Notes on connecting the TriMetric to measure Solar input only, or Wind input only.

The TriMetric may be connected so that it measures only input from a wind or solar source, rather than the more usual connection that shows the "net" input and output from the batteries. The suggested connections are shown on the other page.
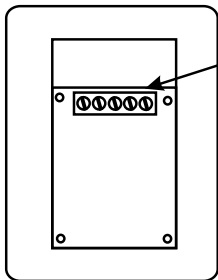
1. **The basic principle** for measuring "amps" and "amp hours" is to place the shunt in the NEGATIVE path that interrupts the current that you wish to measure. That is what is shown on the diagram. The same principle could be used to measure only load current, or to measure the <u>combined</u> (sum of) solar and wind input on one meter if that were desired.

2. **Choosing a shunt.** You may want to use a 100A/100mV shunt for measuring wind or solar input to reduce the amp hour error. The reason is that the more common 500A/50mV shunt resolves current down to 0.1 amp. This implies a possible uncertainty in amp hours of 24(hours) x .1 amp per day, or 2.4 amp-hr per day. By using the 100A/100mV shunt this can be reduced to 1/10 of that, to 0.24 amp hours/day. But note that a typical "100A/100mV" should be only used when the wind or solar input is less than 75 amps to avoid overheating these shunts.

3. The connections shown on the diagram for the "wind" and "solar" measurements cause the "AMPS" value on the meter to read a NEGATIVE value when the sun is shining, or the wind is blowing. This will also cause the "AMP HOURS FROM FULL" to become MORE NEGATIVE as more energy is accumulated. This is counter intuitive, and if you wish to have the incoming amps read POSITIVE instead, just reverse the connections between G2 and Sig to the meter. (But be sure to read note 5 below) The reason for the suggested wiring is that you can then use *two* of the meter functions for accumulating the "amp hours" from these sources. One can be used for a short term measurement (like an hour, day or perhaps a week) whereas the other can accumulate production over months or a year. If you wire it with the amps (and amp hours) coming in as a positive number, you won't have available the longer term measurement.

To measure "short term" amp hours, use the "**Amp Hours From Full**" display (that's the first of the 6 items in the "Extra data" group on the bottom of the TriMetric label.) This one will measure amp hours from 0.01 to 9,999 amp hours, however the "amp hours" will read as a negative number.

The **"long term" measurements of "amp hours"** can be made with the "Cumulative Batt Amp Hour" display, which in this case will not measure battery amp hours, but will measure accumulated amp hours from 1 to 999,000 amp hours. These will also read as a negative number.

So how can this 3 digit display show above 999 amp hours? Answer: When the display is above 999 amp hours the display will show with a **flashing decimal point**. This means "multiply the number by 1000". If you see 1.02 with flashing decimal point, that means 1020 amp hours.

4. Resetting amp hours: Either the long or short term amp hour numbers may be reset manually at any time. While observing the one you wish to reset--push and hold the RESET button for about 4 seconds until the display STAYS at 0. A quick push will <u>not</u> reset it.

IMPORTANT PROGRAMMING NOTES: Also refer to page 13 of TriMetric TM-2020 instructions for more detail on programming the TriMetric . These instructions are available on the web site.

5. To insure that the meter does not automatically reset the amp hours to 0, be sure to program the "PREFERENCES" setting to P02 or P03. Use SELECT button to go to the "blank" display, right after "Battery % Full". Then hold SELECT down and quickly push RESET to go into the program mode. Use RESET to program **P02** or **P03** --<u>Not</u> P00 or P01.

6. If you have wired the meter up so that amps come in as a POSITIVE number, then you must also program the "Efficiency factor" to 100, which is shown by a "00" in the programmed display. (Otherwise the AmpHours will accumulate at a lower percentage than "true".) To program this, use the SELECT button to show the "Battery % Full" display. Then hold SELECT down and quickly push RESET to go into the program mode. Use RESET to program H00 or L00 (depending on the shunt type you are using.)

BOGART ENGINEERING

M+ terminal must be connected to + with short wire (except as noted on page 3 of instructions "For unusual cases...").

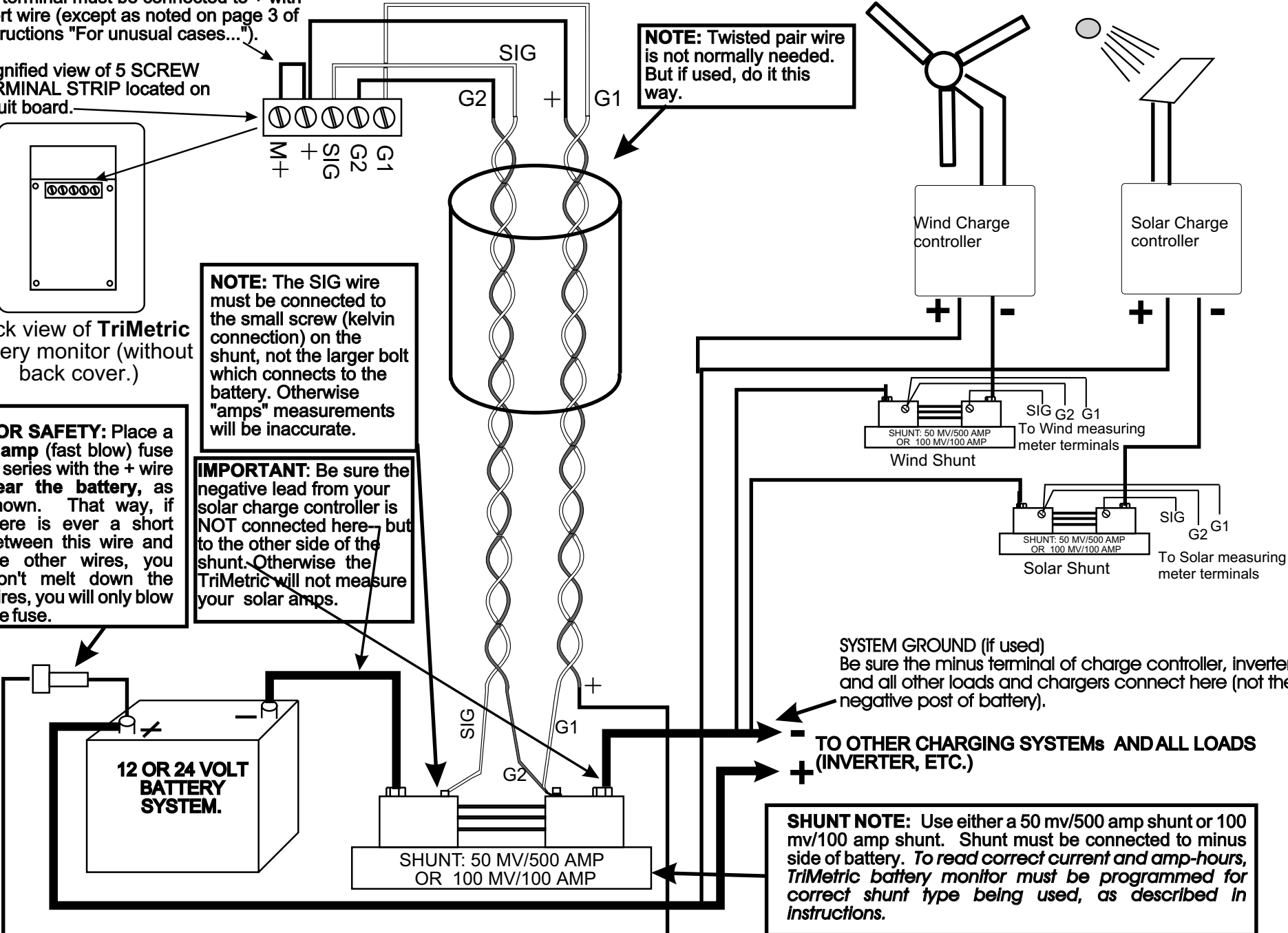Magnified view of 5 SCREW TERMINAL STRIP located on circuit board.

Back view of **TriMetric** battery monitor (without back cover.)

M+ + SIG G2 G1

SIG

G2 + G1

NOTE: Twisted pair wire is not normally needed. But if used, do it this way.

Wind Charge controller

Solar Charge controller

+ −

+ −

FOR SAFETY: Place a **2 amp** (fast blow) fuse in series with the + wire **near the battery,** as shown. That way, if there is ever a short between this wire and the other wires, you won't melt down the wires, you will only blow the fuse.

NOTE: The SIG wire must be connected to the small screw (kelvin connection) on the shunt, not the larger bolt which connects to the battery. Otherwise "amps" measurements will be inaccurate.

IMPORTANT: Be sure the negative lead from your solar charge controller is NOT connected here, but to the other side of the shunt. Otherwise the TriMetric will not measure your solar amps.

SHUNT: 50 MV/500 AMP OR 100 MV/100 AMP
Wind Shunt

SIG G2 G1
To Wind measuring meter terminals

SHUNT: 50 MV/500 AMP OR 100 MV/100 AMP
Solar Shunt

SIG G2 G1
To Solar measuring meter terminals

SYSTEM GROUND (if used)
Be sure the minus terminal of charge controller, inverter, and all other loads and chargers connect here (not the negative post of battery).

12 OR 24 VOLT BATTERY SYSTEM.

SIG

G1

G2

+

−

+

TO OTHER CHARGING SYSTEMs AND ALL LOADS (INVERTER, ETC.)

SHUNT: 50 MV/500 AMP OR 100 MV/100 AMP

SHUNT NOTE: Use either a 50 mv/500 amp shunt or 100 mv/100 amp shunt. Shunt must be connected to minus side of battery. *To read correct current and amp-hours, TriMetric battery monitor must be programmed for correct shunt type being used, as described in instructions.*