

# 5 in 1 Multifunction Gauge

**Model: KC-109A**

Operation Manual



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### **OVERVIEW**

KC-109A 5 in 1 multifunction gauge used integration design, which could achieve distance measurement, stud detection, laser mark, etc. Tool adopts the LCD screen with backlight, which can show various measure results, it is easy to operate and light to carry. It is an ideal tool for building and decoration industries (for example, real estate agent, upholstery designer and craftsman, etc.)

Distance measurement: The tool can effectively measure object's distance within 16 meters. It contains the functions of sound indication for pressing key, temperature display and memory, which can conduct consecutive measurements, automatic area and volume calculation. Convenient location and level bubble assistant locating function can bring your work to a new level.

Stud detection: The tool can detect the position of joists, AC live wires or metals. It will calibrate automatically after turning on. Select mode for joists, AC live wires or metals detection by setting the mode switch. Once approaching the edges of joists, AC live wires or metals are detected, the scanner will send out sound indication and you can easily mark the central position of the measured surface through the marker slot on top of the tool with pencil. The function of alarming for AC live wires will duly remind you of noticing whether there are AC live wires behind the wall, no matter functional switch is set on joists or metal.

Laser mark function: The tool can generate a visible red laser line on the surface of objects. It is convenient for you to choose the desired position while constructing. The tool also has the pin fixation function for using on the wall.

KC-109A Multifunction gauge is a Class 2 laser tool conforming to the EN 60825-1: 1994+A1: 2002+A2: 2001 safety rule.

### **SAFETY INSTRUCTIONS**

**Failure to follow the instructions listed below may cause personal injury.**

- Read and understand all instructions prior to any operation.
- Do not remove any label from the tool.
- Do not operate the tool with the presence of flammable/explosive gases.
- Do not operate the laser tool around the children or allow children to operate the laser tool, failure to do so will injure eyes of children.
- Do not stare into the laser beam.
- Do not project the laser beam directly into the eyes of others.
- Do not set up the tool at eye level or operate the tool on or near a reflective surface, as the laser beam could be projected into your eyes or the eyes of others.
- Do not observe the laser beam by using optical tools such as binoculars and magnifying glass.
- Operate with care because the pin is sharp.

- Do not push the metal pins into material other than dry wall or wood as breakage of the pins and the tool may occur.
- Remove the batteries when storing the tool for an extended time to avoid damage to the tool caused by batteries deteriorate.
- **Cautions:** when drilling, tacking and cutting on the wall, floor or ceiling, it is necessary to notice the wires and iron pipes inside them and this kind of materials can be detected by the intelligent scanner of our company, disconnect with the power when operating near wires.
- **Warnings:**

**DANGER**  
 Class 2 Laser Product  
 PER EN60825-1:1994+A1:2002+A2:2001  
 $P_{max} < 1mW, \lambda = 630 \sim 660nm$   
**Do not stare into beam!**  
**Avoid direct eye exposure!**  
**This tool emits a laser radiation!**

### **Battery Safety Instructions**

- Please remove the batteries when clean the product.
- Remove the batteries before long term storage
- Please install the batteries properly as the instructions of the positive and negative charges
- Please dispose the batteries properly. High temperature will cause explosions and do not burn the batteries. Strap insulated tape around the battery charges to avoid unsafe contacts with other objects. Many countries have regulations regarding battery disposal. Please follow the local regulations of battery disposing.

### **TOOL COMPONENTS**



- A. Measuring reference---Distance measurement is counted from end of the tool
- B. Marking / hanging hole -- As a marking hole of detected object's edge when detecting; as a hanging

hole to assistant fix the tool when laser marking.

C. LCD with backlight---Indicates detecting or measuring result.

D. Mode switch --- Set the mode for wood joists, AC live wires or metals.

E.  $\boxed{+/-}$  ---Addition key: Add the measured length, area or volume

F. Detection button---Press the button to detect when detecting.

G.  $\boxed{READ}$  --On/read key: Press this key to start the tool and read the measured distance, keep pressing this key and move the tool to read dynamic result.

H.  $\boxed{RM}$  ---Memory read key: Read out and display the result of length, area or volume which is stored last time

I. Ultrasonic sensor aperture

J. Laser pointer

K. Function switch--- Select mode for laser mark, distance measure or detection.

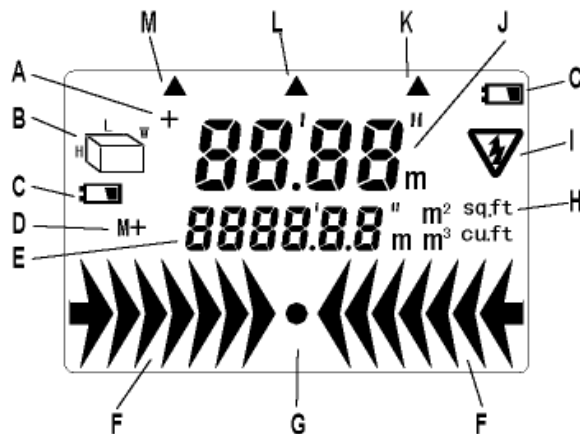
L. Level vials

M.  $\boxed{M}$  ---Memory input key: Input the length, area or volume into memory

N. Pin button ---Can fix the tool while laser marking.

O.  $\boxed{MODE}$  ---Clear/Mode select: Press this key to clear or return back to the menu to select length, area or volume mode.

## ILLUSTRATION OF DISPLAY SCREEN



A. Plus

B. Length/Area/volume (L=length; W=width; H=height)

C. Display when lack of electric quantity

D. Memory

E. Memory, computing result

F. Indication symbol for approaching the target object---the two symbols will light in turn towards the center symbol when approaching the edge of the detected object.

G. Symbol for central arrow---the light is on when detecting the edge of the detected object.

H. Measurement units

I. Caution symbol for AC live wires---the symbol is light when AC live wire is detected.

J. Current measuring result

K. Joist detecting indication---the light is on when the current detecting mode is on joist.

L. AC detecting indication---the light is on when the current detecting mode is on AC live wire.

M. Metal detecting indication---the light is on when the current detecting mode is on metal object.

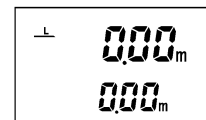
## **OPERATION GUIDE**

### **● Battery installation**

Open the battery compartment door on the back of the tool, and plug one 9 Volt block battery onto the battery connector and put the battery back to the compartment and close the door.

### **● Distance measurement and account functions**

Switch the "K" button to the "DISTANCE" position, the tool will enter distance measurement state and wait to measure.



### **1. Distance measurement**


- Make the induction hole "I" face against the measured object (e.g. the wall) and keep the tool vertical to the measured object; make sure the level bubble stands between the two lines by adjusting the position of the tool.
- Press the **READ** key to get the measured distance and the laser beam indicates the measured surface
- Keep pressing the **READ** key and move the tool to get the dynamical readings, and the measured distance will be displayed on upper portion of the screen.
- Press the **MODE** key and **READ** key together to select the measuring unit as British measurement or Metric system.(original measuring unit:Metric measurement).

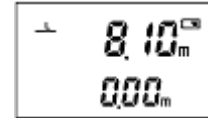
### **TIPS:**

- 1、 In the "DISTANCE" mode, the backlight will be automatically light, and go out without pressing the key within 15s. Press any key to turn on the backlight again.
- 2、 In the "DISTANCE" mode, the tool will turn off automatically without pressing key within 30s. Press **READ** key to turn on it. The value before turning off will display on the screen.

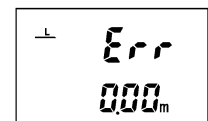
3、 The tool will have sound indication when pressing the key. It shows that the pressing key is effective.

4、 Inaccurate measurement may result from the following:

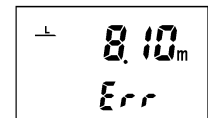
a. When the battery runs out: at this time, the “” icon will continuously appear on LCD to remind you of replacing the battery.



b. When the measured distance is out of the effective range: the effective range is 2' ~53' (0.6~16m).



c. When the calculated result is out of the specified range: at this time, an error message “Err” will be displayed on the lower line of the screen.



d. When addition of different parameters (e.g. length plus area), the “+” will be ignored and the screen will keep the same read as the unit was operated before.

e. When another ultrasonic source or high frequency noise is nearby: leave or shut down the noise resource when taking measurement.

f. When barriers appear between the tool and the measured surface.

g. When the measured surface is not smooth: the measured surface should be smooth, hard and of homogeneity.

h. When the measuring environment is not good: the temperature and humidity will affect the accuracy of measurement, and take measurement under environment of no wind, and temperature of the unit should be same with temperature of the circumstance, especially for long distance measuring (between 40' to 53' / 12m to 16m), the relative humidity should be above 48%, and the size of measured surface should be at least 10ft. by 10ft./3m by 3m.

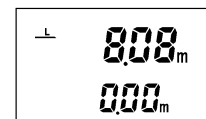
i. When measuring, ultrasonic sensor aperture should straightly face to the measured surface.

## REMARK:

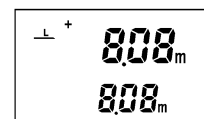
- A. The measured object must be normatively hard surface and not be blocked by any barriers;
- B. Select a smooth hard surface with big area to measure for precise result;
- C. If the measured surface is too small and irregular or with soft surface, chipboard can be used on the surface of the measured object;
- D. The tool cannot measure through glasses;
- E. The tool should be over 2 feet (60cm) away from the measured object when measuring;
- F. To make sure accurate measurement, you should operate when temperature of the unit is same with temperature of the circumstance.
- G. The distance measurement should be counted from the end of the tool.

## 2、 Addition (W/O using M memory)

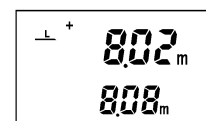
- Press **READ** key for measurement and the measured value is displayed on upper portion of the screen;



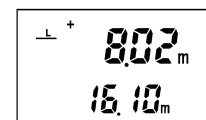
- Press **+/=** key to enter the addition mode, and the “+” icon will appear on the display and at the same time, the result is displayed on the lower side of the display (press **+/=** key again to cancel the add operation);



- Press **READ** key again for second time measurement, the measured value is displayed on upper portion of the screen;



- Press **+/=** key again to display the sum on the lower portion of the screen;



- Repeat the steps above can continue accumulation.

## 3、 Addition (using M memory)

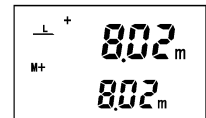
- Press the **M** key to save the first measured result, and the “M+” will appear on the display;



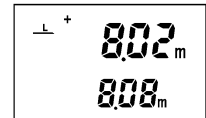
- Press the **READ** key for new measurement;



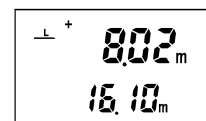
- Press the **+/=** key to enter the addition mode, and the “+” will appear on the display;



- Press the **RM** key to recall previous measurement for the addition (displayed on the bottom of the display), and at the same time, the “M+” icon disappears and the stored memories will be automatically eliminated;

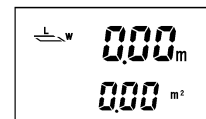


- Press **+/=** key, the sum is shown on the lower portion of the screen.

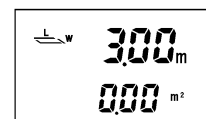


## 4、 Area

- Press **MODE** key to enter area mode, and the " $\overline{L}$ " will appear on the display for calculation of a room area;



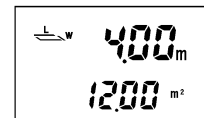
- The length character “L” on the display will blink showing the length measurement you will be firstly taking. Press **READ** key to take length measurement that is displayed on upper portion of the screen. (Step 1);



- The width character “W” on the display will blink showing the next measurement to take. Press **READ** key to take width measurement that is displayed on upper portion of the screen (Step 2);



- Then the area is automatically displayed on the lower portion of the screen;



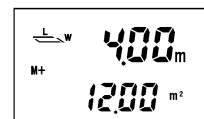
- Press the **READ** key again will toggle back and forth between the length and width measurement on the upper portion of the screen;
- Press **MODE** key to clear the data on the portion of the screen, then can begin the new calculation of area.
- To choose measurement mode, press **MODE** key again.

**Tips:**

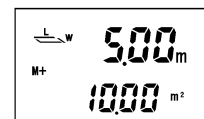
Press the **MODE** key one by one will toggle back and forth between the length, area, volume and length measurement. If there are datum on the display, first pressing the **MODE** key will clear the current datum, and the mode will be invariable.

**5、 Addition of area under area mode:**

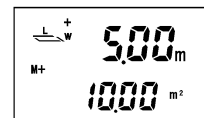
- Press the **M** key to save the calculated area of first time measurement, at the same time, the “M+” icon appears on the screen;



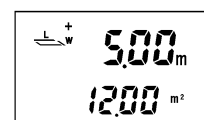
- Press **MODE** key to clear the current displayed data, then can begin the second time measurement and computation (follow step 1 and step 2 under the area section);



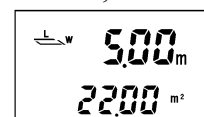
- After getting the desired area of the second time computation, press **+/=** to enter the addition mode. A “+” icon would appear on LCD.



- Press **RM** key to recall the first calculated area for the addition. The “M+” icon will disappear and the stored memory will be automatically cleared;




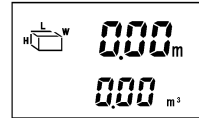
- Press **+/=** key, the sum of both areas is shown on the lower portion of the screen;



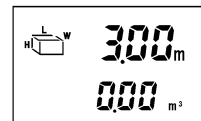
- Repeat the steps above to keep adding the measured area.

## 6、 Volume

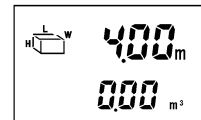
- Press **MODE** key to enter volume mode, and the "  "will appear on the display for calculation of a room volume;



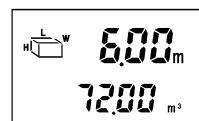
- The length character “L” on the screen will blink showing length measurement will be taking. Press **READ** key to take length measurement, the result will be displayed on upper portion of screen. (Step 1)



- The width character “W” on the screen will blink showing the next measurement to take. Press **READ** key to take width measurement, the result will be displayed on upper portion of screen. (Step 2);



- The height character “H” on the screen will blink showing the next measurement to take. Press **READ** key to take height measurement, the result will be displayed on upper portion of screen. (Step 3);



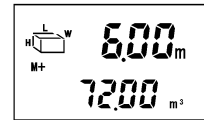
- Then the volume is automatically displayed on the lower portion of the screen;
- Pressing the **READ** key again will toggle back and forth between the length, width and height measurement on the upper portion of the screen;
- Press **MODE** key to clear the data on the portion of the screen, and then can begin the new calculation of volume;
- To choose measurement mode, press **MODE** key again.

### Tips:

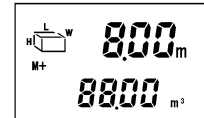
Press the **MODE** key one by one will toggle back and forth between the length, area, volume and length measurement. If there are datum on the display, first pressing the **MODE** key will clear the current datum, and the mode will be invariable.

## 7、 Addition of volumes under volume mode:

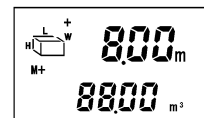
- Press **M** key to save the calculated volume of first time measurement, and the “M+” icon will appear on LCD;



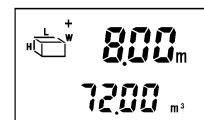
- Press **[MODE]** key to clear the current displayed data, then can begin the second time measurement and computation (Follow step 1 to 3 under the volume section);



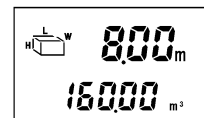
- After getting the calculated volume of second time, press **[+/-]** key to enter the addition mode. A “+” icon would appear on LCD;



- Press **[RM]** key to recall the first calculated volume for the addition. The “M+” icon will disappear and the stored memory will be automatically cleared;



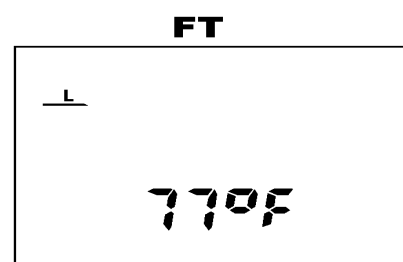
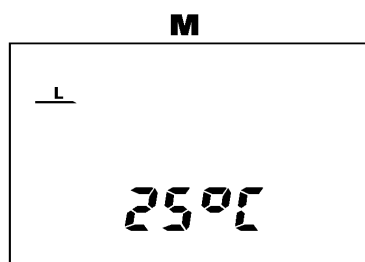
- Press **[+/-]** key, the sum of both volumes is shown on the lower portion of the screen;



- Repeat the steps above to keep adding the measured volume.

## 8、 Temperature display

Press and hold **[MODE]** key and at the same time press the **[RM]** key, the environment temperature will appear on the lower portion of screen (the unit is °C if the distance unit is M, while the unit is °F if the distance unit is ft/in), and press the **[READ]** key again to return the measuring state.



## ● Stud detect

Press the “k” button to the "DETECTOR" location, the tool will enter detection state and wait to detect.

### 1、 Calibration

The tool should be calibrated on the surface of the detected object before detecting or after function “D” switch’s diversion.

### ●Detecting calibration for joist

Set the mode switch to the mode for joist, and then lightly adhere the scanner to the detected surface, press the power button to connect to the power supply, the scanner will send out sound indication and be calibrated automatically according to the thickness of the detected wall. The calibration is finished when the sound stops. You can process joist detection now and please always press the power button during the detecting course.

#### Notice:

- 1、 when calibrating, the scanner cannot be directly put on the materials with high density (e.g. metals, joists), or wet, new-painted and unsuitable places. Restart calibration by changing another place.
- 2、 When approaching or detecting the AC live wire during calibration, the caution symbol for live wires will indicate after calibration.

### ●Detecting calibration for AC live wires

Set the mode switch to the mode for AC live wire, and then calibrate the tool with reference to the method of “detecting calibration for joist”.

#### Notice:

When calibrating, the tool will automatically set the degree of induction according to the distance to the live wire. If distance to the AC live wire is far enough, the induction will be set to the strongest degree; if close to the AC live wire, the tool will automatically set to the most ideal induction according to the distance.

### ●Detecting calibration for metal objects

Set the mode switch to the mode for metal object, and then calibrate the tool with reference to the method of “detecting calibration for joist”.

#### Notice:

- 1、 when calibrating, the tool will automatically set the degree of induction according to the existence of the metal object. If no metal object exists, the induction will be set to the strongest degree; if metal object exists, the tool will automatically set to the most ideal induction according to the type and size of the metal object.
- 2、 When approaching or detecting the AC live wire during calibration, the caution symbol for live wires will indicate after calibration.

## 2、 Detection

### ● Joist detection---detecting joists through walls

According to the calibration requirements for joist detection, calibrate the tool to the ideal induction degree and process as per the following steps:

- a. Move the tool across the surface of the object in straight line horizontally and slowly, and hold the tool firmly against the surface.
- b. When the tool moves horizontally and is close to the detected object, the outer side of arrow symbol will illumine and then slow down the moving speed, and the arrow lights of both sides will light in turn towards the center light (if the arrow symbols of both sides go out when moving, reset automatic calibration and detection from another place).
- c. If the edge of joists are detected, the center arrow symbol will illumine and the beeps will ring, at this time, make a mark on the edge of detected object through the marker slot by pencil. Then continue to move the unit slowly in the same way until the arrow symbol goes out and the beeps stop.
- d. Repeat the steps above from the opposite direction to detect the other edge of the target object and make a mark; the center of the two markers is just the center of the detected object. Repeat the operations for several times to get the relatively precise result.

**Notice:** If the power button released incautiously, you must restart the calibration and repeat the steps above to detect.

● **AC live wire detection---detecting the AC live wire through walls**

- a. According to the calibration requirements for AC live wire detection, calibrate the tool to the ideal induction.
- b. Operate the tool and find out the two edges of AC live wires and make a mark with reference to the method of “Joist detection---detecting joists through walls”.
- c. The center of the two marks is just the center of AC live wire.

**Notice:** AC live wires in metal pipes or metal covered wire, as well as metal walls or walls of high density all cannot be detected.


● **Metal object detection---detecting the metal stud through walls**

- a. According to the calibration requirements for metal stud detection, calibrate the tool to the ideal induction.
- b. Operate the tool and find out the two edges of metal studs and make a mark with reference to the method of “Joist detection---detecting joists through walls”.
- c. The center of the two marks is just the center of metal stud.

**TIPS:**

- 1.The tool can accurately detect the center of the target object, but the width of the target object can only be detected in a range.
- 2.Please do not use the tool near strong electric wave or high frequency interference.
- 3.Please do not use the scanner in high temperature and wet place.

4. Please try to avoid using the tool on wet plate and wall.
5. Sometimes, the scanner cannot detect the slate or mixed plate correctly because the density of the materials change a lot.
6. When tacking, cutting or drilling on the wall, ceiling or floor, please take care to the wires and pipes on the back of them.
7. The covered wires, useless wires, telephone lines, CATV wires and circuitries without electricity could not be detected as live wires.
8. When the thickness of detected wall is over 3/4 inches or the joists are close to each other, joist detection is not suitable, generally, the space between joists is 16 or 24 inches, and the width of the joist is 1-1/2 inches.
9. The detection is not suitable for metal wall or the wall with high density materials of metal.
10. When constructing beside the AC live wires, the power supply should be switched off.
11. If the tool cannot calibrate or detect normally, possible reasons are as follows:

- a) When the battery is low, the “” symbol will blink continuously on the screen after calibration. Replace with new battery according to instructions.
- b) In order to make sure that the scanner is on the best state during detection, hold the tail of the tool when operation and keep the other hand at least 6 inches away from the tool during detection.

## ● Laser marking function

Press the K button to the "LASER" location, the tool will enter laser marking function. The laser diode is powered and emit laser line.

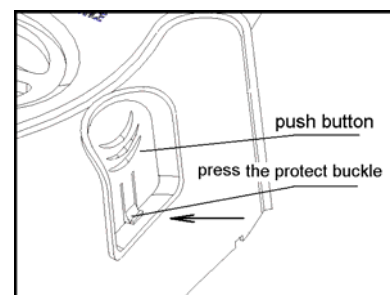
### 1. Tool fixation

When using the tool on the dry wall or wooden wall, you can locate the tool by push pins fixation function:

- 1) Locate the tool on the desired place.
- 2) Push inward and keep pressing the protect buckle on the side of the push button, making the buckle claw break away from the joint surface.
- 3) Press the push pin button N emphatically. Forelock the push pin into the wall and make sure the fixation is firm.

Notice:

- a. Please don't press the push pin without breaking protect buckle away from the joint surface to avoid damage to the tool.
- b. When the push pin is not needed, please pull the pin back to make sure the push pin protect buckle has been retracted to original place to avoid damage



## 2. Laser mark

- Take measurement and determine where the laser line needs to be projected.
- Measure for position of laser line. (See “How to fix the tool”)
- Determine laser orientation.( Do not stare into the laser beam. See "Safety Instructions")
  - a. Horizontal line: turn the tool (left or right) until the bubble above the tool is between the two lines.
  - b. It can project laser line at an angle by rotating the tool and using hanging hole assistant location instrument.
- Length of light adjustment: When projecting laser line, you can open the support board on the back of the tool or place some object to underlay the whole tool to obtain suitable length of the laser line.

### Tips:

- The tool is designed to project a baseline on the surface of the object. The reflection of the baseline on any other surfaces cannot be used as a reference.
- If the laser line is not visible during operation, please check and replace the battery.
- The tool is recommended for indoor use. The visibility of the laser will be affected if the tool is used outdoor.

| <b>Cautions</b>  |
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| <ul style="list-style-type: none"> <li>● Operate with care and do not let the tool drop down.</li> <li>● Do not disassemble the tool in case of damage.</li> <li>● Keep the tool dry and clean.</li> <li>● Please place the tool with workbox when not use.</li> <li>● Avoid dust and water, which may stain the lens.</li> <li>● Avoid rain and water.</li> <li>● Do not exposed the the tool to vibration and high or low temperature environment.</li> <li>● In case of damage of tool by deterioration of battery.</li> <li>● Remove the battery when not in use for an extended period of time</li> </ul> |

## **TECHNICAL SPECIFICATIONS**

|                      |                             |
|----------------------|-----------------------------|
| Name                 | 5 in 1 Multifunction Gauge  |
| Type                 | KC-109A                     |
| Recommended use      | Indoor or indirect sunlight |
| Length of laser line | 2m                          |
| Width of laser       | <5mm                        |
| Power of laser       | <1mW                        |
| Wavelength           | 630~660nm                   |
| Laser class          | Class II                    |

|                       |                    |  |   |
|-----------------------|--------------------|--|---|
| Measure distance      | Measurement range  |  | 2'to 53' (0.6~16m)                                      |
|                       | Calculation range  | Length   | 9999'11" (9999.99m)                                     |
|                       |                    | Area   | 99999.9 sq ft (99999.9m <sup>2</sup> )                  |
|                       |                    | Volume   | 999999 cu ft (999999m <sup>3</sup> )                    |
|                       | Resolution         |  | 0.01m   |
|                       | Temperature range  |  | 0°C to +40°C  |
|                       | Automatic turn-off |  | The tool will be automatically off after 30s disabling. |
| Backlight function    |                    | Shutdown automatically if there is no action of pressing keyboard in 15s |   |
| Object of detection   |                    |  | Joists, AC live wires and Metals                        |
| Detection capability  | Joist              |  | Thickness of wall is 19mm(3/4 inches)                   |
|                       | AC live wire       |  | 50mm(2 inches) deep away from the wall                  |
|                       | Metals             |  | 38mm(1 1/2 inches) deep away from the wall              |
| Power supply          |                    |  | One 9V battery  |
| Power consumption     |                    |  | <50mA   |
| Operating temperature |                    |  | +5°C ~+40°C   |
| Operating humidity    |                    |  | 30%~70%   |
| Storage environment   |                    |  | -20°C ~+60°C, ≤85% (w/o battery)                        |
| Size                  |                    |  | 170mm×85mm×45mm   |
| Weight                |                    |  | About 230 g (battery not included)                      |

## **WARRANTY**

The product is warranted to be free from defects in materials and workmanship for a period of one year from the date of purchase on the basis of providing relevant card.

### **Notice:**

The warranty does not apply to the following conditions

- Disassembling the laser tool will void the warranty.
- Any damage resulting from, but not limited to wear, water, being dropped or repairs attempted by others.

Tips: Most parts of the product could be recycled, please refer to your local regulations for disposing of them instead of throwing into the dustbin.