

PID Sensor – Regular Maintenance

Technical Note No. DTN-01156-AD

Purpose

This document provides information to enable a PID Sensor user to determine if their PID sensor requires maintenance and to ensure necessary maintenance can be accomplished as appropriate.



Overview:

PID sensors look like many other small electrochemical and MOS sensors, being packaged in a common sensor format, but there are important differences. PID sensors have critical components that can be replaced or cleaned to effectively extend the life of the sensor for many years. To ensure stability and sensitivity, it is necessary to keep the internal sensor components clean during their operating life and to replace them when needed.

Cleanliness

Always wash hands thoroughly and wear clean nitrile gloves when handling sensor components. Do not expose sensor components to harsh or dusty environments. Contaminants from oils and particulates transferred from hands and from other environmental conditions cause poor and unpredictable performance.

Components

Components that require occasional maintenance in the form of cleaning and/or replacement are shown here.

10.6 eV Lamp



Ionization Cell



Filter Set



NOTE: For details of disassembly of the AU PID sensor see Technical Note [DTN-02092-AB](#).

- The lamp must be kept clean to ensure stable intensity of emission of high energy light.
- The high energy UV light causes degradation of the ionization cell over time. It must be replaced when its performance is affected.
- There are several layers of filters to help protect the cell and lamp. These filters should be replaced occasionally to ensure good performance.

Performance Issues

It is important to recognize when sensor performance is lacking and to properly identify the cause.

- When a sensor is contaminated, the signal is typically unstable, lacks reproducibility, and the relative strength of the signal is typically low.

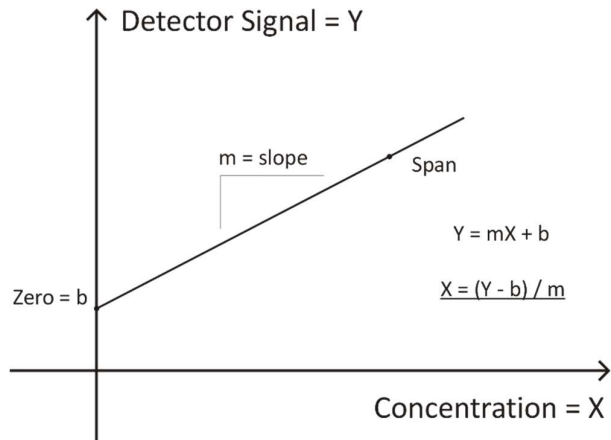
Consider two aspects of the response of the detector:

Slope - Signal Strength ($m = V/ppm$)

- Signal strength should be high enough for the sensor to exhibit an output of at least 1.6V at nominal full-scale input (full-scale is the range of the sensor)

Background (signal at 0 ppm)

- The background signal should be 100 mV or less.



If signal strength is low or if background is high, the lamp should be cleaned and worn parts should be replaced.

Lamp

The UV lamp has a lifespan of about 12 months. During this time, a clean lamp will produce relatively constant intensity, and the sensor will exhibit consistent sensitivity (signal strength). The lamp is sensitive to contamination which obstructs the passage of UV light, traveling out of the face of the lamp lens and through the ionization cell. Depending on the conditions present, the intensity will degrade over time. Sensor sensitivity should be verified by presentation of a standard check-gas as a sample. Lamp cleaning should be performed when sensitivity falls below an acceptable level.

See the Lamp Cleaning video DTV-02024-AA

Ionization cell

The detector ionization cell is a multilayer device consisting of 3 electrodes separated by layers of Teflon. When fresh and new, the surfaces of the Teflon layers are free of contaminants and very smooth. Over time, exposure to high energy UV light causes the surface of the Teflon layers to degrade. They become ragged and pitted from the damage done by the light. This damaged surface provides pockets for contaminants and moisture to collect. You will notice raised background and more moisture sensitivity. After about 8 months of continuous usage, the ionization cell should be replaced.

Refer to technical note DTN-02092-AB for assembly and disassembly instructions.

Filters

The filter set should be replaced whenever maintenance is performed. In conditions where heavy particulate loads are present, filters should be replaced more often.

Refer to technical note DTN-02092-AB for assembly and disassembly instructions.