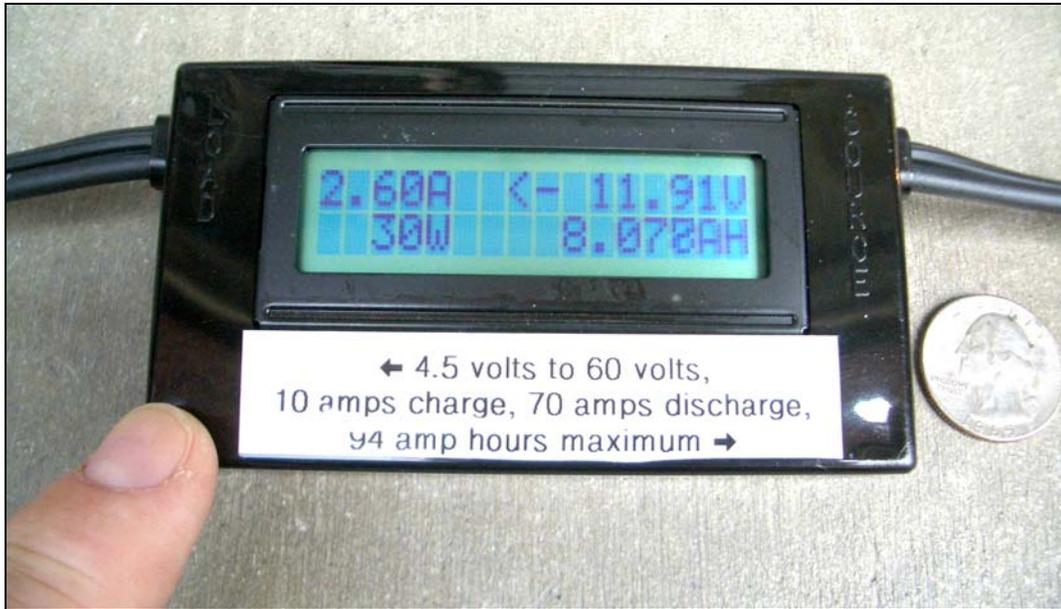


Battery Watcher



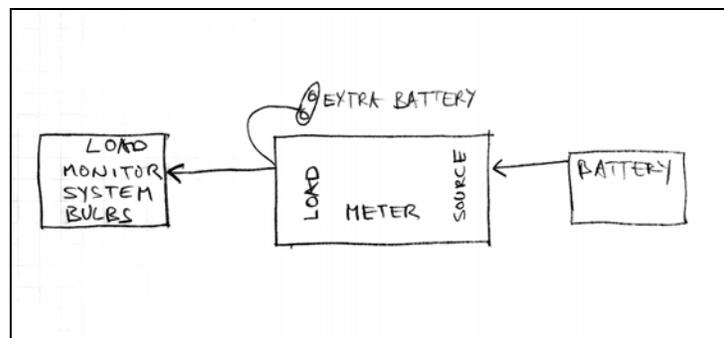
Consider this a gas gauge for your battery.

This handy meter keeps track of battery and charger condition. You will know how much energy was put in your battery and how much is left. It distinguishes itself from the Asian copies by accuracy and a display that changes from A/hr to Watt/hours. Watt hours is a more accurate way of measuring energy lost or gained.

Quick interpretation of the above display discharging example: Your load (on left) **[LOAD]** is drawing 2.60 Amperes from the battery (on the right) **[SOURCE]** which is now at 11.91 Volts. This has been going on for a while as the total A/Hrs drawn from the battery 8.078 A/Hrs (Ampere per hour). All the W means is that 2.60×11.91 equals 30 watts, a continuous power draw of 30 Watts.

The source side has a 4 ft. 16Ga silicon like cable attached and a 4XLR(M); the load side has a 1 ft. 16Ga silicone like cable and a 4XLR(F). Pin 1 is NEGATIVE, Pin 4 is POSITIVE as in most Sony and Arri gear. Cheap breakable plastic case. Do not hit it with a hammer. No backlight, no luxuries, just a decent price.

BATTERY HEALTH



To measure the load, first connect the meter **source leads** to the battery (or power supply). The meter display should light up and indicate the source voltage in 1 second. Wait for that. Then connect the load to the **load leads**. The meter will show how much you are taking out of the battery. This set up can also be used to measure battery capacity. The arrow on the display indicates direction of current flow. If you disconnect the load and charge the battery, the meter will show how much you put in, in amp hours (Ahr).

You can leave the meter connected to a 20Ahr battery for 2 months before its drained. It draws only 10 milliamps.

Charger Checking:

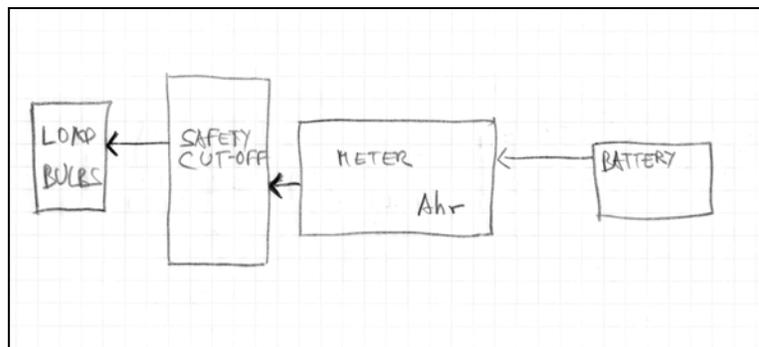
You can read that your charger is putting out a residual .002 A in float mode to a full battery at 13.2-13.8V. Now you know that the charger is not killing your batteries.

Battery checking:

Wondering if your battery is really dead? If initially the voltage is below 10.8 for a 12V lead acid battery, be very suspicious. If the charge current never goes below 1A consider it dead. If the amp hours keep increasing past advertised battery capacity +20%, be very suspicious. If the battery gets warm while charging, it's junk. If the battery splits open and gasses out poisonous foul smelling fumes, it's time to discard it in an environmentally correct way.

To Test Battery Capacity

The best test of a battery that tells you if its good or bad: Discharge it thru the watcher under a less than C over 3 load to 10.8 volts. Read the capacity. Charge it fully thru the watcher.



The load could be several 12V light bulbs matching the current draw typical gear you use. The battery cut off is available from us. We sell for your convenience a 10A model with 4 pin XLRs and a hefty 60A model (not pictured) are available.

You will be able to read off the amp hours taken out of the battery to the 10.8V cutoff point when the load is automatically disconnected. Cool. An easy self-testing rig. Now you know how much your battery will put out in the real world under real circumstances.



This is the voltage cut off good to 10 A and some load light bulbs. It is easy to assemble bulbs this way to come up with the load you want. The cut off protects the battery from over discharge. Just plug the thing in and go to bed.

Easy Numbers

Battery is 20 amp hours fully charged. Load is 5A of light bulbs and discharges to 10.8V of battery. How many amp hours are in the battery? Read it off the face of the meter after safety cut off disconnects the load. How long will it take? 20 amp hour (battery) divided by 5 amps (load) equals 4 hours. Like this:

Ahr: A=hr. Remember 9th grade math? You will find pretty large variances depending on real battery capacity $\pm 20\%$ on new ones; $\pm 50\%$ on 4 year old ones. If you double the current, capacity will shrink. If it's below 0°F, it will be 50%, etc. This works well for lead acid batteries between 1A and 80Ahr. It will work with NiCads and Lithium or NiMhd also.

C over 3

The maximum discharge rate of a lead acid battery should not be more than one third of its advertised **capacity** ("C"). So do not discharge a 30 Ahr battery with more than 10 Amps. If you regularly discharge small batteries with large currents, the life will be severely reduced. We use C over 10 to get a better approximation of real life situations. NiCads and NiMhd have a minimum voltage of 1.0 V per cell. There is no battery that should be drained to 0 volts.

A/hr vs. Watt/hr

Amp hour is Amps passed (negative or positive – in or out) per hour. Voltage may change so its not a super accurate measure of energy drawn or put into a battery. Watt hour is Volts x Amps per hour. So if the voltage goes up or down while amps are being measured they are reflected in the measurement. This gives a better comparison of energy stored or used.

Meter Power

A 9V DC external battery is required if the battery you wish to meter is 4.5V DC or below.

The meter contains no internal battery. It is powered from the battery you are testing. It absorbs about 10 milliamps at 12V. The meter will turn on at 4.5 volts and will measure any DC voltage up to 60 volts. To measure voltages between zero and 4.5 volts, attach a 9V DC battery to the attached external battery power cables. We tuck these rarely used cables inside the battery case.

Plug in battery first

The meter's microprocessor goes through a **self-calibration** routine every time voltage is applied. This routine takes about 1 second. **Wait for the voltage display before connecting the load.** This way you will have a very accurate current measurement. If the load is connected before the source of power is connected the current measurement may have up to a 1 amp error.

Not sure how much power your system uses? This meter will show you exactly how many watts and amps your system is drawing from the power source. Once you know the draw, you can easily compute the amount of the time you will be able to get out of each of your batteries, or you just try it and watch the meter.

Do not disassemble. No user serviceable parts inside. No fuses anywhere. Fuses are for wusses. Seriously, if you pass more than 70A through this meter the internal solder will melt on the wire connections and the wire will just disconnect. There is no serious damage done. Its very hard to change wiring to the unit after delivery. Besides you voiding the warrantee its not recommended.

Aircraft notice re lead acid sealed batts: "This battery meets or exceeds all requirements of **D.O.T. 175.159** dry rechargeable battery".

Use a screwdriver,  Go to Jail!

No user serviceable parts inside this unit. Do not open it!

It's a cheap and easy way to track your batteries.
It answers the Good? Bad? Question.

Closing note:
This is a SIMPLE meter to track DC use and battery capacity.
It easily checks all DC gear: camera motors, chargers, inverters, lamps, recorders, tuners etc.

Maximum Operational Voltage	60 volts
Minimum Operational Voltage with no extra battery	4.5 volts
Minimum Voltage with 9V extra battery	Zero Volts
Maximum Amps while discharging	70 Amps
Maximum Amps displayed while charging	10 Amps
Safe Charging Rate	70 Amps
Safe Discharging Rate	70 Amps
Maximum Power	4,200 Watts
Current resolution	10 Milliamps
Voltage resolution	20 Millivolts
Power resolution	0.1 Watts
Maximum amp hours of battery	94 Amp Hours
Amp Hour resolution	0.01 Amp Hour
Current Consumption	10 Milliamps
Resistance of inline device	.001 ohms
Cable made of silicone like material: HPV	Melting temp 90 degree same as silicone
Dimensions inches	W: 3 7/8, H: 2 3/16, D: 7/8
Weight:	Approx. 3 oz plus cables and connectors
Standard Connectors (4 ft. lead on Load, 1 ft lead on Source) Plug a meter built for Panavision into a ARRI battery and ther will be no display, no damage done.	4XLR Pin 1=Neg. Pin 4=Pos. Panavision: pin 1= pos., pin 2=neg., pin3=NC Arri: : pin 1= neg., pin 2=pos., pin3=NC

Lead Acid Battery sample voltages:

Open Circuit Voltage		Percent State of Charge coming of a charger	Real world values after 48 hr storage
24V batt	12V batt		
	Below 10.8V		DEATH !!!
22.8	11.4V		0%
23.6	11.8V	0%	20%
24.2	12.1V	20%	40%
24.6	12.3V	40%	80%
25.2	12.6V	60%	100%
25.6	12.8V	80%	
26.0	13.0V	100%	

Interested in good well-packaged cheap sealed **Lead Acid Batteries**? Especially for ARRI 235, 416, 435, 535, ARRI D-21, ARRICAM ST/LT, Moviemcam, Red One, RED, Sony F23, Sony F35, Sony F900's, Phantom HD and Panavision Genesis. Look at:
http://wolfvid.com/datasheets/Batteries_and_chargers.pdf

I can explain it to you but I can't make you understand it .

Extremely useful site: <http://www.batterystuff.com/>



Battery cut off

All the cut off does is disconnect the (light bulb) load off a battery at 10.8 volts. All it does is prevent the over discharge of the battery under test. If you over discharge a battery, any battery, you will destroy it. It is set at a proper voltage for 10 NiCad cells or a 12V lead acid battery: 10.8

Battery cut off 10A model (picture on left) with 4 pin XLRs **\$ 60.00**

Battery cut off 60A model (not pictured) no cables **\$ 100.00**



Light bulb load

4 XLR connector with Banana plug and 4 load bulbs **\$ 55.00**

Warranty: Not dead on arrival, 10 days return. Do not open unit; no user serviceable parts inside: 12 months parts and labor. Read this:

http://wolfvid.com/datasheets/Warrantee_WSV_sample.pdf

Support: There is no online or telephone technical support available for this product. All the information you will need to operate it is included above. If you suspect that your unit is malfunctioning and it is within the warranty period, return it. This product is intended to be used by technicians and professionals that have the knowledge required to operate simple technical devices such as this. It helps to know Ohms law. <http://www.the12volt.com/ohm/ohmslaw.asp> You got to know Ohms law ☺ Pretty good manual for a similar meter:

http://www.rc-cars-planes.com/docs/wu100v2_user_manual.pdf

If you want just a voltmeter check out Datel.com and look for digital panel meters (these used to be poorly manufactured, I returned 60% of the shipped meters, maybe they have improved in the last 5 years)

<http://store.cd4power.com/cgi-bin/cd4power.storefront/437935ee04717192271d0c9f894206df/Catalog/1013>

<http://store.cd4power.com/cgi-bin/cd4power.storefront/47328dd402222b54271e0c9f8942063c/Catalog/1042>



or http://www.aeicomp.com/Detail.asp?Product_ID=300.400_TM4 uses internal Batt **\$ 35**



or another voltmeter

<http://www.marteltesttools.com/products.php?cat=113&action=detail&id=69>

<http://www.martelmeters.com/products.php?cat=1>

Single Hole Mounting 2-Wire Operation 4 to 24V d.c. Reverse Polarity Protection **\$ 40 approx.**

A \$ 24.99 voltmeter <http://www.sidewinder.com.au/page168.html>



Total knowledge:

http://wolfvid.com/datasheets/Batteries_and_chargers.pdf

This document on the web at

http://wolfvid.com/datasheets/Battery_watcher.pdf

12/12/09

More info at www.wolfvid.com