

**WIRELESS HIGH VOLTAGE  
TRANSFORMATION RATIO TESTER**



**USER'S MANUAL**

## Precaution For Use

Thanks for your purchase of **this Wireless High and Low Voltage Transformation Ratio Tester** of our company. In order to make better use of this product, please make sure to:

——**Read this user manual in detail, the operators must fully understand the manual instructions and be able to operate the instrument skillfully, and then can field testing.**

——**Strictly comply with the safety rules and precautions listed in this manual.**

- ◆ Under any circumstance, shall pay special attention on safety in using this meter. Especially when measuring voltage circuit over AC100V and above.
- ◆ It is strictly forbidden to use this meter to test bare wires or busbar with voltage over 35kV
- ◆ If the tested line voltage over 600V, it must be used insulation rod to connection.
- ◆ Because the high voltage circuit is very dangerous, the operator must be strictly trained and obtain the national high voltage operation certification before using the meter for field test.
- ◆ Pay attention to the text labeled on the panel and backplane of the Meter.
- ◆ Do not place and store the meter in high temperature and humidity or dewy places and under direct sunlight for a long time.
- ◆ Replace the battery, please pay attention to the battery polarity. If you not use the leaker for a long time, please take out batteries.
- ◆ Disassembly, calibration, and repair of this tester must be performed by authorized personnel.
- ◆ If meter's clamp and components are damaged, Please stop to use.
- ◆ It should avoid impingement on the clamp head, and maintain the instrument regularly, do not clean with corrosive or coarse material, should use soft cloth (such as eyewear cloth), and stained with anti-rust and dehumidification kind of lubricant (such as wd-40), gently wipe the instrument clamp head.
- ◆ Due to the reason of this instrument, if it is dangerous to continue using, should stopped and sealed immediately ,and handled by an authorized institution.
- ◆ The meter manual with the danger mark "  ", users must follow instructions to operate safely.
- ◆ The meter manual with the extremely dangerous mark "  ", users must in strict follow instructions to operate safely.
- ◆ It is recommended that the meter should make insulation strength test at least once a year (AC 60kV/rms telescopic insulation rod is fully opened between the two ends).

## 1. Introduction

This **Wireless High and Low Voltage Transformation Ratio Tester** break through the traditional structure, special designed and manufactured for online measurement of current transducer, transformer primary current and secondary current, transformation ratio, phase and polarity judgment below 35kV in operation. The instrument is composed of primary current clamp (high voltage detector), secondary current clamp, host machine, high voltage insulation rod, monitoring software, communication cable, etc. The instrument is equipped with two types of primary current clamps: high voltage current clamp and flexible current clamp, which can cope with various testing sites. Among the high-voltage current clamp use wireless transmit the test data, which transmission distance of 100 meters.






The current clamp is made of high performance permalloy with magnetic shielding technology, which is almost free from the influence of the external magnetic field, ensuring the long time uninterrupted monitoring of high accuracy, high stability and high reliability.

The host LCD display clear and obvious, with large storage space, can store 3000 groups of data.

The high voltage detector connect with 5pcs insulation rods, used for high voltage line current measurement which the wire with insulation skin below 60KV or the bare wire below 35KV, high voltage current clamp have unique automatic plug and pull structure, by pressing or pulling out the insulation rod can be easy to clamp or withdraw the tested line, saving time and more effective. It is widely used in substations, power plants, industrial and mining enterprises, inspection stations, electrical maintenance departments for current detection and electrical field operations. The insulation rod is handiness, and has the characteristics of moisture-proof, high temperature resistance, impact resistance, bending resistance, high insulation, scalable and so on. Insulation level 110KV.

This **Wireless High and Low Voltage Transformation Ratio Tester**, also have the functions of high and low voltage clamp meter, high altitude current tester and so on.

## 2. Electrical Symbols

	Extremely dangerous! The operator must strictly follow the safety rules, otherwise there would be danger of electric shock, causing personal injury or injury accident.
	Dangerous ! The operator must strictly follow the safety rules, otherwise there would be danger of electric shock, causing personal injury or injury accident.
	Warning ! Operators must strictly follow safety rules , otherwise personal injury or equipment damage may occur
	Alternating Current (AC)
	Direct Current (DC)

### 3. Technical Specification

#### 3.1. Base Conditions

Influence Quantity		Base Condition	Working Conditions	Remark
Environment Temperature		23°C±5°C	-15°C～50°C	
Environment Humidity		40%～60%	< 80%	
Sine Wave Distortion		≤1%	≤3%	
Signal Frequency		50HZ±5HZ	45HZ～65HZ	
Angle Error Test	Primary high voltage current clamp	60A±3A	0.0A±800A	
	Primary Flexible Current Clamp	300A±30A	0.0A～3000A	
	Secondary Current Clamp	1A±0.2A	10mA～5A	
External Electric Magnetic Field		To be avoided		
The Tested Wire Position		Measured wire at approximately the geometric center of the clamp		

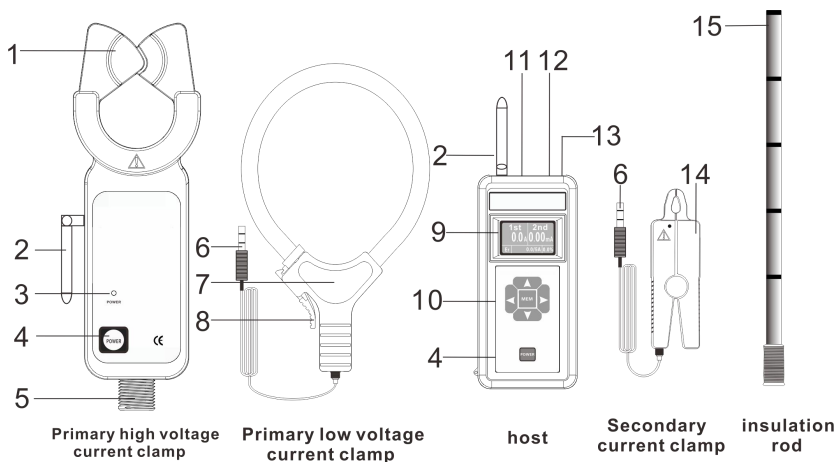
#### 3.2. Technical Specification

Function	H/L voltage current transducer, transformer primary and secondary circuit current, transformation ratio, angle error, polarity, and phase adjustment
Power Supply	DC 6VLR03(1.5V AAA×4)
Test Mode	Clamp CT
Primary High voltage Current Test Accuracy	Range:0.0A～800A; Resolution: 0.1; Accuracy: ±0.5%FS (23°C±3°C, below70%RH, the conductor should be in the center of the clamp)
Primary Flexible Current Clamp Test Accuracy	Range:0.0A～3000A; Resolution: 0.1; Accuracy: ±1.0%FS
Secondary Current Test Accuracy	Range: 0.00mA～5A; Resolution: 0.01mA; Accuracy: ±0.5%FS
Transformation Ratio Measurement Range	1～500
Transformation	0.1

<b>Ratio Resolution</b>	
<b>Angle Error Test Accuracy</b>	Range: 0~360°; Resolution: 1°; Accuracy: ±3°
<b>Shift</b>	Full automatic
<b>Sampling Rate</b>	2 times/second
<b>Data Storage</b>	3000 groups, Press the left arrow key to keep the data and store automatically (Power down or replace the battery will not lose data)
<b>Data Hold</b>	Press left arrow key to hold data in test mode, "HOLD" symbol display, press HOLD key again to cancel hold function
<b>Data Access</b>	Press the right arrow key enter data access mode
<b>Overflow Display</b>	Exceed measure range overflow function: "OL" symbol display
<b>No Signal Indication</b>	When the receiver has not received transmit signal, dynamic display "no- -" symbol.
<b>Auto Shut Down</b>	15 minutes after boot up, the meter shuts down automatically without any operation
<b>Battery Voltage</b>	When battery voltage is lower than 4.8V, low battery voltage symbol will display and remind to replace battery.
<b>Display Mode</b>	LCD: 128dots×64dots; backlight function, suitable for dark site
<b>LCD Size</b>	Display area: 44mm×27mm
<b>Host Size</b>	78mm×165mm×42mm
<b>Primary High Voltage Current Clamp Size</b>	Jaw Size: φ48mm Out Shape Size: 76mm×255mm×31mm
<b>Primary Flexible Current Clamp Size</b>	Jaw Size: φ200mm Out Shape Size: 200mm×245mm×13mm
<b>Secondary Low Voltage Current Clamp Size</b>	Jaw Size: φ8mm Out Shape Size: 137mm×40mm×19.5mm
<b>Primary Current Clamp Transmission Distance</b>	Wireless transmission distance 100M
<b>Secondary Current Clamp Connection Cable Length</b>	2M
<b>Meter Weight</b>	5 kg (with insulation rod and toolkit)
<b>External</b>	Avoid extremely strong electromagnetic fields; Avoid 315MHz, 433MHz

<b>Interference</b>	Same-frequency Signal Interference
<b>Working Temperature</b>	-15℃~50℃; below 70%rh
<b>Store Temperature</b>	-10℃~60℃; below 70%rh
<b>Insulation Rod Size</b>	Φ32mm, 1m/pcs (5pcs)
<b>Insulation Rod withstand voltage</b>	110kv
<b>Insulation Strength</b>	Host and detector: AC1000V/rms(between the shell and screws)

#### 4. Structure



- 4.1. Primary high voltage current clamp
- 4.2. Antenna
- 4.3. High voltage clamp boot up indication
- 4.4. **POWER** Key
- 4.5. Insulation rod connector
- 4.6. Low voltage current clamp output plug
- 4.7. Primary low voltage flexible current clamp
- 4.8. Trigger
- 4.9. LCD display of the host
- 4.10. **MEN** Key and arrow key
- 4.11. Primary low voltage flexible current clamp input interface
- 4.12. Secondary current clamp input interface
- 4.13. USB Interface
- 4.14. Secondary current clamp
- 4.15. Insulation rod

## 5. Operation Method



Please carefully check whether all parts of the instrument are damaged or not before usage, without any damage can be used.

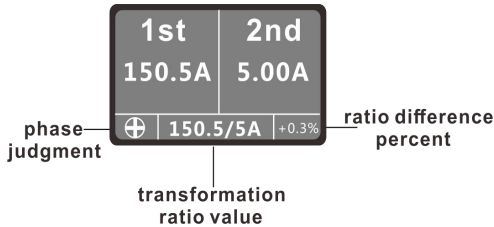
According to manual instructions to install the battery

### 5.1. Primary high voltage current clamp start up

Press the **POWER** button to start up, the **POWER** indicator light on, and the high voltage detector will start to detect automatically, and the test results (magnitude of current and pulse at the high-voltage end, etc.) will be sent to the host through wireless transmission. About 15 minutes after the high voltage detector is started up, the **POWER** indicator will continue flashing, indicating that it will automatically shut down. The **POWER** indicator will continue flashing about 30 seconds and then automatically shut down to reduce the battery consumption. If the **POWER** indicator continues flashing, press the **POWER** key, the detector will continue to work. In the normal detecting, press the **POWER** key to shut it down.

### 5.2. The host start up and shut down

Press the **POWER** key to start up, the LCD displays, and the host enters the test receiving mode (see the figure below) after normal start up. The primary current is the test data of the high voltage end, and the secondary current is the test data of the low voltage end. If the signal is detected in both the primary and secondary circuits, the host will use the secondary circuit as **5A** to convert and display its turn ratio, and indicate the phase; if the host is unable to identify phase of the primary and secondary loop circuit, the "no Er" sign will be displayed.




About 10 minutes after the host starts up, the LCD will continue flashing, prompt that will automatically shut down, the LCD after continue flashing about 30 seconds will automatic shutdown, to reduce the battery consumption. If the LCD continues to flashing, press the **POWER** key to continue working.


In test mode, press **POWER** key to shut down.

In the angle error parameter display mode, long press **MEN** key return to test mode, press **POWER** key again to shut down.

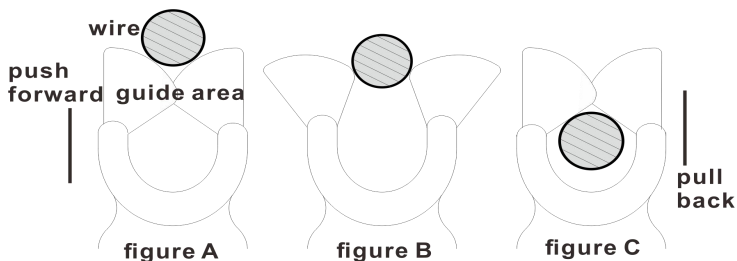
In data access mode, the cursor move to "Return", press **MEN** key return to test mode, press the **POWER** key to shut down

### 5.3. The testing of High voltage current and overhead line current

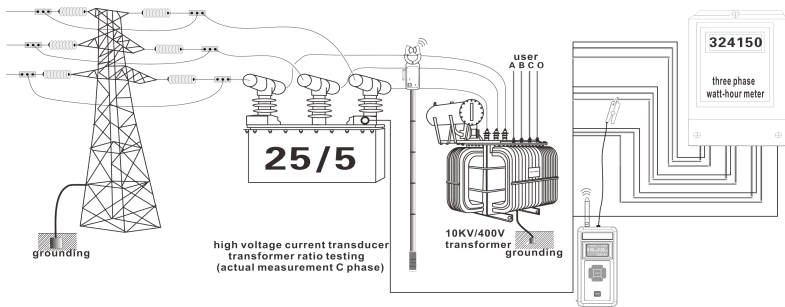
	Extremely dangerous! The operator must strictly follow the safety rules, otherwise there would be danger of electric shock, causing personal injury or injury accident.
	Must be connected to the insulation rod and then can clamp to test the high voltage line, otherwise there is a risk of electric shock, causing personal injury or injury accident.
	Dangerous! It is strictly forbidden to use this meter to test bare wires or busbar with voltage over 35kV, otherwise there would be danger of electric shock, causing personal injury or injury accident.
	Dangerous! It cannot be used to measure the circuit over 1200A. There would be danger of electric shock, causing personal injury or injury accident.

	Before the test, connect the insulation rod first, the insulation rod must be connected in place, and finally connect the detector, avoid the impact between the instrument and the earth surface.
	Must connect the meter with the special insulation rod
	At the end of the test, the insulation rod should be tilted, and the detector should be disassembled first, then the insulation rod, avoid the impact between the detector and earth surface.

After connected the high voltage detector and 5 pieces insulation rods and start up normally, make the wire in the middle of the guide area of the clamp of high voltage detector, as shown in figure A. The guide area of the high voltage detector is perpendicular to the wire, push the insulation rod forward and let the high voltage detector clamp the tested wire, the high voltage detector start to working and send the test result to the host. After the host starts up normally, it will automatically enter the detection and reception state. If the host receives the signal sent by the high voltage detector, it will display the current value of the primary loop of the high voltage end in real time. If the host does not receive the signal sent by the high voltage detector, the primary current will be shown as "no signal". If the host shows the primary current value as "OL", indicate that the measured primary current exceeds the upper range of the high voltage detector. Pull back the insulation rod, the high voltage detector is evacuated from the tested wire, as shown in figure C. Try to keep the detector guide area perpendicular to the wire during the evacuation







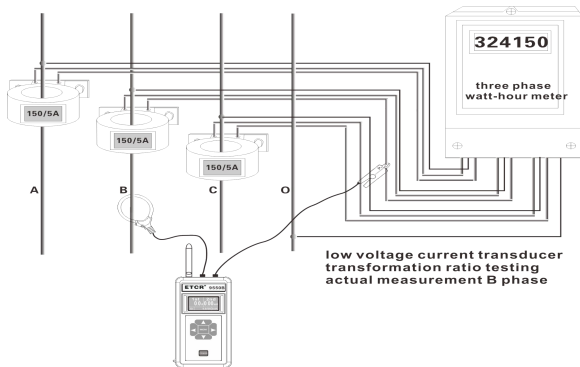
Attention! For the safety, after test, please remove the meter away from the tested wire.

Overhead line current can also be tested with this instrument.

#### 5.4. Primary flexible current clamp transformation ratio test sample graph

5.4.1. Connect the low voltage current clamp and host, start up and enter into test mode

5.4.2. Clamp the primary and secondary current clamp on the measured line (note that the flexible coil is fully closed loop) and observe the reading of the secondary current. If the "OL" symbol on the instrument, indicate that the measured current exceeds the upper range of the instrument.



#### 5.5. Secondary low voltage current testing



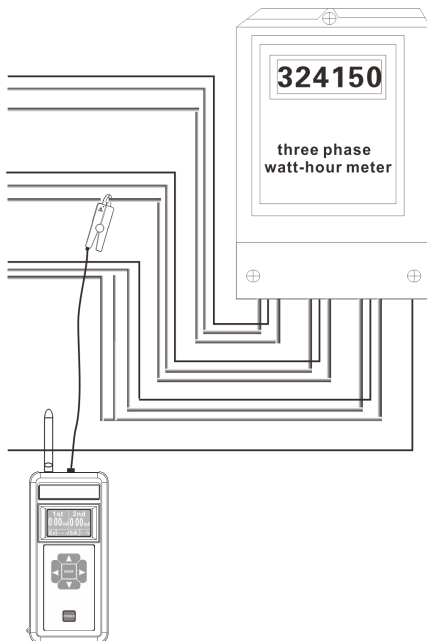
Electricity, dangerous! Must be operated by trained and authorized personnel, the operator must strictly follow the safety rules, otherwise there would be danger of electric shock, causing personal injury or injury accident.

Low voltage current clamps should not be used to test lines exceeding 600V or 5A. Otherwise there is the risk of electric shock, causing personal injury or equipment damage.


5.5.1. Connect the low voltage current clamp and host, start up and enter into test mode

5.5.2. Clamp the low voltage current clamp on the measured line (note that the clamp jaw is fully closed) and observe the reading of the secondary current. If the secondary current display the "OL" symbol on the instrument, indicate that the measured secondary current exceeds the upper range of the instrument.

5.5.3. Reference figure



## 5.6. Transformation ratio and phase test

	<b>【 Primary Current 】</b> : The current collected by the high voltage detector is the primary current of the transformer.
	<b>【 Secondary 】</b> : The current collected by the low voltage current clamp is the secondary current of the transformer
	<b>【 the transformation ratio of the secondary current 5A. 】</b> : The measured secondary current value converted to 5A, and the primary current is converted according to this multiple, which is the same as the transformation ratio value. Display <b>【XXX/5A】</b>
	<b>【 Transformation Ratio 】</b> : The measured ratio of primary current and secondary current The high voltage detector collects the secondary bus current of the transformer, and calculates the ratio of the primary current of the transformer to the secondary current of the transformer
	<b>【 Same Phase 】</b> : The phase difference is about $0^{\circ} \sim 30^{\circ}$ or $330^{\circ} \sim 360^{\circ}$ , which is the

same phase polarity.

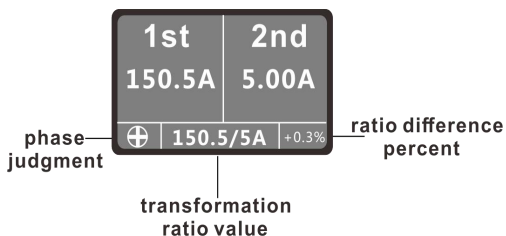
**【 Out Phase 】** : The phase difference is about 150°~ 210°, which is out phase polarity, that is, the primary or second current clamp is reversed, the polarity is opposite (the front of the high voltage detector and the front of the red mark of the low voltage current clamp is the same current input end)



**【Er】**: If it cannot be recognized normally, the host may not receive the signal from the high and low voltage terminals normally, the signal may be interfered with the same frequency, and the signal amplitude may be too small.

After starting up, CT1 and CT2 are respectively used to clamp on the primary and secondary circuits of the current transformer. The host shows the magnitude of current, phase, and polarity of the primary and secondary loop circuit, conversion ratio and ratio difference of the primary and secondary circuits based on the current.

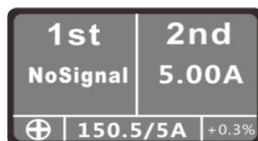
For example, If the variable ratio is set to 150/5A, and test the same phase positive polarity line, the primary current is 150.5A and the secondary current is 5.00A, then the converted variable ratio is 150.5/5A and the ratio difference is 0.3%.

Because:  $(150.5-150) / 150 * 100\% = 0.3\%$

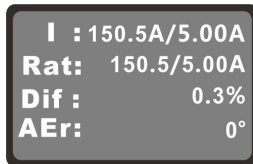


In the test mode, press the arrow key to select the type of flexible coil for collecting current data by primary current. If select the wired flexible coil as the primary side current collection, the "  " symbol will be displayed in the upper left corner. If select the wireless receiving flexible coil as the primary side current collection, the "  " symbol is displayed in the upper left corner

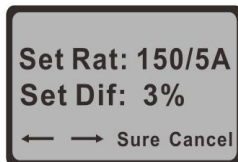
If in the state of wireless reception, the primary side current clamp meter is in the state of shutdown, or the wireless signal connection with the host is failed due to signal interference, the primary side current shows the "no signal" indication.



Press **MEN** key for about 2 seconds to enter the display interface of angle error parameters: current value of primary and secondary loop; only when the phase difference is about 0° ~ 30° or 330° ~ 360°, can be considered as the same phase polarity. The phase difference is about 150°~ 210° as out of phase, indicate that the primary and secondary current clamp are not clamping on the same current line. Press the **MEN** key for about 2 seconds to exit the display mode of angle error parameters and return to the test mode.



Under the test mode, press up arrow key to enter transformation ratio and error setting. Press the up and down key to change the number size (long press the up and down key to achieve  $\pm 10$  number changes), press the left and right keys to move the cursor, press the MEM key to return.



For example, the tested current transformer ratio is set as 150/5A, and the ratio difference (error) is 3%. The setting of the transformer ratio shall be consistent with the name plate of the transformer.

If the ratio difference of actual test exceeds the setting error, an OL symbol is displayed at the bottom right of the LCD.

## 5.7. Data Hold and Remove

During the test, press left key can lock the display data of LCD, press the let key again, and return back to normal test mode.

## 5.8. Data storage

During the test, press left key can lock the display data of LCD, "HOLD" symbol indicate, and automatic numbering stores the locked data at the same time. Press left arrow key again to relieve the data lock, and return to test mode, "HOLD" symbol disappear. The instrument can store up to 3000 groups of data

## 5.9. Data access, delete

After start up, press the right arrow key to access the data and automatically display the 0001 group of stored data. At this time, press the left and right keys to move the cursor, press the MEM key to confirm. This instrument can set to "+1, -1, +10, -10" quick access and stored data function, press the MEM key once, according the increasing (decreasing) quantity query, the cursor on "+10, -10" position, has been holding down the MEM key, can 100 increasing (decreasing) query.

Move the cursor to the "back" position, press the MEM key to exit data access mode and return to test mode.

## 5.10. Data delete


Under the data access mode, move the cursor to “Delete” position, press the “MEN” key to confirm delete the stored data, and return back to test mode. Data cannot be recovered after deletion


## 5.11. Data upload

Connect the USB communication cable between the computer and the host, turn on the detector and run the monitoring software. If the software shows that the serial port is opened and connected successfully, the stored historical data can be read, uploaded to the computer and saved.

Monitoring software has online real-time monitoring and historical query function, dynamic display, with the maximum, minimum, average value indication, with alarm value setting and alarm indication function, with historical data reading, consulting, saving, printing and other functions.

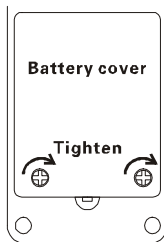
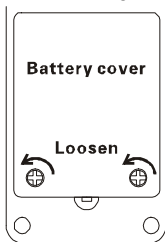
## 6. Replace Batteries

	Warning! Do not test if the battery cover plate is not well covered, otherwise it is dangerous.
	Pay attention to the battery polarity, or will damage the meter
	Do not mix new and old batteries for use.

6.1. When the battery voltage of the high voltage detector lower than  $5.2V \pm 0.3V$ , the host will continue to flashing and display “” symbol; when the battery voltage of the host lower than  $5.2V \pm 0.3V$ , the host will continue displaying the low battery voltage symbol, indicate that low battery. Please replace batteries in time.

6.2. Power off and make sure the meter is off state. Loosen two screws and open the battery cover plate to replace new qualified batteries, pay special attention on the battery specification and polarity, and then cover the board well and fasten the two screws.

6.3. Press **POWER** key to check whether the meter can start up normally or not. If not, please repeat the operation according to the step 2.



## 7. Accessories

Host	1PCS
Primary High Voltage Current Clamp	1PCS
Primary Flexible Current Clamp	

Secondary Low Voltage Current Clamp	1PCS
Insulation Rod(1 M/PCS)	5PCS
USB communication Cable	1PCS
CD Software Copy	1PCS
Tool Bag	1PCS
Manual/ Maintenance Card/ Certificate	1SET

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

**The contents of this user manual cannot be used as a reason to use the product for special purposes.**

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