



## ELECTRO-TECHNIC PRODUCTS INC.

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### **Model 12701 PEAK VOLTAGE CALIBRATOR OPERATING MANUAL**



#### **SECTION 1 - GENERAL INFORMATION**

- 1.1.1 The Model 1270 Peak Voltage Calibrator is intended for use with the Electro-Technic Products High Frequency Generators to set the output voltage accurately. In use, it replaces the electrode normally used with the Generator.
- 1.1.2 It consists of a plastic barrel, 8.375 in. (21.5 cm) long and 1.25 in. (3.2 cm) in diameter, with two electrodes inside. One is stationary and the other is movable. A built-in safety stop prevents the electrodes from making contact. An alligator clip with insulated handles is attached to the movable electrode via a 3 ft (90 cm) long wire. The fixed electrode is inserted into the Generator electrode socket. A graduated scale on the barrel permits accurate measurement of the gap between electrodes. The scale is calibrated in volts and distance.
- 1.1.3 The range of the instrument is 10 kV to 50 kV. Although the scale is graduated down to 6 kV, calibration below 10 kV is not practical. Calibration standards at specific voltages below 10 kV are available. Call for price and availability.

Part Number 085-0030-1

Printed in USA

*Leak Testers, Corona Treaters, Science Education Products*

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1.1.3 Applications include laboratory work requiring an approximate voltage setting, production work where a consistent, repeatable, and verifiable voltage setting must be established and maintained, or for surface treating over delicate or sensitive surfaces where a certain maximum voltage must not be exceeded.

## 1.2 Packing List

<i>Quantity</i>	<i>Product No.</i>	<i>Description</i>
1	-	Peak Voltage Calibrator
1	085-0030-1	Instruction Manual
1	X004-15	Certificate of Calibration

## 1.3 Warranty Repair/Replacement Information

1.3.1 If the unit requires repair, forward it freight prepaid to Electro-Technic Products, Inc. Please request a Return Authorization Number prior to sending it in.

1.3.2 Electro-Technic Products, Inc. reserves the right to repair or replace any unit sent in for warranty repair.

1.3.3 If found to be out of warranty, or damaged due to improper use, it will be repaired for a minimal labor and parts charge. We will advise the customer prior to any work being done.

## SECTION 2 - INSTALLATION

2.1.1 Turn off power to the High Frequency Generator.

2.1.2 The tip of the Calibrator can be inserted into the electrode socket of the High Frequency Generator. But for the most accurate results, especially for electrodes with a large surface area, or brush-type electrodes, when the Generator is turned on, simply touch the tip of whatever electrode is being used to the shaft of the Calibrator. This ensures that the voltage is set to the exact electrode being used.

**Note: For voltage settings less than 20 kV, use the Model 1246 Shorting Block on the electrode, except for Model BD-10 Series Generators.**

2.1.3 Attach the alligator clip lead from the Calibrator to a large metal object, or earth ground.

## SECTION 3 - OPERATION

### 3.1 Operation Controls

- 3.1.1 Gap Adjustor Dial. Located opposite the plastic barrel. This knurled dial adjusts the gap between the two electrodes of the Calibrator.

### 3.2 Operation

- 3.2.1 The ring attached to the movable electrode indicates the position on the graduated scale corresponding to the gap distance and voltage. See Figure 1 which is the scale on the Calibrator enlarged to twice actual size. Turn the Gap Adjustor Dial to the gap distance/voltage desired. About 30 complete turns of the dial adjusts the gap distance by about 1 in. (25 mm); therefore, a fine, precise setting is possible.
- 3.2.2 Adjust the output of the Generator so that no spark would be generated at the electrode tip if power were applied. For models with a High Voltage Adjust Knob located on the Generator Housing, turn the knob completely counterclockwise.
- 3.2.3 Turn on power to the Generator and slowly increase the voltage control until a spark is seen to jump the gap between the electrodes of the Calibrator. The Generator voltage output is now equal to the value indicated on the Peak Voltage Calibrator scale.
- 3.2.4 To be able to interpret the voltage reading from the scale, the difference between the starting voltage and the breaking voltage must be understood.

Starting Voltage is the potential required to cause a spark initially to jump between an electrode and a metal object. This voltage is usually higher than the voltage required to sustain the spark once it has started.

Breaking Voltage is the potential below which a spark between an electrode and a metal object can no longer be sustained. Many factors contribute to the spark ceasing to jump across the gap.

When the Peak Voltage Calibrator is used, the gap between electrodes can be increased by as much as 0.25 in. (6 mm) between the starting voltage and the breaking voltage of the spark.

- 3.2.5 Because the uncertainty in establishing the breaking voltage, the Calibrator is designed to read the starting voltage. When this Calibrator is not used, the only other way to establish the spark voltage is to measure the spark length from the High Frequency Generator electrode tip to a metal object. Normally it is difficult to accurately measure this distance, and generally it is the breaking - not starting - voltage which is used. This is why the spark length indicated by the peak Voltage

Calibrator is shorter than that which would be delivered when a spark develops, for example, when a pinhole leak is detected in a tank lining. When a pin hole is encountered, the corona discharge will deliver a spark from the electrode tip through the pin hole to the metal surface below.

- 3.2.6 After the peak voltage desired has been established, turn off power to the High Frequency Generator, remove the Peak Voltage Calibrator and reinstall the electrode normally used. Spark generated from this electrode tip will correspond to the same voltage as that indicated on the scale of the Calibrator provided:
- a) The same Generator voltage adjustment is maintained.
  - b) The geometry of the electrode is similar to that of the electrodes of the Calibrator. Electrodes with a large surface area, or brush-type electrodes, may, because of their size, deliver a peak spark voltage somewhat lower than that indicated by the Calibrator.

### 3.3 Calibration

3.3.1 The Peak Voltage Calibrator is factory calibrated, and a Certificate of calibration is furnished. Yearly recalibration is recommended. Factory calibration service is available for a nominal charge. It includes test data for all output positions with a number of electrodes, and is traceable to a NIST standard. Request a Return Authorization Number prior to returning to the factory for calibration.

3.3.2 The following accuracy is used when factory calibration is preformed.

10 kV ± 3 kV
20 kV ± 3 kV
30 kV ± 3 kV
40 kV ± 3 kV

### 3.4 Hazards

3.4.1 The same precautions should be taken while operating this device as those taken when using a High Frequency Generator. Consult the instructions for the Generator for specific operating precautions.

3.4.2 The fixed position of the electrodes are set at the factory. A safety stop prevents accidental shorting. Do not attempt to alter this setting as doing so may create a potential shock hazard.

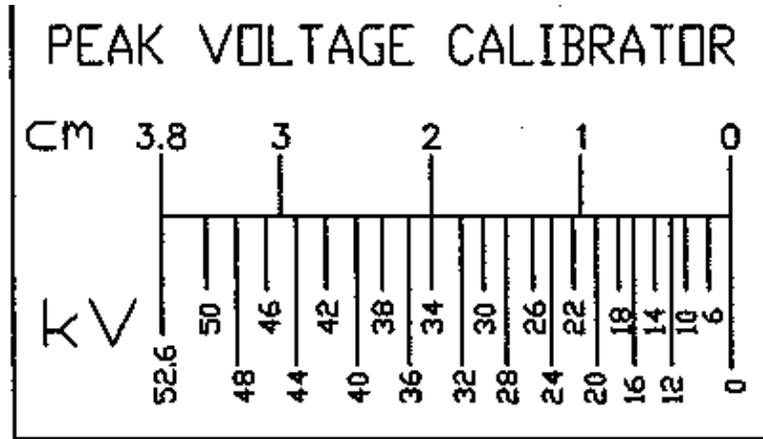


Figure 1. Spark Gap Scale (Enlarged to Twice Actual Size)

#### 4.1 REPAIR AND MAINTENANCE.

The following are repair parts for the Peak Voltage Calibrator. Contact the factory for price and availability. All other parts are internal to the unit, and cannot be replaced without affecting the calibration and function of the unit. See Section 2. In use, a thin film is formed on the contact points through oxidation enhanced by the small amount of ozone gas generated by the spark. If the calibrator is found to be in calibration as received, a cleaning of these contacts is recommended to preserve the calibration.

Part Number	Description
026-0015-1	Alligator Clip, Black