



Link-10 (E-Meter)



Xantrex Battery Monitor

We stock hard-to-find Link-10 & XBM Options!

When you rely on batteries to supply the power for your living space, transportation or lifting needs, it is important to know how much power you have left. Battery voltage alone is rarely a sufficient indication of battery state-of-charge – voltage is only an accurate charge indication when batteries have been idle for several hours.

The Xantrex battery gauges, the Link-10 (formerly the “E-Meter”) and the Xantrex Battery Monitor (XBM) are among the best battery “fuel gauges” available for Renewable Energy (RE), Recreational Vehicle (RV), Electric Vehicle (EV), and Marine battery monitoring needs. These gauges measure ampere-hours so that you know with good accuracy how much power you have left.

Common Features

- Ideal for 12 or 24 volt systems
- Optional prescaler for 48 volt systems
- Mounts in 2” round hole
- Displays battery bank data:
 - State of Charge bar graph
 - Voltage
 - Amperage
 - Ampere Hours
 - Time Remaining or Percentage Remaining
- Accurately measures battery banks as large as 2000 Ampere Hours.
- Puckert calculations account for non-proportional discharge based on load.
- Calculates battery efficiency helping you to know the health of your batteries
- Low battery alarm provides both visual warning and external contact signal.
- Optional Temperature Sensor accounts for temperature de-rating of battery capacity
- Optional RS-232 computer port and PC display/data logging software.

Link-10 Unique Features

- 3 ½ digit LED display with auto dimming
- 2 button operation
- Splash-proof for marine applications
- 28 mA “sleep” power consumption
- Operates up to 40 volts (76 volts with optional standard prescaler)
- Measures up to 400 volts with optional HV prescaler – ideal for Electric Vehicles

XBM Unique Features

- 3 ½ digit LCD display with backlight
- 3 button operation
- Displays temperature (when optioned)
- Low 8 mA power consumption
- Operates up to 35 volts (110 volts with optional prescaler)

BATTERY CONNECTION

The Xantrex battery gauges come with a shunt (very high power, low value resistor) used to measure current in and out of the batteries. The shunt is installed in series with the cable going to the most negative battery terminal. The shunts are rated to handle up to 500 amps of current. Voltage from the batteries is used to both power the meter and allow the meter to measure the voltage. Wiring from the batteries and shunt to the meter may be up to 50 feet long if it is the proper size and type. A 25 or 50 foot long, 6-conductor, twisted pair cable with fuses is optionally available.

BATTERY STATE OF CHARGE

The Xantrex battery gauges use ampere-hour measurements to determine how much of the battery capacity remains. An "Ampere" is a measurement of electrical power at a moment in time. An "Ampere-hour" is a measurement of energy transfer over time – "1 Ahr" is one ampere flowing for one hour, or two amperes flowing for half an hour, etc. As the batteries are being discharged the ampere-hours grow increasingly negative. As the batteries are being charged, the ampere-hour grow increasingly positive.

It is a well known characteristic of batteries that the higher the rate of discharge the less energy the battery can deliver. For example, a normal 225 Ahr golf cart battery will provide 225 Ahrs of power if drained over a period 20 hours. But if the current draw is increased such that the battery is drained over a period of 5 hours the capacity is only 185 Ahrs. To account for this phenomena the battery gauges use a Puekert exponent to de-rate the capacity based on the current being drawn from the batteries.

At the end of each battery charging cycle the battery gauges re-calculate the battery efficiency. As the battery life decreases so does the battery efficiency. Battery efficiency is a good indication of the health and longevity of the batteries in your system.

TEMPERATURE SENSOR OPTION

It is also well known that battery temperature effects the battery capacity. For example, a typical wet lead acid battery at 0° C has 10% less capacity than the same battery at 20° C. The availability of the temperature sensor ensures accurate battery gauging. The temperature sensors may be mounted to a battery post for optimal temperature sensing.

PRESCALER OPTIONS

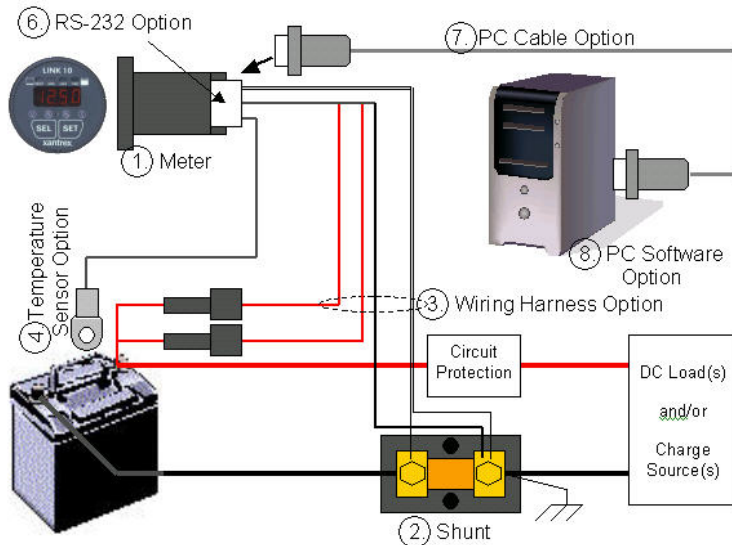
Both gauges are ideally suited for 12 to 24 volt battery systems. However, prescaler options are available for both gauges to allow them to monitor 48 volt systems. The Link-10 also has a 400 volt prescaler option that allows it to be used for Electric Vehicle (EV) applications. See the following configuration diagrams for details.

ALARMS

Both gauges have programmable alarm thresholds. Once the state of charge and/or battery voltage drops below the programmed thresholds an visual alarm is displayed and at the same time an external alarm output is activated. This external output can be wired to an audible warning device, or can be used to control a battery charger or start a generator.

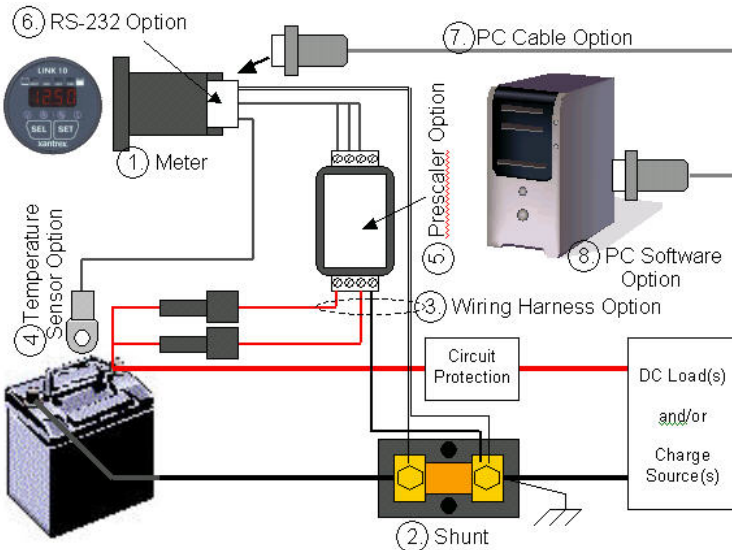
RightHand Engineering specializes in data monitoring for small-scale Renewable Energy (RE) and Electric Vehicle (EV) applications.

LINK-10 CONFIGURATIONS



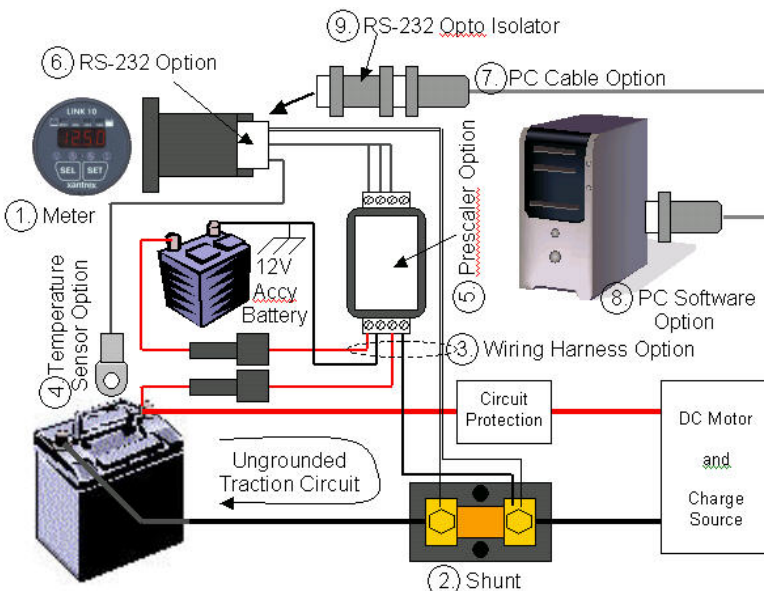
12 & 24 Volt Systems

For systems ranging in voltage between 9.5 and 40 volts the Link-10 can be installed without any prescaler option.



48 Volt Systems

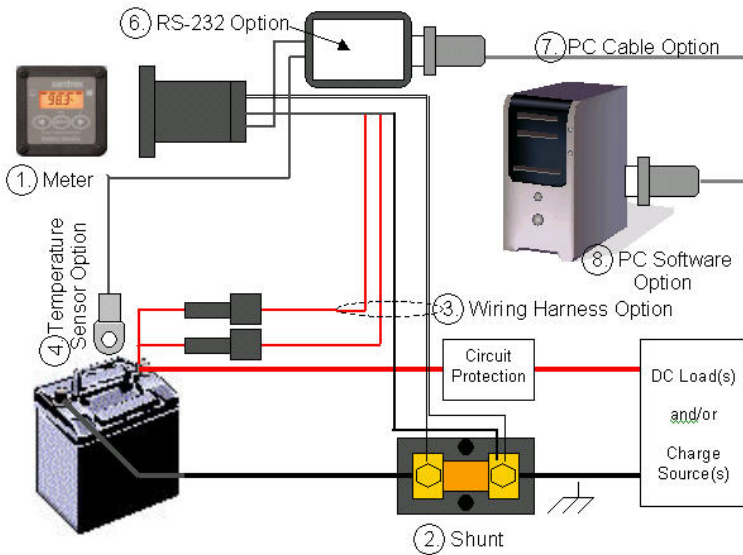
For systems ranging in voltage between 36 and 76 volts the Link-10 requires the standard medium voltage prescaler option.



76 Volt & Higher Systems

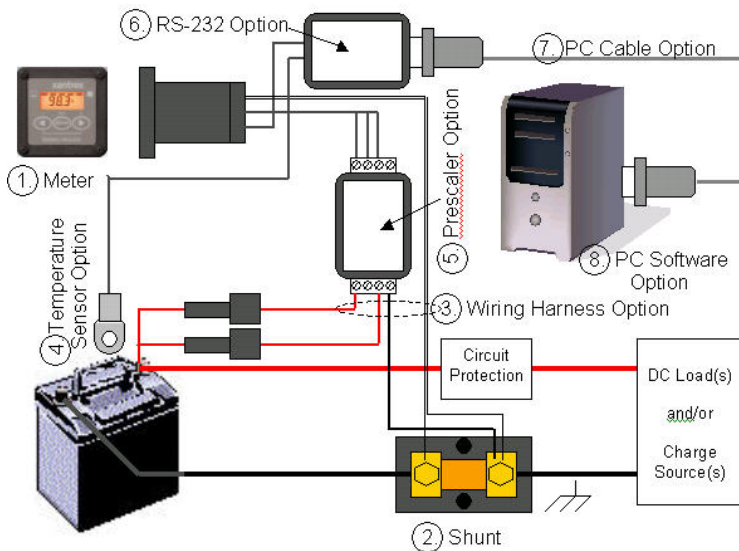
For systems ranging in voltage between 76 and 400 volts the Link-10 requires the high voltage prescaler option. This is typically for Electric Vehicle (EV) applications. The prescaler provides isolated meter power from a separate 12 volt source (allowing the traction battery to remain isolated from the vehicle chassis). If the RS-232 option is to be used the RS-232 Opto Isolator must be added to maintain the traction battery isolation.

XBM CONFIGURATIONS



12 & 24 Volt Systems

For systems ranging in voltage between 9 and 35 volts the XBM can be installed without any prescaler option.



48 Volt Systems

For systems ranging in voltage between 35 and 110 volts the XBM requires the prescaler option.

140 Volt & Higher Systems

The XBM is not rated for voltage over 140 volts. There are no prescaler options for these applications.

RightHand Engineering specializes in data monitoring for small-scale Renewable Energy (RE) and Electric Vehicle (EV) applications.

PC INTERFACE OPTIONS

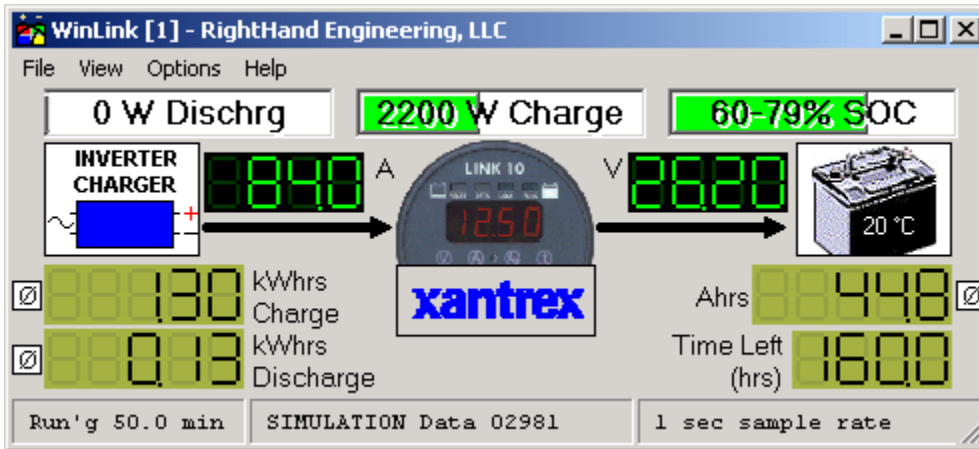
Both battery gauges have an optional 9-pin RS-232 serial port for connection to a PC via a 9-pin cable. This makes the real-time measurement data available to the PC for data logging and display. Documentation from the manufacturer contain the data protocol allowing development of custom software.

The RS-232 option for the XBM is optically isolated so that the PC's chassis is isolated from the battery system. The RS-232 option for the Link-10 may also be isolated by the addition of an optional, external, in-line optical isolator. Isolation is of particular importance when used in Electric Vehicle applications where the traction batteries must not be grounded to the chassis.

The RS-232 option for the Link-10 can not be retrofitted. If RS-232 is desired, that meter must be ordered with the option prior to shipping.

PC SOFTWARE OPTIONS

RightHand Engineering's *WinLink* PC software runs under Windows 98 through Vista and provides real-time display and data logging of data provided by the Link-10. The "Professional" version adds the ability to do data logging at intervals as small as 10 seconds or as large as 1 hour (the non-pro version has a fixed 1 hour interval), plus the ability to send emails based on battery state of charge changes. Graphing of the logged data is done using a spread-sheet such as Microsoft Excel (instructions are included on how to import to Excel). For a complete list of *WinLink* features, see the *WinLink* spec sheet.



The XBM's *Battery Monitor* PC software runs under Windows 98 through XP and also provides real-time display and data logging, as well as data graphing.



SPECIFICATIONS

Feature	Link-10	XBM
Mounting	2" round panel hole	2" round panel hole
Securing	Locking ring (included)	Screws (not included)
Meter Face	2.5" diameter round	2.55" square
Water Resistance	Splash proof & conformal coated	Splash proof
Compliances	European CE	European CE, RoHS
Display Type	3 ½ digit LED w/ 4-bar SOC graph	3 ½ digit LCD w/ 5-bar SOC graph
Operating Temperature	0 to 50 degrees C	0 to 50 degrees C
Supply Power	9.5 to 40 volts, 50 to 150 mA (28 mA sleep mode)	9 to 35 volts, 6 to 8 mA (add 4 mA for prescaler)
Volt Measurement Range	0 to +50 volts (w/o prescaler), 0.05 V resolution < 20 volts, 0.1 V resolution >= 20 volts, 0.6% + 1 count accuracy.	0 to + 35 volts (w/o prescaler) 0.01 V resolution, 0.3% accuracy.
Amp Measurement Range	0 to +/- 500 A, 0.1 A resolution < 40 amps, 1.0 A resolution >= 40 amps, 0.8% + 1 count accuracy.	0 to +/- 500 A, 0.1 A resolution < 200 amps, 1.0 A resolution >= 200 amps, 0.4% accuracy.
Temp Measurement Range	0 to 99 degrees C, 1 degree C resolution.	0 to 50 degrees C, 1 degree C resolution.
AmpHour Range	0 to 1999 Ahr, 0.1 Ahr resolution < 200 Ahr, 1 Ahr resolution >= 200 Ahr	0 to 2000 Ahr, 0.1 Ahr resolution < 200 Ahr, 1 Ahr resolution >= 200 Ahr
Measurement Display Modes	Volts, Amps, Ahr or kWhr, Time or Percentage remaining, + 6-levels of SOC	Volts, Amps, Ahr, Percentage and Time to go, Temperature, plus 6-levels of SOC
History Displays	Charge Efficiency Factor (CEF), number of chg/dischg cycles, average and deepest discharge Ahrs.	Charge Efficiency Factor (CEF), avg & deepest discharge Ahrs & %, number of chg/dischg cycles, number of full charge/discharges, number of over & under voltage alarms.
Alarm Output	150 mA, 50 V max transistor output, referenced to ground.	1 amp, 60 V max relay output. Selectable polarity.
Meter Setup	Front panel using 2 buttons	Front panel using 3 buttons or via PC software with RS-232 option.
Setup Lock	Yes	Yes, plus Super Lock via PC software.
Shunt	500A, 50 mV, included	500A, 50 mV, included
OPTIONS		
Temperature Sensor	Available	Available
Medium Voltage Prescaler Kit (typically for 48 V applications)	Available. Measures to +100V. Powers from 36 to 76 volts.	Available. Measures to +110V. Powers from 27 to 175 volts
High Voltage Prescaler Kit (typically for EV applications)	Available. Measures 0 to +400 V. Powers from 9 to 18 volts, with 400 V isolation.	Not available
RS-232 Serial Port	Isolated (2500 Vrms) or Non-isolated Available	Isolated Available. 16 to 25 mA, 1500 Vrms isolation.
PC Software	WinLink SW Available	Battery Monitor SW Available