DE | EN | FR

ECOLINE ELT 220

BEDIENUNGSANLEITUNG
USER MANUAL
MODE D'EMPLOI

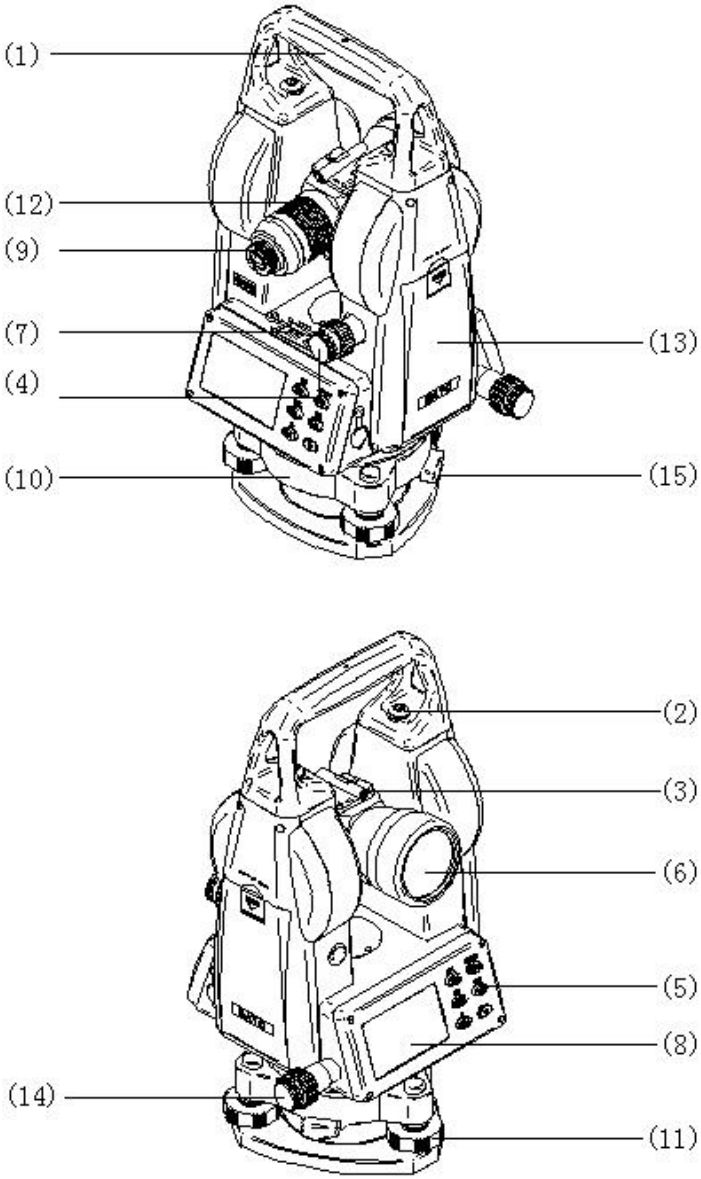
geo FENNEL
ECOLINE

EXACTLY WHAT YOU NEED.

CONTENTS

IMPORTANT READ THIS BEFORE USING YOUR INSTRUMENT 1

- Make a full check for the instrument before using it. Be sure that the instrument's functions, power, original settings and revised parameters meet your requirements before you operate it.
- To avoid direct sunlight to the instrument's lens, never leave the instrument exposed to extreme heat longer than necessary, or it could affect the instrument's accuracy.
- When mounting or dismounting the instrument to or from the tripod, hold the instrument by one hand, turn the central screw on the tripod by the other hand to prevent the instrument from falling. If the instrument must be carried on the tripod, hold the instrument as vertically as possible. Never carry the instrument horizontally over your shoulder. Any long distance transport should be done with the instrument in the carrying case.
- Put the instrument in the carrying case to avoid extrusion, crash and shock during the transportation. Shockproof cushion should be necessarily put inside the carrying case during the long distance transportation.
- Clean the dirt on the surface of the organic glass and plastic by floss or brush after using the instrument. Dry the instrument in time after use in the rain.
- Do not use harsh chemicals to clean the surface of the organic glass and plastic components. A water dampened rag is all that is necessary.
- Use absorbent cotton or lenses tissue to clean the exposed optical parts. Handkerchief, clothes or other things like that are forbidden for cleaning.
- The instrument should be stored in an area of low humidity and good ventilation, where the temperature will not exceed 110° F(45°C). It should be necessary to replace the desiccant regularly in the carrying case.
- Always remove the alkaline / rechargeable battery before storing the instrument.
- Please contact our company if the instrument's functions appear abnormal. Non-professional repairers are forbidden to disassemble the instrument.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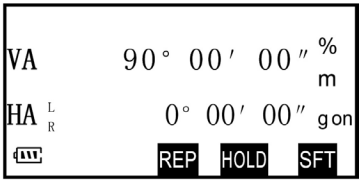
FEATURES

2

1	carrying handle
2	handle screw
3	sighting collimator
4	vertical tangent screw and motion clamp
5	operating key
6	objective lens
7	plate level
8	display
9	eyepiece
10	base plate
11	foot screw
12	focusing knob
13	battery
14	horizontal tangent screw and motion clamp
15	clamp of tribrach

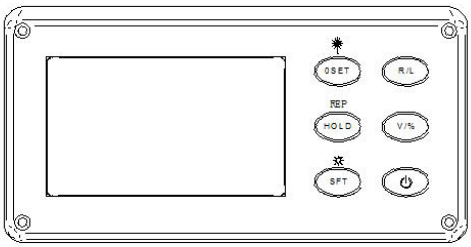
DISPLAY INDICATION

VA	vertical angle
HA_R	horizontal angle right
HA^L	horizontal angle left
SFT	the second function
REP	repeat the horizontal angel
⏻	auto power off
HOLD	the horizontal angle is holding
%	percent grade
m	distance unit
gon	angle unit
🔋	battery level



OPERATING PANEL

Button	Function 1	Function 2
0SET	Set horizontal angle 0	Switch laser plummet on or off
HOLD	Hold the horizontal angle	Repeat horizontal angle measurement
SFT	Select the second function	Press it and hold on for 2 seconds to turn on or off illumination
R/L	Switch horizontal angle right or left	
V/%	Switch vertical angle percent grade or DMS	
⏻	Power switch	



OPERATION 3

PREPARATION FOR MEASUREMENT

Level and center the instrument precisely to ensure its best performance.

Mount the tripod
Firstly place the tripod legs to a suitable position and tighten the locking device.
Mount the instrument
Attach the instrument to the tripod carefully, and then move the instrument by loosening center screw. Lock slightly the center screw on the tripod when the plummet is centered above the mark.
Roughly level the instrument with the circular vial
Use footscrew 1, 2 to move the air bubble in the circular vial so it is centered left to right. Use footscrew 3 to move the air bubble to the center of the vial.

Fine tune level the instrument with the plate level
Loosen horizontal clamp knob. Turn the instrument to place the plate vial parallel with the footscrew 1, 2.
Center the bubble using these two footscrews. Attention: Turn the two foot screws reversely when you adjust them.
Turn the instrument 90°and center the bubble using level screw 3.
Repeat step 1, 2 every time the instrument is turned 90°to center all the bubbles in these positions.

Return to the original position in step A. Rotate the instrument 180°. The plate vial is mounted correctly and the instrument is leveled nicely if the bubble is centered no matter the instrument is rotated in any direction. At the position of step 1, rotate the collimating section 180°. The plate level is mounted correctly and the instrument is levelled nicely if the bubble is centered no matter what direction the collimating section is rotated.

Please pay attention to the relations between the turning direction of the level screws and the moving direction of the bubble.

POWER ON

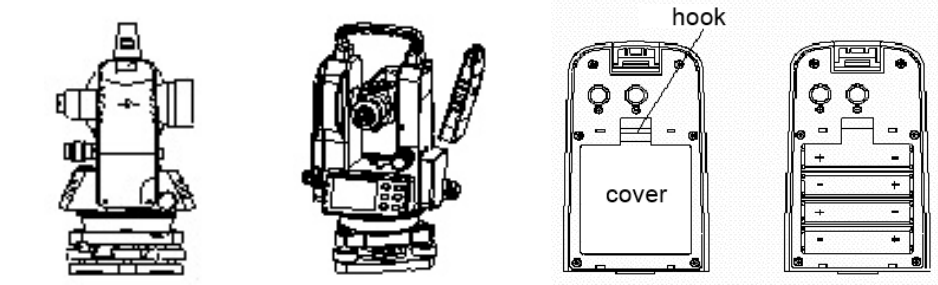
When pressing the power button by 1 sec. audio tone sounds and after a test period of about 2 seconds in which all segments are displayed instrument is ready for use
Push „V%“ button to show vertical angle in %.
Press the power button and hold on for 2 seconds to turn off the instrument.

ALKALINE / RECHARGEABLE BATTERY INDICATION

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

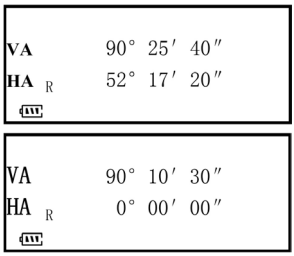
CHANGE THE BATTERIES

Removing tvhe alkaline / rechargeable battery
In case of use of Alkaline batteries:
Push down the press button and remove the battery compartment.
Battery replacement
Push down the hook to pull cover board away from the battery compartment.
Replace the old alkaline battery by new ones / load rechargeable battery - outside of instrument. Take care of correct polarity when replacing the battery.
Snap the battery cover back into place.
Mounting battery compartment
Slip the projection on the bottom of the battery compartment into the slot. Push the press button on top of the battery compartment until it clicks into place.



HORIZONTAL ANGLE OSET (0SET)

- Aim at target A using crosshair of the telescope.
- Press „0SET“ key once to set reading of horizontal angle 0°00′ 00″.
- „0SET“ key is only effective to the horizontal angle.
- Horizontal angle can be set 0 at any time except the holding state (HOLD key).



VERTICAL ANGLE 0 ERROR CORRECTION

- Power on while Pressing „R/L“, “SETUP”is shown.
- Then the first line will display “SET F1”and glint.
- Level the instrument and collimate the reference target in normal telescope setting (Face 1), press „0SET“ the first line will glint and display “SET F2”.
- Turn the telescope in reverse setting (Face 2), collimate the same target ,press „0SET“ the first line will glint and display “SET”.
- Press „0SET“ to confirm correction and enter the angle measuring mode.
- If you want to exit at any time, you can press „SFT“.

MODE CONVERSION OF HORIZONTAL RIGHTWARD AND LEFTWARD (HA_R/HA^L)

Aim at target "A" using crosshair of the telescope.
Press „R/L" key, transform horizontal angle mode HA_R into the mode HA^L.
Measuring by mode HA^L. „R/L" key is of no effect to the vertical angle.
Press „R/L" key again, transform mode HA^L into mode HA_R

HORIZONTAL ANGLE LOCKED - UNLOCKED

Turn the tangent knob and place the required horizontal angle.
Press „HOLD" key once , hold and flicker the value of the horizontal angle.
Aim at the target.
Press „HOLD" key, no blink and hold to the value of the horizontal angle.
„HOLD" key is of no effect to the vertical angle.

MEASURING A PERCENT OF GRADE (SLOPE MEASUREMENT %)

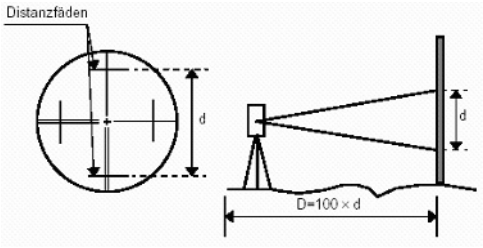
Press „V%" the display of vertical angle switches to percent grade. Press „V%" again.The display turns back to normal angle measurement mode.

ANGULAR REPEATED MEASUREMENT

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

MEASURING DISTANCE

Measuring distance with cross-hair is another application of ELT 220. To perform this function, a scale station pole is needed. By viewing through the telescope, the length between upper and under stadia hairs which multiplies 100 is the distance from instrument center to station pole. (The length refers to the reading from station pole between two stadia hairs).



- First fix the station pole at the measuring point.
- Level instrument. By viewing through the telescope, make sure the reading "d" between two stadia lines.
- The distance from instrument center to station pole "D" is 100 times of "d" (D = d x 100)

AUTOMATIC POWER OFF

If no operation in 20 minutes, turn off power supply automatically.

DISPLAYS ILLUMINATION

Switch on illumination:
Press „SFT" key for 2 sec.

Switch off illumination:
Press „SFT" key again for 2 sec.

FUNCTION SETTING

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

FUNCTION SETTING METHOD

- Power on while pressing „0SET“ to enter the function setting mode.
- Press „0SET“ or „HOLD“ to select the item (1-4).
- Press „R/L“ or „V%“ to change the setting of the selected item.
- Setting all the item as you need.
- Press „SFT“ to finish setting and enter 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-Akku
Operating time	18 h
alternatively	4 x 1,5V AA Alkaline-Batterie
Laser plummet:	
Wave length	650 nm
Output	1 mw max.
Laser class	2
Spot size	2 mm / 1,5 m
Dimension:	
Length / Width / Height	190 / 165 / 345 mm
Weight	4,8 kg
Temperature range	-20°C bis +45°C
Tribrach	detachable
Dust / water protection	IP 54

SAFETY INFORMATION 5

ERROR DISPLAY

Display	Error Content
E01	Vertical angle 0 position is out of range or set with incorrect procedure.
E04	There's abnormality in internal memory system.
E05	Reserved for adjustment in factory.
E06	There's abnormality in angle measuring system.
E07	The level collimation or the telescope revolve too fast(over 4 r/s).
E08	There's a error detected in angle measuring system. The instrument should be re-powered 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 manufacturers option), 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

Please handle measuring instruments with care.
Clean with soft cloth only after any use. If necessary damp cloth with some water: If instrument is wet clean and dry it carefully.
Pack it up only if it is perfectly dry.
Transport in original container / case only.

SAFETY INSTRUCTIONS

- Please follow up instructions given in operators' manual.
- Use instrument for measuring jobs only.
- Do not open instrument housing. Repairs should be carried out by authorized workshops only. Please contact your local dealer.
- Do not remove warning labels or safety instructions.
- Keep instrument away from children.
- Do not use instrument in explosive environment.

SPECIFIC REASONS FOR ERRONEOUS MEASURING RESULTS

Measurements through glass or plastic windows.
Dirty laser emitting windows.
After instrument has been dropped or hit. Please check accuracy.
Large fluctuation of temperature: If instrument will be used in cold areas after it has been stored in warm areas (or the other way round) please wait some minutes before carrying out measurements.

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.

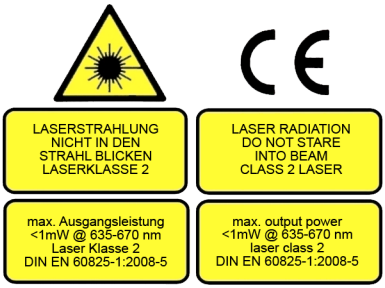
EXCEPTIONS FROM RESPONSIBILITY

- The user of this product is expected to follow the instructions given in operators' manual. Although all instruments left 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 users' 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 60825-1:2008-05.
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.

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Technische Änderungen vorbehalten.
All instruments subject to technical changes.
Sous réserve de modifications techniques.

CE

11/2013