Electronic Auto-level Rotating Laser (RL400)

Congratulations on your choice of this DaveBell electronic auto-level rotating laser. For the purpose of long-term use of this instrument, we suggest you to read this instruction manual carefully before using it.

Contents

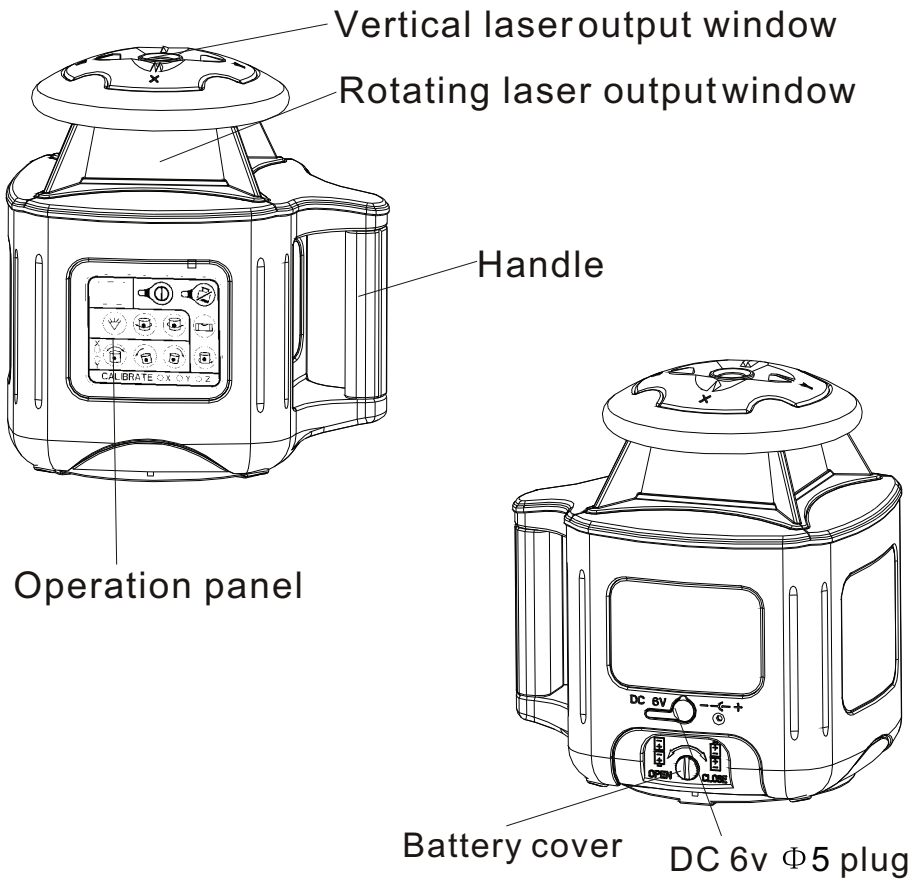
1. Features

- Output the laser-new function, It extends the usage and survey range.
- Large electronic auto-level range. When beyond the range, laser blinks, and terminate rotation to ensure the measurement.
- “Vertical”&”horizontal” two working modes,respectively able to project one laser horizontal plane and one plumb line, and one plumb plane and one horizontal line.
- Able to adjust the laser rotating scan speed
- Scan function to adjust the scan angle and scan direction
- Slope operation function facilitates user to perform the slope scan at different inclinations.
- Calibration function
- Rainproof, dustproof and shockproof
- Timing auto-off function
- Optional detector and remote control will bring more convenient operations.
- Various accessories of elaborate design would expand instrument’s application range.

2. Laser Safety

- Laser output mark is attached beside the output aperture
- Do not look straight at the laser beam.
- Do not disassemble the instrument or attempt to perform any internal servicing. Repairs and servicing are to be performed only by authorized service centers.
- This instrument complies with the safety classification standards of laser radiation.

3. Nomenclature



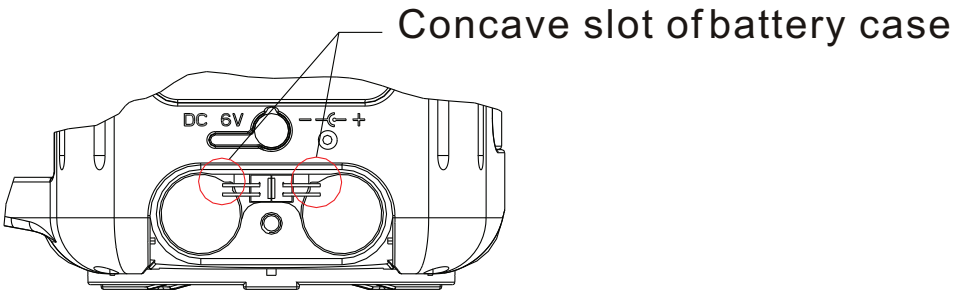
4. Operation Instruction

Battery:

LS521II is equipped with one battery case for both Ni-MH pile.

1.Ni-MH pile:

- Using coin to unscrew the battery cover to open it. As fig. respectively insert the two rechargeable batteries into the battery case (note: inserting the battery pack, the convex lead-line of the battery pack matches with the concave slot in the battery case.) and insert the lead-line into the jack beside the battery pack. Finally screw the battery case using coin. Turn on, the unit works normally.



• By using the special adapter, charge the pack though external outlet jack. Now the charging indicator lamp displays red, and after 5 hours or so, lamp will become green, which means the Ni-MH pile has been fully charged.

Note : (1) We suggest you charge the pack for two more hours after completely charged to ensure its capacity.

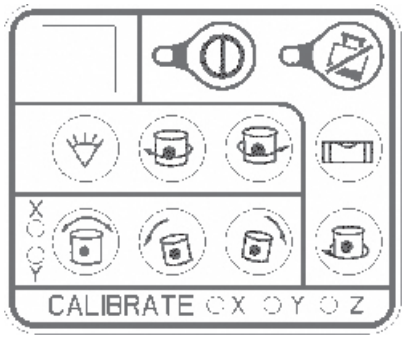
(2) Suggest firstly charging the new battery for twelve hours.

(3) The unit can still work, when charged with adapter.

2.C Alkaline battery

Take out the special Ni-MH pack, put in 4 C alkaline battery according to the illustrated polarity direction. Finally screw the battery cover using a coin. Press the ON key, the unit works normally. There is no charging indicator lamp, although connected with the adapter. (If the battery case is filled with normal C batteries, the external adapter do not charge for them.)

Unit and Remote Control Operating Panel

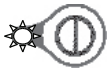


Instrument Operating panel

Remote Control panel

1.Power On/Off

A. Press the button  to power on, and now the power indicator lamp is lightened. See fig. Then the instrument will be automatically levelled. 

Note: When low voltage, the power indicator lamp blinks.(See fig.) 

Please replace the battery as soon.

B. Press the button  to power off.

2.Speed adjustment

After automatically levelled, the unit rotates with high speed. Press button to change the rotating speed.

High speed → low speed

Note: this button is useless when the unit is automatically levelled.

3.Scan mode

Press the following button to use the scan mode:

① Scan status

Press the button , the unit is changed into scan status from rotating. The first status is large scan angle.

②Adjusting the scan angle

Press the button to adjust the scan angle. The alternant order is following :

Large scan angle → small scan angle → point

③Adjusting the scan range

Press the button , the scan area moves counter-clockwise .

Press the button , the scan area moves clockwise

④Exit from the scan status

Press the button exit from the scan status,

and enter into continuous rotating status.

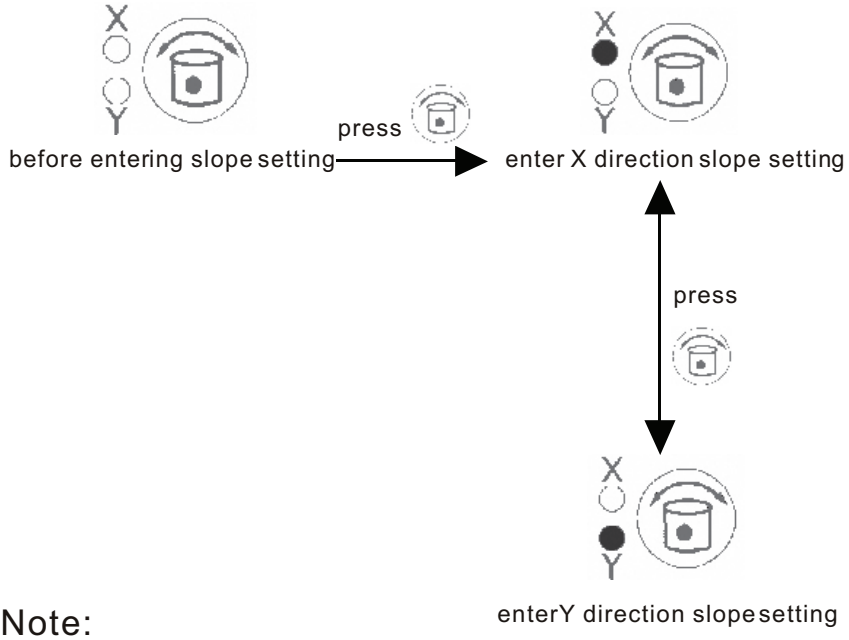
Note: these three buttons are useless when the unit is automatically levelled.

4.Slope Adjusting Function

Press the following button to use the slope adjusting function:

①Press the button , enter into the slope setting status, select X/Y direction slope. See the following fig.:

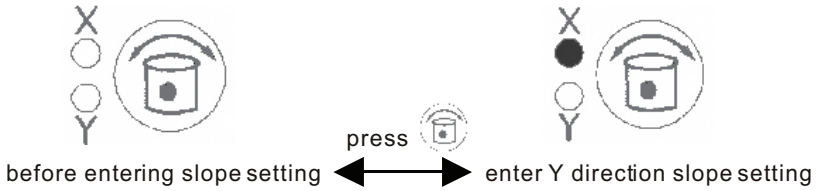
1) Locate the unit horizontally:



Note:

1. When the unit is automatically levelled, press button , and the unit will be back to primary working status (rotating or scan);
2. When the unit is in safety mode, press this button to exit from the safety mode and enter into the slope setting mode. The inclined unit does not change the current status.

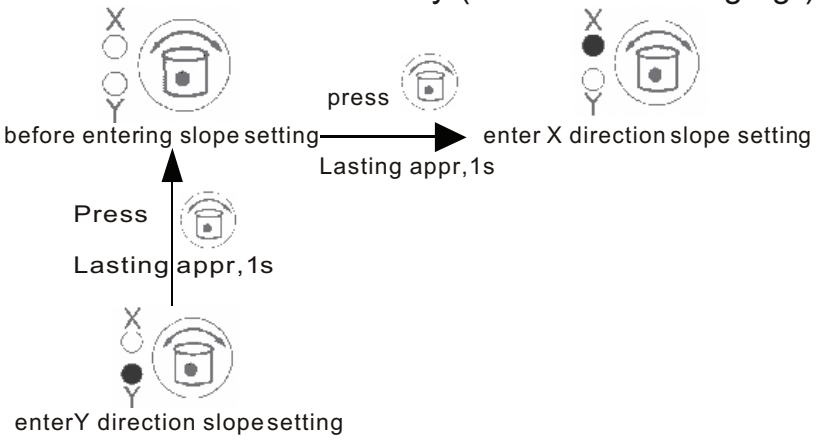
2) Located the unit vertically:



Note:

1. The unit in X direction slope adjusting function is valid, and Z direction automatically levelled.
2. When the unit is working in vertical direction, entering into slope adjusting function, the unit can not enter into rotating or scan status immediately. It will enter into rotating or scan status after the unit have been levelled in Z direction.

② Exit from the slope setting status when the unit located horizontally (see the following fig.)



③ adjusting the slope angle

Make the operating panel face to yourself:

Press button ,the laser point above the unit moves forward. Single pressing for mini adjusting, and continuous pressing for fast adjusting.

Press button ,the laser point above the unit moves backward. Single pressing for mini adjusting, and continuous pressing for fast adjusting.


X slope adjusting

Press button ,the laser point above the unit moves to left. Single pressing for mini adjusting, and continuous pressing for fast adjusting.

Press button ,the laser point above the unit moves to right. Single pressing for mini adjusting, and continuous pressing for fast adjusting.


Y slope adjusting

Note:

1. The max. adjusting angle is 5 degree.
2. During the slope adjusting status, if the unit is changed from vertical to horizontal or from horizontal to vertical, it will enter into auto-level status instead of slope adjusting status.

5.Safety Mode (TILT)

① After power on, the unit enters into auto-level status. Press button  ,the indicator lamp is lightened(see fig.).
The unit enters into safety mode. 
When the unit is in safety mode, if the unit is inclined by collision or strike, the rotating head will stop rotating and both the laser and indicator lamp blinks (see fig.), and the unit does not auto-level. You must press button  ,then the unit will re-level automatically, entering into primary working status. 

② Press button  to exit from the safety mode, the unit enters into auto-level mode.

6.Alarm If Beyond Range

If the instrument is more tilted than auto-level range of 5 degree, the laser blinking, frequency becomes slow and an alarm is delivered as reminder. Now please re-position the instrument.

7. Timing Auto-off function

After power on, press button  .
The unit will be in the sleep status. The unit is unawakened for lasting 30 minutes, the unit will be auto-off. During the sleep status, awake the unit by remote control.

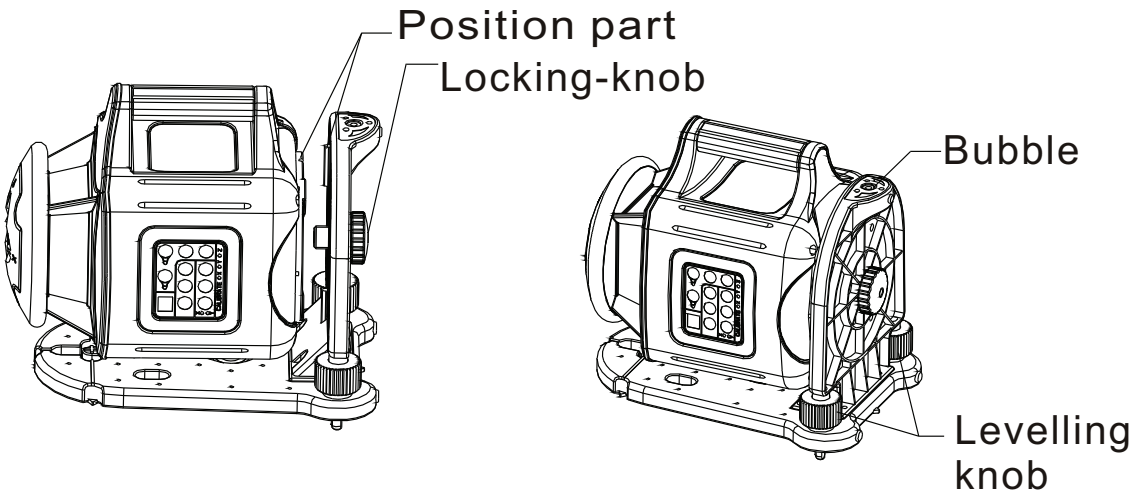
5. Application Methods

Using of Bracket Accessory

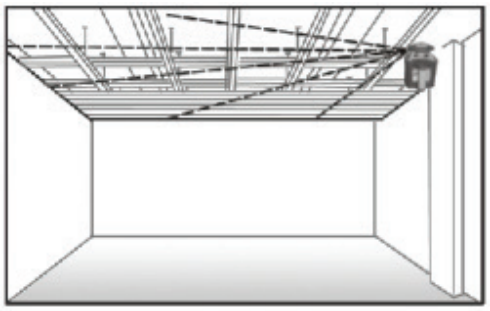
Needing to use the laser vertical scan, the unit can be connected with the bracket to be used horizontally (see Fig.).

1. Face the bottom gap to the bracket convex part, then switch the locking-knob to screw the bracket onto the unit. Screw it to fix the unit on the bracket.
2. Make the bracket bubble centering through the two leveling knobs of the rotary bracket.

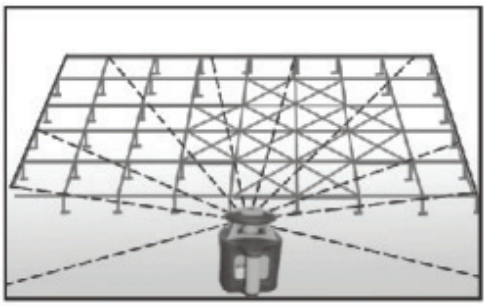
3. Power with the battery or the special adaptor.
Turning on the unit, it works normally.



6. Application Demonstration

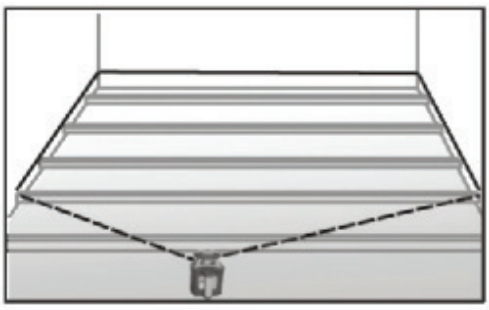


Reference for ceiling installation



Reference for frame installation

Reference for guardrail installation



Reference for flooring

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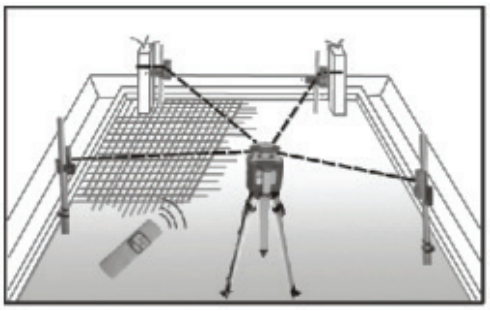
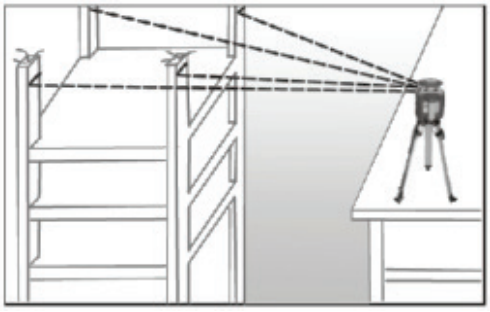
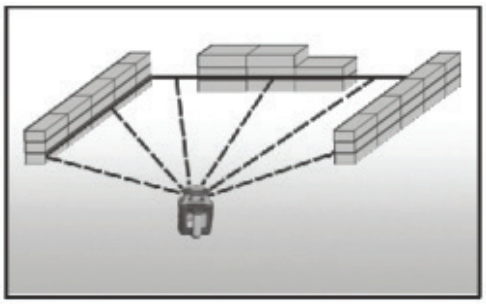


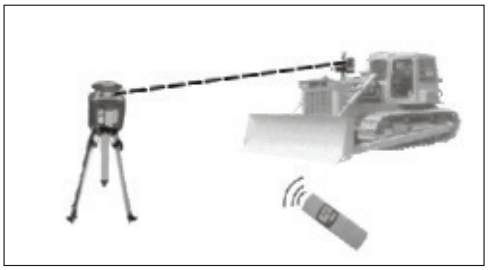
Reference for square leveling



Reference for floorslab installation



Reference for construction



Reference for land leveling

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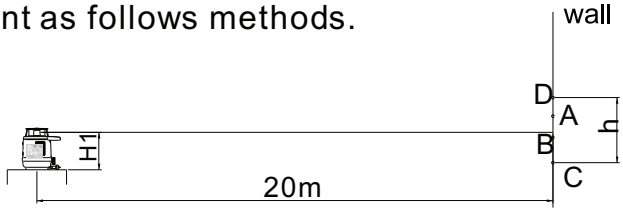
7. Self-check and Calibration

Accuracy Self-check

After using the unit for a period of time or before take it to finish a large subject, the user needs to self-check for the instrument. If the unit accuracy error exceed, the user needs to self-check for the instrument as follows methods.



1. Set up the instrument on a table 20m far away from an indoor wall, and let X axis face against the wall;
2. Press power switch, after the unit auto-level, press button make the unit in scan status. Press button to ensure the output laser clear to be visible;
3. Press button , let the laser beam moves though the X direction and irradiate on the wall and then make a mark A at the laser beam projected;
4. Rotate the instrument by 90° in turn, and mark B, C, D respectively on the wall (B,C,D should be on one line with A);
5. Measure the distance h between the highest and the lowest point among A, B, C, D;
6. If h≤4mm，the accuracy is qualified;

If 4≤h≤10mm, users can make accuracy calibration by yourselves;

If h≥10mm, please contact authorized servicing centers or dealers for repair.

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Accuracy Calibration

With reference to the above step 4 of Accuracy Self-check, select h/2 position as datum line.

①.Enter into self-calibration

In power-off status, press the button and on the instrument, and then release the button while still hold the press of for 10 seconds or so. After the self-calibration indicator lamps of X and Y direction blink three times at the same time, release , and the instrument enters self-calibration mode. *Remote control is an necessity during self-calibration.* Open the down cover of the remote control, you can see the operation panel for calibration.

A. X-direction Self-calibration

②.Select self-calibration direction:

Firstly make X-direction of the instrument face against datum line, and then press button once to select self-calibration for X-direction. Now the X-direction indicator lamp, in the the unit panel "CALIBRATOR" range, is lightened (see following fig.), and rotating head begins to rotate.

Unit panel "CALIBRATOR" range

③Calibrate the laser beam:

Press the two arrows in the remote control, let the laser beam superpose the datum line.

④Confirm the value: Press button the remote control for confirmation. Then the indicator lamp of X direction will go out as follow fig.

Unit panel “CALIBRATOR” range

Note: After calibration, power off and power on again, the calibration will take effect finally.

B. Y-direction Self-calibration

②.Select self-calibration direction:
Firstly make Y-direction of the instrument face against datum line, and then press X/Y button two time to select self-calibration for Y-direction. Now the Y-direction indicator lamp, in the the unit panel “CALIBRATOR” range, is lightened (see following fig.), and rotating head begins to rotate.

Unit panel “CALIBRATOR” range

③Calibrate the laser beam:
Press the two arrows △ ▽ in the remote control, let the laser beam superpose the datum line.

④Confirm the value: Press button ENT on the remote control for confirmation. Then the indicator lamp of Y direction will go out as follow fig.

Unit panel “CALIBRATOR” range

Note:

1. After calibration, power off and power on again, the calibration will take effect finally.
2. After X-direction self- calibration, Y axis accuracy must be check; after Y-direction self-caliration, X axis accuracy must be checked, until all of the X and Y axis accuracy complies with the request.

C. Z-direction Self-check & Self-calibration

A. Z-direction Self-check

1.According to <1> the accuracy checking fig. Locating the instrument rotates horizontally lin the table, measure H1 between the laser beam and table;

2.The instrument rotates vertically located on the table, make the Z axis faces against the wall.

3 Power on, let the unit emit point laser irradiates to the wall, make mark E;

4.When the instrument located on the table rotates vertically, measure H2 between the laser beam and table. Count value H(H=H1-H2+h/2), make out O' in the position of H down the highest mark in A, B, C, D. It is the datum mark in the vertically rotating position;

5.Measure h' between E and O';

If h' ≤6mm, the accuracy is qualified;

If 6≤h' ≤10mm, users can make accuracy calibration by themselves;

If h' ≥10mm, please contact authorized servicing centers or dealers for repair.

B. Z-direction Self-calibration

According to the same step used in the X and Y direction self-calibration

a. Press button X/Y in the remote control to select self-calibration for Z-direction. Now the Z-direction indicator lamp, in the unit panel "CALIBRATOR" range, is lightened (see following fig.)

Unit panel "CALIBRATOR" range

b. Press the two arrows △ ▽, let the laser point move up and down until superpose the datum mark O' or in one with the datum mark O' .

c. Press button ENT confirmation. Then the indicator lamp of Z direction will go out as follow fig. Z-direction self-calibration is end.

Unit panel "CALIBRATOR" range

Note: After X, Y or Z self-calibration, power off and then power on again, the calibration will take effect finally.

8.Technical Specifications

- Laser Wavelength: 635nm
- Laser Classification: Class 2/Class 3
- Accuracy: horizontal: 1mm/10m vertical: 1.5mm/10m
- Self-leveling Range: 5
- Measuring Range: (1) 30m Indoor scan (radius) (2) 200m Detector
- Scan speed: High-speed: 500 50rpm
- Slow-speed: 120 50rpm
- Scan range: Large scan, Small scan, point
- Power: 4XC alkaline batteries or 4.8V Ni-MH pile or 6V special adaptor
- Size: 188 150 207mm
- Weight: 2Kg (without battery)
- Working Temperature: 0 +40^{0}c

9.Packing List

NO.	Description	Qty
1	LS521Ⅱ（with bracket）	1
2	LS715（with bracket）	1
3	LS312 RC	1
4	LS306 glass	1
5	LS307 target	1
6	LS310-2 (US) adaptor	1
7	Case	1
8	Instruction manual	1
Q.C. Date:_____/_____/___		

10. Maintenance

- The instrument should be carefully operated and properly preserved, and any violent shock or falling will possibly result in the damage of instrument.
- Do not attempt to disassemble the instrument, and the unprofessional disassembly will result in the damage of instrument.
- Keep the cleanness of instrument, especially the laser output window, and remove dust by the gentle operation of soft clean cloth.
- Take the batteries out when the instrument is not in use for a long time, and keep the instrument in the carrying case when it is unused.