

BatteryMINDER[®] COMMERCIAL

48-Volt Model 483CEC1

Battery Maintainer-Charger-Desulfator INSTRUCTION MANUAL*



Includes:

- ATS Temperature Sensor (installed)
- Ring Terminals with 15A Fuse (Model RTA 2415)
- EZC-01 EZ Connector + Mounting Screws

READ AND SAVE THESE INSTRUCTIONS

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Glossary of Terms

- **Maintain a battery**
BatteryMINDER ensures batteries are truly fully charged and will likely continue improving the condition of the battery set to the fullest extent possible.
- **Rested**
A battery set that has been as fully charged as possible and left disconnected from maintenance-charger or any type load overnight.
- **Specific Gravity**
One of the key parameters of battery operation is the specific gravity of the electrolyte. Specific gravity is the ratio of the weight of a solution to the weight of an equal volume of water at a specified temperature. Specific gravity is used as an indicator of the state of charge of a cell or battery.
- **Sulfation**
Occurs when the battery sits discharged for a long period of time and large sulfate crystals build up in the plates. The large sulfate crystals increase the resistance of the plates and makes the battery harder to recharge and reduces the amount of power that can be drawn from the battery.

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

This manual contains important safety and operating instructions for all BatteryMINDer battery maintenance-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 MAINTENANCE-CHARGER, (2) BATTERY AND (3) PRODUCT USING BATTERY EACH TIME YOU USE THE MAINTENANCE-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 set. Review cautionary marking on these products.
2. To reduce risk of injury, maintenance-charge only lead acid type rechargeable batteries. Other types of batteries may burst causing personal injury and damage.
3. Do not expose maintenance-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.
5. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting maintenance-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 maintenance-charger.
 - b. Not to operate maintenance-charger with damaged cord or plug – replace the cord or plug immediately.
 - c. That extension cord is properly wired and in good electrical condition.
 - d. That wire size is large enough for AC ampere rating of maintenance-charger as specified in **Recommended Minimum AWG Size Table**.

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

- e. Do not operate maintenance-charger with damaged cord or plug – replace the cord or plug immediately.
- f. Do not operate maintenance-charger if it has received a sharp blow, been dropped, or otherwise damaged in any way.
7. Do not disassemble maintenance-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 maintenance-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.
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 maintenance-charger for charging a LEAD-ACID battery sets only. It is not intended to supply power to a low voltage electrical system. Do not use battery maintenance-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.

Always follow battery manufacturer's strict instructions for proper care, charging and testing of battery. Questions relating to the subject should be referred directly to the battery manufacturer to be certain of current requirements that may have been added to or changed since publication of their instructions.

C. PREPARING TO CHARGE

1. Be sure area around battery set is well ventilated while battery set is being charged.
2. Clean battery set terminals. Be careful to keep corrosion from coming in contact with eyes.
3. 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.
4. Study all battery manufacturer's specific precautions while charging and recommended rates of charge.
5. Determine voltage of battery set by referring to vehicle owner's manual and make sure it matches output rating of battery set maintenance-charger.

D. MAINTENANCE-CHARGER LOCATION

1. Locate maintenance-charger as far away from battery set as DC cables permit.
2. Never place maintenance-charger directly above battery set being charged; gases from battery will corrode and damage maintenance-charger.
3. Never allow battery acid to drip on maintenance-charger when reading electrolyte specific gravity or filling battery.
4. Do not operate maintenance-charger in a closed-in area or restrict ventilation in any way.
5. Do not set a battery on top of maintenance-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 to batteries using only the supplied RTA-2415 Ring Terminal assembly and the supplied EZC-01 Connector **ONLY** only after removing AC plug from electric outlet. Never allow the two ring terminals to touch each other.
2. Connect to battery set using only the supplied RTA-2415 Ring Terminal Assembly and the supplied EZC-01 connector **ONLY**.

F. FOLLOW THESE STEPS WHEN BATTERY SET IS INSTALLED IN VEHICLE. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION.

QUALIFYING YOUR BATTERY SET:

Preliminary Requirements

NOTE: The BatteryMINDER has no electrical output unless it is connected to a battery set that is not completely dead. Testing the BatteryMINDER with a volt or an Amp meter without the unit being connected across a good battery set 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

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%

technical support at: techsupport@vdcelectronics.com or call our toll-free technical support line 800-379-5579 x6 (M - F, ET 9 - 5). **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 maintenance-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 set 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 2.06 Volts/cell, [49.4V/ battery set]), even before you purchased it, then you can disregard our recommendations for qualifying / testing your battery, before using the BatteryMINDER.

Testing a Filler Cap or Manifold-type Lead Acid Battery

- Carefully remove all caps from your battery set.
- 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 set can be expected to function normally.
- 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.**
- Recharge the battery set with the BatteryMINDER to ensure that it is slowly and completely charged before you determine its condition. Allow battery set to “rest” (see **Glossary of Terms** on page 2) 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 set with the BatteryMINDer to ensure it is as completely charged as possible, before you determine its condition. Allow battery set to “rest” overnight for a minimum of 12 hours before testing with a digital voltmeter only. Failure to test a “rested” battery set will cause false readings. Be certain to read and understand all safety related instructions (pages 3 - 7) before proceeding further.
2. Measure battery set's voltage, without any load attached. If the voltage is less than **2.06 Volts/cell, (49.4V/battery set)** (Typically 50% of charge) the battery set may be too heavily sulfated to be fully recoverable. If voltage is **2.06 Volts/cell, (49.4V/battery set)** 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 set. Charge battery set to its maximum level. Allow battery set to rest for a minimum of 8 hours before retesting. If improvement is seen, continue until battery set's voltage reaches full capacity level or no further increase is seen. Refer to **Open Circuit No Load Voltage** table.
4. **Note: Do not expect to completely dissolve sulfate in a day. Long established sulfate will require a longer period to be fully dissolved. Be patient and you will rewarded with a “sulfate-free” battery set.**

SIMPLIFIED OPERATING INSTRUCTIONS

Read and thoroughly understand ALL SAFETY Instructions, pages 3 - 5 including *Preparing to Charge, DC Connection Precautions, Unit Location and Qualifying Your Battery Set* BEFORE proceeding further.

1. Install Ring Terminal Assembly (RTA-2415) to the first and last battery in the series connected 48-V grouping. **Use a digital volt meter to assist. Observe Polarity bands: Red = Positive, Black = Negative.**
2. Ambient Temperature Sensor, **ATS-1** comes already installed on the Temperature Sensor input connector (4). Do not detach.
3. Plug AC power cord (6) into a 120 Vac electrical outlet.
4. Observe **POWER GREEN** steady.
5. Observe **BATTERY SET CONNECTION GREEN/RED** LED indicator (3E):
If lit **RED**, reverse battery set connector attachments on battery set.

IF IN DOUBT REGARDING ANY OF THE ABOVE, REFER TO **Detailed Operating Instructions, page 15.**

Detailed Specifications	
Plastic enclosure material:	UL-94V0 Noryl or PC or PC+ABS
Enclosure Dimension:	Approx. 9.06 in. (230mm) (L) x 4.72 in. (120 mm) (W) x 2.36 in. (60 mm) (H)
Weight:	Approx. 2.86 lb. (1.3 Kg)
Operating temperature:	-20°C/-4°F to 40°C/104°F
Storage temperature:	-40°C/-40°F to 85°C/185°F
Operating Humidity range:	0 to 95% RH



Refer to enlarged view of unit label with detailed descriptions on Page 11 for Sections 1, 2 and 3

BatteryMINDER 483CEC1 Features	
1	Battery Type Selector button
2	Battery Charge Stage Indicators: <i>See Table on next page</i>
3	LED Indicators: <i>See Table on next page</i>
4	Temperature Sensor input connector with ATS-1 Ambient Temperature Sensor installed (included)
5	Output cord with quick connect plug
6	Ring Terminal cordset with quick connect plug (included)
7	Mounting tabs
8	EZC-01 EZ Connector with screws (included)
9	Input power cordset

BatteryMINDER 483CEC1 Features <i>Con't. from Previous Table</i>		
	Meaning	Action
2A VOLTAGE: LOW, REJECTED	Start of charge AMBER STEADY ON = battery set fully discharged. RED FLASHING = Battery set's voltage is near zero volts.	Allow BatteryMINDER to try to restore battery set.
2B	Battery set is being constant current charged to about 80%.	Allow BatteryMINDER to charge battery set.
2C	Battery set is being constant voltage charged to about 95%.	Allow BatteryMINDER to charge battery set.
2D	Maintenance mode. Battery set is being topped off to 100%.	Allow BatteryMINDER to maintain and desulfate battery set indefinitely.
3A POWER	GREEN STEADY = AC power connected. GREEN FLASHING = ECO mode (no battery set connected, very low standby power mode).	None required.
3B BATTERY WEAK	Battery set's voltage is low at start of charge OR voltage is low after testing stage.	Allow BatteryMINDER to attempt to restore battery set if low at start of charge. Replace battery set if voltage is low after testing stage.
3C BAD CELL	RED FLASHING = one or more cells of the battery set are dead.	Battery set must be replaced.
3D DESULFATING	FLASHING = battery set is being desulfated.	None required.
3E BATTERY CONNECTION	GREEN STEADY = battery set connected properly. RED STEADY = battery set connect improperly.	If needed, correct battery set connection.
3F TESTING	BLUE STEADY = test in progress, pause in charging. (Tests to see if battery set holds charge.)	None possible.
3G TEMPERATURE COMPENSATION	Meaning: BLUE STEADY = cold temperature compensation being applied. GREEN STEADY = hot temperature compensation being applied.	None required.

BatteryMINDer 483CEC1 Unit Label close-up

BatteryMINDer® COMMERCIAL

Maintenance Charger - Desulfator
Model 483CEC1
48-Volt @ 3 Amp

1 BATTERY TYPE

- Odyssey / PLT
- WET / AGM / SEALED
- GEL

2 VOLTAGE LOW / REJECTED

- A
- B
- C
- D

3

- A POWER
- B BATTERY WEAK
- C BAD CELL
- D DESULFATING
- E BATTERY CONNECTION
- F TESTING
- G TEMPERATURE COMPENSATION

BatteryMINDers.com / 800-379-5579 (ET)

For Sealed or Filler Cap Lead-Acid Batteries ONLY

LED INDICATION TABLE			
POWER			GREEN
Green Steady	AC power connected		
Green Flashing	ECO mode		
BATTERY CONNECTION		GREEN	RED
Green Steady	Battery set connected correctly		
Red Steady	Battery set connected incorrectly		
BATTERY WEAK			AMBER
Amber Steady	Battery set requires soft-start charging or battery set's voltage is < 50.0V after analysis stage		
BAD CELL			RED
Red Flashing	Battery set's voltage is < 46.0V 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 temperature < 21°C/70°F		
VOLTAGE LOW	AMBER	REJECTED	RED
Initial qualification of the battery set's condition (at the beginning of Soft-Start stage)			
Amber Steady	Voltage: 12V - 42V		
Red Flashing	Voltage: < 12V (Low Voltage)		

Charging Stages

- **Soft-Start** is used if a battery set's voltage is under 42V when charging begins. It uses a low constant current to slowly bring up voltage. This prepares a weak or neglected battery set for the Constant Current stage.
- **Constant Current** (sometimes called Bulk) is the main charging stage. The maintenance-charger puts out a constant current of 3A, its maximum current. Battery set's voltage rises until the battery set reaches the optimal charging voltage.
- **Constant Voltage** (sometimes called Absorption) is the second charging stage. The maintenance-charger regulates the current given to the

battery set to maintain a constant voltage. As the battery set 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. It will be in this stage for a minimum of one hour.

- **Battery Test** is administered by reading your battery set's voltage while resting the battery set for 10 minutes. A voltage of under 50.0V indicates a weak battery set, under 46.0V indicates a shorted cell. The battery set is tested at completion of the Constant Voltage stage, and every 12 hours while in **Float**.
- **Float** (sometimes called Maintenance) is the maintenance-charger's long term stage. The maintenance-charger can and should be left connected indefinitely. This will keep the battery set fully charged ensuring no sulfate can form. The maintenance-charger maintains float voltage using very little power as it actively monitors the battery set and adjusts its output several times a second.

Indicator Light Details

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

A neglected battery set 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.

- **Bad Cell** if the battery set is under 46.0V after a **Battery Test**.

The maintenance-charger shuts off output to avoid any damage to your battery set. Loads or banks of batteries may trigger this mode if they are too large for this maintenance-charger.

- **Testing** light is **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 (-0.112V/°C) as necessary to properly charge your 48V battery set. 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 set freezing. By using temperature compensation, the BatteryMINDer ensures your battery set will never over or under charge, even in extreme conditions.

Battery Type Characteristics:

- **Odyssey / PLT (pure lead tin)** uses heavy duty construction packed with pure lead plates which mean that you get more power - twice the overall power and three times the life of conventional batteries.
- The **Wet** cell comes in two styles; Serviceable and Maintenance free. Both are filled with electrolyte and are basically the same.
- **AGM (absorbed glass mat)** is a special design glass mat designed to wick the battery electrolyte between the battery plates. AGM batteries contain only enough liquid to keep the mat wet with the electrolyte and if the battery is broken no free liquid is available to leak out.
- **Sealed batteries** are "maintenance free" and won't emit any corrosive fumes like flooded batteries do.
- **Gel Cell** batteries contain a silica type gel that the battery electrolyte is suspended in. This thick paste like material allows electrons to flow between plates but will not leak from the battery if the case is broken. Usually a Gel Cell will be identified with the label "GEL" on the battery.
- More often than not AGM Batteries are mistakenly identified as Gel Cell Batteries. Both batteries have similar traits; such as being non-spillable, deep cycle, may be mounted in any position, low self discharge, safe for use in limited ventilation areas, and may be transported via Air or Ground safely without special handling.

DETAILED OPERATING INSTRUCTIONS

Installed properly, your maintenance-charger is set to provide your battery set with what it needs to out-live and out-perform any similar battery set used in the same application-conditions by a factor of two.

Read and thoroughly understand all safety instructions, pages 3 - 7 including *Preparing to Charge, DC Connection Precautions, Maintenance-Charger Location and Qualifying Your Battery Set before proceeding further.*

1. Insert output cord plug into **EZC-01 installed connector** (see EZC-01 Installation Instructions, next page). **Note: Always grip cord by the Plug, not wire when inserting and removing to avoid damage. Damage to the cord set-plug is NOT COVERED BY WARRANTY.**
2. Plug the unit's power cord into a standard – grounded 120 VAC electrical outlet. The power on LED indicator will light **GREEN**. Within 30 seconds, if it does not light **GREEN** check the outlet to be sure it is functioning. In addition, be sure if outlet is controlled by a switch, no one will accidentally shut off the power to the outlet. Check for correct polarity = (no error **RED** LED indicator). If error indicator is lit, reverse the maintenance-charger's output connections to the battery set.
3. **Maintenance-charger will automatically start within 15 - 30 seconds.** The Bulk LED Indicator will light **GREEN**. The maintenance-charger will now begin charging by first checking the battery set to determine its voltage and ability to accept a charge. Should the battery set not have a normal fully discharged voltage (42V or less) the unit will begin charging in the "Soft-Start" mode to determine if the battery set can be safely charged. If it cannot, the Soft-Start LED will light **RED** and charging will be stopped. Battery set should be carefully checked under a load by a qualified person before further attempting to charge it. **Note: If the battery set does not have a minimum no load OCV (Open Circuit Voltage) of 12 volts, the Soft-Start LED will light **RED** and maintenance-charger will reject battery set.**

No further effort should be made to charge this battery set with this maintenance-charger or any charger. Discard this battery, unless it has just been subjected to a long period of continuous discharge under a load such as can occur with leaving lights on. Allow such a battery set to "Rest" for several hours (overnight if possible) before determining if it is defective. Be very suspicious of any 48V battery set that does not have at least 44V (OCV) before it is recharged. It may well be seriously damaged and unsafe for any type of use or recharge. The unit's Battery Condition Indication LED will help you determine if the battery set is less than 44V (**YELLOW**).

4. After battery set has been fully charged, Float stage LED will light. The battery set may not be able to be fully charged, may be too large or

too deeply discharged to be fully charged in the normal time allowed by maintenance-charger. If you are certain battery set is not defective, having read and understood completely all of the above concerns and conditions, proceed to reboot the maintenance-charger by unplugging from the wall (AC), disconnecting from the battery set (DC) and waiting a minimum of 30 seconds before reconnecting the battery set and then the AC. This allows maintenance-charger to begin charging battery set again. If battery set is not defective it should be able to be fully charged after being restarted. After sufficient time has lapsed the Float stage LED Indicator (**Features** table, p. 10, item **2D**) will illuminate confirming when / if battery set is now fully charged.

OCV=Open Circuit No Load Voltage	
OCV - "Rested" Voltage	Full Capacity Percentage
48V	
51.6 - 52.4	100%
50.4 - 51.6	75%
49.6 - 50.4	50%
48.8 - 49.6	25%
48.0 - 48.8	0%
<44 = shorted	

EZC-01 Installation

The **EZC-01 Connector** is universal, flush-mountable for use on any BatteryMINDER Charger-Maintainer; it allows BatteryMINDers to be quickly connected or disconnected from battery sets located in vehicles such as golf carts, people movers, boats and more.



IMPORTANT INFORMATION ON USING PRODUCT OUTDOORS: Always mount units in vertical position with cord sets exiting downward to ensure weather tight integrity and in clear sight so LED Indicators are always visible. Unit must be mounted this way to ensure long term trouble-free life including weatherproof integrity. Mounting in any other manner or using unmounted (parallel to ground) except indoors may cause unit to fail due to water intrusion that is unable to drain correctly.

For best connection use with BatteryMINDER Ring Terminal assembly RTA-2415. Use 7/8" hole saw bit to install. Drill small test hole to be sure no interference with other wires or parts. Close protective cover securely to ensure water tightness.



TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
Power ON indicator does not light after being plugged into AC for 30 seconds.	AC outlet is dead.	Plug in a lamp or other appliance to check for voltage. If controlled by a wall switch, be sure switch is on and try to prevent accidental shut off while maintenance-charger is working.
VOLTAGE indicator lights RED solid . (See page 10, item 2A)	Output lead connections to the battery set may be reversed.	Switch (reverse) connections at the battery set.
	Battery set's voltage <12 volts.	Battery set may be damaged and should not be recharged. Allow battery set to "recover" by letting it " REST " without a load.
	Battery set was just recently removed from a load (lights, electronic equipment) or used for extended time without a maintenance-charger.	If battery set is healthy and just deeply discharged it should recover its voltage (rise above 12 volts) sufficiently to allow maintenance-charger to begin an attempt to fully recharge it.
	Battery set has " RESTED " and still cannot be recovered – recharged.	Battery set should be safely discarded – recycled.
Battery Set Weak Indicator lights RED blinking .	Battery set may be weak, heavily sulfated, or too large to fully charge before unit times out.	
	Battery set may be so large it may require a second full recharge.	Reboot unit by unplugging from AC electrical outlet, disconnect from battery set so there will be no electrical power going to the unit from either direction, wait a minimum of 30 seconds, connect to battery set first then plug into AC outlet
Battery set Weak Indicator lights YELLOW (<i>Before</i> battery set has been completely charged).	Battery set can be weak due to sulfation, self discharge or was very deeply discharged.	Attempt a full recharge and recheck after completion. If still YELLOW , follow next procedure ("After battery set has been completely charged.")
Battery set Condition Indicator lights YELLOW (<i>After</i> battery set has been completely charged).	Battery set still has an unacceptable level of sulfation.	Reboot unit by unplugging from AC electrical outlet, disconnect from battery set so there will be no electrical power going to the unit from either direction, wait a minimum of 30 seconds, connect to battery set first then plug into AC outlet
Rested: A battery set that has been as fully charged as possible and left disconnected from maintenance-charger or any type load overnight.		

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).

BatteryMINDER Model 483CEC1

Serial Number _____

Place of purchase _____

Date of purchase _____

RMA# _____

NOTES

BatteryMINDer® Guarantee and Warranty Policy effective Jan. 2013.

ALL Returns and Replacements must be authorized by a VDC Electronics technician. Units must only be returned to VDC Electronics, Inc., NOT TO THE DEALER FROM WHOM IT WAS PURCHASED.

One-Year 100% Unconditional Money Back Guarantee:

Your BatteryMINDer product is guaranteed within the first year to perform as claimed or VDC Electronics, Inc. will refund your full purchase price including all taxes, shipping or handling cost applicable to the purchase. Customer will return product to VDC Electronics at their expense.

Please call 800-379-5579 x6, M - F, 9 AM - 5 PM (ET) to speak to a technician and have your unit available when you call. This information is required:

- Your contact information
- Product serial number
- Proof of purchase

The Technician will provide you with an RMA number and shipping information. Please be sure to write this down. You will be required to fill out this form to complete your return: <http://www.batteryminders.com/returns/>. Clearly write your RMA number on the outside of the package you are returning. We suggest using a carrier that provides tracking information. VDC Electronics is not responsible for packages lost in transit to VDC Electronics. If the unit is to be replaced, it is shipped by ground with free shipping. Expedited shipping is available at extra cost.

Five-Year Limited Warranty:

Your BatteryMINDer product is warrantied for FIVE years from date of purchase at retail against defective material or workmanship. We make no warranty other than this limited warranty and expressly exclude any implied warranty including any warranty for consequential damages. This limited warranty is not transferable.

- If the technician determines defective unit should be **repaired**, customer will return product at their expense. Once we receive the unit it will be repaired and shipped back to customer, all at no charge. Expedited shipping is available at extra cost.
- If the technician determines unit does not need repair but only needs **replacement**, customer will be required to pay a \$9.95 shipping fee for the replacement unit. This fee may be subject to change without notice. There is no cost for the replacement unit itself. Expedited shipping is available at extra cost.

Please call 800-379-5579 x6 M - F, 9 AM - 5 PM (ET) to speak to a technician and have your unit available when you call. The technician will do troubleshooting to see if the product is defective. If it is, then this information is required:

- Your contact information
- Product serial number
- Proof of purchase

The Technician will provide you with an RMA number and shipping information. Please be sure to write this down. You will be required to fill out a form to complete your return which can be found on: <http://www.batteryminders.com/shipping-policies/>. Clearly write your RMA number on the outside of the package you are returning. We suggest using a carrier that provides tracking information. VDC Electronics is not responsible for packages lost in transit to VDC Electronics.