



ECP ICOM 2012

Installation, Commissioning, Operation and Maintenance Manual

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Contact details for all the international branches of EcoCooling are available on the website.

1. SAFETY

The installer shall comply with all local regulations, including:

- Management of Health and Safety at Work Regulations 1992 (amended in 1994 and 1997).
- Personal Protective Equipment at Work Regulations 1992.
- Provision and Use of Work Equipment Regulations 1992 (replaced in 1998).
- Manual Handling Operations Regulations 1992.
- The Working at Heights Regulations 2005.
- Control of Substances Hazardous to Health Regulations 2002 (COSHH), (where appropriate including The Control of Asbestos Regulations 2012.)
- Permit to Work Systems, including Hot Work.

Installation and maintenance of EcoCoolers entail some electrical and mechanical hazards, which can be reduced by regarding the following procedures:

ELECTRICAL INSTALLATION

The EcoCooler shall be protected by a residual current device (RCD) or residual current circuit breaker (RCCB).

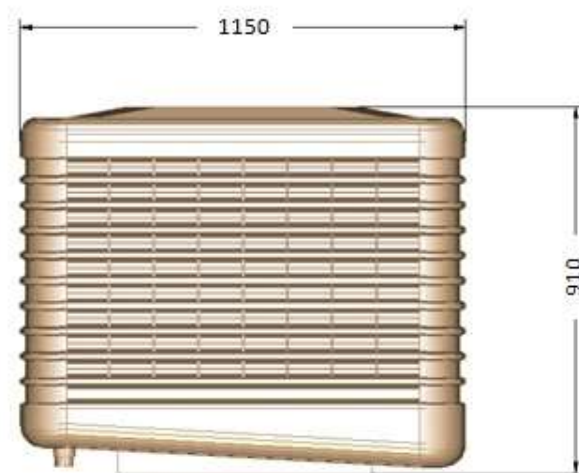
TO REDUCE THE RISK OF ELECTROCUTION AND MECHANICAL INJURY

The EcoCooler shall be isolated from the 240V mains power prior to removing the side panels from the cooler. This prevents remote operation of the cooler via the control panel, and hence activation of the high speed fan or water systems. In the event that power is required for fault diagnosis, precautions must be taken to prevent remote operation of the cooler.

HAZARDS FROM THE CAPACITOR

The capacitor, which is contained in its own casing, can retain charge and must be discharged by a competent person prior to handling.

2. SPECIFICATIONS



Size height 910mm
length 1150mm
width 1150mm

Volume 1.3m³

Weight dry 55kg
operating 92kg

3. SHIPPING

The coolers are shipped on a 1200 x 1200 pallet, which may be used to support the EcoCooler during installation.

Claims for damages can only be accepted if damage is recorded on the delivery documentation, and so the cooler must be unpackaged and inspected upon receipt.

To remove the packaging, cut the 4 bands which secure the product to the pallet, and lift off the protective cardboard lid.



Figure 1. The packaged cooler.

4. REMOVING THE SIDE PANELS

It is necessary to remove the sides for installation. This also reduces the weight of the EcoCooler and facilitates manual handling.

REMOVE THE SECURING BOLTS

All sides are secured by an M8 bolt in each of the top corners, as illustrated in Figure 2. Remove these using an 8mm nut spinner, and preferably a cordless drill.

It is critical that the bolts are replaced after refitting the side panels.



Figure 2. Remove M8 retaining bolts.

LIFT OVER THE SECURING TABS

The tabs circled in Figure 3 prevent the sides from falling out. Using 2 hands, lift the side and then pull it out, as indicated by the arrows.

LEVER THE SIDE OFF

The side is then free, but may require further negotiating to remove it from the EcoCooler. Use a screwdriver to lever the side free, as demonstrated in Figure 4.

Access to the control panel is gained by removing the side panel with the thick section of the sump on the left, and the thin on the right.



Figure 3. Lift the side up, and then pull it out.



Figure 4. Lever the side off with a screwdriver.

5. ECOCOOLER LAYOUT

Installation of EcoCoolers requires connection of all the services featured in Figure 5. Installation methods are covered in a latter section of this manual. Dimensions of the layout can be obtained from an engineering drawing of the sump in Appendix A.

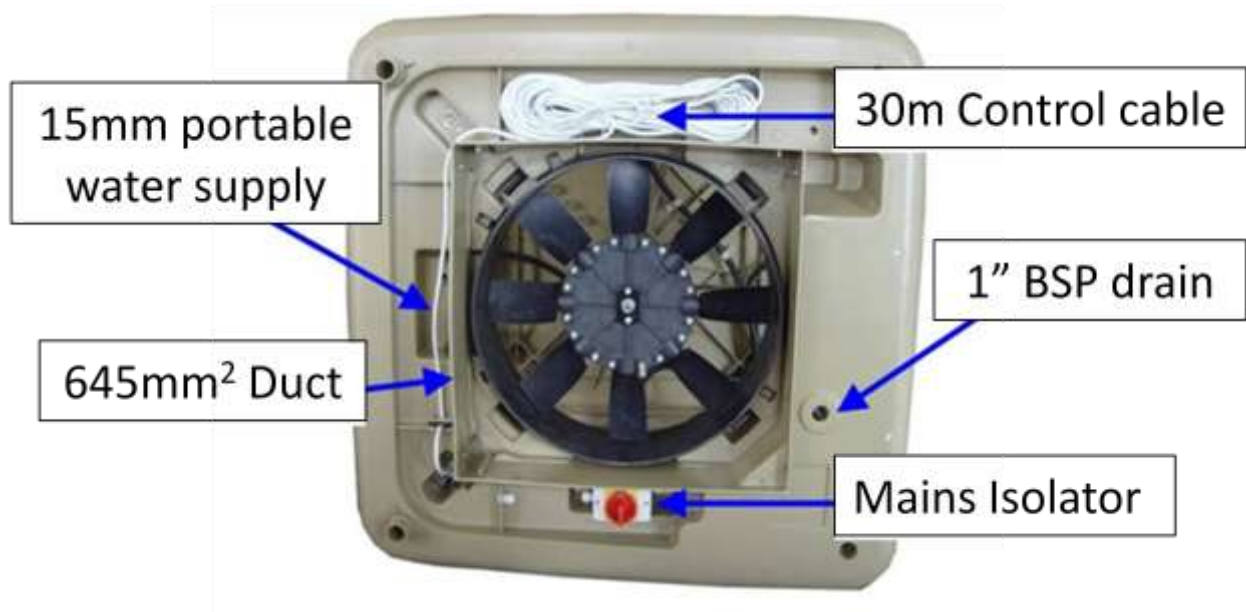


Figure 5. The layout of services on the sump of an EcoCooler.

6. CONNECTION REQUIREMENTS

This section details how the services shall be connected.

WATER

Water shall be connected to the cooler through a 15mm town mains water supply, of water pressure between 1 and 7 bar. A flexible braided hose, featured in Figure 6, is supplied with the EcoCooler and is recommended for coupling the water inlet valve and 15mm pipe, to prevent stress on the valve fitting. It is also recommended that a double check valve is fitted in the mains water supply.



Figure 6. The flexible braided hose with integral isolation valve and 15mm compression fittings, delivered inside the cooler.

The compression fitting is assembled as pictured in Figure 7.



Figure 7. Assembly of a compression fitting.

ELECTRICITY

The EcoCooler requires a 240V AC 13A single phase supply, protected with a residual current device (RCD) or residual current circuit breaker (RCCB). This is connected to the external isolator fixed to the base of the cooler as illustrated in Figures 8 and 9.

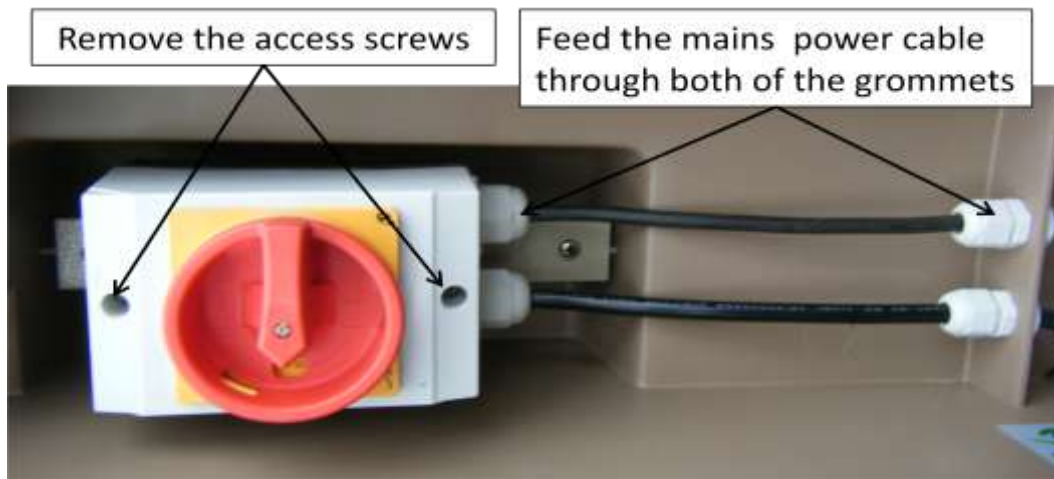
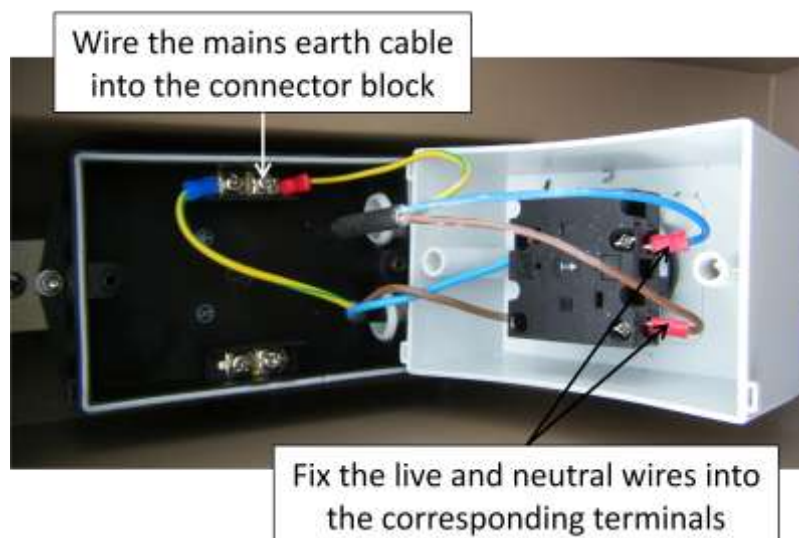


Figure 8. Inserting the 240V 13A single phase mains power cable.



Figures 9. Connecting the mains power to the EcoCooler, through the isolator switch.

DRAIN VALVE

On delivery, the drain valve is electrically connected to the control panel but requires mechanical fitting to the base of the sump, with a rubber washer on either side, as illustrated in Figure 10.

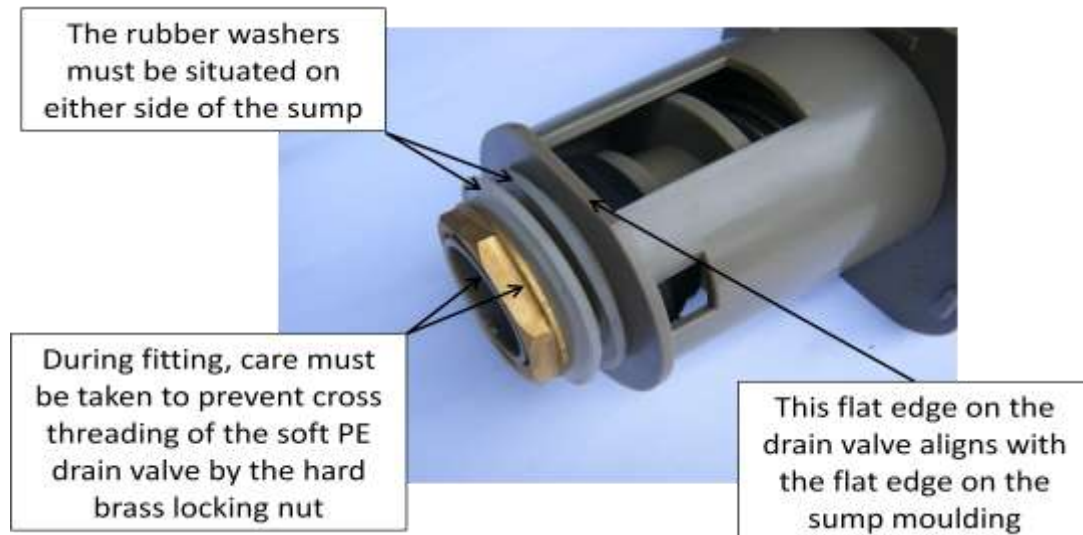


Figure 10. Mechanical fitting of the drain valve to the sump.

The drain valve fitting is 1" BSP, and should the drain valve require pipe work then standard 28mm pipe components can be obtained from Walsey Group. Part No and descriptions:

555043 C/B 28MM X 1" F.I COMPRESSION COUPLING

555012 C/B 28MM COMPRESSION ELBOW

515122 HEP20 28MMx3M P/BUTYLENE PIPE

WALL CONTROL CABLE

A 30m 16core control cable is coiled and fastened to the base of the cooler. It is connected to the control box (Figure 13) via connector blocks to the corresponding colours. Wiring diagrams and further details on the control systems are featured in the latter section on controls.

The control cable can be extended up to 500m using standard multi-core cable. The connections to the control box are 2.8mm x 0.5mm spade connectors.

7. INSTALLING ECOCOOLERS ON BUILDINGS

Each product in the EcoCooling range requires a different physical installation method, and these are detailed in this section.

ECPD – DOWN DISCHARGE ECOCOOLER

Figure 13 illustrates the standard installation technique for an ECPD unit. The flange on the EcoCoolers sump slots directly over a standard 645mm square duct, resting on the duct location points featured in Figure 24. Support brackets must be installed on the lower side of the cooler, which carries the majority of the water and thus weight in the sump reservoir. The additional support prevents plastic deformation of the EcoCooler from prolonged tensile stress.

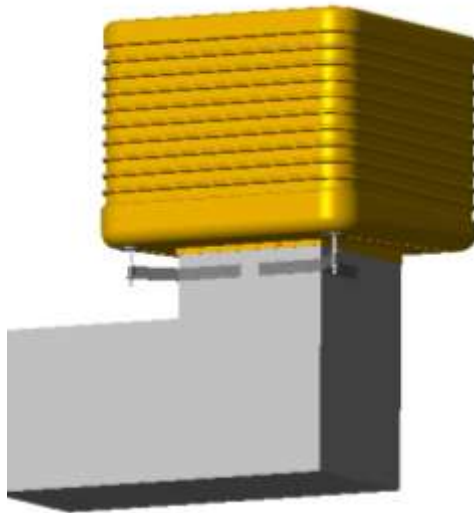


Figure 13. Installation of an ECPD EcoCooler. Securing holes for self tapping bolts can be seen where the base of the cooler meets the duct.



Figures 14 and 15. Photos of a typical rooftop ECPD installation. The weight of the cooler is supported on the underside of the roof.

ECPT – TOP DISCHARGE ECOCOOLER

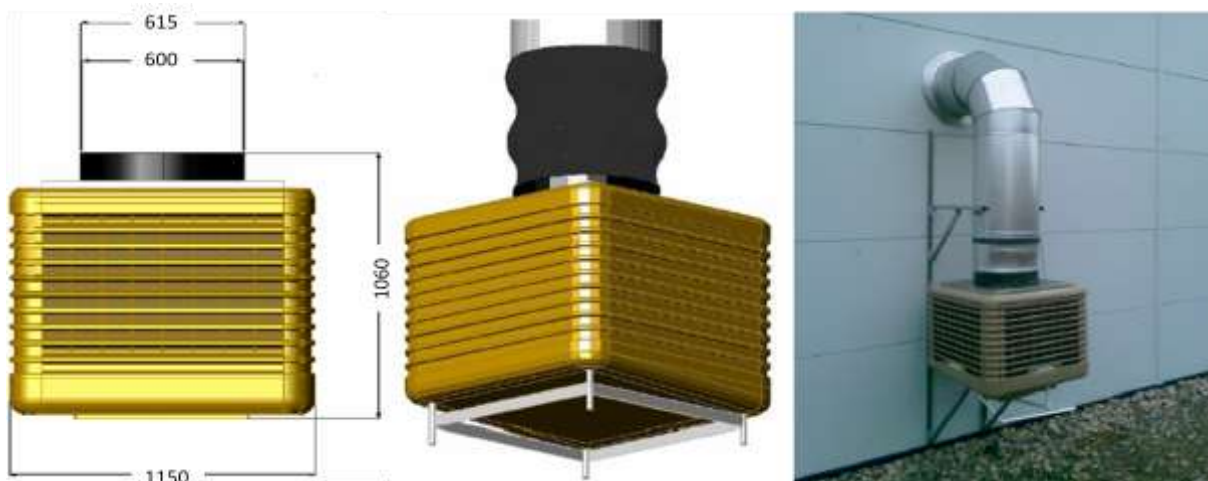
Based upon an EcoCooler ECPD, a stainless steel fan transition element is fitted to the top. A further polymer blanking plate is used to seal the existing venturi position. Duct can be fixed to the steel element or to the 600mm internal diameter venturi.



Figure 16. A standard ECPT.

Figure 17 illustrates the standard support method for top discharge coolers; there are four support points molded into the sump which are on 920mm centers. A support frame should be fabricated to suit the install, such as that pictured in Figure 18. There are several key features to note in this install:

1. The framework which extends above the EcoCooler supports the ductwork. All ductwork for top discharge coolers must be self supporting – loading of the EcoCooler lid will result in permanent deformation of the EcoCooler.
2. A flexible duct connector is used, which reduces the transfer of vibration between the cooler and ductwork. Vibration of the cooler is increased in top discharge coolers due to the higher centre of gravity of the high speed fan, and so it is recommended that a flexible connector is used.
3. **The top plate assembly requires weather sealing after installation to prevent the ingress of moisture. This can be achieved with a generous beading of silicon around the venturi, and around the fan transition element.**



Figures 17 to 19. Images featuring dimensions, a frame for supporting an EcoCooler with a flexible duct connector, and a typical installation photo.

ECPS – SIDE DISCHARGE ECOCOOLER

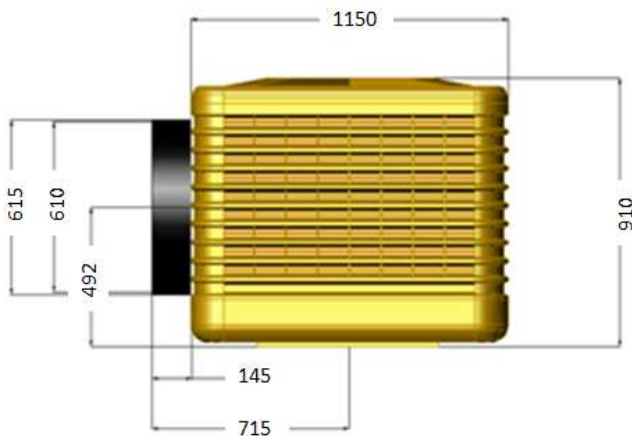
Based upon an ECPD EcoCooler, a single side panel is replaced by a stainless steel fan transition element. A polymer blanking plate is used to seal the existing venturi position. Duct can be fixed to the steel element or to the 600mm internal diameter venturi.

- All ductwork for side discharge coolers must be self supporting – loading of the EcoCooler will result in permanent deformation, which will likely result in distortion of the van venturi.



Figure 20. A standard ECPS.

Figure 22 illustrates a standard support method for side discharge coolers; there are four support points molded into the sump which are on 940mm centers. A support frame should be fabricated to suit the install, such as that pictured in Figure 22.



Figures 21 and 22. An image featuring dimensions and a typical ECPS mounted on a scaffold frame.

POSITIONING

It is critical that:

- The EcoCooler is installed in a position where the input air is free from fumes, dust particles, road traffic exhaust fumes etc.
- The EcoCooler is installed away from any building ventilation exhausts, preventing the recycling of warm saturated air which would significantly reduce performance.
- The EcoCooler is installed with a minimum clearance of 300mm on all sides, to allow sufficient airflow around the EcoCooler and enable access for maintenance. All the sides must be removable for maintenance, including changing the Munters CelDEK pads, and the side of the control panel should be the most accessible.
- The EcoCooler sits level, ensuring it drains fully and operation is safe and efficient.
- It is mounted sufficiently high that the drain connection can be made – typically 150mm clear from the roof on the water inlet side, as illustrated in Figure 23.
- The drain does not require any filtration.

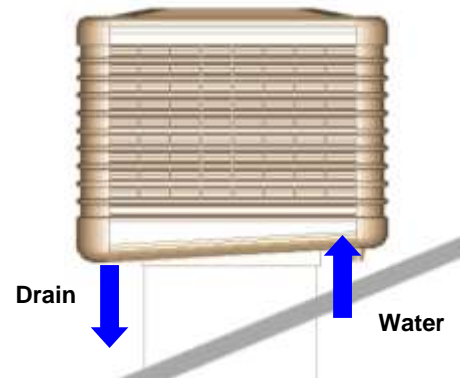


Figure 23. Positioning on a sloping roof.



Figure 24. Duct location points.

SUPPORTING

The EcoCooler is designed to be supported from a plain square duct with nominal external dimensions 645 x 645mm. The duct slots inside the square sump molding and rests on 8 duct location points, illustrated in Figure 24.

The corners of the EcoCooler must be supported by the brackets delivered inside the cooler, as illustrated in Figure 25. The brackets should be attached to the duct using self tapping screws, and the feet on each corner adjusted accordingly.

SECURING

Securing the EcoCooler to the ducting can be done using M8 20mm self tapping bolts; it is recommended that at least 3 are inserted on each side, as described in Figure 13 on Page 9.

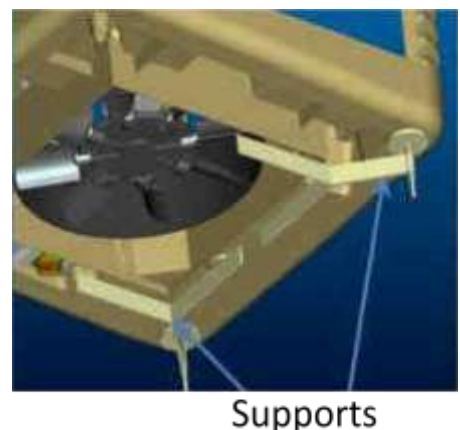


Figure 25. Installation of sump supports.

8. CONNECTION OF THE WALL CONTROLLER

The wall controller is delivered packed inside the cooler. Final connections are made after the control cable has been routed. The 16 cores are connected to the two terminal strips inside the Wall Controller. **The Alarm and Timer must be bridged as shown below or the cooler will not run.**

Wall Control

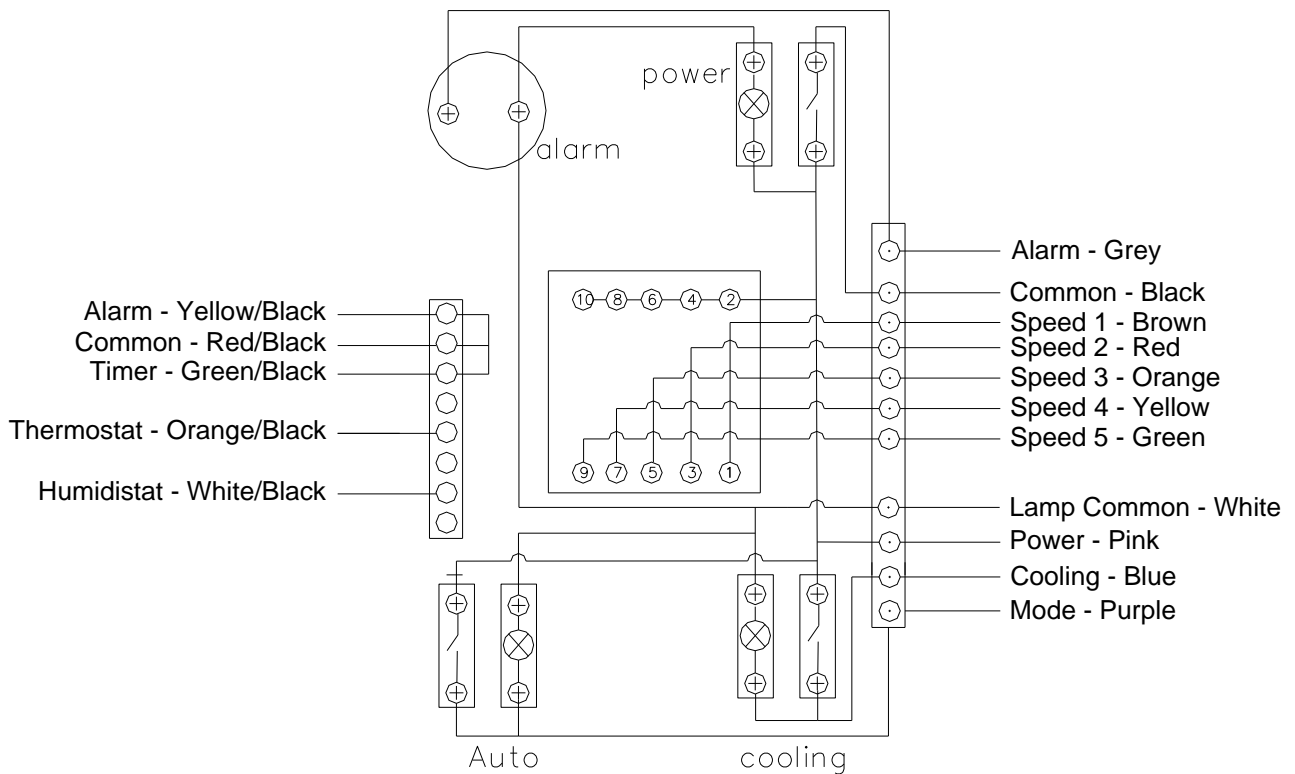
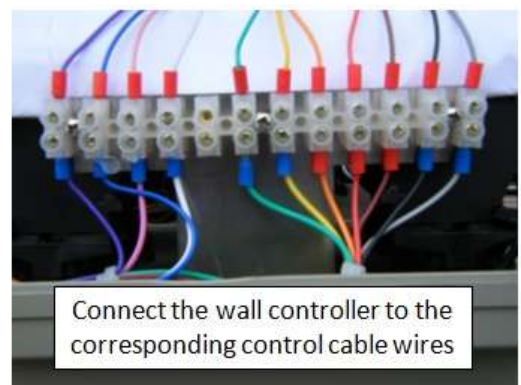
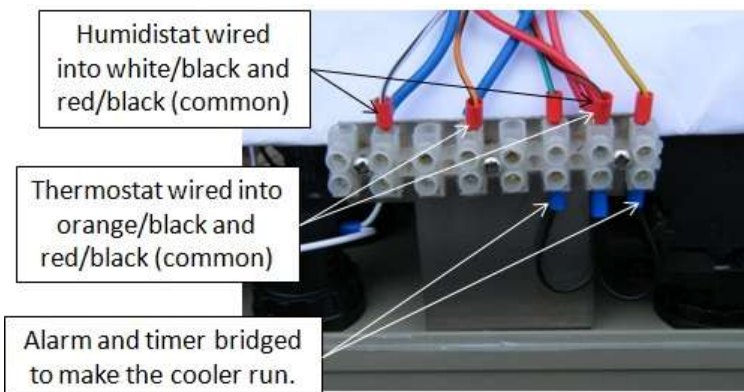


Figure 26. The wiring diagram for a wall control box.



Figures 27 and 28. Photos of a connected wall controller including, as an example, a humidistat and thermostat.

THE AUTO BUTTON

If no thermostat is to be used, then the Auto button should be removed and associated wires terminated. A blanking plug can be found inside the wall control box upon delivery.

CONNECTION OF REMOTE ITEMS

The Alarm, Timer, Thermostat and Humidistat should all be volt free contacts using the Red/Black as a common. These can be connected to the cores provided in the wall control box, as shown in Figures 26 and 27 on Page 13, or directly to the EcoCooler inside the main control box (wiring diagrams featured in Appendices B and C.)

Alarm – This connection is to be used in conjunction with such systems as fire alarms and smoke detectors, to shut down the cooler in a controlled manner and prevent venting of fires. When the connection is broken, the fan stops and the EcoCooler drains. The alarm light on the wall control flashes 6 times and “6” appears on the main control board LED screen. Note that:

- The connection must be closed for the cooler to run.
- If only the Alarm contact is used, the Timer must be bridged.
- The Alarm function operates in both Manual and Automatic Mode.

Timer – This switches the cooler on and off, maintaining the previous settings on restart. This contact must be made at all times for the cooler to run, and if the connection is broken, “to” appears on the main control board LED screen.

Thermostat – This switches the EcoCooler on, and off when the air temperature conditions are met. In automatic mode, when air temperature rises above the level set on the thermostat, the EcoCooler starts up at speed 3 with cooling. The control system then checks the thermostat status every 10 minutes, and actions the following:

- a. Air temperature is higher than the set level – the thermostat shows a closed contact. The cooler will increase the speed of the fan by one increment up to the maximum speed 5 with cooling.
- b. Air temperature is lower than the set level – the thermostat shows an open contact. The cooler will decrease the fan speed by one increment until it either stays at Speed 1/VENT, or shuts down completely.

If a thermostat is not used then this contact should be bridged.

Humidistat – This switches the cool function (and water circulation) on and off when the set humidity conditions are met. In automatic mode, when relative humidity rises above the level set on the humidistat, the EcoCooler switches to vent mode. The control system then checks the humidistat status every 10 minutes, and actions the following:

- a. Relative humidity is higher than the set level – the humidistat shows an open contact. The EcoCooler will remain in vent mode, with water circulation disabled.
- b. Relative humidity is lower than the set level – the humidistat shows a closed contact. The EcoCooler switches to cool mode, enabling water circulation.

If a humidistat is not used then this contact should be bridged.

AUTOMATIC OPERATION

In Auto operation, the fan speed and cooling mode are set automatically. Dip Switch 8 allows the cooler to stop completely during cool periods. The default settings are:

- The EcoCooler stays at speed 1/vent mode during cool periods.
- The EcoCooler reacts to the status of the humidistat and thermostat, whose functions are explained in the previous section Connection of Remote Items.
- Full fan speed automatic control is retained.

CONNECTION OF SUNVIC TLX7501

The Sunvic TLX7501 provides a very simple and user friendly thermostatic control of an EcoCooler and its derivatives. A 2 core cable is required from the wall controller to the Sunvic TLX750 thermostat. This carries a 12V control signal. The wiring diagram in Figure 29 shows the connection to an EcoCooler when only a thermostat is used which requires the Alarm, Timer and Humidistat control items to be bridged out to the Common.

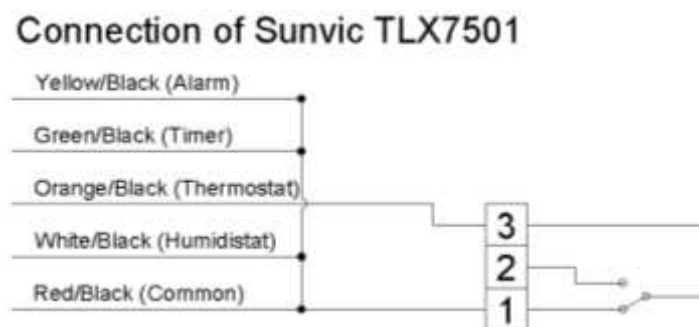


Figure 29. Wiring diagram of a Sunvic TLX7501.

There are two bridges in the thermostat which can be removed. These are small brown wire links which can be cut. This changes the minimum set point from 5C to 16C and changes the heating symbol to a cooling symbol.

The EcoCooler has a variable configuration for automatic control. If dipswitch 8 is down the cooler will continue to run at speed 1 in cold conditions. **It is normal to set dipswitch 8 up which sets the EcoCooler to stop in cool conditions.**

CONNECTION OF EBERLE 7001

The Eberle 7001 provides a very simple and user friendly thermostatic and humidistatic control of an EcoCooler and its derivatives. A 3 core cable is required from the wall controller to the Eberle 7001 humidistat. This carries a 12V control signal. The wiring diagram in Figure 30 shows the connection to an EcoCooler when only a thermostat is used which requires the Alarm and Timer control items to be bridged out to the Common.

The EcoCooler has a variable configuration for automatic control. If dipswitch 8 is down the cooler will continue to run at speed 1 in cold conditions. **It is normal to set dipswitch 8 up which sets the EcoCooler to stop in cool conditions.**

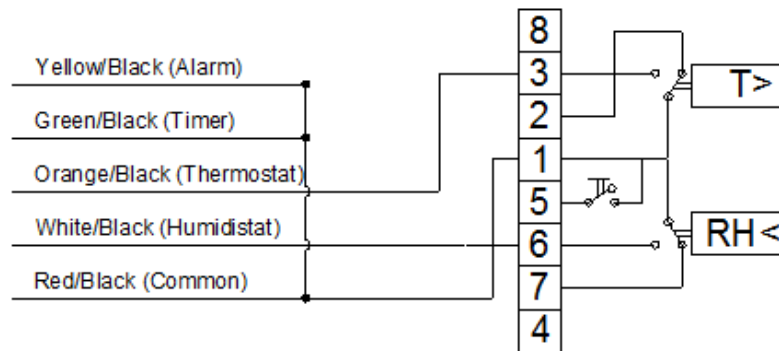


Figure 30. Wiring diagram for Eberle 7001.

THE 'SPARE' CONNECTION – AUTOMATIC START OF AN AUXILIARY FAN

The 'SPARE' connection on the main control panel can be used to provide a volt free, or a 240v control signal. This is typically used to control an extract fan and achieve a balanced ventilation system. The feature is illustrated in Figure 30, and shown on the wiring diagrams in Appendices B and C.

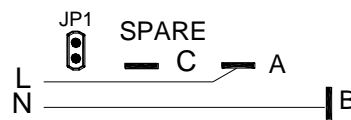


Figure 31. The SPARE terminals on the EcoCoolers printed circuit.

The spare can be wired in 2 different ways:

- To send a volt free control signal, use terminals A and C. This provides a volt free contact switch protected by a 1A fuse. This fuse can be increase to a maximum of 8A using a 20mm fuse (RS components part no 542-1480).
- To send a 240V (AC) control signal, use terminals A and B. By enabling jumper JP1, a 240V(AC) control signal is provided to contact A with contact B being neutral. DO NOT increase the fuse size over 1A. Additional cabling is required for this feature to be used.

10. OTHER FITMENTS

There are several components which may be installed to assist with noise and hygiene in EcoCoolers.

3 BLADED FAN – ECP 09-02

Noise levels produced by the rotation of the fan can be reduced by installing a 3 bladed fan, as pictured in Figure 32.

The existing fan can be removed by:

- Unscrewing the normally threaded nut on the motor spindle, at the centre of the fan.
- The fan should then be pulled off the tapered spindle using a twin leg puller.
- The original fan can then be replaced by the 3 bladed fan.
- The washers supplied with the fan should be assembled as shown in Figure 33, with the 2 largest washers nearest the fan, then a small washer, a spring wash, and then another small washer before the lock nut.
- The new fan can then be pulled onto the spindle by tightening the nut.



Figures 32 and 33. A 3 bladed fan fitted in a ECPS EcoCooler, and the arrangement of washers for securing.

ANTI-VIBRATION MOUNTS

Vibration of EcoCoolers and thus noise can be reduced with the addition of anti-vibration mounts, which are installed between the motor mounting frame and fan the venturi, as pictured in Figure 34.



Figure 34. Anti-vibration mounts installed between the motor and the EcoCooler.

AIR FILTERS

To improve the level of filtration, air filters are available which wrap around the outside of the EcoCooler, as pictured in Figures 33 and 34. ECPD and ECPT EcoCoolers require a 4 sided air filter, which is fastened via a Velcro seam and a pair of elastic fastenings.



Figure 35. A 4 sided air filter installed on a standard ECPD EcoCooler.

ECPS EcoCoolers require a 3 sided filter to allow for the fan venturi and ductwork. The elastic cord is wrapped around pegs on the fan transition element, as shown in Figures 36 and 37. The pegs are M8 bolts and spacers, which are shipped with the air filter, and require screwing into the pre drilled holes.

Older model EcoCoolers will require the holes drilling before the pegs can be fitted. Each side requires a total of 7 holes drilling, 5cm from the edge of the fan transmission element, at 11cm intervals.



Figures 36 and 37. Installation of a 3 sided air filter on an ECPS EcoCooler. The fastening pegs are located at 11cm intervals, 5cm in from the edge of the fan transmission element, on both sides.

9. CONFIGURATION OF THE ECOCOOLER

All variable parameters are set by changing the positions of the dip-switches located on the main control board. These changes can only be made during mains power off for a minimum of 5 seconds.

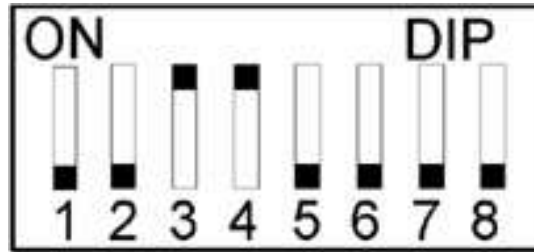


Figure 32. Configuring EcoCoolers is via the dipswitches located in the main control box.

Switch	Default	Function
1	Off	Pre Cool Cycle
2	Off	Salinity 1
3	On	Salinity 2
4	On	Salinity 3
5	Off	24 hr dry cycle
6	Off	Off speed 1390 On max speed 1200
7	Off	Off speed 1390 On max speed 1000
8	Off	Enables complete stop in Auto

DIP SWITCH 1: PRE COOL CYCLE

The EcoCooler runs a water circulation process at the beginning of cooling mode, soaking the pads for 5 minutes before the fan starts.

DIP SWITCHES 2, 3 AND 4: SALINITY SETTINGS

As the water circulating the EcoCooler evaporates, the inherent scale forming salts increase in concentration. To control this issue, the cooler drains the sump completely when a set concentration is reached, which is determined volumetrically using the water level probes.

Dip switches 2, 3 and 4 control the number of fill cycles prior to draining the sump. The concentration factor should be calculated based on the analysis of the water used. The default setting from the factory is: 2 off, 3 on, 4 on which is a 30% bleed rate.

Note that the set number of fill cycles is displayed by the control board LED for 3 seconds when power is first applied.

2	3	4	Concentration	Bleed
Off	Off	Off	No drain	0%
Off	Off	On	2.2	46%
Off	On	Off	2.8	36%
Off	On	On	3.4	30%
On	Off	Off	3.9	25%
On	Off	On	4.5	22%
On	On	Off	5.1	20%
On	On	On	5.7	18%

DIP SWITCH 5: 24HR DRY CYCLE

This can be applied in certain circumstances to improve the hygiene of the EcoCooler. Enabling dip switch 5 programs the EcoCooler to dry out for 30 minutes during every 24 hours of continuous operation.

DIP SWITCHES 6 AND 7: FAN SPEED SETTINGS

These enable the top speed of the fan to be limited, and may be used to reduce overall capacity or noise.

- DP6 – Limits the fan speed to 1200rpm
- DP7 – Limits the fan speed to 1000rpm

DIP SWITCH 8: AUTO STOP CONDITIONS

When the set conditions have been achieved in 'AUTO' mode, the EcoCooler's default setting is to remain at Speed 1, 'VENT'. Enabling dip switch 8 will action the EcoCooler to shut down completely.

10. COMMISSIONING

The cooler is commissioned by cleaning, running the test routine, checking wall control operation and finally, if applicable, checking remote items. The test routines are imitated using the test switch, located on the side of the EcoCooler's main control box, as pictured in Figure 38.



Figure 38. The test switch located on the side of the EcoCooler's main control box.

THE CLEAN ROUTINE

Clean and remove any debris from the cooler sump by pressing the test switch for 7 seconds. This opens the water inlet and drain valves simultaneously. End the routine by pressing the switch once.

THE TEST SEQUENCE

A test sequence can be started by pressing the test switch for 5 seconds. The sequence can be stopped at any time by pressing the switch once. The following sequence is initiated, and its status is displayed on the LED screen situated on the main control board.

STAGE 1 – FAN TEST

The fan runs sequentially through each of the five speeds from low to high, retaining each speed for approximately 4 seconds, and then stops. The LED screen displays the corresponding 'F1', 'F2', 'F3', 'F4' and 'F5' fan speeds. Note that the spare contact closes during this sequence.

STAGE 2 – DRAIN TEST

The drain valve opens for 7 seconds and then closes, and the LED screen displays 'Dr'. Note that if a Scavenge Pump is used, it operates at the same time as the drain.

STAGE 3 – WATER VALVE TEST

The Water inlet valve opens for 17 seconds, and the LED screen displays 'V'.

STAGE 4 – WATER LEVEL PROBE TEST

The water inlet valves stays open and the cooler fills to level H (the third level). The LED display shows 'L1', and then 'L2' as the water level rises lifting the floats. The water inlet valve then closes at 'L3'.

STAGE 5 – CIRCULATION PUMP TEST

When water level probe 'H' is reached, the circulation pump runs for 10 seconds, and the LED display shows 'Ci'.

STAGE 6 – OVERFLOW CHECK

The final stage in the test sequence is to check that the water overflow and alarm are functioning correctly. When the LED screen flashes 'L4':

1. Manually lift the HH (the forth/top) water level float.
2. This will stop the test sequence.
3. The cooler then drains.
4. Alarm 2 is shown and retained on the main control board's LED screen.
5. IS THIS THE FINAL STAGE OF THE TEST SEQUENCE?

By performing the above, all of the key components are validated in sequence. Note that the sequence can be started with the timer and alarm contacts open and in other alarm conditions. If the test cycle runs but the cooler will not operate normally, check the wiring and continuity of the alarm, timer and any remote items.

OTHER POINTS TO CHECK

1. Check the operation of the cooler with the AUTO button off:
 - a. Power – Switches the cooler on and off. The button should illuminate when operated.
 - b. Fan Speed – sets the five different speeds.
 - c. Cool – enables the cooling function.
 - d. Auto – enables Automatic Mode.

- e. Cool and Auto buttons are only illuminated if the Power button is on.
2. All remote items can be checked using the LED on the main control panel:
 - a. Alarm – 6 shows when alarm contact is open.
 - b. Timer – ‘to’ shows when timer contact is open.
 - c. Thermostat and Humidistat can only be validated in Auto Mode.
 - d. Thermostat – “t” shows when thermostat is open - at low temperature.
 - e. Humidistat – “h” shows when humidistat is open – at high humidity.
3. Check that the cooler is sitting level. The cooler is designed to sit on a duct which is finished with a horizontal plain edge. If it is not level, the water controls may not operate correctly.
4. Check the pads are seated properly in their side frames. They can work loose in transit and must be correctly located to ensure efficient and leak free operation.
5. It is recommended that a record is kept of commissioning. A sample commissioning record is included in Appendix D.

11. MAINTENANCE

Regular maintenance of EcoCoolers is recommended. The frequency of maintenance is dependent upon the quality of water, the cleanliness of the air and the frequency of use. In normal conditions, a 6 monthly service will maintain the reliability, efficiency and hygienic operation of the cooler. If EcoCoolers are used continuously, maintenance should be undertaken more frequently.

THE MAINTENANCE PROCEDURE

PREPARING THE ECOCOOLER FOR MAINTENANCE

1. Ensure the EcoCooler is fully drained by switching it off at the wall control. Any water will then be automatically drained.
2. Electrically isolate the cooler at the external switch mounted on the underside of the cooler, pictured in Figure 8.
3. Remove the side panel by following the procedure described in Section 4. Take care not to damage the top surface of the pad.

CLEANING THE ECOCOOLER

1. Clean all surfaces to remove any deposits.
2. Use the ‘Clean Cycle’ described in Section X to aid cleaning.
3. Note on salinity setting: If there is evidence of scaling then the bleed rate should be increased.

PAD INSPECTION

The pads should be replaced if:

1. They are mechanically damaged.
2. They are contaminated by airborne products so badly they cannot be cleaned using a low pressure water pipe.

3. They have salt or scale build up.
4. Their efficiency has reduced to an unacceptable point.

PAD REPLACEMENT

1. Remove pad by lifting out of the side support frames.
2. Clean side frame thoroughly.
3. Place new pad in side frame with distribution layer to the top.

INSECT SCREEN CLEANING

1. Remove the insect screens carefully by lifting them from the side frames.
2. Clean them using low pressure water.
3. Inspect and replace any of the screens if they are damaged.
4. Replace the screens back into the side frame.

VALIDATION OF CONFIGURATION

1. Record the dip switch settings on maintenance record sheet.
2. Validate any changes from the factory default settings.

RE-STARTING OF THE ECOCOOLER

1. Switch on the mains power.
2. Run the test sequence to check the cooler operation (described in Section 10. Commissioning, on page17).
3. Replace the side frames and securing bolts.
4. Check the wall control operation.

12. WINTER SHUTDOWN

An EcoCooler can be damaged in freezing conditions. It is recommended that the mains water supply is isolated and the EcoCooler fully drained. If the mains electricity is to be isolated then remove the drain valve to prevent rainwater building up.

13. FAULT FINDING

The Alarm Light on the Wall Control flashes when an alarm is present. The number of flashes indicates the Alarm Condition.

1 FLASH

SLOW FILL

Run the test routine, check the pressure of the water supply and check the inlet water filter.

2 FLASHES

OVERFLOW

Run the test routine to check the operation of the water level probes, water inlet solenoid valve, and the drain valve.

3 FLASHES WATER LEVEL PROBES ARE OUT OF SEQUENCE

Run the test routine to check the operation of the water level probes, and clean them.

4 FLASHES SLOW EVAPORATION

Run the test routine to check the operation of the circulation pump.

5 FLASHES SLOW DRAIN

Run the test routine to check the operation of the drain valve, water level probes and water inlet solenoid valve.

6 FLASHES EXTERNAL ALARM

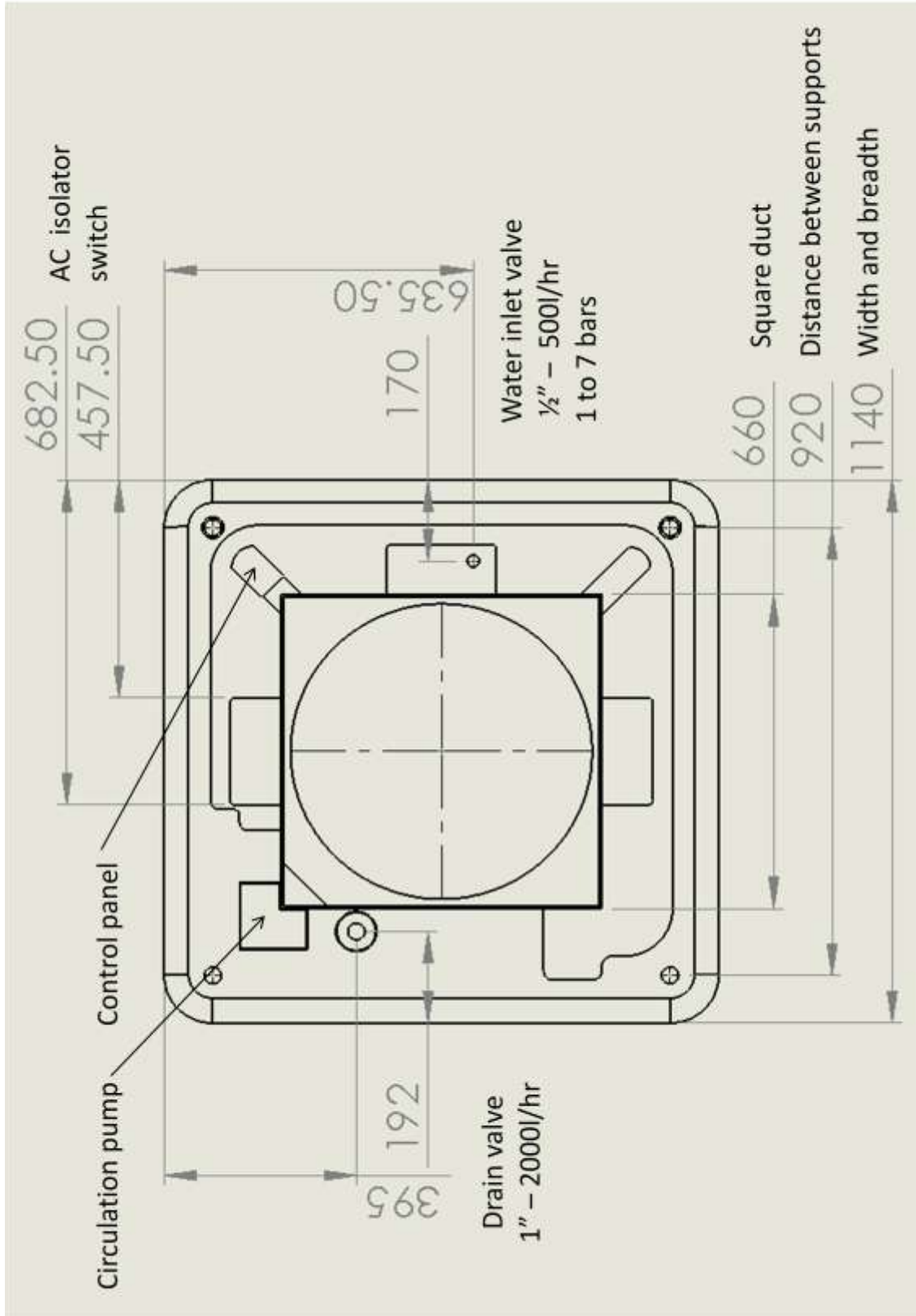
This is normally linked to a fire alarm. Check continuity.

14. ECP TROUBLE SHOOTING TABLE

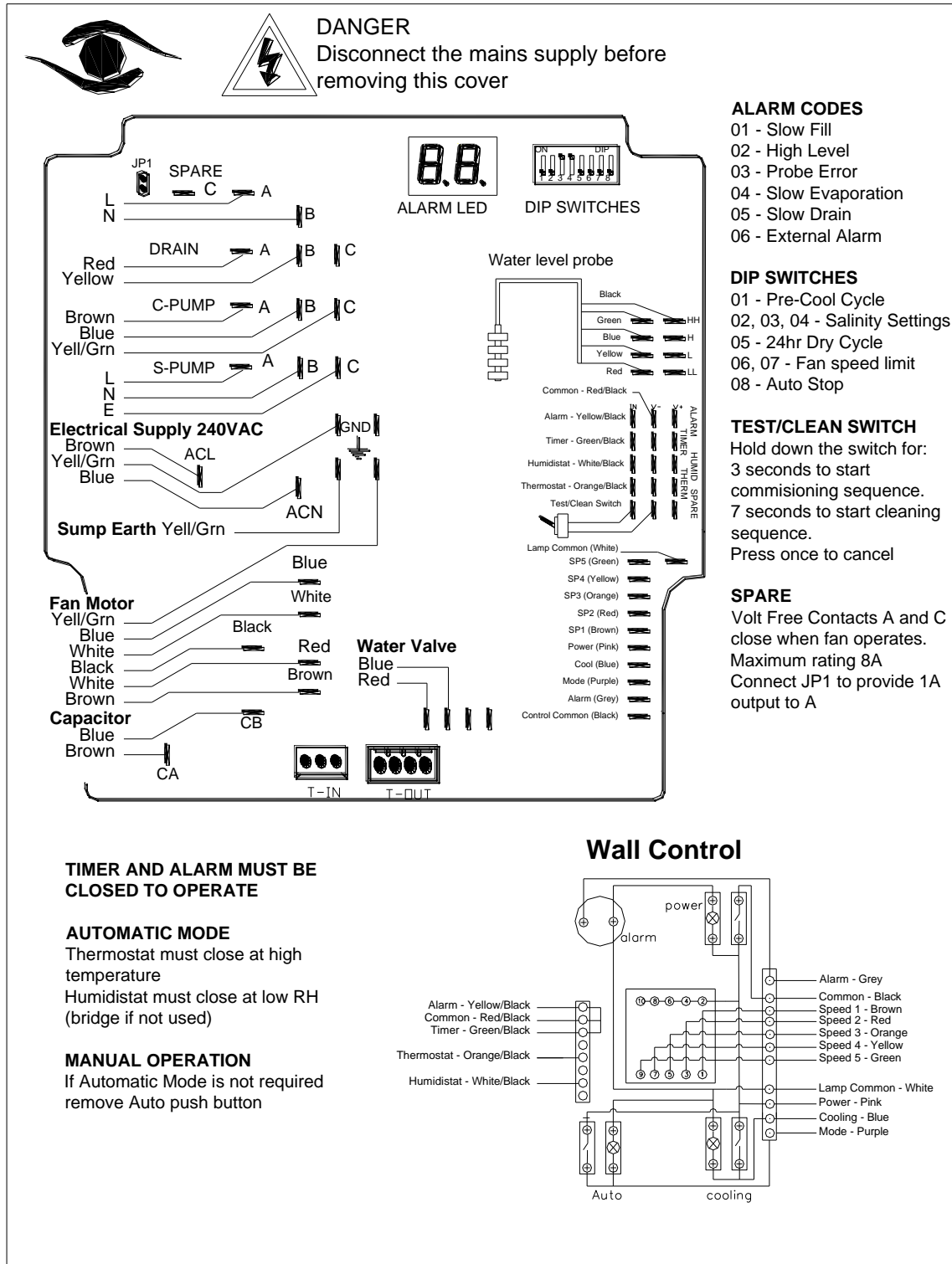
ECP Trouble Shooting Table		
Problem	Cause	Remedy
The EcoCooler will not start.	No external alarm has been fitted, but the control panel is still showing a fault.	Check the alarm and timer have been bridged, as shown in Figure 27 on page 13.
	The pre-cool cycle has been enabled.	The fan will not start until water has circulated for 5 minutes – no action required.
	The electrical power supply has been interrupted.	Check that the RCD or RCCB has not tripped out.
		Check that the isolator switch, located on the base of the EcoCooler, is switched on.
		Check that power is being supplied to control board
	The EcoCooler is still in test mode.	Operate the test switch once or power down the EcoCooler.
The EcoCooler is still in a cleaning routine.		
The EcoCooler is not running efficiently.	The pads are dirty.	Clean the pads, following the EcoCooler cleaning procedure, and replace them if necessary.
Air produced by the EcoCooler smells.	The pads are dirty.	
	There is stagnant water in the EcoCooler.	Run the test sequence to check the functionality of the drain valve.

The fan is touching the venturi.	The venturi is incorrectly located.	Make sure the venturi is correctly located in the EcoCooler
	The fan is incorrectly located.	Adjust the fixing points on the fan motor.
Motor does not start or runs with vibration.	The capacitor, motor, transformer or control board may need replacing.	

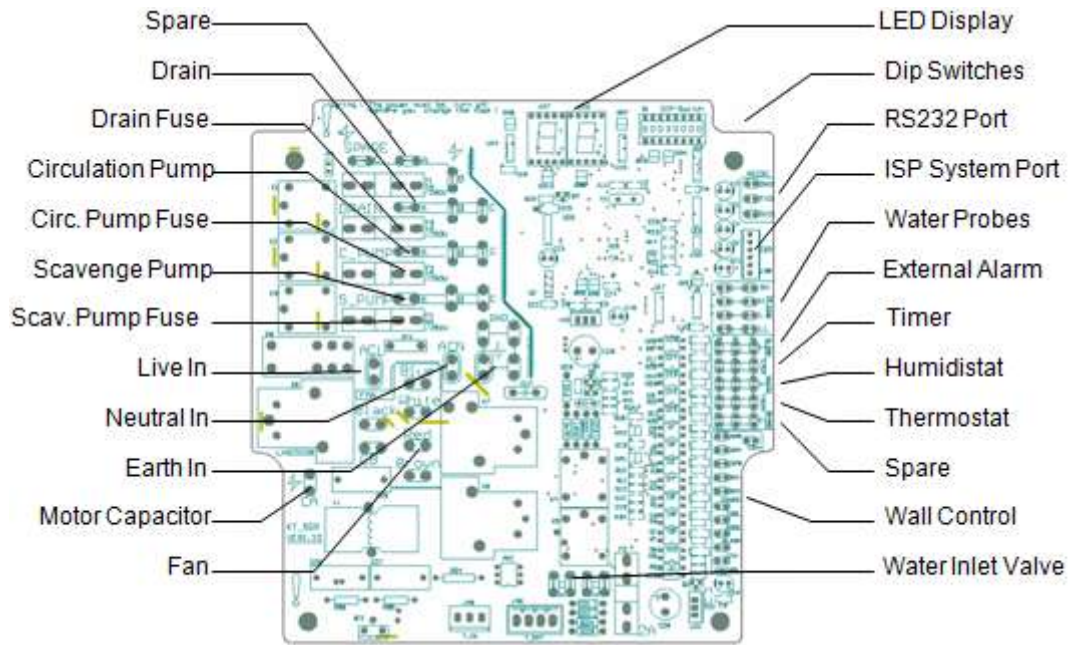
APPENDIX A – ENGINEERING DRAWING OF AN ECP ECOCOOLER SUMP



APPENDIX B – CONTROL BOARD WIRING DIAGRAM



APPENDIX C – THE CONTROL BOARD MAP



EcoCoolers are delivered with all components connected to the control board. The connections are also labelled on the face of the control board.

APPENDIX D – ECOCOOLER COMMISSIONING RECORD

	<p>EcoCooling Limited</p> <h2 style="margin: 0;">Commissioning Record</h2>
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Cooler Model	
Project Description	
Company	
Location	

Installation

The cooler(s) should be installed horizontally and be securely fastened to the ductwork. All electrical services, water supply and drainage should conform to local installation regulations and fitted by an appropriately qualified person.

Is the cooler level?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Is cooler securely fitted to ductwork?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Are all pads correctly fitted and secure?	Yes <input type="checkbox"/> No <input type="checkbox"/>

Configuration

The dip switches, located in the main control panel, should be checked to ensure they comply with, unless special configuration is required, factory settings.

Switch	Default	Function	Actual
1	Off	Pre Cool Cycle	Off <input type="checkbox"/> On <input type="checkbox"/>
2	Off	Salinity 1	Off <input type="checkbox"/> On <input type="checkbox"/>
3	On	Salinity 2	Off <input type="checkbox"/> On <input type="checkbox"/>
4	On	Salinity 3	Off <input type="checkbox"/> On <input type="checkbox"/>
5	Off	24 hr dry cycle	Off <input type="checkbox"/> On <input type="checkbox"/>
6	Off	Off speed 1390 On max speed 1200	Off <input type="checkbox"/> On <input type="checkbox"/>
7	Off	Off speed 1390 On max speed 1000	Off <input type="checkbox"/> On <input type="checkbox"/>
8	Off	Enables complete stop in Auto	Off <input type="checkbox"/> On <input type="checkbox"/>

Operation

Check the operation of the following items by using the test function switch.

Five fan speeds	Yes <input type="checkbox"/> No <input type="checkbox"/>
Water feed solenoid valves	Yes <input type="checkbox"/> No <input type="checkbox"/>
Circulation pump	Yes <input type="checkbox"/> No <input type="checkbox"/>
Drain valve	Yes <input type="checkbox"/> No <input type="checkbox"/>
Water level probes	Yes <input type="checkbox"/> No <input type="checkbox"/>
Water level 4 high level manual check	Yes <input type="checkbox"/> No <input type="checkbox"/>

Commissioning Engineer	
Installation Company	
Date	

APPENDIX E – ECOCOOLER MAINTENANCE RECORD

	<p>EcoCooling Limited</p> <p>Maintenance Record</p>
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Company	
Location	
Cooler Description	
Cooler Serial Number	

Pad Inspection:

Pad quality	Very Good <input type="checkbox"/> Good <input type="checkbox"/> Poor <input type="checkbox"/> Very Poor <input type="checkbox"/>
Recommendation	

Configuration: The dip switches, located in the main control panel, should be checked to ensure they comply with factory settings.

Switch	Default	Function	Actual
1	Off	Pre Cool Cycle	Off <input type="checkbox"/> On <input type="checkbox"/>
2	Off	Salinity 1	Off <input type="checkbox"/> On <input type="checkbox"/>
3	On	Salinity 2	Off <input type="checkbox"/> On <input type="checkbox"/>
4	On	Salinity 3	Off <input type="checkbox"/> On <input type="checkbox"/>
5	Off	24 hr dry cycle	Off <input type="checkbox"/> On <input type="checkbox"/>
6	Off	Off speed 1390 On max speed 1200	Off <input type="checkbox"/> On <input type="checkbox"/>
7	Off	Off speed 1390 On max speed 1000	Off <input type="checkbox"/> On <input type="checkbox"/>
8	Off	Enables complete stop in Auto	Off <input type="checkbox"/> On <input type="checkbox"/>

Operation: Check the operation of the following items by using the test function switch.

Five fan speeds	Yes <input type="checkbox"/> No <input type="checkbox"/>
Water feed solenoid valves	Yes <input type="checkbox"/> No <input type="checkbox"/>
Circulation pump	Yes <input type="checkbox"/> No <input type="checkbox"/>
Drain valve	Yes <input type="checkbox"/> No <input type="checkbox"/>
Water level probes	Yes <input type="checkbox"/> No <input type="checkbox"/>
Water level 4 high level manual check	Yes <input type="checkbox"/> No <input type="checkbox"/>

Notes

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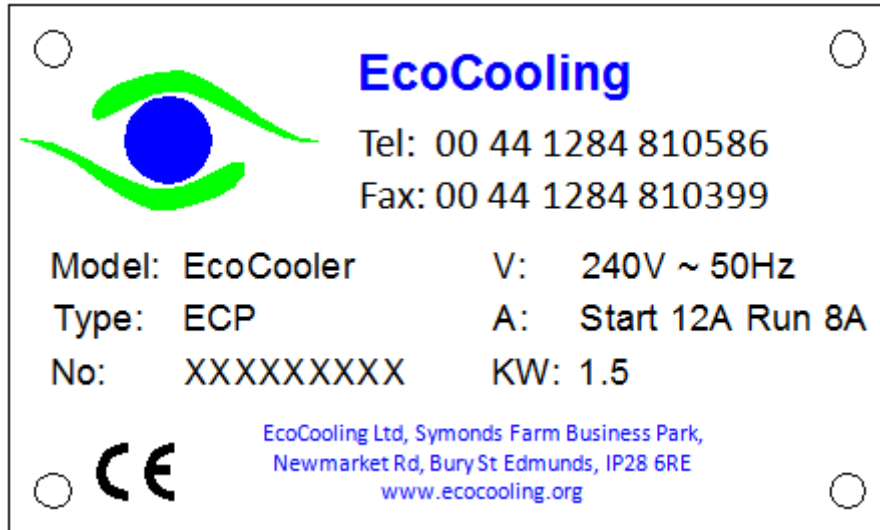
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Signature below acknowledges that the EcoCooler has been serviced in accordance with EcoCooling Limited procedures:

Servicing Engineer			
Company			
Date	___/___/___	Signed

APPENDIX F – SPARE PARTS LIST

The details for an EcoCooler are specified on the Name Plate which can be found on the outside of the cooler adjacent to the external isolator.



ECOCOOLING PART LIST

ECOCOOLERS

Five speed ECP Down discharge cooler c/w controls
 ECP Wet Box
 ECM Stainless Steel Mobile

PART NO

ECPD
 ECPWB
 ECM

ANCILLARY ITEMS

8 Way Plenum Chamber – unassembled (includes delivery)
 4 Way Plenum Chamber – assembled (includes delivery)
 Eberle 7001 Thermostat/Humidistat
 Winter Cover (blanking plates) x 4
 Weather Seal
 Pedrollo scavenge pump
 Scavenge Pump c/w fittings
 Anti Vibration rubber supports (per support fitted)

PART NO

ECP90-01
 ECP90-02
 ECP50-01
 ECP37-01
 ECP30-01
 ECP38-01
 ECP38-02
 ECP08-04

ECP CONVERSIONS: ADDITIONAL COSTS FOR CONVERSION

	PART NO
SDU internal suspended cooler	ECPSDU
ECP Top Discharge Cooler	ECPT
ECP Side Discharge Cooler	ECPS

WATER TREATMENT

	PART NO
Brominator	EC80-01
10Kg Bromine Tablets	EC81-01
Bromine Test Kit	EC82-01
DP1 Tablets	EC82-02
Sump	ECP01-01

SPARE PARTS LIST

	PART NO.
Lid	ECP02-01
Post	ECP03-01
Side Frame	ECP04-01
Pins/Washers (5 pins plus five washers)	ECP05-01
PAD675X860X100(mm) (Munters CelDEK 5090) Single Pad	ECP06-01
PAD675X860X100(mm) (Munters CelDEK 5090) Four Pads	ECP06-02
1.5W MOTOR	ECP07-01
Motor Support Frame (Including Nuts, Bolts and Washers)	ECP08-01
FAN (45 Degree Angle)	ECP09-01
Three Bladed Fan	ECP09-02
Venturi	ECP10-01
Hose from Pump to five way distributor (2006 black hose)	ECP11-02
Hose from five way distributor to water distributor (2006 black hose)	ECP11-03
Short hose from 5 way distributor to water distributor	ECP11-04
Water Level Probe (2006 Four float stainless steel)	ECP12-02
Water Distributor	ECP13-01

Circulation pump (2007 model brown)	ECP14-03
Water Inlet Valve Assembly (Two valves with associated pipework)	ECP15-01
Water Inlet Valve (single valve)	ECP15-02
Water Inlet Valve (single valve) Fixing Kit	ECP15-03
Drain Valve	ECP18-01
5 Speed control board (2007)	ECP21-08
Test Button	ECP21-09
Control Box Transformer	ECP21-10
5 Speed Wall Control (2007)	ECP22-02
Blanking Plug (for removal of auto button)	ECP22-03
5 Speed Control Cable (30m complete with connections)	ECP24-01
Earth Lead	ECP25-01
Capacitor Box	ECP26-01
Capacitor 50 uF 1.5KW motor	ECP27-01
Hook	ECP31-01
Support for Pad Post	ECP32-01
Pad Brace	ECP33-01
Flexible Water Inlet Hose c/w int isolation valve	ECP34-01
Fly Screen	ECP35-01
Power cable	ECP51-01
Back Guard	ECP54-01
Sump Support	ECP57-01