

Air-Weigh®

Self-Weighing Truck and Trailer Scales™



QuickLoad On-Board Scale Installation Guide

**for Vocational Vehicles with
Mack® Camelback Suspensions**

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I. SCALE OVERVIEW

The Air-Weigh® QuickLoad Scale™ for vocational vehicles with the Mack® Camelback suspension includes a dashboard-mounted QuickLoad display, power harness, a deflection sensor with mounting hardware for the steer axle, a second deflection sensor with mounting hardware for the Camelback suspension, and sensor cables.

This **Installation Guide** (P/N: 901-0144-000) provides all the instructions needed to install the second deflection sensor on the Camelback suspension.

Follow the installing procedures in this guide exactly for the most accurate weighing.

The **User Guide** (P/N: 901-0124-000), included with the scale kit, provides the complete scale calibration and operation procedures.



Figure 1. Major Components Location

1. Overview: Sensor Installation for the Mack® Camelback Suspension

The following overview steps are to be applied to the Camelback Suspension Sensor Installation.

- Mark the center of the trunnion tube and prepare it for glue.
- Apply glue to the bottom of the bracket assembly.
- Mount bracket assembly on the trunnion tube with band clamps.
- Tighten the band clamps and let the glue cure.
- Mount the sensor and mounting tab to the brackets.
- Connect the cables and mount to the tab.
- Route the extension cable through the firewall and connect it to the QuickLoad Scale Sensor Port A.
- Check for sensor readings in range.
- Mount the cover over the sensor and brackets.



CAUTION

Cables to the sensor, and any other Air-Weigh wiring, must be separated by a minimum of 12 inches, or properly shielded, from exhaust piping.



CAUTION

Do not move vehicle until the alignment tool is removed.



CAUTION

Do not calibrate sensor following installation until the vehicle has been in operation for one week or 800 miles, whichever comes first. This serves as a break-in period.

NOTE

Heavy calibration must be done using maximum vehicle loads. See document 901-0124-000 for additional information on calibration.

II. INSTALLATION COMPONENTS

The kits and parts for the QuickLoad installation described in this manual are shown in Table 1, below.

Table 1: Part Numbers for Camelback kit installation

Part Number	Description	Quantity
1398	QUICKLOAD CAMELBACK DRIVE SUSPENSION SENSOR KIT	
010-9093D	DEFLECTION SENSOR, DRIVE AXLE	1
014-4000-028	CABLE, SENSOR EXTENSION, 40'	1
110-0080-001	TAB,SS,CONN MOUNT,DFL SNSR	1
110-0073-002	ALIGNMENT TOOL, DEFL SNSR	1
114-0003-000	Bracket, Deflection Sensor, Ro	2
380-0004-001	SPLIT LOOM,0.50 ft, 6 in	0.09
350-0035-000	PREPARATION PADS, ISOPROPYL ALCOHOL (SEE CAUTION)	6
145-4552-001	NYLON TIE, 7", T-50, NYLON, BLK	2
146-0020-000	GROMMET, BUNA-N, 3/8" ID 7/8"	1
133-0009-000	WASHER-FLT, .375 ID, PFC 9, TH	4

132-0014-000	NUT-HEX, .375-24, GRD 8, Y ZN	2
131-0037-001	SCR-MACH, .375-24 X 2.25 HEX H	2
112-0001-000	COVER, DEFLECTION SENSOR ROUND	1
139-0013-000	CLAMP,Band,2.5-4.5in dia	4
010-0021-001	Adhesive Application Converter	1
901-0144-000	MANUAL, QUICKLOAD, DISPLAY KIT, INSTALLATION, CAMELBACK SUSPENSION	1

 **WARNING**

Isopropyl alcohol may cause mild irritation on contact with the skin as well as eye irritation. Immediately flush the affected areas with plenty of water, followed by washing with soap and water. Clothing contaminated with isopropyl alcohol should be removed immediately. Isopropyl alcohol should only be used in properly ventilated areas. Do not use in a confined space. Keep away from flames and other flammable materials.

 **CAUTION**

Adhesive expires within one month (or three months if refrigerated) of scale ship date.

III. TOOLS REQUIRED (CUSTOMER SUPPLIED)

1. Required Tools

The list below contains the tools (customer supplied) to properly install the deflection sensors on the steer axle and on the Hendrickson Suspension.

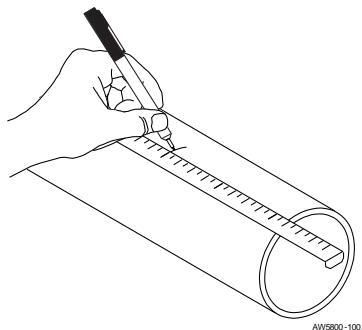
- Sander/grinder
- 40-grit medium sandpaper
- Chalk or permanent marker
- Flat blade screwdriver
- 9/16-inch combination wrench
- Torque wrench, 20 – 80 ft-lb
- 9/16-inch socket and 3/8-inch socket handle
- Caulking gun
- Epoxy paint
- Tape measure

2. Optional

- 50 ml manual dispenser, Loctite™, P/N: 98472 LB 10985 (customer provided)
- Deflection Sensor Test Device, P/N: 1000

IV. INSTALLING THE SENSORS ON THE CAMELBACK SUSPENSION

1. Preparing the Camelback Suspension



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Figure 2. Marking Center of Trunnion Tube

- A. Locate and mark the top center of the trunnion tube. See Figure 2.

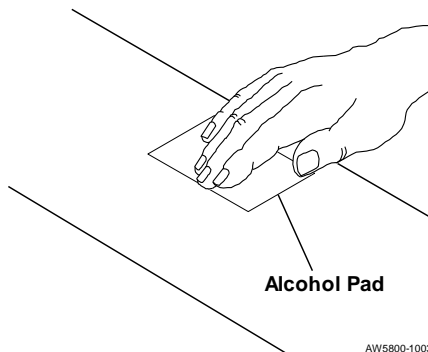


Figure 2. Cleaning Trunnion Tube with Alcohol Wipes

- B. Using chalk or permanent marker, mark the top of the trunnion tube 2-3/8 in. (60.32 mm) on both sides of the center mark. The overall measurement is 4-3/4 in. (120.60 mm). Clean the entire marked-off area using two (2) of the supplied alcohol pads (P/N 350-0035-000). (P/N: 350-0035-000. See Figure 2.



CAUTION

The axle must be cleaned *before* and *after* sanding the marked surface area and before installing the bracket with glue. Failure to clean the axle could result in the glue not adhering to the axle and the bracket.

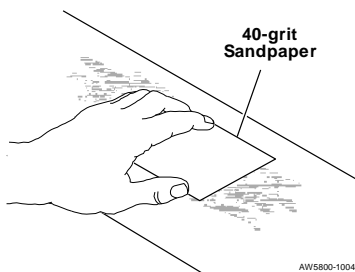


Figure 3. Sanding Trunnion Tube

- C. Using 40-grit medium sandpaper, sand the marked off area until it is free of paint and other residues. See Figure 3.
- D. Clean the sanded area using two (2) of the supplied alcohol pads (P/N 350-0035-000). See Figure 2.

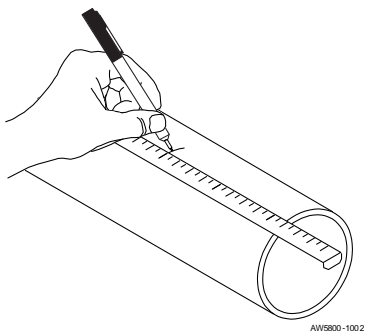


Figure 4

- E. Re-mark the center of the trunnion tube. See Figure 4.

2. Preparing the Brackets

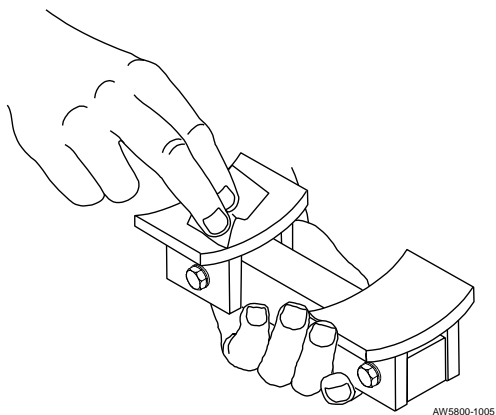


Figure 5. Cleaning Bracket Assembly

- A. Clean the underside of the bracket assembly (P/N: 010-0088-002) with (1) of the supplied alcohol pads (P/N: 350-0035-000). See Figure 5.
- B. Ensure that the bracket assembly bolts are only loosely fastened to the nuts, so that the alignment tool (110-0073-000) has a slight amount of free play.

3. Assembling the Glue Kit

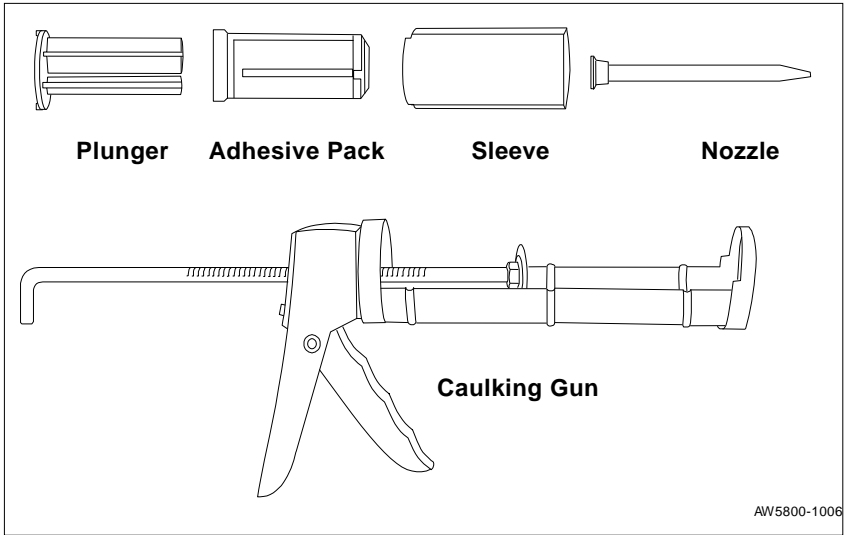


Figure 6. Glue Kit

Use the following steps to assemble the glue kit. See Figure 6.

1. Twist tab off glue cartridge.
2. Slide glue adhesive pack into sleeve. Align correctly because one side has a larger diameter.
3. Insert the blue plunger into the glue adhesive pack. Align correctly because one side has a larger diameter.
4. Insert nozzle into glue cartridge. Twist to secure. Insert glue cartridge into caulking gun.

5. Press trigger and dispense and discard a small amount of adhesive ensuring both sides of the duo-pak glue cartridge are flowing freely. See Figure 7. Trim end of nozzle to allow better flow, if necessary.

4. Applying the adhesive

- A. The working time of the glue at 73°F is about 10 minutes.

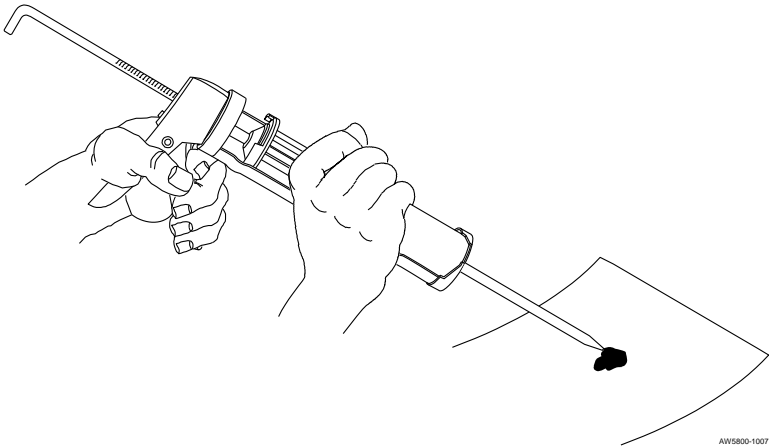


Figure 7. Clearing Duo-pak Adhesive

- B. Remove the cap from the cartridge. Press trigger and dispense and discard a small amount of adhesive to ensure both sides of the duo-pak glue cartridge are flowing freely and evenly. See Figure 7. Trim end of nozzle to allow better flow, if necessary.

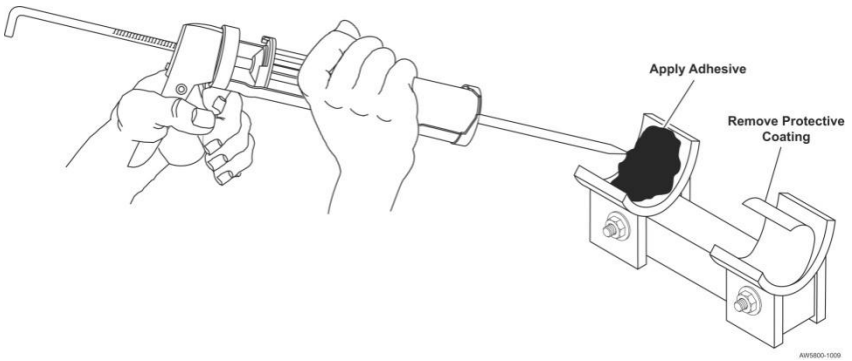


Figure 8. Applying Adhesive to Mounting Bracket

- C. Attach the mixing nozzle (350-0039-XXX). Following the adhesive manufacturer’s instructions, apply the adhesive **liberally** to the bottom of the bracket assembly. See Figure 8.
- D. Remove and properly dispose of the mixing nozzle when finished, and replace the cap on the adhesive cartridge.

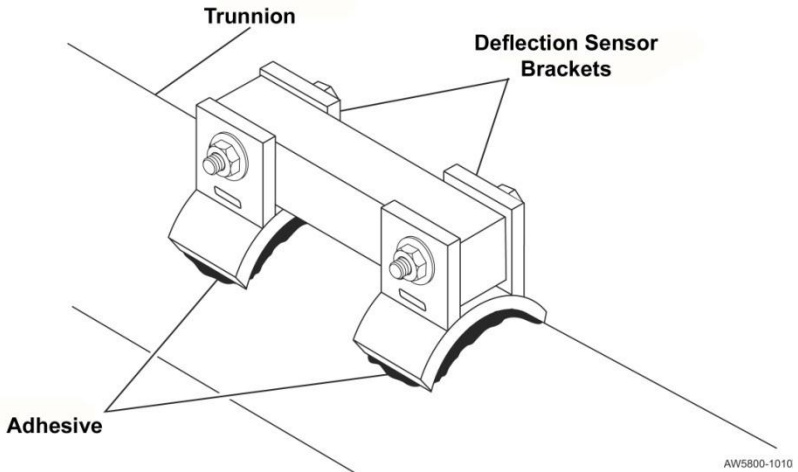


Figure 9. Placing Brackets on Trunnion Tube

5. Mounting Brackets on Axle

Use the following steps to attach the mounting bracket to the trunnion tube. See Figure 9.

- A. Place the mounting bracket assembly in the top center of the trunnion tube.
- B. Ensure the center mark on the alignment tool lines up with the center mark on the trunnion tube.
- C. Place a band clamp (P/N: 139-0016-000) through the slot in the bottom of each bracket and wrap band clamp around trunnion tube. See Figure 10, next page.
- D. Using a flat blade screwdriver, tighten the band clamps securely in place ensuring the mounting brackets remain parallel to the trunnion tube length.
- E. Ensure the alignment tool still has some play in the mounting brackets.

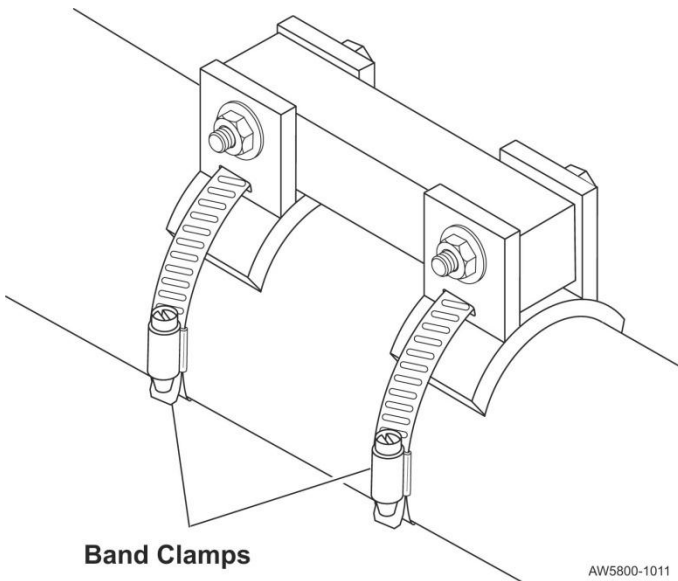


Figure 10. Attaching Band Clamps

- F. Band clamps should be very tight. If necessary, to keep the bracket assembly parallel to the trunnion tube,

loosen the band clamps and readjust the bracket assembly.

- G. Retighten the band clamps.
- H. Temporarily remove the nut (P/N 132-0014-000) from one of the bolts (P/N 131-0037-001) and remove the bolt from the bracket assembly.
- I. Ensure the unfastened side of the alignment tool lifts easily out of the mounting bracket.
- J. If the alignment tool binds, loosen one or both of the band clamps so the brackets can be realigned and the alignment tool has free play.
- K. Reset the alignment tool and replace the bolt into the bracket assembly and loosely attach the nut to the bolt.
- L. Allow time for the adhesive to cure. Refer to Table 2, below, for curing times.
- M. After the adhesive has cured, apply Epoxy Paint to the glue and axle seam and let dry.

Table 2. Adhesive Fixture Times

Ambient Temperature	Fixture Time
32° F (0° C)	6 Hours
54° F (12° C)	3 Hours
72° F (22° C)	2 Hours

Cure time is 24 hours.

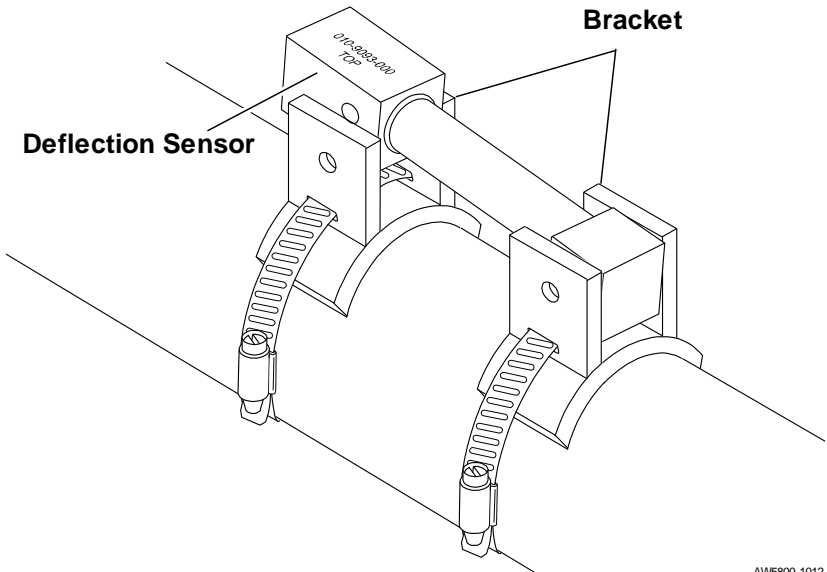


Do not move the vehicle until the adhesive is cured and the alignment tool is removed.

6. Deflection Sensor Installation

After the adhesive has cured, the installation of the Deflection Sensor on the Camelback Suspension should now be completed.

- A. Remove the alignment tool from the brackets. It should fit loosely. Retain the two 3/8 bolts (P/N131-0037-001) and 3/8 nuts (P/N132-0014-000) for re-use during installation of the deflection sensor.
- B. Clean the bracket channels with one of the alcohol pads.
- C. **Sensor insertion:** Clean the deflection sensor (P/N 010-9089-000) ends with the remaining alcohol pad.
- D. Insert the deflection sensor into the brackets with its cable extending **toward** the side of the vehicle where you'll route the sensor extension cable to the firewall. The **TOP** lettering on the sensor should face **up**. See Figure 11.



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Figure 11. Inserting the Sensor

- E. Align the deflection sensor with the bracket holes. See Figure 11.
- F. Place a 3/8" ID flat washer (P/N: 133-0009-000) on one of the 3/8" x 2 1/4" bolts (P/N: 131-0037-001) saved in Step IV.6.A.
- G. Slide the bolt through the bracket holes nearest the sensor cable, from the front of the vehicle to the rear. See Figure 12.

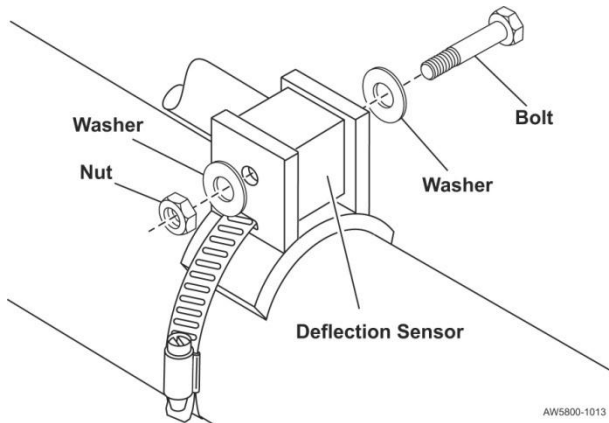


Figure 12. Inserting Bolt and Washers into Sensor and Bracket

- H. Place the connector assembly bracket tab (P/N 110-0080-000) on the second bolt followed by a washer. Ensure the tongue and tab extends around the end of the sensor. See Figure 13.
- I. Slide the second bolt through the bracket holes farthest from the sensor cable, from the front of the vehicle to the rear.

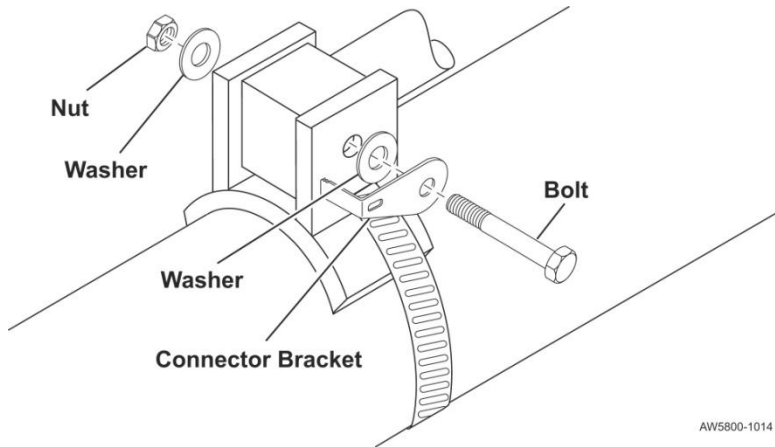


Figure 13. Inserting Connector Assembly Bracket Tab

- J. Place a washer and a hex nut on each bolt and hand-tighten.



When tightening the sensor mounting bolts, ALWAYS use a torque wrench to check the torque on the nut, not the bolt head.

NOTE

The next steps require the use of either the QuickLoad Scale or the Deflection Sensor Test Device (P/N: 1000). If using the QuickLoad Scale, it must be powered and the Deflection Sensor Extension Cable must be installed. See *Installing the sensor extension cable* on page 20.

NOTE

A/D refers to the analog-to-digital conversion of the sensor reading.

7. Setting the Sensor A/D Values

Insert the Deflection Sensor connector plug into the Sensor Extension Cable connector,

- OR -

Connect to the P/N 1000 Deflection Sensor Test Device.

Ensure the locking tabs on the connector plug and connector receptacle engage completely.

A. Tightening the Nuts on the Sensor Assembly

1. Tighten the nut on the cable end of the sensor and torque to 25-ft lbs (34 Nm). Torque will be increased in a later step.
2. Tighten the nut on the non-cable end of the sensor and torque to 25 ft-lb (34 Nm). Torque will be increased in a later step.

Verify the A/D reading at this time using the display in the cab (the QuickLoad Scale module must be connected to the Sensor and display, and powered up) or using the Deflection Sensor Test Device. If within range (750 – 1250), proceed to Step D. Otherwise, proceed as below:

B. A/D Reading is BELOW 750

If the A/D reading is **below 750** or there is no A/D reading at all, follow these steps to exert a pre-load on the sensor.

1. Loosen the nut on **the non-cable end** of the sensor.
2. Exert upward pressure lightly with your fingers (or a screwdriver, if necessary) under the **non-cable end**

of the sensor until an appropriate A/D reading is reached, for example:

DRIVE: 750 TO 1250

3. Tighten the nut on **the non-cable end** of sensor and torque to 25 ft-lbs (34 Nm). If the A/D readings are still within proper range, proceed to Step D.

C. A/D Reading is ABOVE 1250

If the A/D reading is **above 1250**, follow these steps to exert a pre-load on the sensor.

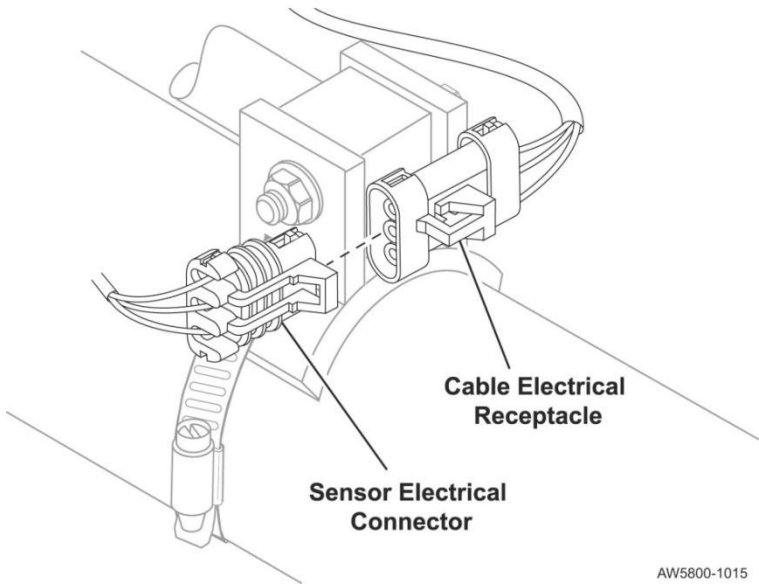
1. Loosen the nut on **the non-cable end** of the sensor.
2. Exert downward pressure lightly with your fingers on **the non-cable end** of the sensor until an appropriate A/D reading is reached. Tighten nut and torque to 25 ft-lbs (34 Nm).
3. Check A/D reading; if they are below 750 repeat Step B: 1 – 3 (above). If they are above 1250, repeat Step C: 1 – 3. If within range proceed to Step D.

D. Final Sensor Torque

1. Tighten the nut on the cable end of the sensor and torque to 50 ft-lbs.
2. Tighten the nut on the non-cable end of the sensor and torque to 50 ft-lbs.

Perform a final check of A/D values. If not within range, repeat Steps B or C.

If using the Deflection Sensor Test Device, disconnect the test fixture. Proceed with the next step of the installation.

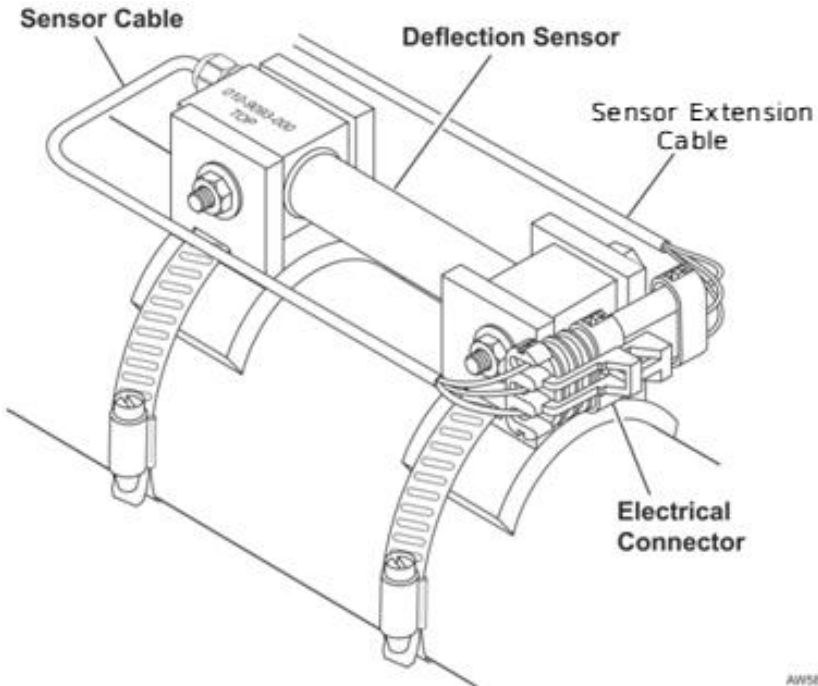


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Figure 14. Assembling the Electrical Connectors

8. Installing the sensor extension cable

- A. Connect the sensor connector to the 15' sensor extension cable (014-1500-028) to form a connector assembly. See Figure 14.



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Figure 15. Routing the Sensor Cable

- B. Mount the connector assembly on the connector assembly bracket tab by inserting the tab in the grooves on the sensor extension cable connector. The connector grooves are on the side opposite the installed connector position assurance tab. See Figure 15.
- C. Route the sensor extension cable through the cab firewall, along the frame and across the trunnion tube to where the deflection sensor will be installed. **Do not use cable clamps to secure the sensor extension cable. Use nylon wire ties.**
- D. Connect the sensor extension cable to Sensor Port A on the back of the QuickLoad display. See Figure 16 for a view of the QuickLoad display sensor connections.

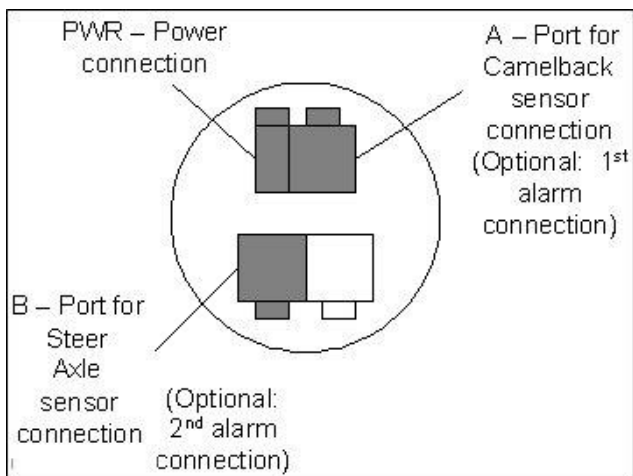


Figure 16. Connections: Steer Axle and Camelback Sensors

9. Cover installation

- A. Locate the opening in the end of the cover. The opening is used for the sensor cable to go through. See Figure 17.

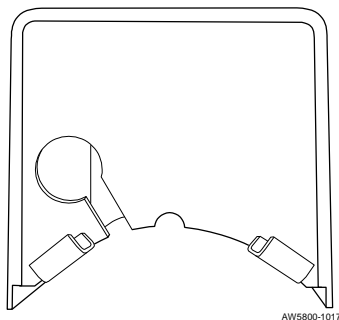
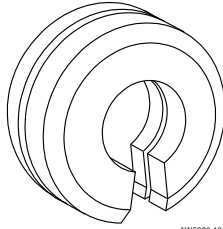


Figure 17. Cable Opening in Cover

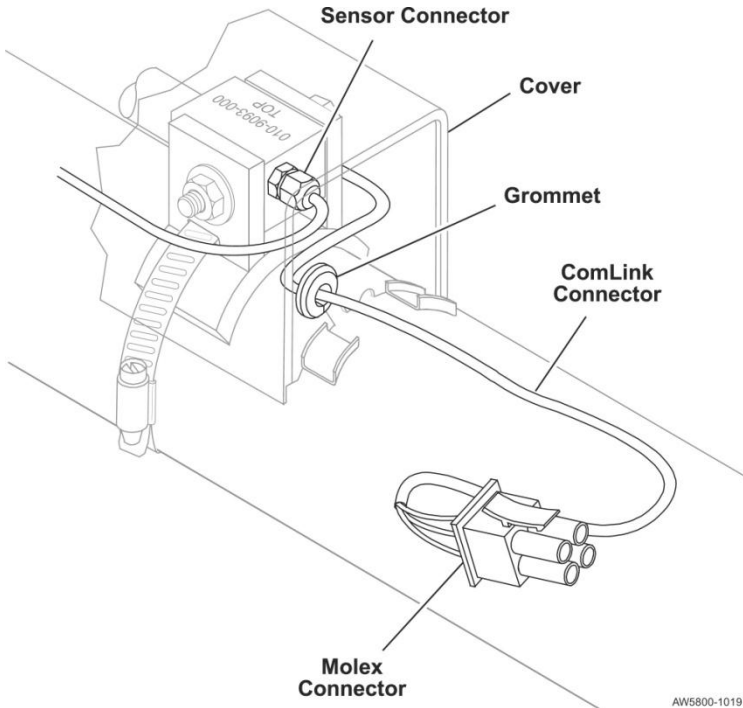
- B. Cut a notch in the supplied grommet (P/N 146-0014-000) and place it on the sensor cable. See Figure 18.



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Figure 18. Notching the Grommet

- C. Slide the sensor cable/grommet combination into the cover hole with the Molex connector of the sensor cable on the outside of the cover. See Figure 19.



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Figure 19. Placing the Cable and Grommet into Cover

- D. Set the Deflection Sensor Cover over the sensor on the trunnion tube. See Figure 20.

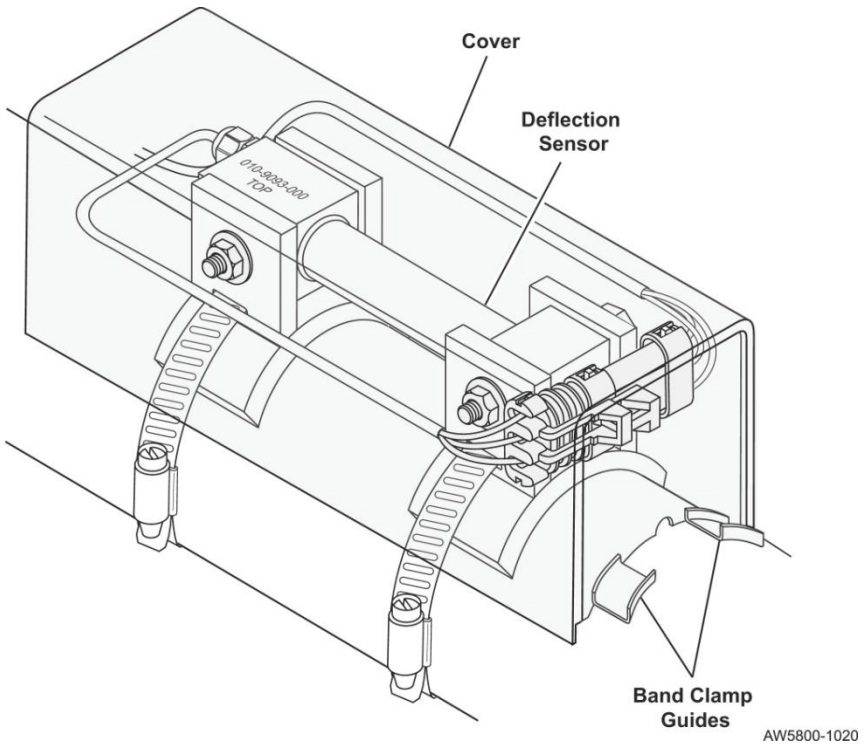
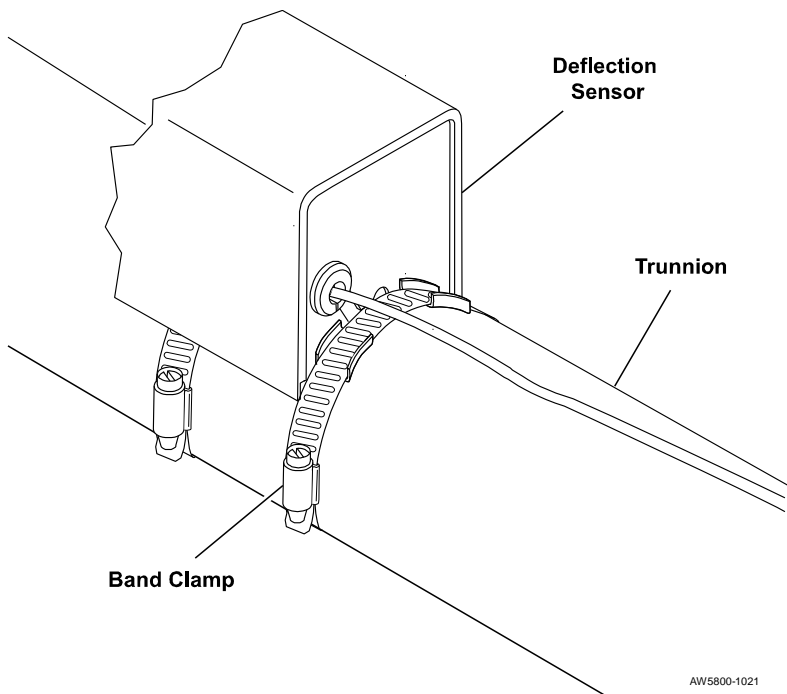


Figure 20. Placing Cover Over Deflection Sensor

- E. Very loosely install band clamps (P/N 139-0016-000) around the trunnion tube on both sides of the Deflection Sensor. Ensure that the band clamp on the driver side circles the trunnion tube and NOT the sensor deflection cable. See Figure 21.
- F. Mount the cover on top of the sensor and sensor brackets so that the sensor cable is completely under the cover. The bracket band clamps should emerge from the cover's side (Figure 20). The sensor extension cable should emerge from the cover's end port on the side that you will be routing the cable to the firewall. See Figure 21.



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Figure 21. Clamping Cover to Trunnion Tube

- G. Slip each band clamp over the flange on the ends of the cover and tighten in place. See Figure 21.
- H. Route the sensor cable across the trunnion tube to the frame of the vehicle and up to the dash and LoadMaxx Truck Scale. Do not use clamps on sensor cable. Secure all cables using nylon ties.

Your Air-Weigh scale installation is now complete.



CAUTION

Following sensor installation, do not calibrate until after the vehicle has been in normal operation for a week or 800 miles, whichever comes first. This allows for a break-in period for the sensor.

Do not operate the vehicle with the alignment tool in place.

NOTE

Heavy calibration must be done using maximum vehicle loads. See document 901-0116-000 for additional information on calibration.

Limited Warranty

For product failures due to material or manufacturing defects, Air-Weigh will replace or repair all components for up to 3 years from shipment date to the end-user Air-Weigh customer. These three-year components include: Displays, ComLinks, Sensors, Power Cables, Sensor Assemblies, Sensor Harnesses, and all other associated external components. Air-Weigh assumes no responsibility for administering warranty claims directly with any third party end users.

The responsibility of Air-Weigh under this warranty is limited to the repair, replacement, or credit of the defective part or assembly.

This warranty does not cover incidental or consequential damage to persons or property caused by use, abuse, misuse, or failure to comply with installation or operating instructions. This limited warranty does not apply to any product that has failed due to accident, abuse, alteration, installation not consistent with printed installation instructions, improper maintenance, improper operation, or as a result of system integration or installation not explicitly approved in writing by Air-Weigh.

Air-Weigh and its resellers shall have no responsibility or liability for damages if the purchaser or any other person alters the vehicle incorporating Air-Weigh products. This limited warranty shall not apply to any product that has been repaired or altered by anyone not employed by Air-Weigh or not operated in accordance with the manufacturer's printed material delivered with this product.

Air-Weigh hereby expressly disclaims any and all implied warranties of any type, kind of nature whatsoever, and particularly any implied warranty of merchantability or fitness for a particular purpose not expressly stated by Air-Weigh in its printed material delivered with its products.

Some states do not allow the exclusion or limitation of incidental or consequential damages. If such laws apply, the limitations or exclusions contained in the terms and conditions of this Warranty may not apply. This warranty gives you specific legal rights and you may also have other rights, which vary state to state.

May be covered by U.S. Patent Nos. 5478974, 5780782, 7478001

Foreign Patent Nos. 260494, 677998, 2122766

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Procedure for Warranty Claims

1. For a warranty claim of an Air-Weigh product, customers should get the part number, serial number, and failure description of the failed item and call Air-Weigh Customer Support. Air-Weigh will replace or repair units that have failed due to workmanship, at the discretion of Air-Weigh. In the event that Air-Weigh requests to examine product prior to disposition, or for repairs or replacements, Air-Weigh requires a Return Material Authorization (RMA) number to be issued before the item is returned. Customers should contact Air-Weigh's Customer Support Department at (888) 459-3247 for an RMA number. Please reference this RMA number in all correspondence.
2. Claimed items shall be shipped freight pre-paid to: Air-Weigh, Customer Support Department, 1730 Willow Creek Circle, Eugene, Oregon 97402, USA. The Air-Weigh RMA number shall appear on the outside of the return packaging.
3. Air-Weigh shall examine returned material within 30 days after receipt, or sooner if mutually agreed upon. If Air-Weigh determines that the part or assembly was defective in material or workmanship and within the warranty period, Air-Weigh will repair or replace the part or assembly and return freight pre-paid. In the event Air-Weigh determines that the part or assembly cannot be repaired or replaced and is within the warranty period, a credit not to exceed the purchase price will be issued to the Air-Weigh customer.
4. Air-Weigh Accounting will process a credit memo and notify the Air-Weigh customer by email or fax. The Air-Weigh customer will process a corresponding debit memo and notify Air-Weigh Accounting.
5. If the part or assembly received by Air-Weigh does not meet the requirements of the warranty program set forth above, at the Air-Weigh customer's request the part or assembly will either be discarded, returned freight collect, or repaired or replaced at the Air-Weigh customer's expense and returned freight collect.

Notes:

Notes:

Notes:



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