

# measuring instruments



## P3240-1C Multimeter, digital

Digital multimeter with 3 1/2-digit, 18-mm LCD display; for measuring DC and AC voltage and amperage; may be used to test whether diodes, transistors or capacitors are conducting

**AC voltage ranges:**  
200 ... 700 V

**DC voltage ranges:**  
200 mV ... 1000 V

**AC/DC current ranges:**  
20  $\mu$ A ... 10 A

automatic over-voltage indicator, polarity indicator, over-voltage protection, high-voltage protection up to 3 kV

Internal resistance:  
10 MOhms

Powered by a 9-V battery (supplied)

Dimensions: approx.  
88x172x36 mm



## P3210-1C Multimeter, analogue

Moving-coil instrument with overload protection; for measuring AC and DC voltage and amperage; double scale (10 and 3 units), with a mirrored background and an arc length of approx. 90 mm, and a second double scale for setting the pointer to zero at midpoint; switch for selecting current type (AC or DC), for resetting to zero and for testing the battery

**AC/DC voltage ranges: 100 mV ... 30 V along with 1-mV range for using the multimeter as a highly sensitive galvanometer**

**AC/DC current ranges:**  
100  $\mu$ A ... 3 A and 10 A

Powered by four AA batteries (supplied)

Class: 2 (DC), 3 (AC)

Green ABS plastic case with yellow labelling

Dimensions: approx. 120x160x50 mm



**Detail:** Thanks to the 1-mV measuring range including an amplifier, the P3210-1C analogue multimeter can be used as a highly sensitive galvanometer



# magnetic "inno" measuring instruments



## DE710-00 Universal multimeter "inno", magnetic

Durable remote-control measuring instrument for use in any position, i.e. vertically or horizontally in overhead projection

Pointer setting: zero at left or at midpoint

Three insertable double scales: 1/3 - 10/30 - 100/300 (included)

Arc length of scale: approx. 200 mm, digits 26 mm tall  
LED display, 20 mm tall, indicates measuring units and type of current: mV DC, V AC and DC,  $\mu$ A AC and DC, mA AC and DC, A AC and DC

**Measuring ranges: 1 mV, 1 ... 30 V DC**

**1 ... 30 V AC**

**100  $\mu$ A ... 10 A AC and DC amperage**

Fuses: fine-wire fuses in fuse sockets (F 3.15 A and F 10 A)

Accuracy class: 2

Back panel features six strong neodymium magnets for mounting the device magnetically and a battery compartment for changing the batteries easily

Power supply: Four 1.5 V AA cells (included) or

four 1.5 V/1500 mAh rechargeable cells P3122-1B

5.5-mm hollow DC jack for 6 V external power supply

Dimensions: approx. 260x230x60 mm; weight: approx. 2.7 kg

### Recommended accessories:

P3120-6N Mains transformer, 6 V/500 mA, as external power supply



## DE710-1S Insertable double scales, set of 3

White metal scales for insertion in "inno" universal multimeter DE710-00

## DE710-7A nA-Amplifier

Current-Voltage converter in plastic case, for connection to measuring instruments with +/- or +/-3 Volts final value;

measurement of very low current 1 nA ... 10  $\mu$ A/V;

On/Off switch, two safety-sockets for connection to a measuring instrument, LED for indication of the mode

Power supply: 9-V battery

(included) or external power supply 12 V/2 A (P3130-1P)

Dimensions: 84x84x39 mm



## DE710-7N Resistor 30 M $\Omega$

For enlargement of the measuring range of the multimeter "inno" DE710-00 up to 300 Volts AC or DC (not shown)

# magnetic "inno" measuring instruments



**Use:** Universal multimeter with pointer set to zero at midpoint and used as a highly sensitive galvanometer



**DE710-2S Insertable double scale, zero at midpoint, 5/15**  
White metal scale for insertion in "inno" universal multimeter DE710-00 with zero set to midpoint  
Scale ranges: -5...0...+5 / -15...0...+15



**Use:** Universal multimeter with transparent scale inserted



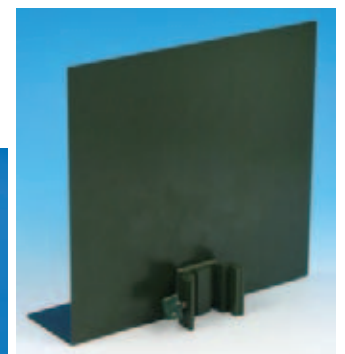
**DE710-1P Insertable scales, transparent, set of 6**  
Transparent acrylic scales for insertion in "inno" universal multimeter DE710-00  
Ranges: 0...1, 0...3, 0...10, 0...30, 0...100, 0...300



**Use:** Universal multimeter used horizontally on overhead projector



**Use:** Universal multimeter used at an elevated position



**P3120-5G Assembly platform, large**  
Metal platform mounted on saddle, green powder-coated, for supporting magnetic equipment or instruments, e.g. universal multimeter DE710-00 on special NTL profile  
Dimensions: 260x230 mm



## measuring instruments



### DE700-1M Demonstration measuring instrument, digital/analog

An electronic multimeter for measuring current, voltage and resistance that combines the advantages of analogue and digital displays in one device; selection of measuring ranges, current type and display by means of side-mounted switches; pointer is set electronically to zero at midpoint, also by means of a switch; the currently selected scale is indicated by the red diode within the particular scale lighting up; measured values shown on a 7-segment LED display, 26 mm tall, and on a digital monitoring display on the rear panel

**Voltage ranges: 9 ranges for AC and DC**

**100, 300 mV; 1, 3, 10, 30, 100, 300, 1000 V**

**Amperage ranges: 11 ranges for AC and DC**

**100, 300  $\mu$ A; 1, 3, 10, 30, 100, 300 mA; 1, 3, 10 A**

**Resistance ranges: 11 ranges**

**100, 300 Ohms; 1, 3, 10, 30, 100, 300 kOhms; 1, 3, 10 MOhms**

Internal resistance: >100 kOhms

Accuracy: class 1.5

Scale type: double scale (3 and 10 units) with mirror background and LED indicators

Arc length of scale: 200 mm

Power connection: three 4-mm safety jacks

Overload protection: fine-wire fuses in sockets

ABS plastic case

Voltage source: 230 V/50...60 Hz

Dimensions: 260x230x210 mm



# magnetic "inno" measuring instruments



"inno" measuring instruments: durable - easy to transport and use - magnetically mounting



## DE722-1P Panelmeter „inno“

Demonstration instrument for measuring voltage and amperage; very easy to transport and magnetically mountable; the 26-mm LED display showing the measured value and the 20-mm LED display for the measurement unit and type of current allow readings to be taken easily even at a distance

Technical data:

Display: 3 1/2-digit LED display; digit height 26 mm

Input: 4-mm safety jacks

**Measuring ranges: 0 ... 200 mA, 0 ... 20 A, 0 ... 40 V AC/DC**

Fuses: F 10 A fine-wire fuse (5 x 20 mm) in socket

Throw switch: DC/OFF/AC

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 540 g



## DE722-10 Ohmmeter „inno“

Demonstration meter for measuring resistance and for testing diodes; the component to be measured is connected to the two 4-mm safety jacks; this instrument is easy to transport and can be mounted magnetically; the 26-mm LED display showing the measured value and the 20-mm LED display for the measurement unit allow readings to be taken easily even at a distance

Technical data:

Display: 3 1/2-digit LED display; digit height 26 mm

**Measuring ranges: 200 Ohms; 2, 20, 200, kOhms; 2 MOhms; 2 V (diode testing)**

Accuracy:  $\pm 0.2\%$   $\pm 1$  digit for all ohmage ranges up to 200 kOhms, beyond that  $< 5\%$

Diode testing:  $\pm 20\%$

Throw switch: ON/OFF; measurement input: two 4-mm safety jacks

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 450 g



## DE722-1V Mikrovoltmeter „inno“

Demonstration instrument for measuring extremely small voltage levels; very easy to transport and magnetically mountable; the 26-mm LED display showing the measured value and the 20-mm LED display for the measurement unit allow readings to be taken easily even at a distance

Technical data:

Display: 3 1/2-digit LED display; digit height 26 mm

Input: 4-mm safety jacks

**Measuring ranges: 20, 200  $\mu$ V; 2, 20, 200 mV; 2 V**

10-turn potentiometer for setting to zero

Accuracy: above 2% (when precisely set to zero)

Input resistance: 100 ohms

Throw switch: ON/OFF; power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 485 g



## Recommended accessories for "inno" measuring instruments:

P3120-6N Mains transformer, 6 V/500 mA, as external power supply

With the s-shaped assembly platform P3120-5B any "inno" measuring instrument is easily converted into a table model.



# magnetic "inno" measuring instruments



## DE722-1C Coulomb Meter „inno“

Demonstration meter used in electrostatics for measuring charges; this instrument is easy to transport and can be mounted magnetically; the 26-mm LED display allows readings to be taken even from a distance

Display: 3 1/2-digit LED display; digit height 26 mm

4-mm safety jacks: measurement input (IN) and common ground (COM)

**Measuring range: +/-1999 nC; reset button for resetting instrument to zero**

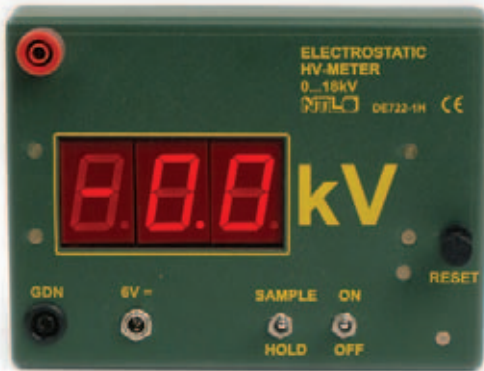
Accuracy: better than 1 %; droop rate: better than 5 digits/min

Throw switch: ON/OFF

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 380 g



## DE722-1H Static voltmeter "inno"

Demonstration meter for measuring high electrostatic voltages; unlike mechanical electroscopes, this instrument delivers exact and clear quantitative readings as well as the polarity of the charge; the value measured can be frozen using the hold switch; this instrument is easy to transport and can be mounted magnetically; the 26-mm LED display allows readings to be taken from a distance

Technical data:

Display: 2 1/2-digit LED display; digit height 26 mm

Measurement input provided by means of specially insulated 4-mm safety jacks

4-mm safety jack for ground connection

**Measuring range: 0 ... 18.0 kV**

Reset button for resetting instrument to zero

Accuracy: better than 2 % for 0 ... 10 kV

Throw switch: ON/OFF

Throw switch: measure sample - freeze measured value (hold)

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 483 g



## DE722-1M Teslameter „inno“

Demonstration instrument for measuring magnetic flux density using an axial or tangential magnetic field sensor; this instrument is easy to transport and can be mounted magnetically; the 26-mm LED display allows readings to be taken from a distance

Technical data:

Display: 2 1/2-digit LED display; digit height 26 mm

**Measuring range: ±200 mT**

Accuracy: ±1.5 %

Throw switch: ON/OFF

DIN jack: for connecting an axial or tangential sensor

Button for setting to zero

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 400 g



### Required accessory:

DE722-2A Magnetic field sensor, axial

DE722-2T Magnetic field sensor, tangential

### Recommended accessories for "inno" measuring instruments:

P3120-6N Mains transformer, 6 V/500 mA, as external power supply P3120-5B S-shaped assembly platform



# magnetic "inno" measuring instruments



## DE723-1W Wattmeter „inno“

Demonstration instrument for measuring power in low-voltage circuits; very easy to transport and magnetically mountable; the 26-mm LED display showing the measured value and the 20-mm LED display for the measurement unit allow precise readings to be taken even at a distance

Technical data:

Display: 3 1/2-digit LED display; digit height 26 mm

Input: 4-mm safety jacks (pair)

**Types of measurement: true power (W), work/energy (Ws)**

**Measurement limits: 20 Veff, 2 Aeff**

Accuracy: <1.5 %

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 450 g



## DE722-1L Conductivity meter "inno"

Demonstration instrument for measuring electrical conductivity of liquids; very easy to transport and magnetically mountable; the 26-mm LED display showing the measured value and the 20-mm LED display for the measurement unit allow precise readings to be taken even at a great distance

Technical data:

Display: 3 1/2-digit LED display; digit height 26 mm

External sensor for measurement (not included)

**Measuring ranges: 20, 200 μs; 2, 20, 200, 2000 ms**

Accuracy: approx. 1 %

4-mm safety jacks for connecting the conductivity electrode

"Slope" adjustment knob for setting the display to zero; toggle switch: ON/OFF

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 400 g



### Required accessory:

**C4100-1D Conductivity electrode**



## P3120-1P pH-Meter "inno"

Demonstration meter for measuring pH; this instrument is easy to transport and can be mounted magnetically; the 26-mm LED display allows readings to be taken accurately even from a distance

Technical data:

Display: 3 1/2-digit LED display; digit height 26 mm

External sensor for measurement (not included)

**Measuring range: 0.00 ... 14.00 pH; precision: 0.01 pH; accuracy: <0.5 %**

BNC jack for connecting pH electrode

Knobs for adjusting slope and zero point (pH 7)

Knob for temperature adjustment; toggle switch: ON/OFF

Power supply: 4 x 1.5 V mignon cells (included) or 5.5-mm hollow DC jack for 6 V/500 mA external power supply P3120-6N

Case: green ABS plastic with yellow labelling

Dimensions: approx. 160x120x45 mm; weight: approx. 400 g



### Required accessories:

C4100-1E pH electrode, BNC connector

C4100-1F Buffer solution, pH 4, 100 ml

C4100-1G Buffer solution, pH 7, 100 ml



# "handy" measuring instruments



## DE727-1F

### Capacitance meter "handy"

Handheld digital device for measuring the capacitance of capacitors; 3 1/2-digit LCD display, digit size 18 mm

#### Nine measuring ranges:

**200 pF ... 20000  $\mu$ F**

Precision: 0.1 pF ... 10  $\mu$ F

Accuracy: +/-1 %

Measurement cycle: 0.5 sec

Turn control for setting exactly to zero

Fine-wire fuse provides overload protection

Power supply: 9 V battery (supplied)

Dimensions: 185x87x39 mm

Weight: 290 g



## DE727-1W Power meter "handy"

Handheld digital instrument for measuring power in AC and DC circuits; display options include ACV, ACA, DCV, DCA and watts (true power); 3 1/2-digit LCD display, digit size 13 mm

#### Measuring ranges:

**AC watts (true power): 2000 or 6000 W, max.**

**600 V AC, 10 A AC**

**AC/DC volts: 100 or 600 V, max. 600 V**

**AC/DC amperes: 10 A, max. 10 A**

Accuracy: +/-1 %

Polarity: bipolar (switches automatically)

Turn control for setting exactly to zero when

measuring watts

4-mm safety jacks

Power supply: 9 V battery (supplied)

Dimensions: 177x85x42 mm

Weight: 430 g



## DE727-1L LCR meter "handy"

Handheld digital instrument for measuring inductance (L), capacitance (C) and resistance (R); 3 1/2-digit LCD display, digit size 18 mm

#### Measuring ranges:

**Inductance: 2 mH ... 20 H (five ranges)**

**Capacitance: 2 nF ... 200  $\mu$ F (six ranges)**

**Resistance: 200 Ohms ... 20 MOhms**

**(six ranges)**

#### Diode testing

Accuracy: +/-3 %

Measurement cycle: 0.4 sec

Power supply: 9 V battery (supplied)

Dimensions: 185x87x39 mm;

Weight: 280 g

# "handy" measuring instruments



## DE727-1E Electromagnetic field meter "handy"

Handheld digital instrument for measuring electromagnetic fields around electrical wiring and electronic devices (e.g. TVs, PC monitors, video equipment)  
3 1/2-digit LCD display, digit size 13 mm

### Measuring ranges:

**0.01 ... 19.99  $\mu$ Tesla; 0.1 ... 199.9 mGauss**

Bandwidth: 30 ... 300 Hz

Accuracy: +/-4 %

Measurement cycle: 0.4 sec

Power supply: 9 V battery (supplied)

Dimensions: 131x70x25 mm

Weight: 165 g



## DL727-1L Luxmeter „handy“

Handheld digital device for measuring luminescence; very wide range and high resolution; splash-proof front panel; external sensor includes a highly sensitive photodiode and a colour correction filter; LCD display, 52x38 mm, and analogue scale

**Measuring ranges: 40.00, 400.0, 4000, 40000, 400000 lux (foot-candles)**

Zero-reset button (effective only in the 40-lux range)

Precision: 0.01 ... 100 Lux

Accuracy: +/-3 %

Maximum-minimum storage, data-hold and peak-hold functions, automatic shutdown, RS 232 interface

Power supply: 9 V battery (supplied)

Dimensions: 200x68x30 mm (instrument), 82x55x7 mm (sensor); weight: 220 g



## C4505-1A Conductivity meter "handy"

Handheld digital device for measuring conductivity; splash-proof front panel; external probe (included); LCD display, digit size 21.5 mm

**Measuring ranges: 1.999, 19.99 ms**

Precision: 0.001, 0.01 ms

Accuracy: 3 %

Measurement cycle: 0.4 sec

Data-hold function, automatic temperature compensation

Power supply: 9 V battery (supplied)

Dimensions: 200x68x30 mm (excluding sensor)

Weight: 270 g



## C4205-1A pH-Meter „handy“

Handheld digital device for measuring pH; splash-proof front panel; external probe with BNC connector and storage solution included; LCD display, digit size 21.5 mm

**Measuring range: 0.00 ... 14.00 pH**

Precision: 0.01 pH

Accuracy: approx. 0.1 pH

Measurement cycle: 0.4 sec

Data-hold function; two calibration screws (pH 7 and pH 4 or pH 10)

Power supply: 9 V battery (supplied)

Dimensions: 205x68x30 mm (excluding sensor); weight: 220 g

### Recommended accessories:

C4100-1F Buffer solution, pH 4, 100 ml

C4100-1G Buffer solution, pH 7, 100 ml



# measuring instruments, amplifiers



## MB270-2V LF amplifier "compact", magnetic

Used in amplifying weak audio signals for measurement purposes or for driving a loudspeaker  
Amplification factor: 1, 3, 10, 30, 100, 300, 1,000, 3,000, 10,000 times  
Accuracy: better than 20 %  
Frequency range: 25 Hz ... 70 kHz  
Output voltage: 2.8 Veff (2.1 Veff rms at 4 ohms); two 4-mm output jacks, short-circuit protection  
Input voltage: 2.8 Veff (max. 30 Veff)  
Power supply: 12 V DC through hollow jack, supplied by mains transformer P3130-1P (12V/2A)  
Dimensions: 84x84x39 mm

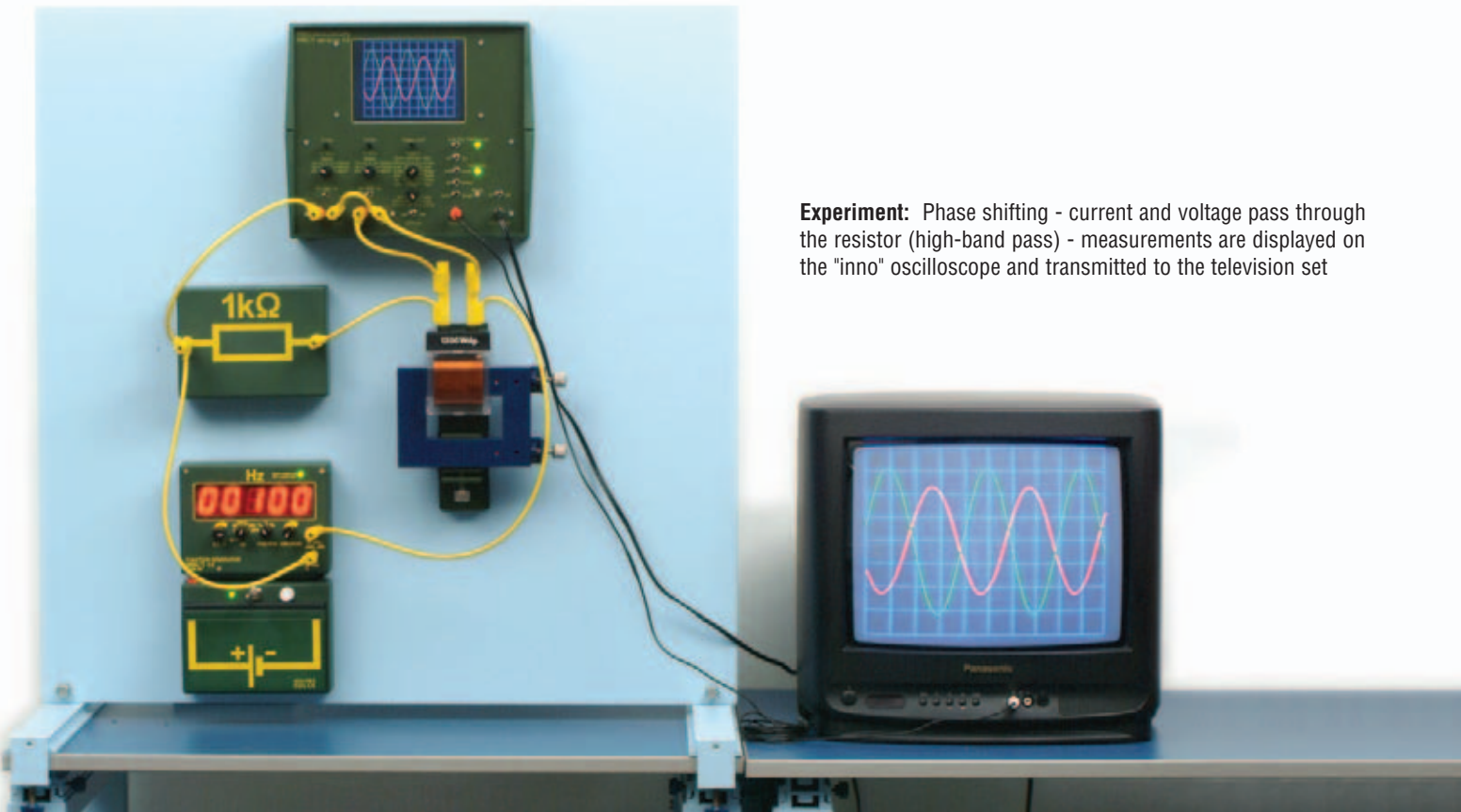


## DE750-3A Oscilloscope, two-channel, 30 MHz

For taking measurements during demonstrations and student experiments  
Monitor size: 80x100 mm, with measuring grid  
Y deflection: 1mV ... 5 V/DIV, with fine adjustment  
Max. input voltage: 400 V AC/DC  
Operating modes: Ch1, Ch2, Ch1+Ch2, Ch1-Ch2, XY display  
Input impedance: 1M $\Omega$ /30 pF; coupling: DC, AC, GND  
X deflection: 0.2 s ... 20 ns/DIV, with fine adjustment  
Triggering: auto, norm, TV-H, TV-V  
Dimensions: approx. 316x132x410 mm; weight: approx. 7.8 kg  
Voltage source: 230 V AC/50 ... 60 Hz

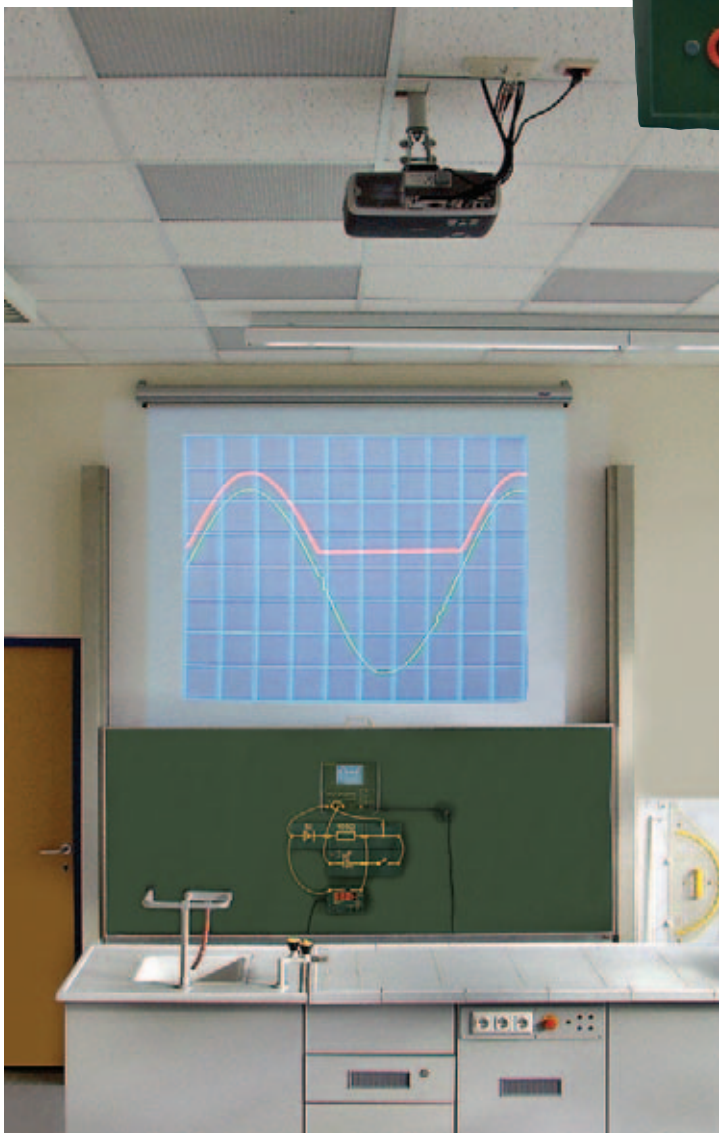
### Additionally required:

DG500-4A BNC to 4-mm socket adapter



**Experiment:** Phase shifting - current and voltage pass through the resistor (high-band pass) - measurements are displayed on the "inno" oscilloscope and transmitted to the television set

# magnetic "inno" oscilloscope



## Magnetically mounting digital video memory oscilloscope

### DE710-20 NTL video oscilloscope "inno"

Two-channel, magnetically mounting digital memory oscilloscope; compact, light and easy to use; including easy-to-read display and the option of projecting the image without the need of any additional device such as a computer; no waits during booting, no problems with software, no problems with connections, no version conflicts

5.6" TFT colour monitor; resolution: 256x256 pixels (8 bit/8 bit)

Genuine PAL video output for directly connecting a TV set or a video beamer

May be operated in XY mode despite digital memory

Vertical operating modes: Y1, Y2, Y1 and Y2, Y1+Y2, Y1-Y2, XY,

Input Y2 is a differential input, additionally invertable

(for demonstration of the full-wave rectification)

4-mm safety jacks for input, no adapter necessary, up to max. 20 kHz

Power supply: 12 V DC through hollow jack

Dimensions: approx. 260x230x70 mm; weight: approx. 1.9 kg

### Recommended power supply:

P3130-1P Mains transformer 12V DC/2A

Output voltage: 12 V DC/24 VA supplied by 5.5-mm hollow DC plugs

Voltage source: 100 ...240 V AC/50...60 Hz

**Experiment:** Half-wave rectification - projected using a beamer