

## **Low Loss PWRgate Installation and Owner's Manual**

The Low Loss PWRgate is a simple backup power system. Communication equipment will remain operative on battery during AC power blackouts. Power supplies and batteries can be swapped out while equipment remains on, with no glitches.

A Low Loss PWRgate transfers up to 25 amperes at up to 16 volts DC continuously. It is a safe way to connect both a battery and a power supply to a load, while electrically isolating both from each other. Whenever your 13.8 volt power supply is on, the supply feeds the load while also charging the battery, keeping the battery healthy and ready for use. When the power supply is off, or loses power, the battery feeds the load. Switching is instantaneous.

The Low Loss PWRgate uses MOSFET power transistors to switch the load between power sources with only a 20 millivolt drop, much smaller than similar systems that use Schottky diodes. This keeps the power losses to a minimum.

### **Installation**

Pick a location that is close, or central, to your power supply, battery and load. Some 12 volt equipment may draw large amounts of current, so remember to keep all wires as short as possible and use a large wire size in order to minimize the voltage drop. The Low Loss PWRgate can be installed in any orientation in a cool dry location. The Low Loss PWRgate will remain cool during normal operation.

### **Connecting the Power Supply**

Anderson Powerpole® connectors are used for all Low Loss PWRgate connections due to their low loss characteristics. The Anderson Powerpoles on the Low Loss PWRgate are compatible with and will mate to the 15 amp, 30 amp or 45 amp Anderson Powerpole connectors, use the size appropriate for your application. The power supply wire should be heavy gauge and as short as possible. The Red connector is used for the positive (+), and the Black connector is used for the ground or negative (-).

### **Connecting the Battery**

The Low Loss PWRgate is designed to use absorbed glass mat (AGM) or gel cell batteries from 7 ampere-hour to 70 ampere-hour. The battery wire should be heavy gauge and as short as possible and must be fused (up to 30A) as close to the battery as possible.

## **A Word About Batteries!**

**CAUTION! Handle batteries with knowledge and extreme care!** Automotive and marine batteries have dangerous chemicals that can spill out. These batteries emit hydrogen that will explode from a small spark, sending shrapnel and acid in ALL directions. These types of batteries are NOT recommended. If you choose to use them, be careful!

Batteries can get very hot when improperly charged or shorted, and can explode. Shorted battery wires can and will cause fires! Use a fuse located directly at the battery plus (+) terminal.

Choose a 12 volt battery with an ampere-hour rating according to your power needs. Find a battery with a true ampere-hour rating. Pay no attention to "cranking amps".

Use of gel cell or AGM batteries is recommended. Gel and AGM batteries will not spill, will not explode and will last longer than automotive or marine batteries. AGM and gel batteries have many advantages and are usually worth the extra price. Select a battery that offers both safety and performance.

## **Connecting the Load**

Connect the communications equipment to the Low Loss PWRgate and enjoy knowing you now have full backup power.

## **System Checkout**

When the power supply and battery are connected and the Low Loss PWRgate is powering a load, a quick check out is as follows. Simply turn on your equipment, then unplug the power supply. The equipment should operate without interruption, now powered by the battery. You may notice a slight drop in the voltage, which is normal, as a power supply is a nominal 13.8 volts and the battery is 12 volts. Plug the power supply back in, and the equipment will now be powered from the AC power supply.

## **Low Loss PWRgate Charging Circuit**

The charging circuit is a simple "float" charger in order to maintain a battery near full charge. The circuit is provided so that any 13.8 volt power supply will function safely as a charger. It can supply about 3.0 amps if the battery is heavily discharged. As the battery voltage rises, the charging current decreases until it supplies only a current equal to the quiescent discharge rate of the battery.

If a large battery were heavily discharged, it could take a week to recharge the battery, using this circuit. Nevertheless, in most applications, the battery is only called on when a power failure occurs, hopefully infrequently. The charging circuit is useful to prevent self discharge of a battery, keeping it healthy and ready to use. Otherwise batteries left unattended will go bad in a few months.

We hope you enjoy your Low Loss PWRgate and if you do, tell your friends!

## **Specifications:**

Max voltage: 16 Volts

Max current: 25 Amps

Circuit: Power MOSFET "OR-gate" with powerpath controller

MOSFETS: 1 in each path, 60 amp, 20v P-channel

Voltage Drop: 0.020 VDC at rated output

Charging circuit: Schottky diode and limiting resistor, constant voltage float charger

Connectors: Anderson PowerPoles, 25A, with two output connectors

Size: 3.9 x 2.0 x 0.8 in. ice blue, transparent

Circuit board: double sided, surface mount

Weight: ~3 oz

## **Low Loss PWRgate Warranty**

The Low Loss PWRgate is warranted against failure due to defects in workmanship or materials for one year after the date of purchase from KI0BK or an authorized dealer. If purchased from an authorized dealer it must be returned with a copy of the original sales receipt or proof of purchase.

Warranty does not cover damage caused by abuse, accident, misuse, improper or abnormal usage, failure to follow instructions, improper installation, alteration, lightning, or other incidence of excessive voltage or current. If failure occurs within this period, return the Low Loss PWRgate to KI0BK at your shipping expense with a full explanation and necessary proof of purchase. The device will be repaired or replaced, at our option, without charge, and returned to you at our shipping expense. Repaired or replaced items are warranted for the remainder of the original warranty period. You will be charged for repair or replacement of the Low Loss PWRgate made after the expiration of the warranty period.

KI0BK shall have no liability or responsibility to customer or any other person or entity with respect to any liability, loss or damage caused directly or indirectly by use or performance of the products or arising out of any breach of this warranty, including, but not limited to, any damages resulting from inconvenience, loss of time, data, property, revenue, or profit, or any indirect, special incidental, or consequential damages, even if KI0BK has been advised of such damages.

Except as provided herein, KI0BK makes no express warranties and any implied warranties, including fitness for a particular purpose, are limited in duration to the stated duration provided herein.