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IPC Irwin Xenon Stroboscope

Part Number IPC-2816-L

User Instructions



INTRODUCTION.

The IPC Irwin Xenon Stroboscope is a precision instrument with a wide range of applications, these include: dynamics experiments, vibration modes in wires and sheets, speed and frequency measurements and demonstrating persistence vision. The Stroboscope offers both internal and external triggering and provides a highly accurate digital readout of the set flash rate.

DESCRIPTION.

The Xenon Stroboscope front panel incorporates a large 3-digit LED display and a three-position range switch, allowing a total flash rate range from 1 per second to 250 per second. The flash rate for each range is adjusted via a rotary fine control. The actual Xenon Discharge Tube is located at the back of the unit behind a large clear Perspex window. The Stroboscope also includes the added function of switching from the internal flash rate trigger to an external trigger control, via a two-position toggle switch, the external trigger input is via two (black and blue) 4mm input sockets.

The front panel also incorporates an illuminated (green) mains on/off switch and a mains input IEC socket, containing an in-built protection fuse. Normally the unit is supplied with a separate UK plug to IEC plug, 2.0m mains lead.

The instrument is contained in a robust metal case with a durable powder coated finish, four rubber mounting feet are also fitted for stability.

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INSTRUCTIONS.

Internal Trigger mode:- To operate the unit in its normal mode set the Trigger switch to the internal (INT) position, the flash rate can now be adjusted from 1 to 250 flashes per second. To set the required flash rate use both the three-position range switch and the rotary fine control, the LED display always shows the set internal flash rate.

External Trigger mode:- First set the Trigger switch to the external (EXT) position, this will allow the black and blue sockets to operate the external trigger. The following two methods can be used to operate the external trigger:-

1. **Short-Circuit method:-** To perform this simply connect a 4mm test lead to one of the two sockets and then touch the other end to the other socket, this will flash the Strobe once, repeated shorts will continue to flash the strobe. This method can also be activated using any type of mechanical switch, as well as by a photodiode (note: polarity is important when using a photodiode). **Note:** if the short-circuit is maintained after the original flash the strobe will not flash again.
2. **Electrical Signal method:-** The Stroboscope can be externally triggered by either the output of a Signal Generator (set to a minimum of 5V with respect to 0V) or a standard 5V TTL circuit signal. Simply connect the electrical output of the signal source to the 4mm trigger sockets (note: the black socket must be connected to 0V). **Note:** for maximum strobe brightness when using this method, we recommend the range switch is set to the range covering, or nearest to, the signal frequency.

Additional Accessories:- a range of IPC Irwin products suitable for both the Short-Circuit and Electrical Signal external triggering are listed below.

EXPERIMENTS.

The uses of a Stroboscope are numerous, here are a few typical examples:-

- a) **Visual Phase-Lock:-** This is achieved by connecting the external trigger source (eg. Signal Generator) to both the Stroboscope and a vibrating object, as both the strobe and object are running at the same frequency this will visually make the object appear stationary. **Note:** when driving the vibration object, the source voltage must not fall below 5V, as this will stop the Stroboscope from triggering.
- b) **To Measure the Speed of a Rotating Wheel:-** Initially, it may be helpful to mark a white dot on the rim of the wheel. With the trigger switch on the Stroboscope set to INT, direct the strobe flash towards the rotating wheel. Now adjust the flash rate until the dot on the wheel appears stationary, the flash rate is now equal to the rotational speed of the wheel in revolutions per second.
Care must be taken to avoid anomalous results, this is because a Stroboscope can sometimes give misleading visual effects, as the following examples:-

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A dot on the rim of a wheel rotating at a speed of 30 revolutions per second will appear stationary when the flash rate is set to 5, 6, 7.5, 10 and 15 per second. Under these conditions, the dot will be illuminated every sixth, fifth, fourth, third or second revolution respectively and, in consequence, the image of the dot will appear to flicker.

When set to 60 flashes per second, two stationary dots will appear on either side of the wheel. At 90 flashes per second, three dots will be visible, spaced evenly around the rim of the wheel.

- c) **To set a Rotating or Vibrating Object to a required frequency:-** Set the trigger switch on the Stroboscope to INT and then adjust the flash rate to the required object frequency. Now regulate the frequency of motion of the object to find the lowest at which the light from the Strobe makes the object appear stationary. Again, it may be of help to make a reference mark on the object.
- d) **Stroboscope Photography:-** With the trigger switch set to INT, select a suitable flash rate: 10 per second is a good optimum value. To achieve the best results, bright reflective objects should be used against a dark background in a darkened room.

ACCESSORIES.

1. **Replacement Xenon Discharge Tube, part number: IPC-2820-L**, the Tube is straight forward to change, and only requires a small cross-head screwdriver.
2. **IPC Irwin Photo Timing Gate, part number: IPC-3210-P**, this unit contains a photodiode and can be used to trigger the Stroboscope in the External Mode.
3. **IPC Irwin Signal Generator, part number: IPC-4744-W**, this unit can be used to trigger the Stroboscope in the External Mode.
4. **IPC Irwin Signal Generator & Amplifier, part number: IPC-4885-W**, this unit can be used to trigger the Stroboscope in the External Mode.

SPECIFICATIONS.

Electrical Supply	= 220-240VAC, 50-60Hz
Fuse Ratings	= IEC Socket Inlet: F1.0A, UK Mains Plug: 3A
Dimensions	= 255 x 220 x 110mm overall
Mass	= 2.9kg
Flash Rate	= 1 to 10 per/sec, 10 to 100 per/sec & 100 to 250 per/sec
Flash Power	= 5W (mean)
Flash Duration	= 12 microseconds
Accuracy	= +/- 2% on each range

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

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IMPORTANT- ELECTRICAL SAFETY NOTICE

Only connect the product to single phase mains electrical supply (with neutral nominally at each potential), also check that the supply voltage and frequency are within the products stated range. Before connecting to the mains electrical supply, examine the information on the products rating label (the value of the fuse fitted to the product is also stated), ensure that the mains plug or outlet circuit is fitted with an appropriate fuse of higher value.

WARNING: THIS PRODUCT MUST BE EARTHED

This product is designed for Electrical Safety Class 1.

If a mains lead is not fitted or supplied, connect the wires to a Standard UK, 3-pin plug as follows:-

Green/Yellow wire to the terminal marked: E (Earth) or coloured Green or Green/Yellow.

Brown wire to terminal marked: L (Live) or coloured Brown.

Blue wire to terminal marked: N (Neutral) or coloured Blue.

LIVE PARTS SHOULD NEVER BE EXPOSED UNLESS THE PRODUCT HAS BEEN SWITCHED OFF AND ISOLATED FROM THE MAINS ELECTRICITY SUPPLY.

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: **Xenon Stroboscope (230V AC, 50Hz main voltage)/IPC-2816-L**

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).

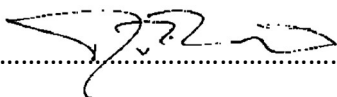
2001/95/EU	General Product Safety Directive.
2014/35/EU	Low Voltage Directive (LVD).
2014/30/EU	Electromagnetic Compatibility (EMC) Directive.
2011/65/EU	Restriction on Hazardous Substances Directive (RoHS).

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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