

GeoMax ZDL700 Series



User Manual

Gebrauchsanweisung

Manuel d'utilisation

Manual del usuario

Manuale d'uso

Kullanma Kılavuzu

EN

DE

FR

ES

IT

TK

User Manual (English)

EN

1. Introduction

Purchase

Congratulations on the purchase of a new GeoMax electronic level. It is designed to make levelling works easier and quicker on any job site.

Product



This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "11. Safety Directions" for further information.

Read carefully through the User Manual

before you use the product.

Product identification

The model and the serial number of your product are indicated on the type plate.

Enter the model 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: _____ Serial no.: _____

Validity of this manual

This manual is valid for ZDL700.

Trademarks

All trademarks are the property of their respective owners.

Available documentation

Name	Description
ZDL700 User Manual	All instructions required in order to operate the product to a basic level are contained in this User Manual. Provides an overview of the system together with technical data and safety directions.

Symbols

The symbols used in this Manual have the following meanings:



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.

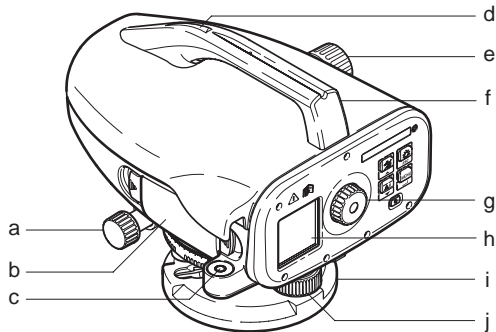


Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

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2. Instrument Components



- | | |
|---------------------------------|-------------------------|
| a) Horizontal fine motion screw | f) Handle |
| b) Battery compartment | g) Eyepiece |
| c) Circular level | h) LCD display |
| d) Gunsight | i) Base plate |
| e) Focusing knob | j) Levelling foot-screw |

Container Contents

ZDL700, allen key, user manual, strap, CD-ROM, RS232 data transfer cable.




Accessories

Tripod, GeoMax telescopic aluminium staff, GeoMax 1 section, fibre glass staff. (Optional: sunshade, 4 rechargeable batteries and charger)

3. Measurement Preparations

3.1 Change Battery

Insert 4 AA dry cells according to the positive and negative signs as indicated on the holder.

-  Always replace with a complete battery set!
-  Do not use old and new batteries together.
-  Do not use batteries from different manufacturers or batteries of different types.

3.2 Set-up Instrument

Levelling

- Set up the tripod. Extend the legs to a suitable length and ensure that the tripod head is approximately level. Tread the tripod shoes firmly into the ground to ensure stability.
- Mount the instrument on the tripod by screwing the tripod screw onto the base of the instrument.
- Use the three levelling foot screws to center the circular bubble in order to level the instrument.

Eyepiece Adjustment

Point the telescope to a uniform light surface such as a wall or a piece of paper. Turn the eyepiece until the cross hairs are sharp or distinct.

Target Image Focusing

Use the gunsight to aim the objective lens at the staff. Turn the horizontal fine motion screw until the staff is nearly centered in the field of view and then turn the focusing knob to focus on the staff. Ensure that staff image and reticle are sharp or distinct.

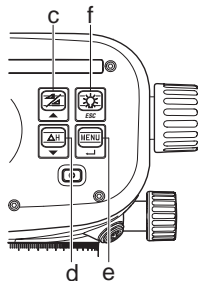
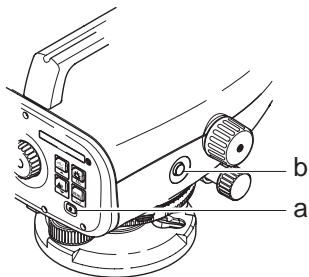
Power ON




The instrument is ready to measure.

 Technical hints:

- First check and adjust the electronic and optical line-of-sight errors, then the circular level on the instrument and then the staff: before starting work in the field, after long storage periods or after long transportation.
- Keep the optics clean. Dirt or condensation on the optics can limit measurements.
- Before starting work, let the instrument adjust to the ambient temperature (approx. 2 minutes per °C of temperature difference).
- Avoid measuring through window panes.
- Staff sections have to be fully extended and properly secured.
- Touching the upper third of the tripod, can damp vibrations at the instrument due to wind.
- Use the lens hood to cover the objective when backlight disturbs.
- Evenly illuminate the measuring area of the staff with a flashlight or spotlight in darkness.

4. User Interface



Key	Symbol	1 st level functions	2 nd level functions
a) On/Off		Power On or Off switch	NONE
b) MEAS		Measuring trigger key	Press and hold for 3 seconds to start and stop tracking measurement / timer measurement
c) Height / Distance		Alternating between Height and Distance display	Cursor up (in Menu / Settings mode), Switch between intermediate sight I and foresight F in line leveling program BIF





Key	Symbol	1 st level functions	2 nd level functions
d) dH		Height Difference and Elevation measurement	Cursor down (in Menu / Settings mode)
e) MENU		Activation and Selection of settings	ENTER key for confirmation purpose
f) Backlight		LCD backlight illumination	ESC key to decline termination of program / application or to exit setting (in Menu / Settings mode)





Modes

MEAS	Measurement Mode
MENU	MENU
ADJ	Adjustment Mode
TRK	Tracking
SET	Settings

BF BF	BF line levelling
BFFB BFFB BF B BFFB BFFB	BFFB line levelling
BIF BIF BIF	BIF line levelling
dH	Height Difference
	Measurement interval / timer activated




Icons

	LCD backlight ON
	Upright staff measuring mode
	Inverted staff measuring mode
	External power connected


	Battery icon at various capacities
	Data stored to internal memory
	Tilt warning OFF
	Measurement averaging activated


Measurement and Data Display Symbols


PtID: / RfID:	Point ID / Reference Benchmark ID
BM:	Benchmark elevation
dH:	Height Difference
Elv:	Elevation

	Measured staff height
	Measured distance
	Mean height difference in BFFB

Menu Setting

Menus	Selections (sub-selections)	Descriptions
1. Program	Line Levelling (BIF, BF, BFFB)	Select line levelling method.  Sighting and measurement sequence in line levelling is indicated with highlighted 'alphabet' of the respective line levelling icons.

Menus	Selections (sub-selections)	Descriptions
2. Intermediate Sight	ON / OFF	Enable / disable Intermediate Sight in BIF line levelling.
3. Input PtID	Input user point ID.	
4. Input BM	Input Reference Benchmark elevation.	
5. Data Manager	View Data	Viewing recorded data / deleting of a recorded data by pressing ENTER key.
	Download Data (GSI / ASCII)	Transferring of recorded data to PC via RS232, in GSI-8 or ASCII format.
	Delete All Data	Deleting of all recorded data in the on-board / internal memory.
6. Recording	Memory	Measurement recorded to on-board / internal memory.  In line levelling application, recording mode has to be set prior to first backsight measurement.
	Off	Measurement not stored.
	Ext	Measurement recorded to external device in GSI-8 format via RS232 cable.
7. Adjustment	Adjustment program.	
8. Inverse Staff	ON [Inverted], OFF [Upright], AUTO [Auto recognition of staff orientation]	Recognition mode setting of staff orientation.

Menus	Selections (sub-selections)	Descriptions
9. Settings	Contrast (10 levels)	LCD display contrast setting.
	Unit (M, Int. ft, US ft, Ft in 1/16 inch)	Unit setting.
	AutoOff (ON 15 min. / OFF)	ON 15 min., instrument will be switched off about 15 minutes after the last key press. OFF, the instrument will not auto switch off.
	Rounding (Standard / Precise)	Minimum reading display setting. In metric: <ul style="list-style-type: none"> • Standard = 0.001m for height and 0.01m for distance • Precise = 0.0001 m for height and 0.001m for distance In Ft (Int. and US ft): <ul style="list-style-type: none"> • Standard = 0.01 ft for height and 0.1 ft for distance • Precise = 0.001 ft for height and 0.01 ft for distance In Ft in 1/16 inch: <ul style="list-style-type: none"> • Precise & Standard = ft-inch-1/16 inch for height and distance
	Beep (ON / OFF)	Trigger key acoustic signal setting.
	RS232 (Baudrate: 1200, 2400, 4800, 9600, 19200, 38400; Parity: None, Odd, Even; Stop Bit: 1, 2; Data Bit: 7, 8)	Communication settings for RS232 interface.
	Tilt Warning (ON / OFF)	Electronic tilt warning setting.
	Backlight (ON / OFF)	Backlight setting.
	Averaging	Input number of measurement for averaging of measurements.
	Language (List of interface language selections)	Interface language setting.
	Timer	Input measurement time interval 00 hr: 00 min (applicable to Ht / Dist application only).  Press height / distance or dH or backlight or menu key. A message "stop Tracking" will be displayed.

5. Set of Characters

EN

Benchmark Elevation (BM),

numeric input consists of 0 ~ 9, space, decimal, Ft in 1/16 inch separator, the "+" and "-" signs.

Point ID (PtID)

Point ID alphanumeric input consists of a ~ z, 0 ~ 9 and space.

Accepting character in the existing value

If there is no change for any particular character in the existing entry field, press ENTER key to accept the old entry.

Clearing all the existing entry field

Highlight the first entry field with "SPACE" character and press ENTER key to clear the entire last input value.

To discard entry

Press ESC key to discard entry and restore old value.

Point ID increment

Point ID will be automatically incremented by 1 from the last point ID, if point ID input field is not updated manually.

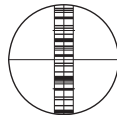
6. Operation

Height and Distance measurement (electronic)

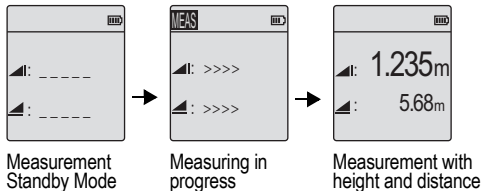
Example of an electronic measurement:





Always aim at the center of bar code staff and focus the staff image for accurate measurement.



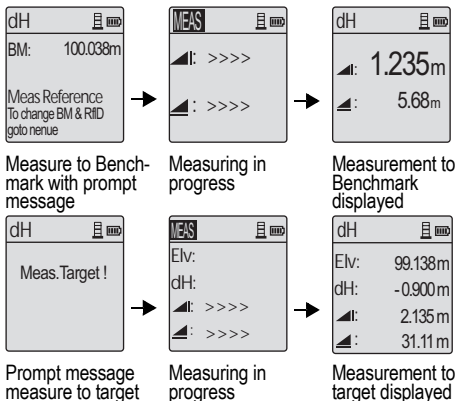
6.1 Height and Distance Measurement



Step	Key	Description
1.		Press to switch on the instrument, GeoMax logo is displayed follow by the default measurement standby mode.
2.		Aim at staff and focus. Lightly trigger the measurement key to activate measurement.
3.		Height and distance measurement is displayed.

6.2 Height Difference and Reduced Level Measurement (internal Memory not active)

EN



Step	Key/Screen	Description
1.		Press key to start height difference and reduced level function.
2.		A message "Meas. Reference" with input reduced level is displayed.
3.		Press measuring key to initiate measurement with respect to the Reference staff / Benchmark.
4.		Reference height and distance measurement is displayed; follow by a message "Meas. Target!" prompted.
5.		Again, press measure key to start measurement with reference to target point.
6.		The following results are displayed accordingly; - target reduced level (RL), target height difference (dH) with respect to the reference staff, height and distance of target point.

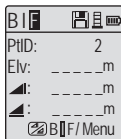
6.3 BIF Line Levelling Measurement (internal Memory active)



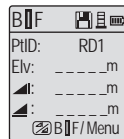
Measure to backsight with prompt message



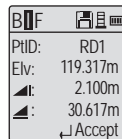
Backsight measurement displayed with prompt message



Measure to foresight with prompt message



Go to menu set "Intermediate Sight" to ON OR press Height & Distance key, measure to intermediate sight



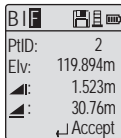
Intermediate sight measurement displayed with prompt message



Measure to next intermediate sight with prompt message

















Go to menu set "Intermediate Sight" to OFF OR press Height & Distance key, measure to foresight













Foresight measurement displayed with prompt message


















Measure to backsight of next change point with prompt message



Step	Key/Screen	Description
1.	 	Initialize the BIF method.
2.		Initiate measurement to Benchmark.
3.	 	Backsight measurement displayed.
4.	 	To start 'Intermediate sight' measurement, go to menu set 'Intermediate Sight' to ON or press Height & Distance key.
5.	 	Intermediate sight measurement displayed.
6.	 	Go to menu set 'Intermediate Sight' to OFF or press Height & Distance key, then measure to the foresight staff.
7.	 	Foresight measurement displayed.
8.		System refreshes a standby display for measurement to the backsight of next change point.


6.4 BF Line Levelling Measurement

Step	Key/Screen	Description
1.	 	Initialize the BF method
2.		Initiate measurement to Benchmark
3.	 	Backsight measurement displayed.
4.	 	Measure to the foresight staff.
5.	 	Foresight measurement displayed.
6.		System refreshes a standby display for measurement to the backsight of next change point.

6.5 BFFB Line Levelling Measurement

Step	Key/Screen	Description
1.	 	Initialize the BFFB method.
2.		Initiate measurement to Benchmark.
3.	 	Backsight measurement displayed.
4.	 	Measurement to foresight.
5.	 	Foresight measurement displayed.
6.		Measure to the foresight staff (second sighting).
7.	 	Foresight (second sighting) measurement displayed.
8.		Measure to the backsight staff (second sighting).
9.	 	Backsight (second sighting) measurement displayed.

Step	Key/Screen	Description
10.		System displays current 'Change Point' measurement report. Press ENTER key to accept the result.
11.		System refreshes a standby display for measurement to the backsight of next change point.

 Mean (average) of height difference in double-sighting of backsight and foresight for BFFB line levelling method.

\overline{dH}

EN

6.6 Timer Measurement

Set measurement time interval 00 hr:00 min in Menu\Settings\Timer. Press and hold measuring key for 3 seconds to start timer measurement, Timer icon will be shown at the top left of LCD display to indicate current measurement mode. To stop timer measurement, press and hold measuring key for 3 seconds.

6.7 Data Transfer

The data is stored in the internal memory ZDL700 and can be downloaded using the PC based GeoMax PC Tools

Data Output

Data via interface and data export in GSI-format.

- GSI-8
8-data characters output format (83..00+12345678). These data words can hold alpha as well as numeric data.

Communication

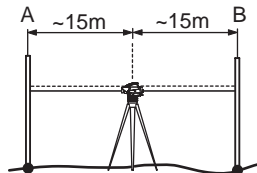
Communications parameters of the RS232 interface for data transfer from instrument to computer / external device.

GeoMax standard settings are:

- 19200 baud rate,
- 8 data bits (8 data bits are automatically set when parity "None" is set.)
- No parity (No parity [when data bits = 8])
- CR/LF (New line and line feed)
- 1 stop bit

7. Check & Adjust

7.1 Electronic Collimation Adjustment

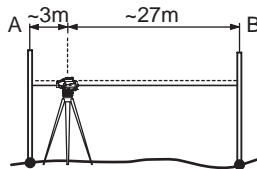


To activate "Adjustment" program, go to Menu\Adjustment.

Step 1: Aim at Staff A and press MEAS key. Measurement display, press ENTER key to accept.

Step 2: Aim at Staff B and press MEAS key. Measurement display, press ENTER key to accept.


Now shift the ZDL700 towards staff A and set it up at about 3 m to staff A.



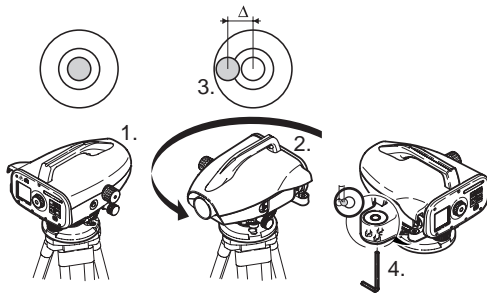
Step 3: Aim at Staff B and press MEAS key. Measurement display, press ENTER key to accept.

Step 4: Aim at Staff A and press MEAS key. Measurement display, press ENTER key to accept.


The new electronic collimation error is displayed. To accept new correction, press ENTER key, otherwise press ESC key to decline adjustment result.

 Optical collimation error can be corrected by adjusting the reticle.

7.2 Circular Level

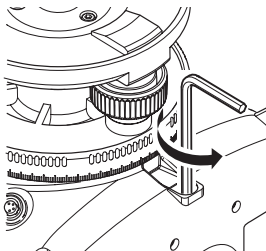


Step	Description
1.	Level instrument.
2.	Turn instrument by 180°.
3.	Center bubble if it extends beyond the centering circle.

Step	Description
4.	Correct half of the error with the Allen key.
	Repeat steps 1 to 4 until the circular level bubble is centered at any random telescope pointing.

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7.3 Optical Collimation / Reticle Adjustment



Step	Description
1.	Turn Allen key until design value is reached.
2.	Check collimation.

If the collimation error exceeds 3 mm over 60 m distance, the collimation needs to be adjusted.

8. Error Messages

EN

No.	Error message	Counter measure / causes
E99	System Error, Contact Services !	Hardware faults or file errors or adjustment errors or setting errors rendering instrument not working properly.
E100	Low Battery !	Change to new or freshly charged batteries.
E101	Point No. Not Incremented!	Change the PtID. Max. PtID is 99999999 and do not end any 8 characters string with an alphabet character.
E102	Too Bright !	Darken staff or reduce lighting on staff or shade the objective telescope.
E103	Too Dark !	Light up staff uniformly.
E104	No Staff !	Check target.
E105	Invalid Entry!	Check the entry / input.
E106	Out Of Level !	Level the instrument.
E107	Memory Full!	Set internal memory to OFF and continue measurement without recording OR download stored data to an external device and continue measurement with internal memory ON after deleting all recorded data in the internal memory.
E108	Data File Error !	Data file error.
E109	Low Memory!	Prepare to download data to external device, in order to continue further measurement with recording ON after deleting all recorded data in the internal memory.
E110	Target Too Close !	Move staff or instrument further apart.
E111	Target Too far !	Move staff or instrument closer together.
E112	Too Cold !	Stop working, external temperature is outside the instrument operating temperature.
E113	Too Hot !	Stop working, external temperature is outside the instrument operating temperature.

No.	Error message	Counter measure / causes
E114	Invalid Measurement !	Make another measurement. If further measurement proved to be futile, check staff position and Inverse Staff setting, check the lighting condition at the staff and stray light, check focusing and targeting, check if sufficient length of barcode in the field of view.
E115	Temperature Sensor Error !	Cover the objective telescope with a hand and switch ON the instrument. Hardware communication failed.
E116	Adjustment Error !	Carry out the adjustment with guided steps, make sure instrument is level and staff is truly vertical in normal position. Collimation is out of correction range.
E117	BM Change Not Allowed!	Exit to default measurement mode by pressing HEIGHT/DISTANCE key, and change the Benchmark elevation in the INPUT BM menu mode.
E119	Staff Blocked	Not enough barcode length for measurement.
E120	Image sensor Error!	Contact services.
E121	Adjustment Inverse Staff Not Allowed!	Check the staff orientation and staff setting.
E123	PtID Change Not Allowed	Exit the message by pressing ESC key.

9. Operation Messages

Operation message	Counter measure / remark
Start Tracking!	Tracking mode starts.
Stop Tracking!	Tracking mode stops.
Tracking Hold!	Press measure key for 3 seconds to restart tracking mode. Tracking will hold after 10 unsuccessful measurements.
Abort Measurement!	Current measuring process is terminated.

Operation message	Counter measure / remark
Downloading Data!	Downloading of data from the internal memory to an external device is in progress.
Download Completed!	System has successfully downloaded the internal memory data to an external device.
No Data In Memory!	No data is stored in the internal memory.
Delete. Are You Sure?	Question prompting user to confirm the deletion of a data (in View Data mode) / all the data (in Delete All Data mode) in the internal memory.
Data Deleted!	System confirmation a data or all the data in the internal memory is deleted.
Can't Delete!	Reference Benchmark and line levelling measurement not allowed to be deleted by single data deletion method.
Change BM. Are You Sure?	Question to prompt user if changing of Reference Benchmark elevation to confirm.
Wait! File System Clean Up!	Cleaning up of temporary files/system files.
Shut Down!	System is switching OFF.
Sand Clock Icon	Please wait! System task is in progress.
Meas Target	Aim to target staff and press measuring button.
Setting...	System parameter setting in progress.
Change Point not completed! Quit Application?	Prompt message to quit application during line levelling process. Complete current line levelling change point measurements, then leave the application program. Pressing ENTER key to quit application; otherwise, press ESC key to return to current application.
Quit This Application?	Prompt message to quit current application, pressing ENTER key to quit application; otherwise, press ESC key to return to current application.

10. Care and Transport

10.1 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.

10.2 Storage

Product

Respect the temperature limits when storing the equipment, particularly in summer if the equipment is inside a vehicle. Refer to "12. 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.

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.

10.3 Cleaning and Drying

Product and Accessories

- Blow dust off lenses.
- 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. Always close the transport container when using in the field.

11. Safety Directions

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11.1 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.

11.2 Intended Use

Permitted use

- Measuring distances.
- Recording measurements.
- Electronic and optical height measurements to a staff.
- Optical height readings.
- Optical distance measuring with stadia readings.
- Data communication with external appliances.

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 measuring on roads.
- Aiming directly into the sun.



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.

11.3 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.

11.4 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.

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.

11.5 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.

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 and before and after important measurements.

DANGER

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




CAUTION

Strong magnetic fields in the immediate vicinity (e.g. transformers, melting furnaces...) may influence the compensator and lead to measuring errors.

Precautions:


When measuring near strong magnetic fields, check results for plausibility.


CAUTION

Be careful when pointing the product towards the sun, because the telescope functions as a magnifying glass and can injure your eyes and/or cause damage inside the product.

Precautions:


Do not point the product directly at the sun.


WARNING

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.

Precautions:


The person responsible for the product must make all users fully aware of the existing dangers.


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.


WARNING

If computers intended for use indoors are used in the field there is a danger of electric shock.

Precautions:

Adhere to the instructions given by the computer manufacturer with regard to field use in conjunction with GeoMax products.



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

When using a vertical staff supported by one brace there is always the danger of falling, for example by wind gusts and therefore danger of damage to equipment and danger of personal injuries.

Precautions:


Never leave a vertical staff supported by a brace unsupervised (person at the staff).


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.


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 interna-

tional rules and regulations are observed. Before transportation or shipping contact your local passenger or freight transport company.

⚠ 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.

⚠ 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 downloaded from 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.

11.6 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 radios, 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.

11.7 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 frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication.

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.

12. Technical Data

EN

Height measurements	Standard deviation per km double run (ISO 17123-2): <ul style="list-style-type: none"> • Electronic measurement with ZDL700 barcode staff: 0.7 mm • Optical measurement with standard aluminum E-scale/Numeral staff: 2.5 mm
Distance Accuracy (Standard Deviation)	10 mm for $D \leq 10$ m Distance in m x 0.001 for $D > 10$ m
Range	Distance measuring range for electronic measurements with barcode staff: 2 m to 105 m.
Optical - Shortest focusing distance	50 cm
Measuring time single measure (Electronic)	Typically 3 seconds and less in normal daylight condition; needs longer measuring time in uniform dim light condition (20 lux).
Circular Bubble	Circular Bubble Sensitivity: 10'/2 mm
Compensator	Magnet damped pendulum compensator with electronic range monitoring <ul style="list-style-type: none"> • Tilt Warning Range (Electronically): $\pm 10'$ • Compensator range (Mechanically): $\pm 10'$ • Setting accuracy: 0.35" max. (Standard Deviation) • Magnetic field sensitivity: $< 10''$ (Line-of-sight difference in horizontal constant magnetic field at a field strength of up 5 Gauss)
RS232 Port	For communication to PC / data collector via RS232 data transfer cable.
Internal Memory Storage	Capacity: up to 2000 points.
Data Transfer Programs	To PC via RS232 using GeoMax PC-Tools and HyperTerminal via RS232 on PC, using a Windows® application
Battery Power	AA dry cells 4 x 1.5 V

LCD	<ul style="list-style-type: none"> • Type: Monochrome display with backlight capability • Dimensions: 128 x 104 pixels
Telescope	<ul style="list-style-type: none"> • Magnification (Optical): 24 x • Free objective diameter: 36 mm • Clear Objective Aperture: 2 ° • Multiplication constant: 100 • Addition constant: 0
Hz Circle	<p>Circle Engraving: Plastic horizontal circle of 360° (400 gon). Graduation and numerals scale resolution at 1°(upper scale) and at 50 gon intervals (lower scale)</p>
Side Drive	Movement & Play in side drive: Continuous horizontal dual drive
System	<ul style="list-style-type: none"> • MMI capability • Measuring / applications • Keyboard: 5 rubber keys
Temperature Range	<ul style="list-style-type: none"> • Operating Temperature: -10°C to +50°C • Storage Temperature: -40°C to +70°C
Environmental Specifications	<ul style="list-style-type: none"> • Protection against water, dust and sand: IP55 (IEC 60529) • Protection against Humidity: Up to 95% humidity no condensation. The effects of condensation are to be effectively counteracted by periodically drying out the product.

Dimensions	Instrument: <ul style="list-style-type: none"> • Length (incl. front of lens tube to fully extended eyepiece) 219 mm • Width (from the external face of focusing drive to the external side of circular bubble holder) 196 mm • Height (incl. hand grip, base fully extended) 178 mm Container: <ul style="list-style-type: none"> • Length 400 mm • Width 220 mm • Height 325 mm
Weight	2.55 kg (including 4 AA batteries)

Conformity to national regulations



Hereby, GeoMax AG declares that the ZDL700 is in compliance with the essential requirements and other relevant provisions of the applicable European Directives 1999/5/EC. The declaration of conformity may be consulted at <http://www.geomax-positioning.com>.

13. International Limited Warranty, Software Licence Agreement

International Limited Warranty

This product is subject to the terms and conditions set out in the International Limited Warranty which you can download from the GeoMax home page at <http://www.geomax-positioning.com/internationalwarranty> 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.

Software Licence Agreement

This product contains software that is preinstalled on the product, or that is supplied to you on a data carrier medium, or that can be downloaded by you online pursuant to prior authorization from GeoMax AG. Such software is protected by copyright and other

laws and its use is defined and regulated by the GeoMax Software Licence Agreement, which covers aspects such as, but not limited to, Scope of the Licence, Warranty, Intellectual Property Rights, Limitation of Liability, Exclusion of other Assurances, Governing Law and Place of Jurisdiction. Please make sure, that at any time you fully comply with the terms and conditions of the GeoMax Software Licence Agreement.

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GeoMax ZDL700 Series

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