UNI-T

UT58D

Operating Manual

Modern Digital Multimeter

Overview

⚠Warning
To avoid electric shock or personal injury, read the "Safety Information" carefully before using the Meter.

Digital Multimeter Model UT58D is a 2000-count hand-held instrument with remarkable features: ex-large LCD, steady operations, overload protection for all ranges and unique structure. It is designed with large-scale integrated circuits and dual integral A/D converter as the core, which offers 28 measuring ranges and can measure AC/DC voltage, AC/DC current, resistance, capacitance, inductance, transistor, diode and continuity. It is also equipped with data hold, full icon display and sleep mode functions,etc;

Unpacking Inspection

Open the package case and take out the Meter. Check the following items carefully for any missing or damaged part:

Item	Description	Qty
1	English Operating Manual	1 pc
2	Test Lead	1 pair
3	Multi-Purpose Socket	1 pc
4	Test Clip	1 pair
5	Holster	1 pc
6	9V Battery (NEDA 1604, 6F22 or 009P)	1 pc

In the event you find any missing or damaged part, please contact your dealer immediatel

Safety Information

This Meter complies with the standard IEC61010: Pollution Degree 2; Overvoltage Category; (CAT. II 1000V, CAT. III 600V) and Double Insulation;

CAT. II: Local level, appliance, PORTABLE EQUIPMENT etc., with smaller transient voltage overvoltages than CAT. III
CAT. III: Distribution level, fixed installation, with smaller transient overvoltages than CAT. IV

Use the Meter only as specified in this operating manual, otherwise the protection provided by the Meter may be impaired.

In this manual, a **Warning** identifies conditions and actions that pose hazards to the user, or may damage the Meter or the equipment under test.

A **Note** identifies the information that user should pay attention to.

⚠Warning
To avoid possible electric shock or personal injury, and to avoid possible damage to the Meter or to the equipment under test, adhere to the following rules:

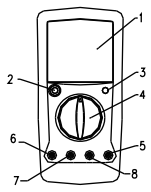
- **Before using the Meter inspect the case. Do not use the Meter if it is damaged or the case (or part of the case) is removed. Look for cracks or missing plastic. Pay attention to the insulation around the connectors.**
- **Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads with identical model number or electrical specifications before using the Meter.**
- **Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and grounding.**
- **The rotary switch should be placed in the right position and no any changeover of range shall be made during measurement is conducted to prevent damage of the Meter.**
- **When the Meter working at an effective voltage over 60V in DC or 30V rms in AC, special care should be taken for there is danger of electric shock.**
- **Use the proper terminals, function, and range for your measurements.**
- **If the value to be measured is unknown, use the maximum measurement position and reduce the range stop by step until a satisfactory reading is obtained.**
- **Do not use or store the Meter in an environment of high temperature, humidity, explosive, inflammable and strong magnetic field. The performance of the Meter may deteriorate after dampened.**
- **When using the test leads, keep your fingers behind the finger guards.**
- **Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes, capacitance or current.**
- **Before measuring current, check the Meter's fuses and turn off power to the circuit before connecting the Meter to the circuit.**
- **Replace the battery as soon as the battery indicator appears. With a low battery, the Meter might produce false readings that can lead to electric shock and personal injury.**
- **Remove test leads and multi-purpose socket from the Meter and turn the Meter power off before opening the Meter case.**
- **When servicing the Meter, use the replacement parts with the same model or identical electrical specifica-tions.**
- **To avoid any damage to the meter or any accident, do not alter the internal circuit of the Meter randomly.**
- **Soft cloth and mild detergent should be used to clean the surface of the Meter when servicing. No abrasive and solvent should be used to prevent the surface of the Meter from corrosion, damage and accident.**
- **The Meter is suitable for indoor use.**
- **Turn the Meter power off when it is not in use and take out the battery when not using for a long time.**
- **Constantly check the battery as it may leak when it has been using for some time, replace the battery as soon as leaking appears. A leaking battery will damage the Meter.**

International Electrical Symbols

~	AC (Alternating Current).
⎓	DC (Direct Current).
⏚	Grounding.
⧈	Double Insulated.
	Low Battery Indication.
⚠	Warning. Refer to the Operating Manual.
	Diode.
≂	AC or DC.
	Fuse.
	Continuity Test.
CE	Conforms to Standards of European Union.

The Meter Structure (See Figure 1)

① LCD Display
② **POWER**
③ **HOLD** Button.
④ Rotary Switch
⑤ **COM** Input Terminal
⑥ **20A** Input Terminal
⑦ **mA** Input Terminal
⑧ Other Input Terminal.



(Figure 1)

Rotary Switch

Below table indicated for information about the rotary switch positions.

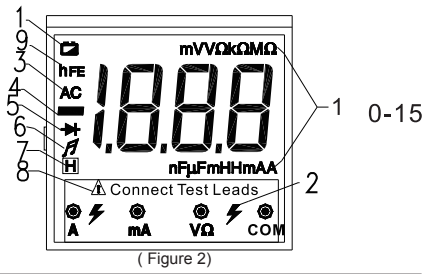
Rotary Switch Position	Function
V⎓	DC voltage measurement.
V~	AC voltage measurement.
hFE	Transistor Test
A~	AC Current Measurement
A⎓	DC Current Measurement
Fcx	Capacitance Test
HLx	Inductance Test
	Diode test
	Continuity test
Ω	Resistance measurement.

Functional Buttons

Below table indicated for information about the functional button operations

Button	Description
POWER (Yellow Button)	Turn the Meter on and off. ● Press down the **POWER** to turn on the Meter. ● Press up the **POWER** to turn off the Meter.
HOLD (Blue Button)	● Press **HOLD** once to enter hold mode. ● Press **HOLD** again to exit hold mode. ● In Hold mode, H is displayed and the present value is shown.

Display Symbols (See Figure 2)



(Figure 2)

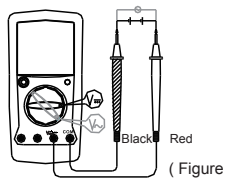
No.	Symbol	Description
1		The battery is low. ⚠Warning: To avoid false readings, replace the battery as soon as the battery indicator appears.
2		Warning Symbol.
3	**AC**	Indicator for AC voltage or current. The displayed value is the mean value.
4		Indicates negative reading.
5		Test of diode.
6		The continuity buzzer is on.
7	H	Date hold is active.
8	⚠ Connect Terminal	Indicator of connecting test leads into different input terminals.
9	**hFE**	The Unit of Transistor Test
10-15	**mA, A**	A: Amperes (amps). The unit of current. mA: Milliamp. 1 x 10^{-3} or 0.001 amperes.
	mV, V	V: Volts. The unit of voltage. mV: Millivolt. 1 x 10^{-3} or 0.001 volts.
	Ω,kΩ,MΩ	Ω: Ohm. The unit of resistance. kΩ: kilohm.1 x 10^{3} or 1000 ohms. MΩ: Megaohm. 1 x 10^{6} or 1,000,000 ohms.
	μF nF	F: Farad.The unit of capacitance. μF: Microfarad. 1 x 10^{-6} or 0.000001 farads. nF: Nanofarad. 1 x 10^{-9} or 0.000000001 farads.
	mH, H	H: Henry. The unit of Inductance. mH: Millihenry. 1 x 10^{-3} or 0.001 henry.

Measurement Operation

A. Measuring DC and AC Voltage(See Figure 3)

⚠Warning

To avoid harms to you or damages to the Meter from electric shock, never attempt to measure voltages higher than 1000 or 1000V rms although readings may be obtained.



(Figure 3)

The DC Voltage ranges are: 200mV, 20V, 200V and 1000V.
The AC Voltage ranges are: 2V, 200V and 1000V

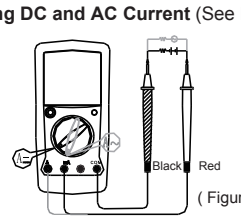
To measure DC&AC Voltage, connect the Meter as follows:

1. Insert the red test lead into the V Ω input terminal and the black test lead into the **COM** input terminal.
2. Set the rotary switch to an appropriate measurement position in V⎓ or V~ range.
3. Connect the test leads parallel across with the object to be measured.
   The measured value shows on the display.

Note

- If the value of voltage to be measured is unknown, use the maximum measurement position (1000V) and reduce the range step by step until a satisfactory reading is obtained.
- The LCD displays **"1"** indicating the existing selected range is overloaded, it is required to select a higher range in order to obtain a correct reading.
- In each range, the Meter has an input impedance of approx. 10MΩ This loading effect can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to 10 kΩ , the error is negligible (0.1% or less).
- When voltage measurement has been completed disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminal of the Meter.

B. Measuring DC and AC Current (See Figure 4)



(Figure 4)

⚠Warning

Never attempt an in-circuit current measurement where the open circuit voltage between terminals and ground is greater than 60V DC or 30V rms.
If the fuse burns out during measurement, the Meter may be damaged or the operator himself may be hurt.
Use proper terminals, function, and range for the measurement. When the testing leads are connected to the current terminals, do not parallel them across any circuit.

The DC Current ranges : 2mA, 200mA and 20A
The AC Current ranges : 2mA, 200mA and 20A

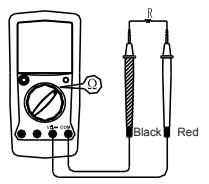
To measure current, do the following:

1. Turn off power to the circuit. Discharge all high-voltage capacitors.
2. Insert the red test lead into the 20A or mA input terminal and the black test lead into the COM terminal. When you measure current below 200mA, please insert the red test lead into the mA input terminal. When you measure 200mA or above, insert the red test lead into the 20A input terminal.
3. Set the rotary switch to an appropriate measurement position in A⎓ or A~ range.
4. Break the current path to be tested. Connect the red test lead in serial to the more positive side of the break and the black test lead to the more negative side of the break.
5. Turn on power to the circuit.
   The measured value shows on the display.

Note

- If the value of current to be measured is unknown, use the maximum measurement position, and reduce the range step by step until a satisfactory reading is obtained.
- For safety sake, the measuring time for high current should be less than 10 seconds and the interval time between 2 measurements should be greater than 15 minutes
- When current measurement has been completed, disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminal of the Meter

C. Measuring Resistance (See Figure 5)



(Figure 5)

⚠Warning

To avoid damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring resistance.

The resistance ranges are: 200Ω, 2kΩ 200kΩ, 2MΩ and 20MΩ

To measure resistance, connect the Meter as follows:

1. Insert the red test lead into the V Ω input terminal and the black test lead into the COM terminal.
2. Set the rotary switch to an appropriate measurement position in Ω range.
3. Connect the test leads with the object being measured in parallel.
   The measured value shows on the display.

Note

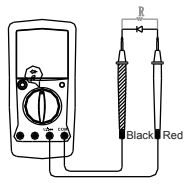
The test leads can add 0.1Ωto 0.3 of error to the low resistance range(200Ω) measurement.

To obtain accurate readings in low-resistance, short-circuit the input terminals beforehand and record the reading obtained (called this reading as X). (X) is the additional resistance from the test lead.

Then use the equation:
measured resistance value (Y) - (X) = accurate readings of resistance.

- For high resistance (>1M Ω), it is normal taking several seconds to obtain a stable reading..
- When there is no input, for example in open circuit condition, the Meter displays "1".
- When resistance measurement has been completed, disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminal of the Meter.

D. Testing Diodes and Continuity (See Figure 6)



(Figure 6)

⚠Warning

To avoid damage to the Meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before measuring diodes.
To avoid harms to you, never attempt to input

voltages higher than 60V DC or 30V rms in AC.

Testing Diodes

Use the diode test to check diodes, transistors, and other semiconductor devices. The diode test sends a current through the semiconductor junction, and then measures the voltage drop across the junction. A good silicon junction drops between 0.5V and 0.8V.

To test out a diode out of a circuit, connect the Meter as follows:

1. Insert the red test lead into the **V**Ωinput terminal and the black test lead into theCOM terminal
2. Set the rotary switch to →|← .
3. For forward voltage drop readings on any semiconductor component, place the red test lead on the component's anode and the black test lead on the component's cathode.
   The measured value shows on the display.

Note

- In a circuit,a good diode should still produce a forward voltage drop reading of 0.5V to 0.8V; however; the reverse voltage drop reading can vary depending on the resistance of other pathways between the probe tips.
- Connect the test leads to the proper terminals as said above to avoid error display. The LCD will display "1" indicating open-circuit or wrong connection. The unit of diode is Volt (V), displaying the positive-connection voltage-drop value.
- The open-circuit voltage is around 2.8V.
- When diode testing has been completed, disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminal of the Meter.

Testing for Continuity

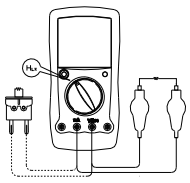
To test for continuity, connect the Meter as below:

1. Insert the red test lead into VΩterminal and the black test lead into the COM terminal.
2. Set the rotary switch to →|← .
3. Connect the test leads across with the object being measured.
4. The buzzer sounds if the resistance of a circuit under test is <70Ω.
   The tested circuit resistance value simultaneously shows on the display and the unit is Ω.

Note

- When continuity testing has been completed, disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminal of the Meter.

E. Measuring Inductance (See Figure 7)



(Figure 7)

⚠Warning

Make sure the tested inductance is far away from the high electromagnetic field so as to to obtain accur -ate reading.

The inductance ranges : 2mH, 20mH, 200mH and 20H.

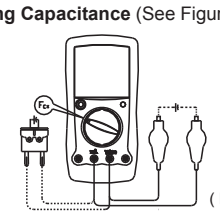
To test for Inductance, connect the Meter as below:

1. According to the size of the tested object's leads, insert multi-purpose socket or test clip into the mA and **V**Ω terminal.
2. Set the rotary switch to an appropriate measurement position in HLx range.
3. Insert the tested object into the corresponding jack of the multi-purpose socket or connect the test clip to the object being measured.
   The measured value shows on the display.

Note

- If the value of inductance to be measured is unknown, use the maximum measurement position, and reduce the range step by step until a satisfactory reading is obtained.
- When inductance testing has been completed, disconn -ect tested objects from multi-purpose socket or test clip, and remove multi-purpose socket or test clip away from the input terminal of the Meter.

F. Measuring Capacitance (See Figure 8)



(Figure 8)

⚠Warning

To avoid damage to the Meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance.Use the DC voltage function to confirm that the capacitor is discharged.

To avoid harms to you, never attempt to input voltages higher than 60V DC or 30V rms in AC.

The capacitance ranges: 20nF, 200nF, 2μF and 100μF.

To measure capacitance, connect the Meter as follows:

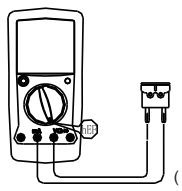
1. According to the size of the tested object's leads, select multi-purpose socket or test clip to insert into the mA and V Ω terminal.
2. Set the rotary switch to an appropriate measurement position in Fcx range.
3. Insert the tested object into the corresponding jack of he multi-purpose socket or connect the test clip to he object being measured.

   The measured value shows on the display.

Note

- If the value of capacitance to be measured is unknown, use the maximum measurement position, and reduce the range step by step until a satisfactory reading is obtained.
- When the tested capacitor is shorted or the capacitor value is overloaded, the LCD display "1".
- To minimize the measurement error caused by the distributed capacitance, the testing lead should be as short as possible.
- To increase accuracy especially when measuring small capacitance range 20nF, subtract the test leads' open-circuit value from the display reading.
- It is normal to take a longer time when testing a high capacitor value.
- For testing the capacitor with polarity, connect the red clip or red test lead to anode and black clip or black test lead to cathode.
- When capacitance testing has been completed, remove the testing leads away from the multi-purpose socket, and remove multi-purpose socket or test clip away from the input terminal of the Meter.

G. Measuring Transistor (See Figure 9)



(Figure 9)

⚠Warning

To avoid harms to you, never attempt to input volt -ages higher than 60V DC or 30V rms in AC.

t

To measure transistor, connect the Meter as follows:

1. Insert the multi-purpose socket into the **V**Ωand mA terminal.
2. Set the rotary switch to hFE range.
3. Insert the NPN or PNP type transistor to be tested into the corresponding jack of the multi-purpose socke
4. The measured nearest transistor value shows on the display

Note

- When tra sistor measeurement has been completed, remove the transistor to be tested away from the multi-purpose socket, and remove multi-purpose socket away from the input terminal of the Meter.

Sleep Mode

To preserve battery life, the Meter automatically turns off if you do not turn the rotary switch or press any button for around 15 minutes. When the Meter is under sleep mode, it consumes 10 A current.

To activate the Meter, press POWER for two times.

Operation of Hold Mode

⚠Warning

To avoid possibility of electric shock, do not use Hold mode to determine if circuits are without power. The Hold mode will not capture unstable or noisy readings .

To use the Hold mode as follows:

- Press HOLD to enter Hold mode.
- Press HOLD again to exit Hold mode.
- In Hold mode, H is displayed.

General Specifications

- Maximum Voltage between any Terminals and grounding:
  Refer to different range input protection voltage.
- ⚠Fused Protection for mA Input Terminal : CE Version: 0.5A, 250V fast type, Φ5X20mm.
- ⚠20A Input Terminal : Unfused.
- Maximum Display : 1999,updates 2~3 times/ second.
- Range : Manual ranging.
- Polarity display : Automatically
- Overloading : Display "1".
- Low Battery Indication : Display "".
- Data Hold : Display "H"
- Temperature :
  Operating : 0°C ~40 (32°F~104°F)
  Storage : -10°C~50°C(14°F~122°F)
- Relative Humidity : ≤ 75% @ 0°C~ below 30°C, ≤ 50% @ 30°C~40°C.
- Altitude: Operating: 2000m; Storage: 10000m
- Electromagnetic Compatibility: In a radio field of 1 V/m, Overall Accuracy = Specified Accuracy + 5% of Range; in a radio field of more than 1 V/m, no assigned accuracy is specified.
- Battery Type : One piece of 9V (NEDA1604 or 6F22 or 006P).
- Dimensions : 179x88x39mm.
- Weight : Approx.380g (including holster and battery)
- Safety/Compliances: IEC61010 CAT II 1000V, CATIII 600V Overvoltage and Double Insulation standards
- Certificate : CE

Accuracy Specifications

Accuracy: ±(a% reading + b digits) guarantee for 1 year.
Operating temperature:18°C ~28°C .
Relative humidity:≤75%RH.

A. DC Voltage

Range	Resolution	Accuracy	Overload Protection
200mV	0.1mV	±(0.5%+1)	250V DC / V AC
20V	0.01V		1000V rms
200V	0.1V		
1000V	1V	±(0.8%+2)	

Remarks:Input Impedance: approx.10MΩ.

B. AC Voltage

Range	Resolution	Accuracy	Overload Protection
2V	0.001V	±(0.8%+3)	1000V AC
200V	0.1V		
1000V	1V	±(1.2%+3)	

Remarks:

- Input Impedance: approx.10MΩ .
- Frequency response: 40Hz~400Hz
- Displays sinewave RMS value(AVG response)

C. DC Current

Range	Resolution	Accuracy	Overload Protection
2mA	0.001mA	±(0.8%+1)	CE Version:Fuse 0.5A, 250V, fast type,Φ5x20mm
200mA	0.1mA	±(1.5%+1)	
20A	0.01A	±(2%+5)	Un-Fused

Remarks:

- At 20A Range:
  Continuous measurement ≤10 seconds and interval time between 2 measurement greater than 15 minutes.
- Measuring Voltage Drop: 200mV for full ranges.

D. AC Current

Range	Resolution	Accuracy	Overload Protection
2mA	1μA	±(1%+3)	CE Version:Fuse 0.5A, 250V, fast type,Φ5x20mm
200mA	0.1mA	±(1.8%+3)	
20A	10mA	±(3%+7)	Un-Fused

Remarks:

- Frequency reaponse: 40Hz~400Hz
- At 20A Range:
  Continuous measurement ≤ 10 seconds and interval time between 2 measurement greater than 15 minutes
- Measuring Voltage Drop: 200mV for full ranges.
- Displays sinewave RMS value(AVG response)

E. Resistance

Range	Resolution	Accuracy	Overload Protection
200Ω	0.1Ω	±(0.8%+3) + Test Lead Short Circuit Resistance	250V rms
2kΩ	1Ω	±(0.8%+1)	
200kΩ	100Ω		
2MΩ	1kΩ		
20MΩ	10kΩ	±(1%+5)	

Remarks:

- To obtain accurate readings when measuring 200Ω, short-circuit the testing leads beforehand and record the reading obtained (called this reading as X). (X) is the additional resistance from the test lead.
  Then use the equation:
  measured resistance value (Y) – (X) = accurate readings of resistance.

F. Diodes and Continuity

Function	Range	Resolution	Overload Protection	Remarks
Diodes	→|←	1mV	250V rms	Open circuit voltage approx.2.8
Continuity Test		1Ω		The buzzer sounds if the resistance of a circuit under test is<70 Ω

G.Inductance

Range	Resolution	Accuracy	Overload Protection
2mH	0.001mH	±(2%+10)	250V rms
20mH	0.01mH		
200mH	0.1mH		
20H	10mH	±(3%+10)	

Remarks:

- The tested inductance: Q≥10, Internal resistance ≤1.3k.
- When the tested inductance is >1H, the obtained reading is only for reference.

H. Capacitance

Range	Resolution	Accuracy	Overload Protection
20nF	0.01nF	±(2.5%+5)	250V rms
200nF	0.1nF		
2μF	1nF		
100μF	100nF	±(5%+4)	

Remarks:

- When the tested capacitor is≥40μ F, the obtained reading is only for reference

I. Transistor

Range	Resolution	Remarks	Testing Conditions
hFE	1β	The displayed value is hFE approx. value of tested transistor (0~1000β)	Ibo≈10μA Vce≈ 2.8V

Maintenance

This section provides basic maintenance information including battery and fuse replacement instruction.

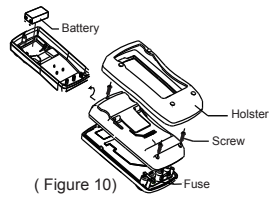
⚠Warning

Do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test, and service information. To avoid electrical shock or damage to the Meter, do not get water inside the case.

A. General Service

- Periodically wipe the case with damp cloth and mild detergent. Do not use chemical solvent.
- To clean the terminals with cotton bar with detergent, as dirt or moisture in the terminals can affect readings.
- Turn the Meter off when it is not in use and take out the battery when not using for a long time.
- Do not store the Meter in place of humidity, high temperature, explosive, inflammable and strong magnetic field

B. Replacing the Fuses (See Figure 10)



(Figure 10)

⚠Warning

To avoid electrical shock or arc blast, or personal injury or damage to the Meter, use specified fuses ONLY in accordance with the following procedure.

To replace the Meter's fuse:

1. Turn the Meter off and remove all connections from the terminals.
2. Remove the holster from the Meter.
3. Remove the 3 screws from the case bottom, and separate the case top from the case bottom.
4. Remove the fuse by gently prying one end loose, then take out the fuse from its bracket.
5. Install ONLY replacement fuses with the identical type and specification and make sure the fuse is fixed firmly in the bracket.
   Fuse 1: 0.5A, 250V, fast type, Φ5x20mm
6. Rejoin the case bottom and case top, and reinstall the 3 screws and holster.
   Replacement of the fuses is seldom required. Burning of a fuse always results from improper operation.

C.Replacing the Battery (See Figure 10)

⚠Warning

To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator " " appears.

To replace the Meter's battery:

1. Turn the Meter power off and remove all connections from the terminals.
2. Remove the holster from the Meter.
3. Remove the 3 screws from the case bottom, and separate the case top from the case bottom.
4. Remove the battery from the battery connector.
5. Replace with a new 9V battery (NEDA1604, 6F22 or 006P).
6. Rejoin the case bottom and case top, and reinstall the 3 screws and the holster.

** END **

UNI-T
UNI-TREND TECHNOLOGY (CHINA) CO., LTD.
No6, Gong Ye Bei 1st Road,
Songshan Lake National High-Tech Industrial
Development Zone, Dongguan City,
Guangdong Province, China
Tel: (86-769) 8572 3888
http://www.uni-trend.com