

# **AIR TO WATER HEAT PUMP (CHILLER)**



## **Operation, installation and maintenance manual VR3002**

The piping connection should be installed according to the local legal laws and regulations as well as the profession standard.

# Pre-Installation

## Movement and Storage

The unit must not be transported, moved or stored at greater than a 30° angle from the upright position. Store the unit in a dry area until required.

The unit must be installed by a suitably qualified tradesperson and all electrical wiring must be completed by a licensed electrical contractor in accordance with all local Standards.

## Safety

The installation must be overseen by a qualified person, in order to avoid an incorrect installation that could damage to the unit or cause injuries to people. Any faults and or leaks must be repaired immediately before the unit continues to operate. If repairs have been carried out to the unit then operation of the safety devices and parameter must be rechecked.

If a refrigerant leak occurs, remove the complete charge using a recovery unit and store the refrigerant in mobile container.

***Note: care is to be taken as the refrigerant can breakdown due to high temperature, these refrigerants by-products are dangerous.***

Once the leak has been repaired recharge the unit with the correct filling weight and the type found on the unit's nameplate.

***Note: ensure the correct refrigerant gas is used to recharge the unit as an incorrect gas can cause damage beyond repair to the compressor.***

**Do not use oxygen to purge lines or to pressurize a unit for any purpose.** Oxygen gas reacts violently with oil, grease and other common substances. Use only refrigerant or dry nitrogen for testing.

Never exceed the specified maximum operating pressures.

Do not un-weld or flame cut the refrigerant lines including any refrigerant circuit components until the entire refrigerant (liquid and vapour) has been removed from unit. Traces of vapour should be displaced with dry nitrogen.

**Refrigerant in contact with an open flame will produces toxic gases.**

## Pre-Installation

Ensure that the necessary safety protection equipment is available when servicing. Have the appropriate fire extinguishers for that system.

**Do not siphon refrigerant.**

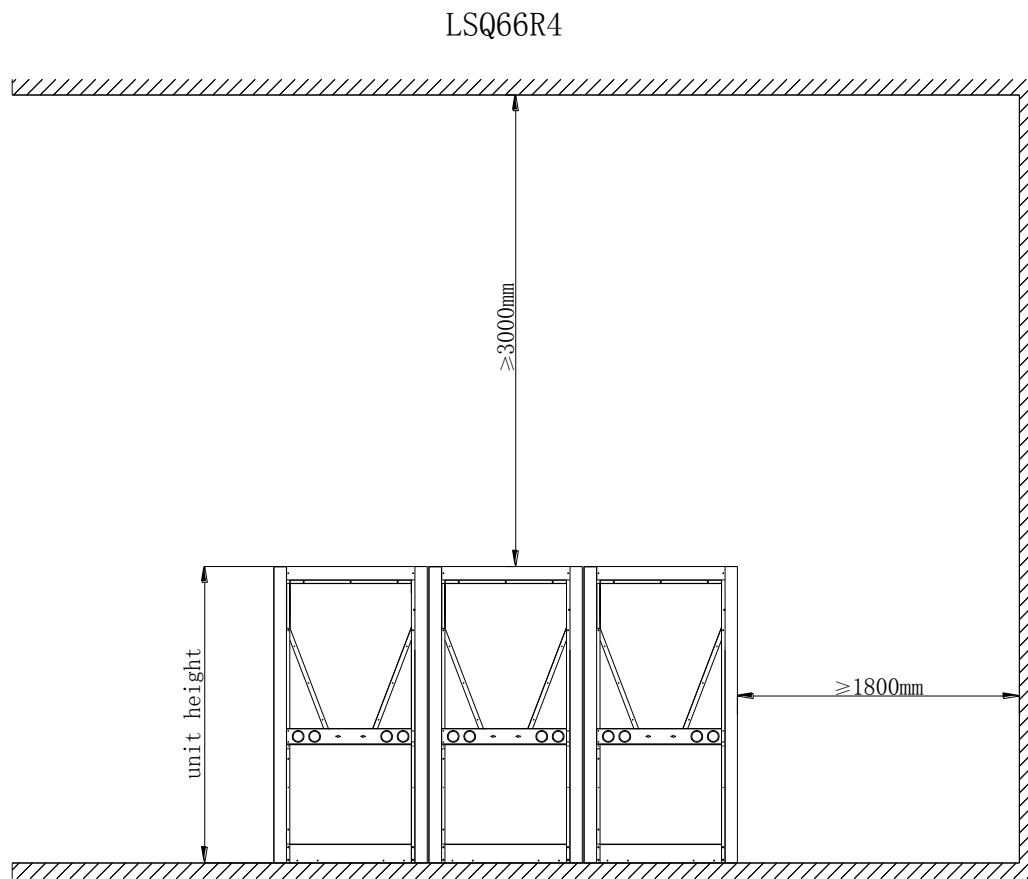
Avoid spilling liquid refrigerant onto the skin or splashing it into the eyes. Use safety goggles. Wash any spills from the skin with soap and water. If liquid refrigerant enters the eyes, immediately and abundantly flush the eyes with water and consult medical advice.

***Note: Never apply an open flame or live stream to a refrigerant container. This can dangerously overpressure and cause an explosion.***

## Installation Location

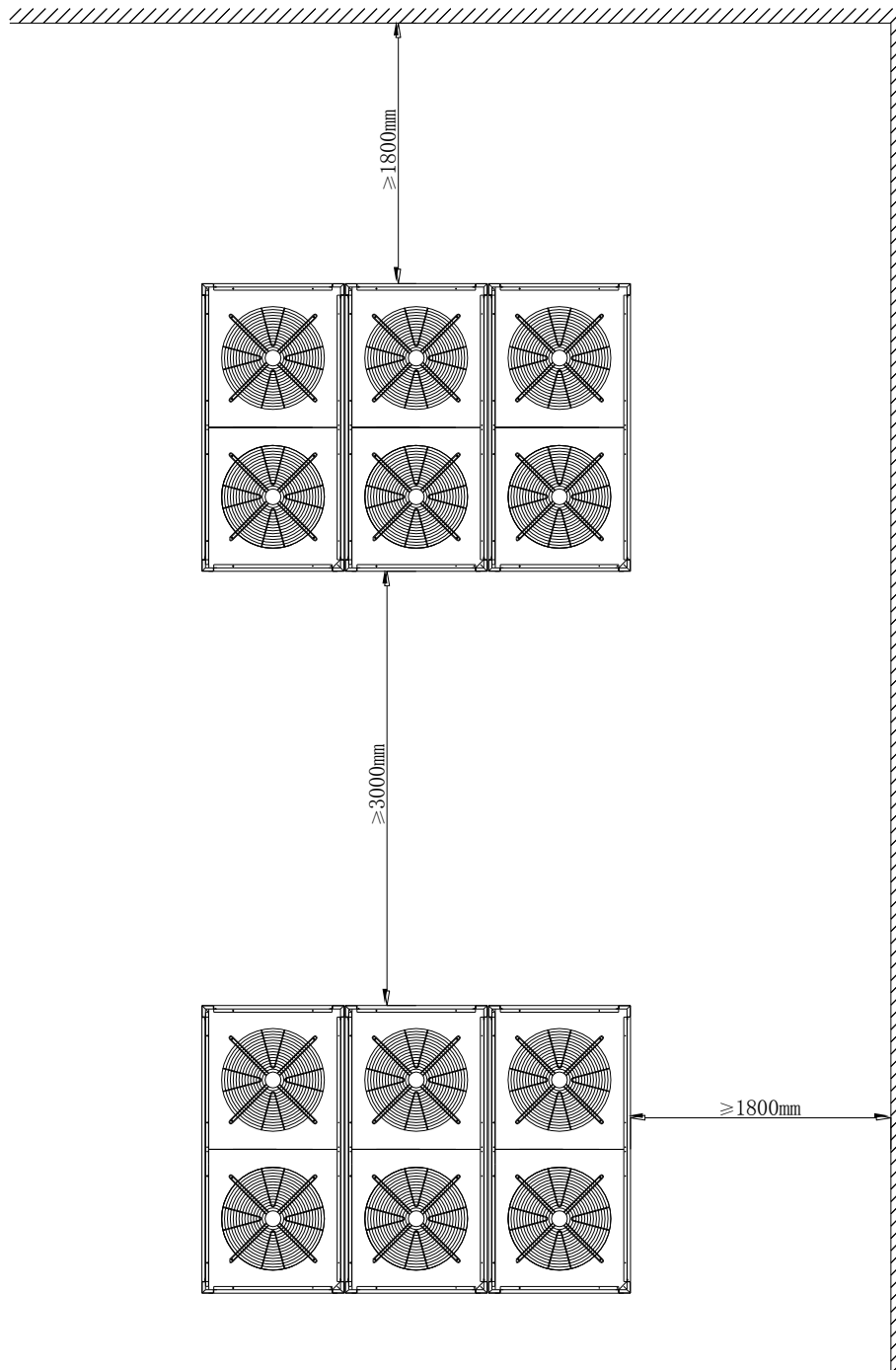
- The unit must be installed on a solid level surface on a concrete pad foundation not connected to the house foundation. Rubber cushions can be added to reduce vibration and noise if required.
- The unit should be placed so that it is well away from bedrooms or noise sensitive areas including neighbour's section boundaries.
- The unit should be well ventilated with no obstructions and kept level at all times.
- Ensure there is good drainage around installation area and make sure this water cannot run out onto paths as it may cause ice or slime build up which is undesirable. (The unit can produce large volumes of condensation water when running in high humidity zones. There is also a large run off when the unit melts ice during a defrost cycle).
- Avoid locations exposed to machine oil vapour, salty air, thermal springs sulphur gases or other harsh substances
- If operation in temperatures below 0°C for prolonged periods or locations where the snow may fall the unit must be raised at least 300mm off the ground. This is necessary to avoid ice build-up on the unit's chassis.
- The unit must be installed level in both axes (less than 2mm tolerance per meter)
- Locations exposed to strong winds should be avoided otherwise baffles may be necessary to deflect strong winds and to prevent snow from blowing directly into the unit. They must not restrict air flow into the unit.
- Keep suitable distance between the unit and the building to ensure the normal running of the unit and enough room is available for maintenance.

# Positioning



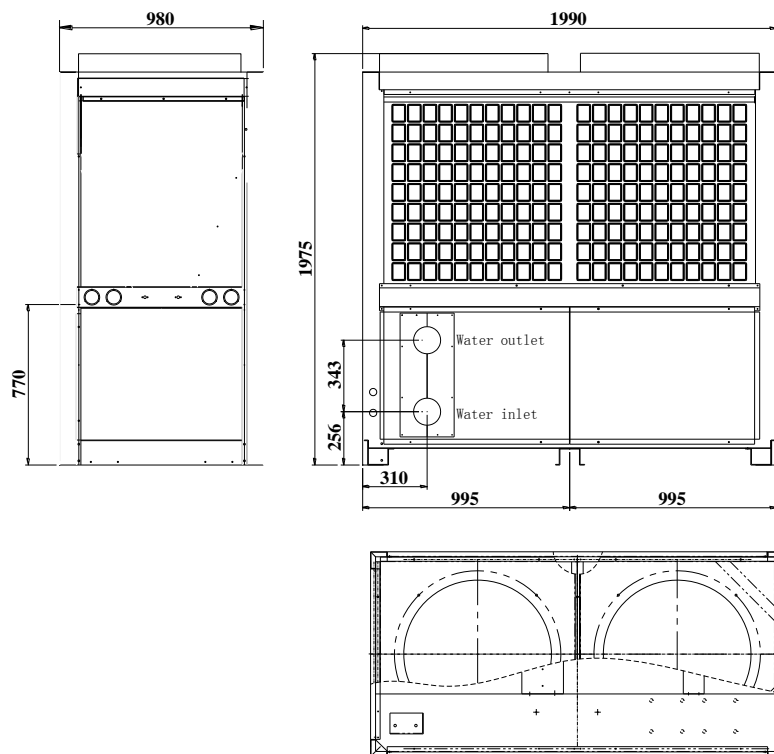
# Positioning

LSQ66R4

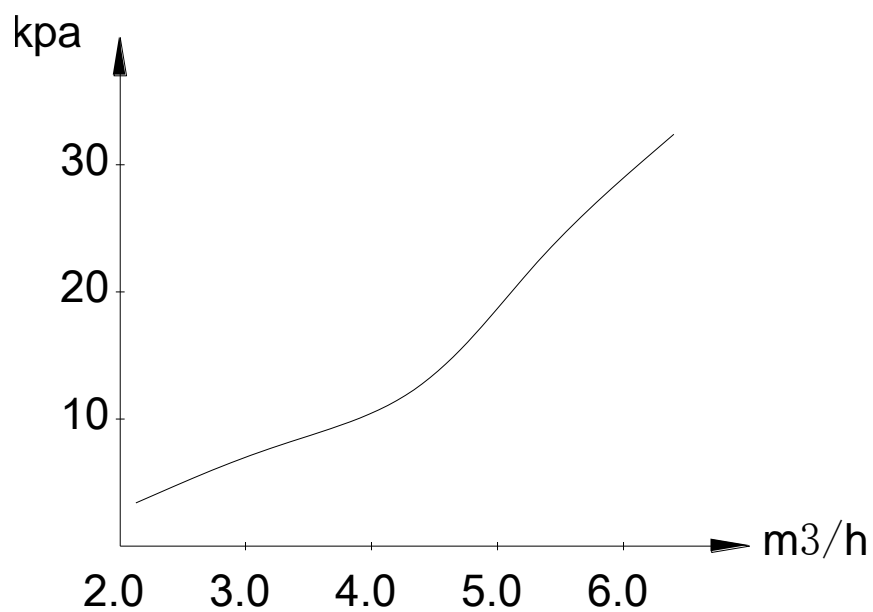


# Dimension and water pressure drop

LSQ66R4



Water pressure drop



# Pipe connections

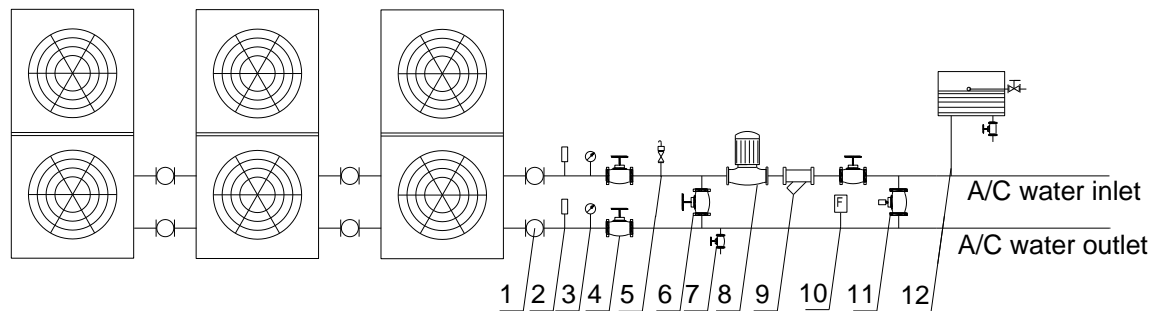
Several unit could be connected together to build a large system.

Each controller is set to different cooling, heating set point (2-3 degree difference) so they will not start at the same time to reduce start current.

All units water pump control signal connected together to A/C contactor which supply power for water pump so the water pump can run as long as any unit is running.

Max. 6 units could be connected in one series.

## LSQ66R4



1. soft-joint for reducing vibration between machine and system
2. temp gauge
3. water pressure gauge
4. shut off valve for closing water way when repair
5. automatic air vent valve
6. by-pass valve for by pass machine when washing water system
7. drainage valve for discharging water in the system
8. water pump
9. filter for filtering dirt 60mesh/square inch
10. water flow switch ( If it is assembled inside the factory, no need to install)
11. differential pressure by-pass valve for guaranteeing enough circulation water for system
12. water supplement tank

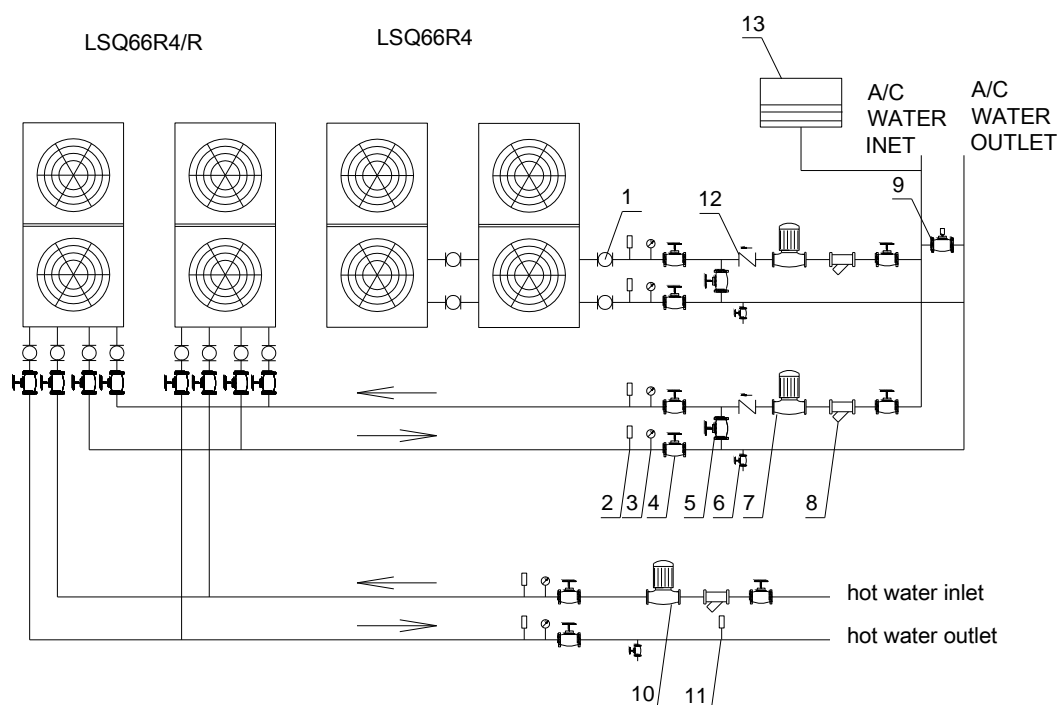
Remark: A/C water pump should be installed in the water inlet of machine.

Drainage valve should be installed in the lowest point of system to discharge water before freezing point in case of machine freezing.



# Pipe connections

## Mixed models connection:



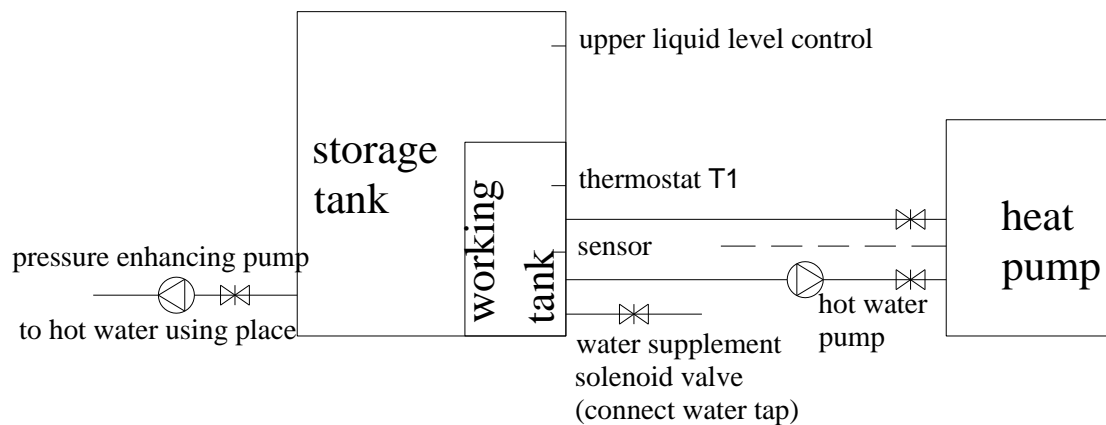
1. soft-joint for reducing vibration between machine and system
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3. water pressure gauge
4. shut off valve for closing water way when repair
5. by-pass valve for by pass machine when washing water system
6. drainage valve for discharging water in the system
7. A/C water pump
8. filter for filtering dirt
9. differential pressure by-pass valve for guaranteeing enough circulation water for system
10. hot water pump
11. water flow switch
12. non-return valve
13. water supplement tank

### Remark:

1. hot water pump and A/C water pump should be installed in the water inlet.
2. LSQ66R4 and LSQR66R4/R should use a water pump separately
3. Non-return valve should install on water outlet of each water pump.
4. When using changeable flow system (two way valve to control fan coil), differential pressure by-pass valve must be installed.

# Pipe connections

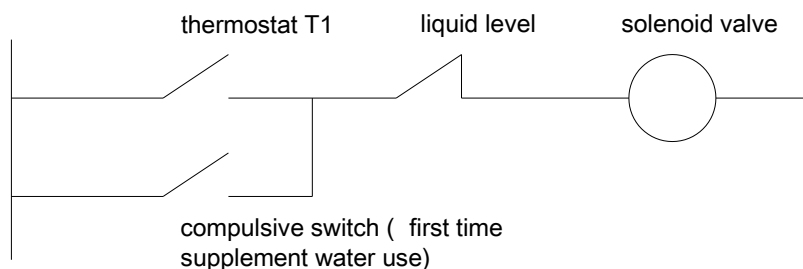
## Small scale hot water use system



this is a small scale hot water application system. The suggested storage tank is below 5 ton.

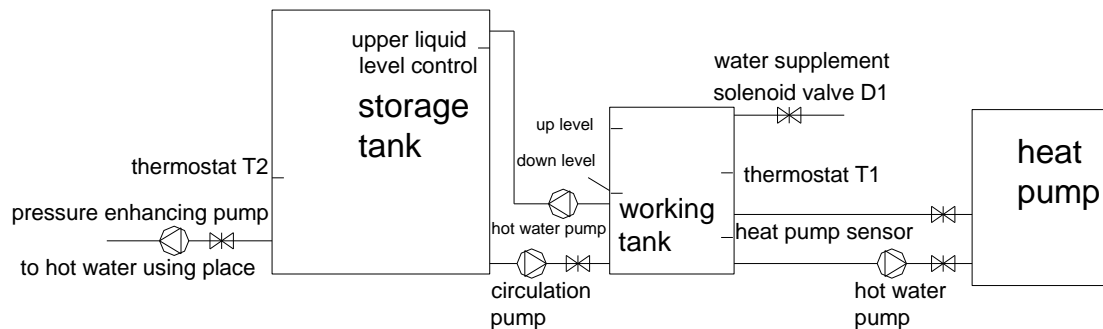
### Working principle:

1. heat pump hot water temp. setting  $55^{\circ}\text{C}$ , thermostat T1  $53^{\circ}\text{C}$
2. when working tank water temp. is  $53^{\circ}\text{C}$ , thermostat T1 close, water supplement solenoid valve which is controlled by thermostat T1 open, tap water pressure push working tank (there is a hole connecting working tank and storage tank) hot water to the storage tank until thermostat break or storage tank water is full. (upper liquid level control)
3. when storage water tank is full, even working tank water reach  $53^{\circ}\text{C}$ , it will not send water to storage tank so the heat pump continue to heat working tank water to  $55^{\circ}\text{C}$  then heat pump stop.
4. if long time no use of storage tank water and water temp goes down, then working tank will heat the storage tank water through its wall.



# Pipe connections

This is big scale hot water use system:



Working principle:

1. heat pump hot water temp. setting  $55^{\circ}\text{C}$ , thermostat T1 setting  $53^{\circ}\text{C}$ , T2  $48^{\circ}\text{C}$
2. when working tank hot water reach  $53^{\circ}\text{C}$ , thermostat T1 close and control hot water pump to draw working tank hot water to storage tank. Until reach working tank down water level or storage tank up level.
3. when working tank water reach down level, it start water supplement solenoid valve to supplement water until water reach up level.
4. when storage tank is full, even working tank water reach  $53^{\circ}\text{C}$ , it will not send hot water to storage tank, then heat pump heat working tank water to  $55^{\circ}\text{C}$  and close.
5. If storage tank water does not be used for a long time and water temp. goes down, to  $48^{\circ}\text{C}$ , thermostat T2 break to start circulation and hot water pump until T2 close.

## Buffer Tank

A buffer tank is recommended to ensure a trouble free heat pump operation. A suitable buffer tank can avoid excessive heat pump cycling (switching on and off).

The buffer tank provides a hydraulic separation from the volume flow in the heat pump and heating circuits. The volume flow in the heat pump circuit remains constant, even if the heating circuit volume flow is reduced by thermostatic valves.

If the total of the systems water volume is less than 12L/KW then a buffer tank should be added to reduce the compressor from ON/OFF cycling. This will prolong the compressor life span.

When a buffer tank is installed, the heating system will absorb energy from the buffer tank first. To save energy consumption ,install the indoor pump P1 that is switched on only when compressor is on. This is by changing EV01 to “1”.

RT sensor should be taken out of the unit and put into buffer tank’s sensor pocket. The RT sensor is by default located at inlet water pipe . The RT sensor in the buffer tank will control the tank temperature by starting and stopping the compressor and pump together as required.

If RT sensor has not been changed to buffer tank’s sensor pocket when EV01 has been change to “1”, when the unit reaches its set temperature ,the compressor will stop, pump P1 will also stop accordingly due to EV01 being set to “1”. When this occurs ,there is no water circulation between the heat pump and buffer tank. RT will keep its stopped temperature ,not the buffer tank water temperature. RT then can not switch on compressor and pump P1 even when buffer tank water is getting cold. Changing the RT sensor into the buffer tank will avoid this problem.

# Frost Protection

The plate heat exchanger, the piping and the hydraulic pump can be damaged by frost, despite the built-in anti-freeze protection of the unit.

In frost prone areas refer to installation location instructions.

To avoid freezing-up of the water contained in the system, one of the precautions must be taken during winter:

1. Drain the water from the system, using the drains in the lower part of the unit.
2. Add the correct percentage of glycol antifreeze to the water circuit.
3. The power to the unit must be on all the time so unit can start circulation pump and auxiliary heater for anti-freeze protection.

## ***Important***

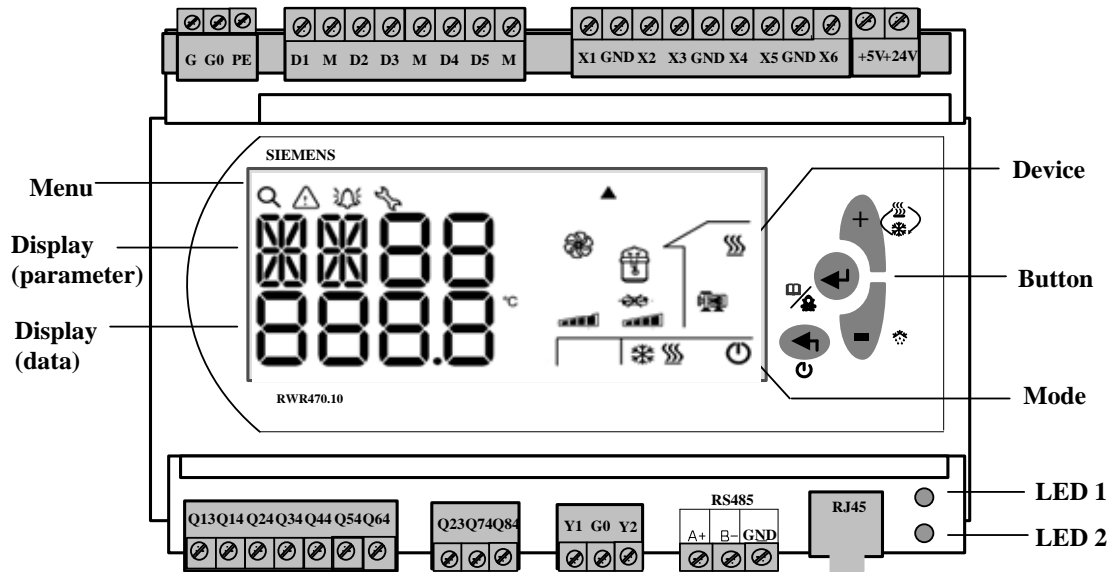
***The pipe work must be flushed before the heat pump is connected, so that any contaminants do not damage the components parts .***

***The water pressure in the evaporator can not exceed 500 kPa or 72 PSI.***

# Installation

1. The pipe installation must adhere to the local Building Code, standards and any local council requirements.
2. Ensure that the water flow and returns are correct and not reversed. Reversing the water flow will reduce the output of the unit; refer to the labels on the unit for the correct water flow direction.
3. The water pipes must not transmit any radial or axial forces to the heat exchanger. Allow some pipe flexibility between the unit and the structure to reduce any stresses and vibrations issues.
4. The water supplied to the system must be clean and not contain heavy metals that could cause harm to the unit. The water must be treated with an approved inhibitor and tested annually to prevent corrosion, fouling and deterioration of the pump fittings.
5. Protection devices are to be installed to protect the unit from operating outside of its running parameter such as control devices; shutoff valve, bleed valves, safety valves and expansion tanks.
6. The pipe installation should be designed to have the least number of elbows and joiners as they reduce flow. Install drain connections at low points to allow the system to be drain if required.
7. Flexible connections should be used where possible to reduce vibration transmission.
8. Insulate all pipe work and exposed areas to protect against both thermal heat loss and to prevent condensation on chilled pipes.
9. When filling the water system, use air vents and flushing procedure to evacuate any residual air pockets.
10. The heat pump is not fitted with shutoff valves and therefore these must be fitted outside of the heat pump to facilitate future service requirement.

# Electrical Connections



	Terminal Assignments		Terminal Assignments
G	Power supply AC/DC 24 V	Q13	Supply 1 (AC 24 V ... 230 V)
G0	Power supply ground	Q14	Compressor 1
PE	Safety ground	Q24	Compressor 2
		Q34	A/C water pump
X1	Inlet water temperature	Q44	CN03=0, Fan motor; CN03=1 fan motor high speed
X2	Outlet water temperature	Q54	4-way valve
X3	Atmospheric temperature of outdoor	Q64	Electric heater or boiler
X4	Hot water temperature		
X5	Coil temperature	Q23	Supply 2 (AC 24 V ... 230 V)
X6	Exhaust gas temperature /Suction temperature	Q74	3 way valve or hot water pump
GND	Common reference point for analog input	Q84	CN03=1, fan motor low speed; CN03=0, no use.
+5 V	DC 5 V power output for active sensor	Y1	Output 10V when there is Alarm ,output 0V when there is no alarm
+24 V	DC 24 V power output for active sensor	GND	Common reference point
		Y2	EVI Output 0V or 10V
D1	Water flow switch		
D2	Low pressure switch	A+	A+ connector for RS485
D3	high pressure switch	B-	B- connector for RS485
D4	Air conditioner switch	GND	Optional for RS485 communication
D5	Hot water switch	RJ45	Service interface for parameters uploading and downloading
M	Common reference point for digital input		

## Warning:

*Electrical installation and service must be carried out under the supervision of a qualified electrician. Electrical installation and wiring must be carried out in accordance with local Standards.*

# Electrical Connections

## Power Connection

Before connecting the power supply, please confirm the unit suits the power supply as the nameplate attached to the inside of control board panel.

- Breaker protection must be installed according to the max value stated in the nameplate attached to the unit inside of the front panel.
- The equipment must be installed via an isolator switch with a minimum breaking gap of 3 mm.
- The power supply must conform to the specification on the unit's nameplate. The supply voltage must be within the range specified in the electrical data table. For wiring connection, refer to the electric wiring diagram on the inside panel of the unit.
- When the building is equipped with a RCD the heat pump should be equipped with a separate one.

### **IMPORTANT:**

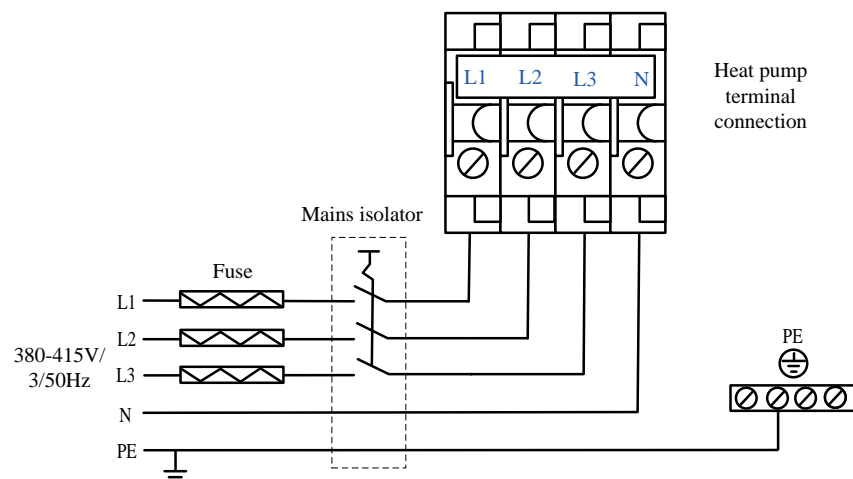
*During the installation of the unit, first make the water connections and then electrical connections. If the unit is to be removed first disconnect the electrical connections, then the water connections to reduce the chance of an electrical shock.*

### **WARNING:**

*Disconnect the main power supply switch before servicing the system or handling any internal parts of the unit.*

*In case of any major malfunction turn the unit off, disconnect the mains power supply and contact a qualified service engineer.*

## Mains Connection Diagram





# Electrical Connections

## Inlet water temperature sensor:

The return water sensor (RT) from the factory is placed on the water inlet pipe.

If a buffer tank is adopted, the RT sensor can be moved to the buffer tank temperature sensor inlet pocket and EV01 parameter value can be set to “1”. This stops the pump running when the compressor is OFF (refer to Buffer Tank section).

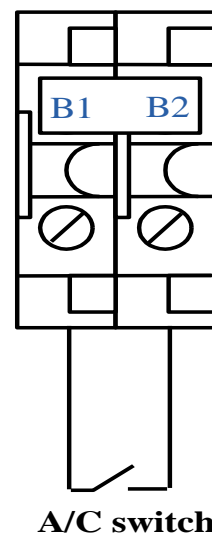
If the RT sensor can not be moved to the buffer tank temperature sensor inlet, the EV01 parameter value must be set to “0” (factory default setting). This allows the pump to continue to run so RT measures the same as the buffer tank water temperature.

### **IMPORTANT:**

*All temperature sensors must be separated (min 200 mm) from high voltage power cables to avoid interference which will cause measured temperature fluctuating and the heat pump may operate incorrectly.*

## A/C switch

If the parameter SF14=0, the unit's A/C ON/OFF is done by bridging the switch B1-B2, the unit's heating /cooling function is activated. An external signal like a timer or thermostat, etc could be connected to B1-B2 to activate or deactivate the unit for heating/ cooling functions. This external signal must be voltage free. If the remote control is adopted to control the unit then SF14 should be set to “1”. Then the A/C switch could not control the unit any more.



### **Note**

***This is a potential free input contact only. DO NOT PUT 230VAC INTO THIS CONTACT***

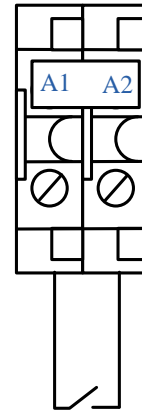
## Electrical Connections

### Hot Water Switch

The unit's hot water production for ON/OFF control can only be done by the hot water switch.

When the hot water switch A1-A2 is bridged, the unit's hot water function is activated. An external signal like a timer or thermostat, etc could be connected to the A1-A2 to activate or deactivate the unit's hot water function as required.

This external signal must be voltage free.



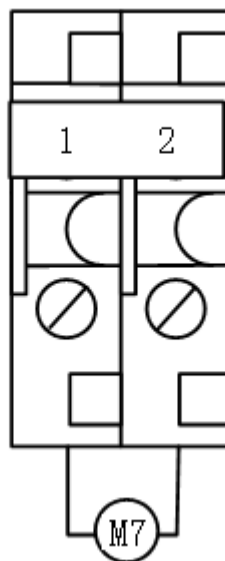
Hot water switch

#### *Note*

*This is a potential free input contact only. DO NOT PUT 230VAC INTO THIS CONTACT*

### A/C water Pump Connection (Q34)

There is a connection port (1-2) at the terminal connections for connecting A/C water pump. If water pump current is over 2A, a relay contactor must be used to activate the water pump.



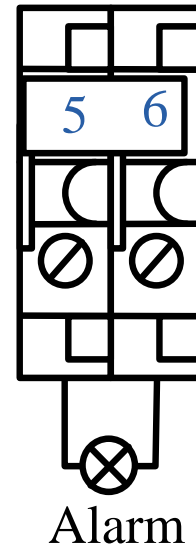
#### *Note*

*This is a 230VAC output 2amp max.*

## Electrical connection

### Alarm Output (Y1)

If an alarm is activated with the unit, there is a signal output if required. The user can connect an alarm unit such as indication light or an alarm bell. This is connected to the terminal port (5-6), Y1 output is 10VDC.

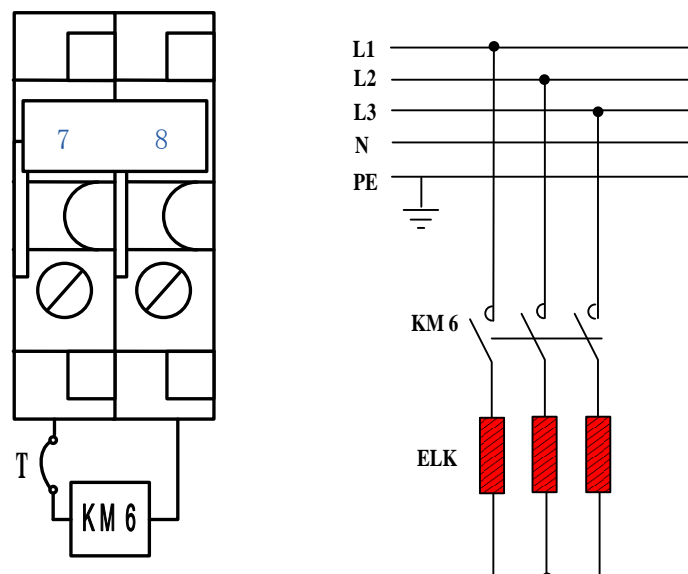


#### Note

***This is a 10VDC output. DO NOT PUT A 230VAC INTO THIS CONTACT.***

### Auxiliary Electric Heater or Boiler (Q64)

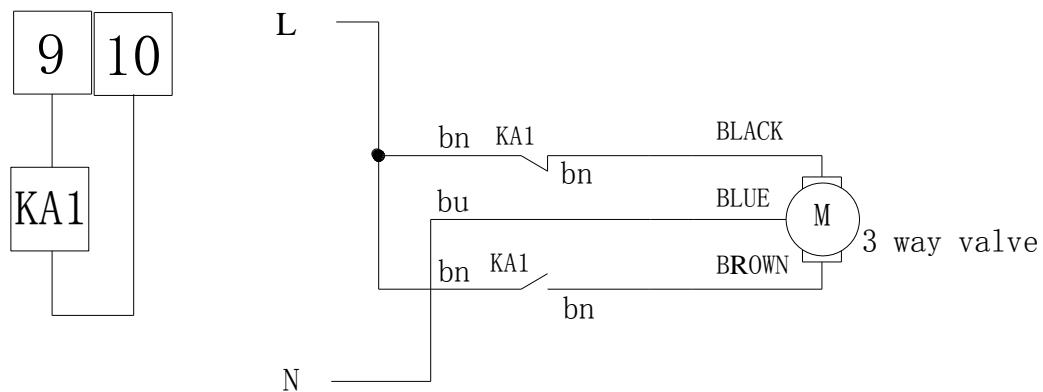
There is a connection port (7-8) which can be used to activate and de-activate an auxiliary electric heater or a boiler. The max current for Q64 is 2 Amps therefore a contactor must be applied to control auxiliary electric heater or boiler.



## Electrical connection

### External Three Way Valve Connection (Q74)

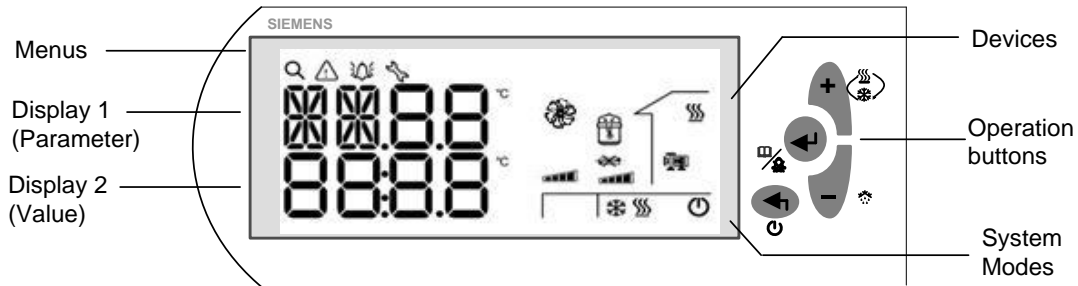
A three valve needs to be installed to revert from heating to domestic hot water. If the water pump is for both heating and domestic hot water circulation, set SF10=0. Connect a 3 way valve without spring return to relay (KA1) (not supplied). KA1 is connected to Q74 - port (9-10).



If a hot water pump is adopted separately for domestic hot water circuit, set SF10=1, connect the hot water pump to terminal (9-10). If the current is over 2A, use a relay contactor to activate the water pump.

# Control

## 1、Controller display (display window & button area)



### ①Menus area:

Icon	Meaning	Function
	Query/view	Actual values of all temperature
	Warning	Existence of warning, and the latest 10 warnings
	Alarm	Existence of alarm and the latest 20 alarms
	Parameters	Set parameters and values (see also Menu Tree)

### ②Operating buttons

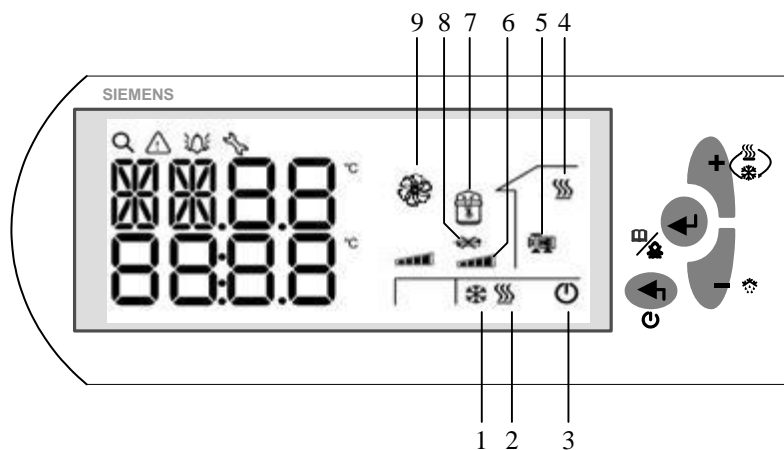
Button	Name	Use
	<Esc>	In Menu /parameter setting mode, press it to return to the previous menu level, or to reject the value entered
	<Enter>	Press down it for more than 2 seconds and release it to enter the Menu mode In Menu/parameter setting mode, press it to confirm the selected menu level, or the value entered Press it to acknowledge/reset warnings and alarms
	<Plus>	Press it for 2 seconds to activate the System Mode in stop mode Or, press it to select the menu level, or to increase the value in Menu/parameter setting mode
	<Minus>	Press it to select the menu level, or to decrease the value in Menu/parameter setting mode

### ③Display area:

- At normal working mode, display 1 shows temperature code, display 2 shows this code temperature value.
- At menus mode, display 1 shows menus code, display 2 shows this code value.

# Control

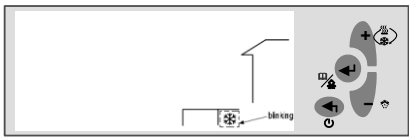







## ④ Symbol explanation



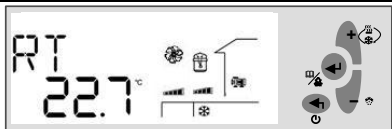
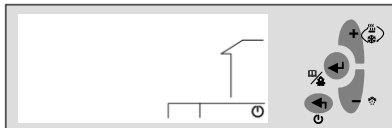

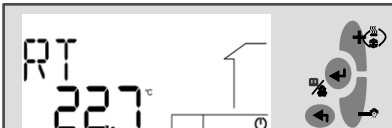
- 1、 Cooling mode
- 2、 Heating mode
- 3、 OFF
- 4、 Hot water mode
- 5、 Water pump
- 6、 Compressor energy grade
- 7、 Compressor
- 8、 Water flow switch (light on represents the water flow switch alarm)
- 9、 Fan motor

# Control

## 2、 Selection of System Modes

Display	Procedures
	<p>In stop mode, press the &lt;Plus&gt; button for 2 seconds, and release it to activate the selection of system mode. The currently system mode will start flashing.</p> <p>Press &lt;Plus&gt; or &lt;Minus&gt; to select the desired system mode, and then press &lt;Enter&gt; to confirm.</p>
<p>If the current system is heating only (when SF01=2) or cooling only (when SF01=0), the selection of system modes is disable.</p> <p>If the current system is heating &amp; cooling (when SF01=1), the full sequence of selecting the system modes will be as follows.</p>	
Activity	Sequence
Press <Plus>	 →  →  →  → 
<p>  appear at the same time, it is auto mode, the actual running mode is decided by ST18 and ST19.</p>	

## 3、 Viewing temperature

Display	Procedures
	<p>In normal working mode, press &lt;plus&gt; or &lt;minus&gt; to check the temperature.</p>
Display	Procedures
	<p>In stop mode, press the &lt;Enter&gt; button for 2 seconds and release it to enter the Menu mode.</p> <p>By default, the Query  icon is blinking, waiting for further instructions.</p>
	<p>Press the &lt;Enter&gt; button to enter the query mode.</p> <p>Press &lt;plus&gt; or &lt;minus&gt; to check the temperature.</p>

Code	Describe
RT	Inlet water temperature
ST	Outlet water temperature
OT	Atmospheric temperature of outdoor
HT	Hot water temperature
CT	Coil temperature
ET	Evaporating temperature

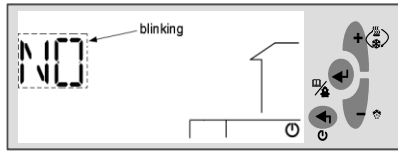
# Control

## 4、Changing Set points (for end users)

Display

Procedures

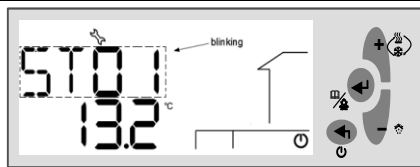
In stop mode, press <Enter> for 2 seconds and release it to activate the Menu mode.



When the **Q** icon is blinking, press <Plus> or <Minus> to navigate to the **M** menu, and then press <Enter> to proceed.

Contents under the **M** Parameter Menu may vary with the privilege right of the user.

- For end users, select “NO,” and press <Enter> to proceed.
- For service men and factory users, select “EU” or “ID”, and press <Enter> to input the 4-digit password .



For end users, parameters in the “ST” group will by default be displayed. Press <Plus> and <Minus> to navigate to the parameter and press<Enter> to continue.

Or, continuously press <Esc> to exit out of the current level and back to the desired menu level.

## 5、Accessing the Parameter Menu

Display

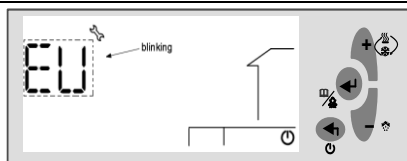
Procedures

In Stop mode, press <Enter> for 2 seconds and release it to activate the Menu mode.

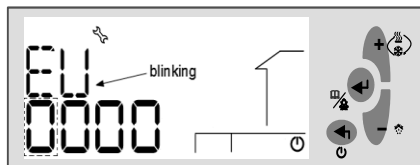
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Contents under the **M** menu may vary with the privilege right of the user.

- For end users, select “NO” and press <Enter> to proceed.
- For service men and factory users, select “EU” or “ID”and press <Enter>. Input the 4-digit password when the following screen is displayed



Press <Enter> to confirm and continue to input the password.



Password is required for the service man (EU)and factory users(ID).

To input password, follow the instructions below:

- When the digit is blinking, press <Plus>/<Minus> to select the value. Then, press <Enter> to confirm, and proceed to the next digit.
- Or, press <Esc> at any time to cancel the input and return to the previous blinking digit.
- Repeat steps above to input other three numbers.
- After inputting the password, press <Enter> to confirm, and proceed to setting parameter values.



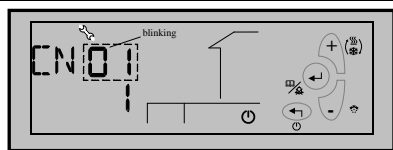
# Control

## 6、Adjusting Parameter Values

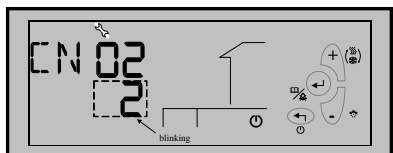
*Display*

*Procedures*

After inputting password and enter into the parameter setting mode.



Press <Plus> or <Minus> to select the parameter code, and press <Enter> to confirm.



The default value of the parameter will start flashing, allowing you to make a change. Press <Plus> or <Minus> to increase or decrease the value, and press <Enter> to confirm.

Continuously press <Esc> to exit out of the current level and back to the desired menu level.

During heating mode, a heating water return temperature of 15 °C must be maintained in order to Assure proper defrosting of the evaporator.

### User Settings

Para- meter	Descriptions	De- fault	Min.	Max.	Unit	Res	Privi- lege
ST01	Setting temperature at cooling mode (End User)	12	ST11	ST12	°C	0.1	0
ST02	Setting temperature at heating mode (End User)	40	ST13	ST14	°C	0.1	0
ST03	Setting temperature differential at Cooling mode	1	0	10	°C	0.1	0
ST04	Setting temperature differential at Heating mode	1	0	10	°C	0.1	0
ST05	Setting temperature at heating for compensation function	20	0	30	°C	0.1	0
ST06	Compensation factor for heating compensation function	6	0	30	-	0.1	0
ST07	Outdoor temperature to start the electric heater or boiler	0	-10	20	°C	0.1	0
ST08	Outdoor temperature differential to stop the electric heater or boiler	5	1	20	°C	0.1	0
ST09	Hot water temperature	50	ST15	ST16	°C	0.1	0
ST10	Hot water temperature differential	3	1	10	°C	0.1	0
ST18	No use		15	30	°C	0.1	0
ST19	No use		1	10	°C	0.1	0

# Controller

## Heating compensation curve setting

The control temperature for the heating mode has two methods: fixed and changeable temperatures.

1. The fixed temperature is a fixed value and is directly set by the end user from the set area.
2. The changeable temperature is determined by values of ST05, ST06 and the actual outdoor temperature measured by the OT sensor probe.

This function is selected by SF04:

When SF04=0, it is fixed temperature;

When SF04=1, it is changeable temperature.

When SF04=0, the set temperature for heating is ST02.

When SF04=1, the set temperature for heating will be controlled by ambient temperature (OT), ST05 and ST06 according to the following formula:

Set temperature at heating =  $ST05 + ST06 / 10 * (ST05 - OT)$ .

- ST05 is indoor temperature
- ST06 is the heating compensation coefficient curve factor you select for the heat pump to work with. Increasing ST06 will increase compensation temperature and RT will increase relatively.
- OT is the outside temperature.
- The calculated temperature can be used for the control reference, but the maximum data will not exceed ST14.

For example:

Set the heating compensation coefficient ST06 to 7,

When outdoor temperature is 0°C, the control temperature is 34°C;

When outdoor temperature is -10°C, the control temperature is 41°C;

When outdoor temperature is -20°C, the control temperature is 48°C;

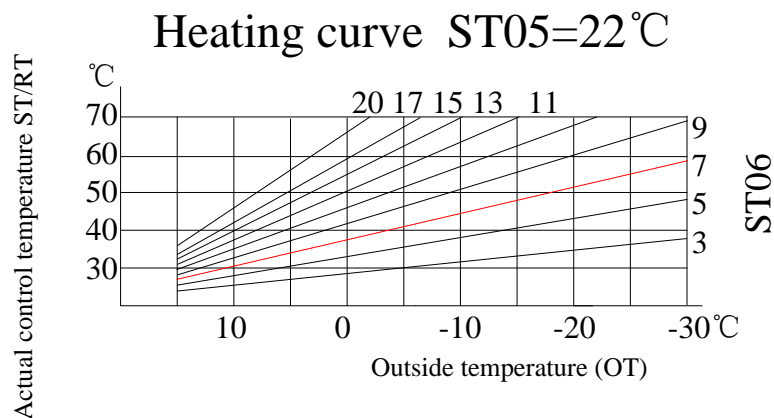
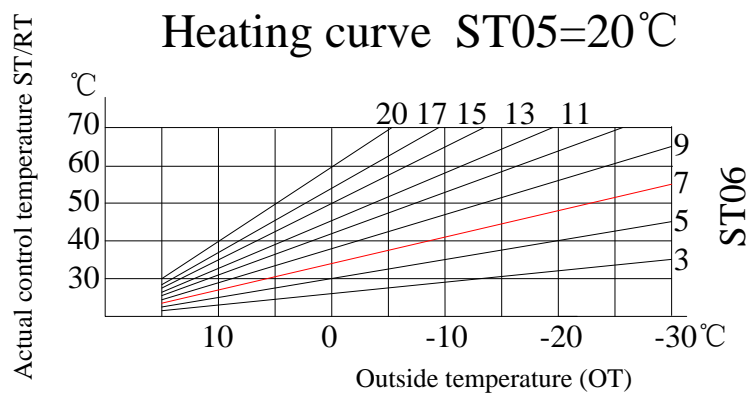
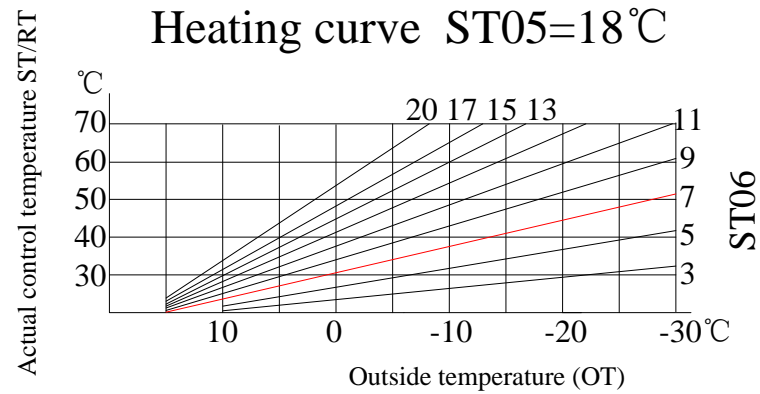
When there is a drop of the outdoor temperature, the control temperature will become higher to meet the larger heating requirement.

As the outdoor temperature increases, the control temperature will become lower, this will keep the unit under a lower pressure and therefore will have lower energy consumption.

Changing ST05 or ST06 can change the heating curve.

# Controller

Three example curve when ST05=18, 20 and 22.



# HSHMI-01 Remote Control

**Optional part for air to water units with Siemens controller**

## **General information**

- Working power: 5VDC 0.16A
- Power consumption:  $\leq 1\text{W}$
- Workable temperature:  $0^{\circ}\text{C} \sim 70^{\circ}\text{C}$
- Standard delivered cable: 10m
- Dimension: 85(W)×20(H)×140(L)

## **Siemens controller setting**

This remote control can switch the unit's air conditioning function ON/OFF only. The hot water ON/OFF function is activated or de-activated through terminal connection port A1-A2 .

SF14 has to set to "1" to activate the remote control switching on/off unit function.

If SF14 is "0" then the remote control cannot switch ON or OFF the unit AC function, but still can check temperature data and reset alarms.

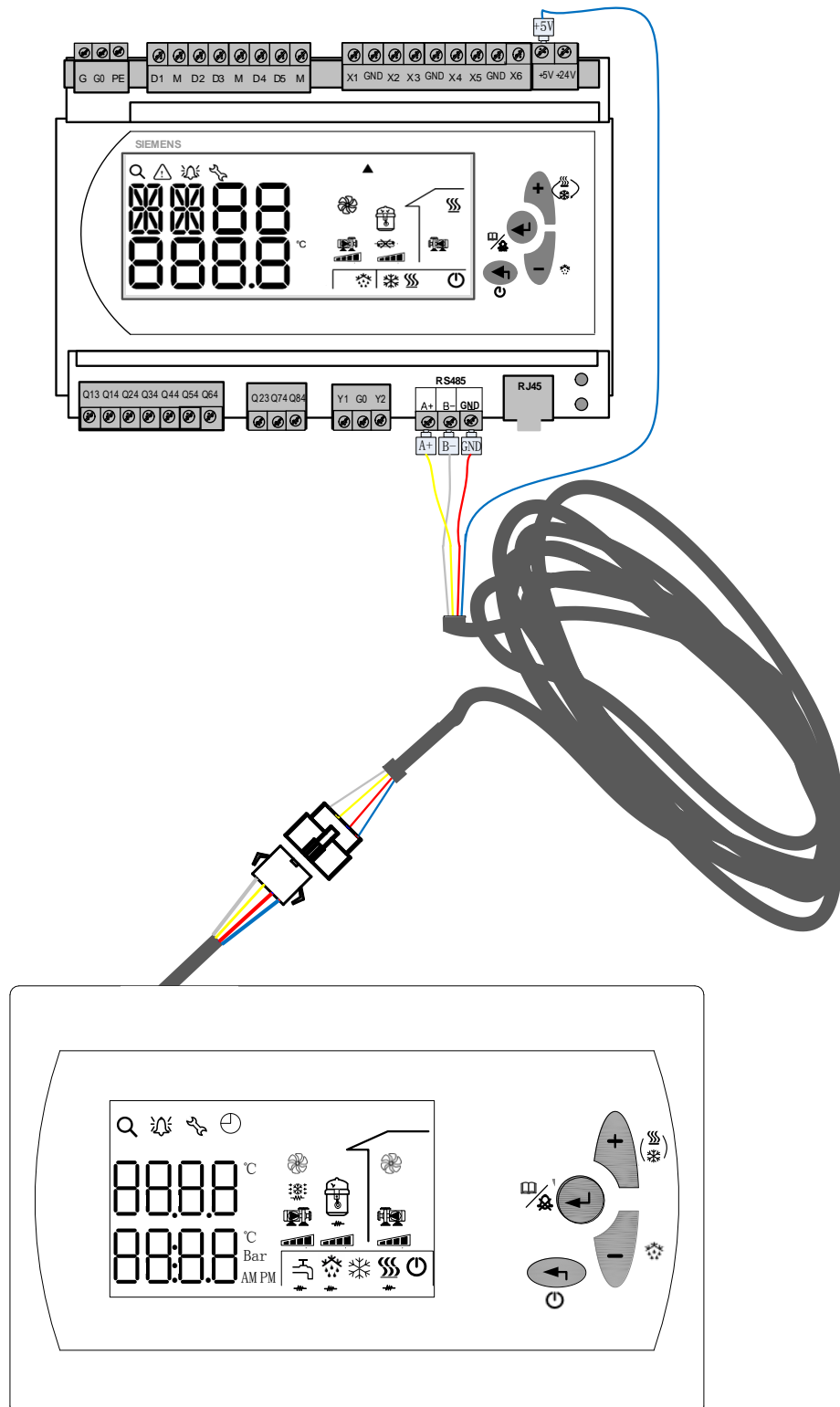
## **Auto reset alarm**

AL00: communication trouble

The other alarms are the same as Siemens controller.

# HSHMI-01 Remote Control

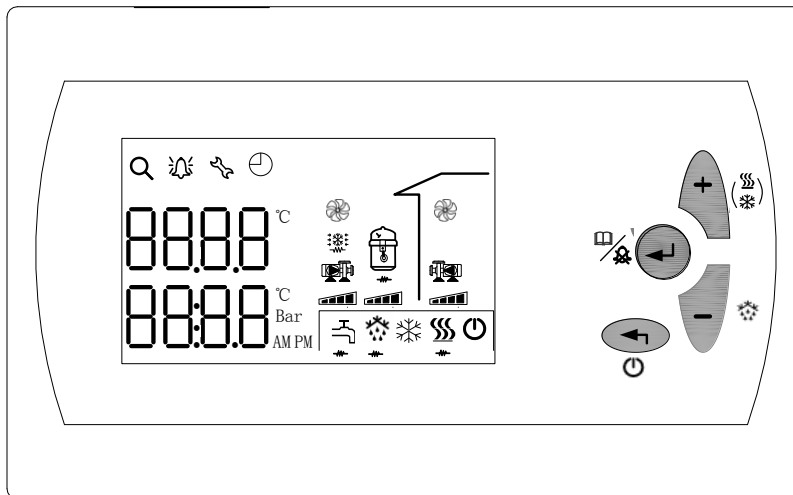
## Connect to Siemens controller



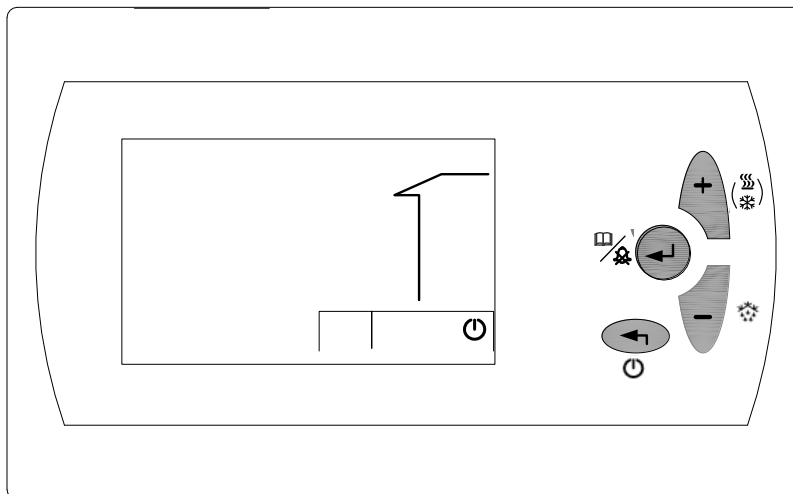
# HSHMI-01 Remote Control

## Operation

After power ON, remote control will display as below:



The communication between the Siemens controller and remote control will costs some time and need to wait until stop mode as below appears on remote control then further operation could be done.



When setting parameter data via remote control, buttons should be pushed in slow speed as the communication between remote control and Siemens controller costs time.

Unit A/C function could be switched on via pushing <exit> button on remote control:

The unit will switch off when the <exit> button is pushed, “OK” will display if the unit was running, press <enter> button to confirm shut down.

The other operations are same as Siemens controller on the unit.

# Commissioning and Adjusting

## **Preparations- Filling and Flushing**

1. Before commissioning, ensure the whole system has been properly flushed and filled with water.
2. Check the pipe work system for leaks.
3. The heating system is filled with water and inhibitor to the required pressure between 100-200 kPa or 15-30PSI.
4. Vent air out the system using the air venting valves.

## **Compressor Heater**

- The unit is equipped with a compressor heater which heats the compressor before start-up when outdoor temperature is low.
- The unit must be in the standby state for 6-8 hours before the unit is switch on for the first time. This is so the compressor heater has the compressor at the correct temp before the FIRST start, this will ensure no damage is done to the compressor on start up.

## **Phase Sequence Protector:**

There is a phase sequence protector for three phase units.

1. After powering the unit up for the first time, check the indication lights on the device.
2. Refer to Chapter on Components for location of the phase sequence protector
  - “Normal” green light on means that phase connection is correct
  - “PR” red light on means that phase connection is in reversal.
  - “PL” red light on means that there is a loss of one or more phases.
  - “O UVR-VOLT” red light on means that power supply voltage is too high/low.

# Commissioning and Adjusting

## Startup and Inspection

1. Turn the isolator switch on.

**Note:**

***Ensure that the heating control system is in the off position first.***

2. Check that all incoming phases are correct.
3. The compressor heater must have been operational for at least 6–8 hours before a compressor start can be initiated.
4. Check that water flow switch is installed correctly.
5. Start the unit by turning on the heating control system and therefore closing the A/C switch and or the hot water switch.
6. The water pump will start (the flow switch should operate), then fan motor, and finally the compressor.
7. Adjust the flow rate to make water inlet/outlet temperature difference around 5°C.
8. To work out the temperature differential between the input and output flow press PLUS (+) button to check ST and RT. The temperature difference between ST/RT can be adjusted by increasing the flow rate by either using circulation pumps or control valve.


## Air in the System after Startup


- Air will initially be released from the water as its heated and further venting may be required.
- If a bubbling sound can be heard from the heat pump, the circulation pump, underfloor and or radiators then the entire system will require further venting.
- When the system is stable (correct pressure and all air eliminated) the automatic heating control system can be set as required.



# Warning and Alarms

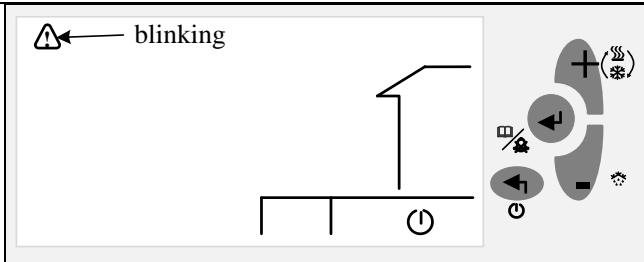


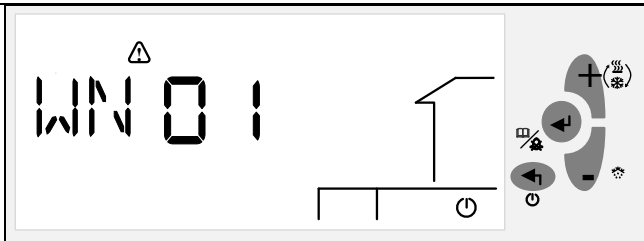
## Warning Management

When a warning is detected, the corresponding warning code will be displayed on the LCD. The warning icon  will flash simultaneously.

- Only the latest 10 warnings will be kept under the  menu.
- Upon power failure of the controller, the warning logs will be erased and recounted

Parameter	Descriptions
WN01	Anti-freeze in winter

## Viewing Warning Logs

Display	Procedures
Press down the <Enter> for 2 seconds and release it to activate the Menu mode.	
	<p>When the  icon is flashing, press &lt;Plus&gt;/ &lt;Minus&gt; to navigate to the  menu, and then press &lt;Enter&gt; to confirm.</p>
	<p>Two letters “WN” will be displayed on the LCD, continuously flashing. Press &lt;Enter&gt; again to view the last 10 warning codes generated. If no warning is generated, the word “NoNE” will be displayed.</p>
Continuously press <Exit> to exit out of the current level, and back to the normal running mode.	



# Warning and Alarms

## Alarm Management

The alarms in RWR470.10 are divided into two groups: auto reset alarms and manual reset alarms.

1. Auto reset alarm, the user is not required to acknowledge and reset the unit.
2. The unit will automatically restart once the alarm status disappears.
3. Once a manual reset alarm is detected, the system will stop automatically.
4. The user needs to record and contact the installer/supplier to reset the unit.
5. To acknowledge and reset the alarm press the <Enter> button.
6. Ensure that the fault has been fixed before the alarm has been reset.

When an alarm is detected:

- The corresponding device icon (if any) and the  icon will continuously flash. An alarm code will be displayed on the screen.
- If more than one alarm is detected, the alarm codes will be displayed successively on the LCD screen. These will be seen by using the <plus> or <minus> buttons, or they are manually acknowledged or reset (only for manual reset alarms).
- If the system detects warnings and alarms at the same time, the warning codes will NOT be displayed on the LCD screen.
- The last 20 auto alarms and manual reset alarms generated in total are separately logged under the auto reset alarm (AR) and manual reset alarm (MR) categories in the  menu.

### **Note:**

***The alarm log is lost if the unit has a power failure or been de-powered.***

# Warning and Alarms

## Auto Reset Alarms

The following are auto reset alarms description:

Codes	Description
AL01	Compressor low pressure (D2)
AL02	Compressor high pressure (D3)
AL03	Low outlet water temperature protection (low than AR01 at any mode)
AL05	High outlet water temperature protection (higher than AR03 at heating/hot water mode)
AL17	Flow switch alarm after the delay (AR05)

## Manual Reset Alarms

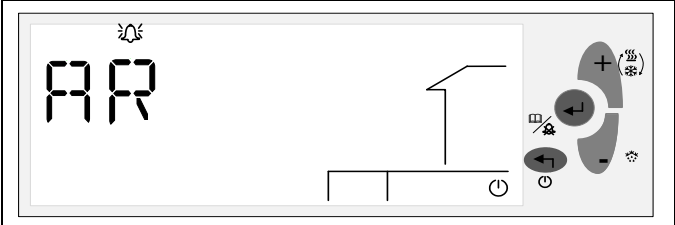

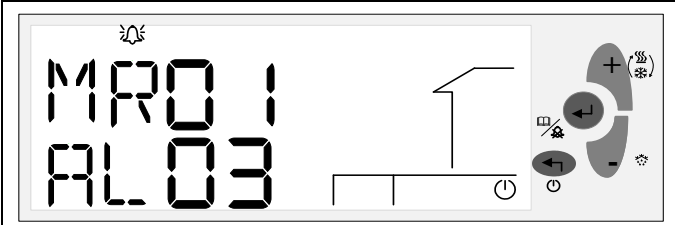
The following are manual reset alarms description:

Codes	Description
AL11	RT sensor out of parameter (over 120 °C or lower than -35 °C) (X1)
AL12	ST sensor out of parameter (over 120 °C or lower than -35 °C) (X2)
AL13	OT sensor out of parameter (over 120 °C or lower than -35 °C) (X3)
AL14	HT sensor out of parameter (over 120 °C or lower than -35 °C) (X4)
AL15	CT sensor out of parameter (over 120 °C or lower than -35 °C) (X5)
AL16	ET sensor out of parameter (over 120 °C or lower than -35 °C) (X6)
AL18	Compressor low pressure alarm times within 24 hours is over the limit (AR06)
AL19	Compressor high pressure alarm times within 24 hours is over the limit (AR07)
AL20	Low suction gas temperature protection (AR08)
AL21	High exhaust gas temperature protection (over AR10)

# Warning and Alarms

## Viewing Alarm Logs


MR01 and AR01 are respectively the latest information of the manual reset alarm and auto reset alarm.

Display	Procedures
Press down the <Enter> for 2 seconds, and release it to activate the Menu mode.	
	<p>Press &lt;Plus&gt; or &lt;Minus&gt; to navigate to the  menu, and then press &lt;Enter&gt; to confirm.</p> <p>By default, auto reset alarm “AR” will be displayed on the LCD, flashing.</p>
To view auto reset alarms generated, press <Enter> to continue when “AR” is displayed.	
<p>To view manual reset alarms, press the &lt;Minus&gt; or &lt;Plus&gt; to navigate to the “MR” group, and then press &lt;Enter&gt; to continue.</p> <p>By default, the first manual reset alarm “MR01” will be displayed as follows. Press &lt;Enter&gt; to view the first manual reset alarm code.</p> <p>Or, press&lt;Minus&gt; or &lt;Plus&gt; to view other numbered alarms, and press&lt;Enter&gt; to view the specific code.</p>	
	<p>If no alarm is generated, the word “NoNE” will be displayed.</p>
Continuously press <Exit> to exit out of the current level, and back to the normal running mode.	

## Acknowledging and Resetting Manual Reset Alarms

Any alarm detected by the system, either an auto reset alarm or a manual reset alarm will be displayed on the LCD. However, only manual reset alarms require user’s acknowledgement and reset.

- Press <Enter> to acknowledge and clear the alarm.

If the alarm status is cleared, the corresponding device icon and alarm icon  that are flashing will accordingly disappear.

- Restart the system, as appropriate.

# Maintenance

To ensure the optimal performance of the unit regular maintenance is essential. Failure to undertake regular maintenance can reduce the unit performance and of the system shorten the life of the unit and void any warranty

## Exterior Maintenance

1. Make regular checks throughout the year that the inlet grill is not blocked or clogged by leaves, snow or anything else.
2. Ensure during the colder times of the year that there isn't too much frost or ice building up on or around the unit.
3. Periodically inspected for loose, damaged or broken parts. If these faults are found and not eliminated, the unit could cause physical injury and damage to people, goods and property.
4. Regularly carry out leak checks and immediately repair any leak found. If there is a leak in the plate heat exchanger, this part must be replaced.

## Unit Refrigerant Checks

1. Verify the air grills are clear and clean it at least once a year, or more often if the equipment environment is especially demanding, this ensures that the unit's performance can be maintained.
2. Check the operation of the high-pressure and low pressure switches. Replace them if there is a fault.
3. Check the fouling of the filter dryer (by checking the temperature difference in the copper piping). Replace it if necessary.
4. Full-load operating test verify the following values:
  - A. Compressor high-pressure side discharge pressure
  - B. Compressor low-pressure side suction pressure
  - C. Verify the charge status by checking RT,ST and high pressure .
  - D. Temperature difference between the heat exchanger water inlet and outlet temperature
  - E. Actual liquid sub-cooling, overheating at the expansion device on heat pumps verify correct defrost of the air heat exchanger

## Maintenance

If there is not enough refrigerant in the system, this is indicated by lower pressure on pressure gauge reading relative to refrigerant saturated bubble or liquid pressure. Unit will have poor performance.

If the low refrigerant charge is significant, suction pressure drops, then the compressor suction superheat will also be high.

Find the leak and completely drain the system with a refrigerant recovery unit. Carry out the repair, leak test and then recharge the system.

***Note:***

***After the leak has been repaired, the circuit must be tested, without exceeding the maximum low-side operating pressure shown on the unit name plate.***

***The refrigerant must always be recharged in the liquid state into the liquid line.***

***The refrigerant cylinder must always contain at least 10% of its initial charge.***

***For the refrigerant quantity per unit, refer to the data on the unit name plate.***

### Verify the Alarm Status

1. Check the alarm menu when the unit is in the standby mode to see if any alarms or warning have occurred.

### Electrical Maintenance

1. Check for correct termination tension of the electrical connections, contactors, isolation switch and transformer.
2. Check the condition of the contactors, fuses and capacitors,
3. Check the condition of the electrical cables and their insulation.
4. Carry out an operating test of the electric evaporator heaters, compressor crankcase heater, refrigerant valve and expansion device.
5. Check the phase/earth insulation of the compressors, fans and pumps.
6. Check the compressor, fan and pump winding status.

# Maintenance

## Mechanical Maintenance

1. Check the tension of the fan motor, fan wheel, compressor and control box fixing bolts.
2. Check that no water has penetrated into the control box.

## Evaporator Coil

It is recommended that the finned coils are inspected regularly to check the degree of fouling. This depends on the environment where the unit is installed, areas by the sea can cause increase corrosion and an approved sprayed film coating is recommended.

For coil cleaning proceed as follows:

1. Remove fibers and dust collected on the evaporator face with a soft brush (or vacuum cleaner).
2. Clean the coil with the appropriate cleaning agents

## Water Circuit Checks

1. Clean the water filter if fitted.
2. Purge the system to remove any air.
3. Verify the correct operation of the water flow switch.
4. Check the status of the thermal piping insulation.
5. Check the water flow by checking the water inlet and outlet temperature difference.
6. Check the concentration of the anti-freeze protection solution (ethylene glycol or polyethylene glycol).
7. Check the status of the heat transfer fluid or the water quality.
8. Check the expansion tank for signs of excessive corrosion or gas pressure loss and replace it, if necessary.
9. Check that the water pressure safety valve is not leaking
10. Check that the air vent valves are not leaking system water

# Nameplate

## Air Cooled

### Cooling & Heating Unit

Model:	LSQ66R4
Cooling capacity:	66.0kW
Heating capacity:	69.0kW
Voltage:	380-415V 3N~
frequency:	50Hz
Nominal power at cooling:	23.0kW
Nominal current at cooling:	41.7A
Nominal power at heating:	19.0kW
Nominal current at heating:	34.4A
Max power :	33.0kW
Max current:	59.8A
Refrigerant:	R407C
Filling weight:	7.5 kg×2
Water flow:	11.52m <sup>3</sup> /h
Max operative pressure:	3.0Mpa
Pipe connector:	DN100
Anti electric shock grade:	I
Water proof grade:	IPX4
Weight:	660kg
Series No.:	
Manufacture date:	