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Selecting the Right Battery Charger

Abstract

Choosing the right battery charger is important to ensure that batteries are charged efficiently and accurately. Choosing the right model depends on the input voltage, battery type, and battery capacity. Features of the different models are briefly introduced.

Introduction

Using the right battery charger is the first step in protecting and maintaining your expensive deep-cycle batteries. Xantrex Technology's Truecharge™ chargers deliver a fast multistage charge, tailored for your 12 Vdc battery type. Microprocessor-controlled charging gives your batteries an accurate charge and reduces the risk of overcharging them. The temperature sensor available on many models further refines the charge profile for correct charging under a variety of conditions. Truecharge delivers maximum charging, even when charging from less than perfect shorepower conditions or from true sine wave generators. To get the best charge, you need the right charger for your purposes. This technical note contains information to help you select the right model. It also provides approximate charging times and other information for each Truecharge model.

Choosing the right model

Rules of battery charging

Before choosing a model, note these rules of battery charging:

- Use Truecharge models for 12 Vdc lead-acid battery systems only.
- Do not mix battery types (gel, flooded, or AGM) on a multi-bank charger. The chargers have battery-type settings that once selected, apply to all connected banks regardless of their type. Mixing battery types will result in incorrect charging, reduced battery life, and possible damage to the bank which doesn't match the charger's settings.
- Be careful mixing batteries that have different applications on a multi-bank charger. A starting battery on the same charger as a frequently discharged deep-cycle battery will be subjected to more charge cycles than it needs. Adding a disconnect switch between the starting battery and the charger would allow the charger to be used for the starting bank only when it needs it.

Selection factors

To choose the charger best suited to your application you need to know your input voltage (120 or 230 Vac), your battery type, and its capacity in amp-hours.

Battery type

All Truecharge models charge gel or flooded batteries. The Truecharge plus models also charge AGM batteries. If you have AGM batteries, make sure the charger you select will charge them.

Battery capacity in amp-hours

If you underestimate the required charging capacity, the charger will take longer to charge your batteries. If you overestimate, the charger may deliver too much current. Excessive charging current can cause battery heating, accelerated water loss in flooded-type batteries, and damaged batteries. Many battery manufacturers recommend a maximum charging rate of 20% of the amp-hour capacity of the battery. For example, a 100 Ah battery should not be charged at more than a 20 Adc rate.

Multi-bank chargers and capacity

If you are connecting battery banks of different capacity to the same multi-bank charger, base the size of the battery charger on the smallest battery bank, to avoid overheating due to an excessive charge rate. If choosing this size results in excessively long charge times for the larger bank in your system, you may require separate chargers.

Choosing the model

To choose the best model, refer to Table 1, Choosing the Truecharge Model. Read down the first column until you find the capacity of your batteries, then read across, choosing your input voltage and battery type. The last column contains the Truecharge model you need.

Table 1 Choosing the Truecharge Model

If your battery capacity is:	and input voltage is:	and battery type is:	Choose this model:
25 to 100 amp-hours	120 Vac	Gel or Flooded	TC 10TB TC 10 clip lead
	230	Gel or Flooded	TC 10i
100 to 200 amp-hours	120	Gel, Flooded, AGM	TC 20+
	230	Gel, Flooded	TC 20i
More than 200 amp-hours	120	Gel, Flooded, AGM	TC40+
	230	Gel, Flooded	TC 40i

Truecharge features

Table 2 provides more information about the Truecharge models.

Table 2 Characteristics of Truecharge Battery Chargers

	Truecharge model						
Characteristics	**10**	**10TB**	**20+**	**40+**	**10i**	**20i**	**40i**
AC input voltage	Nominal 120Vac, 50/60 Hz				Nominal 230Vac, 50/60 Hz		
Number of battery banks charged	One	One or two	Up to three	Up to three	One	One or two	One or two
Charging current in amps	10	10	20	40	10	20	40
Battery types charged (switch selectable)	Gel Flooded	Gel Flooded	Gel Flooded AGM	Gel Flooded AGM	Gel Flooded	Gel Flooded	Gel Flooded
Manual Temperature compensation switch	Yes	No	Yes	Yes	Yes	Yes	Yes
Optional temperature sensor	No	No	Yes	Yes	No	Yes	Yes
Portable	Yes	No	No	No	Yes	No	No
Permanent installation	No	Yes	Yes	Yes	No	Yes	Yes
AC connection type	Standard North American supply cord	Terminals	Pigtail leads	Pigtail leads	Standard IEC inlet for supply cord (cord not provided)		
Battery connection type	Clip leads	Terminals	Terminals	Terminals	Clip leads	Terminals	Terminals
Regulatory Approvals (see notes)	1	2	2	2	1	3	3

1. CSA/NRTL approved to CSA and UL standards
2. CSA/NRTL approved to CSA and UL standards including marine applications and Ignition Protection
3. CE Mark for the Low Voltage Directive and EMC Directive

Charging times

The length of time to recharge your batteries depends on the battery and charger size. Table 3 shows the typical charging time for flooded batteries, based on a maximum recommended 50% depth of discharge.

Table 3 Approximate Charging time in hours of standard battery sizes

Battery size	Time in hours		
	10A	20A	40A
Group U-1 (30 Ahr)	2.0	not recommended	not recommended
Group 24 (75 Ahr)	5.0	not recommended	not recommended
Group 27 (100 Ahr)	6.5	3.0	not recommended
Group 4D (200 Ahr)	12.5	6.5	3.5
Group 8D (230 Ahr)	not recommended	7.5	4.0
Two Group 8Ds (460 Ahr)	not recommended	15.0	7.5

For more information

Visit our website www.xantrex.com or call us at 1-800-446-6180, Monday to Friday from 8 am to 5 pm PST.