MachineDesign®

Altech Corp.®

ULTIMATE BATTERY CARE

Advanced battery care products are an essential part of today's complex systems, allowing for greater operational capabilities in a trustworthy device that fits into multiple applications.

Battery care should be approached as an overall philosophy to benefit completely from your battery systems. The idea is to be able to implement rapid and automatic charging, provide battery charge optimization during a specific time, facilitate flat battery recovery, and deliver real-time diagnostics during installation as well as operation. Taking this philosophy forward, we're talking about optimizing battery life, but also being sensitive to providing ease of installation and reduced maintenance requirements.

Power solutions today are asked to fulfill the requirements of multiple applications whether separately or all in the same device. These functions include the power supply unit, battery charger, and battery management, and can include battery backup as well. Most importantly, available power must be automatically distributed to the load as first priority, with charging the battery second among the load and the battery. Power devices must be able to manage all the loads intended while also providing consistent and ongoing monitoring of the entire system.

Rapid Automatic Charging

Providing high reliability for your battery system is important. This extends throughout the system, which means that your system must operate using easily accessible power with suggested standard input voltages such as 115 VAC, 230 VAC, or 277 VAC. This allows these units to operate in any country in the word without worrying about setting the correct input voltage. This DC UPS battery system capable to output multiple voltages for a wide variety of specific applications using 12 VDC with up to a 35 Amp load, 24 VDC with up to a 20 Amp load or 48 VDC with up to a 20 Amp load.

Altech's CB series is a microcontroller equipped product line that incorporates advanced automated multi-stage charging to expand battery life while also providing important features such as diagnostics and system monitoring functions for the easy handling and control of outputs. The CB series of smart battery chargers provide advanced multi-stage battery charging capabilities that are completely automatic and based on a series of algorithms suited to meet the most advanced requirements of battery manufacturers. Through the use of the microprocessor-controlled charging algorithms, the system can detect a battery's condition so it is able to choose the appropriate charging mode.

Battery systems such as the CB series of smart battery chargers are suited to operate with all battery types where jumper selection sets provide predefined curves for open lead acid, sealed lead acid, Gel, NiCd, and Li-Ion batteries. These particular units are compact, install quickly and easily, and offer a rugged enclosure with IP20 protection in a DIN rail configuration. For maximum protection and safety, these devices provide protection against deep battery discharge and reverse polarity connections as well as high insulation between primary and secondary circuits. They also provide detection of batteries with the wrong nominal voltage and provide battery disconnect protection.

Conformity to standard safety regulations is an essential part of every design. For battery systems, these may include such standards as IEC/EN 60335-2-29 Battery chargers; EN60950 / UL60950; Electrical safety EN54-4 Fire Detection and fire alarm systems; EMC Directive; and DIN 41773 (charging cycle standard).

Battery Testing and Monitoring

The CB product line is equipped with an auto-diagnostic system that operates in real time to provide wide reaching fault monitoring capabilities. Units are able to detect accidental disconnection of the battery cables and perform an immediate response that switches off the output power to prevent damage. Similarly, if the battery is not connected, the output power is not engaged, and an alarm is set. During a Float charge, the quality of the battery connection (resistance) is monitored every 60 seconds to assure the cable has been properly installed. The system also tests internal impedance in case of an open circuit, checks to see if the battery is connected with inverted polarity, and checks the battery voltage connections to prevent the connection of the wrong battery type. An end of charge check is used so that when the battery is fully charged, the device automatically switches to the Float charging mode.

Diagnosis of the battery and device is presented through the illumination of an LED via a Blink Code. Indications include 1 Blink every two seconds for Float state, 1 Blink per second for Absorption state, 2 Blinks per second for Boost state, and 5 Blinks per second for Recovery state. Full diagnostics not only function during operation but throughout the installation process as well, alerting personnel of potential challenges that must be addressed.

Battery care permeates all aspects of your system. For example, managing your system assures that load outputs are never affected by battery conditions and that your system provides continuous control over time, which provides high efficiency operation. The rapid recovery of almost discharged batteries is guaranteed by the automatic multi-stage charging system and real-time diagnostics, adding value and reliability to the system hosting the CB device (see Figure 2).

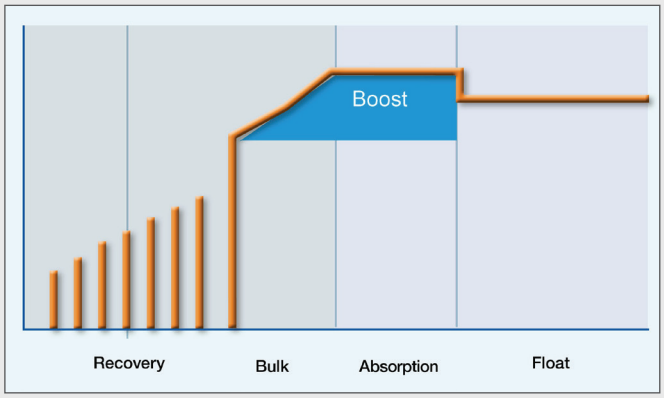

Figure 2: *The CB series incorporates what the company calls 4+1 charging phases: Bulk, with constant current; Absorption, at constant voltage; Boost/Fast for maximum permissive voltage; Float, for maintenance; and +1 Recovery of discharged batteries.*

The CB series produces event logging that includes the number of battery charging cycles that have elapsed, including how many have been completed and how many have been aborted, as well as charging times and the total number of standby/backup transitions that have occurred. System flexibility further allows the operation to be customized, including the entire charging curve of the battery, battery type setting, control of various time-out algorithms of charge, setting boost voltage, absorption, and many other features. A CANbus J1939 communications connection allows for the monitoring of over 50 parameters concerning the battery charger, the state of charge, and possible faults in the system. It is also possible to monitor, configure, record events, and receive alarms from the optionally set up CB and connected batteries.

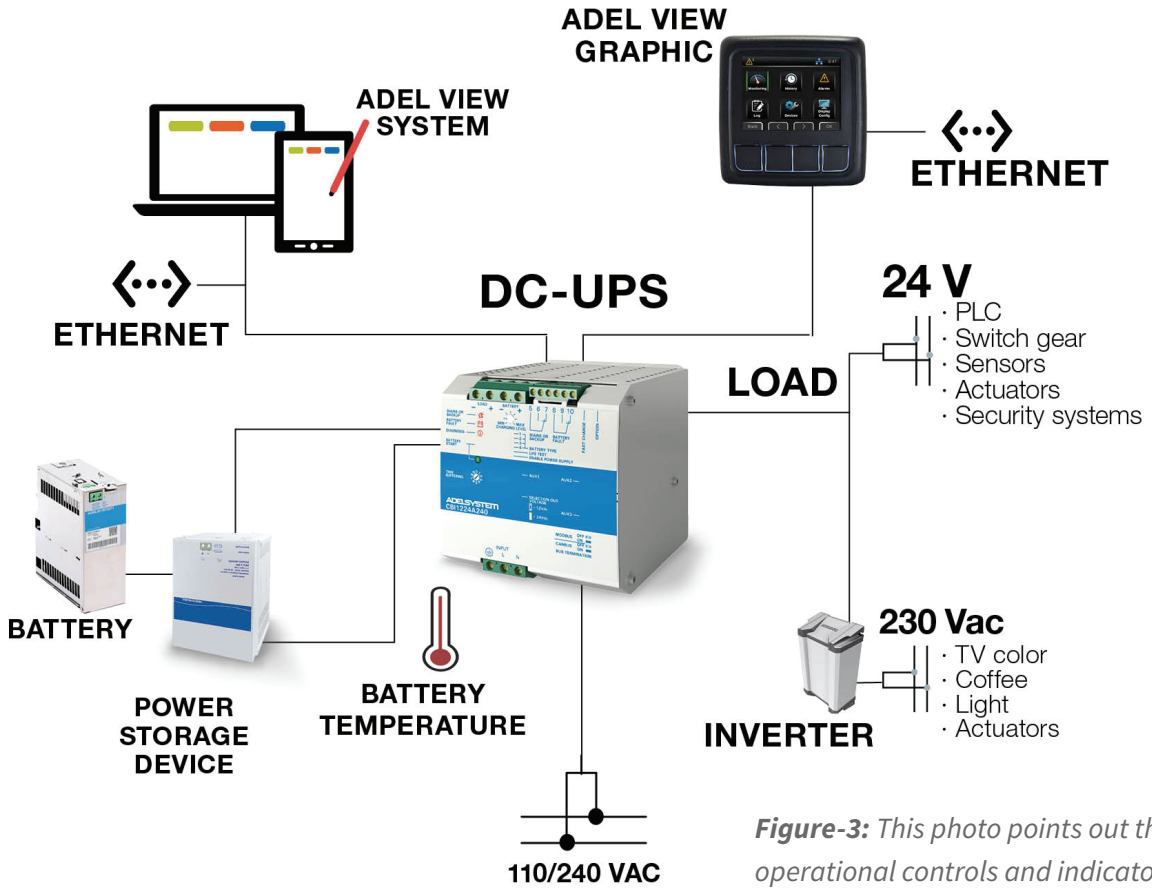

Figure-3: *This photo points out the important operational controls and indicators of a CBI charger.*

Applications

Many people think of chargers being used for standard emergency backup for such applications as lighting, greenhouse control, portable equipment, remote measurement and control system, and other applications that already run off battery power. The CB series of automated automatic charging systems has extended use in industrial applications for water pumping, fire protection systems, and other key safety devices. These chargers are also used for security systems from everything from automatic revolving doors to access control and from alarms to emergency backup systems. As a product that is available for a broad spectrum of uses, systems are also installed in the telecommunications industry for telecom towers as well as base station transceivers, and for the automotive service industry for all types of repair centers for cars, trucks, and motorcycles.

Conclusion

Complete power solutions contain everything from your power supply unit, battery charger, battery care module and/or backup battery module. Users must keep their equipment online and operating at all times, which means that automatically distributing power among loads and the battery is important. This provides a stabilized system that provides proper operations regardless of power fluctuations or outages. Stabilizing your systems for proper operation whatever your power fluctuations or outages can provide you with significant cost savings over time.