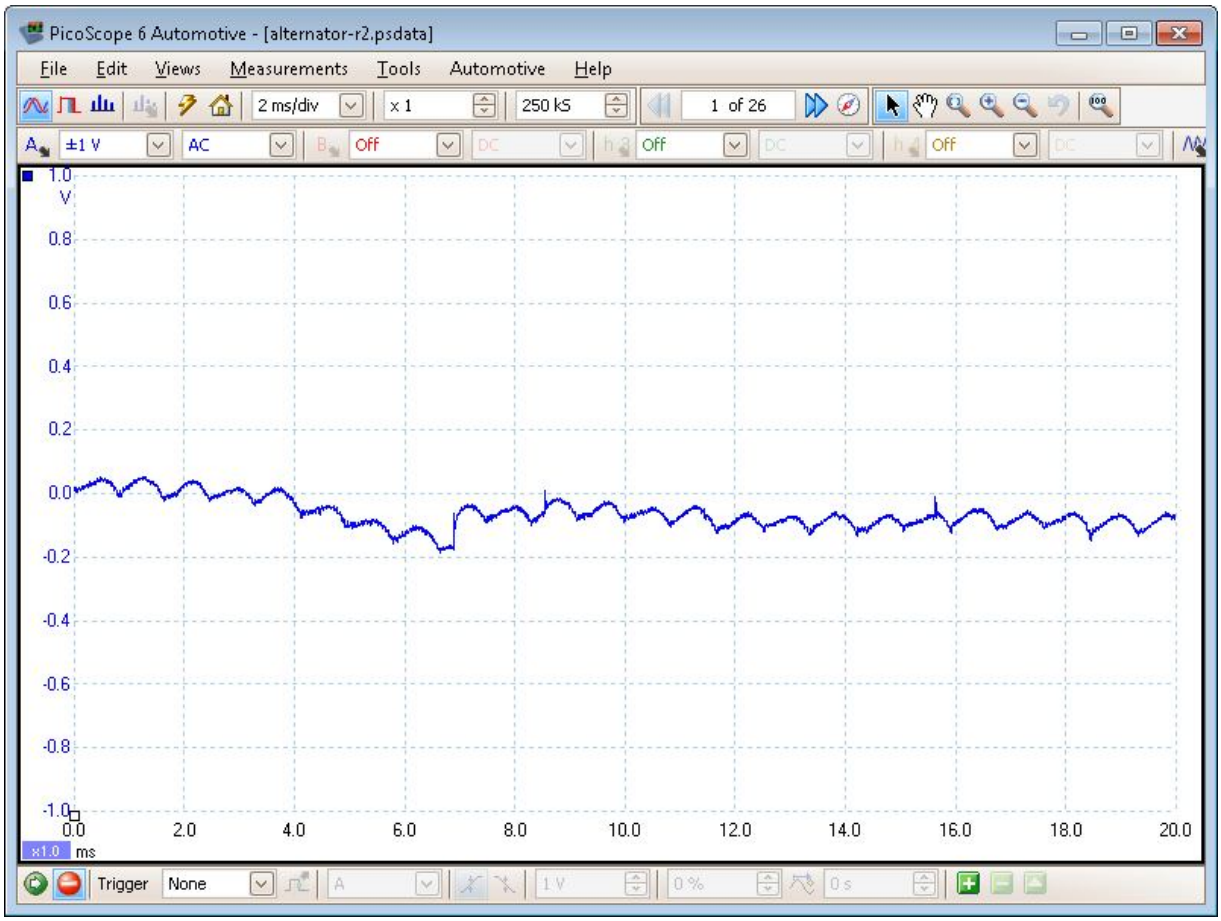
Alternator Ripple diode test.



Waveform Notes

The example waveform illustrates the rectified output from the alternator. This waveform shows that: -

- The output is correct and that there is no fault within the phase windings or the diodes (rectifier pack).
- The three phases from the alternator have been rectified to direct current (DC) from the original alternating

current (AC) and that the three phases that contribute towards the alternator's output are all functioning.

If the alternator was suffering from a diode fault, long downward 'tails' will appear on the trace at regular intervals and 33% of the total current output will be lost. A fault within one of the three phases will show a similar picture to the one illustrated but will be three or four times the height, with the base to peak voltage in excess of 1 volt.

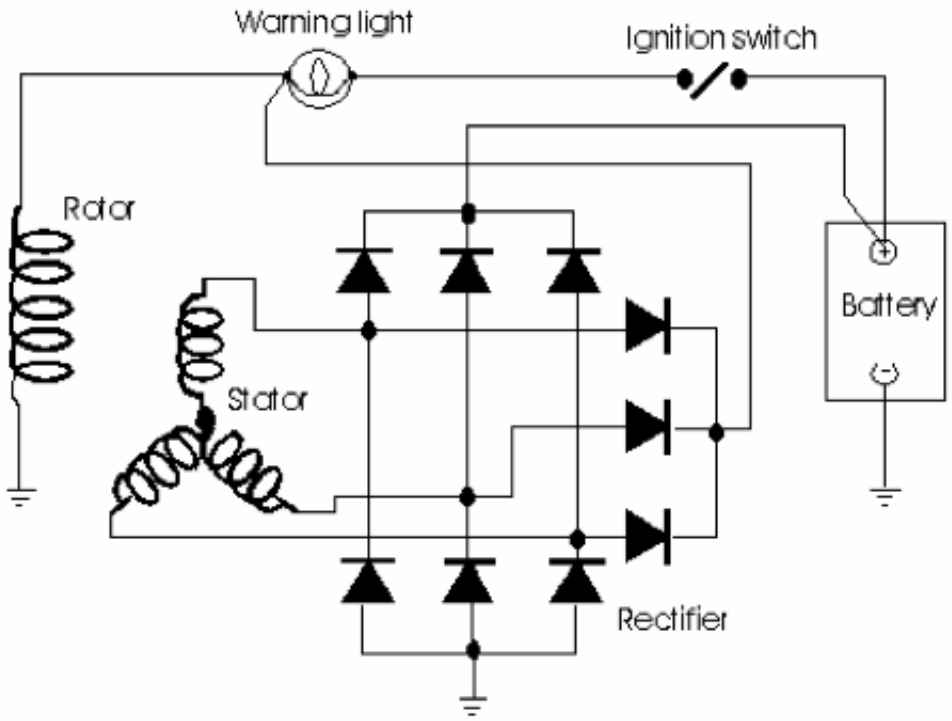
The voltage scale at the side of the oscilloscope is not representative of the charging voltage, but is representative of the upper and lower limits of the DC ripple. The 'amplitude' of the waveform will vary under different conditions, with a fully charged battery showing a 'flatter' picture, while a discharged battery will show a greater amplitude until the battery is charged.

Technical Information

The alternator output, as the name implies, produces an alternating current (AC) output, which is rectified to direct current (DC) to provide the correct type of voltage to replenish the battery, keeping it at full charge.

The alternator has three internal windings wound 120 degrees between phases and requires nine diodes in a 'bridge' configuration to rectify the output. The voltage is controlled by a solid-state regulator that maintains the voltage at a predetermined setting of about 13.5 to 15 volts. The output current is determined by the requirement at the time. For example, a battery that has just been subject to prolonged cranking will see a higher output from the alternator than if the battery were fully charged.

The regulated voltage can be measured on a multimeter, but this reading can appear correct even if the alternator has a diode fault that reduces the output by 33%. The only true way to monitor the alternator output is to observe the output waveform on an oscilloscope.


Warning light
Ignition switch
Rotor
Stator
Battery
Rectifier