



## Turning On UV Lamps In A PID Monitor

### UV Lamp in PID monitors

Several products from RAE Systems use a photoionization detector (PID):

- MiniRAE Plus
- MultiRAE Plus
- MultiRAE IR
- ToxiRAE II
- UltraRAE
- MiniRAE 2000
- AreaRAE

Each PID monitor includes an Ultraviolet (UV) lamp as an integral part of the detector. Two different diameters 0.5" (1.4cm) and 0.25" (0.6cm) and three different photon energy limits (9.8 eV, 10.6 eV, and 11.7 eV) are offered in these lamps.

### Turn on the UV lamp

The UV lamp is made of a glass envelope and a UV window on one end of the envelope. The inside of the lamp is filled with low-pressure gases. To turn on the lamp, a high-voltage electric field is applied from the outside the glass envelope. The molecules inside the lamp are ionized and produce a glow discharge to generate the UV light.

If the UV lamp has not been used for a long period of time (>1 month), it may be slightly harder to turn on for the first time. If such a condition occurs, an error message "Lamp" appears in the monitor display during the power-on sequence. This phenomenon is more common in 0.25" (0.6cm) UV lamps used in ToxiRAE II and MultiRAE Plus products, because of the relatively small lamp size.

To solve this problem, simply turn the monitor on and off a few times, and the lamp should turn on. After the UV lamp is turned on for the first time, it should be easier to turn on the next time.

### Diagnose UV Lamp Failure

Each product has a built-in sensing mechanism to monitor the status of the UV lamp. If the UV lamp is not on, the error message "Lamp" is displayed. If the lamp error message persists, then further diagnosis of the problem becomes necessary.

It is possible that the UV lamp is actually on when the lamp error message appears. This is because as the lamp becomes old, the threshold level to detect lamp failure may have shifted and caused a false alarm. To eliminate such possibility, simply check to see if the UV lamp is actually on. This can be done in most instruments by reading the lamp current in the diagnostic mode. It can also be done easily in the MiniRAE 2000, ToxiRAE II or UltraRAE by removing the sensor cap and observing the glow light of the UV lamp in a dark place. Otherwise, you can feed calibration gas to the monitor and look for sensor response. If the reading changes significantly with the gas, the UV lamp is on. If the UV lamp is on and the error message persists, then it is necessary to adjust the lamp threshold. Refer to the operation manual for details on how to read the lamp current and adjust the threshold level.

One of the most common failure mechanisms for the UV lamp is a leak developed along the seal of the glass envelope. When such a condition occurs, the lamp becomes very hard or impossible to turn on and requires replacement.