



**Electronic Height Sensor
Installation/Troubleshooting Guide**



The Haldex Electronic Height Sensor allows the use of Haldex's Trailer Roll Stability (TRS) brake system on spring suspension equipped trailers. The sensor will allow the TRS to measure the trailer's load state and adjust the braking force needed by the TRS to minimize trailer rollover. The Haldex Electronic Height Sensor offers mounting characteristics and linkages like the Haldex EGP Leveling Valve for air suspensions.

The Haldex Electronic Height Sensor is used to measure the difference in height between the trailer chassis and trailer axles as the load on the trailer varies from unladen (empty) to laden (fully loaded).

The Haldex Electronic Height Sensor is fixed to the trailer chassis and mechanically connects to the axle with a linkage assembly. When the trailer is loaded the distance between the chassis and the axle is reduced as the spring suspension is compressed. This causes the sensor linkage to raise, which in turn rotates the sensor's spindle. Rotation of the sensor's spindle varies the sensor's output voltage and this change in voltage is measured by the TRS ECU. The TRS then calculates the trailer's percentage load according to parameters set during the installation of the Haldex Electronic Height Sensor.

IMPORTANT NOTICE

The information listed herein is correct to the best of Haldex's knowledge and belief, having been compiled from reliable and official sources of information. However, HALDEX CAN NOT ASSUME ANY RESPONSIBILITY for possible error or misapplication of the product. Final determination of the suitability of the product for the use contemplated by the Buyer is the sole responsibility of the Buyer. Haldex shall have no responsibility in connection with this suitability.

IMPORTANT NOTICE

The description and specifications contained in this Installation/Service Manual are current at the time of printing. Haldex Brake Products Corp. reserves the right to discontinue or modify its models and/or procedure and to change specifications at any time without notice.

All Rights Reserved

Material may only be reproduced with the written permission of Haldex.

Introduction



Kit Contents:

<u>Part Number</u>	<u>Description</u>	<u>Qty.</u>
815030001	Electronic Height Sensor	1
RN10JJ	Mechanical Linkage Kit	1
814020001	TRS/Sensor Connection Cable	1
11095	3/8" NPT Plug	1
L31265	Installation/Troubleshooting Guide	1

For Engineering and Technical Support

Technical Service or Troubleshooting help can be obtained by calling Haldex and asking for the ABS/TRS Technical Support Line at 1-(800) 643-2374.

In Canada, please call: 1-(800) 267-9247.

For further information: Refer to these ABS publications featured on the Haldex website (www.haldex.com):

- TRS Installation/Service Manual (L30040)
- The Trailer Roll Stability (TRS) Diagnostic+ User Guide
- TRS End Of Line Test Manual (L31253W)



Installation of the Electronic Height Sensor

Before Installing the Electronic Height Sensor

The amount of spring deflection of the trailer's spring suspension from an unloaded state to a fully loaded state must be known in order for the Electronic Height Sensor to be installed and function correctly.

The spring **deflection** is the change in distance from the axle tube to some fixed reference point on the chassis when the trailer is unloaded (empty) to fully loaded.

Once the spring suspension deflection is determined an acceptable range of the horizontal lever length is obtained from the TRS Diagnostic+ Software, see the [Configuring the TRS with Diagnostic+ Software](#) on Page 10.

The **Sensor Lever Length** is the distance between the center of the sensor's spindle to the attachment point of the vertical linkage rod onto the horizontal linkage rod measured along the horizontal rod.

Unloaded Trailer

Loaded Trailer

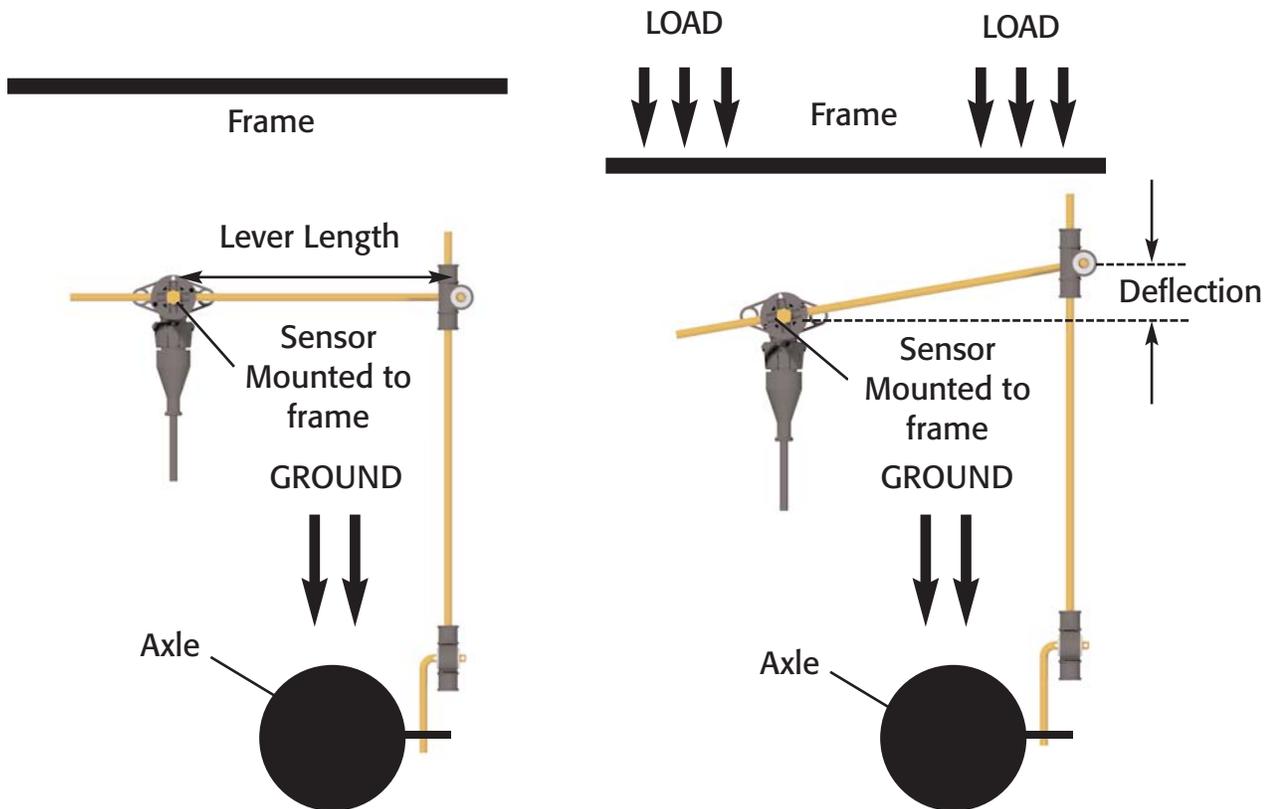


Figure 1: Lever Length and Deflection Defined

Installation of the Electronic Height Sensor



After mounting the sensor within the limits of acceptable ranges of lever lengths the actual lever length is then measured. This value is then programmed into the TRS ECU with the TRS Diagnostic+ Software.

It is imperative that the deflection and lever length be accurate and configured into the TRS in order that the TRS load sensing function operates correctly.

The TRS Diagnostic+ Software is available free of charge for download from the Haldex website and may be run on a Windows (TM) based personal computer. In addition to the software, a set of diagnostic cables are needed to connect the TRS brake system to the personal computer's USB port. These cables are sold as a kit, Haldex Part Number AQ15853 and may be purchased separately. Please note that the kit "DOES NOT" include a personal computer.

Mounting the Electronic Height Sensor

The Electronic Height Sensor must be installed on the trailer chassis with the cable connector pointing downwards and the arrow on the spindle pointing upwards. The sensor must be mounted so that the lever length is within the acceptable range of lever lengths, provided by the TRS Diagnostic+ Software. The Electronic Height Sensor is attached to the chassis with two 5/16" bolts, 2-1/2" long, Grade 5 or better. Do not torque the mounting bolts more than 12 lb-ft. The interconnection cable must be able to reach from the Electronic Height Sensor to the TRS ECU Auxiliary Port 4. The interconnection cable is approximately 12 ft. long.

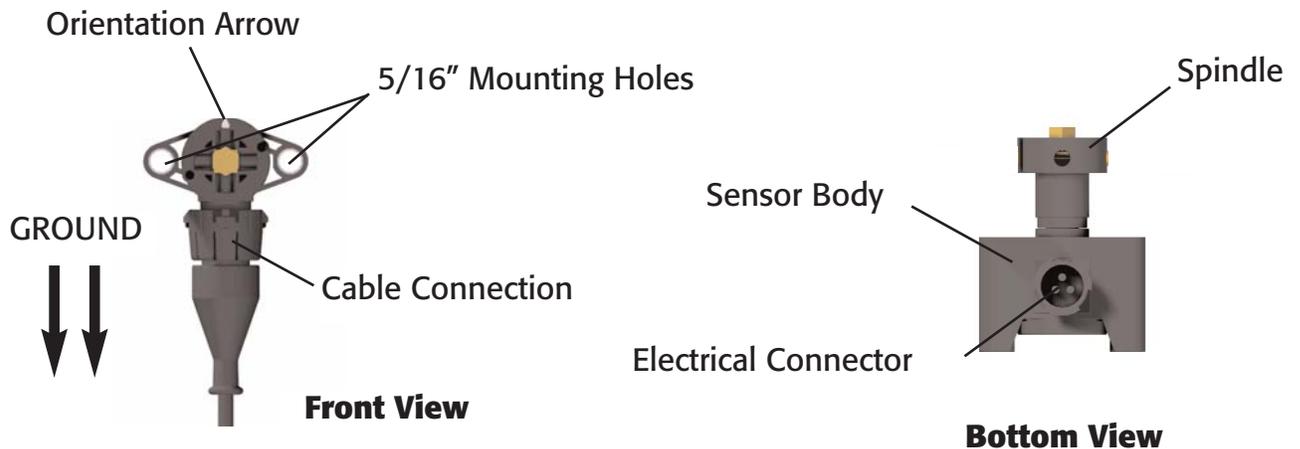


Figure 2: Electronic Height Sensor



Installation of the Electronic Height Sensor

The sensor is mounted in such a position that the vertical linkage rod is central to the axle/axles, both longitudinally and laterally, if a tri-axle, or connected to a lead axle if a tandem axle arrangement. It does not matter if the Electronic Height Sensor is located in front of, behind, or above the axle. It does not matter if the linkage attaches to the top of the axle, the front edge, or trailing edge of the axle tube.

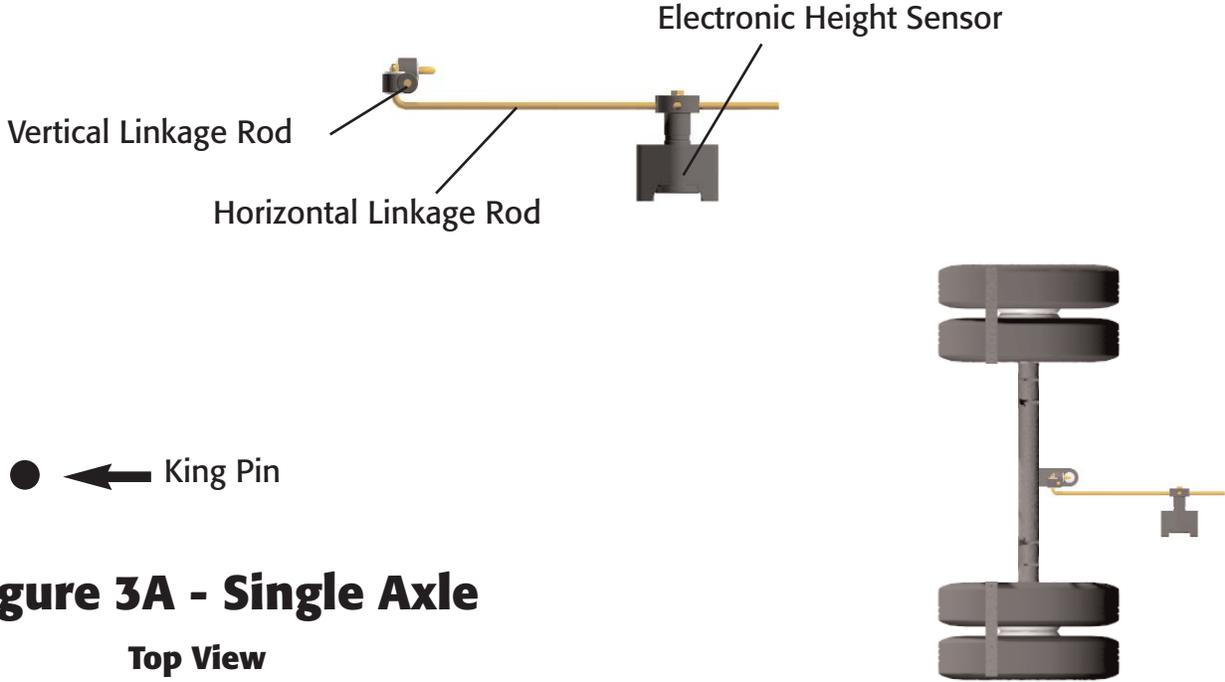


Figure 3: The Electronic Height Sensor is mounted central to the trailer’s axles

Installation of the Electronic Height Sensor

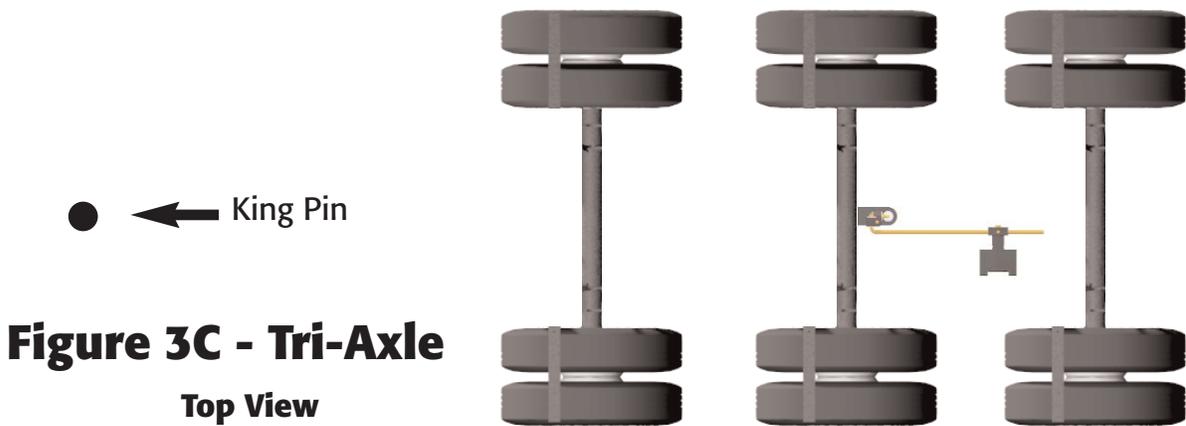


Figure 3: The Electronic Height Sensor is mounted central to the trailer’s axles

When the unloaded trailer is sitting on flat level ground and at its normal king pin height, the horizontal linkage rod must be level and parallel to the ground. The vertical linkage rod must point straight up and down. On the unloaded trailer the angle between the vertical and horizontal linkage rods must be 90°.

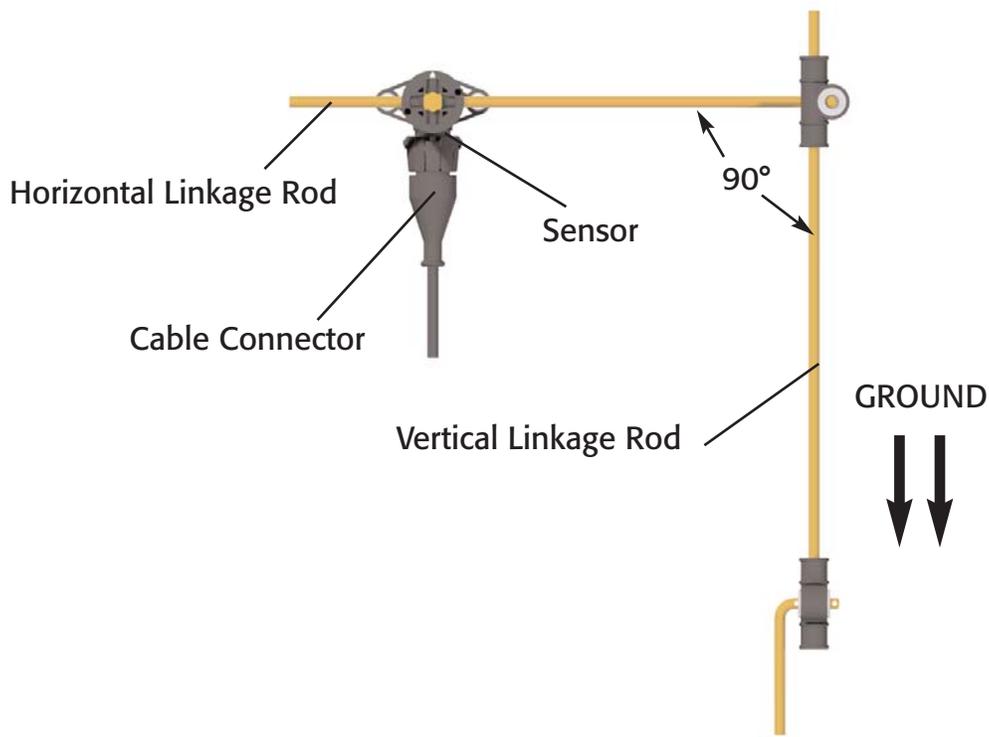


Figure 4: Linkage Rods Set-up on an unloaded trailer.



Installation of the Electronic Height Sensor

The linkage must be free from any side loading which might cause the linkage to bind or bend. The linkage must be positioned in a location with enough clearance for the linkage to freely move up and down without any mechanical interference. The sensor must be mounted so that the resulting lever length is within the acceptable range of lever lengths obtained from the TRS Diagnostic+ Software. As an installation aid, the spindle may be locked to the housing with two 0.15" diameter rods, not supplied, as shown in Figure 5.

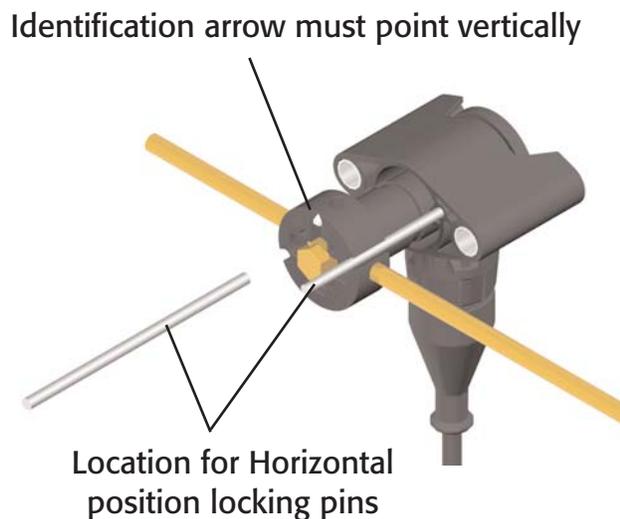


Figure 5: Locking Pin Placement

After mounting the sensor to the chassis, the horizontal linkage rod may be fixed in the horizontal position with the locking pins and the vertical rod placement on the horizontal rod can be established and secured with the linkage clamps. A short bubble level may be helpful to verify the orientation of the linkage rods. Fine tuning of the linkage is possible by adjusting the jam nuts on the axle attachment rod. When the linkage is in the correct orientation, all clamps and screws should be tightened to secure the linkage and sensor. Subsequently, any locking pins used during installation should be removed from the sensor before the trailer is loaded.

Installation of the Electronic Height Sensor



On the TRS valve assembly, plug port #41 (air bag suspension port) by inserting the 3/8" NPT plug (supplied in the kit) to allow the proper function of the TRS system. Torque the plug to 28 lbs-ft max.

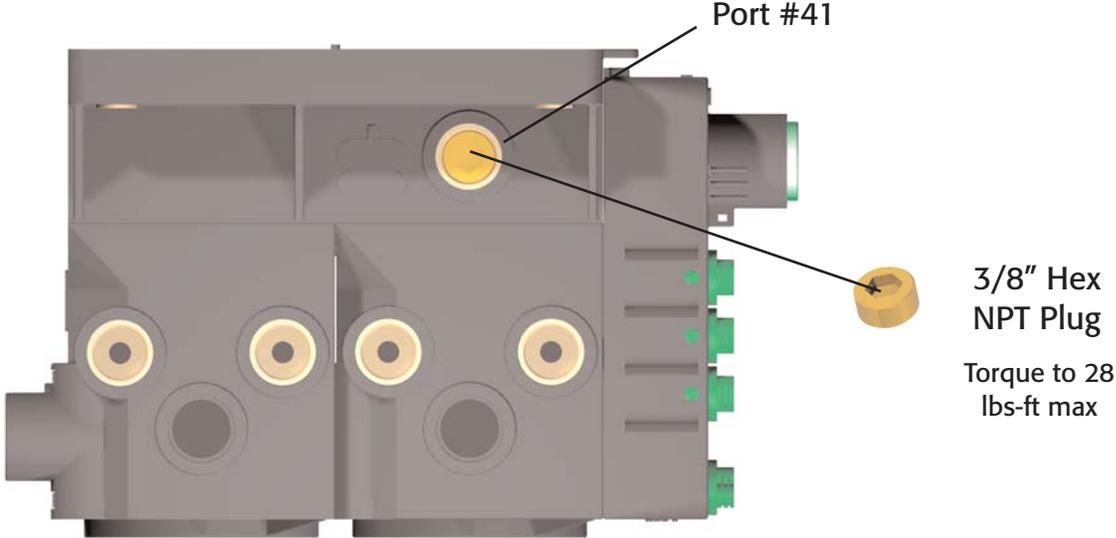


Figure 6: TRS Port #41 is plugged by using the 3/8" NPT Plug (supplied in the kit)

Electrical Connection to the TRS ECU

Use the cable supplied in the kit to connect the Electronic Height Sensor to the TRS ECU. The cable is to be connected to Auxiliary Port #4 in the TRS ECU. The TRS ECU is shipped with a blanking plug installed in Port #4. Remove that port's blanking plug and insert the sensor cable.

Installation of the Electronic Height Sensor

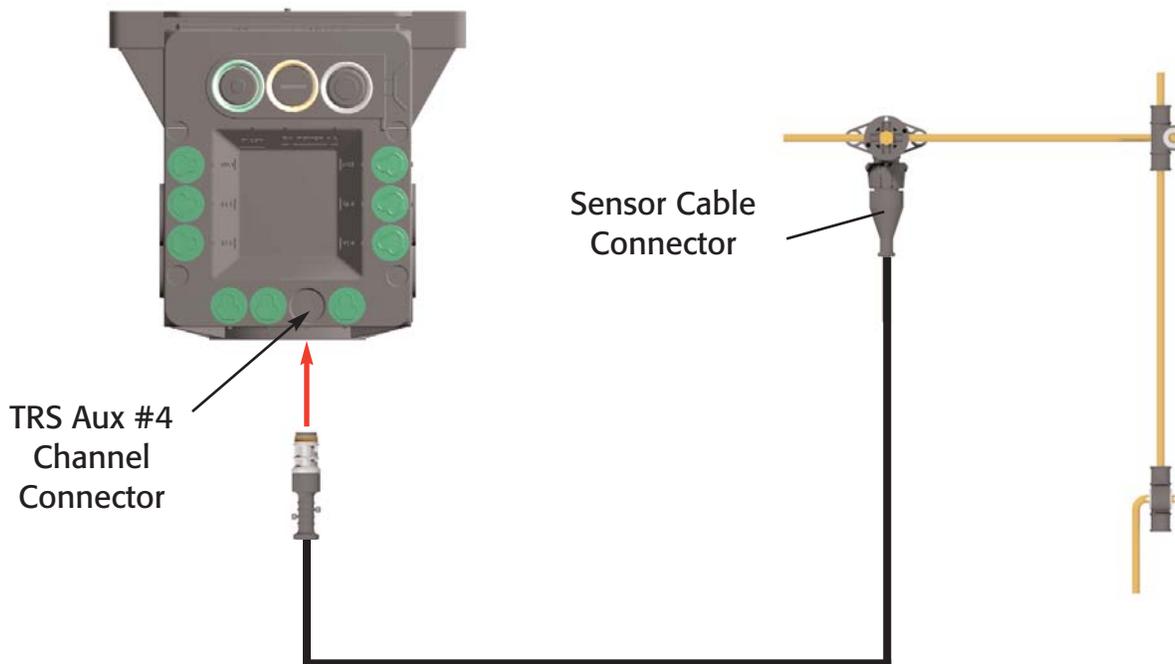


Figure 7: Interconnection between the TRS and the Electronic Height Sensor

Note: The blanking plug has a locking lever that engages a circular cut-out in the ECU socket. To remove the blanking plug, the locking lever tab must be pushed in while simultaneously pulling the blanking plug out. Refer to the TRS Service Installation Manual L30040 for further instruction.

The sensor cable has a similar connector end with a locking lever. Insert the cable connector such that the locking lever engages the circular cut out in the TRS auxiliary socket. An audible click may be heard as the lever engages. Gently tug on the cable to verify the cable is secure and locked in the TRS ECU. The other end of the cable is then connected to the Electronic Height Sensor as shown in **Figure 7**.

Note: The sensor cable connection is keyed to ensure proper installation. Orient the connector with the keys and twist the cable connector onto the sensor and verify the cable is securely fastened on the sensor. Secure the cable to the trailer in such a fashion to prevent chafing of the cable's jacketing, or the cable being snagged on mechanical components, or otherwise damaged.

Installation of the Electronic Height Sensor



Configuring the TRS with Diagnostic+ Software

The TRS ECU will need to be configured for the Electronic Height Sensor. This is done by reprogramming the TRS ECU software configuration.

To configure the TRS ECU for use with the Electronic Height Sensor you need:

- 1.) PC software: Diagnostic+ version 5.16 or greater
- 2.) Diagnostic cable set to connect between the PC and the TRS ECU

If an updated copy or help running the Diagnostic+ software is needed, refer to the TRS Diagnostic+ User Guide at www.haldex.com. For Engineering and Technical Support call 1-800-643-2374 ask for the ABS/TRS support line.

The Diagnostic cable set is available as a kit, Haldex Part number AQ15853 and may be purchased separately. Please note that this kit **does not** include a personal computer.

After installing the Diagnostic+ Software onto a PC, connect to the trailer with the diagnostic cables and electrically power up the trailer's blue ABS power. Start the Diagnostic+ Software and open the Auxiliary Configuration window shown in **Figure 8**. Refer to the TRS Diagnostic+ User Guide.

Select the Aux 4 channel and highlight the Mechanical Height Sensor from the drop down list. Once this device is selected, press the "MODIFY" button to set up the Electronic Height Sensor parameters.

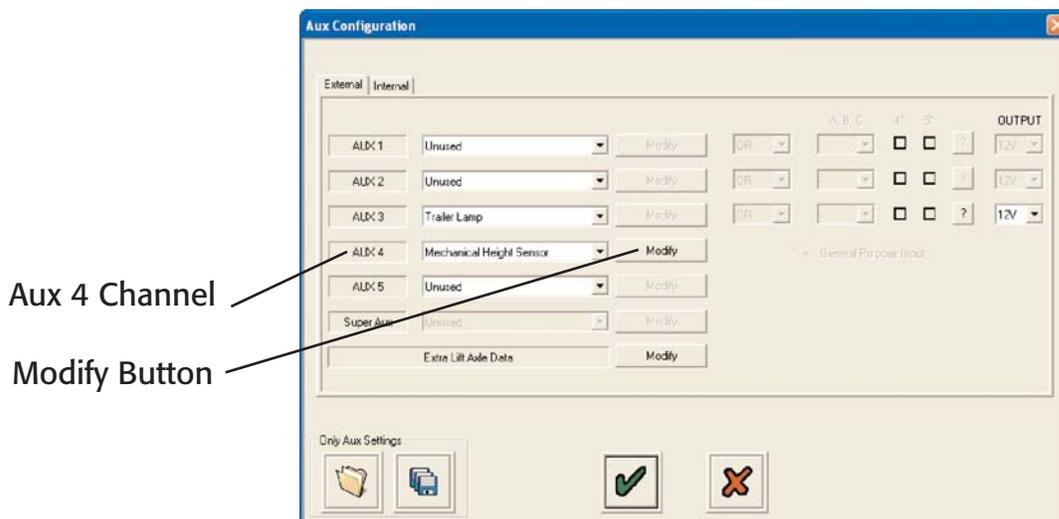


Figure 8: Auxiliary Device Configuration Window

Installation of the Electronic Height Sensor

Enter the deflection of the spring suspension in millimeters in the box indicated as shown in **Figure 9**. Once the deflection is entered a range of acceptable lever lengths is displayed as shown.

Note that for the entered deflection of 20 mm the range of acceptable lever lengths is: 100 to 150 mm. After mounting the sensor, measure the actual lever length and enter this value, in millimeters, into the input box as shown in **Figure 9**.

The Diagnostic+ Software requires the deflection and lever length to be entered in millimeters. The acceptable lever length range is also reported in millimeters. 1 inch = 25.4 millimeters.

The screenshot shows a software window titled "Mechanical Height Sensor" with the following elements and annotations:

- Deflection Input:** A text box containing "10" mm, with a range of "(10mm - 65mm)" displayed to its right. An annotation points to this box: "Enter the Deflection Value".
- Lever Length Input:** A text box containing "100" mm, with a range of "(100mm - 150mm)" displayed to its right. An annotation points to this box: "The range of lever acceptable lengths".
- Visual Aids:** Two diagrams of a suspension spindle and linkage assembly are shown. An annotation points to the left diagram: "After mounting the height sensor, measure and enter the actual value in Lever Length of the horizontal rod".
- Confirmation Buttons:** Two buttons are at the bottom: a green checkmark and a red 'X'. An annotation points to the green checkmark: "Indicate which side the linkage is on when facing the spindle, here the left side of the spindle is selected".
- Final Instruction:** An annotation points to both confirmation buttons: "Click the 'Green' checkmark to accept or 'Red' to cancel".

Figure 9: Parameter Input Window for the Electronic Height Sensor

Installation of the Electronic Height Sensor



Aside from deflection and lever length parameters, the location of the sensor spindle on the trailer (left or right side) in relation to the linkage will need to be set. Left sided operation is shown in **Figure 9**. To set right sided operation click the circle under the diagram to select.

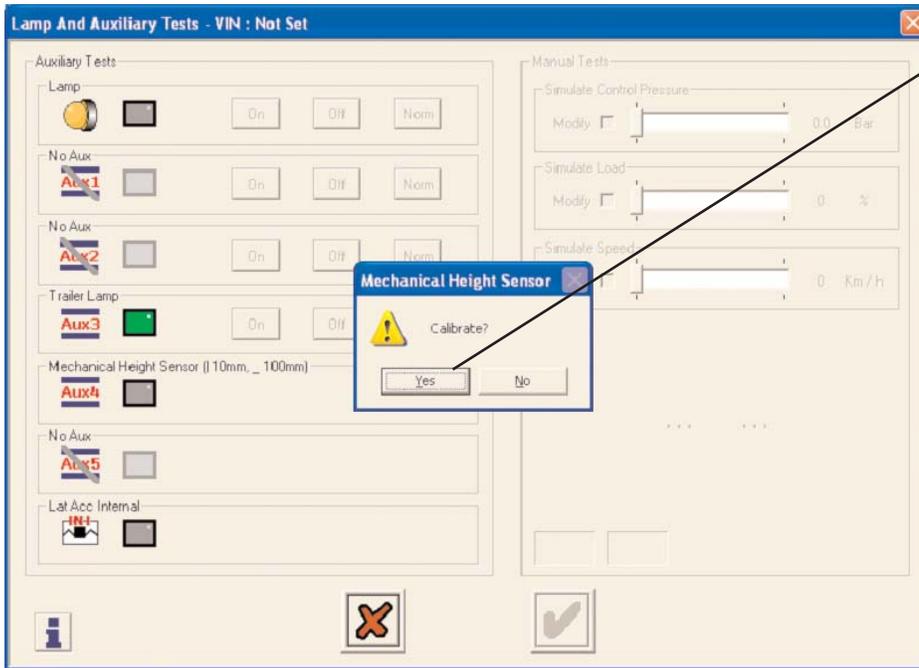
The range of lever lengths depends upon the deflection of the spring suspension or it's stiffness. A different deflection distance will result in a different range of acceptable lever lengths.

Once the parameters have been set, click the "Green" check mark icon to close the window. Program the updated configuration into the TRS. Reference the Diagnostic+ Users Guide for information on how to do this.

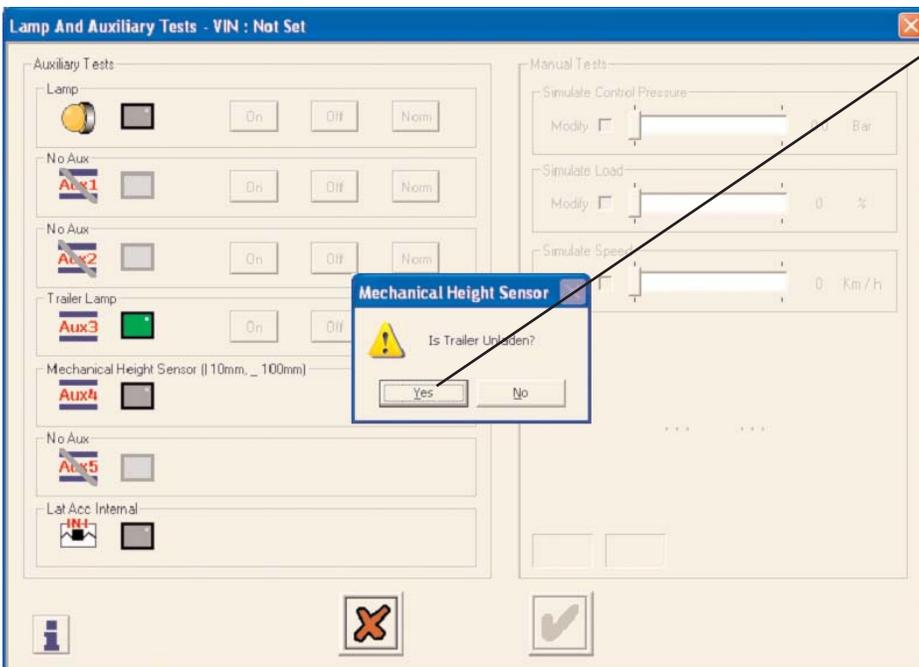
End of Line Test of the Electronic Height Sensor

After the sensor is configured it is required that the End of Line Test be run with the Diagnostic+ Software to calibrate and verify the sensor installation. **Figure 10** shows the Lamp and Auxiliaries portion of the End of Line Test. This is where the height sensor is calibrated to the trailer. The trailer must be unloaded, level and set at its normal running ride height, with blue ABS power applied to the trailer. Refer to the TRS End of Line Test Manual L31253W at www.haldex.com.

Installation of the Electronic Height Sensor



If the trailer is level, and is at normal running height select **YES**



If the trailer is unloaded select **YES**

Figure 10: Note that this Electronic Height Sensor test will confirm that you want to calibrate and that the trailer is unloaded or empty.

Installation of the Electronic Height Sensor

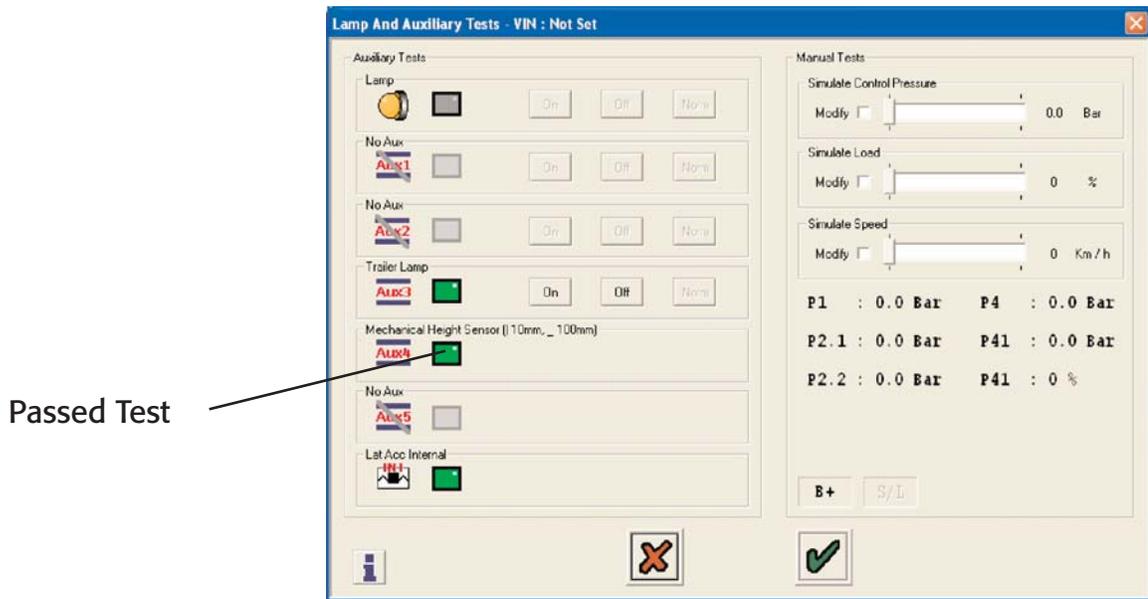


Figure 11: A passed test of the Electronic Height Sensor is indicated by the “Green” box.

Once the End of Line Test has been successfully completed the vehicle is ready to be put into service. Normal operation of the sensor may be verified by monitoring the main system schematic screen of Diag+. **Figure 12** shows the sensor output expressed as a percentage of the trailer load.

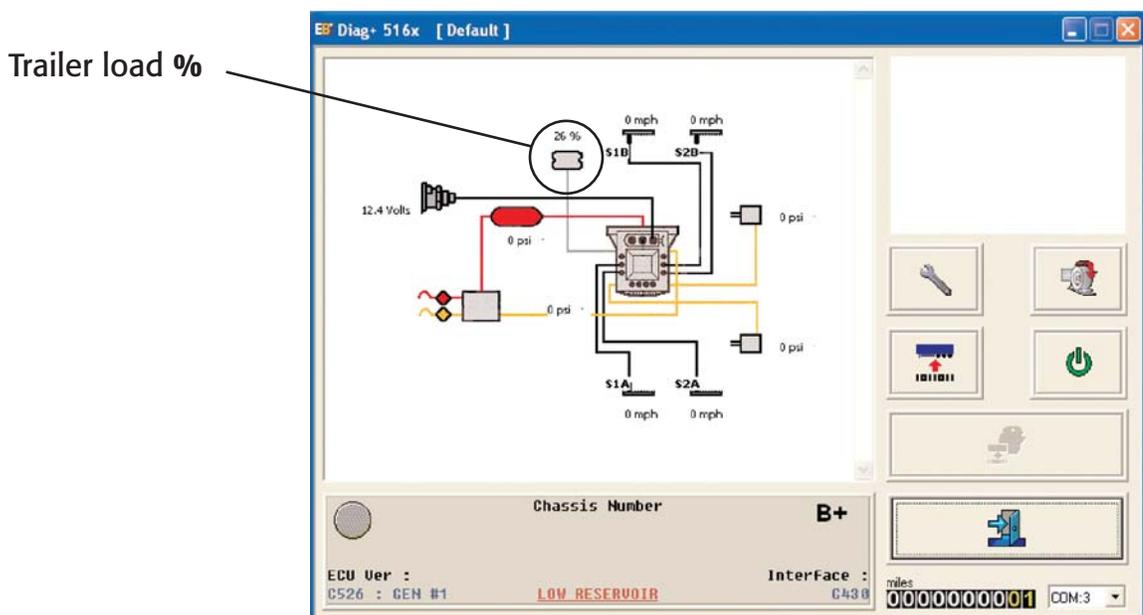


Figure 12: A trailer at 26% loaded state.



Installation of the Electronic Height Sensor

Troubleshooting:

If the Trailer ABS fault lamp is ON with an active DTC of: "Aux 4 configuration error or Aux 4."

Check the following:

Verify TRS software configuration is set for correct side of lever: "Left or Right".

Verify the lever length and deflection is correctly set for the trailer.

Verify the orientation arrow on the sensor spindle is pointing up.

With the trailer completely unloaded, level and at it's running height. Inspect the mechanical linkage for squareness i.e. that the horizontal linkage rod is level; the vertical linkage rod is plumb, the angle between the two rods is 90 degrees. Verify that the trailer chassis is level and not leaning due to a problem with the mechanical spring suspension. Verify that the linkage pieces are not loose, bent or broken, that all components are securely fastened together.

The sensor shows a load state of X% load and does not change as the trailer is loaded or unloaded.

Examine the mechanical linkage for binding or mechanical interference. Verify the linkage is free to move as intended. Disconnect the linkage from the sensor and turn the spindle by hand, verify the spindle is free to turn. Verify the orientation arrow on the sensor spindle is pointing up.

Examine the cable between the Electronic Height Sensor and the TRS for damage and correct installation. Verify the cable has continuity and no short circuits are present between the three conductors. Verify the cable between the TRS and the sensor is correctly fastened into the TRS Aux Port #4 and onto the Electronic Height Sensor.

Preventative Maintenance

The linkage assembly needs to be periodically checked for free movement with no binding or sticking and enough clearance to allow free movement. Bent, welded or corroded linkage pieces should be replaced. Brittle or hardened rubber pieces are to be replaced as necessary.

With the trailer unloaded, and set at running ride height, the linkage must be checked for squareness between the horizontal and vertical rods. In addition, the horizontal rod must be level, the vertical rod is plumb and all the linkage pieces are securely fastened together to the axle and to the sensor.

Attachment points to the axle and chassis need to be inspected for mechanical soundness and that the attachment is secure.

Haldex (www.haldex.com), headquartered in Stockholm, Sweden, is a provider of proprietary and innovative solutions to the global vehicle industry, with focus on products in vehicles that enhance safety, environment and vehicle dynamics.

Haldex is listed on the Stockholm Stock Exchange. Haldex has a yearly turnover of close to 5.6 billion SEK and employs 4,300 people.

Disclaimer: The products described within this literature, including without limitation, product features, specifications, designs, availability and pricing are subject to change by Haldex and its subsidiaries at any time without notice.

This document and other information from Haldex, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system, in the current literature or catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through their own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements are met.

©2010, Haldex AB - This material may contain Haldex trademarks and third party trademarks, trade names, corporate logos, graphics and emblems which are the property of their respective companies. The contents of this document may not be copied, distributed, adapted or displayed for commercial purposes or otherwise without prior written consent from Haldex.

Austria

Haldex Wien Ges.m.b.H.
Vienna
Tel.: +43 1 8 69 27 97
Fax: +43 1 8 69 27 97 27
E-Mail: info.AT@haldex.com

Belgium

Haldex N.V.
Balegem
Tel.: +32 9 363 90 00
Fax: +32 9 363 90 09
E-Mail: info.BE@haldex.com

Brazil

Haldex do Brasil Ind. e Com. Ltda.
São Paulo
Tel.: +55 11 213 55 000
Fax: +55 11 503 49 515
E-Mail: info.BR@haldex.com

Canada

Haldex Ltd.
Cambridge, Ontario
Tel.: +1 519 621 6722
Fax: +1 519 621 3924
E-Mail: info.CA@haldex.com

China

Haldex International Trading Co. Ltd.
Shanghai
Tel.: +86 21 5240 0338
Fax: +86 21 5240 0177
E-Mail: info.CN@haldex.com

France

Haldex Europe SAS
Weyersheim (Strasbourg)
Tel.: +33 3 88 68 22 00
Fax: +33 3 88 68 22 09
E-Mail: info.EUR@haldex.com

Germany

Haldex Brake Products GmbH
Heidelberg
Tel.: +49 6 221 7030
Fax: +49 6 221 703400
E-Mail: info.DE@haldex.com

Hungary

Haldex Hungary Kft.
Szentlőrincváta
Tel.: +36 29 631 300
Fax: +36 29 631 301
E-Mail: info.HU@haldex.com

India

Haldex India Limited
Nasik
Tel.: +91 253 2380094
Fax: +91 253 2380729

Italy

Haldex Italia Srl.
Biancospino (Milan)
Tel.: +39 039 47 17 02
Fax: +39 039 27 54 309
E-Mail: info.IT@haldex.com

Korea

Haldex Korea Ltd.
Seoul
Tel.: +82 2 2636 7545
Fax: +82 2 2636 7548
E-Mail: info.HKR@haldex.com

Mexico

Haldex de Mexico S.A. De C.V.
Monterrey
Tel.: +52 81 8156 9500
Fax: +52 81 8313 7090

Poland

Haldex Sp. z.o.o.
Praszka
Tel.: +48 34 350 11 00
Fax: +48 34 350 11 11
E-Mail: info.PL@haldex.com

Russia

OOO "Haldex RUS"
Moscow
Tel.: +7 495 747 59 56
Fax: +7 495 786 39 70
E-Mail: info.RU@haldex.com

Spain

Haldex España S.A.
Granollers
Tel.: +34 93 84 07 239
Fax: +34 93 84 91 218
E-Mail: info.ES@haldex.com

Sweden

Haldex Brake Products AB
Landskrona
Tel.: +46 418 47 60 00
Fax: +46 418 47 60 01
E-Mail: info.SE@haldex.com

United Kingdom

Haldex Ltd.
Newton Aycliffe
Tel.: +44 1325 310 110
Fax: +44 1325 311 834
E-Mail: info.GBAy@haldex.com

Haldex Brake Products Ltd.
Redditch
Tel.: +44 1527 499 499
Fax: +44 1527 499 500
E-Mail: info.GBRe@haldex.com

USA

Haldex Brake Products Corp.
Kansas City
Tel.: +1 816 891 2470
Fax: +1 816 891 9447
E-Mail: info.US@haldex.com

