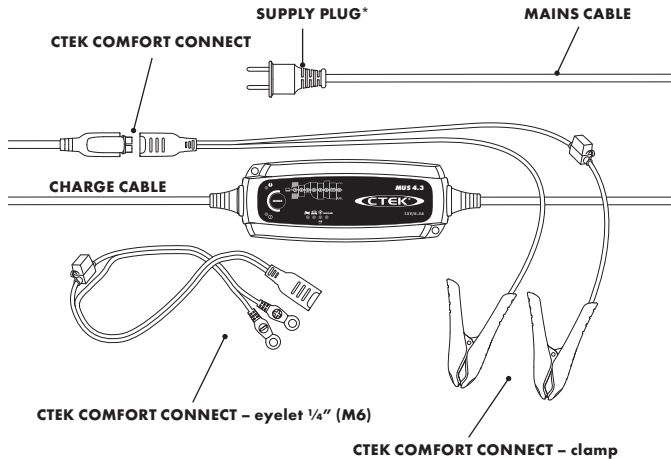


# MANUAL

## INTRODUCTION

MUS 4.3 (1065) is a switch mode charger with both float and pulse maintenance and is a part of a series of battery chargers from CTEK Sweden AB. These chargers represent the latest technology within battery charging. A MUS 4.3 (1065) gives the battery maximum life.



\*Supply plugs may differ to suit your wall socket.

## IMPORTANT SAFETY INSTRUCTIONS

### CALIFORNIA PROPOSITION 65

WARNING: This product contains chemical known to the state of California to cause cancer or reproductive toxicity.

1. **SAVE THESE INSTRUCTIONS**
  - This manual contains important safety and operating instructions for battery charger model MUS 4.3 (1065).
2. Do not expose charger to rain or snow.
3. Use of an attachment not recommended or sold by CTEK may result in a risk of fire, electric shock or injury to persons.
4. To reduce risk of damage to electric plug and cord, pull by the plug rather than cord when disconnecting charger.
5. An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure that: a) Pins on plug of extension cord are the same number, size and shape as those of plug on charger; b) Extension cord is properly wired and in good electrical condition; and c) Wire size is large

EN

enough for AC ampere rating of charger as specified in "RECOMMENDED MINIMUM AWG SIZE FOR AC EXTENSION CORDS".

6. Do not operate charger with damaged cord or plug - return the charger to the retailer.
7. Do not operate charger if it has received a sharp blow, been dropped or otherwise damaged in any way; take it to the retailer.
8. Do not disassemble charger; take it to the retailer when service or repair is required. Incorrect reassembly may result in a risk of electrical shock or fire.
9. To reduce risk of electric shock, unplug charger from AC outlet before attempting any maintenance or cleaning.

10. **WARNING - RISK OF EXPLOSIVE GASES**  
a) **WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS**

**REASON, IT IS OF OUTMOST IMPORTANCE THAT YOU FOLLOW THE INSTRUCTIONS EACH TIME YOU USE THE CHARGER.**

- b) To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary marking on these products and on engine.
11. **PERSONAL PRECAUTIONS**
- a) Consider having someone close enough by to come to your aid when you work near a lead-acid battery.
  - b) Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
  - c) Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
  - d) If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10 minutes and get medical attention immediately.
  - e) NEVER smoke or allow a spark or flame in vicinity of battery or engine.

- f) Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short-circuit battery or other electrical part that may cause explosion.
- g) Remove personal metal items such as rings, bracelets, necklaces, and watches when working with lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
- h) Use charger for charging a LEAD-ACID battery only. It is not intended to supply power to a low voltage electrical system other than in a starter-motor application. Do not use battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
- i) NEVER charge a frozen battery.

## 12. PREPARING TO CHARGE

- a) If necessary to remove battery from vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
- b) Be sure area around battery is well ventilated while battery is being charged.
- c) Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.

- d) Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. Do not overfill. For a battery without removable cell caps, such as valve regulated lead acid batteries, carefully follow manufacturer's recharging instruction.
- e) Study all battery manufacturer's specific precautions while charging and recommended rates of charge.
- f) Determine voltage of battery by referring to car owner's manual and make sure it matches output rating of battery charger.

## 13. CHARGER LOCATION

- a) Locate charger as far away from battery as DC cables permit.
- b) Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
- c) Never allow battery acid to drip on charger when reading electrolyte specific gravity or filling battery.
- d) Do not operate charger in a closed-in area or restrict ventilation in any way.
- e) Do not set a battery on top of charger.

EN

## 14. DC CONNECTION PRECAUTIONS

- a) Connect and disconnect dc output clips only after setting any charger switches to “off” position and removing AC cord from electric outlet. Never allow clips to touch each other.
- b) Attach clips to battery and chassis as indicated in 15(e), 15(f), 16(b) through 16(d).

## 15. FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

- a) Position AC and DC cords to reduce risk of damage by hood, door or moving engine part.
- b) Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.
- c) Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has larger diameter than NEGATIVE (NEG, N, -) post.

- d) Determine which post of battery is grounded (connected) to the chassis. If negative post is grounded to the chassis (as in most vehicles) see (e). If positive post is grounded to the chassis, see (f).
- e) For Negative-grounded vehicle, connect POSITIVE (RED) clip from battery charger to POSITIVE (POS, P, +) ungrounded post of battery. Connect NEGATIVE (BLACK) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gage metal part of the frame or engine block.
- f) For Positive-grounded vehicle, connect NEGATIVE (BLACK) clip from battery charger to NEGATIVE (NEG, N, -) ungrounded post of battery. Connect POSITIVE (RED) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gage metal part of the frame or engine block.
- g) When disconnecting charger, turn switches to off, disconnect AC cord, remove clip from vehicle chassis, and then remove clip from battery terminal.
- h) See operating instructions for length of charge information.

## 16. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE. A SPARK NEAR BATTERY MAY

## CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

- a) Check polarity of battery terminals. POSITIVE (POS, P, +) battery post usually has a larger diameter than NEGATIVE (NEG, N, -) post.
- b) Connect POSITIVE (RED) charger clip to POSITIVE (POS, P, +) post of battery.
- c) Position yourself and free end of cable as far away from battery as possible – then connect NEGATIVE (BLACK) charger clip to NEGATIVE (NEG, N, -) post of battery.
- d) Do not face battery when making the final connection.
- e) When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.
- f) A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

## IMPORTANT SAFETY INFORMATION!

- Charge no other batteries than specified in TECHNICAL INFORMATION.

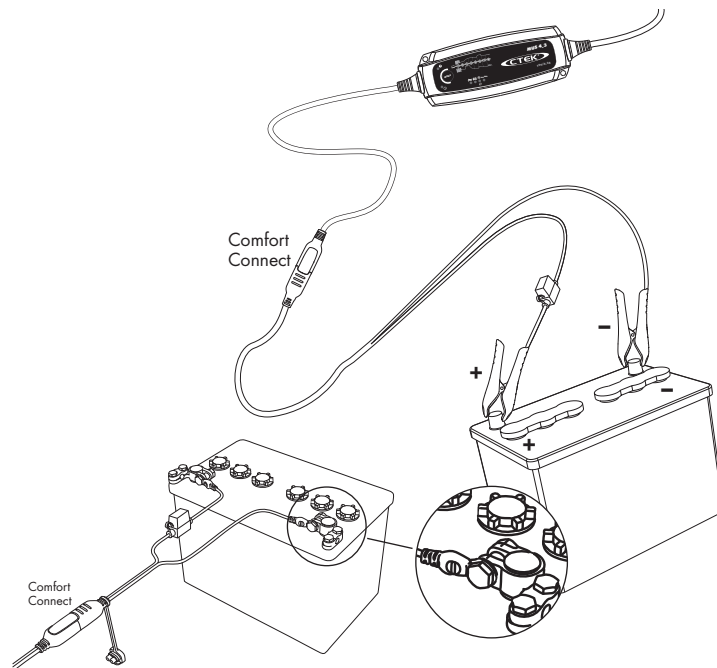
- Check the charger cables prior to use. Ensure that no cracks have occurred in the cables or in the bend protection. A charger with damaged cables must be returned to the retailer.
- Ensure that the cabling does not jam or comes into contact with hot surfaces or sharp edges.
- Never charge a damaged battery.
- Never place the charger on top of the battery when charging.
- Avoid covering the charger.
- 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.
- If power consumers like fitted alarms and navigation computers are connected to the battery, the charging process takes longer and may drain the battery.
- 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 50 hours, this is an indication of an error. 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.
- Do not extend the charge cable.

## RECOMMENDED MINIMUM AWG SIZE FOR AC EXTENSION CORDS

LENGTH OF CORD FEET (M)	AWG SIZE OF CORD
25 (7.6)	18
50 (15.2)	18
100 (30.5)	18
150 (45.6)	16

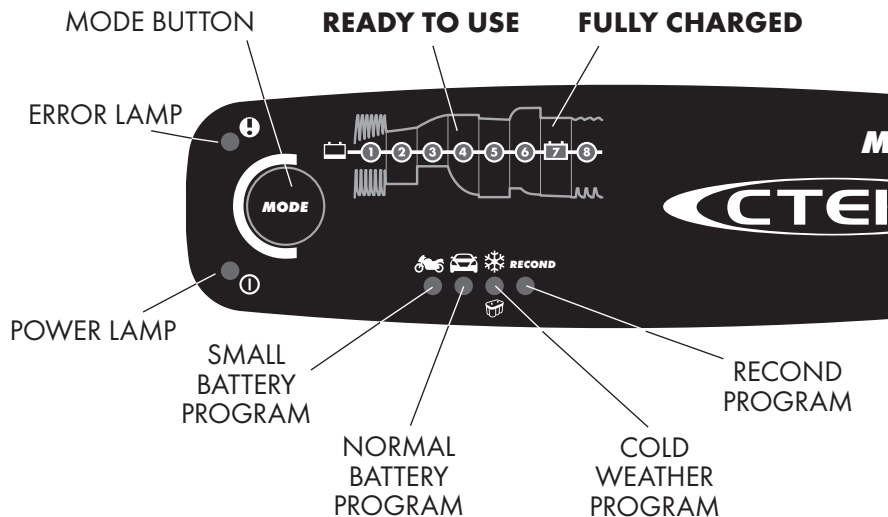
## CONNECT AND DISCONNECT THE CHARGER TO A BATTERY



# OPERATING INSTRUCTIONS

1. Connect the charger to the battery.
2. 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.
3. Press the MODE-button to select charging program.
4. 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.
5. Stop charging at any time by disconnecting the mains cable from the wall socket.




EN

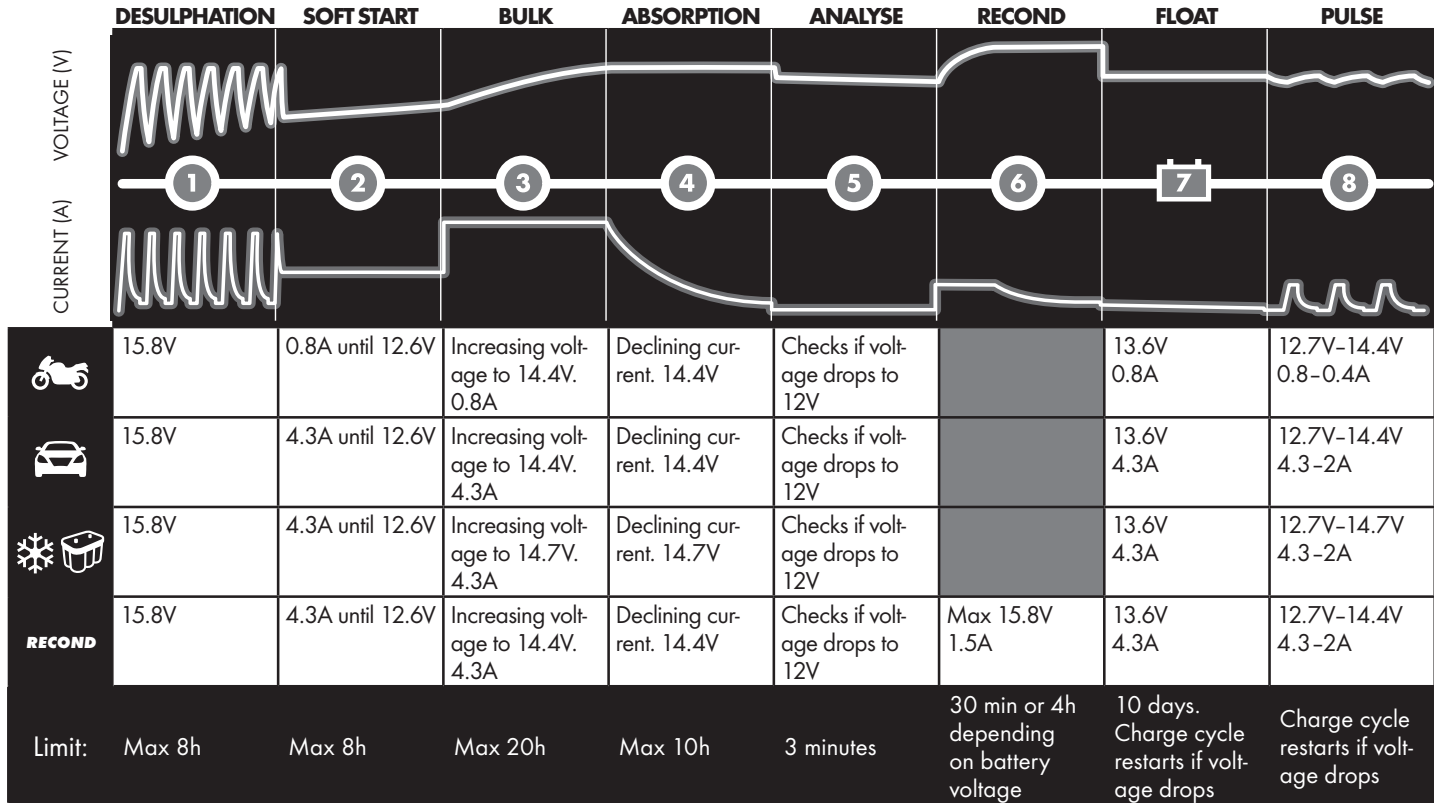


# CHARGING PROGRAMS

Settings are made by pressing the MODE-button. After about two seconds the charger activates the selected program. The selected program will be restarted next time the charger is connected.

## THE TABLE EXPLAINS THE DIFFERENT CHARGING PROGRAMS:

PROGRAM	BATTERY SIZE (AH)	EXPLANATION	TEMP RANGE
	1.2-14Ah	<b>Small battery program</b> 14.4V/0.8A. Use for smaller batteries.	-4°F-122°F (-20°C-+50°C)
	14-160Ah	<b>Normal battery program</b> 14.4V/4.3A. Use for WET batteries, Ca/Ca, MF, GEL batteries and many AGM batteries.	41°F-122°F (+5°C-+50°C)
	14-160Ah	<b>Cold weather program</b> 14.7V/4.3A . Use for charging at low temperatures and for power AGM batteries like Optima and Odyssey.	-4°F-41°F (-20°C-+5°C)
<b>RECOND</b>	14-160Ah	<b>Recond program</b> 15.8V/1.5A. Use to return energy to the empty WET and Ca/Ca batteries. Recond your battery once per year and after deep discharge to maximise lifetime and capacity. The Recond program adds STEP 6 to the normal battery program. Frequent use of the Recond program may cause water loss in the batteries and reduce service life of electronics. Contact your vehicle and battery supplier for advice.	-4°F-122°F (-20°C-+50°C)



### STEP 1 DESULFATION

Detects sulfated batteries. Pulsing current and voltage, removes sulfate 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 that charging proceeds with 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 Recond program to add the Recond step to the charging process. During the Recond step voltage increases to create controlled gassing in the battery. Gassing 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.

## READY TO USE

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



BATTERY SIZE (AH)	TIME TO 80% CHARGED
2Ah	2h
8Ah	8h
20Ah	5h
60Ah	15h
110Ah	28h

# ERROR LAMP

If the error lamp is lit, check the following:



**1. Is the charger's positive lead connected to the battery's positive pole?**

**2. Is the charger connected to a 12V battery?**

**3. Has charging been interrupted in STEP 1, 2 or 5?**

Restart the charger by pressing the MODE-button. If charging is still being interrupted, the battery...

**STEP 1:** ...is seriously sulfated and may need to be replaced.

**STEP 2:** ...can not accept charge and may need to be replaced.





**STEP 5:** ...can not keep charge and may need to be replaced..

# MAINTENANCE INSTRUCTIONS

The MUS 4.3 (1065) is maintenance-free. The charger must not be opened; doing so will invalidate the warranty. If the power cable is damaged the charger must be returned to the retailer. The charger casing can be cleaned using a damp cloth and mild cleaning agent. Remove the plug from the power socket before cleaning.

EN

# TECHNICAL SPECIFICATIONS

Charger model	MUS 4.3
Model number	1065
Rated Voltage AC	110-120VAC, 50-60Hz
Charging voltage	  14.4V,   14.7V, <b>RECOND</b> 15.8V
Min battery voltage	2.0V
Charging current	4.3A
Current, mains	1.1A rms (at full charging current)
Back current drain*	<1Ah/month
Ripple**	<4% of rated current
Ambient temperature	-4°C to +122°F (-20° to +50°C), output power is reduced automatically at high temperatures
Charger type	Eight step, fully automatic charging cycle
Battery types	All types of 12V lead-acid batteries (WET, MF, Ca/Ca, AGM and GEL)
Battery capacity	1.2-110Ah, up to 160Ah for maintenance
Dimensions	6½ x 2½ x 1½ inches (L x W x H)
Weight	1.4 lbs

\*) 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 Power Inc, 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 5 years from the date of purchase. The customer must return the product together with the receipt of purchase to the retailer. This warranty is void if the battery charger has been opened, handled carelessly or repaired by anyone other than CTEK Power Inc or its authorised representatives. CTEK Power Inc 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 Power Inc is not obligated to any other warranty other than this warranty.

# 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 D571179	CTM 372715
US7541778	US D580853	CTM 3151800
EP1744432	US D581356	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 000835541-0001	CTM 2010/05152 pending
US7629774B2	RCD 000835541-0002	CTM1042686
EP09170640.8 pending	US D596126	CTM 766840 pending
US12/564360 pending	US D596125	
SE528232	RCD 001705138-0001	
SE525604	US D29/378528 pending	
	RCD 201030618223.7 pending	

EN

# SUPPORT

CTEK offers a professional customer support: [www.ctek.com](http://www.ctek.com).

For latest revised user manual see [www.ctek.com](http://www.ctek.com).

By e-mail: [info@ctek.se](mailto:info@ctek.se), by telephone: (330) 963-0981,  
by fax (330) 963-0982.

By mail: CTEK Power Inc,  
2374 Edison Blvd. Twinsburg  
OH 44087-2376 US



Bengt Hagander, President  
CTEK SWEDEN AB