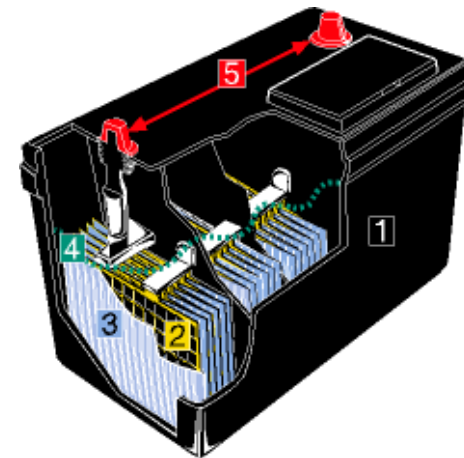


EVERYTHING YOU NEED TO KNOW ABOUT BATTERIES BUT WERE AFRAID TO ASK

Second Edition



The **Battery Life Saver**[™] electronic device

The Most Effective Desulfator Available

Patent #7374839

The dawning of a new age of battery
longevity and true freedom from
maintenance

Chuck Van Breemen

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About The Author



After leaving the service where he acted as the crew chief for the OV-1 Mohawk during the Viet Nam war. Chuck Van Breemen decided to try his hands at many things; from racing motorcycles to driving a truck in the eleven western states. He pulled 27 foot flatbed doubles. It was during this time that he came up with his first invention – TARP GUARD™ tarpaulin protector. It is designed to protect tarps used on flat beds. He retired from trucking to work on getting a degree

in mechanical engineering under the GI bill.

Mr. Van Breemen received his BSME from the University of Portland, Portland, Oregon in 1977 and went directly to work at Freight liner Trucks as a research engineer. He worked in the field of new product development. He was a successful inventor, entrepreneur, chief engineer, project engineer, and research engineer for various companies in aerospace, industrial and consumer environments.

Chuck had extensive experience in taking a product from inception to market and has been responsible for million dollar budgets.

He created new products and market opportunities for Freight liner Corporation, Sears Manufacturing, Barry Controls, Gabriel Ride Control, H.O. Bostrom Company, Bostrom Seating, Inc. Hendrickson Truck Suspension Company and Vancom, Inc.

He was the inventor or co-inventor of seven patents, five of them in the area of suspensions.

In manufacturing, he reduced the reject rate on Gabriel Ride Control assembly line for Ford Windstar struts from 76% to 37% in 3 days; to 4% in 3 weeks. While at Gabriel, he also developed computer controlled suspensions.

He performed as the President and later the Vice-President of the Tampa Bay Inventors Council and actively helped other inventors be successful.

Mr. Van Breemen passed away in the spring of 2007. Today his dreams and product lines live on and are supervised by his widow and best friend, Elyse Van Breemen.



The **Battery Life Saver**[™] electronic device
The Most Effective Desulfator Available
Patent #7374839

BLS-36N

Designed for 36 volt battery powered vehicles or battery systems, most commonly used on golf carts. Ideally mounted permanently to constantly keep the batteries in optimum condition. Equipped with a low voltage cut-off to prevent from excessive battery drain. Eye ring connections.

BLS-48N

Designed for use with 48 volt golf carts to rejuvenate old, heavily sulfated batteries and/or extend the life of new, good working batteries. Simply attach it and forget it. Equipped with a low-voltage cutoff to prevent from excessive draining.

BLS-72N

Works with 72 Volt NEV's (Gem, Ford Think, or Zen) or 72 volt battery systems. Ideally mounted permanently to keep the batteries in optimum condition and extend battery life. Can be used to rejuvenate old batteries. Comes with 3/8" eye rings for attachment to the battery terminals. Equipped with a low voltage cutoff to prevent from excessive battery drain

Also available for 42, 84, 96, 120, 144 and 156 volts systems.

High Powered Industrial Models

BLS-24/36-Multi-F

For 24 and 36 volt industrial sized batteries found in forklifts and lift trucks.

BLS-36/48-Multi-F

For 36 and 48 volt industrial sized batteries found in forklifts and lift trucks.

If you own a system that uses Lead-Acid batteries, you should read this booklet.

Lead-Acid batteries are everywhere. They are used in your car, boats, golf carts, forklifts, airplanes, solar systems and much much more.

This booklet explains what causes your batteries to become weaker and not being able to hold a charge.

It tells you what you can do to prevent having to buy new batteries frequently.

The solution is easy to use, does not require a mechanic, and is less than the cost of even one battery.

Please continue reading.....

Basics – How Does A Battery Work?

We can define a battery as a device that is capable of storing and releasing electricity in a controlled way.

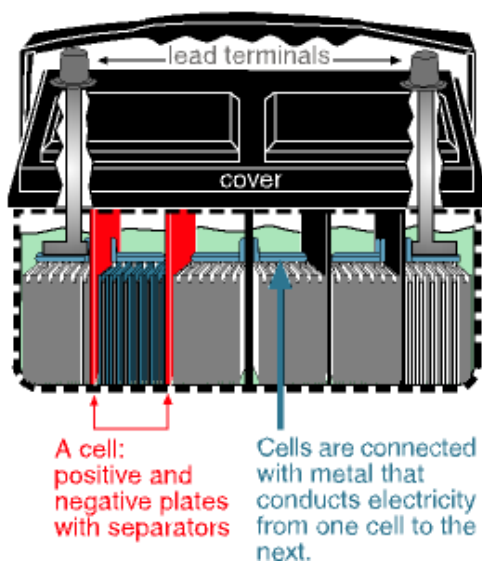
The purpose of the battery

A battery is used to store and provide power. Some batteries just provide power to start a vehicle and run some electrical accessories, while others can provide all the power needed to run a system. An electrical current is generated in the battery by a chemical reaction between the lead plates and sulfuric acid electrolyte. There are two general types of lead-acid batteries, starter batteries and deep cycle batteries.

Golf cart and forklift batteries are examples of **deep cycle batteries**. A deep cycle battery must provide a moderate amount of current for a long period of time and may go days before getting recharged. Deep cycle batteries are different than the ones used in car batteries. Cars use **starter batteries**. They provide very high current for a few seconds and get recharged immediately. **Never** use a car battery for a golf cart.

How does it work?

In a normal battery we have three basic elements: a plate made of lead, sulfuric acid and another plate made of lead oxide. When discharged the sulfuric acid reacts with the lead and lead oxide forming lead sulfate plus water. The less charge, the more water and lead sulfate are created. When you recharge the battery, the lead sulfate breaks apart, and the system returns to its original elements of lead, lead oxide and sulfuric acid for the most part.



Typical battery construction



The **Battery Life Saver**™ electronic device
The Most Effective Desulfator Available
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The Battery Life Saver™ electronic device is suited to all types of lead acid batteries - Flooded, Gel, and AGM. It can be used on individual batteries and banks of all sizes. It is reverse polarity protected - if it is hooked up in reverse, it will draw current but will not damage the battery or itself. The case is isolated. It is used in parallel with a charging source. Each unit is approximately 4.5 inches wide by 2.25 inches deep by 2 inches high and weighs 11.4 ounces. The electronics are potted in an anodized aluminum heat sink, protecting them from the environment.

12 and 24 Volt Models

BLS-12N

Designed for use with a 12 volt battery or battery bank. Ideal for use with RV's, boats, and other vehicle applications. Ideally mounted permanently to keep the batteries in optimum condition and extend battery life. Equipped with a low voltage cut-off . Eye ring connections.

BLS-12/24B

Designed for use with a 12 or 24 volt battery or battery bank. Also ideal for use with a battery charger to rejuvenate unusable batteries. Comes with battery clamps for attachment. This is the best BLS model to rejuvenate old batteries. Ideal for Renewable Energy battery banks.

BLS-12/24C

Works with a 12 or 24 volt battery, battery bank and vehicles with multiple batteries. Can be installed permanently on a battery system to keep the batteries in optimal condition and extend battery life. The system should be charged regularly. Can also rejuvenate old batteries. Similar to the BLS-12/24B, but comes with 3/8" eye rings for attachment to the battery terminals.

excites the broadest spectrum crystal frequencies possible. This is your assurance that the BLS will effectively maximize your battery performance.

How durable it is?

The is not a toy made of plastic! It is made of durable corrosion resistant anodized aluminum. It will not break if dropped or hit. The electronics are encapsulated for weather proof protection and durability.

What if a battery has a shorted or open cell?

The BLS will **NOT** fix a shorted or open cell! You can test for a shorted cell by visiting our webstie or reffering to our intruction manual included with the BLS. If the battery has a short or open cell, replace it!

When replacing a battery that is part of a multiple battery bank, replace all of the batteries at the same time if you are not using the BLS. Otherwise, the older batteries will pull the new one down. However, If you have been using the BLS you can get away with replacing just the bad battery.

The problem: why do batteries fail?

The sulfate that is created while discharging a battery is mostly reconverted into lead, lead oxide and sulfuric acid, but a small amount maintains its sulfate configuration (crystal form). Every time the battery is charged and discharged more of those crystals are deposited on the plates. Like layers of snow on a garden they accumulate until you can no longer see the garden. These crystals interfere with the flow of electricity in and out of the battery. The batteries will take longer to charge and a charge will last less time. Deep cycle batteries are especially prone to sulfate buildup because they work for extended lengths of time before being recharged. This and heat (temperatures over 70 degrees F) accelerate the buildup of sulfate.

A perfectly good battery will seem dead because lead sulfate has built up on the plates.

Today there is a solution.

It is called **Battery Life Saver™(BLS)** electronic device.

What Battery Manufacturers Will Not Tell You

Battery manufacturers are in the business of making and selling batteries. **The more batteries die, the more they can make and sell.** They won't tell customers about a new, incredible invention that doubles or triples the life of the battery. In fact, they do not want to believe it exists!

They will tell you that batteries last three years – or, if you are lucky, four years. They will say that sulfate buildup is inevitable, because they want two things from you:

1. They want you to bring “their” old battery back to them because **they need the lead.**
2. **They want you to buy a new battery from them** at 90% of the so-called “retail price” (which is actually factored in for their profit).

The last thing they want you to know is that something can be done about sulfate buildup. They won't tell you about the Battery Life Saver electronic device and they won't recommend it. If you ask them about it, they will tell you “it doesn't work.” **So why ask?**

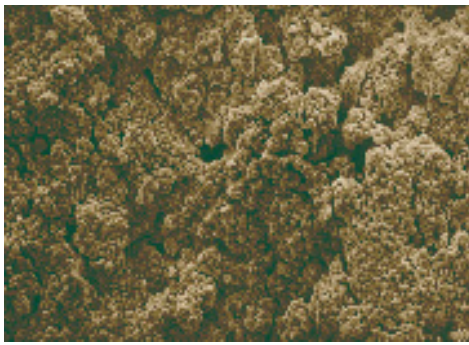
BLS Product Pictures

BLS-12/24B

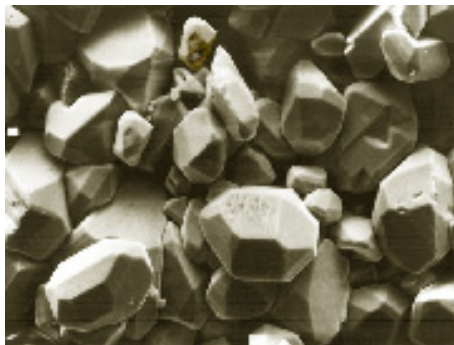


BLS-36N





A new positive plate with no sulfate buildup



Sulfate crystal buildup on a positive plate

The Solution To Premature Battery Failure

The first and most common cause of premature battery failure is **sulfate buildup on the plates**. It interferes with the charging and discharging of the batteries and is responsible for 75 to 80 percent of premature battery failures. This buildup is accelerated by the following:

- high temperatures -- over 70 degrees
- discharging the battery below 5.25 volts on a 6 volt battery
- extended storage without charging.

The best way to prevent and remove this buildup is to use the Battery Life Saver(BLS) electronic device.

The second most common cause of premature battery failure is **loss of electrolyte** (the liquid chemical that causes electricity to flow) due to overcharging or heat caused by sulfate buildup. Although the BLS will reduce water consumption, be sure to keep your batteries filled. Fill batteries only when fully charged.

The third most common cause is **undercharging**. Undercharging accelerates the buildup on the plates. Use BLS to overcome this problem. Make sure that you recharge your batteries frequently.

The fourth most common cause is typically called "old age." The plates shed material which falls to the bottom of the battery and eventually **shorts the plates**. This shedding is accelerated by sulfate buildup, which can be reduced with the BLS.

The answer to longer battery life is the BLS!

All About Battery Life Saver(BLS) Electronic Device

What is the BLS?

It is an electronic device that eliminates the buildup of lead sulfate on battery plates, which is the main cause of battery failure. It brings "dead" batteries back to life and will maintain functioning batteries in a like new condition.

Why do you need the BLS

About 80% of lead acid batteries fail prematurely because of a buildup of lead sulfate on the plates. This buildup causes the battery to become unusable at approximately one-third of its natural life. The BLS electronic device dissolves this buildup, restoring the battery to full capacity.

How does it work?

The BLS solves battery problems by dissolving the buildup of lead sulfate crystals. Each crystal is a tiny radio receiver. In fact, when Marconi (or Tesla) invented the radio, he used a lead sulfate crystal for his receiver. The BLS is like a small radio transmitter. Using breakthrough square wave technology, it sends a radio signal to each of the crystals of lead sulfate causing them to convert back into lead and sulfuric acid. This gradually restores the battery to its original condition and allows the electrical charge to be drawn from the battery.

What are benefits of using the BLS?

- Extends battery life two to three times.
- Prevents slowdown. Restores power and performance.
- Restores or maintains original distance traveled.
- Reduces consumption of water and reduces maintenance trouble.

How effective is it?

The effectiveness of a de-sulfator is a function of its power output and the ability to stimulate a broad spectrum of frequencies.

The BLS has fins for cooling, because the electronics in the BLS need the cooling fins to handle its high power output. No other de-sulfator puts out this much power. If you see a similar device housed in a plastic box, be advised that it cannot possibly be powerful enough to be effective.

Because of how the square wave technology is applied, the BLS

8. Can I use my BLS electronic device on my car as well?

Yes. The best model for a car is the BLS-12N. It is designed specifically to be installed permanently on the car. If you have multiple vehicles, you may want to rotate the BLS from one to another. You can do this. However, it is not a good practice, because the BLS electronic device is designed to be installed permanently on a vehicle.

9. How can I tell if the BLS electronic device is working?

An hydrometer is the best way to determine if the BLS is working. Check the batteries before installing, then recheck every month. Use the table below to determine the condition of the batteries. This will tell you how the batteries are doing. In Deep Cycle applications, you will notice that you can go farther and faster as your batteries are brought back to life.

STATE-OF-CHARGE (Per Battery)

Open Circuit Voltage 6 V – 8 V	Approximate State-of- Charge at 80°F (26.7°C)	Hydrometer Average Cell Specific Gravity	Electrolyte Freeze Point
6.33 - 8.55	100%	1.265	-77°F (-67°C)
6.23 - 8.30	75%	1.225	-35°F (-37°C)
6.12 - 8.16	50%	1.190	-10°F (-23°C)
6.03 - 8.04	25%	1.155	15°F (-9°C)
5.95 - 8.00 or less	DISCHARGED	1.120 or less	20°F (-7°C)

Battery Maintenance Pointers

Perform regular maintenance to prolong the life of your batteries, especially during hot weather.

- **Check the electrolyte levels.**
- **Clean the battery tops.** This eliminates conductive paths that reroute and waste electricity.
- **Check the battery voltage.** Recharge if necessary.
- **Recharge your battery** after deep cycle discharges.
- **DO NOT mix old and new batteries** in the same bank!

Use the BLS – just attach it to your batteries and forget about it.

The BLS As A Maintenance Tool

Here is how to use the BLS to maintain and restore batteries:

- **To maintain your batteries in top condition** use a BLS-36N for a 36 volt system or BLS-48N for a 48 volt system. Simply connect it to the bank of batteries. Connect the red wire to the positive (+) post of the battery that is connected to the motor controller. Connect the black wire to the negative (-) post of the battery that is connected to the motor controller. This is the recommended way to use the BLS electronic device. It will prevent buildup in the battery.

Note: The BLS is not a battery charger and it does draw power from the battery.

- **To restore weak batteries in your shop,** use BLS-12/24-B with a charger.
- **To store your cart during the winter or summer** use the BatterySolver Package. This consists of a BLS and an automatic float charger. It will keep batteries fresh until they are needed for use. Even new batteries awaiting use need to be charged regularly and have the BLS electronic device to keep them in optimal condition.

More On Deep Cycle Batteries

Deep cycle batteries are of heavy duty construction. They are built to give five to ten years of service. Up until now, it was not possible to actually obtain the longevity that was built into the battery. With the Battery Life Saver electronic device it is possible to keep a battery producing power for a longer time than the battery's design life.

Golf cart batteries, for example, are all flooded cell construction, which means that the plates are covered in liquid (a solution of sulfuric acid). This type of construction gives good performance in an acceptable size. You may have heard of other types of deep cycle batteries. Gel cell is another type of battery. It is the same as a flooded cell, except that silicone dioxide is added to the acid to make it jellied. Absorbed glass matt, AGM, is another way to immobilize the acid by putting a fiberglass sponge between the cells. These two types of deep cycle batteries are not common but may become popular in the future. They offer no advantage other than cleanliness.

The BLS electronic device is especially important for deep cycle applications, because batteries sulfate more in deep cycle use. The very nature of deep cycle batteries invites misuse and damage. Operating for extended lengths of time at less than full charge with deeper discharges causes increased buildup on the plates. Therefore, deep cycle batteries require more maintenance.

Frequently Asked Questions

1. Why don't batteries last as long as the warranty states?

Sulfate accumulation (main cause), loss of electrolyte, overcharging and undercharging shortens the life expectancy of batteries. See more information on page 4.

2. My system has 6 batteries. Which BLS should I use?

Count the filler holes to determine the voltage of your system. Eighteen holes is 36 volts, so you need a BLS-36N. Twenty-four holes is 48 volts so you need a BLS-48A or a BLS-48N (depending on the application).

3. Do I need a separate unit for each of my batteries?

NO! Never connect more than one BLS to the same bank of batteries.

4. Will BLS electronic device harm my batteries?

No. The BLS puts out a low voltage signal that will not harm the battery or any electronics attached to it. Inadvertent discharging will not cause permanent damage since the BLS electronic device prevents the damage normally associated with deep discharging.

5. Why haven't I heard about the BLS before?

The battery manufacturers and dealers do not want you to know about the BLS. Why would they? It doubles or triples the life of a battery!

6. If I use the BLS, how long will it extend the life of my battery?

The typical life of a battery is three to five years. Some people have estimated that a battery used in automotive applications in North America, without sulfate buildup, would last nine years. We say that BLS electronic device will double or triple the life of your battery.

7. Why shouldn't I just buy new batteries when my old ones go bad?

You can, especially if you own stock in a battery company. It will cost you more money in the long run. You still run the risk of being stranded by battery failure as new batteries go bad quicker than you think. This usually occurs in the worst possible place at the most inopportune time. You should not mix old and new batteries in the same bank. This means you should replace all six when one goes bad unless you are using the BLS.

New batteries are frequently not very fresh, i.e. they may already have sulfate buildup from sitting on the store shelf too long. For example, I recently bought a new battery from a major auto parts chain and had to use my BLS electronic device on it before it would start my car. Any time you store batteries, you should be using the BLS to keep them fresh.