4.1.03-00 Internal resistance and matching in voltage source

What you can learn about ...

- ➔ Voltage source
- ➔ Electromotive force (e.m.f.)
- ➔ Terminal voltage
- ➔ No-load operation
- ➔ Short circuit
- ➔ Ohm's law
- ➔ Kirchhoff's laws
- ➔ Power matching

Principle:

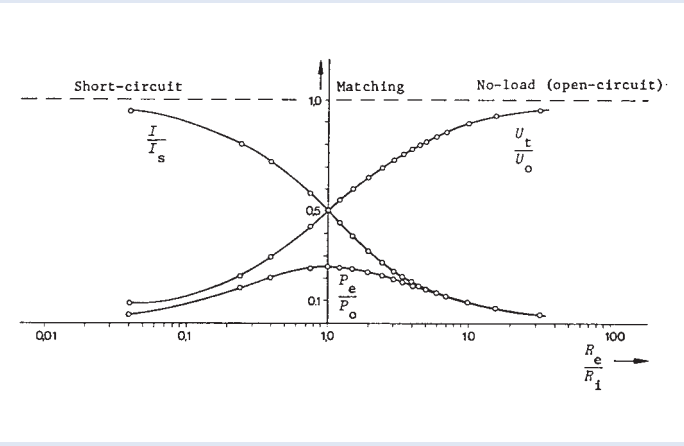
Both the terminal voltage of a voltage source and the current depend on the load, i.e. on the external resistance. The terminal voltage is measured as a function of the current and from it the internal resistance and no-load voltage of the voltage source are determined and the power graph plotted.

What you need:

Battery box	06030.21	1
Flat cell battery, 9 V	07496.10	1
Flat cell battery, 4.5 V	07496.01	1
Power supply 5 V DC/2.4 A with 4 mm plugs	11076.99	1
Rheostats, 10 Ω, 5.7 A	06110.02	1
Rheostats, 100 Ω, 1.8 A	06114.02	1
Digital multimeter 2010	07128.00	2
Double socket, pair red and black	07264.00	1
Connecting cable, 4 mm plug, 32 A, red, l = 50 cm	07361.01	3
Connecting cable, 4 mm plug, 32 A, blue, l = 50 cm	07361.04	2

Complete Equipment Set, Manual on CD-ROM included

Internal resistance and matching in voltage source P2410300



Power diagram of a voltage source.

Tasks:

1. To measure the terminal voltage U_t of a number of voltage source as a function of the current, varying the external resistance R_e, and to calculate the no-load voltage U_0 and the internal resistance R_i.

   1.1 Slimline battery

   1.2 Power supply

   1.2.1 Alternating voltage output

   1.2.2 Direct voltage output

2. To measure directly the no-load voltage of the slimline battery (with no external resistance) and its internal resistance (by power matching, $R_i = R_e$).
3. To determine the power diagram from the relationship between terminal voltage and current, as illustrated by the slimline battery.