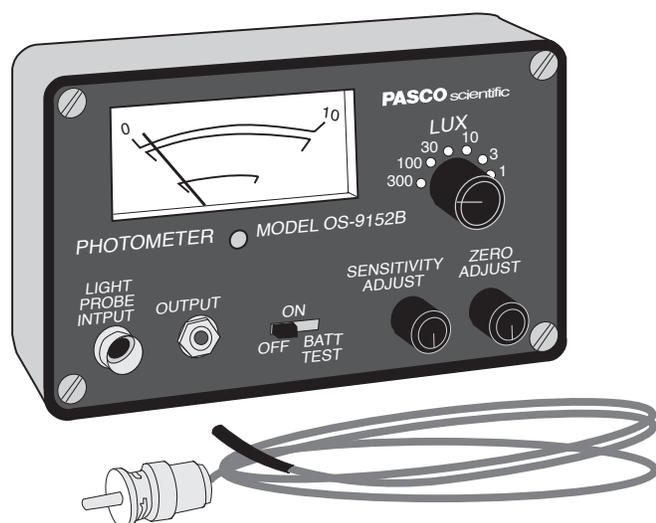


**Instruction Sheet
for the PASCO
Model OS-9152B**

PHOTOMETER



Introduction

The PASCO OS-9152B Photometer is a battery powered, self contained, medium sensitivity instrument. The unit contains a selenium photovoltaic cell, high sensitivity amplifier and meter readout. In addition to six ranges of sensitivity, the instrument features a variable sensitivity control, internal battery check, and external chart recorder output jack.

The OS-9152B Photometer may be used either to read the light directly incident on the selenium cell or, through the use of a detachable fiber optic probe, to measure the incident light up to 30 inches from the Photometer. The fiber optic probe also makes it possible to measure light in areas which would not be accessible to the Photometer.

The instrument is housed in a bakelite case with a black anodized aluminum front panel. The instrument operates from a single 9 volt battery.

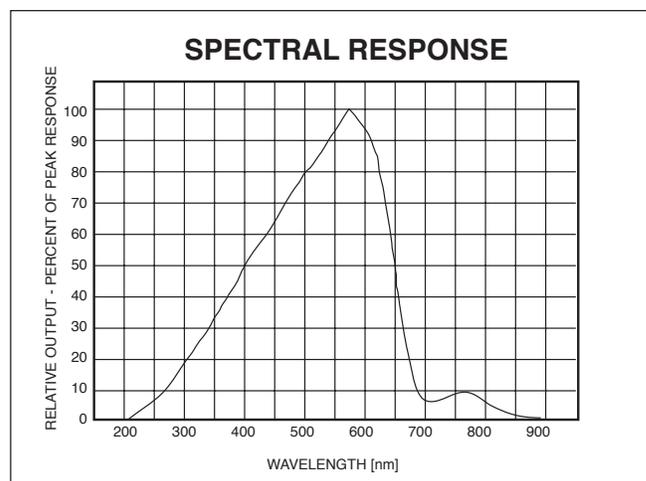
Sensitivity

1 to 300 Lux full scale in 1x and 3x ranges. Sensitivity Adjust permits any input (within the dynamic range of the instrument) to be adjusted to provide a full scale reading. The instrument is calibrated only when the sensitivity adjust knob is turned fully clockwise. However, the 1x and 3x ratios of the Sensitivity (LUX) Switch are still valid for any setting of the Sensitivity Adjust.

► **NOTE:** The selenium cell in the OS-9152B does not have a corrected photopic response. The instrument is calibrated to a 2700° K tungsten filament lamp, and will indicate the correct intensity only for that source. For other light sources no calibration is specified. However, when that same source is used for all measurements the instrument will provide accurate relative intensities, and approximate absolute (lux) intensities.

Spectral Response:

Typical selenium cell response. See diagram below.



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This instruction sheet edited by: Mary Ellen Niedzielski

Meter:

5 cm scale length with 0 - 10, and 0 - 3 graduations.

Controls:

Sensitivity - Lux, Zero Adjust, Sensitivity Adjust, Off, On, and Battery Test.

Recorder Output:

1.5 V at 1 mA. Miniature microphone connector.

Battery:

One 9 volt battery
approximately 100 hours life.

Battery replacement:

To replace the battery, remove the four screws from the corners of the front panel. Carefully lift the front panel from the case. Remove the battery connection wires and discard the existing battery. Connect the replacement battery and slide it into the battery clip. Replace the front panel and refasten the four screws.

Operating Instructions:

- ① **Mechanical Zero** - Before turning the instrument on, check that the meter movement is mechanically zeroed. If not, turn the adjustment screw, directly below the meter face, until the needle is exactly over zero.
- ② **Battery Check** - Turn the Power Switch to the 'Batt. Test' position. The meter needle should read to the right of the 'Replace Batt.' line. If the needle reads to the left of the line replace the battery.

► **NOTE:** Instruments are shipped without the battery installed.

- ③ **Electronic Zero** - Place the palm of your hand tightly over the Light Probe Input connector (if the fiber optic probe is not attached to the Photometer) or over the end of the fiber optic probe (if the probe is attached to the Photometer). When all light has been prevented from entering the selenium cell turn the Sensitivity (Lux) Switch to the '1' position and turn the Zero Adjust Knob until the meter needle reads zero.

④ **Measurements Without the Fiber Optic Probe -**

The Photometer should be held or mounted so that the Light Probe Input connector on the Front Panel points directly at the light source to be measured. Turn the Sensitivity Adjust fully clockwise. Turn the Sensitivity Control Switch to '300' and then clockwise one step at a time until the meter reads the highest value without going off scale. The Photometer now indicates the intensity directly in Lux (see Spectral Response section).

► **NOTE:** The calibration of the OS-9152B Photometer is valid only when the instrument is used without the fiber optic probe.

- ⑤ **Measurements With the Fiber Optic Probe** - The fiber optic probe is attached to the Photometer by slipping the connector of the fiber optic probe over the Light Probe Input connector on the Photometer. A quarter twist clockwise locks the probe to the Photometer. A quarter twist counterclockwise disengages the probe. The probe should be pointed directly at the light source to be measured. Turn the Sensitivity Adjust fully clockwise. Turn the Sensitivity Control Switch to '300' and then clockwise one step at a time until the meter reads the highest value without going off scale. The Photometer now indicates the relative intensity.

As noted above, the calibration of the instrument is not valid when the fiber optic probe is used. The probe will attenuate the intensity of the light reaching the selenium cell to approximately 6.5% of its value when the probe is not used.

- ⑥ **Measuring Relative Intensities** - In many cases it is not necessary to know the absolute intensity of the light being measured, but only its relative intensity to another source. This type of measurement is made in following manner.

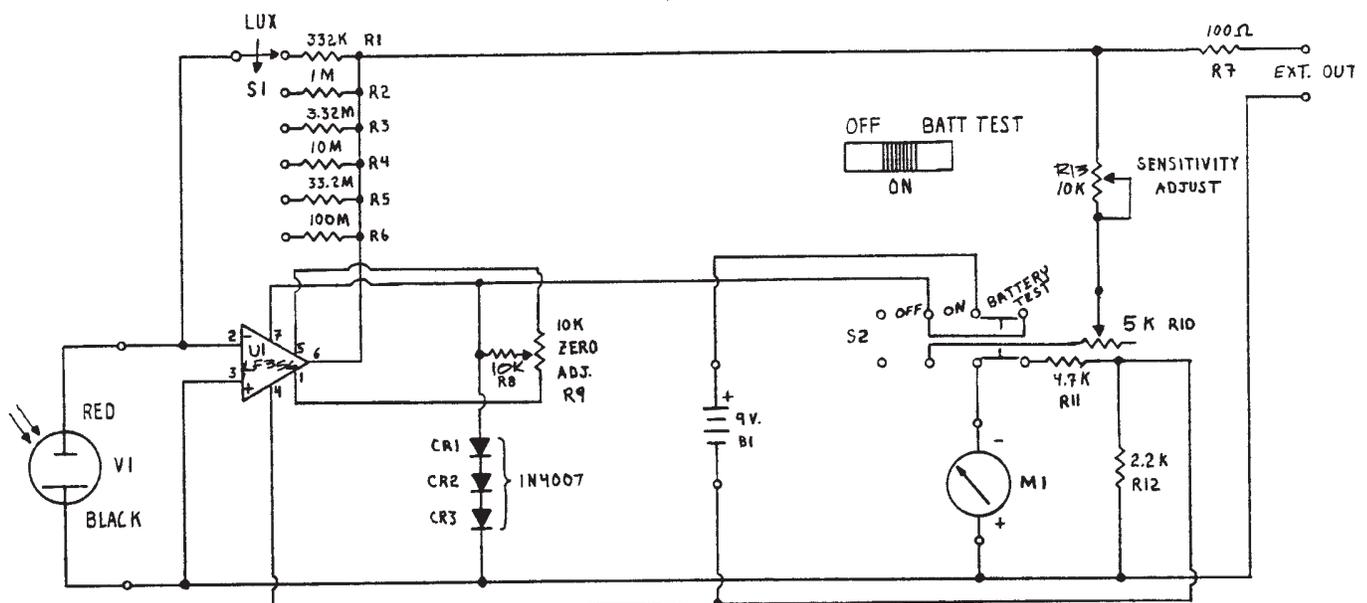
Set up the Photometer to measure the intensity of the source which will be the reference value for all other measurements. This should be the most intense source. Turn the Sensitivity Control until the Photometer just reads off scale. Now turn the Sensitivity Adjust counterclockwise until the meter needle reads directly over the '10' on the meter face (full scale). Any subsequent sources which are now measured without changing any controls will indicate their relative intensity directly on the 0 - 10 scale. For example, a second source which reads 6.5 on the scale would have a relative intensity of 65% of the reference source.

The Sensitivity Control Switch may be turned to other scales, but keep in mind the change in reading it will produce. For example, if the Sensitivity Switch was set to '100' when the reference source was measured, and then switched to the '30' setting for a low level source, one would read the 0 - 3 scale which has an actual range of 0 - 30%. In a similar manner if the Sensitivity Control Switch was turned to the '300' setting, one would use the 0 - 3 scale with an actual range of 0 - 300%.

- ⑦ **Measurement Techniques** - The OS-9152B Photometer uses a selenium photovoltaic cell as the light sensitive element. The current output of this device is proportional to the intensity of the light incident on the cell and to the area of the cell illuminated. When making measurements it is important to remember that the instrument is merely indicating a current proportional to the amount of light incident on the selenium cell. Therefore, if the area of the cell which is illuminated is reduced (by using the fiber optic probe for example) the instrument reading will decrease, even though the light intensity being measured remains the same.
- ⑧ **External Output Jacks** - A miniature phone jack is located on the front panel of the OS-9152B Photometer. This will provide approximately 1.5 V at 1 mA for a full scale meter reading.

► **IMPORTANT:** The Sensitivity Adjust will not decrease the output at the jacks as it will decrease the meter reading.

- ⑨ **Care of the Fiber Optic Probe** - Two simple precautions will help to maintain the efficiency of the fiber optic probe. First, do not bend the probe in less than a 2 inch radius at any given point. **Do not coil tighter than a 4 inch circle.** Also do not bend the probe within 3 inches of either end. Second, take care not to scratch or mar the ends of the probe. This will reduce the light transmission. If the probe ends become scratched or dirty they may be cleaned by lightly grinding the end of the probe on a fine grinding stone or cutting the probe off square with a sharp single edge razor blade.
- ⑩ **Using the OS-9152B Photometer with the PASCO Optics System** - The OS-9152B Photometer may be used in two ways with the PASCO Optics System. First, the Photometer may be placed directly on the optics bench, without the fiber optic probe, so that the selenium cell is in the center of the optic bench. This arrangement is ideal for measuring the light transmitted through two polarizers. The second arrangement utilizes the fiber optic probe inserted into the mounting hole of the linear translator (OS-9104B) or angular translator (OS-9106A). This arrangement would be used, for example, to measure intensity variations in a diffraction pattern.



Schematic, Photometer (OS-9152B)

Technical Support

Limited Warranty

PASCO scientific warrants this product to be free from defects in materials and workmanship for a period of one year from the date of shipment to the customer. PASCO will repair or replace, at its option, any part of the product which is deemed to be defective in material or workmanship. This warranty does not cover damage to the product caused by abuse or improper use. Determination of whether a product failure is the result of a manufacturing defect or improper use by the customer shall be made solely by PASCO scientific. Responsibility for the return of equipment for warranty repair belongs to the customer. Equipment must be properly packed to prevent damage and shipped postage or freight prepaid. (Damage caused by improper packing of the equipment for return shipment will not be covered by the warranty.) Shipping costs for returning the equipment, after repair, will be paid by PASCO scientific.

Feed-Back

If you have any comments about this product or this manual please let us know. If you have any suggestions on alternate experiments or find a problem in the manual please tell us. PASCO appreciates any customer feedback. Your input helps us evaluate and improve our product.

To Reach PASCO

For Technical Support call us at 1-800-772-8700 (toll-free within the U.S.) or (916) 786-3800.

email: techsupp@PASCO.com

Contacting Technical Support

Before you call the PASCO Technical Support staff it would be helpful to prepare the following information:

- If your problem is computer/software related, note:

Title and Revision Date of software.

Type of Computer (Make, Model, Speed).

Type of external Cables/Peripherals.

- If your problem is with the PASCO apparatus, note:

Title and Model number (usually listed on the label).

Approximate age of apparatus.

A detailed description of the problem/sequence of events. (In case you can't call PASCO right away, you won't lose valuable data.)

If possible, have the apparatus within reach when calling. This makes descriptions of individual parts much easier.

- If your problem relates to the instruction manual, note:

Part number and Revision (listed by month and year on the front cover).

Have the manual at hand to discuss your questions.