

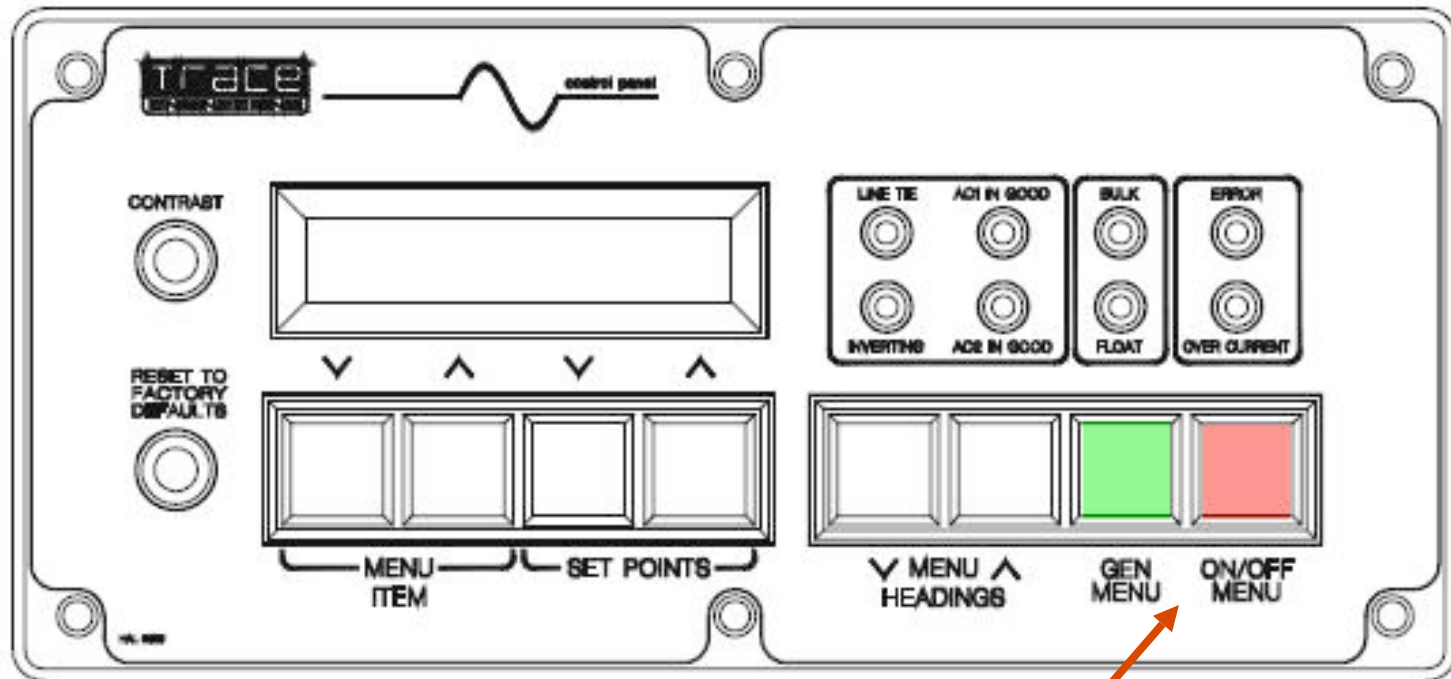


## **Inverter / Charger Installation Programming**





# To Access Set-up Men (Menu items 9 through 20)



Press Red and Green together to access  
the Setup Menu

# Menu 9: Inverter Setup

## 8.1 MENU 9: INVERTER SETUP

Inverter Setup	9	Set Grid Usage	FLT SELL SLT LBX	FLT
		Set Low Battery cut out VDC	32.0 - 70.0	44.0
		Set LBCO delay minutes	00 - 255	15
		Set Low battery cut in VDC	20.0 - 71.0	52.0
		Set High battery cut out VDC	20.0 - 66.0	64.0
		Set search watts	00 - 240	48
		Set search spacing	20 - 255	59

In the Inverter Setup Menu, it is recommended that the Low Battery Cut out VDC setting be changed to **46.0** instead of the default value of 44.0 VDC. This gives added protection to the batteries.

# Notes on Search Function

## » Search settings (Watts and Spacing)

- When the loads are going to be off for a given time, say laboratory loads that will not be used during the night, the Search capability allows the inverter to turn itself off and “go to sleep” saving energy. Every so many cycles, it “searches” to see if there are any loads requiring power (equal to the search setting in watts), and if it sees such a load, the inverter turns itself back on to power the load.
- If there is a refrigerator on the circuit, the search function might as well be disabled. And, if there are very small loads that might want to be allowed to come on – (**such as a 7W night light**) then the watt setting will have to be changed. (If a 7W load wants to come on at night, and the search setting is set to **48Watts**, the inverter will not come on until it sees a demand for 48 watts, so the 7W light will not come on.)
- **Quite often, the search function is disabled and can serve as an energy saver.**



# Menu 10: Battery Charging

## 8.2 MENU 10: BATTERY CHARGING

Battery Charging	10	Set Bulk volts DC	40.0 - 64.0	57.6
		Set Absorption time h:m	00:00 - 23:50	02:00
		Set Float volts DC	40.0 - 64.0	53.6
		Set Equalize volts DC	40.0 - 64.0	57.6
		Set Equalize time h:m	00:00 - 23:50	02:00
		Set Max Charge amps AC	01 - 35	30
		Set Temp Comp	LeadAcid Nicad	LeadAcid

The Bulk volts, Float volts, and Equalize volts all need to be set in accordance with the battery manufacturer's recommendations. For example, manufacturer's data from the Trojan website for some of their batteries would show:

# Sample Trojan Battery Voltage Recommendations

	System Voltage				
Voltage Settings	6V	12V	24V	36V	48V
Daily Charge	7.4	14.8	29.6	44.4	59.2
Float	6.6	13.2	26.4	39.6	52.8
Equalize	7.8	15.5	31	46.5	62

SAMPLE VOLTAGE SETTINGS FROM A TROJAN DATA SHEET

# Charging Voltages

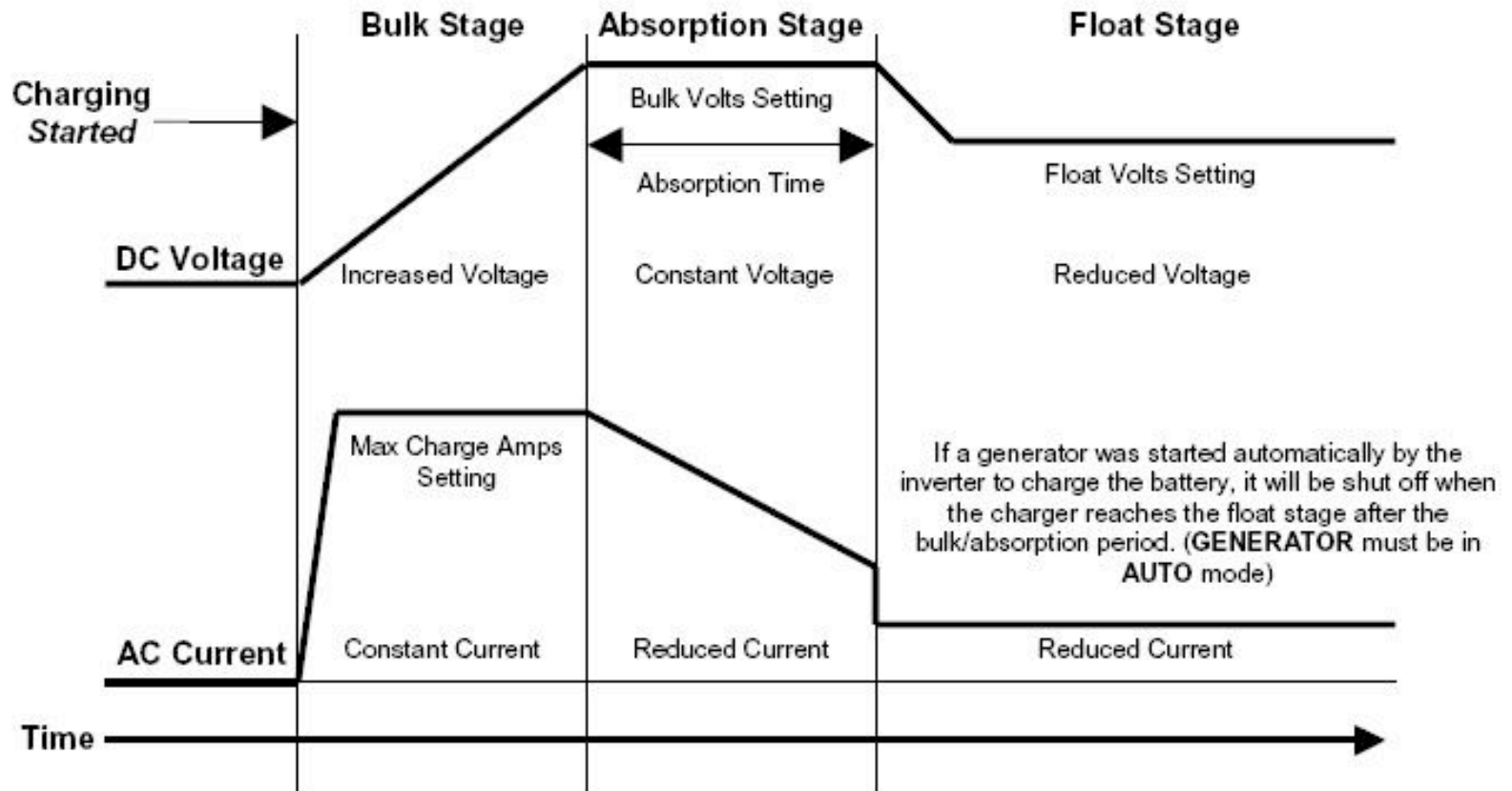
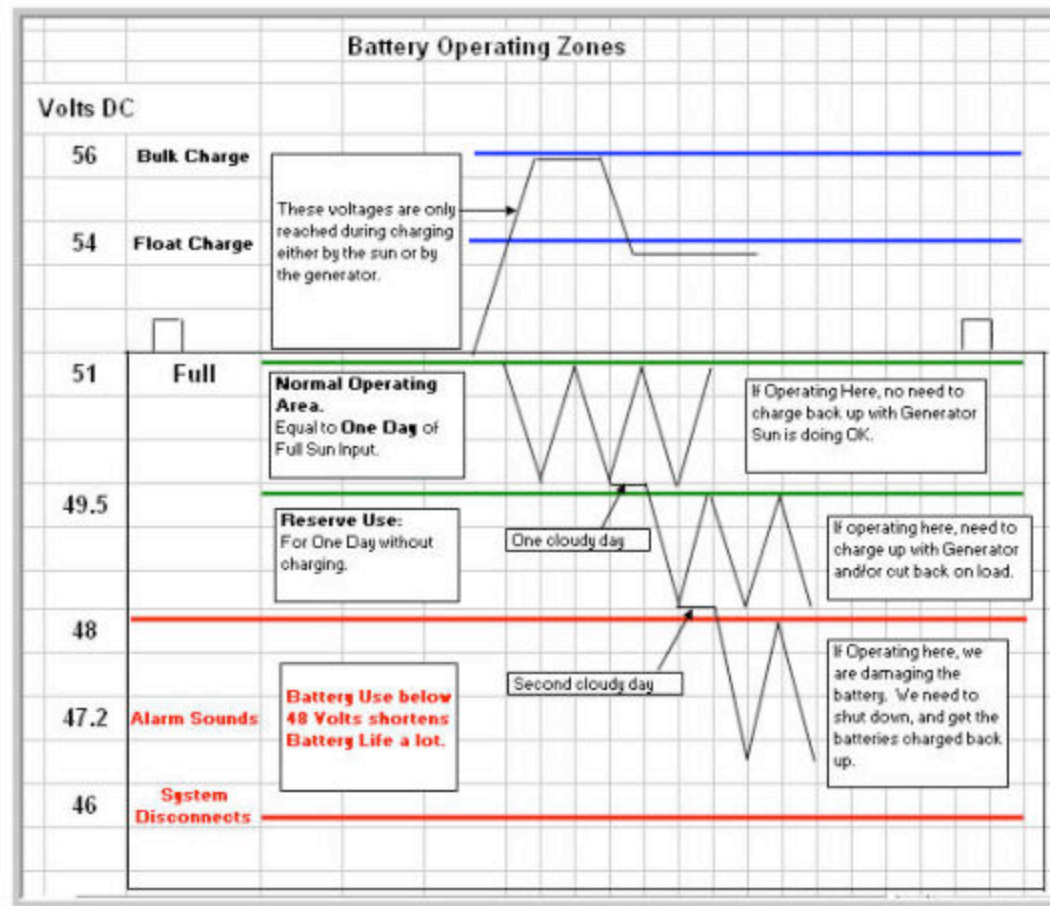


Figure 21, Three-Stage Battery Charging



# Battery Voltages



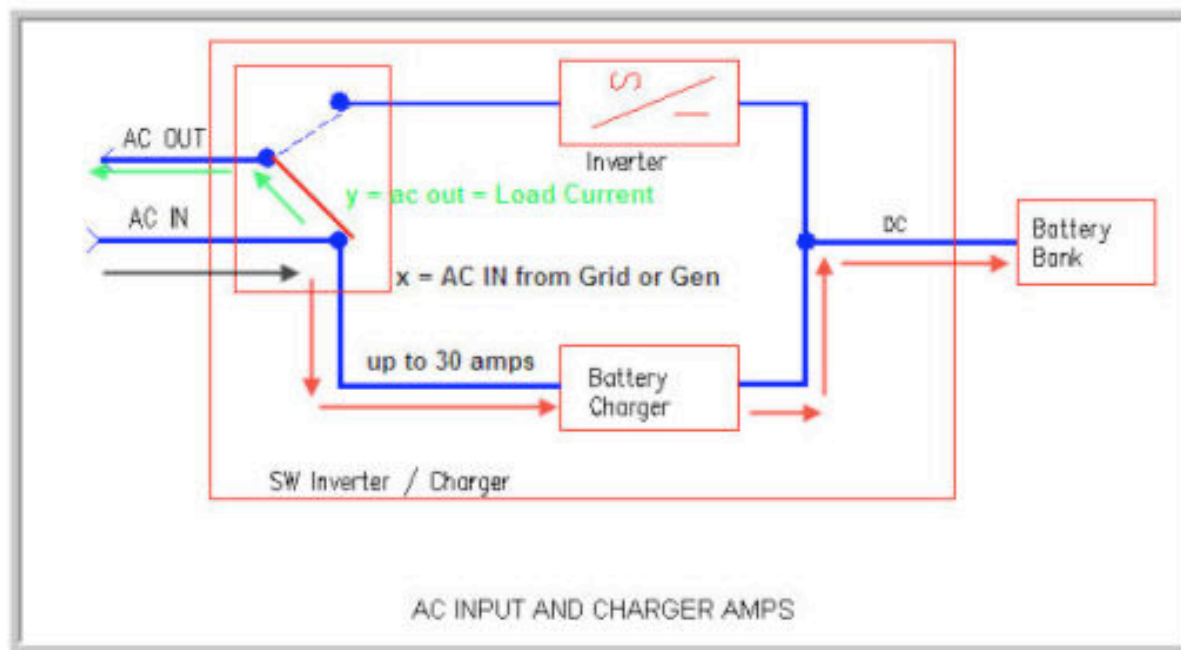
# Menu 11: AC Inputs

## 8.3 MENU 11: AC INPUTS

AC Inputs	11	Set Grid (AC1) amps AC	00 - 63	60
		Set Gen (AC2) amps AC	00 - 63	30
		Set Input lower limit VAC	80 - 111	108
		Set Input upper limit VAC	128 - 149	132

The settings for AC1 Grid Input Amps, AC2 Gen Input Amps, the Maximum charging amps from Menu 10 all work together.

Consider the following sketch:



# Menu 11: AC Inputs

- In this sketch, it is assumed that the MAX CHARGE Amps is set in Menu 10 to 30 amps.
- The Load Current,  $y$ , plus the current going to the battery charger are not generally permitted to exceed the AC IN current,  $x$ .
- So, if the AC IN is from the grid, and if the GRID AC1 amps is set to 60 amps, then the battery charger can draw its full 30 amps leaving 30 amps for the load current.
- Under this condition, if the load current rises to 40 amps, then the current going to the battery charger would automatically limited to 20 amps (for a total, not to exceed 60 amps.) Then, if the load current rose to 60 amps, there would be nothing left for the battery charger. If this situation persisted, the batteries would not get charged.



# Menu 11: AC Inputs

- If the AC IN is from the Generator and the GEN AC2 amps is set to 30 amps, then it is seen that any load on the AC OUT terminals of the system will detract from the current that can go to the battery charger.
- In these settings, the most important ones to get correct are the GRID AC1 Amps and the Generator AC2 Amps, since the battery charger amps is automatically reduced as the load increases.



# Menu 11: AC Inputs

**Ultimately, these settings have a huge affect on whether or not the batteries get charged adequately.**

**The AC INPUT SETTINGS are the most overlooked and most improperly set of all of the menu functions.**

**We should look at some examples on the board.**



# Menu 11: AC Inputs

- The last item under Menu 11 is the setting for the **lower limit of Voltage AC** that the system will accept (to power the loads and charge the batteries.) This needs to be set with some thought. If this window is kept tight, this will assure that low voltage electricity does not reach the loads. This might be appropriate if there are problems with low voltage only during short, intermittent parts of the day. **However, if there are constant low voltage problems and the window is set tightly, then this will also prohibit the equipment from connecting to the grid to charge the batteries.**
- It is generally good to set this at the lowest voltage level that is acceptable to the equipment being powered, unless we are not going to use the AC Voltage to power the equipment. (Keep AC IN turned OFF during the lab usage times.)



# Menu 18: Grid Usage Timer

- Generally, the grid usage timer is not used. Grid electricity is used whenever it is available.
- A situation where the grid usage timer might be used would be in an area where the day-time grid power supply is not clean enough to power the laboratory loads. If the grid power is connected to the SW, the grid power is fed through the SW, without conditioning, to the loads. In this case the grid power feed to the inverter equipment should be turned off during the lab hours of the day, allowing the lab equipment to be fed from the clean power manufactured by the inverter.
- Then, when the laboratory work is finished, the grid power could be reconnected to the SW equipment during the night, to charge the batteries.
- This could be done as described above, operating manual disconnect switches at the beginning and end of the shift, or by setting the Grid Usage Timer, to only use the grid power between say 6 p.m. and 6 a.m.



# Programming Caution

**IF THE DC POWER TO THE SW EQUIPMENT IS LOST, DUE TO EITHER TURNING OFF THE CIRCUIT BREAKER, OR REMOVING ONE OF THE BATTERY CABLES, ALL NON-DEFAULT PROGRAMMING IS LOST, AND THE SETTINGS REVERT BACK TO FACTORY DEFAULTS UPON RECONNECTION TO DC POWER.**

**THEREFORE, ONCE THE SETTINGS ARE DETERMINED THEY SHOULD BE PRINTED, LAMINATED, AND POSTED AT THE INVERTER AND KEPT IN THE SITE OPERATIONS MANUAL.**

