

CORREX POWER ANODE SYSTEMS

A Guide to the Operation and Fault Finding
of Impressed Current Corrosion
Protection: **EcoSword**

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General Information:

- How the Correx Works:

Corrosion protection in mild steel enamelled cylinders was traditionally achieved by using a Magnesium Sacrificial Anode, which would be absorbed by the water (being less “Noble” than the mild steel of the tank).

This effectively turns the tank into a “Battery”; with the sacrificial Anode as the +.

The small areas, where there may be no enamel coverage act as the Cathode (-) and the water in the tank is the “Electrolyte”. This method produces a small electrical potential, which satisfies the water’s desire to absorb ions.

The Correx is an Impressed Current system, where a small electronic device introduces this electrical potential into the water and likewise, satisfies the water’s desire to absorb ions.

Essentially, the “Battery” effect is applied in reverse, with the Anode(s) receiving the small DC voltage which is transmitted through the water to the tank wall, and then to Earth, where the Correx Potentiostat detects it.

The advantage of this method is that the Anodes do not deplete over time as Magnesium ones do.

General Information:

- EcoSword Fitted Systems:

The EcoSword range of water heaters have a factory fitted Correx system.

These employ either one or two anodes (depending on model), an Earth connection and integration into the Burner Control system where the Correx is monitored.

Error Messages:

- EcoSword:

The EcoSword will display the following error message:

The message will show every 10 seconds or so and will repeat for as long as the fault condition persists.

Once the cause of the fault has been rectified, the Digital Control Module (DCM) will need to be powered off at the local isolator (not the appliance rocker switch) for around 5 minutes to affect a reset of the Correx monitoring feature.



Fault Finding: Initial Reset

The Correx is a low voltage, low current system which can be affected by power fluctuations such as power outages, spikes and surges.

Before undertaking any in-depth fault finding, it is always prudent to attempt a power down reset first.

If the reset is successful, the Anode warning message will disappear.

If the reset is unsuccessful, the fault condition persists and is being caused by another situation proceed with the following check list.

Fault Finding: General Visual Checks

- Check the Anodes:

The Anode(s) are a two-piece construction with the outer nut and inner rod. There must not be any contact between these two parts or a “Dead short” will occur. Check for conductive debris (such as metal filings, solder etc.) If the seal between the two sections of the Anode has failed, water can leak into the space and will also cause a short.

If there are two Anodes, try disconnecting one and re-setting the control. If the control will reset with one anode disconnected, the one which is out of circuit is likely to be defective and will need to be replaced.

If no Anodes are connected, the Correx will also go to fault. Check to make sure the wiring is connected to at least one Anode.

- Check the Earth Connection:

The Correx requires a solid connection to Earth to operate. Make sure the Earth connection is tight and not corroded.

Re-terminating the Earth connection with a new connector on clean wire or to a different point on the casing can rectify the issue and the controller will reset.

Fault Finding: General Electrical Checks

Wiring Continuity Check: Power Off

Carry out a continuity check on each cable from the Potentiostat to the Anodes. Your Multimeter should “bell out” and display an almost zero resistance reading.

If you register an *OL* on your Multimeter, this indicates an open loop and a possible broken cable.

Repeat this check on all Anode cables and the Earth connection.

If any of the cables register an open loop, they should be replaced.

Power On Electrical Checks: 230VAC Supply Check

Check the 230VAC supply to the Potentiostat. Ensure the phase is correct (brown wire is live) and that the potential difference between Live and Neutral is correct.

There should be no voltage on the Neutral cable when tested to Earth.

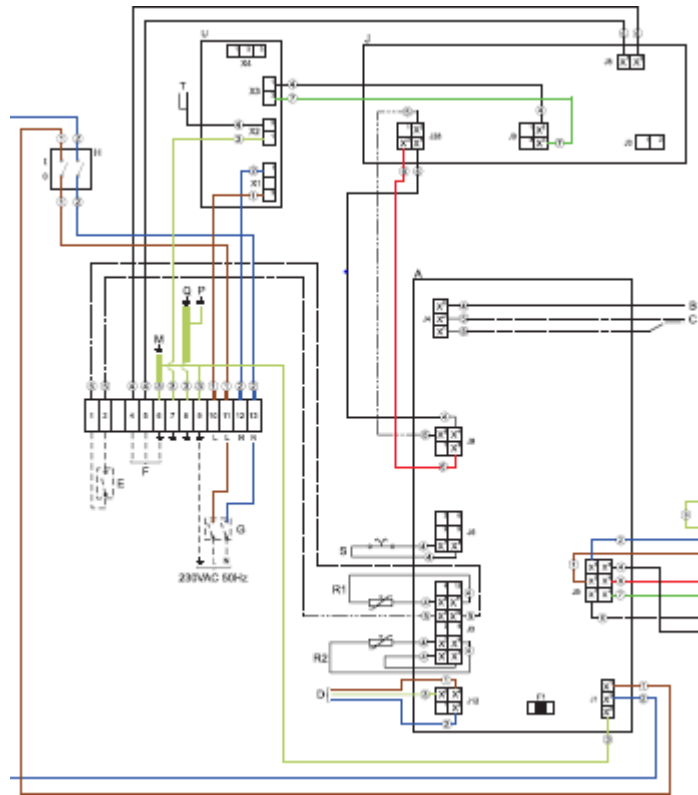
Low Voltage Circuit Checks: Power Off

Anode can short circuit if the immersed section of the Anode touches internal metal parts of the tank.

Remove the connector from The Anode and check the resistance between the anode pin and the adjacent tank surface. This should be greater than 50k Ω , otherwise it indicates a possible dead short.

It is possible to rotate the anode 180° and reset the controller to see if the fault condition clears.

Fault Finding: EcoSword Connection Checks



Check the plug connections on the small PCB with the flashing LED: Correx Potentiostat (shown as U).

The pins of X1, X2 and X3 connections may become pushed back or loose. These can be adjusted with a pin or small Screwdriver.

