

POWER-GATE INSTALLATION INSTRUCTIONS

OR-Series Non-Programmable GEN 4.0 v1

Congratulations on your POWER-GATE purchase! POWER-GATE is designed to provide years of trouble-free operation. Please read the instructions in their entirety prior to undertaking installation. Like any work performed around batteries, electrical circuits, vehicles, and moving parts, exercise caution to insure safe installation and use. If you are not familiar with batteries, electrical circuits, or basic auto/marine-electrical architecture, seek the assistance of a professional installer. Failure to install POWER-GATE correctly may cause poor performance, premature product failure, personal injury, or possibly damage to the vehicle or vehicle accessories.



The manufacturer is not responsible for damage incurred due to improper installation.

PRE-INSTALLATION

PACKING LIST:

- POWER-GATE OR-ing Non-Programmable
- Nylon insert nuts, 3/8-16 (3)
- Brass washers, #24 Small Pattern (3)
- Installation Guide

WHAT YOU WILL NEED:

- Copper lugs for cable terminations
- Drill and appropriate mounting hardware
- Digital multi-meter
- 3/8 torque wrench
- 16 AWG black wire for ground extension
- Wire stripper
- Lug crimper
- Soldering torch, solder, and flux

CONNECTING LUGS TO CABLES

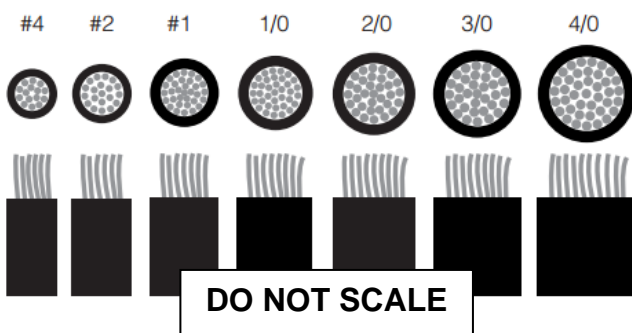
POWER-GATE™ is engineered to transfer electricity at peak performance levels approaching 99.9%. Unfortunately, most installers often overlook electrical joints between cables, lugs, and battery terminals. POWER-GATE™ is one part of a complete electrical system; cables and connection points require just as much attention as the connections to POWER-GATE™ itself.

- Cables should be flexible, free of oxidation, and coated with neoprene or some sort of insulation.
- Cable cross-section should be appropriately sized for the distance and peak current being transferred.
- DR400 applications, use at least 2/0 cable.
- DR500 applications, use at least 3/0 cable.
- DR600 applications, use at least 4/0 cable.
- Don't guess the correct cable size.
- Lugs made of copper, silver-plated copper, or tin-plated copper are good conductors.

Creating a good joint between cables and connectors ensures efficient transfer of electricity. Lugs should be soldered to cables or hydraulically crimped with industry standard crimping equipment. To properly connect cable to lug:

1. Strip cable's insulation material exposing copper strands of cable.
2. "Tin" copper strands by first covering with solder flux. Heat copper strands with torch until solder melts into copper strands. The goal is to pre-saturate or solder-pot the copper strands with solder.
3. Insert solder slugs into lug barrel followed by tinned cable.
4. Use torch to heat lug and cable. When the solder slugs melt, molten solder from tinned cable and solder slugs will combine while inserting cable into lug.
5. Remove heat and allow lug and cable to cool.
6. Once cool, use heat shrink wrap or electrical tape to create moisture barrier between cable insulation and lug.

This method should produce a sound electrical joint. Later, use a digital multi-meter to insure connection is efficient at elevated current.



CONNECTING CABLES TO POWER-GATE™

POWER-GATE™ does not use cooling fins commonly present on high-current switches. It is critical that cable connections to connection posts provide optimum surface area contact for two reasons: proper cooling and proper current conductivity.



Nut

Washer

Lug

Brass Flange

CRITICAL TORQUE VALUE

It is critical that a calibrated torque wrench is utilized when attaching nylon insert nuts to brass posts. Improper under-torque may cause unnecessary electrical resistance while improper over-torque may spin the brass assembly internally or possibly break off the brass post.

Use 15 Newton-meters on the 3 primary connection posts.

INSTALLATION INSTRUCTIONS

Step 1 With engine off, remove all wires and cables from negative terminals of all batteries.

Step 2 Select desired location for POWER-GATE OR-ing device; keep the following points in mind:

- Distance between sources, POWER-GATE, and load(s).
- Easy access to POWER-GATE
- Footprint doesn't conflict with other wires, cables, reservoirs, rotating parts etc...
- Adequate distance from high-heat sources like exhaust manifold

Step 4 Mount POWER-GATE using the four mounting holes and appropriate hardware for your given installation.

Step 5 **Connect POWER-GATE ground wire to good, common, electrical ground, ideally directly to a battery negative post on the battery itself before proceeding to Step 6**

Step 6 Connect cables between sources, load(s), and OR-ing device as shown in the diagram and insulate appropriately.

Step 7 **BEFORE RECONNECTING BATTERIES**, verify that your installation matches the diagram.

Step 8 Restore ground connections on both batteries.

POST INSTALLATION CHECKOUT

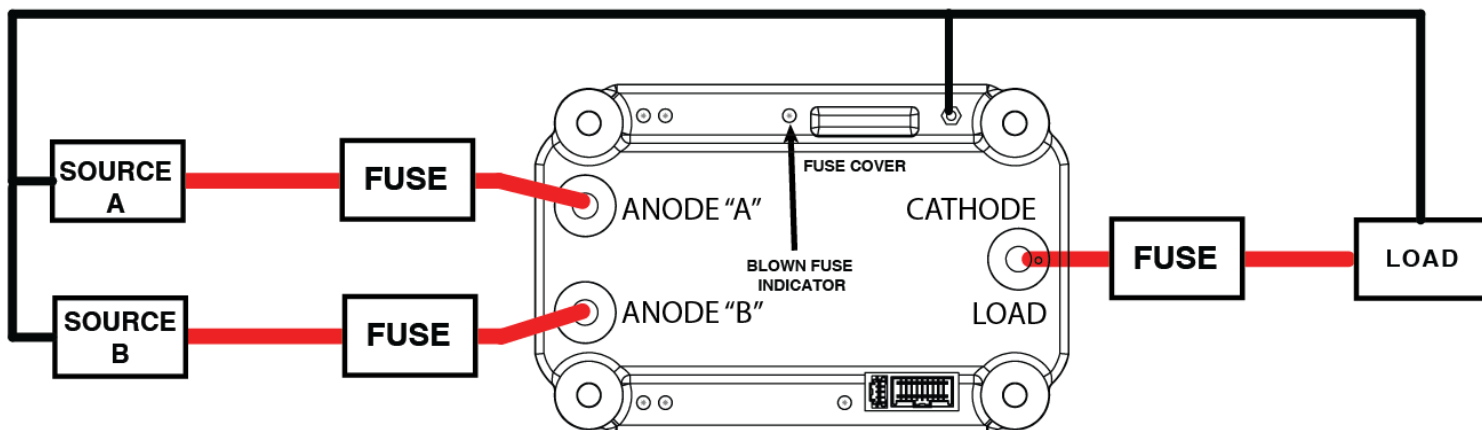
Assumptions:

- Both ANODE sources are connected and have a normal static voltage of 12 to 13 volts (24-26 volts for 24v systems)
- Cables and connections are pristine and electrically sound, not poor, corroded, or high resistance.
- Alternator or source(s) is/are in good working order and with the vehicle running, the output voltage is between 13 to 14.9 VDC (26 to 29.8 VDC for 24 volt vehicles)

Using your digital multimeter, perform the following checks:

1. Read the DC voltage from an anode to ground. This should reflect the DC voltage of that source.
2. Read the DC voltage from the cathode "A" to ground. This should reflect the DC voltage of the LOAD battery.
3. With one probe on the anode and one probe on one cathode, the multimeter will reflect the difference between these two points and should reflect less than 0.05 volts. If greater, shut the vehicle down and call support. There should never be more than 0.05 volts drop between the anode and cathode posts at **maximum rated current**. The SOURCE anode with higher voltage will cause the SOURCE anode with lower voltage NOT to conduct and therefore the Green LED should be extinguished.
- 4.

BLACK GROUND TO COMMON NEGATIVE



HOW POWER-GATE™ FUNCTIONS

The POWER-GATE™ OR'ing device is an extremely efficient, one-way electrical valve. It provides electrical conduction from anode to cathode more efficiently than the cables attached to it. In normal operation, the SOURCE supplying greater voltage will conduct current to the CATHODE post. When a SOURCE is conducting current from anode to cathode, that side's **GREEN** LED will be illuminated. POWER-GATE™ will NOT allow the independent discharge between SOURCES, nor will it allow current to flow from CATHODE to ANODE.

POWER-GATE™ is always on; there's no on/off switch. It continuously draws 0.002 to 0.025 amps from the battery (which is less than the power consumption of your vehicle's clock) in the process of protecting your batteries.

The **GREEN** LED indicates proper operation.

If the **GREEN** LED is not illuminated, it means the following:

- the voltage at the anode is less than the voltage at the other anode
- Under-voltage (less than 8 volts)

POWER-GATE™ is encapsulated to provide rigidity, and protection from chemicals, dirt, and moisture.

DEVICE FAILURE



Should POWER-GATE cease to function correctly for any reason, it is important to remove the device from the electrical circuit. Like any component in an electrical distribution circuit, if it is not functioning correctly, the POWER-GATE will dissipate heat as current passes through it. If ignored, heat related damage could result if a faulty device is not removed. Perfect Switch, LLC cannot be responsible in any way for ancillary damage to the vehicle and equipment installed in, on, or about the vehicle. Electronic components can cease to function at any time. It is the operator's responsibility to frequently assess the health of the electrical system to ensure a safe and reliable working environment.

PROTECTION FUSE

Should the protection fuse blow open, the **RED** "Fuse Open" LED will illuminate, and remove POWER-GATE from operation immediately and contact manufacturer for further instructions. Failure to remove POWER-GATE from operation may cause irreparable damage to the internal semiconductors.

NOTES

POWER-GATE ONE-YEAR LIMITED WARRANTY

Perfect Switch, LLC, warrants the POWER-GATE against all defects in materials and workmanship for a period of one year from the date of the original purchase, subject to the following terms and conditions:
This warranty does not apply if the serial number or housing of the product has been removed or if the product has been subjected to physical abuse, improper installation, water damage, corrosion due to sea salt, road salts, or de-icing chemicals, transient voltage spikes, or modification.

To obtain warranty service, please contact the manufacturer for a Return Materials Authorization (RMA) number. The product must be returned, insured and shipping prepaid, to Perfect Switch, LLC at the address below, in its original packaging or a suitable equivalent, along with the purchaser's receipt and written description of the problem.

Perfect Switch, LLC's responsibility under this warranty is limited to repair or replacement of the product or refund of its purchase price, at the sole discretion of Perfect Switch, LLC. Perfect Switch, LLC, disclaims all other warranties, expressed or implied, including warranties of merchantability and fitness for any particular purposes whatsoever, and no other remedy shall be available including without limitation, incidental or consequential damages, loss of time, inconvenience, or commercial loss. In no event shall Perfect Switch, LLC's liability exceed the purchase price of the product in question.

Some states do not allow the exclusion or limitation of incidental or consequential damages of how long an implied warranty lasts, so the above limitations or exclusions may not apply to you.

This warranty gives you specific rights. You may have other legal rights which may vary from state to state. Perfect Switch, LLC, wants you to be satisfied with its products. Should you have any difficulties with the operation or performance of your POWER-GATE multi-battery accessory, please the manufacturer.

