Self-leveling Rotary Laser FRE-211

Operating Manual

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SAFETY PRECAUTIONS:

- During instrument operation, be careful not to expose your eyes to the emitting laser beam. Exposure to a laser beam for a long time may be hazardous. This is a class 2 laser product.
- Do not try to dismantle the instrument. Have it repaired by your Dealer or Supplier. Dismantling it to repair yourself, voids the Warranty.
- When attaching the instrument to a tripod, make sure it is securely fixed to the top plate and ensure the tripod leg clamps are securely fastened. If not securely fastened, damage may occur to the laser instrument or tripod.
- When setting-up the tripod, beware of the tripod feet which are very sharp. (These sharp points allow the tripod to be securely positioned on the ground.)
- Take care to operate this laser product at a height to avoid the eye level of vehicle drivers or pedestrians. Do not use the laser in the vicinity of highly reflective materials such as mirrors etc.
- At the end of the life of this instrument, remove the batteries, and dispose of responsibly in compliance with local regulations.

OPERATING ADVICE:

- The instrument should not be store or used in extreme temperatures nor used in conditions subject to rapid changes of temperature. The instrument may not function properly if used outside its stated temperature range.

- Store the instrument & accessories dry inside the carrying case and keep the case in a dry area not subject to vibration, dust or high levels of moisture.

- When storage and usage temperatures are widely different, leave the instrument in its case until it adjusts to the surrounding temperature.

- The instrument should be transported or carried carefully to avoid impact or vibration.

- The instrument should be stored in the carrying case and packed with cushioning material. Always handle the item carefully.

- Be sure to observe the advice & instructions in the Manual for proper use of the instrument.

1. Functions

This instrument is equipped with a semiconductor diode with a wavelength of 635nm, which gives the laser beam, excellent visibility. The laser's prism head rotates through 360 degrees to form a laser-scanning surface. The laser instrument can be mounted & used, as illustrated below:

Upright-setting

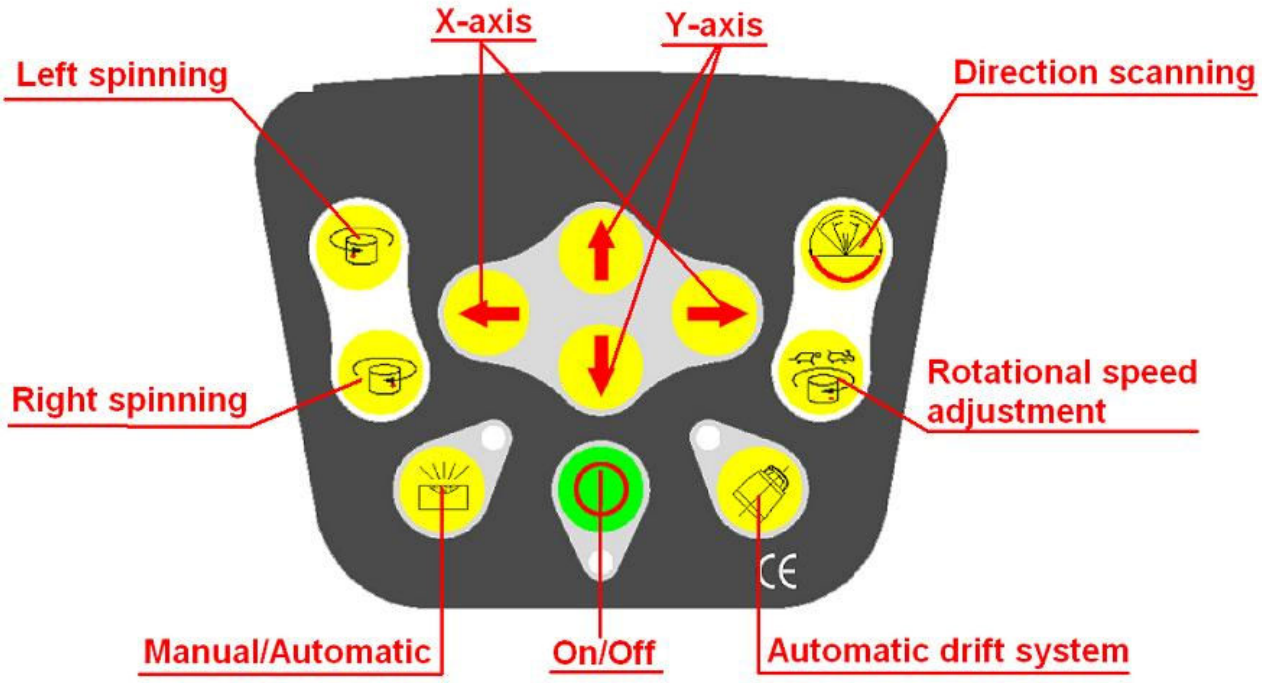
Horizontal-setting

When the instrument is set upright, it will emit a laser-beam to form a horizontal scanning surface and a plumb line automatically. When set horizontally, it will form a plumb scanning surface and a vertical line.

2. Introduction

2.1 Main body

2.2 Control Panel



2.3 Control Panel keys:

(1) On/Off: Switches the instrument power ON & OFF.
(2) Power indicator: When lit, the instrument is powering up. Otherwise it is switching off.
(3) Mode indicator: When lit, the instrument is leveling manually. When it flashes, it is in alarm condition. ie. the slope of the instrument is "out-of-range".
(4) Automatic drift system: Warns the User of a misaligned device.
(5) Automatic drift system indicator: When the light is flashing slowly, it is in Automatic drift system mode. When the light is flashing quickly, the laser level will not level .
(6) Speed adjustment: (rotating speed): 0 – 60 – 120 – 300 - 600 r.p.m selectable.
(7) Directional Scanning: Angle of scanning in 5 modes: 0 - 10 - 45 - 90 - 180°
(8) Manual/Automatic indication: Controls the mode of leveling.
(9) Left-spinning: Makes the laser module step-move counter-clockwise, when the laser module is power off or it is scanning directionally.
(10) Right-spinning: Makes the laser module step-move clockwise, when the laser module is power off or it is scanning directionally.
(11) X-axis: Adjusts the slope of the X-axis, when the instrument is in its Manual mode.
(12) Y-axis: Adjusts the slope of the Y-axis, when the instrument is in Manual mode.

3. Directions:

3.1 Battery Installation

4x type C sized Ni-MH rechargeable batteries can be used in this laser instrument.
Please fit the battery type which is supplied by the manufacturer.
Insert the battery pack into the fixed place at the bottom of laser. Then tighten 4 screws.

3.2 Instrument Positioning

3.2.1 Horizontal scanning

Place the instrument on a tripod, stable flat surface or fix it to a wall. Try to keep the mounting surface within the range -5 to +5°so the instrument can self-level.

3.2.2 Vertical scanning

Place the instrument on a flat surface and try to keep the mounting surface within the range from -5°to +5°so the instrument can self-level.

3.3 Operations

3.3.1 Power

Press the On/Off button to operate automatic leveling and the power indicator lights.

When Power indicator lights, it also will show when the voltage of the batteries is low. Then the rechargeable batteries need to be re-charged.

Press the ON/OFF button again to switch off the instrument. (Power indicator goes out.)

3.3.2 Leveling

Press the ON/OFF button to activate the automatic leveling function. Firstly the laser beam flashes as it tries to find true level. Then when auto-leveled, the laser beam will rotate at a fixed speed of 600 r.p.m.

If the instrument is placed unevenly, or the base of the instrument exceeds the range of ±5°, the mode indicator and the laser beam will both flash together. Re-position the instrument to enable it to find level & operate correctly again.

3.3.3 Spinning

(1) Continuous Spinning

Press the "Rotational speed adjustment" button to control the spinning speed of the laser module. If the button is pressed repeatedly, the spinning speed of the laser module

will continuously change as follows: 0-60-120-300-600-0 r.p.m.

(2) Scanning mode

Set the rotating speed to zero r.p.m, & the laser module will stop spinning. Press the button "Right-spinning", the laser module will step-move clockwise. Then if you press the button "Left-spinning", it will step-move counter-clockwise.

3.3.4 Directional scanning

(1) Set the rotating speed to Zero r.p.m, & the laser module will stop spinning. Press the butto "Directional scanning"; the laser module will scan directionally. If you press the button repeatedly, the scan angle of the laser module will continuously change, through the following sequence: 0°-10-°45°-90-°180°-0°.

(2) Press the button "Left-spinning" or "Right-spinning" to change the direction of scanning.

3.3.5 Slope Adjustment (Grade setting)

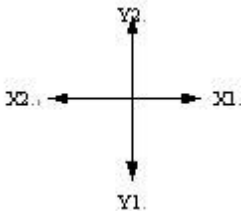
When the instrument is positioned upright to set horizontal levelling, the slope of both the

X-axis and Y-axis can be manually adjusted to set a grade/slope.

Press the button “Manual/Automatic”, the green indicator illuminates & the instrument is now in its Manual setting mode.

(1) Slope of X-axis

a. Aim the X1-beam to the direction of the slope required, then adjust as required.



b. Press button ⇦ or ⇨ to move the laser beam up or down.

(2) Slope of Y-axis

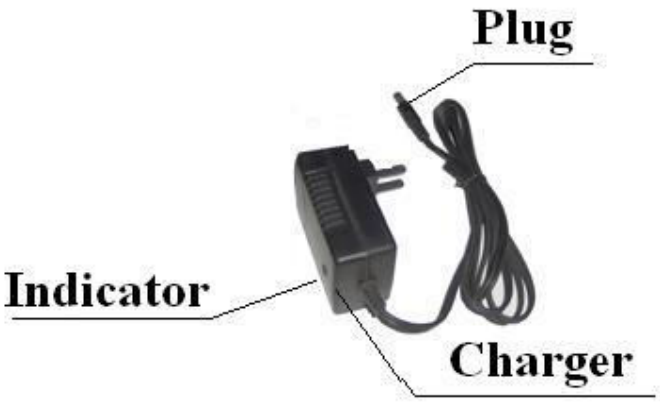
a. Aim the Y1-beam to the direction of the slope required, then adjust as required.

b. Press button ⇧ or ⇩ to move the laser beam up or down.

(3) To exit the Slope adjustment (Grade) mode:

Press the Manual/Automatic button again. The green indicator will switch off & the instrument will quit the slope adjustment mode and will, in time, self-level again.

4. Power



When the voltage indicator illuminates, the batteries need to be charged immediately. Connect

the Mains charger, insert the small charger dc plug into the socket at the bottom of the instrument (as above picture). Switch ON mains supply.

If the Chargers' red indicator illuminates, it shows the batteries are being charged.

When this indicator changes to green, it shows charging is now complete.

NOTES:

(1) If using the standard rechargeable batteries supplied with the instrument, re-charging will be finished within approx. 7 hours.

(2) Power required for the Charger: Voltage: 85-265V, Frequency 50-60Hz.

(3) Charging and use of the Laser instrument can continue simultaneously.

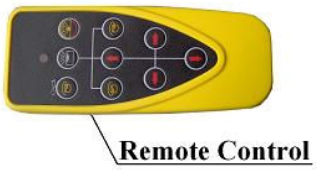
(4) When storing the instrument (or if the instrument is unused for a long time), it is recommended that the batteries are removed. This applies to dry cell batteries and rechargeable batteries alike.

(5) Brand new rechargeable batteries or long-time unused rechargeable batteries need to be recharged and discharged at least 5 times to attain their maximum capacity.

5. Remote

The Remote control uses infrared technology to operate the Laser instrument.

Simply fit its 2 x AAA batteries (supplied) & aim the Remote control at the Laser to operate. Available distance, indoor: 30m or outdoor 20m. The keypad includes 9 keys; the indicator on the RC will flash to show the operating signal has been sent out, when pressing any key.



Remote Control

Functions available via the Remote control are as follows:

(1) Rotating: Operating method as described in section 3.3.3

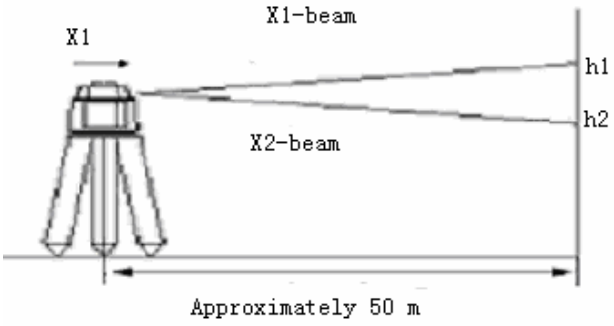
(2) Directional scanning: Operating method as per section 3.3.4

(3) Slope / Grade adjustment: Operating method as per section 3.3.5

6. Checking the Accuracy of the instrument:

6.1 Horizontal-surface checking

(1) Place the Laser instrument approx. 50m in-front of a wall (or position a scale-plate at approx. 50m away from the instrument), and then adjust the level of the base approximately, to aim the X1 to the wall (or scaleplate), as shown below:



(2) Switch ON & use the laser detector to measure height h1 of the X1-beam on the wall or scale-plate.

(3) Loosen the screw of the tripod, turn the instrument around by 180°& measure the

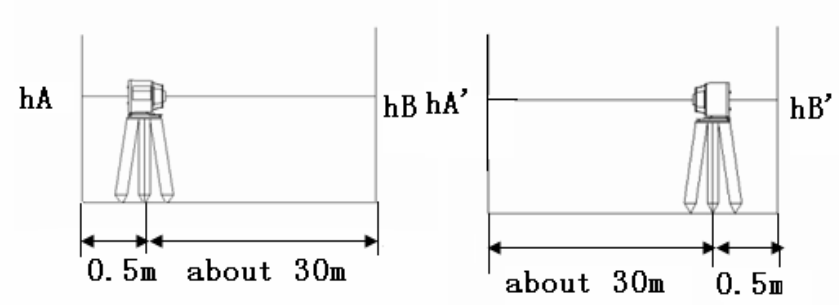
height h2 of X2-beam on the wall or scale- plate. The result should be the same as with height reading h1.

Deviation **D-value between h1 and h2 should to be less than 10mm.**

(4) Check the Y-beam in the same way.

6.2 Horizontal-line Checking

(1) Place the instrument between two walls, approx. 30m apart, (or two scale-plates at a distance of approx. 30m).



(2) Place the instrument to AUTO (self) level horizontally and then adjust the instrument.

(3) Switch ON the power, and then measure the middle point of the laser beam on the wall (or scaleplate): hA, hB and hA′, hB′.

(4)□1=hA-hA′, □2=hB-hB′

Deviation D-value between □1 and □2 should to be less than 6mm.

7. Specifications

Leveling Accuracy	Horiz. +/-2.9mm over 30 metres Vert. +/-2.9mm over 30 metres
Leveling Range	±5°
Measuring Range	500m diameter (when using the laser detector)
Spinning Speed	0□60□120□300□600 r.p.m
Directional-Scanning Angle	0°□10 °□45 °□90 °□180 °
Slope-adjusting Range	±5°(Bi-directional)
Laser source	Laser Diode, wavelength:635nm
Down Point Laser	Accuracy:±1mm @1.5 metres

	Wavelength:650nm
Remote Control Distance	Approx. 20m
Working Temperature	Minimum -20□ to max +50□
Power Supply	DC 4.8-6V (4 x type C size NI-MH rechargeable batteries)
Continuous usage rating	Approx. 20 hours
Water-proof / dust protection	IP 64
Dimensions	160(L) x 160(W) x 185(H)mm
Weight	2.0kg with batteries fitted