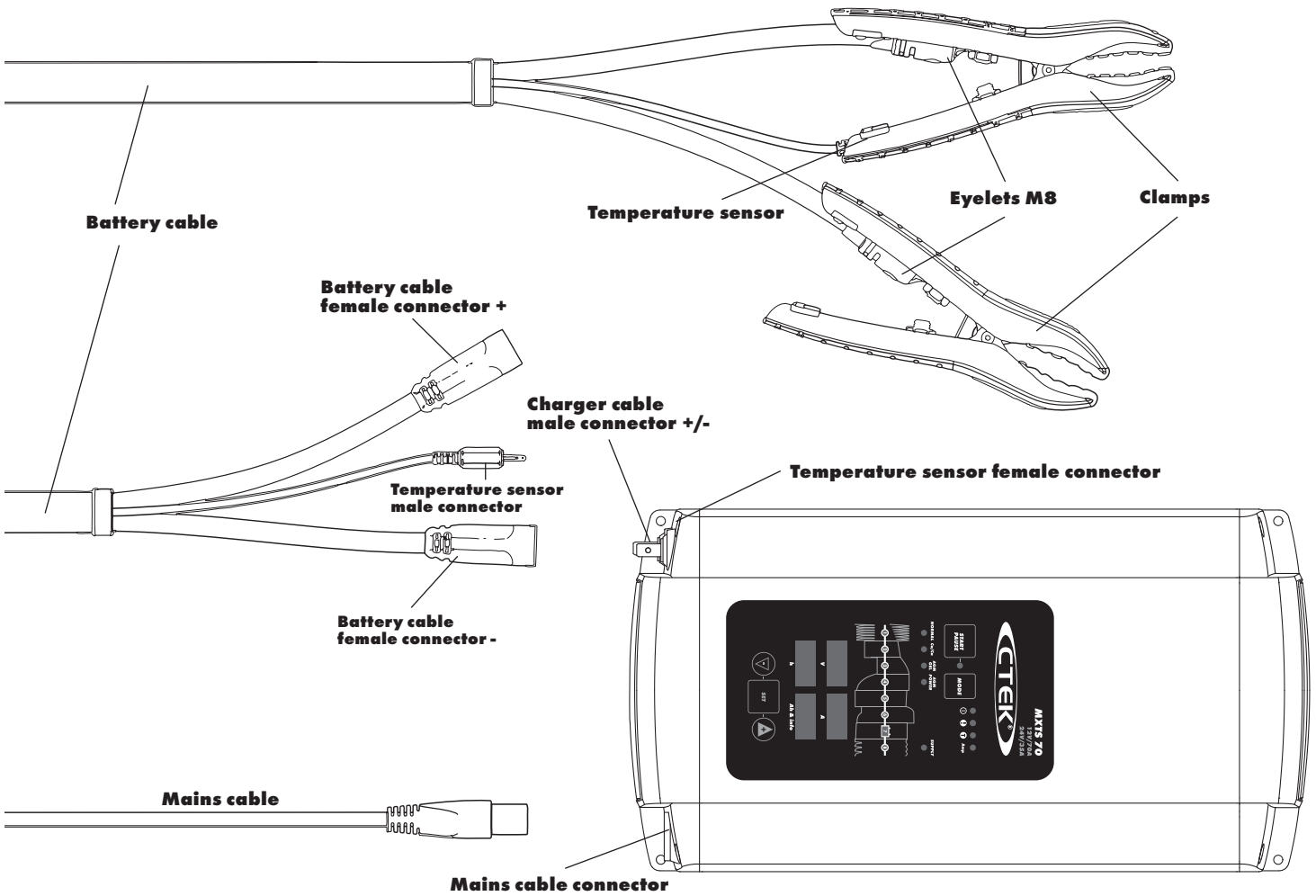
CONGRATULATIONS

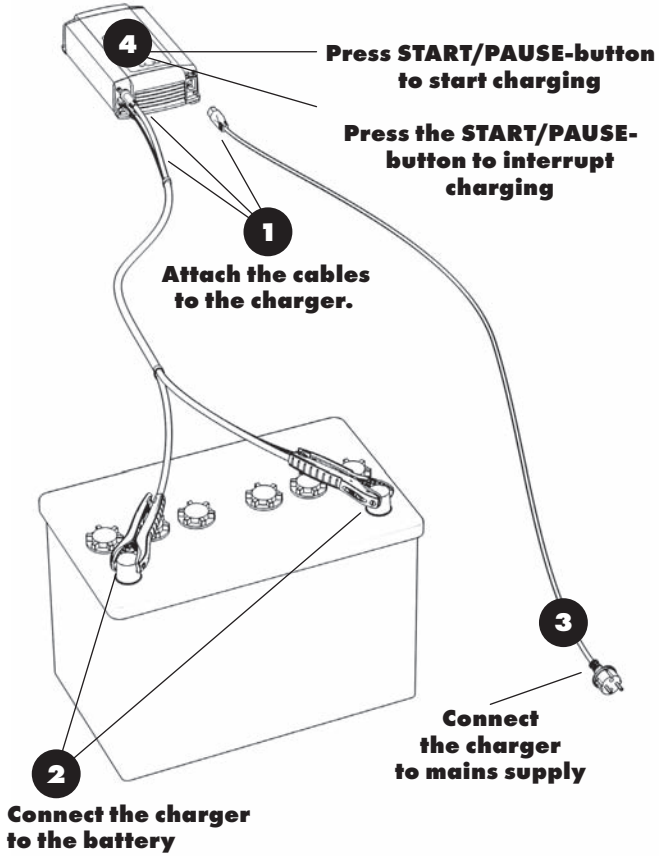
to the purchase of your new professional switch mode battery charger. This charger is included in a series of professional chargers from CTEK SWEDEN AB and represents the latest technology in battery charging. MXTS 70 is the first charger with multiple adjustable parameters.



QUICK GUIDE

To charge, **with last used program settings**

EN



WARNING!
Batteries and electronics will be damaged if 12V batteries are charged in 24V-setting.

CHARGING

For best possible charging of your batteries the voltage and current is adjustable. In addition to that temperature compensated charging is selectable. See below how to set the parameters for customized charging.

1. **Connect the charger cables to the charger**
   (see connect the cables)

2. **Connect the charger to the battery**
   (see connect the cables)

3. **Connect the charger to the wall socket**
   The power lamp will indicate that the mains cable is connected to the wall socket. The error lamp will indicate if the battery clamps are incorrectly connected. The reverse polarity protection will ensure that the battery or charger will not be damaged.

4. **Press the MODE-button to select charging program**

5. **Press SET-button to set parameters**

6. **Select voltage**
   - Display (h) will indicate that voltage (U) is selectable
   - Display (V) will indicate set voltage
   - Press +/- to change
   - Press SET-button to confirm

7. **Select current**
   - Display (h) will indicate that current (A) is selectable
   - Display (A) will indicate set current
   - Press +/- to change
   - Press SET-button to confirm

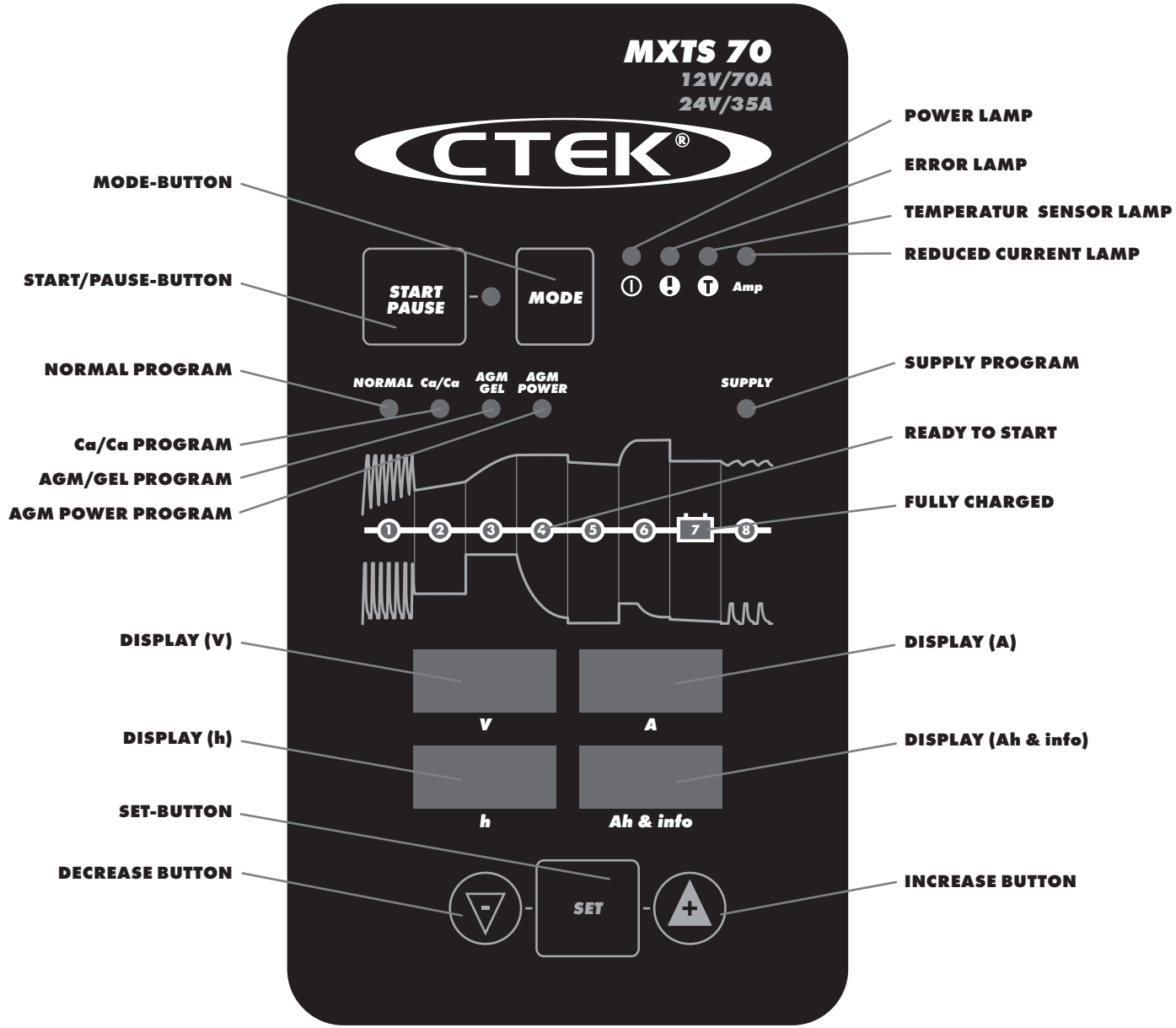
8. **Select temperature compensation**
   - Display (h) will indicate that temperature compensation (t) is selectable
   - Temperature sensor lamp will indicate activated temperature sensor
   - Press +/- to change
   - Press SET-button to confirm

9. **Press the START/PAUSE-button to start charging cycle or press MODE-button to change charging program**

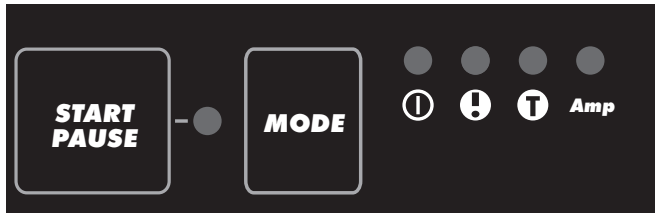
10. **Follow the 8-step display through the charging process**
    The battery is ready to start the engine when STEP 4 is lit.
    The battery is fully charged when STEP 7 is lit.

11. **Stop charging at any time by pressing the START/PAUSE-button**

12. **Press START/PAUSE-button to resume charging cycle**



INDICATION LAMPS, DISPLAYS AND ERRORCODES



INDICATION LAMPS:

START/PAUSE LAMP
Indicates that charging has not started or has been interrupted.
Press START/PAUSE-button to start/resume.

POWER LAMP
Indicates that mains supply is connected.

ERROR LAMP
Indicates that a fault has occurred.
Se ERROR CODES for description.
Press START/PAUSE-button to clear error and interrupt charging.

TEMPERATURE SENSOR LAMP
Indicates that the temperature sensor is activated.
Voltage is automatically adjusted to optimize charge at ambient temperature.

REDUCED CURRENT LAMP
Indicates that the maximum current is limited.

SETTINGS BEFORE START:

DISPLAY (V)
Indicates voltage set
Options: 12/24 Volts
DISPLAY (A)
Indicates current set
Options: 70/50/40/30/20 A in 12V setting
Options: 35/25/20/ 15/ 10 A in 24V setting
70A/35A could only be selected for Supply program.
For Normal-, Ca/Ca-, AGM/GEL- and AGM Power-program maximum current is 50A/25A.

DISPLAY (h)
Indicates which parameter to set
Options: U/A/t

DISPLAY (Ah & info)
Displays error codes

REAL TIME INDICATION DURING CHARGING:

DISPLAY (V)
Displays output voltage
DISPLAY (A)
Displays output current
DISPLAY (h)
Alt. 1. Displays total elapsed charging time (minutes/hours)
Alt. 2. Displays time elapsed until error occured
DISPLAY (Ah & info)
Alt.1. Displays total charge delivered since start (minutes/hours)
Alt.2. Displays error codes together with ERROR lamp

ERROR CODES:

E01 **REVERSE POLARITY**
Connect the charger according to "CONNECT THE CABLES"

E02 **OVER VOLTAGE**
Battery voltage to high for the chosen charging program, check battery voltage.

E03 **TIME OUT STEP 1: DESULPHATION**
Restart the charger. If charging is still being interrupted the battery is seriously sulphated and may need to be replaced.

E04 **TIME OUT STEP 2: SOFT START**
Restart the charger. If charging is still being interrupted the battery can not accept charge and may need to be replaced.

E05 **TIME OUT STEP 5: ANALYSE**
Restart the charger. If charging is still being interrupted the battery can not keep charge and may need to be replaced.

E06 **BATTERY OVERHEATED**
The battery is too hot to charge. The battery is damaged and may need to be replaced.

E07 **LOW BATTERY VOLTAGE IN SUPPLY PROGRAM**
Battery voltage too low or too large consumers connected. Check if 12V battery connected in 24V battery setting or disconnect large consumers.

E08 **HIGH CURRENT IN SUPPLY PROGRAM**
Check if clamps are short circuited or connected reversed polarity.

E99 **OVER VOLTAGE PROTECTION**
If battery voltage is below 17V the ERROR lamp is lit when 24V setting has been selected.

Alt 1. Press START/PAUSE button to charge with 12V setting. To set the parameters for customized charging proceed with "CHARGING" step 5 to 8
Alt 2. Press INCREASE or DECREASE button to change to 24V setting. Press START/PAUSE button to resume. To set the parameters for customized charging proceed with "CHARGING" step 5 to 8.

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CHARGING PROGRAMS

Choose program by pressing the MODE-button.
Adjust parameters according to "CHARGING" (6–8).
Press START/PAUSE button to start the selected program.

The table explains the different Charging Programs:

Program	Battery Size (Ah)	Explanation	Temp range
NORMAL	40–1500Ah **20–750Ah**	Use for WET and MF batteries.	**-20°C–+50°C** (-4°F–+122°F)
Ca/Ca	40–1500Ah **20–750Ah**	Use for Ca/Ca batteries. Use Ca/Ca-program to maximize charge with minimum loss of fluid. Including RECOND step. Recond your battery once per year and after deep discharge to maximise lifetime and capacity.	**-20°C–+50°C** (-4°F–+122°F)
AGM/GEL	40–1500Ah **20–750Ah**	For AGM and GEL batteries which are recommended to receive lower voltage charge.	**-20°C–+50°C** (-4°F–+122°F)
AGM POWER	40–1500Ah **20–750Ah**	Use for AGM batteries which are recommended to receive higher voltage charge.	**-20°C–+50°C** (-4°F–+122°F)
SUPPLY	40–1500Ah **20–750Ah**	Use as 12V/24V power supply or use for float maintenance charging when 100% capacity of the battery is required. Supply program activates step 7 without time or voltage limitation. Supply program enables the charger to deliver 70A/12V or 35A/24V for 30 seconds.	**-20°C–+50°C** (-4°F–+122°F)

12V			24V		
Current	**Battery size Min**	**Battery size Max**	**Current**	**Battery size Min**	**Battery size Max**
20A	40Ah	100Ah	**10A**	**20Ah**	**50Ah**
30A	60Ah	150Ah	**15A**	**30Ah**	**75Ah**
40A	80Ah	200Ah	**20A**	**40Ah**	**100Ah**
50A	100Ah	-	**25A**	**50Ah**	**-**
70A*	100Ah	-	**35A***	**50Ah**	**-**

- Using higher current than recommended may result in batteries not being completely charged.
- Using lower current than recommended will prolong the charging time.
- The currents are the maximum recommended current for battery charging. If a parallel consumer is connected then the current setting could be increased with this current value.
- Some battery manufacturer could recommend different values. Please check with the manufacturer if uncertain. The main recommendations are that Gel batteries should be charged in the lower current range, Power AGM's in the upper range and most other battery types in the mid-range.

**) 70/35A Could only be selected for Supply program*

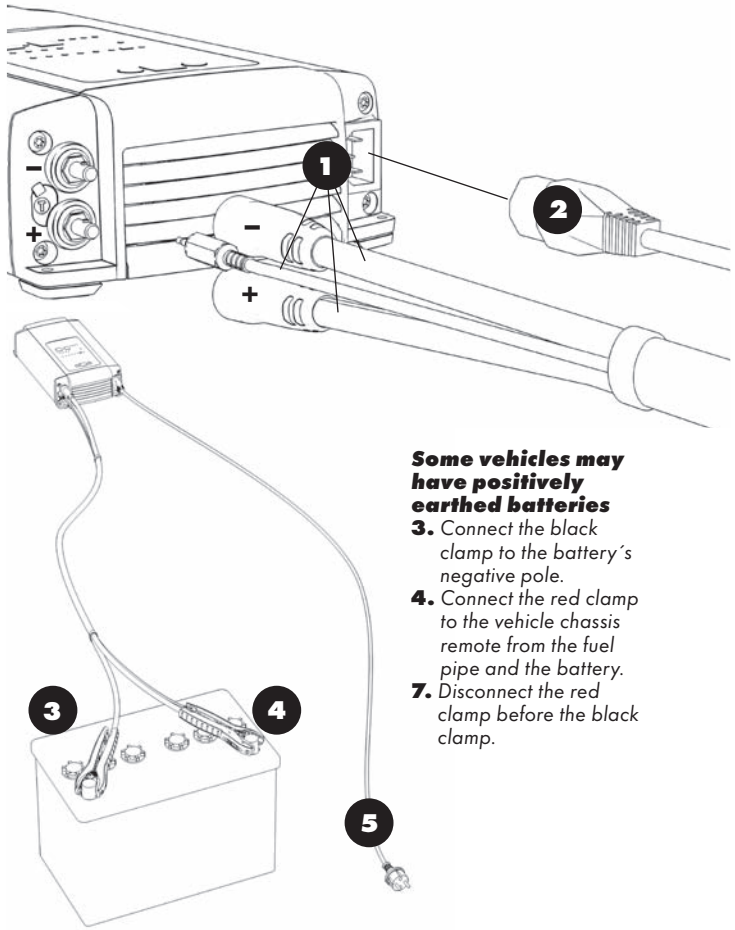
WARNING!
Risk for short circuiting the battery cables. Connect charger cables to the charger before connecting the battery

WARNING!
Risk for electrical shock if touching positive and negative terminals when charging

CONNECT THE CABLES

If the battery clamps are incorrectly connected, the reverse polarity protection will ensure that the battery and charger are not damaged.

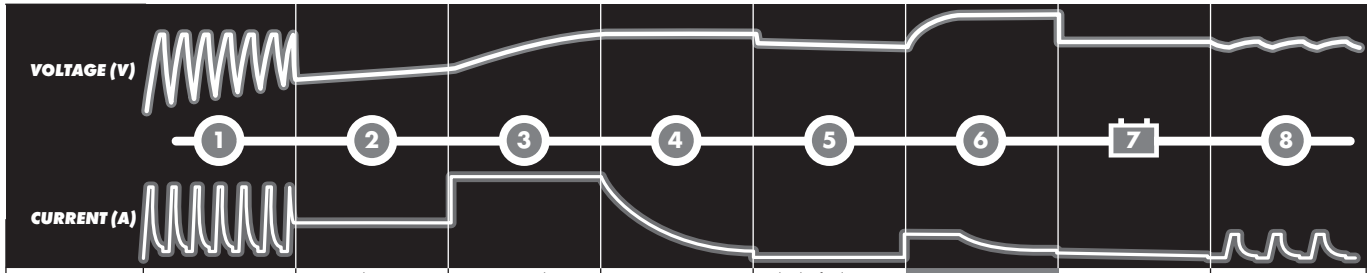
1. Connect the battery cable, including the temperature sensor, to the charger
2. Connect the mains cable to the charger
3. Connect the red clamp to the battery´s positive pole.
4. Connect the black clamp to the vehicle chassis remote from the fuel pipe and the battery.
5. Connect the charger to the wall socket
6. Disconnect the charger from the wall socket before disconnecting the battery
7. Disconnect the black clamp before the red clamp



Some vehicles may have positively earthed batteries

3. *Connect the black clamp to the battery´s negative pole.*
4. *Connect the red clamp to the vehicle chassis remote from the fuel pipe and the battery.*
7. *Disconnect the red clamp before the black clamp.*

CHARGING PROGRAMS



	DESULPHATION	SOFT START	BULK	ABSORPTION	ANALYSE	RECOND	FLOAT	PULSE
NORMAL	15.8V **31.6V**	50A until 12.6V **25A until 25,2V**	Increasing voltage to: 14.4V **28.8V** 50A **25A**	14.4V **28.8V** Declining current	Checks if voltage drops to: 12V **24V**		13.6V **27.2V** Max 50A **Max 25A**	12.7V–14.4V **25.4-28.8V** 50–5A **25-2,5A**
Ca/Ca	15.8V **31.6V**	50A until 12.6V **25A until 25,2V**	Increasing voltage to: 14.7V **29.4V** 50A **25A**	14.7V **29.4V** Declining current	Checks if voltage drops to: 12V **24V**	Max 15.8V **Max 31.6V** 1.5A	13.6V **27.2V** Max 50A **Max 25A**	12.7V–14.7V **25.4-29.4V** 50–5A **25-2,5A**
AGM/GEL	15.8V **31.6V**	50A until 12.6V **25A until 25,2V**	Increasing voltage to: 14.4V **28.8V** 50A **25A**	14.4V **28.8V** Declining current	Checks if voltage drops to: 12V **24V**		13.6V **27.2V** Max 50A **Max 25A**	12.7V–14.4V **25.4-28.8V** 50–5A **25-2,5A**
AGM POWER	15.8V **31.6V**	50A until 12.6V **25A until 25,2V**	Increasing voltage to: 14.9V **29.8V** 50A **25A**	14.9V **29.8V** Declining current	Checks if voltage drops to: 12V **24V**		13.6V **27.2V** Max 50A **Max 25A**	12.7V–14.9V **25.4-29.8V** 50–5A **25-2,5A**
SUPPLY							13.6V/Max 70A **27.2V/Max 35A***	
Limit:	**Max 4h**	**Max 4h**	**Max 30h**	**Max 10h**	**3 minutes**	**30 min or 4h depending on battery voltage**	**10 days Charge cycle restarts if voltage drops**	**Charge cycle restarts if voltage drops**

**) SUPPLY program is not time or voltage limited*

STEP 1 DESULPHATION
Detects sulphated batteries. Pulsing current and voltage, removes sulfates from the lead plates of the battery restoring the battery capacity.

STEP 2 SOFT START
Tests if the battery can accept charge. This step prevents charging a defect battery.

STEP 3 BULK
Charging with maximum current until approximately 80% battery capacity.

STEP 4 ABSORPTION
Charging with declining current to maximize up to 100% battery capacity.

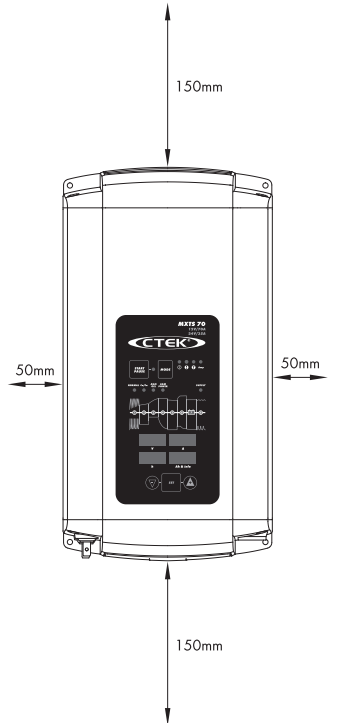
STEP 5 ANALYSE
Tests if the battery can hold charge. Batteries that can not hold charge may need to be replaced.

STEP 6 RECOND
Choose the Ca/Ca program to add the Recond step to the charging process. During the Recond step voltage increases to create controlled gasing in the battery. Gasing mixes the battery acid and gives back energy to the battery.

STEP 7 FLOAT
Maintaining the battery voltage at maximum level by providing a constant voltage charge.

STEP 8 PULSE
Maintaining the battery at 95–100% capacity. The charger monitors the battery voltage and gives a pulse when necessary to keep the battery fully charged.

MOUNTING
When permanently mounting the charger, mount the charger on a firm surface. Fix the charger with screws in the four holes. Use screws intended for the surface. Allow space around the charger to not interfere with air cooling.



READY TO USE
The table shows the estimated time for empty battery to 80% charge

CHARGING CURRENT	BATTERY SIZE 20Ah	50Ah	100Ah	200Ah	500Ah
10A	2h	5h			
20A		2h	5h		
25A		2h	4h	8h	20h
50A			2h	4h	10h

TECHNICAL SPECIFICATION

Charger model	MXTS 70
Model number	1045
Rated Voltage AC	220–240VAC, 50–60Hz
Charging voltage	Max 15,8V/31,6V
Start voltage	2.0V
Output current	Max 70A/35A (max 30 sec.) Max continuous 50A/25A
Current, mains	6.3–4.4A rms (at full charging current)
Back current drain*	<1Ah/month
Ripple**	<4%
Ambient temperature	-20°C to +50°C (-4°F to +122°F)
Charger type	8 step, fully automatic charging cycle with adjustable parameters
Battery types	All types of 12V/24V lead-acid batteries (WET, MF, Ca/Ca, AGM and GEL)
Battery capacity	12V: 40–1500Ah, 24V: 20–750Ah
Dimensions	332 x 178 x 80mm (L x W x H)
Insulation class	IP20
Weight	3.6kg (without charger cable)

**) Back current drain is the current that drains the battery if the charger is not connected to the mains. CTEK chargers has a very low back current.*
***) The quality of the charging voltage and charging current is very important. A high current ripple heats up the battery which has an aging effect on the positive electrode. High voltage ripple could harm other equipment that is connected to the battery. CTEK battery chargers produce very clean voltage and current with low ripple.*

LIMITED WARRANTY

CTEK SWEDEN AB, issues this limited warranty to the original purchaser of this product. This limited warranty is not transferable. The warranty applies to manufacturing faults and material defects for 2 years from the date of purchase. The customer must return the product together with the receipt of purchase to the point of purchase. This warranty is void if the battery charger has been opened, handled carelessly or repaired by anyone other than CTEK SWEDEN AB or its authorised representatives. The charger is sealed. Removing or damaging the seal will void the warranty. CTEK SWEDEN AB makes no warranty other than this limited warranty and is not liable for any other costs other than those mentioned above, i.e. no consequential damages. Moreover, CTEK SWEDEN AB is not obligated to any other warranty other than this warranty.

SAFETY

- **The charger is** designed for charging 12V or 24V lead-acid batteries. Do not use the charger for any other purpose.
- **Check the charger** cables prior to use. Ensure that no cracks have occurred in the cables or in the bend protection. A charger with damaged cables must not be used. A damaged cable must be replaced.
- **Never charge** a damaged battery.
- **Never charge** a frozen battery.
- **Never place** the charger on top of the battery when charging.
- **Always provide** for proper ventilation during charging.
- **Avoid covering** the charger.
- **A battery being** charged could emit explosive gasses. Prevent sparks close to the battery. When batteries are reaching the end of their lifecycle internal sparks may occur.
- **All batteries fail** sooner or later. A battery that fails during charging is normally taken care of by the chargers advanced control, but some rare errors in the battery could still exist. Don't leave any battery during charging unattended for a longer period of time.
- **Ensure that** the cabling does not jam or comes into contact with hot surfaces or sharp edges.
- **Battery acid is** corrosive. Rinse immediately with water if acid comes into contact with skin or eyes, seek immediate medical advice.
- **Always check** that the charger has switched to STEP 7 before leaving the charger unattended and connected for long periods. If the charger has not switched to STEP 7 within 55 hours, this is an indication of an error. Manually disconnect the charger.
- **Batteries consume** water during use and charging. For batteries where water can be added, the water level should be checked regularly. If the water level is low add distilled water.
- **This appliance is** not designed for use by young children or people who cannot read or understand the manual unless they are under the supervision of a responsible person to ensure that they can use the battery charger safely. Store and use the battery charger out of the reach of children, and ensure that children cannot play with the charger.
- **Connection to** the mains supply must be in accordance with the national regulations for electrical installations.
- **The charger** must only be connected to an earthed socket outlet.
- **The charger** is designed for indoor use. Do not expose to rain or snow.

CTEK PRODUCTS ARE PROTECTED BY

2011-09-19

Patents	Designs	Trade marks
EP10156636.2 pending	RCD 509617	CTM 669987
US12/780968 pending	US D575225	CTM 844303
EP1618643	US D580853	CTM 372715
US7541778	US D581356	CTM 3151800
EP1744432	US D571179	CTM 1461716 pending
EP1483817 pending	RCD 321216	CTM 1025831
SE524203	RCD 000911839	CTM 405811
US7005832B2	RCD 081418	CTM 830545751 pending
EP1716626 pending	RCD 001119911-0001	CTM 1475420 pending
SE526631	RCD 001119911-0002	CTM 1935061 pending
US7638974B2	RCD 081244	V28573IP00
EP1903658 pending	RCD 321198	CTM 1082141 pending
EP09180286.8 pending	RCD 321197	CTM 2010004118 pending
US12/646405 pending	ZL 200830120184.0	CTM 4-2010-500516 pending
EP1483818	ZL 200830120183.6	CTM 410713
SE1483818	RCD 001505138-0001	CTM 2010/05152 pending
US7629774B2	RCD 000835541-0001	CTM1042686
EP09170640.8 pending	RCD 000835541-0002	CTM 766840 pending
US12/564360 pending	D596126	
SE528232	D596125	
SE525604	RCD 001705138 pending	
	US D29/378528 pending	
	RCD 201030618223.7 pending	
	US RE42303	
	US RE42230	

SUPPORT

CTEK offers a professional customer support: **www.ctek.com**.
For latest revised user manual see www.ctek.com.
By e-mail: **info@ctek.se**,
by telephone: +46(0) 225 351 80, by fax +46(0) 225 351 95.
By mail: CTEK SWEDEN AB, Rostugnsvägen 3, SE-776 70 VIKMANSHYTTAN, SWEDEN.

VIKMANSHYTTAN, SWEDEN 2011-09-01

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