Installation Guide

L30040 5/08 Rev. 5

HALDEX TRS
(Trailer Roll Stability)

Installation / Service Manual
for 4S/2M and 2S/2M Systems

$ 7.00

Technical Service
and
Engineering Support

In the U.S. please call:

1-800-643-2374 (press 2)

In Canada, please call:

1-800-267-9247

(www.hbsna.com)

IMPORTANT NOTICE

The data 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 products 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 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.

Table of Contents

This installation manual describes the correct installation procedures for the Haldex TRS (Trailer Roll Stability) for trailers.

Safety First !

Please follow your company's safety procedures when you install this equipment. Be sure that you understand all instructions before you begin.

Note: Remove all air pressure and electrical power from the brake system before beginning work.

General Operation

Haldex TRS is the latest offering in a full line of Haldex trailer ABS systems. Haldex TRS provides a further enhancement in safety by detecting the potential of trailer rollover. Haldex TRS continually monitors the trailers vehicle speed, air suspension pressure, and lateral acceleration along the vehicle's roll axis. If the Haldex TRS determines that a rollover threshold is reached a series of light brake applications are applied to the side of the vehicle lifting off the ground. If the wheel slip on the unloading side exceeds a threshold the system automatically applies a heavy brake application on the opposite side. Vehicle stability is achieved by reducing the vehicle speed to a "Safe Harbor" range.

The Haldex TRS product is compatible with all towing vehicles and is compliant with FMVSS121 providing the ABS functionality through either permanent or stoplight power; permanent power is required for the roll stability feature. In the event of power failure, as with other ABS systems, Haldex TRS defaults to a standard service brake system.

A Haldex TRS system may be used on most air suspension equipped semi-trailer configurations with 1 to 3 axles, and may be used in either 4 sensor 2 modulator (4S/2M) or 2 sensor 2 modulator (2S/2M) applications plumbed in a side-by-side configuration only, using either disc or drum brakes. For other vehicle configurations contact Haldex Engineering Support. TRS may be used on B-trains, full trailers pulled by tractors or straight trucks. Not on doubles or triples using A-frame dollies.

The Haldex TRS product ***MUST NOT*** be installed on center-axle trailers, full trailers, or semi-trailers and dollies equipped with mechanical spring suspension. For vehicles with axle spreads greater then 72" inches contact Haldex Engineering Support.

VEHICLE REQUIREMENTS:

- Constant (permanent) power # 7 Pin Blue wire on J560 connector.
- LED stop lamps (because the stop lamps are illuminated during a rollover event)
- Air Suspension

Warning:

The Haldex TRS product can help reduce the potential risk of rollover in conjunction with good driving practices. Driving too fast for conditions may still result in a rollover even with a Haldex TRS equipped trailer. Safe driving remains the most important element in accident prevention. Failure to drive safely can result in serious personal injury and/or damage to property.

System Components

"See Haldex Trailer ABS Service Components Catalog L20243 for additional information on Haldex ABS Products"

Haldex Supplied Items

ECU/Modulator Assembly

TRS Power Cord w/Stop Light Activation

Speed Sensor Cable Extensions

Diagnostic Cable

Required / Optional Supplier Section

90° Sensor

Trailer Brake Control Valve

LED Stop Light

Sensor Clip

ABS Lamp

Diagnostic Tools

PC Diagnostics Kit (PC not included)

Software

PC Cable

7-Way Diagnostic Connector

TRS Info Center

Optional Installation Aids

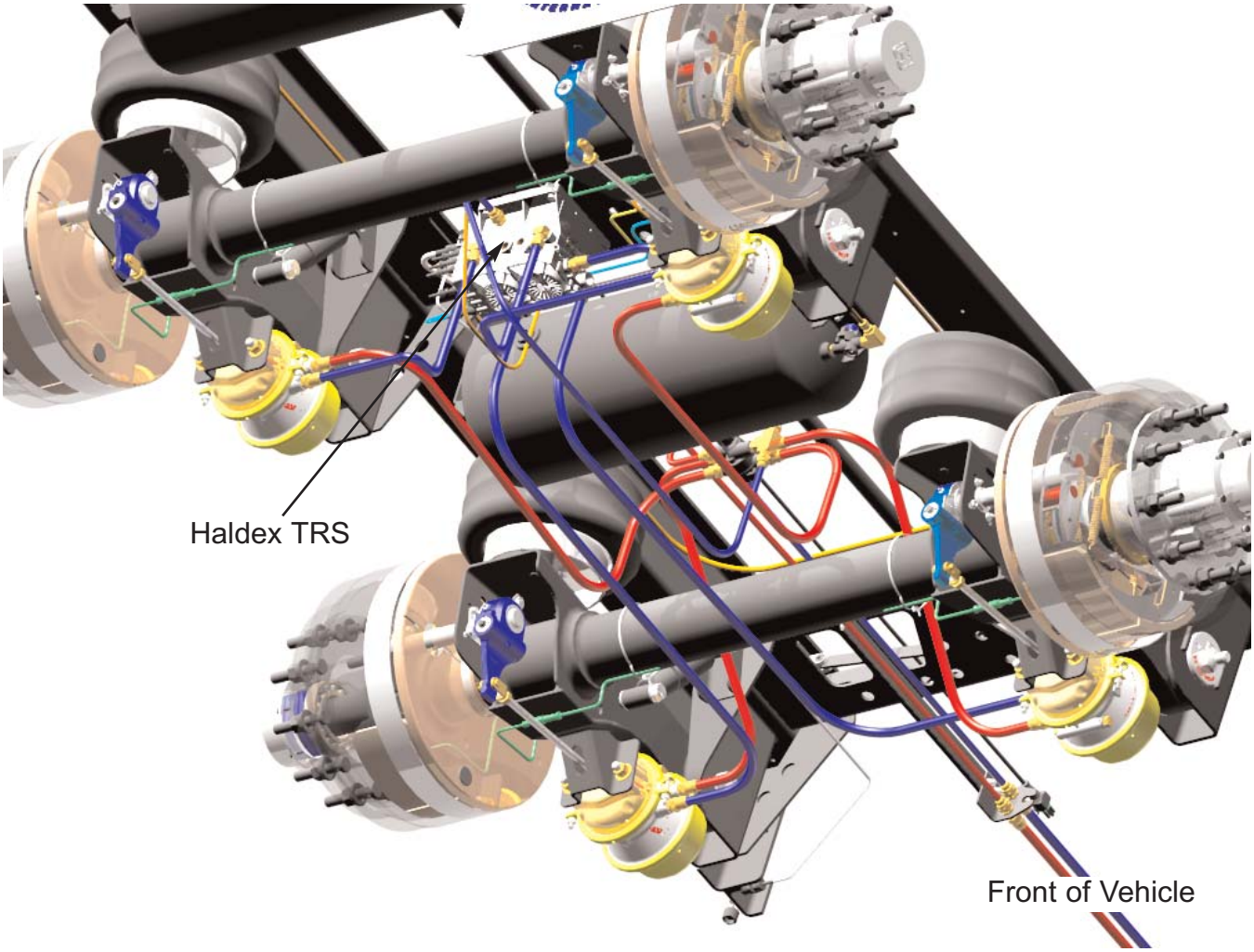
3-Way Clip

Hose Clip

Basic TRS Power Cord

Tie Strap

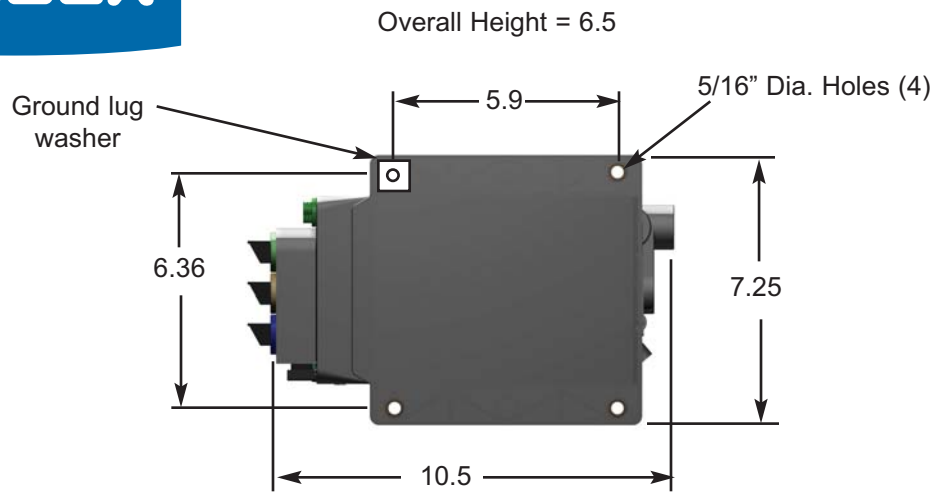
Sensor Clip



Key Installation Points for the Haldex TRS unit:

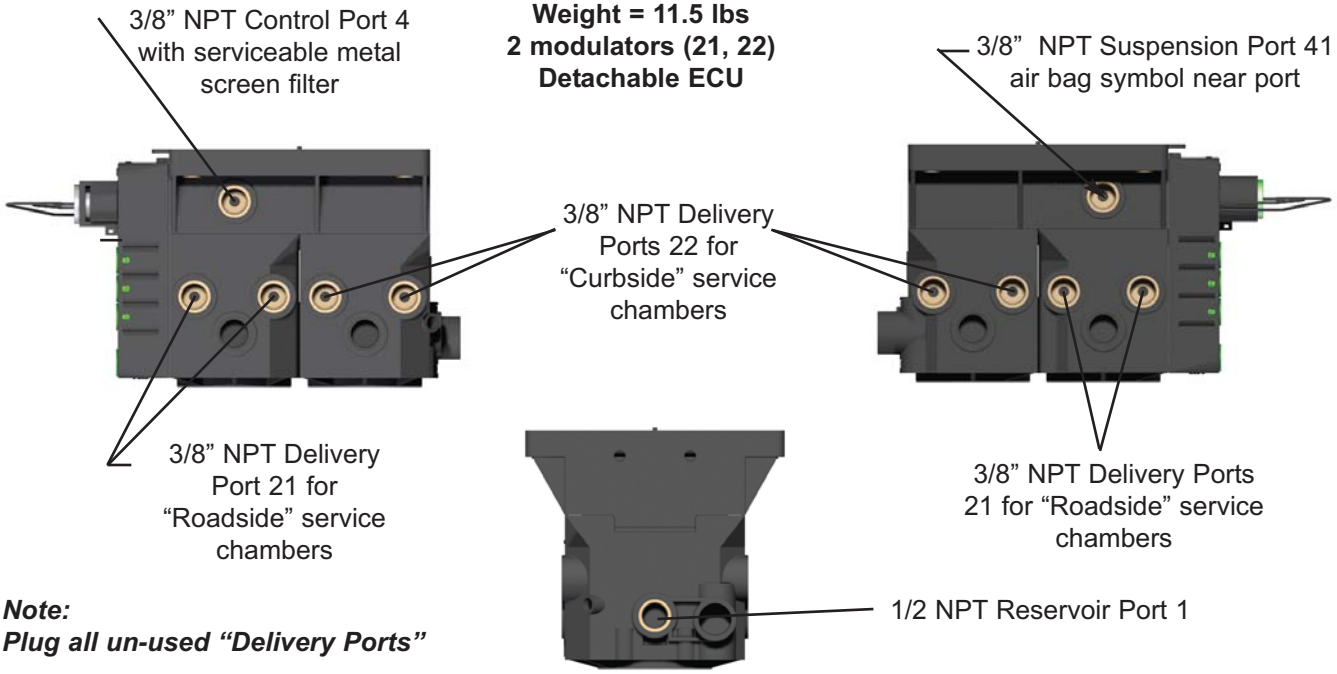
1. TRS Valve and ECU preferred location is: centered between axles, centered between frame rails and as close to the trailer floor as possible
2. ECU must face toward the “roadside” of the vehicle
3. Side-by-Side plumbing - Delivery Ports on Valve 21 used for “RoadSide”, Delivery Ports on Valve 22 used for “CurbSide”
4. Plumbing is similar to an ABS relay valve except Port 41 is added, which connects to the air bag circuit
5. Plug unused pneumatic delivery ports on the modulator
6. Plug unused electrical ports on the ECU
7. Make sure sensor and connectors lock into the side holes of the ECU
8. Make sure ECU Slidelock Lever is closed and in the locked position
9. Leave some slack in sensor cables to accommodate movement between components and trailer suspension

All dimensions in inches



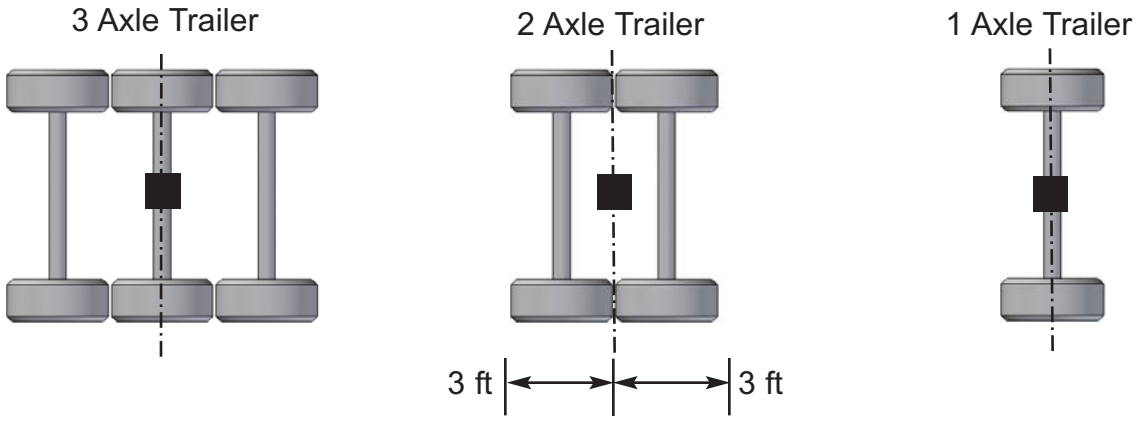
5. Drill the ECU/Modulator 4 hole mounting pattern into the crossmember. Use 3/8 drill bit. See page 29 for a mounting pattern template.

6. Mount the unit to the crossmember with rust resistant 5/16” x 2 1/4” long bolts, SAE Grade 5 or better, with washers and locking nuts. Torque the mounting bolts to 15 ft-lbs maximum. Washers to be used on the modulator and crossmember.



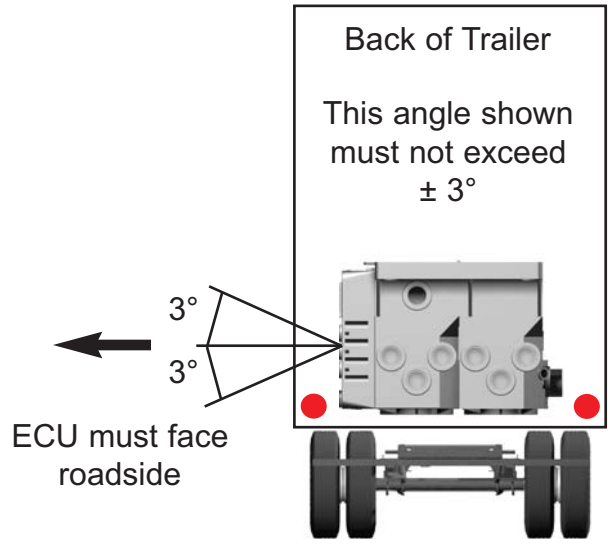
Note:
Plug all un-used “Delivery Ports”

Mounting the ECU/Modulator Assembly

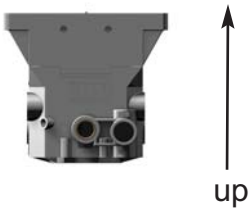


ECU/Modulator Assembly

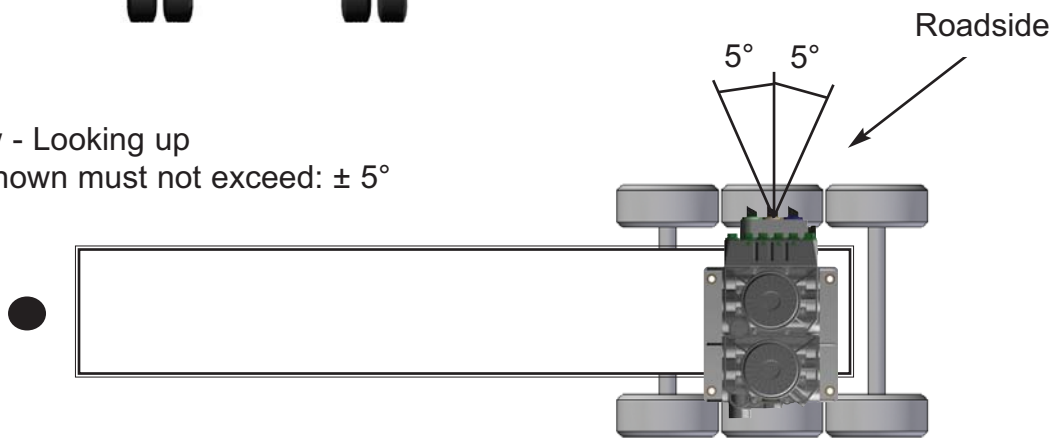
1. Locate unit inside frame rails, it can be offset to the side if necessary
2. Tandems - locate unit within +/- 3 ft of the center of the axle spread
3. Tridems - locate unit close to center axle for brake balance
4. Locate unit as high up to the trailer floor as possible



Haldex ECU/Modulator Assembly should be mounted vertically.

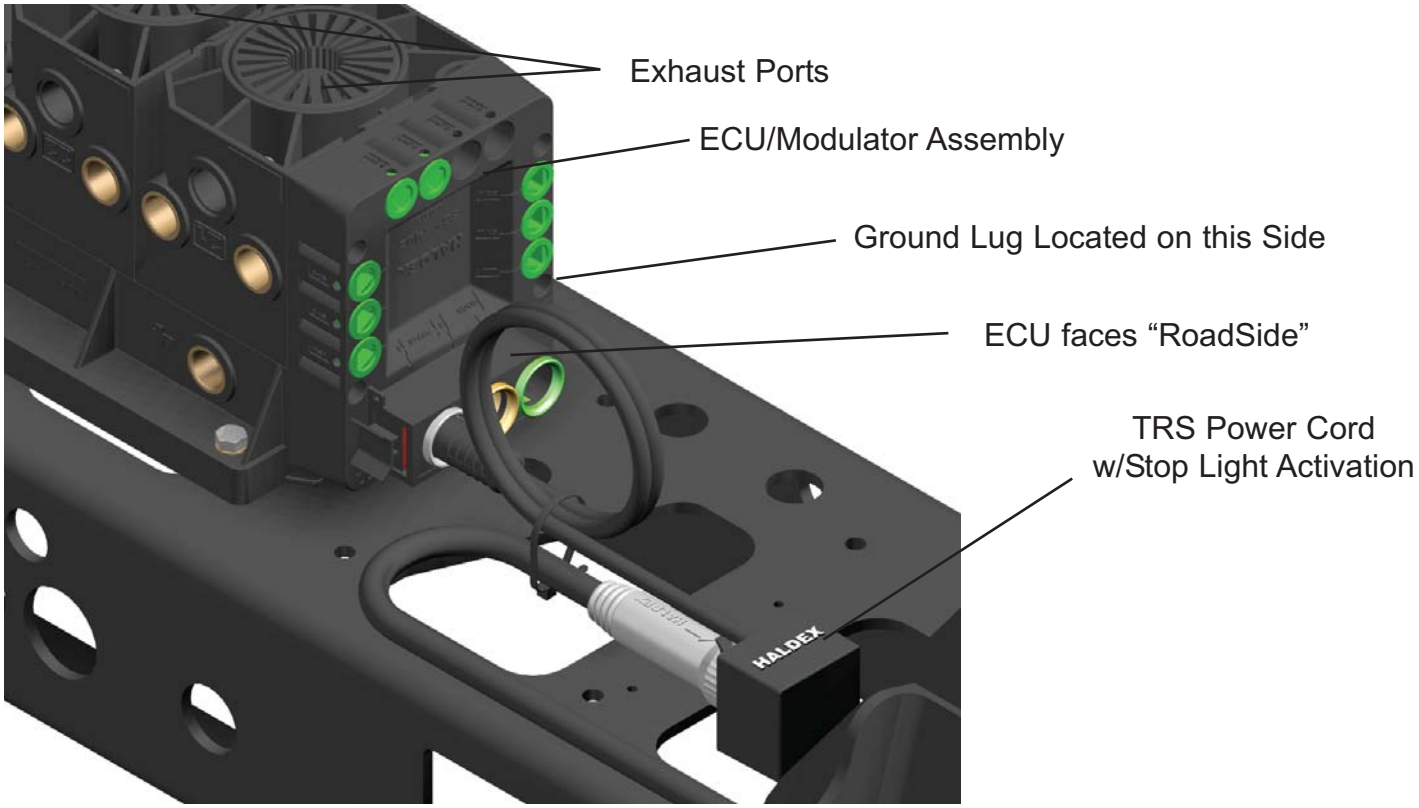


Bottom View - Looking up
The angle shown must not exceed: ± 5°



Mounting the ECU/Modulator Assembly (Bottom View Shown)

The ECU/Modulator assembly must be frame mounted on a rigid structural member as high in the chassis as possible to protect the unit from direct spray and other road debris. The exhaust ports should be down and ECU facing the “roadside” of the vehicle. This unit should “***NOT***” be in the direct spray of high pressure washing.



1. Determine the center of the axle(s) spread where the ECU/Valve Assembly will be installed as shown on page 7.

2. Look for a rigid cross member within ± 3 feet of this center to mount the ECU/Modulator Assembly. It may be necessary to straddle two cross members with a metal mounting bracket, 3/16” minimum thickness. If bracket is to be painted, mask off the area on the bracket where the modulator ground lug washer is located.

3. The side-to-side (roadside to curbside) position should be within the frame rails as shown on page 7. It is permissible to offset the unit to one side as long as sufficient clearances exist for airline and electrical cabling connections.

4. The ECU must face the roadside of the vehicle and be level as shown on page 7.

5. If the Power Cord with Stop Light Activation is selected, secure the electronic module by fastening it to the trailer frame with P-clamps, tie-straps, etc.

TRS Plumbing Schematic

Note:

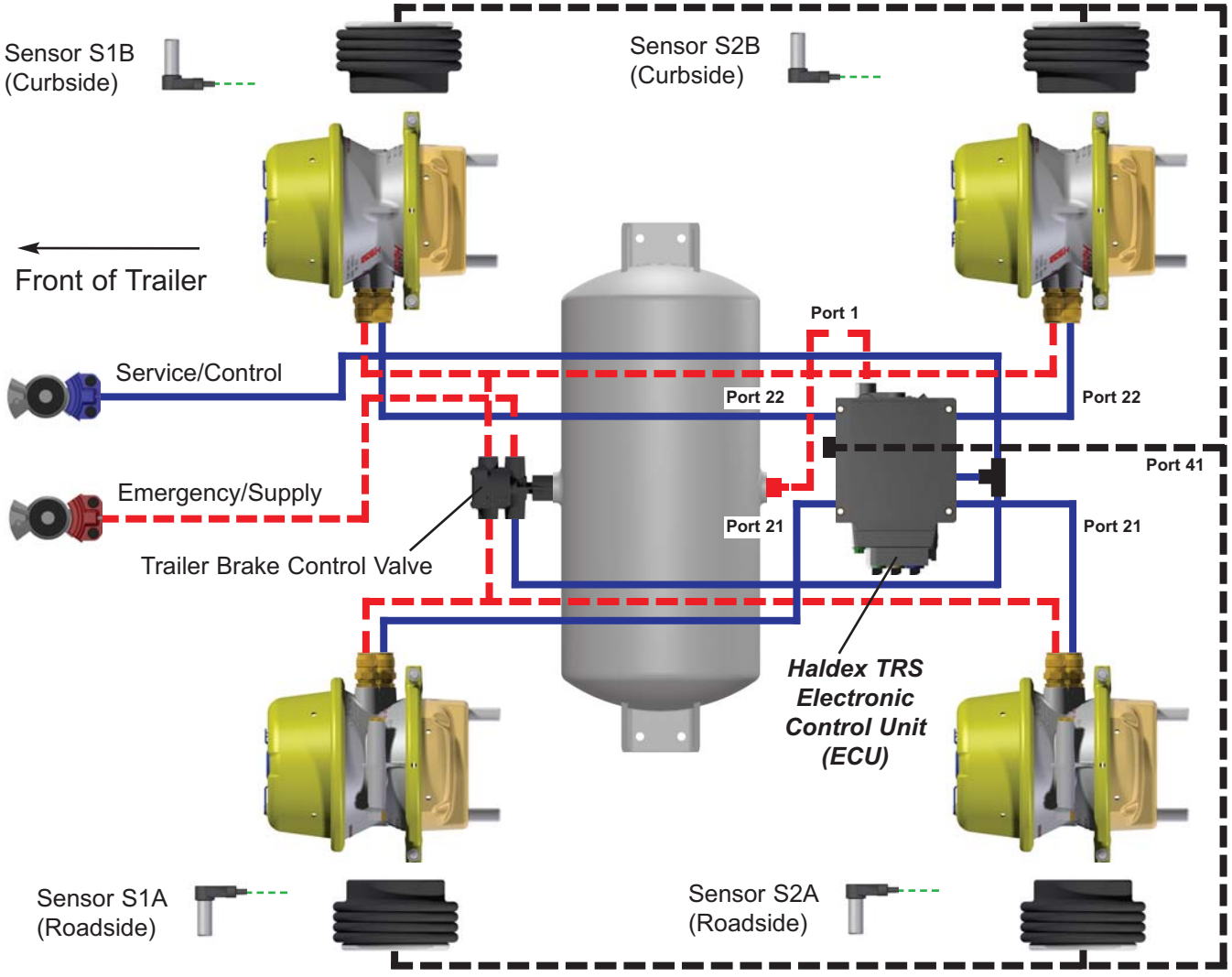
Delivery Hose shown in "Blue" shall be attached to Modulator 21 ports to "Roadside" chambers and Modulator 22 ports to "Curbside" chambers.

Port #1 from valve to air tank should be 3/4" tubing.

ECU/Modulator Assembly

Trailer Brake Control Valve

Plumbing Schematic (4S/2M)



Legend:

Service/Control Line
Emergency/Supply Line
Air Bag Line

Note:
Haldex TRS with ECU facing "RoadSide"

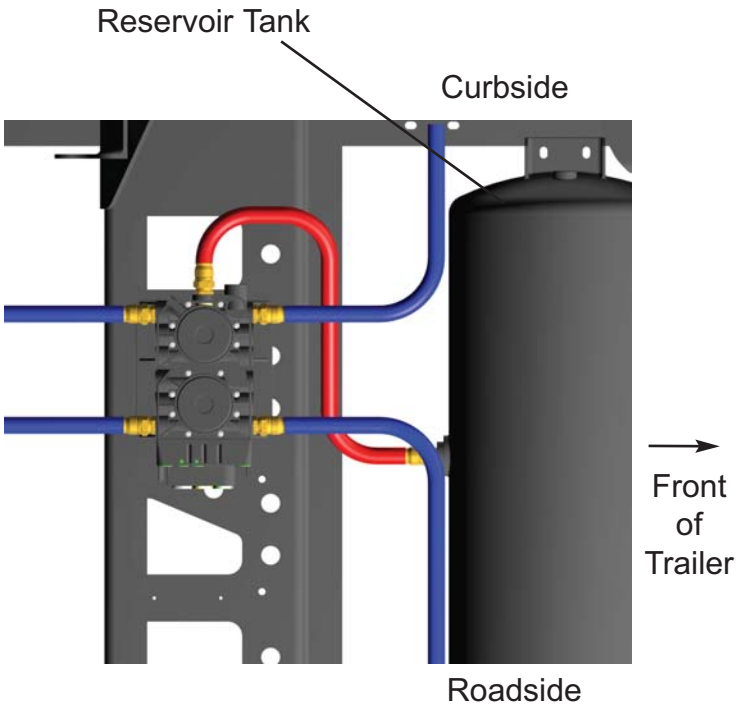
AIR BRAKE COMPONENTS AND SYSTEM SCHEMATIC ARE DESIGNED TO ALLOW COMPLIANCE WITH FMVSS121.

THIS SCHEMATIC IS FOR INFORMATION PURPOSES ONLY. IT IS THE VEHICLE MANUFACTURERS ULTIMATE RESPONSIBILITY TO CERTIFY THEIR SYSTEM MEETS ALL APPLICABLE REGULATIONS.

PIPE NIPPLES USED TO MOUNT BRAKE VALVES MUST BE HEAVY WALL TYPE PER SAE J514.

Plumbing the Modulator Air Valve

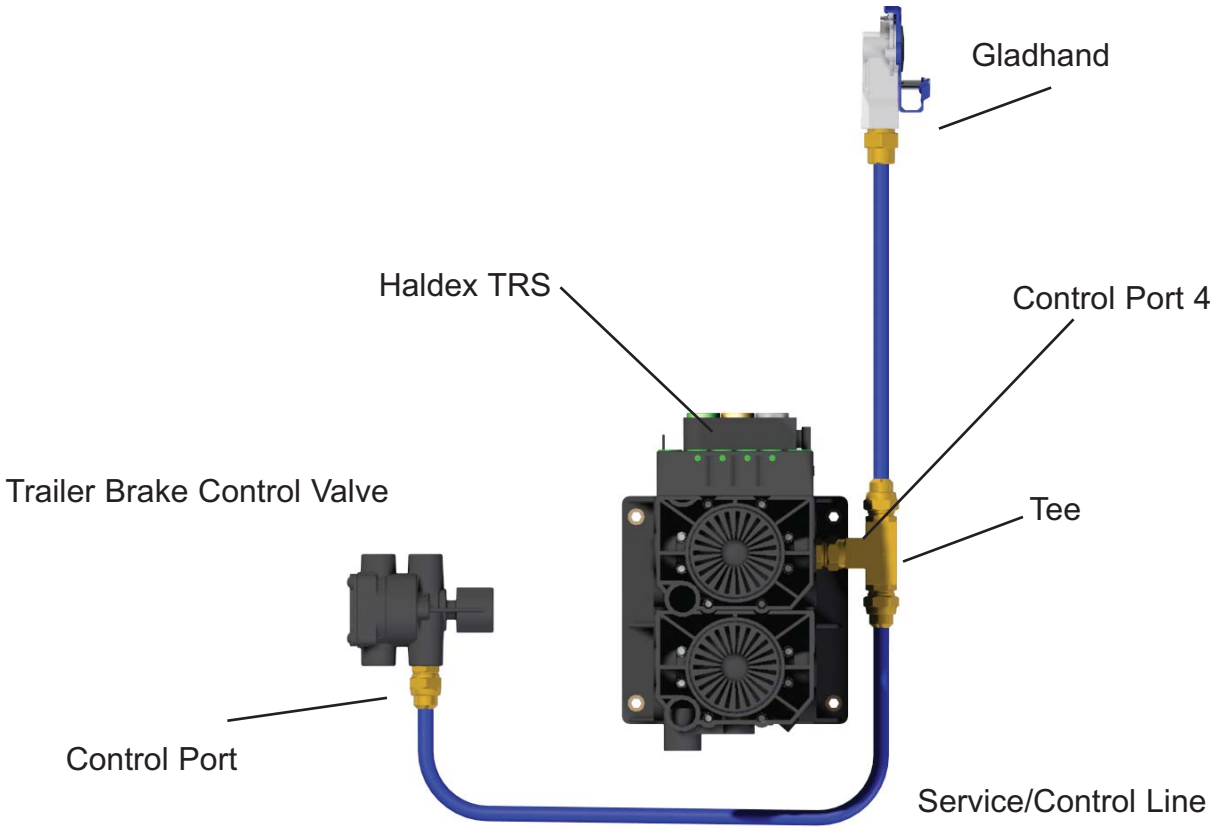
viewed from bottom



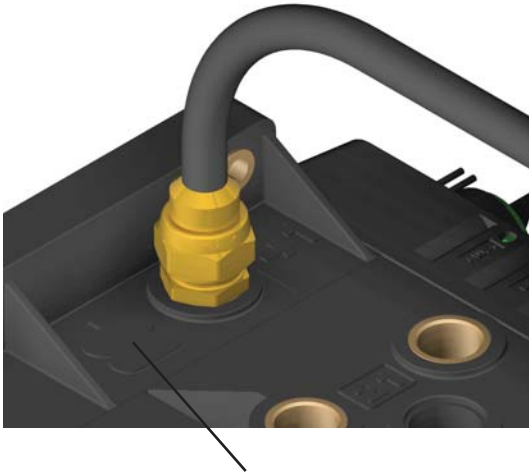
1. Reservoir port plumbing shown in red: plumb 3/4” O.D. tubing between the reservoir tank and the modulator reservoir port 1.

2. Delivery ports plumbing shown in blue: attach delivery hoses from modulator 21 ports to “roadside” chambers. Attach delivery hoses from modulator 22 ports to “curbside” chambers. Plug unused delivery ports. Use thread sealant sparingly on all fittings. (Loctite ST565 or similar). *DO NOT* use teflon tape on fittings, it can break and contaminate the air system.

3. Control port plumbing shown in blue: From the gladhand connect the modulator control Port 4 to the Trailer Brake Control Valve port as shown by installing a tee fitting into the TRS modulator.



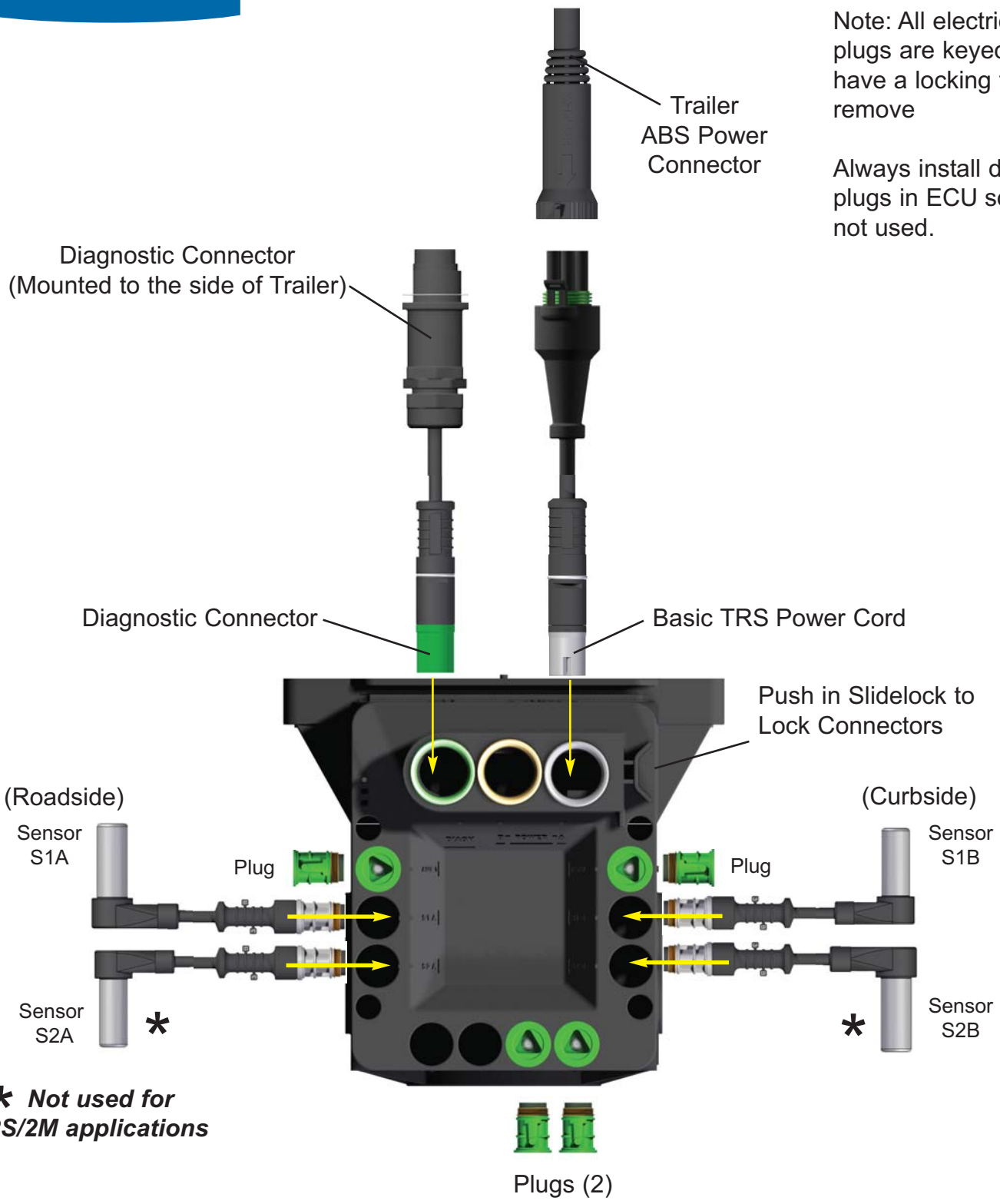
4. Suspension port plumbing: connect the modulator suspension port 41 to the delivery side of the leveling valve. This connection can be made by adding a tee to the delivery port of the leveling valve or the connection can be made by cutting the synflex tubing of the air bag circuit and adding a tee.



Electrical Wiring Overview (Basic Power Cord)

Note: All electrical plugs are keyed and have a locking tab to remove

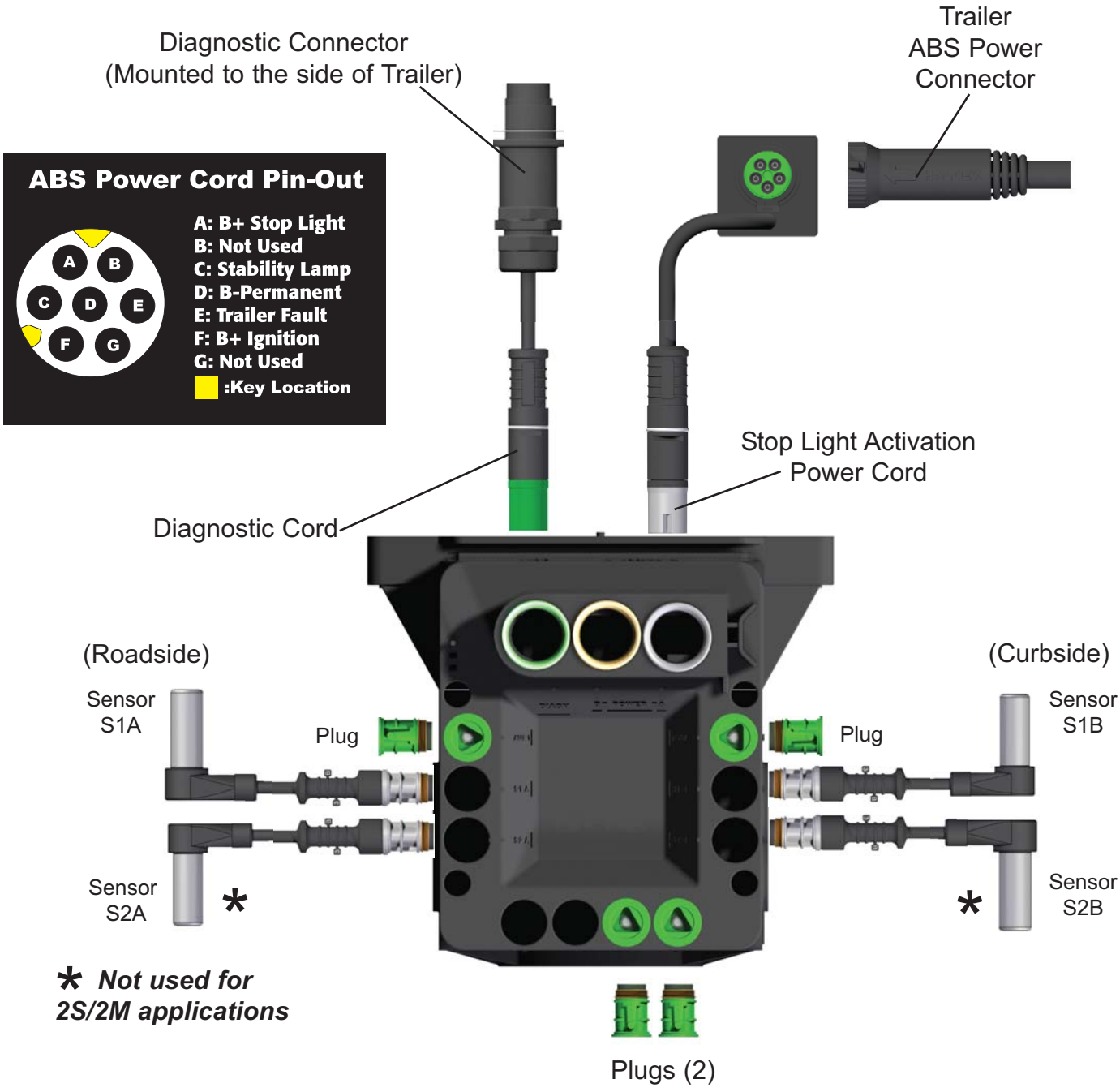
Always install dummy plugs in ECU sockets not used.



* ***Not used for 2S/2M applications***

Electrical Wiring Overview (Stop Light Activation Power Cord)

The Stop Light Activation Power Cord illuminates trailer brake lights during “roll event”.



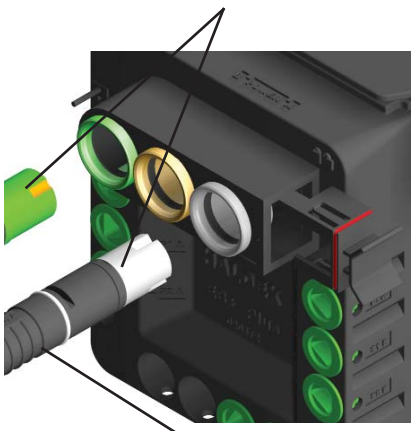
* ***Not used for 2S/2M applications***

Electrical Connections to the ECU/Modulator Assembly

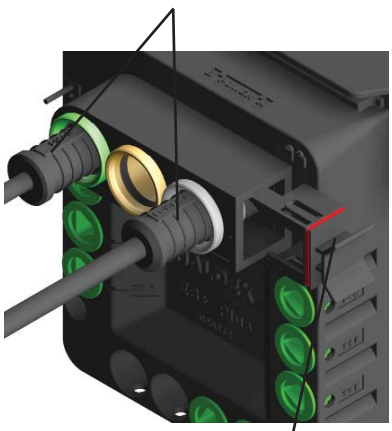
Power and Diagnostic Connections: Move lever on the ECU to the unlocked position. Insert grey “stop light activation power cord” and “diagnostic cord” into ECU ports with molded labels facing upward. Press connectors into the ports until they bottom out. Ensure the “red seal” remains seated on the locking lever. Move lever to the lock position. If the unit remains unlocked, vibration will loosen the cords, causing them to fall out. Disabling the Haldex TRS and ABS functions of the system.

1. Pull out locking lever.

2. Position Connectors.

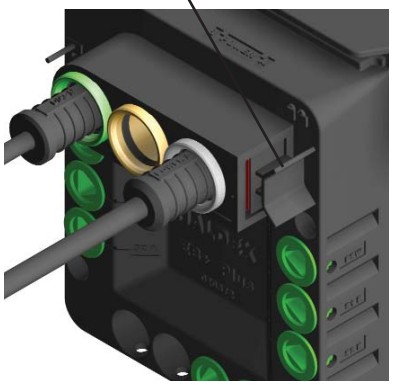


3. Insert Connectors.



Red Seal

4. Push Locking Lever in.

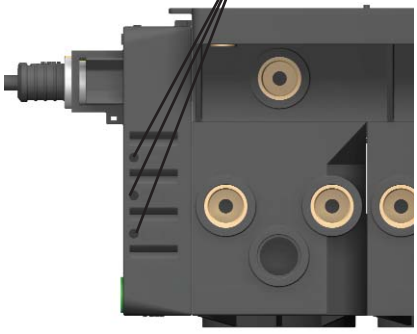


Molded Label

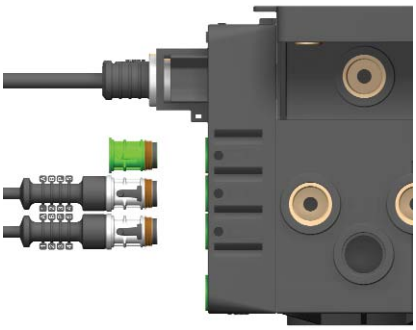
Ensure that the moded label faces upward before inserting into the Haldex TRS ECU

Locking Tab

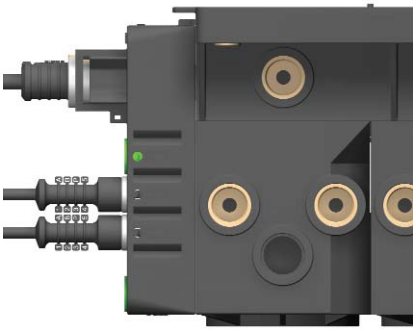
Lock holes for Sensors and Plugs



Position Sensors and Plugs into correct locations



Push firmly into correct holes and listen for click.



Electrical Connections to the ECU/Modulator Assembly

Sensor extensions: connect sensor extensions to speed sensors and ECU as shown. Connectors must be pushed fully into the sensor cable sockets and ECU ports until they click into place to prevent falling out due to vibration. Ensure contact pins are clean. Ensure o-rings are present and clean on both sides of the sensor extensions.

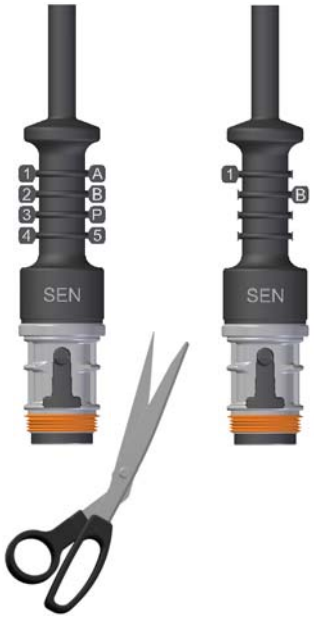
Plugs (2)

Sensor extension identification is used for traceability from the wheel end to the ECU. This is easily accomplished by removing identification tabs for each sensor extension as shown below.

ECU Iden.	Tab Removed								Component
	1	2	3	4	A	B	P	5	
S1A		cut	cut	cut		cut	cut	cut	S1A
S1B		cut	cut	cut	cut		cut	cut	S1B
S2A	cut		cut	cut		cut	cut	cut	*S2A
S2B	cut		cut	cut	cut		cut	cut	*S2B

(DO NOT cut items in the grey boxes)
** Not used for 2S/2M applications*

Example: S1B
Front Axle, Curbside

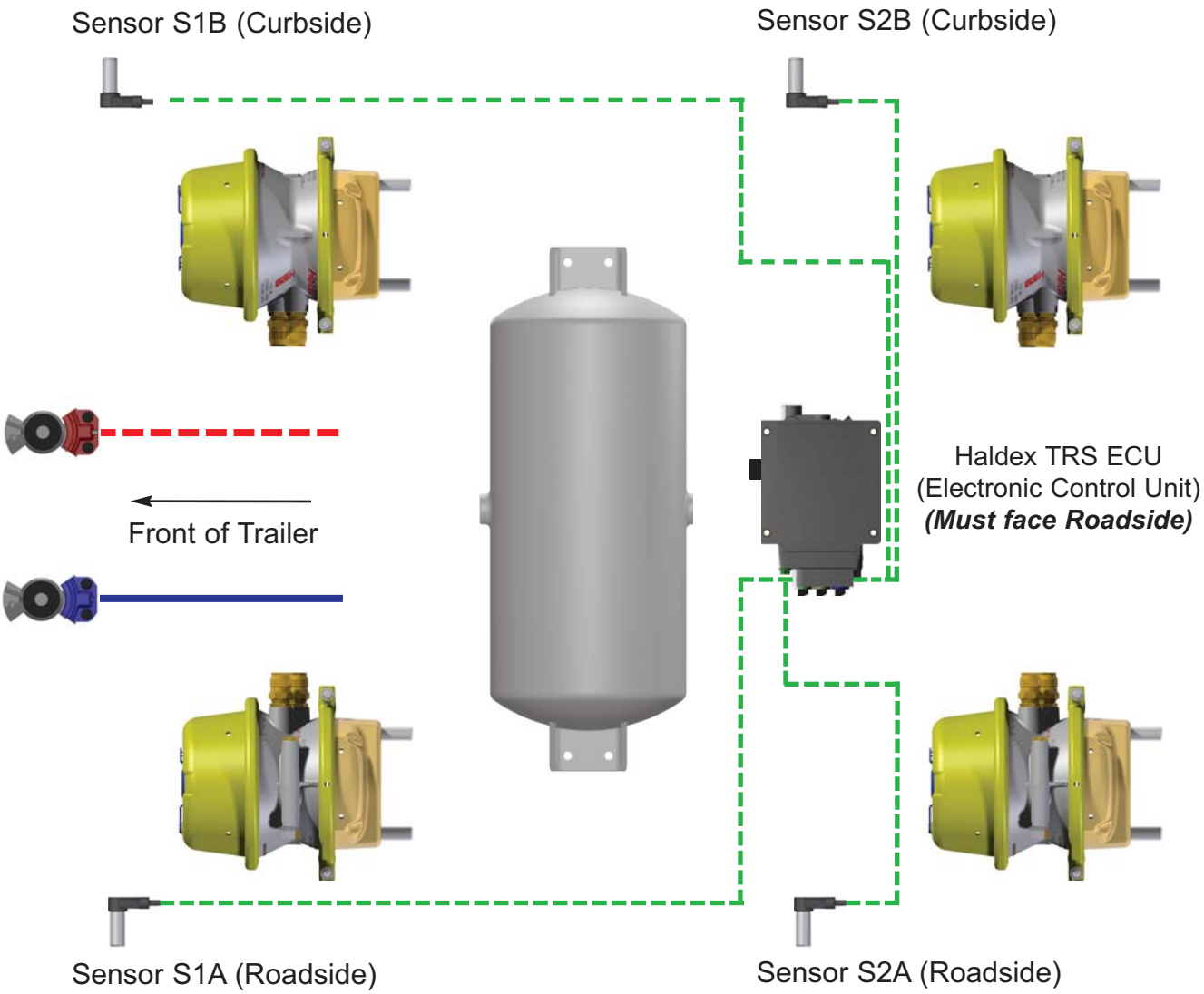


Cut Tab with Scissor

Wheel End Speed Sensor and Cable

Correct location and mounting of “speed sensors” at the wheel ends is critical for proper TRS system operation. The Haldex TRS system will adjust the braking air pressure in response to input from the speed sensors. Incorrect installation or location of speed sensors and exciter rings will result in poor or no Haldex TRS system performance.

In the figure below the speed sensors are cabled to specific socket locations on the ECU.



Legend:

Sensor Line

Sensor Requirement:

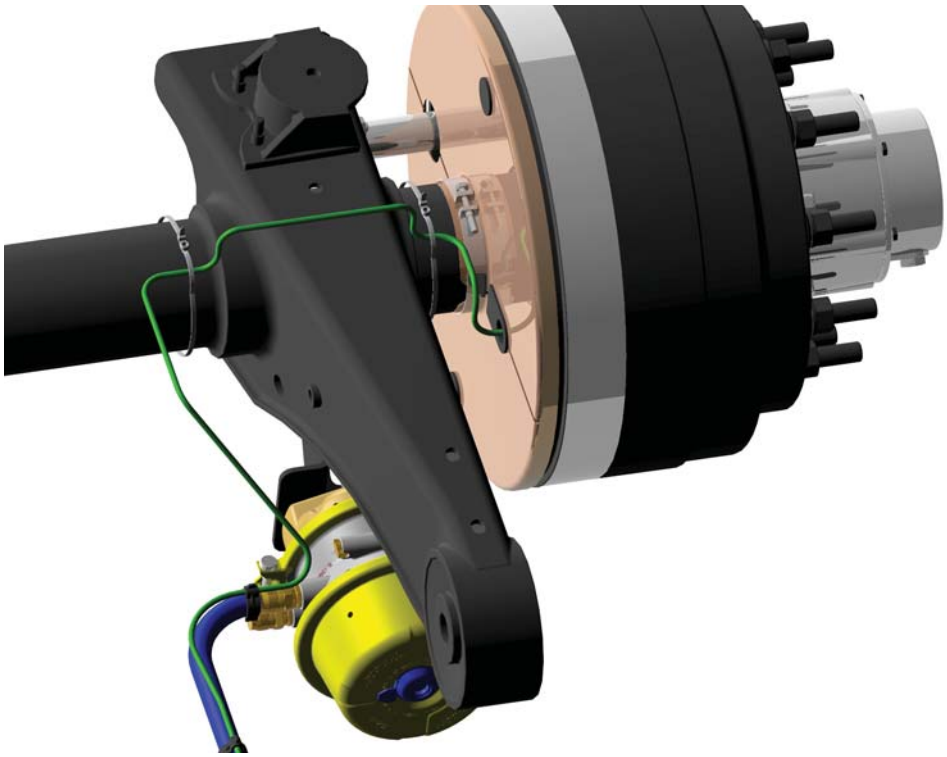
4S/2M Application - S1A, S2A, S1B and S2B
2S/2M Application - S1A and S1B (Sensors shall be placed on rear most axle).

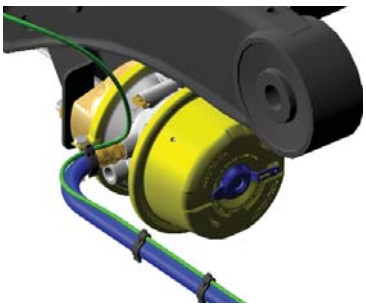
Wheel End Speed Sensor and Cable

This manual depicts speed sensor cable routing along the vehicle axles. This was shown for clarity. Although it is possible to route cables this way, the preferred approach is to route the speed sensor cables along the air hoses between the TRS valve and the brake actuators.

Tie straps may be used to secure sensor cable to the axle. Although tie straps may be used, a more reliable installation results if single clips are used to secure speed sensor cables to air hoses.

Leave some slack in cables to accommodate movement between chassis components. Excess cable must not be allowed to hang free, it must be bundled and attached to the chassis or air lines to prevent damage due to vibration and abrasion.





A sensor clip is placed on the hose and sensor wire.

Single Sensor Hose Clip

Excess cable length may be taken up in either a “short bone” or a “long bone” arrangement and secured with tie straps. Do not coil the cable into a loop smaller then 4 inches in diameter. Do not over tighten the tie straps when the cable is coiled, as this could cause a cable failure.

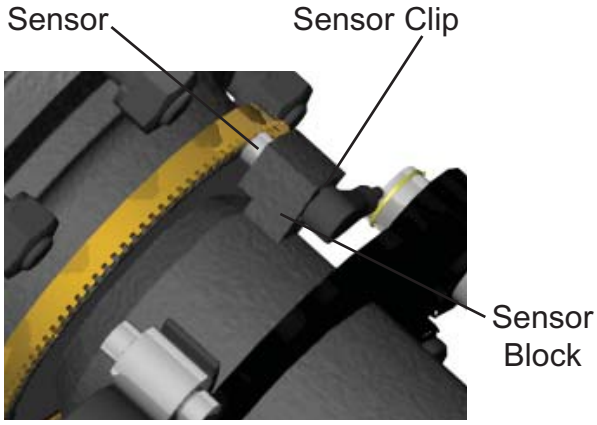
Push up and attach tie straps.

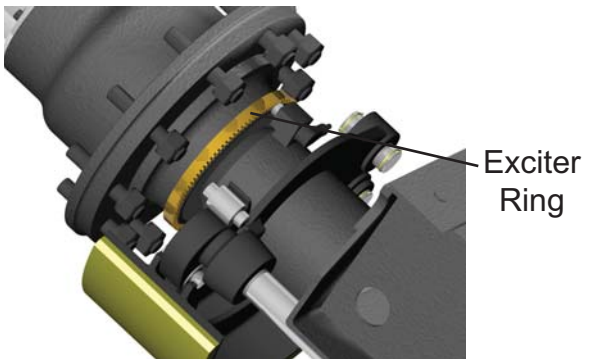
Long Cable (long bone)

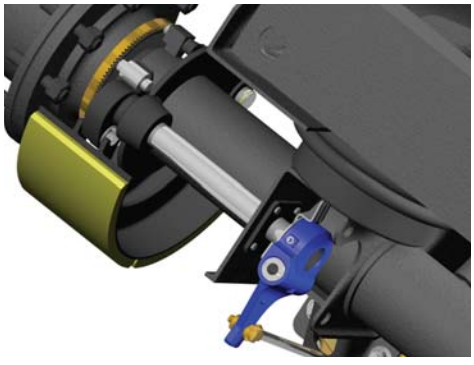
Short Cable (short bone)

4. Disc brakes may have their exciter rings machined into the disc or hub. Speed sensor mounting holes may be found on the torque plate or the caliper assembly. First determine the location of the exciter ring in the disc brake. Next locate the speed sensor mounting holes. Insert the speed sensor clip into the sensor mounting hole. Lightly grease the speed sensor with a lithium based grease (use Dow Corning Molycoat CU7439 or equivalent) and insert into the sensor clip. Ensure the sensor cable is not under any tension, is not touching the disc brake and is clear from moving parts.

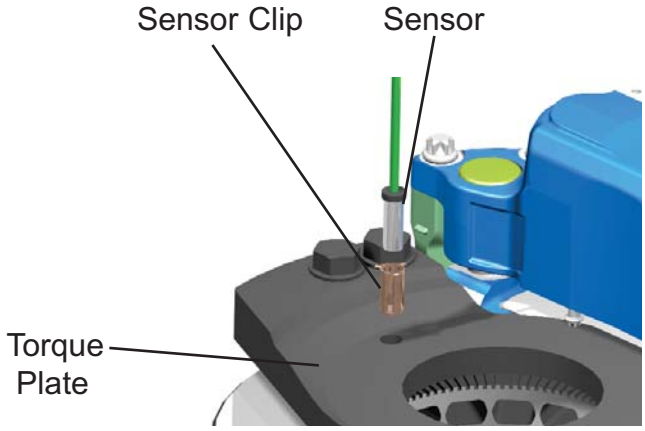
Drum Brake Installation

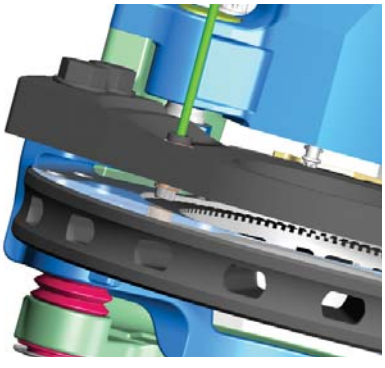




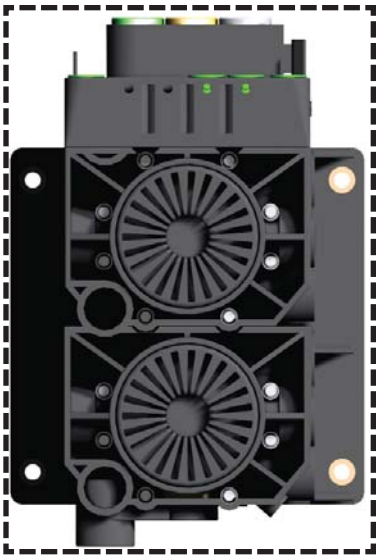


Disc Brake Installation





Paint Preparation

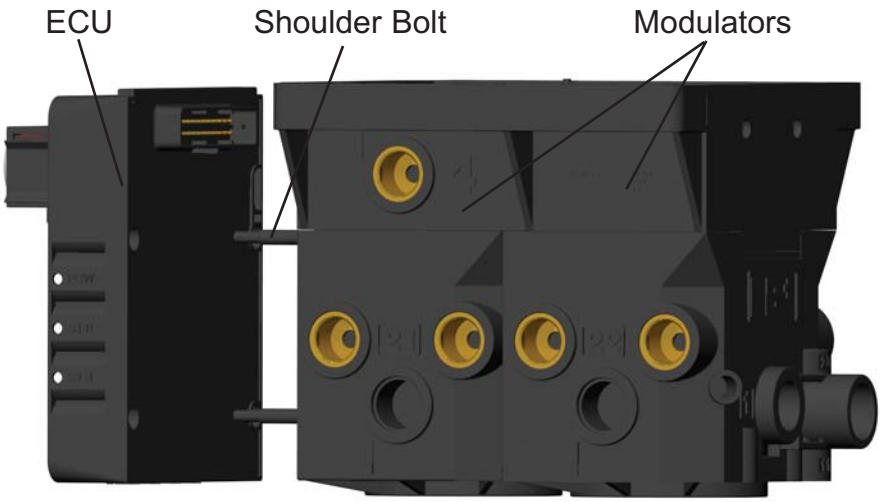


1. Prior to Painting or Undercoating, the ECU/Modulator Assembly **MUST BE PROTECTED**. All unused electrical connections are to have sealed plugs installed. All unused pneumatic ports are to have pipe plugs installed.

   Mask off bottom side exhaust ports as shown.

   Painting recommendations: Water based, baking for 1 hour @ 212° F.

Service of ECU/Modulator



1. The ECU and Modulator can be separated if required. There are 4 bolts that hold the ECU to the modulator and a 26 pin electrical connector. When removing and reinstalling the ECU, be careful not to damage the electrical pins.

2. Begin by removing the 4 bolts on the face of the ECU using a T20 torx tool. Pull the ECU back from the modulator, which disconnects the electrical connector.

3. To reinstall the ECU, securely fasten the ECU to the modulator with 4 bolts.

4. Control port metal screen filter. The filter should be serviced as deemed necessary based on the application and environment. The filter should also be checked when service brakes are slow to apply. Disconnect air line fitting and back the filter out of the port using needle nose pliers or a straight blade screwdriver.

There are two tools available to troubleshoot the TRS system faults: the Info Center and a PC based software tool, DIAG+. Both tools need to be connected to the diagnostic port of the ECU and the vehicle powered with 12 volts DC. Do Not use a battery charger, AC voltages, or unregulated shop air when servicing the vehicle.

Info Center

This hand held, dedicated tool is used for display of odometer and diagnostic fault codes, plus other information stored in the ECU. It consists of a LCD (Liquid Crystal Display) and two buttons marked with an up/down and right pointing arrows. The left hand button (showing a right pointing arrow) means "select". The right hand button (showing an up/down arrow) means "change" or "next" to allow movement between the different menus and options. An internal battery allows the tool to "remember" the settings and faults of the last powered up ECU it was connected to. ABS PLC Info Center will also read and clear diagnostic trouble codes.

DIAG+

This PC based software tool provides the most features and functionality of the diagnostic tools. The vehicle parameter data is stored inside the Haldex TRS ECU. The DIAG+ software can be loaded on a PC with the following requirements:

- 486 Processor or above
- 8 Megabyte RAM (16 recommended)
- 20 Megabyte Hard Drive
- CD ROM Drive
- 640 x 480 VGA Monitor
- 9 pin RS232 serial Com Port (if unavailable, a USB to RS232 converter is required, but not included in the kit.

Compatible with MS Windows 98, ME, XP, NT or 2000

Diagnostic Tools - Info Center

The TRS Info Center can be used to provide the functions listed here. Connect as shown below and apply 12 volt DC power through the 7-way. The Haldex ABS PLC Info Center may be used with the TRS system to read and clear DTC's.

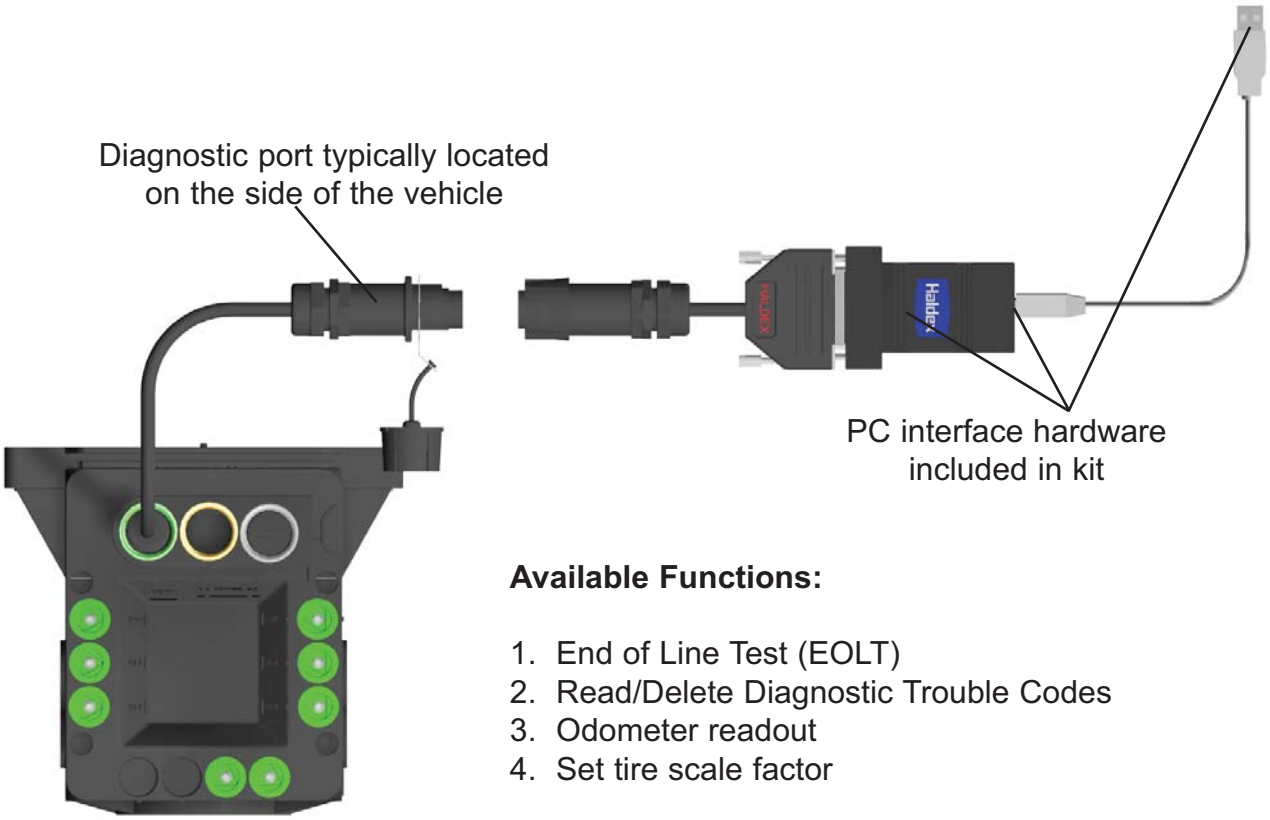
Haldex TRS Info Center

Diagnostic cable typically located on the side of the vehicle

AVAILABLE FUNCTIONS:

1. View Odometer readout
2. View % Loaded readout
3. Read & Delete Diagnostic Trouble Codes
4. View Number of Sensors and Modulators
5. View Orientation of Sensors and Modulators
6. View Sensed Wheel Output
7. View Auxiliary Configuration
8. View ECU Software Version, Serial Number
9. View Info Center Software Version
10. View Trailer Manufacturer, VIN
11. Monitor trip distance
12. View and change wheel scale factor

See TRS Info Center User Guide for more information.



Available Functions:

1. End of Line Test (EOLT)
2. Read/Delete Diagnostic Trouble Codes
3. Odometer readout
4. Set tire scale factor

See DIAG+ User Guide for more information.

Testing After Installation

After installing the TRS system and completing pneumatic brake system checks, the TRS system should be tested for additional functionality using the following equipment.

- Info Center or DIAG+
- 12 volt DC power supply, 3-5 amp minimum (not a battery charger)
- 100 to 120 psi air pressure on the emergency gladhand
- 20 to 40 psi air pressure on the service gladhand
- Connect the power supply to the 7-way J560 at the nose of the trailer or 5-way ABS drop out connector at the chassis of the trailer.
- Brakes need to be manually adjusted.

1. Secure the vehicle against movement.

2. Connect the Info Center or DIAG+ to the ECU diagnostic port.

3. Charge the service (20-40 psi) and emergency (100-120 psi) air system.

4. Connect the power source to the Trailer 7-way or ABS 5-way connectors.

5. Switch the stop light power source ON.
    A. Each valve should “blow-down” a brief shot of exhaust air.
    B. ABS light should flash “ON” for about 2 seconds then go “OFF”.

6. Remove stop light power. Switch the permanent power source ON.
    A. Each valve should “blow-down” a brief shot of exhaust air.
    B. ABS light should flash “ON” for about 2 seconds then go “OFF”.

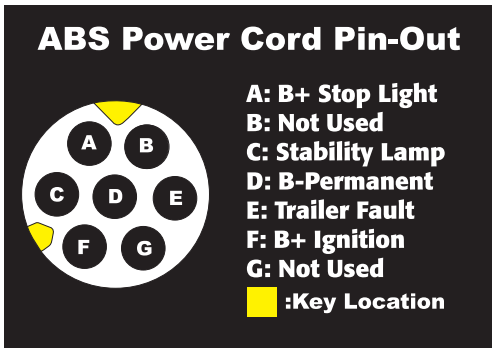
7. Read Odometer display for a mileage value.

8. Read Diagnostic Trouble Codes (DTC). It should display “Clear”.

9. If a problem exists, a DTC will be displayed. Power down the system, remove service and emergency air source, park the vehicle, and correct the problem. Clear the DTC.

10. Remove the service air pressure and rotate each wheel at 1 rev / 2 sec.
    A. Front, roadside wheel should display S1A on the diagnostic tool.
    B. Front, curbside wheel should display S1B on the diagnostic tool.
    C. Rear, roadside wheel should display S2A on the diagnostic tool.
    D. Rear, curbside wheel should display S2B on the diagnostic tool.

11. To perform a road test with a tractor, turn on the ignition key and charge air system. Again, make sure ABS warning light comes on briefly, then goes out. Pull the trailer at a speed above 6 mph and make a brake application until the tractor-trailer has come to a complete stop. Verify that the ABS light has remained OFF. *If the light remains OFF, the system is functioning properly*. If the TRS system detects an error during the stop, the warning light will be ON.

ABS light doesn't flash "ON" when ignition power supplied to the trailer.	1. Ensure all power cables are connected properly (7-way, 5-way, ECU permanent power. 2. Check for burned out bulb. 3. Check for open or short circuit in lamp. 4. Check power at 5-way and ECU. If power is available at the 5-way, but not at the TRS unit, replace power adapter cable.
TRS doesn't power up 	Reference page 13 of this manual for pin identifications. Perform the following checks: 1. Make sure the power adapter cable is plugged into the ECU properly. 2. Make sure 12 volts at the 5-way plug. 3. Disconnect Grey Permanent Power cable at the ECU and check for +/- 12 volts between sockets B- and B+ ignition. 4. Apply stop light power and check for 12 volts between socket B- and socket B+ stoplight.

Note. Most ABS or TRS problems are related to: A) Cut, Corroded, or Abraded Wires. B) Corroded Connectors and Terminals. C) Connector Terminal not latched or seated correctly to mating assemblies. D) Excessive sensor air gap, Sensor clip retention, or E) Wheel bearing end play.

Diagnostic Trouble Code List

There are 6 failure modes with this system. The fault codes are grouped in this manner.

1. Power Supply
2. Sensors
3. Modulators
4. ECU
5. Lateral Accelerometer
6. Auxiliaries

Group 1. Power Supply Fault Code List	
ECU TIME OUT or NO LINK	No supply on ignition switched line. Check truck fuses, 7-way connection, 5-way ABS connection, power cable connections. Check diagnostic cable for corrosion.
PWR ISO7638 FAIL	Intermittent power loss. Check all electrical connections as mentioned above.
PWR LO VOLT	Supply voltage < 8 volts. Check voltage regulator on tractor, loose connections, and corrosion.
PWR HI VOLT	Supply voltage > 17 volts. Same as above.
Group 2. Sensor / Sensor Extension Fault Code List	
	Note. The fault code identified which sensor/wheel end needs to be checked.
S1A CONT S1B CONT S2A CONT S2B CONT	Open or Short Circuit. 1. Disconnect the sensor extension cable from sensor and measure electrical resistance between the two pins in the sensor housing, it should be between 980-2350 ohms. 2. Disconnect sensor extension from ECU and measure continuity.
S1A SIGNAL S1B SIGNAL S2A SIGNAL S2B SIGNAL	Intermittent low sensor output occurs when vehicle is moving. Check for broken sensor retaining clip, damaged or misaligned exciter ring, excessive wheel bearing end play, loose/ damaged/corroded sensor connections or a break inside the sensor cabling.
S1A OUTPUT S1B OUTPUT S2A OUTPUT S2B OUTPUT	Low sensor output. 1. Rotate the wheel at 1 rev / 2 sec and measure AC voltage at the sensor plug, it should be > 200 millivolts. 2. Make sure sensors are pushed up against exciter rings.

Group 3. Modulators Fault Code List

BRK APPLY SC BRK APPLY OC BRK APPLY SC DRIVE BRK APPLY UNSPEC	Internal fault with the brake apply solenoid. Detach ECU and replace modulator.
EPRV 21 HOLD SC EPRV 21 DUMP SC EPRV 21 HOLD OC EPRV 21 DUMP OC EPRV 21 HOLD SC DRIVE EPRV 21 DUMP SC DRIVE EPRV 21 HOLD UNSPEC EPRV 21 DUMP UNSPEC	Internal fault with the hold or dump solenoids of modulator 21. Detach ECU and replace modulator.
EPRV 22 HOLD SC EPRV 22 DUMP SC EPRV 22 HOLD OC EPRV 22 DUMP OC EPRV 22 HOLD SC DRIVE EPRV 22 DUMP SC DRIVE EPRV 22 HOLD UNSPEC EPRV 22 DUMP UNSPEC	Internal fault with the hold or dump solenoids of modulator 22. Detach ECU and replace modulator.
DEMAND SC DEMAND OC	Internal fault with the service/control line pressure transducer. Detach ECU and replace modulator.
EPRV 21 DEL SC EPRV 21 DEL OC EPRV 22 DEL SC EPRV 22 DEL OC	Internal fault with the delivery pressure transducer. Detach ECU and replace modulator.
EPRV 21 SLOW REC EPRV 22 SLOW REC	Wheels are slow to recover after brakes are released. Make sure foundation brakes are operating properly, delivery hoses not pinched, speed sensors not crossed with modulator, correct side-by-side plumbing.
RESR SC RESR OC	Internal fault with the reservoir pressure transducer. Detach ECU and replace modulator.
SUSP SC SUSP OC SUSP OUT OF RANGE	1. Check for air leaks on suspension lines 2. Make sure leveling valve is plumbed correctly 3. Internal fault with the suspension pressure transducer. Detach ECU and replace modulator.

Group 4. ECU Fault Code List	
REV SWITCH SC REV SWITCH OC REV SWITCH PNEUMATIC REV SWITCH SIGNAL	1. ECU configured incorrectly, contact Haldex Engineering 2. Internal fault with relay emergency valve pressure switch. Detach ECU and replace.
PNEUMATIC DEMAND LOSS	No corresponding pneumatic demand pressure. Detach ECU and replace.
TOWED CAN DEMAND LOSS	CAN communication fault. Detach ECU and replace.
TOWED CAN CONTROL LOSS	CAN communication data fault. Detach ECU and replace.
ECU EE ERR	Internal ECU fault. Detach ECU and replace.
ECU PARAM ERR	Internal ECU fault. Detach ECU and replace.
ECU EE UNSPEC	Internal ECU fault. Detach ECU and replace.
Group 5. Lateral Accelerometer Fault Code List	
LAT ACC OC LAT ACC SC LAT ACC SIGNAL	Ensure proper positioning, ECU connection, and no damage to the lateral accelerometer cable. Replace external lateral accelerometer. Otherwise, replace ECU.
Group 6. Auxiliaries Fault Code List	
AUX1	Auxiliary Channel 1
AUX2	Auxiliary Channel 2 (stop lamp circuit)
AUX3	Auxiliary Channel 3 (trailer fault lamp circuit)
AUX4	Auxiliary Channel 4
AUX5	Auxiliary Channel 5 Open or short circuit; check auxiliary channel wiring, connections, misaligned connector. Detach and replace

Odometer Setting

The TRS system requires a wheel scale setting to ensure accuracy of the odometer. The default value is 508 millimeter rolling radius or 502 revs/mile. This value may change depending on the tire size. Consult tire manufacturer for rolling or loaded radius and tire scale factor on the next page.

To change the tire scale factor, consult the PC DIAG+ operating manual.

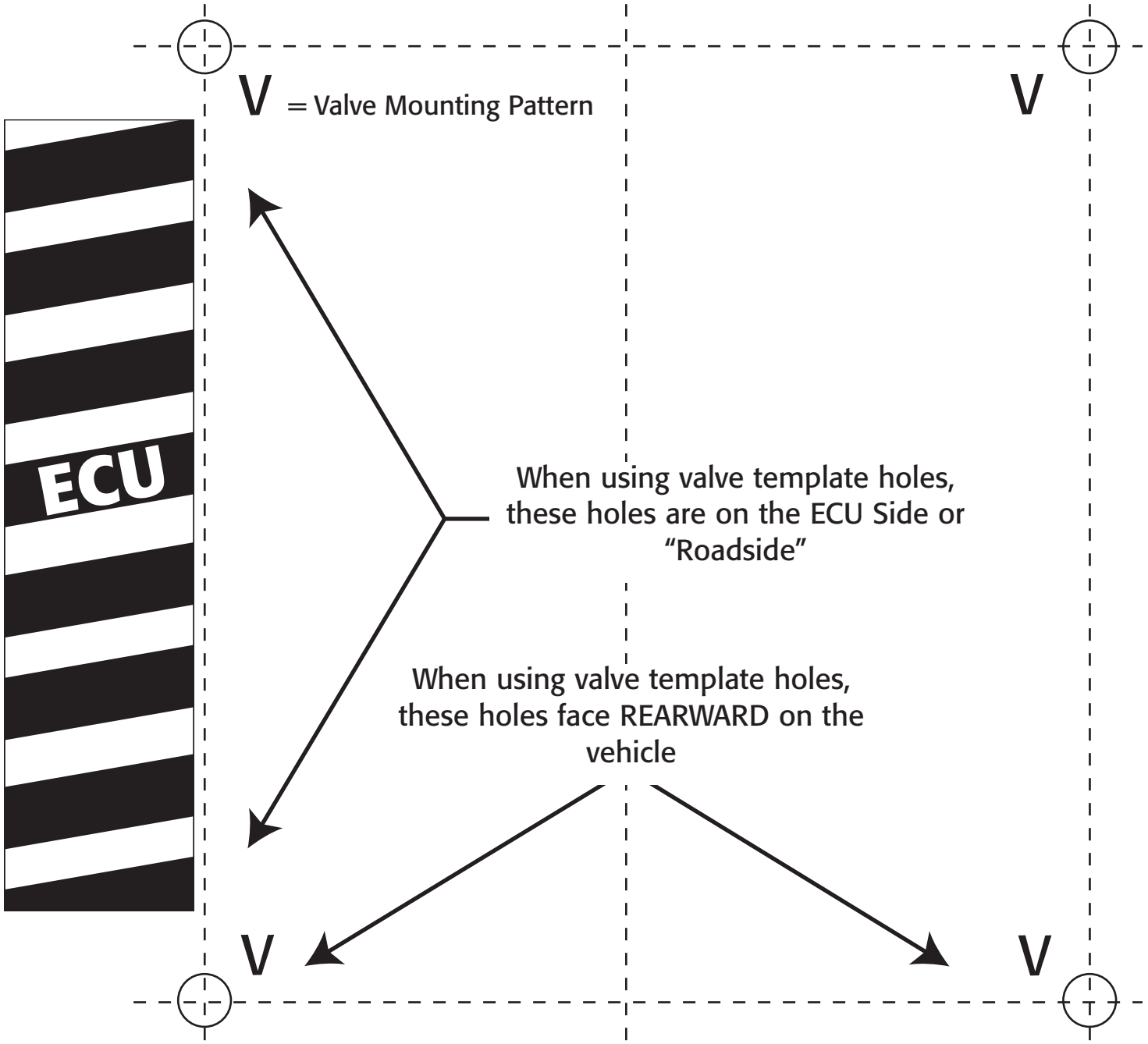
Wheel Scale Factor Chart

Use DIAG+ to set wheel scale factor using Rolling Radius (mm) found in columns below

Trailer Tire	Rolling Radius Rdyn (mm) ***100T***	Rolling Radius Rdyn (mm) ***80T***	Rev/Mile ***100T***	Rev/Mile ***80T***
80T Smallest Tire		***442***		***579***
215/75R17.5		471		543
8R17.5		477		538
275/65R17.5HC		485		527
8.5R17.5		488		524
245/70R17.5		490		523
235/75R17.5		490		523
225/70R19.5		491		521
8.25R15		517		495
9R17.5HC		517		495
10R17.5		524		490
265/70R19.5		531		483
285/70R19.5		543		470
100T Smallest Tire	***442***		***580***	
305/70R19.5	446	557	574	459
11R17.5HC	451	563	568	454
10.00R15TR	452	565	566	453
255/70R22.5	452	565	566	453
275/70R22.5	469	588	545	436
445/50R22.5	483	604	527	422
10R22.5	493	615	520	416
9.00R20	493	617	519	415
295/75R22.5	494	617	518	414
285/75R24.5	508	634	504	403
295/80R22.5	508	637	503	402
11R22.5	508*	637	502*	402
10.00R20	510	640	501	401
315/80R22.5	522	653	491	393
80T Largest Tire		***655***		***391***
11.00R20	525		488	
305/75R24.5	525		488	
11R24.5	536		478	
10.00R22	536		478	
12.00R20	541		472	
425/65R22.5	543		471	
11.00R22	549		466	
100T Largest Tire	***655***		***391***	

*Factory Tire Scale Set At 508 mm rolling radius or 502 Rev/Mile

Wheel Scale Factor for other tire sizes: SF = (1000/Rc) x (T/100) or SF = N x (T/100)
Rdyn = rolling radius (mm) Rc = Rolling Circumference (m) = 2(3.14) x Rdyn/1000
N = Revolution/Mile T = Exciter Ring Teeth


V = Valve Mounting Pattern
V
ECU
When using valve template holes, these holes are on the ECU Side or "Roadside"
When using valve template holes, these holes face REARWARD on the vehicle
V
V

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Notes:

Haldex

Notes:

Haldex offers proprietary vehicle technology solutions to the global vehicle industry within specific niches. We focus on products to improve safety, the environment and vehicle dynamics.

We are enhancing our competitive capabilities and building long-term customer relationships through high performance, low total costs to the customer through the product's service life, ethical business practices and commitment to long-term partnerships. Haldex operations are divided into four business areas: Commercial Vehicle Systems, Hydraulic Systems, Garphyttan Wire and Traction Systems.

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