Electrocorder EC-6VA-xK
User Instructions

WARNING!

THIS PRODUCT MUST ONLY BE USED BY SUITABLY QUALIFIED PERSONNEL; DO NOT ATTEMPT TO USE THIS PRODUCT UNLESS YOU ARE QUALIFIED TO DO SO.
HIGH VOLTAGES THAT CAUSE BURNS AND LETHAL SHOCKS ARE PRESENT DURING VOLTAGE MONITORING AND RECORDING!

Voltage inputs are not isolated from each other, as one input is energised, other will become live!

General Description

Thank you for purchasing the Electrocorder EC-6VA, we hope you enjoy using this product, this package consists of seven main components:

1. Electrocorder logger (1)
The logging unit is housed in a strong ABS case.
2. Carry Case (1)
The ABS case of the logging unit is in turn contained within a soft carry case.
3. Voltage Input Leads (4)
Four voltage input leads are provided to allow easy connection to the voltage system.
4. Current Sensors (3)
Three current sensors are provided.
5. USB Lead (1)
A USB lead is provided to allow connection between the logger and any modern PC.
6. Software CD (1)
Electrosoft software is provided free.
7. User Instructions (1)
These User Instructions are provided to give guidance, to qualified personnel.

PC Hardware requirements

To run Electrosoft you must have certain hardware and software installed on your computer. The system requirements include:-
An IBM® - compatible Personal Computer with a minimum of an 80486 processor.
A hard disk, with at least 5MB spare capacity.
One CD/DVD drive.
An SVGA 1024 x 768 or higher resolution display.
At least 16MB of random access memory (RAM).
A mouse.
Microsoft® Windows 9X, NT4.0, 2000, XP, Vista, Windows 7.

Installing Electrosoft
When you run the Setup program, it will automatically set a path on your hard disk and install Electrosoft there.

In Windows 9X, NT4.0, 2000, XP, Vista, Windows 7 the Setup program will create an option in your Programs menu, which is in the Start menu.

Step 1: To install Electrosoft; run Setup.

For Windows 9X, NT4.0, 2000, XP, Vista, Windows 7.
Step 2: From the Taskbar menu click Start and choose Run. The Run dialogue box appears.
Step 3: Type a:\Setup. Click OK. Follow the instructions on the screen to install Electrosoft - you will be alerted when the installation is complete.

Getting started
In order to set-up an Electrocorder, you must first run Electrosoft on your PC. Then connect an Electrocorder to the PC serial port using the correct (supplied) serial lead. In Electrosoft, use the 'Setup' dialog box window and input the details of the location to be monitored. The Electrocorder does NOT need to be connected in to the mains voltage to perform this task.

The recording mode is set by default to commence recording when the Electrocorder "Start" button is pressed, and to stop recording when the memory is full. This logger can be used to record voltage and current separately. When recording voltage, the logger will take power from the voltage supply, however when logging only current, battery life will be reduced, where possible use a voltage input.

Select the recording method - two options are available:
1. Record to EN50160 standard - the Electrocorder will take a sample once every second for 10 minutes. It then averages the samples taken over that 10 minute period and stores the value. In this mode the unit will record for approximately 50 days until the memory is full.

2. Take a sample over a discrete period - the Electrocorder can be set to take an average over a selected period, 1 (one) sec to 60 (sixty) minutes and also record the max and min during each period. For example, **a unit set to record every 1 (one) second will record for approximately 2 hours**. A unit set to record every 12 seconds will record for approximately 1 day. **A unit set to record every 60 (sixty) minutes will record for approximately 300 days.**

When the required information has been input, download to the connected Electrocorder by clicking the 'Write Setup' icon. The Electrocorder is now ready to monitor voltage.

When the Electrocorder is recording (with voltage connected) a flashing green light will show, when it has completed recording, a steady red light will appear on the unit. The database contained within Electrosoft will also advise that the unit has completed recording and is ready to be collected. To download the recorded data connect the Electrocorder to the PC serial port and click the 'Read Setup' icon. The recorded data is displayed for analysis.

This document is produced in conjunction with the Help file contained in Electrosoft, which contains a detailed explanation of all features and contains information, which should be studied prior to using this product.

USB to RS232 Serial Converter (for use with RS232 loggers only)
If you have purchased a USB to RS232 converter, you must install the drivers. You can use the drivers shipped with the program which may be in the USB sub-folder within the Program Folder, normally C:\Program Files\Electrosoft\USB. You can download them from the website www.electrocorder.com or use the disk, if one came with the converter.

The following describes the XP installation, other operating systems will vary slightly. When you plug the converter into the PC, it will detect it and identify the new hardware as UC232R, Windows will then ask to search for the drivers, choose "Yes, this time only", then on the next screen choose, "Install from a list location" then specify the location of the drivers, possibly the USB sub folder, in the installation folder, or wherever you saved the files to when you downloaded from the internet.

When installed, make a note of the serial or COM port number the converter has been assigned to and when you run Electrosoft, select the appropriate serial port or COM port number.

SAFETY TIPS

Voltage inputs are labelled 'L1', 'L2', 'L3' and Neutral is labelled 'N'. For correct operation this recorder must have a proper Neutral (N) connection. Current inputs are labelled 'A1', 'A2' & 'A3'.

Prior to connection of the logger to any voltage system:-

1) If possible electrically isolate the conductors to which you wish to connect.

2) Remove (unplug) all voltage leads from the logger.

3) Current input sensors must only be used around insulated conductors.

4) Using insulating gloves, connect the each current sensor in turn around each current carrying conductor.

5) Using insulating gloves, connect the each voltage lead in turn to the electrical bus-bar with the crocodile clip.

6) When all voltage leads are connected to the voltage bus-bars, then beginning with the Neutral (N) input, connect in turn each lead to the logger (with the 4mm shrouded plugs).

7) As you connect L1, L2 and L3 there will be a visual light indication should voltage be present on the input.

8) Voltage leads are double layer. The inner layer is white, should the lead become scuffed and/or damaged, the white inner layer should become visible, as opposed to the normal red or black outer layer. When this occurs, you must replace the voltage lead with a new, undamaged one.

Features & Benefits of the EC-6VA Logger System

Feature	Benefit
Unit is small and lightweight.	Quick and easy to install
Easy to use Windows software.	Can be used by non-technical staff.
Electrosoft contains internal database.	**Allows effective management of distributed Electrocorders.**
True RMS voltage measurement.	Complies to EN50160:1994.
Soft carry case, with handle	Allows you to keep and carry all the leads etc. together with the logger.

Colour Codes Around the World

Phase	IEC Colour Code	Old UK Colour Code	US Color Code	Canadian Color Code
L1 (A)	Brown	Red	Black	Red
L2 (B)	Black	Yellow	Red	Black
L3 (C)	Grey	Blue	Blue	Blue
N (Neutral)	Blue	Black	White, grey	White
G (Ground/Earth)	Yellow/Green Stripe	Yell/Green Stripe	Green, Yell/Green	Green, bare copper

Inputs and Connections on Various Systems

Colour and Input Terminal	Single Phase (2-Wire)	Single Phase (3-Wire)	3 Phase Delta	3 Phase Wye/Star
Brown (L1/A1)	X (Live)	X (Live)	X (L1)	X (L1)
Black (L2/A2)		X (Earth)	X (L2)	X (L2)
Grey (L3/A3)			X (L3)	X (L3)
Blue (N)	X (Neutral)	X (Neutral)	X (N)	X (N)
For correct operation this recorder must have a proper Neutral (N) connection.				

Single Phase 2 Wire Systems (using inputs 'A1', 'L1' and 'N')

Simply place the current sensor A1 around the current carrying conductor, then connect 'L1' to System Live/Hot and connect 'N' to System Neutral. We would not recommend connecting the Neutral (N) to anything other than System Neutral. We do not recommend connecting this input to an external System Ground (G) or Earth (E) as the floating voltage on the Neutral (internal Star-point) could trip sensitive Earth Fault or Earth Leakage protection equipment.

Single Phase 3 Wire Systems (using inputs 'A1', 'A2', 'L1', 'N' and 'L2')

Place the current sensor 'A1' around the current carrying conductor, place A2 around the Ground/Earth conductor. Now connect (IN THIS ORDER) 'N' to System Neutral, then 'L1' to System Live/Hot. NOW, before connecting 'L2' to System Ground/Earth use a voltmeter to check that there is no voltage on logger input 'L2' which, when connected to System Ground/Earth could draw a fault current through System Ground/Earth and trip the system! Typically with 'L1' and 'N' connected there is around 0.5Vac on 'L2', which is normally too low to trip an Earth Fault Relay! HOWEVER please do check your setting prior to

connection. Finally connect 'L2' to System Ground/Earth last. To disconnect, remove the System Ground/Earth connection to 'L2' first, then the other inputs to L1 and N after.

3 Phase Wye/Star and 3 Phase Delta (using inputs A1-A3, L1-L3 & N)

This recorder has an internal star-point, which is internally connected to the Neutral (N) input. For unbalanced three phase voltage inputs it is likely that the star-point will have a 'floating' voltage with respect to an external ground. We would therefore NOT recommend connecting the Neutral (N) input to an external system Ground (G) or Earth (E) as the floating voltage on the Neutral (internal Star-point) could trip sensitive Earth Fault or Earth Leakage protection equipment; connect Neutral (N) input to System Neutral only!

Technical Specifications VOLTAGE CHANNELS

TECHNICAL SPECIFICATIONS (subject to change without notice)	
Measurement range (Vrms)	**0Vac to 600Vrms (Ph – Ph)** or 0V to 350Vrms (Ph – N)
Maximum channel input voltage	600Vrms (Ph – Ph), 350Vrms (Ph – N) or 850Vpeak.
Inputs (non-isolated inputs)	Three phase inputs (**L1, L2 & L3**) & Neutral (**N**), **Non-isolated input channels!**
Input socket types	4mm shrouded 'banana' plugs & sockets, each with insulated crocodile clip.
Measurement accuracy	**±1% of reading** (10 bit) within 90Vac - 450Vrms (ph – ph); else ±3%. (50/60Hz ±2%)
Vmin & Vmax meas time resolution	Always one cycle (50/60 Hz), independent of selected averaging period.
Sampling frequency	16 samples per cycle **800Hz @ 50Hz** or **960Hz @ 60Hz**
Data recorded	Average voltage, max & min voltage-cycle-value during the averaging period
Memory capacity	192kB able to record 32,000 Voltage levels per phase.
Memory type	Non-volatile SEEPROM
Memory - averaging period & duration	1 sec to 60 mins (1sec. avg gives 2 hrs of logging, 60min. avg gives 300 days of logging)
Real-time clock accuracy	Greater than 0.001%
Input Lead Length	**Metric** 1.0 metres **Imperial** 3' 6" (3 feet, 6 inches)
Battery life (while plugged in)	Unlimited - mains powered & battery backup (9,000 hours, 1 year while unpowered).
Battery Type	Unit contains **four** 9V Alkaline batteries (E-Block, PP3, 1604A).
Communications Interface type	USB.
Electrosoft Software	Windows (9x, 2K, ME, NT, XP, Vista, Windows 7); 1024 x768 min resolution
Environmental (temp & sealing)	-10C to +40C **or** +14°F to +104°F – **Indoor or protected environment only!**
Dimensions & Weight	**Metric** 250 x 160 x 160mm & 1kg **Imperial** - 10" x 6" x 6" & 2lb
Standards	Recording - EN50160: 1994 - CAT III, maximum input 1000Vac.

Technical Specifications CURRENT CHANNELS

TECHNICAL SPECIFICATIONS (subject to change without notice)	
Current Range	**Model EC-6VA–1K is 10 to1kA, model –2K is 15 to 2kA, model –3K is 20 to 3kA**
Current Measurement Accuracy	**2% of reading 100 to 500A, otherwise 10%**
Sampling frequency	16 samples per cycle **800Hz @ 50Hz** or **960Hz @ 60Hz**
Data recorded	Average current, max & min current-cycle-value during the averaging period
Memory capacity	192kB able to record 32,000 current levels per channel.
Memory type	Non-volatile SEEPROM
Memory - averaging period & duration	1 sec to 15 mins (1sec. avg gives 2 hrs of logging, 60min. avg gives 300 days of logging)

Calibration
Each unit is individually calibrated during testing.

Battery life (while connected)
Unlimited - mains powered and battery back up.

Battery life (while unplugged)
The 9V Alkaline batteries should last for at least 9,000 hours (1 year),

Caution
The batteries used in this device may present a risk of fire or chemical burn if mistreated. Do not recharge, disassemble, heat above 100°C or incinerate. Replace with a 9V Lithium or Alkaline battery IEC Type 6-F22 (PP3, MN1604). Use of another battery may present a risk of fire or explosion. Dispose of used batteries promptly. Check for signs of battery (electrolyte) leakage. If leakage has occurred, the PCB must be cleaned in an approved manner by a competent (trained) person. Keep away from children.

Maintenance
Regularly check the Electrocorder casing for signs of damage (cracks, broken or loose parts) or misuse. If the unit is damaged in any way it must **NOT** be used and should be returned to the supplier. The unit must not be used for any other purpose than for that recommended by the manufacturer. The unit must not be submerged in any liquid.

Cleaning
Wipe the outside of the case with a clean cloth damped with IPA (Isopropyl Alcohol).

Warranty
All Acksen products carry a minimum 1 year back to base warranty covering manufacturing defects and component failures. The device contains no user-serviceable parts and as such should only be repaired by skilled and authorised personnel. Failure to comply could result in unsafe operation and should not be attempted under any circumstances. Contact below for a list of approved service agents.
Note: Any unauthorised repair or adjustment will automatically render the warranty invalid.

Repair and spare parts

Acksen Ltd.
28 Station Road
Whiteabbey
Newtownabbey
Co. Antrim BT37 0AW
United Kingdom
Or an approved repair company.

Returning a product for repair
If returning a product to the manufacturer for repair, it should be sent freight pre-paid to the appropriate address. A copy of the Invoice and of the packing note should be sent simultaneously by airmail to expedite clearance through Customs. A repair estimate showing freight return and other charges will be submitted to the sender, if required, before work on the device commences.

WEEE
For EU customers Acksen Ltd offer a product take-back service. For customers within the European Union (only) and products manufactured or sold by us; when those products reach the end of their life, simply send them back to us at your expense, we will dispose of them according to the relevant legislation. WEEE Reg. No. WEE/DD2117VU

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ELECTROCORDER

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