INSTALLING AND CONFIGURING THE WABCO iABS WITH AUTOMATIC LIFT AXLE CONTROL OPTION

KITS 400 612 039 0, 400 612 040 0, 400 612 041 0. MUST BE USED WITH THE WABCO PREMIUM ECU/VALVE ASSEMBLIES: 400 500 350 0 (2S/1M), 400 500 450 0 (4S/2M)

TECHNICAL BULLETIN

TP19039

WABCO

Mobilizing Vehicle Intelligence

Table of Contents

Edition 1
Version 1 (08.2020)
TP19039 (en)

1 General Information

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, notes and/or tips

Reference to information on the internet

1. Action step
   - Action step
   ⇨ Consequence of an action

■ List
   • List

Note on the use of a tool/WABCO tool

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 the WABCO Customer Care Center at 855-228-3203, by email at wnacustomercare@wabco-auto.com, or visit our website: www.wabco-na.com.

Refer to the latest iABS Maintenance Manual MM19001. To obtain this publication, visit our website at wabco-na.com, or call the WABCO Customer Care Center at 855-228-3203.

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.

WABCO TOOLBOX PLUS™ Software

The TOOLBOX PLUS™ Software provides PC diagnostics for WABCO products and can be purchased and downloaded from https://wabco.snapon.com. For complete instructions for using TOOLBOX PLUS™ refer to User's Guide MM19047. To obtain this literature, visit www.wabco-na.com/literature.

WABCO Academy

https://www.wabco-academy.com/home/

WABCO Online product catalog

https://www.wabco-customercenter.com

Your direct contact to WABCO

WABCO North America LLC
WABCO USA LLC
1220 Pacific Drive
Auburn Hills, MI 48326
Customer Care Center: (855) 228-3203
www.wabco-na.com

2 Safety Information

Provisions for a safe work environment

- Only trained and qualified auto technicians and auto mechanics 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 respective company 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.

4 Introduction

The WABCO iABS Automatic Lift Axle Control system uses the generic I/O capability to automatically control the lift axle function of the trailer. The Lift Axle function may be configured in three different ways. Each method has its own specific hardware requirement and installation.

Automatic Override Kit 400 612 039 0 is a fully automatic system that uses a combination of switch input and lifting and lowering pressures all preset by the trailer manufacturer using the WABCO TOOLBOX PLUS™ Software. This lift axle configuration monitors axle load in order to raise or lower the lift axle without driver intervention. The system senses the load and raises or lowers the lift axle based on preset suspension air pressures set by the trailer manufacturer. When the lift axle control valve is activated and raises the axle, an optional lift axle indicator on the trailer is activated to signal to the driver that the lift axle is in the “raised” position.

Kit 400 612 039 0 contains hardware for a fully automatic feature that will keep the lift axle in the lowered position when the parking (spring) brakes are applied. When the parking (spring) brakes are released the lift axle will move to the load appropriate position.

Manual Override Kit 400 612 040 0 is a fully automatic system that uses a combination of switch input and lifting and lowering pressures all preset by the trailer manufacturer using the WABCO TOOLBOX PLUS™ Software. This lift axle configuration monitors axle load in order to raise or lower the lift axle without driver intervention. The system senses the load and raises or lowers the lift axle based on preset suspension air pressures set by the trailer manufacturer. When the lift axle control valve is activated and raises the axle, an optional lift axle indicator on the trailer is activated to signal to the driver that the lift axle is in the “raised” position.

Manual Override Kit 400 612 040 0 contains the required cables for a manual override switch option that can be activated to keep the lift axle in the lowered position regardless of vehicle load. Please refer to local governing ordinances.

Automatic/Manual Override Kit 400 612 041 0 is a lift axle system that features both automatic and manual override modes.

This lift axle configuration monitors axle load in order to raise or lower the lift axle without driver intervention. The system senses the load and raises or lowers the lift axle based on preset suspension air pressures set by the trailer manufacturer. When the lift axle control valve is activated and raises the axle, an optional lift axle indicator on the trailer is activated to signal to the driver that the lift axle is in the “raised” position.

This kit contains hardware for a fully automatic feature that will keep the lift axle in the lowered position when the parking (spring) brakes are applied. When the parking (spring) brakes are released the lift axle will move to the load appropriate position.

This kit also contains the required cables for a manual override switch option that can be activated to keep the lift axle in the lowered position regardless of vehicle load. Please refer to local governing ordinances.

Note **400 612 039 0**, **400 612 040 0** and **400 612 041 0** must be used with a WABCO iABS Premium ECU/Valve assembly 400 500 350 (2S/1M) or 400 500 430 0 (2S/2M - 4S/2M).

Refer to the instructions in this technical bulletin for installing the WABCO Trailer iABS with Lift Axle Control Option.

4.1 Configuration of Lift Axles by Functionality

The Lift Axle function may be configured in three different ways.

Each method has its own specific hardware requirement and installation.

A. Automatic Lift Axle with Manual Override Switch (No spring brake delivery line pressure switch used). Kit number 400 612 040 0.

This configuration allows the lift axle to automatically raise and lower based upon values put into TOOLBOX PLUS™ Software which are downloaded into the ECU when it is programmed. This configuration has a trailer-mounted manual override switch that allows the driver to disable the ECU controlled raise/lower function and keep the lift axle in the down position. This allows the driver to keep the trailer in compliance where local ordinances require all lift axles to be kept in the down position regardless of load carried. Refer to Figure 1 for the Manual Override Switch option.

B. Automated Lift Axle with Automatic Override (Spring brake delivery line pressure switch required). Kit number 400 612 039 0.

This configuration allows the lift axle to automatically raise and lower based upon values put into TOOLBOX PLUS™ Software which are downloaded into the ECU when it is programmed. This configuration allows the driver to lower the lifted axle when parked by pulling the red dash valve in the tractor to remove trailer supply air. This feature is useful for slider positioning or fast loading operations to ensure that the lift axle is in the down position. Specifically, when the delivery line from the trailer spring brake chamber meets or drops below 70 psi (4.82 bar), the ECU will automatically lower the lift axle. Refer to Figure 2 for the Automatic Override Switch option.

C. Automated Lift Axle with Both Manual and Automatic Override. Kit number 400 612 041 0.

This configuration allows the driver to lower the lifted axle by means of a toggle switch or by pulling the red dash valve in the tractor to remove trailer supply air when the vehicle is at rest. This requires the technician to perform the installation instructions for both manual and automatic configurations outlined in Step 10. Refer to Figure 3 for the installation diagram.

A lift axle can be lowered by removing power to the trailer.

4.2 Installation

⚠WARNING

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

⚠WARNING

Remove all pressure from the air system before you disconnect any component. Pressurized air can cause serious personal injury.

⚠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

Ensure the trailer has correct electrical grounding; refer to SAE Specification J1908.

⚠WARNING

When you work on an electrical system, the possibility of electrical shock exists, and sparks can ignite flammable substances. You must always disconnect the battery ground cable before you work on an electrical system to prevent serious personal injury and damage to components.

Fig. 1

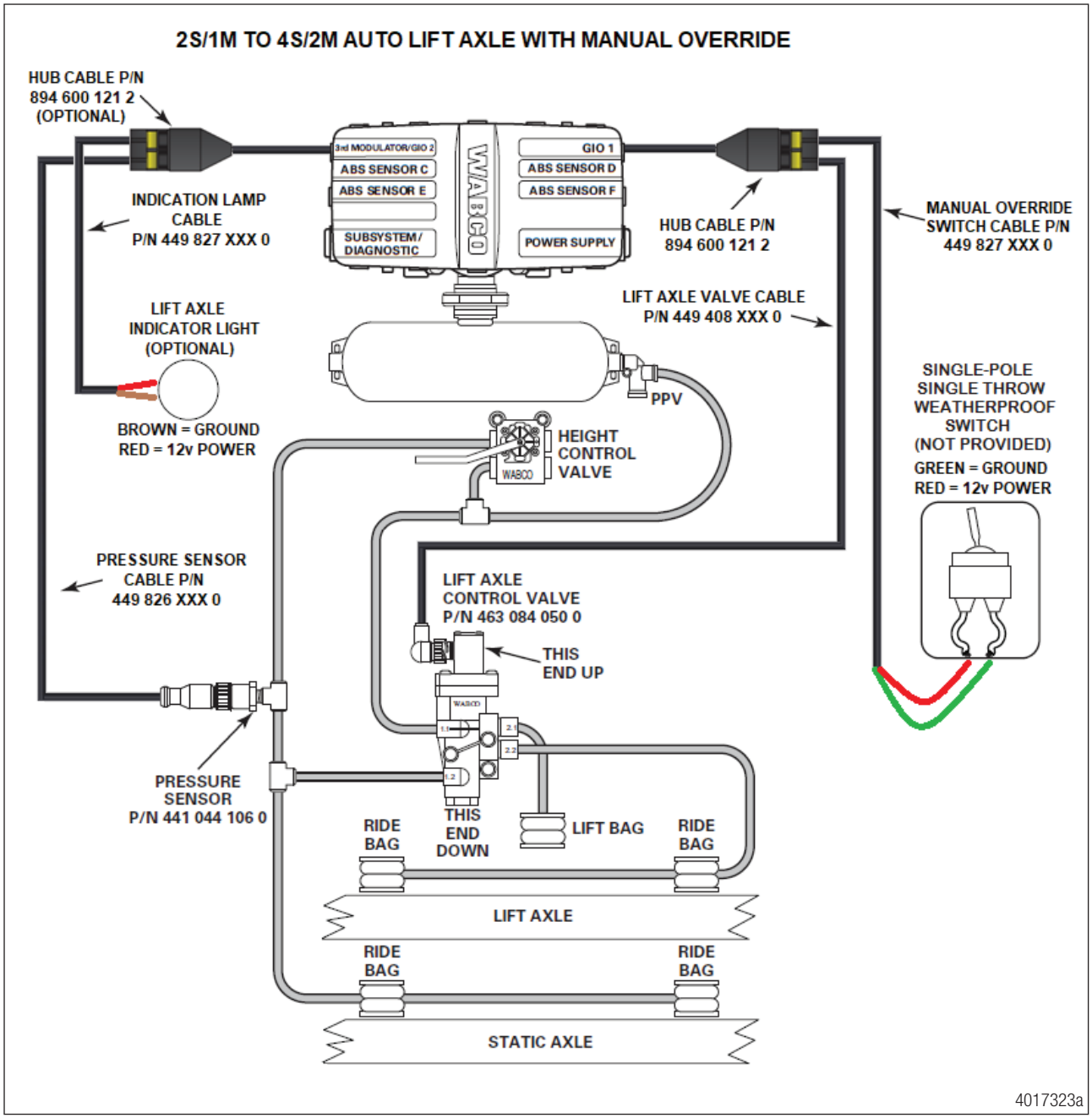


Fig. 2

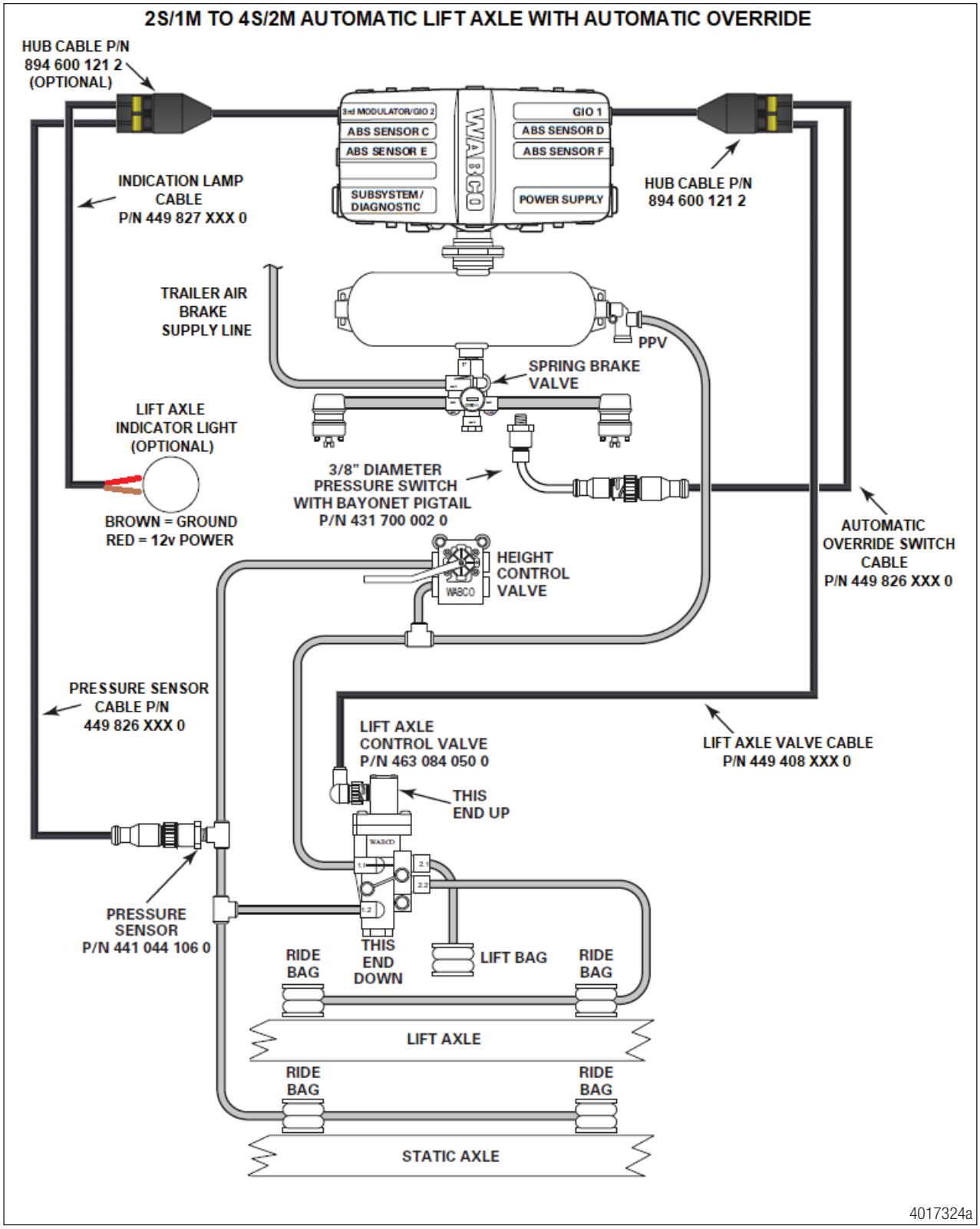
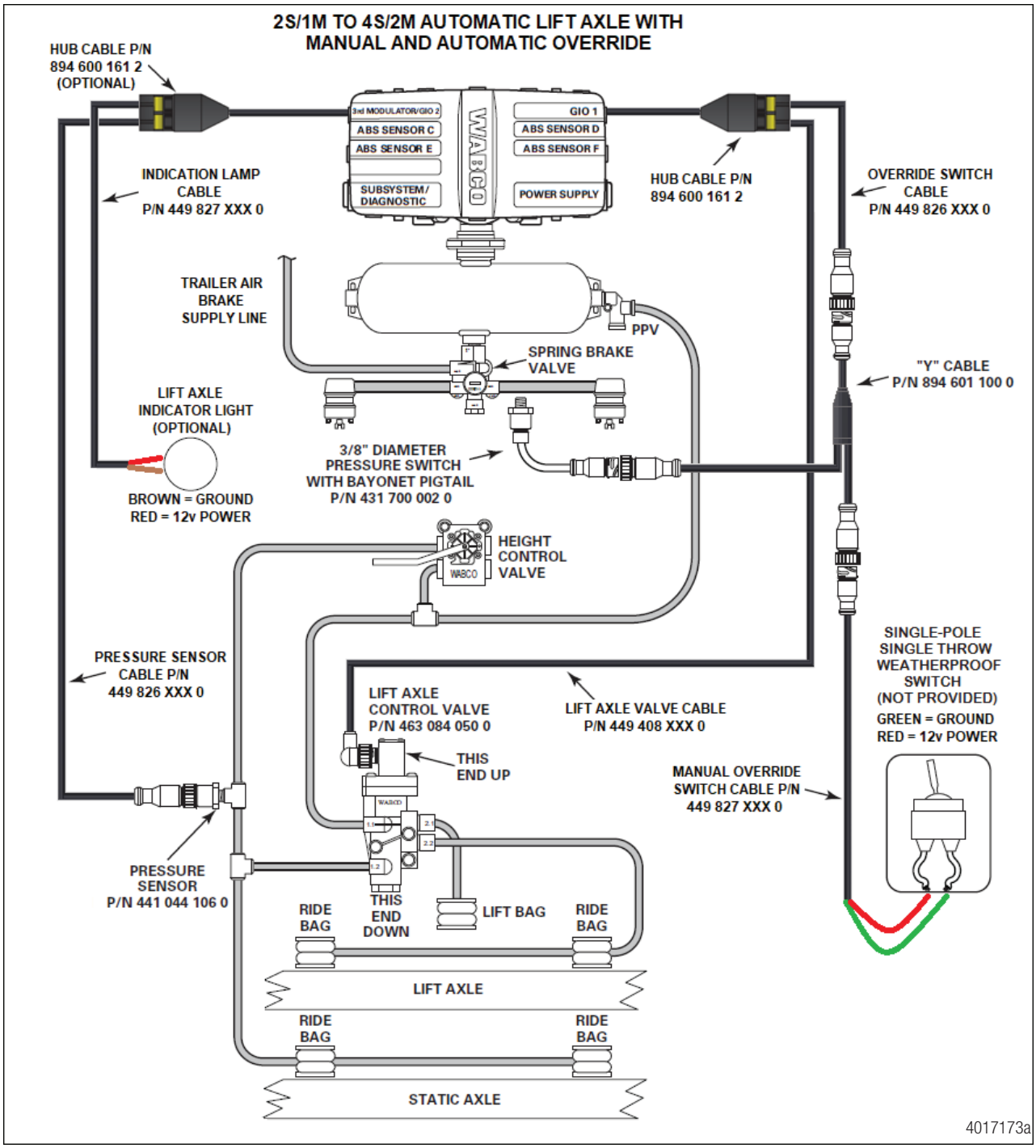

2S/1M TO 4S/2M AUTOMATIC LIFT AXLE WITH AUTOMATIC OVERRIDE
HUB CABLE P/N
894 600 121 2
(OPTIONAL)
3rd MODULATOR/GIO 2
ABS SENSOR C
ABS SENSOR E
SUBSYSTEM/
DIAGNOSTIC
WABCO
GIO 1
ABS SENSOR D
ABS SENSOR F
POWER SUPPLY
HUB CABLE P/N
894 600 121 2
INDICATION LAMP
CABLE
P/N 449 827 XXX 0
TRAILER AIR
BRAKE
SUPPLY LINE
PPV
SPRING BRAKE
VALVE
LIFT AXLE
INDICATOR LIGHT
(OPTIONAL)
3/8" DIAMETER
PRESSURE SWITCH
WITH BAYONET PIGTAIL
P/N 431 700 002 0
BROWN = GROUND
RED = 12v POWER
HEIGHT
CONTROL
VALVE
AUTOMATIC
OVERRIDE SWITCH
CABLE
P/N 449 826 XXX 0
PRESSURE SENSOR
CABLE P/N
449 826 XXX 0
LIFT AXLE
CONTROL VALVE
P/N 463 084 050 0
LIFT AXLE VALVE CABLE
P/N 449 408 XXX 0
THIS
END UP
PRESSURE
SENSOR
P/N 441 044 106 0
THIS
END
DOWN
RIDE
BAG
LIFT BAG
RIDE
BAG
LIFT AXLE
RIDE
BAG
RIDE
BAG
STATIC AXLE
4017324a

Fig. 3


2S/1M TO 4S/2M AUTOMATIC LIFT AXLE WITH MANUAL AND AUTOMATIC OVERRIDE
HUB CABLE P/N 894 600 161 2 (OPTIONAL)
3rd MODULATOR/GIO 2
ABS SENSOR C
ABS SENSOR E
SUBSYSTEM/ DIAGNOSTIC
WABCO
GIO 1
ABS SENSOR D
ABS SENSOR F
POWER SUPPLY
INDICATION LAMP CABLE P/N 449 827 XXX 0
HUB CABLE P/N 894 600 161 2
OVERRIDE SWITCH CABLE P/N 449 826 XXX 0
TRAILER AIR BRAKE SUPPLY LINE
PPV
SPRING BRAKE VALVE
"Y" CABLE P/N 894 601 100 0
LIFT AXLE INDICATOR LIGHT (OPTIONAL)
3/8" DIAMETER PRESSURE SWITCH WITH BAYONET PIGTAIL P/N 431 700 002 0
BROWN = GROUND
RED = 12v POWER
HEIGHT CONTROL VALVE
PRESSURE SENSOR CABLE P/N 449 826 XXX 0
LIFT AXLE CONTROL VALVE P/N 463 084 050 0
LIFT AXLE VALVE CABLE P/N 449 408 XXX 0
SINGLE-POLE SINGLE THROW WEATHERPROOF SWITCH (NOT PROVIDED)
GREEN = GROUND
RED = 12v POWER
THIS END UP
MANUAL OVERRIDE SWITCH CABLE P/N 449 827 XXX 0
PRESSURE SENSOR P/N 441 044 106 0
THIS END DOWN
RIDE BAG
LIFT BAG
RIDE BAG
LIFT AXLE
RIDE BAG
RIDE BAG
STATIC AXLE
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1. Wear safe eye protection.
2. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.

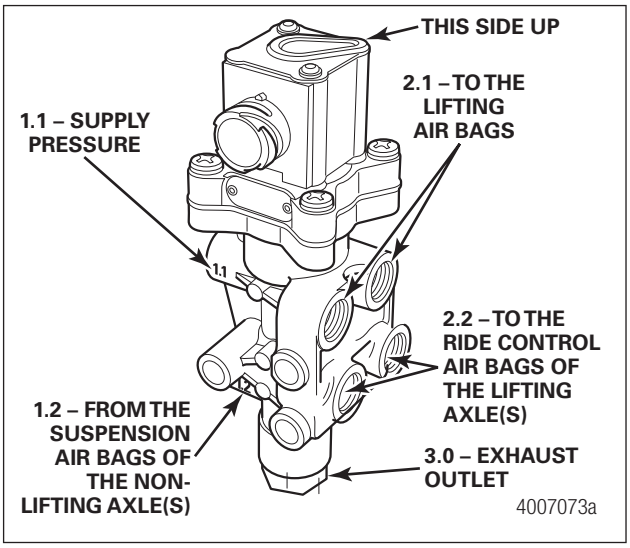
> The trailer must not be loaded during this component installation.

3. Drain the brake and suspension systems of air before starting this procedure.
4. Disconnect the electrical power before starting this procedure.
5. Start with connecting the GIO hub cable, P/N 894 600 161 2, into the ECU‘s GIO 1 port and push in until the locking clip seats. Then, if using the optional lift axle indicator light cable, install another GIO hub cable, P/N 894 600 161 2, into the ECU‘s GIO 2 port and push in until the locking clip seats. Refer to Figures 1, 2 and 3 depending on the override functionality selected.
6. If the optional lift axle indicator light is not used, plug the pressure sensor cable, P/N 449 826 XXX 0 into the ECU‘s GIO port 2. If the lift axle indicator light is used, plug the cable into the hub cable port 1. The bayonet connector end of the cable will plug into the pressure sensor, P/N 441 044 106 0. Refer to Figures 1, 2 and 3, depending on the override functionality selected.

   The pressure sensor must be attached to the ride bag air circuit of the trailer‘s air suspension in order to determine the load on the trailer.
7. Connect the lift axle control valve cable, P/N 449 408 XXX 0 to the GIO hub cable port 2 that is plugged into the ECU GIO 1 port. Push the cable in completely until the lock engages. The bayonet cable end of the cable will connect to the lift axle control valve, P/N 463 084 050 0. Refer to Figures 1, 2 and 3, depending on the override functionality selected.
8. Ensure that the lift axle control valve is installed correctly. Refer to Figure 4.

> A barrier of plastic or mylar should be placed between the lift axle control valve and the surface it will be mounted on. This will help inhibit potential corrosion between dissimilar metals.

Fig. 4



9. Perform one of the following depending on the trailer you are servicing.

   A. **For Trailers with Both Manual and Automatic Lift Axle Override.**

   Connect the override switch cable, P/N 449 826 XXX 0 to the GIO hub cable port 1 of the GIO hub cable connected to the ECU GIO 1 port. Then connect the single wire leg of the lift axle "Y" cable, P/N 894 601 100 0 to the other end of the override switch cable. This "Y" cable splits the override switch cable into two leads. Then the next step is to plug the manual override cable, P/N 449 428 XXX 0 into either one of the other legs of the "Y" cable. The other end of the manual override switch cable must be connected to a single-pole, single-throw, weatherproof toggle switch that is mounted on the trailer in a driver-accessible location.

   To wire the switch connect the blue wire of the cable to one side of the toggle switch and the brown wire to the other side of the switch. The yellow/green wire is not used and must be capped or terminated to prevent any corrosion. This switch overrides the settings that govern the raise/lower feature and keeps they lift axle in the lowered position as long as the switch is activated.

   Then to install the automatic override portion of the system, connect the other end of the "Y" cable to the pressure switch, P/N 431 700 002 0.

   Then pressure switch, P/N 431 700 002 0 must be connected between the delivery port of the parking (spring) brake valve and the parking (spring) brake chamber using a tee in the delivery line. When supply air is removed from the trailer, the pressure switch overrides the settings that control raise/lower feature and keeps the lift axle in the lowered position as long as the parking (spring) brakes are set. This is achieved by pulling the red dash valve in the towing vehicle to remove supply air from the trailer.

   B. **For Trailers with Automatic Lift Axle Override**.

   Connect the override switch cable, P/N 449 826 XXX 0 to the GIO hub cable port 1 of the GIO hub cable connected to the ECU GIO 1 port. Then connect the other end of the override switch cable to the pressure switch, P/N 431 700 002 0.

   Then pressure switch, P/N 431 700 002 0 must be connected between the delivery port of the parking (spring) brake valve and the parking (spring) brake chamber using a tee in the delivery line. When supply air is removed from the trailer, the pressure switch overrides the settings that control raise/lower feature and keeps the lift axle in the lowered position as long as the parking (spring) brakes are set. This is achieved by pulling the red dash valve in the towing vehicle to remove supply air from the trailer.

   C. **For Trailers with Manual Lift Axle Override.**

   Connect the manual override switch cable, P/N 449 827 XXX 0 to the GIO hub cable port 1 of the GIO hub cable connected to the ECU GIO 1 port. The other end of the manual override switch cable must be connected to a single-pole, single-throw, weatherproof toggle switch that is mounted on the trailer in a driver-accessible location.

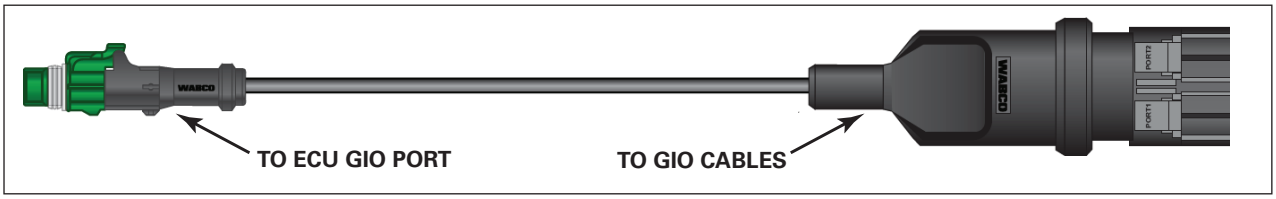
   

   This switch is not provided by WABCO. Ensure that the "on" and "off" positions are clearly labeled.

   To wire the switch, connect the green wire of the cable to one side of the toggle switch and the brown wire to the other side of the switch. The red wire and yellow wires are not used and must be capped or terminated to prevent any corrosion. This switch overrides the settings that govern the raise/lower feature and keeps they lift axle in the lowered position as long as the switch is activated.

The "Port 1" and "Port 2" lettering is located on the GIO hub cable, P/N 894 600 161 2. Refer to Figure 5 below for an example.

Fig. 5



10. If used, connect the (optional) lift axle indicator light cable, P/N 449 827 XXX 0 to the HUB cable plugged into GIO 2, P/N 894 600 161 2 port 2. To connect the other end of the cable to the light, the brown wire needs to be connected to the light ground, and then the yellow wire needs to be connected to the power side of the light. The other two wires (green, red) are not used and can be capped. Refer to Figures 1, 2 and 3.

    (The lift axle indicator light cable is not part of the kit. Please choose the appropriate length for your application. Refer to Appendix IV.)

    WABCO requires that an LED light or incandescent light of less than 1 amp is used. Ensure the LED light has a load resistor to prevent unwanted illumination of the light.

11. The next step is to connect the TOOLBOX PLUS™ software and activate the Automatic Lift Axle function and set the lifting and lowering pressures.

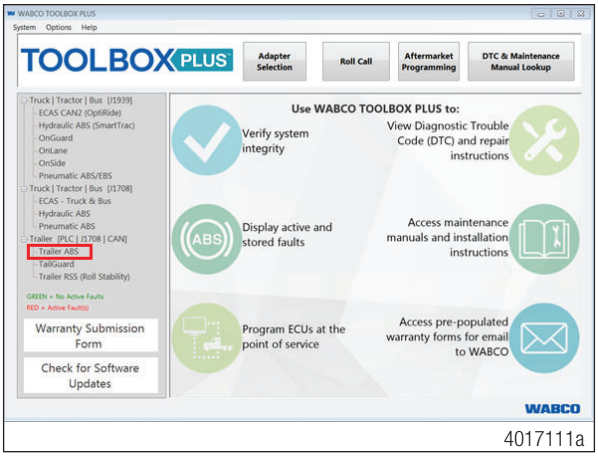
4.3 Automatic Lift Axle Activation Procedure

The following steps detail the process to activate the Automatic Lift Axle function via the TOOLBOX PLUS™ Software.

The Automatic Lift Axle function can only be enabled on premium ECUs (part numbers 400 500 350, 400 500 430).

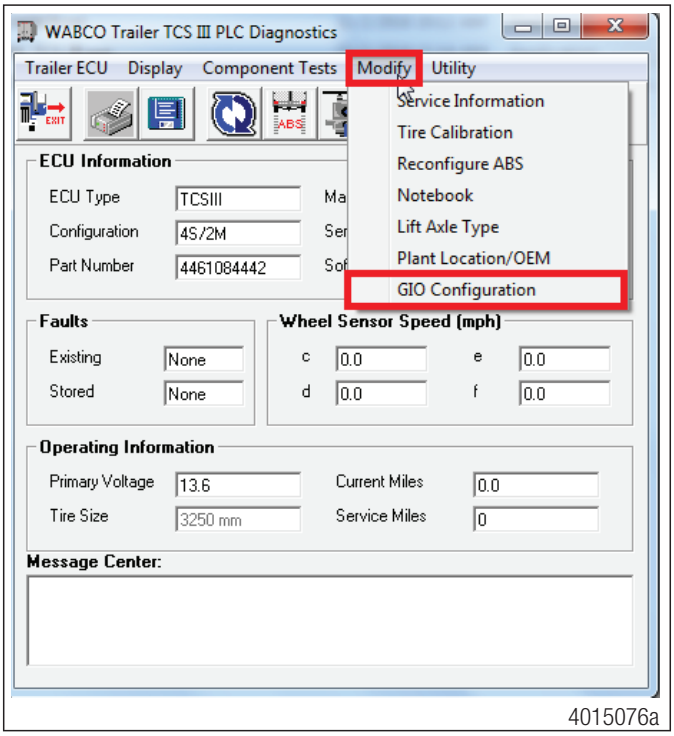
1. Open the iABS Diagnostics from the TOOLBOX PLUS™ Main Screen by selecting the Trailer ABS diagnostic section. Figure 6.

Fig. 6



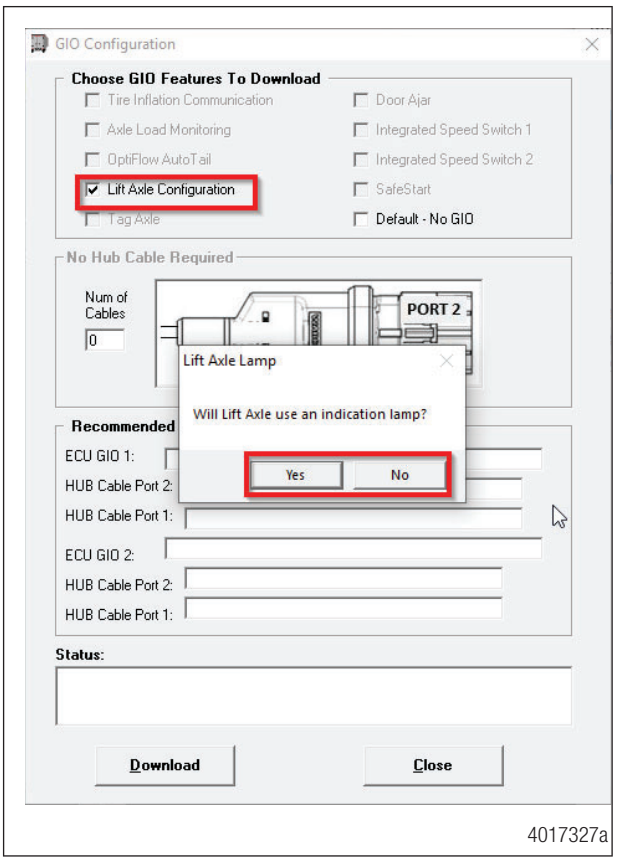
2. From the top menu bar, go to the Modify pull-down menu and select "GIO Configuration". Figure 7.

Fig. 7



3. When the GIO Configuration screen is displayed, select the check box "Automatic Lift Axle". A pop-up will appear asking if the optional lift axle indicator light will be used. Select Yes or No depending on the trailer application. Figure 8.

Fig. 8



Once you select whether the optional indicator light will be used or not, the connections for the necessary cables will be shown below in the window. Figure 9 and Figure 10.

Fig. 9

CABLE CONNECTIONS WITH INDICATOR LIGHT

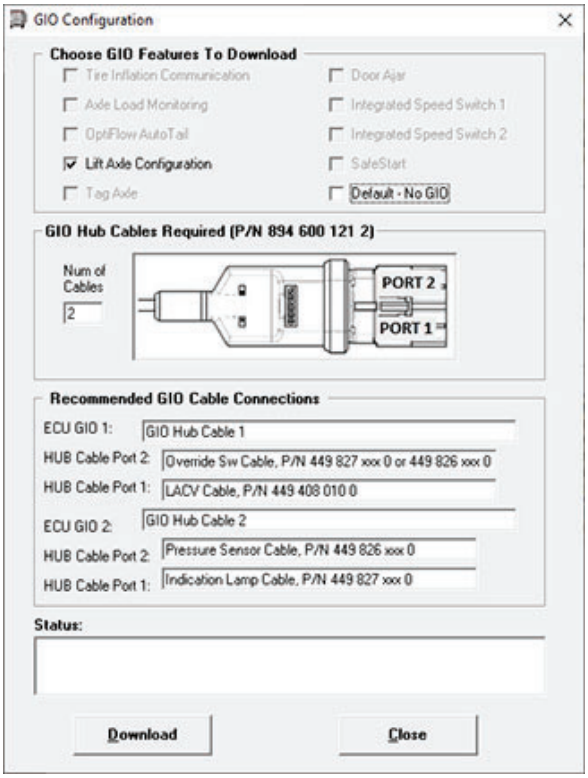


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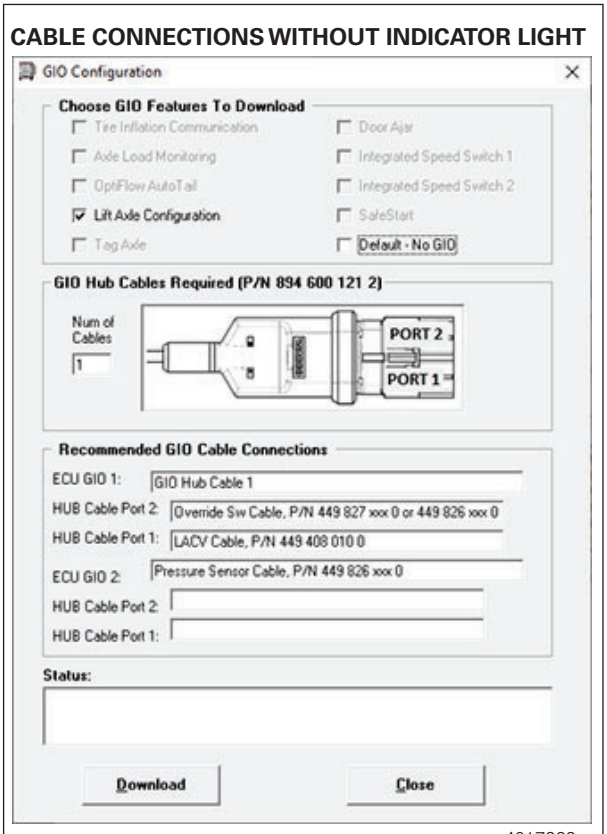
Fig. 10

CABLE CONNECTIONS WITHOUT INDICATOR LIGHT



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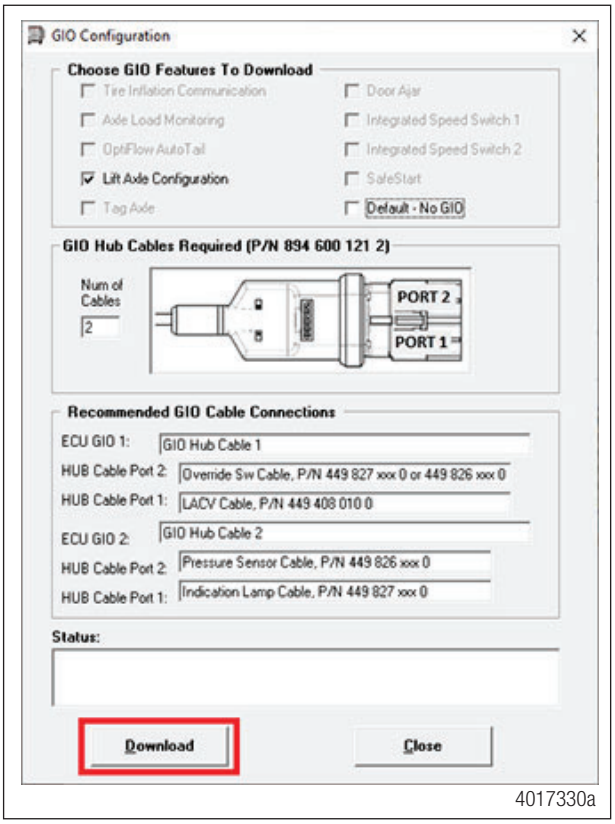
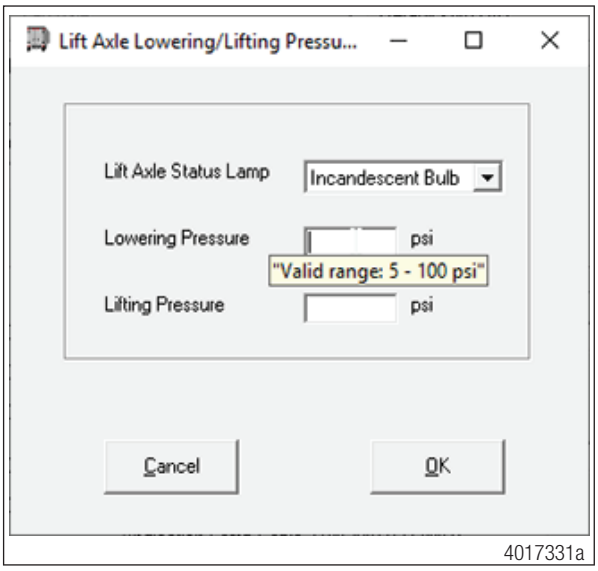
4. After reviewing the cable connections, select the **Download** button which will bring up the Lift Axle Lifting/Lowering Pressures screen. Figure 11.

Fig. 11



5. The Lift Axle Lifting/Lowering Pressures screen appears, allowing for the selection of the optional light being used if previously selected. The lifting and lowering pressures can then be entered. Figure 12.

Fig. 12



Determining Lifting and Lowering Pressures

Values will be obtained from the suspension manufacturer and modified according to the customer's performance expectations. Ensure these values comply with government regulations where the trailer will be in service.

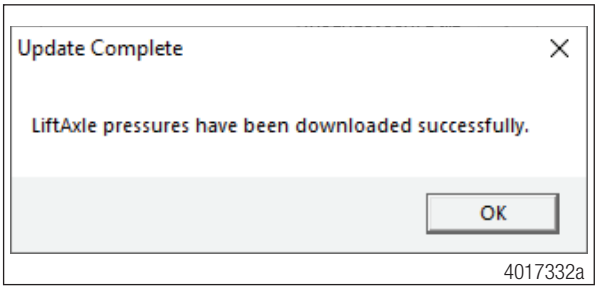
Type the Lowering and Lifting Pressures in the fields provided.

The values must fall within the following restrictions:

- Valid range: 5-100 psi
- Lowering Pressure must be greater than Lifting Pressure
- Lowering and Lifting pressures must differ by at least 15 psi

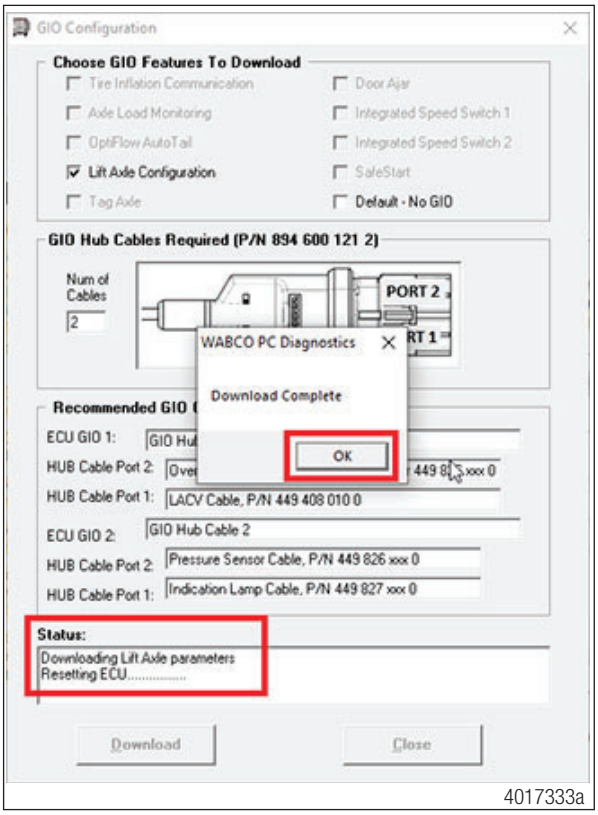
6. The values are validated and programmed when the **OK** button is pressed. When a confirmation message appears, press the **OK** button to continue. Figure 13.

Fig. 13



7. After selecting **OK** on the Lift/Lowering Pressures window, it will go back to the **GIO Configuration** Window, and the ECU will reset 2 times. Once the resets are complete, a Download Complete window will pop up. Click **OK** and the programming is now finished. Figure 14.

Fig. 14



4.4 Lift Axle Operation Check

The Lift Axle Operation Check is performed after the ABS system has been properly programmed and the Sensor Orientation Test has been successfully performed.

The trailer must have constant power applied and have air supplied to the supply/emergency (red) line.

Activate the manual override switch (if equipped) to confirm that the lift axle lowers in an unladen state. Once confirmed, return the switch to its original position and the lift axle should raise.

Testing the automatic override configuration (if equipped) that has the delivery line pressure switch in place of the manual toggle switch requires a tractor. Correct operation should be tested after the trailer Sensor Orientation Test has been completed. Attach the unladen trailer to a tractor and ensure both air and power are hooked up. Release the trailer spring brakes using the red trailer brake valve on the tractor dash. The lift axle should move to the raised position once the spring brake has released.

Apply the spring brakes (evacuating air) using the red trailer brake valve on the tractor dash. The lift axle should lower. This completes the pressure switch test.

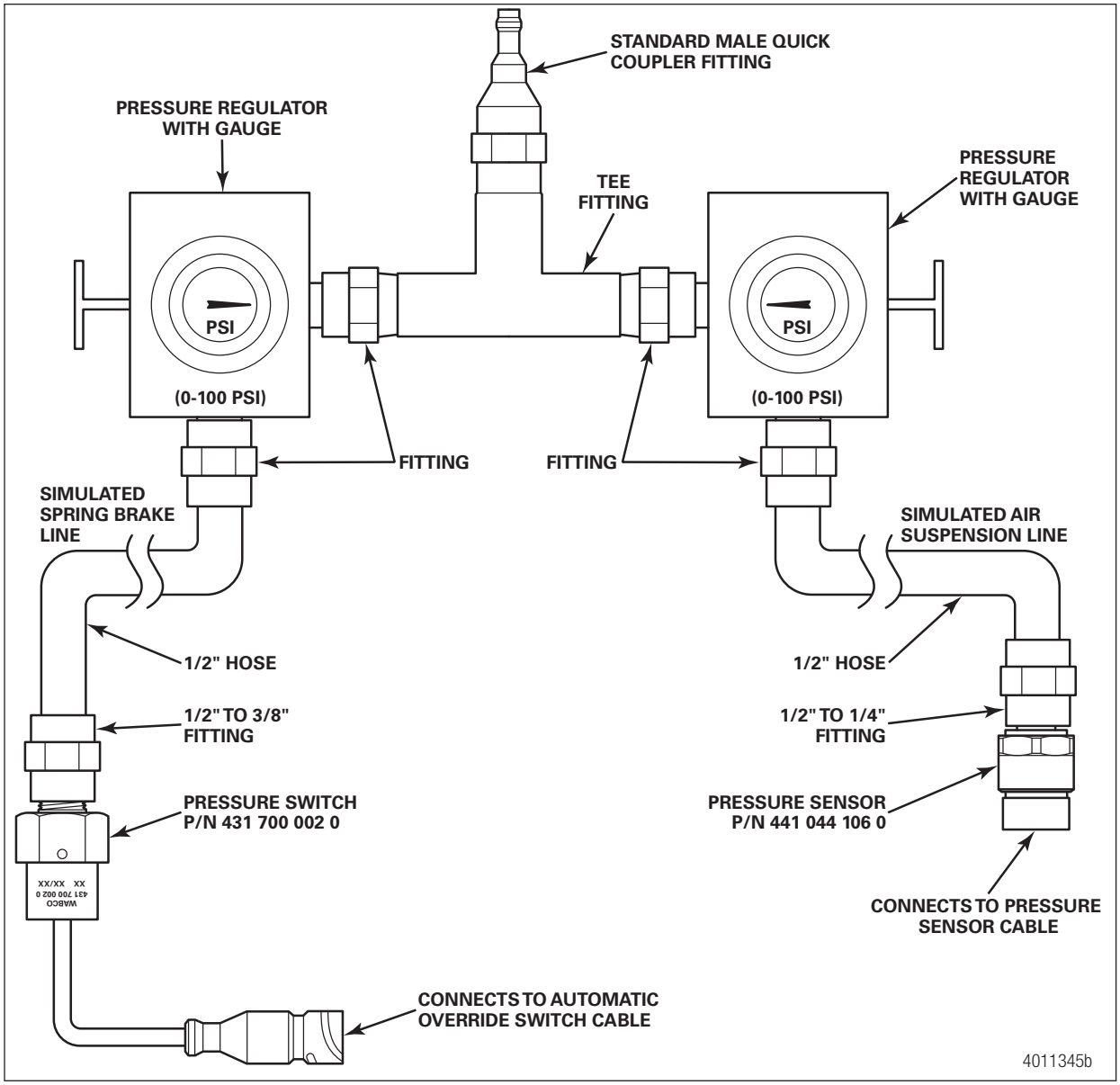
Add the appropriate amount of weight to the trailer so that the ride bag pressure equals or exceeds the “Lowering Pressure” value entered into the Parameter screen. The lift axle should lower from the raised position and the indicator lamp should extinguish.

This completes the Lift Axle Operation Check.

4.4.1 Lift Axle Test Rig

Some trailer OEMs may choose to construct an assembly to rapidly test the performance of automatic lift axle installations using the spring brake delivery line pressure switch. Components used in the construction of this assembly are commonly found at trailer OEM facilities. Figure 15.

Fig. 15



4.4.2 Using the Lift Axle Test Rig — Automatic Override

Prior to beginning the test, the WABCO ABS with Lift Axle Control must be installed and have successfully completed the End of Line testing. Do not proceed without accomplishing this first.

1. Attach shop air to lift axle test rig “tee” fitting.
2. Connect the test rig‘s pressure switch to the automatic override switch cable which is plugged into port 1 of the HUB cable plugged into GIO 1.
3. Connect the test rig‘s pressure sensor to the pressure sensor cable which is plugged into port 1 of the HUB cable plugged into GIO 1, or directly plugged into GIO 1 (if the optional lift axle indicator light is not used).

4. Adjust pressure regulator attached to the pressure sensor to 15 psi.
5. Adjust pressure regulator attached to the pressure switch to 90 psi.
6. Increase the air pressure to the pressure sensor to a psi level above the lift axle's stated lowering pressure. The lift bags should deflate and the axle should lower.
7. Decrease the air pressure to the pressure sensor to a psi level below the lift axle's stated raising pressure. The lift bags should inflate and the axle should rise.
8. Decrease the air pressure to the pressure switch to a level below 70 psi. The lift bags should deflate and the axle should lower.
9. Increase air pressure to the pressure switch to a level above 70 psi. The lift bags should inflate and the axle should rise.
10. The test has been completed. Remove the connections to the test rig, and re-attach the connections on the trailer's pressure sensor and pressure switch.

4.4.3 Using the Lift Axle Test Rig — Manual Override

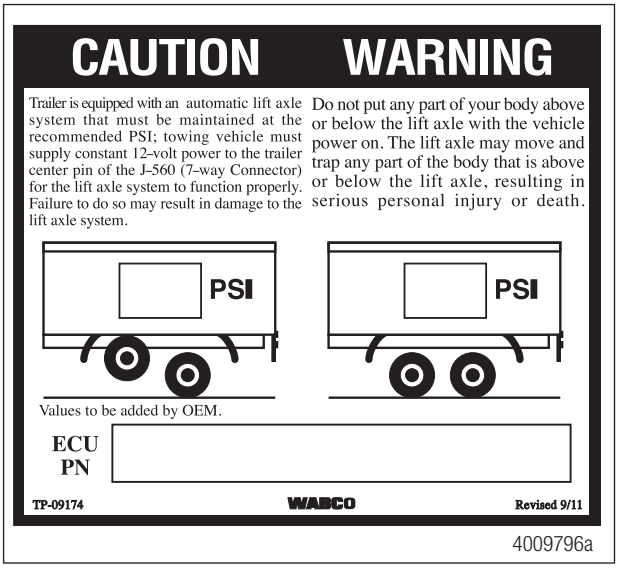
Prior to beginning the test, the WABCO ABS with Lift Axle Control must be installed and have successfully completed the End of Line test. Do not proceed without accomplishing this first.

1. Attach shop air to lift axle test rig "tee" fitting.
2. Connect the test rig's pressure sensor to the pressure sensor cable which is plugged into port 1 of the HUB cable plugged into GIO 1, or directly plugged into GIO 1 (if the optional lift axle indicator light is not used).
3. Adjust pressure regulator attached to the pressure sensor to 15 psi.
4. Ensure the manual override switch is in the deactivated (OFF) position.
5. Increase the air pressure to the pressure sensor to a psi level above the lift axle's stated lowering pressure. The lift bags should deflate and the axle should lower.
6. Decrease the air pressure to the pressure sensor to a psi level below the lift axle's stated raising pressure. The lift bags should inflate and the axle should rise.
7. Activate the manual override switch (switch to the ON position). The lift bags should deflate and the axle should lower.
8. Deactivate the manual override switch (switch to the OFF position). The lift bags should inflate and the axle should rise.
9. The test has been completed. Remove the connections to the test rig, and re-attach the connections on the trailer's pressure sensor and pressure switch.

4.4.4 Lift Axle Label

The lifting and lowering pressures will be clearly written with indelible ink on label TP09174. This label will be affixed near the lift axle on the trailer body by the trailer's original equipment manufacturer. Figure 16.

Fig. 16



5 Appendix I

5.1 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.

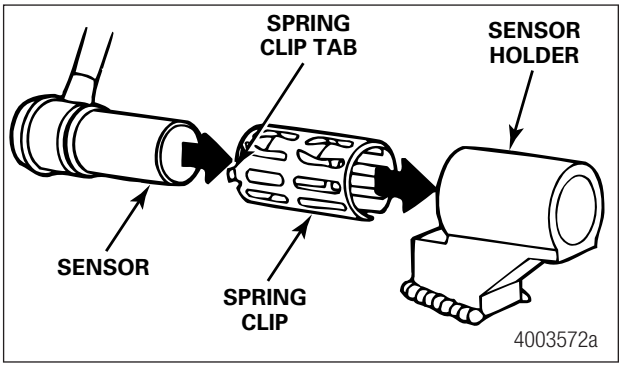
1. Apply a mineral oil-based grease that contains molydisulfide to the sensor spring clip, the body of the sensor and the bore of the sensor block. The grease must be anti-corrosive and contain adhesive properties that will continuously endure temperatures from –40° to 300°F (–40° to 150°C).

   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. Figure 17.

Fig. 17

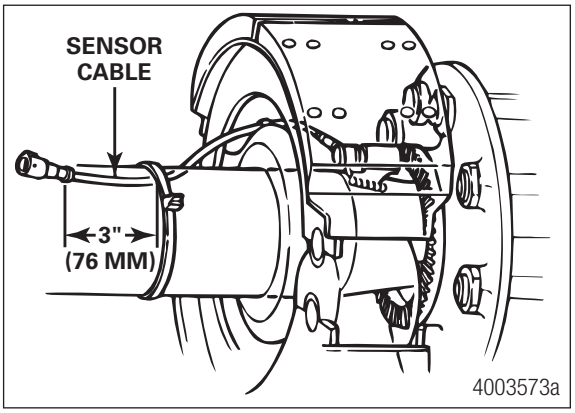


4. Route the sensor cable toward the brake chamber, over the brake spider or through the prestamped hole dedicated for ABS sensors. Route to the back side of the axle. Secure the cable to the axle between the brake spider and the suspension brackets. Continue to route the sensor cable behind the spring seats. Secure the cable to the axle one inch from the molded sensor plug. Figure 18.

   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.

Fig. 18



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.

6 Appendix II

6.1 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).

6.1.1 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.

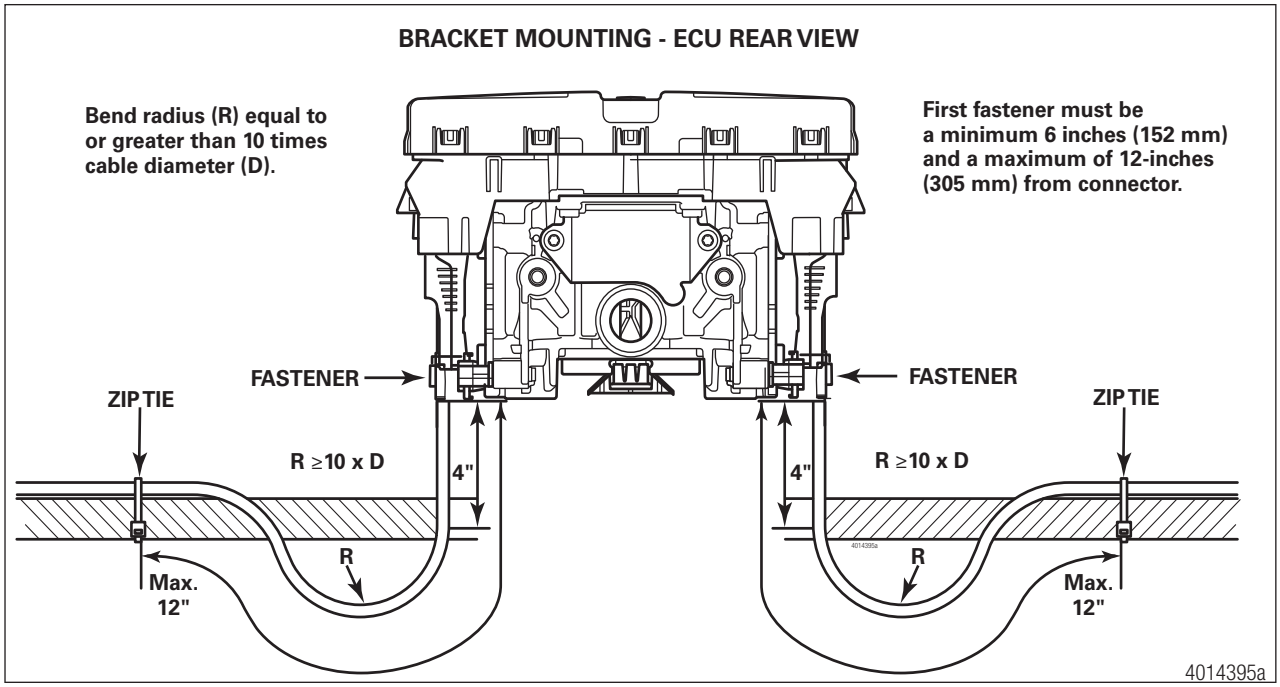
WABCO has many lengths of cables available so it is a best practice to obtain a length that best suits the requirements of the installation. Refer the Parts List in Appendix IV to find the different cable lengths that WABCO offers.

6.1.2 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). Refer to Figure 19 for the ECU mounting of 2S/2M-4S/3M ABS.

Fig. 19



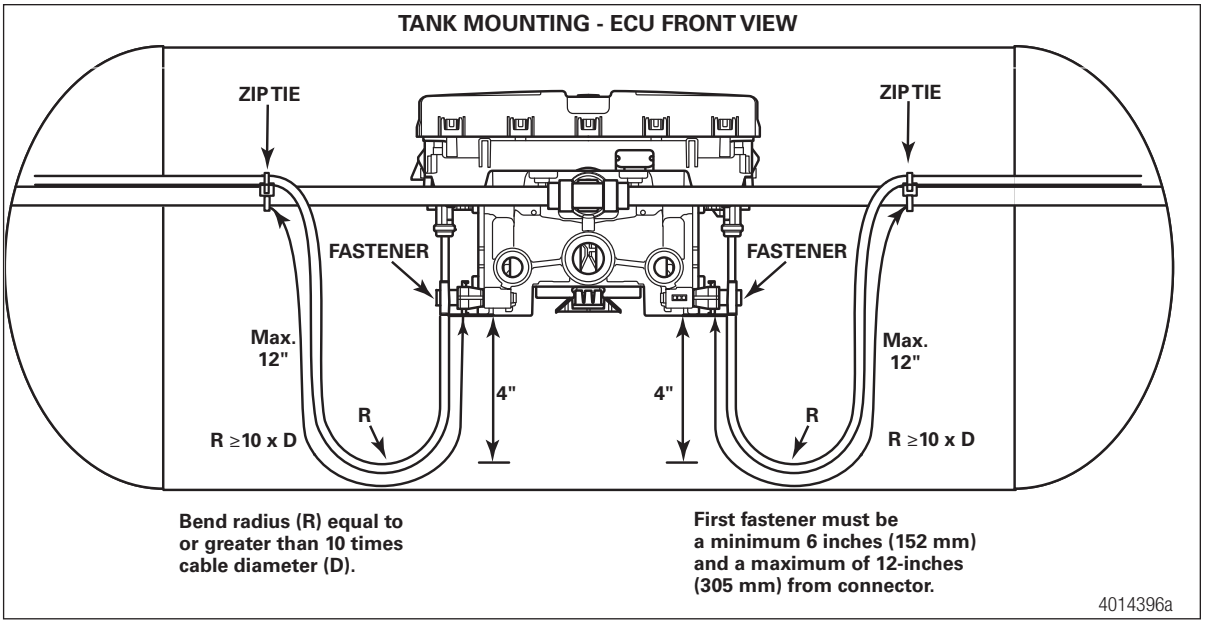
ABS 2S/2M-4S/3M

6.1.3 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. Refer to Figure 20 for 2S/2M-4S/3M ABS.

Fig. 20

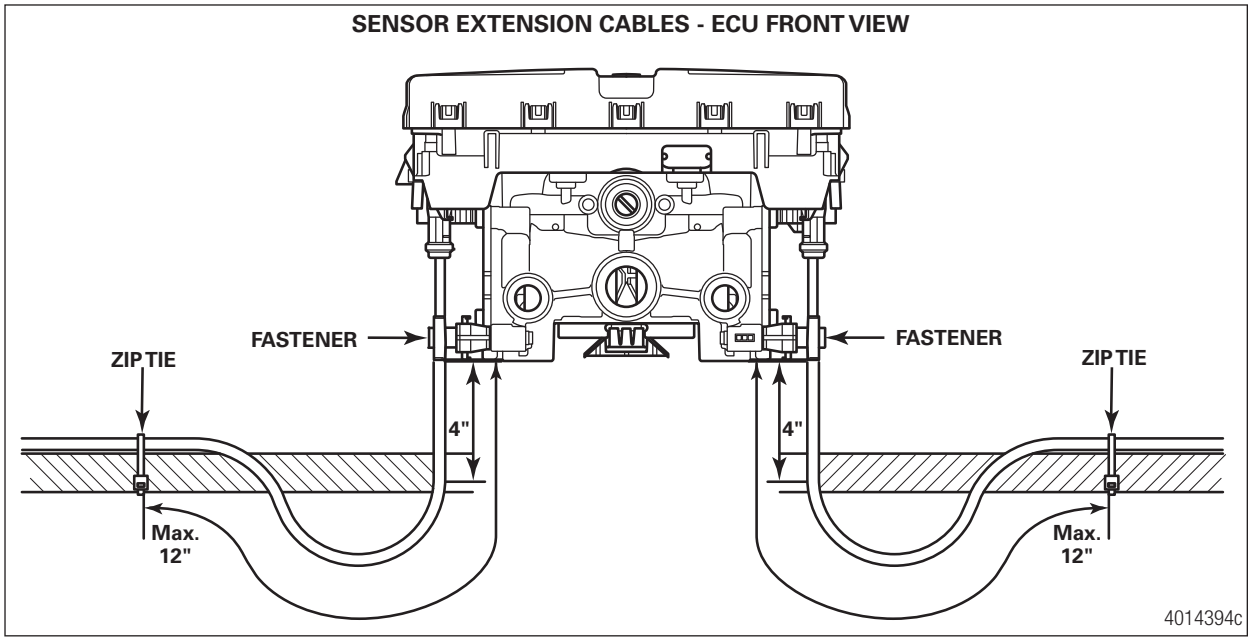


CORRECT POWER AND GIO/MODULATOR CABLE STRAIN RELIEF FOR ABS 2S/2M-4S/3M

6.1.4 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. Figure 21 illustrates the correct amount of slack in the sensor extension cables and correct attachment to the air delivery lines for ABS ECUs.

Fig. 21



6.1.5 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 Figure 22 for air line attachment and Figure 23 for axle attachment.

Fig. 22

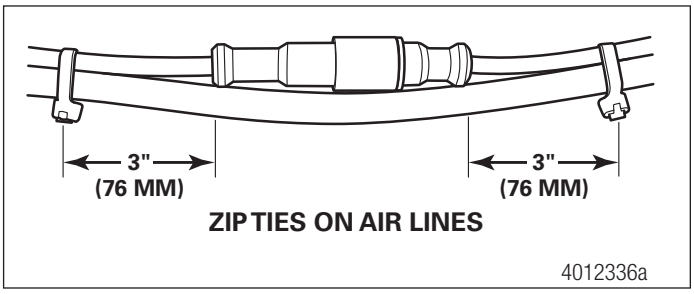
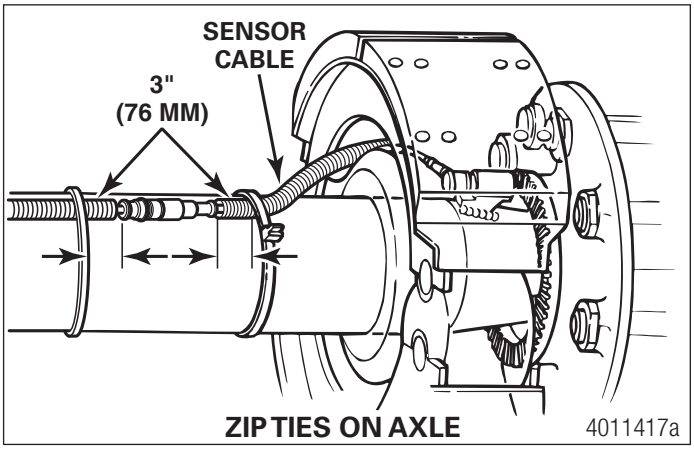


Fig. 23



7 Appendix III

7.1 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.

NOTE: 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.

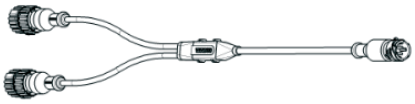
8 Appendix IV

8.1 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

AUTOMATIC LIFT AXLE KIT BOMs				
	Part Number	Description	Quantity	Notes
Automatic Override (Kit 400 612 039 0)				
1	463 084 050 0	Lift Axle Control Valve	1	
2	449 408 040 0	Lift Axle Control Valve Cable	1	
3	894 600 120 2	GIO HUB Cable	1 or 2	Qty 1- If indication light is not used Qty 2- If indication light is used (NOTE KIT ONLY COMES WITH 1)
4	449 826 030 0	Pressure Sensor/Pressure Switch Cable	2	
5	441 044 106 0	Pressure Sensor	1	
6	431 700 002 0	Pressure Switch	1	
7	TP09174	Label	1	
Manual Override (Kit 400 612 040 0)				
1	463 084 050 0	Lift Axle Control Valve	1	
2	449 408 040 0	Lift Axle Control Valve Cable	1	
3	449 826 030 0	Pressure Sensor Cable	1	
4	894 600 120 2	GIO HUB Cable	1 or 2	Qty 1- If indication light is not used Qty 2- If indication light is used (NOTE KIT ONLY COMES WITH 1)
5	449 827 030 0	Manual Override Switch Cable	1	
6	441 044 106 0	Pressure Sensor	1	
7	TP09174	Label	1	
Combination Override (Kit 400 612 041 0)				
1	463 084 050 0	Lift Axle Control Valve	1	
2	449 408 040 0	Lift Axle Control Valve Cable	1	
3	449 826 030 0	Pressure Sensor/Pressure Switch Cable	2	
4	894 600 120 2	GIO HUB Cable	1 or 2	Qty 1- If indication light is not used Qty 2- If indication light is used (NOTE KIT ONLY COMES WITH 1)
5	449 428 030 0	Manual Override Switch Cable	1	
6	441 044 106 0	Pressure Sensor	1	
7	431 700 002 0	Pressure Switch	1	
8	894 601 100 0	ABS Lift Axle "Y" cable	1	
9	TP09174	Label	1	

Appendix IV

PARTS LIST			
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 or 2	 GIO Cable 3 Pin (Pressure Sensor/ Automatic Override Switch Cable)	449 826 010 0 449 826 030 0 449 826 100 0	1 M 3 M 10 M
GIO 1 or 2	 GIO Cable 2 Pin (Lift Axle Valve Cable)	449 408 010 0 449 408 040 0 449 408 060 0	1 M 4 M 6 M
GIO 1 or 2	 GIO Cable Blunt Cut 4 Wire (Indication Lamp/Manual Override Switch Cable)	449 827 030 0 449 827 060 0 449 827 120 0 449 827 180 0	3 M 6 M 12M 18 M
GIO 1 or 2	 HUB Cable GIO	894 600 121 2	0.5 M
N/A	 12V Analog Input Cable (Manual Override Switch Cable)	449 428 030 0 449 428 100 0	3 M 10 M
N/A	 Override Switch “Y” Cable	894 601 100 0	
N/A	 Pressure Sensor	441 044 106 0	N/A

PARTS LIST			
Slot on iABS Modulator	**Application**	**Part Number**	**Length**
N/A	 Lift Axle Control Valve	463 084 050 0	N/A
N/A	 Pressure Switch	431 700 002 0	N/A

For further product details contact your distributor or the WABCO Customer Care Center at 855-228-3203.

About ZF Friedrichshafen AG

ZF is a global technology company and supplies systems for passenger cars, commercial vehicles and industrial technology, enabling the next generation of mobility. ZF allows vehicles to see, think and act. In the four technology domains Vehicle Motion Control, Integrated Safety, Automated Driving, and Electric Mobility, ZF offers comprehensive solutions for established vehicle manufacturers and newly emerging transport and mobility service providers. ZF electrifies different kinds of vehicles. With its products, the company contributes to reducing emissions and protecting the climate.

ZF, which acquired WABCO Holdings Inc. on May 29, 2020, now has 162,000 employees worldwide with approximately 260 locations in 41 countries. In 2019, the two then-independent companies achieved sales of €36.5 billion (ZF) and $3.4 billion (WABCO). For more information, visit **www.wabco-na.com**.

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