



# M45

## Battery charger

For lead-acid batteries 1,2-120Ah



User's Manual and a guide  
to professional battery charging  
For Starter/Deep Cycle batteries

EN

### INTRODUCTION

Congratulations on your purchase of your new professional M45 Switch Mode Charger with Pulse Maintenance. M45 is a member of a family of professional chargers from CTEK Sweden AB. It represents the state-of-the-art technology for battery charging. A M45 will prolong the lifetime of your battery. Read this user manual and follow the instructions carefully before using the charger.

### SAFETY

- The charger is designed for lead-acid batteries from 1,2-120Ah. 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 being 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 fulfill the national heavy current requirements.
- Check the cabling in the charger 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.

### BATTERY TYPES AND SETTINGS

M45 can easily be configured to charge many different types of 12V lead-acid batteries; wet batteries, MF, AGM och for most GEL-batteries. The following recommendations should, however, only be seen as guidelines. When in doubt, always consult the battery manufacturer for further instructions. Settings are made by pressing the "MODE-button" and stepping forward by pressing the button one step at a time, releasing the button when the required mode is reached.

	<b>Mode 14.4V/0.8A</b> This mode is normally used for <14Ah batteries.
	<b>Mode 14.4V/3.6A</b> Normal setting for wet batteries, MF and for most GEL batteries.
	<b>Mode 14.7V/3.6A</b> This setting is recommended for batteries at temperatures below 5°C. It is also recommended for many AGM batteries. This setting is not recommended for maintenance charging when the temperature at times exceeds +5°C. In this case, the 14.4V/3.6A mode is recommended.

### CHARGING

#### Charging batteries mounted in a vehicle:

- The power cord should be disconnected before connecting or disconnecting the battery leads.
- Identify the pole that is grounded (attached to the chassis). Ground is normally connected to the negative terminal.
- Charging a negatively grounded battery. Connect the red wire to the positive pole of the battery and the black cable to the vehicle's chassis. Be careful not to connect the black cable in the vicinity of a fuel pipe or the battery.
- Charging a positively grounded battery. Connect the black wire to the negative pole of the battery and the red cable to the vehicle's chassis. Be careful not to connect the red cable in the vicinity of a fuel pipe or the battery.

#### Charging of a battery not connected to a vehicle:

- The power cord should be disconnected before connecting or disconnecting the battery leads.
- Connect the red wire to the positive pole of the battery and the black cable to the negative pole.

### Connecting the provided cables with eyelet terminals:

Make sure that the cable is not being pinched or in contact with warm surfaces or sharp edges. When the cable is mounted on the battery, it should not be connected to the charger. Connect the eyelet terminals to the battery's poles - the red cable to the positive pole and the black cable to the negative pole. After this, the quick contact can be connected.

### Reverse Polarity Protection

If the battery cables are connected incorrectly, the reverse polarity protection will make sure that the charger and the battery are not damaged. In this case, the red warning lamp (0) will be lit.

### Start charging

- Set the proper charging mode for the battery by pushing the Mode button until the correct setting is lit. Choosing settings for your battery is described under "BATTERY TYPES AND SETTINGS".
- When you are sure the battery leads are correctly placed, connect the power cord to the power outlet to begin charging. If the battery leads are wrongly connected, the pole-changing switch will ensure the battery and charger are not damaged. The fault indicator (1) will light. In which case start from the beginning again.
- The charging lamp (2) will now indicate charging or the maintenance lamp (3) will indicate that the battery is fully charged. If the voltage drops the charger sends a pulse to the battery. The length of the pulse depends on how much the voltage has dropped. The charger can be connected for months.
- If nothing happens: If the voltage indicator is lit but no other lamp is lit there could be a bad connection to the battery or chassis or the battery could be faulty. Check the wall power outlet. If you experience problems: start with the sensitive connection between the battery clamps and the charger.
- Charging can be stopped at any time by disconnecting the supply cord or by setting the charger on Standby. Always remove the power cord from the power outlet before disconnecting the battery leads from a battery in a vehicle. When you stop charging a battery in a vehicle, remove the cable from the chassis before removing the other cable.
- If the charger lamp and the maintenance-charger lamp are flashing alternately, the reason for this is due to:
  - An interruption during charging, due to a loose connection or because the battery has ceased to work.
  - The battery has become sulphated. If the lamps flash for more than 30 minutes, this indicates that the battery is dead and needs to be replaced.
  - If there is an interval of more than 10 seconds between the flashes, this indicates that the battery has a high self-discharge rate and may need to be replaced.

### CHARGING PHASES

M45 operates in a four step fully automatic cycle. It begins charging with an almost constant current (0.8A or 3.6A) until maximum voltage (14.4V or 14.7V) is reached. The charger changes mode at this point. It locks the voltage at maximum level and allows the current to drop. The M45 switches automatically to pulse maintenance charging when the current drops to 0.4A. The charging cycle restarts if the battery voltage drops to 12.9V.

### TECHNICAL SPECIFICATION

Model	MULTI XS 3600
Voltage AC	220-240VAC, 50-60Hz
Back current drain*	<1mA
Voltage	Charging Voltage Nominal: 2V 14.4V; 14.7V
Ripple**	Max 50mV rms, max 0.13A
Current	0.8A; 3.6A
Ambient Temperature	-20°C to +50°C, power is reduced automatically at increased ambient temperature.
Cooling	Natural convection.
Charging cycle	M45 is a multistage fully automatic charger
Type of batteries	All types of 12V lead-acid batteries (Wet, MF, VRLA, GEL).
Battery Capacity	1.2-120Ah
Dimensions	165x61x38mm (L x W x H)
Insulation	IP65
Weight	0.5kg

\* Back Current Drain is what the charger uses to drain the battery if the power cord is disconnected.

\*\*) Quality of the current and voltage are very important. High current ripple heats up the battery and makes the positive electrode age prematurely. High voltage ripple could harm other equipment connected to the battery. M45 produces a high quality current and voltage with very low ripple.

### TEMPERATURE PROTECTION

M45 is protected from being overheated. The power will be reduced if the ambient temperature is raised.

### MAINTENANCE

The charger is maintenance free. Note that disassembly of the charger is not permitted and will void the warranty. If the power cord is damaged, the charger must be left to the reseller for maintenance. The case can be cleaned with a soft damp cloth and mild cleanser. The charger should be disconnected from the power while cleaning.

### EQUIPMENT

M45 is delivered with a set of battery leads with battery pole clamps and a set of battery leads with eyelet terminals.

### WARRANTY

CTEK SWEDEN AB, Rostugnsvägen 3, 776 70 VIKMANSHYTTAN, SWEDEN, declares

under sole responsibility that the battery charger M45 to which this declaration relates is covered by the following warranty: The warranty is valid for 5 years from the date of purchase. The unit is warranted against defective workmanship or materials for 5 years from the date of purchase. The customer must return the product together with the original purchase receipt to the place of purchase. This warranty is void if the unit is handled carelessly, repaired or altered 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 express limited warranty and CTEK SWEDEN AB neither assumes nor authorizes anyone to assume or make any other obligation towards the product other than his limited warranty.

VIKMANSHYTTAN, SWEDEN 2008-12-12

Böje Måleus, VD

CTEK SWEDEN AB,

Rostugnsväg 3

776 70 VIKMANSHYTTAN, SWEDEN

Fax: +46 223793

www.ctek.com

### BULK CHARGING TIME

The table shows the length of time for bulk charging.

Battery size (Ah)	Mode	Time (h)
2		2
8		8
14		3
20		5
60		15
100		25
120		27



**Some experts believe the incorrect or prolonged use of almost any product could cause serious injury or death. For information that may reduce your risk of serious injury or death consult the points below and additionally, the information available at [www.datastreamserver.com/safety](http://www.datastreamserver.com/safety)**

- Consult all documentation, packaging and product labelling before use. Note that some products feature online documentation which should be printed and kept with the product.
- Check product for loose / broken / damaged / missing parts, wear or leaks (if applicable) before each use. Never use a product with loose / broken / damaged / missing parts, wear or leaks (if applicable).
- Products must be inspected and serviced (if applicable) by a qualified specialist every 6 months assuming average residential use by a person of average weight and strength, above average technical aptitude, on a property matching average metropolitan specification. Intended use outside these guidelines could indicate the product is not suitable for intended use or may require more regular inspection or servicing.
- Ensure all possible users of the product have completed an industry recognised training course before being given access to the product.

- The product has been supplied by a general merchandise retailer that may not be familiar with your specific application or your description of the application. Be sure to attain third party approval for your application from a qualified specialist before use regardless of prior assurances by the retailer or its representatives.
- This product is not intended for use where fail-safe operation is required. As with any product (take an automobile, aircraft, computer or ball point pen for example) there is always a small chance of a technical issue that needs to be repaired or may require replacement of the product or a part. If the possibility of such failure and the associated time it takes to rectify could in any situation inconvenience the user, business or employee or could financially affect the user, business or employee then the product is not suitable for your requirements. This product is not for use where incorrect operation or a failure of any kind, including but not limited to a condition requiring product return, replacement, service by a technician or replacement of parts could cause a financial loss, loss of employee time or an inconvenience requiring compensation.
- If this item has been purchased in error considering the points above simply contact the retailer directly for details of their returns policies if required.