FLUKE®

5320A
Multifunction Electrical Tester Calibrator

Extended Specifications

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General Specifications

Warm-Up Time ..... 30 minutes
Specifications Confidence Level ..... 99 %
Specifications Interval ..... 1 year
Temperature Performance
Operating Temperature ..... 18 to 28 °C
Calibration Temperature (tcal) ..... 23 °C
Temperature Coefficient ..... Temperature coefficient for temperature outside of Tcal ±5 °C between +5 °C to +40 °C is 0.1 x /°C
Storage Temperature ..... -20 to +70 °C
Relative Humidity (operating) ..... <70 % to 28 °C
Altitude
Operating ..... 3,050 m (10,000 ft.)
Storage ..... 12,200 m (40,000 ft.)
Dimensions ..... 450 mm X 480 mm X 170 mm (17.7 in. X 18.9 in. X 6.7 in.)
Weight ..... 18 kg (39.7 lbs.)
Power Line ..... 115/230 V ac (50/60 Hz) ±10 %
Power Consumption ..... 150 VA Maximum
Safety Class ..... Class I, Bonded Enclosure
Electrostatic Discharge ..... This instrument meets class I for ESD requirements per EN 61326 (Criteria A)
⚠ **Fuse Protection**
AC mains input ..... 2 A, 250 V for 230 V, Time delay (T2L250 V – 5 x 20 mm)
4 A, 250 V for 115 V, Time delay (T4L250 V – 5 x 20 mm)
RCD input ..... 3.15 A, 250 V, Fast (F3.15L250V – 5 x 20 mm)
Meter amps (A) input ..... 20 A, 500 V, Time delay (T20L500V – 6.3 x 32 mm)
Loop/Line impedance input ..... 4 A, 250 V, Time delay (T4L250V – 6.3 x 32 mm)
Leakage current input ..... 100 mA, 150V, Fast (F100mL150V – 5 x 20 mm)

Electrical Specifications

Low Resistance Source

Total Range ..... 100 mΩ to 10 kΩ
Resolution ..... 3½ digits (continuously variable)

Uncertainty and Maximum Ratings

Range	Resolution	Maximum AC or DC Current[1]	2-Wire Uncertainty[2] (tcal ±5 °C)	4-Wire Uncertainty (tcal ±5 °C)
100 mΩ to 4.99 Ω	0.1 mΩ	400 mA	0.3 % + 25 mΩ	0.3 % + 10 mΩ
5 to 29.9 Ω	0.01 Ω	250 mA	0.2 % + 25 mΩ	0.2 % + 10 mΩ
30 to 199.9 Ω	0.1 Ω	100 mA	0.2 % + 25 mΩ	0.2 % + 10 mΩ
200 to 499 Ω	1 Ω	45 mA	0.2 %	0.2 %
500 Ω to 1.999 kΩ	1 Ω	25 mA	0.2 %	0.2 %
2 to 4.99 kΩ	10 Ω	10 mA	0.2 %	0.2 %
5 to 10 kΩ	10 Ω	5 mA	0.2 %	0.2 %

Notes:
[1] Test current can exceed 120 % of maximum current for up to 3 seconds. Terminals automatically disconnect if test current exceeds 120 % of specified maximum current.
[2] Uncertainty is valid to 200 mW. For higher power rating, add 0.1 % per each 300 mW above 200 mW.

Test Current Measurement

Range ..... 0 to 400 mA ac + dc rms
Resolution ..... 1 mA
Uncertainty ..... $\left(\left(\frac{20}{\sqrt{R}}\right)+0.1\right)mA$ R = set resistance between 0.5 Ω to 10 kΩ.

Short Mode

Nominal resistance ..... <50 mΩ
Maximum current ..... 400 mA ac + dc rms

Open Mode

Nominal resistance ..... 30 MΩ ±20 %
Maximum input voltage allowed ..... 50 V ac + dc rms
Test voltage reading ..... 0 to 50 V ac + dc rms
Resolution ..... 1 V
Uncertainty ..... 5 % + 2 V

High Resistance Source

Range.....10 kΩ to 10 GΩ plus 100 GΩ single value selection.
Resolution.....4½ Digit (continuously variable for 10 kΩ to 10 GΩ range)

Uncertainty and Maximum Ratings

Range	Resolution	Maximum Voltage (ac+dc) Peak	Uncertainty[1] (tcal ±5 °C)
10.000 to 39.99 kΩ	1 Ω	55 V	0.2 %
40.00 to 99.99 kΩ	10 Ω	300 V	0.2 %
100.00 to 199.99 kΩ	10 Ω	800 V	0.2 %
200.0 to 999.9 kΩ	100 Ω	1100 V	0.2 %
1.0000 to 9.999 MΩ	100 Ω	1150 V	0.3 %
10.000 to 999.9 MΩ	1 kΩ	1575 V[2]	0.5 %
1.0000 to 10.000 GΩ	100 kΩ	1575 V[2]	1.0 %
100 GΩ	NA	1575 V[2]	3.0 %[3]

Notes:
[1] Uncertainty is valid to 500 volts. For test voltages above 500 V, add 0.1% for each 200 V above 500 V.
[2] Maximum test voltage with the supplied banana leads is 1000 Vrms. For higher voltages, use leads rated at 1575 V or above.
[3] Calibration value uncertainty is specified in the table. Nominal value is ± 15 %.

Test Voltage Measurement

Range.....0 to 2000 V dc peak
Resolution.....1 V
Uncertainty.....1 % + 5 V for R above 1 MΩ
1 % + 2 V for R below 1 MΩ
Settling Time.....2 seconds for input deviations of <5 %

Test Current Measurement

Range.....0 to 9.9 mA dc
Uncertainty.....1.5 % + 5V/R A (where R is the selected resistance value)
Settling time.....2 seconds (for voltage reading deviations < 5 %)

Short Mode

Nominal resistance.....<100 Ω
Maximum input current allowed.....50 mA ac + dc rms
Test current range.....0 to 50 mA ac + dc rms
Resolution.....0.1 mA
Uncertainty.....2 % + 0.5 mA

Resistance Multiplier Adapter (x1000 multiplier)

Resistance range.....350 MΩ to 10 TΩ

Uncertainty and Maximum Ratings

Range	Resolution	Maximum Voltage (ac+dc) Peak	Uncertainty (tcal ±5 °C)
350.0 MΩ to 99.99 GΩ	100 kΩ	10000 V	1.0 % + R[1]
100.00 GΩ to 999.9 GΩ	10 MΩ	10000 V	2.0 % + R[1]
1.0000 TΩ to 10.000 TΩ	100 MΩ	10000 V	3.0 % + R[1]

Notes:
[1] R is the uncertainty of resistor to be multiplied by 1000.

Ground Bond Resistance Source

Range.....25 mΩ to 1.8 kΩ
Resolution.....16 discrete values
Minimum test voltage/current.....10 V / 10 mA

Uncertainty and Maximum Ratings

Nominal Value	Deviation from Nominal Value	Absolute Uncertainty of Characterized Value (tcal ±5 °C)	Maximum Continuous Test Current ACrms or DC[1]	Maximum Short-term Test Current AC rms or DC[2]	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	14 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 % + 150 mA
1.8 Ω	±10%	± 18 mΩ	6 A	30 A	1.5 % + 100 mA
5 Ω	±10 %	± 30 mΩ	3.2 A	21 A	1.5 % + 70 mA
10 Ω	±10 %	± 60 mΩ	2.0 A	15 A	1.5 % + 50 mA
18 Ω	±10 %	± 100 mΩ	1.5 A	10 A	1.5 % + 30 mA
50 Ω	±10 %	± 300 mΩ	0.8 A	5.0 A	1.5 % + 20 mA
100 Ω	±10 %	± 500 mΩ	0.5 A	3.0 A	1.5 % + 10 mA
180 Ω	±10 %	± 1 Ω	0.25 A	1.35 A	1.5 % + 5 mA
500 Ω	±10 %	± 2.5 Ω	0.1 A	0.6 A	1.5 % + 3 mA
1 kΩ	±10 %	± 5 Ω	0.05 A	0.3 A	1.5 % + 2 mA
1.8 kΩ	±10 %	± 10 Ω	0.025 A	0.15 A	1.5 % + 2 mA

Notes:

[1] Test currents up to 30 % of maximum continuous test current can be applied to the Calibrator with no time limitation. Test current between 30 % and 100 % of the maximum continuous test current can be applied to the Calibrator for a limited time. Minimum period of full current load is 45 seconds. The Calibrator calculates the allowed time period and when exceeded, the output connectors are disconnected.

[2] Maximum short term test current is defined as the rms value of halfwave or fullwave test current flowing through the UUT. Maximum time of test is 200 ms. A time interval of 200 ms represents 10 full waves of power line voltage at 50 Hz and 12 full waves at 60 Hz.

Test Current Measurement

Range.....0 to 40 A ac+ dc rms
Resolution.....1 mA to 100 mA depending on resistance output and test current

Open Mode

Nominal resistance .....>100 kΩ
Maximum voltage .....50 V ac+dc rms
Test voltage range.....0 to 50 V ac+dc rms
Resolution.....1 V
Uncertainty.....2 % + 2 V

Line/Loop Impedance Source

Range.....25 mΩ to 1.8 kΩ
Resolution.....16 discrete values
Minimum test voltage/current.....10 V/10 mA

Uncertainty and Maximum Ratings

Nominal Resistance Value	Deviation from Nominal Value	Absolute Uncertainty of Characterized Value (tcal ±5 °C)	Maximum Continuous Test Current AC rms or DC[1]	Maximum Short-term Test Current AC rms or DC[2]	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	14 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 % + 150 mA
1.8 Ω	±10 %	±18 mΩ	6 A	30 A	1.5 % + 100 mA
5 Ω	±10 %	±30 mΩ	3.2 A	21 A	1.5 % + 70 mA
10 Ω	±10 %	±60 mΩ	2.0 A	15 A	1.5 % + 50 mA
18 Ω	±10 %	±100 mΩ	1.5 A	10 A	1.5 % + 30 mA
50 Ω	±10 %	± 300 mΩ	0.8 A	5.0 A	1.5 % + 20 mA
100 Ω	±10 %	± 500 mΩ	0.5 A	3.0 A	1.5 % + 10 mA
180 Ω	±10 %	± 1 Ω	0.25 A	1.35 A	1.5 % + 5 mA
500 Ω	±10 %	± 2.5 Ω	0.1 A	0.6 A	1.5 % + 3 mA
1 kΩ	±10 %	± 5 Ω	0.05 A	0.3 A	1.5 % + 2 mA
1.8 kΩ	±10 %	± 10 Ω	0.025 A	0.15 A	1.5 % + 2 mA

Notes:

[1] Test currents up to 30 % of maximum continuous test current can be applied to the Calibrator with no time limitation. Test current between 30 % and 100 % of the maximum continuous test current can be applied to the Calibrator for a limited time. Minimum period of full current load is 45 seconds. The Calibrator calculates the allowed time period and when exceeded, the output connectors are disconnected.

[2] Maximum short term test current is defined as the rms value of halfwave or fullwave test current flowing through the UUT. Maximum time of test is 200 ms. A time interval of 200 ms represents 10 full waves of power line voltage at 50 Hz and 12 full waves at 60 Hz.

Test Current Measurement

Type of recognized test current.....Positive impulse (halfwave), negative impulse (halfwave), symmetrical (fullwave).
Range.....0 to 40 A ac+dc rms
Resolution.....1 to 100 mA depending on test current and resistance output

Prospective Fault Current

Range.....0 to 10 kA

Correction Manual Mode

Residual Impedance Range.....0 to 10 Ω
Resolution.....1 mΩ
Uncertainty.....Uncertainty in manual (MAN) mode is the uncertainty of selected resistance value. See table above. Also, the uncertainty of the manually entered correction should be taken into consideration.

Correction Scan Mode

Residual Impedance Range.....0 to 10 Ω
Resolution.....1 mΩ
Uncertainty.....(1 % +15 mΩ) + uncertainty of selected resistance value.

Correction COMP Mode (Active Loop Compensation) (5320A/VLC only)

Residual Impedance Range.....0 to 2 Ω
Maximum Test Current.....<25/N A pk, where N equals number of UUT generated test current periods.
Uncertainty of compensation.....(1 % + 15 mΩ) + uncertainty of selected resistance value. Uncertainty is valid at the point in time when the COMP function is initiated.

Leakage Current Source

Range.....0.1 to 30 mA
Resolution:
Passive Mode .....10 µA setting, 1 µA measurement
Differential Mode.....10 µA setting, 1 µA measurement
Substitute Mode.....10 µA
Active Mode (5320A/VLC only).....10 µA
Test Voltage:
Passive Mode .....60 to 250 V ac+dc rms
Differential Mode.....60 to 250 V ac+dc rms
Substitute Mode.....10 to 250 V ac+dc rms
Active Mode (5320A/VLC only).....50 to 100 V ac+dc rms
Uncertainty:
Passive Mode .....0.3 % + 2 µA ac+dc rms
Differential Mode.....0.3 % + 2 µA ac+dc rms
Test uncertainty can be influenced by power line voltage instability
Substitute Mode.....0.3 % + 2 µA ac+dc rms
Active Mode (5320A/VLC only).....0.3 % + 1 µA ac+dc rms

RCD (Residual Current Device)

Trip Current Range:
0.5 X I and 1 X I mode: .....3 to 3000 mA in 1 mA steps
1.4 X I and 2 X I Mode.....3 to 1500 mA in 1 mA steps
5 X I Mode .....3 to 600 mA in 1 mA steps
Trip Current Measurement Resolution.....1 µA on 30 mA range
10 µA on 300 mA range
100 µA on 3A range
Uncertainty:
0.5 X I and 1 X I mode: .....1 % rms
1.4 X I and 2 X I Mode.....2 % rms
5 X I Mode .....5 % rms
Trip Time Range .....10 to 5000 ms
Trip Time Uncertainty .....0.02 % + 0.25 ms
Series Resistance.....0.025 Ω, 0.05 Ω, 0.1 Ω, 0.33 Ω, 0.5 Ω, 1 Ω, 1.8 Ω, 5 Ω, 10 Ω, 18 Ω, 50 Ω, 100 Ω, 180 Ω, 500 Ω, 1000 Ω, 1800 Ω
Line/Touch Voltage Range.....250 V
Line/Touch Voltage Uncertainty.....5 % + 3 V

AC/DC Voltage Calibrator (5320A/VLC only)

Range.....3 to 600 V, ac or dc
Resolution.....4 digits
Internal Ranges:
AC Mode .....30, 100, 300, and 600 V (Autoranging only)
DC Mode .....30, 150, and 600 V (Autoranging only)
Frequency:
Range.....40 to 400 Hz
Resolution.....3 digits
Uncertainty..... 0.02 %
Settling Time .....300 ms to 3 s, depending on output value

AC Voltage

Uncertainty and Maximum Burden Current

Range	Resolution	Uncertainty ±(% of Reading + mV)	Maximum Burden Current
3 – 29.99 V	0.001 V	0.1 % + 9	500 mA
30 – 99.99 V	0.01 V	0.1 % + 30	300 mA
100 – 299.9 V	0.1 V	0.1 % + 90	150 mA
300 – 600 V	0.1 V	0.1 % + 180	50 mA

DC Voltage

Uncertainty and Maximum Burden Current

Range	Resolution	Uncertainty ±(% of Reading + mV)	Maximum Burden Current
3 – 29.99 V	0.001 V	0.1 % + 9	2 mA
30 – 149.9 V	0.01 V	0.1 % + 45	3 mA
150 – 600 V	0.1 V	0.1 % + 180	5 mA

AC Output Signal Distortion.....0.2 % ±10 mV (harmonic distortion and non-harmonic noise from 20 Hz to 500 kHz), for output power lower than 10 VA on each range.
Sensing Ammeter Current Range.....500 mA
Resolution.....1 mA
Uncertainty.....±5 mA

Multimeter

Voltage

Range.....0 to 1100 V ac rms or dc
Resolution.....4½ digits
Internal Ranges.....10, 100, and 1100 V (Autoranging only)
Frequency Range.....DC, 20 Hz to 2 kHz
Input Resistance.....10 MΩ ±1 %
Time Constant.....1.5 s
Readings/Second.....2
Measurement Category.....1000 V CAT I, 300 V CAT II

AC/DC Voltage Uncertainty

Range	Resolution	Uncertainty ±(% of Reading + mV)
10 V	0.001 V	0.15 % + 5
100 V	0.01 V	0.20 % + 50
1100 V	0.1 V	0.20 % + 550

Current

Range.....0 to 20 A continuous, 30 A for up to 30 minutes, ac rms or dc
Resolution.....4½ digits
Internal Ranges.....300 mA, 3 and 30 A (Autoranging only)
Frequency Range.....DC, 20 to 400 Hz
Time Constant.....1.5 s
Readings/Second.....2

AC/DC Current Uncertainty

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

Phantom Power

Range.....0 to 33 kVA
Resolution.....3 digits
Uncertainty..... $\sqrt{(V_{unc})^2 + (I_{unc})^2}$ where V_{unc} is specified uncertainty of measured voltage and I_{unc} is specified uncertainty of measured current.

Hipot Leakage Current Measurement Mode

Range.....0 to 300 mA ac rms or dc
Resolution.....4 1/2 digits
Frequency range.....DC, 20 Hz to 400 Hz
Time constant.....1.5 s
Readings/second.....2

Hipot Leakage Current Mode Uncertainty

Range	Resolution	Uncertainty +/- (% of reading + µA)
300 uA	0.01 µA	0.3 % + 0.21
3 mA	0.1 µA	0.2 % + 1.5
30 mA	1 µA	0.2 % + 15
300 mA	10 µA	0.2 % + 150

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Hipot Timer Measurement Mode

Range.....0.1 to 999 s

Resolution.....1 ms

Uncertainty.....0.02 % + 2 ms (dc)
0.02 % + 20 ms (ac)

10 kV Adapter (1000:1 voltage divider)

Range.....0 to 10 kV ac peak/dc
Resolution.....4½ digits
Uncertainty.....0.3 % of value + 5 V dc
0.5 % of value + 5 V ac at 50 or 60 Hz

80K-40 High Voltage Probe

Range.....0 to 40 kV ac peak/dc
Resolution.....4½ digits
Uncertainty.....0.5 % of value + 10 V dc
0.5 % of value + 10 V ac at 50 or 60 Hz

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

5320A-LOAD	Current Calibration Load Resistors
5320CASE	Rugged Transit Case
Y5320	Rack Mount Kit (Slides)

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