



## SAMPLE SPECIFICATION FOR SINGLE PHASE, LC BATTERY CHARGERS

### *Battery Charger Design Guidelines*

This specification is for engine starting applications where "trickle chargers" were used, where the required amperage typically does not exceed 5 amps, and where improved gen-set starting reliability is necessary. Charger shall be designed for heavy-duty industrial service and capable of full-rated output indefinitely at temperatures between -10 C and +50 C. The charger shall be capable of recharging a fully discharged battery of the maintenance-free lead acid, conventional (wet) lead acid or nickel-cadmium type. Charger shall maintain the battery automatically and minimize the need for battery electrolyte replenishment. Conservatively rated SCRs and diodes in full-wave bridge shall be used. A crank disconnect relay shall not be required to protect the charger from overload. Regulation shall not be by cycling charger on and off. Charger shall be wall mounted and natural convection cooled. The housing shall be constructed of rustproof metal (e.g. aluminum) and treated with a protective coating.

### *Battery Charger Standards*

The charger shall be designed and built in accordance with applicable NEMA standards, UL 1012, and the best commercial practice for industrial-grade battery chargers. The manufacturer shall maintain a comprehensive quality control system and shall be ISO 9001 or ISO 9002 registered.

### *Battery Charger Input*

Charger shall operate from: 50 Hz (48 to 53 range) or 60 Hz (57 to 63 range).

Nominal input voltage shall be: (120V or 230V).

Input shall be fused. Proven surge suppression devices shall be fitted.

### *Battery Charger Output*

#### *General Characteristics*

Output voltage shall be (12, 24, 36, or 48) volts nominal. Output current shall be sufficient to fully recharge a battery within six hours after supplying six starting attempts of 45 seconds each to a starter with a rolling current of 1,000 amps. Full rated output current shall be available at both float and high-rate voltage settings. Charger shall be equipped with an output fuse and electronic current limit. The charger's current limit shall be fixed at 100%, and shall protect the charger against damage caused by an output short circuit. Output voltage shall be adjustable via an internal potentiometer.

#### *Regulation and Temperature Compensation*

Voltage regulation shall be within  $\pm 1\%$  of the correct temperature-compensated value from no load to full load with simultaneous variations of  $\pm 10\%$  input voltage and  $\pm 5\%$  input frequency. DC output shall be constant voltage and current limited. The charger shall be protected against damage by reverse connection of the battery.

Charger shall incorporate automatic ambient temperature compensation to maximize battery performance and life. Temperature coefficient shall be (-0.2%) per degree C to assure correct charging in all temperatures.

#### *Float/Equalize Control*

The charger shall be equipped with an automatic high rate (equalize) charge facility operating in response to the battery's state of charge. Charger shall operate at the high rate until the battery is fully charged, then revert to float voltage to prevent overcharging. High-rate operation shall be governed by the requirement of the battery. Mechanical or electronic timers shall not be used. Boost voltage shall be a fixed increment above the float voltage.

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*Indicators*

A meter for output amperes shall be provided.

The battery charger shall be Stored Energy Systems type LC or approved equivalent.

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