

**FLUKE®**

# 5320A Multifunction Electrical Tester Calibrator

Verify and calibrate electrical test  
tools with a single instrument





# 5320A Multifunction Electrical Tester Calibrator:

## Wide workload coverage with a single instrument

**If you are using a custom solution to calibrate electrical testers manually, you will realize significant productivity improvements by using a 5320A calibrator with MET/CAL® Plus Calibration Management Software.**

Test instruments that verify the safety of electrical installations, appliances, and other electrical/electronic devices are becoming more common, thanks in part to regulatory standards. For example, installation and portable appliance testing regulations such as EN 61557 (16th Edition) in the United Kingdom, and VDE 0100/0700 in Germany are designed to protect users from hazards such as electrocution and fire.

Safety standards such as CCC in China, CE in Europe, UL and CSA in North America, drive regulatory testing for new electrical and electronic products, by using electrical safety testers (hipots) in the final stages of manufacturing.

Traditionally, calibrating electrical testers requires a lot of equipment. You need one set of calibration instruments for insulation testers, another set for loop/line impedance testers, another for high voltage dielectric breakdown testers (hipots)...and yet another set of instruments for ground bond testers.

All of this equipment takes up valuable space on your workbench. But that's not the only disadvantage. You also have to maintain each item, keeping it in working order and in calibration, with the appropriate documentation and procedures. You may need to train technicians to use each instrument. And, of course, automating the calibration process becomes difficult, if not impossible, when multiple pieces of equipment are involved.

Now there is a better solution: the Fluke 5320A Multifunction Electrical Tester Calibrator. The Fluke 5320A enables you to verify and calibrate a wide range of electrical test tools with a single instrument. Using one instrument instead of many simplifies your processes, allowing you to realize efficiencies in equipment utilization and training. Automating the 5320A with MET/CAL® Plus Calibration Software adds even more efficiencies, along with better throughput and consistency. And the 5320A is easy to use, helping you to get up and running quickly.

### Multiple functions in one easy-to-use instrument

The Fluke 5320A Multifunction Electrical Tester Calibrator is an accurate, flexible instrument that allows you to calibrate many different types and models of electrical testers efficiently and effectively.

The 5320A replaces resistors, decade boxes, and other custom calibration solutions with a single instrument. It features precision high voltage, high current resistors to give you better test uncertainty ratios (TURs).

Using one multifunction instrument instead of many allows you to free up valuable bench space and simplify the processes you use for calibrating electrical testers.

You will find the 5320A calibrator remarkably easy to use. A big, bright, full-color screen displays values clearly, and shows which terminals are active in an easy-to-comprehend graphic format. An illustrated help guide is built into the instrument to

provide additional assistance if you need it.

For even greater efficiency, the 5320A can be automated with MET/CAL® Plus Calibration Management Software. MET/CAL Plus software has become the industry standard for automating the calibration process and managing the inventory of your cal lab. MET/CAL Plus is a complete, scalable and affordable solution.

LAN, IEEE-488 and RS-232 interfaces on the 5320A provide convenient, industry standard connectivity.

### A global network of support

No matter where you are in the world, Fluke supports your instrument investment with a range of services and training. The Fluke MET/SUPPORT™ Gold program provides priority software support. Our developers are continuously releasing new MET/CAL procedures to help you cover your workload in the most efficient manner possible. Training programs are offered in a variety of formats, in locations around the world, to match your learning style and budget.

### The solutions you need, from the leader in calibration

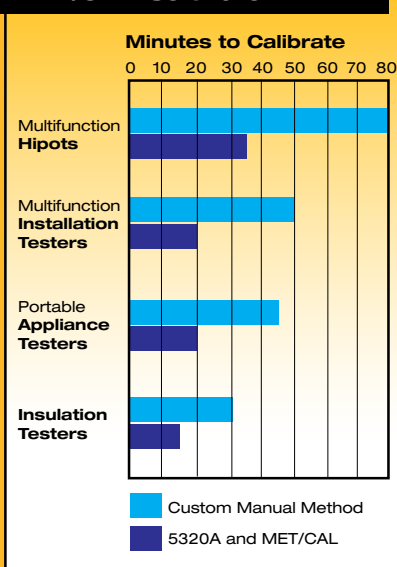
Long known as a leader in dc and low frequency ac calibration, Fluke is also recognized for its offerings in temperature, pressure, power, process, and rf calibration. Fluke provides the calibrators, standards, software, service, support and training you for a complete solution in your cal lab.

### Broad workload coverage

The 5320A calibrates a broad range of equipment, including:

- Hipot testers
- Insulation resistance testers (megohm meters)
- Loop/line impedance testers
- Continuity testers
- Earth resistance testers
- Ground bond testers
- Leakage current testers
- Circuit breaker testers (RCD/GFCI)
- Multifunction installation testers
- Portable appliance testers (PATs)
- Medical electrical safety testers

**Productivity improvements with the 5320A and MET/CAL® Software**







**Maximize your workload coverage with the Fluke 5320A Calibrator**

The Fluke 5320A Multifunction Electrical Tester Calibrator combines many functions into a single instrument, replacing discrete resistors, decade boxes and other custom solutions commonly used to calibrate electrical testers. It's flexible and precise enough to calibrate a wide range of instrumentation.

**Multifunction installation testers**

The 5320A has all the functionality needed to calibrate installation testers with insulation resistance, continuity, loop, RCD and earth resistance test capabilities.

**Portable appliance testers (PATs)**

The 5320A has all the functionality needed to calibrate PATs, with insulation resistance, ground bond, leakage current, flash voltage and load test capabilities.

**Continuity testers and earth (ground) resistance testers**

To calibrate these low ohms testers, a calibrator must be able to source precision low ohms. From its low ohms precision resistors, the 5320A calibrator sources resistance values ranging from 100 mΩ to 10 kΩ, with 3½ digits of resolution. Choose 2-wire or 4-wire modes for maximum flexibility.

**Loop/line impedance testers and ground bond testers**

The 5320A calibrator has 16 high power, high current resistors it can source to increase the resistance of a loop or line by a known amount. Use Scan mode to automatically determine the resistance of the loop, and use Active Loop Compensation mode (5320A/VLC) to compensate for any residual impedance in the loop or line.

**Residual-current device (RCD) or ground fault current interrupter (GFCI) testers**

The 5320A simulates a circuit breaker (an RCD/GFCI) to verify and calibrate trip current and trip time, without tripping the installation's current breakers. For most RCD testers, trip times are calculated to an uncertainty of 0.25 ms, to provide better than 4:1 test uncertainty ratios (TUR). Trip current uncertainty is 1 %, which also provides better than 4:1 TURs in most applications.

**Insulation resistance testers**

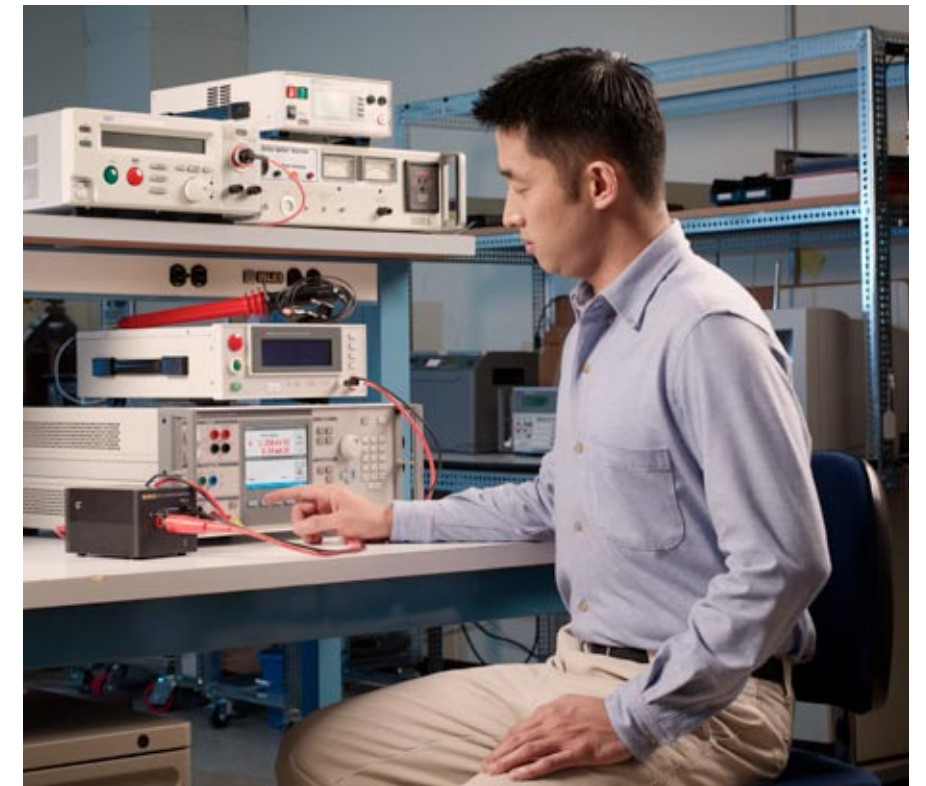
The 5320A calibrator sources high-ohms, high voltage resistors and measures the high voltage output of megohm meters and other portable and bench insulation testers. When calibrating insulation resistance testers up to 1.5 kV, you can select a wide range of continuously variable resistance values, from 10 kΩ to 10 GΩ, with 4½ digit resolution and one single value of 100 GΩ. When calibrating 5 kV insulation testers, the external 10 kV dual function adapter extends the resistors' range up to 10 TΩ. The adapter functions both as a 1000:1 voltage divider to 10 kV, and as a x1000 resistance multiplier.

**Leakage current testers**

Simulate a leakage current for direct/touch, differential and substitute leakage current methods with 4½ digit resolution from 0.1 mA to 30 mA. The 5320A lets you choose the method that works best for your test, unlike other calibrators that only offer a single method.

**Voltmeters**

Many testers have built-in voltmeters. But you don't need an additional calibrator to test this part of the workload. The 5320A/VLC calibrator adds a precision voltage source to 600 V with 0.1 % uncertainty, to calibrate ac/dc voltmeters.



**Hipot testers**

Electrical safety testing with hipots is an integral part of development and manufacturing of electronic and electrical products, ranging from refrigerators to power supplies. Such testing is often required by government regulations to ensure product safety.

The Fluke 5320A provides best-in-class hipot calibration of ac and dc voltage. The built-in 1000 V meter measures voltage and current. For voltages over 1 kV, Fluke provides a standard 10 kV adapter or an optional 40 kV probe. With the 10 kV adapter, ac voltages to 10 kV can be calibrated with 0.5 % uncertainty. Either item can be used with the built-in meter to measure voltage over 1000 V.

For calibration of hipot current up to 100 mA, Fluke offers a load adapter accessory. Use the load adapter in conjunction with the 5320A built-in current meter for full calibration of hipots. (Load adapter available early 2007).

**Medical safety testers**

With the broad functionality and high accuracy of the Fluke 5320A, calibrating medical safety testers is a snap, allowing you to add these items to your calibration workload.





# This versatile calibrator is also remarkably easy to use.

## Making measurements is as easy as 1-2-3

### Large, bright full color display

**A.** Large readouts enable you to easily read the primary sourced or measured values. Sourced values are in blue and measured values are in red.

### Active terminal display

**B.** Always know which calibrator terminals are active. When a function has been selected, the graphical display shows the active terminals.

### Soft menu keys

**C.** Soft menu keys adapt to the active function, so the menu structure is intuitive and easy to learn.

### Output knob, numeric keypad

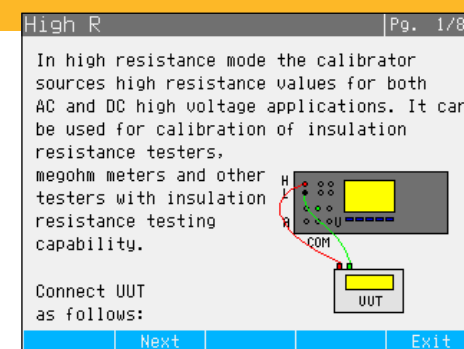
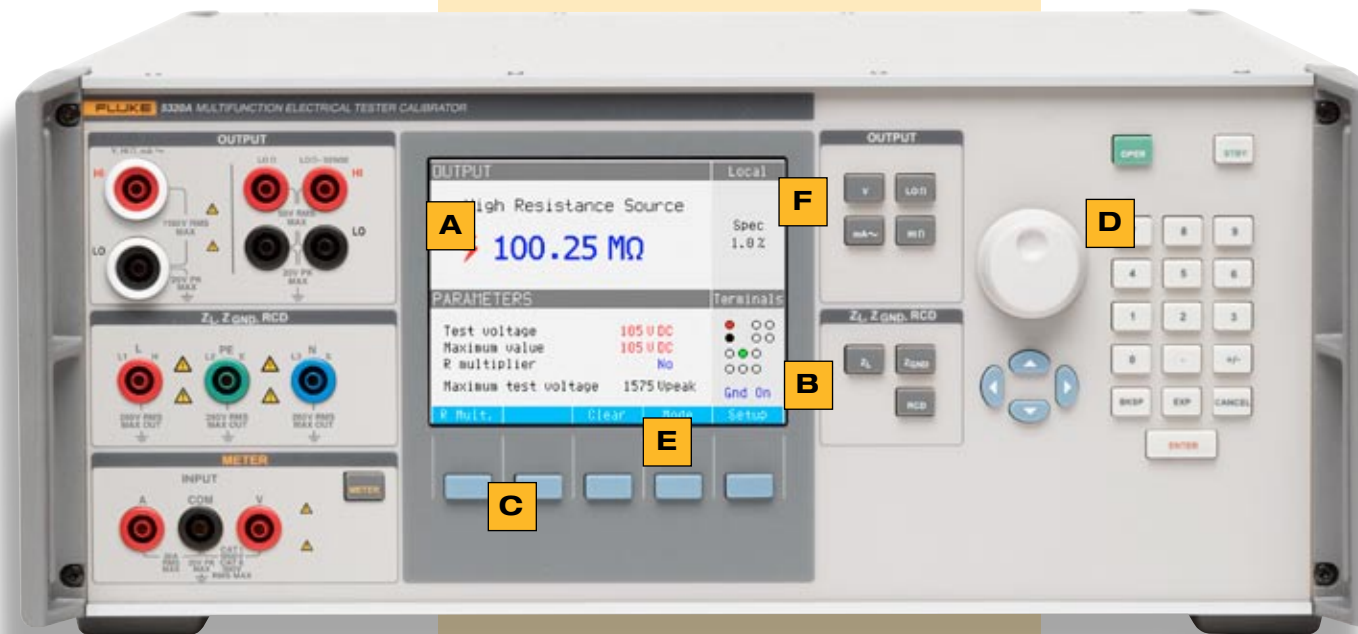
**D.** To select an output value or measurement range, use the numeric keypad or rotary knob.

### Graphical help guide

**E.** Find out what connections to make in an easy-to-understand graphical format. The help guide is available through the "Mode" softkey.

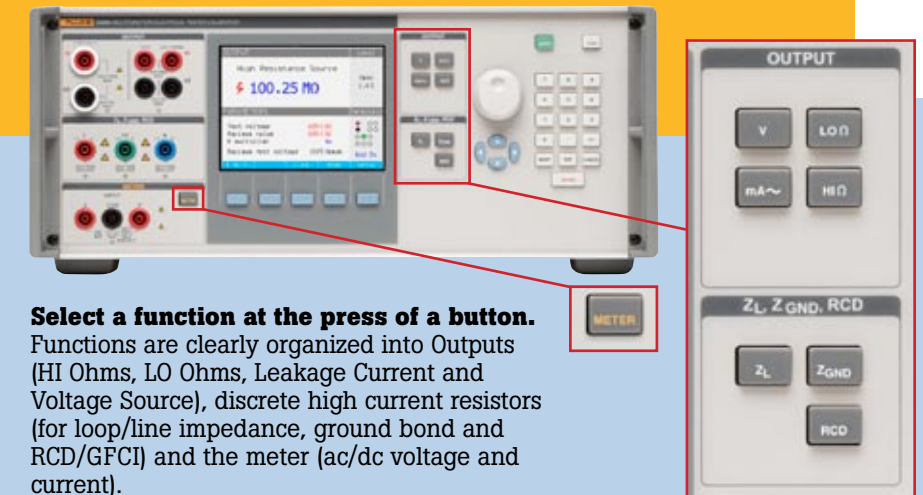
### Spec readout

**F.** The spec readout lets you view the uncertainty of the sourced or measured primary value.



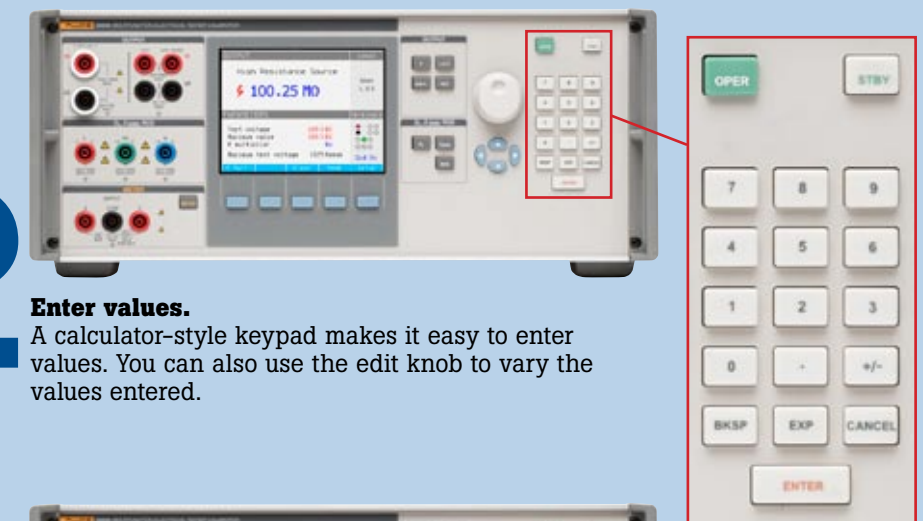
**LAN, GPIB, RS-232 connectors**  
Makes it convenient to connect the 5320A to your PC for automation and data exchange

1



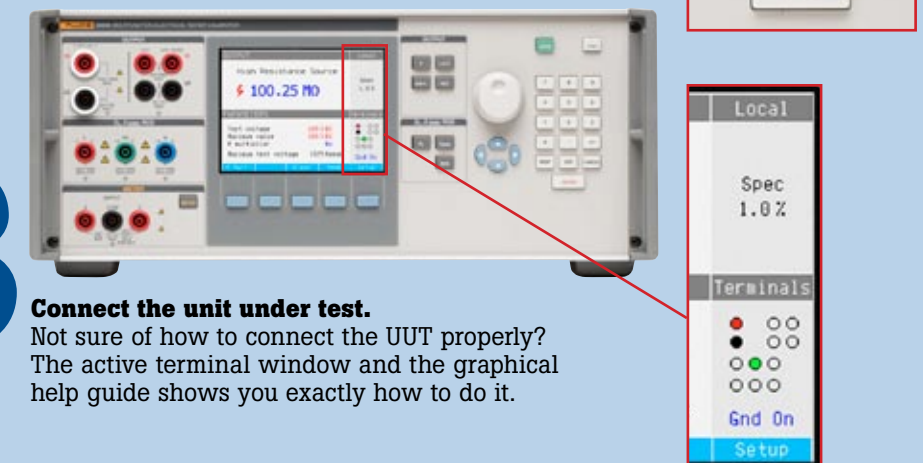
**Select a function at the press of a button.** Functions are clearly organized into Outputs (HI Ohms, LO Ohms, Leakage Current and Voltage Source), discrete high current resistors (for loop/line impedance, ground bond and RCD/GFCI) and the meter (ac/dc voltage and current).

2



**Enter values.** A calculator-style keypad makes it easy to enter values. You can also use the edit knob to vary the values entered.

3



**Connect the unit under test.** Not sure of how to connect the UUT properly? The active terminal window and the graphical help guide shows you exactly how to do it.

**Just press the Operate key and you're ready to go!**



Automation and support keep you up and running efficiently



**Automate the 5320A calibrator with MET/CAL® Plus Calibration Management Software**

MET/CAL Plus software automates the calibration process, helping you to increase throughput and ensuring that calibrations are done consistently every time. This powerful software application documents calibration procedures, processes, and results, for greater ease in complying with ISO 17025 and similar quality standards.

MET/TRACK® software, a dedicated system to manage your test and measurement assets, is incorporated into the MET/CAL Plus application. MET/TRACK software supports the traceability and record-keeping requirements of quality and accreditation standards.

Fluke maintains a calibration procedure library with thousands of procedures that can be used as-is or modified to meet your specific needs. Fluke offers Warranted Procedures, warranted by Fluke Corporation to produce valid calibrations on the intended unit under test (UUT) for the specified model and revision level. These procedures are available for purchase, but are offered free to members of the MET/SUPPORT™ Gold software support program.

A wide variety of accessory products exist to perform batch updates using bar code readers or scanners; view data over the Internet; log temperature and humidity data and import it directly into MET/CAL software.



**The support you need, when you need it**

Fluke calibrators are known for their accuracy and reliability. Fluke operates global calibration and repair facilities to keep your equipment in top working order. A variety of service programs are available.

MET/CAL software owners can get up and running quickly with the free MET/SUPPORT Silver program that includes 60 days of free support via telephone, fax, and email. But the support doesn't stop there. Enroll in the annual MET/SUPPORT Gold program and receive additional premium support and services to help keep you as productive as possible. In addition to priority support by telephone, fax or email, you get free access to the Fluke library of Warranted Procedures, software updates and upgrades, discounts on training courses and more. Even if you use only a few of the Gold services, you can easily recover more than the cost of your membership fee.

Fluke's commitment to support provides additional benefits as well, including invitations to software user group meetings and conferences, periodic e-mail bulletins and a newsletter.

**A wide variety of training courses to fit multiple learning styles**

If you need to arrange for training for yourself or for your staff, Fluke can help there too, with a broad range of classes on metrology principles, lab management, software use, procedure writing and more. Classes are available in traditional, instructor-led formats and also in online formats and on CD-ROM. You're sure to find a class that matches your learning style and budget.

Your Fluke representative will be happy to help you select the software, support, or training programs that best fit your needs.



## Summary Specifications

### Measurement functions

#### Voltmeter

Range of input voltage: 0 to 1000 V RMS (ac or dc)  
Resolution: 4½ digits  
Frequency range: DC, 20 Hz to 2 kHz  
Reading/second: 2

Range	Uncertainty (% of reading + mV)	Resolution
10 V	0.15 % + 5	1 mV
100 V	0.20 % + 50	10 mV
1100 V	0.20 % + 550	100 mV

#### Ammeter

Range of input current: 0 to 30 A RMS  
Resolution: 4½ digits  
Frequency range: DC, 20 to 400 Hz  
Reading/second: 2

Range	Uncertainty (% of reading + mA)	Resolution
300 mA	0.15 % + 0.15	0.1 mA
3 A	0.15 % + 1.5	1 mA
30 A	0.30 % + 15	10 mA

#### VA measurement

Total range: 0 to 33 kVA  
Resolution: 1 VA

#### 10 kV Adapter (1000:1 Divider)

Range: 0 to 10 kV ac peak/dc  
Uncertainty: 0.3 % of reading + 5 Vdc  
0.5 % of reading + 5 Vac (at 50 or 60 Hz)

#### 80k-40 High Voltage Probe

Range: 0 to 40 kV ac peak/dc  
Uncertainty: 0.5 % of reading + 10 Vdc  
0.5 % of reading + 10 Vac (at 50 or 60 Hz)

### Output functions

#### Voltage calibrator (5320A/VLC only)

Range of output voltage: 3 V to 600 V ac or dc  
Voltage Resolution: 4 digits  
Frequency range: 40 Hz to 400 Hz  
Frequency resolution: 3 digit  
Distortion of ac output signal: 0.2 % + 10 mV

Range	Resolution	Uncertainty in ac mode (% of reading + mV)	Max. burden current in ac mode	Uncertainty in dc mode (% of reading + mV)	Max. burden current in dc mode
3 V to 29.99 V	1 mV	0.1 % + 9	500 mA	0.1 % + 9	5 mA
30 V to 99.99 V	10 mV	0.1 % + 30	300 mA	0.1 % + 45	5 mA
100 V to 299.99 V	100 mV	0.1 % + 90	150 mA	0.1 % + 180	3 mA
300 V to 600 V	100 mV	0.1 % + 180	50 mA	0.1 % + 180	2 mA

#### High voltage resistance (Insulation resistance test)

Total range: 10 kΩ to 10 TΩ  
Resolution: 4½ digits

Range	Resolution	Maximum Voltage (ac+dc) Peak	Uncertainty <sup>[1]</sup> (tcal ± 5 °C)
10.000 kΩ to 39.99 kΩ	1 Ω	55 V	0.20 %
40.00 kΩ to 99.99 kΩ	10 Ω	300 V	0.20 %
100.00 kΩ to 199.99 kΩ	10 Ω	800 V	0.20 %
200.0 kΩ to 999.9 kΩ	100 Ω	1100 V	0.20 %
1.0000 MΩ to 9.999 MΩ	100 Ω	1100 V	0.30 %
10.000 MΩ to 999.99 MΩ	1 kΩ	1575 V	0.50 %
1.0000 GΩ to 10.000 GΩ	100 kΩ	1575 V	1.00 %
100 GΩ	<sup>[2]</sup>	1575 V	3.00 %
350.0 MΩ to 10.000 TΩ <sup>[3]</sup>	100 kΩ	5500 V	<sup>[4]</sup>

[1] Uncertainty is valid at maximum test voltage to 500 V. For test voltage over 500 V add 0.1 % per each 200 V. [2] 100 GΩ is a single value resistor. [3] With resistance multiplier adapter. [4] Uncertainty of resistor to be multiplied by 1000 + 1 % of displayed value to 99.99 GΩ, or + 2 % of displayed value to 999.9 GΩ, or + 3 % of displayed value to 10 TΩ.

#### Low voltage resistance (Continuity and earth resistance test)

Total range: 100 mΩ to 10 kΩ  
Resolution: 3½ digits

Range	Resolution	Maximum ac or dc Current	2-Wire Uncertainty <sup>[1]</sup> (tcal ± 5 °C)	4-Wire Uncertainty (tcal ± 5 °C)
100.0 mΩ to 4.99 Ω	0.1 mΩ	400 mA	0.3 % + 25 mΩ	0.3 % + 10 mΩ
5.00 Ω to 29.9 Ω	10 mΩ	250 mA	0.2 % + 25 mΩ	0.2 % + 10 mΩ
30.0 Ω to 199.9 Ω	100 mΩ	100 mA	0.2 % + 25 mΩ	0.2 % + 10 mΩ
200 Ω to 499 Ω	1 Ω	45 mA	0.20 %	0.20 %
500 Ω to 1.999 kΩ	1 Ω	25 mA	0.20 %	0.20 %
2.00 kΩ to 4.99 kΩ	10 Ω	10 mA	0.20 %	0.20 %
5.00 kΩ to 10 kΩ	10 Ω	5 mA	0.20 %	0.20 %

[1] Uncertainty is valid to 200 mΩ. For higher power rating, add 0.1 % per each 300 mΩ above 200 mΩ.

### Output functions continued

#### Discrete resistors (Loop and line impedance and ground bond test)

Total range: 25 mΩ to 1.8 kΩ  
Resolution: 16 discrete values

Nominal resistance value	Deviation from nominal	Calibration uncertainty	Maximum test current ac (RMS) or dc	Maximum short term test current ac (RMS) or dc*	Test current uncertainty
25 mΩ	50 %	± 5 mΩ	30 A	40 A	1.5 % + 0.7 A
50 mΩ	50 %	± 5 mΩ	28 A	40 A	1.5 % + 0.5 A
100 mΩ	30 %	± 5 mΩ	25 A	40 A	1.5 % + 0.35 A
330 mΩ	20 %	± 7 mΩ	18 A	40 A	1.5 % + 0.3 A
500 mΩ	10 %	± 8 mΩ	10 A	40 A	1.5 % + 0.2 A
1 Ω	10 %	± 10 mΩ	8 A	40 A	1.5 % + 0.15 A
1.8 Ω	10 %	± 18 mΩ	6 A	30 A	5 % + 0.1 A
5 Ω	10 %	± 30 mΩ	3.2 A	16 A	1.5 % + 70 mA
10 Ω	10 %	± 60 mΩ	2.0 A	10 A	1.5 % + 50 mA
18 Ω	10 %	± 100 mΩ	1.5 A	7.5 A	1.5 % + 30 mA
50 Ω	10 %	± 300 mΩ	0.8 A	4.0 A	1.5 % + 20 mA
100 Ω	10 %	± 500 mΩ	0.5 A	2.5 A	1.5 % + 10 mA
180 Ω	10 %	± 1 Ω	0.25 A	1.25 A	1.5 % + 5 mA
500 Ω	10 %	± 2.5 Ω	0.1 A	0.5 A	1.5 % + 3 mA
1 kΩ	10 %	± 5 Ω	0.05 A	0.25 A	1.5 % + 2 mA
1.8 kΩ	10 %	± 10 Ω	0.03 A	0.15 A	1.5 % + 2 mA

\*Maximum short term test current is defined as RMS value of halfwave or fullwave test current from the UUT. Maximum time of test current is 200 ms (represents 10 full waves of power line voltage at 50 Hz and 12 full waves at 60 Hz).

#### Leakage current (Direct/touch/contact, differential, substitute leakage current mode)

Leakage current range: 0.1 mA to 30 mA  
Uncertainty: 0.3 % + 2 µA (ac+dc) RMS  
Resolution: 10 µA  
Test voltage: 10 to 250 V ac+dc

#### RCD – Residual current device (Ground fault circuit interrupter)

##### Trip current

Range of trip current in 0.5xI and 1xI mode: 3 to 3000 mA, in 1 mA steps  
Range of trip current in 1.4xI and 2xI mode: 3 to 1500 mA, in 1 mA steps  
Range of trip current in 5xI mode: 3 to 600 mA, in 1 mA steps  
Uncertainty of measured trip current: 1 % RMS (0.5xI and 1xI mode), 2 % RMS (1.4xI and 2xI mode), 5 % RMS (5xI mode)

##### Trip time

Range of trip time: 10 to 5000 ms  
Uncertainty of trip time: 0.25 ms  
Output voltage on RCD terminals: Power line voltage, 115 V or 230 V



## General specifications

### Environmental

**Operating temperature:** 18 °C to 28 °C

**Calibration (Tcal):** 23 °C

**Storage temperature:** -20 °C to 70 °C

**Temperature Coefficient:** Temperature coefficient for temperatures outside of Tcal  $\pm$  5 °C between +5 °C and +40 °C is 0.1/°C

**Relative humidity (operating):** < 70 % to 28 °C

**Altitude (operating):** 3,050 meters (10,000 ft) maximum

**Altitude (non-operating):** 12,200 meters (40,000 ft) maximum

**Specifications confidence interval:** 99 %

### Electromagnetic compatibility

**EMI/RFI:** Designed to comply with Class B per EN61326

### Safety and protection

**Safety:** Designed to comply with EN61010

**Electro static discharge:** This instrument meets class 1 for ESD requirements per EN61326

### Communication interfaces

**Standard interfaces:** LAN, IEEE 488 (GPIB), RS-232

### Dimensions and weights

**Dimensions:** (D x W x H) 450 mm x 480 mm x 170 mm (17.7 in x 18.9 in x 6.7 in).

Mounts within industry-standard 483 mm (19 in) rack-mount frames when fitted with the rack mounting kit.

**Shipping weight:** 25 kg, (55 lbs)

**Net weight:** 18 kg, (39.7 lbs)

### Power

**Line voltage:** 115/230 V  $\pm$  10 %, 50/60 Hz nominal

**Line frequency:** 47 to 63 Hz

**Power consumption:** 150 VA maximum

## Ordering information

Models	Description
5320A	Multifunction Electrical Tester Calibrator
5320A/40	Calibrator with 40 kV Probe
5320A/VLC	Calibrator with 600 V Source and Active Loop Compensator
5320A/VLC/40	5320A/VLC Calibrator with 40 kV Probe

Note: All models include the 10 kV divider/resistance multiplier adapter as standard

### Accessories

5320CASE	Rugged Transit Case
Y5320	Rack Mount Kit (Slides)
5320A-USLEAD	US Mains Plug-to-Banana Leads (available early 2007)
5320A-LOAD	Hipot Current Calibration Load Resistors (available early 2007)

**Fluke.** *Keeping your world up and running.™*

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