

# UT-CS09A/D Flex Clamp Current Sensor

Thank you for purchasing this brand new UNI-T product. In order to safely and correctly use this device, please read this manual carefully, especially the Safety Instructions section. Please keep the manual accessible near the device for future reference.

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## 1. Instruction

UT-CS09A/UT-CS09D is a stable, safe and reliable 3000A AC Rogowski flex Clamp Current Sensor (hereinafter called current sensor). The core of the design is the Rogowski coil.

### ⚠ Warning:

To avoid electric shock or injury, please read Safety Instructions and Warnings before operating this product.

## 2. 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 ----- 1 pc
- BNC adapter----- 1 pc
- Battery: 1.5V AAA----- 3 pc

## 3. Safety Instructions

In this manual, a Warning identifies conditions and actions that pose hazard(s) to the user or the test device.

This device strictly follows CE standards: IEC61010-1; IEC61010-031; IEC61010-2-032 as well as CAT IV 600V, RoHS, pollution grade II, and double insulation standards.

If the clamp is used in a manner that is not specified in this manual, the protection provided by the device might be impaired.

- 1) Do not use the device if the rear cover or the battery cover is not covered up.
- 2) When measuring, keep fingers behind the finger guard on the measuring head. Do not touch bare cables, connectors, unoccupied input terminals or circuit being measured.
- 3) Before measuring, the switch should be on correct position. Do not switch positions during measurement.
- 4) Do not use the clamp on any conductor with voltages higher than DC 1000V or AC 750V.
- 5) Use caution when working with voltages above 33V AC rms. Such voltages pose shock hazard.
- 6) Do not use the device to measure current higher than specified range. If current value being measured is unknown, select 3000A position and reduce accordingly.
- 7) To avoid false reading, replace the battery if "POWER" indicator flashes. Remove the battery if the sensor is left unused for a long time.
- 8) Do not change the internal circuit of the device.
- 9) Do not store or use the sensor in high temperature, high humidity, explosive, or strong magnetic field environments.
- 10) Use soft cloth to clean the case, do not use abrasives or solvents.
- 11) Do not use when the jaw or "jaw end" is worn.

## 4. Symbols

	Double insulation
	Grounding
	Warning
	AC (Alternating Current)
	Battery
	High voltage hazard
	Comply with European Union standards
	Conforms to UL STD. 61010-1, 61010-2-032, 61010-031, Certified to CSA STD. C22.2 No. 61010-1, 61010-2-032, 61010-031.
	It is applicable to test and measuring circuits connected at the source of the building's low-voltage MAINS installation.

## 5. Structure

1. Flexible Rogowski coil
  2. Flexible clamp lock
  3. Fixed piece
  4. Power indicator
  5. Switch
    - Normal status: constant red light
    - Low power (<3.3V): flash once for every 1s period. Please replace the batteries.
  6. Corresponding output voltage
    - A. 30A range: 1A -> 100mV
    - B. 300A range: 1A -> 10mV
    - C. 3000A range: 1A -> 1mV
  7. Voltage signal output terminal
- The corresponding voltage output of AC current measured through flexible current sensor.

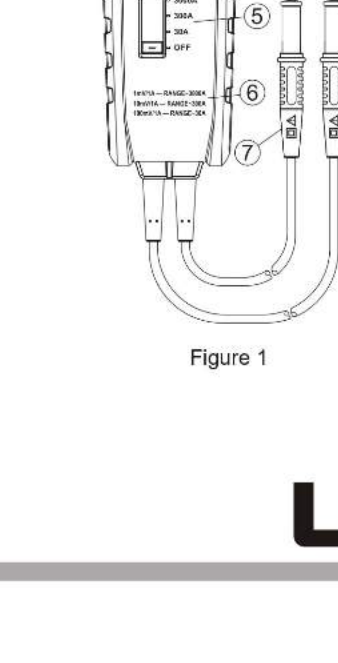
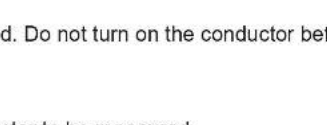


Figure 1



## 6. Operations

BNC terminal can be used to connect flexible current sensor to read out on oscilloscope

### ⚠ Warnings :

To avoid false reading, do not use low input impedance settings when using oscilloscopes as readouts.

### AC measurement

#### ⚠ Warning:

Before measuring, switch off the conductor to be measured. Do not turn on the conductor before the sensor is locked around the conductor to be measured.

#### ⚠ Caution:

Keep your hands away from the Rogowski ring and conductor to be measured.  
1. Connect the sensor with alternating voltage measure device e.g. multimeter. (see figure 2)

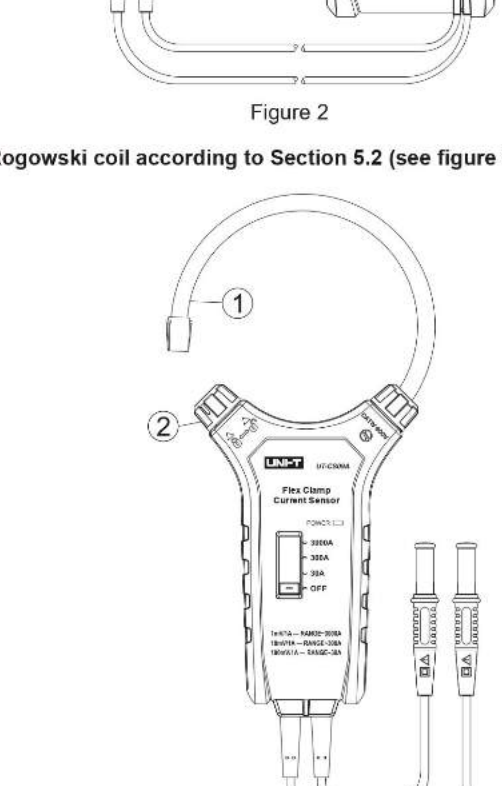


Figure 2

### 2. Unlock the Rogowski coil according to Section 5.2 (see figure 3).

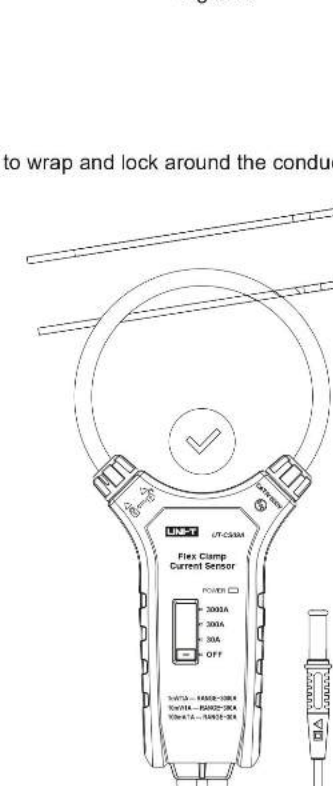


Figure 3

### 3. Use the Rogowski coil to wrap and lock around the conductor to be measured. (see figure 4)

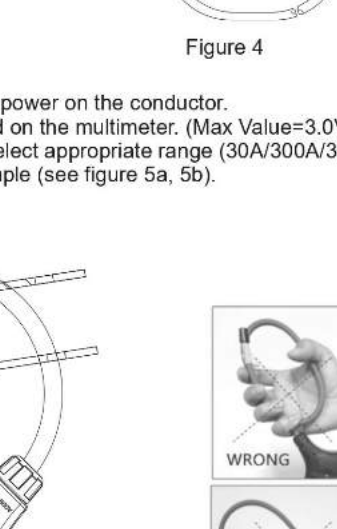


Figure 4

4. Turn on the sensor, then power on the conductor.
5. Read the value displayed on the multimeter. (Max Value=3.0V). If the current to be measured is over the range, please select appropriate range (30A/300A/3000A)
6. Improper operation example (see figure 5a, 5b).

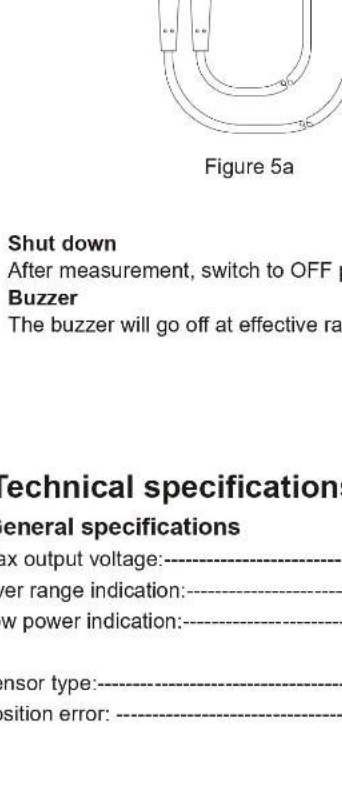


Figure 5a

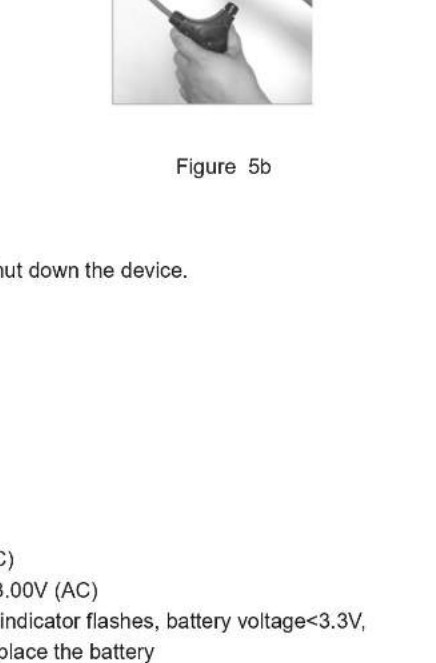


Figure 5b

- Shut down**  
After measurement, switch to OFF position to shut down the device.
- Buzzer**  
The buzzer will go off at effective range.

## 7. Technical specifications

### A. General specifications

- Max output voltage:----- 3.00V (AC)
- Over range indication:----- "POWER"> 3.00V (AC)
- Low power indication:----- "POWER" indicator flashes, battery voltage<3.3V, please replace the battery
- Sensor type:----- Rogowski clamp sensor
- Position error:----- At central position: ±3.0% of reading  
outside central area: additional error according to zone ABC (see Electric specification)
- Drop test: ----- 1 meter
- Measuring head size:----- UT-CS09A Length=25.4cm (10")  
UT-CS09D Length= 45.7cm (18")
- Conductor trace line:----- Max diameter: 14cm
- Electromagnetic field interference:----- unstable performance or incorrect reading
- Battery:----- AAA 1.5V (3pcs)

### B. Operating environment

- Max altitude:----- 2000m
- Safety standard:----- IEC61010-1; IEC61010-031  
IEC61010-2-032; CAT IV 600V
- Pollution grade:----- 2
- Information of usage:----- Indoor
- Operating temperature:----- 0 °C~50 °C
- Operating humidity:----- ≤80%RH
- Storage:----- -20 °C ~ 60 °C (≤80%RH)

### C. Electric specifications

- Accuracy:----- ±(% of reading+ numerical number of least significant digit) 1 Year Warranty
- Environment temperature:----- 23 °C ± 5 °C
- Environment humidity:----- ≤80%RH
- Temperature coefficient:----- 0.2×(specified accuracy)/ °C (<18 °C or >28 °C)

### (1) UT-CS09A AC current measurement:

Range	Resolution	Corresponding voltage	Accuracy (at central position)	Frequency Response
30A	0.1A	~100mV/1A	±(3%+5)	45Hz~500Hz
300A	1A	~10mV/1A		
3000A	10A	~1mV/1A		

Additional accuracy range when measuring outside of optimum location (Assume no external electric or magnetic field)	Central optimum measurement location	±(3%+5)	√	
	15mm(0.6") away from center	Additional 2.0%	Zone A	
	25mm(1.0") away from center	additional 2.5%	Zone B	
	35mm(1.4") away from center	additional 3.0%	Zone C	

### (2) UT-CS09D AC current measurement:

Range	Resolution	Corresponding voltage	Accuracy (at central position)	Frequency Response
30A	0.1A	~100mV/1A	±(3%+5)	45Hz~500Hz
300A	1A	~10mV/1A		
3000A	10A	~1mV/1A		

Additional accuracy range when measuring outside of optimum location (Assume no external electric or magnetic field)	Central optimum measurement location	±(3%+5)	√	
	35mm(1.4") away from center	Additional 1.0%	Zone A	
	50mm(2.0") away from center	additional 1.5%	Zone B	
	60mm(2.4") away from center	additional 2.0%	Zone C	

## 8. Maintenance

### A. General maintenance

⚠ Warning: remove the test probes before open the rear cover or it may pose a shock hazard.

- a. The maintenance and service must be implemented by qualified professionals or designated departments.
- b. Clean the case with a dry cloth. Do not use abrasives or solvents

### B. Battery installation & replacement

The sensor uses three AAA 1.5V alkaline batteries for operation.

To install or replace the battery:

- a. Switch off the sensor and remove the test probes from the terminal input.
- b. Unscrew the battery cover, remove the cover and install new batteries ensuring that the correct polarity is observed.
- c. Use batteries of the same type
- d. Replace the battery cover and screw up.



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