

# Installation Instructions

# APP4

## 502000

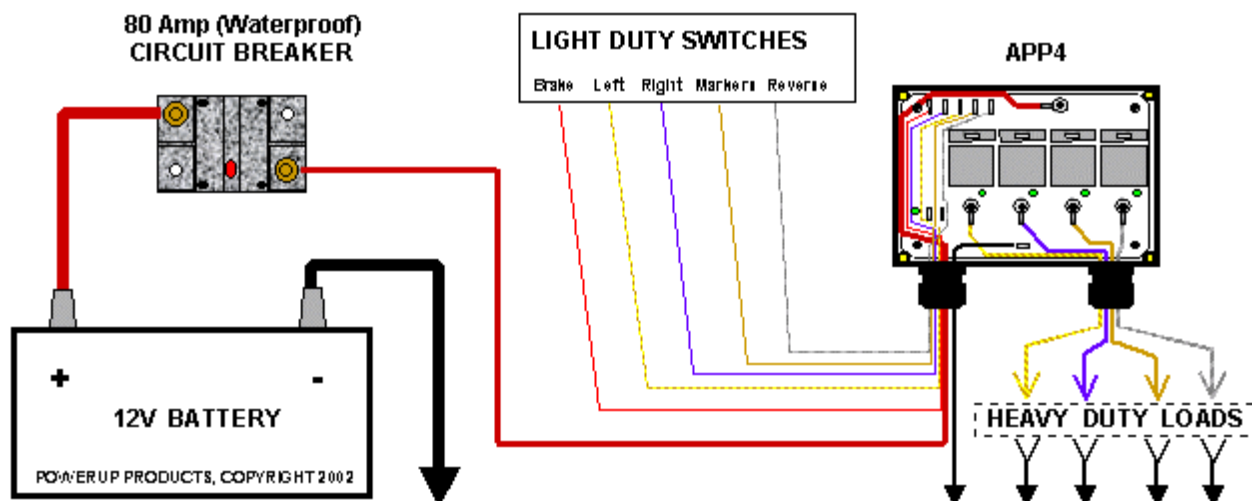
The APP4 (Auxiliary Power Protector with 4 outputs) is a vehicle wiring safety device that isolates the Truck Body/Bed wiring from the OEM Chassis Harness. By providing a power source independent of the OEM wiring the unit acts as a current multiplier. By providing protection to the vehicle's original wire harness from potential faults, large auxiliary loads can be safely added without risk of overloading the wiring harness or damaging the in cab switches. The unit also has built in switching intelligence to provide "3 wire" to "2 wire" conversion for mixing brake with turn signals. Further the modular nature of the unit allows it to be mounted near the devices that it is to control, thereby providing easier installation with shorter wire runs and quick logical access for testing. Working in concert with the vehicle's switch panel and electrical wiring the unit can control signal lights or other auxiliary electrical devices.

The system is designed for use in vehicles with single wire 12vDC electrical systems and will operate reliably with supply voltages between 9v and 15v. If the supply voltage drops below this lower threshold the system shuts down, isolating the outputs from the battery. This provides additional equipment protection and can save a potentially low battery from complete discharge.

The unit is rated to switch a total current of 80 amps. Each of the 4 individual outputs of the APP is individually protected with a switched output relay and a manual reset thermal circuit breaker rated at 20 amps. Inside the APP, nested between each relay and its corresponding output terminal stud there is a green output indicator LED. The output indicator LED displays whether an output is on or off, providing a quick visual indication that the unit is functioning.

## Product Features

- Protects original vehicle wiring and switches when adding large Auxiliary loads
- 4 protected outputs with replaceable long life automotive relays & 20A circuit breakers
- Foreign to Domestic, 3 wire to 2 wire Brake converter logic
- Output LED indicators verify circuit operation
- Built-in Phantom voltage cancellation circuit



**Note that with a Frame "GROUND" all current must flow through the Chassis back to the BATTERY**

## **Trouble Shooting**

The importance of good wiring practices and proper grounding **cannot** be overemphasized. The PowerUp Customer Service Department routinely encounters field failures with symptoms of; improper functioning, intermittents, unusual behavior, and even complete failure to turn on, that consistently are found to be the direct result of poor wiring practices and or bad grounding. These types of problems cause much frustration for everyone and yet are unnecessary and completely avoidable if attention is given to basic electrical wiring practices. Following these guidelines should aid in the successful installation and maximize the performance of the entire vehicles electrical system.

## **Ground**

Ground is Ground, right? Well yes in theory but not always in practice. Like the closed hydraulic system that electron movement is named after, all the current that leaves the battery (pump) must return to it at one point. For any electrical device to operate reliably in the system it needs more than just a good connection from the battery, but also an equally good return path (Ground) free of resistance for the current to flow back to the battery. Further the return path at the battery needs to be large enough to accommodate all the current used by the many electrical devices on the vehicle or power will be lost.

A Mechanical “Ground” to a painted toolbox may fail to provide this needed electrical return path. A “Ground” to a clean welded stud on the body may be very good but the connection from the body to a cross-member and frame might be made only with a few rusty bolts and a small gage static wire. These kinds of conditions are common, yet wholly inadequate in providing the needed return path for the proper operation of any electrical system.

## **Rapid Flash**

The "Rapid Flash" condition should be familiar to anyone whose vehicle has had a turn signal lamp burn out. This happens because some vehicle flashers need a certain minimum load to operate normally. The APP4 is designed to provide isolation protection of the vehicles wiring harness, so its inputs will not noticeably load the vehicle’s flasher circuit. Advanced LED lighting can use as little as one-tenth the electricity of a standard incandescent bulb, meaning that ten LEDs would be needed to provide the same load. Any combination of these conditions can cause a rapid flash condition that is similar to what happens when a lamp has burned out.

To restore the normal flash rate simply install a resistor kit (PowerUp P/N 300110) with the APP4. Securely mount the two resistors provided in the kit, near the APP4 utilizing their attached brackets. Connect the resistor's Black wire to a good electrical “Ground.” Crimp a F.M. ¼” “Push-On” connector to the end of each Red wire and then plug these onto the provided R.F. (Rapid Flash) “Push-On” Stabs inside the APP4. For safety each R.F. Stab is protected with a low amperage auto-resetting fuse.

## **Installation Information**

In order for any electrical device to operate reliably it needs more than just a good connection to the battery, but also an equally good return path “Ground” free of resistance. A complete and proper installation involves more than just hooking up the power wires, it requires that the whole circuit be checked for an adequate current path. Careful installation with solid crimped wire connectors and a cleanly dressed wiring harness will minimize potential problems and optimize the performance of all the electrical devices on the vehicle.

- 1) Securely mount the APP to the vehicle using the 4 holes in the mounting flanges. The APP’s case is weather resistant, NOT waterproof and must be installed in a protected location with the cable glands pointing DOWN. The wires exiting from the bottom of the case should form a drip loop directing moisture away from the unit.
  - a) The preferred location is inside a toolbox or behind the seat in the cab.
  - b) Do NOT install the APP anywhere where excess heat may cause damage to the enclosure. Or inside a battery box as acid fumes will damage the electronics.
  - c) When mounting the APP inside a toolbox, it is recommended that a silicon sealant be used around the lid and wires entering the case’s cable glands.
- 2) Install the main power wire from the battery “+” terminal to the V+ power stud inside the case. Do not skimp on the size of this wire, as all of the controlled outputs will be powered through this one run of wire.
  - a) Use a red 10AWG wire for runs up to 8 ft,
  - b) Use a red 8AWG wire for runs of 8 to 18 ft
  - c) Use a red 6AWG wire for runs over 18 ft
- 3) Install an 80A circuit breaker<sup>1</sup> near the battery to protect the power wire to the APP.
- 4) Run a good electrical ground for the APP’s electronics. Use a black 16AWG wire to run from the battery’s “-” ground strap stud (best) to the “GND” (ground) “Push-On” stab inside the unit.
- 5) Feed the vehicle’s factory wiring harness into the enclosure through the left cable gland and to the 5 input stabs. Provide enough slack that the wires exiting from the bottom of the case can form a drip loop to whisk moisture away from the unit. Trim any excess cabling if needed.
- 6) Terminate each input wire from the harness. Carefully strip off ¼” of insulation and terminate with an insulated crimp-on ¼” FM “Push-On” (QDC, Quick Disconnect) connector.
- 7) Connect these wires onto the appropriate ¼” input stabs location inside the APP.
- 8) Turn on the ignition. Test the input wires with a trouble light. Check the output LEDs for proper operation. (If everything doesn’t operate perfectly double check your work, you may also read the troubleshooting section for some inspiration.)
- 9) Turn off the ignition / power to the APP.
- 10) Connect the vehicle loads to the output posts in the APP. Terminate each of the wires with a #10 insulated ring lug and tighten the KEP-Nuts securely against loosening from vibration.
- 11) Make sure the box is free of wire trimmings and other foreign objects before turning the system back on. Replace the cover on the APP. Lid must be tight, but don’t over torque cover screws.
- 12) Return main power / turn “On” the ignition and verify the operation of the total wired system from switches to lights.

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<sup>1</sup> 80A amp circuit breakers are available separately from Miller Accessories, or can be ordered directly from PowerUp Products, PowerUp P/N 2501080 (formerly P/N B-WPB80)

