

GeoMax ZEL400HV



GEOMAX
A Hexagon Company

**English, Deutsch, Français,
Español, Italiano, Nederlands**



GeoMax ZEL400HV



Introduction

Purchase



Congratulations on the purchase of a new Rotating Laser from GeoMax AG.

This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "6 Safety Directions" for further information. Read carefully through the User Manual before you switch on the product.

Product identification

The type and serial number of your product are indicated on the type plate. Enter the type and serial number in your manual and always refer to this information when you need to contact your agency or GeoMax authorized service workshop.

Type: ZEL400HV





Serial No.: _____



There are drawings on the first page of the user manual. Unfold that page while reading through the user manual. The letters and numbers in () always refer to these drawings.

Symbols used in this manual

The symbols used in this manual have the following meanings:

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 and/or 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.

Trademarks

All trademarks are the property of their respective owners.

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1 General Information

Description

The ZEL400HV is an automatic visible laser that can be used for levelling, vertical alignment, plumbing and squaring. Applications include installing suspended ceilings, technical flooring, partitions and a variety of outdoor alignment work.

The ZEL400HV laser has these advanced features:

- Automatic self-levelling in both horizontal and vertical modes
 - Choice of beams: rotating plane, scanning, chalk line, single point or constant squaring
 - Square shot that's left/right adjustable
-

Laser parts overview

1. Rotating head
 2. Plumb or square laser beam aperture
 3. Laser beam aperture
 4. Laser chalk line aperture
 - 4a. Handle to switch between rotation/chalk line mode
 5. Arrow (align with 90° index mark)
 6. 90° index mark (one of four)
 7. Retractable foot for vertical setup
 8. Adjustable feet for vertical setup
 9. Batteries (rechargeable or alkaline)
 10. Jack for battery charger (on rechargeable models)
 11. 5/8" mount
 12. Protection Cap
 13. Vial for vertical setup
-

Keypad functions Overview

14. Decrease rotation speed, decrease scan area
 15. Increase rotation speed, increase scan area
 16. Moving the square shot to the right
 17. Moving the square shot to the left
 18. Capture window for remote control
 19. Manual mode light
 20. Manual/Automatic
 21. Tilt light
 22. Tilt
 23. Battery low light
 24. On/Off
-

2 Basic Operation



An overview of laser and keypad functions can be found on page 7.

The laser performs a self-test when switched on. The beam blinks while the laser is self-levelling. After the laser is leveled, the head will start to rotate.

2.1 Auto/Man Key

Auto: Automatic levelling - the default mode when the laser is switched on.

Man: Manual use.

The ZEL400HV laser is always in the automatic self-levelling mode (Auto) when switched on. Once the instrument has self-levelled, the laser head will start to rotate.

You can choose to have constant rotation by using the manual mode. This way, the beam will rotate even if the instrument is not leveled (necessary when working on inclined planes).

For safety, a red light will blink above the Auto/Man button to advise the user that the laser is in manual mode.

2.2 Tilt Key

Tilt Mode

Tilt: Tilt Mode. This will work only when selected.

This feature stops the laser automatically if the laser is disturbed or moved, preventing inaccurate readings. Use this feature only in automatic mode, not in manual mode.

Push the Tilt key (22) after switching the instrument on. The Tilt feature is available 30 seconds after the instrument has self-levelled.

The red light above Tilt key will blink when operating in this mode. If the laser is disturbed, the head will stop rotating and the red light will be on continuously. Turn the laser off, wait 5 seconds and switch it on again (check that the beam is at its original reference).

2.3 Horizontal Setup

Horizontal setup, step by step

1. The ZEL400HV can be used directly on the ground, on the wall mount or on a tripod with a 5/8" screw.
2. Press the On/Off key (24) to switch the laser on. It will automatically self-level.
3. To select the Manual mode, press key (20).
4. To select the Tilt mode, press the key (22). This feature is available 30 seconds after the laser has self-levelled.

5. If you wish to move the laser beam to a specific point, briefly press key (16) or (17).
 6. To adjust the rotation speed, press key (14) or (15) continuously according to the direction you wish. To stop the rotation, press once the opposite key.
 7. To turn the laser off, press key (24).
-

2.4 Vertical Setup

Vertical setup, step by step

No accessories are needed for this position. The ZEL400HV can be used directly on the ground. However, it can be used on the mount for a better setup.

1. Flip up the retractable foot (7). Place the instrument in vertical position, resting on this foot. Use the adjustable feet (8) to rough level the laser to adjust the top bubble vial (13).
 2. Switch the instrument on. Once the instrument is leveled, the head will start rotating.
-

2.5 Squaring

Squaring, step by step

1. Put the laser on the ground and repeat the steps 1 and 2 for vertical use.
2. Stop the head rotation by pressing key (14) or (15).
3. To position the rotating vertical plane perpendicular to a reference line: Coincide the arrow (5) located below the beam aperture with the index (6) located above the retractable foot (there is also an index mark on the foot).

Move the laser so that the beam is over the reference point on the ground, keeping the arrow and index aligned.

Align the beam projecting from the top of the head to your second reference point with key (16) or (17) on the laser or with the ZDR300. (This beam is 90°, or square, to the other vertical plane beam.)

4. Start the head rotation using keys (14) or (15) to change speed or use the chalk line.



It is important to check while you're using the laser that it has not been moved and that your setting is still accurate.

2.6 Rotation Speed

Your laser is equipped with a visible laser diode.

It may be necessary to adjust the rotation speed according to the ambient light conditions using keys (14) and (15). The laser beam is more visible in slow motion. It is possible to stop the rotation and point the beam manually to view the beam over long distances.

2.7 Using the Laser Chalk Line

Ideal for viewing at short distances. To use the laser chalk line feature, hold the head and lift the handle (4a) on the laser head upwards so that the beam comes out the laser line aperture (4). This gives a precise and stable laser line

for working directly on your reference plane. You can move the line by rotating the head manually or by using the ZDR300 in remote control mode.



The ZDR300 detector will not work with the chalk line feature.

2.8 Using the Scanning

Allows you to see the beam easier when the laser is further away. To use the scanning, turn the laser on. The laser should be in 'point' mode.

If it is in chalk line, bring the lid on the laser head downwards so that the beam comes out the beam aperture (3).

To put the laser on scan mode, use the keypad or the ZDR300 in remote control mode.

To scan, simultaneously press (14) and (17) on the laser.

The beam will blink until it has self-leveled, and then will start scanning. Use (16) or (17) to aim the scan.

Use (15) to increase and (14) to decrease (10° to 35°). To turn the scanning off, simultaneously press (14) and (17) again.

2.9 Power

Installing alkaline batteries

1. To install alkaline batteries in your ZEL400HV laser, use a coin to unscrew the battery cap located at the bottom of the instrument.
2. Remove the battery pack.
3. Insert two alkaline batteries (D or LR20) in the pack, matching the polarity (" +" or " -") as indicated at the bottom of the pack.
4. Put the battery back into its place and tighten the screw. Your ZEL400HV is ready for use.

To replace batteries

1. When battery power is low, the laser head will stop rotating, the laser beam will blink, and the low battery light (23) will come on.
 2. Replace both batteries at the same time.
-

Using rechargeable batteries

If your ZEL400HV is equipped with an optional rechargeable battery, you must recharge it for 8 hours before first use.

1. Insert the re-charger plug into the jack located on the battery pack (10).
2. Plug the charger into an electrical outlet (110 volts or 220 volts).
3. Charge for 8 hours.

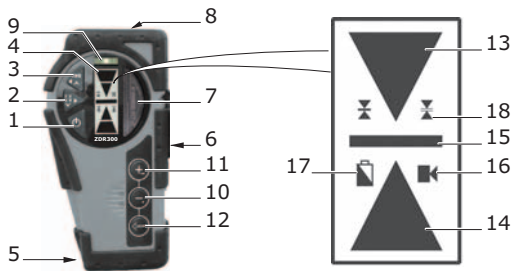
Later recharges

The ZEL400HV can be charged while working. If electricity is available on the job site, simply plug in the charger and keep on working. You can also remove the battery pack to charge it, and replace with the alkaline battery compartment to keep on working.

3 Accessories

3.1 ZDR300 Detector/Remote Control

Description



	Detector Mode	Remote Control Mode	Scanning Mode
1	On	Off	Off
2	Coarse/Fine	Move square shot right	Decrease scan length
3	Sound On/Off	Move square shot left	Increase scan length
4	LCD display		
5	Battery location		

	Detector Mode	Remote Control Mode	Scanning Mode
6	Slots for bracket		
7	Capture window		
8	Magnet		
9	Bubble vial		
10		Decrease rotation speed	Aim scan left
11		Increase rotation speed	Aim scan right
12			Scan On/Off

LCD Display

13 Lower the detector

14 Raise the detector

15 Level

16 Sound On/Off

17 Battery level

18 Coarse/Fine mode



- A detector is recommended when it's difficult to see the laser beam (outdoors, bright light).
- Before using the ZDR300 detector mode, it is very important to set laser on "laser point" mode (turning the top cover). The receiver cannot detect the beam in chalk line mode.

Using the ZDR300 in detector mode

1. Press the On/Off button to turn the detector on.
 2. Press button (2) (Fine/Coarse) to select the detection mode. A symbol appears either on the right or left side of the LCD, displaying which mode was selected.
 3. Press the Sound button (3) to select level of sound (mute, normal, high). Default mode is mute, indicated with no symbol. The sound symbol will blink when you select normal loudness, and be constant in high mode.
 4. Turn the capture window (7) towards the laser beam and move the detector up or down, following the indication on the LCD. A down arrow indicates the detector should be lowered. An arrow facing up indicates the detector should be raised. When a horizontal line appears on the display, the detector is at the same level as the laser beam.
 5. Use the two marks on the side of the ZDR300 to draw your level.
 6. You can also view the same information on the LCD on the back of the detector.
 7. Press the On/Off button to turn the detector off. Automatic switch-off will occur after 10 minutes if not used.
 8. The detector has a magnetic attachment (8) for use on ceiling grids or partition rails. To use the detector with a rod, slide the rod bracket into the slots (6).
 9. Keep the capture window (7) clean, using a soft cloth and glass cleaner.
-

Using the ZDR300 in remote control mode

The ZDR300 can be used to stop or start rotation, increase or decrease rotation speed, and move the square shot or stationary point left or right. It also controls scanning and calibration.

To use it as a remote control, press any key (except On/Off).
If in detection mode, press On/Off to change to the remote control functions.

To change the battery

To install a new 9V (LR6) battery, open the compartment on the back of the detector. First raise the left side of the cover, then the right side, and lift out. Follow the polarity indications inside (- is next to the side wall of the detector).

3.2 Mounts

Universal Mount

The universal mount can be used as a wall mount and for vertical setups on a tripod. It features sturdy, all metal construction, with a spring-activated mechanism that allows you to easily change height for quick set-ups. Also, it has a fine adjustment screw on the bottom for precise positioning.

- As a wall mount, it can be attached to a grid for suspended ceiling setup.
- The GeoMax wall mount can also be used on its side and attached to a tripod (5/8") to hold the laser in the vertical position.

Grade Mounts

Adjustable grade mounts are used to lay out inclined planes, such as cathedral ceilings. The ZEL400HV must be in manual mode when using grade mounts.

3.3 Other Accessories



- Laser-enhancing glasses improve the visibility of the laser beam in bright light conditions.
 - Red magnetic targets improve the visibility of the laser beam in bright conditions. Quickly attaches to any metallic surface.
-

4 Checking and Adjusting



THIS CHAPTER IS VERY IMPORTANT: Here are a few simple instructions to check your ZEL400HV for calibration. Remember that the laser is a precision instrument and that it is important that you keep it calibrated and in proper condition. The accuracy of your work is completely your responsibility and you should regularly check your instrument especially prior to important jobs. Directions follow for checking each axis for calibration. If the laser needs to be calibrated, follow the instructions or take it to a service center.

Keypad functions when calibrating



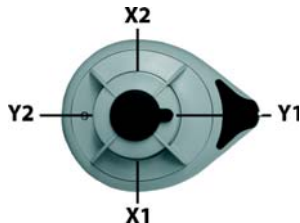
- a) Save data
- b) Move beam up
- c) Move beam down
- d) Change axis

4.1 Horizontal Checking/Calibration (X and Y Axis)

4.1.1 Horizontal Checking

Horizontal checking, step by step

1. Place the laser on a flat surface 15 or 30 m from a wall. Position it so that the X2 is facing the wall.
2. Switch the laser on. After it's level, stop the rotation so that the beam is a point.
3. Mark the location of the beam.
4. Rotate the laser 180°. After 90 seconds, mark the location of the beam near the first mark.
5. Both measurements must be at the same place.
At 100 m, the marks should be no more than 15 mm apart. This is 7.5 mm at 100 m levelling accuracy.
6. If the marks are close enough, X-axis is within calibration. The second axis (Y) must then be checked (see Step 7).
If the marks are not close enough, the X-axis needs to be calibrated (see "X-axis calibration").
7. To check the Y-axis, turn the laser 90° from Step 4 so that Y2 is facing the wall. Repeat the same steps: mark the Y beam, rotate 180°, and mark again. If the marks are more than 15 mm apart at 100 m, the Y-axis should be calibrated.



4.1.2 Horizontal Calibration



- The laser must be calibrated to bring beam to the center of the two marks (Steps 3-4 in "4.1.1 Horizontal Checking").
 - The calibration is easily done using the laser keypad or the ZDR300 in remote control mode.
-

X-axis calibration

1. Turn the laser off before switching to calibration mode. Simultaneously press two laser keys, On/Off and auto/man.
 2. After a few seconds, release On/Off key.
 3. The X LED indicator (19) will blink, then the Y LED (21). Release the auto/man key.
 4. The X LED (19) will blink rapidly, indicating the laser is ready to be calibrated in the X-axis. If you have not moved the laser, use the X marks made in Steps 3 and 4 of "4.1.1 Horizontal Checking".
 5. Mark the spot that's halfway between the two marks.
 6. With X1 facing the marks, bring the laser beam up or down to the center mark by using (16) or (17) on the laser keypad or (2) or (3) on the ZDR300.
 7. Next, check Y-axis against center mark. Turn the laser 90° so that Y1 faces the wall. If the beam is not on the center mark, calibrate Y. If Y is OK, see "Saving the calibration" below.
-

Y-axis calibration

1. To change to Y-axis calibration, press (15) on the laser or (11) on ZDR300. The Y LED will blink rapidly, indicating that the laser is ready to be calibrated in the axis.
 2. If you have not moved the laser, use the center mark from above. Bring the laser beam up or down to that center spot by using (17) or (16) on the laser keypad or (2) or (3) on the ZDR300.
-

Saving the calibration

The laser is now calibrated in the X and Y-axis. Press (14) on keypad or (10) on the ZDR300 to save the calibration data. If you don't wish to save the calibration, press the On/Off key (24) on the laser.

4.2 Vertical Checking/Calibration (Z Axis)

4.2.1 Vertical Checking

Vertical checking, step by step

1. Place laser in vertical mode, on a flat surface about 3 m away from a plumb line (plumb bob hanging on a string, at least 2.5 m high). If you need to calibrate, beam will be easier to see in a darkened room.
 2. Use the adjustable feet to rough level the laser to adjust the top bubble vial.
 3. Turn the laser on. Stop the rotation so that the beam is a point.
 4. Hold the laser head and move the beam up and down the entire length of the plumb line by hand. If the beam is slanted, and not vertical like the plumb line, the Z-axis needs calibration.
-

4.2.2 Vertical Calibration

Vertical calibration, step by step

1. Turn the laser off before switching to calibration mode. Simultaneously press On/Off and Auto/Man.
 2. After a few seconds, release On/Off key.
 3. The X LED indicator (19) will blink, then the Y LED (21). Release the Auto/Man key.
 4. The Z LED (23) will blink rapidly; indicating laser is ready to be calibrated in Z-axis.
 5. Move the beam until it's vertical and parallel to the plumb line using (17) or (16) on the laser or (2) or (3) on the ZDR300. Move the laser slightly so that the beam is over the plumb line for the final check.
-

Saving the calibration

The laser is now calibrated in Z-axis. Press (14) on laser or (10) on detector to save the calibration data. If you don't wish to save the calibration, press the On/Off Key on the laser.

5 Care and Transport

5.1 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 transport container and secure it.

Shipping

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

Shipping, transport of batteries

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.

Field adjustment

After transport inspect the field adjustment parameters given in this user manual before using the product.

5.2 Storage

Product

Respect the temperature limits when storing the equipment, particularly in summer if the equipment is inside a vehicle. Refer to "7 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.

NiMH batteries

- Refer to "7 Technical Data" for information about storage temperature range.
 - A storage temperature range of 0 to +20°C/32 to 68°F in a dry environment is recommended to minimise self-discharging of the battery.
 - At the recommended storage temperature range, batteries containing a 10% to 50% charge can be stored for up to one year. After this storage period the batteries must be recharged.
 - 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.
-

Alkaline batteries

If the equipment is to be stored for a long time, remove the alkaline batteries from the product in order to avoid the danger of leakage.

5.3 Cleaning and Drying

Product and accessories

- Blow dust off optical parts.
 - 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 may 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.
 - Do not repack until everything is completely dry.
-

Cables and plugs

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

6 Safety Directions

6.1 General Introduction

Description

- The following directions should 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.
-

6.2 Intended Use

Permitted use

- The instrument casts a horizontal laser plane for the purposes of alignment.
 - The unit can be set up on its own base plate, wallmount or on a tripod.
 - The laser beam can be detected by means of a laser detector.
 - This product is intended for indoor use and applications.
-

Adverse use

- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is specifically permitted for certain functions.

- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with obviously recognizable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of GeoMax.
- Inadequate safeguards at the working site, for example when using on or near roads.
- Deliberate dazzling of third parties.
- Controlling of machines, moving objects or similar monitoring application without additional control- and safety installations.

 **Warning**

Adverse use can lead to injury, malfunction and damage.

It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them. The product is not to be operated until the user has been instructed on how to work with it.

6.3 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 in close proximity to electrical installations or similar situations by the person in charge of the product.

6.4 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 completely safe condition.

Manufacturers of non GeoMax accessories

The manufacturers of non GeoMax accessories for the product are responsible for developing, implementing and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts in combination with the GeoMax product.

Person in charge of the product

The person in charge of the product has the following duties:

- To understand the safety instructions on the product and the instructions in the user manual.
- 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 radio transmitters are respected.

Warning

The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and

the deployment of personnel who use the product and for the safety of the equipment in use.

6.5 Hazards of Use

Warning

The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial and environmental consequences.

Precautions:

All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the product.

Warning

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 and before and after important measurements.


Danger

Because of the risk of electrocution, it is very dangerous to use poles 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.



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 and 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 may 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**

During the transport, shipping or disposal of batteries it is possible for inappropriate mechanical influences to constitute a fire hazard.

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.

 **Warning**

Using a battery charger not recommended by GeoMax can destroy the batteries. This can cause fire or explosions.

Precautions:

Only use chargers recommended by GeoMax to charge the batteries.

 **Warning**

High mechanical stress, high ambient temperatures or immersion into fluids can cause leakage, fire or explosions of the batteries.

Precautions:

Protect the batteries from mechanical influences and high ambient temperatures. Do not drop or immerse batteries into fluids.

 **Warning**

Short circuited battery terminals can overheat and cause injury or fire, for example by storing or transporting in pockets if battery terminals come in contact with jewellery, keys, metallized paper or other metals.

Precautions:

Make sure that the battery terminals do not come into contact with metallic objects.

 **Caution**

During the operation of the product there is a hazard of squeezing extremities by moving parts.

Precautions:

Keep extremities in safe distance from moving parts.

 **Warning**

If the product is improperly disposed of, the following can happen:

- 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 unauthorized 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.

Precautions:



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 unauthorized personnel.

Product specific treatment and waste management information can be requested on the GeoMax home page at <http://www.geomax-positioning.com> or received from your GeoMax dealer.

Warning

Only GeoMax authorized service workshops are entitled to repair these products.

6.6 Laser Classification

6.6.1 General

General

The following directions (in accordance with the state of the art - international standard IEC 60825-1 (2007-03) and IEC TR 60825-14 (2004-02)) provide instruction and training information to 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.



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.



Products classified as laser class 2 or class 3R may cause dazzle, flash-blindness and afterimages, particularly under low ambient light conditions.

6.6.2 ZEL400HV

General

The rotating laser produces a visible red laser beam which emerges from the rotating head.

The laser product described in this section is classified as laser class 3R in accordance with:

- IEC 60825-1 (2007-03): "Safety of laser products".
- EN 60825-1 (2007-10): "Safety of laser products".

Class 3R laser products:

Direct intrabeam viewing may be hazardous (low-level eye hazard), in particular for deliberate ocular exposure. The risk of injury for laser class 3R products is limited because of:

- unintentional exposure would rarely reflect worst case conditions of (e.g.) beam alignment with the pupil, worst case accommodation,
- inherent safety margin in the maximum permissible exposure to laser radiation (MPE),
- natural aversion behaviour for exposure to bright light for the case of visible radiation.

Description	Value
Maximum radiant power	< 2.7 mW c.w.
Pulse duration (effective)	7.4, 4.5, 2.2, 1.5, 1.5 ms
Pulse repetition frequency	0, 1.5, 2.5, 5, 7.5, 10 rps
Wavelength	620 nm - 690 nm
Beam divergence	< 1.5 mrad
NOHD (Nominal Ocular Hazard Distance) @ 0.25s	35 m / 115 ft
Scan angle	2 to 36°

 **Warning**

From a safety perspective class 3R laser products should be treated as potentially hazardous.

Precautions:

Prevent direct eye exposure to the beam. Do not direct the beam at other people.

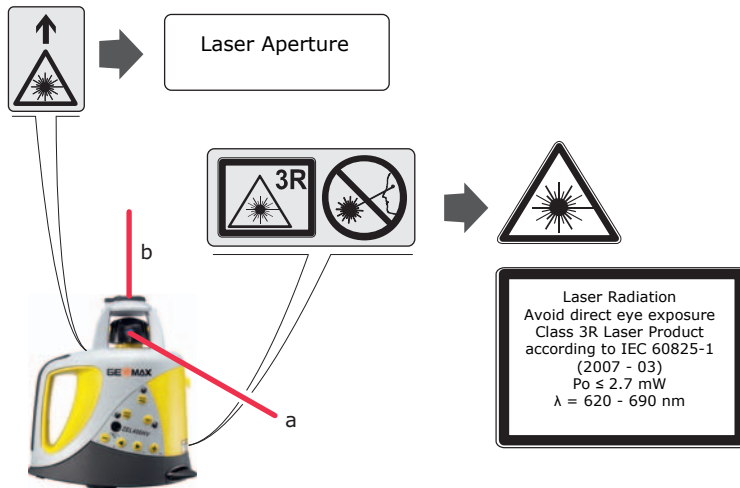
 **Warning**

Potential hazards are not only related to direct beams but also to reflected beams aimed at reflecting surfaces such as prisms, windows, mirrors, metallic surfaces etc.

Precautions:

Do not aim at areas that are essentially reflective, such as a mirror, or which could emit unwanted reflections.

Labelling



- a) Laser beam
- b) Plumb beam

6.7 Electromagnetic Compatibility EMC

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 in conjunction with accessories from other manufacturers, for example field computers, personal computers, two-way radios, 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 and two-way radio, 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 very intense electromagnetic radiation, for example, near radio transmitters, two-way radios or diesel generators.

Precautions:

Check the plausibility of results obtained under these conditions.

 **Warning**

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.

6.8 FCC Statement, Applicable in U.S.

 **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 ZEL400HV

Complies with 21CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No.50, dated July 26, 2001

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.

Type: ZEL400HV

Art.No.:

Power: 3.0V \Rightarrow / 1.5A

GeoMax AG

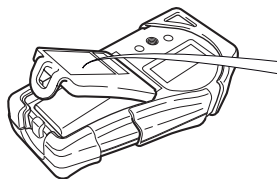
CH-9443 Widnau

Manufactured:

S.No.:

Made in China





Type: ZDR300

Art.No.:






Power: 9.0V $\overline{\text{m}}$ / 0.2A

GeoMax AG

CH-9443 Widnau

Manufactured:

S.No.:

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.

Made in China

7 Technical Data

7.1 ZEL400HV Technical Data

Specifications

Recommended use (diameter)	Ø300 m with detector
Levelling accuracy	± 7.5 mm at 100 m
Accuracy for chalk line	± 4.5 mm at 12 m
Levelling range	± 10%
Scanning angle	10° - 35°
Laser diode	635 nm (visible)
Power	2 alkaline batteries (LR20 or D) Rechargeable battery pack
Charging time	8 hours
Battery Life	Alkaline batteries: 160 hours NiMH battery pack: 50 hours
Dimensions	150 x 160 x 170 mm
Weight	1.3 kg
Rotation speed	0 - 600 rpm
Environmental	IP65 (Rain and dustproof)

7.2 ZDR300 Technical Data

Specifications

ZDR300 operating distance	Reception 150 m Emission remote 30 m
Capture window	40 mm
Sound	High, normal, mute
Displays	Front and back LCD
Power	9V alkaline battery (LR6 type)
Battery Life	50 hours
Dimensions	150 x 80 x 35 mm
Weight	280 g

8 International Limited Warranty

International Limited Warranty

This product is subject to the terms and conditions set out in the International Limited Warranty which can be requested on the GeoMax home page at <http://www.geomax-positioning.com> or collect from your GeoMax distributor.

The foregoing warranty is exclusive and is in lieu of all other warranties, terms or conditions, express or implied, either in fact or by operation of law, statutory or otherwise, including warranties, terms or conditions of merchantability, fitness for a particular purpose, satisfactory quality and non-infringement, all of which are expressly disclaimed.

GeoMax ZEL400HV



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