Battery Charger

MULTI XS 25000, XS 25000
MULTI XT 14000, XT 14000

For lead-acid batteries

User Manual and Guide to professional charging of starter and deep cycle batteries.

INTRODUCTION

Congratulations on purchasing your new CTEK professional switch mode battery charger. This charger is part of a range of professional battery chargers from CTEK SWEDEN AB. It represents the latest technology in battery charging with charging and analysis in eight steps with temperature compensation. **Read this User Manual and follow the instructions carefully before using your new charger.**

SAFETY

- The charger is designed for lead-acid batteries. Do not use the charger for any other purpose
- Use safety glasses and turn your head away when connecting or disconnecting a battery.
- Battery acid is corrosive. Rinse immediately with water if acid comes into contact with skin or eyes. Seek medical advice.
- Make sure that the cable is not pinched or in contact with warm surfaces or sharp edges.
- While charging, a battery can emit explosive gases, so it is important to avoid sparks in the immediate area.
- Always provide for proper ventilation during charging.
- Avoid covering the charger.
- Make sure that the electrical cable does not come into contact with water.
- Never charge a frozen battery.
- Never charge a damaged battery.
- Do not place the charger on the battery while charging.
- The electrical connection must fulfil the national heavy current requirements.
- Check the charger cabling before use. Make sure there are no cracks in the cabling or in the protective covering. A charger with damaged cables may not be used.
- Always check that the charger has gone over to maintenance charging mode before leaving the charger unattended and connected for long periods. If the charger had not gone over to maintenance charging within 3 days, this is an indication of a problem. In this case the charger must be disconnected manually.
- All batteries fail sooner or later. A battery that fails during charging is normally taken care of by the chargers advanced control, but certain uncommon errors in the battery can still arise. Don't leave the battery charger unattended for a longer period of time.
- Only mount the charger on a flat surface.
- This equipment may not be used by children or by those who can not read and understand the manual if they are not supervised by a responsible person who can guarantee that the battery charger is being used in a safe manner. Store and use the battery charger out of the reach of children. Make sure that children do not play with the battery charger.
- When using outdoors the charger has to be positioned horizontally with the long side or top side turned up.

CHARGING

Connecting the charger to a battery fitted in a vehicle

1. The power cord should be disconnected when connecting or disconnecting the battery leads.
2. Identify the battery terminal that is grounded (connected to the chassis). The negative terminal is normally the grounded post.
3. Charging a negatively grounded battery. Connect the red cable to the positive terminal on the battery and the black cable to good metal engine ground away from the battery. Ensure you do not connect the black cable to fuel lines or sheet-metal body parts.
4. Charging a positively grounded battery. Connect the black cable to the negative terminal on the battery and the red cable to good metal engine ground away from the battery. Ensure you do not connect the red cable to fuel lines or sheet-metal body parts.

Connecting the charger to an out of vehicle battery:

1. The power cord should be disconnected when connecting or disconnecting the battery leads.
2. Connect the red cable to the positive terminal on the battery and the black cable to the negative terminal.
If the battery leads have been connected incorrectly, the reverse polarity protection system will ensure that neither the charger nor the battery are damaged.

Start charging

1. Connect the chargers AC cord to an AC Power Supply. The charger will indicate POWER, yellow indication lamp (B).
2. The lamp for completely discharged battery (1) will illuminate if the battery's voltage is less than 12V for MULTI XS 25000 and XS 25000 or 24V for MULTI XT 14000 or XT 14000.
3. Normal charging will be indicated by the following lights: completely discharged battery (1), bulk charging (2), absorption charging (3) or maintenance charging (4). When the maintenance charging lamp illuminates the battery is fully charged. Charging will start if the voltage drops. The charger can normally be connected for months. Reconditioning (only on MULTI XS 25000 and MULTI XT 14000) is indicated by the lamp (5) illuminating.
4. If the battery leads have been connected incorrectly, the reverse polarity protection system will ensure that neither the charger nor the battery are damaged.
5. If nothing happens. If the lamp indicating the setting and the power lamp remain lit but no other lamp illuminates, the connection to the battery or chassis may be poor or the battery may be faulty. Another cause may be a lack of voltage in the AC Power Supply. Begin by improving the connection between the battery and charger.

6. Charging can be stopped at any time by disconnecting the charger's AC cord. Always disconnect the AC cord before disconnecting the battery leads. When you stop charging a battery installed in a vehicle you should always disconnect the battery lead from the chassis before disconnecting the other battery lead.

IMPORTANT INFORMATION FOR MULTI XT 14000 AND XT 14000
Please note that the battery pack in the 24V system in most cases consists of more than one battery. They are linked up to the 24V system, but the individual batteries generally have a lower voltage. Therefore it is important for the charger to be connected correctly.

BATTERY TYPES AND SETTINGS

The XS 25000 and XT 14000 are programmed according to "PROGRAM DESCRIPTION" with fixed settings. MULTI XS 2500 and MULTI XT 14000 can easily be set for different types of batteries or conditions. The following recommendations should, however, only be seen as guidelines. Please consult the battery manufacturer for further instructions.
Settings are made by pressing the "MODE-button " and stepping forward one press at a time until the required mode is reached, the button is then released. After about 2 seconds the charger activates the selected mode. The selected mode is saved in a memory in the charger and remains there even if the charger is disconnected from battery and mains.

NORMAL	NORMAL - Normal setting for wet batteries, maintenance free and for most Gel batteries. Some Gel batteries prefer a slightly lower charging voltage. Please consult the battery manufacturer when in doubt.
SUPPLY 	SUPPLY - The charger operates at a constant voltage. This is the maintenance mode for applications where maximum capacity from the battery is important, like floor sweepers and golf carts. Note that the Spark protection function is suppressed in this mode.
RECOND	RECOND - This mode is used to recover deep discharged flooded batteries where you could expect a stratified acid (high acid weight in the bottom, low on top). Check with battery manufacturer when in doubt. Use this mode with care, because the high voltage will cause some water loss. 16V is normally no problem for electronics in 12V system, or 32V in 24V system. Consult your supplier when in doubt. Life of light bulbs will be reduced at higher voltage. Try to disconnect light from the battery during this phase. Maximum effect and minimum risk for electronics is achieved by charging a disconnected battery.

CHARGING PHASES

MULTI XS 25000, XS 25000, MULTI XT 14000 and XT 14000 charges and analyses in eight fully automatic steps.
MULTI XS 25000 and MULTI XT 14000 have three different operating modes, see Battery Types and Settings.

The battery charger has an 8-step fully automatic charging cycle:

Desulphation
Desulphation with pulses recovers sulphated batteries. Indicates with lamp 1.

Soft start (Lamp 1)
Start mode for the charging cycle. The start phase continues until the battery's terminal voltage has risen above the set limit, at which point the charger switches to bulk charging. If the terminal voltage has not passed the voltage limit within the time limit, the charger switches to fault mode (lamp 0) and discontinues the charging. If so, the battery is faulty or its capacity is too large.

Bulk (Lamp 2)
Main charge when 80% of charging takes place. The charger delivers maximum current until the terminal voltage has risen to the set level. Bulk has a maximum time, at which point the charger automatically switches to Absorption.

Absorption (Lamp 3)
Complete charge up to virtually 100%. The terminal voltage is maintained at the set level. During this phase the current tapers successively. Once the current has tapered to the set limit, this phase switches to being timed. If the total time for Absorption exceeds the time limit the charger automatically switches to maintenance.

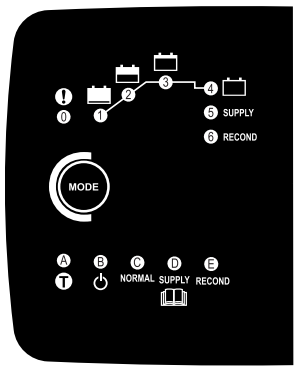
Analysis (Lamp 3)
Testing self-discharge. If self-discharge is too high, charging is discontinued and fault mode is indicated.

Maintenance charging - Float (Lamp 4)
Charging at constant voltage.

Maintenance charging - Pulse (Lamp 4)
State of charge varies between 95% and 100%. The battery receives a pulse when the voltage drops and keeps the battery in perfect condition when it is not in use. The charger can be connected for months at a time. The charger continuously measures the terminal voltage to determine whether a charging pulse should be initiated. If the battery is loaded and/or the battery's terminal voltage drops the charger starts a charging pulse until the terminal voltage reaches the set level. The charging pulse is then discontinued and the cycle is repeated infinitely. If the terminal voltage drops below a lower limit, the charger automatically goes back to the beginning of the charging curve.

Recond (Lamp 6) (only on MULTI XS 25000 and MULTI XT 14000)
This mode is used to recover deeply discharged flooded batteries. Recondition of deep discharged batteries. The voltage increases with reduced current for a limited time period. The higher voltage starts some gassing and mixing of the acid, which is beneficial for both battery capacity and expected life. Note that the battery could emit explosive gas during Recond. Recond is performed between Analysis and Maintenance.

INDICATORS



Lamp	Description
0	Fault mode, the charging is discontinued. For fault causes, see below.
1	Start mode
2	Bulk charging
3	Absorption charging
4	Maintenance charging
5	Supply (Only on MULTI XS 25000 and MULTI XT 14000)
6	Recond reconditioning of completely discharged batteries. (Only on MULTI XS 25000 and MULTI XT 14000)
A	Charging without temperature compensation.
B	Mains voltage connected
C	Normal (Only on MULTI XS 25000 and MULTI XT 14000)
D	Supply (Only on MULTI XS 25000 and MULTI XT 14000)
E	Recond (Only on MULTI XS 25000 and MULTI XT 14000)

Fault mode
The charger goes to fault mode in the following situations:
- The battery is connected with poles reversed to the charger's terminals.
- The charger's analysis function has interrupted charging.
- The terminals on the charger are short-circuited after charging has started.
- The charger has been in start mode for more than 4 hours.

TEMPERATURE COMPENSATION
MULTI XS 25000, XS 25000, MULTI XT 14000 and XT 14000 have a sensor cable placed together with the battery cables. The units will automatically adjust the charging voltage if the temperature deviates from +25°C. A high temperature lowers the voltage and freezing conditions is handled by higher voltage.
The temperature is best measured on or very close to the battery. Therefore always place the sensor as close to the battery as possible when charging. The sensor cable could be prolonged or cut to length with the same functionality. A short-circuited or disconnected sensor is indicated by lamp A. The charging voltage is then adjusted to the +25°C condition.

SPECIFICATION

	MULTI XS 25000 XS 25000	MULTI XT 14000 XT 14000
Voltage AC	170–260VAC, 50–60Hz.	
Charging voltage	14.4V	28.8V
Charging current	25A max.	14A max.
Current, mains	2.9A rms (at full charging current)	
Back Current Drain*	<2Ah per month	
Current ripple**	<4%	
Ambient temperature	-20°C to +50°C Output power is automatically reduced at higher temperatures.	
Cooling	Fan	
Charger type	Eight-step, fully automatic	
Battery types	All types of 12V lead-acid batteries (WET, MF, AGM and GEL).	All types of 24V lead-acid batteries (WET, MF, AGM and GEL).
Battery capacity	50–500Ah	28–300Ah, up to 500Ah maintenance
Protection class	IP44 (Outdoor use)***	
Weight	1.9kg	

*) Back current drain is the current that the charger drains from the battery if the AC cord is disconnected.
**) The quality of the charging voltage and charging current are very important. High current ripple heats the battery and ages the positive electrode. High voltage ripple can damage other equipment connected to batteries. The battery chargers from CTEK produces very high quality voltage and current with low ripple.
***) IP44 cannot be guaranteed if the charger is not positioned horizontally with the long side or top side turned up.

MAINTENANCE

The charger is maintenance-free. The charger must not be opened; doing so will invalidate the warranty. If the power cable is damaged it must be replaced by CTEK or its authorized representative. The charger casing can be cleaned using a damp cloth and mild cleaning agent. Remove the plug from the power socket before cleaning.

LIMITED WARRANTY

CTEK SWEDEN AB, Rostugnsv. 3, SE-776 70 VIKMANSHYTTAN, SWEDEN issues this limited warranty to the original purchaser of this product. This limited warranty is not transferable. CTEK SWEDEN AB warrants this unit for two years from the date of purchase against defect workmanship or material. It is the obligation of the purchaser to forward the unit together with proof of purchase to the manufacturer or its representative with transportation cost prepaid. This warranty is void if the unit is abused, handled carelessly or repaired by anyone other than CTEK SWEDEN AB or its authorized representative. CTEK SWEDEN AB makes no warranty other than this limited warranty and expressly excludes any implied warranty including any warranty for consequential damages. This is the only expressed limited warranty and CTEK SWEDEN AB neither assumes nor authorizes anyone to assume or make any other obligation towards the product other than this limited warranty.

DECLARATION OF CONFORMITY

CTEK SWEDEN AB hereby declares under sole responsibility that the MULTI XS 25000, XS 25000, MULTI XT 14000 and XT 14000 battery chargers, to which this declaration relates, conforms with the following standards: EN60335-1, EN60335-2-29 following the provisions of directive 73/23/EEC amended by 93/68/EEC and EN61000-3-3, EN61000-3-2, EN55014-1, EN55014-2, 55011 following the provisions of directive 89/336/EEC amended by 92/31/EEC and 93/68/EEC.

Vikmanshyttan Sweden, 01-01-2006

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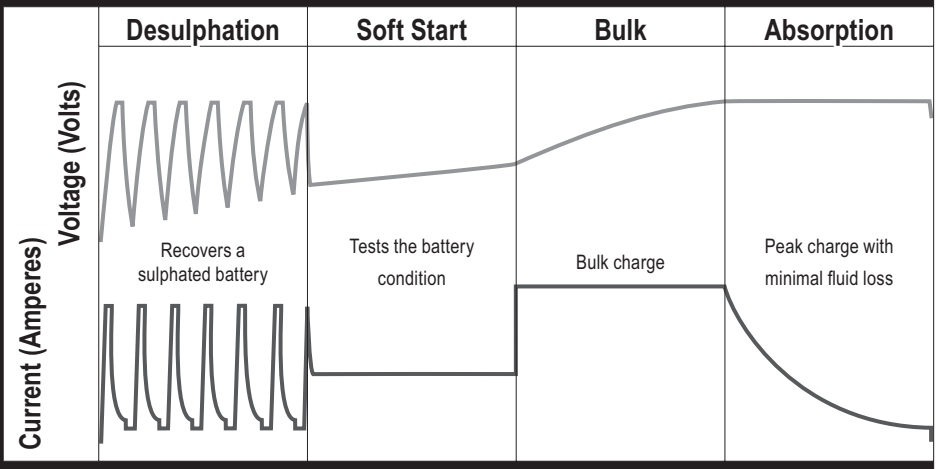
PARAMETERS

PROGRAM DESCRIPTION



MULTI XS 25000

MODE	Desulphation	Soft Start	Bulk	Absorption
NORMAL or RECOND	YES	Max 25A for 4h until the voltage reaches 12.6V.	25A for max 20h.	14.4V until after the current dropped to 4.5A, max 12h.
SUPPLY				

XS 25000

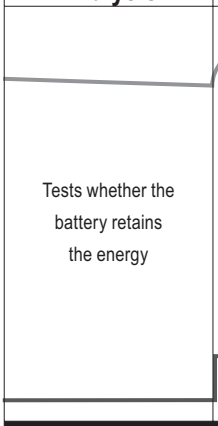
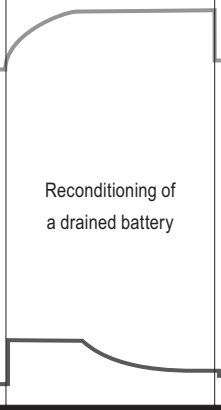
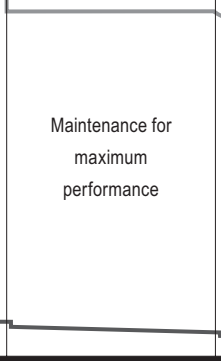
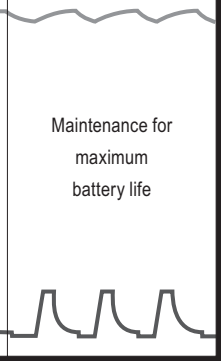
MODE	Desulphation	Soft Start	Bulk	Absorption
PRESET	YES	Max 25A for 4h until the voltage reaches 12.6V.	25A for max 20h.	14.4V until 4h after the current dropped to 4.5A, max 12h.

MULTI XT 14000

MODE	Desulphation	Soft Start	Bulk	Absorption
NORMAL or RECOND	YES	Max 14A for 4h until the voltage reaches 25.2V.	14A for max 20h.	28.8V until 4h after the current dropped to 2.5A, max 12h.
SUPPLY				

XT 14000

MODE	Desulphation	Soft Start	Bulk	Absorption
PRESET	YES	Max 14A for 4h until the voltage reaches 25.2V.	14A for max 20h.	28.8V until 4h after the current dropped to 2.5A, max 12h.

Analysis	Recond	Float	Pulse
			
Tests whether the battery retains the energy	Reconditioning of a drained battery	Maintenance for maximum performance	Maintenance for maximum battery life

Analysis	Recond	Float	Pulse
Warning indication if voltage drops to 12.0V in 3 minutes.	Max 15.8V and 3A for 4h for deeply discharged batteries. Otherwise for 30 minutes (**only in Recond mode**).	13.6V with max 25A for max 10 days.	Pulse start at 12.9V, max voltage 14.4V.
		13.6V max 25A.	

Analysis	Recond	Float	Pulse
Warning indication if voltage drops to 12.0V in 3 minutes.		13.6V with max 25A for max 10 days.	Pulse start at 12.9V, max voltage 14.4V.

Analysis	Recond	Float	Pulse
Warning indication if voltage drops to 24.0V in 3 minutes.	Max 31.6V and 1.7A for 4h for deeply discharged batteries. Otherwise for 30 minutes (**only in Recond mode**).	27.2V with max 14A for max 10 days.	Pulse start at 25.8V, max voltage 28.8V.
		27.2V max 14A.	

Analysis	Recond	Float	Pulse
Warning indication if voltage drops to 24.0V in 3 minutes.		27.2V with max 14A for max 10 days.	Pulse start at 25.8V, max voltage 28.8V.