

# Manual Supplement

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This supplement contains information necessary to ensure the accuracy of the above manual.

## Change #1, 39247, 40107, 40985, 41082, 41141

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

### 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  $\pm 5$  °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)  $\pm 10$  %
- 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, 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 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 <sup>[1]</sup>	2-Wire Uncertainty <sup>[2]</sup> (tcal $\pm 5$ °C)	4-Wire Uncertainty (tcal $\pm 5$ °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 <sup>[1]</sup> (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 999.9 MΩ	1 kΩ	1575 V <sup>[2]</sup>	0.5 %
1.0000 to 10.000 GΩ	100 kΩ	1575 V <sup>[2]</sup>	1.0 %
100 GΩ	NA	1575 V <sup>[2]</sup>	3.0 % <sup>[3]</sup>

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 %

### **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	5500 V	1.0 % + R <sup>[1]</sup>
100.00 GΩ to 999.9 GΩ	10 MΩ	5500 V	2.0 % + R <sup>[1]</sup>
1.0000 TΩ to 10.000 TΩ	100 MΩ	5500 V	3.0 % + R <sup>[1]</sup>

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 <sup>[1]</sup>	Maximum Short-term Test Current AC rms or DC <sup>[2]</sup>	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 <sup>[1]</sup>	Maximum Short-term Test Current AC rms or DC <sup>[2]</sup>	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  $\Omega$

Resolution ..... 1 m $\Omega$

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  $\Omega$

Resolution ..... 1 m $\Omega$

Uncertainty..... (1 % +15 m $\Omega$ ) + uncertainty of selected resistance value.

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

Residual Impedance Range..... 0 to 2  $\Omega$

Maximum Test Current..... <25/N A pk, where N equals number of UUT generated test current periods.

Uncertainty of compensation..... (1 % + 15 m $\Omega$ ) + 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  $\mu$ A setting, 1  $\mu$ A measurement

Differential Mode ..... 10  $\mu$ A setting, 1  $\mu$ A measurement

Substitute Mode..... 10  $\mu$ A

Active Mode (5320A/VLC only) ..... 10  $\mu$ A

#### 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  $\mu$ A ac+dc rms

Differential Mode ..... 0.3 % + 2  $\mu$ A ac+dc rms

Test uncertainty can be influenced by power line voltage instability

Substitute Mode..... 0.3 % + 2  $\mu$ A ac+dc rms

Active Mode (5320A/VLC only) ..... 0.3 % + 1  $\mu$ A 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  $\mu$ A on 30 mA range  
10  $\mu$ A on 300 mA range  
100  $\mu$ A 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** ..... 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.

### 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





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

## Change #2

On page 11, delete the following from the Table:

Plug adapter (x2)	2743474
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## Change #3

On page 21, replace the first paragraph under Turning on the Calibrator with the following:

With the Calibrator setup for the proper line voltage, press the power switch on the back panel so the “I” side of the switch is depressed. During its power-up cycle, the Calibrator displays a power supply test screen while initializing internal circuits and checking the mains connection. The mains connection tests are:

- Power line voltage test – The line voltage must be within preset limits. For the 230 V setting, the range must be between 180 V and 260 V. For the 115 V setting, the limits are between 90 V to 130 V
- Power line frequency test – The frequency must be within preset limits. 49 Hz to 51 Hz or 59 Hz to 61 Hz.
- Potential difference and polarity test – The potential difference between neutral and protective earth must be less than 15 V.

*Note*

*The polarity of the neutral and the line wires must be correct for the 5320A to power on. If the “L-N-PE” test fails during the power-on process, the neutral and the line wires should be swapped on the plug end of the 5320A power line cord. Only a qualified service technician should make this change.*

The screen in Figure 3 is displayed when the Calibrator completes these tests.