



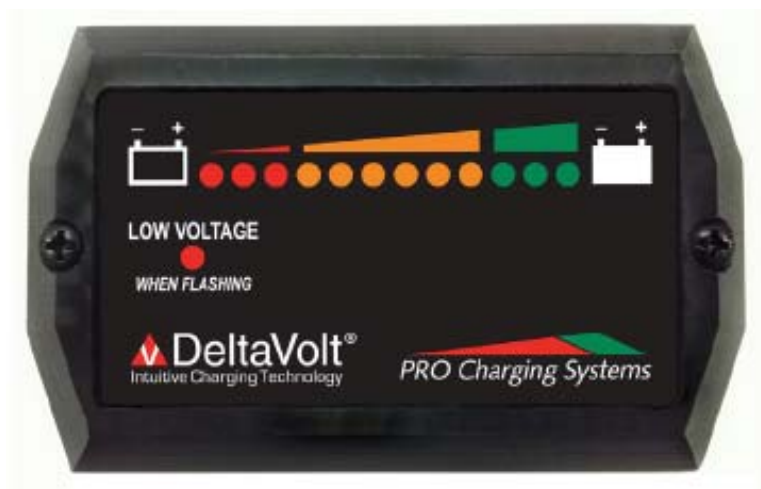
# PRO Charging Systems

## Safety, Installation and Operating Instructions

*Instructions importantes concernant la sécurité*

Manual for the following Battery Fuel Gauge models:

BFG12V, BFG24V, BFG36V, BFG48V, BFG64V and BFG72V



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### IMPORTANT NOTICE:

Please save and read these safety, operating and installation instructions before installing or using your Pro Charging Systems (PCS) product. Contact technical support at PCS with any product, installation, or service questions (800.742.2740).

Pro Charging Systems, LLC  
LaVergne, TN 37086-3539

## INSTRUCTIONS FOR THE FOLLOWING BATTERY PACK CONFIGURATIONS:

Model	Description	Weight	Size	Sample Battery Configuration
BFG 12V	Battery Fuel Gauge	8 oz.	0.35"H x 3.85"W x 2.40"L	12V System Configuration - 1-12V Battery, 2-6V Batteries
BFG 24V	Battery Fuel Gauge	8 oz.	0.35"H x 3.85"W x 2.40"L	24V System Configuration - 2-12V Batteries, 4-6V Batteries
BFG 36V	Battery Fuel Gauge	8 oz.	0.35"H x 3.85"W x 2.40"L	36V System Configuration - 3-12V Batteries, 6-6V Batteries
BFG 48V	Battery Fuel Gauge	8 oz.	0.35"H x 3.85"W x 2.40"L	48V System Configuration - 4-12V Batteries, 8-6V Batteries, 6-8V Batteries
BFG 64V	Battery Fuel Gauge	8 oz.	0.35"H x 3.85"W x 2.40"L	64V System Configuration - 8-8V Batteries
BFG 72V	Battery Fuel Gauge	8 oz.	0.35"H x 3.85"W x 2.40"L	72V System Configuration - 6-12V Batteries, 9-8V Batteries, 12-6V Batteries

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### IMPORTANT SAFETY INSTRUCTIONS

#### *INSTRUCTIONS IMPORTANTES CONCERNANT LA SÉCURITÉ*

**SAVE THESE INSTRUCTIONS. This manual contains important safety and operating instructions for future reference.**

*CONSERVER CES INSTRUCTIONS. CE MANUEL CONTIENT DES INSTRUCTIONS IMPORTANTES CONCERNANT LA SÉCURITÉ ET LE FONCTIONNEMENT.*

**Understand and relate the Hazard Levels and Signal Words utilized in this manual with the following definitions:**



This symbol means: Immediate hazards, which will result in severe personal injury or death.



This symbol means: Hazards or unsafe practices, which could result in severe personal injury or death.



This symbol means: Hazards or unsafe practices, which may result in minor personal injury, product or property damage.



This symbol means **BE ALERT!** Your safety, or the safety of others, is involved!

## PERSONAL SAFETY PRECAUTIONS




**Always read all instructions before using your product!**

- 1. Wear complete eye protection and clothing protection.** Avoid touching eyes while working near battery. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, eyes, or other surfaces. 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 seek medical attention promptly.
- 2. Dress properly.** Wear protective, electrically nonconductive clothes and nonskid footwear. 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. Wear restrictive hair covering to contain long hair.
- 3. Avoid working alone.** Be sure someone is within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
- 4. Stay alert.** Watch what you are doing, and use common sense. Do not operate any equipment when you are tired.
- 5. Keep children away.** Children must never be allowed in the work area. Do not let them handle machines, tools, battery chargers, or extension cords.
- 6. Keep work area clean.** Cluttered areas invite injuries.
- 7. Observe work area conditions.** NEVER smoke or allow a spark or flame in the vicinity of battery or engine. Don't expose to rain. Keep work area well lit.
- 8. Do not overreach.** Keep proper footing and balance at all times. Do not reach over or across electrical cables or frames.
- 9. Avoid electrical shock.** To reduce risk of electrical shock, unplug charger from outlet before attempting any maintenance or cleaning.
- 10. Do not operate product with damaged electrical wiring or connections.** If damaged, replace the electrical wiring or connections immediately.
- 11. Store idle equipment.** When not in use, store equipment in a dry location to inhibit rust. Always lock up tools and equipment and keep out of reach of children.
- 12. Maintain battery fuel gauge with care.** Inspect periodically and, if it has received a sharp blow, been dropped, or otherwise damaged in any way, have it repaired by an authorized technician. Do not disassemble battery fuel gauge; contact PCS technical support when service or repair is required (800.742.2740). Incorrect reassembly may result in risk of electrical shock or fire.
- 13. Check for damaged parts.** Before using any PCS product, carefully check any part that appears damaged to determine that it will operate properly and perform its intended function. Check for broken parts and any other condition that may affect proper operation. Any part that is damaged should be properly repaired or replaced by a qualified technician. Do not use the product if any part does not operate properly.
- 14. Replacement parts and accessories.** When maintaining, only use accessories intended for use with this product. Approved accessories are available from Pro Charging Systems (800.742.2740).

## SAVE THESE INSTRUCTIONS!

### INSTALLATION AND PREPARATION


 **WARNING** To reduce risk of battery explosion, follow these instructions, those published by the battery manufacturer, and by the manufacturer of any equipment that you intend to use in the vicinity of battery. Review all cautionary markings on these products and on the engine.

*Pour réduire le risque d'explosion, lire ces instructions et celles qui figurent sur la batterie.*

### GENERAL OPERATION


 **WARNING** Use the Battery Fuel Gauge for a LEAD-ACID (lead acid, sealed lead acid, gel cell and AGM) batteries only.

*Utiliser le chargeur pour charger une batterie au plomb uniquement*

 **WARNING** Be extra cautious to reduce risk of dropping a metal tool onto battery. It might cause a spark or short-circuit a battery or other electrical part, possibly resulting in an explosion. If damaged, contact PCS (800.742.2740).

 **CAUTION** Never smoke or allow an open spark or flame in the vicinity of the battery or engine.

*Ne jamais fumer près de la batterie ou du moteur et éviter toute étincelle ou flamme nue à proximité de ces derniers.*

 **CAUTION** Working in the vicinity of a lead-acid battery is dangerous. Batteries generate explosive gases during normal operation. For this reason it is of the utmost importance that prior to each use of your charger, you read and follow the instructions provided exactly.

*Il est dangereux de travailler à proximité d'une batterie au plomb. Les batteries produisent des gaz explosifs en service normal. Il est aussi important de toujours relire les instructions avant d'utiliser le chargeur et de les suivre à la lettre.*

### INSTALLATION:

**Below are the simple steps for installing the Battery Fuel Gauge**

**A Template is provided in order to determine the location of the mounting holes.**

Step 1 - After determining the location for the Gauge, drill the necessary holes to allow for installation and feed the wiring to the battery area.

Step 2 - Check the battery pack with a volt meter to determine which two posts provide the entire battery pack voltage.

Step 3 - The cable leading from the battery pack to the Battery Fuel Gauge comes in two parts. Connect the part with the ring terminals to the batteries first.

Step 4 - After confirming that the connections to the battery pack are correct, "mate" that cable with the cable that comes from the gauge using the JST Connector Tab and housing that are already attached to the cables.

Once you connect your PCS Battery Fuel Gauge, the gauge will begin working automatically. State of charge will be displayed by illumination of the Light Emitting Diodes (LEDS) located on the front of the unit.

Follow the instructions below for the proper order of connection and how to connect to different battery configurations:

**PROPER ORDER OF CONNECTIONS**

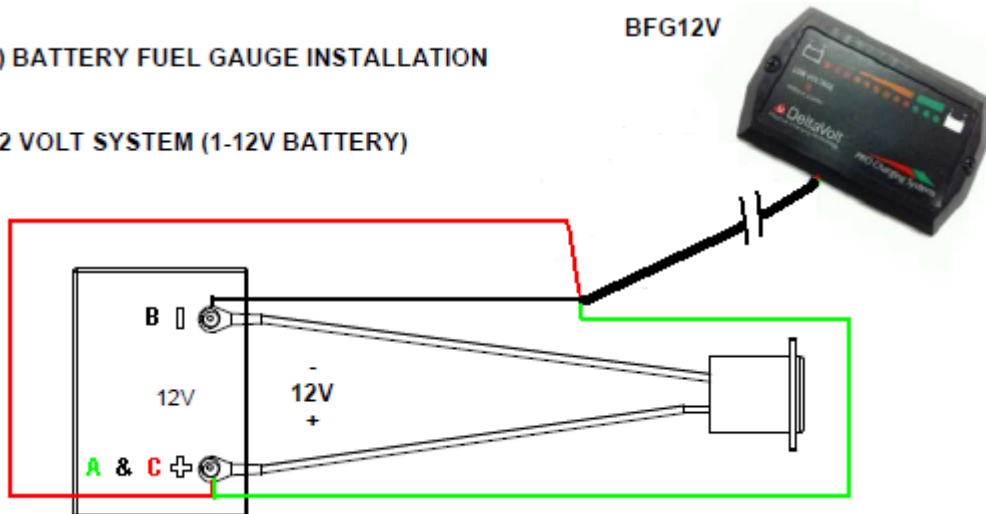
- A** - GREEN CONDUCTOR TO BATTERY PACK POSITIVE (+)
- B** - BLACK CONDUCTOR TO BATTERY PACK GROUND (-)
- C** - RED CONDUCTOR TO POSITIVE (+) POST OF THE SAME BATTERY AS B

**IMPORTANT:** RED WIRE (FUEL GAUGE POWER) MUST BE ATTACHED TO THE POSITIVE (+) TERMINAL ADJACENT TO BATTERY PACK GROUND. FAILURE TO DO SO MAY RESULT IN PERMANENT DAMAGE TO THE GAUGE.

**CAUTION:** FAILURE TO FOLLOW THESE INSTALLATION INSTRUCTIONS MAY CAUSE PERMANENT DAMAGE TO THE BATTERY GAUGE

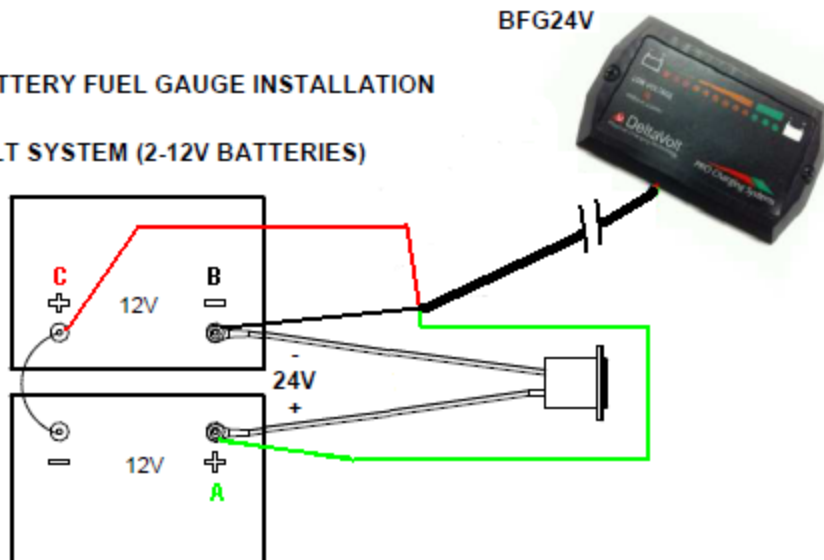
**ONE (1) BATTERY FUEL GAUGE INSTALLATION**

**12 VOLT SYSTEM (1-12V BATTERY)**



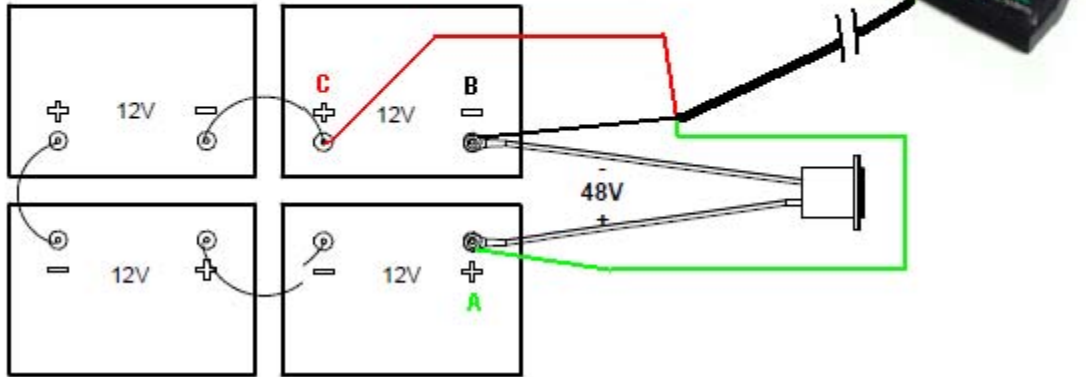
**TWO (2) BATTERY FUEL GAUGE INSTALLATION**

**24 VOLT SYSTEM (2-12V BATTERIES)**



**FOUR (4) BATTERY FUEL GAUGE INSTALLATION**

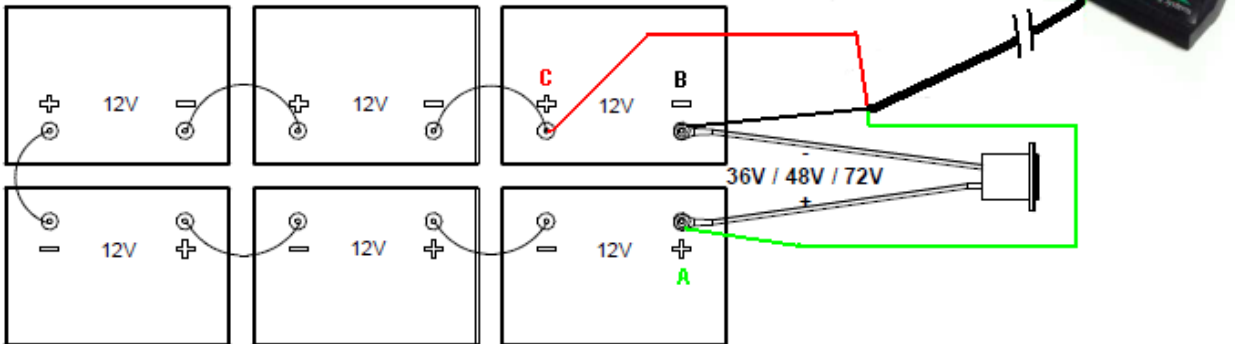
**48 V SYSTEM (4-12V BATTERIES)**



**SIX (6) BATTERY FUEL GAUGE INSTALLATION**

**36V SYSTEM (6-6V BATTERIES)  
-OR-  
48V SYSTEM (6-8V BATTERIES)  
-OR-  
72V SYSTEM (6-12V BATTERIES)**

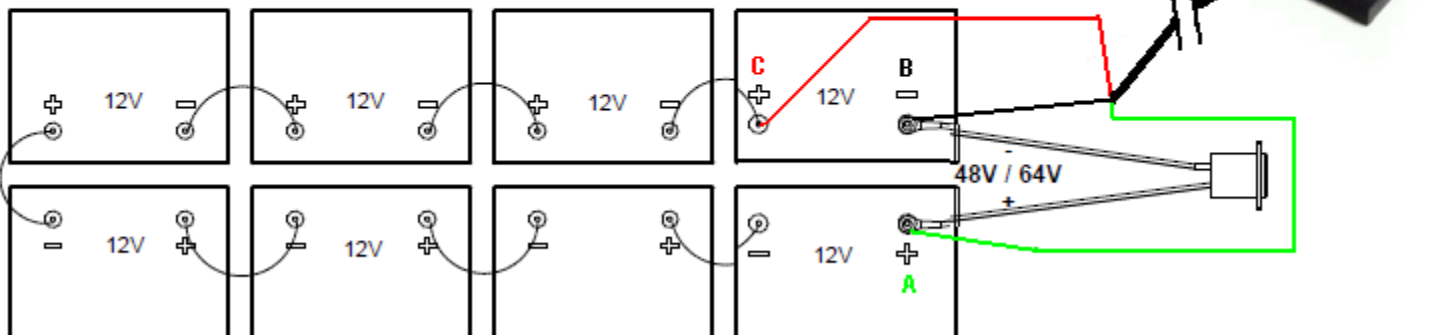
**BFG36V OR BFG48V OR BFG72V**



**EIGHT (8) BATTERY FUEL GAUGE INSTALLATION**

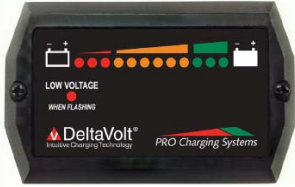
**48V SYSTEM (8-6V BATTERIES)  
-OR-  
64V SYSTEM (8-8V BATTERIES)**

**BFG48V OR BFG64V**



## BATTERY FUEL GAUGE INDICATIONS

When your Battery Fuel Gauge is activated, the battery fuel gauge provides battery pack status information utilizing three red LED indicators, six amber LED indicators and three green LED indicators.



### Battery Fuel Gauge Indicators

A total of 12 LED indicators are provided in order to display the state of charge of the battery pack.

The indications are as follows:

12th LED (green) . . . . .	Battery Pack is approximately 100% full
11th LED (green) . . . . .	Battery Pack is approximately 92% full
10th LED (green) . . . . .	Battery Pack is approximately 83% full
9th LED (amber) . . . . .	Battery Pack is approximately 75% full
8th LED (amber) . . . . .	Battery Pack is approximately 67% full
7th LED (amber) . . . . .	Battery Pack is approximately 58% full
6th LED (amber) . . . . .	Battery Pack is approximately 48% full
5th LED (amber) . . . . .	Battery Pack is approximately 40% full
4th LED (amber) . . . . .	Battery Pack is approximately 32% full
3rd LED (red) . . . . .	Battery Pack is approximately 25% full
2nd LED (red) . . . . .	Battery Pack is approximately 17% full
1st LED (red) . . . . .	Battery Pack is approximately 8% full
STANDBY MODE. . . . .	The appropriate LED will flash every few seconds when the equipment/vehicle is not in use.

**SPECIAL NOTE:** The LED will stay on when the equipment is in use. When the equipment/vehicle is not being used the Battery Fuel Gauge will go to STANDBY MODE and it will flash every few seconds. During charge, the indicator will be solid only after the pack is over 50% charged.

**LOW VOLTAGE LED (red) . . . . .** This LED will blink when the battery pack voltage reaches a very low level (approx. 1.8 volts per cell). ie- on a 48V battery pack the voltage would be 43.20.

**If the Low Voltage LED comes on often or becomes solid, it is recommended that use of the equipment be stopped immediately to protect electronics that are connected to the battery pack. Recharge batteries as soon as possible.**

**On some models, a buzzer may also be activated when the LOW VOLTAGE LED comes on.**

## TROUBLESHOOTING

**PROBLEM:** The LED indicator illuminated on the Battery Fuel Gauge is flashing every few seconds.

Solution Sequence:

1. This is the STANDBY MODE and is normal when the equipment/vehicle is not in use. The flashing LED is still indicating the condition of the battery pack.
2. Start using the equipment/vehicle and the LED light will stay on.
3. If this is happening during charging, wait until the battery pack is at least 50% charged and the appropriate LED will illuminate and stay on until the charge cycle is complete and then the LED will go to standby mode.

**PROBLEM:** No LED indicators illuminated on Battery Fuel Gauge.

Solution Sequence:

1. Confirm that wires are connected properly to the battery pack.
2. Check for corrosion on the battery post. Corrosion can cause a bad connection
3. Call technical support for further assistance (800.742.2740).

**PROBLEM: After charging the battery pack, the 12<sup>th</sup> LED does not illuminate, but a lower light does.**

Solution Sequence:

1. This is an indication that the battery pack voltage is lower than what PCS would consider a full charge.
2. The equipment may have a small draw on the pack, which would cause the “static voltage” of the pack to be lower than what PCS would consider full. When the equipment is used the starting light will most likely stay on for a longer period of time in this scenario.
2. Call technical support for further assistance (800.742.2740).

**PROBLEM: While charging, an LED is just flashing every few seconds.**

Solution Sequence:

1. This is an indication that the battery pack voltage is still below 50% charged.
2. Once the battery pack voltage reaches at least 50% and the Battery Fuel Gauge senses that a charge is being applied to the pack, the appropriate light will come on and stay on. This will usually be light number 7 (amber). From that point on the lights will keep going up until the charge cycle is complete.

### **LIMITED WARRANTY**

Pro Charging Systems, LLC (PCS) makes this Limited Warranty only to the original retail purchaser.

PCS warrants this Battery Fuel Gauge for one year from the date of retail purchase against defective materials and/or workmanship. If such defects should occur, this unit will either be repaired or replaced at the discretion of the manufacturer. It is the responsibility of the original purchaser to return the Battery Fuel Gauge along with proof of purchase, transportation, and/or any mailing or handling charges prepaid to the manufacturer or its authorized representative.

This limited warranty is void if the product is misused, improperly maintained, handled carelessly or incorrectly operated. Additionally, this warranty is void if the Battery Fuel Gauge is disassembled, the connecting cables are cut, the connecting plugs are cut off, the Battery Fuel Gauge is altered without authorization from PCS, the serial number is removed, or repair is attempted by anyone other than an authorized representative.

PCS makes no other warranty other than this limited warranty and expressly excludes any implied warranty, including warranty for any incidental or consequential damages.

This is the only expressed limited three year warranty authorized by PCS and does not authorize anyone to assume or make any other obligation towards the product other than this three year Limited Warranty. Some states do not allow limitation of incidental or consequential damages.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Please call Pro Charging Systems, LLC for full warranty information and/or service please call (800.742.2740).