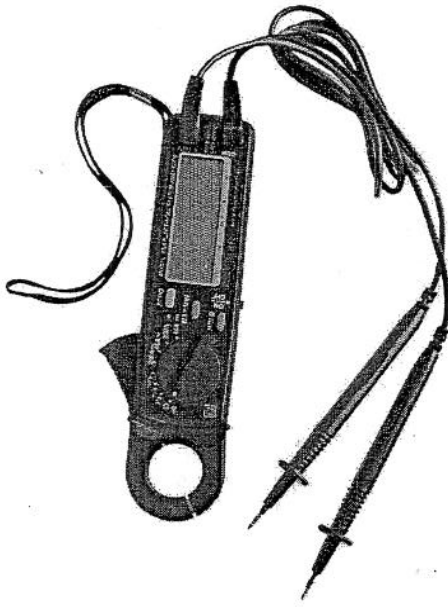


Electrical System Analyzer

Model: ESA

User's Manual



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EN 61010-2-032

CAT II 600V

CAT III 300V

Pollution Degree 2

Definition of Symbols:



Caution: Refer to Accompanying Documents



Caution: Risk of Electric Shock



Double Insulation

Overvoltage Category I (CAT I):

Equipment for connection to circuits in which measures are taken to limit the transient overvoltages to an appropriate low level.

Overvoltage Category II (CAT II):

Energy-consuming equipment to be supplied from the fixed installation.

Overvoltage Category III (CAT III):

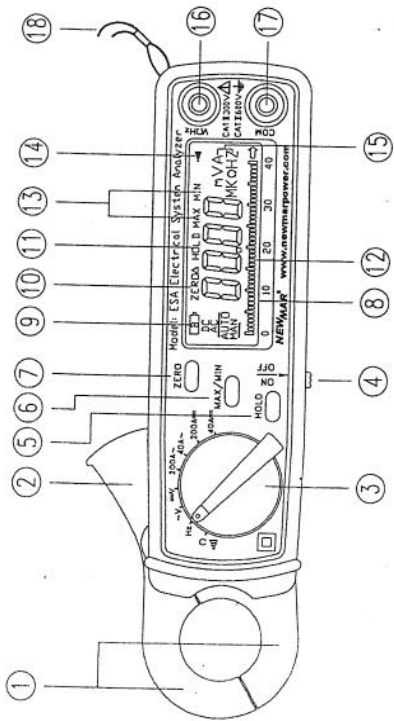
Equipment in fixed installations.

WARNING: If the ESA is used in a manner Not specified by the manufacturer, the protection provided by the meter may be impaired.

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- 1. Features
 - 1. Accurate DC/AC digital clamp meter for current measurement.
 - 2. 10mA high resolution on 40A DC/AC range.
 - 3. One touch zero for DCA adjustment.
 - 4. 23 mm diameter jaw.
 - 5. Large 3 3/4 digits LCD
 - 6. Fast bar graph display (20 times/sec.) for transient observation.
 - 7. Continuity and frequency measurements.
 - 8. Max/Min and Data Hold functions.
 - 9. 600V overload protection for ohm measurement.
 - 10. Easy single rotary switch for any function selection.
 - 11. Ideal for work in areas with restricted space.

2. Meter Description



1. Transformer Jaw

This is used to pick up current signal. To measure DC/AC current, conductor must be enclosed by the jaw.

2. Transformer Trigger

This is used to open the jaw.

3. Function Selector Switch

This is used to select the function user desired, such as DCA, ACA, DCV, ACV, Hz, Ohm and Continuity.

4. On/Off Switch

This is used to turn the power on or off.

5. Data Hold Button

Once this button is pushed, the reading is held on the LCD. Press again to release it.

6. Max/Min Hold Button

This button is used to enable the maximum or minimum value to be displayed and updated during measurement. Press once, minimum value is displayed and updated. Press again, maximum value is displayed and updated. Press again (the third push), meter returns to normal measurement mode. Zero function will be disabled if MAX/MIN is enabled.

7. Zero/Relative Button

Once this button is pressed, the current reading is set to zero and is used as a zero reference value for all other subsequent measurements. The function is also used to remove offset value caused by the residual magnetism remaining in the core for the DC current measurement. The Zero/Relative function will be disabled if the MAX/MIN button is pressed.

8. LCD

This is a 3 3/4 digit Liquid Crystal Display with maximum indication of 3999. Function symbols, units, bar graph, sign, decimal points, low battery symbols, max/min symbols, and zero symbol are included.

9. Low Battery Symbol

When this symbol appears, it means the battery voltage has dropped below the minimum required voltage. Refer to Section V for battery replacement.

10. Zero/Relative Symbol

When this symbol appears, it means a reference value has been subtracted from the actual reading. The reading shown is an offset value. Press and hold the zero button for 2 seconds to disable this function.

11. Data Hold Symbol

Once the hold button is pressed, this symbol appears on LCD.

12. Bar graph

The bar graph has forty segments. It displays segments proportional to the actual reading. Each segment represents one count.

13. Max/Min Hold Symbol

Once the max/min button is pressed, either MAX or MIN shall be displayed on LCD

14. Continuity Symbol

If ohm and continuity function is selected, this symbol appears on LCD.

15. Unit Symbols

Once a function is selected, corresponding unit (V, Ω , A, or Hz) is displayed on LCD.

16. V Ω Hz Input Terminal

This terminal is used as input for voltage, ohm/continuity, or frequency measurements.

17. COM Terminal

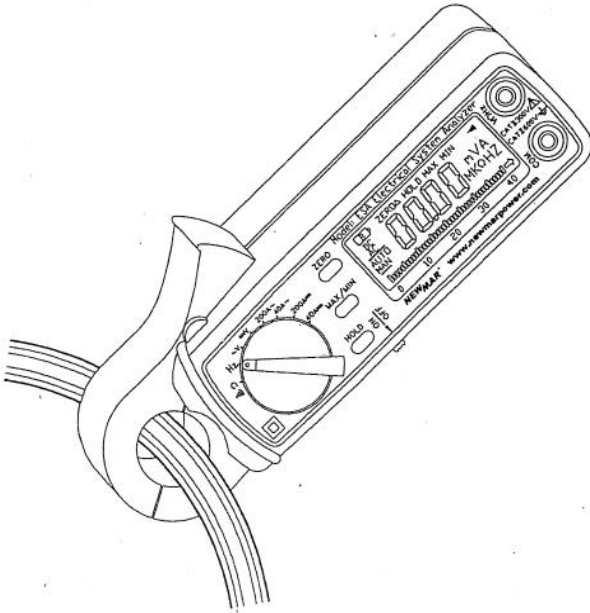
This terminal is used as common reference input.

18. Hand Strap

Put your hand through the strap to avoid accidentally dropping the meter.

3. Operation Instructions

3.1. DC/AC Current Measurements



WARNING: Make sure that all the test leads are disconnected from the meter's terminals for current measurement.

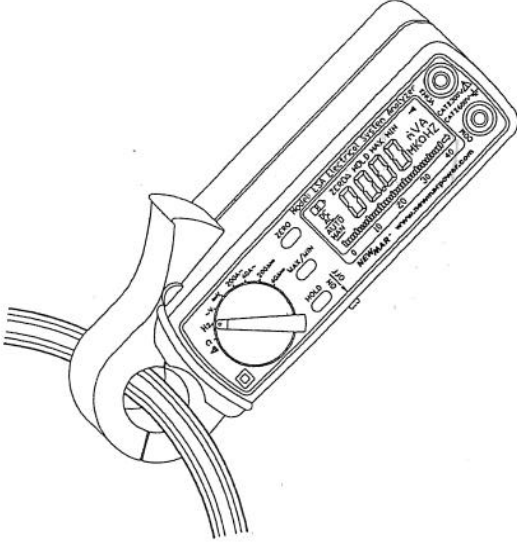
3.1.1. DC Current

- Set the rotary switch at 40A DC or 200A DC.
- Push the zero button to adjust the reading to zero.
- Press the trigger to open the jaw and fully enclose the conductor to be measured. No air gap is allowed between the two half jaws.
- Read the measured value from the LCD display.

3.1.2. AC Current

- Set the rotary switch at 40A AC or 200A AC
- Press the trigger to open the jaw and fully enclose the conductor to be measured. No air gap is allowed between the two half jaws.
- Read the measured value from the LCD display.

3.2. DC/AC Voltage Measurements



WARNING: Maximum input for DC V is 600, and for AC V is 600. Do not attempt to take any voltage measurement that exceeds the limits. Exceeding the limits could cause electrical shock and damage to the meter.

3.2.1. DC Voltage

- Set the rotary switch at V DC.
- Insert the test leads into the input jack.
- Connect the test prods of the test leads in PARALLEL to the circuit to be measured.
- Read the measured value from the LCD display.

3.2.2. AC Voltage

- Set the rotary switch at V AC
- Insert the test leads into the input jack.
- Connect the test prods of the test leads in PARALLEL to the circuit to be measured.
- Read the measured value from the LCD display.

WARNING: Before taking any in-circuit resistance measurement, remove power from the circuit being tested and discharge all the capacitors.

3.3. Resistance and Continuity Measurement

- 3.3.1. Set the rotary switch at Ω
- 3.3.2. Insert the test leads into the input jack.
- 3.3.3. Connect the test prods of the test leads to the two ends of the resistor or circuit to be measured.
- 3.3.4. Read the measured value from the LCD display.
- 3.3.5. If the resistance is lower than 40Ω , a beeping will be heard.

3.4. Frequency (Hz) Measurement

- 3.4.1. Set the rotary switch at Hz.
- 3.4.2. Insert the test leads into the input jack.
- 3.4.3. Connect the test prods of the test leads in PARALLEL to the signal or circuit to be measured.
- 3.4.4. Read the measured value from the LCD display.

3.5. Relative Reading Measurements

The zero button also can be used to make a relative measurement. Once the button is pushed, the current reading is set to zero and a zero symbol is displayed on LCD. All the subsequent measurements will be displayed as a relative value with respect to the value being zeroed. Press the zero button for 2 seconds to return to normal mode. Note: This function is disabled if MAX/MIN function is enabled. Watch for symbol displayed on LCD.

3.6. Holding the LCD Reading

Press the HOLD button. The reading will be held and kept on LCD.

3.7. Finding the MAX/MIN Value

Press the MAX/MIN button to enable the maximum and minimum values to be recorded and updated during measurement. Push the button once, the maximum value is displayed and updated. Push again (second push), the minimum value is displayed. Push again (third push), MAX/MIN function is disabled and returned to the normal measurement mode. If MAX/MIN button is pressed, the ZERO function will be disabled and the ZERO symbol will disappear from LCD.

4. Specifications (23°C±5°C)

DC Current:

Range	Resolution	Accuracy	Overload Protection
40A	10mA	±1.0%±2dgts	DC 400A
0-150A	100mA	±1.0%±2dgts	DC 400A
150-200A	100mA	±2.2%±2dgts	DC 400A

AC Current:

Range	Resolution	Accuracy		Overload Protection
		50/60 Hz	40 – 1KHz	
40A	10mA	±1.0%±3dgts	±1.5%±4dgts	AC 400A
0-150A	100mA	±1.0%±3dgts	±1.5%±4dgts	AC 400A
150-200A	100mA	±2.2%±3dgts	±2.5%±4dgts	AC 400A

DC Voltage: (Input Impedance: 10M Ω)

Range	Resolution	Accuracy	Overload Protection
400V	0.1V	±1.0%±2dgts	DC 1000V

AC Voltage: (Input Impedance: 10M Ω)

Range	Resolution	Accuracy		Overload Protection
		50/60 Hz	40 – 1KHz	
400V	0.1V	±1.5%±2dgts	±2.0%±4dgts	AC 800V


Resistance (Ω) and Continuity: (open voltage 0.4V)

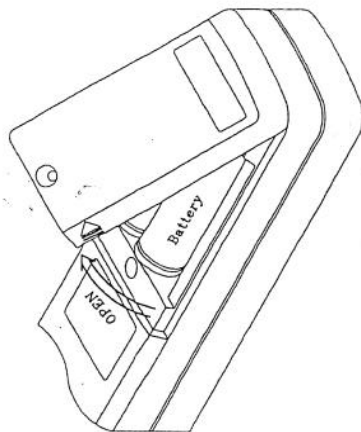
Range	Resolution	Accuracy	Beeping	OL Protection
40-400 Ω	0.1 Ω	±1.0%±2dgts	< 40.0 Ω (approx.)	AC 600V

5. Battery Replacement

Range (Hz)	Resolution (Hz)	Accuracy	Sensitivity	Overload Protection
100-100K	0.01 - 100	$\pm 0.5\% \pm 2$ dgts	10V	AC 600V

Indoor Use

- Conductor Size: 23mm max. (approx.)
 Battery Type: two 1.5V SUM-3
 Display: 3 3/4 LCD with 40 seg. bargraph
 Range Selection: manual
 Overload Indication: far left digit blinks
 Power Consumption: 10 mA (approx.)
 Low battery Indication: 
 Sampling Time: 2 times/sec. (display)
 Operating Temperature: 20 times/sec. (bar graph)
 Operating Humidity: -10°C to 50°C
 Altitude: less than 85% relative
 up to 2000M
 Storage Temperature: -20°C to 60°C
 Storage Humidity: less than 75% relative
 Dimension: 183mm (L) x 63.6mm (W) x 35.6mm (H)
 7.2" (L) x 2.5" (W) x 1.4" (H)
 Weight: 190g (battery included)
 Accessories: Carrying bag x 1
 Users manual x 1
 1.5V battery x 2



When the low battery symbol is displayed on the LCD, replace the old batteries with two new batteries.

- 5.1. Turn the power off and remove the test leads from the meter.
- 5.2. Remove the screw of the battery compartment.
- 5.3. Lift and remove the battery compartment.
- 5.4 Remove the old batteries.
- 5.5. Insert two new 1.5V "AA" batteries.
- 5.6. Replace the battery compartment and secure the screw.

6. Maintenance & Cleaning

Servicing not covered in this manual should only be performed by qualified personnel. Repairs should only be performed by qualified personnel. Periodically wipe the case with a damp cloth and detergent; do not use abrasives or solvents.