TECHNICAL DATA SHEET
LITHIUM ION
BATTERY CHARGER

PC-6200

The PC-6200 Charger is designed to support Li-ION batteries in the range from 1 to 5 Amp Hours of capacity, with pack voltages from 3.6 to 16.8 Volts. The PC-6200 has a power envelope available at the battery during charging of 90 watts, and comes configured for a nominal C/2 charge rate and a six hour time out. The PC-6200 has three modes of operation.

1. **Pre-qualification Mode** - When the battery is first connected to the charger, a current equal to 1/10 of the maximum charge current is applied to the battery to determine if the battery parameters fall within acceptable tolerances for charging to begin.
2. **Constant Current Mode** - Provided the battery parameters of terminal voltage, polarity, and temperature are acceptable, the PC-6200 begins to charge the battery using a constant current source, set for C/2.
3. **Constant Voltage Mode** - This mode provides a tapering current flow to the battery as the PC-6200 replaces the final 50% of charge to the battery.

Illustrated in **Fig.1**, the PC-6200 is charging a battery composed of four 5 AH Li-Ion cells, 2 in series, two strings in parallel, using a nominal C/2 charge rate. The first curve in **Fig. 1** shows the current from the PC-6200 as it brings the battery from full discharge to full charge. The second curve, **Fig. 2** shows the voltage measured at the battery's terminals.

During the first minute of the charge cycle, the PC-6200 supplies to the battery a current of .5 Amperes. This current is used to qualify the battery as to measured parameters prior to beginning the actual charge process. Once the PC-6200 verifies it has an acceptable battery to charge, it switches to a constant current of 5 Amps. It remains in this state until the battery terminal voltage reaches 8.2 volts. The PC-6200 then switches to a constant voltage source and the current begins to taper as the battery's internal cell voltage rises with its state of charge. When the current to the battery reaches a preset level, usually the constant current divided by 20, or 6 hours has elapsed since charging began, the current to the battery goes to zero.

CHARGER SPECIFICATIONS

Model No: PC-6200	
Manufacturers CAGE Code: 03UN7	
AC Input Range: 100 to 260VAC; 47 to 63Hz	
Battery Charge Voltage: 4.2VDC to 16.8VDC max. (factory set)	
Battery Charge Current: 0.5A to 5.0A max. (factory set)	
Power In: 1.5A max.	
Battery Connection: Cable	
Time Out Period: 6 Hours	
Weight: 1.1 lbs. (0.5 Kg)	
Dimensions: 7" x 5" x 2 1/2" H (18cm x 13cm x 6.5cm)	
Operating / Charging Temp: 0° C to 50° C (32°F to 122°F)	
Storage Temp: -25° C to 70° C (-13°F to 158°F)	
Humidity: 95% relative	
Color: Black	
Exterior Case: Aluminum	
Harmonized Tariff Code: 8507.90.80.00	

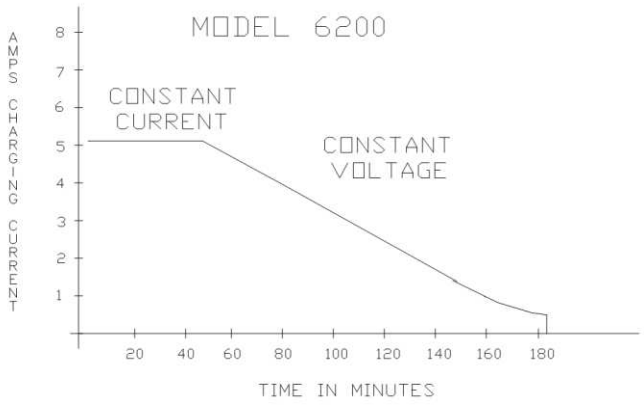

Figure 1

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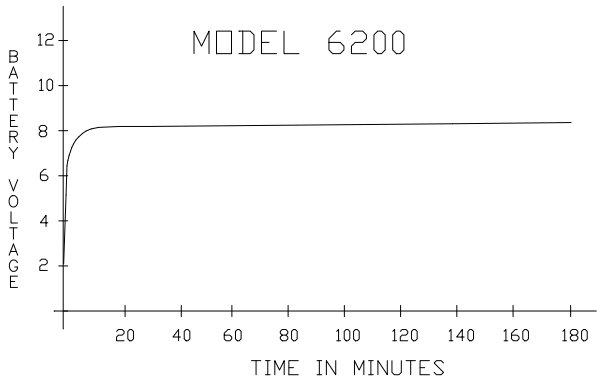

Figure 2

Two LED's provide a status report to the user of the charger's operations. Initially, during pre-qualification and the constant current phase of charging, the Red light is on. At the point the charger switches from constant current to constant voltage, the green light comes on in addition to the red light. When the charger has measured the current to the battery equal to I-full, or approximately 1/15 of the maximum charge current, the red light will turn off. The Green light will remain on if the time-out period occurs before I-full is reached. If the charger times out while still in the constant current mode, the Red light will blink, indicating that the charge process failed. If the battery's terminal voltage never reaches a nominal 3 volts per cell using the pre-qualification current, the Red light will blink, indicating a defective battery.

The PC-6200 is designed to support low volume Li-Ion applications. Internal jumper settings provide the user with a range of options, enabling the PC-6200 to support 12 battery pack configurations. Nominally setup around the SAFT Li-Ion battery packs, the configurations are for four to eight cells, and three current ranges amounting to C/2 for the three basic capacities of SAFT MP cells.

The power dissipated by the charger is a function of the differential between the internal regulated supply and the battery terminal voltage. Therefore, the first jumper selects one of four regulated supply voltages, depending on the number of cells to be charged. The current supplied to the battery during the constant current phase of the charge cycle is selected next. Finally the charger output voltage is selected from one of four jumper selections, again depending on the number of cells to be charged.

Since Li-Ion is very sensitive to excessive charge voltage, the PC-6200 has two adjustments that permit very precise control over these charge voltages. The first adjustment sets the exact voltage at which the unit makes its transition from constant current to constant voltage. Because the battery is accepting a high charge current, this transition may of necessity be set higher than the finish voltage for the cells, but is a nominal 4.1 Volts per cell. Next the ending voltage is set. Because the current is so low at charge terminate, the IR losses in the charger/battery interface are minimal. This voltage is set to precisely 4.1 Volts per cell, ensuring complete control at the end-of-charge point.

While these adjustments may seem onerous, Patco has a calibrator available. The PC-620 permits the exact settings to be made with relative ease, and provides the distributor or manufacturer with the ability to not only calibrate the PC-6200 for any one of the twelve battery configurations, but simulate a complete charge cycle, verifying the PC-6200's performance.

