

Make/Model	Date
Aqua Breeze/Eco Pacific EVAP4	18/02/2024

### Common Faults

- Film capacitors in the motor control circuitry degrade to the point that the control board will not run the fan, or will only start the fan briefly.
- The dump valve can go short circuit and blow a trace off the PCB. This appears to be addressed with a PTC fuse in revision 5a PCBs.
- The boards tend to suffer from corrosion, which can result in no communication or no power to the controller.
- The triac in the fan motor control circuitry can fail short circuit, making it impossible to turn off the fan with the wall control.
- On some revisions of the PCB, there is no insulating material or gap between the earthed triac heatsink and the triac gate trace. As the only insulation is the green PCB coating, this can arc and will usually damage the triac, associated optocoupler and occasionally other components in the fan control circuitry.

### Design Flaws & Remedies

- Revision 2/3 PCBs: No gap between the fan motor triac heatsink and the triac gate drive PCB trace. The heatsink needs to be removed and a gap created using nibblers to remove part of the aluminium heatsink.
- Revision 2/3 PCBs: Replace R21/R24 with Vishay PR01 47K resistors, raised up off the PCB.
- Revision 5a PCBs: Replace R15/R17 with Vishay PR01 47K resistors, raised up off the PCB.
- C17 can be replaced with 470uF/25V. There's no need for a 470uF/50V component.
- Revision 2/3 PCBs: The M205 fuse in the fan motor section is labelled as 8A on the PCB, but a 10A fuse is installed. The fuse should be replaced with a 10A ceramic slow-blow fuse.
- C4 (PCB Revision 2/3) or C2 (PCB Revision 5a) will have 44-48V DC across it in normal operation. Some boards come with 50V capacitors in this location, which isn't really adequate. Replace C4 (Revision 1 PCBs) with 1000uF/63V.

### LED Flashes – Revision 5a

LED Flashes	Description
1	Cool Mode, Dump valve closing/activated.
2	Solenoid valve open – filling with water.
3	Solenoid closed, pump starting.
4	Cooling in progress, fan running.
6	Cooler turned off, drain valve still active (dump delay).

## Original Component Values

Electrolytic Capacitors:	Film Capacitors:	Resistors:	Transformers:
<p>PCB Revision 1: C4: 680uF 63V C8: 470uF 50V C11: 10uF 63V C12: 47uF 63V C17: 470uF 50V C20: 100uF 63V</p> <p>PCB Revision 2/3: C4: 1000uF/50V C8: 470uF/50V C11: 10uF/50V C12: 47uF/35V C17: 470uF/50V C20: 100uF/50V</p> <p>PCB Revision 5a: C1: 10uF/50V C2: 1000uF/50V C3: 10uF/50V C4: 470uF/50V C8: 10uF/50V C9: 47uF/35V C14: 470uF/25V C18: 100uF/50V</p>	<p>PCB Revision 1: C18: 100nF 250VAC X2 C22: 100nF 250VAC X2 C23: 100nF 250VAC X2 C19: 10nF 250VAC X2 C21: 10nF 250VAC X2</p> <p>PCB Revision 2/3: C18: 100nF 275VAC X2 C19: 10nF 275VAC X2 C21: 10nF 275VAC X2 C22: 100nF 275VAC X2 C23: 100nF 275VAC X2</p> <p>PCB Revision 5a: C15: 100nF 275VAC X2 C16: 100nF 275VAC X2 C17: 100nF 275VAC X2 C19: 10nF 275VAC X2 C20: 10nF 275VAC X2</p>	<p>PCB Revision 2/3: R21: 47K 1W CF R24: 47K 1W CF</p> <p>PCB Revision 5a: R15: 47K 1W CF R17: 47K 1W CF</p>	<p>PCB Revision 3: T1: Stadium TF 750724-G</p> <p>PCB Revision 2: T1: Stadium TF 750724-G</p> <p>PCB Revision 5a: PowerTran M 7164</p>
Semiconductors:	Relays:		Fuses:
<p>PCB Revision 1: U9: LM317T</p> <p>PCB Revision 2/3: D9: 1N4007 D10: 1N4007 Q4: BT139X-800 Z2: P6KE7V50A U8: 814 U11: CNY17-3 U9: LM317T</p> <p>PCB Revision 5a: Q1: BT139X-600FDG U7: LM317T</p>	<p>PCB Revision 2/3/5a: RLY1: 10A 24VDC RLY2: 10A 24VDC RLY3: 10A 24VDC</p>		<p>F1: 10A M205 Slow</p>

## Substitutions

U11 (CNY17-3) can be replaced with 4N35.

## Standard Repair Procedure

- If the MCU is socketed, remove it from the socket.
- Remove all film capacitors.
- Remove all electrolytic capacitors.
- Remove all relays.
- Test the room fan triac to make sure it is not shorted, if shorted, remove it.
- Remove the triac heatsink.
- If an arc has occurred between the heatsink and the triac gate trace, remove the triac and associated optocoupler. Check the diodes in the fan control circuitry and remove any damaged components.
- Remove the transformer.
- Clean and dry the PCB.
- Repair all corrosion – grind off solder mask and corrosion with engraver pen, repair as necessary and tin any exposed copper.
- Remove solenoid/float switch header (4-way) and check under it for corrosion, repair as necessary and re-install the header.
- Replace 6P6C jack, checking for corrosion once removed. Fit new jack, do not reuse.
- Replace all electrolytic capacitors.
- Replace all film capacitors.
- Replace all relays.
- Test the resistance of the transformer primary winding and ensure it is not open-circuit.
- Re-install or replace the transformer as necessary.
- Using a pair of nibblers, modify the triac heatsink so that a short can not occur between the gate drive PCB trace on the top layer of the PCB and the heatsink.
- Re-install the heatsink and fit new components to the fan control circuitry as necessary.
- Clean the PCB with IPA to remove flux residue.
- Coat the solder-side of the PCB with APL.
- Once the APL has dried, remove the APL from the screw holes in the PCB as these are used to earth the metal tray that the PCB is installed in.