Operator's Manual

Apache
Technologies

STORM™

STORM Laserometer

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

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 use.

Please contact your Apache dealer or the Apache factory should you have questions regarding specific applications or if you require additional information.

IMPORTANT: Fill out the Warranty Registration Card and return it to Apache Technologies, Inc.

Please record your information below for future reference.

Serial Number: _____

Date of Purchase: _____

Purchased From: _____

_____

Phone: _____

Table of Contents

1 General Description

The STORM™ laserometer is designed to receive reference elevation information from all rotating laser levels. A large 5.0 inch (127 mm) vertical reception window captures the laser beam using patented SuperCell™ receiving technology.

Elevation information is output via Liquid Crystal Displays (LCD's) on the front and rear and Light Emitting Diodes (LED's) on the front. A beeper also emits an adjustable audible tone.
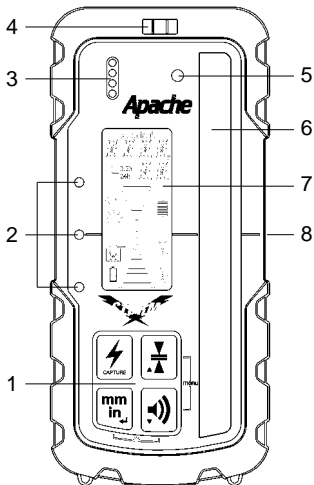
The LCD's indicate elevation information graphically with arrows and bars and numerically. A proportional growing arrow graphic indicates high, low, or on-grade. A numeric elevation display indicates on-grade and how far the laserometer is from on-grade.

Accuracy levels, units of measure, sound levels, and various other user options are selectable to meet a variety of job requirements.

The unit has been specifically designed for use in harsh construction environments. Strobe rejection technology, over molded housings, recessed windows, waterproof design and durability are incorporated into every detector.

A general purpose clamp is included and designed to mount the detector on various grade rods and staffs. A secondary offset mounting location provides additional versatility is certain applications. A patented reversible wedge on the clamp allows sure grip mounting to round, oval, square, and rectangular rods, as well as various sizes of wooden staffs.

2 Front View

1. Keypad - Power, Accuracy, Units, and Volume switches. Refer to §5 & 6 for detailed operation.

2. LED's - Easy to see Light Emitting Diodes show position of laserometer relative to the laser beam. Green for on-grade and Red for high or low.

3. Beeper output - Fast audible signal is too High; lower to get to on-grade. Solid signal is On-grade. Slow signal is too Low; raise to get to on-grade.

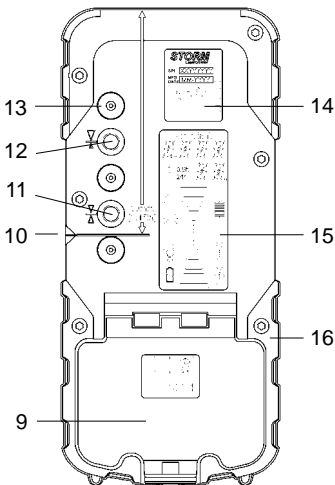4. Bubble Vial - aids in keeping laserometer level for accurate readings.

5. Photo-Sensor - Anti-strobe sensor detects strobe lights and rejects their input on laser reception.

6. SuperCell Reception Window - Five (5) inches (127 mm) of reception range. Window must be directed toward laser.

7. LCD (front and rear) - Displays elevation information and laserometer settings and status. Refer to §7 for details.

8. On-grade Mark - Aligned with laser on-grade reading.

3 Rear View

9. Battery Door & Latch - Waterproof housing holds two "AA" alkaline batteries.

10. Marking Notch - Used to transfer or mark elevation position in handheld applications. Aligns with center on-grade position. Top of detector is 3.15 in (80 mm) from marking notch.

11. Captive Screw Thread, Center on-grade clamp position. Insert accepts rod clamp screw to secure detector to the clamp. See §7.11 for additional clamp information.

12. Captive Screw Thread, Offset on-grade clamp position. Allows a larger above grade display for certain applications. See §7.12 for additional clamp information.
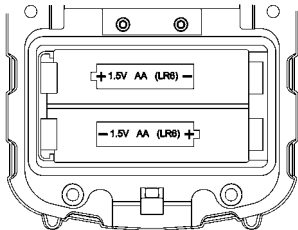
13. Clamp Guides (3) - Dimples align rod clamp.

14. Serial Number / ID Label

15. Rear LCD - Refer to §7 for details.

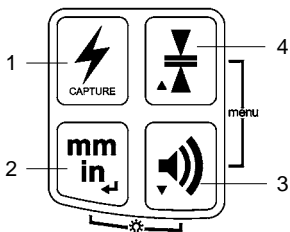16. Rubber over mold - Protects the unit from accidental drops.

4 Operation - Installing the Batteries

1. Open the battery door using a coin or similar pry device to release the battery door tab.

2. Insert two AA batteries noting the plus (+) and minus (-) diagrams inside the battery housing.

3. Close the battery door. Push down until it "clicks" into the shut position.

5 Operation - Primary Switch Functions

1. Power Switch - Press the power switch to turn power ON. All LED's, the LCD, and the beeper will come on momentarily. CAL will be displayed and LED's sequenced as the unit goes through a self-calibrating procedure for approximately 3 seconds.

NOTE: Do not power up the unit in a laser beam or strobe. If detected, the unit will revert to the previous calibration.

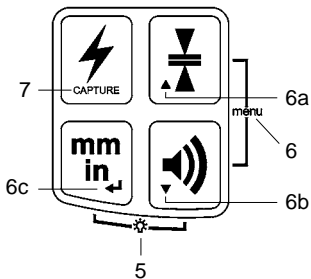Press and hold the Power switch for 2 seconds to turn power OFF.

2. Units of Measure Switch - Press once to display the current settings in the numeric display area. Press again while the units are displayed (within one second) to change the current selection. Subsequent presses will scroll through the setting selections of centimeters (cm), millimeters (mm), inches (in), fractional inches (in), and feet (ft). For fractional inches, the fraction bar will be displayed on the LCD. The selected setting will always be displayed on the top of the LCD.

3. Volume Switch - Pressing the switch cycles High, Medium, Low and Off. One beep is emitted at the selected volume when changed. When sound if Off, a single beep will signal that a laser beam has been detected.

4. Accuracy Switch - Press once to numerically display current accuracy settings on the LCD. Press again while the accuracy is displayed (within one second) to change the current selection. Subsequent presses will scroll through five accuracy options (Ultra Fine, Super Fine, Fine, Medium, Coarse). Refer to §11, Specifications, for details.

6 Operation - Secondary Switch Functions

5. LED Display - Pressing the Units and Volume switches together enables the selection of LED's ON Bright, ON Dim, or OFF. Press together to cycle the selection. The LED's will display the current level of brightness selected as the switches are pressed. The LED light bulb symbol on the LCD will also change to display the selected setting.

6. Menu - Pressing the Accuracy and Volume switches together enables entry into the Menu functions. Refer to §9 for details.

   6a. In the Menu mode, the up arrow (Accuracy switch) scrolls the menu up.

   6b. In the Menu mode, the down arrow (Volume switch) scrolls the menu down.

   6c. In the Menu mode, the enter arrow (Units switch) enters or selects the available options.

7. Capture - Allows a reading to be recorded. Refer to §8, Special Functions, for detailed operation of the Capture function.

NOTE: Units, Volume, Accuracy and LED Brightness are stored in memory and will be retained when the unit is turned off or when batteries are replaced.

7 Liquid Crystal Display

1. Grade indication arrows
2. Battery status indicator
3. Laser out-of-level / laser low battery indicator
4. LED brightness level
5. Beeper volume level
6. Auto shut-off timer
7. Units of measure
8. Numeric elevation / Menu text display
9. Numeric elevation for fractional inches / Menu text display
10. Accuracy (deadband) indicator
11. Offset on-grade clamp location
12. Center on-grade clamp location

1. Grade Indication Arrows - 10 individual levels of grade information for above and below grade. Arrow size increases as distance away from on-grade increases.

Arrow bars can be selected to represent the selected deadband or can be proportional to the vertical reception range. Refer to §9 for details. Horizontal bar indicates on-grade.

Lower to on-grade ————————————————➤ On-grade

Out-of Beam display - a sequence of arrows will indicate if the receiver has moved beyond the vertical reception range and will indicate which direction to move to get back to the laser beam. The display can be turned on or off. Refer to §9 for details.

8

7 Liquid Crystal Display

2. Battery Status - indicates 4 levels of battery status.

Full -
Batteries
OK

Half -
Initial
Warning

Outline - Approx.
30 Minutes
Remaining

Flashing -
Change
Batteries

3. Laser Out-of-Level and Laser Low Battery warning - certain laser transmitters can signal warnings by changing the rotation speed (RPM) of the laser. When enabled, the transmitter outline is displayed with the appropriate out-of-level or low battery symbol.

If a laser out-of-level is detected, the bubble vial symbol will blink. Additionally, the beeper will emit an alternating hi-low tone as a distinct warning, even if the beeper has been turned off. No elevation information will be displayed.

If a laser low battery warning is detected, the battery symbol will blink. Elevation information will be displayed normally. Refer to the laser's instructions.

Refer to §9, Menu Functions, for details on enabling these warnings.

4. LED Brightness - indicates if LED's are on Bright, Dim or Off. No display indicates LED's are Off.

LED's
Bright

LED's
Dim

7 Liquid Crystal Display

5. Beeper Volume - indicates if Loud, Medium, Low or Off is selected. No symbol represents beeper Off.

Beeper Loud   Beeper Medium   Beeper Low

6. Automatic Shut-Off - clock symbol and number indicate a 30 minute (0.5 hour) or 24 hour shut-off is selected. No symbol indicates automatic shut-off is disabled. Refer to §9 for details.

30 minutes selected   24 hours selected

7. Units of Measure - indicates if centimeters (cm), millimeters (mm), inches (in), fractional inches (inch with fraction bar), or feet (ft) is selected.

7 Liquid Crystal Display

0.124 8. Numeric Elevation / Menu Text Display - when in the normal operating mode, the four-character graphic displays numeric elevation.

Resolution and the decimal point will be determined by the units of measure and the accuracy selected. Refer to §11, Specifications, for details.

-- -- -- -- Dashed lines across the display indicate the numeric vertical reception range has been exceeded.

The numeric display may also be turned off. Refer to §9, Menu Functions, for details.

MENU When in the MENU mode, the menu function text abbreviations will be displayed. Refer to §9, Menu Functions, for details.

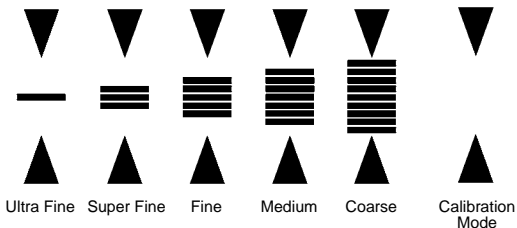*1/16* 9. Numeric Elevation for Fractional Inches / Menu Text - when in the normal operating mode and fractional inches are selected as the unit of measure, the top number, bottom number, and fraction bar are displayed to form the fraction.

When in the MENU mode, the two-character graphic displays the text abbreviation of the current setting and available options when scrolling through the menu.

7 Liquid Crystal Display

10. Accuracy Indicator - indicates 5 levels of accuracy selections - Ultra Fine, Super Fine, Fine, Medium, and Coarse. Refer to §11, Specifications, for the specific values for each accuracy selected.

No center bar is displayed for calibration mode. Refer to §8, Special Functions, for details.

Ultra Fine   Super Fine   Fine   Medium   Coarse   Calibration Mode

11. Offset on-grade clamp position - clamp position is sensed automatically and displayed. Offset clamp position moves the on-grade location to allow more grade information to be displayed above grade. This is useful in applications where going below grade is not required, i.e. driving stakes down to grade.

12. Center on-grade clamp position - clamp position is sensed automatically and displayed. Standard center position displays an equal amount of information above and below grade. Refer to §10 for additional clamp information.
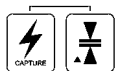
8 Special Functions

Capture Function: The Capture function is used to obtain a single reading and keep it displayed. This may be useful when the unit may not be visible and grade information needs to be obtained.

When in the laser beam and power on, momentarily press the Power/Capture switch. The current elevation reading will be saved. A flashing display will confirm the reading has been captured. Press any switch to return to normal operation.

When out of the laser beam and power on, momentarily press the Power/Capture switch. A short intermittent beep and 'WAIT' displayed on the LCD confirm the Capture mode. (The beeper will turn on to Low if turned off.) Place the receiver in the beam. The beeper will chirp rapidly after approximately 5 seconds confirming beam capture. A flashing display will also confirm the reading has been captured. Press any switch to return to normal operation.

Calibration Mode: Pressing the Power and Accuracy switches together when the unit is off enables entry into a laser calibration accuracy mode. This mode is not marked on the unit.

This accuracy is designed to be used when calibrating a laser. It is not recommended for field use. Refer to §11, Specifications, for calibration mode values.

Calibration mode will be confirmed on the LCD by the accuracy indicators without the on-grade bar.

Press any key or cycle power to exit the calibration mode and return to the previously stored accuracy setting.

9 Menu Functions

The Menu screen is accessed by pressing the Accuracy and Beeper switches together for approximately two seconds. Menu text will appear in the numeric display area. The first line is the menu function. The second line is the current setting for that function. The remainder of the LCD will be clear. No elevation information will be displayed while in the menu screens.

Menu items are selected by scrolling up or down the blue scroll arrows (▲▼) on the Accuracy and Volume switches.

Menu items are entered by pressing the blue enter arrow (↵) on the Units switch. Once entered, the current setting will blink.

To change the current setting, use the blue scroll arrows to scroll through the options for that function. Once selected, press the blue enter arrow (Units switch) to confirm selection.

Use the blue scroll arrows to select additional functions.

Once all selections are made, scroll to EXIT, and press the blue enter arrow to exit the menu. Alternatively, the Power switch can be used to enter a selection, to back up one step or exit the menu.

SENS - Sensitivity - HI / MD / LO - Selects reception sensitivity to laser and other light sources.

MD is used for most applications and is default setting.

HI can be used when working with a weak laser beam or if the beam needs to be picked at very long distances.

NOTE: Refer to the laser's specifications for accuracy and distance information.

LO is used if outside sources are disturbing elevation readings.

AVG - Numeric & Arrow Averaging - HI / MD / LO - Averages laser beam strikes to improve arrow display performance at long distances. Algorithm factors in laser RPM and accuracy setting.

MD is default setting and used for most applications.

HI can be used in windy conditions, when the laser beam may be unstable, or when working at long distances. *NOTE: Refer to the laser's specifications for accuracy and distance information.*

LO uses minimum averaging to display laser strikes.

D.R.O. - Digital Read Out - ON / OF - Turns the numeric display On or Off. Default is ON.

UNIT - Units of Measure - Select centimeters (cm), millimeters (mm), inches (in), fractional inches (in), or feet (ft). Default is mm.

FRC.R - Fractional Reduction - ON / OF - Applied when fractional inches are Units of Measure selected.

ON reduces fractions to the least common denominator.

OFF leaves fraction in reducible form.

Default is ON.

ARRW - Arrow Display - DB / PR - Adjusts how the off-grade arrow and bars are displayed. Default is DB.

DB - Deadband - each bar represents the deadband or accuracy setting. *NOTE: For larger deadbands, all bars may not be displayed.*

PR - Proportional - each bar represents the available vertical reception range divided by the number of segments.

O.O.B - Out-of-Beam Display - ON / OF - ON displays a sequence of arrows that indicate when the receiver has moved beyond the vertical laser reception range. The sequence will indicate which direction to move to get back in the laser beam. The display remains on for approximately 25 seconds.

OF turns the display Off. Default is ON.

9 Menu Functions

GRD.A. - Grade Alarm - ON / OF - Special application function that when turned ON, disables the audible signal when on-grade. When moved out of the on-grade deadband, the beeper activates as normal. Default is OF.

A.S.O. - Automatic Shutoff - 0.5 / OF / 24 - Selects automatic shutoff time from last laser strike. Default is 30 minutes.

0.5 - 30 minute shutoff.
OF - Automatic shutoff turned Off.
24 - 24 hour shutoff.

TX.O.L. - Transmitter Out-of-Level - OF / 6.7 / 5.0 / 3.3 / 2.7 / 2.3
Special Application used with transmitters that communicate to the receiver that the laser is out of level. The lasers change their rotating speed when they are out of level. When enabled, the receiver senses this change and alerts the user. Grade display information is disabled when activated. Default is OF.

TX.L.B. - Transmitter Low Battery - OF / 6.7 / 5.0 / 3.3 / 2.7 / 2.3
Special Application used with transmitters that communicate to the receiver that the laser has a low battery. The lasers change their rotating speed. When enabled, the receiver senses this change and alerts the user to a laser low battery condition. Default is OF.

Selection is in RPS. See §11, Specifications, for RPM equivalents.

INFO - Information - RPS / VER / VEND / MODL / S/N - the "+" symbol indicates an additional level. Press the blue enter arrow.

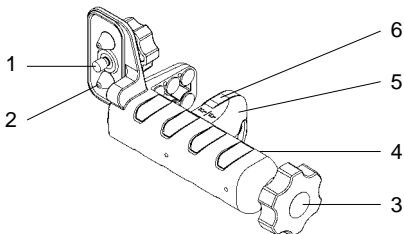RPS displays laser Revolutions Per Second for current laser strikes
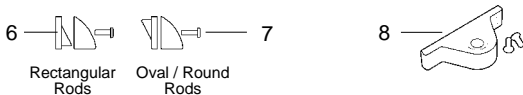VER displays software version
MODL displays model information
S/N displays serial number

NOTE: Most menu functions are stored in memory and will be retained when the unit is turned off. Sensitivity, Averaging, Fractional Reduction and Grade Alarm are reset to default settings.

10 Rod Clamp

1. Captive Rod Clamp Screw - attaches to the back of detector.

2. Alignment Points (2) - help secure and align rod clamp.

3. Clamping Screw Knob - secures clamp to rods by moving the traveling jaw. Clockwise tightens; Counterclockwise loosens.

4. Reference Bar - top of bar is aligned with the detector's on-grade location for both standard center on-grade and offset on-grade clamp locations.

5. Traveling Jaw - moving jaw grips tightly to rods.

6. Reversible Face - slanted face is used to tightly grip round and oval rods; flat face is used to grip rectangular and square rods.

Rectangular Rods

Oval / Round Rods

7. Flathead Screw - holds reversible face in place. Remove with flathead screwdriver. Rotate face as shown to change.

8. Optional Bubble Vial Kit - aids in keeping rods plumb when taking rod readings.

11 Specifications

Working Radius:		3 ft. - 1000 ft. (1 m - 300 m)			
		Laser dependent			
Laser Detection Height:		5" (127 mm)			
Numeric Readout Height:		4" (102 mm)			
Accuracy:	In	In (frac)	ft	mm	cm
Ultra Fine	0.02	1/32	0.002	0.5	0.05
Super Fine	0.05	1/16	0.005	1.0	0.10
Fine	0.10	1/8	0.010	2.0	0.20
Medium	0.20	1/4	0.020	5.0	0.50
Coarse	0.50	1/2	0.050	10.0	1.0
Calibration	0.01	1/64	0.001	0.1	0.01
Reception Angle:		± 45° minimum			
Detectable Spectrum:		610 nm to 780 nm			
Beeper Volumes:		Loud	110 dBA		
		Medium	95 dBA		
		Low	65 dBA		
LED Grade Indicators:		Front, Green on-grade, Red Hi/Low			
Power Supply:		2 x 1.5 Volt "AA" batteries			
Battery Life:		60+ hours			
Automatic Shut Off:		Selectable, 30 minutes, 24 hours, Off			
Environmental:		Waterproof, Dustproof to IP67			
Weight without clamp:		13.1 oz. (371 g)			
Dimensions without clamp:		6.6" x 3.0" x 1.4" (168 x 76 x 36 mm)			
Operating Temp:		-4°F to +140°F (-20°C to +60°C)			
Storage Temp:		-40°F to +158°F (-40°C to +70°C)			
Transmitter Rotation		RPS = RPM			
		6.7	400		
		5.0	300		
		3.3	200		
		2.7	160		
		2.3	140		

Specifications subject to change without notice

12 Warranty

Apache Technologies, Inc. STORM laserometer and clamp are warranted to be free of defects in material and workmanship for a period of three years. This warranty period is thirty-six months from the date the product is delivered from the dealer to the purchaser or is put into service by a dealer as a demonstration unit or rental unit. In addition to the basic warranty above, Apache Technologies may choose to repair or replace, at its discretion, any STORM laserometer, in the event of a failure for any reason, during the warranty period.

A Warranty Registration Card must be filled out properly and on file with Apache Technologies.

Any evidence of misuse, alteration, or an attempt to repair products by unauthorized personnel, or use of parts other than those provided by Apache Technologies automatically voids the warranty. Competitor purchased and tested units are excluded from this warranty.

The user of the product is expected to follow all operating, maintenance and care instructions.

Apache Technologies liability under this warranty is limited to repairing or replacing any product returned to its factory for that purpose. The foregoing states the entire liability of Apache Technologies regarding the purchase and use of its product and they shall not be held responsible for any consequential loss or damage of any kind.

This warranty is in lieu of all other warranties, expressed or implied, and constitutes all of Apache Technologies liability with respect to merchandise sold by it.

13 Maintenance and Safety

Detector Cleaning: Do not wipe dust or dirt off the detector reception window or display windows with a dry cloth or other abrasive material as scratching could occur, reducing visibility through these windows. A soft cloth and mild soap and water are effective. The unit may be submerged under water or sprayed with a low pressure hose if necessary. Do not use any other fluids other than water as they may attack polymer components.

Transport: Use the original carton or a laser instrument case to transport the detector.

Storage: If the detector will not be used for a month or more, it is recommended to remove the batteries.

Batteries: It is recommended to use only high quality alkaline or rechargeable batteries.

Intended Uses of Detector: The laser detector is designed and suitable for detecting a rotating laser beam.

Prohibited Uses:
- Operation without instruction.
- Operation other than the intended uses.
- Opening the detector, except the battery compartment.
- Modification or conversion of the detector.

Precautions:
- The person in charge of the detector must understand the instructions in this manual and ensure other users do also.
- Periodically carry out test measurements, particularly after the detector has been subjected to abnormal use and before and after important measurements.

CE DECLARATION OF CONFORMITY

Application of Council Directive:

89/336/EEC

Manufacturer's Name:

Apache Technologies, Inc.

Manufacturer's Address:
8261 State Route 235
Dayton, OH 45424 USA

European Representative Address:
Apache Technologies Europe GmbH
Langenberger Str. 590
D-45277 Essen, Germany

Model Number(s):
STORM

Equipment Type / Environment:
ITE / residential, commercial, light industrial

Harmonized Standards Applied:
Electromagnetic Compatibility (EMC),
EN 61326:1997 +A1:1998 +A2:2001 +A3:2003 Class B Annex A
EN 550022:1998 +A1:2000 +A2:2003
EN 61000-4-2:1995; EN 61000-4-3:1996; EN61000-4-8:1993

We herewith declare, in exclusive responsibility, that the instrument
conforms to the above mentioned directive including their amendments
up to the date below.

May 2007

Robert G. Conner

Robert G. Conner, President

Notice to Our European Union Customers

For product recycling instructions and more information,
please go to: 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

Apache
Technologies