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VECTOR™ USMC VECTOR 21



VECTOR™

Operating & Operator Maintenance Instructions

Version 0.3

vectronix 

VECTOR™

Congratulations on purchasing your VECTOR.

VECTOR = 4 instruments in 1:

- **Binoculars**

Superb optics in a robust, watertight, rubber-armoured casing.

- **Digital Compass**

Displays magnetic azimuth or grid azimuth in degrees or mils.

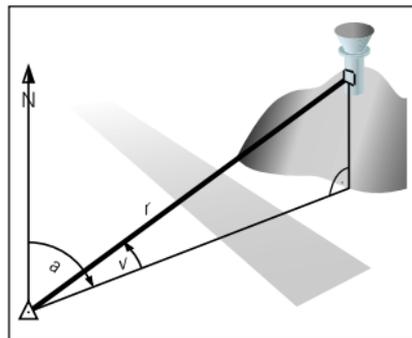
- **Laser Rangefinder**

Measures from 5 m to over 10 km (depending on visibility and nature of target objects).

- **Inclinometer**

Displays vertical angles between -45° and $+45^\circ$.

As its name implies, the VECTOR measures the polar vector from your position to the target object.



- r Range** (slope distance)
- a Azimuth** (bearing, horizontal direction, angle between north and object)
- v Vertical angle** (inclination, elevation)



For safe use of the VECTOR, please note the detailed safety directions included in this manual.

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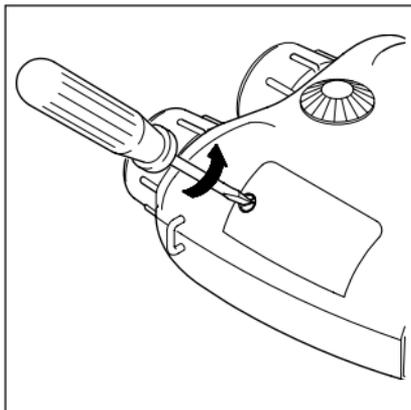
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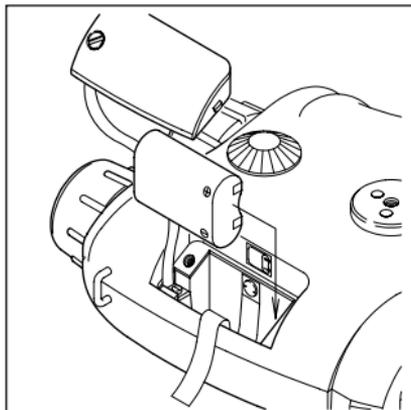
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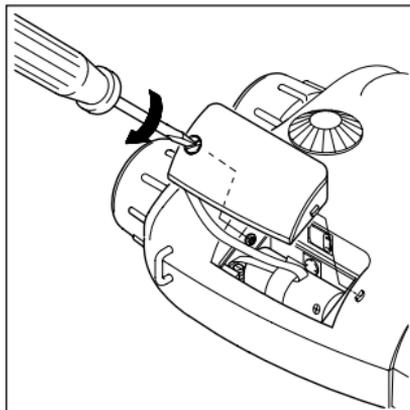


Open the battery compartment using a suitable tool, or a coin. Insert a 6V lithium battery, type 2CR5 or equivalent. Ensure that the drawing ribbon lies above the securing tape of the battery cover. Keep the battery cover seals and the instrument case clean.



Refit the battery cover and re-tighten the screw.

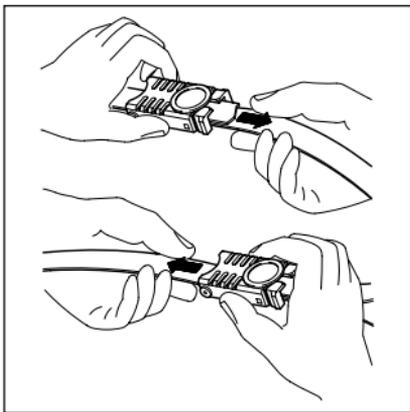
The VECTOR monitors the battery's condition. If the display shows 'Lo batt', this indicates that the battery is used up. You can still get readings, but the battery needs to be replaced soon.



The 'Lo batt' display may also appear under cold conditions, since low temperature reduces the battery performance.

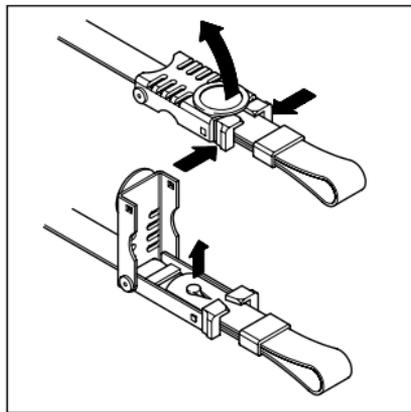
i Remove the VECTOR battery before a prolonged period of non-use. Use non-magnetic batteries only!

Adjusting the neck strap



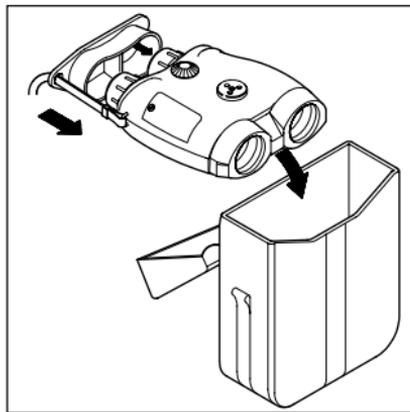
Adjust the length of the neck strap by pulling the strap slowly but firmly around the back of the catch.

Removing the neck strap



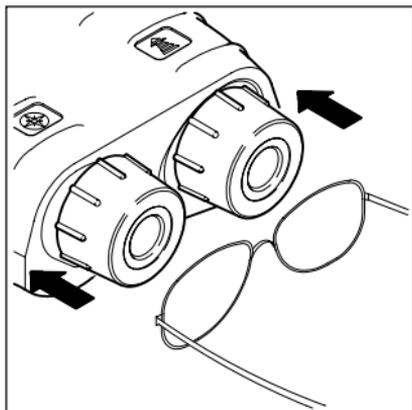
Open both catches: Squeeze the two clips together and lift the cover. Remove the strap ends and pull them through the lugs on the VECTOR.

Storing the VECTOR



i To protect from dirt: Always fit the eyepiece cover and keep your VECTOR in its pouch when not in use.

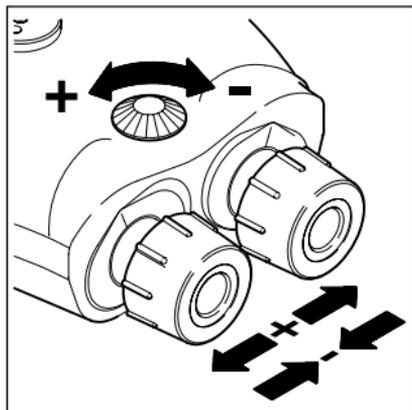
Eyepiece viewing distance



When using the VECTOR with glasses, push the eyecups fully inwards.

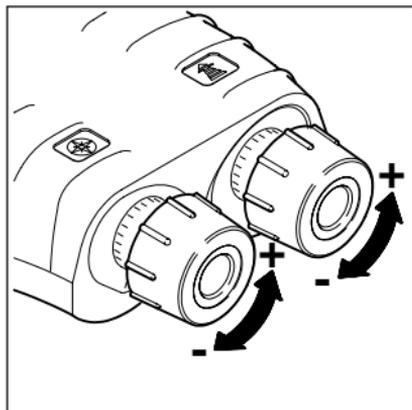
When using the VECTOR without glasses, pull the eyecups out to the stop.

Eye-base adjustment



Turn the adjusting knob until the left and right fields of view fuse to form a circular image.

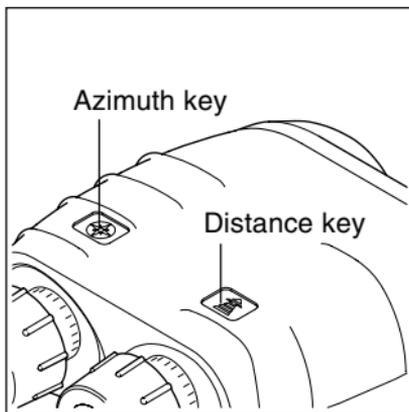
Dioptric adjustment



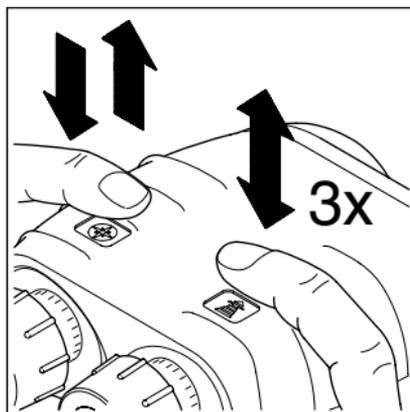
Sight on an object farther than 100 m away and rotate the eyepieces to obtain a sharp image. Standard setting: 0 dioptries.

i If the VECTOR is being used by a number of different people, remember your personal dioptric setting.

Using the VECTOR



The VECTOR is operated entirely by means of the keys on the top of the casing.



Key operation is indicated by the following symbols:

Downward arrow: press and hold down the key.

Upward arrow: release the key

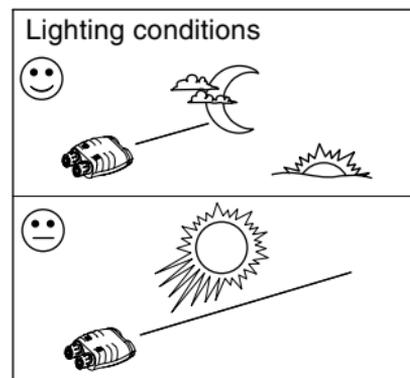
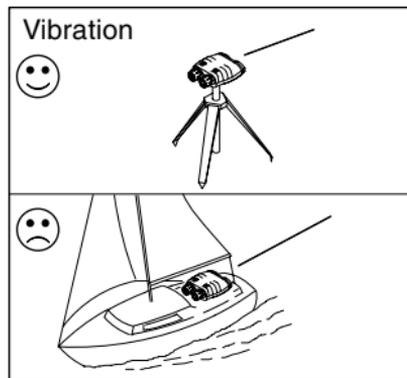
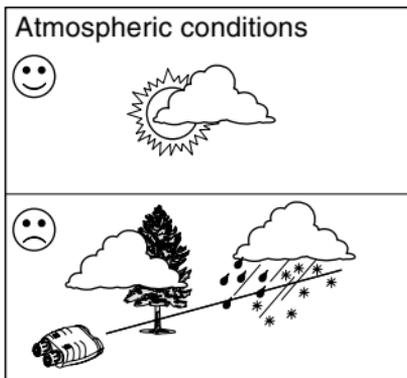
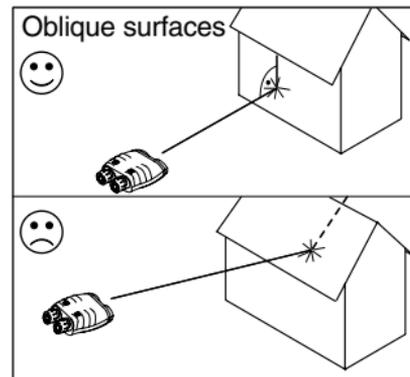
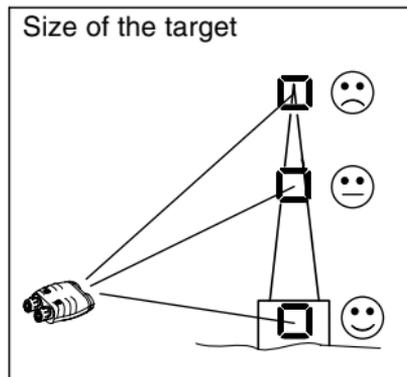
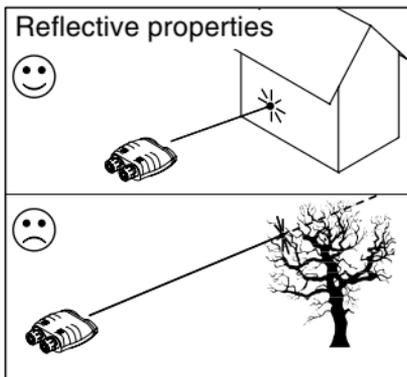
Double arrow: press and release the key (click)

Double arrow plus a number:
Press and release the key in rapid succession (e.g. triple click)

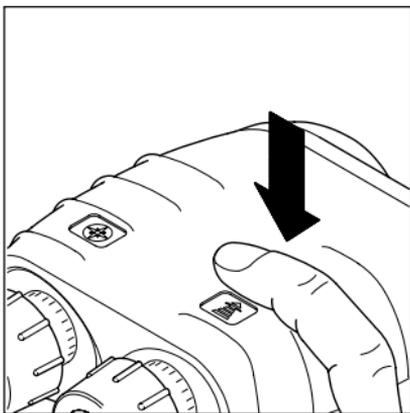
Sight the object to be measured using the pointing circle or reticle (optional).
Hold the VECTOR steady during measurement.

The VECTOR displays the measurement result, then switches itself off automatically after a few seconds.

i You can prolong the display period by holding down the measuring key while the result is displayed.

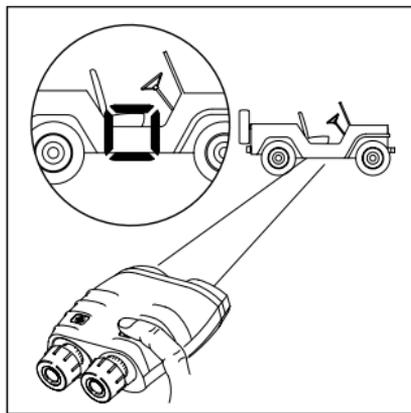


Distance measurement (slope distance)

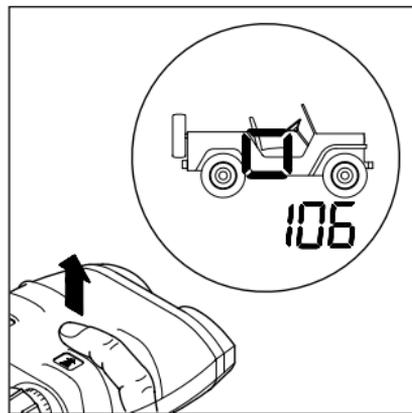


Press and hold the distance key; the pointing circle appears in the field of view.

i Turning the pointing circle on and off: see page 29.



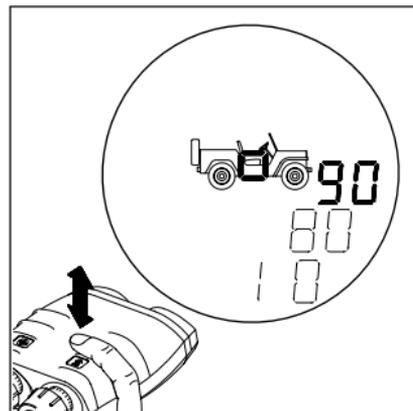
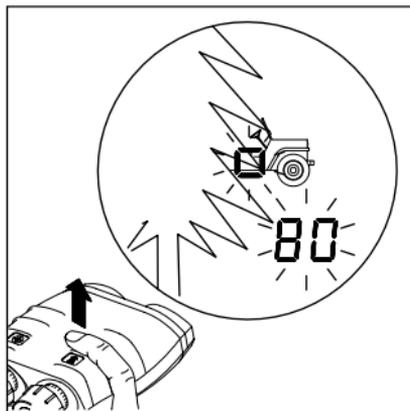
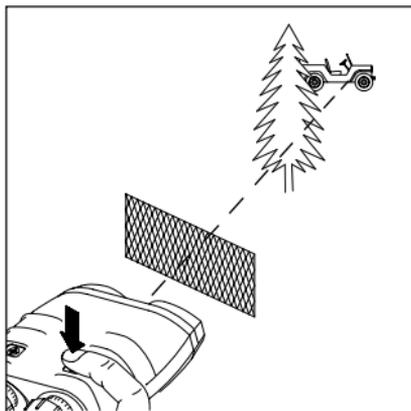
Sight the pointing circle on the object.



Hold the VECTOR steady as you release the distance key. Read off the distance. If "----" appears in the display, the object lies outside the measuring range, or measuring conditions are poor (see page 10).

i Setting measurement units and range gate: see pages 32, 33.

Multiple object measurement



Up to 3 separate distances can be obtained with a single measurement, for example when:

- the laser beam passes through objects in front of the main target (bushes, shrubs, etc.)
- there are reflective objects behind the main target (mountains, etc.)

i This feature is always activated. The order of the displayed ranges is: closest, strongest between first and last, and furthest detected echo.

Sight on the most visible portion of the object. Operate the VECTOR as described under "distance measurement".

The distance display blinks for a few seconds after a multiple distance measurement. Click the distance key repeatedly to obtain all the measured distances in succession.

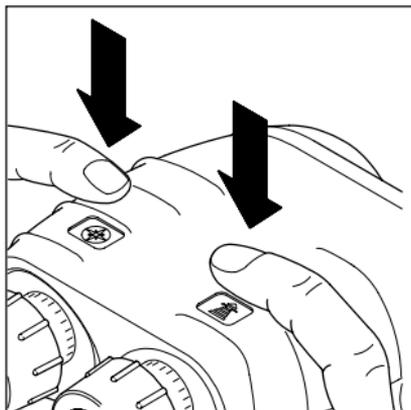
Data transfer for multiple measurements

For data transfer via PLGR when measuring multiple targets proceed as follows:

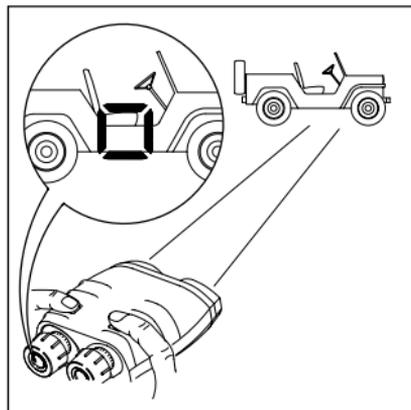
- Set the communication mode to "PLGr Con" as described before.
- Press the distance key until the desired measurement is displayed.
- Now press the azimuth key to transfer this data.

See page 12 for details about "Multiple object measurement".

Combined measurement with data transfer (slope distance, azimuth, inclination)



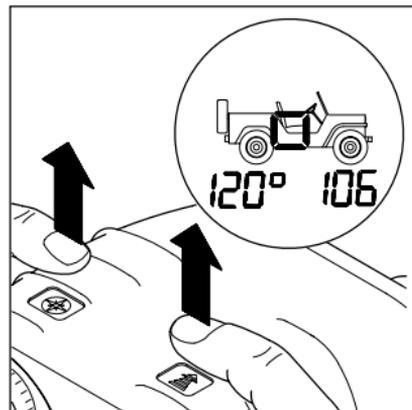
Measurement data is transmitted via the (optional) interface cable immediately after the measurement is taken (see page 27). It is not possible to store measurement data in the VECTOR itself.



Hold down both keys simultaneously (or the remote fire button); the pointing circle appears, together with the current azimuth.

Sight the object with the pointing circle.

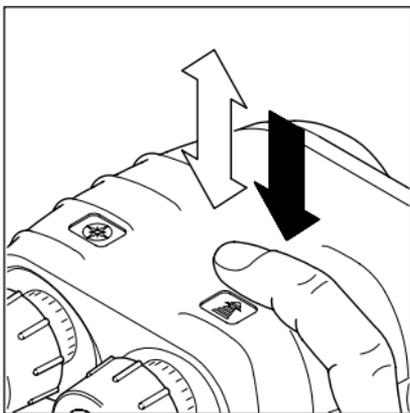
Release both keys (or the remote fire button) while holding the VECTOR steady.



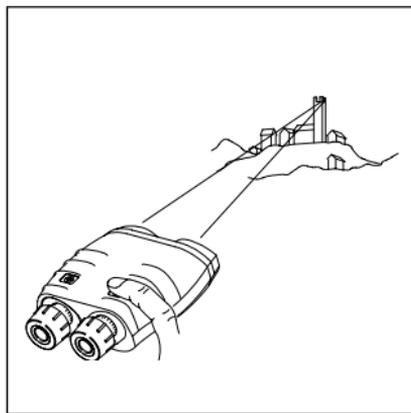
The azimuth appears at the left and the slope distance at the right of the field of view. The inclination angle is not displayed, but it is sent via the data interface.

i Setting measurement units: see page 32.

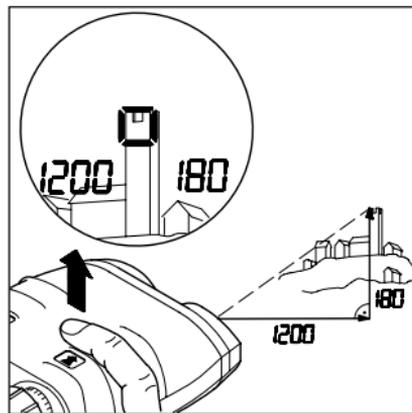
Horizontal dist. and height difference between your position and a remote object



Click the distance key once, then press and hold it down. The pointing circle appears.



Sight the object with the pointing circle.

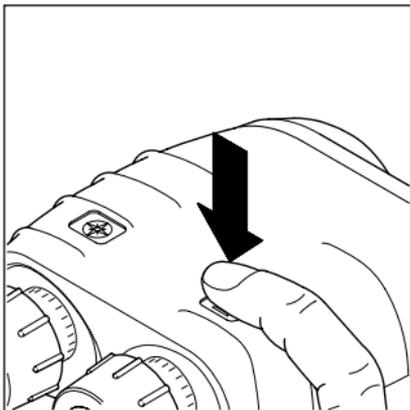


Release the distance key while holding the VECTOR steady. The horizontal distance appears at the left and the height difference at the right of the field of view.

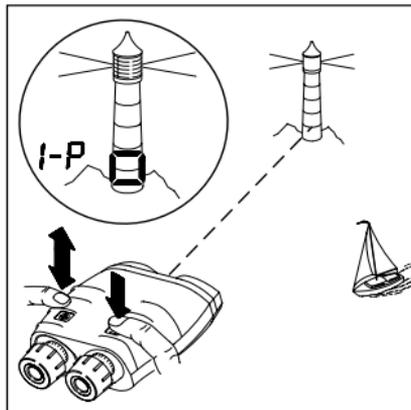


Setting measurement units: see page 32.

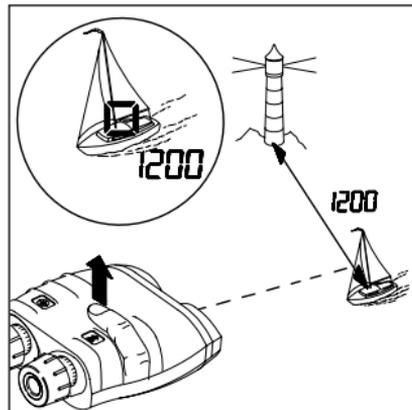
Distance between two objects



Press and hold the distance key.
The pointing circle appears.



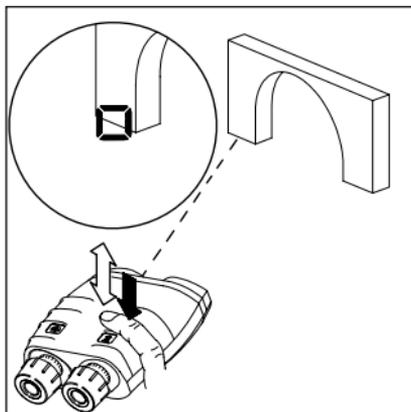
Sight the first object with the pointing circle.
Click the azimuth key while holding the VECTOR steady.
The first object measurement is confirmed (1-P = first point).



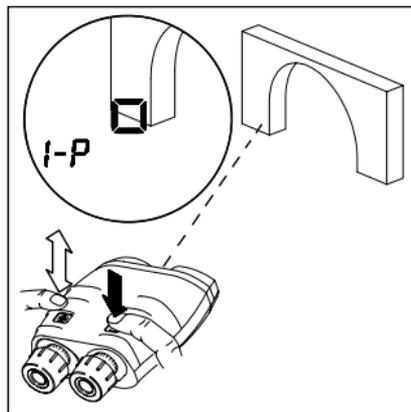
Sight the second object with the pointing circle.
Release the distance key while holding the VECTOR steady.
The distance between the two objects is displayed.

i Setting measurement units:
see page 32.

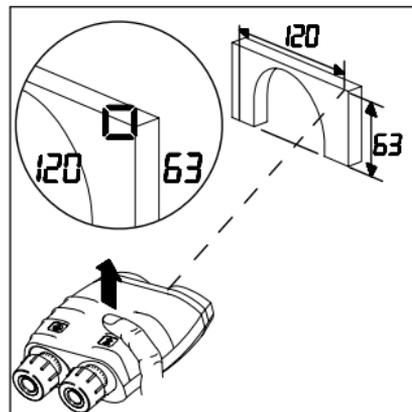
Horizontal and vertical distance between two objects



Click the distance key once, then press and hold it down. The pointing circle appears.



Sight the first object with the pointing circle. Click the azimuth key while holding the VECTOR steady. The first object measurement is confirmed (1-P = first point).



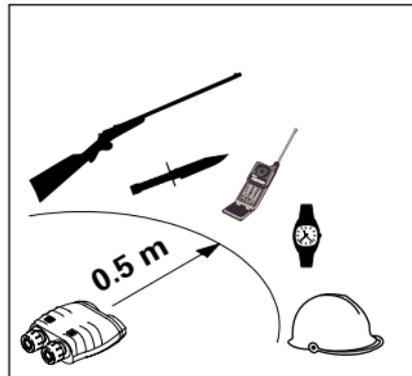
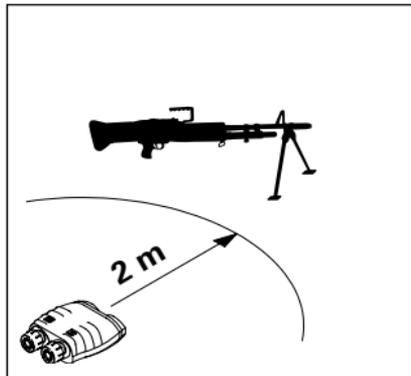
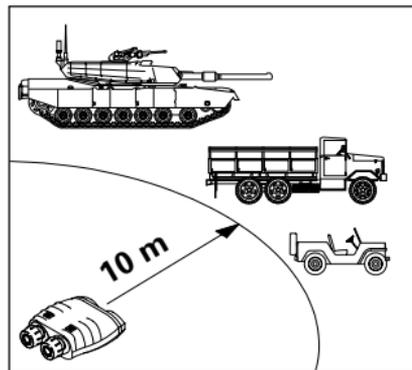
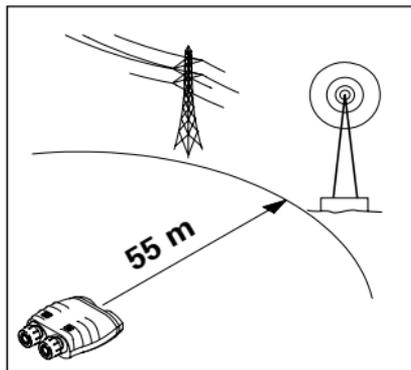
Sight the second object with the pointing circle. Release the distance key while holding the VECTOR steady. The horizontal distance appears at the left and the vertical distance at the right of the field of view.

i Setting measurement units: see page 32.

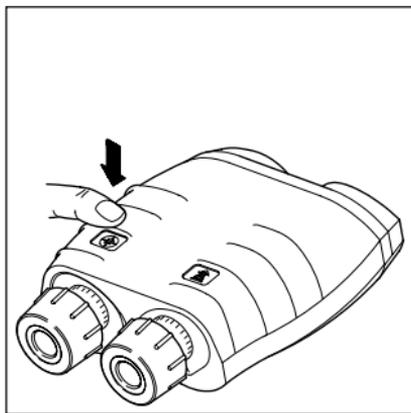
The VECTOR has a digital compass that works similarly to a magnetic compass. Metal objects and magnetic fields can cause errors in directional readings. Nonmagnetic metals and alloys do not affect the compass readings.

i Countermeasures:

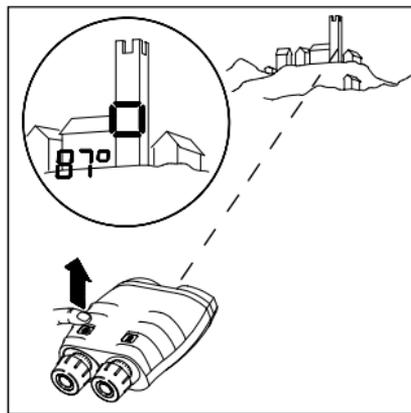
- Use non-magnetic batteries only!
- Calibrate the compass (see pages 36–40) after every battery change.
- Observe the minimum safe distances shown opposite when making azimuth measurements or calibrating the compass:



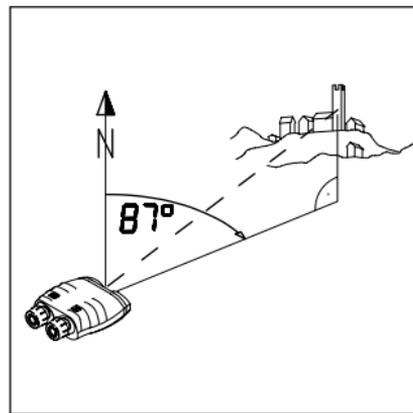
Azimuth measurement



Press and hold the azimuth key. The pointing circle appears, together with the current azimuth. The display updates continuous azimuth twice per second.

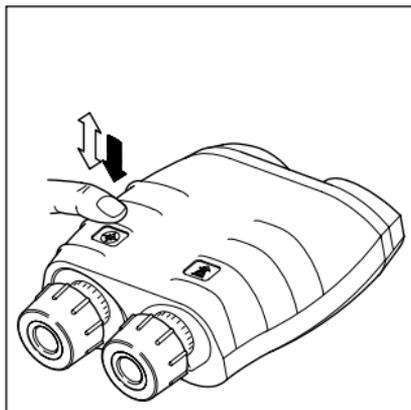


Sight the object with the pointing circle, then release the azimuth key while holding the VECTOR steady. The most recently measured azimuth is displayed.

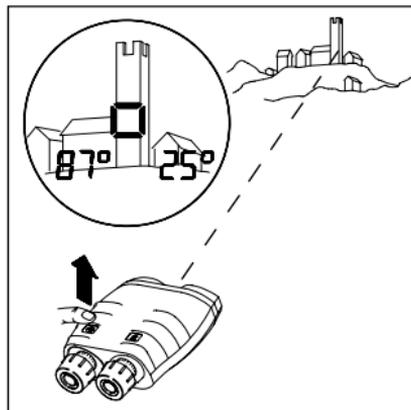


i Setting measurement units: see page 32.

Combined azimuth and inclination angle measurement



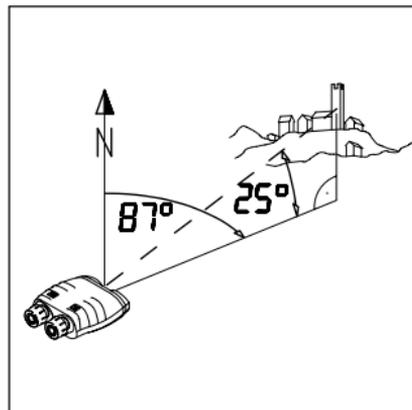
Click the azimuth key once, then immediately press and hold it down.



The following items appear in the field of view:

- the pointing circle
- the current azimuth at the left
- the current angle of inclination at the right.

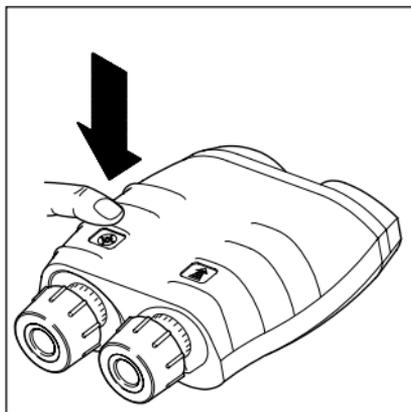
Sight the object with the pointing circle, then release the azimuth key while holding the VECTOR steady.



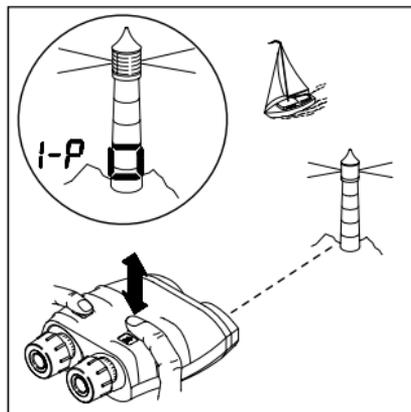
The azimuth and angle of inclination to the object are displayed.

i Setting measurement units: see page 32.

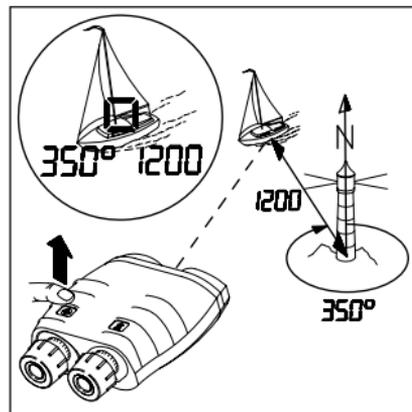
Azimuth and horizontal distance between two objects



Press and hold the azimuth key. The pointing circle appears, together with the current azimuth.



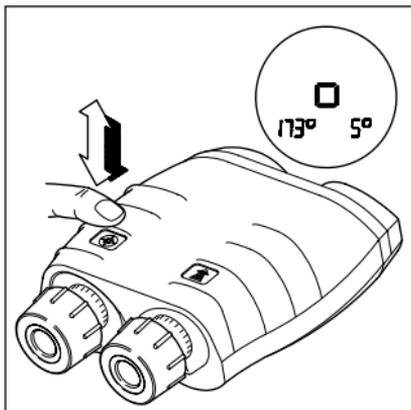
Sight the first object with the pointing circle. Click the distance key (> 0.5 s) while holding the VECTOR steady. The first object measurement is confirmed (1-P = first point).



Sight the second object with the pointing circle. Release the azimuth key while holding the VECTOR steady. The azimuth appears at the left and the horizontal distance at the right of the field of view.

i Setting measurement units: see page 32.

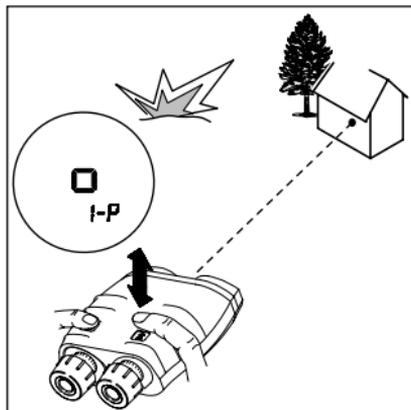
Fall of shot - FOS



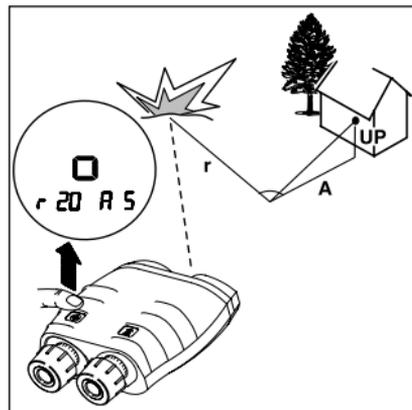
Click the azimuth key once, then immediately press and hold it down.

The following items appear in the field of view:

- the current azimuth at the left
- the current angle of inclination at the right



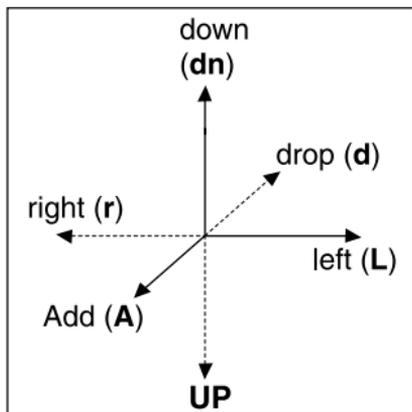
Sight the **target** with the pointing circle. Click the distance key while holding the VECTOR steady - "1-P" appears.



Sight the **FOS** and release azimuth key while holding the VECTOR steady.

The **corrections** (L.. / r., A.. / d..) from FOS to target appear first.

Fall of shot - FOS (continued)



i The display time can be extended, by holding down the distance key during the time the parameters are shown.

Click distance key to display height correction (UP.. / dn..).
Click distance key to display **corrections** again.

Example: If a shot is left and short, the correction is **r..** and **A..** with the appropriate value.

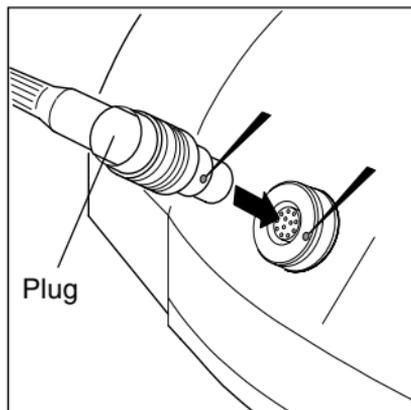
On the underside of the VECTOR is a socket for sending data to:

- personal computers or laptops
- modems
- fire control systems
- PLGR / DAGR

i Our customer service will be pleased to inform you about special accessories for transmitting and analysing data.

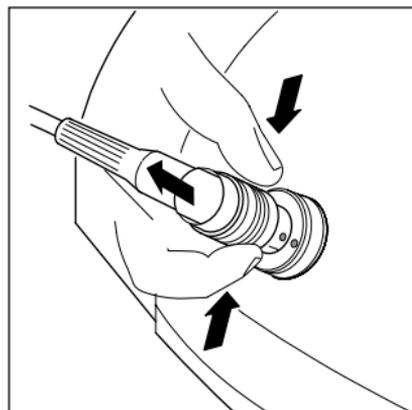
Caution

Incorrect handling can damage the socket and optional interface cable.



To plug:

Align the respective red markings on the plug and socket. Slide the plug carefully into the socket until the locking mechanism engages.

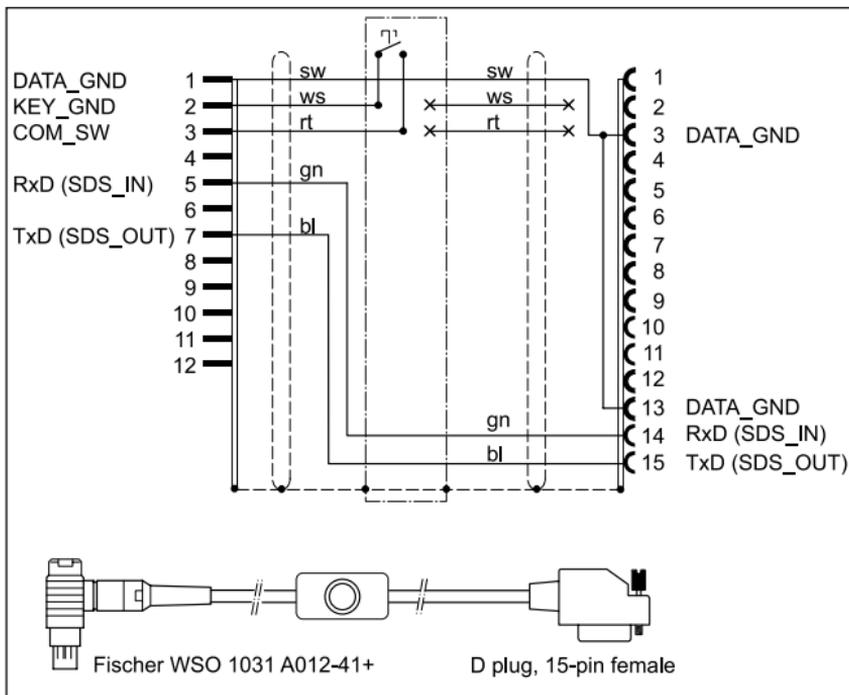


To unplug:

Grasp the plug grip

- between two fingers,
- draw it carefully back to the stop to disengage the locking mechanism,
- pull back a little harder until the plug slips out of the socket.

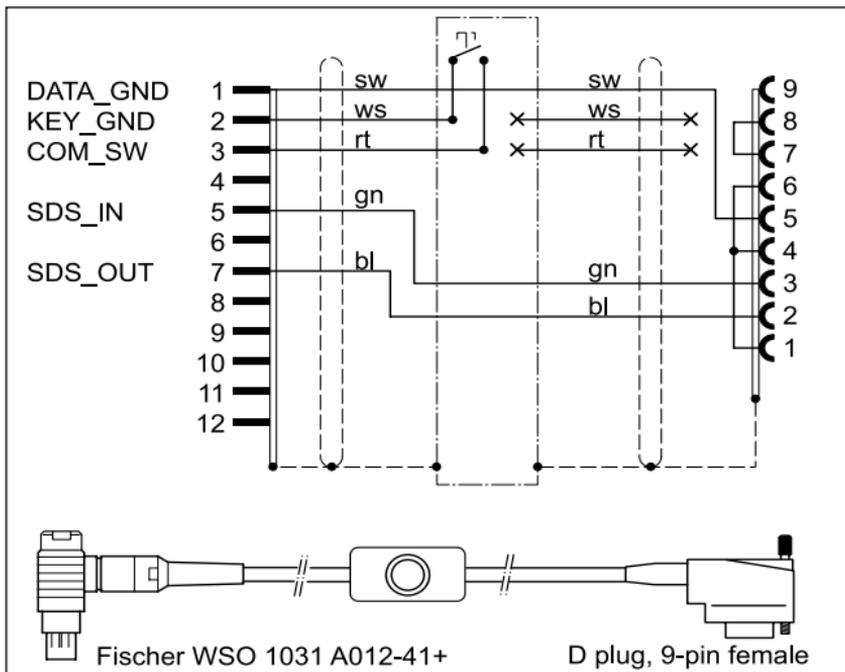
Cable configuration to PLGR



Interface parameters

Interface RS 232
 Data transmission bidirectional
 Baud rate 9600 bps
 Parity none
 Data bits 8
 Stop bits 1
 Handshake none

The optional interface cable is intended for connection to a PLGR serial interface with a 15-pin plug.



Interface	RS 232
Data transmission	bidirectional
Baud rate	9600 bps
Parity	none
Data bits	8
Stop bits	1
Handshake	none

The optional interface cable is intended for connection to a PC serial interface with a 9-pin D plug.

Data transfer format for PC

Every measurement (distance, azimuth, inclination) is transmitted as 10 ASCII characters; 11 for distance data:

Z	XXXXXX	XY	<CR>
Start character	Measurement value	Checksum	End character

A complete set of measurements therefore consists of 31 ASCII characters.

Before and after this continuous string, a steady logic 1 is transmitted while the VECTOR is powered on.

Start character for measurement value:

d (v) distance
 a azimuth
 e angle of inclination (elevation)

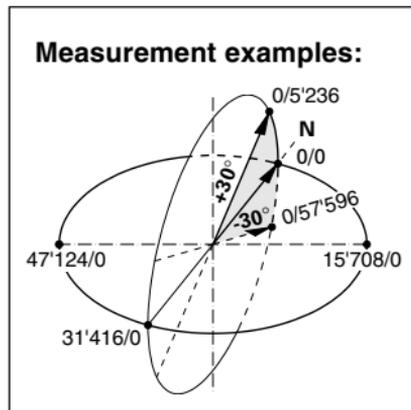
Start character for error report:

C compass error
 R distance error
 M instrument (main board) error

Measurement value: 6 integer digits or six-digit hexadecimal error code.

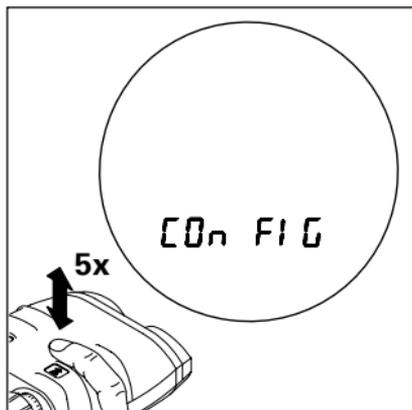
The data transmitted comprises:

- distance in centimetres, with 0.5 m resolution
- azimuth and inclination in milliradians (full circle = 6'283.2 mrad) and 0.2 mrad resolution.



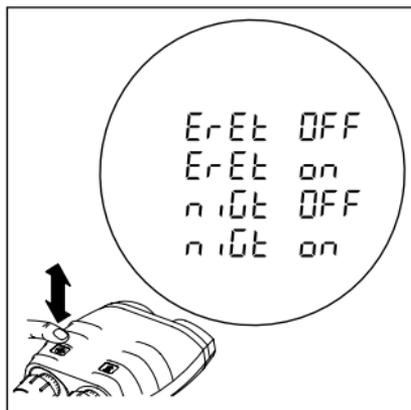
Checksum: 2 hexadecimal digits. These correspond to the 8 LSBs (least significant bits) of the ASCII measurement value and the start character.

End character: 1 position for line feed (CR).



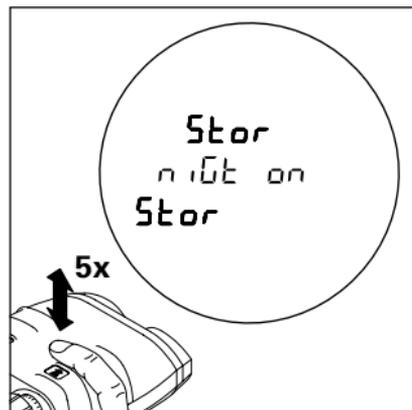
Various instrument functions are switched on and off via the configuration menu.

Click the distance key five times in rapid succession. "CO n FIG" appears followed by the current range setting.



Click the azimuth key until the desired function status appears.

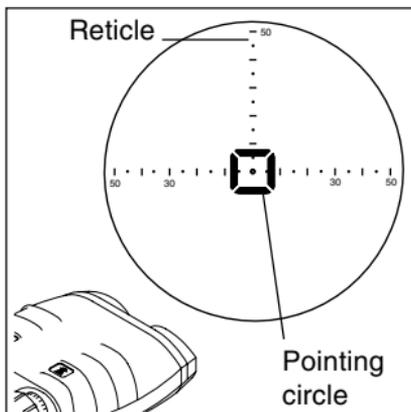
i The various functions are described in detail on the following pages.



Click the distance key five times in rapid succession to save your settings.

If the distance key is not correctly clicked five times, the previous settings remain unchanged and "Old Conf" is displayed.

Electronic reticle

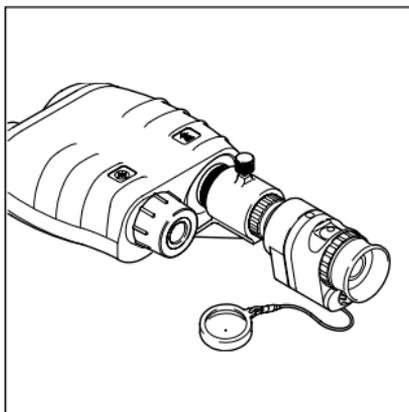


Function: ErEt on/OFF
(Electronic Reticle)

The pointing circle is by default **OFF**.

'ErEt' on is automatically selected when 'niGt on' is selected.

Night vision device



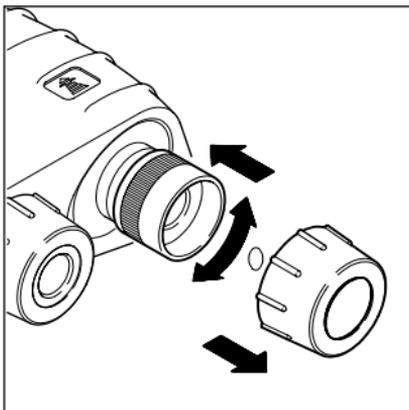
Function: niGt on/OFF
(Night Vision)

This function

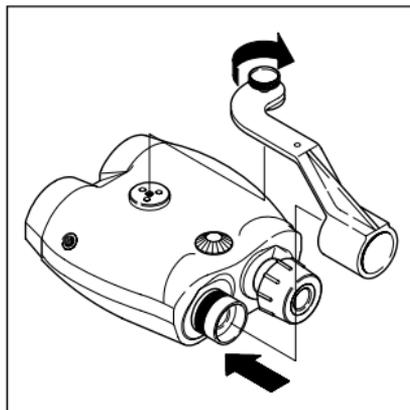
- is normally turned **OFF**;
- reduces the display brightness;
- is needed only when a night vision device is attached.

'niGt on' may appear if operation is attempted with the function 'niGt on' during daylight conditions.

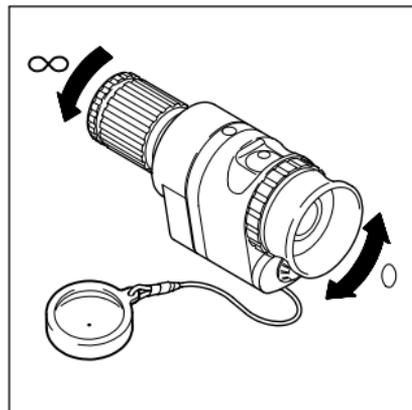
Using the VECTOR with a night vision device



Remove binocular enhancer when attached.
Remove the eyecup from the right eyepiece.
Rotate the right eyepiece to adjust it to 0 dioptres.
Then slide the eyepiece fully inwards.



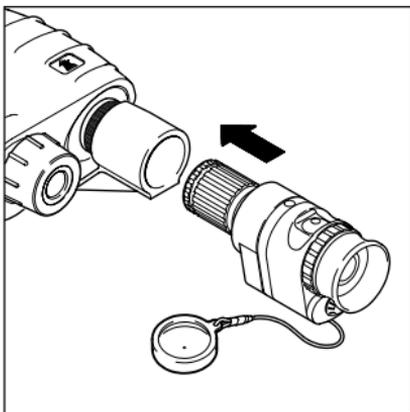
Fit the adapter, and screw it firmly to the tripod bushing.



Adjust the eyepiece on the night vision device to suit your eyesight. Standard setting: 0 dioptres.

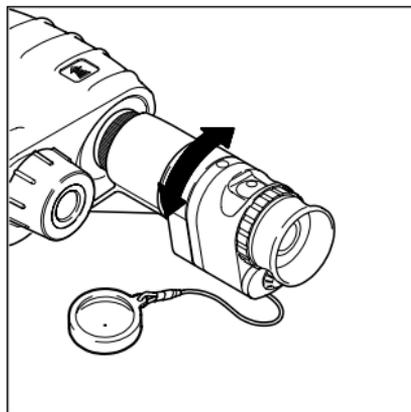
Remove the protective lens cap.
Rotate the lens counter-clockwise all the way out

Using the VECTOR with a night vision device (continued)



Carefully slide the night vision device into the adapter.

Activate the "niGt" function in the configuration menu (see page 28).



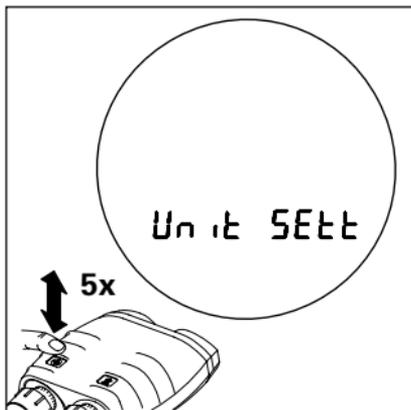
At observation distances below 100 m, focus the night vision device.

While sighting on an object with the azimuth button pressed and held, adjust PVS-14 (diopter) eyepiece and (objective) focus in order to see the object and azimuth readout clearly.

Adjust PVS-14 brightness (gain control) to improve the image.

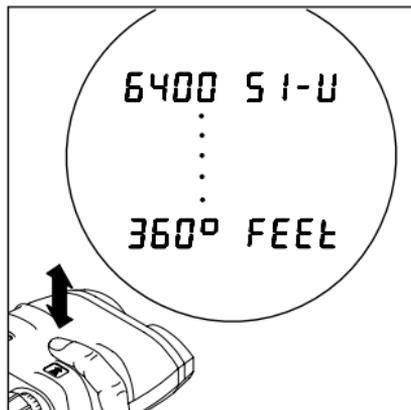
! When you finish using the night vision device, return to the normal "niGt OFF" setting.

i "niGt on" is displayed, when function is activated and used in daylight conditions.



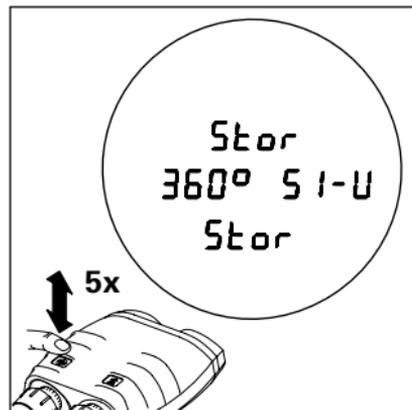
Various angle and distance measurement units may be set via the configuration menu.

Click the azimuth key five times in rapid succession. "Unit SEt" appears briefly, followed by the measurement units currently in use by the VECTOR.



Click the distance key until the desired units appear in the field of view:

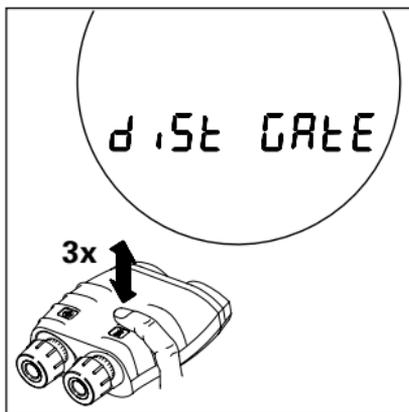
- at the left: angular unit in mils or degrees
- at the right: distance unit in metres (SI-Unit) or feet.



Click the azimuth key five times in rapid succession to save your preferred units.

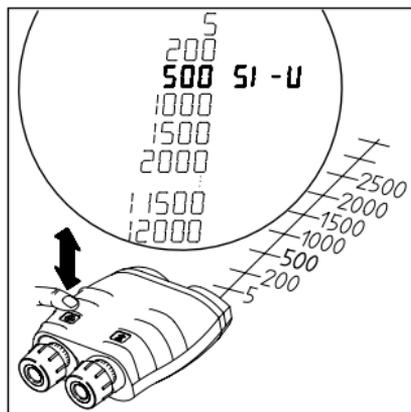
If the azimuth key is not correctly clicked five times, the previous settings remain unchanged and "Old Unit" is displayed.

Range gate



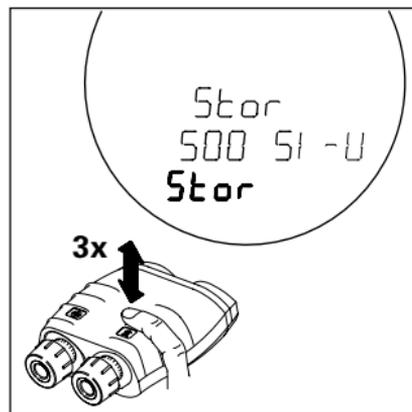
In certain applications, it may be desirable to limit the closest distance that the VECTOR will measure.

Click the distance key three times in rapid succession. "diSt GAtE" appears, followed by the current setting.



Click the azimuth key until the desired minimum distance appears (e.g. 500 m). Depending on VECTOR model the range gates will be different.

i Setting the minimum distance to "5 SI-U" disables the range gate (default gate = 500m).



Click the distance key three times in rapid succession to save the setting. If you do not press the distance key, the previous setting remains unchanged and "Old GAtE" is displayed.

i "GAtE on" is displayed when closer ranges are measured.

Declination compensation Declination display

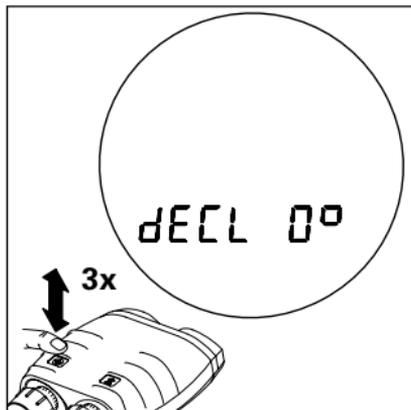
Declination represents the deviation between magnetic north and grid north.

Declination

- varies from location to location
- varies from time to time
- is specified on most land and sea maps

To refer the azimuth angle to grid north: enter the local declination value into the VECTOR.

To refer the azimuth angle to magnetic north: enter a zero declination value into the VECTOR.

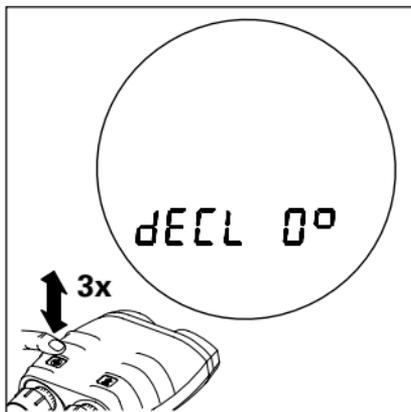


Click the azimuth key three times in rapid succession. The current declination value is displayed for 10 seconds. The VECTOR displays "Old dECL" before switching itself off (the declination value is unchanged).

Declination is displayed in the currently selected angular units (see page 32).

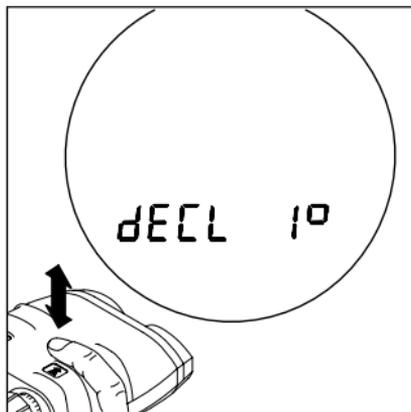
- i** The stored declination value
- is reset to 0 when the measurement units are changed (see page 32);
 - is retained when the battery is exhausted or replaced;
 - is factory-set to 0.

Declination setting/correction



Click the azimuth key three times in rapid succession. The stored declination value is displayed.

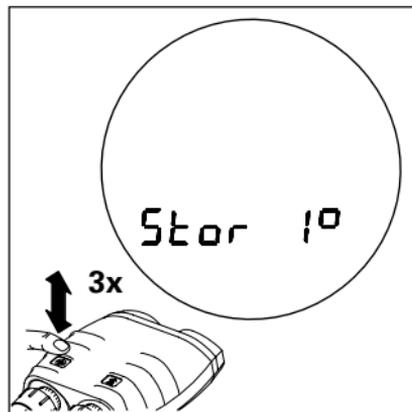
! When used with PLGR (or other device determining declination (MAGVAR)) declination must be set at "0".



Distance key

- short click: the declination value changes by one unit per click.
- long click (hold down the key for longer than half a second): the declination value changes continuously.

i Use the azimuth key to change between increment and decrement !



Click the azimuth key three times in rapid succession to store the new declination value.

If the azimuth key is not correctly clicked three times, the previous settings remain unchanged and "Old dECL" is displayed.

How?

There is a choice of three calibration procedures:

- 4 point calibration (4 Pt Co) achieves adequate precision for most applications.
- 12 point calibration (12 Pt Co) is performed at the factory under optimal conditions.
- 12 point calibration on tripod (PPS Co), Precision Pointing System.

When?

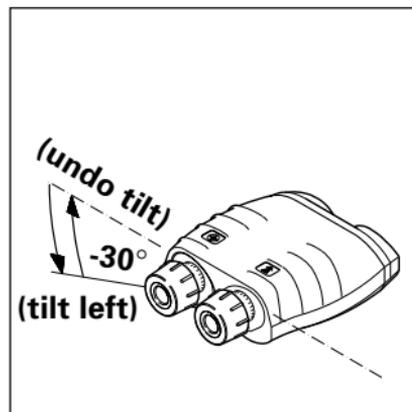
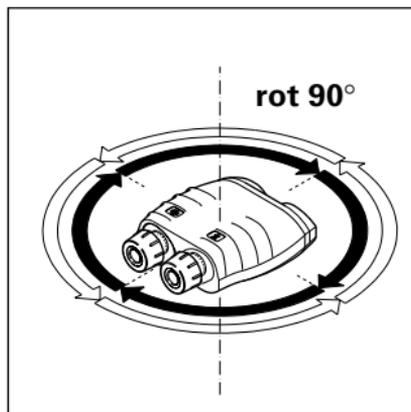
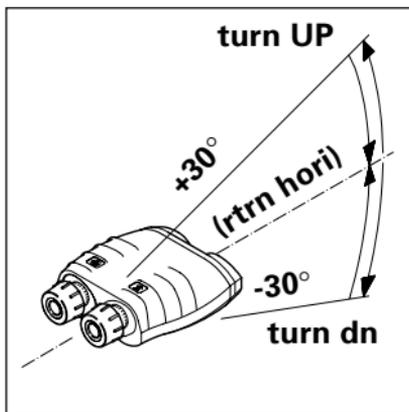
- After every battery change.
 - After the VECTOR has been exposed to strong magnetic fields.
 - When metallic parts have been attached to the VECTOR (e.g. night vision device).
 - After movement greater than 20 km and/or to a different terrain type.
-  Check the stored declination after every compass calibration, and correct if necessary.

Where?

In an open area (e.g. a field) at an adequate distance from buildings and metallic objects (see page 18). Ensure that there are no buried pipes, cables, etc. in the vicinity.

 Never calibrate the compass inside a building, or in the vicinity of disruptive magnetic fields!

Operator guidance



The VECTOR needs to be swivelled in various directions during calibration. Instructions for the required direction of movement appear successively in the display:

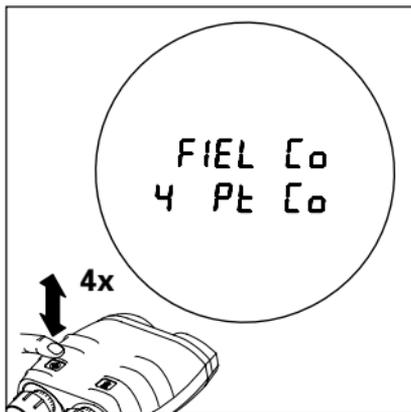
turn UP tilt upwards
rtrn hori return to horizontal
turn dn tilt downwards
rot 90°(60°) ... rotate by 90°(60°)

tilt left tilt the left side of the VECTOR downwards
undo tilt return to horizontal
too far reverse direction

i Instructions in brackets apply to 12 point calibration only.
Always turn in the same direction for all "rot 90°" instructions.

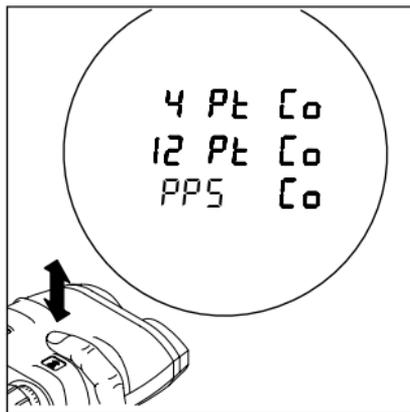
Important: Perform each movement **slowly and steadily**, until the next instruction appears. When you see the "StOP" instruction, **immediately hold the VECTOR still** and on no account move it while "StOP" is displayed.

Calibration procedure (hand held)

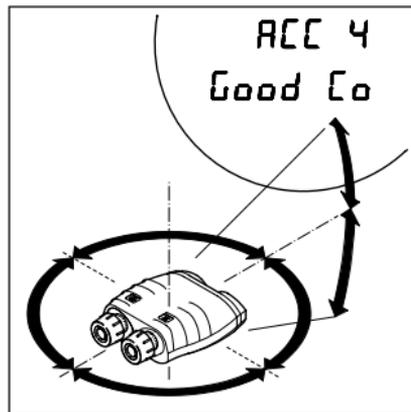


Point the VECTOR roughly northwards.

Click the azimuth key four times in rapid succession. "FIEL Co" appears briefly, followed by "4 Pt Co" for the regular 4 point calibration.



i If you want to perform the 12 point calibration click the distance key when "4 Pt Co" is displayed until the desired option is displayed. The selected procedure starts automatically in a few moments. Move the VECTOR according to the displayed instructions (see page 37).

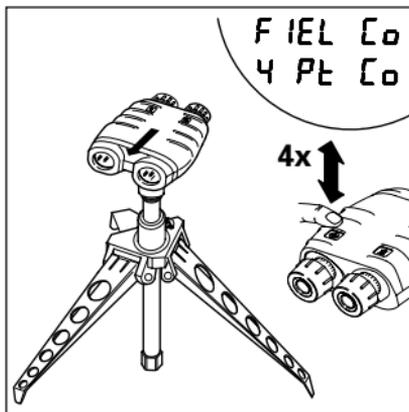


After the last instruction, analysis begins and the pointing circle blinks for a few seconds.

You then see

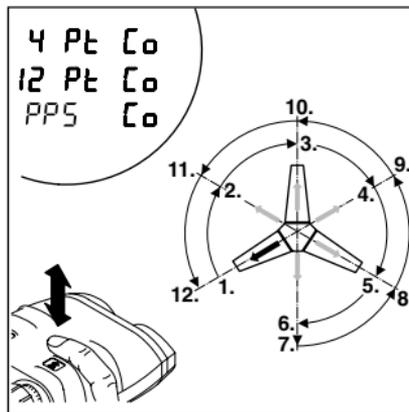
- "Good Co" followed by accuracy value
- "bAd Co" followed by accuracy value
- "ACC": accuracy value in units selected

Calibration procedure (on tripod)

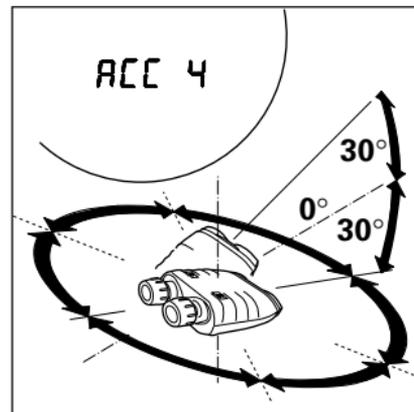


Place the VECTOR on mini-tripod SST3-2 and level 30° downwards (see marking on tripod).

Click the azimuth key four times in rapid succession. "FIEL Co" appears briefly, followed by "4 Pt Co".



Now press the distance key until "PPS Co" is displayed. The calibration procedure starts automatically in a few moments. Proceed as described before. As a help for "rot 60°": rotate from the first tripod foot to the middle position between this and the next foot, then to the next foot and so on.



After the last instruction and the analysis the accuracy value is displayed.

Calibration procedure (hand held and on tripod)

Magnetic interference can still lead to inaccurate measurements, even if calibration was successful. For this reason, you should verify compass accuracy after a successful calibration: perform several azimuth measurements on known landmarks and compare the results.

After calibration, the VECTOR acts on the measurement results as follows:

Display	Process
"Good Co" "ACC xx"	The newly determined constants are automatically stored.
"bAd Co" "ACC xx"	The newly determined constants are automatically stored

Possible causes of calibration failure:

- The VECTOR was moved while a "StOP" instruction was displayed.
- Movements performed too fast, or jerkily.
- Strong magnetic disturbances in the vicinity.

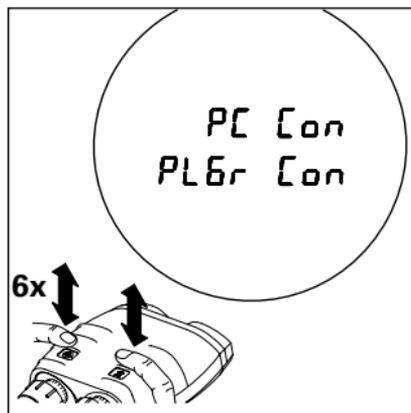
 If you get a "bAd Co", reattempt calibration until "Good Co" appears. Consider moving to an alternative position.

Setting the mode of the data interface (RS 232) for Rockwell PLGR+96 / PLGR II

The VECTOR data interface communication mode can be switched between:

- the standard PC mode
- the data output for the communication with PLGR+96 / PLGR II.

The default setting for the communication is the PLGR mode.



To change the communication settings proceed as follows:

- Press the azimuth key six times in rapid succession to engage the RS 232 setting mode. "IF SEtt" will be displayed, followed by the current setting.

- Press the distance key to browse in the menu.
- If the currently displayed setting is confirmed by a rapid six fold click with the azimuth key the setting of the RS232 communication will apply and will be stored. The stored communication mode appears in the display.
- If the setting was not stored, the signal "OLD rS" will be displayed.
- To quit without altering, wait until the display ceases.



When used with PLGR declination must be set at "0" (see page 35).

Setting the PLGR+96

- Set the tracking mode to **CONT**.
- Select the position format which corresponds to the map being used.
- Select the appropriate ELEV units.
- Select the appropriate ELEV reference.
- Select the appropriate ANG units.
- Select the appropriate ANG reference (Grid).
- Select the datum which corresponds to the map being used.



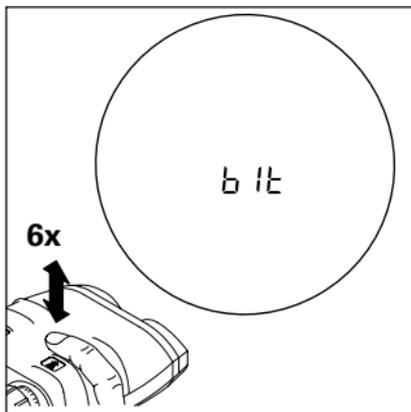
The proper datum must be selected. Improper datum selection will result in poor target position accuracy.

- Set the AUTOMATIC OFF TIMER to **OFF**.
- Set the SERIAL mode to standard.

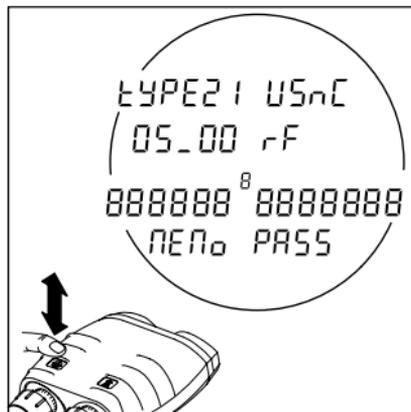


Note: Azimuth in VECTOR and Azimuth on PLGR+96 / PLGR II will be different, due to Declination Angle.

Built-in-Test



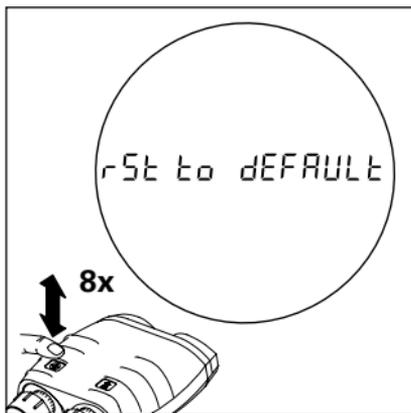
Click the distance key six times in rapid succession. "blt" appears briefly, the test procedure starts automatically.



Use the azimuth key to scroll through the list. Otherwise after some seconds it's proceeded automatically.

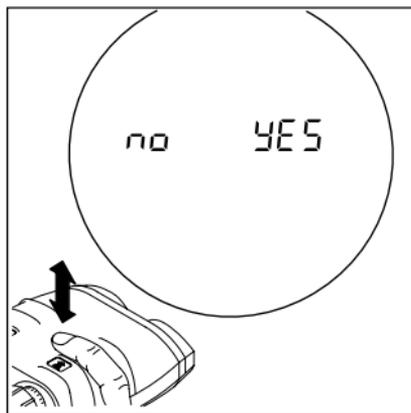
1. Software type: Type 21 USMC
2. Software version: 05.00 rF
3. All display segments on: 888888 88888888
4. Memory test: MEMO PASS / FAIL

Setting VECTOR back to factory settings



Click the azimuth key eight times in rapid succession.

"rSt to dEFAULT" is displayed followed by "no YES".

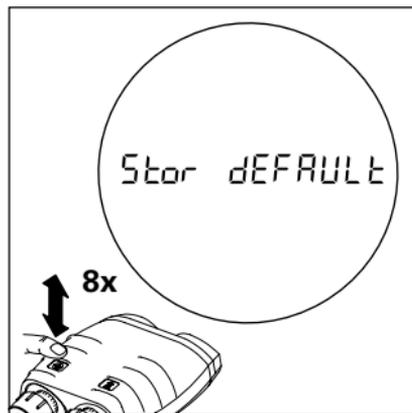


Azimuth key

- YES: allows to change back to factory settings

Distance key

- no: keeps current settings



Click the azimuth key eight times in rapid succession to set VECTOR to factory settings. "Stor dEFAULT" is displayed.

If not done correctly, the settings remain unchanged and "no CHAnGE" is displayed.

Troubleshooting

Problem	Possible cause	Solution
You cannot see a circular image with both eyes.	Eye-base or eyecup incorrectly adjusted.	Adjust the eye-base or eyecup following the instructions on page 8.
	Eyes are not positioned on the VECTOR's optical axis.	Reposition your head, or the instrument.
Measurements cannot be taken.	The battery has run out.	Replace the battery. Preferably use SANYO type.
	Battery contacts corroded.	Clean the battery contacts.
	Low temperature reduces battery performance.	Carry the VECTOR close to your body.
	Extreme heat shortens battery life.	Do not store the battery at temperatures in excess of +70°C.

Troubleshooting (continued)

Problem	Possible cause	Solution
"- - -" appears in the display when distance is measured.	<p>The distance is outside the specified measuring range.</p> <p>Measured distance lies within the distance gate.</p> <p>Inadequate reflectance:</p> <ul style="list-style-type: none">• object too small or inaccurately targeted;• The VECTOR was shaken during measurement;• Bad weather conditions (haze, fog, turbulence).	<p>See the specified measuring range on page 54.</p> <p>Reduce or turn off the range gate, following the instructions on page 33.</p> <p>See the list of factors affecting measuring range on page 10.</p>

Troubleshooting (continued)

Problem	Possible cause	Solution
Distance display blinks.	Multiple object measurement is activated: see page 12.	Click the distance key to display distances in succession (see page 12).
These symbols are displayed during azimuth measurement: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _	The permissible angle has been exceeded: tilted too far upwards tilted too far downwards tilted too far to the right tilted too far to the left	Do not over-tilt or bank the VECTOR.

Troubleshooting (continued)

Problem	Possible cause	Solution
Inaccurate azimuth measurement values.	<p>Incorrect declination value has been stored.</p> <p>Disruptive magnetic fields at the measuring position.</p> <p>Calibration in an area with magnetic interference.</p> <p>Altered magnetic conditions within the instrument after a battery change.</p>	<p>Store the correct declination value (see page 34, 35).</p> <p>See the factors affecting measurement accuracy on page 18.</p> <p>Recalibrate the compass (see pages 36– 40).</p> <p>Recalibrate the compass.</p>
The expected display does not appear after clicking a key several times.	Key was pressed too slowly, or with insufficient force.	Press and release the key in rapid succession. Always press the key down until there is an audible click.

Troubleshooting (continued)

Problem	Possible cause	Solution
The electronic pointing circle and display are not visible.	"niGT" is activated, for use with a night vision device. Dioptric is out of focus.	Select "niGT OFF" in the configuration menu (see pages 28, 29). Adjust dioptric setting
The electronic pointing circle is not visible.	"ErET OFF" is selected (for use with a glass reticle).	Select "ErET on" in the configuration menu (see pages 28, 29).
"Lo bAtt" is displayed.	The battery is used up. Reduced battery performance at low temperature.	You can still get some readings, but the battery needs to be replaced soon. You can still get some readings, but the VECTOR or the battery needs to be warmed up (e.g. on your body).

Troubleshooting (continued)

Problem	Possible cause	Solution
"niGT on" is displayed.	"niGT" is activated, for use with a night vision device but used in daylight conditions.	Select "niGT OFF" in the configuration menu (see pages 28, 29).
"GAtE on" is displayed.	"DISt GAtE" is activated.	Select an appropriate range gate (see page 33).
Compensation can not be completed.	Timing out of compensation (nothing in display). Going too far on a command	Turn / tilt farther or move faster. Turn / tilt more slowly and stop at the appropriate time.
Measurement data not being received at PLGR	Interface cable not properly connected. Combined measurement not being used. 'PC Con' selected	Adjust cable connection. Press range and azimuth buttons simultaneously. Change to 'PLGr Con'.

Safety notices

Intended purpose

The VECTOR

- is designed as a navigation aid;
- is to be used in addition to other instruments or techniques;
- must never be used as a sole navigation instrument.

Limitations of use

The VECTOR must not be used in the vicinity of sensitive electrical equipment.

All other usage limitations are mentioned in the technical specifications.

Inappropriate use

- VECTOR deployment without prior knowledge of the operating instructions and safety notices.
- Changes and modifications to the VECTOR by the customer.
- Use of third-party accessories not expressly approved by Vectronix AG.

Inappropriate use brings the risk of

- injuries;
- instrument errors;
- damage to property;
- malfunction;

Blinding hazard

- Do not look into powerful light sources with the VECTOR.
- Do not open the VECTOR. The built-in laser can cause eye injuries.

Explosion hazard

The battery must not be

- short-circuited;
- recharged;
- mechanically modified;
- placed in fire or heated above +85°C with the VECTOR.

Safety notices (continued)

Physical injury hazard

- Do not place the VECTOR on a vehicle parcel-shelf or dashboard – risk of injury when braking.
- Check the carrying strap at regular intervals, and replace it if damaged.

Environmental hazard

The VECTOR contains certain components that should be treated as hazardous waste, and must therefore be disposed of via a specialist dealer.

Deposit used batteries at a proper collection point.

Avoiding storage and transport damage

- When not in use, always keep the VECTOR in its pouch with the eyepiece protection caps fitted.
- Remove the battery prior to prolonged storage. Battery leakage can damage the VECTOR!
- Observe the permissible storage temperatures.
- Do not expose the VECTOR to strong mechanical shocks or abrupt temperature transitions during transport (moisture condensation).
- Use the pouch and transit case or equivalent packaging for shipment.

Avoiding measurement errors

- Note the factors affecting measurement accuracy (see pages 10, 18).
- Always perform test measurements after the VECTOR has been exposed to rough handling (vibration, falls, etc.), and before carrying out important measurement tasks.

Care/cleaning

The VECTOR's performance and serviceability are conditional on regular care and immediate attention to problems:

- Do not touch glass lenses with fingers.
- Do not soil the operating keys with oil or grease.
- Avoid abrupt temperature transitions, since these can cause condensation moisture to develop inside the VECTOR.

The VECTOR does not need special care or cleansers.

Therefore

- do not use any kind of impregnated cloth intended for cleaning spectacle lenses,
- do not use any solvent except water, e.g. no alcohol or cleansers.

Lens cleaning

Particles of dirt should be blown off or removed using a soft brush. Finger prints may be cleaned first by wiping with a damp cloth, followed by soft, clean optical tissue or chamois leather.

Cleaning the casing

Wipe the casing with a damp cloth.

Pay special attention to dirt and grease around the keys. Blow out the VECTOR interface cable socket, and clean it carefully.

Allow the VECTOR to dry fully before packing.

Cleaning the interface cable

Protect the cable from damp and dirt as much as possible! Wipe the cable with a damp cloth. Blow out soiled cable plugs with clean air, and leave them to dry.

Rangefinder

Laser type: IR diode	1550 nm
Eye safety	Class 1
Safety standards	IEC 60825-1 Ed 1.2: 2001-08 ANSI Z 136.1 (2000) FDA 21 CFR, Ch 1§ 1040 (1988)
Range capability	5 m - 12000 m
Specified performance	25 m - 5500 m
Visibility	10 km
Target size	2.3 x 2.3 m
Albedo	0.3
Detection probability	>90%
Accuracy (1 σ)	\pm 5 m
False alarm rate	< 2%
Beam divergence	\leq 0.4x0.7 mils
Display resolution	1 Meter / 1 foot

Technical data (continued)

Optics

Magnification	7x
with Binocular Enhancer	10x
Clear objective diameter	42 mm
Exit pupil diameter	6 mm
Eye relief	18.5 mm
Field of view @ 1000 metres	120 m
Axial resolution	better than 6 arcseconds
Interpupillary distance adjustment .	58.5-71.5 mm
Focus	fixed
Dioptric correction	> ± 5 dpt

Pointing circle illuminates to indicate laser direction and approximate laser spot size on target.

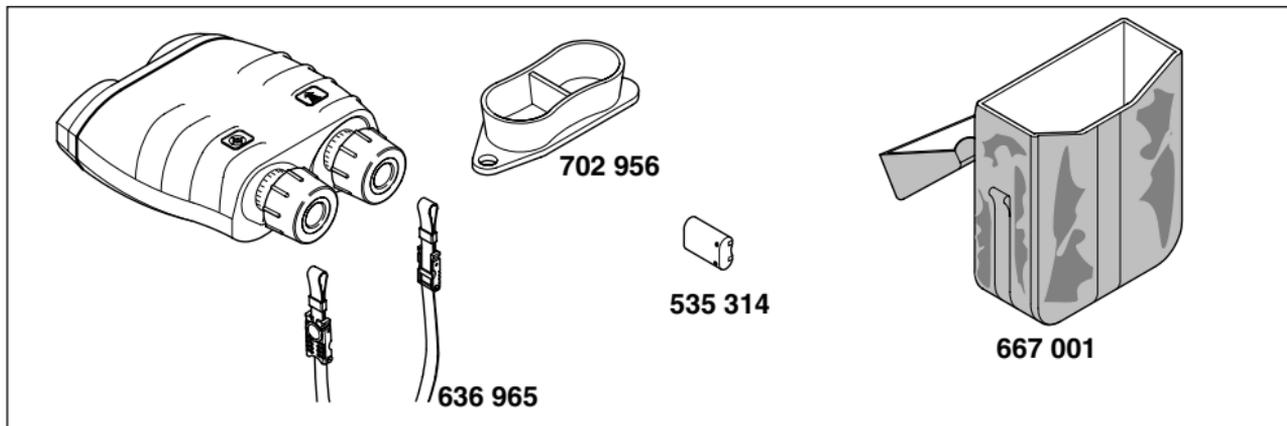
Magnetic compass (azimuth and inclination)

Azimuth measurement range	360° / 6400 mils
Accuracy (1 σ):	
Azimuth	± 10 mil
Inclination	± 3 mil
Display resolution	1° / 1 mil
Maximum inclination / bank angle	$\pm 45^\circ$
Max. update rate	120/min
Compass calibration	user initiated, menu driven
Declination	$\pm 9.9^\circ$ / 999 mil (adjustable)

Technical data (continued)

Miscellaneous

Power supply	6V lithium battery (type 2CR5)
Battery capacity	approx. 3000 measurements
Protective covering	environmentally sealed, impact-resistant rubber armour casing
Immersion proofing	10 min. in 1 m depth of water
Operational temperature range	-35° to +63°C
Storage temperature range (without battery)	-40° to +85°C
Shock resistance	30 g / 11 ms / xyz axes
Vibration resistance	10 to 500 Hz for 10 minutes
Dimensions	205 x 178 x 82 mm
Tripod bushing thread	A 1/4"
Weight	1710 g (including eyepiece protection and battery type 2CR5)
Interface	RS-232, unidirectional output

**Order no. Description**

—	VECTOR 21
535 314	SEB50 lithium battery, 6 volt, SANYO type 2CR5
636 965	STR1 neck strap
702 956	Eyepiece protection cover

Optional equipment:

667 001	SVP272 camouflage pouch with accessories
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Accessories



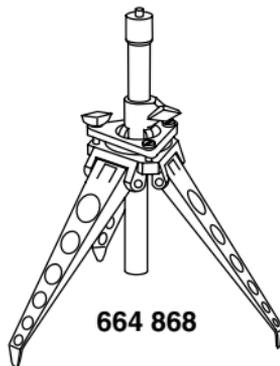
901 601



664 671



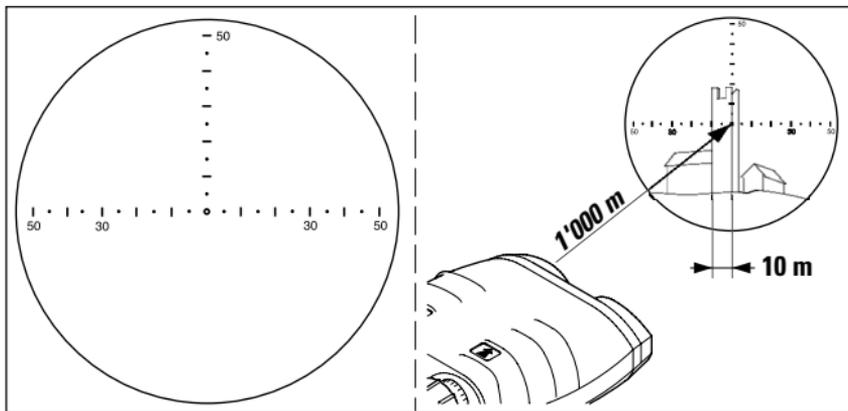
664 672



664 868

Order no.	Description
901 601	SEV73 Data cable to PLGR
664 671	SOBD1 objective cap (order 2 pcs.)
664 672	SOBD2 objective cap with glint protection (order 2 pcs.)
664 868	SST3-1 mini-tripod, non-magnetic

Reticle



Glass reticle

An engraved reticle can be used in place of the electronic pointing circle.

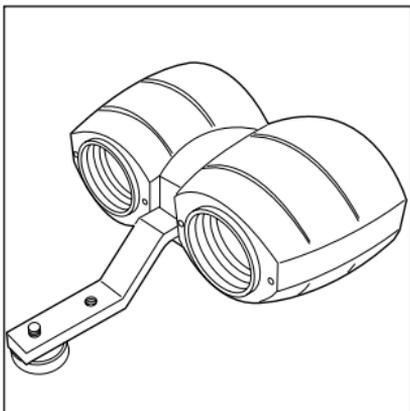
Line spacing: 10 mils

Line-point spacing: 5 mils

i 1 mil corresponds to 1 m spacing at a distance of 1 km.

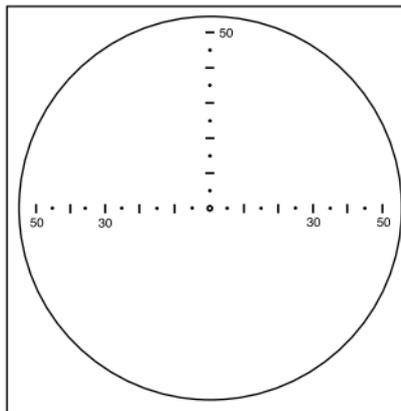
In the sample above it's 10 mil and therefore 10 m.

Reticle with Binocular Enhancer



Binocular Enhancer

- Increase in range performance up to 35% (average 25%)
- Magnification (together with VECTOR) 10x

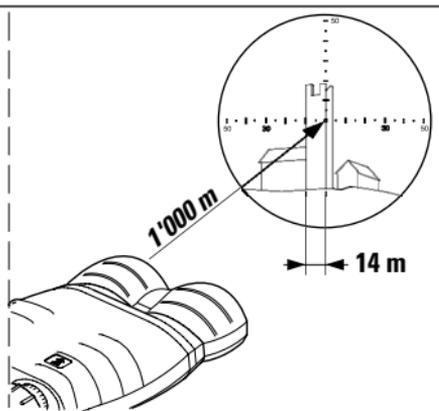


Glass reticle and Binocular Enhancer

The size factor of the glass reticle changes when used together with the Binocular Enhancer

Line spacing: 7 mils

Line-point spacing: 3.5 mils

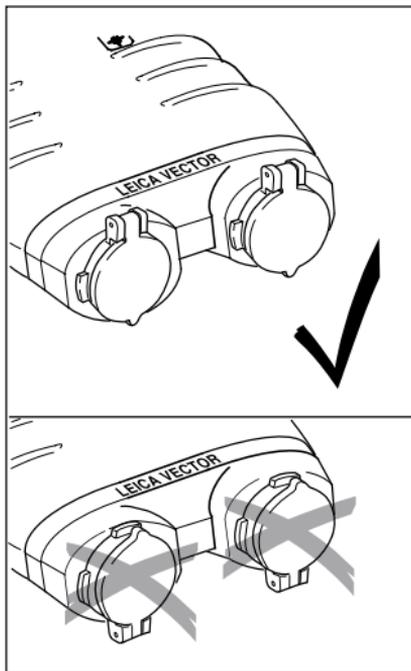


i 1 mil corresponds to 1.4 m spacing at a distance of 1 km.

In the sample above it's 10 mil and therefore 14 m.

Options

Mounting the objective cap with glint protection (SOBD2)



Our customer and information service will be glad to offer assistance if your instrument requires maintenance, if it sustains damage, or if you require any other information:

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SQS certification attests that Vectronix operates a quality management system that complies with international standards for quality and quality management systems (ISO 9001) and environmental management systems (ISO 14001).



Total Quality Management – our commitment to total customer satisfaction. Ask your local Vectronix representative for more information about our TQM programme.

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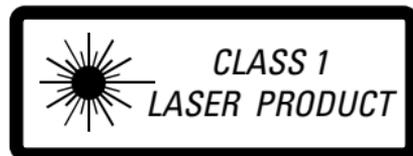
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Eye safety

IEC 60825-1 Ed 1.2 (2001-08)
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FDA 21 CFR Ch 1§ 1040 (1988)



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