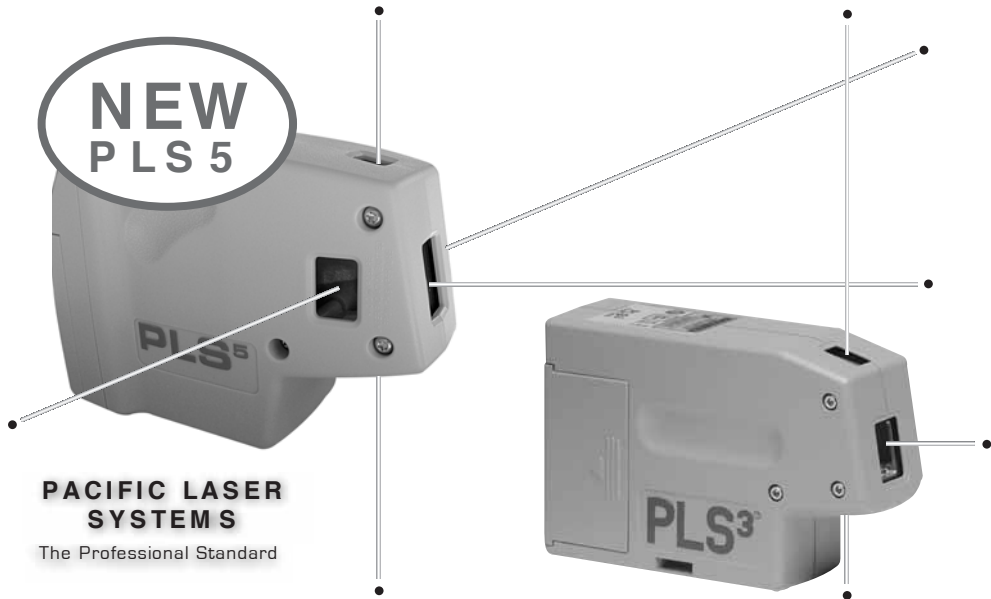


PLS OPERATING MANUAL

**NEW
PLS 5**



**PACIFIC LASER
SYSTEMS**

The Professional Standard

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Welcome to PLS laser tools. We believe you have chosen the finest laser tool in the world. We are committed to the highest quality standards in workmanship and materials.

PLS laser tools were developed by contractors to provide every trade with accurate and efficient alignment information. Thousands of our customers will attest to the savings of time and money through the performance, convenience and versatility of PLS laser tools. You can be confident of prompt service to your laser, should the need arise.

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About Pacific Laser Systems

The PLS family of laser tools was developed to give contractors the ability to transfer critical layout reference points for any job site task. All are self-leveling, compact and durable laser alignment tools.

What sets PLS • Pacific Laser Systems apart from the rest? Built by contractors for contractors, PLS tools were developed out of necessity by professionals with over 50 years of experience in commercial and residential interior and exterior layout. PLS founders were contractors first before becoming manufacturers of the finest point-to-point alignment tools in the world.

Point-to-point reference means you can plumb with a PLS5 or PLS3 literally from floor to ceiling or from 50 feet off the ground. With our PLS5, squaring or layout of 90° angles can be done faster than ever before.

About Pacific Laser Systems

Our target market is the professional contractor who needs a dependable alignment tool that will speed production and save money. General Contractors and project managers use the PLS laser to check existing conditions before work begins. They also use it to judge the work performed by subcontractors. Subcontractors use PLS lasers for layout on the job site. As much as 25% of the work day can be spent on layout. The PLS5 system gives square reference easily and quickly. No more 3-4-5. The unique PLS cantilever design allows easy sight of the opposing reference points and is proven to be effective in installing curtain walls, foundations, columns, skylights, doors, cabinetry and much more. The portability and utility of PLS lasers make them attractive alignment tools when bubble vial levels or rotary lasers are too cumbersome or too limited to do the job.

The PLS5 and PLS3 are registered trademarks of PLS•Pacific Laser Systems.
The PLS5 utilizes our patented technology, U.S. Patent No. 5,144,487.

Maintenance

Good care of the PLS³ or PLS⁵ is primarily common sense care. Remove the batteries from unit if the laser is to be stored for a considerable period of time. Keep the optic windows clean using a soft cloth or photographic grade cleaning tissue. Avoid storage conditions of prolonged heat or cold.

Warranty

This product is warranted by PLS • Pacific Laser Systems to the original purchaser to be free from defects in material and workmanship under normal use for a period of one year from the date of purchase. During the warranty period, and upon proof of purchase, the product will be repaired or replaced (with the same or similar model at our option), without charge for either parts or labor through PLS. The purchaser shall bear all shipping, packing and insurance costs. Upon completion of the repair or replacement, the unit will be returned to the customer, freight prepaid. The warranty will not apply to this product if it has been misused, abused or altered. Without limiting the foregoing, battery leakage, dents or gouges to the plastic housing, broken optic windows, damage to the switch/LED membrane are presumed to result from misuse or abuse. Tampering with or removal of the caution or certification labels voids this warranty.

Neither this warranty or any other warranty, express or implied, including implied warranties of merchantability, shall extend beyond the warranty period. No responsibility is assumed for any incidental or consequential damages. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

There is nothing an owner can do in the way of service or maintenance on PLS tools. Contact PLS or your local service center for repairs.

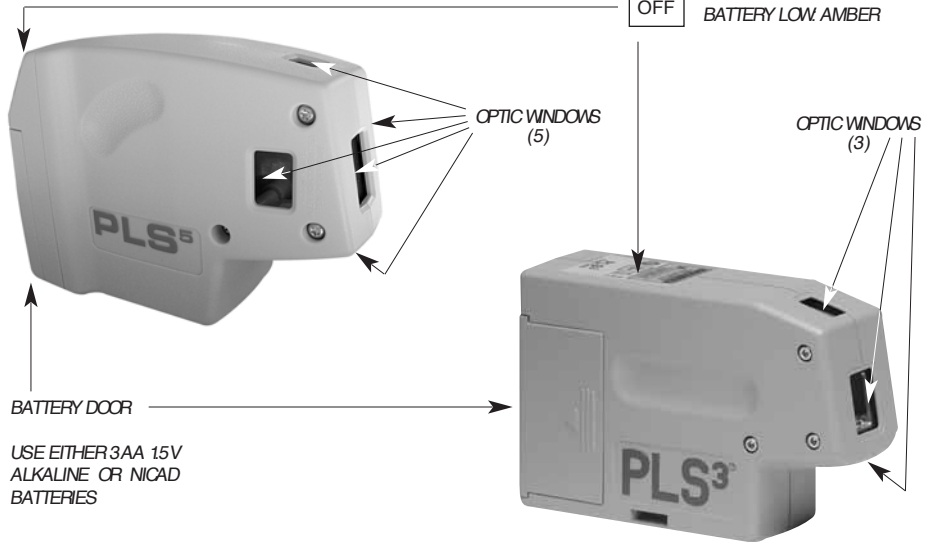
Features

1/4 X20 ACCESSORY MOUNT IN BASE OF EACH UNIT

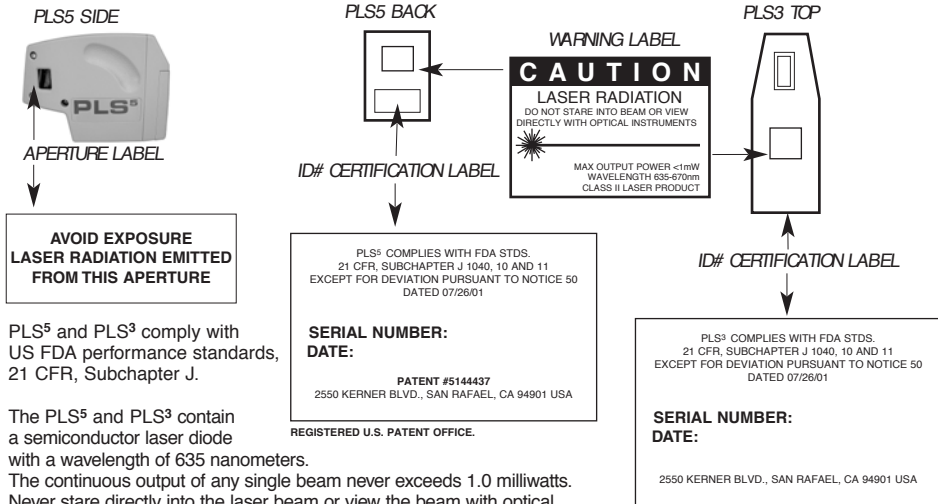
INDICATOR LED

ON
OFF

ON: GREEN
TILT: RED
BATTERY LOW: AMBER



Safety Labeling & Instructions



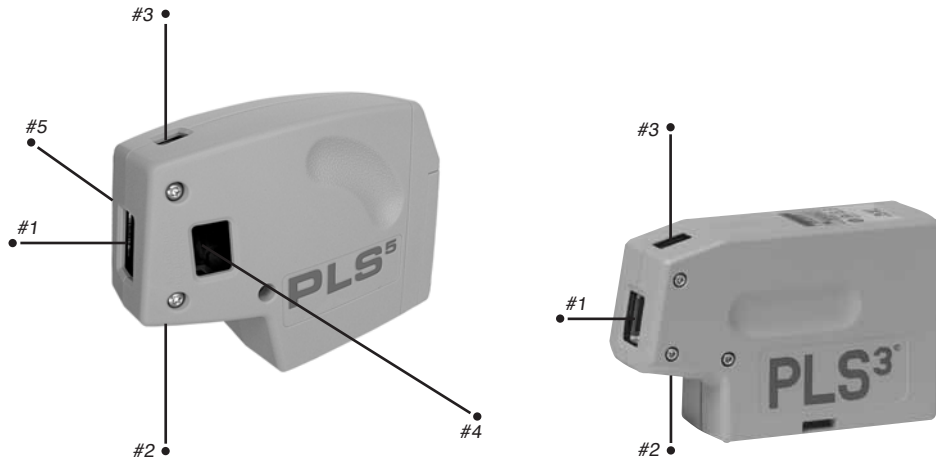
PLS⁵ and PLS³ comply with US FDA performance standards, 21 CFR, Subchapter J.

The PLS⁵ and PLS³ contain a semiconductor laser diode with a wavelength of 635 nanometers. The continuous output of any single beam never exceeds 1.0 milliwatts. Never stare directly into the laser beam or view the beam with optical instruments. Turn the laser off when not in use.

CAUTION: USE OF CONTROLS, ADJUSTMENTS OR PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

These labels are attached to every PLS laser. These are not to be removed or defaced.

Beams



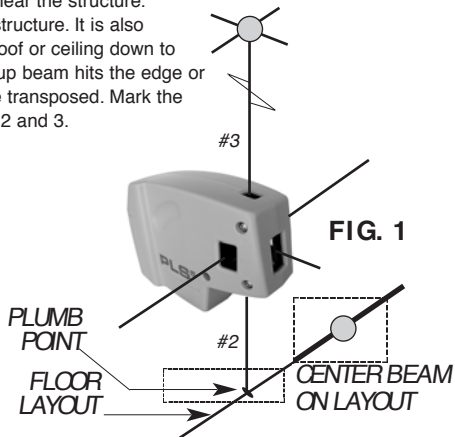
PLS⁵ The five beams of the PLS⁵ are: #1 Forward Beam, #2 Down Beam, #3 Up Beam, #4 Left Beam, #5 Right Beam. **All PLS⁵ beams have the same brightness and are square to each other.**

PLS³ The three beams of the PLS³ are: #1 Forward Beam, #2 Down Beam, #3 Up Beam.

Plumb

To establish plumb with the PLS⁵ and PLS³, place the #2 down beam over the mark to be transposed. See Fig.1. The #3 up beam is exactly plumb within specification. You can shoot plumb marks down and up, or cantilevered over the edge of a building/shaft opening or floor track, etc. See Fig.2. Use the floor stand with your PLS⁵ or PLS³ to increase the sight angle of the #2 down beam.

The PLS³ and PLS⁵ can quickly survey existing conditions for plumb. Use a tape and #3 up beam. Position the laser near the structure. Check any distance up or down the structure. It is also possible to transpose marks from a roof or ceiling down to the floor. Move the laser until the #3 up beam hits the edge or center of the ceiling component to be transposed. Mark the floor at the #2 down beam. See Fig. 2 and 3.



Level

Precise level and grade marks are easily established with the PLS⁵ and PLS³. Swivel the unit about its center, stopping to mark the desired level or grade points. See Fig. 4. Any stable surface can be used. When mounted on a tripod or wall mount, swivel and mark. See Fig. 5. When turning your PLS⁵ or PLS³ on a tripod be sure tripod head is perfectly level. Error in marks can result with tripod out of level.

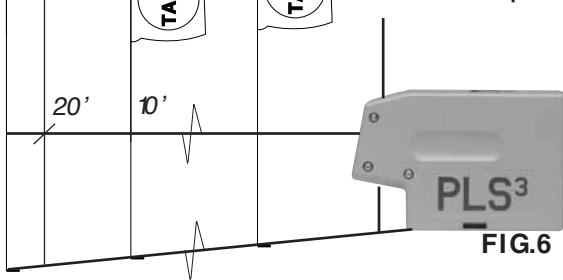


FIG. 6

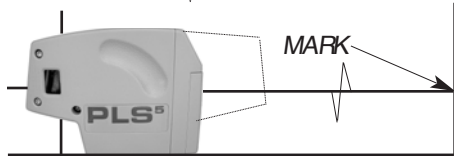


FIG. 4

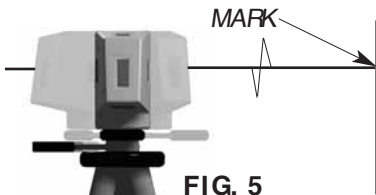
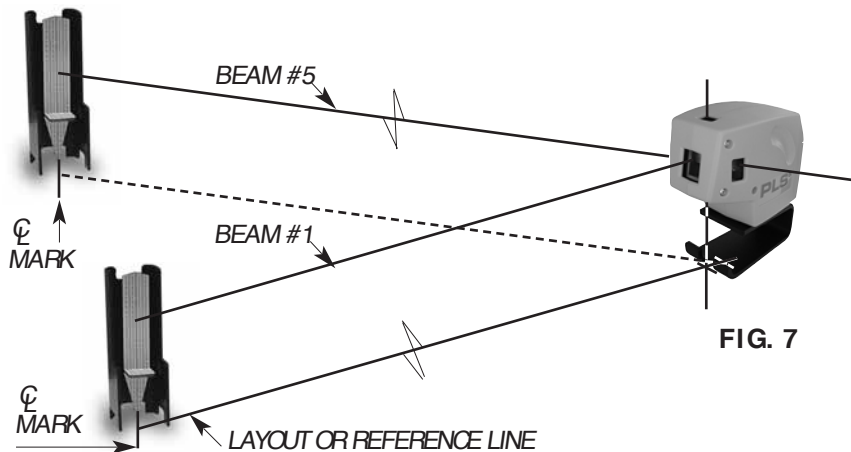


FIG. 5

To survey existing conditions for level, point in the direction to survey. Using a tape or rod with a bench mark, the variations in level or grade can be noted quickly at various distances. See Fig. 6.

Square

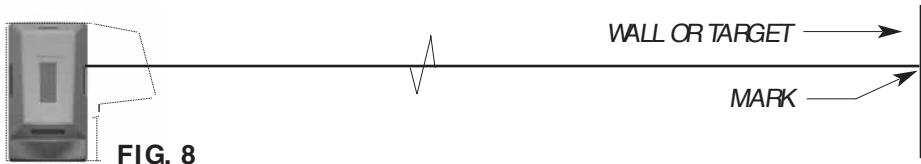
To establish square, place the PLS5 with the #2 down beam over the layout reference line. See Fig. 7. Place the pendulum target on that line, and center #1 forward beam on the center of the target. Once centered, move the pendulum target to square on #4 left beam or #5 right beam. Make a mark on the floor or surface near the laser and the second mark at the desired distance from the laser. See Fig. 7.



Checking Calibration

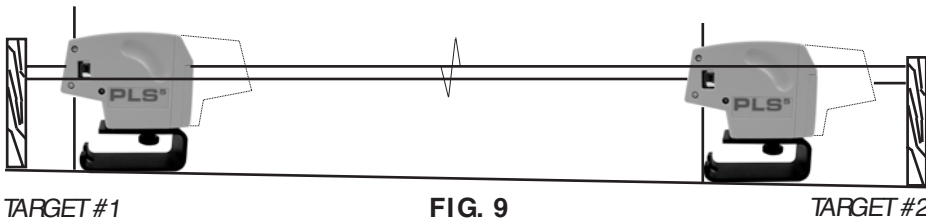
There are several easy methods to check the calibration and accuracy of the PLS⁵ and PLS³. **We recommend that you check this periodically.**

METHOD 1 (PLS⁵ only) Quick Check of Performance Accuracy. Place the PLS⁵ on a stable surface 25'-0" or more from a suitable wall or target. See Fig. 8. Point the #1 forward beam at the wall or target and carefully mark the center of elevation. Swivel the PLS⁵ 90° on its center until the #5 right beam is over the first mark. Check to see if there is any difference in elevation from the center of #1 forward beam and the center of #5 right beam. Repeat to check #4 beam. At 50'-0" the difference should not be greater than 1/8." At 25'-0" the difference should not be greater than 1/16."



Checking Calibration

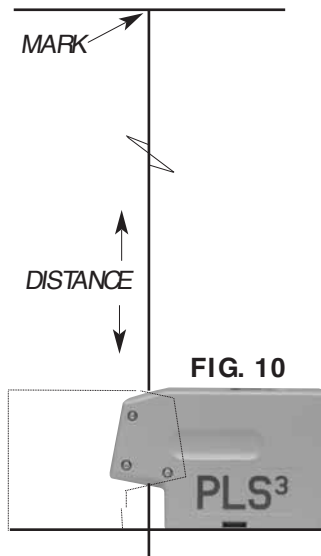
METHOD 2 (both PLS⁵ and PLS³) Exact Check of Level Accuracy. Find a fairly level site line (preferably a concrete slab) 25'-0" or greater with two opposing walls. You can also use scrap 2 x 4s, for example, as targets. See Fig. 9. Place the laser about 6" from target #1, and carefully mark the elevation of #1 forward beam on the target. Swivel the laser 180° on its center. Mark the elevation center of #1 forward beam on target #2. Move the laser to target #2. At 6" from the target, mark the center of elevation of #1 forward beam on target #2. Swivel the laser on its center and mark center of elevation at target #1. You now have two centers of elevation at each target. Carefully measure the distance between centers of each set of marks. If the distance is the same, the laser is exactly level. If there is a difference, subtract one measurement from the other. This method magnifies any error by a factor of two. Therefore, divide this difference by two to find the exact error of level. The maximum error for the PLS⁵ is 1/16" at 25'-0" or 1/8" at 50'-0." The maximum error for the PLS³ is 1/8" at 25'-0" or 1/4" at 50'-0."



Checking Calibration

METHOD 3 (both PLS5 and PLS3) Exact Check of Plumb Accuracy. This requires significant vertical height (minimum 10'-0") and the ability to mark at that height. Place the unit with the #2 down beam exactly centered on both axes over a cross mark. See Fig. 10. At the surface above, mark both axes of #3 up beam. Rotate the laser 180° and place the #2 down beam exactly centered on the same mark. The #3 up beam should be exactly over the first mark.

If there is a difference between mark #1 and mark #2, the error of the plumb beam is one half that difference.



Magnetic Bracket Instructions

To use the magnetic bracket with the PLS laser:

1. Screw the 1/4 x 20 threaded knob to the mount on the base of the PLS laser.
2. Mount the PLS laser and bracket to steel studs, steel door frame, I-beams, carpenter's square, etc.
3. Rotate the PLS laser to desired point and make your mark.

Combine the PLS laser, the magnetic bracket, a standard steel carpenter's framing square and one or more clamps and you have the ability to mount the laser in unlimited ways. Clamp carpenter's square to concrete forms, ladders, wood studs, etc. Attach the PLS laser with magnetic mount as described above. If you drill two small holes centered on the long section of the carpenter's square, the square can be attached to unfinished drywall partitions with screws or removable nails. Slide the PLS laser up and down the mounted carpenter's square to the precise desired height.



FIG. 11

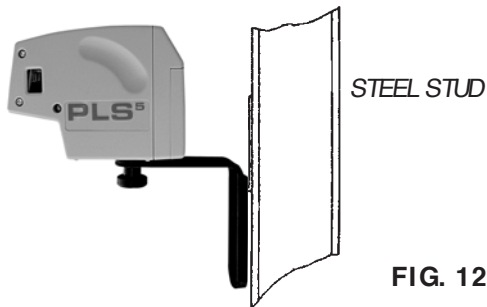


FIG. 12

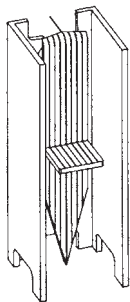
Pendulum Target

Use the PLS⁵ pendulum target for a variety of time saving alignment tasks. For square: For consistent accuracy in establishing or checking square, use the PLS⁵ target to transfer the laser beam to the floor surface. To establish square, see page 8 of this manual. Always mount the PLS⁵ laser on the floor stand when establishing square. The pendulum target is designed so the beams are best seen at this height.

For transfer of vertical lines:

To transfer vertical marks quickly and accurately to a wall:

1. Place the front of the PLS⁵ laser against the wall with the #1 forward beam on the mark to be transferred. (If the mark is on the floor, place the #2 down beam over the mark.)
2. Place the target with its back flat against the wall at the desired height and move the target until the #3 up beam is centered on the plastic lined target.
3. Mark the top or bottom of the target arrow pins.



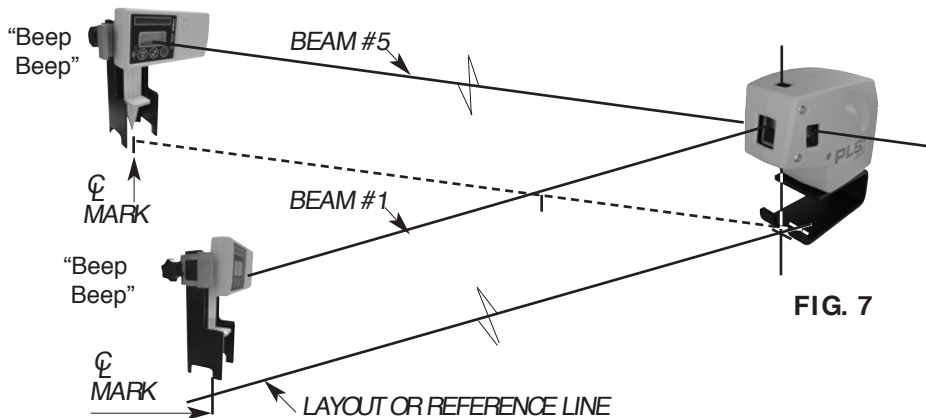
PENDULUM TARGET

FIG. 13

PLS5 System Interior - Exterior System

The PLS5 is the only point-to-point layout tool for use on both indoor and outdoor job sites. Bright sunshine has traditionally limited the use of visible beam lasers to interior projects. The PLS5 partnered with our laser receiver gives the contractor the ability to accurately lay out a job site up to 250 + feet, even in the brightest outdoor conditions.

The PLS5 can also be used inside, without the receiver, for all point-to-point alignment tasks.



PLS5 Exterior Applications

CONCRETE CONSTRUCTION

- Layout of batter boards
- Layout & alignment for masonry projects
- Layout for saw cutting (control joints)
- Alignment of anchor & J bolts
- Layout & alignment of piers and column footings
- Layout of form boards for concrete flatwork

ELECTRICAL AND MECHANICAL CONSTRUCTION

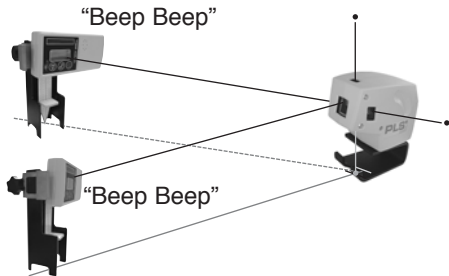
- Rough-in of conduit
- Rough-in of waste and supply lines
- Rough-in of natural gas supply lines

FRAMING CONSTRUCTION

- Layout of control lines on concrete slabs, decking and sub-floors
- Alignment of exterior heavy gauge steel framing
- Layout & alignment for commercial & residential wood framing

GLAZING CONSTRUCTION

- Layout & install of curtain walls & storefront projects.



Specifications

| | PLS5 | PLS3 |
|--------------------------|--|--|
| Light Source: | Semiconductor laser diode 630-650nm, visible | Semiconductor laser diode 630-650nm, visible |
| Working range: | +/- 100 feet | +/-100 feet |
| Accuracy: | < 1/8" @ 100 feet (<3mm @ 30 meters) | < 1/4" @ 100 feet (<6mm @ 30 meters) |
| Leveling: | Automatic | Automatic |
| Leveling range: | +/- 6° | +/- 6° |
| Power supply: | 3 AA batteries, alkaline or Ni-cad rechargeable | 3 AA batteries, alkaline or Ni-cad rechargeable |
| Operating time: | + 30 hrs. continuous use | + 30 hrs. continuous use |
| Operating temp.: | 0° F to 122° F (-18° C to 50° C) | 0° F to 122° F (-18° C to 50° C) |
| Storage temp.: | -40° F to 158° F (-40° C to 70° C) | -40° F to 158° F (-40° C to 70° C) |
| Indicators: | Green light: ON Red light: EXCEEDS TILT Amber light: BATTERY LOW | Green light: ON Red light: EXCEEDS TILT Amber light: BATTERY LOW |
| Environmental: | Water resistant; not submersible | Water resistant; not submersible |
| Dimensions: | 2" X 4" X 4 3/4 " | 1 3/4" x 5" x 3 1/4" |
| Weight (with batteries): | 1.13 lbs. (.52 kg.) | 12 oz. (.33 kg.) |



PLS Lab Technicians

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