

II. TECHNICAL DATA

Properties expressed in numerical values with tolerances are guaranteed by the factory.

Numerical values without tolerances serve only for information and represent the properties of an average instrument.

A. MEASURING RANGE

1. Direct voltages

a. mV-ranges

Full-scale values	19.98 mV, 199.8 mV, 1998 mV
Resolution	10 μ V at the most sensitive range
Input resistance	1 M Ω
Overload protection	max. 500 V d.c.

b. V-ranges

Full-scale values	19.98 V, 199.8 V, 1000 V
Input resistance	10 M Ω
Overload protection	max. 1000 V d.c.

Accuracy

Relative to full-scale value	+ 0.1 %
Relative to reading	+ 0.1 %
<u>A.C. rejection for frequencies > 50 Hz</u>	min. 80 dB

2. Direct currents

a. nA-ranges

Full-scale values	19.98 nA, 199.8 nA, 1998 nA
Resolution	10 pA at the most sensitive range
Voltage drop	1 mV/nA

b. μ A-ranges

Full-scale values	19.98 μ A, 199.8 μ A, 1998 μ A
Voltage drop	1 mV/ μ A

c. mA-ranges

Full-scale values	19.98 mA, 199.8 mA, 1400 mA
Voltage drop	1 mV/mA

Accuracy

Relative to full-scale value	+ 0.3 %
Relative to reading	+ 0.2 %

3. Alternating voltages

a. mV-ranges

Full-scale values	19.98 mV _{rms} , 199.8 mV _{rms} , 1998 mV _{rms}
Resolution	10 μ V at the most sensitive range
Preliminary indication with short-circuited input	max. 20 μ V (Δ 2 digits)
Input impedance	1 M Ω // 40 pF
Overload protection	at frequencies \leq 50 Hz max. 300 V _{rms} at all other frequencies max. 30 V _{rms}

b. V-ranges

Full-scale values	19.98 V _{rms} 199.8 V _{rms} 500 V _{rms}
Input impedance	10 M Ω // 25 pF
Overload protection	max. 500 V _{rms} or 750 V _p

Accuracy

20 Hz - 300 kHz: Relative to full-scale	$\pm 0.3\%$
Relative to reading	$\pm 0.2\%$
10 Hz - 20 Hz and 300 kHz - 1 MHz: Relative to full-scale	$\pm 1\%$
At values > 1400 , ≥ 50 kHz	additional error $\pm 0.7\%$ of reading
Frequency response	10 Hz...1 MHz

Measuring method

By means of full wave rectifier (for sinewave input voltages, calibrated in rms values).

4. Alternating currentsa. nA-ranges

Full-scale values	19.98 nA, 199.8 nA, 1998 nA
Resolution	10 pA at the most sensitive range
<u>Accuracy</u>	
10 Hz - 50 Hz	$\pm 0.5\%$, relative to full-scale value $\pm 0.5\%$, relative to reading
50 Hz - 100 Hz	$\pm 1\%$, relative to full-scale value $\pm 0.5\%$, relative to reading
Voltage drop	1 mV/nA

b. μ A-ranges

Full-scale values	19.98 μ A, 199.8 μ A, 1998 μ A
Accuracy 10 Hz...10 kHz	0.5%, relative to full-scale value 0.5%, relative to reading
10 kHz - 20 kHz	$\pm 1\%$, relative to full-scale value $\pm 1\%$, relative to reading
Voltage drop	1 mV/ μ A

c. mA-ranges

Full-scale values	19.98 mA, 199.8 mA, 1400 mA
Accuracy 10 Hz ... 100 kHz	$\pm 0.5\%$, relative to full-scale value $\pm 0.5\%$, relative to reading
100 kHz - 200 kHz	$\pm 1\%$, relative to full-scale value $\pm 1\%$, relative to reading
Voltage drop	1 mV/mA

5. H.F. voltages

To be measured with probe PM 9203

Frequency range	300 kHz ... 700 MHz
Full-scale values	19.98 mV _{rms} 199.8 mV _{rms} 1998 mV _{rms}
Minimum measurable H.F. voltage	2 mV

Accuracy	See chapter XIV
Input capacitance	$\leq 2 \text{ pF}$
Parallel damping resistance	Dependent on voltage and frequency, between $10 \text{ k}\Omega$ and $200 \text{ k}\Omega$
Measurements with probe PM 9203 and T-connector PM 9253	
Frequency range	$300 \text{ kHz} \dots 1200 \text{ MHz}$
Accuracy	$700 \text{ kHz} \dots 1200 \text{ MHz} < + 5 \text{ dB}$ $- 0 \text{ dB}$

6. Resistances

a. Ω -range

Full-scale values	$19.98 \Omega, 199.8 \Omega, 1998 \Omega$
Resolution	0.01Ω in range 13.99Ω
Accuracy	$\pm 0.2 \%$, relative to full-scale value $\pm 0.2 \%$, relative to reading
Measuring current	1 mA
Measuring voltage	2 V max.

b. $\text{k}\Omega$ range

Full-scale values	$19.98 \text{ k}\Omega, 199.8 \text{ k}\Omega, 1998 \text{ k}\Omega$
Accuracy	$\pm 0.2 \%$, relative to full-scale value $\pm 0.2 \%$, relative to reading
Measuring current	$5 \mu\text{A}$
Measuring voltage	7 V max.

c. $\text{M}\Omega$ range

Full-scale values	$19.98 \text{ M}\Omega, 199.8 \text{ M}\Omega, 1998 \text{ M}\Omega$
Accuracy	$\pm 0.3 \%$, relative to full-scale value } up to $\pm 0.2 \%$, relative to reading } $100 \text{ M}\Omega$ $\pm 2 \%$, above $100 \text{ M}\Omega$
Measuring current	5 nA
Measuring voltage	7 V max.

B. GENERAL DATA

- Range selection

Range group with push-buttons, manually.

Three ranges within each group, chosen by means of automatic range selector; also manually adjustable.

- Temperature range

For the stated accuracy $23 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$

Temperature coefficient (except for H. F. measurements) between $-10 \text{ }^\circ\text{C} \dots 45 \text{ }^\circ\text{C}$

Typical value

$\leq 200 \text{ ppm}/^\circ\text{C}$

$\leq 100 \text{ ppm}/^\circ\text{C}$

<u>- Power supply</u>	
Mains voltage	115 V and 230 V \pm 15 %
Mains frequency	50...60 Hz
Power consumption	22 VA
Capacitance between mains and circuit zero	< 50 pF
Capacitance between "LO" and chassis	1.5 nF
Permissible direct voltage between chassis and circuit zero	max. 500 V
<u>- Common mode rejection</u>	
	120 dB
<u>- Timing</u>	
Integration time	100 ms
Integration time without range selection	for d. c. approx 750 ms for a. c. approx 2 s
Range selection	approx. 100 ms
<u>- Analogue output</u>	
Voltage per digit	5 mV
Max. output voltage	7 V
Source resistance	5 k Ω \pm 0.25 %
<u>- Digital output</u>	
With additional printed circuit board PM 9221.	

C. MECHANICAL DATA

Dimensions	Width	305 mm
	Height	145 mm
	Depth	270 mm
Weight		7 kg.