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ECOLINE ELT 220

BEDIENUNGSANLEITUNG
USER MANUAL
MODE D'EMPLOI

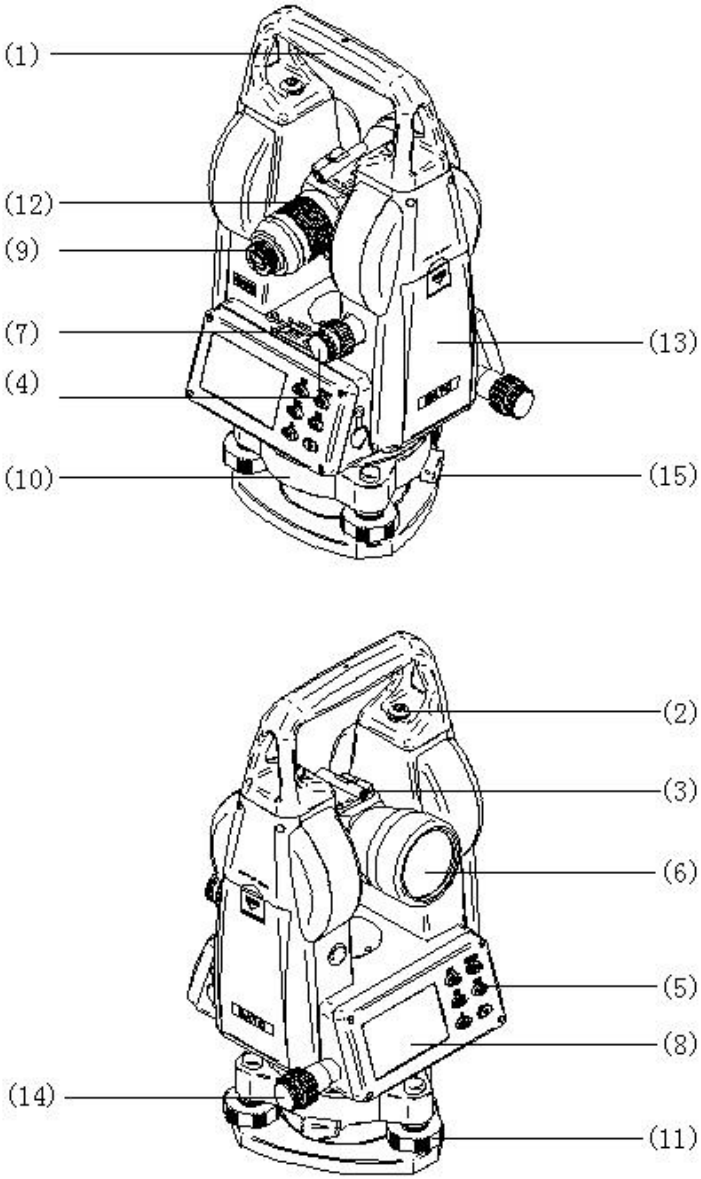
geo FENNEL ECOLINE

EXACTLY WHAT YOU NEED.

CONTENTS

IMPORTANT INFORMATION BEFORE USING YOUR INSTRUMENT 1

- The ELT 220 Electronic Theodolite is a precision instrument and must be handled with care.
- For an optimum performance of the instrument we recommend to read this manual carefully and keep it in a convenient place for future reference. Before start using the ELT 220 Electronic Theodolite, carefully check all settings and parameters to ensure that they meet your requirements and acclimatise the instrument to the ambient temperature.
- Avoid direct sunlight onto the objective lens and never leave the instrument exposed to extreme heat longer than necessary as this could affect the instrument's accuracy.
- When mounting or dismounting the instrument to or from the tripod, hold the instrument with one hand, turning the tripod centring screw with the other hand to prevent the instrument from falling.
- Never carry the instrument mounted on the tripod.
- Always carry the instrument in the carrying case to avoid damage.
- To maintain the performance of the instrument ensure that the weather hood is used to protect the instrument against rain and dust.
- After use, remove dust and moisture with a suitable brush, soft cloth or lens tissue.
- The optical components should be treated with particular care and only cleaned with a grease-free soft brush, a soft linen cloth or lens tissue.
- Do not use harsh chemicals or abrasives materials to clean the instrument.
- The instrument should be stored in an area of low humidity and good ventilation, where the temperature will not exceed 45ºC.
- Always remove the alkaline or rechargeable battery before storing the instrument.
- Contact your geo-FENNEL dealer if the instrument does not function correctly.
- Non-approved workshops should not disassemble the instrument as this could affect your warranty.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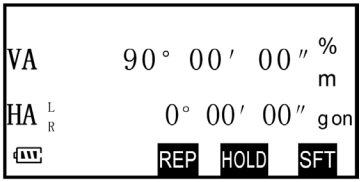
FEATURES 2

1	Carrying handle
2	Handle locking screw
3	Optical sight
4	Vertical tangent screw and clamp
5	Keypad
6	Objective lens
7	Plate level
8	Display
9	Eyepiece
10	Tribrach
11	Footscrew
12	Focusing drive
13	Battery compartment
14	Horizontal tangent screw and clamp
15	Tribrach clamp

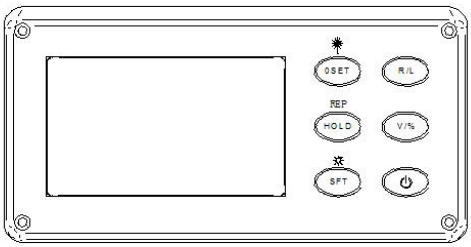
DISPLAY INDICATION

VA	Vertical angle
HA_R	Horizontal angle right
HA^L	Horizontal angle left
SFT	Select second function
REP	Repeat the horizontal angle
⏻	Power on/off
HOLD	Hold horizontal angle
%	Vertical grade percentage
m	Not applicable to ELT 220
gon	Angle unit
🔋	Battery power status



KEYPAD FUNCTIONS

Button	Function 1	Function 2
0SET	Horizontal angle “0 Set”	Laser plummet on/off
HOLD	Hold the horizontal angle	Repeat horizontal angle measurement
SFT	Select the second function	Press and hold for 2 seconds to turn illumination on/off
R/L	Horizontal angle right/left	
V/%	Vertical angle percentage grade/DMS	
⏻	Power on/off	



OPERATION 3

PREPARATION FOR MEASUREMENT

Level and centre the instrument precisely to ensure optimum performance.

Setting up the instrument and the tripod
Extend the tripod legs to a suitable height and tighten the locking screw. Attach the instrument onto the tripod carefully. With the tripod centring screw slightly loose move the instrument across the tripod head until the laser plummet is in coincidence with the ground point.
Level the instrument with the circular bubble. Use the footscrews 1 and 2 to move the bubble of the circular vial until it is centred. Use footscrew 3 to move the bubble to the centre of the vial.

Accurately level the instrument with the plate level
Release the horizontal clamp and rotate the instrument until the plate level is parallel with the footscrew 1 and 2. Centre the plate level using the same two footscrews. Turn the instrument by 90°and centre the bubble using footscrew 3. Repeat this procedure until the plate level is centred in all positions.

Please take care of the relation between the direction of rotation of the footscrews and the moving direction of the bubble.

POWER ON/OFF

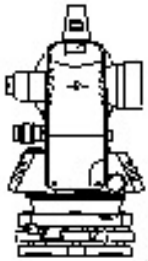
Press the power button for 1 sec. An audio signal sounds followed by a test period of about 2 seconds. All segments are displayed on the LCD to confirm that the instrument is ready for use.
Press and hold the power button for 2 seconds to power off the instrument.

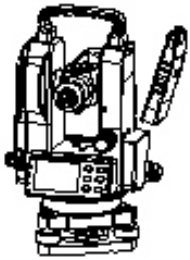
BATTERY STATUS INDICATION

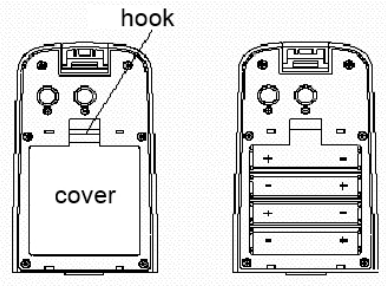
	Full power
	Effective
	Low power but still effective
	Very low power, replace the alkaline battery / recharge the NiMH battery pack
	Instrument will shortly power/off automatically. Replace the alkaline battery / recharge NiMH battery pack immediately

BATTERY REPLACEMENT

- Power off the instrument and remove the battery case.
- Press down the hook of the battery box and remove the cover.
- Charge the battery outside of the instrument and insert it again when fully charged.
- Alternatively: Insert new alkaline batteries.
- Close the cover and insert the battery box again.

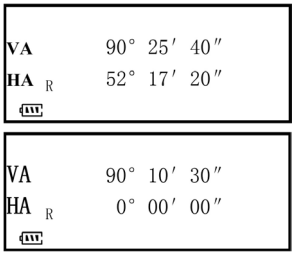






HORIZONTAL ANGLE OSET (0SET)

- Aim at target "A" using the crosshair of the telescope.
- Press the "0SET" key twice to set the reading of the horizontal angle 0°00′ 00″.
- The "0SET" key is only effective for the horizontal angle.
- The horizontal angle can be set to "0" at any time except in the HOLD mode (HOLD key).



VERTICAL ANGLE SET

- Press the power button and "R/L" simultaneously.
- "F1" will be displayed.
- Press the „O-SET" button.
- Indication „F1" - first rotation(A).
- Confirm the adjustment via collimator with „O-SET".
- Rotate.
- „F2" will be displayed - second rotation (B).
- Confirm the adjustment via collimator with „O-SET".

HORIZONTAL ANGLE CLOCKWISE/ANTI-CLOCKWISE (HA_R/HA^L)

Aim at target "A" using the crosshair of the telescope.
Press the "R/L" key; change the horizontal angle mode HA_R into the mode HA^L.
Measuring with mode HA^L. The "R/L" key is of no effect to the vertical angle.
Press the "R/L" key once again to change the mode HA^L into the mode HA_R

HORIZONTAL ANGLE "HOLD"

Turn the tangent screw and place the required horizontal angle.
Press the "HOLD" key once, and the value of the horizontal angle flashes.
Press the "HOLD" key once again to hold the horizontal angle.
Aim at the target.
Press the "HOLD" key again to release at the required horizontal angle.
The "HOLD" key has no effect on the vertical angle.

SLOPE PERCENT MODE

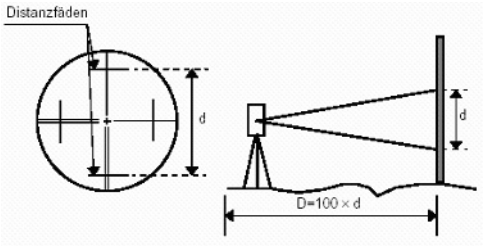
Press the button "V%" to switch from the vertical angular measurement shown in degrees into percent indication. Press the button "V%" again to turn back to normal angle measurement mode.

ANGULAR REPEATED MEASUREMENT

1	Press the "SFT" key
2	Press the "REP" key
3	Aim at a target "A" and press the "0SET" key
4	Aim at target "B"
5	Press the "HOLD" key
6	Aim at target "A" once again and press the "0SET" key
7	Aim at target "B" once again
8	Press the "HOLD" key
9	Repeat steps 2-8 to measure the desired number of repetitions
10	Press the "SFT" key to exit this mode

DISTANCE MEASUREMENT USING THE STADIA METHOD

A distance measurement can be carried out yb using the crosshair.



- Read the levelling rod.
- Aim the instrument's telescope at the levelling rod.
- Multiply the value of the distance „d" between the two stadia hairs with 100.
- The result „D" = the distance from the instrument centre to the levelling rod (D = d x 100).

AUTOMATIC POWER OFF

The instrument will power off after 20 minutes automatically if no key is used.

DISPLAYS ILLUMINATION

Power on the illumination:
Press the "SFT" key for 2 sec.

Power off the illumination:
Press the "SFT" key once again for 2 sec.

FUNCTION SETTING

ITEM		INSTRUCTION	PARAMETER SETTING	
1	Vertical angle display	Switch between horizontal and zenith	Setting ON horizontal	Setting OFF zenith
2	Automatic power off	Auto power off (on and off)	Setting ON ON	Setting OFF Off
3	Minimum angle display	Switch between 10“ and 20“	Setting ON 10“	Setting OFF 20“
4	Angle unit	Switch between DEG and GON	Setting ON GON	Setting OFF DMS (Grad)

FUNCTION SETTING METHOD

- Power on and press 0SET“ simultaneously to enter the function setting mode.
- Press “0SET“ or “HOLD“ to select the items (1-4).
- Press “R/L“ or “V%“ to change the setting of the selected item.
- Set the desired function.
- Press “SFT“ to finish the function setting and return to the normal angle measuring mode.

4 TECHNICAL SPECIFICATIONS

Telescope:	
Magnification	30x
Clear objective aperture	45 mm
Shortest focussing distance	1,5 m
Angle measurement:	Incremental
Accuracy	6 mgon (20“)
Shortest focussing distance	3 mgon (10“)
Measuring units	400 gon / 360°
Display illumination	1 x LCD / yes
Vials:	
Circular level	30“ / 2 mm
Plate level	8“ / 2 mm
Power supply	NiMH battery
Operating time	18 h
alternatively	4 x 1,5V AA Alkaline batteries
Laser plummet:	
Wave length	650 nm
Output	1 mw max.
Laser class	2
Spot size	2 mm / 1,5 m
Dimensions:	
Length / width / height	190 / 165 / 345 mm
Weight	4,8 kg
Temperature range	-20°C up to +45°C
Tribrach	detachable
Dust / water protection	IP 54

SAFETY INFORMATION

ERROR DISPLAY

Display	Error Content
E01	Vertical angle “0” position is out of range or set with incorrect procedure.
E04	Internal memory system error.
E05	Reserved for factory adjustment.
E06	Failure in angle measuring system.
E07	Rotation speed of telescope was too fast (over 4 r/s).
E08	Angle measuring system error. The instrument should be powered off/on to eliminate this error.

Attention:
Fully check every part of the instrument and see whether the operation coincides with the procedures after the error appears. If the error code is still shown after many checks please send the instrument for repair.

WARRANTY

This product is warranted by the manufacturer to the original purchaser to be free from defects in material and workmanship under normal use for a period of two (2) years from the date of purchase. During the warranty period, and upon proof of purchase, the product will be repaired or replaced (with the same or similar model at the manufacturers discretion), without charge for either parts or labour. In case of a defect please contact the dealer where you originally purchased this product. The warranty will not apply to this product if it has been misused, abused or altered. Without limiting the foregoing, leakage of the battery, bending or dropping the unit are presumed to be defects resulting from misuse or abuse.

INTENDED USE OF INSTRUMENT

Triangle, polygon and engineer measurements in the field of civil engineering as well as cadastral survey.

CARE AND CLEANING

Handle measuring instruments with care.
After use, remove dust and moisture with a suitable brush, soft cloth or lens tissue.
The optical components should be treated with particular care and only cleaned with a grease-free soft brush, a soft linen cloth or lens tissue.
Only carry the instrument in its original carrying case/container.

SAFETY INSTRUCTIONS

- Follow the instructions given in the user manual.
- Only use the instrument for its intended applications.
- Do not open the instrument housing. Repairs should be carried out by authorized workshops only. Please contact your local geo-FENNEL dealer.
- Do not remove warning labels or safety instructions.
- Keep the instrument away from children.
- Do not use the instrument in explosive environment.

SPECIFIC REASONS FOR ERRONEOUS MEASURING RESULTS

Measurements through glass or plastic windows.
Dirty optical components or laser emitting window.
After the instrument has been dropped or hit. Please check the accuracy.
Large fluctuation of temperature: acclimatise the instrument to the ambient temperature.

ELECTROMAGNETIC ACCEPTABILITY (EMC)

It cannot be completely excluded that this instrument will disturb other instruments (e.g. navigation systems); will be disturbed by other instruments (e.g. intensive electromagnetic radiation nearby industrial facilities or radio transmitters).

CE-CONFORMITY

Instrument has CE-mark according to EN 55011:2007, EN 61000-6-1:2007.

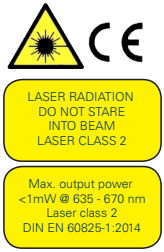
EXCEPTIONS FROM RESPONSIBILITY

- The user of this product is expected to follow the instructions given in the User Manual. Although all instruments leave our warehouse in perfect condition and adjustment the user is expected to carry out periodic checks of the product's accuracy and general performance.
- The manufacturer, or its representatives, assumes no responsibility of results of a faulty or intentional usage or misuse including any direct, indirect, consequential damage, and loss of profits.
- The manufacturer, or its representatives, assumes no responsibility for consequential damage, and loss of profits by any disaster (earthquake, storm, flood etc.), fire, accident, or an act of a third party and/or a usage in other than usual conditions.
- The manufacturer, or its representatives, assumes no responsibility for any damage, and loss of profits due to a change of data, loss of data and interruption of business etc., caused by using the product or an unusable product.
- The manufacturer, or its representatives, assumes no responsibility for any damage, and loss of profits caused by usage other than explained in the User Manual.
- The manufacturer, or its representatives, assumes no responsibility for damage caused by wrong movement or action due to connecting with other products.

LASER CLASSIFICATION

The instrument is a laser class 2 laser product according to DIN IEC 60825-1:2014.
It is allowed to use unit without further safety precautions.
Eye protection is normally secured by aversion responses and the blink reflex.

The laser instrument is marked with class 2 warning labels.



Please note:
If you return instruments for repair / for adjustment to us please disconnect batteries or rechargeable batteries from the instrument - this is for safety reasons!
Thank you.