



Digital Multimeters

From product characterization to troubleshooting and maintenance

BUYING GUIDE

Keysight Benchtop Digital Multimeters

One family. Three performance grades. 4 classes.



ESSENTIAL

DM5-class

- 5.5 Digits of resolution
- 150 ppm Basic DCV accuracy



ADVANCED

DM6, DM7-class

- 6.5 to 7.5 Digits of resolution
- 16 to 75 ppm Basic DCV accuracy



PRO

DM8-class

- 8.5 Digits of resolution
- 4 ppm Basic DCV accuracy

Introduction

Selecting the right digital multimeter (DMM) depends on the precision, speed, and data capacity your application demands. Keysight offers three performance grades of DMMs — Essential, Advanced, and Pro. This buying guide compares these grades and their specifications. Each model balances resolution, accuracy, memory, and connectivity to meet a wide range of needs, from basic lab measurements to high-throughput, metrology-grade testing. Whether you're teaching fundamentals, validating designs, or performing traceable calibrations, use this guide to compare key features and choose the DMM that aligns with your requirements.

Essential

The DM5-class Essential DMMs include the EDU34450A and 34450A. They offer entry-level 5.5 digits of resolution suitable for learning labs and basic R&D, plus remote connectivity and data logging tools.



Advanced

Advanced DMMs come in two classes. The DM6-class includes the 34460A-34465A and DM34460A-DM34461A, and the DM7-class includes the 34470A. Advanced DMMs offer up to 7.5 digits of resolution, faster sampling, and enhanced digitizing.



Pro

The DM8-class Pro DMMs include the 3458A. For metrology-grade precision, these DMMs offer 8.5 digit resolution and double the sampling rate of Advanced models, capturing 100,000 readings per second.



Step 1. Check the General Specifications

All Keysight DMMs enable a wide range of measurements, whether you're measuring small current draw in Internet of Things (IoT) devices or verifying sensor performance. Our lineup of DMMs offer the precision, memory, and speed needed to meet a wide range of test requirements, from capturing slow current changes to fast voltage spikes. Coupled with instrument

control and data logging software, you can configure the DMM instrument controls, capture measurements from a PC, and quickly create automated test sequences without programming. The first part of your DMM selection process will be based on digits of resolution, accuracy, memory, interface, and reading rate.

DMM comparison of specifications

Specifications	Essential	Advanced	Pro
Class	DM5	DM6, DM7	DM8
Digits of resolution	5.5 digits	6.5 to 7.5 digits	8.5 digits
Basic direct current voltage (DCV) accuracy	150 ppm	16 to 75 ppm	4 ppm
Memory	5,000 readings	Up to 2M readings	148,000 readings
Interface	USB, LAN	USB, LAN, GPIB	GPIB
Maximum reading rate	110 readings/s	Up to 50,000 readings/s	100,000 readings/s
	EXPLORE ESSENTIAL	EXPLORE ADVANCED	EXPLORE PRO

Essential

Core Features

- 5.5 digits
- 150 ppm DCV accuracy
- 5,000 sample memory
- USB / LAN connectivity
- 110 readings/s

Key Capabilities

Full-featured entry-level model ideal for teaching labs and basic bench setups. Large 7-inch, dual-measurement color display, real-time logging, and charting tools support foundational measurement tasks.

Advanced

Core Features

- 6.5 to 7.5 digits
- 16 to 75 ppm DCV accuracy
- Up to 2M reading memory
- USB / LAN / GPIB connectivity
- 50k readings/s

Key Capabilities

Troubleshoot unstable or fast-changing signals with a fast reading rate, enhanced triggering, and digitizing features. Excellent for higher-level R&D and mission-critical test labs.

Step 2. Look at Key Features



Pro

Core Features

- 8.5 digits
- 4 ppm DCV accuracy
- 148k reading memory
- GPIB connectivity
- 100k readings/s

Key Capabilities

Delivers metrology-grade precision, high-speed measurements, and 24-bit digitizer resolution for testing power electronics and semiconductors and use in calibration labs. Ideal for standards traceability.

Step 3. Consider Your Use Cases

No matter your role — educator, design engineer, or calibration specialist — it's important to understand how your DMM performs in real-world applications. Keysight DMMs are trusted in labs, production lines, and test benches for their accuracy, speed, and reliability. Here are a few typical use cases for each grade.

Essential DMMs: Foundational accuracy for every learner

Keysight Essential DMMs are designed with accessibility and ease of use in mind. Our Essential DMMs are ideal for teaching labs, basic R&D benches, and general troubleshooting. They offer dependable accuracy and intuitive interfaces that help new users measure confidently.

Keysight Essential DMMs enable the teaching of electrical fundamentals — voltage, resistance, continuity, and current. They are useful for supporting student labs or for general troubleshooting, with fast performance for making checks on circuit boards, components, and power supplies. They can also log environmental data or slow-changing signals during experiments.

Here are some application examples:

- > Digital Multimeters In the Lab
- > Create Test Automation without Programming
- > Work Seamlessly and Productively with Modern Test Workbenches
- > Make Simple DC Power Measurements with a Digital Multimeter
- > How to Characterize a Diode



Advanced DMMs: Versatile tools for validation and debug

Keysight Advanced DMMs offer increased precision and speed, delivering reliable data at high throughput for engineers. With faster sampling, better accuracy, and enhanced triggering, they're optimized for real-world product development.

Keysight Advanced DMMs are ideal for troubleshooting electronic devices such as switching power supplies or identifying unusual signal transients. They can also monitor ultra-low current draw in sleep-mode IoT or wearable devices. In manufacturing processes, DMMs are automated for pass / fail testing using SCPI programming commands over USB, LAN, or GPIB-controlled interfaces. Our Advanced DMMs can also provide on-screen data analysis using built-in histogram and trend chart displays.

Here are some application examples:

- > Measuring Low Current Consumption with a Digital Multimeter
- > Understanding Measurement Accuracy Specifications for Battery Testers
- > How to Measure Resistance Using Four-Wire Measurement
- > 7 Steps to Improve Your DMM Measurement Throughput
- > Eliminate Measurement Errors and Achieve the Greatest Accuracy Using a DMM

Consider Your Use Cases (cont.)

Pro DMM: Trusted precision for calibration and R&D

Engineered with metrology-grade precision, the **Keysight Pro DMM** supports mission-critical environments where the smallest deviations matter. The Keysight Pro digital multimeter provides unmatched resolution and noise performance, making it indispensable in metrology and research labs.

The Keysight Pro DMM is ideal for performing traceable calibrations and validating precision standards. With a sampling rate of 100,000 readings per second, it is also ideal for high-throughput manufacturing environments. Its 24-bit digitizer resolution with 12 MHz bandwidth enables the detection of very small voltage changes, critical in metrology-grade applications. Our Pro DMM supports compliance and verification workflows in highly critical industries such as aerospace or medical device manufacturing.

Here are some application examples:

- Evaluation of the Performance of a State of the Art Digital Multimeter
- Calculating Uncertainty Using Digital Multimeter Ratio Measurement Techniques
- Make Better AC RMS Measurements with Your Digital Multimeter
- Autocalibration Improves DMM Measurement Stability and Accuracy
- Solving for Common Low Resistance Measurement Accuracy Issues



Step 4. Final Key Considerations

Before choosing a DMM, consider the factors impacting accuracy, workflow efficiency, and long-term flexibility. These features help ensure the instrument you select performs as you need it to, now and in the future.

Digits of resolution

Digits of resolution is the level of detail that is measurable by a DMM on small signal changes.

Choose Essential for general measurement observations, Advanced for detailed design work, and Pro for high-precision, low-noise measurements.

Accuracy

Accuracy defines how close your measurement is to the true value.

Use Essential for general troubleshooting, Advanced for compliance testing, and Pro for precision-critical tasks like calibration or semiconductor testing.

Memory depth

Memory depth affects the length and detail of a single signal capture by a DMM.

Choose Essential for short tests, Advanced for extended monitoring, and Pro for high-resolution, long-duration logging and analysis.



Final Key Considerations (cont.)

Connectivity

Connectivity enables remote control, automation, and integration into test systems.

Select Essential for local USB or remote LAN access, Advanced with USB, LAN, and GPIB for legacy system integration, and Pro with GPIB for connecting to legacy test instruments in ATE systems.

Reading rate

Reading rate determines how quickly a DMM captures data, critical for dynamic signals.

Use Essential for steady signals, Advanced for transient events, and Pro for high-speed, time-critical measurements.



Common mistakes to avoid when selecting a digital multimeter

- Choosing insufficient resolution for the signals you are testing.
- Ignoring connectivity requirements for automation or remote monitoring.
- Underestimating memory needs for long-duration logging.
- Overlooking the need for fast sample rates to capture spikes or events.
- Assuming temperature or capacitance features are standard; you must verify the feature set.
- Selecting a form factor that doesn't align with test setup constraints.

Portable Digital Multimeters

Keysight DM4-class portable DMMs include the U1200 Handheld DMMs. Portable DMMs are designed to withstand harsh working conditions, improve safety, and offer convenience in the palm of your hand, whether you are troubleshooting electronics or performing machinery installation and maintenance. Equipped with smart features like an integrated frequency counter and overvoltage protection, our portable DMMs help you quickly detect issues and obtain accurate measurements in the field. Select one of our portable DMMs when you need to perform field service or mobile testing and need a rugged and portable DMM built for harsh environments. Explore our most popular models to find the one that is best for your application.



Digits of resolution	3.5 to 4.5
Maximum reading rate	5 to 40 readings/s
Measurement functions	Base*, Base + temperature, Base + low pass filter mode, Base + frequency counter

* "Base" measurement function consists of DCV and AC voltage (ACV), DC current (DCI) and AC current (ACI), 2-wire resistance, frequency, capacitance, diode test, and continuity test.

Modular Digital Multimeters

Keysight modular DMMs offer the power of a benchtop DMM in a compact, flexible form factor, saving valuable rack space. Our top modular DMMs deliver superior DCV accuracy and faster reading rates than our Advanced models, all within high-density PXI / PXIe modules. Choose one of our modular DMMs when space, scalability, and high-throughput testing are critical. Ideal for automated test systems like high-volume manufacturing and multiboard or parallel testing where simultaneous measurements are needed.

With four models ranging from 21 ppm to 90 ppm one-year DCV accuracy, select the modular DMM that is right for your application.



Digits of resolution

6.5 to 7.5

Basic DCV accuracy

21 ppm to 90 ppm

Maximum reading rate

150 to 60k readings/s

DMM Software Functionality

Keysight instrument control and data logging software extends the value of your digital multimeter by simplifying setup, speeding data analysis, and enabling PC automation. The intuitive software control application allows you to configure and monitor measurements remotely, ideal for distributed labs or busy test benches. Built-in logging and visualization tools enable you to track trends, spot anomalies, and export data easily.

For more knowledgeable users, SCPI scripting enables programmatic test automation and batch execution. Whether you're managing a single instrument or coordinating multiple DMMs across your lab, Keysight software helps transform high-precision measurements into actionable results, faster.

To explore the DMM software, visit our [instrument control and data logging software page](#).



Why Choose Keysight?

Keysight DMMs offer long-term stability, multiple connectivity options, and powerful software integration. Here's why engineers choose Keysight:

High precision and stability

- Delivers stable, low-noise measurements for metrology, R&D, and high-precision test.
- Long-term measurement stability minimizes the need for frequent recalibration.

Proven reliability and durability

- Built for reliable, rugged performance with extensive environmental and stress testing.
- Trusted in mission-critical industries like aerospace / defense and semiconductor manufacturing.

Robust measurement features

- Support for digitizing, trend charting, built-in math functions, and enhanced triggering.
- SCPI command support enables automation and integration into test systems.

Global support and calibration services

- Global services and support network minimizes downtime.
- ISO / IEC 17025-accredited calibration maintains traceability and compliance.

Feature

Specification

Resolution

Up to 8.5 digits

Accuracy

As low as 4 ppm

Reading rate

Up to 100,000 readings/sec

Software integration

Instrument control and data logging software included

Application range

Education to metrology-grade



Calibration

Ensure your test system performs to specification and meets local and global standards.



Repair

Restore equipment to original functionality and specifications with trained technicians.



KeysightCare

Innovate at speed with curated support plans and prioritized response and turnaround times.



Education

Make measurements quickly with eLearning and in-house, instructor-led training.



Keysight Support

Get 24x7 access to service requests, case management help, and technical articles.

Select the DMM That Is Right for You

Should you need more information on Keysight DMM offerings, visit our extensive [library of resources](#) to help you select the right digital multimeter for your application. Here are some of the resources that can guide you in determining the best signal generator for your needs:

- > [Fundamentals of Sensor Measurements Using a DMM](#)
- > [10 Things You Must Know Before Buying Your Next Benchtop DMM](#)
- > [How to Select a Handheld DMM That is Right for You](#)



Once you are ready, visit **Keysight DMMs** to select one of our popular configurations or build one to meet your specific application.



Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.