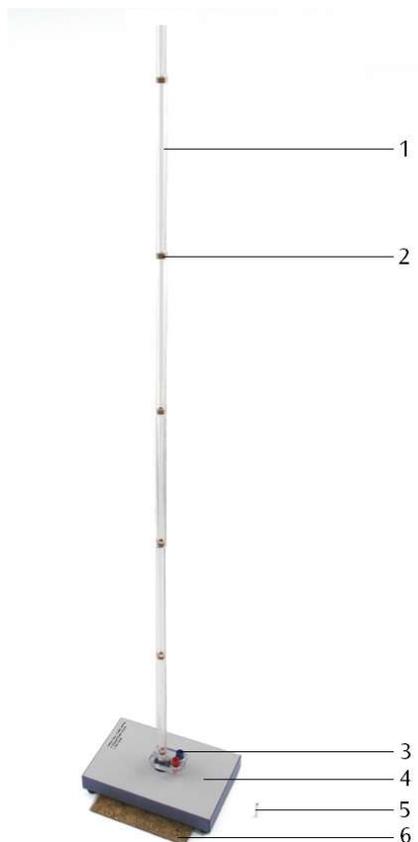


Free-Fall Tube with 6 Induction Coils 1001005

Instruction sheet

10/23 SP/ALF/UD



- 1 Free-fall tube
- 2 Coil
- 3 Connector sockets
- 4 Plinth with socket
- 5 Bar magnet
- 6 Cork mat

1. Description

The free-fall tube with 6 induction coils is used to illustrate the principles of induced voltages.

The free-fall tube is a plastic tube that is mounted upright on a plinth and has six identical induction coils connected in series with one another. Within the clamp socket of the plinth there is a rubber washer, which prevents the falling body (a bar magnet) from bouncing back up the tube after the impact.

If the bar magnet is allowed to fall through the tube, a voltage is induced in each of the coils in turn. Since the velocity of the magnet increases with time as it falls, the amplitudes of the voltage peaks also increase as time passes, while their

widths decrease. The area under each of the voltage peaks remains constant.

By means of a data logger or a storage oscilloscope it is possible to display the voltage curve graphically. Two 4 mm sockets are provided for making the connections.

After falling, the magnet is held in the rubber washer and can be retrieved when the plinth is tilted sideways. The cork mat serves to protect the magnet and the table top from damage by the impact.

2. Technical data

Coil width:	5 mm
Distance between coils:	180 mm
Number of turns:	13 in each coil
Overall dimensions:	130x200x1020 mm ³ approx.
Weight:	500 g approx.

3. Assembly

- Set up the tube in the socket of the plinth using gentle pressure.

Bumps, knocks or any lateral forces acting on the tube may damage the instrument.

- Do not subject the tube to any mechanical stress.

4. Operation

Also required:

1 Voltage Sensor 500 mV, Differential 1021681

1 Sensor Cable 1021514

1 Data logger

1 Software

More information about digital measurement can be found on the product's webpage in the 3B Webshop.

- Set up the experiment as shown in fig. 1.
- Connect the voltage sensor to the connector sockets of the tube and the data logger.
- Start the software.
- Hold the bar magnet over the top opening of the tube.

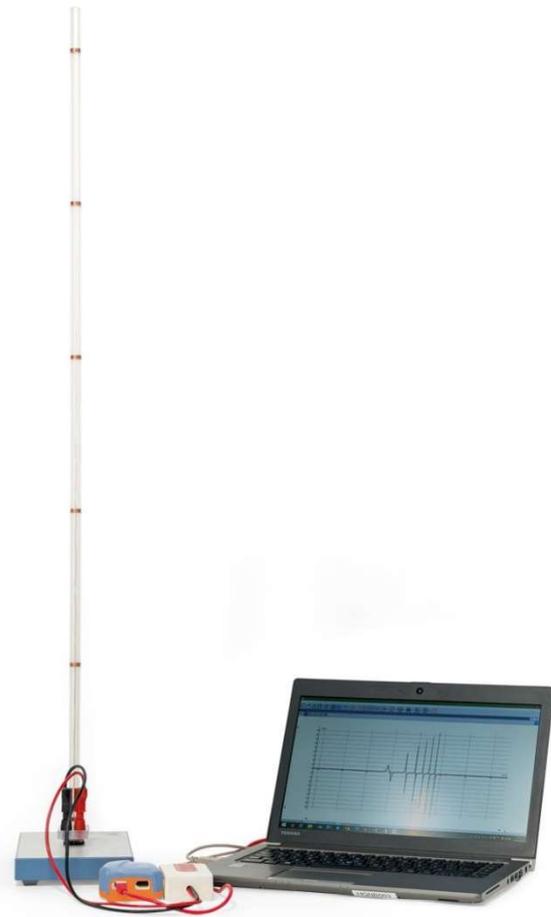


Fig. 1: Experiment set-up

- Start a measurement in the program and allow the bar magnet to fall.
- Evaluate the voltage curve.

Alternatively, the measurement may be carried out with an oscilloscope.

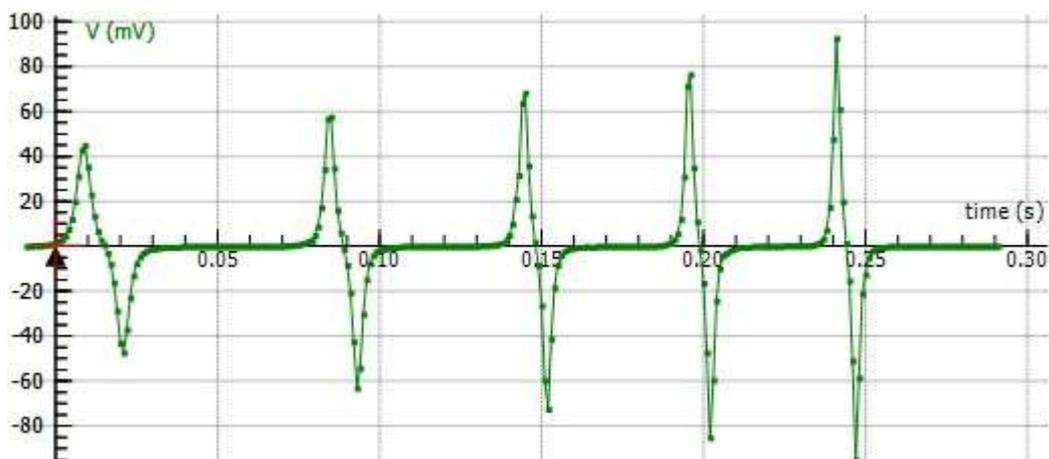


Fig. 2: Trace of induced voltage as a function of time