# AN03 - Grounding Issues with the LIT

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In a small number of installations, after being in operation for some time, the LIT seems to fail to measure some or all of the Fogrod inputs due to grounding issues.

## Brief Explanation

We can **test** for the problem in two ways:

- changing the conductivity setting to make the LIT much more sensitive - this works most of the time for grounding issues
- putting a ground rod into the wetwell and connecting it to the GND input ('Fogrod Return' on new units) on the top right of the LIT (first disconnect the control panel ground from this input)

## The Symptoms

An example that is **definitely** a grounding issue:

- the level reads correctly when the pumps are off, but when a pump turns on the level reading changes immediately

Examples that **might** be a grounding issue, but could be something else:

- the level is 100% (i.e., the Fogrod is fully submerged) but the LIT measures 70% or maybe zero
- the LIT measures the correct level of 60% but the 20%-40% level LEDs are flashing and the *Wiring or Contact Fault* is on (this tells us that the LIT thinks that the 2nd, 3rd and 4th contacts are dry even though the 5th and 6th are wet)

Assuming the wiring is correct then it is possible there is a grounding issue.

## Tests

### 1. Conductivity Threshold

A. Write down the conductivity setting (the screwdriver setting top right of the LIT, or the knob in older LITs). If you are working with wastewater it should be on the default of 50.
B. Increase the value to 100 (or double the current value) - do any more level LEDs come on (or stop flashing and stay solid)?
C. If the level reading is still not correct, turn the conductivity setting all the way to the maximum (300) - are all the correct LEDs on now?

Remember that if the level was only reading the incorrect value when a pump was running you will need to have some level in the well and turn a pump on to confirm that the LIT is still reading ok.
If this test solved the problem we know there is a grounding issue. Go to section - Long Term Resolution.
If not, try the next test:

### 2. Ground Rod / Long piece of wire

You need a ground rod (a lump of metal) connected to a long piece of wire, or just a long piece of wire if you don't have a ground rod.

A. Disconnect the control panel ground from the GND input at the top of the LIT (labeled 'Fogrod Return' in the new version of the LIT).

B. Put the ground rod / long piece of wire into the wetwell so it is under water.
C. Connect the other end to GND ('Fogrod Return' in new units).

What you have done is connected the "water ground" directly to the LIT so that control panel grounding issues are bypassed. Does the level now show up correctly?

If neither of these tests changed anything then the problem is a different one and you should open the product manual in the troubleshooting section - check the wiring, test the LIT, then the Fogrod to find the issue. Call us if you need help.

If either of the tests did work - read on..

## Long Term Resolution

It's not a great idea to keep the conductivity threshold too sensitive (assuming the first test solved your problem). It's ok as a temporary solution but your grounding issue might get worse and it's always best to fix your underlying problem.

You have two choices:

- fixing the grounding issue in the panel
- putting a ground rod into the wetwell permanently and connecting it to the GND input ('Fogrod Return' in new units) at the top of the LIT (instead of the control panel ground).

The first choice is the best one, but if you have external people who do your panel work you may prefer the second choice which is simple.

### Information for your control panel people

If you saw the problem occur only when pumps were running then you have an issue with pump currents moving the ground point connected to the LIT. It could be a high resistance path, it could be a wiring issue. Key point: the connection into the LIT from the control panel ground should be as tightly connected to the "water ground" in the wetwell as possible.
If the original problem occurred even when no pumps were running, then you might have an issue with a high resistance connection somewhere. If you have submersible pumps and the cases are grounded and connected into the panel these connections should be checked.

## Background - Explaining the LIT detection

The LIT works by applying a low ac voltage to each of the "Fogrod inputs" and measuring current flow. Current flows through the Fogrod cable, though the Fogrod, into the water, back to the control panel ground and back into the GND input at the top of the LIT ('Fogrod Return' in the new version of the LIT).

It's a very simple concept and as a result, very reliable. The Default conductivity threshold always works fine for municipal wastewater and it isn't a setting that you need to "tune". But if there are grounding issues then extra resistance or pump currents can affect the measurement. Changing the conductivity setting makes the LIT more sensitive to avoid this issue, but it isn't a good long term solution.

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