



Operators Manual

True RMS Voltstick

Distribution Voltmeter

Model 8-031

Model 8-033

Model 8-034

SensorLink[®] Corporation 

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Safety Information

The Voltstik is designed solely for use when attached to a suitable universal hot stick. All precautions appropriate for the line voltage should be taken. The hot stick should be considered the sole voltage isolation device between the line and the operator. The high voltage insulator on the right side of the Voltstik case is the sole high voltage isolation device between the two high voltage measurement points. This insulator must be kept clean and in good condition. This is the part of the instrument that isolates one high voltage potential from another. Dirt, moisture, or mechanical damage will reduce this insulator's ability to insulate high potentials and could result in flash over of the insulator. A small amount of alcohol on a rag may be used to remove dirt and grease. If physical damage is observed on the insulator, it should be sent back to the factory for test and repair. No support structures or other high voltage lines should be near any part of this insulator during measurements. Particular caution should be used to keep the Voltstik electrodes from compromising the spacing between phases or from high voltage to ground.

CAUTIONS:



THE CHUCK AND THE ENTIRE METER COMPARTMENT OF THE VOLTSTIK IS AT THE SAME POTENTIAL AS THE COMMON OR LEFT ELECTRODE. WHEN THE EXTENSION CABLE IS CONNECTED TO GROUND, NEUTRAL, OR ANOTHER PHASE KEEP THE CHUCK AND THE ENTIRE METER COMPARTMENT AWAY FROM THE PHASE YOU ARE MEASURING OR ANY OTHER HIGH VOLTAGE SOURCE. THE HIGH VOLTAGE PROBE (THE RIGHT SIDE OF THE INSTRUMENT) IS THE SOLE ISOLATION DEVICE BETWEEN THE TWO MEASUREMENT POINTS.



MAINTAIN ALL PERSONNEL A MINIMUM OF 2 METERS AWAY FROM THE EXTENSION CABLE.



SECURE WITH A WIRE TIE ANY SLACK PORTIONS OF THE EXTENSION CABLE NOT REQUIRED FOR COMPLETING A MEASUREMENT.



THE VOLTSTIK SHOULD ONLY BE USED BY PERSONNEL TRAINED IN SAFE METHODS OF UTILIZING HOT STICKS IN PRIMARY VOLTAGE ENVIRONMENTS.



THE SAFETY CONSIDERATIONS OF HOW TO USE THE VOLTSTIK SHOULD BE PART OF THE TAIL GATE SAFETY MEETING EVERY TIME THE VOLTSTIK IS USED.

Specifications

The Voltstik has been developed specifically for measurement of AC voltage in the electrical utility industry. This instrument can be used remotely with any hotstick and universal chuck adapter. It will measure voltage up to 20, 30 or 40 KV depending on our model. This instrument can be used for voltage measurements on phase-to-phase, phase to ground, underground cable, and regulator tap settings. The instrument performs an automatic self test to verify operation. The case is water resistant and will withstand high physical impact. The following specifications apply:

Model Number	8-031	8-033	8-034
Range of Operation Voltage	0-20kVAC	0-30kVAC	0-40kVAC
Resolution			
Voltage 0-2kVAC	1V	1V	1V
Voltage 2-20kVAC	10V	10V	10V
Voltage 20+kVAC		100V	100V
Voltstik Weight	2.2 lbs 1 kg	2.4 lbs 1.09 kg	2.6 lbs 1.18 kg
Accuracy	±2%		
Operation			
Controls	One button operation		
Electrodes	Detachable		
Frequency	60 Hz (57 to 63 Hz) or 50 Hz (47 to 53 Hz) Models Available		
Mechanical			
Display	3.5 Digit Display		
Housing	Shock & water resistant molded urethane		
Hotstick mounting	Universal chuck adapter (Hotstick not included)		
Battery	9 volt alkaline		
Operating Temperature	-30 to +60 degrees C -22 to +140 degrees F		
Options			
10 Ft (3.28m) Coiled Extension Cable		Model 7-032-10 Coiled	
10 Ft (3.28m) Straight Extension Cable		Model 7-032-10	
20 Ft (6.56m) Straight Extension Cable		Model 7-032-20	
30 Ft (9.84m) Straight Extension Cable		Model 7-032-30	
40 Ft (13.12m) Straight Extension Cable		Model 7-032-40	
Regulator Electrode - 20kV only (For tap regulator and close metering points)		Model 7-034	
Soft Carrying Case		Model 8-037	
Hard Carrying Case		Model 7-042	

OPERATING INSTRUCTIONS

The Voltstik is controlled by the single push button switch located on the front panel, and is operated as follows:

- 1. Press the control switch momentarily to turn the VOLTSTIK on.**
Each time the Voltstik is turned on it conducts a series of tests. First all number segments of the LCD will light up using the following screens.

LOBAT VOLT KV HOLD	242
	1888
LOBAT VOLT KV HOLD	0.0.2
VOLT	671

The above screens indicate approximate numbers that may vary from meter to meter. They should, however be consistent every time you turn on your individual meter.

The unit will measure an internal signal and the display will read about 6 to 12 KV.

KV	11.42
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This signal voltage is injected into the input of the electronics and in order for the display to read correctly, all electronics and autoranging must be properly functioning. This test is very important if the meter is to be used for presence or absence of voltage.

OPERATING INSTRUCTIONS (Continued)

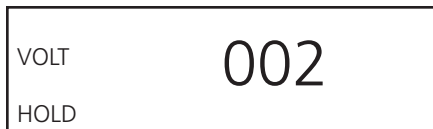
The final screen of the test sequence will display the voltage field that is ambient around the meter. They are typically less than 5 volts.



The Voltstik is now in the normal measurement mode. It can be used to make voltage measurements by connecting the Voltstik between different potentials, using the connection points located at the end of the high voltage probe and on the left side of the case.

2. Press the control switch a second time to go to the sample and hold mode.

The VOLTSTIK is now in the sample and hold mode and this is indicated by the word HOLD showing on the display.



The word "HOLD" will flash when the instrument has obtained a valid reading. The Voltstik must be held steady across the voltage for 3-4 seconds to obtain a valid Hold. To clear the reading, press the button again and note that the word HOLD disappears from the display. To enter hold mode again, press button and note the word HOLD again appears in the display.

3. The VOLTSTIK will automatically change ranges. The Voltstik will automatically change to the correct range, either up or down.

4. The VOLTSTIK will turn itself off automatically after several minutes of inactivity.

If it is desired to turn the unit off manually, press and hold the button down until all the words disappear from the left side of the LCD display and then let go.

OPERATING SUGGESTIONS AND FEATURES

When using the "hold" mode, the instrument looks for a stable connection to the line before capturing the reading. Many lines are oxidized and getting a stable connection can be difficult. If a poor connection is made, the Voltstik will not hold the reading. This is not a malfunction but a feature to prevent erroneous readings due to poor connections. Use the rough electrodes of the Voltstik accessory probes as a file to clean a spot for good connection. Also, hold the meter steady with some pressure against the wires to insure a good connection to the line.

The autoranging feature of the instrument is designed to provide accurate measurement of low voltage measurements across regulators, or good resolution of zero voltage measurements. However, if the instrument is accidentally connected across high voltage phases, slips into the next phase, or one electrode touches ground while the other is connected to high voltage, the instrument will safely move to the higher range and provide a reading. This is an important safety feature.

When making high voltage measurements the "Hold" mode should be used whenever possible. This allows the user to concentrate completely on getting the instrument safely into position, making a good connection, and safely removing the instrument from the high voltage structure. No attention need be devoted to reading the display while at high voltage. If readings are attempted while connected to the high voltage, care must be taken not to be distracted from physically controlling the instrument or allowing the meter to slip. Extra care must be taken to prevent the chuck or hotstick connection from getting too near ground structures. This will result in a flash from the left side electrode to ground.

MAKING PHASE TO GROUND MEASUREMENTS

The following meter and accessories are required to make a phase to ground measurement:

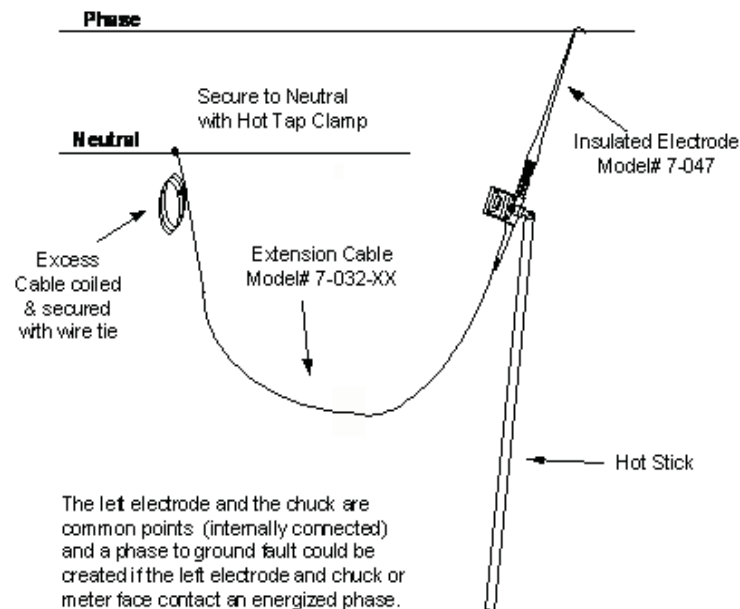
- One Voltstik rated for the nominal voltage of the conductor. Model# 8-031 (20KV), 8-033 (30KV), or 8-034 (40KV)
- One Insulated Electrode Part# 7-047, 7-036, or 7-037
- One Extension Cable long enough to reach phase to ground. Part # 7-032-10 (10'), 7-032-20 (20'), 7-032-30 (30'), or 7-032-40 (40')
- One Hot Tap Clamp (not provided by SensorLink Corporation)
- One Hotstick with universal chuck (not provided by SensorLink Corporation)

1. **Attach the Voltstik to a hotstick.**
2. **Attach the Insulated Electrode on the High Voltage or right side (right side when looking at the face of the instrument) and a straight or hooked probe into the end of the Insulated electrode.**

Note: Insulated Electrode Part# 7-047 can be substituted with Part Numbers 7-036 and 7-037.

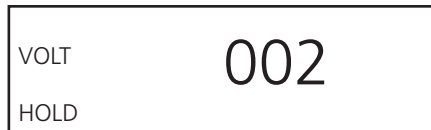
3. **Attach Extension Cable to the common, or left side, of the Voltstik. The other end of the Extension Cable should then be attached to a known ground source.**

Use a standard hot tap clamp for this connection.



MAKING PHASE TO GROUND MEASUREMENTS (CONTINUED)

4. **Turn the Voltstik on by pressing the button on the face of the instrument.** It will perform an auto self test to verify valid operation. The final step of this test will leave the instrument indicating a floating number, typically 000 to 005 volts. (To view start up screens see Operating Instructions.)
5. **Press the button and the word HOLD will appear.**



6. **The Voltstik is now ready for measurement. Place the probe that is on the end of the Insulated Electrode directly on the conductor to be measured.** You can use the serrated edges of the probe to saw through any built up corrosion. Leave the probe on the conductor for 3 to 4 seconds. The word "HOLD" will flash when the instrument has obtained a valid reading. If any voltage is present on the conductor, the Voltstik will hold the number for you to read. It will continue to flash the word HOLD until you pull the instrument down and either press the button or leave the unit unattended for 5 minutes.

CAUTIONS:



THE CHUCK AND THE ENTIRE METER COMPARTMENT OF THE VOLTSTIK IS AT THE SAME POTENTIAL AS THE COMMON OR LEFT ELECTRODE. WHEN THE EXTENSION CABLE IS CONNECTED TO GROUND, NEUTRAL, OR ANOTHER PHASE KEEP THE CHUCK AND THE ENTIRE METER COMPARTMENT AWAY FROM THE PHASE YOU ARE MEASURING OR ANY OTHER HIGH VOLTAGE SOURCE. THE HIGH VOLTAGE PROBE (THE RIGHT SIDE OF THE INSTRUMENT) IS THE SOLE ISOLATION DEVICE BETWEEN THE TWO MEASUREMENT POINTS.



MAINTAIN ALL PERSONNEL A MINIMUM OF 6 FEET (2 METERS) AWAY FROM THE EXTENSION CABLE.



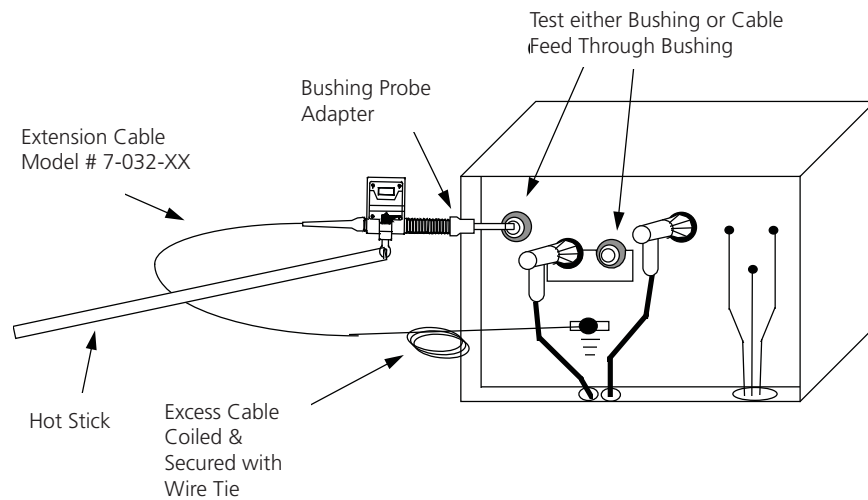
SECURE WITH A WIRE TIE ANY SLACK PORTIONS OF THE EXTENSION CABLE NOT REQUIRED FOR COMPLETING A MEASUREMENT.

MAKING PHASE TO GROUND MEASUREMENTS ON UNDERGROUND ELBOWS

The following meter and accessories are required to make a phase to ground measurement:

- One Voltstick rated for the nominal voltage of the conductor.
Model # 8-031 (20KV), 8-033 (30KV), or 8-034 (40KV)
- One Insulated Electrode Part# 7-047, 7-036, or 7-037
- One Extension Cable long enough to reach phase to ground Part# 7-032-10 (10'), 7-032-20 (20'), 7-032-30 (30'), or 7-032-40 (40')
- One Bushing Probe Adaptor Part# 7-041-1/4-20, or 7-041-3/8-16
- One Bushing Probe (not provided by SensorLink Corporation)
- One Hot Tap Clamp (not provided by SensorLink Corporation)
- One Hotstick with universal chuck (not provided by SensorLink Corporation)

1. **The Voltstick should be attached to a hotstick. It should be equipped with a Bushing Probe Adapter on the High Voltage or right side (right side when looking at the face of the instrument) and an Extension Cable should be attached to the common or left side.**
2. **A third party Bushing Probe can now be attached to the Bushing Probe Adapter.**
3. **The end of the Extension Cable should then be attached to a known ground source.**



The left electrode and the chuck are common points (internally connected) and phase to ground fault could be created if the left electrode and chuck or meter face contact an energized phase.

Making Phase to Ground Measurements ON UNDERGROUND ELBOWS (Continued)

4. Turn the Voltstik on by pressing the button on the face of the instrument. It will perform an auto self test to verify valid operation. The final step of this test will leave the instrument indicating a floating number, typically 000 to 005 volts.
5. Press the button and the word HOLD will appear.



6. The Voltstik is now ready for measurement. Place the Bushing Probe end of the Voltstik directly in the bushing to be measured. Leave the probe in the bushing for 3 to 4 seconds.
The word "HOLD" will flash when the instrument has obtained a valid reading. If any voltage is present in the elbow, the Voltstik will hold the number for you to read and continue to flash the word HOLD until you either press the button or leave the unit unattended for 5 minutes.

CAUTIONS:



MAINTAIN ALL PERSONNEL A MINIMUM OF 6 FEET (2 METERS) AWAY FROM THE EXTENSION CABLE.



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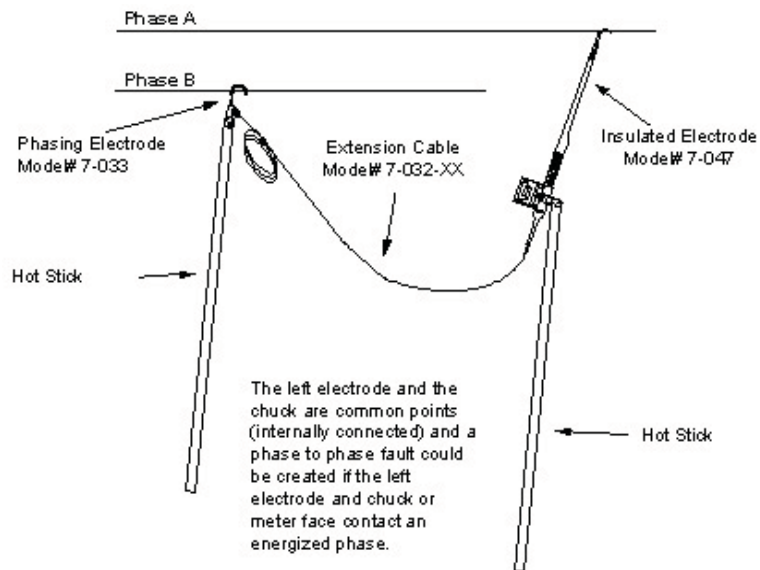
Making Phase to Phase Measurements With two Hot Sticks

The following meter and accessories are required to make a phase to phase measurement:

- One Voltstik rated for the nominal phase to phase voltage of the conductor. Model# 8-031 (20KV), 8-033 (30KV), or 8-034 (40KV)
- One Insulated Electrode Model# 7-047, 7-036, or 7-037
- One Extension Cable long enough to reach phase to phase Model # 7-032-10 (10'), 7-032-20 (20'), 7-032-30 (30'), or 7-032-40 (40')
- One Phasing Electrode Model# 7-033
- Two Hotsticks with universal chucks (not provided by SensorLinkCorporation)

1. **Attach the Voltstik to a hotstick.**
2. **Attach the Insulated Electrode on the High Voltage or right side (right side when looking at the face of the instrument) and a straight or hooked probe into the end of the Insulated electrode.**

Note: Insulated Electrode Part# 7-047 can be substituted with Part Numbers 7-036 and 7-037.



MAKING PHASE TO PHASE MEASUREMENTS (Continued)

- 3. Attach Extension Cable to the common or left side of the Voltstik. The other end of the Extension Cable should then be attached to a Phasing Electrode Part# 7-033 which is then attached to another hotstick.**
- 4. Turn the Voltstik on by pressing the button on the face of the instrument.**

It will perform an auto self test to verify valid operation. The final step of this test will leave the instrument indicating a floating number, typically 000 to 005 volts.

- 5. Press the button and the word HOLD will appear.**
- 6. The Voltstik is now ready for measurement.**

SensorLink recommends that two people work in tandem when making Phase to Phase measurements. The two hotsticks must be brought to the line and removed from the line at the same time. Otherwise high voltage may be conducted from the line to personnel. Place the Standard Probe or Insulated Electrode end of the Voltstik directly on one of the phases to be measured and the Phasing Electrode on the other phase to be measured. Use the rough edges of the probe to file through any built up corrosion. Leave the probes on the conductors for three to four seconds. The word "HOLD" will flash when the instrument has obtained a valid reading. The Voltstik will hold the number for you to read. It will continue to flash the word "HOLD" until you pull the instrument down and either press the button or leave the unit unattended for five minutes.

CAUTIONS:



MAINTAIN ALL PERSONNEL A MINIMUM OF 6 FEET (2 METERS) AWAY FROM THE EXTENSION CABLE.



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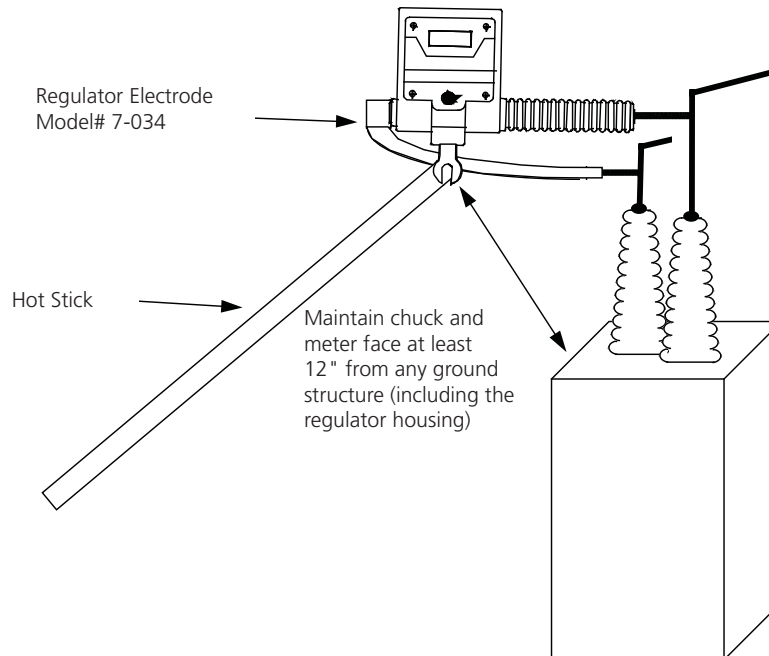
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MAKING MEASUREMENTS ON A TAP REGULATOR

TAP switching voltage regulators are installed to either buck or boost the voltage of a circuit. Before they can be de-energized, they need to be set so that they neither buck nor boost the circuit. The 20 KV Voltstik, because of its accuracy, is an excellent instrument for this task.

The following meter and accessories are required to make a measurement on a Tap Regulator:

- One Voltstik Model# 8-031 (20KV)
 - One Regulator Electrode Part# 7-034
 - One Hotstick with universal chuck (not provided by SensorLink Corporation)
1. The Voltstik should be attached to a hotstick. It should be equipped with a Standard Probe on the High Voltage or right side (right side when looking at the face of the instrument) and the Regulator Probe should be attached to the common or left side. The Regulator Probe can be adjusted so that the tips of the probes can touch the bushings of the regulator. This will allow you to make a measurement between the two bushings.

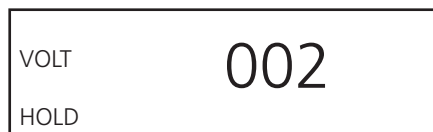


MAKING MEASUREMENTS ON A TAP REGULATOR (Continued)

2. **Turn the Voltstik on by pressing the button on the face of the instrument.**

It will perform an auto self test to verify valid operation. The final step of this test will leave the instrument indicating a floating number, typically 000 to 005 volts.

3. **Press the button again and the word HOLD will appear.**



4. **The Voltstik is now ready for measurement. Place the Voltstik directly on the two bushings.**

You can use the rough edges of the probe to file through any built up corrosion. Leave the probes on the conductors for 3 to 4 seconds. The word "HOLD" will flash when the instrument has obtained a valid reading. The Voltstik now should be reading the voltage potential between the two bushings. The Voltstik will hold the number for you to read and continue to flash the word HOLD until you pull the instrument down and press the button. You may want to make a TAP adjustment and measure the voltage potential again prior to taking the regulator off line. Press the button until the word HOLD stops flashing. This indicates that the unit is ready to make another reading.

CAUTIONS:



DO NOT TOUCH THE REGULATOR HOUSING OR ANY OTHER PART OF THE REGULATOR OTHER THAN THE INTENDED CONTACT POINTS.



KEEP THE UNIVERSAL CHUCK OR HOTSTICK CONNECTOR CLEAR OF THE REGULATOR HOUSING OR OTHER GROUND STRUCTURES.



THE REGULATOR ELECTRODE (LEFT SIDE OF THE VOLTSTIK) AND THE CHUCK ARE COMMON POINTS (INTERNALLY CONNECTED).

Battery Replacement

When the "LOBAT" indication shows on the display, the battery should be replaced.



The unit will continue to operate for at least the rest of the day. The Voltstik is powered by a single 9V battery. To replace the battery, remove the four screws on the battery cover at the rear of the unit. Carefully insert a screwdriver blade in the notch and pry the cover out, being careful not to damage the cover seal. Pull the battery out of the compartment and separate the battery from the battery connector. Do not pull on the battery wires. Install a fresh battery and reinsert the battery in its compartment. Do not pinch the wires between battery and compartment; put wires in slot above the battery. Reinstall the cover by gently pressing it into place while pulling out on the edges of the compartment, and reinstall the four cover screws. Take care to avoid over tightening the screws. Always reuse the screws provided and do not damage or lose the o-ring seal on each screw.

Carrying Cases



Hard Carrying Case
Hard Carrying Case can be requested at the time of order. Part# 7-042



Soft Carrying Case
Soft Carrying Case can be requested at the time of order. Part# 8-037

ACCESSORIES

<p>10' Coiled Extension Cable Part # 7-032-10 10' Straight Extension Cable Part # 7-032-10 20' Straight Extension Cable Part # 7-032-20 30' Straight Extension Cable Part # 7-032-30 40' Straight Extension Cable Part # 7-032-40</p>	
<p>10' Coiled Extension Cable Part # 7-032 COILED CABLE</p>	
<p>Phasing Electrode Part # 7-033</p>	
<p>Regulator Probe Part # 7-034</p>	
<p>Insulated Electrodes Part # 7-047</p>	
<p>Bushing Probe Adapter Part # 7-041</p>	

SensorLink® Corporation Warranty

SensorLink Corporation warrants each instrument it manufactures to be free from defects in materials and workmanship under normal use and service for the period of one year after date of shipment. Within this period, SensorLink Corporation agrees to repair or replace, at SensorLink Corporation's option, any instrument that fails to perform as specified. This Warranty shall not apply to any instrument that has been:

- 1) Repaired, worked on, or altered, including removal of the front panel, by persons unauthorized by SensorLink Corporation in such a manner as to injure, in SensorLink Corporation's sole judgment, the performance, stability, or reliability of the instrument;
- 2) Subjected to misuse, negligence, or accident; or
- 3) Connected, installed, adjusted, or used otherwise than in accordance with the instructions furnished by SensorLink Corporation.

This Warranty is in lieu of any other warranty, expressed or implied. SensorLink Corporation reserves the right to make any changes in the design or construction of its instruments at any time, without incurring any obligation to make any change whatever in units previously delivered.

If a failure occurs, contact the manufacturer for a Return Authorization and instructions for return shipment. This warranty constitutes the full understanding of the manufacturer and buyer, and no terms, conditions, understanding, or agreement purporting to modify or vary the terms hereof shall be binding unless hereafter made in writing and signed by an authorized official of SensorLink Corporation.

Quality Assurance Certification
20KV, 30KV, 40KV Voltstik Meter
Model 8-031, 8-033, 8-034

SensorLink certifies that its calibration measurements are traceable to the National Institute of Standards and Technology (NIST), to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

This document certifies the following Voltstik was tested at the SensorLink Corporation High Voltage Laboratory, Ferndale, WA, USA to the appropriate standard and comply with the requirements of that standard.

Serial Numbers _____

Model Number _____

I hereby certify that the Voltstik listed above has passed all tests defined in the SensorLink Corporation standard. I also certify that I have reviewed the standard and test procedure and that they are sufficient in determining compliance with the standard.

Signed _____

Date _____

06/05
DOPM-803-100
Manual Revision V44



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