USER MANUAL

Ardent 300A / 1000A AC-DC True RMS Digital Clamp Meter

ARD-CM300ACDC | ARD-CM1000ACDC

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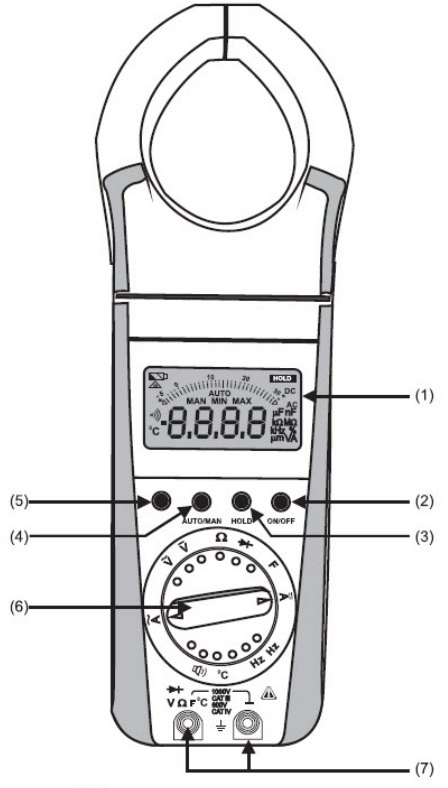
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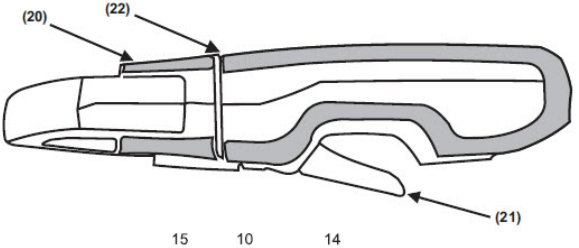
AUTO/MAN
HOLD
ON/OFF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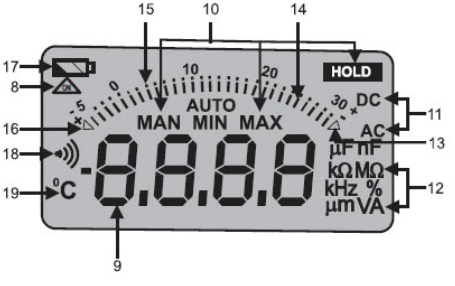

15
10
14
17
8
16
18
19
9
HOLD
AUTO
MAN MIN MAX
DC
AC
11
13
12
µF nF
kΩ MΩ
kHz %
µm VA

1.0 Parts Identification Diagram

(1) Liquid Crystal Display (LCD)
(2) ON/OFF pushbutton
(3) Data hold and MIN/MAX
(4) Manual range selection
(5) Multifunction
(6) Function selector switch
(7) Terminal sockets
(8) Continuously on
(9) Digits, decimal points, polarity
(10) Manual range selection data HOLD and MIN/MAX storage
(11) Selected function
(12) Unit of measured quantity
(13) Overrange indication for positive analog range
(14) Pointer for analog indication
(15) Scale for analog indication
(16) Overrange indication for negative analog range
(17) Low battery indication
(18) Buzzer indication
(19) Display °C for temperature measurement range
(20) Rotary mechanism for clamp jaws
(21) Safe trigger mechanism
(22) Limit for safe access

Note: This diagram will be referenced throughout the manual.

2.0 Safety Features and Precautions

This meter is manufactured and tested in compliance with the safety standard IEC 61010-1:2010. However, the safety of both the user and the instrument cannot be guaranteed in the event of incorrect operation or negligent handling.

To maintain the safe and proper condition of the meter and to ensure safe operation, it is absolutely necessary to carefully and completely read these operating instructions before use.

Intended Use

- Use the instrument only as intended under the specified environmental and electrical operating conditions. Do not use in explosion prone environments.
- Before using the instrument to determine that a circuit is not hazardous, live test the viability of the measurement by checking a known voltage of similar magnitude.
- Use only correct fuses supplied by the manufacturer.
- Use only proper accessories supplied by the manufacturer.
- Repairs and alterations may be performed only by a skilled person authorized by the manufacturer.
- When the battery symbol is displayed, the instrument may measure incorrectly.
- Measurements of components within circuits may produce incorrect results.
- Do not use the instrument in the 30 mA and 300 mA ranges when measuring the current of electronic circuits.
- Ensure that the test object is discharged after performing an insulation resistance measurement.

Observe the following safety precautions:

- The meter must only be operated by persons who understand the danger of shock hazards and know how to apply safety precautions. Shock hazards exist anywhere, where voltages of more than 30 V (TRMS) may occur.
- Operators must use individual protective equipment if hazardous live parts of installation could be accessible.
- Avoid working alone in shock hazardous environment while carrying out measurement.
- Keep hands/fingers behind the edge that separates rotating jaws with hand-held part (22). This is the limit of the hand held part during measurement.
- The maximum allowable voltage between any terminal sockets (7) and earth is 1000 V.
- Unexpected voltages can occur at devices under test (e.g. defective devices). For example, capacitors can be dangerously charged.
- Verify that test leads are in good condition, e.g. no cracked insulation, no open circuits in the leads or connectors.
- The meter must not be used for measurements on circuits with corona discharge (high voltage).
- Measurements under moist ambient conditions are not permitted.
- Do not exceed permissible overload limits of the measuring ranges. Limit values can be found in the table “Measuring Ranges” in chapter 17 “Specifications.”
- Do not use the clamp meter if obvious wear in jaw opening is visible.

- Current measuring range is protected with a fuse. The maximum permissible voltage of the measuring circuit (=nominal voltage of the fuse) is 1000 VAC/DC in 'mA" ranges.
- Adherence to the instructions in this manual is crucial for maintaining the safety features of the digital multimeter.

Cat I	Measurements in electrical circuits which are not directly connected to the mains: for example electrical systems in motor vehicles and aircraft, batteries, etc.
Cat II	Measurements in electrical which are electrically connected o the low-voltage mains:with plugs, e.g. at home, in the office or laboratory, etc.
Cat III	Measurements in building installations, stationary power consumers, distributor terminals, devices connected permanently to the distributor.
Cat IV	Measurements at power sources for low-voltage installations, meters, mains terminals, primary over voltage protection devices.

Table 1: Safety Category Ratings per IEC61010

	AC - Alternating Current		See explanation in manual
	DC - Direct Current		Double insulation Protection Class II
	Either AC or DC		Fuse
	Ground		

Table 2: International Symbols

Meaning of the Acoustic Signals

- Intermittent acoustic signal: Voltage limit exceeded; for Voltage >1000 V
- Intermittent acoustic signal: Current limit exceeded; for Current >360A/>1100A

3.0 Initial Start-Up

Battery

The meter includes a 9V flat-cell battery in accordance with IEC 6 F 22 or IEC 6 LR 61.

Switching the Meter ON

Press the "ON/OFF" pushbutton (2). Switch "ON" is acknowledged by a sound signal. As long as the pushbutton is pressed, all segments of the liquid crystal display (LCD) will appear. After the pushbutton is released, the meter is ready for operation.

NOTE: Electrical discharge and high frequency interference can cause incorrect displays, and may block the measuring sequence. To reset, switch the meter off and back on. If this procedure is unsuccessful, briefly disconnect the battery from the contact terminals.

Automatic Power-Off

The meter turns off automatically when the measured value remains constant (variations of the measured value (± 2 digits) for 10 minutes and when neither a pushbutton nor the function selector switch is operated during that time.

Preventing Automatic Power-Off

In order to prevent automatic turn-off, select "continuously on" mode by pressing the yellow multifunction pushbutton (5) and the ON/OFF pushbutton (2) together. The function "continuously on" is shown on the LCD by the symbol "⚠" (8).

Turning the Meter OFF

Press the ON/OFF pushbutton (2).

4.0 Function and Range Selection

4.1 Autoranging

This multimeter features autoranging for all measuring ranges with the exception of the 30 mV⎓ and 300 mV⎓ ranges. Autoranging is automatically selected after turning the multimeter on. According to the measured quantity applied, the multimeter automatically selects the measuring range which gives the best resolution. When switching to frequency measurement and ratio measurement, the previously selected voltage measuring range is maintained.

The meter switches automatically to:

- The next highest range at ± 3099 digits + 1 digit
- The next lowest range at 240/280 digits - 1 digit

4.2 Manual Range Selection

Autoranging can be turned off and ranges selected manually according to table 3.

Manual mode is switched off when AUTO/MAN pushbutton (4) is pressed for approximately 1 second, when function selector is operated, or when meter is turned off and on again.

When switching back to autoranging from 30 mV⎓ or 300 mV⎓ ranges, 3 V⎓ is automatically selected.

AUTO/ MAN	Function		Acknowledgment	
			Display	Sound Signal
Short	Manual Operation ON: User range is fixed Switching sequence at:		MAN (10)	1X
Short	V⎓: 3V → 30V → 300V → 1000V → 30mV → 300V → 3V ... V~: 3V → 30V → 300V → 1000V → 3V... Ω: 30MΩ → 30Ω → 300Ω → 3kΩ → 30kΩ → 300kΩ → 3MΩ →.30MΩ... F: 30nF →300nF → 3µF → 30µF → 30nF → Hz: 300Hz → 3KHz → 30KHz →100KHz → 300Hz...		MAN (10)	1X
	ARDENT Clamp 1000A	A~, A⎓: 300A→1000A→300A...		
	ARDENT Clamp 300A	A~, A⎓: 30A→300A→30A...		
Long	Return to autoranging		—	2X

Table 3

5.0 Liquid Crystal Display (LCD)

5.1 Digital Display

The digital display shows the measurement value, decimal point, and sign. The selected measuring unit (12) and function (11) are displayed. When measuring DC quantities minus sign appears in front of the digits, if the positive pole of the measurement magnitude is applied to the "⊥" input terminal. "OL" appears if the measuring range upper limit is exceeded. The digital display is updated 2.8 times per second. The sub digital display (14) shows the measured value. With V and Ω measurements the digital display is updated 2 times per second.

5.2 Analog Indication

The analog indication with pointer gives the dynamic response of a moving coil and is updated 20 times per second when measuring V and Ω. Analog indication is of particular use when observing variations of measured values and for calibration procedures.

The analog bar indicator (15) has its own polarity indication. When measuring DC quantities, the analog scale has a negative range of 4 scale divisions so that variations of the measures values "around zero" can be observed exactly. When the measured value exceeds the range of indication, the left triangle (16) is shown before the polarity of the analog indicator switches over after approximately 0.7s. The overrange is indicated by the right triangle (13) when measured value is > 3099 digits (on the range ⟶|⟵ : 1999).

5.3 Display with Backlight (Optional)

This instrument is provided with a selectable backlight for taking measurements in poor lighting conditions.

Switching the Backlight On

Press the AUTO/MAN and HOLD keys simultaneously.

Switching the Backlight Off

Press the AUTO/MAN and HOLD keys simultaneously.

6.0 Measurement Value Storage Hold

6.1 Hold Function

The HOLD function allows to automatically hold the measured values. The meter holds the measured value on the digital display with a sound signal and displays “HOLD” on the LCD display (10). The probes or clamp can be removed from the measuring point and the measured value on the digital display (9) can be read. The analog indication is not influenced by the HOLD feature.

The actual measured value can still be noted/read. Note that with a held digital display, the location of the decimal point is also held. With autoranging selected, the measuring range of the analog indicator is no longer known.

NOTE: The HOLD function is not available in the following functions: "→|←", °C, 30 mV and 300 mV ranges in function V⎓

Activating the HOLD Function

Press the HOLD pushbutton. As long as the data HOLD function is active, manual range selection is not available.

To switch off the HOLD function, perform one of the following:

- Press the HOLD pushbutton for approximately 1s.
  - This is acknowledged by 2 sound signals.
- Operate the function selector switch.
- Turn the multimeter off and on again.

7.0 MIN/MAX Function

With the MIN/MAX function, you can hold the minimum and maximum measured value which was applied to the input of the multimeter after activating MIN/MAX function. The most important application is the determination of the minimum and the maximum value for long-term monitoring of measured parameters.

The actual measured value can still be noted/read during this feature. Apply the measured quantity to the meter and select the measuring range prior to activating the MIN/MAX function. With the function activated, you can select the measuring ranges only manually, if you switch to another range, the stored MIN/MAX values are cleared.

Function MIN/MAX	Data MIN/MAX	Measuring Ranges	Measured Values MIN/MAX	Meter Display		
				Meas. Value Digital	MIN/ MAX	Sound Signal
1. Activate and Store	2x short, 30mV/300mV and °C 1xshort	V~, A~, Ω, F, %, °C, Hz	Stored	Actual measured value	MIN and MAX flash	1X
2. Store and Display	Short	V~, A~, Ω, F, %, °C, Hz	Storage continued in the background. New MIN/MAX displayed	Stored MIN value	MIN	1X
	Short			Stored MAX value	MAX	
3. Return to 1	Short	V~, A~, Ω, F, %, °C, Hz	Same as 1. Stored values are not cleared	Same as 1	Same as 1	1X
Reset	Long		Cleared	Cleared	Cleared	2X

Table 4

8.0 Voltage Measurement

According to the voltage to be measured, set the function selector switch (6) to V~ or V⎓. Connect the test leads as shown in figure 1. The "⊥" socket should be connected to the lowest potential ground available.

NOTE: The 30 mV ⎓ and 300 mV ⎓ measuring ranges can only be selected with the AUTO/MAN pushbutton (4). On the 1000 V range, an intermittent sound signal warns when the measured value exceeds the upper range limit.

Zero Adjustment on the 30 mV ⎓ Measuring Range

Connect the test leads to the meter and join the free ends. Select the measuring range, then press the multifunction pushbutton (5). The meter acknowledges "zero" setting with a sound signal. The LCD shows "00.00" (+1 digit) and the decimal point flashes. The displayed voltage at the instant the pushbutton is pressed is used as a reference value (max ±200 digits) and is automatically deducted from the values measured thereafter.

The clear the zero adjustment, perform one of the following:

- Press and hold the yellow multifunction pushbutton.
  - This is acknowledged by a sound signal.
- Turn the multimeter off and on again.

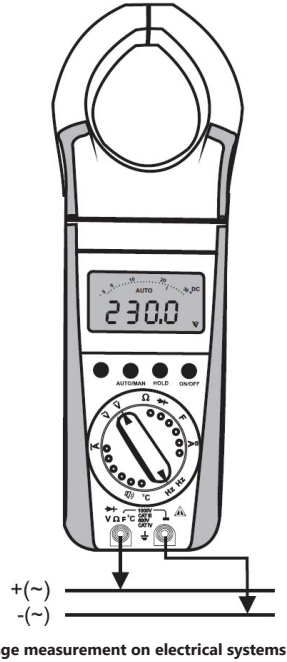


Fig. 1 Voltage measurement on electrical systems up to 1000 V

9.0 Resistance Measurement

*ATTENTION:*Verify that the device under test is electrically dead. External voltages would falsify the measured results.

- Set the function selector switch (6) to Ω.
- Connect the device under test as shown in figure 2.

Zero Adjustment on the 30Ω Measurement Range

When measuring small resistance values on the 30Ω range, you can eliminate the resistance of the leads and contact resistance by zero adjustment.

- Connect the test leads to the multimeter and join the free ends.
- Briefly press the yellow multi-function pushbutton (5).The meter acknowledges zero adjustment by a sound signal, the LCD shows "00.00"(+1digit), and the decimal point flashes. The resistance measured at the instant the pushbutton is pressed is used as a reference value (max.200digits). It is automatically deducted from the values measured thereafter.

The clear the zero adjustment, perform one of the following:

- Press and hold the yellow multifunction pushbutton.
  - This is acknowledged by a sound signal.
- Turn the multimeter off and on again.

Fig. 2 Resistance Measurement

10.0 Diode and Continuity Test

*ATTENTION:*Verify that the device under test is electrically dead. External voltages would falsify the measured results.

- Set the function selector switch (6) to "→|←".
- Connect the device under test as shown in figure 3 or 4.

The multimeter displays the forward voltage in Volts. As long as the voltage drop does not exceed the maximum display value of 1.999V, you can also rest several series-connected elements or reference diodes with small reference voltage. Reverse direction or open circuit: The multimeter indicates overrange "OL."

NOTE: Resistors and semiconductor junction in parallel with the diode falsify the measured results.

Diode Test and Continuity with Beeper

With the "beeper" function selected, the meter emits a continuous sound signal on the range 0 to approximately 0.2V.

To Switch the Beeper On:

- Briefly press the yellow multifunction button (5).
- The multimeter acknowledges turn-on with a sound signal. The symbol "🔊" (18) appears on the LCD.

To Switch the Beeper Off:

- Briefly press the yellow multifunction button (5) again.
- The multimeter acknowledges turn-off with a sound signal. The symbol "🔊" (18) disappears from the LCD.

When selecting the function “Diode test and Continuity test” with the function Selector switch (6), beeper is always switched OFF. Repeated brief pressing of the multifunction pushbutton (5) alternately switches the beeper on and off. When pressing the pushbutton for a long time, the beeper is always switched OFF, this is acknowledged by the beeper sounding twice.

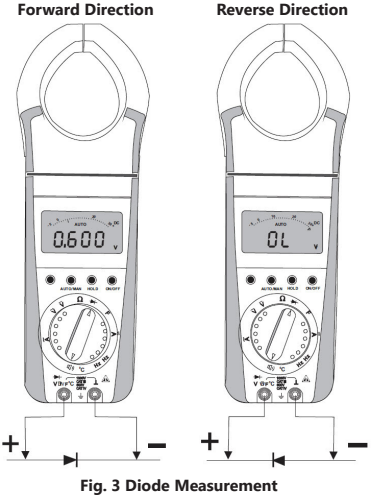


Fig. 3 Diode Measurement

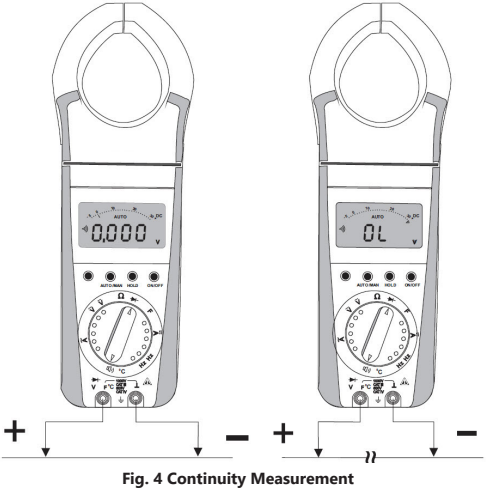


Fig. 4 Continuity Measurement

11.0 Temperature Measurement

This meter allows you to measure temperature with Pt100 and Pt1000 temperature sensors in the range from - 200 (-100) °C to 850°C.

- Set the function selectors witch (6) to"Ω "
- Connect the sensor to the two terminals.
- Briefly press the yellow multifunction pushbutton(5). The multimeter switches to temperature measurement, automatically detects the connected sensor (Pt100 to Pt1000), and shows the measured temperature in °C on the digital display.

NOTE: This measurement automatically considers the lead resistance of Temperature sensors which are available as accessory. It is not possible to switch over to temperature measurement when the 30Ω resistance range is selected.

Sensor Lead Resistance up to 50Ω

Lead resistance of sensors having a value differing from that of company sensors can be considered up to a value of 50Ω as follows:

- Briefly press the yellow multi-function pushbutton (5) again. The LCD now displays the resistance value which the multimeter automatically considers after selecting the temperature measuring range. We can recognize that this is the resistance correction value on the temperature measuring range. The “°C” character is simultaneously shown on the display.
- You can set the lead resistance correction value as follows:
- Press the HOLD pushbutton (3) to increment the value, or the AUTO/MAN pushbutton(4) to decrement the value. Each time the pushbutton is briefly pressed, the value changes by one digit.
- Briefly press the yellow multifunction pushbutton (5) again. The LCD displays the measured temperature. The flashing decimal point shows you that we have entered a correction value for the lead resistance The correction value is retained as long as multimeter is switched on.
- Each time the yellow multifunction pushbutton (5) is briefly pressed, the display changes between measured temperature and correction value of the lead resistance.

To exit the temperature measurement function:

- Press and hold the yellow multifunction button.
  - This is acknowledged by two sound signals.
- Turn the multimeter off and on again.

NOTE: For the lead resistance, the actual value measured on the clamp meter should be taken as correction value and not any specified value.

12.0 Capacitance Measurement

- Verify that the device under test is electrically dead. External voltages would falsify the measured results.
- Set the function selector switch (6) to 'F'
- Connect the (discharged) device under test to the "⊥" and "F" socket via test lead.

NOTE: Connect polarized capacitors with the "⊥" pole to the "—" socket. Resistors and semiconductor junction in parallel with the capacitor falsify the measured results.

Zero Adjustment on the 30 nF Measuring Range

When measuring small capacitance values on the 30 nF range, the internal resistance of the multimeter and the capacitance of the leads can be eliminated by zero adjustment.

- Connect the test leads to the meter without device under test.
- Briefly press the yellow multi-function pushbutton (5) displaying"00.00"(+1 digit) on the LCD and by a flashing decimal point. The capacitance measured at the instant the pushbutton is pressed is used as reference value (max.200 digits). It is automatically deduced from the values measured thereafter.

The clear the zero adjustment, perform one of the following:

- Press and hold the yellow multifunction button.
  - This is acknowledged by two sound signals.
- Turn the multimeter off and on again.

13.0 Frequency Measurement

Frequency measurement is possible on all voltage measuring ranges in AC and DC modes.

- Set the function selector switch (6) to V~, V-
- Connections are made the same way as for voltage measurement.
- Briefly press the yellow multi-function pushbutton (5). The multi meter switches to frequency measurement. The frequency is displayed on the LCD.

See chapter 17 for the lowest measurable frequencies and the maximum permissible voltages.

Changing between voltage, frequency, and duty cycle measurement

Repeated brief pressing of the yellow multi-function switch (5) changes the measuring function in the following order:

Voltage → Frequency → Duty cycle → Voltage

From frequency or duty cycle measurement, directly switching back to voltage measurement is possible by:

- Press and hold the yellow multifunction button.
  - The meter acknowledges this by two sound signals. The voltage measuring range last selected is maintained.
- Operate the function selector switch (6).

14.0 Duty Cycle Measurement

Duty cycle measurement is used to determine the ratio of pulse duration to cycle time of recurring square-wave signals.

- Set the function selector switch (6) to V~ or V-
- Connections are made as shown in figure 1. Briefly press the yellow multifunction pushbutton (5) twice. The meter switches to duty cycle measurement. The duty cycle that is the percentage pulse duration of a signal is displayed on the LCD in %.

$$\text{Duty cycle (\%)} = \frac{\text{pulse duration}}{\text{cycle duration}} \times 100$$

NOTE: Input applied frequency must remain constant during the duty cycle measurement. Change-over between voltages,frequency and duty cycle factor measurement is done as described in the chapter 13.

15.0 Current Measurement

ARD-CM1000ACDC can measure current up to 1000 A in two ranges, 300.0 A and 1000 A. ARD-CM300ACDC can measure current up to 300 A in two ranges, 30.00 A and 300.0 A.

One of the two ranges can be selected manually with AUTO/MAN key. To measure the current through a cable, push the trigger (21) to open the jaws and clamp the jaws around the cable as shown in figures 5 and 6.

15.1 DC Current Measurement

Set the function selector switch (6) to A⎓.

Zero adjustment on A⎓ functionality:

- Zero adjustment is possible with lower range (30.00 A range for ARD-CM300ACDC and 300.0 A range for ARD-CM1000ACDC).
- Press yellow multifunction key shortly either in AUTO mode or when in the lower amperage range while in manual mode.
- For higher range (300.0A range for ARD-CM300ACDC and 1000A range for ARD-CM1000ACDC) same reference which is available for lower range is used.

The meter acknowledges zero setting by a sound signal, the LCD shows “00.00 / 000.0”(+1digit). The displayed current at the instant the pushbutton is pressed, is used as reference value. It is automatically deduced from value measured thereafter. Maximum number of digits that can be nullified are 100.

The clear the zero adjustment, perform one of the following:

- Press and hold the yellow multifunction button (5) for a long time twice.
- Switching the instrument off.

15.2 AC Current Measurement

- Set the function selector switch (6) to A⎓ and briefly press the multifunction key (5).

Changeover between A ⎓ and A~

Repeated brief pressing of the yellow multi-function switch (5) changes the measuring function in the following order:

A⎓ → A~ → A⎓

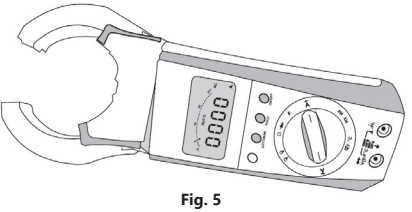


Fig. 5

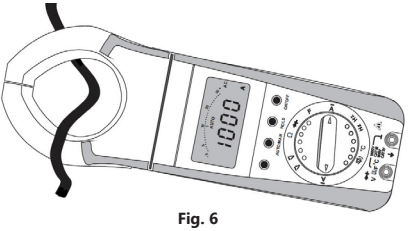


Fig. 6

Rotary Mechanism for Clamp Jaws:

In conventional clamp meters, the jaws are locked on the same plane as the meter. When current measurement is done on vertical bus bars, overhead cables, or cables in congested places, a conventional meter's display may be impossible to read.

The ARDENT clamp meters have a rotary mechanism for the clamp jaws. These rotary clamp jaws can be rotated at different angles at a 30° step with a maximum up to 90° in both clockwise and anti-clockwise directions as shown in figure 7. This allows the user to align the clamp jaws in the orientation of bus bar/ conductor while keeping the display and keys facing the user, as shown in figure 8.

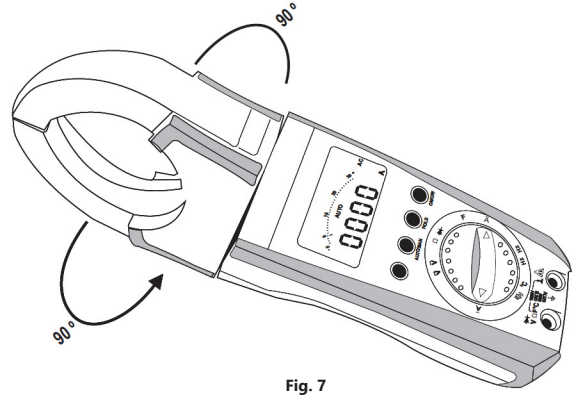


Fig. 7

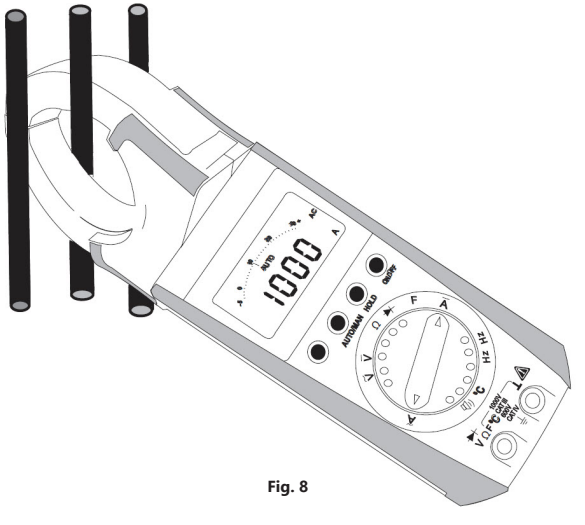


Fig. 8

Safe Trigger Mechanism

Conventional clamp meters have jaw trigger mechanisms near to either the left jaw or the right jaw. When taking measurements on bare bus bar or bare conductors, the user's hand comes very close to bare bus bar/conductor, which poses potential safety hazards.

The ARDENT Clamp Meter's jaw trigger mechanism is ergonomically designed at the bottom side of the meter (figure 9). This unique design allows the user's hand to be at a safe distance from potential safety or shock hazards.

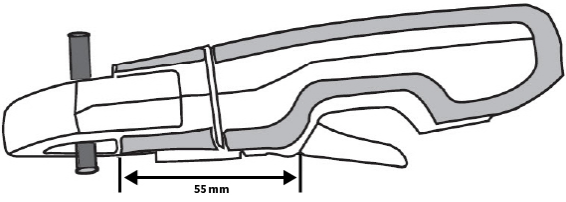


Fig. 9

16.0 Empty Positions

Empty positions on dial indicates no function is available on these positions as shown in figure 10. There are three empty positions present on the dial.

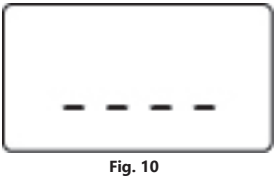


Fig. 10

17.0 Specifications

Measuring Function	Measuring Range	Resolution	Input Impedence	Digital Display Deviation ±(% of RDG+digits)	Overload Capacity [1]	
					Overload Values	Overload Duration
V⎓	30.0 mV	10 mV	>10 GΩ //<40pF	0.5+3 [2]	1000V DC AC eff/rms sine wave	Cont.
	300.0 mV	100 mV	>10 GΩ //<40pF	0.5+3		
	3.000 V	1 mV	11 MΩ //<40pF	0.25+1		
	30.00 V	10 mV	10 MΩ //<40pF	0.25+1		
	300.0V	100 mV	10 MΩ //<40pF	0.25+1		
	1000V	1V	10 MΩ //<40pF	0.35+1		
V~ (TRMS)	3.000 V	1 mV	11 MΩ //<40pF	0.75+2 (10 to 300 digit) 0.75+1 (>300 digit)		
	30.00 V	10 mV	10 MΩ //<40pF			
	300.0 V	100 mV	10 MΩ //<40pF			
	1000 V	1 V	10 MΩ //<40pF			
			No load voltage			
Ω	30.0 Ω	10 mΩ	max. 3.2 V	0.5+3 [2]	1000V DC AC eff/rms sine wave	10 min.
	300.0 Ω	100 mΩ	max. 3.2 V	0.5+3		
	3.0 kΩ	1 Ω	max. 1.25 V	0.4+1		
	30.0 kΩ	10 Ω	max. 1.25 V	0.4+1		
	300.0 kΩ	100 Ω	max. 1.25 V	0.4+1		
	3.0 MΩ	1 kΩ	max. 1.25 V	0.6+1		
	30.0 MΩ	10 kΩ	max. 1.25 V	2.0+1		
—▶—	2.0 V	1 mV	max. 3.2 V	0.25+1		
A~ (TRMS)	1000A Model	2 to 300.0A	0.1 A	1.5+5	1100 A	Cont.
		1000 A	1 A	1.5+5		
	300A Model	0.2 to 30.0A	0.01 A	1.5+5	330 A	
		300.0 A	0.1A	1.5+5		
A(DC)	1000A Model	2 to 300.0A	0.1 A	1.5+5	1100 A	
		1000 A	1 A	1.5+5		
	300A Model	0.2 to 30.0A	0.01 A	1.5+5	330 A	
		300.0 A	0.1A	1.5+5		

Measuring Function	Measuring Range	Resolution	Input Impedance		Digital Display Deviation ±(% of RDG+digits)	Overload Capacity [1]	
			Discharge Resistance	$U_{0\ max}$		Overload Values	Overload Duration
°C	pt 100	-200 to 200°C	—	—	2 Kelvin + 5 digits [3]	1000V DC AC eff/rms sine wave	10 min.
		200 to 850 °C	—	—	1.0+5 [3]		
	pt 1000	-100 to 200°C	—	—	2 Kelvin + 2 digits [3]		
		200 to 850 °C	—	—	1.0+2 [3]		
F	30.0 nF	10 pF	250 kΩ	2.5 V	1.0+3 [4]	1000V DC AC eff/rms sine wave	Cont.
	300.0 nF	100 pF	250 kΩ	2.5 V	1.0+3		
	3.0 µF	1 nF	250 kΩ	2.5 V	1.0+3		
	30.0 µF	10 nF	250 kΩ	2.5 V	3.0+3		
Hz	300.0 Hz	0.1 Hz	1 Hz	45 Hz	0.5+1 [4]	<=3KHz; 1000 V <= 30Khz; 300 V <=100 KHz; 30 V	Cont.
	3. KHz	1 Hz	1 Hz	45 Hz			
	30.0 KHz	10 Hz	10 Hz	45 Hz			
	100.0 KHz	100 Hz	100 Hz	100 Hz			
%	2.0 to 98.0%		0.1%	2 Hz	2Hz to 1KHz ± 5 digits 1KHZ to 10KHz ± 5 digits [5]		

1. At 0 to 40°C

2. With zero adjustment, without zero adjustment +35 digits

3. Without sensor

4. 3VU = 1.5V eff/rms to 100V eff/rms
   30 VU = 15 V eff/rms to 300V eff/rms
   300VU = 150 V eff/rms to 1000V eff/rms

5. On the range 3VDC, square sine wave signal position on one side 5 to 15V, F= const., not 163.84 Hz or integral multiple

Reference Conditions

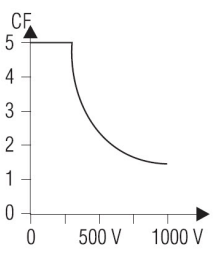
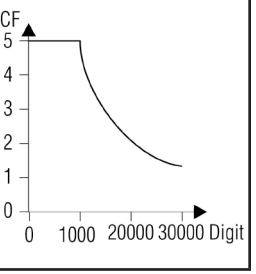
Ambient temperature	23°C ± 2 K
Relative humidity	45% to 55% RH
Frequency of measured quantity	45 Hz to 65 Hz
Waveform of measured quantity	Sinusoidal
Battery voltage	8V ± 0.1V

Influence Quantities and Variations

Influence Quality	Range of Influence	Measured Quantity/ Measuring Range	Variation [1] ±(% of RDG+digits)
Battery Voltage	[4] ...< 7.99 V > 8.1 V to 10.0 V	V⎓	± 2 digits
		V~	± 2 digits
		30Ω/300Ω/°C	± 2 digits
		3 kΩ to 30 MΩ	± 2 digits
		A~	± 2 digits
		F, Hz, %	± 2 digits
Relative Humidity	75% 3 days Meter off	V⎓≂, A~, Ω, F, Hz, %, °C	1 x Intrinsic error
HOLD	—		± 1 digit
MIN/MAX	—	V⎓≂, A~	± 2 digits

1) After the symbol is displayed.

Influence Quality	Range of Influence	Measuring Ranges	Attenuation
Common mode interference voltage	Noise quantity max.1000 V~	V⎓	> 120 dB
	Noise quantity max. 1000 V~ 50 Hz, 60 Hz sinusoidal	3 V~, 30 V~	> 70 dB
		300 V~	> 70 dB
		1000 V~	> 60 dB
Normal mode interference voltage	Noise quantity V~ value of the measuring range at a time max. 1000 V~, 50 Hz, 60 Hz. sinusoidal	V⎓	> 50 dB
	Noise quantity max.1000 V~	V~	> 110 dB

Influence Quality	Range of Influence		Measured Quantity/ Measuring Range	Variation [1] ±(% of RDG+digits)
Temperature	0 °C +21 °C and +25 °C to +40°C		30/300 mV⎓	1.0+3
			3 to 300 V⎓	0.15+1
			1000 V⎓	0.2+1
			V~	0.4+2
			30 Ω [2]	0.15+2
			300 Ω	0.25+2
			3 KΩ to 3 MΩ	0.15+1
			30 MΩ	1.0+1
			-200 to 200°C	0.5°C+2
			200 to 850°C	0.5+2
			ADC, AAC	±0.1 x spec. accuracy +10
Frequency of the measured quantity	>65 Hz to 400 Hz		3 to 300 VAC	2.0+3
	>400 Hz to 1 kHz			2.0+3
	>65 Hz to 1 kHz		1000 VAC	3.0+3
	15 Hz to <30 Hz			±1% of range +1
	30 Hz to <45 Hz			
	66 Hz to <1 kHz			
	Crest factor CF	1 to 3	V~, A~ [4]	±1% of rdg.
		>3 to 5		±3% of rdg.
	The permissible crest factor CF of the AC quantity to be measured function of the displayed value			
Waveform of the measured Quantity [3]	Voltage Measurement		Current Measurement	
				

1) With temperature: Error data apply per 10K change in temperature.
With frequency: Error data apply to a display from 300 digits onwards
2) With zero adjustment
3) With unknown waveform (crest factor CF > 2), measure with manual range selection
4) With the exception of sinusoidal waveform.

Display

LCD display field (50.0mm x 25.4mm) with digital display and display of unit of measure, current type and various special functions.

Analog

Indication	LCD scale with pointer
Scale length	55mm
Graduation	± 30 w/ 29 scale divisions on ⎓, 30 w/ 25 scaled divisions on all other ranges
Polarity indication	Automatic change-over
Overrange indication	Triangle (13)
Sampling rate	20 reading/s Ω: 10 readings/s

Digital

Main display character height	7 segment digits - 12mm
Number of digits	3-3/4 digit 3100 counts
Overflow display	"OL"
Polarity display	"–" sign is displayed when positive pole is at "⊥"
Sampling rate	2.0 readings /s Ω and °C: 1 reading/s

Power Supply

Battery	9V flat cell battery; manganese-dioxide cell according to IEC 6F22, alkaline-manganese cell according to IEC 6FR61 or suitable NiCd storage battery
Service Life	Withought backlight on using alkaline-manganese cell: approx. 220 hours on: V⎓ approx. 80 hours on: V~
Battery test	Automatic display of symbol when battery voltage drops below approx. 7V

Electromagnetic Capability

Emission	EN 61326 : 2022, Class B	
Immunity	IEC 61000-4-2	8 kV atmosphere discharge 4 kV contact discharge
	IEC 61000-4-3	3 V/m

Electrical Safety	IEC 61010-1:2010-06
Protection class	II
Measuring category	CAT IV 600V CAT III 1000V
Pollution degree	2
High voltage test	7.4 kVAC between housing and input 4.26 kVAC between jaws and input

Measured quantity/ measured range	Response Time		Transient response for step function of the measured quantity
	Analog indication	Digital display	
V⎓, V~, A~	0.7s	1.5s	0 to 80% of upper range limit
30 Ω to 3M Ω	1.5s	2s	0 to 50% of upper range limit
30MΩ	4s	5s	
→|←	0.7s	1.5s	
µF, °C	—	Max. 1 to 3s	0 to 50% of upper range limit
300 Hz to 3 KHz	—	Max. 2s	
30 to 100 KHz	—	Max 0.7s	
% (1 Hz)	—	Max 9s	
% (>=1Hz)	—	Max 2.5s	

Environmental Conditions

Functional temperature range	-10 to 50°C [14 to 122°F]
Storage temperature range	-25 to 70°C [-13 to 158°F] (w/o batteries)
Altitude	up to 2000m

Mechanical Configuration

Dimensions	3.5 x 10.6 x 2.8 in [90 x 270 x70 mm]	
Weight	1.3 lb [600g]	
Jaw Opening	300A model	1.4 in [35mm]
	1000A model	2.0in [51mm]

18.0 Maintenance

ATTENTION: Disconnect the meter from the measuring circuit before replacing the battery.

18.1 Battery

Before initial start-up, or after storage of your instrument, make sure that no leakage has occurred at the instrument battery. Repeat this inspection at regular intervals.

If battery leakage has occurred, electrolyte from the battery must be carefully and completely removed and a new battery must be installed, before the instrument can be placed back into operation.

If the  symbol appears in the LCD display, replace the battery as soon as possible. You can continue to take measurements, but reduced measuring accuracy may result.

Replacing the Battery

- Place the multimeter on its face, loosen the screw present on the rear side and remove the battery cover from bottom side.
- Remove the battery from the battery compartment and carefully disconnect battery connectors.
- Snap the battery connectors to a new 9V battery and insert the battery into the battery compartment.
- Tighten the battery cover with the screws.

18.2 Periodic Check-up

The clamp meter does not require any specific maintenance. The surface between jaws should be cleaned with a dry cloth before operating. Avoid use of cleaners, abrasives, or solvents.

19.0 Replacement Parts

Part Number	*Description*
ARD-PRB-STD	ARDENT standard tip test lead set, replacement, CAT IV 600V/CAT III 1000V, 48in length
ARD-PRB-FPT	ARDENT fine tip test lead set, replacement, CAT IV 600V/CAT III 1000V, 48in length
ARD-AG-CLP-1	ARDENT alligator clip set, CAT IV 600V/CAT III 1000V. For use with ARD-PRB-STD
ARD-CM-CASE-1	ARDENT carrying case, polyester canvas, 10.50 x 3.50 x 3.50in, 3 compartments.

ARDENT

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ARD-CM300ACDC
ARD-CM1000ACDC

Rev. A: 4/30/2025

Always check www.automationdirect.com for latest revision.