

Laser Levels:

Bet You Can't Buy Just One

Combining the capabilities of dot, line, and rotary lasers will send your other layout tools into retirement while saving time and improving accuracy

BY GARY M. KATZ



DOT



LINE



ROTARY

When my editor asked me to do a head-to-head test of laser levels, I was confused. I explained that there are three general types—dot, line, and rotary—with dozens of models to choose from.

“Let’s test the levels most of our readers are likely to use,” he replied, pushing to narrow the focus. “Doesn’t one type of laser level do it all?”

No. There’s no such thing as a laser level that does it all. But each type of laser performs a variety of leveling and layout tasks, and of course, there are ranges of function within each type.

Matching a level’s features with the type of work you do and the amount you’re willing to spend is the big challenge. You might end up with one laser or several. But if you make smart choices, these high-tech devices will save you huge amounts of time and trouble.

For greater accuracy, expect to pay more and see less

In laser levels, accuracy typically is measured in the amount of error over a certain distance. Several variables affect accuracy. The light-emitting diode is one. Although a bigger dot or broader laser line is easier to see, it’s also less accurate because

Dot lasers range in price from \$19 to well over \$500 and project a simple point. The least-expensive models shoot one dot off the end of a torpedo-type level and are for interior use only. The most-expensive units are self-leveling, shoot five dots, and can be used outside.

A dot laser won’t eliminate the need for a spirit level, but it can replace a water level, a transit, a builder’s level, and a plumb bob. Dot lasers are the brightest among the laser-level types; more-expensive units cast dots that are strong enough to see in a brightly lit room and outside.

The most useful models shoot plumb dots (one up and one down) as well as square dots (two horizontal dots that are level and square to one another).

Why you need one: Plumb dots are faster and more accurate than a plumb bob, and they’re not affected by wind or extreme height. Also, transferring lines from a floor to a ceiling, or from a top plate to a bottom plate, becomes a one-person, one-step process.

Square dots are useful for framing walls or squaring foundations. They make the method of measuring a 3-4-5 triangle nearly obsolete. Set up a square-dot laser on one corner, align the first beam with the edge of one wall, and the other beam casts a dot down the length of the adjacent wall. When a dot laser is used with a calculator to find precise diagonal length, laying out even the most complex wall system becomes a fast, easy, one-person job. Many carpenters avoid setting up batterboards, or at least reduce layout time dramatically, by using a dot laser.

Until recently, dot lasers were the smallest instruments available, so it’s no wonder they’re popular among framers and finish carpenters. Many fit easily in a tool belt, bucket, or box.

Photo left: Courtesy of DeWalt. Photos center, right: Courtesy of Stabila.

DOT LASERS GET YOU LEVEL, SQUARE, AND PLUMB



RoboToolz RT-7510-3

- Interior use
- Self-leveling
- Three dots: level and plumb
- Working range: 100 ft.
- Accuracy range: $\pm 1/4$ in. over 100 ft.
- Street price: \$129
- **Worth mentioning:** Comes with carrying case that attaches to tool belt. Can be recalibrated on-site. A pendulum lock automatically engages when the laser is off. www.robotoolz.com

Stanley FatMax PB2

- Interior use
- Self-leveling
- Two dots: plumb
- Working range: 100 ft.
- Accuracy range: up $\pm 1/8$ in. over 50 ft.; down $\pm 1/4$ in. over 50 ft.
- Street price: \$99
- **Worth mentioning:** Comes with a carrying case that attaches to tool belt. The built-in magnetic base adheres to pipe and metal studs. www.stanleytools.com



PLS5X

- Interior/exterior use
- Self-leveling
- Five dots: level, plumb, and square
- Working range: up to 250 ft. with detector
- Accuracy range: $\pm 1/8$ in. over 100 ft.
- Street price: \$500 without detector
- **Worth mentioning:** Comes with case and accessories. Works with a detector (\$160; sold separately). www.plslaser.com



Detector



Boring work gets easier with a specialized dot laser

Drilling through studs and joists for plumbing and electrical lines always has been a tedious job: repeated measurements, snapped lines, pitch calculations, and center marks on every framing member. The whole process often is made worse by poor lighting conditions in base-

ments, attics, or crawlspaces. Stabila's new HL-100 Laser Hole Locator (\$200; www.stabila.com), known as the "holes-in-a-row" laser, makes quick, easy work of locating holes for plumbing and electrical rough-in.

The Stabila HL-100 goes into the first hole and proj-

ects a laser dot to the second mark. A handy knob and a bubble vial on the back of the Hole Locator adjust the laser for level and for pitch up to $1/4$ in. per ft. After that, it's a simple matter of following the laser dot with your drill, from one joist or stud to the next.



LINE LASERS

level can be anywhere within the width of the projected light. Better-quality diodes emit tighter dots or lines. Most lasers emit red light, but some manufacturers are offering green lasers, claiming that green is more visible. While this might be true, the technology required to project green light requires significantly more power than red light, so batteries don't last as long.

The self-leveling mechanism built into more-expensive laser levels also has a bearing on accuracy. The mechanism contains a tiny internal pendulum as well as magnets that dampen the pendulum's movement, keeping the diode stationary when someone walks across the floor. Too much dampening can have an adverse effect on accuracy.

Although it's true that more-accurate laser levels usually cost more than less-accurate models, the degree of accuracy required really depends on the work you do. Not everyone requires 1/8-in. accuracy over 100 ft. Foundation and grading contractors may require that degree of precision, but many carpenters would be thrilled with reliable accuracy of 1/4 in. over 50 ft. When buying any laser level, check the accuracy rating given by the manufacturer, and make sure it meets the tolerances for the work you do.

Detectors make laser levels more versatile

In the past, many laser levels could be used only indoors, in rooms that weren't too bright. Today, improvements in laser technology have overcome both brightness and distance limitations. All three laser-level categories—dot, line, and rotary—feature models that can be used with a detector. This device can be positioned some distance away from the laser's diode and moved up or down until the detector picks up the level projection, blinking or beeping in response.

Teaming a laser level with a detector broadens the scope of the work you can do. When you can't see the line, the detector can. Used outdoors, the laser and detector work like a transit and rod. If handling a broad range of exterior layout tasks is important, make sure to look for a laser level that works with a detector.

Lasers find level in different ways

Lasers run the gamut when it comes to leveling systems. Manual-leveling models rely on knobs and vials, just like old-fashioned build-

Line lasers range in price from \$40 to more than \$600 and cast a line of colored light. Like inexpensive dot lasers, the simplest line lasers project from a torpedo or similar type of level. More-expensive models cast up to four lines 90° from one another.

Line lasers are not as bright as dot lasers, and they generally are limited to indoor use unless they are equipped to work with detectors. Also, the farther the line is cast, the more the beam degrades. In fact, some line lasers are difficult to detect in a large, bright room.

Why you need one: Line lasers can replace spirit levels, stringlines, plumb bobs, and sometimes water levels, but only newer incarnations of this laser type replace builder's levels.

Models equipped with level and plumb lines create a crosshair, which is helpful for centering layouts on projects like tile-work, cabinet installations, flooring, and more.

Lines cast by lasers generally are limited to less than 180°. If you're working on multiple walls in a room or home, you often have to turn the laser manually to cover the entire area. Some units, like the Pacific Laser Systems PLS360E, cast a 360° horizontal line but don't project a vertical line. Units equipped with a dot, like the Stabila LAX-100, enable extended working range outside.

Some pricier line-laser models offer the ability to lock the line at any angle, which is helpful when casting a parallel line to an out-of-level ceiling or installing handrails and skirtboards parallel to stairs.

SET THEM WHERE THEY NEED TO BE

Figuring out where to set up a unit sometimes can be a big hurdle in deciding how best to use it. This explains why most lasers come with accessories that offer a variety of mounting options. These options cover most job-site conditions and accommodate different trades. Other accessories, such as the Laserjamb (www.laserjamb.com), also are available. On the Laserjamb, the laser mounts to a telescoping pole via a tripod attachment and can be placed anywhere in a room with ceilings lower than 12 ft.



Tripod. Just about all lasers come ready to fasten to a tripod. Many rotary kits include the tripod and surveyor's rod.



Nylon strap. Several dot and line lasers come with a strap for suspending units from pipes, braces, and scaffolding.



Vacuum. Some small units come with a built-in vacuum-powered suction device that sticks to the wall and doesn't leave marks.



Wall brackets. Most rotary and many line lasers come with brackets that can be nailed to a wall or hung on a suspended ceiling track.

GIVE YOU LEVEL AND PLUMB LINES AT THE PRESS OF A BUTTON



Black & Decker CrossFire BDL310S

- Interior use
 - Self-leveling
 - Two lines: level and plumb
 - Working range: 40 ft.
 - Accuracy range: $\pm 1/8$ in. over 10 ft.
 - Street price: \$99
 - **Worth mentioning:** Mounting options include strap, wall-mount bracket, and tripod.
- www.blackanddecker.com



New pulsing line lasers overcome indoor limitations

Until now, line lasers have been limited to relatively small interior spaces, and they've been useless outdoors or in large, brightly lit areas. But a new pulsing technology introduced last year by PLS promises to make line laser levels much more versatile. This new type of laser emits a pulsing beam visible to handheld detectors, making the level effective in all lighting situations.

Other manufacturers have joined PLS in developing pulsing line laser levels. Johnson's AccuLine Pro 40-6660 shoots multiple lines (see below). All the lines have a pulse mode, so the tool works with a detector indoors or outdoors. Mounted to a rotating base and equipped with a degree scale and fine-adjustment knob, it's easy to turn exact angles using this instrument (\$900 at Amazon.com).

The PLS90 (\$695 with detector) is a more compact pulsing model that shoots two vertical lines at exact right angles and one plumb dot straight down. With no moving parts, a pulsing line laser is a good alternative for anyone not ready to invest in a rotary laser.

LaserMark ILMXTE

- Interior/exterior use
 - Self-leveling
 - Two lines: level and plumb
 - Working range: up to 100 ft. with detector
 - Accuracy range: $\pm 3/32$ in. over 30 ft.
 - Street price: \$299
 - **Worth mentioning:** This kit includes magnet, mini-tripod, and detector.
- www.cstsurvey.com



Detector

Stabila LAX-100

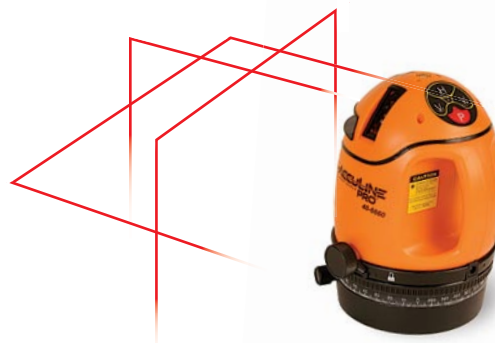
- Interior (dot for exterior)
 - Self-leveling
 - Two lines, one dot: level and plumb
 - Working range: 34 ft., lines; 130 ft., dot
 - Accuracy range: $\pm 3/8$ in. over 100 ft.
 - Street price: \$399
 - **Worth mentioning:** The unit can be rotated 360° within its protective base, and can be set up on uneven surfaces up to 8°.
- www.stabila.com



Mini-tripods. Many models come with folding stands that have multiple adjustments for setting up on uneven surfaces.



Magnets. Most often part of a separate mounting bracket, which comes with the tool, this method is useful for mounting to metal studs, ductwork, and garage doors.



er's levels. The least-expensive rotary levels have this feature. Self-leveling lasers come in two varieties. Some models must be placed on a surface close to level, within 3° to 5°. Others are equipped with a bubble vial that enables you to get the unit close to level (within 3° to 5°) before the laser's self-leveling mechanism can work. Dot and line lasers require a dampening system to help steady the line, preventing wild fluctuations caused by someone walking on a floor.

If you want a rotary laser level that does all the work of getting level, look for an automatic self-leveling model. For a significant jump in price (\$600 versus \$250), you'll get a tool equipped with sensors and motors for true automatic self-leveling.

Durability and portability are about more than the case

Lasers come in all sizes and shapes. To be useful, dot and line lasers must be small so that they're always available, on your tool belt or in your toolbox or bucket, right near where you're working. Dot lasers generally are the smallest and the most portable, though several companies manufacture smaller line lasers. Many larger line lasers come with built-in adjustable bases and some with built-in degree scales for turning accurate angles.

Most small dot and line lasers are encased in rubber and can survive a short fall, which is important because these instruments take a beating on the job site. I've dropped several of my line and dot lasers and never had a problem. Although not all manufacturers agree, I can't help but believe that a built-in locking mechanism—a lever that secures the pendulum when the tool is switched off—provides additional protection.

Rotary lasers are another story. With their expensive sensors and servomotors, auto self-leveling lasers always should be stored in protective cases and locked safely in a truck or van because these tools are susceptible to damage and theft.

A tripod isn't the only setup option

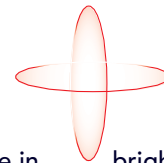
Perhaps the best thing about laser levels is that they don't require a whole lot of user interaction. When focused on performing a specific layout task, you simply place the laser somewhere, turn it on, and get to work. Lasers sometimes have to be set up in peculiar places, so manufacturers have produced creative mounting devices for a variety of setup scenarios.

All laser levels come ready to attach to a tripod. Although tripods are great for rotary lasers because they frequently are used outside, dot and line lasers require a little more flexibility.

As a carpenter, I've learned to appreciate the concept of utility. To be prized, like a set of scribes or a circular saw, a tool must perform several tasks, it must be portable, and it must be easy to set up and store in a toolbox or bucket. This is also true for laser levels. I've stopped looking for the perfect all-in-one laser level. I'd rather have a tool I can depend on, one that's there when I need it. And I've also learned as a contractor that it's good to have several lasers because the guys on my crew always need to borrow one.

One final note: The tools shown here were chosen to illustrate various functions available with each type. For more manufacturers, please visit our Web site at www.FineHomebuilding.com. □

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Rotary lasers range in price from \$250 to over \$2000 and shoot a single bright dot that spins to create a 360° line. When it comes to job-site productivity, including new construction, remodeling, and even foundation excavation, rotary lasers can't be beat. Less-expensive models are manual-leveling and less accurate (¼ in. over 100 ft.) than high-end models. The more-expensive units project a highly visible beam, automatically level themselves, and are more accurate (⅛ in. over 100 ft.).

Why you need one: Most rotary lasers have several speeds or variable speeds. At slow speeds, the dot is more visible, but the line might not be continuous. At higher speeds, the spinning dot creates a solid line, but the line won't be visible in bright light. In fact, rotary lasers are never visible outdoors, and only the most expensive units are powerful enough to cast a visible line in a large,

bright room. But that's not a problem because rotary lasers are used almost exclusively with detectors.

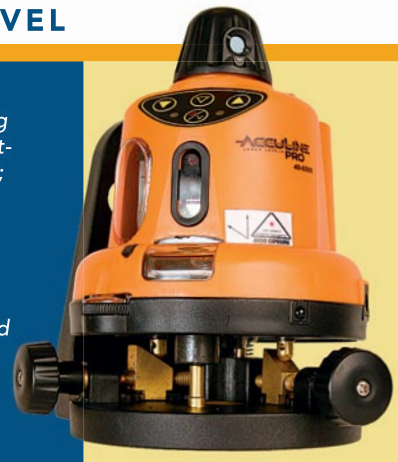
Using a detector might sound like a hassle, but actually, it's a joy. Set up a rotary laser near the center of a new job site, and one person working with a detector can set batterboards or formboards for footings, flatwork, or grading—alone.

Several rotary lasers also are engineered to cast vertical lines: Tilt the head of the instrument, and the tool can shoot plumb lines over long distances for framing tall walls or door openings, aligning special architectural features, or laying out a perfectly plumb elevator chase.

The rotary function can be halted so that the laser projects a simple dot. Many also have line settings, which enable you to cast a nonrotating line. Although some rotary lasers can take the place of a dot laser, rotaries don't project a crosshair like line lasers.

THREE DIFFERENT APPROACHES CAN GET A UNIT LEVEL

Manual-leveling *Much like earlier laser levels, manual-leveling rotary levels require a bit of adjustment. Most are simple to operate; they have one or two bubble vials and adjustment knobs built into the unit. Whether you're shooting level or plumb, set up the device close to level, fine-tune the knobs until the bubble vials are level, and you're ready to go.*



ROTARY LASERS PROJECT LINES THE FARTHEST



DeWalt DW071-K1

- Interior/exterior use
- Manual-leveling
- Level and plumb dot and rotary functions
- Diameter range: up to 600 ft. with detector
- Accuracy range: $\pm 1/4$ in. over 100 ft.
- Street price: \$250
- **Worth mentioning:** Kit includes wall-mounting bracket. Tool has out-of-level shutoff. Works with detector (\$130; sold separately). www.dewalt.com



LaserMark LM800DI

- Interior/exterior use
- Automatic self-leveling
- Level, plumb, and square dot, line, and rotary functions
- Diameter range: up to 2800 ft. with detector
- Accuracy range: $\pm 1/16$ in. over 100 ft.
- Street price: \$980
- **Worth mentioning:** Kit includes detector, rechargeable battery, wall-mounting bracket, and remote control. Laser is equipped with battery-level indicator and out-of-level shutoff. www.cstsurvey.com



Stabila LAR-100

- Interior/exterior use
- Automatic self-leveling
- Level, plumb, and square dot, line, and rotary functions
- Diameter range: up to 980 ft. with detector
- Accuracy range: $\pm 1/8$ in. over 100 ft.
- Street price: \$1199
- **Worth mentioning:** Kit includes detector, remote control, and wall-mounting bracket. Equipped with out-of-level shutoff. Can project lines at a slope. www.stabila.com



Self-leveling The best dot and line lasers are self-leveling. The pendulum-and-magnet leveling mechanism is simple and reliable, with few moving parts and a compact size. For the self-leveling feature to work properly, you set the unit roughly level (within 3° to 6°, depending on the model), and the pendulum and magnets take over, leveling the unit.



Auto self-leveling These lasers are equipped with sensors and a servomotor that level the instrument perfectly as soon as it is switched on. One important point to note about automatic self-leveling lasers: They need an automatic shutoff, just in case the tool or tripod is kicked and knocked out of level. Without this shutoff, the instrument could relevel automatically—without the operator's knowledge—at a new elevation.

