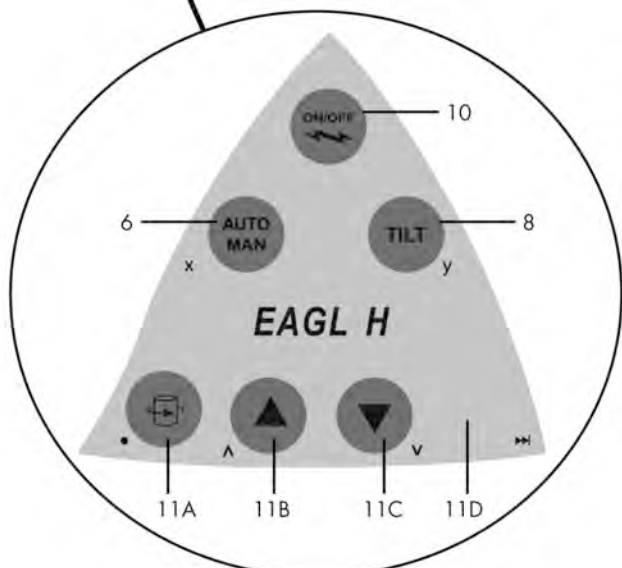


AGL

EAGL H & H+

Owner's manual





Two models are described in this manual, the EAGL H and H+. Some sections apply only to the EAGL H+. Although either product is very simple to use, we recommend that you read this manual before operating the laser.

1. General information

1.1 Description

The EAGL H and H+ laser levels are automatically self-leveling in horizontal. They have a visible laser beam for use indoors, and can be used outdoors with the included detector. They also have manual grade for slope matching.

The EAGL H+ has these additional features:

- Plumb beam
- Vertical mode, with semi-automatic leveling, for squaring and short range vertical work

CAUTION

The EAGL H and H+ are Class 3R lasers, manufactured to comply with the international rules of safety IEC 60825-1, 2001. Although the power of the emission of the beam does not exceed 5 mW in Class 3R, the following cautions are recommended:

- Do not stare directly at the beam
- Do not set up the laser at eye level

A. CDRH warning label for USA



B. Aperture label

AVOID EXPOSURE. LASER LIGHT
IS EMITTED FROM THIS APERTURE

CLASS 3R LASER PRODUCT
WAVE LENGTH 630-680 nm
MAX. OUTPUT POWER: 5mW
LASER LIGHT: AVOID DIRECT EYE EXPOSURE
CONFORMS TO IEC 60825-1; 2001
COMPLIES WITH 21 CFR 1040.10 AND 1040.11
EXCEPT FOR DEVIATIONS
PURSUANT TO LASER NOTICE NO. 50
DATED JULY 26, 2001
AGL, 2202 Redmond Road
Jacksonville, AR 72076



1.2 Specifications

Recommended use (diameter)	
Horizontal mode	1,000 ft. (300 m) with detector
Vertical mode (H+ only)	130 ft. (40 m)
Leveling accuracy	$\pm 3/32"$ at 100 ft. (± 7.5 mm at 100 m)
Accuracy (H+ in vertical)	$1/8"$ at 35 ft. (3 mm/10 m)
Self-leveling range	$\pm 10\%$
10% slope match	Manual in both X & Y axes; also, semi-automatic mode with Y in automatic, X in manual
Laser diode	<5mW, Class 3R, 635 nm
Power	2 alkaline batteries (D or LR20) NICAD Rechargeable battery pack
Charging time	16 hours
Battery life	Alkaline batteries: 160 hours Battery pack: 40 hours
Operating temperature	14° to 122° F (-10° to 50° C)
Dimensions	6" x 6.3" x 6.7" (15 x 16 x 17 cm)
Weight	3 lbs. (1.3 kg)
Rotation speed	0, 90, 600 rpm
Environmental	IP54 for water and dust resistance

1.3 Laser and keypad overview

See inside front cover for photos corresponding to these callouts.

EAGL H

1. Rotating head
2. Rotating laser beam aperture
3. Batteries (rechargeable or alkaline)
4. Jack for battery charger (on rechargeable models)
5. 5/8" - 11 tripod mount
6. Automatic / Manual mode
7. Tilt (H.I. Alert) LED
8. Tilt (H.I. Alert)
9. Battery low light/Indicates remote signal received
10. On/Off

- 11A. Rotation speed
- 11B. Beam up for matching slope or calibration
- 11C. Beam down for matching slope or calibration
- 11D. Change calibration axis

EAGL H+

- 12. Plumb or square beam aperture
- 13. Arrow (align with 90° index mark)
- 14. 90° index mark (one of four)
- 15. Adjustable foot
- 16. Retractable feet
- 17. Vial for vertical setup
- 18. Capture window for remote control
- 19. Cap with axis alignment points

2. How to use your EAGL H laser

The laser does a self-test when turned on. The beam blinks while the laser is self-leveling. After it has leveled, the head will start to rotate.

2.1 Horizontal Setup

1. The EAGL H can be used directly on the ground or on a standard 5/8" - 11 tripod.
2. Press the On / Off key to switch the laser on. It will start its automatic leveling.
3. To select H.I. Alert, press the Tilt key (8). The H.I. Alert function will be active 30 seconds after the laser has finished its self-leveling. See Section 2.3 for more information.
4. To turn the laser off, press On / Off key.

2.2 Vertical Setup (EAGL H+ only)

The EAGL H+ is equipped with semi-automatic leveling. This means that you can put the EAGL H+ roughly in vertical position but there is the need to level it accurately with the use of the keypad on the laser or the LS50R laser receiver / remote control.

2.2.1 How to use the semi-automatic leveling

Put the EAGL H+ in vertical position by using the retractable feet on the laser or with use of a mount. Find the leveling indication LEDs near the handle. You will notice that at least one of the LEDs will start blinking.

If LED A is blinking

Press on the "UP" key on the EAGL H+ keypad (located on the bottom of the laser keypad). If you use a LS50R Receiver / Remote be sure not to have the receiver on and press the "UP" symbol.

If LED C is blinking

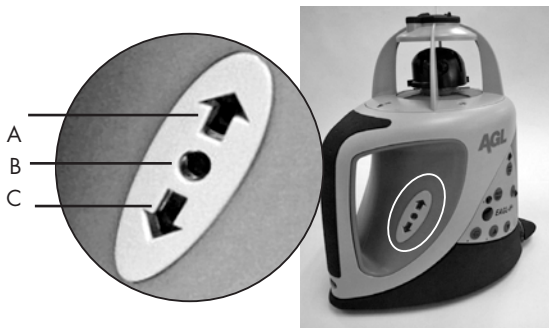
Press on the "DOWN" key on the EAGL H+ keypad (located on the bottom of the laser keypad). If you use a LS50R Receiver / Remote be sure not to have the receiver on and press the "DOWN" symbol.

If LED B is continuously on

The EAGL H+ is leveled correctly.

If LED B is continuously on but LED A or B is blinking at the same time, the EAGL H+ is close to level.

Level the EAGL H+ correctly using the above mentioned description.



2.3 H.I. Alert (Tilt) mode

The H.I. Alert feature stops the laser automatically if the laser is disturbed, preventing inaccurate readings. It functions only when selected.

To activate this safeguard feature, press the Tilt key (8) after turning the laser on. The LED next to it will blink rapidly while the laser is self-leveling.

About 30 seconds after the head starts to rotate, the LED will blink slowly, indicating the H.I. Alert is activated.

If the laser is disturbed while in H.I. Alert mode, the head will stop rotating, the beam will turn off, and the LED indicator will be on continuously.

Turn the laser off and turn it on again. Check to see if the beam elevation has changed from its original benchmark position.

The laser is no longer in H.I. Alert mode. Press Tilt to return to H.I. Alert.

CAUTION: The Tilt function is not available in vertical mode on the EAGL H+.

2.4 Rotation speed

There are 3 rotation settings: 0, 90 and 600 rpm (the default speed). To change to 90 rpm, press (11A). Press again to stop rotation. The laser beam is more visible at the slower speed. It's

also possible to stop the rotation and use the beam as a point to view at a greater distance.

2.5 Matching slope (manual grade)

The laser can be used to match manual slope on both X and Y axes. Two modes are available:

- Complete manual mode: X and Y axis will be both manual
- Semi-automatic mode: Y in automatic / X in manual

• Semi-automatic mode

1. Set the laser over a start point. Turn the laser so that X on the top of the housing faces away from the direction of the slope (and the laser keypad faces the slope). Sight along the two alignment points on the top cap to roughly align the X axis of the laser to the second point.
2. After turning the laser on and allowing it to self-level, hold the Auto/Man key for a few seconds until the LED next to it is lit continually. The laser is in manual mode in X axis and automatic self-leveling mode in Y axis.
3. Press **▲** on the keypad to match a positive slope in X and **▼** to set a negative slope; the Y axis will stay level.
4. Press twice on the Auto/Man key to return to the automatic mode.

• Manual Mode

1. Set the laser over a start point. Turn the laser so that X on the top of the housing faces away from the direction of the slope (and the laser keypad faces the slope). Sight along the two alignment points on the top cap to roughly align the X axis of the laser to the second point.
2. After turning the laser on and allowing it to self-level, press the Auto/Man key. The LED next to it will blink, indicating you're in manual mode and can match slope in the X axis. The head will start rotating.
3. Press **▲** on the keypad to match a positive slope in X and **▼** to set a negative slope.
4. To switch to the Y axis, press the Tilt key. Both X and Y LEDs will blink, indicating you're in manual mode and can match slope in the Y axis.

Note: The Y axis grade will be at a 90 degree angle from the X axis grade output.

5. Press **▲** or **▼** on the keypad to match slope in Y.
6. Press the Auto/Man key to return to automatic mode.

CAUTION: In manual mode, the beam rotates, even if the laser is not leveled. The H.I. Alert (Tilt) function is not available when the unit is in manual mode.

2.6 Power

2.6.1 Installing alkaline batteries

1. To install alkaline batteries in your EAGL H laser, use a coin to unscrew the battery cap located near the bottom of the instrument.
2. Remove the battery pack.
3. Insert two alkaline batteries (D or LR20). Orient them per the battery outlines in the inside of the battery pack (to match polarity).
4. Put the battery back into its place and tighten the screw. Your EAGL H is ready for use.

To replace batteries

1. When battery power is low, the battery light blinks but the laser still works. If the battery continues to run down, the laser stops completely.
2. Always replace both batteries at the same time.

2.6.2 Using rechargeable batteries

First-time use

If your EAGL H is equipped with an optional rechargeable battery, you must charge it for 16 hours before first use.

1. Insert the charger plug into the jack located on the battery pack.
2. Plug the charger into an electrical outlet (110 volts or 220 volts, depending on charger and country).
3. Charge for 16 hours.

Later recharges

The EAGL H can be charged while working. If electricity is available on the job site, simply plug in the charger and keep on working. You can also remove the battery pack to charge it, and replace with the alkaline battery compartment to keep on working.

For optimum life of the battery, it is recommended to charge the battery after fully discharged. To assure battery life, do not charge over 20 hours.

The battery and the charger can be damaged if damp. Always store and charge your instrument in a dry and covered place.

3. Care and handling

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

1. The EAGL H is a precision instrument, which must be handled with care. Avoid shock and vibrations. Always store and transport the laser and accessories in the carrying case.
2. Although weather resistant, you must always keep your laser and its accessories dry and clean after using. This will increase the battery life.
3. Do not store your laser at temperatures below -4°F (-20°C) or above 176°F (80°C) because the electronic components could be damaged.
4. Do not store your instrument in its case if the instrument or the case is wet, to avoid water condensation inside the instrument.
5. To maintain the precision of your laser, check and adjust it regularly.
6. Keep the aperture lens clean. Use a soft cloth and glass cleaner.
7. Please make sure to charge the batteries only when they are out of power or becoming so. Recharging batteries that are still useable will shorten their capacity.

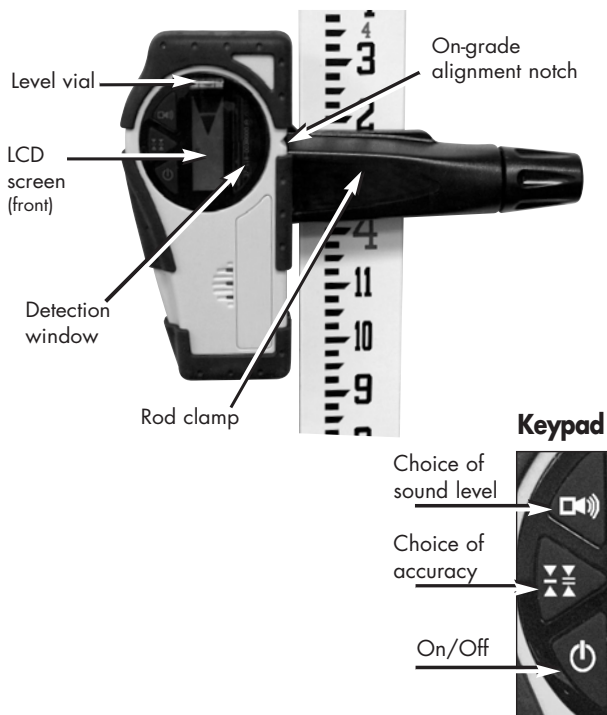
4. Warranty

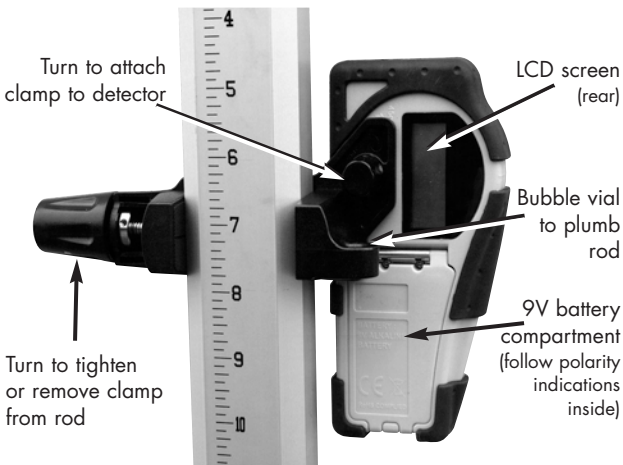
The EAGL H laser comes with a two-year warranty (in North America, one year, with warranty to two years with online or mail-in registration within 45 days of purchase).

More information can be found at: www.agl-lasers.com

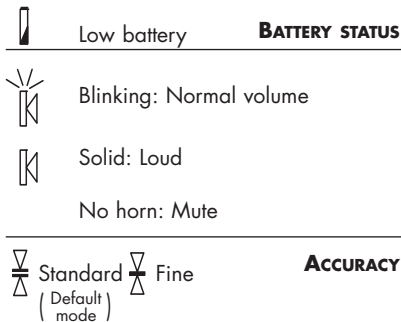
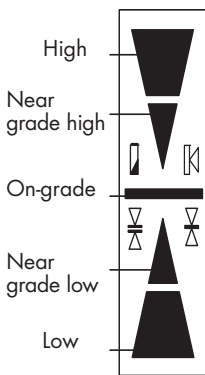
5. Accessories

5.1 LS50 Detector for grade rods or handheld applications





• LCD Display



• Using the detector

1. Press the On/Off key to turn on the detector.
2. Press the middle key to select the accuracy (deadband).
3. Press the top key to select the sound level.
4. Turn the detection window towards the laser beam, and

move the detector up or down according to the information given on the LCD display. There are 5 channels of information, or grade indicators.

A down arrow indicates you must move the detector down to reach the laser reference; an up arrow, move it up. When a horizontal line appears on the display, the detector is at the same level as the laser beam.

5. Press the On/Off key to turn the detector off. It will automatically shut off after 10 minutes if not used (and give a warning beep).

6. Keep the detection window clean, using a soft cloth and glass cleaner.

* Troubleshooting

If you cannot pick up the beam with the detector, check how you are lined up with the laser. One of the head protection supports on the laser may be blocking the beam; move to the left or right to receive the beam.

• **EAGL H+**

This model uses the LS50R detector, which can be used as a remote control for the semiautomatic leveling mode and for calibration. See previous page for detection functions; for remote functions, turn detector off and press other keys.

• **Specifications**

Range*	500 ft. (150 m)
Accuracy*	Fine: $\pm <1/16"$ (1 mm) Standard: $\pm 1/8"$ (2.5 mm)
Battery life	50 hours; 9V alkaline
Environmental	Waterproof (IP66)
Size	6" x 3.25" x 1.5"; .35 lbs. (15 x 8 x 3.5 cm .2 kg)

* *Varies with laser used. Actual accuracy depends on beam diameter and distance to the laser.*

5.2 Tripods

The laser can be mounted on a 5/8" - 11 flat head tripod. You can also use a tripod with an elevating column to adjust the height of the laser.

5.3 Other accessories

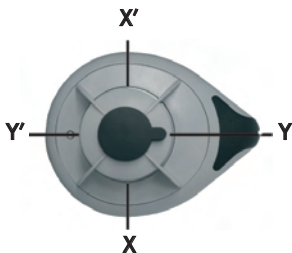
- Laser-enhancing glasses improve the visibility of the laser beam in bright light conditions.
- Red magnetic target improves the visibility of the laser beam in bright conditions. Quickly attaches to any metallic surface.
- LS50R detector/remote control functions as a detector, similar to the LS50, plus can be used to calibrate the laser. Cannot be used as a remote control with the EAGL H, except for calibration.
- TL25 remote control: facilitates calibration; cannot be used as a remote, except for calibration.
- Universal SM200 mount: can be used as a wall mount, and with the EAGL H+ for vertical setups on a tripod.

6. Check and Adjust

THIS CHAPTER IS VERY IMPORTANT:

Here are a few simple instructions to check your laser for calibration. The laser is a precision instrument and it is important that you keep it calibrated and in proper condition. The accuracy of your work is completely your responsibility and you should check your instrument before beginning each job, and especially after the instrument has taken a sharp jolt or been dropped, or when temperature changes greater than 50 degrees F (28 degrees C) have occurred.

The laser has 2 horizontal axes: X and Y, as indicated on the top of the laser.



Each end of each axis must be checked for calibration. If needed, the axis can be calibrated, carefully following the instructions. You can also take the laser to a service center for calibration.

Check and calibrate in this order:

Check both sides of X axis.

- If X is within spec, proceed to check both sides of Y.
- If X needs calibration, calibrate X

Check both sides of Y axis.

- If Y is within spec, proceed to final X to Y check
- If Y needs calibration, calibrate Y; proceed to X to Y check

Final X to Y check: compare X, X', Y, Y'

4.1 Calibration overview

Calibration is electronic, using the laser keypad. The optional detector/remote control or optional small remote may also be used (hold close to remote window below X LED).

If the beam is visible, calibrate using the non-rotating point. If it's too bright to see the beam, you'll use the detector and will need to have the beam rotating. When you're in calibration mode, press the rotation key (11A) on the laser to rotate the beam.

The axis LED should blink slowly when in calibration mode. When laser is self-leveling or making an adjustment, it will blink rapidly.

IMPORTANT:

When pressing an arrow key to move the beam for calibration, use short, rapid clicks. Do not hold the key down. One click will move the beam a very small

amount (1/32" at 150' or 1mm at 100m). After pressing the key, the LED will blink rapidly as the laser reacts. Wait until the LED returns to a slow blink to proceed.

4.2 Horizontal checking and calibration

4.2.1 Checking X axis

- 1.** Place the laser on a flat surface or tripod 100 ft. (30 m) away from a wall. Position so that X (noted on top of laser) is facing the wall.
- 2.** Turn on the laser.
- 3.** Mark the location of the center of the beam. If it's too bright to see the beam, use the detector.
- 4.** Rotate the laser 180 degrees so that X' faces the wall.
- 5.** Mark the location of the center of the beam near the first mark so that both marks are in line, one above the other.
- 6.** At 100 ft., the marks should be no more than 3/16" apart (at 30m, no more than 5mm apart). This is within the stated accuracy of $\pm 3/32"$ at 100 ft. ($\pm 0.0075\%$).
- 7.** If the marks are close enough, X axis is within calibration. The second axis Y must then be checked (see later section).
If the marks are not close enough, the X axis needs to be calibrated.

4.2.2 Calibrating X axis

The laser must be calibrated to bring the beam to the center of the two X marks. Read "Calibration Overview" before proceeding.

- 1.** Turn off the laser.
- 2.** Hold the Auto/Man (6) key. While holding, momentarily press the ON key.
- 3.** After the LEDs blink in sequence, release the Auto/Man key.
- 4.** X LED will blink rapidly, indicating leveling. When the LED blinks slowly, the laser is ready to calibrate.
- 5.** If you have not moved the laser, use the X marks made in previous steps of "Checking X axis".
- 6.** Use arrows on the keypad to move beam up or down to the halfway mark. If the X' axis is toward the wall with the marks, use the \blacktriangle key (11B) to raise beam, and the \blacktriangledown key (11C) to lower beam.

7. After completing the X calibration, press the **>>|** key (11D) to change the axis and to calibrate the Y axis. On the remote, press the double arrow key **>>|** .

8. If the Y axis doesn't have to be calibrated, press the Auto/Man key (6) to save the calibration you've just made on X axis. Or you can save the calibration by pressing and holding for a few seconds the rotation key (11A). On remote, use key with the small dot.

If you are not sure of the calibration, don't save it and turn the laser off using the On/Off key.

4.2.3 Checking Y axis

- 1.** Rotate the laser 90 degrees so that Y is facing the wall.
- 2.** Mark the location of the center of the beam.
- 3.** Rotate the laser 180 degrees so that Y' faces the wall.
- 4.** Mark the location of the beam center near the first mark.
- 5.** At 100 ft., the marks should be no more than 3/16" apart (at 30m, no more than 5mm apart). This is within the stated accuracy of $\pm 3/32"$ at 100 ft. ($\pm 0.0075\%$).
- 6.** If the marks are close enough, Y axis is within calibration. Proceed to "Final X to Y Check." If the marks are not close enough, Y axis needs to be calibrated.

4.2.4 Calibrating Y axis

The laser must be calibrated to bring the beam to the center of the two Y marks. Read "Calibration Overview" before proceeding. If you are still in calibration mode from the X axis, turn Y' towards the wall and press the **>>|** key (11D) to change to the Y axis. When the Y LED blinks slowly, it's ready to be calibrated in Y axis.

If you're no longer in calibration mode

- 1.** Turn off the laser.
- 2.** Hold the Auto/Man (6) key. While holding, momentarily press the ON key.
- 3.** After the LEDs blink in sequence, release the Auto/Man key.
- 4.** Select the Y axis by pressing the **>>|** key (11D) on the laser keypad. On the remote, press the double arrow key **>>|** .

5. Y LED will blink rapidly, indicating leveling. When the LED blinks slowly, the laser is ready to calibrate.
6. If you have not moved the laser, use the Y marks made in previous steps of "Checking Y axis".
7. Use keypad arrows to move beam up or down to the halfway mark. If the Y' axis is toward the wall with the marks, use the \blacktriangle key (11B) to raise beam, and the \blacktriangledown key (11C) to lower beam.
8. Press Auto/Man key (6) to save the calibration you've just made on the Y axis. Or you can save the calibration by pressing and holding for a few seconds the rotation key (11A). On remote, use key with the small dot.

If you are not sure of the calibration, don't save it and turn the laser off using the On/Off key.

Final X to Y Check

As a final check, compare X and Y axes to be sure that your adjusted calibration is within the specs of $\pm 3/32"$. The marks for X, X', Y, and Y' should be no more than $3/16"$ apart at 100 ft. (5mm at 30m).

4.3 Cone error checking

1. Set up the laser 2 ft. or 1 meter from a wall (a) or a pole and 100 ft. or 30 meters from another wall or pole (b).
2. Turn the laser on.
3. When the laser is leveled, stop the rotation and mark the location of the beam (center of the beam) on the near wall (a), using the detector if ambient conditions are too bright.
4. Rotate the laser 180° and mark the location of the center of the beam on the far wall (b).
5. Install the laser 2 ft. or 1 meter from the far wall. When the the laser has self-leveled, line up the beam near the previous mark (b), and make a new mark (b').
6. Mark the location of the beam (a') on the other wall near the first mark (a).
7. Compare the two sets of marks on the walls. If the difference between $aa'-bb'$ exceeds $3/16"$ (5mm), contact your local service center.





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