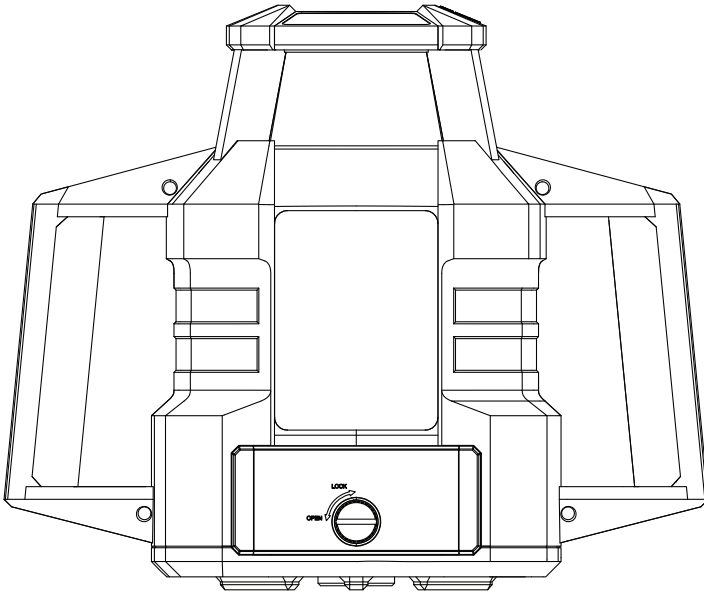




Owner's Manual

NRL900-R, NRL900-G,
NRL902-R, NRL902-G,
NRL900HT-R, NRL900HT-G



CONTENTS

SAFETY	3
1. PRODUCT FEATURES	6
2. BUTTON FUNCTIONS	8
3. LCD FUNCTIONS	10
4. UNIT SETUP	11
5. OPERATION	12
6. CHECKING CALIBRATION	14
7. SPECIFICATIONS	16
8. MAINTENANCE AND CARE	17

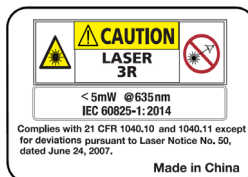
Safety

The instrument is not to be operated for any purpose other than what it is designed for as described in this manual. Use of the controls, adjustments or performance of procedures other than those specified herein may result in hazardous laser exposure. It is the user's complete responsibility to follow the instructions in the manual.

- The laser output information is displayed on the warning label. Do not remove safety labels from the instrument.
- Do not look straight at the laser beam. Set up the instrument in a way that prevents laser beam from shooting into people's eyes.
- Do not disassemble the instrument or attempt to perform any internal servicing. Repairs and servicing are to be performed only by authorized service centers.
- Do not operate or calibrate the unit in any other way or use any other tools or procedures different than described in this manual.



NRL900-G



NRL900-R
NRL902-R
NRL900HT-R



NRL902-G
NRL900HT-G

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.

Caution: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1) L'appareil ne doit pas produire de brouillage;
- 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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:

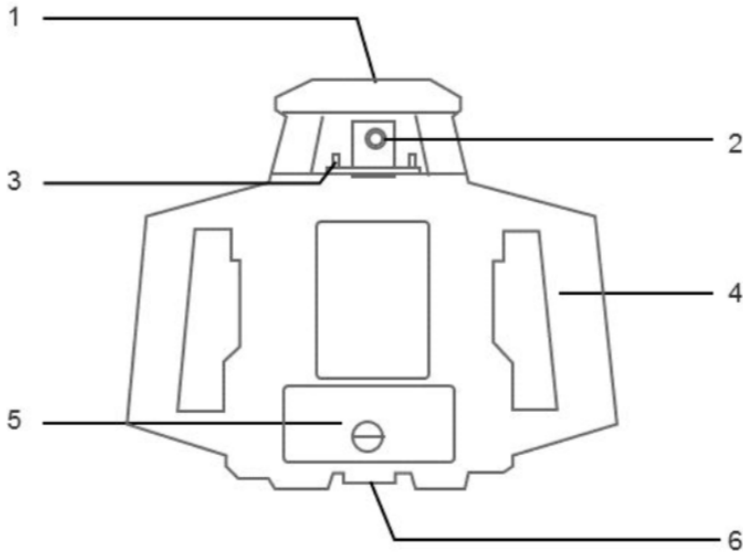
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To satisfy FCC&IC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation.

To ensure compliance, operations at closer than this distance is not recommended.

Les antennes installées doivent être situées de façon à ce que la population ne puisse être exposée à une distance de moins de 20 cm. Installer les antennes de façon à ce que le personnel ne puisse approcher à 20 cm ou moins de la position centrale de l'antenne.

1. PRODUCT FEATURES



1 Plumb Up (only in NRL902 & NRL900HT)

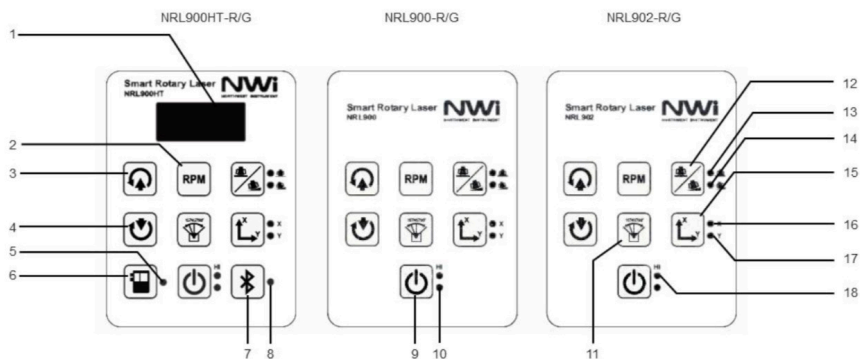
2 Horizontal Laser Beam

3 Infrared Receiver

4 Handle

5 Rechargeable Battery Pack

6 Plumb Down (only in NRL902 & NRL900HT)



1. LCD
2. Rotate Speed Switching Button
3. Up/ Increase/ CCW Button
4. Down/ Decrease/ CW Button
5. Detector Link Indicator
(NRL900HT-R/G only)
6. Detector Link Switching Button
(NRL900HT-R/G only)
7. Bluetooth Link Switching Button
(NRL900HT-R/G only)
8. Bluetooth Link Indicator
(NRL900HT-R/G only)
9. Power Button
10. Power Indicator
11. Scan Angle Switching Button
12. Working Mode Switching
Button
13. Normal Leveling Mode
Indicator
14. Slope Mode Indicator
15. Slope Axis Switching Button
16. X Axis Slope Indicator
17. Y Axis Slope Indicator
18. HI Mode/ Alert Indicator

2. BUTTON FUNCTIONS



Power Button

Short press to power on the unit.

Press and hold to power off.



Up/ Increase/ CCW Button

In Normal Leveling Mode:

Short press to set the unit to rotate CCW if the scan angle is 360°. Short press to move the line or dot CCW one step if the scan angle is not 360°.

Press and hold to move the line or dot CCW continuously if the scan angle is not 360°.

In Slope Mode:

Short press to increase the slope one step.

Press and hold to increase the slope continuously.



Down/ Decrease/ CW Button

In Normal Leveling Mode:

Short press to set the unit to rotate CW if the scan angle is 360°.

Short press to move the line or dot CW one step if the scan angle is not 360°.

Press and hold to move the line or dot CW continuously if the scan angle is not 360°.

In Slope Mode:

Short press to decrease the slope one step.

Press and hold to decrease the slope continuously.



Rotate Speed Switching Button

Short press to switch the scanning speed if the scan angle is 360°.The switching sequence will cycle through: 600rpm, 1200rpm, and 300rpm.



Working Mode Switching Button

Short press to switch the unit working mode between Normal Leveling and Slope.



Scan Angle Switching Button

Short press to cycle through scanning angles in a sequence: 360°, 0°/ dot, 15°, 45° and 90°.



Slope Axis Switching Button

Short press to switch between X axis slope and Y axis slope if the unit is working in slope mode.



Bluetooth Link Switching Button (NRL900HT-R/G only)

Short press to enable or disable the Bluetooth feature.



Detector Link Switching Button (NRL900HT-R/G only)

Short press to enable or disable the Detector feature

3. LCD FUNCTIONS

The NRL900HT-R/G has a two-line LCD that can show the unit's current working status.

AUTO
LEVELING

The unit is leveling.

LASER
300 RPM

The unit has completed its leveling and is rotating at a speed of 300rpm.

HI
300 RPM

The unit has completed its leveling and entered HI Mode.

SLOPE
LEVELING

The unit has entered Slope Mode, but it's still leveling to make the Slope more accuracy.

LASER
Point

The unit has completed its leveling and is projecting a point at an angle without rotating.

LASER
15°

The unit has completed its leveling and is projecting a point at an angle without rotating.

X+2.002%
Y+3.003%

The unit has entered Slope Mode and completed its leveling. The X axis slope has been set to +2.002% while the Y axis has been set to +3.003%.

4. UNIT SETUP

Horizontal Mode

You may set your instrument unit up on a tripod, hang it up on a wall with a wall mount (NUCB05, sold separately) or simply set it on a stable surface.

Vertical Mode

With the vertical bracket provided (NUCB05, sold separately) set the instrument on a tripod or stable surface.

Instrument should be set approximately level within $\pm 6^\circ (\pm 1^\circ)$.

5. OPERATION

Automatic leveling

Short press the  Power Button to power on the unit. The unit will level automatically. The Power Indicator will be on.

In horizontal mode:

The unit will activate the laser beam and start rotating after self-leveling.

In vertical mode:

The unit will activate a laser point without rotating and enter slope mode after self-leveling

Slope

In horizontal mode:

1. Adjust the unit to point the X/Y direction (find the X/Y marked on the top of the unit) towards the target.
2. Power on the unit.
3. Short press the  Working Mode Switching Button to switch the unit to Slope Mode.
4. Short press  the Slope Axis Switching Button to switch the slope axis
5. Press the  Up/ Increase/ CCW Button to increase the slope and the  Down/ Decrease/ CW Button to decrease.
6. Short press the  Working Mode Switching Button to switch the unit back to Normal Leveling Mode.

In vertical mode:

1. Adjust the unit to point the X/Y direction (find the X/Y marked on the top of the unit) towards the target.
2. Power on the unit.
3. Wait for the unit to level itself automatically and the unit will enter Slope Mode by default (the default slope axis will be X.)
4. Short press the  Up/ Increase/ CCW Button or  Down/Decrease/ CW Button to start rotating.
5. Short press the  Working Mode Switching Button to switch the unit back to Normal Levelling Mode

HI Mode and HI Alert

The unit will enter HI Mode after 30 seconds of no button operation once it has automatically leveled.

In HI Mode, if the unit detects that it is no longer level, it will generate the HI Alert.

To clear the HI Alert, power the unit off and back on again.

Remote Control

Infrared:

An infrared remote comes with the rotary laser as an accessory. Users can control the unit with the remote instead of directly operating the keypad on the rotary laser itself.

Bluetooth and Detector:

NRL900HT-G and NRL900HT-R support remote control through Bluetooth or the detector.

Users can use NWi Smart Laser App to connect to and control the rotary laser directly within a distance of 100ft.

Users can use the same app to connect to the detector, while the detector connects to the rotary laser. In this way, the communication distance can be extended to a maximum of 1000ft.

6. CHECKING CALIBRATION

Although every unit has been calibrated in the factory before shipping, it is also the user's responsibility to check the accuracy of the units before use to avoid costly mistakes.

Checking Horizontal Accuracy

1. Set up the unit at around 98ft(-3ft) away from the wall (or a rod), with the X direction (check the mark on the top of the unit) aiming toward the wall.
2. Power on the unit and wait until the unit is leveled. Mark the current laser line on the wall and name it with **h1**. If it's difficult to see the laser line, the detector can help.
3. Rotate the unit 180° so the -X direction is aiming towards the wall.
4. Wait until the unit is leveled. Find the laser line on the wall and mark it as **h2**.
5. The error of the X direction will be $h1-h2$ and it is required to be within $\pm 1/16$ in.
6. Check the Y axis through the same method.

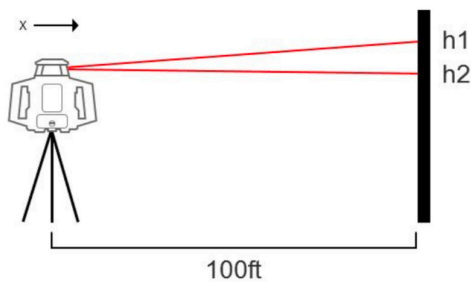


Figure 1

7) If the error of any axis exceeds the criteria, the unit needs to be sent to an authorized service center and calibrated.

Checking Vertical Accuracy

1. Set up the instrument between 2 walls (or 2 grade rods) about 30m from each other. Set it closer to one wall than the other as shown below (Figure 2).
2. Lay down the instrument as shown. Press the Power Button and the instrument will find its level position. Mark the laser position on the wall as h_A and h_B .
3. Then re-install the unit to close to the other wall as shown below (Figure 3), repeat step 2 and mark the points as h_{A1} and h_{B1} . Calculate $\Delta 1 = h_A - h_B$, $\Delta 2 = h_{A1} - h_{B1}$. The difference between $\Delta 1$ and $\Delta 2$ should be within $\pm 1/8$ in.

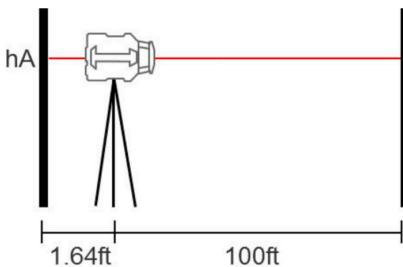


Figure 2

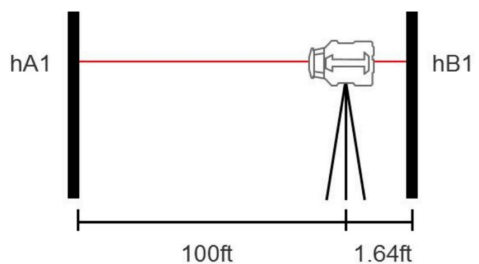


Figure 3

7. SPECIFICATIONS

	NRL900HT-R/G	NRL900-R/G	NRL902-R/G
Accuracy	Horizontal 1/16 in @ 100ft		
	Vertical 1/8 in @ 100ft		
	Plumb up 1/8 in @ 100ft	/	Plumb up 1/8 in @ 100ft
	Plumb down 23/64 in @ 100ft	/	Plumb down 23/64 in @ 100ft
Leveling Range	6° ± 1°		
Working Distance (Diameter)	R: Up to 200ft, G: Up to 250ft		
	Up to 2000ft with Detector		
Rotating Speed	0/300/600/1200 RPM		
Slope Range	±8%		
Scan Angle	15° / 45° / 90°		
Laser Type	R: 635nm G: 520nm		
Laser Power	3R		
Remote	Bluethooth, Wireless, Infrared	Infrared	
	Up to Bluethooth: 100ft Detector: 1000ft Infrared: 50ft	Up to 50ft	
Operanting Temperature	-10° C ~ 50° C		
Power Supply	4D NI-MH Battery Pack / Up to 20 Hours		
LCD	YES	NO	
Size	10.9in x 6.2in x 9in		
Weight	6.6 lb		

8. MAINTENANCE AND CARE

1. Handle instrument with great care. Avoid shock and vibration. Always store and transport instrument in its carrying case.
2. Keep instrument dry and clean after use and before packing it in the carrying case.
3. Check and calibrate the instrument regularly to maintain accuracy.
4. Keep the lens of the laser aperture clean. Use soft cloth and glass cleaner to clean it.

NORTHWEST INSTRUMENT, INC.

Standard Warranty Terms

The warranty period for the instrument grade laser is 36 months from the date of purchase. Northwest Instrument, Inc. (Seller) warrants this instrument made by Northwest Instrument to be free from manufacturing defects in materials and workmanship. For claims to be made under this warranty the instrument must be inspected by Northwest Instrument and the defect must be proven to Seller's satisfaction. At the time that it is proven to the Seller's satisfaction that the instrument is defective, it shall be repaired or replaced, at the Seller's option and returned to the original purchaser at no cost to them, including transportation charges. Seller's sole obligation and the Buyer's sole remedy are limited strictly to repair or replacement with these provisions below:

A. The instrument is returned to the Seller, properly packaged with the transportation charges prepaid and insured and accompanied by proof of ownership. Receipt and previous registration are required.

B. Except for ordinary wear and tear resulting from normal usage, the instrument, upon inspection by the Seller is determined to be defective in material and/or workmanship. Under no circumstances shall the Seller be liable for any consequential, incidental or contingent damages whatsoever.

Limitations and Exclusions

A. This warranty does not apply to instruments subject to negligence, abuse, accident, improper operation, instruments damaged in transit or damage due to unauthorized service repairs made by someone other than the Seller or any other authorized service personnel. Circumstances beyond the Seller's control cannot be warranted.

B. This warranty does not apply to regular required maintenance such as cleaning, adjusting, lubricating or calibrating unless required as a result of a defect in workmanship or materials. If upon examination of the instrument, the Seller determines that additional repair services are required and not covered under this warranty, the Seller shall notify the Buyer of such repair charges and proceed only after authorization has been received.

C. This warranty does not apply to instruments damaged in transit to or from the Seller or any authorized repair center. Other remedies may or may not be available for transportation damages.



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