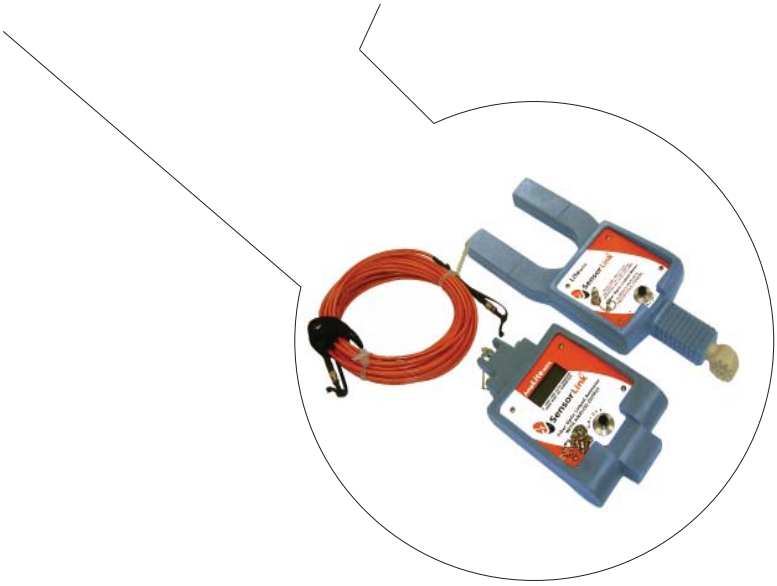

Operators Manual

Amp Litewire

Fiber Optic Coupled Ammeter

SensorLink®

Wide Jaw Amp Litewire Sensor Transmitter
Model: 8-016

Amp Litewire Sensor Transmitter
Model: 8-015 XT

Amp Litewire Receiver

Fiber Optic Cable
Model: 7-026-1

Operators Manual
Amp Litewire
Fiber Optic Coupled Ammeter

Available Stock Codes:			
8-015 XT 50HZ	8-015 XT 60HZ	8-015 XT EURO	
8-016 50HZ	8-016 60HZ	8-016 EURO	
6-026	6-027		

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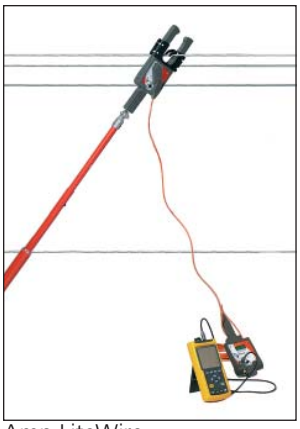
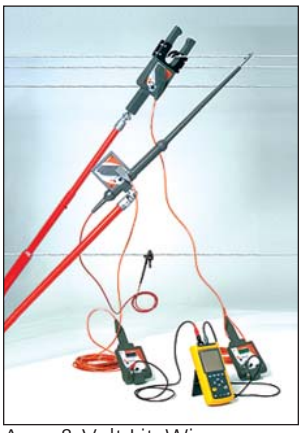


Amp LiteWire



Amp & Volt LiteWire

Theory of Operation

The Amp Litewire is a two piece, True RMS ammeter with a fiber optic link between the high voltage amp sensor transmitter and the readout at ground potential. The amp sensor transmitter is mounted on a hotstick (insulated pole) and slipped over a high voltage line. A fiber optic cable connects the amp sensor transmitter to a receiver unit at ground potential, which contains the digital readout and an analog output. The instrument has no moving parts and does not require clamping onto the wire. The cases are water resistant and will withstand high physical impact.

The analog output is the unique feature of this instrument. It is a reproduction of the high voltage current waveform that will display up to the 50th harmonic, but available as a 0-2 volt AC signal at ground. This allows the use of many sophisticated low voltage instruments, such as scopes, waveform acquisition recorders, analyzers, and other analysis instruments which would previously not be usable at high voltage.

The fiber optic cable is physically rugged while providing the high speed data path required for digital waveform transmission from the sensor to the display unit. It also is the high voltage insulator between the two units.

The Amp LItewire may be used with the Volt Litewire to maintain power systems and troubleshoot power problems.

SAFETY INFORMATION

The Litewire is designed for use when attached to a suitable universal hotstick. All precautions appropriate for the line voltage should be taken. The sensor transmitter unit of the Litewire is not designed to be a high voltage insulator. The sensor transmitter should not bridge between conductors or between a conductor and ground. Be careful not to allow the universal chuck adaptor or the metal parts of the hotstick to bridge between high voltage and ground or between two high voltage points.

The fiber optic cable is a high voltage insulator and will isolate equipment and personnel in the same manner as a fiber glass hot stick. Visually inspect and clean the fiber with a non-abrasive hot stick wipe. The fiber should be replaced if the visual inspection reveals a flaw of a void or a hole in the finish of the fiber. The fiber should also be tested to determine its electrical insulation properties. If a fault is observed, the fiber should be replaced.

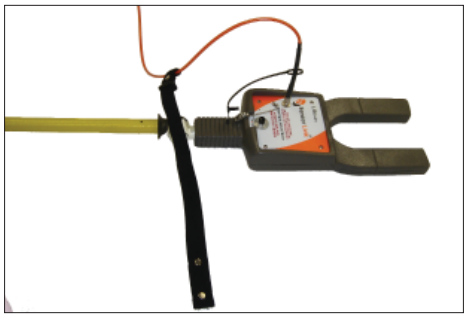
Specifications

Model Number	8-015 XT	8-016	6-026	6-027
Sensor Opening	Standard	Wide Jaw	Standard for Powermetrix	Ultra Wide Jaw for Powermetrix
Opening Width	2.5" 6.35 cm	3.86" 9.84 cm	3.86" 9.84 cm	6" 15.24 cm
Weight	4.8 lbs 2.18 kg	6.0 lbs 2.73 kg	6.0 lbs 2.73 kg	6.8 lbs 3.084 kg
Range of Operation				
Current	1-2000 A	1-2000 A	1-2000 A	1-2000 A
Voltage Environment	up to 150 kV	up to 150 kV	up to 150 kV	up to 69 kV
Accuracy	±1.5 %			
Resolution				
Amps 1-199.9	.1 A			
Amps 200-2000	1 A			
Frequency				
50Hz Calibrated	47 to 53 Hz			
60Hz Calibrated	57 to 63 Hz			
Analog Output	One mv RMS per Amp on both the low range and the high range. Output connector is BNC. No DC offset voltage.			
Output Impedance	6000 ohms minimum			
Frequency Response	3000 Hz or to the 50th harmonic			
Fiber Optic Cable				
Standard Length	40 ft, 12.19 m			
Isolation	100 kV per Foot, 150 kV max			
Mechanical				
Ambient Temperature	-22° to +140° F, -30° to +60° C Lithium battery required for use below -4°F (-20° C)			
Display	3.5 Digit Display in Receiver			
Housing	Shock and Water resistant molded urethane			
Hotstick Mounting	Universal Chuck Adaptor (hot stick not included)			
Battery	9 volt, one per Transmitter and Receiver			

OPERATING INSTRUCTIONS

The Litewire is controlled by the single push button switch located on the front panel of each unit, and is operated as follows:

1. Connecting the Fiber Optic link
   Work with one end at a time
   Uncover the dust cap on the male connector
   Uncover the dust cap on the female receiver, located on the sensor transmitter
   Line-up the male connector and insert into the female receiver
   Push and twist to lock into place
   Repeat the process on the opposite end of the fiber for the receiver unit
2. Attach units to the hot stick
   Attach the sensor transmitter to a universal hot stick (Insulated Pole)
3. Attach the Strain Relief Strap
   Wrap the velcro securely around the handle of the Transmitter as shown below



4. Press each switch once to turn on each unit of the Litewire
   The lower unit will activate the digital display when it is turned on.

5. Measurement Modes:
   Auto Range Mode (low/high range)
   If digits are showing in the digital display of the receiver as shown in figure 2.0, the LiteWire is in the normal Autor Ranging measurement mode.

Figure 2.0

To use the Litewire in this mode, place the sensor transmitter so the current carrying wire is between the jaws into the sensor and observe the display on the receiver. The current in the wire will be continuously displayed. The digital display is auto ranging and the current may always be read directly from the receiver. No sample and hold mode is necessary since the readings can be observed at the operator's location.

High Range Mode (exclusive high range)
It may be necessary to have the unit in the high current range before a high current transient takes place. This prevents the Litewire from missing the transient while it is trying to switch ranges. Press the power on/off switch of the amp sensor transmitter. The unit will now be in the High Range mode.

Figure 2.1

The resolution of the display will not display a decimal point, as in figure 2.1.

6. Hanging the Unit
   A detachable hook, ordered separately, is available to allow the amp sensor transmitter and its hotstick to hang temporarily from overhead wires.
   **The unit should never be left unattended while hanging.
   **The receiver unit should never be allowed to hang free.
   **The receiver unit should always be placed on a solid surface.

7. Output
   At the same time that the digital display is responding, an analog replica of the high voltage current waveform is available at the BNC connector. This signal may be read with any instrument that is capable of reading 0-2 volt AC and having an input impedance of 6000 ohms or greater. A portable oscilloscope, waveform recorder, or power analyzer may be used. You will need the following equipment to output to an analog device:
   (1) Amp Litewire: 8-015 XT Narrow Jaw or 8-016 Wide Jaw
   (1) Hanger Assembly: 7-017 Narrow Jaw or 7-016 Wide Jaw
   (1) 7-011-CABL
   (1) 7045 Hard Carrying Case

8. Extending the Power Off time-out
When the Amp Litewire sensor transmitter is powered on, the user has two minutes to place it on a conductor with greater than 7-10 Amps.
To extend the time to 10 minutes the user needs to place the sensor transmitter in the High Range mode. If the Auto Range is desired, press the on/off button on the sensor transmitter an additional time. The user now has 10 mintues to place it on a conductor with greater than 7-10 Amps.

9. Powering the unit OFF
Either unit may be manually turned off by holding its button down for 4-8 seconds.

NOTE: The Litewire meters will automatically turn themselves off if there is no signal detected during a time out period. This feature is designed to save battery power. If an automatic time-out occurs, the units will have to be manually restarted. The amp sensor transmitter will turn off first and the receiver will always turn off one minute after losing communications with the amp sensor transmitter.

Upon initial power-up of the units, if there is no signal detected within a one minute time period, the Amp Sensor/Transmitter unit will automatically turn itself off. If a signal of 7-10 amps or greater is detected within the one minute time period, the unit will continue to operate, or as long as the battery will operate the unit.

TROUBLESHOOTING GUIDE

Why are there dashes on the display?

Dashes on the display indicate that the amp sensor transmitter is not communicating. Troubleshoot the communications:

a. Make sure the amp sensor transmitter is powered on

b. Make sure the battery in the amp sensor transmitter has 8.5VDC or greater

c. Check the fiber end and ferule for dirt. See page nine and ten for the fiber optic cable handling and cleaning instructions

d. Replace the Fiber Optic Cable

Why is my unit not powering on?

a. Verify that there are fresh 9V Batteries in each unit

b. The units will automatically power off after one minute of inactivity in low range, or ten minutes in high range. Seven to 10 amps is required to keep the unit powered

Handling Guidelines

Male Connector
(End of Cable)

Female Receiver
(Mounted on Instrument)

Guide One:
Never touch the ceramic ferrite end face of the male connector.

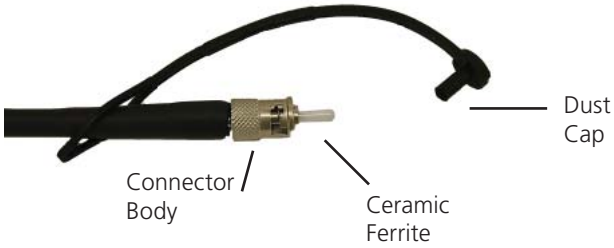
Guide Two:
Cover the fiber optic connector when not in use. Unprotected connector ends are most often damaged by impact, such as hitting the floor. The provided tethered boot will protect the connector's polished ferrule end from impact damage that might crack or chip the polished surface. Please contact Sensorlink Corporation for a replacement if the provided boot is lost or broken.

Guide Three:
The fiber end face and ferrule must be absolutely clean before it is inserted into a transmitter or receiver. Dust, lint, oil (from touching the fiber end face), or other foreign particles obscure the end face, compromising the integrity of the optical signal being sent over the fiber. From the optical signal's point-of-view, dirty connections are like dirty windows. Less light gets through a dirty window than a clean one. See page ten for cleaning instructions.

Guide Four:
As residue can build up in the boot, it important that the connector is thoroughly cleaned before mating, even if it was cleaned before the protection boot was installed. It is hard to conceive of the size of a fiber optic connector core. The core of your fiber is 62.5 microns, about half the size of a sheet of paper. Fiber optic connectors need to be clean and some debris cannot be seen by the naked eye. It is not unreasonable that users develop the discipline to clean the connectors everytime they are mated. See page ten for cleaning instructions.

Cleaning

The fiber optic cable can be cleaned by wiping with a small amount of alcohol on a rag. The fiber optic cable should be cleaned and handled in the same manner as a fiberglass hotstick. It is critically important for fiber optic connectors to be free of dust and dirt to maintain optimum performance. Cleaning should be done as often as possible. Especially if used in a dusty and or dirty environment. A simple and effective way to guarantee cleanliness is to clean the ends of your fiber optic cables each time they are disconnected.



Recommended Equipment:

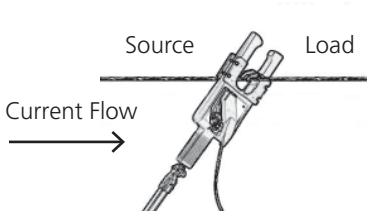
Kimwipes® or any lens-grade, lint-free tissue. The type sold for eyeglasses work quite well.
Denatured alcohol. Note: Use only industrial grade 99% pure isopropyl alcohol. Commercially available isopropyl alcohol is for medicinal use and is diluted with water and a light mineral oil. Industrial grade isopropyl alcohol should be used exclusively.
Canned dry air.
(Optional) Microscope

Recommended Process:

1. Fold the tissue twice so it is four layers thick.
2. Saturate the tissue with alcohol.
3. Clean the sides of the connector ferrule. Place the connector ferrule in the tissue. Apply pressure to the sides of the ferrule. Rotate the ferrule several times to remove all contamination from ferrule sides.
4. Move to a clean, saturated part of the tissue that is four layers thick. Put the tissue against the end of the connector ferrule. Put your fingernail against the tissue so that it is directly over the ferrule. Scrape the end of the connector until it squeaks; it will sound like a crystal glass that has been rubbed when it is wet.
5. (Optional) Use the microscope to verify the quality of the cleaning. If it isn't completely clean, repeat the steps with a clean tissue. Repeat until you have a cleaning technique that yields good, reproducible results.
6. Mate the connector immediately if possible. If not possible, be sure to replace protective boot.
7. 7. Air can be used to remove lint or loose dust from the port of a transmitter or receiver to be mated with the connector. Never insert any liquid into the ports.

Directional Properties

The Amp sensor on the Litewire is direction sensitive. In order to insure proper phase relationship when comparing to a voltage reference, place the Amp Litewire so the face of the instrument is facing the load. Another indication of improper orientation would be indicated by the phase angle indication on the Bar Graph Screen of the Fluke 43. The proper phase angle should be 0 to ±90° when measuring the fundamental. When the sensor is positioned in an improper orientation the phase angle will read ±91° to ±180°.

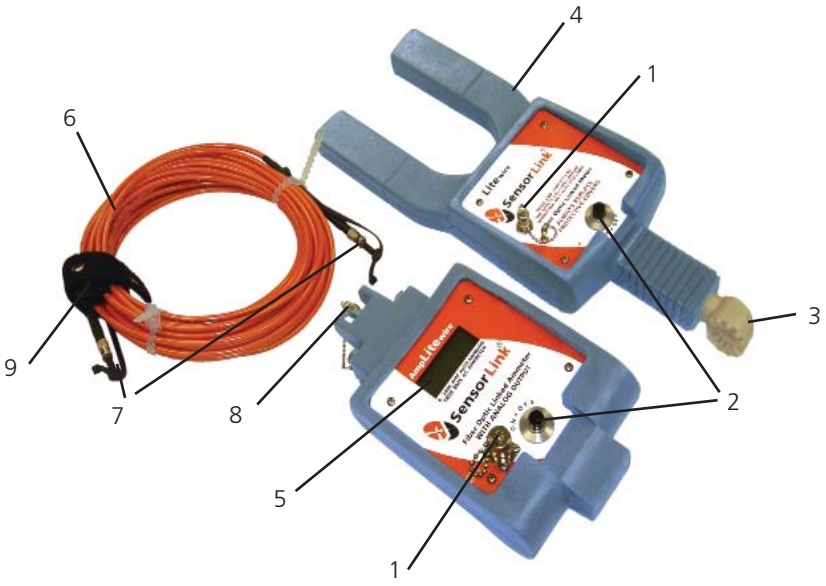


BATTERY LIFE & REPLACEMENT

The Litewire is powered by two 9V batteries, one in the upper unit and one in the lower unit. When the word "LOBAT" appears on the display, the battery in the upper unit should be replaced. When the word "LOBAT" flashes on the display, the battery in the lower unit should be replaced. The unit will continue to operate for an hour or more after one of these indicators appears.

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. To avoid breaking the battery leads do not pull on the battery only. Install a fresh battery and reinsert the battery in its compartment. Do not pinch the wires between the 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 overtightening the screws. Always reuse the screws provided and do not damage or lose the o-ring seal on each screw.

Amp Litewire Diagram



1. Female Fiber Optic Ends
2. ON/OFF Switch
3. Universal Chuck Adaptor
4. Amp Sensor/Transmitter
5. Digital Display
6. Fiber Optic Cable
7. Male Fiber Optic Ends
8. BNC Outputs
9. Strain Relief with Velcro

SensorLink Corporation Warranty

SensorLink 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 agrees to repair or replace, at SensorLink'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 in such a manner as to injure, in SensorLink'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.

This Warranty is in lieu of any other warranty, expressed or implied. SensorLink 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.

Quality Assurance Certification
Fiber Optic Coupled Ammeter
Model 8-015 XT and 8-016

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 Model 8-015 XT/8-016 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 Numbers _____

I hereby certify that the Model 8-015 XT/8-016 Amp Litewire 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: _____

Form No: SALE-Manual Template AMP LW-014 REV: V01
Date: 11/19/2013
Manual Stock Code No: DOPM-801-500

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