

Electricity with the Modular System

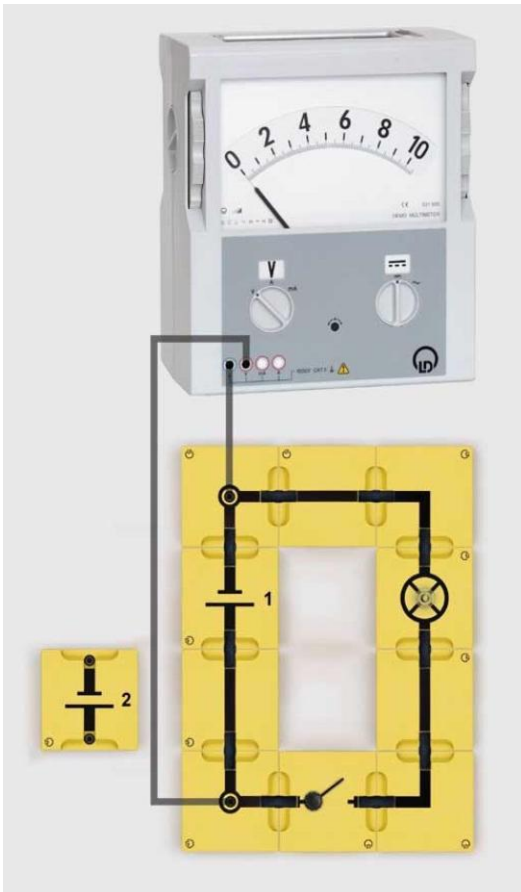
Basic Electric Circuits
Simple circuit

Connecting batteries in series

Objective of the experiment

To investigate the series connection of two batteries.

Setup



Apparatus

1	539 024	Lamp socket E10, BST
1	from 505 15	Incandescent lamp, 6 V / 0.05 A, E10
1	539 025	Toggle switch, BST
2	539 053	Battery elements, BST
3	539 001	Connector blocks BST, straight
2	539 004	Connector blocks BST, 90° angle
2	539 005	Connector blocks BST, 90° angle with socket
10	539 000	Bridging plug, BST
1	531 906	Demo multimeter, passive
2	500 644	Safety connection lead, 100 cm
1	301 300	Demonstration experiment frame
1	301 301	Adhesive magnetic board

Carrying out the experiment

Battery 1

- Screw the incandescent lamp into the lamp socket and set up the circuit initially with only one battery (Battery 1).
- Close the switch.
- Observe the brightness of the lamp and measure the voltage U_1 at the battery.
- Open the switch again.

Battery 2:

- Replace battery 1 with battery 2 and repeat the experiment.

Battery 1 and 2:

- Replace connector block 539 001 below battery 2 with battery 1. At the same time, make sure battery 2's positive terminal is connected to battery 1's negative terminal.
- Close the switch and observe the brightness of the lamp.
- Measure the common voltage U_{tot} of batteries 1 and 2.
- Reverse the polarity of battery 1.
- Close the switch for a short time and observe the lamp.

Measuring example

Battery	Brightness of the lamp	Voltage U / V
1	low	3.0
2	low	3.0
1 and 2 (opposite poles connected)	high	6.0
1 and 2 (equal poles connected)	not lit up	-

Evaluation

Two batteries are connected in series by connecting the positive terminal of one battery to the negative terminal of the other battery.

The total voltage U_{tot} of the series-connected batteries is a result of the sum of the partial voltages U_1 and U_2 of the individual batteries:

$$U_{tot} = U_1 + U_2.$$