



## **Trouble Shooting Guide - AMP Research Power Step**

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Concern	Possible root-causes
Steps inoperative	Factory door ajar switch in-op?
	Fuse burned
	Diodes connected in reverse polarity or faulty diode
	Connections not secure
	Connected to incorrect wire in vehicle electrical system
Intermittent operation	Connections not secure
	Faulty diode or connection
	Bad ground
One or more doors deploy the step, others do not	Diodes connected in reverse polarity or faulty diode
	Connections not secure
Steps shake and/or shutter during operation	Bad ground
	Connections not secure
Delay in step operation or steps deploy after doors have been closed	Diodes connected in reverse polarity or faulty diode
Steps make a creaking noise during operation	Tighten wedge bolt.
	Loosen lower mount bolts and remove step extrusion from lower mount. Re-install step extrusion to lower mount and tighten.
Steps make a ticking noise when fully deployed or fully retracted and motor continues to run.	Tolerance ring / clutch assembly failed / failing. Replace clutch assembly.
Steps operate randomly	Diodes connected in reverse polarity or faulty diode
	Connections not secure
	Connected to incorrect wire in vehicle electrical system
Step stays down all the time and motor can be heard running	Tolerance ring / clutch assembly faulty. Replace clutch assembly.
Step go up when opening door and down when closing door	Motor polarity reversed. Exchange location of wires going into motor plug. (Swap orange and white wires in motor plug.)



## Trouble Shooting Guide – Frequently Asked Questions

**Q: The wire colors on my vehicle do not match the colors in your diagram. What do I do?**

**A:** Unfortunately vehicle manufactures frequently change the color of the wires in their wiring harnesses. The wire that we need locate is the factory door-ajar signal located inside each door. You can find this circuit by removing the door panel and physically tracing the wires leading to the door latch / switch. Once you have located the bundle of wires that go to the switch you will need to isolate the door-ajar circuit. This circuit will be a “negative switching” circuit. Negative switching indicates that the circuit will be in a “ground “ state where the circuit is connected to the minus or negative side of the battery with the door open (Except 02 – 03 Ford Super Duty and 08 Ford Super Duty where the circuit is closed to ground with the door shut). With the door closed the circuit will sometimes show a very small amount of current or nothing at all.

The best and safest way to isolate this wire is to use a computer safe circuit tester like the CTS24 Circuit Tester by Blue Point available from Snap On Tools. There are other manufacturers of similar testers. The important thing about this kind of tester is that it is specifically designed to be “computer and air bag safe”. This means the tester will not damage sensitive electrical systems.

A multimeter or continuity tester can also be used by setting the tester to the Ohms setting and connecting one probe to the negative battery terminal and probing the previously located wires. With the door open, operate the door latch with the door handle to open the latch. Manually close the latch with a screwdriver or other tool by actuating the latch and simulating the strike pin located on the doorjamb. The correct wire will change readings on the tester from no continuity to 100% continuity when opening and closing the latch (Except 02 – 03 Ford Super Duty and 08 Ford Super Duty where the circuit is closed to ground with the door shut). Or when using a tester like the CTS24 the reading will change from green (indicating ground or minus) to nothing (in some cases red). Complete the balance of the wiring per our wiring diagram.

**Q: The step only goes up (down) halfway and stops. How can I fix it?**

**A:** The body of certain vehicles is often not straight and can put the steps in a bind. Open the door and put the step in the down position. On the underside of the step you will find two 3/16” socket head bolts (Allen bolts) that hold the step to the linkage. Remove these two bolts and dislodge the step from the linkage by tapping on the bottom of the step with a soft face mallet as if you were going to remove step. It is important that the step is totally separated from the linkage. Failure to do so will not allow the linkages to properly align. You only need to remove the Allen bolts from the front or the rear linkage. Both are not necessary. Next put the step in the up position and reinstall the step on the linkage and reinstall the 3/16” Allen bolts and tighten. This will align the linkages and eliminate the binding that is causing the step to stop half way up.



## **Power Step System Operation**

### **Control Module**

The operation of the steps is driven by our controller that is mounted under the hood. The controller is completely “potted” in epoxy and is therefore totally sealed. There are no serviceable parts inside the controller. The controller is the brain of the system and contains hardware and software that not only actuates the steps, but also controls the crucial “anti pinch” function. Controllers very rarely fail and are almost never intermittent.

### **Trigger Wires**

The trigger wires that tap into the vehicle door ajar switches are ground actuated. That is: these wires look for a ground signal. In general, closing the circuit to ground with one of these wires lowers the step and an open circuit (no ground signal) retracts the step. This can be a useful test to isolate concerns and to diagnose conditions.

### **Diodes**

Most applications use diodes in the wiring circuit. Diodes are the electrical equivalent of a one-way valve. Diodes isolate against unwanted actuation or delay of the steps, isolate passenger and driver side door-ajar signals and insure proper operation of the factory door-ajar warning light in the instrument panel. The orientation of the diode is of extreme importance. An improperly installed diode or poorly secured diode connection can cause a number of concerns.

### **Motor & Drive System**

There is one motor per side of the vehicle that drives the steps up and down. This is accomplished by alternating polarity between poles of the motor. Reversing polarity causes the motor to reverse direction. Testing for voltage to the motor can be a useful test in diagnosing concerns. If the motor is getting a 12 volt positive and a negative (ground) signal and does not respond, in most instances the motor will need to be replaced. The motor contains a gear drive system and employs rubber cushions that dampen start up and shut down. Currently there are three types of motors in service. They are: black, black with white gear case, and inline / CRH. There are no user service parts inside the motor or gear case.



## **Power Step Knowledge Base**

### **Concern: Intermittent/Erratic Operation – Wire connection**

The connector between the wire harness and controller can sometimes make intermittent contact as a result of the terminals not being properly seated in the white plastic connector. The corrective action is to check each wire by pulling on the wire to determine if it pulls out of the back of the white plastic connector. If a wire pulls free it was most likely not making secure contact. Secure the wire by re-inserting it into the white plastic connector and insuring that the metal terminal “prongs” engage into the plastic and prevent it from backing out.

### **Concern: GM truck erratic step operation – Ground**

Some owners of GM trucks equipped the Duramax diesel engines have reported erratic operation of the Power Step. The corrective action is to move the Power Step system ground wire from the 10 mm junction box mounting bracket to the air conditioning support bracket bolt located behind the junction box. The resulting improved ground signal path will correct erratic, unreliable operation.

### **Concern: Step deploys when shutting doors and / or hood – Shock sensor**

In vehicles equipped with a security system that utilizes a shock sensor the steps can sometimes deploy as a result of shutting the hood and / or doors. The corrective action is to reduce the sensitivity of the shock sensor.

### **Concern: Ford Super Duty – Sticking door ajar switch**

In older Super Duty trucks there have been reports of the factory door ajar switch sticking as a result of the original equipment lubricant drying out and causing the switch to malfunction. Sometimes this condition can be rectified by liberal application of a high solvent base lubricant like WD-40. Replacement and or removal, cleaning and re-lubrication of the switch may be necessary.

### **Concern: Traction Bars**

Some suspension manufacturer’s traction bars make contact with the Power Step and will not work together. Fabtech traction bars on a Ford Super Duty truck will not work with the Power Step. Major modifications to the inner rocker panel sheet metal are required. Other manufacturer’s traction bars may also interfere with the Power Step.



### **Concern: Battery connections**

Battery connections that are not secure or connections that have corroded over time can cause the system to malfunction. Often a clicking sound can be heard coming from the controller and the steps will not function when the battery connections are weak.

### **Concern: Body lift**

Some suspension manufacturer's body lifts will cause the step to make contact with the body mount(s) and cannot be used with the Power Step. GM SUVs with body lift spacers cause the step to contact the body mount. The Power Step cannot be used without major modifications to the frame/body mount.



## Flowchart Note

The purple trigger wires in the Power Step wire harness are a negative switching circuit. When the purple trigger wire is connected to ground (negative battery terminal) there will be an audible click sound from the controller and the step will deploy. When ground is not present the step will retract. If grounding the purple trigger wire deploys the step, the controller and motor are operating properly and the next areas to examine are connections and diodes. In connecting the purple trigger wire to ground under the hood we have bypassed the diodes and connections in the balance of the system. Carefully review the wiring diagram for the vehicle make, model and year under evaluation and insure that the factory door-ajar signal wire has been properly identified and that the correct diodes are installed in the proper location and orientation. The F.A.Q. section covers identifying the factory door-ajar signal wire. If a diode is faulty or is connected backwards, the system will not receive the necessary ground signal to deploy the step. The same is true if the connections are not making proper contact with the door-ajar signal wire. Again, a carefully review of the wiring diagram is in order as well as a thorough evaluation of the connections to make certain they are secure and making contact.

If a faulty diode is suspected testing is recommended. Diodes transmit current in only one direction. To test, isolate the diode by disconnecting it from the balance of the system. The diode will have a silver stripe on one end. Connect the side of the diode without the stripe to twelve volt positive and the end with the stripe to a tester (continuity tester, test light, multimeter) and ground the tester. Current should flow in this direction. Current should not flow through the diode if the end with the stripe is connected to the twelve volt positive. The diode is bad if current flows in this direction or if current does not flow in either direction. Any of the following diodes can be used as replacements: 1N4002, 1N4003, 1N4004, 1N4005, 1N4006, and 1N4007. Diodes are available from AMP Research at no charge. Call 949-221-4198 to request diodes.

