Aligning Bores is Now Faster and Easier Than Ever
Why Lasers?

From the beginning, mechanical and optical methods of alignment in stem tube applications have been the tried and true methods for aligning stem tube bearings to drive-shaft gearbox rotation axes. However, there is a MUCH better way: lasers. It is an established fact that lasers offer faster and much more accurate alignments than optical or mechanical methods, and in most cases, are easier to learn and use. Here are just a few of the many advantages of lasers over traditional methods:

**10x Higher Resolution**
Sophisticated electronics are used to detect the position of the laser beam, offering extremely high resolution measurements, down to 0.0002" (0.5 microns)! Higher resolution means higher accuracy and the confidence that what you see is what you get.

**Higher Accuracy**
Lasers don’t have sag like tight wire. nor are they subject to interpretation of an operator’s eye like using optics. This means laser are much more accurate. Higher accuracy means longer bearing life and fewer breakdowns.

**Results 3x Faster Than Optical Bore Scopes or Tight Wire**
Setup takes 15 to 20 minutes and taking bore measurements is extremely fast. But the real time-savings is the live alignment data feature that allows the user to see the bore moving as its being adjusted. This feature means that overall alignments with lasers can be done up to 3x faster than with optical bore scopes or tight wire!

**More Accurate and Repeatable Measurements Than Optics**
With optics, the measurement process can be more of an “art” than a science, since one operator will “see” a different set of values than another. Conversely, laser systems use sophisticated electronic sensors to detect the laser, eliminating operator visual variability, and therefore offer greater accuracy and repeatability.

**Why Hamar?**

Over 47 Years of Laser Alignment Innovation
Hamar Laser has been providing highly accurate alignment systems to many different industries and applications. We started in the machine tool industry where tolerances are high and applications are difficult, and then 35 years ago we developed the world’s first steam turbine bore alignment system. We never looked back and since then have developed systems for engine-block bores, stem tube, heat exchangers, spherical bearings, extruders and many other bore applications! All of that experience and knowledge has gone into the design of the L-708/L-708LD Stern Tube Bore Alignment system, resulting in the most accurate, fastest and yet easy-to-use tool in the industry.

**Self-Centering Target Adapters**
Reduces Alignment Time by 50%
With conventional bore alignment methods, the bore fixture typically requires at least 2 measurements (one at 0° and another at 180°) to remove mounting errors and account for diameter changes. The bore fixtures also need to be square to the centerline. With Hamar’s patented, self-centering target adapter technology, diameter changes do not affect the accuracy, so only 1 measurement is needed and squareness of the adapter is not important (see sidebar). This means it literally takes about 10 seconds to insert the target/adapter into a bore to take a measurement. This saves a lot of time and also means lesser skilled techs can achieve excellent results.

**Minimal Training**
Easy to use means easy to train. Our laser setup is very similar to using tight wires. This means less training for your techs. Our systems only require 1 day of training or 2 if you purchase software. Training is held either at your plant or in our training facility in sunny Sarasota, FL.

**Adaptability**
Our lasers can easily be adapted to many different bore application from stem tube bore alignment to engine blocks and even large-bore gun barrels. Usually all that is needed is a few extra fixtures and maybe a specialized target.
Self-Centering Laser Adapters

Our patented A-514 self-centering laser and target bore adapters accurately and quickly position the laser and target on the bore centerline. The adapters can be centered to the bore to within 0.0008" (0.008 mm).

Large Range of Bore Diameters

The A-514 self-centering laser and target adapters have adjustable legs that allow adapters to be used for diameters ranging from 3.75" (95 mm) to 40" (1 M). Choose from three bore adapters: A-514A for bores from 3.75" (95 mm) to 7.05" (172 mm), A-514B for bores from 6.5" (165 mm) to 17.5" (445 mm) and A-514C for bores from 17.5" (445 mm) to 40" (1 M). A leg-setting gage and caliper also come with the system to set the legs to the nominal bore ID.

Key Features – L-708/L-708LD

Long Range, High Accuracy

The L-708 can be used out to 100 feet (31 m) and the L-708LD out to 200 feet (61 m). The laser beam is straight to 0.0008" mm/M.

400 Wireless Data Transmission

With a Zigbee wireless range of up to 400 feet (120 m), our R-1307-2.4ZB Readout can transmit its data to another readout or to a computer running our Bore9 software. This is especially helpful on long-distance stern-tube applications where constantly monitoring a reference target is a must.

Precise Laser Angular Adjustment

Precise angular adjustments provide angular pointing control of the laser beam, so it can be tilted with a resolution of 0.0007° in 100" (0.018 mm in 30.5 M). The L-708LD laser has an angular adjustment resolution of 0.0014° in 200" (0.036 mm in 61 M).

Large-Range Targets for Large Bores

For 200-foot measuring range, the laser drift on long-distance stern-tube applications. Both features super-linear 20x20 mm laser drift monitoring targets can be used to monitor laser drift on long distance applications. Both features super-linear 20x20 mm PIDs for high accuracy and large measuring range.

Laser Drift Monitoring Targets

Laser drift monitoring targets are available for the T-1202 and Z-1202 lasers. The targets can be configured to add an insertion pole to insert the target up to 25 feet (8 meters) into a bore or stern tube. This is very helpful where getting to the inside of the stern tube is hard to do.

Specialized Target and Accessory Options for Bore Alignment

Hunar laser offers several target and accessory options for specialized applications from 2-axis bore targets for bores ID’s down to 7/8" (18 mm) to a highly accurate 4-axis target. We are also happy to discuss customized targets if your application requires it. Here are a few examples:

4-Axis Target for Gearbox Shaft Axis Alignment to Stern Tube Bore

Adding our T-212 and 4-Axis Sparkle target to a fixture on the output flange of the gearbox and you can measure the center and angular alignment of the gearbox shaft axis or rotation relative to the stern tube bore.

Deep Bore Insertion Pole

Our T-1202 and 2.4ZB laser readouts can be configured to add an insertion pole to insert the target up to 25 feet (8 meters) into a bore or stern tube. This is very helpful where getting to the inside of the stern tube is hard to do.
Specs & Dimensions

L-708 / L-708LD Laser

Size (See line drawings)
1.6 lbs. (0.7 kg.)

Ambient Light Correction
Blinking laser provides ambient light protection by removing the effects of background light from the measurement improving accuracy

Power
9V external battery pack/AC adapter

Center
Laser concentric within .0003” (0.008 mm)

Angular Adj.
Controlled by two high-pitch adjustment knobs.

Resolution
Coarse: .0006”/ft. (0.05 mm/M)
Fine: .000007”/ft. (0.0006 mm/M)

Angular Adj.
Coarse: ± 1.0° (± .21”/ft. or 17.5 mm/M)
Fine: ± 0.03° (± .007”/ft. or 0.6 mm/M)

Range
Fine: ± 0.03° (± .007”/ft. or 0.6 mm/M)

Operating Distance
L-708: Up to 100’ (30.5 M)
L-708LD: Up to 200’ (61 M)

Laser Beam Diameter
L-708: < 0.25 in. (6.4 mm) dia.
L-708LD: < 0.38” (9.6 mm) dia.

Beam Straightness
.00001”/ft. (0.0008 mm/M)

Beam Stability
.0001”/hr./°F (0.004 mm/hr./°C)
.0001”/hr./°F (0.01 mm/hr./°C)

Laser Type
Diode Laser < 0.9 mW, CW, BRH Class II

Laser Wavelength
650 nanometers

Materials
Aluminum Flange. All mounting surfaces: 440 SS.

Targets and Bore Adapters

A-512 Target
Mounting Surface OD: 1.2498” (31.745 mm) Target sensor concentric to OD to within .0003” (0.008 mm) Mounting surface 440 SS

A-514A
Small Bore Target Adapter For bore diameters from 3.75” (95 mm) to 6.75” (172 mm)

A-514B
Medium Bore Target Adapter For bore diameters from 6.50” (165 mm) to 17.5” (445 mm)

A-514C
Large Bore Target Adapter For bore diameters from 17” (431.8 mm) to 40” (1 M)

A-514G

A-510
2-Axis Bore Target

A-510STA
Self-Centering Bore Hub for ID’s: 2” - 6” (51-152 mm)

A-510STA
Self-Centering Bore Hub for ID’s: 9” - 6” (229-152 mm)

M-705C
Set of 4 Adapter legs customized to each bore diameter

A-510SM
Small-Bore Self-Centering, 2-Axis Bore Target for ID’s: 1.5” - 3.0” (38 - 76 mm)

T-220
Super Small, Self-Centering, 2-Axis Bore Target for ID’s: 7/8” - 2.0” (18.50 mm)

T-218
2-Axis Bore Target with See-Through Capability 10x10 mm PSD

T-1220
2-Axis Bore Target with See-Through Capability 20x20 mm PSD