INGCO

说明书材质要求：105g 有光铜版纸	说明书成品尺寸：100*100mm
第一：专色用6级防晒油墨+CMYK油墨要求： 1.PANTONE137C专色油墨(专色用6级防晒油墨)： 如果自己配色，油墨配比为：泗联中黄(防晒)2000g 泗联金红(防晒)225g 2.C色油墨：泗联天蓝墨 3.M色油墨：泗联金红墨 4.Y色油墨：pantone123C专色油墨 5.K色油墨：泗联黑墨	第二：特别注意： 1.印刷时看样请参考我司提供的实物样品颜色。不得偏色 2.137C的专色不得参考C=0，M=35，Y=90，K=0对应的四色色谱颜色来看样印刷 Pantone 137C Black（两色印刷）
折叠方式：骑马钉	备注：

特别注意：此页内容不印刷

风琴折 + 对折 页面顺序

16P 页面顺序

9	10	11	封面
12	13	14	封底

1	2	3	4
5	6	7	8

20P 页面顺序

11	12	13	14	封面
15	16	17	18	封底

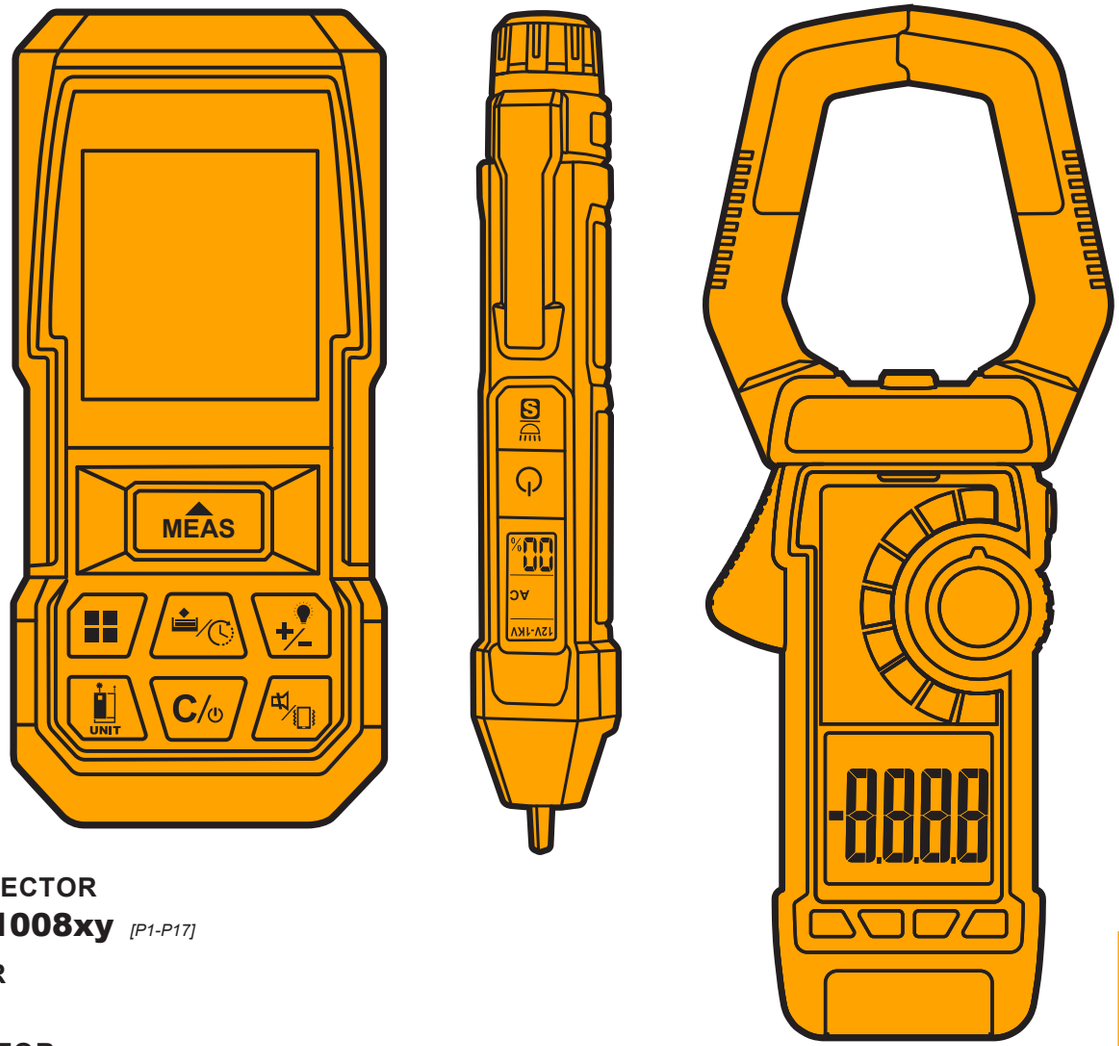
1	2	3	4	5
6	7	8	9	10

更改记录					
	1.新制作				
	1124.V01	2024.11.26	QQY		
	版本号	日期	设计师		

www.ingco.com

PRODUCT MANUAL

LASER DISTANCE DETECTOR COMBO KIT



INNOVATED BY INGCO
INDUSTRIAL

LASER DISTANCE DETECTOR

HLDD1008 HLDD1008xy *[P1-P17]*

DC/AC CLAMP METER

DCM610002 *[P18-P44]*

AC VOLTAGE DETECTOR

VD210003 *[P45-P51]*

x(blank,1,2,3,4,5,6,7,8,9,E,S,A,M)

y(blank,-1,-2,-3,-4,-5,-6,-7,-8,-9,E,S,A,M)

SCAN FOR VIDEO

Original Instructions

GENERAL SAFETY WARNINGS

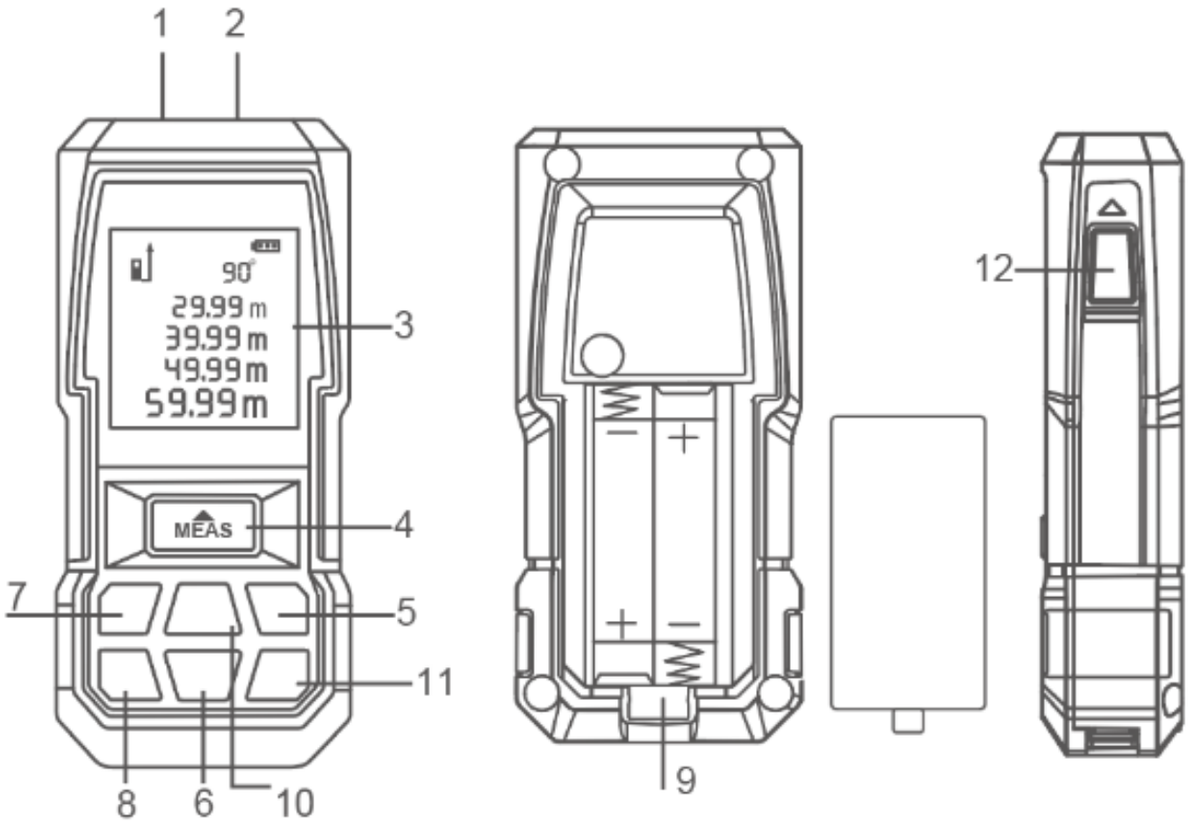
a) This product is a class II laser product. DO NOT stare into beam at any time when operating this product!
b) DO NOT looking directly into the beam with optical aids to avoid causing serious laser radiation!
c) DO NOT remove any safety labels on this product!
d) DO NOT use this product in an unstable situation.
e) Please avoid kids to contact and use the meter.
f) DO NOT disassemble or restructure the meter. Otherwise, it may lead to laser emission resulting in unnecessary personal injury.
g) Please keep the manual, it is useful when you use it.

Forbidden

a) Opening or repairing the equipment without allow.
b) Measuring on sun.
c) Others measuring out of appointed range.
d) Immersing the equipment in water.
e) Cleaning the lens using alcohol or any other organic solvent.
f) Wiping the lens directly with fingers or other rough surfaces.
g) Powering the equipment beyond the rated DC voltage.

SPECIFICATIONS

Structure of product



Components

1. Laser emitter
2. Laser receiver
3. Display screen
4. Power key/Measuring key
5. Plus key/ Minus key/Light key
6. Clear key/Exit key/OFF key
7. Function key
8. Reference switch key /Unit switch key
9. Battery compartment
10. Data review key/Delay key
11. Trumpet off key/Vibrator off key
12. Measuring key

Technical specifications

Model No.	HLDD1008 HLDD1008xy
Single measurement	√
Continuous measurement (max/min)	√
Area/Volume/Pythagoras	√
Plus and minus	√
Unit Conversion	√
Historical data review	√
Error code	√
Battery power indication	√
Third reference point	√
Laser auto switch of	30s
Instrument auto switch off	180s
Measuring range	0.05m~100m
Measuring accuracy (Standard deviation)	±2.0mm
Measuring unit	m, ft, in, ‴
Area unit	m^2, ft^2, in^2, ft^2
Volume unit	m^3, ft^3, in^3, ft^3
Laser type	620~690nm
Laser class	class II <1mW
Operating temperature	0~+50ºC
Storage temperature	-20~+65ºC
Batteries	2×1.5V
Working time (fully charged)	>5000 times

Model No. NOTE: x (blank, 1,2,3,4,5,6,7,8,9,E,S,A,M); **y** (blank, -1,-2,-3,-4,-5,-6,-7,-8,-9,E,S,A,M)

- Due to our continuing program of research and development, the specifications herein are subject to change without notice.

Accessories

1. Laser distance meter 1pcs
2. Battery 2pcs
3. User manual 1pcs
4. Packing box 1pcs
5. Hand rope 1pcs
6. Tools bag 1pcs

OPERATION

Firstly, thank you for your choice on our handhold laser distance meter. Please carefully read the safety instructions and the user manual before using this product, otherwise it may result in hazardous laser radiation and electric shock.

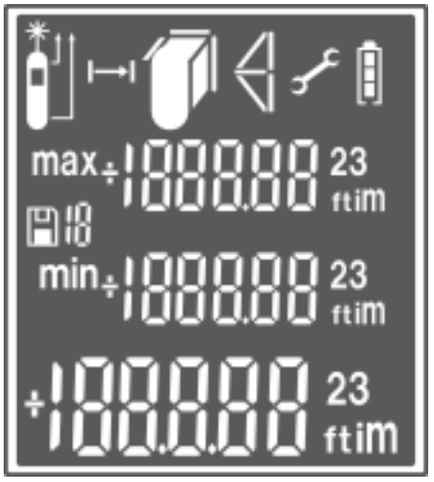
NOTE:

- When measuring distance within 10m, measurement accuracy is ±2mm; more than 10m, measurement accuracy is calculated as follows: ±2mm±0.05*(D-10) (D: Measuring Distance, Unit: m).
- When measuring too poorly reflecting target or very rough surfaces, or the environment temperature is too high or too low or ambient brightness is too bright, such as under sunlight, The deviation will be unfavorable.

Operation

Switch-On

Short-time press MEAS or ▲ to switch on the equipment, screen will show as below very quickly:



Then the meter enter single measurement mode and laser point is opened, indication as shown as figure A. Laser point is automatically shut down if no any operation after 30 seconds. Or short-time press C/⏻ to close the laser point, indication as shown as figure B. Short-time press MEAS or ▲ again to open laser point, indication as shown as Figure C.

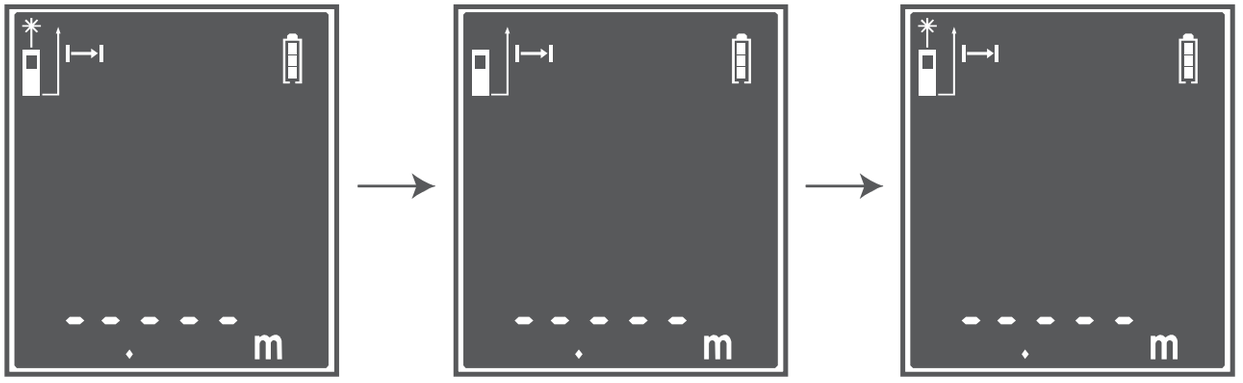
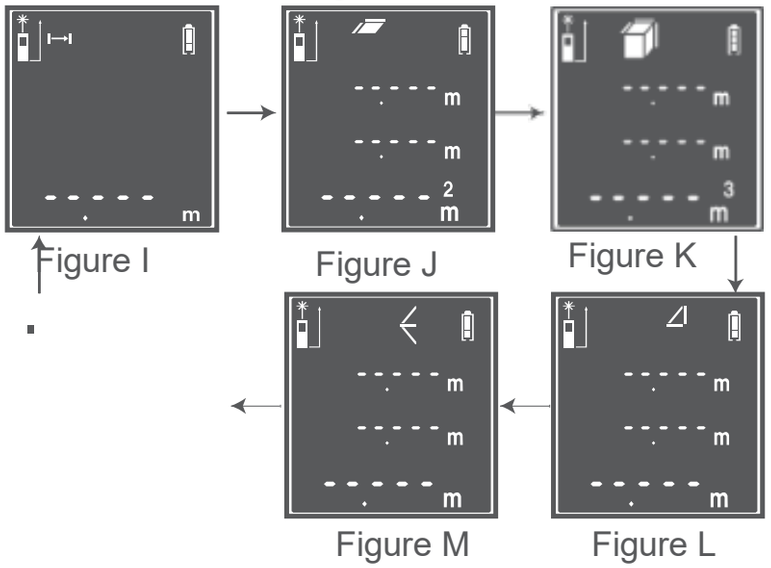
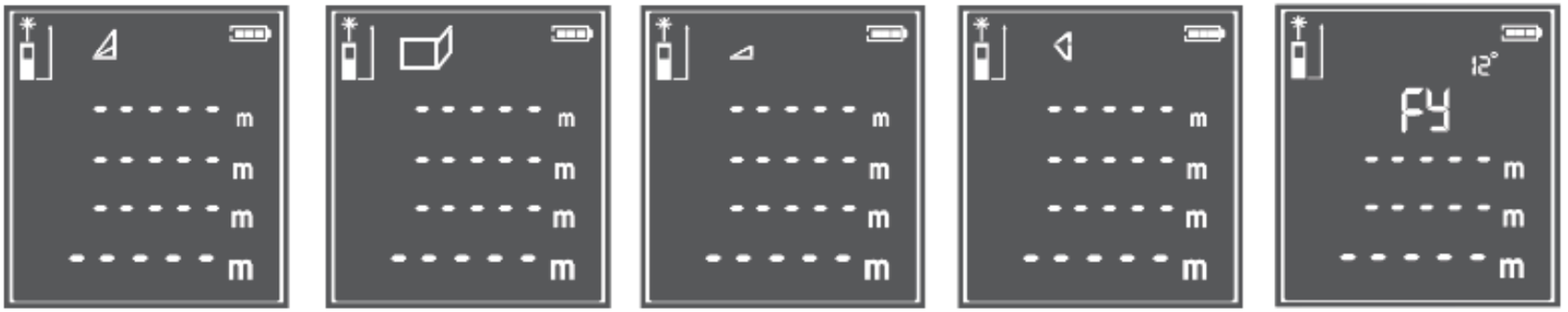


Figure A Figure B Figure C

Change measurement mode

Default setting of measurement is single measurement mode, indication as shown as Figure I. Short-time press to switch area measurement mode, indication as shown as Figure J. Short-time press again to switch volume measurement mode, indication as shown as Figure K. Short-time press again to switch single Pythagorean theorem measurement mode, indication as shown as Figure L. Short-time press again to switch dual Pythagorean theorem measurement mode, indication as shown as Figure M. Short-time press again to switch another dual Pythagorean theorem measurement mode, indication as shown as Figure A2. Short-time press again to switch dual area measurement mode, indication as shown as Figure B2. Short-time press again to switch automatic horizontal and vertical measurement mode, indication as shown as Figure C2. Short-time press again to switch area of triangle measurement mode, indication as shown as Figure D2. Short-time press again to switch lofting measurement mode, indication as shown as Figure E2.





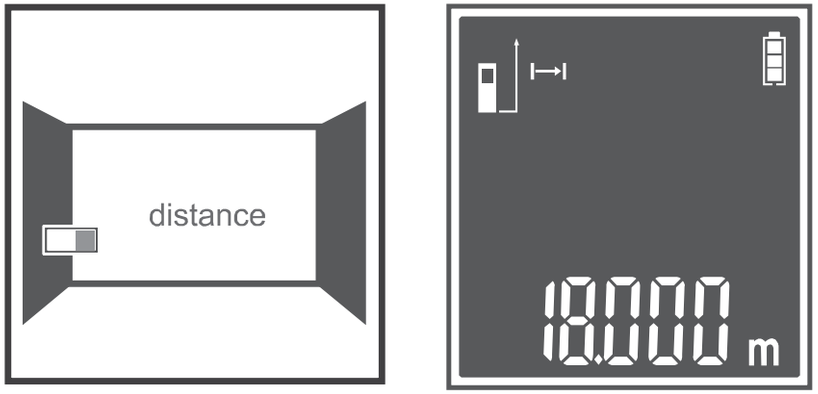
A2 B2 C2 D2 E2

Function description

Single measurement

At the single measurement mode, aim the laser onto target. Short-time press MEAS or ▲, the measuring result will be displayed immediately as shown as Figure O.

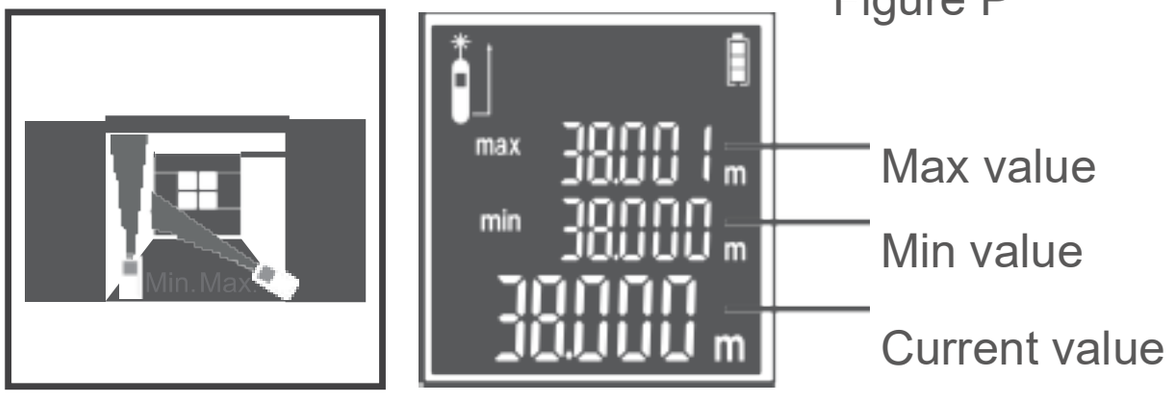
Figure O



Continuous measurement

At the single measurement mode only, aim the laser onto target. long-time press MEAS or ▲ to enter the continuous measurement, the max measuring value, mix measuring value and current measuring value will be displayed at screen. Indication as shown as Figure P.

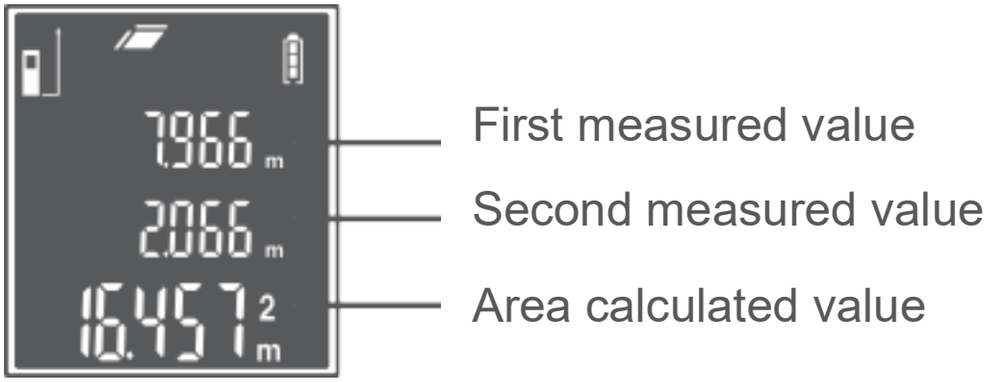
Figure P



Area measurement

At the area measurement mode, aim the laser onto target. Short-time press MEAS or ▲ to measure the two side lengths of the target respectively, area calculated value will be displayed as shown as Figure Q.

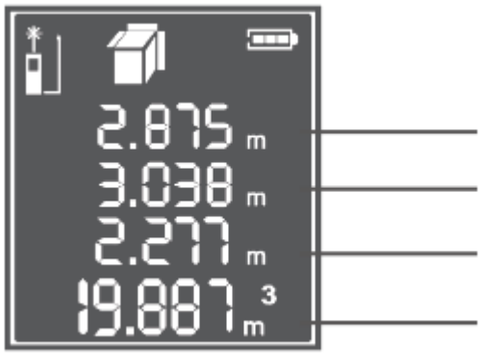
Figure Q



Volume measurement

At the volume measurement mode, aim the laser onto target. Short-time press MEAS or ▲ to measure three lengths of the dimensional target orderly. The

volume calculated value will be displayed immediately as shown as figure R. (Note: the length value of third side do not display at screen, because the screen can display three lines only.)



First measured value
Second measured value
Third measured value
Volume calculated value

Figure R

Single Pythagorean theorem measurement

At single Pythagorean theorem measurement mode, aim the laser onto target. Short-time press MEAS or ▲ to measure the length of the hypotenuse and right-angle side of a right triangle. The height calculated value of the right triangle will be displayed immediately on the screen as shown as Figure S.

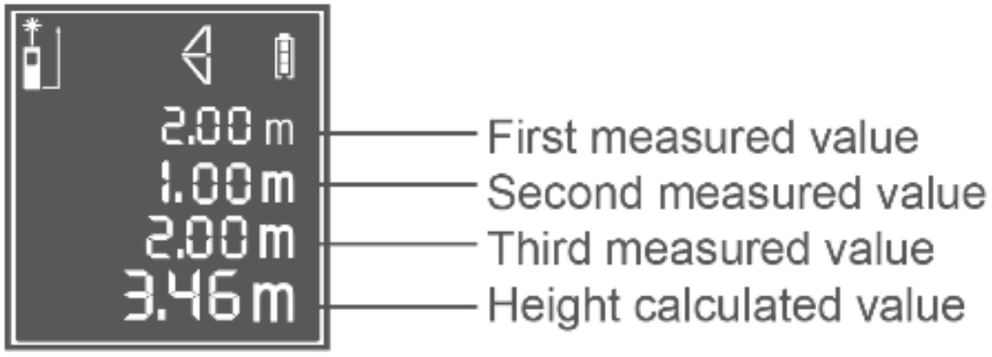
Figure S

Hypotenuse measured value
Right-angle side measured value
Height calculated value

Dual Pythagorean theorem measurement

At dual Pythagorean theorem measurement mode, aim the laser onto target. Short-time press MEAS or ▲ to measure the length of the hypotenuse, right-angle side and other hypotenuse of a triangle orderly. The total height calculated value will be displayed immediately on the screen as shown as Figure T.

Figure T



At another dual Pythagorean theorem measurement mode, aim the laser onto target. Short-time press MEAS or ▲ to measure the length of the first hypotenuse, the second hypotenuse and the right-angle side of a triangle orderly. The subtract height calculated value will be displayed immediately on the screen.

Dual area measurement

At the dual area measurement mode, aim the laser onto target. Short-time press MEAS or ▲ to measure the height of the house, one side length and

another side length. The total area calculated value will be displayed immediately on the screen.

Automatic horizontal and vertical measurement

At the automatic horizontal and vertical measurement mode, aim the laser onto target. Short-time press MEAS or ▲ to measure the hypotenuse. The horizontal right-angle side length and the vertical right-angle side length calculated value will be displayed immediately on the screen.

Area of triangle measurement

At the area of triangle measurement mode, aim the laser onto target. Short-time press MEAS or ▲ to measure the three sides length of the triangle. The area of the triangle calculated value will be displayed immediately on the screen.

Lofting measurement

At the lofting measurement mode, aim the laser onto target. Set the lofting value by short-time pressing +/- (plus) or short-time pressing ▽ (subtract). Long-time pressing +/- or long-time pressing ▽ will change the value quickly. Moving the detector, the value on the screen will change. When the distance is whin 5 mm as the lofting value, the detector will buzz and vibrate.

Historical data review mode and delay measurement mode

Short-time press to switch historical data review mode, the last measuring data will be displayed, indication as shown as Figure N. At this mode, short-time press to view the measurement backward, short-time press to view the measurement forward, Short-time press to delete the measurement one by one. Historical Data range: 0-99. (**NOTE:** At this Historical Data Review Mode, there will be some measuring data that factory tested. It does not mean this equipment has been used.)

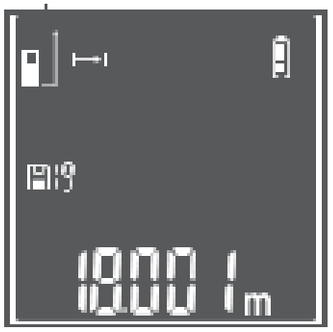


Figure N

Long-time press to switch **delay measurement mode**, indication as shown as Figure Y. At this mode, short-time press to plus the delay time, short-time press to subtract the delay time. The delay time range: 5-60s.

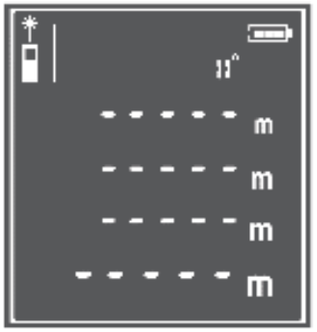


Figure Y

Plus/minus functions and light functions

At the single measurement mode, aim the laser onto target. Short-time press MEAS or ▲ to get a measurement, indication as shown as Figure U, Then Short-time press +/-, indication as shown as Figure V, then short-time press MEAS or ▲ to get another measurement, The summation will be displayed immediately, indication as shown as figure W. It is plus function; minus function is same as plus function.

At area measurement mode and volume measurement mode, plus function and minus function is available.

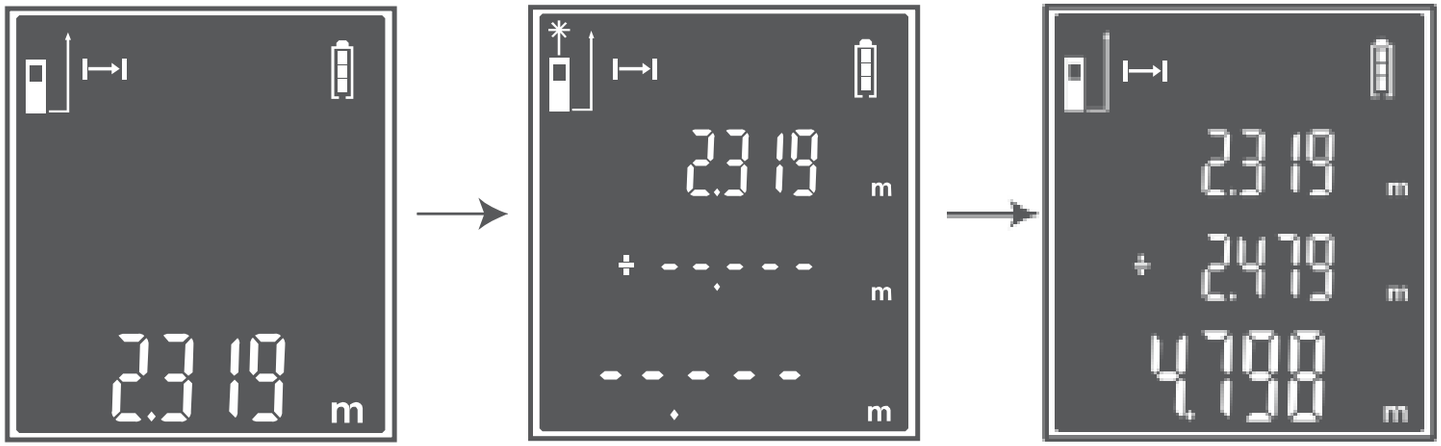


Figure U Figure V Figure W

Long-time press +/- to turn off the light of the screen. Long-time press +/- to turn on the light of the screen.

Change measurement reference

Default measuring reference is the bottom of meter, indication as shown as figure D. Short-time press UNIT to change the measuring reference to the top of foot block. Short-time press UNIT again to change the measuring reference to the top of meter, indication as shown as figure E.

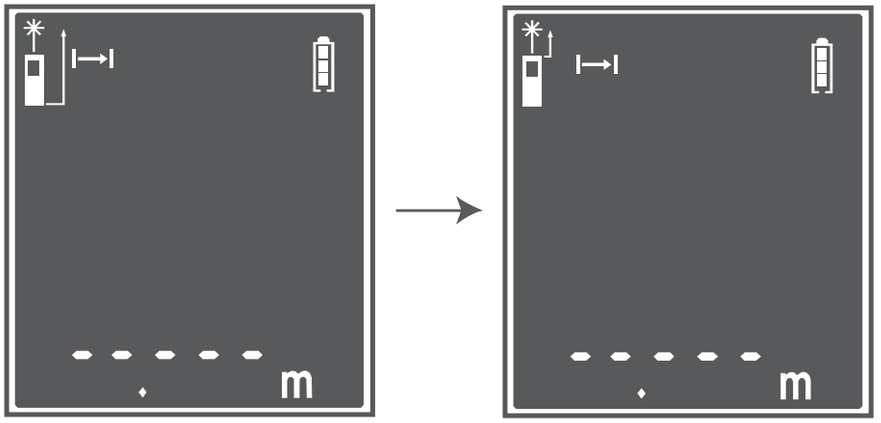


Figure D Figure E

Unit conversion

Factory default that unit is m, indication as shown as figure F. Long-time press UNIT to switch unit m to Ft, indication as shown as figure G. Long-time press UNIT again to switch the unit Ft to In, indication as shown as figure H. (Note: Long-time press UNIT to switch the unit of measurement, the value will switch correspondent at the same time if there is value of measurement.)

When the unit is m2, Long-time press UNIT, the unit will switch unit m2 to Ft2. long-press again, switch unit “Ft2” to “in2”

When the unit is m3, Long-time press UNIT , the unit will switch unit m3 to Ft3. long-press again, switch unit “Ft3” to “in3”

Later when you switch on meter, the meter will remember the last measuring unit you used.

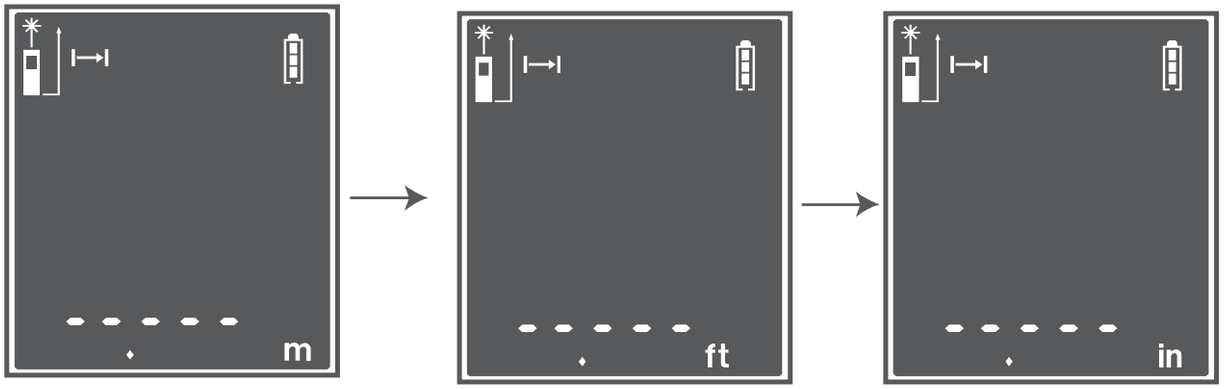


Figure F Figure G Figure H

Switch Off

The equipment can be switched off at any time by long-time press C/⏻ .

Trumpet off key / Vibrator off key

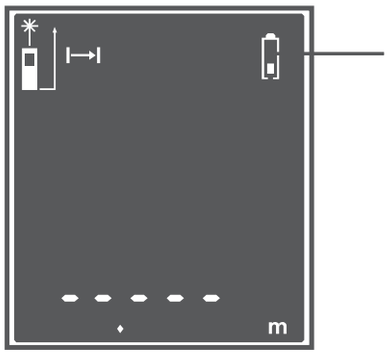
Short-time press to turn off the trumpet. Short-time press again to turn on the trumpet.

Long-time press to turn off the vibrator. Long-time press again to turn on the vibrator.

Battery power indication

When the battery power indication as shown as Figure X, it means the battery should be changed.

Figure X



Battery Power Indication

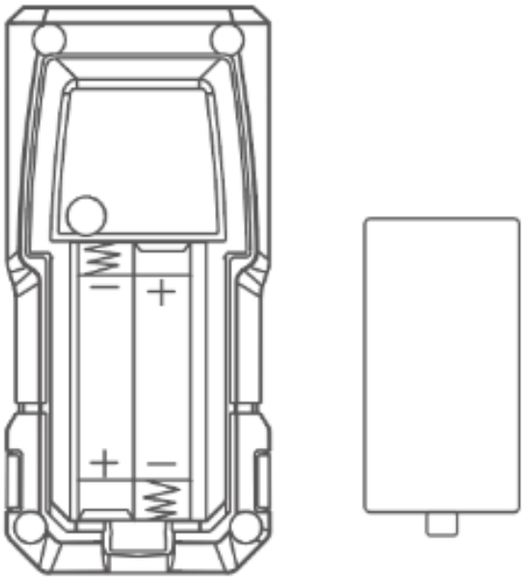
Error code

Code	Possible cause	Remedy
Err 104	Error of Pythagorean theorem measuring	Remeasure
Err 101	Battery too low	Change batteries
Err 155	Out of measuring range	Measure target within the range
Err 157	Received signal too weak	Measuring high reflectance target or use high reflectance reflector
Err 159	Received signal too strong	Measuring low reflectance target or use low reflectance reflector
Err 194	Value is too big to display at screen	Reduce measuring range

MAINTENANCE&MALFUNCTIONS

Battery installation

According to figures, remove battery compartment lid and insert 2*AA batteries (alkaline).



GENERAL SAFETY WARNINGS

Safety statement

⚠ **CAUTION!**

This symbol indicates conditions and operations that will cause damage to the instrument or equipment.

⚠ **WARNING!**

This symbol indicates conditions and operations that are dangerous to the user.

Safety Instructions

Please read this manual carefully before using this product.

“WARNING” mark indicates the condition and operation which may cause danger to users.

“CAUTION” mark refers to the condition and operation which may cause damage to the instrument or equipment.

Safe working regulations

⚠ **WARNING!**

In order to avoid possible electric shock or personal injury and other safety accidents, please abide by the following specifications:

- Please read this manual carefully.
- Use the instrument strictly according to this instruction, otherwise the

protection function provided by the instrument may be damaged or weakened.

- Please be careful if the measurement exceeds 30V AC true RMS, 42V AC peak or 60V DC. There may be danger of electric shock at this kind of voltage.
- Voltage applied between terminals or between each terminal and grounding point shall not exceed the rated value.
- By measuring the known voltage to check whether the meter work is normal, if it is not normal or damaged, do not use it again.
- Before using the instrument, please check whether there are cracks in the instrument shell or plastic parts damaged. If so, please do not use again.
- Before using the instrument, please check whether the probe is cracked or damaged. If so, please replace the same type and the same electrical specifications.
- Do not exceed the lowest rated Category of Measurement (CAT) rating in products, probes or accessories.
- Do not measure the current when the probe is inserted into the input jack.
- Don't work alone.
- Please comply with local and national safety code. Wear personal protection equipment (such as approved rubber gloves, masks and flame retardant clothes, etc.) to prevent being damaged by electric shock and electric arc due to exposed hazardous live conductor.
- When it shows low battery indicator, please replace the battery in time in

case of any measurement error.

- Do not use the instrument around explosive gas, steam or in wet environment.
- When using the probe, please put your fingers behind the finger protector of the probe.
- When measuring, please connect the neutral wire or the ground wire firstly, then connect the live wire; When disconnecting, please disconnect the live wire firstly, then disconnect the neutral wire and ground wire.
- Before opening the outer cabinet or battery cover, please remove the probe on the instrument. Do not use the instrument in the circumstances that the instrument is taken apart or battery cover is opened.
- It only meets the safety standards when the instrument is used together with the supplied probe. If the probe is damaged and needs to replace, the probe with same model number and same electrical specifications must be used for replacement.

THE SYMBOLS IN INSTRUCTION MANUAL

	High voltage warning
	AC (Alternating current)
	DC (Direct current)
	AC or DC
	Warning message
	Ground
	Fuse
	Double insulation or reinforced insulation protection
	Low battery
	Conforms to European Union directives
	This additional product label indicates that this electrical/electronic product must not be discarded in household waste.
VFD	Frequency converter
Inrush	Inrush current measurement
	Low input impedance voltage measurement

INTENDED USE

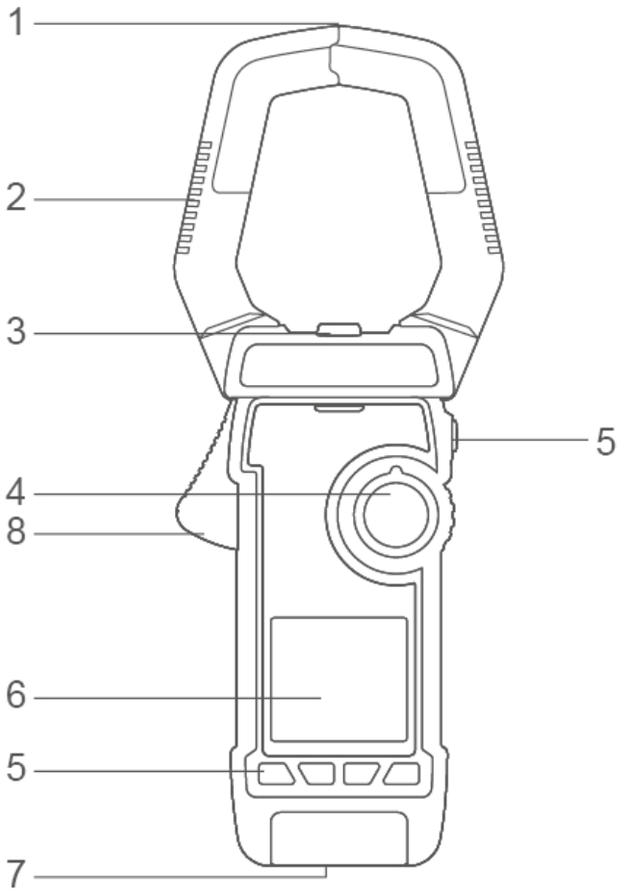
This meter is a double impedance high performance true RMS digital clamp meter, which integrates multiple functions, makes your work easier, more efficient and safer.
It can measure AC/DC voltage, AC/DC current, frequency, duty, resistance, capacitance, temperature, diode, NCV, LIVE, PHASE, VFD, inrush current, etc.

High input impedance voltage measurement:
When measuring in a circuit, it has little effect on circuit performance. This is the desired effect for most voltage measurement applications and is especially important for sensitive electronic or control circuits.

Low input impedance voltage measurement (LoZ Ṽ):
It can safely troubleshoot sensitive electronic or control circuits and circuits that may contain false voltages, and can more reliably determine whether there is a voltage on the circuit.

SPECIFICATIONS

Instrument panel



Components

1. NCV senser
2. Clamp
3. Flashlight
4. Knob switch
5. Function key
6. Display
7. Measuring input jack
8. Trigger

General technical specifications

Environment condition of using:
Safety: IEC 61010-1, Pollution level 2
IEC 61010-2-032: CAT III 1000V / CAT IV 600V
IEC 61010-2-033: CAT III 1000V / CAT IV 600V
Altitude < 2000m
Working environment temperature and humidity:
0~40°C (<80% RH, <10°C non condensing).
Storage environment temperature and humidity: -10~60°C (<70% RH, remove the battery).
Temperature coefficient: 0.1x Accuracy/°C (<18°C or >28°C).
MAX. Voltage between terminals and earth ground: AC750V or DC1000V
Display: 6000 counters read out. Automatically display the unit symbols according to the shift of the measurement function.
Over range indication: displays “OL”.
Low battery indication: when the battery voltage is lower than the normal working voltage, “  ” will be displayed.
Input polarity indication: automatically display “—”.
Auto power off: approx. 15 minutes
Power: 3 x 1.5V AAA alkaline batteries.

Precision index

The accuracy applies within one year after the calibration.

Reference condition: the environment temperature 18°C to 28°C, the relative humidity is no more than 80% accuracy: ±(% reading + word)

FUNCTIONAL OPERATIONS

FUNC: Function selection key

When there are multiple functions in one position, press this key to switch.

RAN: Range selection key

When the meter is turned on, the meter defaults to the AUTO range mode and displays the "auto" character.

It is effective in 60/600A, ACV, DCV and resistor functions. Press this key to enter the manual range mode, continue to press to enter the higher range until the highest range, and press again to return to the lowest range. In manual range mode, press this key for more than 2 seconds to return to automatic range.

MAX MIN: Max/Min view key

At current, voltage, resistance and temperature functions. Press this key to cycle through the maximum and minimum values; Press this key for more than 2 seconds to exit this mode. After entering this mode, the meter will automatically switch to manual range.

When entering the maximum/minimum viewing mode, first press the range key to switch to the most suitable range.

REL: Relative value On/DC current zero key

In DC current measurement mode, this key is zero. Before measuring DC current, if the display is not ZERO, press this key to turn on ZERO function first, and the display screen will display the "zero" character.

In the current, voltage, resistance, capacitance and temperature, this key is the relative value key. Press this key to turn on relative value measurement, the display screen will display "REL", and press it again to exit the relative value measurement function.

: Data Hold/Flashlight key

Press this key to turn on data hold, and the display screen displays "H" character to show data locking. Press again to cancel; Press this key for more than 2 seconds to turn on or off the flashlight.

Operation

Auto power Off

No operation in 15 minutes. The meter will power Off automatically to save battery energy. After automatic power off, press any key to power on.
If you press the "FUNC" key and keep, then turn on the meter power, the auto power off function will be cancelled.

Inrush current measurement

1) Turn the knob to Ã, and select proper range(60/600A or 1000A), press FUNC key until the "inrush" character is displayed.

2) Then press the trigger to open the clamp, clamp the conductor to be tested, and then slowly release the trigger until the clamp are completely closed, and determine whether the conductor to be tested is clamped in the center of the pliers, if the conductor is not in the center of the pliers, additional errors will occur.
3) Turn on the equipment to be tested (such as motor) and then trigger the meter by inrush current.
4) Read the measurement results on the display.

Measuring range of inrush current:

60/600A gear: 10~600A

1000A gear: 100~1000A

⚠ **WARNING!**

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition.**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.**

NOTE:

- Please place the measured conductor in the center of the clamp head, otherwise additional error will occur.
- The measuring time of inrush current is about 100ms.

VFD current measurement

1) Turn the knob to Ã， and select proper range(60/600A or 1000A), press

FUNC key until the "VFD" character is displayed.

2) Then press the trigger to open the clamp, clamp the conductor to be tested, and then slowly release the trigger until the clamp are completely closed, and determine whether the conductor to be tested is clamped in the center of the pliers, if the conductor is not in the center of the pliers, additional errors will occur.

3) Read the measurement results on the display.

⚠ **WARNING!**

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury**
- **Please do not use VFD function to verify the presence of dangerous voltage or current, which may exceed the indicated value to avoid electric shock or personal injury.**

NOTE: Please place the measured conductor in the center of the clamp head, otherwise additional error will occur.

AC current measurement

1) Turn the knob to $\tilde{A}$， and select proper. Range (60/600A or 1000A), "⎓"/ "AC" character is displayed.

2) When measuring DC current and the display screen shows that it is not ZERO, first press the REL key to clear it. The display screen shows the

character "Zero".

3) Then press the trigger to open the clamp, clamp the conductor to be tested, and then slowly release the trigger until the clamp are completely closed, and determine whether the conductor to be tested is clamped in the center of the pliers, if the conductor is not in the center of the pliers, additional errors will occur.
4) Read the measurement results on the display.

⚠ **WARNING!**

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition.**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.**
- **Please do not use VFD function to verify the presence of dangerous voltage or current, which may exceed the indicated value to avoid electric shock or personal injury.**

NOTE: Please place the measured conductor in the center of the clamp head, otherwise additional error will occur.

VFD Voltage measurement

1) Turn the knob to $\overline{\tilde{V}}$ or $^{LoZ}\tilde{V}$, press FUNC key until the "VFD" character is displayed.
2) Insert red probe to “INPUT” jack, insert black probe to “COM” jack.
3) Connect the probe with voltage source or both ends of load in parallel for

measurement.

4) Read the measurement results on the display.

⚠ WARNING!

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition.**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.**
- **Please do not use VFD function to verify the presence of dangerous voltage or current, which may exceed the indicated value to avoid electric shock or personal injury.**

⚠ CAUTION!

- **When using LoZ Ṽ (low input impedance) measurement, the continuous measurement time cannot exceed 1 minute.**
- **Do not use LoZ mode to measure voltage in circuits that may be damaged by the low impedance of this mode.**

AC/DC Voltage measurement

1) Turn the knob to V̄ or LoZ Ṽ, press FUNC key until the "⎓" or "⏦" character is displayed.
2) Insert red probe to “INPUT” jack, insert black probe to “COM” jack.
3) Connect the probe with voltage source or both ends of load in parallel for measurement.
4) Read the measurement results on the display.

⚠ WARNING!

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition.**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.**
- **Please do not use VFD function to verify the presence of dangerous voltage or current, which may exceed the indicated value to avoid electric shock or personal injury.**

⚠ CAUTION!

- **When using LoZ Ṽ (low input impedance) measurement, the continuous measurement time cannot exceed 1 minute.**
- **Do not use LoZ mode to measure voltage in circuits that may be damaged by the low impedance of this mode.**

NOTE:

- High input impedance: approx. 10MΩ
- Low input impedance: approx. 300kΩ

Frequency/duty measurement

1) Turn the knob to Hz%.
2) Insert red probe to “INPUT” jack, insert black probe to “COM” jack.
3) Connect the probe with voltage source or both ends of load in parallel for measurement.
4) Read the measurement results on the display.

⚠ WARNING!

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition.**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.**

Resistance measurement

1) Turn the knob to  .
2) Insert red probe to “INPUT” jack, insert black probe to “COM” jack.
3) Connect the probe to the both ends of resistor or circuit to be tested for measurement.
4) Read the measurement results on the display.

⚠ WARNING!

When measuring circuit impedance, determine that the power supply is disconnected and the capacitor in the circuit is completely discharged.

Continuity test

1) Turn the knob to  , press FUNC key until the “  ” symbol is displayed.
2) Insert red probe to “INPUT” jack, insert black probe to “COM” jack.
3) Connect the probe to the both ends of resistor or circuit to be tested for measurement.
4) If the resistance value of the tested resistor or circuit is less than about 30Ω, and the green LED indicator light is on at the same time, The

resistance value will be displayed.

⚠ **WARNING!**

When measuring circuit continuity, determine that the power supply is disconnected and the capacitor in the circuit is completely discharged.

Diode test

1) Turn the knob to  , press FUNC key until the "  " symbol is displayed.
2) Insert red probe to "INPUT" jack, insert black probe to "COM" jack.
3) Connect the red probe to diode anode and connect the black probe to diode cathode.
4) Read the measurement results on the display.

⚠ **WARNING!**

When measuring diode, determine that the power supply is disconnected and the capacitor in the circuit is completely discharged.

Capacitance measurement

1) Turn the knob to  , press FUNC key until capacitance function.
2) Insert red probe to "INPUT" jack, insert black probe to "COM" jack.
3) Connect the probe to the both ends of capacitance to be tested for measurement.
4) Read the measurement results on the display.

⚠ **WARNING!**

When measuring capacitance, determine that the power supply is disconnected and the capacitor in the circuit is completely discharged.

Temperature measurement

1) Turn the knob to °C/°F.
2) Insert the K-type thermos couple, the positive pole (red) of the thermocouple into the “INPUT” jack, and the negative pole (black) into the “COM” input.
3) Contact the thermocouple probe with the measured object.
4) Read the measurement results on the display.

⚠ **WARNING!**

When measuring temperature with thermocouple, the probe of thermocouple can't touch the charged object, otherwise it may damage the instrument and may suffer electric shock or personal injury.

NOTE: It takes a long time for the cold end of thermocouple to be restored in the meter to achieve thermal balance with the environment.

Non-contact AC voltage (NCV) detection

1) Turn the knob to ‘NCV/LIVE/PHASE’, the “NCV” symbol is displayed.
2) Then NCV sensor gradually approaches the detected point.
3) When a weak electromagnetic field signal is sensed, the "---L" character is displayed, the buzzer emits a slow beep sound, and the green LED

indicator light is on.

4) When a strong electromagnetic field signal is sensed, the "---H" character is displayed, the buzzer emits a quick beep sound, and the red LED indicator light is on.

NOTE: When using NCV function, please remove the probe, otherwise the detection Sensitivity will be affected.

Live detection

1) Turn the knob to 'NCV/LIVE/PHASE', press FUNC key until the "LIVE" symbol is displayed.
2) Insert red probe to "INPUT" jack.
3) Connect the red probe to the conductor to be tested for measurement.
4) When a low voltage is detected, the "---L" character is displayed, the buzzer emits a slow beep sound, and the green LED indicator light is on.
5) When a high voltage is detected, the "---H" character is displayed, the buzzer gives a quick beep sound, and the red LED indicator light is on. In general, the fire line detected at this time.

NOTE: When using Live function, please remove the black probe, otherwise the detection Sensitivity will be affected.

Phase sequence detection

1) Turn the knob to "NCV/LIVE/PHASE", press key until the "PHASE" symbol is displayed.

2) Insert red probe to “INPUT” jack.
3) Connect the red probe to the conductor to be tested for measurement.
4) Display A and flash prompt to detect the first phase, detect the first phase, beep and often display A, enter the next step.
5) Display B and blink to detect the second phase, after the detection of the second phase, beep and often show AB, go to the next step.
6) Display C and blink to detect the third phase. After the detection of the third phase is complete, beep a long sound and often show ABC, enter the next step.
7) Display test results: --L left (+ left symbol ), --R right (+ right symbol ).

NOTE:

- Please complete the test of the three wires within 1 minute, otherwise the detection timeout error will occur, indicating the ‘PABC’ symbol and the ‘P’ letter flashing. If a timeout error occurs, return to the phase sequence check and recheck.
- When using phase function, please remove the black probe, otherwise the detection Sensitivity will be affected.

DC Current

Range	Resolution	Accuracy
60A	0.01A	±(2.5%reading+8)
600A	0.1A	
1000A	1A	

MAX current: 1000A

NOTE: Press ZERO key to clear before measurement.

AC Current

Range	Resolution	Accuracy
60A	0.01A	±(2.5%reading+8) VFD: ±(5.0%reading+10) INRUSH: ±(5.0%reading+10)
600A	0.1A	
1000A	1A	

MAX current: 1000A; True RMS

Frequency range: 0.1~600A: 40Hz~400Hz; 600~1000A: 40Hz~60Hz

DC Voltage

Range	Resolution	Accuracy
600mV	0.1mV	±(0.5%reading+5)
6V	0.001V	
60V	0.01V	
600V	0.1V	
1000V	1V	±(0.8%reading+5)

Input impedance: 10MΩ(LoZ:300kΩ)

Overload protection: AC750V/DC1000V

Maximum input voltage: AC750V/DC1000V

NOTE: In the small voltage range, when the probe is not connected to the measuring circuit, the meter display reading may not be zero, which is normal and will not affect the normal measurement.

AC Voltage

Range	Resolution	Accuracy
600mV	0.1mV	±(0.8%reading+5)
6V	0.001V	
60V	0.01V	
600V	0.1V	
750V	1V	±(1.0%reading+5)
1000V	1V	±(2.0%reading+5)

Input impedance: 10MΩ(LoZ:300kΩ)

Overload protection: AC750V/DC1000V

Maximum input voltage: AC750V/DC1000V

NOTE: In the small voltage range, when the probe is not connected to the measuring circuit, the meter display reading may not be zero, which is normal and will not affect the normal measurement.

AC Voltage

Range	Resolution	Accuracy
600mV	0.1mV	±(0.8%reading+5)
6V	0.001V	
60V	0.01V	
600V	0.1V	
750V	1V	±(1.0%reading+5)
VFD (750V)	0.1V	±(2.0%reading+5)

Input impedance: 10MΩ(LoZ:300kΩ)

Overload protection: AC750V/DC1000V

Maximum input voltage: AC750V/DC1000V

Frequency range: 40Hz ~ 1kHz; True RMS

NOTE: In the small voltage range, when the probe is not connected to the measuring circuit, the meter display reading may not be zero, which is normal and will not affect the normal measurement.

Resistance

Range	Resolution	Accuracy
600Ω	0.1Ω	±(1.0%reading+5)
6kΩ	0.001kΩ	
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	
60MΩ	0.01MΩ	

Overload protection: 250V

Continuity

	<approx. 30Ω, the buzzer sounds and the green LED light on	Test Voltage Approx. 1V Overload protection:250V

Diode

	It displays the approximate forward voltage value of the diode.	Forward DC current is about 1.5mA Reverse DC voltage is about 3V Overload protection:250V

Capacitance

Range	Resolution	Accuracy
10nF	0.001nF	±(4.0%reading+5)
100nF	0.01nF	
1000nF	0.1nF	
10μF	0.001μF	
100μF	0.01μF	
1000μF	0.1μF	
10mF	0.001mF	
100mF	0.01mF	±(5.0%reading+10)

Overload protection: 250V

Frequency/duty

Range	Resolution	Accuracy
10Hz	0.001Hz	±(1.0%reading+3)
100Hz	0.01Hz	
1000Hz	0.1Hz	
10kHz	0.001kHz	
100kHz	0.01kHz	
1000kHz	0.1kHz	
10MHz	0.001MHz	
1~99%	0.1%	±(3.0%reading+3)

Overload protection: 250V

Hz/Duty:

1) Range: 0 ~ 10MHz
2) Voltage sensitivity: 0.5~10V AC (As the frequency increases, the voltage should increase accordingly.)

Through mode V:

1) Range: 10Hz ~ 10 kHz
2) Voltage sensitivity: >0.5V AC (As the frequency increases, the voltage should increase accordingly.)

Clamp measuring frequency:

1) Range: 10Hz ~ 1 kHz
2) Current sensitivity: >20A (As the frequency increases, the current should increase accordingly.)

Temperature

Resolution		Accuracy	
ºC	1ºC	-40ºC~ 0ºC	± 3ºC
		0ºC ~ 400ºC	± 1.0% or ± 2ºC
		400ºC ~ 1000ºC	± 2.0%
ºF	1ºF	-40ºF~ 32ºF	± 6ºF
		32ºF~ 752ºF	± 1.0% or ± 4ºF
		752ºF~ 1832ºF	± 2.0%

NOTE: The above precision does not include the error of thermocouple probe.

MAINTENANCE&CLEAN

⚠ **WARNING!**

To avoid electric shock, remove the test probe before opening the battery cover or back cover.

General maintenance

- Maintenance and service of this instrument must be carried out by professional qualified maintenance personnel or maintenance department.
- Use wet cloth or mild detergent regularly to clean the shell. Do not use abrasives or solvents. Wipe the contacts in the socket with a clean cotton swab soaked in alcohol.

Battery installation or Replacement

The meter uses three AAA 1.5V batteries. Please install or replace the batteries according to the following steps.

1) Turn off the power of the meter and remove the probe
2) Use screwdriver to unscrew the screw that fixes the battery cover and remove the battery cover
3) Remove the old battery and install the new battery according to the polarity of the battery marked in the battery box
4) After installing the new battery, cover the battery cover and lock the screw

⚠ **WARNING!**

- **To avoid the possibility of electric shock or personal injury caused**

by incorrect reading, replace the battery immediately when the "" sign is displayed on the display screen.

- **Please use the same type of batteries, do not use substandard batteries**
- **In order to ensure safe operation and maintenance of the instrument, please take out the battery when not in use for a long time, in order to prevent damage to the product caused by battery leakage.**

SAFETY WARNINGS

⚠ WARNING!

Please read the instruction manual carefully before use and strictly observe the safety rules and the caution, attention and warnings listed in the instruction manual.

Safety instruction

⚠ WARNING!

To avoid possible electric shock or personal injury:

- If the voltage detector is not used according to the instruction, the protection function provided by the electric pencil may be affected or invalidation.
- Do not use if the display is not displayed.
- Before using the voltage detector, please test the known power supply to ensure that the voltage detector is in good working condition.
- When using voltage detector, even if there is no indication or no sound alarm, there may still be voltage. Voltage detector indicates the effective voltage when a supply voltage generates enough intensity electrostatic field. If the field strength is very weak, voltage detector can’t detect the existence of voltage. The existence of voltage may be affected by several factors, including but not limited to: shielded wires/cables, thickness and type of insulation, distance from voltage sources, differences in complete insulators, socket design, etc.
- Do not use voltage detector if it is damaged or unable to work properly.

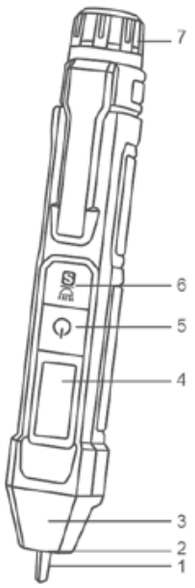
Before using, check whether the tip of the probe is cracked or broken. If there is a question, please send it to repair in time.

- Do not apply the rated voltage exceeding the marking on the voltage detector.
- When testing voltages above 30 volts, be extra careful, because such a voltage is at risk of electric shock.
- Comply with local and national safety regulations and use appropriate protective equipment in accordance with local or national authorities.

THE SYMBOLS IN MANUAL

	Warning message
	Low battery
	Conforms to European Union directives
	This additional product label indicates that this electrical/electronic product must not be discarded in household waste.

SPECIFICATIONS



Components

1. Probe (NCV sensor)
2. Flashlight
3. Signal indicator
4. Display
5. Power switch
6. Sensitivity/Flashlight
7. Battery cover

Technical specifications

Detection voltage: AC voltage: 12~1000V, 50/60Hz
Application environment: Operating temperature: 0~40℃
Storage temperature: -10~50℃
Humidity: ≤95%
Altitude: ≤2000m
Safety compliance:
CAT.III 1000V
CAT.IV 600V; CE
Battery: 2×1.5V AAA

OPERATION

Power ON/OFF

Press the power key and keep up for more than 1 second. The buzzer beeps once, the Power LED lit up and the instrument entered the test state. When the power on, power key was pressed to shut down.

High/low sensitivity

Load the battery, press power key, the pen turns on and default high sensitivity test status. When the power key is pressed to shut down, the test status is automatically memorized. When the battery is off, the default is restored to high sensitivity. The sensitivity / flashlight key (less than 1 second) can be switched at high and low sensitivity.

NOTE:

High sensitivity: 12V~1kV

Low sensitivity: 70V~1kV

Flashlight

Press the sensitivity / flashlight key and hold for more than 2 seconds. The flashlight is opened; The flashlight is closed by pressing the sensitivity / flashlight key and holding for more than 2 seconds.

No signal and no operation will be automatically closed after 5 minutes.

AC Voltage detection

The voltage detector probe is placed near the AC voltage. When the voltage is induced, the signal light will be lit. The barograph of the screen will become higher or lower as the voltage signal intensity is induced, and the beep hint will become faster or slower with the signal intensity，and percentage value will become higher or lower with the signal intensity.

NOTE:

- Because the socket structure is different, when not by the backlight color change to distinguish the Live and neutral, generally according to the detected signal intensity to distinguish.
- Distinguish Live and neutral, if Live and neutral is near, the two lines can be separated as far as possible; it is true that it is not separable and can be distinguished according to the intensity of the signal. One of the strong

signals is live wire and neutral wire with weak signal.

- Under normal condition, the live wire and neutral wire can be identified according to the signal intensity detected by the detector.
- When distinguishing the live wire from the neutral line, separate the two lines as far as possible to detect them. If they cannot be separated, they can be distinguished according to the signal intensity detected. The strength of the detected signal for the live wire is strong. The detected signal strength for the neutral wire is weak.

Auto power OFF

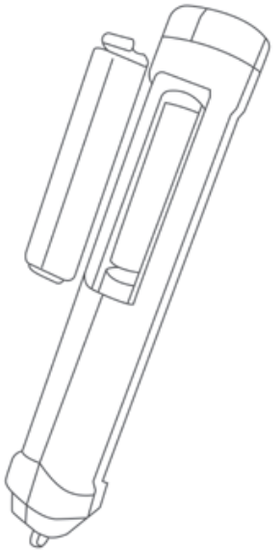
After about 5 minutes without any operation and No signal detection, the voltage detector will be automatically shut down to extend the battery life

Low battery indicates

When the battery voltage drops to less than 2.5 volts, the display will display "  " symbol. When the battery voltage drops to less than 2.3 volts, the voltage detector will automatically turn off. When low battery tip, please replace the battery.

Replace the battery

Press the snap and push the battery cover off the body, remove the batteries and insert the positive terminal of the new battery toward the tip of the tester.



⚠ WARNING!

To avoid electric shock, do not use the voltage detector to detect voltage before the battery cover is buckled and locked.

Clean

Clean with a wet cloth.

NOTE: After cleaning, the voltage detector must be dried before it can be used.

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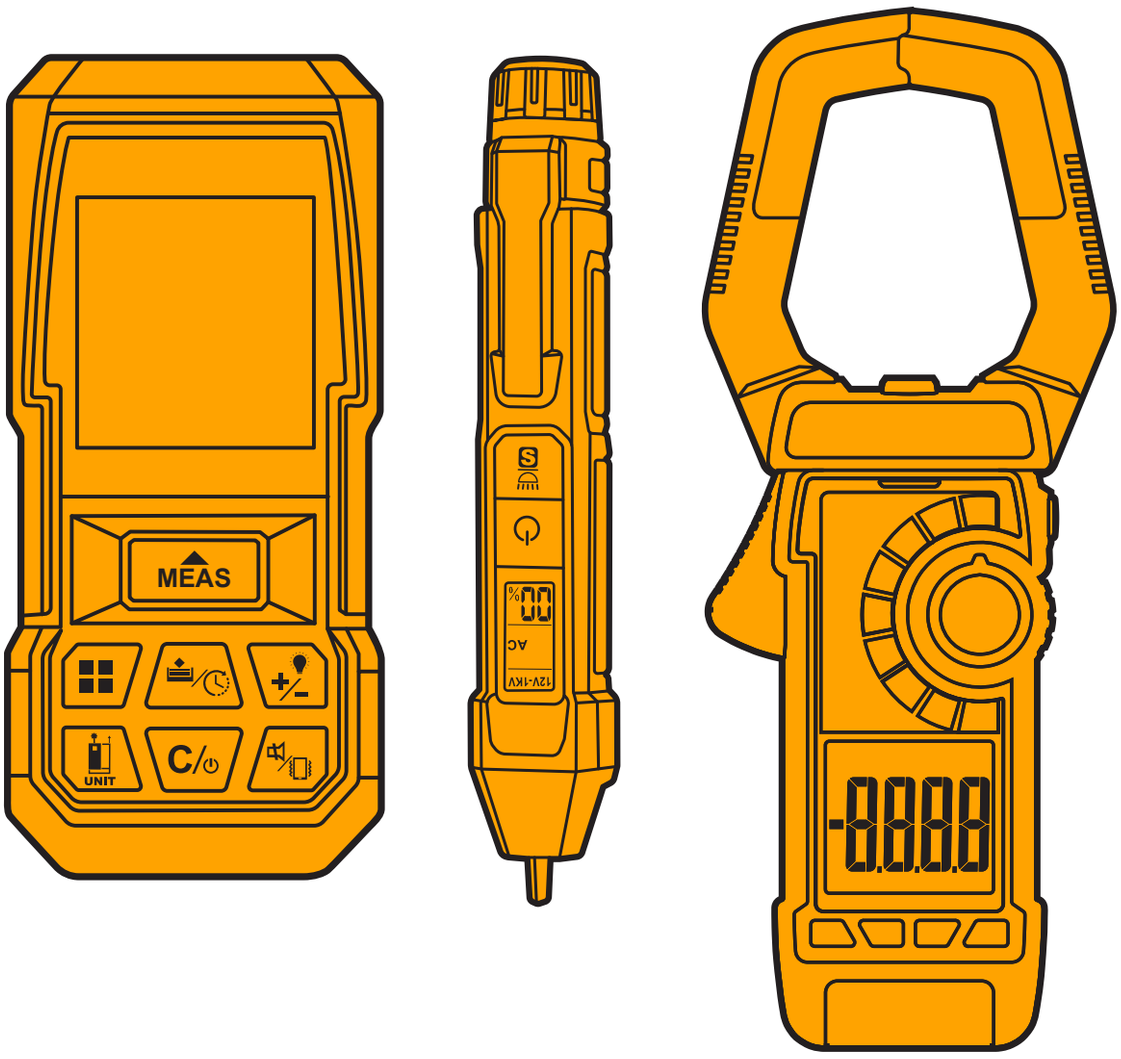

MADE IN CHINA 1124.V01

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