

Megger®

AVO210

Digital multimeter - Digitalmultimeter

Multimètre Numérique - Multímetro digitales

Digitale multimeter

User manual

Bedienungsanleitung

Manuel utilisateur

Guía del usuario

Gebruikershandleiding




SAFETY INFORMATION



Understand and follow operating instructions carefully.








WARNING

- Do not use test leads or the multimeter if they are damaged
- Do not use the multimeter if the tester is not operating properly
- To reduce risk of fire and shock do not expose this product to rain or any moisture
- When using test leads or probes, keep fingers behind the finger guards.
- Remove test leads from meter before opening the battery door or meter case.
- Use the meter only as specified in this manual or the protection by the meter might be impaired.
- Always use proper terminals, switch position, and range for measurements.
- Never attempt a voltage measurement with the test lead inserted into the A input terminal.
- Verify the meter's operation by measuring a known voltage. If in doubt, have the meter serviced.
- Do not apply more than the rated voltage, as marked on meter, between terminals or between any terminal and earth ground.
- Do not attempt a current measurement when the open voltage is above the fuse protection rating.
- Suspected open circuit voltage can be checked with voltage function.
- Only replace the blown fuse with the proper rating as specified in this manual.
- Use caution with voltages above 30 Vac rms, 42 Vac peak , or 60 Vdc. These voltages pose a shock hazard.
- To avoid false readings that can lead to electric shock and injury, replace battery as soon as low battery indicator  appears.
- Disconnect circuit power and discharge all high voltage capacitors before testing resistance, continuity, diodes, or capacitance.
- Do not use meter around explosive gas or vapour.

CAUTION

- Disconnect the test leads from the test points before changing the position of the function rotary switch.
- Never connect a source of voltage with the function rotary switch Ω , , --- , \sim , A ,  position.
- Do not expose Meter to extremes in temperature or high humidity.
- Never set the meter in --- \sim A function to measure the voltage of a power supply circuit in equipment that could result in damage the meter and the equipment under test.

Symbols as marked on the meter and instruction card

	Risk of electric shock
	See instruction card
---	DC measurement
	Equipment protected by double or reinforced insulation
	Battery
\sim	AC measurement
	Conforms to EU directives

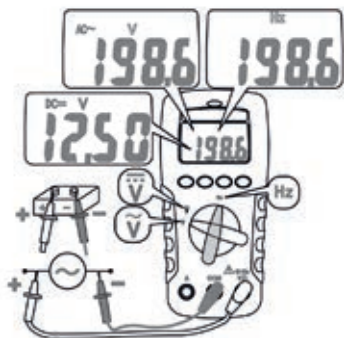
Maintenance

Do not attempt to repair this Meter. It contains no user-serviceable parts. Repair or servicing should only be performed by qualified personnel.

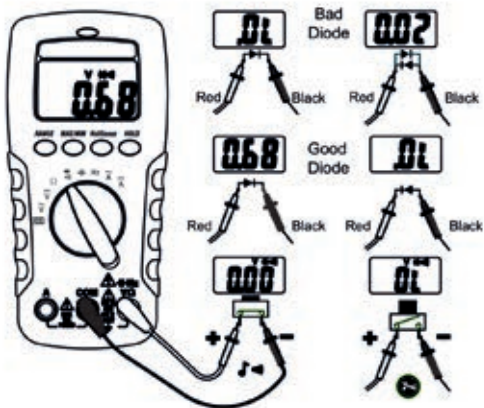
Cleaning

Periodically wipe the case with a dry cloth and detergent. Do not use abrasives or solvents.

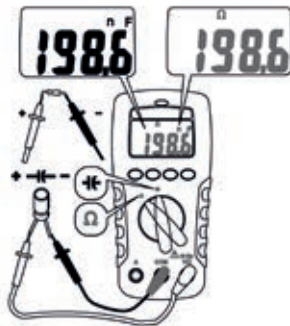
AC / DC Voltage and Frequency



Continuity and Diode



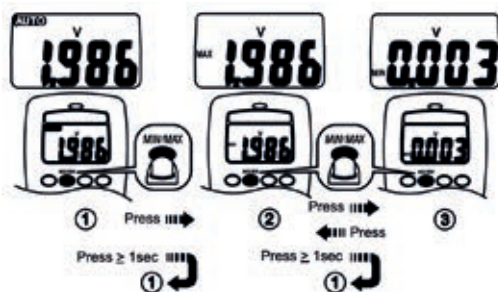
Resistance and Capacitance



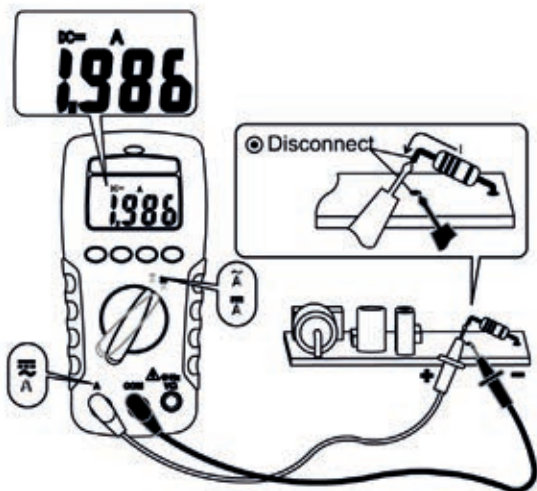
Note – To improve the measurement accuracy of small value capacitor, record the reading with the test leads open, then subtract the residual capacitance of the meter and leads from measurement.

$$C_{\text{UNKNOWN}} = C_{\text{MEASUREMENT}} - C_{\text{RESIDUAL}}$$

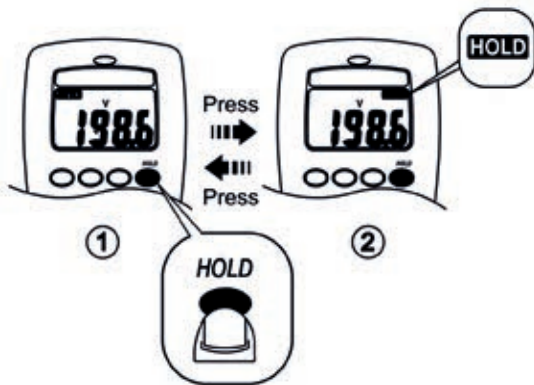
MIN MAX Record



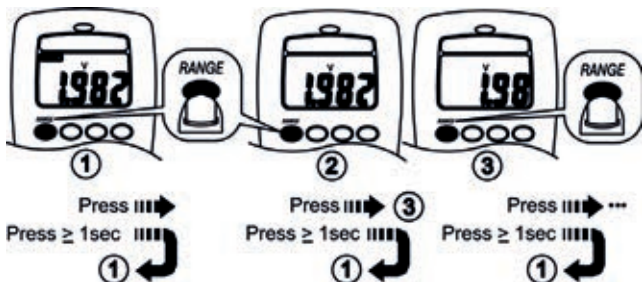
DC / AC Current



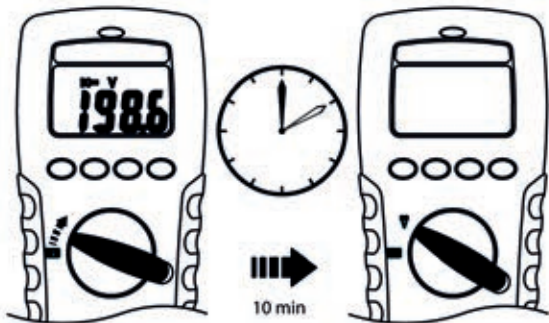
Display Hold



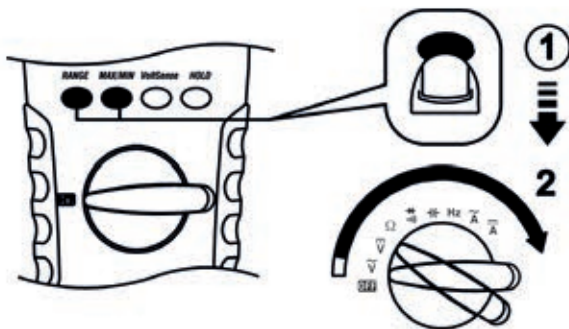
Manual Ranging and Auto Ranging



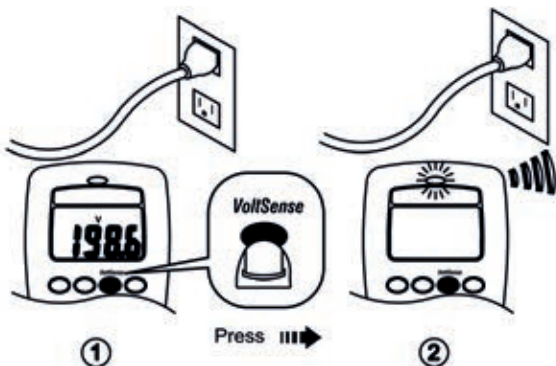
Auto Power Off (Battery Saver)



Disable Auto Power Off



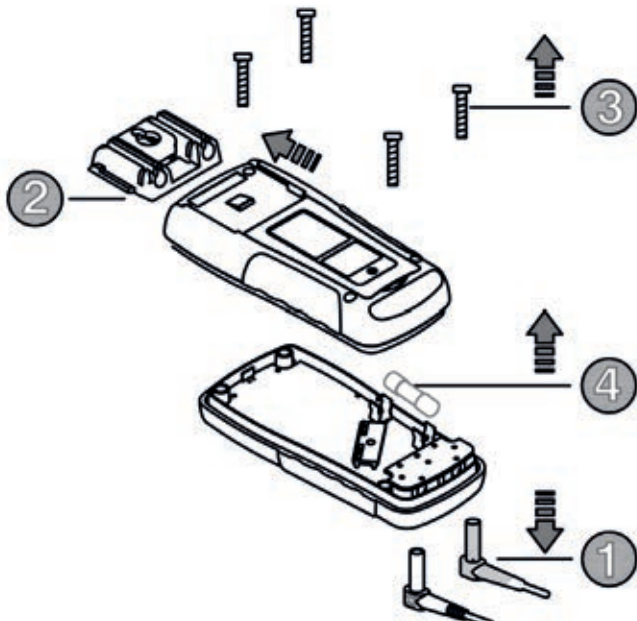
Non-Contact Voltage Alert (VOLTSENSE)



1. Volt sense switch will be activated on any function or at OFF status.
2. Test leads are not used for the Volt sense test.
3. Press the Volt sense button. The display will blank out, a tone sounds and the red LED lights up to verify the instrument is operational. The Volt sense button must be held down to detect the presence of voltage without use of the leads.
4. If a voltage of 50V to 600V (50 to 500Hz) is detected near the top of meter a continuous tone sounds and the red LED near the top of meter illuminates.

Fuse Replacement

Refer to the following diagram to replace fuse.



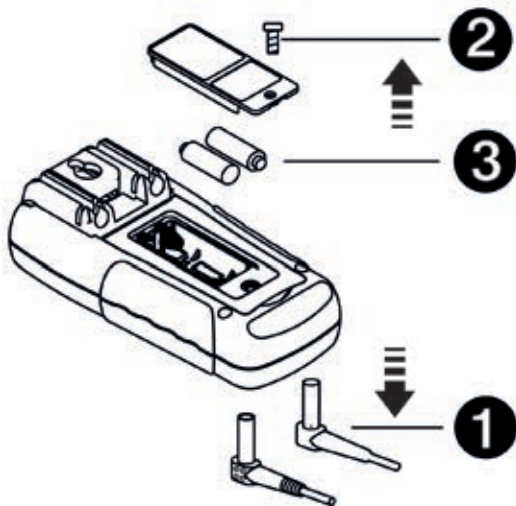
Use only a fuse with the amperage, interrupt, voltage, and speed rating specified.


Fuse rating: 10A, 500V

Battery Replacement




Refer to the following diagram to replace the batteries:



Replace the batteries as soon as the low batteries indicator  appears, to avoid false reading.
Batteries 1.5V x 2

Specifications

General Specifications

Display :	2000 counts.
Polarity Indication :	Automatic, positive implied, negative indicated.
Overrange Indication :	"OL" or "-OL".
Batteries Life :	Alkaline 250 hours
Low Batteries Indication :	 is displayed when the batteries voltage drops below operating voltage.
Auto Power Off :	Approx 10 minutes.
Operating Ambient :	Non-condensing $\leq 10\text{ }^{\circ}\text{C}$, $11\text{ }^{\circ}\text{C} \sim 30\text{ }^{\circ}\text{C}$ ($\leq 80\%$ R.H) $31\text{ }^{\circ}\text{C} \sim 40\text{ }^{\circ}\text{C}$ ($\leq 75\%$ R.H), $41\text{ }^{\circ}\text{C} \sim 50\text{ }^{\circ}\text{C}$ ($\leq 45\%$ R.H)
Storage Temperature :	$-20\text{ }^{\circ}\text{C}$ to $60\text{ }^{\circ}\text{C}$, 0 to 80% R.H. when battery removed from Meter.
Temperature Coefficient :	$0.15 \times (\text{Spec.Accy}) / ^{\circ}\text{C}$, $< 18\text{ }^{\circ}\text{C}$ or $> 28\text{ }^{\circ}\text{C}$
Measure :	Samples 2 times per second nominal.
Altitude :	6561.7 ft (2000 m)
Safety :	Complies with EN61010-1, UL61010-1, IEC 61010-1,
V/Ω :	CATIII 600 V, CATII 1000 V.
A :	CATIII 500 V
Pollution degree :	2
Power Requirements :	1.5 V x 2 IEC LR03, AM4 or AAA size
Dimensions (W x H x D) :	74 mm x 156 mm x 44 mm
Weight :	(320 g) including battery.
Accessories :	Battery (installed), Test leads and user manual

Electrical Specifications

Accuracy is \pm (% reading + number of digits) at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C} < 80\% \text{ RH}$.

DC / AC Volts

Range	AC Accuracy
200.0 mV *	Unspecified
2.000 V *	$\pm(1.5\%+5 \text{ dgt})$ 50 Hz ~ 300 Hz
20.00 V ~ 200.0 V *	$\pm(1.5\%+5 \text{ dgt})$ 50 Hz ~ 500 Hz *
750 V AC / 1000 V DC	

DC Accuracy : $\pm(0.5\% + 2 \text{ dgt})$

Over voltage protection : 1000 V DC or 750 V ACrms.

Input Impedance : 10 M Ω // less than 100 pF.

* CMRR / NMRR : (Common Mode Rejection Ratio)
(Normal Mode Rejection Ratio)

VAC : CMRR > 60 dB at DC, 50 Hz / 60 Hz

VDC : CMRR > 100 dB at DC, 50 Hz / 60 Hz

NMRR > 50 dB at DC, 50 Hz / 60 Hz

AC Conversion Type :

Average sensing rms indication.

AC conversions are ac-coupled, true rms responding, calibrated to the sine wave input. * The minimum LCD reading is 1400 count in Auto Ranging Mode.

Crest Factor : C.F. = Peak / Rms

+ 1.5% addition error for C.F. from 1.4 to 3

+ 3% addition error for C.F. from 3 to 4

DC / AC Current

Range	DC Accuracy	AC Accuracy	Voltage Burden
2.000 A	±(1.0% + 3 dgt)	±(1.5% + 5 dgt)	2 V max
10.00 A **		50 Hz ~ 500 Hz *	

Overload Protection : A input : 10 A (500 V) fast blow fuse

* AC Conversion Type : Conversion type and additional specification are same as DC/AC Voltage.

** Ampere Testing Duty Ratio Table

Ampere	Testing Time	Rest Time
10 A	1 min	10 min
9 A	2 min	10 min
8 A	3 min	10 min
7 A	4 min	10 min
6 A	5 min	10 min
5 A	Continually	N/A

Resistance


Range	Accuracy	Voltage Burden
200.0 ~ 200.0 KΩ **	± (0.7 % + 3 dgt)	2 V max
2.000 MΩ **	± (1.0 % + 3 dgt)	
20.00 MΩ *	± (1.5 % + 3 dgt)	

Open circuit Voltage : -1.3 V approx.

* <100 dgt rolling.

** The minimum LCD reading is 1400 count in Auto Ranging Mode.

Diode Check and Continuity

Range	Resolution	Accuracy
	10 mV	$\pm(1.5\% + 5 \text{ dgt})^*$

* For 0.4 V ~ 0.8 V

Max. Test Current : 1.5 mA

Max. Open Circuit Voltage : 2 V

Overload Protection : 600 V rms.

Frequency

Range	Sensitivity	Accuracy
2000 Hz ~200.0 KHz	> 1.5 Vac rms, < 5 Vac rms	Frequency : 0.01% \pm 1 digit
2.000 MHz ~ 20.00 MHz	> 2 Vac rms, < 5 Vac rms	

Overload Protection : 600 V rms.

Minimum pulse width : > 25 ns

Duty cycle limits : > 30% and <70%

Capacitance

Range	Accuracy	Overload Protection
2.000 nF ~ 200.0 μ F	$\pm(1.9\% + 8 \text{ dgt})$	600 V rms
2.000 mF *		

* < 10 dgt of reading rolling.

- CATIV Measurement category IV: Equipment connected between the origin of the low-voltage mains supply outside the building and the consumer unit.
- CATIII Measurement category III: Equipment connected between the consumer unit and the electrical outlets.
- CATII Measurement category II: Equipment connected between the electrical outlets and the user's equipment.



WEEE Directive

The crossed out wheeled bin symbol on the instrument and on the batteries is a reminder not to dispose of them with general waste at the end of their life.

Megger is registered in the UK as a Producer of Electrical and Electronic equipment. The registration no is; WEE/DJ2235XR.

Users of Megger products in the UK may dispose of them at the end of their useful life by contacting B2B Compliance at www.b2bcompliance.org.uk or by telephone on 01691 676124.

Users of Megger products in other parts of the EU should contact their local Megger company or distributor.

Battery Disposal

Batteries in this product are classified as Portable Batteries under the Batteries Directive. Please contact Megger Ltd for instructions on the safe disposal of these batteries.

For disposal of batteries in other parts of the EU contact your local distributor.

Megger is registered in the UK as a producer of batteries.

The registration number is BPRN01235.

For Further information see www.megger.com

Limited Warranty

This meter is warranted to the original purchaser against defects in material and workmanship for 1 year from the date of purchase. During this warranty period, manufacturer will, at its option, replace or repair the defective unit, subject to verification of the defect or malfunction.

This warranty does not cover fuses, disposable batteries, or damage from abuse, neglect, accident, unauthorised repair, alteration, contamination, or abnormal conditions of operation or handling.

Any implied warranties arising out of the sale of this product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. The manufacturer shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expense or economic loss. Some states or countries laws vary, so the above limitations or exclusions may not apply to you.

Megger Limited
Archcliffe Road
Dover, Kent
CT17 9EN

Tel: +44 (0) 1304 502 101

Fax: +44 (0) 1304 207 342

www.megger.com

AVO210

Digital multimeter



- 2000 count digital display
- 1000 V DC / 750 V AC ranges
- 10 A AC / DC ranges
- Resistance, frequency and capacitance ranges
- Non-contact voltage sense feature
- CAT III 600 V

DESCRIPTION

The AVO210 is a general purpose multimeter suitable for electricians, heating engineers and alarm technicians. The additional features make the instrument useful for a wide range of applications.

The instrument offers AC and DC voltage and current measurements as well as resistance, frequency and capacitance ranges.

The AVO210 has simplified functions that avoid continuous reference to the user guide.

The testleads included with the AVO210 have GS38 compliant shrouded tips.

Auto-ranging

When first selected, all functions are auto-ranging. A range button on the AVO210 allows multiple manual range selection on each function.

Minimum / Maximum measurements

The instrument has a MIN MAX function that allows the user to switch between minimum and maximum measurements. The display does not have to be continually monitored to capture a momentary increase or fall in readings.

Data Hold

This function allows a displayed result to be frozen which avoids having to remember a measurement value. The hold function can be nested within the MIN MAX feature which stops the AVO210 continuously updating the minimum and maximum values.

Voltage measurements

Both AC and DC voltage measurements up to 750 V and 1000 V respectively are possible with the AVO210.

Current measurements

A separate fused terminal is provided for current measurements up to 10 A for both AC and DC.

Continuity / diode testing

The continuity function features a buzzer and provides the user both optical and audible indication of identifying and confirming continuity between two points. This function also allows forward and reverse bias testing of diode and semiconductor junctions.

Volt sense function

The AVO210 has a built in non-contact voltage sensor fitted in the top of the instrument that is activated by the Volt sense button.

Resistance, capacitance and frequency

Resistance can be measured directly on the ohms range from 0 to 20 MΩ with capacitance measurements from 0 to 2.000 mF. In addition, frequency measurements from 0 to 20 MHz are possible.

SPECIFICATIONS

Display	2000 counts
Polarity	Automatic, positive implied, negative indicated
Over-range indication	"OL" or "-OL"
Battery indicator	"<" is displayed when the batteries voltage drops below operating voltage
Auto power down	Approx 10 minutes
Operating ambient	Non-condensing ≤10 °C, 11 °C ~ 30 °C (≤80% R.H) 31°C ~ 40 °C (≤75% R.H), 41 °C ~ 50 °C (≤45% R.H)
Storage temperature range and humidity	-20 °C to 60 °C, 0 to 80% R.H. when battery removed from meter
Temperature co-efficient	0.15 x (Spec. Accy.) / °C, < 18 °C or > 28 °C
Sample rate	Samples 2 times per second nominal
Maximum altitude	6561.7 ft (2000 m)
Safety	
Complies with EN61010-1, UL61010-1, IEC 61010-1,	
V/Ω	CAT III 600 V, CATII 1000 V
A	CAT III 500 V
Pollution degree	2
Power supply	1.5 V x 2 LR03 or AAA size
Battery life	Alkaline 250 hours
Dimensions	74 mm x 156 mm x 44 mm
Weight	320 g

ELECTRICAL

Accuracy is ± (% reading + number of digits) at 23°C ± 5°C < 80%RH.

AC/DC volts

Range	AC Accuracy
200.0 mV	Unspecified
2.000 V *	±(1.5%+5 dgts) 50 Hz ~ 300 Hz
20.00 V ~ 200.0 V *	±(1.5%+5 dgts) 50 Hz ~ 500 Hz *
750 V AC / 1000 V DC	±(1.5%+5 dgts) 50 Hz ~ 500 Hz *

DC Accuracy : ±(0.5% + 2 dgts)

Over voltage protection : 1000 V DC or 750 V AC rms.

Input Impedance : 10 MΩ // less than 100 pF.

*** CMRR / NMRR : (Common Mode Rejection Ratio)**

(Normal Mode Rejection Ratio)

VAC : CMRR > 60 dB at DC, 50 Hz / 60 Hz

VDC : CMRR > 100 dB at DC, 50 Hz / 60 Hz

NMRR > 50 dB at DC, 50 Hz / 60 Hz

AC conversion type

Average sensing rms indication.

AC conversions are ac-coupled, true rms responding, calibrated to the sine wave input.

* The minimum LCD reading is 1400 count in Auto Ranging Mode.

Crest Factor : C.F. = Peak / Rms

+ 1.5% addition error for C.F. from 1.4 to 3

+ 3% addition error for C.F. from 3 to 4

DC/AC current

Range	DC Accuracy	AC Accuracy	Voltage Burden
2.000 A	±(1.0% + 3 dgts)	±(1.5% + 5 dgts)	2 V max
10.00 A **	±(1.0% + 3 dgts)	50 Hz ~ 500 Hz*	2 V max

Overload protection

A input: 10 A (500 V) fast blow fuse

*** AC Conversion Type :** Conversion type and additional specification are same as DC/AC voltage.

**** Ampere Testing Duty Ratio Table**

Ampere	Testing Time	Rest Time
10 A	1 min	10 min
9 A	2 min	10 min
8 A	3 min	10 min
7 A	4 min	10 min
6 A	5 min	10 min
5 A	Continually	N/A

Resistance measurements

Range	Accuracy	Voltage Burden
200.0 ~ 200.0 KΩ **	±(0.7% + 3 dgts)	2 V max
2.000 MΩ **	±(1.0% + 3 dgts)	2 V max
20.00 MΩ *	±(1.5% + 3 dgts)	2 V max

* <100 dgt rolling.

* * The minimum LCD reading is 1400 count in Auto Ranging Mode.

Open circuit voltage -1.3 V approx.

Diode check

Range	Resolution	Accuracy
(Diode symbol)	10 mV	±(1.5% + 5 dgts)*

Frequency

Range	Sensitivity	Accuracy
2000 Hz ~ 200.0 KHz	>1.5 Vac rms, <5 Vac rms	Frequency: 0.01%±1 digit
2.000 MHz ~ 20.00 MHz	>2 Vac rms, <5 Vac rms	Frequency: 0.01%±1 digit

Capacitance

Range	Accuracy	Overload Protection
2.000 nF ~ 200.0 µF	±(1.9% + 8 dgts)	600 V rms
2.000 mF *	±(1.9% + 8 dgts)	600 V rms

Input impedance 10 MΩ // less than 100 pF.

ORDERING INFORMATION

Description	Order Code
AVO210 digital multimeter CAT III 600 V	1000-969
Included accessories	
Test leads	
Optional accessories	
Pouch	2007-366

UK
Archcliffe Road Dover
CT17 9EN England
T +44 (0) 1304 502101
F +44 (0) 1304 207342
UKsales@megger.com

UNITED STATES
4271 Bronze Way
Dallas TX 75237-1019 USA
T 800 723 2861 (USA only)
T +1 214 333 3201
F +1 214 331 7399
USsales@megger.com

OTHER TECHNICAL SALES OFFICES
Valley Forge USA, College Station USA,
Sydney AUSTRALIA, Danderyd SWEDEN,
Ontario CANADA, Trappes FRANCE,
Oberursel GERMANY, Aargau SWITZERLAND,
Kingdom of BAHRAIN, Mumbai INDIA,
Johannesburg SOUTH AFRICA, Chonburi THAILAND

CERTIFICATION ISO
Registered to ISO 9001:2008 Cert. no. Q 09290
Registered to ISO 14001:2004 Cert. no. EMS 61597
AVO210_DS_en_V01
www.megger.com
Megger is a registered trademark