

Digital Static Field Meter Operation and Maintenance



Made in the
United States of America



Figure 1. Desco [19492](#) Digital Static Field Meter

Description

The Desco Digital Static Field Meter indicates surface voltage and polarity on objects. The meter can measure ranges of 0 to $\pm 1.999\text{kV}$ or 0 to $\pm 19.99\text{kV}$ at a distance of 25mm with an accuracy of $\pm 5\%$ of the displayed value. The automatic zero button allows adjustment to zero with no screws or dials to turn. The hold button allows the user to “freeze” a displayed measurement for evaluation. A LED range finder helps the operator to place the meter at the correct distance from the surface being measured. The meter will automatically turn off after 20 minutes to conserve battery power (9V). The Digital Static Field Meter is calibrated with accepted procedures and standards traceable to the National Institute of Standards and Technology.

“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 9V Alkaline Battery
- 1 Certificate of Calibration

Features and Components

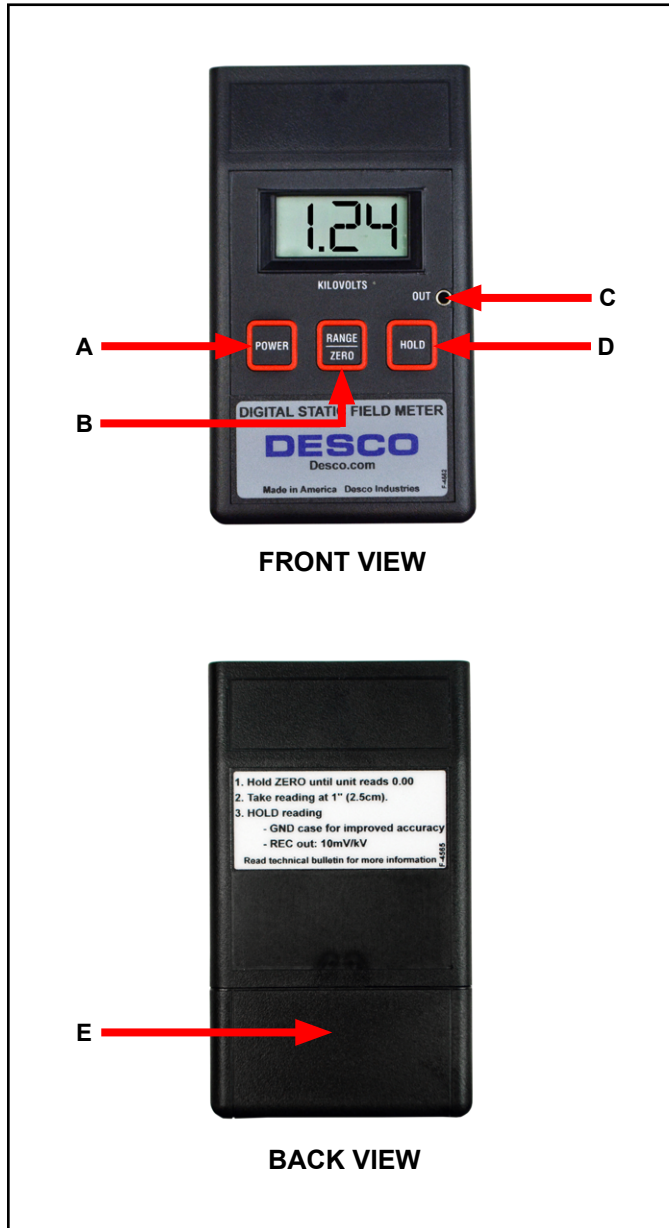


Figure 2. Digital Static Field Meter features and components

A. POWER Button: Press to turn the unit ON and OFF.

B. RANGE / ZERO Button: Press to select the measurement range. Press and hold to zero the meter.

C. Analogue Output Jack: A low-voltage signal of the measured voltage is provided at this output. The voltage is 1/1000th ($\pm 2\text{kV}$ range) or 1/10,000 ($\pm 20\text{kV}$ range) of the measured voltage.

D. HOLD Button: Press to freeze the reading on the display. Press again to return to normal measurement operation.

E. Battery Cover: Slide the cover down to open the 9V battery compartment.

Operation

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.

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.

ZERO THE METER

Turn the meter on by pressing the POWER button. Press the RANGE / ZERO button to set the meter to the 2kV (3 decimal places) range. Point the top of the Meter approximately 25mm away from a grounded metal surface. Use the red LED range guide. The Meter is properly positioned when the projected red bullseyes are centered on top of each other. Press and hold the RANGE / ZERO button until the meter displays “.000”.

MAKING A MEASUREMENT

Place the meter 25mm from the object to be measured. This distance is measured from the front edge of the meter case to the surface of the object. The meter now displays a reading (from 0 to ± 2.00 or ± 2.00) of the electrostatic field in kilovolts per inch.

Note: The red ranging lights are provided to help place the meter at the correct distance from the object. The lights are set to produce a concentric red bullseye pattern on a flat opaque surface 25mm from the front edge of the meter. This can be practiced by aiming the meter at a sheet of white paper.

The display will indicate “1” or “-1” when the meter is over-ranged. Change the range of the unit if necessary. If the measurement exceeds 20kV, move the meter farther away from the object and multiply the reading by the distance (in inches) away from the object being measured. The measurement accuracy is dependent on a stable ground reference and the 25mm measuring distance. It is also dependent on the “aspect ratio”, relating the size of the object to be measured to the measurement distance.



Figure 3. Reading the Digital Static Field Meter while in the $\pm 20\text{kV}$ range



Figure 4. Reading the Digital Static Field Meter while in the $\pm 2\text{kV}$ range

Note: This aspect ratio should be at least 3 for best accuracy, i.e. the object should be at least a 3 inch (75mm) square when measuring at a 1 inch (25mm) distance. Accurate measurements may be made at other measurement distances by scaling the meter range and observing the proper aspect ratio. For example, at a measurement distance of 3 inch (75mm), multiply the meter reading by 3 to give a range of 0 to 60 kilovolts. For accuracy, the object being measured at this distance should be at least a 9 inch (230mm) square.

HOLDING THE LAST READING

With the meter positioned 25mm 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.

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 it is to be stored for an extended period of time.

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 damage would not be covered by the limited warranty.

Specifications

Performance

Measurement Range (switch selectable)

Low Range 0 to ± 2 kV / inch

High Range 0 to ± 20 kV / inch

Measurement Accuracy

Voltage Monitor Output Better than $\pm 5\%$ of reading, 10mV

Voltage Display Better than $\pm 5\%$ of reading, ± 2 counts

Measurement Stability ± 10 counts

Voltage Monitor

Output 2 volts output at full scale

Ratio

Low Range 1/1000 of the measured electrostatic field

High Range 1/10000 of the measured electrostatic field

Front Panel Meter

Voltage Display 3-1/2 digit LED display

Range

Low 0 to ± 1.999 kV / inch

High 0 to ± 19.99 kV / inch

Display Resolution

Low Range 1V / inch

High Range 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

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 Accessories

Desco Europe offers accessories for the Digital Static Field Meter designed to facilitate routine auditing and periodic testing of ionisation equipment (Ref: IEC 61340-4-7). The Meter and accessories combination can be used to test an ioniser's overall performance. This highly portable test kit allows the user to make quick and accurate offset voltage balance level and neutralisation discharge time measurements (counting or using a stopwatch). These accessories are available as Desco item [19440](#) Test Kit Upgrade which includes the Conductive Plate and Charger.

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

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



Figure 5. Installing the [19441](#) Conductive Plate



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