t TRUST
Air Conditioners

TROPICAL AIR-COOLED SCREW CHILLER

TRUST AIR CONDITIONING EQUIPMENT CO.
Prepared By: Engineering & R & D Department.

Contents

توجه:

شرکت تراست حق تغییر مشخصات دستگاه ها را در جهت بهبود و ارتقای کیفیت برای خود محفوظ می دارد.

2017

I. Safety precautions

Before use, read through the operating instructions to ensure proper using. Please keep it well so that the professional technician can refer to it anytime.

1. Installation safety considerations

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.

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.

Strongly recommend employing a specialized company to unload the machine.

The units can 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.

Ensure that the valves are correctly installed, before operating the unit.

In certain cases the relief valves are installed on isolating valves. These valves are factory-supplied lead-sealed in the open position. This system permits isolation and removal of the relief valves for checking and replacing. The relief valves are designed and installed to ensure protection against overpressure caused by fire.

Ensure good ventilation, as accumulation of refrigerant in an enclosed space can displace oxygen and cause asphyxiation or explosions.

Inhalation of high concentrations 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

2. Maintenance safety considerations

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.

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: The unit must never be left shut down with the liquid line valve closed, as liquid refrigerant can be trapped between this valve and the expansion device. (This valve is situated on the liquid line before the filter drier box.)

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

Never work on a unit that is still energized.

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

If any maintenance operations are carried out on the unit, lock the power supply circuit in the open position ahead of the machine.

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.

At least once a year thoroughly inspect the protection devices (valves). If the machine operates in a corrosive environment, inspect the protection devices more frequently

3. Repair safety considerations

All installation parts must be maintained by the personnel in charge, 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.

If a leak occurs or if the refrigerant becomes contaminated 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 R-134a charge, as indicated on the unit name plate polyolester 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.

Don't weld or flame cut the refrigerant pipelines or any refrigerant circuit component until all refrigerant (liquid and gas) 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.

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 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.

Ensure that you are using the correct refrigerant type before recharging the unit.

Charging any refrigerant other than the original charge type (R-134a) will impair machine operation and can even lead to a destruction of the compressors. The compressors operating with this refrigerant type are lubricated with a synthetic

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 pipelines 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. Consult the list of replacement parts that corresponds to the specification of the original equipment.

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 shutoff 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 loosen 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.

II. Product

1. General Information

1). Product line up

Model	Power Supply	Cooling Capacity (kW)	Quantity of Compressor	Quantity of Fan
TMCU0380B3O3/1AT3SB	380V/3Ph/50Hz	380	1	6
TMCU0500B3O3/1AT3SB	380V/3Ph/50Hz	500	1	8
TMCU0600B3O3/1AT3SB	380V/3Ph/50Hz	600	1	10
TMCU0760B3O3/1AT3SB	380V/3Ph/50Hz	760	2	12
TMCU0900B3O3/1AT3SB	380V/3Ph/50Hz	900	2	14
TMCU01000B3O3/1AT3SB	380V/3Ph/50Hz	1000	2	16
TMCU01200B3O3/1AT3SB	380V/3Ph/50Hz	1200	2	20

3). External appearance

TMCU0380B3O3/1AT3SB module

TMCU0500B3O3/1AT3SB module

TMCU0600B3O3/1AT3SB   module

TMCU0760B3O3/1AT3SBmodule

TMCU0900B3O3/1AT3SB module

TMCU01000B3O3/1AT3SB module

TMCU01200B3O3/1AT3SB   module

2. Feature

### ♣ Environmental care

■ R134a refrigerant

Refrigerant of the HFC group with zero ozone depletion potential.

It is environmentally safe and does not have a phase-out date.

♣ Economical operation cost

■ Extremely high full load and partial load energy efficiency. New twin-rotor screw compressor equipped with a high-efficiency motor and a variable capacity valve that can adjust the capacity of 25%, 50%, 75% and 100% in 4 stages (Stepless control is optional) and permits exact matching of the cooling capacity to the actual load.

■ Electronic expansion device permits the operation at a lower condensing pressure and improve the utilization of the evaporator heat exchange surface (superheat control).

■ Economizer system with electronic expansion device for increases the cooling capacity. Automatic scheduling of the Chiller's compressors allows the chiller to match the fluctuating cooling load and conserve energy with each unit running at its peak efficiency.
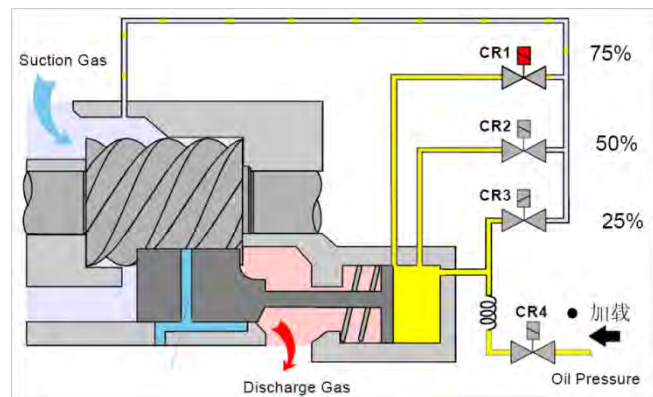
♣ Lower operating noise

■ The twin-screw compressor adopts the strong points of gapless-loss, high-efficiency cubage, low-noise, few easy workout parts. Double-wall structure not only compensates the pressure, but also significantly reduces the noise. Cast iron structure of the compressor casing and oil separator can reduce the noise significantly.
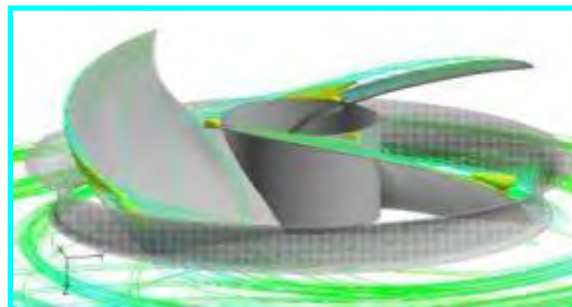
■ Low-noise fans, made of a composite material are now even quieter and do not generate   intrusive low-frequency noise. Rigid fan mounting avoids start-up noise.

 Multiple direct drive dynamically balanced propeller fans operate at low tip speeds for maximum

efficiency and minimum noise and vibration. A heavy-gauge vinyl-coated fan guard protects each fan.

Outstanding reliability

■ Full factory testing of all the units ensures a trouble free start-up. Extensive test makes certain that each safety and operating control is properly adjusted, and operates correctly. The unit has passed full factory test before being delivered to ensure the reliable working on the site.

■ Transport simulation test in the laboratory on a vibrating table.

Simple structure, easy Installation

■ The unit can be placed in service after being connected with power supply and water supply during field installation .Standard flange connection and wire mesh to the electrical panel make the installation easy and simple.

State of technique, accuracy control

■ The sensors related to control and other assemblies are equipped by factory and strictly tested Intelligent control：The unit is controlled by micro-controller and has the automatic control functions of fault diagnosis, energy management and anti-freezing monitoring, which ensures the high-efficiency operation of the unit, and more convenient in use. The unit with RS485 open protocol communication interface. BMS compatible. The startup and shutdown of each unit is controlled by the host computer, reducing the running cost to the lowest.

■ Complete and safe control system: All electrically control elements are designed and selected with stable quality and reliable function; The unit designed with multiple security measures ensure the safe and reliable running witch including high and low pressure protection, oil pressure difference protection, anti-freezing protection, water flow protection, power protection, overload protection etc.

3. Specification

Single compressor:

		380	500	600	760
Cooling capacity	kW	379	500	597	758
Power input	kW	121	155	186	242
COP	kW/kW	3.13	3.23	3.21	3.13
Semi-hermetic screw compressor					
Circuit A	Quantity	1	1	1	1
Circuit B	Quantity	--	--	--	1
Oil recharge	Type	BSE170	BSE170	BSE170	BSE170
Circuit A	L	30	30	30	30
Circuit B	L	--	--	--	--
Refrigerant	Type	R134a	R134a	R134a	R134a
Circuit A	kg	76	90	105	76
Circuit B	kg	--	--	--	76
Control Type		EXV	EXV	EXV	EXV
Evaporator	Type	Shell and tube heat exchanger(DX)			
Water content	L	222	308	340	550
Water flow	m³/h	65.2	86	102.3	130.7
Pressure drop	kPa	39	54	56	75
Max. design pressure	MPa	1	1	1	1
Pipe connection type		Victaulic Coupling			
Water inlet/outlet pipe dim.	mm	125	125	125	150
Condenser	Type	Fin-coil	Fin-coil	Fin-coil	Fin-coil
Fan	Quantity	6	8	10	12
Total air flow	m³/h	23000*6	23000*8	23000*10	23000*12
Fan speed	rpm	940	940	940	940
Unit length	mm	3810	4865	5800	7720
Unit width	mm	2280	2280	2280	2280
Unit height	mm	2370	2370	2370	2370
Shipping weight	kg	3420	4460	5170	6630
Running weight	kg	3640	4770	5510	7080
Safety protection device		The following safety devices are equipped as standard. High pressure protection; Low pressure protection; Compressor overload protection; Fans overload protection; High discharge temp. protection; Power failure protection; Contactor protection; Water flow protection; Motor protection; Low oil level protection; Differential pressure protection;			

Note:

1) Nominal cooling capacities are based on the following conditions:

Chilled water inlet/outlet temp: 12℃/7℃; Outdoor temp (DB/WB):35℃/24℃.

2) The applicable ambient temperature range of R134a air-cooled screw units is 15℃ ～ 52℃。

3) Water side fouling factor: 0.018m2·°C/kW.

Dual compressors:)

		900	1000	1200
Cooling capacity	kW	908	1000	1210
Power input	kW	279	310	372
COP	kW/kW	3.25	3.23	3.25
Semi-hermetic screw compressor				
Circuit A	Quantity	1	1	1
Circuit B	Quantity	1	1	1
Oil recharge	Type	BSE170	BSE170	BSE170
Circuit A	L	30	30	30
Circuit B	L	30	30	30
Refrigerant	Type	R134a	R134a	R134a
Circuit A	kg	76	90	105
Circuit B	kg	90	90	105
Control Type		EXV	EXV	EXV
Evaporator	Type	Shell and tube heat exchanger(DX)		
Water content	L	620	600	770
Water flow	m³/h	156.2	172	208
Pressure drop	kPa	75	75	72
Max. design pressure	MPa	1	1	1
Pipe connection type		Victaulic Coupling		
Water inlet/outlet pipe dim.	mm	150	150	200
Condenser	Type	Fin-coil	Fin-coil	Fin-coil
Fan	Quantity	14	16	20
Total air flow	m³/h	23000*14	23000*16	23000*20
Fan speed	rpm	940	940	940
Unit length	mm	8800	9640	11700
Unit width	mm	2280	2280	2280
Unit height	mm	2370	2370	2370
Shipping weight	kg	7980	9160	9580
Running weight	kg	8600	9760	10350
Safety protection device	The following safety devices are equipped as standard. High pressure protection; Low pressure protection; Compressor overload protection; Fans overload protection; High discharge temp. protection; Power failure protection; Contactor protection; Water flow protection; Motor protection; Low oil level protection; Differential pressure protection;			

Note:

1) Nominal cooling capacities are based on the following conditions:

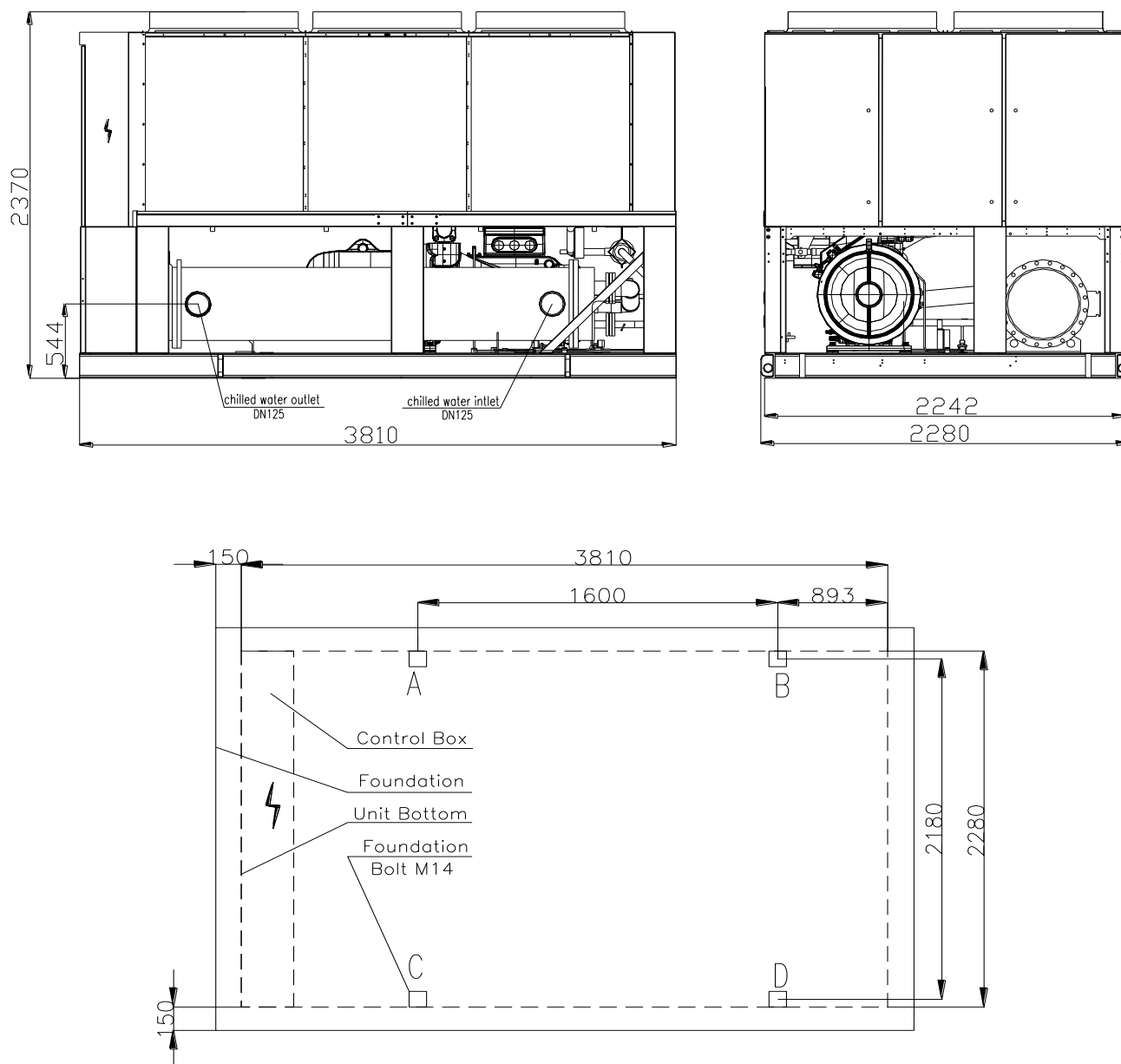Chilled water inlet/outlet temp: 12℃/7℃; Outdoor temp (DB/WB):35℃/24℃.

2) The applicable ambient temperature range of R134a air-cooled screw units is 15℃ ～ 52℃。

3) Water side fouling factor: 0.018m2·°C/kW.

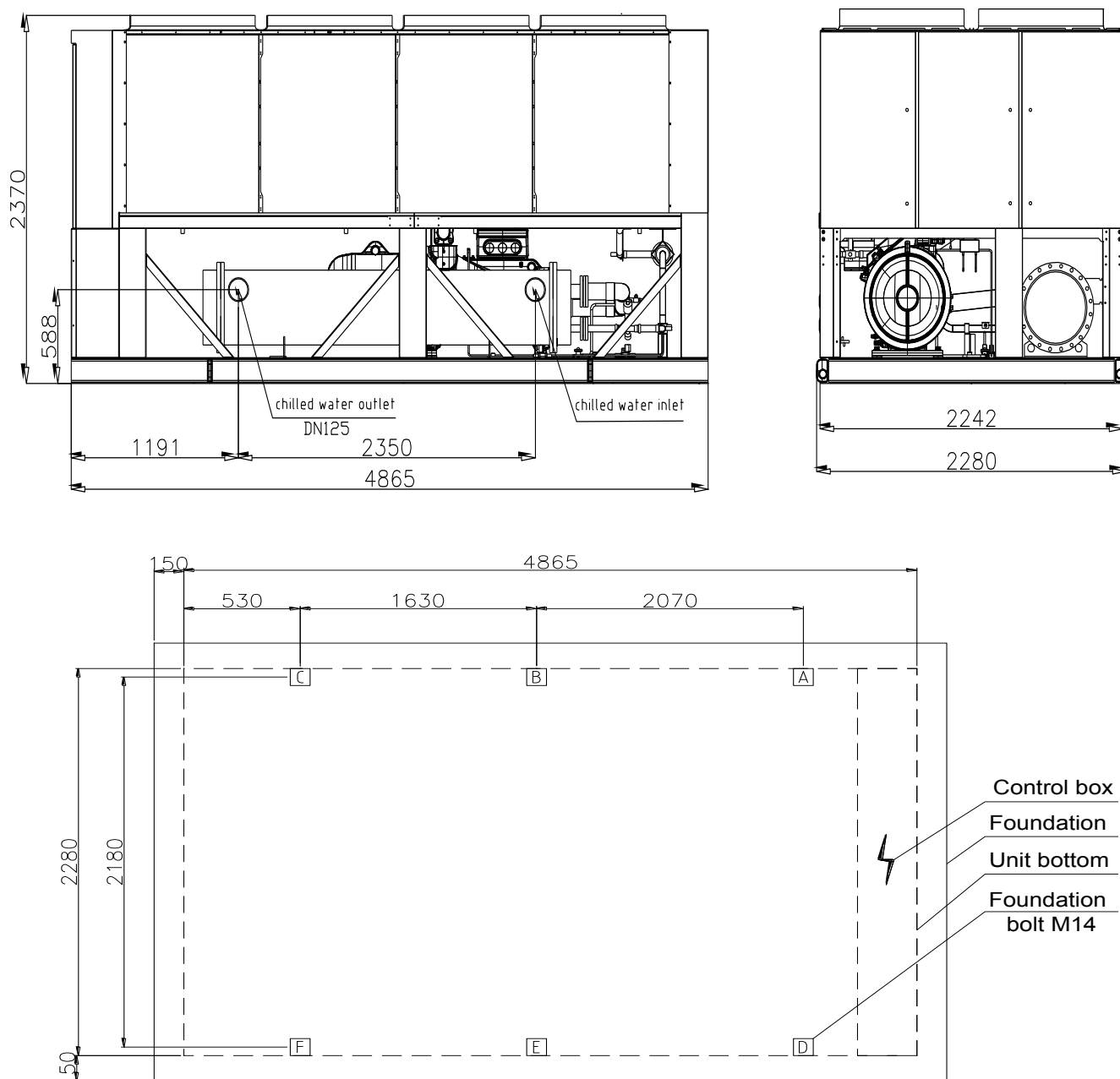## 4. Outline dimension

(1) TMCU0380B3O3/1AT3SB

Unit (mm)

Model	Weight to be supported by spring isolator(kg)			
	A	B	C	D
TMCU038B3O3/1AT3SB	894	926	894	926

(2) TMCU0500B3O3/1AT3SB

Unit (mm)

chilled water outlet
DN125

chilled water inlet

1191
2350
4865

2370
588

2242
2280

150
4865
530
1630
2070

C
B
A

2280
2180

Control box
Foundation
Unit bottom
Foundation
bolt M14

F
E
D

150

Model	Weight to be supported by spring isolator(kg)					
	A	B	C	D	E	F
TMCU0380B3O3/1AT3SB	656	876	853	656	876	853

(3) TMCU0600B3O3/1AT3SB

Unit(mm)

chilled water outlet
DN125

chilled water intlet
DN125

2370

668

5800

2242

2280

150

5800

2000

1500

1000

A

B

C

Control Box

Foundation

Unit Bottom

Foundation
Bolt M14

2180

2280

D

E

F

150
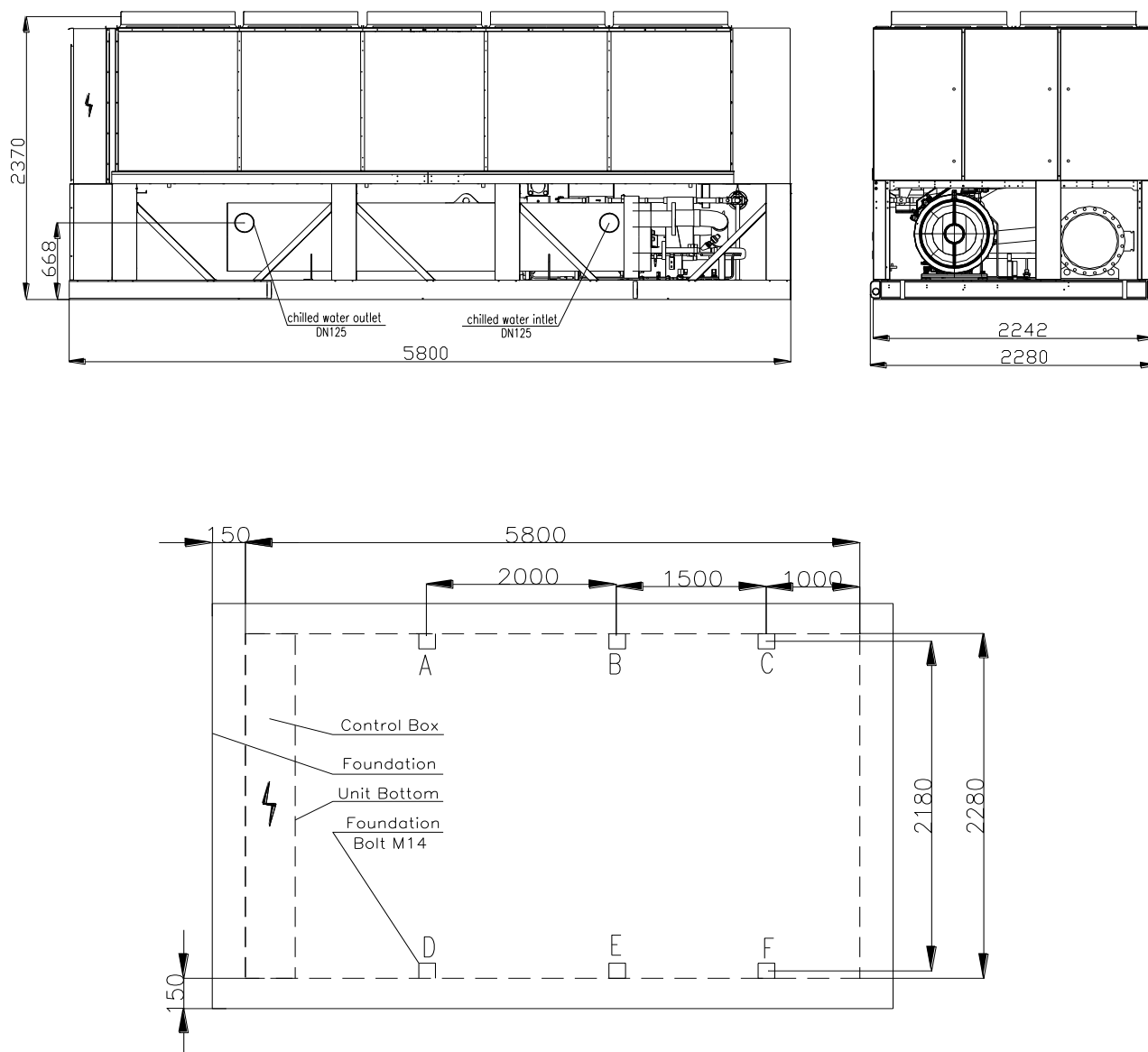
Model	Weight to be supported by spring isolator(kg)					
	A	B	C	D	E	F
TMCU0600B3O3/1AT3SB	890	939	926	890	939	926

(4) TMCU0760B3O3/1AT3SB

Unit(mm)
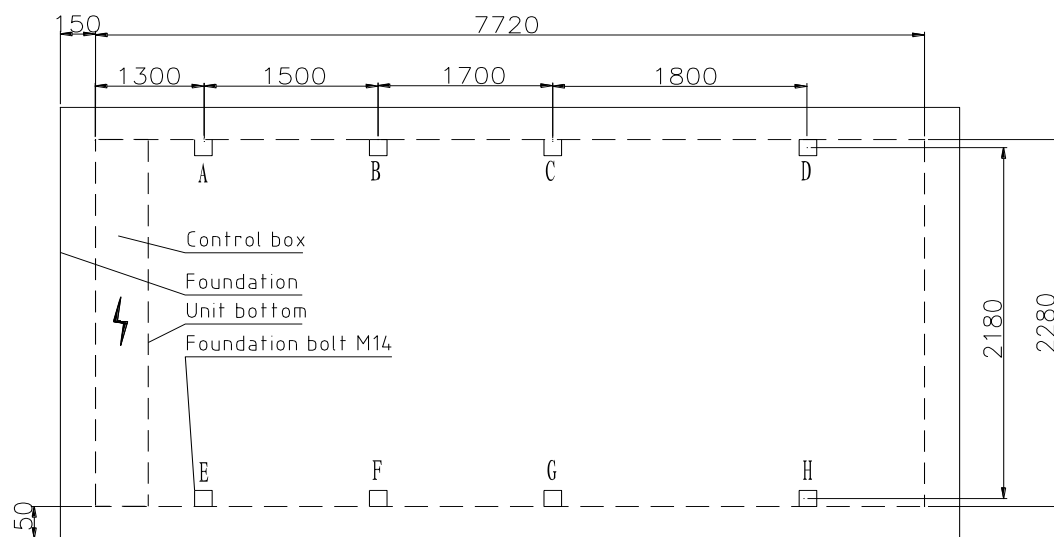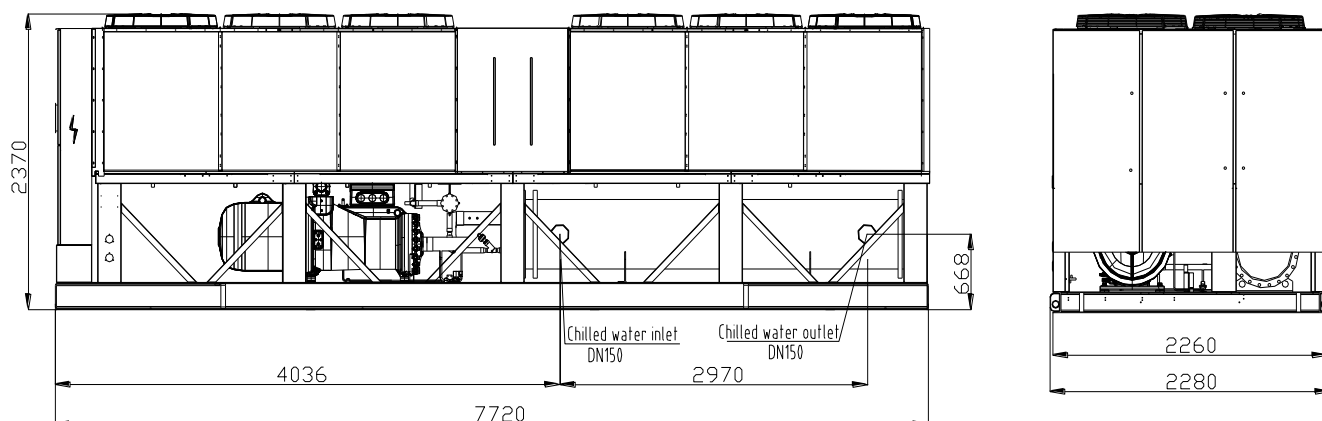
Model	Weight to be supported by spring isolator(kg)							
	A	B	C	D	E	F	G	H
TMCU0760B3O3/1AT3SB	894	951	846	849	894	951	846	849

14

(5) TMCU0900B3O3/1AT3SB

Unit(mm)

chilled water inlet
DN150

chilled water outlet
DN150

2370

700

5022

2950

8800

2260

2280

150

8800

564 1570 1180 1800 2570

A   B   C   D   E

Control Box

Foundation

Unit Bottom

Foundation
Bolt M14

F   G   H   I   J

2180

2280

150
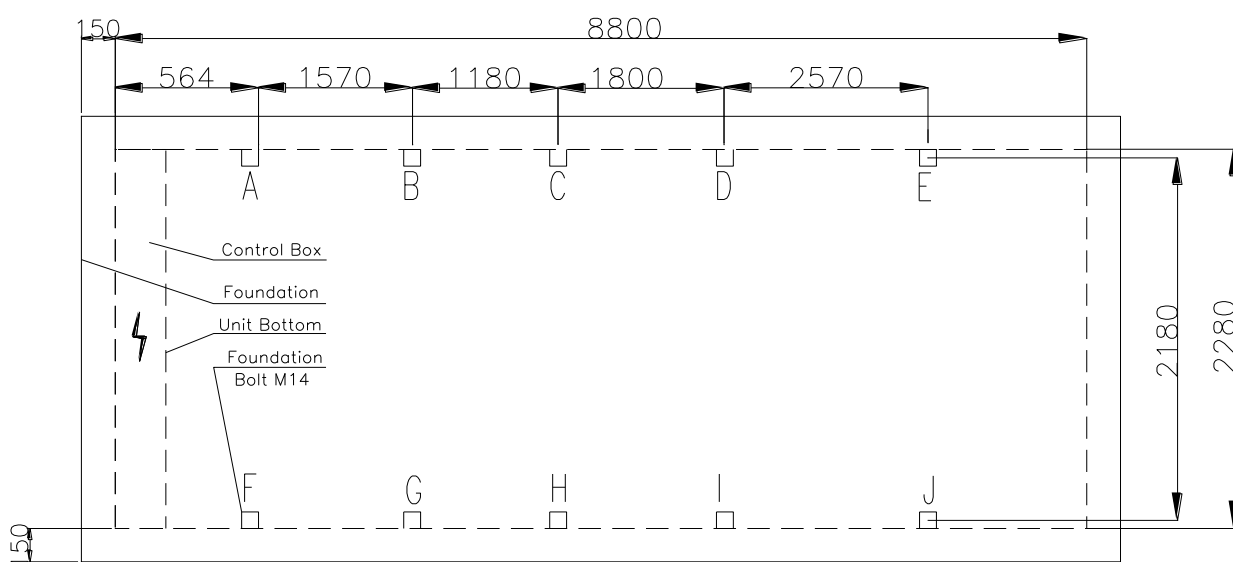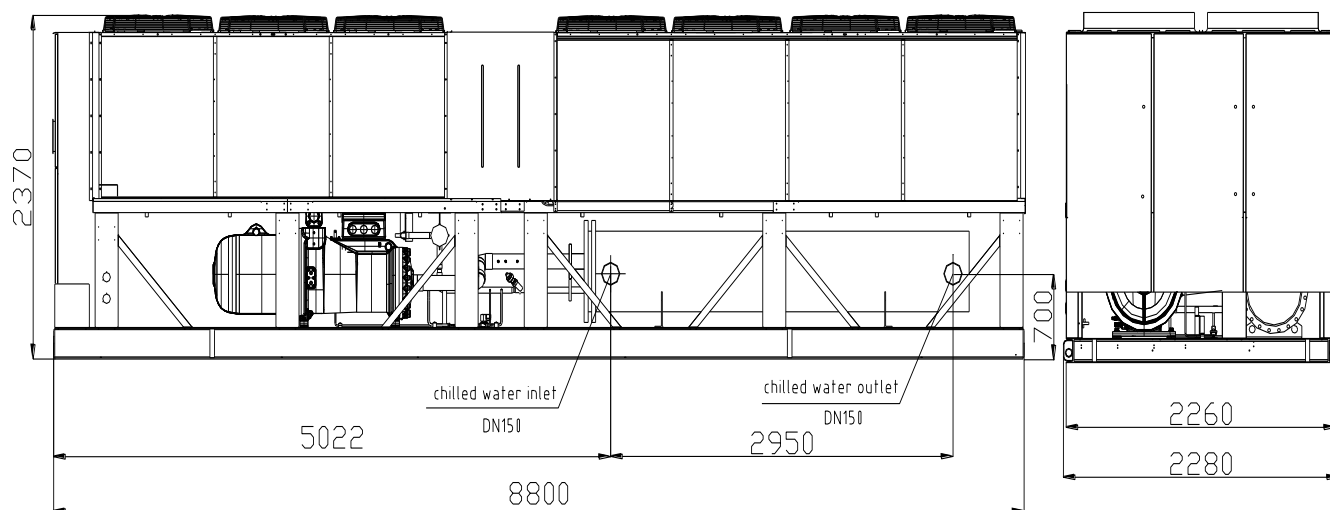
Model	Weight to be supported by spring isolator（kg）									
	A	B	C	D	E	F	G	H	I	J
TMCU0900B3O3/1AT3SB	837	957	960	780	766	837	957	960	780	766

(6) TMCU01000B3O3/1AT3SB

Unit(mm)

Chilled water inlet DN150

chilled water outlet DN150

Control Box
Foundation
Unit Bottom
Foundation Bolt M14
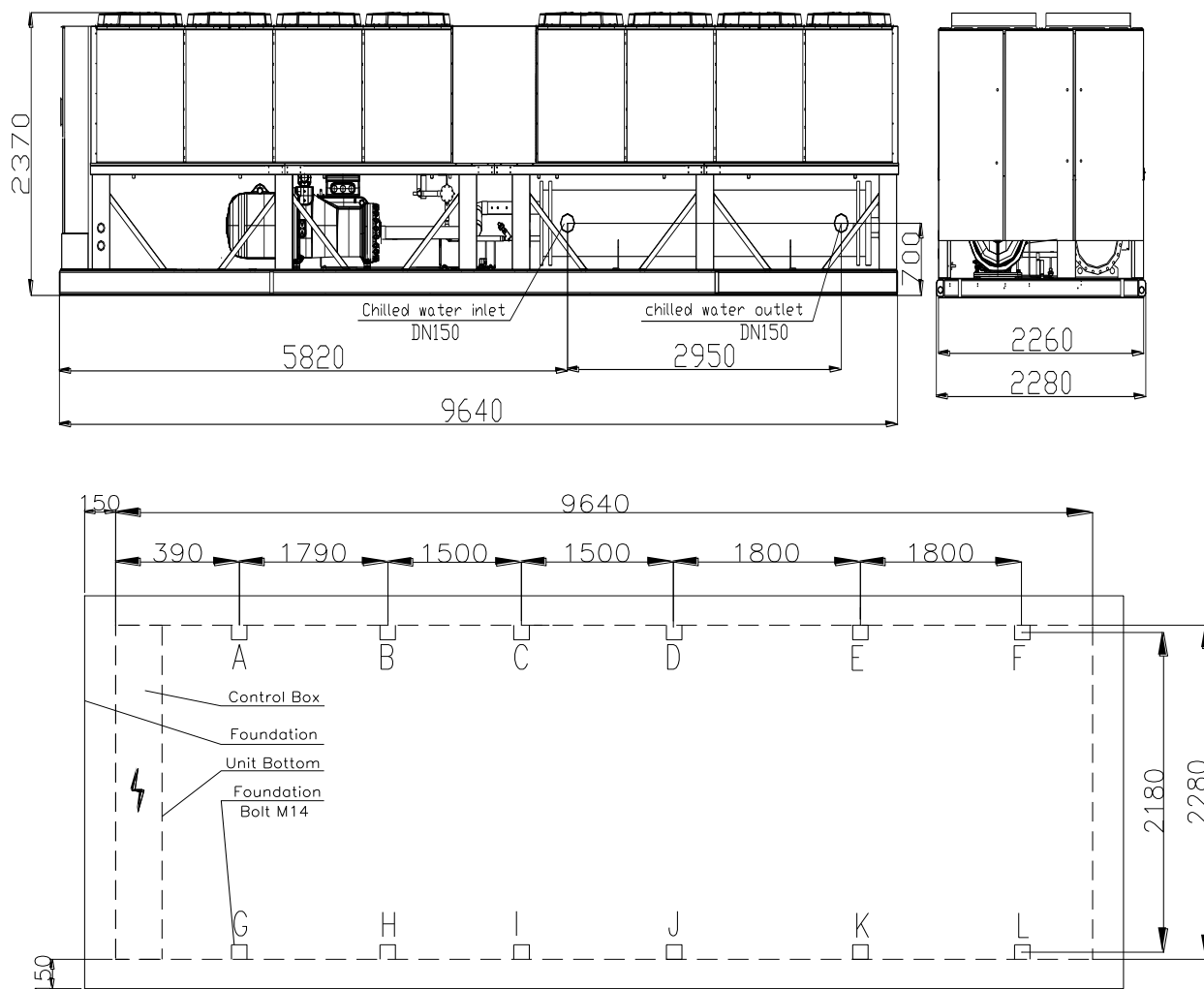
Model	Weight to be supported by spring isolator（kg）											
	A	B	C	D	E	F	G	H	I	J	K	L
TMCU01000B3O3/1AT3SB	761	923	933	758	752	753	761	923	933	758	752	753

(7) TMCU01200B3O3/1AT3SB

Unit(mm)
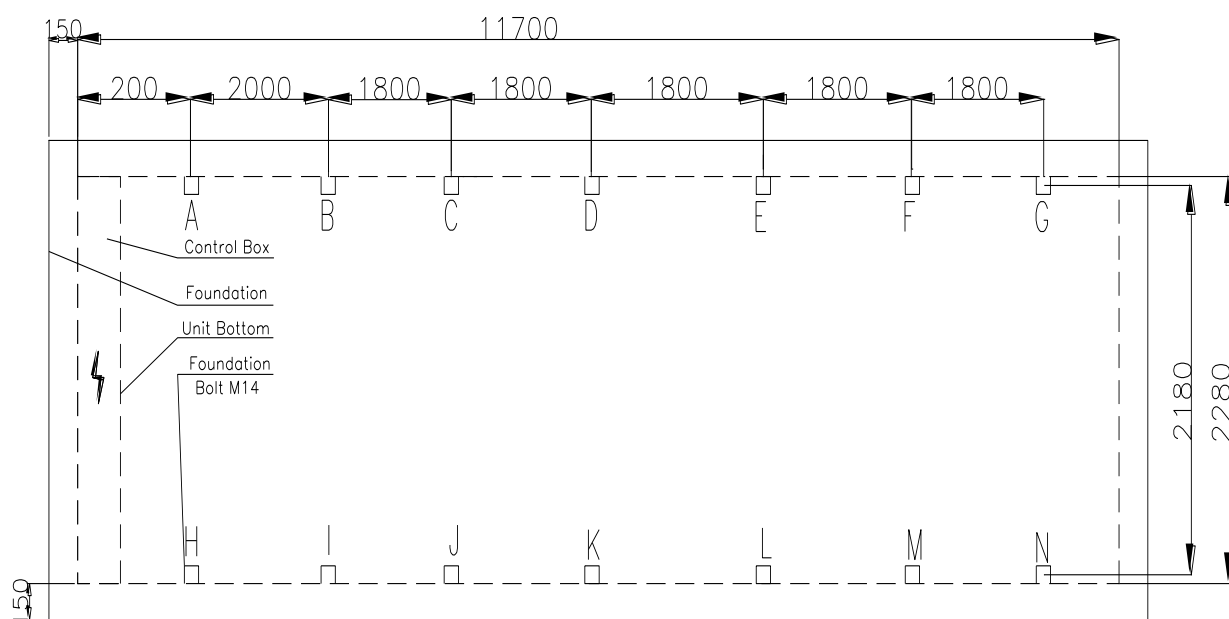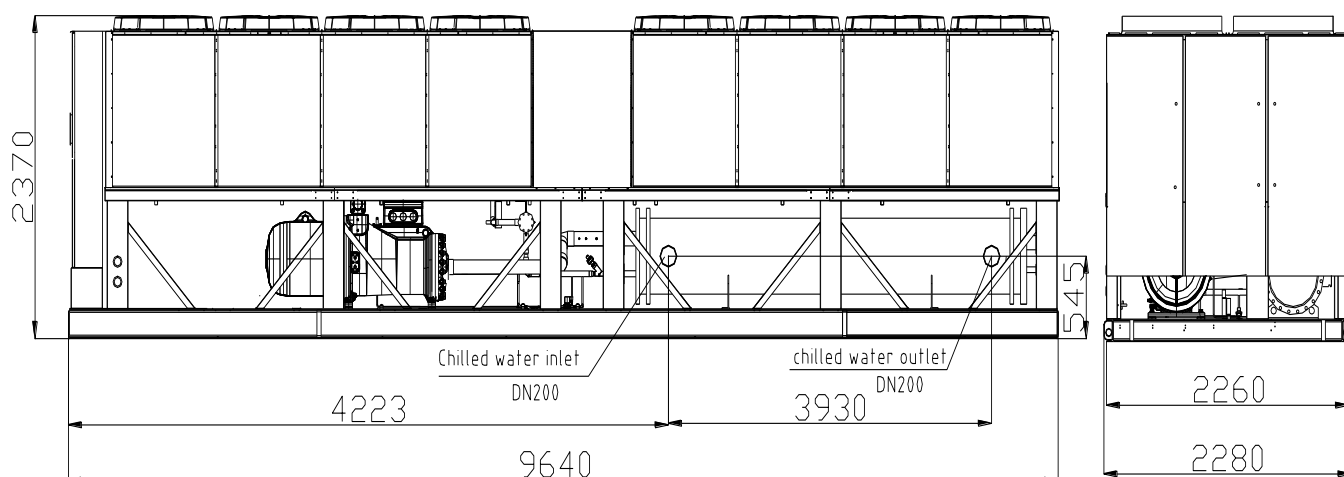
Model	Weight to be supported by spring isolator（kg）													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
TMCU01200B3O3/1AT3SB	710	764	791	775	713	711	711	710	764	791	775	713	711	711

5. Refrigeration system

1). Refrigeration system diagram

380/500/600kW

760/900/1000/1200kW

Condenser

Drier filter

Angle valve

Angle valve

System 1

1200kW used
760/900/1000kW none

Economizer

TXV

Capillary

SV

SV

SV

Sight glass

Compressor

EXV

Check valve

System 2

Evaporator

Same to system 1

Water inlet

Water outlet
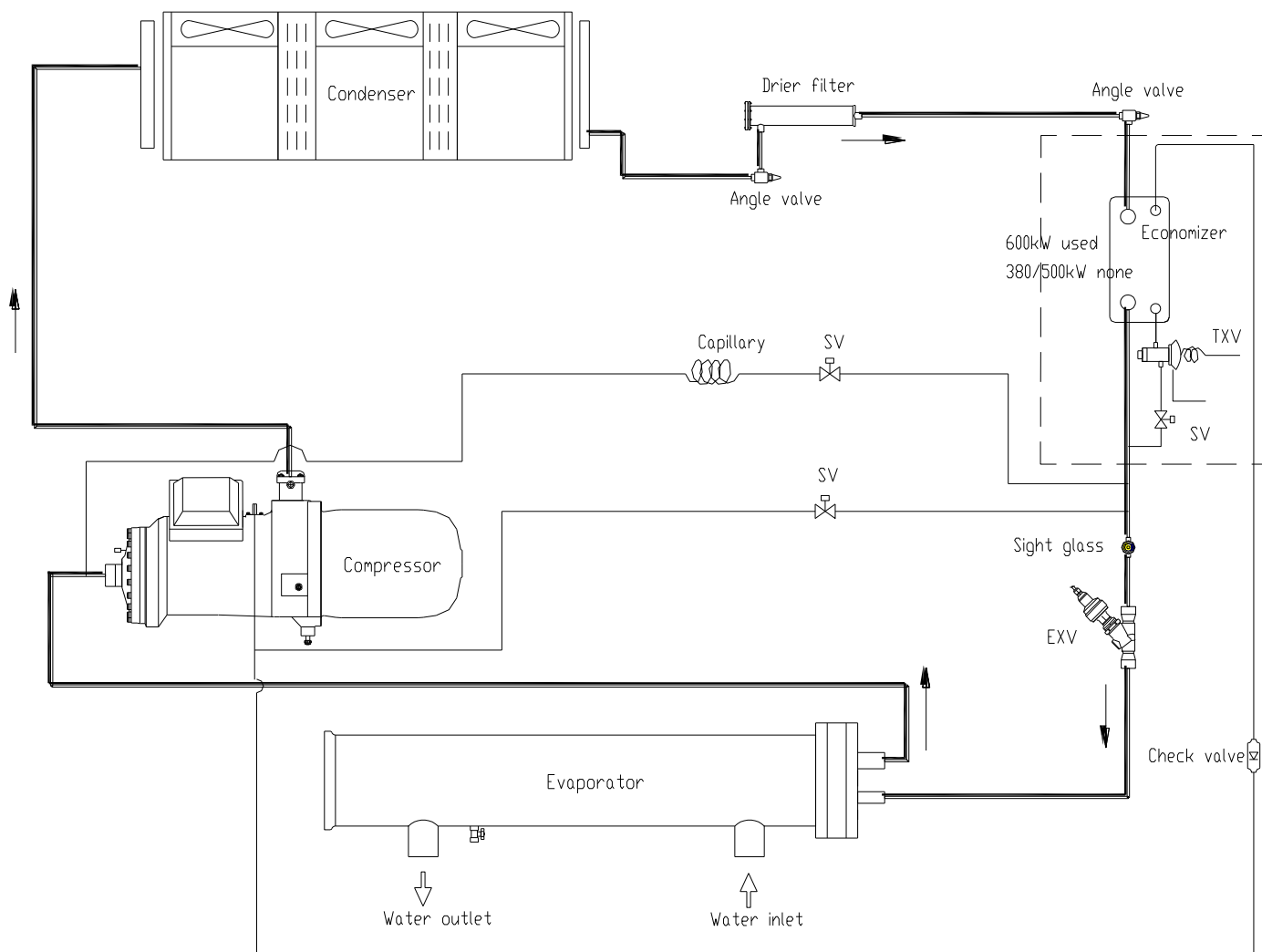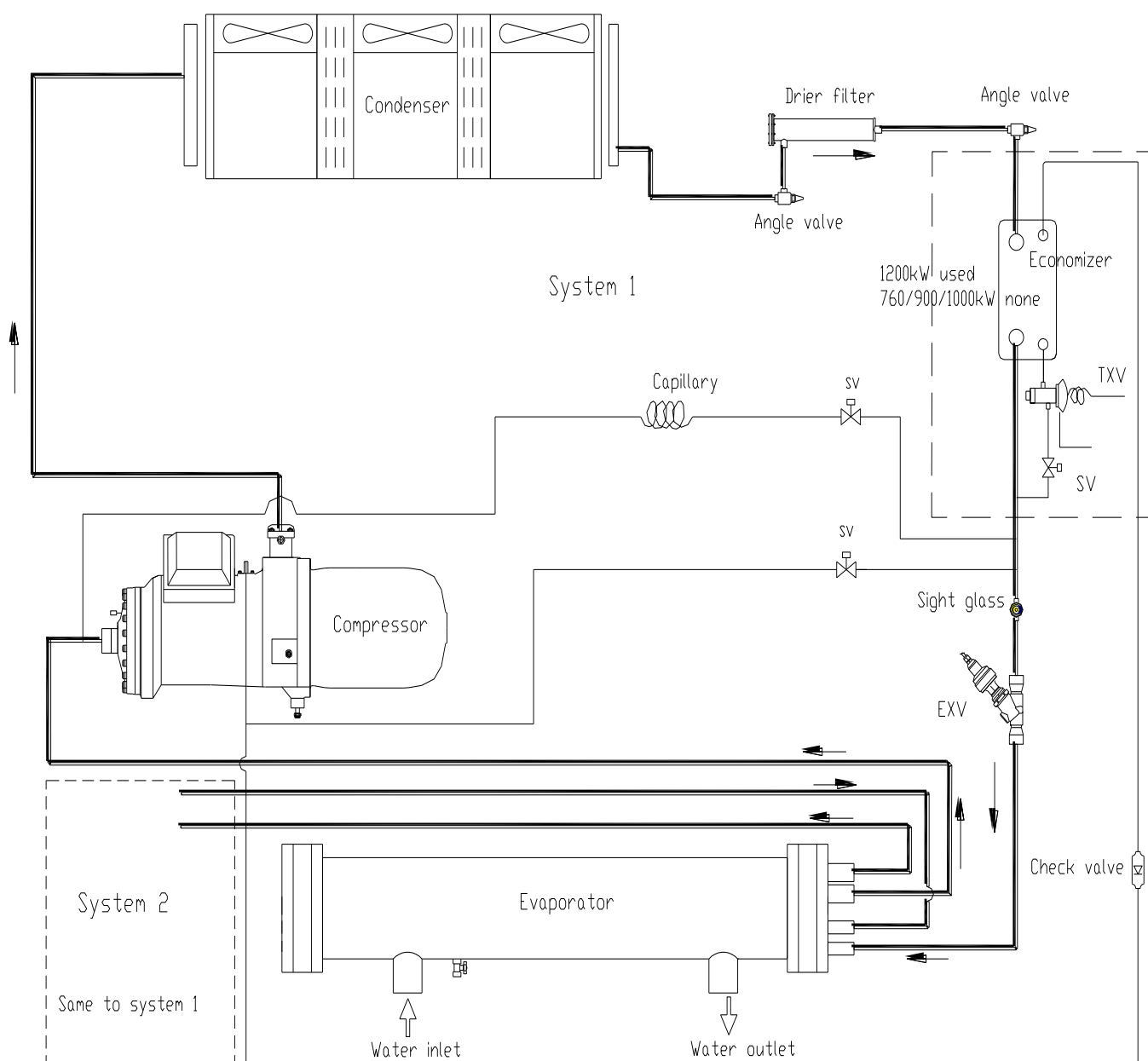
6. Key parts list

No	Name	Picture	Model	Brand	
1	Compressor		CSH series	Bitzer	Germany
4	Fan		RZLC-9.0P30S6BGE-C	RAINBOW	China
5	Drier filter		SRA Series	SRNENG	China
7	Electric expansion valve		ETS250	Danfoss	Denmark
8	Solenoid valve		FDF8MJ-10	STF	China
12	Safety valve		SFV25 T325(2416+187)	Danfoss	Denmark

7. Application

### 1).Operating Range

Content	Running range
Ambient Temp.	15℃～52℃(T3)
Leaving water Temp.	5℃～15℃
Water flow volume	Rating flow volume±20%
Max inlet/outlet water Temp. difference	8℃
Fouling factor (m$^{2\cdot}$℃/kW)	0.018
Voltage tolerance	Rating Voltage±10%
Phase tolerance	±2％
Power supply frequency	Rating frequency±2%
Evaporator max working pressure on water side	1.0MPa
Compressor max. start count	4 times/h
Environment quality	High corrosive environment and high humidity should be avoided.
Drainage system	The height of water drainage should not be higher than the base of the unit on the spot
Storage and transport temperature	-25℃～55℃
RH(relative air humidity)	In + 40℃ does not exceed 50%, + 25℃ no more than 90%
Applicable altitude range：	No more than 1000m

2).Water Flow – Water Drop Pressure Curve

Balance the chilled water flow through the evaporator. The flow rates must fall between the minimum and maximum values shown in the below table. Flow rates below the minimum values shown will result in laminar flow which will reduce efficiency, cause erratic operation of the electronic expansion valve and could cause low temperature cutouts. On the other hand, flow rates exceeding the maximum values shown can cause erosion on the evaporator water connections and tubes, even piping breaking.

Variable chilled water flow through the evaporator while the compressor(s) are operating is not recommended. The chiller control set points are based upon a constant flow and variable temperature.

Unit Model	MIN. FLOW RATE		MAX. FLOW RATE	
SIZE	m^3/h	GPM	m^3/h	GPM
TMCU0380B3O3/1AT3SB	53	233	79	348
TMCU0500B3O3/1AT3SB	69	304	104	458
TMCU0600B3O3/1AT3SB	83	365	124	546
TMCU0760B3O3/1AT3SB	105	462	157	691
TMCU0900B3O3/1AT3SB	124	546	186	819
TMCU01000B3O3/1AT3SB	138	608	207	912
TMCU01200B3O3/1AT3SB	165	727	248	1092

Evaporator Water Pressure Drop Curve

Evaporator Water Pressure Drop Curve
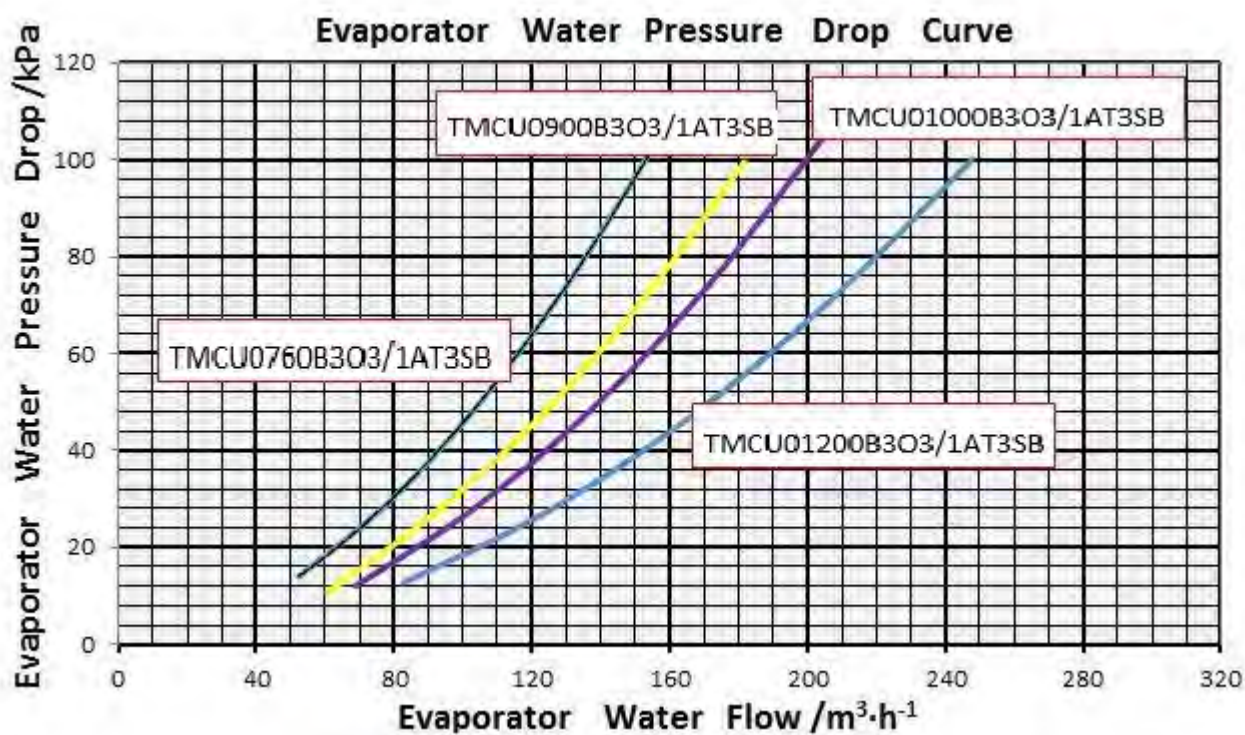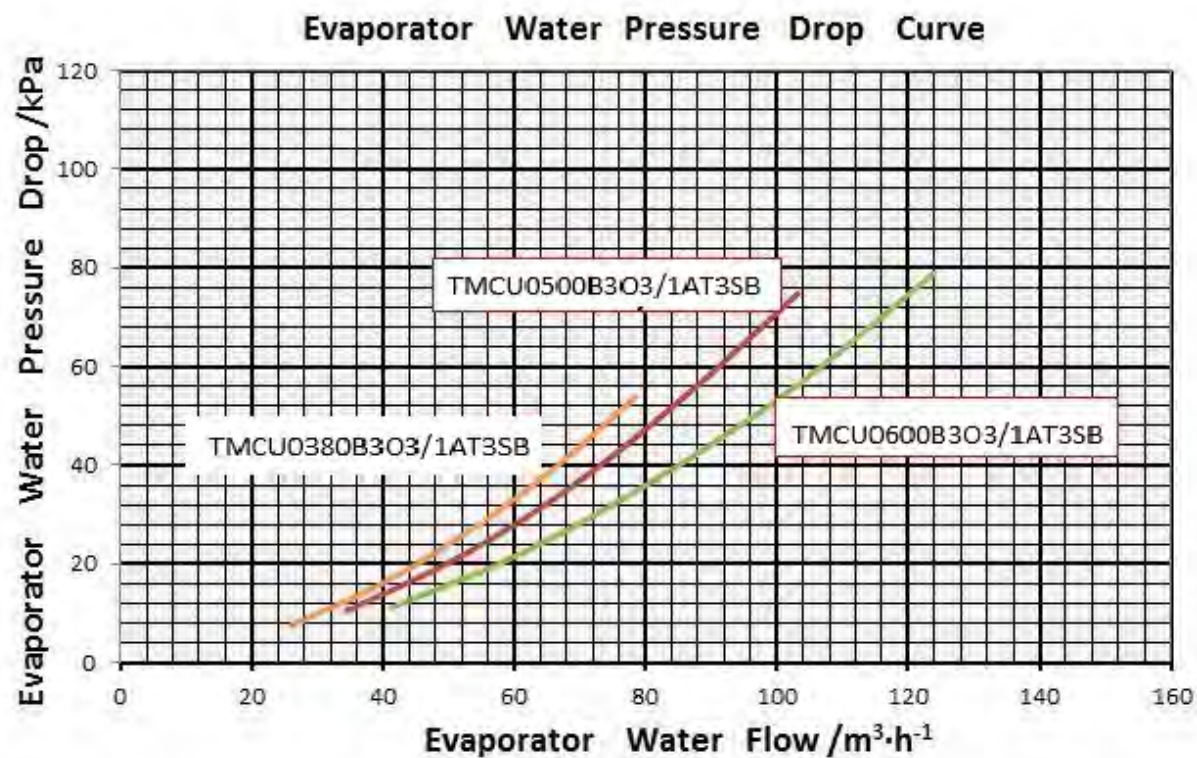
3).Minimum volume in pipeline system

How to calculate minimum volume in pipeline system:

$W=QgT/CP\triangledown t$

W — Minimum water volume（kg）；

Qg — Total cooling/heating capacity of the terminal（kW）；

T — Thermal stability time requirement，Take（8~10）×60s；

CP — Water specific heat at constant pressure，4.187kj/（kg·℃）；

$\triangledown t$ — Water temperature fluctuation required value，take 5℃。

For system, Qg is calculated according to the lowest load so that it operates steadily.
It can also calculated according to 0.5Q(50%). T takes 8 minutes, the shortest time that the unit running.
That is 480s. Cp=4.18kj/kg, $\triangledown t$ =5℃

According to the above formula, the result is as following:
W=0.5Q*480/（4.18*5）=11.48Q kg

Note:

The above formula is only for reference, different factor should be adopted to suit for different condition.

8. Capacity table

Model	Leaving Water Temp (℃)	Ambient Temperature/℃																
		15		20		25		30		35		40		46		52	
		Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)
380	5	421.3	90.8	400.5	99.0	383.6	105.5	365.2	112.9	352.6	117.9	326.9	126.5	312.6	131.7	296.5	136.9
	6	439.5	92.2	417.6	100.5	399.8	107.1	379.9	114.5	365.4	119.5	340.2	128.1	324.6	133.4	307.9	138.6
	7	457.5	93.7	434.8	102.0	415.9	108.6	395.1	116.1	379.0	121.0	353.4	129.8	337.2	135.1	320.2	140.3
	8	475.7	95.2	451.9	103.6	432.0	110.2	410.3	117.7	393.8	122.8	366.7	131.5	349.9	136.7	332.5	141.9
	9	493.7	96.6	469.0	105.0	448.3	111.8	425.5	119.4	408.0	124.4	379.9	133.1	362.6	138.4	344.9	143.7
	10	511.9	98.0	486.2	106.6	464.4	113.3	440.7	120.9	420.5	125.9	393.2	134.9	373.7	140.1	355.6	145.3
	11	530.0	99.5	503.3	108.0	480.5	114.9	455.8	122.6	436.6	127.9	406.4	136.5	388.0	141.7	369.5	147.0
	12	548.0	100.9	520.4	109.5	496.7	116.4	471.0	124.1	450.8	129.5	419.6	138.2	400.7	143.4	381.9	148.6
	13	566.2	102.4	537.6	111.1	512.9	118.0	486.2	125.8	465.0	131.2	432.9	139.9	413.3	145.1	394.2	150.3
	14	584.2	103.8	554.7	112.5	529.0	119.6	501.4	127.5	479.2	132.8	446.1	141.5	426.0	146.8	406.5	152.0
	15	602.4	105.3	571.8	114.1	545.1	121.1	516.6	129.0	494.4	134.7	459.4	143.2	439.5	148.4	419.8	153.6
500	5	531.6	117.7	508.5	128.0	493.0	135.9	473.8	145.2	465.5	150.8	435.2	162.0	416.4	168.9	394.8	175.8
	6	556.6	119.0	532.0	129.5	514.6	137.7	493.5	146.9	482.2	152.9	451.5	164.3	432.1	171.2	410.2	178.0
	7	581.5	120.3	555.5	130.9	536.6	139.4	514.0	148.9	500.0	155.0	469.0	166.6	449.0	173.5	426.5	180.4
	8	606.4	121.6	579.1	132.4	558.4	141.1	534.5	150.8	519.7	157.5	486.6	168.9	465.9	175.8	442.7	182.6
	9	631.3	122.9	602.6	133.9	580.4	142.8	555.0	152.8	538.6	159.7	504.1	171.1	482.7	178.0	459.0	184.9
	10	656.2	124.1	626.2	135.3	602.4	144.6	575.5	154.7	554.9	161.7	521.6	173.5	497.1	180.3	473.6	187.2
	11	681.1	125.5	649.7	136.8	624.4	146.3	595.9	156.7	576.1	164.3	539.3	175.7	516.5	182.6	491.7	189.4
	12	706.0	126.8	673.1	138.3	646.3	148.0	616.5	158.6	594.9	166.5	556.8	178.0	533.4	184.9	508.0	191.8
	13	730.8	128.0	696.7	139.7	668.3	149.8	637.0	160.6	613.7	168.9	574.4	180.3	550.3	187.2	524.3	194.0
	14	755.7	129.3	720.2	141.2	690.2	151.4	657.4	162.5	632.4	171.1	591.9	182.5	567.1	189.4	540.6	196.3
	15	780.5	130.6	743.8	142.7	712.6	153.2	678.7	164.6	652.7	173.6	610.7	184.9	585.2	191.7	557.9	198.6

Note: The inlet/outlet water temperature difference is 5°C.

Tropical air-cooled screw chiller

Model	Leaving Water Temp (℃)	Ambient Temperature/℃															
		15		20		25		30		35		40		46		52	
		Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)
600	5	637.2	132.7	612.3	146.7	594.0	158.6	572.3	171.5	560.2	181.3	529.1	194.2	509.8	202.1	491.7	209.8
	6	656.6	135.0	631.1	149.1	612.6	160.9	590.5	173.9	578.1	183.5	546.4	196.5	526.6	204.4	508.1	212.2
	7	677.4	137.5	651.2	151.7	632.5	163.5	610.0	176.4	597.0	185.7	565.0	198.9	544.5	206.8	525.7	214.6
	8	698.1	140.2	671.3	154.4	652.4	166.0	629.5	178.9	617.6	188.2	583.6	201.3	562.5	209.0	543.4	216.9
	9	718.9	142.8	691.4	157.1	672.3	168.6	649.0	181.5	637.3	190.6	602.3	203.6	580.4	211.4	561.0	219.3
	10	739.6	145.4	709.0	159.1	692.2	171.2	668.5	184.1	654.6	192.7	620.9	206.0	596.2	213.8	576.2	221.6
	11	760.4	148.1	731.6	162.4	712.1	173.8	687.9	186.7	676.8	195.2	639.5	208.3	616.3	216.1	596.4	223.9
	12	781.1	150.6	751.7	165.0	732.0	176.4	707.4	189.3	696.6	197.6	658.2	210.6	634.3	218.5	614.0	226.3
	13	801.9	153.2	771.8	167.7	751.9	178.9	726.9	191.8	716.4	199.9	676.8	213.0	652.2	220.9	631.7	228.7
	14	822.6	155.9	791.9	170.4	771.8	181.5	746.4	194.3	736.1	202.3	695.4	215.3	670.2	223.1	649.4	231.0
	15	844.8	158.8	813.3	173.4	793.0	184.1	767.1	197.1	757.3	204.8	715.3	217.7	689.2	225.5	668.4	233.4
760	5	832.9	185.3	802.5	194.9	770.5	209.8	729.4	223.3	706.6	236.3	656.6	257.7	626.4	270.6	595.7	283.5
	6	861.9	189.5	832.1	198.6	799.3	213.2	759.4	226.4	732.4	239.0	680.6	260.5	649.5	273.2	617.6	285.9
	7	891.0	193.6	861.8	202.4	828.2	216.9	789.4	229.6	758.0	242.0	706.6	263.1	674.4	275.6	641.4	288.1
	8	920.1	197.7	891.4	206.2	857.1	220.6	819.4	232.8	788.1	245.2	732.6	265.8	699.2	278.1	665.1	290.4
	9	949.0	201.9	921.1	210.0	885.9	224.3	849.3	236.0	815.8	248.4	758.6	268.6	724.1	280.6	688.9	292.7
	10	978.1	206.1	950.6	213.9	914.8	227.3	879.3	239.1	839.9	250.9	780.9	271.2	745.6	283.0	709.3	294.9
	11	1007.2	210.2	980.3	217.6	943.7	231.8	909.3	242.3	871.6	254.5	810.5	274.0	773.8	285.6	736.2	297.2
	12	1036.2	214.3	1009.9	221.4	972.6	235.5	939.3	245.5	899.4	257.6	836.5	276.6	798.7	288.0	760.0	299.4
	13	1065.3	218.5	1039.6	225.2	1001.5	239.2	969.3	248.7	927.3	260.7	862.5	279.4	823.5	290.5	783.6	301.7
	14	1094.4	222.6	1069.2	229.0	1030.4	243.0	999.3	251.8	955.1	263.8	888.5	282.0	848.3	292.9	807.4	304.0
	15	1123.5	226.7	1098.9	232.7	1059.3	247.0	1029.3	255.0	985.0	267.2	916.3	284.7	875.0	295.5	832.9	306.2

Note: The inlet/outlet water temperature difference is 5°C.

Model	Leaving Water Temp (℃)	Ambient Temperature/℃															
		15		20		25		30		35		40		46		52	
		Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)
900	5	906.7	218.2	892.5	230.6	870.3	244.7	848.0	261.5	825.4	271.9	783.7	291.3	748.8	303.2	716.2	315.0
	6	942.9	221.0	927.1	231.9	906.7	247.6	884.3	264.5	859.6	275.3	813.3	295.2	777.0	307.0	742.6	319.0
	7	983.1	223.0	965.9	234.5	944.4	250.6	920.6	267.9	908.0	279.0	842.8	299.0	805.3	310.9	771.1	322.8
	8	1023.2	225.0	1004.8	237.1	982.1	253.7	956.9	271.2	928.0	283.0	872.4	302.9	833.5	314.7	799.5	326.7
	9	1063.4	227.0	1043.6	239.7	1019.8	256.7	993.2	274.6	962.1	286.9	902.0	306.7	861.8	318.7	828.0	330.6
	10	1103.5	229.7	1082.5	242.3	1057.4	259.6	1029.6	277.9	996.3	290.9	931.5	310.6	890.0	322.6	852.9	334.4
	11	1143.7	232.2	1121.4	244.9	1095.1	262.7	1065.9	281.3	1030.5	294.7	961.1	314.6	918.3	326.4	884.9	338.3
	12	1183.8	234.5	1160.2	247.5	1132.8	265.7	1102.2	284.6	1064.7	298.6	990.6	318.4	946.5	330.3	913.4	342.2
	13	1224.0	236.6	1199.1	250.1	1170.5	268.6	1138.5	287.9	1098.9	302.4	1020.2	322.3	974.8	334.1	941.9	346.1
	14	1264.1	238.5	1237.9	252.7	1208.1	271.7	1174.8	291.4	1133.1	306.3	1049.7	326.1	1003.1	338.0	970.4	350.0
	15	1304.3	241.0	1276.8	256.6	1245.8	274.7	1211.1	295.0	1167.3	310.5	1079.3	330.0	1031.3	342.0	1001.0	353.8
1000	5	1051.2	237.9	1006.7	258.3	979.7	273.5	944.0	291.3	933.3	301.9	872.5	324.5	834.6	338.4	791.9	352.3
	6	1111.5	240.0	1062.2	260.7	1028.6	276.5	987.1	294.8	965.6	305.9	904.2	329.0	864.6	342.8	821.2	356.8
	7	1160.6	242.1	1108.5	263.2	1071.5	279.6	1026.9	298.4	1000.0	310.0	937.7	333.4	897.0	347.3	852.5	361.1
	8	1209.7	244.0	1154.9	265.6	1114.4	282.8	1066.8	302.1	1037.5	314.7	971.4	337.8	929.2	351.7	883.8	365.6
	9	1258.8	246.1	1201.2	268.0	1157.3	285.8	1106.5	305.7	1073.5	319.1	1005.0	342.2	961.5	356.2	915.1	370.0
	10	1308.0	248.1	1247.5	270.6	1200.3	288.9	1146.4	309.3	1109.4	323.6	1038.5	346.7	989.2	360.6	943.0	374.5
	11	1357.1	250.2	1293.8	273.0	1243.2	292.0	1186.1	312.9	1145.5	328.0	1072.2	351.1	1026.1	365.0	977.8	378.9
	12	1406.2	252.2	1340.1	275.4	1286.0	295.0	1226.0	316.5	1181.4	332.5	1105.8	355.6	1058.3	369.4	1009.1	383.4
	13	1455.4	254.3	1386.4	277.9	1329.0	298.2	1265.7	320.1	1217.4	336.9	1139.3	360.1	1090.6	373.9	1040.4	387.8
	14	1504.5	256.3	1432.7	280.3	1371.9	301.2	1305.6	323.6	1253.3	341.3	1173.0	364.5	1122.9	378.3	1071.8	392.2
	15	1542.4	258.3	1469.9	282.8	1408.8	304.3	1342.0	327.4	1291.8	346.1	1208.4	368.9	1157.4	382.8	1105.0	396.6

Note: The inlet/outlet water temperature difference is 5°C.

Model	Leaving Water Temp(℃)	Ambient Temperature/℃															
		15		20		25		30		35		40		46		52	
		Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)	Cooling Capacity (kW)	Power Input (kW)
1200	5	1284.6	267.1	1257.7	288.2	1222.2	307.7	1186.8	332.7	1129.8	363.3	1070.0	387.0	1031.7	401.5	992.7	415.8
	6	1325.2	271.3	1298.4	292.3	1263.4	311.8	1225.8	336.3	1166.7	367.3	1105.2	391.4	1065.6	405.9	1025.5	420.3
	7	1368.0	275.9	1339.1	296.4	1304.5	315.9	1267.8	340.3	1210.0	372.0	1143.2	395.8	1102.3	410.3	1060.9	424.7
	8	1410.6	280.6	1379.8	300.5	1345.8	320.1	1309.8	344.2	1246.9	376.2	1181.2	400.2	1138.9	414.7	1096.3	429.1
	9	1453.4	285.3	1420.5	304.6	1386.9	324.2	1351.8	348.2	1286.9	380.6	1219.3	404.6	1175.6	419.1	1131.7	433.5
	10	1492.1	288.9	1461.2	308.7	1428.0	328.3	1387.8	351.6	1321.0	384.6	1251.8	409.1	1207.1	423.5	1162.3	437.9
	11	1538.7	294.6	1502.0	312.8	1469.2	332.5	1435.9	356.1	1367.2	389.5	1295.4	413.5	1248.8	428.0	1202.5	442.3
	12	1581.4	299.3	1542.7	316.9	1510.3	336.6	1477.9	360.0	1407.2	393.9	1333.5	417.9	1285.5	432.3	1237.9	446.8
	13	1624.1	304.0	1583.3	321.0	1551.5	340.7	1519.9	363.9	1447.3	398.3	1371.5	422.3	1322.1	436.7	1273.3	451.2
	14	1666.8	308.6	1624.1	325.1	1592.7	344.9	1561.9	367.9	1487.4	402.7	1409.5	426.7	1358.7	441.1	1308.7	455.6
	15	1711.6	313.8	1664.8	329.2	1633.8	349.0	1607.1	372.1	1530.8	407.5	1450.5	431.1	1398.3	445.5	1346.9	460.0

Note: The inlet/outlet water temperature difference is 5°C.

9. Accessories

Standard accessories

NO.	Name	Quantity
1	Qualified certification	1
2	User manual	1
3	Water flow switch connectors	1
4	Packing list	1

Optional accessories

No.	Name	Model	Introduction	Picture
1	Water flow switch	WFS-1001-H (Honeywell)	Installed on evaporator outlet pipe to prevent heat exchange pipe from frost crack.	
2	Vibration damper	MHD Series	To avoid vibration and noise, it must be used between base and foundation when install the unit.	
3	Remote control cabinet	YCKZ-P	Can be installed in the control room. Through the cable connected to the unit touch screen, it can display all states information and complete all the operations of unit (startup/shutdown, error confirm, etc.)	

III. Controls

1. Control flow chart
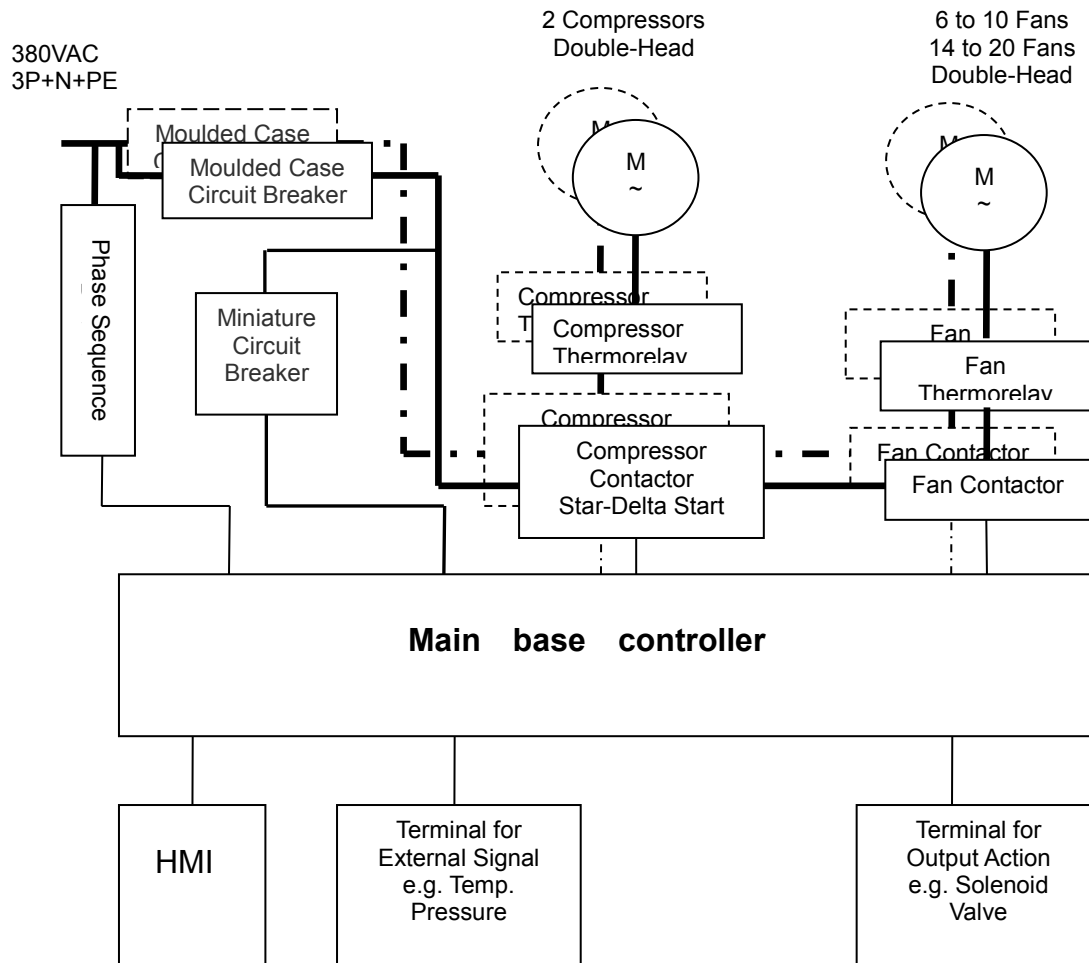
Main base controller gathers signals through input terminals, such as pressure, temperature and the state of protection switches and ensures unit's current condition. At the same time, according to input signal from HMI, such as starting signal, controller performs the logical operations and outputs signals. These signals act on components, time relay, contactors and so on.

HMI+ Main base controller:
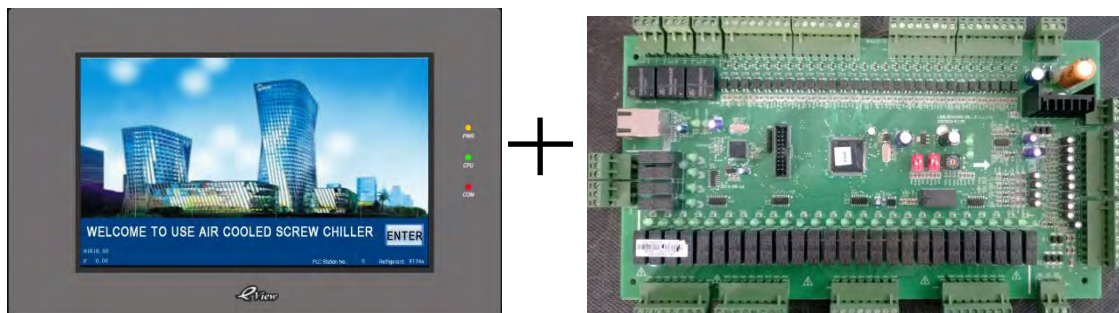
2. Energy adjustment
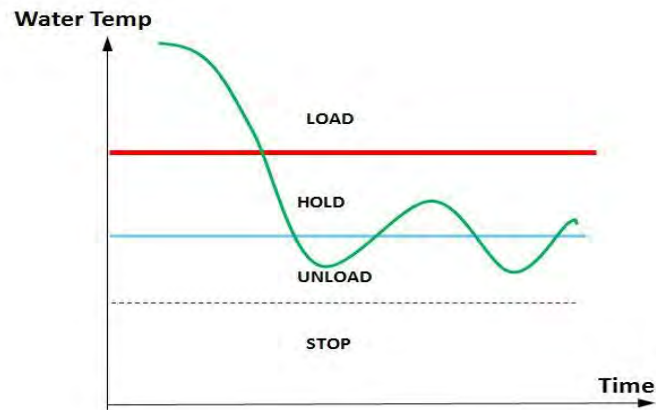
The unit can adjust capacity by chilled water, please see above picture.

Energy adjustment is districted when starting high pressure is too high.
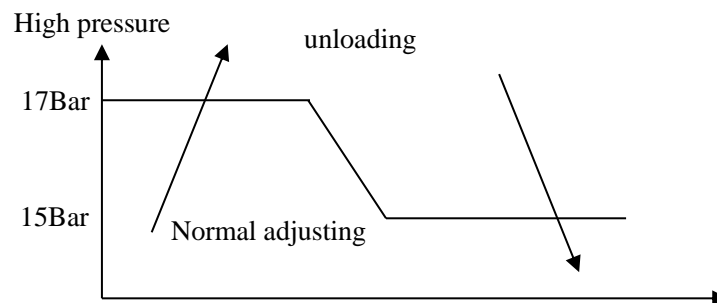
3. Start/stop process

1).Cooling start

```
                        ┌──────────────┐
                        │   Power-on   │
                        └──────┬───────┘
                               │                  YES
                          ◇ Detect ◇ ──────────→ ┌──────────────┐
                               │                  │ Clear failure│
                              NO                  └──────┬───────┘
                               │ ←───────────────────────┘
                        ┌──────────────┐
                        │   Start on   │ ←──────────┐
                        └──────┬───────┘            │
                        ┌──────────────┐            │
                        │   Pump on    │            │
                        └──────┬───────┘            │
                               │         YES  ┌──────────────────┐
                    ◇ Water flow switch ◇ ──→ │ Stop. Clear failure│
                               │              └──────────────────┘
                              NO
                               │                        NO  ┌──────────┐
        ◇ Water temp is ok. Oil heating time is enough.  ──→ │ Stand by.│
             Stop time is enough. ◇                          └──────────┘
                              YES
                        ┌──────────────┐
                        │  Fan motor   │
                        └──────┬───────┘
                        ┌────────────────────┐
                        │ Compressor 25% SV on│
                        └──────┬─────────────┘
                        ┌────────────────────┐
                        │ Compressor Y-△ start│
                        └──────┬─────────────┘
                        ┌────────────────────┐
                        │ Compressor 50% SV on│
                        │     25% SV off      │
                        └──────┬─────────────┘
                        ┌────────────────────┐
                        │ Compressor 75% SV on│
                        │     50% SV off      │
                        └──────┬─────────────┘
   ┌─────────┐                 │                     ┌──────────┐
   │ Loading │ ←──── ◇ Energy adjust ◇ ────────────→ │  Unload  │
   └────┬────┘                 │                     └─────┬────┘
        │              ┌──────────────┐          ◇ Water temp.is ok. ◇
        └────────────→ │    Stand     │                   │
                       └──────────────┘             ┌──────────┐
                                                     │   Stop   │
                                                     └──────────┘
```

31

2).Cooling stop

```
                        ┌──────────────┐
                        │     stop     │
                        └──────┬───────┘
                               │
                               ▼                    NO
                       ╱────────────────╲      ┌──────────────┐
                      ╱   Running   time  ╲────▶│   Stand by   │
                      ╲   is enough.      ╱     └──────────────┘
                       ╲────────────────╱
                          YES  │
                               ▼
                        ┌──────────────────┐
                        │ Unload to 50% step│
                        └────────┬─────────┘
                                 │
                                 ▼
                        ┌──────────────────┐
                        │ Unload to 25% step│
                        └────────┬─────────┘
                                 │
                                 ▼
                        ┌──────────────────┐
                        │  Compressor off  │
                        └────────┬─────────┘
                                 │
                                 ▼
                        ┌──────────────────┐
                        │  Fan motor off   │
                        └────────┬─────────┘
                                 │
                                 ▼
                        ┌────────────────────┐
                        │ Compressor 25%SV off│
                        └────────┬───────────┘
                                 │
                                 ▼
                        ┌──────────────────┐
                        │ Chilled pump off │
                        └──────────────────┘
```

4. Sensors

1). Temperature sensors

The temp. sensors use NTC thermistors, they including chilled leaving water temp., chilled entering water temp., ambient temp., condenser fin temp., discharge temp., EXV suction temp..

NO.	Name	Type	Remark
1	Chilled entering water temp.	NTC,10k@25℃	Emerson
2	Chilled leaving water temp.	NTC,10k@25℃	Emerson
3	Ambient temp.	NTC,10k@25℃	
4	Discharge temp.	NTC,5k@90℃	CGQ-PQI
5	EXV suction temp.	NTC,10k@25℃	Carel

2). Pressure sensors

The pressure sensors are **pressure transmitters**, including high pressure, low pressure, EXV suction pressure transmitters. **Danfoss AKS3000** are used.

Water temp. thermistor	Ambient or pipe temp. thermistor	Pressure transmitter AK3000

5. Parts control

1). Oil heater control

In unit sand by period, oil heater is energized to keep normal oil temperature. When unit starts, it is turned off.

Oil heating time limits:

➤ When cooling water inlet temperature >= 35°C (real time value), oil heating time for first startup is 0.5h. If power down happens during operation and downtime is less than 8hrs, no heating time delay is needed when unit restarts. If it exceeds 8hrs, 0.5h heating time is need.

➤ When cooling water inlet temperature >= 30°C (real time value), oil heating time for first startup is 1h. If power down happens during operation and downtime is less than 5hrs, no heating time delay is needed when unit restarts. If it exceeds 5hrs, 1h heating time is need.

➤ When cooling water inlet temperature >= 25°C (real time value), oil heating time for first startup is 2hrs. If power down happens during operation and downtime is less than 3hrs, no heating time delay is needed when unit restarts. If it exceeds 3hrs, 0.5h heating time is need. If it exceeds 5hrs, 2hrs heating time is need.

2). Fan Control

The number of operating fan as required is according to the discharge pressure. For example, for TMCU0500B3O3/1AT3SB, there are 8 fans, divided into 5 groups. Opening condition as follow:

Cooling mode fan control
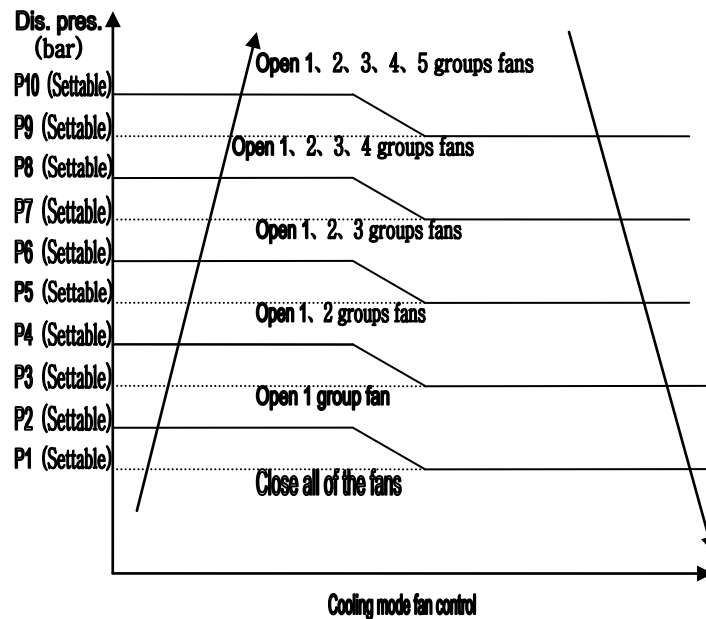
3). Solenoid valve control

a. Compressor suction injection solenoid valve control

Compressor suction injection solenoid valve control is opened when running discharge temperature is higher than setting value(**default 100℃**).it is closed when discharge temperature is lower than setting value(**default 90℃**).

b. Compressor central injection solenoid valve control

Compressor central injection solenoid valve control is opened when running discharge temperature is higher than setting value(**default 85℃**).it is closed when discharge temperature is lower than setting value(**default 75℃**).

c. Economizer solenoid valve control

Economizer solenoid valve is opened after unit started.

4). Pressure sensor control

a. High pressure control
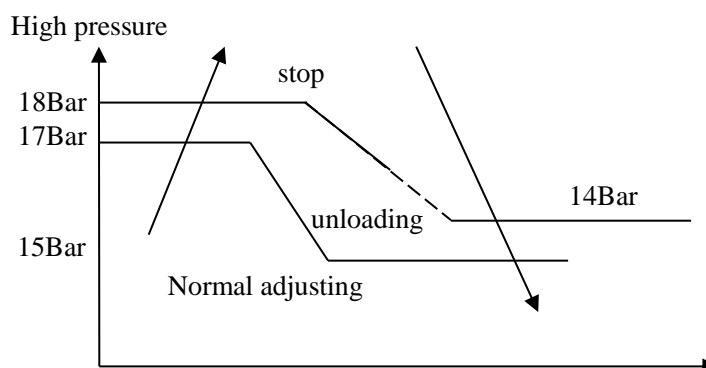
b. Low pressure control
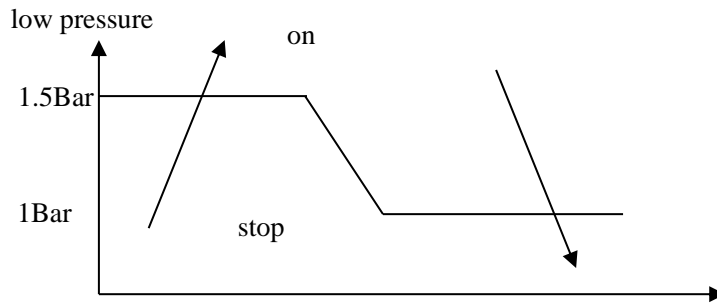
5). EXV controller control

a. EXV controller wiring principle
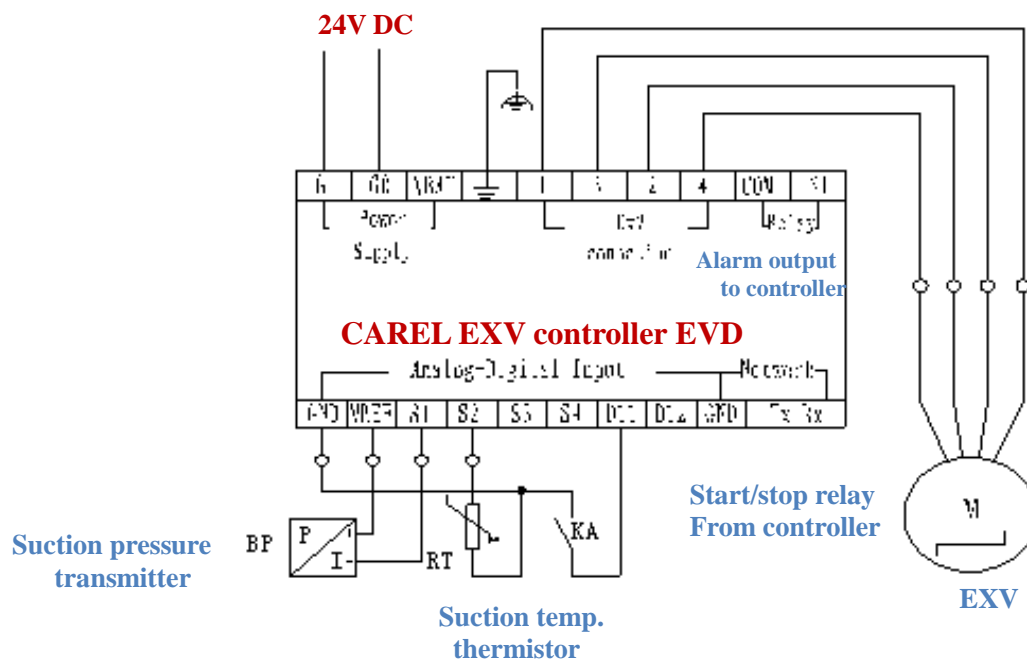
EXV controller is started by main base controller.it detects suction pressure and suction temperature and calculate suction superheat. Then it control EXV opening depending on super heat. If it is wrong, EXV will output alarm signal to main base controller.

b. Controller display

The interface of EXV controller can not display and set parameter on unit, it only displays running status.

LED	Light	Extinguish	Flicker
NET	Can be connected to the network	Not connected	Communication failure
OPEN	Open the valve	-	Disable the drive
CLOSE	Close the valve	-	Disable the drive
🔔	Activate the alarm	-	-
⏻	Drive power	The drive is not connected to power supply	-

If parameters need to be displayed and set, the interface should be changed.

Remove cover

Change display
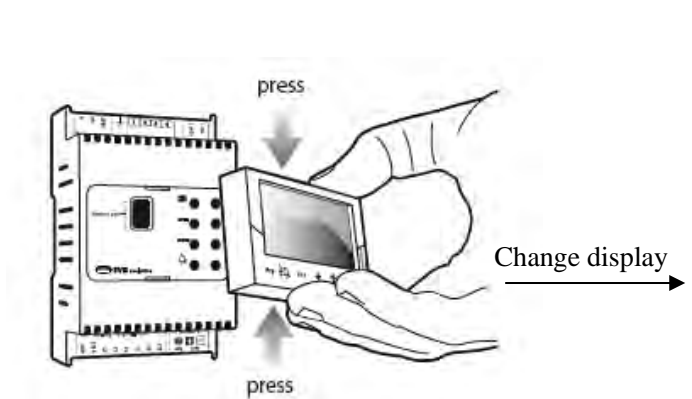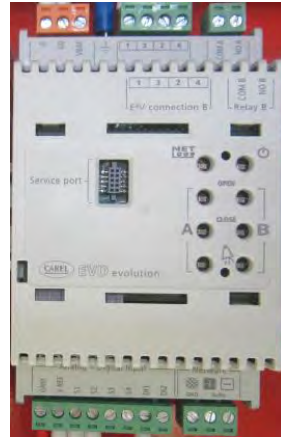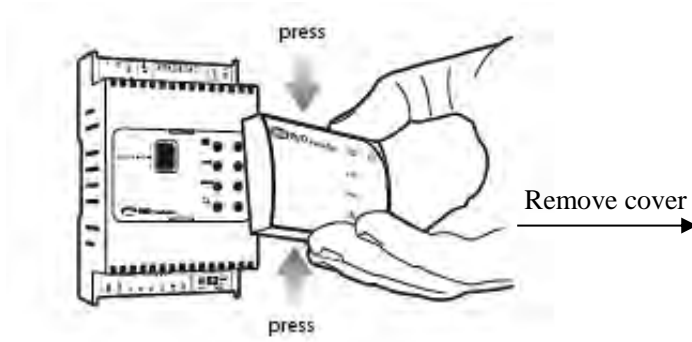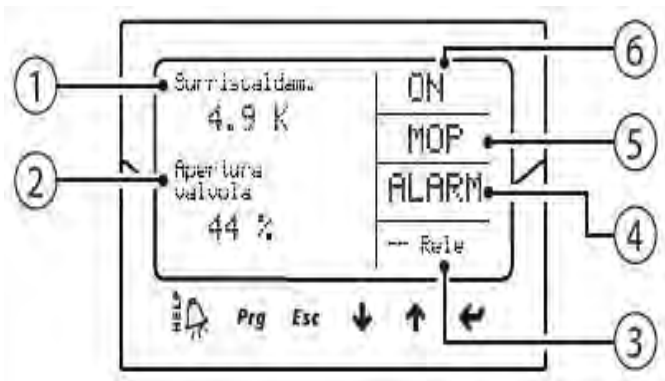
Display

1	Display suction superheat
2	Display EXV opening
3	Relay output status
4	Alarm
5	Start of the protection
6	Control state

Button	Function
Prg	Open the display screen, enter the password to enter the programming mode
HELP 🔔	• In the alarm state, the display alerts the queue; • When the "producer" level under the rolling parameters, the display shows the interface
Esc	• To exit the programming (maintenance / producer) and display mode; • set a parameter, the exit without saving changes
↓/↑ UP/DOWN	• Display screen navigation; • Increase / decrease the value
↵ Enter	• from the parameter setting mode, the display switches to • Confirm the list of parameters and return the value

Running status   **Display all status**

Press ↓ / ↑

Press **Esc** button

b. Controller parameter checking and changing.

Checking or changing repair parameters step:

①Press one or more Esc to switch to the standard display interface;

②Press Prg: display interface input password;

③Press ENTER input repair level password: 22, starting from the rightmost digit, each input a digital, confirm with ENTER ;

④ If the password is correct, will display the first parameters can be modified: network address;

⑤Press UP/DOWN to select parameters should be set up;

⑥Press ENTER to move to the parameter value;

⑦ Press UP/DOWN to modify the parameter value;

⑧Press ENTER to save the new parameter values;

⑨Repeat the above 5, 6, 7, 8 step change other parameters;

⑩ Press Esc to exit the repair parameters modify the program.

The following shows the detailed settings: 13 pages

Drive hardware configuration 1/13	Drive hardware configuration 2/13
Network address 198	Refrigerant type R134a Valve type Danfoss ETS 250

Drive hardware configuration 3/13	Drive hardware configuration 4/13
Type of probe S1 User-defined Unit type Fin coil evaporator air-conditioner	Type of probe S1 NTC Carel Auxiliary control type Disabled

Drive hardware configuration 5/13	Drive hardware configuration 6/13
Type of probe S3 Unused Relay configuration Generate alarms	Type of probe S4 Unused DI1 configuration Start/stop SH control

Drive hardware configuration 7/13	Control parameter settings 8/13
Language Chinese DI2 configuration Disabled	Overheat degree 6.0K Valve opening upon start 50% Pre-positioning duration 30s

Control parameter settings 9/13	Control parameter settings 10/13
Hot air by-pass temperature --- Hot air by-pass temperature --- EPR back pressure ---	LowSH 2.0K LOP -50℃ MOP 50℃

Control parameter settings 11/13	Control parameter settings 12/13
Enable manual valve positioning 0 Manually set the valve position 0stp	HiTcond threshold 80.0℃ Constant temperature adjustment point 0℃ Constant temperature adjustment variance 0.1K

Checking or changing manufacturer parameters step:

①Press one or more Esc to switch to the standard display interface;

②Press Prg: display interface input password;

③Press ENTER input manufacturer password, starting from the right most digit, each input a digital, confirm with ENTER ;

④ If the password is correct, it will display the following parameter type list:

- Configuration parameters

- Sensor parameters

- Control parameters

- The special parameters

- Alert configuration parameters

- Valve parameters

⑤Press UP/DOWN button to select the category, and then press ENTER to enter the first class number

⑥Press UP/DOWN to select parameters to be set, and then press ENTER to move to the parameter value;

⑦Press UP/DOWN to modify the parameter value;

⑧Press ENTER to save the new parameter values;

⑨Repeat the above 6, 7, 8 step change other parameters;

⑩ Press "Esc" to exit the manufacturer parameter modification program.

Unit Type		380,500,600,720,900,1000, 1200,1420	Remarks
Setting parameters	Refrigerant	R134a	Selected based on the refrigerant type of the unit
	Valve	Danfoss ETS250	
	Sensor S1	4-20 mA; 0-10.0 V	Automatically brought out by subsequently set parameters
	Control mode	shell-and-tube unit	
	Overheat degree	6	
	Valve opening upon start	50%	
	Pre-positioning delay	6	
	Valve opening in standby state	0	
	Power supply mode	1	Available values include: (1) 0: 24 V AC (2) 1: 24 V DC; default value: 0
Check parameters	Enable manual valve positioning	0	
	Manually set the valve position	0	
	Auxiliary control	Invalid	

Relay settings	Alarm relay	
DI2 settings	Invalid	
Variable 1 on the display	Overheat degree	
Variable 2 on the display	Valve opened	
Sensor S1 alarm management	Valve at a fixed position	
Sensor S2 alarm management	Valve at a fixed position	
S1: calibration offset	0	
S1: calibration gain, 4–20 mA	1	
Pressure sensor S1: minimum value	0	Set based on the actual sensor
Pressure sensor S1: maximum value	30	Set based on the actual sensor
Pressure sensor S1: minimum value	0	Set based on the actual sensor
Pressure sensor S1: maximum value	30	Set based on the actual sensor
Sensor S2	CAREL NTC	
Language	English	
Measurement unit	°C (K), bar g	
PID: proportional gain	80	
PID: integration time	40	
PID: derivation time	1.5	
Minimum number of valve steps	350	
Maximum number of valve steps	3810	
Number of steps for valve closing	3970	
Valve rate	250	
Low SH protection: threshold	1	
Low SH protection: integration time	2.5	
LOP protection: threshold	-50	
LOP protection: integration time	4	
MOP protection: threshold	50	
MOP protection: integration time	10	
Low overheat degree alarm delay (Low SH, 0 = no alarm)	300	
Low evaporation temperature alarm delay (LOP, 0 = no alarm)	300	
High evaporation temperature alarm delay (MOP, 0 = no alarm)	600	
Low air suction temperature alarm threshold	-50	
Low air suction temperature alarm delay (0 = no alarm)	300	

6. HMI operation

1) Initial Startup

- Before power up for the first time，make sure that the wiring is firm between the control box and the main switch ， the insulation resistances reach the requirements ,and the earth wire has been properly installed.
- The wiring might be loose due to the factors such as long-distance transport. Carry out complete inspection for the bolts of all wiring terminals for looseness 。
- Be sure that the distribution capacity is compliant with the power of the unit and the diameter of the selected cable can bear the maximum working current of the unit.
- Inspect whether the red emergency stop button on the control box is in natural state.

1) Introduction of Control Screen:

【Home page】

1) Power indicator (yellow), which is on when display is powered on; it is off when powered off.

2) Status indicator (green), which flashes at low frequency when display is normally operative, otherwise it is off.

3) Communication indicator (red), which flashes at high frequency when display and controller communicate normally, otherwise it is off.

4) Controller and touch screen procedure version: showing the number of controller and touch screen procedure version used by the current unit.

Basic Interface and Operations:
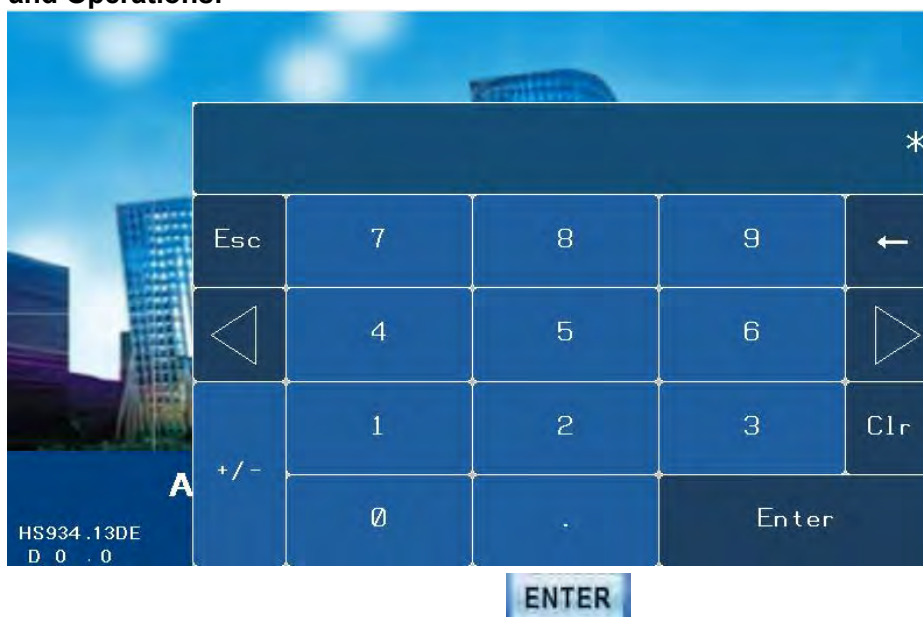
After the system initializing is completed, please clink on button, and the "Password Input" dialog will be popped up, please input the User Password(58806) or User Manage Password (40828),and click "ENTER" into the next interface (Mode Setting Page)

✧ **Mode setting page**

41
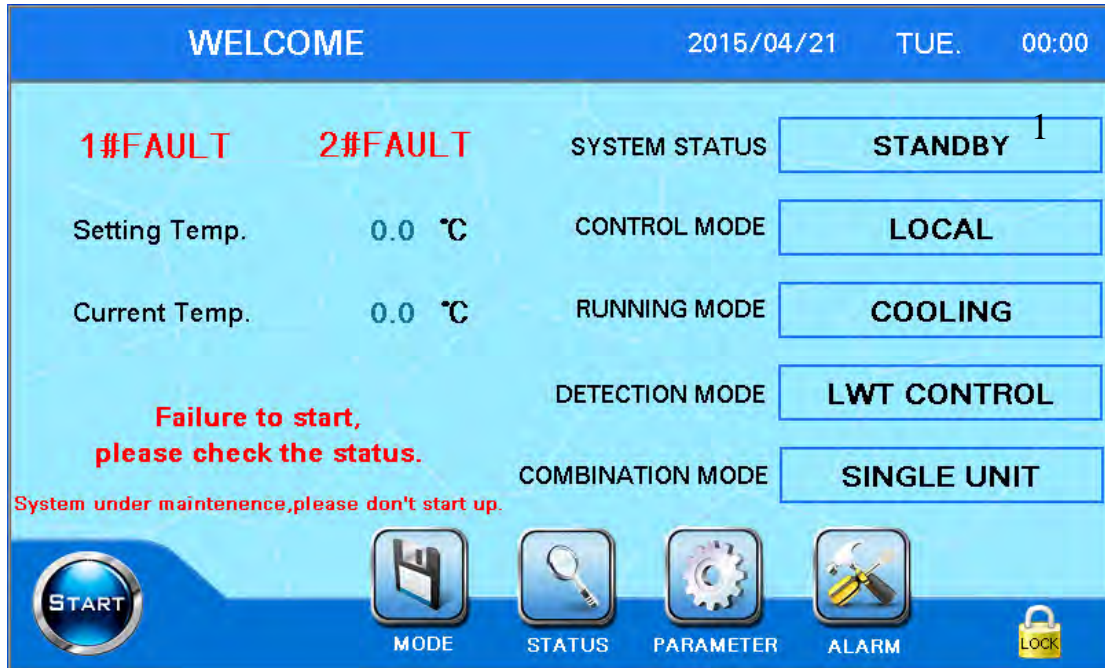
【Mode setting page】

Control mode and working mode are to be set in this page:

1) Control mode and running mode which have been selected currently for units are displayed here, and this position will correspondingly vary according to the choices of customers when selection of modes is changed.

2) Selection of unit control modes, including three modes: "LOCAL", "REMOTE", "TIMED", i.e. local control, remote control, timing control.

3) Selection of unit operation modes, including three modes: "PUMP", "COOLING", i.e. pump mode, cooling mode.

4) Click on "PgDn" to enter the next page (Main Page).

5) Click on "BACK", return to the homepage of units.

Note:

① The control mode and running mode can be selected optionally in standby status,   while only the control mode can be switched in running status.

② Control Mode: The selection of the ways of Unit starting/stopping.   "LOCAL" indicates you can only start or stop the unit through "Start/Stop" button in touch screen. "REMOTE" indicates you can only achieve the unit starting or stopping though the "Remote Start" and "Remote Stop" hardware interfaces; "TIMED" indicates the unit can achieve timing start/stop according to the time set by the user.

✧ **Main Page**
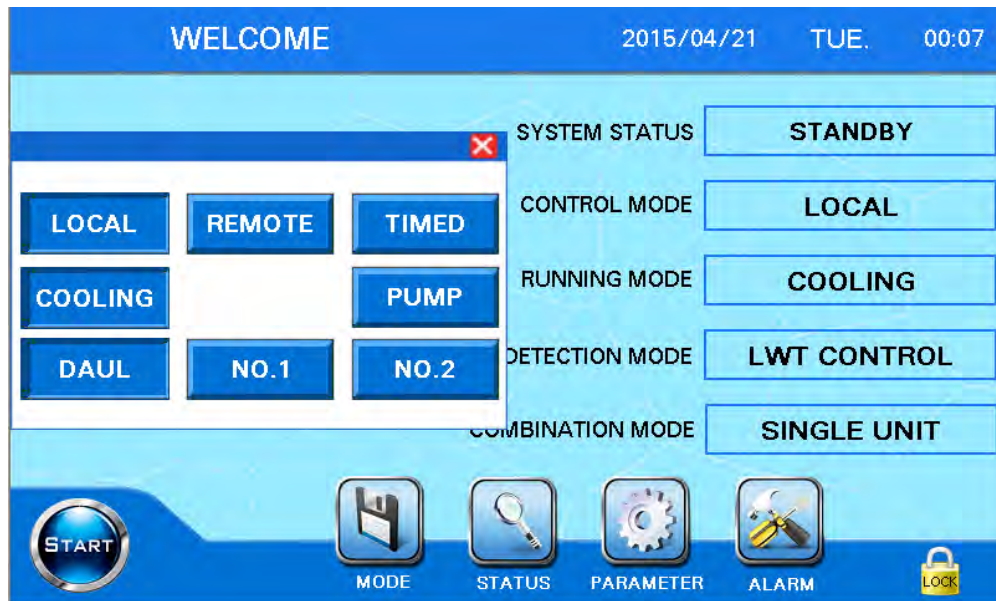
【Main page】

1. System Status: Current system status of units is displayed here. The status of system possibly displayed is as follows:

1) Standby status: in normal condition, displaying "Standby status" after the unit is powered on.

2) Running status: indicating that starting of unit compressors has been finished (entering the running status after double-head Start of one compressor), and it has entered the process of automatic energy adjustment from this point.

3) Pause status：The unit enters "Pause" status when the current detection water temperature (chilled outlet water temperature in single-unit or chilled inlet water temperature in Multi-units) is lower than the setting temperature of unit pause. The compressor start to run until the current detection temperature is higher than the setting temperature of compressor start, then the unit enter "Running" status.

4) Shutting down status: the status display "shutting down" after the unit has been confirmed to execute shutdown action. After finished, the unit enters "Standby" Status.

5) Protection status: indicating that the unit is in a failure status currently, click on "alarm information" to see alarm details.

2. Control mode and running mode: the current mode will be displayed here. For example, the current page displays that the unit is in a "LOCAL MODE", and the running mode is "PUMP MODE".

3. Detection Mode: Leaving water control is by default only in the single-unit mode, with entering water control not allowed; entering water control is by default in the multi-units combination mode, with setting of leaving water control not allowed。

4. Combination Mode: indicates "Single-unit" when the unit isn't in the case of multi-combination control and indicates "Multi-Units" when the unit is in Multi-combination control. (Note: When the system has only one unit, please don't set to multi-unit control)

5. This position is the unit alarm display area, and alarm information of failure content will be displayed here in a mobile mode in case of any failure in units.

6. Functional key area of units. It has the functional keys of "SETTING", "ALARM", "STATUS" and "Multi-Unit" through which different operating interfaces are accessible. Introduction of their functions will be detailed hereafter.

7. Start is required upon completion of unit set-up, directly click on "START" button on the lower left, and the following dialog box will be popped up at this moment: click on "CANCEL" if you don't expect to execute the start.

【Ensure unit start-up】

8. The sign "Failure to start, please check the status" will appear when the conditions of compressor stating can't be required.

Note:

Multi-Status button disappear when the combination mode is "Single-unit". Click
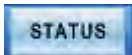
STATUS button to query the current unit status.

Starting Operation

The system is in pause state when the water pump has been completed to open, but the compressor is unable to start because some other factors can't satisfy the condition of compressor starting, the interface indicates "Failure to start, please check the status". The starting conditions include oil heating time 、restart delay、the temperature of compressor starting. In this case, only when all of the conditions have been meet, the unit starts to operate the compressor, otherwise the sign "Failure to start, please check the status" will keep displaying in the main page.

Note: Clicking on START button is invalid when the unit is in failure. The unit can start normally only when all of the alarm have been eliminated and reset manually on the touch screen interface.

Shutting down operation

Click on STOP button , and the "Confirm Shutdown" dialog will be popped up. Click on "Confirm" if you ensure execution of Shutdown action, the system status indicates "Shutting down". (Note: The system status indicates "shutting down" even the requirements of shutting down the compressor are not meet. The unit will execute shutdown action automatically after all of the requirements have been satisfied.)

The action of 4 functional keys in main page will be detailed in subsequent sections:

✧ **Setting**

Click on [SETTING] in main page to enter the password page. Click on the dialog box of password input, an input keyboard will be popped up in the interface, input user manage password "40828", then click on "Enter" in numeric keyboard, the dialog box disappears, click on "ENTER" to enter "User Parameter Setting Page".
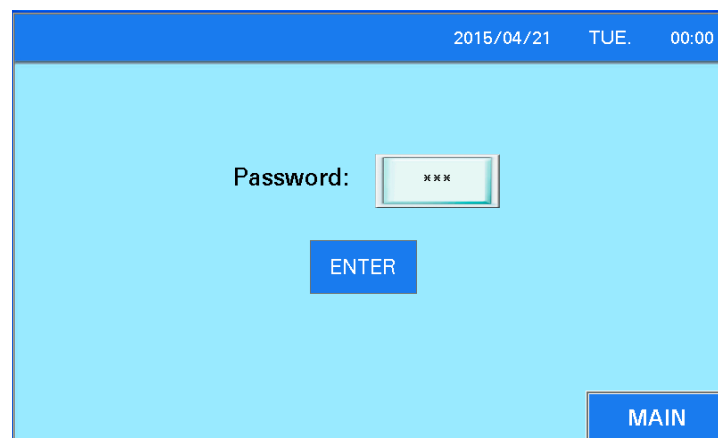
【User parameter setting page 】

Password error page

"Password Error Page" will be popped up when the password is wrong, click on [Confirm] button to return "Password Input Interface", input the password again to enter the next page.

PARAMETER SETTING

Temp. Adjustment Period	0	S
Setting Temp.(EWT)	0.0	℃
Temp./Compressor Start (EWT)	0.0	℃
1#Load Limit	0	(0:100% 1:75% 2:50%)
2#Load Limit	0	(0:100% 1:75% 2:50%)

PARAMETER	CLOCK	AUTOMATIC ON/OFF	SCREEN	MAIN

Note:

① "Max" in the upper left indicates the upper limit of the setting parameter; "Min" in the upper right indicates the lower limit.

② "Automatic On/Off": Only displaying under Timed mode.

Explanation:

① Target Temp. (Chilled Leaving Water): The target temperature of the chiller leaving water

② Temp. / Compressor start (Chilled Leaving Water): One of the compressor starting conditions required to be achieved for the chilled leaving water temperature. The compressor can start only at the current chilled leaving water temperature ＞ the setting value in cooling mode, or the current chilled leaving water temperature ＜ the setting value in heating mode.

③ Temp. Adjustment Period: The time interval between two temperature detections.

✧ **Clock setting**

PARAMETER SETTING

Temp. Adjustment Period	0	S
Setting Temp.(EWT)	0.0	℃
Temp./Compressor Start (EWT)	0.0	℃
1#Load Limit	0	(0:100% 1:75% 2:50%)
2#Load Limit	0	(0:100% 1:75% 2:50%)

Manual input is allowed

PARAMETER	CLOCK	AUTOMATIC ON/OFF	SCREEN	MAIN

Clock setting

Click on the numerical box, the numeric keyboard will appear, input the time, click "ENT" to save and take

effect. Click "ESC" to cancel the input value.

Note: Please pay special attention in setting of time and date to the fact that setting of non-existent date or time is not allowed, and we assume no liability or responsibility for setting of non-existent date or time and consequence resulting from this setting.

✧ **Adjust screen**
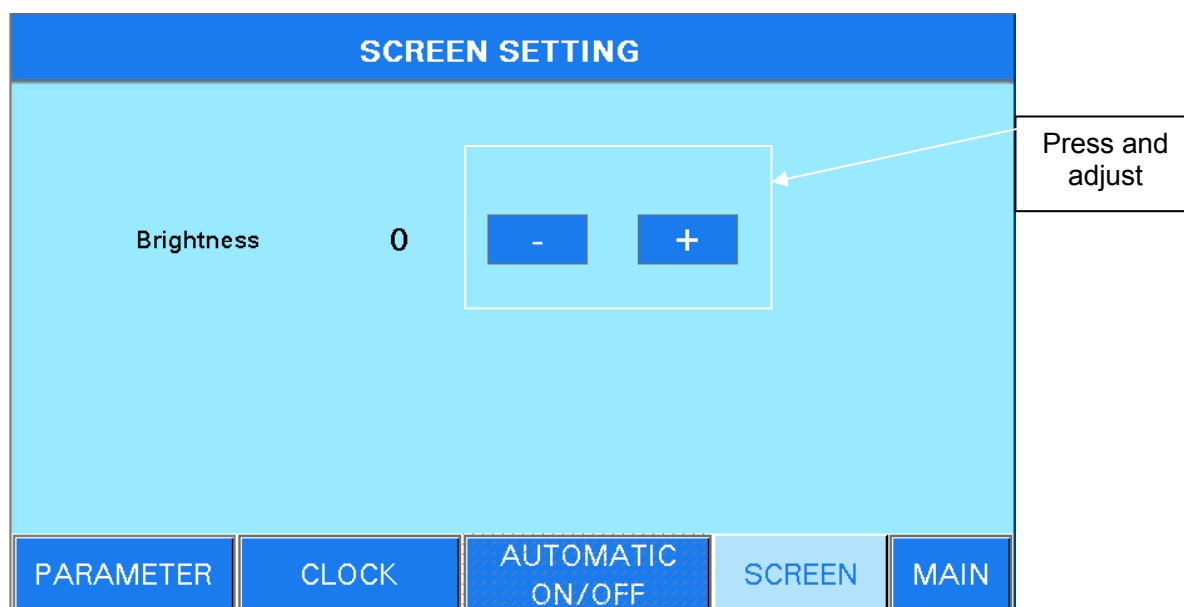
User can increase and reduce the brightness and contrast of screen by clicking on "+"and "-" in this page.
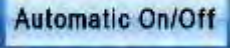
User can also open and close the keypad tone of screen by clicking on "<u>ON</u>" and "<u>OFF</u>".

User can modify the time of backlight by clicking on the numeric box following the time of backlight.

Electric control capacity displays the battery capacity of PLC whose battery is used for supplying power for PLC interior time in the case of failure to engage PLC. Reset of PLC interior event will be resulted from too long power-fail time of PLC module without battery.

✧ **Automatic On/Off**

If the automatic on/off function is needed, please switch to "TIMED" mode in control mode (as shown in

Picture 2) firstly, then enter user parameters setting page, click on [Automatic On/Off] button to enter the following page ,and set the starting times and shutdown times.
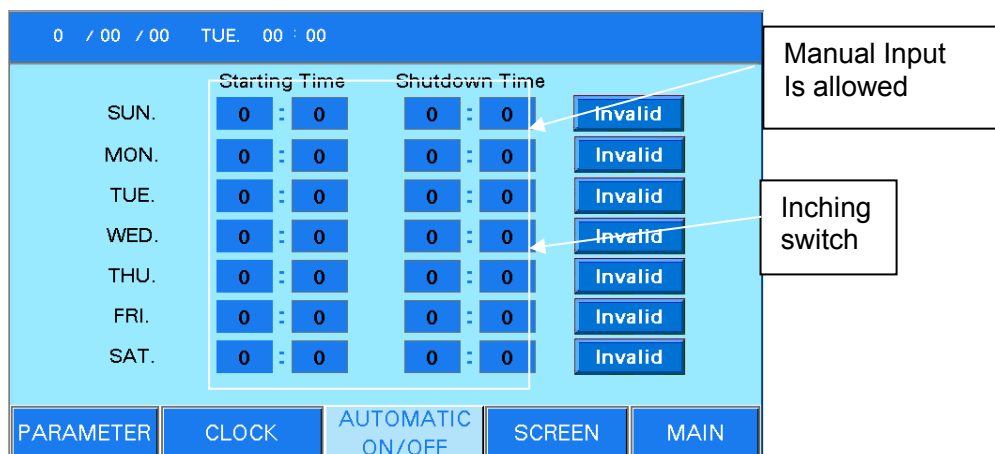
Automatic On/Off setting

Any time every day in a week can be selected, and the units will be started or stopped at the time points.

When a period of continuous running time (for example from 10:00 Tuesday to 16:00 Thursday) is necessary,

you can set the time 10:00 in starting time and 0:00 in shutdown time on Tuesday and click on " **Invalid**

to switch to **Valid** , set the time 0:00 in starting time and 16:00 in shutdown time on Thursday and

click on " **Invalid** to switch to **Valid** ,all of the others time buttons are **Invalid** . Pay

attention to that the starting time must be before the shutdown time.

Since system interior time is used for timing start / stop, please draw attention to check whether the time of the system is correct when you are using this function.

✧ **Comm. Setting**

Click on **Comm. Setting** to enter the below page:
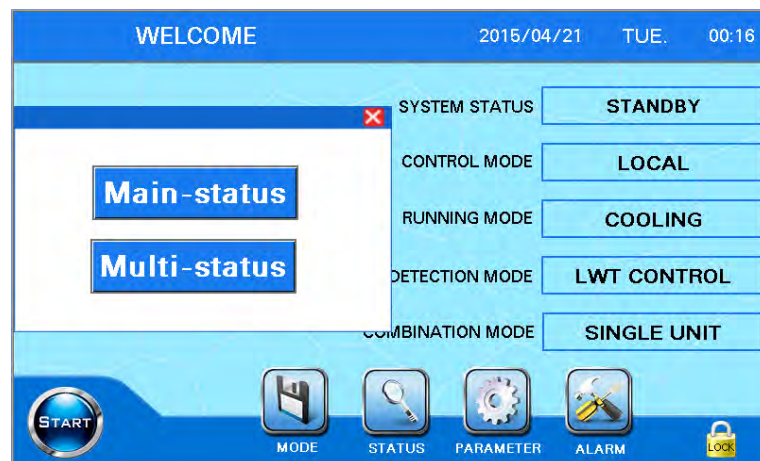
Note: "1#Comp. ON" "2#Comp. ON" only appear in dual-compressors units.

① Mult-Units: When the unit need to be multiple controlled, please contact the after-sale service engineers

to do settings of the unit. After setting well, press the **Single unit** button, it will turn to **Multi units** ,

then the number of multi units should be set according to the practical situation.

② "1#comp. on" "2#comp. on": No.1 or No.2 compressor can be selected to work or not, when the compressor meet the conditions it will shut down refer to the stop progress if user want to stop one compressor.

✧ **Status**

Click on **STATUS** in main page to check the current unit status information.

Status information

The upper left in the page display the refrigerant type; the upper right display the station number address, the

station number of master is set to 1.

Note:

To start up, following conditions are required:

① "Restart Delaying" need to display "NO" ,if "YES", it indicates the delaying period has not achieved.

② "Water Temp. Allow Compressor Start" need to display "YES", if "NO", it indicates the current temperature is not able to meet the compressor starting condition.

③ "Remaining Oil Heating Time" need to display "0", if more than 0, it indicates the oil heating is in process.

To shut down, the following condition is required:

① "Min. Running Time Elapsed" need to display "YES", if 'NO', it indicates the shortest running period has not achieved.

Current data display

Please click on [PgDn] button to enter the current data interface, the interface indicates current detection data. User can enter this interface to query the temperature information when there are alarms such as temperature too high or too low.

Current data display

Input

Input status

"ON" as displayed indicates the input point is closed; "OFF" as displayed indicates the input point is open.

Note:

① "Remote Start/Stop" is available only under REMOTE mode.

② "Water Switch": indicating that current water flow status of chilled water system. "OFF" displayed in no water flow state, otherwise "ON".

③ "Contactor Protection": indicating that when the compressor start to run, the contactor   act normally, "OFF" switch to "ON".

④ All of protection switch is "ON" in normal condition and "OFF" in failure status.

Output status

Output

"ON" as displayed indicates the output point is energized; "OFF" as displayed indicates the output point is de-energized.

✧ **Alarm**

Alarm information page

Click on [ALARM] button in Main Page to enter the alarm information page.

If there is any alarm, the unit will execute alarm procedure action. The unit alarm status can't be removed until all of the alarms have been eliminated and alarm shutdown process has been finished. Click on [Reset] button and "Fault" in main page disappear, the unit returns to normal. If the warning message is more, please click on [↑] [↓] to check. These in red color indicate the alarms which have not been eliminated; these in white color indicate the alarms which have been eliminated.

Note:

1. High-Pressure Protection is unable to reset in alarm information page, manual reset in the high pressure switch (installed in the discharge pipe) is needed.

2. Compressor and fan overload protection are unable to reset automatically, please check the relevant thermal relay in the control box to reset manually.

History Alarm Information

Click on **History Alarm Information** button in Alarm Page to enter history alarm information query information, as shown in Picture 8.2. Max.5 warning messages can be recorded meanwhile. The messages will be updated automatically if there are more messages.

Message		Alarm	
Time 2000 / 00 / 00 00 : 00		UP	NEXT

LWT	0.0 ℃		
EWT	0.0 ℃		
Ambient Temp.	0.0 ℃		
1#Discharge Temp.	0.0 ℃	2#Discharge Temp.	0.0 ℃
1#Suction Pres.	0.0 Bar	2#Suction Pres.	0.0 Bar
1#Discharge Pres.	0.0 Bar	2#Discharge Pres.	0.0 Bar

TEMP.PRES. | 1#IN/OUT | 2#IN/OUT | ALARM | DETAILED | MAIN

History alarm information query

Note:

1. The history alarm information record the unit operating parameters when there happen unit alarms during the compressor running.

NO.	Interface in English
1	Water flow fault
2	Anti-freeze Protection
3	1# High-pressure protection
4	1# Low-pressure protection
5	1# Compressor Motor Protection
6	1# Low Oil Level Protection
7	1# Contactor protection
8	1# Oil differential pressure protection
9	1# Compressor overload
10	1# Fans overload
11	Power Failure Protection
12	Entering water temp. sensor failure
13	Leaving water temp. sensor failure
14	Ambient temp. sensor failure
15	1# Fin temp. sensor failure
16	1# Discharge temp. sensor failure
17	2# Fin temp. sensor failure
18	2# Discharge temp. sensor failure
19	1# Suction pressure failure
20	1# Discharge pressure failure
21	2# Suction pressure failure
22	2# Discharge pressure failure
23	1# High discharge temp. protection
24	1# High Fin temp. protection
25	1# Differential pressure protection
26	1# Low Suction Pressure protection
27	2# High discharge pressure protection

28	1# Mode switch failure
29	Mode water temp. protection
30	1# EXV module failure
31	2# High pressure protection
32	2# Low pressure protection
33	2# Compressor motor protection
34	2# Oil level protection
35	2# Contactor protection
36	2# Oil differential pressure protection
37	2# Compressor overload
38	2# Fans overload
39	2# High discharge temp. protection
40	2# High Fin temp. protection
41	2# Differential pressure protection
42	2# Low Suction Pressure protection
43	2# High discharge temp. protection
44	2# Mode switch failure
45	2# EXV module failure
46	Invalid Address Number

✧ **Multi-units status**

Communication Status		Run Status	Prot. Status	Running Time	
1#	Host	Running	Normal	0	H
2#	Connected	Running	Normal	0	H
3#	Connected	Standby	Fault	0	H
4#	Unconnected				
5#	Unconnected				
6#	Unconnected				
7#	Unconnected				
8#	Unconnected				

Check 0   # Adress Message   MAIN

Multi units status

In this page, you can query the status of different modules through choosing the corresponding module button, also can check the status of all modules meanwhile through master-monitoring.

Master-monitoring page

Click on **Scan All** to enter the next page, it will show the information of all connected units as following: The communication, alarm information, status, refrigerant type of each unit can be inquired in the following pages.

Communication Status		Run Status	Prot. Status	Running Time	
1#	Host	Running	Normal	0	H
2#	Connected	Running	Normal	0	H
3#	Connected	Standby	Fault	0	H
4#	Unconnected				
5#	Unconnected				
6#	Unconnected				
7#	Unconnected				
8#	Unconnected				

Check 2 # Adress Message   ENTER   MAIN

Click on PgDn to enter the next page.

PARAMETER SETTING

Temp. Adjustment Period	0	S
Setting Temp.(EWT)	0.0	℃
Temp./Compressor Start (EWT)	0.0	℃
1#Load Limit	0	(0:100% 1:75% 2:50%)
2#Load Limit	0	(0:100% 1:75% 2:50%)
Set The Number of Multi Units	0	

PARAMETER   CLOCK   AUTOMATIC ON/OFF   SCREEN   MAIN

Note:

① Max.8 units can achieve combination control, the unconnected unit can access the combination control system at any time as long as the unit is powered on and connected with the system by communication cable.

② The "Status" displays "Run" until the unit finish the starting action and enter the process of automatic energy adjustment, otherwise displayed "shutdown"

7. Control screen menu structure

Touch screen tree diagram

```
┌──────────────┐
│   Homepage   │
└──────┬───────┘
       │
┌──────┴───────┐
│ Mode Setting │
└──────┬───────┘
       │
┌──────┴───────┐
│  Main Page   │
└──────┬───────┘
       │
   ┌───┴────────────┬────────────────┬──────────────┐
┌──┴─────────┐ ┌────┴─────┐ ┌────────┴──┐ ┌──────────┴──┐
│  Setting   │ │  Multi-  │ │   Alarm   │ │   Status    │
│ (Password  │ │  Status  │ │           │ │             │
│   Input)   │ │          │ │           │ │             │
└──┬─────────┘ └────┬─────┘ └────┬──────┘ └──────┬──────┘
   │                │            │               │
┌──┴─────────┐ ┌────┴─────┐ ┌────┴──────┐ ┌──────┴──────┐
│    User    │ │Multi Units│ │  Alarm   │ │History Alarm│
│ Parameter  │ │  Status   │ │Information│ │ Information │
│  Setting   │ │           │ │          │ │    Query    │
└──┬─────────┘ └────┬──────┘ └──────────┘ └─────────────┘
   │                │
   │        ┌───────┼───────────┐
   │   ┌────┴───┐ ┌─┴──────┐ ┌──┴──────┐
   │   │ Module │ │ Status │ │ Status  │
   │   │ Choose │ │ Info 1 │ │ Info 2  │
   │   └────────┘ └───┬────┘ └────┬────┘
   │                  │           │
┌──┴──┬──────┬───────┬┴─────┬─────┴────┬──────┬──────┐
```

| Clock Setting | Adjust Screen | Automatic On/Off | Comm. Setting | Status Information | Current Data Display | Input | Output |
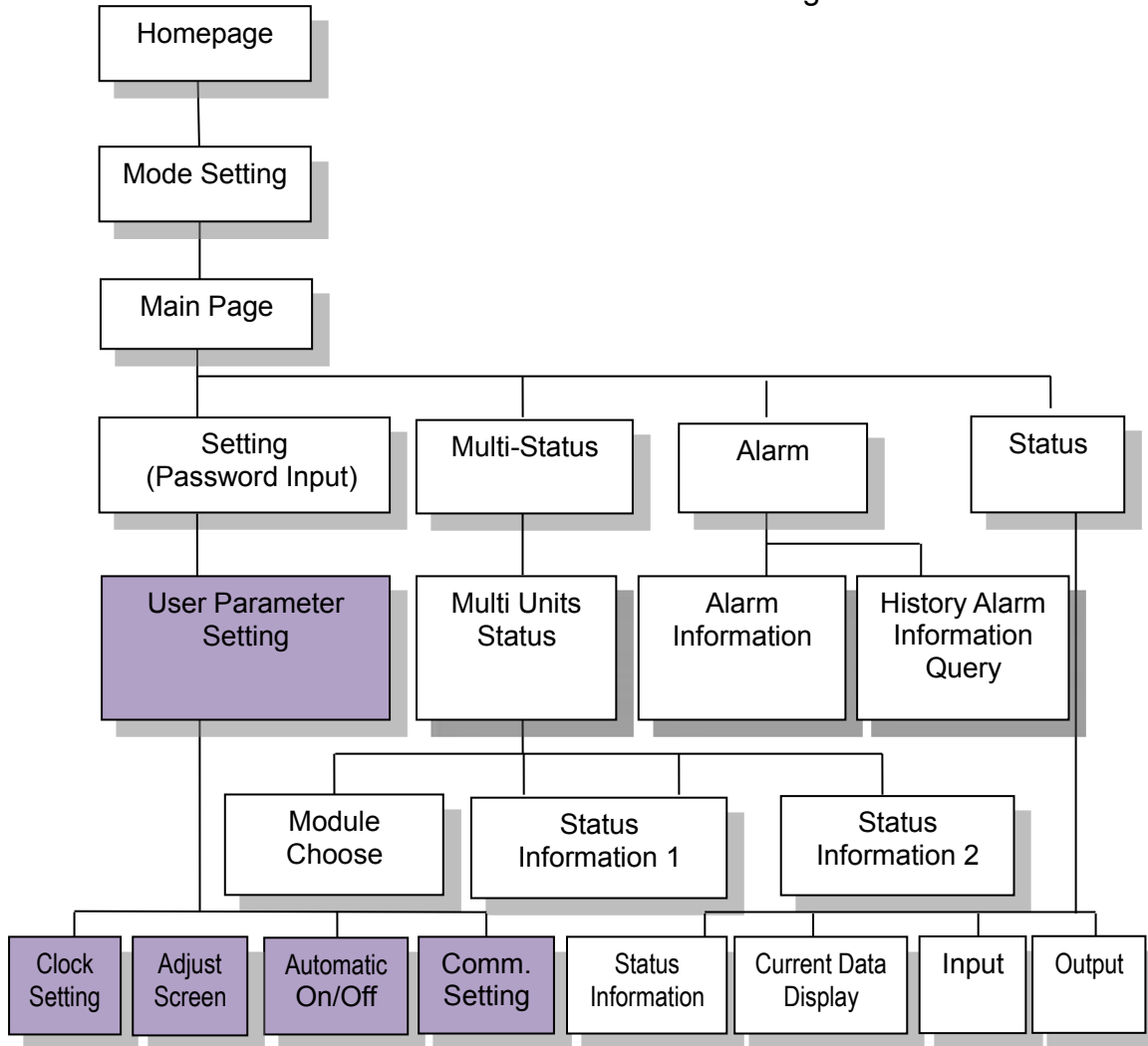
8. Safety protection

Name	Code	Brand	Setting Range	Location
Low-pressure Switch	YK-0.03/0.10-O-R-7000	JUNLE	0.03~0.10MPa	
High-pressure Switch 1	YK-2.1/1.7-C-R-7000	JUNLE	1.7~2.1MPa	
High-pressure Switch 2	YK-2.2/1.8-C-R-7000	JUNLE	1.8~2.2MPa	
Low-pressure Sensor(For main control board)	AKS33	Danfoss	-1~12bar	
High-pressure Sensor	AKS3000	Danfoss	0~30bar	

Note: Manual reset is needed for high-pressure switch.

IV. Electrical control

1. Electrical data

TMCU0xxxB3O3/1AT3SB		380	500	600	760	900	1000	1200
Standard voltage	V				380V 3Ph 50Hz			
Voltage range	V				340~420			
Max. running current	A	287	368	412	574	655	736	824
Max. power consumption	kW	163	209	239	326	372	418	478
Rated current	A	202	264	317	405	473	528	634
Compressor A								
Locked rotor Amps.	A	586	805	805	586	586	805	805
Max. allowed current	A	370	450	450	370	370	450	450
Rated current	A	173	225	268	173	177	225	268
Rated power	kW	106.6	135.8	162	106.6	108.2	135.8	162
Compressor B								
Locked rotor Amps.	A	--	--	--	586	805	805	805
Max. allowed current	A	--	--	--	370	450	450	450
Rated current	A	--	--	--	173	227	225	268
Rated power	kW	--	--	--	106.6	137.2	135.8	162
Fan								
Full load Amps.(each)	A	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Power input(each)	kW	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Total input	kW	14.4	19.2	24	28.8	33.6	38.4	48
Crankcase heater								
Voltage	V	220	220	220	220	220	220	220
Total input	kW	0.3	0.3	0.3	0.6	0.6	0.6	0.6
Total Amps.	A	1.36	1.36	1.36	2.72	2.72	2.72	2.72

NOTE:

1.Customer to specify the exact nominal power supply available at site so that electrical components are selected accurately.

2.Main power must be supplied from a single field supplied and mounted fused circuit breaker.

3.The compressor crankcase heaters must be energized for hours before the unit is initially started or after a prolonged power disconnection.

4.All field wining must be in accordance with local standards.

5.Neutral line required on 380V-3Ph-50Hz(5 wires) power supply.

6.Rated load Amps values are on nominal conditions.

7.The ±10% voltage variation from the nominal is allowed for a short time, not permanent.

2. Electrical components introduction

1) Moulded case circuit breaker

The mould case circuit breaker is mainly used in a non-frequently operated low voltage distribution line or used as a power switch in the switch cabinet. It can connect or disconnect a load circuit, isolate power, and provide protection for circuits, electric devices, and motors. In the case of overcurrent, overload, or short circuit, the circuit breaker disconnects the circuit automatically. The applied mould case circuit breaker

provides overload and short circuit protection.

2) Power protector

This module is used to detect power supply and provide protection in case of phase loss, phase sequence, and under voltage of incoming line power, so as to prevent damage to the compressor or other components caused by power failure. Some models also provide protection for overvoltage and three phase imbalance.

3) Time relay and intermediate relay

The time relay is an automatic switch device which performs delayed control based the electromagnetic or mechanical principles. It controls the star delta switching time for the compressor contactor. The preset time is star operation time (6s). The coil voltage is AC 220V. The rated contact current is usually low and is used for controlling the loop only.

The intermediate relay delivers intermediate signals among control circuits to increase the number and capacity of contacts. Normally, the main control board output controls starting and stopping of loads such as motor and water pump by using the intermediate relay to drive the contactor coil. The coil power supply can be DC or AC. Our standard screw compressor model uses the AC220V coil.

4) Compressor and fan thermal overload relay

The thermal overload relay works based on the principle of heating effect of electric current. With inverse time limit action feature which is similar to the permissible overload feature of the motor, it is used to provide overcurrent protection for the compressor and fan. For compressor overload protection, the major loop current of the motor is converted to an AC 0-5 A current signal by the current mutual inductor. Then the thermal overload relay performs overload protection. For fan overload protection, the thermal overload relay is connected in series with the major loop.

6) .Current transformer and transducer

The current transformer transforms primary current with a larger value to secondary current with a smaller value for the purpose of protection or measurement. A current transformer with transformation ratio of 400/5 can transform 400A current to 5A. A transducer transduces the measured current to DC voltage or DC current. After the current transformer transforms the current to AC 0-5 A current signals, the transducer outputs 4-20 mA analog signal based on the linear scale to the main control board.

7) Electronic expansion valve

The electronic expansion valve is equipped with a stepping motor which controls the valve status. A special-purpose electronic expansion valve control module is required to drive the electronic expansion valve.

8) Solenoid valve

When the solenoid valve is energized, the electromagnetic coil generates electromagnetic force to pull up the closed component from the valve seat and the valve is open. When the solenoid valve is powered off, the spring pushes the closed component to the valve seat once the electromagnetic force disappears and the valve is closed. Voltage of the solenoid valve washer is AC220V, and it is driven directly by the main control board output.

3. Electrical components parameter setting

1）Moulded case circuit breaker

TEST key: to press to test whether the breaker is normal in stop condition
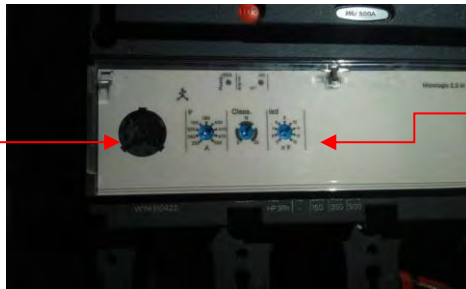
Tripping value

Unit Type	Compressor Startup Current	Maximum Running Current of the Entire Unit	Value		
			Ir	Class.	Isd
380	586	287	320	5	6
500	805	368	410	0.8	7
600	805	412	440	0.9	7
760	586+586	287+287	320+320	5	6
900	586	287	320	5	6
	805	368	410	0.8	7
1000	805+805	368+368	410+410	0.9	7
1200	805+805	412+412	440+440	0.9	7
Remarks:/					

2) Power protector
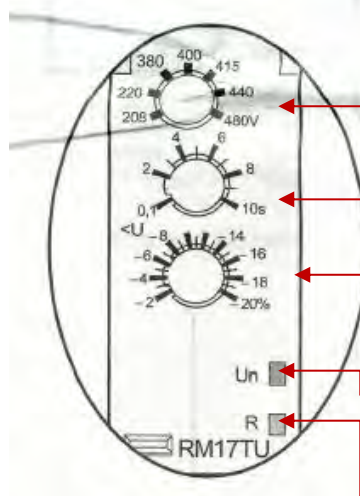
U： 380V

T： 6S

＜ U ：

Power LED ，on lighting

Running LED normal lighting; fault off

Power protector use Schneider RM17TU type.

① Select the voltage class. For standard units, the voltage is 380 V.

② Set the delay to 6s.

③ Set the under voltage value to 10%.

Note: Set the processing parameters only when the system is powered off.

3) Time Relay

Time's up LED
Up display green

T： 6S

Power LED
On display red
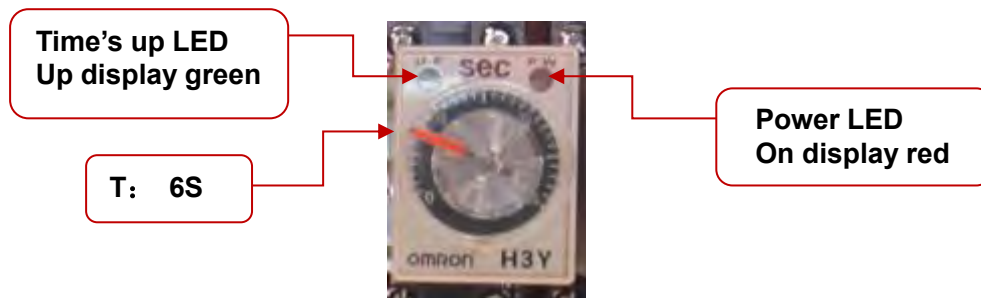
Time relay use Omron H3Y type.

4) Compressor and fan thermal overload relay

Thermal overload relay takes advantage of heating effect to protect the compressor and fans.

TEST key: to press to test whether the overload relay is normal in stop condition

Reset key: to press to reset the overload relay if there is compressor overload protection

Current setting panel: to set the protection current value.

Note：Compressor overload relay, only apply to 3UA series of Siemens brand

Reset key: to press to reset the overload relay if there is compressor overload protection

TEST key: to press to test whether the overload relay is normal in stop condition

Stop key: to press to make the output in off-state

Current setting panel: to set the protection current value

Note：Fan overload relay, only apply to LRD series of Schneider brand

Compressor thermal relay value:

The calculation of compressor overload value (transformation ratio of current mutual inductor is A/B) is as follows:

(Maximum running current of compressor/current mutual inductor A) x B = Thermal relay value of compressor

For example, if the maximum running current of compressor is 250 A, and the transformation ratio of current mutual inductor is 300/5,

Thermal relay value = (250/300) x 5 = 4.17

Note: Use a value that is smaller than the calculated one. For example, in the preceding calculation, the

calculated value is 4.17; in practice, set the value to 4.15.

Unit Type	Maximum running current of compressor	Transformation ratio of current transformer	Thermal relay value of compressor
380	287	300/5	4.8
500	368	500/5	3.7
600	412	500/5	4.2
760	287+287	400/5	3.6/3.6
900	287+368	300/5$500/5	4.8/3.7
1000	368+368	500/5	3.7/3.7
1200	412+412	500/5	4.2/4.2

Fan motor thermal relay value:

Unit type	Fan quantity	Maximum running current of fan motor	Thermal relay value of fan motor
380	6	6.5	**6.5**
500	8	6.5	**6.5**
600	10	6.5	**6.5**
760	12	6.5	**6.5**
900	14	6.5	**6.5**
1000	16	6.5	**6.5**
1200	20	6.5	**6.5**

4) Main base controller DIP setting
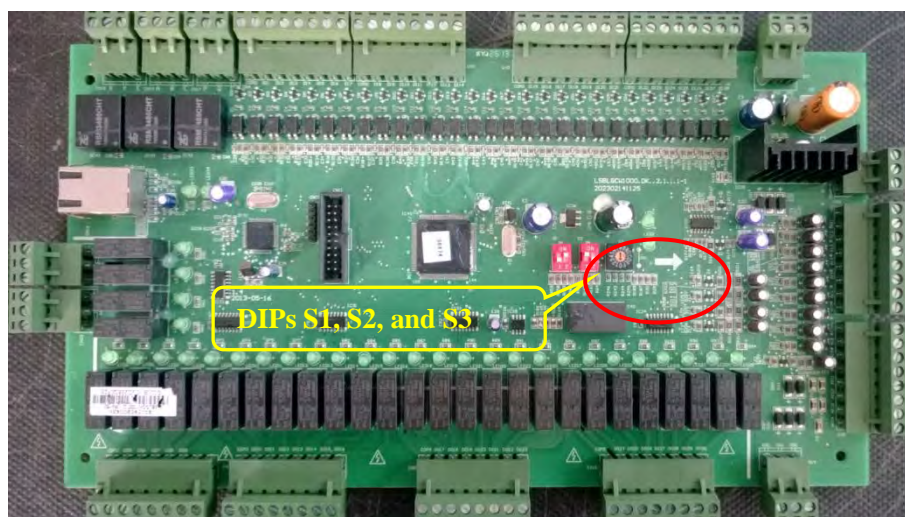
4. Field wiring

1) Wiring diagram

[380&500&600&720kW]

[900&1000&1200&1420kW]

PE N L3 L2 L1

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |

- Water Flow Switch
- Remote Start
- Remote Stop
- C/H Mode Switch (Only Heat Pump)
- Multi-units communication interface
- Aux. Heater (Heat pump)
- Cooling Lamp
- Heating Lamp (Heat pump)
- Water Pump
- 1# Alarm
- 2# Alarm
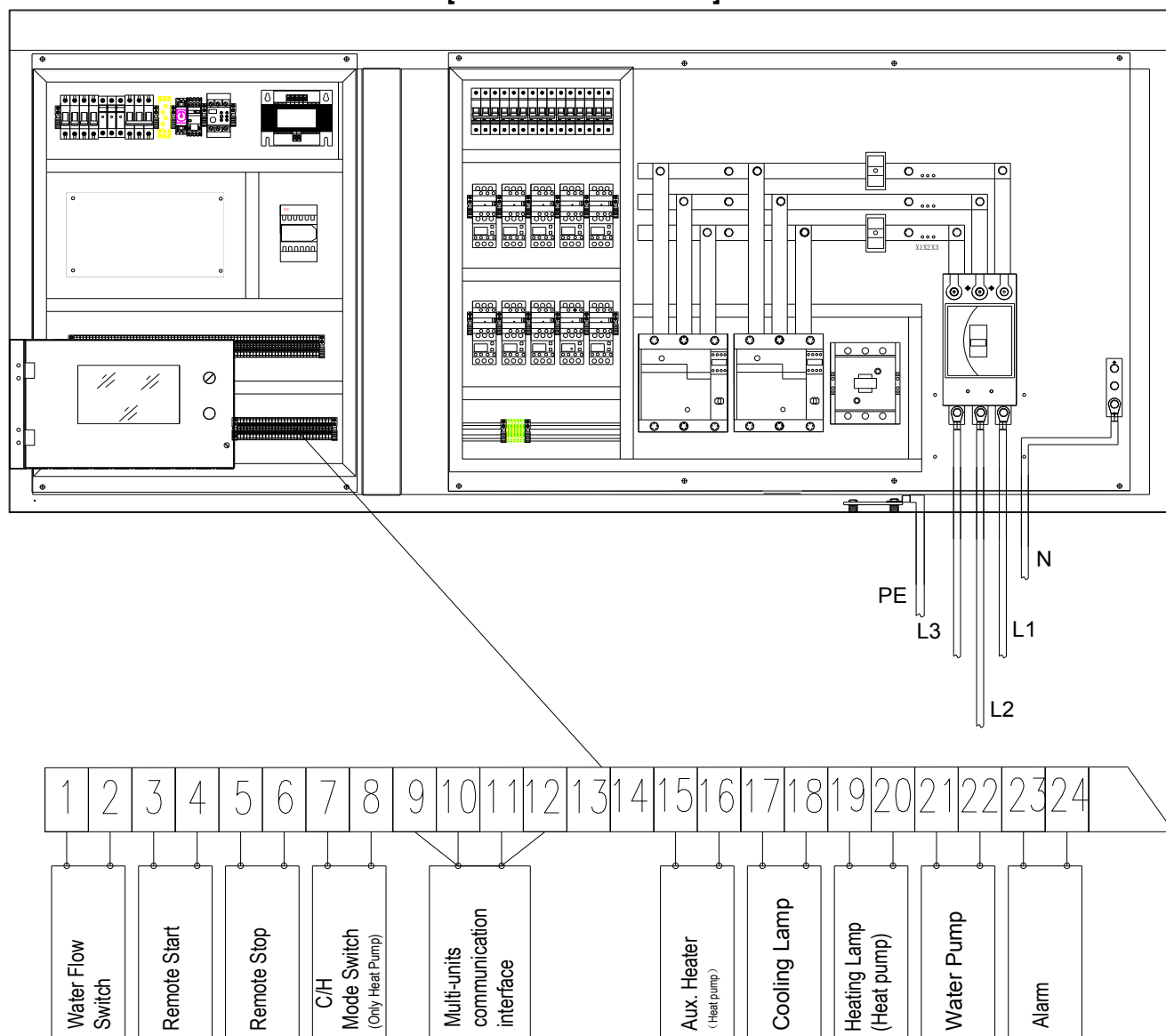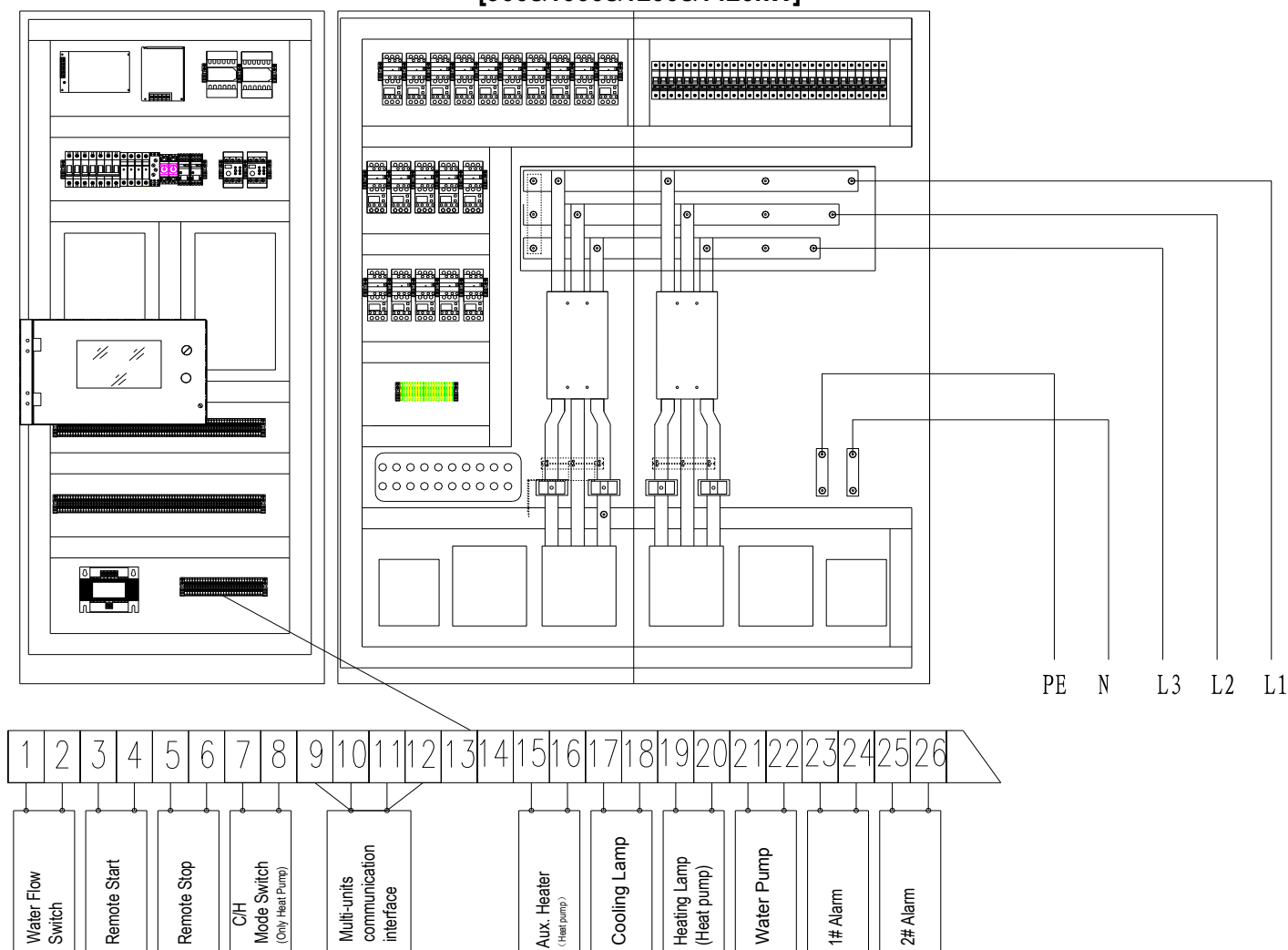
2) Recommended cable and mould case circuit breaker

Model	Recommended cable	Recommended breaker	Note
TMCU0380B3O3/1AT3SB	BVR150*4+BVR95*1	330A	The cable must be copper core. If units are used in high temperature conditions, the breaker needs larger capacity.
TMCU0500B3O3/1AT3SB	BVR240*4+BVR120*1	500A	
TMCU0600B3O3/1AT3SB	BVR300*4+BVR150*1	500A	
TMCU0700B3O3/1AT3SB	2*（BVR150*4+BVR95*1）	630A	
TMCU0900B3O3/1AT3SB	2*（BVR185*4+BVR95*1）	830A	
TMCU01000B3O3/1AT3SB	2* (BVR240*4+BVR120*1)	1000A	
TMCU01200B3O3/1AT3SB	2* (BVR300*4+BVR150*1)	1000A	

Note: The length of leading-in power cables in the unit cannot exceed 180 m.

Cable introduction

BVR：Copper core PVC insulated soft wire					
Domestic model	Conductor material	Insulator material	Nominal section area (MM ²)	UL model	Note
BVR70	Cu	PVC	70	2/0	
BVR95	Cu	PVC	95	4/0	
BVR120	Cu	PVC	120	250	
BVR150	Cu	PVC	150	300	
BVR185	Cu	PVC	185	400	
BVR240	Cu	PVC	240	500	
BVR300	Cu	PVC	300	600	The cable must be copper core.
BVR400	Cu	PVC	400	800	

3) Pump wiring
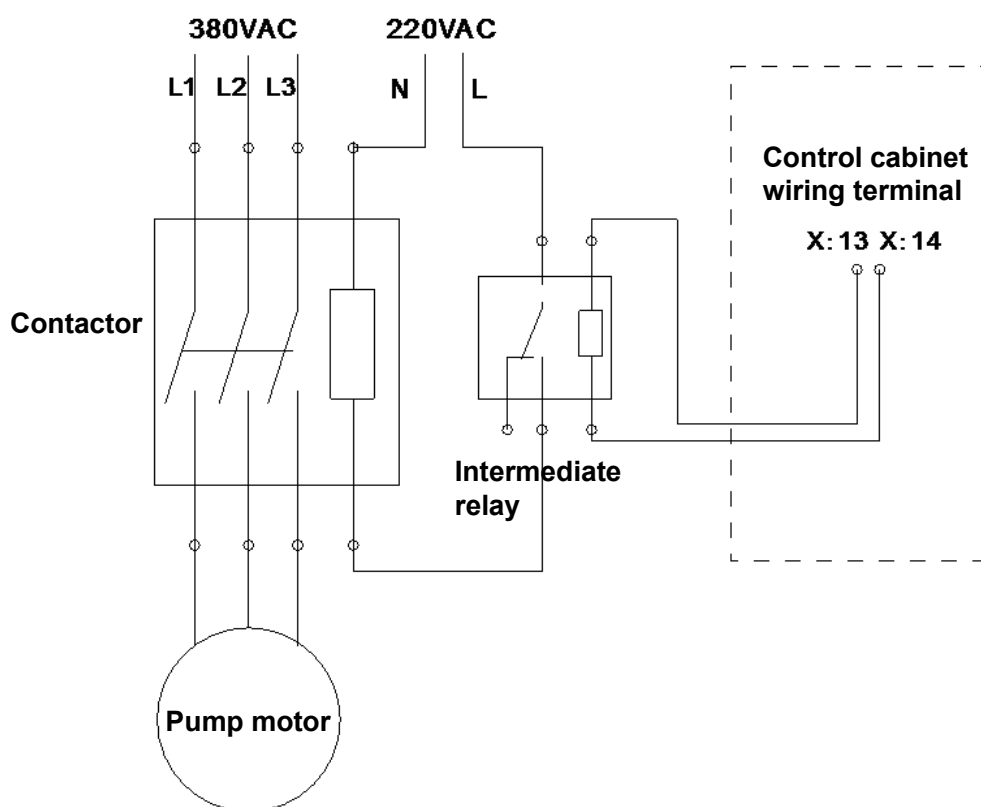
4) Water flow switch wiring

Typically, a water flow switch is installed in the pipe of cooling water system to monitor the flow status of cooling water in real time. Once the cooling water stops flowing, the water flow switch sends an alarm signal to the controller, which will perform timely processing to prevent accidents from occurring.

Note: A water flow switch is only a protection switch and cannot be used as a signal for unit power-on or power-off.

Alert status　　　　　　　Water flow normal

COM
NO
NC

COM
NO
NC

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
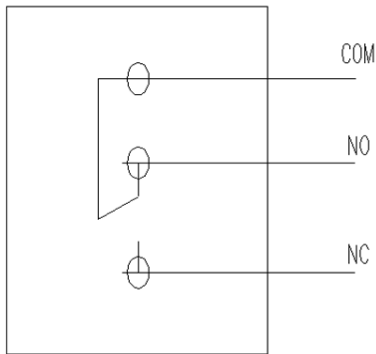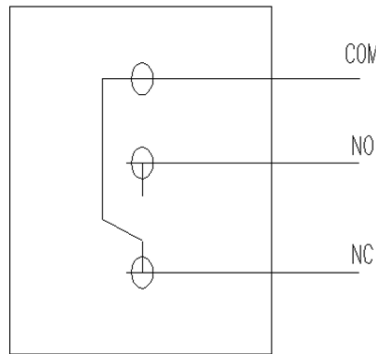
Connect the CDM NC of the water flow switch to customer terminals 5 and 6.

Water flow switch

5) Multi-combination and PC connection

Nowadays multi-combination of units and PC system (such as BMS) is becoming more and more popular. TRUST air-cooled screw chiller has reserved a RS485 interface using the MODBUS protocol.

Note: PLC unit and MIC unit cannot be mixed in a system, that is only PLC unit and PLC unit can be multi-combined, MIC unit and MIC unit can be multi-combined.

(1) PLC units multi-combination & PC connection

Note: PC system or multi-combination functions can only choose one. Two-compressors unit is counted as one unit and the max. combination no. of units is 8.

Multi-combination wiring

Unit 1#
Wiring terminals for user
| 9 | 10 | 11 | 12 |

Unit 2#
Wiring terminals for user
| 9 | 10 | 11 | 12 |

Unit 8#
Wiring terminals for user
| 9 | 10 | 11 | 12 |
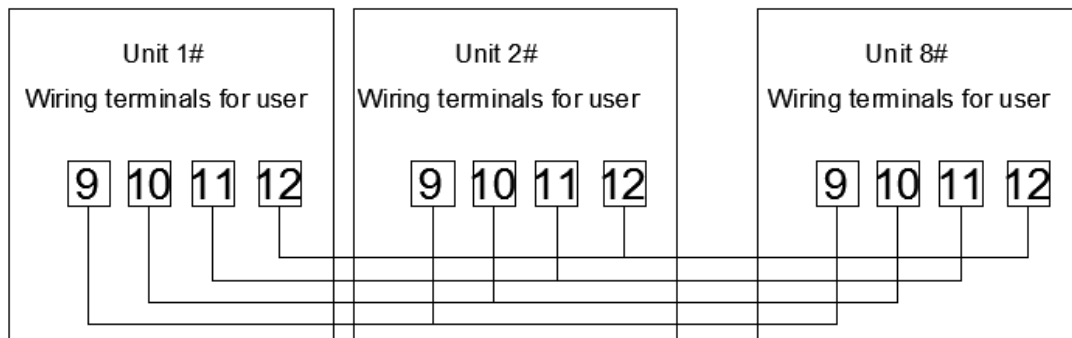
Detailed information of connection terminal:

No. 9 is A+, no. 10 is B-, no. 11 is shielding layer and can be disconnected, no. 12 is COM.

Note: If you want to use multi-combination function, in addition to connect the unit according to the requirements above and you also need to set the following information in software.

Click "PARAMETER SETTING" on the home page and then go to the next page (Password page):

2015/04/21　　TUE.　　00:00
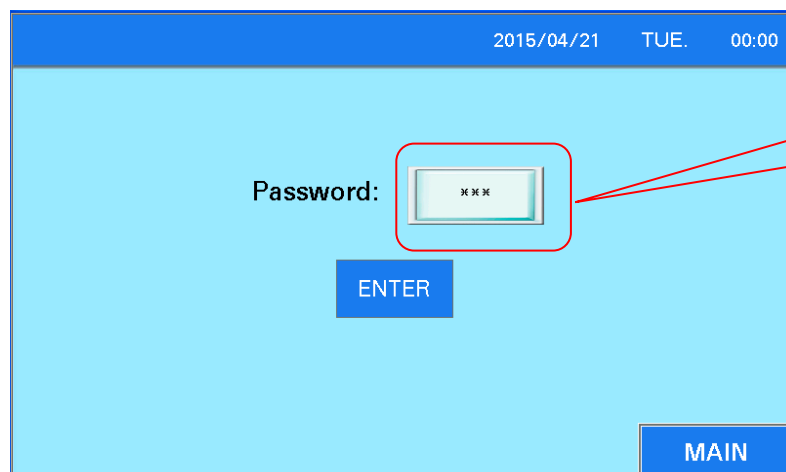
Password:　[***]

Click here to pop-up keyboard

ENTER

MAIN

Input password "40828", then click "ENTER", the dialog disappears and then click "COMFIRM" to enter into the next page (PARAMETER SETTING page1)

Click "Single unit" then come into "Multi units" and it means the unit is in multi-combination mode. Then set multi-combination no. of units at the bottom of the screen.

PC connection wiring
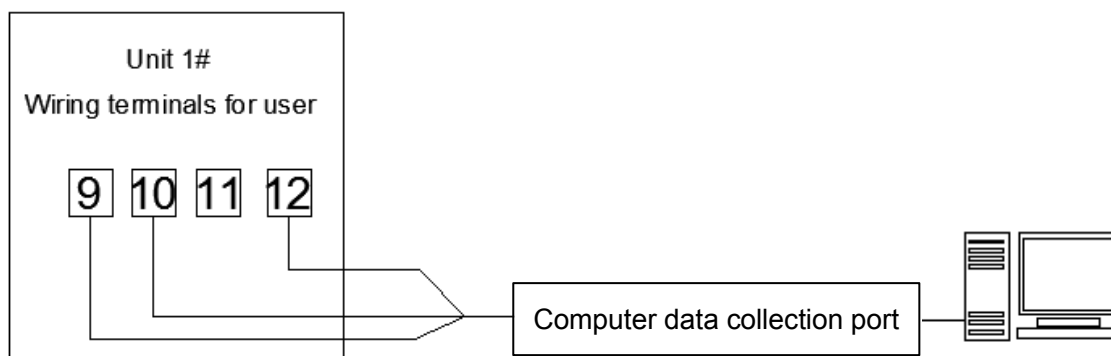
Notes for PLC unit PC communication:

Bit rate: 19200

Transmission bit：8

Stop bits: 1

Parity check: even

Communication wiring and setting guidance

PLC (Schneider M218) communication wiring

Wiring without Ethernet port:

Enlarge figure of serial port
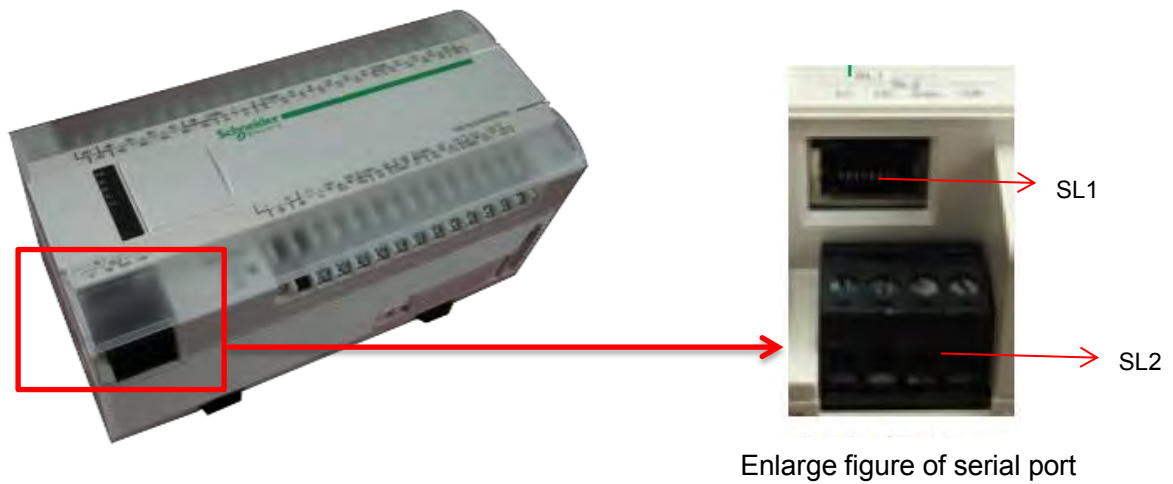
Serial connection SL1: RJ45 port

1	NC
2	NC
3	NC
4	D1
5	D0
6	NC
7	NC
8	Common

Serial connection SL2: wiring terminal

| D1 | D0 | Shielding | Com |

Serial connections:

SL1：For communication with touch screen

SL2：For PC

D1：RS485+；D0：RS485-

Wiring with Ethernet port:
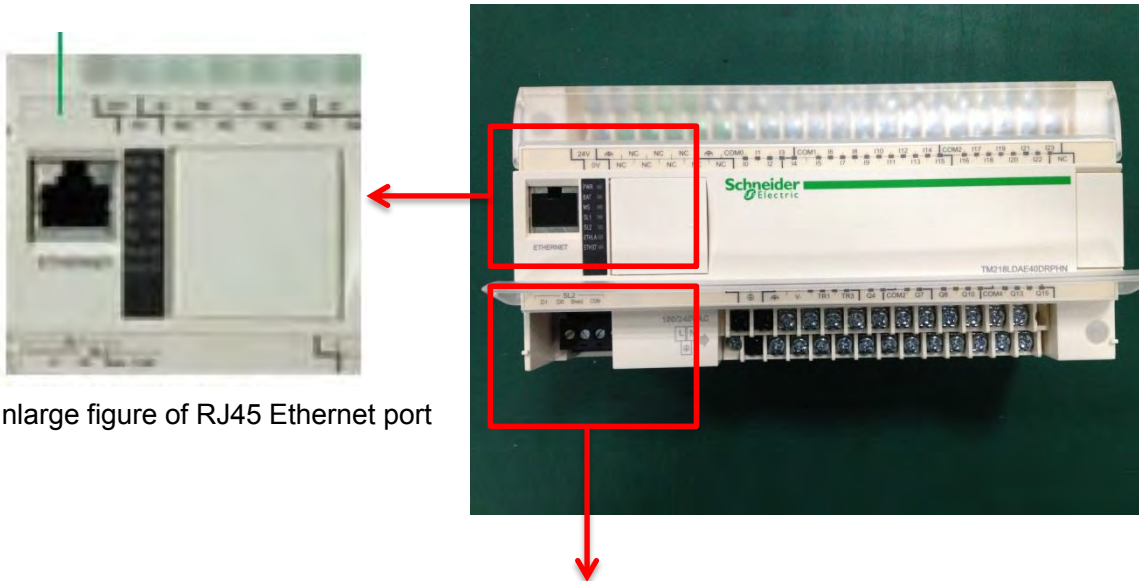
Enlarge figure of RJ45 Ethernet port

SL1

SL2
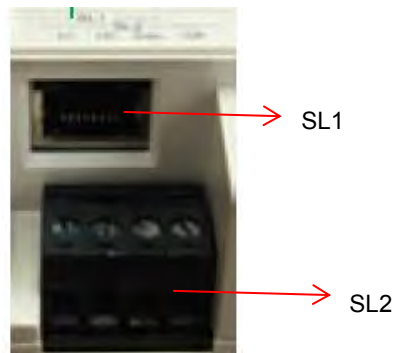
Enlarge figure of serial port

Serial connections:

SL1：For PC

SL2: For communication with EXV
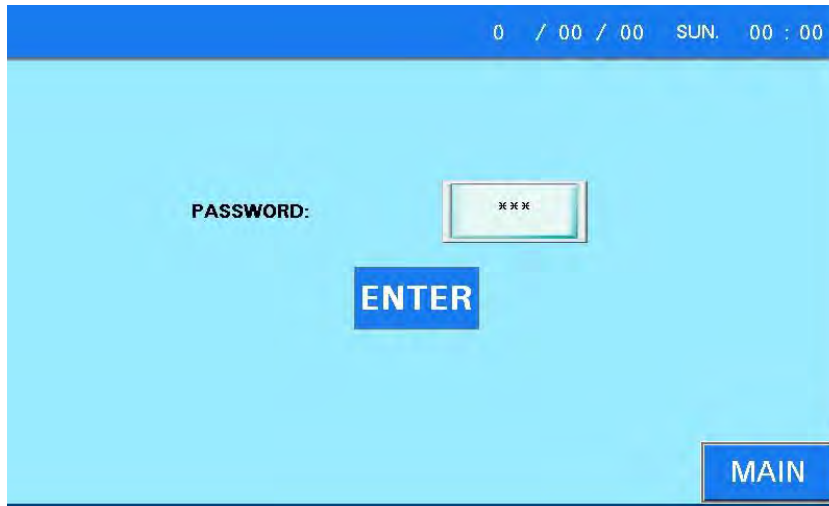
RJ45 Ethernet port: For communication with touch screen

PLC setting:

For PLC unit, we should set address, baud rate and other parameters on the screen. Specific operation is as follows:

Entering the touch screen operation interface, select "SETTING".

Input password: 40828 and enter the next page. Click "COMM. SETTING" to enter the interface below.

Setting notice:

1. First, click to read the serial port information of the unit. If you want to modify the information, please turn to the second step.

2. Set the right value in the box below the key and then click . Then click to confirm whether you have modified the information successfully.

3. If you need to modify the above information again, please repeat step 1->2.

Setting note：

Baud rate range：1200,2400,4800,9600,19200,38400,57600,115200

Address：0~247；0 for master，1~247 for slave

Data bits：7 or 8

Stop bit：1 or 2

Parity bit：0: no   1: uneven   2: even

Port：0: RS232   1: RS485

(2) MIC units multi-combination & PC connection
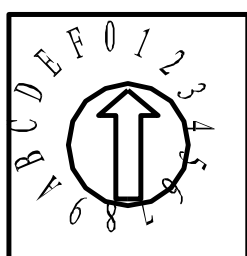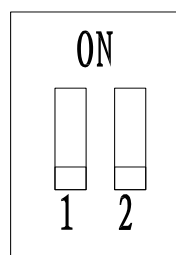
Address switch   Mode switch
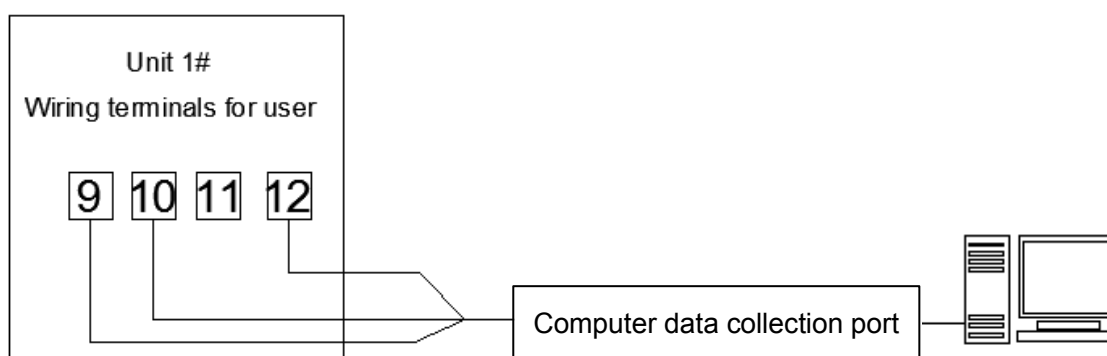
Notes:

① PC system or multi-combination functions can only choose one.

② For single-unit, if it is not connected with PC, please set S2: 1 to "OFF", 2 to "OFF"; if it is connected with PC, please set S2: 1 to "ON", 2 to "OFF", S1 is local address.

③ For multi-units, please set S2: 1 to "OFF", 2 to "ON", S1 is local address (note: addresses can only be 1~8 and cannot be repeated, or there will be something abnormal in communication), no. 1 unit is the master unit.

④ When it is set to multi-units, after right communication wiring and power on, the master can automatically identify the addresses and come into multi-combination. If the commissioning is not OK, please set it to "single-unit" mode.

⑤ After switch dialing, please power on again.

	Single-unit(no PC)	Single-unit(with PC)	Multi-units
S1	No need to dial switch	Local address	Local address
S2:1	OFF	ON	OFF
S2:2	OFF	OFF	ON

PC connection wiring

Notes for MIC unit PC communication
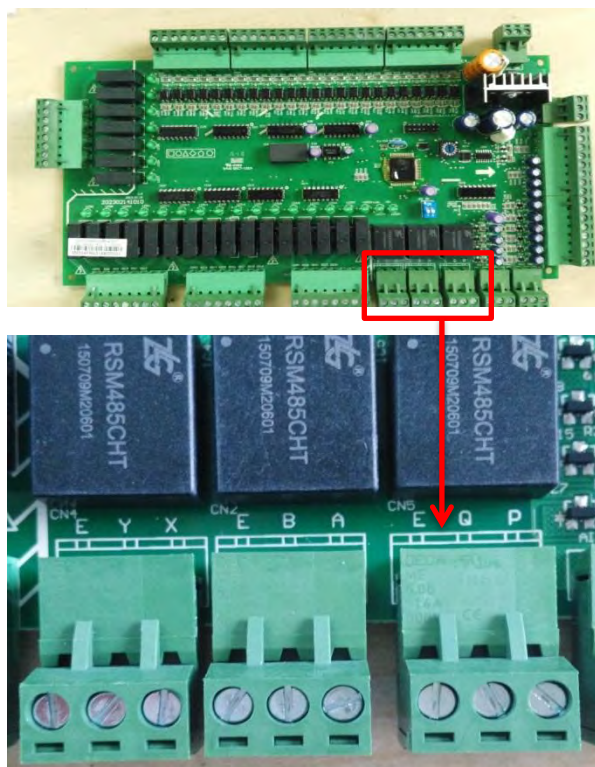
Bit rate: 9600

Transmission bit：8

Stop bits: 1

Parity check: no

Communication wiring and setting guidance

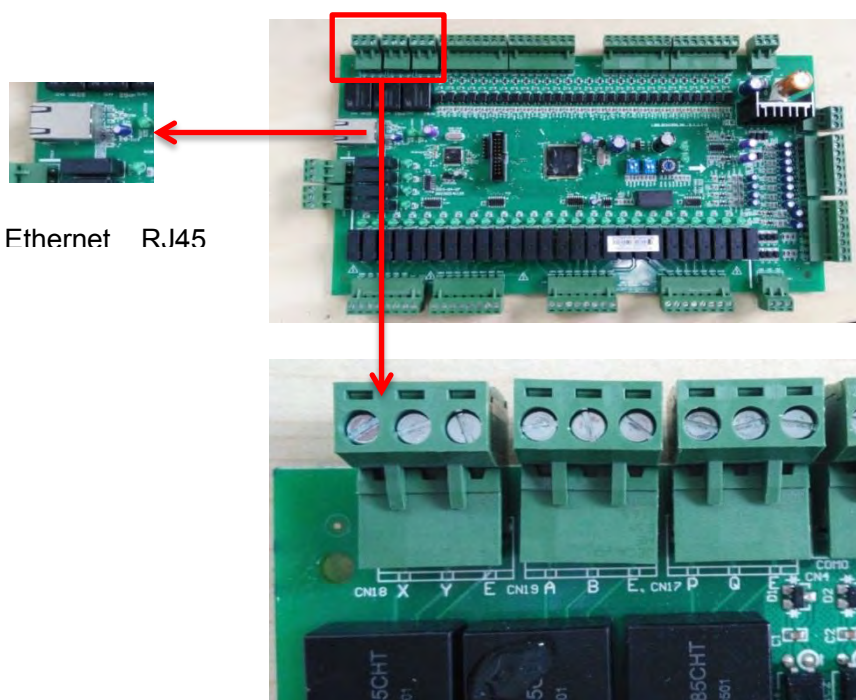**MIC communication**

Wiring without Ethernet port:

CN4: For PC

E: COM port; Y：RS485+; X：RS485-;

CN2: For communication with touch screen

CN5: For communication with EXV

Wiring with Ethernet port:

Ethernet   RJ45

CN18: for PC

E: COM port; Y: RS485+; X: RS485-;

CN19: For communication with touch screen

CN17: For communication with EXV

Ethernet RJ45 port：Reserved

MIC setting：

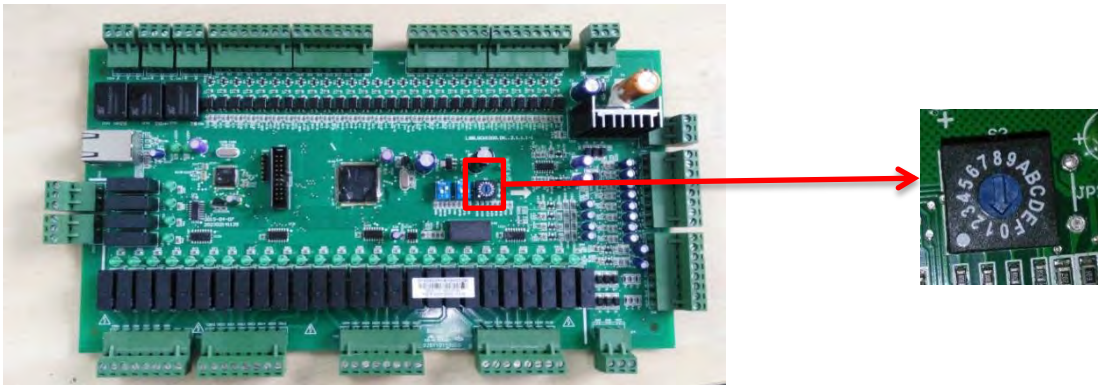Parameters of MIC units can be adjusted.
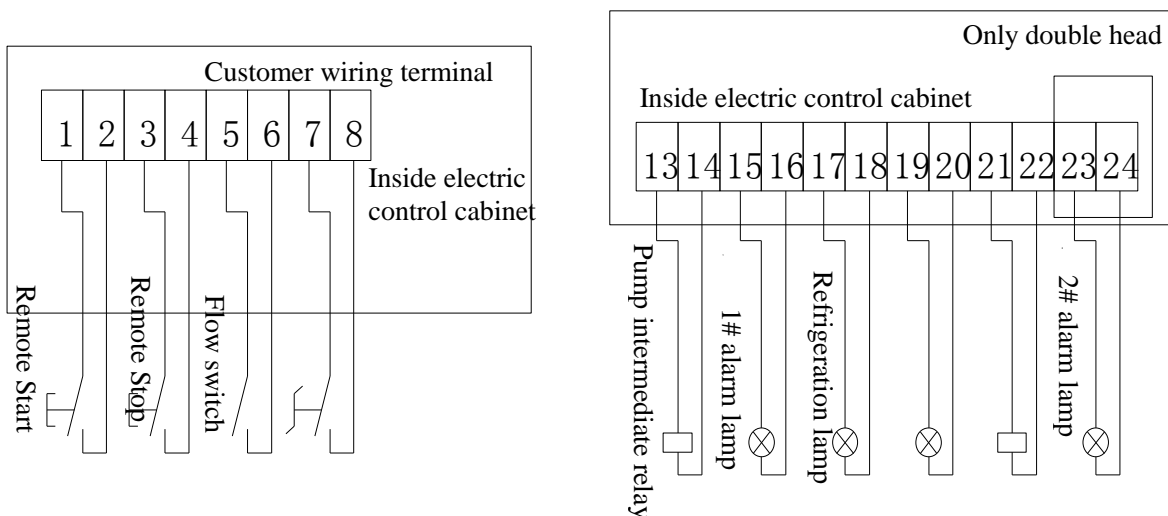
Baud rate: 9600

Data bits: 8

Stop bit: 1

No parity

Address should be set by dialing switch. Setting range is 1~F.

When PC is using, please don't dial the switch to 0.

6) **Others wiring**

The wiring ports for remote start/stop, flow switch, water pump linked control, alarm indication, etc. are reserved in the electrical cabinet of the unit, with the numbers shown in the diagram below.

Remote start/stop switch need to use inching switch.

Lamp input 220VAC.

TRUST

Air Conditioning Systems

Cooling & Heating

برند برتر در اولین جشنواره بین‌المللی
برترین نام و نشان‌های تجاری ایران

TRUST AIR-CONDITIONING EQUIPMENT CO.
Shiraz office: 8 th floor, Alvand Blog., Dostan St.,
Moaliabad Ave., SHIRAZ, IRAN., Post code: 71877-14446
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