

## Series 300 & 400 Retrofit/Upgrade Installation Procedures

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**WARNING!!!** Always use proper eye protection when performing any mechanical repairs. Failures to use proper eye protection can lead to serious and permanent eye damage. Only perform the mechanical repairs that you are properly qualified to perform. Mechanical repairs that are beyond your technical capabilities should be handled by a professional qualified technician.

**DANGER!!!** Before removing or replacing the alternator, always DISCONNECT THE NEGATIVE (B-) CABLE AT THE BATTERY to avoid serious injuries or damage. If the battery is not disconnected, the alternator output terminal (B+) is always live (Hot). Touching this terminal with a tool to metal (Ground) can quickly get hot enough to burn skin and damage parts or tools.

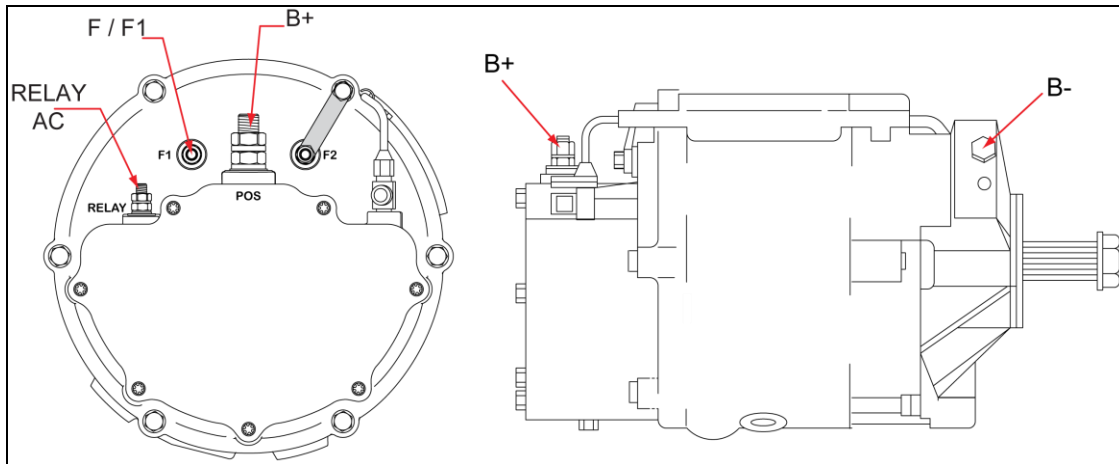
**NOTE!** Once the NEGATIVE (B-) CABLE IS DISCONNECTED (AT THE BATTERY) it is recommended to place the battery under charge while performing the removal and installation of the alternator

### **1) ALTERNATOR REMOVAL:**

FOLLOW ENGINE OR VEHICLE MANUFACTURER'S INSTRUCTIONS FOR REMOVING THE OLD ALTERNATOR FROM THE ENGINE AND INSTALLING THE NEW ALTERNATOR

**NOTE!** Before disconnecting any electrical connections use the provided label ID pkg. # 4900-3000, to TAG and IDENTIFY all wires and cables as illustrated in **FIG. 1**. Wire connected to RELAY use label “AC” for identification.

**FIG. 1**



a) Disconnect all electrical connections from the existing alternator.

**NOTE!** When replacing an oil cooled 50DN or 50DN+ alternator, remove all oil lines between the alternator and engine. Plug oil lines outlets with proper tubing or pipe caps, or ask your distributor for an “Oil Line Cap Kit” # 4900-5000.

b) Remove alternator drive belt.

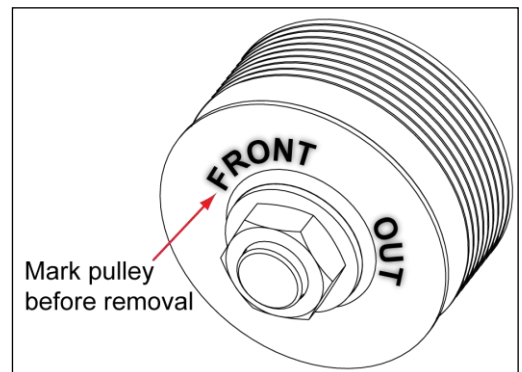
c) Remove 4 alternator mounting bolts.

**CAUTION!** With the use of a hoist and with caution to prevent personal injury, remove the alternator from the engine.

## 2) PULLEY INSTALLATION & ALIGNMENT:

**FIG. 2**

- a) To prevent misalignment, should the old pulley be reused, mark pulley (face) before it is removed from the old alternator. See **FIG. 2**.
- b) Replace pulley if damaged or worn.

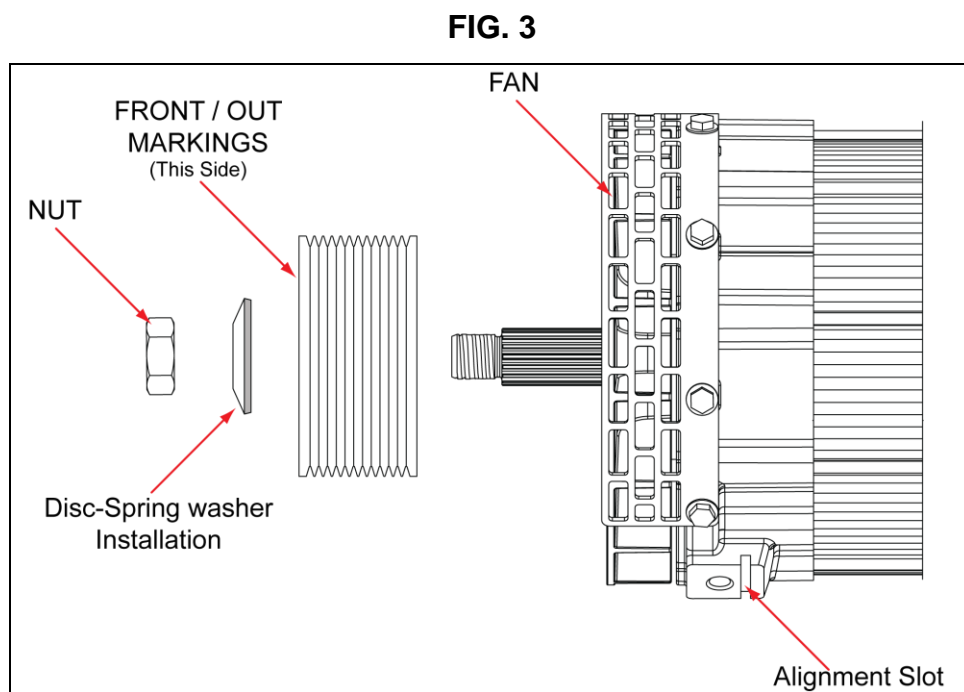


**NOTE!** It is recommended not to use pulleys with a diameter smaller than 76mm/ 3.0” as pulley ratio may over speed the (alternator) rotor RPM limits.

300 & 400 Series alternators are shipped with a label ID Pkg. # **4900-3000**, Mounting Hardware Pkg. # **84100-3010**, One maintenance free Air Precleaner # **4800-2101** and Pulley Nut Pkg. # **4900-2100**.

Nut, disc-spring washer & plastic shaft collar, are tightened on the rotor shaft to prevent an axial rotor movement and protect it from possible damage in transportation.

- c) Remove nut, disc-spring washer and discard the plastic collar.
- d) To ensure pulley alignment, install pulley with the marked or markings **“Front/Out”** as illustrated in **FIG.3**.



Pulley should slide freely, by hand onto shaft. **DO NOT USE HAMMER.**

- e) Install disc-spring washer only as illustrated in **FIG. 3**.

Torque the pulley nut to 265-290 Nm / 195-215 ft-lb

### **3) ALTERNATOR INSTALLATION:**

**CAUTION!** Use caution to prevent personal injury. Use a hoist and carefully place the alternator on the mounting bracket.

**NOTE!** Ensure the two dowel pins on the alternator mounting bracket are seated in the alignment slot of the alternator front bracket. See **FIG. 3**.

Secure alternator to the mounting bracket using the Mounting Hardware Pkg. provided (four 1/2-13 x 1.250 in. bolts & lock washers).

Mounting bolts should go 0.7 to 1.0 in. / 18 to 25 mm into alternator mounting pads.  
Torque mounting bolts to 88Nm / 65 ft-lbs.

#### **4) AIR PRECLEANER INSTALLATION**

##### **300 & 400 Series alternators with 76mm / 3" diameter Air Intake Cover**

**NOTE!** The Air Precleaner supplied is designed to operate in temperatures of up to 93C / 200°F. Applications with ambient temperatures greater than 93°C / 200°F, a 3" fresh air intake hose duct must be installed to the alternator back cover.

**CAUTION ! AIR PRECLEANER MUST BE REPLACED EVERY 12 MONTHS, TO AVOID PREMATURE ALTERNATOR FAILURE.**

- a) Install the Air Precleaner supplied, onto alternator back cover placing the (precleaner) ejection slots downwards @ 6:00 or connect the fresh air intake hose.
- b) Hold Air Precleaner against cover and torque hose clamp screw 4.0-4.5 Nm / 35-40 in-lbs. as illustrated in **FIG. 4**.

##### **400 Series alternators with 100mm / 4" diameter Air Intake Cover**

- c) Install a fresh air intake duct hose on the alternator back cover.

Air Duct Hose specifications:

- 100 mm / 4 in. diameter.
- Total length should not exceed 4 m. / 13 ft.
- Should not have more than two 90° bends.

**CAUTION !** If a filter or air precleaner is used, consult the manufacturer for air flow restriction.

Replace the alternator drive belt if damaged or worn.

Install belt following engine manufacturer instruction.

Verify the drive belt is properly aligned with poly-V grooves.

Belt wrap: 180 degree nominal. Less belt wrap requires more belt tension.

**Please refer to belt manufacturer for drive belt tension guidelines**

**WARNING!!!** Low or High belt tension causes premature bearings failure. Low belt tension causes belt to slip, pulley and bearings will overheat, resulting in bearing failure. High belt tension increases bearings fatigue and again will result in premature bearings failure. Please contact drive belt manufacturer for belt tension specifications and or instructions.

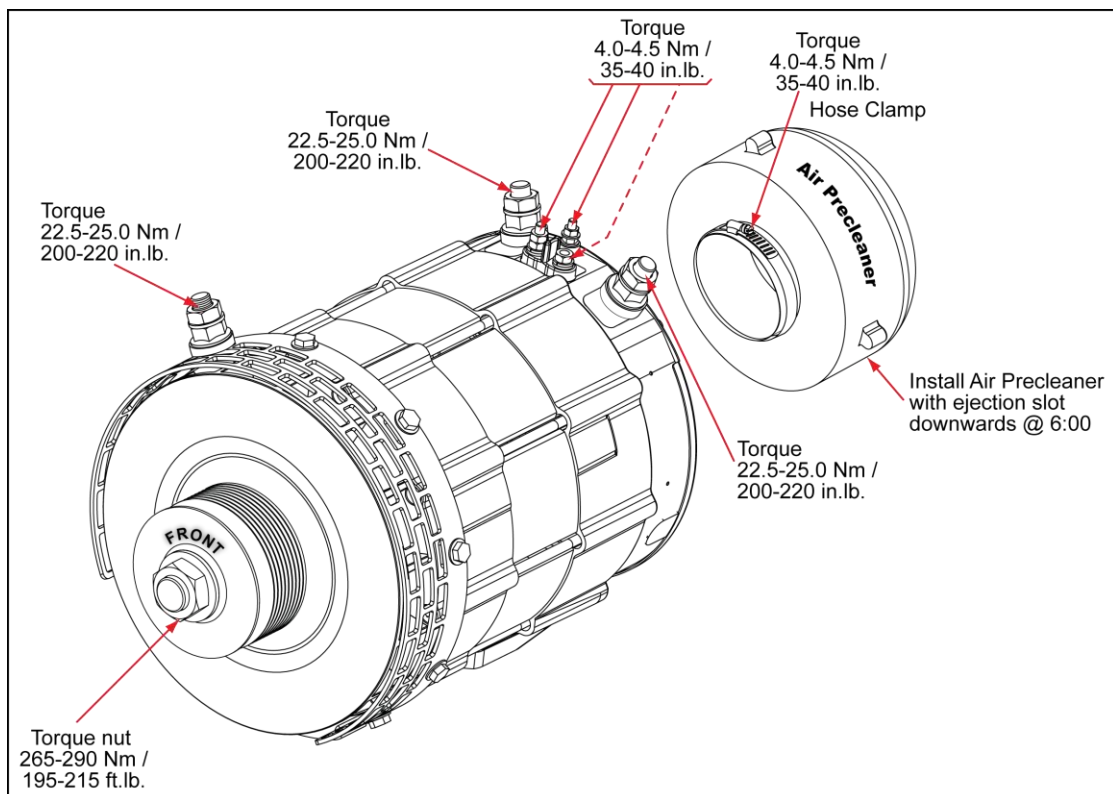
## 5) ALTERNATOR ELECTRICAL CONNECTIONS:

**NOTE!** Clean all terminals, replace corroded or bad connectors. Replace wires and cables with damaged insulation or broken wires strand.

**WARNING!!!** Cables or wires should not rest over the air precleaner, as vibration will cause premature failure. Redirect all cables and wires away from air precleaner.

- a) Connect tagged B+ and B- cables, to the corresponding new alternator terminals and torque to 22.5-25.0 Nm / 200-220 in.-lbs. See **FIG.4**.
- b) Connect tagged F and AC (Relay) wires to the corresponding new alternator terminals and torque to 4.0-4.5 Nm / 35-40 in.-lbs. See **FIG.4**.

**FIG. 4**



## 6) VOLTAGE REGULATOR REPLACEMENT:

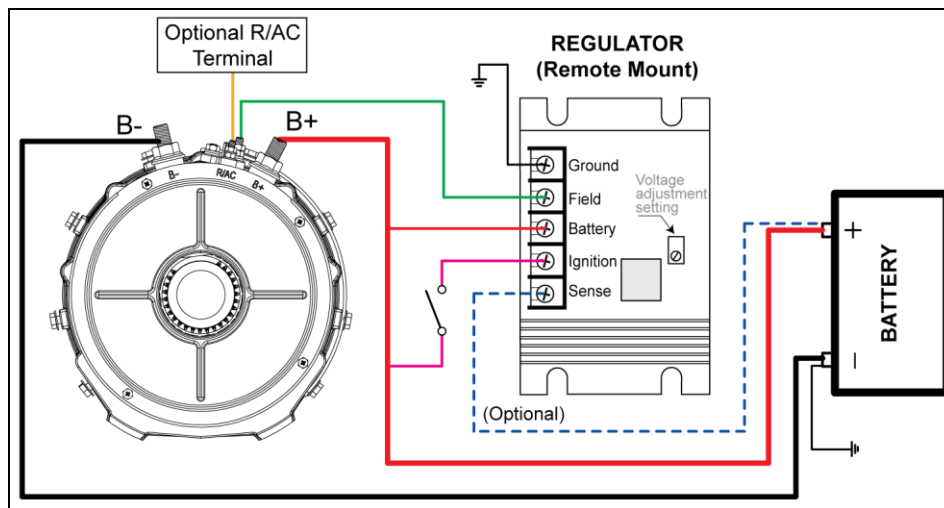
VR-300 type voltage regulators are firewall mounted.

**NOTE!** FIG. 5 is a typical wiring diagram; the actual vehicle electrical schematic may not have Ignition and/or Sense wires connected.

- a) From left to right label the wires starting with Ground, Field, Battery, (see **NOTE!**) Ignition and or Sense wires may not be present
- b) Remove and install the new VR-300 regulator following the installation instruction.
- c) Connect wires in the corresponding position and torque to: 1.6-2.0 Nm / 14-18 in-lbs.

Voltage regulators # **3500-50251** are factory-set @ 28.0 Volts, but are adjustable, therefore can be adjusted to your desired voltage setting.

**FIG. 5 (typical wiring diagram)**



## 7) ALTERNATOR OUTPUT TEST:

**NOTE!** Test must be performed with fully charged batteries.

- a) Verify batteries are fully charged (24.5-25.5 Volts). Disconnect battery charger.
- b) Re-connect battery B- cable and start engine.
- c) Turn on all vehicle loads and measure voltage at the alternator output B+ terminal.  
Voltage reading should be between 27.6-28.5 dependent on (remote) Voltage Regulator set point.

## 8) VOLTAGE DROP TEST:

Voltage drop measurements must be taken with all electrical loads turned on.

- a) **At Alternator**, measure voltage between alternator output B+ terminal and B- source (ground). Record readings obtained.
- b) **At Batteries**, measure between B+ and B- terminals. Difference between the two readings represents voltage (lost) drop within the circuit. If voltage drop is less than 0.5 V no further action is required, if higher, check for inadequate cable gauge or faulty connections.

**If you need additional information please contact our Technical Service Department.**