

# 1507/1503 Insulation Testers

## Technical Data



The Fluke 1507 and 1503 Insulation Testers are compact, rugged, reliable, and easy to use. With their multiple test voltages, they are ideal for many troubleshooting, commissioning, and preventative maintenance applications. Additional features, like the remote probe on these tools save both time and money when performing tests.



### Features and benefits:

- Insulation test range:
  - 1507: 0.01 MΩ to 10 GΩ
  - 1503: 0.1 MΩ to 2000 MΩ
- Insulation test voltages:
  - 1507: 50 V, 100 V, 250 V, 500 V, 1000 V
  - 1503: 500 V, 1000 V
- Save both time and money with Automatic calculation of Polarization Index and Dielectric Absorption Ratio
- Make repetitive tests simple and easy with the 1507's Compare (Pass/Fail) function (only available on the 1507)
- Repetitive or hard-to-reach testing is easy with the remote test probe
- Live circuit detection prevents insulation test if voltage > 30 V is detected for added user protection
- Auto-discharge of capacitive voltage for added user protection
- AC/DC voltage: 0.1 V to 600 V
- 200 mA Continuity
- Resistance: 0.01 Ω to 20.00 KΩ
- Save battery power with auto power off
- Read measurements easily with large, backlit display
- CAT IV 600 V overvoltage category rating for added user protection
- Remote probe, test leads, probes and alligator clips included with each tester
- Accepts optional Fluke TPAK magnetic hanging system to free your hands for other work
- Four AA alkaline batteries (NEDA 15 A or IEC LR6) for at least 1000 insulation tests
- One-year warranty

# 1507/1503 Specifications

## AC/DC voltage measurement

### Accuracy

| Range   | Resolution | 50 Hz to 400 Hz<br>± (% of Rdg + Digits) |
|---------|------------|--|
| 600.0 V | 0.1 V      | ± (2 % + 3)                              |

**Input impedance:** 3 MΩ (nominal), < 100 pF

**Common mode rejection ratio (1 kΩ unbalanced):** > 60 dB at dc, 50 or 60 Hz

**Overload protection:** 600 V rms or dc

## Earth bond resistance measurement

| Range    | Resolution | Accuracy <sup>1</sup><br>+ (% of Rdg + Digits) |
|----------|------------|--|
| 20.00 Ω  | 0.01 Ω     | ± (1.5 % + 3)                                  |
| 200.0 Ω  | 0.1 Ω      |  |
| 2000 Ω   | 1 Ω        |  |
| 20.00 kΩ | 0.01 kΩ    |  |

<sup>1</sup>Accuracies apply from 0 to 100 % of range.

**Overload protection:** 2 V rms or dc

**Open circuit test voltage:** > 4.0 V, < 8 V

**Short circuit current:** > 200.0 mA

## Insulation specifications

**Measurement range:** 0.01 MΩ to 10 GΩ model 1507, 0.01 MΩ to 2000 MΩ model 1503

**Test voltages:** 50 V, 100 V, 250 V, 500 V, 1000 V

**Test voltage accuracy:** + 20 %, - 0 %

**Short-circuit test current:** 1 mA nominal

**Auto discharge:** Discharge time < 0.5 second for C = 1 μF or less

**Live circuit detection:** Inhibit test if terminal voltage > 30 V prior to initialization of test

**Maximum capacitive load:** Operable with up to 1 μF load

### Accuracy (Model 1507)

| Output Voltage            | Display Range       | Resolution | Test Current  | Accuracy<br>± (% of Rdg + Digits) |
|---------------------------|---------------------|------------|---------------|-----------------------------------|
| 50 V<br>(0 % to + 20 %)   | 0.01 MΩ to 20.00 MΩ | 0.01 MΩ    | 1 mA @ 50 kΩ  | ± (3 % + 5)                       |
|                           | 20.0 MΩ to 50.0 MΩ  | 0.1 MΩ     |               |                                   |
| 100 V<br>(0 % to + 20 %)  | 0.01 MΩ to 20.00 MΩ | 0.01 MΩ    | 1 mA @ 100 kΩ | ± (3 % + 5)                       |
|                           | 20.0 MΩ to 100.0 MΩ | 0.1 MΩ     |               |                                   |
| 250 V<br>(0 % to + 20 %)  | 0.01 MΩ to 20.00 MΩ | 0.01 MΩ    | 1 mA @ 250 kΩ | ± (1.5 % + 5)                     |
|                           | 20.0 MΩ to 200.0 MΩ | 0.1 MΩ     |               |                                   |
| 500 V<br>(0 % to + 20 %)  | 0.01 MΩ to 20.00 MΩ | 0.01 MΩ    | 1 mA @ 500 kΩ | ± (1.5 % + 5)                     |
|                           | 20.0 MΩ to 200.0 MΩ | 0.1 MΩ     |               |                                   |
|                           | 200 MΩ to 500 MΩ    | 1 MΩ       |               |                                   |
| 1000 V<br>(0 % to + 20 %) | 0.1 MΩ to 200.0 MΩ  | 0.1 MΩ     | 1 mA @ 1 MΩ   | ± (1.5 % + 5)                     |
|                           | 200 MΩ to 2000 MΩ   | 1 MΩ       |               |                                   |
|                           | 2.0 GΩ to 10.0 GΩ   | 0.1 GΩ     |               | ± (10 % + 3)                      |

### Accuracy (Model 1503)

| Output Voltage            | Display Range       | Resolution | Test Current  | Accuracy<br>± (% of Rdg + Digits) |
|---------------------------|---------------------|------------|---------------|-----------------------------------|
| 500 V<br>(0 % to + 20 %)  | 0.1 MΩ to 20.00 MΩ  | 0.01 MΩ    | 1 mA @ 500 kΩ | ± (2.0 % + 5)                     |
|                           | 20.0 MΩ to 200.0 MΩ | 0.1 MΩ     |               |                                   |
|                           | 200 MΩ to 500 MΩ    | 1 MΩ       |               |                                   |
| 1000 V<br>(0 % to + 20 %) | 0.1 MΩ to 200.0 MΩ  | 0.1 MΩ     | 1 mA @ 1 MΩ   | ± (2.0 % + 5)                     |
|                           | 200 MΩ to 2000 MΩ   | 1 MΩ       |               |                                   |

## EN61557 Specifications

The following tables are a requirement for European labeling.

| Measurement           | Intrinsic Uncertainty   | Operating Uncertainty <sup>1</sup> |
|-----------------------|---|------------------------------------|
| Volts                 | ± (2.0 % + 3)   | 30 %                               |
| Earth Bond Resistance | ± (1.5 % + 3)   | 30 %                               |
| Insulation Resistance | Depends on test voltage and range.<br>See Insulation Test specifications. | 30 %                               |

<sup>1</sup>This specification comes from the standard and indicates the maximum amount allowable by the standard.

### EN61557 influence variables and uncertainties

| Earth Bond Resistance<br>Influence Variable | Designation per EN61557 | Uncertainty for<br>Insulation Resistance | Uncertainty for<br>Earth Bond Resistance |
|---|-------------------------|--|--|
| Supply Voltage                              | E2                      | 5 %                                      | 5 %                                      |
| Temperature                                 | E3                      | 5 %                                      | 5 %                                      |

<sup>1</sup>Specification confidence level 99 %.

The following tables can be used to determine the maximum or minimum display values considering maximum instrument operating error per EN61557-1, 5.2.4.

### Insulation resistance maximum and minimum display values

| 50 V        |                       | 100 V       |                       | 250 V       |                       | 500 V       |                       | 1000 V      |                       |
|-------------|-----------------------|-------------|-----------------------|-------------|-----------------------|-------------|-----------------------|-------------|-----------------------|
| Limit Value | Minimum Display Value | Limit Value | Minimum Display Value | Limit Value | Minimum Display Value | Limit Value | Minimum Display Value | Limit Value | Minimum Display Value |
| 0.05        | 0.07                  | 0.05        | 0.07                  | 0.05        | 0.07                  | 0.05        | 0.07                  |             |                       |
| 0.06        | 0.08                  | 0.06        | 0.08                  | 0.06        | 0.08                  | 0.06        | 0.08                  |             |                       |
| 0.07        | 0.09                  | 0.07        | 0.09                  | 0.07        | 0.09                  | 0.07        | 0.09                  |             |                       |
| 0.08        | 0.10                  | 0.08        | 0.10                  | 0.08        | 0.10                  | 0.08        | 0.10                  |             |                       |
| 0.09        | 0.12                  | 0.09        | 0.12                  | 0.09        | 0.12                  | 0.09        | 0.12                  |             |                       |
| 0.1         | 0.13                  | 0.1         | 0.13                  | 0.1         | 0.13                  | 0.1         | 0.13                  | 0.1         | 0.1                   |
| 0.2         | 0.26                  | 0.2         | 0.26                  | 0.2         | 0.26                  | 0.2         | 0.26                  | 0.2         | 0.3                   |
| 0.3         | 0.39                  | 0.3         | 0.39                  | 0.3         | 0.39                  | 0.3         | 0.39                  | 0.3         | 0.4                   |
| 0.4         | 0.52                  | 0.4         | 0.52                  | 0.4         | 0.52                  | 0.4         | 0.52                  | 0.4         | 0.5                   |
| 0.5         | 0.65                  | 0.5         | 0.65                  | 0.5         | 0.65                  | 0.5         | 0.65                  | 0.5         | 0.7                   |
| 0.6         | 0.78                  | 0.6         | 0.78                  | 0.6         | 0.78                  | 0.6         | 0.78                  | 0.6         | 0.8                   |
| 0.7         | 0.91                  | 0.7         | 0.91                  | 0.7         | 0.91                  | 0.7         | 0.91                  | 0.7         | 0.9                   |
| 0.8         | 1.04                  | 0.8         | 1.04                  | 0.8         | 1.04                  | 0.8         | 1.04                  | 0.8         | 1.0                   |
| 0.9         | 1.17                  | 0.9         | 1.17                  | 0.9         | 1.17                  | 0.9         | 1.17                  | 0.9         | 1.2                   |
| 1.0         | 1.30                  | 1.0         | 1.30                  | 1.0         | 1.30                  | 1.0         | 1.30                  | 1.0         | 1.3                   |
| 2.0         | 2.60                  | 2.0         | 2.60                  | 2.0         | 2.60                  | 2.0         | 2.60                  | 2.0         | 2.6                   |
| 3.0         | 3.90                  | 3.0         | 3.90                  | 3.0         | 3.90                  | 3.0         | 3.90                  | 3.0         | 3.9                   |
| 4.0         | 5.20                  | 4.0         | 5.20                  | 4.0         | 5.20                  | 4.0         | 5.20                  | 4.0         | 5.2                   |
| 5.0         | 6.50                  | 5.0         | 6.50                  | 5.0         | 6.50                  | 5.0         | 6.50                  | 5.0         | 6.5                   |
| 6.0         | 7.80                  | 6.0         | 7.80                  | 6.0         | 7.80                  | 6.0         | 7.80                  | 6.0         | 7.8                   |

# EN61557 Specifications cont.

## Insulation resistance maximum and minimum display values cont.

| 50 V        |                       | 100 V       |                       | 250 V       |                       | 500 V       |                       | 1000 V      |                       |
|-------------|-----------------------|-------------|-----------------------|-------------|-----------------------|-------------|-----------------------|-------------|-----------------------|
| Limit Value | Minimum Display Value | Limit Value | Minimum Display Value | Limit Value | Minimum Display Value | Limit Value | Minimum Display Value | Limit Value | Minimum Display Value |
| 7.0         | 9.10                  | 7.0         | 9.10                  | 7.0         | 9.10                  | 7.0         | 9.10                  | 7.0         | 9.1                   |
| 8.0         | 10.40                 | 8.0         | 10.40                 | 8.0         | 10.40                 | 8.0         | 10.40                 | 8.0         | 10.4                  |
| 9.0         | 11.70                 | 9.0         | 11.70                 | 9.0         | 11.70                 | 9.0         | 11.70                 | 9.0         | 11.7                  |
| 10.0        | 13.0                  | 10.0        | 13.0                  | 10.0        | 13.0                  | 10.0        | 13.0                  | 10.0        | 13.0                  |
| 20.0        | 26.0                  | 20.0        | 26.0                  | 20.0        | 26.0                  | 20.0        | 26.0                  | 20.0        | 26.0                  |
| 30.0        | 39.0                  | 30.0        | 39.0                  | 30.0        | 39.0                  | 30.0        | 39.0                  | 30.0        | 39.0                  |
| 40.0        | 52.0                  | 40.0        | 52.0                  | 40.0        | 52.0                  | 40.0        | 52.0                  | 40.0        | 53.0                  |
|             |                       | 50.0        | 65.0                  | 50.0        | 65.0                  | 50.0        | 65.0                  | 50.0        | 65.0                  |
|             |                       | 60.0        | 78.0                  | 60.0        | 78.0                  | 60.0        | 78.0                  | 60.0        | 78.0                  |
|             |                       | 70.0        | 91.0                  | 70.0        | 91.0                  | 70.0        | 91.0                  | 70.0        | 91.0                  |
|             |                       | 80.0        | 104.0                 | 80.0        | 104.0                 | 80.0        | 104.0                 | 80.0        | 104.0                 |
|             |                       | 90.0        | 117.0                 | 90.0        | 117.0                 | 90.0        | 117.0                 | 90.0        | 117.0                 |
|             |                       |             |                       | 100.0       | 130.0                 | 100.0       | 130.0                 | 100.0       | 130.0                 |
|             |                       |             |                       |             |                       | 200.0       | 260.0                 | 200.0       | 260.0                 |
|             |                       |             |                       |             |                       | 300.0       | 390.0                 | 300.0       | 390.0                 |
|             |                       |             |                       |             |                       | 400.0       | 520.0                 | 400.0       | 520.0                 |
|             |                       |             |                       |             |                       |             |                       | 500.0       | 650.0                 |
|             |                       |             |                       |             |                       |             |                       | 600.0       | 780.0                 |
|             |                       |             |                       |             |                       |             |                       | 700.0       | 910.0                 |
|             |                       |             |                       |             |                       |             |                       | 800.0       | 1040.0                |
|             |                       |             |                       |             |                       |             |                       | 900.0       | 1170.0                |
|             |                       |             |                       |             |                       |             |                       | 1000.0      | 1300.0                |
|             |                       |             |                       |             |                       |             |                       | 2000.0      | 2600.0                |

## Earth bond resistance maximum display values

| Limit Value | Maximum Display Value |
|-------------|-----------------------|
| 0.4         | 0.28                  |
| 0.5         | 0.35                  |
| 0.6         | 0.42                  |
| 0.7         | 0.49                  |
| 0.8         | 0.56                  |
| 0.9         | 0.63                  |
| 1.0         | 0.7                   |
| 2.0         | 1.4                   |
| 3.0         | 2.1                   |
| 4.0         | 2.8                   |
| 5.0         | 3.5                   |
| 6.0         | 4.2                   |
| 7.0         | 4.9                   |
| 8.0         | 5.6                   |
| 9.0         | 6.3                   |
| 10.0        | 7.0                   |
| 20.0        | 14.0                  |
| 30.0        | 21.0                  |
| 40.0        | 28.0                  |
| 50.0        | 35.0                  |
| 60.0        | 42.0                  |
| 70.0        | 49.0                  |
| 80.0        | 56.0                  |
| 90.0        | 63.0                  |

| Limit Value | Maximum Display Value |
|-------------|-----------------------|
| 100.0       | 70.0                  |
| 200.0       | 140.0                 |
| 300.0       | 210.0                 |
| 400.0       | 280.0                 |
| 500.0       | 350.0                 |
| 600.0       | 420.0                 |
| 700.0       | 490.0                 |
| 800.0       | 560.0                 |
| 900.0       | 630.0                 |
| 1000.0      | 700.0                 |
| 2000.0      | 1400.0                |

## 1507/1503 General Specifications

**Maximum voltage applied to any terminal:**

600 V ac rms or dc

**Storage temperature:** -40 °C to 60 °C

(-40 °F to 140 °F)

**Operating temperature:** -20 °C to 55 °C

(-4 °F to 131 °F)

**Temperature coefficient:** 0.05 x (specified accuracy)

per °C for temperatures < 18 °C or > 28 °C

(< 64 °F or > 82 °F)

**Relative humidity noncondensing:**

0 % to 95 % @ 10 °C to 30 °C (50 °F to 86 °F)

0 % to 75 % @ 30 °C to 40 °C (86 °F to 104 °F)

0 % to 40 % @ 40 °C to 55 °C (104 °F to 131 °F)

**Vibration:** Random, 2 g, 5-500 Hz per

MIL-PRF-28800F, Class 2 instrument

**Shock:** 1 meter drop per IEC 61010-1 2nd Edition

(1 meter drop test, six sides, oak floor)

**Electromagnetic compatibility:** In an RF field of

3 V/M, accuracy = specified accuracy

(EN 61326-1:1997)

**Safety:** Complies with ANSI/ISA 82.02.01 (61010-1)

2004, CAN/CSA-C22.2 NO. 61010-1-04, and IEC/EN

61010-1 2nd Edition for measurement category IV

600 V (CAT IV)

**Certifications:** CSA per standard CSA/CAN C22.2

No. 61010.1-04; TUV per standard IEC/EN 61010-1

2nd Edition

**Batteries:** Four AA batteries (NEDA 15A or IEC LR6)

**Battery life**

Insulation test use: Tester can perform at least 1000 insulation tests with fresh alkaline batteries at room temperature. These are standard tests of 1000 V into 1 MΩ with a duty cycle of 5 seconds on and 25 seconds off.

Resistance measurements: Tester can perform at least 2500 earth bond resistance measurements with fresh alkaline batteries at room temperature. These are standard tests of 1 Ω with a duty cycle of 5 seconds on and 25 seconds off.

**Size:** 5.0 cm H x 10.0 cm W x 20.3 cm L

(1.97 in H x 3.94 in W x 8.00 in L)

**Weight:** 550 g (1.2 lb)

**IP rating:** IP40

**Altitude**

Operating: 2000 m CAT IV 600 V,

3000 m CAT III 600 V

Non-operating (storage): 12,000 m

**Over-range capability:** 110 % of range

**Included accessories:** TL224 Test Leads, TP74 Test

Probes, clips PN 1958654 (red) and PN 1958646

(black), holster and remote probe

## Ordering Information

**Fluke-1507** Insulation Tester

**Fluke-1503** Insulation Tester

**Included**

Remote probe, test leads, test probes, alligator clips, holster, user documentation

**Optional accessories**

**TPAK™** Magnetic Tool Hanger

**C101** Hard Case

**TLK225** SureGrip Master

Accessory Kit



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