service bulletin

MerCruiser
STERN DRIVES/INBOARD ENGINES

NUMBER: 80-12
DATE: 9/19/80

CIRCULATE TO:
SERVICE MANAGER
PARTS MANAGER
MECHANICS

A. MCM 470/485 and MIE 470 Voltage Regulator Damage
B. MCM 470/485 and MIE 470 Water Cooled Voltage Regulator Testing
C. Early MCM 470 Charging System (with Air Cooled Voltage Regulator) Testing

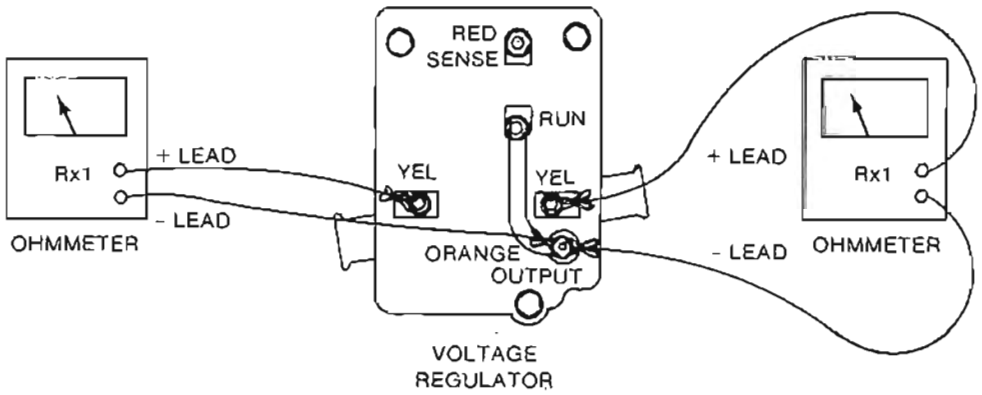
A. MCM 470/485 and MIE 470 VOLTAGE REGULATOR DAMAGE

Excessive resistance in the ammeter circuit can cause voltage regulator damage on MerCruiser 470/485 engines. To prevent this possibility, a Voltage Regulator Kit (B-86255A3), which eliminates the ammeter circuit, has been released. The kit includes a voltage regulator, jumper wire, battery meter and installation instructions. Install this kit on any MerCruiser 470 (Serial No. 4625580 and above) or 485 engine (originally equipped with an ammeter) with which recurring voltage regulator failures have been experienced.

B. MCM 470/485 and MIE 470 WATER COOLED VOLTAGE REGULATOR TESTING

Disconnect both battery cables from battery and remove regulator from engine.

Check regulator diodes (Figure 1) by connecting positive (+) ohmmeter lead to one stator terminal (yellow) and negative (-) ohmmeter lead to output (orange) terminal. Meter MUST show conduction. Reverse ohmmeter leads. Meter MUST NOT show conduction. Repeat test for other stator (yellow) terminal.



NOTE: Positive lead of ohmmeter shows conduction with a diode, as shown below.

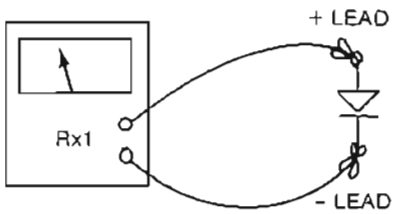


Figure 1. Checking Regulator Diodes

Check voltage regulation point using a D.C. variable voltage supply and ohmmeter (Figure 2). Connect voltage supply positive (+) lead to sense (red) terminal. Connect jumper wire from sense (red) terminal to output (orange) terminal. Connect voltage supply negative (-) lead to ground on regulator case. Turn on voltage supply to 16-18 volts. Connect ohmmeter positive (+) lead to ground on regulator case and ohmmeter negative (-) lead to one stator (yellow) terminal. Ohmmeter MUST NOT show conduction. If meter shows conduction, momentarily disconnect and reconnect it. If meter still shows conduction, voltage regulator is bad (regulation point too high) and must be replaced. If meter did not show conduction, slowly reduce voltage supply setting while observing ohmmeter. Meter MUST go into conduction at some voltage between 15 volts and 13.5 volts. If meter does not show conduction when supply voltage is reduced to between 15 volts and 13.5 volts, voltage regulator is bad (regulation point too low) and must be replaced. Repeat test for other stator (yellow) terminal.

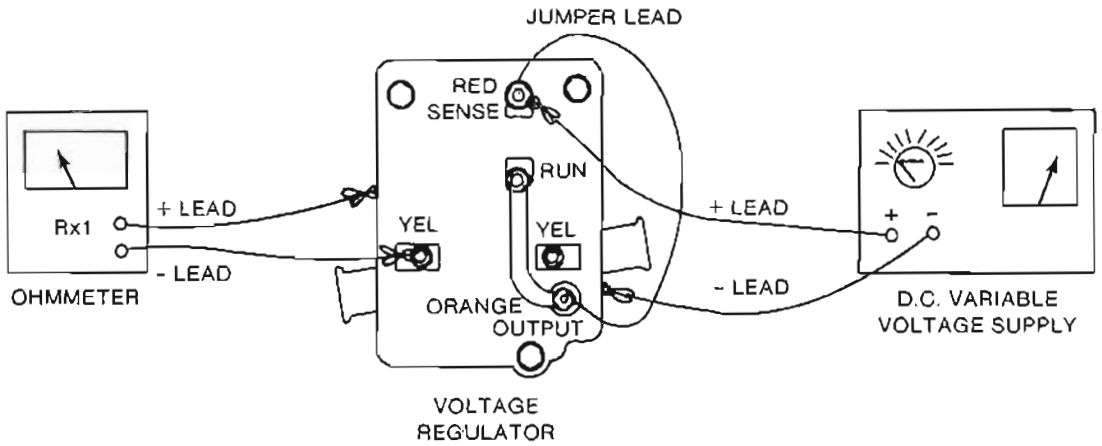


Figure 2. Checking Voltage Regulator Point - Water Cooled Regulator

C. EARLY MCM 470 CHARGING SYSTEM (with AIR COOLED VOLTAGE REGULATOR) TESTING

1. Make the following corrections in your MerCruiser Service Manual - Section 3 (Electrical), Part C, Page 29:
   a. STATOR TESTING, Step 4:
      Systems with 4 stator wires: Connect ohmmeter between 2 white/black wires. Meter should read 2.6 ohms.
   b. REGULATOR TESTING, Step 1:
      With regulator leads disconnected, continuity should not exist between regulator leads or between white lead and metal base. Continuity should exist between red lead and metal base in one direction of polarity only. Reversing meter leads should result in no continuity between red lead and metal base.
2. Check voltage regulation point using a D.C. variable voltage supply and ohmmeter (Figure 3). Connect voltage supply positive (+) lead to regulator red lead and voltage supply negative (-) lead to ground on regulator case. Connect ohmmeter postive (+) lead to regulator white lead and ohmmeter negative (-) lead to ground on regulator case. Slowly increase voltage while observing ohmmeter. Meter must show conduction when voltage reaches 14.5 volts (± 0.5v). If meter shows conduction before voltage reaches 14 volts, regulation point is too low and voltage regulator must be replaced. If meter does not show conduction until voltage exceeds 15 volts, regulation point is too high and voltage regulator must be replaced.

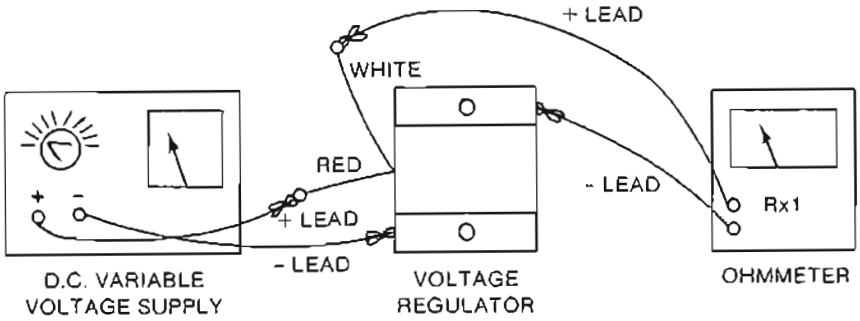


Figure 3. Checking Voltage Regulation Point - Air Cooled Regulator