USER MANUAL

ARD-MM410

Digital Multimeter

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PAGE

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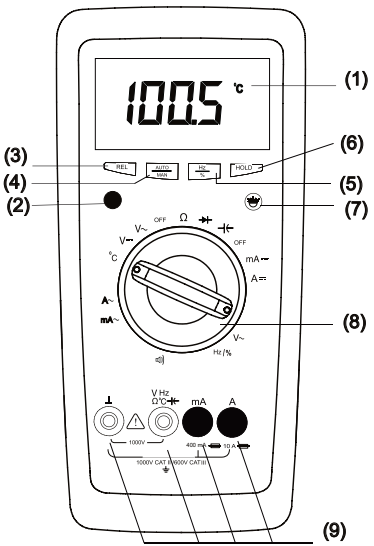
100.5
°C
REL
AUTO
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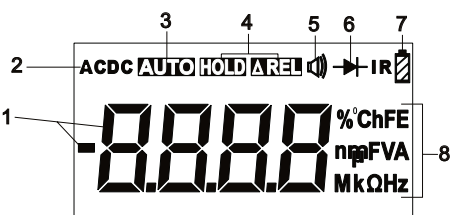
1
2
3
4
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7
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ACDC
AUTO
HOLD
REL
IR
%°ChFE
nμmFVA
MkΩHz

Multimeter Operating Elements

(1) LCD Display

(2) Multifunction Pushbutton (yellow)

(3) Pushbutton for relative value

(4) Automatic or Manual range

(5) Hz% for VAC & VDC

(6) Data HOLD

(7) Backlight (optional)

(8) Function selector for ON/OFF and measurement function selection

(9) Terminal sockets

LCD Display

1 Digital display w/ indication of decimal point and polarity

2 Selected current/voltage type

3 Automatic range selection

4 REL/HOLD

5 Continuity test: Beeper indicator

6 Diode measurement

7 Low battery

8 Unit of measured quantity

1.0 Safety Features and Precautions

This digital multimeter is manufactured in compliance with established safety regulations, and incorporates a high level of safety. 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.

For user safety and protection, this multimeter is fitted with an Automatic terminal Blocking System (ABS). It is coupled with the function selector switch which blocks the terminal sockets not necessary for 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.
- Avoid working alone in shock hazardous environment while carrying out measurement.
- The maximum allowable voltage between any terminal sockets and earth is 1000 V. Voltages of greater than 500 V may only be applied to sockets "⊥" and “V” with the selector switch in the voltage measurement position (selector switch in “V” position).
- 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 prior to each use, 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).

- Be particularly careful when measurements are made in high-frequency electrical circuits. Dangerous voltages may be present.
- Measurements under moist ambient conditions are not permitted.
- Do not exceed permissible overload limits of the measuring ranges. Limit values can be found in chapter 15.
- All current ranges are equipped with fuses. The maximum allowable voltage for the measuring current circuit (nominal voltage of the fuse) is equal to 600 V~.
- The instrument may only be used in power installations when the electrical circuit is protected with a 20 A fuse or circuit breaker, and the nominal voltage of the installation does not exceed 1000 V.

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

2.0 Initial Start-Up

Battery

Remove the rubber holster and install the provided AA batteries into the meter.

Please see chapter 16.1 for detailed instructions on battery installation.

Switching the Meter ON

Turn the Function selector switch from the OFF position to the desired measuring function.

When switching from the OFF position, all LCD segments are activated briefly.

A drawing of the LCD can be found on page 2.

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

ATTENTION: Before opening the battery compartment, disconnect meter from the measuring circuit and follow the instructions in chapter 16.

Automatic Turn-Off

The meter switches itself OFF automatically after 15 minutes if no keys or the selector switch have been activated during this time.

Switching the Meter back On

Activate the HOLD key or toggle the function selector switch.

Switching the Meter Off

Turn the selector switch to the OFF position.

3.0 Function and Range Selection

The function selector switch is coupled with the Automatic terminal Blocking System (ABS) which allows access only to two correct sockets for each function. Prior to switching to the "mA" or "A" functions or from the "mA" or "A" functions, remove the test lead from the corresponding socket. When the test leads are plugged-in, the terminal blocking systems prevents accidental switching to non-permissible functions.

3.1 Measuring Function Selection

The desired measuring function is selected with the function selector switch (white or yellow print).

To select the function printed in yellow, the yellow multifunction key must also be pressed. If the multifunction key is pressed again, the function printed in the white half circle is reactivated.

3.2 Automatic Measuring Range Selection

Automatic measuring range selection (autoranging) is available for all measuring ranges except for the ranges 400 mV~ and 10A. Autoranging is functional as soon as the meter is switched ON. According to the measured quantity applied, the meter automatically selects the measuring range which gives the best resolution.

3.3 Manual Measuring Range Selection

You can switch off autoranging, select, and fix the ranges manually according to Table 3.

First, select the desired measuring function with the function selector switch and, if appropriate, the multifunction key.

Press the AUTO/MAN key to initiate manual ranges. Use the AUTO/MAN key to select your desired resolution.

Manual mode is switched off by pressing and holding the AUTO/MAN key until a second acoustic signal is heard and the display switches to AUTO.

NOTE: When switching back to autoranging in the 400 mV~ range, the 4 V~ range is activated.

NOTE: For Temperature (C), Frequency (Hz), Duty Cycle (%), and Capacitance (F), measuring range is always AUTO. No manual range selection is possible.

AUTO/ MAN Key	Function	Acknowledgment	
		Display	Acoustic Signal
Brief	Manual Operation ON: Measuring range is defined Switching Sequence at:	N/A	1x
Brief	V⎓: 400mV→4V→400V→ 1000V→400mV→4V... V~: 4V→40V→400V→ 1000V→400mV... mA⎓: 40mA→400mA→40mA... MA~:40mA→400mA→40mA... Ω: 40MΩ→400MΩ→4KΩ→40KΩ→ 4MΩ→40MΩ...	N/A	1x
Long	Return to automatic range selection	AUTO	2x

Table 3

4.0 Liquid Crystal Display (LCD)

4.1 Digital Display

The digital display shows the measurement value, decimal point, and sign. The selected measuring unit and function 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. "OL" appears if the measuring range upper limit is exceeded. The digital display is updated three times per second for V, A, W, Cap Freq, and duty cycle measurements.

4.2 Display with Backlight

Pressing the ☼ key turns the backlight on and off to take readings in poor lighting conditions.

5.0 Beeper

The following steps are acknowledged by a sound signal:

- Activation or deactivation of the following functions: AUTO/MAN, REL, or HOLD, Hz/%, and Backlight.
- When measuring AC Voltage > 750 V, DC Voltage > 1000V, AC/DC mA > 400 mA, AC/DC A > 10 A, the beeper will continue sounding as the overload warning.
- Approximately 1 minute before the meter is automatically powered off, the beeper will sound 5 times. Before the meter is powered off, the beeper will sound one long time to warn the user.

6.0 Measurement Value Storage Hold

By pressing the HOLD key, the currently displayed measurement value can be "held," and "HOLD" is simultaneously displayed on the LCD.

The HOLD display is switched off if:

- the HOLD key is reactivated.
- the function selector switch is operated.
- the yellow multifunction key is activated for a change of function (AC→DC).
- the REL key is activated.
- the AUTO/MAN key is activated.

7.0 Relative Value Measurement

Press the REL key to display relative value. All functions can be used for relative value measurement except Hz/duty.

8.0 Voltage Measurement

Turn the function selector switch to V⎓.

NOTE: The measuring range 400mV~ can only be selected with the AUTO/MAN key.

ATTENTION: Make certain that the current ranges ("mA" or "A") are deactivated and that the measurement cables are connected to the correct terminals, "V and ⊥ ", before connecting your multimeter for the measurement of voltage. If the fuse tripping limit values are exceeded due to operator error, both the operator and the instrument are in danger. Observe the voltage limit values as printed on the meter.

Select the respective voltage type which corresponds to the measuring value by briefly pressing the yellow multifunction key. Each activation of the key causes alternate switching between AC and DC, as well as acknowledgment by means of a sound signal. The symbols DC and AC indicate the selected voltage type in the LCD display.

Connect the test leads as shown in figure 1. Insert black probe into the "⊥" terminal and red probe into the “V” terminal. After selection of the function with the selector switch, the voltage type DC is always activated.

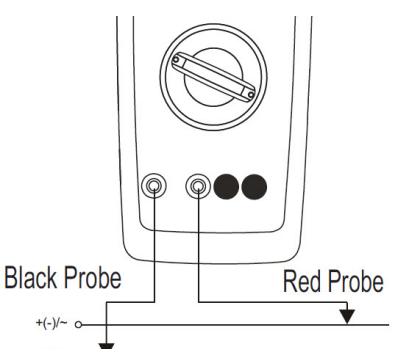

Fig. 1 Voltage Measurement

9.0 Current Measurement

ATTENTION: Switch off the power supply to the measuring circuit and/or the load and discharge and capacitors which might be present.

1 Select function A with the function selector switch for currents >400 mA, or function mA for currents <400 mA. When measuring currents of unknown magnitude, select the highest measuring range first.

2 Select the function corresponding to the measured quantity by briefly pressing the yellow multifunction key. Each time the key is pressed, alternate switching takes place between AC and DC, and changeover is acknowledge by sound signal. The symbols DC and AC indicate the selected current type in the LCD display. After selection of this function with the selector switch, the current type DC is always activated.

3 Connect the measuring instrument in series to the load as shown in figure 2 (without contact resistance).

Notes on Current Measurement:

- The meter must be used only in power systems when the current circuit is protected with a 20 A fuse or circuit breaker and the nominal voltage of the system does not exceed 600 V.
- Make the measuring circuit connections mechanically strong and secure so that they do not accidentally open. The conductor cross sections and connection points should be designed to avoid excessive heating.
- Current ranges up to 400 mA are protected with a FF1.6 A/600 V fuse.
- In the 400 mA measuring range an intermittent sound signal warns if the measurement value has exceeded the measuring range upper limit value.

- The 10 A current measuring range is protected with a 16 A/600 V fuse.
- If a fuse blows, eliminate the cause of the overload before placing the meter back into operation.
- Fuse replacement is described in chapter 16.2.

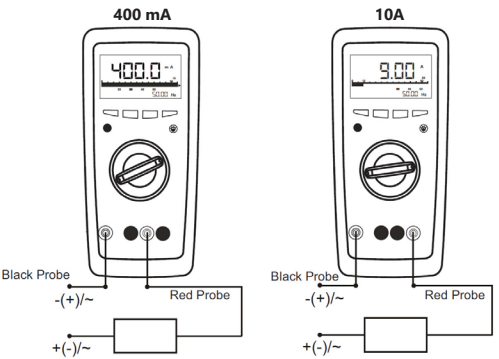

Fig. 2 Current Measurement

9.1 AC Measurement with (Clip-On) Current Transformers

9.1.1 Transformer Output mA/A

ATTENTION: If current transformers are operated with an open circuit on the secondary side, e.g. due to defective or disconnected leads, a blown fuse in the meter or a wrong connection, dangerously high voltages can occur at the connections. For this reason, verify that the current circuit of the multimeter and secondary winding of transformer connected to the multimeter form an intact circuit. Connect the transformer to the sockets ⊥ and mA or A .

Connect the transformer to the sockets ⊥ and mA or A .Some current transformers include safety devices, which prevent dangerous voltage increases at open electrical circuits. The maximum allowable operating voltage at the primary conductor is equal to the nominal voltage of the current transformer. When reading the measurement value, consider the transformation ration of the transformer, as well as additional display error.

9.1.2 Transformer Output mV/A

Some transformers have a voltage output (designation: mV/A). Consequently, the secondary connection must be connected to ⊥ and V.

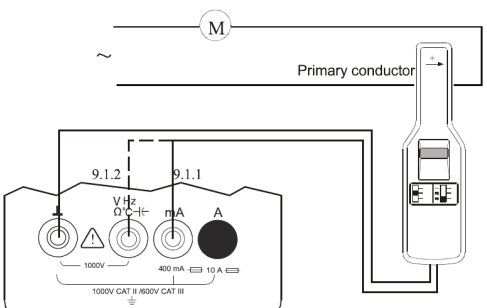

Fig. 3

10.0 Resistance Measurement

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

- Set the function selector switch to "Ω".
- Connect the device under test as shown in figure 4.

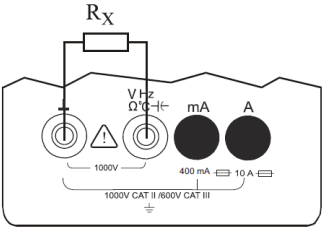

Fig. 4

Zero Adjustment (Relative Mode)

In the measurement of resistance, the inherent error of the meter and the resistance of leads can be eliminated by zero adjustment.

- Short the leads connected to meter
- Press REL key

The instrument acknowledges zero adjustment with a sound signal, and value close to 00 and REL are displayed on LCD.

The resistance measured at the moment the REL key is pressed serves as a reference value. This value is then automatically subtracted from all measured value.

Deleting Zero Adjustment

Short the leads connected to meter and then press REL key or activate the function selector switch. Alternatively, switch the Multimeter off.

11.0 Diode Testing & Continuity Measurement

11.1 Diode Testing

ATTENTION: First, switch off the power supply to the measuring circuit and/or the load and discharge and capacitors which might be present.

- Set the function selector switch to "→|←".
- Connect the device under test as shown.

Conducting Direction and Short-Circuit

The measuring instrument displays the forward voltage in volts. As long as the voltage drop does not exceed the maximum display value of 1.000 V, several elements connected in series may be tested.

Reverse Direction or Interruption

The measuring instrument displays a voltage of "**OL**."

NOTE: Resistors and semiconductor paths in parallel to the diode distort the measurement results.

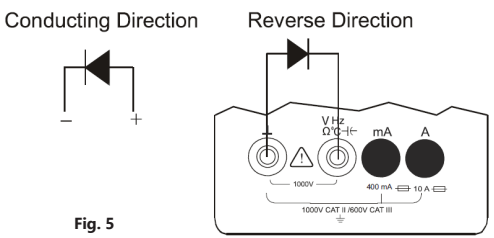

Fig. 5

11.2 Continuity Testing

ATTENTION: First, switch off the power supply to the measuring circuit and/or the load and discharge and capacitors which might be present.

- Set the selector switch to "→|←".
- Press the yellow multifunction key to switch to the continuity measuring range. Display of the symbol is activated.

The instrument generates a continuous sound signal at a measured resistance of < 75 Ω.

Connect the device under test as shown in figure 5.

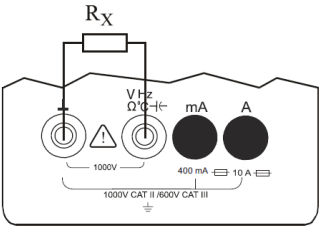

Fig. 6

12.0 Capacitance Measurement

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

Set the function selector switch to "F".

Ensure the device under test is discharged. Connect the device under test to socket "⊥" and "F" with measurement leads. Polarized capacitors must be connected to the "⊥" socket at the "—" pole.

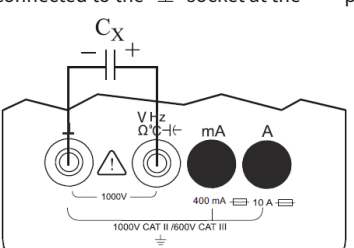

Fig. 7

NOTE: Resistors and semiconductor paths in parallel to the capacitor distort the measurement results. To measure small value capacitors please use short measurement cables. If ▨ is displayed, the measured values are not valid.

Zero Adjustment (Relative Mode)

For the measurement of small capacitance values in the 5 nF and 50 nF ranges, the inherent error of the meter and the capacitance of the leads can be eliminated by zero adjustment.

- Connect the leads to the meter before connecting them to the device.
- Briefly press the REL key.

The multimeter acknowledges zero adjustment with an sound signal, and a value close to "00.00" and REL are displayed at the LCD. The capacitance measured at the moment the key is activated serves as a reference value. This value is then automatically subtracted from all measured values.

Deleting Zero Adjustment

There are three ways to delete the zero adjustment:

- Press REL key
  - Clearance is acknowledged by beeper sound
- Activate the function selector switch
- Switch the multimeter off

13.0 Frequency & Duty Cycle Measurement

13.1 Frequency Measurement

Set the function selector switch to VAC and press Hz/% key, as shown on page 19. The frequency measurement mode is activated. “Hz” symbol is displayed on the LCD. The digital display is expanded to 9999 digits. Only auto mode is possible, no manual range is possible.

Connections are made the same way as for voltage measurement.

The lowest measurable frequencies and the maximum allowable voltages can be found in chapter 15 "Specifications."

13.2 Duty Cycle Measurement

Use duty cycle measurement to determine the ratio of pulse duration to cycle time of recurring square wave signals. The duty cycle that is the percentage pulse duration of signal is displayed on LCD:

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

Note : The applied frequency must remain constant during the duty cycle measurement.

Set the function selector switch to VAC and press Hz/% key twice as shown in figure 8. The duty cycle (%) mode is activated. “%” symbol is displayed on LCD.

NOTE : Hz/% key is only applicable for VAC.

Connections are made the same way as voltage measurement shown in figure 8.

The lowest measurable frequencies and the maximum allowable voltages can be found in chapter 15 "Specifications."

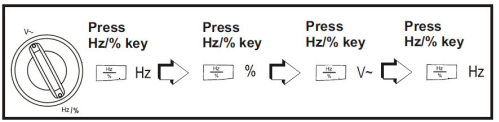

Fig. 8

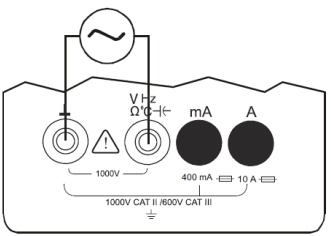

Fig. 9

14.0 Temperature Measurement

The multimeter measures temperature with the included K-type adapter and thermocouple (NiCr-Ni) in the range 0°C to 1300°C. Set the function selector switch to °C. Connect the sensor as shown in figure 10.

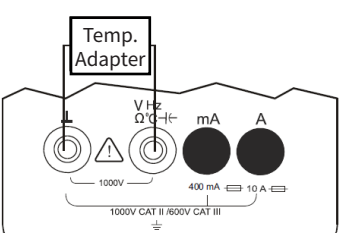

Fig. 10

15.0 Specifications

Measuring Function	Measuring Range	Resolution	Input Impedance V(AC) V(DC)
V~	400.0 mV	100 mV	>20 MW
	4.000 V	1 mV	11 MW
	40.00 V	10 mV	10 MW
	400.0 V	100 mV	10 MW
	1000 V	1 V	10 MW
V⎓	400.0 mV	100 mV	11 MW
	4.000 V	1 mV	11 MW
	40.00 V	10 mV	10 MW
	400.0 V	100 mV	10 MW
	1000 V	1 V	10 MW
			Approx. voltage drop at max. meas. current
A~	40.00 mA	10 mA	450 mV
	400.0 mA	100 mA	4.2 V
	10.00 A [1]	10 mA	750 mV
A⎓	40.00 mA	10 mA	450 mV
	400.0 mA	100 mA	4.2 V
	10.00 A [1]	10 mA	750 mV
			Open-circuit voltage
Ω	400.0 W	100 mW	Approx. 0.45 V
	4.000 kW	1 W	
	40.00 kW	10 W	
	400.0 kW	100 W	
	4.000 MW	1 kW	
	40.00 MW	10 kW	
🔊	400.0 W	100 mW	
→|←	1.000 V	1 mV	Approx. 1 V
F	5.000 nF	1 pF	
	50.00 nF	10 pF	
	500.0 nF	100 pF	
	5.000 mF	1 nF	
	50.00 mF	10 nF	
	200.0 mF	100 nF	
			f_{min}
Hz [2]	10.000 Hz	0.001 Hz	1 Hz
	100.00 Hz	0.01 Hz	1 Hz
	1.0000 kHz	0.1 Hz	1 Hz
	10.000 kHz	1 Hz	1 Hz
	100.00 kHz	10 Hz	1 Hz
	500.0 kHz	100 Hz	1 Hz
%	2.0 to 98.0%	0.1%	---
			Sensor
°C	0 to 1300°C	1°C	K-type NiCr-Ni

1) Max. 12A/5min — 16A/30sec

2) Indication for frequency measurement expanded to 9999 digits

Measuring Function	Measuring Range	Digital Display Deviation ±(% of RDG+digits)	Overload Capacity [1]	
			Overload Value	Overload Duration
V~	400.0 mV	0.75+2	1050 V(DC)	Continuous
	4.000 V	0.5+2		
	40.00 V			
	400.0 V			
	1000 V			
V⎓	400.0 mV	1.5+5	1050 V(AC) rms	Continuous
	4.000 V	1+5		
	40.00 V			
	400.0 V			
	1000 V	1+10		
A~	40.00 mA	0.8+2	480 mA	Continuous
	400.0 mA			
	10.00 A [4]	1.5+5	12A	5 min
			16A	30 sec
A⎓	40.00 mA	1+5	480 mA	Continuous
	400.0 mA			
	10.00 A [4]	2+5	12A	5 min
			16A	30 sec
Ω	400.0 W	0.8+5	500 V DC/AC rms	10 min
	4.000 kW	0.8+2		
	40.00 kW			
	400.0 kW			
	4.000 MW	1+5		
	40.00 MW	2+5		
🔊	400.0 W	Acoustic signal for 0...<75W (approx)		
→|←	1.000 V	2+10		
F	5.000 nF	3+40 [2]	500 V DC/AC rms	10 min
	50.00 nF	2+10 [2]		
	500.0 nF	0.5+3 [2]		
	5.000 mF	1+2 [2]		
	50.00 mF	1.5+2 [2]		
	200.0 mF	5+10 [3]		
Hz [4]	10.000 Hz	0.2+2	<1 kHz : 1000V <10 kHz : 400 V <500 kHz : 40 V except 400 mV	Continuous
	100.00 Hz			
	1.0000 kHz			
	10.000 kHz			
	100.00 kHz			
	500.0 kHz			
%	2.0 to 98.0%	10 Hz...1 kHz : +5D 1 kHz...10 kHz : +5D/kHz		
°C	0 to 1300°C	2+3	500 V DC/AC rms	10 min

1) At 0°C to 40°C
2) With zero adjustment REL
3) Time required for measurement approx. 60 seconds
4) Indication for frequency measurement expanded to 9999 digits

Reference Conditions

Ambient Temperature	+ 23 °C ± 2 K
Relative Humidity	45% to 55%
Measuring Magnitude Frequency	Sine, 50 Hz
Measuring Magnitude Waveform	Sine
Battery Voltage	3 V ± 0.1 V

Ambient Conditions

Working Temperature Range	-10°C to 50 °C
Storage Temperature Range	- 25°C to 10°C
Climate Classification	2z/-10/50/70/75% (without batteries) in compliance with VDI/ VDE 3540
Relative Humidity	45 to 75%
Elevation	to 2000 m

Display

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

Digital

Display Character Height	7 segment digits/ 1 mm
Number of Places	3 3/4 place 3999 steps
Overflow Display	"OL"
Polarity Display	"–" sign is displayed when plus pole is at "⊥"
Measuring Rate	3 measurements/second

Influence Quality and Effects

Influence Variable	Influence Range	Meas. Magnitude/ Measuring Range	Influence Effect
Temp.	0°C to 21°C and 25°C to 50°C	V⎓ V~ mA/A⎓ mA/A~ Ω F Hz Duty(%) °C	0.1 x intrinsic error/k

Influence Variable	Influence Range (max. Resolution)	Frequency	Intrinsic Error at Ref. ±(% of RDG+D)
Frequency VAC	4, 40, 400 V	20Hz ... <50Hz > 750Hz ... 1 kHz	2+3
	400 mV,1000 V	20Hz ... <50Hz >50Hz ... 500Hz	2+3

Influence Variable	Influence Range	Meas. Magnitude/ Measuring Range	Influence Effect
Relative Humidity	55 to 75%	V≂ mA/A≂ Ω F Hz Duty(%) °C	1 x intrinsic error

Influence Variable	Interference Magnitude	Measuring Angle	Attenuation
Common Mode Interference Voltage	1000 V DC/AC 50 Hz sine	All V DC	> 100 dB
	1000 V DC	All V AC	> 100 dB
	1000 V AC 50 Hz sine	400 mV / 4V AC	> 55 dB
		40 V AC	> 55 dB
		400 V AC	> 43 dB
		1000 V AC	> 23 dB
Series Mode Interference Voltage	max.1000 V AC 50/60 Hz sine	V DC	> 43 dB
	max.1000 V DC	V AC	> 55 dB

Aux. Voltage Influence (Without "▨" display) - all ranges except:
cap. ± 8 D
cap. range ±20 D

Power Supply

Battery	2 x 1.5 V (AA) mignon cell zinc-carbon cell per IEC R6 alkaline manganese cell per IEC LR6
Service Life	With zinc-carbon cell: approx. 300 hr. With alkaline manganese cell: approx. 600 hr.
Battery Test	Automatic display of the symbol "▭" when battery voltage falls below approx. 2.4 V

Fuse

Fuse for >400 mA	FF 1.6 A/ 600 V; 6.3 mm x 32 mm; protects all current measuring ranges up to 400 mA in
Fuse for 10 A	FF 16 A / 600 V; 6.3mmx32 mm Protects all current measuring ranges up to 10 A

Electromagnetic Compatibility

EMC Immunity	IEC 61326-1:2012,Table A.1 IEC 61000-4-2 8 KV atmosphere discharge 4 KV contact discharge IEC 61000-4-3 3V/m

Short-term measured value deviation may occur during electro-magnetic interference thus reducing the specified operating quality.

Electrical Safety

Installation Category	IEC 61010-1-2010 600V CAT III/ 1000V CAT II
Pollution Degree	2
High Voltage Test	3.7 kV-(IEC 61010-1-2010)

Mechanical Design

Protection	For meter : IP 52 For Terminals : IP 20
Dimensions	W x H x D (in [mm])
With Holster	3.4 x 7.4 x 2.1 [86 x 188 x 53]
Without Holster	3.1 x 6.9 x 1.5 [79 x 174 x 38]
Weight	Approx. 1.1 lb [.480 kg] with battery

16.0 Maintenance

ATTENTION: Disconnect the instrument from the measuring circuit before opening the instrument to replace the battery or the fuse.

16.1 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, you should change the battery as soon as possible. You can continue to take measurements, but reduced measuring accuracy may result.

Replacing the Batteries

Unscrew the battery compartment cover from base housing. No need to remove whole base housing.

Remove the batteries from the battery compartment Insert two new 1.5 V AA cells in accordance with the polarity symbols in the battery compartment.

Screw the base housing cover to front housing. Dispose of the dead batteries in an environmentally sound fashion. Refer to local regulations and guidelines for designated collection points or recycling facilities.

16.2 Fuses

The 16 A fuse interrupts the 10 A current measuring range, and the 1.6 A fuse the mA current measuring ranges. All other measuring ranges continue to function.

If a fuse blows, eliminate the cause of the overload before placing the instrument back into operation.

See Replacement Parts table on page 28.

Replacement of Fuses

- Turn off the meter and disconnect it from any measurement circuit.
- Remove the defective fuse using a test prod or similar tool.
- Install a new fuse, ensuring it makes proper contact.

Only use the specified fuses:

For current measuring ranges up to 400mA:

- Type: FF 1.6A / 600 V~
- Size: 6.3mm × 32mm

For the 10A measuring range:

- Type: FF 16A / 600 V~
- Size: 6.3mm × 32mm

ATTENTION: Use only the fuses specified above. Using a fuse with different specifications may place the operator, the system, and the measuring instrument in danger. Using repaired fuses and short-circuiting of the fuse holder is prohibited.

Fuse Testing

- Remove the fuse to be tested
- Set selector switch to "→|←"
- Press yellow function key to select "))"
- Plug measurement cable into the "V, Ω, →|←, F" socket
- Measure the resistance of the fuse
- A continuous audible signal and the display of approx. 10.2 Ω indicate that the fuse for the mA current is acceptable
- A continuous audible signal and the display of approx. 0.0 Ω indicates that the fuse for the A current range is acceptable
- If a value other than those indicated above, or it "OL" is displayed, the fuse must be replaced

16.3 Housing

No special maintenance is required for the housing. Excessive contamination has an adverse effect on isolation and reduces input resistance. The surface must be kept clean for this reason. Use a slightly dampened cloth for cleaning. Avoid the use of cleansers, abrasives or solvents.

17.0 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-CLCT-1	ARDENT clamp-on current probe, CAT III 600V, 1-1000A
ARD-CM-CLCT-5	ARDENT clamp-on current probe, CAT III 600V, 10-1000A
ARD-TPA1	ARDENT temperature adapter and thermocouple
ARD-FS1P6A	ARDENT fuse, replacement, 1.6A
ARD-FS16A	ARDENT fuse, replacement, 16A
ARD-MM-BT-1	ARDENT rubber holster, replacement
ARD-MM-CASE-1	ARDENT carrying case, polyester canvas, 9.50 x 4.50 x 4.50in, 2 compartments

ARDENT

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Always check www.automationdirect.com for latest revision.