

Inclination Laser NL-700/-701/-702



Intuitive Operation with Maximum Precision

- OLED display
- Easy operation
- Highest accuracy
- Robust design
- Optional radio remote control
- Steep inclination up to 50 %
- Transfer of inclination on both axes possible



Congratulations on the purchase
of your new GEO laser.

Designed, developed and
made in Germany

In addition to information on how to use the laser, these operating instructions also contain important safety instructions in the enclosed leaflet!
Please note: First carefully read the safety instructions in the separate leaflet and then the operating instructions before using the laser.

The lasers in the NL-70x series are self-levelling inclination lasers via two axes. They project either a horizontal reference plane or one that is inclined on one or two axes into space.

The axes are aligned either via a precise telescopic sight that can be locked in 90° steps in the case of the NL-700 and NL-701 models or via an optical sight in the case of the NL-702 model.

All functions can be operated via radio using the optional FB-11 remote control.

For both axes, it is possible to transfer the existing inclination using the optionally available FE-54 locking receiver.

1. Laser Description

2.1 Inclination Symbol

Enables clear inclination assignment. The +/- signs and the X/Y letters correspond to the inclination display. In addition, the symbol shows the progression of the inclination or the change in inclination in relation to the centre axis.

2.2 Laser Warning Sign

Laser class 2, P_P < 2.6 mW

2.3 Spring Clamp

For safe storage of the protective cap for the aiming device.

2.4 Charging Socket

Behind a protective flap

2.5 Rotary Axis with Fine Adjustment Screws

(Only NL-700)
Central mounting thread 5/8".

2.6 Aiming Device The telescopic sight is located under a protective cap and is used for quick alignment of the inclination axis in all four directions, even when aiming at different heights. The NL-702 has an optical sight.

2.7 Rotor Head Adjustable to 0 and from 300 - 1200 rpm

2.8 Housing
Robust light-metal housing, plastic coated, swept and filled with nitrogen. 100 % watertight.

2.9 Handle
For easy handling, safe transport and simple set-up.

2.10 OLED Display
Easy-to-read graphic display for intuitive operation.

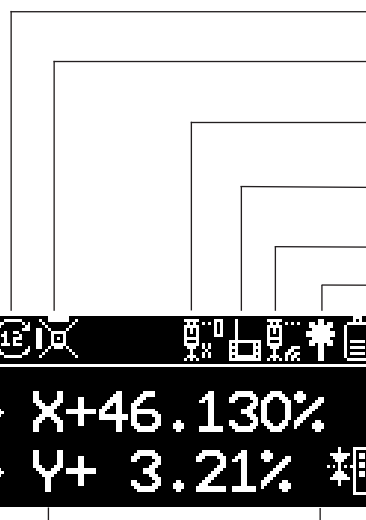
2.11 Antenna

2.12 Keypad

Clear, user-friendly, self-explanatory keys.

2.13 Bottom, Protruding, Stainless Steel
Central mounting thread 5/8"

2. Display



Rotor Speed (see 4.3.3)

Laser Range Cut-Off
(see 4.3.4)

Monitoring of Automatic Locking
(see 6.8)

Remote Control Connected
(see 5.1)

Kick Guard Active (see 5.2)

Laser Beam Status (see 5.3)

Battery Charge Status (see 5.5)
(Alternatively, the battery symbol changes to a plug symbol when using an external power supply).

Locking Receiver for Y-Axis Connected (analogous symbol for the X-axis) (see 7.1)

Inclination X-/Y-Axis with Sign
(see 4.3.1 und 4.3.2)

3. Set-Up and Alignment

Determine the starting point and target point for alignment of the inclination axis.

Set up the laser over the starting point and aim it at the target point. If necessary, adjust the inclination.



Please note:
Before starting work, especially on steep slopes, check or adjust the inclination and inclination assignment via fixed points or by surveying.

4. General Operation

4.1 Switching On/Off



Press the ON button briefly to switch on.
Press and hold the ON button to switch off. If an FB-11 remote control is connected to the unit at this time, it is also switched off by radio.

4.2 Levelling Screen

After switching on, the device type and serial number are shown. The display then changes to the levelling screen.



Especially in the case of steeper inclinations, the unit should be levelled as accurately as possible in order to keep errors in axis alignment as low as possible. The levelling screen can be left again by briefly pressing the ON button. Without further action, it is automatically exited after approx. 2 minutes.

For checking or readjustment, this screen can be called up again at any time by pressing the ON button briefly.

4.3 Quick Settings

After leaving the levelling screen, the unit displays the main screen as shown in point 2



To make settings here, press the Menu/OK button briefly each time until the parameter to be changed flashes.

To access the comprehensive basic configuration, press the Menu/OK button for about 2 seconds (see chapter 6).



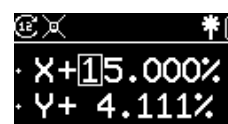
You can exit the quick settings at any time by pressing the ON button briefly.



The actual changes are made using the arrow keys.

You can now make the most important settings in the following order:

4.3.1 X-Axis Inclination



Pressing the arrow keys ←/→ selects either the sign of the inclination or each individual digit. Pressing the arrow keys ↑/↓ changes the value accordingly. Pressing the arrow keys ←/→ simultaneously resets the inclination to 0.000 %.

Pressing the ON button exits change mode. Changes take effect immediately.

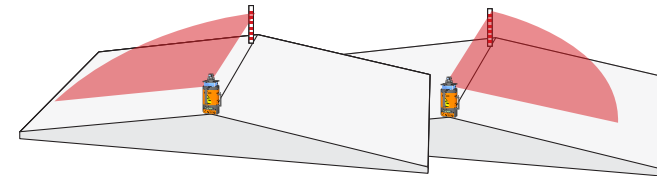
Pressing the Menu/OK button takes you to the next parameter.

4.3.2 Y-Axis Inclination

The inclination is set in the same way as the X-axis.

Remark:

You can reverse the inclination on the corresponding axis by changing the sign; ideal, for example, for creating roof profiles.



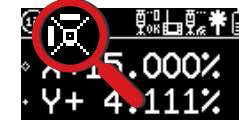
4.3.3 Rotor speed

The rotor speed can be adjusted in a range from 300 (display 3) to 1200 (display 12) rpm with the arrow keys ↑/↓.



It is also possible to switch off the rotation for special applications (rotor speed 0). In this case, the rotor head can be rotated manually by pressing the arrow keys ←/→ as long as the change mode for this setting is still active (flashing).

4.3.4 Laser Range Cut-Off (Not for Speed 0)



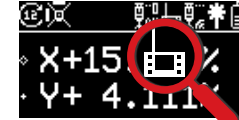
By pressing the respective arrow key, you can switch the laser off and on again in an area, e.g. to exclude reflections on a glass facade. The blanked area is marked by a bar.

The symbol displayed shows the laser in top view. This results in the adjacent radiation characteristic for the upper example setting:



5. Display and Status Indications

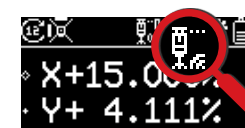
5.1 Remote control



If an FB-11 remote control is connected to the unit, this is indicated by the remote control symbol in the upper status bar.

A remote control delivered with the laser is already programmed for your laser at the factory. In order to program another and new remote control, you must set the laser to "pairing mode", see chapter 6.6. In this case, please refer to the operating instructions for the FB-11 for the operating procedures for the remote control.

5.2 Kick Guard



If the kick guard is not switched off in the settings, it is activated approx. 3 seconds after the last operation and indicated by the status symbol. The sensitivity can be changed in the basic configuration.



If the kick guard is triggered due to a vibration of the unit, the laser beam is switched off and this warning screen appears.

5.3 Laser Beam Status



The status symbol shows the state of the laser. If the laser beam is switched off or flashing, this symbol acts accordingly.

5.4 Power-Saving Mode

The laser can be switched to power-saving mode with the FB-11 remote control, e.g. to bridge longer breaks in work. The following screen is displayed on the laser and remote control:



The unit is switched on again fully by pressing the ON button on the unit or remote control briefly.

5.5 Battery Warning



If the main screen flashes alternately with the battery warning message shown, the battery capacity is still sufficient for about half an hour of operation. The unit then switches off automatically.

5.6 Charging Mode

If the battery charger is plugged in when the unit is switched off, the following charging screen appears:



The animated battery on the left side shows the current charge status. The values on the right side are mainly for service and diagnostic purposes and show the current battery voltage, the charging current, the battery capacity reached and the external charging voltage.

6. Basic Configuration

You can access the basic configuration by pressing and holding the Menu/OK button (approx. 2 seconds). The individual setting options are each shown on different setting screens, through which you can scroll forwards and backwards with the arrow keys ←/→.

You can also move to the next settings page by pressing the Menu/OK button briefly. The current setting is marked with a frame in each case. Using the arrow keys ↑/↓, you can change the respective settings, which are accepted without further explicit confirmation.

You can return to the main screen at any time by pressing the ON button. You can change the basic configuration in the following order:

6.1 Sensitivity Wind/Vibration (Laser Flashing)



If the selected sensitivity is exceeded due to wind or vibration, for example, both the laser beam and the laser beam symbol flash in the status bar of the main screen.

The following guide values apply:

High	Weak influence, approx. 0.005 % or 5 mm/100 m
Middle	Medium influence, approx. 0.010 % or 10 mm/100 m
Low	Strong influence, approx. 0.015 % or 15 mm/100 m

6.2 Kick Guard



This menu is used to set the sensitivity of the kick guard or switch it off completely.

The following applies:

High	High sensitivity until the kick guard is triggered
Middle	Medium sensitivity until the kick guard is triggered
Low	Low sensitivity until the kick guard is triggered
Off	Kick guard deactivated

6.3 Unit



Used to switch the display unit of the inclination to percent (%) or per mil (‰).

6.4 Laser Power

Depending on the task, it may be useful to reduce the laser power.



You can vary it in 5 steps:

- 1 Corresponds to approx. 0.4 mW
- 2 Corresponds to approx. 1 mW
- 3 Corresponds to approx. 1.5 mW
- 4 Corresponds to approx. 2 mW
- 5 < 2.6 mW

Remark: The unit corresponds to laser class 2 in every setting. At speed 0, the laser power is limited to less than 1 mW.

6.5 Laser Beam Mode (Flashing Mode)



In this setting you determine whether the laser beam should flash during the levelling process (Flash) or be switched off (Off).

Note: The laser beam symbol in the status bar of the main screen flashes during levelling even when set to "Off". This function is inactive at speed 0.

6.6 Radio Interface (Bluetooth)



If the laser is operated with locking receivers or a remote control, radio operation must be activated (On). If this is not the case, the radio interface can be switched off (Off) to reduce power consumption. In order to connect a new remote control to the laser, it must be in pairing mode (Pairing). Please refer to the operating instructions for the remote control for the required operating procedures.

6.7 FE-54 Configuration



This menu is used to assign an FE-54 locking receiver to a specific axis. To do this, set the FE-54 to programming mode by holding down its ON button with the receiver switched off until two LEDs light up simultaneously.

Then select the desired axis in the menu above and confirm it with the Menu/OK button. The laser then searches for the receiver via radio (display: SEARCH) and then configures it:



If the configuration is successful, this is indicated by a tick:



The FE-54 is now ready for use on the selected axis.

6.8 Monitoring of Automatic Locking

If this function is activated, the laser reports an error as soon as the optical and/or radio connection to the locking receiver is interrupted.



Laser/Con. Monitoring of the laser beam connection and the radio connection
Laser Monitoring of the laser beam connection
Off No monitoring/function deactivated

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6.9 Charger Mode (+12 V Start Mode)



Especially for fixed installations with external power supply, it may be helpful to handle the behaviour of the laser differently when the external power supply is switched on and off at the charging socket:

Auto On/Off The laser switches on and off when the external power supply is connected and disconnected.
Auto On The laser switches on when the external power supply is connected. Switching off must be done at the unit.
Charging The laser switches to charging mode when the voltage is applied (default setting).

6.10 Automatic Levelling



On = Automatic levelling switched on (default setting)
Off = Automatic levelling on both axes switched off

6.11 Web Documents



If you scan the QR code shown with a mobile phone or tablet, you will be redirected to a page on our website where you can call up all documents relevant to this laser, such as operating instructions or declarations of conformity.

6.12 Default Settings



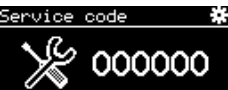
To reset the laser to its default settings, select "Reset" with the arrow key ↑ and confirm with the Menu/OK button.

6.13 Language Setting



Select your language.

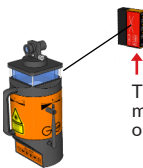
6.14 Service Code



Is used for service and maintenance purposes only.

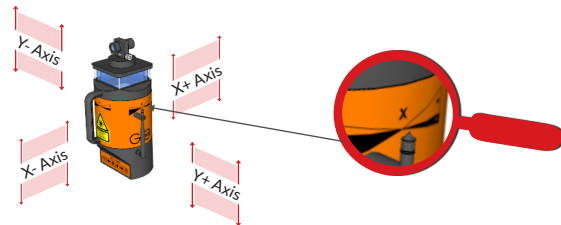
7. Working with the Locking Receiver

The locking receiver is factory set for operation on the X+ axis. However, you can change the axis assignment at any time as described in 6.7. You can operate the laser with either one or two locking receivers on the X- and Y-axes. The procedure described then applies analogously to the second axis. Please note that the locking receiver is always operated with the battery compartment cover facing downwards, otherwise malfunctions will occur. The following illustration shows the schematic set-up on the X+ axis.



The battery compartment cover must always face down when operating the receiver!

You can also see the axis assignment from the stickers on the laser:

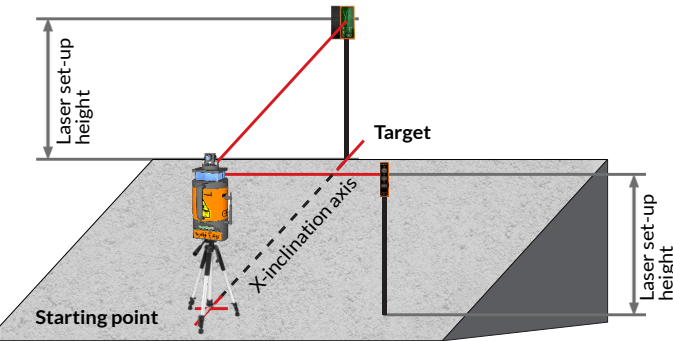


7.1 Inclination Measurement Parallel to the Ground / Inclination Transfer on the X-Axis

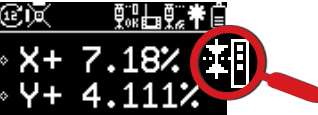
Set up the laser as usual over the starting point and aim the X-inclination axis at the target point. If necessary, set the desired cross-inclination of the Y-axis. After switching on the locking receiver, it is in measuring mode, without controlling the laser.

Remark: The receiver has two sensitivity levels: After switching on, it is in rough measuring mode with +/- 1 mm accuracy. This is signalled by slow flashing of the status LED on the receiver. By briefly pressing the ON button, you switch to the more precise measuring mode with an accuracy of +/- 0.1 mm (two LEDs flash alternately).

Attach the receiver to a measuring rod and set the height directly in front of the laser to its working height. This height is then transferred to the target point.



Then press the A button on the receiver to establish the radio connection to the laser. An active radio connection is indicated by a receiver symbol in the corresponding axis in the display.



After the radio connection has been established, the automatic receiver search (SCAN) is started on the corresponding axis:



When the laser is received, the laser plane is steered to the centre of the receiver and locked there. The approximate inclination value is then shown. You can then immediately take the FE-54 out of laser reception and switch it off. The laser takes over the current inclination value and displays it after approx. 10 seconds.

Alternatively, the FE-54 can also be installed fixed to achieve continuous locking of the laser plane.

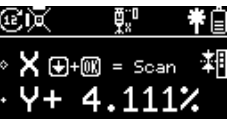
7.2 Further Operating Displays

7.2.1 No Laser Reception



If laser reception is interrupted, a crossed-out laser symbol appears in the corresponding axis.

If you then select the axis with the Menu/OK button, you can start the automatic search for the receiver by pressing the Menu/OK button and arrow keys → simultaneously:



Alternatively, you can start the SCAN process by pressing the A button on the locking receiver.

7.2.2 Monitoring of Automatic Locking



If monitoring of automatic locking is activated in the settings (see chapter 6.8), this symbol appears in the status bar. Correct functioning of the FE-54(s) is indicated by a small "OK" in the lower right part of the symbol. In case of an error, the respective axis designation "X" or "Y" flashes at this point instead.



If the radio connection and/or the line-of-sight from the laser to the locking receiver is interrupted according to the settings, the adjacent screen appears after approx. 1 minute and the laser beam switches off. You can acknowledge the error message by pressing the ON button briefly.

7.2.3 Locking Receiver Low Battery



A low battery condition of the receiver is indicated by the flashing of a small battery symbol inside the receiver icon. Quick replacement is advised.

8. Manual Operation

In principle, it is possible to switch off automatic levelling on both axes for special applications (see chapter 6.10).

In this case, two crossed-out spirit levels are shown in the main display instead of the inclination values. To move the axes, briefly press the Menu/OK button until both axes flash. You can then adjust the X-axis with the arrow keys ↑/↓ and the Y-axis with the arrow keys ←/→.

It is also possible to control the axes on one or two axes via the FE-54 locking receiver when automatic operation is switched off.



The following illustration shows an example of the main screen when automatic levelling is switched off and with remote control of the Y-axis via FE-54.

For more information, please contact your dealer for these special cases.

9. Power Supply/Charging the Battery

The laser has an integrated Li-ion battery. Alternatively, it can be powered by an external 12 V DC power source using the connection cable 0117.02.

- It is charged exclusively using the mains power supply unit/battery charger type NE-81.
- Protect the charger from moisture and only use it indoors.
- Permissible charging temperature 0° C to + 40° C, preferably + 10° C to + 25° C.
- Take the unit out of the case for charging.
- Charging is finished after approx. 5 hours.
- Low ambient temperatures shorten the operating time, high temperatures shorten the battery life.
- Defective batteries must be disposed of correctly.

10. Checking Adjustment

Set up the laser in an upright position and adjust both axes to 0.000 % inclination. Mark the height of the laser beam at the desired measuring distance. Then turn the laser device on the tripod by 180° and make a new mark. If the adjustment is correct, the first mark does not deviate from the second mark. Turn the unit by 90° and repeat this procedure. If the unit shows a misalignment, please contact your dealer or our service department.

11. Troubleshooting

- No laser beam
 - The unit is levelling and "Laser Beam Mode" is set to "Off" (see 6.5).
 - Kick guard has triggered (warning screen is shown) (see 5.2)
- Low range
 - Clean laser exit window

3. Rotor head does not rotate

- Check rotor speed (see 4.3.3)

4. Laser beam flashes slowly

- Maximum inclination reached (limit switch). Move the unit into the levelling range by tilting it forwards. (See 4.2)

12. Maintenance

The laser does not require any special maintenance. Keep the electrical connections clean. Do not clean with a water jet; clean glass parts with a clean, soft cloth. Store the laser in a dry condition. Always transport the laser in its original case.

13. Technical Specifications

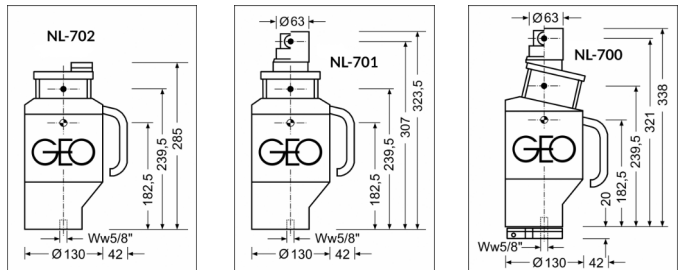
Laser class: 2, P_P < 2.6 mW
Laser: diode laser, visible red, 658 nm
Range depending on ambient conditions: to 500 m, Ø 1000 m
Inclination range NL-701, NL-702: X-axis -5 % to +20 %
Inclination range NL-701, NL-702: Y-axis -5 % to +5 %
Inclination range NL-700: X-axis -5 % to +50 %
Inclination range NL-700: Y-axis -5 % to +12 %
Self-levelling range: over the complete inclination range
Speed setting: on 0 and from 300 - 1200 rpm
Reading accuracy: 0.001 %
Permissible deviation: ±5 mm/100 m
Operating time with internal Li-ion battery: up to 27 hours
External power supply: 11 to 14 V DC with cable 0117.02
Undervoltage cut-off: yes
Watertight: to 0.35 bar
Temperature range: - 10° C to + 50° C
Weight: 3.6 kg
Working distance radio remote control: to 350 m
The range is restricted by obstructions in the path of the radio signal.
Frequency range: 2.4 GHz ISM band
Transmission power < 100 mW (EIRP)

Conformity with national regulations:
GEO-Laser GmbH herewith declares that the devices NL-70x conform to the following directives: 2014/30/EU, 2014/53/EU and 2011/65/EU.

In countries with national regulations that are not covered by the European directives the operator must himself check the provisions and permits for use. The homologation is only valid in conjunction with an antenna up to 3 dBi.

Guarantee 24 months
WEEE Reg. No. DE 18149249

14. Dimensional Drawing



15. Standard Delivery Package

No.	Order No.	Type	Description
1	0002.700.1	NL-700	Two-axis inclination laser with aiming device, up to 50 % and rotary axis
or	0002.701.1	NL-701	Two-axis inclination laser with aiming device, up to 20 %
or	0002.702.1	NL-702	Two-axis inclination laser with sight, up to 20 %
with			
2	0037.25	NE-81	Mains power supply unit/battery charger
3	0077.36		Transport case



16. Optional Accessories

No.	Order No.	Type	Description
1	0009.46.1	FE-54	Locking receiver for light plane
2	0026.16	FB-11	2-way radio remote control
3	0045.04	DS-80	Rotary axis (included with NL-700)
4	0117.02		12 V Li-ion connection cable
5	0047.00		Battery connection (C)

