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FLUKE®

# 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
- Three-year warranty

1000 V CAT III
600 V CAT IV

True RMS

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# 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 ± (% of Rdg + Digits)** | **60 Hz to 400 Hz ± (% of Rdg + Digits)** |
| 600.0 mV | 0.1 mV | ± (1 % + 3) | + (2 % + 3) – (6 % – 3) |
| 6.000 V | 0.001 V | ± (1 % + 3) | + (2 % + 3) – (6 % – 3) |
| 60.00 V | 0.01 V | ± (1 % + 3) | + (2 % + 3) – (6 % – 3) |
| 600.0 V | 0.1 V | ± (1 % + 3) | + (2 % + 3) – (6 % – 3) |
| 1000 V | 1 V | ± (2 % + 3) | + (2 % + 3) – (6 % – 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 up to 500 V, decreasing linearly to crest factor <= 1.5 at 1000 V. For non-sinusoidal waveforms add ± (2 % reading + 2 % FS) typical, for a crest factor up to 3.
**Input impedance:** 10 MΩ (nominal), < 100 pF, ac-coupled
**Common mode rejection ratio (1 kΩ unbalanced):** > 60 dB at dc, 50 or 60 Hz
**Overload protection:** 1000 V rms or dc, $10^7$ 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) |
| [1]Accuracies apply to ± 100 % of range | | | |

**Input impedance:** 10 MΩ (nominal), < 100 pF
**Normal mode rejection ratio:** > 60 dB @ 50 Hz or 60 Hz
**Common rode rejection ratio:** > 120 dB @ dc, 50 Hz or 60 Hz (1 kΩ unbalance)
**Overload protection:** 1000 V rms or dc



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## 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] | ± (2 % + 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) | |
| [1]1 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 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 | | |
| 50.0 MΩ[2] | 0.01 MΩ | ± (1.5 % + 3) | ± (2.0 % + 3) |
| [1]Accuracies apply from 0 to 100 % of range<br>[2]Up to 80 % relative humidity | | | |

**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 % + 3)

**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) |



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## 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 | 100.0 mV | 150.0 mV | N/A |
| 6.0 V | 1.0 V | 1.5 V | -400.0 mV and 2.5 V |
| 60.0 V | 10.0 V | 36.0 V | 1.2 V and 4.0 V |
| 600.0 V | 100.0 V | — | 12.0 V and 40.0 V |
| 1000.0 V | 300.0 V | — | 12.0 V and 40.0 V |

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

[1]Accuracies 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 |





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## 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 | | |
| | 0.6 to 2.0 GΩ | 100 MΩ | | ± (10 % + 3 counts) |

## 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 | | |

## 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<br>0 % to 95 % @ 10 °C to 30 °C (50 °F to 86 °F)<br>0 % to 75 % @ 30 °C to 40 °C (86 °F to 104 °F)<br>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: accuracy = 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 |



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## 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

**Includes:** Remote probe, test leads, alligator clips, K-type thermocouple (1587 only), hard case, user documentation.

### Optional accessories

**TPAK** Magnetic Tool Hanger
**i400** Clamp with Adapter
**C25** Soft Case







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