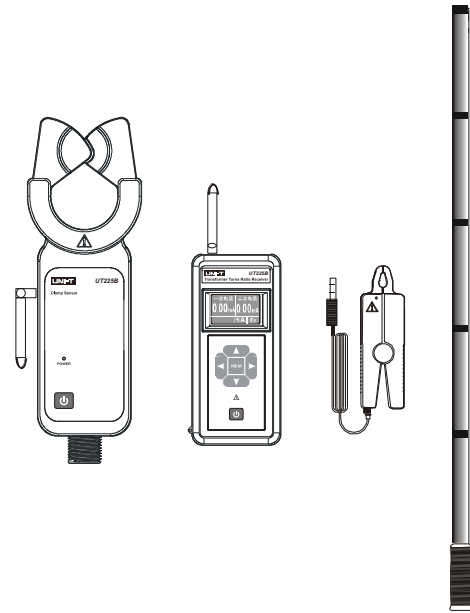


UNI-T®

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UNI-TREND TECHNOLOGY (CHINA) CO., LTD.

No.6, Gong Ye Bei 1st Road,
Songshan Lake National High-Tech Industrial
Development Zone, Dongguan City,
Guangdong Province, China



UT225B

Operating Manual

High Voltage Transformer Turns Ratio Tester





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I. Safety Information

Thank you for purchasing the product. Before performing on-site test, please carefully read the instructions in the user manual and make sure you are skilled at operating the product, and please follow the safety information and precautions listed in the user manual.

- ◆ Pay special attention to safety when using the product, especially for measuring circuit with voltage over AC 100V.
- ◆ It is forbidden to test bare conductor or bus bar with voltage over 35kV.
- ◆ Insulation stick must be connected if the voltage of measured line is over 600V.
- ◆ On-site testing must be performed by authorized trained personnel.
- ◆ Please pay attention to the labeled words and symbols at the front and rear panels of the product.
- ◆ Do not keep the product in places with high temperature, high moisture, dew or direct sunlight for a long time.
- ◆ Be sure the battery polarity is correct when replacing battery, remove the battery if not used for a long time.
- ◆ Use, disassembling and maintenance must be performed by authorized qualified personnel.
- ◆ Avoid impact on the clamp jaws. Perform regular maintenance on the product, do not use corrosive or coarse material to clean the product, please mildly wipe the product through soft cloth (i.e. glasses cloth) dipped with anti-rust dehumidifying lubricant (i.e. WD-40).
- ◆ Please stop using the product if it poses danger during use.
- ◆ The danger symbol “” at the product and the user manual identifies that the operator must perform safe operation according to the instruction.
- ◆ The extreme danger symbol “” at the user manual identifies that the operator must strictly perform safe operation according to the instruction.
- ◆ It is recommended to perform dielectric test on the product once a year at least (AC 60kV/rms between both ends 5 pieces of connected insulation sticks).

II. Introduction

UT225B High-Voltage Transformer Turns Ratio Tester makes a breakthrough on conventional structure. It is designed and manufactured to test primary current, secondary current and turns ratio of transformer below 35kV, and identify phase type and polarity. UT225B consists of primary clamp sensor (high-voltage clamp sensor), secondary clamp sensor, tester, high-voltage insulation stick, monitor software, communication line, etc. The primary clamp sensor can transmit testing data in a wireless manner, with transmission distance at 100 meters.

Made up of high-performance permalloy and designed with magnetic shielding technology, the clamp sensor can resist external magnetic fields and continuously perform monitoring with high accuracy, stability and reliability.






The LCD of the tester can display contents clearly. The tester has an ultra large storage capacity to store up to 3000 groups of data.

Connected with 5 pieces of insulation sticks, the high-voltage clamp sensor can be applied to measure current of insulated line below 60kV or high/low-voltage bare conductor below 36kV. The special automatic plugging structure enables the high-voltage clamp sensor to clamp onto or remove from the measured conductor easily and fast. The insulation stick is characterized by lightweight, moisture-proof, impact-resistant, bending-resistant, and highly insulated (insulation level: 110kV). UT225B is extensively used to inspect current, prevent electricity theft and perform field electrical operation for substation, power plant, power inspection department, industrial and mining enterprise, inspection station, and electrical repair department.

The monitor software can indicate maximum, minimum and average values, and have multiple functions including dynamic display, real-time monitoring, alarming threshold setting, alarming indication, data viewing/saving/printing, etc.

UT225B has the same functions as High/Low Clamp Meter, Aerial Current Tester, and other products.

III. Electrical Symbols

	Extremely dangerous! The operator must follow the safety information strictly, otherwise it may present a risk of electric shock, which can cause personal injury or death.
	Danger! The operator must follow the safety information strictly, otherwise it may present a risk of electric shock, which can cause personal injury or death.
	Warning! The operator must follow the safety information strictly, otherwise it can cause personal injury or product damage.
	Alternating Current (AC)
	Direct Current (DC)


IV. Technical Specifications

1. Basic conditions:

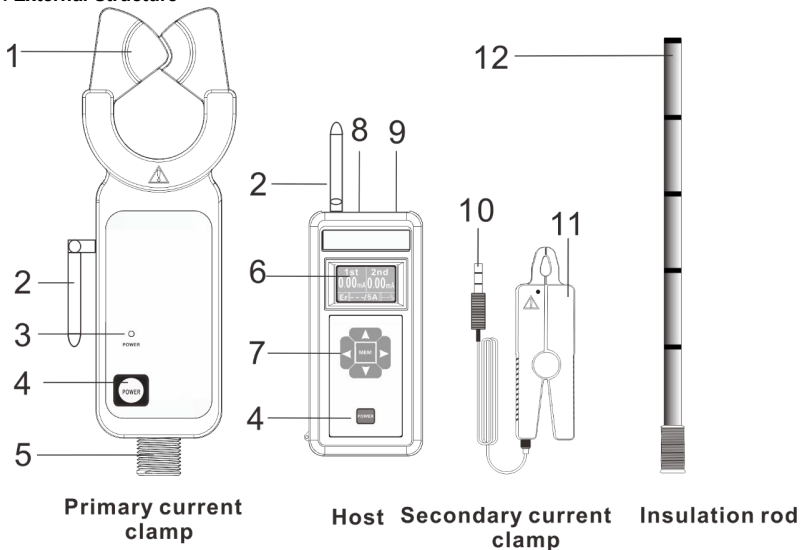
Influence quantity	Basic conditions	Work conditions	Remark
Ambient temperature	23°C±5°C	-15°C±50°C	
Ambient humidity	40%~60%	<70%	
Distortion rate of sinusoidal wave	1%	3%	
Signal frequency	50Hz±5Hz	45Hz±65Hz	
External electric and magnetic fields	Shall be avoided		
Location of measured conductor	Place the measured conductor at the center of the clamp jaws.		

2. Technical parameters:

Functions	Testing on current and turns ratio of high/low-voltage current transformer and transformer primary/secondary circuit; identification of polarity and phase type.
Power supply	DC6V LR03 alkaline dry batteries (1.5V AAA × 4), with the ability to work for 30 hours continuously.
Testing mode	By clamp sensor (CT)
Testing accuracy of primary current	Range: 0.0A~800A Resolution: 0.1A Accuracy: ±0.5%FS
Testing accuracy of secondary current	Range: 0.00mA~5A Resolution: 0.01mA Accuracy: ±0.5%FS
Measurement range of turns ratio	1~500
Resolution of turns ratio	0.1
Dimensions of primary clamp sensor	Clamp jaws size: 48mm External dimensions: 76mm × 255mm × 31mm
Dimensions of secondary transformer	Clamp jaws size: 8mm External dimensions: 137mm × 40mm × 19.5mm


Range switching	Fully automatic
Sampling rate	3 times per second
Data storage	Store 3000 groups of data. Press “◀” to hold data and perform automatic numbering and data storage (data loss does not occur if power is down or battery is replaced).
Data hold	Press “◀” to hold data (with the symbol “HOLD” displayed), then press HOLD to disable data hold.
Data viewing	Press “▶” to enter data viewing mode.
Overload indication	The symbol “OL” appears
No-signal indication	The tester indicates “No signal” if no transmission signal is received.
Auto power off	The product powers off automatically 15 minutes after it is powered on.
Battery voltage	If the battery voltage is lower than 4.8V, the symbol “  ” appears to indicate replacing battery.
Transmission distance of primary clamp sensor	100M (wireless transmission)
Data transfer	USB
Connecting wire of secondary clamp sensor	2M
Display mode	LCD: 128dots × 64dots (Designed with backlight function, suitable for use in dark environments)
LCD size	Display domain: 44mm × 27mm
Tester dimensions	78mm × 165mm × 42mm
Product weight	5kg (including carrying bag and insulation stick)
External interference	Avoid extra strong electromagnetic field; avoid co-channel interference of frequency at 433MHz and 315MHz.
Operating temperature and humidity	-15°C~50°C; <70%Rh
Storage temperature and humidity	-10°C~60°C; <70%Rh
Size of insulation stick	32mm; 1m/piece (including 5 pieces)
Withstand voltage of insulation stick	110KV
Dielectric strength	Tester and clamp sensor: AC 1000V/rms (between casing and screw)

v. External Structure



- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Primary clamp sensor 2. Antenna 3. Power indicator 4. Power button 5. Connector of insulation stick 6. LCD display | <ul style="list-style-type: none"> 7. MEN button and arrow buttons 8. Input port for secondary clamp sensor 9. USB port 10. Output plug for secondary clamp sensor 11. Secondary clamp sensor 12. Insulation stick |
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vi. Operating Instructions

	<p>Please check if any product component is damaged before use. Do not use if damaged component is found.</p> <p>Install battery according to the user manual.</p>
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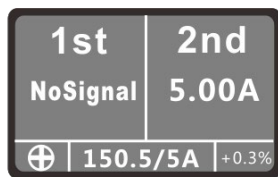
1. Power On/Off the Primary High-Voltage Clamp Sensor

When “⏻” is pressed, the high-voltage clamp sensor is powered on (with the indicator light “⏻” lit up) and it starts automatic testing. The testing results (current, pulse and others of the high-voltage end) are sent to the tester via wireless transmission. The indicator light “⏻” flashes continuously 15 minutes after the clamp sensor is powered on, to indicate auto power off. After the indicator light “⏻” flashes continuously for about 30 seconds, the clamp sensor powers off automatically to save battery power. If “⏻” is pressed when the POWER indicator light flashes continuously, the clamp sensor can continue working. Press “⏻” to power off the clamp sensor.

2. Power On/Off the Tester

When “⏻” is pressed, the tester powers on and then enters receiving mode (picture below). The primary current is the testing data of the high-voltage end, the secondary current is the testing data

of the low-voltage end. If signal is detected for both primary and secondary circuits, the tester simultaneously shows the change by converting the secondary current at 5A, and indicates the phase type. The symbol "No signal" appears if the tester fails to connect with the high-voltage clamp sensor normally.




The LCD flashes continuously 10 minutes after the tester is powered on, to indicate auto power off. After the LCD flashes continuously for about 30 seconds, the tester powers off automatically to save battery power. If "⏻" is pressed when the LCD flashes continuously, the tester can continue working.


Under testing mode, press "⏻" power off the tester.

Under phase error mode, long press "MEN" to return to testing mode, then press "⏻" to power off the tester.

Under data viewing mode, move the cursor to "Return", press "MEN" to return to testing mode, then press "⏻" to power off the tester.

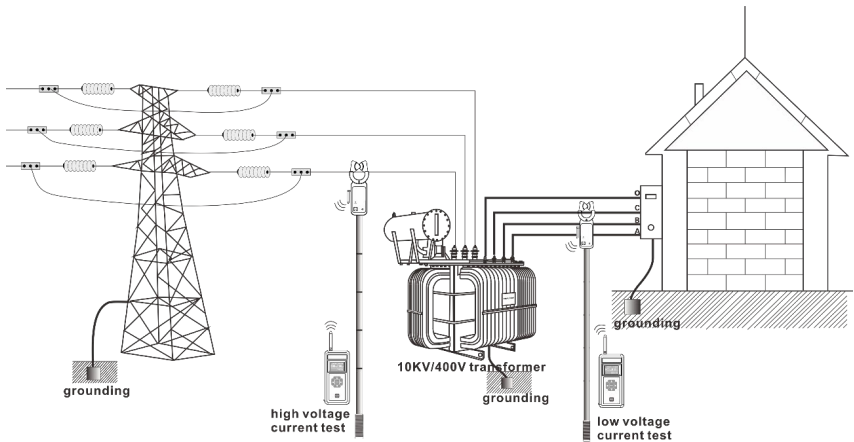
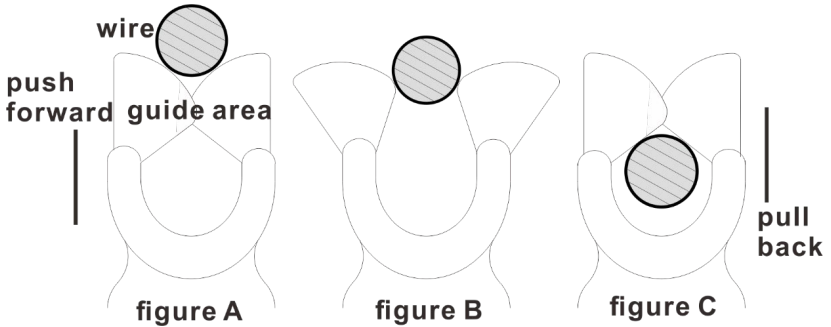
3. Testing of High-Voltage Current and Overhead Current

	<p>High voltage! Extremely dangerous! The operation must be performed by authorized trained personnel. The operator must stringently follow the safety regulations, otherwise it may present a risk of electric shock, which can cause personal injury or death.</p>
	<p>The insulation stick must be connected when performing testing by clamping high-voltage line, otherwise it may present a risk of electric shock, which can cause personal injury or death.</p>
	<p>Danger! It is forbidden to test bare conductor or bus bar with voltage over 35kV, otherwise it may cause electric shock, thus causing personal injury or product damage.</p>
	<p>Danger! Do not measure circuit over 800A, otherwise it may present a risk of electric shock, which can cause personal injury or product damage.</p>

	<p>Please first connect the insulation stick before connecting the clamp sensor, to avoid impact on the ground.</p>
	<p>Please use dedicated insulation stick to connect the clamp sensor.</p>
	<p>After testing, incline the insulation stick, disconnect the clamp sensor, and then disconnect the insulation stick, to avoid impact on the ground.</p>


Connect the high-voltage clamp sensor with the 5 pieces of insulation sticks, power on the high-voltage clamp sensor, then set the conductor at the middle area of the leading sector of the clamp jaws, as shown in Figure A. Make the leading sector vertical to the conductor, push the insulation stick so as for the jaws to clamp the measured conductor, then the high-voltage clamp sensor starts

testing and sends the testing result to the tester. After the tester is powered on, it enters receiving state automatically. If the tester receives signal transmitted by the high-voltage clamp sensor, it displays the current of primary circuit at high-voltage end in real time; if not, it displays "No signal" for primary current. If the tester displays "OL" for primary current, it indicates the measured primary current is over the upper range specified by the high-voltage clamp sensor. To remove the high-voltage clamp sensor from the measured conductor, please pull back the insulation stick (keep the leading sector perpendicular with the conductor), as shown in Figure C.



	<p>Warning! For safety sake, please remove the clamp sensor from the measured conductor after testing. Overhead current can be measured by the tester.</p>
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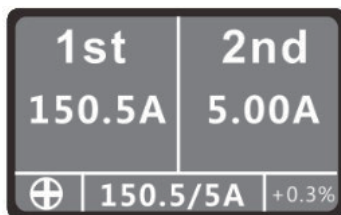
5. Testing of Turns Ratio and Phase Identification

	<p>“Primary current”: The current collected by the high-voltage clamp sensor, that is, the primary current of current transformer.</p>
	<p>“Secondary current”: The current collected by the low-voltage clamp sensor, that is, the secondary current of current transformer.</p>
	<p>“Turns ratio based on secondary current of 5A”: Convert the measured secondary current to 5A, and convert primary current according to the multiple (same as turns ratio), “XXX/5A” is displayed.</p>
	<p>“Turns ratio”: Actual ratio of primary and secondary currents. The high-voltage clamp sensor collects secondary current of bus bar of transformer, then converts the ratio between primary current of transformer and secondary current of current transformer.</p>
	<p>“In phase”: If phase difference is 0°~30° or 330°~360°, it is identified as in-phase polarity.</p>
	<p>“Out phase”: If phase difference is 150°~210°, it is identified as out-phase polarity, that is, the primary or secondary clamp sensor clamps the measured conductor reversely, causing reverse polarity (The front side of high-voltage clamp sensor and the dotted side of low-voltage clamp sensor are the co-directional current input end).</p>
<p>“Er”: Failure to identify normally. This may be caused by failure to receive signal from high/low-voltage end, co-channel signal interference, low signal amplitude, or others.</p>	

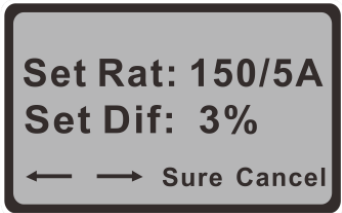
Clamp the primary and secondary circuits of current transformer by the high- and low-voltage clamp sensors, then the tester shows current, phase type, polarity, turns ratio converted based on secondary current, ratio error.

For example:

If turns ratio is set to 150/5A, in-phase positive-polarity circuit is tested, primary current is 150.5A, and secondary current is 5.00A, then the converted turns ratio is 150.5/5A, and the error is 0.3% $(150.5 - 150) / 150 * 100\% = 0.3\%$



After the tester is powered on, press “ ” to enter ratio and error setting page. Press “ ” and “ ” to adjust the value (long press “ ” and “ ” to adjust the value by ± 10), press “◀” and “▶” to move the cursor, and press “MEM” to confirm or return.

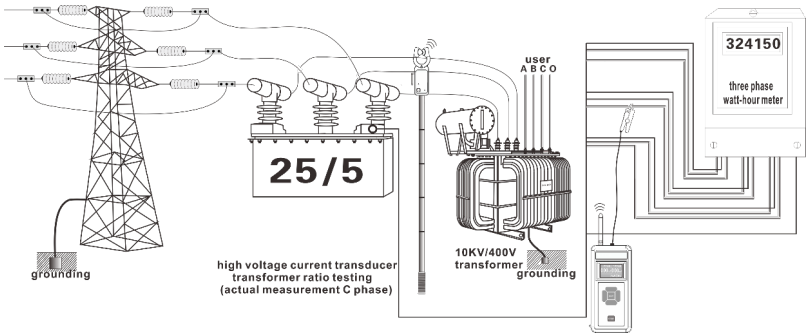
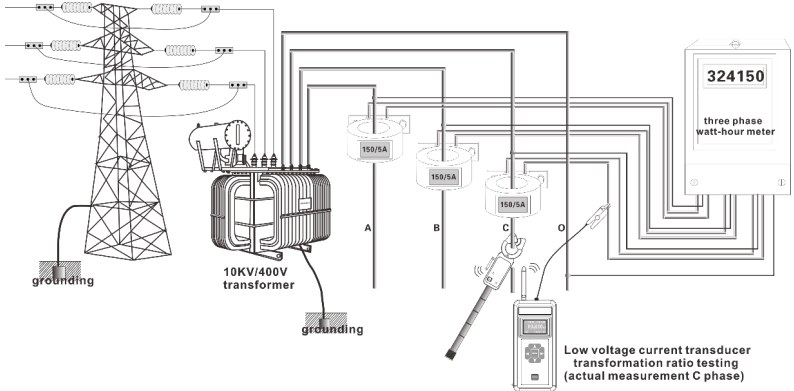


For example:

The turns ratio of measured current transformer is 150/5A, and the ratio error (error) is 3%. The set turns ratio shall be consistent with the value specified by the nameplate at the current transformer.

If the actual test error is over the set error, the symbol "OL" appears on bottom right of the LCD.

On-site wire connection:



6. Data Hold/Storage

When "◀" is pressed during test, the displayed data is held, the symbol "HOLD" appears, and the tester performs automatic numbering and stores the held data. When "◀" is pressed again, the held

data is unlocked, the tester returns to testing mode, and the symbol "HOLD" disappears. The tester can store maximum 3000 groups of data.

7. Data Viewing/Deletion

Press "▶" to view data and display the stored data of Group No. 0001. Press "◀" and "▶" to move the cursor, press "MEM" to confirm. The tester is designed with fast viewing mode (+1, -1, +10, -10), press "MEM" once to view data by increment/decrement. Move the cursor to "+10, -10" and hold down "MEM" to view data by increment/decrement at 100.


To exit data viewing mode and return to testing mode, please move the cursor to "Return" and then press "MEM".

8. Data Uploading

Connect the tester with computer via USB cable, turn on the clamp sensor, then operate the monitor software. If the software displays open serial port and successful connection, the stored data can be read, uploaded, and saved.

The monitor software can indicate maximum, minimum and average values, and have multiple functions including dynamic display, real-time monitoring, alarming threshold setting, alarming indication, data viewing/saving/printing, etc.

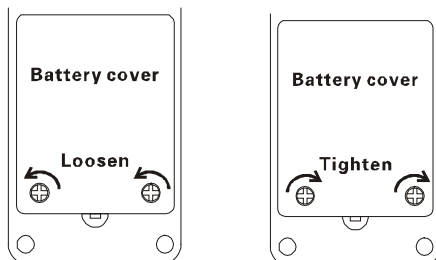
VII. Battery Replacement

	It is forbidden to test without battery cover set in place, otherwise it may pose risk.
	Pay attention to the battery polarity, otherwise it may cause product damage.
	Do not apply new battery with used one.

1. The symbol "E" flashes if the battery voltage of primary clamp sensor is lower than 4.8V. If the battery voltage of the tester is lower than 4.8V, the tester shows the low battery symbol to indicate insufficient battery power, please replace the battery.

2. Power off the product, loosen the screws at the battery cover, open the battery cover, replace with new batteries (pay special attention to the battery polarity), rejoin the battery cover, then tighten the screws.

3. Press "⏻" to check if the product can be powered on normally. If the product cannot be powered on, please repeat Step 2.



VIII. Packing List

Meter	1 pc
Primary high-voltage clamp sensor	1 pc
Secondary low-voltage clamp sensor	1 pc
Insulation stick (1 m/pc)	5 pc
USB cable	1 pc
Carrying bag	1 pc
AAA alkaline dry battery	8 pc
User manual	1 pc

The content of this user manual cannot be used as a reason for using the product for special purposes.

The company is not responsible for other losses caused by use.

The company reserves the right to modify the contents of the user manual. If there are changes, no further notice will be given.