

**SUBJECT:** Lamar Technologies LLC (Electrodelta) voltage regulator part number VR286.

**REASON:** To provide general instructions for Non-Shunt paralleling Voltage Regulator adjustment procedure.

**INFORMATION:** This document for reference only. Always refer to the aircraft/rotorcraft manufacturer's service and maintenances manuals concerning Instructions for Continued Airworthiness or test and adjustment information specific to the application.

**PROCEDURE:**

**SET-UP:**

- a. Assuming an aircraft installation with two VR286, voltage regulators installed and connected to appropriate alternators in parallel. Connect a suitable voltmeter across the load bus to read the voltage developed by each alternator as it is brought on line. In addition, each alternator should have an individual load meter connected to read its' current.
- b. When It Is not possible to reach each voltage regulator to make Individual adjustments with engines running, an extension cable long enough to reach inside the cockpit can be fabricated with four each 16 AWG wires. The regulators should be temporarily installed for adjustment, and each regulator should be appropriately marked (e.g. "left side or right side") so they can be reinstalled after adjustments are made.
- c. With the paralleling wire disconnected and batteries and only essential loads switched on, the engines are started and only one of the Alternator Control Switches should be turned on.
- d. With the engines brought up to 125% minimum speed, the voltage on the operating system is adjusted to 14.5 volts (14 volt systems) or 28.5 volts (28 volt system). This system is switched off and the next system is switched on. This system is in turn adjusted to the same voltage at the same load and engine speed.
- e. When this is completed the paralleling wire is reconnected, the first system is switched on and the loads compared. Each load should be equal or its maximum differential no more than 15% of the rating of a single alternator. (Example: In the case of 60 amp alternators, 9 amps should be the maximum difference.)
- f. If it is desired to pull the load division closer together, the heavier loaded channel's regulator may be adjusted lower, the lighter channel's regulator adjusted higher or both. This is a very fine adjustment and should not be readjusted too far.

- g. An alternate method used when it is anticipated that very small loads are to be paralleled is to use the Alt. Out Indicators (if equipped) as an aid for the adjustment. This involves using the lightest loading possible and begins by setting the systems as shown above. If one channel's Alt. Out indicator is lit signifying that it's off the bus, readjust it slowly upward until its Alt. Out indicator just goes out. This usually provides the sharpest paralleling for low loads.
- h. Regardless of the procedure, test the system by turning on the heaviest loads available and vary engine speeds, together and separately (if possible) to be certain that everything remains properly in balance throughout the speed and load range of the alternators.

## **PROBLEMS & TROUBLESHOOTING:**

### **NOTE:**

The Electrodelta VR286 will not work with other brand paralleling regulators in the same system. It is recommended that these regulators are always replaced in pairs.

- a. If problems are encountered, the first thing is to check each channel individually. If both channels don't operate properly, don't attempt to parallel until the problem is remedied. It may be anything from a loose belt to a bad rotor coil in one of the alternators.
- b. Good paralleling depends on balance. If substantial voltage rise is necessary to achieve equal load division the problem is usually higher impedance across one of the channels. The ground return must also be included in this analysis.
- c. In order for proper load sharing to occur, both channels must be approximately the same impedance. If not the higher impedance channel's voltage regulator must raise its' voltage excessively to achieve load balance. This voltage rise is an indication that such a problem has occurred. Sometimes the higher impedance channel may be determined by precise measurement of the voltage drop when it is operated by itself and compared to the other side.

## **WARNINGS & PRECAUTIONS:**

Consult your airframe operating and maintenance manuals and technical information for additional guidance in application.