# TRAVEL LITE SOLAR PACKAGE





# **TRAVEL LITE INFORMATION GUIDE**

Sunny Summer Day – 90% effeciency 400W x 0.9 = 360W of Solar Output 6hrs x 360W = 2160 watts per day

Sunny Winter Day – 70% effeciency 400W x 0.7 = 280W of Solar Output 3hrs x 280W = 840 watts per day

<u>Cloudy Summer Day – 30% effeciency</u> 400W x 0.3 = 120W of Solar Output 6hrs x 120W **= 720 watts per day** 

Cloudy Winter Day – 10% effeciency 400W x 0.1 = 40W of Solar Output 3hrs x 40W = 120 watts per day Battery Bank 400AH x 12 Volts = 4800 Watts of Stored Power



4800W x 85% (15% reserve) = 4080 watts of useable power

<u>Appliances – Power Usage and Runtimes based on full battery</u> (4080W battery power divided by appliance watts/hour)

Air Conditioner	= 1100W	= 3.7 <b>hrs</b>
Cooktop	= 1500W	= 2.72 hrs
Fireplace	=1600W	= 2.55 hrs
Microwave	= 1100W	= 3.7 hrs
Water Heater	= 1600W	= 2.55 hrs
Refrigerator	= 80W	= 51 hrs
Lights, Water Pump, Misc.	= 40W	= <b>102</b> hrs

## 2-200 Watts Solar Panels = 400 Watts



# **TRAVEL LITE INFORMATION GUIDE**

Sunny Summer Day – 90% effeciency 300W x 0.9 = 270W of Solar Output 6hrs x 270W = 1620 watts per day

Sunny Winter Day – 70% effeciency 300W x 0.7 = 210W of Solar Output 3hrs x 210W = 630 watts per day

<u>Cloudy Summer Day – 30% effeciency</u> 300W x 0.3 = 90W of Solar Output 6hrs x 90W = **540 watts per day** 

<u>Cloudy Winter Day – 10% effeciency</u> 300W x 0.1 = 30W of Solar Output 3hrs x 30W = 90 watts per day Battery Bank 400AH x 12 Volts = 4800 Watts of Stored Power



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Lights, Water Pump, Misc.	= 40W	= 102 hrs

### **300W Solar Blanket**



# Training to Calibrate Battery Monitor

## Step 1 - To make sure that the battery bank is full

- Ignore the percent on the battery monitor until the monitor is calibrated.
- See battery monitor page to change the battery capacity to 400AH.
- Plug into shore power and make sure Inverter is turned on.
- Check battery monitor and make sure batteries are charging.
- When Amps (A) on the battery monitor get below 0.5A, then the battery bank is full.
- Hold the up arrow on the battery monitor for 3 seconds and it will calibrate the battery monitor and show 100%.

## Step 2 - When end user says they are not using any power and batteries die

 Always use the battery monitor and Intellitronix monitor to confirm current power (wattage) draw. The battery monitor will show the real-time charge/discharge on the whole system. The AC loads can be checked on the Intellitronix monitor. Cycle through the screens to see the watts being used on each circuit (see pic to right).

## Step 3 – How to shutoff AC/DC Power to unit

- To maximize battery life, turn the inverter remote switch (pictured on right) off to ensure AC loads are off and removes small draw from the inverter. Turn off battery disconnect; the battery monitor will only show solar charging.
- If you plan on leaving unit for weeks or more, then disconnect the Anderson connector on the battery, then press button on top of battery for 3 seconds and let go and it will shut down the battery. No LED lights will be on the battery cover.

## Step 4 – Understanding how to read the Battery Monitor

 Between the volts and amps on the battery monitor will show whether the system is charging or discharging by the + (charging) and – (discharging). See 500A Battery Monitor pages for more details.











Note: The Lithium Batteries BMS (Battery Management System) will put the batteries in sleep mode once they reach 10V. To wake up the batteries use solar power or charge with a lithium activation charger

# 3000W 12V PURE SINE WAVE INVERTER CHARGER W/ LCD DISPLAY

R-INVT-PCL1-30111S

When using shorepower the Inverter charges batteries at 780 watts an hour ,about 7 hours to refill.

#### CHARGER SPECIFICATIONS

Output Current: 5-75A configurable, 5A intervals

Nominal Input Voltage: 120 VAC

Input Frenquency Range: 40Hz - 70Hz

Surge Power (1 second): 9000W

Output Frequency (Nominal): 50/60 Hz

Output Waveform: Pure Sine Wave

No Load Power Consumption: Normal: <30W; Power Saving: <15W

#### **GENERAL SPECIFICATIONS**

Battery Types: GEL, AGM, SLA, FLD, CAL, LI, USER

Operating Temperature: 0 ~ 40°C / 0 ~ 104°F

Storage Temperature: -30 ~ 70°C / -22 ~ 158°F

Humidity: 0% ~ 95%

Noise: <50dB

Dimensions: 20.1 x 9.7 x 7.6 in / 510 x 248 x 193 mm

Weight: 63.5 lbs / 28.8 Kg

#### INVERTER SPECIFICATIONS

Continuous Power: 3000W

AC Output Voltage Range: 100~120VAC configurable, 5V interval

DC Input Voltage Range: 10~16 VDC

Nominal Efficiency: > 90% Peak

Surge Power (1 second): 9000W

Output Frequency (Nominal): 50/60 Hz

Output Waveform: Pure Sine Wave

No Load Power Consumption: Normal: <30W; Power Saving: <15W



# 3000W 12V PURE SINE WAVE INVERTER CHARGER W/ LCD DISPLAY

R-INVT-PCL1-30111S

## Fault / Warning Codes

The following fault codes will have a caution symbol when experiencing the fault

Warning Code	Warning Event	Icon On
03	Battery over voltage	
04	Battery low voltage	
05	Inverter over temperature	<u> IS</u> A
07	Inverter overload	
88	Transformer phase reversal	881
89	Frequency is out of range	<b>89</b> A

The following will experience an error display as well as the fault code

Fault Code	Fault Event	Icon on
02	Heat sink over temperature	
03	Battery voltage is too high	03_
04	Battery voltage is too low	
05	Output short circuit	
06	Output is too high or too low	06_
07	Overload	07
99	Inverter fail to slow start	99

### 11 Maximum Utility Charging

The PCL inverter chargers can operate like battery chargers converting incoming AC power into DC recharging power. The 2000W has a 65A max while the 3000W has a 75A max adjustable battery charging.



# <u>Step 1:</u>

Setting 11 on 3000w Inverter Charger is how to adjust the Utility Charging from the default maximum 75A of charging to a lower value by increments of 5A. The illustration to the right shows how the shore power is being distributed from charging to running appliances when the maximum 75A charging is selected. By lowering the charging value, then it will increase how many amps can be used for appliances.

## <u>Step 2:</u>

To <u>SAVE</u> the Utility Charging selection, turn off the Inverter Charger at the remote switch first. Then the battery disconnect can be turned off. This order only needs to be done for initial setup.

## 3000W 12V PURE SINE WAVE INVERTER CHARGER W/ LCD DISPLAY R-INVT-PCL1-301115





## 200-WATT 12 VOLT MONOCRYSTALLINE SOLAR PANEL RSP200D-G1

# **Electrical Data**

Maximum Power at STC*	200 W
Optimum Operating Voltage (V <sub>mp</sub> )	21.0 V
Optimum Operating Current (I <sub>mp</sub> )	9.52 A
Open Circuit Voltage (V <sub>oc</sub> )	24.1 V
Short Circuit Current (I <sub>sc</sub> )	10.9 A
Cell Efficiency	21.0%
Maximum System Voltage	1000 VDC UL
Maximum Series Fuse Rating	15 A

# **Thermal Characteristics**

Operating Module Temperature	-40°C to +80°C
Nominal Operating Cell Temerature (NOCT	) 47±2°C
Temperature Coefficient of Pmax	-0.42%/°C
Temperature Coefficient of Voc	-0.31%/°C
Temperature Coefficient of Isc	0.05%/°C

## **Mechanical Data**

Solar Cell Type	Monocrystalline (156 x 156 mm)
Number of Cells	40 (4 x 10)
Dimensions	1620 x 657 x 35 mm
Weight	11.5 kg
Front Glass	Tempered Glass 0.13 in (3.2 mm)
Frame	Anodized Aluminium Alloy
Connectors	Solar Connectors
Fire Rating	Class C

# Solar Connectors

Rated Current	30A
Maximum Voltage	1000VDC
Maximum AWG Size Range	10 AWG
Temperature Range	-40°F to 194°F
IP Rating	IP 67

# DEHCO ELECTRONICS



Optional 300w panel be helpful for charging while parked in the shade or to help rapid charge your batteries or

extend your appliance

use during the day.

- High performing PET-laminated monocrystalline cells, 19% efficiency
- Foldable and portable design with carrying handle
- Expandable design with industry standard MC4 connector

### **300W FOLDABLE MONOCRYSTALLINE SOLAR PANEL**

Optimum Operating Voltage (Vmp)	39.5V
Optimum Operating Current (Imp)	7.6A
Cables	3 ft
Weight	27.5 lb
Folded Dimensions	27.0 × 19.5 × 2.0 in
Unfolded Dimensions	81.0 × 55.5 × 0.5 in





RBM500-G1

SPECIFICATIONS	
Working Voltage:10-120V	Working Dissipation:10-15mA
Standby Dissipation:1-2mA	Voltage Accuracy : ± 1%
Current Accuracy:± 1%	Capacity Accuracy:± 1%
Backlight on current (50A):30-60mA	Backlight on current (>50A):80-120mA
Preset capacity value:.1-9999 AH	Temperature range:0-35°C
Weight:2.6 oz / 75 g	Size : 3.9 x 2.4 x 0.7 in / 100 x 61 x 17 mm

# **KEY FEATURES**

High precision current detection

High and Low Voltage Programmable Alarm - Backlight and voltage value will flash simultaneously Data Storage - Designed to automatically store the last testing data when system shuts off Displays multiple electronic parameters (Voltage, Current, Consumed Power and Battery Capacity) Universal Battery Monitor- Voltage range 10V-120V and up to 500A Accurate Battery SOC% Large backlit LCD Display 10



## 500A BATTERY MONITOR RBM500-G1

## **IDENTIFICATION OF PARTS**



LCD InterFace



500A Shunt/Sampler



10ft (3m) Shielded Wire



3ft (1m) B+ Wire

## INSTALLATION

### Connection/Setup

First, connect the Shunt in series to the negative circuit of your battery. B- of shunt connects to B- of the battery. P- of shunt connects to P- of output or C- of charge.

Then take a wire of 0.3-0.75 mm<sup>2</sup>. One end of the wire connects to positive of battery, another end connects to B+ of Shunt (either one is ok).

Finally connect the Shunt to the Renogy Battery Monitor by the shielded wire and the screen of the Renogy Battery Monitor display should turn on.



Attention: Please connect as shown. The shunt must be series connected to the negative circuit, DO NOT connect to the positive circuit. If you want to extend the shielded wire, you must use 4 lines of the same specification.

### Mounting

The Renogy Battery Monitor is fixed by tabs, so it is easy to install. First, open a rectangular orifice on your equipment panel according to the size. Then put The Renogy Battery Monitor into the rectangular orifice, and make sure the tabs are locked.



## 500A BATTERY MONITOR RBM500-G1



#### Use steps

 Connect and check the current: Power on after completing the connection as shown, the screen should display capacity percentage. If the screen has no response, please check the connection. Then charge or discharge the battery and check whether the display current is equal to the actual current. If the deviation is large, please check the connection.

2. Capacity reset: On first use, the percentage and capacity are not the actual value, you should reset the capacity. First, discharge the battery to 0% and hold the ⊙ key for 3s to set the capacity zero or charge the battery fully and hold th ⊗ key for 3s to set the capacity full. This will only have to be done on initial installation of the Renogy Battery Monitor or if the battery bank is replaced.

3. Check and reset the actual capacity: If you find the displayed capacity doesn't match the actual capacity during use, please check and reset the actual capacity, discharge the battery to 0 % and hold the  $\odot$  key for 3s to set the capacity 0, then set the preset capacity as large as possible. Then charge the battery fully and the displayed capacity should be the actual capacity. Finally set the display capacity as preset capacity (Please refer to use setting).



#### Preset capacity and voltage setting:

- Press the e key for 3s to enter setting menu;
- CAP—Preset capacity: An initial capacity has been set at the factory, please set it
  according to the real capacity of your battery.
- HIGH V-Full capacity voltage: When the voltage is higher than the set value, the capacity will be automatically set to 100%.

## 500A BATTERY MONITOR RBM500-G1

- LOW V-Zero capacity voltage: When the voltage is lower than the set value, the capacity will be automatically set to 0%. If the discharge continues, the voltage value will flash, and the alarm will beep once every 10s.
- ALARM-Alarm setting: When the battery capacity is below the set capacity, the percentage and battery symbol will flash and the alarm will beep once every 10s.
- Attention: If you need to set the HIGH V and LOW V values, please confirm the full charge voltage and all discharge voltage specifications of your battery.

3. Select CAP and click the ext{ expected with a set of the s

4. We can set other items with the same method as preset capacity. When all the items are set and all the values are correct, click the 
key to save the set and quit the setting menu.

### Set capacity to zero or full:

On first use or change of the battery bank, the memory capacity should be set zero or full: In the main interface, hold the  $\odot$  key for 3s to set the capacity zero, the percentage will be 0%; hold the  $\otimes$  key for 3s to set the capacity full, the percentage will be 100%.

### Sleep mode wake up operation

 When the battery current is low, the Renogy Battery Monitor will go into a low power sleep mode, press any key to see the display if needed. When the battery current rises over normal value or the battery starts charging or discharging the Renogy Battery Monitor will wake up.

The Renogy Battery Monitor can stay connected to the battery bank since it has a very low self-consumption.

### Manual turn off backlight function:

Long press front 
 Keyboard can turn off the backlight, Long press again 
 Keyboard can Wake up the backlight.

## REGO 12V/400AH Lithium Iron Phosphate Battery w/Self Heating RBT12400LFPL-SHBT







Battery Specifications			
No.	ltem	Specification	
1	Rated Capacity	400Ah	
2	Nominal Voltage	12.8V	
3	Absorption Voltage	14.4V	
4	Voltage Range	10V~14.8V	
5	Maximum Continuous Charge Current	200A	
6	Maximum Continuous Discharge Current	350A	
7	Internal Resistance	≤10mΩ	
8	Self-discharge Rate	≤1.5%/Month (25℃)	
9	SOC Accuracy	< 5%	
10	Built-in Heater	Yes (Powered By External Power Supplies)	
11	Communication Protocol	RV-C, Modbus	
12	Communication Connector	LP16 7-Pin Connector, Bluetooth Module	
13	Input/Output Connector	Anderson 350A Connector	
14	Momentary Push Button	Yes	
15	Cell Temperature Sampling Range	-40°C~85°C	
16	Cell Temperature Sampling Accuracy	±2℃	
17	Cell Voltage Sampling Range	2V~5V	
18	Cell Voltage Sampling Accuracy	≤10mV	
19	Battery Voltage Sampling Range	8V~20V	
20	Battery Voltage Sampling Accuracy	±500mV	
21	Current Sampling Range	-600~600A	
		0A: ±300mA	
22	Current Sampling Accuracy	0A~30A: ±0.3A (>-10°C), ±0.5A (≤-10°C)	
		30A~600A: ±1% (>-10°C), ±1.5%(≤-10°C)	
23	Cell Balancing	Passive Balancing	
24	Balancing Current	40mA~200mA	
25	Boot Loader	Yes	
26	Cycle Life	≥2500 Cycles (100% DOD, 75% EOL, 25℃, 0.2C)	
		Battery Status Indicator: Yellow/Red	
27	LED Indicator	Heater Status Indicator: Green/Red	
		Battery Level Indicator: Blue	
28	Cascade Communication	Yes	
20	Rethere Operation Transmission	Charge: 0°C~55°C	
29	battery Operating Temperature	Discharge: -20°C~60°C	
		Within 6 Months: -25℃~45℃	
30	Battery Storage Temperature	Within 7 Days: -30°C~60°C	
31	Heater Turn On Detection Duration	60s	
32	Heater Turn On Attemps	3	
33	Heater Turn On Interval	10min	
34	Heater Start Operating Temperature	≤5°C	
35	Heater Stop Operating Temperature	≥10°C	
36	Heater Rated Power Consumption	200W	
37	Heating Speed	5°C/h	
38	Protection Rating	IP65	
39	Dimension	457 x 329 x 267.2 mm	
40	Weight	46±1.5 kg	
-	2		



# SOLAR ROOFTOP JUNCTION BOX W/ MC4 CONNECTORS

SRCB-2 (this is on the roof and the rear wall of your RV used for hooking up solar panel to your charge controller)



DEHCO, INC.

LARGE SOLAR ROOF TOP BOX

ASSY WITH CONNECTORS

PT 0219 1133

А

RT NUMBER

IATERIAL BLACK UV STABLE ABS PLASTIC INISH BLACK -GLOSS SMOOTH

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DEHCO



# POWER PROTECTION MANAGEMENT SYSTEM LOAD SHED AND BREAKER PANEL ALL IN ONE

### CH001



### Features

- Combines a breaker panel and energy management system into an all-inclusive unit
- Power management for different available sources including 50 Amp & 30 Amp Service
- Easy configuration by setting circuit priority and max current allowance
- Automatically sheds and re-engages loads to avoid tripping the breaker
- 6 AC relays
- · Monitors AC loads independently in real time

# Intellitronix Energy Management System

The Intellitronix Energy Management System combines a standard breaker box with automatic power management for use in a recreational vehicle. It automatically senses and shifts AC loads to best utilize the available power. It decides what AC circuits get power based on user priority settings.

For example, if someone is using a hair dryer and running a microwave oven and toaster, and the refrigerator starts running, that may temporarily be more power than is available, potentially causing a main circuit breaker to trip, or overloading a generator. The <u>Intellitronix</u> Energy Management System can temporarily shut down the refrigerator power. When enough appliances are turned off, and sufficient power is available, refrigerator power is automatically restored. It also functions as a standard breaker box using standard breakers and wiring.







The Power Module looks almost identical to a standard breaker box and is wired the same way. It adds a 12V input to drive the Energy Management System. Inside, the eight led lights indicate which circuits are using power. (Two center ones are input power)

Up to six 120VAC Circuits out, each with standard breakers, 15A or 20A.

### **Power Module Specifications**

- Max input power breaker 50 Amps 2-phase, or 30 Amps single phase 120 VAC
- Digital Control System power input 12 VDC, (0.2 amps normally, to 1 Amp max for all circuits opened)
- Six, normally on, relay operated 20 Amp circuits
- Two positions for input breaker(s), 50 Amp 2-phase, or 30A single phase
- Six 15 Amp or 20 Amp standard circuit breakers
- Breaker box style enclosure with rear wire entry strain reliefs, H 10" x W 10" x D 4.75, including ¼" mounting flange.

### **Power Module Specifications**

Max input power breaker 50 Amps 2-phase, or 30 Amps single phase 120 VAC Digital Control System power input 12 VDC, (0.2 amps normally, to 1 Amp max for all circuits opened) Six, normally on, relay operated 20 Amp circuits Two positions for input breaker(s), 50 Amp 2-phase, or 30A single phase Six 15 Amp or 20 Amp standard circuit breakers

Breaker box style enclosure with rear wire entry strain reliefs, H 10" x W 10" x D 4.75, including ¼" mounting flange.

### **Control Module Specifications**

Three button control, "Up", "Down", "Enter"

Six yellow led power indicators, one for each circuit under control

An OLED graphics display 0.95"

Uses common ethernet cable (up to 300 feet) to connect to the Power Module for data and power

Flush mount circular enclosure 2 1/16" diameter, 1 ¼" deep.

### **Control Module Display**

The top yellow numbers indicate which circuits are on. Circuits temporarily disconnected are indicated by a square block around the number.

There are six main menus/displays, accessed by pressing the "Up" or "Down" buttons:

- 1) Total Power Display Load 53% 0.0A Enter for Reset
- 2) History Menu Enter to show Watts History
- 3) Max Power Setting Display ( use this to set what your shore power cord is plugged into 15,20,30 amp service for example or 25 amp while inverting)
   Max Gen Amps
   30.0A

4) Circuit Priority Display 123456 Circuit Priority

4 ....

5) Present Wattage Display (use this to help manage your power consumption the example below is using 221 watts of 115v or AC power)
 W 123 57 13
 W 0 23 5

6) Present Amperage Display ( same as 5 however in amps ,,,, amps x volt = watts)
2.0A 1.0A 4.1A
5.3A 0.3A 1.7A

Pressing Enter at the History Menu shows past power consumption in Watt hours per circuit,

first showing circuits 123, then 456, then previous hours as you press the "Down" button. Pressing the enter button again returns you to the History Menu screen.

Unr ago 123
0.00 0.00 12.0
Ohr ago 456
1.20 10.0 0.50
23hr ago 123
1.03 2.56 0.00
23hr ago 456
0.00 3.22 1.01
Pressing Enter at the Max Power Setting Display allows editing of the maximum amps allowed by the system. Press Up/Down to set, Enter to save.

Pressing Enter at the Circuit Priority Display allow editing of circuit priorities. An arrow appears below each priority number as you continue to press the Enter button. Pressing the Up or <u>Down</u> buttons changes the priority pointed to by the arrow. A circuit at priority level "1" will be turned off last. Priority level "6" is turned off first when too much power is being used. The default setting is "1 2 3 4 5 6". This indicates the first circuit (leftmost in display) has the most priority and the sixth circuit has the least priority. A setting of "6 2 3 4 5 1" indicates the first circuit (in first position, far left), has the least priority and the sixth circuit (far right) has the most priority.

Pressing Enter at the Total Power display, ("Enter for Reset") asks "Reset? Y/N\_N" press Up/Down buttons until "Reset? Y/N\_Y" appears. Then press the Enter button. It will show "Resetting... "for a few seconds. Any lines that were powered off are all powered on. This is like resetting a breaker. It assumes you have reduced the load that had previously turned off some lines.