



8261 State Route 235  
Dayton, Ohio 45424 USA  
Phone: (937) 482-0200  
Fax: (937) 482-0030  
[www.apache-laser.com](http://www.apache-laser.com)



Thank you for purchasing an Apache Technologies, Inc. product. Your laser system is a premium quality tool that has been designed and manufactured to provide years of precise and reliable performance. The system has been specifically designed for use in construction environments.

This manual is an important part of your purchase as it will familiarize you with the unit and explain the numerous features that have been designed into it. Please read this manual thoroughly before using your laser system.

Please contact your Apache dealer or the Apache factory should you have questions regarding specific applications or if you require additional information. Contact information is located on the back cover. Additional contacts are:

Website: [www.apache-laser.com](http://www.apache-laser.com)  
E-mail: [sales@apache-laser.com](mailto:sales@apache-laser.com)  
[service@apache-laser.com](mailto:service@apache-laser.com)

Please record your product information below. This will assist you if there are any questions regarding warranty or service.

PRODUCT: \_\_\_\_\_

LASER SERIAL NUMBER: \_\_\_\_\_

DETECTOR SERIAL NUMBER: \_\_\_\_\_

DATE OF PURCHASE: \_\_\_\_\_

PURCHASED FROM: \_\_\_\_\_

PHONE: \_\_\_\_\_

## EMC Declaration of Conformity

This laser has been tested and found to comply with the limits for a Class B digital device for radio noise for digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communication, and is pursuant to part 15 of the Federal Communication Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This laser generates radio frequency. If it's not used in accordance with the instructions, it may cause harmful interference to radio or television reception. Such interference can be determined by turning the laser off and on. You are encouraged to try eliminating the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the laser and the receiver.

For more information, consult your dealer or an experienced radio/television technician.

**CAUTION:** Changes or modifications to the laser that are not expressly approved by the manufacturer could void authority to use the equipment.

Application of Council Directive(s):	89/336/EEC directive on EMC
Manufacturer's Name:	Apache Technologies, Inc.
Manufacturer's Address:	8261 State Route 235 Dayton, Ohio 45424 U.S.A.
European Representative Address:	Apache Technologies Europe GmbH Langenberger Str. 590 D-45277 Essen, Germany
Model Name/Number(s):	Horizon
Conformance to Directive(s):	EC Directive 89/336/EEC using EN55022 and EN50082-1
Equipment Type/Environment:	ITE/residential, commercial & light industrial
Product Standards:	Product meets the limit B and methods of EN55022 Product meets the levels and methods of IEC 801-2, 8 kV air, 4 kV contact IEC 801-3, 3 V/m 26 to 1000 MHz 80%, @ 1 kHz IEC 801-4, ac leads 2 kV

## Warranty

Apache Technologies warrants the HORIZON laser to be free of defects in material and workmanship for a period of two years. This warranty period is in effect from the date the system is delivered to the purchaser, or is put into service by a Dealer as a demonstrator or rental component. Please refer to the detector operator's manual for detector warranty information.

The manufacturer or its Authorized Service Center will repair or replace, at its option, any defective part of components of which notice has been given during the warranty period. A Warranty Registration Card must be filled out properly and on file with Service Department before warranty repair or replacement can be approved. Travel and per diem expenses, if required, to and from the place where repairs are made will be charged to the purchaser at the prevailing rates.

Customers should send products to the nearest Authorized Factory Service Center for warranty repairs, freight prepaid. In countries with Service Subsidiary Centers, the repaired products will be returned to the customer, freight prepaid.

Any evidence of negligent, abnormal use, accident, or any attempt to repair equipment by other than certified factory-authorized personnel or recommended parts, automatically voids the warranty.

Special precautions have been taken to ensure the calibration of the laser; however, calibration is not covered by this warranty. Maintenance of the calibration is the responsibility of the user.

The foregoing states the entire liability of the manufacturer regarding the purchase and use of its equipment. The manufacturer will not be held responsible for any consequential loss or damage of any kind.

This warranty is in lieu of all other warranties, except as set forth above, including an implied warranty merchantability of fitness for a particular purpose, is hereby disclaimed. This warranty is in lieu of all other warranties, expressed or implied.

### Notice to Our European Union Customers

For product recycling instructions and more information, please go to: [www.trimble.com/environment/summary.html](http://www.trimble.com/environment/summary.html)

#### Recycling in Europe

To recycle Trimble WEEE, call: +31 497 53 2430, and ask for the "WEEE associate," or

mail a request for recycling instructions to:

Trimble Europe BV  
c/o Menlo Worldwide Logistics  
Meerheide 45  
5521 DZ Eersel, NL



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# HORIZON Laser System

## System Description

The HORIZON laser system is a one-man leveling tool that allows one person to take accurate, self-leveled elevation measurements up to 800 feet (250 m) away from the transmitter.

The laser signal is rotated in a 360° plane. The handheld or rod mounted laser detector reads the laser signal. The detector indicates the elevation information via a visual display on front and rear LCD's and also with audible tones. Please refer to the detector operating manual for details.

The HORIZON laser system is designed for all general construction and agricultural leveling tasks. Set the transmitter in a central location to provide an unobstructed continuous elevation reference. This reference can be used by multiple persons for a variety of leveling applications with additional laser detectors.

## Features and Functions

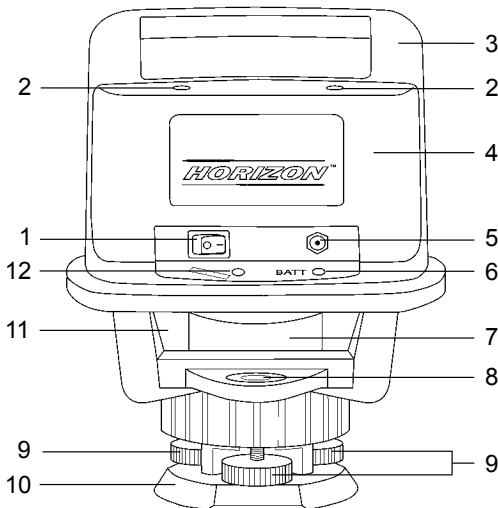
**1. Power Switch** - turns the laser on and off.

**2. Battery Housing Screws** - easy access to battery compartment with universal key or small coin.

**3. Handle** - allows easy handling and safe set-up of the laser.

**4. Battery Housing** - holds four "D" cell alkaline batteries.

**5. Recharging Jack** - Rechargeable battery option not available.



## Features and Functions

**6. Low-Battery LED** - flashes when batteries need replacing.

**7. Rotating Prism** - rotates at 600 rpm to transmit the laser signal.

**8. Bull's-Eye Level** - provides quick reference for front to back and side to side leveling.

**9. Leveling Screws** - turn clockwise or counterclockwise to bring the laser within self leveling range.

**10. Mounting Base** - supports the laser and allows the laser to be used freestanding.

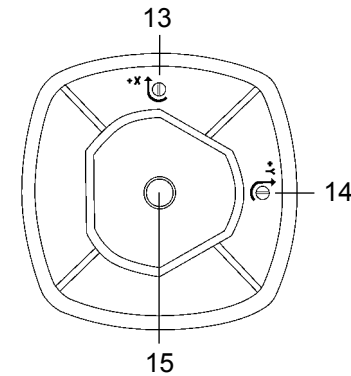
**11. Lighthouse** - sealed compartment protects the internal components from the environment.

**12. Out-of-Level LED** - flashes when the laser is out of its self-leveling range.

**13. X Axis Calibration Screw** - allows the X axis of the laser to be adjusted in the field per the calibration procedure.

**14. Y Axis Calibration Screw** - allows the Y axis of the laser to be adjusted in the field per the calibration procedure.

**15. 5/8-11 Tripod Mount** - threaded insert allows the laser to be attached to a standard 5/8-11 construction tripod.



Bottom View

## How to Use the Laser System

### Installing / Removing the Batteries

1. Turn battery housing screws counterclockwise and remove the battery housing. A universal key (supplied) or small coin can be used to turn the screws.

2. Install or remove the batteries as required.

**Note:** When installing the batteries, be sure to note the positive (+) and negative (-) diagram inside the housing. Place ribbon straps behind the batteries for easy battery removal.

**Note:** The laser has reverse-polarity protection. If the batteries are put in wrong, no damage occurs to the laser, but it does not operate.

3. Put the battery housing in place and turn the screws clockwise to tighten.

### Setting Up and Leveling the Laser

1. Set up a tripod to the height appropriate for your application needs.

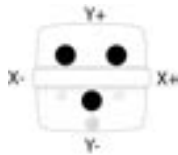
2. Insert the 5/8-11 tripod screw into the laser's 5/8-11 threaded insert.

3. Turn the screw and tighten to hold the laser securely in place.

4. Press the power switch to turn the laser on.

**Note:** When the laser is initially turned on, the out-of-level LED will flash if the laser needs leveling.

5. Using the left-thumb rule (see the Note that follows), turn both X axis screws equal amounts in opposite directions to move the level bubble to the center of the bull's-eye.



**Note:** Left-thumb rule - both thumbs in, both thumbs out, the bubble follows the direction of the left thumb.



## Setting Up and Leveling the Laser

6. Observe the location of the bubble (top or bottom of the bull's-eye) and using the left-thumb rule, turn the Y axis screw to move the level bubble to the center of the bull's-eye.



**Note:** When the laser is level, the bubble is centered in the bull's-eye and the out-of-level LED stops flashing and the laser's rotor begins rotating.

**Note:** If the laser is knocked out of its self-leveling range, the out-of-level LED start flashing, the rotor stops, and the laser beam turns off.

7. To restore level, simply re-level the laser and check your initial reference elevation.

### Determining the Height of Instrument (HI)

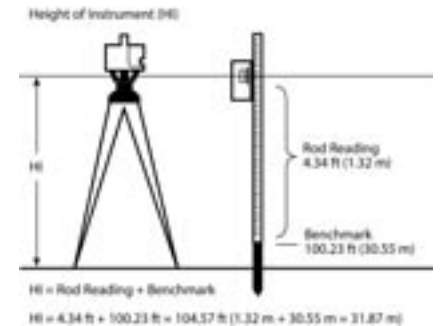
The height of instrument (HI) is the elevation of the laser's beam. The HI is determined by adding the grade-rod reading to a benchmark or known elevation.

1. Set up and level the laser.

2. Attach the detector to a grade rod and turn on the detector.

3. Place the grade rod on a benchmark (BM) or other known elevation.

4. Slide the detector up or down the grade rod until the LCD shows an on-grade reading.



5. Add the grade-rod reading to the benchmark to determine the height of instrument.

**Example:**

Benchmark elevation	=	100.23 ft	(30.55 m)
On-grade rod reading	=	+ 4.34 ft	(1.32 m)
Height of instrument	=	104.57 ft	(31.87 m)

6. Use this HI as a reference for all other elevations.

## Checking Calibration

To check the horizontal calibration, a tripod with a 5/8-11 threaded mount, handheld detector, universal key (supplied), or a 1/16 in. (1.5 mm) diameter pin or small nail are required. Having another person to help saves time if you need to adjust the calibration.

1. Set up and level the laser 100 ft (30 m) from a wall.

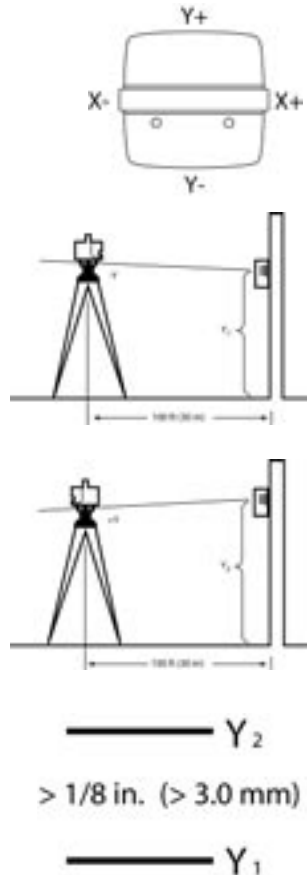
2. Point the Y- axis toward the wall. Raise/ lower the detector until you get an on-grade reading. Using the on-grade marking notch as a reference, make a mark on the wall. This mark is  $Y_1$ .

**Note:** For increased precision, use the fine accuracy (deadband) setting on the detector.

3. Rotate the laser 180° (Y+ axis toward the wall) and re-level the laser.

4. Raise/lower the detector until you get an on-grade reading for the Y+ axis. Using the on-grade marking notch as a reference, make a mark on the wall. This mark is  $Y_2$ .

5. Measure the difference between the two marks. If they differ more than 1/8 inch at 100 feet (3.0 mm at 30 m), the laser needs calibrating.



## Checking Calibration

6. To correct for a calibration error, position the receiver at the midpoint of the two elevation marks on the wall. This position is  $Y_3$ .

**Note:** Although you can calibrate the laser by yourself, having another person to help saves time.

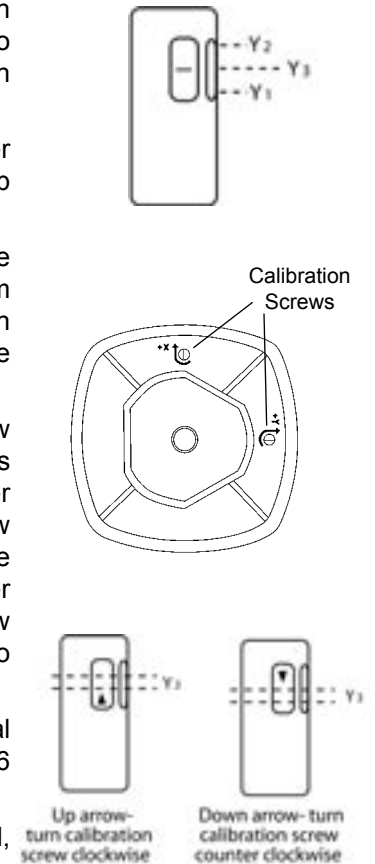
7. To adjust the calibration, insert the universal key (or a nail 1/16 in. or 1.5 mm diameter) into the opening in the calibration screw and turn the screw in the appropriate direction.

**Note:** The arrows on the display show which direction the calibration screws need turning. An up arrow on the receiver indicates that the Y axis calibration screw needs to be turned clockwise to lower the laser plane. A down arrow on the receiver indicates that the Y axis calibration screw needs to be turned counterclockwise to raise the laser plane.

8. Rotate the laser 180° back to the original face. Make sure this axis is less than 1/16 in. (1.5 mm) from the midpoint line.

**Note:** If additional adjustment is required, repeat steps 2-7 above.

9. After adjusting the Y axis, rotate the laser 90°. Repeat steps 2-8 starting with the -X axis facing the wall.



## Specifications

Laser Type, Classification	670 nm visible, Class II
Self-Leveling Range	±10 arc minutes
Compensation Type	Wire Hung, Air Damped
Rough Leveling Method	Three-screw leveling base with bull's-eye circular bubble and out-of-level LED
Horizontal Accuracy	±10 arc seconds over temperature <±1/16 in. per 100 ft (<±1.5 mm per 30 m)
Machine Control Compatible	Yes
Power Source	4 D-cell alkaline batteries
Battery Life (68° F / 20° C)	80 hours
Operating Diameter	1600 ft (500 m)
Operating Temperature	-4°F to 122°F (-20°C to 50°C)
Weight (with batteries)	7.5 lbs (3.4 kg)
Tripod Mount	5/8 in x 11

## Troubleshooting

If none of the following techniques corrects the problem, take the system to your dealer or authorized service center for evaluation or repair.

Problem	Solution
Laser will not operate	Press power switch. Check or replace batteries. Make sure the battery contacts are clean. Make sure the battery housing is securely in place. Return the laser to an authorized service center for inspection.
Laser out-of-level indicator does not shut off	Make sure the laser setup is stable. Make sure the leveling screws are free to turn. Re-level the laser and make sure the bubble is centered in bull's-eye level vial. Return the laser to an authorized service center for inspection.
Laser not accurate	Check and adjust the laser's calibration as needed. Return the laser to an authorized service center for inspection.
Low-battery LED is flashing	Replace the batteries.
The laser levels, the rotating prism turns, but the laser beam does not come on	Return the laser to an authorized service center for inspection.
The receiver does not detect the laser beam at long range	Clean the lighthouse and recheck the receiver distance. Return the laser to an authorized service center for inspection.

## Maintenance and Care

Following the maintenance and care recommendations in this manual will provide years of service from the leveling system.

Carry the laser in its moisture-resistant, field-tested carrying case to safely move the laser from one job to another.

However well the product is designed, mishaps do occur. The most common problems associated with these are covered in the following areas.

### Storage

**CAUTION:** Do not store the laser in a wet carrying case. If the case gets wet, open it and let it dry before storing the laser.

### Battery Disposal

Some states and local areas have regulations regarding the disposal of batteries. Be sure that replaced batteries are disposed of properly.

### System Cleaning

Use only a good-quality glass cleaner and a soft cloth to clean all external optical components. A dry cloth used on the laser exit windows may scratch or damage the glass surfaces.

Monthly, wipe off with a moist, clean cloth any dust or dirt from the laser's outer surface, inside the battery housing, and within the leveling base. Blow off any loose debris before cleaning any surfaces to prevent scratching of optical surfaces.

## Safety Information

Included in this manual are **CAUTIONS** and **Notes**.

A **CAUTION** indicates a hazard or unsafe practice that could result in minor injury or property damage.

A **Note** indicates important information unrelated to safety.

### Laser Safety

This laser complies with all applicable portions of Title 21 of the code of Federal Regulations, Department of Health and Human Services, Food and Drug Administration (Federal Register, Volume 50, Number 161, August 20, 1985).

As with any visible laser device, the following safety rules should be observed:

- Never look directly into a laser beam or point the beam into the eyes of others. Set the laser at a height that prevents the beam from shining directly into people's eyes.
- Do not remove any warning signs from the laser.
- Use of this product by people other than those trained on this product may result in exposure to hazardous laser light.
- If service is required, which results in the removal of the outer protective cover, removal must only be performed by factory-trained personnel.

### Labels

Labels required for this product:

