Model of a high-current transformer

Induction furnace

Objects of the experiment

1. Demonstrating the operation of an induction furnace
2. Measuring the primary current and estimating the secondary current

Setup

Apparatus

1 coil with 500 turns, main	562 21
1 ring-shaped melting ladle	562 20
1 melting ring	562 32
1 U-core with yoke	562 11
1 clamping device	562 12
1 demo-multimeter, passive	531 905
2 safety connecting leads, 100 cm, black	500 644
1 measuring junction box	502 05

Carrying out the experiment

- Put the melting ring into the melting ladle.
- Switch the coil with 500 turns on, read the primary current from the demo-multimeter, and observe the melting ring.
- When the ring has melted, switch the coil with 500 turns off.

Observation

After the coil with 500 turns has been switched on, the melting ring starts to melt.

Measuring example

N_1	N_2	I_1 in A	*I_2 in A
500	1	1.3	650

$$*I_2 = \frac{N_1 \cdot I_1}{N_2}$$

Evaluation

In the high-current transformer set up for this experiment, the ratio of the numbers of turns of the primary and secondary coil is $\frac{500}{1}$.

Due to the current transformation ratio of the high-current transformer ($\frac{N_1}{N_2} = \frac{I_2}{I_1}$), the secondary current is 500 times the primary current.

The large secondary current flowing through the melting ladle leads to a strong warming of the melting ring.

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