INSTALLING AND CONFIGURING THE WABCO TRAILER iABS™ WITH BRAKE PAD WEAR

TECHNICAL BULLETIN

TP19121

WABCO

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Edition 1
Version 1 (09.2022)
TP19121 (en)

1 General Information

1.1 Symbols Used in this Document

⚠ DANGER

Description of an immediate situation which will result in irreversible injury or death if the warning is ignored.

⚠ WARNING

Description of a possible situation which may result in irreversible injury or death if the warning is ignored.

⚠ CAUTION

Description of a possible situation which may result in irreversible injury if the warning is ignored.

NOTICE

Description of a possible situation which may result in material damage if the warning is ignored.

Important information, notices and/or tips

Reference to information on the Internet

Descriptive text

– Action step

1. Action step 1 (in ascending order)
2. Action step 2 (in ascending order)

⇨ Result of an action

• Listing

Indicating the use of a tool / WABCO tool

General Information

1.2 How to Obtain Additional Maintenance, Service and Product Information

If you have any questions about the material covered in this publication, or for more information about the WABCO product line, please contact WABCO Customer Care Center at 855-228-3203, by email at wabconacustomercare@zf.com, or visit our website: www.zf.com/cv.

Refer to the Society of Automotive Engineers (SAE) website to find all current SAE documents and standards applicable to WABCO products (such as SAE J447 and SAE J908 at www.sae.org).

Refer to the National Highway Traffic Safety Administration (NHTSA) website to find all current documents referenced in the manual at www.nhtsa.gov.

1.3 How to Obtain Parts and Kits

Contact the WABCO Customer Care Center at 855-228-3203 (United States and Canada); 800-953-0248 (Mexico). Email: supportwabconacustomercare@zf.com, supportwabconaorders@zf.com or supportwabconaspecs@zf.com.

1.4 WABCO TOOLBOX PLUS™ Software

TOOLBOX PLUS™ Software provides PC diagnostic for WABCO products and can be purchased and downloaded from https://wabco.snapon.com.

The software User Guide, MM19047 can be obtained by visiting our Literature Center.

Purchase and Download TOOLBOX PLUS™
https://wabco.snapon.com

ZF Commercial Vehicle Literature Center
https://zf.com/cvliterature

1.5 WABCO Academy

www.wabco-academy.com

1.6 WABCO Online Product Catalog

www.wabco-customercenter.com

1.7 Your Direct Contact to ZF CVS

ZF CV Systems North America LLC

1220 Pacific Drive
Auburn Hills, MI 48326

Customer Care Center: (855) 228-3203

https://www.zf.com/products/en/cv/home/cv.html

2 Safety Information

2.1 Provisions for a safe work environment

- Only experienced, trained and qualified automotive technicians may carry out work on the vehicle.
- Read this publication carefully.
- Follow all warnings, notices and instructions to avoid personal injury and property damage.
- Always abide by the vehicle's Original Equipment Manufacturer (OEM) specifications and instructions.
- Observe all accident regulations of the repair facility as well as regional and national regulations.
- The workplace should be dry, sufficiently lit and ventilated.
- Use personal protective equipment if required (safety shoes, protective goggles, respiratory protection and ear protectors).

Read and observe all Danger, Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

⚠WARNING

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip or fall over. Serious personal injury and damage to components can result.

⚠WARNING

This product can expose you to chemicals including Nickel, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

3 Important Information

Use only genuine WABCO components. Other manufacturers' parts are not designed for use with a WABCO ABS system and may not function correctly.

WABCO recommends that a control line filter, part number 432-500-005-0, be installed on the air system's control line, upstream of the ABS ECU/valve assembly.

4 Introduction

Wear indicator can be connected on up to 6 brakes on the ECU. All wear indicators are connected in series and are connected to the wear input. These are operated with the supply voltage of 12V.

4.1 Warning Indicator/Warning Lamp

If the wear indicators indicate that the wire is worn through for a period of at least 4 seconds (or longer), a voltage will be measured at the lining wear sensor and the warning will be activated. The warning indicator/warning lamp will warn the driver if the end value for lining wear has been reached (100% brake lining wear).

When the ignition is switched on, the warning indicator/warning lamp (yellow) flashes in 4 cycles = 16 times. The warning indicator/warning lamp no longer lights up when the vehicle's speed exceeds 7 km/h. Replacing the wear indicators is automatically detected by the system when the linings are changed. The warning level is deactivated after 8 seconds.

5 Installation

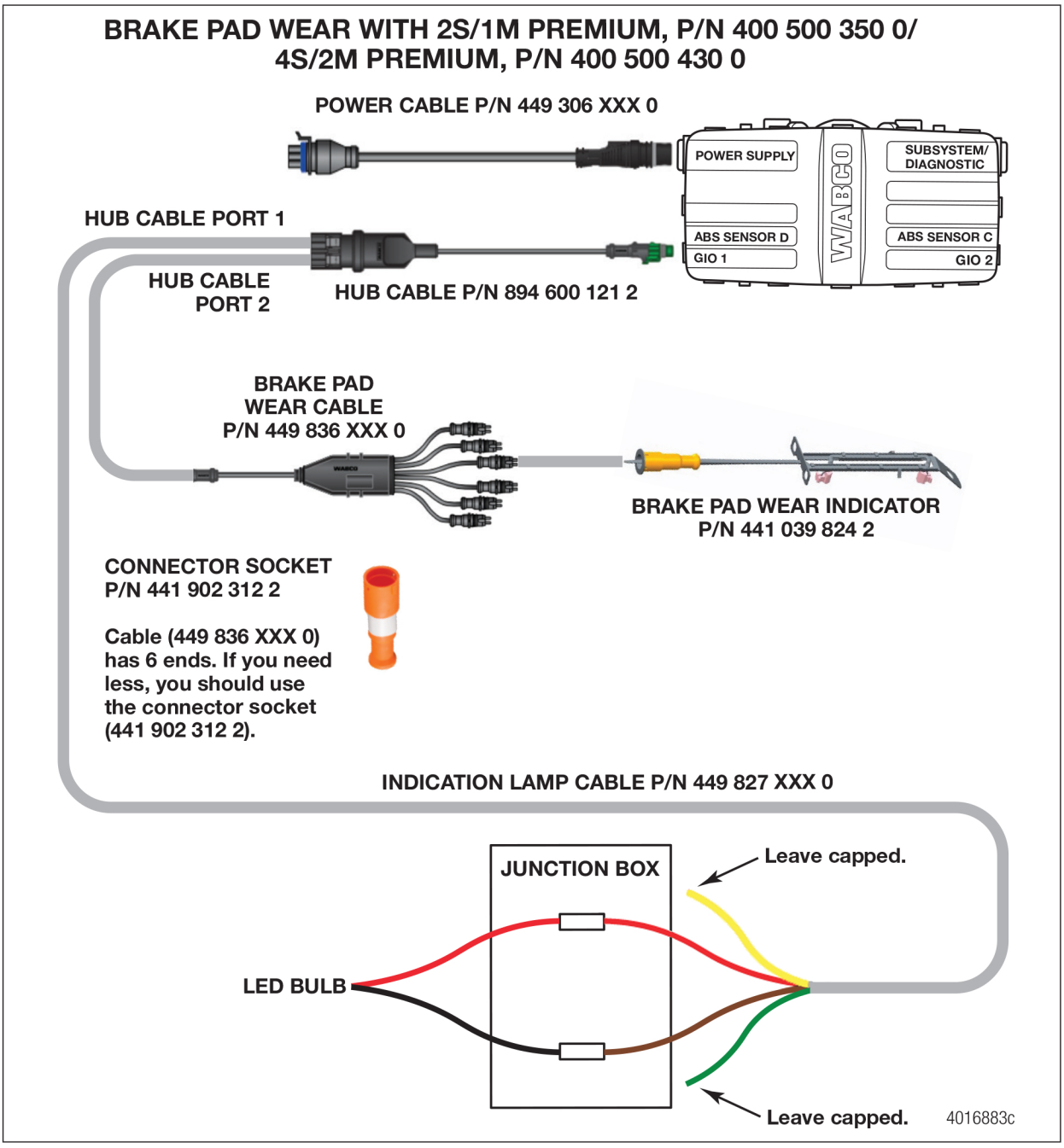
5.1 Installation of Brake Pad Wear System

For correct installation, refer to the next page for 2S/1M and 4S/2M premium ECUs.

⚠ WARNING

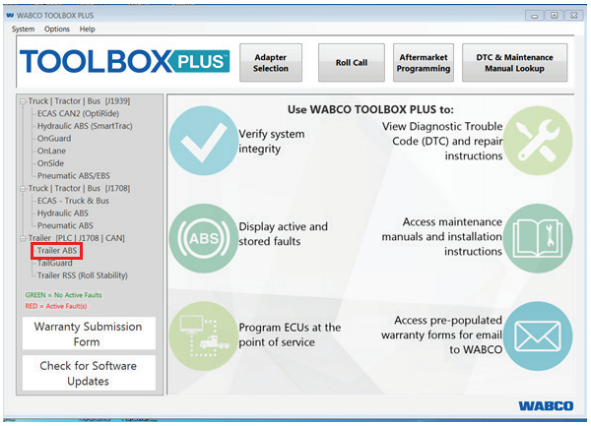
Drain the brake and suspension systems of air before starting this procedure. Otherwise it may result in serious personal injury or damage to product.

1. Connect power cable, part number 449 306 XXX 0, to the power supply port on the ECU. Make sure the power cable is fully seated and secured with a yellow locking tab.
2. Install the GIO Hub Cable, part number 894 600 121 2, to the GIO 1 port on the ECU. Install the indication Lamp Cable, part number 449 827 XXX 0, into Hub Cable Port 1 and the Brake Pad Wear Cable, part number 449 836 XXX 0, into Hub Cable Port 2.
3. Install the Brake Pad Wear Indicator, part number 441 039 824 2, into the Brake Pad Wear Cable. Use Connector Sockets, part number 441 902 312 2, in any unused leads from the Brake Pad Wear Cable.
4. Connect the indication lamp cable wires to the indication lamp as follows:
   - Connect the red wire on the indication lamp cable to the positive terminal on the indication lamp.
   - Connect the brown wire on the indication lamp cable to the negative terminal on the indication lamp.
   - Cap the yellow and green wires on the indication lamp cable. These wires are not used.


BRAKE PAD WEAR WITH 2S/1M PREMIUM, P/N 400 500 350 0/
4S/2M PREMIUM, P/N 400 500 430 0
POWER CABLE P/N 449 306 XXX 0
POWER SUPPLY
SUBSYSTEM/
DIAGNOSTIC
WABCO
ABS SENSOR D
ABS SENSOR C
GIO 1
GIO 2
HUB CABLE PORT 1
HUB CABLE
PORT 2
HUB CABLE P/N 894 600 121 2
BRAKE PAD
WEAR CABLE
P/N 449 836 XXX 0
BRAKE PAD WEAR INDICATOR
P/N 441 039 824 2
CONNECTOR SOCKET
P/N 441 902 312 2
Cable (449 836 XXX 0)
has 6 ends. If you need
less, you should use
the connector socket
(441 902 312 2).
INDICATION LAMP CABLE P/N 449 827 XXX 0
JUNCTION BOX
Leave capped.
LED BULB
Leave capped.
4016883c

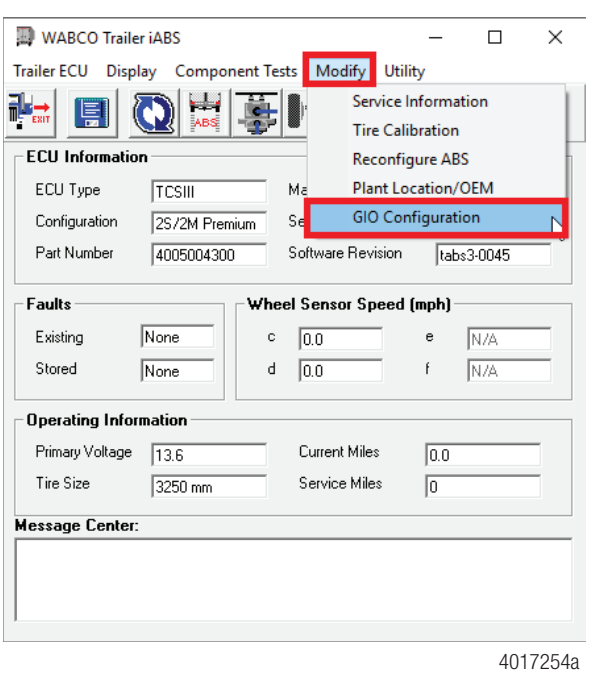
5.2 Activating the Brake Pad Wear System with TOOLBOX PLUS™ Software

1. Open the iABS diagnostics from the TOOLBOX PLUS™ main screen by selecting the Trailer ABS diagnostic section.



4017253a

2. From the top menu bar, go to the Modify pull-down menu and select “GIO Configuration”.



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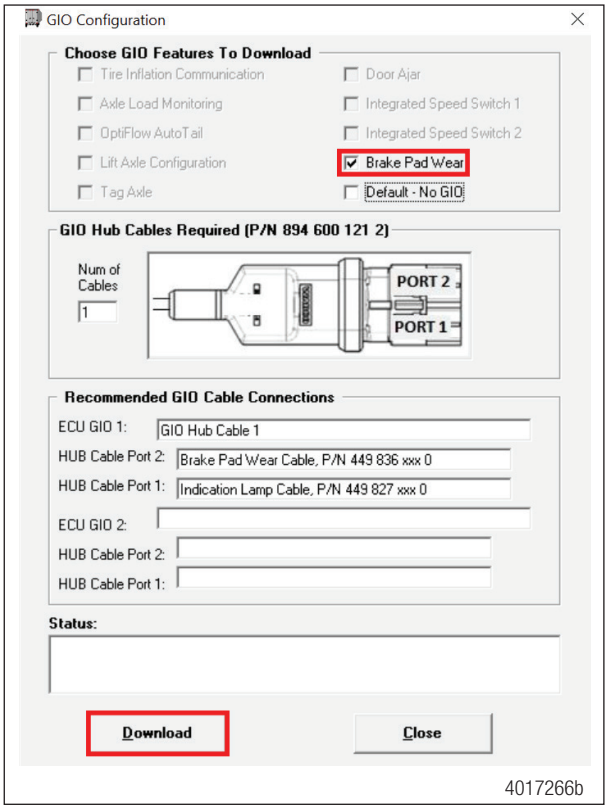
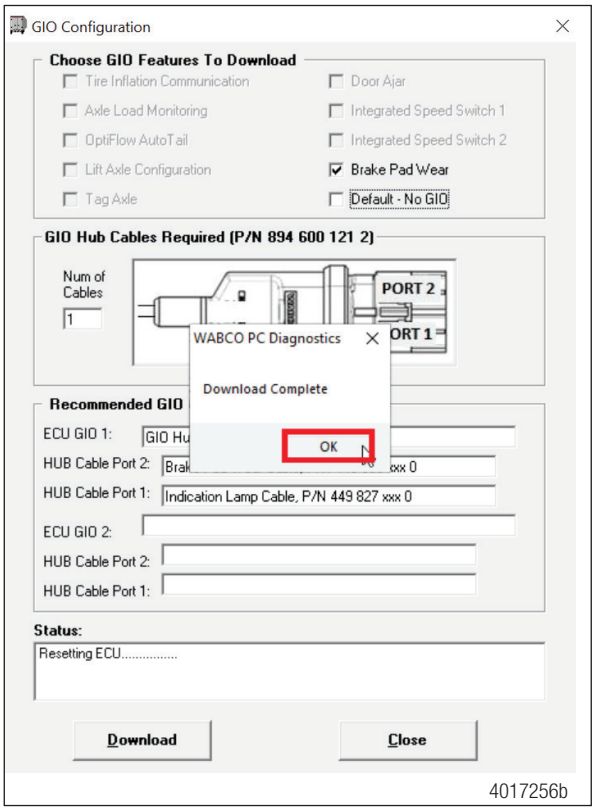
Installation

3. When the GIO Configuration screen is displayed, click “Brake Pad Wear” and click “Download”.



4. The “Download Complete” screen will appear to confirm the successful programming of ECU. Click “OK” to exit.



6 Appendix I

6.1 Installing Sensors on Non-ABS-Prepped Axles

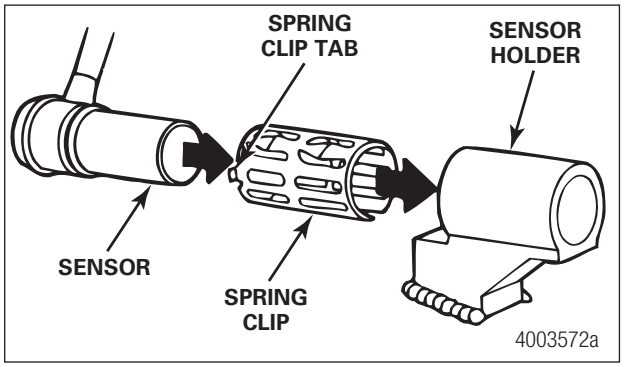
Sensor locations vary due to suspension type. WABCO recommends placing the sensors on the axle that will provide the most braking performance. The trailer manufacturer, suspension manufacturer, along with WABCO, work together to determine this information. Contact the necessary party for further information.

1. Apply a mineral oil-based grease that contains molydisulfide to the sensor spring clip, the body of the sensor and the bore of the sensor block. The grease must be anti-corrosive and contain adhesive properties that will continuously endure temperatures from −40° to 300°F (−40° to 150°C).

   Lubricants approved for use on WABCO sensors and spring clips are as follows. The use of non-approved lubricants is at your own risk. Please note that non-approved lubricants can reduce the performance of the parts or lead to damage of the product that may not be covered under warranty.

   - Mobilith SHC-220 (Mobil)
   - TEK 662 (Roy Dean Products)
   - Staburags NBU 30 PTM (Kluber Lubrication)
   - Valvoline EP 633

2. Push the spring clip into the sensor holder from the inboard side, until the spring clip tabs are against the sensor holder. Push the sensor into the spring clip as far as possible. Use WABCO spring clips to ensure a correct fit.
3. Push the spring clip into the sensor holder from the inboard side until the spring clip tabs are against the sensor holder. Push the sensor into the spring clip as far as possible.

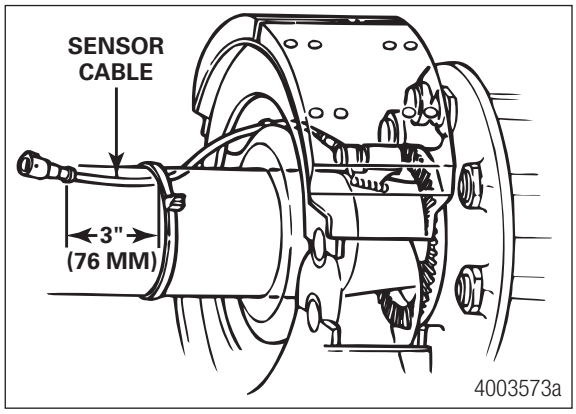


Appendix I

4. Route the sensor cable toward the brake chamber, over the brake spider or through the prestamped hole dedicated for ABS sensors. Route to the back side of the axle. Secure the cable to the axle between the brake spider and the suspension brackets. Continue to route the sensor cable behind the spring seats. Secure the cable to the axle one inch from the molded sensor plug.

   Do not overtighten tie wraps on a cable. Overtightening can damage the cable. Do not tie wrap the molded sensor plug. The sensor extension cable must follow the brake hose to the ECU/valve assembly to allow for axle jounce and rebound.

   Brake hose clips with a provision for the sensor extension cable are recommended as opposed to tie wraps. WABCO does not supply this part.



5. Install the wheel hub carefully so that the tooth wheel pushes against the sensor as the wheel bearings are adjusted. There should be no gap between the sensor and the tooth wheel. If the gap is too large, this can cause the ECU to log a fault code.
6. Test the sensor output voltage. Use a volt/ohm meter to check the output voltage of the sensors while rotating the wheel at approximately 1/2 revolution per second. Minimum output must be 0.2 volts AC, though if the wheel is spun faster than 1/2 of a revolution per second, the reading will likely be higher. It is important to spin the wheel at the correct speed to determine the output is in fact correct. If minimum output is less than 0.2 volt AC, push the sensor toward the tooth wheel. Recheck the sensor output.

7 Appendix II

7.1 Cable Strain Relief Guidelines

It is important that cabling follow good strain relief practices to ensure maximum performance and durability. Failure to provide adequate strain relief on the cables can result in future maintenance that is not covered under warranty.

Strain relief is defined as a small amount of slack in the cable at the area of connection. This lack of cable tension allows for slight movement of the cable during times when components of the suspension and air system may be in motion. A small amount of slack also eases access to other system components.

A taut cable can affect the lifespan of the cable. Cables without adequate strain relief can potentially stress a cable connection enough that moisture could intrude. Unnecessary wear at bend points can be the result of a cable under tension.

Cable strain relief is a universal practice. It applies to all WABCO product lines from Anti-Lock Brake Systems (ABS) to Roll Stability Systems (RSS).

7.1.1 Excess Cable Length

In cases where the length of cable exceeds what is required, the excess must be bundled in an efficient manner. It should not be draped or wrapped around components or left unsecured. Any slack remaining in the cable once the connections are made can be gathered up in a Z-shaped loop. Do not coil the cable and pinch into a bowtie or dog-bone shape. All cable zip ties should be tightened in a manner only to the extent that the cable is held sufficiently in place. Fasten the excess cable to an area that is free of sharp edges and moving components.

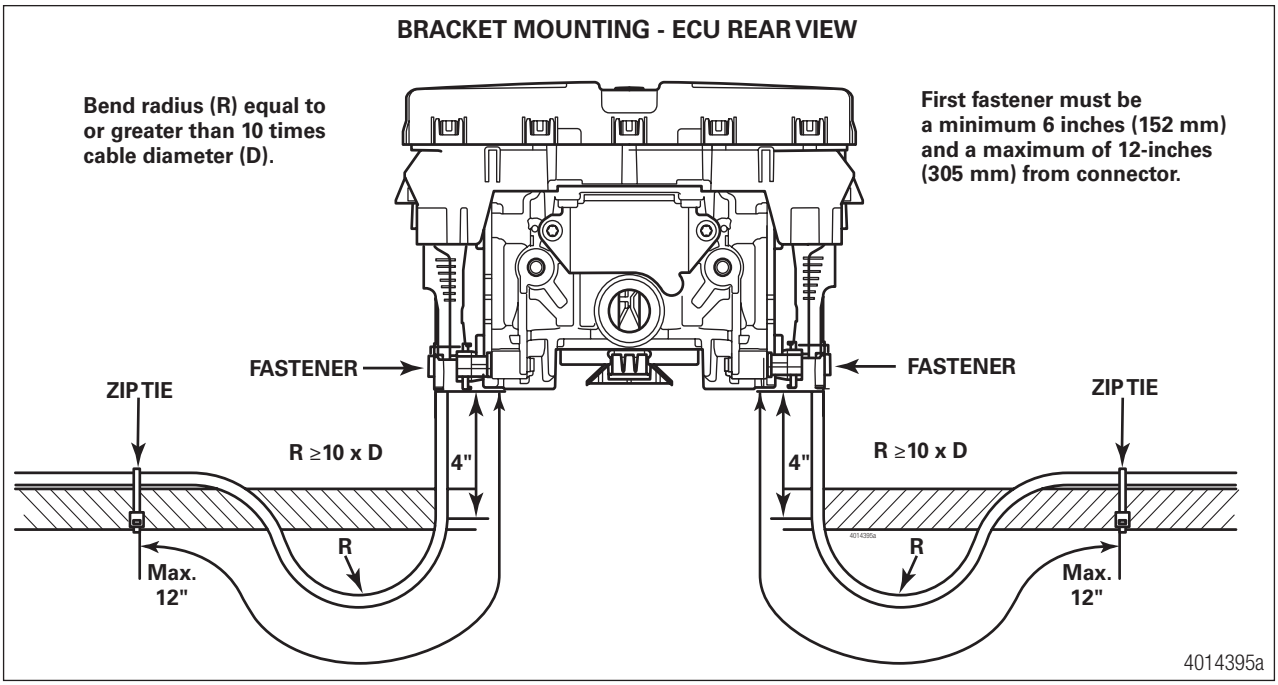
WABCO has many lengths of cables available so it is a best practice to obtain a length that best suits the requirements of the installation. Refer to the Parts List in Appendix IV to find the different cable lengths that WABCO offers.

Appendix II

7.2 Strain Relief at the ECU — Bracket Mounting

WABCO recommends that cable connections to a component, such as an ECU valve assembly, display a visible amount of slack in the cable up to the first tie or clip that secures the cable to the trailer structure or air line. This first anchor point should be a minimum 6-inches (152 mm) of cable length from the cable/component connection and maximum of 12-inches (305 mm). This applies to all sensor, power, valve and GIO cables. Regardless of whether zip ties or cable clips are used, cables should be secured at intervals not greater than 18-inches (457 mm) to avoid cable vibration.

Ideally, cables should be affixed to the rigid structure of the trailer. A good rule of thumb is to have the bend of the cable, also known as bend radius, be greater than or equal to ten times the diameter of the cable. If the cable is 1/4-inch (6.35 mm) in diameter, then the bend should be a minimum of 2-1/2-inches (64 mm). See below for the ECU mounting of 2S/2M-4S/3M ABS.

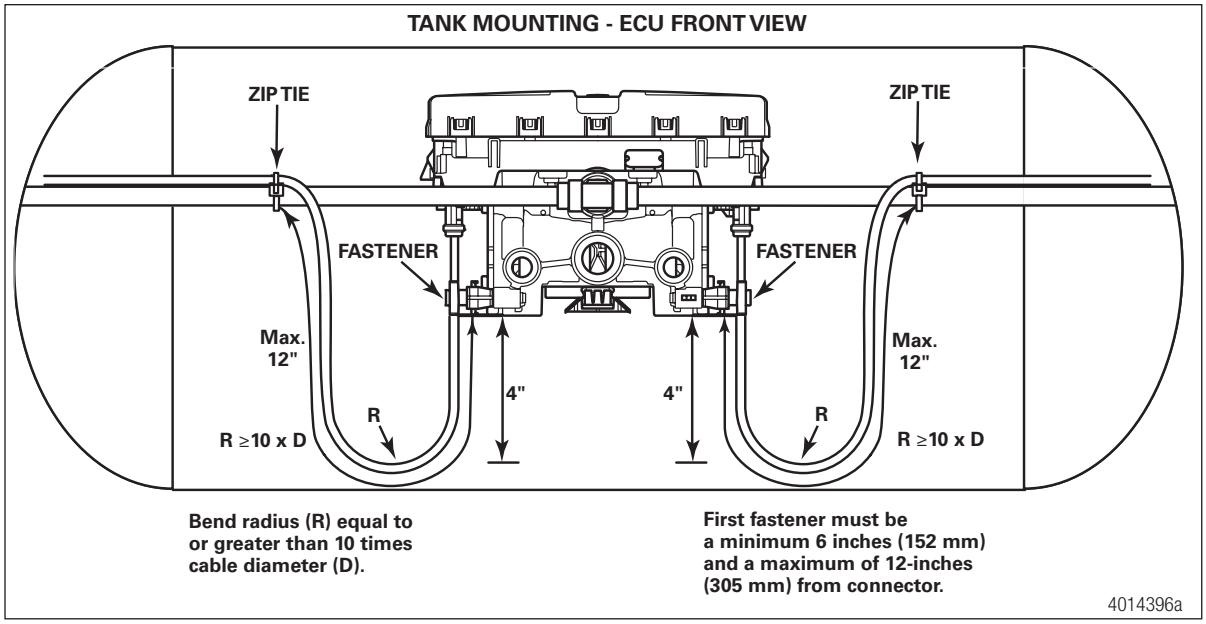


7.2.1 Strain Relief at the ECU — Tank Mounting

It is necessary that cable connections to a component, such as an ECU valve assembly, display a visible amount of slack in the cable up to the first tie or clip that secures the cable to the trailer structure or air line. This first anchor point should be a minimum 6-inches (152 mm) of cable length from the cable/component connection and a maximum of 12-inches (305 mm). This applies to all sensor, power, valve and GIO cables. Regardless of whether zip ties or cable clips are used, cables should be secured at intervals not greater than 18-inches (457 mm) to avoid cable vibration.

Ideally, cables should be affixed to the rigid structure of the trailer. However, structure is not always available on tank-mounted installations. In these cases, securing the cable may be accomplished by fastening the cable to nearby air lines. It is important to note that cables should be secured only to the extent that the cable is held sufficiently in place. See page 19 for 2S/2M-4S/3M ABS.

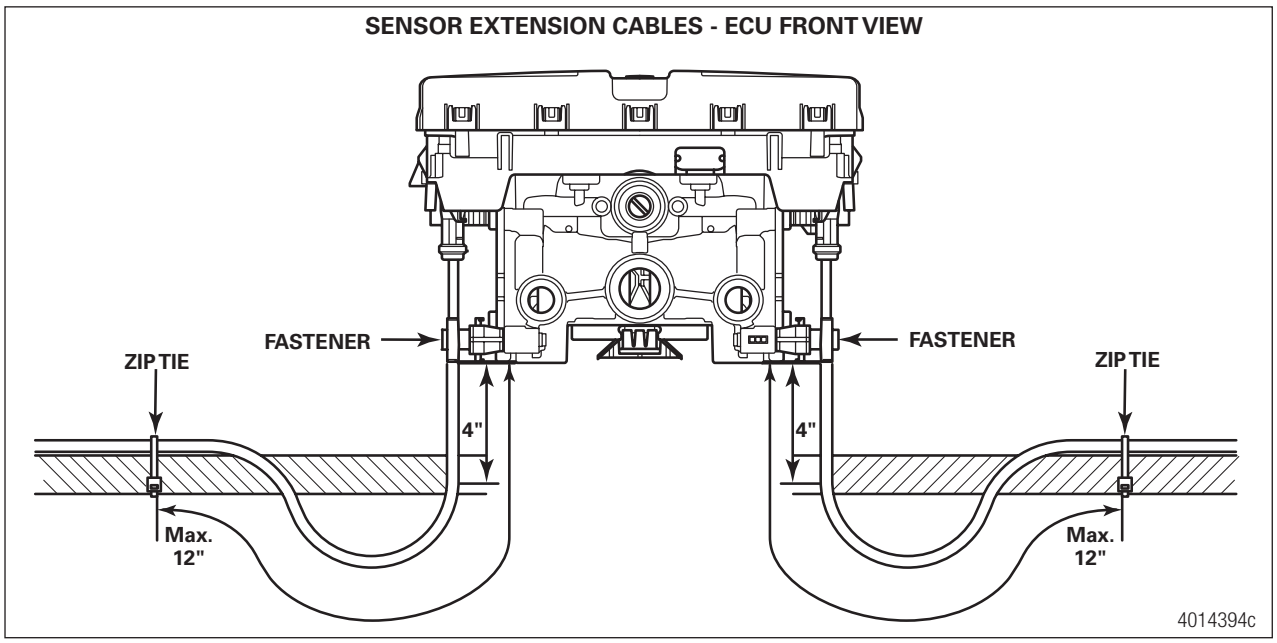
Appendix II



Correct Power and Gio/Modulator Cable Strain Relief for ABS 2S/2M-4S/3M

7.2.2 Sensor Extension Cables at the ECU

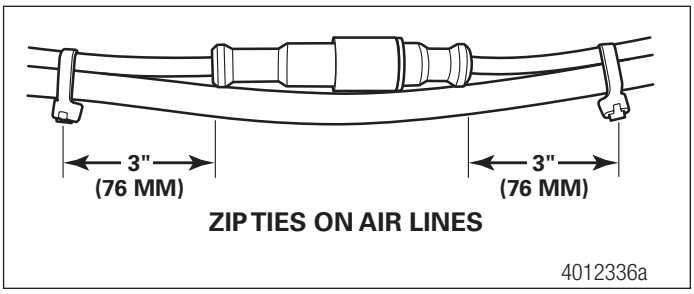
On valves that are tank mounted with no trailer structure nearby, or have remote-mounted cables, the sensor extension cables are attached to the air lines. Cable clips are preferred over zip ties. It is important to remember that cables should be fastened in a manner where the cable is secured enough where the cable will not move or chafe against what it is mounted to. A small amount of slack should be present to ensure that the cables do not become taut after installation or the servicing of components. The figure below illustrates the correct amount of slack in the sensor extension cables and correct attachment to the air delivery lines for ABS ECUs.

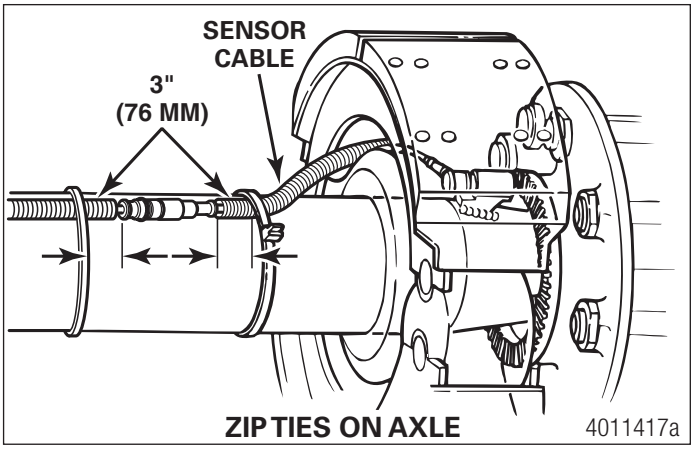


Appendix II

7.2.3 Cable-to-Cable Connections

It is important to ensure all cable-to-cable connections maintain good strain relief. Cable restraints must be placed between 2- and 4-inches (51-102 mm) from the cable connector to ensure correct strain relief. Regardless of whether zip ties or cable clips are used, cables should be secured at intervals not greater than 18-inches (457 mm) to avoid cable vibration. Refer to the illustrations below for air line attachment and axle attachment.





8 Appendix III

8.1 Vehicle Electrical Grounding Guidelines

Ensure that the vehicle includes a correct common chassis ground point. A common chassis ground point connects the trailer frame/chassis to the ground pin of the J560 seven-way connector and will protect the vehicle electrical system from unwanted electrical noise.

Common chassis ground can be verified by measuring the resistance between the J560 ground pin and the vehicle chassis (or frame) and confirming that the resistance is less than 10 Ohm (<10 Ω). If this is not the case, the electrical contact at the common chassis ground point is not sufficient or not present. If a common chassis ground point is present, but not sufficient, ensure that there is no paint or debris inhibiting electrical contact at the ground point. If a common chassis ground point is not present, WABCO recommends adding one.

Do not add more than one common chassis ground point (connecting the J560 ground pin to the chassis) to avoid potential ground shifts within the vehicle electrical system.

Additionally, all standard trailer components, such as axles, should also be electrically connected to the common chassis ground. If the axles are not correctly grounded to the chassis, a ground strap electrically connecting the axle to the chassis may be added to ensure adequate protection from unwanted electrical noise. This can be verified by measuring the resistance between the vehicle chassis/frame and the other trailer component, then confirming that the resistance is less than 10 Ohm (< 10 Ω).

For more details concerning correct vehicle grounding, reference SAE standard J1908.

Note during welding work on the trailer:

- Disconnect power to the trailer.
- Disconnect all cable connections to devices and components and protect the plug-ins and connections from contamination and humidity.
- Always connect the grounding electrode directly with the metal next to the welding position when welding, to prevent magnetic fields and current flow via the cable or components.
- Make sure that grounding connections are robust by removing paint or rust at the connection points.
- Prevent heat influences from the welding activity on devices and cabling when welding.

Note during electrostatic painting the trailer frame or bogie:

- Disconnect all cable connections to devices and components and protect the plug-ins and connections from contamination and humidity.

9 Appendix IV

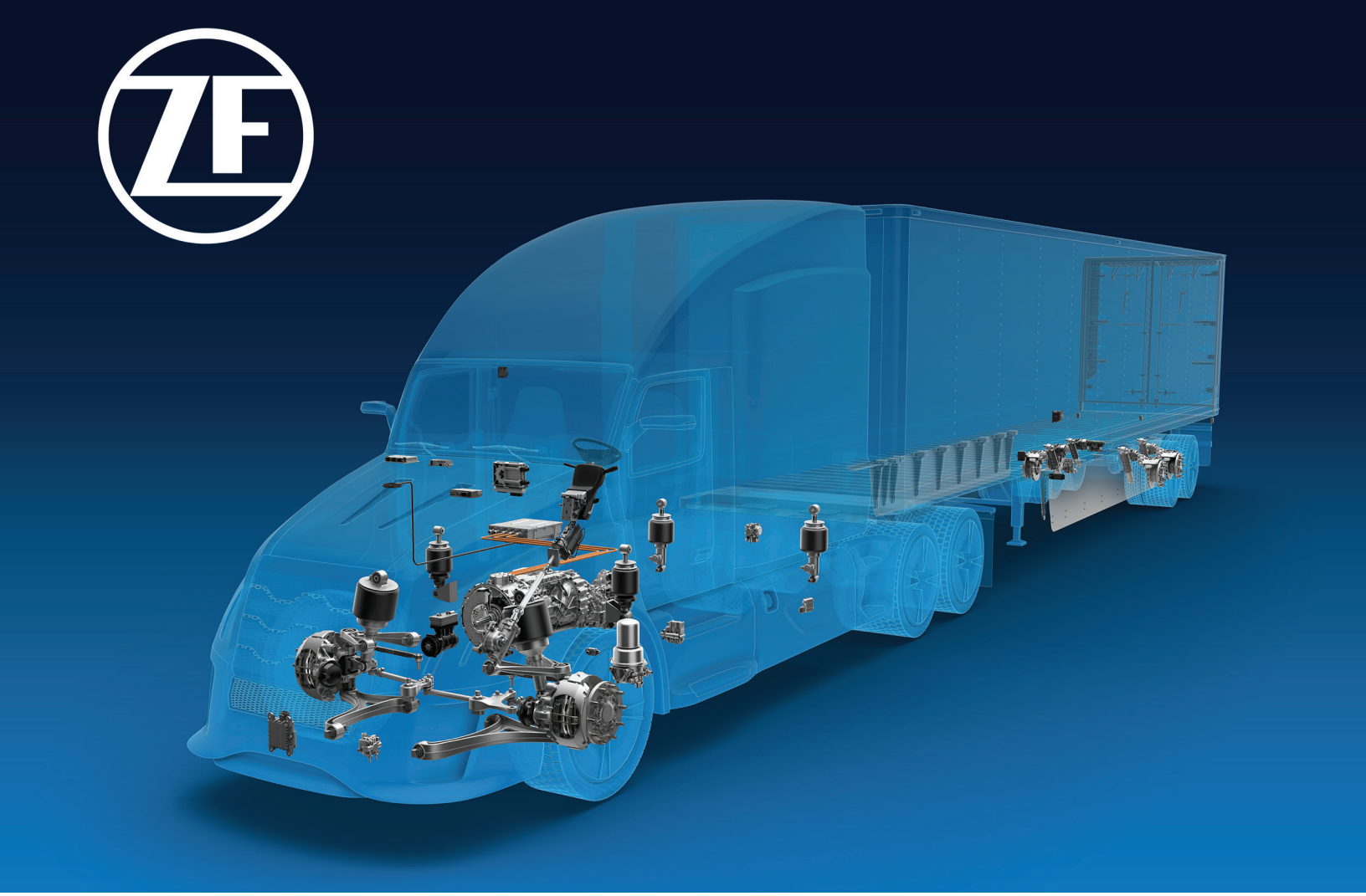
9.1 Parts and Variant List

VARIANT LIST		
		
Variants	iABS 1M Premium	iABS 2M Premium
Part Number	400 500 350 0	400 500 430 0
CAN Capable	Yes	Yes
GIO Capable	Yes	Yes

Slot on iABS Modulator	Application	Part Number	Length
Power	 Power Cable	449 306 005 0 449 306 010 0 449 306 030 0 449 306 047 0	0.5 M 1 M 3 M 4.7 M
Sensor Ports C,D,E,F	 Sensor Extension Cable	449 733 008 0 449 733 013 0 449 733 018 0 449 733 030 0 449 733 050 0 449 733 070 0 449 733 090 0 449 733 120 0	0.8 M 1.3 M 1.8 M 3 M 5 M 7 M 9 M 12 M
GIO 1	 HUB Cable GIO	894 600 121 2	0.5 M
Hub Cable Port 1	 Brake Pad Wear Cable	449 836 013 0 449 836 030 0	1.3 M 3 M

Appendix IV

Slot on iABS Modulator	Application	Part Number	Length
Hub Cable Port 2	 GIO Cable Blunt Cut 4 Wire (Switch/Indication Lamp Cable)	449 827 030 0 449 827 060 0 449 827 120 0 449 827 180 0	3 M 6 M 12 M 18 M
Brake Pad Wear Cable	 Connector Socket	441 902 312 2	N/A
Brake Pad Wear Cable	 Brake Pad Wear Indicator	441 039 824 2	N/A



For further details, contact the
WABCO Customer Care Center at 855-228-3203.

About CVS Division

ZF's Commercial Vehicle Solutions (CVS) division is helping shape the future of commercial transportation ecosystems. Our mission is to be the preferred global technology partner to the commercial vehicle industry. Powerfully combining ZF's commercial vehicle systems expertise, extensive technology portfolio and global operations, the division serves the full commercial vehicle industry value chain. As the automotive industry progresses towards an increasingly autonomous, connected, and electrified (ACE) future, ZF's CVS division innovates, integrates and supplies components and advanced control systems that help make commercial vehicles and fleets operate more safely and sustainably. CVS unites ZF's former Commercial Vehicle Technology and Commercial Vehicle Control Systems divisions, the latter being formed following ZF's acquisition of WABCO in Spring 2020.

For more information, visit: **www.zf.com/cv**