

Electricity with the Modular System

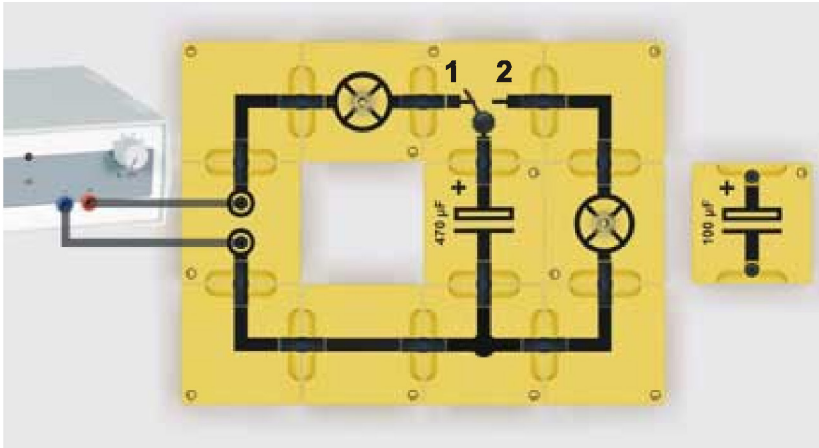
Basic Electric Circuits
Capacitors

Charging and discharging a capacitor

Objective of the experiment

To demonstrate the capacitor's charge and discharge process.

Setup



Apparatus

1		539 030	Capacitor 470 μ F, BST
1		539 029	Capacitor 100 μ F, BST
2		539 024	Lamp sockets E10, BST
2	from	505 15	Incandescent lamps, 6 V / 0.05 A, E10
1		539 026	Change-over switch, BST
1		539 001	Connector block BST, straight
1		539 003	Connector block BST, straight, 2 sockets
4		539 004	Connector blocks BST, 90° angle
1		539 006	Connector block BST, T branch
12		539 000	Bridging plug, BST
1		521 49	Power supply, 12 V DC, 230 V
2		500 644	Safety connection lead, 100 cm
1		301 300	Demonstration experiment frame
1		301 301	Adhesive magnetic board

Carrying out the experiment

- Set up the circuit with the 470 μF capacitor.
- Adjust a voltage of approx. 12 V at the power supply.
- Place the change-over switch in position 1 and observe the lamps.
- Then place the change-over switch in position 2 and observe the lamps again.
- Replace the 470 μF capacitor by the 100 μF capacitor (539 029) and repeat the measurement.

Observation

When the change-over switch is placed in position 1, lamp 1 temporarily lights up.

When the change-over switch is placed in position 2, lamp 2 temporarily lights up.

In the case of the capacitor with a capacity of $C = 470 \mu\text{F}$, the lamps glow brighter than in the case of the capacitor with a capacity of $C = 100 \mu\text{F}$

Evaluation

When the change-over switch is placed in position 1 the capacitor's charging circuit is closed.

A brief charging current flows, through which the capacitor is charged.

In this process, electrical energy is transferred from the voltage source to the capacitor and stored there.

After switching to position 2, the capacitor's charging circuit is opened and the discharge circuit is closed.

A brief discharge current flows, through which the capacitor is discharged.

In this process, electrical energy stored in the capacitor is transformed into light and thermal energy in lamp 2.

A capacitor with higher capacity can store more energy than a capacitor with lower capacity.