

MULTI-BATTERY ISOLATOR APPLICATION & INSTALLATION INSTRUCTIONS

(For inboard & outboard marine applications refer to instruction 180119 - Marine Isolator Installation Instructions section at www.surepower.com)
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 which make the job a snap. See the table that follows for the recommended wire size and circuit breaker 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

GROUP 1	General Motors (Delcotron/Delphi)	Except Delcotron/Delphi CS series alternators (CS series used on most 1985 and newer GM vehicles).
	Ford	Up to 1998
	Chrysler	All models, all years including Nippondenso externally regulated alternators.
	Jeep	Equipped with Nippondenso externally regulated alternators
	Japanese Imports	With alternators using external voltage regulator or external sensing.
	Motorola	Load Handler Series or 8EM Remote Sense Series
A Group 1 Isolator will have an alternator post and up to four battery posts. There are no colored terminals.		
GROUP 2	General Motors (Delcotron/Delphi)	Equipped with Delcotron/Delphi CS series (most 1985 - 1993) or CS130-D series alternators (most 1993 and newer***)
	Jeep	Vehicles equipped with Delcotron/Delphi CS series alternator (most 1985-1990).
	Toyota, Honda & Some Imports	1985 and newer equipped with Nippondenso alternator with internal regulators or alternators with an "S" (sense) terminal.
	Ford	Many 1998 and newer
Unplugging the plug-in connector from the alternator and counting the number of holes in the connector can identify the CS series alternator. The CS series will have three small and one large hole. The CS130-D alternator has four pin terminals all the same size. The SI series will have two slotted holes in the connector. ***Delco/Delphi CS series alternators require a separate sense wire which is included with the connector kit. The connector kit may or may not be included with the Isolator, but is available as an accessory. All Group 2 Isolators may be used in Group 1 applications. Simply disregard the additional excitation ("E") terminal. A Group 2 Isolator will have a colored fourth terminal indicating the "E" terminal.		
GROUP 3	Motorola	Other than Load Handler Series
	Bosch	Requiring regulator sensing
A Group 3 Isolator will have a colored fourth terminal indicating the "R" terminal.		
GROUP 4	Battery Isolators are not compatible with these alternators. A Battery Separator is recommended for these applications. Alternators with internal voltage sensing, e.g. some Mitsubishi and Hitachi , or single wire self exciting Delco/Delphi alternators. Isolators may be used if the alternator is modified. For further information on Group 4 Isolation Technology contact Sure Power Industries.	

MAXIMUM ALTERNATOR RATING	RECOMMENDED WIRE SIZE / CIRCUIT BREAKER			
	Up to 15ft	15ft to 20ft	20ft to 25ft	25ft to 30ft
70 Amps	#8 ga. / 50 Amp	#8 ga. / 50 Amp	#6 ga. / 50 Amp	#6 ga. / 50 Amp
95 Amps	#8 ga. / 50 Amp	#6 ga. / 50 Amp	#4 ga. / 50 Amp	#4 ga. / 50 Amp
130 Amps	#6 ga. / 80 Amp	#4 ga. / 80 Amp	#2 ga. / 80 Amp	#1 ga. / 80 Amp
160 Amps	#4 ga. / 120 Amp	#2 ga. / 120 Amp	#2 ga. / 120 Amp	#0 ga. / 120 Amp
240 Amps	#000 ga. / 150 Amp	#000 ga. / 150 Amp	#0000 ga. / 150 Amp	#0000 ga. / 150 Amp



A World Leader in Vehicle Electronic Engineering

INSTALLATION INSTRUCTIONS

RELEVANT TO ALL SIZES AND TYPES OF ISOLATORS

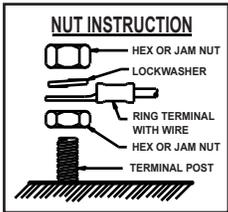
CAUTION: If you are installing an Isolator on a Toyota (alternator group type #2) or a Motorola/Bosch (alternator group #3) see special instructions before disconnecting any part of the existing system.

WHAT YOU WILL NEED

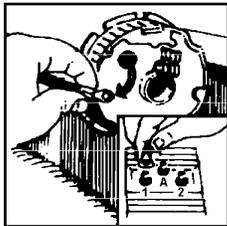
Screwdriver • Drill with 1/8" bit • Wire Crimper • Open end wrench set • Nut driver set • Automotive grade wire • Ring terminals
Butt connectors • Appropriately sized circuit breaker • Terminal Boot Covers

1. Remove the wires from negative terminals of all the batteries on your vehicle. Do not run the engine, extinguish all burning material and do not smoke near the engine. FOLLOW VEHICLE MANUFACTURER'S RECOMMENDATIONS FOR DISCONNECTING BATTERY.

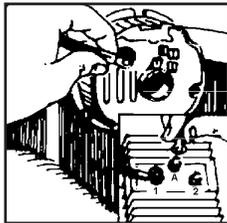
2. Mount the isolator in a convenient location as near to the alternator as possible and away from the exhaust manifold. Allow for proper ventilation. Do not mount on the engine. Drill 1/8" holes and mount with the screws provided.



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



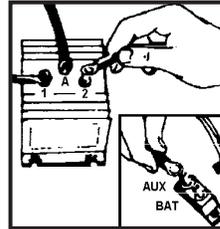
4. Locate the "BAT" terminal at the rear of the alternator. It is usually the largest connection. Disconnect **ALL** the wires (including the voltage regulator sensing wire if present) from the "BAT" terminal of the alternator. Reconnect these same wires to the "1" terminal of the battery isolator. Lengthen the wires, if necessary. Be sure you follow proper splicing techniques. **NOTE:** DISCONNECTING OR CUTTING THESE WIRE IN A LOCATION OTHER THAN AT THE ALTERNATOR MAY RESULT IN IMPROPER FUNCTIONING OF THE CHARGING SYSTEM.



5. Connect one end of a new wire of the proper size (see 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.

CAUTION: 1985-1990 Ford or 1998 and newer Ford vehicles may require special instructions (see □

□ pages 2 and 3 for specific instructions).



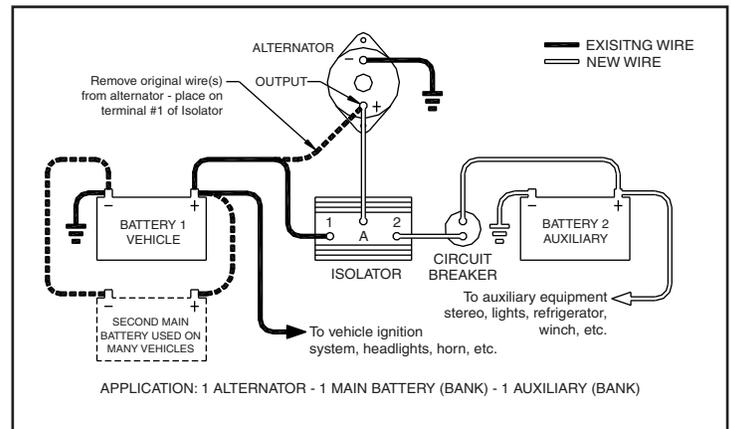
positive "+" terminal of battery bank Isolators

6. 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 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

7. IF YOUR INSTALLATION FALLS IN ALTERNATOR GROUP TYPE #2 OR #3, PROCEED TO SPECIFIC INSTRUCTIONS FOR THAT RELEVANT GROUP, OTHERWISE PROCEED TO STEP #8.

8. Connect all of the auxiliary loads (phone, lights, stereo, refrigerator, winch etc.) to the positive post of the auxiliary battery(ies). Reconnect the ground cables removed in step 1. 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.

9. Perform the electrical tests (page 4) to assure proper operation.



HELPFUL HINT FOR FORD INSTALLATIONS (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 on Page 2.

CAUTION: Disconnect battery before proceeding with modification and installation.

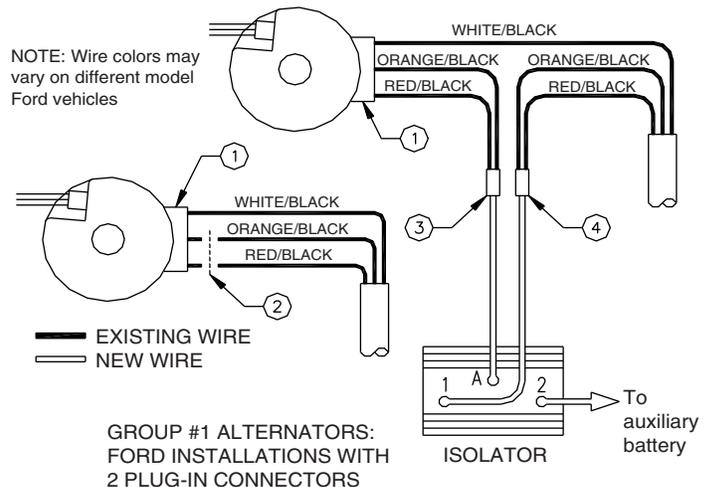
1. Locate the connector on the side of the alternator that has one light wire and two heavy black wires with orange or red trace.

2. Cut both black/orange wires close to the alternator, allowing enough length to attach a splice (approximately 2 to 3 inches). 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).

3. 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.

4. 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.

5. Return to Step #8 of general instructions, on Page 2.



SPECIAL INSTRUCTIONS FOR GROUP 2 ALTERNATORS

GENERAL MOTORS DELCOTRON/DELPHI

When installing an isolator on a GM "CS" series alternator equipped vehicle the general isolator installation instructions on page 2 of this instruction sheet must 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. There are two styles of Connectors used on GM vehicles after 1985. These are CS and CS-130D.

Note: If the existing Delco/Delphi connector has a wire in the "S" position of the standard CS alternators or a wire in the "D" position on the CS-130D connector, the replacement of this plug is not necessary. Proceed to step 3 below. If these positions on the connectors are vacant, proceed as follows:



If the mating side of the connector looks like this:
Refer to Instruction 180064, page 1. CS-130D
Most common on 1993 and later vehicles.



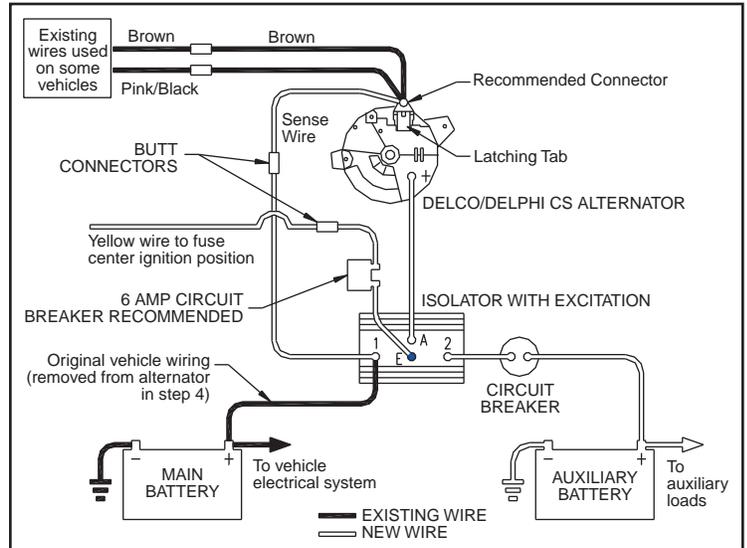
If the mating side of the connector looks like this:
Refer to Instruction 180064, page 2. CS Series
Most common on 1986 and later vehicles.

Please follow steps 1-4 below after completing page 1 or page 2 of Instruction 180064.

1. Reconnect the new plug into the alternator.
2. Route the remaining sense 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 along with wires from step 4 of general installation instructions. This becomes the voltage sense wire.
3. 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 IGNITION 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 6 amp circuit breaker [supplied with the 144-C Kit] insert the circuit breaker in the yellow wire as shown in the diagram.) Cut the correct length, strip and crimp on the supplied ring terminal. Now connect the yellow wire to the "E" terminal of the isolator with the lock washer and nut. Colored terminal indicates "E" post on the Isolator.

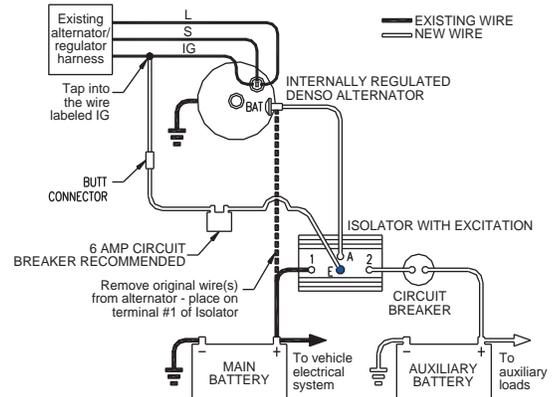
4. Now proceed to Step 8 of the GENERAL ISOLATOR INSTALLATION INSTRUCTIONS.



TOYOTA, SOME HONDAS & IMPORTS

Using internally regulated Nippondenso alternators. When installing an isolator to a Toyota alternator, follow general installation instructions in addition to the following steps.

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 6 amp circuit breaker (Sure Power Model 1506) 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.

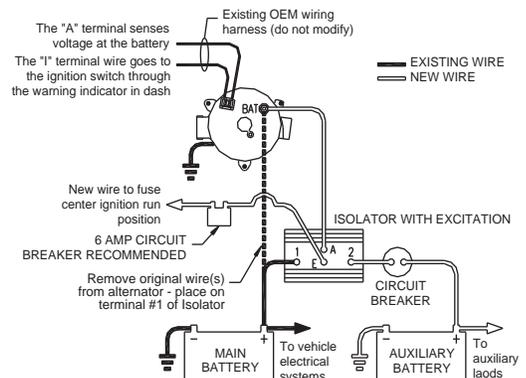


1998 & LATER FORDS

NOTE: This procedure is an additional step for some 1998 and newer Ford applications. Group 1 general instructions on page 2 of instruction sheet 180012 must be followed in addition to this instruction.

After completing steps 1-9 of the general instructions, connect a new wire from the "E" terminal of the Isolator to a 6 amp circuit breaker, then to an ignition run connection in the fuse center. Colored terminal indicates "E" post. Sure Power recommends a 6 amp circuit breaker (Sure Power Model 1506) be inserted in this line.

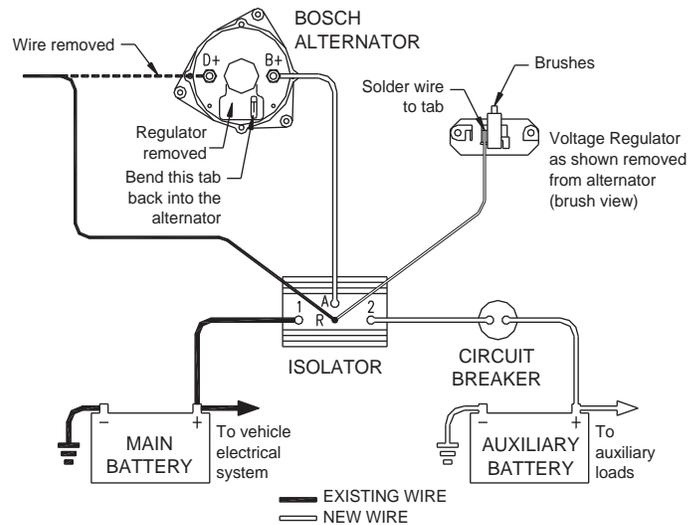
NOTE: The Group #2 isolator may be used in applications not requiring the excitation by not connecting the "E" terminal.



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 VOLKSWAGON VANAGONS).
FOR ALTERNATOR EQUIPPED VOLKSWAGON VANS USING AN EXTERNAL MOUNTED REGULATOR, CONSULT FACTORY.

1. After completing Step #4 of standard instructions, remove the two screws attaching the regulator. 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 above.
8. Now proceed to Step #5 of the GENERAL ISOLATOR INSTALLATION INSTRUCTIONS on Page 2.



ELECTRICAL TEST:

1. 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.
2. 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 0.8 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).
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.
4. Colored terminal indicates "E" post on group 2 isolators and "R" terminal on most group 3 isolators.

INSTRUCTIONS FOR TESTING A SURE POWER ISOLATOR WITH OHMMETER*:

1. Remove all wires from the isolator.
 2. 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".
 3. 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 "E" to "A".
 4. Hold one probe on the aluminum heatsink, being sure there is contact by scratching through 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.
 5. 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.
**If using a digital ohmmeter, a diode scale MUST be used.

SURE POWER 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 of limitation of incidental or consequential damages. Therefore, the above limitation(s) may not apply to you.