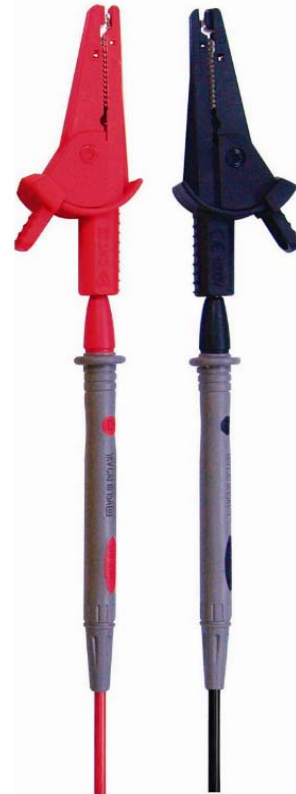


*multi-function + auto-range, CATIII 1000V  
ACV/DCV/OHMS/4 to 4000 M ohm, 100V, 250V, 500V, 1000V*

# INSULATION TESTER

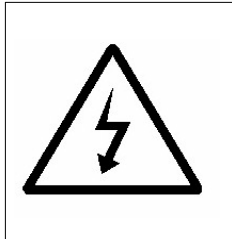
Model : DI-6400



Your purchase of this INSULATION TESTER marks a step forward for you into the field of precision measurement. Although this INSULATION TESTER is a complex and delicate instrument, its durable structure 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 touch the input terminals & the test lead's pins during the measurements.**
- \* **Mega ohm range, do not apply external voltage to input terminals at any time.**
- \* **ACV & ohms range, do not apply the overload voltage to the input terminals !**
- \* **Remove test leads before open the battery cover !**
- \* **Cleaning - Only use the dry cloth to clean the plastic case !**

## Environment Conditions

- \* Installation 1000v CAT III .
- \* Pollution Degree 2.
- \* Altitude up to 2000 meters.
- \* Indoor use.
- \* Relative humidity 80% max.

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# 1. FEATURES

- \* Digital display, easy and correct read-out.
- \* Auto-range and multi-function for insulation measurement of 4/40/400/4000 MΩ ( 100 V, 250 V, 500 V, 1000 V ).
- \* Insulation measurement with auto discharge function, safety.
- \* Build in the ACV & DCV & OHMS measurement function.
- \* Precision 400 ohm & 4000 ohm auto-range easy for measuring low resistance such as motor windings, relay coils etc.
- \* A continuity beeper is equipped in OHM range.
- \* Data hold function to lock the current reading.
- \* Lock & Test functions offer worker's safety and easy operation.
- \* 77 X 49 mm (1.06" height) large LCD display.
- \* Battery operating easily to carry with user.
- \* LCD display allows clear read-out even at bright place.
- \* LSI-circuit provides high reliability and durability.
- \* Built-in over-input and low battery indication.
- \* Overload protection for each range.
- \* Automatic zero adjust & automatic circuit discharge.
- \* Durable & portable housing case with the front protective cover.
- \* RS-232 computer interface.
- \* Powered by AA DC 1.5V X 8 batteries or DC 9V adapter.

# 2. SPECIFICATIONS

## 2-1 General Specifications

Display	27 mm (1.06") LCD (Liquid Crystal Display), Max. indication : 6100 ( V ), 4200 ( MΩ ), 4200 ( Ω ).	
Measurement	Insulation	4/40/400/4000 MΩ /100 V 4/40/400/4000 MΩ /250 V 4/40/400/4000 MΩ /500 V 4/40/400/4000 MΩ /1000 V
	DCV	600.0 V
	ACV	600.0 V
	OHM	400.0/4000 Ω

Sampling Time	0.4 second.
4000M ohm Respond Time	Max. approx. 4.0 second.
Zero Adjustment	Automatic adjustment.
Over-input	Indication of " - - - - " .
Operating Temp.	0 to 50 °C ( 0 to 122 °F ).
Operating Humidity	Less than 80% R.H.
Power Supply	1.5V AA ( UM-3 ) battery x 8 PCs, Alkaline or heavy duty battery or DC 9V adapter ( 500 mA ).
Power Consumption	Approx. 112 mA (100M ohm/1000V range).
	Approx. 70 mA (100 M ohm/500V range).
	Approx. 58 mA (100 M ohm/250V range).
	Approx. 53 mA (100 M ohm/100V range).
	Approx. 18 mA ( ACV range).
	Approx. 18 mA ( DCV range).
	Approx. 65 mA (0 ohm/OHM range).
Dimension	225 x 125 x 64 mm (8.86 x 4.92 x 2.52 inch),
Weight	819 g / 1.80 LB (includes 8 PCs batteries).
Standard Accessories	Instruction Manual ..... 1 PC Test leads ( TL-888 ).....1 set Heavy duty alligators ( AL-05 ).....1 pair

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

<b>Meg ohm ( Insulation )</b>		
<i>Range</i>	<i>Accuracy</i>	<i>Resolution</i>
4/40/400/4000 M ohm (100V/250V/500V/1KV)	± ( 3% + 5d) < 2000 M ohm	1 K/10 K/0.1 M/1 M ohm
	± ( 5% + 5d) ≥ 2000 M ohm < 4000 M ohm	

<b>OHMS</b>			
<i>Range</i>	<i>Accuracy</i>	<i>Resolution</i>	<i>Open Circuit Voltage</i>
400/4000 ohm	± ( 1% + 2d)	0.1/1 ohm	Approx. 4.7 V
* Overload Circuit Protection AC/DC 500V (within 20 sec)			

<b>DC VOLTAGE</b>			
<i>RANGE</i>	<i>Accuracy</i>	<i>Resolution</i>	<i>Input Impedance</i>
600 DCV	± ( 1% + 2d)	0.1 DCV	10 M ohm
* Overload Circuit Protection AC/DC 600V			

<b>AC VOLTAGE</b>			
<i>RANGE</i>	<i>Accuracy</i>	<i>Resolution</i>	<i>Input Impedance</i>
600 ACV	± ( 1% + 2d)	0.1 ACV	10 M ohm
* Overload Circuit Protection AC/DC 600V			

# 3. FRONT PANEL DESCRIPTION



Fig. 1

- 3-1 Display
- 3-2 Function/Range Switch
- 3-3 DC Adapter Input Socket
- 3-4 RS-232 Output Socket
- 3-5 Input Terminal
- 3-6 Hold Button
- 3-7 Test Button
- 3-8 Lock Button
- 3-9 Battery Cover/Compartment

## 4. PRECAUTION & PREPARATIONS FOR MEASUREMENTS

- 1) Remove the power from the circuit when making the measurement. If any voltage is present in the testing circuit, then an erroneous reading will result.
- 2) Ensure that the batteries (8 x 1.5 V AA battery) is connected correctly the right position into the battery compartment or DC 9V adapter.
- 3) Rotate the "Function/Range Switch" (3-2, Fig. 1) to the right position before making measurement.

## 5. MEASURING PROCEDURE

### 5-1 OHMS Measurement (Continuous Check)



**\* Do not apply the external voltage to the input terminals !**

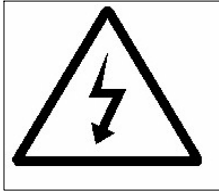
- 1) Connect the RED test plug into " ohm terminal " ( 3-5, Fig. 1 )
- 2) Connect the BLACK test plug into " COM terminal " ( 3-5, Fig. 1 ).
- 3) Rotate the " Function/Range Switch " ( 3-2, Fig. 1 ) to the "  $\Omega$  " position.
- 4) Connect test alligator clips into circuit under test.

#### **Note :**

- \* ***A continuity beeper is equipped. If the measured resistance < approx. 4 ohm, the beeper sounds will be generated.***
- \* ***If want to delete interior impedance of test-lead, you can short them then press " TEST " button ( 3-7, Fig. 1 ) to subtract scrap value and get precision reading. This function only valid if the interior impedance less than 100  $\Omega$ .***
- \* ***During the OHMS measurement, if press the " Hold Button " ( 3-6, Fig. 1 ) will freeze the display value.***



## **5-2 Meg OHM Measurement ( Insulation Measurement )**



- \* **Do not touch the input terminals & the test lead's pins during the measurements.**
- \* **Do not apply external voltage to input terminals at any time.**

- 1) Connect the RED test plug into " MΩ terminal " ( 3-5, Fig. 1 )
- 2) Connect the BLACK test plug into " COM terminal " ( 3-5, Fig. 1 )
- 3) Rotate the " Function/Range Switch " ( 3-2, Fig. 1 ) to the " 4000MΩ /100V ", " 4000MΩ /250V ", " 4000MΩ /500V " or "4000MΩ /1000V " position according the user's requirement.
- 4) Connect the test ALLIGATOR CLIPS into the circuit under test.
- 5) You'll may choice " MANUAL " or " LOCK " mode to make the measurement.

### **MANUAL mode**

*\* The exciting voltage just generate to the test terminals within a short period only.*

- 1) Press " TEST " Button ( 3-7, Fig. 1 ) continuously ( finger is not released from the " TEST " Button ), the meter will sound " bi-bi-bi " warning voice ( about 3 seconds ) then start the measurement, then the meter will sound " one second ON, one second OFF " continuously, the measurement value will present on the display. Until the display value is stable, release the " TEST " button, the display will show " D.H " symbol and latch the measurement value.
- 2) After finish the measurement, press " TEST " Button to cancel hold function and prepare next measurement.

### **LOCK mode**

*\* The exciting voltage just generate to the test terminals continuously.*

- 1) Press " LOCK " button ( 3-8. Fig. 1 ) once the display will show " LOCK " symbol.
- 2) Press " TEST " button once, the meter will sound " bi-bi-bi " warning voice ( about 3 seconds ) then start the measurement, then the meter will sound " one second ON, one second OFF " continuously, the measurement value will present on the display.

#### **Note :**

*\* During this period, the exciting voltage will generate to the test terminals continuously.*

- 3) Press " TEST " button once again to close measurement at same time the display will show "D.H" symbol and latch last value, press " TEST " button once again to cancel hold function and ready for next measurement.

### **5-3 ACV/DCV Measurement**



**\* Do not apply the overload voltage to the input terminals !**

- 1) Rotate the " Function/Range Switch " ( 3-2, Fig. 1 ) to the " V " position.
- 2) Press " TEST button " ( 3-7, Fig. 1 ) once to choice " AC " or " DC " function.
- 3) Connect the RED test plug into " V terminal " ( 3-5, Fig. 1 )
- 4) Connect the BLACK test plug into " COM terminal " ( 3-5, Fig. 1 )
- 5) Connect test leads into circuit under test.
- 6) The reading will show on the display, press " HOLD " button ( 3-6, Fig. 1 ) will latch the reading value, press the " HOLD " button once again will release " HOLD " function "

#### **Note :**

*\* During the ACV/DCV measurement, if press the " Hold Button " ( 3-6, Fig. 1 ) will freeze the display value.*

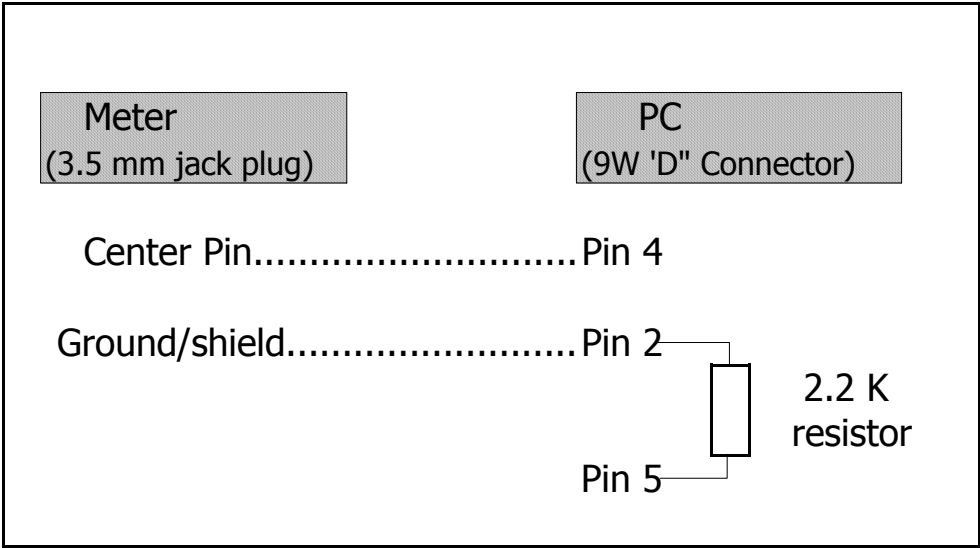
## 6. MEASURING CONSIDERATION FOR Meg OHM TESTING

- 1) The amount of time during which the test voltage applied will also affect the reading. With good insulation, the measured value of insulation resistance will slowly increase as applied typically. This is due to dielectric absorption effect of the applied DC voltage on the bulk insulation resistance.
- 2) Measurements made in a humid environment will result in lower insulation resistance values than a dry environment.

## 7. RS-232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal ( 3-4, Fig. 1 ).

The data output is a 16 digit stream which can be utilized for user's specific application.  
A RS232 lead with the following connection will be required to link the instrument with the PC serial port.



The 16 digits data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

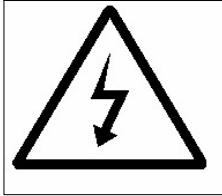
**Each digit indicates the following status :**

D0	End Word = 0D	
D1 & D8	Display reading, D1 = LSD, D8 = MSD For example : If the display reading is 1234, then D8 to D1 is : 00001234	
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP	
D10	Polarity 0 = Positive      1 = Negative	
D11 and D12	Annunciator for Display	
	ACV = 50	ohm = 38
	DCV = 70	Mohm = 40
D13	When send the upper display data = 1 When send the lower display data = 2	
D14	4	
D15	Start Word = 02	


**RS232 setting**

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

## 8. BATTERY REPLACEMENT



- \* **Remove test leads before open the battery cover !**
- \* **Risk of electric shock !**

- 1) When the upper left corner of LCD display show " ".  
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 becomes inaccurate .
- 2) Loose the screws that on the " Battery cover " ( 3-9. Fig. 1 ).  
Slide the battery cover & remove the battery.
- 3) Replace with 8 x 1.5V AA(UM-3) battery and reinstate the cover.

## **9. THE ADDRESS OF AFTER SERVICE CENTER**

