BUCKLEYS

MANUFACTURERS OF SPECIALIST TEST EQUIPMENT

ST-AC Pro'

High Frequency Spark Tester

Instruction manual

Please read this manual before using the equipment

5830-0037 04/22 | English

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Description

The ST-AC Pro' high frequency tester comprises of a lightweight, hand-held probe connected by a cable to a portable generator.

A robust aluminium case houses the generator and its components. On the front panel of the case there is:

- ON/OFF Indicator lamp
- Output ON/OFF/Control knob
- Handle probe connection

On the back panel of the case there is:

- Earth return socket
- Mains voltage selector switch
- IEC mains input socket
- Mains ON/OFF switch

Technical data

Operating temperature range:	0°C to +30°C
Storage temperature range:	-10°c to +40°c
Supply voltage:	110/120 volts or 220/240V AC (see rear panel of generator unit)
Supply frequency:	50Hz to 60Hz
Power consumption:	52W
Output voltage:	10 to 55KV
Output frequency:	100KHz – ring pulsed 50Hz
Net Weight:	4.05kg
Dimensions:	W = 175mm H = 90mm D = 235mm
Altitude:	Up to 2000m
Relative Humidity:	80% max. (non-condensing) Installation
Category:	Category II (over-voltage transients)

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

Unpacking

The ST-AC Pro' and the handle should be removed from their bags and be checked for damage. If any part is damaged, the carrier and supplier should be notified immediately. All packing material should be kept for inspection and the ST-AC Pro' should not be used.

The package contains the following items:

1 x Generator unit
1 x Probe handle
1 x Mains power lead
1 x Flexible probe lead
1 x Operating instructions

If any of these are missing, contact your supplier immediately.

The packaging should be retained for the future to be used if the unit needs to be sent back for repair or needs to be stored.

Safety Precautions and Symbols

Caution, risk of danger

Caution, risk of shock

Earth return (grounding terminal)

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

Note: The use of this equipment should be reviewed as part of the process risk assessment.

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 ST-AC Pro' Spark Tester is intended to generate a powerful high frequency, high voltage discharge; therefore it should only be used by responsible and authorised personnel that have read and understood this manual.

The ST-AC Pro' Spark tester is designed to protect the operator from receiving a dangerous electric shock. The case is earthed and the high-voltage output is isolated from the mains supply.

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

The high voltage generated by this unit is at a frequency of 100KHz, well above the motor frequency of the human central nervous system. A serious shock is unlikely if the probe is accidentally touched during operation, however it is likely to be painful, and may result in localised burns. A greater risk is to those who might have an incipient heart condition or from the reflex action when receiving a high-frequency shock, relating to contact by the operator if working near hot surfaces or rotating machinery. Injury could also occur if the spark reached sensitive parts of the body (e.g. eyes).

In a reasonably ventilated room of a volume greater than 40m3, the exposure to ozone produced by the high voltage spark is not expected to present a major 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. This may also be the case where the user has some particular sensitivity or a pre-existing lung condition. Under these conditions adequate ventilation should be provided.

When in use always position the unit so that mains ON/OFF switch is easily accessible to the operator.

Operation

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

WARNING: This equipment should NOT be used in a potentially explosive atmosphere as the high voltage WILL cause a spark and an explosion could result.

WARNING: This equipment should not be used in damp or wet conditions, or where the amount of conductive dust is greater than would normally occur.

Safety Warning: DO NOT USE this equipment in the event of it being immersed in water. It must be immediately returned to Buckleys for service, calibration and/or repair.

Check that the operating voltage is in accordance with the available supply voltage by reference to the voltage selector switch on the back of the generator unit.

Connect a suitable plug (preferably fused at 3 Amps) to the mains supply cable as follows: **Brown** - Live, **Blue** - Neutral, **Green/Yellow** – Earth

WARNING: This equipment MUST be earthed
WARNING: The equipment should not be operated if any part is in a damaged condition

Ensure that the mains supply is disconnected, and then screw the flexible probe electrode into the red end of the handle.

WARNING: do not connect electrodes whilst the generator is connected to the mains supply.

Set the output control knob fully anti-clockwise (Output OFF) and check that the mains ON/OFF switch is in the OFF position. Connect the plug to the mains supply socket and switch on. Holding the probe handle in one hand so that the probe tip is at least 20cm from any object and switch ON the generator.

WARNING: The handle should not be put down whilst the unit is switched on.

Select the output for the required size of spark by holding the probe tip close to the 4mm earth terminal on the back panel of the generator and turn the control knob to set the required spark length.

Anticlockwise = Reduce output/output OFF;
Clockwise = Output ON/increase output

The high voltage spark should only be taken from the metal end of the flexible probe and not from the side i.e. through the probe's plastic covering, as the heat of the spark may melt the plastic and could cause a fire hazard.

The output control should be adjusted for the lowest output at which an effective test can be carried out.

The probe should always be kept moving when testing as the high frequency output can cause localised heating in the article under test and could burn a hole in it.

When the testing has finished, switch OFF the generator before putting down the handle and then remove the plug from the mains supply.

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.

Maintenance

The ST-AC Pro' has been designed so that no maintenance is required by the user. The ST-AC Pro' should be inspected regularly, check for damage to the unit. If damage is found, the ST-AC Pro' must not be used and should be returned to the manufacturer for repair.

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.

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 ST-AC Pro' 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 ST-AC Pro' 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 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 – eg industrial processes, measuring equipment, scientific apparatus, domestic radio and TV?

Other Risks

- Have you checked that there are no ongoing processes in the area (eg 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.

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 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 **ST-AC Pro' High Frequency 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 **ST-AC Pro' High Frequency 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

Contact details

Manufacturer: Buckleys (UVRAL) Ltd

Address: Buckleys House
Unit G, Concept Court
Shearway Business Park
Shearway Road
Folkestone
Kent CT19 4RG, UK

Tel: +44 (0)1303 278888

Website: www.buckleysinternational.com

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.