FLUKE®

106/107

Digital Multimeters

Users Manual

June 2013, Rev. 1, 10/15

LIMITED WARRANTY AND LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for one year from the date of purchase. This warranty does not cover fuses, disposable batteries, or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

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Introduction

The Fluke 106 and 107 Digital Multimeters (the Product) are 6000-count instruments.

The Product is battery powered with a digital display.

Except where noted, the descriptions and instructions in this Users Manual apply to both the 106 and 107.

Unless otherwise identified, all illustrations show the 107.

How to Contact Fluke

To contact Fluke, call one of the following telephone numbers:

- Technical Support USA: 1-800-44-FLUKE (1-800-443-5853)
- Calibration/Repair USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31-402-675-200
- Japan: +81-3-6714-3114

Safety Information

A **Warning** identifies conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that could cause damage to the Product or the equipment under test.

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury:

- **Carefully read all instructions.**
- **Read all safety information before you use the Product.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**
- **Do not use the Product around explosive gas, vapor, or in damp or wet environments.**
- **Do not use the Product if it is damaged.**
- **Disable the Product if it is damaged.**
- **Do not use the Product if it operates incorrectly.**
- **Examine the case before you use the Product. Look for cracks or missing plastic. Carefully look at the insulation around the terminals.**
- **Use only correct measurement category (CAT), voltage, and amperage rated probes, test leads, and adapters for the measurement.**
- **Measure a known voltage first to make sure that the Product operates correctly.**

- **Do not use test leads if they are damaged. Examine the test leads for damaged insulation and measure a known voltage.**
- **Do not apply more than the rated voltage, between the terminals or between each terminal and earth ground.**
- **Do not use the HOLD function to measure unknown potentials. When HOLD is turned on, the display does not change when a different potential is measured.**
- **Do not touch voltages >30 V ac rms, 42 V ac peak, or 60 V dc.**
- **Keep fingers behind the finger guards on the probes.**
- **Remove all probes, test leads, and accessories before the battery door is opened.**
- **Do not exceed the Measurement Category (CAT) rating of the lowest rated individual component of a Product, probe, or accessory.**
- **Remove the input signals before you clean the Product.**
- **Have an approved technician repair the Product.**
- **Remove the batteries if the Product is not used for an extended period of time, or if stored in temperatures above 50 °C. If the batteries are not removed, battery leakage can damage the Product.**

- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**
- **Use only specified replacement parts.**
- **Use only specified replacement fuses.**
- **Limit operation to the specified measurement category, voltage, or amperage ratings.**
- **Do not use test leads if they are damaged. Examine the test leads for damaged insulation and measure a known voltage.**
- **Do not use in CAT III or CAT IV environments without the protective cap installed. The protective cap decreases the exposed probe metal to <4 mm. This decreases the possibility of arc flash from short circuits.**

Table 1 is a list of the symbols used on the Product and in this manual.

Table 1. Symbols

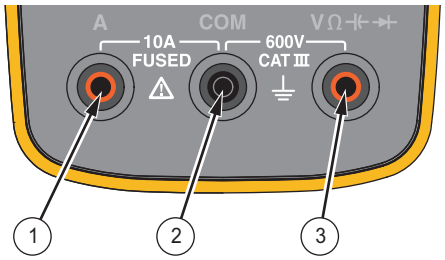
	Consult user documentation.		WARNING. RISK OF DANGER.
	Static awareness. Static discharge can damage part(s).		WARNING. HAZARDOUS VOLTAGE. Risk of electric shock.
~	AC (Alternating Current)	⏚	Earth
⎓	DC (Direct Current)		Capacitance
≂	Both direct and alternating current		Diode
	Battery		Fuse
	Conforms to relevant South Korean EMC Standards		Certified by TÜV SÜD Product Service.
CE	Conforms to European Union directives.		Certified by CSA Group to North American safety standards.

Table 1. Symbols (cont.)

CAT II	Measurement Category II is applicable to test and measuring circuits connected directly to utilization points (socket outlets and similar points) of the low-voltage MAINS installation.
CAT III	Measurement Category III is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.
CAT IV	Measurement Category IV is applicable to test and measuring circuits connected at the source of the building's low-voltage MAINS installation.
	This product complies with the WEEE Directive marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 "Monitoring and Control Instrumentation" product. Do not dispose of this product as unsorted municipal waste.

Instrument Overview

Terminals



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Item	Description
①	Input terminal for ac and dc current measurements to 10 A and current frequency (107 only) measurements.
②	Common (return) terminal for all measurements.
③	Input terminal for voltage, resistance, continuity, diode (107 only), capacitance, and frequency (107 only) measurements.

Display

Figure 1 and Table 2 show the items on the Product display.

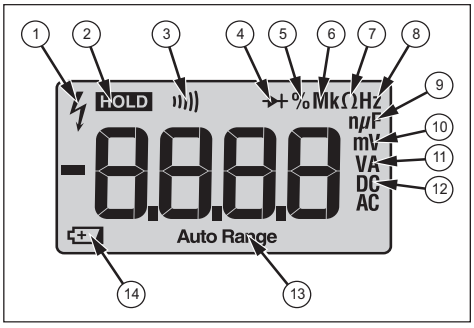

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Figure 1. Display

Table 2. Display

Item	Description	Item	Description
①	High voltage	⑧	Frequency is selected
②	Display Hold is enabled	⑨	Farads
③	Continuity selected	⑩	Millivolts
④	Diode test is selected	⑪	Amps or volts
⑤	Duty Cycle is selected	⑫	Dc or ac voltage or current
⑥	Decimal prefix	⑬	Auto Range mode is enabled
⑦	Ohms is selected	⑭	Low battery. Replace battery.

Auto Power Off

The Product automatically powers off after 20 minutes of inactivity.

To restart the Product, turn the rotary switch back to the **OFF** position and then to a necessary position.

To disable the Auto Power Off function, hold down the **YELLOW** button when turning on the Product, until PoFF shows on the display.

Auto Backlight Off

The backlight automatically turns off after 2 minutes of inactivity.

To disable the Auto Backlight Off function, hold down ☼ when turning on the Product, until LoFF shows on the display.

Note

To disable both the Auto Power Off function and the Auto Backlight Off function, hold down the **YELLOW** *button and ☼ at the same time, until both* PoFF *and* LoFF *show on the display.*

Measurements

Data Hold

⚠⚠ Warning

To prevent possible electrical shock, fire or personal injury, do not use the HOLD function to measure unknown potentials. When HOLD is turned on, the display does not change when a different potential is measured.

To hold the present reading, push HOLD. Push HOLD again to continue normal operation.

Measure AC and DC Voltage

To measure ac and dc voltage:

1. Choose ac or dc by turning the rotary switch to $\tilde{V}$ or $\overline{\tilde{V}}$.
2. Connect the red test lead to the **V Ω ⊣⊢ →⊢** terminal and the black test lead to the **COM** terminal.
3. Measure the voltage by touching the probes to the correct test points of the circuit.
4. Read the measured voltage on the display.

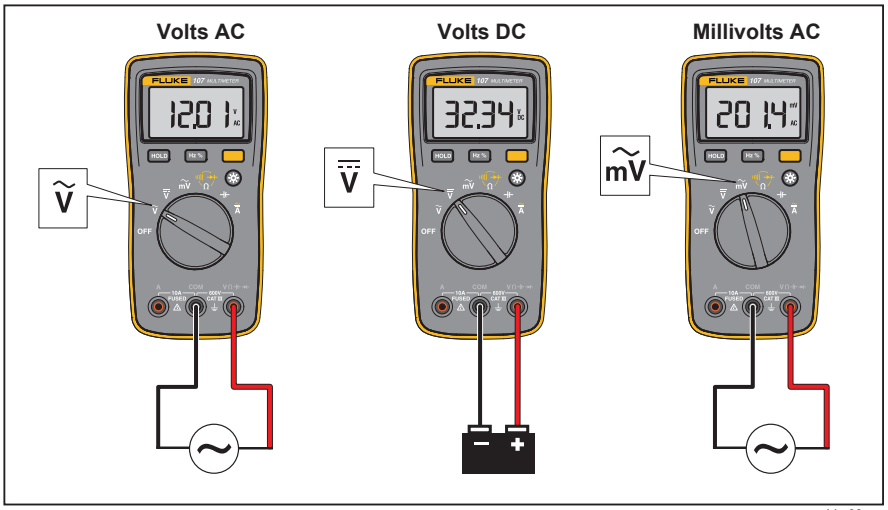

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Figure 2. Measure AC and DC Voltage

Measure AC or DC Current

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, remove circuit power before you connect the Product in the circuit when you measure current. Connect the Product in series with the circuit.

1. Turn the rotary switch to ⎓̃ A.
2. Push the **YELLOW** button to toggle between ac or dc current measurement.
3. Connect the red test lead to the **A** terminal to be measured and connect the black test lead to the **COM** terminal.
4. Break the circuit path to be measured.
5. Connect the test leads across the break and apply power.
6. Read the measured current on the display.

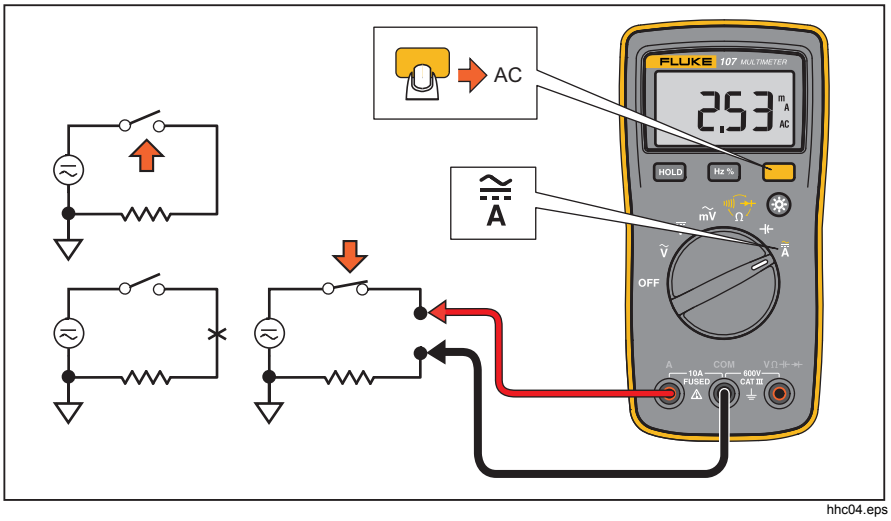

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Figure 3. Measure AC and DC Current

Measure Resistance

1. Turn the rotary switch to Ω (106 does not have ⊣►). Make sure power is disconnected from the circuit to be measured.
2. Connect the red test lead to the **V Ω ⊣⊢ ⊣►** terminal and the black test lead to the **COM** terminal.
3. Measure the resistance by touching the probes to the desired test points of the circuit.
4. Read the measured resistance on the display.

Test for Continuity

With the resistance mode selected, push the **YELLOW** button once to activate the continuity mode. If the resistance is <70 Ω, the beeper sounds continuously, designating a short circuit. If the Product reads OL, the circuit is open.

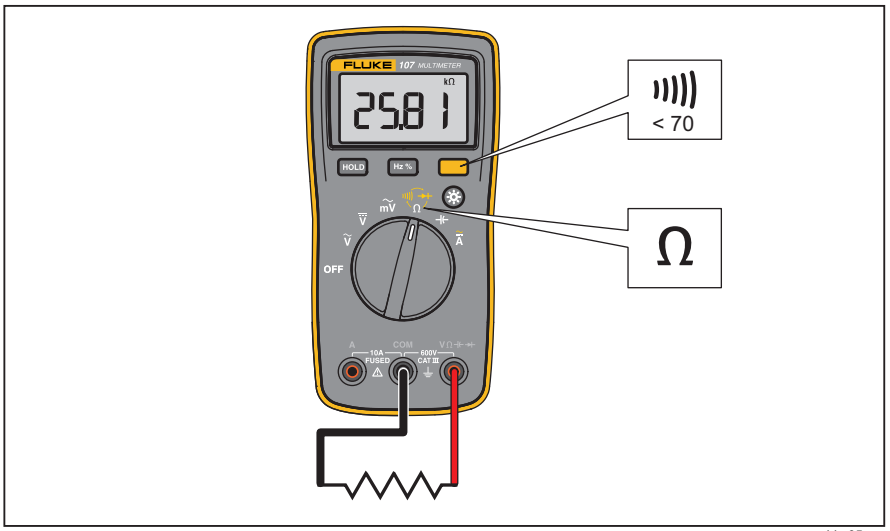

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Figure 4. Measure Resistance/Continuity

Test Diodes (107 Only)

1. Turn the rotary switch to .
2. Push the **YELLOW** button twice to activate the diode test mode.
3. Connect the red test lead to the **V Ω** terminal and the black test lead to the **COM** terminal.
4. Connect the red probe to the anode and the black test lead to the cathode of the diode being tested.
5. Read the forward bias voltage value on the display.
6. If the polarity of the test leads is reversed with diode polarity, the display reading shows OL. This can be used to distinguish the anode and cathode sides of a diode.

Measure Capacitance

1. Turn the rotary switch to ⊣⊢.
2. Connect the red test lead to the **V Ω ⊣⊢ →⊢** terminal and the black test lead to the **COM** terminal.
3. Touch the probes to the capacitor leads.
4. Let the reading stabilize (up to 18 seconds).
5. Read the capacitance value on the display.

Measure Frequency and Duty Cycle (107 Only)

The Product can measure frequency or duty cycle while making either an ac voltage or an ac current measurement.

1. Push Hz % to change the Product to frequency or duty cycle.
2. When the Product is in the required function (ac voltage or ac current), push Hz %.
3. Read the frequency on the display.
4. To make a duty cycle measurement, push Hz % again.
5. Read the percent of duty cycle on the display.

Maintenance

Beyond replacing the batteries and fuse, do not attempt to repair or service the Product unless you are qualified to do so and have the relevant calibration, performance test, and service instructions. The recommended calibration cycle is 12 months.

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury:

- **Remove the input signals before you clean the Product.**
- **Use only specified replacement parts.**
- **Use only specified replacement fuses.**
- **Have an approved technician repair the Product.**

For safe operation and maintenance of the Product, repair the Product before use if the batteries leak.

General Maintenance

Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Dirt or moisture in the terminals can affect readings.

To clean the terminals:

1. Turn the Product off and remove the test leads.
2. Shake out any dirt that may be in the terminals.
3. Soak a new swab with isopropyl alcohol and work around the inside of each input terminal.
4. Use a new swab to apply a light coat of fine machine oil to the inside of each terminal.

Test the Fuse

1. Turn the rotary switch to Ω (106 does not have ⇥).
2. Plug a test lead into the **V** Ω ⊣⊢ ⇥ terminal and touch the probe to the **A** terminal.
   - A good **A** terminal fuse is indicated by a reading less than 0.1 Ω.
   - If the display reads OL, replace the fuse and test again.
   - If the display shows any other value, have the Product serviced. See *Service and Parts*.

Replace Batteries and the Fuse

To replace the batteries or the fuse, see Figure 5.

⚠ Caution

Be sure to observe Electro Static Discharge precautions.

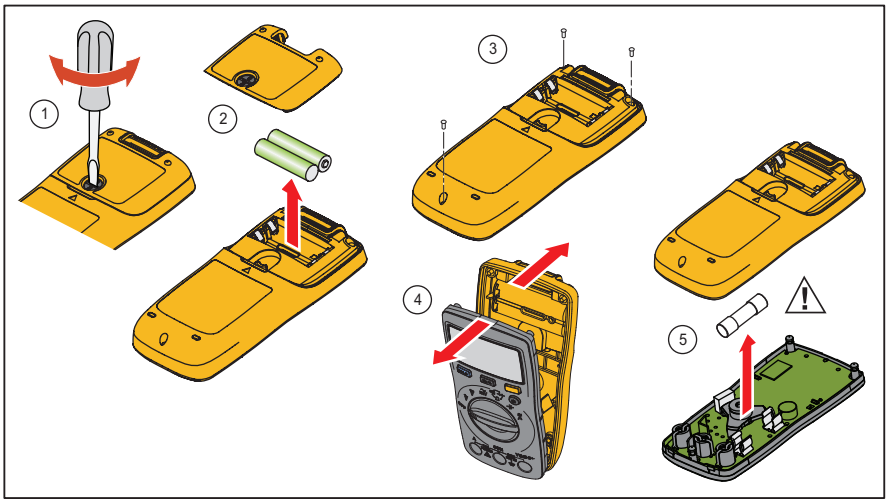

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Figure 5. Replace Batteries and the Fuse

Service and Parts

If the Product fails, first check the batteries and fuse. Then, review this manual to make sure you are operating the Product correctly.

Replacement parts are:

Item	Fluke Part Number
Batteries	2838018
Battery door	4319659
Test leads TL175	4306653
Fuse	803293
Screws	4320657

General Specifications

Maximum voltage between any terminal and Earth Ground	600 V
Fuse protection for A input	11 A, 1000 V, IR 17 kA
Display (LCD)	6000 counts, updates 3/sec
Battery Type	2 AAA, NEDA 24A, IEC LR03
Battery Life	200 hours minimum
Temperature	
Operating	0 °C to 40 °C
Storage	-30 °C to 60 °C
Relative Humidity	
Operating Humidity	Non-condensing when <10 °C; ≤90 % at 10 °C to 30 °C; ≤75 % at 30 °C to 40 °C
Operating Humidity, 40 MΩ Range	≤80 % at 10 °C to 30 °C; ≤70 % at 30 °C to 40 °C
Altitude	
Operating	2000 m
Storage	12,000 m

Temperature Coefficient	0.1 X (specified accuracy) / °C (<18 °C or >28 °C)
Size (HxWxL)	142 mm x 69 mm x 28 mm
Weight	200 g
IP Rating	IEC 60529: IP 40
Safety	
General	IEC 61010-1: Pollution Degree 2
Measurement	IEC 61010-2-033: CAT III 600 V
Electromagnetic Compatibility (EMC)	
International	IEC 61326-1: Portable, IEC 61326-2-2 CISPR 11: Group 1, Class A

Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself.

Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted and radiated disturbances.

Emissions that exceed the levels required by CISPR 11 can occur when the equipment is connected to a test object. The equipment may not meet the immunity requirements of this standard when test leads and/or test probes are connected.

Korea (KCC) ..... Class A Equipment (Industrial Broadcasting & Communication Equipment)

Class A: Equipment meets requirements for industrial electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.

USA (FCC) ..... 47 CFR 15 subpart B. This product is considered an exempt device per clause 15.103.

Accuracy Specifications

Accuracy is specified for 1 year after calibration, at operating temperatures of 18 °C to 28 °C, relative humidity at 0 % to 75 %. Accuracy specifications take the form of: ±([% of Reading] + [Number of Least Significant Digits]).

Function	Range	Resolution	Accuracy	
			106	107
AC Volts (40 Hz to 500 Hz) [1]	6.000 V 60.00 V 600.0 V	0.001 V 0.01 V 0.1 V	1.0 % + 3	1.0 % + 3
DC Volts	6.000 V 60.00 V 600.0 V	0.001 V 0.01 V 0.1 V	0.5 % + 3	0.5 % + 3
AC Millivolts	600.0 mV	0.1 mV	3.0 % + 3	3.0 % + 3
Diode Test [2]	2.000 V	0.001 V	N/A	10 %

[1] All AC, Hz, and duty cycle are specified from 1 % to 100 % of range. Inputs below 1 % of range are not specified.
[2] Typically, open circuit test voltage is 2.0 V and short circuit current is <0.6 mA.

Function	Range	Resolution	Accuracy	
			106	107
Resistance Ω	400.0 Ω 4.000 kΩ 40.00 kΩ 400.0 kΩ 4.000 MΩ 40.00 MΩ	0.1 Ω 0.001 kΩ 0.01 kΩ 0.1 kΩ 0.001 MΩ 0.01 MΩ	0.5 % + 3 0.5 % + 2 0.5 % + 2 0.5 % + 2 0.5 % + 2 1.5 % + 3	0.5 % + 3 0.5 % + 2 0.5 % + 2 0.5 % + 2 0.5 % + 2 1.5 % + 3
Capacitance [1] ⊣⊢	50.00 nF 500.0 nF 5.000 µF 50.00 µF 500.0 µF 1000 µF	0.01 nF 0.1 nF 0.001 µF 0.01 µF 0.1 µF 1 µF	2 % + 5 2 % + 5 5 % + 5 5 % + 5 5 % + 5 5 % + 5	2 % + 5 2 % + 5 5 % + 5 5 % + 5 5 % + 5 5 % + 5

Function	Range	Resolution	Accuracy	
			106	**107**
Frequency [2] **Hz** (10 Hz to 100 kHz)	50.00 Hz 500.0 Hz 5.000 kHz 50.00 kHz 100.0 kHz	0.01 Hz 0.1 Hz 0.001 kHz 0.01 kHz 0.1 kHz	NA	0.1 % + 3
Duty Cycle [2]	1 % to 99 %	0.1 %	NA	1 % typical [3]

[1] Specifications do not include errors due to test lead capacitance and capacitance floor (may be up to 1.5 nF in the 50 nF range).

[2] All AC, Hz, and duty cycle readings are specified from 1 % to 100 % of range. Inputs below 1 % of range are not specified.

[3] Typical means when the frequency is at 50 Hz or 60 Hz and the duty cycle is between 10 % and 90 %.

Function	Range	Resolution	Accuracy	
			106	107
AC Current (40 Hz to 200 Hz) $\widetilde{A}$ [1]	4.000 A 10.00 A	0.001 A 0.01 A	1.5 % + 3	1.5 % + 3
DC Current $\overline{\overline{A}}$ [1]	4.000 A 10.00 A	0.001 A 0.01 A	1.5 % + 3	1.5 % + 3
[1] 10 A duty cycle <7 minutes on, 20 minutes off, 25 °C to 40 °C.				

Function	Overload Protection	Input Impedance (Nominal)	Common Mode Rejection Ratio	Normal Mode Rejection Ratio
AC Volts	600 V [1]	>10 MΩ <100 pF [2]	>60 dB at dc, 50 Hz or 60 Hz	–
AC Millivolts	600 mV	>1 M, <100 pF	>80 dB at dc, 50 Hz or 60 Hz	–
DC Volts	600 V [1]	>10 MΩ <100 pF	>100 dB at 50 Hz or 60 Hz	>60 dB at 50 Hz or 60 Hz

[1] 6×10^5 V Hz Max.
[2] For mV (AC), input impedance is approximately 1 MΩ.