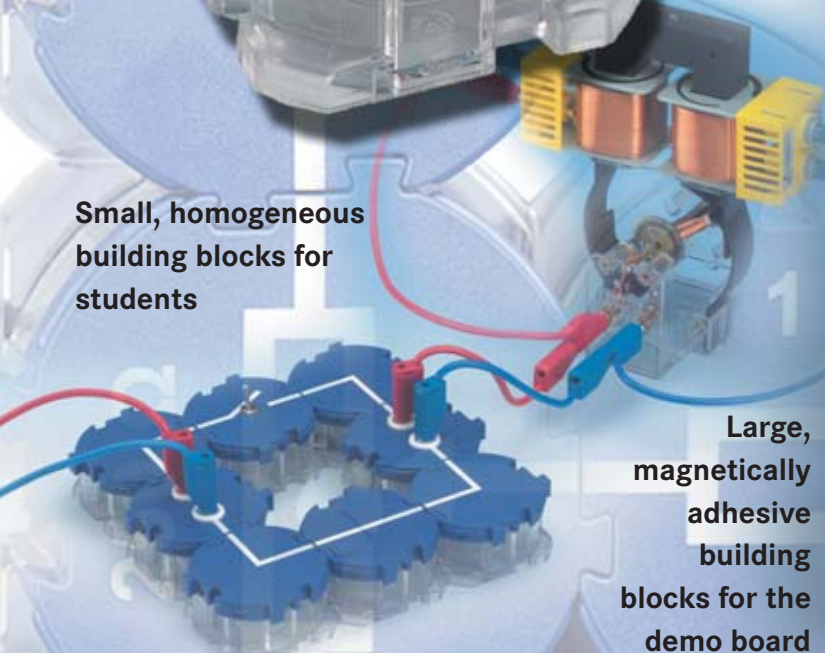


The new electric/electronic building block system



Small, homogeneous building blocks for students

Large, magnetically adhesive building blocks for the demo board



... always a good contact!

PHYWE

The teacher building block



Actual size

Quality guarantee
 ★ ★ ★ ★ ★
12 years
 of safe contact
 of components!



Demo building block system

Set 1

The system for electric/electronic demonstration experiments consists of 2 sets that can be put together and which supplement each other. Detailed information on Set 2 is given on page 4.

Equipment set demo experiments Electrics/Electronics, Set 1 09400.88

As a starter kit, we also offer the chance to purchase the set in two steps.

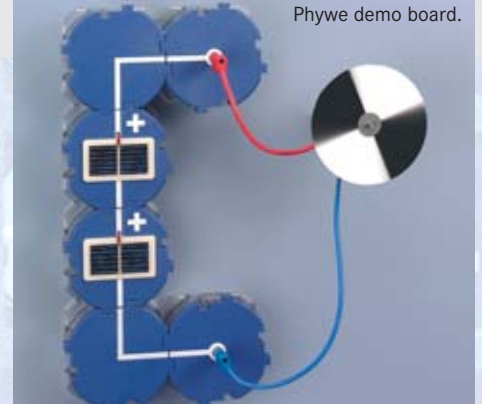
Equipment set demo experiments, introductory set 09400.66

Equipment set demo experiments, supplementary set 09400.55

A detailed order overview with the necessary accessories and working materials is given on side 6.



Series and parallel connection of solar cells on the Phywe demo board.



Experiment literature

Demonstration experiments in physics
 Electrics/Electronics on the board LB 1 01001.02

Demo building block system Sets 1

Demo experiments electrics/electronics, Set 1 (without board)	09400.88
Demo experiments electrics/electronics, Set 1 (incl. board)	09400.44
Demo experiments, introductory set	09400.66
Demo experiments, supplementary set to 09400.66	09400.55

The student building block



Actual size



Student building block system

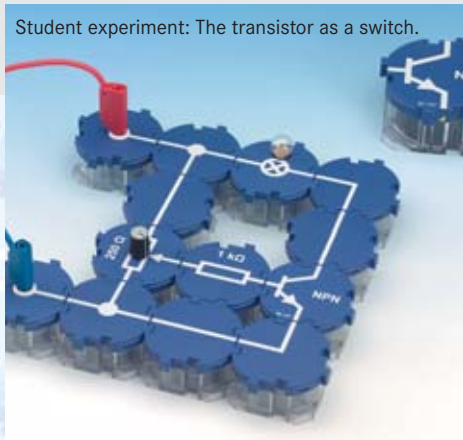
Set 1

The student electrics/electronics system consists of equipment sets that can be put together on any flat surface and which supplement each other. Detailed information on Set 2 is given on page 5.

Student building block system Set 1

05600.88

A detailed order overview with the necessary accessories and working materials is given on side 6.



Student experiment: The transistor as a switch.



Student building block system Set 1

Student building block system Set 1

05600.88

Experiment literature

Student experiments in physics
Electrics/electronics SB 1



01002.02



Quality guarantee
 ★ ★ ★ ★ ★
12 years
 of safe contact
 of components!

Demo building block system

To perform Set 2 experiments, Set 1 is also required.

Equipment set demo experiments Electrics/Electronics, Set 2 **09401.88**

A detailed order overview with the necessary accessories and working materials is given on side 7.

Set 2



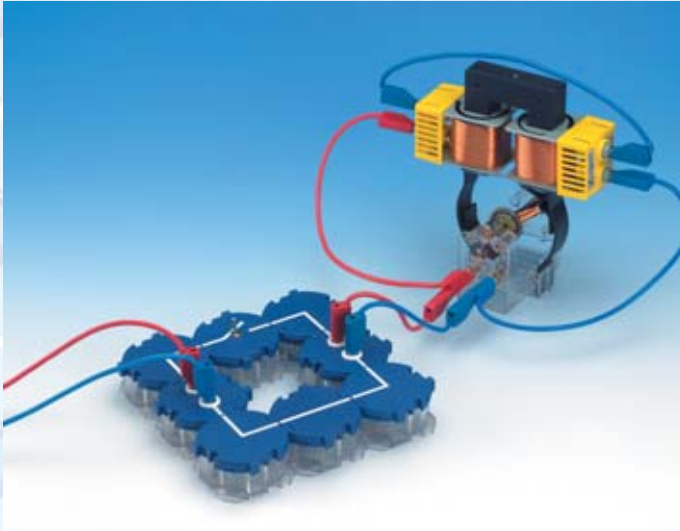
Experiment literature

Demonstration experiments in physics
 Electrics/Electronics on the board LB 201003.02

Demo building block system Set 2

Demo experiments electrics/electronics, Set 2

09401.88



Student building block system

Set 2

To perform Set 2 experiments, Set 1 is also required.

Student building block system Set 2

05601.88

A detailed order overview with the necessary accessories and working materials is given on side 7.

Set 2



Set 1 and Set 2
in the same storage box

Set 1 and Set 2 can both be stored in a wooden box, to save space and allow a good overall view. The clear arrangement of all necessary articles can be simply placed on the table for student experiments.

Student building block system Set 2

Student building block system Set 2

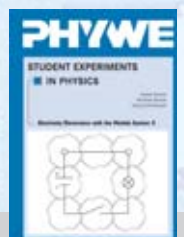
05601.88

Student building block system Set 1 + Set 2 in a box

05602.88

Experiment literature

Student experiments in physics
Electrics/electronics SB 2



01004.02

List of topics for Set 1

Materials for student and demonstration experiments

1	Electric Circuits
1.1	The simple circuit
1.2	Measurement of voltage
1.3	Measurement of current
1.4	Conductors and non-conductors
1.5	Changeover switches and alternate switches
1.6	Parallel and series connection of voltage sources
1.7	The safety fuse
1.8	The bimetallic switch
D 1.9	AND and OR Circuits
2	Electrical Resistance
2.1	Ohm's Law
2.2	The resistance of wires – dependence on length and cross-section
2.3	The resistance of wires – dependence on material and temperature
2.3	Current and resistance in a parallel connection
2.4	The resistivity of wires
2.5	Current strength and resistance with resist. connec. in parallel
2.6	Current strength and resistance with resist. connec. in series
2.7	Voltage in a series connection
2.8	The potentiometer
2.9	The internal resistance of a voltage source
3	Electric Power and Work
3.1	The Power and work of electric current
4	Capacitors
4.1	Capacitors in direct current circuits
4.2	The charging and discharging of a capacitor
4.3	Capacitors in alternating current circuits
5	Diodes, Part 1
5.1	The diode as electrical valve
5.2	The diode as rectifier
5.3	The characteristic curve of a silicon diode
5.4	Properties of solar cells – the dependence on the illuminating intensity
5.5	The characteristic current-voltage curves of a solar cell
D 5.6	Solar cells connected in series and in parallel – characteristic current-voltage curves and performance
D 5.7	Series and parallel connections of solar cells – characteristic current-voltage curves and power
D 5.8	The characteristic curve of a germanium diode
6	Transistors, Part 1
6.1	The npn transistor
6.2	The transistor as direct current amplifier
6.3	The characteristic current-voltage curves of a transistor
6.4	The transistor as a switch
6.5	The transistor as a time-delay switch
D 6.6	The p-n-p transistor

D = only demo experiment
1, 2, 3, 4 = Introductory set 09400.66 5, 6 = supplementary set 09400.55

Set 1	Order No.	Quantity	Order No.	Quantity
Student equipment set electrics/electronics	05600.88			
Demo equipment set electrics/electronics			09400.88	
Lead, straight	05601.01	4	09401.01	6
Lead, angular	05601.02	4	09401.02	6
Lead, T-shaped	05601.03	2	09401.03	4
Lead, intermittent	05601.04	2	09401.04	4
Lead, add-on building block	05601.10	2	09401.10	4
Lead, straight with jack	05601.11	2	09401.11	2
Lead, angular with jack	05601.12	2	09401.12	2
On/Off switch	05602.01	1	09402.01	2
Changeover switch	05602.02	2	09402.02	2
Lamp socket, E10	05604.00	2	09404.00	2
Battery holder	05605.00	2	05605.00	2
Resistor 1 Ohm	–	–	09411.10	1
Resistor 10 Ohm	–	–	09412.10	1
Resistor 50 Ohm	05612.50	1	09412.50	1
Resistor 100 Ohm	05613.10	1	09413.10	2
Resistor 500 Ohm	05613.50	1	09413.50	1
Resistor 1 k Ohm	05614.10	1	09414.10	1
Resistor 10 k Ohm	05615.10	1	09415.10	1
Resistor 47 k Ohm	05615.47	1	09415.47	1
Potentiometer 250 Ohm	05623.25	1	09423.25	1
Potentiometer 10 k Ohm	05625.10	1	09425.10	1
Capacitor 47 µF	05645.47	1	09445.47	1
Capacitor 100 µF	05646.10	1	09446.10	1
Capacitor 470 µF	05646.47	1	09446.47	1
Germanium diode AA 118	–	–	09450.00	1
Silicon diode 1N4007	05651.00	1	09451.00	1
Transistor NPN (BC337)	05656.00	1	09456.00	1
Transistor PNP (BC327)	–	–	09457.00	1
Solar cell 2.5 cm × 5 cm, DB	–	–	09470.00	2
Solar cell 21 mm × 62 mm, with connectors	06752.13	1	–	–
Solar cell holder 21 mm × 62 mm	06752.14	1	–	–
Crocodile clamps, 10 pcs	07274.03	3/10	07274.03	3/10
Conductors and non-conductors	06107.50	1	06107.50	1
Connectors, 2 pcs	07278.05	1	07278.05	1
Bimetal strip	05913.00	1	05913.00	1
Motor 2V DC	–	–	11031.00	1
Disc for motor	–	–	11031.01	1

All the advantages at a glance.

- Worldwide unique building block system, registered for a patent!
- Demo building blocks can be fixed to all magnetically adhesive boards.
- With Phywe you only need one board for all topics.
- The building blocks are easy to remove from experimental set-ups using the gripper rims and because of their perfect fit.
- Wiring diagram of the experiments can be completely illustrated.
- 100-percent compatibility between student and teacher building blocks (only difference is the size).
- Student building blocks can be set up without their mounting plates but with secure contact on any flat surface like a table or desk.
- Optimum literature to match the system with numerous experiments and topics.

The building blocks give you the following advantages:

100-percent reliable contact due to interlocking building blocks

Impact strength material

Segments can be easily removed

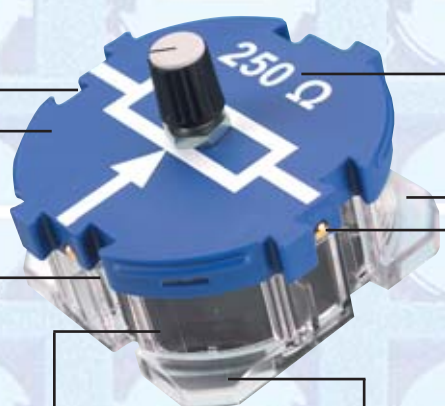
Building blocks secure against manipulation

Labeling easily legible

Transparent side walls: components visible

Gold contacts (no corrosion)

demo building block magnetically adhesive



List of topics for Set 2

Materials for student and demonstration experiments

7	Transformation of energy
7.1	The transformation of electrical energy into heat energy
7.2	The transform. of electrical energy into mechanical energy
8	Electrochemistry
8.1	The conductivity of electrolytes
8.2	Voltage and current strength in conductive processes in liquids
8.3	Electrolysis
8.4	Galvanization
8.5	Galvanic cells
8.6	The lead accumulator
D 8.7	The PEM Electrolyser and PEM Fuel cell
D 8.8	The PEM Solar-hydrogen model
9	Electromagnetism
9.1	The magnetic effect of a current-carrying conductor
9.2	Lorentz force: A current-carrying conductor in a mag. field
9.3	The electric bell
9.4	A model of an electromagnetic relay
9.5	Controlling with a relay
9.6	The twilight switch
9.7	The galvanometer
9.8	The reed relay
10	Electric motors
10.1	The permanent magnet motor
10.2	The main circuit motor
10.3	The shunt motor
D 10.4	The synchronous motor
11	Induction
11.1	Induction voltage with a permanent magnet
11.2	Induction voltage with an electromagnet
11.3	The alternating current generator
D 11.4	The direct current generator
D 11.5	Lenz's rule
D 11.6	The behaviour of a direct current generator under load
12	Transformers
12.1	Voltage transformation
12.2	Current transformation
D 12.3	Forces between primary and secondary coils
D 12.4	The heavy current transformer
13	Self-induction
13.1	Self-induction on switching on
13.2	Self-induction on switching off
13.3	Coils in alternating current circuits
D 13.4	Current strength on switching coils on and off
14	Safe working with electrical energy
14.1	Earthing of the power supply line
14.2	The protective conductor system
14.3	The protective break transformer
15	Sensors
15.1	The NTC resistor
15.2	The PTC resistor
15.3	The light dependent resistor (LDR)
16	Diodes, Part 2
16.1	The characteristic curve of a Z-diode
16.2	The Z-diode as voltage stabilizer
16.3	The light emitting diode
16.4	The photo diode
16.5	The bridge rectifier
16.6	The filter network
17	Transistors, Part 2
17.1	Voltage amplification of a transistor
17.2	Stabilization of the operating point
17.3	Transistor control with light
17.4	Temperature control of a transistor
17.5	Undamped electromagnetic oscillations
D 17.6	Transistors in a digital circuit
D 17.7	The Darlington circuit
D 17.8	How phototransistors function
D 17.9	Information transfer through a photoconductor
18	The operational amplifier and applications
D 18.1	The differential amplifier
D 18.2	The digital circuit
D 18.3	The generation of oscillations

Set 2	Order No.	Quantity	Order No.	Quantity
Student equipment set electrics/electronics	05601.88			
Demo equipment set electrics/electronics			09401.88	
Lead, T-shaped	05601.03	2	–	–
Connector, cross-shaped, insulated	–	–	09401.05	1
Connector, cross-shaped, connected	–	–	09401.06	1
Universal holder	05603.00	1	09403.00	1
Resistor, 100 ohm	05613.10	1	–	–
Transistor, npn (BC337)	–	–	09456.00	1
Capacitor, 10 nF	–	–	09442.10	1
Capacitor, 47 nF	05642.47	1	09442.47	1
NTC resistor	05630.00	1	09430.00	1
PTC resistor	05631.00	1	09431.00	1
Fotowiderstand	05632.00	1	09432.00	1
Z-diode ZF 4.7	05652.00	1	09452.00	1
Photodiode BPW 24	05653.00	1	09453.00	1
Light emitting diode, red	05654.00	1	09454.00	1
Bridge rectifier	05655.00	1	09455.00	1
Bridge rectifier with LED	–	–	09455.00	1
Phototransistor	–	–	09458.00	1
Operational amplifier	–	–	09460.00	1
Light emitting diode for Optical fibre	–	–	09461.00	1
Light waveguide, 2 m	–	–	09461.02	1
Coil, 400 turns	07829.01	2	09472.01	2
Coil, 1600 turns	07830.01	1	09472.02	1
Coil holder	05672.00	1	–	–
Contact spring with armature	05673.00	1	09473.00	1
Contact element	05673.01	1	09473.01	1
Bell gong	05673.02	1	05673.02	1
Relay, 6 V-	05674.00	1	09474.00	1
U-core	07832.00	1	07832.00	1
Yoke	07833.00	1	07833.00	1
U-core retainer screw	07834.00	1	07834.00	1
Rotating shaft	07836.00	1	–	–
Magnet, l = 72 mm, bar-shaped	07823.00	1	06318.00	1
Motor model holder	–	–	07849.00	1
Motor model	07850.10	1	07850.20	1
Rotary holder for Motor model	–	–	07850.21	1
Bearing plate	–	–	07837.00	1
Magnet holder	–	–	09476.10	1
Reed contact	–	–	09463.00	1
Distributor support	–	–	07924.00	1
Conductor swing	–	–	06412.00	1
Motor, 12 V-	–	–	09475.00	1
Compass, marked, 1 only	06350.02	(1)	–	–
Galvanometer movement	07875.00	1	09477.00	1
Galvanometer scale	07876.00	1	09477.01	1
Notch bearing with plug pin	07877.00	1	–	–
Glow lamp	07506.90	1	–	–
Headphones, 2 kOhm, 4 mm-plugs	06811.00	1	–	–
Model person for electrical safety	05680.00	1	09480.00	1
Shelf with holder	–	–	09471.00	1
Electrode holder	–	–	06618.00	2
Trough, grooved, without lid/Glass trough	34568.01	1	06620.00	1
Copper electrode, 76 × 40 mm	45212.00	2	45212.00	2
Zink electrode, 76 × 40 mm	45214.00	1	45214.00	1
Lead electrode, 76 × 40 mm	45215.00	2	45215.01	2
Iron electrode, 76 × 40 mm	45216.00	1	45216.02	1

Introductory electrics experiments

Introductory electrics experiments

Building blocks with jacks can be used initially as an introduction to the system, these are then connected with leads.

The building blocks are the same size as the demo-experiments building blocks.

Battery box with jacks, DB	09390.05
Lamp socket E10 with jacks, DB	09390.04
Lever switch with jacks, DB	09390.01

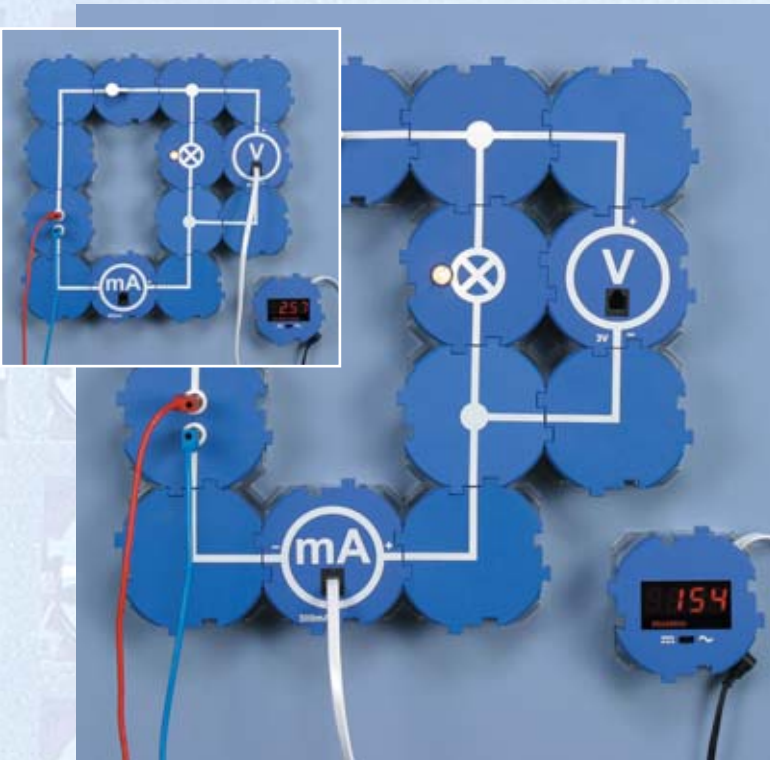


D = only demo experiment

Your advantage! Display building block packages! You couldn't have wished for anything better!

One display building block used for an experiment: Simply change the display building block and you can measure and display either the current or the voltage.

Experiment: The electric circuit

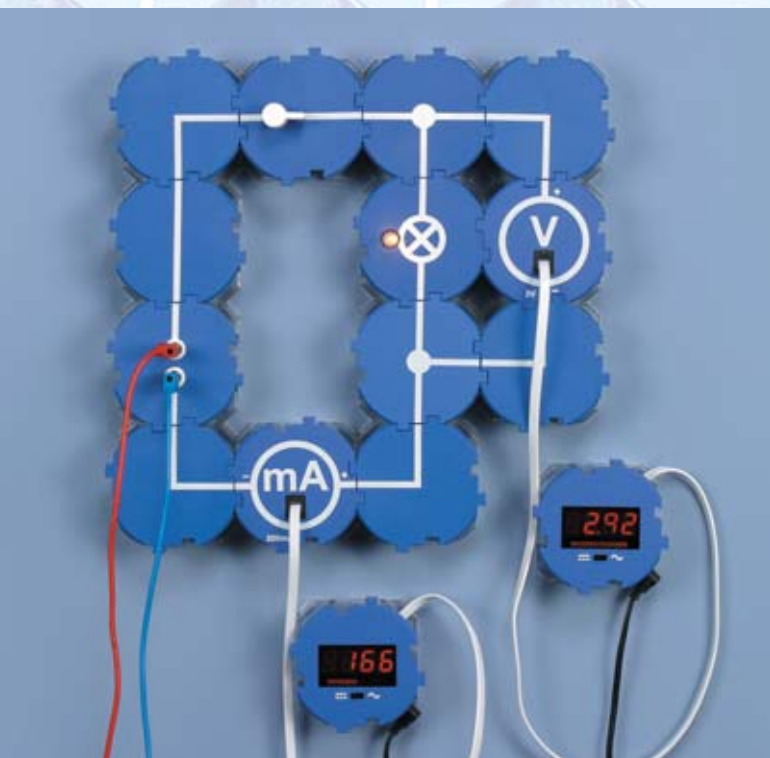


Package 1 includes

Description	Order-No.	Quantity
Display building block	09485.01	1
Measuring building block 300 mA	09485.02	1
Measuring building block 30 V	09485.05	1
Power supply 12VDC/2A	12151.99	1

09400.33

Simultaneous measurement of current and voltage using two display building blocks in the experiment set-up.



Package 2 includes

Description	Order-No.	Quantity
Display building block	09485.01	2
Measuring building block 300 mA	09485.02	1
Measuring building block 3 A	09485.03	1
Measuring building block 3 V	09485.04	1
Measuring building block 30 V	09485.05	1
Power supply 12VDC/2A	12151.99	2

09400.77

Of course, the building blocks can also be purchased separately!

NEW!

Display building block with analog and digital display

for the electricity/electronics building block system

The new display building block for measurement of AC and DC voltage. Frequency range: 2 Hz – 20 kHz



Connecting cable for connecting the 300 mA, 3 A, 3 V or 30 V measuring building block.

LED bar for analog display.

Seven-segment LED display, 3 digits (including polarity), digit height 14 mm


DC/AC selector

12 VDC power supply

Display building block 09485.01


A combination of the display building block and the following measuring building blocks allows you to simply measure and clearly display the most important values in many different current and voltage ranges:

1. Measuring building block ± 300 mA 09485.02




- Resolution: 1 mA
- Internal resistance: 0.5Ω
- Maximum current: 500 mA
- Plug for connecting cord to display building block.

2. Measuring building block ± 3 A 09485.03




- Resolution: 10 mA
- Internal resistance: $75 \text{ m}\Omega$
- Maximum current: 3.5 A
- Plug for connecting cord to display building block.

3. Measuring building block ± 3 V 09485.04



- Resolution: 10 mV
- Internal resistance: $1 \text{ M}\Omega$
- Maximum voltage: 10 V
- Plug for connecting cord to display building block.

4. Measuring building block ± 30 V 09485.05



- Resolution: 100 mV
- Internal resistance: $1 \text{ M}\Omega$
- Maximum voltage: 50 V
- Plug for connecting cord to display building block.

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 int.sales@phywe.com



www.phywe.com

Yes, I'm very interested and would like to have

...a quotation free of charge and without any obligations for:

Order-No.	Description	Quantity		

Name _____

School _____

Customer number. (if known) _____

Address _____

Post code, city or town _____

Phone _____ Fax _____

E-mail _____

Date _____ Signature _____