

UT281A/C/E

Flex Clamp Meter User Manual

I. Overview

UT281A/C/E are 3000A AC current true RMS digital clamp meters with Rogowski Coil (hereinafter refer to as flex clamp meter). UT281 is designed with LSI double integration A/D converter as the core, along with full range overload protection and a unique appearance, which makes UT281 a great performance professional electrical meter. UT281A has a coil length of 25.4cm (10 inches). Both UT281C and UT281E have a coil length of 45.7cm (18 inches). UT281E can also measure voltage, resistance, and frequency. UT281 series have IP54 rating and are able to withstand impact from a one meter drop.

This operating manual includes relevant safety information and warnings. Please read this manual carefully and observe all cautions.

Warning:

Before using the product, please read the operation safety rules carefully.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

II. Unpacking Inspection

Open the package box and take out the meter. Please check carefully if items are missing or damaged.

1. Manual-----1
2. Probes-----1 pair (UT281E only)

If any pieces above are missing or damaged, please contact your dealer immediately.

III. Operation Safety Rules

Pay attention to Warnings. Warnings mean situations or actions that may endanger the user, or may damage the meter and the device being tested. The meters are designed and manufactured strictly following IEC61010-1:2010, IEC61010-2-32:2012, IEC61010-2-033:2012 (UT281E only), IEC61326-1:2013, and IEC61326-2-2:2013 safety standards, and complies with double insulation, over-voltage category (CAT IV 600V), and pollution level 2 safety standards. Operations outside the instructions within this manual may void the warranty provided for the meter.

The clamp meters Conforms to UL STD. 61010-1, 61010-2-032 and 61010-2-033; Certified to CSA STD. C22.2 NO. 61010-1, 61010-2-032 and 61010-2-033.

Operations outside the instructions within this manual may void the warranty provided for the meter.

1. Check the meter and the probe, if the probe or the insulated case is damaged, or the LCD displays nothing, or the meter cannot work normally, please stop using the meter and notify your dealer.
2. Do not use the meter if the back cover or the battery cover is not completely closed.
3. Remember not to touch the metal parts of the probe when measuring. Do not touch any exposed wire, connector, unused input terminal, or circuit being tested to avoid electrical shock.
4. Functional keys should be in right position before measuring. Switching ranges during measurement is strictly prohibited to avoid damaging the meter.
5. Do not input voltages over DC 1000V or AC 750V to avoid electrical shock or damages to the meter (UT281E only).
6. When the meter measures RMS voltages over DC 70 or AC 33 V (UT281E only), special care should be taken to reduce risk of electrical shock.
7. Do not measure voltage or current beyond the input limitation. If you are not sure about the measurement range, please switch the range to maximum. Before testing the in-circuit resistance, diode, or the circuit continuity, please block all power supplies on the circuit and discharge all capacitors, otherwise the results will be inaccurate (UT281E only).
8. When the LCD displays , batteries should be replaced to ensure accurate measurements. Take out the batteries if the meter has not been used for a long time.
9. Do not alter any connection inside the meter.
10. Do not store or use the meter under high-temperature, high-humidity, inflammable, explosive, or strong magnetic environment.
11. Please use soft cloth and neutral detergent to clean the meter's case instead of grinding agent or solvent to avoid corrosion.

IV. Electrical Symbols

	Double Insulation		Low Battery
	Grounding		AC/DC
	Warning		High Voltage Danger
	AC		CE Standard of EU
	DC		ETL Standard Certification

V. Exterior Structure and Printing Symbols (See Figure 1)

1. Rogowski Coil-Test coil of flex clamp meter
2. Clamp Lock – Turn the knob to unlock clamp; turn in opposite way to lock
3. LCD – Displays measurement data and function modes
4. "HOLD" – Short press to turn on/off hold mode
5. "INRUSH" and "INRUSH" – Short press to turn on/off backlight. Long press for 2 seconds to turn on/off inrush measurement mode
6. "RANGE" and "Hz" – For UT281E only: Short press to switch between 30.00A/300.0A/3000A/Auto; default is Auto "RANGE" -For UT281A/C: Short press to switch between 30.0A/300.0A/3000A
7. Power and Range Shift Switch (UT281E only): Set to A/V for current and voltage measurement. Set to A/Ω for current and resistance measurement. For UT281A/C: Long press key for 2 seconds to turn on/off meter
8. Voltage and Resistance Measurement Input (UT281E Only): Maximum AC voltage measurement is 600V, maximum resistance is 6M Ω

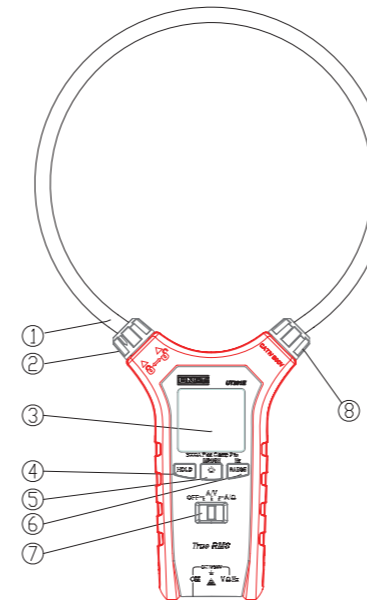


Figure 1

VI. Display Symbols

UT281A/C (Figure 2.1)

- INRUSH: Starts up 80ms inrush measurement
- : Low battery indicator
- : Data hold
- "A": Current unit (ampere)
- "APO": Auto power off after 10 minutes

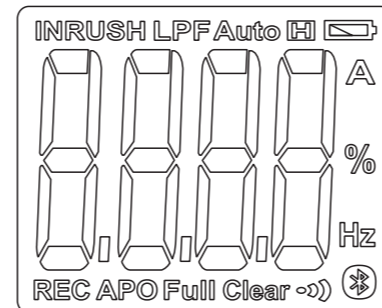


Figure 2.1 UT281A/C

UT281E (Figure 2.2)

- INRUSH: Starts up 80ms inrush measurement
- : Buzzer
- : Low battery indicator
- : Data hold
- A: Ampere; Hz: Hertz; V: Voltage; Ω: Ohm; kΩ: kilohm; MΩ: Megaohm; AC: alternating current
- Auto: Auto range
- "APO": Auto power off after 10 minutes
- Large display: Main display
- Smaller display: Secondary display

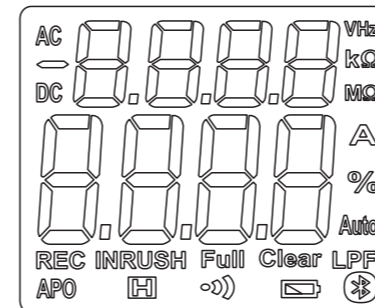


Figure 2.2 UT281E

VII. Operation Instructions

UT281 is powered by three AAA 1.5V batteries. Please be aware of the battery polarity when installing.

Long press the power switch for over 2 seconds to turn on/off the meter.

If the LCD displays , the batteries should be replaced in time to ensure accurate measurement. Take out the batteries if the meter has not been used for a long time.

AC Current Measurement

Warning:

Disconnect all power supplies of the device before measurement. Do not power on the wire to be tested until the meter has safely clamped the wire.

Caution:

Do not get too close to the coil during measurement.

1. Turn off the meter and disconnect the power of wire to be tested.
2. Rotate the clamp lock counterclockwise and move the flex clamp (as Figure 3).

3. Clamp only one wire to be tested, as shown below:
4. After clamping the wire, lock the clamp again
5. Be sure not to measure any current beyond the rated current.
6. Turn on the meter and power on the wire to be tested. Do not get too close to the coil during measurement.
7. Read the current value on the LCD; if the measurement value is above the measurement range, "OL" will be displayed. Please choose the proper range manually (30.00A/300.0A/3000A).
8. The following are wrong or improper measurement methods:

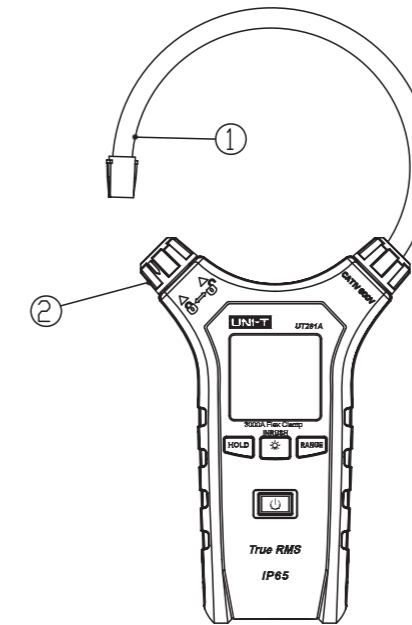


Figure 3

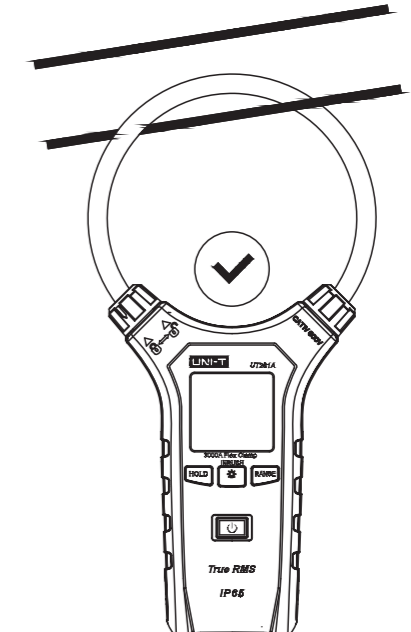


Figure 4

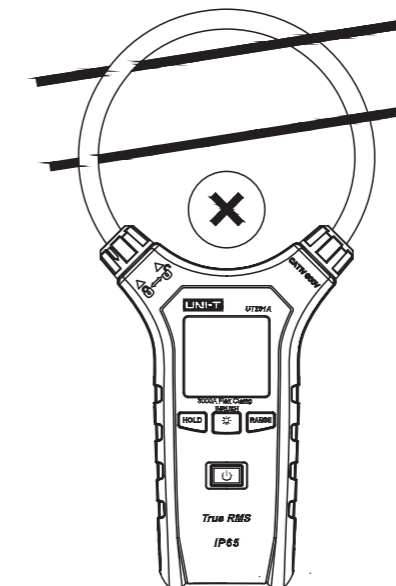
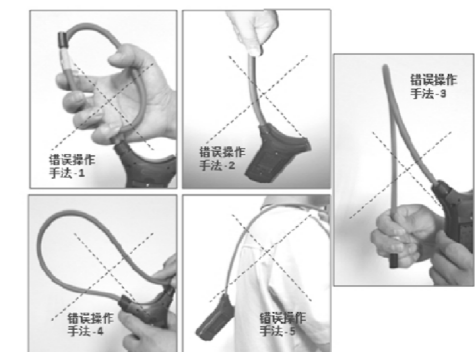


Figure 5 – Wrong measurement methods



AC Current and Frequency Measurement (UT281E Only)

1. Insert the black probe to the COM terminal and the red probe to the "V" input terminal.
2. To measure current and voltage: Turn the switch to "A/V".
3. Under this measurement mode, long press "RANGE" for 2 seconds to start current and frequency measurement.
4. Connect with the voltage to be measured
Put the black and the red probe on two ends of the voltage to be measured. The meter can adjust range automatically. The main display will show the true RMS of the AC current and the secondary display will show the AC voltage or the frequency.

Warning: The meter cannot measure AC voltages beyond 600V, meter will display "OL" for levels above 600V.

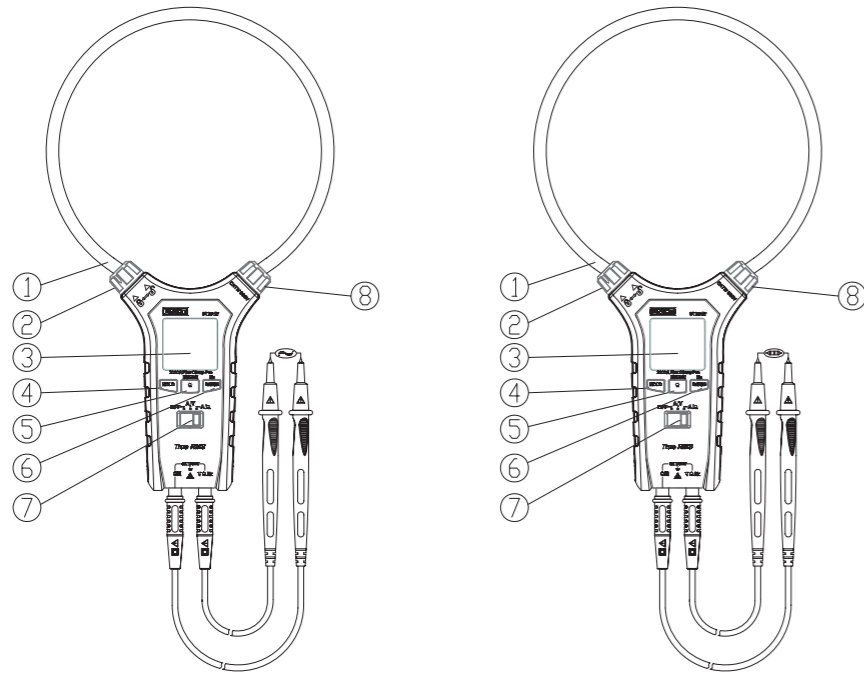


Figure 6

Figure 7

Resistance Measurement: (UT281E only) see Figure 7

1. Insert the black probe to the COM terminal, and the red probe to the "V" input terminal.
2. To measure current and resistance: Turn the switch to "A/Ω".
3. Contact the black and red probes to the ends of the resistor to be measured. The meter can select range automatically. The main display will show the AC current value and the secondary display will show resistance value.

Warning: During in-circuit resistor measurement, disconnect all the power to the circuit and release all residual charges in capacitors. Separating the components from the circuit before measurement can improve results.

Auto Power Off:


The meter will automatically power off without any operation in 10 minutes in order to save energy. When the meter enters auto sleep mode, the current state will be saved automatically. To power UT281A/C on again, the power switch should be pressed; for UT281E, power switch should be turned to OFF, and then turned back to current measurement mode.

Buzzer:

Press any key under any measurement mode, if the key works, then buzzer will make a sound, the buzzer will be silent if the key does not work.

VIII. Technical Specifications

1. General Specifications

LCD	Display maximum is 3000
Overload indication	"OL" or "-OL" will be displayed
Low battery indication	"  " means that the meter is in low battery and new batteries should be replaced.
Sampling rate	About 3 times per second
Sensor type	Clamp sensor of Rogowski Coil
Measuring position error	During measurement, the meter will have ±0.3% additional reading error for the source to be tested is in the central position. If not in the center, A, C, D district error should be added
Impact strength	The meter can withstand impacts of dropping from 2 meter's height
Clamp size	UT281A has a coil of 25.4cm (10 inches). Both UT281C and UT281E have a coil of 45.7cm (18 inches)
Wire diameter maximum	Over 50cm
Electromagnetic field effect	When the electromagnetic interference exists, the meter may show unsteady or wrong reading
Power supply	3 AAA 1.5V batteries
Auto power off	15 minutes

2. Environmental Limitations

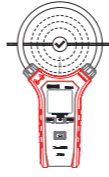
Working condition	Indoor use
Maximum height	2000m
Safety	IEC61010-1, IEC61010-2-032, CATIV 600V
Pollution level	2
Working temperature and humidity	0°C~30°C (no more than 80%RH)
	30°C~40°C (no more than 75%RH)
	40°C~50°C (no more than 45%RH)
Storage temperature and humidity	-20°C~60°C (no more than 80%RH)

3. Electrical Specifications

Accuracy	± (%reading+word), calibration period is one year
Temperature	23°C±5°C
Humidity	≤80%RH
Temperature Coefficient	0.1 × (accuracy)/°C


(1) UT281A AC Current Measurement

Range	Resolution	Accuracy	Description
30.00A	0.01A	±(3%+5)	Accuracy when measuring in center position. Please refer to figure 8
300.0A	0.1A		
3000A	1A		
Inrush Current Measurement	Measurement Range:0.50A~3000A	Only for reference	
Frequency Response	45Hz~500Hz		

Additional accuracy for optimal measurement (when no other electrical or magnetic fields are present)	Center for optimal measurement	± (3%+5)	✓	
	15mm (0.6 inches)	Add 2.0%	Region A	
	25mm (1.0 inches)	Add 2.5%	Region B	
	35mm (1.4 inches)	Add 3.0%	Region C	

(2) UT281C/E AC Current Measurement

Range	Resolution	Accuracy	Description
30.00A	0.01A	±(3%+5)	Accuracy when measuring in center position. Please refer to figure 8
300.0A	0.1A		
3000A	1A		
Inrush Current Measurement	Measurement Range:0.50A~3000A	Only for reference	
Frequency Response	45Hz~500Hz		

Additional accuracy for optimal measurement (when no other electrical or magnetic fields are present)	Center for optimal measurement	± (3%+5)	✓	
	35mm (1.4 inches)	Add 1.0%	Region A	
	50mm (2.0 inches)	Add 1.5%	Region B	
	60mm (1.4 inches)	Add 2.0%	Region C	

(3) UT281 AC Voltage Measurement

Range	Resolution	Accuracy	Overload Protection
6.000V	0.001V	±(1.2%+5)	600V AC
60.00V	0.01V		
600.0V	0.1V		
Frequency Response	45Hz~500Hz		

Main Display: true RMS of the current
 Secondary Display: true RMS of the AC voltage
 Input Impedance ≥ 10MΩ

(4) UT281E Resistance Measurement (Ω)

Range	Resolution	Accuracy	Overload Protection
6.000kΩ	0.001kΩ	±(1.2%+3)	
60.00kΩ	0.01kΩ		
600.0kΩ	0.1kΩ		
6.000MΩ	0.001MΩ		

Main Display: true RMS of the current
 Secondary Display: resistance measurement

(5) UT281E Frequency Measurement (Hz)

Range	Resolution	Accuracy	Overload Protection
20Hz~40kHz	0.1Hz	±(1%+2)	600V AC

Main Display: true RMS of the current
 Secondary Display: frequency measurement

IV. Maintenance

1. General Maintenance

Warning: To avoid electric shock, remove the probe before opening the bottom cover.

- The repair and service of the meter should be accomplished by professional maintenance personnel or authorized departments.
- Clean the meter case by using dry cloth periodically. Grinding agent and solvent shall not be used.

2. Battery Installation and Replacement

This product uses 3 AAA 1.5V batteries. Please install or replace the batteries by the following steps:

- Turn off the meter and remove probes
- Turn the panel down, remove the screws in the battery holder, take off the battery cover, take out the batteries and replace for new ones in accordance with the polarity indication.
- Please use same type batteries instead of improper ones.
- After installing new batteries, cover and screw in the battery holder.

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