

# Electricity with the Modular System

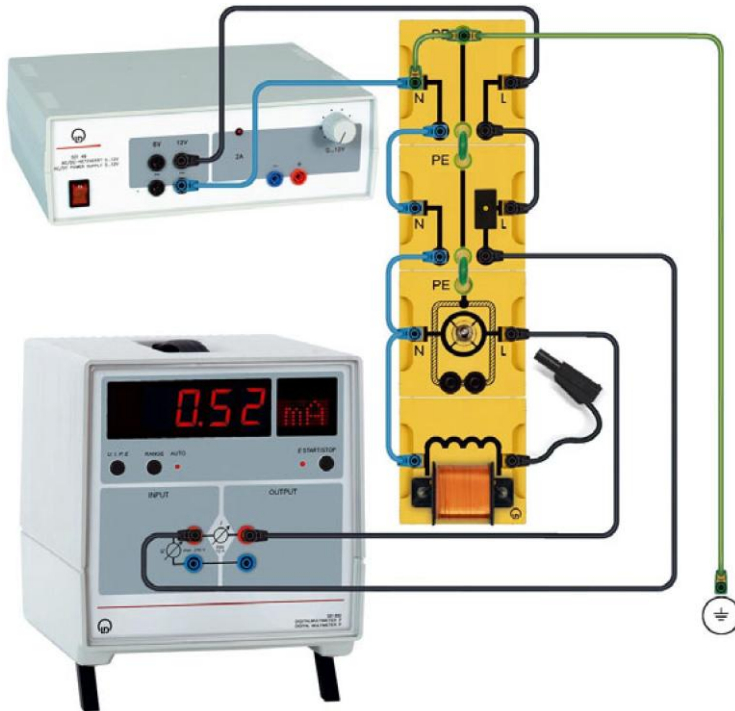
Electrical Safety in the Household  
Protection by fuses

Overload due to  
a load

## Objective of the experiment

To demonstrate the protective function of a fuse in the event of overload due to an electrical load.

## Setup



## Apparatus

1	539 087	Model fuse, BST
1	539 088	Load with housing, BST
1	539 090	Lead component PE, N, L; BST
1	539 052	Coil holder, BST
1	590 86	Coil, 50 turns
1	531 832	Digital multimeter P
1	521 49	Power supply, 12 V AC
3	500 602	Safety connection lead, 10 cm, blue
2	500 604	Safety connection lead, 10 cm, black
1	500 600	Safety connection lead, 10 cm, yellow/green
2	500 591	Safety bridging plugs, yellow/green
1	500 622	Safety connection lead, 50 cm, blue
3	500 624	Safety connection lead, 50 cm, black
1	500 640	Safety connection lead, 1 m, yellow/green
Recommended		
1	502 04	Distribution box with earthing socket

### Carrying out the experiment

- Using the  $U, I, P$  button, adjust the 0,0  $\mu\text{A}$  measuring range on the digital multimeter.
- Switch on the power supply (12 V, AC) and read the current.
- Connect the coil holder (539 052) with coil (additional load e.g. as a model of a heater) in parallel to the load with housing (539 088).
- Read the current  $I$  on the digital multimeter and observe the fuse.
- After the fuse triggers, re-read the current on the digital multimeter.

### Observation and measurement results

Operating mode	Current $I$ in A
Load with housing	0.55
With additional load	6.12
After the fuse triggers	0

### Evaluation

Fuses protect electrical lines from excessive currents that might occur, e.g. in the event of a high electrical load.

An excessive electrical load refers to when the current in the household circuit becomes much higher due to the simultaneous operation of many different electrical devices or devices consuming too much electrical power.

In the experiment example, the current in the lines of a household installation increases to about 6.1 A (more than ten times its normal value) when a coil with 50 turns is additionally connected.

The electric circuit is interrupted by the triggering of the fuse after about 1 - 2 s (see also the results of experiment D 3.8.1.1.a). Current can no longer flow through the lines.

This prevents lines from catching fire and inhibits the destruction of electrical loads due to the thermal effect of electric current.