



## INSTALLATION INSTRUCTIONS

### Alternators

**NOTE:** See also special instructions if applicable to your unit.

#### CAUTION: PLEASE READ FIRST

- Always engage safety brake, parking brake and wheel chocks. Always use quality jack stands; the tire jack supplied with your car is not for mechanical work.
- Place manual transmission in neutral.
- Turn off all electrical accessories.
- Do not work on a hot car.
- Wear eye protection when working around batteries.
- Always disconnect battery ground terminal and cable assembly.
- Always work in a well ventilated area.
- Do not smoke around engine compartment.
- Never disconnect a battery cable or alternator cable and wires

when engine is running. Transient voltages (spikes) are produced when this occurs and some of these voltages exceed 200 volts. This can cause alternator and computer failure.

- Avoid shorts. Never jumper between terminals or from terminals to ground, nor try to trouble shoot by "sparking" terminals. Always use dielectric grease on terminals and use boots to cover terminals if supplied. Use heat shrink tubing when replacing connectors to protect wires and crimps from the elements (Figure 1).

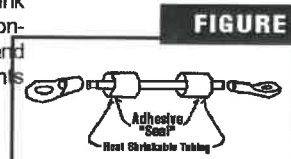


FIGURE 1

#### PRE-INSTALLATION CHECKS

1. Careful visual inspection can save time. Therefore, be sure to verify that all electrical connections are clean and tight. Check fuses and fusible links and replace as necessary (Figure 2). Check battery post terminals and cables, replacing all frayed, broken or corroded connectors and wires.
2. Check belts for cracks and abrasions; replace if necessary.
3. Check for corrosion on bolts and wires.
4. Internal regulators use a special connector at alternator (Figure 3). Make certain this connector is not corroded. Replace if necessary.



FIGURE 3

5. If your alternator has an externally mounted regulator, double check your wiring for corrosion and clean as necessary. It is a good practice to replace an externally mounted regulator when replacing the alternator.

6. Be certain that your battery is good. Defective batteries are responsible for 80-90% of all alternator failures. A good battery should have 2.1 Volts per cell. A 12 Volt battery has 6 cells and will read 12.6 Volts open circuit when fully charged. A dead battery will read 11.9 Volts or less. If you are uncertain of your battery's condition, have it checked by a professional with a battery load tester. Always use quality batteries.

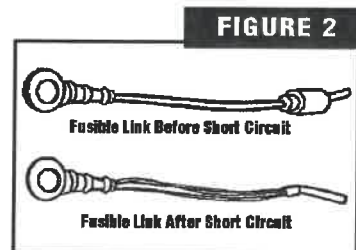


FIGURE 2

#### REMOVAL OF OLD ALTERNATOR

1. Label all wires before removing to assure proper reinstallation and location.
2. Disconnect the battery ground cable from the battery.
3. Disconnect battery, field, stator and ground wires to the alternator.
4. If the unit is a GM Delco SI series, press on locking tab (see Figure 3) and grasp the connector firmly and remove. If the unit is a Ford early style with external regulator, carefully label each wire as to its location and remove nuts holding each wire. Some units use a push-on connector at the stator and field terminals. Cut and remove the push-on connectors and replace with a ring connector as illustrated in Figure 4.
5. Remove bolts securing alternator and brackets if necessary.
6. Remove alternator belt and inspect.
7. Remove alternator from engine.

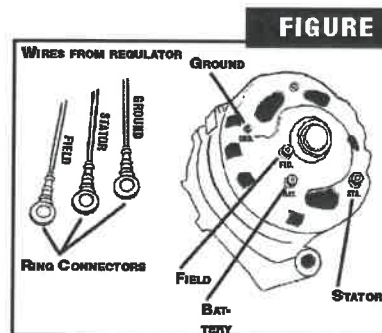


FIGURE 4

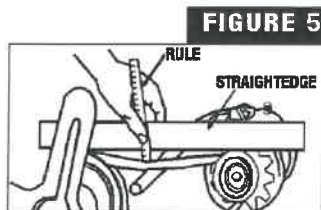
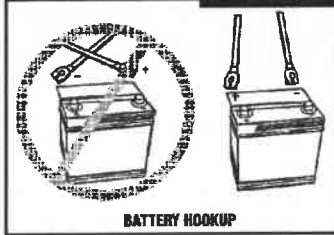


FIGURE 5

#### INSTALLATION OF NEW ALTERNATOR

1. Check for interference between mounting brackets, hoses, wires and other objects.
2. Install alternator and all bolts. *Do not tighten bolts at this time.*
3. Check belt alignment. Proper alignment is critical for serpentine belts. Be sure that each groove is properly seated in the pulley.
4. Adjust belt tension and tighten belt tension bolt as illustrated in Figure 5. Do not use heavy tools to pry on alternator case; hand pressure is adequate. Belt needs approximately 1/2" of deflection.
5. Tighten all other bolts.
6. Reconnect all wires and check labeling for correct location. Note that one wire alternators only need the battery charge wire connected in order to work. See special instructions on one wire hookup.
7. Be sure that the battery is good and fully charged. A low battery can damage the alternator because alternators are designed to maintain batteries, not to charge a dead or weak battery.

**FIGURE 6**



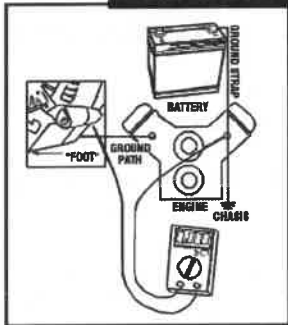
against corrosion and contaminants.

11. Before starting engine—Recheck. Make sure that all connections are clean and tight, the alternator belt is properly tensioned, and all bolts are tight.

## SYSTEM CHECK

- 1a. **Cars with Indicator Lights:** The indicator lamp should light when ignition switch is turned on. When engine starts, the indicator lamp should go out. If the engine idle is too low, the indicator lamp may glow slightly but this does not mean the alternator is malfunctioning. A slight increase in engine RPM should cause the light to go out.

**FIGURE 8**

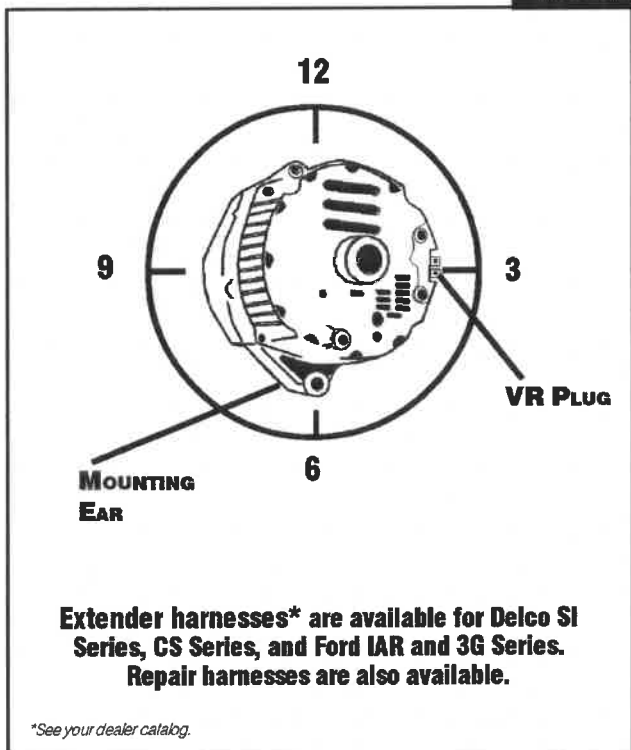


- 1b. **Cars with Amp meters:** Turn on ignition and lights. Note the amount of discharge on amp meter. After starting engine, amp meter should indicate less discharge or a charge condition depending on state of battery. If engine idle is low the amp meter may indicate a slight discharge—this is normal. Amp meter should advance to "0" or charge as engine speed increase. Check belt tension from time to time. Belt slippage is more apt to occur when battery is discharged or weak or when heavy demands are made on charging system.

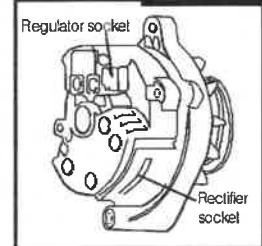
2. Never attempt to polarize an alternator. Alternators intended for use in 2 wire and 3 wire passenger car systems do not require polarizing. Our one wire system alternators do not need polarizing and are pretested and set at the factory.

3. Apply a moderate load to the charging system (i.e., high beam headlights) and run engine at 1500 RPMs. Using a digital voltmeter set for DC volts and with one test lead on the grounding bolt at the "adjusting ear" and the other test lead on the negative (-) battery post, measure to see if you have DC volts present. If you have a reading of 0.10VDC or higher, you have a poor ground connection between alternator and battery. Recheck your alternator grounding points at the "foot" and "adjusting ear" and the negative battery cable (Figure 8).

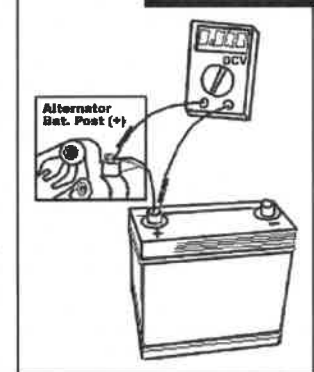
**FIGURE 10**



**FIGURE 7**



**FIGURE 9**



4. With battery fully charged and engine running, check voltage at battery(+) post and ground post(-). Voltage should be 13.8-14.5VDC, anything above 15.5VDC is dangerous and anything below 12.7VDC means the battery is not charging.
5. Using the voltmeter, measure the voltage drop between the (+) terminal of the battery and the alternator (+) output terminal (Figure 9). Voltage should be less than 0.40VDC. If voltage is higher than 0.40VDC, check for poor connections between (+) of alternator and (+) of battery. Even too small a (+) battery cable will cause this problem.

## SPECIAL INSTRUCTIONS

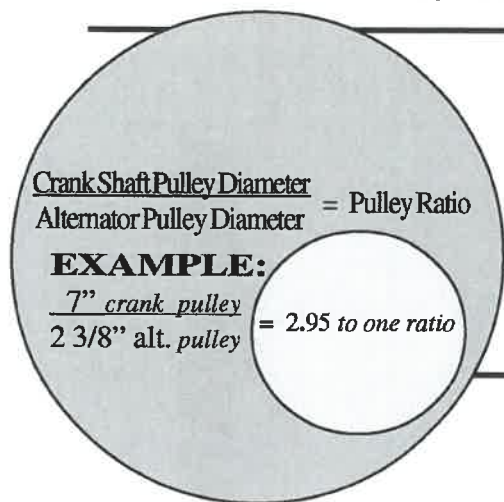
1. One wire alternators require no jumpers from the internal regulator to the alternator battery post. A wire should run from the output terminal to the battery positive post, hence the term "one wire".
2. Some alternators may have a different regulator "clocking" (position of VR Plug in relation to the mounting ear as viewed from the back) from what was removed from the vehicle. It may be necessary to use an extension harness as applicable for your unit. (See Figure 10)



# WARNING



**This alternator should not be allowed to exceed 18000 RPMs at any time. Alternator components are not designed to withstand the increased stress resulting from excessive RPMs.** Powermaster recommends that you calculate your pulley ratio and multiply it times your highest expected engine RPM to determine if your alternator will operate within the acceptable range.



To calculate a vehicle's pulley ratio, the engine's crank pulley diameter should be divided by the alternator's pulley diameter. This ratio should then be multiplied times the highest expected engine RPMs. The result will be that vehicle's maximum alternator RPM.

$$(\text{Pulley Ratio}) \times (\text{Max. Engine RPM}) = \text{Max. Alternator RPM}$$

$$2.95 \times 6000 \text{ max. rpm} = 17700 \text{ max. alternator rpm}$$

If your situation allows for greater than 18000 alternator RPMs, Powermaster recommends increasing the alternator pulley diameter or decreasing the crank pulley diameter to compensate. Powermaster has various pulleys available to help. If pulley ratio compensation is not an option, installing a rev limiter on the engine is recommended.

**Excessive RPMs can cause the alternator fan to flex and contact the drive belt. This could cause property damage and/or personal injury. In addition to RPMs, there are other factors that will substantially increase the likelihood of alternator fan-to-belt contact.**



**ALTERNATOR BRACKET ALIGNMENT AND STABILITY:**

Alternator brackets can be misaligned in such a way that the clearance between the alternator fan and belt is reduced. Loose or nonrigid brackets can also increase the likelihood of contact.



**WORN OR LOOSE BELTS:**

Belts that allow for side-to-side movement or deflection will decrease the effective gap between the fan and belt and increase the likelihood of contact.



**IMPROPER BELTS:**

Powermaster supplied V-type pulleys are designed to accommodate up to a 10mm or 3/8" belt. Larger belts will not seat into the pulley groove properly and will increase the likelihood of belt-to-fan contact. If the application requires a belt of greater than 10mm or 3/8" width, Powermaster recommends the original equipment pulley be used instead of the supplied pulley.

**NOTE: Powermaster is not responsible for vehicle damage or any other damage resulting from improper use of this product.**



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If you still need assistance, call our tech line at:  
(630) 849-7754  
(in the USA)

You may also contact us by e-mail at [tech@powermasterperformance.com](mailto:tech@powermasterperformance.com)

**Thank You!**