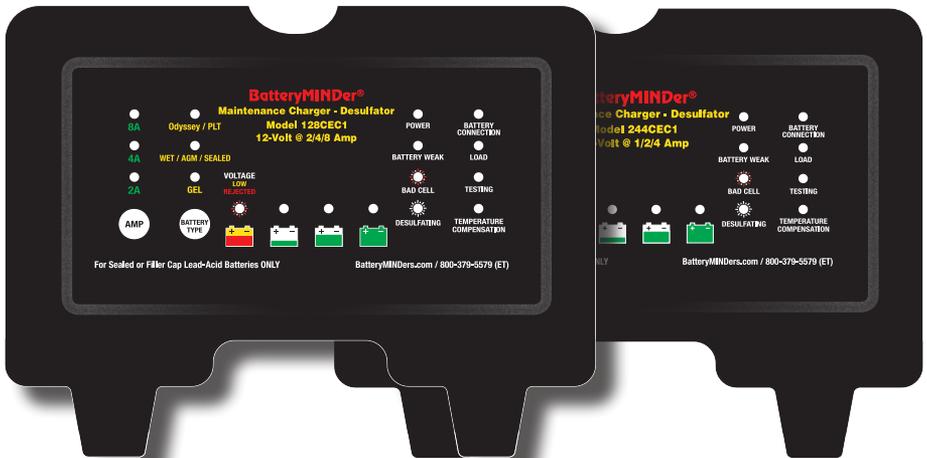


BatteryMINDer®

12-Volt 128CEC1 and 24-Volt 244CEC1 Battery Maintainer-Desulfators* Quick Start and Safety Manual



All Models Include:

- ATS Temperature Sensor (installed)
- Ring Terminals with 15A Fuse
- Insulated Battery Clip cordset with quick connect plug

**NOT for use with Aviation-type batteries*

READ AND SAVE THESE INSTRUCTIONS

A complete detailed instruction manual can be found on
BatteryMINDers.com. Go to **Support**.

VDC Electronics, Inc. • 155 W. Carver St., Ste. 2 • Huntington, NY 11743
www.BatteryMINDers.com • techsupport@vdcelectronics.com

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

This manual contains important safety and operating instructions for all BatteryMINDer battery chargers unless otherwise specified.

A. WARNING: RISK OF EXPLOSIVE GASES

WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT YOU FOLLOW THE INSTRUCTIONS ON (1) BATTERY CHARGER, (2) BATTERY AND (3) PRODUCT USING BATTERY EACH TIME YOU USE THE CHARGER.

1. To reduce risk of battery explosion, follow these instructions and those published by manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary marking on these products and on engine.
2. To reduce risk of injury, charge only lead acid type rechargeable batteries. Other types of batteries may burst causing personal injury and damage.
3. Do not expose charger to rain or snow.
4. Use of an attachment not recommended or sold by VDC Electronics may result in a risk of fire, electric shock, or injury to persons.
5. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger. Make sure cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
6. 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:
 - a. That pins on plug of extension cord are the same number, size, and shape as those of plug on charger;
 - b. Not to operate charger with damaged cord or plug – replace the cord or plug immediately.
 - c. That extension cord is properly wired and in good electrical condition; and
 - d. That wire size is large enough for AC ampere rating of charger as specified in **Recommended Minimum AWG Size Table**.

Recommended Minimum AWG size for Extension Cords For Battery Chargers					
AC input rating, amperes		AWG size of cord			
Equal to or greater than	But less than	Length of cord, feet			
		25	50	100	150
0	2	18	18	18	16

- e. Do not operate charger with damaged cord or plug – replace the cord or plug immediately.
- f. Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way.
7. Do not disassemble charger; call VDC Electronics Tech Support Dept. 800.379.5579 x6 (ET) for advice when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
8. To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning.

B. PERSONAL PRECAUTIONS

1. Consider having someone close enough by to come to your aid when you work near a lead-acid battery.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
3. Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
4. 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.
5. NEVER smoke or allow a spark or flame in vicinity of battery or engine.
6. 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.
7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a 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.
8. 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.
9. NEVER charge a frozen battery or a battery at a temperature above 123° F.

C. PREPARING TO CHARGE

1. 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.
2. Be sure area around battery is well ventilated while battery is being charged.
3. Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.

4. 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 instructions.
5. Study all battery manufacturer's specific precautions while charging and recommended rates of charge.
6. Determine voltage of battery by referring to car owner's manual and make sure it matches output rating of battery charger.

D. CHARGER LOCATION

1. Locate charger as far away from battery as DC cables permit.
2. Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
3. Never allow battery acid to drip on charger when reading electrolyte specific gravity or filling battery.
4. Do not operate charger in a closed-in area or restrict ventilation in any way.
5. Do not set a battery on top of charger.
6. Always mount units in vertical position with cord sets exiting downward to ensure weather tight integrity. Unit must be mounted in this manner to ensure long term trouble free life including weatherproof integrity. Mounting in any other manner or using un-mounted (parallel to ground) except indoors may cause unit to fail due to water intrusion that is unable to drain correctly.

E. DC CONNECTION PRECAUTIONS

1. Connect and disconnect DC output clips only after removing ac cord from electric outlet. Never allow clips to touch each other.
2. Attach clips to battery and chassis as indicated in Section G.

F. 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:

1. Position AC and DC cords to reduce risk of damage by hood, door, or moving engine part.
2. Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.
3. Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has larger diameter than NEGATIVE (NEG, N,-) post.
4. Determine which post of battery is grounded (connected) to the chassis. If negative post is grounded to chassis (as in most vehicles), see (5). If positive post is grounded to the chassis, see (6).
5. 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.
6. 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.
 7. When disconnecting charger, disconnect AC cord, remove clip from vehicle chassis, and then remove clip from battery terminal.
 8. See operating instructions for length of charge information.

G. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

1. Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has a larger diameter than NEGATIVE (NEG, N, -) post.
2. Attach at least a 24-inch-long 6-gauge (AWG) insulated battery cable to NEGATIVE (NEG, N, -) battery post.
3. Connect POSITIVE (RED) charger clip to POSITIVE (POS, P, +) post of battery.
4. Position yourself and free end of cable as far away from battery as possible – then connect NEGATIVE (BLACK) charger clip to free end of cable.
5. Do not face battery when making final connection.
6. When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.
7. A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

QUALIFYING YOUR BATTERY:

Preliminary Requirements

NOTE: The BatteryMINDER has no electrical output unless it is connected to a healthy battery. Testing the BatteryMINDER with a volt or an Amp meter without the unit being connected across a good battery will result in a false reading. If you experience any problems, or are not sure of how to properly use or connect your BatteryMINDER, please e-mail our technical support at: techsupport@vdcelectronics.com or call our toll-free technical support line 800-379-5579 x6 (ET). **Be certain to leave your phone number with the area code, time zone and the best time to call.** To gain the best result from your new charger and to maximize the life and performance of your batteries we strongly recommend you qualify (test) your batteries before attempting to either charge-maintain or desulfate them. Remember, even if you just

purchased a “new” battery it may have been subjected to conditions that have caused “sulfation” such as high temperature ($\geq 80^{\circ}\text{F}$).

NOTE: If your battery is new and you are certain it was not subject to conditions that could have caused sulfation (such as high temperature storage ($\geq 80^{\circ}\text{F}$) and/or allowed to self-discharge to **12.4 Volts / 24.8 Volts** or lower), **even before you purchased it, then you can disregard our recommendations for qualifying / testing your battery, before using the BatteryMINDER.**

Specific Gravity	State of Charge Level
1.270 (4 Balls floating)	100%
1.250 (3 Balls floating)	75%
1.190 (2 Balls floating)	50%
1.150 (1 Balls floating)	25%
1.120 (0 Balls floating)	Discharged%

Testing a Filler Cap or Manifold-type Lead Acid Battery

1. Carefully remove all caps from your battery.
2. Check the water-liquid electrolyte level. If the level is low or has ever been below top of plates, severe lead plate sulfation has taken place. Significant recharge/reconditioning time is needed to restore these plates to a condition where the battery can be expected to function normally.
3. Refill each cell with distilled water only to the liquid level indicator found in each cell. **Before proceeding further you must be thoroughly familiar with the safety and operating instructions.**
4. Recharge the battery with the BatteryMINDER to ensure that it is slowly and completely charged before you determine its condition. Allow battery to “rest” (see **Glossary of Terms** in detailed manual) overnight for a minimum of 12 hours before testing with a temperature compensated hydrometer and/or digital type voltmeter only.

Testing with a Hot/Cold Calibrated Hydrometer Tester

Read the tester instructions carefully for most accurate readings.

1. When using the tester the first time or after a long period of non-use, fill the tester with the battery fluid and let it sit for 1/2 hour or longer. This will soak the balls in order to give you more accurate readings. Failure to do so will give you false readings indicating a battery that may not be in as good a condition as you may have thought.
2. After inserting the tester in a cell, gently tap the tester several times against the inside wall of each cell to dislodge air bubbles that will cause more balls to float than should. Failure to do so will yield false readings that indicate a battery that is not fully desulfated or does not qualify for desulfation.
3. If no balls float in any cell, the cell is shorted. This means your battery is

beyond the point of being properly recharged or reconditioned/desulfated. Dispose of the battery.

4. If each cell floats three (3) or more balls (or 1250 on gauge-type), your battery can be desulfated/reconditioned.
5. Always rinse the tester with fresh water after every use. Failure to do so will cause false readings.

Testing a Sealed, AGM or GEL Lead Acid Battery

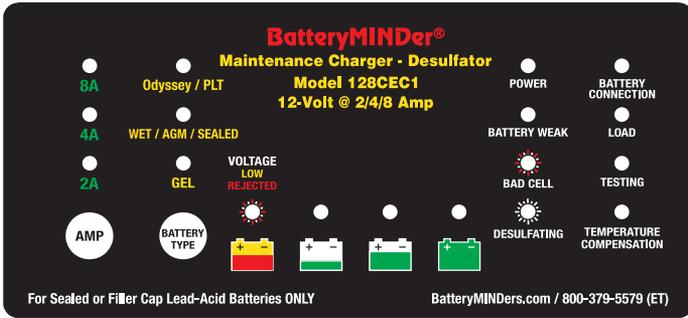
These batteries have no filler caps or manifold-type covers. Because you cannot gain access to the interior of your battery you cannot test it with a hydrometer.

USE A DIGITAL VOLTMETER ONLY:

1. Recharge the battery with the BatteryMINDER to ensure it is as completely charged as possible, before you determine its condition. Allow battery to “rest” overnight for a minimum of 12 hours before testing with a digital voltmeter only. Failure to test a “rested” battery will cause false readings. Be certain to read and understand all safety related instructions (pages 2 to 7) before proceeding further.
2. Measure battery’s voltage, without any load attached. If the voltage is less than **12.4 volts / 24.8 volts** (Typically 50% of charge) the battery may be too heavily sulfated to be fully recoverable. If voltage is **12.4V / 24.8V** or higher full recovery can be expected, given sufficient time (average 1-2 weeks for batteries that are heavily sulfated).
3. Connect the BatteryMINDER to the battery. Charge battery to its maximum level. Allow battery to rest for a minimum of 8 hours before retesting. If improvement is seen, continue until battery voltage reaches full capacity level or no further increase is seen. Refer to **Open Circuit No Load Voltage** table.

OCV=Open Circuit No Load Voltage		
OCV - “Rested” Voltage		Full Capacity Percentage
12V	24V	
12.9 - 13.1	25.8 - 26.2	100%
12.6 - 12.9	25.2 - 25.8	75%
12.4 - 12.6	24.8 - 25.2	50%
12.2 - 12.4	24.4 - 24.8	25%
12.0 - 12.2	24.0 - 24.4	0%
<11.0 = shorted	<22.0 = shorted	

Note: All OPTIMA brand starter/deep cycle batteries have a fully charged “resting” voltage of 13.1 (OCV). Increase above values accordingly.



For
244CEC1
model,
please
refer to
actual unit

128CEC1		
Load Light OFF		
Soft-Start	8A Setting	4A
	4A Setting	2A
	2A Setting	1A
Constant Current	8A	
	4A	
	2A	
Constant Voltage	14.1 (Gel)	
	14.4 (Wet, AGM, Sealed)	
	14.7 (Odyssey, PLT)	
Float (Charge Complete)	13.05 (Gel)	
	13.4 (Wet, AGM, Sealed)	
	13.6 (Odyssey, PLT)	
Load Light ON		
Float (Battery < 11V)	8A	
	4A	
	2A	
Float (Battery < 12V)	8A	
	4A	
	2A	
Float (Battery < 13V)	8A	
	4A	
	2A	
Float (Battery < 13V)	8A	
	4A	
	2A	

244CEC1		
Load Light OFF		
Soft-Start	4A Setting	2A
	2A Setting	1A
	1A Setting	.5A
Constant Current	4A	
	2A	
	1A	
Constant Voltage	28.2 (Gel)	
	28.8 (Wet, AGM, Sealed)	
	29.4 (Odyssey, PLT)	
Float (Charge Complete)	26.1 (Gel)	
	26.8 (Wet, AGM, Sealed)	
	27.2 (Odyssey, PLT)	
Load Light ON		
Float (Battery < 22V)	4A	
	2A	
	1A	
Float (Battery < 24V)	4A	
	2A	
	1A	
Float (Battery < 26V)	4A	
	2A	
	1A	
Float (Battery < 26V)	4A	
	2A	
	1A	

Quick Start Instructions

Read and thoroughly understand **ALL SAFETY** Instructions, pages 2 - 7 including Preparing to Charge, Charger Location, DC Connection Precautions, and Qualifying Your Battery **BEFORE** proceeding further.

1. Place the Positive (**RED**) clip on the positive battery terminal.
2. Place the Negative (**Black**) clip on the negative battery terminal.
3. Select **Amperage** and **Battery Type** by pressing:



4. Plug in the BatteryMINDER.
5. Power and Battery Connection light should be **GREEN**. Indicator will come on showing state of battery charge and present charging stage.

LED INDICATION TABLE			
POWER		GREEN	
Green Steady	AC power connected		
Green Flashing	ECO mode		
BATTERY CONNECTION		GREEN	RED
Green Steady	Battery connected correctly		
Red Steady	Battery connected incorrectly		
BATTERY WEAK		AMBER	
Amber Steady	Battery requires soft-start charging or battery voltage is < 12.5V / 25.0V after analysis stage		
LOAD		AMBER	
Amber Steady	The output current is up to the maximum rating in Float mode		
BAD CELL		RED	
Red Flashing	Battery voltage is < 11.5V / 23.0V after analysis stage		
TESTING		BLUE	
Blue Steady	Analysis stage		
DESULFATING		BLUE	
Blue Flashing	Desulfating pulses are in process		
TEMPERATURE COMPENSATION		GREEN	BLUE
Green Steady	Ambient temperature > 27°C/80°F		
Blue Steady	Ambient battery temperature < 21°C/70°F		
VOLTAGE LOW		AMBER	REJECTED
Initial qualification of the battery's condition (at the beginning of Soft-Start stage)			
Amber Steady	Voltage: 12 Volt: 3 - 10.5V / 24 Volt: 6 - 21V		
Red Flashing	Voltage: 12 Volt: < 3V / 24 Volt: < 3V (Low Voltage)		

Charging Stages

- **Soft-Start** is used if a battery's voltage is under 10.5V when charging begins. It uses a low constant current to slowly bring up voltage. This prepares a weak or neglected battery for the Constant Current stage.
- **Constant Current** (sometimes called Bulk) is the main charging stage. The charger puts out a constant current of 2A, 4A or 8A for 12V and 1A, 2A or 4A for 24V, its full power. Battery voltage rises until the battery reaches the optimal charging voltage.
- **Constant Voltage** (sometimes called Absorption) is the second charging stage. The charger regulates the current given to the battery to maintain a constant voltage. As the battery nears a full charge, the current needed to maintain this voltage decreases. Once the current falls below a 0.10A change per hour, the stage is complete.
- **Battery Test** is administered by reading your battery voltage while resting the battery for 10 minutes. A voltage of under 12.5V indicates a weak battery, under 11.5V indicates a shorted cell. The battery is tested at completion of the Constant Voltage stage, and every 12 hours while in **Float**.
- **Float** (sometimes called Maintenance) is the charger's long term stage. The charger can and should be left connected indefinitely. This will keep the battery fully charged ensuring no sulfate can form. The charger maintains float voltage using very little power as it actively monitors the battery and adjusts its output several times a second.

Indicator Light Details

- **Power** light is **GREEN** anytime the charger is plugged into AC Power.
- **Battery Connection** light is **GREEN** when the unit is correctly connected to a battery. If the **Battery Connection** light is **RED** the polarity is reversed and the positive and negative terminals need to be switched. If the light remains **RED** after switching the connections, there is a short circuit.
- **Battery Weak** light is **AMBER** if the **Soft-Start** mode is used or the battery fails a Battery Test. The indicator will stay on until the battery passes a Battery Test.

A neglected battery can take over 2 weeks of desulfation to correct. If after 2 weeks it still reads as a Weak Battery, there is likely internal physical damage.

- **Load** light is **AMBER** if the charger is in Float and outputting 2A. This indicates a drain on the battery or a large battery that was not charged within the time limits. If possible remove any loads. When this light is

on, the battery charge level lights correspond only to battery voltage, not charging stages (see **Load Light Table**, Page 8).

- **Bad Cell** light flashes **RED** if the charger has not completed the **Constant Current** stage in 20 hours and battery voltage is under 11.5V ( Flashing), or if the battery is under 11.5V after a **Battery Test** ( Flashing).

The charger shuts off output to avoid any damage to your battery. Loads or banks of batteries may trigger this mode if they are too large for this charger. Remove any loads and charge batteries individually.

- **Testing** light flashes **BLUE** when the unit is performing a **Battery Test** (see **Charging Stages**).
- **Desulfation** light flashes **BLUE** any time the unit is desulfating. The BatteryMINDER desulfates any time it is outputting current.
- **Temperature Compensation** light is **GREEN** if the temperature is over 27°C/80°F, **BLUE** if the temperature is under 21°C/70°F. BatteryMINDER CEC model includes an ambient temperature sensor which allows it to vary the output voltage as necessary to properly charge your 12V (-0.025 V/°C) or 24V (-0.050 V/°C) battery. Batteries charged at higher temperatures without compensation will overcharge and may out-gas. Batteries charged at lower temperatures without compensation will undercharge allowing sulfation to build, possibly leading to the battery freezing. By using temperature compensation, the BatteryMINDER ensures your battery will never over or under charge, even in extreme conditions.

Temperature	Compensation		Temperature	Compensation	
	12V	24V		12V	24V
50°C/122°F	-0.625 V	-1.250 V	10°C/50°F	+0.375 V	+0.750 V
45°C/113°F	-0.500 V	-1.000 V	5°C/41°F	+0.500 V	+1.000 V
40°C/104°F	-0.375 V	-0.750 V	0°C/32°F	+0.625 V	+1.250 V
35°C/95°F	-0.250 V	-0.500 V	-5°C/23°F	+0.750 V	+1.500 V
30°C/86°F	-0.125 V	-0.250 V	-10°C/14°F	+1.000 V	+2.000 V
25°C/77°F	0.000 V	0.000 V	-15°C/5°F	+1.125 V	+2.250 V
20°C/68°F	+0.125 V	+0.250 V	-20°C/-4°F	+1.250 V	+2.500 V
15°C/59°F	+0.250 V	+0.500 V			

Consider using accessory ABS-248 “At the Battery Sensor” for more accurate temperature compensation. It is highly recommended if your battery is located in a different environment or compartment than your charger.

FOR REPAIR OR REPLACEMENT

All returns must be authorized by VDC Electronics.

In the event that you believe your product may be defective, you **MUST** speak to a VDC Electronics technician at **1-800-379-5579 x6** (M - F, ET) before proceeding further. If you must return the unit, the technician will give you an **RMA #**. Please use Return Form found on batteryinders.com/ under **Shipping & Returns** when returning your product.

IMPORTANT NOTICE

BatteryMINDer® Five-Year Warranty Registration

batteryinders.com/ under **Registration**

Please register your unit on-line within 10 days of purchase. **Due to the ever-changing technology associated with this BatteryMINDer® unit, we may be unable to keep you informed of significant upgrades, changes, etc. without your registration.** The information you provide upon registration will be used to keep a record of your purchase and will assist in providing support should you ever need to contact our Technical Service department:
techsupport@vdcelectronics.com; 800-379-5579 x6 (ET).

Model **BatteryMINDer** 128CEC1 or 244CEC1

Serial Number _____

Place of purchase _____

Date of purchase _____

RMA# _____

NOTES

