UNI-T UT133A Digital Multimeter Instruction Manual

UNI-T UT133A Digital Multimeter Instruction Manual

Contents

Introduction

UT133A, B are 6000 count palm sized multimeters with auto and manual range respectively. These CE/ETL certified multimeters are CAT II 600V, which can withstand 6000k surge voltage. UT133 are designed with high voltage warning and over range alarm, making this series great for a wide range of measurement needs.

Features:

- Smart appearance with comfy handle
- Pass 2-meter drop test Large LCD screen with 6000 counts display, true RMS measurement, fast ADC digital converter (3 times/s)
- Overload protection with alert
- Extensive range for capacitance measurement, short response time. E.g. When measuring <10mF, response time <6s
- Support NCV, frequency (UT133A) and battery (UT133B) measurement.
- Support up to 600V/10A AC/DC current and voltage measurement.
- Backlight installed for dim occasions.
- Energy saving

Open Box Inspection

Open the package box and take out the device. Please check whether the following items are deficient or damaged and contact your supplier immediately if they are.

- User manual — pc
- Test leads—— -1 pair
- K-type thermocouple- -1 pc (UT133A Only)

Safety Instructions

Safety Standards

- CE, cETLus
- EN 61326-1:2013; EN 61326-2-2:2013
- EN 61010-1:2010; EN 61010-2-030:2010; EN 61010-2-033:2012
- Conforms to UL STD. 61010-1, 61010-2-030, 61010-2-033, Certified to CSA STD. C22.2 No. 61010-1, 61010-2-030, 61010-2-033.
- CAT Ill 600V, double insulation standard, over voltage standard, and RoHS, pollution grade Il

Safety Instructions

1. Do not use the device if the rear cover is not covered up or it will pose a shock hazard
2. Do not use the device if the device or test leads appear damaged or if you suspect that the device is not operating properly. Pay particular attention to the insulation layers.
3. During measurement, keep your fingers behind the finger guard.
4. Do not input over 600V voltage between the device and the grounding.
5. Use caution to measure voltage >DC 60V or AC 30Vrms.
6. Never input voltage and current exceeding the value listed on the device.
7. Functional dial should be switched to proper position.
8. Do not switch the functional dial during measuring.
9. Do not change the internal circuit of the device in order to avoid the damage to the device and users.
10. Replace the fuse with the specified model.
11. To avoid false reading, replace the battery when the battery indicator a1 appears.
12. Do not use or store the device in high temperature, high humidity, flammable, explosive or strong magnetic field environments.
13. Use damp cloth to clean the case; do not use detergent containing solvents or abradants.
14. Before each use verify meter operation by measuring a known voltage or current. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Symbols

Low battery
Direct current
Alternating current
Warning
Double insulation
Caution, possibility of electric shock
Grounding
Comply with European Union Standards
Conforms to UL STD. 61010-1, 61010-2-030, 61010-2-033, Certified toCSA STD. C22.2 No. 61010-1, 61010-2-030, 61010-2-033.
CAT 3 It is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.

General specifications

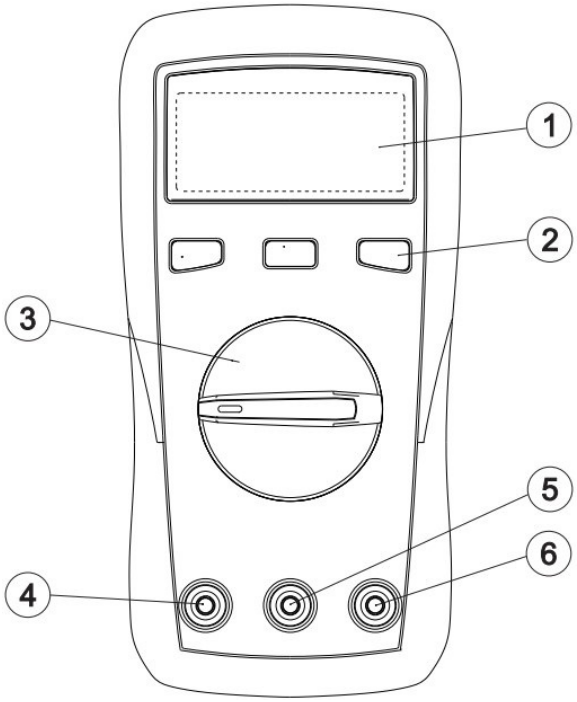
1. **Max voltage between input terminal and earth grounding:** 600Vrms
2. **Fuse Type:**
   10A Jack: F 10A H 600V Fuse ®6x25mm (or ®6x32mm) mA/pA Jack: F 600mA H 600V Fuse ®6x32mm
3. **Display count:** 6000
   Overload indication: OL, refresh 3 times/s

Others:

1. **Range:** Auto UT133A/Manual UT133B
2. **Backlight:** Manual, shutdown after 30s.
3. **Polarity:** — for negative pole
4. **Data hold indication:** BI
5. **Low power indication:** x+
6. **Operating temperature:** 0°C~40″C (32'F~104F)
   Storage temperature: -10°C~50°C (14'F~122'F)
   Relative humidity: <75% at 0°C~30°C; <50% at 30°C~40°'C
7. **Operating altitude:** 0~2000m
8. **Battery type:** AAA 1.5Vx2
9. **Dimension:** 155mmx76.5mmx49mm

10. **Weight:** 255g(with batteries)
11. **Electromagnetic compatibility:**
    RF<1V/m, overall accuracy=specified accuracy+5% of range.
    RF>1V/m, no specified calculation.

Structure(see figure 1)



1. LCD display
2. Functional buttons
3. Functional dial
4. 10A input terminal
5. COM input terminal
6. Other input terminals

Buttons

UT133A:

- **SELECT :** Cydle switch the functions through AC/DC mV range, frequency, resistance Idiode/ continuity, “C/’F
- **REL :** The voltage, current and capacitance mode, press this button to remove the base.
- **HOLD/LIGHT :** Press the button once to hold the reading. Press this button for 2 seconds to turn on/off the backlight.

UT133B:

- **HOLD/SELECT :** Press to turn on/off data hold function (except at continuity/diode position)
- **REL :** The capacitance mode, press this button to remove the base.
- **LIGHT:** Press this button to turn on/off the backlight.

Operation instructions

To avoid false reading, replace the battery if the battery low power symbol w appears. Also pay special attention to the warning sign A besides the test lead housing, indicating that the tested voltage or current must not exceed the values listed on the device.

AC/DC voltage measurement (see Figure 2)

1. Switch the dial to ACV position
2. Insert the red test lead to VQmA jack, black to COM jack.
3. Connect test leads with the load in parallel.
4. At mV position, press SELECT to enter frequency measurement (10Hz~1MHz)
5. Reading is displayed.

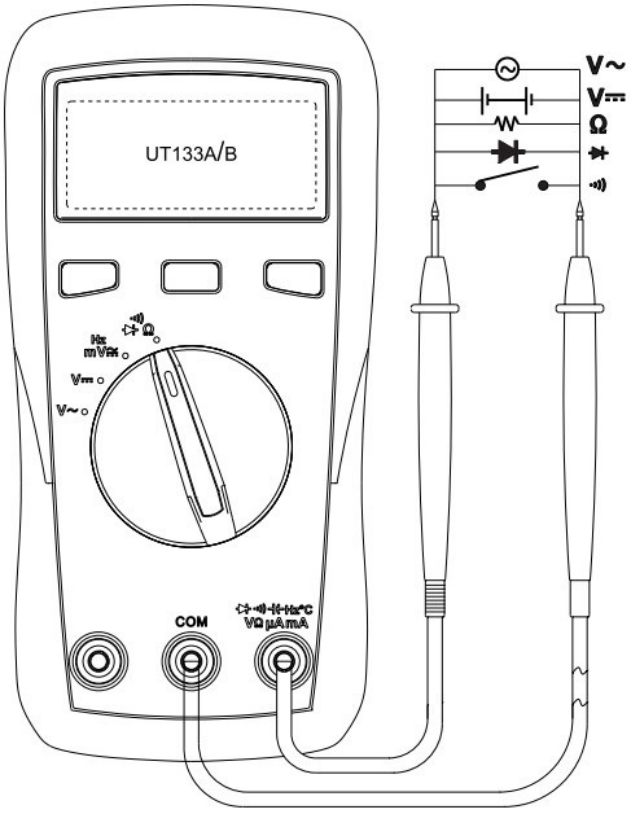
Warnings

- Do not input voltage over 600Vrms, or it may pose shock hazard.
- Be cautious when measuring high voltage

note:

- Before using the device, if the voltage is unknown, switch the dial to the maximum range position and reduce the range according to the practical reading.
- Test a known voltage to verify the device.
- When input impedance about 10MQ, there may be errors when measurement high voltage. Input impedance=10kQ, measurement errors can be ignored (<0.1%)

Resistance measurement.



1. Switch the dial to resistance position
2. Insert the red test lead to VOmA jack, black to COM jack.
3. Connect test leads with the load in parallel.
4. Reading is displayed.

Notes

- If the resistor is open or over the range, the “OL” symbol will be displayed on the screen.
- Before measuring resistance, switch off the power supply of the circuit, and fully discharge all capagitors.
- When measuring low resistance, the test leads will produce 0.10~0.2Q measurement error. To obtain accurate measurement, short the test leads and use REL function.
- If the resistance when shorted is more than 0.5Q, please check if test leads are loosened or damaged.
- Resistance measurement can be used to inspect device’s internal fuses.(see figure 4b)
- Do not input over 60V DC or 30V AC or it will pose shock hazard.

Continuity measurement (see figure 2)

1. Switch the dial to continuity position
2. Insert the red test lead to VOmA jack, black to COM jack.
3. Connect test leads with the load in parallel.
4. Reading is displayed. Measured resistance >51Q, circuit is in open status. Measured resistance <10Q, circuit is in good conduction status, buzzer will go off

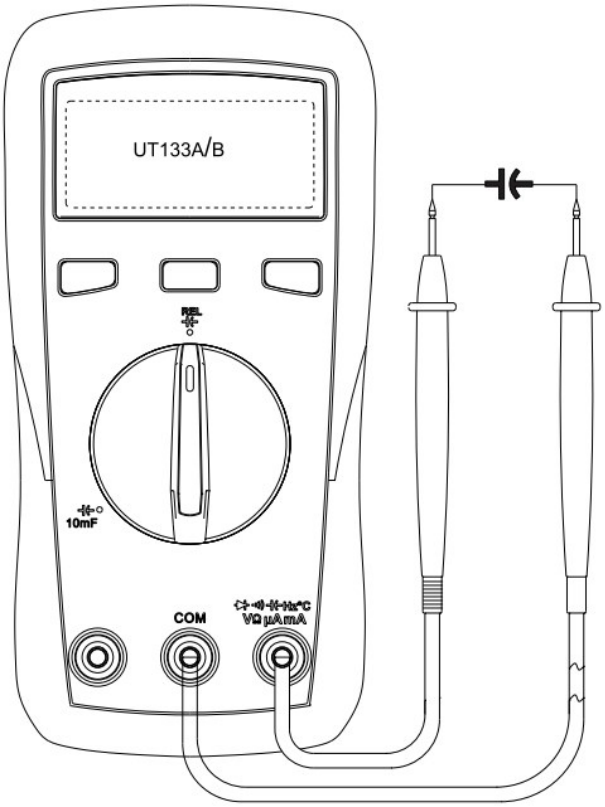
Warnings:
Switch off the power supply to the circuit, and fully discharge all capacitors

Diode measurement (see figure 2)

1. Switch the dial to diode position
2. Insert the red test lead to VOmA jack, black to COM jack.
3. Red test lead to positive pole, black to negative pole.
4. Reading is displayed. 5)“OL” symbol appears when the diode is open or polarity is reversed. For silicon PN junction, normal value: 500 ~ 800mV (0.5 ~ 0.8V).

Notes:
Switch off the power supply to the circuit, and fully discharge all capacitors Voltage for testing diode is about 4.0V/1.5mA.

Capacitance measurement (see figure 3)

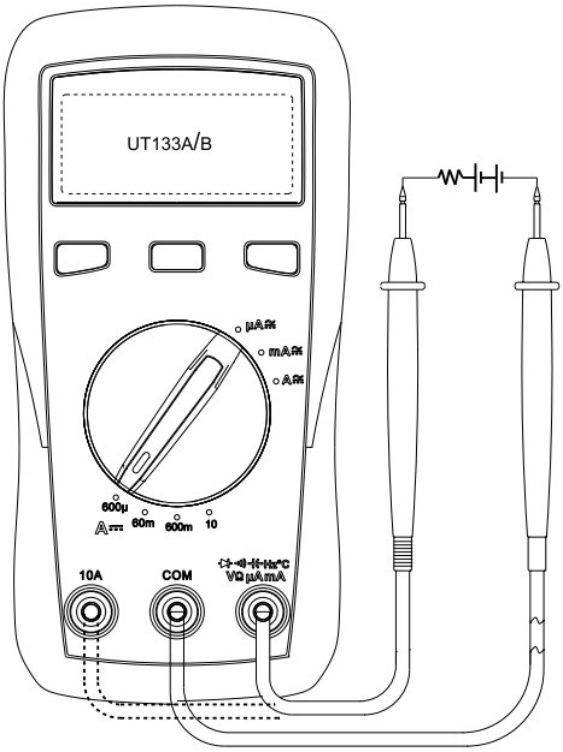


1. Switch the dial to capacitance measurement
2. Insert the red test lead to VQmA jack, black to COM jack.
3. Reading is displayed.

Notes:

- Switch off the power supply to the circuit, and fully discharge all capacitors
- Before measuring capacitors (especially for high voltage capacitors), please fully discharge them.
- If the tested capacitor is shorted or its capacity is over the specified range “OL” symbol will be displayed on the screen.
- When measuring large capacitors, it may take a few seconds to obtain steady readings.
- When there is no input, the device displays a fixed value (intrinsic capacitance).
- For small capacitance measurement, to ensure measurement accuracy, the measured value must be subtracted from intrinsic capacitance. Or users can measure small capacity capacitors with relative measurement function (REL) (the device will automatically subtract the intrinsic capacitance)

AC/DC current measurement (AC current measurement is only for UT133A)

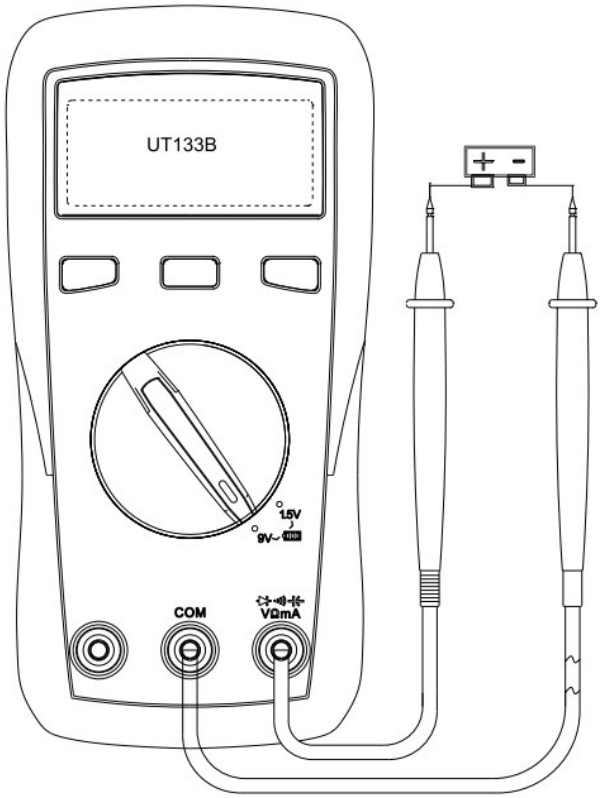


1. Switch the dial to AC/DC current position
2. According to the current being measured. Insert the red test lead to VQmA jack or 10A jack, black to COM jack.
3. Connect test leads with the circuit in series
4. Reading is displayed.

Notes:

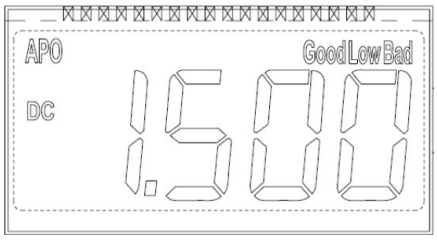
- Before measuring, switch off the power supply of the circuit.
- If the range of the measured current is unknown, select the maximum range and then accordingly reduce.
- There are fuses inside VOmA jack and 10A jack. Do not connect the test leads with any circuits in parallel.
- If the tested current is about 10A, each measurement time is about 10 seconds(less than 30s) and the next test should be after 15 minutes.

Battery measurement (Only for UT133B)



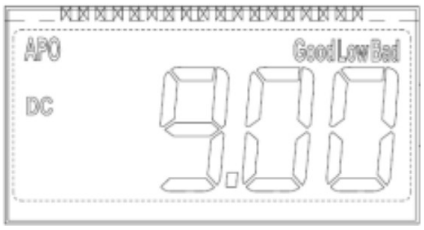
1. Switch the dial to battery position
2. Insert the red test lead to VOmA jack or 10A jack, black to COM jack.
3. Connect red test lead to + pole of the battery, black to — pole.
4. Reading is displayed (Good-normal status; Low-low power; Bad-need replacement)
5. LCD display of battery status

1.5V battery: resistance=30Q



Indication	Voltage
Good	>1.31
Low	0.95V-1.3V
Bad	^0.94V

9V battery: resistance=900Q

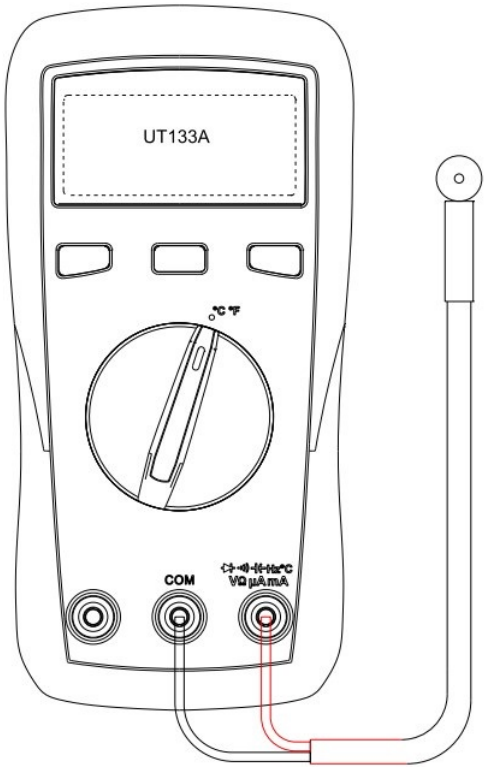


Indication	Voltage
Good	^7.8
Low	5.7V-7.7V
Bad	^5.6V

Note:

- When the display shows Bad, you need to replace the battery
- If the battery voltage <0.2V, there is no indication on the display, LCD only shows the flashing voltage value
- Do not input over 60V DC or 30V AC voltage.

Temperature measurement (Only for UT133A)

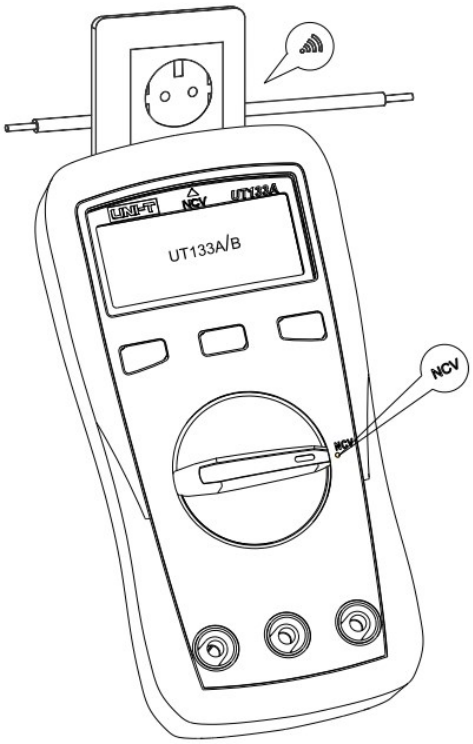


1. Switch the dial to temperature position
2. Insert K-type thermocouple to the device and place the test probes on the object under measurement.
3. Reading is displayed.

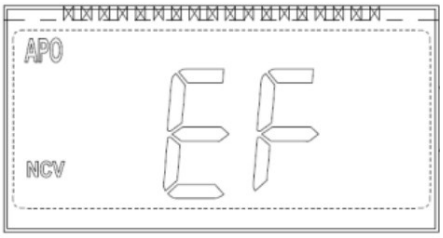
Note

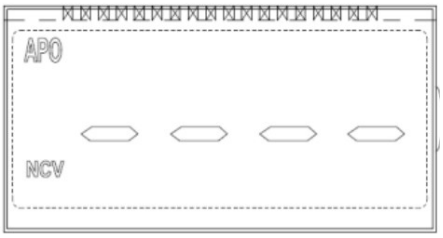
- Only K-type thermocouple is applicable.
- The measured temperature should be less than 250°C/482°F (‘F=”C*1.8+32)
- Turn on the device, after “OL” symbol appears, insert K-thermocouple into the device.

NCV measurement (see figure 7)



1. Switch the dial to NCV position
2. Place the device near the measured object. “~”symbol indicates the intensity of the electric field. More “~”and the higher the buzzer frequency, the higher the electric field intensity.
3. Intensity of electric field.





* “EF”: 0~50mV
* =”: 50 ~ 100mV
* 100 ~ 150mV
* : 150 ~ 200mV/
*———=”:5200mV

Others

- The device enters measurement status in 2 seconds after startup. Restart the device iPErE” appears.
- The device automatically shuts down if there is no operation for 15 minutes. You can wake up the device by pressing any key. To disable auto shutdown: switch the dial to OFF position and long press SELETE button until the device turn on.

Buzzer notification

1. Input voltage =600V (AC/DC), buzzer will continuously beep indicating measure range is at limit
2. Input current >10A (AC/DC), buzzer will continuously beep indicating measure range is at limit
3. The buzzer will go off five times continuously 1 minute before auto-off.
    - **Low power warnings:**

      Voltage of the battery < 2.5V, \+ symbol appears

Technical specifications

Accuracy: £ (% of reading + numerical value in least significant digit slot), 1 year warranty ‘
Ambient temperature: 23’C + 5°C (73.4’F £ 9’F)
Ambient humidity: <75% RH

Notes
To ensure accuracy, operating temperature should be within 18°C ~ 28°C. Temperature Coefficient= 0.1*(specified accuracy)/”C (<18 “C or >28°C)

1.DC voltage

Range		**Resolution**	**Accuracy**
Position	**Model**		
600.0mV	UT133A/B	0.1mV	+(0.7%+3)
6.000V/6000mV	UT133A/B	0.001V/1mV	+(0.5%+2)
60.00V	UT133A/B	0.01V	+(0.7%+3)
600.0V	UT133A/B	0.1V	+(0.7%+3)

Input impedance: About 10MQ.

Results might be unstable at mV range when no load is connected. The value becomes stable once the load is connected. Least significant digit ≤±3
Max input voltage: +600V, when the voltage=610V, “OL” symbol appears and the buzzer goes off.
Overload protection: 600Vrms (AC/DC)

2.AC voltage

Range		Resolution	Accuracy
Position	**Model**		
600.0mV	UT133A	0.1mV	+(1.0%+2)
6.000V	UT133A	0.001V	?(0.7%+3)
60.00V	UT133A	0.01V	+(1.0%+2)
600.0V	UT133A/B	0.1V	+(1.2%+3)
60Hz – 1MHz	UT133A	0.01Hz/0.001MHz	+(0.1%+5)

Continuity, Diode

Position	Resolution	Remark
	0.1Ci	Set ValueOpen circuit: resistance>500, no beep.Well-connected circuit: resistance^ 10Ct, continuous beeps.
	0.001V	**UT133A**Open circuit voltage :4V , test current: about 1.5mA **UT133B**Open circuit voltage :2.1V , test current: about 1mA Silicon PN junction voltage: 0.5 – 0.8V.

Overload protection: 600Vrms

Capacitance

Range	Resolution	Accuracy
9.999nF	0.001nF	REL mode : +(4%+10)
99.99nF	0.01nF	+(4%+5)
999.9nF	0.1nF	+(4%+5)
9.999/F	0.001pF	+(4%+5)
99.99gF	0.01pF	+(4%+5)
999.9pF	0.1pF	+(4%+5)
9.999mF	0.001mF	+10%

Temperature (Only for 133A)

Range			Resolution	Accuracy
	—40-1000’C	—40-40”	1’C	+4 ”C
		>40-500’C		+(1.0%+4)
		>500-1000”C		+(2.0%+4)
’F	-40-1832”F	-40-104”F	1’F	+5 ‘F
		>104-932”F		+(1.5%+5)
		>932-1832”F		+(2.5%+5)

Overload protection: 600V
K-type thermocouple is only applicable for temperature less than 250°C/482°F.

DC current

Range		Resolution	Accuracy
Position	Model		
600.0\A	UT133A/B	0.1pA	+(1.0%+3)
6000\A	UT133A	1pA	+(1.0%+3)
60.00mA	UT133A/B	0.01mA	+(1.0%+3)
600.0mA	UT133A/B	0.1mA	+(1.0%+3)
6A	UT133A	0.001A	+(1.2%+5)
10.00A	UT133A/B	0.01A	+(1.2%+5)

verioad protection: 600Vrms
WA mArange: F1 Fuse ®6x32mm F 600mA H 600V
10A range: F2 Fuse ®6x25mm (or ®6x32mm) F 10A H 600V
Input current≥ 10A, buzzer goes off; input current>10.10A “OL” symbol appears 29 30

AC current (Only for UT133A)

Range		Resolution	Accuracy
Position	Model		
600.0pA	UT133A	0.UA	+(1.2%+3)
6000pA		1pA	
60.00mA		0.01mA	
600.0mA		0.1mA	
6A		0.001A	+(1.5%+5)
10.00A		0.01A	

Frequency response: 40~400Hz
Display: true RMS
Accuracy guarantee range: 5-100% of the range, shorted circuit allows least significant digit=2
Input current=10A, buzzer goes off; input current>10.10A “OL” symbol appears
Overload protection: (similar to DC current)

maintenance

WARNING: To avoid electric shock, make sure the probes are disconnected from the measured circuit before removing the rear cover. Make sure the rear cover is tightly screwed before using the instrument.

1. **General maintenance**
    1. Clean the case with a damp cloth and detergent. Do not use abradants or solvents
    2. If there is any malfunction, stop using the device and send it to maintenance.
    3. The maintenance and service must be implemented by qualified professionals or designated departments.
2. **Replacements (see Figure 8a, Figure 8b)**

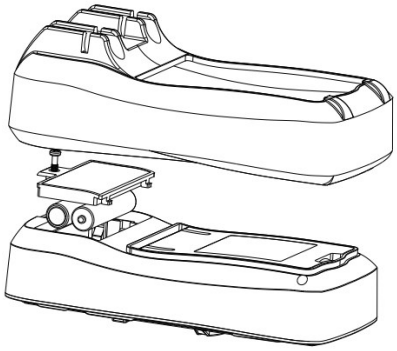
    Battery replacement:

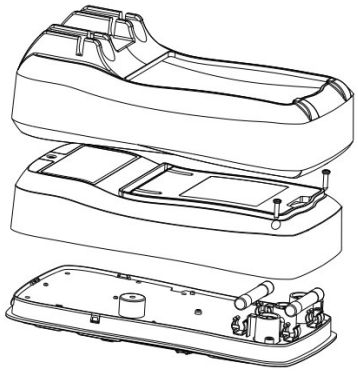
    To avoid false reading, replace the battery when the battery indicator appears. Battery Specification: AAA 1.5V x 2
    1. Switch the dial to “OFF “position and remove the test leads from the input terminal.
    2. Take off the protective case. Loosen the screw on battery cover; remove the cover to replace the battery. Please identify the positive and negative pole.

Fuse replacement:

1. Switch the dial to “OFF “position and remove the test leads from the input terminal
2. Loosen the both screws on the rear cover, and then remove the rear cover to replace the fuse

Fuse specification
F1 Fuse ®6x32mm F 600mA H 600V
F2 Fuse ®6x25mm (or ®6x32mm) F 10A H 600V





Test probe replacement
If insulation on probe is damaged, replace it.

WARNING:
If the test leads need to be replaced, you must use a new one which should meet EN 61010-031 standard, rated CAT II 600V, 10A or better.

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http://www.uni-trend.com

Documents / Resources

	UNI-T UT133A Digital Multimeter [pdf] Instruction Manual UT133, UT133A Digital Multimeter, Digital Multimeter, Multimeter