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Operating instructions

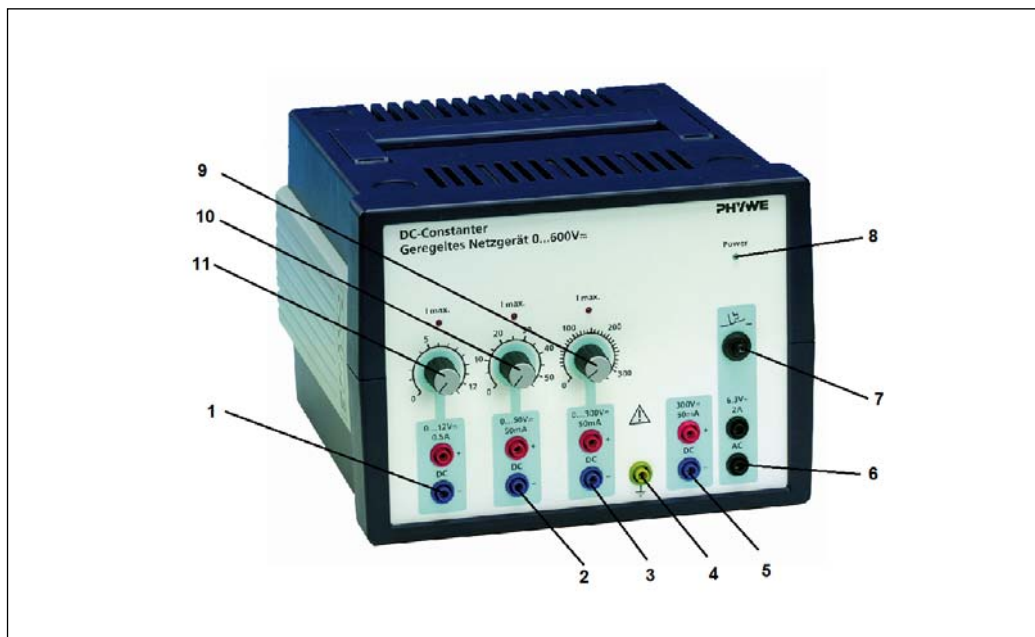
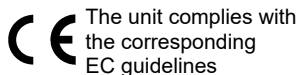


Fig. 1: Front view of the regulated Power supply 13672-93

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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.
- Only use the instrument for the purpose for which it was designed.
- 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 slots.
- 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 start up this instrument in case of visible signs of damage to it or to the line cord.
- **This instrument supplies voltages that are dangerous to contact and is therefore only to be operated under expert supervision. The regulations that are valid for working with dangerous electrical voltages are to be strictly followed to exclude the possibility of harm to life or health. In particular, the circuitry (experimental set-up) is first to be completely set up and be rechecked in current-less condition (absolute disconnection from the mains, mains plug unplugged!) before the instrument is connected to the mains and switched on. Interventions in, and changes to, the circuit are therefore also only to be performed in current-less condition. Further connections are only to be made with shockproof safety leads.**

2 PURPOSE AND DESCRIPTION

This instrument finds manifold uses as a power supply for the small and low voltage range up to 600 V. It is equipped with four galvanically separated, ungrounded direct voltage outputs which are independent of each other. Three of these outputs are adjustable and each has a display to show when the corresponding automatic current limitation is active. All outputs are short-circuit proof. The instrument serves in particular for the operation of various special electron tubes (Braun's tube 06987-00, narrow

beam tube 06959-00, electron diffraction tube 06721-00, Franck-Hertz tube 09105-10). An ungrounded, galvanically separated alternating voltage output supplies the required heating voltage.

3 FUNCTIONAL AND OPERATING ELEMENTS

The front plate of the instrument holds the following functional and operational elements (see Fig. 1):

1. *Output, 0...12 V $\overline{=}$ /0.5 A*
Pair of 4 mm safety sockets, positive terminal red, negative terminal blue.
2. *Output, 0...50 V $\overline{=}$ /50 mA*
Pair of 4 mm safety sockets, positive terminal red, negative terminal blue.
3. *Output, 0...300 V $\overline{=}$ /50 mA*
Pair of 4 mm safety sockets, positive terminal red, negative terminal blue.
4. *"Earthing" socket*
is connected with the earth lead via the line cord.
5. *Output, 300 V $\overline{=}$ /50 mA*
Pair of 4 mm safety sockets, positive terminal red, negative terminal blue.
6. *Output, 6.3 V \sim /2 A*
Pair of 4 mm safety sockets.
7. *Overcurrent circuit breaker for 6.3 V \sim output*
8. *Switch-on control lamp, green light emitting diode*
9. *Adjusting knob for 0...300 V $\overline{=}$ output voltage*
with red light emitting diode to show when the current limitation is applied.
10. *Adjusting knob for 0...50 V $\overline{=}$ output voltage*
with red light emitting diode as (9).
11. *Adjusting knob for 0...12 V $\overline{=}$ output voltage*
with red light emitting diode as (9).

4 HANDLING

The instrument is held in an impact-resistant plastic housing. The cover plate of the housing has a carrying handle that can be swung upwards. The base plate has a similar handle, which can be swung out to enable the instrument to stand in an inclined position. Four rubber feet ensure slip resistance and stability. The instrument can be stacked on other instruments having the same type of housing, whereby the rubber feet stand in the pan-shaped hollows of the instrument below for increased security against displacement.

The connecting cable supplied serves for connection of the instrument to the AC mains. The connecting plug socket is at the back of the instrument.

Changing the primary safety fuse:

The fuse holder is in the upper part of the mains socket of the digital counter, and so is only accessible when the connecting cord is not plugged in. Unplug the connecting cord, open the fuse holder using a screwdriver, take out the defect fuse and replace it with a new one (first check the specification of this against the data on the type plate), then fit the fuse holder back in the mains socket.

Should this fuse blow when the instrument is switched on, never replace it with a more resistant fuse! A defect is indicated and the instrument must be returned to the Phywe service department for repair.

The experimental set-up must be complete and connected to the instrument before the instrument is switched on at the on/off switch on the back of it.

All outputs can be simultaneously fully loaded. As they are galvanically separated from each other, the individual output voltages can be connected as required in series or inverse. An adjustable voltage in the range 300...600 V can so be obtained by series connection of the two 300 V $\overline{=}$ outputs.

When the instrument is switched off, voltage could still be carried at the output sockets for a further 10 seconds.

The direct voltage outputs are equipped with automatic current limitations of 0.5 A (12 V) or 50 mA (0...50 V, 0...300 V and 300 V), respectively. Below these current strengths, the output voltages are electronically stabilized, in which case the adjustable voltages can be read from the scales on the adjusting knobs (if higher accuracy is required, additional voltmeters must be installed). The red light emitting diodes above the adjusting knobs show the onset of current limitation. When this occurs, then the corresponding voltage is load dependent and the value of it no longer corresponds to the adjusting knob scale value.

When all outputs are to be used at full load, in particular when small voltages are set at maximum current, do not stack the instrument on or under other instruments. The inclined instrument position is then recommended.

Notes on the function of the current limitation:

When adjusting knobs for voltage adjustment are quickly turned clockwise, the current limitation could briefly light up. The 300 V $\overline{=}$ fixed voltage output has the characteristic that, when overloaded, the current strength can be reduced to approx. 30 mA (so-called retracting characteristic line); it is therefore possible that, when an overload occurs in a series connection of the two 300 V $\overline{=}$ outputs, the current limitation stays at 30 mA even after elimination of the overload situation, i.e. the voltage does not build up to the set value. Should this occur, briefly and completely interrupt the circuit.

5 NOTES ON OPERATION

This high-quality instrument fulfills all of the technical requirements that are complied 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 no mobile phones etc. are to be used in the near vicinity. The individual connecting leads must not be longer than 2 m.

The Instrument can be influenced by electromagnetic charges and other electromagnetic phenomena in such way, that it works no longer within the given specifications. The following measures reduce or prevent disturbing influences: Avoid carpeted floor ensure potential equalization, perform the experiments on conductive and grounded surfaces, use screenings and screened cables and do not work with high frequency emitters (radios, mobile phones etc.) in the immediate vicinity. After a total blackout, carry out a "Reset" (new start) of the complete system.

6 TECHNICAL SPECIFICATION

(typical for 25 °C and 5 min. operating time)

Operating temperature range 5–40 °C
Relative humidity <80 %

Mains supply

Protection class I
Connecting voltage see type plate
(+6 %/–10 %)
Mains frequency 50/60 Hz
Power consumption 100 VA
Mains fuse see type plate
(5 mm x 20 mm)
Housing dimensions (mm) 230 x 168 x 250 (W, H, D)
Weight approx. 4 kg

Outputs

	Output 1	Output 2	Output 3	Output 5	Output 6
Voltage	approx. 0...12 V $\overline{\text{---}}$	approx.. 0...50 V $\overline{\text{---}}$	approx. 0...300 V $\overline{\text{---}}$	approx. ca. 300 V $\overline{\text{---}}$	approx. 6.3 V~
Rated current	0.5 A	50 mA	50 mA	50 mA	2 A
Stability on mains change –10 %/+6 %	≤0,1 %	≤0.1 %	≤0.1 %	—	—
Stability on load change 0...100 %	≤0,1 %	≤0.1 %	≤0.1 %	—	—
Residual ripple	≤5 mV	≤5 mV	≤20 mV	≤20 mV	—
Current limitation	approx. 550 mA	approx. 55 mA	approx. 55 mA	approx. 70 mA	—
Short-circuit current	approx. 550 mA	approx. 55 mA	approx. 55 mA	approx. 30 mA	—
Overload protection	short-circuit proof	short-circuit proof	short-circuit proof	short-circuit proof	protective switch
Reverse polarity protection	up to 1 A	up to 1 A	up to 1 A	up to 1 A	—
Current limitation display	LED	LED	LED	—	—

7 WARRANTY

We guarantee the instrument supplied by us for a period of 24 months within the EU, or for 12 months outside of the EU. Excepted from the guarantee are damages that result from disregarding the Operating Instructions, from improper handling of the instrument or from natural wear.

The manufacturer can only be held responsible for the function and technical safety characteristics of the instrument, when maintenance, repairs and alterations to the instrument are only carried out by the manufacturer or by personnel who have been explicitly authorized by him to do so.

8 WASTE DISPOSAL

The packaging consists predominately of environmentally compatible materials that can be passed on for disposal by the local recycling service.



Should you no longer require this product, do not dispose of it with the household refuse.

Please return it to the address below for proper waste disposal.

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