

1. APPLICATIONS

- 1.1 Starter motors are designed for use on internal combustion engines fitted to on and off highway applications. **Use for aviation is specifically excluded.**
- 1.2 Cranking Time
Starter motors are short term rated and operation for an excessive time will cause them to overheat and / or damage the overrunning clutch. Prestolite will **not** take responsibility for damage to starters caused by excessive cranking.
In normal operation it is expected that cranking times will be less than 5 seconds and cranking in excess of 30 seconds must be avoided. The maximum acceptable cranking cycle that the starter should be subjected to during installation and subsequent service consists of three operations of 30 seconds separated by periods of at least 120 seconds rest.
- 1.3 Over-speed Protection
If the starter remains energized after the engine has started then the ring gear will drive the pinion at a high speed. In order to minimize damage to the armature, the drive incorporates a roller clutch which disconnects the armature from the pinion when the engine ring gear drives the pinion faster than the motor.
Prestolite will **not** accept liability for damage to the starter caused by excessive operation after the engine has started (running in mesh).
- 1.4 Operation with a Running Engine
Attempts to operate the starter into a running engine will cause serious damage to the starter. Prestolite will **not** accept liability for failures caused in this manner. It is recommended that remote installations should be fitted with protection devices to prevent occurrence of this problem.
- 1.5 Prestolite reserves the right to make product improvements at any time without any responsibility to update previously supplied products.

2. INSTALLATION AND SAFETY PRECAUTIONS

- 2.1 The supply is 12V or 24V nominal from batteries.
- 2.2 All cables connected to the starter should be of a heavy duty stranded type.
 - a. The installer/ operator must confirm that the cables are adequate with appropriate overcurrent protection for the battery bank which is connected
 - b. The cables and connections should be checked to ensure that the total volt drop in the relay circuit should not exceed 2V including volt drops in associated switches, connections etc.
- 2.3 Always isolate the supply before adjusting or removing the starter. Disconnect the negative battery terminal first to avoid a short circuit condition and arcing. Failure to follow this procedure can result in damage to ancillary equipment on the vehicle.
- 2.4 **REFER TO “VEHICLE/ENGINE MANUFACTURES HAND BOOK” WHEN JUMP STARTING** – failure to do so may cause expensive and irreparable damage to the vehicle or related parts.
- 2.5 No additional connections are permitted to the switched side of the solenoid switch or the solenoid coil.
- 2.6 Where an integral starter control relay (IMS) is fitted to the starter, connections from the relay to the starter may **not** be modified in any way, and the relay shall **not** be bypassed either:
 - a. Temporarily during commissioning or maintenance or
 - b. In the complete finished vehicle/equipment installation.
- 2.7 In order to disconnect the starter from the battery supply, whilst the vehicle is not in use, a supply isolation switch is required; double-pole isolation is recommended, minimum acceptable is isolation of the live (positive) side of the system power supply close to the power source.
- 2.8 Ensure that the starter is rigidly mounted.
- 2.9 The starter must be mounted on the engine with the solenoid switch above the horizontal.
- 2.10 Standard versions are ventilated and have a drain tube or drain slot which is intended to be mounted at the lowest position of the starter.
- 2.11 Prestolite are **not** responsible for failures to starters or ancillary equipment mounted incorrectly. Contact an authorized dealer or Prestolite Technical Service directly for assistance. (See footer for contact information).
- 2.12 A battery isolator switch should be used for safety under fault conditions.
- 2.13 Ensure that the cables are securely fixed and away from all moving parts and excessive temperatures.
- 2.14 Rubber terminal covers should be fitted to prevent exposed terminals suffering from corrosion. These rubber covers also help to prevent accidental contact with live terminals.
- 2.15 Open flywheel applications can lead to severe corrosion of the shaft. To prevent this damage make sure all flywheel covers are fitted correctly.
- 2.16 After placing the cable lugs on to the starter terminals, each terminal nut should be tightened to appropriate torque.

2.17 The starter must not be used:

2.17.1 To prime the engine for either fuel or oil gallery filling. This is particularly important with new or refurbished engines. If the engine fails to start after 30Secs the engine control / fuel system / starting aid should be investigated.

2.17.2 To move the vehicle.

Prolonged and or repeated cranking will damage the starter

2.18 The starter must not be operated by bridging across terminals. Insulating caps should be fitted to prevent accidental connection across terminals.

2.19 No suppression device of any kind should be connected to the installation without prior consultation with Prestolite Electric.

2.20 **Do not** pull the pinion forward with the starter connected.

Prestolite Electric Incorporated:

- ***Will not accept liability for any unapproved modifications made to the Starter.***
- ***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. MAINTENANCE

Prestolite recommends carry out the following procedures at six monthly intervals.

3.1 Check the starter fixing bolts are tight to the engine and/or vehicle manufacturers recommended torque.

3.2 Check the security of all the electrical connections and cables.

3.3 Carefully remove excessive dirt and contamination from the outside of the starter.

3.4 The battery should be maintained in a good condition, particularly regarding the state of charge and the electrical connections, as these are the main causes of poor starting and of starter motor failure.

4. TIPS ON HOW TO AVOID A REPEAT FAILURE

- When replacing a starter motor checks should be made to ensure the control circuit – key switch / starter control is functioning correctly – faulty or defective ignition key switch and or starter button / control circuit may have caused the original failure-i.e. running in mesh after starting or making attempts to start when the engine has started. Failure to correct this may cause a repeat failure.
- Some engines / applications suffer premature crankshaft thrust washer wear, causing the flywheel to move closer to or into contact with the starter – check crankshaft end float to ensure adequate clearance exists by trying to move the flywheel toward to away from the starter mounting hole.
- Spacers – some applications are fitted with spacers – check when removing old unit – if present these MUST be fitted to the new product.
- Batteries – size and capacity CCA and Ah are specified by the manufacture – replacements outside of manufactures recommendations may adversely affect starter operation and/or the starter's ability to crank the engine specifically at low temperatures.
- Poor connections to the battery / starter / chassis can cause high resistance – typically noted as slow cranking or hesitation when starting begins.