

# FLORIDA DEPARTMENT OF TRANSPORTATION

## CHARGING SYSTEM PERFORMANCE TEST PROCEDURE

### Overview:

An FDOT compliant vehicle shall be equipped with a heavy-duty (12 volt) electrical system. All components are to be selected and integrated to function in an environment characterized by low engine (alternator) speeds and high amperage draws. The entire electrical system, shall comply with 49 CFR sections 393.29, 393.30, 393.31, 393.32, and 393.33 respectively. Test results shall be recorded on the Amp Draw analysis form in **Exhibit 15**, which shall incorporate all add-on componentry to include items listed on the Agency's **Anticipated Usage** form.

### Alternator:

Under standard operating conditions with the engine running, the electrical load should be powered by the alternator alone, and the battery itself becomes a load. The alternator's rated output shall be 50% more than vehicle recorded load. Under vehicle idle, the alternator maximum output will be approximately 40% of the rated output. At idle, the load must not exceed 150% of the idle output.

When testing, the battery must be fully charged and maintain 12.6 volts with ignition off.

1. With the engine "OFF" and the battery in a good state of charge (12.6 volts), connect an accurate ammeter (50 Amperes range or less), in series, with the grounded terminal of the battery and the ground cable.
2. With the ignition ON, switch each individual continuous electrical load ON and OFF separately. Record the reading(s) on the FDOT Amp Draw Analysis Worksheet under the SYSTEMS paragraph. The sum of these values, divided by 2 (50 percent) is the total electrical requirement with the switch "ON" and the engine "OFF." Record the Total Amp Draw (b) on the FDOT AMP Draw Analysis Worksheet.
3. Connect a Snap-On MT3750 AVR.
4. Start the engine, disable the FAST IDLE, and turn off all accessories.
5. Using the load knob, slowly introduce the load to the alternator until the voltage measures 12.0 VDC on the display. Record the amperage output at 12.0 VDC on the FDOT AMP Draw Analysis Worksheet, Total Idle Amp Output (a). The system fails if the Total Amp Draw (b) is within 10% of the Total Idle Amp Output (a).

### Parasitic draw:

Battery must be fully charged and maintain 12.6 volts with ignition off.

1. With the ignition "OFF" and the battery in a good state of charge (12.6 volts), connect an accurate ammeter (20 Amperes range or less), in series, with the grounded terminal of the battery and the ground cable.
2. Parasitic draw cannot exceed 50 milliamps. If it exceeds 50 milliamps the system fails.

### Reserve capacity/customer add on components:

The reserve capacity defined during the alternator test (c) should sufficiently support all add on components identified at the time of bus order. The bus fails if the reserve capacity is not within **10%** of the reserve capacity listed in the delivery package.