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PHYWE Power Supply
DC: 0…12 V, 2 A / AC: 6 V, 12 V, 5 A

13505-90 / -93

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Operating instructions

CE The unit complies with the applicable EC-guidelines

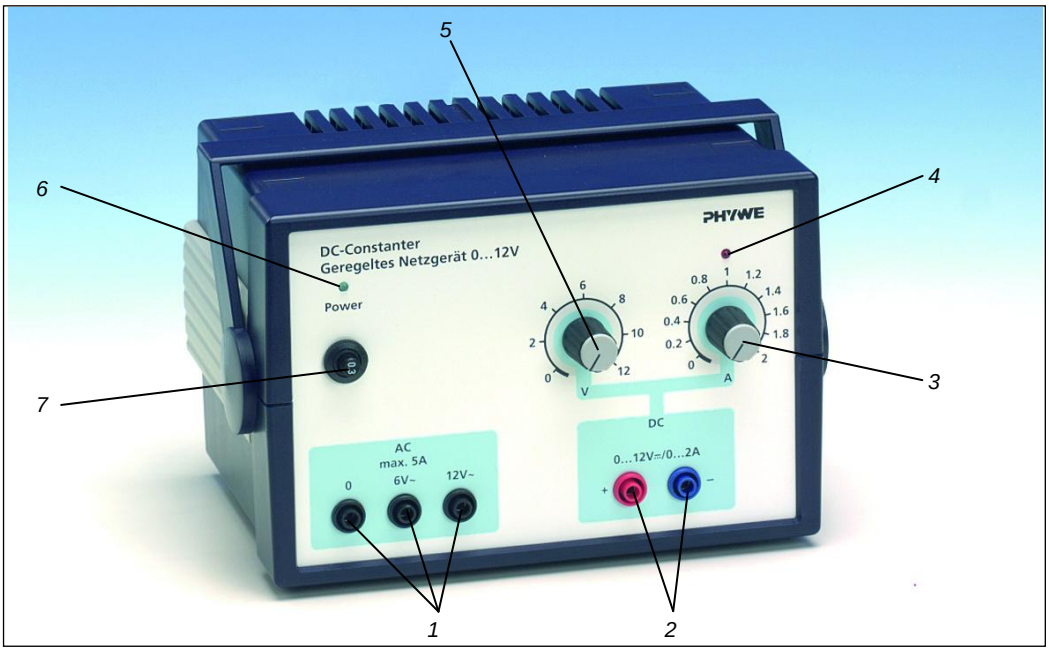

Fig. 1: Front view of the power supply 13505-93.

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1 SAFETY PRECAUTIONS

Attention!

- Carefully read these operating instructions completely before operating this instrument. This is necessary to avoid damage to it, as well as for user-safety.
- Check that your mains supply voltage corresponds to that given on the type plate fixed to the instrument.
- Install the instrument so that the on/off switch and the mains connecting plug are easily accessible. Do not cover the ventilation slits.
- Take care that no liquids or objects enter in through the ventilation slots.
- Only use the instrument in dry rooms in which there is no risk of explosion.
- Do not operate if there are visible signs of damage to the unit or the connection cord.
- Only use the instrument for the purpose for which it is intended.

2 PURPOSE AND CHARACTERISTICS

The unit is a high performance, low voltage source which is ideal for use in schools, laboratories and training establishments. Due to its economical price and excellent electrical features it is especially suitable for student experiments on electrical theory and electronics.

The unit has a short-circuit proof DC voltage output which can be operated both as an electronically regulated DC source of 0…12 V and as a regulated constant current source of 0.005…2 A. In addition, the instrument supplies 6 V and 12 V ungrounded alternate voltages with load capacities of up to 5 A.

All voltages are galvanically separated from the mains and are within the low voltage protection range.

3 FUNCTIONAL AND OPERATING ELEMENTS

The unit is accommodated in an impact resistant plastic housing. A retractable carrying handle is recessed into the unit and can be folded down so that the instrument slopes down towards the back. Four rubber feet provide resistance to slipping. The unit can be stacked onto other units of the

same design, because the rubber feet fit into cup-shaped recesses of the unit beneath, ensuring that the top instrument does not slide off. The sloped position can only be used for the uppermost unit of the stack.

The supplied connecting cord is used to connect the unit to the AC mains. The cord is inserted into the equipment connector at the back of the unit. The **two-pole mains switch** for operating the unit is situated in the immediate vicinity of the equipment connecting plug at the back of the unit.

The centre of the back plane provides a thread for the attachment of the support clamp for small case (02043-10), which is optional available (see Fig. 2). By use of that clamp, the unit can be fixed to various support rods. Thereby, the visibility will be increased in demonstration experiments.

Attention!

To avoid damage to the inner electrical components of the unit and to prevent people from getting harmed by electric shock, use the provided support clamp 02043-10, only.

You must not use screws with lengths over 16 mm!

Fig. 2: Back plane of the small case with support clamp attached

All other functional and operating elements are located on the front panel of the unit (see Fig. 1):

1 Outputs 6 V AC, 12 V AC/5 A

Three 4 mm safety sockets; the rated voltages of 6 V and 12 V are obtained when approximately half the rated current (2.5 A) is drawn. With simultaneous loading the maximum value of the sum of both currents is 5 A.

2 Output 0…12 V DC/0…2 A

Pair of 4 mm safety sockets for obtaining the voltage selected with the control knob (*5*) or the constant current set with the control knob (*3*).

3 Control knob "Current limit"

For the continuous adjustment of the maximum current from about 5 mA to 2 A. Constant current operation requires the load resistance to be lower than the quotient of the voltage set with the control knob (*5*) and the current limit set with (*3*).

4 Indicator "Constant current mode"

Lights up when the current limit selected with the control knob (*3*) is reached. In this case the voltage is no longer regulated, depending instead on the load resistance.

5 Control knob "DC voltage"

For the continuous adjustment of the electronically regulated (stabilised) DC voltage from 0 V to 12 V. If the current drawn is lower than the current limit set by the control knob (*3*), i.e. if the indicator (*4*) does not light, then the set voltage is being regulated.

6 Mains indicating lamp

Indicates that the mains voltage is connected and the unit is switched on.

7 Automatic cut-off

This is wired in the mains feed and protects all outputs. After it has tripped, the cause of the overload should be rectified. The cut-off can then be switched in again after a brief cooling period. **The total maximum power that can be drawn is 60 VA.**

4 HANDLING

The instrument is ready to use immediately on being switched on. We recommend that the voltage regulator and the current limiter are not set higher than is required for the particular experiment. Should the current-limitation display (*4*) light up before the target voltage is reached then, after a repeated check on the circuit, set a higher limiting value if required.

The scales at adjusting knobs (*3*) and (*5*) are suitable for coarse adjustment of the corresponding values. The use of measuring instruments is necessary for accurate adjustment. The direct voltage output is permanently short-circuit proof, without that the automatic circuit-breaker is triggered on disconnection. Should the 60 VA performance limit be exceeded at the alternating voltage outputs, then the automatic circuit-breaker responds within a short time. The same is true when, on simultaneous loading of direct and alternating voltage, the total power withdrawn (including the power lost across the control system) exceeds 60 VA.

The thermal circuit breaker integrated in the transformer is an additional protection at extreme ambient temperatures and on use of the instrument at full capacity. When appropriate, this disconnects from the mains circuit and, after cooling (approx. 20 min), automatically reconnects to it. In the meantime, the cause (overloading, hindrance to heat release by stapling, sunshine etc.) should have been eliminated.

Attention!

The power supply is to be exclusively used for supplying suitable experimental set-ups and instruments. The user carries the responsibility for the operational reliability of the set-up to which the instrument is connected. When it is connected to incorrect circuitry, even the relatively low performance provided by the instrument could cause considerable damage (fire hazard!). To avoid unnecessary risks, we therefore recommend that the setup which it is to supply be carefully checked prior to switching the power supply on.

The connection of AC and DC outputs in parallel is not permitted. This could result in the destruction of the DC output.

5 NOTES ON OPERATION

This high-quality instrument fulfils all of the technical requirements that are compiled in current EC guidelines. The characteristics of this product qualify it for the CE mark.

This instrument is only to be put into operation under specialist supervision in a controlled electromagnetic environment in research, educational and training facilities (schools, universities, institutes and laboratories).

This means that in such an environment, no mobile phones etc. are to be used in the immediate vicinity. The individual connecting leads are each not to be longer than 2 m.

The instrument can be so influenced by electrostatic charges and other electromagnetic phenomena that it no longer functions within the given technical specifications. The following measures reduce or do away with disturbances:
Avoid fitted carpets; ensure potential equalization; carry out experiments on a conductive, earthed surface, use screened cables, do not operate high-frequency emitters (radios, mobile phones) in the immediate vicinity.

6 TECHNICAL DATA

(typical for 25 °C)

Operating temperature range	5…40 °C

Mains supply

The instrument corresponds to protection class I. It is only to be connected to a socket with an earth lead connection.

Connecting voltage (+6 % / −10 %)	see type plate
Mains frequency	50 Hz/60 Hz
Power consumption	68 VA
Mains fuse	circuit breaker

DC voltage output

Output voltage	0…12 V
Rated current	2 A
Current regulator adjustment range	approx. 0…2 A
Ripple	V_{pp} = max. 1 mV
Internal resistance	≤10 mΩ
Overload protection	short-circuit proof

AC voltage outputs

Output voltages	6 V, 12 V
Rated current	5 A (in total) temporary (1 h) 8 A at 6 V
Overload protection	overcurrent cut-off

Total load capability	60 VA

Housing dimensions (mm³)	206 x 130 x 160 (WxHxD)
Weight	approx. 3 kg

7 ACCESSORIES

Optional available items:

- Support clamp for small case 02043-10

8 WARRANTY

We give a warranty of 24 months for units supplied by us inside the EU, and a warranty of 12 months outside the EU. The following is excluded from the warranty: Damage that is due to non-compliance with the operating instructions, improper use, or natural wear.

The manufacturer can only be held liable for the function and safety-relevant properties of the unit, if the maintenance, service, and modifications of the unit are performed by the manufacturer or by an institution that is expressly authorised by the manufacturer.

9 WASTE DISPOSAL

The packaging mainly consists of environmentally-friendly materials that should be returned to the local recycling stations.

Do not dispose of this product with normal household waste. If this unit needs to be disposed of, please return it to the address that is stated below for proper disposal.

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