

TECHNICAL PROCEDURE **PRE-ALIGNED VANTRAAX®**

SUBJECT: Alignment Verification Procedure

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Hendrickson offers original equipment manufacturers (OEMs) the option of ordering a pre-aligned VANTRAAX® slider suspension system. These pre-aligned VANTRAAX slider systems are built on precision fixtures and feature axles that are perpendicular to the slider box and parallel to each other. Hendrickson also ensures the pivot connection on all pre-aligned slider systems is properly assembled and securely tightened to the proper torque and clamp load. No additional alignment adjustments are required with these slider systems prior to delivery to the final customer.

A pre-aligned VANTRAAX slider can be distinguished from other VANTRAAX sliders by its unique, factory-installed pivot connection hardware. This hardware features a boot that covers the end of the bolt threads, nut and reuse indicator on the outboard side of the pivot connection (Figure 1). If for any reason this original pivot connection is loosened or disassembled, a new replacement QUIK-ALIGN® pivot bolt (without the boot) must be used as replacement hardware.

The trailer OEM is responsible for the total trailer alignment and all facets of design and construction required for the trailer to accommodate the slider suspension system. The procedure described on the following pages is intended for use by trailer OEMs to verify trailer alignment after construction and before final delivery.

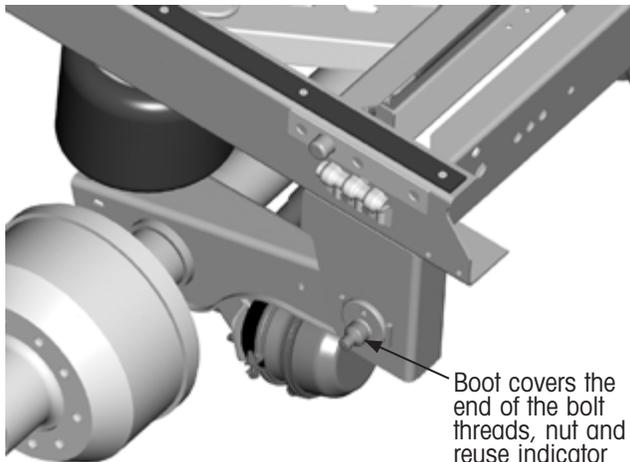


Figure 1: Pre-aligned VANTRAAX pivot connection hardware

The descriptions and specifications contained in this publication were current at the time of printing.

Hendrickson reserves the right to discontinue or modify its products and/or procedures and to change specifications at any time without notice.

Any reference to brand name in this publication is made as an example of the types of tools and materials recommended for use and should not be considered an endorsement. Equivalents may be used.

IMPORTANT NOTICE

Hazard signal words (such as Warning or Caution) may appear in various locations throughout this publication. Information accented by one of these signal words must be observed at all times. Additional notes are utilized to emphasize areas of procedural importance and provide suggestions for ease of repair. The following definitions indicate the use of these signal words.

⚠ WARNING: INDICATES HAZARDS OR UNSAFE PRACTICES WHICH COULD RESULT IN SEVERE PERSONAL INJURY OR DEATH.

⚠ Caution: Indicates hazards or unsafe practices which could result in damage to machine or minor personal injury.

NOTE: Additional service information not covered in the service procedures.

Departure from the instructions, choice of tools, materials and recommended parts mentioned in this publication may jeopardize the personal safety of the service technician or vehicle operator.

Always use genuine Hendrickson replacement parts.

Every effort has been made to ensure the accuracy of all information in this publication. **However, Hendrickson makes no expressed or implied warranty or representation based on the enclosed information.**

USING THE ALIGNMENT CHECK KIT

This document focuses on the use of the alignment check kit (part number S-27659) to verify alignment on pre-aligned VANTRAAX slider suspension systems. The kit consists of a kingpin adapter, wheel extender assembly, extensometer and body rail alignment tool.

Before conducting any installation or verification work:

- Read and understand all applicable Hendrickson publications for additional safety information.
- Read and understand all applicable work instructions and safety information provided by the trailer manufacturer.
- Park the trailer on a flat, level, debris-free surface.

PROPERLY POSITIONING THE TRAILER

Proper trailer positioning is critical to the success of the alignment verification procedure. The trailer must be as close as possible to the normal running position but in a “relaxed” state without any pre-load applied to the TRI-FUNCTIONAL® bushings.

IMPORTANT: Pre-loaded TRI-FUNCTIONAL bushings will complicate the alignment verification procedure by providing inaccurate measurement data. To avoid this inaccuracy, perform the proper trailer positioning procedure as follows.

1. Position the trailer for alignment verification:
 - a. Move the slider to the rear-most position of the trailer. Make sure the slider locking pins are fully extended through the body rail holes.
 - b. With the trailer still coupled to the tractor, adjust the trailer landing legs so there is adequate ground clearance.
 - c. Pull the trailer forward in a straight line for a minimum of 10 feet and gently apply the trailer brakes. This forces the slider locking pins to the rear of the body rail holes, removing locking pin slack and relieving bushing pre-load.



Figure 2: *Measuring kingpin height*

- d. Lower the trailer landing legs so they contact the ground. Uncouple the trailer from the tractor and apply shop air to the trailer emergency glad hand to release the parking brakes.
- e. Chock the wheels of the rear trailer axle to prevent the trailer from moving. The front trailer axle will be used in the verification process and should not be chocked.

IMPORTANT: Keep trailer parking brakes disengaged.

2. Set the kingpin (or fifth wheel) to the height indicated on the order specification:
 - a. Using a tape measure, determine the current trailer kingpin height by measuring from the ground to the kingpin mounting plate (Figure 2).
 - b. Using the landing gear crank adjuster, adjust the landing legs to within $\frac{1}{16}$ inch of the order specification.
 - c. Verify the kingpin height by measuring from the ground to the kingpin mounting plate on both sides of the kingpin.
3. Set suspension ride height to the height indicated on the suspension identification tag.

Ride height is defined as the distance from the suspension mounting surface (the bottom of the slider box) to the center of the axle (Figure 3) and is subject to many variables including tire pressure, work surface and trailer position.

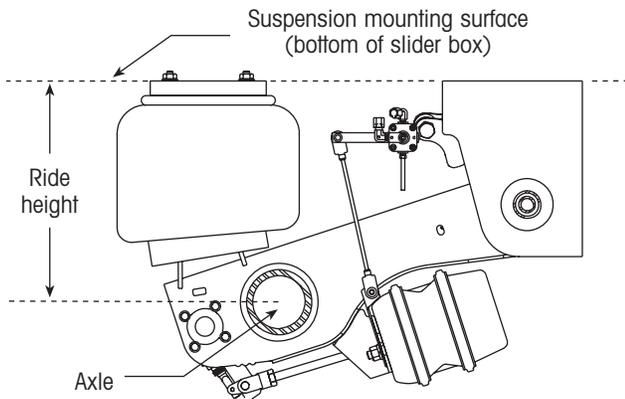


Figure 3: Ride height defined

Refer to Hendrickson publication [L459 Checking Trailer Ride Height](#) available as a free download on www.hendrickson-intl.com, for complete ride height setting instructions.

INSTALLING THE KINGPIN ADAPTER AND WHEEL-END EXTENDER ASSEMBLY

1. Place the kingpin adapter (Figure 4) onto the kingpin. Make sure the kingpin adapter eyebolt is facing down and pointing toward the rear of the trailer.

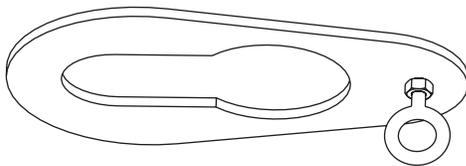


Figure 4: Kingpin adapter

2. Install two stud extenders (Figure 5) onto two lower wheel studs of the front tandem axle (Figure 6). There is no need to remove the wheel nuts, just thread the stud extenders onto the ends of the wheel studs. Make sure to skip a wheel stud between the two extenders. Thread the extenders onto the wheel studs a minimum of four full turns.

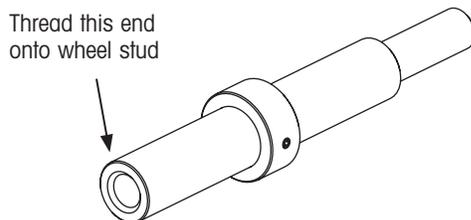
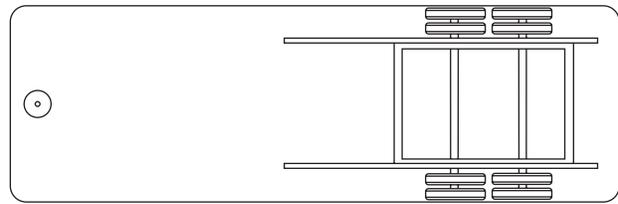


Figure 5: Stud extender



Thread stud extenders onto the wheel studs of the front axle



Figure 6: Installing the stud extenders

3. Guide the wheel extender subassembly (Figure 7) onto the wheel using the previously installed stud extenders as pilots. The stud extenders should be outside of the wheel extender subassembly.

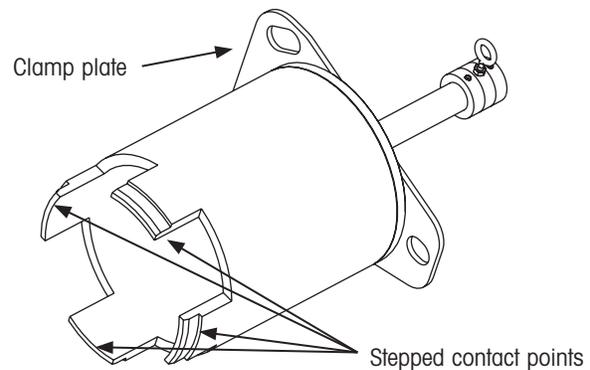


Figure 7: Wheel extender subassembly

- Rotate the clamp plate so the two oval holes in the plate are roughly aligned with the stud extenders, but do not install the clamp plate on the stud extenders at this time. The remaining hole in the clamp plate now indicates where the third stud extender needs to be installed (i.e., on an upper wheel stud, forming a triangle with the other two).

Thread the third extender onto the wheel stud a minimum of four full turns.

- Place the clamp plate on the three stud extenders and thread the wing nuts (Figure 8) onto the stud extenders. Make sure the wheel extender subassembly is firmly seated on the face of the wheel and lightly tighten each wing nut, just enough to hold the wheel extender subassembly in place against the face of the wheel.

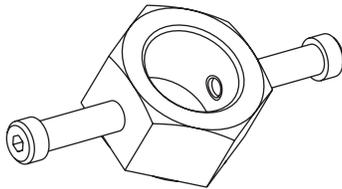


Figure 8: Wing nut

- Securely hand-tighten the upper wing nut, making sure the wheel extender subassembly is firmly seated on the face of the wheel. There must be no gap between the wheel extender subassembly and the face of the wheel at all four stepped contact points (Figure 7). Now securely hand-tighten the lower two wing nuts, again making sure the wheel extender subassembly is firmly seated on the face of the wheel and there are no gaps.

A typical, finished wheel extender installation should look like Figure 9.

NOTE: Failure to properly secure the wheel extender to the wheel will significantly reduce the accuracy of the alignment verification.

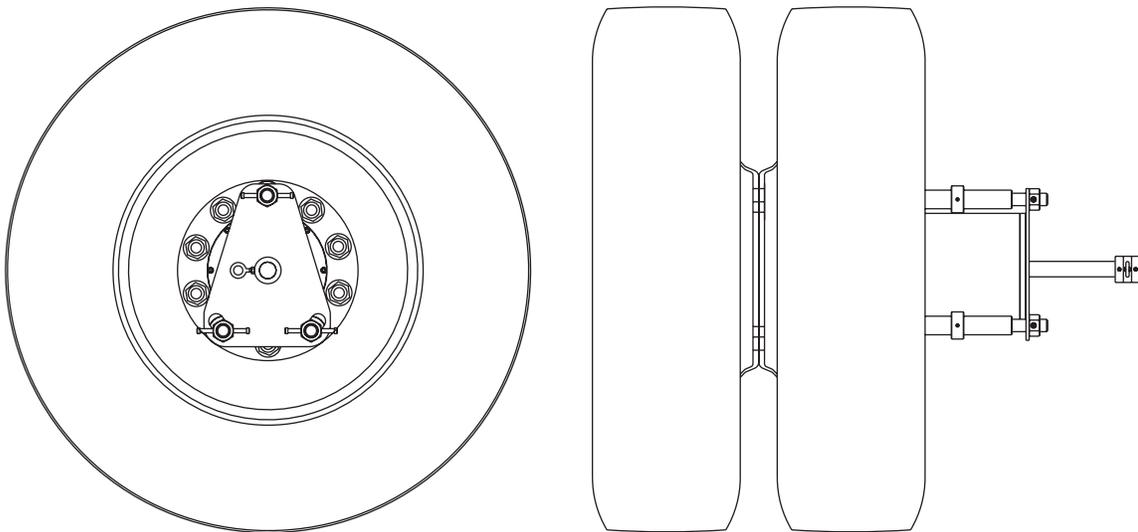


Figure 9: Typical wheel extender installation

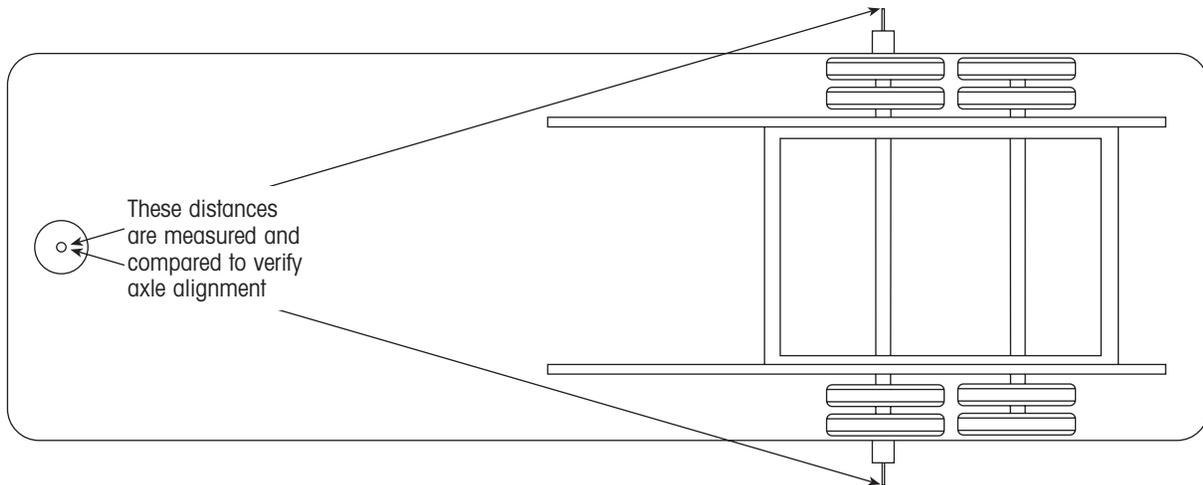


Figure 10: Verifying axle alignment

VERIFYING AXLE ALIGNMENT WITH THE EXTENSOMETER

The extensometer is an instrument designed to accurately measure the straight line distance between two points. It uses a stainless steel measuring tape in which holes have been punched at precise intervals. The tape is held inside a frame, which also houses a digital micrometer and electronic tensioning device (Figure 13). In use, the hook on the end of the tape is attached to the kingpin adapter eyebolt and the tape is allowed to unreel until the hook on the end of the extensometer frame can be attached to the wheel extender eyebolt. The slack is then taken out of the tape with the winding handle and a pin on the frame is located in one of the holes in the tape. The tape-tensioning handle is then turned, shortening the length of the frame, and increasing the tension on the tape. When the correct tension has been achieved, as indicated by a system of red and green LEDs, the digital micrometer is read. The entire process is repeated on the other side of the trailer and the two micrometer measurements are compared to determine if the alignment is within specification (Figure 10).

Use the following procedure to verify axle alignment with the extensometer.

1. Thread the extensometer tape over the trailer landing gear assembly and attach the hook on the end of the tape to the kingpin adapter eyebolt (Figure 11). The extensometer hook opening should face toward the curbside of the trailer.
2. Allow the tape to unwind and attach the hook on the end of the extensometer frame to the wheel extender eyebolt (Figure 12). The extensometer hook opening should face inboard.
3. Make sure the extensometer frame is fully extended. Rotate the tape-tensioning handle (Figure 13) counterclockwise until it stops.
4. Rotate the tape winding handle clockwise to take the slack out of the tape and peg the nearest tape hole on the locating pin. Try to get the tape as tight as possible while still being able to place one of the holes in the tape onto the locating pin.
5. Slide the brass tape clip (Figure 14) over the locating pin to lock the tape to the extensometer, preventing it from slipping off the locating pin while it is being tensioned in the following steps.
6. Tighten the tape by rotating the tape-tensioning handle clockwise until the red LED illuminates. At this point, the tape has excessive tension.
7. Check the kingpin adapter seating. Pull down gently on the kingpin adapter with both hands until the adapter is flush with the lower kingpin latching surface, then gently remove both hands from the kingpin adapter. Refer to Figure 11 for hand placement.
8. Repeat step 7 one more time.

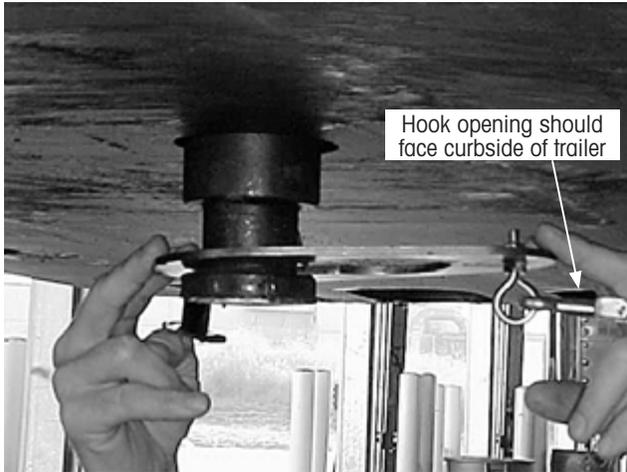


Figure 11: Attaching the extensometer tape to the kingpin adapter

9. Remove tension from the tape by rotating the tape-tensioning handle counterclockwise, in $\frac{1}{4}$ -turn increments, until the green LED illuminates. At this point, the tape has the proper tension.
10. With the green LED on, place one finger under the tape and lightly lift the tape to remove tension. The green LED should turn off.
11. Gently lower the tape to restore tension. The green LED should illuminate again.
12. Repeat steps 10 and 11 two more times. If the proper tape tension has been achieved, the green LED will reappear each time.

If neither the red nor the green LEDs illuminate, increase the tape tension by rotating the tape-tensioning handle clockwise until the green LED illuminates, then repeat steps 10 through 12.



Figure 12: Attaching the extensometer to the wheel-end extender

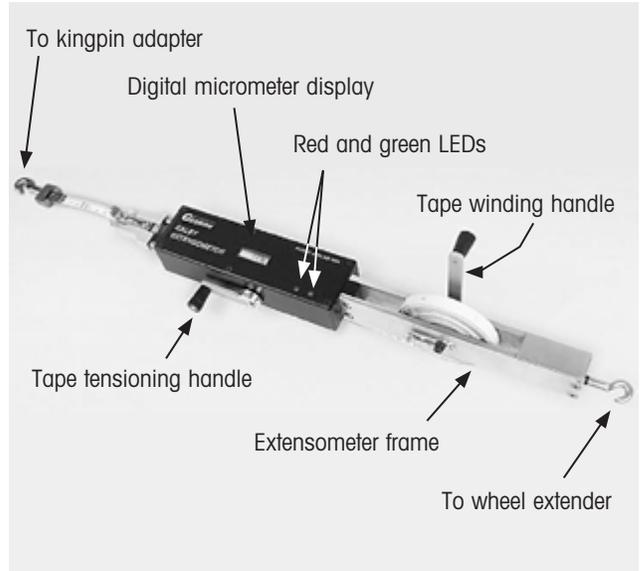


Figure 13: Extensometer

If the red LED illuminates, repeat steps 9 through 12.

13. When step 12 has been successfully completed and the green LED illuminates three straight times, check and record the digital micrometer readout.

The digital micrometer displays millimeters. For example, a display of 11.30 indicates 11.30 millimeters.

14. Carefully remove the measuring equipment and repeat the entire procedure on the opposite side of the trailer.

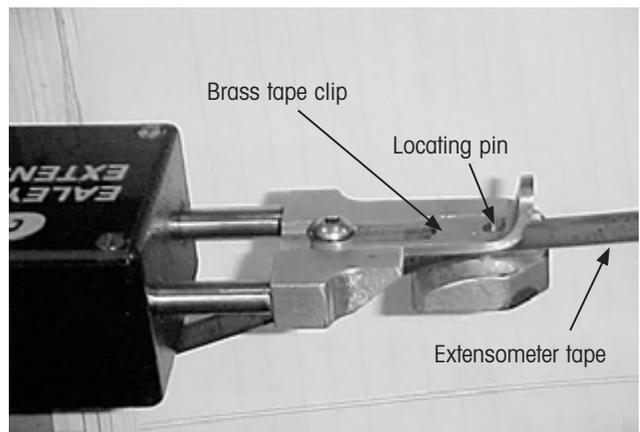


Figure 14: Tape locking details

15. Compare the two readings.

If the readings are within 6 millimeters of each other, the suspension is within the ± 0.1 degree alignment specification.

If the readings differ by more than 6 millimeters, contact your quality assurance manager and use the following procedure to further diagnose the alignment problem.

VERIFYING BODY RAIL PLACEMENT WITH THE EXTENSOMETER

If the axle alignment verification procedure revealed a difference of more than 6 millimeters between the two micrometer measurements, body rail placement must be checked.

The fore / aft relationship of one body rail to the other is also critical to the proper alignment of the suspension. The body rail alignment tool, included in the alignment check kit, can be used to check fore / aft body rail placement. In use, the tool is installed in the forward most body rail hole and the distance from the tool to the kingpin is measured and compared to the other body-rail-to-kingpin measurement (Figure 15).

NOTE: Body rail placement only needs to be checked if the alignment verification procedure revealed a difference of more than 6 millimeters between the two micrometer measurements.

Use the following procedure to verify body rail placement with the extensometer:

1. If necessary, remove the stop bar if it is currently occupying the forward most pair of body rail holes.
2. Install the eyebolt on the inboard side of the body rail and thread the shoulder stud onto the eyebolt from the outboard side of the body rail (Figure 16).
3. From the inboard side of the body rail, slide the tapered collar over the eyebolt with the tapered end against the body rail.
4. From the inboard side of the body rail, slide the hex nut over the eyebolt and thread it onto the shoulder stud.

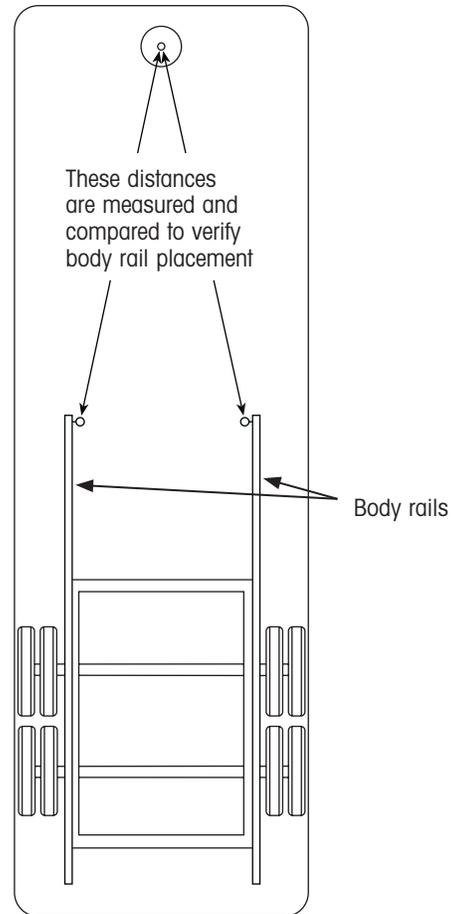


Figure 15: Verifying body rail alignment

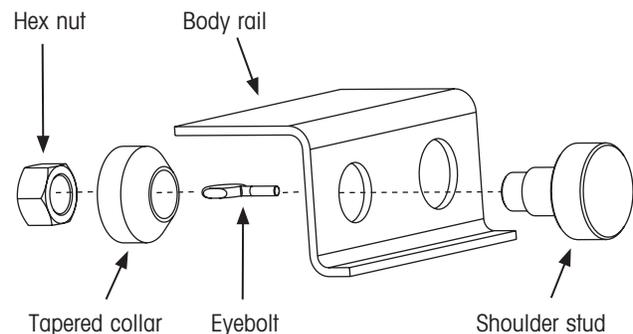


Figure 16: Installing the body rail alignment tool

5. From the inboard side of the body rail, rotate the eyebolt so it is parallel to the ground. Securely hand tighten the hex nut and verify that the body rail alignment tool is properly seated, centered and square in the body rail hole.
6. Repeat steps 1 through 15 of the "VERIFYING AXLE ALIGNMENT WITH THE EXTENSOMETER" procedure to measure and compare body rail differential.

If the body rail differential readings differ by more than 3 millimeters, contact your quality assurance manager.

PROPER CARE AND MAINTENANCE OF ALIGNMENT CHECK KIT

The wheel-end extender and extensometer are delicate and expensive pieces of measurement equipment. Improper care and usage can lead to damage and loss of precision. Use the following guidelines to help ensure the precision and longevity of the equipment.

- Before each use, check to make sure the extender shaft inside the wheel extender subassembly is tight. Rotate the shaft retainer clockwise to ensure the shaft is tight (Figure 17).
- Do not use the equipment in locations or at times when other workers are likely to be inconvenienced by its use.
- Wipe the wheel-end extender subassembly, body rail alignment tool, kingpin adapter and extensometer clean after each use.
- When not in use, store the alignment check kit in a clean and secure location.
- If the wheel-end extender or extensometer has been dropped, carefully check each piece of equipment to make sure they are still yielding consistent measurements.

The extensometer can be checked by repeatedly making the same measurement to ensure it is within ± 1.5 millimeters.

The wheel-end extender can be checked by making a measurement and then rotating the wheel-end extender 180 degrees and making the same measurement to ensure it is within ± 1.5 millimeters.



Figure 17: Checking retainer shaft for tightness



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Call your trailer dealer or Hendrickson at **866.RIDEAIR (743.3247)** for additional information.



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