

PHILIPS

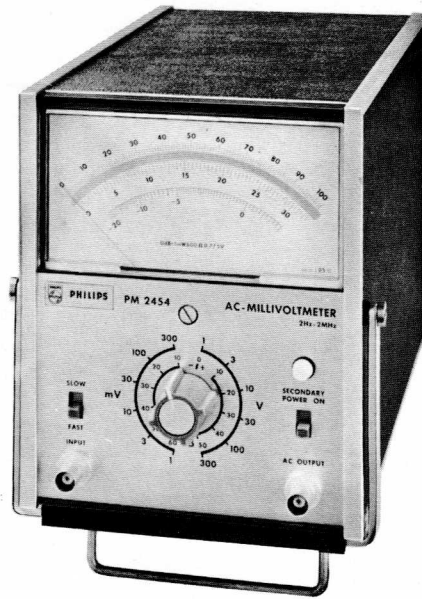


AC - MILLIVOLTMETER

PM 2454

9499 470 05811

1/172/2/06



PEM4373

PHILIPS

Manual

AC-MILLIVOLTMETER

PM2454

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GENERAL

I. INTRODUCTION	5
II. TECHNICAL DATA	6
III. ACCESSOIRES	7
IV. BLOCK DIAGRAM	8

DIRECTIONS FOR USE

V. INSTALLATION	9
VI. OPERATION	12

SERVICE DATA

VII. CIRCUIT DESCRIPTION	15
VIII. GAINING ACCESS TO THE PARTS	28
IX. MAINTENANCE	30
X. CHECKING AND ADJUSTING	31
XI. LIST OF PARTS	33
A. MECHANICAL	33
B. ELECTRICAL	38

LIST OF FIGURES

1. Block diagram	8
2. Rear view	10
3. Front view	11
4. Impedance matching stage	17
5. Pre-amplifier	18
6. Buffer stage	19
7. Connecting octave filter PM 6410	20
8. Meter circuit	23
9. Stabiliser circuit	25
10. Rear side	34
11. Location of components	35
12. Right-hand view	36
13. Left-hand view	36
14. Bottom view	37
15. Top view	37
16. Printed circuit board U2	41
17. Printed circuit board U3	42
18. Printed circuit board U5	43
19. Circuit diagram	45

IMPORTANT

In correspondence concerning this instrument, please indicate the type number and serial number as given on the type plate at the rear of the instrument.

General

I. INTRODUCTION

The PHILIPS AC-Millivoltmeter PM 2454 is a sensitive and accurate measuring instrument suitable for measuring voltages from 50 μ V...300 V in the frequency range from 2 Hz...2 MHz

The instrument is fully transistorised (Silicon transistors), mains-powered and of modular construction. It can, therefore, be used both as a table model and in combination with other equipment mounted in standard racks.

A special feature of this AC-Millivoltmeter is its high input impedance of 10 M Ω //25 pF. On account of this it is also possible to measure voltages from high-ohmic sources.

The 12 measuring ranges of 1 mV...300 V f.s.d. overlap so that a high reading accuracy is obtained. The moving-coil instrument is provided with a mirror scale with the ranges 0-30 and 0-100 as well as a dB scale from -20 dB...+2 dB (total scale span -80 dB...+52 dB). The indicating speed can be switched from "FAST" to "SLOW", so that it is also possible to obtain a high reading accuracy at lower frequencies.

Due to its large bandwidth the instrument has wide range of applications, e.g. measurements on LF and IF amplifiers, carrier-wave telephony, infra and ultrasonics, etc.

The amplifier output, moreover, makes it possible to employ the instrument as a pre-amplifier for special purposes or may be used for connecting an oscilloscope.

II. TECHNICAL DATA

Tolerances: Numerical values with tolerances stated are guaranteed by the factory. Numerical values without tolerances serve merely for information and represent the properties of an average instrument.

A. ELECTRICAL

Measuring range	50 μ V...300 V divided into 12 ranges from 1 mV...300 V(f. s. d.)
dB Measuring range	-80 dB...+52 dB (12 ranges) 0 dB = 1 mW into 600 Ω , 0.775 V
Measuring accuracy	10 Hz...300 kHz ± 1 % of f. s. d. ± 1 % of the reading Additional error at: 300 kHz...1 MHz ± 1 % of f. s. d. 1 MHz...2 MHz and 2 Hz...10 Hz ± 2 % of f. s. d. Switchable indication speed
Preliminary deflection	In position 1 mV < 25 μ V (with short-circuited input)
Input impedance	10 M Ω /25 pF
Overload protection	For d. c. and frequencies < 100 Hz at all ranges : 300 Vrms For frequencies > 100 Hz Ranges 1 mV...1 V: 30 Vrms Ranges 3 V...300 V: 300 Vrms
Effect of mains voltage variations	A mains voltage variation of ± 15 % causes an additional measuring error of max. 0.2 %
Temperature range	+ 15 ^o C...35 ^o C for the tolerances specified. Between 0 ^o ...15 ^o and 35 ^o ...50 ^o C a temperature coefficient of ± 0.1 %/ ^o C should be taken into account.
Rectifying circuit for the meter section	Full-wave rms value rectifier
Meter scale	Mirror scale with knife-edge pointer. Calibrated in rms values of sinusoidal input voltages. Linear division from 0...103 and 0...32.5 dB-scale from -20 dB...+2 dB

IV. BLOCK DIAGRAM (Fig. 1)

The voltage to be measured is applied to input attenuator I via input socket "INPUT". This attenuator is a capacitively compensated voltage divider, which effects an attenuation of 50 dB for all voltages from the 3 V range and upwards. For the lower ranges the input voltage is applied direct to the impedance matching stage.

Attenuator II is an ohmic voltage divider, which, in conjunction with attenuators I and III, divides the intermediate ranges into steps of 10 dB. The signal is now amplified by a factor 50 in a pre-amplifier and then applied to voltage divider III and from there to a second impedance matching stage. The latter consists of a double emitter-follower stage, so that the voltage divider is not influenced by the output amplifier.

The output of the second impedance stage is connected to output socket "AC OUTPUT" as well as to the amplifier and the rectifying circuit. In the feedback circuit of the multi-stage amplifier circuit a rectifier network has been included, which supplies the current for the meter. As the current in the feedback circuit is exactly proportional to the input voltage, the value indicated by the instrument will be equal to the value of the measuring voltage.

By means of switch "SLOW" the indicating speed of the meter can be reduced by including an additional capacitor, so that better reading is possible in the case of fluctuating measuring value indications.

The mains transformer is screened twice, whereby the screening of the primary windings are connected to the rim earthing contact of the mains input socket. Due to the very low capacitance of the primary winding with respect to the secondary winding and with respect to the housing, only negligibly small earth currents will arise. As a result the properties of the instrument will be practically the same as those of battery-operated instruments.

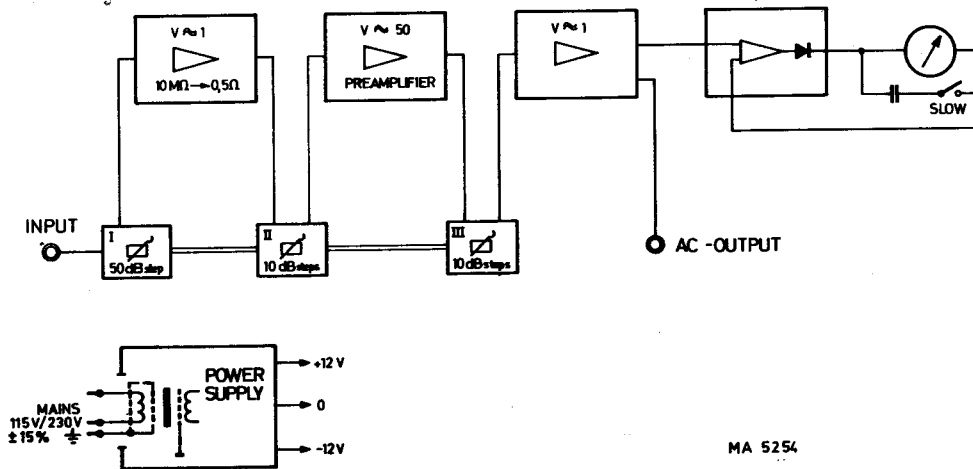


Fig. 1 Block diagram

