

Application Note

Transfer-Line and Rotary Dial Machine Spindle Alignment

System Recommendations

L-700 Spindle Alignment System



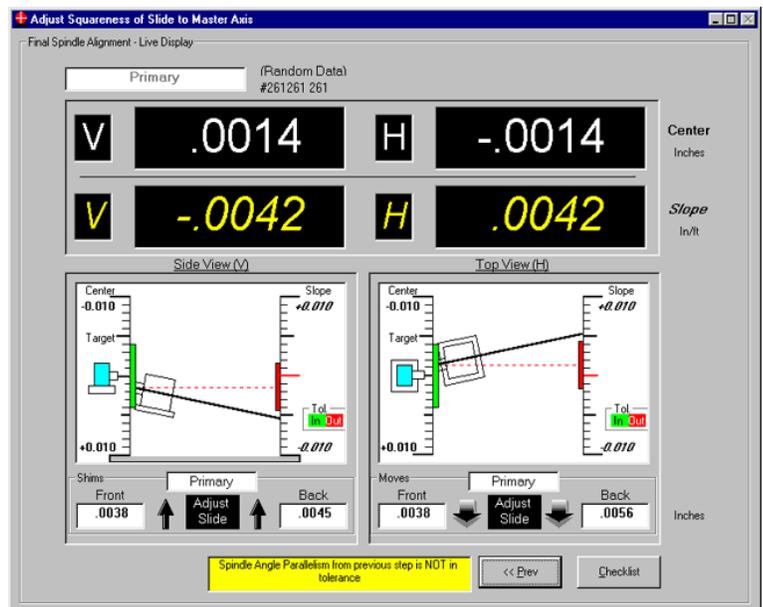
Since 1967, Hamar Laser has designed and manufactured alignment systems that offer unparalleled accuracy and alignment time savings. Our patented 4-axis L-700 Spindle Alignment System is a powerful alignment tool that will help you to align your transfer-line and rotary-dial machine applications up to 70% faster than conventional methods. With a resolution of .00002 in. (0.0005 mm), real-time data output and large, color, software graphics, the L-700 is the perfect tool to align transfer-line and large rotary-dial spindles quickly and accurately.

Save Millions in Reduced Tooling Costs and Increased Production

The L-700 has been saving our customers millions of dollars in reduced tooling costs and increased production for over 20 years. One of the biggest killers of transfer-line productivity is broken taps, drill, reams, etc., which temporarily brings down the line. The single, biggest factor causing broken tools is poor angular alignment, especially for taps. When a tap tries to enter a hole and the angular alignment is poor, it results in premature tool wear and breakage. At one "Big Three" automobile manufacturer, we have seen transfer lines break a tool every 50 parts before laser alignment and every 5000 parts after. On that one line alone, the company was able to save \$1.5 million annually in reduced tooling costs and increased production (20 engines per day)!

Simple Setup and Fixturing

The critical alignment of a transfer-line or rotary-dial machine is the axis of rotation (AOR) of the spindle to the part holder or master part. Traditional methods of aligning these spindles (indicators and alignment bars) are excruciatingly difficult and seem to take forever to perform. The L-700, by contrast, is extremely simple to set up. The .500 in. (12.7 mm) mounting stud on the L-700 laser is inserted into the spindle chuck and the laser beam is aligned to the spindle's AOR, which is then projected out to the master part, bushing or part holder, where the 4-axis target measures the travel of the spindle head for straightness, squareness to the master part or bushing and parallelism to the ways.



Spindle8 Final Alignment Screen

Real-Time Data and 4-Axis Target Speed Alignment

The L-700 significantly speeds machine alignment by simultaneously checking the vertical and horizontal center and angle readings and providing real-time alignment data. This means alignment errors can be quickly and easily fixed without changing the setup. Our Windows software has a large, color display of misalignment information and will even calculate shim values!



.00002 in. Resolution Provides Very Accurate Alignment

Most transfer-line and rotary-dial machines make high-tolerance parts and require very accurate alignments. The L-700 Spindle Alignment system has a centering resolution of .00002 in. (0.0005 mm) and angular resolution of .00002 in/ft (0.002 mm/M). That combined with software to correct mounting errors produces very accurate alignment down to .0001 in. (0.0025 mm) for center and .0001 in/ft (0.008 mm/m) for angle under good environmental conditions.

Up to 50% Reduction in Master Part Cost

One of the most expensive aspects to aligning transfer-line spindles is the fabrication of the master part, which can easily cost over \$50,000. When using conventional methods, the exact part that is going to be manufactured needs to be machine and inspected. Then the spindles are aligned to this part. With the L-700 system, the design of the master part can be significantly simplified and the cost can drop by 50% or more. Since the T-261 Target has a .500 in. (12.7 mm) mounting stud, all that is needed to locate a hole is the .4998 in. mounting hole. So instead of having to bore the actual cylinder bore, a part that has a .4998 hole in place of the bore is fabricated. This saves a lot of time and money. In fact, so much money can be saved, it can almost pay for the cost of the L-700 before it is even used!

Single or Dual Spindle Alignment Capability

With the addition of an extra laser, computer interface and 4-axis target, the L-700 Spindle Alignment System can also handle complex multiple spindle applications. Our Spindle8 Software can handle both sets of laser systems at the same time.

Features

- Simple fixturing for mounting the laser and target.
- Center resolution of .00002 in. (0.0005 mm) and .00002 in/ft (0.002 mm/m) angular resolution.
- Real-time measurement data in 4 axes (vertical and horizontal angle and vertical and horizontal center).
- Windows based software with large, color graphics.
- Software corrects mounting errors and calculates shim values if needed.
- L-700 laser mounts in the spindle to project its axis of rotation up to 100 ft. (30.5 m).
- Vertical and horizontal controls for both angle and center for adjustment of laser to spindle's precise axis of rotation.
- Laser runs for up to 8 hours on a standard, replaceable 9-volt battery.
- Compact and rugged (4 x 2.9x 1.75 in. or 101.6x73.7x44.5 mm)
- Needs only 10 in. (250 mm) of space between spindle and master part or tool holder.

Recommended System Configuration

L-700 Spindle Alignment Laser
T-261A 4-Axis Spindle Target
R-358 Computer Interface with 0.5 Micron (.00002 in.) Resolution
S-1391 Spindle8 Spindle Alignment Software
A-807 Calibration Fixture
R-342 Laptop Computer
A-814 Shipping Case

Optional Accessories

R-1342 Ruggedized Laptop Computer