1.3 OEM Solutions

Ophir – The World Leading Source for Custom Designed Laser Measurement Solutions

1.3.1 Introduction

Many laser systems manufacturers need to have a measuring capability built into their systems.
Ophir is the world's leading supplier of OEM laser power/energy measurement instrumentation which can be built into host systems (such as medical, industrial, etc). With extensive experience accumulated in the field, Ophir offers the largest variety of OEM products **both off the shelf and custom designed** and is therefore best able to satisfy customer requirements.

Many configurations possible

An OEM solution is usually needed to monitor laser performance in the system, and possibly to provide fast feedback for system control. Depending on your application, various configurations can be used, such as:

- Just a sensor, with raw analog output
- Sensor with electronics providing an amplified analog or digital output
- Complete instrument, including numeric display and/or PC interface
- Custom designed solution for special requirements

In the following pages, you will see a range of "standard" OEM sensors available; these are actually families of existing OEM sensors with typical specifications shown. They can be tailored as needed to fit your specific requirements.

In addition to the products described below, Ophir has developed hundreds of other OEM solutions. Simply contact your Ophir representative who is likely to have just the right solution to your needs.

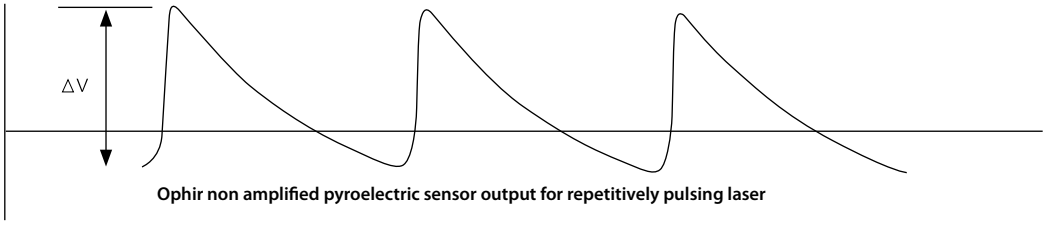
1.3.3 Pyroelectric OEM Sensors

1.3.3.1 Pyroelectric OEM Sensors - Introduction

Ophir manufactures three main types of pyroelectric OEM sensors:

- Compact pyro sensors with no electronics with output connected to the host electronics. Since the energy of pyro sensors is proportional to the peak to valley voltage output and not the maximum voltage output, the user has to take this into account in designing the electronic interface (see below)
- Pyroelectric sensors identical with standard PE-C sensors but with RS232 or analog output instead of connection to smart sensor
- Compact smart PE-C sensors with the electronics in a separate electronics module

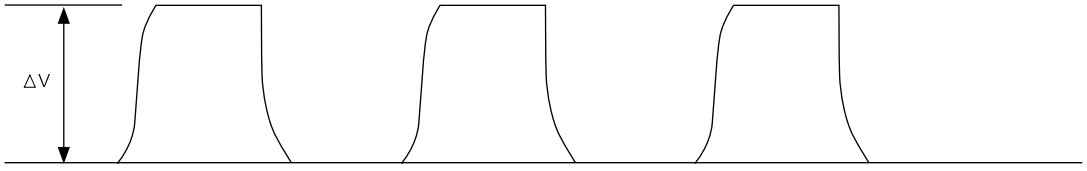
Typical output from a non amplified pyroelectric sensor appears as follows:



Ophir non amplified pyroelectric sensor output for repetitively pulsing laser

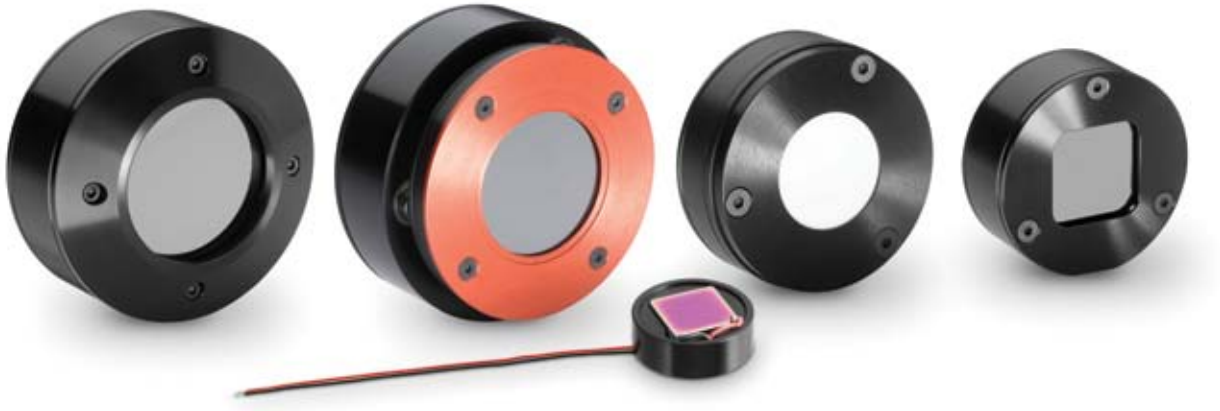
In the example shown above using a non amplified sensor, note that energy is proportional to ΔV and not to the voltage above the zero level. Note also that the peak rapidly decays and therefore the output depends on pulse rate and duration. It follows therefore that in order to measure pyroelectric pulses, the voltage level must be known before the pulse and must also compensate for pulse rate (or work at a low enough pulse rate for the correction to be rendered negligible).

When using a sensor with built-in electronics, typical output appears as follows:



Output from Ophir pyroelectric OEM sensor with built-in signal conditioning

Note that the output voltage is now proportional to the energy and since the voltage is held for a fixed time, the output is much less dependent on pulse rate or duration.
In the above example, the user does not need to perform any signal conditioning but simply has to read the voltage level or get the ouput in digital form to determine the energy. The output is also available in digital form via RS232.



1.3.3.2 Standard Pyroelectric OEM Sensors

<0.1µJ to 40J

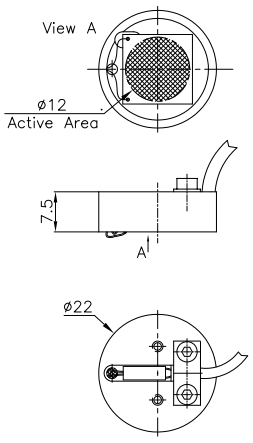
Features

- Performance identical to standard PE-C sensors (see section 1.2)
- Analog, RS232 or smart head output
- Wide dynamic range, switchable ranges
- Selectable wavelengths
- Compact non amplified versions available

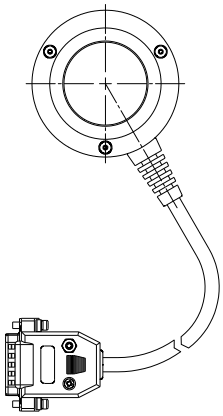
Pyroelectric OEMs – Examples only – many variations are possible

Category	Non amplified sensor. Can be very compact	Standard PE-C with built in digital or analog output. No need for meter or PC interface	PE-C smart sensor with remote electronics module allowing very compact sensor head
Model	**PE10-U**	**PE-C-RS232**	**PE-C-RE**
Features	**Very compact**	**Digital output with no need for meter or PC interface**	**Possibility of smart sensor with very compact sensing head**
Absorber Type	Metallic with AR coating	Choose from std PE-C	Metallic or BF
Aperture mm	φ12	Choose from std PE-C	Usually 10mm
Spectral Range µm [a]	0.19 – 10.6µm	Same as std PE-C	0.19 – 10.6µm
Calibration Accuracy +/-% at calibrated wavelength	Usually customer calibrated	3	3
Max Pulse Width	Configurable [b]	Same as std PE-C	Same as similar std PE-C
Max Repetition Rate	Configurable [b]	Same as std PE-C	Same as similar std PE-C
Sensitivity	Typical 40V/J	Same as std PE-C	Same as similar std PE-C
Noise Equivalent Energy	~100nJ	Same as std PE-C	Same as similar std PE-C
Max energy density for 10ns pulses	100mJ/cm^2 typical	Same as std PE-C	Same as similar std PE-C
Max Average Power Density	50W/cm^2 typical	Same as std PE-C	Same as similar std PE-C
Power Supply Requirements	NA	7 – 12VDC (in special cases up to 24V)	Power supplied by smart meter or PC interface
Cooling	Conduction	Air or Conduction	Air or Conduction
Output	Flying leads typical	RS232 or analog	DB15 smart connector
Dimensions	φ22 x 7.5mm	Same as std PE-C	Sensor head can be very small, see example below. Remote electronics module dimensions
Part Number	**Consult Ophir representative**	**Consult Ophir representative**	**Consult Ophir representative**
Notes: (a)	Unit can be calibrated for one or more wavelengths in this range		
Notes: (b)	By choosing circuit capacitance and resistance, maximum pulse rate and width can be optimized. This is usually limited by the condition (max pulse width)*(max pulse rate) < 0.1		

PE10-U



PE50BF-DIF-C-RS232 (example)



D15 Connector Pinout:
Pin 2: RxD for PC
Pin 3: TxD for PC
Pin 5: Ground

Miniature PE10-RE (example)