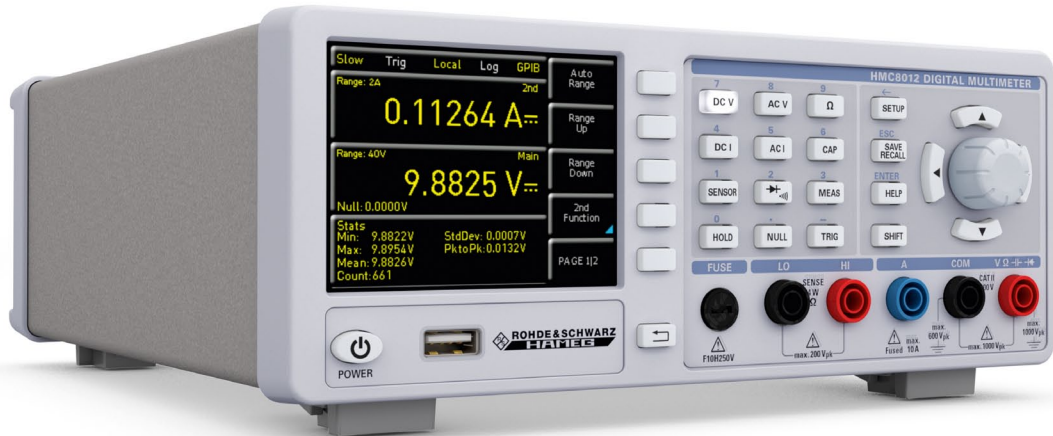


## Digital Multimeter HMC8012



HMC8012 - rear view of  
GPIB-version



HZC95  
19" rackmount kit 2RU



HZ15 (included)  
Silicon test lead with safety  
connector and probe



- ✓ 5¾-Digit Display (480,000 Counts)
- ✓ Simultaneous Display of 3 Measurements, e.g. DC + AC + Statistics
- ✓ Up to 200 Measurements per Second
- ✓ DC Basic Accuracy 0,015%
- ✓ 12 Measurement Functions: DCV, DCI, True RMS, ACV and ACI, Frequency, 2- and 4-Wire Resistance, Capacitance, Continuity, Diode Test, Temperature, Power
- ✓ Crisp color TFT display for excellent readability
- ✓ Resolution: 1µV, 100nA, 1mΩ, 1pF, 1Hz, 0,1°C
- ✓ True RMS Measurement AC, AC + DC
- ✓ Mathematic Functions: Limit Testing, Minimum/Maximum, Average, Offset, DC Power, dB, dBm
- ✓ Temperature Measurements with Platinum Sensors (PT100/PT500/PT1000)
- ✓ Data Logging in .CSV-Format to Internal Memory or USB-Stick
- ✓ Interfaces: USB-TMC and Ethernet / LXI, optional IEEE-488 (GPIB)
- ✓ SCPI commands widely compatible with Agilent 34410A

## Digital Multimeter HMC8012

All data valid at 23°C ±5K after 90 minutes warm-up and with 5% digits.

| DC Specifications DC Accuracy in ± (% of reading + % of range): |                         |                              |                 |                  |                                      |
|-----------------------------------------------------------------|-------------------------|------------------------------|-----------------|------------------|--------------------------------------|
| Function                                                        | Range <sup>1)</sup>     | Test Current<br>Voltage drop | Input Impedance | 1 Year 23°C ±5 K | Temp. Coefficient<br>0-18°C, 28-55°C |
| DC Voltage                                                      | 400,000 mV              |                              | 10 MΩ/>10 GΩ    | 0,015+0,002      | 0,0010+0,0005                        |
|                                                                 | 4,00000 V               |                              | 10 MΩ/>10 GΩ    | 0,015+0,002      | 0,0008+0,0003                        |
|                                                                 | 40,0000 V               |                              | 10 MΩ           | 0,020+0,002      | 0,0010+0,0005                        |
|                                                                 | 400,000 V               |                              | 10 MΩ           | 0,020+0,002      | 0,0015+0,0005                        |
|                                                                 | 1000,00 V               |                              | 10 MΩ           | 0,025+0,002      | 0,0015+0,0005                        |
| Resistance<br>[2/4-wire] <sup>2)</sup>                          | 400,000 Ω               | 1 mA                         |                 | 0,050+0,005      | 0,0020+0,0005                        |
|                                                                 | 4,00000 kΩ              | 1 mA                         |                 | 0,015+0,002      | 0,0020+0,0002                        |
|                                                                 | 40,0000 kΩ              | 100 µA                       |                 | 0,015+0,002      | 0,0020+0,0002                        |
|                                                                 | 400,000 kΩ              | 10 µA                        |                 | 0,030+0,003      | 0,0020+0,0002                        |
|                                                                 | 4,00000 MΩ              | 1 µA                         |                 | 0,060+0,005      | 0,0020+0,0002                        |
|                                                                 | 40,0000 MΩ              | 100 nA                       |                 | 0,250+0,003      | 0,0080+0,0005                        |
|                                                                 | 250,000 MΩ              | 460 nA    10 MΩ (parallel)   |                 | 2,000+0,010      | 0,200+0,0005                         |
| DC Current <sup>4)</sup>                                        | 20,0000 mA              | <0,30 V                      |                 | 0,05+0,010       | 0,008+0,0010                         |
|                                                                 | 200,000 mA              | <0,27 V                      |                 | 0,05+0,010       | 0,008+0,0010                         |
|                                                                 | 2,00000 A               | <0,2 V                       |                 | 0,25+0,070       | 0,012+0,0015                         |
|                                                                 | 10,0000 A <sup>3)</sup> | <0,60 V                      |                 | 0,25+0,070       | 0,010+0,0010                         |
| Continuity                                                      | 4000 Ω                  | 1 mA                         |                 | 0,05+0,010       | 0,005+0,0005                         |
| Diode Test                                                      | 5 V                     | 1 mA                         |                 | 0,05+0,010       | 0,005+0,0005                         |

- Notes:**
- 1) 240.000 / 480.000 counts expt in 1000V and 10A range
  - 2) Specifications are for 4-wire measurement; 2-wire measurement using NULL function.
  - 3) Maximum current load at >5A is 30 seconds, followed by a pause of >30 seconds
  - 4) At 250V maximum

| AC Specifications AC Accuracy in ± (% of reading + % of range): |                         |                            |                  |                                      |  |
|-----------------------------------------------------------------|-------------------------|----------------------------|------------------|--------------------------------------|--|
| Function                                                        | Range <sup>1)</sup>     | Frequency                  | 1 Year 23°C ±5 K | Temp. Coefficient<br>0-18°C, 28-55°C |  |
| AC Voltage <sup>2)</sup>                                        | 400,000 mV              | 10 Hz–20 Hz                | 3,0+0,05         | 0,01+0,01                            |  |
|                                                                 | 4,00000 V               | 20 Hz–45 Hz                | 1,5+0,05         | 0,01+0,01                            |  |
|                                                                 | 40,0000 V               | 45 Hz–20 kHz               | 0,3+0,05         | 0,01+0,01                            |  |
|                                                                 | 400,000 V               | 20 kHz–50 kHz              | 1,0+0,05         | 0,02+0,01                            |  |
|                                                                 | 750,00 V <sup>4)</sup>  | 50 kHz–100 kHz             | 3,0+0,05         | 0,05+0,01                            |  |
| AC Current <sup>5)</sup>                                        | 20,0000 mA              | 20 Hz–40 Hz                | 1,5+0,05         | 0,01+0,01                            |  |
|                                                                 | 200,000 mA              | 40 Hz–1 kHz                | 0,5+0,05         | 0,01+0,01                            |  |
|                                                                 | 2,00000 A               | 1 kHz–5 kHz                | 1,5+0,05         | 0,01+0,01                            |  |
|                                                                 | 10,0000 A <sup>4)</sup> | 5 kHz–10 kHz <sup>3)</sup> | 2,5+0,05         | 0,01+0,01                            |  |

- Notes:**
- 1) 240.000 / 480.000 counts expt in 750V and 10A range
  - 2) Specifications are for sinusoidal curves. Input impedance is 1 MΩ parallel <100 pF
  - 3) Except 10A range
  - 4) Maximum current load at >5A is 30 seconds, followed by a pause of >30 seconds
  - 5) At 250V maximum
  - 6) For ACV measurements and frequencies above 50 kHz the user is required to choose an appropriate measurement range.

| Frequency Counter Specifications Frequency Accuracy in ± (% of reading): |                     |              |                  |                                      |
|--------------------------------------------------------------------------|---------------------|--------------|------------------|--------------------------------------|
| Function                                                                 | Range <sup>1)</sup> | Frequency    | 1 Year 23°C ±5 K | Temp. Coefficient<br>0-18°C, 28-55°C |
| AC Voltage <sup>2)</sup>                                                 | all ranges          | 5 Hz–700 kHz | 0,01             | 0,005                                |
| AC Current <sup>2)</sup>                                                 | 20 mA, 200 mA       | 5 Hz–10 kHz  | 0,01             | 0,005                                |
|                                                                          | 2 A, 10 A           | 5 Hz–5 kHz   | 0,01             | 0,005                                |

- Notes:**
- 1) Display of frequency available as 2nd measurent for main functions ACV and ACI
  - 2) Input sensitivity: >7,5% of full scale (5 Hz–400 kHz) resp. >20% (400–700 kHz)

| Frequency Counter Resolution |                  |               |            |
|------------------------------|------------------|---------------|------------|
| Setting                      | Measurement time | Display range | Resolution |
| Slow                         | 1 s              | 999,999 kHz   | 1 Hz       |
| Medium                       | 100 ms           | 999,99 kHz    | 10 Hz      |
| Fast                         | 10 ms            | 999,9 kHz     | 100 Hz     |

| Capacitance Specifications Capacitance Accuracy in ± (% of reading + % of range): |          |                  |                                   |
|-----------------------------------------------------------------------------------|----------|------------------|-----------------------------------|
| Function                                                                          | Range    | 1 Year 23°C ± 5K | Temp. Coefficient 0-18°C, 28-55°C |
| Capacitance                                                                       | 5,000 nF | 2,0±2,5          | 0,02±0,002                        |
|                                                                                   | 50,00 nF | 1,0±2,0          | 0,02±0,002                        |
|                                                                                   | 500,0 nF | 1,0±0,5          | 0,02±0,002                        |
|                                                                                   | 5,000 µF | 1,0±0,5          | 0,02±0,002                        |
|                                                                                   | 50,00 µF | 1,0±0,5          | 0,02±0,002                        |
|                                                                                   | 500,0 µF | 2,0±1,0          | 0,02±0,002                        |

| General Information                                                     |                                                                                    |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Power supply:                                                           | 115V / 230V ±10%, adjustable voltage selector on rear panel; Frequency 50Hz / 60Hz |
| Power consumption:                                                      | 25W max., 12W typ.                                                                 |
| Ambient temperature:                                                    | 0...+55°C (operating); -40...+70°C (storage)                                       |
| EMC compliance:                                                         | DIN EN 61326-1, DIN EN 55011                                                       |
| Safety compliance:                                                      | DIN EN 61010-1, CAN/CSA-C22.2 No. 61010-1-12                                       |
| Measuring Category:                                                     | CAT II, 600V; CAT I, 1000V <sub>DC</sub> , 750V <sub>AC RMS</sub>                  |
| Dimensions (W x H x D):                                                 | 222 x 88 x 280 mm                                                                  |
| Weight:                                                                 | approx. 2.7 kg                                                                     |
| Warm-up time:                                                           | 90 minutes                                                                         |
| All data valid at 23°C ±5K after 90 minutes warm-up and with 5 ¼ digits |                                                                                    |

| Additional Specifications                                                   |                                                                                                           |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>DC voltage</b>                                                           |                                                                                                           |
| Measuring Method                                                            | Sigma Delta analog/digital converter                                                                      |
| Input Resistance                                                            | >10 GΩ (selectable for ranges 400 mV / 4 V<br>10 MΩ (on all ranges)                                       |
| CMRR                                                                        | 120 dB for VCM <500V, 1 kΩ unbalance in the LO-line and<br>5 measurements/second                          |
| SMRR                                                                        | >60 dB for 50 or 60 Hz ±0,1% and 5 measurements/second                                                    |
| Input current                                                               | 60 pA for 25°C                                                                                            |
| Overload protection                                                         | 1000V for all ranges                                                                                      |
| <b>AC voltage</b>                                                           |                                                                                                           |
| Measuring Method                                                            | AC coupled True RMS measurement                                                                           |
| Input Resistance                                                            | 1 MΩ parallel <100 pF (on all ranges)                                                                     |
| Crest Factor                                                                | Max. 10 (0,5% additional measurement uncertainty)                                                         |
| CMRR                                                                        | >60 dB 1 kΩ in the LO-line and frequency <60 Hz                                                           |
| Overload protection                                                         | 750 V <sub>rms</sub> (for all ranges)                                                                     |
| <b>AC current / DC current</b>                                              |                                                                                                           |
| Shunt Resistance                                                            | 13,75 Ω for 20 mA; 1,25 Ω for 200 mA; 25 mΩ for 2 A, 10 A                                                 |
| Overload protection                                                         | Fuse: F10H250V on the front panel                                                                         |
| <b>Resistance</b>                                                           |                                                                                                           |
| Measuring Method                                                            | 2-wire and 4-wire                                                                                         |
| Overload protection                                                         | 1000V for all ranges                                                                                      |
| <b>Continuity</b>                                                           |                                                                                                           |
| Measuring Method                                                            | 1 mA constant current                                                                                     |
| Threshold value                                                             | Adjustable in 1 Ω steps                                                                                   |
| Response Time                                                               | 200 measurements/second                                                                                   |
| Overload protection                                                         | 1000V                                                                                                     |
| <b>Diode Test</b>                                                           |                                                                                                           |
| Measuring Method                                                            | 1 mA constant current                                                                                     |
| Threshold value                                                             | Adjustable in 10 mV steps                                                                                 |
| Response time                                                               | 10 measurements/second                                                                                    |
| Overload protection                                                         | 1000V                                                                                                     |
| <b>Temperature</b>                                                          |                                                                                                           |
| Measurement method                                                          | Resistance measurement with platinum sensor                                                               |
| Sensor types                                                                | PT100, PT500, PT1000                                                                                      |
| Connection                                                                  | 2-wire, 4-wire                                                                                            |
| Overload protection                                                         | 1000V                                                                                                     |
| <b>Math Functions</b>                                                       |                                                                                                           |
| Statistics                                                                  | Min/Max/Average/Standard deviation                                                                        |
| Relative measurement                                                        | NULL key, offset via keyboard                                                                             |
| Logarithmic functions                                                       | dB: Reference level via keyboard or NULL key<br>dBm: Reference impedance 50/75/600 Ω or freely selectable |
| <b>Data logging</b>                                                         |                                                                                                           |
| Number of measuring counts                                                  | Internal: 50,000; external: defined by USB stick capacity.                                                |
| Rate Log                                                                    | Min.: 5 ms typ. (in accordance to measuring function and<br>resolution) Max: 3.600 s                      |
| Duration Log                                                                | Internal: 250 s...50.000 h; external: defined by USB stick<br>capacity                                    |
| Data Log                                                                    | Main, 2nd, Time-Stamp                                                                                     |
| <b>Interfaces</b>                                                           |                                                                                                           |
| USB 2.0 (TMC and CDC/VCP), Ethernet 10/100 (LXI),<br>IEEE-488/GPIB optional |                                                                                                           |
| <b>Programming</b>                                                          |                                                                                                           |
| SCPI, compatible with Agilent 34401A and 34410A                             |                                                                                                           |

| Reading Rates       |         |            |         |                          |
|---------------------|---------|------------|---------|--------------------------|
| Function            | Setting | Resolution | Display | Reading Rates (per sec.) |
| AC Voltage          | Slow    | 5 3/4      | 400,000 | 5                        |
|                     | Medium  | 4 3/4      | 40,000  | 10                       |
|                     | Fast    | 4 3/4      | 40,000  | 200                      |
| DC Voltage          | Slow    | 5 3/4      | 400,000 | 5                        |
|                     | Medium  | 4 3/4      | 40,000  | 10                       |
|                     | Fast    | 4 3/4      | 40,000  | 200                      |
| AC Current          | Slow    | 5 3/4      | 200,000 | 5                        |
|                     | Medium  | 4 3/4      | 20,000  | 10                       |
|                     | Fast    | 4 3/4      | 20,000  | 200                      |
| DC Current          | Slow    | 5 3/4      | 200,000 | 5                        |
|                     | Medium  | 4 3/4      | 20,000  | 10                       |
|                     | Fast    | 4 3/4      | 20,000  | 200                      |
| Resistance (2-wire) | Slow    | 5 3/4      | 400,000 | 5                        |
|                     | Medium  | 4 3/4      | 40,000  | 10                       |
|                     | Fast    | 4 3/4      | 40,000  | 50                       |
| Resistance (4-wire) | Slow    | 5 3/4      | 400,000 | 5                        |
|                     | Medium  | 4 3/4      | 40,000  | 10                       |
|                     | Fast    | 4 3/4      | 40,000  | 25                       |
| Frequency           | Slow    | 6          | 999,999 | 1                        |
|                     | Medium  | 5          | 99,999  | 10                       |
|                     | Fast    | 4          | 9,999   | 100                      |
| Diode               |         | 4 3/4      | 40,000  | 10                       |
| Continuity          |         | 4 3/4      | 40,000  | 200                      |
| Temperature         |         | 4          | 999,9   | 10                       |

**Accessories supplied:** Line cord, printed operating manual, HZ15 Silicon test lead with safety connector and test probe, 1m (black + red), Software-CD

**Recommended accessories:**

HZ812 PT100 Temperature probe 2-wire  
 HZ887 PT100 Temperature probe 4-wire  
 HZC95 19" rackmount kit 2RU for HMC series