

auto range, true rms

ACA LEAKAGE TESTER

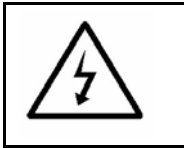
Model : DL-9954



Your purchase of this ACA LEAKAGE TESTER marks a step forward for you into the field of precision measurement. Although this ACA LEAKAGE TESTER is a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

Caution Symbol



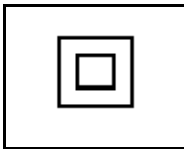
Caution :

- * Risk of electric shock !

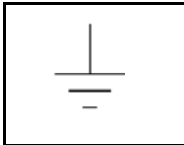


Caution :

- * Do not apply the overload voltage, current to the input terminal !
- * Remove test leads before open the battery cover !
- * Cleaning - Only use the dry cloth to clean the plastic case !



- * Double insulation



- * Function earth

Environment Conditions

- * Jaw Section : CAT III 600 V, 600 A.
- * Terminal : CAT II 600 V.
- * Pollution Degree 2.
- * Altitude up to 2000 meters.
- * Relative humidity 80% max.

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1. FEATURES

- * High precision AC mA measurement, it is useful for AC mA leakage current measurement.
- * Measure AC mA on the inductive conductor.
- * Design meet IEC 1010 CATIII 600V safety requirement.
- * 4000 counts, auto range and multi-functions.
- * Measurement for ACA, ACV, DCV, Ohms, Diode, Continuity beeper.
- * True RMS measuring reading for ACV and ACA function.
- * Two AC leakage current range : 40 mA, 400 mA .
- * Two AC current range : 40 A, 120 A.
- * Data hold.
- * Relative measurement.
- * Crystal time base, high quality.
- * LCD display allows clear readout-out even at high ambient light level.
- * LSI circuit provides high reliability and durability.
- * Overload protection circuit is provided for all range.
- * Compact & heavy duty ABS housing fireproof plastic case.



2. SPECIFICATIONS


2-1 General Specifications

Display	10.8 mm (0.43") LCD, 4 digits, Max. indication 4000.
Measurement Range	ACA, ACV, DCV, Ohms, Diode, Continuity beeper, Relative.

Polarity	Automatic Switching, " - " indicates negative polarity.
Over-input	Indication of " OL ".
Sampling Time	Approx. 0.35 second.
Battery	2 x 1.5 V AA (UM-3) batteries.
Operating Temperature	0 to 50 °C (32 to 122 °F).
Operating Humidity	Less than 80% RH.
Weight	251 g/0.55 LB (including battery).
Dimension	HWD : 191 x 64.5 x 36.1 mm (7.5 x 2.5 x 1.4 inch)
Max. Jaw Open Size	16.0 mm (0.63 inch) Dia.
Accessories Included	Operation manual..... 1 PC. Test lead (red & black)..... 1 PC.
Optional Accessories	Carrying case, CA-52A Light Adapter, Anemometer Adapter, Pressure Adapter, Humidity Adapter, Tachometer Adapter, Sound level Adapter, High Voltage Probe.

2-2 Electrical Specifications (23± 5 °C)

Function	Range	Resolution	Accuracy	Overload Protection
DCV	400 mV DC only	0.1 mV	± (0.5 % + 2d)	 AC/DC 600V
ACV (true rms)	4 V	0.001V	DCV :	
	40 V	0.01V	± (1 % + 2d)	
	400 V	0.1 V	ACV :	
	600 V	1 V	± (1.2 % + 5d)	
ACA Leakage (true rms) 0.1 to 400 mA	40 mA	0.01mA	± (1.5 % + 3d)	
	400 mA	0.1mA		
ACA (true rms) 0.01 to 120 A	0 to 39.99 A	0.01 A	± (1.5 % + 3d)	AC 120A
	40 to 100 A	0.1 A		
	100.0 to 120 A	0.1 A	± (3 % + 3d)	
<i>Remark</i>	<ul style="list-style-type: none"> * True RMS measuring reading for ACV and ACA function. * Input impedance for ACV & DCV range is 10 Meg ohm. * ACA, ACV frequency response is from 40 to 1 KHz. * ACA, ACV specification be tested on sine wave 50/60 Hz. 			

Function	Range	Resolution	Accuracy	Overload Protection
Ohms	400 ohm	0.1 ohm	$\pm (1 \% + 5d)$	 AC / DC 400 V
	4 K ohm	1 ohm		
	40 K ohm	10 ohm		
	400 K ohm	100 ohm	$\pm (2 \% + 2d)$	
	4 M ohm	1 K ohm		
	40 M ohm	10Kohm		
Diode	Short/non conductance, good/defect test.			
Continuity	If measuring resistance is less than 10 ohm, the beeper will sound .			

Remark :

** Spec. tested under the environment RF Field Strength less than 3 V/M & frequency less than the 30 MHz only.*

3. FRONT PANEL DESCRIPTION

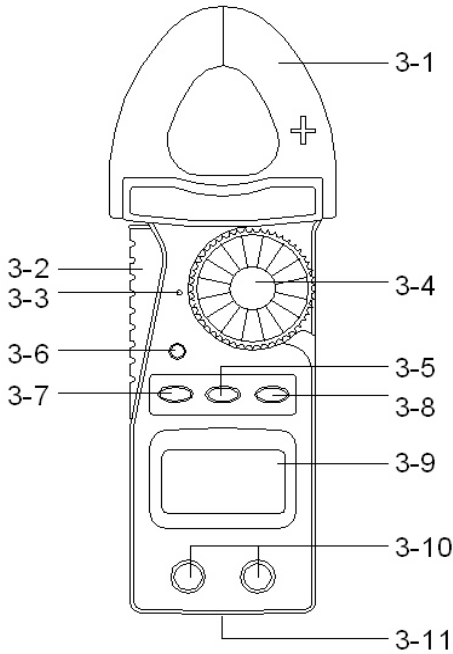


Fig. 1









- 3-1 Current Sense Jaws
- 3-2 Trigger
- 3-3 Function Indicator
- 3-4 Function rotary switch
- 3-5 Range button
- 3-6 Hold button
- 3-7 FUNC. button (Function button)
- 3-8 REL. button (Relative button)
- 3-9 Display
- 3-10 Input terminal
- 3-11 Battery compartment/Cover

4. PRECAUTIONS & PREPARATIONS FOR MEASUREMENT



- 1) Ensure that the DC 1.5V x 2 batteries are connected with the right polarity and placed in the battery compartment correctly.
- 2) Place the Red & Black Test Leads into the proper input terminal before making measurement.
- 3) Remove either of the test leads from the circuit when changing the measurement function.
- 4) Except operate the " Data Hold " function, it should cancel the " Data Hold " function, otherwise the display reading will freeze permanently.
- 5) Do not exceed the maximum rated voltage to the input terminal.
- 6) Always switching the " Function Rotary Switch " to the " OFF " position when the instrument is not operation.
- 7) Remove the battery if the instrument is not to be used in a long period of time.
- 8) Though the most ranges build the overload protection circuit, however it is prohibited to apply any voltage to input terminal when making the measurement.
- 9) The water resistance structure is apply for the front panel only. Do not throw the instrument into water, otherwise the meter will be damaged permanently.
- 10) For safety consideration, when change the new test leads, it should use the replace test leads that already approval of " CATIII-600V " at least.

5. MEASURING PROCEDURE

5-1 Symbols & units of display

Symbols / Units	Descriptions
	Appears when selecting DCV mode.
	Appears when selecting ACV & ACA mode.
	Appears when the " Data hold " function is operated.
	Appears when the " Relative " function is operated.
	Battery voltage is under the low condition already.
	Appears when operating the " Automatic range " mode.
	Appears when the " Continuity beeper " is operated.
mV, V	Units for voltage measurements.
Ω , K Ω , M Ω	Units for resistance measurements.
	Appears when the " Diode " function is operated.
—	Appears when measuring a DCV value is negative.
mA, A	Units for " Current " measurement.

5-2 DCV, ACV Measurement

- 1) Connect BLACK test lead into " COM " terminal.
- 2) Connect RED test lead into " V Ω " terminal.
- 3) If measure " DCV ", select the " Function rotary switch " (3-4, Fig. 1) to the " V " position then push the " FUNC. button " (3-7, Fig. 1) for display show " ".
- 4) If measure " ACV ", select the " Function rotary switch " (3-4, Fig. 1) to the " V " position then push the " FUNC. button " (3-7, Fig. 1) for display show " ".
- 5) When LCD show the " AUTO " marker, the meter is under the " auto range " mode. Meter will select the suitable measurement range automatically.
- 6) Under the operation of " auto range " mode, push the " Range button " (3-5 Fig. 1) will hold the range.

5-3 Resistance Measurement

- 1) Connect BLACK test lead into " COM " terminal.
- 2) Connect RED test lead into " Ω " terminal.
- 3) Select the " Function rotary switch " (3-4, Fig. 1) to the " Ω " position then push the " FUNC. button " (3-7, Fig. 1) for display show " Ω ".
- 4) When LCD show the " AUTO " marker, the meter is under the " auto range " mode., the meter will select the suitable measurement range automatically.
- 5) Under the operation of " auto range " mode, push the " Range button " (3-5 Fig. 1) will hold the range.

5-4 Continuity Check

- 1) Connect BLACK test lead into " COM" terminal.
- 2) Connect RED test lead into " V Ω " terminal.
- 3) Select the " Function rotary switch " (3-4, Fig. 1) to

- the " \rightarrow " position then push the " FUNC. button " (3-7, Fig. 1) for display show " \rightarrow "
- 4) when the resistance value is less than 10 ohm, the beeper sound will be generated.

5-5 Diode Test

- 1) Connect BLACK test lead into " COM " terminal.
- 2) Connect RED test lead into " V " terminal.
- 3) Select the " Function rotary switch " (3-4, Fig. 1) to the " \rightarrow " position then push the " FUNC. button " (3-7, Fig. 1) for display show " \rightarrow ".
- 4) a. When connected with polarity as shown in Fig. 2, a forward current flow is established and the approx. Diode Forward Voltage (VF) value in volt will appears on the display reading. If the diode under test is defective, " .000 " or near " .000 " value (short circuit) or " OL " (open circuit) will be displayed.

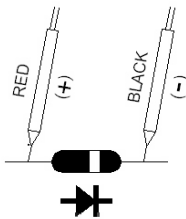


Fig. 2

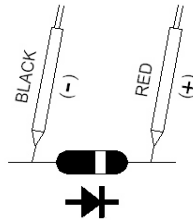


Fig. 3

- b. When connected as shown in Fig. 3, a reverse check on the diode is made. If the diode under test is good, " OL " will be displayed. If the diode under test is defective, " .000 " or other numbers will be displayed. Proper diode testing should include both steps a. and b. above.

5-6 AC leakage Current, AC Current Measurement

1) AC leakage Current

Select the " Function rotary switch " (3-4, Fig. 1) to the " 40 mA/400 mA " position.

AC Current Measurement

Select the " Function rotary switch " (3-4, Fig. 1) to the " 40 A/120 A " position.

- 2) Press the " Trigger " (3-2, fig. 1) to open the " Current Sensor Jaws " (3-1, Fig. 1) & clamp on the measure conductor only.
- 3) When LCD show the " AUTO " marker, the meter is under the " auto range " mode. Meter will select the suitable measurement range automatically.
- 4) Under the operation of " auto range " mode, push the " Range button " (3-5 Fig. 1) will hold the range.

Remark :

No ACA signal input, if the display show few counts (less than 0.05 mA, such as 0.02 mA, 0.03 mA...), it is normal & not effecting the measurement value.

5-7 Relative Measurement

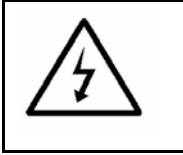
- 1) During the measurement of ACV, ACA, DCV and ohm, the circuit will memorize the last measured values if push the " REL. button " (3-8, Fig. 1) at once, then LCD will show zero value & a " REL. " indicator.
- 2) The input measured values will deduct last measured values " automatically, then show those new value on the display.
- 3) It will release the Relative Measurement function if push the REL. button at once again, at same time the " REL. " marker will disappear.

5-8 Data Hold Operation


- 1) During the measurement, pushing the " Hold button " (3-6, Fig. 1) once a while will freeze the measured value and the LCD will indicate " HOLD " symbol.
- 2) Push the " Hold Button " again to release the data hold function.

6. MAINTENANCE

6-1 Battery replacement



Caution : Remove test leads before opening the battery cover !

- 1) When the LCD display showing the mark of "  it is necessary to replace the battery, However in-spec. measurement may still be made for several hours after " Low battery indicator " appears before the instrument become inaccurate.
- 2) Open the screw of " Battery Cover " (3-11, Fig. 1) by screwdriver, then move the battery.
- 3) Replace with 2 x 1.5 V AA (UM-3) batteries and reinstate the cover.

6-2 Cleaning



Caution : Cleaning - Only use the dry cloth to clean the plastic case !

7. OPTIONAL ACCESSORIES & ADAPTER

<i>Item</i>	<i>Model</i>
<i>Carrying Case</i>	<i>CA-52A</i>
<i>Light Adapter</i>	<i>LX-02</i>
<i>EMF Adapter</i>	<i>EMF-824</i>
<i>Pressure Adapter</i>	<i>PS-403</i>
<i>Anemometer Adapter</i>	<i>AM-402</i>
<i>Tachometer Adapter</i>	<i>TA-601</i>
<i>Sound Adapter</i>	<i>SL-406</i>
<i>High Voltage Probe</i>	<i>HV-40</i>

8. THE ADDRESS OF AFTER SERVICE CENTER

