BUCKLEYS

MANUFACTURERS OF SPECIALIST TEST EQUIPMENT

PST-100

High Voltage Spark Tester

Instruction manual

Please read this manual before using the equipment

5830-0012 03/24 | English

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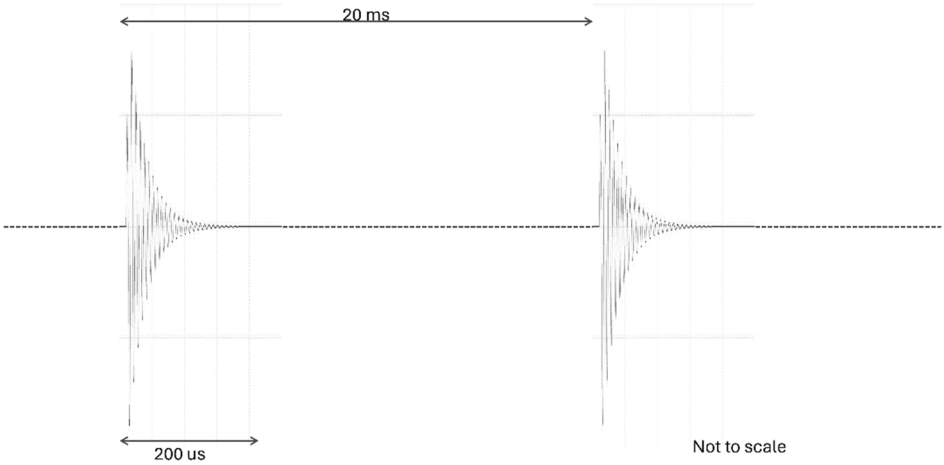
General Description

The PST-100 high voltage spark tester is a lightweight, handheld, spark- test pistol.

The PST-100 is primarily used for detecting pinholes or flaws in electrically non-conductive coatings, linings, membranes, pipe wraps and other plastic-coated metals.

The PST-100 generates a pulsed ring output voltage. The pulse repetition is 20mS @ 50Hz or 16.6mS @ 60Hz mains. The ring frequency is approximately 100kHz. The output voltage is adjustable from 10kV to 55kV.



Output voltage characteristics at 50hz mains frequency

Technical Specification

Operating temperature range:	0 to +45°C
Storage temperature range:	-10 to +70°C
Supply voltage:	
6000-0002, 6000-0006, 6000-0014	220/240V AC
6000-0003, 6000-0007, 6000-0015	105/120V AC
Supply frequency:	50 to 60 Hz
Max power consumption:	30VA
Output voltage:	10kV to 55kV
Output:	Pulsed Ring
Pistol weight:	1.2kg
Altitude:	Up to 2000m
Relative humidity:	80% Max (Non-Condensing)
Installation category:	Category II

This product has been manufactured under the controls established by a quality management system that meets the requirements of ISO9001.

Unpacking

Remove the PST-100 from its packaging and check for damage. If any part is damaged, the carrier and supplier should be notified immediately.

All packing material should be kept for inspection. The PST-100 should not be used.

The package contains the following items:

- 1 x PST-100 pistol unit
- 1 x Flexible probe

Safety Precautions and Symbols

Caution, risk of danger

Caution, risk of shock

Category II double isolation

Earth return (grounding terminal)

Read the information in this manual carefully before using the equipment.

Note: The works safety officer should approve the use of this equipment.

IMPORTANT: Service and repair of this product and its components **MUST ONLY** be undertaken by trained, approved technicians working in full accordance with Buckleys' service guidelines. Failure to do so may expose the operator to potentially lethal voltages.
Under no circumstances should anyone other than trained approved technicians attempt to dismantle or repair this product.

The PST-100 Spark Tester is intended to generate a high voltage discharge, it is only to be used by responsible and authorised personnel that have read and understood this manual.

The probe must **NEVER** be directed at the body.

There is a potential risk to those who might have an incipient heart condition.

There is also a potential risk from the reflex action when receiving a high- voltage shock. Injury could also occur if the spark were discharged to sensitive parts of the body (e.g. eyes).

In a reasonably ventilated room of a volume greater than 40m^3, the exposure to ozone produced by the high voltage spark should not present a risk to health. In a 'confined space' situation it is likely that ozone levels will exceed the exposure limit and present some risk to health. Under these conditions adequate ventilation must be provided.

WARNING: This equipment must not be used in any combustible atmosphere; the high voltage discharge will cause a spark from which an explosion could result.

WARNING: This equipment must not be exposed to damp or wet conditions, or where the amount of conductive dust is greater than would occur in a normal situation

WARNING: Never connect or disconnect the electrode with the PST-100 connected to the mains supply.

IMPORTANT: We strongly advise that individuals with pacemakers, cochlear implants, or trans-dermal electronic implants - e.g. glucose monitors do not use our high-voltage test equipment under any circumstances.

Misuse or failure to comply with the guidelines outlined in this manual may impair the safety provided by the equipment.

PST-100 Earth Terminal

The PST-100 has been tested and verified by an authorised, independent third party as meeting the requirements of IEC 61010:2010 - Safety requirements for electrical equipment for measurement, control, and laboratory use.

The construction methods employed throughout comply with double insulation. The earth terminal located on the handle is a functional earth terminal, NOT a Protective Conductor Terminal as defined by IEC61010 and is intended as a high voltage return point during the operation of the PST-100. This arrangement also aids suppression of possible EMC interference.

Therefore, when conducting an electrical safety test (Portable Appliance Test) to the PST-100 it should be considered a class 2 appliance and tested accordingly.

Calculating the test voltage

It is important to set an appropriate test voltage, as if it is too high, the spark may damage the material being tested, and if it is too low, the user may not detect flaws that are present. Buckleys AC instruments generate between 10 and 55kV AC, and the level can be set by turning the knob on the instrument. The recommended setting is the minimum that achieves the desired result.

The easiest way to determine the best setting is to set up a test with a sample (e.g., 30cm square) of the material to be tested with the same thickness as the actual test material. If a small hole is made in the middle of the test sample and the sample is placed on a grounded surface, the test brush can be drawn over the hole repeatedly whilst the test voltage is progressively increased. Once a visible spark is reliably observed each time the electrode crosses the hole, the selected setting can then be used for subsequent testing.

Operation

WARNING: NEVER connect or disconnect the electrode with the generator connected to the mains supply.

WARNING: This equipment must not be used in any combustible atmosphere; the high voltage discharge will cause a spark from which an explosion could result.

WARNING: This equipment must not be exposed to damp or wet conditions, or where the amount of conductive dust is greater than would occur in a normal situation.

Screw the flexible probe electrode into the red end of the PST-100. Set the output control knob on the rear fully anti-clockwise. Connect the plug to the mains supply socket.

Setting the Output Voltage
Hold the end of the flexible probe at the determined distance for a spark to jump to an earthed metal test piece, squeeze the trigger and turn the output control knob slowly clockwise until the output voltage is high enough to cause a spark to jump the gap. Alternatively — for increased accuracy in setting the output voltage - a Buckleys Spark Gap Setter (part number 6005-0064) may be used.

The probe should always be kept moving when testing as the high voltage and ring frequency combination may cause heating in the article under test which may result in burning. The output control should be adjusted for the lowest output at which an effective test can be carried out.

When testing is complete, release the trigger to switch off the PST-100's output.

Disconnect the PST-100 from the mains supply before attempting to remove the flexible probe.

Applications

Insulation Testing:
The insulation to be tested should have a conductive backing, e.g. if a joint in plastic or rubber is to be tested, it should be laid on a metal sheet. If this is not practical, aluminium foil or copper wire can be placed behind the joint. It is recommended that this should be earthed, although it is not necessary if the area of the metal backing is very much larger than the area of the probe, e.g. greater than 1000:1.

Adjust the output of the PST-100 for the item under test (see: Calculating the test voltage). Slowly sweep the area to be tested, looking at the probe at all times. When a fault is passed over, the high-voltage probe discharge will change to a single spark. Remove the probe from the surface and mark the point where the fault was detected.

NOTE: Electrode size influences the output voltage. For this reason, we recommend a maximum size of 150mm.

Gas Discharge Lamp Testing
The PST-100 can be used to excite gas discharge lamps, to confirm that the vacuum has not been lost e.g. fluorescent tubes.

The lamp/tube should not be fitted, as the high voltage could contact the fitting and be passed into the wiring and could damage other equipment connected to that wiring.

Hold the probe against the glass of the lamp and increase the output voltage from minimum, if the lamp is correctly evacuated, the lamp will glow where the probe touches the glass.

Ozone Production
Small quantities of ozone can be produced from the high-voltage spark, useful for chemistry lecture demonstrations etc.

Risk Assessment

It is the user's responsibility to complete a risk assessment before using Buckleys equipment. The following points offer some guidance but must not be assumed to be complete or sufficient.

Personal safety

- Have all users been trained in the correct and safe use of the instruments?
- Are they aware that the instrument produces high voltages, and can give electric shocks if used incorrectly?
- Is the instrument in good condition, undamaged? Is the instrument dry? Are the accessories similarly in good condition, dry and undamaged?
- Is it possible to ensure that persons with pacemakers, cochlear implants or trans-dermal implants of any kind are sufficiently far from the instrument & test site to be safe?
- Ozone is an irritant gas which will be produced when the instrument produces sparks – is the test outdoors, or is there sufficient, suitable ventilation in place to ensure that this is not hazardous?
- Is the access route to the area of the test safe? Is fall protection necessary? If so, is it in place?
- Has the instrument been properly grounded to a metallic grounding point?

Explosion & Fire Risk

- Buckleys high-voltage instruments will produce sparks - Are you certain that there is no risk of an explosive atmosphere?
- Have all easily ignited and/or flammable materials been removed from the area to be tested?

EMC & RFI

- Buckleys high-voltage instruments will produce sparks which may create interference in nearby electronic apparatus, particularly communication and computer equipment.
- Are you certain that there is no risk of such interference causing a danger to others – particularly medical or life support equipment?
- Are you sure that there is no risk of such interference causing costs or inconvenience to others – e.g. industrial processes, measuring equipment, scientific apparatus, domestic radio and TV?

Other Risks

- Have you checked that there are no ongoing processes in the area (e.g. below the roof you're working on) that may be dangerous – X-ray machines, other radiation?
- Are you certain that the instrument has not been immersed, dropped or otherwise damaged in a way that is not obvious?
- Have you verified that the ground connection is actually grounded?
- Is the person responsible for site safety aware of / fully understanding the testing you are going to do, and has it been reviewed in line with the site procedures?

NOTE: Wherever you are intending to use equipment of this type, on your site or on a customer's, always obtain clearance from the company safety officer.

Maintenance

The PST-100 has been designed to be maintenance free, however the PST-100 should be inspected regularly, checking for damage to the unit. If any damage is found, the PST-100 must not be used, and should be returned to the manufacturer for repair.

Two 500mA anti-surge fuses are located on the rear panel. These may be replaced by the user. Disconnect the PST-100 from the mains supply before attempting to replace fuses.

IMPORTANT: Service and repair of this product and its components **MUST ONLY** be undertaken by trained, approved technicians working in full accordance with Buckleys' service guidelines. Failure to do so may expose the operator to potentially lethal voltages.
Under no circumstances should anyone other than trained approved technicians attempt to dismantle or repair this product.

Disposal information

Producer registration number: WEE/HJ0051TQ

This Product must be disposed of in accordance with UK WEEE Producer Responsibility Regulations, or in accordance with your local WEEE guidance.

For further information on UK WEEE Producer Responsibility regulations click on:
http://www.gov.uk/government/collections/producer-responsibility-regulations

EC Declaration of conformity

We, Buckleys (UVRAL) Ltd., as sole manufacturer of the apparatus listed below, declare that the product **PST-100 High Voltage Spark Tester** is manufactured in conformity with the following directives: **2014/30/EU**, **2014/35/EU**, **2015/863/EU** and **2011/65/EU (RoHS)**.

Date: 01/07/2021

Authorised by:

J P Hoveman

CEO, Buckleys (UVRAL) Ltd.

CE

UKCA Declaration of conformity

We, Buckleys (UVRAL) Ltd., as sole manufacturer of the apparatus listed below, declare that the product **PST-100 High Voltage Spark Tester** is manufactured in conformity with the following UK legislation: **Electronic Compatibility Regulations 2016**, **The Electrical Equipment (Safety) Regulations 2016** and **Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012.**

Date: **01/07/2021**

Authorised by:

J P Hoveman

CEO, Buckleys (UVRAL) Ltd.

UK CA

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Distributor details

Product registration

Thank you for choosing a Buckleys product, we are sure it will provide you with many years of reliable service.

Please register this product via Buckleys' website and download the Warranty Registration Certificate.

Register your product in 5 minutes

Once your product is registered, you will receive the following benefits:

- **FREE** annual service & calibration reminders by email
- **Latest** industry news relating to your product
- Be the **first** to hear about our new products

We strive to improve the quality of our products and service.
Registering your product helps us monitor overall quality of our products, service and dealer network. Additionally, if we ever need to contact you regarding your product, we are able to do so immediately.

We will also send you annual service/calibration reminders by email to help ensure your product is always in perfect working order.

To register your product, simply visit:

www.buckleysinternational.com/registration

... Complete the online form and click on SUBMIT.