

Laser Receiver

User Manual

■ March 2024 | Rev. 1.0

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This manual is subject to change without notice.

Revisions:

Version	Date	Description
1.0	2024.03	First release

Read Before Use:



Operate in strict accordance with this user manual.

Improper use may result in damage or performance degradation.

If you have any questions during use, contact the customer service.

Disclaimer:

- The purchased products, services, and features are stipulated by the contract. All or part of the products, services, and features described in this manual may not be within the scope of your purchase or usage. Unless otherwise specified in the contract, all the content in this manual is provided "AS IS" without warranties of any kind, express or implied.
- The content of this manual is subject to change due to product upgrades and other reasons. FJDynamics reserves the right to modify the content of this manual without notice.
- This manual only provides guidance for use of this product. Every effort has been made in the preparation of this manual to ensure accuracy of the content, but no information in this manual constitutes a warranty of any kind, express or implied.

Download FJDynamics App:

Scan the QR code to install the FJDynamics app on your device. Then, start the app, tap **'Add Device'**, connect to LR2, and proceed as prompted to view the data.



Preface

Thank you for purchasing this LR2 Laser Receiver. This product can detect laser beams from most models of rotary laser transmitters on the market. Before using this product, read this manual carefully for the setup, use, and maintenance and the related warnings and cautions. The warnings

describe the dangerous or irregular operations that may lead to minor personal injuries or property losses.

Note

Use this product in accordance with the operation and safety instructions in this manual, and check the product performance on a regular basis. FJDynamics or any of its representative does not assume any responsibility for any consequences of using this product in violation of this manual, including any direct, indirect, and consequential damages and profit losses.

WARNING

1. When using this product with construction or agricultural machinery, comply with all the safety instructions in the user manual of the machinery.
2. When using this product with excavating machinery, comply with all the safety regulations and practices for excavating and ditching operations.
3. Watch out for overhead obstacles and high-voltage wires when this product is mounted on a pole.
4. Do not use damaged power cables, plugs, or sockets as they may damage the product.
5. To protect the lithium battery and avoid fires, use the included charger to charge this product, and disconnect the charger when the charging is complete.
6. Keep this product away from sources of strong radio waves, such as TVs, radios, high-voltage wires, and radio transmission towers. They may interfere with wireless communication and cause misoperation.
7. Ensure that this product is in good condition and works in a proper environment. Do not clean the housing with high-pressure water stream. Though this product is designed with IPX6 water protection, high-pressure water stream and prolonged submersion in water may still damage the internal circuits.
8. Keep this product away from fires and other heat sources to avoid irreversible damage to the housing.

Technical Support

Users are provided with a two-year warranty, starting from the date of purchase. Service charges will be collected for technical support and maintenance services out of the warranty period. Do not disassemble this product, except the mounting plate, without authorization from FJDynamics. Otherwise, FJDynamics shall have the right to terminate the warranty and assume no responsibility for any personal injury or property loss directly or indirectly caused by the unauthorized disassembly.

Contact FJDynamics by any of the following methods:

Tel: 1833-330-6660 (United States)

Tel: 496-931-090-130 (Europe)

Tel: 400-777-6160 (China)

FJDynamics official website: <https://www.fjdynamics.cn>(China)

FJDynamics official website: <https://www.fjdynamics.com>

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1. Overview

1.1 Product Introduction

The FJDynamics LR2 Laser Receiver (LR2) features 360° laser detection within a range (operating radius) of up to 450 m depending on the laser transmitter. It is easy to install and use and provides four elevation accuracy options with the highest one reaching ± 2 mm to meet various requirements. Users can check the elevation via the LED indicators and wireless or wired terminals, making this product a suitable choice for a wide range of applications.

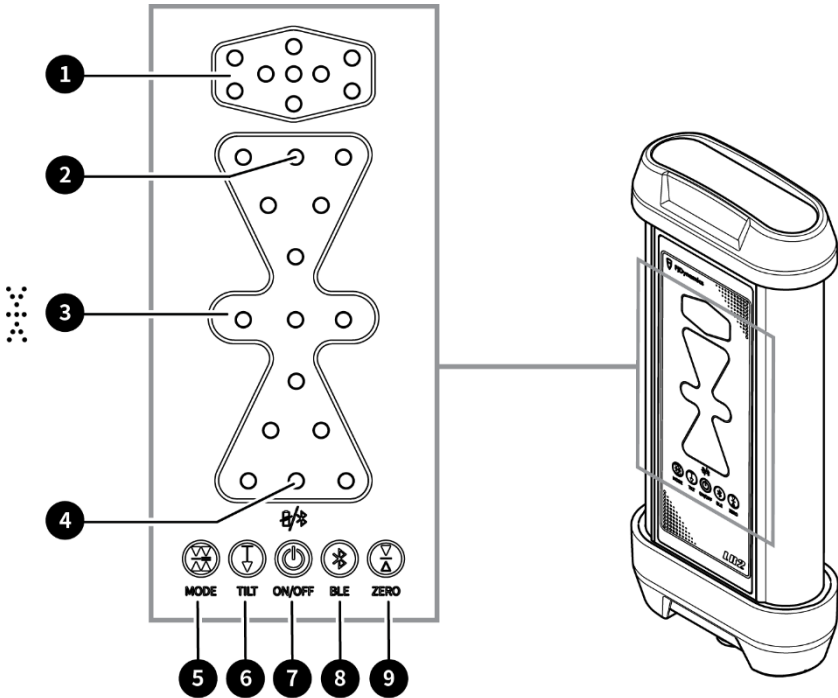
1.2 Specifications

Operating diameter	Up to 900 m (depending on the laser transmitter)
Spectrum range	625 nm to 785 nm
Detection angle	360°
Capture window	220 mm
Elevation accuracy	Mode 1: ± 2 mm Mode 2: ± 4 mm Mode 3: ± 10 mm Mode 4: ± 25 mm
Tilt accuracy	High: $\pm 0.5^\circ$ Normal: $\pm 1^\circ$
Compatibility	Compatible with red-beam rotary laser transmitters of mainstream brands
Wave filtering	Supported
Communication	Bluetooth 5.0 and CAN2.0
Wireless communication range	30 m
Zero point display	LED indicators, app, and controller terminal
Power supply	Internal battery or via power cable
Battery life	Approximately 70 h
Charging time	4 h to 5 h
Auto power-off	With no laser detected for 30 minutes when powered by battery
External power supply	DC 9 V to 30 V
Mounting modes	With magnets With clamps: square pipe 32 mm to 38 mm

	round pipe $\Phi 38$ mm to $\Phi 52$ mm
Dimensions	334 mm×147 mm×72 mm
Housing materials	Engineering plastics and aluminum alloy
Weight	Approximately 1.5 kg
Charging temperature	0°C to 40°C
Storage temperature	-35°C to 70°C
Operating temperature	-20°C to 55°C (powered by battery) -30°C to 65°C (powered via cable)
IP rating	IP66

1.3 Indicators and Buttons

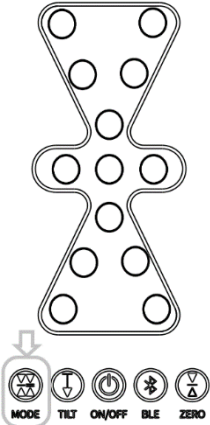
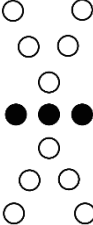
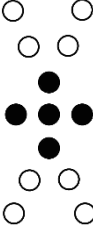
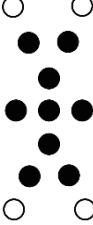
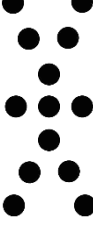
- Panel



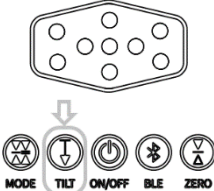
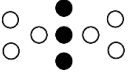
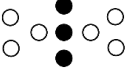
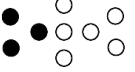
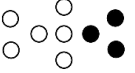
1	Tilt indicator	6	Tilt button
2	Charging indicator	7	Power button
3	Elevation indicator	8	Bluetooth button

4	Low-battery/Bluetooth indicator	9	Zero point button
5	Mode button		

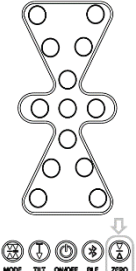
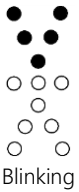
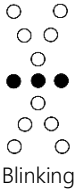
• Mode button and indicator patterns

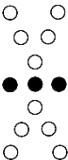
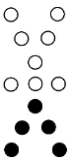
Button	Mode	Indicator Pattern	Accuracy
 <p>Press this button to switch to the next mode. The default accuracy is ± 2 mm.</p>	1	 <p>Blinking 3 times</p>	± 2 mm
	2	 <p>Blinking 3 times</p>	± 4 mm
	3	 <p>Blinking 3 times</p>	± 10 mm
	4	 <p>Blinking 3 times</p>	± 25 mm

• Tilt button and indicator patterns

Button	Accuracy Pattern	Accuracy
 <p>The product can detect left and right tilts with an accuracy of $\pm 0.5^\circ$ or $\pm 1^\circ$ (default).</p> <ul style="list-style-type: none">• Press the button to start tilt detection with an accuracy of $\pm 1^\circ$, and press it again to exit detection.• Press and hold the button until the accuracy pattern on the right is displayed, when the tilt accuracy is set to $\pm 0.5^\circ$. Release the button to start tilt detection.• Press the button again to exit tilt detection. The tilt accuracy changes back to $\pm 1^\circ$.	 <p>Blinking 3 times</p>	$\pm 0.5^\circ$
	Tilt Pattern	Tilt
	 <p>Blinking</p>	Vertical
	 <p>Blinking</p>	Left tilt
	 <p>Blinking</p>	Right tilt

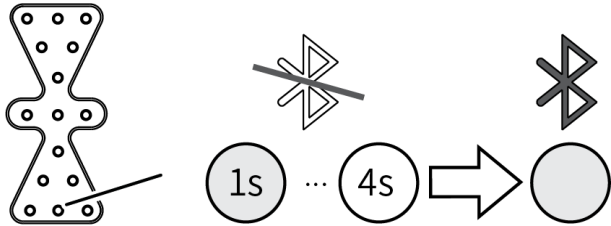
• Zero point button and indicator patterns

Button	Pattern	Laser Strike Position
 <ul style="list-style-type: none">• If the laser strike position is not the default center, press this button to set the current laser strike position as the zero point.• Press and hold this button for 3s to set the default	 <p>Blinking</p>	Above the zero point
	 <p>Blinking</p>	On the zero point

<p>center as the zero point.</p> <ul style="list-style-type: none"> When a non-center point is set as the zero point, the pattern below is displayed.  <ul style="list-style-type: none"> After the zero point is set, the patterns on the right are displayed, depending on the laser strike position. 	 <p>Blinking</p>	<p>Below the zero point</p>
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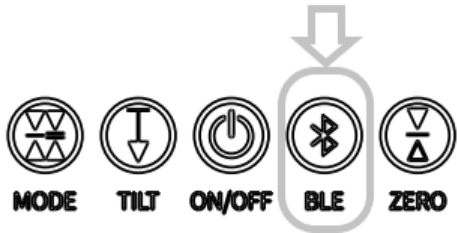
• **Bluetooth indicator**

Bluetooth is turned on by default when you turn on the device. When the Bluetooth connection is not established, the Bluetooth indicator is on for 1s and then off for 4s; when the Bluetooth connection is established, the Bluetooth indicator remains lit.



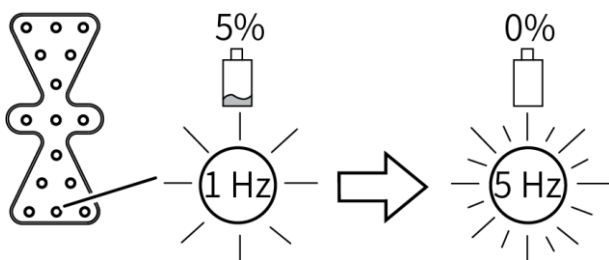
• **Bluetooth button**

Press the Bluetooth button to turn on or off Bluetooth.



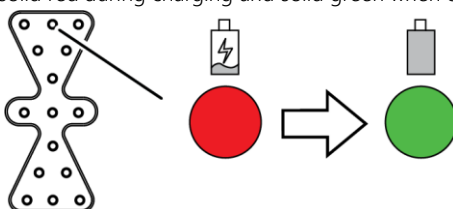
• **Low-battery indicator**

The low-battery indicator blinks slowly when the battery level drops to 5%. When the battery level is 0%, the indicator blinks fast, and the device automatically turns off in 10s. Charge the device as soon as possible when the battery is low.

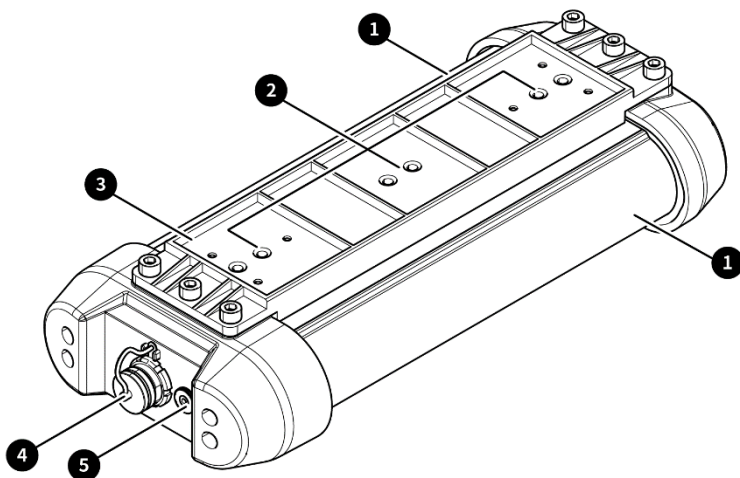


- **Charging indicator**

The charging indicator is solid red during charging and solid green when charging is complete.

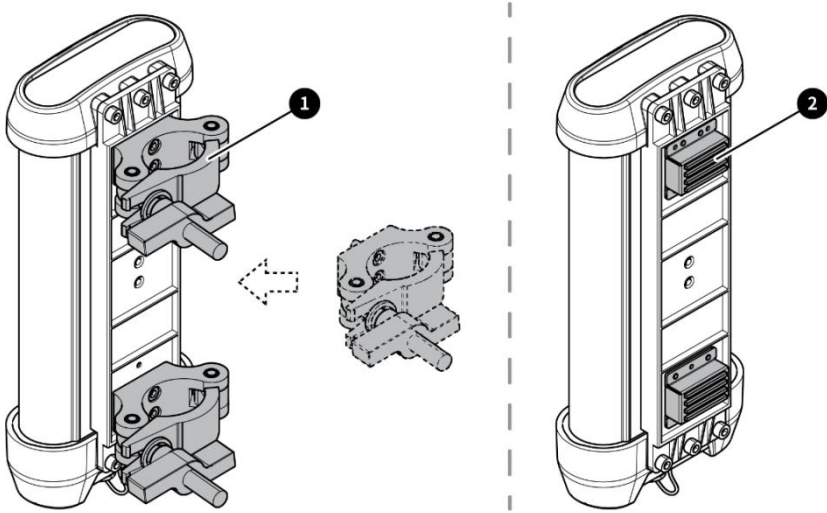


- **Product structure**



1	Transparent cover	4	Aviation connector port
2	Clamp/magnet fixing holes	5	Charging port
3	Mounting plate		

2. Mounting



❶ Using clamps

Fix two clamps to the upper and lower holes on the mounting plate and mount the receiver to a square or round pipe. Determine whether to fix a clamp to the middle holes based on the site requirements.

❷ Using magnets (optional)

Fix two magnets to the upper and lower holes on the mounting plate and attach the receiver to an iron object. Purchase the magnets if needed.

3. Operation

1. Position a rotary laser transmitter and turn it on.
2. Raise or lower the machine blade or arm to position the cutting edge or bucket at the desired grade elevation.
3. Mount the LR2 onto the mast near the path of the laser beam and turn on the LR2.
4. Keep the machine blade or arm motionless, raise or lower the LR2, and adjust until the zero point indicators blink.
5. Securely clamp the LR2 in place. The zero point is set.
6. While operating, use the LED display to continually check the grade, moving the blade or cut/fill

according to the direction of the LR2 display.

4. Maintenance

1. Keep the receiver housing dry and clean.
2. Keep the bottom of the magnets clean and free of debris.

5. Waste Disposal

This product contains metal materials and electronic components. Wastes of it must be disposed of in an environmentally safe way according to local laws and regulations. Any wastes, such as packaging materials, metal parts, and electronic components, must be delivered to local recycling facilities for disposal.

6. Warning message

- **CE Warning :**

When charging, please place the device in an environment that has a normal room temperature and good ventilation. It is recommended to charge the device in an environment with a temperature that ranges from 0°C~40°C. Please ensure to use only the charger offered by the manufacturer. Using unauthorized charger may cause danger and violate the authorization of the device and the guarantee article. The adapter shall be installed near the equipment and shall be easily accessible.

Warning:- replacement of a battery with an incorrect type that can defeat a safeguard;

- disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion;
- leaving a battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas; and
- a battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas.

RF exposure information: The Maximum Permissible Exposure (MPE) level has been calculated based

on a distance of $d=20$ cm between the device and the human body. To maintain compliance with RF exposure requirement, use product that maintain a 20cm distance between the device and human body.

This product can be used across EU member states.

EU Regulatory Conformance

Hereby, FJ Dynamics Co.,Ltd. declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU .

- **FCC Warning :**

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user's authority to operate the equipment.

When using the product, maintain a distance of 20cm from the body to ensure compliance with RF exposure requirements.

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

- **Equipment Under Test (EUT) Description**

Product Name:	Laser Receiver
Maximum EIRP:	-2.13 dBm
Hardware Version:	V3.0
Software Version:	V1.2.0.4
Frequency Range:	Bluetooth: 2402 MHz ~ 2480 MHz
Antenna information:	PCB Antenna, 1.5 dBi
Bluetooth Version:	5.0
Modulation Type:	GFSK
Note:	BLE only support 1M

EU Declaration of Conformity

Number

Laser Receiver_LR2_of Doc

Name and address of the Manufacturer

FJ Dynamics Co. Ltd.
Floor 21, Das Tower, Yuehai Subdistrict, Nanshan District, Shenzhen, China

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration

LR2 is a Laser Receiver which incorporate Bluetooth technologies

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation
Directive RED: 2014/53/EU

and other Union harmonization legislation where applicable:

Directive RoHS: 2011/65/EU

Directive WEEE: 2012/19/EU

References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared.

EN IEC 62368-1:2020+A11:2020; EN 50663:2017;
ETSI EN 301 489-1 V2.2.3; ETSI EN 300 328 V2.2.2;
ETSI EN 301 489-17 V3.2.4;

The Notified Body	Performed
Name: Phoenix Testlab Number: 0700	Applicable Modules: B+C



And issued the EU-type examination certificate

Certificate number:

This product can be used across EU member states.

Description of accessories and components, including software, which allow the radio equipment to operate as intended and covered by the DoC

Hardware version	V3.0
Software version	V1.2.0.4
Antenna	WLAN/BT: PCB Antenna
Battery	N18650CP 3.6V/3350mAh (ZhengZhou BAK Battery Co., Ltd.)
Adapter	XSD-0503000DEXD Input: 100-240V, 50/60Hz, 0.5A Output: 5.0V/3A SHENZHEN SUNSHINE TECHNOLOGICAL CO., LTD

Please note: In order to fix bugs or further enhance functionalities of your device, could release software updates after the launch of the product.

All software versions launched, are verified and compliant with EU regulations. All RF parameters (e.g. frequency range, output power) are not accessible to the end user, and thus cannot be changed or altered.

Signed for and on behalf of:

Shenzhen 2024/07/31

Place and date of issue

Jeth Liao

Name, Function, signature