POWER-GATE INSTALLATION INSTRUCTIONS
RR-Series Rectifier-Relay 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 of your multi-battery accessory. 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 Module (1)
- Control Harness (1)
- Vinyl blade insulators (2)
- Nylon insert nuts, 5/16-18 (2)
- Brass washers, 5/16 (2)
- Ground ring terminal and hardware

WHAT YOU WILL NEED:
- In-line fuses (2) scaled to alternator output
- Copper lugs for cable terminations
- Digital multi-meter
- 5/16 inch nut driver
- 16 AWG black wire for ground extension
- Wire stripper
- Lug crimper
- Soldering torch, solder, and flux

INSTALLATION INSTRUCTIONS

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

Step 2   Select desired location for POWER-GATE Module; keep the following points in mind:
- Distance to the Source and Load
- 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

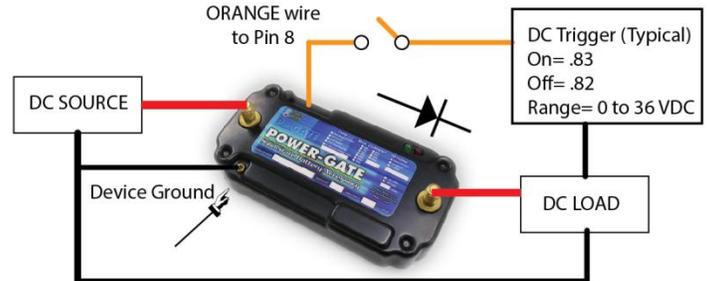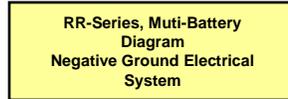**Step 3**   Mount POWER-GATE with appropriate hardware.

Step 4   Connect POWER-GATE ground wire to Source and Load common ground (ex. ideally either battery negative terminal) **before proceeding to Step 5**.

Step 5   Connect Pin 8 (device trigger input) to control or activation voltage.

Step 6   Connect cable(s) to POWER-GATE SOURCE and LOAD as shown in diagram. **FUSE** and insulate appropriately. Torque nylon insert nut to 75 inch-pounds +5/-0 (8.5 newton-meters).

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

Step 8   Re-connect ground cables to the negative posts on batteries and proceed to Post Installation Checkout.

RR-Series, Muti-Battery Diagram
Negative Ground Electrical System

ORANGE wire to Pin 8

DC SOURCE

Device Ground

DC Trigger (Typical)
On= .83
Off= .82
Range= 0 to 36 VDC

DC LOAD

POST INSTALLATION CHECKOUT

Assumptions:
- Appropriate system trigger or control voltage is applied to Pin 8.
- SOURCE voltage the same or higher than LOAD voltage as referenced to the same ground.
- Cables and connections are pristine and electrically sound, not poor, corroded, or high resistance.

Using your digital multimeter, perform the following checks:
1. Read the DC voltage from the SOURCE post to ground. This should reflect the DC voltage of the SOURCE.
2. Read the DC voltage from the LOAD post to ground. This should reflect the DC voltage of the LOAD.
3. With one probe on the SOURCE post and one probe on LOAD post, the multimeter will reflect the difference between these two points and should reflect less than 0.05 volts. If greater, disconnect batteries, as this indicates excessive current being transferred from the AUXILIARY battery to the MAIN battery. There should never be more than 0.05 volts drop between the anode and cathode blades at **maximum rated current**.

HOW POWER-GATE™ FUNCTIONS

The POWER-GATE™ Module is an extremely efficient, one-way electrical valve. It provides electrical conduction from SOURCE to LOAD more efficiently than the cables attached to it.

When trigger voltage is applied to Pin 8, the device will behave like an ideal diode, allowing current to flow in a uni-directional fashion from SOURCE to LOAD.

When trigger voltage is removed from Pin 8, the device will behave like a non-conducting relay. Current cannot flow from SOURCE to LOAD, nor can it flow from LOAD to SOURCE.

The **GREEN** LED indicates the MOSFET array is enhanced and current can flow from SOURCE to LOAD.
If the **GREEN** LED is not illuminated, it means one or both of the following:
- the voltage at the LOAD is more positive than the voltage at the SOURCE and the device is in diode mode.
- trigger voltage is removed and the device is in its non-conducting mode

The **RED** LED will illuminate if the internal protection fuse is blown.
The YELLOW LED in not used in this configuration.

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

See reverse side for more information…..

POWER-GATE
Solid-State Battery Accessories
P-GATE

CONNECTING CABLES TO POWER-GATE™

POWER-GATE™ lacks cooling fins commonly present on multi-battery isolation devices. It is critical that cable connections to anode and cathode provide optimum surface area contact for proper electrical conductivity.

GROUND WIRE

The external ground wire must be grounded to the battery negative terminal before connecting cables to either the anode or cathode. Failure to do so may cause the POWER-GATE™ to heat up and fail.

AWG Size American Wire Gauge	Resistance in Milliohms per foot	Voltage Drop Per Foot	
		at 100 amps	at 250 amps
00	.078	.0078V	.0195V
0	.098	.0098V	.0245V
1	.124	.0124V	.031V
2	.156	.0156V	.039V
3	.197	.0197V	.0495V
4	.249	.025V	.0625V
6	.395	.039V	.0975V
10	.999	.1V	.250V

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.
- Lugs made of copper or silver-plated copper are good conductors.

Creating a good joint between cables and connectors insures efficient transfer of electricity. Lugs should be soldered to cables; hand crimping *does not* provide enough compression for a good joint. 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 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 multimeter to insure connection is less than .01 volts at 100 amps.

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 insure a safe and reliable working environment.

THIS SPACE FOR NOTES

POWER-GATE ONE-YEAR LIMITED WARRANTY

POWER-GATE
Solid-State Battery Accessories
P - GATE

MADE IN THE USA