

Ionisation Test Kit Operation and Maintenance



Made in the
United States of America



Figure 1. Desco [19493](#) Ionisation Test Kit

Description

The Desco Ionisation Test Kit allows the [19492](#) Digital Static Field Meter to be used to measure the offset voltage (balance) and charge decay of ionisation equipment. The Test Kit also includes a Charger used to place a $\pm 1000V$ charge on the [19441](#) Conductive Plate, making it possible to also measure the discharge times of air ionisation equipment per IEC 61340-4-7. The [19493](#) Ionisation Test Kit includes the [19492](#) Digital Static Field Meter, providing a highly portable and cost effective means of verifying the performance of a wide variety of ionisation equipment.

Note: The Digital Static Field Meter is designed to operate only with the [19493](#) Ionisation Test Kit. It is not compatible with other brands.

Although not as accurate, the Desco Ionisation Test Kit has been designed to make measurements that correspond to those made by using a charged plate analyser. The Ionisation Test Kit provides convenience and portability to test per IEC 61340-4-7 or Compliance Verification ESD TR53. A Charged Plate Monitor should be used if precise measurements are required.

The Ionisation Test Kit includes a slide-on isolated Conductive Plate, a ± 1000 volt Charger and a durable thermoplastic carrying case with custom cut-outs for all of the above components along with the Digital Static Field Meter.

“All non-essential insulators and items (plastics and paper), such as coffee cups, food wrappers and personal items shall be removed from the workstation or any operation where unprotected ESDs are handled. The ESD threat associated with process essential insulators or electrostatic field sources shall be evaluated to ensure that:

- the electrostatic field at the position where the ESDs are handled shall not exceed 5 000 V/m;
- or
- if the electrostatic potential measured at the surface of the process required insulator exceeds 2 000 V, the item shall be kept a minimum of 30 cm from the ESDs; and
 - if the electrostatic potential measured at the surface of the process required insulator exceeds 125 V, the item shall be kept a minimum of 2,5 cm from the ESDs.

If the measured electrostatic field or surface potential exceeds the stated limits, ionization or other charge mitigating techniques shall be used.” [IEC 61340-5-1 Clause 5.3.4.2 Insulators]

Packaging

- 1 Digital Static Field Meter
- 1 Conductive Plate
- 1 Charger
- 2 9V Alkaline Batteries
- 1 Carrying Case
- 1 Certificate of Calibration

Features and Components

DIGITAL STATIC FIELD METER

See technical bulletin [TB-3040.E](#) for information on the Digital Static Field Meter that is included in the [19493](#) Ionisation Test Kit.

CHARGER

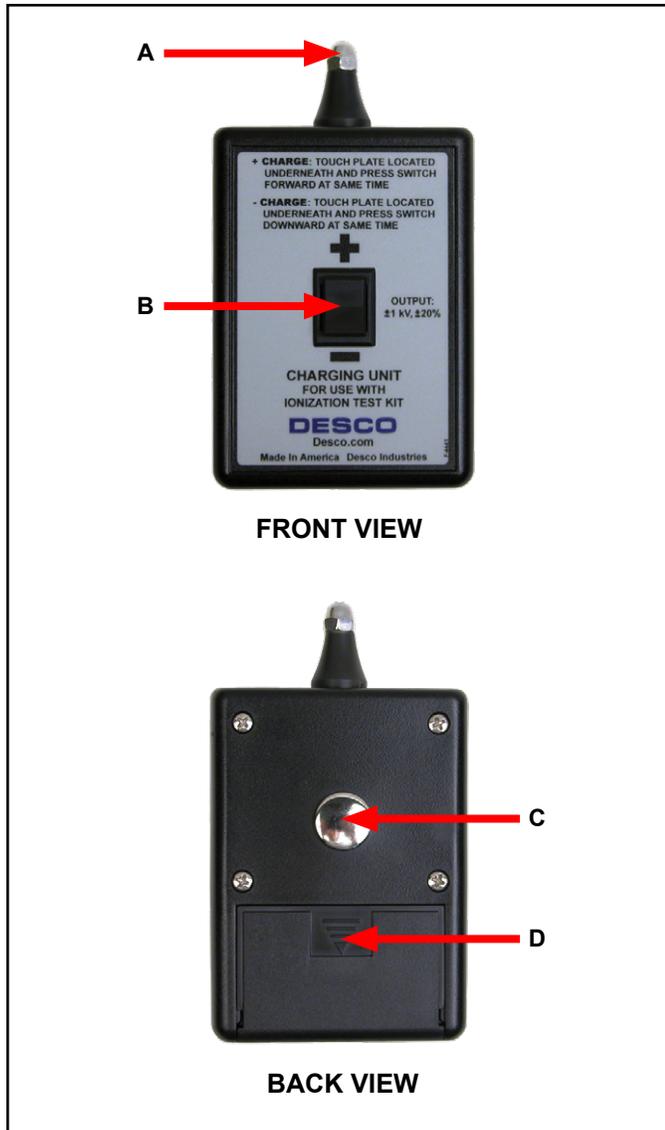


Figure 2. Charger features and components

A. Output Contact: The output contact is connected to an internal power source. When the touch plate located underneath the unit is connected to ground, the output contact will provide a charge of the indicated polarity. The charger is designed so that an operator can press the rocker switch and touch the plate simultaneously with the fingers of the same hand.

B. Rocker Switch: Press and hold to select the polarity that will be provided at the Output Contact.

C. Touch Plate: Make contact with the touch plate while pressing down the rocker switch to provide voltage to the Output Contact. The operator must be properly grounded during use.

D. Battery Compartment: Slide the cover down to open the 9V battery compartment.

Operation

TAKING OFFSET VOLTAGE (BALANCE) MEASUREMENTS

The Ionisation Test Kit has been designed to match the compact size and hand held convenience of the Digital Static Field Meter. Use the following procedure to verify the offset voltage (balance) of air ionisation equipment. This quick and easy procedure will help determine if the piece of ionisation equipment is working within the manufacturer's specifications or user requirements.

It is extremely important that ionisers be checked regularly for offset voltage (balance) and discharge times. An ioniser operating in an out-of-balance state can place a charge on sensitive electronic components or assemblies.

Note: The Digital Static Field Meter is built in a conductive case. The instrument senses the difference in potential between the case (and the person holding the case / ground connection) and the surface under test. Ensure that the person using the instrument is wearing a wrist strap and grounded to achieve more accurate measurements.

INSTALLING THE ISOLATED PLATE ASSEMBLY

The Digital Static Field Meter's case has two slots along its sides. The top slot is closest to the face of the instrument. Slide down the tabs of the Conductive Plate into the top slot of the Meter's case as far as they go (see Figure 3).



Figure 3. Installing the [19441](#) Conductive Plate

ZERO THE METER

Turn the Meter on by pressing the POWER button. Press the RANGE / ZERO button to set the Meter to the 2 kV (3 decimal places) range. Make contact between the top of the Conductive Plate and a grounded surface. Press and hold the RANGE / ZERO button until the Meter displays “.000”.

MAKING A MEASUREMENT

Locate the Test Kit in an ionised environment at the appropriate distance from the device under test. The static field displayed is the actual balance of the ioniser or voltage offset. The display will indicate “1” or “-1” when the Meter is over-ranged. Change the range of the unit if necessary.

Note: When testing pulsed ioniser systems, the voltage displayed is constantly changing. This pulse rate may be faster than the display update rate of the Field Meter, therefore the displayed voltage is an average of the actual voltage. The output of the Field Meter is useful in this situation for more accurate measurements.



Figure 4. Reading the Digital Static Field Meter while in the $\pm 20\text{kV}$ range



Figure 5. Reading the Digital Static Field Meter while in the $\pm 2\text{kV}$ range



Figure 6. Auditing ionisation equipment with the Digital Static Field Meter and Conductive Plate (Ref: IEC 61340-4-7)

HOLDING THE LAST READING

With the meter positioned 2.5cm from the object being measured, press the HOLD button. This will freeze the reading from the object on the display and the analogue output signal. This feature allows the operator to move the meter where it may be more easily read or saved for later reference.

Note: The red ranging lights will be off while the meter is in HOLD mode. It is advised to do this between measurements to prolong battery life.

ANALOGUE OUTPUT

The analogue output jack labelled “OUT” on the face of the meter accepts a standard 2.5mm monaural phone plug and is provided so the output of the Digital Static Field Meter may be connected to an oscilloscope, strip chart recorder, external meter or other device. The voltage at this output is 1/1000th ($\pm 2\text{kV}$ range) or 1/10,000 ($\pm 20\text{kV}$ range) of the measured voltage. Contact Customer Service for more information.

TAKING DISCHARGE TIME MEASUREMENTS

In order to verify that an ioniser is operating properly it is also important that its ability to neutralise or discharge static electricity is measured. The following procedure will measure an ioniser’s discharge time:

OPERATING THE CHARGER

The Charger has a momentary rocker-switch that powers the unit. Holding the switch forward / backward supplies power to the output terminals.

POLARITY SELECTION

The top of the rocker switch is labelled “+”, and the bottom is labelled “-”. To provide a POSITIVE voltage output, touch the plate located underneath the charger, and press the switch forward at the same time. To provide a NEGATIVE voltage output, touch the plate located underneath the charger, and press the switch downward at the same time.

Note: For the Charger to work correctly, the operator and Field Meter must be properly grounded. A ground path to the touch plate must exist.

IONISER DISCHARGE TIME MEASUREMENTS

Use the Field Meter with the conductive plate in the appropriate location for measurements.

POSITIVE DISCHARGE TIME MEASUREMENTS

To provide a POSITIVE voltage output, touch the plate located underneath the Charger, and press the switch forward at the same time. Momentarily touch the Charger’s output terminal to the conductive plate attached to the Field Meter. The meter reads approximately +1.10kV. By using a stop watch or other timing device, determine the time needed for the voltages to decrease from +1.10kV to +0.10kV. This is the positive discharge time.



Figure 7. Charging the Conductive Plate on the Digital Static Field Meter

NEGATIVE DISCHARGE TIME MEASUREMENTS

To provide a NEGATIVE voltage output, touch the plate located underneath the Charger, and press the switch downward at the same time. Momentarily touch the Charger’s output terminal to the conductive plate attached to the Field Meter. The meter reads approximately -1.10kV. By using a stop watch or other timing device, determine the time needed for the voltages to decrease from -1.10kV to -0.10kV. This is the negative discharge time.

IMPORTANT: A ground path must be provided between the touch plate of the Charger and the ground reference of the Field Meter. This is normally provided by holding the Charger in one hand and the Field Meter with Conductive Plate in the other.

Maintenance

The Digital Static Field Meter is factory calibrated and no maintenance is required. If for any reason you believe the Meter is not working correctly, please contact Desco Europe Customer Service. CAUTION - There are no user serviceable parts. Any unauthorised service will void the warranty and result in additional repair charges.

Note: This Meter is a precision instrument and should not be subjected to dropping as that would void the warranty.

BATTERY CHECK

The battery should be replaced when "BAT" is indicated on the display. Always replace the battery with a 9V alkaline or equivalent battery in order to remain CE compliant.

BATTERY REPLACEMENT

The Digital Static Field Meter operates from a standard 9 VDC alkaline battery. Battery life is in excess of 50 hours under normal use. When the battery voltage drops below 6.5V, "BAT" will appear on the display. To change the battery, slide the battery cover down at the back of the Meter and remove the battery from the battery clip. Replace the battery with a fresh one and reinstall the battery cover. The battery should be removed from the Meter if its is to be stored for an extended period of time.

The battery in the Charger should be replaced annually or when it is unable to provide approximately $\pm 1100V$.

CLEANING

It is important to keep the insulators on the adapter plate clean and free of contaminates that may cause surface leakage. To test the performance of the adapter plate, charge the plate and note the discharge rate in a nonionised area. The self discharge rate to 10% of original voltage should not be less than five minutes.

The area around the aperture of the Digital Static Field Meter must be kept clean to ensure accurate, drift-free readings. Never touch the aperture with anything. To remove dust or other particulate matter, use low-pressure instrument-grade air. To remove more severe contamination, spray or flush with the smallest practical amount of clean technical-grade of isopropyl alcohol. Then allow the instrument to air dry for several hours.

Specifications

STATIC FIELD METER

Performance	
Measurement Range (switch selectable)	
<i>Low Range</i>	0 to $\pm 2kV$ / inch
<i>High Range</i>	0 to $\pm 20 kV$ / inch
Measurement Accuracy	
<i>Voltage Monitor Output</i>	Better than $\pm 5\%$ of reading, 10mV
<i>Voltage Display</i>	Better than $\pm 5\%$ of reading, ± 2 counts
Measurement Stability	± 10 counts
Voltage Monitor	
Output	2 volts output at full scale
Ratio	
<i>Low Range</i>	1/1000 of the measured electrostatic field
<i>High Range</i>	1/10000 of the measured electrostatic field
Front Panel Meter	
Voltage Display	3-1/2 digit LED display
Range	
<i>Low</i>	0 to $\pm 1.999kV$ / inch
<i>High</i>	0 to $\pm 19.99kV$ / inch
Display Resolution	
<i>Low Range</i>	1V / inch
<i>High Range</i>	10V / inch
Sampling Rate	3 readings per second
Features	
Automatic Shut-Off	Unit will shut-off after 20 minutes from last activity
Ranging System	LED distance indicator; aligned targets indicate one (1) inch
Range / Zero Switch	LED distance indicator. Resets the instrument to zero and selects the measurement range.
Low Battery Indicator	An LCD display message indicates when the battery is low
Hold Switch	Retains the LCD display reading when depressed

General

Dimensions	0.9" H x 2.8" W x 4.9"L (24mm x 70mm x 126mm)
Weight	4.9oz. (140g) with battery
Voltage Monitor Connection	2.5mm jack (3/32") monophone
Tip	Signal
Sleeve	Ground

Operating Conditions

Temperature	50 to 86°F (10 to 30°C)
Relative Humidity	To 80%, non-condensing
Altitude	To 2000m

Certifications	CE
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Power Requirements

Power	One (1) 9-volt alkaline battery
Operating Time	Greater than 50 hours, with a new battery at 21°C continuous
Power Switch	A membrane switch that is designed to prevent accidental turn on. Powers the instrument on and off.

IONISATION TEST KIT

Charge Plate Assembly	Aluminium bracket, bare aluminium plate and teflon spacers isolate plate from bracket
Voltage Output	1/1,000 of measured voltage @ low range 1/10,000 of measured voltage @ high range
Charge Plate Area	2.95" W x 1.18" L (7.5cm x 3.0cm)
Charge Plate Assembly Weight	2.4oz. (68g)
Charger Dimensions	1.1" H x 2.6" W x 4.5" L (2.8cm x 6.6cm x 11.4cm)
Charger Weight	5oz. (140g) with battery
Charger Power Requirements	One 9-volt alkaline battery
Charger Output (using Static Field Meter with charge plate)	1.1kV minimum for ± voltage
Certifications	CE

Limited Warranty, Warranty Exclusions, Limit of Liability and RMA Request Instructions

See the Desco Europe Warranty -
DescoEurope.com/Limited-Warranty.aspx