



## »» 6.1 Precaution for use

### Operating temperature

A detector should be operated at its optimal temperature given in the final test report (delivered with every VIGO device).

### Maximum voltage

Do not operate the PV detector at higher bias voltages than suggested in the final test report (delivered with every device).

### Be careful using ohmmeters for PV detectors!

Standard ohmmeters may overbias and damage the detector. This is especially true for small physical area or SWIR PV detectors. Bias can be used for 10mV resistance measurements of any type of detector. Ask for conditions of  $I - V$  plot measurements!

### Usage

Devices can operate in 10% to 80% humidity, in  $-20^{\circ}\text{C}$  to  $+30^{\circ}\text{C}$  ambient temperature range. Operation at  $>30^{\circ}\text{C}$  ambient temperature may reduce performance for standard Peltier coolers. Ask for systems that can operate in  $+30^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$  ambient temperature range.

### Storage

The following conditions should be fulfilled for safe and reliable operation of detector:

- store in dark place, 10% to 90% humidity and  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  temperature,
- avoid exposing to direct sunlight and strong UV/VIS light as this may result in degradation of the detector performance,
- avoid electrostatic discharges at leads, therefore, the devices should be stored having leads shorted.

### Handling

Some IR window materials are soft and brittle. Particular attention should be paid to not scratch surface of the window. A damaged window may entirely degrade the detector performance. Excessive mechanical stress applied to the package itself or to a device containing the package may result in permanent damage. Peltier element inside thermoelectrically cooled detectors is susceptible to mechanical shocks. Great care should be taken while handling cooled detectors.

### Shaping leads

Avoid bending the leads at a distance less than 2mm from base of the package to prevent glass seal damage. When shaping the leads, keep it at maximum two right angle bends and three twists at the distance minimum 6mm from the base of the package. Keep the leads of the detecting element shorted when shaping!

### Soldering leads

IR detectors can be easily damaged by excessive heat. Special care should be taken when soldering the leads. Usage of heat sinks is highly recommended. Tweezers can be used for this purpose; when soldering, clamp a lead at a place between the soldering iron and the base of the package. To avoid destructive influence of ESD and other accidental voltages (e.g., from a non-grounded soldering iron) rules for handling LSI integrated circuits should be applied to IR detectors, as well. Leads should be soldered at  $+370^{\circ}\text{C}$  or below within 5s.

### Beam power limitations

Damage thresholds, specified as integrated power of incoming radiation:

- for detectors without immersion lens irradiated with continuous wave (CW) or single pulse longer than  $1\mu\text{s}$ , irradiance on the active area must not exceed  $100\frac{\text{W}}{\text{cm}^2}$ . The irradiance of the pulse shorter than  $1\mu\text{s}$  must not exceed  $1\frac{\text{MW}}{\text{cm}^2}$ ,
- for optically immersed detectors irradiated with CW or single pulse longer  $1\mu\text{s}$  than irradiance on the apparent optical active area must not exceed  $2.5\frac{\text{W}}{\text{cm}^2}$ . The irradiance of the pulse shorter than must not exceed  $10\frac{\text{kW}}{\text{cm}^2}$ ,
- for repeated irradiation with pulses shorter than  $1\mu\text{s}$ , the equivalent CW irradiation, average power over the pulse - to - pulse period should be less than the CW damage threshold according to equation

$$\left(\frac{\text{equivalent CW power}}{\text{focus area}}\right) = \left(\frac{\text{pulse peak power}}{\text{focus area}}\right) \cdot \left(\frac{\text{pulse}}{\text{duration}}\right) \cdot \left(\frac{\text{repetition}}{\text{rate}}\right).$$

Saturation thresholds vary by detector type and can be provided upon request.

## Cleaning window

Keep the window clean. Use a soft cotton cloth damped with isopropyl alcohol and wipe off the surface gently, if necessary.

## Mechanical shocks

The Peltier element may be damaged by excessive mechanical shock or vibration. Care is recommended during manipulations and normal use. Drop impacts against hard surface are particularly dangerous.

