

## 6½-Digit Precision Multimeter HM8112-3 [HM8112-3S]



HM8112-3

HM8112-3S:  
Multimeter with built-in  
Scanner Card (8+1  
Channels, 2- and 4-Wire)



HZ42  
19" Rackmount Kit 2RU



Precise Temperature  
Measurement with Sensor



- ✓ 6½-Digit Display (1,200,000 Counts)
- ✓ Resolution: 100nV, 100pA, 100μΩ, 0.01°C/F
- ✓ DC Basic Accuracy 0.003%
- ✓ 2-Wire/4-Wire Measurements
- ✓ Measurement Intervals adjustable from 0.1...60s
- ✓ Up to 100 Measurements per Second transmitted to a PC
- ✓ True RMS Measurement, AC and DC+AC
- ✓ Mathematic Functions: Limit Testing, Minimum/Maximum, Average and Offset
- ✓ Temperature Measurements with Platinum (PT100/PT1000) and Ni (K and J types) Sensors
- ✓ Internal Data Logger for up to 32,000 Measurement Results
- ✓ Offset Correction
- ✓ Galvanically isolated USB/RS-232 Dual-Interface, optional IEEE-488 (GPIB)
- ✓ [HM8112-3S]: HM8112-3 incl. Scanner Card (8+1 Channels each 2- and 4-Wire)

# 6½-Digit Precision Multimeter HM8112-3 [HM8112-3S]

All data valid at 23 °C after 30 minutes warm-up.

## DC specifications

Ranges HM8112-3:	0.1V; 1V; 10V; 100V; 600V
Ranges HM8112-3S:	0.1V; 1V; 10V; 100V
Input impedance:	
0.1V, 1.0V	>1 GΩ
10V, 100V, 600V	10 MΩ
Accuracy:	Values given are in ±(% of reading (rdg.) + % of full scale (f.s.))

Range	1 year; % rdg.	23 °C ±2 °C % f.s.	Temp. coefficient 10...21 °C + 25...40 °C
0.1V	0.005	0.0006	0.0008
1.0V	0.003	0.0006	0.0008
10.0V	0.003	0.0006	0.0008
100.0V	0.003	0.0006	0.0008
600.0V	0.004	0.0006	0.0008

Integration time:	0.1 s	1...60 s
Display range:	120.000 digit	1,200.000 digit
600V range	60.000 digit	600.000 digit
Resolution:	1 μV	100 nV
Zero point:		
Temperature drift	better than 0.3 μV/°C	
Long-term stability	better than 3 μV for 90 days	

## AC specifications

Ranges HM8112-3:	0.1V; 1V; 10V; 100V; 600V	
Ranges HM8112-3S:	0.1V; 1V; 10V; 100V	
Measurement method:	true rms, DC or AC coupled (not in 0.1V range)	
Input impedance:		
0.1V, 1V	1 GΩ    <60 pF	
10...600V	10 MΩ    <60 pF	
Response time:	1.5 sec to within 0.1% of reading	
Accuracy:	For sine wave signals >5% of full scale	
Values given are in ±(% of reading + % of full scale); 23 °C ±2 °C for 1 year		

Range	20 Hz...1 kHz	1...10 kHz	10...50 kHz	50...100 kHz	100...300 kHz
0.1V	0.1+0.08	5+0.5 (5kHz)			
1.0V	0.08+0.08	0.15+0.08	0.3+0.1	0.8+0.15	7+0.15
10.0V	0.08+0.08	0.1+0.08	0.3+0.1	0.8+0.15	4+0.15
100.0V	0.08+0.08	0.1+0.08	0.3+0.1	0.8+0.15	
600.0V	0.08+0.08	0.1+0.08			

Temperature coefficient 10...21 °C and 25...40 °C; [% rdg. + % f.s.]	
at 20 Hz...10 kHz	0.01 + 0.008
at 10...100 kHz	0.08 + 0.01
Crest factor:	7:1 (max. 5x range)
Integration time:	0.1 s
Display range:	120.000 digit
600V range	600.00 digit
Resolution:	1 μV
Overload protection:	
(V/Ω-HI to V/Ω-LO) and to chassis	
Measurement ranges	all
all the time	850 V <sub>peak</sub> or 600 V <sub>dc</sub>
Maximum input voltage LOW against chassis/safety earth	250 V <sub>rms</sub> at max. 60 Hz or 250 V <sub>dc</sub>

## Current specifications

Ranges:	100 μA; 1 mA; 10 mA; 100 mA; 1 A
Integration time:	0.1 s
Display ranges:	120.000 digit
1 A range	100.000 digit
Resolution:	1 nA
Accuracy:	DC 45 Hz...1 kHz 1...5 kHz
[1 year; 23 °C ±2 °C]	0.02 + 0.002 0.1 + 0.08 0.2 + 0.08
Temperature coefficient/°C:	10...21 °C 25...40 °C
[% rdg. + % f.s.]	0.002 + 0.001 0.01 + 0.01
Voltage:	<600 mV...1.5V
Response time:	1.5 s to within 0.1% of reading
Crest factor:	7:1 (max. 5 x range)
Input protection:	fuse, FF 1A 250V

## Resistance

Ranges:	100 Ω, 1 kΩ, 10 kΩ, 100 kΩ, 1 MΩ, 10 MΩ
Integration time:	0.1 s
Display ranges:	120.000 digit
Resolution:	1 mΩ

## Accuracy:

Values given are in ±(% of reading + % of full scale)

Range	1 year; %rdg	23 °C ±2 °C %f.s.	Temp. coefficient/°C 10...21 °C	25...40 °C
100 Ω	0.005	0.0015	0.0008	0.0008
1 kΩ	0.005	0.001	0.0008	0.0008
10 kΩ	0.005	0.001	0.0008	0.0008
100 kΩ	0.005	0.001	0.0008	0.0008
1 MΩ	0.05	0.002	0.002	0.002
10 MΩ	0.5	0.02	0.01	0.01

Measurement current:	Range	Current
	100 Ω, 1 kΩ	1 mA
	10 kΩ	100 μA
	100 kΩ	10 μA
	1 MΩ	1 μA
	10 MΩ	100 nA

Max. measurement voltage: approx. 3V

Overload protection: 250V<sub>p</sub>

## Temperature measurement

PT100/PT1,000 (EN60751):	2- and 4-wire measurement
Range	-200...+800 °C
Resolution	0.01 °C; measurement current 1 mA
Accuracy	±(0.05 °C + sensor tolerance + 0.08 K)
Temperature coefficient	
10...21 °C and 25...40 °C	<0.0018 °C/°C
NiCr-Ni (K-type):	
Range	-270...+1,372 °C
Resolution	0.1 °C
Accuracy	±(0.7% rdg. + 0.3 K)
NiCr-Ni (J-type):	
Range	-210...+1,200 °C
Resolution	0.1 °C
Accuracy	±(0.7% rdg. + 0.3 K)

## Frequency and period specifications

Range:	1 Hz...100 kHz
Resolution:	0.00001...1 Hz
Accuracy:	0.05% of reading
Measurement time:	1...2 s

## Specification Scanner Card H0112

Channels:	8 (4-wire)
Switching:	bistable, floating relays
Thermal voltage:	typ. 500 nV, max. 1 μV <sup>†</sup>
Max. voltage between 2 contacts:	125V <sub>pk</sub>
Max. measuring voltage:	125V <sub>pk</sub> – also V/Ω-input –
Volt-Hertz-Product:	≤1 x 10 <sup>6</sup> V x Hz
Max. switching current:	1 A <sub>rms</sub>
Max. contact resistance:	approx. 1 Ω (each wire)
Life time:	2 x 10 <sup>8</sup> switches (0.1 A; 10 V <sub>dc</sub> )
Insulating resistance:	3 GΩ <sup>††</sup>
Capacity:	>100 pF, between contacts
Switching delay:	20 ms
Measurement delay:	between 50 ms and 300 ms

## Interface

Interface:	Dual-Interface USB/RS-232 (H0820), IEEE-488 (GPIB) (optional)
Functions:	Control/Data fetch
Inputs:	Function, range, integration time, start command
Outputs:	Measurement results, function, range, integration time (10 ms...60 s)

## Miscellaneous

Time to change range or function:	approx. 125 ms with DC voltage, DC current, resistance approx. 1 s with AC voltage, AC current
Memory:	30,000 readings/128 kB
Safety class:	Safety class I [EN 61010-1]
Power supply:	105...254 V~; 50...60 Hz, CAT II
Power consumption:	approx. 8W
Operating temperature:	+5...+40 °C
Storage temperature:	-20...+70 °C
Rel. humidity:	5...80% (non condensing)
Dimensions (W x H x D):	285 x 75 x 365 mm
Weight:	approx. 3 kg

<sup>1)</sup> max. 1  $\mu$ V after a warm-up of 1.5 h

<sup>\*\*1)</sup> at rel. humidity <60%

**Accessories supplied:** Line cord, Operating manual, PVC test lead (HZ15), Interface cable (HZ14), CD

**Recommended accessories:**

H0112	Scanner Card (Installation only ex factory) as HM8112-3S
H0880	Interface IEEE-488 (GPIB), galvanically isolated
HZ10S	5 x silicone test lead (measurement connection in black)
HZ10R	5 x silicone test lead (measurement connection in red)
HZ10B	5 x silicone test lead (measurement connection in blue)
HZ13	Interface cable (USB) 1.8m
HZ33	Test cable 50 $\Omega$ , BNC/BNC, 0.5m
HZ34	Test cable 50 $\Omega$ , BNC/BNC, 1.0m
HZ42	19" Rackmount kit 2RU
HZ72	GPIB-Cable 2m
HZ887	Temperature probe