

**FLUKE**®

# Fluke Digital Multimeters

Solutions for every need



# How to choose the best DMM for your job

Choosing the right digital multimeter (DMM) requires thinking about what you'll be using it for. Evaluate your basic measurement needs and job requirements and then take a look at special features/functions built into many multimeters. Think about whether you need to do basic measurements, or if you need the more advanced troubleshooting options offered by special features.

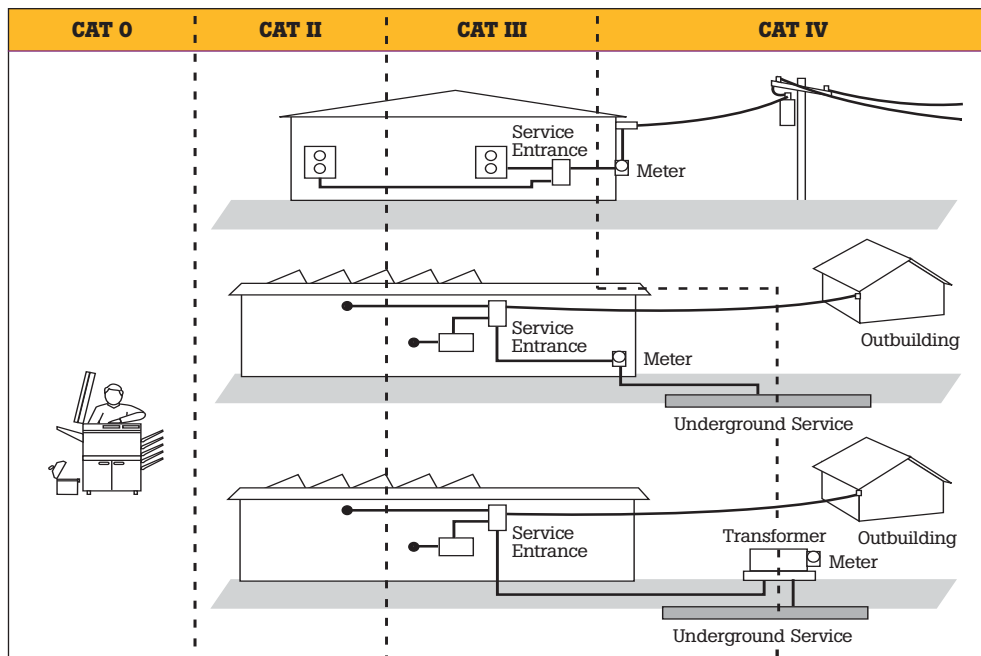
## Factors to consider:

- Your work environment (voltage level, types of equipment, types of measurements, applications)
- Specialty features/functions (capacitance, frequency, temperature, non-contact voltage, low impedance mode, min-max record, data logging, trending)
- Resolution and accuracy (6,000, 20,000, or 50,000 count resolution)

## Safety

The increased occurrence and levels of transient overvoltages in today's power systems have given rise to more stringent safety standards for electrical measurement equipment.

Transients that ride on top of power sources (mains, feeder or branch circuits) can trigger a sequence of events that may lead to serious injury. Test equipment must be designed to protect people working in this high-voltage, high-current environment.










Measurement category	In brief	Examples
<b>CAT 0</b>	Electronic (Not directly connected to mains)	<ul style="list-style-type: none"> <li>• Protected electronic equipment</li> <li>• Equipment connected to (source) circuits in which measures are taken to limit transient overvoltages to an appropriately low level</li> <li>• Any high-voltage, low-energy source derived from a high-winding resistance transformer, such as the high-voltage section of a copier</li> </ul>
<b>CAT II</b>	Appliances, PCs, and TVs	<ul style="list-style-type: none"> <li>• Appliance, portable tools, and other household and similar loads</li> <li>• Outlet and long branch circuits</li> <li>• Outlets at more than 10 meters (30 feet) from CAT III source</li> <li>• Outlets more than 20 meters (60 feet) from CAT IV source</li> </ul>
<b>CAT III</b>	MC panels, etc.	<ul style="list-style-type: none"> <li>• Equipment in fixed installations, such as switchgear and polyphase motors</li> <li>• Bus and feeder in industrial plants</li> <li>• Feeders and short branch circuits, distribution panel devices</li> <li>• Lighting systems in larger buildings</li> <li>• Heavy appliance outlets with short connections to service entrance</li> </ul>
<b>CAT IV</b>	Three-phase at utility connection, any outdoor conductors	<ul style="list-style-type: none"> <li>• Refers to the "origin of installation," i.e., where low-voltage connection is made to utility power</li> <li>• Electricity meters, primary overcurrent protection equipment</li> <li>• Outside and service entrance, service drop from pole to building, run between meter and panel</li> <li>• Overhead line to detached building, underground line to well pump</li> </ul>









Models	Compact meters					Specialty meters		
	117	116	115	114	113	28 II	27 II	28IIEX
<b>Basic features</b>								
Counts	6000	6000	6000	6000	6000	20000	6000	20000
True-rms readings	ac	ac	ac	ac	ac	ac		ac
Basic dc accuracy	0.5 %	0.5 %	0.5 %	0.5 %	0.5 %	0.05 %	0.1 %	0.05 %
Wide bandwidth						20 kHz	30 kHz	20kHz
Auto/manual ranging	•/•	•/•	•/•	•/•	•/•	•/•	•/•	•/•
Digits	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	4-1/2
ATEX II 2G Eex ia IICT4 safety rating Zone 1 and Zone 2								•
<b>Measurements</b>								
Voltage ac/dc	600 V	600 V	600 V	600 V	600 V	1000 V	1000 V	1000V
Current ac/dc	10 A	600 µA	10 A			10 A	10 A	10 A
Resistance	40 MΩ	40 MΩ	40 MΩ	40 MΩ	60 kΩ	50 MΩ	50 MΩ	50 MΩ
Frequency	100 kHz	100 kHz	100 kHz			200 kHz	200 kHz	200 kHz
Capacitance	10,000 µF	10,000 µF	10,000 µF		10,000 µF	10,000 µF	10,000 µF	10,000 µF
Temperature		(+) 400 °C				(+) 1090 °C		(+) 1090 °C
dB								
Conductance						60 nS	60 nS	60 nS
Duty cycle/pulse width						•/-	•/-	•/-
Continuity/diode test	•	•	•	•	•	•	•	•
Motor Drive (ASD) Measurements						•		•
VoltAlert™, non-contact voltage detection	•							
VCHEK™					•			
LoZ: low input impedance	•	•		•	•			
Lo Ohms								
Microamps		•				•	•	•
<b>Display</b>								
Wireless capabilities								
Dot matrix display								
Dual display								
Analog bargraph	•	•	•	•	•	•	•	•
Backlight	•	•	•	•	•	Two level	Two level	Two level
Graphical trend display								
<b>Diagnostics and data</b>								
Min Max recording/with time stamp	•/-	•/-	•/-	•/-	•/-	•/-	•/-	•/-
Fast Min Max						250 µs		250 µs
Display Hold/Auto (Touch) Hold	•/-	•/-	•/-	•/-	•/-	•/•	•/•	•/•
Relative reference						•	•	•
Stand alone logging								
Trend Capture								
Readings memories								
USB interface								
<b>Other features</b>								
Automatic selection, ac/dcvolts	•	•		•	•			
Real time clock								
Overmolded case, integrated holster								
Removable holster	•	•	•	•	•	•	•	•
Closed case calibration	•	•	•	•	•	•	•	•
Separate battery/fuse access	•	•	•	•	•	•/•	•	•/-
Completely sealed/ watertight						•	•	•
Automatic power off	•	•	•	•	•	•	•	•
Low battery indication	•	•	•	•	•	•	•	•
Operating temperature range	-10 °C, +50 °C	-10 °C, +50 °C	-10 °C, +50 °C	-10 °C, +50 °C	-10 °C, +50 °C	-40 °C, +55 °C	-40 °C, +55 °C	-15 °C, +50 °C
<b>Warranty and electrical safety</b>								
Warranty (years)	3	3	3	3	3	Lifetime	Lifetime	3
Input alert						•	•	•
Dangerous voltage indication	•	•	•	•	•	•	•	•
IP Rating	IP42	IP42	IP42	IP42	IP42	IP67	IP67	IP67
EN61010-1 CAT III	600 V	600 V	600 V	600 V		1000 V	1000 V	1000 V
EN61010-1 CAT IV					600 V	600 V	600 V	600 V



# Digital Multimeter selection chart

	Best for	Applications	Recommended DMM
Advanced meters	Advanced industrial troubleshooting, including data logging and graphing intermittent problems	<b>Logging:</b> For unattended monitoring of signals over time, to detect intermittent problems.	289 
		<b>Graphing:</b> View logged values graphically in the field right on the meter, without a PC.	
		<b>Working on VSDs:</b> Take accurate voltage, current and frequency measurements on the output side of the drive at either the drive itself or the motor terminals.	
		<b>Testing motor windings or contact resistance:</b> Allows testing of resistance up to 50 ohms with one milliohm (0.001 ohm) resolution.	
Advanced meters	Advanced electronic applications, including data logging and graphing intermittent problems	<b>Logging:</b> For unattended monitoring of signals over time, characterize device performance.	287 
		<b>Graphing:</b> View logged values graphically in the field right on the meter, without a PC.	
		<b>Monitoring two parameters at the same time:</b> Dual display allows for monitoring of two selectable parameters.	
		<b>Performance testing:</b> Testing the frequency response of amplifiers and audio transmission line.	
Advanced meters	Industrial troubleshooting	<b>Working on VSDs:</b> Take accurate voltage, current and frequency measurements on the output side of the drive at either the drive itself or at the motor terminals.	87V 
		<b>Industrial troubleshooting:</b> All of the resolution and accuracy you need to solve more problems on motor drives, in-plant automation, power distribution, and electromechanical equipment.	
		<b>Checking power quality:</b> Capture glitches and spikes as short as 250 μs. Identify irregular signals.	
Wireless meters	Remote Display Digital Multimeter	<b>Take measurements in hard to reach places:</b> With its removable display, you have the flexibility to take measurements in hard to reach places or in areas with restricted access. You can be in two places at once and reduce the risk of arc flash by separating yourself from hazardous measurement situations.	233 
		<b>Work more productively:</b> Now one person can complete a test that would have required two people using ordinary test tools.	
	Fluke FC wireless test tools work together to help you troubleshoot faster	<b>Work faster, safer and easier with FC Wireless Test Tools:</b> The 3000 FC Multimeter displays the meter measurement, plus readings from up to three wireless modules, connect to your smart phone to see reading directly on your phone.	3000 FC  <b>New</b>
	<b>Build the system as your needs grow:</b> Start with the multimeter and future proof your investment.		
General purpose meters	Every day use requiring true-rms, accurate, rugged meter	<b>Industrial troubleshooting:</b> Applications requiring exceptional ease-of-use, ruggedness and reliability.	179 
		<b>Electrical maintenance and troubleshooting:</b> Variety of commercial electrical troubleshooting, installation and maintenance.	
		<b>Temperature measurements:</b> Built-in thermometer conveniently allows you to take temperature readings without having to carry a separate instrument.	
General purpose meters	Every day use requiring average responding, accurate, rugged meter	<b>Industrial troubleshooting:</b> Applications requiring exceptional ease-of-use, ruggedness and reliability.	77 IV 
		<b>Electrical maintenance and troubleshooting:</b> Variety of commercial electrical troubleshooting, installation and maintenance.	

	Best for	Applications	Recommended DMM
Compact meters	Wide variety of electrical work	<b>Electrical maintenance troubleshooting:</b> When you need to eliminate false or "ghost" voltages or perform continuity, connection or basic wiring checks.	<b>117</b> 
		<b>Non-contact voltage detection:</b> Integrated non-contact voltage detection simplifies many tasks.	
	HVAC troubleshooting	<b>Residential HVAC maintenance:</b> Lower voltage HVAC residential maintenance, installation and troubleshooting.	<b>116</b> 
		<b>Temperature and microamp measurements:</b> Troubleshooting problems with HVAC equipment and flame sensors.	
Electronic and field service applications	<b>Electronic troubleshooting:</b> Troubleshoot a wide variety of measurement parameters, including frequency and capacitance.	<b>115</b> 	
Utility applications involving basic electrical tests	<b>Revenue meter tests:</b> Involving meter sets and reconnects, capacitor checks, detection of absence or presence of voltage, and for continuity, connections or basic wiring checks.	<b>Simultaneous voltage and continuity checks:</b> Check LoZ low impedance function allows users to check voltage and continuity simultaneously.	<b>113</b> 
Specialty meters	Harsh environments requiring dustproof and waterproof test equipment	<b>Industrial troubleshooting in indoor and outdoor harsh environments:</b> Dustproof, waterproof, shockproof multimeter designed to withstand the toughest environments.	<b>28 II/27 II</b> 
		<b>Working on VSDs:</b> Take accurate voltage, current and frequency measurements on the output side of the drive at either the drive itself or at the motor terminals. (28 II only)	
Specialty meters	Industrial troubleshooting in explosive environments	<b>Safety and compliance:</b> The Fluke 28 II Ex The Model MX57EXTRMS is an intrinsically safe digital multimeter designed for use in dangerous or explosive atmospheres. Agency Approvals: IECEx Ex ia IIC T4 Gb, Ex ia IIIC T130 °C Db, I M1 Ex ia I Ma	<b>87V Ex</b> 
		<b>Industrial troubleshooting:</b> Completely sealed, IP67 rated case; Withstands drops up to 10 feet or 3 meters (with holster); Dustproof per IEC60529 IP6x; Waterproof per IEC60529 IPx7; Meets IEC Overvoltage Electrical Safety Standard No. 61010-1:2001	

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