

FLORIDA DEPARTMENT OF TRANSPORTATION
ALTERNATOR OUTPUT TEST PROCEDURE

VERSION 1

Prepared for: The Florida Vehicle Procurement Program

By: Robert E. Westbrook, Paul E. Johnson Jr., Cecil H. Carter, Leroy E. Edwards

OVERVIEW

This test is the alternator output test for all transit equipment purchased through Florida Vehicle Procurement Program contracts. This test is performed on all aftermarket alternators that are recommended by bus manufacturers to replace the OEM alternators. FDOT desires to have this test simulate an environment that simulates severe duty transit operation. The FDOT will test one of each type of alternator to be used on the transit vehicles. **This could include OEM alternators if proposed by the bus manufacturer.**

TEST CONDITIONS / EQUIPMENT

This test will be performed in the FDOT Bus Inspection, Testing and Research facility. The subject alternator is tested using a Crumbliss 2115 Alternator tester. It is encased in an aluminum heat-shroud containing a thermometer. Heat is provided by a 500 degree heat gun attached to the heat-shroud. This set-up provides a simulation of under hood operating conditions. During testing, a 12 volt battery is used to maintain the charging system. DC on/off switches control two 12" DC condenser fan motors to prevent the battery from overcharging.

TEST SET-UP

1. Install subject alternator into tester vise;
2. Determine appropriate size alternator pulley to be used;
3. Determine tester pulley size to drive alternator at correct engine idle RPM;
4. Install drive belt between alternator pulley and tester pulley;
5. Check that both pulleys are properly aligned;
6. Attach correct test leads to alternator being tested;
7. Connect cables to 12-volt battery;
8. Note the RPM levels to be used during test.
9. Place heat-shroud over alternator/vise assembly;
10. Position heat gun;
11. Turn on testers cooling fans; (*switch located on left side of the tester*)
12. Turn on BATTERY switch; (*if required for particular test*)
13. Turn on START switch;
14. Set MOTOR switch to Slow position;
15. Set VOLT switch to 12 or 24 volt position;
16. Set PULLEY knob to diameter of pulley being used;

TEST PROCEDURE

1. Adjust RPM to engine idle speed;
2. Turn FIELD CURRENT load control from minimum position slowly toward maximum position until VOLT gauge reads 12.4;
3. Note reading from AMP gauge;

This reading is Maximum Output at Idle under Full Load;

Follow below, to determine SAE (hot) rating Performance Curve;

Raise RPM up gradually another 500 RPM;

Note reading from AMP gauge;

Raise RPM up gradually another 500 RPM;

Note reading from AMP gauge;

Raise RPM up gradually another 500 RPM;

Note reading from AMP gauge;

Raise RPM up gradually another 500 RPM;

Note reading from AMP gauge;

The above readings can be used to plot performance graph;

4. Take temperature reading of housing surface, starter, rotors and both bearings;
5. Record and file all readings on each tested alternator;

During the test period, the temperature inside the heat shroud will be between 120 - 150 degrees F. The alternator will run at minimum idle speed (600 rpm) for 30 minutes and at maximum rpm speed (2000) for 30 minutes.

The alternator amperage output, minimum battery voltage and temperature condition of the alternator will be continuously monitored.

SYSTEM TEST RESULTS

Alternator will be considered “failed” if:

- a. Amperage output falls below the maximum amperage draw for the type bus it will be used on;
- b. Amperage output falls below the advertised output curve on a “hot” rating based on RPM increments.