Electricity with the Modular System

Electrical Safety in the Household

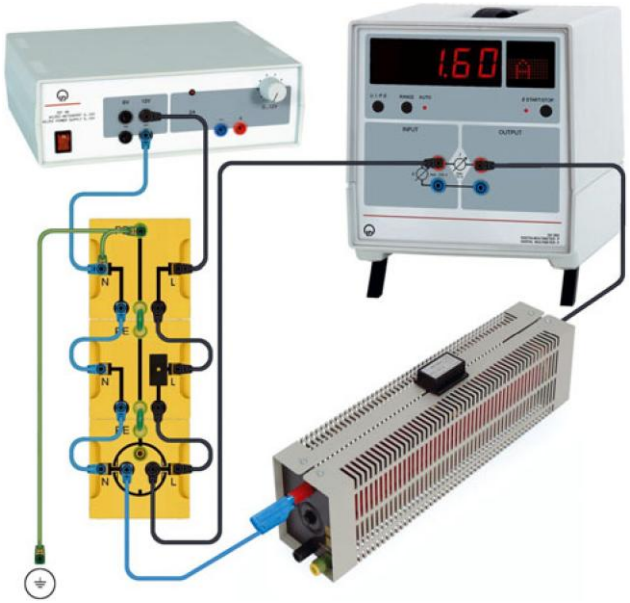
Protection by fuses

Interrupting the circuit using a fuse

Objective of the experiment

To investigate the relationship between the current and a circuit's disconnection time using a fuse.

Setup



Apparatus

1		539 087	Model fuse, BST
1		539 086	Model outlet, BST
1		539 090	Lead component PE, N, L; BST
1		537 32	Rheostat, 10 Ω
1		531 832	Digital multimeter P
1		521 49	Power supply, 12 V, AC
2		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	from	500 591	Safety bridging plugs, yellow/green
2		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

D 3.8 2012-02-27

Carrying out the experiment

- Switch on the power supply (12 V, AC).
- Using the rheostat, adjust a current of approx. 1,6 A.
- Start taking time using the electronic stopwatch.
- When the fuse interrupts the circuit, stop the time
- Repeat the measurement with other current strengths (see table).

Measurement results

Current *I* / A	Time *t* / s
1.6	80
1.8	30
2.0	20
3.0	10
4.0	5

Evaluation

The higher the current strength, the faster the fuse interrupts the circuit.

However, a rapid interruption of the circuit with a 1.2 A labelled bimetal fuse is not observed until current strengths reach *I* ≥ 5 A.

Note: As shown in the graph of measured values below, the disconnection time of the fuse is not linearly dependent on the current.
The higher the current, the faster the circuit's disconnection approaches the value t = 0.