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718 Static Sensor
Installation, Operation and Maintenance

Made in the
United States of America



Figure 1. (Left to right) SCS 718 Static Sensor and SCS 718A Air Ionizer Test Kit.

Description

The SCS Static Sensor 718 is a portable handheld instrument used for locating and measuring electrostatic charges. It can be used to locate ESD trouble-areas, and is a valuable tool for the ESD-control engineer. Used in conjunction with the SCS Air Ionizer Test Kit 718A (sold separately), it can be used for verification and auditing of air ionizers. The Static Sensor 718 is battery-powered and has several measurement features:

Range: measurements can be taken in a 0 to ±1.999 kV or 0 to ±19.99 kV range.

Automatic Zero: push button feature allows easy adjustment to zero. No screws or dials to turn.

HOLD function: allows the User to “freeze” a displayed measurement, for later evaluation.

Automatic shutoff: conserves battery power by shutting off the instrument after 20 minutes of inactivity.

Power Requirements and Battery Installation

1. Both the Static Sensor 718 and SCS Charger 718A use a 9V alkaline battery.
2. To install the battery on either unit:
3. Remove the battery cover, located in the lower back of the unit. To do this, press down on the cover and slide it downward.
4. Pull the battery connector out of the housing, and align the male/female ends of the connector with the proper terminals on the battery.
5. Connect the two and place the connected battery into the housing by inserting the connector end first, then following up with the other end of the battery.
6. Replace the cover.
7. The SCS Static Sensor 718 has a Low Battery indicator. Once the battery is depleted to approximately 6.5 volts, the instrument will show BAT in the display. At this time, the Static Sensor 718 will not produce accurate results and the battery should be replaced.
8. The SCS Charger 718A also has a low battery indicator. This is an LED located at the left-hand side of the unit. When the battery voltage drops below operating level, the LED will light up. At this time, the user should replace the battery. Usage of the Charger 718A under low battery conditions would lead to insufficient voltage levels being generated.

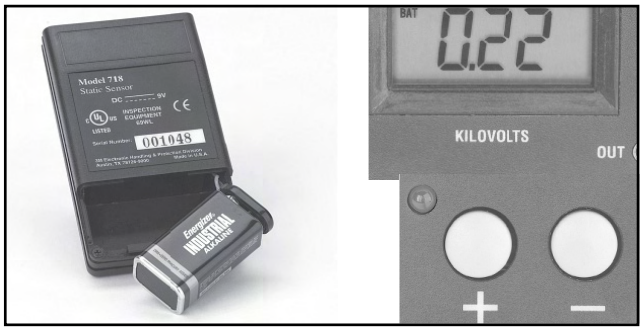


Figure 2. SCS 718 and 718A Battery Replacement and Indicators.

Operation of the Static Sensor 718

For accurate measurements during usage, it is recommended that the outside housing of the Static Sensor 718 be connected to an electrical ground. This can be accomplished by having the user holding the instrument connected to ground through either a static control wrist strap, or while wearing static control footwear. The enclosure of the Static Sensor 718 is made of conductive plastic and is, therefore, electrically connected to whomever is holding the instrument. In addition, ground for the instrument can be provided through the Voltage Monitor Output on the front of the case.

The SCS Static Sensor 718 is a precision electronic instrument. Improper use or rough treatment can damage the unit, and render it incapable of providing accurate measurements.

Turning the unit ON and OFF: To turn on the Static Sensor 718, momentarily press down on the membrane switch labeled POWER. Determining that the power is on can be verified by seeing that the liquid crystal display (LCD) is on, and that the red light-emitting diodes in the front of the sensor are lit.

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To shut off the Static Sensor 718, momentarily press down on the membrane switch labeled POWER. Determining that the power is off can be verified by seeing that the liquid-crystal display (LCD) is off.

Making Electrostatic Voltage Measurements: hold the instrument 1-inch (2.54 cm) away from the object being measured. The display will update with the voltage measurement in kilovolts. If the measured voltage is greater than the measurement range of the instrument, a -1. Will be displayed. At this time, switch to a greater range. If over-ranging occurs even with the high range activated, the static charge on the object cannot be measured with the Static Sensor 718.

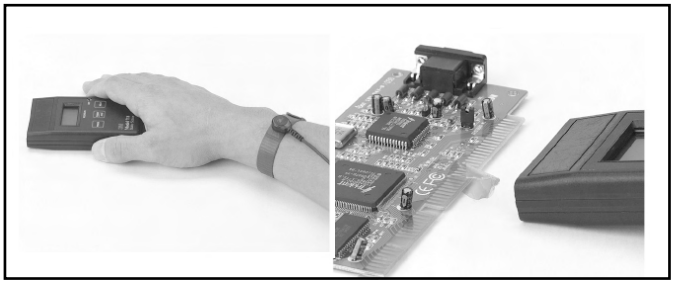


Figure 3. Using 718 Static Sensor to take measurements.

Measurement Range: all measurements are in kilovolts (kV) as stated on the front label of the unit. The Static Sensor 718 has two measurement ranges: 0 to ±1.999 kV and 0 to ±19.99 kV. The unit's current measurement range mode can be verified by checking the display. Three digits following the decimal point indicate that the unit is in 0 to ±1.999 kV range. Two digits following the decimal point indicate that the sensor is in 0 to ±19.99 kV range. To change between measurement ranges, press the RANGE/HOLD button once, momentarily.

HOLD Function: in the event that the user wishes to freeze the current measurement, the HOLD function of the Static Sensor 718 may be used. Simply press the HOLD switch momentarily and the currently displayed voltage will be frozen. A HOLD notice will also be displayed to alert the user that the instrument is currently in HOLD status. To unfreeze the display and return to floating measurement, momentarily press the HOLD switch once again.
Note: During HOLD condition the distance indicating LED's are turned off.

Zero Adjustment: the SCS Static Sensor 718 has a zero adjustment function, which sets a zero reference point for all subsequent measurements. This zero reference can be set by pointing the instrument at a known zero-voltage surface, and holding down the RANGE/ZERO button for longer than 3 seconds. After 3 seconds, the display will flash and adjust to zero. Repeat this step for both the low and the high ranges. The zero adjustment should be performed every time the unit is turned on.

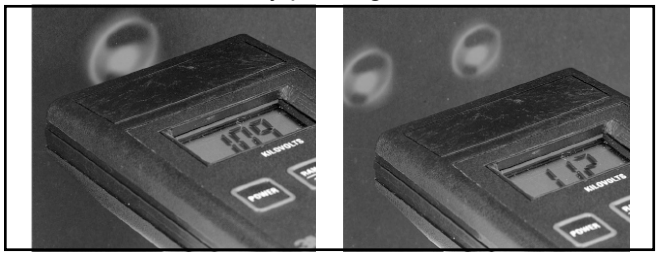


Figure 4. 718 Static Sensor showing hold function and floating measurement function.

Measurement Accuracy: Distance Indicator: the Static Sensor 718 is factory calibrated to give accurate measurements when it is placed one inch (2.54 cm) away from the object to be measured. To assist the user in gauging this distance, two light-emitting diodes (LED's) are present on the front face of the instrument. These LED's emit two red, bull's-eye targets on the surface of the object being measured. As the instrument gets closer to the one inch measurement distance, the bull's-eyes begin to converge. When they converge and become one, the instrument is approximately one inch away, and the measurement can be made. For more accurate measurements, it is recommended that the user manually measure the distance between the front housing of the instrument and the object being measured.

Accuracy and Size of Object to be Measured: the minimum surface area on an electrostatically charged object which can be accurately measured is a 5 square inch (32.3 cm^2) area.

Measurements from Greater than One Inch (2.54 cm) Away: in the event that a one inch separation between object-to-be measured and the Static Sensor 718 cannot be achieved, it is possible to get approximate readings.

Continuous Output: an output jack is provided on the front of the SCS Static Sensor 718. This output can be used to feed a continuous signal into a data storage device for continuous monitoring of measured voltages. Please use a 3/32 inch (2.5 mm) mono-phone plug to connect into the output jack. The output signal is dependent on the measurement range currently selected. For the low range, the output signal is 1/1000 of the measured electrostatic voltage. For the high range, the output signal is 1/10,000 of the measured voltage.

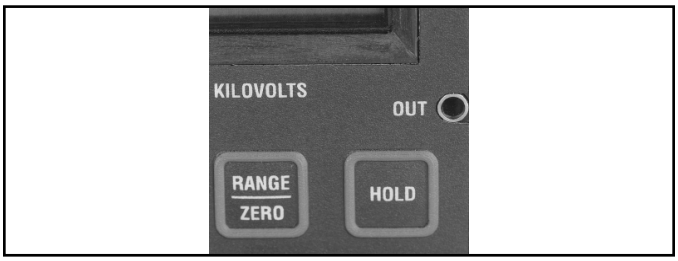


Figure 5. 718 Static Sensor has a continuos output range.

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Automatic Shut-Off: the Static Sensor 718 will automatically shut-off 20 minutes after the last switch activity. This is done in order to conserve battery power. In the event that the user needs to have the unit stay ON continuously, when turning the unit on press the POWER AND RANGE switches simultaneously. This deactivates the Automatic Shut-Off feature. The BAT indicator will then flash three times to indicate that the automatic shut-off features has been disabled. The Automatic Shut-Off feature will reset itself the next time the instrument is turned on.

Operation and Use of SCS Air Ionizer Kit 718A

It is recommended that the user be familiar with ionizer test standards ANSI/ESD S3.1 and draft standard ANSI/ESD SP3.3 if the Air Ionizer Test Kit 718A is used to perform verification testing on ionizer performance.

Assembly: slide the charge plate over the Static Sensor 718 until it stops. The charge plate slides onto the lower groove, on the sides of the Static Sensor 718.



Figure 6. 718 Static Sensor charging plate in use.

Charging the Plate: holding the Static Sensor 718 (with charge plate attached) in one hand, use the other hand to touch the probe of the SCS Air Ionizer Test Kit 718A to the charge plate. Press either the + button (for a positive voltage) or the – button (for a negative voltage), then remove the probe from the charge plate. Be sure to keep the button pressed while removing the probe from the charge plate. The display on the Static Sensor 718 will indicate a positive or negative charging voltage (1.1kV minimum). If a voltage of less than ±1.1kV is displayed, check to see if the low battery indicator on the SCS Charger 718A is illuminated. If illuminated, replace the battery in the charger. If the unit continues to supply an incorrect voltage to the charge plate, please contact SCS for additional instructions.
Testing ionizer discharge time: after charging the plate, hold the SCS Static Sensor 718 approximately one foot (30.5 cm) away from the ionizer. Monitor the display to see how quickly the 1.1 kV charge is dissipated to 0.1 kV. The speed at which this occurs (the discharge time) indicates how well the ionizer is operating. Please refer to the specific ionizer's operating manual or consult with the ionizer manufacturer to determine what this discharge time should be. Repeat this procedure for both a positively and a negatively charged plate.

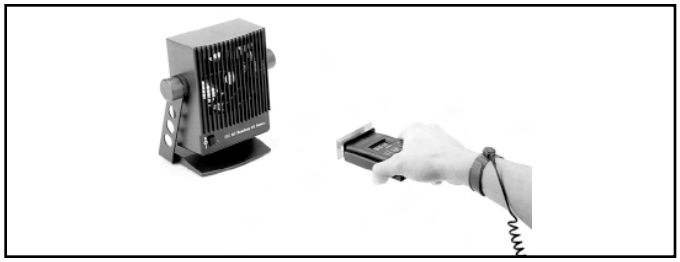


Figure 7. Testing Ionizer Offset Balance.

Testing Ionizer Discharge Time: after charging the plate, hold the SCS Static Sensor 718 approximately one foot (30.5 cm) away from the ionizer. Monitor the display to see how quickly the 1.1 kV charge is dissipated to 0.1 kV. The speed at which this occurs (the discharge time) indicates how well the ionizer is operating. Please refer to the specific ionizer's operating manual or consult with the ionizer manufacturer to determine what this discharge time should be. Repeat this procedure for both a positively and a negatively charged plate.

Testing ionizer offset balance: zero the charge plate by touching it with a grounded object. This can either be the finger of a grounded person or some other item which is connected to electrical ground. In either case, zeroing the charge plate should make the display on the Static Sensor 718 read zero. Hold the Static Sensor 718 approximately one foot (30.5 cm) in front of the ionizer. Monitor the display. The value displayed is the offset balance of the ionizer, which is the difference between the number of positive and negative ions being emitted. Please refer to the specific ionizer's operating manual or consult with the ionizer manufacturer to determine what this offset balance should be.

Service/Calibration

Service and Repair: in the event that you believe the Static Sensor 718 or the SCS Air Ionizer Test Kit 718A is in need of repair, please contact your local SCS representative for troubleshooting help, and, as needed, repair information. There are no user-serviceable parts on either product.

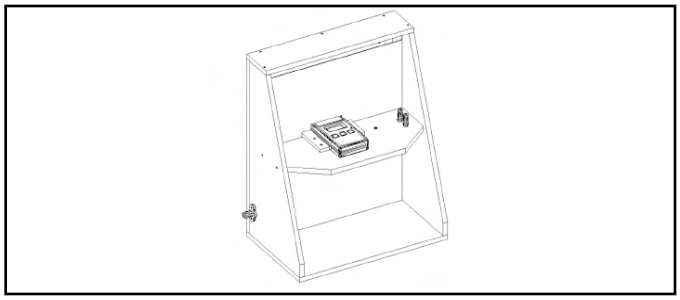


Figure 8. 718 Static Sensor on test fixture.

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Calibration: the SCS Static Sensor 718 and SCS Air Ionizer Test Kit 718A products are supplied by the factory pre-calibrated. SCS does not specify a minimum calibration cycle for the Static Sensor 718 or Air Ionizer Test Kit 718A products. The user, usually according to internal Quality procedures, determines calibration cycles. In the event that the user wishes to perform a self-calibration, the following steps should be followed for the Static Sensor 718 (user-calibration not possible on the Air Ionizer Test Kit 718A).

Equipment Needed: Test Fixture High-Voltage Power Supply, capable of supplying voltages up to 10,000V. Voltmeter, with > 50 kilohms input impedance, capable of measuring voltages down to the µV range. Cable with a 3/32 inch (2.5 mm) mono plug and secondary connector to interface with voltmeter.

Test Fixture: Metal plate of at least 5 square inches area (38.7 cm^2) area. Metal stand capable of supporting Static Sensor 718, and holding it one inch (2.54 cm) away from the metal plate, centered. Connectors on the plate with which it can interface with the high voltage power supply. Connections on the metal stand with which it can be connected to electrical ground.

Procedure: Place the Static Sensor Static Sensor 718 on the metal stand. Verify that it is exactly one inch (2.54 cm) away from the metal plate, and that its position is centered relative to the plate. Connect the stand to ground. Turn on the Static Sensor 718 and set it to the low range. Ground the plate. Zero the display. Remove the ground from the plate, and connect it to the high voltage power supply. Apply a 1 kV charge to the plate.

The instrument should now be reading 1.000. If it is not, remove the battery door and use a screwdriver to turn the small screw located inside the battery compartment. Use a small screwdriver to turn the small screw, located on the front right side of the instrument. This screw should adjust the reading on the display. Once the display has been adjusted to read 1.000, the low range of the SCS Static Sensor 718 is now calibrated. Repeat procedures 5.5.2 - 5.5.6 for the high of the meter, using a test voltage of 5,000 volts.

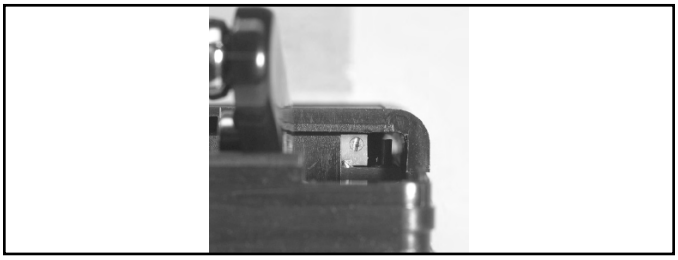


Figure 9. 718 Static Sensor adjustable screw for display.

Specifications

718 STATIC SENSOR

Performance	
Measurement Range (switch selectable)	
Low Range	0 to ±2kV / inch
High Range	0 to ±20 kV / inch
Measurement Accuracy	
Voltage Monitor Output	Better than ±5% of reading, 10mV
Voltage Display	Better than ±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	1 V / inch
High Range	10 V / inch
Sampling Rate	3 readings per second
Features	
Ground Snap Connector	Provides connection for a grounding wire
Automatic Shutoff	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

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General	
Dimensions	0.9" H x 2.8" W x 4.9"L (24 mm x 70 mm x 126 mm)
Weight	4.9 oz. (140 g) with battery
Voltage Monitor Connection	2.5 mm jack (3/32") monophone
Tip	Signal
Sleeve	Ground
Operating Conditions	
Temperature	50 to 86ºF (10 to 30ºC)
Relative Humidity	To 80%, non-condensing
Altitude	To 2000 m
Certifications	cULus, CE
Power Requirements	
Power	One (1) 9-volt alkaline battery
Operating Time	Greater than 50 hours, with a new battery at 21ºC continuous
Power Switch	A membrane switch that is designed to prevent accidental turn on. Powers the instrument on and off.

718A AIR IONIZER TEST KIT

Charge Plate Assembly	Aluminum bracket, bare stainless steel 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	3.25" W x 1.25" L (8.3 cm x 3.2 cm)
Charge Plate Assembly Weight	2.5 oz. (70 g)
Charger Dimensions	0.87" H x 2.4" W x 4.9" L (2.2 cm x 6.1 cm x 12.4 cm)
Charger Weight	5 oz. (140 g) with battery
Charger Power Requirements	One 9-volt alkaline battery
Charger Output (using Static Sensor 718 with charge plate)	1.1 kV minimum for ± voltage
Certifications	cULus, CE

Packaging

718 STATIC SENSOR
1 Static Sensor
1 9V Alkaline Battery
1 Certificate of Calibration

718A AIR IONIZER TEST KIT
1 Charge Plate Assembly
1 Charger
1 9V Alkaline Battery
1 Certificate of Calibration

Safety Information

Intended Use:
The SCS Static Sensor 718 is a portable, handheld instrument designed for measuring voltages associated with electrostatic charge. Its intended use is for measuring the amount of voltage, in a range from 19.99 kilovolts, associated with an electrostatic charge buildup on a surface. Any deviation from this intended use could impair the instrument's effectiveness and possibly lead to an unsafe operating condition.
The SCS Air Ionizer Test Kit 718A is a set of accessories for use in conjunction with the Static Sensor 718. Their intended use is for verifying the operation of air ionizers by measuring the neutralization time for a static charge placed on a stationary metal plate. Any deviation from this intended use could impair the instrument's effectiveness and possibly lead to an unsafe operating condition.

Caution:
The Static Sensor 718 and SCS Charger 718A use 9VDC power supplied by a 9V alkaline battery. Usage of any other power source may cause damage to the instruments.

The Static Sensor 718 and Air Ionizer Test Kit 718A have no user-serviceable parts. Do not disassemble the products for any reason. UNAUTHORIZED SERVICE WILL VOID THE WARRANTY.

The Static Sensor 718 and Charger 718A are NOT designed for usage in hazardous environments where the possibility of explosion or fire exists.

Regulatory Information

WEEE Statement

The following information is only for EU-members States: The mark shown to the right is in compliance with Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE). The mark indicates the requirement NOT to dispose the equipment as unsorted municipal waste, but use the return and collection systems according to local law.

cULus Statement
Meets UL Safety Requirements.

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FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help. Restriction of the use of certain hazardous substances (RoHS): Meets 2011-65-EU Directive.

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