

Operators Manual

Recording Ammeter

Amcorder UG

Unit and Accessory Part Numbers



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



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



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

Operators Manual

Amcorder UG

Underground Recording Ammeter








Available Stock Codes:			
920 UG 50HZ	920 UG 60HZ		

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SPECIFICATIONS

Kit Number	6-920-UG-3
Type	Three Phase Underground Recording Ammeter Kit 3 ea Amcorder UG 1 ea IrDA Serial Cable 1 ea Soft Carrying Case 1 ea Softlink Software
Range of Operation	
Voltage	69 kV
Current	1 to 2000 A
Resolution	
Amps	0.1 A
Accuracy	
Amps	± 1%, ± 2 Counts
Frequency, 50 Hz	47 to 53 Hz
Frequency, 60 Hz	57 to 63 Hz
Mechanical	
Weight	1.8 lbs, 0.82 kg
Sensor Opening	up to 2.5 in, 6.35cm
Dimensions	8.87 in x 5.38 in x 3.74 in, 22.3 cm x 13.7 cm x 9.5 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).
Submersible	Submersible to 6 ft of water to IPX8
Hotstick Mounting	Shotgun Style Hotstick (Hotstick not included)
Battery	9 Volt Alkaline or Lithium
Software Requirements	Softlink for SensorLink
Processor	100 Mhz or Higher, 200 Mhz Recommended
RAM	32 MB, 64 MB Recommended
Drive Space	15 MB to Load Software, 10 MB Operating Space
Data Collection Space	64,000 Data points

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 UG measures and records True RMS Amps on primary and secondary underground lines. The non-conductive clamp assembly allows it to securely hang vertically beneath the elbow. Once on the line it begins to collect and record the current load. The Amcorder UG uses the same current sensor technology as the original SensorLink® Ampstik®, which does not use magnetic materials.

Measurements are taken at user defined intervals, entered before deployment in Softlink. Softlink is a user-friendly software interface for downloading, viewing, graphing, and exporting data. The data is saved as a .xml or .csv file, allowing it to be opened and analyzed in other data management programs

Remove the units from the line to download the data via IrDA.



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 UG 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.

The following Table indicates the expected battery life at 68° F or 20° C

Sample Interval (Seconds)	Expected Life of a 9-volt Alkaline Battery (Days)	Expected Life of a 9-volt Lithium Battery (Days)
60	180	360
30	120	240
15	75	180
10	60	120
5	28	60
1	7	14

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 of Amcorder UG

Attaching the Amcorder UG to an elbow:

Step 1: Attach the Shotgun or Grip All type hot stick to the Amcorder UG

Step 2: Set the clamp on the Amcorder UG into the open position



Closed Clamp



Open Clamp

Step 3: Place the Amcorder UG on the conductor beneath the elbow and above the concentric neutral. It does not matter if the clamp is facing upwards as shown below in step four, or downwards

Step 4: Push the unit against the conductor until the clamp closes



Step 5: Release the hot stick from the Amcorder UG

Step 5: Repeat the above steps for additional units deploying on other phases

Removal of the Amcorder UG

Removing the Amcorder UG from an elbow:

Step 1: Attach the hot stick to the Amcorder UG

Step 2: Pull the hot stick to open and release the clamp's grip on the conductor

Note: If there is a concern about pulling the elbow off the bushing, pull from the side, or use a second hot stick to hold the elbow in place.

Submersed Applications

When placing the Amcorder UG in an application where it may become submersed in water, make sure that the battery cover is seated tight against the bottom of the battery cavity. If the Amcorder UG is going to be left submersed for an extended period of time, place a bead of grease to the sides of the battery cover.

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.

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/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

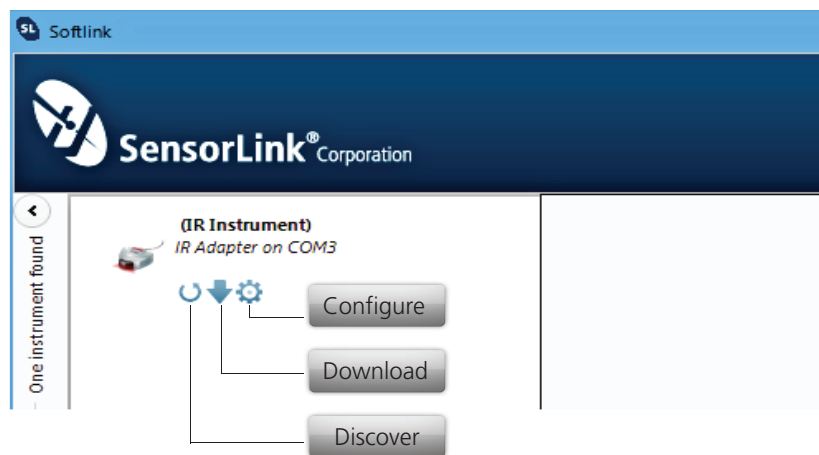
Softlink communicates with one Recorder at a time. To make sure only one Recorder is communicating, stand any other Recorders on their base. To communicate with a Recorder, follow these steps:

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. The battery cover will need to be removed.

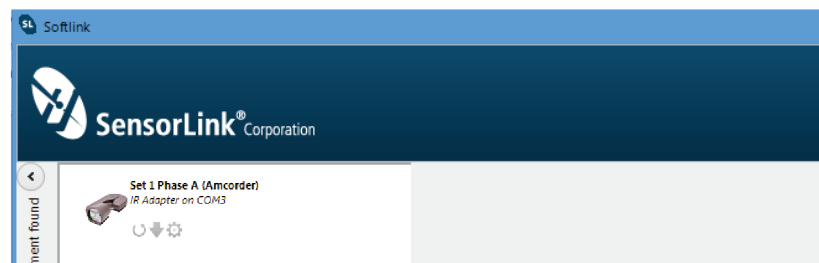
Step 3: Open Softlink from either the Desktop or Start Menu.

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.

Amcorder Configuration

Amcorder Information

Serial Number: 239849

Firmware: 920-2.00.0014 15 Feb 2004

Name (16 Characters): Set 1 Phase A

Description (46 Characters): Bakerview & Northwest May 5 - 12

Log Interval

15 minutes

Sample Interval

30 seconds

☐ Clear all logged data from your instrument and synchronize logging with the hour

Cancel Upload

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.

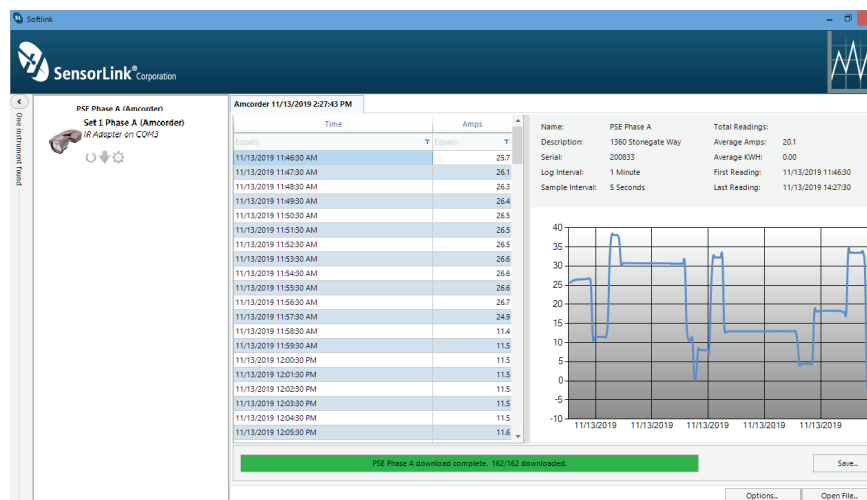
Clock is Unset: If the Recorder's battery fails prior to any Softlink communication.

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.

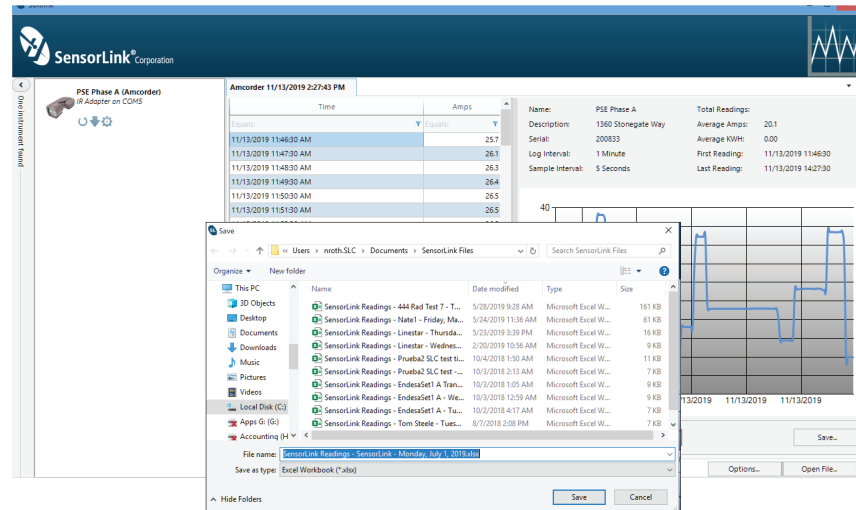
Saving Recorder Data

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

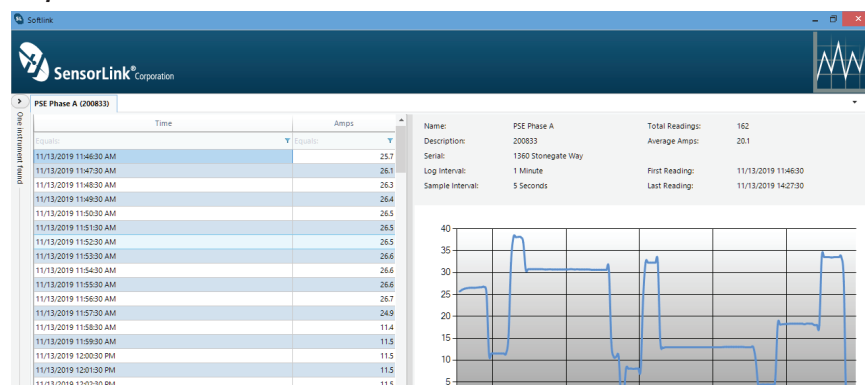
Previously saved files from a Recorder may be opened in Softlink. Follow these steps for opening saved files:

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



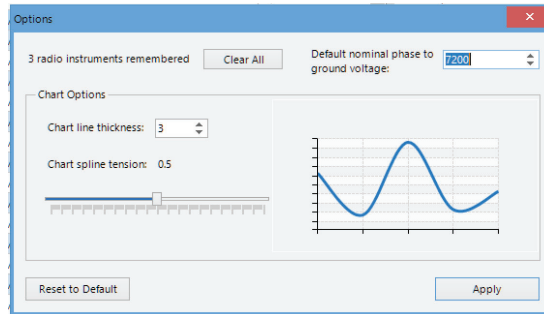
Opening data files in other programs

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

SensorLink Readings - PSE Phase A - Wednesday, November 13, 2019							
File	Home	Insert	Draw	Page Layout	Formulas	Data	Review
View	Add-ins	Help					
F9							
1	PSE Phase A						
2	200833						
3	1360 Stonegate Way						
4	(Logging Clock Synchronized)						
5	Configuration						
6	Sample Interval:	5 Seconds					
7	Log Interval:	1 Minute					
8	DATE/TIME	AMPS					
9	13-Nov-19 11:46:30	25.7					
10	13-Nov-19 11:47:30	26.1					
11	13-Nov-19 11:48:30	26.3					
12	13-Nov-19 11:49:30	26.4					
13	13-Nov-19 11:50:30	26.5					
14	13-Nov-19 11:51:30	26.5					

Recorder Options

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



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

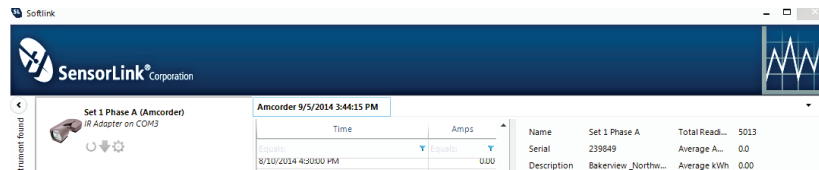
Chart line thickness: The thickness of the graph lines can be changed by the user. Thickness is numbered 1 - 10, and defaults at three. The software will show a preview to the user as the value is changed.

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.

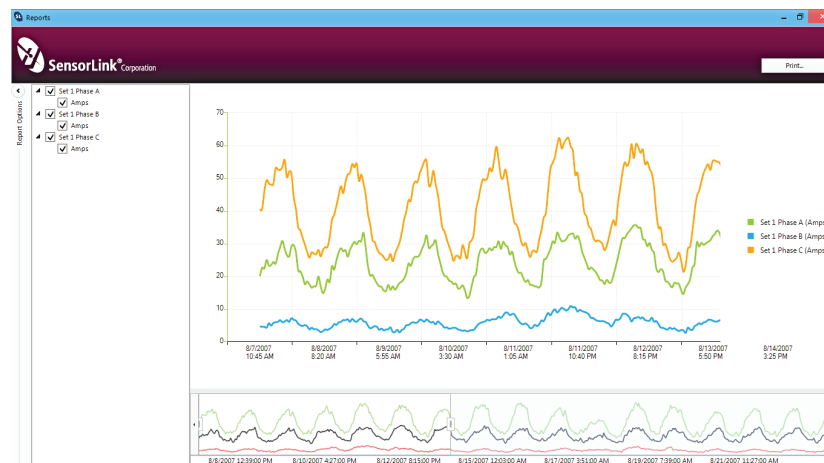
Default nominal phase to ground voltage: This option is for Varcorders and has no effect on the operation of an Amcorder.

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 UG Model 920 UG

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 920 UG was/were 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 UG Amcorder UG(s) have/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.

Form No: SALE-Manual Template AMCORDER-010 REV: V03

Date: 01/2020

Manual Stock Code No: M050-062-001

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