

SURE POWER MULTI-BATTERY ISOLATOR APPLICATION AND INSTALLATION INSTRUCTIONS

The installation of a Sure Power multi-battery isolator is quite simple as long as you carefully read and understand these instructions, and most importantly review the application chart below, before you begin.

First, make sure you have all the tools, wire, connectors and circuit breakers you will need. Sure Power offers a range of installation wiring kits that make the job a snap. See the table that follows for the right kit for your installation.

For optimum system performance it is recommended that a battery labeled "Deep Cycle" be used in the auxiliary position.

Finally, Sure Power multi-battery isolators are designed for alternator systems with negative ground, and batteries of the same nominal voltage. Batteries of differing voltages cannot be used. **For positive ground systems, marine outboard systems, or heavy duty truck systems, contact Sure Power for the proper isolator for your specialized application.**

PLEASE READ INSTRUCTIONS COMPLETELY PRIOR TO STARTING INSTALLATION MULTI-BATTERY ISOLATOR APPLICATION CHART

| ALTERNATOR TYPE | SURE POWER MODEL NUMBER | | | RECOMMENDED WIRE SIZE CIRCUIT BREAKER OR INSTALLATION KIT | | | |
|--|-------------------------|--|--|--|-------------------------|-------------------------|---------------------|
| | MAXIMUM ALT. OUTPUT | 2 Batteries 1 main (bank) 1 aux. (banks) | 3 Batteries 1 main (bank) 2 aux. (banks) | Up to 15 Ft | 15 Ft to 20 Ft | 20 Ft to 25 Ft | 25 Ft to 30 Ft |
| GROUP #1 Original Equipment Delco (GM), except Delcotron CS series alternators (CS series used on most 1985 and newer GM vehicles). Motorcraft (Ford) All models, all years. (Chrysler) All models, all years - including Nippondenso externally regulated alternators. Jeeps equipped with Nippondenso alternators, externally regulated. Japanese Imports with alternators using external voltage regulator or external sensing Motorola - Load Handler Series. 8EM Remote Sense Series. | Up to 70 Amps | 702 | 703 | #8 ga. 50 Amp (1) | #8 ga. 50 Amp (2) | #6 ga. 50 Amp (3) | #6 ga. 50 Amp |
| | Up to 95 Amps | 952 or 9523A | 1203, 1303 or 12033A, 13033A | #8 ga. 50 Amp (1) | #6 ga. 50 Amp (3) | #4 ga. 50 Amp | #4 ga. 50 Amp |
| | Up to 120 Amps | 1202, 1302 or 12023A, 13023A | 1203, 1303 or 12033A, 13033A | #6 ga. 80 Amp (4) | #4 ga. 80 Amp | #2 ga. 80 Amp | #1 ga. 80 Amp |
| | Up to 160 Amps | 1602, 2002 | 1603 | #4 ga. 120 Amp | #2 ga. 120 Amp | #2 ga. 120 Amp | #0 ga. 120 Amp |
| | Up to 240 Amps | 2402 | 2403 | #2 ga. 150 Amp | #0 ga. 150 Amp | #00 ga. 150 Amp | #000 ga. 150 Amp |
| GROUP #2 DELCO (GM) equipped with Delcotron CS series alt. (most 1985 and newer). * Or CS-130D, 1993 and newer.*** Jeep vehicles equipped with Delcotron CS series alt. (most 1985 and newer). Toyota, Honda and Some Imports equipped with Nippondenso alternator with internal regulator. | Up to 95 Amps | 9523A** | 12033A** 13033A | #8 ga. 50 Amp (1) | #6 ga. 50 Amp (3) | #4 ga. 50 Amp | #4 ga. 50 Amp |
| | Up to 120 Amps | 12033A** 13023A | 12033A** 13033A | #6 ga. 80 Amp (4) | #4 ga. 80 Amp | #2 ga. 80 Amp | #1 ga. 80 Amp |
| <p>* The CS series alternator can be identified by unplugging the plug-in connector from the alternator and counting the number of holes in the connector. The CS series will have 3 small and one larger hole. The CS130D alternator has 4 holes all the same size. The S1 series alternator will only have 2 slotted holes in the connector.</p> <p>** Sure Power model 144-CD connector kit required for Delcotron group #2 applications.</p> <p>*** Delco CS130D alternator requires the part #640059 sense wire which is included with the 144 kit or available separately from Sure Power Industries. All group #2 isolators may also be used in group #1 applications - simply disregard the additional excitation ("E") terminal. The colored terminal indicates "E" terminal on group #2 isolators.</p> | | | | | | | |
| GROUP #3 Motorola (other than Load Handler) Bosch (requiring regulator sensing). | Up to 70 Amps | 702R | 703R | #8 ga. 50 Amp (1) | #8 ga. 50 Amp (2) | #6 ga. 50 Amp (3) | #6 ga. 50 Amp |
| | Up to 95 Amps | 952R | N/A | #8 ga. 50 Amp (1) | #6 ga. 50 Amp (3) | #4 ga. 50 Amp | #4 ga. 50 Amp |
| | Up to 120 Amps | 1202R | 1203R | #6 ga. 80 Amp (4) | #4 ga. 80 Amp | #2 ga. 80 Amp | #1 ga. 80 Amp |
| Colored terminal indicates "R" post on most Group 3 Isolators. All Group #3 Isolators may also be used in Group #1 applications - disregard the "R" terminal. | | | | | | | |
| GROUP #4 For alternators with internal voltage sensing, ie; some Mitsubishi and Hitachi, or single wire self exciting Delco alternators. | N/A | *1314 BATTERY SEPARATOR | N/A | #6 ga. N/A (4) | #6 ga. N/A (3) | #4 ga. N/A | #2 ga. N/A |
| *A SOLENOID PRIORITY SYSTEM. NOT AN ELECTRONIC ISOLATOR. ISOLATOR MAY BE USED BY MODIFYING ALTERNATOR. | | | | | | | |

APPLICABLE SURE POWER WIRING KITS AVAILABLE

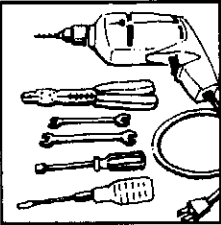
- 8 gauge wire, 50 amp circuit breaker or SURE POWER KIT #1882-D (includes 15 ft. #8 ga., 50 amp CB, terminals and connector)
- 8 gauge wire, 50 amp circuit breaker or SURE POWER KIT #1884-D (includes 25 ft. #8 ga., 50 amp CB, terminals and connector)
- 6 gauge wire or SURE POWER KIT #1887 (includes 25 ft. #6 ga., terminals and connector)
- 6 gauge wire or SURE POWER KIT #1886-D (includes 15 ft. #6 ga., terminals and connector)

GENERAL INSTALLATION INSTRUCTIONS RELEVANT TO ALL SIZES OF ISOLATORS, INCLUDING THOSE SHOWN ON THE SIMPLIFIED APPLICATION CHART.

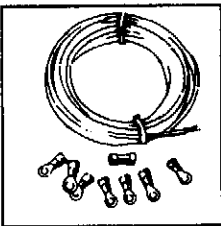
CAUTION: IF YOU ARE INSTALLING AN ISOLATOR ON A TOYOTA (ALTERNATOR GROUP TYPE #2) SEE SPECIAL TOYOTA INSTRUCTIONS BEFORE DISCONNECTING ANY PART OF THE EXISTING SYSTEM.
IF YOU ARE INSTALLING AN ISOLATOR ON A MOTOROLA OR BOSCH (ALTERNATOR GROUP TYPE #3) SEE SPECIAL MOTOROLA AND BOSCH INSTRUCTIONS BEFORE DISCONNECTING ANY PART OF THE EXISTING SYSTEM.

SURE POWER MULTI-BATTERY ISOLATOR INSTALLATION INSTRUCTIONS.

- 1.** You need only simple tools to install your isolator:
- Screwdriver
 - Drill with 1/8" bit
 - Wire stripper
 - Crimper
 - Open end wrench set
 - Nut driver set



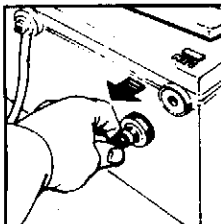
- 2.** You will also need an adequate length of automotive grade wire, ring terminals and butt connectors. Use the *Isolator Wire Size* chart to determine the proper size wire for your needs.



We also recommend the use of a circuit breaker when applicable to protect your auxiliary battery circuit. See application chart for the proper size and type.

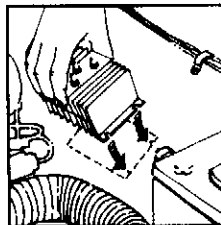
To make the job easier an Installation Kit is available from SURE POWER. The kits come in various sizes, as shown on page 1 of the instruction sheet. Your dealer can assist you in the correct selection.

- 3.** To avoid possible electrical short and injury, remove the wire from the negative (-) terminal of the vehicle's battery. If there is more than one battery on your vehicle, disconnect the negative (-) lead on each one. Do not run the engine with the battery disconnected. Doing so could burn out the alternator. Also, extinguish any burning material and do not smoke near the battery or engine compartment. Follow vehicle manufacturer's recommendations for disconnecting battery.

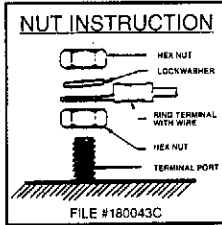


Do not run the engine with the battery disconnected. Doing so could burn out the alternator. Also, extinguish any burning material and do not smoke near the battery or engine compartment. Follow vehicle manufacturer's recommendations for disconnecting battery.

- 4.** Mount the isolator in a convenient location as near to the alternator as possible and away from the exhaust manifold. Allow for proper ventilation. **Do not mount on the engine.** Drill 1/8" holes and mount with the screws provided. Take care when drilling and mounting as to not damage any vehicle components.

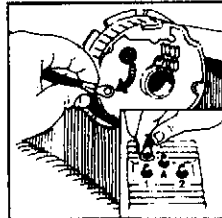


- 5.** Install hardware to the studs in the order shown in diagram, being careful not to over torque the bottom hex nut. Failure to install bottom hex nut will void warranty and result in poor electrical connections.



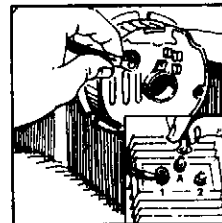
CAUTION: If you are installing an Isolator in conjunction with a 1985 and later Ford alternator, do not proceed until you have read and understand the "Helpful Hint for Ford Installations" on Page 4.

- 6.** Locate the "BAT" terminal at the rear of the alternator. It is usually the largest connection. DISCONNECT THE WIRES (INCLUDING THE VOLTAGE REGULATOR WIRE IF PRESENT) FROM THE "BAT" TERMINAL OF THE ALTERNATOR. Reconnect these same wires to the "1" terminal of the battery isolator. Lengthen the wires, if necessary. Be sure you follow proper splicing techniques.

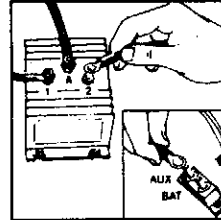


NOTE: DISCONNECTING OR CUTTING THESE WIRES IN A LOCATION OTHER THAN AT THE ALTERNATOR MAY RESULT IN IMPROPER FUNCTIONING OF THE CHARGING SYSTEM.

- 7.** Connect one end of a new wire of the proper size (see Isolator Application Chart - Recommended Wire Size) to the battery "BAT" terminal of the alternator and the other end to the "A" terminal of the isolator. This should now be the only wire connected to either of these terminals.

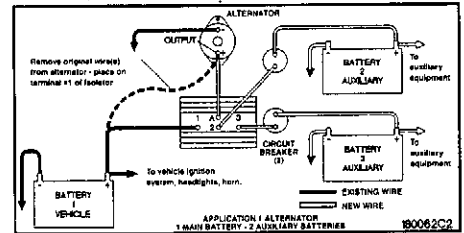


- 8.** Mount a circuit breaker as near to the auxiliary battery as practical, and away from engine or exhaust heat (see application chart for proper size). Connect one end of a new wire of the proper size (see Isolator Wire Size Chart) to the "2" terminal of the isolator.



Run the wire to the circuit breaker and connect it to the "AUX" terminal. Run another wire from the circuit breaker to the auxiliary battery, connecting one end to the "BAT" terminal of the circuit breaker and the other to the positive "+" terminal of the auxiliary battery.

- 9.** For three or four battery isolators repeat step 8 for each auxiliary battery, connecting terminal "3" to auxiliary battery 3 through its circuit breaker; terminal "4" to auxiliary battery 4 through its circuit breaker, etc.



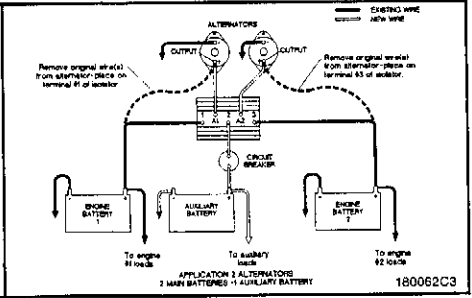
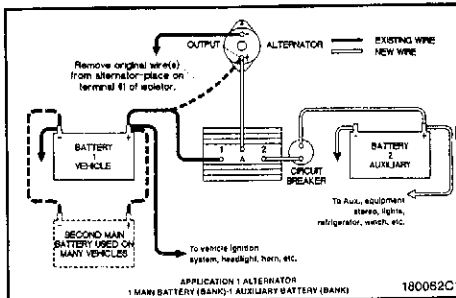
- 10.** IF YOUR INSTALLATION FALLS IN ALTERNATOR GROUP TYPE #2 OR #3, PROCEED TO SPECIFIC INSTRUCTIONS FOR THAT RELEVANT GROUP, OTHERWISE PROCEED TO STEP #11.

- 11.** Connect all of the auxiliary loads (phone, lights, stereo, refrigerator, winch, etc.) to the positive post of the auxiliary battery or batteries. Then reconnect the ground cables removed in step 3. Also, make sure the negative (-) terminals of the auxiliary battery(s) are properly grounded with a conventional ground strap. Protect with circuit breakers as required.

- 12.** Perform electrical tests (Page 4) to assure proper operation.

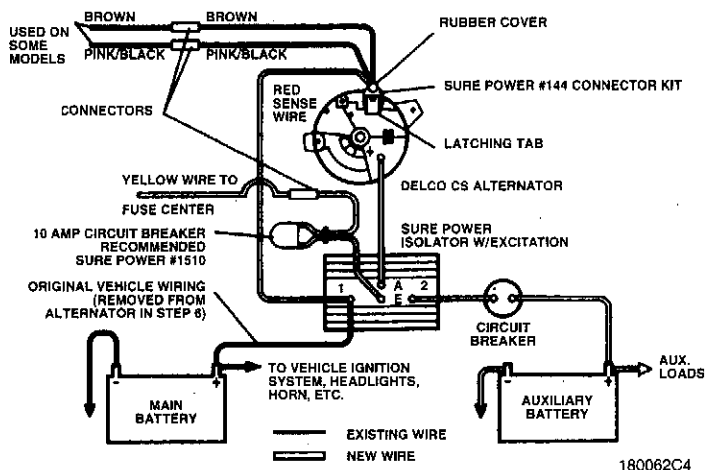
GROUP I

SCHEMATICS OF TYPICAL MULTI-BATTERY INSTALLATIONS USING ELECTRONIC ISOLATORS.



SEE APPLICATION CHART FOR APPROPRIATE SIZE AND ISOLATOR MODEL NUMBER. FOR SPECIAL APPLICATIONS SUCH AS TWO ALTERNATORS, SEE YOUR DEALER OR SURE POWER CATALOG FOR APPROPRIATE ISOLATOR MODEL.

GROUP #2 ALTERNATORS



NOTE: When installing an isolator on a GM DIESEL equipped with a "CS" series alternator, or if the vehicle is equipped with a Delco "CS-130D" alternator, please refer to Sure Power instruction 180064.

GENERAL MOTORS DELCOTRON. Before proceeding with any installation it is recommended that you look closely at your Delcotron alternator to ascertain its size. The amperage output is imprinted in close proximity to the output stud—verify that you have the correct size isolator.

When installing an isolator on a GM "CS" series alternator equipped vehicle the general isolator installation instructions should be followed in addition to Group 2 instructions. However, this alternator requires external excitation and external sensing. An isolator with an excitation terminal "E" and a plug connector kit (144 or 144-C) are required. Delco CS-130-D alternators require Sure Power 640059 sense wire included with 144 kits or available separately.

The following procedure refers to 3A isolators and installation kit #144 #144-C. For CS130D refer to instructions 180064.

Locate and remove the plug-in connector from the alternator. This may be done by inserting a small screwdriver under the latching tab.

NOTE: If the existing Delco connector has a wire in the "S" position, replacement of this connector is not necessary. Proceed to Step #7.

1. Cut the wire(s) (brown and/or pink-black) at a convenient location within 6" of the connector plug end.
2. Remove the rubber dust cover (if installed) from the old plug-in connector and install it on the new plug-in connector provided in the #144 or #144-C kit.
3. Strip 1/4" of insulation from the cut wires (see step 2) and insert the wires into the butt connectors and crimp, matching brown and/or pink with black trace wires (brown to brown, and/or pink/black to pink/black). Some vehicles have a brown wire only; some have a pink/black; some have a combination of both. Whichever combination you find, match it to the corresponding wire by color code. Secure all loose wires.

If wire colors do not match, note the terminal position and match the terminal position to terminal position, ie "L" to "L," "F" to "F," or "I" to "I."

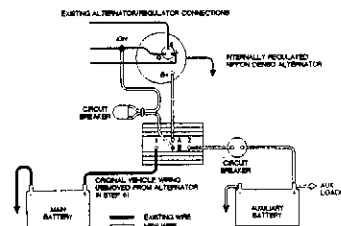
4. Reconnect the new plug-in to the alternator.
5. Route the remaining red wire of the plug-in connector to terminal #1 of the Sure Power isolator. Cut to the correct length, strip and crimp on the 1/4" ring terminal supplied. Now connect to terminal #1 of the isolator. This becomes the voltage sense wire.
6. External excitation connection. The "E" post of the isolator requires connection to an ignition switched source such that power is applied only in the ignition/run position. BE SURE POWER IS NOT APPLIED WHEN IGN IS SWITCHED TO ACCESSORY POSITION. On most late GM vehicles this point may be one of the spare ignition terminals marked "IGN" on the fuse center. Connect one end of the yellow wire supplied to one of these spare ignition terminals. Route the other end of the yellow wire to the "E" terminal of the isolator. (If using the recommended 10 amp circuit breaker [supplied with the 144-C Kit] insert the circuit breaker in the yellow wire as shown in the diagram.) Cut to the correct length, strip and crimp on the supplied ring terminal (or 10 amp circuit breaker, if used). Now connect the yellow wire to the "E" terminal of the isolator with the lock washer and nut. **Colored terminal indicates "E" post.**
7. Now proceed to Step 11 of the GENERAL ISOLATOR INSTALLATION INSTRUCTIONS.

GROUP #2 ALTERNATORS Continued

TOYOTA and some Hondas and Imports using internally regulated Nippondenso alternators. When installing an isolator to a Toyota alternator, follow general installation instructions.

1. Locate the small ignition wire terminal labeled "IGN" that runs from the alternator to the wiring harness. Check that you have the right wire by stripping a small section of wire and then determining that voltage is present only when the key is in the "run" position but not in the "accessory" position. Do not interrupt wire.
2. After completing Steps 1-9 of general instructions, connect an excitation wire from the point located in Step #1 above, to the "E" terminal of the isolator. **Colored terminal indicates "E" post. Sure Power recommends a 10 amp circuit breaker (Sure Power Model 1510) be inserted in this line.**

NOTE: The Group #2 isolator may be used in applications not requiring the excitation by not connecting the "E" terminal.

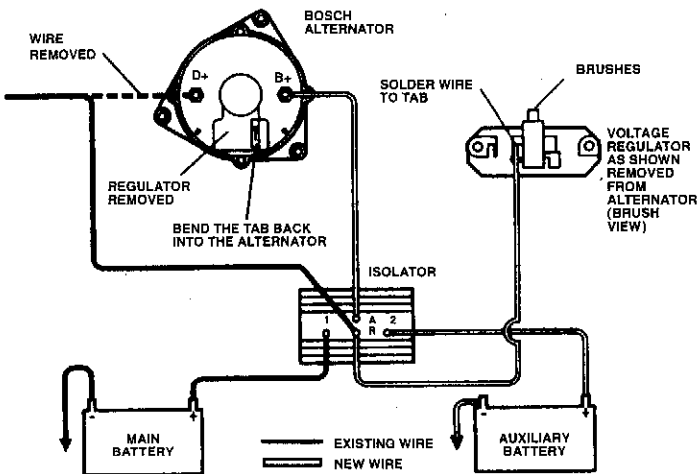


GROUP #3 ALTERNATORS:

Carefully review the individual schematics shown below and then follow the specific installation instructions relative to the type of alternator and vehicle with which you are working.

FOR BOSCH ALTERNATOR USING ALTERNATOR MOUNTED REGULATOR SYSTEM (AS USED ON VOLKSWAGEN VANAGONS).

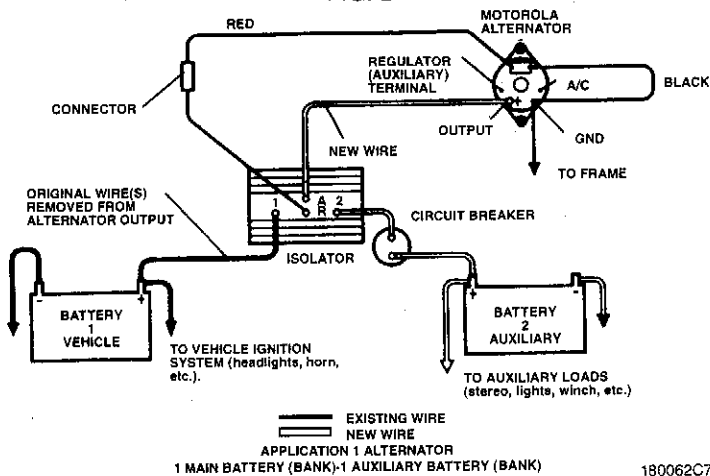
FOR ALTERNATOR EQUIPPED VOLKSWAGEN VANS USING AN EXTERNAL MOUNTED REGULATOR, CONSULT FACTORY.



1. After completing Step #4 of standard instructions, remove the two screws attaching the regulator to alternator. With great care, remove the regulator. Use a downward, rolling motion to prevent breaking off the brushes.
2. Bend the connector prong of the alternator, as illustrated, so that it will no longer mate with the internal connection strap of the regulator. (The regulator connector may need to be bent also to insure no contact.)
3. Solder an appropriate length of #14 wire to the regulator connector prong, as was bent in Step #2 (see illustration).
4. Replace regulator. Note: suggest a flat blade to hold the brushes in the holder until regulator is in place. Replace mounting screws (route wire so it will not be pinched or in the way).
5. Connect the other end of the wire that was soldered on the regulator to the "R" terminal on the isolator. **Colored terminal indicates "R" post.**
6. Disconnect the wire(s) going to the D+ terminal of the alternator.
7. Reconnect these same wire(s) to the "R" terminal of the isolator with the wire connected in Step #5.
8. Now proceed to Step #5 of the GENERAL ISOLATOR INSTALLATION INSTRUCTIONS.

GROUP #3 ALTERNATORS Continued
MOTOROLA ALTERNATORS EXCEPT LOAD
HANDLER SERIES. (FOR LOAD HANDLER SERIES,
USE STANDARD INSTRUCTION)

FIG. B



180062C7

- Prior to starting Isolator installation, take the following measurements:
 - Start engine. Run at fast idle.
 - Measure the voltage at the output of alternator. This should be about 14 volts.
 - Measure the voltage at the "REG" terminal of the alternator. (This is the terminal with the small red wire)
 Note whether this voltage is the same or about one volt higher than that measured at the output.
- Complete steps 1-9 of standard instructions.
- If the regulator voltage (as measured in step #1 above) is the same as the output voltage:
 - Disconnect regulator wire from regulator (or auxiliary) terminal of alternator.
 - Connect the regulator wire to the "R" terminal of the isolator. **Colored terminal indicates "R" post.** Leave the regulator terminal on the alternator empty.
- If the regulator voltage is higher than the output voltage, move the red regulator wire from the regulator post to the output post of the alternator. Do not use "R" post of isolator.
- If the red regulator wire is already on the output post, follow standard instructions.
- Complete Step #11 of standard instructions.

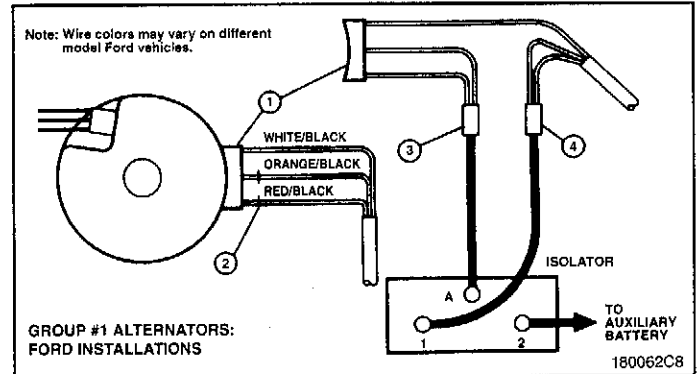
ELECTRICAL TEST:

- Engine not running: #1 terminal of isolator should read vehicle battery voltage, #2 terminal should read auxiliary battery voltage. The "A" terminal may read from zero to 13 volts. The "E" terminal on 3A series isolators (group 2) should read zero volts, the "R" terminal on "R" series isolators (group 3) should read from zero to 13 volts.
- Engine running and alternator charging: #1, #2 and "E" terminal on 3A isolators (group 2) should read voltage regulator setting or less approximately 13.8 to 14.5 volts. The "R" terminal on "R" series isolators (group 3) should also read voltage regulator setting or less. The "A" terminal voltage should read .8 to 1 volt higher than the reading of the #1, #2 terminals and "E" terminals on 3A series isolators (group 2) and "R" terminals on "R" series isolators (group 3).
- For 12 volt systems the "A" post should read approximately 14.8 to 15.5 volts. The #1 and #2 terminal should read 13.8 to 14.5 volts. If the "A" terminal reads 13.8 to 14.2 volts the regulator may be sensing the alternator output rather than the main battery. This situation needs to be corrected for proper charging of batteries.
- Colored terminal indicates "E" post on group 2 isolators and "R" terminal on most group 3 isolators.**

HELPFUL HINT FOR FORD INSTALLATIONS
(LATE 1985 & LATER)

ISOLATOR INSTALLATION INSTRUCTIONS FOR FORD
PRODUCTS USING AN ALTERNATOR WITH
PLUG-IN CONNECTIONS (LATE 1985 & LATER)

This section applies to Ford alternators with 2 plug-in connections. If your alternator has an output bolt, return to Step 6 of general instructions.



GROUP #1 ALTERNATORS:
 FORD INSTALLATIONS

CAUTION: Disconnect battery before proceeding with modification and installation.

- Locate the connector on the side of the alternator that has one light wire and two heavy black wires with orange or red trace.
- Cut both black/orange wires close to the alternator, allowing enough length to attach a butt splice (approximately 2 to 3 inches). This is the proper connection. Do not cut the smaller wire.
- Damage to vehicle may occur if wires are cut beyond the factory cabling splice (approximately 6 inches from the alternator).
- Splice an extension wire to *both* wires that are attached to the alternator and connect the other end to the "A" terminal of the Isolator.
- Splice an extension wire to *both* wires extending from the vehicle wire harness and connect the other end to the "1" terminal of the isolator.
- Return to Step #8 of general instructions.

INSTRUCTIONS FOR TESTING A SURE POWER
ISOLATOR WITH OHMMETER*

- Remove all wires from the isolator.
 - Using a needle movement ohmmeter Rx-1 scale or a digital ohmmeter diode scale, hold the Red* probe on terminal "A" and with the Black* probe touch terminal #1 and #2, and the "E" terminal for 3A isolators (Group #2), and the "R" terminal for (Group #3) isolators. A good isolator will show a current flow from "A" to #1, #2 and "R," and no current flow to "E."
 - Next, hold the Black* probe on terminal "A" and with the Red* probe touch terminal #1 and #2 (Terminal "E" and "R," if used). A good isolator will allow no current flow from "A" to #1, #2 or "R" and will show a current flow from "A" to "E."
 - Hold one probe on the aluminum heatsink, being sure there is contact by scratching thru the protective coating. Then touch with the other probe, terminals "A," #1, #2 (the "E" terminal for 3A isolators (Group 2), the "R" terminal for Group 3 isolators). A good isolator will show no current flow.
 - Colored terminal indicates "E" post on group 2 isolators and "R" terminal on most group 3 isolators.**
- *On some import ohmmeters, the red and black probes are reversed for these tests.

SURE POWER BATTERY ISOLATOR
ONE-YEAR LIMITED WARRANTY.

Sure Power Industries, Inc. warrants each new product against factory defects in material and workmanship for one year after date of purchase. The owner will be responsible for removing from the vehicle and returning any defective unit(s), transportation costs prepaid to Sure Power Industries, Inc. factory or a factory authorized servicing distributor. Sure Power Industries, Inc. will, without charge, repair or replace at its option, unit(s) which its inspection determines to be defective. All transportation charges must be borne by the purchaser. A copy of the purchaser's receipt must be returned with the defective unit(s) in order to qualify for warranty coverage. Exclusions from this warranty are the finish and any condition(s) determined by Sure Power Industries, Inc. to have been caused by abnormal use or service. This warranty shall not apply to any Sure Power product which has been improperly installed.

There are no warranties, expressed or implied (including any implied warranties of merchantability or fitness), which extend beyond this warranty period. The loss of use of the product, loss of time, inconvenience, commercial loss or consequential damages are not covered. Sure Power Industries, Inc. reserves the right to change the design of any product without assuming any obligation to modify any product previously manufactured.

This warranty gives you specific legal rights. You may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts. Some states do not allow the exclusion or limitation of incidental or consequential damages. Therefore, the above limitation(s) may not apply to you.



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