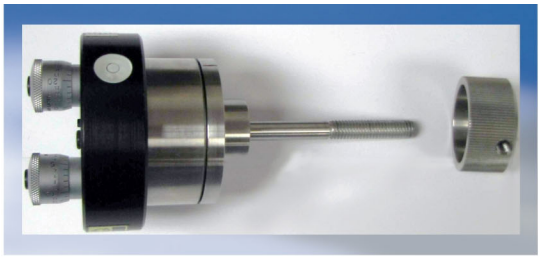
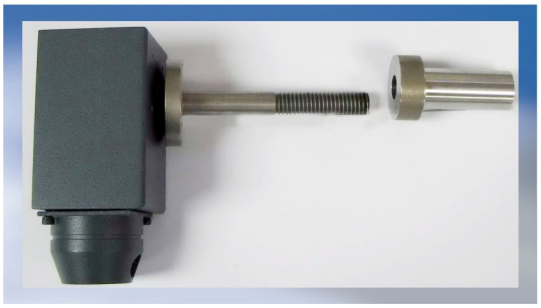
Application Note 1

Hinge Line Alignment

System Recommendations

L-705 Bore Hinge Line Alignment System





Hamar Laser's Hinge Line Alignment System has been a proven performer in the aerospace industry for many years. In fact, the first hinge line system Hamar Laser delivered revolutionized the industry by reducing an 8-hour job, requiring eight workers and four theodolites, to one that took only two workers less than an hour to complete. In addition, accuracy was significantly higher and the results were consistently repeatable. Currently, several aircraft builders are using this alignment system to accurately align hinge-pin bushings in tooling fixtures and vertical and horizontal stabilizers.

The L-705 Bore Hinge Line Alignment System

L-705 Laser Fits Into Standard Optical Tool Fixtures

The L-705 Laser has been designed with a standard aerospace tooling diameter of 2.25" (57.15 mm). The centering of the laser beam to the housing is controlled to extremely tight tolerances, usually less than .0005" (.013 mm). Built-in micrometers on the back of the laser control the angle adjustment of the laser beam. These two features eliminate the steering fixture and a reference target, making the task of aligning large floor assembly jigs fast and accurate.

Recommended System Configuration
L-705 Bore Laser (beam concentric to OD to within .001 mm)
L-705SD-375 Bore Adapter
T-271-375 Virtual Center Target
T-271B-375-500 (2) Customized Bushing
T-271B-375-625 (2) Customized Bushing
A-510 Target 2-Axis Bore Target
R-1307B 2.4ZB 2-Axis Readout (2)
A-814 Shipping Case
Optional Accessories
A-910-2.4ZB 2.4GHz Radio Interface
S-1403 Bore9 Software
T-218 2-Axis Reference Target

T-271 Virtual Target Reduces Costly Fixturing

Hamar Laser Instruments has developed the world's only virtual target (T-271) that is used for conventional, through-type bushings and spherical-bearing hinge line bushings. It is considered a *virtual* target because it functions as if it were in the actual center of the respective bearing without actually being inside it. No matter what attitude the spherical bearing is in, the target center readings are accurate. This reduces costly fixturing needed with conventional hinge line alignment methods.

R-1307 Readout

The Model R-1307 Readout supports both wireless targets, such as the A-1519, or local (cabled) targets. It is available with a radio frequency of either 900 MHz or 2.4 GHz ISM band. The R-1307 can be used as the primary readout or as an additional readout to copy position data captured by another R-1307.

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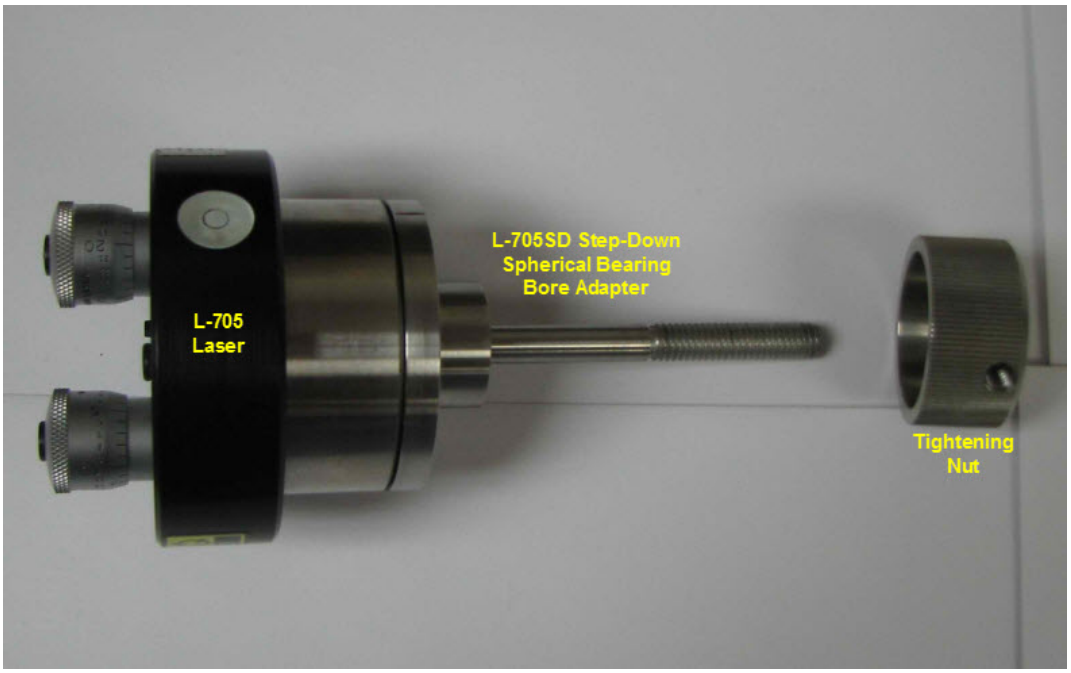
Alignment System Features

- Virtually instantaneous setup
- Built-in horizontal and vertical angular adjustments for quick referencing
- 2-Axis target with .0001" (.0025 mm) and virtual center
- Laser beam straight to ± .0001" (.0025 mm) in 10' (3M) or ± .001" (.025 mm) in 100' (30.5 M)
- Easily accommodates bores as small as 1.5" (38.10 mm)
- Wireless interface or large LED readout eliminate long cables
- Complete system weighs less than 15 lbs. (6.7 kg)
- Portable enough to fit in a small carrying case
- Battery operated
- Dynamic or live display of component misalignment



L-705 Bore Laser with L-705SD Bore Adapter

L-271 2-Axis Virtual Center Target with Customized Bearing Adapter and T-271B Customized Bushing with criteria for customization

Configuration for One Bore Diameter