



## PV Power Electronics for Remote Telecom



### The PVT16.8 for 16.8kW of PV Input

- **Cut Diesel Costs – Reduce OPEX**
- **Pure Solar or Hybrid Power Solution**
- **Reliable Power for Telecom BTS and Telecom Backbone Operations**
- **Real-Time Remote Monitoring**
- **Alarms on All Key Parameters**
- **48VDC or 24VDC, Pos or Neg Ground**
- **Optional AC Output with stackable Inverter/Charger in Adjunct Cabinet**
- **Proven on Sites Worldwide**
- **Best Solar MPPT Charge Controllers with Highest PV Energy Harvest**
- **IP66 (NEMA4) Cabinet**
- **Standard 5 year Warranty**
- **Sizes from 4.2kW to 21kW of PV**

### Off-Grid Telecom Power System With Battery Management and Real-Time, Remote Monitoring and Control

The Apollo Solar Telecom Power Solution includes the PV power electronics and all required accessory equipment, management and monitoring software, in a weather-proof cabinet. Apollo also offers a wide range of system design, installation, commissioning and ongoing support services worldwide.

### Remote Power System Monitoring

The Apollo Solar PVT Product Line provides real-time monitoring of the entire power system with automatically updates 3 times per minute. Instant alarm reports and charts showing history of all key parameters plus detailed diagnostics make this the most advanced system available. The result is maximum uptime, optimized system efficiency, and reduction in diesel fuel expense. Charts report Hourly, Daily, Monthly or Annual performance and spreadsheet data is available for trend analyses or to document the increase in CapEx ROI.

### Maximum Power Point Tracking and Optimum Charging Efficiency Cut Costs

The Apollo Solar Battery Charge Management System captures up to 35% more power from the photovoltaic (PV) array. The Apollo MPPT algorithm starts early and locks onto the peak power during rapidly changing insolation and temperature. The 180Voc high-voltage PV-input capability dramatically reduces the up-front and life-of-system cost by reducing the number of PV panels required, cutting the cost of wiring, and increasing the life of the batteries.

### After-Sales Service

Apollo Solar trained application engineers provide support services that best serve your system and network requirements.

### Training

Apollo also offers comprehensive customer training in the installation, commissioning, and operations of the PVT product line.

# Apollo Solar Telecom PV Battery Charge Management Systems



## Green Power for Mobile

### **BENEFITS:**

#### **REDUCE OPEX**

- Solar is now less expensive than diesel fuel. Reduce your OPEX now.
- Cut service calls – Reliability – Apollo Solar has the top track record
- No more needless site visits – Remote Monitoring of all functions
- Rapid Installations – Turn-Key - Installs quickly and works the first time
- Factory assembled and tested – 5 year warranty – extensions available
- Cut PV Module Costs – Higher Energy Harvest from fewer modules

#### **FLEXIBLE INSTALLATIONS**

- Widest PV Input Voltage Range to 180Voc – Works with all PV modules
- Stock and learn one product – Universal AC Power from our Inverter
- Works in all environments – Service customers at any location:  
Field proven in jungle, desert, high-mountain, and marine environments.



### **STANDARD FEATURES:**

- 48V Positive Ground System (Negative ground and 24V also available)
- Each Charge Controller provides up to 80 Amps continuous current to the load and battery at up to 45°C ambient temp. 60 Amps to 60°C ambient.
- Parallel stack multiple panels for up to 1280 Amps into batteries.
- Maximum Power Point Tracking for 30% better PV energy harvest.
- Internal Battery State-of-Charge Monitor included.
- Remote Monitoring of all functions and values – View real time performance and complete history any time from any PC. See details below.
- Set alarms on critical values – including site security.
- Accurate battery voltage sensing to optimize battery life and charging.
- True Sine Wave Inverter/Charger provides 120V, 230V, 240V or 120/208V 3 Phase power and charges the batteries from a generator – eliminates rectifiers.
- Complete with all Circuit Breakers & Connectors – Ready to install.
- Surge Protection on all PV inputs and Load Circuits.
- Standard sizes from 4.2kW of PV to 21kW of PV supply telecom loads from 300 watts to 1500 watts at 48 volts DC.

### **OPTIONS:**

- Remote Communication with custom reporting to a private server.
- Include a GSM Modem if the site does not have internet access.
- Hybrid - Control Generator-Starting based on Battery State-of-Charge.
- Combiner Boxes – With Surge Protection

#### **Designed and built by Apollo Solar in the USA**

The Apollo Solar PV for Telecom systems are designed and built in the USA. Apollo Solar is responsible for the design and manufacturing of all the key components including the core T80 Charge Controllers, the complete system panel and the essential Remote Monitoring Software. Because all the components come from Apollo Solar, we provide our customers with a single point of responsibility for support and the complete product carries a 5 year warranty with optional extensions.



<b>APOLLO SOLAR PVT16.8 SPECIFICATIONS</b>	
<b>PV INPUTS</b>	
Maximum Open Circuit Voltage (Voc)	180v Operating, 200v absolute max
Maximum Input Current per T80HV	50 Amps
Maximum PV Array Power per T80HV	4200 Watts
Minimum PV input voltage (Vmp)	75 volts (Max battery charge voltage +16%)
Connector Maximum Wire Size	Up to 35mm <sup>2</sup> or AWG 2
<b>CHARGE CONTROLLERS</b>	
Technology	Maximum Power Point Tracking (MPPT)
Efficiency	98% typical
Operating Temperature Range	-40C to +60C
Certifications	UL1741, CSA C22.2 No.107.1-01
<b>BATTERY CHARGING OUTPUT</b>	
Maximum Charge Current per T80HV	80 Amps
Maximum Charge Current per system	320 Amps with 4 T80HVs, 1280 Amps Max
Battery Charging Method	4 Stage: Bulk, Absorb, Float, Equalize
Absorb Voltage	Settable from 54.2v to 60.8v in 0.1v steps
Absorb Time	Settable from 0 to 10 hours in 1 minute steps
Float Voltage	Settable from 51.2v to 56.8v in 0.1v steps
Manual Equalization	Settable timeout with batt temp monitoring
Automatic Equalization	Settable time and period with temp monitor
Battery types supported	Flooded, AGM, GELL, NiCad and Nickel-Iron
Connector Maximum Wire Size	150mm <sup>2</sup> or AWG 4/0 or 350mcm
<b>DC LOAD</b>	
Essential DC Load - Maximum Current	50 Amps at 48 volts DC
Maximum Voltage	60.0 volts DC (Adjustable)
Minimum Voltage	42.0 volts DC (Adjustable)
Surge Protection	48 volt MOV on Telecom Load Output
Connector Maximum Wire Size	16mm <sup>2</sup> or AWG 6
<b>CIRCUIT BREAKERS</b>	
Type	Magnetic Hydraulic
Certification	IEC / EN 60947-2 listed
Rating on PV Inputs	50 Amps at 250 volts DC Dual Pole
Rating on Charge Controller Outputs	100 Amps at 80 volts DC Dual Pole
Rating on Essential Telecom DC Load	50 Amps at 80 volts DC Dual Pole
Rating on Non-Essential DC Load	50 Amps at 80 volts DC Dual Pole
Rating on AC Loads	5 Amps at 277 volts AC Dual Pole
Rating on Battery Disconnect	100Amps for 1 T80, 250A for 2 or 3 T80s, 400Amps for 4 or 5 T80s, all Dual Pole

<b>REMOTE MONITORING - INTERNET CONNECTION</b>	
Real-time response	3 updates per minute minimum
GUI displays	Maps with pin locations showing status of all sites, Site Status with display of all numeric quantities, Bar Charts for 14 parameters, Spreadsheet tables, Alarm History, Diagnostic Messages.
Bar Chart quantities displayed	DC Energy Record, Irradiance Received, Battery Energy Flows, Battery Voltage, Max Power Received by Battery, Max Power Received from Battery, Estimated Solar Energy Potential, Power from PV Array to T80, Current from PV Array to T80, True Battery Voltage, Battery Current, PV Voltage
Bar Chart display period	Data displayed for 1 Hour, 1 Day, 1 Month or 1 Year. Frequency of data may be by 10 minutes, 1 hour, 1 day, or 1 month.
Database storage	All system component specifications, maintenance history, all data retrieved.
Alarms reported remotely	Battery Low Voltage, Battery high voltage, Load or Battery Circuit Breakers tripped, Enclosure Door Open, PV Array Theft attempt, Surge Arrestor MOV at end of life.
<b>LOCAL ALARMS (DRY CONTACTS)</b>	Battery Breaker Trip, Load Breaker Trip, Low Battery Voltage, High Cabinet Temp, High Battery Voltage, High Battery Temp.
<b>OPTIONS</b>	
1 Inverter for small AC output	350VA for small AC loads
2 Inverter/Charger for AC and Rectifier	4kVA of AC and 50A Charging from Genset
3 GSM Cellular Modem	Quad band with external antenna
4 IP66 (NEMA 4) Steel Enclosure	800x600x300mm   1200x1000x300mm
<b>PHYSICAL SPECIFICATIONS</b>	
	4.2kW System   8.2, 12.6 or 16.8kW
Panel Dimensions	550x750mm panel   1150x950mm panel
Shipping crate Dimensions	650x850x400mm   1250x1050x400mm



**The T80HV Charge Controller**



**PVT4.2kW system**



**PVT12.6kW system**



## Apollo Solar Real-Time Remote Monitoring System

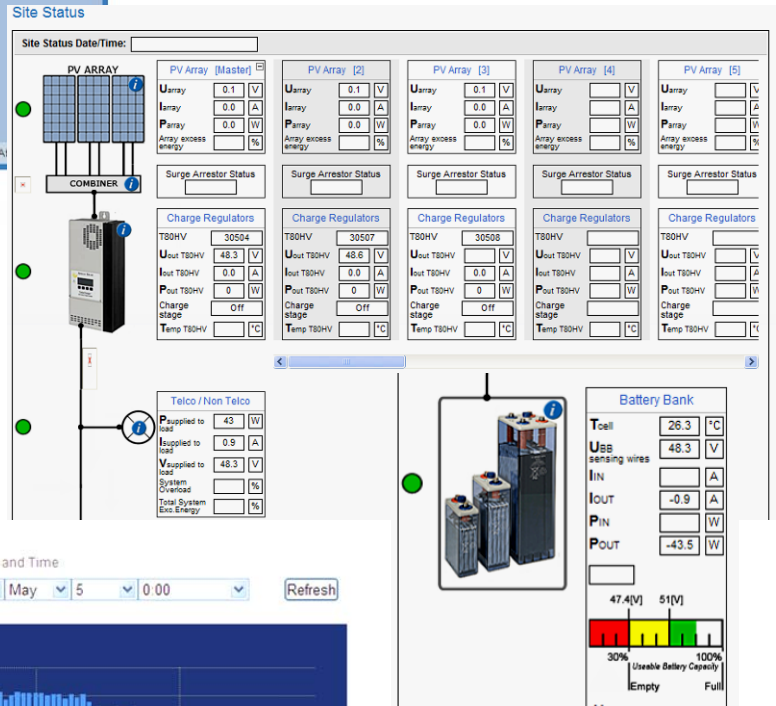
The key to reducing system maintenance cost is complete monitoring of all the remote sites. Apollo created this software to satisfy the demanding requirements of telecom companies. The data from every site is sent up to our server or to the customer's own server automatically. With the proper authorization, the data for any site can be displayed using a variety of user friendly Maps, Diagrams, Bar Charts and Spreadsheet tables. Below are some examples of these displays.



Using the Map Display, all the sites in any country can be shown. The color of each pin indicates the Alarm Status. Green for NO Alarms, Yellow for Warnings and Red for Critical Alarms. The Map can be set to display only the Red or just the Red and Yellow using the status filter.

By clicking on any site pin, the Site Status page comes up.

The Site Status page shows all the equipment at any site. The Numeric Data is updated in real-time and the energy flows are shown. The alarms are indicated. By clicking on the small blue "i" on each icon, all the data on that piece of equipment from the database is displayed. This includes spec sheets, serial numbers and system diagrams. The Site Status screen makes maintenance easy.



This is an example of a Bar Chart showing the PV voltage during 1 day with data every 10 minutes. Hovering the cursor over any bar displays the actual numeric value, with Bar Charts available for 12 different quantities.

## Where to buy:

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