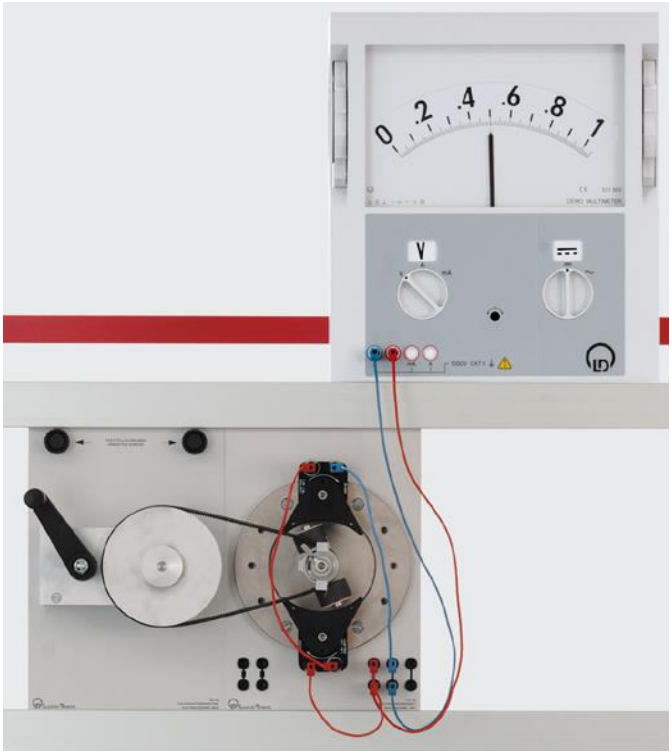
Object of the experiment

1. Demonstrate the design and investigate the function of a stationary armature generator

Setup



Take note of the set-up and safety instructions in the manuals for 727 81 and 563 480.

Apparatus

1 Basic machine unit	727 81
1 ELM hand-cranked gear	563 303
1 ELM magnet rotor	563 19
1 ELM brush holder rack	563 18
2 ELM wide pole pieces for coils	563 101
2 ELM coils, 250 windings	563 11
1 ELM centring disc	563 17
1 Allen key	563 16
1 Demo multimeter, passive	531 905
1 Connecting lead, 19 A, 25 cm, red	500 411
1 Pair of connecting leads, 19 A, 25 cm, red/blue	501 44
1 Pair of connecting leads, 19 A, 50 cm, red/blue	501 45
1 Demonstration panel frame	301 300
1 Equipment shelf	301 310
2 Bench clamps with pin	301 05

Procedure

- Select a measuring range of 1 V (DC) on the demo multimeter and set the needle in the centre of the scale with the zero-point calibration knob.
- Establish the middle of the scale as the zero point and mark it if desired.
- Set the rotor (563 19) turning by slowly rotating the pulley with the belt (do not use the hand-crank just yet) and observe the needle of the demo multimeter.
- Select a measuring range of 10 V (AC) on the demo-multimeter and set the needle back to the start of the scale with the zero-point calibration knob.
- Turn the crank handle make the rotor turn faster and faster and observe the needle of the demo multimeter.

Observation

When the rotor is rotated, a voltage is induced in the coils of the stator.

DC measuring range:

The voltage displayed on the demo multimeter repeatedly changes polarity.

AC measuring range:

The faster the magnetic rotor is turned, the greater the induced voltage becomes. The maximum voltage is about 10 V.

Evaluation

If a magnetic field rotates between fixed induction coils, the direction and the magnitude of the magnetic field through the induction coils continually change. This causes a voltage to be induced in the induction coils, which repeatedly changes polarity (alternating voltage).

The induced voltage is greater the faster the magnetic field between the induction coils turns.

A generator which features a magnetic rotor rotating between fixed induction coils is called a stationary armature generator or alternatively a rotating/revolving field or internal field generator.

With such a generator, an alternating (AC) voltage is generated which can be tapped directly from the ends of the induction coils.

One type of stationary armature generator often used in practice is a bicycle dynamo.

Remark:

The rotor of a stationary armature generator can be formed by permanent magnets or electromagnets.

LEYBOLD DIDACTIC GMBH · Leyboldstrasse 1 · D-50354 Hürth · Phone (02233) 604-0 · Fax (02233) 604-222 · e-mail: info@leybold-didactic.de