



INSTALLATION & OPERATION MANUAL



CS-i SERIES

COMMERCIAL INVERTER POOL HEAT PUMP



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1. Introduction

This manual contains information relating to the installation, troubleshooting, operation, and maintenance of this EvoHeat unit. Instructions in this manual must always be followed. Failure to comply with these recommendations will invalidate the warranty. Should you have any questions or require technical support, call the EvoHeat office on 1300 859 933 to speak to our team.

The data and information contained in this manual is correct at the time of publishing and is subject to change without notice. For the most up to date manual, contact EvoHeat directly.

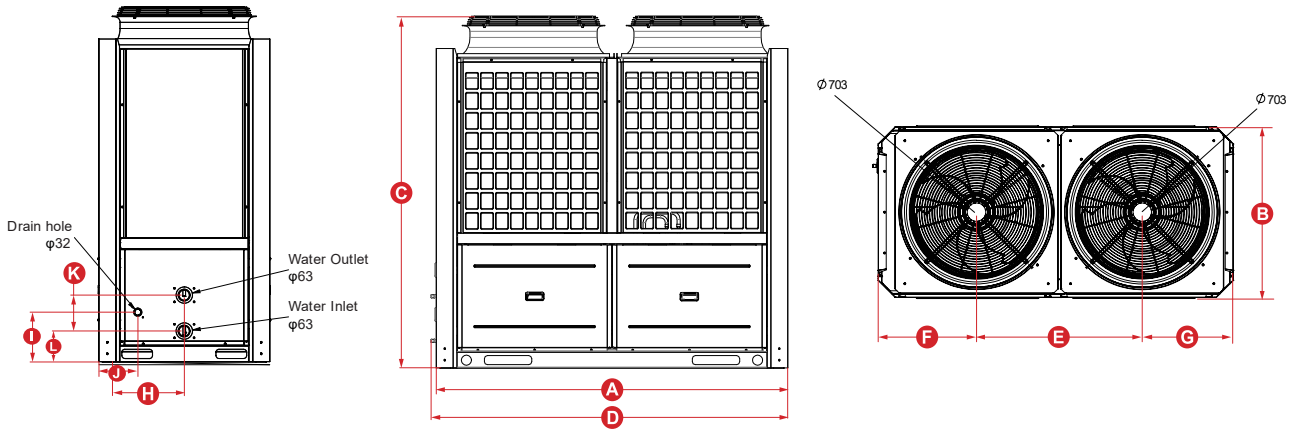


Engineered to meet the demands of any commercial application, the Evo CS-i is the most reliable and efficient way to heat a commercial pool. Designed with the latest full inverter technology and exclusive smart features, the Evo CS-i delivers reliable year-round performance with the lowest running costs

TECHNICAL DATA		CS-i 65	CS-i 130	CS-i 250
Heat output at 27°C air/26°C water	kW	65	130	246
Heat output at 15°C air/26°C water	kW	50.1	100	186
Cooling output at 35°C air/30°C water		30.2	73.4	128.4
Cooling output at 43°C air/26°C water	kW	18.4	54.8	109.2
C.O.P. at 27°C air		16.10 - 6.10	15.64 - 5.73	14.80-5.60
Power: Boost mode at 27° air	kW	80kW	175kW	292kW
Power: Silent mode at 27° air		39kW	76kW	142kW
Consumed power at 27° air	kW	0.76-10.65	1.76-20.97	4.10-43.95
Power Supply		380-415/3/50	380-415/3/50	380-415/3/50
Max current per phase	A	21	37.7	90
Max current per phase (Boost Mode)	A	26.3	46.1	105.5
Compressor Type		Mitsubishi DC	Hitachi DC	Hitachi DC
Refrigerant		R410A	R410A	R410A
PVC Water connection	mm	50	110	110
Water flow Rate	L/min	417	883	1000
Noise Level Range at 1M (Min – Max)	dB(A)	41-60	42-63	59-70
Noise (Silent Mode) at 1M	dB(A)	41	42	59
Gross dimensions L/W/H	mm	1750/830/1750	2259/1158/2124	2540/1330/2430
Net weight	kg	358	659	1015
Shipping Weight	kg	401	712	1080

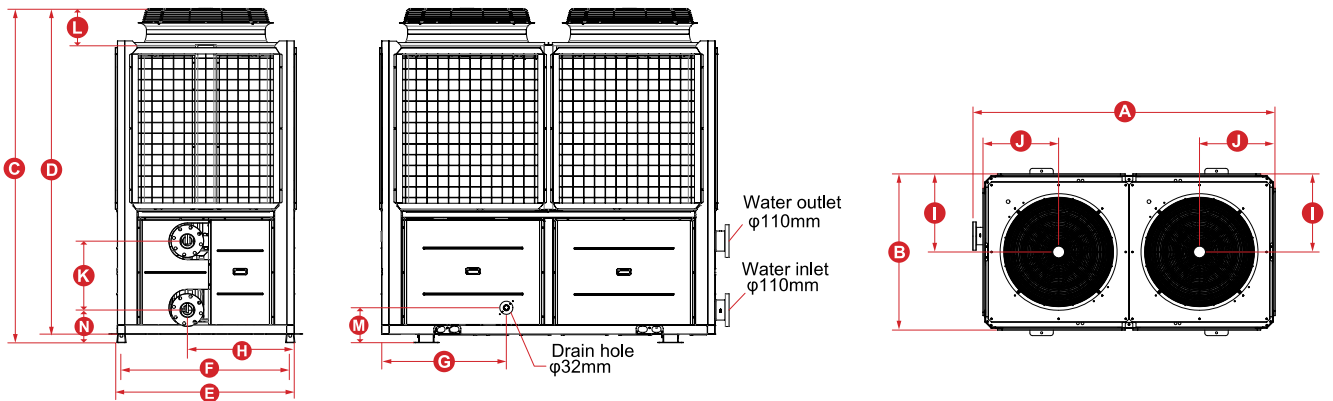
2. Dimensions

Evo CS-i 65



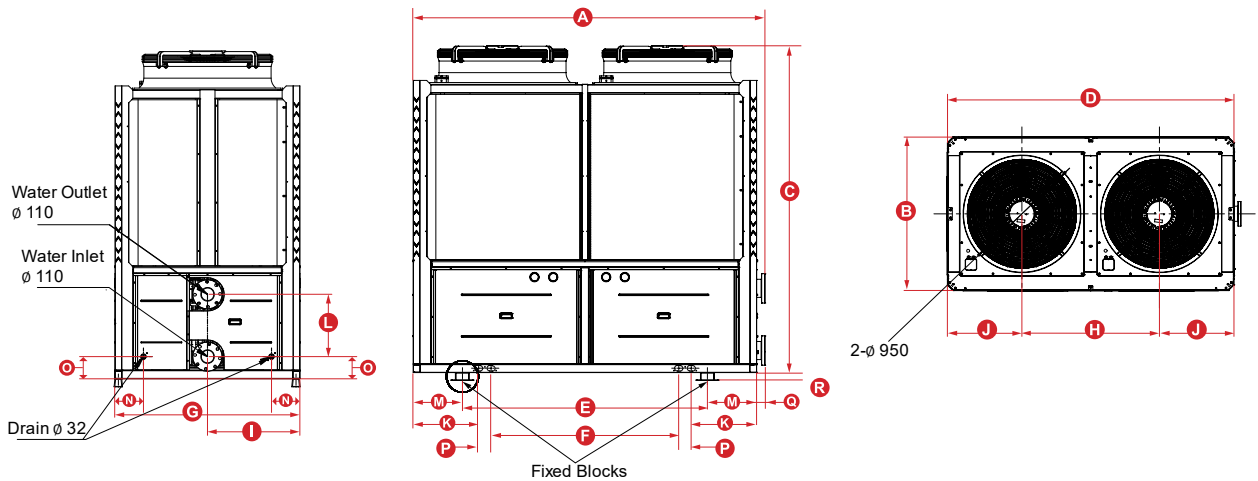
A (L)	B (W)	C (H)	D	E	F	G	H	I	J	K	L
1735	843	1738	1761	809	481	444	417	244	191	176	150

Evo CS-i 130



A (L)	B (W)	C (H)	D	E	F	G	H	I	J	K	L	M	N
2260	1177.4	2181.7	2127	1150	1098.5	810.6	695	589.3	569	450	240	227.9	213

Evo CS-i 250



A (L)	B (W)	C (H)	D	E	F	G	H	I
2540	1330	2470	2480	1770	1356	1278	1190	665

J	K	L	M	N	O	P	Q	R
645	472	450	355	204	160	90	60	56

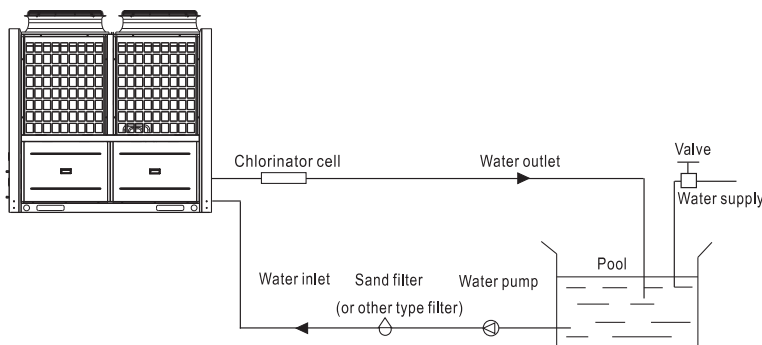
3. Safety Instructions



Installation, repair, or relocations must only be done by a fully qualified technician. If done incorrectly there is a number of hazards that can occur including fire, electric shock, water leakage and injury.

- A circuit breaker must be installed for the unit.
- Ensure the unit has a good power connection and earthing to avoid the risk of electrical shocks.
- Do not use any means to accelerate the defrosting processor or to clean other than those recommended by EvoHeat.
- The unit must be stored in a room without any continuously operating ignition sources (for example: open flames, an operating gas appliance)
- Do not pierce or burn the unit.
- If the supply cord is damaged, it must be replaced by a qualified service agent.
- This appliance must be installed in accordance with national wiring regulations.
- Before obtaining access to terminals all supply circuits must be disconnected.

4. Installation



The schematic diagram is for reference only. Check the water inlet/outlet label on the heat pump while plumbing the unit.

Upon receiving the unit, check the packaging for any obvious signs of damage. Inform EvoHeat immediately if there is any evidence of rough handling. When the heater has been removed from the packaging check the refrigerant gauge on the front panel of the unit. When all refrigeration systems are operating, check the gauges are showing a pressure between the 10 o'clock & 2 o'clock range on the outside red band – any less than this figure means there may be a leak in the refrigerant system, and you should immediately contact your EvoHeat Dealer.



IMPORTANT: EvoHeat heat pumps **MUST** be connected by a licensed electrician. Under no circumstances should an unlicensed person attempt to install or repair an EvoHeat heat pump themselves. Heater electrical installation undertaken by an unlicensed installer will void the warranty. Correct installation is required to ensure safe and efficient operation of your pool heater.

Before installation it is very important to ensure 5 variables are carefully checked to allow the unit to operate correctly.

- Heater Condition
- Location
- Clearances & Airflow
- Adequate water flow & plumbing
- Correct electrical connection & supply

WARNING

THIS PRODUCT CONTAINS A BUTTON BATTERY

If swallowed, a lithium button battery can cause severe or fatal injuries within 2 hours.

Keep batteries out of reach of children.

If you think batteries may have been swallowed or placed inside any part of the body, seek immediate medical attention.

The unit is equipped with an over-load protection system. After a previous stoppage, the unit will not start for at least 3 minutes.

Be aware that refrigerants may not contain an odour.

An all-pole disconnection device must be incorporated which as at least 3mm clearances in all poles, a leakage current that may exceed 10mA, residual current device (RCD) having a rated residual operating current not exceeding 30mA and disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

*Caution: Single wall heat exchanger, not suitable for potable water connection.

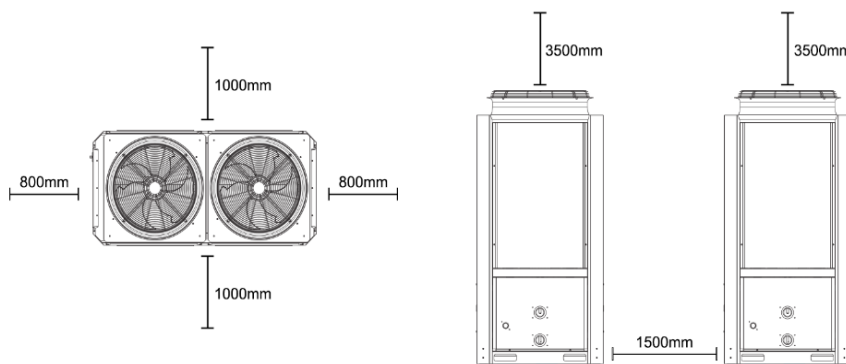
4.1 Rubber Feet

All EvoHeat units are provided with rubber feet which EvoHeat highly recommend being installed. The rubber feet help reduce vibration of the unit and help provide a space below the heat pump to install the drainage barbs.

4.2 Location of Installation

Evo recommend the heat pump should be installed in an outdoor location with appropriate ventilation. Installing the heater indoors without adequate ventilation, or in a poorly ventilated enclosed space, will result in very poor performance and can, in extreme cases, damage the heater. If a suitable outdoor location is unavailable please contact EvoHeat for specialist technical advice.

<p>The Evo unit should be installed:</p>	<ul style="list-style-type: none"> - At least 3.5m away from the water's edge. - No greater than 7.5m from the water's edge (to avoid heat loss from the piping). - No greater than 5m below the water level of the pool/spa. - On a flat level surface.
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Make sure the heat pump is not located where large amounts of water may run-off from a roof into the unit. Sharp sloping roofs without gutters will allow excessive amounts of rain water mixed with debris from the roof to be forced through the unit. A water deflector may be needed to protect the heat pump.

A rough estimate of heat loss over a 30m pipe run can be as high as 600 Watts per hour per 5 degrees of temperature difference between the air/ground and the pool water. These losses need to be taken into account over long distances and piping may need to be insulated to reduce heat leakage. If these installation guidelines cannot be adhered to, contact EvoHeat for specialist technical advice.

The casing of this unit is made from high quality durable stainless steel, however if it is intended to be installed in a coastal or corrosive saltwater environment; regular application of an anticorrosive surface protectant to all exposed metals and fixings is recommended.

4.3 Airflow Clearances

The heat pump unit needs continuous fresh air whilst running. The heater draws up to 47000 m³/h ambient air through the sides and discharges through the top fan cowl.

Ensure the heater is installed in a well-ventilated area with plenty of fresh air, a minimum gap between walls/fences etc of 1000mm on the sides and 3500mm overhead clearance. Leave sufficient space for unobstructed airflow into and out of the heater. Do not locate the heater in an enclosed area, or the discharged cold air will recirculate into the unit and consequently lower the heating efficiency as well as possible icing up.

When units of a similar height are placed side by side, EvoHeat recommend a 1500mm clearance between units.

*Fan discharge distance can be reduced by adding a Plenum to alter the air flow direction. Contact EvoHeat or a HVAC specialist for further advice. If you do not have a location with these suggested clearances, please contact our EvoHeat Tech Support Specialist to discuss appropriate installation locations.

4.4 Adequate Water Flow

All EVOHEAT heat pumps have a factory preset internal water flow switch. If there is insufficient water flow the heater will not operate.

It is CRITICAL that there is sufficient water flow to the unit. Incorrect water flow can cause a loss of heating capacity and efficiency and possibly damage the unit. Optimal water flow rates are listed in the EvoHeat manual. It is imperative that water flow is kept as close as possible to these flow rates.

Before connecting the heater to the plumbing, all piping must be thoroughly flushed to ensure no debris can enter the heater. Failure to remove pipe debris can jam or damage the flow switch and may cause damage to the heater. When cleaning the pool it is advisable to turn off your heater as restricted water flow may cause the heater to shut down and indicate low water flow fault (E03 error) or high pressure fault (E01 Error).

4.5 Drainage & Condensation



During operation, water in the air condenses on the fins of the evaporator. In high humidity, the condensate may be several litres per hour, giving the impression that the unit is leaking. This process is a normal function of heat pumps.

The heater will automatically activate reverse cycle or de-icing mode when required which also increases condensate discharge. This normally occurs at temperatures below 8°C. The condensate water will discharge through the base of the heater. As an option a pipe can be connected to the drain on the base of the unit to direct condensate water to an appropriate location.

Ensure the CS-i series units are installed level to evenly distribute condensate into and through the condensate trays. A quick way to verify that the water is condensation is to shut off the unit and keep the pool pump running. If the water stops running out of the basepan, it is condensation. **AN EVEN QUICKER WAY IS TO TEST THE DRAIN WATER FOR CHLORINE** – if there is no chlorine present, then it's condensation.

NOTE Removal of condensation can be achieved via installation of a condensate pan or by plumbing to a waste water drain. If plumbing, EvoHeat recommend raising the heat pump of the ground approximately 100mm to allow enough space to connect the condensate lines under the heat pump together, then drain to a wastewater drain.

The condensate water captured will discharge from the heat pump through one end, typically where the heat pumps Inlet/Outlet connections are located. The condensate discharges from the heat pump through a 32mm female threaded connections. Ensure condensate is plumbed away from the heat pump to an appropriate location, ideally a drain.

Note: A 32mm Male threaded adapter is NOT supplied with the heat pump.

4.6 Plumbing

A by-pass must be created to regulate the volume of water flowing through the heat pump to achieve design flow rate, and to have the ability to bypass ALL water from entering the heat pump.

Flow Rate

Since there is no residual heat or flame temperatures the unit does not need copper heat sink piping. PVC pipe can be run straight into the unit.

Location

Connect the unit in the pool pump discharge (return) line downstream of all filter and pool pumps, and upstream of any chlorinators, ozonators or chemical pumps.

The CS-i 65 comes supplied with barrel unions for the Inlet/Outlet connections which accepts 50mm PVC pipe. The CS-i 130 & CS-I 250 have 100mm PVC flange connections for the Inlet/Outlet connections.

Give serious consideration to adding a quick coupler fitting at the unit inlet and outlet to allow easy draining of unit for winterizing and to provide easier access should servicing be required.

IMPORTANT: Size an appropriate water pump to supply water to the heat pump/s to meet or slightly exceed heat pump model/s design flow rate specifications. A by-pass must be fitted for each individual heat pump to regulate the volume of water flow through each heat pump. The by-pass is used to reduce flow rate to design flow rate specifications. You'll know when design flow rate is achieved when there is a 2°C difference between Inlet and Outlet temperatures. This can be observed using each heat pumps digital display controller.

4.7 Electrical Connection

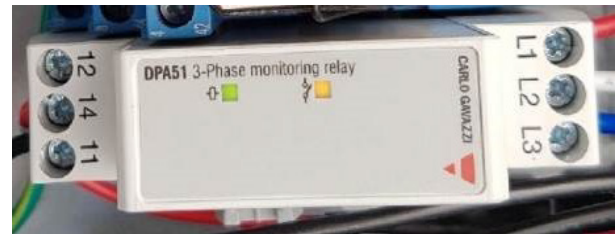
Always use a suitably qualified Electrician to perform any electrical work, they must read the manual before connecting.

Ensure all cabling, circuit breakers, and protections are of a suitable size and specification in accordance with electrical wiring legislation for the heater being installed. Ensure to check that there is adequate voltage and current available at the heater connection to run the unit.

Voltage range should be between 380-415 volts for 3 phase units. Voltage ranges outside these parameters will cause heater damage and void your warranty.

1. Ensure power is disconnected during installation or service.
2. Always comply with the national and local electrical codes and standards.
3. Ensure the electrical cable size is adequate for heater requirements at the installation location.
4. The heater must be equipped with a circuit breaker and isolation device.
5. The CS-i 65 has the ability to hard-wire a water pump directly to the heat pump. With this type of set up a circuit breaker must be installed between the heat pump and water circulation pump. Please note the heat pumps stated max. amp draw makes no allowance for the addition draw of the water pump that is hard wired to the heater. The CS-i 130 and CS-i 250 models connect to a water pump via an external relay, drawing its power from a separate power circuit.
6. The unit must be well earthed. Remove the front panel to access the electrical connection terminals of the heater. The electrical wiring diagram is affixed to the inside of the front panel or at the back of this manual.

NOTE: Correct phase connection is important with 3 phase heaters. If 2 lights are showing on the 3 PHASE relay monitor this means the EvoHeat heat pump has been wired correctly (one orange light and one green light). If only one light is showing, the phases are out of rotation and need to be rotated to get the correct phase rotation.



4.8 Initial Start-up

For the unit to heat the pool, the filter pump must be running to circulate water through the heat exchanger.

After installation is completed, follow the steps below:

1. Turn on your filter pump. Check for water leaks and verify flow to and from the pool.
2. Turn on the electrical power supply to the unit, then press the ON/OFF key on the display, it should start after a few minutes.
3. After the system has been running for approximately 5 minutes; check the 2 temperatures displayed on the screen and review the Temperature Differential (TD). The small temperature displayed is the cold-water inlet temperature, the main temperature display is the heated water outlet.
4. Adjust the water flow by opening or closing the 3-way valve installed at the cold-water inlet to achieve a target TD of approximately 2°C (e.g. 22°C inlet water and 24°C outlet water).
5. After running a few minutes make sure the air leaving the top of the unit is cooler (between 5-10 °C)
6. To test the correct operation of the unit's flow switch, while the unit is turned on and operating, turn OFF the water pump that is supplying the unit with water. The unit should turn off automatically.
7. Allow the unit and pool pump to run 24 hours per day until desired pool water temperature is reached. (Note: this may take up to several days depending on the initial water temperature and the size and location of the pool).

4.9 Time Delay

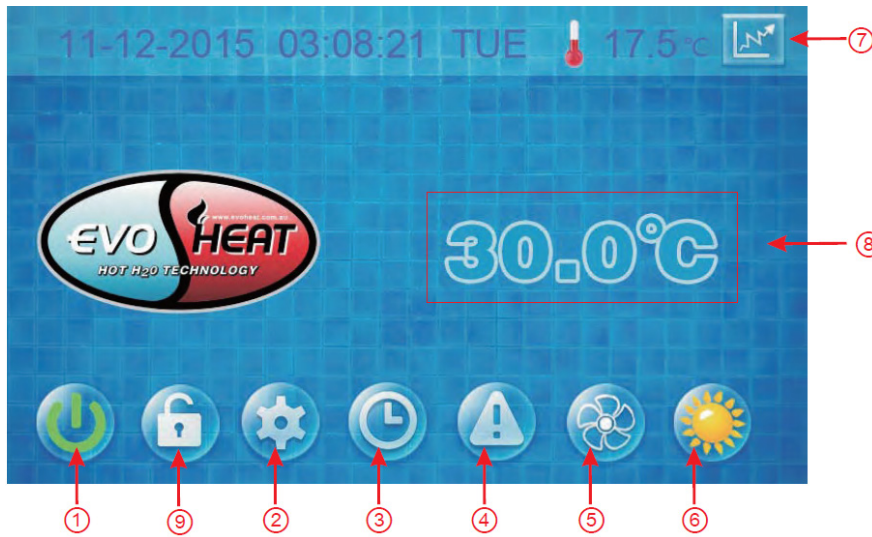
The unit is equipped with a 3-minute built-in solid-state restart delay included to protect control circuit components and to eliminate restart cycling and contactor chatter.

This time delay will automatically restart the unit approximately 3 minutes after each control circuit interruption. Even a brief power interruption will activate the solid state 3-minute restart delay and prevent the unit from starting until the 5-minute countdown is completed.

Power interruptions during the delay period will have no effect on the 3-minute countdown.

5. Operation

5.1 The Controller



1	ON/OFF	Start up or shut down the unit
2	PARAMETER	View the unit state and the parameter
3	CLOCK	Set the clock or turn the timer on/off. When the timer is on, this button is green
4	FAULT DISPLAY	View fault history
5	SILENT SETTING	Turn on/off silent function and set timing of the Low speed function
6	MODE	Enter mode settings and the target temp. settings interface
7	TEMP. CURVE	View temp. and power curve
8	WATER INLET TEMP.	Enter mode settings and the target temp. settings interface
9	LOCK	Lock or unlock the screen (password: 022)

5.2 Operating Functions

EvoHeat have developed a YouTube Channel with video walkthroughs of the different controller functions. Scan the QR code or head to our channel to view the videos we have available <https://www.youtube.com/@evoheatpumps>



5.2.1 Startup & Shutdown

To turn the unit on or off, press the ON/OFF button.

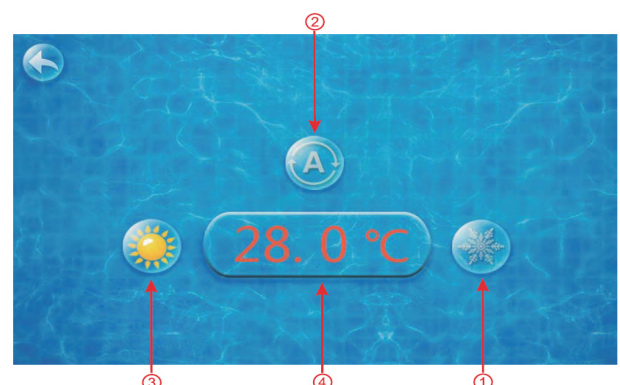
5.2.2 Setting the Mode & Target Temperature

In the main interface, click the MODE button or WATER INLET TEMP. (8) button to get the following menu:

Choose from the modes: Refrigeration mode (1), Automatic mode (2) or Heating mode (3).

Note: When the unit is designed for single automatic mode or single thermal mode, the mode cannot be switched.

From this screen, pressing the temperature (4) will allow you to adjust it as desired.

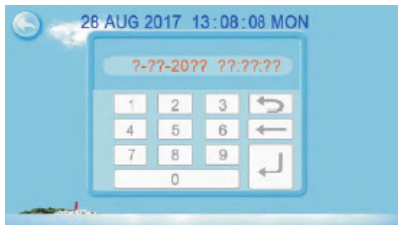


5.2.3 Clock Settings



Press the CLOCK button to bring up the clock menu. This menu allows you to either change the system date & time (left) or set timers (right).

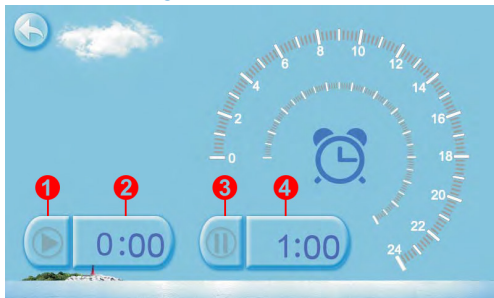
5.2.3.1 Setting the Date & Time



Click the value you wish to change to set the time directly. Press confirm to save the settings.

EXAMPLE	If the setup time were 23/11/2016 at 1:00pm; you would input: 23-11-16 13:00:00.
	<i>Be aware that if the input format is incorrect, pressing the confirm button will save the wrong time.</i>

5.2.3.2 Setting Timers



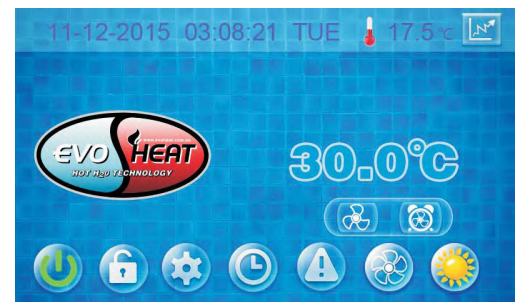
No.	Name	Button Colour	Function
1	Start Timing	Start: Green End: Grey	Click this button to start or end the timing start setting function
2	Timing On		Click to set the start time of the timer.
3	End Timing	Open: Red End: Grey	Click this button to start or end the timing end setting function.
4	Timing Off		Click to set the end time of the timer.

5.2.4 Silent & Silent Timers

Note: When silent mode is active it locks the compressor into a lower speed, reducing the available full heating capacity.

5.2.4.1 Silent Setting

Press the SILENT TIMING button from the main menu to bring up the silent settings. Press the left-hand fan symbol to enable silent mode. To exit silent mode, follow the steps and press the button again.

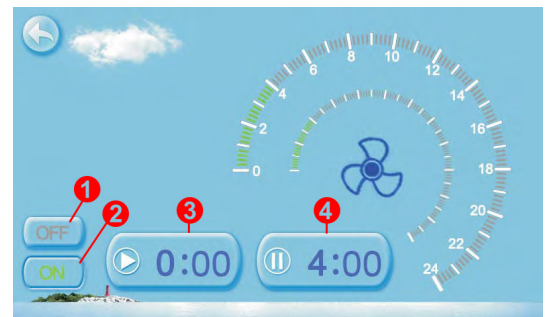


	When silent mode is enabled, the icon will display with only 3 fans compared to 5 when the mode is off.
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5.2.4.2 Silent Timer

Press the alarm clock (right) button to bring up the Silent Timer menu.


No.	Name	Button Colour	Function
1	Stop Timing	On: Red Off: Grey	Turn off the silent timer
2	Timing On		Start the silent timer
3	End Timing	Open: Red End: Grey	Set silent timer start time
4	Timing Off		Set silent timer end time



The start and end time values must be within the range of 0:00 – 23:00; the value can be precise to the hour digit.

Example: Click 'ON' to use timing silent. The unit will begin silent mode from 0:00 and end at 4:00. Click 'OFF' to turn off the timing silent manually, however the unit will turn off this setting once it reaches the end time.

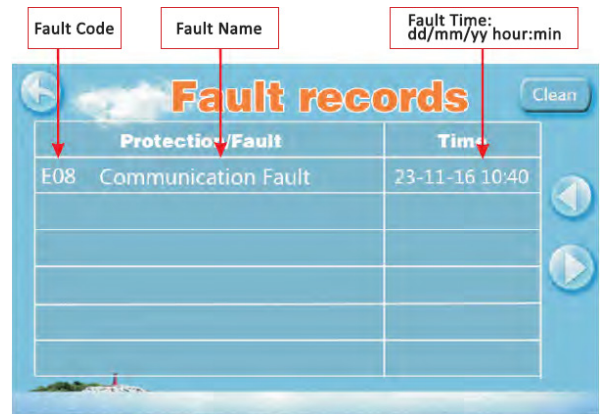
5.2.5 Fault History

If there have been no faults, the Fault button  on the main menu will appear dimmed.

When a fault does occur, the fault icon will flash. The fault interface menu will record the time, code, and name of the fault for you to view.

After troubleshooting, if you do not check the failure's record the fault button on the main menu will appear red but will not flash. If it is checked, it will appear dim again.

Faults appear in reverse order according to the time of occurrence. Press the clean key to delete all fault records.



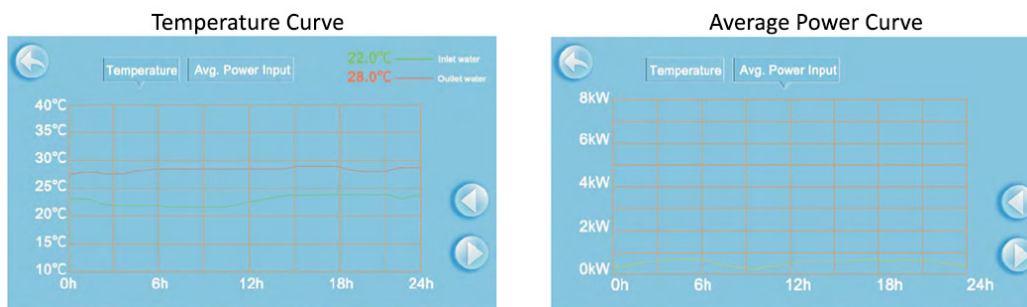
5.2.6 Colour Display Calibration

Quickly tap repeatedly on the blank area of any menu until you hear a long beep. This will allow you to enter the calibration interface.

Press '+' to start the calibration. When you hear the beep again you will finish the calibration and exit.

5.2.7 Temperature Curve

Press the **TEMP CURVE** button to view the temperature curve & average power curve.



The temperature curve automatically updates every hour and will be stored for 60 days.

If the unit is powered off after less than 1 hour of operation, the data in this period will not be saved.

*Note: On the CS-i 250, 'Comp. Frequency' replaces the 'Avg Power Input' button.

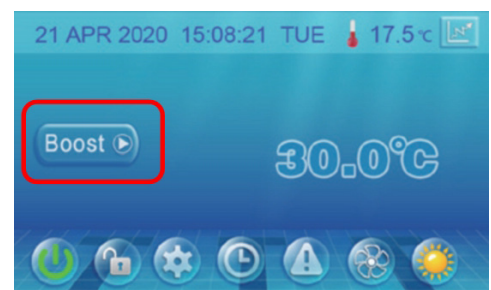
5.2.8 Boost Mode

The CS-i system is capable of operating in high output Boost mode to assist in reaching the desired target temperature faster.

You can activate boost mode by simply pressing the "Boost" button in the display.

When the target water temperature is reached, the system will automatically deactivate Boost mode and retrain to normal operation.

Alternatively, Boost mode can be manually deactivated by simply pressing the "Boost" button again to turn it off.



5.2.9 Unlocking & Locking the Controller

To lock or unlock the controller, you can easily do so by accessing the main menu and selecting the lock symbol. When prompted for a password, simply enter 022, this is the default password and cannot be changed.

6. Troubleshooting

HEAT PUMP NOT WORKING? CHECK THE FOLLOWING:

IS THE SCREEN OF CONTROL PANEL LIT?

If not, make sure the electrical wires and cables are correctly connected and the power is on. Ensure any circuit breaker devices are set to the ON position and press the ON button on your controller. Check your controller cable is plugged in and is not damaged. If the unit has been shut off or the power has been interrupted the heater will not restart for a 5-minute period to protect the compressor. Wait 5 minutes before attempting a restart.

IS THERE ENOUGH WATER FLOW?

If the screen displays a water flow related error check the water flow. Is the water pump in operation and the system free of debris that may cause a blockage? Disconnect pool cleaners to ensure proper water flow.

DOES YOUR HEAT PUMP HAVE AN ERROR MESSAGE ON THE SCREEN?

If yes, refer to the error code table 19.

IS THE HEAT PUMP SET TO RUN AT THE CORRECT TIME & DATE?

Please check your current timing or temperature modes on your controller – you may have programmed the unit to turn on at a different time.

IS THE CURRENT POOL/SPA WATER TEMP HIGHER THAN THE SET TEMP ON THE CONTROLLER?

If so the unit will not operate until the pool/spa water temperature falls below the set temperature on the controller.

HEAT PUMP IS RUNNING BUT NOT HEATING, CHECK THE FOLLOWING:

IS THE AIR DISCHARGED FROM THE TOP OF THE FAN NOTICEABLY COOLER THAN THE AMBIENT TEMPERATURE?

If not, check the refrigerant gauge on the bottom panel of the heater. Another way to determine if the heater is working correctly is to look at the controller's screen and check to see if the WATER OUT temp is higher than the WATER IN temp. Check also the INLET WATER TEMP is lower than the HEAT TEMP set point.

If the gauge shows less than 0.8MPA contact EvoHeat tech support to check the refrigerant system.

IS THE FAN FUNCTIONING?

If not contact EvoHeat tech support on 1300 859 933



Example of empty (loss of refrigerant)



Example of normal (Note: can vary based on ambient temperature)

Ensure sufficient fresh airflow around the unit as per installation instructions. Make sure cold air discharged does not recycle back through the heater. Check the condenser fins. If they are dirty or blocked use a low flow garden hose only (Pressurised water may cause damage to the heater).

- The unit will periodically defrost when the ambient air temperature is lower than 8 degrees.

IF THE HEAT PUMP IS RUNNING CONTINUOUSLY, CHECK THE FOLLOWING:

- Check the set temperature is at your desired level and that the pool water temperature is at or below this set point.
- Alternatively, this could be a possible electrical component failure – contact EvoHeat tech support.

WATER APPEARING AROUND THE BASE OF THE UNIT, CHECK THE FOLLOWING:

The water appearing around the base of your heat pump could be condensation or a possible water leak. To determine, check the following:

- Check the discharge for the presence of chlorine.

If the water has no chlorine then it is condensation and is it normal – see drainage and condensation for more information. If the water has chlorine, it is a water leak and you need to contact EvoHeat tech support.

- Turn the heater off & run the water pump continuously for a period of 2-4 hours.

If the water dries out, then it was condensation – see drainage and condensation for more information. If there is a continuous leak contact EvoHeat tech support.

6.1 Error Codes (CS-i 65 & 130)

Protect/fault	Fault display	Reason	Elimination methods
Inlet Temp. Sensor Fault	P01	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Outlet Temp. Sensor Fault	P02	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Ambient Temp. Sensor Fault	P04	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Coil 1 Temp. Sensor Fault	P05	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Coil 2 Temp. Sensor Fault	P15	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Suction Temp. Sensor Fault	P07	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Discharge Temp. Sensor Fault	P081	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Exhaust Air over Temp Prot.	P082	The compressor is overload	Check whether the system of the compressor running normally
Antifreeze Temp. Sensor Fault	P09	Antifreeze temp sensor is broken or short circuited	check and replace this temp sensor
Pressure sensor Fault	PP	The pressure Sensor is broken	Check or change the pressure Sensor or pressure
High Pressure Prot.	E01	The high-pressure switch is broken	Check the pressure switch and cold circuit
Low Pressure Prot.	E02	Low pressure1 protection	Check the pressure switch and cold circuit
Flow Switch Prot.	E03	No water/little water in water system	Check the pipe water flow and water pump
Waterway Anti-freezing Prot.	E05	Water temp. or ambient temp. is too low	
Inlet and outlet temp. too big	E06	Water flow is not enough and low differential pressure	Check the pipe water flow and whether water system is jammed or not
Anti-freezing Prot.	E07	Water flow is not enough	Check the pipe water flow and whether water system is jammed or not
Primary Anti-freezing Prot.	E19	The ambient temp. Is low	
Secondary Anti-freezing Prot.	E29	The ambient temp. Is low	
Comp. Overcurrent Prot.	E051	The compressor is overload	Check whether the system of the compressor running normally
Communication Fault	E08	Communication failure between wire controller and mainboard	Check the wire connection between remote wire controller and main board
Communication Fault (speed control module)	E081	Speed control module and main board communication fail	Check the communication connection
Low AT Protection	TP	Ambient temp is too low	
EC fan feedback Fault	F051	There is something wrong with fan motor and fan motor stops running	Check whether fan motor is broken or locked or not
Fan Motor1 Fault	F031	1. Motor is in locked-rotor state 2. The wire connection between DC-fan motor module and fan motor is in bad contact	1. Change a new fan motor 2. Check the wire connection and make sure they are in good contact
Fan Motor2 Fault	F032	1. Motor is in locked-rotor state 2. The wire connection between DC-fan motor module and fan motor is in bad contact	1. Change a new fan motor 2. Check the wire connection and make sure they are in good contact

Protect/fault	Fault display	Reason	Elimination methods
Drv1 MOP alarm	F01	MOP drive alarm	Recovery after the 150s
Inverter offline	F02	Frequency conversion board and main board communication failure	Check the communication connection
IPM protection	F03	IPM modular protection	Recovery after the 150s
Comp. Driver Failure	F04	Lack of phase, step or drive hardware damage	Check the measuring voltage check frequency conversion board hardware
DC Fan Fault	F05	Motor current feedback open circuit or short circuit	Check whether current return wires connected motor
IPM Overcurrent	F06	IPM Input current is large	Check and adjust the current measurement
Inv. DC Overvoltage	F07	DC bus voltage>Dc bus over-voltage protection value	Check the input voltage measurement
Inv. DC Less voltage	F08	DC bus voltage<Dc bus over-voltage protection value	Check the input voltage measurement
Inv. Input Less volt.	F09	The input voltage is low, causing the input current is high	Check the input voltage measurement
Inv. Input Overvolt.	F10	The input voltage is too high, more than outage protection current RMS	Check the input voltage measurement
Inv. Sampling Volt.	F11	The input voltage sampling fault	Check and adjust the current measurement
Comm. Err DSP-PFC	F12	DSP and PFC connect fault	Check the communication connection
Input Over Cur.	F26	The equipment load is too large	
PFC fault	F27	The PFC circuit protection	Check the PFC switch tube short circuit or not
IPM Overheating	F15	The IPM module is overheat	Check and adjust the current measurement
Weak Magnetic Warn	F16	Compressor magnetic force is not enough	
Inv. Input Out Phase	F17	The input voltage lost phase	Check and measure the voltage adjustment
IPM Sampling Cur.	F18	IPM sampling electricity is fault	Check and adjust the current measurement
Inv. Temp. Probe Fail	F19	Sensor is short circuit or open circuit	Inspect and replace the sensor
Inverter Overheating	F20	The transducer is overheat	Check and adjust the current measurement
Inv. Overheating Warn	F22	Transducer temperature is too high	Check and adjust the current measurement
Comp. Over Cur. Warn	F23	Compressor electricity is large	The compressor over-current protection
Input Over Cur. Warn	F24	Input current is too large	Check and adjust the current measurement
EEPROM Error Warn	F25	MCU error	Check whether the chip is damaged Replace the chip
V15V over/undervoltage fault	F28	The V15V is overload or undervoltage	Check the V15V input voltage in range 13.5v~16.5v or not

6.2 Error Codes (CS-i 250)

Protect/fault	Fault display	Reason	Elimination methods
Inlet temp. Sensor Fault	P01	The temp. sensor is broken or short circuit	Check or change the temp. sensor
Outlet temp. Sensor Fault	P02	The temp. sensor is broken or short circuit	Check or change the temp. sensor
Ambient temp. Sensor Fault	P04	The temp. sensor is broken or short circuit	Check or change the temp. sensor
Syst1: suction temp. Sensor fault	P17	The temp. sensor is broken or short circuit	Check or change the temp. sensor
Syst2: suction temp. Sensor fault	P27	The temp. sensor is broken or short circuit	Check or change the temp. sensor
Syst3: suction temp. Sensor fault	P37	The temp. sensor is broken or short circuit	Check or change the temp. sensor
Syst4: suction temp. Sensor fault	P47	The temp. sensor is broken or short circuit	Check or change the temp. sensor
Abnormal power fault	EE1	Power fault occurs on the home interface	The fault is cleared by the main control after 3 minutes
Flow Switch Prot.	E03	No water/little water in water system	Check the pipe water flow and water pump
Anti-freezing Prot	E07	Not enough water flow	Check the pipe water flow and if the water system has a jam
Primary Anti-freezing prot.	E19	The ambient temp. is low	Check the ambient temp. is low or not
Secondary Anti-freezing prot.	E29	The ambient temp. is low	Check the ambient temp. is low or not
Inlet and outlet temp. too big	E06	Water flow is not enough and low differential pressure	Check the pipe water flow and whether water system is jammed or not
Water(out) high temp. prot.	E065	The outlet temp. is high	Check the outlet temp. is high or not
Water(out) low temp. prot.	E071	The outlet temp. is low	Check the outlet temp. is low or not
Syst1: Exhaust Air over temp. Prot.	P182	The compressor is overload	Check whether the system of the compressor running normally
Syst2: Exhaust Air over temp. Prot.	P282	The compressor is overload	Check whether the system of the compressor running normally
Syst3: Exhaust Air over temp. Prot.	P382	The compressor is overload	Check whether the system of the compressor running normally
Syst4: Exhaust Air over temp. Prot.	P482	The compressor is overload	Check whether the system of the compressor running normally
Communication Fault	E08	Communication failure between wire controller & mainboard	Check the wire connection between wire controller and main board
Fan Motor1 Fault	F031	1. Motor is in locked-rotor state. 2. The wire connection between DC-fan motor module & fan motor is in bad contact	1. Change a new fan motor 2. Check wire connection and make sure they are in good contact
Fan Motor1 Fault	F032	1. Motor is in locked-rotor state. 2. The wire connection between DC-fan motor module & fan motor is in bad contact	1. Change a new fan motor 2. Check wire connection and make sure they are in good contact
Low ATProtection	TP	Ambient temp. is too low	Check if the ambient temp is low
Communication Fault (Fan Motor 1)	E081	Fan motor 1 and main board communication fail	Check the communication connection
Communication Fault (Fan Motor 2)	E082	Fan motor 2 and main board communication fail	Check the communication connection
Communication Fault (speed control module)	E081	Speed control module and main board communication fail	Check the communication connection
Syst1:Coil temp. Sensor Fault	P15	The temp. Sensor is broken or short circuited	Check and change the temp. Sensor
Syst2:Coil temp. Sensor Fault	P25	The temp. Sensor is broken or short circuited	Check and change the temp. Sensor
Syst3:Coil temp. Sensor Fault	P35	The temp. Sensor is broken or short circuited	Check and change the temp. Sensor
Syst4:Coil temp. Sensor Fault	P45	The temp. Sensor is broken or short circuited	Check and change the temp. Sensor
Syst1:Exhaust temp. Sensor Fault	P181	The temp. Sensor is broken or short circuited	Check and change the temp. Sensor
Syst2:Exhaust temp. Sensor Fault	P281	The temp. Sensor is broken or short circuited	Check and change the temp. Sensor
Syst3:Exhaust temp. Sensor Fault	P381	The temp. Sensor is broken or short circuited	Check and change the temp. Sensor
Syst4:Exhaust temp. Sensor Fault	P481	The temp. Sensor is broken or short circuited	Check and change the temp. Sensor
Syst1:Low pressure sensor Fault	PP11	The sensor is broken or short circuited	Check and change the pressure sensor
Syst2:Low pressure sensor Fault	PP21	The sensor is broken or short circuited	Check and change the pressure sensor
Syst3:Low pressure sensor Fault	PP31	The sensor is broken or short circuited	Check and change the pressure sensor

Syst4:Low pressure sensor Fault	PP41	The sensor is broken or short circuited	Check and change the pressure sensor
Syst1:High pressure sensor Fault	PP12	The sensor is broken or short circuited	Check and change the pressure sensor
Syst2:High pressure sensor Fault	PP22	The sensor is broken or short circuited	Check and change the pressure sensor
Syst3:High pressure sensor Fault	PP32	The sensor is broken or short circuited	Check and change the pressure sensor
Syst4:High pressure sensor Fault	PP42	The sensor is broken or short circuited	Check and change the pressure sensor
Syst1:High pressure prot.	E11	The high pressure switch of the system is disconnected	Check the pressure switch of the system
Syst2:High pressure prot.	E21	The high pressure switch of the system is disconnected	Check the pressure switch of the system
Syst3:High pressure prot.	E31	The high pressure switch of the system is disconnected	Check the pressure switch of the system
Syst4:High pressure prot.	E41	The high pressure switch of the system is disconnected	Check the pressure switch of the system
Syst1:Low pressure prot.	E12	The low pressure switch of the system is disconnected	Check the pressure switch of the system
Syst2:Low pressure prot.	E22	The low pressure switch of the system is disconnected	Check the pressure switch of the system
Syst3:Low pressure prot.	E32	The low pressure switch of the system is disconnected	Check the pressure switch of the system
Syst4:Low pressure prot.	E42	The low pressure switch of the system is disconnected	Check the pressure switch of the system
Syst1:4-way valve abnormal switch	E121	The syst1 4-way valve switchover failed	Check if the 4-way valve reversing state is required
Syst2:4-way valve abnormal switch	E221	The syst2 4-way valve switchover failed	Check if the 4-way valve reversing state is required
Syst3:4-way valve abnormal switch	E321	The syst3 4-way valve switchover failed	Check if the 4-way valve reversing state is required
Syst4:4-way valve abnormal switch	E421	The syst4 4-way valve switchover failed	Check if the 4-way valve reversing state is required
Syst1:Suction high temp. Prot.	E077	The suction temp. is high	Check the suction temp. is high or not
Syst2:Suction high temp. Prot.	E078	The suction temp. is high	Check the suction temp. is high or not
Syst3:Suction high temp. Prot.	E377	The suction temp. is high	Check the suction temp. is high or not
Syst4:Suction high temp. Prot.	E478	The suction temp. is high	Check the suction temp. is high or not
Syst1:Refrigerant leakage Prot.	E131	The refrigerant leakage	Check the system for refrigerant leakage
Syst2:Refrigerant leakage Prot.	E231	The refrigerant leakage	Check the system for refrigerant leakage
Syst3:Refrigerant leakage Prot.	E331	The refrigerant leakage	Check the system for refrigerant leakage
Syst4:Refrigerant leakage Prot.	E431	The refrigerant leakage	Check the system for refrigerant leakage
Anti-condensation prot.	E174	The condition of current air temp and inlet water temp is cruel	Check the air temp and inlet water temp
Syst1:Inverter Board Comm. Failure	F151	Communication failure with syst1 compressor drive board	1. Check if the communication line is normal 2. Check if the syst1 compressor drive board is normal
Syst1:Compressor start Failure	F152	Syst1 compressor failed to start	1. Check if the compressor line is normal; 2. Check if the syst1 compressor is blocked
Syst1:Start IPM Prot.	F153	Syst1 compressor starting current is too large	1. Check if the starting high pressure is excessive; 2. Check if the syst1 compressor is blocked
Syst1:Running IPM Prot.	F154	Syst1 compressor running current is too large	Check if the pressure ratio is too high
Syst1:Comp. IPM Over-temp. Prot.	F155	Syst1 compressor running current is too large	Check if there is a gap in the installation of the fluorine-cooled heat sink
Syst1:Comp. Overcurrent Prot.	F156	Syst1 compressor drive board has poor heat dissipation	Check if the pressure ratio is too high
Syst1:Comp. Bus Over Voltage	F157	Voltage is too high	Check if the input voltage is higher than 480V
Syst1:Comp. Bus Under Voltage	F158	Voltage is too low	Check if the input voltage is lower than 250V
Syst2:Inverter Board Comm. Failure	F251	Communication failure with syst2 compressor drive board	1. Check if the communication line is normal 2. Check if the syst2 compressor drive board is normal
Syst2:Compressor start Failure	F252	Syst2 compressor failed to start	1. Check if the compressor line is normal; 2. Check if the syst2 compressor is blocked
Syst2:Start IPM Prot.	F253	Syst2 compressor starting current is too large	1. Check if the starting high pressure is excessive; 2. Check if the syst2 compressor is blocked
Syst2:Running IPM Prot.	F254	Syst2 compressor running current is too large	Check if the pressure ratio is too high

Syst2:Comp. IPM Over-temp. Prot.	F255	Syst2 compressor running current is too large	Check if there is a gap in the installation of the fluorine-cooled heat sink
Syst2:Comp. Overcurrent Prot.	F256	Syst2 compressor drive board has poor heat dissipation	Check if the pressure ratio is too high
Syst2:Comp. Bus Over Voltage	F257	Voltage is too high	Check if the input voltage is higher than 480V
Syst2:Comp. Bus Under Voltage	F258	Voltage is too low	Check if the input voltage is lower than 250V
Syst3:Inverter Board Comm. Failure	F351	Communication failure with syst3 compressor drive board	1. Check if the communication line is normal 2. Check if the syst3 compressor drive board is normal
Syst3:Compressor start Failure	F352	Syst3 compressor failed to start	1. Check if the compressor line is normal; 2. Check if the syst3 compressor is blocked
Syst3:Start IPM Prot.	F353	Syst3 compressor starting current is too large	1. Check if the starting high pressure is excessive; 2. Check if the syst3 compressor is blocked
Syst3:Running IPM Prot.	F354	Syst3 compressor running current is too large	Check if the pressure ratio is too high
Syst3:Comp. IPM Over-temp. Prot.	F355	Syst3 compressor running current is too large	Check if there is a gap in the installation of the fluorine-cooled heat sink
Syst3:Comp. Overcurrent Prot.	F356	Syst3 compressor drive board has poor heat dissipation	Check if the pressure ratio is too high
Syst3:Comp. Bus Over Voltage	F357	Voltage is too high	Check if the input voltage is higher than 480V
Syst3:Comp. Bus Under Voltage	F358	Voltage is too low	Check if the input voltage is lower than 250V
Syst2:Inverter Board Comm. Failure	F451	Communication failure with syst4 compressor drive board	1. Check if the communication line is normal 2. Check if the syst4 compressor drive board is normal
Syst2:Compressor start Failure	F452	Syst4 compressor failed to start	1. Check if the compressor line is normal; 2. Check if the syst4 compressor is blocked
Syst2:Start IPM Prot.	F453	Syst4 compressor starting current is too large	1. Check if the starting high pressure is excessive; 2. Check if the syst4 compressor is blocked
Syst2:Running IPM Prot.	F454	Syst4 compressor running current is too large	Check if the pressure ratio is too high
Syst2:Comp. IPM Over-temp. Prot.	F455	Syst4 compressor running current is too large	Check if there is a gap in the installation of the fluorine-cooled heat sink
Syst2:Comp. Overcurrent Prot.	F456	Syst4 compressor drive board has poor heat dissipation	Check if the pressure ratio is too high
Syst2:Comp. Bus Over Voltage	F457	Voltage is too high	Check if the input voltage is higher than 480V
Syst2:Comp. Bus Under Voltage	F458	Voltage is too low	Check if the input voltage is lower than 250V
Fan Motor 1 Output Out Phase	F101	System 1 fan failed to start	Check if the system 1 fan line is normal
Fan Motor 1 Output Zero Speed	F102	System 1 fan failed to start	Check if the system 1 fan rotor is locked
Fan Motor 1 Start IPM Prot.	F103	System 1 fan starting current is too large	Check if the system 1 fan rotor is locked
Fan Motor 1 Running IPM Prot.	F104	System 1 fan running current is too large	Check if the system 1 fan rotor is locked
Fan Motor 1 Overcurrent Prot.	F105	System 1 fan running current is too large	Check if the system 1 fan rotor is locked
Fan Motor 1 Over-temp. Prot.	F106	System 1 fan drive board has poor heat dissipation	Check the heat dissipation condition
Fan Motor 1 Bus Over Voltage	F107	Voltage is too high	Check if the input voltage is higher than 480V
Fan Motor 1 Bus Under Voltage	F108	Voltage is too low	Check if the input voltage is lower than 250V
Fan Motor 2 Output Out Phase	F201	System 2 fan failed to start	Check if the system 2 fan line is normal
Fan Motor 2 Output Zero Speed	F202	System 2 fan failed to start	Check if the system 2 fan rotor is locked
Fan Motor 2 Start IPM Prot.	F203	System 2 fan starting current is too large	Check if the system 2 fan rotor is locked
Fan Motor 2 Running IPM Prot.	F204	System 2 fan running current is too large	Check if the system 2 fan rotor is locked
Fan Motor 2 Overcurrent Prot.	F205	System 2 fan running current is too large	Check if the system 2 fan rotor is locked
Fan Motor 2 Over-temp. Prot.	F206	System 2 fan drive board has poor heat dissipation	Check the heat dissipation condition
Fan Motor 2 Bus Over Voltage	F207	Voltage is too high	Check if the input voltage is higher than 480V
Fan Motor 2 Bus Under Voltage	F208	Voltage is too low	Check if the input voltage is lower than 250V

7. Appendix

7.1 Parameter List

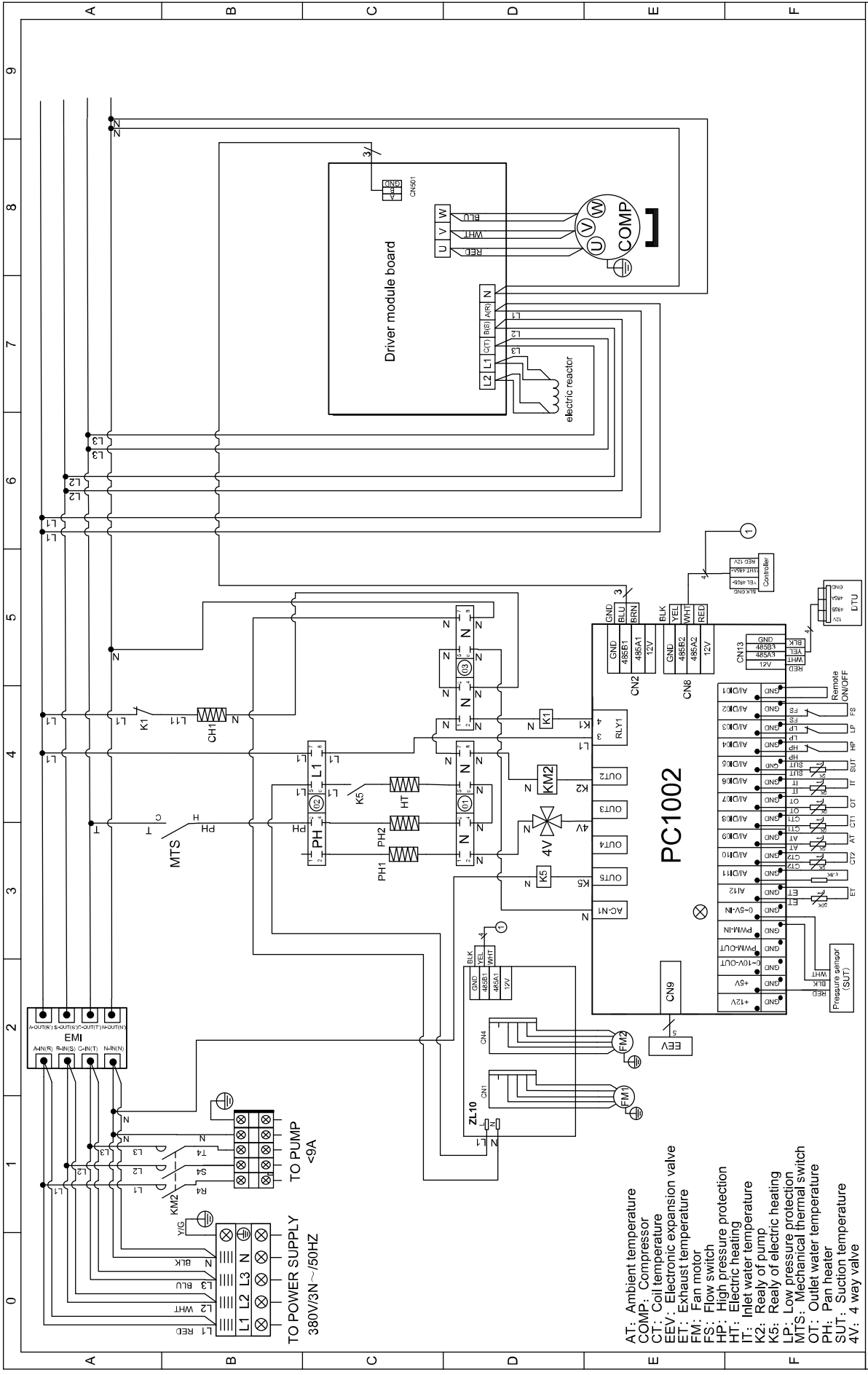
Meaning	Default	Remarks
Refrigeration target temperature set point	27°C	Adjustable
Heating the target temperature set point	27°C	Adjustable
Automatic target temperature set point	27°C	Adjustable

7.2 Cable Specifications

Single Phase Unit					
Nameplate maximum current	Phase line	Earth line	MCB	Creepage Protector	Signal Line
No more than 10A	2 x 1.5mm ²	1.5mm ²	20A	30mA less than 0.1 sec	n x 0.5mm ²
10~16A	2 x 2.5mm ²	2.5mm ²	32A		
16~25A	2 x 4mm ²	4mm ²	40A		
25~32A	2 x 6mm ²	6mm ²	40A		
32~40A	2 x 10mm ²	10mm ²	63A		
40~63A	2 x 16mm ²	16mm ²	80A		
63~75A	2 x 25mm ²	25mm ²	100A		
75~101A	2 x 25mm ²	25mm ²	125A		
101~123A	2 x 35mm ²	35mm ²	160A		
123~148A	2 x 50mm ²	50mm ²	225A		
148~186A	2 x 70mm ²	70mm ²	250A		
186~224A	2 x 95mm ²	95mm ²	280A		

Three Phase Unit					
Nameplate maximum current	Phase line	Earth line	MCB	Creepage Protector	Signal Line
No more than 10A	3 x 1.5mm ²	1.5mm ²	20A	30mA less than 0.1 sec	n x 0.5mm ²
10~16A	3 x 2.5mm ²	2.5mm ²	32A		
16~25A	3 x 4mm ²	4mm ²	40A		
25~32A	3 x 6mm ²	6mm ²	40A		
32~40A	3 x 10mm ²	10mm ²	63A		
40~63A	3 x 16mm ²	16mm ²	80A		
63~75A	3 x 25mm ²	25mm ²	100A		
75~101A	3 x 25mm ²	25mm ²	125A		
101~123A	3 x 35mm ²	35mm ²	160A		
123~148A	3 x 50mm ²	50mm ²	225A		
148~186A	3 x 70mm ²	70mm ²	250A		
186~224A	3 x 95mm ²	95mm ²	280A		

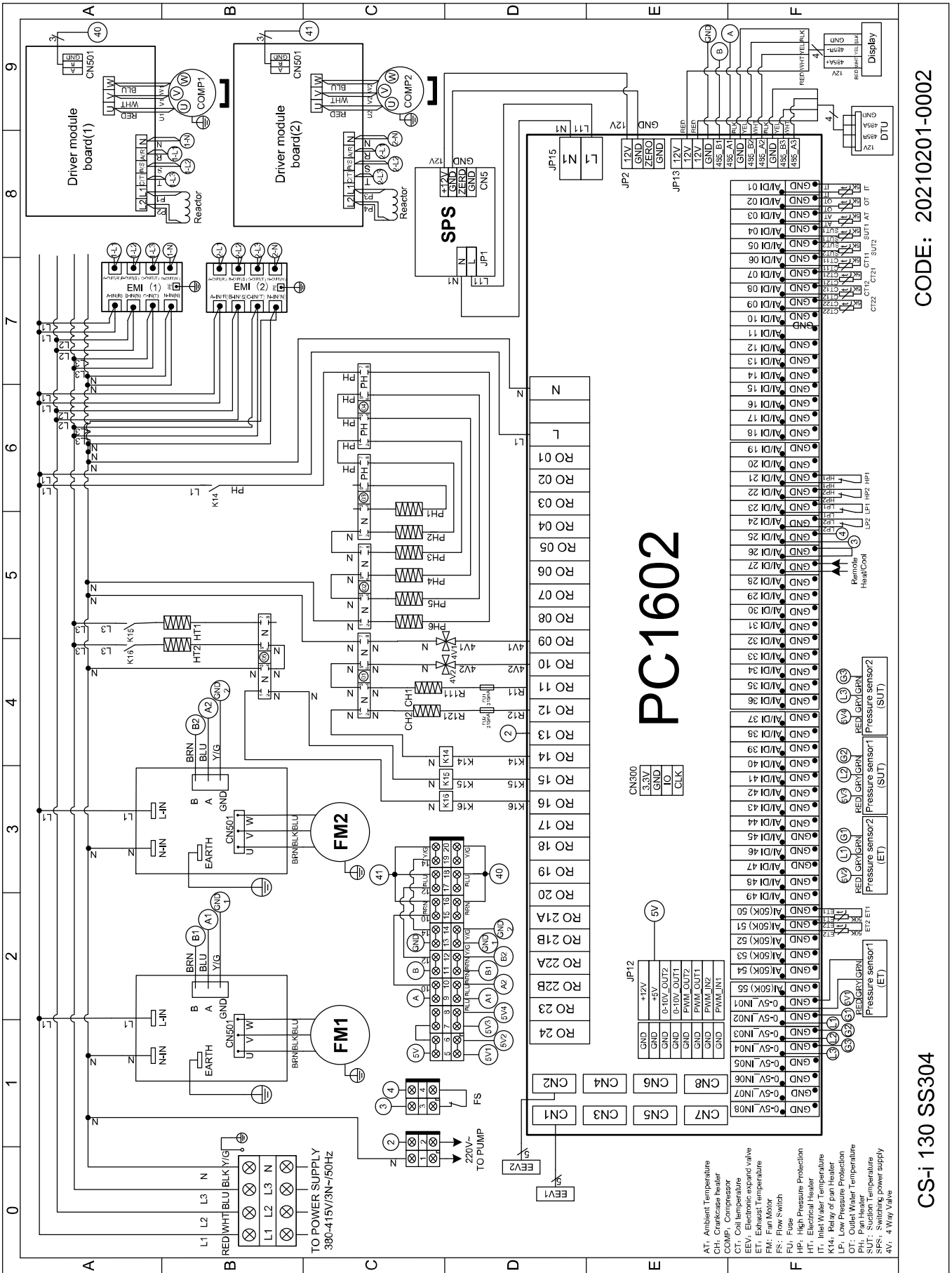
7.3 Wiring Diagrams



- AT: Ambient temperature
- COMP: Compressor
- CT: Coil temperature
- EEV: Electronic expansion valve
- ET: Exhaust temperature
- FM: Fan motor
- FS: Flow switch
- HP: High pressure protection
- HT: Electric heating
- IT: Inlet water temperature
- K2: Relay of pump
- K5: Relay of electric heating
- LP: Low pressure protection
- MTS: Mechanical thermal switch
- OT: Outlet water temperature
- PH: Pan heater
- SUT: Suction temperature
- 4V: 4 way valve

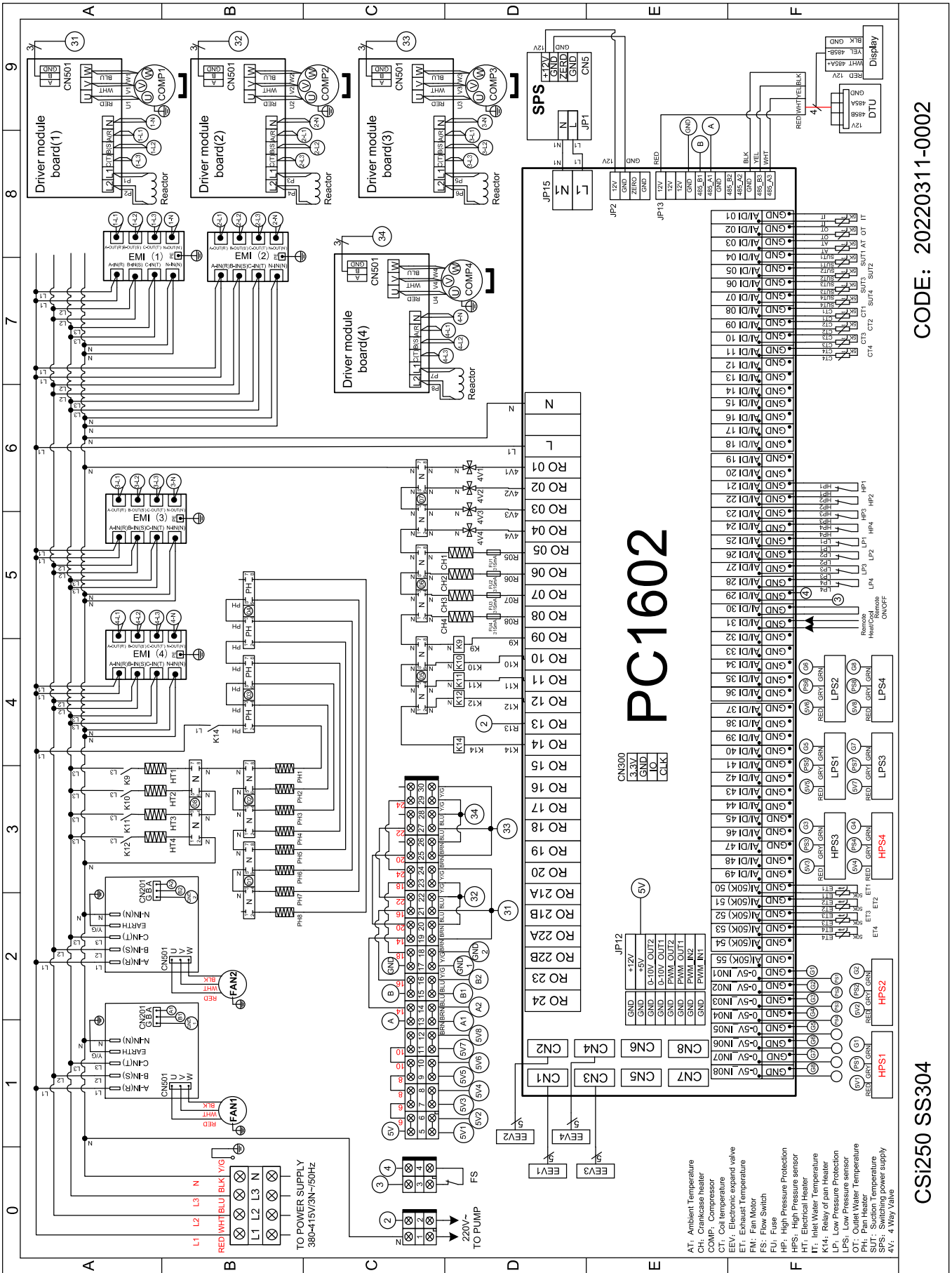
CODE: 20210201-0001

CS-i 65 SS304



CODE: 20210201-0002

CS-I 130 SS304



CODE: 20220311-0002

CSi250 SS304

Number	Sign	Meaning
01	OUT1	Compressor (output 220-230VAC)
02	OUT2	Water pump (output 220-230VAC)
03	OUT3	4-way valve (output 220-230VAC)
04	OUT4	High speed of fan (output 220-230VAC)
05	OUT5	Low speed of fan (output 220-230VAC)
06	AC-L	Live wire (input 220-230VAC)
07	AC-N	Neutral wire (input 220-230VAC)
08	AI/DI01	Emergency switch (input)
09	AI/DI02	Water flow switch (input)
10	AI/DI03	System low pressure (input)
11	AI/DI04	System high pressure (input)
12	AI/DI05	System suction temperature (input)
13	AI/DI06	Water input temperature (input)
14	AI/DI07	Water output temperature (input)
15	AI/DI08	System fan coil temperature (input)
16	AI/DI09	Ambient temperature (input)
17	AI/DI10	Mode switch (input)
18	AI/DI11	Master-slave machine switch/antifreeze temperature (input)
19	AI12 (50K)	System Exhaust temperature (input)
20	0_5V_IN	Compressor current detection/pressure sensor (input)
21	PWM_IN	Master-slave machine switch/feedback signal of EC fan (input)
22	PWM_OUT	AC fan control (output)
23	0_10V_OUT	EC fan control (output)
24	+5V	+5V (output)
25	+12V	+12V (output)
26	CN2	Frequency conversion board communications
27	CN8	Color line controller communication
28	CN9	Electronic expansion valve
29	CN13	The port for centralized control

8. Maintenance

8.1 F.A.Q

<p style="text-align: center;"></p> <p style="text-align: center;">DO I NEED TO GET MY UNIT SERVICED?</p>	<p>It is recommended that you get your EvoHeat unit serviced once a year by your local certified air conditioning or refrigeration technician. If your unit is located in a coastal area, more frequent maintenance may be necessary. During the service, they will check the operational pressures of the refrigeration system and give the unit and fins a good clean to ensure maximum performance.</p> <p>Our commercial service plan offers on-time servicing by qualified and accredited EvoHeat technicians - in combination with our genuine EvoHeat replacement parts.</p>
<p style="text-align: center;"></p> <p style="text-align: center;">DO WE HAVE RECOMMENDED SERVICE AGENTS?</p>	<p>EvoHeat have a large database of recommended service agents. Please contact EvoHeat tech support on 1300 859 933 for your local service agent details.</p>
<p style="text-align: center;"></p> <p style="text-align: center;">SHOULD I CHECK MY UNIT REGULARLY?</p>	<p>We recommend checking the unit regularly to avoid potential issues and damage to your heat pump.</p>
<p style="text-align: center;"></p> <p style="text-align: center;">WHAT SHOULD I BE CHECKING REGULARLY?</p>	<p>Check the water inlet/outlets often for leaks. Avoid the condition of no water or air entering into the system, as this will influence unit's performance and reliability.</p> <p>You should clear the pool/spa filter regularly to avoid damage to the unit as a result of the dirty or clogged filter.</p> <p>The area around the unit should be dry, clean and well ventilated. Make sure there is nothing blocking the airflow of the heater e.g. Leaf litter.</p> <p>Discharge all water in the water pump and water system, so that freezing of the water in the pump or water system does not occur. You should discharge the water at the bottom of water pump if the unit will not be used for an extended period. You should check the unit thoroughly and fill the system with water fully before using it for the first time after a period of time.</p> <p>Check the power supply and cable connection often, should the unit begin to operate abnormally, switch it off and contact the qualified technician</p>

8.2 Energy Saving Tips

If pool water is allowed to cool significantly, it may take several days to return to the desired swimming temperature. For weekend use, it is more economical to maintain the pool water temperature at or near your desired swimming temperature.

If you do not plan to use your pool for a prolonged period, then you might choose to turn the heat pump completely off or decrease the temperature setting of the control several degrees to minimize energy consumption.

- Use an accurate pool thermometer. A difference of 2°C, between 26°C and 28°C, will significantly increase energy consumption.
- Monitor the water temp. of the pool in summer, you can reduce heat pump usage due to warmer temperatures.
- When the pool is not used for long periods, turn off the heat pump.
- Where possible, shelter the pool from prevailing winds with well-trimmed hedges or other landscaping or fencing.
- Always use a high-quality pool cover when practical. Besides providing a valuable water saving feature, a pool cover will dramatically reduce heat loss and reduce your pool heating running costs by up to 70%!

8.3 Advanced

<p align="center">CHECK THE AREA</p>	<p align="center">GENERAL WORK AREA</p>
<p>Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system. prolonged period of no usage.</p>	<p>All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.</p>
<p align="center">PRESENCE OF FIRE EXTINGUISHER</p>	<p align="center">WORK PROCEDURES</p>
<p>If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging</p>	<p>Work shall be undertaken under a controlled procedure to minimise the risk of a flammable gas or vapour being present while the work is being performed.</p>
<p align="center">CHECKING FOR PRESENCE OF REFRIGERANT</p>	<p align="center">VENTILATED AREA</p>
<p>The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.</p>	<p>Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere. prolonged period of no usage.</p>
<p align="center">CABLING</p>	<p align="center">DETECTION OF FLAMMABLE REFRIGERANTS</p>
<p>Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also consider the effects of aging or continual vibration from sources such as compressors or fans.</p>	<p>Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.</p>
<p align="center">REPAIR TO INTRINSICALLY SAFE COMPONENTS</p>	<p align="center">LABELLING</p>
<p>Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.</p> <p>Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.</p>	<p>Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.</p>
<p>NO IGNITION SOURCES</p>	<p>No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. No Smoking signs shall be displayed.</p>
<p>CHARGING PROCEDURES</p>	<p>In addition to conventional charging procedures, the following requirements shall be followed.</p> <ul style="list-style-type: none"> • Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them. • Cylinders shall be kept upright. • Ensure that the refrigeration system is earthed prior to charging the system with refrigerant. • Label the system when charging is complete (if not already). • Extreme care shall be taken not to overfill the refrigeration system. <p>Prior to recharging the system, it shall be pressure tested with OFN. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site. The safety wire model is 5*20_5A/250VAC, and must meet the explosion-proof requirements.</p>

CHECKS TO THE REFRIGERATION EQUIPMENT

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using flammable refrigerants:

- The charge size is in accordance with the room size within which the refrigerant containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed; If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

CHECKS TO ELECTRICAL DEVICES

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised.

Initial safety checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That there no live electrical components and wiring are exposed while charging, recovering or purging the system;
- That there is continuity of earth bonding.

REPAIRS TO SEALED COMPONENTS

1. During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
2. Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

NOTE: The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to.

LEAK DETECTION METHODS

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.

Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

<p>REMOVAL AND EVACUATION</p>	<p>When breaking into the refrigerant circuit to make repairs or for any other purpose conventional procedures shall be used. However, it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:</p> <p>Remove refrigerant; Purge the circuit with inert gas; Evacuate; Purge again with inert gas; Open the circuit by cutting or brazing.</p>	<p>The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be "flushed" with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task.</p> <p>Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.</p> <p>Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available. working on them.</p>
<p>RECOVERY</p>	<p>When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.</p> <p>When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.</p> <p>The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.</p>	<p>The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.</p> <p>If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.</p>
<p>DECOMMISSIONING</p>	<p>Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.</p> <ol style="list-style-type: none"> a) Become familiar with the equipment and its operation. b) Isolate system electrically. c) Before attempting the procedure ensure that: <ul style="list-style-type: none"> - Mechanical handling equipment is available, if required, for handling refrigerant cylinders; - All personal protective equipment is available and being used correctly; - The recovery process is always supervised by a competent person; - Recovery equipment and cylinders conform to the appropriate standards. d) Pump down refrigerant system, if possible. e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system. f) Make sure that cylinder is situated on the scales before recovery takes place. g) Start the recovery machine and operate in accordance with manufacturer's instructions. h) Do not overfill cylinders. (No more than 80 % volume liquid charge). i) Do not exceed the maximum working pressure of the cylinder, even temporarily. j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off. k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked. 	

9. Warranty



Refer to the EvoHeat website for warranty details

- Australia: <https://evoheat.com.au/warranty-terms/>
- South East Asia: <http://evoheat.com.sg/warranty/>

1. Warranty terms are from date of purchase.
2. This warranty excludes any defect or injury caused by or resulting from misuse, abuse, neglect, accidental damage, improper voltage, vermin infestation, incompetent installation, any fault not attributable to faulty manufacture or parts, any modifications which affect the reliability or performance of the unit.
3. This warranty does not cover the following:
 - a. Natural Disasters (hail, lightning, flood, fire etc.)
 - b. Rust or damage to paintwork caused by a corrosive atmosphere
 - c. When serviced by an unauthorized person without the permission of Evo Industries
 - d. When a unit is installed by an unqualified person
 - e. Where a unit is incorrectly installed
 - f. When failure occurs due to improper or faulty installation
 - g. Failure due to improper maintenance (refer Operating Instructions)
 - h. 'No Fault Found' service calls where the perceived problem is explained within the operation instructions.
 - i. Costs associated with delivery, handling, freighting, or damage to the product in transit.
4. If warranty service is required, you should:
 - a. contact Evo Industries Australia on 1300 859 933 or via our Contact page on our web site
 - b. provide a copy of your receipt as proof of purchase
 - c. have completed the online *Warranty Registration Form*
5. Onsite technical service is available within the normal operating area of your Evo Authorised Service Agents. Service outside this area will incur a traveling fee.
6. Unless otherwise specified to the purchaser, the benefits conferred by this express warranty and additional to all other conditions, warranties, rights and remedies expressed or implied by the Trade Practices Act 1974 and similar consumer protection provisions contained in legislation of the States and Territories and all other obligations and liabilities on the part of the manufacturer or supplier and nothing contained herein shall restrict or modify such rights, remedies, obligations or liabilities.

REGISTER YOUR WARRANTY

EvoHeat highly recommend customers complete their warranty details online to ensure efficient warranty claim processing.

To register your warranty, scan our QR Code or head to our website and fill in the Warranty Registration Form: <https://evoheat.com.au/warranty-registration/>

