

1. APPLICATIONS

Alternator Application & Conditions of Use

- 1.1 Prestolite Electric Incorporated (Prestolite) alternators are designed for use on approved applications on bus, coach, RV, and heavy commercial vehicle, industrial, agricultural and marine engines. **Use for aviation is specifically excluded.**
- 1.2 The alternator is designed to operate with a battery connected to its main terminals and its use without a battery is specifically excluded unless agreed by Prestolite Electric during the installation sign off. It is, however, permissible to run the alternator within its speed range without a battery connected for the short period of time necessary for engine testing. However, care should be taken to ensure that components subject to damage from high voltages are protected during such tests. Complete isolation of the alternator is recommended.

The output is self-limiting and the machine will not be damaged in the short term by an electrical load exceeding its rated value, but prolonged use at speeds where the rated output is exceeded will lead to battery discharge. It is essential that careful evaluation is carried out to ensure that a good load balance has been obtained. Poor load balance will result in the alternator running at maximum output for a high proportion of the duty cycle with consequential reduction in the long term life and durability of the alternator. Prestolite Electric will not be responsible for undercharged batteries resulting from poor load balance. Models not specifically designed for Dual (parallel) operation should only be used as a single alternator.
- 1.3 To achieve the expected / predicted operating life it is essential that the Prestolite Electric alternators are operated within their specified temperature and speed ratings.
 - 1.3.1 Maximum continuous speed. Consult the specific product operation guide for the speed rating of your alternator.
 - 1.3.2 Temperature range – 40 °C to +93 °C with specific models rated at 110°C and 115°C. Consult the specific product operation guide for the temperature rating of your alternator.
- 1.4 Prestolite Electric alternators are air cooled machines and require a supply of clean, dry cool air. Do not obstruct the airflow in anyway.
- 1.5 The nominal voltage setting of these alternators is 14.2 or 28.4 respectively for 12 or 24 volt systems, unless the customer has specifically requested another set point.
- 1.6 Unless specifically stated alternators are designed for commercial applications: Prestolite makes no claim for fitness of use in a military or hazardous application. If used in these applications without Prestolite sign off that will be solely the responsibility of the purchaser.
- 1.7 Prestolite reserves the right to make product improvements at any time without any responsibility to update previously supplied products.

2. INSTALLATION



Whilst the engine is running the fan and pulley assembly constitute a safety hazard to a person performing work in the engine compartment.



Care must be taken so as to minimize the risk of hands or clothing of an operator coming into contact with any rotating component or belt.

2.1 Electrical

- 2.1.1 The output cable(s) must be rated to carry the maximum output current between the alternator and the battery. The total voltage drop in both positive and negative cables (including connectors) must not exceed 1 volt on a 24 volt system & 0.5 volts on a 12 volt system, at maximum output.
- 2.1.2 All cables should be supported to avoid failure due to vibration and should be securely connected to the alternator. Prestolite Electric recommendations for terminal tightening should be adhered to and the customer should check that this is suitable for the installation. Where cable conduits are used these should be looped adjacent to the alternator and a hole positioned at the lowest point to ensure water drainage.
- 2.1.3 A fuse should be fitted to prevent reverse battery connection causing an alternator failure. Fuses should also be used to protect cables from damage due to system short circuits. It is sometimes useful for servicing to fit a battery isolation switch in line between alternator and battery.
- 2.1.4 Main and auxiliary connections should be made to the terminals securely. Prestolite recommends the use of boots and/or silicone grease for added protection.
- 2.1.5 A warning light (where applicable) with a minimum rating of 2W or an equivalent resistor must be connected to the alternator to provide initial excitation current from the battery, this is necessary to ensure correct excitation. The warning light has the advantage of indicating failure of the charging system. Normally the warning light will be illuminated when the ignition switch is on and the alternator stationary. As the alternator speed is increased the warning light will go out when the cut in speed is reached. A charging system fault is indicated by one of the following:
 - Warning light is not illuminated with stationary alternator.
 - Warning light does not extinguish at cut in speed.
 - Warning light subsequently illuminates during operation.

2.2 Mechanical

- 2.2.1 The alternator should be sited where it will not be exposed to contamination e.g. by spillage of fuel, oil, brake fluid, antifreeze, battery acid or kerosene.

- 2.2.2 The alternator should be mounted on the engine in a cool position where the flow of air through the unit will be unobstructed and where there will be no risk of damage due to radiant heat from the exhaust system. The side of the engine opposite to the exhaust outlet is therefore preferred.
If exhaust side mounting is unavoidable, heat shields should be used.
See individual data sheet for maximum operation temperature.
- 2.2.3 Bearing life is a function of pulley overhang, radial pulley load, drive ratio and speed. Having regard to these factors, the bearing life should be calculated for all installations to ensure that the design life is adequate. We recommend the maximum pulley load be approximately 900-1100N (200-250 lbf). Over-tensioning of the drive belt will reduce bearing life.
- 2.2.4 The pulley should be fitted to the shaft such that it abuts the center of the fan. It is essential that the shaft nut be tightened to the specified torque on the outline drawing. Serious damage to the machine can occur if this nut is not tightened to the specified torque. Customer service instructions must emphasize the importance of this torque specification.
- 2.2.5 Instructions referring to mechanical handling, torque specifications and tightening procedures must be adhered to.
- 2.2.8 Drive line:
- High levels of torsional oscillations can seriously reduce the service life of the alternator and in extreme circumstances lead to fatigue failure of housings.
 - Consideration should be given to dynamic hub loads and torsional oscillation during the design stage and if necessary, installation of an Overrunning Alternator De-coupler Pulley should be considered. Prestolite will not accept liability for early life / fatigue failure caused by high levels of torsional Oscillation.

In order to minimize radio frequency emissions, brush replacement should be planned at regular intervals.

Prestolite Electric Incorporated:

- **Will not accept liability for any unapproved modifications made to the Alternator.**
- **Reserves the right to refuse to accept responsibility for any failure defect or consequence of failure if the application has not been approved by our Applications Engineering team.**
- **Will not support any of its products used in aviation applications.**
- **Any change made to a system design or installation detail after completion of the application approval by Prestolite, whether or not Prestolite Electric is informed of the change, shall automatically invalidate any previous approvals.**

3. SERVICE PRECAUTIONS

- 3.1 The cable(s) are live at all times while the battery is connected. Before any form of maintenance or inspection is attempted the battery must be disconnected. **Always** disconnect the negative cable first
- 3.2 Connections must not be made or broken in the presence of a flammable vapour. Hydrogen gas from a charging battery can cause a fire and/or an explosion.
- 3.3 The alternator must not be operated in the presence of a flammable vapour.
- 3.4 Whilst rotating, the fan and pulley constitute a safety hazard; no maintenance work or inspection should be attempted whilst the engine is running.
- 3.5 The alternator or battery leads must not be disconnected whilst the engine is running.
- 3.6 Refitting:
Reversed battery connections will result in a high fault current damaging the rectifier, causing severe arcing, and overheating the cable. It is therefore essential to ensure correct polarity.
- 3.7 'Jump' Starting:
The use of an external battery connected in parallel with the installed battery for emergency starting purposes is permitted providing:
- a. The external battery is the same nominal voltage as the installed battery.
 - b. The correct polarity is maintained; reversed connection will result in dangerously high circulating current and fire risk. Refer to 3.2 and 3.6.
 - c. The installed battery is not disconnected.
 - d. For reasons of safety, a negative point away from the battery should be chosen.
- 3.8 This alternator contains an electronic regulator and therefore special care is necessary. In particular:
- The alternator regulator terminals should not be 'flashed'.
 - Use of high voltage test equipment (i.e. meggers) must only be used as detailed in the workshop manual.
 - Welding and other high voltage processes should **not** be performed on the vehicle whilst the alternator is connected.

4. MAINTENANCE

Prestolite Electric will not be responsible for any damage if maintenance instructions specified in the workshop manual.

When replacement parts are required, it is essential that only genuine Prestolite Electric specified components are used.

- 4.1 All terminals, mounting bolts and pulley nuts should be regularly checked for tightness.
- 4.2 The air passages in the machine should be regularly checked to ensure they are clear. When fitted this should include the pipe and filter.
- 4.3 The Prestolite Electric Service Manual covers workshop procedures for stripping, assembling and testing alternators.
- 4.4 Drive belts must be tensioned as per engine manufacturers' specification.