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instruction manual



The device complies
with the relevant EC
directives.



Fig. 1: 12975-88 Cobra DigiMotion Expert Set

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1 SAFETYINFORMATION



Attention!

- Before operation of the device, read the operating instructions carefully and completely. You protect yourself and avoid damage to your device.
- Do not operate the device if damage is visible.
- Use the device only for its intended purpose.
- Do not open the device.
- Protect the device from dust, moisture and vapours. Only clean the device when it is disconnected from the mains voltage with a slightly damp, lint-free cloth. Sharp cleaning agents or solvents are unsuitable.
- Please charge the MotionDot in time and do not keep the battery in a low-power state for extended periods.
- If the signal source is not used for a long time, it is advisable to charge it about every 3 months.
- If the device temperature rises or any other suspicious phenomenon is noticed, disconnect the power supply immediately.
- Avoid scratching the MotionBoard with sharp objects, especially its surface.

2 PURPOSE AND CHARACTERISTICS

The Cobra DigiMotion sets enable experiments to be carried out on various topics in kinematics and dynamics. They are designed for use in physics lessons at secondary school level and are used to investigate two-dimensional planar motion. The sets consist of a board and a signal source.

They are based on the principle of electromagnetic positioning and enable the continuous measurement of the position of this signal source at any point in time within the effective measuring range. Through high-frequency data acquisition, the trajectory of objects in the two-dimensional plane can be displayed using the accompanying free software LABsense. Velocity and acceleration can be calculated from the position data at any point in time. The measurement takes place in parallel with the visualisation of the motion phenomena, thereby making physical laws clearly visible.

Cobra DigiMotion Basic Set 12975-77 for 6 experiments in the fields of

- Dynamics
- Kinematics
- Vibrations
- Energy

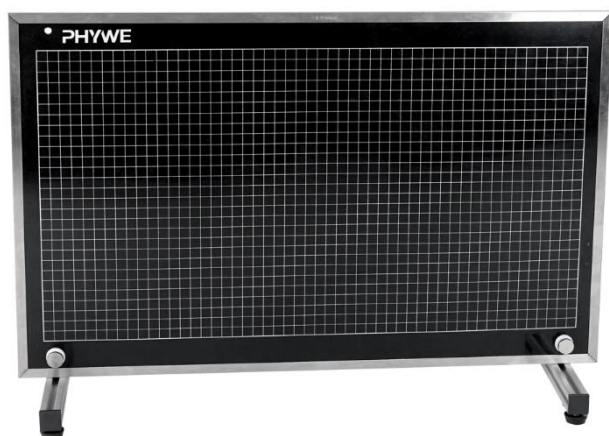
Cobra DigiMotion Expert Set 12975-88 for 9 experiments. In addition to the six experiments in the basic set, three further experiments are available in the following areas:

- Circular motion
- Centrifugal motion
- Superposition of motions

3 FUNCTIONAL AND OPERATING ELEMENTS

12975-21 MotionBoard

The MotionBoard is the central measuring unit of the Cobra DigiMotion system. It detects the position of the MotionDot contactlessly using integrated electromagnetic technology and displays movements two-dimensionally with high precision. The measurement data is displayed in real time in the free LABsense software via Bluetooth or a cable connection.



The MotionBoard is the central measuring unit of the Cobra DigiMotion system. It detects the position of the MotionDot contactlessly using integrated electromagnetic technology and displays movements two-dimensionally with high precision. The measurement data is displayed in real time in the free LABsense software via Bluetooth or a cable connection.

12975-11 Motion Dot (signal source)

The MotionDot is the mobile signal source of the Cobra DigiMotion system and enables highly precise detection of two-dimensional movements. Through electromagnetic induction, its position on the MotionBoard (12975-21) is continuously recorded and displayed in real time in the LABsense app.



12975-13 Pendulum bob set of 3

Three pendulum bodies with rods of various lengths for conducting oscillation experiments with the Cobra DigiMotion Set (12975-77 / 12975-88). A MotionDot can be inserted into the pendulum body (12975-11).



12975-23 Connector for pendulum bob

Connecting part to connect the angle disc (12975-33) with the stand rod with base (12975-20). This item is required for conducting oscillation experiments with the Cobra DigiMotion Set (12975-77 / 12975-88).



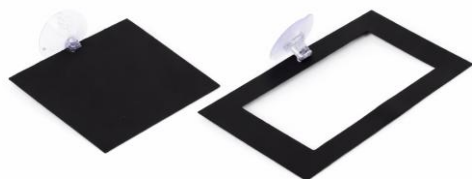
12975-33 Angular disc

The angular disc is used for conducting oscillation experiments with the Cobra DigiMotion Set (12975-77 / 12975-88) or for the Cobra SMARTexperiment - Mathematical Pendulum (12972-00).



12975-43 Damping pad, set of 2

Two damping cards that cause different levels of damping. They can be attached to a pendulum body (12975-13) using the suction cup. This item is used for conducting damped oscillation experiments with the Cobra DigiMotion Set (12975-77 / 12975-88).



12975-12 Electromagnetic release

The electromagnetic release is used for conducting the free fall experiment with the Cobra DigiMotion Set (12975-77 / 12975-88). It is rechargeable via USB-C.



12975-22 Protective cover for MotionDot

The protective cover is used for conducting the free fall experiment with the Cobra DigiMotion Set (12975-77 / 12975-88). A MotionDot can be inserted and the protective cover features a short rod that is compatible with the electromagnetic release (12975-12).



12975-15 Catapult for MotionDot

The catapult is designed for the MotionDot (12975-11). It features 4 gears and is used for conducting projectile motion experiments and experiments for investigating centrifugal motion with the Cobra DigiMotion Set (12975-77 / 12975-88).



12975-10 Collection container

The collection container is used for safely catching the MotionDot. It is used for conducting various experiments with the Cobra DigiMotion Set (12975-77 / 12975-88).



12975-20 Support rod with base

The stand rod with base is used for conducting various experiments with the Cobra DigiMotion Set (12975-77 / 12975-88).



12975-30 Stand for MotionBoard

With the help of two stand feet, the MotionBoard (12975-21) can be set up stably for conducting various experiments with the Cobra DigiMotion Set (12975-77 / 12975-88).



12975-40 Accessories including screws, spirit level, and cable

The accessory set consists of various screws, a spirit level and cables for charging the MotionDot (12975-11) and for powering the MotionBoard (12975-21). It is required for all experiments with the Cobra DigiMotion Set (12975-77 / 12975-88).



4 HANDLING

4.1 MotionBoard

Assembly of the Stand

The panel has mounting holes at the top left, bottom left, and bottom right.

- Insert the screw through the washer.
- Place it into the slot of the stand.
- Tighten securely.

The MotionBoard can be positioned horizontally or vertically.

Alignment / Calibration

Place the spirit level on the panel.

The panel can be leveled by adjusting the stand.

Notes:

- The zero point (0|0) is defined in the software.
- The system is factory-calibrated.
- Do not perform your own recalibration.

Power indicator

- **Off:** Device switched off
- **Blue:** Device switched on

Bluetooth Indicator

- **Off:** No power/ Bluetooth off
- **Blue:** Bluetooth active

4.2 MotionDot (Signal source)

Power indicator

- **Off:** No function / no signal
- **Green:** Ready for operation

Charging Indicator

- **Off:** Not charging
- **Rot:** Charging
- **Green:** Fully charged

Note:

- Charge for at least 2 hours before first use.
- Switch on – the indicator light illuminates.
- During use, the transmitting side must face the front of the panel.

Connection to PC

- Connect the Type-C cable to the computer.
- Download the LABsense software
- Start data collection

5 OPERATING INSTRUCTIONS



This quality device meets the technical requirements summarized in the current European Community directives. The product properties entitle the user to CE-marking.

This device may only be operated under expert supervision in a controlled electromagnetic environment of research, teaching and training facilities (schools, universities, institutes and laboratories).

The individual connected lines must not be longer than 2 m.

Electromagnetic phenomena (HF, burst, indirect lightning discharges, etc.) can influence the device so that it no longer operates within the specified data. The following measures reduce or eliminate the disturbing influence: Avoid carpeting; ensure equipotential bonding; experiment on a conductive, grounded base, use of shielding, shielded cables.

6 TECHNICAL DATA

Electromagnetic Platform:

- Measurement area: 521 mm × 293 mm
- Resolution: 0.012 mm
- Accuracy: 1 mm
- Communication distance: up to 50 m
- Power supply: USB Type-C charging
- Charging port: 4-pin magnetic suction interface

Signal Source:

- Electromagnetic position measurement within the effective area
- Optimal measurement distance to the platform: 8 mm to 16 mm
- Transmission of motion via electromagnetic induction
- Battery: 3.7 V / 65 mAh lithium battery
- Charging interface: USB-Type-C
- Dimensions: h = 30 mm, r = 35 mm

7 SCOPE OF DELIVERY

The Cobra DigiMotion Basic Set 12975-77 contains the following components:

MotionBoard for Cobra DigiMotion	12975-21
MotionDot for Cobra DigiMotion	12975-11
Pendulum bob set of 3	12975-13
Connector for pendulum bob	12975-23
Angular disc	12975-33
Damping pad set of 2	12975-43
Electromagnetic release	12975-12
Protective cover for MotionDot	12975-22
Catapult for MotionDot	12975-15
Collection container	12975-10
Support rod with base	12975-20
Stand for MotionBoard	12975-30
Accessories: screws, spirit level, cable	12975-40

The Cobra DigiMotion Expert Set 12975-88 consists of:

Cobra DigiMotion Basis Set	12975-77
Circular Motion Set for Cobra DigiMotion	12975-04
Centrifugal Motion Set for Cobra DigiMotion	12975-05
Superposition of Motions Set for Cobra DigiMotion	12975-06

8 ACCESSORIES

The Cobra DigiMotion Basic Set 12975-77 can be expanded with the following sets:

Circular Motion Set for Cobra DigiMotion 12975-04

The Circular Motion Set, in combination with the Cobra DigiMotion Base Set (12975-77), enables the investigation of two-dimensional motion. The MotionDot can be attached to the pivot arm at various positions, allowing circular motions with different radii to be performed. The frequency of the circular motion can be controlled by means of a motor. An external power supply is required for this purpose, which is not included in the scope of delivery.



Centrifugal Motion Set for Cobra DigiMotion 12975-05

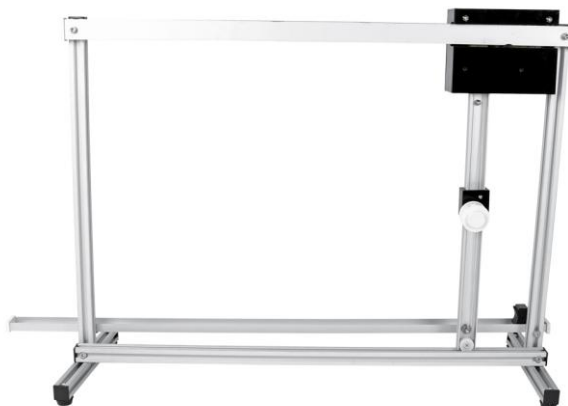
The Centrifugal Motion Set, in combination with the Cobra DigiMotion Base Set (12975-77), enables the investigation of two-dimensional centrifugal motions. The MotionDot can be launched into a centrifugal track using the catapult (included in the Base Set), allowing the centrifugal motion to be studied at varying initial velocities.



Superposition of Motions Set for Cobra DigiMotion

12975-06

The Superposition of Motions Set, in combination with the Cobra DigiMotion Base Set (12975-77), enables the investigation of motion addition and motion decomposition. The MotionDot can be controlled in the x- and y-direction by means of a motor.



9 DISPOSAL

The packaging consists mainly of environmentally friendly materials, which should be sent to the local recycling points.



This product does not belong in the normal garbage disposal (household garbage).

If this device is to be disposed of, please send it to the address below for professional disposal.

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