Manual

Elma Laser 7 Zoom
EAN 5706445677238

English

elma (e) instruments

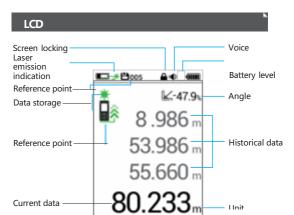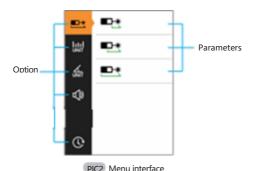## Safety Regulations
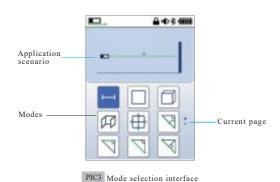**Please read the safety regulations and operation guide carefully before operating.**

△ Please read all of the operational guide and safety regulations in this manual before operation . Improper operations without complying with this manual may cause damage to the device, influence on measurement result or cause personal injury to the user or a third party.

△ The instrument is not allowed to disassemble or repair in any ways. It is forbidden to do any illegal modification or performance change for laser emitter. Please keep it out of reach of children and avoid being used by any irrelevant person.

△ It is strictly prohibited to shoot eyes or other parts of body with the laser. It is not allowed to take the laser to shoot the surface of any highly reflective objects.

△ Due to electromagnetic radiation interference to other equipment and devices, please don't use the meter in the plane or around medical equipment, don't use it in inflammable, explosive environment.

△ Discarded meter device should not be processed just like household garbage, please handle it in line with related law and regulations.

△ Any quality issues or any questions on the meter, please contact local distributors or manufacturer in time, we are ready to offer solutions for you.

LCD

Screen locking

Voice

Laser emission indication

Battery level

Reference point

Data storage

Angle

⟋-47.9°

8.986 m

53.986 m

Historical data

Reference point

55.660 m

Current data

80.233 m

Unit

PIC1 Main interface

Parameters

Option

PIC2 Menu interface

Application scenario

Modes

Current page

PIC3 Mode selection interface

Buttons

Power on/ Measure/ Confirm

Mode selection/ Left button

Camera auxiliary measuring

Add/Up

Menu/ Right button/ Screen locking

Subtract/ Down

Power off/ Clear

Li-ion Charging
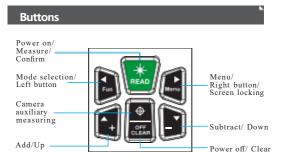
Type-C charging

Lithium Battery

The built-in 3.7V 2000mAh battery is not removable.

The instrument has its own charging circuit, with clear undervoltage and charging indication.

When the battery is low, the battery symbol is blank and flashes. In this case, charge the battery in time. Plug in the USB cable to charge, a scrolling battery symbol will appear on the screen, and the battery symbol will stop rolling when the battery is fully charged.

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Battery Maintenance

When not used for a long time, please fully charge the product and recharge it every six months to avoid battery discharge damage.

Power on

In the shutdown state, long press ![key] key to enter the measuring mode.

In on state, long press ![key] key to turn off the instrument. If no operation is performed within 300 seconds, the

instrument will automatically shut down. (300 seconds is the default value, users can to set it referring to the Menu Settings).

Single Measurement

The operation is as follows:

1. In the measurement mode, press ![key] key to emit laser.
2. Lock the measurement target, press ![key] key to measure the distance, and the value will be displayed in the main display area of the screen. The historical data of the last three measurements will be displayed in the auxiliary

display area, which can be cleared by pressing ![key] key.

Continuous Measurement

This mode helps users to find a certain distance point without frequently pressing the button to get the required data. The operation is as follows:

1. In measurement mode, long press ▣ key to enter the continuous measurement mode. The screen will display the maximum value MAX and minimum value MIN, as well as the difference between the maximum and minimum values. The main display area displays the current measured value.

2. Short press ▣ or ▣ key to exit the continuous measurement. After completing the measurement, the measurement results are automatically saved to the storage media for easy access at any time.

Mode Selection

Press ▣ key to enter the mode selection page. The operation is as follows:

Press ▣ ▣ ▣ ▣ to switch modes;

Press ▣ to enter the selected mode;

Press ▣ to return to the measurement interface;

Area Measurement

(Application scenario)

Select ▣ mode, the screen displays 🔲 , follow the prompts to complete the following operations.

　　Press 🔲 key to measure the length of the rectangle;
　　Press 🔲 key to measure the width of the rectangle;
After the measurement is completed, the instrument automatically calculates the area. If the user thinks that the measurement data may be wrong, he can also short press 🔲 key to return to the last measurement and re-measure.

Volume Measurement

(Application scenario)

Select ▣ mode, the screen displays ▱, follow the prompts to complete the following operations.

▱ Press 🔘 key to measure one side (length) of the cube;
▱ Press 🔘 key to measure one side (width) of the cube;
▱ Press 🔘 key to measure one side of the cube (height);

In the actual measurement, the user does not have to measure in the order of length, width and height. After the third measurement is completed, the instrument automatically calculates the volume. If the user thinks that the measurement data may be wrong, he can also short press 🔘 key to return to the last measurement and re-measure.

Wall Area Measurement

(Application scenario)

Select ▣ mode, the screen displays ▱, follow the prompts to complete the following operations.

▱ Press 🔘 key to measure the height of the wall;
▱ Press 🔘 key to measure the width 1 of wall S1;

The instrument automatically calculates the area of the wall = height x width 1;

🔲 Press ➕ to measure the width of wall S2;
The instrument calculates the total area of the wall automatically;
Total area of the wall = height x (width 1+ width 2); By analogy, press ➕ key to measure the width of the wall n;
Total area of the wall = height x (width 1+ width 2+ ___) + width n);

If the user thinks that the measurement data may be wrong, he can also short pres ▨ key to return to the last measurement and re-measure.

Camera Area Measurement

(Application scenario)

Select ▦ mode, function introduction: The user measures the distance to the target, and then adjusts the length (a) and width (b) through the camera to coincide with the length and width boundary of the target, the instrument automatically calculates the area of the target, the operation is as follows:

1. Aim at the measurement target to make the whole target appear in the camera frame;
Short press ➕ key to freeze the image frame; Four arrows are displayed on the screen. Adjust the arrow position by pressing ▨ ▨ to make it coincide with the target boundary;

3. Short press ▪ key to switch the arrow, and continue to adjust the arrow position to coincide with the target boundary;

4. After all arrows coincide with the target boundary, the target area is automatically calculated and displayed below;

5· Short press ▪ key or ▪ key to start the second measurement.

Length —— —— Width

—— Area

Pythagoras Measurement

Note: During triangle measurement, if ERR 5 appears on the screen, it indicates that the measurement data does not meet the triangle rule, such as the hypotenuse of a right triangle is smaller than the right side, and the user needs to measure again.

1. Get the height and horizontal distance of the right triangle (Angle&Height measurement)

(Application scenario)

Select ▧ mode, the screen displays ◣ , follow the prompts to complete the following operations.

▧ Press 🔲 key to measure the hypotenuse and dip angle of the right triangle;

After measuring the hypotenuse of a right triangle, the instrument calculates the height C and horizontal distance B of the right triangle based on the hypotenuse length and dip angle.

2. Get the height of a right triangle

(Application scenario)

Select ◣ mode, the screen displays ◣, follow the prompts to complete the following operations.

◣ Press 🔲 key to measure the hypotenuse A of the right triangle;

◣ Press 🔲 to measure the leg B of the right triangle;

The instrument will automatically calculate the height C of the triangle after the second measurement;

3. Get the hypotenuse of a right triangle

(Application scenario)

Select ◺ mode, the screen displays ◺, follow the prompts to complete the following operations.
◺ Press 📏 key to measure the leg B of the right triangle; ◺ Press 📏 key to measure the other leg C of the right triangle;
The instrument will automatically calculate the hypotenuse A of the triangle after the measurement.
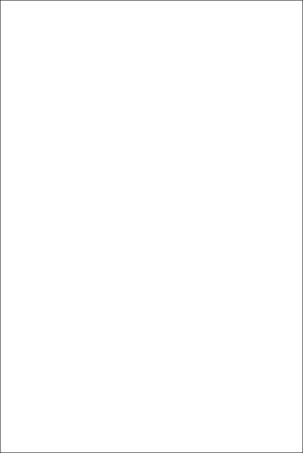
4. Get the base sum of a triangle

(Application scenario)

Select ◹ mode, the screen displays ◹, follow the prompts to complete the following operations.
◹ Press 📏 key to measure one side C of the triangle;
◹ Press 📏 to measure the height B of the triangle;
◹ Press 📏 to measure the other side A of the triangle;
The instrument will automatically calculate the third side D of the triangle after the measurement.

5. Triangle auxiliary line height measurement

(Application scenario)

Select ◥ mode, the screen displays ◥ , follow the prompts to complete the following operations.

▨ Press 🔋 to measure one side A of the triangle;
▨ Press 🔋 to measure the auxiliary line length B of the triangle;
▨ Press 🔋 to measure the base C of the triangle;
The instrument will automatically calculate the auxiliary line height D of the triangle after the measurement.

Triangle Area Measurement

(Application scenario)

Select ◤ mode, the screen displays ◣, follow the prompts to complete the following operations.

7 Press 🔋 to measure the first side A of the triangle;
▨ Press 🔋 to measure the second side B of the triangle;
▨ Press the 🔋 key to measure the third side C of the triangle;
The instrument will automatically calculate the area S of the triangle after the measurement.
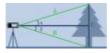
Slope Measurement

(Application scenario)

Select ◢ mode, the screen displays ◢ , follow the prompts to complete the following operations.

◢ Press ➕ to measure the first side A;

4 Press ➕ to measure the second side B;

The instrument will automatically calculate the height ◢ of slope C and the length ◢ of slope C after the measurement.
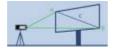
Height Tracking

(Application scenario)

Select ◁ mode, the screen displays ◁ , follow the prompts to complete the following operations.

Press ➕ key to measure side B, the screen shows the angle of B ◁ and the length of B ◁ ; Short press ➕ key again, and the instrument will start continuous measurement and measure the other side A. The screen displays the angle A ◁ and the absolute height difference ◁ between A-B in real time.

Measurement of Distance between Any Two Points in Space (Azimuth Measurement)

(Application scenario)

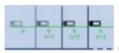Select 🖾 mode, the instrument enters the calibration state, the screen displays:

Please put the instrument at rest and wait for about 3s to complete the calibration, (if there is vibration during the period, the instrument cannot be calibrated), the user can short press ▦ key to exit the calibration. It is recommended to perform a calibration before starting the measurement to improve data accuracy. When the calibration is complete, follow the prompts to do the following operations:

▽ Press ⊞ to measure the distance from the instrument to point A;

▽ Press ⊞ to measure the distance from the instrument to point B;

The instrument automatically calculates the distance C between A and B.

Staking-out Measurement

(Application scenario)

Select ⅢⅠ mode, the screen displays 插, follow the prompts to complete the following operations.
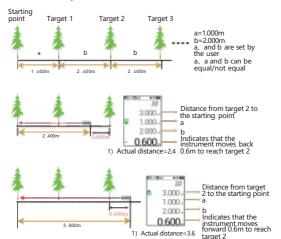
1. After entering the staking-out mode, adjust the size of a by ➕ ➖ key (long press ➕ ➖ key to increase the adjustment range). After the adjustment is complete, press ➡ key and staking-out value a will be set.

2. After setting a, adjust the size of b by ➕ ➖ key (long press ➕ ➖ key to increase the adjustment range). After the adjustment is completed, press ➡ key, staking-out value b is set, and the instrument starts staking-out.

Staking-out mark:

🔄 Do not reach the staking-out point, please move the instrument backward;

🔺 Beyond the staking-out point, please move the instrument forward;

⏳ Reach the staking-out point.

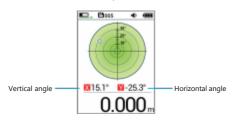Exit staking-out: Press ⌫ key to exit staking-out.

Function description:

Starting point

Target 1   Target 2   Target 3

a   b   b

1.o00m   2.o00m   2.o00m

a=1.000m
b=2.000m
a、and b are set by the user
a、a and b can be equal/not equal

2.400m   0.600m

3.000   Distance from target 2 to the starting point
1.000   a
2.000   b
0.600   Indicates that the instrument moves back 0.6m to reach target 2

1) Actual distance=2.4

0.600m

3.600m

3.000   Distance from target 2 to the starting point
1.000   a
2.000   b
0.600   Indicates that the instrument moves forward 0.6m to reach target 2

1) Actual distance=3.6

Level Bubble Measurement

Select ⚙ mode, the screen displays ⊕ , follow the prompts to complete the following operations.

The universal electronic level bubble simulates the actual level bubble function and measures the tilt angle relative to the horizontal and vertical positions.

Vertical angle ⟶ ✕15.1° ... ✓-25.3° ⟵ Horizontal angle

0.000 m

Distance Addition

Select ⟷ mode and follow the prompts to complete the operation:

Step 1: Press 🔲 key to turn on the laser, then press 🔲 key, the main display area will display the measurement data;

Step 2: Press 🔲 key, the instrument enters the addition measurement, and [+] is displayed on the left side of the lower end of the screen;

Step 3: Repeat Step 1, after the second measurement, the instrument will automatically sum. The auxiliary display area shows the first and second measurement data, and the main display area shows the sum of the two data.

Step 4: Repeat step 1, after each measurement, the instrument will continue to sum, the auxiliary display area shows the last sum data and the last measurement data, the main display area shows the sum of the two data.

Distance Subtraction

Select mode and follow the prompts to complete the operation:

Step 1: Press key to turn on the laser, then press key, the main display area will display the measurement data;

Step 2: Press key, the instrument enters the subtraction measurement, and [-] is displayed on the left side of the lower end of the screen;

Step 3: Repeat Step 1, after the second measurement, the instrument will automatically subtract. The auxiliary display area shows the first and second measurement data, and the main display area shows the difference of the two data;

Step 4: Repeat step 1, after each measurement, the instrument will continue to subtract, the auxiliary display area shows the last subtract data and the last measurement data, the main display area shows the difference of the two data.

Note: In the process of addition and subtraction, user can short press key to cancel the last value of addition and subtraction. Short press several times to exit the addition and subtraction state.

Area Addition & Subtraction

Figure 4 First measured area

Figure 5 Second measured area

Figure 6 Sum of area

Step 1: Measure the first area (refer to area measurement), as shown in Figure 4;

Step 2: Short press ▪ to clear the data of screen, and [+] will be displayed in the main display area;

Step 3: Repeat step 1 to measure the second area, and the result is shown in Figure 5;

Step 4: Short press ▪ key, the instrument will automatically sum the two areas. The auxiliary display area will display the first and second area values, and the main display area will display the sum of the two areas, as shown in Figure 6.

Multiple addition: After completing step 3, repeat step 2 and step 3 to continue to add the next area. Finally, perform step 4 and the instrument will sum all the measured areas.

Note:The operation procedure of subtraction is similar to that of addition, so it will not be explained here.

Figure 7 First measured volume   Figure 8 Second measured volume   Figure 6 Sum of volume

Step 1: Measure the first volume (refer to volume measurement), as shown in Figure 7;

Step 2: Short press ▣ to clear the data of screen, and [+] will be displayed in the main display area;

Step 3: Repeat step 1 to measure the second volume, and the result is shown in Figure 8;

Step 4: Short press ▣ key, the instrument will automatically sum the two volumes. The auxiliary display area will display the first and second volume values, and the main display area will display the sum of the two volumes, as shown in Figure 9.

Multiple addition : After completing step 3, repeat step 2 and step 3 to continue to add the next volume. Finally, perform step 4 and the instrument will sum all the measured volumes.

Note:The operation procedure of subtraction is similar to that of addition, so it will not be explained here.

Save Records

After completing the measurement, the measurement results are automatically saved to the storage media. The maximum memory is 100 units, please refer to Menu Settings to view records.
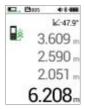
Camera Auxiliary Measuring

In strong sunlight, the laser cannot be identified with the naked eye. The user can measure the distance through the auxiliary measurement function, the operation is as follows:

1. Enter auxiliary measurement: press ✤ key in measurement mode.

2. Measurement distance: Aim the center circle of the screen at the measurement target and make a single measurement. The measurement results are displayed at the bottom of the screen.

3. Zoom: Press ▦ key to switch 1X/2X/4X. There are three zoom modes.

4. Exit auxiliary measurement: press ⬡ or ▦ key to exit. If there is measurement data, press ▦ key several times until the data is cleared and exit.

5. Press ▦ key and the measured data will be displayed on the

- Battery level
- Zoom ratio
- Target auxiliary location
- Measurement data

Automatic Screen Rotation and Locking

Horizontal display   Vertical display

- Automatic screen rotation: The instrument can automatically rotate the screen content according to the current direction. It supports 360° rotation and displays in 4 directions.

- Screen locking: Long press ▦ key to lock/unlock the current screen orientation. When locked, the 🔒 icon is displayed.

  Note: Electronic level bubble mode, azimuth mode and Camera Area mode do not support screen rotation.
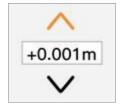
Menu Settings

Menu operation

1. Short press ▦ key to enter the menu.
2. Short press ▣ ▣ key to select options;
3. Short press ▣ key to enter the option setting;
4, Short press ▣ key to return to measurement interface;

- Option setting operation

1. Short press ▣ ▣ key to select different setting parameters;
2. Press ▣ key to confirm the current parameter;
3. Press ▦ key to return to the menu;

- Menu option

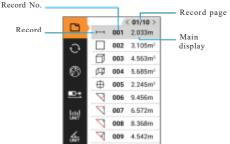| No.	Option	Parameter
1. Reference point	▣◄	▣◄ Front benchmark ▣◄ Middle benchmark ▣◄ Rear benchmark
2. Length unit	𝗎𝗇𝗂𝗍	0.000m, 0.00m, 0.00ft, 0.0in, 1/32in, 0′ 00″
3. Angle unit	UNIT	° : Angle unit % : Slope unit
4. Sound	🔊	Sound on Sound off
5. Delay	🕒	2s、5s、10s、30s、OFF（turn off delay function）
6. Backlight time	☼	10s、30s、60s、ON（turn on backlight）
7. Laser-on time	ＯＦＦ	20s、60s、120s
8. Shutdown time	⏻	auto-off in 2 minutes auto-off in 5 minutes No auto-off

10. Self-calibration ◯

The self-calibration function is mainly used to correct data. When the deviation occurs when the user measures the distance, the function can be used to correct the distance, the correction range: -0.009~0.009m. For example, if the user thinks that the value is larger by 2mm,the value can be adjusted to -0.002m to compensate 2mm; On the contrary, if it is 2mm smaller, it is adjusted to 0.002m. The operation is as follows:

Enter the self-calibration, short press ⬆️⬇️ to modify the self-calibration value, short press 🟢 to save the modified value and return to the menu option.

11. Viewing records 🗂️

Record No.

Record page

Record

Main display

The operation is as follows:

Short press ⬆️⬇️ key to select the record;
Short press Fun Back key to turn the page back and forth;
Short press 🟢 key to view the record;
Short press ⬛ key to return to menu option;
Short press ⬛ key to enter the delete state;

Delete state is as follows：

Three options:
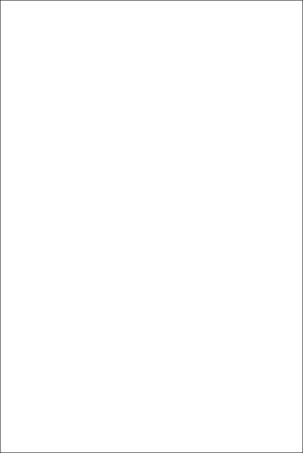1) Delete a single record
2) Delete all records
3) Back to view records

The operation is as follows:

Short press ▲ ▼ key to select the operation; Short press ■ key to perform the operation; Short press ▦ to return to menu option;

12. Factory reset

The operation is as follows:

Short press ⬆️⬇️ key to select the operation;

Short press the 🔋 key to perform the operation. If Yes is selected,the instrument will be restored to factory settings. If No is selected, the system returns;
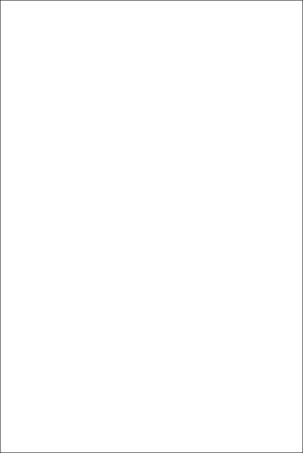
Short press 📟 to return to the menu option;

13. Language settings 🌐

The operation is as follows:

Short press ⬆️⬇️ key to select the operation;

Short press the 🔋 key confirm your Language; Short press 📟 to return to the menu option;

USB Connection Function

- The instrument provides USB computer connection function, and the WINDOWS software LDM Studio is provided in the official website software package, which is convenient for the measurement function of the instrument controlled by the computer. The stored records of the instrument can be downloaded, and can be printed and exported to EXCEL data sheets. Download the software from the official website: www.elma.instruments.com

- The instrument provides open USB HID communication function for users to develop the instrument for the second time. For the complete protocol, see the documentation in the package: USB-HID Command List EN vr.docx.

Installation and use steps:

1) This software does not need to be installed. Open the LDMStudio folder in the package and double-click the LDMStudio.exe file to run the software.

2) After running the software, connect the instrument to the computer with a USB cable. If the connection is successful, "Connection OK" is displayed at the lower left end of the page.

3) Click ![button] or ![button] button to control instrument measurement data or clear data;

4) If records are stored in the instrument, click ![button] to export the records in the instrument. After exporting records, user can click ![button] button to generate EXCEL documents, or click ![button] to print reports.

Error Message

When ERR × information appears on the instrument,
it indicates that the instrument may not be able to perform correct measurements. The following is a list of possible error messages and solutions.

Error messages	Meaning & Solutions
ERR 1	Reflection signal is too weak, use the reflecting plate
ERR 2	Reflection signal is too strong, test different reflective surfaces
ERR 3	Low battery voltage, charge the battery
ERR 4	Memory error, return to factory for repair
ERR 5	Pythagoras error, remeasure
ERR 6	Out of measuring range
ERR 7	Camera error, return to factory repair
ERR 8	Angle sensor error, return to factory for repair

Technology Specifications:

Range	150m
Precision	±(2mm+d *1/10000)*
Display screen	2.4" IPS color screen
Laser type & class	500-800nm，class II <1mW
Area volume/measurement	√
Wall area measurement	√
Pythagorean measurement	√
Angle& Height measurement	√
Add/Subtract measurement	√
Area&Volume addition/subtraction	√
Min/Max value	√
Delay measurement	√
Self-calibration	√
Camera area measurement	√
Trapezoidal measurement	√
Reference height measurement	√
Roof slope measurement	√
Height tracking measurement	√
Azimuth measurement	√
Staking-out measurement	√
Electronic level bubble	√
Auto screen rotation	√
Angle range	±90°
Angle accuracy	±1°
Back copper nut	1/4"copper nut
Protection grade	IP68
Auto laser off	20s(changeable)
Auto switch off	300s(changeable)
Max storage	100 units

Battery	3.7V 2000mAh lithium battery
Charging Specification	DC5V 1A Type-C
Type-C charging	About 3h
Battery life	5500 times of measures when camera mode is off; 3500 times of measures under camera mode
Storage temperature	-20℃~60℃
Working temperature	0℃~40℃
Storage humidity	20%~80%RH
Dimension	128x60x29.5mm

* "d" indicates the actual distance

** In harsh environment, such as: sunlight is too strong, the ambient temperature fluctuates excessively, the reflection effect of the obiect's surface is weak, the battery is low, then the measurement results will have a large error, so a reflecting plate is needed.

Instrument Maintenance:

- The meter should not be stored in high temperature and strong humidity environment for longtime; if it is not used very often, please place the meter in the potable bag and store it in cool and dry place.

- Please keep the device surface cleaning. Wet soft cloth is applied to clean dust, but erosion liquid is not allowed to use for the meter maintenance. Laser window and focus lens can be maintained according to maintenance procedures for optical device.

Packing List

Please check if the accessories are completed according to the below list.

NO.	Item	Unit	QTY	Note
1	Laser distance meter	pc	1	
2	Portable bag	pc	1	
3	Hand strap	pc	1	
4	Reflector	pc	1	
5	User manual	pc	1	
6	Gift box	pc	1	
7	USB Type-C	pc	1	

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