

NEXO



GeoSight Sender Unit
GeoSight Meter Unit
GeoSight Laser Module



User Manual

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IMPORTANT SAFETY INSTRUCTIONS

- 1) Read these instructions.
- 2) Keep these instructions for future reference and give a copy of them to any other person who may need to use your GeoSight system.
- 3) Follow all instructions and heed all warnings.
- 4) Do not use this apparatus near water.
- 5) Clean only with dry cloth.
- 6) Do not use near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 7) Only use attachments/accessories specified by the manufacturer.
- 8) Unplug this apparatus during lightning storms or when unused for long periods of time.
- 9) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, if liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



CLASS 2 Laser. This symbol indicates potential hazard

MOST IMPORTANT – safety precautions when using laser equipment.

- NEVER look directly into the laser, even when it is switched off, as someone may activate it without warning.
- WARN others in the venue that you are going to use a laser and move them away from the target area before activating the GeoSight.
- Ensure that others do not enter the target area of the laser whilst it is in use and ensure that the meter unit is to hand at all times so that the beam can be switched off immediately if necessary.
- Use the laser for the minimum amount of time and switch off as soon as the measurement is complete. Disconnect the cable from the Meter Unit as soon as possible and ALWAYS ensure that the Meter Unit is disconnected when the public have access to the venue.
- NEVER use the laser in any other application than it is designed. DO NOT operate the laser when hand holding the Sender Unit. There are serious penalties for using a laser in any manner that may cause accident or injury.

!! Particularly it is VERY dangerous to point the laser at vehicles or aircraft !!





Other important safety issues

The GeoSight system is primarily a rigging accessory and as such requires careful handling. Use of the meter does not absolve the user from any other rigging practice or responsibility. The user must assess risk and method before using GeoSight in any given application. No liability is accepted on the part of NEXO or its agents or representatives for damage, loss or injury caused as a consequence of using GeoSight or related accessories.

- The Sender Unit must be safely attached to the loudspeaker array structure when used above 2m from ground level. DO NOT fix the Sender Unit with tape, Velcro or any other temporary fixing method.
- Always use the GeoT mounting bracket supplied or, if used in other applications, ensure that a suitable mounting fixture is provided.
- The use of GeoSight does not preclude the obligation to follow normal rigging safety procedures.
- Be aware that any object left on the top of a PA system during installation may fall when the system is operated. Always check that all accessories are secured before final hoisting.
- When making adjustments to the PA system with motor hoists always look to the system – not the Meter Unit! Check the measurement only when you are satisfied that the system has finished moving safely.
- When using the Meter Unit be aware of other rigging operations around you.
- Always follow the appropriate safety procedures for the site (including wearing the appropriate protective clothing and headgear).
- Always store the meter unit and the cable properly after use to prevent trip hazards or damage. GeoSight components are not waterproof. Take care when using them outdoors.
- As with any component of flown loudspeaker arrays, regular safety inspections are obligatory
- Take care when disposing of batteries. Never throw used batteries into fire or source of heat. Place them in a suitable waste container.
- GeoSight operates at low voltages and cannot itself give rise to electric shock HOWEVER: The Sender Unit and the Cable could come into contact with other electrical apparatus which, if faulty, could result in electrical potential being applied to the GeoSight components. For this reason always ensure that associated equipment is thoroughly tested. When using GeoSight outdoors be aware that lightning could strike the Sender Unit. Always unplug the system in case of electrical storms.

GEO SIGHT SYSTEM COMPONENTS

GeoSight SST/LST - The Sender Unit that mounts to the system bumper or rigging frame. Available as either SST (without laser module) or LST (with laser module as shown in the above photograph) the Sender Unit contains a precision solid-state inclinometer, calibration storage and a rugged housing. Mounting hardware for NEXO GeoT bumpers is included.



GeoSight MMT - The Meter Unit containing a backlit display with a two-button menu driven interface. The Meter Unit operates on 6 x AA batteries.



GeoSight LMT - optional high brightness laser module. This item can be purchased separately and fitted by the user but requires calibration (see appendix A of this manual).



GeoSight 30CT - 30m long 6-pin XLR-XLR cable that connects the Meter Unit to the Sender Unit.



PRINCIPAL FEATURES OF THE GeoSIGHT INCLINOMETER SYSTEM

- Precision angle measurement to +/- 0.05 deg. resolved to +/- 0.1 deg. displayed.
- Intelligent interpolative measurement - the final resting angle of the system is displayed within three periods of oscillation whilst the system is moving after motor hoist adjustment. This feature reduces installation time, as the user does not need to wait until the PA system comes to rest after each angle adjustment.
- Many Sender Units may be used with one Meter Unit. Calibration information is stored in the Sender Unit using non-volatile memory and remains accurate after the Meter Unit is disconnected. The Sender Unit may be re-calibrated on the fly to any angle within its range from menu controls on the meter unit, allowing adjustment of PA system elevation to be made in relative values if required.



NOTE: Observe the laser safety procedures when activating the laser

- The Sender Unit has an on-board green laser (optional) that is calibrated parallel to the Sender Unit mounting faces and switched from menu commands on the Meter Unit. Green lasers are 20 times more visible than red lasers and provide highly visible indication of the aiming of the PA system.
- Serial data connection between the Meter Unit and the Sender Unit. This enables any cable length to be used (up to 100m), as cable resistance has no influence upon the calibration of the Sender Unit.
- Rugged packaging for reliable performance and long service life. Mounting hardware for use with NEXO GeoT Tangent Array systems is included however the GeoSight may be used in many other applications with suitable accessories (not supplied).
- Integration with the GeoT rigging system providing a reliable and tour friendly precision tool.
- NEXO innovation and reliability.



INSTALLATION OF THE SENDER UNIT FOR GeoT SYSTEMS

A mounting bracket and cable adaptor is supplied for use with GeoT bumper systems. The Sender is mounted on the underside of the bumper as follows:

- Invert the GeoT bumper and support it so that it cannot topple and cause injury.

Observe that there are six pre-drilled holes in the central spine plate. These holes must be prepared by threading with an M5 tap

- Identify the front of the GeoT bumper and attach two pieces of rubber strip to the surface of the central spine plate as shown in the photograph below.

- Place the GeoSight Sender Unit with the top surface of the Sender Unit against the rubber strips and the XLR connector towards the rear of the bumper. Observe that the laser output beam passes through the holes provided in the front bumper cross-member.

- Place the mounting bracket over the Sender Unit ensuring that the mounting holes align as shown in the photograph. Note that the bracket is not symmetrical and has a front and rear orientation.

- Fix the bracket to the bumper spine plate with the 4 x M5 machine screws and shake-proof washers supplied.

- A short cable with 1 x Male chassis XLR and 1 x Female line XLR is supplied. Pass the female line plug through the XLR mounting hole in the cross-member at the rear of the GeoT bumper and again through the second hole in the inner face of the cross-member. The chassis XLR should be fitted to the bumper using the 2 x M3 nuts and bolts supplied. Access to the nuts can be made through the cut outs in the cross-member. The rubber grommet can then be fitted in the hole in the inner face of the cross-member and the line plug inserted into the socket in the rear of the Sender Unit.

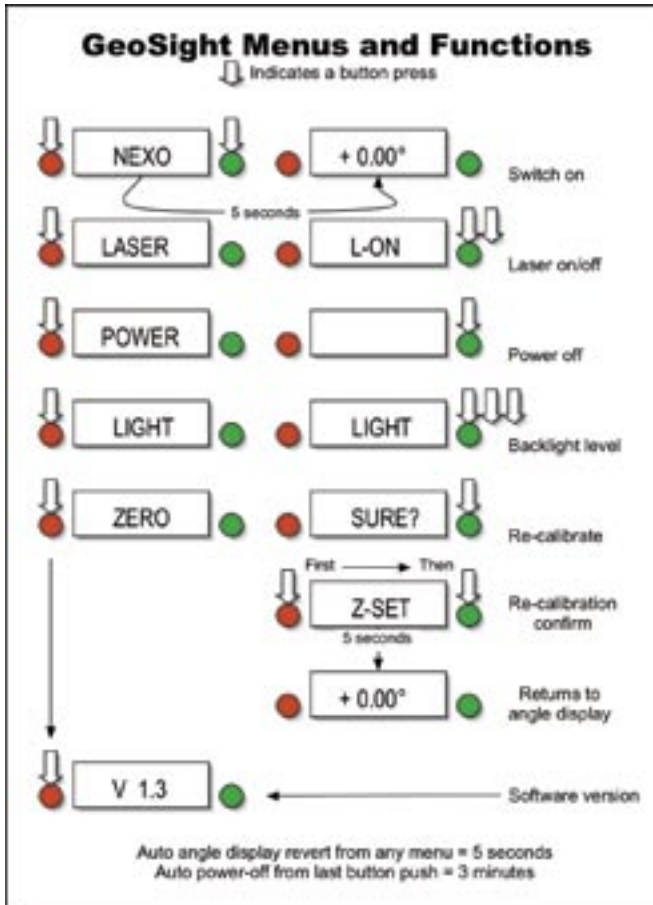
In operation the Inclinator Cable may then be easily plugged into to the rear of the bumper without requiring access to the Sender Unit itself.



USING THE GEO SIGHT INCLINOMETER SYSTEM

The Operation Menu

The GeoSight is operated from the meter unit by means of two buttons, one RED and the other GREEN. In most screens the RED button calls the menu item and the GREEN button executes the command. The diagram below illustrates the menus and button actions.



• Connect the Inclinator Cable to the Sender Unit (via the GeoT bumper socket if present) and to the Meter Unit.

NOTE: The Inclinator Cable is durable but requires the same handling precautions and strain relief that users would provide for any other flown cable.

continued overleaf



NOTE: Observe the laser safety procedures when activating the laser

- Switch on the unit by pressing the RED and the GREEN button simultaneously. The unit checks the backlight and displays 'NEXO' for approximately 5 seconds during the boot sequence. After booting the unit displays the current angle readout in degrees.

NOTE: The initial angle reading is relative to the last calibration of the unit. In order to be sure that the inclinometer measurement is correctly calibrated to the bumper the following procedure must be followed:

Sender Unit angle calibration procedure

- Place the bumper on a solid, stable surface.
- Take a good quality spirit level or calibrated digital level and place it on the top edge of the bumper.
- Pack the bumper at the front or rear as required so that the bumper is perfectly horizontal.
- Switch on the GeoSight and scroll to the 'ZERO' menu item using the RED button. Press the GREEN button and note that the display reads 'SURE?' Immediately press and HOLD the RED button and then press the GREEN button. The display reads 'Z-SET' for approximately 5 seconds whilst the calibration register is reset and the Sender Unit re-boots.
The Sender Unit is now calibrated to read $+0.00^\circ$ when the bumper is perfectly horizontal.

NOTE: It is normal for the Meter Unit display to occasionally display $\pm 0.01^\circ$ when static. This is because the GeoSight continually calculates the static angle from dynamic information and is in fact fractionally more accurate when the PA system is swinging than it is when absolutely still.

Angle display and interpolation

The GeoSight system is now ready for use and will display the computed static resting angle of the Sender Unit when the Meter Unit is active. The accuracy of the reading is a function of the number of periods of pendulum 'swing' that the PA system has undergone. As a guideline, the angle display has the following accuracy:

- 1 periods (cycles) of swing: $\pm 1.0^\circ$
- 2 periods (cycles) of swing: $\pm 0.5^\circ$
- 3 periods (cycles) of swing: $\pm 0.1^\circ$

It will be obvious that the measurement cannot be relied upon when the PA system hoists are actually being operated. Once the hoist(s) have stopped the Meter Unit display quickly resolves the measurement. A satisfactory value for the resting angle is normally displayed within a few seconds.

Limits of angle measurement

The GeoSight has a usable range of +/- 30° with full accuracy. The sensor is capable of measuring angles up to 44° but with reduced accuracy of +/- 1° at 40°. The additional range is left available to the user but should be used with caution. If extreme angles are needed outside the +/- 30° range it is preferable to mount the Sender Unit at a known angle that is closer to the target angle however this would require customised mounting hardware.

Adjusting the angle of the PA system using relative values

Once in position, the Sender Unit can if required be re-calibrated in place to relative zero by following the calibration procedure given above. This allows the PA system to be re-adjusted relative to its original elevation by reading the value of the adjustment rather than the absolute value.

In this case the user must be careful to note when the Sender Unit has been re-calibrated because its horizontal position will no longer be 0.00°. For this reason it is wise to calibrate each Sender installation before use unless you are confident that it has not been re-calibrated to some other angle.

This function may be useful when re-adjusting a system that has been installed to a known position but where the calibration state of the Sender Unit is unknown or appears to be incorrect.

Preservation of calibration data

Once the array installation is complete the Meter Unit should be disconnected from the Inclinometer Cable and can be used with other Sender Units. If subsequent adjustment of the array is required the Meter Unit may be re-connected to the Sender Unit without loss of calibration.

Notes:

OPERATING THE LASER

The laser is operated by scrolling to the LASER menu using the RED button and switching ON and OFF using the GREEN button. Note that the unit will automatically power off three minutes after the last button push.



NOTE: Observe the laser safety procedures when activating the laser

Vertical (elevation) reference

The laser is used to confirm that the upper margin of the PA system dispersion is reaching the design target. The NEXO GeoSoft array design software illustrates the position of the laser target relative to the overall system coverage (GeoSoft version 2.0 and later).



Horizontal (azimuth) reference

With correct calibration (see page 13) the laser provides an accurate azimuth reference as well as vertical. Future versions of GeoSoft will refer to the laser in reference to horizontal coverage.

Laser Visibility

The brightness of the laser is approximately 20 times that of a red laser of similar power however the actual visibility will depend on the ambient light and the colour of the surface which the laser is illuminating. The beam is quite visible when there are air particles present and the spot is visible in daylight under suitable conditions.

Take extreme care in bright ambient light conditions not to look into the laser beam whilst searching for the spot. Even though the beam may be difficult to locate the on-axis power of the beam is dangerous to eyesight in all ambient conditions.

Notes:

POWER MANAGEMENT

Automatic power off

The GeoSight Inclinometer system manages its power consumption and auto powers off 3 minutes after the last button push.

Battery condition and replacement

The Meter Unit requires 6 x AA batteries for operation (included in the shipping package). Only high performance alkaline type batteries such as Duracell MN1500 LR6 should be used.

Low battery indication: When the batteries are low the display shows ***** and the functions of the GeoSight are disabled.

To replace the batteries

- Remove the 2 x M4 countersunk machine screws in each of the side faces of the Meter Unit.
- Withdraw the inner assembly of the Meter Unit from the outer cover and place on a flat surface.
- Identify the battery bay and disconnect the PP3 type connector.
- Withdraw the battery pack from the battery bay.
- Replace the batteries being careful to observe polarity.
- Replace the battery pack and re-connect
- Replace the outer cover and re-fit the screws. Do not over tighten.



Battery Life

The LMT laser module is by far the most demanding feature of the system in terms of power consumption, followed by the backlight function and finally the inclinometer electronics. Users should expect approximately 2.5 hours continuous use of the laser for the LST version. The standard SST version without the laser has battery life in the order of 100 hours continuous use (estimated).

SERVICING

The SST/LST Sender Units, the LMT optional laser module and the MMT Meter Unit contain no user serviceable parts. Please refer to your local NEXO distributor for service.

INSTALLING AND CALIBRATING THE LMT LASER MODULE

The Sender Unit is supplied in two versions:

- GeoSight SST – standard version without the laser module
- GeoSight LST – with the optional laser module fitted

The LST version has been factory calibrated so that the laser output beam is parallel to the top face and the edge faces of the Sender housing. If the GeoSight LMT Laser Module is purchased separately it requires installation and calibration before use. Installation is simple providing that the following guidance is observed.

Installing the LMT laser module

- Remove the three countersunk machine screws from the side faces of the Sender Unit.
- Withdraw the inner chassis from the outer cover and place it on a table.
- Remove the plastic blanking plate that occupies the mounting hole for the laser. The blanking plate is located directly opposite the XLR connector.
- Carefully remove the LMT module from the packaging



NOTE: The laser module has an exposed PCB and must be treated with extreme care.

- Offer the LMT module to the inner face of the chassis ensuring that the laser bezel passes through the mounting hole. The clearance is tight to help prevent water ingress and there may be a little of the coating material causing the bezel to bind in the hole. If this is the case clean the inner edge of the hole gently with fine wet and dry paper.
- When the bezel fits correctly pass the four M3 machine screws (supplied) through the fixing holes from the outside of the chassis. Offer the bezel to the screws and start each thread in the bezel by hand.
- Spin each machine screw so that it just pinches the rubber pads on the front surface of the bezel between the bezel and the chassis. Using a suitable Allen key add a quarter turn to each screw.
- Attach the two-pin plug on the end of the flying leads of the LMT module to the socket in the Sender Unit chassis. Early models of the Sender have the socket soldered to the XLR connector. Later models have the socket mounted on the PCB.
- Replace the outer cover of the Sender Unit and refit the three fixing screws. Do not over tighten.

CALIBRATING THE LMT LASER MODULE

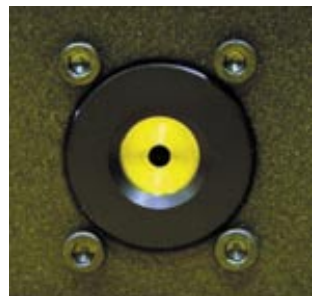
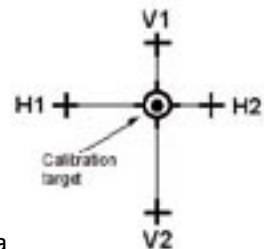
Careful calibration of the laser is required as small errors multiply to produce large errors over distance. Use the following procedure to calibrate the laser.

The Sender Unit must be placed in a position where it is registered vertically and horizontally – e.g. on a solid table with a block clamped to it as a side fence. The laser output beam should be aimed at a vertical surface at least 20m distant from the Sender Unit.



NOTE: Observe the laser safety procedures when activating the laser

- Switch on the laser and note where the laser dot falls on the vertical target surface. Make a mark on the surface at the centre of the laser dot.
- Rotate the Sender Unit 180° around the axis of the laser output beam. Ensure that the Sender Unit is firmly registered against the fence and observe the new position of the laser dot. Make a second mark at the centre of the dot and make sure that the two marks are identified for vertical orientation.
- Turn the Sender Unit through 90° and repeat the process, identifying the two laser dots marks for horizontal orientation. After following this procedure the target surface should have four marks as shown in the diagram shown right.
- Connect the marks V1 and V2 with a line and similarly the pair of marks H1 and H2. The point where the two lines coincide is the calibrated target point for the laser dot. Make a clear mark on the target surface at this point.
- With the Sender Unit firmly registered against the fence adjust the four M3 machine screws around the circumference of the laser bezel until the laser dot falls on the desired calibration mark. The adjustment is quite sensitive and more so the further the target surface is from the Sender Unit. Make only small adjustments to each of the screws and make sure that the screws are not tightened completely.
- When the calibration is completed place a drop of thread lock on each of the screw heads and label the sender unit as having been calibrated with the date and name of the person doing the work.



Calibration of the Laser will be required annually to ensure the precision of the system. It is good practice to incorporate this task with a general inspection of the system components for electrical and mechanical safety.

LIMITED 1 YEAR WARRANTY

Nexo hereby warrants that GeoSight products will be free from defects in materials and workmanship for a period of 1 year from date of purchase. This warranty EXCLUDES the following components for which no warranty is offered:

The CT30 cable
The LMT laser diode
The MN1500 batteries supplied.

The above items are either subject to unwarrantable wear and tear or have a life expectancy which is dependent upon use and treatment (i.e. the Laser Diode has an expected life of >5000 Hours but could be easily damaged or reduced in life by rough handling). In the case of a Laser Module malfunction the LMT module should be removed from the Sender Unit, carefully packed and returned to NEXO for inspection. Replacement of the Laser Module at any time is at the sole discretion of NEXO.

If you believe that the product is defective within the warranty period please return it complete to your nearest NEXO dealer who will arrange for the replacement or repair. Please keep the packaging supplied with the product for this purpose. NEXO reserves the right to replace or repair products with successful warranty claims at their discretion.

The warranty does not apply to normal wear and tear, abuse, water penetration or use in extreme environments. It does not apply in the case of unauthorised repair. All implied WARRANTIES OF MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE are hereby disclaimed and NEXO hereby disclaims liability for incidental, special or consequential damages resulting from the use or unavailability of this product.

If there is no NEXO dealer in your territory please pack the defective product(s) carefully and send them with a written explanation of the fault to:

NEXO France S.A.
154 allée des Erables
ZAC des PARIS NORD
II B.P. Roissy CDG
Cedex

Please include all of your contact information and a note of the date of purchase. NEXO will contact you upon receipt.

GEO SIGHT SPECIFICATIONS

Part No. Item Description	MMT Meter Unit	SST Standard Sender Unit	LST Sender Unit with Laser Module	LMT Laser Module Option	BST Sender Unit Mounting Bracket	30CT 30m Cable
Accessories (included)	6 x MN1500 battery			4no. M3 x 10 Cap screws	4no. M5 x 15 Cap screws	
					4no. M5 S/p washer	
					2no. Foam rubber strip	
					1no. CTL adapter	
Size Length	245mm	160mm	160mm		164mm	30m
Width	101.6mm	76.2mm	76.2mm		120mm	
Height	50.8mm	50.8mm	50.8mm		57mm	
Weight	1.20Kg	0.55Kg	0.60Kg	0.05Kg	0.45Kg	1.145Kg
Power Consumption						
Inclinometer only	-	255mW	255mW	-	-	-
Backlight on full	-	495mW	495mW	-	-	-
Laser on	-	-	1800mW	-	-	-
Battery Life (est)						
Inclinometer only	-	100 hours	100 hours	-	-	-
Backlight on full	-	50 hours	50 hours	-	-	-
Laser on	-	-	14 hours	-	-	-
Laser Class				Class 2 / IEC825		
Wavelength				532nm		
Maximum Output Power				<5 mW		
Beam Diameter (1/e2)				<1 mm		
Beam divergence				<1.4mrad		
Mean time to failure (based upon laser diode manufacturer's figures)				>5000 hours		

NEXO reserves the right to change specifications without notice.

DECLARATION OF CONFORMITY

This equipment has been tested and found to comply with the safety objectives and essential requirements of the 73/23/EEC and 89/336/EEC directives:

EN 60065 (1998) Audio, video and similar electronic apparatus - Safety requirements,

EN55103-1 (1996) Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use

– Part 1: Emission,

EN55103-2 (1996) Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use

– Part 2: Immunity.

This space is intentionally left blank for user notes:

NEXO

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