Operating and maintenance instruction manual
“Original version”

Light self-centred laser measuring instrument to measure height and stagger

Reference : REGLIGHT

SNCF approval N°: MTP EO 17036

Dear customer,

You have just purchased a product from 4NRJ.

We thank you for the trust you have placed in us and hope that you will be fully satisfied with your purchase.

We kindly ask you to pay close attention to the recommendations contained in this document.

To ensure that the equipment is always available and can be used in the safest possible conditions, it must be regularly inspected and maintained. The service life of the product directly depends on the level of care taken in using and maintaining it.

To ensure that the product’s characteristics are preserved, 4NRJ would like to highlight the following points:

- Follow the maintenance intervals
- Replace defective components with original parts
- Do not make any modifications

We hope that our equipment, which has been designed and developed using cutting-edge technology, will serve you with utmost satisfaction.

Dear Customer, we remain fully at your service.

4NRJ

Service page

Written by: Paul Santerre
Date of first issue: 01/01/2016

Revision record

Date	Nature of the change	Made by	Index
11/10/2021	New format	Kevin Buy	E

Contents

Introduction

The instruction manual forms an integral part of this product. It contains important instructions on safety and use. Before using the product, please read all the operating and safety instructions.

The product must be used in accordance with the instructions given in this document and solely for areas that are suitable for work on the catenary.

Please keep this document in a safe place.

Compliant application scope

Please adhere to the designated conditions of use for this product.

Failing this, 4NRJ will not be in a position to:

- Guarantee the results of any measurements obtained.
- Be held responsible for the consequences of improper use.

This device is designed to test and measure the height of the contact wire and its stagger relative to the track axis. The operation is carried out from the ground and the measurements can be stored on a smartphone using an application developed by 4NRJ.

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Warnings!

This product is designed to be used by people who know and understand the best practices of catenary engineering.

Caution: if the product is defective, has been dropped, used improperly or modified, it may lead to incidents.

Make sure you have the appropriate personal protective equipment (list not exhaustive).

Description

Contents

1	REGLIGHT mast
2	Carrying bag
3	REGLIGHT base
4	RLAHD application (to be downloaded)
5	USB-rechargeable lamp (with charger)
6	REGLIGHT lamp clips
7	Charger for distance meter

***Track cant and post installation measurement available as an option.**

Technical characteristics

Mat fitted with a LEICA DISTO D810 distance meter
Mast weight: 2 kg
Type: Laser / Camera
Dimensions with mast: 1,700 x 130 x 1,260 mm
Dimensions without mast: 1,700 x 130 x 1,260 mm
Base weight: 5 kg
Stagger measurement: ± 450 mm
Storage and carrying bag
Bag dimensions: 1,750 x 200 x 200 mm
Bag weight: 6 kg

Properties of the Laser / Camera distance meter

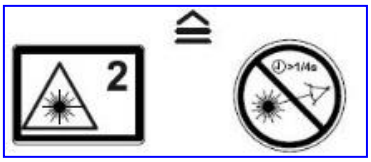
Distance measurement	
Typical measuring tolerance	±0.1 mm
Maximum measuring tolerance	±2.0 mm
Typical range	200 m
Range in unfavourable conditions	80 m
Smallest unit of measurement displayed	0.1 mm
Tilt measurement	
Measuring tolerance to laser beam	-0.1° / +0.2°
Measuring tolerance to housing	±0.1°
Range	360°

General information	
Laser class	2
Laser type	635 nm, < 1 mW
Protection class	IP54 (dust and splash water protected)
Automatic laser switch off	after 90 seconds
Automatic power switch-off	after 180 seconds
Dimensions (H x D x W)	61 x 31 x 164 mm
Weight	238 kg
Temperature range: -Storage -Operation -Charging	 -25 to 60°C -10 to 50°C -10 to 40°C
Photos / Screenshots	
Resolution for photos	800 x 600 dpi
Resolution for screenshots	240 x 400 dpi
File format	JPG
Gallery download	USB
Li-Ion battery	
Rated voltage	3.7 V
Capacity	2.6 Ah
Measurements per battery charge	Approx. 4,000
Charging time	Approx. 4 h
Output voltage	5.0 V
Charging current	1 A

Overview of risks and recommendations

To ensure that the tool operates correctly and fulfils its primary measuring function, it is important to continually check that it is in good condition before and after use.

Always adhere to the network lockout procedure.



Risks of use:

⚠ Beware of the risks associated with lasers. Do not look into the laser of the distance meter.

⚠ Maintenance procedures are exclusively reserved for 4NRJ’s after-sales service.

⚠ Be sure to strictly follow the instructions in the operating manual of the device.

General recommendations (non-exhaustive list):

- ✓ Visually inspect the condition of the tool before use.
- ✓ Protect your tool from impacts.
- ✓ Follow the different steps in the operating procedure.
- ✓ In case of damage, please contact the 4NRJ after-sales service.
- ✓ It is forbidden to change the physical appearance of your tool (non-exhaustive list: painting, engraving or marking).
- ✓ All modifications must be approved in writing by 4NRJ.
- ✓ Never disassemble and reassemble any parts of the measuring instrument.

Storage & transport (non-exhaustive list):

- ✓ Carry the tool in its bag until it is ready to be used.
- ✓ Take care to avoid damaging the device during transport.
- ✓ Store the tool in a place protected from moisture and light.
- ✓ Storage temperature: -15°C to +60°C.

Cleaning (non-exhaustive list):

- ✓ Wipe the device with a clean, lint-free cloth before and after each time it is used. Do not use chemical or abrasive cleaning products, as they may damage the anti-corrosion treatment

Tool repair:

- ✓ Where relevant, some of the components must be replaced by components of the same type. Please contact the 4NRJ after-sales service department.

If required or in doubt, please return the product to 4NRJ for inspection and repair.

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Phone: +33 (0)2 54 42 05 12
E-mail: contact@4nrj.com

Use

The REGLIGHT measuring instrument is a tool to measure the height of the contact wire and its stagger relative to the track axis. However, if the equipment is not maintained and checked, it may result in erroneous measurements (refer to the periodic inspection section). Certain rules must be followed for it to be used correctly.

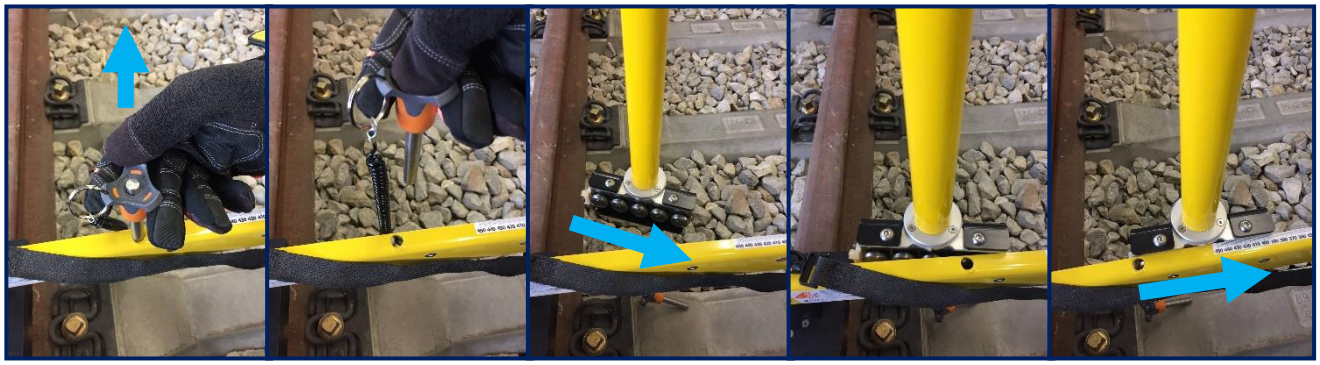
Before you begin, please download the “RLAHD” application onto your smartphone (Android system).

RLAHD

As this is a measuring instrument, it must be kept perfectly clean at all times to prevent damage to the tool.

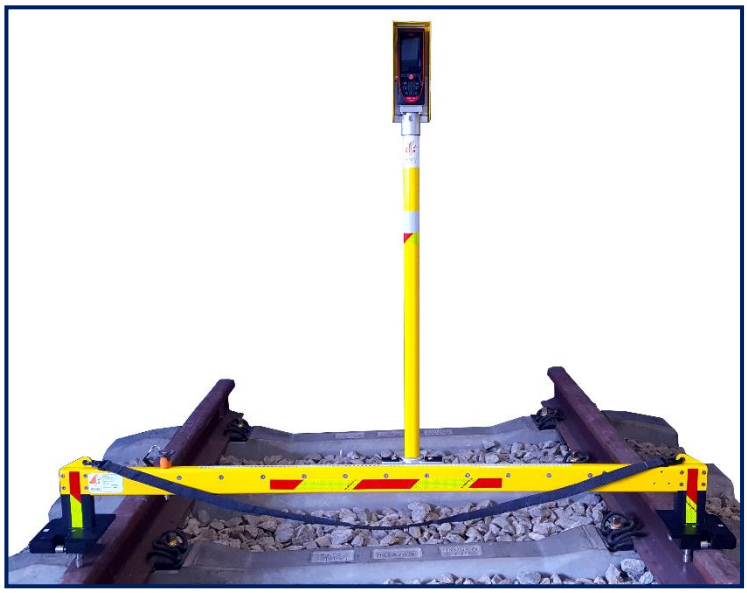
Implementation

1. Take the base and mast of the measuring instrument out of the bag.
2. Remove the locking pin from the base.
3. Insert the mast into the base rail.



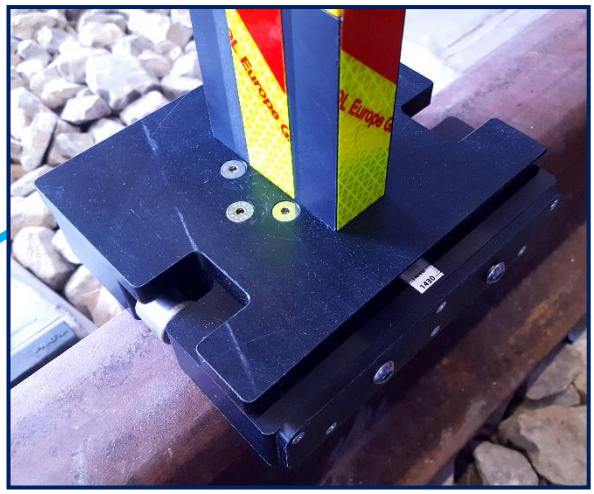
4. Put the pin back in place.

5. Place the base on the rails with one of the blocks in contact and push the opposite block with your hand.



⚠ Caution: This device does not measure the track gauge!

6. Before each series of measurements, ensure that the measuring instrument is centred with the rules positioned on the blocks on either side of the instrument.

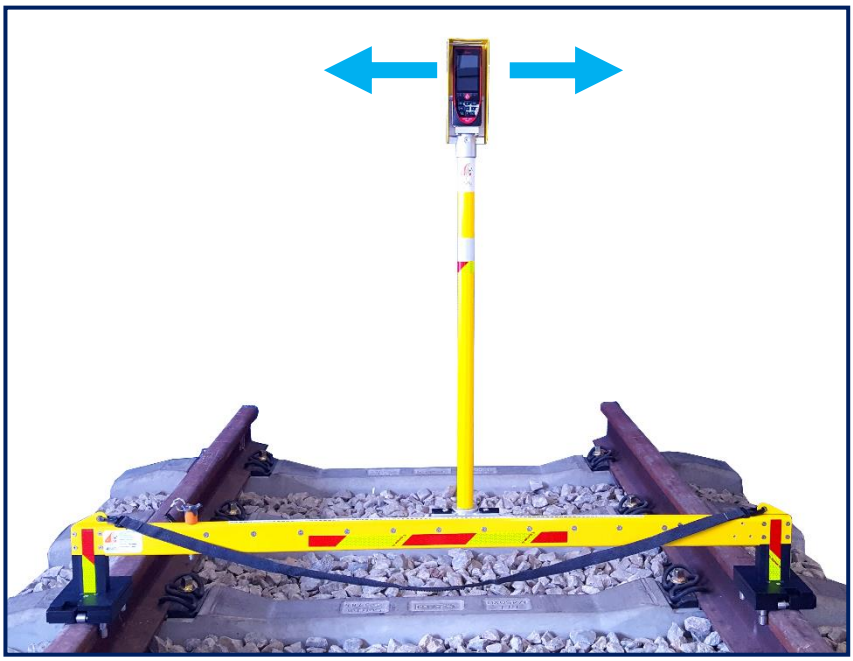



⚠ Caution: The difference must not exceed 2 mm (one scale = 2 mm)!

7. Move the measuring mast from right to left without forcing, while using the distance meter to aim at the catenary contact wire (to use the distance meter, please refer to the next section “Using the distance meter”).

8. Press the distance measurement button to display the height on the screen.

9. The contact wire stagger can be seen by reading the rule on the base.



Using the distance meter

A. Switch on the distance meter using the button 

B. If you are in the main menu select 

C. If not, check that you have the same display as the photo below.

D. To switch to camera mode, click on the button 
Use the up and down arrows to zoom in/out

D. To take a measurement, move the mast and aim the laser or camera at the catenary.

Press the button 

to take the height measurement.

For more details on how to use the distance meter, refer to appendix 1.

Using the REGLIGHT at night

1. Place the lamp clips on the mast.
2. Clip on the LED lamp.
3. Press the “ON/OFF” button. The LED Lamp has several modes; press the ON/OFF button several times to change mode.

After Use

After every use, store the instrument’s components in the appropriate compartments of the bag. It is very important to wipe the tool with a clean, dry cloth. Ensure that the rollers are cleaned after each use.

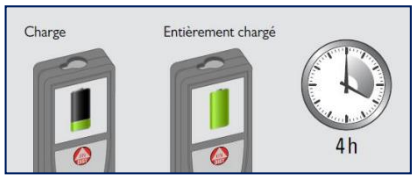
⚠ Caution: Follow the maintenance intervals given at the end of this manual.

Recharging the distance meter

Charge the unit with its mast. A flap is provided for this purpose.

Only use the charger supplied with the REGLIGHT measuring instrument.

⚠ Caution: The mast is a measuring component. Therefore, when recharging the distance meter, place the mast in a position that prevents it from falling.



RLAHD application

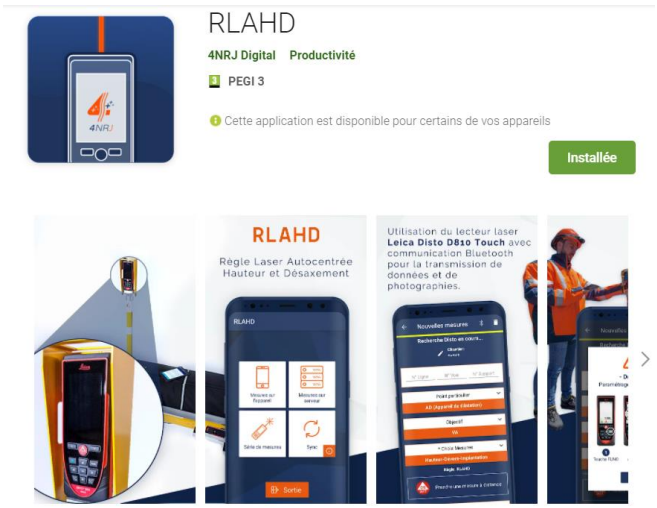
The “RLAHD” application is available for smartphones / tablets running ANDROID. It can be used to enter data in digital format, add several indications that are needed to take measurements and save the series of measurements in a database that can be viewed on your computer, smartphone or tablet.

Downloading the application

To use this application, download it from the PLAYSTORE by typing 4NRJ in the search bar.

An Internet connection is required to download this application

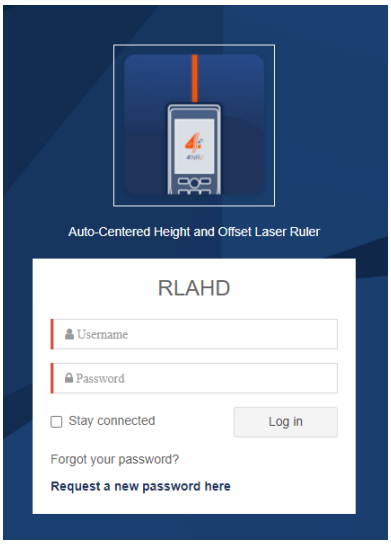
The application is free!



Logging in for the first time

If you have not yet created an account, please click on “New account” and fill in the various fields.
A confirmation e-mail is then sent to you.

Otherwise, enter your E-mail address and Password.

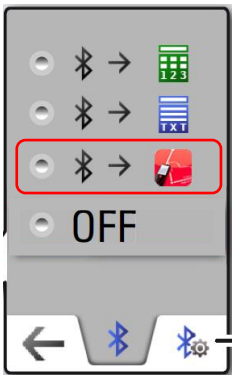


Using the application

⚠ Caution: Make sure your distance meter and your smartphone / tablet are in BLUETOOTH mode!

To set the distance meter to BLUETOOTH mode:

1. Click on the “Functions” button. 
2. Select the settings module. 
3. Use the right arrow to scroll through the menu and select the “Bluetooth” icon.
4. Select the third line and click on the logo at the bottom right.
5. Select “Unencrypted” mode and go back to the main menu.



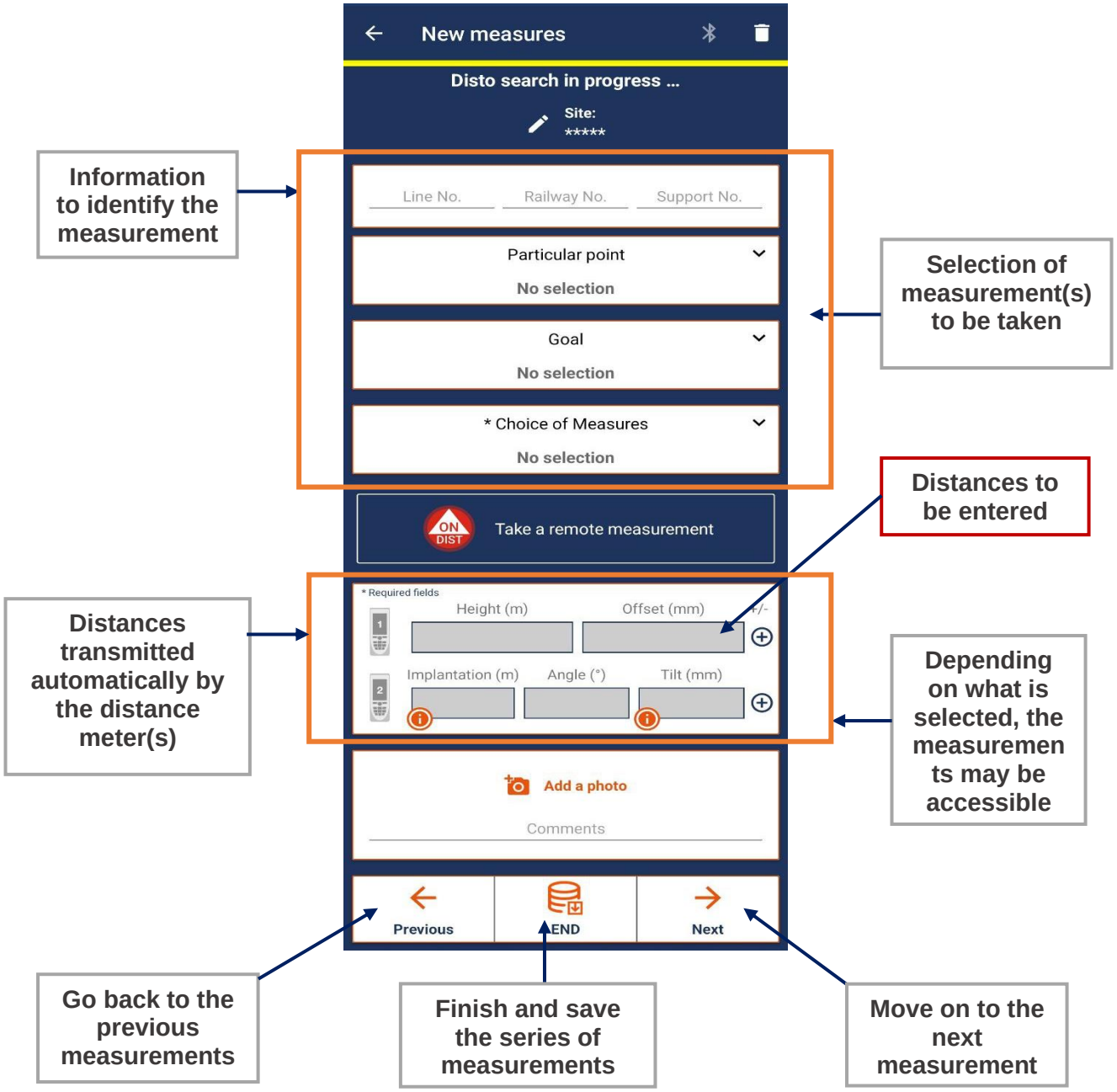
Your device is now in Bluetooth mode

When you click on the measurement series icon in the application, the link between your smartphone / tablet and the distance meter will automatically be set up.

A message at the bottom of the screen is displayed to confirm whether or not the two devices are properly connected. If not, go back to the main menu of the application and try again.

⚠ Caution: If you have the “Track Cant and Post Installation Measurement” option, you will need to activate the Bluetooth mode on both of your distance meters.

Once the connection is established, you have access to the features of the application.



Caution: The stagger distance must be entered manually.

You can also add comments and up to 3 photos of the measurement taken.

To retrieve the distances from the application, carry out the same operations as in the section “Using the distance meter” by pressing the button.

Processing the data

Once the series of measurements has been completed, the application stores the measurements in memory.

They can be seen using the “Memory” function in the main menu of the application.

If you have a “mobile network” or “WI-FI” internet connection, the data will automatically be transferred to a database that can be accessed via the internet.

1. Go to the address www.4nrj-apps.com
2. Enter your login details and select “RLAHD”.
3. View your series of measurements.

Details on the device

The REGLIGHT measuring instrument is supplied with a calibration record and is identified by a manufacturer’s plate.

This plate contains important information, including the height correction, which is the distance between the top of the rail head and the measuring base of the distance meter. This value is incorporated in the instrument.

If the height value is not consistent, please refer to the following guidelines or contact 4NRJ.

Checking the correction value

1. Click on the “Functions” button. 

2. Select the settings module. 
3. Use the right arrow to scroll through the menu and select the “Offset” icon. 
4. Scroll the numbers up or down to find the value **01.04** m and then confirm the value.

Periodic inspection

It is essential to inspect a product to ensure that it has a long service life.

Refer to the table below to follow the inspection intervals.

Inspection intervals	Before / after use	3 months	12 months
Clean the tool	X		
Clean the rollers	X		
Degrease the rollers		X	
Calibration test and full service (Customer inspection)			4NRJ / Customer*
Test on 4NRJ BERHD bench	X**		

The REGLIGHT measuring instrument must be serviced and inspected every year.

*You can carry out this maintenance yourself if you have a BERHD calibration bench.

Otherwise, your measuring instrument must be returned to 4NRJ with all its components in its bag, so that we can carry out servicing and calibration.

**If you have a test bench (BERHD), we recommend that you check your measuring instrument each time before using the REGLIGHT to ensure that the measurements it takes are correct.

The inspection date and the number of days remaining before the next “Customer Inspection” can be found by scanning the QR code on the product. (See Appendix)

Even if the device is kept in storage, it must be inspected every year.

If you have any problems, please contact our customer service department and specify your needs:

Phone: +33 (0)2 54 42 05 12

E-mail: contact@4nrj.com

Cleaning the tool

✓ Remove all traces of pollution (grease, moisture) with a clean, dry, non-abrasive cloth.

✓ You can moisten your cloth with a small amount of water.

Cleaning the rollers

✓ Clean the rollers with a clean, dry, non-abrasive cloth.

✓ Remove any excess grease from the 8 stainless steel bushes.

Degreasing the rollers

✓ To degrease the rollers, use a clean, dry, non-abrasive cloth and a degreasing spray (Brand: WD-40, 3-in-1, etc.).

✓ Apply the degreaser to the bearings and axles, and allow the degreaser to penetrate into the bearings.

✓ Clean and dry using the cloth. Leave the measuring instrument to dry in the open air for about 15 minutes.

✓ Apply a spray of dry PTFE lubricant (Brand: 3-in-1, WD-40, etc.).

Full service

4NRJ highly recommends that you have your measuring tool serviced.

Scan the QR code on your measuring instrument and follow the inspection procedure (listed below).

If all the steps are compliant, you will extend the date of the customer inspection by another year when you confirm the customer inspection.

Lubricating the rail and slides:

✓ Use grease with the following characteristics: lithium soap, NLGI2 grade.

(For example: Mobilux EP2).

✓ Apply grease to the Mast rail and the slides on which the measuring instrument is deployed.

Inspection of the rollers:

✓ Measure the diameter of the rollers (stainless steel bushes) after cleaning.

The measurement must be greater than or equal to Ø 30 mm. If the dimension is less, please contact us.

Calibration test on BERHD bench:

✓ Follow the procedure by scanning the QR code located on the BERHD Bench. This test takes less than 5 minutes.

If you do not have a BERHD test bench, please return your measuring instrument to 4NRJ.

Disposal

The product must not be disposed of with household waste.

Recycle the product through an approved waste disposal company or through your local recycling service.

Comply with the regulations in force.

If in doubt, please contact your recycling centre.

Guarantee

Object of the guarantee

The guarantee covers damage to the device resulting from an internal defect. Only a device invoiced by 4NRJ and still under a 2-year distributor warranty can be guaranteed by 4NRJ.

Contents of the guarantee

The guarantee covers the cost of repairing the device specified below:

- The cost of parts.
- The cost of labour.
- The cost of transport.

The guarantees only apply to transport costs in Metropolitan France.

Replacements

Where repair is impossible or the cost of repair is greater than the cost of replacement, a new device with equivalent technical characteristics will be provided to replace it.

Loan

When the repair is expected to take a long time, functional equipment in good condition may be provided on loan, depending on availability.

Effective date and duration of the guarantee

The guarantee takes effect on the date of delivery of the equipment. The guarantee limit covers up to 2 years

To benefit from the guarantee

In the event of a claim, the owner must:

• Report the damage, within 5 working days, specifying the date, nature and circumstances, to 4NRJ (info below).

On receipt of the equipment:

• 4NRJ will conduct an assessment to determine whether the equipment will be covered by the guarantee.

The guarantee does not apply to:

• Devices that are not used in accordance with the manufacturer’s instructions or that are not maintained or cleaned properly.

• The transport costs for the device, the repairer’s travel costs and labour costs relating to an unjustified request for work or damage that is not guaranteed or not established by the after-sales service.

• Any work or repairs carried out by persons not approved by 4NRJ, any makeshift or temporary repairs remaining at the customer’s expense, and the consequences of any aggravation of the damage resulting thereof.

• Any damage due to causes external to the device (non-exhaustive list): theft, fall, lightning, flood, fire, etc.

• Accessories and wearing parts (non-exhaustive list) (batteries, cables, seals, filters, etc.)

• Any cosmetic damage

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APPENDICES

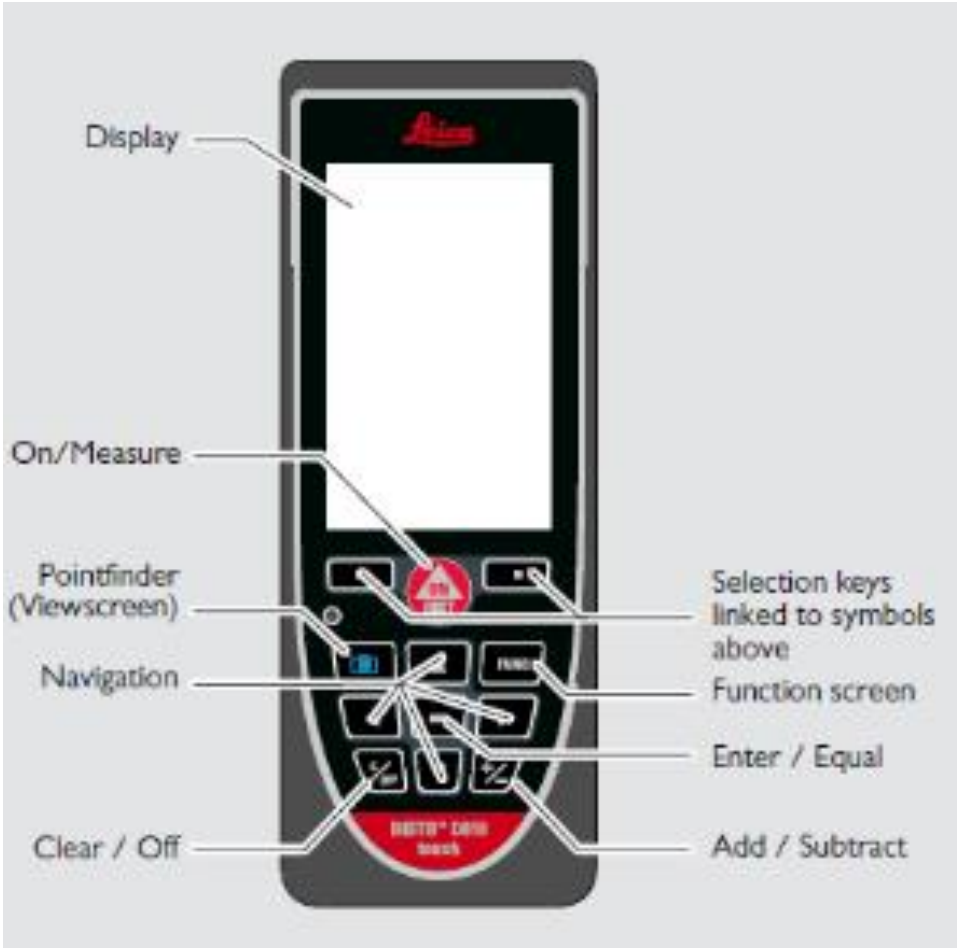
Appendix A - LEICA DISTO D810 distance meter manual

Appendix B - Presentation of the QR Code

Appendix C - Recording the data

Appendix D - Managing 4NRJ products using QR Codes

Appendix A - LEICA DISTO D810 distance meter manual



Laser classification

The device produces visible laser beams, which are emitted from the instrument:
It is a Class 2 laser product in accordance with:

- IEC60825-1 : 2014 „Radiation safety of laser products“

Laser Class 2 products:
Do not stare into the laser beam or direct it towards other people unnecessarily. Eye protection is normally afforded by aversion responses including the blink reflex.

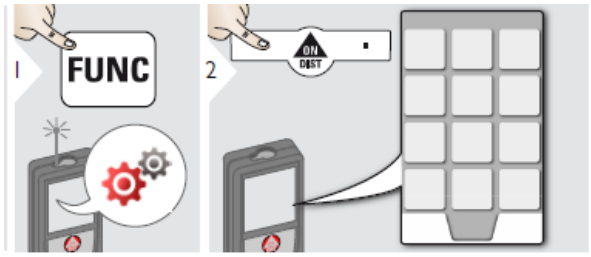
⚠ WARNING
Looking directly into the beam with optical aids (e.g. binoculars, telescopes) can be hazardous.

⚠ CAUTION
Looking into the laser beam may be hazardous to the eyes.

Description	Value
Wavelength	620 - 690 nm
Maximum radiant output power for classification	< 1mW
Pulse repetition frequency	320 MHz
Pulse duration	> 400 ps
Beam divergence	0.16 x 0.6 mrad

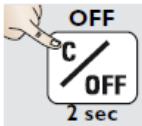
Labelling

Subject to change (drawings, descriptions and technical data) without prior notice.



	Tilt units
	Distance units
	Beep
	Digital level
	Keypad lock
	Bluethooth® Smart
	Tilt calibration
	Favorites
	Illumination
	Touch screen
	Date and Time
	Compass adjustment
	Offset
	Reset
	Information
§	Country Information

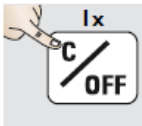
Switching ON/OFF



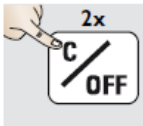
Device is turned OFF.

If no key is pressed for 180 sec, the device switches off automatically.

Clear



Undo last action.

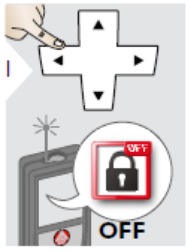


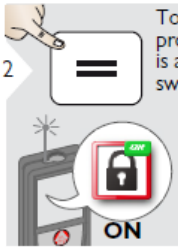
Leave actual function, go to default operation mode.

Message Codes

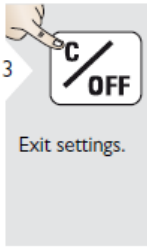
If the info icon appears with a number, observe the instructions in section "Message Codes". Example:

De-/Activate keylock



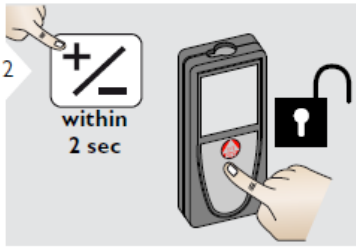


To deactivate, repeat procedure. The keylock is active if device is switched off.

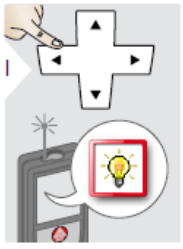


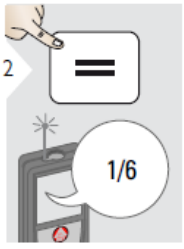
Exit settings.

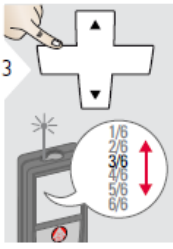
Switch on with keylock



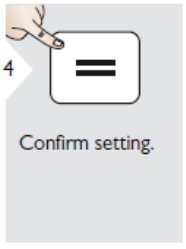
Illumination







Select brightness.

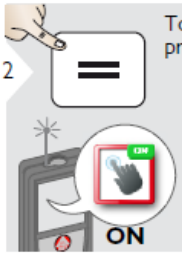


Confirm setting.

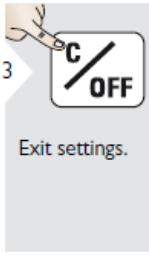
Exit settings.

To save power reduce brightness if not necessary.

Touch Screen ON/OFF

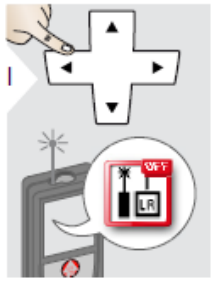


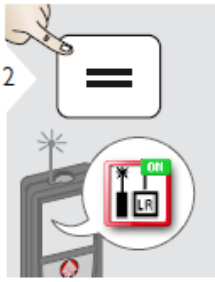
To deactivate, repeat procedure.



Exit settings.

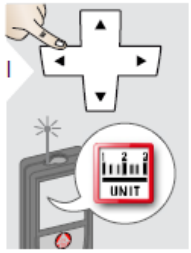
Long range mode

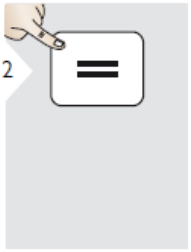


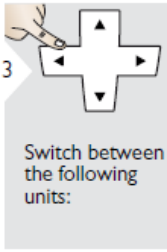


The long range mode allows measuring of difficult targets in unfavorable conditions e.g. bright ambient light or bad target reflectivity. The measuring time is increased.
An icon in the status line shows if the function is active.

Distance units







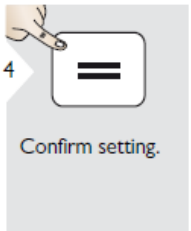
Switch between the following units:

Art. No. 792297:

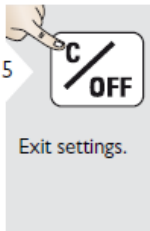
0.00 m	0.00 ft
0.000 m	0.00 in
0.0000 m	0 in 1/32
0.0 mm	0'00" 1/32

US-Model Art. No. 799097:

0.00 m	0 in 1/16
0.000 m	0'00" 1/16
0.0000 m	0 in 1/8
0.0 mm	0'00" 1/8
0.00 ft	0 in 1/4
0.00 in	0'00" 1/4
0 in 1/32	0.000 yd
0'00" 1/32	

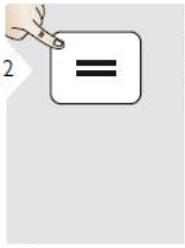


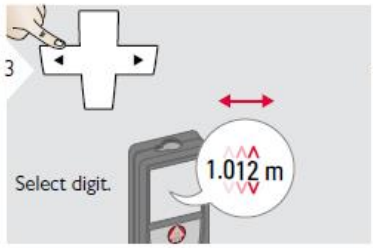
Confirm setting.



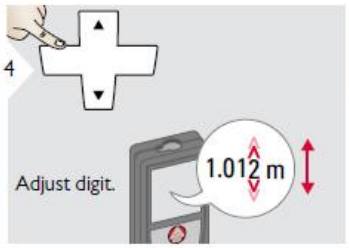
Exit settings.

Offset

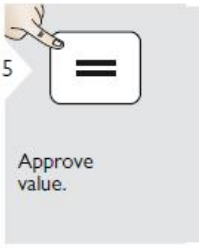




Select digit.



Adjust digit.

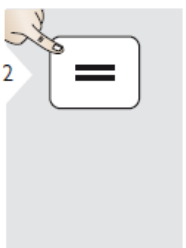


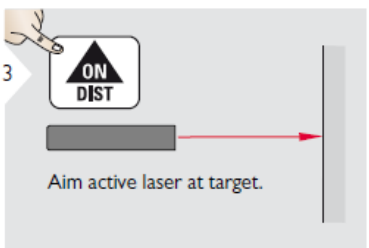
Approve value.

Exit settings.

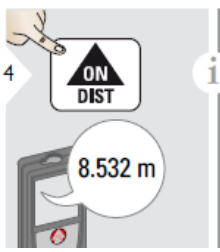
An offset adds or subtracts a specified value automatically to or from all measurements. This function allows tolerances to be taken into account. The offset icon is displayed.

Measuring single distance



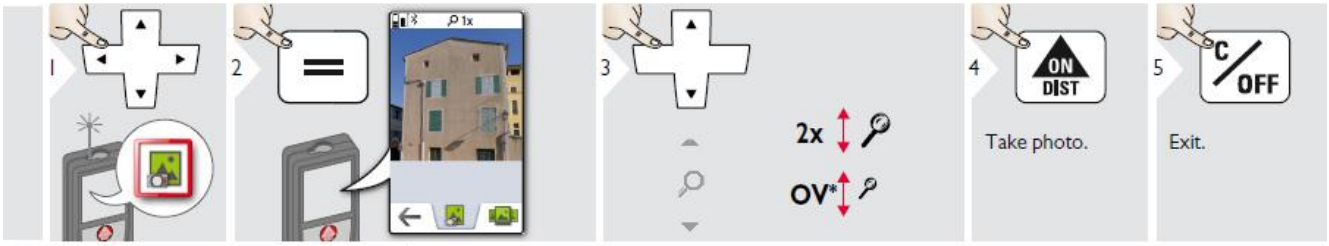


Aim active laser at target.



Target surfaces:
Measuring errors can occur when measuring to colourless liquids, glass, styrofoam or semi-permeable surfaces or when aiming at high gloss surfaces. Against dark surfaces the measuring time increases.

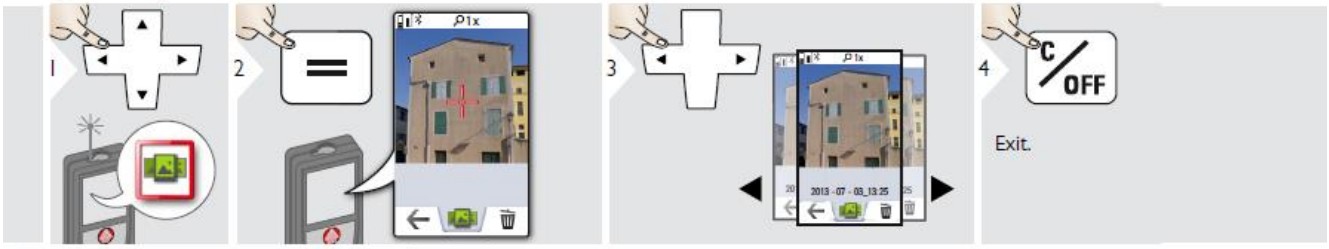
Photo



Tap on the camera icon in the middle of the bottom line to take a photo.
For screenshots, press camera key for 2 sec.

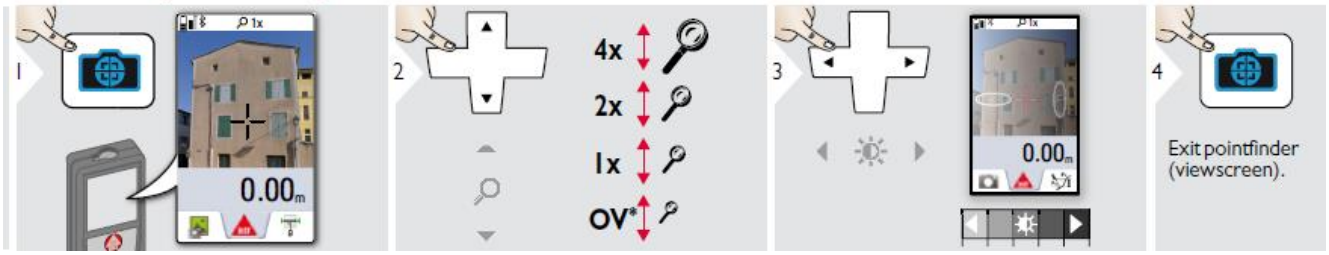
* OV = Overview

Gallery

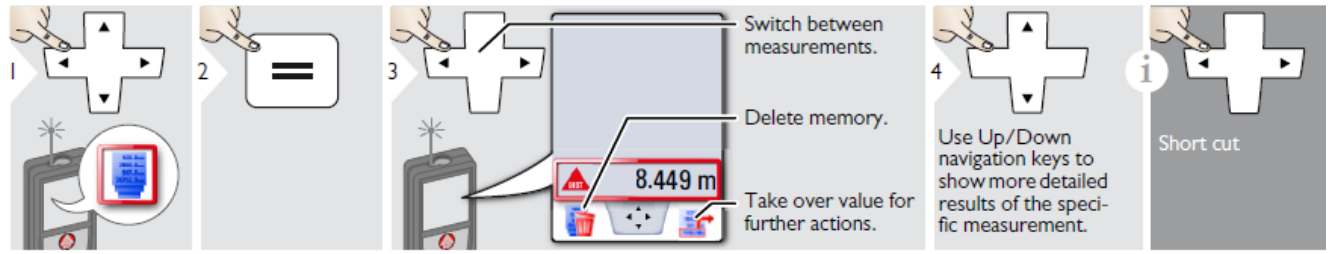


If the device is connected to the computer via USB cable, you can download or delete the gallery. It is not possible to upload any data.

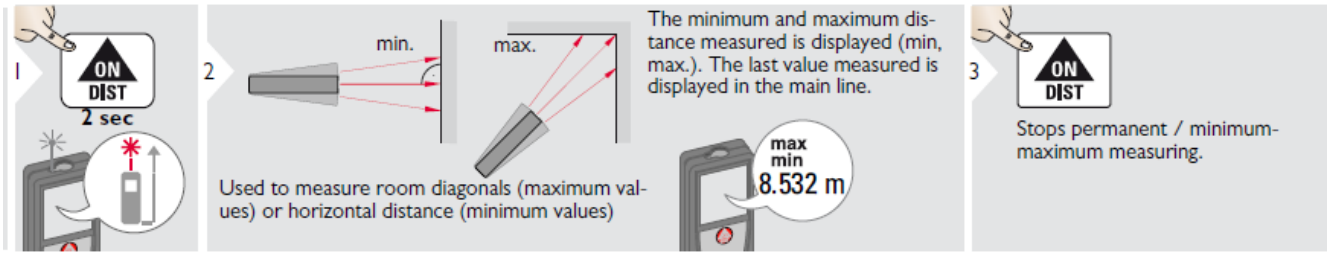
Pointfinder (Viewscreen)



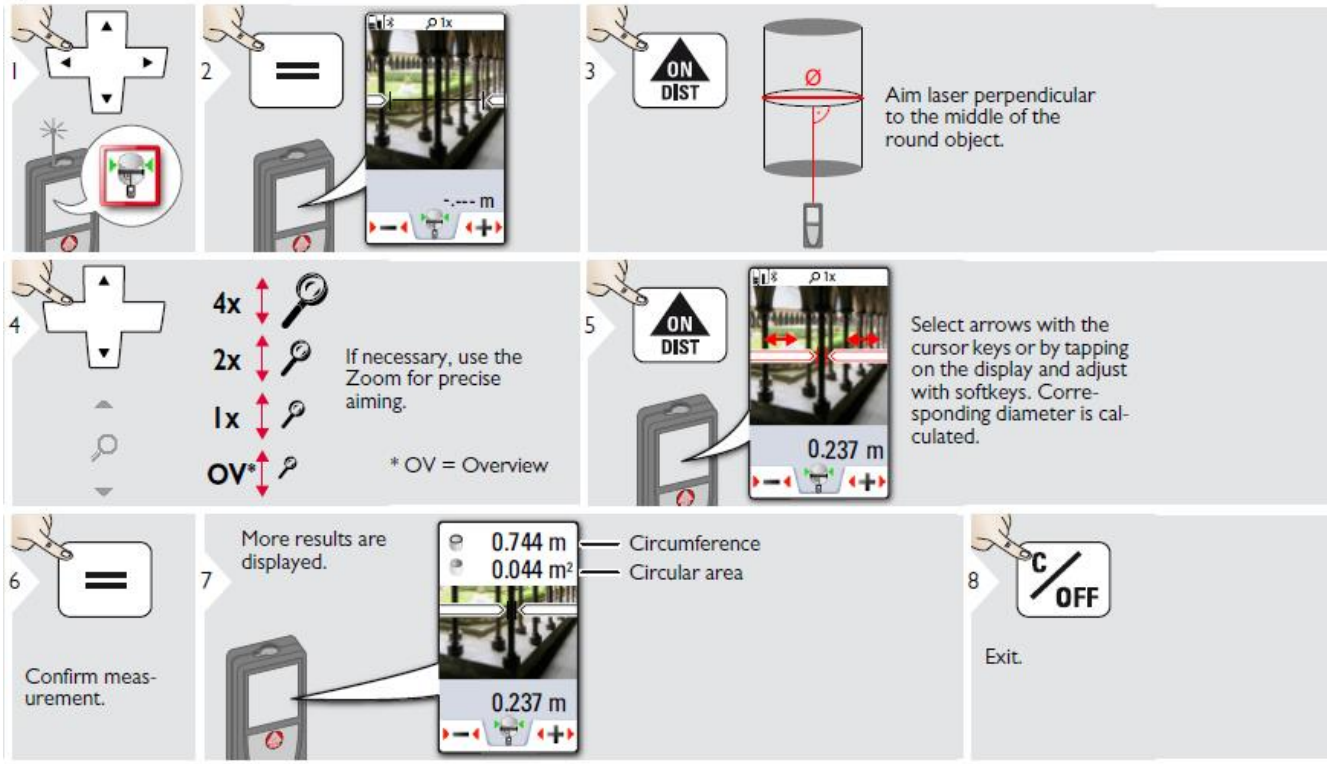
Memory

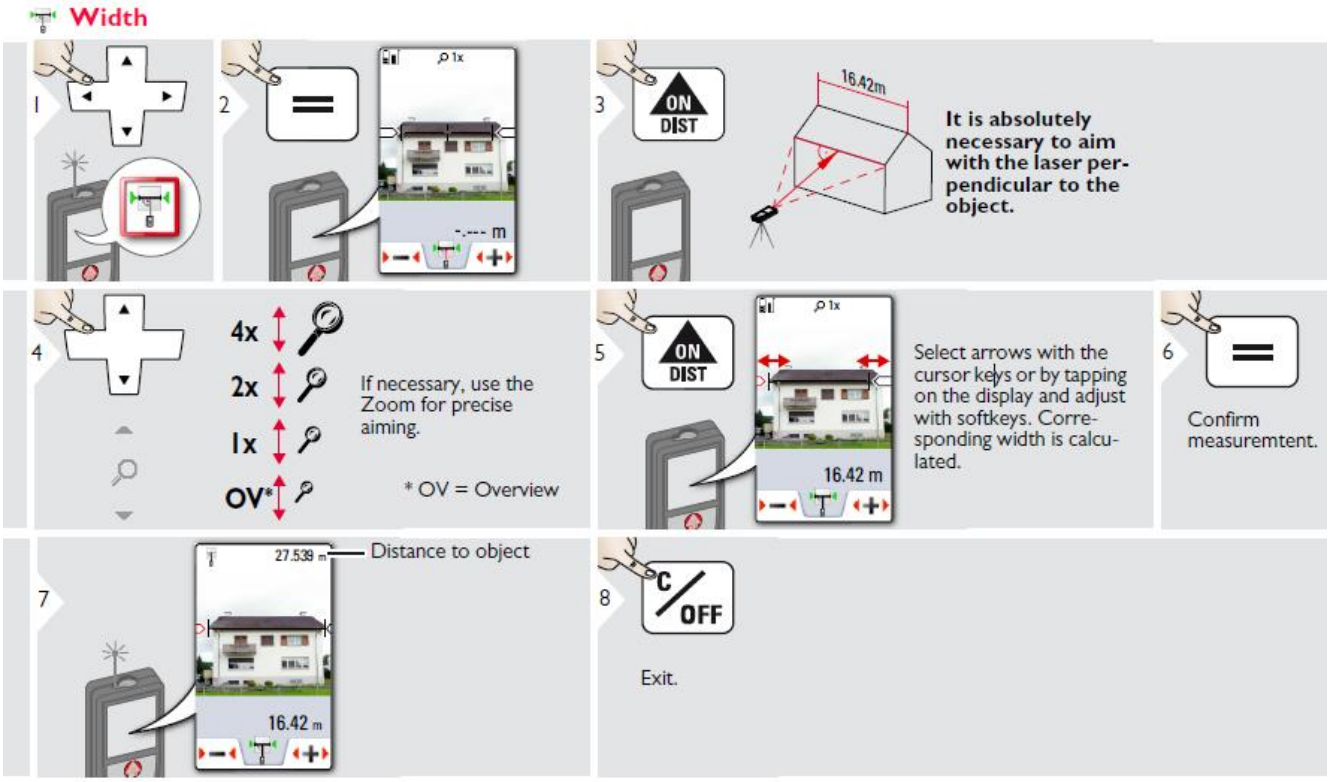


Permanent / Minimum-Maximum measuring



Diameter





Error messages

No.	Cause	Correction
156	Transverse tilt greater than 10°	Hold the instrument without any transverse tilt.
162	Calibration mistake	Make sure, the device is placed on a absolutely horizontal and flat surface. Repeat the calibration procedure. If the mistake still occurs, contact your dealer.
204	Calculation error	Perform measurement again.
240	Data transfer error	Repeat procedure.
252	Temperature too high	Let device cool down.
253	Temperature too low	Warm device up.
255	Received signal too weak, measuring time too long	Change target surface (e.g. white paper).
256	Received signal too high	Change target surface (e.g. white paper).
257	Too much background light	Shadow target area.
258	Measurement outside of measuring range	Correct range.
260	Laser beam interrupted	Repeat measurement.

Appendix B - Presentation of the QR Code

Each measuring instrument (Ref: REGLIGHT) has a unique QR code. It can be used to find out diverse information about the device and to keep track of the date of the next inspections.

How does the QR code work?

The QR code can be used in two different ways.

- **1st method:** The “4NRJ Codes” QR Code reader available exclusively on the PLAYSTORE (ANDROID Smartphone and Tablet).
  Most 4NRJ tools have a QR code. This application can also be used to carry out customer inspections of your tools, if required.

- **2nd method:** A QR code reader available on the PLAYSTORE, APPSTORE or WINDOWS PHONE.

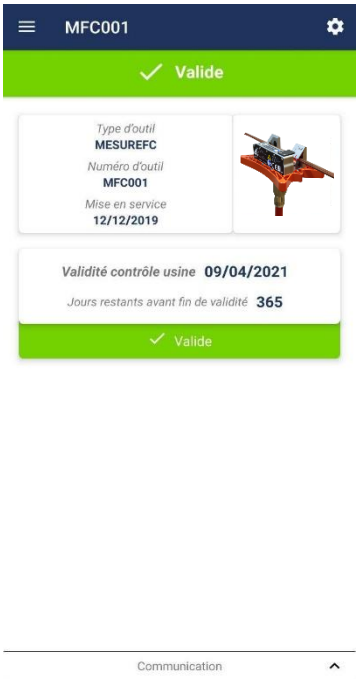
1st method: 4NRJ CODES

- Download the “4NRJ CODES” application from the PLAYSTORE.

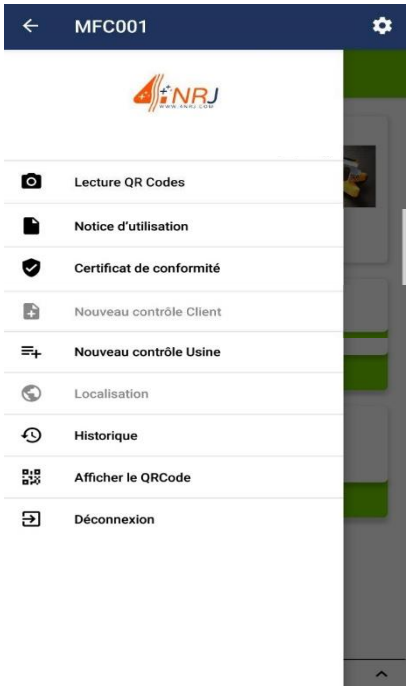
4NRJ CODES PLAYSTORE

- Open the application and scan the QR code with your smartphone.

  You can access the following:
  - The validity status of the product (date of the next customer inspection and number of days remaining).
  - The instruction manual for the product (by pressing ≡).
  - The certificate of conformity for the product (by pressing ≡).



View of the product validity status

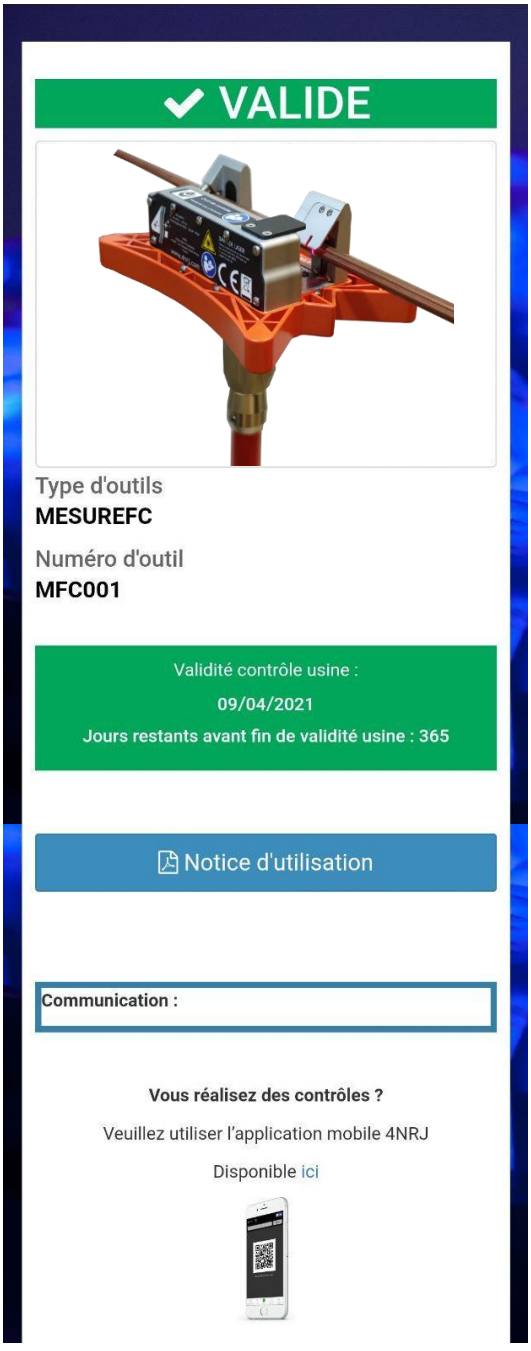


Product menu

With the 4NRJ Codes application, you can also carry out customer inspections for tools that are required and view the history of scanned tools.

2nd method: QR Code reader

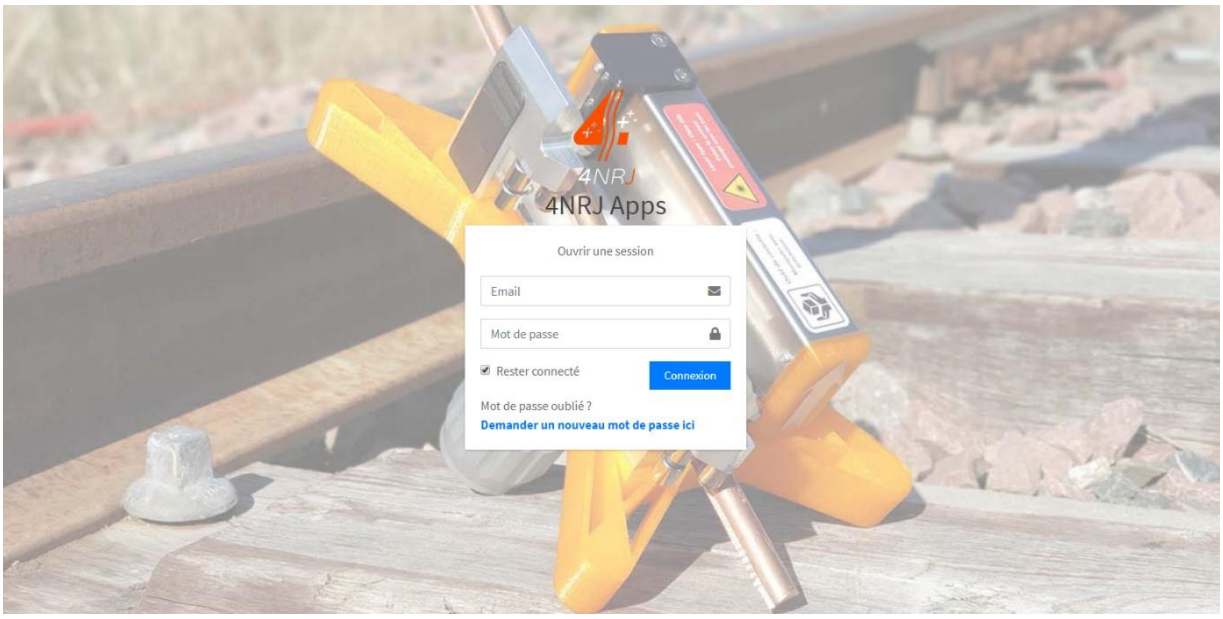
- Download a QR Code reader application from the PLAYSTORE, APPSTORE or WINDOWS Phone
  (QR Droid, QR Code Reader, etc.).
- Open the application and scan the QR code with your phone or tablet.
  You can access the following:
  - The validity status of the product (Date of the next factory inspection and number of days remaining before factory inspection).
  - The instruction manual for the product.
  - The certificate of conformity for the product.



Appendix C – Recording the data

Once you have taken the measurements with your device, you can process the data on your computer.

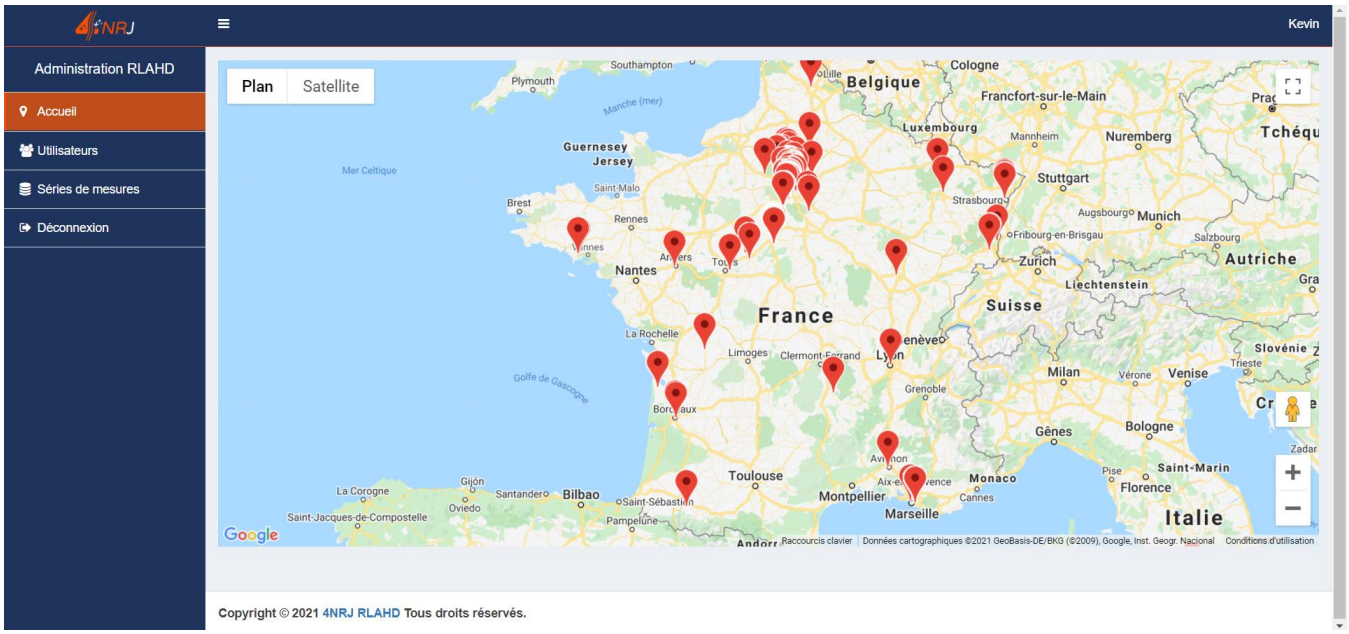
To do this, go to the address below and select “RLAHD”.
https://4nrj-apps.fr/



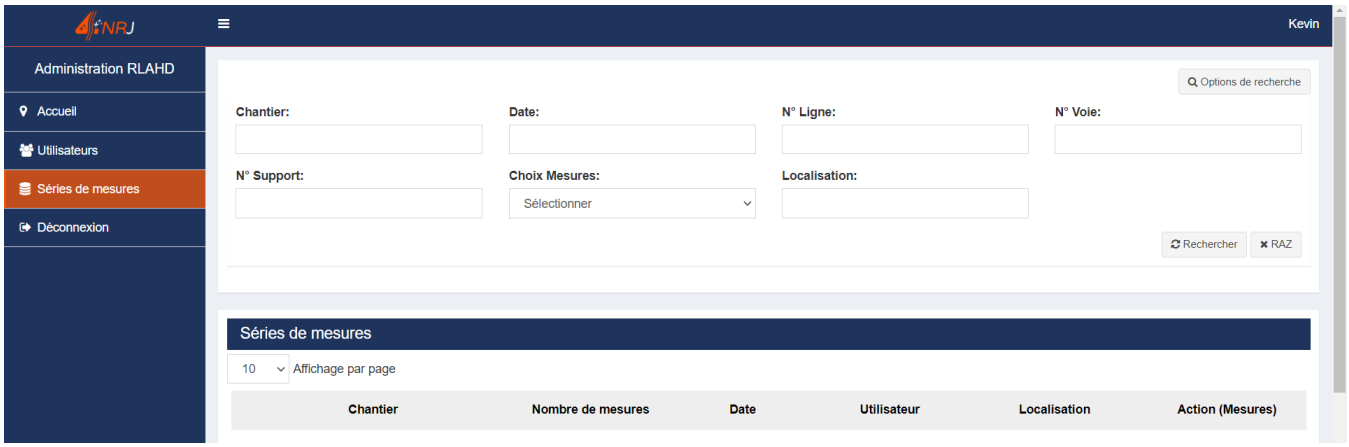
If you do not have an account, please ask 4NRJ for one.

Phone: +33 (0)2 54 42 05 12
E-mail: contact@4nrj.com

You can view the measurements that you have taken on the map.



You can also view the list of your measurements and sort them using your search criteria.



Appendix D - Managing 4NRJ products using QR Codes

The validity status of all your tools can now be tracked by QR code.

To do this, simply log in to your account on the website 4nrjc.com.

If you do not have an account, you can ask for one at contact@4nrj.com.

To add tools to your account, send the serial numbers of your devices and the account to which you wish to link them to contact@4nrj.com.

If you log in to your account, you will be able to see the validity status, the certificates of conformity of your devices and carry out customer inspections on them.

There are two types of account; the supervisor account and the inspector account.

Supervisor account

The supervisor account can manage several inspector accounts as well as the tools that are associated with each inspector.

- To create an inspector account (linked to the supervisor account), click on “Manage rights”, then on “Manage users” and on the “Add user” button.

- Fill in the various fields and press “Save”.

Inspector account

The inspector account only has access to the tool list that has been assigned to it.

4NRJ
WWW.4NRJ.COM

Follow the latest updates to the instruction manual by scanning the QR code.
Or through the internet via the link: www.4nrj.com/reglight-en.pdf