

## pH sensors affected by grounding

Some customers have a particular challenge with pH measurement. The symptom is a surprisingly steady measurement and typically more than one sensor providing the same output. It is typically seen in machine rooms with electromagnetic noise from frequency converters and similar equipment and is caused by grounding issues.

The pH sensor has a metallic electrode which is in electrical contact with the water. If there is a potential between the ground of the water and the ground provided by the PLC/controller the reading will be wrong. The reason is that the PLC/controller measures the current 4-20 mA in the circuit through the sensor and if some of the current escape through the water this measurement become faulty.

### How to check for grounding problems:

If you pull out the sensor from the system, without disconnecting it electrically and put it into a bucket filled with the same water as in the system, but not connected to the system. If the measurement changes significantly, there is a problem.

### Checking the functionality

If the measured pH value is the same there is not a grounding problem. While the sensor is out of the system you can check the functionality by adding a teaspoon (3ml) of ammonia water to 10 l water. The result should be a pH value of 9-10.

### How to solve the problem

The solution is to install a galvanic isolator into the circuit between the PLC and the sensor. This isolator disconnects the sensor wiring from the system ground and it eliminates the effect of different ground levels. We recommend using a loop powered isolator because it is easy to install, and no additional ground level is introduced.

### Which product to choose

We have this isolator from PR electronics in stock

<https://www.prelectronics.com/products/isolation/3100/2-wire-transmitter-isolator-3186/>

– but other similar products will be useable

