PLS

A Fluke Company

H2, HV2R, HV2G

Rotary Laser Levels

Users Manual

December 2018

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Introduction

The H2, HV2R, HV2G Rotary Laser Levels (the Product) are battery-powered, self-leveling, professional grade instruments. The H2 and HV2R emit red laser beams. The HV2G emits a green laser beam. Use the Product to layout reference points and to make sure conditions are level.

How to Contact Fluke

To contact Fluke, call one of the following telephone numbers:

- Technical Support USA: 1-800-44-FLUKE (1-800-443-5853)
- Calibration/Repair USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31 402-675-200
- Japan: +81-3-6714-3114
- Singapore: +65-6799-5566
- China: +86-400-921-0835
- Brazil: +55-11-3530-8901
- Anywhere in the world: +1-425-446-5500

Or, visit the PLS website at www.plslaser.com.

To view, print, or download the latest manual supplement, visit www.plslaser.com.

Safety Information

A **Warning** identifies conditions and procedures that are dangerous to the user; a **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment.

⚠⚠ Warning

To prevent eye damage and personal injury:

- **Read all safety information before you use the Product.**
- **Carefully read all instructions.**
- **Do not alter the Product and use only as specified, or the protection supplied by the Product can be compromised.**
- **Do not use the Product if it operates incorrectly.**
- **Do not use the Product if it is altered or damaged.**

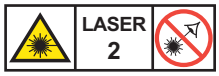
- **Use the Product only as specified or hazardous laser radiation exposure can occur.**
- **Do not look into the laser. Do not point laser directly at persons or animals or indirectly off reflective surfaces.**
- **Do not look directly into the laser with optical tools (for example, binoculars, telescopes, microscopes). Optical tools can focus the laser and be dangerous to the eye.**
- **Do not open the Product. The laser beam is dangerous to eyes.**
- **Batteries contain hazardous chemicals that can cause burns or explode. If exposure to chemicals occurs, clean with water and get medical aid.**
- **Do not disassemble the battery.**
- **Repair the Product before use if the battery leaks.**
- **The battery door must be closed and locked before you operate the Product.**
- **Remove the batteries if the Product is not used for an extended period of time, or if stored in temperatures above 50 °C. If the batteries are not removed, battery leakage can damage the Product.**
- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**
- **Be sure that the battery polarity is correct to prevent battery leakage.**
- **Use only Fluke approved power adapters to charge the battery.**
- **Do not short the battery terminals together.**
- **Do not disassemble or crush battery cells and battery packs.**
- **Do not keep cells or batteries in a container where the terminals can be shorted.**
- **Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.**

Table 1 is a list of the symbols that can be used on the Product or in this manual.

Table 1. Symbols

Symbol	Description	Symbol	Description
	Consult user documentation.	CE	Conforms to European Union directives.
	WARNING. RISK OF DANGER		Conforms to relevant Australian Safety and EMC standards.
	WARNING. LASER RADIATION. Risk of eye damage.		Conforms to relevant South Korean EMC Standards.

Table 1. Symbols (cont.)

Symbol	Description	Symbol	Description
	Battery or battery compartment		Low battery indicator.
	This product complies with the WEEE Directive marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 "Monitoring and Control Instrumentation" product. Do not dispose of this product as unsorted municipal waste.		
	Indicates a Class 2 laser. DO NOT STARE INTO BEAM The following text may appear with the symbol on the product label: “IEC/EN 60825-1:2014. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice 50, dated June 24, 2007.” In addition, the following pattern on the label will indicate wavelength and optical power: λ = xxxnm, x.xxmW.		

Note

In colder climates, the Product needs sufficient time to warm up to achieve the stated accuracy measurements. Turn on the Product and wait 3 minutes before you take a measurement. When you move the Product between environments with large differences in ambient temperature, allow for an additional adjustment time.

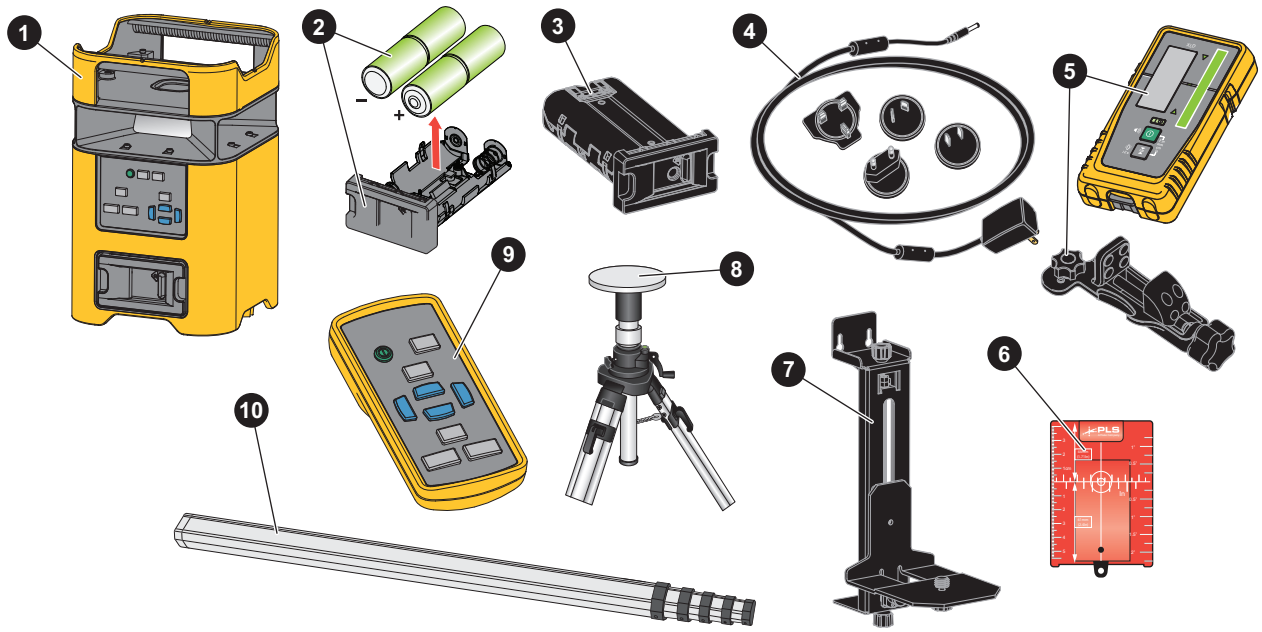
Product Familiarization

The manual explains features for multiple models. Because models have different features and accessories, not all of the information in the manual may apply to your Product.

Features

Use Table 2 to identify the features and standard accessories of your Product.

Table 2. Features



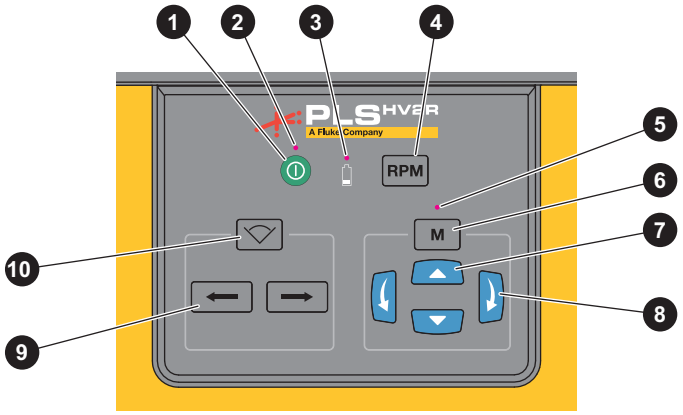
Item	Description	H2 Z	H2 SYS	H2 KIT	HV2R, HV2G Z	HV2R, HV2G SYS	HV2R, HV2G KIT
1	The Product	●	●	●	●	●	●
2	Alkaline battery compartment and 4 D batteries	●	●	●	●	●	●
3	Rechargeable battery		●	●		●	●
4	Ac battery charger		●	●		●	●
5	Rotary laser detector and clamp		●	●		●	●
6	Magnetic reflective target (red or green) [1]		●	●		●	●
7	Wall and ceiling mount					●	●
8	Elevating tripod			●			●
9	Remote control					●	●
10	Grade rod			●			●
Not shown	Carrying case	●	●	●	●	●	●

[1] The H2 and HV2R systems and kits include a red magnetic reflective target. The HV2G system and kits include a green magnetic reflective target.

Product Controls

Table 3 lists the Controls of the Product.

Table 3. Controls

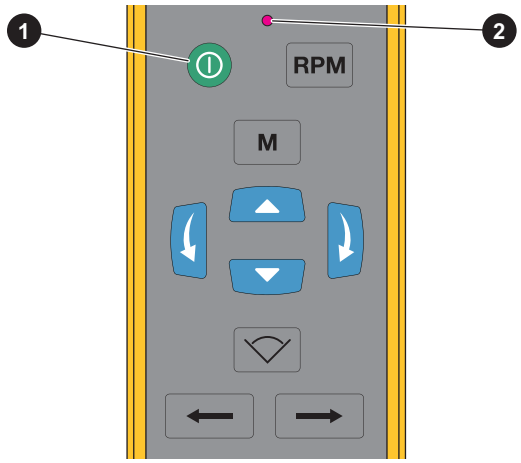


Item	Description	Function
1	Power button	Push and hold to turn on or off the Product.
2	Power LED	Indicates the state of the Product. See *Power LED*.
3	Battery LED	Indicates the battery level. See *Batteries*.
4	RPM button	Cycles through rotational speeds.See *Revolutions Per Minute (RPM)*.
5	Manual mode LED	Lights solid green when the Product is in manual mode.
6	Manual mode button	Turns on and off manual mode.See *Manual Mode*.
7	X axis buttons	With manual mode enabled, pivots the rotary laser up or down. See *Manual Mode*.
8	Y axis buttons	With manual mode enabled, rolls the rotary laser left or right. See *Manual Mode*.
9	Scan angle adjustment buttons	With scan mode enabled, moves the position of the laser beam clockwise or counterclockwise by one scan unit. See *Scan Mode*.
10	Scan mode button	Turns on scan mode and cycles through different arc lengths. See *Scan Mode*.

Remote Control

Table 4 lists the Controls on the Remote. Use the remote keypad to control the Product remotely. Other than the power button and the LED on the remote, all other features on the remote work the same as on the Product.

Table 4. Remote Control



Item	Description	Function
1	Standby button	With the Product on, push to toggle the Product in and out of standby mode.
2	Remote LED	Indicates the battery in the remote has power and that you pushed a button on the remote.

Use the Product

Use the Product to layout reference points and to make sure conditions are level. To stabilize the Product and view the laser that points down, use the accessory mount on the Product to secure the Product to the ceiling and wall mount or a tripod. See Figure 1.

⚠⚠ Warning

To prevent eye damage and personal injury, do not look into the optical windows when the Power LED shows solid or blinking green.

Mount the Product

You can use the Product in an upright position so the laser rotates horizontally.

The HV2R and HV2G can be used in a side position so the laser rotates vertically. In the side position, the Product also emits a horizontal point laser parallel to the side of the Product and perpendicular to the rotary laser.

Figure 1 shows how to mount the Product.

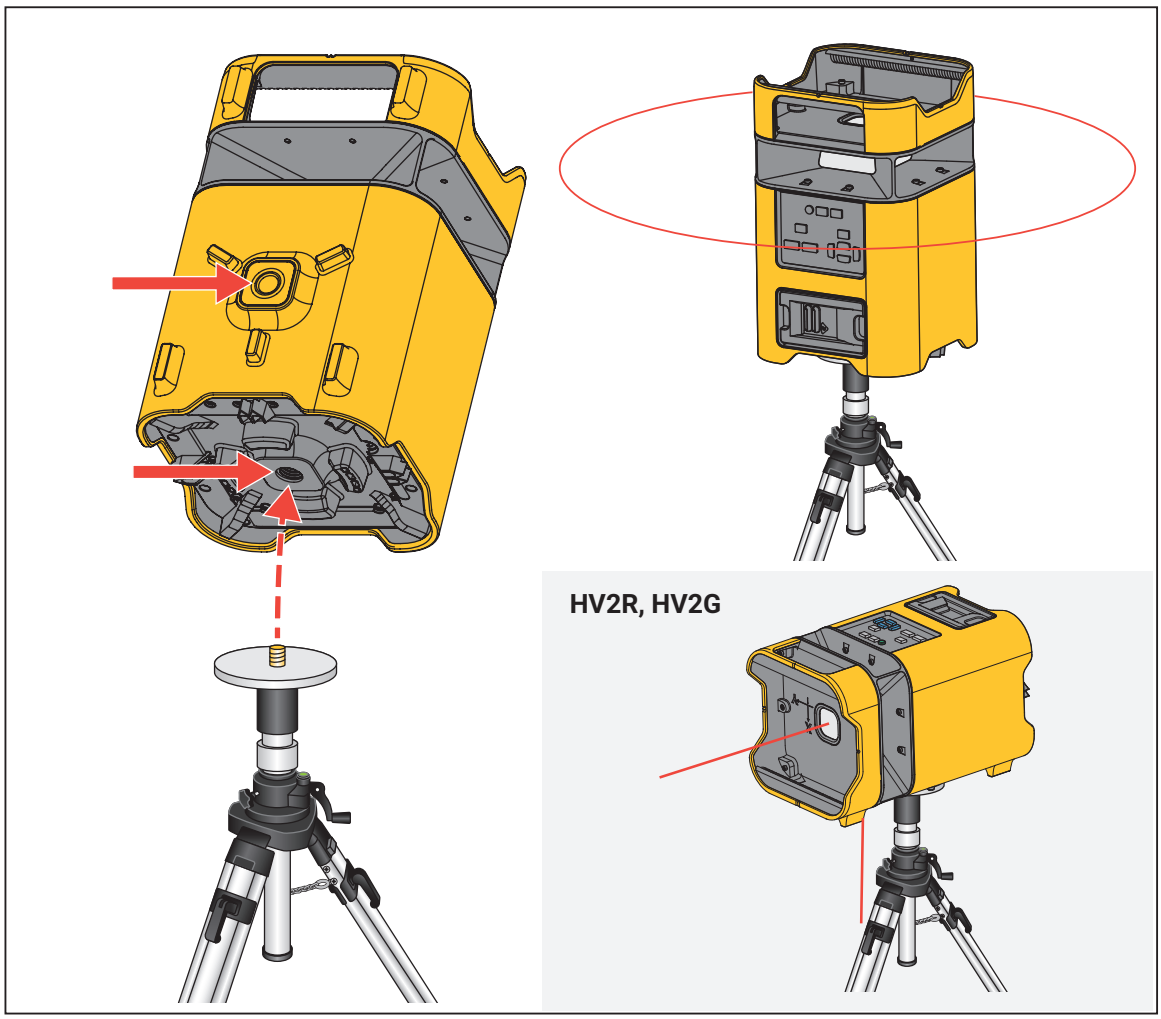


Figure 1. Accessory Mount

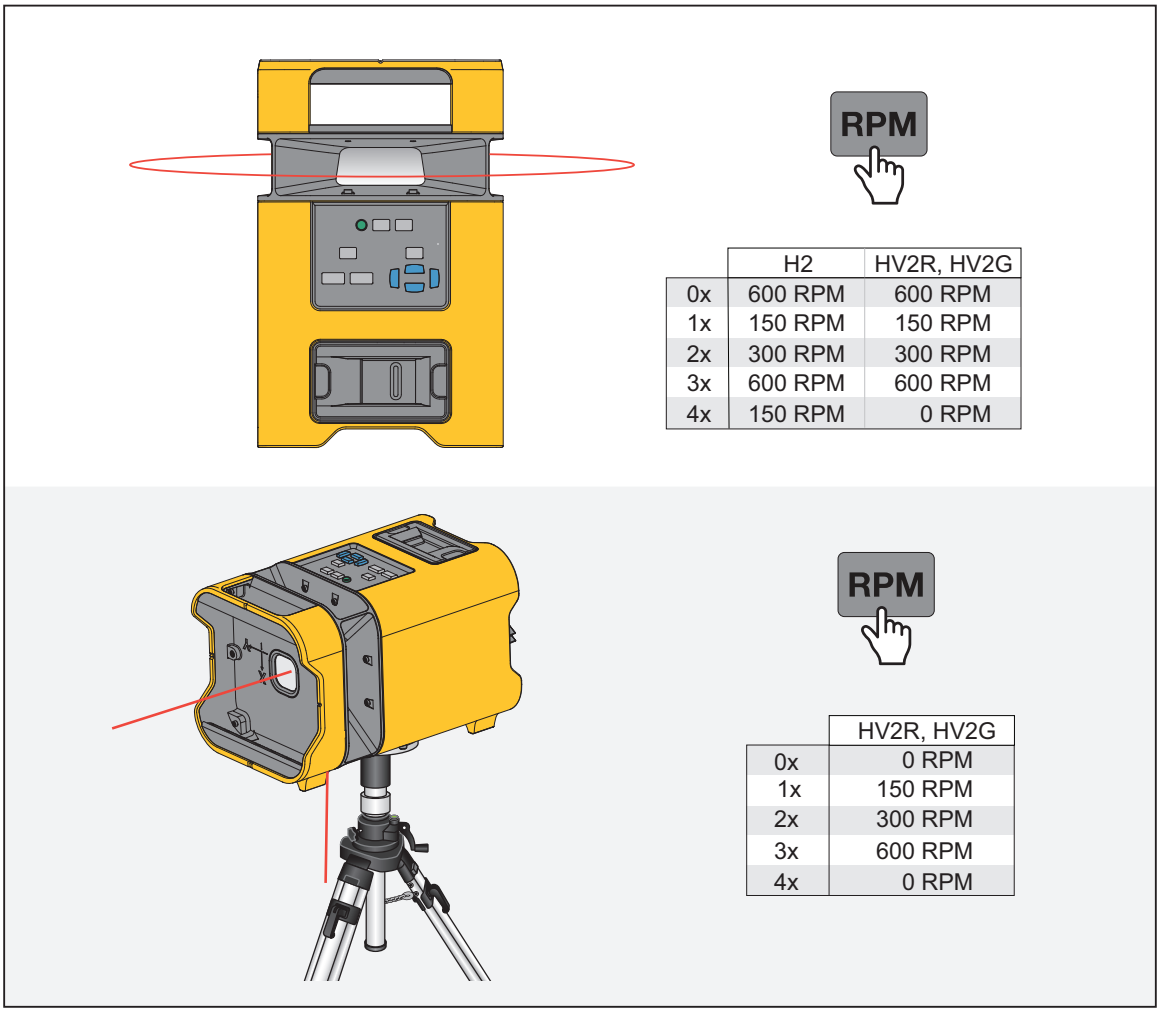
Power LED

The power LED indicates the state of the Product:

- Lights solid green when the Product is on.
- Blinks green at 1 second intervals after the Product runs, gets disrupted or bumped, and cannot self-level. Push ⏻ on the Product twice to turn off and on the Product to reset the rotary laser.
- Blinks green at 10 second intervals when the Product is in standby mode. Push ⏻ on the remote to turn on and off standby mode.

Revolutions Per Minute (RPM)

Figure 2 shows how many times to push RPM to cycle through the possible RPM settings.The default speed is 600 RPM.



	H2	HV2R, HV2G
0x	600 RPM	600 RPM
1x	150 RPM	150 RPM
2x	300 RPM	300 RPM
3x	600 RPM	600 RPM
4x	150 RPM	0 RPM

	HV2R, HV2G
0x	0 RPM
1x	150 RPM
2x	300 RPM
3x	600 RPM
4x	0 RPM

Figure 2. Revolutions Per Minute (RPM)

Manual Mode

Use manual mode to keep the lasers visible when you tilt the Product >5 ° or to enable the x axis and y axis buttons to align items diagonally, such as a stair rail. The laser does not self-level in manual mode.

To use manual mode, push **M**. The manual mode LED lights green. See Figure 3.

To use the x axis and y axis buttons to adjust the angle of the rotary laser:

1. Turn on manual mode.
2. Push:

   to pivot the rotary laser up.

   to pivot the rotary laser down

   to roll the rotary laser to the left.

   to roll the rotary laser to the right.
3. To return to self-leveling mode, push **M** to turn off manual mode.

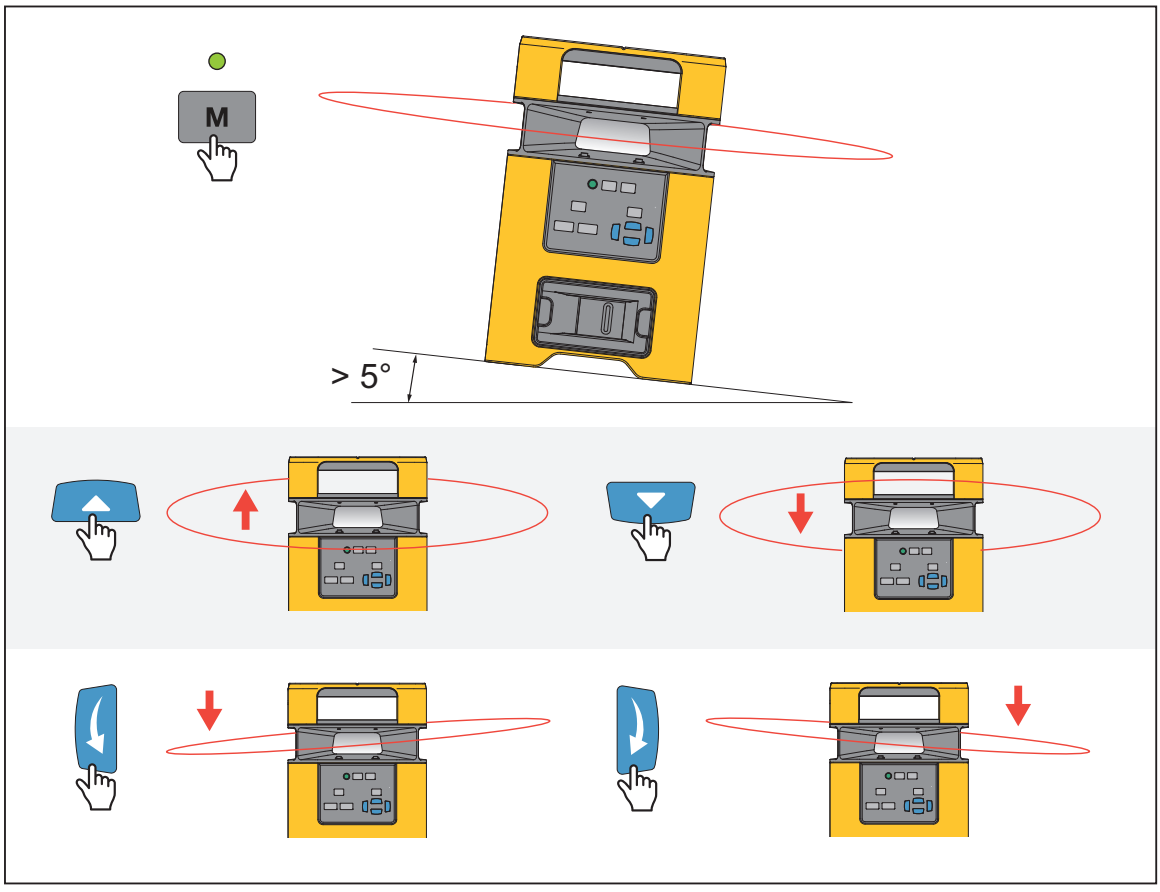


Figure 3. Manual Mode

Scan Mode

Use scan mode to set the rotary laser to oscillate at an arc less than 360 °. The default arc is 10 °.

To use scan mode:

1. Push [⌓] to enable scan mode and to set the arc length. Figure 4 shows how many times to push [⌓] to cycle through the possible arc lengths.

Note

When used in 0 ° point mode, the Product automatically reduces the maximum power of the laser for safety.

2. Push [⟵] or [⟶] to move the position of the laser counterclockwise or clockwise by one arc length, respectively.
3. Push [RPM] to disable scan mode to use the Product in full rotary laser mode.

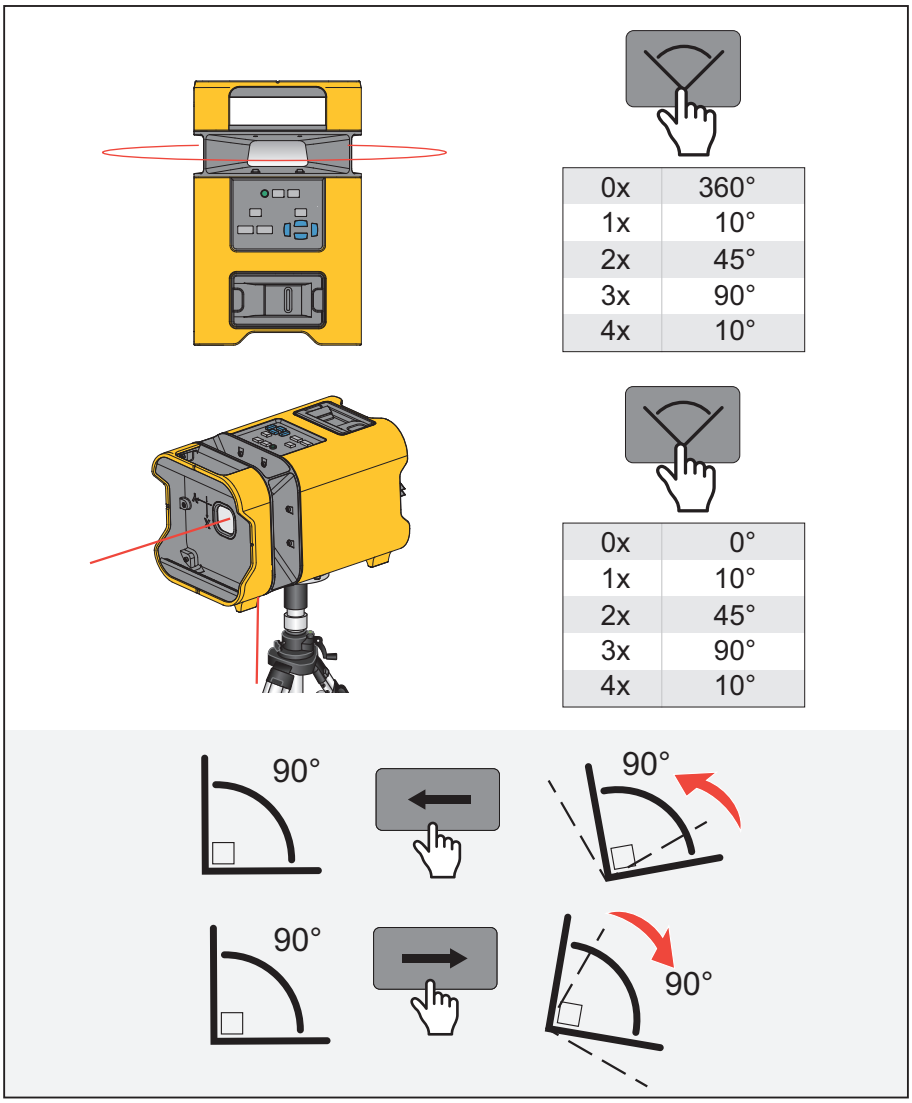


Figure 4. Scan Mode

Level Marks

New Level or Grade Marks

To identify new level and grade marks:

1. Put the bottom of the Product on a stable surface. See Figure 5.
2. Place a mark at the level or grade point on the target area.
3. Repeat for each point as needed.

Note

When the Product is mounted on a tripod, make sure the tripod head is perfectly level. Errors in marks can result if a tripod is out of level.

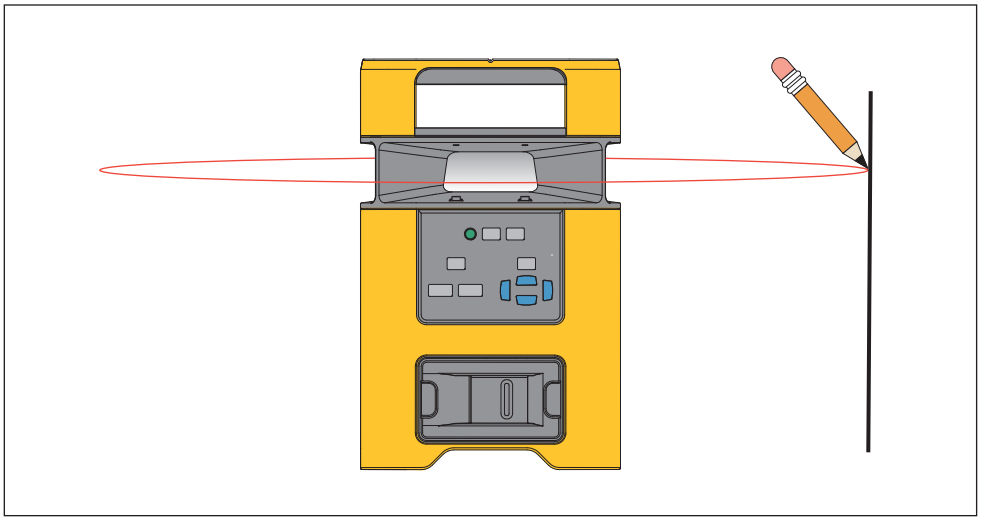


Figure 5. New Level Mark

Existing Item Level Check

To determine if an existing item is level:

1. Point the horizontal laser at the target area.
2. Measure the distance from the item to the laser. See Figure 6.
3. Repeat step 3 at various distances from the Product.

   If the measurements are the same from each distance from the Product, the condition is level.

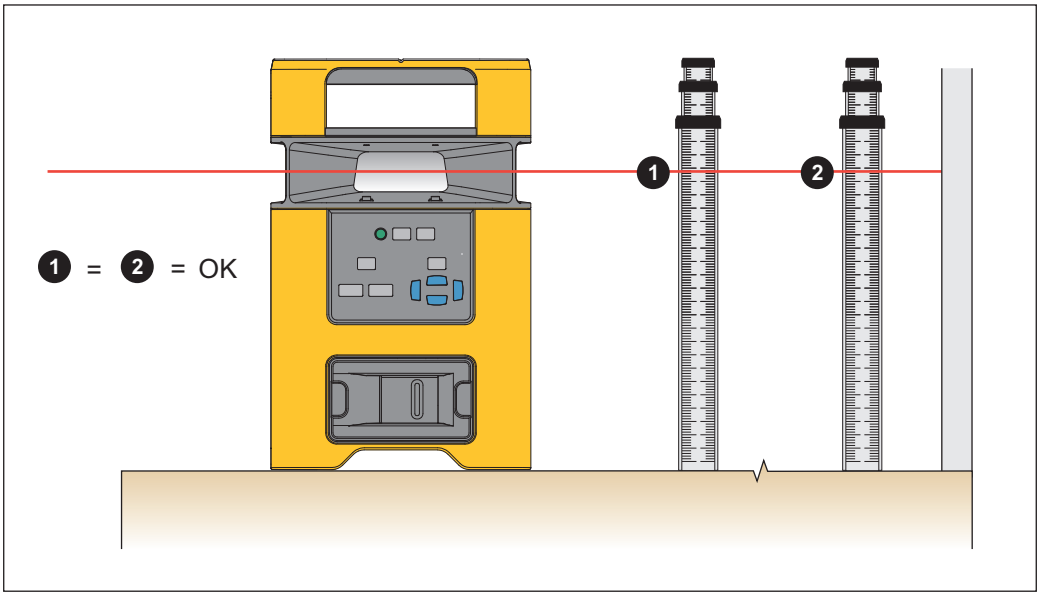


Figure 6. Level of Existing Item

Check Accuracy of the Product

Periodically check the accuracy of the Product.

To check the accuracy of the rotary laser:

1. Find a horizontal site that is almost level, preferably a concrete slab, that is ≥15.24 m (50 ft) wide from a wall to use as a target. See Figure 7.
2. Place the Product 50 ft from the target with the control panel facing towards you.
3. Point the horizontal laser at the target.

4. Place a mark ❶ at the point where the horizontal laser intersects the target area.
5. Turn the Product 180 ° on its center so that the horizontal laser intersects with the target.
6. Place a mark ❷ at the point where the horizontal laser intersects the target area.

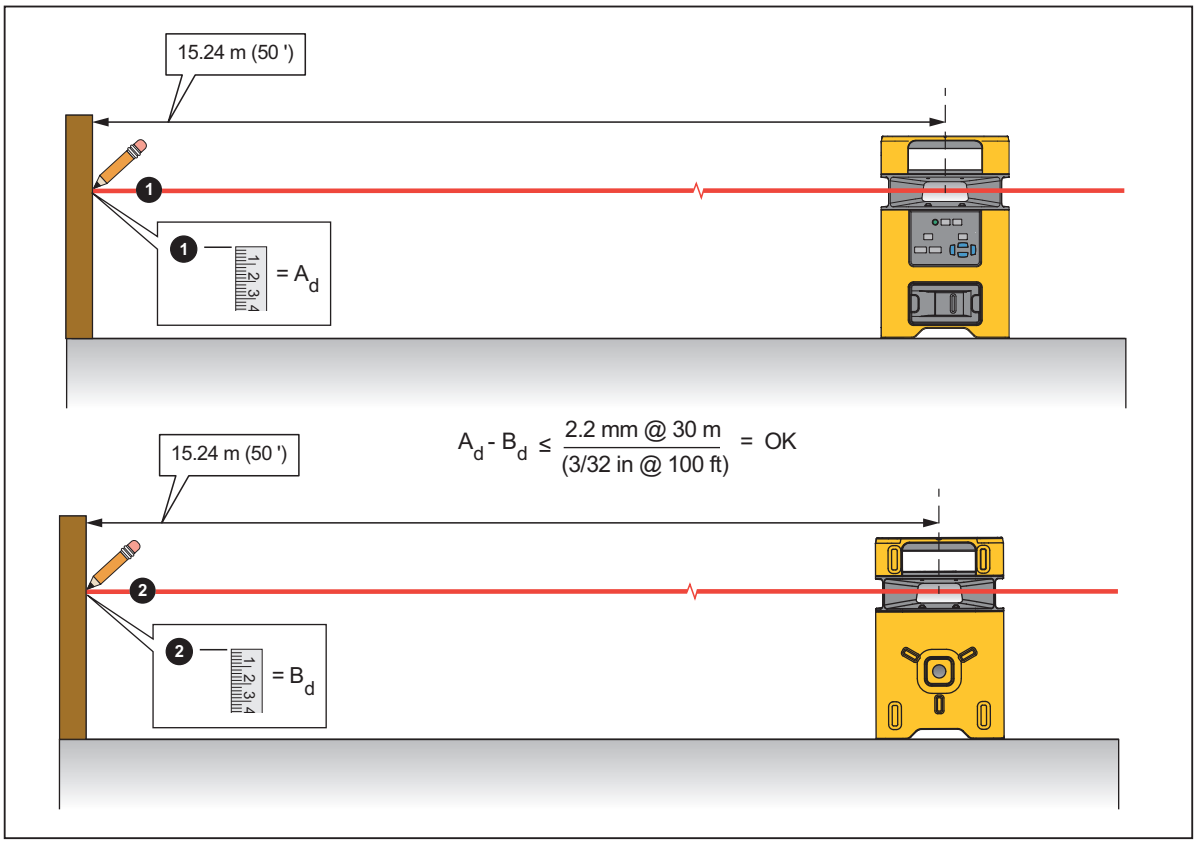


Figure 7. Level Accuracy

7. Measure the distance between mark ❶ and mark ❷.

   If the distances are the same, the laser is level.
8. If the distances are not the same, subtract the lesser measurement from the greater measurement.

   If the distance is ≤2.2 mm at 30 m (≤3/32 in at 100 ft), the laser is within calibration accuracy. If the Product is not within accuracy, contact Fluke. See *How to Contact Fluke*.

Accessories

Table 5 lists the accessories available for the Product.

Table 5. Accessories

Model	Description	PN
PLS RC2	Rotary laser remote control	5022564
PLS XLD	Rotary laser detector with clamp	5037696
PLS XLD CLAMP	Rotary detector clamp	5037709
PLS C19	Rotary laser carrying case	5022586
PLS BP10	Alkaline battery compartment for H2, HV2	5022599
PLS RBP10	Rechargeable battery for H2, HV2	5022607
PLS BC20	Ac battery charger for PLS RBP10	5022618
PLS WCB10	Wall and ceiling mount	5022641
PLS GR16	Grade rod with US and metric units	5022652
PLS TPOD500	Elevating tripod	5022665
PLS RRT4	Red magnetic reflective target	5022629
PLS GRT4	Green magnetic reflective target	5022634

Maintenance

To maintain the Product, clean the case and optical windows and replace the batteries.

⚠⚠ Warning

To prevent eye damage and personal injury, do not open the Product. The laser beam is dangerous to the eyes.

⚠ Caution

To prevent damage to the Product, do not drop the Product. Treat the Product as a calibrated instrument.

Clean the Product

Clean the case with a damp cloth and a weak soap solution.

⚠ Caution

To prevent damage to the Product, do not use abrasives, isopropyl alcohol, or solvents to clean the case or optic windows.

To clean the optical windows, use a pressurized can of air or a dry nitrogen-ion gun, if available, to blow off particulates from the optical surfaces.

Batteries

The power LED indicates the state of the Product:

- Does not emit light when the battery power is ≥20 % or when the battery power falls below the low battery threshold. When the battery falls below the low battery threshold, the Product turns off.
- The battery LED Blinks red between 20 % battery power and the low battery threshold. The Product still functions accurately.

Replace or charge the batteries when the battery LED blinks red.

To install or replace the batteries (see Figure 8):

1. Remove the alkaline battery compartment or the rechargeable battery.
2. Install 4 D batteries. Observe the correct polarity.

   Or,

   Charge the rechargeable battery for 8 hours.
3. Replace the battery compartment or rechargeable battery.

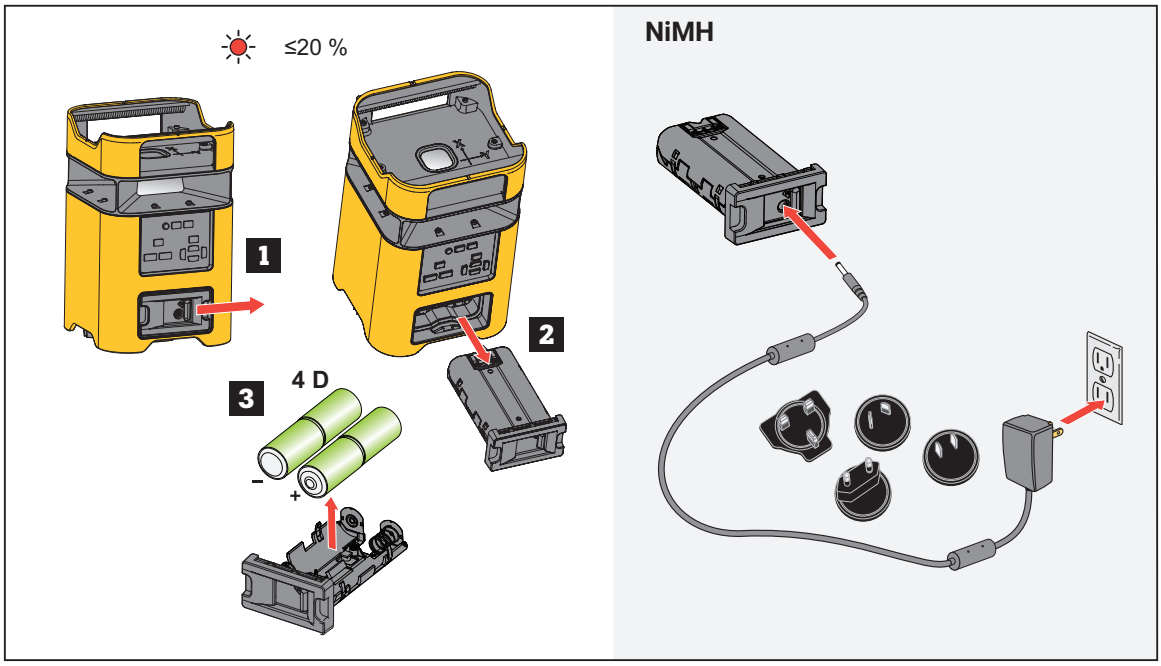


Figure 8. Battery Replacement and Charging

Specifications

	H2	HV2
Battery	4 x D Alkaline IEC LR6, rechargeable NiMh battery pack	
Battery life, continuous use, as tested		
Red	≥60 hours	≥60 hours
Green	NA	≥60 hours
NiMh battery charge time	8 hours	
Accuracy	≤2.2 mm at 30 m (≤3/32 in at 100 ft)	
Working range		
Without XLD laser detector	≤30 m (100 ft)	
With XLD laser detector	≤300 m (1000 ft) radius	
Rotary range	150 RPM, 300 RPM, 600 RPM	0 RPM, 150 RPM, 300 RPM, 600 RPM
Laser leveling range	5 ° ±5 °	
Manual slope range	5 ° ±5 °	
Temperature		
Operating	-20 °C to 50 °C (-4 °F to 122 °F)	
Storage		
With Batteries	-18 °C to 50 °C (-0.4 °F to 122 °F)	
Without Batteries	-20 °C to 70 °C (-13 °F to 158 °F)	
Relative Humidity	0 % to 90 % (0 °C to 35 °C) 0 % to 75 % (35 °C to 40 °C) 0 % to 45 % (40 °C to 50 °C)	
Altitude		
Operating	2000 m	
Storage	12 000 m	
Size (H x W x L)	274 mm x 174 mm x 184 mm (10.78 in x 6.85 in x 7.24 in)	
Weight	~2.89 kg (6.4 lb)	~3 kg (6.6 lb)
Drop Test	1 m	
Safety	IEC 61010-1: Pollution Degree 2	
Ingress Protection	IEC 60529: IP67	
Laser	IEC 60825-1:2014 Class 2	
Light Source	Semiconductor laser diode	
Max Output Power	<1 mW	
Wavelength		
Red	635 nm ±5 nm	635 nm ±5 nm
Green	NA	520 nm ±10 nm
Electromagnetic Compatibility (EMC)		
International	IEC 61326-1: Basic Electromagnetic Environment CISPR 11: Group 1, Class B	
Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself.		
Class B: Equipment is suitable for use in domestic establishments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.		
Emissions that exceed the levels required by CISPR 11 can occur when the equipment is connected to a test object		
Korea (KCC)	Class B Equipment (Broadcast communications equipment for home)	
USA (FCC)	47 CFR 15 subpart B. This product is considered an exempt device per clause 15.103.	