

HDT20A HDT20B

Insulation Resistance Tester User's Manual

Safety Rules

Safety Warning

The design, manufacture and test are all up to the safety standard IEC61010(safety demand of the electronic products), this manual includes the safe using of the instrument and the safety state of instrument, the warning and the safety rules that the users must comply. Please read the manual before use.

Warning

- Please read carefully and understand this manual before using the instrument.
- Please comply the regulation of the manual all the time, and keep the manual for consultation.
- When using the instrument for testing, wrong operation can result in accident and instrument damage.
- The Company reserves the right to modify the instructions, if the instructions are to change without notice, pls understand.

The symbols on the instrument mean that in order to operate the instrument safely, the users are supposed to refer to the relating description in this manual.

Danger is in order to avoid the probably serious or fatal damage in some state and operation.

Warning is in order to avoid the danger of electric-shocking.

Notice means avoiding the damage to the instrument and accurate measuring.

Danger

- Please don't take measurement in the flammability place, the spark maybe result in explosion.
- Please don't operate the instrument if it is wet of the instrument surface or of the user's hand.
- When testing voltage, it probably result in person injury because of the short circuit of the metal part and the testing lead.
- Please don't exceed the maximum scope of the allowable range.
- Don't open the battery cover when testing.
- When taking the insulated measurement, please don't touch the

circuitry under test.

Warning

- If there is abnormality from the instrument, please stop using. For example: the instrument dilapidation or metal part exposure.
- Please don't rotate the Function/Selection switch when the testing lead is inserted into the instrument and connected to the circuitry for testing.
- Please don't install any substituting parts to the instrument or carry on any unauthorized modification, instruments are sent back to the Hongda Company when maintaining.
- Please don't replace the battery when the instrument is in the state of humidity.
- Please sure the connection is fastness of all the testing interfaces between the testing lead and the instrument.
- Please sure the instrument is turned off when opening the battery cover.

Notice

- Before test, please sure the voltage selector switch is on the proper location.
- After test, please set the function switch to the range "OFF". If it is available for a long time, please take out the battery for storage
- Please don't put the instrument in the place of high temperature, humidity, dew and strong light for a long time.
- Please use the humid cloth or detergent to clean the instrument case. Don't use the friction material or solvent.
- If the instrument is wet, please make it dry then storage.

Symbol



The probability of electric-shocking



The instrument has double insulation or reinforcing insulation

Important operation(referring to the manual)

1.Preface

- 1.1 Thanks for use our products, you will get the comprehensive technology support and service from our company.
- 1.2 This manual is used for HDT20A/HDT20B insulation resistance tester.
- 1.3 Before using the product, please read the manual

carefully and keep it well for reference.

1.4 The product is for high-voltage electric equipment tester, please accord to the manual description to operate. And comply strictly to the Nation's related regulations. For inappropriate operation, it will probably result in equipment damage or person safety danger.

1.5 Please consult our company when there is any question as you read the manual or use the instrument.

2.Characteristics

2.1 HDT20A HDT20B is a electron controlled minitype instrument, thereinto, the high voltage insulation resistance tester has three insulation resistance for voltage test.

2.2 The design is up to the following safety standard:

IEC 1010

89/336/EEC(electromagnetism compatibility, Nov, 1992, EMC)

P73/23/EEC(product safety regulation: Nov, 6th, 1979, low-voltage regulation: Feb,19th, 1973)

2.3 Automatically release voltage function:

2.4 Be used for the insulation resistance of all kinds of electron equipment and insulation material, such as transformer, generator, cable, switch, electric equipment and so on. Be used for the maintenance, test and check of all the series of electric equipment.

2.5 Rated voltage variable

HDT20A-- Rated voltage can be switched among 250V, 500V, 1000V by knob switch.

HDT20B-- Rated voltage can be switched among 1000V, 2500V by knob switch.

2.6 High voltage indication

There is the LED in the instrument(HV ON) indicating the high voltage work state.

2.7 Low battery indication.

2.8 Battery drive, removing the operation of hand-cranked generator.

2.9 3 1/2 digital display, reading clearly.

2.10 The measurement range for HDT20A is 0.1M Ω ~ 1999M

Ω. The measurement range for HDT20B is 10M Ω ~ 19.99G Ω.

2.11 Convenient operating and taking.

2.12 Strong carrying capability, output short circuit current is > 1.0 mA.

2.13 Complete protecting circuitry, in case of voltage counterattack and output short circuit protection.

2.14 Can test AC Voltage 1V-750V, the frequency of AC Voltage is 40Hz-400Hz.

2.15 International fashion design, dustproof and dampproof, can be applied to outside operation.

3. Technic specifications

Test condition: test temperature/humidity $23 \pm 5^\circ\text{C}/45 \sim 75\%$

RH;

Low battery voltage indication;

Insulation resistance: $\geq 500\text{M}\Omega$ (1000V);

Voltage withstand: AC 2KV 50Hz 1minute;

Operation temperature and humidity: $0^\circ\text{C} \sim 40^\circ\text{C}$ /Relative humidity 85% or less;

This manual is just applied to this instrument, our company is entitled to modify it.

HDT20A technic specifications

Basic Function	Range	Accuracy
Output Voltage	250V/500V/1000V	$\pm 10\%$
Output Current	250V (R=250k Ω) 1mA	$\pm 10\%$
	500V (R=500k Ω) 1mA	
	1000V (R=1M Ω) 1mA	
200M Ω	250V: 0.1M Ω - 20M Ω	$\pm (4\% \pm 2)$
	500V: 0.1M Ω - 50M Ω	
	1000V: 0.1M Ω - 100M Ω	
2000M Ω	250V: 20M Ω - 500M Ω	$\pm (4\% \pm 2)$
	500V: 50M Ω - 1000M Ω	
	1000V: 100M Ω - 2000M Ω	
Short circuit current	$\leq 1.8\text{mA}$	

central value resistance	250V/500V: 2M Ω	
	1000V: 5M Ω	
ACV	750V	$\pm (1\% + 6)$

AC750V input impedance: 1M Ω.

AC750V frequency response: (50~200) Hz

The median resistance value : Ensure measuring voltage on both ends of less than 90% of the nominal value test voltage under the resistance measurement of threshold

HDT20B technic specifications

Basic Function	Range	Accuracy
Output Voltage	500V/1000V/2500V	$\pm 10\%$
Output Current	$\geq 100\text{M}\Omega$	
Short circuit current	$> 1.0\text{mA}$	
2G Ω	500V: 0.01G Ω - 1.999G Ω	$\pm 10\%$
	1000V: 0.01G Ω - 1.999G Ω	
	2500V: 0.01G Ω - 1.999G Ω	
20G Ω	500V: 0.01G Ω - 19.99G Ω	$\pm 10\%$
	1000V: 0.01G Ω - 19.99G Ω	
	2500V: 0.01G Ω - 19.99G Ω	
ACV	750V	$\pm (0.1\% + 6)$

AC750V input impedance: 1M Ω.

AC750V frequency response: (50~200) Hz

4. Appearance

1. Line terminal L

2. Shield terminal G, the end terminal of ACV measurement

3. The positive terminal of the ACV measurement

4. Earth terminal E

5. Backlight button

6. Range switch button

7. High-volt startup button

8. External power jack

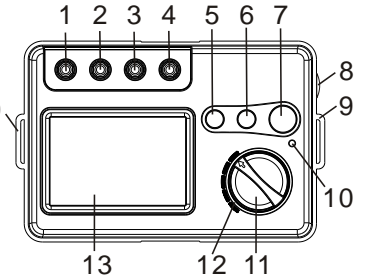
9. Instrument belt hole

10. High voltage indicator

11. Rotary switch

12. Power button

13. 3 1/2 digit display screen



5. Safety notice

5.1 Before use, please read the manual carefully, and comply to its step, operating accordingly.

5.2 Please don't use the accessories not being supplied by the original company in case of danger.

5.3 While measuring, the terminal E、L has DC high voltage output, non-human contact in case of electric shock.

5.4 In order to avoid the error resulted by the insulation leakiness of the test stick, the test stick connected to the terminal L is supposed to hang in the air as possible as it could, can't touch with the outside object.

5.5 When the insulation resistance value of the tested object is very high, and there is the serious word jump phenomenon, then please connect the shield terminal G. For example: measuring the cable core and cable shell, besides connecting the two ends of the tested object to the terminal E and L separately, you are also supposed to connect the inner insulation of the cable core or cable shell to the shield terminal G, in order to avoid the measuring error resulted by the surface leakiness. Further more, you can also use the shielding box. That is to say just put the tested object into the metal shielding box, then connect the shielding box to the instrument shielding terminal G.

5.6 When the measurement is finished, then remove the

connecting line.

5.7 Don't use or have the storage in the place of sun、high temperature、humidity etc.

5.8 The short circuit time of the testing end should be less than 60s.

5.9 The continuous testing time should be less than 3 hours one time.

6.Work theory

The high voltage part of the instrument is applied with the Pulse Width Modulate(PWM), via the inner double voltage output cathode DC high voltage, with the characteristic of energy saving, good voltage linearity, stabilization and small ripple coefficient.

The high voltage produced by the instrument line terminal goes to the instrument earth terminal via the load resistance Rx, then transformation via V/I to display the digit.

7.Testing

Danger

● Before testing, please sure there is no charge existing in the tested circuitry that the high voltage instrument is connected with.

● Please put on a pair of the high voltage insulation gloves.

● If the battery cover is open, please don't carry on any measurement.

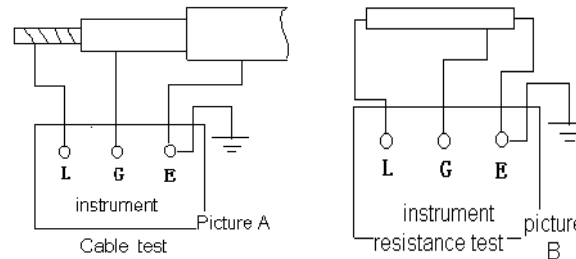
7.1 testing end connection

Insert the plug of the testing line with the testing stick into the L terminal socket of the instrument, then insert the plug of the testing line with the testing clip to the E terminal socket of the instrument and connect well separately.

7.2 testing connection

The connection of terminal E plug(black test lead with the big testing clip) is for the Earth, connect the testing clip to one side of the item ; the connection of terminal L plug(red test lead) is circuitry line, can connect the testing clip to the other side of the item ; the connection of terminal G plug is shielding line, and is connected to the surface of the tested object to avoid the surface leakiness which will influence the testing impedance. Connect the

testing clip to one end of the tested object, and the small clip of the test lead to the surface of the tested object to avoid the current leakiness.(Picture A and B)



7.3 Rated voltage selection

Select the rated voltage according to the test requirements:

HDT20A can choose 250V 500V 1000V

HDT20B can choose 500V 1000V 2500 V

7.4 Testing operation

Please pay attention to safety operation:


Connect the test lead of the test stick to one end of the tested object, press down the high voltage startup button [TEST], then the red indication light HV ON turns on to show that the high voltage output gets through. When the high voltage indicator is on, it means the instrument work normally. If it is off, it shows maybe the battery is low voltage or battery connection is abnormally.

When the measurement is begun, there is reading on the meter header which is the insulation resistance value of the tested object under the current voltage.

For the HDT20A, when the test value is less than 200M Ω , suggest pressing the “ $\frac{2000M\Omega}{200M\Omega}$ ” button, using 200M Ω range can make the readings more accurate. For the HDT20B, when the test value is less than 2G Ω , suggest pressing the “ $\frac{20G\Omega}{2G\Omega}$ ” button, using 2G Ω range can make the readings more accurate. When the testing is out of range (the digit only display “1”), you can check the “ $\frac{2000M\Omega}{200M\Omega}$ ” or “ $\frac{20G\Omega}{2G\Omega}$ ” button is in the raised state or not, if not you can press it to let it in the raised state; if yes show the measured value of insulation resistance measurement is beyond the scope of this instrument, pls consider using a higher resistance of tester.

If you need more convenient readings, you can press the “HOLD, LIGHT” button, the display digit will be locked and backlight is on for easy reading. Press that button again to restore the normal measurement state and the backlight is off.

7.5 Backlight

Press  button, backlight is on; press the button again, the backlight is off.

7.6 Power off

After finish the measurement, press down the high voltage button [TEST], HV ON red indicator turns off slowly, showing the high voltage output has disconnected. Set the switch to the position [OFF], there is no display on the LCD. For the capacitive load, you should completely release the residual charge in the tested object to avoid the residual charge release electricity to injury people.

8. AC Voltage Test

8.1 Using the rotary switch select the “ACV” position


8.2 Insert the red test lead into the “ACV” jack, insert the black test lead into the “G” input jack

8.3 Contact the two test leads with the both ends of the voltage to be measured, then the digital display show the AC voltage in volt.

Note:

1. The measured voltage can't exceed 750V AC RMS, the frequency of the ACV is 40Hz to 400Hz. If exceed this frequency range, the data errors will exceed the technical specifications of this instrument.
2. For the earth voltage to be measured at the both ends can't exceed 750V AC RMS, otherwise will meet the danger of electric shock.
3. AC voltage test, don't need to transfer the high voltage and range, so at that time the “TEST” and “ $\frac{2000M\Omega}{200M\Omega}$ ” “ $\frac{20G\Omega}{2G\Omega}$ ” button are disabled.

9.Battery replacement

If there is the symbol "” on the LCD, it indicates low battery, please replace the battery.

Before replacing the battery, please sure the testing connection has been disconnected and power is cut off.

9.1 Stop all the testing work, and remove the testing line from the tested object.

9.2 Set the switch to the "OFF" position.

9.3 Remove the testing line from the instrument.

9.4 Take off the battery cover on the back of the instrument.

9.5 Put into 6 pieces batteries, the model is LR6 or UM-3.(Please pay attention to the battery polarity)

9.6 Put on the battery cover.

10.Storage

10.1 Set the switch to the "OFF" position.

10.2 When the instrument is available for a long time, please take off the battery to avoid the electrolyte discharge resulting in rust.

10.3 Please keep the case clean.

10.4 instrument storage:

Storage temperature:-10°C~ +50°C

Storage relative humidity: 90%RH

The place need no dust, no causticity gas and well-ventilated.

11 Accessory

HDT20A: one plastic cover, a pair of test lead(with clip), one manual and one warranty card.

HDT20B: one plastic cover, a pair of test lead (with clip), one manual ,one warranty card and one shielding line.