User Notes for Newport LIAD-PY-100M

1. General description and setup:

The LIAD-PY-100M consists of a pyroelectric sensor and a discrete chopper. Together with a host meter such as 843-R, 1919-R or 841-PE-USB, it forms a system capable of measuring CW power in the region of ~100nW up to ~100mW. In order for the system to work correctly, connect up as follows:

Connect LIAD-PY-100M DB15 connector from electronics box to host meter or PC interface device
Connect the BNC cable between the electronics box and the chopper
Connect the included 12V power supply to 12VDC input socket on the chopper

The chopper should be mounted with the side marked "THIS SIDE TOWARD SENSOR" facing the pyroelectric sensor. The side of the chopper blade facing this direction has a low emissivity surface to minimize measurement artifacts that could be caused by thermal signal from the chopper blade. The other side of the blade faces the light source and has an absorptive black coating to minimize stray reflections.

For convenience, the chopper is provided with screw threads on all four sides, to allow it to be mounted in the most convenient orientation possible relative to the light source and sensor.

2. Tips and best practice when using the sensor:

The sensor circuit is sensitive to any signal chopped at 18Hz and insensitive to any other light that does not have a frequency of 18Hz (or a multiple of 18Hz). In general, it is recommended that the chopper be placed as close as possible to the light source, and as far away as possible from the sensor. This will minimize the amount of stray light that will be able to pass through the chopper (and be chopped at 18Hz) and reach the sensor. This is very important when performing measurements at the lower end of the sensor's measurement range, in the region of a few μW or lower.

The LIAD-PY-100M sensor is based on a pyroelectric sensor. Therefore, it is sensitive to mechanical vibrations that can be transmitted through the optical work bench or other surface on which the sensor is standing. Minimizing the effects of such vibrations is recommended when working with very lower powers. This can be accomplished by placing the sensor on soft rubber, cloth or other damping material.

The LIAD-PY-100M sensor is sensitive to IR radiation in the 1μm to 12μm wavelength band. Care should be taken to avoid having heat sources in the field of view that the sensor sees through the chopper window.

Note that the LIAD-PY-100M sensor has a response time 0-95% of approximately 3.5 seconds. It will not be able to respond to signals changing faster than this. Pulsed sources can be measured using the LIAD-PY-100M. The measured

value will represent the average power of the pulsed source. For reliable readings, the pulse rate of the source should exceed 200Hz.

The noise of the LIAD-PY-100M sensor is specified using a 10s moving average. The host meter or interface measures at a rate of 15Hz but for best performance, it is recommended that averaging be performed. This can be done either by engaging averaging on the meter itself, or as a post-processing stage after logging the data into a PC.

3. Zeroing the sensor against the host meter or interface device:

In order to get the best possible performance from the sensor, it is recommended to zero the sensor against the host meter or interface device before using the sensor. This can be done as follows:

- Disconnect the BNC cable between the electronics box and chopper (or power off the chopper) – the sensor output will drop to zero
- Perform regular zeroing function (refer to your Newport power meter or PC interface device "User Manual" for instructions)

It is recommended to eliminate any measurement offset before making sensitive measurements. This can be accomplished by turning off the measured source or blocking it close to the source and then activating the offset feature on the meter or PC. Measurement offsets can be either positive or negative.

4. Compatibility of the LIAD-PY-100M with Newport power meters and PC interface devices:

The following Newport power meters and PC interface devices provide full support for the LIAD-PY-100M sensor, when using the latest firmware upgrade available:

- 1919-R – firmware version 1.30 or above
- 843-R – firmware version 2.19 or above
- 841-PE-USB – firmware version 1.11 or above
- 844-PE-USB

The "PMManager" PC application supports the LIAD-PY-100M sensor to the same degree it supports the host meter or PC interface to which the LIAD-PY-100M is attached.