

CST/berger *AL-Series*

Electronic Self-Leveling **Rotary Laser**

models:
ALH, ALHV, ALHV-G, ALGR



ALHV(-G)



ALGR

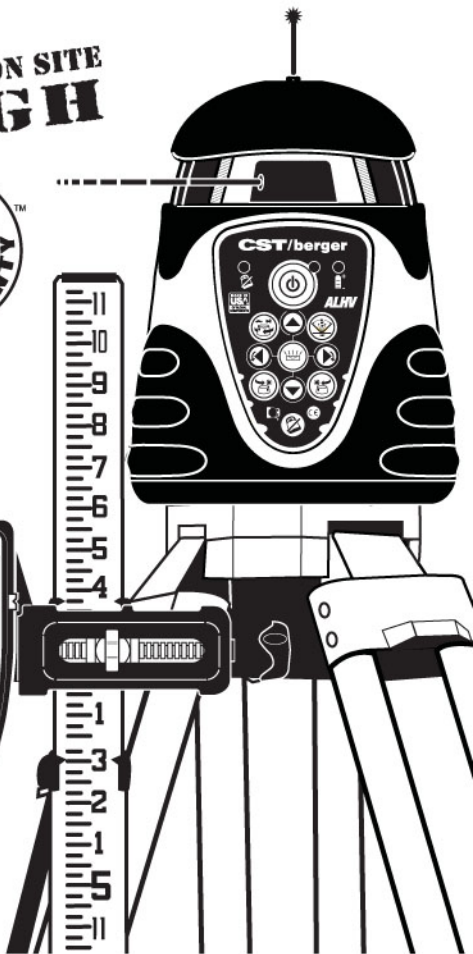


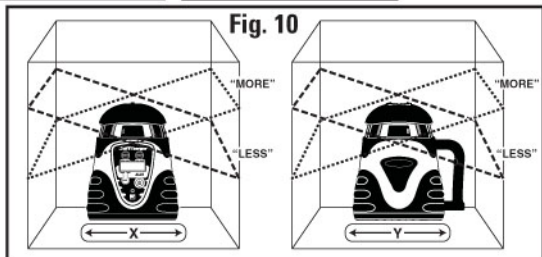
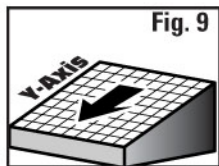
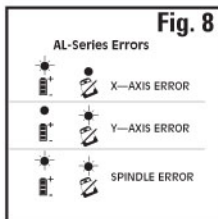
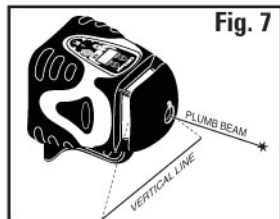
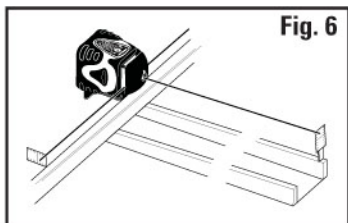
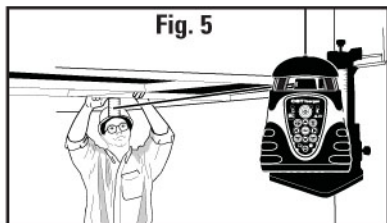
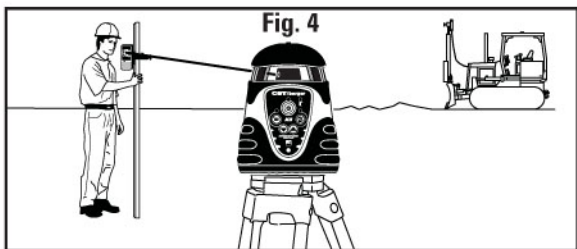
ALH

Instruction Manual

CST/berger

CONSTRUCTION SITE
TOUGH







Thank you for purchasing- the CST/berger AL-Series Automatic Electronic Self-Leveling Rotary Laser Level. Please read this manual thoroughly before operation

MODELS

ALH	ALH Visible Horizontal Beam Electronic Self-Leveling Single Slope Rotary Laser.
ALHV	ALHV Horizontal/Vertical Visible Dual-Beam Electronic Self-Leveling Dual-Slope Rotary Laser.
ALHV-G	ALHV Horizontal/Vertical Visible Dual-Green Beam Electronic Self-Leveling Rotary Laser.
ALGR	ALHVGR Horizontal/Vertical Visible Dual-Beam Electronic Self-Leveling Rotary Laser with Dual Dial-in Grade.

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SAFETY AND CERTIFICATIONS

Working safely with this instrument is possible only when the operating and safety information are read completely and the instructions contained therein are strictly followed.

The use of controls, adjustments, or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Do not stare into the laser beams. Do not direct the laser beam at other persons. Do not disassemble the instrument or attempt to perform any internal servicing. Laser class is indicated on the instrument.

Repair and servicing of this laser are to be performed only by CST/berger or authorized service centers.

This laser complies with all applicable portions of title 21 of the Code of Federal Regulations set by: the Dept. Of Health, Education, and Welfare; the Food and Drug Administration; the Center for Devices; and the Bureau of Radiological Health.

The laser has also been tested and complies with the CE certification requirements set forth in the EC regulations 89/336/EEC and EN 61000-6-1 (EN50082-1), EN 61000-6-3 (EN50081-1) and IEC 60-825-1.



LASER SAFETY



WARNING: Be sure to read and understand all instructions in this manual before using this product. Failure to follow all instructions may result in hazardous radiation exposure, electric shock, fire, and/or bodily injury.



CAUTION: Use of controls or adjustments or performance of procedures other than those specified in this manual, may result in hazardous radiation exposure.



CAUTION: The use of optical instruments with this product will increase eye hazard.

IMPORTANT: The following labels are on your laser for your convenience and safety. They indicate where the laser light is emitted by the level.

ALWAYS BE AWARE of their location when using the level.

ALWAYS make sure that any bystanders in the vicinity of use are made aware of the dangers of looking directly into the laser.

DO NOT remove or deface any warning or caution labels. Removing labels increases the risk of exposure to laser radiation.

DO NOT stare directly at the laser beam or project the laser beam directly into the eyes of others. Serious eye injury could result.

DO NOT place the laser in a position that may cause anyone to stare into the laser beam intentionally or unintentionally. Serious eye injury could result.

DO NOT use any optical instruments such as, but not limited to, telescopes or transits to view the laser beam. Serious eye injury could result.

ALWAYS remove the batteries when cleaning the laser light aperture or laser lens.

DO NOT operate the laser around children or allow children to operate the laser. Serious eye injury could result.

ALWAYS turn the laser "OFF" when not in use. Leaving the laser "ON" increases the risk of someone inadvertently staring into the laser beam.

DO NOT operate the laser in combustible areas such as in the presence of flammable liquids, gases or dust.

ALWAYS position the laser securely. Damage to the laser and/or serious injury to the user could result if the laser falls.

ALWAYS use only the accessories that are recommended by the manufacturer of your laser. Use of accessories that have been designed for use with other rotary lasers could result in serious injury.

DO NOT use this laser for any purpose other than those outlined in this manual. This could result in serious injury.

DO NOT leave laser "ON" unattended in any operating mode.

ALWAYS repair and servicing must be performed by a qualified repair facility. Repairs performed by unqualified personnel could result in serious injury.

DO NOT disassemble the laser. There are no user serviceable parts inside. Disassembling the instrument will void all warranties on the product.

DO NOT modify the product in any way.

FEATURES

**CONSTRUCTION SITE
TOUGH**



ALH









ALHV



ALHV-G



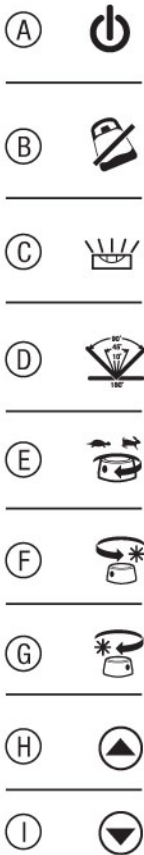
ALGR

	Exterior / Exterior / Exterior			
	Interior / Interio / Interio			
Low Battery Indicator 	✓	✓	✓	✓
Anti-Drift System 	✓	✓	✓	✓
Single Slope/Grade 	✓	✓	✓	✓
Dual Slope/Grade 		✓	✓	✓
Cross-Axis Leveling 	✓	✓	✓	
Dual-Beam 		✓	✓	✓
Scanning Angle Feature 		✓	✓	✓
Directional Head Positioning 		✓	✓	✓
Variable Speed Rotation 		✓	✓	✓
LayDown Auto-beam Positioning 		✓	✓	✓
LCD- On Board Digital Display 				✓

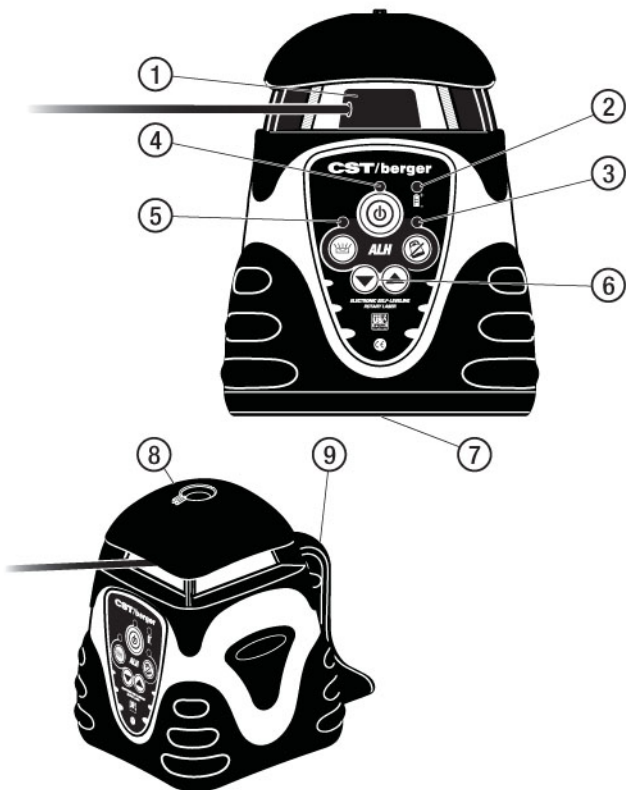
FEATURES - Fig. 1 , 2 & 3

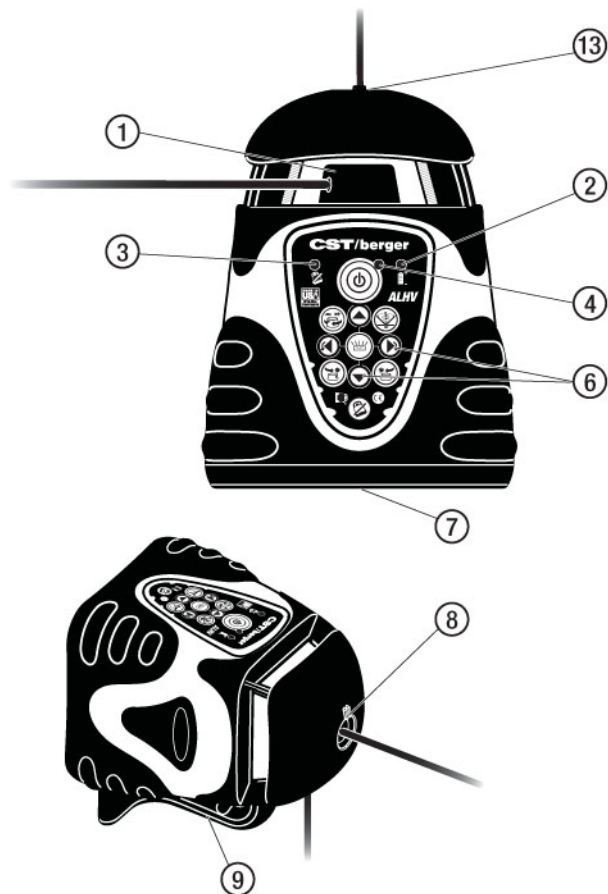
1. Self-Leveling (+/-5°) Rotating Laser Head. (With vertical visible dual-beam ALHV, ALHV-G, ALGR only)
2. Battery Low LED Indicator Light
When indicator lights reach Yellow it is time to change/recharge batteries. (ALH, ALHV, and ALHV-G only)
3. Anti-Drift System LED Indicator (ALH, ALHV, ALHV-G only)
4. Power ON/OFF LED Indicator
5. Manual Mode LED Indicator (ALH, ALHV, ALHV-G only)
6. Manual Grade Adjustment Buttons (ALH, ALHV, ALHV-G)
7. 5/8 - 11 Tripod Mounting Threads (for level work)/ Battery pack.
8. Gun Sight with "X" and "Y" Identifiers
9. Heavy-Duty Handle-(Built in Trivet for Laydown and Vertical Applications with 5/8" - 11 Thread ALHV, ALGR, and ALHV-G only)
10. Select/Adjustment Buttons (ALGR only)
11. LCD Display Panel (ALGR only)
12. Mode Selection Button (ALGR, only)
13. Vertical Beam (ALHV, ALHV-G, ALGR)

ICONS

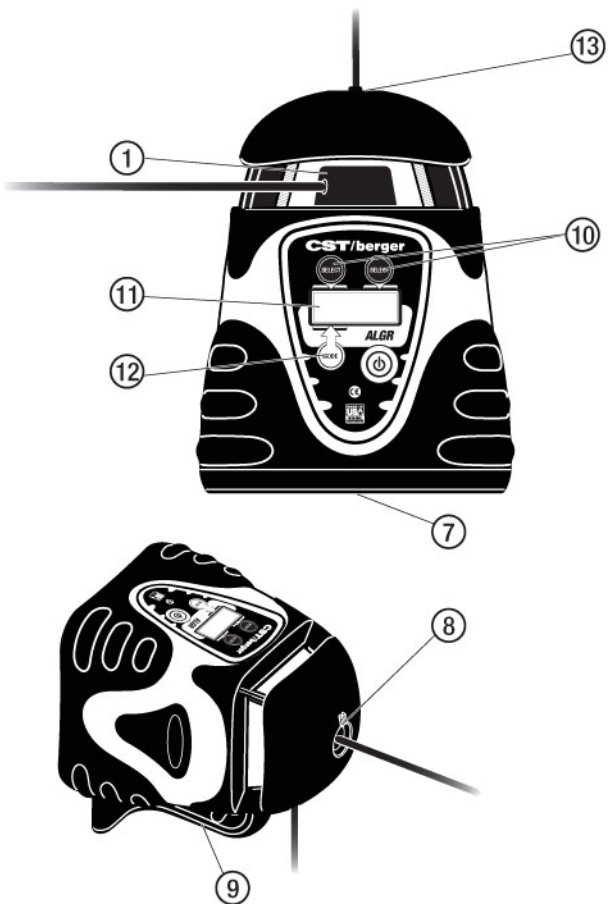


ALH Fig. 1





ALGR Fig. 3



APPLICATIONS

Professional-grade Accuracy and Durability for general construction and site preparation jobs,

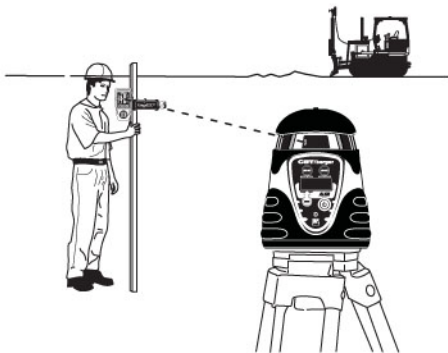
Including,

- Grading and excavation
- Porch and deck construction
- Driveway paving
- Exterior siding
- Marking elevation
- Landscaping
- Pool Installation
- Fencing
- Masonry work
- Concrete forms
- Machine control

Exterior- ALH, ALH, ALHV-G, ALGR

Interior- ALHV, ALHV-G, ALGR

- Building room addition
- Remodeling
- Walls and partitions
- Acoustical ceilings



Benchmark.

NOTE: Setup a Benchmark

During the work day, periodically check your initial set-up to ensure that the laser reference has not moved.

Establish, at a suitable distance (furthest possible), a benchmark (reference) on a stable surface (ie. tree, building). Periodically during the work day, check the benchmark to ensure that your setup has not moved.



Operating Instructions for General Construction Applications

NOTE: A level plane of laser light is created by the rotating beam of the laser. The laser light can be used to reference elevations with the use of a laser detector. (Fig. 4)

1. Place the instrument on a flat, level surface such as a tripod. Setup the instrument in an area where it can not be obstructed and is set at a convenient height.
2. Press the **(A)** button. Allow the instrument to self-level.
3. Setup a "Benchmark" .
4. ALHV, ALHV-G ALGR Only – Set the Variable Speed Rotation (page 14) to the desired rotation speed of the laser head. Ideal speed for use with laser detector is 600 RPM.
5. Take elevation readings using the plane of laser light as a reference. Follow the Detector Operation Procedures in this manual.

Ceiling Grid Applications

1. Attach the laser to the optional wall-mount bracket. Be sure the control buttons are facing outward. Tightening the locking screw will secure the instrument to the bracket.
2. After installing the first piece of ceiling trim, attach the wall-mount to it. Be sure the wall-mount is secure to the trim.
3. Press the **(A)** button. Allow the instrument to self-level.
4. Adjust the distance of the instrument from the grid, typically 1.5-inch (38mm) below the grid. Loosen the adjustment screw and slide the instrument up/down on the wall mount. When the desired height has been reached, tighten the adjustment screw to secure the instrument.
5. Setup a "Benchmark" (page 11).
6. Install the ceiling grid. Attach the magnetic laser target to the ceiling trim being installed. Adjust the height of the trim until the laser beam strikes the target.(Fig. 5)

Laydown Applications (ALHV, ALHV-G, ALGR)

1. Place the instrument in the laydown position on a flat, level surface.
2. Press the **(A)** button. Allow the instrument to self-level.(Fig. 6)
3. Setup a "Benchmark" (page 11).

OPERATION

Remove the laser from its carrying case. The instrument is shipped with a battery current protection insert, which must be removed before operation.

NOTE: All ALH and ALHV(-G) instruments are shipped with ADS on as the default setting. This setting can be changed by the user (see Anti-Drift System - ADS, page 16).

NOTE: ALGR instruments will default to Grade Mode when the instrument is turned on. The Mode button is used for both selecting between the X-axis and Y-axis for setting grade and exiting the Grade Mode (see Grade Mode — Dual or Single Axis Grade). Press and release the Mode button to select between the X-axis and Y-axis when setting grade. To exit the Grade Mode, press and hold the Mode button for 4 to 5 seconds, then release. This will bring up the Mode Select Menu. The user can now toggle to other menu options. Pressing the Mode button for 4 to 5 seconds and releasing is only required to exit the Grade Mode.

Leveling

- 1: The instrument can stand alone on a level, sturdy surface or preferably secured to a 5/8-11 surveyor's tripod.
- 2: Press the **(A)** button once, and allow time (up to 60 seconds) for the instrument to self-level.

NOTE: The laser head may begin to rotate before leveling is complete. The self-leveling speed is approximately 1° per 4 seconds.

- 3: After self-leveling, the instrument will begin operating in Rotation Mode.

NOTE: The ALHV,ALHV-G will return to last mode of operation (i.e. sweep, spot, or rotation speed); however, does not retain grade information.

NOTE: After self-leveling, the instrument will begin operating in Rotation Mode for ALH, last selected mode of operation (i.e. Sweep, Spot, Rotation Mode) for ALHV, ALHV-G, and Grade Mode for ALGR.

Cross Axis Leveling (Models ALHV, ALHV-G)

NOTE: ADS must be off to enable cross-axis leveling.

1. Press the Manual mode **(C)** button once to enable cross-axis leveling. The instrument will level in the x-axis only. The manual grade can be set in the y-axis only.
2. Press the Manual mode **(C)** button again to shut off the cross-axis leveling and to place the instrument into Manual mode.

NOTE: When the ADS is off, the remote Mode button will place the instrument in cross-axis leveling with the first press and in Manual mode with the second press.

Plumbing / Lay-Down (Models ALHV, and ALHV-G)

1. On a flat surface, place the instrument on its back using the built-in trivet (control panel facing upward). (Fig. 7)
2. Press the **(A)** button once, and allow time for the instrument to self-level.

NOTE: When the Instrument is placed in the laydown position, the ADS button **(B)** becomes the Auto Beam Positioning button.

- Press the Auto Beam Positioning (**B**) button; the laser beam will plumb down over point. (Reference Only).
- Use the clockwise (**F**) and counter-clockwise (**G**) buttons for fine adjustment. Plumbing / Lay-Down (Models ALHV, ALHV-G and ALGR)

NOTE: For fine adjustment of the vertical laser plane or of the 90° beam, please refer to "Line Position"

NOTE: For fine adjustment of the vertical laser plane or of the 90° beam, please refer to "Line Position"

Variable Rotation Mode (Models ALHV, ALHV-G, and ALGR)

The rotation mode will give you the option of increasing or decreasing the speed of the rotating laser. This feature can be used to create a room-wide, 360° height reference or vertical plumb line for general alignment, drop ceiling installation, and more.

model ALHV, ALHV-G

Pressing the (**E**) button, will adjust the speed from 600, 300, 150, and 0 RPM.



model ALGR

Using the SELECT buttons, adjust the rotation speed in increments of 50 RPM; lowest possible speed is 100 RPM and the highest is 1000 RPM.

Sweep or Scanning Mode (Models ALHV, ALHV-G, and ALGR)

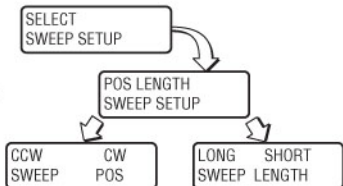
Instead of creating a room-wide reference line, the Sweep (Scanning) Mode creates a shorter, brighter laser "chalk line" that can be used for leveling or plumbing doors, windows, fixtures, and more. You may also use this feature to keep the instrument from interfering with other lasers and detectors on site.

model ALHV, and ALHV-G

Pressing the (**D**) button, will lengthen or shorten the sweep of the laser beam. Preset angles of 10°, 45°, 90°, 180° and spot can be set. Position the sweep area by using the (**F**) or (**G**) buttons.

model ALGR

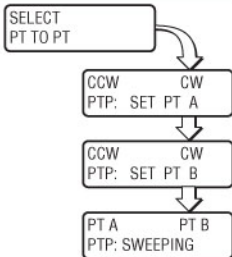
Using the MODE button to enter the "POSITION" option, and use the SELECT buttons to position the sweep clockwise or ccw. Press the MODE button to return to SWEEP SETUP. Use the right SELECT button to enter the "LENGTH" option and use the corresponding SELECT buttons to lengthen or shorten the sweep of the laser beam to the appropriate length for your application. The sweep can be as long as 359° or as short as 3°. The last sweep setup entered remains in memory and will be recalled.



Point-to-Point Mode (Model ALGR)

Similar to the Sweep Setup mode, the Point-To-Point Mode allows you to create a laser “chalk line”, sweeping between any two positions you specify.

Use the left SELECT button to enter the “PTP: SET PT A” option, and use the SELECT buttons to rotate the position of the start point clockwise or counterclockwise. Press the MODE button to enter the “PTP: SET PT B” option, and use the SELECT buttons to rotate the position of the end point clockwise or counterclockwise. Press the MODE button to begin the sweeping action between the two points. You may use the SELECT buttons to readjust the position of each point if needed.



NOTE: In Sweep or Point-to-Point Mode, the selected sweep area will not be exact. The laser will vary slightly from the selected points.

Spot Mode (Models ALHV, ALHV-G, ALGR)

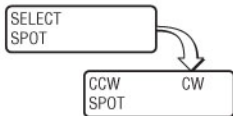
Spot Mode creates a motionless laser dot for reference, allowing the instrument to be used as a straight-line laser.

model ALHV,ALHV-G

Press the (E) button until the instrument is in Spot Mode. Press the (F) or (G) to rotate the laser head clockwise or counter-clockwise. Pressing and holding the (G) or (F) button moves the rotating beam more quickly.

model ALGR

Use the SELECT buttons to rotate the position of the dot clockwise or counterclockwise.



Re-Leveling (Models ALH, ALHV,)

If the instrument is bumped or moved, the instrument will automatically attempt to re-level itself. On a job site, it may be necessary to prevent re-leveling in order to prevent inaccurate measurements by the operator. The Anti-Drift System (ADS) is used for this purpose (see Anti-Drift System - ADS). The instrument can also be placed in Manual Mode to allow the instrument to continue operating when out of level.

Axis Drive Error (Models ALH, ALHV,)

If the instrument is set up or tipped beyond its self-leveling range of $\pm 5^\circ$, the laser head will initially attempt to level; however, when the self-leveling limit is reached, an error will indicate an axis error (Fig. 8).

Turn the instrument OFF, move the instrument to a more level position, then turn the instrument on again.

Model ALGR

The display shows “X TOO STEEP or Y TOO STEEP” Turn the instrument OFF, move the instrument to a more level position, then turn the instrument on again.

If the instrument continues to produce errors, contact CST/berger-Customer Service.

Spindle Motor Error

Models ALH, ALHV, ALHV-G

If the laser spindle motor fails to rotate or rotates outside of the set speed, an error indicator will indicate a spindle motor error (Fig. 8). If this occurs, see “Troubleshooting”.

Model ALGR

The display shows “Spindle Motor Error”.

If the instrument continues to produce errors, contact CST/berger-Customer Service.

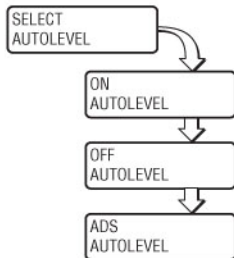
Auto Level Mode (Model ALGR)

The Auto Level Mode allows you to control how the instrument reacts when moved out of level.

Model ALGR

Auto Level Mode can be ON, OFF, or ADS. If Auto Level Mode is set to ON, the instrument will re-level if the instrument is moved out of level.

If Auto Level Mode is set to OFF, the instrument will NOT re-level if the instrument is moved out of level, and will continue to operate; use this option when using an adapter or mount that allows you to tilt the instrument to create a diagonal laser line. Use the left SELECT button to turn the Auto Level option ON or OFF. You may also put the level into ADS Mode (see Anti-Drift System- ADS).



Anti-Drift System – ADS (All Models)

The Anti-Drift System, when ON, will signal to the operator that the instrument has been moved out of level. The laser head will stop rotating, and the beam and ADS LED will blink in the models ALH, ALHV; in the model ALGR the display will show “CONT UNIT UNLEVEL”.

Models ALHV, ALHV-G, and ALH

The default setting for ADS is user selectable. The default setting may be set to ADS ON or ADS OFF. When the instrument is OFF, press and hold the (B) button, and then press the (A) button. Once the instrument is on, turn the instrument off for 15 sec and then back on. If ADS was ON (OFF), it will now be OFF (ON).

To activate ADS, turn off the Manual Mode (if it is ON), by pressing (C) and then press the ADS (B) button. If after 1 minute, the instrument is disturbed and the ADS light is flashing it is necessary to check any bench marks that have been made and ensure the proper "HI" (Height of Instrument). After the flashing ADS has been reset, by pressing the button one time, you will have an additional minute to set and check your measurements.

To turn ADS off press the (B) button once. This will put the instrument into normal Auto Self-Leveling mode.

Model ALGR

This function is prompted through the Auto Level Mode; it clearly signals the user when the instrument is moved out of level. Turn ADS on by selecting it in Auto Level Mode and using the MODE button to return to your desired mode. If ADS is turned on, when the instrument is moved out of level, the laser head will stop rotating and the beam will blink. The operator must use the right SELECT button to select the "CONTinue" option.



The default setting for ADS is user selectable. When the instrument is OFF, press and hold the right SELECT button and then press the ON/OFF (A) button. Once the instrument is on, turn the instrument off for 15 sec and then back on. This will toggle the default setting for Auto Level Mode between ADS and on.

Manual Grade Mode – Single Axis Grade (Model ALH & ALHV (-G))

The single grade function is ideal for general site grading, checking excavations, landscaping and drainage, and more. (Fig. 9)

The selected grade can be as much as a positive or negative 10%, and set in reference to the Y axis of the instrument, noted by the embossed printing on the case.

Model ALH

Manual grade mode can be activated by placing the automatic leveling sensor in the OFF position.

NOTE: The ADS must be deactivated to use the Manual Select button.

Pressing the (C) button will deactivate the level sensor. Using the (H) ("MORE") and (I) ("LESS") arrow buttons, adjust to your desired grade. Rotating head tilts on the Y axis.

NOTE: If the instrument is bumped or moved while in Manual Grade mode, the instrument will not re-level itself.

The instrument will react to "MORE" and "LESS" input. Allow the instrument ample time to react to the input provided, between grade setups or changes. (Fig. 10)

Manual Grade Mode-Dual Axis Grade (Models ALHV, ALHV-G)

Manual mode disengages the leveling feature, allowing the instrument to be placed in any position to grade.

To activate the Manual Mode, Turn off the ADS (if it is on) and then press the (C) button twice to enter Manual Grade Mode. (Note: If the button is pressed only once it will enter Cross Axis Leveling Mode (page13)) (Note: The instrument should be level and rotating before entering manual mode to eliminate the possibility of error.) Once the button has been pressed the Manual Mode Indicator Light will blink. Press the (C) button again to return to normal operation.

NOTE: When returning to normal operation the instrument must be within its leveling range. Re-set the instrument to a level position before pressing the (C) button to the off position.

NOTE: (Model ALHV, ALHV-G) Once the instrument is in manual mode, the remote can be used to set a slope in the Y-axis by pressing the UP(H) or DOWN (L) button, or X-axis by pressing the remote LEFT or RIGHT Arrow Button.

Grade Mode – Dual or Single Axis Grade (Model ALGR)

The dual grade function allows more specialized site preparations such as road grading, airport jobs (grading & paving), irrigation, trenching, landfills, slopes and embankments, and pipe laying. (Fig.11)

The Dual Grade Mode screen is the default screen when the instrument is turned on. Use the MODE button to choose either the X axis or Y axis. An > on the display will indicate the selected axis. Press the left SELECT button to increase slope, press the right SELECT button to decrease slope. Ideally for single axis grade, use the Y axis in order to use the top mounted sight to orient the instrument to your target, as well as locate the high and low positions within the arc. While grade on both axes is set to zero, the instrument will continue to self-level. Percentage of grade can be selected at any time while in this mode. However, the instrument will not go to the desired grade until the instrument has leveled.

+	>X	0.00%	-
	Y	0.00%	

Allow the instrument ample time to react to the input provided. Refer to examples in (Fig. 12) to predict your results.

To exit Grade Mode, press and hold the MODE button for 4 to 5 seconds. When the button is released, the MODE select menu is available. (it is not necessary to press and hold the MODE button to exit any other mode).

NOTE: The total percent grade possible is from a perfectly level base position. If the instrument is mounted on a tripod head which is not perfectly level, then the grade percentage range capability would be reduced by the slope of the base, as this affects the tilt range of the laser head. For maximum grade range, ensure a level tripod head using a spirit level before mounting your instrument.

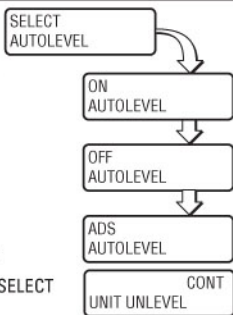
FOR ALL GRADE LASERS: For greater accuracy in grade applications, precisely level the laser level before entering into GRADE MODE.

FOR ALGR: If the instrument can't achieve desired grade it will give an error message "GRADE TOO STEEP"

Anti-Drift in Grade Mode (Models ALGR)

The Auto Level Mode can be set to ADS while instrument is in Grade Mode. ADS will protect against accidental bumps or settling of the instrument that could cause errors. If the instrument has been setup to default to Auto Level ADS at startup, the Grade Mode ADS is already on. If the instrument has not been set up to default to Auto Level ADS at startup, enter the Auto Level Mode and selecting ADS. Return to Grade Mode after selecting ADS. ADS will only be active as long as one axis is set to zero percent grade (Single Axis Grade). ADS will not be active while in Dual Axis Grade. ADS is automatically disabled for 30 seconds whenever a new set point is entered for the grade axis.

In Grade Mode, when the instrument is moved out of grade level, the laser head will stop rotation and the beam will blink to indicate to the operator that the HI of the instrument may have changed. To continue, the operator must acknowledge by pressing the right SELECT button to select the "CONTINUE" option.



NOTE: If movement occurs in only the grade axis, ADS may not indicate movement since the movement is being detected by the non-grade (level) axis. However, in a real world application, both the grade and level axis will likely move.

Line Position Mode (Model ALHV, ALHV-G and ALGR)

In this mode, the instrument allows you to fine-tune the location of your vertical (plumb) laser line. For example, if you've established a plumb line and find that the line is slightly off to the left or right of your target, use Line Position to jog the line into place without moving the entire instrument (useful for floor and wall tile installation, walls or partitions, etc.). The laser will now remain aligned to your target even if you enter other modes (Rotation, Spot, Point-to-Point)

model ALHV, ALHV-G

Line Position mode is available when the instrument is placed in the plumbing position (control panel facing upward). While the instrument is in the plumbing position, it can be used in Rotation, Sweep or Spot mode. To enter the Line Position mode and position the laser reference point the instrument must be rotating. Use the (F) or (G) buttons to position the laser reference point while the instrument is rotating (Fig. 13). If the instrument is in Spot or Sweeping mode the (F) and (G) buttons are used to move the spot or sweep clockwise and counterclockwise, as they do when the laser is in the upright position.

NOTE: The LEFT and RIGHT buttons of the RC700 Remote can be used to position the reference line regardless of the instrument being in Rotation, Spot, or Sweep Mode.

If in manual mode, the LEFT and RIGHT buttons will position the reference line and the UP and DOWN buttons will move the vertical line up and down

model ALGR

Line Position mode is available when your instrument is placed in the plumbing position (control panel facing upward). While the instrument is in the plumbing position, it can be used in Rotation, Spot, or Point-to-Point mode. To enter Line Position mode, use the Mode button to go to the Line Position option and press select. The instrument will rotate at the last rotation speed selected. Press the SELECT buttons to move the position of the laser reference point clockwise (right) or counterclockwise (left) into perfect alignment with your target. (Fig.14)



REPLACING BATTERY

For models ALH, ALHV, and ALHV-G if the battery is low, the LED will be illuminating on the front of the instrument.

For model ALGR, if the battery is low, the LCD will display "ERROR BATTERY LOW".

If the instrument operates erratically, try replacing the batteries. (Fig.15)

1. Remove the battery tray by unscrewing the plastic nut around the mounting thread on the bottom of the instrument.
2. Remove the old batteries and replace with 4 new "D" cell Alkaline batteries.
3. Replace the battery tray. Make sure the battery contacts between the battery pack and the instrument compartment are aligned.

NOTE: Extreme temperatures and the use of batteries with different levels of charge can reduce the operating time of the instrument. Always use batteries with the same power rating and from the same manufacturer. For the proper disposal of the used batteries, see the section "Environmental Protection".

ELECTRICAL SAFETY PROCEDURES



WARNING: Batteries can explode or leak, and can cause injury or fire. To reduce this risk:

ALWAYS follow all instructions and warnings on the battery label and package.

DO NOT short any battery terminals.

DO NOT charge alkaline batteries.

DO NOT mix old and new batteries. Replace all of them at the same time with new batteries of the same brand and type.

DO NOT mix battery chemistries.

DISPOSE of batteries per local code.

DO NOT dispose of batteries in fire.

KEEP batteries out of reach of children.

REMOVE batteries if the device will not be used for several months.

Rechargeable Battery Pack

If you are using a rechargeable battery pack (Cat #57-NMB700), your instrument will provide approximately 14 hours of intermittent use with each full charge. The batteries will begin to perform optimally after five full charges and discharges. You may charge the battery pack within the instrument.

Ensure the power is off, and connect the charging plug to the appropriate charging jack on the bottom of the battery pack. Then plug the charger into the appropriate 120/230V AC outlet. Charge time is typically around 8 hours. The instrument can be charged and used at the same time, but only a minimal charge will be applied to the battery pack.

CALIBRATION

Your ALHV Series Self-Leveling Laser is a sealed instrument and is calibrated to precise accuracies at the factory. However, a calibration check is recommended before the initial use of your laser, and then periodically from that point forward. Be sure to allow time (up to 60 seconds) for the instrument to completely self-level before each check.

Upright Position Peg Test – X axis (All models)

1. To test the X axis, mount the laser on a tripod or a level, sturdy surface and place 100 feet (30m) away from a wall. Face the “X+” side of the instrument to the wall (Fig. 16).
2. Press the **(A)** button and allow the instrument to self-level. Using the laser detector, locate and mark the position of the laser line on the wall Position (A).
3. Loosen the instrument from the tripod and rotate the instrument 180°. Ensure that the height of the tripod does not change, as this will affect your results. Secure and re-level the instrument.
4. Again, using the laser detector, locate and mark the position of the laser on the wall (Position (B)).
5. Mark the centerline between Position A and Position B (Position (C)). Calibration is necessary if the vertical difference between Position A and Position C or Position B and Position C is greater than the specified accuracy.

Repeat the above steps to ensure a correct reading. If the distance is greater than specified accuracy, you will need to calibrate the X axis.

NOTE: For ALHV, ALHV-G, and ALGR Spot Mode can be used without detector if designed

Upright Position Calibration– X axis

model ALH (Fig.16)

1. Power On the instrument with the **(A)** button while holding the **(C)** button down, then release the **(A)** button. You will know if Calibration Mode is activated when the Manual Mode and Anti-Drift LEDs flash alternately. Then, the Manual Mode LED will remain lit; this indicates that the instrument is calibrating within the X axis.(Fig. 17)
2. The **(H)**and **(I)** buttons change the axis increments. The **(H)** button will produce a positive (+) increment.

NOTE: for ALH Pressing the **(C)** button will toggle between X and Y axis for calibration. Manual LED on indicates X- axis is selected.

3. You must raise or lower the beam to center between positions A and B (position C) on the target. The instrument will react to “+” and “-” input within the X+ quadrant. The instrument DOES NOT react to adjustments until the instrument is forced to re-level (i.e. rotate and re-check point (A)).
If B is below A, increase the increment (+).
If B is above A, decrease the increment (-).
4. The adjustments are automatically saved.

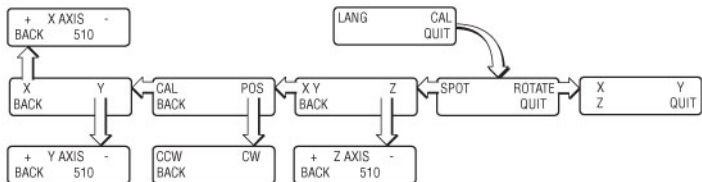
You must now repeat the peg test to insure you have made the correct calibration. A peg test can be done in Calibration Mode.

model ALHV, ALHV-G

1. Power On the instrument while holding the **(C)** button. You will know if Calibration Mode is activated when the Manual Mode and Anti-Drift LEDs flash alternately.
2. The **(C)** and **(E)** button change the X-axis increments. The **(C)** button will produce a positive (+) increment (the **(D)** and **(F)** will change the Y-axis. And the **(D)** button will produce a positive (+) for Y). (Fig.17)
3. You must raise or lower the beam to center between positions A and B on the target. The instrument will react to "+" and "-" input within the X+ quadrant. The instrument **DOES NOT** react to adjustments until the instrument is forced to re-level (i.e. rotate and re-check point A).
If B is below A, increase the increment (+).
If B is above A, decrease the increment (-).
4. The adjustments are automatically saved.

You must now repeat the peg test to insure you have made the correct calibration. A peg test can be done in Calibration Mode.

model ALGR



1. Power ON the instrument while holding the MODE button down.
2. Release both buttons at the same time and wait for calibration instructions to appear on screen. You will have to select the direction of calibration change.
3. Use the right SELECT button, following the chart, to access the X axis for calibration . Please record the three-digit number that appears in the LCD the first time you enter the axis calibration menu; this number is the factory setting (i.e. 510), to which you can return if necessary (this number may vary anywhere between 430 and 590).

You must raise or lower the beam to center between positions A and B(Position C) on the wall. The instrument will react to "+" and "-" input within the X+ quadrant.

- If B is below A, increase the number ("+").
- If B is above A, decrease the number ("-").
4. Press the MODE Button to exit the X axis calibration menu, and save any changes to the calibration settings by turning off the instrument ("QUIT").

You must now repeat the peg test to insure you have made the correct calibration. A peg test can be done in Calibration Mode.

NOTE: It is necessary that a time gap of 30 seconds is allowed for the instrument to change its position.

If B is below A, increase the increment (+).

If B is above A, decrease the increment (-).

- The adjustments are automatically saved when the ON/OFF button is pressed.
- You must now repeat the peg test to insure you have made the correct calibration. A peg test can be done in Calibration Mode.

Upright Position Peg Test and Calibration – Y axis (All models)

To test the Y axis, mount the instrument on a tripod and place approximately 100 feet (30m) away from the target, with the control side (Y+ quadrant) facing the target (Fig. 18); follow steps 2 thru 4 of "Upright Position Peg Test – X axis". Calibrate as in "Upright Position Calibration – X axis", choosing the Y axis to calibrate and adjusting "+" and "-" input as necessary within the Y+ quadrant.

Note: In the model ALH, in order to calibrate the Y axis, when the Manual and ADS LED's flash to indicate that you entered the Calibration Mode, press the Manual button in order to turn off the corresponding LED.

If you are unable to calibrate the instrument, or if the difference between positions A and B is too great to calibrate within the numerical range of 430 to 590, please contact CST/berger or an authorized service center for assistance.

Laydown Position Peg Test – Z axis (ALHV, ALHV-G, ALGR only)

- To test the Z axis, place the instrument on its back using the built-in trivet (control panel facing upward), 100 feet (30m) from a wall on a flat, level surface.
- Hang a plumb line down the wall at least 8 feet long (2,5 m).
- Press the (A) button ("POWER" in the ALGR) and allow the instrument to self-level. If necessary, adjust the rotation speed to easily view the laser beam on the wall. Orient the instrument parallel to the wall and attempt to align with your plumb line. (Fig.19)

If the laser line does not align with the plumb line, then calibration is necessary.

Laydown Position Calibration – Z axis (ALHV, ALHV-G, & ALGR only)

Keep the instrument in its current position. Power OFF the instrument.

model ALHV, and ALHV-G

- Power ON the instrument while holding the (C) button down. You will know if Calibration Mode is activated when the Manual Mode and Anti-Drift LEDs flash alternately.
- The (D) and (F) button change the axis increments. The (D) button will produce a positive (+) increment.
- Select the (D) button to rotate the laser beam counterclockwise, or the (F) button to rotate the laser beam clockwise into alignment with your plumb line.(Fig. 19) For example, the beam must rotate counterclockwise to align with the plumb line, so you must select the (D) button.
- The adjustments are automatically saved.

model ALGR

1. Power ON the instrument while holding the MODE button down.
2. Release the two buttons at the same time and wait until calibration instructions appear on screen. Use the right SELECT button, following the chart You find in "Calibration of the X axis". To access the Z axis press MODE. Please record the three-digit number that appears in the LCD the first time you enter the axis calibration menu; this number is the factory setting (i.e. 510), to which you can return if necessary (this number may vary anywhere between 430 and 590).
3. Select "+" to rotate the laser beam counterclockwise, or "-" to rotate the laser beam clockwise into alignment with your plumb line. For example, the beam must rotate counterclockwise to align with the plumb line, so you must select "+".
4. Press the MODE Button to exit the Z axis calibration menu, and save any changes to the calibration settings by turning off the instrument ("QUIT").

You must now repeat the peg test to insure you have made the correct calibration. A peg test can be done in Calibration Mode.

MAINTENANCE AND CARE

Always clean the instrument after use. Use a soft, dry cloth to remove any dirt or moisture from the instrument. Do not use benzene, paint thinner, or other solvents to clean the instrument. Store the instrument in its case when not in use. Batteries should be removed before long-term storage.

ENVIRONMENTAL PROTECTION

Recycle raw materials instead of disposing as waste. The machine, accessories and packaging should be sorted for environmental-friendly recycling. Do not throw used batteries into waste, fire or water but dispose of in an environmentally friendly manner according to the applicable legal regulations.



Rechargeable Battery Pack: For maximum battery life, the battery pack must contain a full charge. Properly charged, the battery pack will begin to perform optimally after five full charges and discharges.

Instrument does not rotate or self-level, or produces "Error" messages: Ensure that the instrument is within its self-leveling range. Reset the internal processor by turning power off, wait 15 seconds and power the instrument on again. If the instrument rotates but does not self-level, be sure that Auto Level Mode is NOT set to OFF on Model ALGR, or that Manual Mode is not selected for Models ALH, ALHV, and ALHV-G.

If troubleshooting is not effective, please contact CST/berger or an authorized service center for assistance.

SPECIFICATIONS

ALH ALHV ALGR ALHV-G

Laser Diode:	650 nm, 5mW	635 nm, 10mW	532 nm	
Beam Type:	Red Visible Laser		Green Visible Laser	
Horizontal Accuracy: at 100-FT. (30m)	± 1/16-in. (1.6mm)			
Vertical Accuracy: at 100-FT. (30m)	N/A	± 1/8-in. (3mm)		
Leveling Type:	Electronic Self-Leveling (up to ±5°)			
Range: with laser detector	Up to 2800 ft (850m) diameter		Up to 1200 ft (366m) diameter	
Slope/Grade Capability:	Single-Slope (cross-axis)	Dual-Slope (cross-axis)	Dual Dial-in Grade	Dual-Slope (cross-axis)
Battery Power:	Alkaline	60± Hours Intermittent Use		25± Hrs
	NI-MH	30± Hours Intermittent Use		15± Hrs
Rotation Speed: RPM	Fixed 600	Variable 0, 150, 300, 600	Variable 0 - 1000	Variable 0, 150, 300, 600
Weight: Laser Only	5.5 ± lbs. (2.5kg) with batteries			
Dimensions:	8" Height x 6-1/4" Width x 6-3/8" Depth			
Scanning Feature:	No	Yes		
Operating Temperature:	-4° F to 120°F (-18°C to 49°C)		32°F to +104°F	
Warranty:	Three-Year			
Environment:	IP67			

TROUBLESHOOTING

The following information lists basic tests that can be performed to check the ALHV Series in the event of poor performance.

Check Your Batteries: One of the most common causes of performance failures is due to defective or incorrectly installed batteries. Check to see if any batteries are installed backwards and correct if necessary.

- Never selectively replace batteries; always replace all of the batteries at the same time with new batteries. Batteries should be checked with a voltmeter or battery tester to confirm proper voltage.
- Leaky batteries may have damaged the battery contacts in the battery box.
- Check to see that the battery tray is screwed tightly onto the base of the instrument. Also, the fit between the battery prongs and the batteries may need adjustment, as this fit may vary over different brands of battery (especially Energizer™ brand, as they are larger in diameter, preventing a proper connection).
- Alkaline batteries are recommended for the best performance and storage life. Rechargeable batteries such as Nickel-Cadmium will provide performance, but are not as desirable due to their lower terminal voltage. Low cost standard Carbon-Zinc batteries may be used in emergencies, but they should be replaced with alkaline batteries when available.

WARRANTY

Three Year Warranty. CST/berger, warrants this electronic measuring tool against deficiencies in material and workmanship for a period of two years from the date of purchase. Deficient products will be repaired or replaced at CST/berger's option. Proof of purchase is required.

For warranty and repair information, contact:

Your Local Distributor, or CST/berger.

For U.S., before returning the instrument to CST/berger, please call (815) 432-9200 for a Return Authorization Number from our Customer Service Department.

This Warranty does not cover deficiencies caused by accidental damage, wear and tear, use other than in accordance with the manufacturer's instructions or repair or alteration of this product not authorized by CST/berger.

Repair or replacement under this Warranty does not affect the expiry date of the Warranty. To the extent permitted by law, CST/berger shall not be liable under this Warranty for indirect or consequential loss resulting from deficiencies in this product.

Agents of CST/berger cannot change this warranty. This Warranty may not be varied without the authorization of CST/berger.

IMPORTANT NOTE: The customer is responsible for the correct use and care of the instrument. Moreover he is completely responsible for checking the job along its prosecution, and therefore for the calibration of the instrument. Calibration and care are not covered by warranty.

Subject to change without notice.

ELECTRONIC LASER DETECTOR

Introduction

The CST/berger Electronic Laser Detector aids in locating and targeting a visible or invisible beam emitted by a rotary laser; perfect for use in outdoor conditions, where sunlight and distance may make locating the beam more difficult.

The laser detector LD-440 includes a rod clamp which allows to mount the detector onto square, round or oval sighting rods.

Features (Fig. 20)

1. LCD readout window	10. On-Grade LED
2. Speaker	11. Strobe Shield™ Sensor
3. Beam capture window	LCD Display
4. Power ON/OFF	12. High Beam
5. Beam resolution	13. Low Beam
6. Volume OFF/SOFT/LOUD	14. Speaker Volume
7. LCD readout window	15. Beam Resolution
8. Battery door	16. Level Beam
9. Heavy Duty Magnets	17. Battery Strength

Power

Two AA batteries will provide up to 3 months of typical usage. When the instrument is turned on and the low battery symbol remains lit, the battery should be replaced.

Operation— Laser Detector

- 1: Mount the instrument onto a sighting rod if you are using one. Turn on the instrument by pressing the ON/OFF pad. The LCD symbols will momentarily flash and the “coarse” beam indicator symbol will remain lit and the audio signal will be on. (Fig. 21)
- 2: Expose the beam capture window of the laser detector towards the direction of the rotating laser.
- 3: Slowly move the laser detector in an upward and downward direction until the LCD beam indicator arrows appear and/or a pulsing audio signal is heard. Use the Beam Resolution feature to choose between the coarse/low setting, used for approximating level or for initial locating of the center level point, the medium setting, used for greater accuracy, and the fine/high setting, used for the most accurate pinpointing of level.
- 4: Move the detector upward when the low beam indicator light is lit (with volume on, a slow pulsing audio tone is heard). Move the detector downward when the high beam indicator arrow is lit (with volume on, a rapid pulsing audio tone is heard). When the beam is level, the level beam indicator line will be lit and a solid audio tone will be heard.

If the detector is not struck by a laser beam after 5-8 minutes, the detector will automatically shut itself off to preserve battery life. Turn the instrument back on using the power button.

Special Features— Laser Detector

The laser detectors have a unique memory feature, which preserves the last position of the laser beam if the detector is moved out of the plane of laser light (for a brief moment (~5-6sec.)), as well as built in electronic filtering for bright sunlight and electromagnetic interference. Three distinct audio tones (high, on-grade, and low) assist targeting from a distance.

Strobe Shield™ Protection

The **Strobe Shield™** Protection feature is useful in jobsites where there is moving construction equipment with flashing strobe lights. This feature effectively prevents interference of the strobe light with accurate detection of the laser beam. Proper function of feature requires the protection sensor (Fig. 20 #11) to be revealed at all times.

The detector LD-440 has three speaker selections (Off, Loud (105dBA) and Louder (125+ dBA)).

Audio Volume Control

Pressing the volume button (Fig. 20 #6) causes the unit to cycle through volume off, soft volume, loud volume. After each press, the speaker will beep once to acknowledge the button press then beep again to demonstrate the volume level. When the volume is off, there will be one short beep. When the volume is soft, there will be a short beep followed by a longer beep. When the volume is loud, there will be a short beep followed by a loud longer beep. The audio frequency can be selected between four distinct tones. To change tones, hold the volume button (Fig. 20 #6) and press the power button (Fig. 20 #4). The unit will switch to the next tone and then beep to acknowledge frequency and volume setting as above.

The LCD display of the detector LD-440 has seven distinct channels of information, indicating the position of the detector in the plane of laser light.

As you move the detector closer to the center, the arrows fill in to indicate the laser position (Fig. 22).

On Grade LED indicators

The On-Grade LED display is useful when detecting the position of the laser from a distance (emulates the LCD) or in low light conditions. The lower LED indicates that the detector is TOO LOW and must be moved up. The upper LED indicates that the detector is TOO HIGH and must be moved down. The center ON-GRADE LED indicates that the detector is level with the laser.

To increase battery life, the LED display can be disabled. To do so, hold the bandwidth button (Fig. 20 #5) and press the power button (Fig. 20 #4). All three LEDs will flutter and if the LEDs remain on for one second the LEDs are enabled, otherwise they are disabled. The On-Grade LED display is useful as another means to visually see the position of the detector essentially emulating the LCD with a display more visible from a distance or in low light conditions. The lower LED indicates that the detector is too low and must be moved up. The upper LED indicates that the detector is too high and must be moved down. The center LED indicates that the detector is level with the laser. To increase battery life, the LED display can be disabled. To disable, hold the bandwidth button (Fig. 20 #5) and press the power button (Fig. 20 #4). All three LEDs will flutter and if the LEDs remain on for one second the LEDs are enabled, otherwise they are disabled.

NOTE: The loudest frequency is the highest frequency

Care of Your Electronic Laser Detector

This instrument is gasket sealed for water and dust protection. Use a soft, dry cloth to remove any dirt or moisture from the instrument before storage. Do not use benzene, paint thinner, or other solvents to clean the instrument. Remove batteries before long-term storage of the instrument.

Specifications

Description	LD-440 / LD440-G
Dimensions:	6.6" h x 3" w x 1" d (169mm x 76mm x 25mm)
Weight:	10 oz. (275g)
Range:	Up to 1000' (305m)
Beam Detection Sensitivity:	Fine +/- 0,75 mm Medium +/- 1,5 mm Coarse,+/- 3 mm
(sensitivity based on standard conditions with most lasers; may vary slightly due to make,manufacturer, beam size, or working conditions)	
Readout:	LCD, front and rear windows
Power:	Two AA batteries; provides 3 months of typical usage
Warranty:	1 year (For warranty conditions see "Warranty")

REMOTE CONTROL

RC700 Remote Control Operation (Fig. 23) - For models ALHV, and ALHV-G only

This section covers the use of the remote control (Cat. #57-RC700). The remote controls all the functions except power, ADS, and calibration features, with a range of up to 100 feet (30m). Requires 2 'AA' Alkaline batteries.

NOTE: When using the remote in Line Position Mode, the LEFT and RIGHT buttons can be used to position the reference line regardless of the instrument being in Rotation, Spot, or Sweep Mode.

- (1) Variable Rotation** – places instrument in Rotation Mode and adjusts to preset rotational speeds.
- (2) Left Arrow and (3) Right Arrow**– Line positioning in laydown position and Grade Adjustment X-Axis – Only in manual mode.
- (4) Up Arrow and (5) Down Arrow**- Grade Adjustment Y-Axis- Only in manual mode / When in laydown position, grade adjustment of the leveling axis (Only in Manual Mode).
- (6) CCW and (7) CW** – positions the laser in Spot and Sweep modes.
- (8) Scan/Sweep Mode** – places instrument in Scan/Sweep Mode and adjusts to preset angles.
- (9) Manual** – Places the instrument in manual grade if ADS is not selected. In laydown position, allows manual adjustment of the laser.
- (10) Sleep** – places the instrument into a "Sleep" mode by shutting down all functions except front panel LEDs. Pressing any other remote button will put the instrument back into its last mode of operation. The instrument will shut off after 2 hours if no other remote button is pressed.

RC400X Remote Control Operation (Fig. 24) - For model ALGR only

This section covers the use of the optional remote control (Cat. #57-RC400X). The remote controls all functions except power, ADS, and calibration features, with a range of up to 100 feet (30m). Requires two AA Alkaline batteries.

(1) The **"Mode"** button must be depressed every time the user wants to change the action performed. For example: if the user wants to change from rotation to spot mode, the user must press the "Mode" button and then either the "Counter-Clockwise" or "Clockwise" button to initiate spot mode.

The (2) **"CCW"** and (3) **"CW"** buttons will activate spot mode and move the spot "CCW" and "CW". They perform the same CCW and CW movement for the instrument while in sweep mode as well.

Pressing the (4) **"Up"** or (5) **"Down"** button after pressing the "Mode" button will start the rotary head speed at the last RPM setting (the RPM setting defaults to 600 RPM at startup). The "Up" and "Down" buttons will now incrementally increase or decrease the rotary head speed. Once in Grade Mode, the "Down" and "Up" buttons will decrement/increment the Y-axis grade respectively.

The (6) **"Long"** and (7) **"Short"** buttons activates the sweep function. The "Long" button elongates the sweep and the "Short" button shortens it. The "CCW" and "CW" buttons moves the sweep line either CCW or CW, as mentioned previously.

The (8) **"PtoP"** button activates the point-to-point mode after the "Mode" button has been depressed. Use the "CCW" or "CW" buttons to set the first end point, then depress the "PtoP" button. Again use the "CCW" or "CW" buttons to set the second end point, then depress the "PtoP" button: the instrument will start to sweep between the two set endpoints. Use the "CCW" or "CW" buttons to move the laser spot CCW or CW.

Pressing the (9) **LEFT** or (10) **RIGHT** button after pressing the MODE button will put the instrument into Grade Mode. Once in Grade Mode, the LEFT and RIGHT buttons will decrement/increment the X-axis Grade respectively.

Laser Head Positioning- Vertical Laydown Mode The "Left" and "Right" buttons position the laser reference point when the instrument is in the plumbing position (control panel facing upward) in all modes of operation (rotate, spot, and sweep). (Only used with instruments equipped with the vertical laydown feature.)

Please refer to Operation Section of the manual for complete operating instructions.