

G85756

SpacesaverPicoammeter

NFU 602



Purpose

The Picoammeter is designed to measure very small currents and has 9 ranges from 100pA to 1μA, selected by rotary switch. The instrument has a large moving coil meter, with an auto-zero facility. Input is by way of 4mm sockets, or a BNC socket for very low currents where a screened lead is preferred. Voltages up to 5kV will not damage the unit.

Suggested uses include: measurement of ionisation currents, reverse currents of silicon diodes, resistivity of insulators such as plastics, wood and paper, capacitor leakage current etc.

Meter

Analogue, illuminated display of dc current.

Ratings

230V ac $\pm 10\%$ 50Hz 12VA

Input impedance 10MΩ

Maximum input 5kV 1μA

Fuse: F50mA

Temperature range: 10 to 40°C

Humidity: 10 to 70% RH

Mass: 2.7kg

EMC

This equipment is Class A according to the EMC standard EN55011 and is intended for use in a non-domestic

environment only. Interference from nearby sources of RFI (radio frequency interference) may affect the readings. High voltage sources, PCs, laptops, tablets and mobile phones may affect it.

Warnings

For your safety, this product should be used in accordance with these instructions, otherwise the protection provided may be impaired.

Do not open or remove covers or panels. Repairs and service may only be carried out by our repair agent, otherwise the warranty may be void.

Use only the 3-core mains cable supplied with the unit. If the mains cable is replaced, the rating of the replacement must be the same or better than the original.

The unit must be earthed at all times. The unit is earthed/grounded through the 3-core mains lead, so no additional earth connection is required.

Always position the instrument so that it can be disconnected from the mains, if an emergency arises.

This unit is intended for use in DRY conditions. Avoid spillage of water and other liquids on to the unit. If spillage occurs, disconnect the mains supply.

There is no specific requirement for insulation of external circuits as they cannot become hazardous live, as a result of connection to this unit. Limit the length of any connecting leads to 3 metres.

Features

- Large illuminated analogue meter
- Detects currents as small as 1pA
- Input resistance of 10MΩ and maximum voltage input of 5kV
- Input via 4mm shrouded sockets or BNC connector, for screened leads
- Auto-zero facility

Outputs

None.

Basic operation

The Picoammeter has an input resistance of about 10MΩ. Some of this resistance is used to protect the meter against overload. At full scale deflection on the highest range (1μA) the pd across the instrument terminals is

$$pd = 10^{-6}A \times 10^7\Omega = 10V.$$

The gain of the input amplifier is set by the range switch. The meter movement is damped by a shunt capacitor.

The red and black input sockets float, i.e. they are not referenced to 0V.

The green earth/ground socket is connected to the Picoammeter case, and provides a common ground.

When an external circuit is connected to the red and black sockets, they rise to the potentials present in that circuit, and measure the current flowing between those potentials. Either socket can be connected to the green earth/ground socket. This references that input to 0V.

Simple experiment

Check that the mains supply is connected and working (the switch is illuminated).

Turn the meter dial to the 100pA range.

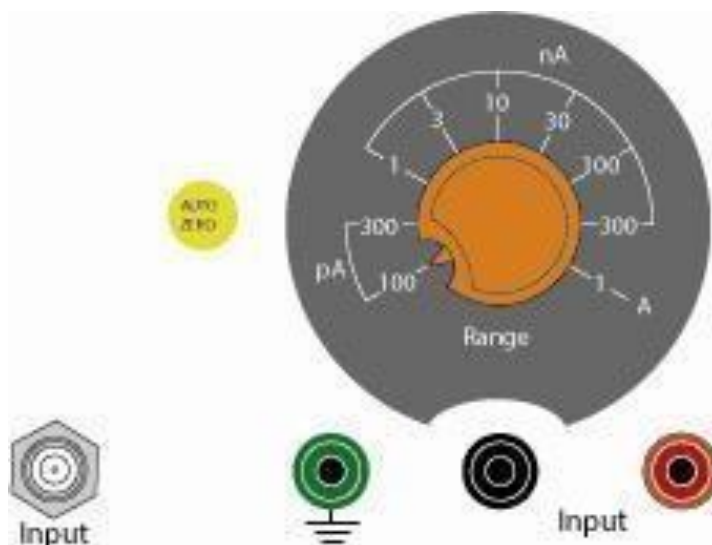
Push the auto zero button.

The needle should swing to almost full scale deflection and then settle back to the 0 point.

Now touch the BNC socket with your finger and check that the needle moves erratically.

Connect the Picoammeter into an appropriate circuit. Select the desired range. Zero the meter.

Commence measurement.



Overload Protection

The Picoammeter is electrically very robust. It can safely be connected to a 5kV supply, but it does take several seconds for the internal capacitance to recover from very large overloads.

In common with all electrical instruments it should be used with care when higher voltages are present.

For example, if used with a Van de Graaff generator as a source of charge, the peak currents resulting from capacitors discharging may well cause permanent damage.

Accuracy

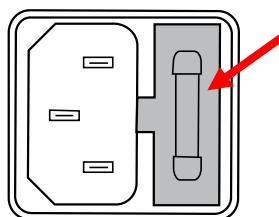
Low tolerance components ensure that the meter accuracy on all ranges is $\pm 5\%$ of full scale deflection.

Mains lead and fuse replacement

The mains cable stows on the back of the unit with a wind and clip feature. The mains cable retainer can be removed to allow the cable to be stored separately. Simply remove the screw and retainer from the base of the unit. The IEC cable is now detachable. In the unlikely event of the fuse blowing, the retainer and mains cable must be removed to gain access to the fuse carrier.



The carrier can be removed with a fingernail or tip of a screwdriver. A spare fuse is provided in the carrier.



Replacement fuses must be 20mm cartridge time-delay fuses, of the correct rating: F50mA



Cleaning

The front panel membrane conceals and protects switches and LEDs. It may be wiped clean using a damp cloth. Be sure to disconnect the unit from the mains before cleaning, and do not use any abrasive cleaners or organic solvents.

Periodic testing

Check the mains lead and plugs at both ends for any damage.

Periodically check the earth bonding and insulation, by performing a Portable Appliance Test (PAT). Most schools and local authorities have a regular schedule for such testing.

Check that the fuse in the mains plug (5A recommended) and the two fuses (F50mA active and spare) in the IEC socket on the back panel are all of the correct rating.

Warranty, repairs and spare parts

The power supply is guaranteed for a period of one year from the date of delivery to the customer. This warranty does not apply to defects resulting from the action of a user such as misuse, improper wiring, any operations outside of its specification, improper maintenance or repair, or unauthorized modification.

Our liability is limited to repair or replacement of the product. Any failure during the warranty period should be referred to Customer Services.

In the event of a fault, apart from replacing the instrument fuse in the IEC socket, the power supply should be referred to the Philip Harris recommended repair agent.

Cooling

Spacesaver power supplies have built-in, quiet-running fans. Ventilation is provided through slots in the base and top of the unit. These should not be obstructed. Under conditions of continuous use at full load and high ambient temperatures, the thermal trip may operate. Reducing the load and/or ambient temperature will allow the supply to operate after a delay.

Instructions for authorized service technicians

Ensure that any replaceable mains cord is of the correct rating.

Ensure that all earth conductors and protective earth bonding is maintained after service work.

Please refer to the detailed service procedures, safe servicing and continued safety - contact techsupport@philipharris.co.uk for advice.

For any manufacturer specific parts please refer to our recommended repairer.

Please refer to product specific risks that may affect service personnel, the protective measures and verification of the safe state after repair.

Disposal of Waste Electrical and Electronic Equipment (WEEE)



Do not dispose of this product with household waste

- For the proper treatment, recovery and recycling please take this product to an appropriate collection point.
- If you are unsure where this is, contact your Local Authority.
- By disposing of this product correctly you will be providing positive help to the environment.

Supplier details

Customer Service Centre, Philip Harris & UNILAB, Hyde Buildings, Ashton Road, Hyde, Cheshire SK14 4RH UK

Orders and Information Tel: 0845 120 4521

Fax: 0800 138 8881

Repairs Tel: 0845 120 3211

E-mail: techsupport@philipharris.co.uk

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