

1587/1577 Insulation Multimeters

Technical Data



Two powerful tools in one.

The Fluke 1587 and 1577 Insulation Multimeters combine a digital insulation tester with a full-featured, true-rms digital multimeter in a single compact, handheld unit, which provides maximum versatility for both troubleshooting and preventative maintenance.

Like other tools that you have come to expect from Fluke, the 1587 and 1577 are rugged, reliable, and easy to use.

Whether you work on motors, generators, cables, or switch-gear, the Fluke 1587/1577 Insulation Multimeters are ideally suited to help you with your tasks.

- Large display with backlight
- Insulation test (1587: 0.01 MΩ to 2 GΩ)
(1577: 0.1 MΩ to 600 MΩ)
- Insulation test voltages (1587: 50 V, 100 V, 250 V, 500 V, 1000 V),(1577: 500 V, 1000 V) for many applications
- 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, DC milliVolts, AC/DC milliamps, Resistance (Ω), Continuity
- Filter for motor drive measurements (1587 only)
- Capacitance, diode test, temperature, Min/Max, frequency (Hz) (1587 only)
- Auto power off to save battery power
- CAT III 1000 V, CAT IV 600 V measurement category
- Included accessories: Remote probe, test leads and probes, alligator clips, (K-type thermocouple, 1587 only)
- Accepts optional Fluke TPAK™ magnetic hanging system to free your hands for other work
- Rugged, utility hard case allows you to bring everything you need for the job
- 3-year warranty

1587/1577 Specifications

AC voltage measurement

1587 accuracy

| Range | Resolution | 50 Hz to 60 Hz | 60 Hz to 5000 Hz |
|----------|------------|----------------|--------------------------|
| 600.0 mV | 0.1 mV | + (1 % + 3) | + (2 % + 3) |
| 6.000 V | 0.001 V | + (1 % + 3) | + (2 % + 3) |
| 60.00 V | 0.01 V | + (1 % + 3) | + (2 % + 3) |
| 600.0 V | 0.1 V | + (1 % + 3) | + (2 % + 3) ¹ |
| 1000 V | 1 V | + (2 % + 3) | + (2 % + 3) ¹ |

¹ 1 kHz bandwidth

1587 lowpass filter Voltage

| Range | Resolution | 50 Hz to 60 Hz | 60 Hz to 400 Hz |
|----------|------------|----------------|-----------------|
| 600.0 mV | 0.1 mV | + (1 % + 3) | + (2 % + 3) |
| 6.000 V | 0.001 V | + (1 % + 3) | + (2 % + 3) |
| 60.00 V | 0.01 V | + (1 % + 3) | + (2 % + 3) |
| 600.0 V | 0.1 V | + (1 % + 3) | + (2 % + 3) |
| 1000 V | 1 V | + (2 % + 3) | + (2 % + 3) |

1577 accuracy

| Range | Resolution | 50 Hz to 60 Hz |
|----------|------------|----------------|
| 600.0 mV | 0.1 mV | + (2 % + 3) |
| 6.000 V | 0.001 V | + (2 % + 3) |
| 60.00 V | 0.01 V | + (2 % + 3) |
| 600.0 V | 0.1 V | + (2 % + 3) |
| 1000 V | 1 V | + (2 % + 3) |

AC conversion: Inputs are ac-coupled and calibrated to the rms value of sine wave input. Conversions are true-rms responding and specified from 5 % to 100 % of range. Input signal crest factor can be up to 3 at full scale up to 500 V, decreasing linearly to crest factor ≤ 1.5 at 1000 V. For non-sinusoidal waveforms add $\pm (2 \% \text{ reading} + 2 \% \text{ FS})$ typical, for a crest factor up to 3.

Input impedance: 10 M Ω (nominal), < 100 pF, ac-coupled

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

Overload protection: 1000 V rms or dc, 10⁷ V Hz Max

DC voltage measurement

| Range | Resolution | Accuracy 1587 ¹ | Accuracy 1577 ¹ |
|------------|------------|----------------------------|----------------------------|
| 6.000 V dc | 0.001 V | 0.09 % + 2 | 0.2 % + 2 |
| 60.00 V dc | 0.01 V | 0.09 % + 2 | 0.2 % + 2 |
| 600.0 V dc | 0.1 V | 0.09 % + 2 | 0.2 % + 2 |
| 1000 V dc | 1 V | 0.09 % + 2 | 0.2 % + 2 |

¹Accuracies apply to ± 100 % of range

Input impedance: 10 M Ω (nominal), < 100 pF

Normal mode rejection ratio: > 60 dB @ 50 Hz or 60 Hz

Common mode rejection ratio: > 120 dB @ dc, 50 Hz or 60 Hz (1 k unbalance)

Overload protection: 1000 V rms or dc

DC millivolts measurement

| Range | Resolution | Accuracy 1587 | Accuracy 1577 |
|-------------|------------|---------------|---------------|
| 600.0 mV dc | 0.1 mV | 0.1 % + 1 | 0.2 % + 1 |

DC and ac current measurement

| Range | | Resolution | Accuracy 1587 ± (% of Rdg+Digits) | Accuracy 1577 ± (% of Rdg+Digits) | Burden Voltage (Typical) |
|-------|---------------|------------|--------------------------------------|--------------------------------------|-----------------------------|
| AC | 400 mA | 0.1 mA | ± (1.5 % + 2) ¹ | ± (2 % + 2) ¹ | 2 mV/mA |
| | 45 to 1000 Hz | 60 mA | 0.01 mA | ± (1.5 % + 2) ¹ | |
| DC | 400 mA | 0.1 mA | ± (0.2 % + 2) | ± (1.0 % + 2) | 2 mV/mA |
| | 60 mA | 0.01 mA | ± (0.2 % + 2) | ± (1.0 % + 2) | |

¹1 kHz bandwidth

Overload: 600 mA for 2 minutes maximum

Overload protection: 440 mA, 1000 V, FAST fuse

AC conversion: Inputs are ac-coupled and calibrated to the rms value of sine wave input. Conversions are true-rms responding and specified from 5 % to 100 % of range. Input signal crest factor can be up to 3 at full scale up to 300 mA, decreasing linearly to crest factor <= 1.5 at 600 mA. For non-sinusoidal waveforms add + (2 % reading + 2 % FS) typical, for a crest factor up to 3.

Ohms measurement

| Range | Resolution | Accuracy 1587 ¹ ± (% of Rdg+Digits) | Accuracy 1577 ¹ ± (% of Rdg+Digits) |
|----------|------------|---|---|
| 600.0 Ω | 0.1 Ω | 0.9 % + 2 | 1.2 % + 2 |
| 6.000 kΩ | 0.001 kΩ | | |
| 60.00 kΩ | 0.01 kΩ | | |
| 600.0 kΩ | 0.1 kΩ | | |
| 6.000 MΩ | 0.001 MΩ | 1.5 % + 3 | 2.0 % + 3 |
| 50.0 MΩ | 0.01 MΩ | | |

¹Accuracies apply from 0 to 100 % of range

Overload protection: 1000 V rms or dc

Open circuit test voltage: < 8.0 V dc

Short circuit current: < 1.1 mA

Diode test (1587 Only)

Diode test indication: Display voltage drop: 0.6 V at 1.0 mA nominal test current

Accuracy: + (2 % + 1)

Continuity test

Continuity indication: Continuous audible tone for test resistance below 25 Ω and off above 100 Ω.

Maximum reading; 1000 Ω

Open circuit voltage: < 8.0 V

Short circuit current: 1.0 mA typical

Overload protection: 1000 V rms

Response time: > 1 m sec

Frequency measurement (1587 only)

| Range | Resolution | Accuracy ± (% of Rdg+Digits) |
|-----------|------------|---------------------------------|
| 99.99 Hz | 0.01 Hz | ± (0.1 % + 1) |
| 999.9 Hz | 0.1 Hz | ± (0.1 % + 1) |
| 9.999 kHz | 0.001 kHz | ± (0.1 % + 1) |
| 99.99 kHz | 0.01 kHz | ± (0.1 % + 1) |

1587/1577 Specifications cont.

Frequency counter sensitivity

| Input Range | V ac Sensitivity (RMS Sinewave) ¹ | | DC Trigger Levels to 20 kHz ² |
|-------------|--|-------------------|--|
| | 5 Hz to 20 kHz | 20 kHz to 100 kHz | |
| 600.0 mV ac | 150.0 mV | 150.0 mV | N/A |
| 6.0 V | 0.3 V | 0.7 V | -400.0 mV and 2.5 V |
| 60.0 V | 3.0 V | 10.0 V | 1.5 V and 4.0 V |
| 600.0 V | 35.0 V | 100.0 V | 15.0 V and 40.0 V |
| 1000.0 V | 200.0 V | 700.0 V | 15.0 V and 40.0 V |

¹Maximum input for specified accuracy = 10x range (1000 V max). Noise at low frequencies and amplitudes may affect accuracy.

²Usable to 100 kHz with full scale input.

Capacitance (1587 only)

| Range | Resolution | ± (% of Rdg+Digits) |
|----------|------------|-------------------------|
| 1000 nF | 1 nF | ± (1.2 % + 2) |
| 10.00 µF | 0.01 µF | |
| 100.0 µF | 0.1 µF | |
| 9999 µF | 1 µF | ± (1.2 % +/- 90 counts) |

Temperature measurement (1587 only)

| Range | Resolution | Accuracy ¹ |
|------------------|------------|-----------------------|
| -40 °C to 537 °C | 0.1 °C | 1 % + 10 counts |
| -40 °F to 998 °F | 0.1 °F | 1 % + 18 counts |

¹Accuracies apply following 90 minutes settling time after a change in the ambient temperature of the instrument

Insulation specifications

Measurement range: 1587: 0.01 MΩ to 2 GΩ , 1577: 0.1 MΩ to 600 MΩ

Test voltages: 50, 100, 250, 500, 1000 V model 1587, 500 and 1000 V model 1577

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



Model 1587

| Output Voltage | Display Range | Resolution | Test Current | Resistance Accuracy |
|---------------------------|-----------------|------------|---------------|---------------------|
| 50 V (0 % to + 20 %) | 0.01 to 6.00 MΩ | 0.01 MΩ | 1 mA @ 50 kΩ | 3 % + 5 counts |
| | 6.0 to 50.0 MΩ | 0.1 MΩ | | |
| 100 V (0 % to + 20 %) | 0.01 to 6.00 MΩ | 0.01 MΩ | 1 mA @ 100 kΩ | 3 % + 5 counts |
| | 6.0 to 60.0 MΩ | 0.1 MΩ | | |
| | 60 to 100 MΩ | 1 MΩ | | |
| 250 V (0 % to + 20 %) | 0.1 to 60.0 MΩ | 0.1 MΩ | 1 mA @ 250 kΩ | 1.5 % + 5 counts |
| | 60 to 250 MΩ | 1 MΩ | | |
| 500 V (0 % to + 20 %) | 0.1 to 60.0 MΩ | 0.1 MΩ | 1 mA @ 500 kΩ | 1.5 % + 5 counts |
| | 60 to 500 MΩ | 1 MΩ | | |
| 1000 V (0 % to + 20 %) | 0.1 to 60.0 MΩ | 0.1 MΩ | 1 mA @ 1 MΩ | 1.5 % + 5 counts |
| | 60 to 600 MΩ | 1 MΩ | | 10 % + 3 counts |
| | 0.6 to 2.0 GΩ | 100 MΩ | | |

Model 1577

| Output Voltage | Display Range | Resolution | Test Current | Resistance Accuracy |
|---------------------------|----------------|------------|---------------|---------------------|
| 500 V (0 % to + 20 %) | 0.1 to 60.0 MΩ | 0.1 MΩ | 1 mA @ 500 kΩ | 2.0 % + 5 counts |
| | 60 to 500 MΩ | 1 MΩ | | |
| 1000 V (0 % to + 20 %) | 0.1 to 60.0 MΩ | 0.1 MΩ | 1 mA @ 1 MΩ | 2.0 % + 5 counts |
| | 60 to 600 MΩ | 1 MΩ | | |

1587/1577 General Specifications

Maximum voltage applied to any terminal: 1000 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, non-condensing: < °C

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 except in temperature: specified accuracy ± 5 °C (9 °F). (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 CAT III 1000 V and CAT IV 600 V

Certifications: CSA per standard CSA/CAN C22.2

No. 61010.1-04; TUV per standard EN 61010 Part 1-1002

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

Battery life: Meter use 1000 hours; Insulation test use: Meter 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

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 III 1000 V, CAT IV 600 V; 3000 m CAT II 1000 V, CAT III 600 V

Storage: 12,000 m

Over-range capability: 110 % of range except for capacitance which is 1 %

Compliance to EN 61557: IEC61557-1, IEC61557-2

Comparison Chart

| | 1587 | 1577 |
|--|------|------|
| Insulation test voltages 50 V, 100 V, 250 V, 500 V, 1000 V | • | |
| Insulation test voltages 500 V, 1000 V | | • |
| Insulation test: 0.01 MΩ to 2.0 GΩ | • | |
| Insulation test: 0.1 MΩ to 600 MΩ | | • |
| Auto-discharge of capacitive voltage | • | • |
| Insulation test smoothing reading | • | |
| Frequency | • | |
| Capacitance | • | |
| Diode test | • | |
| Temperature | • | |
| Min/Max | • | |
| Low pass filter (for work on VSDs) | • | |
| AC/DC Voltage | • | • |
| DC Millivolts | • | • |
| AC/DC milliAmps | • | • |
| Resistance (0.1 Ω to 50 MΩ) | • | • |
| Continuity | • | • |
| Three-year warranty | • | • |
| Remote probe, test leads, alligator clips | • | • |
| K-type thermocouple | • | |
| Rugged, utility hard case | • | • |
| Auto power off | • | • |

Ordering Information

Fluke-1577 Insulation Multimeter
Fluke-1587 Insulation Multimeter

Included
 Remote probe, test leads, alligator clips, K-type thermocouple (1587 only), hard case, user documentation

Optional accessories

TPAK Magnetic Tool Hanger
i400s Clamp with Adapter
C25 Soft Case



Fluke. Keeping your world up and running.

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For additional accessories for these products, see the Top 10 Accessories for Insulation Multimeters at www.fluke.com/top10 or ask for Fluke literature code 2427793.

