

GeoMax Zone60 DG

User Manual



Introduction

Purchase

Congratulations on the purchase of a GeoMax Rotating Laser product.



This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "1 Safety Directions" for further information. Read carefully through the User Manual before you switch on the product.

Product Identification

The model and serial number of your product are indicated on the type plate. Always refer to this information when you need to contact your agency or GeoMax authorised service centre.

Validity of this manual

This manual applies to the Zone60 DG lasers. Differences between the models are marked and described.

Available documentation

Name	Description/Format		
Zone60 DG Quick Guide	Provides an overview of the product. Intended as a quick reference guide.	✓	✓
Zone60 DG User Manual	All instructions required in order to operate the product to a basic level are contained in the User Manual. Provides an overview of the product together with technical data and safety directions.	-	✓

Refer to the following resources for all Zone60 DG documentation/software:

- the GeoMax Zone60 DG CD
- the GeoMax website: <http://www.geomax-positioning.com>

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1 Safety Directions

1.1 General

Description

The following directions enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards.

The person responsible for the product must ensure that all users understand these directions and adhere to them.

About Warning Messages

Warning messages are an essential part of the safety concept of the instrument. They appear wherever hazards or hazardous situations can occur.

Warning messages...

- make the user alert about direct and indirect hazards concerning the use of the product.
- contain general rules of behaviour.

For the users' safety, all safety instructions and safety messages shall be strictly observed and followed! Therefore, the manual must always be available to all persons performing any tasks described here.

DANGER, WARNING, CAUTION and **NOTICE** are standardised signal words for identifying levels of hazards and risks related to personal injury and property damage. For your safety, it is important to read and fully understand the following table with the different signal words and their definitions! Supplementary safety information symbols may be placed within a warning message as well as supplementary text.

Type	Description
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in appreciable material, financial and environmental damage.
	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

1.2 Definition of Use

Intended use

- The product casts a horizontal laser plane or a laser beam for the purpose of alignment.
- The laser beam can be detected by means of a laser detector.
- Remote control of product.
- Data communication with external appliances.

Reasonably foreseeable misuse

- Use of the product without instruction.
- Use outside of the intended use and limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is permitted for certain functions.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with obvious damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of GeoMax.
- Inadequate safeguards at the working site.
- Deliberate dazzling of third parties.
- Controlling of machines, moving objects or similar monitoring application without additional control and safety installations.

1.3 Limits of Use

Environment Suitable for use in an atmosphere appropriate for permanent human habitation: not suitable for use in aggressive or explosive environments.

 **DANGER** Local safety authorities and safety experts must be contacted before working in hazardous areas, or close to electrical installations or similar situations by the person in charge of the product.

1.4 Responsibilities

Manufacturer of the product GeoMax AG, CH-9443 Widnau, hereinafter referred to as GeoMax, is responsible for supplying the product, including the user manual and original accessories, in a safe condition.

Person responsible for the product The person responsible for the product has the following duties:

- To understand the safety instructions on the product and the instructions in the user manual.
- To ensure that it is used in accordance with the instructions.
- To be familiar with local regulations relating to safety and accident prevention.
- To inform GeoMax immediately if the product and the application becomes unsafe.
- To ensure that the national laws, regulations and conditions for the operation of the product are respected.

1.5 Hazards of Use

 **CAUTION** Watch out for erroneous measurement results if the product has been dropped or has been misused, modified, stored for long periods or transported.

Precautions: Periodically carry out test measurements and perform the field adjustments indicated in the user manual, particularly after the product has been subjected to abnormal use as well as before and after important measurements.

 **DANGER** Because of the risk of electrocution, it is dangerous to use poles, levelling staffs and extensions in the vicinity of electrical installations such as power cables or electrical railways.

Precautions: Keep at a safe distance from electrical installations. If it is essential to work in this environment, first contact the safety authorities responsible for the electrical installations and follow their instructions.



NOTICE With the remote control of products, it is possible that extraneous targets will be picked out and measured.

Precautions: When measuring in remote control mode, always check your results for plausibility.

 **WARNING** If the product is used with accessories, for example masts, staffs, poles, you may increase the risk of being struck by lightning.

Precautions: Do not use the product in a thunderstorm.

 **WARNING** Inadequate securing of the working site can lead to dangerous situations, for example in traffic, on building sites and at industrial installations.

Precautions: Always ensure that the working site is adequately secured. Adhere to the regulations governing safety, accident prevention and road traffic.

 **CAUTION** If the accessories used with the product are not properly secured and the product is subjected to mechanical shock, for example blows or falling, the product may be damaged or people can sustain injury.

Precautions: When setting up the product, make sure that the accessories are correctly adapted, fitted, secured, and locked in position. Avoid subjecting the product to mechanical stress.

	CAUTION	<p>During the transport, shipping or disposal of batteries it is possible for inappropriate mechanical influences to constitute a fire hazard.</p> <p>Precautions: Before shipping the product or disposing of it, discharge the batteries by running the product until they are flat. When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping contact your local passenger or freight transport company.</p>
	WARNING	<p>During dynamic applications, for example stakeout procedures there is a danger of accidents occurring if the user does not pay attention to the environmental conditions around, for example obstacles, excavations or traffic.</p> <p>Precautions: The person responsible for the product must make all users fully aware of the existing dangers.</p>
	WARNING	<p>If you open the product, either of the following actions may cause you to receive an electric shock.</p> <ul style="list-style-type: none"> • Touching live components • Using the product after incorrect attempts were made to carry out repairs <p>Precautions: Do not open the product. Only GeoMax authorised service centres are entitled to repair these products.</p>
	WARNING	<p>If the product is improperly disposed of, the following can happen:</p> <ul style="list-style-type: none"> • If polymer parts are burnt, poisonous gases are produced which may impair health. • If batteries are damaged or are heated strongly, they can explode and cause poisoning, burning, corrosion or environmental contamination. • By disposing of the product irresponsibly you may enable unauthorised persons to use it in contravention of the regulations, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination. <p>Precautions:</p>
	<p>The product must not be disposed with household waste. Dispose of the product appropriately in accordance with the national regulations in force in your country. Always prevent access to the product by unauthorised personnel.</p>	
	WARNING	<p>Only GeoMax authorised service centres are entitled to repair these products.</p>
	WARNING	<p>High mechanical stress, high ambient temperatures or immersion into fluids can cause leakage, fire or explosions of the batteries.</p> <p>Precautions: Protect the batteries from mechanical influences and high ambient temperatures. Do not drop or immerse batteries into fluids.</p>
	WARNING	<p>If battery terminals are short circuited e.g. by coming in contact with jewellery, keys, metallised paper or other metals, the battery can overheat and cause injury or fire, for example by storing or transporting in pockets.</p> <p>Precautions: Make sure that the battery terminals do not come into contact with metallic objects.</p>

1.6

Laser Classification

1.6.1

General

General

The following chapters provide instructions and training information about laser safety according to international standard IEC 60825-1 (2014-05) and technical report IEC TR 60825-14 (2004-02). The information enables the person responsible for the product and the person who actually uses the equipment, to anticipate and avoid operational hazards.



According to IEC TR 60825-14 (2004-02), products classified as laser class 1, class 2 and class 3R do not require:

- laser safety officer involvement,
- protective clothes and eyewear,
- special warning signs in the laser working area

if used and operated as defined in this User Manual due to the low eye hazard level.



National laws and local regulations could impose more stringent instructions for the safe use of lasers than IEC 60825-1 (2014-05) and IEC TR 60825-14 (2004-02).

1.6.2

Zone60 DG

General

The rotating laser built into the product produces a visible laser beam which emerges from the rotating head.

The laser product described in this section is classified as laser class 1 in accordance with:

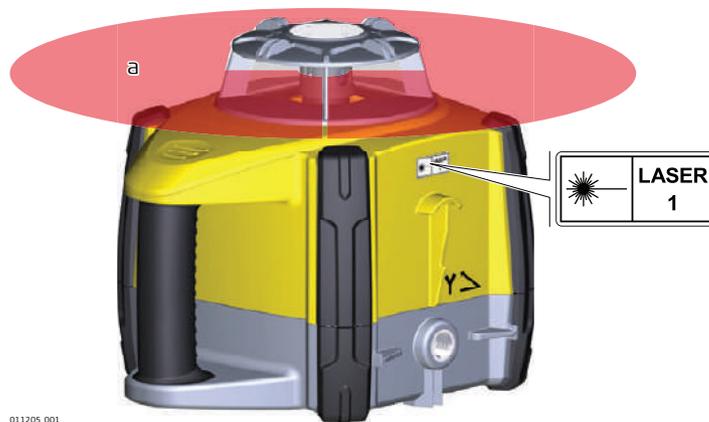
- IEC 60825-1 (2014-05): "Safety of laser products"

These products are safe for momentary exposures but can be hazardous for deliberate staring into the beam. The beam may cause dazzle, flash-blindness and after-images, particularly under low ambient light conditions.

Zone60 DG:

Description	Value
Maximum average radiant output power	0.4 mW / 2.2 mW
Pulse duration (effective)	500 ms / 2.9 ms, 1.4 ms
Pulse repetition frequency	1 Hz / 5 Hz, 10 Hz
Beam divergence	0.2 mrad
Wavelength	635 nm

Labelling



011205_001

a) Laser beam

Description

The term Electromagnetic Compatibility is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

**WARNING**

Electromagnetic radiation can cause disturbances in other equipment.

Although the product meets the strict regulations and standards which are in force in this respect, GeoMax cannot completely exclude the possibility that other equipment may be disturbed.

**CAUTION**

There is a risk that disturbances may be caused in other equipment if the product is used with accessories from other manufacturers, for example field computers, personal computers or other electronic equipment, non-standard cables or external batteries.

Precautions:

Use only the equipment and accessories recommended by GeoMax. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using computers or other electronic equipment, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

**CAUTION**

Disturbances caused by electromagnetic radiation can result in erroneous measurements.

Although the product meets the strict regulations and standards which are in force in this respect, GeoMax cannot completely exclude the possibility that the product may be disturbed by intense electromagnetic radiation, for example, near radio transmitters, two-way radios or diesel generators.

Precautions:

Check the plausibility of results obtained under these conditions.

**CAUTION**

If the product is operated with connecting cables attached at only one of their two ends, for example external supply cables, interface cables, the permitted level of electromagnetic radiation may be exceeded and the correct functioning of other products may be impaired.

Precautions:

While the product is in use, connecting cables, for example product to external battery, product to computer, must be connected at both ends.

Radios or Digital Cellular Phones**WARNING**

Use of product with radio or digital cellular phone devices:

Electromagnetic fields can cause disturbances in other equipment, in installations, in medical devices, for example pacemakers or hearing aids and in aircraft. It can also affect humans and animals.

Precautions:

Although the product meets the strict regulations and standards which are in force in this respect, GeoMax cannot completely exclude the possibility that other equipment can be disturbed or that humans or animals can be affected.

- Do not operate the product with radio or digital cellular phone devices in the vicinity of filling stations or chemical installations, or in other areas where an explosion hazard exists.
- Do not operate the product with radio or digital cellular phone devices near to medical equipment.
- Do not operate the product with radio or digital cellular phone devices in aircraft.

1.8

FCC Statement, Applicable in U.S.



The greyed paragraph below is only applicable for products without radio.

WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

WARNING

Changes or modifications not expressly approved by GeoMax for compliance could void the user's authority to operate the equipment.

Labelling Zone60 DG



011206.001

Labelling receiver

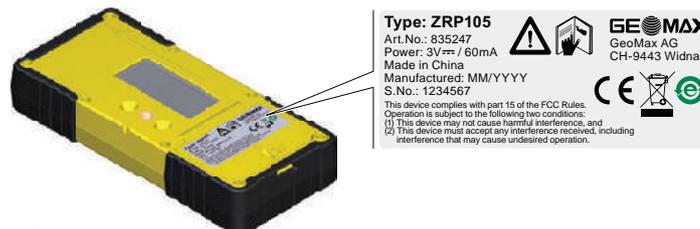
ZRB35:



011178.001

Labelling receiver

ZRP105:



011177.001

Labelling receiver

ZRD105:



011243_001

Type: ZRD105
Art.No.: 835248
Power: 3V[≡] / 60mA
Made in China
Manufactured: MM/YYYY
S.No.: 1234567

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

  
GeoMax AG
CH-9443 Widnau

Labelling receiver

ZRD105B:



014299_001

Model: ZRD105B
Art.No.: 855671
Power: 3V[≡] / 60mA
Made in China
Manufactured: MM/YYYY
S.No.: 1234567

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

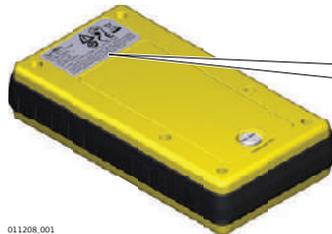
 
GeoMax AG
CH-9443 Widnau

FCC ID: RFD-ID-CT100 IC: 3177A-CT100

Labelling ZRC60

ZRC60



011208_001

Type: ZRC60
Power: 3V[≡] / 100mA
Art.No.: 835245
Made in China
GeoMax AG
CH-9443 Widnau

Contains FCC ID: RFD-CT1300 IC ID: 3177A-CT1300

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2 Description of the System

2.1 System Components

General description

The Zone60 DG is a laser tool for general construction, levelling and slope applications such as:

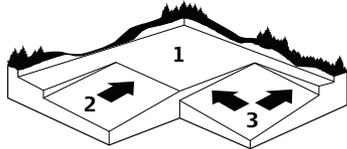
- Setting forms,
- Levelling to grade,
- Controlling depths for excavations.

If set up within the self-levelling range, the Zone60 DG automatically levels to create an accurate horizontal, vertical or sloped plane of laser light.

Once the Zone60 DG has levelled, the head starts rotating and the Zone60 DG is ready for use.

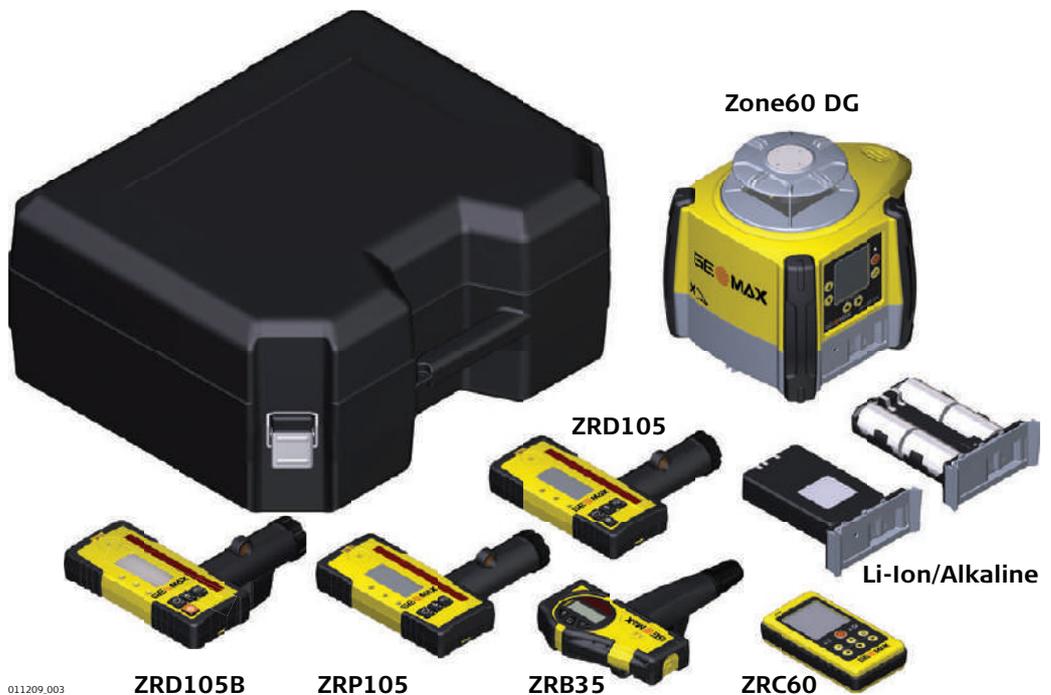
30 seconds after the Zone60 DG has completed the levelling, the H.I.Alert system becomes active and protects the Zone60 DG against changes in elevation caused by movement of the tripod to ensure accurate work.

Area of application



The Zone60 DG is a dual grade laser; it produces an accurate plane of laser light for applications which require level (1), single slope (2) or dual slope (3).

Available system components



011209.003

ZRD105B

ZRP105

ZRB35

ZRC60

Li-Ion/Alkaline



The delivered components depend on the package ordered.

2.2

Zone60 DG Laser Components

Zone60 DG laser components



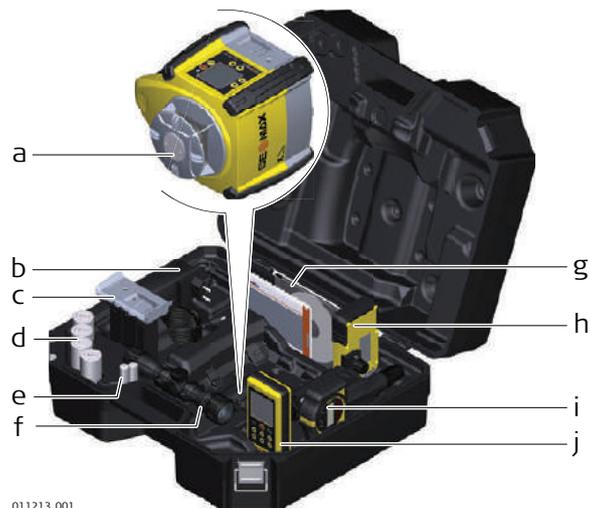
011232.001

- a) Plate for optional scope
- b) Carry Handle
- c) LCD Display
- d) Control Panel
- e) Battery compartment
- f) Charge LED (for Li-Ion battery pack)

2.3

Case Components

Case components



011213.001

- a) Zone60 DG laser
- b) Charger (for Li-Ion versions only)
- c) Li-Ion battery pack or Alkaline battery pack
- d) 4 x D-cell battery (for alkaline versions only)
- e) 2x AA-cell battery
- f) Optional scope assembly
- g) User Manual/CD
- h) Receiver mounted on the bracket
- i) Second receiver (can be purchased separately)
- j) ZRC60 remote control

2.4

Setup

Location

- Keep the location clear of possible obstructions that could block or reflect the laser beam.
- Place the Zone60 DG on a stable ground. Ground vibration and extremely windy conditions can affect the operation of the Zone60 DG.
- When working in a very dusty environment place the Zone60 DG up-wind so the dirt is blown away from the laser.

Setting up on a tripod



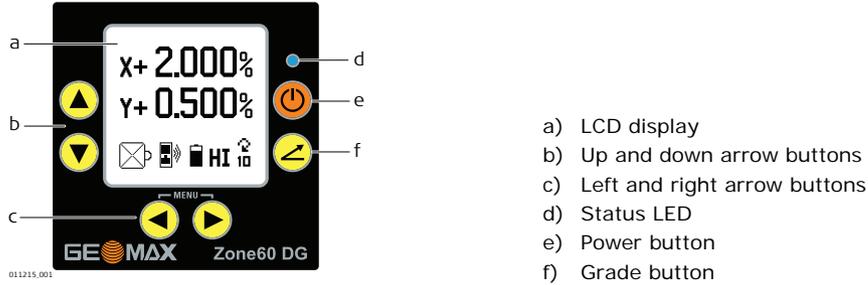
Step	Description
1.	Set up the tripod.
2.	Place the Zone60 DG on the tripod.
3.	Tighten the screw on the underside of the tripod to secure the Zone60 DG on the tripod.

- Attach the Zone60 DG securely to a tripod or laser trailer, or mount on a stable level surface.
- Always check the tripod or laser trailer before attaching the Zone60 DG. Make sure all screws, bolts and nuts are tight.
- If a tripod has chains, they should be slightly loose to allow for thermal expansion during the day.
- Secure the tripod on extremely windy days.

3 Operation

3.1 User Interface

Overview



Description

LCD display	Displays all required user information.
Grade button	Press to start grade entry mode.
Left and right arrow buttons	Press to display and move the cursor for grade entry. Press both simultaneously to enter the Zone60 DG menu.
Up and down arrow buttons	Press to change the grade displayed. Press both simultaneously to reset the grade value to zero.
Power button	Press to turn on or off the Zone60 DG.
Status LED	Indicates the level status of the Zone60 DG.

3.2 Turning the Zone60 DG on and off

Turning on and off

Press the Power Button to turn on or off the Zone60 DG.

After turning on:

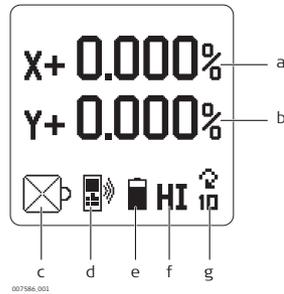
- The LCD display turns on and displays the current status of the Zone60 DG.
- If set up within the $\pm 6^\circ$ self-levelling range (horizontal or vertical), the Zone60 DG automatically levels to create an accurate horizontal plane of laser light.
- Once levelled, the head starts rotating and Zone60 DG is ready for use.
- If activated, the H.I.Alert system becomes active 30 seconds after completing the levelling. The H.I.Alert system protects the laser against changes in elevation caused by movement or settling of the tripod.
- The self-levelling system and the H.I.Alert function continue to monitor the position of the laser beam to ensure consistent and accurate work.

3.3

The LCD Display

Main Display

The LCD display shows all the information that is required to operate the Zone60 DG.



- a) X-axis Grade Value
- b) Y-axis Grade Value
- c) Beam Masking
- d) Radio Indication
- e) Battery Level Indication
- f) H.I. Indication
- g) Head Speed

Start up screens



GeoMax Start up

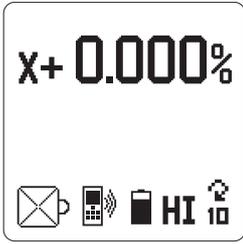
When the Zone60 DG is turned on, the GeoMax Start up screen is shown followed by the Zone60 DG Information screen displaying the following information:

- Model and type
- Serial number
- Software revision level
- Hours of use

3.4

Grade Entry

Direct Grade Entry

Step	Description
1.	To start grade entry mode press the Grade Button once.  To restore the last set grade(s), press and hold the Grade Button for 1.5 seconds.
	<i>The X-axis grade value is displayed:</i>  X-Axis grade entry
2.	To change the grade value press the Up or Down Arrow Buttons.
3.	To enter grade on the Y-axis press the Grade Button a second time. <i>Only the Y-axis grade value is displayed:</i>  Y-Axis grade entry
4.	To change the grade value press the Up or Down Arrow Buttons.
5.	To exit grade entry mode, press the Grade Button until the main display is shown. OR: Wait for 8 seconds. The Zone60 DG automatically returns to the main display.

Grade Entry by Digit

While in grade entry mode, you can easily change the plus/minus sign or individual digits.

Step	Description
	Press the Grade Button to enter the grade entry mode.
1.	Press the Left or Right Arrow Buttons to create a cursor. The cursor always appears on the plus/minus sign. 
2.	Press the Up or Down Arrow Buttons to change the plus/minus sign.
3.	Press the Left or Right Arrow Buttons to move the cursor. 
4.	Press the Up or Down Arrow Buttons to change a digit.
5.	To exit grade entry mode, press the Grade Button until the main display is shown. OR: Wait for 8 seconds. The Zone60 DG automatically returns to the main display.

Reset Grade Value to Zero

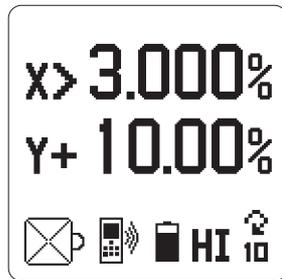
While in grade entry mode, you can quickly change the grade value back to zero by pressing the Up and Down Arrow Buttons simultaneously.

Grade Capability

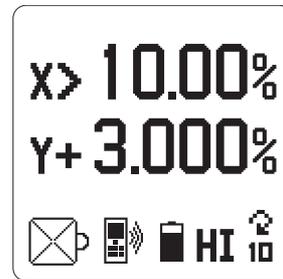
The Zone60 DG can have up to 10.00% grade simultaneously in both the X and Y axes or up to 15.00% grade in one axis.

Entering grades above 10.00% in one axis is only possible if the cross axis grade is $\pm 3\%$ or lower.

 If you try to enter grades greater than 3% or 10%, a notice appears on the screen when you press the button.



X > 3.000%

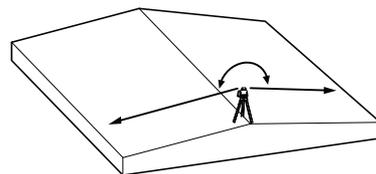


X > 10.00%

Grade Swap

The grade in the X and Y axes can easily be swapped from positive to negative by changing the plus/minus sign in grade entry mode. Refer to **Grade Entry by Digit**.

A typical application for this feature is road building. Example: The Zone60 DG is set up on the crown of the road and one axis is aligned to the centreline. In order to make the cross axis grade fall to the right or left hand side, simply change the plus/minus sign on the display.

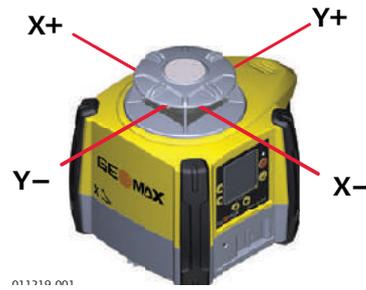


3.5

Axis Identification

Axis identification

When entering grade, it is important to know the correct direction in which the grade is being entered. Refer to the following illustration to identify the correct directions of the axes.



3.6

Conversion of Slope Into Percent of Grade

Conversion of slope

Slope: The change in elevation per unit of measure (foot, metre, etc.)

Percent of Grade: The change in elevation per 100 units of measure (feet, metre, etc.)

Calculating percent of grade from slope:

$$[\text{Slope}] \times 100 = [\text{Percent of Grade}]$$

Example:

Slope	= 0.0059
Conversion	= 0.0059 x 100
Percent of Grade	= 0.590%

3.7

Alignment of the Axes

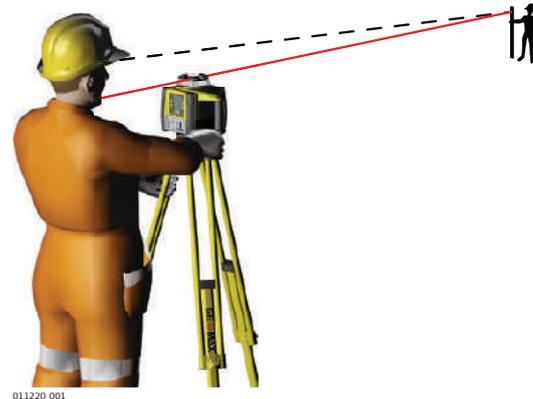
Aligning X- and Y-axis

After the desired grade is correctly set in the display, align the X- and Y-axis to the jobsite.

☞ Ensure that the bubble of the circular level is positioned near the centre of the circle for maximum self-levelling capability.

☞ Ensure that the Zone60 DG is properly positioned over a control point.

The direction of the X-Axis is seen from the front of the Zone60 DG, sighting over the top of the Zone60 DG.



Rotate the Zone60 DG slightly until the alignment marks are aligned with your second control point. Once the Zone60 DG is aligned, you can start working.

3.8

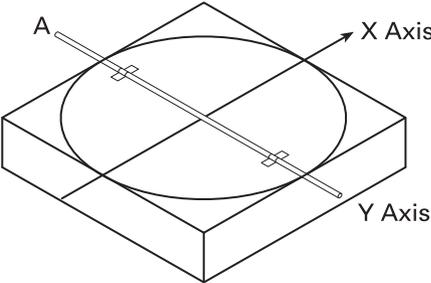
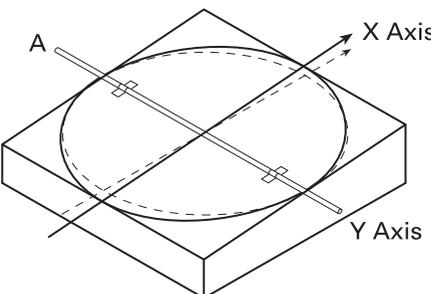
Precise Alignment of the Axes

Precisely aligning X- and Y-axis

Under most conditions, the raised alignment marks on the top of the Zone60 DG are adequate for alignment of the axes. For a more precise alignment, you can use the following procedure.

Objective of a precise alignment:

- To establish Point A on the Y-axis as a reference and take an elevation reading.
- To enter grade into the X-axis and then adjust the position of the laser until the original elevation at Point A is again found.

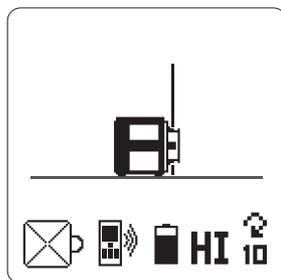
Step	Description
1.	With 0.000% grade in both axes, set up the Zone60 DG directly over a grade stake and roughly align the Y-axis to a second grade stake (Point A).
2.	Take an elevation reading at Point A using the receiver and a survey rod. <div style="text-align: center;">  </div>
3.	Enter +5.000% grade into the X-axis. When grade is entered into the X-axis, the Y-axis acts like a hinge or fulcrum.
4.	With +5.000% in the X-axis, take a second reading at Point A. <div style="text-align: center;">  </div>
5.	Alignment: <ul style="list-style-type: none"> • If the second reading is equal to the first reading, the X-axis is aligned correctly. • If the second reading is greater than the first reading, rotate the Zone60 DG clockwise (to the right) until the two readings are equal. • If the second reading is less than the first reading, rotate the Zone60 DG counter-clockwise (to the left) until the two readings are equal.
	Sighting Scope - An optional sighting scope is available for the Zone60 DG which improves the axis alignment for second day setups. It is recommended that you first perform the precise alignment procedure, and then adjust the scope to these axes.

3.9

Laydown Operation

Vertical plane of laser light

You can use the Zone60 DG in laying down position to create a vertical plane for layout and alignment jobs.



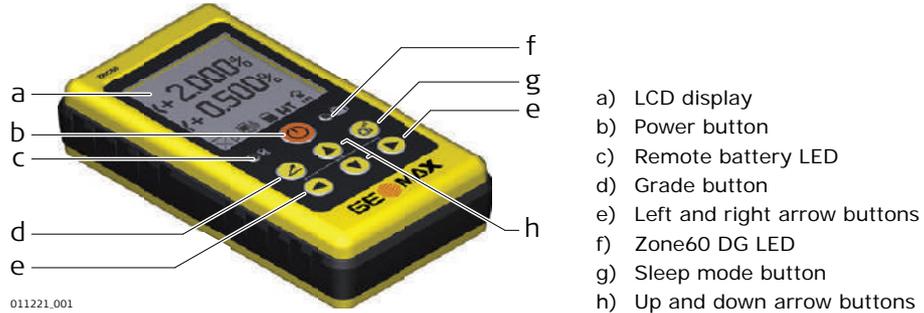
007997.001
Zone60 DG Laying Down Screen

4 ZRC60 Remote Control

4.1 Description of the Remote Control

The RF Remote Control communicates with the Zone60 DG via RF (radio frequency) and is used to control the same functions as on the laser.

ZRC60 Remote Control



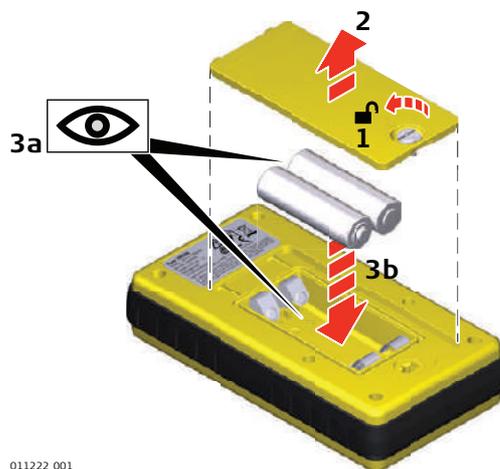
Description of the Control Panel

LCD Display	Displays all required user information.
Power Button	Press to turn on or off the Remote Control.
Grade Button	Press to start grade entry mode.
Up and Down Arrow Buttons	Press to change the grade displayed. Press both simultaneously to reset the grade value to zero.
Left and Right Arrow Buttons	Press to display and move cursor for grade entry. Press both simultaneously to enter the Zone60 DG menu. Press and hold simultaneously for 1.5 seconds to enter the Remote Control menu.
Sleep Mode Button	Press to put the Zone60 DG in sleep mode. <ul style="list-style-type: none"> • During Sleep Mode, all functions are disabled. • The LCD display indicates that the Zone60 DG is in Sleep Mode. • The Zone60 DG sleeps for 2 hours*, then shuts down automatically and must be turned on again at the laser. • When in Sleep Mode, pressing the sleep button wakes the Zone60 DG and normal operation is resumed.
Zone60 DG LED	Indicates level status of the Zone60 DG.
Remote Battery LED	Indicates when the batteries for the Remote Control should be replaced.

* In the Remote Control menu, you can select the sleep time.

Replacing the batteries

The remote control is powered by 2x AA batteries. If the Remote Battery LED flashes, replace the batteries as shown in the picture.



4.2

Pairing the Zone60 DG with the ZRC60 Remote Control

Pairing step-by-step

The Zone60 DG and the ZRC60 Remote Control include radio devices that allow you to activate the functions on the Zone60 DG remotely up to 300 m (1000') from the Zone60 DG. Before using the RF features, the Zone60 DG and the Remote Control must be paired together to be able to communicate with each other.

Step	Description
1.	Turn off both the Zone60 DG and the Remote Control.
2.	Press and hold the Power Button on the Zone60 DG for 5 seconds to turn on the Zone60 DG in pairing mode. The Zone60 DG beeps five times slowly.
3.	Press and hold the Power Button on the Remote Control until pairing is confirmed.
	When the pairing is successful: Both the Zone60 DG and the Remote Control beep quickly five times and the Status LED flashes green quickly (5 Hz). There is no confirmation on the LCD displays during this process.
	When the pairing is not successful: Both the Zone60 DG and the Remote Control beep slowly three times and the Status LED flashes red (1 Hz).

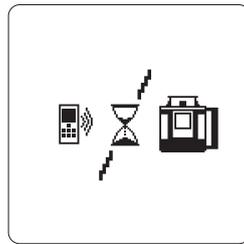
4.3

Connecting Screens for the Remote Control

Information screens while connecting

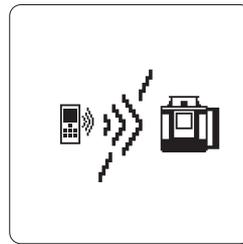
There are three screens on the ZRC60 Remote Control which are displayed when connecting to the Zone60 DG.

Wait Screen



007598.001

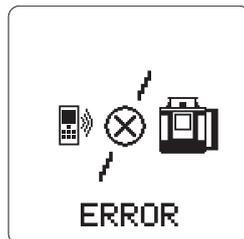
Connecting Screen



007599.001

The "wait" and "connecting" screens are displayed when the Remote Control is first turned on and while connecting to the Zone60 DG.

Lost Communication Screen



007600.001

The "lost communication" screen is displayed when the Zone60 DG and the Remote Control have lost their communication link.



Ensure that you are within clear sight of the Zone60 DG and that you have not exceeded the working range.



The ZRC60 Remote Control has its own menu where you can change the display brightness, sleep mode hours and remote shut-off time. Refer to "7 ZRC60 Menu" for information on the Remote Control menu.

5 Receivers

5.1 Overview

Description

The Zone60 DG is sold with either the ZRB35, ZRP105, ZRD105 or the ZRD105B receiver. The ZRD105B receiver enhances the performance of the Zone60 DG with automatic Beam Catching and monitoring.

5.1.1 ZRB35 Receiver

Instrument components part 1 of 2



- a) Level vial
- b) Keypad
- c) On-grade
- d) Laser Reception window
- e) LCD window
- f) Audio Speaker

Component	Description
Level vial	Aids to keep the rod plumb when taking readings.
Keypad	Power, accuracy and volume functions.
On-grade	Indicates the on-grade position of the laser.
Laser Reception window	Detects the laser beam. The reception windows must be directed towards the laser.
LCD window	Front and rear LCD arrow indicate the detector's position.
Audio Speaker	Indicates the detector's position: <ul style="list-style-type: none"> • High - Fast beeping • On-grade - Solid tone • Low - Slow beeping

Instrument components part 2 of 2



- a) Bracket Mounting Hole
- b) Offset notch
- c) Battery door
- d) Serial number label
- e) Product label

Component	Description
Bracket Mounting Hole	Location to attach the receiver bracket for normal operation.
Offset notch	Use to transfer reference marks. The notch is 45 mm (1.75") below to top of the detector.
Battery door	Access to the battery compartment.

Description of the buttons



- a) Audio
- b) Bandwidth
- c) Power

Button	Function
Audio	Press to change the audio output.
Bandwidth	Press to change detection bandwidth.
Power	Press once to turn on the Receiver.

5.1.2

ZRP105 Receiver

Instrument components part 1 of 2



- a) Level vial
- b) Audio Speaker
- c) LCD window
- d) LEDs
- e) Laser Reception window
- f) On-grade
- g) Keypad

Component	Description
Level vial	Aids to keep the rod plumb when taking readings.
Audio Speaker	Indicates the detector's position: <ul style="list-style-type: none"> • High - Fast beeping • On-grade - Solid tone • Low - Slow beeping
LCD window	Front and rear LCD arrow indicate the detector's position.
LEDs	Display the relative position of the laser beam. Three channel indication: <ul style="list-style-type: none"> • High - Red • On-grade - Green • Low - Blue
Laser Reception window	Detects the laser beam. The reception windows must be directed towards the laser.
On-grade	Indicates the on-grade position of the laser.
Keypad	Power, accuracy and volume functions.

Instrument components
part 2 of 2

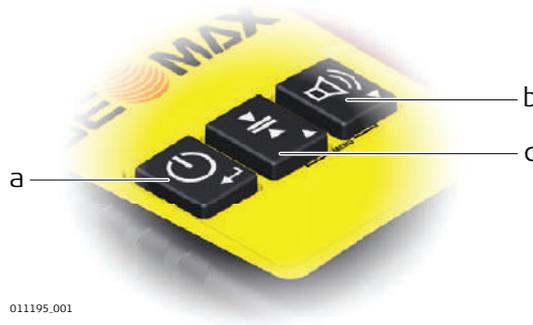


011194.001

- a) Bracket Mounting Hole
- b) Offset notch
- c) Product label
- d) Battery door

Component	Description
Bracket Mounting Hole	Location to attach the receiver bracket for normal operation.
Offset notch	Use to transfer reference marks. The notch is 85 mm (3.35") below to top of the detector.
Product label	The serial number is located inside the battery compartment.
Battery door	Access to the battery compartment.

Description of the Buttons



011195.001

- a) Power
- b) Audio
- c) Bandwidth

Button	Function
Power	Press once to turn on the Receiver.
Audio	Press to change the audio output.
Bandwidth	Press to change detection bandwidth.

5.1.3

ZRD105, Digital Receiver

The ZRD105 Digital Receiver provides you with basic position information by using an arrow display plus digital readout.

Instrument components



- a) Speaker
- b) LCD Digital Display
- c) LED Display
- d) Power button
- e) Target button
- f) Reception window
- g) Bandwidth button
- h) Audio button

Description of the Buttons

Button	Function
Power	Press once to turn on the receiver.
	Press 1.5 seconds to turn off the receiver.
Target	Press to capture the digital reading.
Bandwidth	Press to change detection bandwidths.
Audio	Press to change the audio output.

5.1.4

ZRD105B, Digital RF Receiver

The ZRD105B receiver provides you with basic position information by using an arrow display, digital readout plus RF communication to the Zone60 DG for special features.

Instrument components



- a) Speaker
- b) LCD Digital Display
- c) LED Display
- d) Power button
- e) Beam Catch button
- f) Reception window
- g) Bandwidth button
- h) Audio button

Description of the Buttons

Button	Function
Power	Press once to turn on the receiver.
	Press 1.5 seconds to turn off the receiver.
Beam Catch	Press to capture the digital reading.
	Press 1.5 seconds to start the Beam Catching function. Refer to "8.4 Beam Catching (Grade Matching)".
	Press 5 seconds to start the Beam Lock function. Refer to "8.5 Beam Lock (Grade Matching and Monitoring)".
Bandwidth	Press to change detection bandwidths.
Audio	Press to change the audio output.

5.2

Using the ZRD105B Receiver with the Zone60 DG

Special Functions when using ZRD105B Receiver

The Zone60 DG can be used with almost any receiver.

However, when used with the ZRD105B receiver, the following special functions are available:

- Beam Catching - Allows you to match an existing grade. (Refer to "8.4 Beam Catching (Grade Matching)")
- Beam Lock - Monitors the grade position to keep it on grade. (Refer to "8.5 Beam Lock (Grade Matching and Monitoring)")

Before using the special functions, the Zone60 DG and the ZRD105B must be paired together to be able to communicate with each other. (Refer to "5.3 Pairing the ZRD105B with the Zone60 DG")

5.3

Pairing the ZRD105B with the Zone60 DG

Pairing step-by-step

The Zone60 DG and the ZRD105B Receiver include radio devices that allow you to activate the functions on the Zone60 DG remotely up to 100 m (300') from the Zone60 DG.

Before using the RF features, the Zone60 DG and the Receiver must be paired together to be able to communicate with each other.

Step	Description
1.	Turn off the Zone60 DG.
2.	Press and hold the Power Button on the Zone60 DG for 5 seconds to turn on the Zone60 DG in pairing mode. The Zone60 DG beeps five times slowly.
3.	Press and hold the Power Button on the Receiver until pairing is confirmed.
	When the pairing is successful: Both the Zone60 DG and the Receiver beep five times and the LEDs are flashing (green). There is no confirmation on the LCD displays during this process.
	When the pairing is not successful: The Status LED on the Zone60 DG flashes (red) quickly five times.

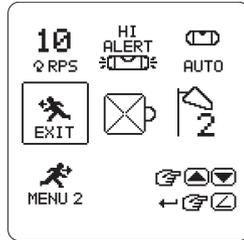
6 Zone60 DG Menu

6.1 Access and Navigation

Description

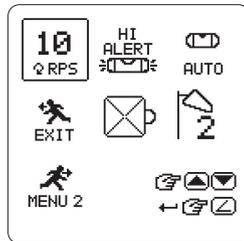
The Zone60 DG has several menu options that allow you to optimise the performance of the Zone60 DG for an individual application. To access the menu of the Zone60 DG, press the Left and Right Arrow Buttons simultaneously while the main screen is displayed.

Navigation within the Menu:

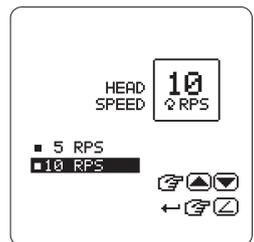


In the bottom right-hand corner of the menu screen, there are displayed User Direction buttons to indicate the navigation within the Zone60 DG menu.

Press the Up and Down Arrow Buttons to move the cursor and highlight an icon or an option.



A highlighted icon is surrounded by a box.

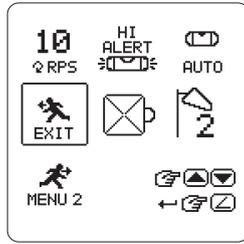


A highlighted option is shaded in black.

Press the Grade Button to select a highlighted icon or to enable/disable a highlighted option.

- If you select an icon, a screen with the options for the selected icon is displayed.
- If you select the menu icon (MENU 1, MENU 2, MENU 3), the next menu set is displayed.
- If you select the EXIT icon, the system returns to the main screen.

Overview



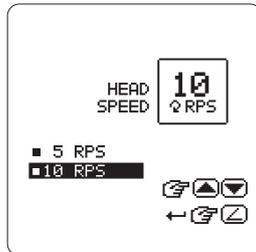
Menu Set 1

In the Menu Set 1, you can select the following parameters:

- Head Speed settings
- H.I.Alert - On/Off
- Automatic/Manual Modes
- Sensitivity settings
- Beam Masking

- ☞ To exit the menu, highlight and select the EXIT icon.
OR: Wait for 8 seconds and the menu is exited automatically.
- ☞ To display the Menu Set 2, highlight and select the MENU 2 icon.

Head Speed Settings

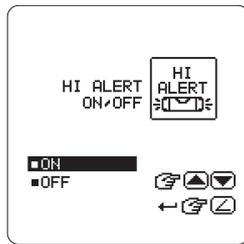


Head Speed Settings

You can select three head speed settings:

- 5 rps
- 10 rps

H.I.Alert - On/Off



H.I.Alert Settings

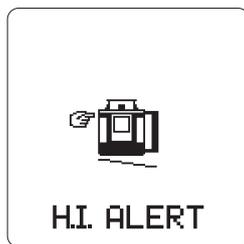
You can choose to enable or disable the H.I.Alert function:

- On
- Off

When enabled, the H.I.Alert function turns on automatically every time the Zone60 DG is turned on. The function becomes active 30 seconds after turning on the Zone60 DG.

How does the H.I.Alert function work?

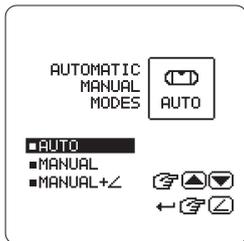
The Height of Instrument (H.I.) or Elevation Alert function prevents incorrect work caused by movement or settling of the tripod that would cause the laser to level at a lower height. 30 seconds after the Zone60 DG has levelled and the head of the laser starts rotating, the H.I.Alert function becomes active.



H.I.Alert screen

The H.I.Alert function monitors the movement of the laser; if disturbed, the H.I.Alert screen flashes and the Zone60 DG beeps rapidly. To stop the alert, turn the Zone60 DG off and on again. Check the height of the laser before beginning to work again.

Automatic/Manual mode



Automatic/Manual Mode Settings

You can select from three different modes:

- Automatic mode (default)
- Manual mode
- Manual mode with grade

You can choose to disable the automatic self-levelling mode. Note: The Zone60 DG always turns on in automatic mode regardless of the previous selection.

Automatic Mode

The Zone60 DG always turns on in automatic mode and continuously self-levels to maintain grade accuracy.

Manual Mode

In manual mode the self-levelling function is turned off. The Manual Mode screen is displayed instead of the normal main screen.

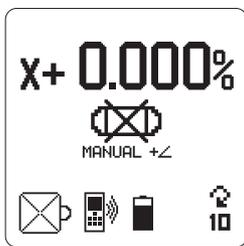
The plane of laser light can be manually sloped using the same buttons as for direct grade entry, but no value for the grade is shown in the display.



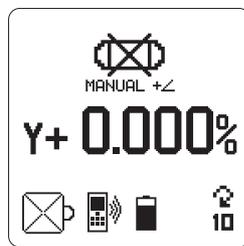
Manual Mode screen

Manual Mode with Grade

In manual mode with grade the self-levelling function is turned off. The Manual Mode with Grade screen is displayed instead of the normal main screen.



Manual Mode with Grade - X-axis



Manual Mode with Grade - Y-axis

The plane of laser light can be manually sloped using the same buttons as for direct grade entry. The value of the entered grade is displayed in the Manual Grade Entry screens.

When using this mode, the Zone60 DG first levels to the selected grade, then returns to manual mode.

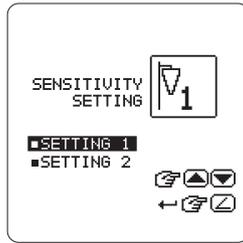


Manual Grade Entry - X-Axis

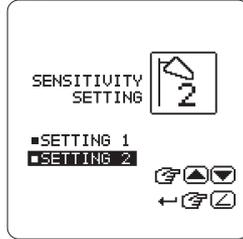


Manual Grade Entry - Y-Axis

Sensitivity Settings



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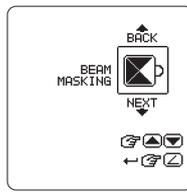
Sensitivity Variable Screens

While levelling, the Zone60 DG responds to disturbances (wind, vibrations) and stops the head rotation, if necessary. You can choose between two levels of sensitivity:

- Sensitivity Setting 1: For normal performance - wind, vibration and other disturbances are minimal.
- Sensitivity Setting 2: For situations when wind, vibration and other disturbances are more severe.

When enabled, the H.I.Alert function turns on automatically every time the Zone60 DG is turned on. The function becomes active 30 seconds after turning on the Zone60 DG.

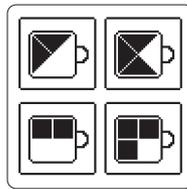
Beam Masking



007619.001

Beam Masking Screen

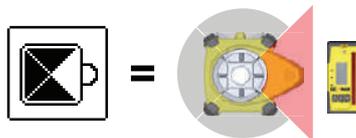
Beam masking allows you to turn off the laser beam on selected sides of the laser to prevent interference with other lasers or receivers that could be working in the same working area.



007620.001

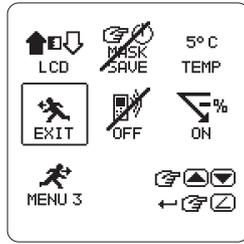
Possible combinations

You can choose to block half or three quarters of the rotating laser beam. Each of the four displayed combinations is available in four different variants. The dark area represents the area where the laser beam is turned off. Use the Up or Down Arrow Buttons to choose from the 16 possible combinations.



011231.001

Overview



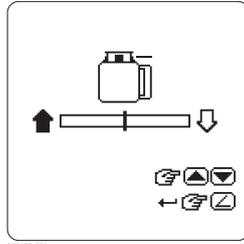
Menu Set 2

In the Menu Set 2, you can select the following parameters:

- Display Brightness
- Beam masking - Save at power off
- Temperature Sensitivity
- Negative Grade - enable/disable
- Radio - enable/disable

- ☞ To exit the menu, highlight and select the EXIT icon.
OR: Wait for 8 seconds and the menu is exited automatically.
- ☞ To display the Menu Set 3, highlight and select the MENU 3 icon.

Display Brightness



Display Brightness screen

With this setting, you can change the display brightness. Use the Up and Down Arrow Buttons to adjust the brightness as desired.

Save Beam Masking at Power Off



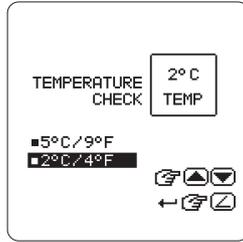
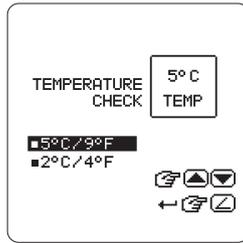
Save Beam Masking screens

Normally, the beam masking setting is disabled every time you turn off the Zone60 DG.

If you prefer to save the beam masking settings for usage on the following day, you can enable the saving of the beam masking setting:

- Save: The beam masking settings are saved at power off.
- Don't save: The beam masking settings are disabled at power off.

Temperature Sensitivity Settings



Temperature Check Settings screens

For each change in temperature of $\pm 5^{\circ}\text{C}$ ($\pm 9^{\circ}\text{F}$) the Zone60 DG returns to the level position to check if the change in temperature has led to a change of the main levelling system.

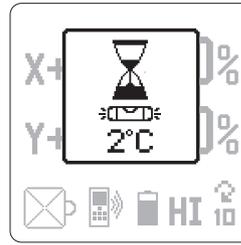
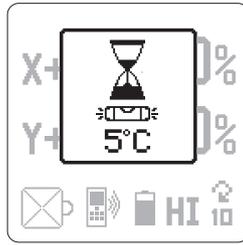
For a more sensitive unit, you can change the setting to $\pm 2^{\circ}\text{C}$ ($\pm 4^{\circ}\text{F}$) temperature change.

Available intervals:

- Temperature is checked every $5^{\circ}\text{C}/9^{\circ}\text{F}$
- Temperature is checked every $2^{\circ}\text{C}/4^{\circ}\text{F}$

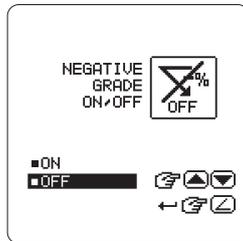
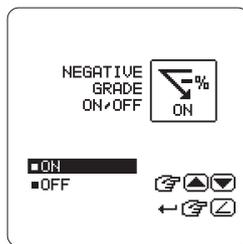
Relevelling process

When the Zone60 DG is relevelling, the Temperature Check Wait screen is displayed. Wait until the process is finished before using the laser again. The Status LED flashes to indicate normal levelling.



Temperature Check Wait screens

Negative Grade - Enable/Disable



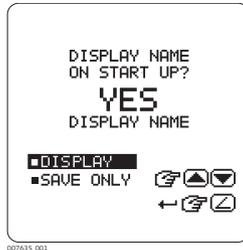
Negative Grade screens

If you want to prevent confusion when setting up the laser, you can disable the negative grade function on the Zone60 DG.

- ON: Negative grade is enabled.
- OFF: Negative grade is disabled.

When negative grade is disabled, only positive grade can be entered in the direction of the arrow-shaped alignment marks on the top of the Zone60 DG.

- Display (YES): The Customer Name screen is displayed each time the laser is turned on.
- Save only (NO): The information entered in the Customer Name screen is stored in the laser, but is only visible when the Customer Name entry screen is accessed.

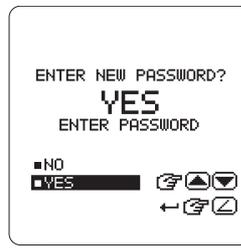


Display Name on Start-Up screens

Protect Customer Name Entry with a Password

After selecting the Display on Start-up setting, you can choose to enable/disable the password protection of the Customer Name entry screen:

- YES: Password protection is enabled. Enter a four-digit password. The password is required each time you access the customer name entry screen.
- NO: Password protection is disabled.

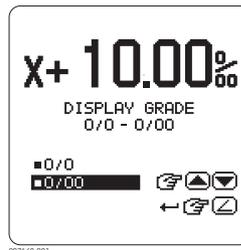
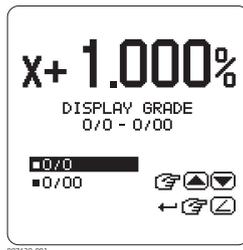


New Password screens

Display - Percent/Per Mil

You can choose to display the grade in percent of grade or per mil:

- 1.000% = 1 metre rise per 100 metres
- 1.00‰ = 1 metre rise per 1000 metres

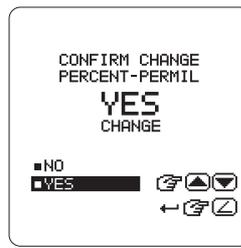
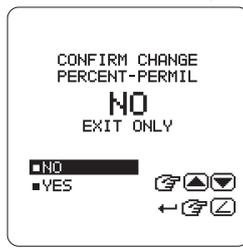


Display Percent

Display per Mil

Standard usage is percent of grade.

You are asked to confirm the selected option to prevent unwanted changes and possible errors due to the shift of the decimal point.

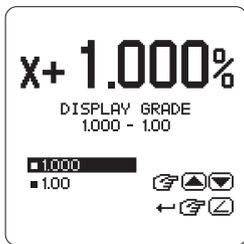


Per Mil - Confirmation Screens

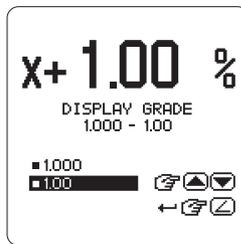
Display - Thousandths or Hundredths

You can choose to display percent of grade in thousandths or hundredths:

- 1.000 - Standard usage is to display thousandths or three digits after the decimal point.
- 1.00 - If you choose to display hundredths, only two digits are displayed after the decimal point.



007643_001
Display Thousandths



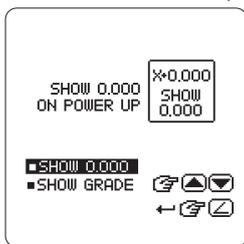
007644_001
Display Hundredths

Show Grade Settings on Power Up

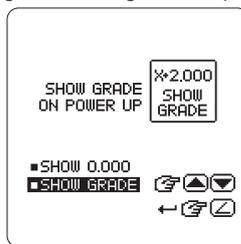
Normally, the grade value is reset to 0.000% every time you turn on the Zone60 DG.

If you prefer to display the previous grade settings when turning on the Zone60 DG, you can enable the option **Show Grade**.

- Show 0.000: The grade settings are reset to 0.000% on power up (default).
- Show Grade: The previous grade settings are displayed on power up.



008000_001
Show 0.000%



008000_001
Show Grade



Note: When the option **Show 0.000%** is selected and you want to restore the last set grade(s), press and hold the Grade Button for 1.5 seconds.

Calibration alert activation

Enabling/Disabling the Calibration Alert Function

You can choose to enable/disable a calibration alert function based on hours of use:

- ON: Calibration alert is enabled
- OFF: Calibration alert is disabled



007645_001
Enable Calibration Alert Screen



007646_001
Disable Calibration Alert Screen

Setting the Hours for Calibration Alert

If you enabled the calibration alert function, the "Set Calibration Alert Hours" screen is displayed. The default setting is 1.040 hours, which corresponds to approximately 6 months, based on a 40-hour working week.



007647.001

Set Calibration Alert Hours Screen

Set the number of hours you would like to work before receiving a calibration alert.

The hours can be set in increments of 40 hours.

Display of Calibration Alert on Start-up Screen

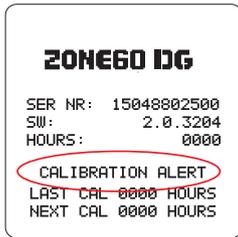
If you enabled the calibration alert function, the calibration alert hours are displayed on the start-up screen after turning on the Zone60 DG:



011319.001

Calibration Alert Hours on Start-up Screen

- LAST CAL: The number of hours since the last calibration.
- NEXT CAL: The number of hours remaining until the next calibration is planned.



007649.001

Calibration Alert Flashing Screen

When the number of planned hours is reached, the words "CALIBRATION ALERT" are displayed for 8 seconds.

After calibrating the Zone60 DG, the calibration alert hours are automatically reset. Changing or disabling the calibration alert is only possible by accessing the menu option "Calibration alert activation".

Overview



Remote Control Menu Screen

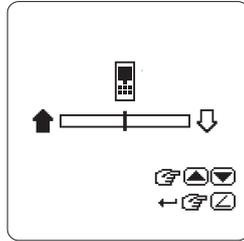
The ZRC60 Remote Control has its own menu where you can change the following parameters:

- Display Brightness
- Sleep Mode Hours
- Remote Shut-Off Time

To access the Remote Control menu, press and hold the Left and Right Arrow Buttons on the remote control for 1.5 seconds.

For navigation within the Remote Control menu, use the same buttons as for navigation within the Zone60 DG menu. (Refer to "6.1 Access and Navigation")

Display Brightness



Remote Control Display Brightness

You can change the display brightness on this screen. Use the Up and Down Arrow Buttons to adjust the brightness as desired.

Sleep Mode Hours

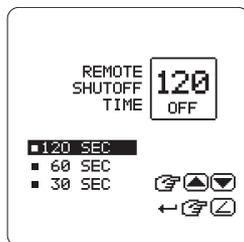


Sleep Mode Hours

You can determine how long the Zone60 DG stays in sleep mode before turning off completely:

- 2 hours
- 4 hours
- 8 hours
- 16 hours

Remote Shut-Off Time



Shut-Off Time

You can determine a shut-off time for the remote control:

- 30 seconds
- 60 seconds
- 120 seconds

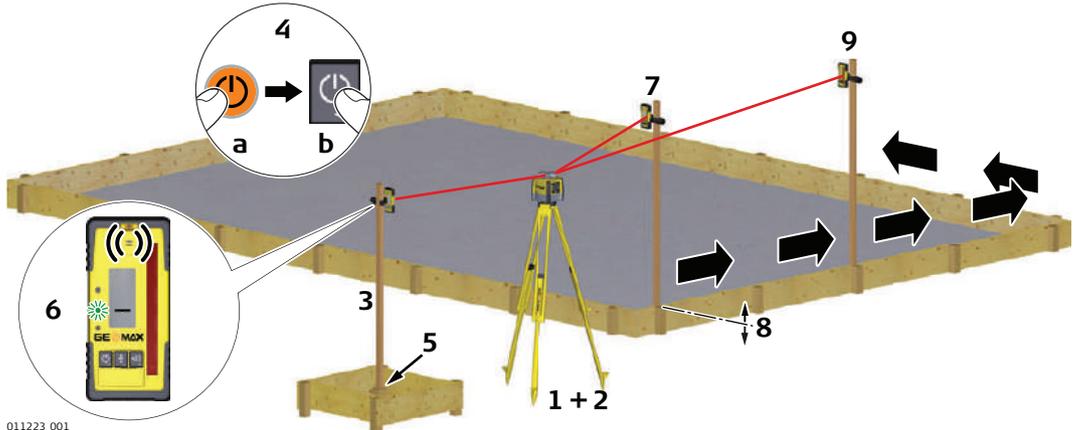
If the remote control is not used during this time, it shuts off automatically.

8 Applications

8.1 Setting Forms

Setting Forms step-by-step

Application shown using the ZRP105 Receiver.



011223_001

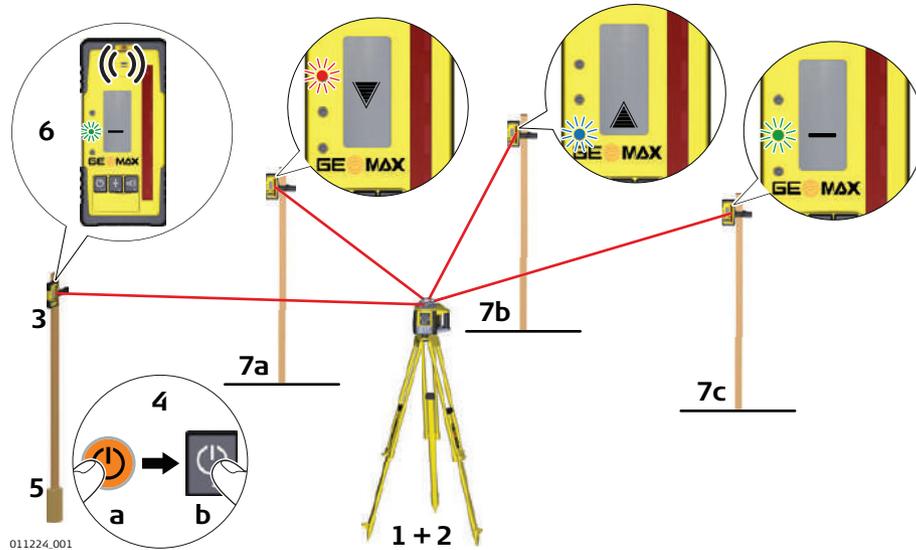
Step	Description
1.	Set up the Zone60 DG on a tripod.
2.	Set up the tripod on a stable surface outside the working area.
3.	Attach the receiver to a rod.
4.	Turn on the Zone60 DG and the receiver.
5.	Set the base of the rod on a known point for the finished height of forms.
6.	Adjust the height of the receiver on the rod until the on-grade (centre-line) position is indicated on the receiver by: <ul style="list-style-type: none"> • the centre bar • the green flashing LED • a solid audio tone
7.	Set the rod with the attached receiver on top of the form.
8.	Adjust the height of the form until the on-grade position is again indicated.
9.	Continue to additional positions until the forms are levelled to the rotating plane of the Zone60 DG.

8.2

Checking Grades

Checking Grades step-by-step

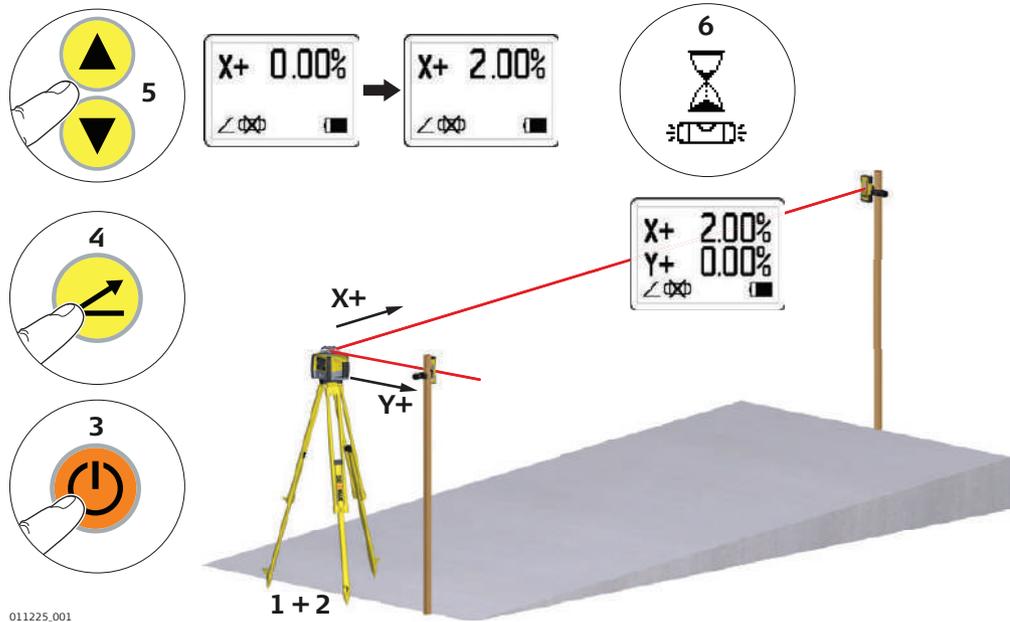
Application shown using the ZRP105 Receiver.



011224.001

Step	Description
1.	Set up the Zone60 DG on a tripod.
2.	Set up the tripod on a stable surface outside the working area.
3.	Attach the receiver to a rod.
4.	Turn on the Zone60 DG and the receiver.
5.	Set the base of the rod on a known point for the finished grade.
6.	Adjust the height of the receiver on the rod until the on-grade (centre-line) position is indicated on the receiver by: <ul style="list-style-type: none"> • the centre bar • the green flashing LED • a solid audio tone
7.	Set the rod with the attached receiver on top of the excavation or concrete pour to check for correct elevation.
8.	Variances can be read in precise measurements with the digital receiver. <ul style="list-style-type: none"> • 7a: Position is too high. • 7b: Position is too low. • 7c: Position is on grade.

Entering Grades step-by-step



011225.001

Step	Description
1.	Set up the Zone60 DG on a tripod.
2.	Set up the tripod at the base of the slope with the x-axis pointing in the direction of the slope.
3.	Turn on the Zone60 DG.
4.	Press the Grade button.
5.	Press the Up or Down button to enter grade for the x-axis (single slope). Press the Grade button to enter grade for the y-axis. Press the Grade button again to exit grade entry mode.
6.	Once grade is entered, the Zone60 DG will begin to adjust to grade. Do not disturb the Zone60 DG during this process.

 To restore previous grade, press and hold the Grade button for 1.5 seconds.

8.4

Beam Catching (Grade Matching)

Beam Catching step-by-step using the ZRD105B

Using the Beam Catching feature you can match an existing grade. The Zone60 DG moves to the new grade position, displays the grade found and begins self-levelling to maintain the grade over time. Maximum range is 100 m (300').



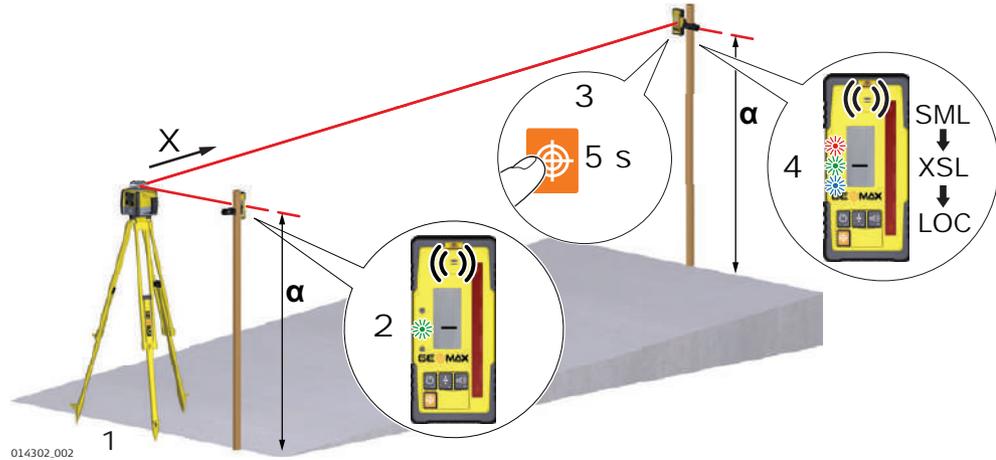
Step	Description
	The Beam Catching process can only be run on the X-axis in horizontal mode.
1.	Set up the Zone60 DG at the base of a slope with no grade dialled into the Zone60 DG and with the X-axis pointing in the direction of the slope.
2.	Adjust the height of the receiver on the rod at the base of the slope until the on-grade (centre-line) position is indicated on the receiver by: <ul style="list-style-type: none"> the centre bar the green flashing LED a solid audio tone the digital display
3.	Move the rod with the receiver to the top of the slope. To start the Beam Catching process, press the Beam Catch button for 1.5 seconds. <ul style="list-style-type: none"> The Zone60 DG searches for the receiver until the on-grade position is found. The receiver shows SMT, then XSC while catching the beam on the X-axis. Once the on-grade position is found, the receiver flashes all three LEDs simultaneously one time and the receiver returns to normal operation.
4.	After this signal, the receiver can be moved and used as normal. The grade for the sloped axis is displayed on the LCD display and the Zone60 DG now self-levels to this new slope.

8.5

Beam Lock (Grade Matching and Monitoring)

Beam Lock step-by-step using the ZRD105B

Using the Beam Lock feature, you can match an existing grade and monitor the laser beam. The Zone60 DG moves to the new grade position, displays the grade found and begins self-levelling to maintain the grade over time. The ZRD105B must remain in place to monitor any movements of the rotating beam. Thus, an accurate grade setup is maintained. Maximum range is 100 m (300').



Step	Description
	The Beam Lock process can only be run on the X-axis in horizontal mode.
1.	Ensure that the grade value is set to zero. Set up the Zone60 DG at the base of a slope with the X-axis pointing in the direction of the slope.
2.	At the base of the slope, adjust the height of the ZRD105B receiver on the rod until the on-grade (centreline) position is indicated on the receiver by: <ul style="list-style-type: none"> the centre bar the green flashing LED a solid audio tone the digital display
3.	Move the rod with the receiver to the top of the slope. To start the Beam Lock process, press the Beam Catch button for 5 seconds. <ul style="list-style-type: none"> The Zone60 DG searches for the receiver until the on-grade position is found. The receiver shows SML, then XSL while catching and locking the beam on the X-axis. Once the on-grade position is found, the receiver flashes all three LEDs simultaneously one time. The display shows LOC while the receiver is in lock mode.
4.	After this signal, the receiver must remain in place to monitor any movements of the rotating beam. The grade for the sloped axis is displayed on the LCD display of the Zone60 DG.
	To turn off the Beam Lock mode on the receiver, hold the Power Button for 1.5 seconds.
	To lock and monitor the rotating beam of an existing grade, mount the receiver in the plane of the laser before starting the Beam Lock process.

9

Batteries

Description

The Zone60 DG can be purchased with alkaline batteries or a rechargeable Li-Ion battery pack. The following information is appropriate only to the model you have purchased.

9.1

Operating Principles

First-time Use / Charging Batteries

- The battery must be charged prior to using it for the first time because it is delivered with an energy content as low as possible.
- The permissible temperature range for charging is between 0°C to +40°C/ +32°F to +104°F. For optimal charging, we recommend charging the batteries at a low ambient temperature of +10°C to +20°C/+50°F to +68°F if possible.
- It is normal for the battery to become warm during charging. Using the chargers recommended by GeoMax, it is not possible to charge the battery if the temperature is too high.
- For new batteries or batteries that have been stored for a long time (> three months), it is effectual to make only one charge/discharge cycle.
- For Li-Ion batteries, a single discharging and charging cycle is sufficient. We recommend carrying out the process when the battery capacity indicated on the charger or on a GeoMax product deviates significantly from the actual battery capacity available.

Operation / Discharging

- The batteries can be operated from -20 °C to +55 °C/-4 °F to +131 °F.
- Low operating temperatures reduce the capacity that can be drawn; high operating temperatures reduce the service life of the battery.

9.2

Battery for Zone60 DG

Charging the Li-Ion battery pack step-by-step

The rechargeable Li-Ion battery pack on the Zone60 DG can be charged without removing the battery pack from the laser.



011226.001

Step	Description
1.	Slide the locking mechanism on the battery compartment to the centre position to expose the charge jack.
2.	Plug the AC connector into the appropriate AC power source.
3.	Connect the charger plug into the charge jack on the Zone60 DG battery pack.
4.	The small LED next to the charge jack flashes indicating that the Zone60 DG is charging. The LED is on solid when the battery pack is fully charged.
5.	When the battery pack is fully charged, disconnect the charger plug from the charge jack.
6.	Slide the locking mechanism to the left position to prevent dirt from getting into the charging jack.



The battery pack reaches a full charge in approximately 5 hours if completely empty. A one-hour charge should allow the Zone60 DG to run for a full 8 hours.

Changing the Li-Ion batteries step-by-step

With the rechargeable Li-Ion battery pack the battery indicator on the Zone60 DG LCD display shows when the battery pack is low and needs to be charged.

The charge indicator LED on the Li-Ion battery pack indicates when the pack is being charged (flashing slowly) or fully charged (on, not flashing).



011227.001

Step	Description
	The batteries are inserted in the front of the laser.
	The rechargeable battery pack can be recharged without being removed from the laser. Refer to " Charging the Li-Ion battery pack step-by-step" for further information.
1.	Slide the locking mechanism on the battery compartment to the right and open the cover of the battery compartment.
2.	To remove the batteries: Remove the batteries from the battery compartment.
	To insert the batteries: Insert the batteries into the battery compartment.
3.	Close the cover of the battery compartment and slide the locking mechanism to the left until it locks into position.

Changing the alkaline batteries step-by-step

With alkaline batteries the battery indicator on the Zone60 DG LCD display flashes when the batteries are low and need to be replaced. If no battery icon is shown, the batteries are okay.



011228.001

Step	Description
	The batteries are inserted in the front of the laser.
1.	Slide the locking mechanism on the battery compartment to the right and open the cover of the battery compartment.
2.	To remove the batteries: Remove the batteries from the battery compartment.
	To insert the batteries: Insert the batteries into the battery compartment, ensuring that the contacts are facing in the right direction.
	The correct polarity is displayed on the battery holder.
3.	Close the cover of the battery compartment and slide the locking mechanism to the left until it locks into position.

About

- It is the responsibility of the user to follow operating instructions and to periodically check the accuracy of the laser and work as it progresses.
- The Zone60 DG is adjusted to the defined accuracy specification at the factory. It is recommended to check the laser for accuracy upon receipt and periodically thereafter to ensure accuracy is maintained. If the laser requires adjustment, contact your nearest authorised service centre or adjust the laser using the procedures described in this chapter.
- Only enter the accuracy adjustment mode when you plan to change the accuracy. Accuracy adjustments should only be performed by a qualified individual that understands basic adjustment principles.
- It is recommended to perform this procedure with two people on a relatively flat surface.

10.1

Checking the Level Accuracy

Checking the level accuracy step-by-step

Step	Description
1.	Place the Zone60 DG on a flat, level surface or tripod approximately 30 m (100 ft) from a wall.
2.	Align the first axis so that it is square to a wall. Allow the Zone60 DG to self-level completely (approximately 1 minute after the Zone60 DG begins to rotate).
3.	Mark the position of the beam.
4.	Rotate the laser 180° and allow it to self-level.
5.	Mark the opposite side of the first axis.
6.	Align the second axis of the Zone60 DG by rotating it 90° so that this axis is square to the wall. Allow the Zone60 DG to self-level completely.
7.	Mark the position of the beam.
8.	Rotate the laser 180° and allow it to self-level.
9.	Mark the opposite side of the second axis.

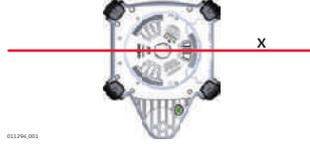
The Zone60 DG is within its accuracy specification if the four marks are within ± 1.5 mm ($\pm 1/16$ ") from the centre.

10.2

Adjusting the Level Accuracy

Description

In Adjustment Mode the X-axis LED indicates changes to the X-axis.



The Y-axis LED indicates changes to the Y-axis



Entering Calibration mode step-by-step

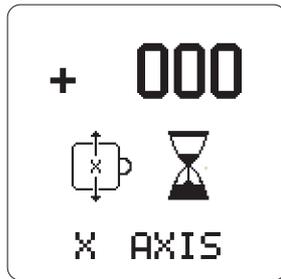
Step	Description
1.	Turn off the power.
2.	Put the Zone60 DG in an upright position.
3.	Press and hold both the Up and Down Arrow buttons.
4.	Press the Power button. The X-axis calibration screen appears. The Zone60 DG is now in Calibration mode.



In Calibration mode, the LED does not blink and the laser head continues to rotate. An hour-glass indicates that the Zone60 DG is levelling.

Calibrating the X-axis step-by-step

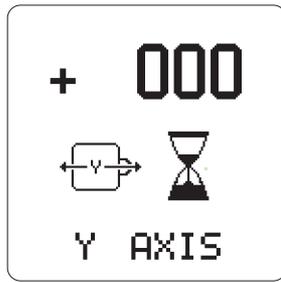
When entering Calibration mode, the X-axis calibration screen appears:



Step	Description
1.	When the hour glass has disappeared, indicating that the Zone60 DG has levelled, check both sides of the X-axis.
2.	Press the Up and Down Arrow Buttons to bring the plane of laser light to the specified level position.  Each step represents approximately 2 arc seconds of change. Therefore, 5 steps equal approximately 1.5 mm at 30 m (1/16" at 100').
3.	Press the Grade Button to accept the adjusted position and to switch to the Y-axis calibration screen.

Calibrating the Y-axis step-by-step

After calibration of the X-axis, the Y-axis calibration screen appears:



Step	Description
1.	When the hour glass has disappeared, indicating that the Zone60 DG has levelled, check both sides of the Y-axis.
2.	Press the Up and Down Arrow Buttons to bring the plane of laser light to the specified level position.  Each step represents approximately 2 arc seconds of change. Therefore, 5 steps equal approximately 1.5 mm at 30 m (1/16" at 100').
3.	Press the Grade Button to accept the adjusted position and to switch to the X-axis calibration screen.
4.	Press and hold the Grade Button for 3 seconds to accept the adjusted positions, save and store the calibration settings and return to the Main User screen.

Exiting Calibration mode

Press and hold the Grade button for 3 seconds to save and exit Calibration mode.



Pressing the Power button at any time while in Calibration mode will exit the mode without saving changes.

10.3

Adjusting the Vertical Accuracy

Entering Calibration mode for the Z-axis step-by-step

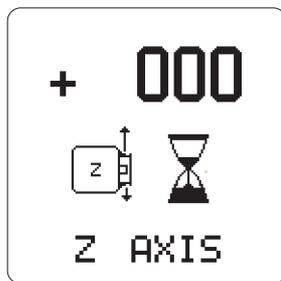
Step	Description
1.	Turn off the power.
2.	Put the Zone60 DG in laydown position.
3.	With power off, press and hold both the Up and Down Arrow Buttons.
4.	Press the Power Button. The active axis is the Z-axis.



In Calibration mode, the LED does not blink and the laser head continues to rotate. An hour-glass indicates that the Zone60 DG is levelling.

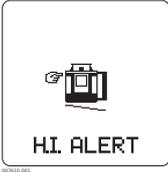
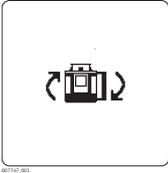
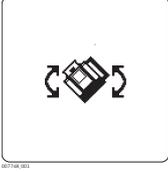
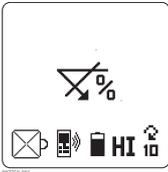
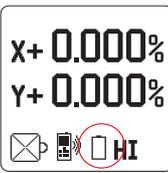
Calibrating the Z-axis step-by-step

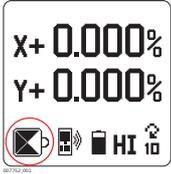
When entering calibration mode for the Z-axis, the Z-axis calibration screen appears:



Step	Description
1.	Press the Up and Down Arrow Buttons to increment the vertical position of the laser beam.
2.	Continue to press the Left and Right Arrow Buttons and monitor the beam until the Zone60 DG is within its specified range.
3.	Press and hold the Grade Button for 3 seconds to accept the adjusted position, to save and store the calibration settings and to return to the main user screen.

Alerts and Message Screens

Alert	Symptom	Possible causes and solutions
	Low Battery indication on the display.	The batteries are low. Replace the alkaline batteries or recharge the Li-Ion battery pack. Refer to "9 Batteries".
	Elevation (H.I.) Alert The Elevation (H.I.) Alert screen is shown and the audio beeps. (Level position)	The Zone60 DG has been bumped or tripod was moved. Turn off Zone60 DG to stop alert, check the height of the laser before beginning to work again. Allow Zone60 DG to relevel and check the height of the laser. After 2 minutes in the alert condition, the unit will shut off automatically.
	Servo Limit Alert The Servo Limit Alert screen is shown.	The Zone60 DG is tipped too far to reach a level position. Relevel the Zone60 DG within the 6 degree self-levelling range. After 2 minutes in the alert condition, the unit will shut off automatically.
	Tilt Alert The Tilt Alert screen is shown.	The Zone60 DG is tipped more than 45° from level. After 2 minutes in the alert condition, the unit will shut off automatically.
	Temperature Alert The Temperature Alert screen is shown.	The Zone60 DG is in an environment where it cannot operate without damaging the laser diode, for example being exposed to the heat from direct sunlight. Shade the Zone60 DG from the sun. After 2 minutes in the alert condition, the unit will shut off automatically.
	Temperature Check The Temperature Check Alert screen is shown.	The Zone60 DG has detected a change in temperature of 5°C and is checking the level position.  Wait until procedure is complete. Refer to " Temperature Sensitivity Settings" for changing the setting between 5°C and 2°C.
	Negative grade entry is not possible.	The negative grade function is disabled. Only positive grade can be entered in the Zone60 DG. To enter negative grade, enable the negative grade function. Refer to " Negative Grade - Enable/Disable".
	The "empty battery" icon flashes.	The Zone60 DG has reached a low battery condition and changes the head speed to 7rps. If the receiver detects the Zone60 DG rotating at 7 rps, it displays a small flashing Zone60 DG.  Check the battery of the Zone60 DG.

Alert	Symptom	Possible causes and solutions
	The beam is not emitting from all sides of the laser.	Beam masking is activated for two or more sides of the laser. To de-activate or change beam masking, refer to "Beam Masking".
	It is not possible to enter grade greater than 10.00% or 3.000%.	The Zone60 DG allows for up to 10% grade entry in both axes simultaneously. If the grade entry for one axis is greater than 10%, the cross axis is limited to 3%.
	The Zone60 DG is not communicating with the remote control.	The Zone60 DG has lost the communication link to the remote control.  Ensure that you are within clear sight of the Zone60 DG and that you have not exceeded the 100 m (300') working range.

Troubleshooting

Problem	Possible Causes	Suggested Solutions
The Zone60 DG does not turn on.	The batteries are low or dead.	Check the batteries and change or charge the batteries if necessary. If the problem continues, return the Zone60 DG to an authorised service centre for service.
The distance of the laser is reduced.	Dirt is reducing the laser output.	Clean the windows of the Zone60 DG and the receiver. If the problem continues, return the Zone60 DG to an authorised service centre for service.
The laser receiver is not working properly.	The Zone60 DG is not rotating. It may be levelling or in H.I.Alert.	Check for proper operation of the Zone60 DG.  Refer to the receiver manual for more information.
	The receiver is out of usable range.	Move closer to the Zone60 DG.
	The batteries of the receiver are low.	Check the low battery symbol on the receiver display. Change the receiver batteries.
The ZRC60 remote control is not working properly.	The remote control is out of usable range.	For normal operation, the remote control works up to 300 m (1,000').
	The batteries of the remote are low.	Check the Remote Battery LED on the control panel. Change the remote control batteries.
The display is too dark or too light.	The setting of the display brightness is unsuitable.	The brightness for both the Zone60 DG and the remote control can be reset in the menu of the respective device. Refer to "Display Brightness"(Zone60 DG) or to "Display Brightness"(Remote control).
The grade is shown in percent(%) or per mil (‰).	The wrong setting has been selected.	Choose the desired setting in the option menu. ("Display - Percent/Per Mil")
The grade resets to zero each time the laser is turned on.	The wrong setting has been selected.	Choose the desired setting in the option menu. ("Show Grade Settings on Power Up")

Problem	Possible Causes	Suggested Solutions
The laser stops too often to relevel.	The sensitivity setting may be set to the "fine" setting (Setting 1).	Choose the Sensitivity Setting 2 in the option menu. (" Sensitivity Settings")
	The Tripod may be unstable.	Check your tripod for stability. Tighten all screws. Use sand bags on the legs if necessary.
	The wind is causing the Zone60 DG to move too much.	Shelter the Zone60 DG from the wind. Press the tripod legs more firmly into the ground.

12

Care and Transport

12.1

Transport

Transport in the field

When transporting the equipment in the field, always make sure that you

- either carry the product in its original transport container,
- or carry the tripod with its legs splayed across your shoulder, keeping the attached product upright.

Transport in a road vehicle

Never carry the product loose in a road vehicle, as it can be affected by shock and vibration. Always carry the product in its container, original packaging or equivalent and secure it.

Shipping

When transporting the product by rail, air or sea, always use the complete original GeoMax packaging, container and cardboard box, or its equivalent, to protect against shock and vibration.

Shipping, transport of batteries

When transporting or shipping batteries, the person responsible for the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping, contact your local passenger or freight transport company.

Field adjustment

Periodically carry out test measurements and perform the field adjustments indicated in the User Manual, particularly after the product has been dropped, stored for long periods or transported.

12.2

Storage

Product

Respect the temperature limits when storing the equipment, particularly in summer if the equipment is inside a vehicle. Refer to "13 Technical Data" for information about temperature limits.

Field adjustment

After long periods of storage inspect the field adjustment parameters given in this user manual before using the product.

Li-Ion and alkaline batteries

For Li-Ion and alkaline batteries

- Refer to "Technical Data" for information about storage temperature range.
- Remove batteries from the product and the charger before storing.
- After storage recharge batteries before using.
- Protect batteries from damp and wetness. Wet or damp batteries must be dried before storing or use.

For Li-Ion batteries

- A storage temperature range of 0°C to +30°C / +32°F to +86°F in a dry environment is recommended to minimize self-discharging of the battery.
- At the recommended storage temperature range, batteries containing a 30% to 50% charge can be stored for up to one year. After this storage period the batteries must be recharged.

12.3

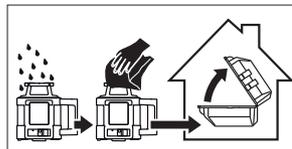
Cleaning and Drying

Product and accessories

- Blow dust off lenses and prisms.
- Never touch the glass with your fingers.
- Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the cloth with water or pure alcohol. Do not use other liquids; these can attack the polymer components.

Damp products

Dry the product, the transport container, the foam inserts and the accessories at a temperature not greater than 40°C /104°F and clean them. Remove the battery cover and dry the battery compartment. Do not repack until everything is completely dry. Always close the transport container when using in the field.



Cables and plugs

Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.

13

Technical Data

13.1

Conformity to National Regulations

Conformity to national regulations

- FCC Part 15 (applicable in US).
- Hereby, GeoMax AG, declares that the product Zone60 DG is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC and other applicable European Directives. The declaration of conformity may be consulted at <http://www.geomax-positioning.com/Downloads.htm>.



Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EU Member state.

- The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.
- Japanese Radio Law and Japanese Telecommunications Business Law Compliance.
 - This device is granted pursuant to the Japanese Radio Law and the Japanese Telecommunications Business Law.
 - This device should not be modified (otherwise the granted designation number will become invalid).

Frequency band

2400 - 2483.5 MHz

Output power

< 100 mW (e. i. r. p.)

Antenna

Zone60 DG:	Chip antenna
ZRC60 remote control:	Chip antenna

13.2

Dangerous Goods Regulations

Dangerous Goods Regulations

The products of GeoMax are powered by Lithium batteries.

Lithium batteries can be dangerous under certain conditions and can pose a safety hazard. In certain conditions, Lithium batteries can overheat and ignite.



When carrying or shipping your GeoMax product with Lithium batteries onboard a commercial aircraft, you must do so in accordance with the **IATA Dangerous Goods Regulations**.



GeoMax has developed **Guidelines** on "How to carry GeoMax products" and "How to ship GeoMax products" with Lithium batteries. Before any transportation of a GeoMax product, we ask you to consult these guidelines on our web page (<http://www.geomax-positioning.com/dgr>) to ensure that you are in accordance with the IATA Dangerous Goods Regulations and that the GeoMax products can be transported correctly.



Damaged or defective batteries are prohibited from being carried or transported onboard any aircraft. Therefore, ensure that the condition of any battery is safe for transportation.

13.3

General Technical Data of the Laser

Operating range

Operating range (diameter):	
Zone60 DG:	1100 m/3600 ft

Self-levelling accuracy

Self-levelling accuracy:	±1.5 mm at 30 m (±1/16" at 100 ft)
Self-levelling accuracy is defined at 25°C (77°F)	

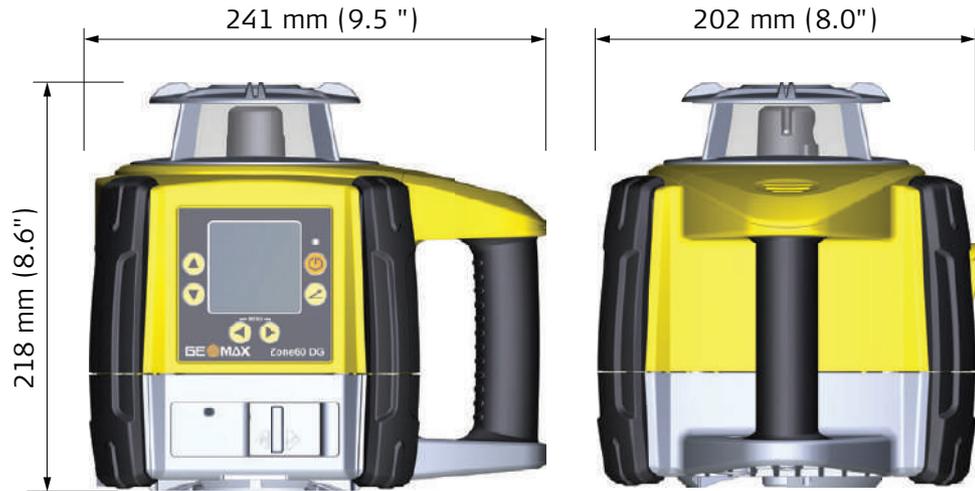
Self-levelling range

Self-levelling range:	±6°
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Head speed

Head speed:	5, 10 rps
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Laser dimensions



011229_001

Grade Capability

± 10% in both axes simultaneously, 15% in one axis with up to 3% in the cross axis

Weight

Zone60 DG weight with battery: 3.4 kg/7.4 lbs.

Internal battery

Type	Operating times* at 20°C
Lithium-Ion (Li-Ion Pack)	40 h
Alkaline (four D-cells)	60 h

*Operating times are dependent upon environmental conditions.

👉 Charging the Li-Ion battery pack takes a maximum of five hours.

👉 Use only high quality alkaline batteries to achieve operating time.

Environmental specifications

Temperature

Operating temperature	Storage temperature
-20°C to +50°C (-4°F to +122°F)	-40°C to +70°C (-40°F to +158°F)

Protection against water, dust and sand

Protection
IP67
Dust tight
Waterproof to 1 m temporary immersion.

Lithium-Ion charger

Type: Li-Ion battery charger
 Input voltage: 100 V AC-240 V AC, 50 Hz-60 Hz
 Output voltage: 12 V DC
 Output current: 3.0 A
 Polarity: Shaft: negative, Tip: positive

Lithium-Ion battery pack

Type: Li-Ion battery pack
 Input voltage: 12 V DC
 Input current: 2.5 A
 Charge time: 5 hours (maximum) at 20°C

13.3.1

ZRC60 Remote Control

Operating range

Operating range (diameter):

300 m / 1000 ft

Batteries

Batteries: Alkaline
Battery life (typical usage)

Two AA-cells
70 hours

Remote Control dimensions



GeoMax Zone60 DG Series



841553-2.0.1en

Original text

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