

Coil in the AC circuit 4.4.04-01/11



- What you can learn about ...
- Inductance
  - Kirchhoff's laws
  - Maxwell's equations
  - AC impedance
  - Phase displacement

**Principle:**

The coil is connected in a circuit with a voltage source of variable frequency. The impedance and phase displacements are determined as functions of frequency. Parallel and series impedances are measured.

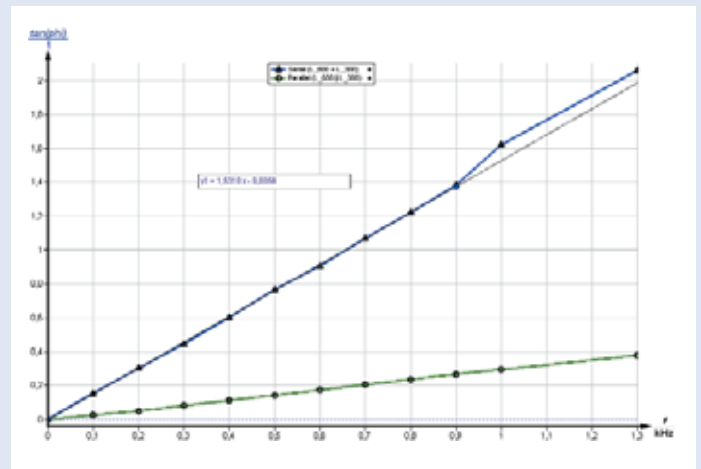
Set-up of experiment P2440411 with FG-Module

**What you need:**

Experiment P2440411 with FG-Module  
 Experiment P2440401 with oscilloscope

Function generator	13652.93	1	
Oscilloscope 30 MHz, 2 channels	11459.95	1	
Difference amplifier	11444.93	1	
Digital counter, 4 decades	13600.93	1	
Screened cable, BNC, $l = 750$ mm	07542.11	2	
Connecting cable, 4 mm plug, 32 A, red, $l = 10$ cm	07359.01	3	
Coil, 300 turns	06513.01	1	1
Coil, 600 turns	06514.01	1	1
Connection box	06030.23	1	1
Connecting cable, 4 mm plug, 32 A, red, $l = 50$ cm	07361.01	5	2
Connecting cable, 4 mm plug, 32 A, blue, $l = 50$ cm	07361.04	4	2
Cobra3 BASIC-UNIT	12150.00	1	
Power supply 12V/2A	12151.99	2	
Data cable 2 x SUB-D, plug/socket, 9 pole	14602.00	1	
Software Cobra3 PowerGraph	14525.61	1	
Software Cobra3 Universal recorder	14504.61	1	
Measuring module Function Generator	12111.00	1	
Connecting cable, 4 mm plug, 32 A, red, $l = 25$ cm	07360.01	2	
Connecting cable, 4 mm plug, 32 A, blue, $l = 25$ cm	07360.04	2	
Carbon resistor 47 $\Omega$ , 1W, G1	39104.62	1	1
Carbon resistor 100 $\Omega$ , 1W, G1	39104.63	1	1
Carbon resistor 220 $\Omega$ , 1W, G1	39104.64	1	1
PC, Windows® 95 or higher			

**Complete Equipment Set, Manual on CD-ROM included**  
**Coil in the AC circuit P24404 01/11**



Tangent of the current-voltage phase displacement as a function of the frequency used for calculation of the total inductance of coils connected in parallel and in series.

**Tasks:**

1. Determination of the impedance of a coil as a function of frequency.
2. Determination of the inductance of the coil.
3. Determination of the phase displacement between the terminal voltage and total current as a function of the frequency in the circuit.
4. Determination of the total impedance of coils connected in parallel and in series.