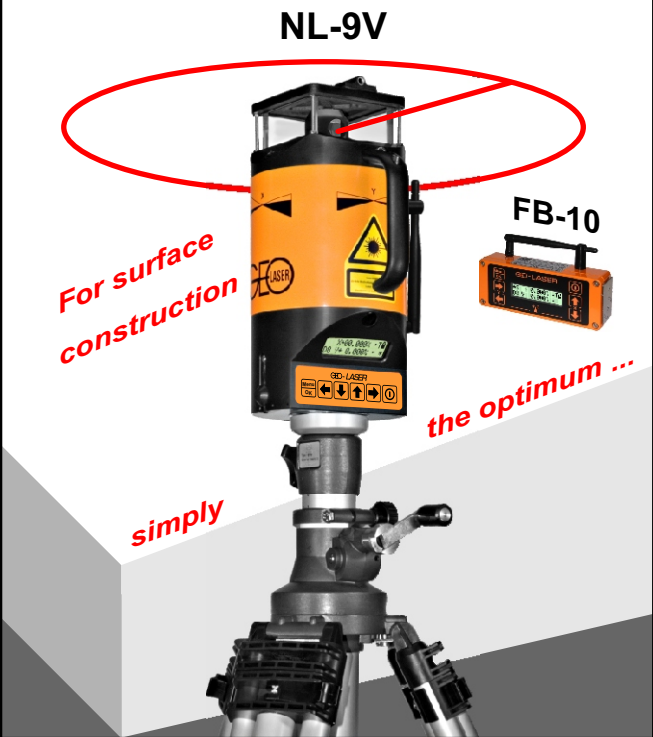




Operating Instructions

Two-Axis Inclination Laser NL-9V, NL-9, NL-8



Congratulations on your new GEO laser

This operating instructions contain enclosed in addition to information on how to use the laser **important safety information**.

Please note: First read the safety instructions on the supplement page 1 - 3 and then the operating instructions carefully before using the laser.

1. Set-up, Alignment

Select the reference point and aiming point to align the inclination axis. Set up the laser on top of the reference point and aim it at the target point.

Adjust the inclination if necessary.

Note:

Before starting work, especially in the case of steep inclines, check and adjust the inclination and inclination assignment via fixing points or by surveying measuring.

2. Device Description

2.1 Function

The automatic 2-axis inclination lasers, type NL-8/-9/-9V are all-round lasers capable of electronic self-levelling over two axes. They project a light plane as reference plane into space, horizontally, with single or double inclination up to steep inclination.

The lasers are equipped with a radio transmitter and radio receiver for the data transfer between FB-10 remote control and FE-53 locking receiver.

2.2 Inclination Symbol

Enables clear inclination assignment.

The +/- and X/Y symbols indicate the inclination. The + ranges are light and the - ranges dark.

The symbol also shows the change in inclination relative to the centre axis.

2.3 Clipp-Spring Clamp

For the protective cap of the aiming device.

2.4 Charging Socket

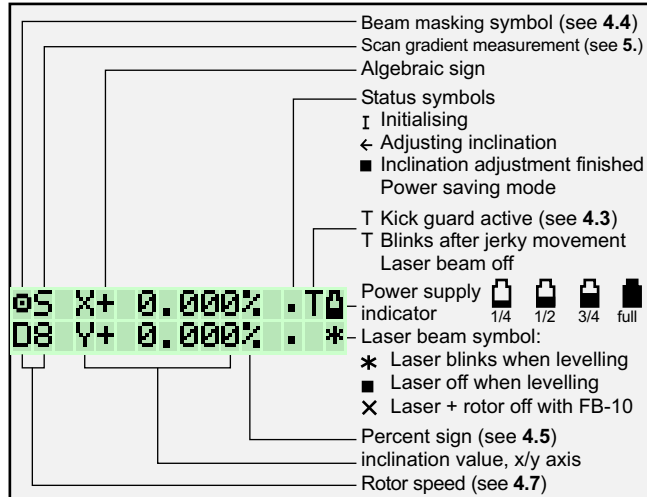
Behind the dust guard cap.

2.5 Bulging GroundArea, niro St.

Central fastening thread 5/8".

2.6 LCD-Display

Clearly legible, illuminated display for on/off, company data, device data, rotor speed, X/Y inclination, duty type and battery level.



2.7 Sighting Device NL-9V. Aiming Device NL-9/-8



The aiming telescope is located under a protective cap and is used for the quick alignment of the inclination axis in all four directions, also when sighting in different heights. The NL-9V is equipped with an optical sighting device.

2.8 Rotor Head

Rotor speed adjustable from 600 - 1000 rpm.

2.9 Box Level

Aid for set-up, for observation from above.

2.10 Antenna Lock

2.11 Robust Light Metal Housing
Plastic-coated, swept and filled with nitrogen, 100 % watertight.

2.12 Laser Warning Sign

Laser class 2, P_e < 2.6 mW

2.13 Handle

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

2.14 Antenna

2.15 Keyboard

Clear layout. User-friendly, self-explanatory keys.

2.16 Rotation Axis with Fine Adjustment Screws (optional NL-9/-9V)

Central fastening thread 5/8".

Turn screws:
apart = loosen fastening
in the same direction = adjust direction
in opposite direction = fasten

3. Buttons

= 3.1 On/Off Button

The device is switched on by pressing this button.

The device and company data are then shown, followed by the operating display with the last settings.

The device is then levelled and referenced on the zero point automatically. After the levelling phase the laser beam and laser beam symbol stop blinking. If this does not happen, the device must be moved into the levelling range by tilting it forwards.

The display illumination switches off after approx. 30 seconds automatically. The illumination is switched on again by pressing the On/Off button shortly.

The arrow buttons keep locked for reasons of unintended settings. The release is made by pressing the menu/OK button.

To switch off the device, press the On/Off button until "Auf Wiedersehen!" appears.

= 3.2 Arrow Buttons - Release Select - Confirm

Press the Wahl/OK button to select and to activate the settings for X/Y inclination, beam masking, if necessary (see 3.9) and grade swap (see 3.8). The activated item blinks.

If, after setting the speed, the button is pressed again or a time of about 20 seconds passes, the adjustment guard is reactivated automatically. This means the arrow buttons do not work.

or = 3.3 X Inclination Setting

Pressing the arrow buttons briefly changes the inclination value by 0.001 %. The value is changed with increasing speed if the button is kept pressed.

+ = 3.4 X Inclination Setting to Zero

The inclination value is set to 0.000 % by pressing the two arrow buttons at the same time.

or = 3.5 Y Inclination Setting

Pressing the arrow buttons briefly changes the inclination value by 0.001 %. The value is changed with increasing speed if the button is kept pressed.

+ = 3.6 Y Inclination Setting to Zero

The inclination value is set on 0.000 % by pressing the two arrow buttons at the same time.

3.7 Quick Setting

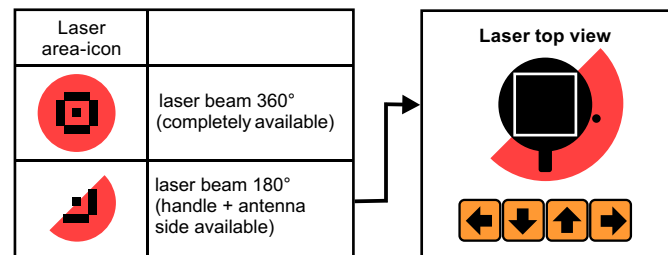
In addition to the respective arrow buttons also press the On/Off button.

or = 3.8 Grade swap: minus or plus (to activate see 4.6)

or = 3.9 Beam masking (to activate see 4.4)

By the laser range deactivation the masking of laser beam is possible at up to 3 optional sides.
When the laser range symbol is blinking, one side can be switched off/on by pressing an arrow button.

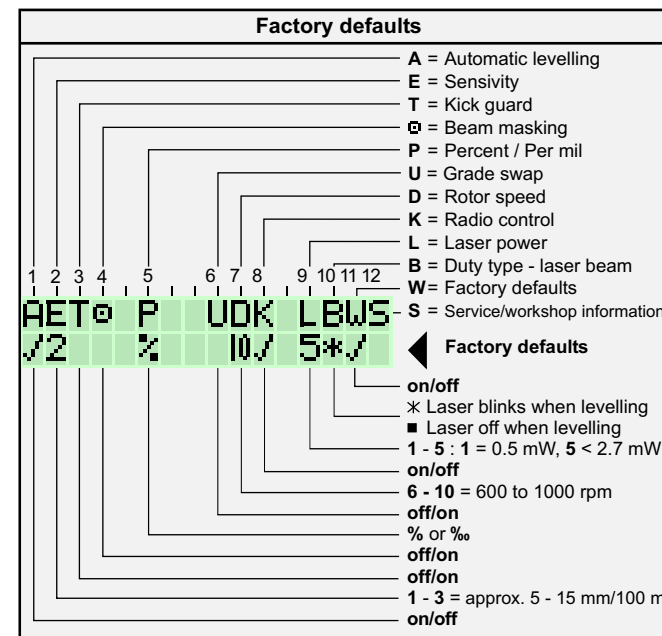
Please note: No symbol line, no laser beam.



4. Device Settings

= Select Menu Level

Keep the button pressed until the adjustment menu is shown.



Changing the Factory Defaults

or = Select Letter
The selected letter begins to blink.

or = Change Settings

= Back to Operating Display
or automatically after 25 seconds.

4.1 Automatic Levelling Cut-Out

= Automatic levelling switched on (factory defaults)

= Automatic self-levelling cut out
On the display appears in front of the X an S and behind the Y and OFF.
Now any required inclination can be adjusted by fixed points.
For electromotive fine/coarse adjustment of the laser beam, push the respective arrow buttons. Longer pushing changes the direction with increasing speed.

4.2 Sensitivity Setting Wind/Vibration

The self-levelling function corrects even the smallest deviation. Additionally the laser beam and the laser beam symbol at the operating mode display blink when the limit values of step 1 to 3 are exceeded, i. e. by influence of wind and/or vibration.

1 = 0.005 % no effect
2 = 0.010 % weak effect (factory defaults)
3 = 0.015 % strong effect

4.3 Kick Guard (Automatic Laser Beam Cut-Out)

= Kick guard switched on. It is only active after 30 sec. Then a T appears in front of the battery symbol at the operating mode display.

This means the laser is switched off automatically as a precautionary measure in the event of a jerky movement (bump). The T then begins to blink. The laser must be switched on again and the positioning checked and corrected if necessary.

= Factory defaults: Kick guard switched off.

4.4 Beam masking (see 3.9)

Select laser range deactivation.

= Laser range deactivation off (factory default).

1 = Laser range deactivation on.

2 = Laser range deactivation on is stored even after the laser is switched off.

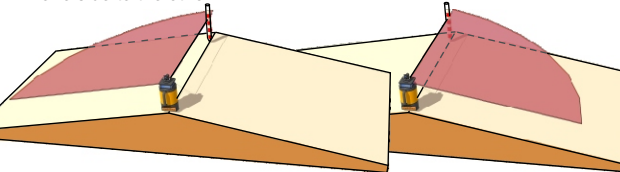
4.5 Inclination value display in % or ‰

Select between % or ‰ indicator.

= factory defaults

4.6 Grade swap

It is possible to transfer the inclination i. e. of a roof profile from one side to the other.



= on. When setting the inclination, + or - can be selected and then inverted.
 = off (factory default)

Please note: Setting only possible in a range of ± 5 %.

4.7 Setting of Rotor Speed

With the arrow buttons from 600 to 1000 rpm.

6 = 600 rpm

10 = 1000 rpm (factory defaults)

4.8 Radio Control On/Off

Is required for the operation of the remote control FB-10 or the locking receiver FE-53.

= off (energy-saving mode)

= on (factory defaults)

4.9 Laser Power

The laser power can be regulated in 5 steps.

approx. 1 = 0.5 mW, 2 = 1 mW, 3 = 1.5 mW, 4 = 2 mW and
5 = < 2.6 mW (factory defaults)

4.10 Laser Beam Modulation Mode

* = Laser beam and laser beam symbol at the operating mode display blink when levelling (factory defaults).

■ = Laser beam is off when levelling.
However the symbol blinks at the operating mode display.

4.11 Factory defaults

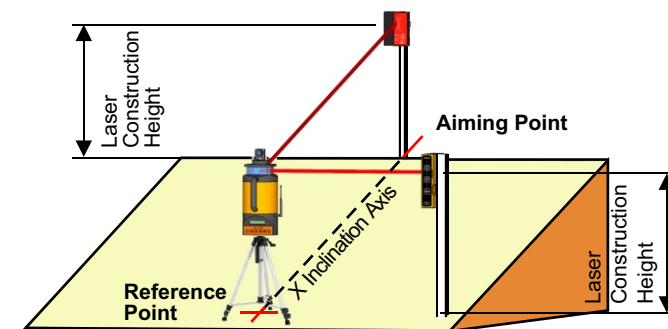
= All set to factory defaults.

4.12 Service/Workshop Notice

First off all a phone no. for service/help appears. Then authorized personnel can put in a numerical code to come to the adjustment mode.

5. Inclination Measurement Parallel to Ground

Even if the inclination is unknown, it can simply be adapted to the ground.



5.1. Operating Instructions

Mount laser above the reference point and align the X inclination axis to the aiming point.

Adjust banking in the Y axis.

Measure laser construction height with the locking receiver FE-53 and a levelling rod. Transfer this height to the aiming point.

Release the automatic scan with the A button of the receiver.

The light plane is now automatically directed within typically 2 min./max. 5 min. to the centre of the receiver and locked there.

The LEDs at the FE-53 are blinking alternately. On the display OFF and the approx. inclination value are shown alternately.

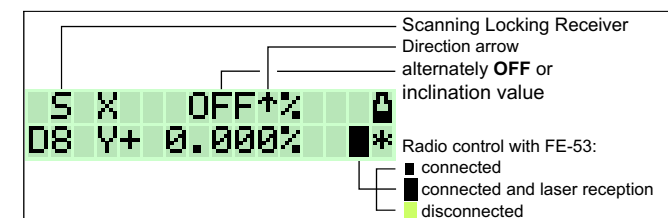
Now the FE-53 can be removed abruptly off the laser light plane and switched off. After approx. 30 seconds the exact inclination value is shown on the display and automatically locked. The % symbol is blinking.

Alternatively the FE-53 can be mounted permanently to realize a long-term fixing of the laser light plane.

Please note: Never operate the remote control or inclination setting at the laser in this mode because by this the laser light plane is moved.

Precondition is an established radio link to the FE-53, indicated by the symbol on the LCD display.

5.2 Display Inclination Measurement



6. Power Supply

7.4 V DC internal lithium ion rechargeable battery or 12 V DC external rechargeable battery via connection cable 0117.02.

6.1 Battery Charging

- Carry out charging only with the power and charging unit, type NE-80 or a 12 V DC external rechargeable battery via connection cable 0117.02.
- Keep charger dry and only use in rooms.
- For charging take the laser out of the transport case.
- Permissible charging temperature 0° C to + 40° C, as best + 10° C to + 25° C.
- After approx. 5 hours the charging time is finished. The display turns off or the battery symbol shows a full battery.
- Low ambient temperatures reduce the running time, high temperatures reduce the battery life.
- Damaged batteries must be disposed.

7. Radio Control

1. The serial numbers of the laser, FE-53 and FB-10 must correspond with each other.
2. Simultaneous operation of FE-53 and FB-10 is not possible.

8. Adjustment

8.1. Checking the Adjustment

Set-up the laser upright and mark laser beam in the height of the required measuring distance. Turn laser device on the tripod by 180°, mark once again. If the adjustment is perfect, the first mark does not deviate from the second one. Turn device by 90°, repeat this process.

8.2. Adjustment

The laser can be adjusted in the field without having to open the device. For safety reasons, however, adjustment should only be carried out by authorized personnel. See the special adjustment instructions in this regard.

9. Troubleshooting

1. No laser beam - check battery charge.
2. Low range - clean laser beam exit window.
3. Laser beam blinks slowly - move device into the levelling range by tilting forwards.
If the errors are not corrected within 2.5 minutes, the device is switched off automatically.
4. Laser switched off automatically (kick guard). Switch on laser again.

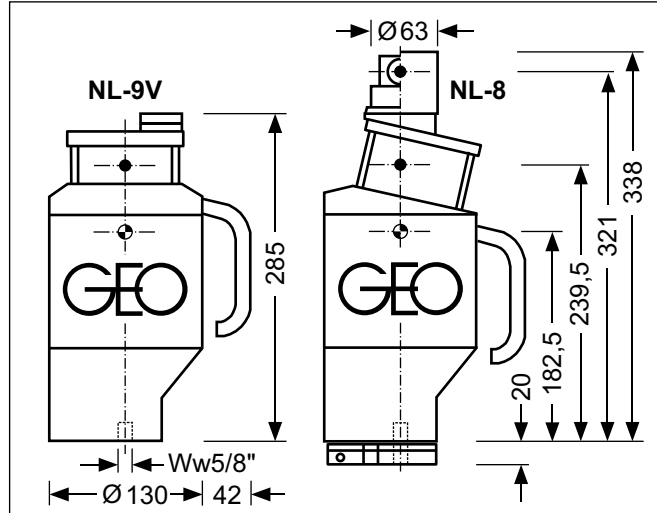
10. Maintenance

The laser requires no special maintenance. Keep the electrical connections clean. Do not clean with water spray.
Clean glass parts with a soft, clean cloth. Store dry.
Always transport the laser in its original case.

Table of Contents

| | Page | Page |
|--|-------|--|
| S1 Safety Information | 1 - 2 | 6. Power Supply 10 |
| S2 Laser Safety | 2 - 3 | 7. Radio Control 11 |
| S3 Repair | 3 | 8. Adjustment 11 |
| S4 EMC | 3 | 9. Troubleshooting 11 |
| S4 Guarantee | 3 | 10. Maintenance 11 |
| S5 Disposal. | 3 | 11. Dimensional Sketch 12 |
| 1. Set-up and Alignment | 5 | 12. Technical Specifications 12 |
| 2. Device Description | 5 - 6 | 13. Standard Delivery Package 13 |
| 3. Buttons | 6 - 7 | 14. Optional Accessories 13 |
| 4. Device Settings | 8 - 9 | 15. Laser Receiver FE-53 14 - 15 |
| 5. Inclination Measurement | 10 | 16. FB-10 Wireless Control 16 - 17 |

11. Dimensional Sketch



12. Technical Specifications NL-8, NL-9, NL-9V

Laser class: 2, PP < 2.6 mW
Laser: diode, visible red, 658 nm
Range depending on circumstances: to 500 m, Ø 1000 m
Inclination range NL-9, NL-9V: X axis from - 5 % to + 20 %
Inclination range NL-9, NL-9V: Y axis from - 5 % to + 5 %
Inclination range with device rotation: X axis ± 20 % / Y axis ± 5 %
Inclination range NL-8: X axis from - 5 % to + 50 %
Inclination range NL-8: Y axis from - 5 % to + 12 %
Inclination range with device rotation: X axis ± 50 % / Y axis ± 12 %
Self-levelling range: over the complete inclination range
Reading precision: 0.001 %
Permissible deviation: ± 5 mm/100 m
Speed adjustment: from 600 - 1000 rpm
Operating time with 7.4 V DC Li Ion rech. battery: to 27 hours
External power supply: 11 V DC to 14 V DC with cable 0117.02
Low battery cut-out: yes
Watertight: to 0.35 bar
Temperature range: - 10° C to + 50° C
Weight: 3.6 kg
Working distance of radio control: up to 350 m
The range is reduced by obstacles in the way of the radio signal.
Guarantee: 24 months
CE: certified

Frequency range: 2.4 Ghz ISM Band
Transmission power: < 100 mW (EIRP)
Conformity with national regulations:
GEO-Feinmechanik GmbH herewith declares that the devices NL-8/-9/-9V conform to the fundamental requirements and other relevant regulations of directive 1999/5/EG.
The declaration of conformity can be found at the following address: <http://www.geo-laser.de>. In countries with national regulations that are not covered by European directives the operator must himself check the provisions and permits for use.
The permit for use is only valid for use with antenna of up to 3 dBi.

13. Standard Delivery Package

| No. | Order No. | Type | Description |
|------|------------|---------|---|
| 1 | 0001.345.1 | NL-8 | Two-axis inclination laser with special aiming device, up to 50 % and rotation axis |
| or | 0001.355.1 | NL-9 | Two-axis inclination laser with special aiming device, up to 20 % |
| or | 0001.356.1 | NL-9V | Two-axis inclination laser with sighting device, up to 20 % |
| with | 2 | 0037.18 | Power supply/Battery charger |
| | 3 | 0077.36 | Transport case |



14. Optional Accessories

| No. | Order No. | Type | Description |
|-----|-----------|-------|--|
| 1 | 1035.29 | | Lightning 2 laser receiver |
| 2 | 1035.27 | Storm | Laser receiver with digital measured value display |
| 3 | 0009.36.1 | FE-53 | Locking receiver for laser light plane |
| 4 | 0026.07 | FB-10 | Two-way radio control |
| 5 | 0045.04 | DS-80 | Rotation axis (NL-8: in standard delivery package) |
| 6 | 0117.02 | | 12 V DC Li Ion connection cable |
| 7 | 0047.00 | | Rechargeable battery connection |



| No. | Order No. | Type | Description |
|-----|-----------|--------|---|
| - | 0085.03 | LM5 | Laser Messfix S, 5 m |
| - | 1001.03 | TN21 | Flexi rod 2.6 m |
| - | 8040.01 | | Floor support for flexi rod TN21 |
| - | 1005.12 | TNL5 | Telescopic levelling rod, 5 m |
| - | 1021.09 | FS-23 | Al tripod, min. 1.05 m, max. 1.70 m |
| - | 1021.21 | FS-30L | Al crank tripod, min. 0.95 m, max. 2.85 m |
| - | 0059.06.1 | ST-10 | Al crank tripod, min. 0.55 m, max. 0.94 m |
| - | 0059.01.1 | ST-20 | Al crank tripod, min. 0.93 m, max. 1.99 m |
| - | 0059.11.1 | ST-30 | Al crank tripod, min. 1.18 m, max. 3.00 m |
| - | 0059.04.1 | ST-40 | Al crank tripod, min. 1.88 m, max. 3.91 m |

15. Locking and Laser Receiver FE-53 (see 5.)

Functions

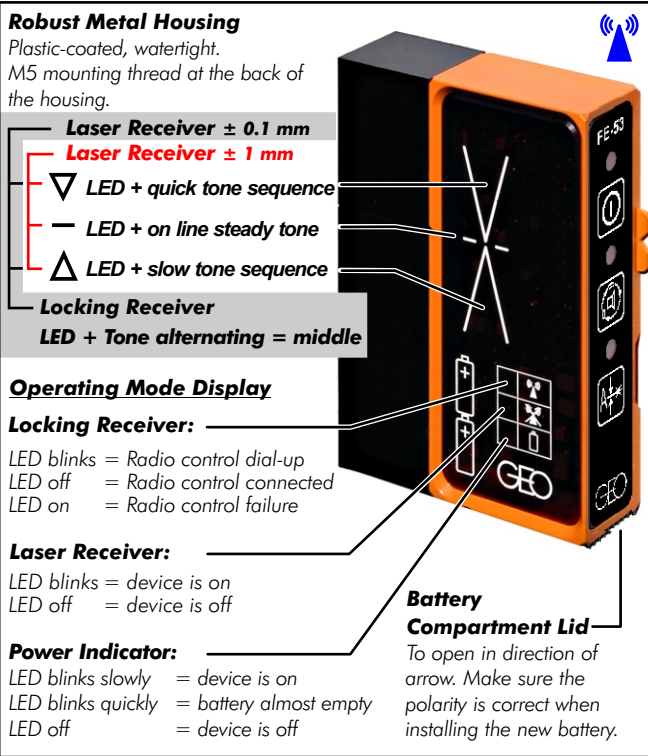
15.1 Measuring Receiver

The laser receiver type FE-53 receives the rotating laser beam and indicates its position to the light plane by way of three LEDs and various signal tones.

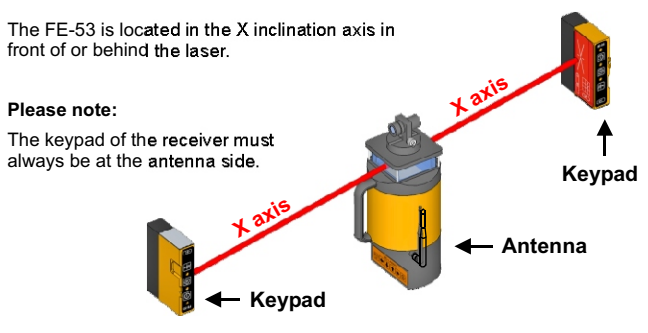
15.2 Locking Receiver for the X Inclination Axis

It directs the rotating laser beam over the whole inclination range automatically to the centre position of the receiver and locks it there.
Accuracy to ± 1mm/100 m.

15.3 Receiver Description



15.4 Positioning of Locking Receiver



15.5 Operation

ⓘ = switch on/off

1. x briefly = Measuring receiver with an accuracy of +/- 1 mm.
Move FE-53 towards the light plane until the reception of the light plane is indicated by LED and signal tone.
To reach the desired accuracy move the FE-53 in arrow direction:
Accuracy: One LED blinks in the middle = +/- 1 mm
2. x briefly = Measuring receiver with an accuracy of +/- 0.1 mm
Accuracy: Two LED's blink alternately = +/- 0.1 mm.
3. x briefly = Back to measuring receiver with an accuracy of +/- 1 mm.
- 1 x long = switch off
Press button until the LED of the operating mode display flashes accompanied by a tone sequence or automatically after 15 min. without reception.

🔊 = tone loud, quiet or off

⬅➡ = Switch over from Measuring to Locking Receiver: search, find and lock automatically

1. x briefly = The radio link with the laser is set-up and the laser light plane is directed to the centre of the receiver and locked there automatically.
As soon as the rotating laser beam hits the arrow range of the receiver, it is automatically directed to the middle and locked there.
The direction of the laser light plane can be changed by slowly moving the laser receiver. The reception is indicated by a symbol at the laser and LEDs at the receiver:

- LEDs blink simultaneously right and left > laser searches for receiver
- LED blinks right or left > receiver found
- LEDs blink alternately right and left > setting finished: centre found and locked

2 x briefly = laser searches for the receiver again.

Switch off receiver to switch off the locking function.

15.8 Outstanding Technical Specifications:

Range depending on ambient conditions: 2 to 350 m
Distance to illuminants and high-voltage power lines: > 1.5 m
Accuracy direction automatic: to ± 1 mm/100 m
Accuracy laser receiver: ± 1 mm or ± 0.1 mm
Reception range/angle: 85 mm / > 100°
Wave length: 610 - 900 nm
Rotor speed: 600 - 1000 rpm
Signal tone: loud, quiet or off
Power supply: 2 x round cell/AA (battery or rech. battery)
Current consumption: approx. 100 mA (operating time to 25 hours)
Housing: watertight, except battery cover
Dimensions / weight: 140 x 100 x 32 mm / 0.52 kg
Frequency range: 2.4 Ghz ISM Band
Transmission power: < 100 mW (EIRP)

Conformity with national regulations:
GEO-Feinmechanik GmbH herewith declares that the FE-53 conform to the fundamental requirements and other relevant regulations of Directive 1999/5/EG.
The declaration of conformity can be found at the following address: <http://www.geo-laser.de>. In countries with national regulations that are not covered by European directives the operator must himself check the provisions and permits for use.
The permit for use is only valid for use with antenna of up to 3 dBi.

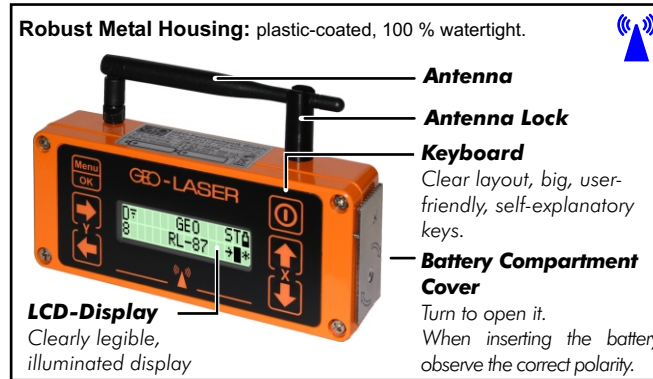
Guarantee: 24 months
CE: certified

16. Wireless Control FB-10

16.1 Functional Description

The remote control FB-10 allows a wireless operation of the GEO inclination lasers.
The laser and remote control each have identical keypads, operation displays, menu displays, radio transmitters and receivers.
Range with visual contact: up to 350 m.

16.2 Device Description



16.3 Button Description (see 3.)

Apart from the ON/OFF button, the functions correspond to those of the keyboard and display of the laser.

Note: It is not possible to switch on the laser and the radio transmission and to switch off the laser by the FB-10.

ⓘ = ON only FB-10

- 1 x briefly = ON: The message "Try to connect .. Please wait .." appears and the remote control connects to the GEO laser within approx. 20 seconds.

1. x long = 🚫 laser beam + rotor switched off (stand-by mode)

2. x long = 🚫 laser beam + rotor switched on again

Note: Press the button until the desired symbol 🚫 or 🚫 appears.

OFF = Auto off after approx. two minutes if no buttons pressed.

16.4 Error Messages:

"Connection Lost!": Communication between laser and remote control interrupted - establish visual contact with the laser or reduce the distance to the laser.
Activate wireless remote control in the menu of the GEO laser (see instructions for use of laser).

"BATTERY LOW": Replace batteries soon.
The LCD light stays off to save power.

"BATTERY EMPTY!": The batteries must be replaced immediately.

Note: The radio transmission can be switched off either in the second menu level of the laser or of the remote control. A renewed switch-on of the radio transmission is possible only at the laser.

16.5 Technical Specifications FB-10:

Working distance: up to 350 m
The range is reduced by obstacles in the way of the radio signal.
Frequency range: 2.4 Ghz ISM band
Transmitting power: < 100 mW (EIRP)

Conformity with national regulations:
GEO-Feinmechanik GmbH herewith certifies that the device FB-10 conform to the fundamental requirements and other relevant regulations of the directive 1999/5/EG. The declaration of conformity can be found at the following address: <http://www.geo-laser.de>.
In countries with national regulations not covered by European directives it is necessary to check whether regulations and homologations allow use.
The homologation is only valid in conjunction with an antenna up to 3 dBi.

Housing: watertight
Power supply: 2 x mignon cells/AA (disposable or rechargeable)
Current consumption: max. 300 mA, min. 55 mA
Operating time: approx.: 10 hours with alkaline battery, 20 hours with NiMH rechargeable battery

Dimensions (without antenna): 150 x 70 x 35 mm
Weight: 0.44 kg

Guarantee: 24 months
CE: certified



GEO - partner of the construction industry for 50 years

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