Topic 11 – Practical 1

Diode bridge rectification

Safety

Maximum current of 1 A to flow in circuit.

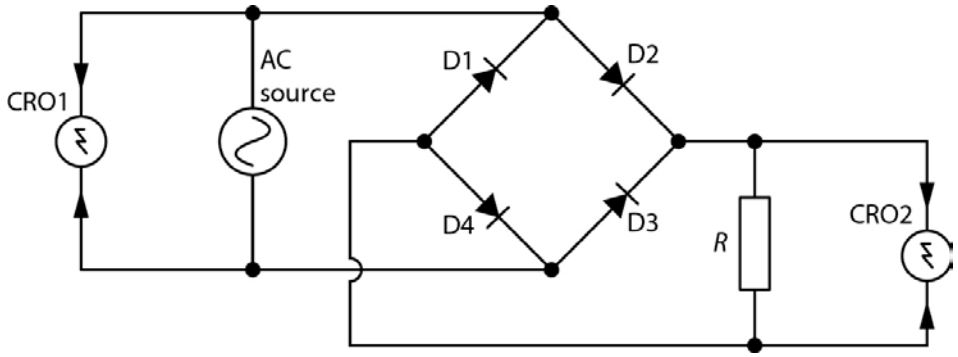
Apparatus and materials

- AC power supply (5–25 V)
- four diodes 1N4001 (max current 1 A)
- resistor (100 Ω or greater)
- two oscilloscopes (or one oscilloscope with two channels)
- connecting wires
- graph paper

Introduction

The conversion of an alternating (ac) electrical signal into a direct (dc) electrical signal is called rectification. The output signal is not completely dc and the level of rectification varies depending on the circuit used.

In a diode bridge rectifier the diodes are connected as a bridge (see circuit below). The output signal is always positive.



Procedure

1 Construct the circuit shown in the diagram above.

2 Set the input signal to 12 V (V_{rms}) and frequency of 50 Hz.

3 Using the first oscilloscope (CRO1), draw the input signal on graph paper. Label and scale the axis of your graph.

4 Using the second oscilloscope (CRO2), draw the output signal on the same graph paper. Label and scale the axis of your graph.

5 Change the input signal to 24 V (V_{rms}) and frequency of 50 Hz and repeat steps **3**–**4**, plotting the graphs on a separate graph paper.

6 Compare the input and output signals in each case.

Questions

1 Compare the maximum value of the output voltage with the input voltage.

2 What is the frequency of the output signal compared to the input one?

3 Make two sketches of the circuit, one showing the current flow when the input voltage is positive and another showing the current flow when the input voltage is negative.