

**FLUKE®**

# 106 & 107

Digital Multimeters

**Users Manual**

PN 4343876

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## **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.

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## ***Introduction***

The Fluke 106 and 107 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.

## ***Safety Information***

The Fluke 106 and 107 comply with IEC 61010-1 CAT III 600 V overvoltage standard. See Specifications.

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.

International electrical symbols used on the Product and in this manual are explained in Table 1.

## **Safe Working Practices**

Review the safety information and comply with the safe working practices.

### **⚠️⚠️ 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 and 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.**
- **Limit operation to the specified measurement category, voltage, or amperage ratings.**
- **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.**
- **Do not use test leads if they are damaged. Examine the test leads for damaged insulation and measure a known voltage.**






- **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.**
- **Use only specified replacement parts.**
- **Use only specified replacement fuses.**
- **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.**

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



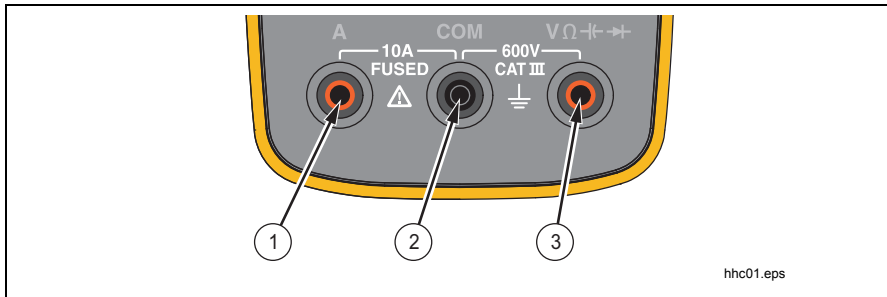
**Table 1. International Electrical Symbols**

	AC (Alternating Current)		Earth Ground
	DC (Direct Current)		Fuse
	AC or DC		Capacitance
	Risk of Danger. Important information. See Manual.		Diode
	Battery	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.

	<p>Conforms to relevant North American Safety Standards.</p>		<p>Conforms to European Union directives.</p>
	<p>Conforms to relevant South Korean EMC Standards.</p>		<p>Inspected and licensed by TÜV Product Services.</p>
	<p>This product complies with the WEEE Directive (2002/96/EC) 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. Go to Fluke's website for recycling information.</p>		

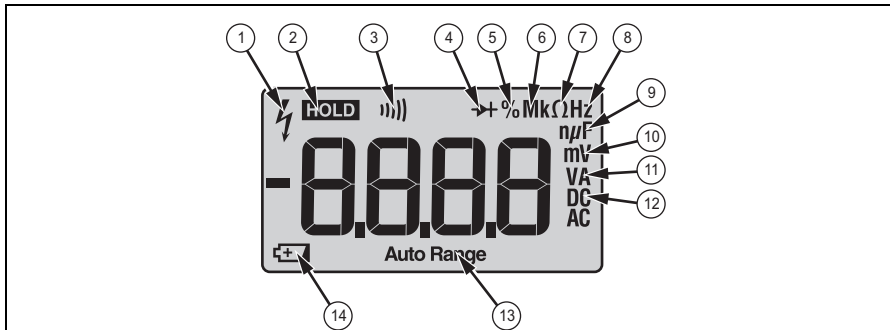
## Instrument Overview

### Terminals



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



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Item	Description	Item	Description
1	High voltage	8	Hz – Frequency is selected
2	Display Hold is enabled	9	F – Farads for capacitance
3	Continuity selected	10	mV – millivolts
4	Diode test is selected	11	A, V – amps or volts
5	Duty Cycle is selected	12	DC, AC – dc or ac voltage or current
6	M, k – decimal prefix	13	Auto Range mode is enabled
7	$\Omega$ – Ohms is selected	14	Battery is low and should be changed

### **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 **Shift** key when turning on the Product, until PoFF shows on the display.

### **Auto Backlight Off**

The backlight automatically turns off after 2 minutes' inactivity.

To disable the Auto Backlight Off function, hold down the ☼ key 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, you can also hold down the **Shift** key and the ☼ key at the same time, until both PoFF and LoFF show on the display.*

## Measurements

### Data Hold


#### Warning

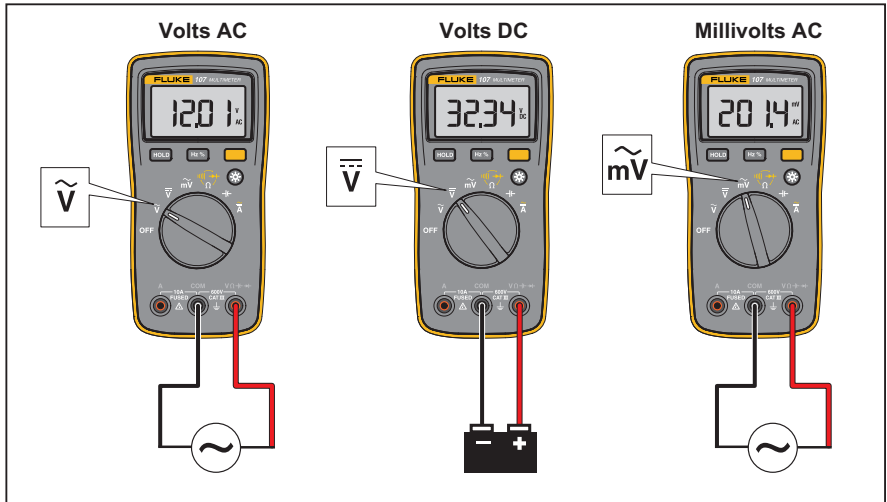
To prevent possible electrical shock, fire or personal injury, do not use the HOLD function to measure unknown potentials. When HOLD is turned on, the display does not change when a different potential is measured.

To hold the present reading, push . Push  again to resume 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  $\bar{v}$ .
2. Connect the red test lead to the  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 1. Measure AC and DC Voltage

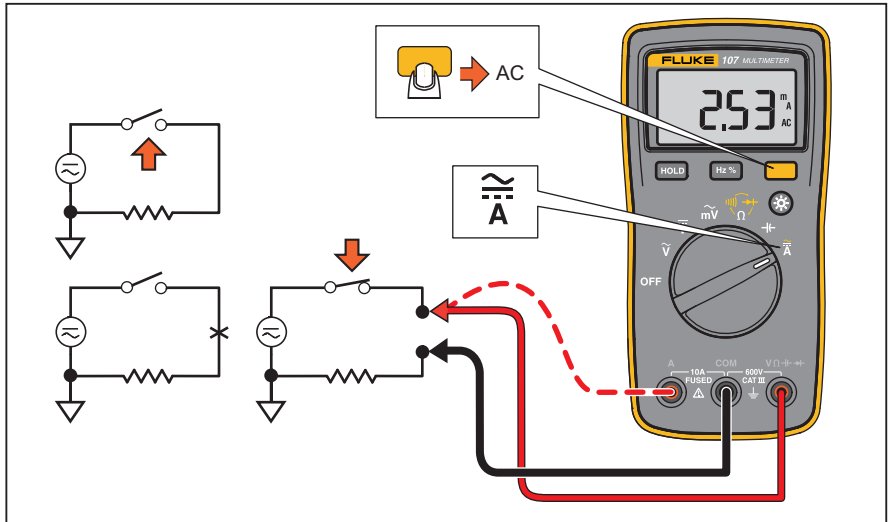
### Measure AC or DC Current

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







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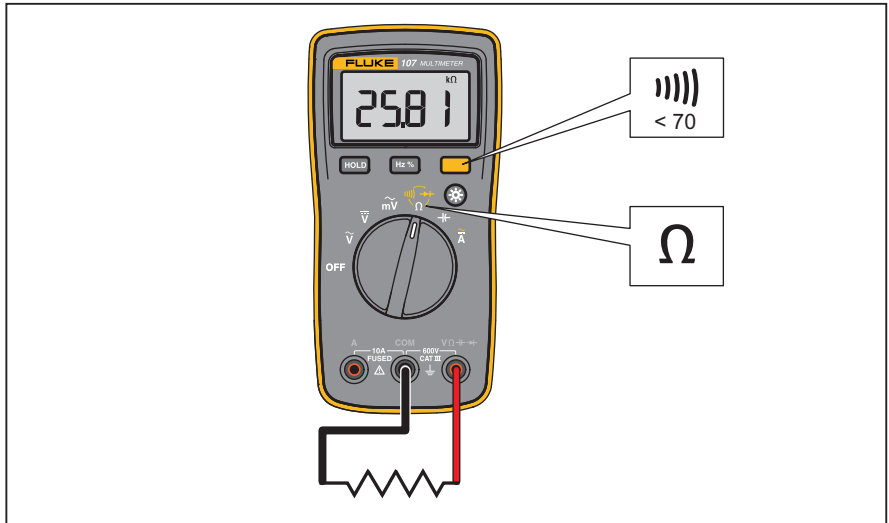
Figure 2. Measure AC and DC Current

**Measure Resistance**

1. Turn the rotary switch to  (106 does not have the diode symbol). Make sure power is disconnected from the circuit to be measured.
2. Connect the red test lead to the  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 beeper. If the resistance is  $<70 \Omega$ , the beeper will sound continuously, designating a short circuit. If the Product reads  $\infty$ , the circuit is open.




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Figure 3. Measure Resistance/Continuity


**Test Diodes (107 Only)**



1. Turn the rotary switch to  $\overrightarrow{\text{V}\Omega}$ .
2. Push the YELLOW function button twice to activate Diode Test.
3. Connect the red test lead to the  $\overrightarrow{\text{V}\Omega}$  terminal and the black test lead to the **COM** terminal.
4. Connect the red probe to the anode side and the black test lead to the cathode side 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  $\square\text{L}$ . 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  $\overset{V\Omega}{\rightarrow} \text{---} \text{---}$  terminal and the black test lead to the **COM** terminal.
3. Touch the probes to the capacitor leads.
4. After allowing the reading to stabilize (up to 18 seconds), 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. Push the  button to change the Product to frequency or duty cycle.

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

## **Maintenance**

Beyond replacing batteries and the fuse, do not attempt to repair or service your Meter 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.

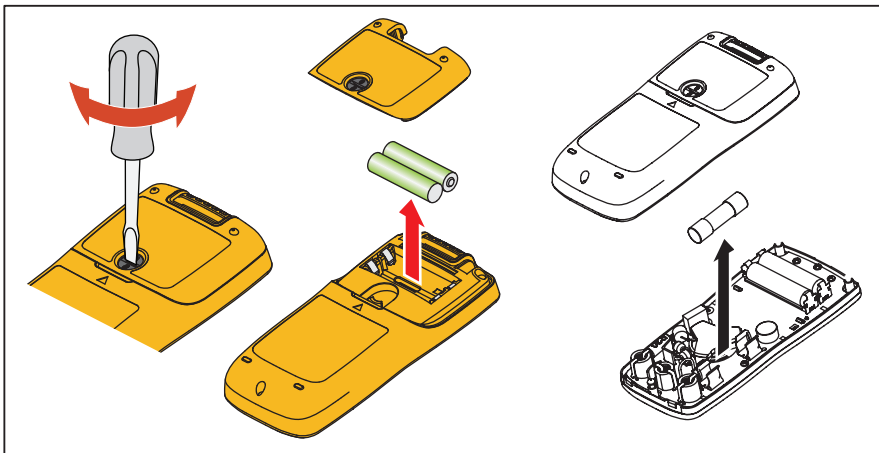
**Test the Fuse**

1. Turn the rotary switch to  $\overrightarrow{\Omega}$  (106 does not have the diode symbol).
2. Plug a test lead into the  $\overrightarrow{V\Omega}$  terminal and touch the probe to the **A** terminal.
  - A good **A** terminal fuse is indicated by a reading less than 0.1  $\Omega$ .
  - If the display reads  $\Omega L$ , 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 4.



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**Figure 4. 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 that you are operating the Product correctly.

Replacement parts are listed below.

<b>No.</b>	<b>Item Description</b>
1	Battery
2	Battery door
3	Test Lead
4	Fuse

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: +81-03-6714-3114
- Singapore: +65-738-5566
- Anywhere in the world: +1-425-446-5500

Visit Fluke's Web site at [www.fluke.com](http://www.fluke.com)

## **General Specifications**





<b>Maximum voltage between any Terminal and Earth Ground:</b>	600 V
<b>Display (LCD)</b> .....	6000 counts, updates 3/sec
<b>Battery Type</b> .....	2 AAA, NEDA 24A, IEC LR03
<b>Battery Life</b> .....	200 hours minimum
<b>Temperature</b>	
Operating .....	0 °C to 40 °C
Storage .....	-30 °C to 60 °C
<b>Relative Humidity</b>	
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
<b>Altitude</b>	
Operating .....	2000 m
Storage .....	12,000 m
<b>Temperature Coefficient</b> .....	0.1 X (specified accuracy) /°C (<18 °C or >28 °C)
<b>Fuse protection for current inputs</b> .....	11A, 1000V Fast Fuse, Fluke specified part only

<b>Size (HxWxL)</b> .....	142 mm x 69 mm x 28mm
<b>Weight</b> .....	200 g
<b>IP Rating</b> .....	IEC 60529: IP 40
<b>Safety</b> .....	IEC 61010-1: 600 V CAT III, Pollution Degree 2
<b>Electromagnetic Environment</b> .....	IEC 61326-1: Portable
<b>Electromagnetic Compatibility</b> .....	Applies to use the Korea only. Class A Equipment (Industrial Broadcasting & Communication Equipment) <sup>[1]</sup>

- [1] This product meets requirements for industrial (Class A) electromagnetic wave equipment and seller or user should take notice of it. This equipment is intended for use in business environments and is not to be used in homes.

## 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:  $\pm$ ([% of Reading] + [Number of Least Significant Digits])

Function	Range	Resolution	Accuracy	
			106	107
AC Volts (40 Hz to 500 Hz) <sup>[1]</sup> 	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 <sup>[2]</sup> 	2.000 V	0.001 V	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.

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Function	Range	Resolution	Accuracy	
			106	107
Resistance (Ohms) $\Omega$	400.0 $\Omega$	0.1 $\Omega$	0.5 % + 3	0.5 % + 3
	4.000 k $\Omega$	0.001 k $\Omega$	0.5 % + 2	0.5 % + 2
	40.00 k $\Omega$	0.01 k $\Omega$	0.5 % + 2	0.5 % + 2
	400.0 k $\Omega$	0.1 k $\Omega$	0.5 % + 2	0.5 % + 2
	4.000 M $\Omega$	0.001 M $\Omega$	0.5 % + 2	0.5 % + 2
	40.00 M $\Omega$	0.01 M $\Omega$	1.5% + 3	1.5% + 3
Capacitance <sup>[1]</sup> $\mu\text{F}$	50.00 nF	0.01 nF	2 % + 5	2 % + 5
	500.0 nF	0.1 nF	2 % + 5	2 % + 5
	5.000 $\mu\text{F}$	0.001 $\mu\text{F}$	5 % + 5	5 % + 5
	50.00 $\mu\text{F}$	0.01 $\mu\text{F}$	5 % + 5	5 % + 5
	500.0 $\mu\text{F}$	0.1 $\mu\text{F}$	5 % + 5	5 % + 5
	1000 $\mu\text{F}$	1 $\mu\text{F}$	5 % + 5	5 % + 5
Frequency <sup>[2]</sup> <b>Hz</b> (10 Hz – 100 kHz)	50.00 Hz	0.01 Hz	NA	0.1 % + 3
	500.0 Hz	0.1 Hz		
	5.000 kHz	0.001 kHz		
	50.00 kHz	0.01 kHz		
	100.0 kHz	0.1 kHz		
Duty Cycle <sup>[2]</sup>	1 % to 99 %	0.1 %	NA	1 % typical <sup>[3]</sup>

[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 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 %

**Multimeters**  
**Accuracy Specifications**

Function	Range	Resolution	Accuracy	
			106	107
AC Current (40 Hz to 200 Hz) 	4.000 A 10.00 A	0.001 A 0.01 A	1.5 % + 3	1.5 % + 3
DC Current 	4.000 A 10.00 A	0.001 A 0.01 A	1.5 % + 3	1.5 % + 3

Function	Overload Protection	Input Impedance (Nominal)	Common Mode Rejection Ratio	Normal Mode Rejection Ratio
AC Volts	600 V <sup>[1]</sup>	>10 M $\Omega$ <100 pF <sup>[2]</sup>	>60 dB at dc, 50 Hz or 60 Hz	–
AC Millivolts	600 mV	>1M, <100pF	>80 dB at 50 Hz or 60 Hz	–
DC Volts	600 V <sup>[1]</sup>	>10 M $\Omega$ <100 pF	>100 dB at dc, 50 Hz or 60 Hz	>60 dB at 50 Hz or 60 Hz
<p>[1] 6 x 10<sup>5</sup> V Hz Max</p> <p>[2] For mV (AC), input impedance is approximately 1 M<math>\Omega</math>.</p>				

