Flooded Water Cooled Screw Chiller

Installation, Operation and Maintenance Manual

SCWE-M series

Please keep this manual carefully for future reference
and read it carefully before operation

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Start-up check list for SCWE-M series liquid chillers

Preliminary information

Job name:_____

Location:_____

Installing contractor:_____

Distributor:_____

Unit Model:_____

Compressor

Circuit A

Compressor model:_____

Serial number:_____

Motor model:_____

Circuit B

Compressor model:_____

Serial number:_____

Motor model:_____

Evaporator

Model number:_____

Serial number:_____

Condenser section

Model number:_____

Serial number:_____

Additional optional units and accessories:_____

_____

Preliminary equipment check

Is there any shipping damage?_____ If so, where?_____

Will this damage prevent unit start-up?

■ Unit is level in its installation

■ Power supply agrees with the unit nameplate

■ Electrical circuit wiring has been sized and installed properly

■ Unit ground wire has been connected

■ Electrical circuit protection has been sized and installed properly

■ All terminals are tight

■ All chilled water valves are open

■ All chilled water piping is connected properly

■ All air has been vented from the chilled water circuit

■ Chilled water pump is operating with the correct rotation. Check the phase sequence of the electrical connection.

■ Circulate chilled water in the water circuit for at least two hours, then remove, clean and replace the screen filter. After the pump test has been completed, switch the unit off again.

■ Inlet piping to cooler includes a 25 mesh strainer with a mesh size of 1.2 mm.

Unit start-up

■ Oil level is correct

■ All discharge and liquid valves are open

■ Locate, repair and mark all refrigerant leaks

■ All suction valves are open, if used

■ All oil line valves and economizer valves (if used) are open

■ Checks have been carried out for any possible leaks. Unit has been leak checked (including fittings)

■ on the whole unit

■ at all connections

Locate, repair, and report any refrigerant leaks _____

_____

■ Check voltage imbalance: AB_____ AC_____ BC_____
Average voltage = _____ V
Maximum deviation = _____ V
Voltage imbalance = _____ %

■ Voltage imbalance is less than ± 2%

WARNING: Operation of the chiller with an improper supply voltage or excessive phase imbalance constitutes abuse which will invalidate the Midea warranty. If the phase imbalance exceeds ± 2.5% for voltage, contact your local electricity supply at once and ensure that the chiller is not switched on until corrective measures have been taken.

Check cooler water loop

■ Water loop volume = _____ liters

■ Calculated volume = _____ liters

- ■ Proper loop volume established
- ■ Proper loop corrosion inhibitor included _____ liters of_____
- ■ Proper loop freeze protection included (if required)_____ liters of_____
- ■ Piping includes electric heater tape, if exposed to temperatures below 0°C
- ■ Inlet piping to cooler includes a 25 mesh strainer with a mesh size of 1.2 mm

Check pressure drop across the cooler

- ■ Entering cooler = _____ kPa
- ■ Leaving cooler = _____ kPa
- ■ Leaving - entering = _____ kPa

Warning: Plot cooler pressure drop on performance data table (in product data literature) to determine total liters per second (l/s) and find unit's minimum flow rate.

- ■ Total = _____ l/s
- ■ Nominal kW = _____ l/s
- ■ Total l/s is greater than unit's minimum flow rate
- ■ Total l/s meets job specified requirement of_____ l/s

Warning: Once power is supplied to the unit, check for any alarms.

Note all alarms _____

_____

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1 Introduction

The chillers are designed to cool water for the air conditioning of buildings and industrial processes. Prior to the initial start-up of the chiller, the people involved in the on-site installation, start-up, operation, and maintenance of this unit should be thoroughly familiar with these instructions and the specific project data for the installation site.

The SCWE-M series liquid chillers are designed to provide a very high level of safety during installation, start-up, operation and maintenance. They will provide safe and reliable service when operated within their application range. This manual provides the necessary information to familiarize yourself with the control system before performing start-up procedures. The procedures in this manual are arranged in the sequence required for machine introduction, installation, operation and maintenance. Always ensure that all required safety measures are followed, including those in this document, such as: wearing protective clothing (gloves, shoes) and safety glasses, using appropriate tools, employing qualified and skilled technicians (electricians, refrigeration engineers) and following local regulations.

1.1 Installation safety considerations

1. Access to the unit must be reserved to authorized personnel, qualified and trained in monitoring and maintenance. The access limitation device must be installed by the customer (e.g. cut-off, enclosure). After the unit has been received, when it is ready to be installed or reinstalled, and before it is started up, it must be inspected for damage. Check that the refrigerant circuit(s) is (are) intact, especially that no components or pipes have shifted (e.g. following a shock). If in doubt, carry out a leak tightness check and verify with the manufacturer that the circuit integrity has not been impaired. If damage is detected upon receipt, immediately file a claim with the shipping company. Midea strongly recommends employing a specialized company to unload the machine.

2. It is compulsory to wear personal protection equipment. Do not remove the skid or the packaging until the unit is in its final position. These units can be moved with a fork lift truck, as long as the forks are positioned in the right place and direction on the unit.

3. The units can also be lifted with slings, using only the designated lifting points marked on the unit. Use slings with the correct capacity, and always follow the lifting instructions on the certified drawings supplied with the unit. Safety is only guaranteed, if these instructions are carefully followed. If this is not the case, there is a risk of material deterioration and injuries to personnel. Never cover any safety devices. This applies to the relief valve(s) in the refrigerant circuit(s). Ensure that the valves are correctly installed, before operating the unit.

4. The relief valves are designed and installed to ensure protection against overpressure caused by fire. The relief valve must only be removed if the fire risk is fully controlled and after checking that this is allowed by local regulations and authorities. This is the responsibility of the operator. If the unit is installed in a room, the safety valves must be connected to discharge pipes.

NOTE:

These pipes must be installed in a way that ensures that people and property are not exposed to refrigerant leaks. These fluids may be diffused in the air, but far away from any building air intake, or they must be discharged in a quantity that is appropriate for a suitably absorbing environment. It is recommended to install an indicating

device to show if part of the refrigerant has leaked from the valve. The presence of oil at the outlet orifice is a useful indicator that refrigerant has leaked. Keep this orifice clean to ensure that any leaks are obvious. The calibration of a valve that has leaked is generally lower than its original calibration. The new calibration may affect the operating range. To avoid a nuisance tripping or leaks, replace or re-calibrate the valve. Periodic check the relief valves. Ensure good ventilation, as accumulation of refrigerant in an enclosed space can displace oxygen and cause asphyxiation or explosions. Inhalation of high concentrations of vapour is harmful and may cause heart irregularities, unconsciousness, or death. Vapour is heavier than air and reduces the amount of oxygen available for breathing. These products cause eye and skin irritation. Decomposition products are hazardous.

1.2 Maintenance safety considerations

1.2.1 Engineers safety consideration

1、Engineers working on the electric or refrigeration components must be authorized, trained and fully qualified to do so. All refrigerant circuit repairs must be carried out by a trained person fully qualified to work on these units. He must have been trained and be familiar with the equipment and the installation. All welding operations must be carried out by qualified specialists.

2、The insulation must be removed and heat generation must be limited by using a wet cloth. Any manipulation (opening or closing) of a shut-off valve must be carried out by a qualified and authorized engineer. These procedures must be carried out with the unit shut-down.

NOTE: During any handling, maintenance and service operations the engineers working on the unit must be equipped with safety gloves, glasses, shoes and protective clothing.

1、Never work on a unit that is still energized.

2、Never work on any of the electrical components, until the general power supply to the unit has been cut using the disconnect switch in the control box.

3、If any maintenance operations are carried out on the unit, lock the power supply circuit ahead of the machine.

4、If the work is interrupted, always ensure that all circuits are still deenergized before resuming the work.

ATTENTION: Even if the unit has been switched off, the power circuit remains energized, unless the unit or circuit disconnect switch is open. Refer to the wiring diagram for further details. Attach appropriate safety labels.

1.2.2 Operating checks:

Important information regarding the refrigerant used:

■ Refrigerant type: R134a

■ Periodic inspections for refrigerant leaks may be required depending on local legislation. Please contact your local dealer for more information.

■ During the life-time of the system, inspection and tests must be carried out in accordance with national regulations.

1.2.3 Safety device checks:

■ The safety devices and external overpressure devices (safety valves) must be checked on site regularly.

■ At least once a year thoroughly inspect the protection devices (valves). If the machine operates in regularly carry out leak tests and immediately repair any leaks.

■ Ensure regularly that the vibration levels remain acceptable and close to those at the initial unit start-up. Before opening a refrigerant circuit, purge and consult the pressure gauges.

■ Change the refrigerant when there are equipment failures, following related regulations or carry out a refrigerant analysis in a specialist laboratory.

■ If the refrigerant circuit remains open for longer than a day after an intervention (such as a component replacement), the openings must be plugged and the circuit must be charged with nitrogen (inertia principle). The objective is to prevent penetration of atmospheric humidity and the resulting corrosion on the internal walls and on non-protected steel surfaces.

1.3 Repair safety considerations

Note: It is compulsory to wear personal protection equipment. The insulation must be removed and warming up must be limited by using a wet cloth. Before opening the unit always ensure that the circuit has been purged.

■ All installation parts must be maintained by qualified and skilled technicians, in order to avoid material deterioration and injuries to people. Faults and leaks must be repaired immediately. The authorized technician must have the responsibility to repair the fault immediately. Each time repairs have been carried out to the unit, the operation of the safety devices must be re-checked.

■ Comply with the regulations and recommendations in unit and installation safety standards. If a leak occurs or if the refrigerant becomes contaminated (e.g. by a short circuit in a motor) remove the complete charge using a recovery unit and store the refrigerant in mobile containers.

■ Repair the leak detected and recharge the circuit with the total R134a charge, as indicated on the unit name plate. Certain parts of the circuit can be isolated. Only charge liquid refrigerant R134a at the liquid line. Ensure that you are using the correct refrigerant type before recharging the unit. Charging any refrigerant other than the original charge type (R134a) will impair machine operation and can even lead to a destruction of the compressors. The compressors operating with this refrigerant type are lubricated with synthetic oil.

■ Do not use oxygen to purge lines or to pressurize a machine for any purpose. Oxygen gas reacts violently with oil, grease, and other common substances.

■ Never exceed the specified maximum operating pressures. Verify the allowable maximum high- and low-side test pressures by checking the instructions in this manual and the pressures given on the unit name plate.

■ Do not use air for leak testing. Use only refrigerant or dry nitrogen.

■ Do not unweld or flamecut the refrigerant lines or any refrigerant circuit component until all refrigerant (liquid and vapour) has been removed from chiller. Traces of vapour should be displaced with dry air nitrogen. Refrigerant in contact with an open flame produces toxic gases.

■ The necessary protection equipment must be available, and appropriate fire extinguishers for the system and the refrigerant type used must be within easy reach.

■ Do not siphon refrigerant. Avoid spilling liquid refrigerant on skin or splashing it into the eyes. Use safety goggles. Wash any spills from the skin with soap and water. If liquid refrigerant enters the eyes, immediately and abundantly flush the eyes with water and consult a doctor.

■ Never apply an open flame or live steam to a refrigerant container. Dangerous overpressure can result. If it is necessary to heat refrigerant, use only warm water.

■ During refrigerant removal and storage operations follow applicable regulations. These regulations, permitting conditioning and recovery of halogenated hydrocarbons under optimum quality conditions for the products and optimum safety conditions for people, property and the environment.

■ Any refrigerant transfer and recovery operations must be carried out using a transfer unit. The units must never be modified to add refrigerant and oil charging, removal and purging devices. All these devices are provided with the units. Please refer to the certified dimensional drawings for the units.

■ Do not re-use disposable (non-returnable) cylinders or attempt to refill them. It is dangerous and illegal. When cylinders are empty, evacuate the remaining gas pressure, and move the cylinders to a place designated for their recovery. Do not incinerate.

■ Do not attempt to remove refrigerant circuit components or fittings, while the machine is under pressure or while it is running. Be sure pressure is at 0 kPa before removing components or opening a circuit.

■ Do not attempt to repair or recondition any safety devices when corrosion or build-up of foreign material (rust, dirt, scale, etc.) is found within the valve body or mechanism.

■ If necessary, replace the device. Do not install safety valves in series or backwards.

ATTENTION:

No part of the unit must be used as a walkway, rack or support. Periodically check and repair or if necessary replace any component or piping that shows signs of damage. The refrigerant lines can break under the weight and release refrigerant, causing personal injury. Do not climb on a machine. Use a platform, or staging to work at higher levels.

■ Use mechanical lifting equipment (crane, hoist, winch, etc.) to lift or move heavy components. For lighter components, use lifting equipment when there is a risk of slipping or losing your balance.

■ Use only original replacement parts for any repair or component replacement.

■ Do not drain water circuits containing industrial brines, without informing the technical service department at the installation site or a competent body first.

■ Close the entering and leaving water shut off valves and purge the unit water circuit, before working on the components installed on the circuit (screen filter, pump, water flow switch, etc.).

■ Do not close the water box bolts until the water boxes have been completely drained.

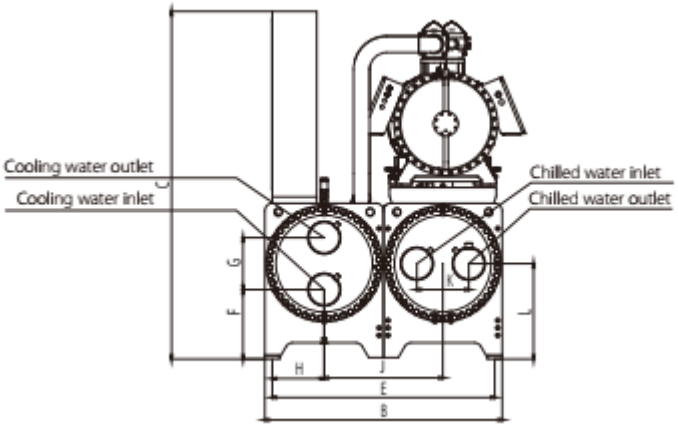
■ Periodically inspect all valves, fittings and pipes of the refrigerant and hydronic circuits to ensure that they do not show any corrosion or any signs of leaks.

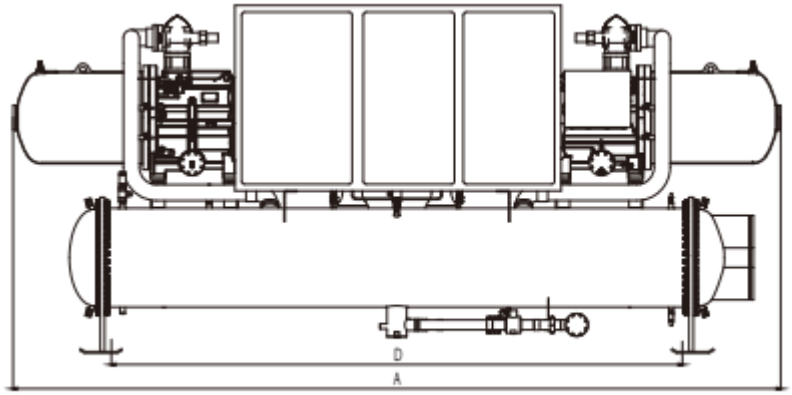
■ It is recommended to wear ear defenders, when working near the unit and the unit is in operation.

■ Before start-up, to the bolts of evaporator and condenser, please tighten the bolts up again.

2 Structure

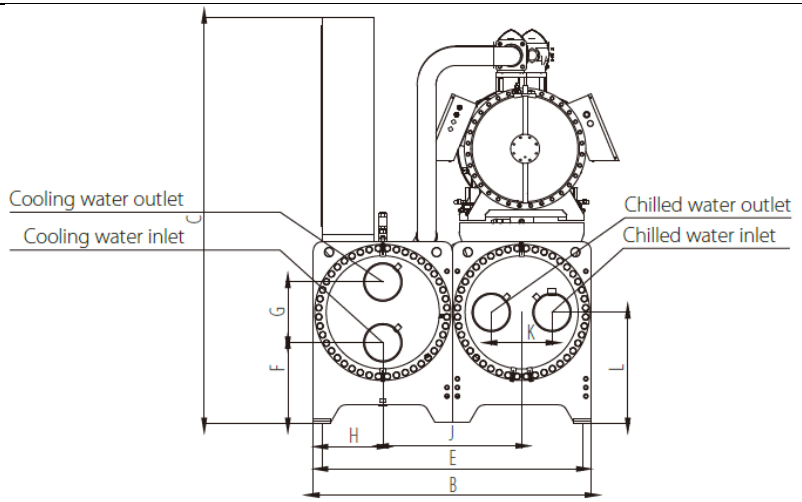
Single compressor unit

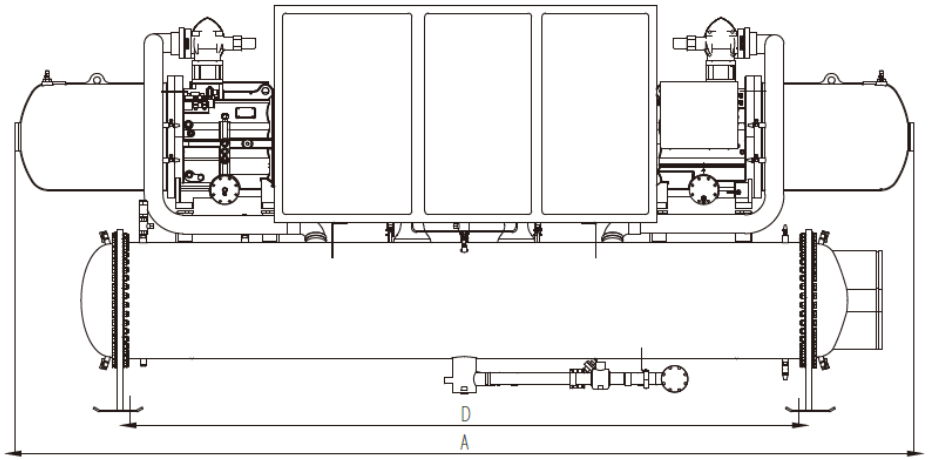




Model	A	B	C	D	E	F	G	H	J	K	L	Water Inlet/Outlet
SCWE100M	2713	1200	1796	2050	1100	381	260	300	600	260	381	DN150
SCWE130M	2713	1200	1809	2050	1100	381	260	300	600	260	381	DN150
SCWE150M	2713	1200	1809	2050	1100	381	260	300	600	260	381	DN150
SCWE180M	2713	1200	1986	2050	1100	381	260	300	600	260	381	DN150
SCWE200M	2738	1400	1946	2050	1300	411	300	300	700	260	431	DN150/DN200
SCWE230M	2970	1400	2093	2050	1300	411	300	300	700	411	300	DN200
SCWE250M	2970	1400	2093	2050	1300	411	300	300	700	411	300	DN200
SCWE300M	3265	1500	2256	2050	1400	413	300	325	750	350	413	DN200

Dual compressors unit

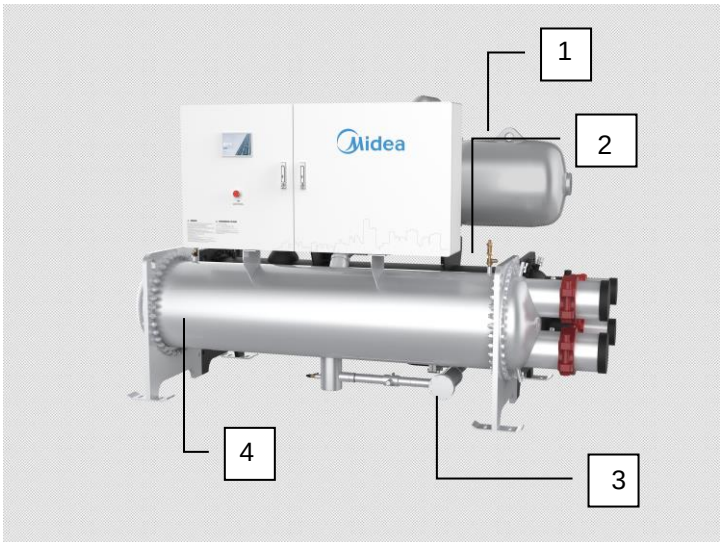




Model	A	B	C	D	E	F	G	H	J	K	L	Water Inlet/Outlet
SCWE340M	4650	1500	2290	3850	1400	413	300	325	750	350	588	DN200
SCWE370M	4650	1500	2290	3850	1400	443	350	325	750	350	588	DN200
SCWE400M	4650	1500	2290	3850	1400	443	350	325	750	350	588	DN200
SCWE460M	4650	1600	2390	3850	1500	436	350	350	800	350	611	DN200
SCWE510M	5180	1600	2390	3850	1500	436	350	350	800	350	611	DN200
SCWE600M	5950	2000	2550	3780	1800	498	470	400	1000	400	733	DN250

3 Major System Components

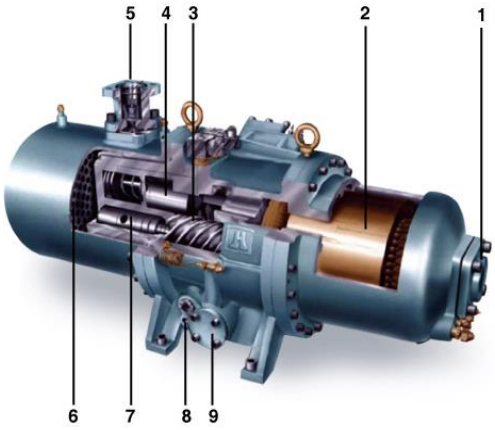
3.1 Major components of the unit



No.	Name
1	Compressor
2	Evaporator
3	Expansion valve
4	Condenser

3.2 Compressor

Advanced twin screw compressor



1. Suction Port
2. Motor
3. Screw
4. Modulation Slide Valve
5. Discharge Port
6. Oil Separator
7. Discharge Bearing
8. Oil Heater
9. Oil Filter

■ Midea screw chiller equipped with the 3rd generation industrial compressor that has the latest advanced 5-6 Asymmetry Dentiform Semi-hermetic Screw Rotors. The rotors are processed by high-precision CNC and each part is well-proportioned and none-gap matching, which minimizes the friction resistance and clearance lost, guarantees quiet running and good duration.

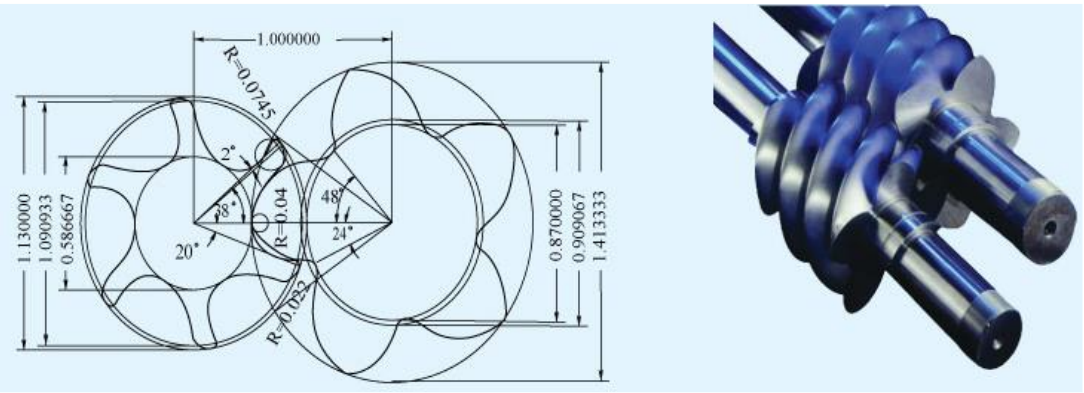
■ SCWE-M Series units are provided with a high efficiency oil separator to maximize oil extraction.

■ Compressors have an infinitely variable control down to 25% of its total capacity. This control is made by means of capacity slides controlled by microprocessors.

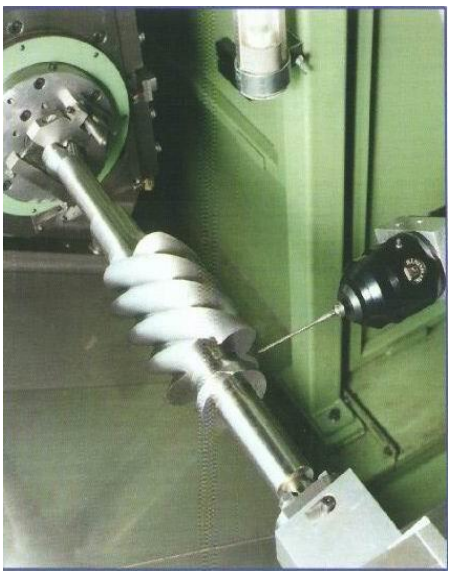
■ Standard starter is star-delta type. Infinitely capacity control type is available (as option).

■ With 5-6 asymmetry dentiform, the screw rotor gained patent by improving the shape of German rotor GHH, proved having good balance, small vibration, and low noise due to balance testing by special machine. Comparing with normal screw rotor with 4-6 dentiform, heat efficiency of the rotor with male and female rotor

adopting 5-6 dentiform increase by 10-12% and energy saves by 25%, the rotor also gained British and American patent.

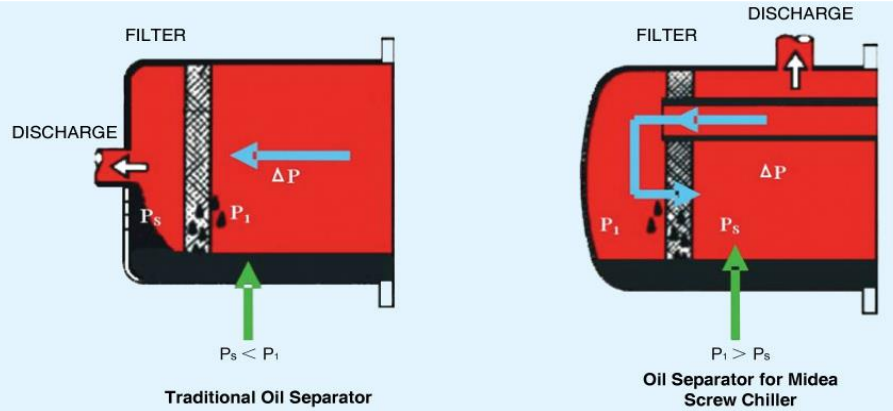


■ The bearing of compressor is from SKF, Sweden, the long lifespan of which ensures screw-type main unit to run continuously more than 50,000 hours.



■ Lubricant:

The lubricant is supplied automatically by pressure difference inside the compressor. It is unnecessary to add an extra lubricant pump.



The compressor is approved for use with the following lubricant:

HBR-B04/BSE170-L for R134a unit

■ The Oil Separator comes from MANN of Germany and has reliable qualification. The oil content can be controlled below 3ppm (the oil content treated by oil-gas separator of common like screw-type air compressor is no less than 8-10ppm). The oil-gas separator amount is double of same kind of other products. The large oil filtering area reduces refrigerant flux speed, and has better separating affect and long lifespan by the secondary reflux technology adopted.

■ Oil filter

The screw compressor has an independent oil filter.

3.3 Pressure vessels

3.3.1 General

Monitoring during operation, re-qualification, re-testing and re-testing dispensation:

■ Follow the regulations on monitoring pressurized equipment.

■ It is normally required that the user or operator sets up and maintains a monitoring and maintenance file.

■ Follow the control programs.

■ If they exist follow local professional recommendations.

■ Regularly inspect the condition of the coating (paint) to detect blistering resulting from corrosion. To do this, check a non-insulated section of the container or the rust formation at the insulation joints.

■ Regularly check for possible presence of impurities (e.g. silicon grains) in the heat exchange fluids. These impurities maybe the cause of the wear or corrosion by puncture

■ Filter the heat exchange fluid check and carry out internal inspections as described in EN 378-2, annex C.

■ In case of re-testing please refer to the maximum operating pressure given on the unit nameplate.

■ The reports of periodical checks by the user or operator must be included in the supervision and maintenance file.

3.3.2 Repair

Any repair or modification, including the replacement of moving parts:

■ Must follow local regulations and be made by qualified operators and in accordance with qualified procedures, including changing the heat exchanger tubes.

■ Must be made in accordance with the instructions of the original manufacturer. Repair and modification that necessitate permanent assembly (soldering, welding, expanding etc.) must be made using the correct procedures and by qualified operators.

■ An indication of any modification or repair must be shown in the monitoring and maintenance file.

3.3.3 Corrosion allowances:

Gas side: 0 mm

Heat exchange fluid side: 1 mm for tubular plates in lightly alloyed steels, 0 mm for stainless steel plates or plates with copper-nickel or stainless steel protection.

3.3.4 Operating life

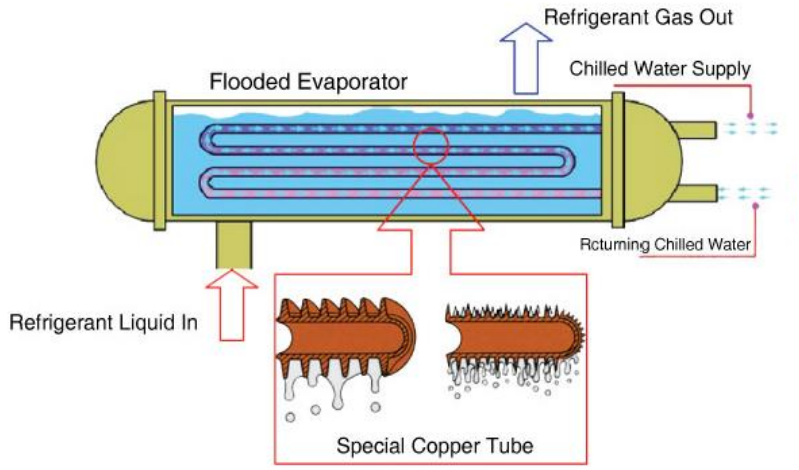
The evaporator and condenser are designed for: prolonged usage of 20 years for high-quality materials.

3.3.5 Security

The unit is equipped with safety valves. And ball valve is connecting safety valve to condenser (evaporator). The ball valve maintain full-state, it is closed only when safety valve is opening or replaced.

Ball valve can protect life and property because it can prevent refrigerant from flowing into the air when safety valve is opening or replaced.

3.3.6 Evaporator



Flooded shell-and-tube evaporator operates with refrigerant in shell and water in tubes. Replaceable water tubes are fabricated from integral finned cooper and mechanically bonded to steel tube sheets. The evaporator is GB151-1999 (Chinese standard) designed, constructed, inspected and stamped. Water side working pressure is designed for 1.0Mpa. Shell and non-connection water head are insulated with 3/4” thick closed cell insulation.

3.3.7 Condenser

Shell and tube operates with refrigerant in shell and water in tubes. Replaceable water tubes are fabricated from integral finned cooper and mechanically bonded to steel tube sheets. The condenser is GB151-1999 (Chinese Standard) designed, constructed, inspected and stamped. Water side working pressure is designed for 1.0MPa.

The condenser is used high-efficient tubes to enhance its transfer performance. Meanwhile, the system's COP can be increased largely by adding the subcooler.

3.3.8 Oil separator

The oil separator with unique structure separate oil from refrigerant high-efficiently. It is solve the oil recycle problem by ensure oil return to compressor normally.

3.4 Throttle parts

The unit achieves high-efficiency when full load and part load by parallel connecting orifice and EXV.

4 System Diagrams

4.1 Principle

The chiller operating principle is: Increase the pressure and temperature of refrigerant vapor by compressor, then process it with condensing, throttling procedures to turn it into refrigerant liquid of low pressure and temperature; with its evaporation into vapor in the evaporator, it absorbs heat from the surrounding environment (refrigerant medium, such as chilled water) to cool down the temperature of refrigerant medium, thus achieving the goal of artificial refrigeration. Evidently, the cycle of vapor-compress refrigeration includes four indispensable processes: compressing, condensing, throttling and evaporating. The following is the principle in details.

Compressing: After the refrigerant vapor in the evaporator has been aspirated by the screw compressor, the motor will impose energy to the vapor through compressor rotor, increasing its pressure and forcing it into the condenser; meanwhile, the temperature of refrigerant vapor increases accordingly at the end of compressing process.

Condensing: The high pressure and high temperature refrigerant vapor, which just come out from compressor, will exchange its heat to cooling water that inside the copper pipe of condenser, through which its temperature will go down. Meanwhile, it will condense to liquid under saturation pressure (the corresponding condensing pressure to condensing temperature). At this point, the temperature of cooling water will increase as it absorbs heat from the refrigerant vapor. The condensing temperature (pressure) is immediately relating to the temperature of cooling water.

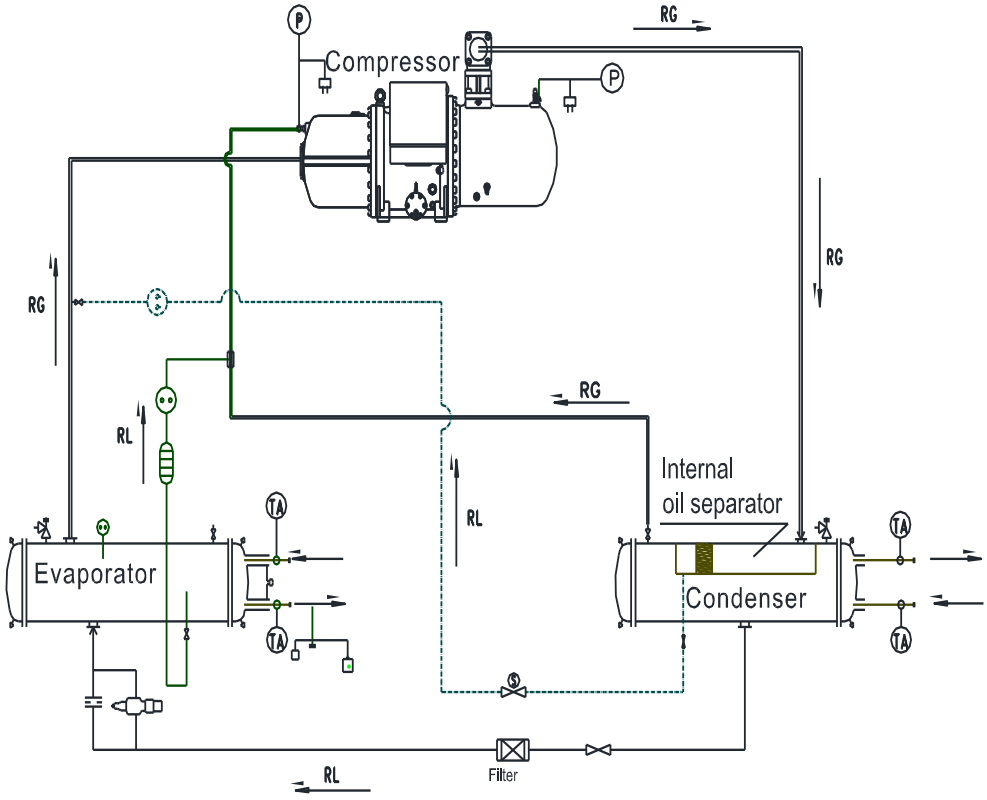
Throttling: The refrigerant liquid of high temperature and pressure from the bottom of the condenser will have decompression and expansion while passing the expenditure orifice. As the pressure and temperature both decrease, it will enter the evaporator as liquid of low pressure and temperature.

Evaporating: The refrigerant liquid of low pressure and temperature will absorb heat from refrigerant medium (such as chilled water) in the evaporator and evaporate into vapor. It cools down the temperature of refrigerant medium to realize the goal of artificial refrigerating.

The refrigerant vapor in the evaporator will be aspirated and compressed by the compressor once again, repeating the four processes mentioned above. Continuous refrigerating is then realized in such a circulating process.

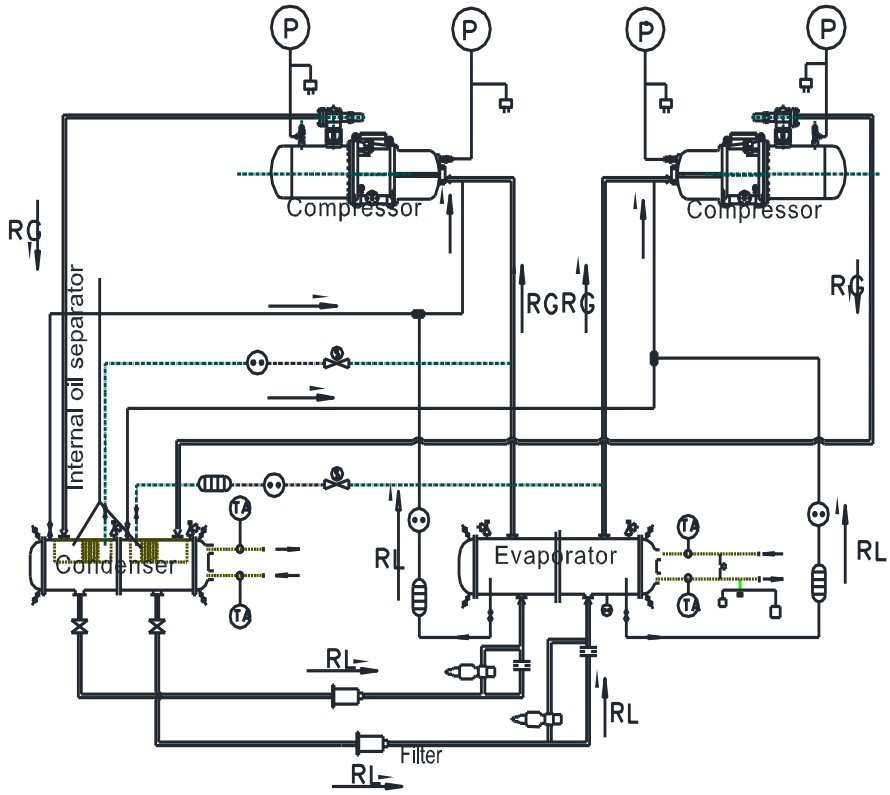
4.2 Single compressor unit

Code	Name
P	Pressure Gauge
TA	Temperature Sensor
	Sight glass
	Filter
S	Solenoid Valve
	Safety Valve
	Check Valve
	Shut-off Valve
RG RG	Refrigerant Gas Line
RL RL	Refrigerant Liquid Line
O	Oil way
W	Water way
	Throttle plate
	High/Low Pressure Switch
	Electric expansion valve
	Venturi Tube
	Pressure Difference Switch



4.3 Dual compressor unit

Code	Name
P	Pressure Gauge
TA	Temperature Sensor
	Sight glass
	Filter
S	Solenoid Valve
	Safety Valve
	Check Valve
	Shut-off Valve
RG RG	Refrigerant Gas Line
RL RL	Refrigerant Liquid Line
O	Oil way
W	Water way
	Throttle plate
	High/Low Pressure Switch
	Electric expansion valve
	Venturi Tube
	Pressure Difference Switch



5 Application Data

5.1 Operating limits

Cooler	Minimum	Maximum
Entering temperature at start-up	8°C	25°C
Leaving temperature during operation	5°C	15°C
Entering/leaving temperature difference at full load	3.8°C	8°C

Condenser	Minimum	Maximum
Entering temperature at start-up	19°C	35°C
Leaving temperature during operation	22°C	42°C
Entering/leaving temperature difference at full load	3.8°C	8°C

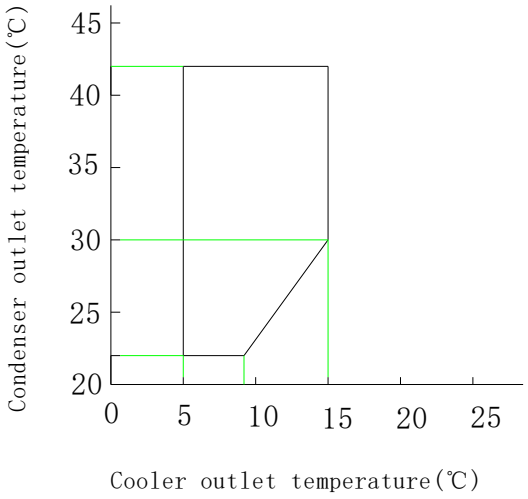
Note:

1. For low-temperature applications, where the leaving water temperature is below 4°C, freeze protection switch will work unit stop.

2. If the temperature leaving the condenser is below 19°C, the unit will stop and warning.

3. Ambient temperatures: During storage and transport of the SCWE-M units. Including by container) the minimum and maximum permissible temperatures is -20°C ~ 46°C (R134a).

Changes water temperature curve in the operation



5.2 Cooler and condenser water flow rates

R134a

Model	Cooler water flow rate m^3/h		Condenser water flow rate m^3/h	
	Minimum	Maximum	Minimum	Maximum
SCWE100M	29	64	37	80
SCWE130M	38	83	47	104
SCWE150M	47	102	58	128
SCWE180M	55	120	68	150
SCWE200M	62	136	77	170
SCWE230M	69	152	87	190
SCWE250M	77	168	96	211
SCWE300M	91	200	113	250
SCWE340M	103	227	129	284
SCWE370M	119	246	140	308
SCWE400M	121	267	152	334
SCWE460M	140	307	174	383
SCWE510M	153	337	192	421
SCWE600M	181	397	226	497

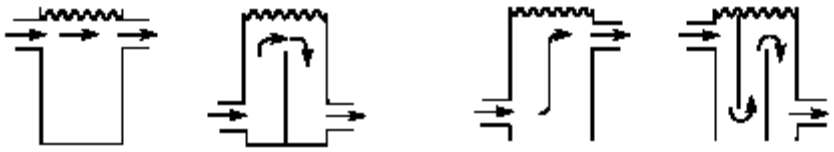
5.3 Variable flow evaporator

Variable evaporator flow can be used. The controlled flow rate must be higher than the minimum flow given in the table of permissible flow rates and must not vary by more than 10% per minute.

5.4 System minimum water volume

Water volume is necessary for stable operation. It is often necessary to add a buffer water tank to the circuit in order to achieve the required volume. The tank must itself be internally baffled in order to ensure proper mixing of the liquid (water or brine). Water tank volume is large than 1 / 10 whole system water volume at least.

Refer to the examples below.



Poor Good Poor Good

6 Physical and Electrical Data

6.1 Physical data

R134a

Unit model	Cooling (kW)	Input(kW)	COP(W/W)	Refrigerant charge (kg)
SCWE100M	337. 0	59. 75	5. 64	100
SCWE130M	436. 3	76. 68	5. 69	110
SCWE150M	535. 3	93. 61	5. 71	140
SCWE180M	627. 7	109. 9	5. 71	140
SCWE200M	714. 1	126. 9	5. 62	150
SCWE230M	798. 6	142. 3	5. 61	160
SCWE250M	882. 7	154. 3	5. 72	170
SCWE300M	1047	185. 8	5. 63	245
SCWE340M	1190	205. 3	5. 79	330
SCWE370M	1289	221. 7	5. 81	330
SCWE400M	1397	240. 8	5. 80	340
SCWE460M	1606	278. 6	5. 79	400
SCWE510M	1765	304. 9	5. 78	400
SCWE600M	2080	360. 9	5. 76	520

Note:

(1) Standardized conditions:

Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft2-°F/Btu (0.0176m2. °C/kW); Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft2-°F/Btu (0.0440m2. °C/kW).

(2) Weights are guidelines only.

(3) It is strongly recommended that all compressor oil get replaced in 2-3 years after unit putting into operation, old oil should be drained out before charging the new oil. Anti-leakage seal should be replaced into new one during unit annually maintenance.

6.2 Electrical data notes

The control box includes the following standard features:

- Protection devices for each compressor.
- Control devices.
- DC 24V remote start/stop control function. (Install by customer).

■ Collect and display water temperature and protections information.

■ Control panel and start panel designed together, in the middle separated by clapboard.

Field connections note:

(1) All connections to the system and the electrical installations must be in full accordance with all applicable codes.

(2) The Midea chillers are designed and built to ensure conformance with local codes.

Indoor installation requirement:

■ Ambient temperature range: 5~42℃

Altitude: lower than or equal to 2000 m.

■ The neutral (N) line must not be connected directly to the unit (if necessary, please use a transformer).

■ Over current protection of the power supply conductors is not provided with the unit.

NOTE: If particular aspects of an actual installation do not conform to the conditions described above, or if there are other conditions which should be considered, always contact local Midea representative.

6.3 Compressor electrical data

R134a

Model	Max running current (A)	Compressor start current (A)	Recommend breaker current(A)
SCWE100M	154.6	315.0	250
SCWE130M	208.0	415.0	250
SCWE150M	235.0	479.0	250
SCWE180M	260.0	506.0	400
SCWE200M	301.0	650.0	400
SCWE230M	369.0	845.0	400
SCWE250M	382.8	753.3	400
SCWE300M	396.8	888.3	630
SCWE340M	235.0/301.0	479/650	630
SCWE370M	235.0/301.0	479/650	630
SCWE400M	301.0/301.0	650/650	630
SCWE460M	369.0/369.0	845/845	800
SCWE510M	382.8/382.8	753.3/753.3	800
SCWE600M	396.8/396.8	888.3/888.3	1000

6.4 Control system

6.4.1 Power and control panel

All controls and motor starting equipment necessary for unit operation are factory wired and function tested. The control panel is divided into a power section and a control section. Power and control section have separate hinged, latched and gasket sealed doors. The power panel is a single power connection. Each power compartment contains compressor starting contactors, control circuit serving compressor capacity control, compressor contractor coils and compressor motor overloads. The compressor motor overloads contain current transformers as an input to the microprocessor. Compressor power supply protection modular protects high

input voltage, low input voltage, phase reversal and lack of phase.

The control section contains touch screen and microprocessor board.

6.4.2 Controller

Micro-computer control device is installed as standard on all the units; it can be used to alter unit set points and control commands.

Touch screen has ultra-high reliability, expedite operation and directly display. Modularized structure is very easy to maintenance.

Microprocessor device protects critical components in response to external signals from its system sensors measuring: motor temperatures, refrigerant gas and oil pressures, electrical supply and cooler

6.4.3 Control section-main feature

Management of the compressor capacity slide is according to the distributed multiprocessor logic system.

Four routine operations at condition of:

- Thermal overload
- High cooler enter water temperature (start-up)
- Display of cooler entering/leaving water temperature
- Display condensing-cooling temperature and pressure.
- Leaving water temperature regulation (also available entering water regulation)
- Compressors and cooler/condenser pumps hour counter
- Display of status safety devices
- Excellent management of compressors load

6.4.4 Safety for each refrigerant circuit feature:

- High pressure (pressure switch)
- Low pressure (pressure switch)
- Oil differential pressure switch
- Compressor thermal
- High discharge temperature on the compressor
- Phase monitor
- Star/Delta transition failed
- Low Delta pressure between suction and discharge

6.4.5 System Security features:

- A serious alarm input (stops the unit)
- A flow controller input (stops the unit)
- A pump thermal input (stops the unit)
- Remote on/off input without alarm signaling
- Control section-main feature
- Management of the compressor capacity based on load requirement and unit safety parameters:
- Display of cooler and condenser entering/leaving water temperature
- Display of cooler/condensing pressure
- Leaving water cooled temperature regulation

■ Display of status safety devices

6.4.6 Convenient control

■ Automatic microcomputer control.

Because adopt control, peripheral equipment and unit carry out automatic control, the user simply start / stop.

■ Large touch screen.

■ Protection

Various of unit protective measure make sure the unit safe and reliable operation, fault information display to facilitate maintenance person to diagnosis and repair.

Main control and protection

Control item	Protection item
Chilled water pressure difference control	Low chilled water flow protection
Cooling inlet water control	Low cooling water flow protection
Chilled water pump control	Anti-free protection
Cooling water tower control	High voltage protection
Fan of cooling water tower control	Low voltage protection
Remote start/stop control	Motor integrated protection
Locate start/stop control	Low oil level protection
Re-start delay control	Motor overload protection
Oil return control	Over/under voltage protection
liquid path by-pass valve control	Temperature Sensor error
Four energy level automatic control	Unit stop for low outlet chilled water temperature

■ Graph. User can know unit running smoothly through the graph.

■ Long data retention. Long data retention convenient for user management and know the unit running very well.

■ Remote monitor function. Reserved standard RS485 communication interface, connect position machine directly.

7 Preliminary Checks

7.1 Check equipment received

1、Inspect the unit for damage or missing parts. If damage is detected, or if shipment is incomplete, immediately file a claim with the shipping company.

2、Confirm that the unit received is the one ordered. Compare the name plate data with the order.

3、The unit name plate must include the following information:

- Version number
- Model number
- Serial number
- Year date of manufacture
- Refrigerant used
- Refrigerant charge
- Voltage, frequency, number of phases
- Unit dimension
- Unit net weight

4、For the condenser and cooler, please check the follow information in the name plate

- Model number
- Design pressure
- Test pressure
- Maximum operation pressure
- Design temperature
- Year date of manufacture

5、Confirm that all accessories ordered for on-site installation have been delivered, and are complete and undamaged.

Note: The unit must be checked periodically during its whole operating life to ensure that no shocks (handling accessories, tools etc.) have damaged it. If necessary, the damaged parts must be repaired or replaced.

7.2 Moving and siting the unit

7.2.1 Moving See chapter 1.1 “Installation safety considerations”.

7.2.2 Siting the unit

Always refer to the chapter “Structure” to confirm that there is adequate space for all connections and service operations. For the centre of gravity coordinates and the position of the unit mounting holes, refer to the certified dimensional drawing supplied with the unit. Typical applications of these units are in refrigeration systems, and they do not require earthquake resistance. Earthquake resistance has not been verified.

If the unit is ordered with the vibration damper kit, please observe the safety and installation notices in the kit installation instructions.

CAUTION: Only use slings at the designated lifting points which are marked on the unit.

Before sitting the unit checks that:

1、The permitted loading at the site is adequate or that appropriate strengthening measures have been taken.

2、The unit is installed level on an even surface (maximum tolerance is 5 mm in both axes).

3、There is adequate space above the unit for air flow and to ensure access to the components.

4、The number of support points is adequate and that they are in the right places.

5、The location is not subject to flooding.

CAUTION: Lift and set down the unit with great care. Tilting and jarring can damage the unit and impair unit operation. If the units are hoisted with rigging, use struts or a spreader bar to spread the slings above the unit. Do not tilt a unit more than 15°.

7.3 Checks before system start-up

Before the start-up of the refrigeration system, the complete installation, including the refrigeration system must be verified against the installation drawings, dimensional drawings, system piping and instrumentation diagrams and the wiring diagrams. During the installation test national regulations must be followed.

External visual installation checks:

■ Compare the complete installation with the refrigeration system and power circuit diagrams.

■ Check that all components comply with the design specifications.

■ Check that all safety documents and equipment that are required by current national regulations are present.

■ Verify that all safety and environmental protection devices and arrangements are in place.

■ Verify that all relevant documents for pressure vessels (certificates, name plates, files, instruction manuals etc.) required by the current national regulations are present.

■ Verify the free passage of access and safety routes.

■ Check that ventilation in the plant room is adequate.

■ Check that refrigerant detectors are present.

■ Verify the instructions and directives to prevent the deliberate removal of refrigerant gases that are harmful to the environment.

■ Verify the installation of connections.

■ Verify the supports and fixing elements (materials, routing and connection).

■ Verify the quality of welds and other joints.

■ Check the protection against mechanical damage.

■ Check the protection against heat.

■ Check the protection of moving parts.

■ Verify the accessibility for maintenance or repair and to check the piping.

■ Verify the status of the valves.

Verify the quality of the thermal insulation and the vapour barriers.

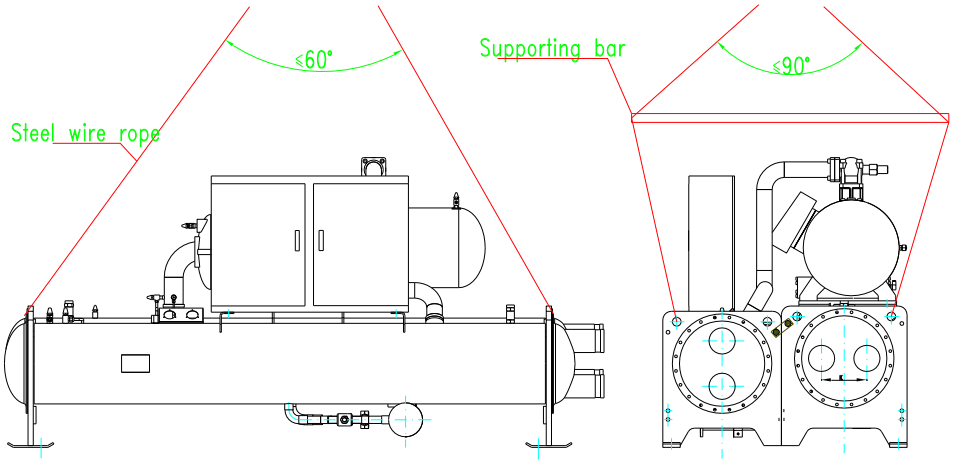
8 Installation

8.1 Notes

■ Be sure that the package will be transported safely, protect it from impacting.

■ When transporting the module with rolling bars, it is recommended to use bars under the module, each one should be a bit longer than the width of basement to keep the module in balance.

■ Sling the unit with steel wire or W-shaped flat band, be sure that the wire could bear the weight 3 times heavier than that of the module, and check whether it hooks to unit tightly. The rings on the compressor are only using for hosting compressor. If steel wire is used, the contact part between it and the unit should be fitted with a cushion to avoid the refrigerant pipe, insulation material or distribution box from being damaged. The steel wire should be round onto the hook to avoid sliding which may cause danger. Please refer to the diagram below:



Any person is not allowed to stand below the unit when sling it.

Warning!

1. Considering high gravity center of unit (especially for single compressor superpose unit), to avoid unit fall down during lifting work on job site, Midea company strongly recommend take some actions to ensure safe and smooth lifting, for example, attach the discharge line of unit and lifting hook of equipment with wire rope or other anti-rotation strap to avoid unit fall aside.

2. Level the unit to but not more than 1/4(6.35mm) across width and length during lifting.

3. Midea company would not answer for any unit damage or human being hurt caused by improper unit lifting work!

8.2 Required installation place

Ensure there is sufficient space for the maintenance:

Model	S/mm	T/mm	Z/mm	Y/mm
SCWE100M-SCWE300M	600	600	3200	1000
SCWE340M-SCWE600M	600	600	4200	1000

Z: Tube removal space for either end.

■ Place without the interference of sunlight other kind of heat source.

■ Place close to electrical source for wiring.

■ Place with solid basement preventing causing resonance and noise.

■ Clean, bright and well ventilated place.

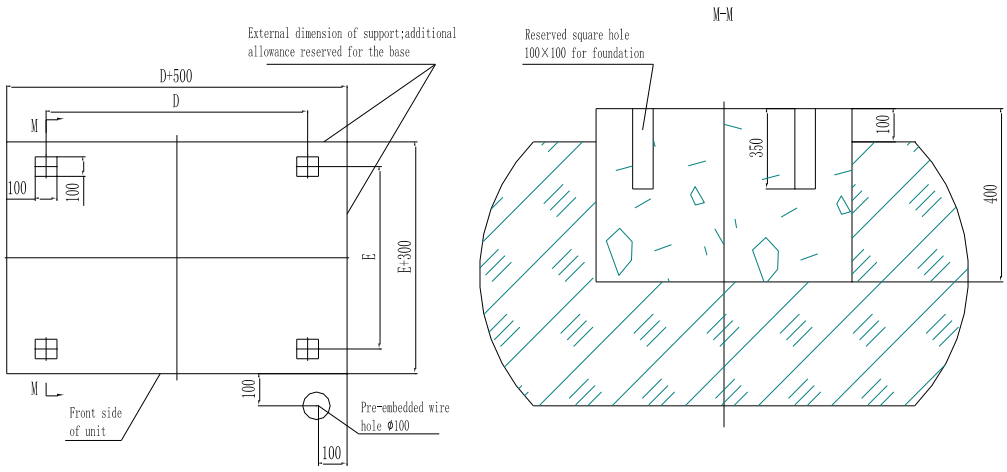
■ Place where it is convenient for piping and water drainage with the least influence to surroundings caused by noise, cool or heat wind.

8.3 Installation Basement

■ Before installation, structure and prefabrication of the basement should be seriously paid attention to, when installing on the top floor or middle, the floor intensity and noise prevention should be considered, it is preferable to communicate with building designer before installation.

■ The drainage channel must be made around the basement which ensures the water can be drowning out fluently. In order to avoid the vibration and noise caused by module, a pad for reducing vibration must be set between the module and the basement, moreover, the unit should be installed on the plane, and a shockproof basement can be adopted if it is necessary.

■ The installation basement for the unit (just for reference) is shown as follows:



8.3.1 R134a type

For single/Dual compressor unit

8. 3. 2 Level the basement to ensure not more than 5 mm unit incline after installation.

8. 3. 3 Absorber (isolation pad or vibration isolator) should be installed to eliminate the vibration and reduce the sound level during unit operation, absorber could also prevent vibration introduced into building.

8. 3. 4 Absorber should be made of high quality rubber with high elasticity to resist and buffer operating weight. Please refer to figure as shown below to correctly install the absorber.

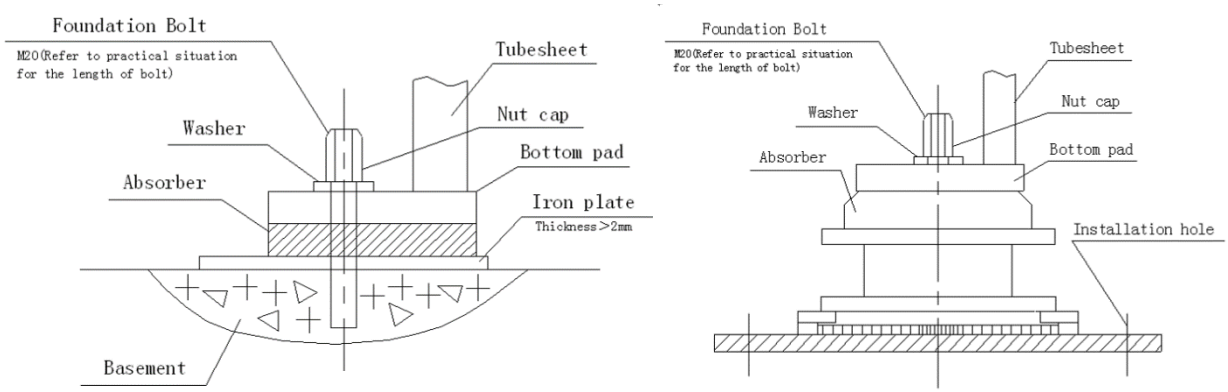


Chart 1 **Chart 2**

Figure: Fixation of unit with absorber:

Note:

1. For chart 1, please reserve the installation holes for foundation bolt on the basement according to installation basement diagram.

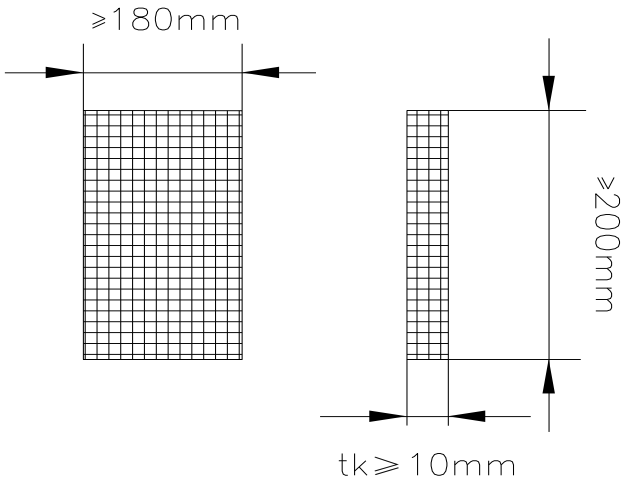
2. For chart 2, reserve the holes for the installation of absorber on the basement.

8.4 Absorbers

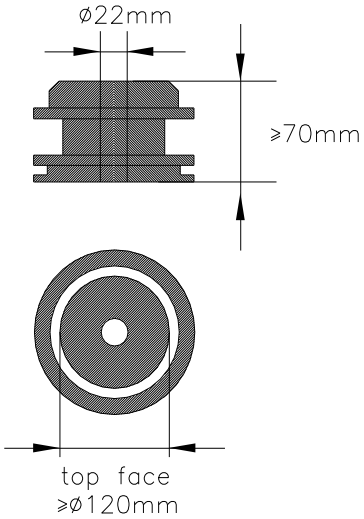
8.4.1 Put the absorbers under unit saddles before final positioned the unit.

The quantity of absorber used for each unit is always decided by the elasticity or durometer value of the absorber. Below please refer to the typical isolation pad and vibration isolator for selection.

Typical isolation pad



Typical vibration Isolator



8.4.2 Expected load bearing value listed below.

Model	Isolation pad		Vibration Isolator	
	Minimum load bearing (kg/EA)	Minimum Quantity	Minimum load bearing (kg/EA)	Quantity
SCWE100M	900	4	900	4
SCWE130M	1000	4	1000	4
SCWE150M	1200	4	1200	4
SCWE180M	1400	4	1400	4
SCWE200M	1400	4	1400	4
SCWE230M	1800	4	1800	4
SCWE250M	1800	4	1800	4
SCWE300M	2000	4	2000	4
SCWE340M	2200	4	2200	4
SCWE370M	2200	4	2200	4
SCWE400M	2200	4	2200	4
SCWE460M	2200	4	2200	4
SCWE510M	2200	4	2200	4
SCWE600M	4000	4	4000	4

Note:

1. Pads have to extend the full length of the saddle when isolation pad be used.
2. Level the unit to within 5mm over through its length and width after absorbers installed.

9 Water Connections

For size and position of the heat exchanger water inlet and outlet connections refer to the certified dimensional drawings supplied with the unit. The water pipes must not transmit any radial or axial force to the heat exchangers or any vibration. The water supply must be analyzed and appropriate filtering, treatment, control devices, isolation to prevent corrosion, fouling and deterioration of the pump fittings. Consult either a water treatment specialist or appropriate literature on the subject.

9.1 Operating precautions

The water circuit should be designed to have the least number of elbows and horizontal pipe runs at different levels.

Below the main points to be checked for the connection:

■ Comply with the water inlet and outlet connections shown on the unit.

■ Units bleed valves shall be proper insulation to avoid the cold loss and condensation generation.

■ In order to ensure cooler, condenser, and piping systems have adequacy water, outlet water side of cooler and condenser should installed flow switch and control with compressor chained, avoid some faults lead to high pressure protection as interior water freeing, low pressure side pressure too low, system oil return ineffective, condenser over pressure and so on.

■ Unit adopt closed-loop water system in order to buffer the impact of water piping caused by due water volume change by expansion or contraction or supply water pressure. Install expansion water tank on the unit return water location. Water level for expansion tank should be 1 meter higher than system water the highest point.

■ The unit chilled water pump should be installed in the entrance side of the cooler.

■ In order to avoid water systems filled with air, resulting in air trapping, so the water piping shall be equipped auto-exhaust valve at the highest point of piping same area. The horizontal pipe max to 1/250 inclination degree in the construction. Water system piping shall be rust must be removed, clean and free from welding slag prior to installation. Unit maintains cleanliness before put into operation.

■ Please install shock-proof hose on the entrances of water piping to reduce body vibration transmitted to the indoor plumbing.

■ The body thermometers and pressure gauges have been installed on the unit import and export place, to inspection ordinary operation.

■ When Chiller operation, cooler water or ice-free liquid must be kept at the minimum 70% flow rate or more to prevent accidents.

■ The main piping system and out of the water-side should be installed in the annex to take over the seat, so that when maintenance piping can be easily separated with the pipe.

■ Unit cannot bear water pipe weight, Unit inlet and outlet water ports shall be connected shock-proof hose or rubber vibration isolation when joint to the corresponding water pipe to prevent vibration, noise transmission and the mutual interference.

■ Before the system start-up verify that the water circuits are connected to the appropriate heat exchangers (e.g. no reversal between cooler and condenser).

■ Do not introduce any significant static or dynamic pressure into the heat exchange circuit (with regard to the design operating pressures).

■ Before any start-up verifies that the heat exchange fluid is compatible with the materials and the water circuit coating.

■ In case additives or other fluids than those recommended by Midea are used, ensure that the fluids are not considered as a gas.

9.2 Midea recommendations on heat exchange fluids:

Standard working conditions of SCWE-M: chilled water inlet / outlet temperatures is 12 / 7 ℃; cooling water inlet / outlet temperature is 30/35 ℃ and water side fouling factor of cooler and condenser are 0.0176 and 0.044 m2 • ℃ / kW.

The freezing point and the boiling point of the glycol liquor (The consistency of glycol for preventing freezing)

Liquor Consistency%	Poidometer	5	10	15	20	25	30	35	40
	Volumenometer	4.4	8.9	13.6	18.1	22.9	27.7	32.6	37.5
Freezing point ℃		-1.4	-3.2	-5.4	-7.8	-10.7	-14.1	-17.9	-22.3
Boiling point(100.7kpa) ℃		100.6	101.1	101.7	102.2	103.3	104.4	105.0	105.6

When industrial water is used as chilled water, little furring may occur; however, well water or river water, used as chilled water, may cause much sediment, such as furring, sand, and so on. Therefore, well water or river water must be filtered and softened in softening water equipment before flowing into chilled water system. If sand and clay settle in the cooler, circulation of chilled water may be blocked, and thus leading to freezing accidents; if hardness of chilled water is too high, furring may occur easily, and the devices may be corroded. Therefore, the quality of chilled water should be analyzed before being used, such as PH value, conductivity, concentration of chloride ion, concentration of sulfide ion, and so on.

1、No NH4+ ammonium ions in the water, they are very detrimental for copper. This is one of the most important factors for the operating life of copper piping. A content of several tenths of mg/l will badly corrode the copper over time.

2、Cl- Chloride ions are detrimental for copper with a risk of perforations by corrosion by puncture. If possible keep below <50ppm.

3、SO42- sulphate ions can cause perforating corrosion. If possible keep below <50ppm.

4、No fluoride ions (<0.1 mg/l).

5、If possible keep Calcium ion below <50ppm.

6、No Fe2+ and Fe3+ ions with non-negligible levels of dissolved oxygen must be present. Dissolved iron < 5 mg/l with dissolved oxygen < 5 mg/l. If possible keep below <0.3ppm.

7、Dissolved silicon: silicon is an acid element of water and can also lead to corrosion risks. Content <30ppm

8、Water hardness: Total hardness <50ppm can be recommended. This will facilitate scale deposit that can

limit corrosion of copper. A total alkalimetric titer (TAC) below 100 is desirable.

9、Dissolved oxygen: Any sudden change in water oxygenation conditions must be avoided. It is as detrimental to deoxygenate the water by mixing it with inert gas as it is to over-oxygenate it by mixing it with pure oxygen. The disturbance of the oxygenation conditions encourages destabilization of copper hydroxides and enlargement of particles.

10、Specific resistance – electric conductivity: the higher the specific resistance, the slower the corrosion tendency. Conductivity <20μV/cm (25℃) are desirable. A neutral environment favors maximum specific resistance values. For electric conductivity values in the order of 200-6000S/cm can be recommended.

11、PH: Ideal case pH neutral at 20-25°C 7 < pH < 8.5. If the water circuit must be emptied for longer than one month, the complete circuit must be placed under nitrogen charge to avoid any risk of corrosion by differential aeration. Charging and removing heat exchange fluids should be done with devices that must be included on the water circuit by the installer. Never use the unit heat exchangers to add heat exchange fluid. Piping systems must be properly vented, with no stress on water box nozzles and covers. Use flexible connections to reduce the transmission of vibrations. Water flows through the cooler and condenser must meet job requirements. Measure the pressure drop across cooler and across condenser and compare this with the nominal values .If the optional pump out storage tank and/or pump out equipment are installed, check to ensure the pump out condenser water has been piped in. Check for field-supplied shutoff valves and controls as specified in the job data. Check for refrigerant leaks on field-installed piping.

9.3 Flow control

Cooling water flow switch and chilled water pump interlock

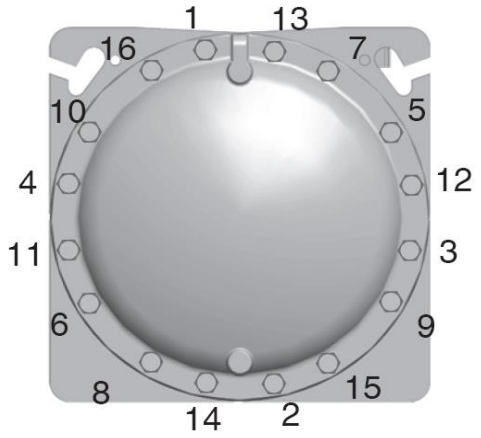
IMPORTANT: On SCWE-M units, the unit water flow switch must be energized, and the chilled water pump interlock must be connected. Failure to follow this instruction will void the Midea guarantee.

The water flow switch is installed on the cooler water inlet and adjusted by the control, based on unit size and application. If adjustment is necessary, it must be carried out by qualified personnel trained by Midea Service.

9.4 Cooler and condenser water box bolt tightening

The cooler (and condenser) are of the shell and tube type with removable water boxes to facilitate cleaning. Retightening or tightening must be done in accordance with the illustration in the example below.

Water box tightening sequence:



Sequence 1: 1 2 3 4

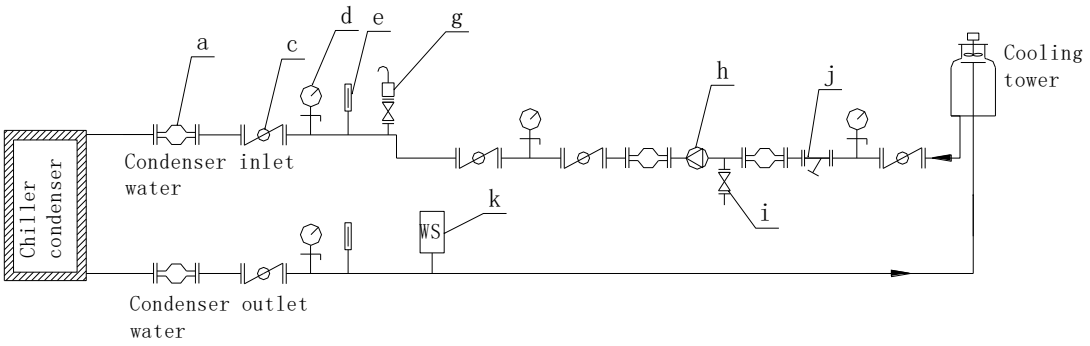
Sequence 2: 5 6 7 8

Sequence 3: 9 10 11 12

NOTE: Before this operation we recommend draining the circuit and disconnecting the pipes to be sure that the bolts are correctly and uniformly tightened.

9.5 System piping connection

Condenser, cooling water piping suggested piping as follow：

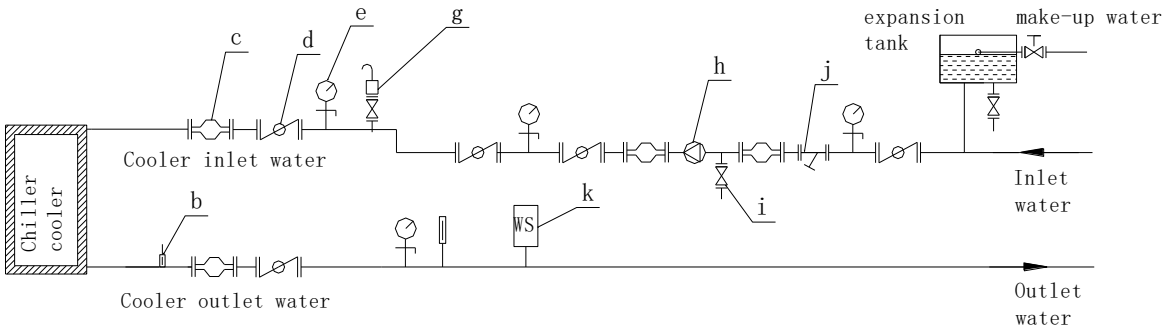


（Condenser, cooling water hose connection diagrammatic sketch）

a Flex connection	k Flow switch
c Butterfly valve	d Pressure gauge
e Thermometer	f Platinum resistance thermometer
g Automatic vent	h Water pump
I Drain valve	j Y- shape strainer

Note: All of water pipe accessories and flow switch is provide by user.

Chilled water piping suggested piping as follow：



Chiller cooler piping diagrammatic sketch）

c Flex connection	b Pressure type temperature controller
e Pressure gauge	d Butterfly valve
g Automatic vent	h Water pump
i Drain valve	j Y- shape strainer
k Flow switch	

Note: All of water pipe accessories and flow switch is provide by user.

User must install flow switch in the outlet pipe of cooler and evaporator, it’s two sides must be level straight pipe which length longer than five times of pipe diameter.

According to pipe size to adjust the water flow switch blades, see the flow switch user manual from manufacturer. The switch connected to the control panel terminal. Check electrical wiring diagram for specific connection.

Warning:

■ Check the flow direction before install flow switch.

■ Flow switch cannot be used for unit start and stop; it's just a safety switch.

■ The material of water box is cast iron, it should be connected with water pipe with flange, never try to weld it with water pipe or may cause water box damage.

■ The use of untreated or improperly treated water may result in unit fouling, erosion, corrosion, Midea Company assumes no responsibility for unit failures from using untreated or improperly treated water.

■ To prevent damage of cooler and condenser, water filter is necessary for water piping to filter impurities.

■ To prevent damage of cooler and condenser, do not exceed 10 bar (1.0MPa) water pressure for normal water box. If necessary, please order special designed larger pressure consist water box from Midea.

10 Electrical Connection

Warning:

■ A special power should be used for water cooled screw chiller, and the voltage should not exceed the allowed range.

■ Only a qualified service technician electrician can perform unit external wiring connection.

■ Please set up the leakage protector according to electric standards.

■ Breaking isolation switches should be added between the power cord of users and the unit. The unit must be grounded to earth directly and reliably.

■ Please fasten the connection of input power lines with correct tools and moment. Check the power for loose timelessly. Min. cross-sectional area of earth conductor mute be greater than half area of the power cable.

■ Must not switch on the power before finishing to check field wiring carefully.

■ Must not try to repair the unit yourself. Inappropriate operation may cause damage to the unit or even serious personal injury and major property loss

■ Only specified brand and models of electronic components can be used. Please request the dealer to supply the installation and technical service.

■ Please read all of the labels posted on the electric panel.

10.1 Power supply

Supply power requirement

Main power: 380V-3N-50Hz

Allowed voltage range: Rating Voltage ±10%

Allowed frequency range: Rating frequency±2%

Max. voltage drop: 10% * Rating Voltage

Allowed voltage phase imbalance (%):±2%

Allowed current phase imbalance (%):±5%

Note: Allowed voltage (current) phase imbalance(%)

Usually, voltage (current) phase imbalance is caused by unit load. During unit load process, when there is difference between one or more phases with others, the phase imbalance will appear and lead to serious problem, especially compressor.

$$\frac{\text{Voltage phase}}{\text{imbalance}} = \frac{\text{Max. deviation from average voltage}}{\text{Average voltage}} \times 100\%$$

Voltage phase imbalance will lead to the imbalance of phase current in motor terminals. For a full load operation of the motor, phase current imbalance will cause excess current and overheat which may reduce the compressor life span, even burn down the motor.

$$\frac{\text{Current phase}}{\text{imbalance}} = \frac{\text{Max. deviation from average current}}{\text{Average current}} \times 100\%$$

10.2 Field Wiring

■ The electric panel has power entry hole, top or side entry type. Users can choose according to actual situation. Please seal the entering wiring hole after installing the main power wires.

■ Recommend to use special supply power. If shared with other equipment, the distribution capacity must be calculated to avoid overload dangerous. Please do EMI protection properly to avoid the disturbance from other equipment

■ Must choose proper power cable for power supply. The length must ensure that the voltage drop in full-load operation is less than rated voltage*2%. If can't shorten the length, must overstrike the power cable.

■ Please carry on waterproof, dustproof and seal work after finishing the field wiring.

■ Please check the insulation resistance test after power down. Measure the resistance between unit body and the terminals, phases with the 500V megger. The resistance should be greater than 10MΩ.

■ The body of the unit should have reliable ground protection installation to avoid electric shock accident.

■ The control circuit power cable must be shield wires and the shield must be connected to the earth to prevent electromagnetic interference.

■ Must equip a power switch device in entry power which has insolation, breaking and protection function.

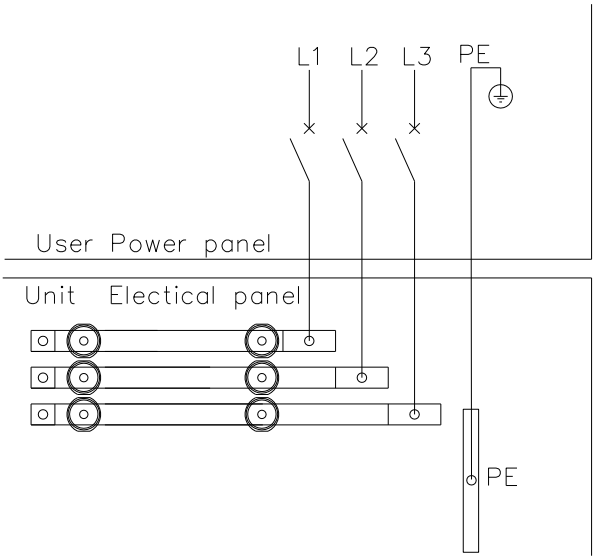
■ The phase sequence should be consistent with working power sequence.

■ Remote start/stop wiring: Inching switch, refer to the terminal diagram.

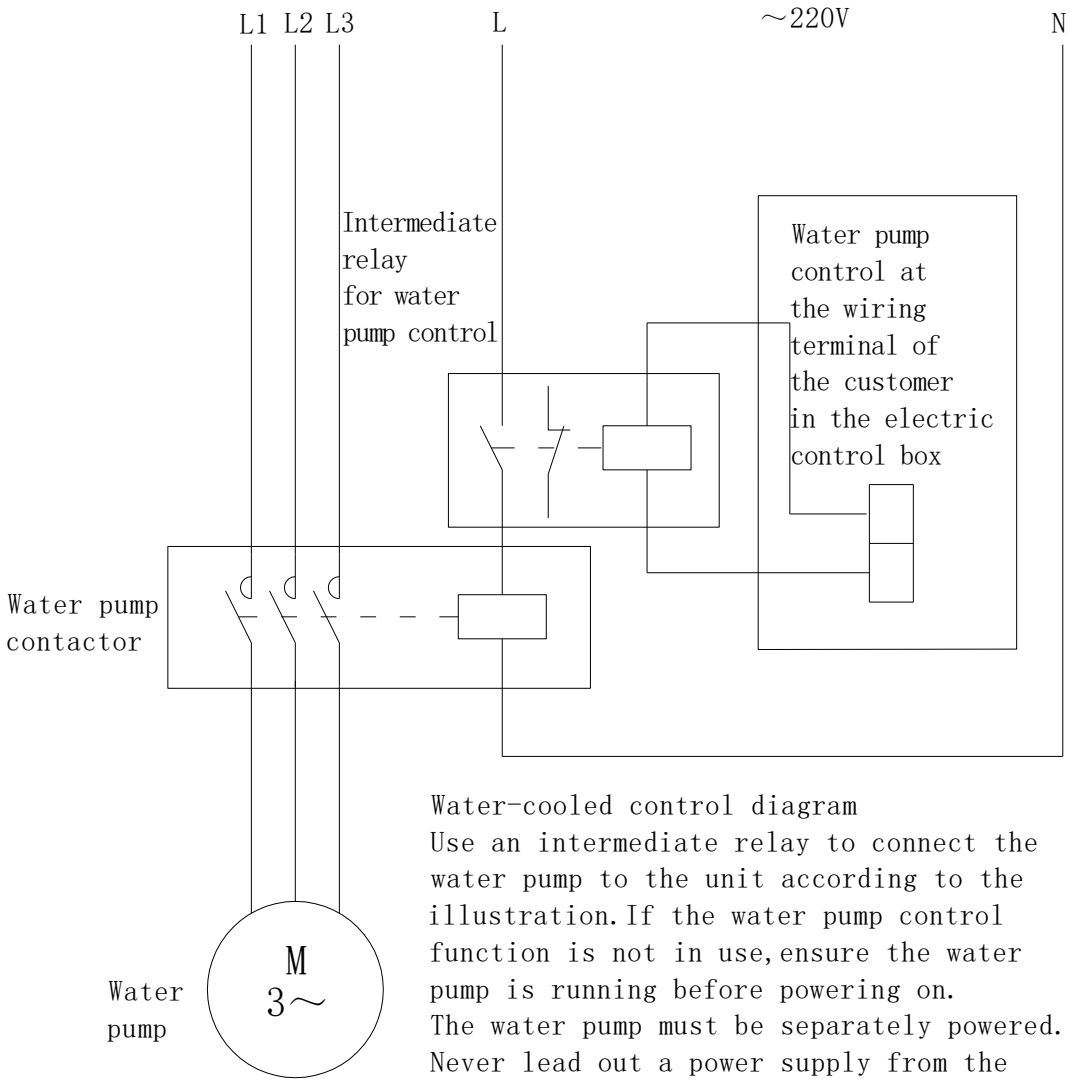
■ Water switch wiring: Equipped by users, refer to the terminal diagram.

■ Please refer to the current data in electrical table, users can choose proper power cable according to local standard, and the wire diameter should not be less than recommended wire size.

■ Midea has no liability for electrical accident caused by the oversight of users.



Power supply wiring



Water-cooled control diagram
Use an intermediate relay to connect the water pump to the unit according to the illustration. If the water pump control function is not in use, ensure the water pump is running before powering on.
The water pump must be separately powered. Never lead out a power supply from the central air conditioning unit. Midea is not liable in any way if this occurs.

Water Pump Wiring Diagram

Recommended external wiring cable

Model	Max running current (A)	Compressor start current (A)	Recommended external wiring cable	Recommend breaker current (A)
SCWE100M	154.6	315.0	50	250
SCWE130M	208.0	415.0	50	250
SCWE150M	235.0	479.0	95	250
SCWE180M	260.0	506.0	95	400
SCWE200M	301.0	650.0	120	400
SCWE230M	369.0	845.0	150	400
SCWE250M	382.8	753.3	185	400
SCWE300M	396.8	888.3	185	630
SCWE340M	235.0/301.0	479/650	2×120	630
SCWE370M	235.0/301.0	479/650	2×120	630
SCWE400M	301.0/301.0	650/650	2×120	630
SCWE460M	369.0/369.0	845/845	2×185	800
SCWE510M	382.8/382.8	753.3/753.3	2×185	800
SCWE600M	396.8/396.8	888.3/888.3	2×185	1000

Note: The given wire length limits the voltage drop to < 2%. If the length cannot be reduced, the power cord should be bolder.

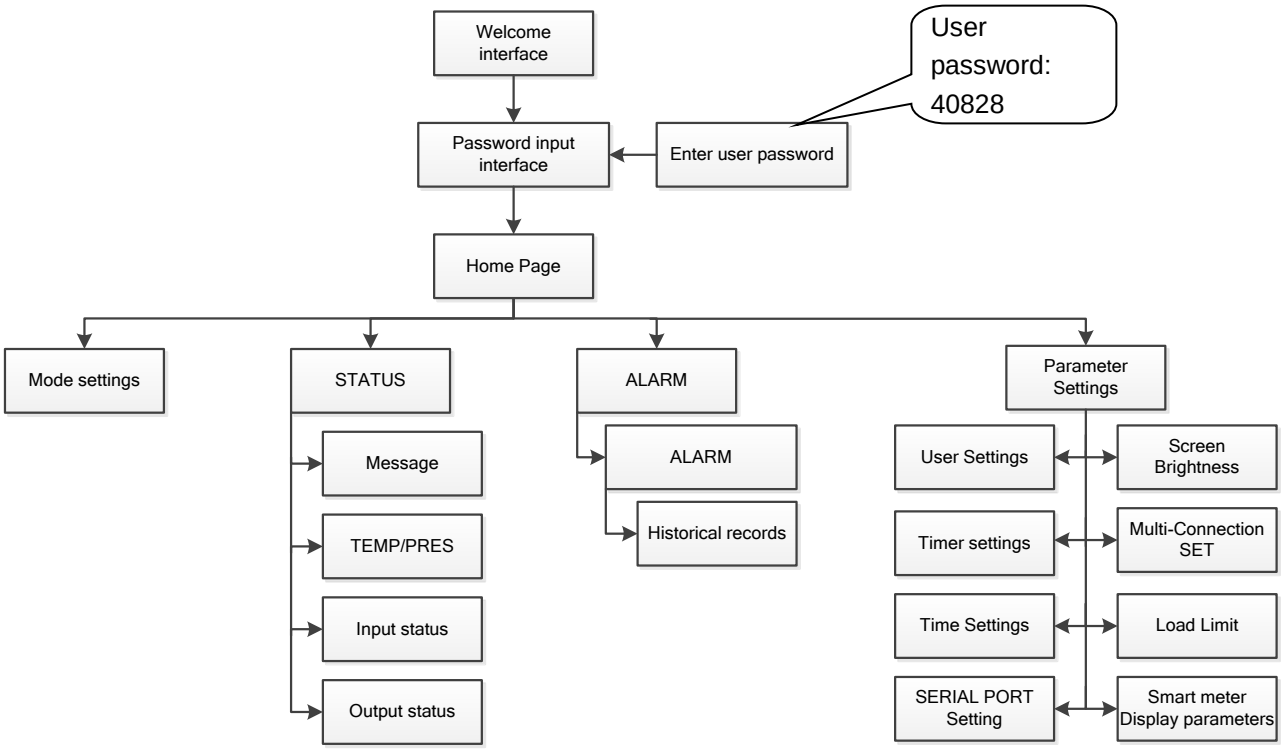
If the cable is installed in pipe or the ambient temperature is above 40℃, it's necessary to enlarge the wire section. Please refer to relevant electrical code for selection according to the max. running current.

11 Operation

11.1 Operation

11.1.1 Unit Operation Flowchart

User interface:



Note: The unit is equipped with remote service module, which could realize the information transmission and global positioning. The remote service module would collect the related operating information of the unit, such as running frequency, temperature and pressure and other parameters, while your private information is not in the list.

11.1.2 Operation Instructions

The control system uses a touch display screen, and all operations are performed directly on the touch screen. This document takes the operations on the dual-model touch screen as an example. The physical display of different models will be slightly different in the field, but the operation methods are basically the same.

11.1.2.1 Welcome interface

In the beginning of powering-on, the system enters the welcome interface, as shown in Figure 11.1.

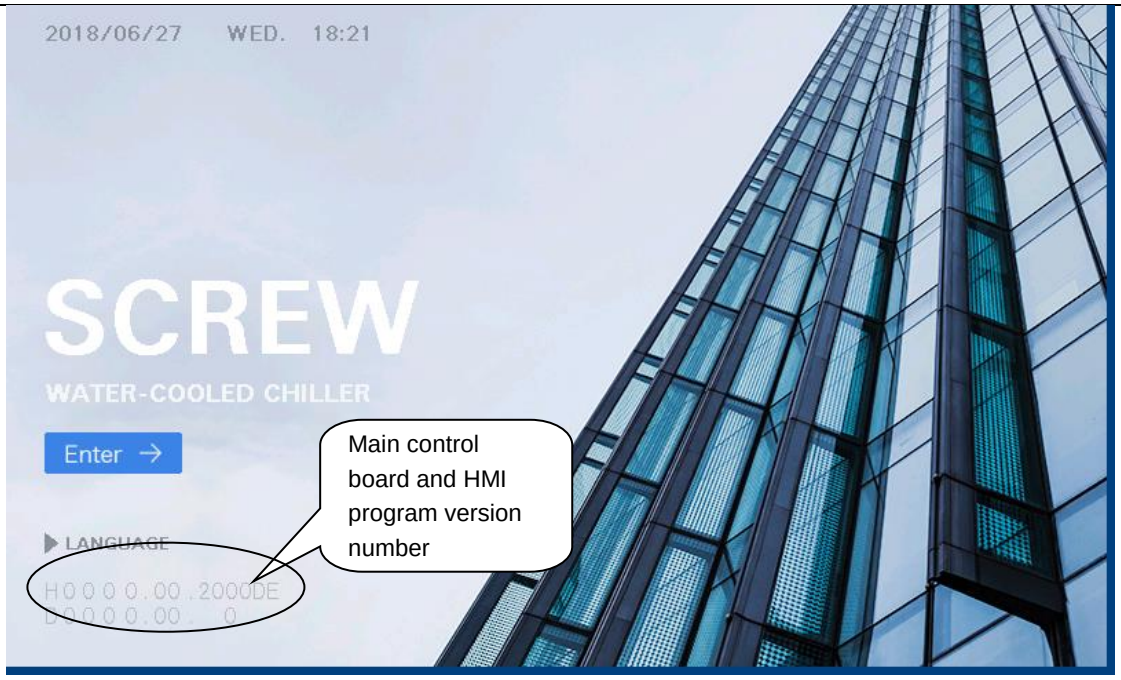


Figure 11.1 (Note: subject to the actual display contents of the unit)

Press "Enter" or a blank space to enter the password input interface, as shown in Figure 11.2.

11.1.2.2 Password input interface

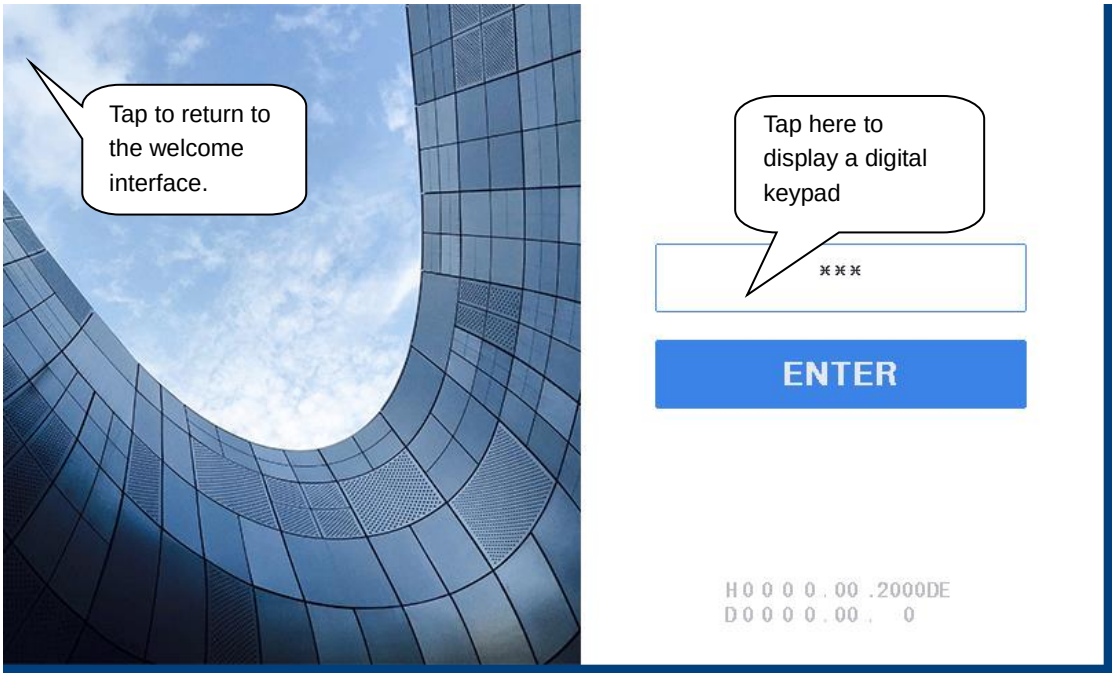


Figure 11.2 (Note: subject to the actual display contents of the unit)

Click the *** box on the password input interface to display a digital keypad, as shown in Figure 11.3.

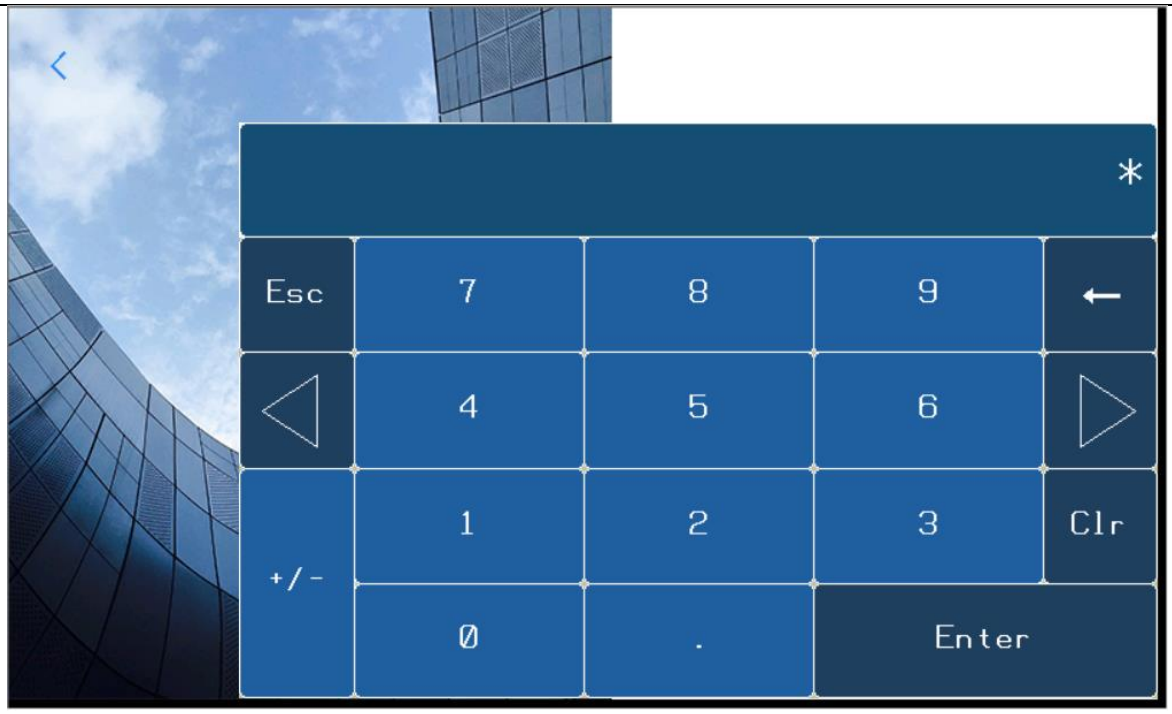


Figure 11.3 (Note: subject to the actual display contents of the unit)

Enter the password (the user password is 40828) on the digital keypad, tap "Enter" to return to the password login interface, and then tap "ENTER" to enter the home page, as shown in Figure 11.4.

11.1.2.3 Home page

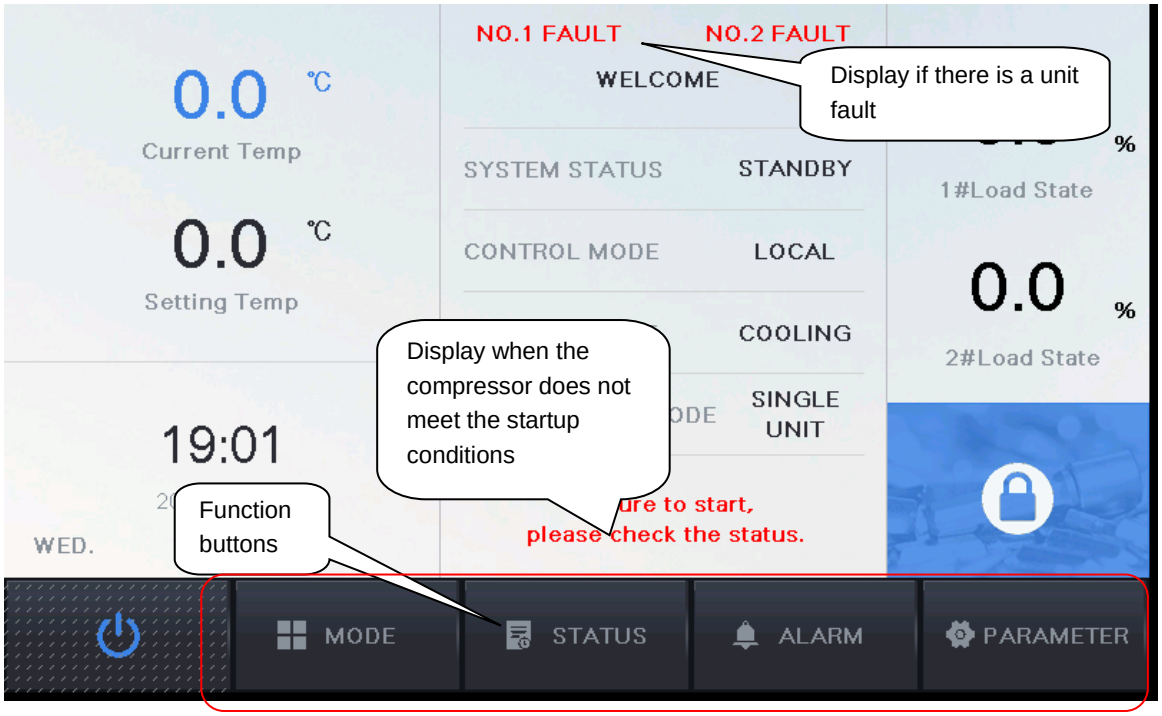


Figure 11.4 (Note: subject to the actual display contents of the unit)

The middle part of the interface displays the system status, unit control mode, running mode, combination mode display, etc.

Tap  in the lower right part of the interface. The unit returns to the welcome interface.

The following table provides the current status display and status description of the unit:

Standby	The unit is not running, but can be started normally.
Error	The unit fails and cannot be started. Refer to the fault query page, and acknowledge and eliminate the fault.
Operating	The unit is running normally.
STARTUP	The status after a unit is started and before the unit enters normal operation.
SHUTDOWN	The unit is being stopped. Three processes including uninstall, compressor stopping, and pump stopping are required. If the unit does not meet the minimum operating time requirement, wait until the unit runs for the minimum required operating time before the unit can be stopped. Check whether the requirement for the minimum operating time is met on the first page of status information. After the requirement for the minimum operating time is met, the system automatically continues the shutdown process.
Pause	1. The compressor does not meet the startup conditions. Compressor startup conditions: ① The water temperature does not meet the compressor startup condition. ② The water temperature must be higher than the compressor startup temperature (target temperature + return temperature difference) in the cooling status, and the water temperature must be lower than the compressor startup temperature (target temperature - return temperature difference) in the heating status. The target temperature and return temperature can be modified on the parameter settings interface. ③ The compressor lubricating oil temperature or oil heating time does not meet the startup conditions. ④ The shutdown duration is too short, and fails to meet the compressor startup interval requirement. The preceding information can be viewed on the first page of status information. After the startup conditions are met, the unit automatically starts up. 2. During operation of the unit, the pause status is displayed during automatic reset of the fault that can be reset.

Note: Cooling: when the unit pauses and the control temperature is higher than (compressor target temperature + startup temperature difference), the compressor is started.

Heating: when the unit pauses and the control temperature is lower than (compressor target temperature - startup temperature difference), the compressor is started.

11.1.2.4 Mode settings

Press "MODE" on the home page to open the mode setting window, as shown in Figure 11.5.

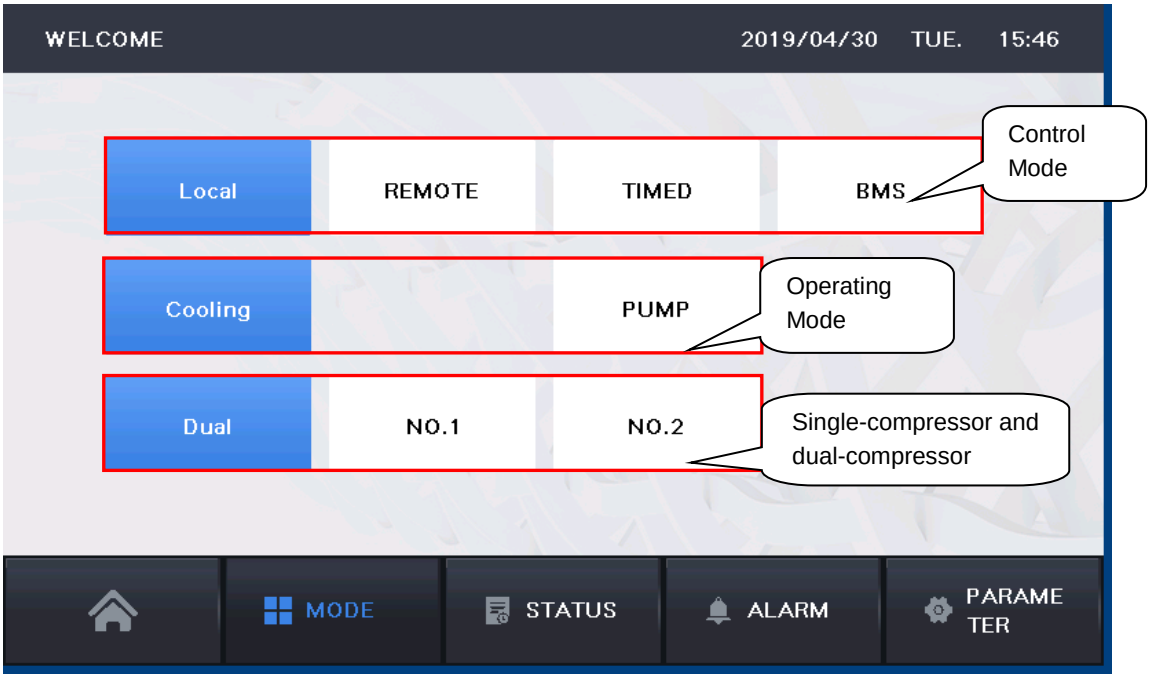


Figure 11.5 (Note: subject to the actual display contents of the unit)

Set the control mode (Local, REMOTE, TIMED, BMS), operating mode (Cooling, HEATING, PUMP), single-compressor or dual-compressor (Dual, NO.1, NO.2) on the displayed interface.

① Control mode: Local, REMOTE, TIMED and BMS.

Local: The unit can be powered on and off normally through the "Start/Stop" icon on the touch screen of the unit.

REMOTE: The unit can be powered on and off normally through the "Remote Start/Remote Stop" switch or button connected to the hardware input point of the controller (PCB or PLC).

TIMED: The unit can be powered on and off normally through the "Start Time/Stop Time" set in the "AUTOMATIC ON/OFF" on the touch screen. For timer settings, refer to "PARAMETER - AUTOMATIC ON/OFF".

BMS: The unit can be powered on and off normally through communication with the upper computer connected to the controller (PCB or PLC) communication interface. For communication settings with the upper computer, see "PARAMETER - SERIAL PORT Settings".

Note: Only one of the control modes is valid. If "Local" is selected, the "REMOTE", "TIMED" and "BMS" control modes will not generate a power-on/off signal to trigger power-on/off. The unit can be switched between control modes in any status. If there is no power-on/off signal in the current control mode after switching, the unit

remains in the status before switching. If the power-on/off signal is present in the current control mode after switching, the unit will power on/off the unit according to the power-on/off signal in the current mode.

② Operating mode: Cooling, HEATING, PUMP. The function options of different operating modes vary with different models.

Cooling: covering all the units.

HEATING: limited to the heat pump unit.

PUMP: covering all the units. After the unit is powered on, only the water pump is operating, and the compressor is stopped.

Note: Only one of the operating modes is valid at the same time. Set it correctly according to the actually needed operating conditions. The modes can be switched only when the unit is stopped.

③ Single/dual-compressor mode: dual-compressor, 1# unit, 2# unit. (This setting not available for the single-compressor unit)

Dual-system: Both 1 # and 2 # are in use.

1# unit: Only 1# compressor is put in use, but 2# compressor is not.

2# unit: Only 2# compressor is put in use, but 1# compressor is not.

Note: Only one mode is valid at the same time. 1# unit mode and 2# unit mode cannot be directly switched when the unit is operating.

11.1.2.5 Power-on/off operations

At present, the unit can be powered on/off through the four modes of "Local", "REMOTE", "TIMED" and "BMS".

(1) Power-on needs to be confirmed in the local mode:

① Unit operating mode (Cooling, HEATING, PUMP) settings.

② The unit cannot be started if the current status is standby or error.

③ To power on the unit using the power-on button on the touch screen, be sure to select "LOCAL" as the control mode. The unit cannot be powered on in other control modes.

④ Check whether oil heating is completed. If oil heating is not completed, the unit may be suspended for a long time and the compressor will not start.

To power on the unit, directly tap  (a blue icon) in the lower left part to display the power-on confirmation window, as shown in Figure 11.6. Press "YES" to implement the startup; press "NO" to cancel the startup and display the corresponding window.

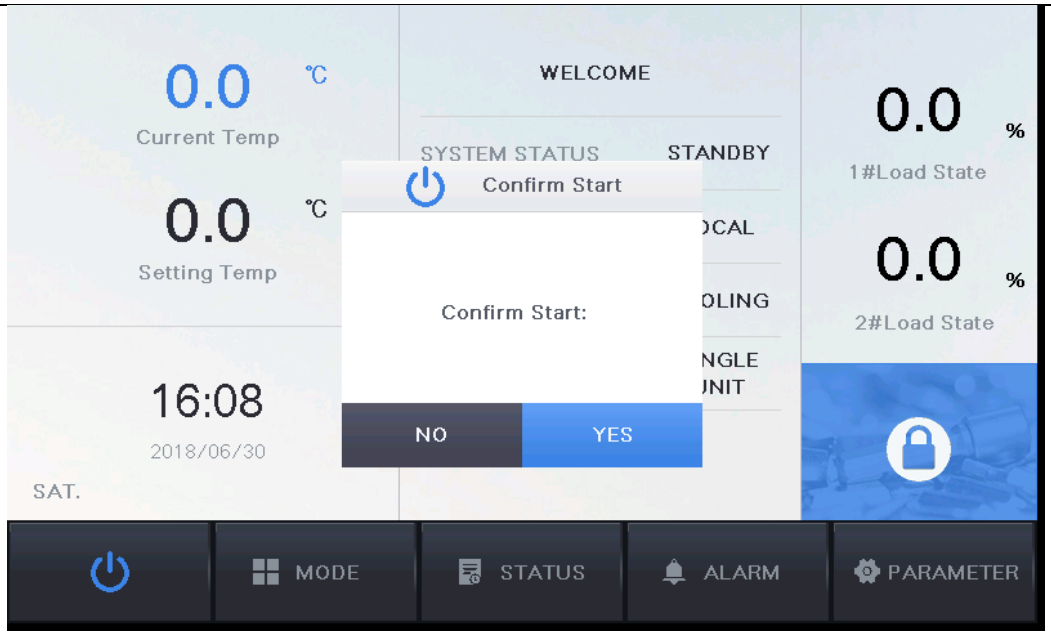


Figure 11.6 (Note: subject to the actual display contents of the unit)

If the startup button is pressed when the startup conditions are not met, a message is displayed on the top of the displayed page: "Failure to start, please check the status", as shown in Figure 11.7. Compressor startup conditions include the lubricating oil temperature or oil heating time, time interval for re-startup, compressor startup temperature, etc. In this case, the page for confirming the startup can still be displayed. However, the compressor is started only after the compressor startup conditions are met; otherwise, the message is always displayed on the homepage: "Failure to start, please check the status." For details, refer to the description in the status information part.

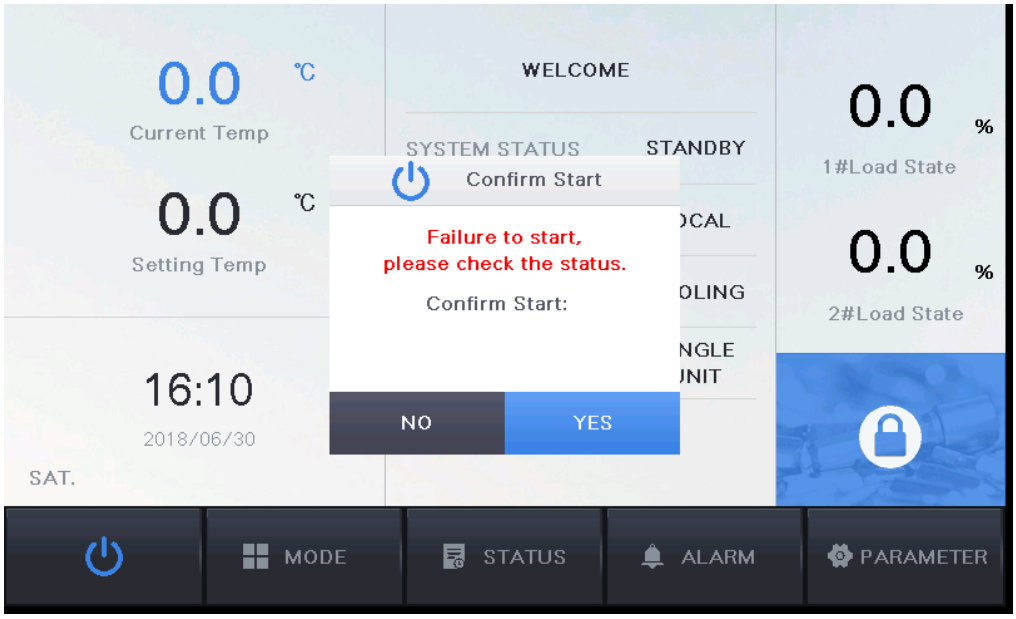
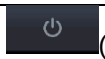


Figure 11.7 (Note: subject to the actual display contents of the unit)

If the compressor startup conditions are not met, the unit will access the halt state after running the pump. The interface displays "Failure to start, please check the status."

Shutdown operation in the local mode:

Press  (a gray icon) to display the shutdown confirmation interface. Touch OK. "Stopping" appears. After the unit meets shutdown conditions, it implements the shutdown procedure.

(2) Power-on/off in remote control mode:
First select "Remote Control" (Welcome -> Login interface -> MAIN -> MODE) on the mode setting interface, and enable or disable the corresponding functions through the two input points "Remote Start" and "Remote Stop".

(3) Power-on/off in the timer mode
First select "TIMED" (Welcome -> Login interface -> MAIN -> MODE) on the "MODE" interface; on the "AUTOMATIC ON/OFF" interface (Welcome Login interface -> MAIN -> PARAMETERS -> AUTOMATIC ON/OFF), set the time in "Start Time" and "Stop Time" and select the corresponding "Enable" buttons. The unit is in "Standby" mode. When the current time of the unit is the same as the "Start Time" setting, the unit will execute the startup command. When the unit is not in the "Stopping" or "Fault" status and the current time of the unit is the same as the "Stop Time" setting, the unit will execute the shutdown command. For details, see "PARAMETER - AUTOMATIC ON/OFF".

(4) Power-on/off in the BMS (upper computer) mode:
First select "BMS" (Welcome -> Login interface -> MAIN -> MODE) on the "MODE" interface. The unit is in "STANDBY" mode. When the upper computer writes 1 into the startup address, the unit will execute the startup command. When the unit is not in "Stopping" or "Fault" status and the upper computer writes 1 into the shutdown address, the unit will execute the shutdown command.

The startup process is as follows:
The chilled water pump will start immediately after a startup command is sent. If the compressor meets the startup conditions (output water temperature, restart delaying time, oil temperature or oil heating time), the cooling pump will start after a delay; otherwise, the unit is in "Pause" status, and the cooling pump will start after the compressor startup conditions are met. Pump startup is completed in n seconds after the cooling pump starts. After the water pump is started, the capacity adjusting solenoid valves 1, 2 and 3 start, the compressor is started m1 second later, the capacity adjust solenoid valve 3 is disconnected m2 seconds later, the capacity adjust solenoid valve 2 is disconnected m3 seconds later, the startup process is completed, and the unit enters the energy scheduling process.

The shutdown process is as follows:
There is a shutdown command. The unit status is "Stopping" and the frequency decreases at a certain rate. If the shutdown condition is met (shutdown delaying time), capacity adjusting solenoid valve 1 is opened, capacity adjusting solenoid valve 2 will be opened m4 seconds later, capacity adjusting solenoid valve 3 can be opened m5 seconds later, the compressor will stop m6 seconds later, and capacity adjusting solenoid valves 1, 2 and 3 will be closed m7 seconds later. Shutdown of the compressor and its capacity adjusting solenoid valves is

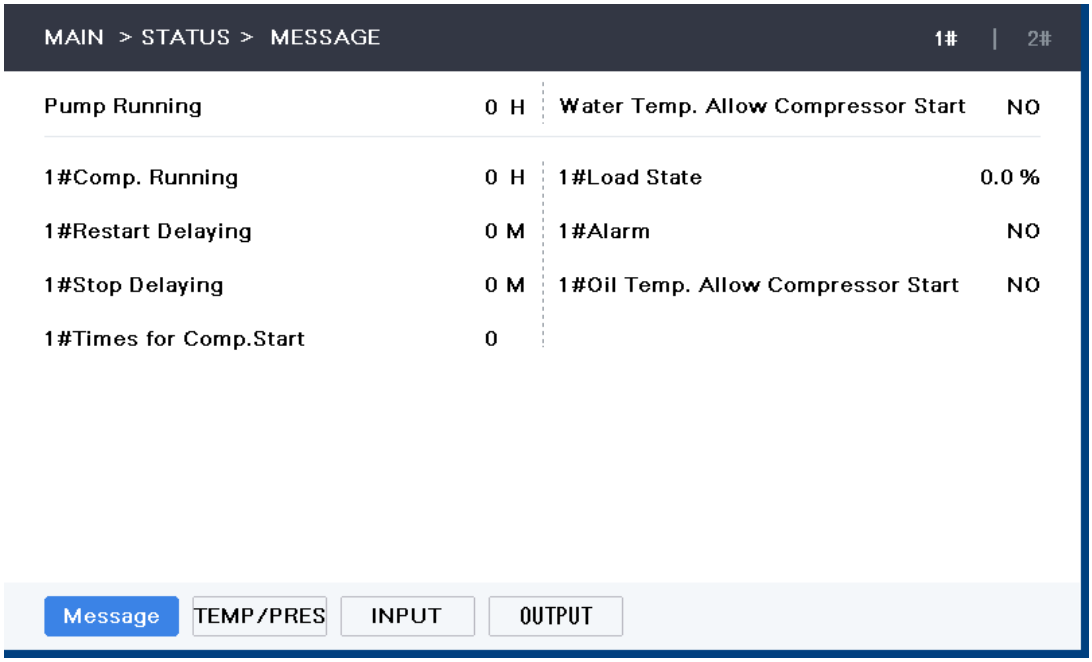
completed. The cooling water pump will be stopped m8 seconds later, and the frozen water pump will be stopped m9 seconds later.

11.1.2.6 Status Information

11.1.2.6.1 Status Information - Information Data Display

Tap "STATUS" on the home page as shown in Figure 11.4 to enter the information data interface, as shown in Figure 11.8.

Display of the model without an oil temperature sensor



Display of the model with an oil temperature sensor

Figure 11.8 (Note: subject to the actual display contents of the unit)

(1) The information data display content includes:

①Pump Running;

② Comp. Running;

③ Compressor start count;

④ Unit load;

⑤ Unit alarm: "Alarm" must be "NO" before the compressor can start up; otherwise "YES" blinks;

⑥ Displays whether oil heating is completed. "Remaining Time/Oil Heating" must be 0 or "Oil Temp. Allow Compressor Start" must be "YES" when the compressor starts up. If the above conditions are not met, the value of "Remaining Time/Oil Heating" or "Oil Temp. Allow Compressor Start" will blink.

⑦ Displays whether the water temperature meets the compressor startup condition. "Water Temp. Allow Compressor Start" must be "YES" before the compressor starts up; otherwise the value of "Water Temp. Allow Compressor Start" displays "NO" by blinking.

⑧ Displays whether the minimum shutdown time of the unit meets requirements. "Restart Delaying" must be 0 before the compressor starts; if the value is not 0, the required delay time for the compressor to restart will be displayed by blinking.

⑨ Displays whether the minimum operation time of the unit meets requirements. "Stop Delaying" must be 0 before the compressor shuts down.

Note: When the compressor is equipped with an oil temperature sensor, the interface displays that the lubricating oil temperature complies with the compressor startup conditions; when the compressor is not equipped with an oil temperature sensor, the interface displays the remaining time of oil heating. It depends on the model.

(2) Startup must meet the following conditions:

①"Restart Delaying" must be "0". If it is not "0", the delay required for startup has no concluded.

②"Water Temp. Allow Compressor Start" must be "YES". If it is "NO", the current water temperature does not meet the compressor's startup conditions.

③ For the unit with an oil temperature sensor: "Oil Temp. Allow Compressor Start" must be "YES". If it is "NO", the current compressor oil temperature does not meet the compressor startup conditions. For the unit without an oil temperature sensor: "Remaining Time/Oil Heating" is "0"; if it is not "0", the current compressor oil heating time does not meet the compressor's startup conditions.

④ "Alarm" must be "NO". If it is not "NO", the unit is faulty and cannot be started.

(3) Conditions to be met before shutdown

"Stop Delaying" must be "0". If it is not "0", the delay required for shutdown has not yet concluded.

Note: Tap 

in the upper right to switch freely between the information data interface of 1# unit

and the information data interface of 2# unit.

11.1.2.6.2 Status Information - TEMP/PRES Display

Tap "TEMP/PRES" on the information data interface 11.8 to enter the TEMP/PRES interface, as shown in Figure 11.9.

The TEMP/PRES interface displays the current temperature, pressure, current, frequency and other related parameters of the unit.

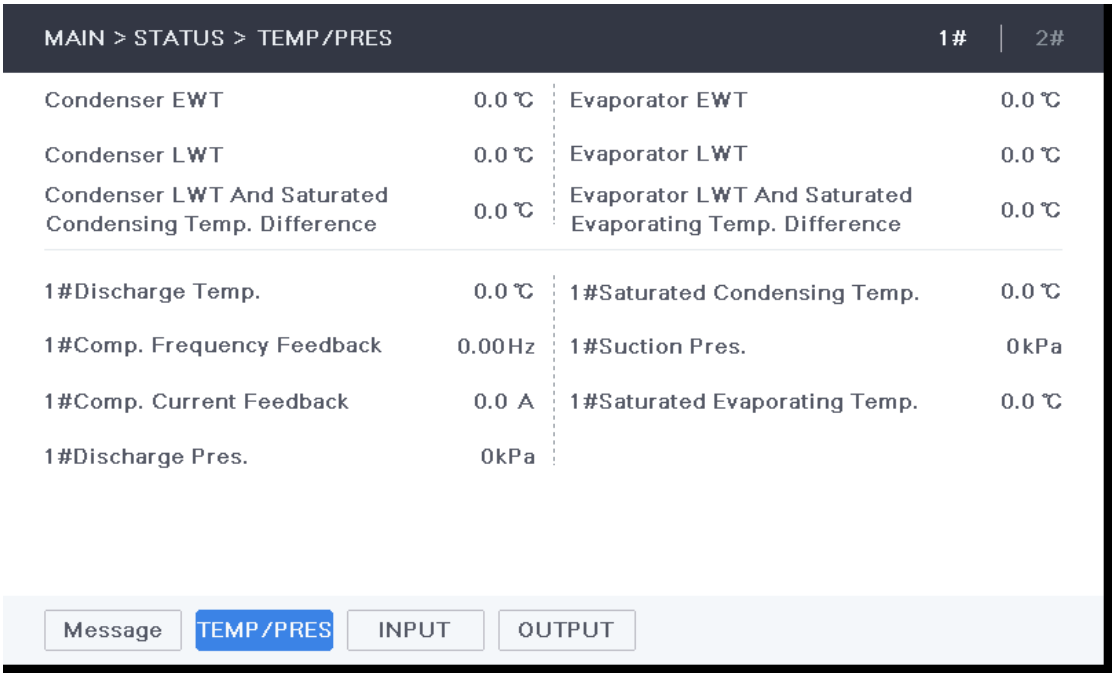


Figure 11.9 (Note: subject to the actual display contents of the unit)

Note: Tap 

in the upper right corner to switch freely between the temperature and pressure interface of 1# unit and the temperature and pressure interface of 2# unit.

11.1.2.6.3 Status Information - Input Status Display

Tap "INPUT" to enter the input status display interface, as shown in Figure 11.10.

Input status page: "ON" indicates that the input point is closed, and "OFF" indicates that the input point is disconnected.

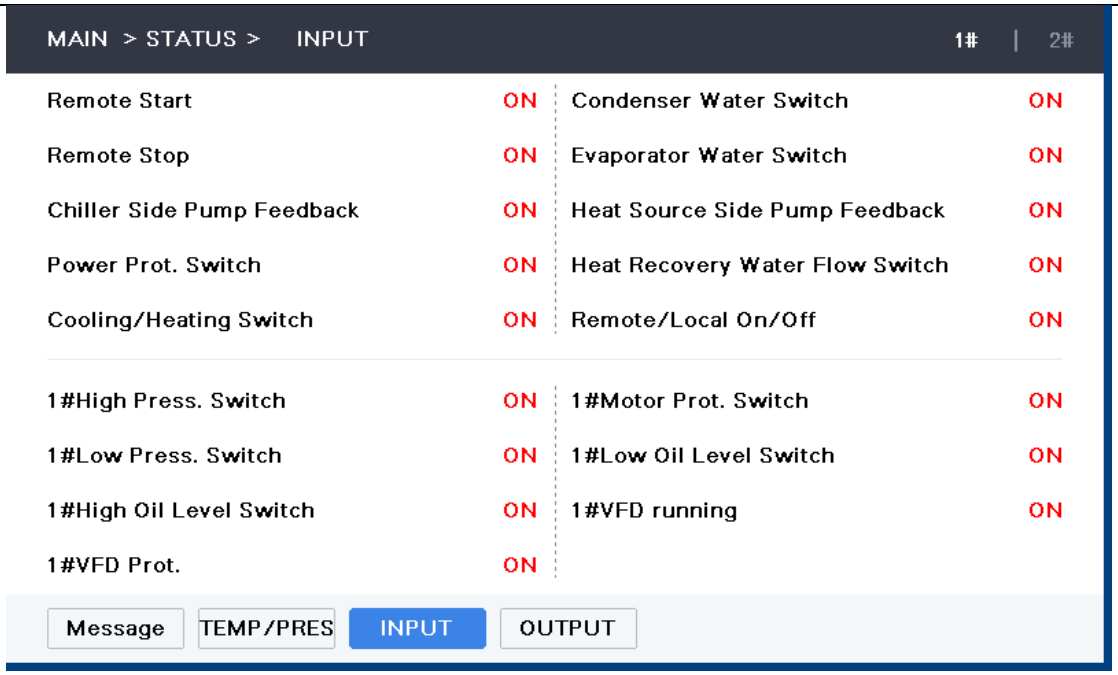


Figure 11.10 (Note: The displayed contents of the actual unit should prevail)

① "Remote Start/Remote Stop": displays the status of remote startup and the user's remote shutdown points. The user needs to install the pulse-mode control switch or hold-mode control switch according to actual conditions.

② "Evaporator/Condenser Water Switch": OFF when the water flow does not meet startup conditions; ON when it meets startup conditions.

③ "VFD running" and "VFD Prot." are visible for the inverter unit only, and this input point is not displayed for the fixed frequency unit.

④ Tap 

in the upper right to switch freely between the input status interface of 1# unit and the input status interface of 2# unit.

11.1.2.6.4 Status Information - Output Status Display

Tap "OUTPUT" to enter the output status display interface, as shown in Figure 11.11.

Output status page: "ON" indicates that the output point is connected to the power supply, and "OFF" indicates that the input point is disconnected from the power supply.

When the unit is in standby mode, all the statuses except "Two-way Val. Closed" output point are displayed as "OFF". When the unit's status is "Starting", "Pause", "Running", "Stopping" or "Fault", the corresponding switching value starts to act according to the program control command.

Note: ① Tap 

in the upper right to switch freely between the output status interface of 1# unit and the output status interface of 2# unit.

② Due to the limited size of the interface, some switching values of the unit are displayed on the second page.

Tap the  button in the lower right to switch between the first and second pages.

Figure 11.11 (Note: subject to the actual display contents of the unit)

11.1.2.7 Alarm Information

11.1.2.7.1 Alarm Information - Real-time Alarm Information Display

Tap "ALARM" on the home screen to enter the real-time alarm information interface, as shown in Figure 11.12.

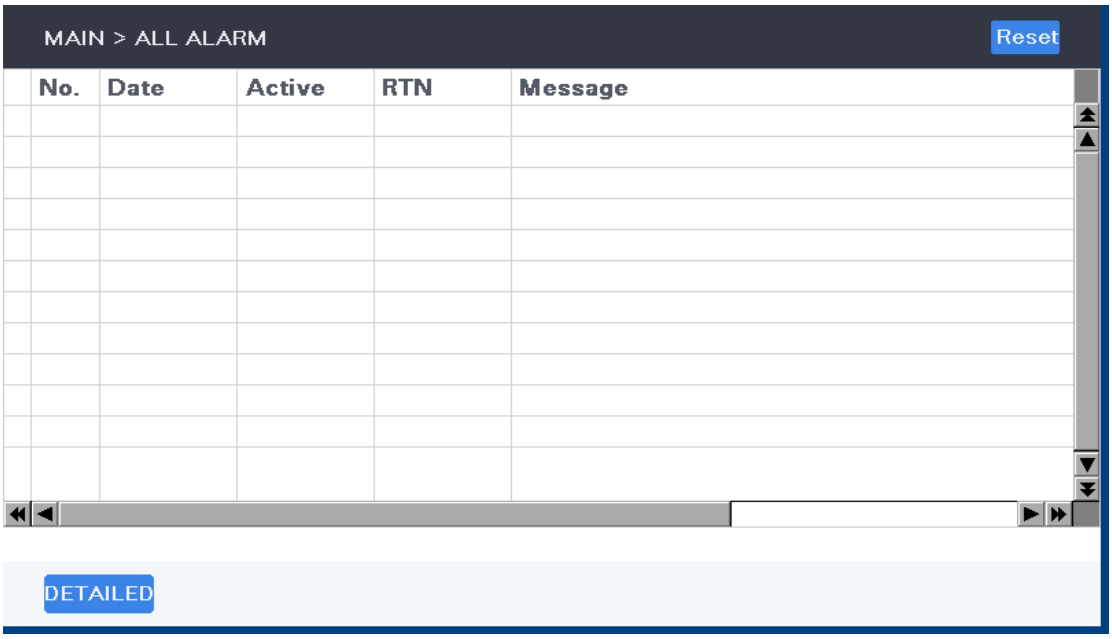


Figure 11.12 (Note: subject to the actual display contents of the unit)

If an alarm is generated, the unit implements an action according to the fault procedure. After the fault is recovered, tap "Reset" to return the system to normal. When there are more fault contents, tap the slider bar or

the Up/Down button to check the faults. The real-time alarm information is displayed according to the occurrence sequence of alarms, and the maximum number of records is 100. The content of the last alarm is displayed on the first line, and so on. Each alarm record contains the date and time of the fault, the time of fault recovery, and the specific fault content. If an alarm is not recovered normally, it will blink until it returns to normal.

Note: ①The high-pressure protection switch cannot be automatically reset. Users should find the protection switch and manually reset it.

②The overload protection function cannot be automatically reset as well. Find the thermal relay in the electric control panel and manually reset the function.

11.1.2.7.2 Alarm Information - Detailed Alarm Information

Tap "DETAILED" on the real-time alarm information interface to enter the detailed alarm information interface, and record the parameter values during the alarm when the compressor is in operation, as shown in Figure 11.13. The detailed alarm information is displayed according to the alarm occurrence sequence. Only the fault that occurs during operation of the compressor will be saved on this interface, and the maximum number of records is 5. Each historical alarm record contains the date and of the fault, and the specific fault content. Tap "Previous" or "Next" to turn the page and view different historical records.

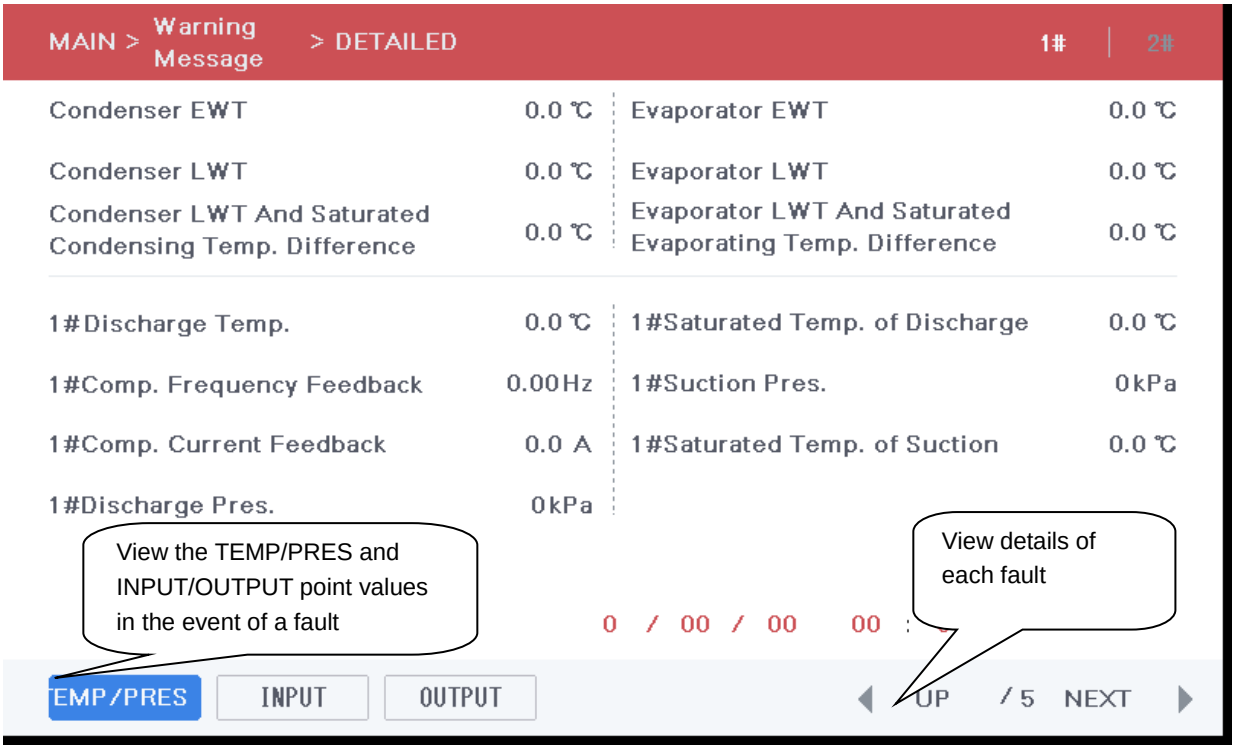


Figure 11.13 (Note: subject to the actual display contents of the unit)

11.1.2.8 PARAMETERS

Tap PARAMETERS on the home page 11.4 to enter the main interface of parameter settings, as shown in Figure 11.14.

USER PARAMETERS interface:

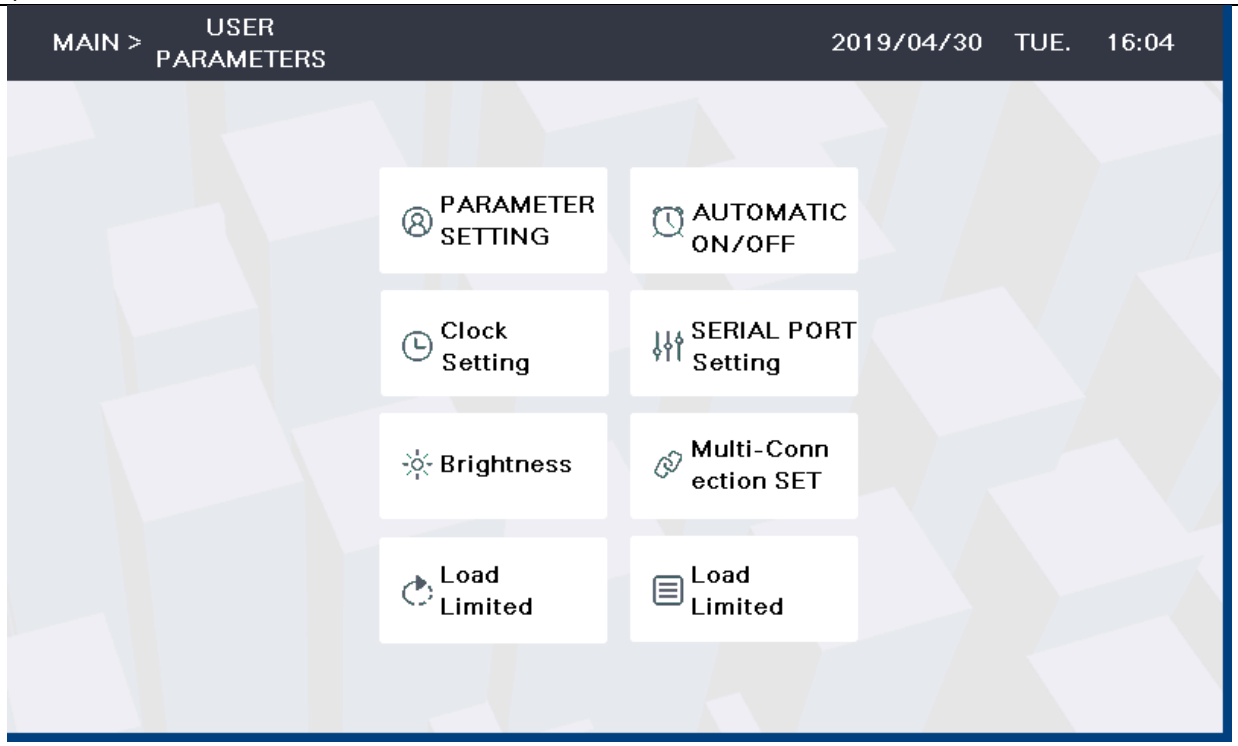


Figure 11.14 (Note: subject to the actual display contents of the unit)

11.1.2.8.1 PARAMETERS - PARAMETER SETTINGS

On the interface shown in Figure 11.14, tap "PARAMETER SETTINGS" to enter the user temperature setting interface, as shown in Figure 11.15.

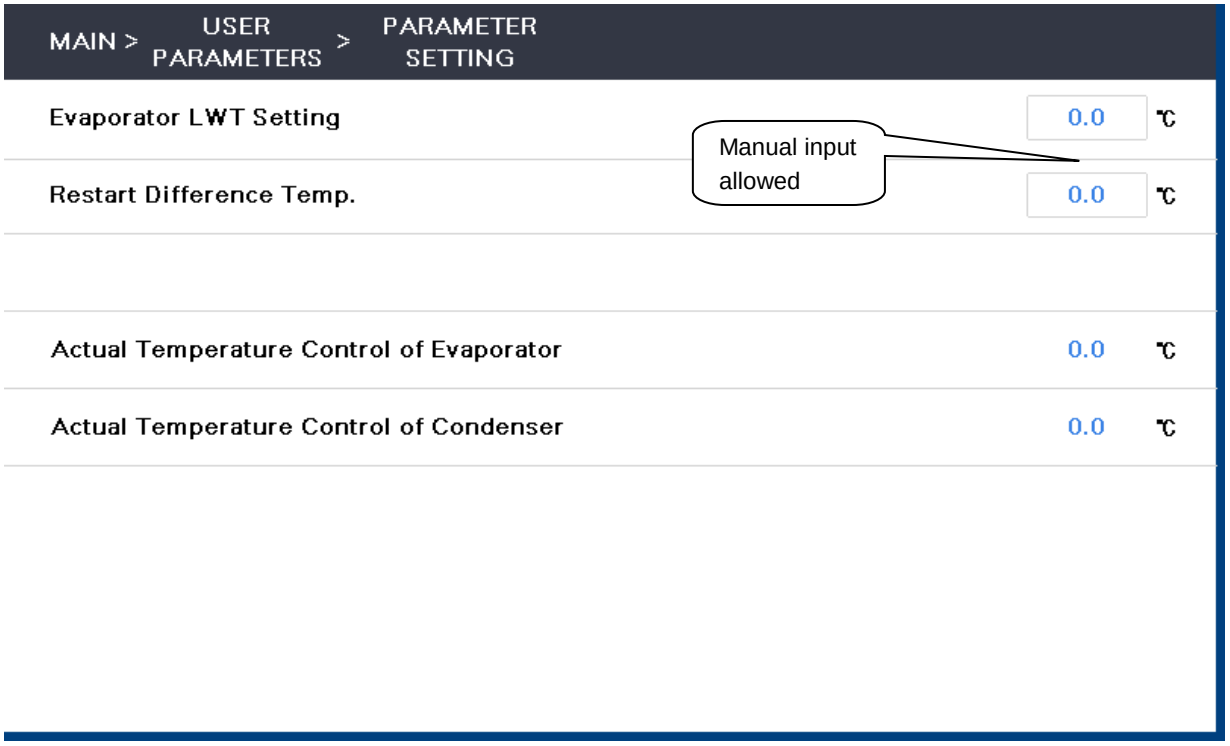


Figure 11.15 (Note: subject to the actual display contents of the unit)

Tap the value box to be set. The value input keyboard will appear, as shown in Figure 11.16.

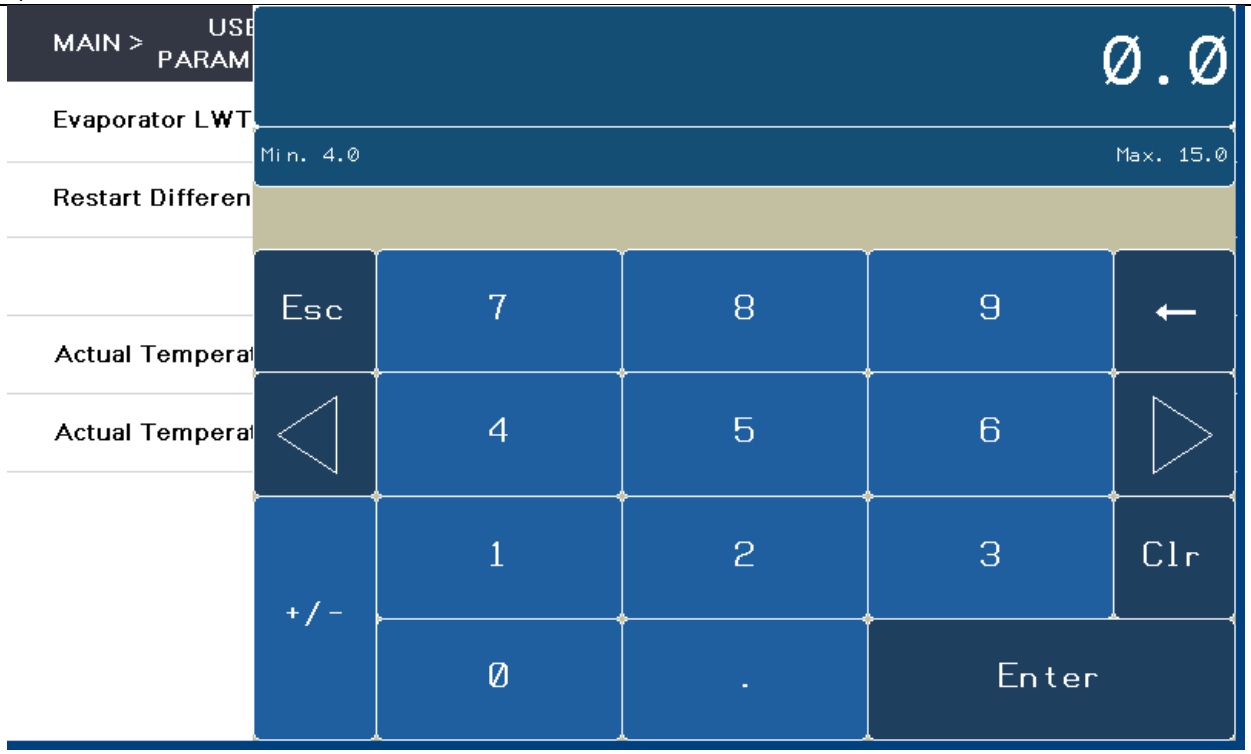


Figure 11.16 (Note: subject to the actual display contents of the unit)

Set MAX in the upper left of the window to the upper limit of set parameter and MIN to the lower limit of the set parameter (the value out of the range not accepted). Press "Enter" to confirm the input. Press "Esc" to cancel the input. The value input keyboard disappears.

Noun explanation:

① Evaporator LWT Setting: target value of water temperature control

② Restart Difference Temp.: a condition that needs to be met by water temperature control when the compressor starts

③ Actual Temperature Control of Evaporator/Actual Temperature Control of Condenser: displays the current target temperature actually controlled by the program. For target temperature switching during compressor operation, to ensure smooth operation of the unit, the actually controlled target temperature will not be immediately switched to the set target temperature, but is close to the set target temperature at a certain change rate until the actually controlled target temperature is the same as the set target temperature.

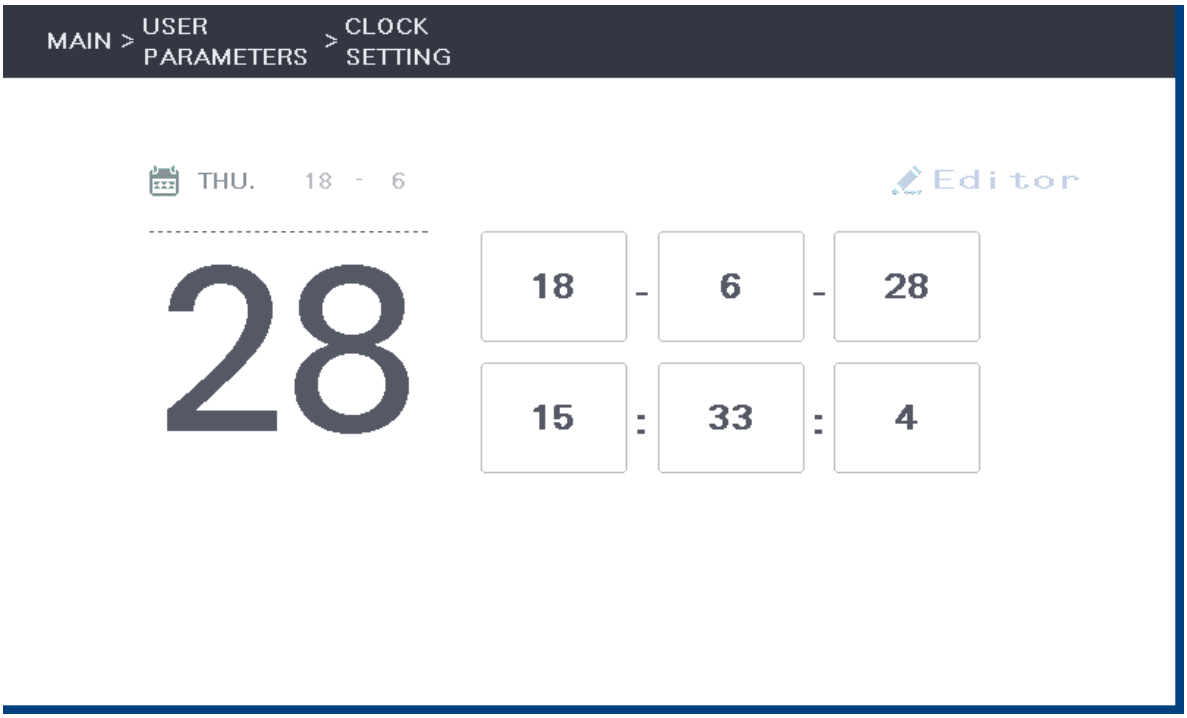
④ For restarting the paused unit, the compressor can be started only when the water temperature during cooling is greater than the set evaporator outlet water temperature + restart difference temperature; the compressor can be started only when the controlled water temperature during heating is smaller than the set condenser outlet water temperature - restart difference temperature.

11.1.2.8.2 PARAMETER - CLOCK SETTING

Tap "CLOCK SETTINGS" in the "PARAMETERS" interface to enter the time setting interface as shown in Figure 11.17.

Tap "Editor" to enter editing mode, tap the value box to be set to display a numeric input keyboard. Enter the corresponding time and press "Enter" to confirm the settings or "Esc" to cancel the input. The numeric input keyboard disappears.

After entering the time, if you tap "OK", the current set time takes effect and the system's time is counted from the current set time; if you tap the "Esc" button, the current set time is invalid, and the system time is counted from its original time.



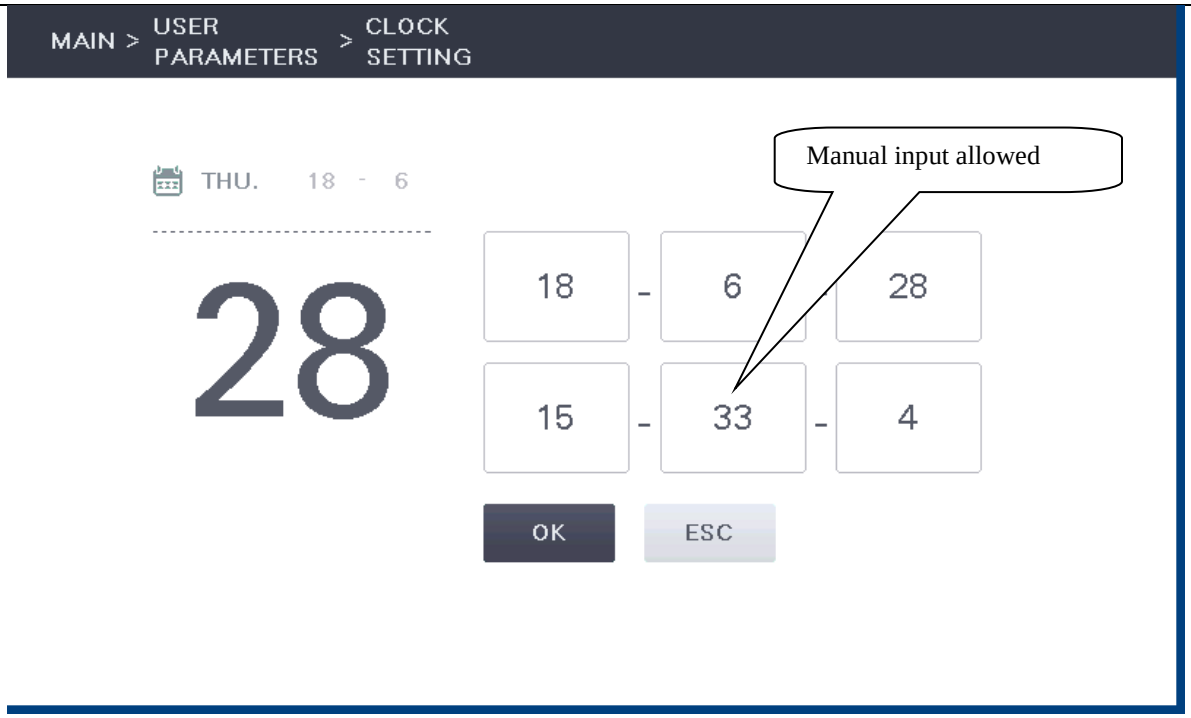


Figure 11.17 (Note: subject to the actual display contents of the unit)

Note: The date and time must be set in a reasonable manner. For any consequences resulting from an unreasonable date/time setting, Midea does not shoulder any liability.

11.1.2.8.3 PARAMETER - Brightness

Tap "Brightness" on the "PARAMETER" interface. The following interface appears, as shown in Figure 11.18. On the interface, "+" is the button used to increase the brightness, and "-" is the button used to decrease the brightness. Press the button once to change the brightness by one grade.

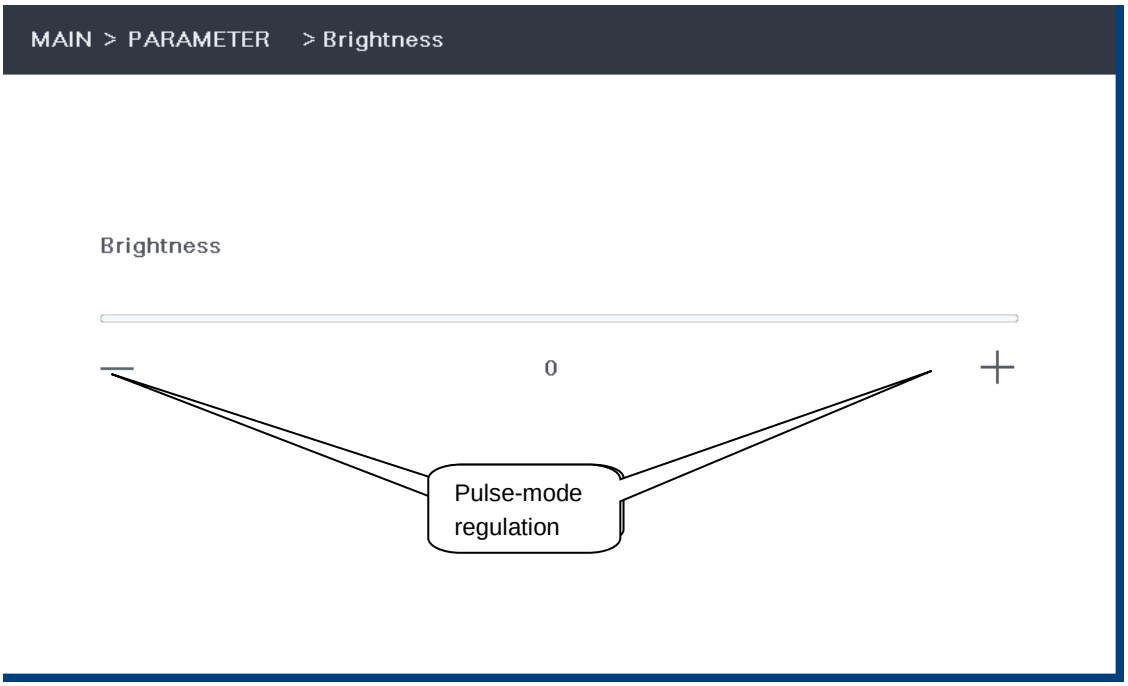
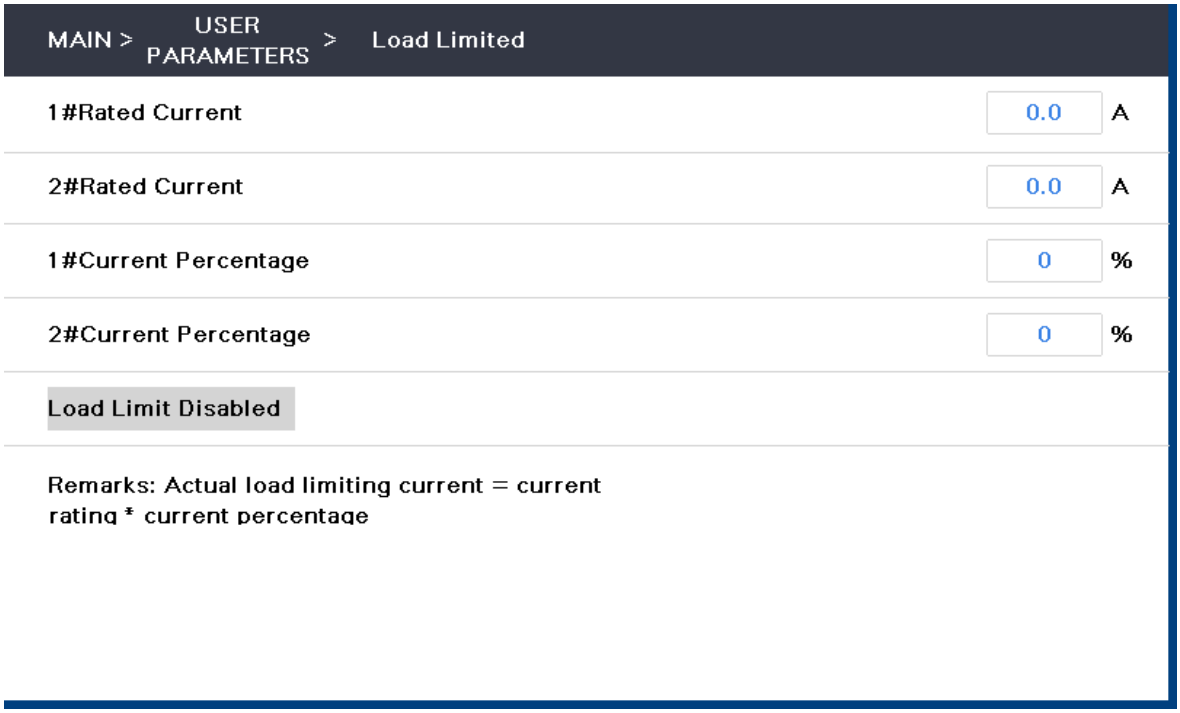


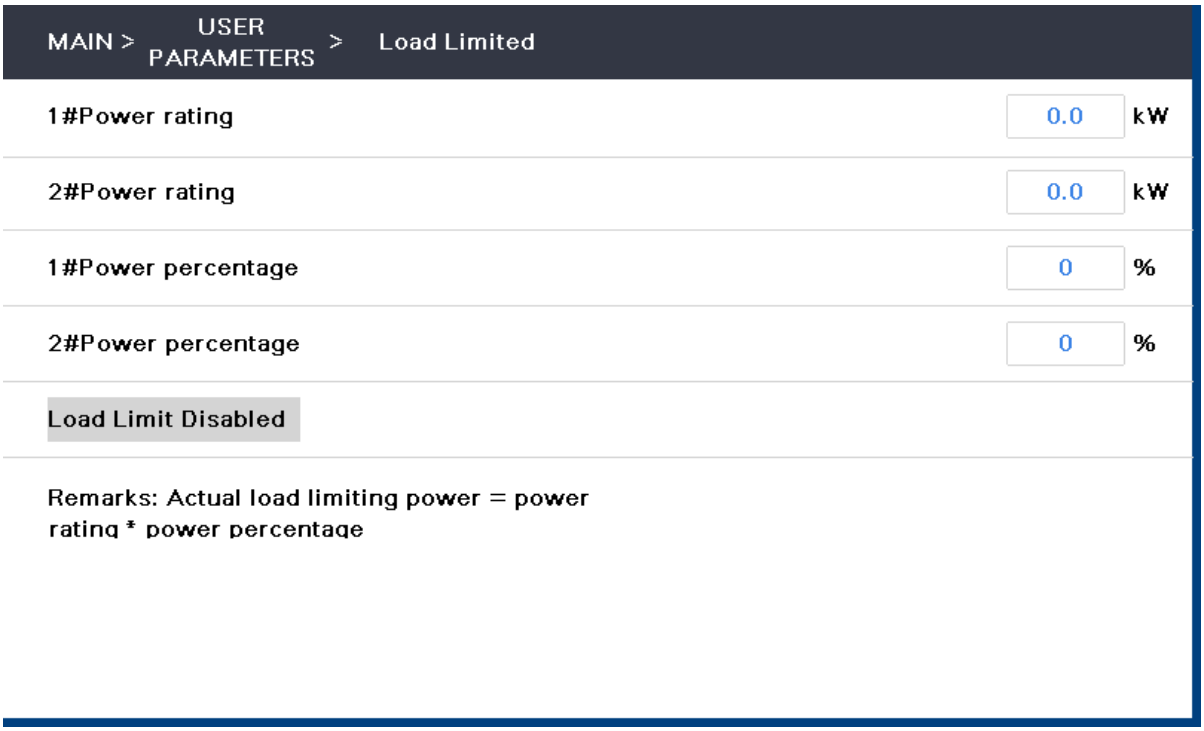
Figure 11.18 (Note: subject to the actual display contents of the unit)

11.1.2.8.4 PARAMETERS - Load Limited

Tap "Load Limited" on the PARAMETER interface to enter the interface as shown in Figure 11.19. Here, the current parameter is set for the fixed frequency unit to implement load limit control, and the power parameter is set for the inverter unit to implement load limit control.



(Fixed frequency unit)



(Inverter unit)

Figure 11.19 (Note: subject to the actual display contents of the unit)

Users can use this function when they need to limit the maximum operating current or power of the compressor:

① The 1# and 2# rated current values and the 1# and 2# current percentages should be set for the fixed frequency unit.

② The 1# and 2# rated power values and the 1# and 2# power percentages should be set for the inverter unit.

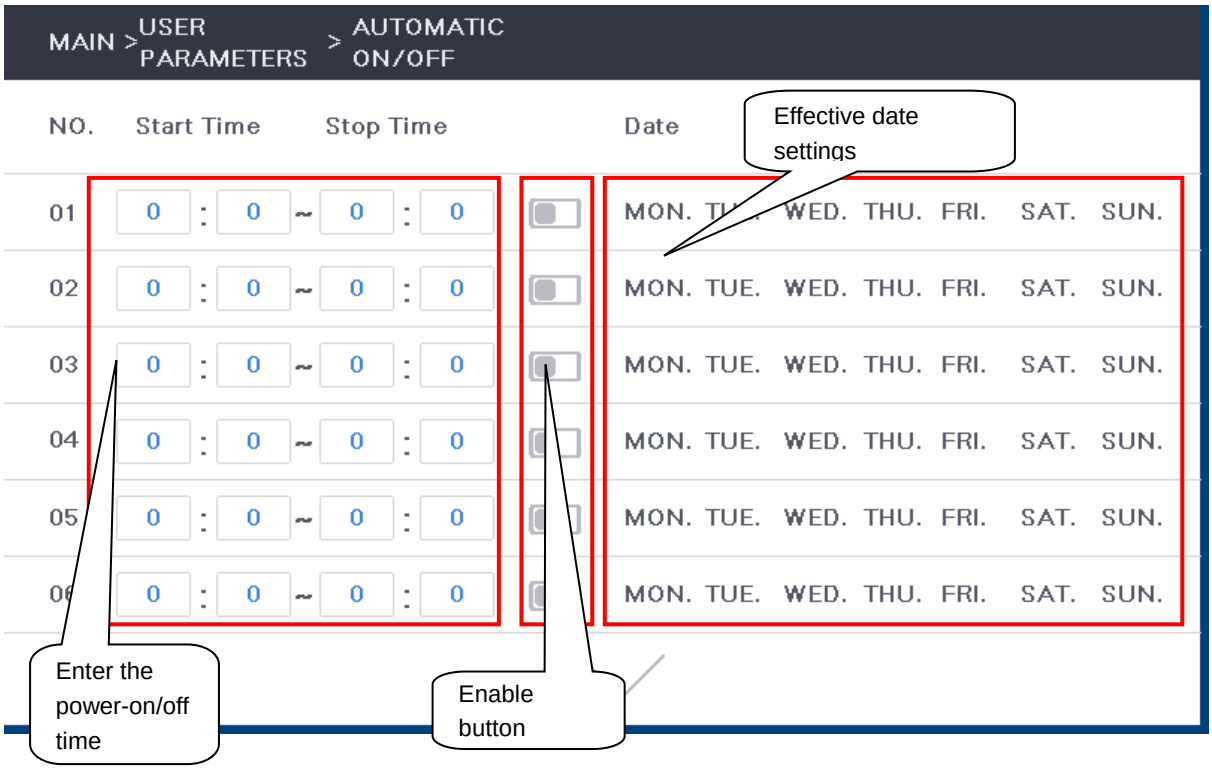
③ Tap "Load Limit Disabled". The load limiting function takes effect when it changes to "Load Limit Enabled".

④ The maximum operating current of the compressor limited by the fixed frequency unit: Rated current value * Current percentage; the maximum operating power of the compressor limited by the inverter unit: Rated power value * Power percentage.

11.1.2.8.5 PARAMETER - AUTOMATIC ON/OFF

To use the automatic on/off function, select "TIMED" in the control mode shown in Figure 11.5, and then enter the user parameter setting interface. Tap "AUTOMATIC ON/OFF" to enter the interface shown in Figure 11.20 below.

You can set the time for automatic on/off on a per-week basis. The unit then automatically starts up and shuts down based on the set time. For example, on at 5:00 on Tuesday and off at 13:00 on Tuesday; on at 08:00 on Thursday and off at 16:00 on Thursday. You can set timed start time to 5:00 and timed stop time to 13:00 in the row with serial number 01, and switch the TUE. button (gray icon) to TUE. (blue icon) and the enable button to  . In addition, set the timed start time to 08:00 and the timed stop time to 16:00 in the row with serial number 02, and switch the THU. button (gray icon) to THU. (blue icon) and the enable button to  . The timed on/off is set based on the system time of the unit. Check the system time before the setting.



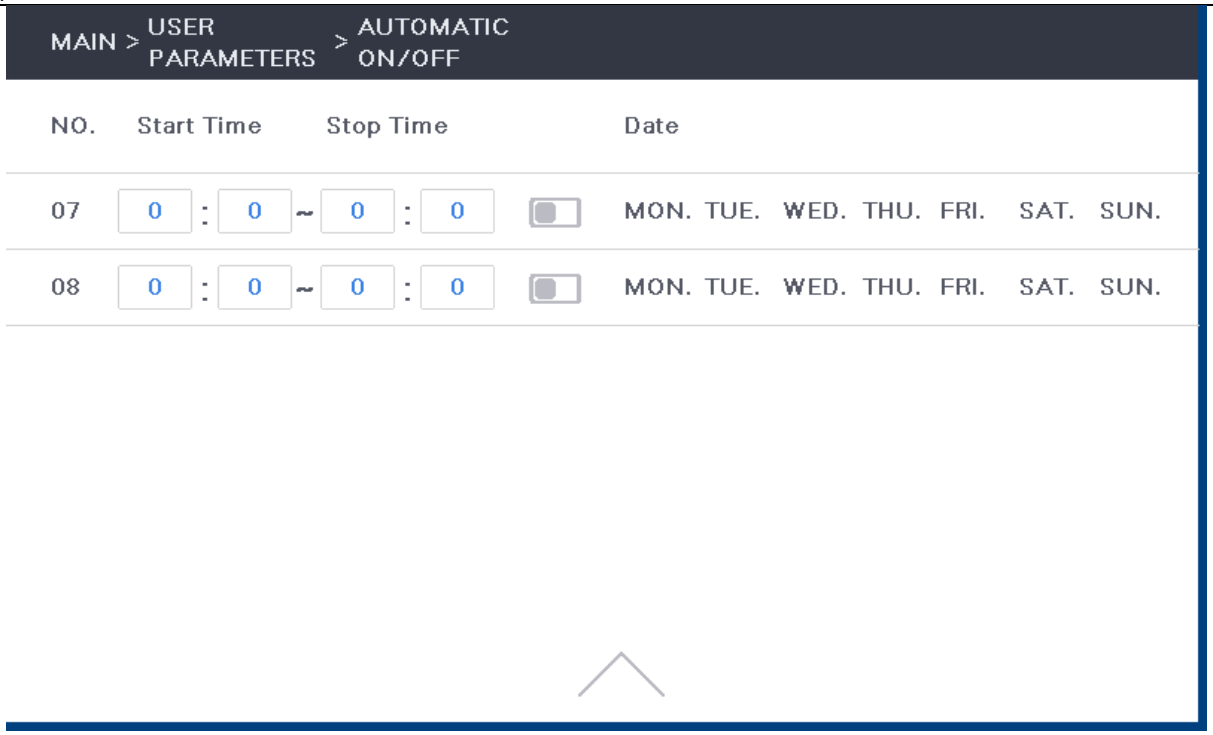


Figure 11.20 (Note: subject to the actual display contents of the unit)

Notes: ① If the unit is in standby status and the "Start Time" and "Stop Time" settings in this segment are the same, when the set start/stop time arrives, the shutdown priority principle will cause the unit to not be started.

② If the unit is in operating mode and the "Stop Time" of the current segment is the same as the "Start Time" of the other segments of the current day, when the set start/stop time comes, the unit will be stopped normally and will not be started again during this period of time.

③ It is advised to set a difference of over 15 minutes between the "Start Time" of other segments of the current day and the "Stop Time" in this segment of the current day; otherwise, if the unit is in operating mode, stop of the unit will be triggered when the "Stop Time" of this segment arrives. Because it takes a certain period of time to complete a stop, if the "Start Time" of other segments comes during stopping of the unit, the startup signal will be ineffective, and the unit will not be started again in this period of time after being stopped.

11.1.2.8.6 PARAMETERS - SERIAL PORT Settings

Tap "SERIAL PORT Settings" on the PARAMETERS interface to enter the interface as shown in Figure 11.21.

As shown in the figure, the parameters are displayed in two columns. The left column displays the successfully set parameter values, and the right column displays the parameter setting entry, which is used to set parameter values. Here, the baud rate, site number (address), and check bit can be set manually, but the data bit, stop bit,

and interface are fixed and cannot be set. After setting the parameters in the input boxes on the right, tap the above "Save" button to save the parameter setting results to the data boxes on the left. Now, the parameters are set successfully.

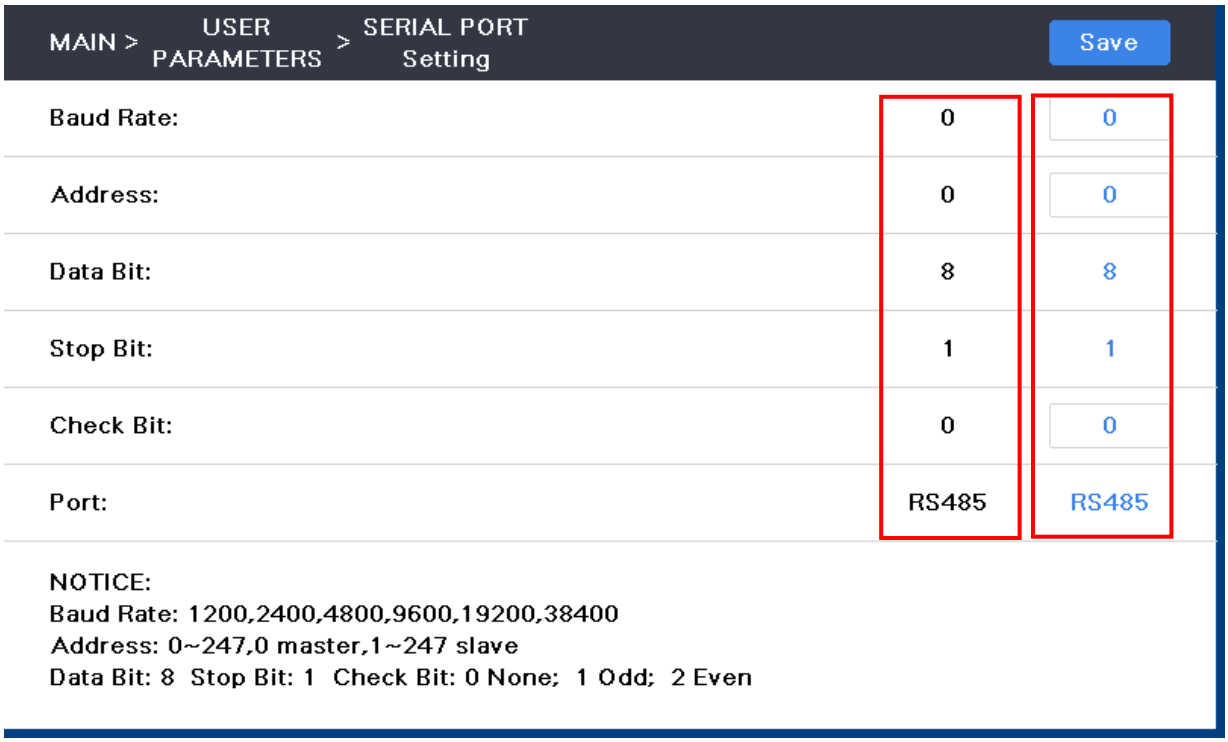


Figure 11.21 (Note: subject to the unit's actual display contents)

The specific settings are as follows:

① Baud Rate: set to 4800, 9600, 19200 or 38400. If this communication port (serial port) is connected to the cloud platform, it can only be set to 9600.

② Address: the site number address when the controller (PCB or PLC) functions as the slave site, with the setting range of 1 to 247. Note to keep the address unique on the bus.

③ Data Bit: fixed to 8.

④ Stop Bit: fixed to 1.

⑤ Check Bit: set to 0, 1 or 2. 0 indicates no check, 1 indicates an odd parity check, and 2 indicates an even parity check.

⑥ Interface: fixed to RS485.

Note: The above settings must be consistent with those of the upper computer.

11.1.2.8.7 PARAMETER - Multi-Connection SET

Tap "Multi-Connection SET" on the PARAMETER interface to enter the "Multi-Connection SET" homepage, as shown in Figure 11.22.

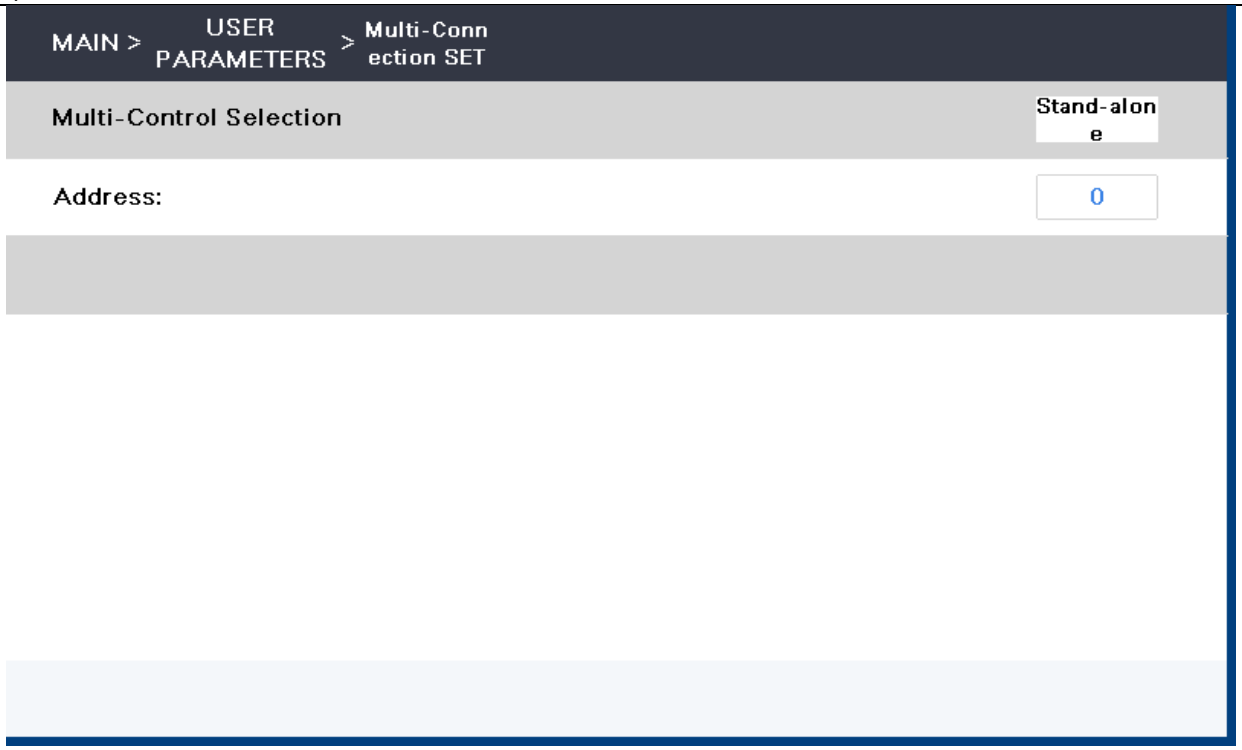


Figure 11.22 (Note: subject to the actual display contents of the unit)

On the "Multi-Connection SET" homepage, tap Stand-alone to switch between Stand-alone and Online and select the multi-control mode. When the Stand-alone mode is selected, the unit cannot implement multi-connection; when the Online mode is selected, the unit can implement setting of the multi-connection mode.

Tap 0 to select the site number (address) in the range of 1 to 16. The site number (address) of the master unit must be set to 1 and the site number (address) of each master/slave unit cannot be used repeatedly.

The following interface shown in Figure 11.23 will be displayed only when the Online mode is selected and the site number (address) is 1.

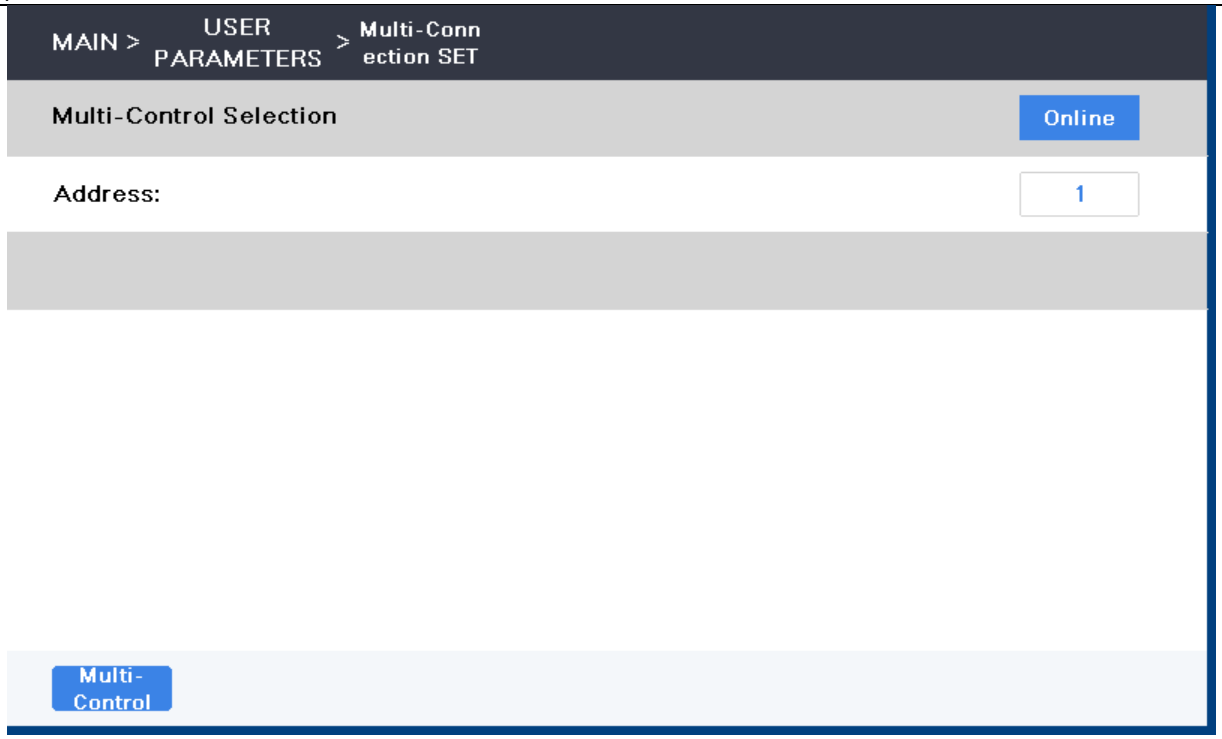
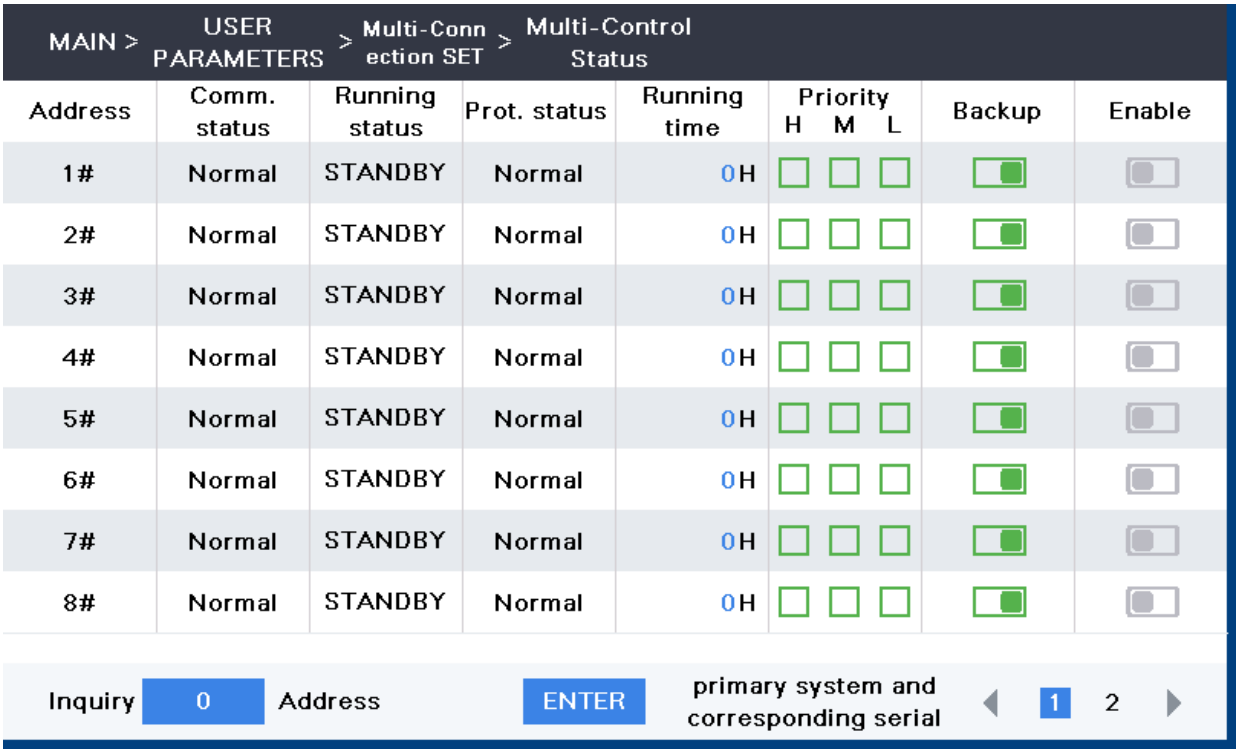


Figure 11.23 (Note: subject to the actual display contents of the unit)

Tap Multi-Control . The unit enters the "Multi-Connection SET" interface in the multi-connection mode, as shown in Figure 11.24.



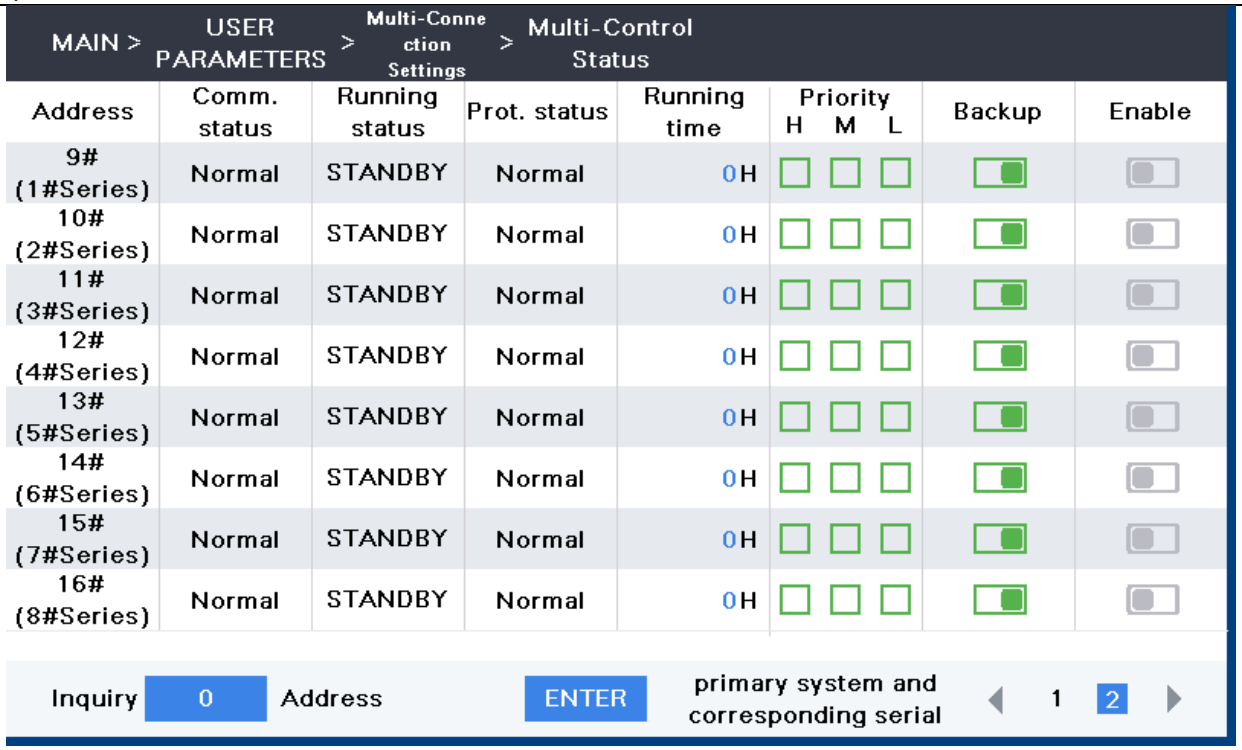


Figure 11.24 (Note: subject to the actual display contents of the unit)

In the multi-connection mode, units 1 to 8 are connected in parallel, units 9 to 16 are series units of units 1 to 8, the priorities of the main system and the corresponding serial system are set to the same by default, and the corresponding relationship is shown on the interface.

Interface display is as follows:

① Address: site number (address) corresponding to each unit.

② Comm. status: communication status between each unit and the master unit.

③ Running status: running status of each unit.

④ Prot. status: the fault alarm status of each unit.

⑤ Running time: cumulative running time of each unit.

⑥ Priority: three levels are available: H, M and L, which represent the priority of the corresponding unit. When other conditions are the same, the unit with the highest priority starts operations first, then the unit with medium priority starts operation, and finally the unit with low priority starts operation.

⑦ Backup: indicates whether the unit is a backup unit (which will be started only when other non-backup units are faulty). For the same unit, its "Enable" option of Backup and Priority option cannot be selected at the same time.

⑧ Enable: indicates whether the unit is added to the multi-control units.

When Priority is selected, the corresponding priority changes from ☐ to ■. When Backup is selected, the

Backup icon is ; if Backup is not selected, the Backup icon is . Only one of the H, M and L options of Priority and the Backup option is valid at the same time. When multi-connection is enabled, the enable icon is . When multi-connection is disabled, the enable icon is . The unit can implement multi-control only when multi-connection is enabled. For all the above selections, just tap the corresponding icon on the touch screen.

Tap the 1 2 button in the lower right corner to switch between the first and second pages.

Enter the unit site number (address) of the unit at 0 at the lower part of the touch screen, and tap ENTER to view the information data, temperature, pressure, input status and output status of the corresponding unit, as shown in Figure 11.25. For the related operations, refer to the operations on the status information interface of 11.25.

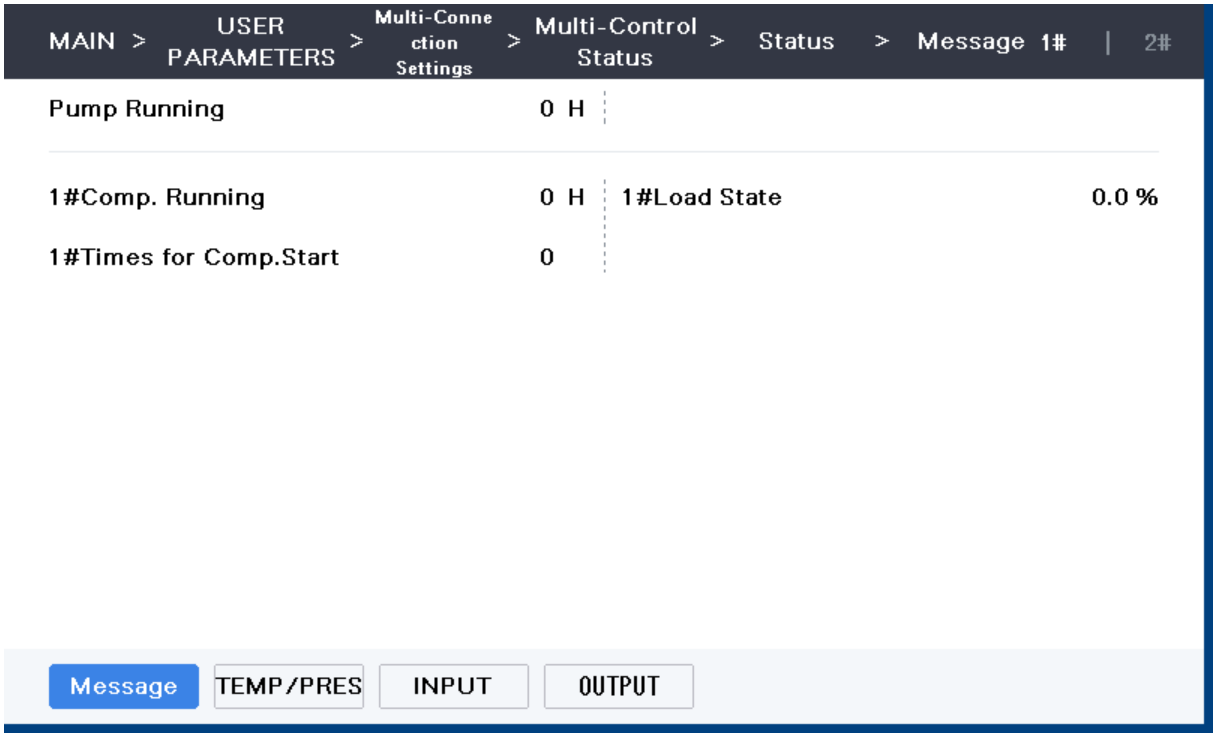


Figure 11.25 (Note: subject to the actual display contents of the unit)

Refer to the actual operation interface. The interface is subject to change without notice.

11.2 Precautions

1 Make sure the power is on for more than eight hours before initial startup, in order to prevent lump phenomenon of refrigerator oil when it starts up. If the ambient temperature is relatively low, time for heating up the oil shall be extended, because when it starts up in low temperature, the oil viscosity is high, it causes difficulty to startup and loading of compressor. When the system stops, the refrigerator oil heater continues to work, do not cut off the power unless the unit is not used for a long time.

2 Do not mix refrigerator oil of different brands. Confirm the brand and specifications of the refrigerator oil when adding it. If change of the refrigerator is required, clean away all the remaining refrigerator oil inside the

compressor and the system before adding new refrigerator oil and changing the dry filter. Qualitative change may happen when some synthetic oil mix up with mineral oil. Therefore, after adding the new refrigerator oil, change the new refrigerator oil to completely remove the remaining oil after starting up again.

3. Stop with the panel emergency stop button when any emergency occurs when start up the compressor.

4. Do not regulate the parameter of the electronic expansion valve controller without the approval of the after-sales people, otherwise, the unit cannot work normally.

5. Make sure the ambient environment of the unit is well ventilated if the safety valve of the store liquid organ is open. Harmful light will be produced when Freon meets fire; therefore, open flames around the unit are prohibited.

6. The water flow rate in the evaporator and condenser must be well maintained when the sets are recovering the refrigerant or charging/discharging it. It may cause the heat exchanger damage if there is a lack of water flow rate or cut-off of water which may result in frost crack of heat exchange tube during the refrigerant being charged or discharge

11.3 Trouble shooting

11.3.1 Fault Messages

In addition to the powerful microcomputer control function, the control system for this screw chiller has a series of self-protection functions, as shown in the following table. These ensure that the unit can operate safely when unattended.

Fault	Fault judgment condition	Fault acting
Power Failure Protection	There is no power switch signal (OFF)	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Evaporator Water Flow Prot.	There is no evaporator water flow switch signal (OFF)	Shut down
Condenser Water Flow Prot.	There is no condenser water flow switch signal (OFF)	Shut down
Evaporator LWT Sensor Fault	Open circuit	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Condenser LWT Sensor Fault	Open circuit	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Evaporator EWT Sensor Fault	Open circuit	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Condenser EWT Sensor Fault	Open circuit	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Multi-Connection Total LWT Sensor Fault	Open circuit	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Anti-freeze Protection	The evaporator outlet temperature is lower than the set value of antifreeze protection	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Temp./High Condenser LWT Alarm	The water outlet temperature of the condenser is higher than the set value for alarm	The unit enters halt state.
Low Oil Level Protection	There is no low oil level switch signal (OFF)	The corresponding compressor shuts down
Comp. Overload Prot.	Compressor overload signal (ON)	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Motor Protection	There is no motor protection switch signal (OFF)	If the unit is in operation, it will shut down. If it is not in operation,

		it will not be allowed to start.
Low Pressure Protection	There is no low pressure switch protection signal (OFF)	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
High Pressure Protection	There is no high pressure switch protection signal (OFF)	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Discharge Temp. Sensor Fault	Open circuit	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Oil Temp. Sensor Fault	Open circuit	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Discharge Pressure Transducer Fault	Open circuit	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Suction Pressure Transducer Fault	Open circuit	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Current Transducer Fault	Open circuit	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
High Discharge Temp. Protection	The discharge temperature is higher than the set value of High Discharge Temp. Protection	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Temp./Low Discharge Superheat Prot.	Discharge superheat is lower than the set value for Low Discharge Superheat Prot.	If the unit is in operation, it will shut down.
Overcurrent Protection	The current of the compressor is greater than the set value for compressor overload protection	If the unit is in operation, it will shut down.
Low Press. Difference Prot.	The difference between high and low pressure is lower than the set value for Low Press. Difference Prot.	If the unit is in operation, it will shut down.
High Discharge Pressure Protection	Discharge pressure is lower than the set value for high discharge pressure protection	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
Low Suction Pressure Protection	Suction pressure is lower than the set value for low suction pressure protection	If the unit is in operation, it will shut down. If it is not in operation, it will not be allowed to start.
EXV Comm. Fault	The number of communication failure of the EXV has reached the set value	If the unit is in operation, it will shut down. If it is not in operation,

		it will not be allowed to start.
EXV Protection	EXV protection status value is not 0	If the corresponding compressor is in operation, it will shut down. If it is not in operation, it will not be allowed to start.

12.3.2 Fault Analysis and Troubleshooting

No.	Symptom	Possible Cause	Solution
1	Low Pressure Protection	1. The system pipeline valve is not opened or the opening is too small. 2. The wiring connection is incorrect. 3. The low pressure switch is damaged. 4. The electronic expansion valve malfunctions or is stuck. 5. The system lacks refrigerant. 6. The intake filter screen or filter is blocked.	1. Open the closed valve. 2. Correct the incorrect connection. 3. Replace the low pressure switch with a new one. 4. Adjust EXV parameters or replace the EXV to ensure normal valve body action. 5. Add enough refrigerant. 6. Check whether the intake filter screen and dry filter are blocked.
2	High Pressure Protection	1. The system pipeline valve is not opened or the opening is too small. 2. The wiring connection is incorrect. 3. The high pressure switch is damaged. 4. The cooling water temperature is too high. 5. Excessive refrigerant has been added. 6. The heat exchange effect of the condenser is poor because the cooling water is dirty. 7. The vacuum degree of the system is too low because the air is mixed. 8. The refrigerant model is incorrect.	1. Open the closed valve. 2. Correct the incorrect connection. 3. Replace the high pressure switch with a new one. 4. Regulate the cooling water inlet and outlet temperatures of the unit to ensure that they are in the required value ranges. 5. Re-regulate the amount of system refrigerant. 6. Clean the water system regularly. 7. Empty the fluoride system. 8. Recharge the correct refrigerant.
3	EXV Protection (for units using an electronic	1. The connection of the expansion valve control	1. Connect the loose wire, and ensure the connection is correct.

	expansion valve)	module is incorrect. 2. The expansion valve core is stuck. 3. The expansion valve parameter settings are incorrect. 4. The EXV control module is damaged.	2. Replace the EXV body. 3. Set the correct EXV parameters 4. Replace the EXV control module.
4	Motor Protection	1. The wiring connection is wrong or becomes loose. 2. The protection module input power is wrong. 3. The built-in temperature sensor fails. 4. The compressor motor is overheated or the discharge temperature is too high.	1. Connect the loose wire, and ensure the connection is correct. 2. Regulate or replace the component to ensure that the input power complies with requirements. 3. Replace the sensor. 4. Regulate the operating conditions to within the operating range allowed by the unit.
5	Energy regulation exception	1. The wiring connection of the capacity adjusting solenoid valve for the compressor is incorrect. 2. The capacity adjusting solenoid valve core is blocked by dirt.	1. Connect the loose wire, correct wrong connections, and replace the damaged solenoid coil. 2. Clean or replace the solenoid valve core.
6	Unit noise or vibration exception	1. The bearing is damaged. 2. The compressor implements liquid compression. 3. Mechanical parts are poorly lubricated due to oil loss. 4. An internal mechanical part has become loose. 5. Pulse resonance occurs at the capacity regulating valve. 6. Foreign matter has entered the compression chamber.	1. Check whether the compressor bearing is damaged; if yes, replace the compressor. 2. Regulate the system superheat degree to adapt to unit operations. 3. Clean the oil pipeline or add lubricating oil to ensure oil supply is normal in the system. 4. If damage occurs, replace the mechanical parts or the compressor. 5. Replace the capacity regulating valve. 6. Dismantle the unit for inspection.
7	High Discharge Temp. Protection	1. There is not enough refrigerant. 2. The EXV is stuck or the parameter settings are incorrect. 3. The high pressure is too high and the load is too large.	1. Add refrigerant. 2. Check the valve body and adjust the EXV's parameters. 3. Eliminate the pipeline blockage and ensure that the cooling water temperature and flow comply with requirements. 4. Debug the system to ensure that oil

		4. Oil is lost or the oil level is low. 5. The pressure ratio is too large and auxiliary cooling is insufficient. 6. There is too much non-condensing gas in the system.	return is normal or add lubricating oil. 5. Check the auxiliary cooling system and ensure normal action. 6. Re-vacuumize the system and ensure the system vacuum degree and refrigerant purity are sufficiently high.
8	Discharge temperature too low	1. There is too much refrigerant in the system and a large amount of liquid is compressed. 2. The cooling water temperature does not meet requirements. 3. An improper EXV is selected or the parameters are incorrect. 4. The spray solenoid valve leaks or the action is incorrect.	1. Re-regulate the system refrigerant 2. Regulate the cooling water so it complies with unit requirements. 3. Replace the EXV with a proper one or readjust the EXV superheat degree. 4. If the spray solenoid valve is leaking inside, replace it. If the parameter settings are incorrect, reset the opening parameter.
9	High Discharge Pressure Protection	1. There is too much refrigerant in the system. 2. There is too much non-condensing gas in the system. 3. The system water flow is insufficient.	1. Adjust the amount of system refrigerant. 2. Re-vacuumize the system and ensure the system vacuum degree and refrigerant purity are sufficiently high. 3. Check the water system to eliminate water system faults and ensure that the cooling water flow and cooling water temperature comply with unit requirements.
10	Low Suction Pressure Protection	1. There is no enough refrigerant. 2. The dry filter or compressor suction filter screen is blocked. 3. There is no enough chilled water or the water temperature is too low. 4. There is a refrigerant leak.	1. Adjust the amount of system refrigerant. 2. Clean or replace the filter and filter screen, and replace the filter core. 3. Check the water system to eliminate water system faults and ensure that the cooling water flow and cooling water temperature comply with unit requirements. 4. Check the system for leaks.

12 Standard Maintenance

12.1 Maintenance and repair

Air conditioning equipment must be maintained by professional technicians, whilst routine checks can be carried out locally by specialized technicians.

Simple preventive maintenance will allow you to get the best performance from your chiller:

- Improved cooling performance
- Reduced power consumption
- Prevention of accidental component failure
- Prevention of major time-consuming and costly interventions
- Protection of the environment

Maintenance means the preventive process for the chiller, and reparation means the solution for the trouble. Customers have the responsibility to find specialized equipment engineers or professional technicians to do routine maintenance according to the required procedures in this manual. The reparation of the chiller has to be carried by qualified service department. After the warranty period, please contact local customer service to get timely and efficiently reparation (non-free) to ensure the chiller run reliably.

Note: In warranty period, the users have to pay for reparation expenses due to their incorrect maintenance of the chiller.

The basic task of the maintenance is regular record (for example, 2 hours) the operating parameters of the chiller every day, fill in the operating parameters table, such as high/low pressure, refrigerant inlet/outlet temperature, etc. The true and complete operating parameters will help to analyze unit operation trends, and detect or predict unit potential problem timely to take preventive measures.

Example: After one month of operation records, analyzing and compare operating parameters. Operator find temperature difference between condenser and chilled outlet water has growing trend, that means the cooling water may be dirty or high hardness, and condenser is constantly scaling, need do softening water treatment or cleaning tubes.

Note: normal operation parameters in debugging are very useful. It can use for as standard, compare with it to find problem trends. Please save it.

12.1.1 Maintenance table

During the unit operating life the service checks and tests must be carried out in accordance with following table.

Item		Frequency of maintenance	Qualified baseline (treatment method)	Remark
General	Noise	At any time	Listen	Stand 1 m from the unit to observe
	Vibration	At any time	Observe to see whether there is vibration with high amplitude	
	Voltage of power supply	At any time	Within ±10% of rated voltage	
	On/Off sequence	When On/Off	Execute according to the on/off	

			program of unit	
	Record operating parameters	Once per 2 hours	on schedule	
	Dry Filter	At any time		
Appearance of unit	Cleaning	At any time	Keep the unit clean	
	Rust	At any time	Do scaling with iron brush and cover it with antirust paint	
	Stableness	At any time	Fasten every screw	
	Insulating material flakes off	At any time	Stick them with adhesive	
	Water leakage	Monthly	Check whether the drainpipe is blocked	
Compressor	Noise	At any time	No noise when starting, running or stopping	
	Insulation resistance	Yearly	It should be over 5MΩ when measuring with ohmmeter of DV500V.	
	Shockproof rubber gets ageing	Yearly	It should be elastic when touching.	
	Middle inspection	Once per 3000 hours	Pay attention to noise, vibration and oil level.	
	Middle inspection	Once per 6000 hours	Confirm the operation of safety device and protection device	
	Oil level (oil quality)	At any time	The normal oil level is at the middle of sight glass. Adding lubricating oil if the oil level decline obviously.	
		Monthly	No dirt, no deterioration (replacement oil)	Replacement of filter core need to be carried by specialized technicians.
		Yearly	Make chemical analysis of the lubricating oil. No emulsification phenomenon. (replace lubricating oil of same brand)	Replacement need to be carried by specialized technicians.
Condenser	Cooled water Flow Temp. Water quality	At any time Monthly	Adjust the water flow to keep the pressure within fiducial value. Keep it within fiducial value.	See Fig. Ⅰ Refer to relationship chart between water quality and scale

	Cleanness	At any time	Keep high pressure within fiducial value.	
	Drainage	At any time	Drain the water before longtime rest.	Water in pipes should be also drained.
	Pressure	At any time	1~1.5MPa	
	Scaling Level of condenser tube	Yearly	The difference between Cooling water outlet temperature and refrigerant temperature in condenser is larger than 6 ℃ (cleaning heat exchange tube with special brushes)	Cleaning need to be carried by specialized technicians.
	Condenser weld	Once per 3 years	No leakage	Carried by qualified service facility
	Condenser water system filter	Unit run for 24 hours	Clean the filter	
		Quarterly	Clean the filter	
Evaporator	Chilled water Flow Temp. Thickness of antifreeze Water quality	 At any time Monthly Monthly	 Within fiducial value Above set thickness Within fiducial value	See Fig. II Refer to characteristic of antifreeze Refer to relationship chart between water quality and scale
	Cleanness	At any time	Keep low pressure within fiducial value.	See Fig. II
	Drainage	At any time	Drain the water before longtime rest.	Water in pipes should be also drained.
	Pressure	At any time	0.3~0.6MPa	
	Evaporator water system filter	Unit run for 24 hours	Clean the filter	
		Quarterly	Clean the filter	
Expansion valve	Performance	Monthly	The pressure on low-pressure side does not change when unscrew or fasten the screw on expansion valve.	Refer to Fig. II for running pressure
Safety valve	Performance	Yearly	Ditto	
Pressure gauge	Pointer	Half-yearly	Compare with the accurate pressure gauge.	
Operating valve	Performance	Monthly	The opening and closing are good.	

Safety valve	Integrity	Yearly	Take apart the connecting pipe of safety valve, check valve to see whether there is corrosion, rust, scaling, leakage phenomenon internal (Replacement safety valve)	Carried by specialized technicians.
Cooling cycle	Refrigerant leakage	Monthly	Seek the leakage on the unit and the pipe joint with leak detector. Expel the water from condenser and evaporator and seek leakage on water inlet and outlet.	Seek-leak can be done with electronic detector, torch detector or soap water.
Electric control	Insulation resistance	Monthly	It should be over 1MΩ when measuring with ohmmeter of 500VDC.	
	Running Current	Monthly	According to running current limit table	Section 7.7
	Conductibility of wire	Monthly	Insulating layer should be intact and well connected. The bolts are fastened.	
	Electromagnetic contactor	Monthly	No spark or buzz sound when pressing ON/OFF of contact repeatedly.	The interval should be more than 3 minutes or the contact may be damaged
	Rotary switch	Monthly	Works normally.	
	Auxiliary relay	Monthly	Works normally.	
	Time-limit relay	Monthly	Works normally.	
	Thermostat	Monthly	The temp. should accord to the set temp..	

After unit operation three years, please contact a qualified maintenance organizations, such as Midea local customer service department to do a comprehensive inspection. Especially check the compressor, make sure the internal components in good status; inspect unit air tightness, heat exchanger copper pipe whether or not has leakage; if necessary, do the nondestructive test for pressure vessel weld (longitudinal joint and girth weld of cooler and condenser), make sure the operation safety; inspect electronic operation and safe control, electronic components should be in good status.

Note: Unit installation for different used occasion, the maintenance inspection period may be shorten. Especially for the occasion unit stop may let to serious or security problems, such as used for industrial field.

Warning!

Water flow rate in condenser or evaporator must be kept during refrigerant reclaim work, charging or discharging work as well, water flow rate insufficient or cut off during refrigerant reclaim, charging or discharging work may cause

condenser or evaporator frozen to damage!

12.1.2 Relation of pressure and water outlet temp.

R134a type

■ High pressure

Abnormal: if the pressure≤6 Kg/cm2G or ≥12Kg/cm2G

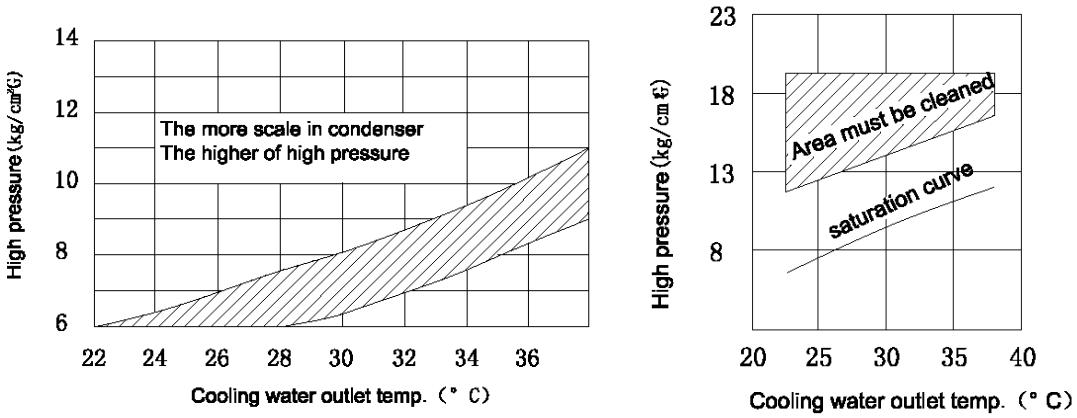


Fig. Ⅰ Relation of pressure and water outlet temp. (The high pressure at full load)

■ Low pressure

Abnormal: if the pressure≤1 Kg/cm2G or ≥3 Kg/cm2G

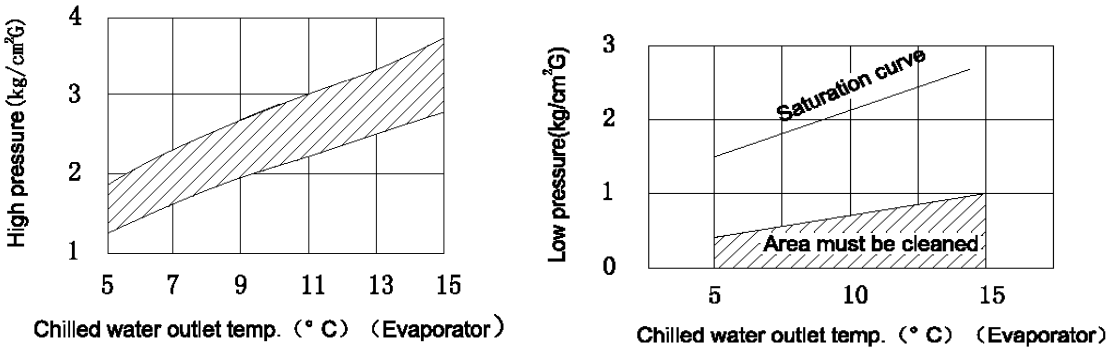


Fig. Ⅱ Relation of pressure and water outlet temp. (The low pressure at full load -Standard)

12.2 Maintenance and Cleaning

12.2.1 Relation between water quality, scale and degree of corrosivity:

The general tendency of influence (water quality to scale and degree of corrosivity) is shown as following table:

Water quality		Furring	Causticity	Remark
1	PH≤6 acidic water	Hard	Big	Hard CaSO4 will be built easily
2	PH≥8 acidic water	Soft	--------	Soft deposit with Fe3+&Cl- will be made.

3	Water of Ca2+, Mg2+	Hard	--------	Hard furring will be built easily.
4	Water of Cl-	Dirt resultant	Very strong	Causticity will be very strong special for iron and copper.
5	Water of SO42-, SiO22-	Hard	Big	Hard CaSO4& CaSO2 will be built easily
6	Water of Fe3+	Hard & Dirt resultant	Big	Deposit of Fe(OH)3& Fe2O3- will be made.
7	Feculent water	Dirt resultant	Very strong	Causticity will be very strong for copper.
8	Organic compound of water	Dirt resultant	--------	Furring will be built easily.
9	Water of exhaust gas	--------	Big	Copper pipe will be causticized and perforated
10	Water of plastic dust	Dirt resultant	--------	--------
11	Water of sulfurous acid gas in atmosphere	--------	Very strong	--------
12	Water interfused by natural effects of pollution, for ex. humidity nearby sea or hexapod body of garden belt	Dirt resultant	Big	--------

12.2.2 Cycle under normal temp. (A):

(Capacity of condenser+ Capacity of pipe+ Capacity of container)×1/3(Thickness of detergent 33%)

12.2.3 Cycle under normal temp. (B):

(Capacity of flume of cooling tower+ Capacity of condenser+ Capacity of pipe)×1/10(Thickness of detergent 10%)

In case doing cleaning after the unit stops, the capacity of flume of cooling tower can be 1/2 or 1/3 of rated value; if doing cleaning as the unit is running, the capacity should achieve rated value.

12.2.4 Precautions on usage of detergent

■ When doing cleaning, please wear rubber gloves and do not expose your skin or your clothes to the detergent. Wash any spills from the skin with soap and water.

■ The container for detergent should be made of plastic or glass rather than lead.

■ The used detergent should be neutralized with lime or soda before draining into gutterway.

■ Detergent is harmful to human; please keep it away from children.

■ Turn on the unit after cleaning to ensure it is clean. If necessary, please do cleaning again.

12.2.5 Additional notices

■ To avoid compressor oil foaming, power supply have to last for 8 hours at least before unit first running, in lower surrounding temperature the time must be delayed longer. Not long enough oil heating may cause ropy oil to resist compressor running. Oil heater have to keep working after unit stop to keep oil in good lubrication status unless long term stop power off.

■ It’s extremely forbidden to use compressor oil mixed with different brands! Before oil refresh, old oil left in compressor need to be cleaned thoroughly.

■ When unit is running, emergent power off button on control panel could stop the unit at any emergencies.

■ Individual ventilation piping towards to outside of equipment house have to be set for relief valves on pressure vessels in case of over pressure.

■ Notices during unit running:

1. Electrical part:

1) check and confirm the voltage in normal range.(+/-10% nominal voltage)

2) check the running current in normal range.

3) contactors in right working status.

4) pressure switch set with proper protection value.

2. Unit system part:

1) sound level of compressor motor, pay attention to over large sound and abnormal noise.

2) check the water pump running smoothly, proper pressure drop showed on pressure gauge.

3) check and ensure proper value pointed on high pressure or low pressure gauge. (refer to 15.1.2)

4) check the sight glass of evaporator and oil return line to ensure reasonable oil supply.

5) check and ensure no leakage on unit.

6) ensure that there is no frost on the suction line, confirm no liquid compression.

3. Evaporator part:

1) ensure correct chilled water flow rate.

2) check and ensure right chilled water outlet temperature comparing with setting point.

3) check and ensure proper chilled water inlet temperature comparing with setting point.

4) check stable chilled water outlet temperature.

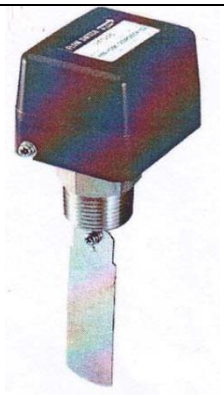
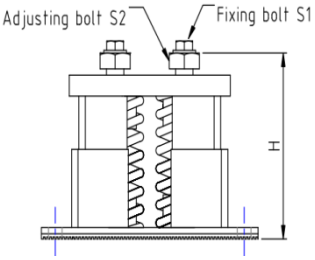
4. Condenser part:

1) check and ensure condensing temperature in proper range.(refer to 15.1.2)

2) ensure correct cooled water flow rate.

3) pay attention to degree of supercooling if possible.(3~7℃ as appropriate)

Available Accessories List

No.	Name	Model	Introduction	Picture	Q'ty
1	Water switch	FQS-030G	In the outlet pipe of evaporator, protecting heat exchange pipes from breakage due to the accidental freezing.		1
2	Vibration damper	SHA-D Series	Vibration damper is to reduce the vibration and noise by isolating the supports from the floor.		4
3	Remote control panel	YCKZ-P	Can be installed indoors by connecting with the unit touch screen via wire line. Demonstrates all the information and able to complete all the operations.(Start/Shut, error confirmation)		1
4	Flange	Standard Flange of HG/T20592-2009	The pipes in water side can be connected by flange, which is possible to endure 1.6MPa of water pressure as customer required.		8

Midea

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