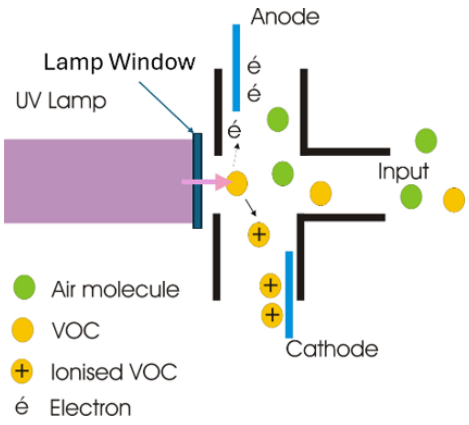
SENOVOL CORPORATION

# The 4-Series PID UV Lamp Behaviors
# Tech Note 260610

## 1. VOC Contamination and Sensitivity Loss

The 4-Series PID UV lamp is engineered and manufactured to deliver at least one year of continuous operation under normal conditions. However, its actual performance depends heavily on the environment in which the PID sensor is deployed, and periodic maintenance is essential to preserve sensitivity.

When a PID sensor operates in high-VOC environments, volatile organic compounds can gradually condense and polymerize on the lamp window. This contamination forms a thin film that attenuates the 10.6 eV ultraviolet output, reducing the amount of ionizing energy reaching the sensor chamber. As a result, the PID sensor's sensitivity and response accuracy decline.




## 2. Cleaning the UV Lamp Window

To restore performance, the UV lamp window must be cleaned to remove VOC deposits. Both methanol and acetone are suitable solvents, though acetone is preferred because it is more effective at dissolving and lifting heavier VOC residues from the quartz window.

The maintenance procedures for the 4-Series PID sensor and UV lamp are available on Senovol's website. The relevant documents can be accessed here:
https://www.senovol.com/uploads/products/Tech_Notes/TN260301_Procedure%20for%20Removing%20the%204S%20PID%20Sensor%20Cap.pdf
https://www.senovol.com/uploads/products/Tech_Notes/TN200702_Maitenance%20of%204S%20PID.pdf

After the UV lamp window is properly cleaned, the lamp often recovers a significant portion of its original output. While it may not return to "as-new" intensity, a standard calibration will typically restore the PID sensor to normal, reliable operation.

## 3. Recommended Cleaning Intervals

The cleaning interval depends entirely on the environmental conditions where the sensor is deployed:

- Industrial environments — In petrochemical plants or other harsh outdoor settings with fluctuating temperature and humidity, VOC deposition occurs more rapidly. We recommend cleaning the lamp window once per month.
- Outdoor air-quality monitoring — Residential neighborhoods, city centers, and public parks typically have moderate VOC levels. For these applications, we recommend cleaning the lamp every three months to maintain consistent sensitivity.

- Indoor environments — Offices, hospitals, residential buildings, and shopping centers generally have much lower VOC loads. Cleaning every six months is typically sufficient or simply wait until the lamp is due for replacement.

  This maintenance schedule helps ensure stable sensitivity and extends the effective operating life of the 4-Series PID UV lamp.

**4. Extending Lamp Life with Duty-Cycle Operation**

Because the UV lamp is very small and contains only a minimal amount of rare gases, we recommend using an "On-and-Off" duty cycle for gas monitors whenever the application is not life-critical. Operating the lamp in a controlled cycle, 30 seconds on and 40 seconds off, managed by an appropriate algorithm, can significantly extend the UV lamp's operating life.

Unlike competing designs, Senovol's proprietary non electrode UV lamps are free from internal contaminants and ignite more easily. Therefore, Senovol's 4-Series PID requires much lower ignition power to start the UV lamp. This ensures that each time power is applied, the lamp ignites reliably, allowing the PID sensor to operate consistently and without interruption.

**5. Choosing Between the 4-Series and 7-Series PID**

The 4-Series PID is primarily designed for handheld instruments, where compact size is essential. For fixed gas-monitoring applications that operate continuously (24/7) and require extended UV lamp life of two years or more, the 7-Series PID sensor is the recommended solution.

The 7-Series PID features a much larger UV lamp containing 45× more rare gases, enabling exceptional long-term stability and output retention. Under continuous operation, the lamp can run for 36 months or longer before replacement is needed.

**7-Series PID Advantages and Highlights**

- **Larger Crystal for Better Stability and Less Maintenance**

  The 7-Series PID incorporates a crystal four times larger than that of the 4-Series.
  - Improves environmental robustness
  - Reduces contamination rate
  - Lowers cleaning frequency
- **Extended Continuous Operation**

  The 7-Series UV lamp supports 36+ months of continuous operation, making it ideal for fixed installations where maintenance access is limited.
- **Pinout Compatibility for Easy Replacement**

  The 7-Series PID uses the same pinout as the 4-Series PID. This allows direct replacement as long as there is sufficient physical space to accommodate the larger 7-Series housing

For complete specifications and performance details, please refer to the 7-Series PID datasheet:
https://senovol.com/uploads/products/datasheet/7-Series%20PID-240412.pdf