

Operating Instructions

Rotary Laser RL-78L/-79L

Locking automatic in combination with FE-53:
 RL-78L: up to 200 m!
 RL-79L: up to 500 m!

- search for alignment
- find alignment
- lock alignment

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. Description

1.1 RL-79L

The automatic rotary laser RL-78L/-79L is an all around laser for horizontal and vertical use capable of electronic self-levelling over three axes. It emits a laser beam which turns into a light plane. It is additionally equipped with manual rotor setting, aligning function and box levels for horizontal and vertical mounting each.

1.2 Robust Light Metal Housing

Plastic-coated, swept and filled with nitrogen, 100 % watertight.

1.3 Laser Warning Sign

RL-78L: Laser class 2R, < 1 mW
 RL-79L: Laser class 3R, < 5 mW

1.4 Keyboard

Clear layout. Big, user-friendly, self-explanatory keys.

1.5 Charging Socket

Behind the dust guard cap.

1.6 Box Level

Aid for horizontal set-up.

1.7 Antenna Lock

1.8 Bulging Ground Area, niro St.

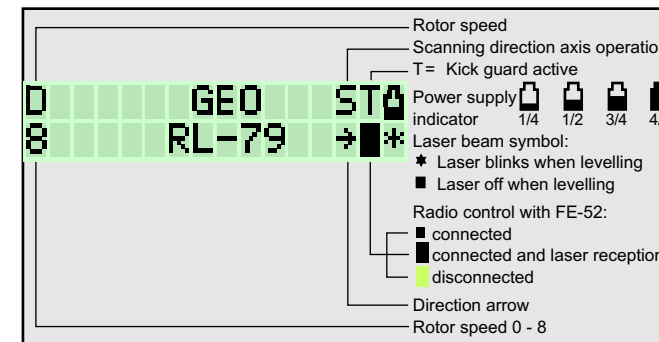
Central fastening thread 5/8".

1.9 Battery Box

Watertight with Li Ion rechargeable battery and safety valve.

1.10 LCD Display

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



Horizontal Set-Up

1.6 Box Level

Aid for horizontal set-up.

1.7 Antenna Lock

1.8 Bulging Ground Area, niro St.

Central fastening thread 5/8".

1.9 Battery Box

Watertight with Li Ion rechargeable battery and safety valve.

1.10 LCD Display

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

Vertical Set-Up

1.13 Rotor Head

Rotor speed adjustable from 0 - 800 rpm

1.14 Box Level

Aid for vertical set-up

1.15 Manual Rotor Setting

with rotation

Pressed in: rotor motor cut out

Extracted: rotor motor cut in again

By turning: setting of the desired position

1.16 Handles

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

1.17 Antenna Radio Remote Control

(see 8.)

2. Buttons

= 2.1 ON/OFF Button

The device is switched on by pressing this button. One after the other the device and company data are then shown, followed by the LCD main level (see 1.10). The device is then levelled 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. To switch off the device, press the ON/OFF button until "Auf Wiedersehen !" appears.

= 2.2 Selection - Adjustment - Acknowledgement

By pushing the menu/OK button, one after the other the rotor speed **D** and the scanning operation for automatic locking of the direction axis are selected (see 2.7). For identification the position cleared blinks and can be adjusted by the arrow up/down buttons as per the following description. If the adjustment does not take place within approx. 20 seconds, the clearing is cancelled.

or = 2.3 Setting of Rotor Speed

When **D** is blinking, the rotor speed changes by 100 rpm when pushing briefly the arrow button. Setting range: 0 - 800 rpm

+ = 2.4 Zero Setting of Rotor Speed

When **D** is blinking, the rotor speed is set to zero.

or = 2.5 Direction Setting (horizontal set-up)

Push the corresponding button for electromotive fine/coarse adjustment of the laser beam in direction. Pushing longer changes the direction with increasing speed. When end position is reached the laser beam blinks slowly. The setting must then be moved back within 2.5 minutes. If this is not done, the laser is switched off automatically.

2.6 Quick Setting

In addition to the respective arrow buttons also press the ON/OFF button.

= 2.7 Locking the Direction Axis

Press the Menu/OK button two times. **S** (scanning mode) blinks. Scanning mode can then be started to lock the direction axis fully automatically by pressing the arrow up/down button. This means the laser light plane is motor driven until it hits the FE-53 and is locked by it with utmost precision.

Note: Prerequisite for this is radio communication with the FE-53, recognisable by the symbol on the LCD display (1.10).

3. Power Supply

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

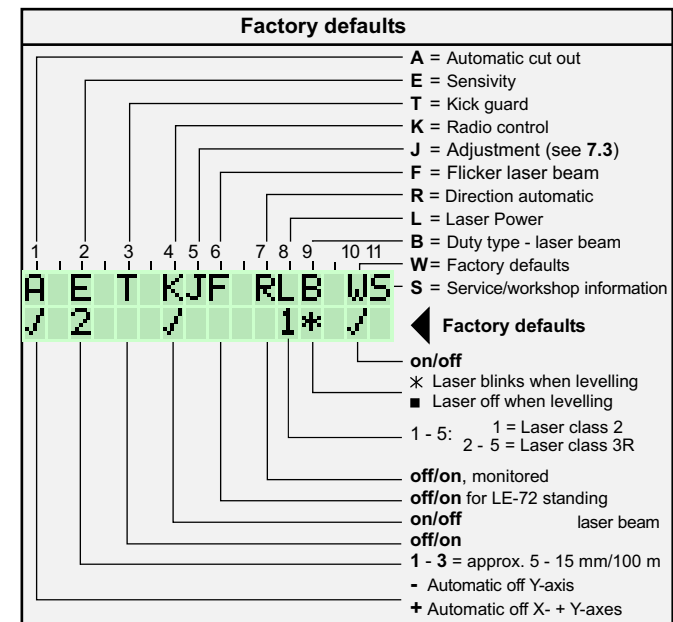
3.1 Battery Charging

- 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.

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

4.1 Automatic Levelling Cut-Out

- = Automatic self-levelling switched on (factory defaults)
- = Automatic self-levelling cutted out for the Y-axis. On the display **Y-A OFF** is indicated.
- = automatic self-levelling cutted out for both axes. On the display **X-A OFF + Y-A OFF** is indicated.

When the automatic is cutted out, the laser can be positioned just as you like it. For electromotive fine/coarse adjustment of the laser beam, push the respective arrow buttons. Longer pushing changes the direction with increasing speed.

4.2 Monitoring of Self-Levelling (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 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 Radio Control On/Off

Is required for the operation with the locking receiver FE-53.

- = off (energy-saving mode)
- = on (factory defaults)

4.5 Automatic Adjustment of Horizontal Light Plane (see 7.3)

4.6 Laser Beam Flickering

- = Modulation off (factory defaults)
- = Flickering for LE-7x stationary beam

4.7 Direction Automatic Monitoring

When using the locking receiver FE-53 the automatic locking can be monitored. The laser beam switches off when the laser or radio contact is interrupted for more than 3 min. It can be switched on again by briefly pressing the laser ON button.

- = off (factory defaults)
- = on

4.8 Laser Power

The laser power can be regulated in 5 steps from < 1 mW to 5 mW. Up to approx. 200 m step 1 = < 1 mW is recommended.

- 1 = < 1 mW (factory defaults)
- 5 = step 5, equivalent to < 5 mW

4.9 Operating Mode Laser Beam

- = Laser beam and laser beam symbol blink at the operating mode display when levelling (factory defaults).
- = Laser beam is off when levelling. But the symbol blinks at the operating mode display.

4.10 Factory defaults

- = All set to factory defaults.

4.11 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. Locking Automatic

The Y-axis can be fixed in connection with the external locking receiver FE-53 and wireless radio control (see 2.7 and 13.).

6. Radio Control

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

7. Adjustment

7.1. 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.

7.2. 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.

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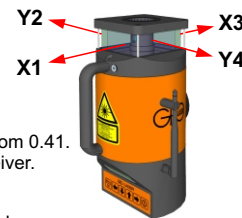
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7.3 Automatic Adjustment

This comfortable possibility to adjust the horizontal light plane and the vertical plumb axis increases the security and the accuracy.



7.3.1 Requirements

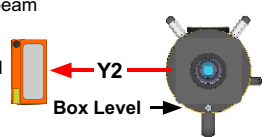
Laser receiver LE-71 or LE-72 firmware version from 0.41. The laser must have the MAC address of the receiver.

7.3.2 Preparation

Mount laser with the bubble level exactly horizontal, switch on the laser and have it rotated by 800 rpm.

Mount the laser at approx. middle of the laser beam height in the Y2 axis.

The recommended distance laser <-> receiver is the maximum of the distance to be measured but must not be less than 10 m and more than 50 m.



Switch on receiver.

Measuring mode: continuous measuring with bluetooth.

7.3.3 Adjustment

- 1 x until the menu is shown
- 4 x until "J" blinks
- 1 x and wait until "Y2 -> LE-7x -> OK" blinks, then
- 1 x and wait until "Y4 -> LE-7x -> OK" blinks, then
- = turn laser by 180°, then
- 1 x and wait until "X3 -> LE-7x -> OK" blinks, then
- = turn laser by 90°, then
- 1 x and wait until the operating mode display is shown again. The adjustment is finished now.

Please note: It is absolutely necessary to check the correctness of the adjustment. If the deviations are too big, the adjustment process must be repeated.

7.3.4 Input of the MAC Address

- Write down the MAC address of the LE-7x. To find it, go to **Settings > Bluetooth MAC/ID** in the LE-7x menu.
- Press Menu/OK button until the second menu plane is shown. Choose "J" by the right arrow button and enter with the arrow up button. Start the input of the MAC address by pressing the ON button. Enter the LE-7x Mac-Address. Use left/right arrow to select the digit and change it with the arrow up and down buttons. Save all by Menu/OK button.

7.3.5 Error Messages

- "Bluetooth is not active -> ABORT" error if bluetooth was switched off
- "ERROR:WRONG MODE" automatic is not switched on in both axes, i. e. device is lying.
- "ZEROADJ. ABORT !" abortion by ON button
- "DATA-IO-ERROR !" receiver type not compatible

8. Troubleshooting

- No laser beam - check battery charge.
- Low range - clean laser beam exit window.
- Laser beam blinks slowly - move device into the levelling range by tilting forwards.
- Laser beam and banking arrows blink slowly - reset laser from the limitation. If the errors of points 3 and 4 are not corrected within 2.5 minutes, the device is switched off automatically.
- Laser switched off automatically (kick guard or direction automatic monitoring) - Switch on laser beam by pressing the ON button shortly.
- Rotor does not rotate: Manual rotor setting: extract knob by turning it (see 1.15).

9. 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.

10. Technical Specifications

RL-78L Laser class / Output: 2 / < 1 mW
 RL-79L Laser class / Output: 3R / < 5 mW
 Laser: diode, visible red, 658 nm
 Beam diameter: at laser 13 mm
 RL-78L Range depending on ambient conditions: to Ø 2 00 m
 RL-79L Range depending on ambient conditions: to Ø 1000 m
 Automatic function: horizontal and vertical
 Automatic function can be switched off: yes, either one or both axes
 Rotor speed: adjustable: 0, 100, 200, 300, 600, 800 rpm
 Self-levelling range: ± 5 %
 Permissible deviation: ± 5 mm/100 m
 Automatic locking: RL-78L to 200 m via locking receiver FE-53
 Automatic locking: RL-79L to 500 m via locking receiver FE-53
 Operating time with 7.4 V DC Li Ion recharg. battery: to 28 hours
 External power supply: 11 to 14 V DC with cable 0117.02
 Low battery cut-out: yes
 Watertight: to 3.5 m
 Temperature range: -10° C to + 50° C
 Weight: 3.4 kg
 Adjustment: possible in the field without having to open the device
 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 RL-78L/-79L, FE-53 and FB-10 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.

11. Standard Delivery Package

No.	Order No.	Type	Description
1	0001.707	RL-78L	Fully automatic rotary laser
2	0037.18	NE-80	Power supply/Battery charger
3	0077.36		Transport case
1- 3	0001.707.1		RL-78L with standard delivery package
1- 3	0001.705.1		RL-79L with standard delivery package



12. Optional Accessories

No.	Order No.	Type	Description
1	1035.29		Lightning 2 laser receiver
2	0009.39.1	LE-72	Laser receiver with digital data display
3	0009.36.1	FE-53	Locking receiver for laser light plane
4	0026.07	FB-10	Two-way radio control
5	0117.02		12 V DC Li Ion connection cable
6	0061.01.2	BW-80	Base plate/Wall mount
7	0122.01.1	ST-05	Facade mounting system



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

13. Locking and Laser Receiver FE-53

Functions

13.1 Laser Receiver

The laser receiver type FE-53 receives a rotating laser or diode laser beam and indicates its position to the light plane by way of two resp. three LEDs and various signal tones. Accuracy approx. ± 1 resp. ± 0,1 mm.

13.2 Locking Receiver for the Y-axis (Direction)

The rotating laser beam is received by the locking receiver FE-53 and then automatically directed to the position fixed before. Deviations are detected and corrected immediately. Accuracy to ± 1mm/100 m.

13.3 Receiver Description

Robust Metal Housing
 Plastic-coated, watertight.
 M5 mounting thread at the back of the housing.

Meas. Receiver ± 0.1 mm
Meas. Receiver ± 1 mm

- LED + quick tone sequence
- LED + steady tone = middle
- LED + slow tone sequence

Locking Receiver
 LED + Tone alternating = middle

Operating Mode Display

Locking Receiver:
 LED blinks = Radio control dial-up
 LED off = Radio control connected
 LED on = Radio control failure

Meas. Receiver:
 LED blinks = device switched on
 LED off = device switched off

Power Indicator:
 LED blinks slowly = device switched on
 LED blinks quickly = battery almost empty
 LED off = device switched off

Battery Compartment Lid
 To open in direction of arrow. Make sure the polarity is correct when installing the new battery.

13.4 Control Principle

The FE-53 can be mounted either on the left or on the right side of the laser. Because of reasons of functionality, the keyboards of both devices must be on the same side.

13.5 Operation

= switch on/off

- 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
 - x briefly** = Measuring receiver with an accuracy of +/- 0.1 mm Accuracy: Two LED's blink alternately = +/- 0.1 mm
 - 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

- 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

- x briefly** = laser searches for the receiver again.

Switch off receiver to switch off the locking function.

13.6 Outstanding technical specifications:

Range with RL-78L depending on ambient conditions : 2 to 200 m
 Range with RL-79L depending on ambient conditions : 2 to 500 m
 Distance to illuminants and high-voltage power lines: > 1.5 m
 Accuracy direction automatic: to ± 1 mm/100 m
 Accuracy measuring receiver: ± 1 mm or ± 0.1 mm
 Reception range/angle: 85 mm / > 100°
 Rotor speed: 300 - 800 rpm
 Signal tone: loud, quiet or off
 Power supply: 2 x round cell/AA (battery or rech. battery)
 Current consumption: approx. 90 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)
 Guarantee: 24 months
 CE: certified

Conformity with national regulations:
 GEO-Feinmechanik GmbH herewith declares that the devices FE-53 and RL-79L 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.

14. Wireless Control FB-10

14.1 Functional Description

The remote control FB-10 allows a wireless operation of GEO lasers with LCD display which are equipped for this purpose. The laser and remote control each have a radio transmitter and receiver. The laser can be operated remotely from a distance of up to 350 m if there is visual contact between it and the remote control. Operation and the LCD display of the laser and the remote control are identical.

14.2 Device Description

Robust Metal Housing: plastic-coated, 100 % watertight.

- Antenna**
- Antenna Lock**
- Keyboard**
Clear layout, big, user-friendly, self-explanatory keys.
- Battery Compartment Lid**
Turn to open it. When inserting the battery observe the correct polarity.
- LCD-Display**
Clearly legible, illuminated display

Apart from the ON 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.

14.3 Button Description (see 2.)

= ON only FB-10

- 1 x short = **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.

14.4 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.