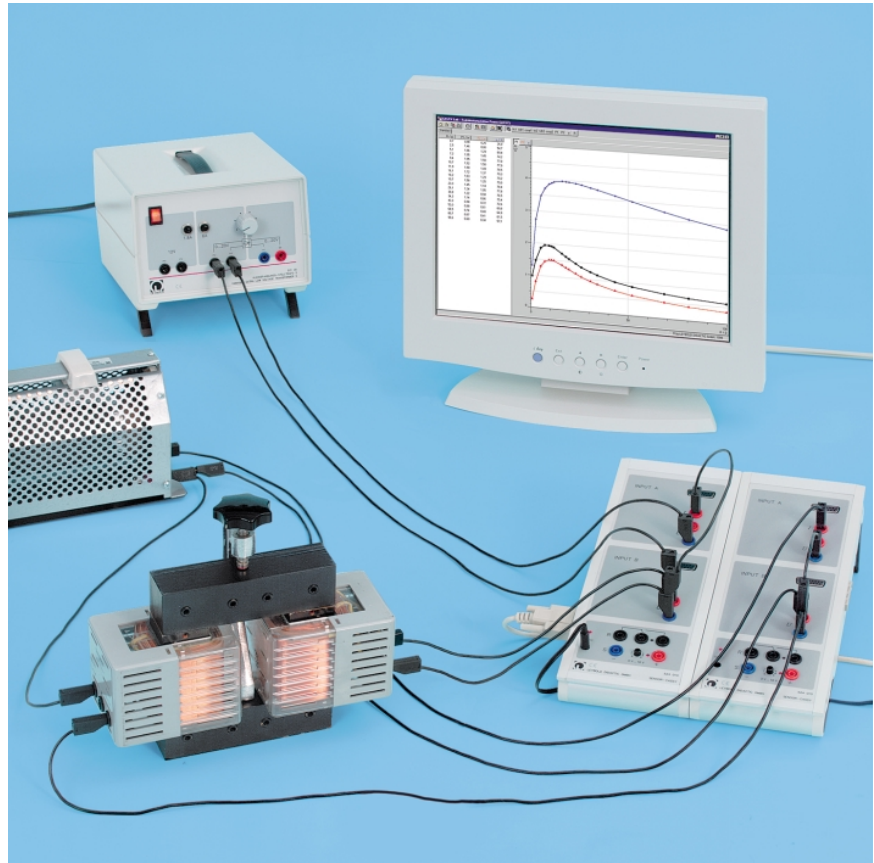


P 3.4.5

Transformer

- P 3.4.5.4 Power transmission of a transformer
- P 3.4.5.5 Experiments with high currents
- P 3.4.5.6 High-voltage experiments with a two-pronged lightning rod



Power transmission of a transformer (P 3.4.5.4a)

As an alternative to the transformer for students' experiments, the demountable transformer with a full range of coils is available which simply slide over the arms of the U-core, making them easily interchangeable. The experiments described for the transformer for students' experiments (P 3.4.5.1-3) can of course be performed just as effectively using the demountable transformer, as well as a number of additional experiments.

The first experiment examines the power transmission of a transformer. Here, the RMS values of the primary and secondary voltage and the primary and secondary current are measured on a variable load resistor 0 – 110 Ω using the computer-based CASSY measuring system. The phase shift between the voltage and current on the primary and secondary sides is determined at the same time. In the evaluation, the primary power P_1 , the secondary power P_2 and the efficiency

$$\eta = \frac{P_2}{P_1}$$

are calculated and displayed in a graph as a function of the load resistance R .

In the two other experiments, a transformer is assembled in which the primary side with 500 turns is connected directly to the mains voltage. In a melting ring with one turn or a welding coil with five turns on the secondary side, extremely high currents of up to 100 A can flow, sufficient to melt metals or spot-weld wires. Using a secondary coil with 23,000 turns, high voltages of up to 10 kV are generated, which can be used to produce electric arcs in horn-shaped spark electrodes.

Cat. No.	Description	P 3.4.5.4 (a)	P 3.4.5.4 (b)	P 3.4.5.5	P 3.4.5.6
562 11	U-core with yoke	1	1	1	1
562 12	Clamping device	1	1	1	1
562 13	Coil with 250 turns	2	2		
562 17	Coil with 23,000 turns				1
562 21	Mains coil with 500 turns for 230 V			1	1
562 19	Coil with 5 turns			1	
562 31	Set of 5 sheet metal strips			1	
562 20	Ring-shaped melting ladle			1	
562 32	Melting ring			1	
521 35	Variable extra low voltage transformer S	1			
537 34	Rheostat 100 Ω	1	1		
524 011USB	Power-CASSY		1		
524 010USB	Sensor-CASSY	2	1		
524 200	CASSY Lab	1	1		
500 414	Connecting lead, 25 cm, black	2	1		2
500 444	Connecting lead, 100 cm, black	8	6		
	<i>additionally required:</i>				
	PC with Windows 95/NT or higher	1	1		
540 52	Experiment insulator				2
300 11	Saddle base				2