Operators Manual
Recording Ammeter
Amcorder

SensorLink®

Unit and Accessory Part Numbers

Amcorder
Model 920
Qty (1) sold in 6-920-1 Kit
Qty (3) sold in 6-920-3 Kit

Universal Switch Stick Adapter
Model 7-053
Qty (1) sold in 6-920-1 Kit
Qty (1) sold in 6-920-3 Kit

Universal Switch Stick Receiver
Model 7-054
Qty (1) sold in 6-920-1 Kit
Qty (3) sold in 6-920-3 Kit

USB IrDA Dongle
Model 7-021B
Qty (1) sold in 6-920-1 Kit
Qty (1) sold in 6-920-3 Kit

Carrying Case
Model 659
Qty (1) sold in 6-920-1 Kit
Qty (1) sold in 6-920-3 Kit

Operators Manual
Amcorder
Recording Ammeter

Available Stock Codes:			
920-50HZ	920-60HZ	920-EURO	920 FRG

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SPECIFICATIONS

Kit Number	6-920-3
Type	Recording Ammeter Kit, Three Phase
	3 Amcorders
	1 IrDA USB Cable
	1 Softlink Software
	1 Universal Hot Stick Adapter
	1 Soft Carrying Case
Range of Operation	
Voltage	69 kV
Current	1 to 1000 A
Resolution	
Amps 1.0 to 99.9 A	0.1 A
Amps 100 to 1000 A	1 A
Accuracy	
Amps	±1%, ± 2 Counts
Frequency	
50 Hz	47 to 53 Hz
60 Hz	57 to 63 Hz
Mechanical	
Weight	1.5 lbs, 0.68kg
Sensor Opening	up to 1.3 in, up to 3.3 cm
Dimensions	9.8 in x 4.8 in x 3 in (24.77 cm x 12.07 cm x 7.62 cm)
Housing	Shock and water resistant molded urethane
Operating Temperature	-22 to +140˚ F, -30 to +60˚ C
	Lithium battery required for temperatures below -4°F (-20°C).
Storage Temperature	-40 to +158˚ F, -40 to +70˚ C
Hotstick Mounting	Shotgun or Universal Style Hot Stick (Hot Sticks not included)
Battery	9 Volt Alkaline or Lithium
Indoor/Outdoor Use	
Relative Humidity	90% Non - Condensing
Altitude	9800 ft, 3000 meters
Software Requirements	Softlink by SensorLink, included in sales kit
Operating System	Windows 7, 8, or 10
Data Collection Space	64,000 Data points
EEC Standards	Successfully passed international test standards indicated by CE

Safety Information

⚠️ Read all safety and instruction statements before using the product. Failing to follow the safety guidelines can cause severe injury or death.

⚠️ Amcorders are designed for use on live, overhead lines with 0 to 69KV. All procedures appropriate for the line voltage are to be taken, including proper work techniques, equipment, and Personal Protection Equipment.

⚠️ The Amcorder should be deployed and retrieved only by certified personnel who have been trained for live-line, high voltage work by their organization.

⚠️ The Amcorder is to be installed and removed from the line with a suitable shotgun or switch stick style hot stick. The hot stick is considered the sole voltage isolation device.

⚠️ The hot stick length must be correct for line voltage per minimum approach distances stated in published OSHA regulations and/or provided by the utility.

⚠️ The cover plate, chuck, and entire Amcorder are to be considered at the same potential. Putting the cover plate, chuck, or other parts of the Amcorder within the air gap of adjacent phases or ground could cause a phase to phase or phase to ground fault.

⚠️ Do not alter the product in any manner.

Theory of Operation

The Amcorder deploys on a line to measure and record True RMS Amps on overhead lines. The Amcorder uses the same current sensor technology as the original SensorLink® Ampstik®, which does not use magnetic materials and has no moving parts. Measurements are taken at user defined intervals. In Softlink software the user selects how often to sample and log the data.

Remove the units from the line to download the data via IrDA. Data can be downloaded via radio with the unit deployed on the line with the optional Radio Transcorder.

Preventative Maintenance

The Recorder should be visually inspected for cracks in urethane. Do not use if cracks are present or the unit is damaged. Verify the air vent on the faceplate has not been covered. The membrane on the inside of the faceplate is designed to allow the unit to breath properly.

Cleaning

The Recorder should be cleaned by wiping with a silicone hot stick wipe to remove dirt, sand, and salt that will degrade the urethane housing.

Low Temperature Applications

The Alkaline Battery and the IrDA transceiver are two components that limit the operation of the Recorder to down to -4F / -20C. By substituting a Lithium long-life battery the Recorder can collect data down to -40. Because the IrDA transmitter doesn't perform at these low temperatures, when collecting the data from the Recorder the temperature needs to be above -4F/ -20C.

Powering the Unit

The Recorder powers on and begins taking recordings when the battery is properly connected and placed into the battery compartment.

Sample and Log Intervals

Sample and Log Interval: The Sample Interval is how often the Recorder reads the current on the conductor. The Recorder will hold the sample current readings until it reaches the Log Interval, at which time the Recorder will average the sample measurements. This average becomes the logged data point. The Recorder begins sampling and logging as soon as a battery is connected.

How many days will the Recorder Log Data? The length of the Log Interval determines the length of time the Recorder will take to use all of the available logged data points. See the below chart for the number of days it will take to fill a Recorder with data, based on various Log Intervals. Note that in most cases the Recorder is limited by battery life more than the recording capacity.

Log Interval (seconds)	Days Recording Until Full
1800	1333*
900	666*
600	444*
300	222*
60	44
30	22
*Exceeds expected battery life	

Battery Replacement and Operation

Changing the Battery: The Amcorder requires one 9V battery. Remove the screw at the base of the unit and remove the cover plate. Snap the battery to the connector and insert into the battery slot. Replace the cover plate.

The Recorder should have a fresh 9-volt battery replaced each time it is setup and deployed. A fresh battery has greater than 9.2 VDC. Alkaline batteries have a short shelf life and care should be taken to make sure the battery is fresh.

Expected Battery Life: The expected life of the battery in a Recorder is varied by how often the Recorder samples the line to collect data and the ambient temperature. Fresh non-rechargeable batteries are required so the reliability and life of the battery can be easily predicted. Predicting the life of rechargeable batteries is uncertain, especially after several recharges. A new battery should be placed into the Recorder before it deployed to ensure the reliability of the battery life.

The Recorder will stop operating when the battery fails to supply more than five volts. All the logged data is safely stored in flash memory. When a fresh battery is put into the Recorder, the user has five minutes to start downloading the data. The data will have accurate date and time stamps. The old data will be cleared from memory after five minutes.

Expected battery life at 68° F or 20° C

Sample Interval (Seconds)	Expected life of a 9V Alkaline battery (Days)	Expected life of a 9V Lithium battery (Days)
60	180	360
30	120	240

Alkaline operating time reduced to 25% at -4° F or -20° C
Lithium operating time reduced to 75% at -4° F or -20° C
Lithium operating time reduced to 50% at -40° F or -40° C

NOTE: Once a fresh battery is inserted, the user has 5 minutes to start downloading the data before the Amcorder resets itself. The Amcorder will only save the logged data in its flash ram for 5 minutes. **We recommend that you do not remove the battery until you have downloaded all of the data.** A new battery should be placed into the Amcorder before it is deployed on the line to ensure the reliability of the battery life.

Installation: Shotgun Style

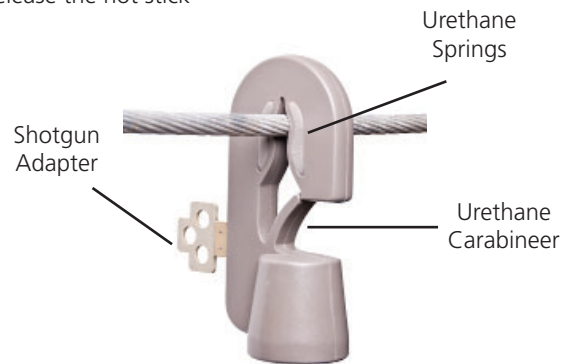**Attaching the Amcorder to a line with a shotgun style hot stick**:

Step 1: Attach the Shotgun adapter to the Amcorder

Step 2: Grasp the Amcorder with the hot stick

Step 3: Place the Amcorder on the conductor

Step 4: Pull down on the unit to ensure that the urethane springs are securely holding the Amcorder on the conductor

Step 5: Release the hot stick

Urethane Springs

Shotgun Adapter

Urethane Carabineer

Removing the Amcorder from the line with a shotgun style hot stick:
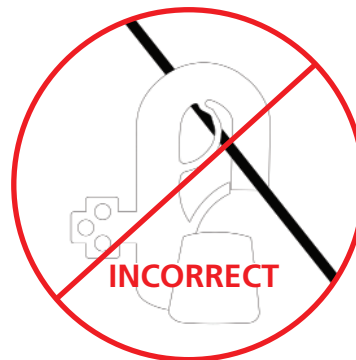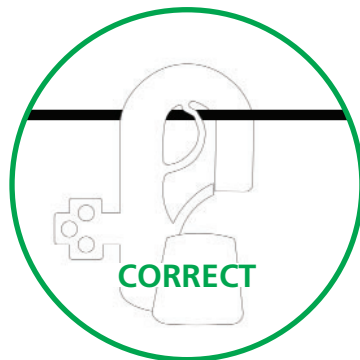
Step 1: Attach the hot stick to the unit

Step 2: Disengage the urethane spring from the conductor

Step 3: Push against the urethane carabineer; it requires ~15lbs of pressure on the carabineer to remove the Amcorder from the line
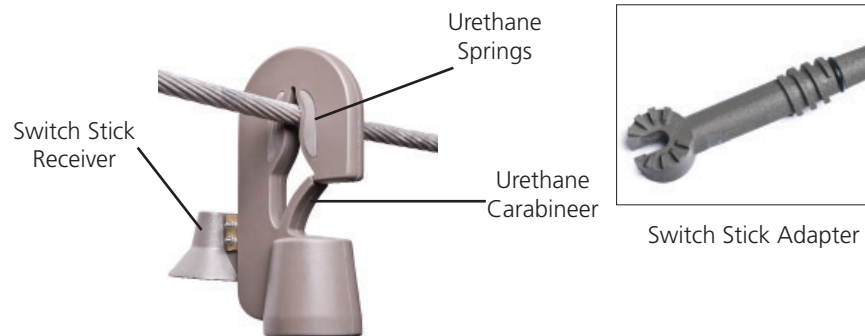
⚠ Line Installation

Do not install on angled or vertical overhead lines. The clamping mechanism is not designed for these lines and doing so will cause the unit to move with the potential of damaging utility assets.

CORRECT

INCORRECT

Installation: Universal Switch Stick

Attaching the Amcorder to a line with a switch stick style hot stick:

Step 1: Attach the Switch Stick receiver to the Amcorder

Step 2: Attach the Switch Stick adapter to the switch stick

Step 3: Insert the adapter into the receiver and then twist until the adapter locks into the receiver

Step 4: Place the Amcorder on the conductor

Step 5: Pull down on the unit to ensure that the urethane springs are securely holding the Amcorder on the conductor

***Step 6:*** Unscrew the switch stick to release the Amcorder

Urethane Springs

Switch Stick Receiver

Urethane Carabineer

Switch Stick Adapter

Removing the Amcorder from the line with a switch stick style hot stick:

Step 1: Insert the adapter into the receiver and twist until firmly in the receiver

Step 2: Push against the urethane carabineer; it requires ~15lbs of pressure on the carabineer to remove the Amcorder from the line

⚠ Line Installation

Do not install on angled or vertical overhead lines. The clamping mechanism is not designed for these lines and doing so will cause the unit to move with the potential of damaging utility assets.

CORRECT

INCORRECT
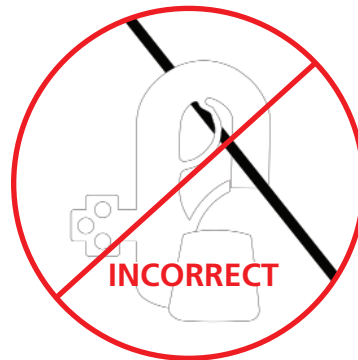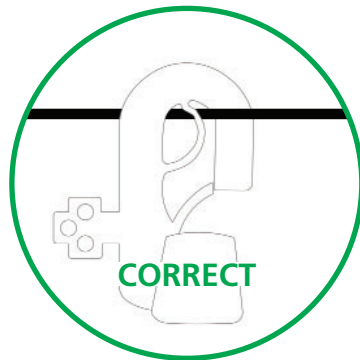
Softlink for Amcorder

SoftLink is a software application that allows the user to download, view, graph and import data from their Recorder. In order for a PC running Softlink to communicate, the Recorder must be powered on, with the IR port on the unit in-line with the IrDA USB that is connected to the PC.

Please see the Transcorder Manual for instructions with radio communication.

Softlink System Requirements

OPERATING SYSTEM: Softlink installs onto computers running Windows 7, 8, and 10. Softlink requires Microsoft .NET, which will install with Softlink if not already installed.

NETWORK INSTALLATION: Softlink is a single user application and is not supported when installed onto a server.

INSTALLATION AUTHORITY: Installation will require administration rights. Computers managed by electric utility organizations often limit the programs that can be installed. If the user does not have admin rights they will need the assistance of the IT department to download the software.

USB PORT PERMISSIONS: The USB IrDA has an install program that runs the first time it is connected. The user may have rights to install programs but may not be aware that the USB ports are locked on the PC. Please contact your network administrator for permission and instructions to complete the install if drivers are not installing automatically.

Softlink Installation

Step 1: Softlink Installer is available at www.sensorlink.com/products/amcorder. Save the file to the desired location. The Softlink .exe file will automatically begin the download when clicked.

Step 2: You must agree to the licensing agreement to proceed with the download

Step 3: A dialog box will appear to let you know when the download is complete

Step 4: To open Softlink, click on the Start Menu. Under Programs, select Softlink. Shortcut paths will automatically load during the install.

Manual IrDA Driver Installation

For information on this install, please reference the IrDA manufactures' documentation available on their product CD. Additionally, if a digital download is required, the driver is available online at www.sensorlink.com/products/amcorder.

[ACT-IR224UN-LN115GENERAL SETUP PROCEDURE]

1. Make sure IrDA USB is NOT plugged into the PC until the driver is installed.
2. Insert the installation CD and run the setup file.
3. Click "Next" to continue through the IrDA Driver Installer welcome screen.
4. When this Installation completes, click "Finish" to close the Wizard window.
5. Insert the IrDA cable into the USB port. A message will pop up stating: "Found new Hardware", then replaced with "New hardware successfully installed and ready to use."

Communicating with Recorder

Softlink communicates with one Recorder at a time. To make sure only one Recorder is communicating, stand any other Recorders on their base. To communicate with a Recorder, follow these steps:

Step 1: Insert the USB IrDA cable into the PC's user port

Step 2: Position the Recorder so the IrDA Port, located at the bottom of the unit, is facing the IrDA

Step 3: Open Softlink from either the Desktop or Start Menu.

Softlink will automatically discover the IrDA and display the communication device in the upper left corner of the program.
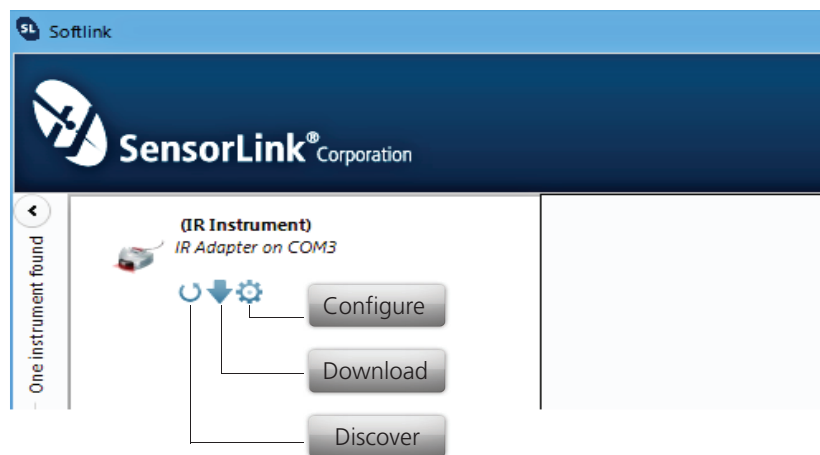
Discover Recorder

Click the discover button to instruct the IrDA to immediately find and communicate to the Recorder. The description and photo displayed will change from the communication device to the unit when the Recorder has been discovered.
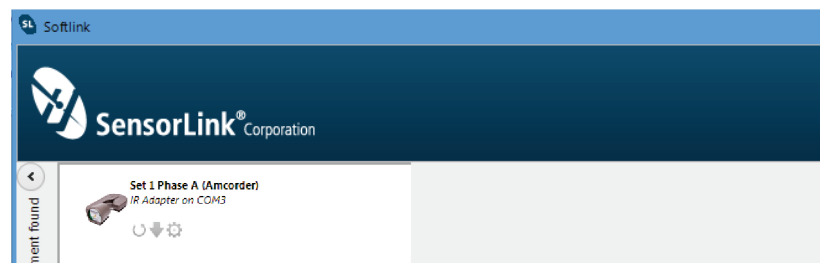
The description and photo displayed will change from the communication device to the unit when the Recorder has been discovered.

Configure

Select the Configure button to setup Recorder preferences.

Name: Identify the Recorder with up to 16 characters.

Description: Enter a description of up to 46 characters. For example, you may want to note the Recorder's service location and the date range for the recordings.

Log Interval: Select how often to log data. The Recorder averages all samples taken since the previous logging and records the result. Typical sample and log synchronization intervals are one minute and 15 minutes, respectively. The log interval must exceed the sample interval.

How many Log intervals are available in the Amcorder? 64,000

Sample Interval: Select how often the Recorder will sample current by sliding the cursor on the scroll bar. Battery life depends on this setting; see page four.

Synchronization: Selecting the "Clear all logged data from the Recorder… and synchronize logging to the hour" box will allow the Recorder to synchronize itself to the computer's clock. When multiple Recorders are setup and synchronized using the same log interval and the same computer, they will all log at the same time.

Clock is Set: If the Recorder is not synchronized before hanging on the line, the log times will be set, even though not evenly aligned to the hour.

Clock is Unset: If the Recorder's battery fails prior to any Softlink communication.

Legacy: Older version Recorders cannot be synchronized. To achieve log-time accuracy with these units, take them down before the battery fails, and download all data before re-hanging the unit. All log times prior to the first download are accurate to within a log interval, as long as the battery has not failed.

Download Recorder Data

Click the Download button to begin downloading data from the Recorder. The user is able to view the Recorder's configuration and progress as it is downloading in the graph view.

The download can be stopped at any time by selecting the red X button.
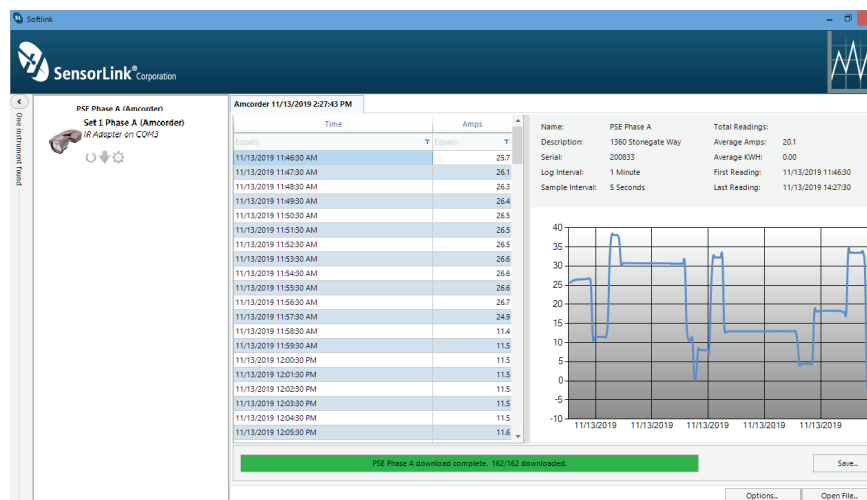
Repeat these steps to download the data from any additional units. Each unit's data will load into a new tab.

NOTE: Once a fresh battery is inserted, the user has 5 minutes to start downloading the data before the Amcorder resets itself. The Amcorder will only save the logged data in its flash ram for 5 minutes. **We recommend that you do not remove the battery until you have downloaded all of the data.** A new battery should be placed into the Amcorder before it is deployed on the line to ensure the reliability of the battery life.
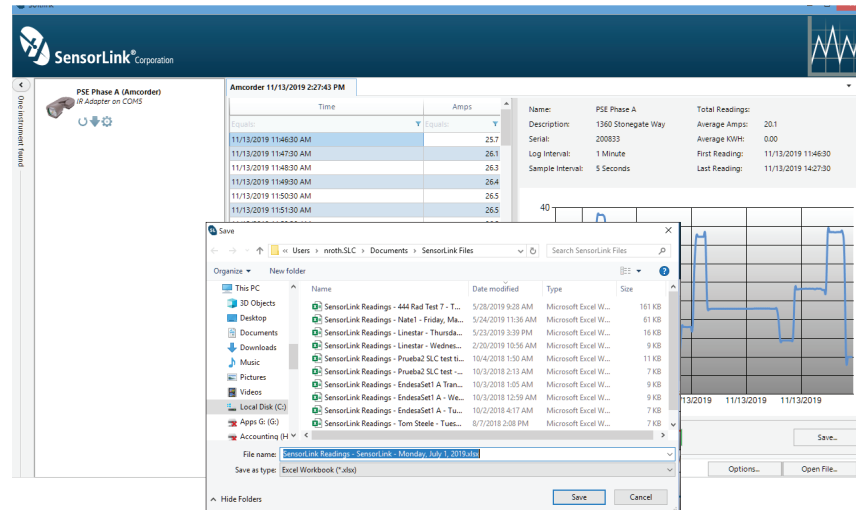
Saving Recorder Data

Data files may be saved as a .csv or .xlsx file for future review in Softlink or another data management program. The data from each recorder is saved into its own file.

Step 1: Select the data file by selecting the Recorder on the menu

Step 2: Select "save"

Step 3: Repeat this process for any other data files to be saved
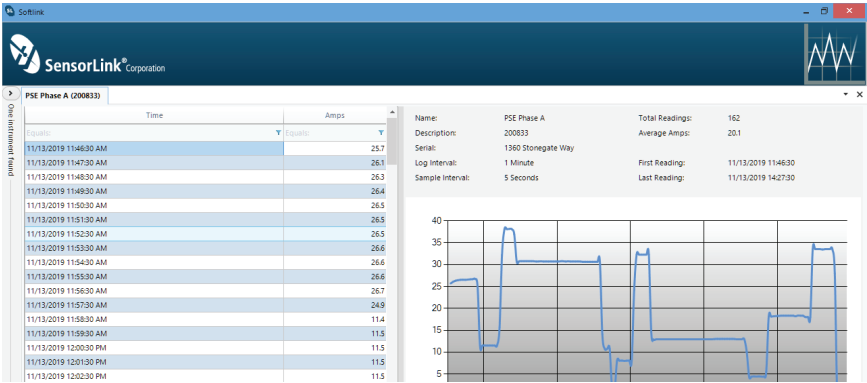
Opening Recorder Data files in Softlink

Previously saved files from a Recorder may be opened in Softlink. Follow these steps for opening saved files:

Step 1: Open Softlink

Step 2: Close the "Discovering ports and instruments" bar

Step 2: Select "Open File"

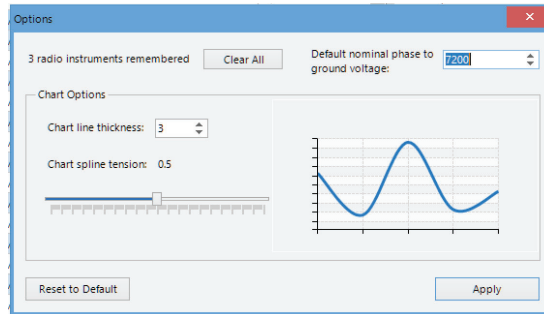*Step 3:* Find and select the .csv or xlsx Softlink file

Opening data files in other programs

Previously saved files from a Recorder may be opened in other data management programs for analysis and review.

Recorder Options

The options button on the Download Screen allows the user to change certain preferences.

Radio instruments remembered: Softlink remembers Radio Transcorders that were used in previous downloads. Select "Reset to Default" for Softlink to forget the radios. See the Radio Transcorder User's Manual for further details.

Chart line thickness: The thickness of the graph lines can be changed by the user. Thickness is numbered 1 - 10, and defaults at three. The software will show a preview to the user as the value is changed.

Chart spline tension: The chart spline tension is used to smooth graph lines. The spline tension range is 0 - 1. Slide the scroll bar to change the spline tension. The software will show a preview to the user as the value is changed.
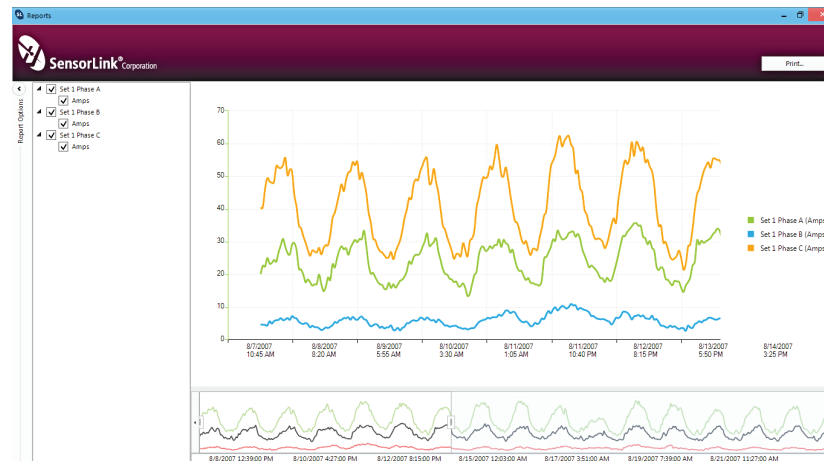
Default nominal phase to ground voltage: This option is for Varcorders and has no effect on the operation of an Amcorder.

Graphing

To graph the downloaded data, click the Graph Icon on the download screen.
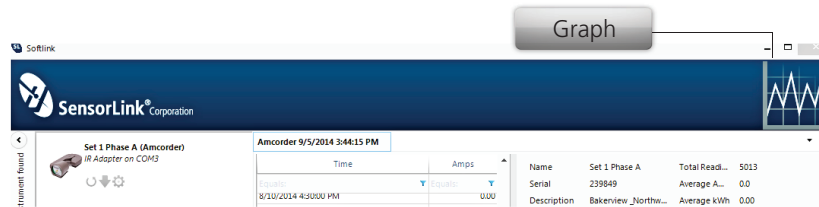
A second screen will open and display the data in graphical format.

Report Options
Select the units and measurement parameters to graph by clicking in the selection boxes. Only selected measurement parameters will display on the graph.

Hide and Show Report Options
Click the left arrow to hide Report Options. Click the right arrow to show the hidden Report options.

Zoom Window
The bottom graph displays the entire time series. To view a section of time, adjust the left and right sliders. The upper graph will display the values between the slides.

Cursor Tool
Placing the cursor over the graph will display the date and time values of the measurements.

Troubleshooting

The Recorder is not communicating

1) Position the IrDA no more than three feet away from the Recorder.
2) Examine the IrDA connection to the PC and reconnect if necessary.
3) Verify the battery has greater than 5 Volts with a Voltmeter. Replace if low.
4) IrDA USB cables are not universal; using an IrDA not supported by Softlink may not work. The IrDA you received with your kit has been tested to work with the Recorders.
5) The Serial Number of the IrDA must start with a "TA" if running Softlink on WIN 10.
6) Try restarting Softlink by first exiting and then restarting.
7) Try restarting your computer and then re-open Softlink.
8) Do not use docking station USB ports. This will cause the program to hang up or have no communication to the USB.
9) Use the same USB port that was unlocked by IT for the USB IrDA. Using a different port will not work without security permissions from IT.

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
True Reading RMS Amcorder
Model 920

SensorLink Corporation 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 920 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 Number: _____

Model Number: _____

I hereby certify that the Model 920 Amcorder 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: _____

These products proudly made in the USA.