Manual Supplement

Manual Title:	5320A Getting Started	Supplement Issue:	**1**
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This supplement contains information necessary to ensure the accuracy of the above manual.

FLUKE®

Change #1

On pages 4 through 10, replace all the Specifications with the following:

General Specifications

Warm-Up Time ..... 30 minutes
Specifications Confidence Interval ..... 99 %
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, Fast (T4L250V – 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, Fast (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 20mm)

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 %

Note: [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	1100 V	0.3 %
10.000 to 199.99 MΩ	1 kΩ	1575 V[2]	0.5 %
200.00 to 999.9 MΩ	10 kΩ	1575 V[2]	1.0 %
1.0000 to 10.000 GΩ	100 kΩ	1575 V[2]	3.0 %
100 GΩ	NA	1575 V[2]	5.0 %[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 uncertainty 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 %

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 ..... Uncertainty of resistor to be multiplied, +3 % of multiplied value
Maximum test voltage ..... 5500 V dc

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 ..... 0.25 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
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 ..... 1000V 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.

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

On page 13, replace both tables with the following:

Table 2. Line Power Fuses

Line Voltage Selection	Fuse	Fluke Part No.
115 Volts	T4AH250V (5 x 20 mm)	2743488
230 Volts	T2AH250V (5 x 20 mm)	2743495

Table 3. Measurement Input Fuses

Input	Fuse	Fluke Part No.
RCD	F3.15L 250V(5 x 20 mm)	2743508
Leakage Current	F100mAL 250V (5 x 20 mm)	2743513
Meter	F20L 500V (6.3 x 32mm)	2743536
Loop/Line Impedance	T4AL 250V(6.3 x 32 mm)	2743524