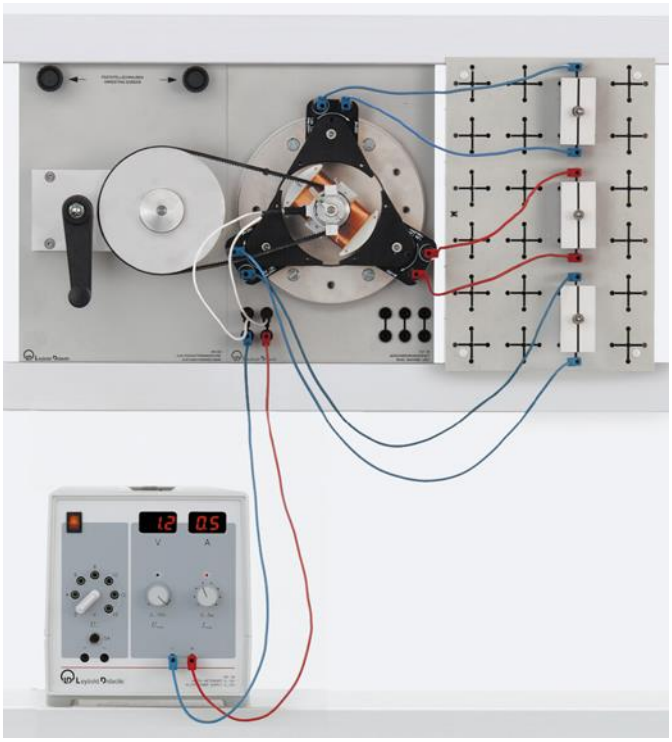
Objects of the experiment

1. Demonstration of the design and investigation of the function of a generator for generating three-phase alternating voltage.

Setup



Apparatus

1 Basic machine unit	727 81
1 ELM hand-cranked gear	563 303
1 ELM two-pole rotor	563 22
1 ELM brush holder rack	563 18
2 ELM brushes	563 13
3 ELM wide pole pieces for coils	563 101
3 ELM coils, 250 windings	563 11
3 Lamp holders (screw-fitting), E10, top, STE 2/50	582 70
3 Bulbs, 2.5 V/0.25 W, E10 (from set of 10)	505 11
1 Plug-in board, DIN A4, STE	576 74
1 ELM centring disc	563 17
1 Allen key	563 16
1 AC/DC power supply, 0…15 V/0…5 A	521 501
2 Pairs of connecting leads, 19 A, 25 cm, red/blue	501 44
2 Connecting leads, 19 A, 25 cm, blue	500 412
1 Pair of connecting leads, 19 A, 50 cm, red/blue	501 45
1 Demonstration panel frame	301 300
1 Plug-in board holder, STE	301 320
1 Equipment shelf	301 310
1 Profile rail	301 311
2 Bench clamps with pin	301 05

Procedure

- Place the brushes in contact with the slip ring of the rotor and connect them to the DC output of the power supply.
- Use the power supply as a constant current source. To do this, turn the voltage limiting knob to its maximum.
- Set the current *I* via the adjustment knob to a value of about 0.5 A.
- Turn the crank handle to make the rotor turn at uniform speed and observe the lamps.

Observation

All three lamps start to light up.

Evaluation

If an electromagnetic rotor rotates between three induction coils, each laid out 120° apart, it is possible to tap three separate alternating voltages from the ends of the coils.

A generator from which three AC voltages can be tapped, each offset from the others in time, is called a three-phase generator and the voltage generated is called a three-phase (alternating) voltage.

Remark:

Three-phase generators are used in practice in power generating stations.

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