For basic leveling applications, there isn’t a better, faster, or more accurate way of aligning surfaces to earth level than the L-730 Precision Leveling Laser. For applications that require greater accuracy, we also offer the L-740 Ultra-Precision Leveling Laser, which is 4 times more accurate.

The L-730 was designed for leveling applications requiring 0.00012”/ft. (0.013 mm/M) accuracies or higher. The system is an extremely portable, yet affordable alternative to traditional leveling methods like theodolites or transits. An automatically sweeping laser plane and wireless, large-range targets with 0.00002” (0.0005 mm) resolution create a powerful tool for quickly alignment almost any surface or machine bed.

**L-730/740 Capabilities**
- Flatness and level of surfaces up to 100 feet (30 M), such as machine beds, machine tables, large parts, flanges, surface plates
- Bed rail twist
- Parallelism of multiple surfaces

**The L-730/L-740 Laser Systems**

**Automatically Rotating Laser Plane**
The L-730 and L-740 Lasers offer automatically rotating laser planes, unlike competitive “point-and-shoot” lasers. This saves a tremendous amount of time since you don’t have to point the laser at the target every time you want to take a data point. The lasers have a range of 100 feet (30 M) in radius.

**Highest Accuracy in the Industry**
The L-730 Precision Leveling laser offers a laser plane flatness of 2 arc seconds (.00012 in/ft or 0.01 mm/M), which is 2-4 times better than the competition. For extremely high accuracy applications, we also offer the L-740 Ultra-Precision Leveling Laser with a plane flatness of 0.5 arc seconds (.00003 in/ft or 0.0025 mm/M).

**Built-in Level Vials**
The L-730 and L-740 have 2 level vials built into the laser that are also accurate to 2 arc seconds. These levels can be calibrated in the field using an easy 15-minute procedure, and they usually hold calibration for several months. For high-accuracy leveling applications, the L-740 offers the L-740SP Split-Prism Level upgrade, which delivers accuracy to 1 arc second.
Wireless Targets and Readouts

Our A-1519-2.4ZB and A-1520-2.4ZB targets feature wireless communication to a ruggedized PDA (R-1355-2.4ZB), which can display up to five targets simultaneously with resolutions down to 0.00002" (0.0005 mm) and up to a 1" (25mm) measuring range. Other features like electronic zeroing and target averaging help to speed alignments. These wireless targets eliminate long extension cords for reference targets. They work with all of our continuously rotating laser plane systems and can be used up to 100' (30.5 M) from the laser.

Multiple Targets for Large Applications

Using Zigbee® Radio wireless technology, more than one target can be used, which is extremely useful on large surfaces or machine beds. This allows the use of multiple work crews, which can really speed alignments, and also allows targets to be used to monitor laser drift during the alignment, which is critical for good results on large machinery.

Real-Time Alignment Data

As with all Hamar Laser products, the L-730 Precision Laser Leveling System provides real-time alignment data. This means that you can put a target over a jacking bolt, begin adjusting it, and the reading automatically updates.

Minimal Training Needed

These systems are so easy to use that usually only requires one day of training (unless our Plane5 software is purchased with the system, which adds one day of training). Compared with optics, where training can last up to two weeks, the L-730 can significantly reduce the time that critical technicians are unavailable while being trained.

A-910-2.4ZB Wireless Computer Interface

The A-910-2.4ZB computer interface is a small, compact USB dongle wireless receiver that communicates with up to 99 2.4GHz ZigBee® targets with a wireless range of up to 200 feet (60 M). Power is supplied by the laptop computer’s USB port and the system IDs can be changed in the software.

Lightweight Auxiliary Readout Attaches Directly to Targets

The R-1308 Auxiliary Single-Axis Readout connects directly to the auxiliary (AUX) port on the side of the A-1519-2.4ZB/A-1520-2.4ZB Wireless Targets. The target position may be viewed in either inches or millimeters and the display shows readings in either Relative (Zero) or Absolute mode. The unit slides on the post of the magnetic base supplied with the target.

Versatile Plane5 Software for Recording and Analyzing Data

The L-730/L-740 Systems can be linked to our Plane5 analyzing software. Plane5 is Microsoft Windows-based and can analyze almost any layout for flatness or straightness.

Alignment System Features

- Continuously rotating diode laser with 100' (30.5 M) radius operating range.
- Instant “on” with virtually no warm up.
- Setup in as little as 10 minutes.
- L-730 Laser plane flat to 2 arc seconds (0.00012 in/ft or 0.01 mm/M).
- L-740 Laser plane flat to 0.5 arc seconds (.00003 in/ft or 0.0025 mm/M).
- Uses A-1519-2.4ZB Single-Axis Wireless Target with .00002" (0.0005 mm) resolution.
- R-1355-2.4ZB PDA Readout displays data for up to 8 A-1519-2.4ZB Targets simultaneously.
- Live data display.
- Backlit, precision level vials accurate to 2 arc seconds (.00012 in/ft).
- Upgrade to L-730SP Split-Prism Levels for 1 arc second accuracy.
- Uses AC adapter or battery pack.
- Win7/8/10 Plane5 software quickly records and analyzes flatness data.

Recommended System Configuration

<table>
<thead>
<tr>
<th>L-730 Precision Leveling Laser</th>
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<tr>
<td>A-1519-2.4ZB Single-Axis 2.4 GHz Wireless Target</td>
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<tr>
<td>R-1308 Auxiliary Readout</td>
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<td>A-910-2.4ZB Computer Interface</td>
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<tr>
<td>R-1388 Plane5 Software</td>
</tr>
<tr>
<td>A-809XL Shipping Case</td>
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</tbody>
</table>

Optional Accessories

| L-106 Instrument Stand |
| R-1355-2.4ZB Ruggedized PDA Wireless Readout |

High-Accuracy Flatness Laser & Target

<table>
<thead>
<tr>
<th>L-740 Ultra Precision Leveling Laser</th>
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<tr>
<td>A-1520-2.4ZB Single-Axis 2.4GHz Wireless Target</td>
</tr>
<tr>
<td>M-1519SP Surface Plate Measuring Base for A-1519-2.4ZB and A-1520-2.4ZB Targets</td>
</tr>
</tbody>
</table>
How the Alignment System Works

There are two ways of checking flatness on a surface:

- **Levels** - Using our built-in level vials and using Earth-Level as a reference.
- **3 Reference Points** - Using 3 reference points and aligning the laser to those points, which we call “bucking-in”.

The L-730/L-740 laser can do either method with ease.

Checking Flatness using Level Vials

1. To check flatness using the level vials, put the laser on an instrument stand or stable mounting surface and level in two axes.

2. Place an A-1519-2.4ZB/A-1520-2.4ZB target on one reference point, mark an outline around the magnetic base, and electronically zero the target by tapping the Zero button in the Read9 Software on the PDA.

3. The laser is now ready to measure the surface for levelness/flatness.

4. Move the target to a measurement point on the surface, where it displays the deviation of that point from the reference point. If the display shows a “+,” the measurement point is higher than the reference point. If it displays a “-,” the point is low relative to the reference point.
5. You can leave a target on the measurement point and if you need to level it, you can watch the data update live while you adjust the machine. When it reads zero, you’re done!

6. You can also check parallelism of a separate surface by moving the target to that surface. The difference from the zero point on the first surface is a measure of the elevation difference from the first surface to the second. For example, say you leveled the laser and zeroed the target on a point on surface #1. Then you moved it to the closest corner on surface #2 and you get -.015". This means that corner of surface #2 is lower by .015" relative to the first surface. Then if you move the target to another corner and get -.020", then this means surface #2 is not only lower by .015", but it is also not parallel (along 1 of the 2 axes) by .005".

7. Please note that if a machine bed is going to be aligned (leveled) rather than just measured, it is important to place the laser on an instrument stand. If the laser is on the same machine bed or table that needs to be aligned, adjusting it will most likely move the laser and affect the setup.

Checking Flatness with the 3-Point Buck-in Method (make parallel to)

Sometimes surfaces are flat but not level, so using level as a reference to check flatness may add unnecessary time and make a perfectly flat surface look like it’s out of specification. To solve this problem, we recommend using three points on a surface as the references, which provides a very accurate way to check surface flatness and eliminates errors caused by surfaces not being level. It also allows the use of reference targets to monitor laser drift, which is very important on large machine beds and parts. This is because small tilts in the surface the laser is mounted on become big movements in the laser when distances are greater than 15' feet (4.5 M).

1. Place the laser on an instrument stand or stable mounting surface and level in two axes. This makes the laser fairly close to being parallel to the surface.
2. Place an A-1519-2.4ZB/A-1520-2.4ZB target on one reference point (#1) right next to the laser, mark an outline around the magnetic base and electronically zero the target by tapping the **Zero** button in the Read9 Software on the PDA.

3. Move the target to the farther point (#2) along the Pitch Axis and mark the outline of the magnetic base.

4. Turn the Pitch Axis coarse and fine adjustment knobs until the PDA reads zero.

5. Move the Target back to Point #1 and re-zero. Repeat Steps 4 and 5 until you get zero at both Point #1 and Point #2.

6. Now move the target to the farthest point (#3) away from the laser on the Roll Axis.

7. Turn the Roll Axis coarse and fine adjustment knobs until the PDA reads zero.
8. Return the target to Point #1 to verify that it reads zero, then move it to Point #2 to verify that it reads zero. If so, the laser is now bucked-in (aligned) to 3 points on the surface and you’re ready to take data.

9. Move the target to a measurement point on the surface where it displays the deviation of that point from the reference point. If the display shows a “+,” the measurement point is higher than the 3 reference points. If it displays a “-,” the point is low relative to the reference points.

10. As discussed above, you can leave the target over an adjustment point and watch it update in real time. You can also measure parallelism as described above.
Using Plane5 Flatness Software

Instead of using our R-1355-2.4ZB PDA display, our Plane5 Software can be used with the L-730/L-740 to quickly download flatness data for analysis and reporting. Plane5 employs a least-squares, best-fit algorithm to eliminate slope errors in the data from the laser not being parallel to the surface. This can save time on the buck-in process.

Plane5 can plot the flatness for squares, rectangles, flanges, circles, surface plate Moody Method and also plot out parallel surfaces. It displays up to 5 targets at the same time and produces a color report that can be emailed.

Plane5 Features

**SELECTING PROGRAM OPTIONS**

When Plane5 loads, it searches the available COM ports for the target type and communication device connected to the computer and automatically selects the detected items when the **Program Options** screen displays. The **Program Options** screen also allows the user to set up parameters such as measuring units, the number of averages taken to minimize the effects of air turbulence and vibration on the readings, and plotting options.

**DEFINING A PROJECT**

The **Project Setup** screen allows the user to define a new project. Up to 3 surfaces, 1 horizontal and 2 vertical, and their shapes (square, rectangle, frame, circle, ring or up to 5 ways) can be selected. The X, Y dimensions of each surface and the number of points to be measured are entered. The laser setup wizard can then be used to aid in making the laser plane parallel to reference points.
TAKING DATA

The **Data Taking** screen displays a grid of one of the surfaces to be measured. Using the mouse, the cursor is moved to the first data point and the space bar is pressed to record the measurement. The software marks the recorded point with a circle and automatically moves to the next point. When the cursor is placed on a point already measured, the software displays the X, Y coordinate and the measurement. Data can be retaken for any point if necessary.

1. Place the laser on the surface and roughly level, making the laser plane approximately parallel to the surface.
2. Set up the target on one point and zero. The grid pattern is then laid out in Plane5 and on the surface itself. For repeatability, it is important to mark the data points on the surface.
3. Move the target along the surface and press the spacebar to record each data point. Once all the points have been taken, the software automatically calculates the flatness data and it can be reviewed in the report section of the software.

PLOTTING DATA

The **Data Plotting** screen graphically displays a 3-dimensional plot of surface flatness. Up to 3 surface plots (1 horizontal and 2 vertical) can be displayed on the graph. For each surface, the data is plotted and the least-squares best-fit plane is drawn.

The graph can also display high and low points, grid lines and the slope high point of the best-fit plane. A display box shows the X, Y coordinates and the measurement point where the cursor passes over each point on the graph. The TIR and the high and low points are also shown for each surface. The user can rotate each graph and zoom in on certain sections for detailed analysis.

Another plotting option is a parallel surface plot, depicting the parallelism of either vertical or horizontal surfaces and providing the results in either in./ft. or mm/M. This plot compares the slopes of the least-squares best-fit planes for both sets of data, providing the parallelism. Plane5 can also calculate the squareness between the LSBF planes of vertical surfaces to horizontal surfaces.
GENERATING REPORTS
Create and save a report from any recorded data. The user can select a variety of configuration options, including graphics of the plot and data tables for single or multiple surfaces. If multiple surfaces are measured, a comparison of the surfaces is provided.