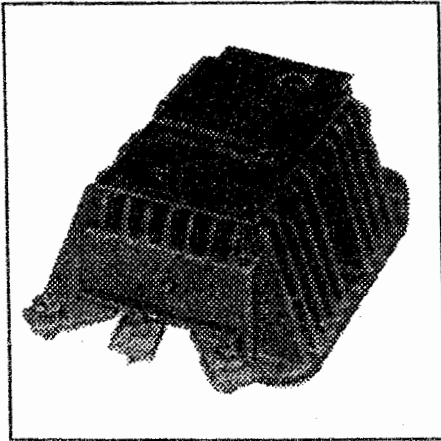


LEECE-NEVILLE**REGULATOR:****5078R****Rating: 14 Volts****Maintenance Instructions**

File: Regulator Maintenance Section

**DESCRIPTION**

The 5078R Prestolite regulator is a solid state transistor voltage regulator for 12 volt alternator systems with 5 amps maximum field current. It is designed for use with self current limiting alternators, and for this reason does not contain a current limiter. All transistors and other semiconductor components are of the silicon type which allows operation in ambient temperatures up to 225 degrees F., making it ideal for trucks and other commercial application with high engine compartment temperatures.

The regulator case is not used as a ground return and all connections are brought to external terminals, making the regulator suitable for positive or negative ground installations.

NOTE: On positive ground systems, the regulator operates between the field and negative lead ("B" circuit), while on negative ground systems, it operates between the field and ground ("A" circuit). This necessitates different wiring systems.

The 5078R regulator has solid state components and contains no moving parts, it will operate in any position with no effect on the voltage setting. However, care must be taken when installing the regulator to position it so water that may find its way into the transistor cavity will drain off through the holes provided.

PRINCIPLE OF OPERATION

The 5078R regulator utilizes a voltage sensitive zener diode to detect voltage changes in the system. When the voltage reaches a predetermined value, the zener

diode completes the driver transistor base circuit, this in turn allows the driver transistor to conduct a reverse bias current to the power transistor that stops the flow of current in the emitter and collector circuit of the power transistor to the field circuit of the alternator. When the voltage drops the zener opens the driver base circuit stopping the reverse bias current flow to the power transistor and allowing it to conduct in a forward bias direction and to the alternator field circuit.

This sequence of events repeats itself very rapidly while the regulator is operating, many times faster than the mechanical vibrating contact type regulators. A field discharge rectifier is included to short out any self induced field current when the power transistor is not conducting.

The zener diode operating voltage is derived from a potentiometer, an externally adjustable resistance which allows the voltage to be varied (tailored) to suit individual requirements. Additional components such as resistors, capacitors and diodes are used to insure stable accurate operation.

SYSTEM TROUBLESHOOTING

Many so called regulator failures have been traced to other faults such as loose, broken or corroded connections or loose and slipping alternator drive belts.

For this reason all wiring, connections, belts and brackets should be thoroughly checked before proceeding to the regulator.

The 5078R regulator is a sealed unit, and is not designed to be dismantled for inspection. To determine if the regulator is at fault, after all wiring connections, etc., have been thoroughly checked, disconnect the field wire from the regulator and connect it to the negative regulator terminal. A word of caution should be mentioned at this point. When performing this test, do not run the unit any longer than necessary, and not above fast idle.

Turn off all accessories that may be damaged by high voltage: Radio, lights, etc., as the regulator is being bypassed. If output is now obtained, (with regulator field lead connected to the negative terminal) the regulator is faulty and should be replaced.

If the charging rate is excessively high and cannot be lowered by means of the adjustment, remove the field wire from the regulator. If the output drops, the regulator is defective and should be replaced.

If the above tests do not indicate a defective regulator, point to point voltage checks should be made. Check the alternator according to the manufacturer's specifications for the particular alternator being tested. Bypass any relays which may be in the system to determine if they are faulty.

ADJUSTMENT:

To adjust the regulator voltage, insure that the batteries are fully charged, then connect an accurate voltmeter to the battery terminals (the use of a digital voltmeter is preferred). All electrical accessories must be turned off before any adjustments are made.

Unscrew the socket head plug in the regulator case and with the engine running at fast idle (1000 - 1500 RPM) turn the adjusting screw in the regulator to obtain proper operating voltage. Turn the adjustment screw clockwise to raise the voltage and counterclockwise to lower the voltage. Do not force the adjusting screw past the stops at either end of the adjusting range to avoid regulator damage. The voltage setting should be 13.9 - 14.1 volts as indicated on the voltmeter. In applications with high amperage requirements, such as ambulances, school buses, etc., the regulator voltage should be set between 14.0 - 14.3 volts.

After the vehicle has been operating for awhile, it may be necessary to readjust the voltage to accommodate special operating conditions. An ideal regulator setting will maintain a fully charged battery without causing the battery to use excess amounts of water.

INSTALLATION

While the 5078R regulator may be mounted in any position with no effect on its operation or voltage setting, a few simple precautions will insure easy maintenance and long regulator life. The regulator should be mounted so that the adjusting screw is accessible. The transistor cavity has three drain holes and the regulator should be positioned so that any water will drain off through the holes and not accumulate around the power transistor. (See Figure 1)

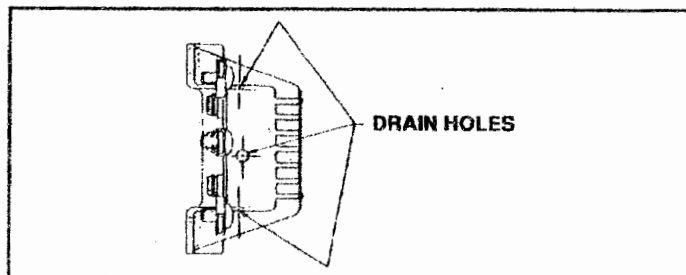


Figure 1

The 5078R regulator will operate in relatively high temperature due to its all-silicon semiconductors, however, care should be taken to avoid areas of excess heat. If possible, locate the regulator in the airstream and avoid close prox-

imity to exhaust pipes or manifolds, which create extremely high temperatures.

The accuracy and reliability of any regulator depends, to a great extent, on its wiring and the 5078R is no exception. Insure that all leads are of adequate wire size and equipped with proper terminals. If possible, solder all terminals to the leads, using rosin core solder, and be sure all terminal screws are properly tightened and free of corrosion.

CAUTION: UNDER NO CIRCUMSTANCES ATTEMPT TO GROUND OR JUMPER THE FIELD TERMINAL. ANY ATTEMPT TO DO SO WILL PERMANENTLY DAMAGE THE REGULATOR.

Wiring diagrams are provided for systems using a battery isolator and systems without a battery isolator.

When a battery isolator is used in a charging system, a diode must be installed between the relay "#3" terminal and the regulator "POS" terminal. This diode allows field current to flow from the battery through the ignition switch to excite the alternator field, but blocks alternator charge current from flowing back through to feed the ignition circuit. See Figure 2 for diode installation information.

DIODE INFORMATION

TYPE: Stud mounted (10-32 Th'd)

NUMBER: JEDEC 1N1200A

RATING: 12 Amp, 100 P.I.V.

MFR.: Motorola, GE, FMC, TRW, Westinghouse

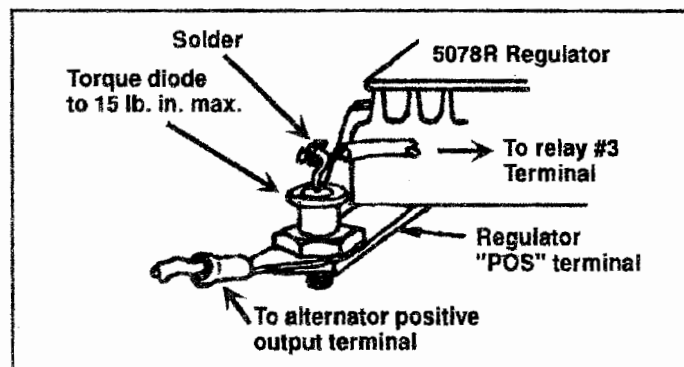


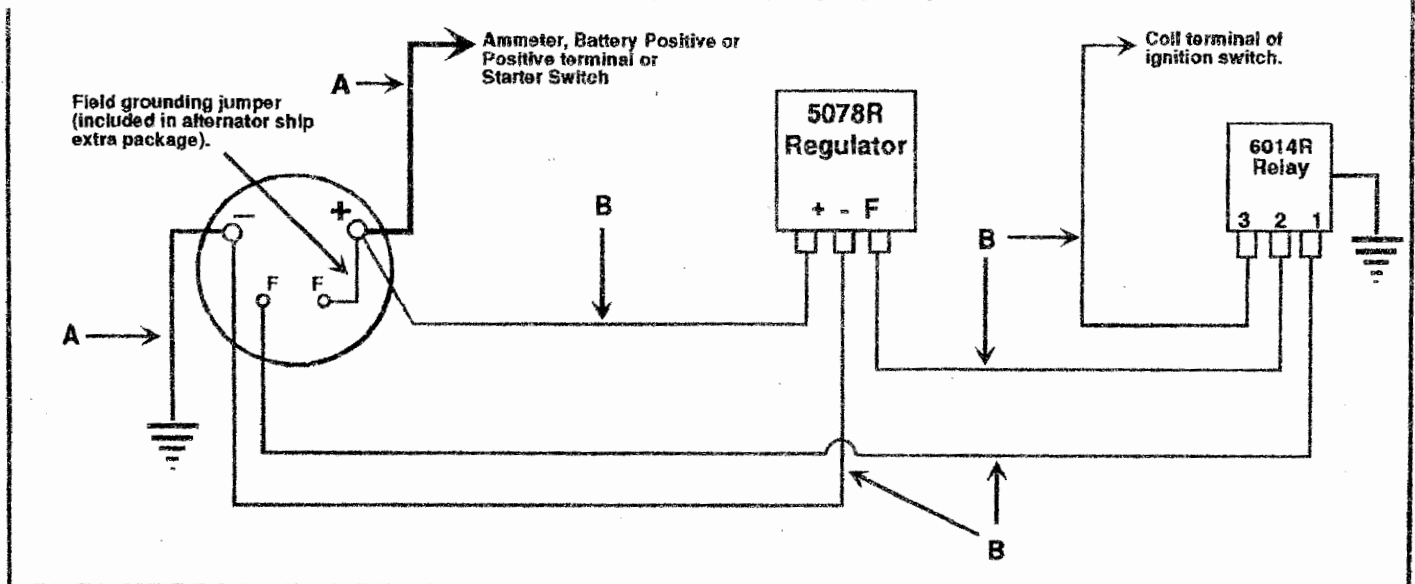
Figure 2

Certain types of diesel powered equipment may not use an ignition, or "run" switch. In this case an oil pressure switch may be used to energize the alternator system.

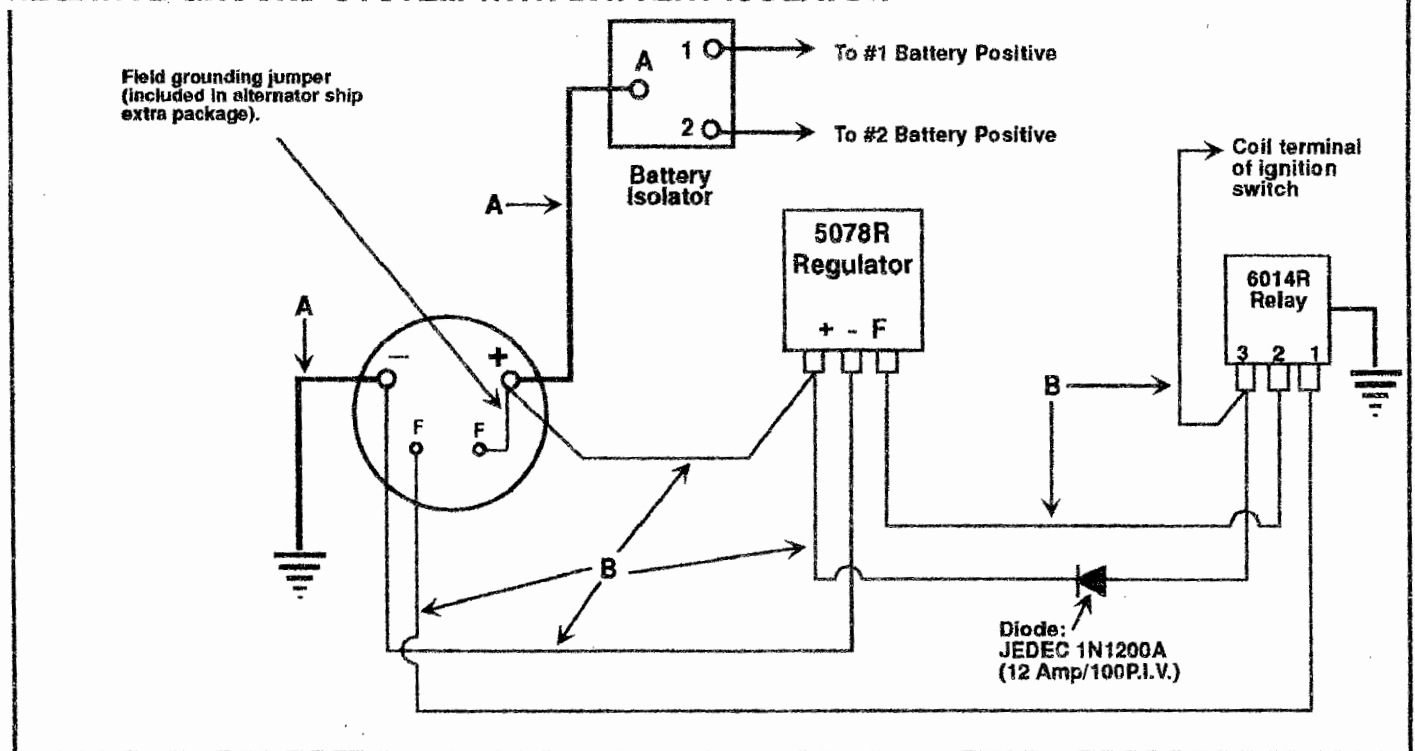
The switch should be installed in the lube oil gallery and should close when the engine is started and oil pressure rises. The system wiring is the same as the illustration except the oil pressure switch is substituted for the ignition switch in this case.

CAUTION: MAKE SURE THAT THE REGULATOR IS WIRED FOR THE CORRECT GROUND POLARITY. DO NOT CHARGE, BOOST OR INSTALL THE BATTERY BACKWARDS. OBSERVE CORRECT POLARITY AT ALL TIMES.

NEGATIVE GROUND SYSTEM WITHOUT BATTERY ISOLATOR



NEGATIVE GROUND SYSTEM WITH BATTERY ISOLATOR



SYSTEM	RECOMMENDED MINIMUM WIRE SIZE Total Length of Circuit	A B	
		A	B
60-65 Amps	12 feet or less	#8	#16
	12 feet to 20 feet	#6	#16
75-105 Amps	12 feet or less	#6	#16
	12 feet to 20 feet	#4	#16
130-165 Amps	12 feet or less	#4	#16
	12 feet to 20 feet	#2	#16

Positive Ground Wiring on Page 4

POSITIVE GROUND DIAGRAM WITH FIELD RELAY

