

PHILIPS

Operating manual

Bedienungsanleitung

Notice d'emploi

REGULATED D.C. POWER SUPPLY
STABILISIERTES SPEISEGERÄT
ALIMENTATION STABILISEE

PE1542/00

9416 015 42001



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1. General

1.1. INTRODUCTION

The PE 1542 is a stabilized D.C. power supply designed for supplying and testing electrical and electronic circuits.

It produces three precise output voltages, which are galvanically separated. All outputs are protected against short circuit.

Regulation of each output is achieved by transistor series-regulator stages.

The transistor series-regulator gives continuously variable adjustments of the output voltages and currents with good accuracy and stability with minimum ripple.

By means of controls, each output voltage can be continuously varied as follows:

output I between 0 V and 20 V

output II between 0 V and 20 V

output III between 0 V and 7 V.

Similarly, controls provide continuously variable output currents between:

0 A and 1 A — output I

0 A and 1 A — output II

0 A and 3 A — output III

Three front-panel meters provide a visual indication of the stabilized output voltage or current.

The load must be connected to the front-panel terminals.

These terminals are floating with respect to earth, but either the "+" or "-" terminal of an output can be linked to the adjacent earth.

If a larger continuously adjustable voltage or current source is required than is available from one output then the outputs can be connected in series or parallel to provide increased power.

NOTE: The design of this instrument is subject to continuous development and improvement.

Consequently, this instrument may incorporate minor changes in detail from the information contained in this manual.

1.2. CHARACTERISTICS

This instrument has been designed and tested in accordance with IEC Publication 348 for Class I instruments and has been supplied in a safe condition. The present Instruction Manual contains information and warnings which shall be followed by the purchaser to ensure safe operation and to retain the instrument in a safe condition.

1.2.1. Technical data

1.2.1.1. General

Safety

In accordance with IEC 348, Safety Class I.

D.C. test voltage

2100 V between primary and chassis

4200 V between primary and secondary

2100 V between secondary and chassis

Output terminals

Floating with respect to earth.

The maximum permissible d.c. voltage between any one of the output terminals and chassis is 250 V.

The "+" or "-" terminal of each output may be connected to the chassis, if desired.

Radio interference

According to VDE 0875 below the K curve.

1.2.1.2. Input

A.C. voltage

110-127-220-240 V (+ or - 10 %)

Frequency

50 to 60 Hz

Consumption	Max. 150 VA
Protection	With fuses F1 and F2, 1 A slow-blow

1.2.1.3. Outputs I and II

a. As voltage stabiliser

Range	0 ... 20 V continuously adjustable by means of R1 (output I) and R3 (output II).
Output effects (stability related to static operation)	
1. Line regulation	For mains voltage variation of + or - 10 % Source effect (including settling) $\leq 0,05\%$ or 2 mV, whichever is greater.
2. Load regulation	For load variations from no-load to full-load and vice versa. Load effect (including settling) ≤ 10 mV.
3. Temperature coefficient	$\leq 0,01\%$ per K from the adjusted output voltage or 1 mV per K, whichever is greater.
4. Periodic and random deviation (PARD)	$\leq 1,5$ mV _{r.m.s.} (+ or - output terminal earthed)
Dynamic operation	
1. Transient recovery time	≤ 25 μ s for a current change from 80 % to 100 % and vice versa and a $\frac{di}{dt} \geq 1$ A/ μ s (see Fig. 7.).
2. Dynamic internal impedance	For sinusoidal load variations from 80 % of full-load to full-load and a frequency of: 1 kHz $\leq 0,02$ Ω 10 kHz $\leq 0,03$ Ω 100 kHz $\leq 0,10$ Ω 250 kHz $\leq 0,20$ Ω
Protection	— Reverse voltage protection — Constant current stabiliser

b. As current stabiliser

Range	0 ... 1 A, continuously adjustable by means of R2 (output I) and R4 (output II).
Output effects (stability related to static operation)	
1. Line regulation	For mains voltage variation of + or - 10 % Source effect (including settling) ≤ 5 mA.
2. Load regulation	For load variations from point D to E and vice versa (see Fig. 6.). Load effect (including settling) ≤ 5 mA.
3. Temperature coefficient	≤ 2 mA per K
4. Ripple current	R.M.S. value ≤ 1 mA
Cross-over point	See point B-C-D in Fig. 6. This value applies for any set output voltage between 0 and 20 V and output current between 0 and 1 A.

c. Series connection

The outputs of the instrument may be series connected.

d. Parallel connection

An arbitrary number of outputs and instruments may be connected in parallel for greater current outputs.

1.2.1.4. Output III

a. As voltage stabiliser

Range	0 ... 7 V continuously adjustable by means of R5.
Output effects (stability related to static operation)	
1. Line regulation	For mains voltage variation of + or - 10 % Source effect (including settling) $\leq 0,05\%$ or 1 mV, whichever is greater.
2. Load regulation	For load variations from no-load to full-load and vice versa. Load effect (including settling) ≤ 6 mV.
3. Temperature coefficient	$\leq 0,01\%$ per K from the adjusted output voltage or 0,5 mV per K whichever is greater.
4. Periodic and random deviation (PARC)	$\leq 1,5$ mV _{r.m.s.} (+ or - output terminal earthed).
Dynamic operation	
1. Transient recovery time	$\leq 25 \mu\text{s}$ for a current change from 80 % to 100 % and vice versa and a $\frac{di}{dt} \geq 1 \text{ A}/\mu\text{s}$ (see Fig. 9.).
2. Dynamic internal impedance	For sinusoidal load variations from 80 % of full-load to full-load and a frequency of: 1 kHz $\leq 0,005 \Omega$ 10 kHz $\leq 0,015 \Omega$ 100 kHz $\leq 0,100 \Omega$ 250 kHz $\leq 0,200 \Omega$
Protection	- Reverse voltage protection - Constant current stabiliser

b. As current stabiliser

Range	0 ... 3 A, continuously adjustable by means of R6.
Output effects (stability related to static operation)	
1. Line regulation	For mains voltage variation of + or - 10 % Source effect (including settling) 20 mA.
2. Load regulation	For load variations from point D to E and vice versa (see Fig. 8.). Load effect (including settling) ≤ 10 mA.
3. Temperature coefficient	≤ 6 mA per K.
4. Ripple current	R.M.S. value $\leq 7,5$ mA.
Cross-over point	See point B-C-D in Fig. 8. This value applies for any set output voltage between 0 and 7 V and output current between 0 and 3 A.

c. Series connection

The outputs of the instrument may be series connected.

d. Parallel connection

An arbitrary number of outputs and instruments may be connected in parallel for greater current outputs.

1.2.2. Environmental data

The environmental data are valid only if the instrument is checked in accordance with the official checking procedures. Details on these procedures and failure criteria are supplied on request by the PHILIPS Organization in your country, or by N.V. PHILIPS' GLOEILAMPENFABRIEKEN, TEST AND MEASURING DEPT., EINDHOVEN, HOLLAND.

Ambient temperature:

- specified operating temperature 0 °C to +40 °C
- rated range operation -10 °C to +40 °C
- storage and transport -40 °C to +70 °C

Cooling

Convection cooled.

The air convection may not be impeded.

Damp heat, cyclic tests
(12 + 12 hours cycle)

21 days ambient temperature 25 °C to 40 °C at a humidity of 93 %.

Bump tests

1000 bumps at an acceleration of 100 m/s², ½ sine for 6 ms duration in each of three directions.

Vibration tests

30 min. in each of three directions 10 Hz to 150 Hz, peak to peak amplitude 0,7 mm and 50 m/s² acceleration.

1.2.3. Mechanical data

Dimensions

Height 153 mm

Width 210 mm

Depth 271 mm

Mass

7 kg net

7,4 kg with packaging.

1.3. ACCESSORIES

Operating manual.

2. Directions for use

2.1. INSTALLATION

Before connecting the instrument to the mains, visually check the cabinet, controls and connectors etc., to ascertain whether any damage has occurred in transit. If any defects are apparent, do not connect the power supply to the mains.

Warning: This instrument generates high voltages and should not be operated with the cabinet plates removed.

The mains plug must be removed before attempting any maintenance work.

2.1.1. Dismantling

The opening of covers or removal of parts, except those to which access can be gained by hand, is likely to expose live parts and also accessible terminals may be live.

The instrument shall be disconnected from all voltage sources before any adjustment, replacement or maintenance and repair during which the instrument will be opened.

If afterwards, any adjustment, maintenance or repair of the opened instrument under voltage is inevitable, it shall be carried out only by a skilled person who is aware of the danger involved.

The replacement of parts in the primary circuit of the instrument are at the user's own risk.

After replacement of such parts (the fuses excepted) a high-voltage test in accordance with IEC Publication 348 is strongly recommended.

Bear in mind that capacitors inside the instrument may still be charged, even if the instrument has been disconnected from all voltage sources.

To remove top-, bottom- and rear-plate, use a screwdriver to lift carefully the ornamental frame at the front and the back over the edge of the front panel or rear panel (see Fig. 5a.).

The top plate, bottom plate and rear plate can be removed now, see Fig. 5b.

To remove the front plate, first pull off the knobs of controls R1 to R6.

The front panel complete with meters terminals and P.C. board can be removed by loosening the 4 screws "A", see Fig. 3.

Also the rear panel with mains transformer T26 can be removed by loosening 4 screws "A".

After remounting the plates, the ornamental frame can be pressed into its original position by hand.

2.1.2. Earthing

The instrument is earthed via the three-core mains cable. The mains plug shall only be inserted into a socket outlet provided with a protective earth contact. The protective action shall not be negated by the use of an extension cord without protective conductor.

The circuit to be supplied may be earthed via the earthing terminal X7 on the front panel.

Warning: Any interruption of the protective conductor inside or outside the power supply, or disconnection of the protective earth terminal, is likely to make the power supply dangerous. Intentional interruption is prohibited.

When an instrument is brought from a cold into a warm environment, condensation may cause a hazardous condition. Therefore, make sure that the earthing requirements are strictly adhered to.

2.1.3. Cooling

Make sure that the natural air-circulation via the air vents in the cabinet is not blocked.

2.1.4. Series connection

The outputs I, II and III may be series-connected.

This is done by connecting the "+" terminal X2 of output I with the "-" terminal X3 of output II and the "+" terminal X4 of output II with the "-" terminal X5 of output III.

If all outputs are series-connected, the instrument supplies 47 V with a maximum current of 1 A between output terminal X1 "-" and X6 "+".

Warning: When one of the output terminals "+" or "-" is connected to earth terminal X7 ($\perp$), the adjusted output voltage is present between the unearthed output terminal and the instrument chassis.

2.1.5. Parallel connection

Parallel connection of the outputs can be achieved by connecting the "+" output terminals together, and the "-" output terminals together.

It is recommended that the power delivered by each output is approximately the same; i.e. the maximum output voltages and currents are set equal for each output.

If output I, II and III are connected in parallel the maximum permissible output voltage is determined by output III (7 V).

When output I and II are parallel connected the maximum adjusted output can be 20 V.

The maximum output current through the load is the sum of the individually adjusted current values.

2.1.6. Load

The load must be connected on the front panel. Connection is made by means of the "+" and "-" output screw-terminal connections X2 and X1 (output I), X4 and X3 (output II), X6 and X5 (output III), see Fig. 1. The load can be earthed via screw terminal X7.

2.1.7. Mains connection

Before inserting the mains plug into the mains socket, make sure that the instrument is set to the local mains voltage.

On delivery, the power supply is set to 220 V. If the power supply is to be used with 110, 127 or 240 V mains supply, the connection on the mains transformer must be changed in accordance with Fig. 4. The transformer is accessible after removing the top plate and unscrewing the rear panel of the cabinet. To this end, see chapter 2.1.1. "Dismantling".

If the stabiliser is set to a different mains voltage, replace the sticker at the rear of the cabinet by an indication which corresponds to the mains voltage set.

If fuses of a different rating are required, the indication on the fuse holders must also be replaced by the corresponding current value.

Warning: The instrument shall be set to the local mains voltage only by a skilled person who is aware of the hazard involved. The power supply shall be disconnected from all voltage sources when it is to be adapted to a different mains voltage.

Check before connecting the instrument to the mains that the correct fuses F1 and F2 are fitted.

1 A slow-blow for 220 - 240 V

2 A slow-blow for 110 - 127 V

The fuse holders of F1 and F2 are located at the rear of the instrument, see Fig. 2.

Fuse replacement.

Make sure that only fuses with the required rated current and of the specified type are used for replacement. The use of a mended fuse and short-circuiting of the fuse holder shall be avoided. The instrument shall be disconnected from all voltage sources when a fuse is to be replaced.

In order to meet the safety requirements, the wires must be fixed to the solder tags of the transformer in such a way that, when the tin melts, they do not become detached.

2.1.8. Controls, indications and terminals

Front panel (see Fig. 1.).

R1	Voltage adjustment of output I
P1	Volt/Ampere meter for indication the voltage or current of output I.
R2	Current adjustment of output I
R3	Voltage adjustment of output II
P2	Volt/Ampere meter for indication the voltage or current of output II
R4	Current adjustment of output II
R5	Voltage adjustment of output III
P3	Volt/Ampere meter for indication the voltage or current of output III
R6	Current adjustment of output III
S1	Power on. Control for switching the instrument ON and OFF.

S2	Meter switch to switch meter P1 for voltage (position "U") or current (position "I") indication.
X1, X2	"—" respectively "+" output terminal of output I
S3	Meter switch to switch meter P2 for voltage (position "U") or current (position "I") indication.
X3, X4	"—" respectively "+" output terminal of output II
S4	Meter switch to switch meter P3 for voltage (position "U") or current (position "I") indication.
X5, X6	"—" respectively "+" output terminal of output III
X7	"⏏" Earth terminal for earthing the positive or negative output terminal of output I, II and III, or for earthing the load.
F1, F2	Fuses, 1 A slow-blow for 220 V and 240 V mains voltage. 2 A slow-blow for 110 V and 127 V mains voltage. (See Fig. 2.).

2.2. OPERATION

2.2.1. Mains

After mains connection (see section 2.1.7.) the instrument can be switched on by means of S1.

2.2.2. Output voltages

The stabilised output voltages of output I and II are adjustable from 0 V to a value higher than 20 V by means of control R1 and R3 respectively.

Adjustment of the stabilised output voltage of output III is done by means of control R5.

Meter P1, P2 and P3 indicates the adjusted output voltage after the relevant switches S2, S3 or S4 respectively are set to position "U".

2.2.3. Output currents

The stabilised output current of outputs I and II are adjustable from 0 A to a value higher than 1 A with control R2 respectively R4.

Adjustment of the stabilised output current of output III is done by means of control R6.

For the adjustment of the constant output current of output I, II and III it is possible to short circuit the output terminals. It is recommended that this is done at low adjusted value of output voltage.

Meter P1, P2 and P3 indicates the output current after the relevant switches S2, S3 or S4 respectively are set to position "I".

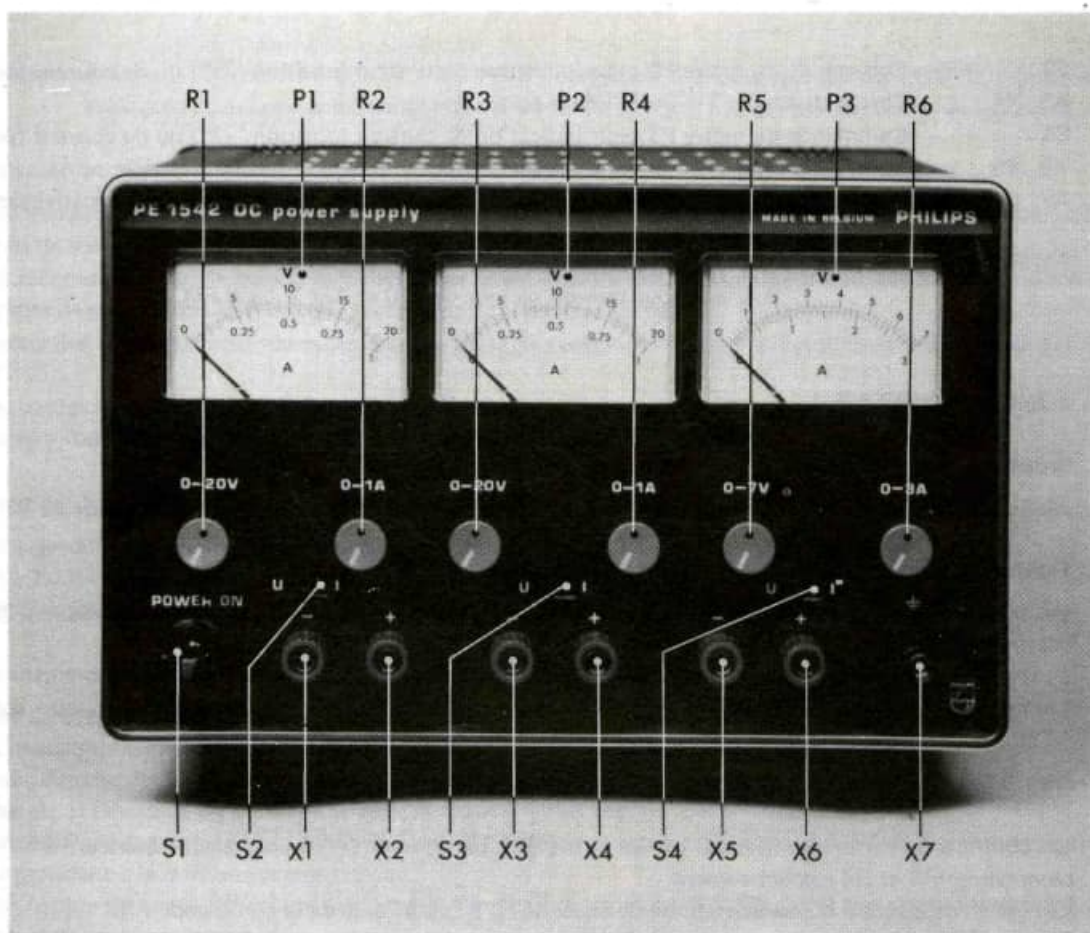


Fig./Abb. 1.

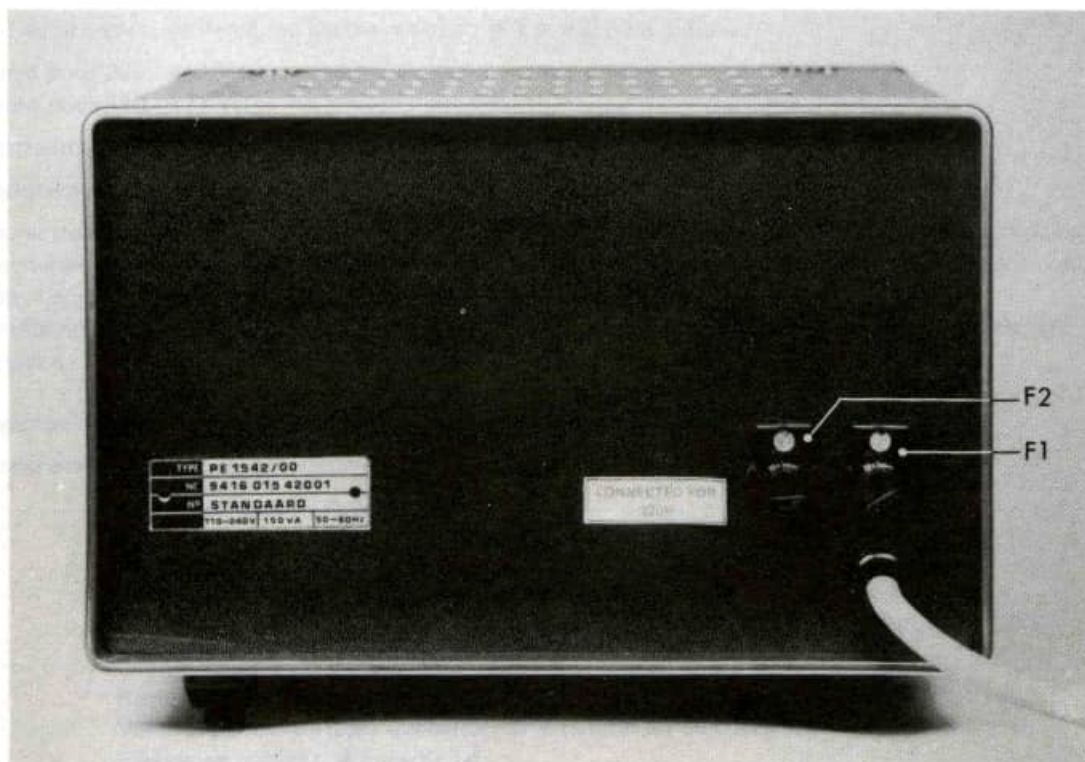


Fig./Abb. 2.

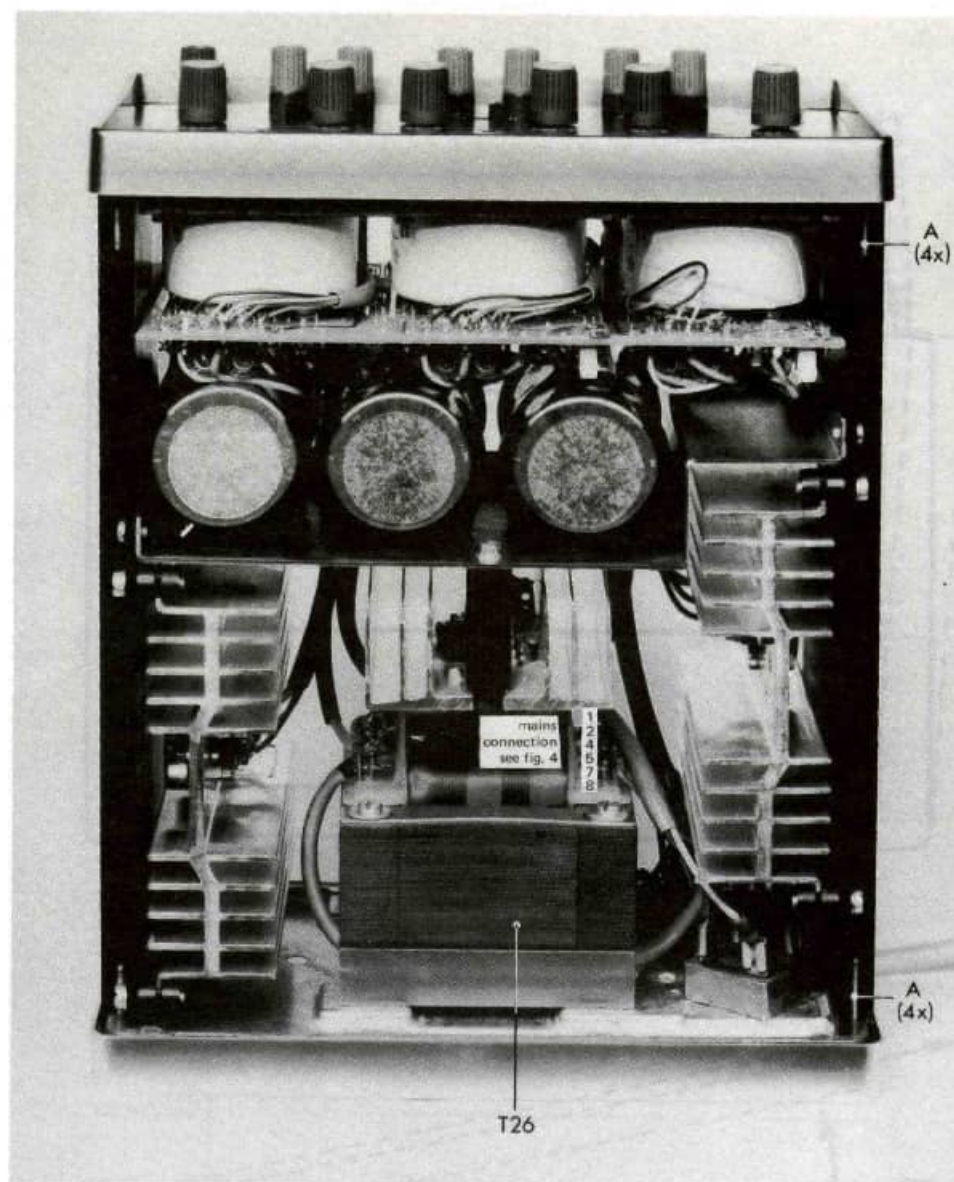


Fig./Abb. 3.

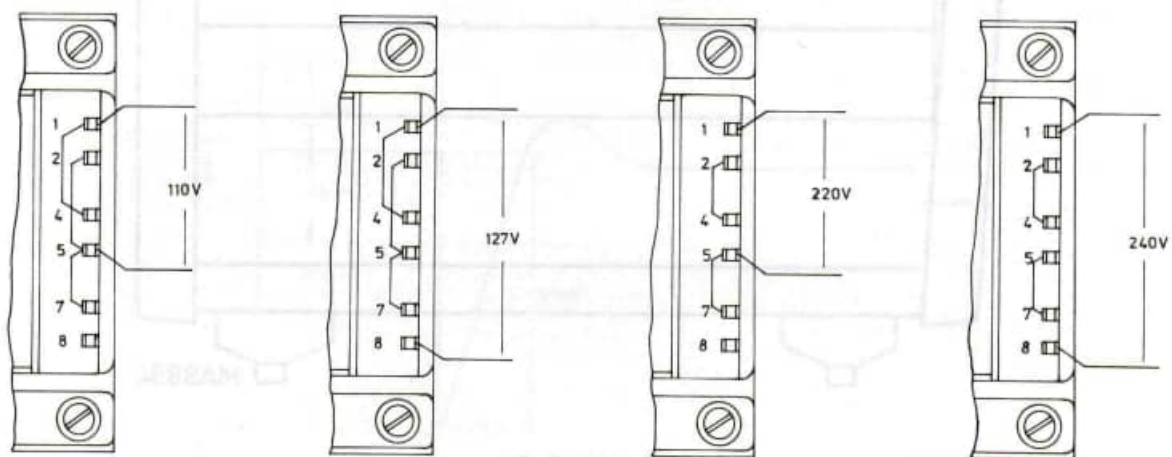


Fig./Abb. 4.

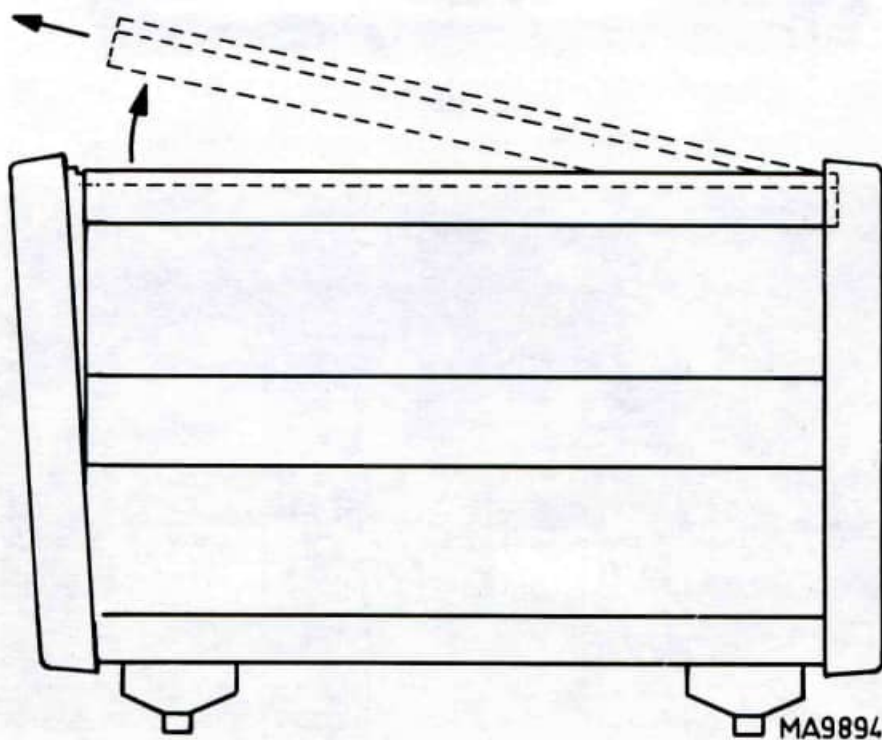
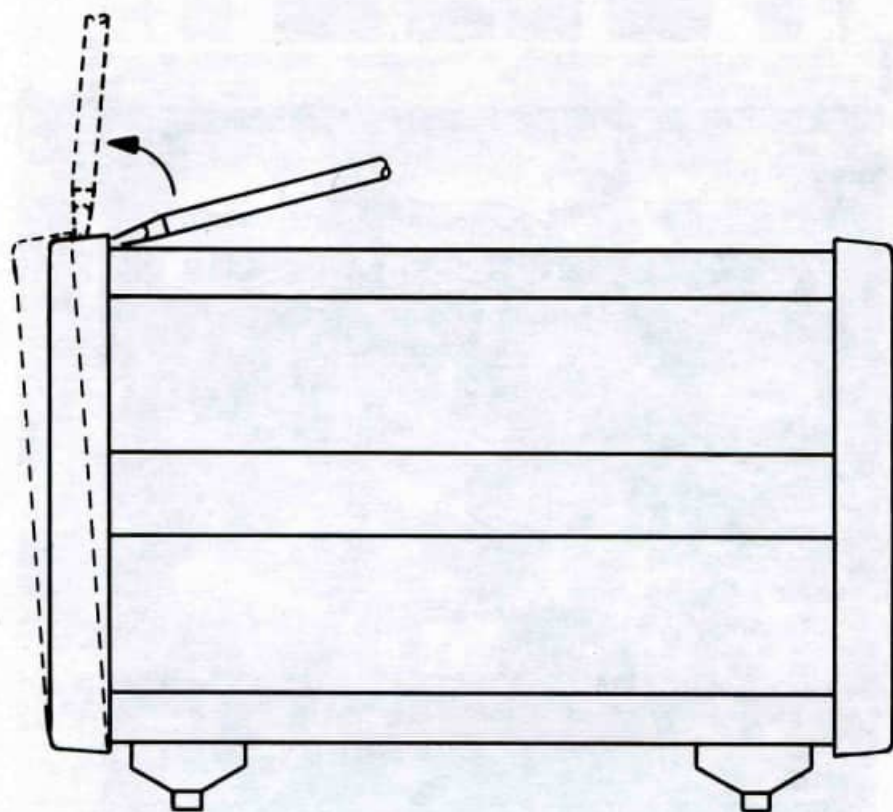
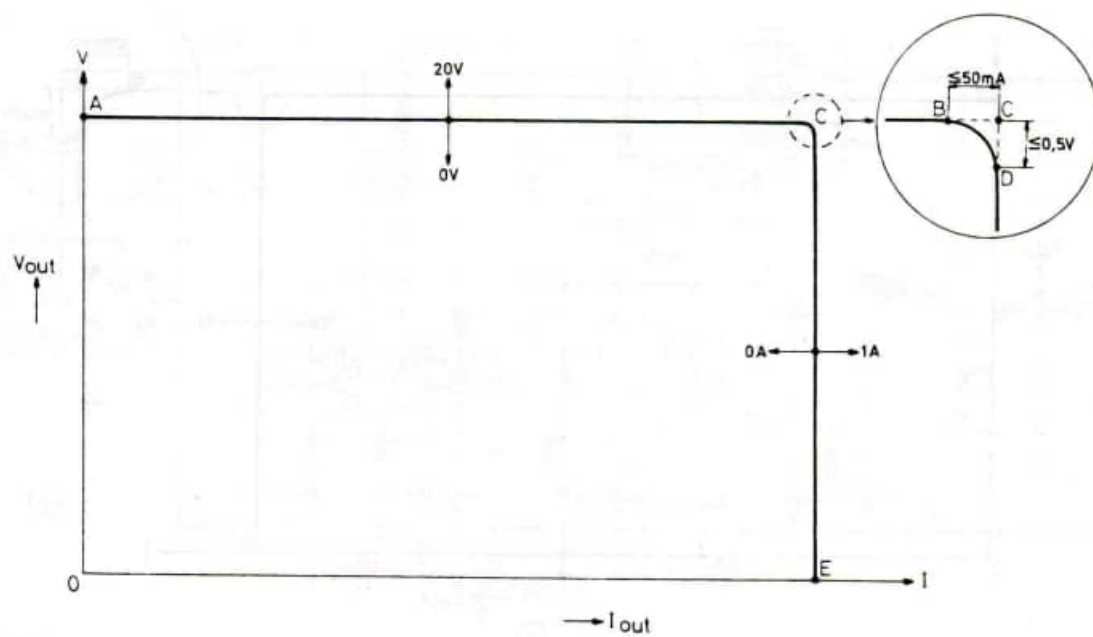
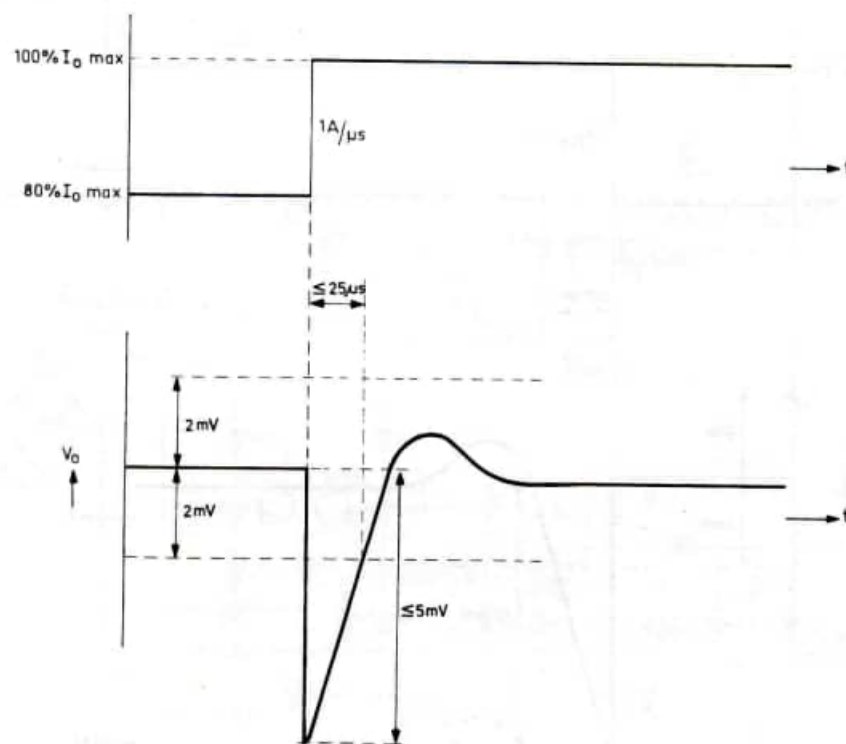


Fig./Abb.5a,5b.



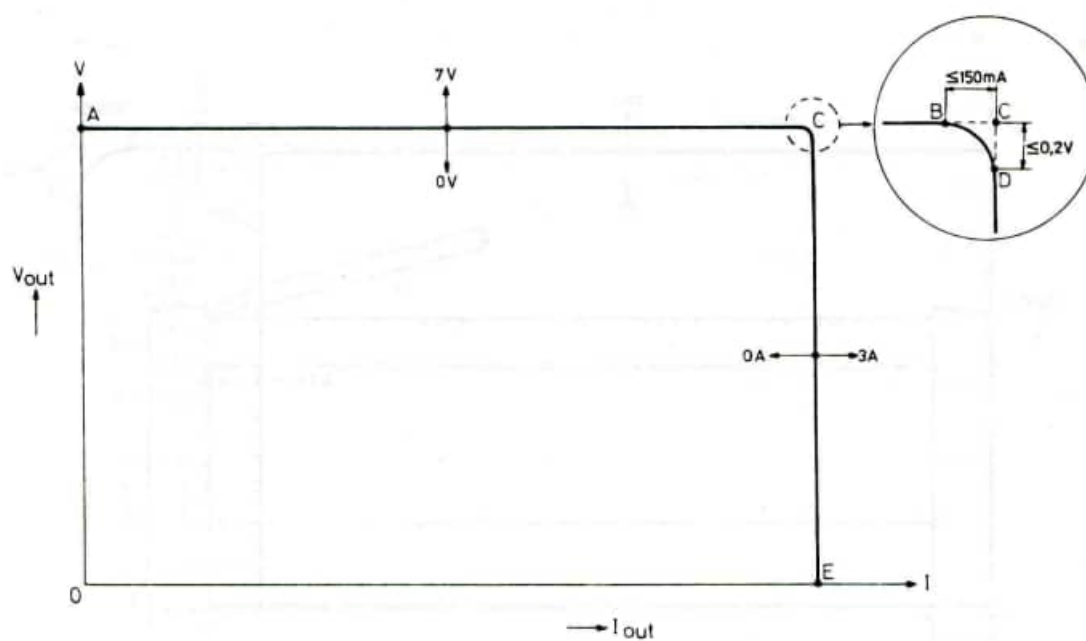
MA9981

Fig./Abb. 6.



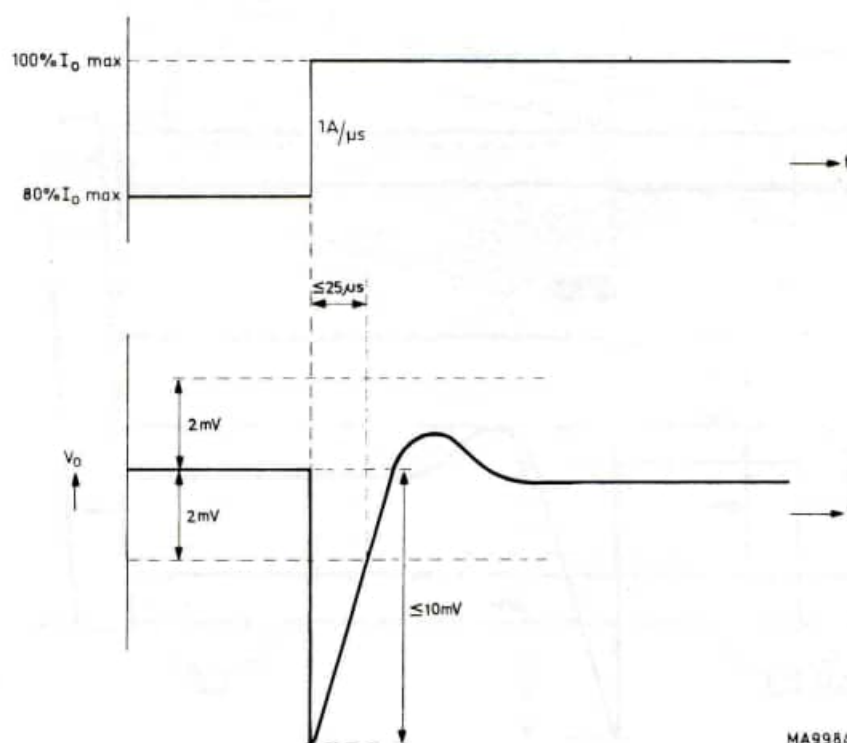
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Fig./Abb. 7.



MA9983

Fig./Abb. 8.



MA9984

Fig./Abb. 9.

Subject to alterations without notice

Änderungen vorbehalten

Tous nos réserves le droit de modifier sans préavis

