HEAD-ON 52MM PHOTOMULTIPLIER (PMT) SYSTEM
USER MANUAL

Rel. 01.00.0003
(Hardware code: ALFA01-9501)

CONCEIVING
PLANNING
DEVELOPMENT
IN SCIENTIFIC
ELECTRONICS

This manual in English is the original version.

Printed in Italy

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IPSES warrants to the end-user in accordance with the following provisions that its branded hardware products, purchased by the end-user from IPSES company or an authorized IPSES distributor will be free from defects in materials, workmanship and design affecting normal use, for a period of one year as of the original purchase date. Products for which proper claims are made will, at IPSES's option, be repaired or replaced at IPSES's expense[1].

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[1] With the exclusion of shipping costs for and from IPSES's development office.

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WARNING!
ELECTRICAL DEVICES COULD DAMAGE EQUIPMENT OR PROPERTY OR CAUSE PERSONAL INJURY

This guide contains instructions and technical features of the HEAD-ON 52MM PHOTOMULTIPLIER (PMT) SYSTEM.
Read with attention before attempting to install.
It is the responsibility of the technician to undertake all the safety rules provided by the law during the installation and the use of this device.
For any information which is not contained in this guide, please contact:

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REVISION HISTORY

Manual revision history

Revision/ Date	Change description	Author
01.00.0000 September, 2005	First version Released	Mancuso C.
01.00.0001 October, 2009	Minor changes	Mancuso C.
01.00.0002 June, 2011	Minor changes	Mancuso C.
01.00.0003 June, 2015	Update document layout	Bottaccioli M.

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DESCRIPTION

The Head-on 52 mm Photomultiplier (PMT) is a detector unit generally used in alpha particle counting systems.

The device consists of:

- A housing which allows protection from mechanical stresses and light during detection activity.
- A photomultiplier with light sensibility around 440 nm.
- Integrate voltage divider which furnishes the correct power supply to the photomultiplier dynodes
- An interlock switch which disabled high voltage when the sample holder is opened
- A sample holder to contain scintillator discs and powdered sample

Measure items also supplied with the system:

- ZnS scintillator discs on mylar

GENERAL DATA

Spectral response : 300 ~ 650 nm (S-11)

Wavelength of maximal response : approximately 440 nm

Photocathode (semi transparent) : Cesium – Antimony

Window material : borosilicate glass

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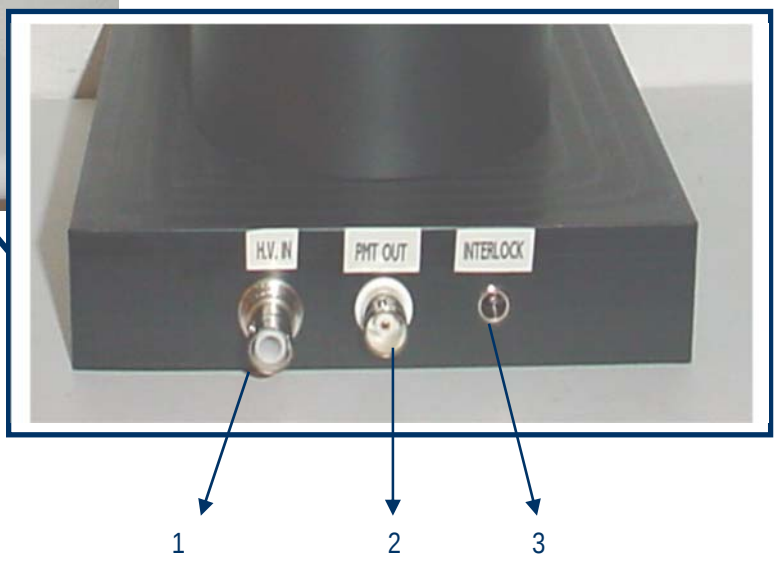
CONNECTORS

PMT system has on its front base three connectors which allow powering, seeing the counting signal and detecting the correct locking of the holder cup.

Be sure to use the proper cables to connect the PMT system, particularly for high voltage connection employ a cable with a correct isolation.



1. High voltage input.
2. Counting signal output
3. Security interlock switch

BE CAREFULL!

Max voltage must be less than - 1500V

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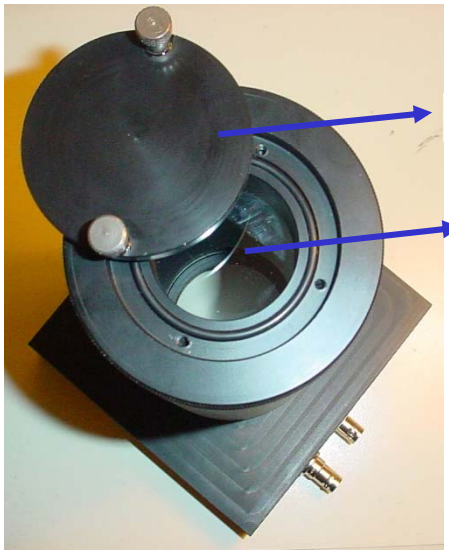
SAMPLE PLACEMENT



To place the sample inside the Photomultiplier (PMT), take off the sample holder (the upper part of the PMT) from the housing as shown in the picture below (Fig. 1)

Fig. 1

Fig. 2 and Fig. 3

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Put the sample holder of the PMT on a level plane so that its plexiglass window lays down perfectly, then unscrew the two screws on the top and open the holder cap (fig. 3).

Place carefully a scintillator disc inside the sample holder with its ZnS surface toward the top (fig. 4). Make sure the disc perfectly lays down on the plexiglass window, then put the powdered sample on the scintillator spreading the powder evenly (Fig. 5).

Close and screw the holder cap, then replace the sample holder on the housing.

Fig. 4

Fig. 5

Each ZnS scintillator disc allows to analyse only one sample: after the measurement the disc will be contaminated by the powder and, for this, it can be re-used only for repeating the analysis on the same sample.

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SAMPLE AND SCINTILLATOR DISC REMOVING

To remove the sample form the PMT, take off the sample holder and open the holder cap as described in the upper section 'Sample placement'.

Take off the powder turning upside down the holder, then place the holder on a level surface.

Carefully remove the scintillator disc using a small suction cup. During this operation, make sure the plexiglass window perfectly lays down on the level plane to avoid stresses which could detach the plexiglass form the holder.

If some ZnS particles are remained on the suction cup, clean it with a soft cloth.

MAINTENANCE

Detector unit

The only parts of the system which need some maintenance are the sample holder and the PMT plexiglass window. Clean them periodically with a soft cloth. When they are opaque, replace them with the spare ones supplied with the system. The new sample holder window must by glued with a drop of cynolit or epoxy. To change the PMT window the whole detector must be dismounted. It does not need to be glued.

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TECHNICAL FEATURES

Spectral Response: 300 ~ 650 nm (S-11)

Peak wavelength: 440 nm

Current Amplification (@1250 V): 7.1 x 10^5

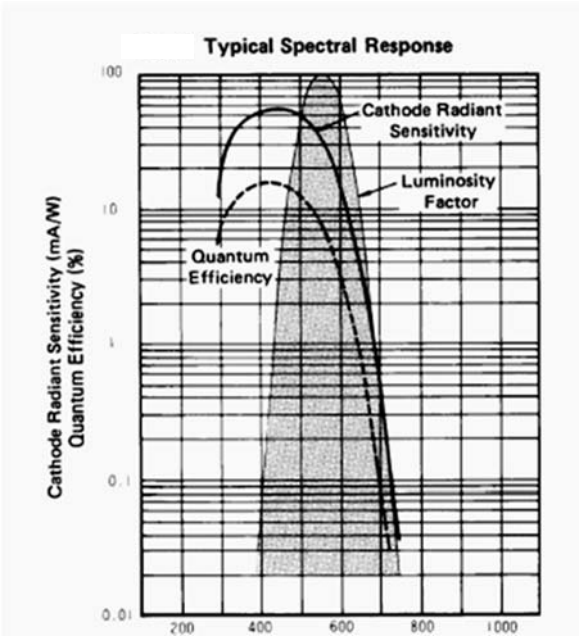
Quantum efficiency (@ 440 nm): 16.2%

Dark current (@1250 V): 1 nA

Operating temperature: 0-50ºC

Operating humidity: 10%-80%

Dimensions: housing: 220 mm height – base: 140 mm x 140 mm



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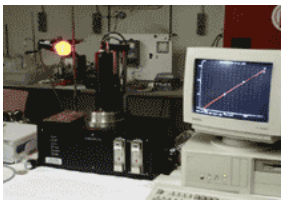
OTHER LABORATORY DEVICES

IPSES operates in the lab instrumentation sector, designing customized electronic solutions, not only by producing and delivering scientific instrumentation, but also through efficient and qualified support, courses and lectures on the basics on principles and methods, and guiding our customers in choosing the right instrument and learning how to use it most efficiently.

thermoluminescence laboratory



IPSES designs, produces and markets all the instrumentation required for a thermoluminescence lab:

- vacuum oven to heat the sample
- thermoregulation unit with enough precision to control the heating ramp
- photo-detector (made up by signal acquisition stage, a sensitive photomultiplier and a high-voltage power supply for the photomultiplier) capable of acquiring the thermoluminescence signal from the sample at different temperatures
- device capable of keeping an inert gas inside the vacuum oven
- dryer and an ultrasonic bath to prepare the samples
- software to control analysis system

Hivo

HiVo is a device especially conceived to furnish an adjustable elevated voltage up to -1.995V. Although it is mainly used to supply photomultipliers, HiVo can be employed with any device needing high voltage and low current supply.

HiVo can be customized to serve our clients' needs to the best: for this, on request, HiVo is available with any supply voltage and positive and/or negative output voltage.
HiVo is equipped with a 3,5 digit LCD display showing the output voltage. A 10-turn potentiometer sets the voltage and assures precision and stability.

For further information, please visit our website ***http://www.ipses.com.***

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CONTACTS

IPSES S.r.l. conceives, projects and markets electronic and scientific instruments. The customized planning of our devices allows us to answer specific necessities for customers asking for embedded systems. IPSES clients enjoy access to a dedicated project engineering team, available as needed.
Our pool consists of highly competent professionals whose experience in this field is extremely strong. Thanks to constant updating and technical development, IPSES is a leading company, combining the dynamism of a young group into the competence and reliability of a qualified staff.

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SUPPORT INFORMATION

The customer is at liberty to contact the relevant engineer at IPSES S.r.l. directly.

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PROBLEM REPORT

The next page is a standard template used for reporting system problems. It can be copied and send as a fax. Alternative bugs may be reported by emails, in this case please insure that the mail contains similar information listed in the *Engineering Problem Report* form.

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ENGINEERING PROBLEM REPORT

Problem describer

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Company			
Date	Tel.	Fax	

Product

Name	Version	Serial No.

Report Type (bug, change request or technical problem)

Major bug	☐	Urgency:	
Minor bug	☐	High	☐
Change request	☐	Medium	☐
Technical problem	☐	Low	☐

Problem Description

Reproduction of Problem

IPSES s.r.l. Action notes

Received by	Date	Report No.	Action

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