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## TC2BIP grounding and noise consideration

### 50/60Hz interference

Normally you will ground the **TC2BIP** by connecting a wire between the ground post on the rear and the system ground.

Although when the **TC2BIP** is operated from 12V gel batteries it can't generate 50/60Hz interference it is possible to get noise passing through the thermistor probe or heater wiring. This happens when the **TC2BIP** is grounded via the ground terminal at the rear because a leak between the inside of the tissue chamber to the heater (or contact from for example the microscope stage to the heater busses) or thermistor is creating a ground loop. Note that the outputs (+ and -) of the **TC2BIP** CANNOT be connected to ground because of the bipolar amplifier design.

The noise may disappear when the **TC2BIP** is turned off and appear when it is on. This is also likely due to the current flowing into the ground in the tissue chamber from the heater due to a leak. To look for a leak you should first check the resistance between the heater leads and ground and the thermistor leads and ground (the leads should be unplugged from the **TC2BIP**). With nothing plugged into the **TC2BIP** check the resistance from the ground post at the rear and your system ground. There should be no connection (ie. very high resistance). To check for a leak via the solution in the chamber you should put salt solution in the tissue chamber and using a ohm meter measure the resistance between the inside the chamber and the heater lead (put the probe on the banana plug that goes into the **TC2BIP** output). Use the Ag/AgCl ground to make the connection to the solution in the chamber. The junction potential at this ground will create an apparent resistance but if you use a high scaled (eg >1M) and try the leads in both directions you should be able to tell if there is a leak. Alternatively if you wash the chamber with distilled water or 70% ethanol and dry the chamber the noise should disappear.