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IPC Irwin Spark Counter/ Alpha Particle Detector

Part Number IPC-6001-R

User Instructions



INTRODUCTION.

The IPC Irwin Spark Counter/Alpha Particle Detector is a highly visible instrument for showing the random nature of radiation. The detection window produces very bright sparks when alpha particles are ionised on the extra high tension (EHT) wire grid. When used in conjunction with a Timer Scaler & Frequency Meter, the number of generated sparks (counts) can be recorded with the radioactive source at different distances to enable graphs to be drawn showing the properties of the particular alpha radiation. These experiments help to demonstrate the random nature of radioactivity and the energy levels of alpha particles.

DESCRIPTION.

The Spark Counter uses an electrically-charged array of fine wires close to a steel electrode to create a detection grid (window), when the alpha source is brought within the detection distance, the air is ionised and sparks occur between the wires and the electrode, hence the range(s) of alpha particles in air from a particular radioactive source may be found.

The Spark Counter comes complete with a sliding holder for the radiation source and an accurate scale to measure the effects of distance between the source and the detection grid.

In order to operate correctly, the Spark Counter requires a school laboratory radioactive alpha source and a variable voltage EHT power supply capable of delivering up to 5kV.

IPC Irwin

Holker School, Cark in Cartmel, Grange over Sands, Cumbria LA11 7PQ, United Kingdom

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INSTRUCTIONS.

First connect a suitable EHT Power Supply to the Spark Counter (making sure the output voltage is off), to do this use three good quality 4mm EHT leads, connect the positive, negative and earth 4mm sockets on the Spark Counter to the EHT supply.

If the sparks are to be counted, a suitable Timer Scaler & Frequency Meter should be connected to the BNC connector on the Spark Counter via a BNC to BNC lead.

Then with the EHT supply voltage fully turned down, switch on the output and then slowly increase the voltage until sparking spontaneously occurs on the detection grid (ie. with no alpha source present), this should occur in the region of 4.5kV to 5.0kV. Now reduce this voltage slightly until the sparking stops, ie. to the point where the spontaneous sparking completely stops.

Next slide the holder to a position several centimetres away from the detection grid and attached the radioactive source to the holder, using a standard handling tool and the recommended precautions for radioactive material.

The source holder may now be slide towards the detection grid and sparks should be produced, in general, the closer the source is to the detection grid the greater the frequency of the sparks. The Spark Counter is fitted with a metric distance scale, so that the radioactive source can be positioned at known distances from the detector, the number or rate of sparks produced can then be measured using the Timer Scaler & Frequency Meter.

ADDITIONAL EQUIPMENT.

IPC Irwin offer a suitable 5kV EHT Power Supply, part number IPC-0734-P, for supplying the required EHT voltages to correctly operate the Spark Counter/Alpha Particle Detector.

We also offer a suitable Timer Scaler and Frequency Meter, part number IPC-3342-T, to enable the accurate counting of the sparks generated.

Should you require suitable 4mm EHT Test Leads we can supply 5kV red and black leads (IPC-0893-P and IPC-0492-P). **Note:** these are only to be used in conjunction with the Spark Counter/Alpha Particle Detector and our 5kV EHT Power Supply.

Also available from IPC Irwin is a suitable BNC to BNC cable for the connection between the Spark Counter/Alpha Particle Detector the Timer Scaler & Frequency Meter, part number IPC-3342-T.

SPECIFICATIONS.

Electrical Supply	= 0 to 5kV (DC)
Dimensions	= 75 x 85 x 305mm overall
Mass	= 0.40kg
Supply Connections	= 4mm Sockets
Counter Connection	= BNC Socket
Measuring Distance	= 0 to 15cm

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Please Note: This Equipment is for Education, Training, or research Purposes Only.

IMPORTANT SAFETY INFORMATION.

The Extra High Tension (EHT) power supply used must be of the type supplied for use in school science laboratories (ie., it must have a current limit of 3mA or less).

The Spark Counter is designed to be used with a traditional alpha-emitting cup-type radioactive source (for example Americium-241 or Plutonium-239) supplied for use in school science laboratories. For important safety information, see the CLEAPSS guide L93 “Managing Ionising Radiations and Radioactive Substances, etc.” The recommended source type is listed as ‘type 8a’ in L93, which includes a model risk assessment for its safe handling and use.

The L93 document is available for free download at: www.cleapss.org.uk/download/L93.pdf

Thank you for choosing this IPC Irwin product, which has specifically been designed for education and we know it will bring you good service long into the future. This is just one product of a wide range of UK designed and manufactured products to enhance a STEM education. Please see www.ipcirwin.com website for more details on the products and service we provide to support teaching and learning in science and technology.

IPC Irwin also provide Portable Appliance Testers and a Calibration service, for more details please go to www.ipcirwin.com or call our sales and technical support line on 015395 58555.



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Declaration of Conformity (In Accordance with EN ISO 17050-1:2010).

Manufacturer: **IPC Irwin, Holker School, Cark-in-Cartmel, Grange-over-Sands, Cumbria, LA11 7PQ, United Kingdom.**

Product/Part No: **Spark Counter/Alpha Particle Detector (5kV Max. Operating Voltage)/IPC-6001-R**

This conformity certificate approves the compliance of the product with the essential safety requirements of the following UK Standards and Regulations:

SI 2005 No.1803	General Product Safety Regulation (implements Directive 2001/95/EC).
SI 2016/1101	Electrical Equipment (Safety) Regulation (implements Directive 2014 /35/EU.
EN 61010-1: 2010	Electrical Requirements for Laboratory Test & Measurement Equipment.
EN 61000-6-1: 2019	EMC, Generic Standards, Immunity for Residential, Commercial and Light Industrial Environments.
EN 61000-6-3: 2019	EMC, Generic Standards, Emission for Residential, Commercial and Light Industrial Environments.
SI 2012 No. 3032	Restriction on Hazardous Substances (RoHS) in Electrical and Electronic Equipment Regulation, (implements Directive 2011/65/EU).



Mark can be used only in the case of conformity assessment according to all relevant UK Standards and Regulations.

EU Declaration of Conformity (In accordance with European Parliament and Council Decision No: 768/2008/EC Annex III).

This conformity certificate approves the compliance of the product with the essential safety requirements of the following EC/EU Directives (Manufacturer, Product/Part No: as above).

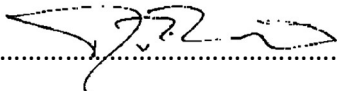
2001/95/EU	General Product Safety Directive.
2014/35/EU	Low Voltage Directive (LVD).
2014/30/EU	Electromagnetic Compatibility (EMC) Directive.
2011/65/EU	Restriction on Hazardous Substances Directive (RoHS).

European harmonised Standards used for conformity assessment and declaration:

EN 61010-1: 2010	Electrical Requirements for Laboratory Test & Measurement Equipment.
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Mark can be used only in the case of conformity assessment according to all relevant EC/EU Directives.

Dickon Knight (Director):  Date of Issue: 24th May 2023.

In the event of any correspondence concerning this product, please contact your supplying agent quoting the catalogue number and serial number shown on the apparatus rating label, together with the voltage and frequency of the mains electrical supply. This will help us to process your enquiry quickly. Any spare parts which may be required are supplied on the understanding that the replacement of those requiring the exposure of live electrical connections **will** be undertaken by an electrically qualified person.

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