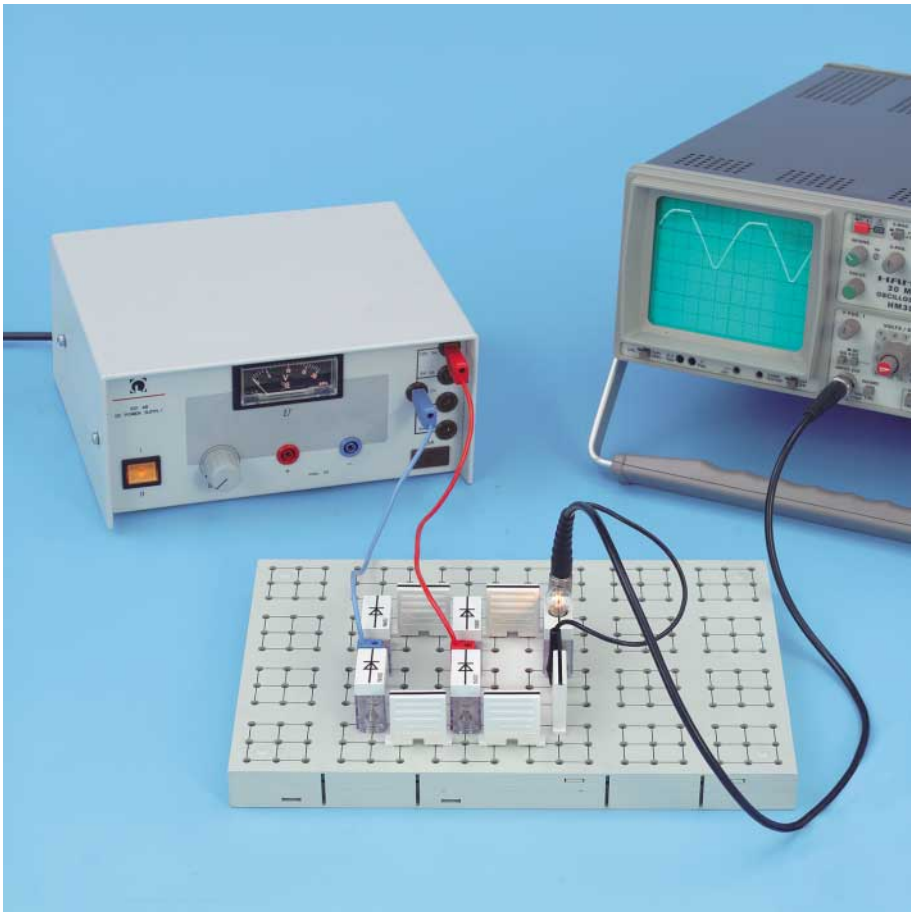

Rectification of AC voltages with diodes (P 4.1.4.1)

P 4.1.4

Diode circuits

P 4.1.4.1 Rectification of AC voltages with diodes

P 4.1.4.2 Limiting voltages with a Z-diode

P 4.1.4.3 Testing polarity with light emitting diodes.

Cat. No.	Description	P 4.1.4.1	P 4.1.4.2	P 4.1.4.3
576 74	Plug-in board, DIN A4	1	1	1
577 42	STE resistor 680 Ω, 2 W		1	1
578 48	STE light emitting diode red, LED 2, top			1
578 57	STE light emitting diode LD 57 C, green			1
578 51	STE Si-diode 1 N 4007	4		
578 55	STE Z-diode ZPD 6.2		1	
579 06	STE lamp holder, E10, top	1	1	
501 48	Set of 10 bridging plubs	1		
505 08	Set of 10 lamps E 10; 12 V/3.0 W	1	1	
521 48	AC/DC power supply 0....12 V, 230 V/50 Hz	1	1	1
575 211	Two channel oscilloscope 303	1		
575 24	Screened cable BNC/4 mm	1		
531 100	Voltmeter, AC/DC, $U \leq 12$ V, e. g. Multimeter METRAmax 2	1		
531 100	Voltmeter, DC, $U \leq 12$ V, e. g. Multimeter METRAmax 2		2	
501 45	Pair of cables, 50 cm, red and blue	2	3	1

Diodes, zener diodes (or Z-diodes) and light-emitting diodes are used today in virtually every electronic circuit.

The first experiment explores the function of half-wave and full-wave rectifiers in the rectification of AC voltages. The half-wave rectifier assembled using a single diode blocks the first half-wave of every AC cycle and conducts only the second half-wave (assuming the diode is connected with the corresponding polarity). The full-wave rectifier, assembled using four diodes in a bridge configuration, uses both half-waves of the AC voltage.

The second experiment demonstrates how a Z-diode can be used to protect against voltage surges. As long as the applied voltage is below the breakdown voltage U_Z of the Z-diode, the Z-diode acts as an insulator and the voltage U is unchanged. At voltages above U_Z, the current flowing through the Z-diode is so high that U is limited to U_Z.

The aim of the last experiment is to assemble a circuit for testing the polarity of a voltage using a green and a red light emitting diode (LED). The circuit is tested with both DC and AC voltage.