

MERITOR WABCO

Technical Bulletin

Electronically Controlled Air Suspension (ECAS) Retrofit Kit Installation Instructions for Meritor WABCO 6S/6M ATC Brake Systems

Hazard Alert Messages

Read and observe all 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.

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 and fall over. Serious personal injury and damage to components can result.

Release all air from the air systems before you remove any components. Pressurized air can cause serious personal injury. Refer to the vehicle manufacturer's service manual for instructions.

How to Obtain Additional Maintenance, Service and Product Information

Refer to Maintenance Manual MM-1315, Electronically Controlled Air Suspension (ECAS) for Buses and Trucks with CAN II (SAE 1939); and User Guide SP-1372, Electronically Controlled Air Suspension (ECAS) Driver Tips. If you have any questions about the material covered in this publication, or for more information about the Meritor WABCO product line, please contact the OnTrac Customer Service Center at 866-OnTrac1 (668-7221) or visit our website:

meritorwabco.com

How to Obtain Parts and Kits

Contact Meritor's Commercial Vehicle Aftermarket at 888-725-9355.

TOOLBOX™ Software

This procedure requires TOOLBOX™ Software version 11.0 or higher. To download this software, visit meritorwabco.com.

ECAS Overview

The Meritor WABCO ECAS is an electrically controlled air suspension system designed to enhance the performance of the vehicle's air suspension when equipped with a Meritor WABCO 6S/6M ATC brake system. The ECAS maintains an accurate leveling of the chassis height through the use of height sensors, electronic control unit (ECU) and solenoid valves. Because of the variety of suspension types and vehicle features, a particular set of parameters was developed for each vehicle type. These parameters determine some of the features and characteristics for the ECAS configuration. In the event of a malfunction in the system, the ECAS indicator lamp will alert the driver and the suspension will retain the existing air pressure in the air suspension bellows. Several of the features provided by ECAS include the following.

- **Automatic Level Control** — The ECAS continually monitors the vehicle's height (axle-to-frame distances) through the ECU and the use of height and pressure sensors. When the height deviates from the preset nominal level, a correction is made quickly, exhausting or pressurizing the air suspension bellows by actuating solenoid valves. The ECAS will maintain the nominal vehicle level regardless of the number of passengers boarding or unloading. There are pre-selected restrictions for when the height corrections can be made.
- **Driver-Controlled Level Adjustment** — Other than the nominal vehicle level, there can be additional levels selected by the driver to raise the vehicle for rough surfaces or lower vehicle height. These levels can be selected by switches on the vehicle dash panel. The driver can also return the vehicle to the nominal level (Recovery). There are pre-selected restrictions for when the height changes can be made.

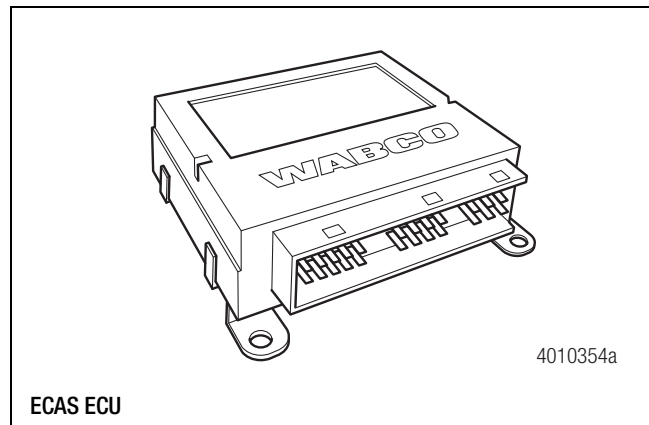
- Automatic Traction Help Load Transfer — When wheel slippage is detected by the vehicle's ABS (due to slippery road surface conditions), a signal from the ABS triggers the ECAS system. The ECAS can transfer weight from the non-drive axle (tag) to the vehicle's drive axle by changing air pressures in the rear axles air suspension bellows. By transferring pressure from the tag axle to the drive axle air bellows, additional weight is transferred to the drive axle, increasing drive wheel traction. This function may also be initiated by the driver activating a switch on the vehicle dash panel. There are pre-selected restrictions for when the traction help can be activated and how much weight can be transferred. The ECAS will continue to hold the transferred load until the preset speed limit has been met, which is 25 mph. If the load transfer is active, all chassis height control functions are suspended until the load transfer has ended.
- Inclination Level Control (Pressure Equality) — The ECAS ECU can adjust pressures in all air suspension bellows together or in individual air bellows. This allows the ECAS to compensate for inclinations caused by unbalanced loads or uneven road surfaces.

Kit Parts List

Locate and verify that the kit is complete and that you have access to TOOLBOX™ Software version 11.0 or higher prior to beginning the installation of this kit.

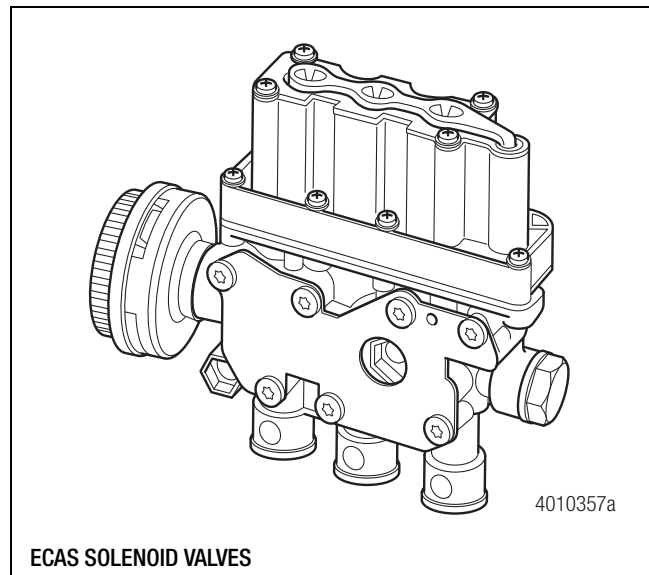
Table A: Kit Parts

Description	Part Number	Quantity
ECAS ECU	S400 850 920 0	1
ECAS Cab Harness	S400 850 916 0	1
ECAS Frame Harness	S400 850 918 0	1
ECAS Solenoid Valves	S472 880 073 0	2
Distance Sensor	S441 050 100 0	1
ECAS Sensor Lever	S441 050 718 2	1
ECAS Sensor Linkage	S433 401 003 0	1
Pressure Sensors	S441 044 106 0	2
M22 Fitting Adapters 1/2"	S400 851 002 4	6
ECAS Valve Bracket	S400 850 055 4	2



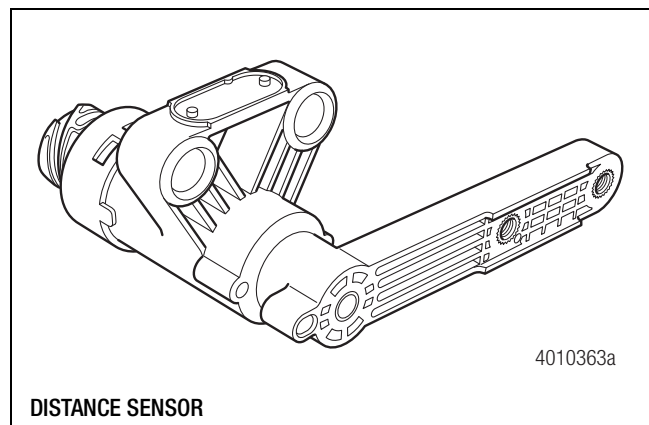
ECAS ECU

Figure 1



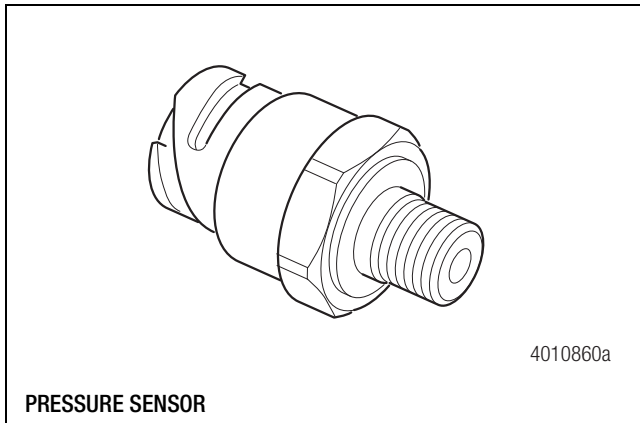
ECAS SOLENOID VALVES

Figure 2



DISTANCE SENSOR

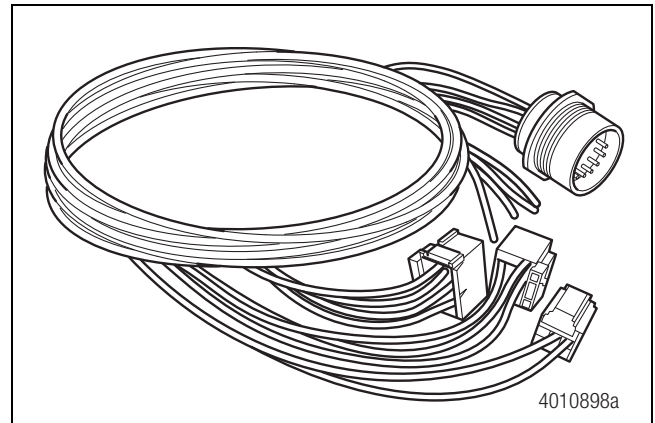
Figure 3



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PRESSURE SENSOR

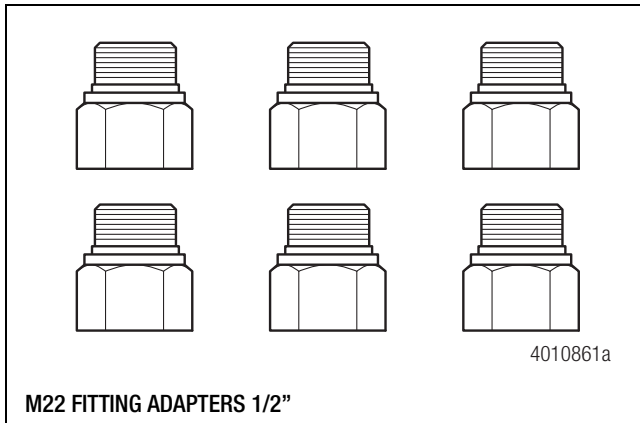
Figure 4



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ECAS CAB HARNESS

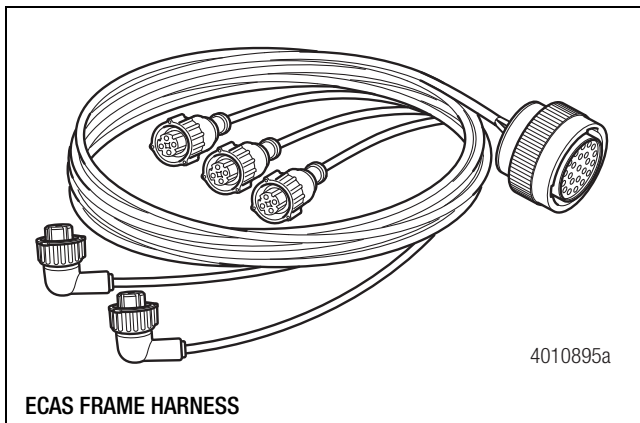
Figure 7



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M22 FITTING ADAPTERS 1/2"

Figure 5



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ECAS FRAME HARNESS

Figure 6

Table B: Additional Items Required

Description	Quantity
Various quick connect fittings for the air lines	As needed
Street T Fittings (1/4")	2
Valve Mounting Nuts (5/16")	4
Valve Mounting Bolts (2-1/2-inch, 5/16")	4
Bracket Mounting Nuts (5/8")	4
Bracket Mounting Bolts (2-inch, 5/8")	4
Additional Air Line	As needed
Incandescent Amber Light – DO NOT USE LED Lights	1
Incandescent Red Light – DO NOT USE LED Lights	1
Three-Position Momentary Switch	1
Two-Position Momentary Switch	1
J1939 Y Connector	1
J1939 Connectors	3

Procedures

Valve and Bracket Installation

1. Wear safe eye protection. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
2. Lower and exhaust all air from the suspension system.
3. Determine the valve mounting location. Verify the valve has correct clearance from the suspension and ensure it is positioned so the valve's exhaust silencer is NOT pointing upward. NOTE: The mounting brackets are not pre-drilled so they can be used for any mounting location. Figure 8.

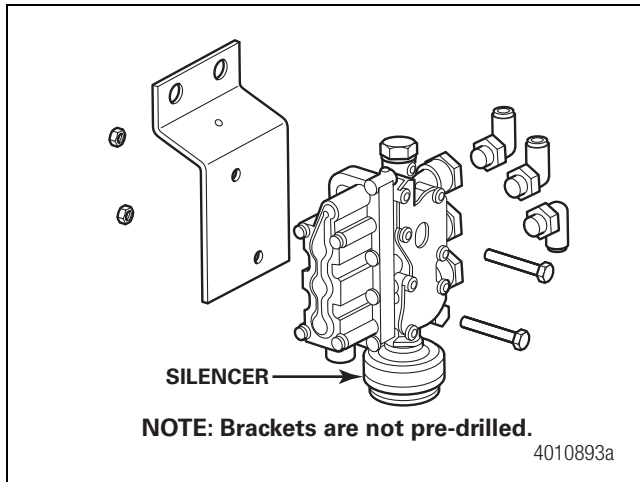


Figure 8

4. Position the brackets to the frame at the chosen mounting location. Drill out the frame and brackets as required.
5. Remove the existing metric fittings from the ECAS valve and replace them with the M22 fitting adapters, part number S400 851 002 0, provided in the kit.
6. Install the quick connect fitting to port 11, which is the air supply port to the valve.
7. Install quick connect fittings to the adapters on port 22 and 23. These ports allow the air to travel to and from the bellows.

Leveling Valve Installation (Must Be Mounted on the Drive Axle)

1. Verify the nominal ride height and measurement location per OEM specifications. This information will be used to set the electronic height sensor as well as calibrate the system.
2. Connect the leveling valve to the drive axle of the tractor. In most cases, the existing pneumatic air valve bracket can be used to mount the electronic height sensor. Figure 9.

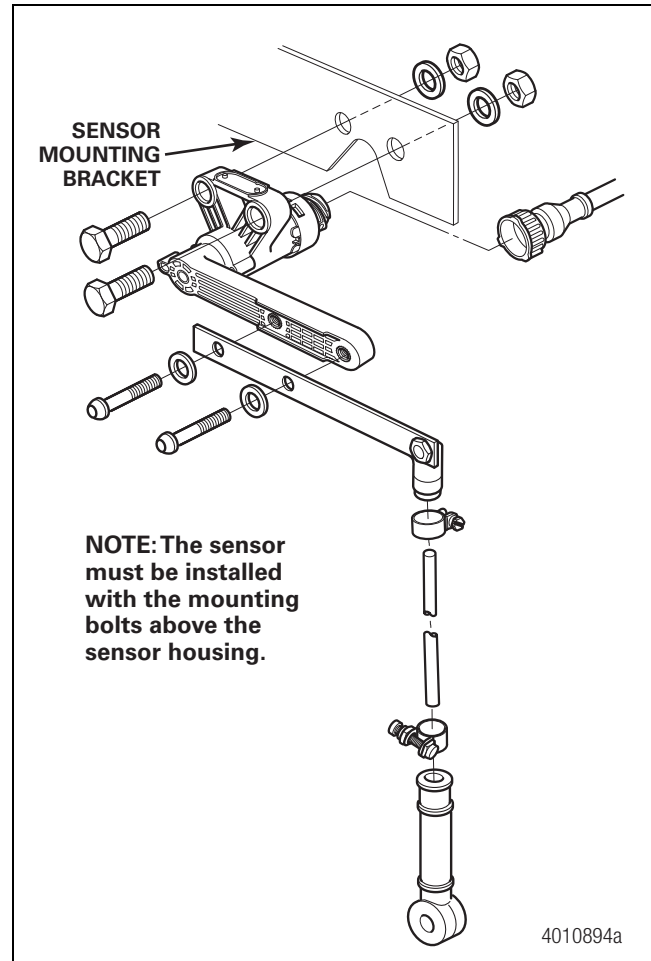


Figure 9

3. Connect the rod ends using a 1/4" (6.35 mm) smooth or threaded rod. Verify that the height sensor can reach full travel without contacting the frame or wiring.
4. Loosely tighten the connection. Final tightening will be made with air in the bellows.

Air Supply Fitting and Bellow Fittings Installation

1. Remove the air line and fitting from both passenger side air bags. Figure 10.

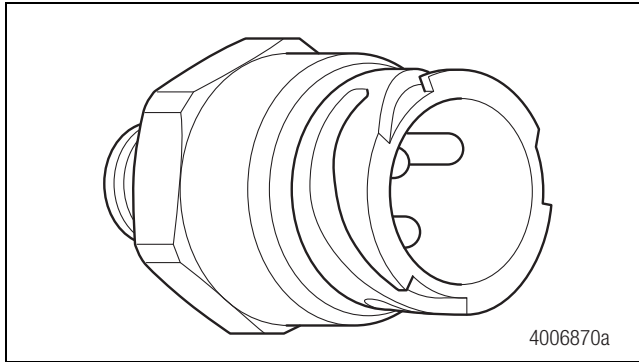


Figure 10

2. Replace the fittings with 1/4" (6.35 mm) street T fittings. Figure 11.

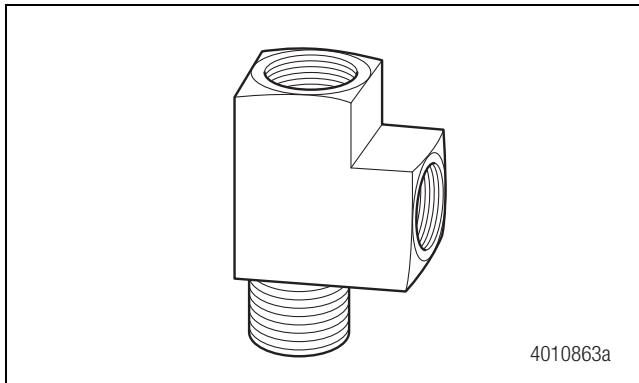


Figure 11

3. Once the T fittings are in place, install the pressure sensors so they are on top of the T fittings.

Suspension Air Line Installation

1. Locate and trace the air supply source to the suspension.
2. Deactivate the manual air suspension dump switch. Deactivation of the manual air suspension dump switch may be made here or at the dash lever in the cab. **Contact the manufacturer or OEM for correct disabling procedures.**
3. Replace the air lines for the rear suspension, if necessary.
4. Ensure the air supply line runs from the supply tank fitting to port 11 on both valves.
5. Make sure the air lines for the bellows are connected to the corresponding valve, Tag or Drive. The bellows on the drive must be connected to the valve designated as the drive axle, curbside to port 22 and street side to port 23.

6. Verify the air lines for the bellows are connected to the corresponding valve, Tag or Drive. The bellows on the Tag must be connected to the valve designated as the Tag axle, curbside to port 22 and street side to port 23. Figure 12.

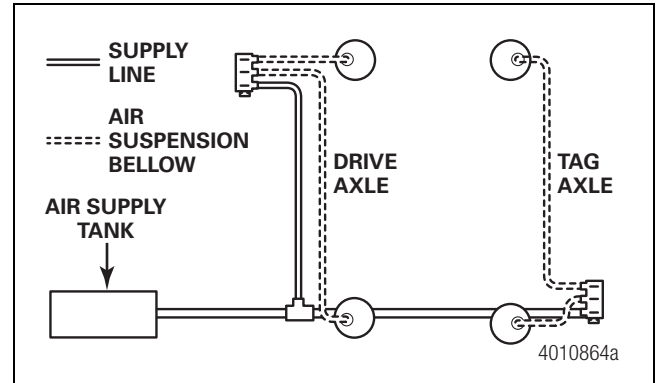


Figure 12

7. Once all of the connections have been made, secure the air lines in place.

ECAS Frame Harness Installation

1. Untie the ECAS frame harness bundle (part number S400 850 918 0) and stretch it out on the floor. Note that one end has a 23-pin female Deutsch connector and the other has five separate connectors. Secure the harness by taping the bundle every 24-30" (610-762 mm). This will assist in routing and securing the harness for final installation. Figure 13. For a wiring diagram, refer to Figure 14.

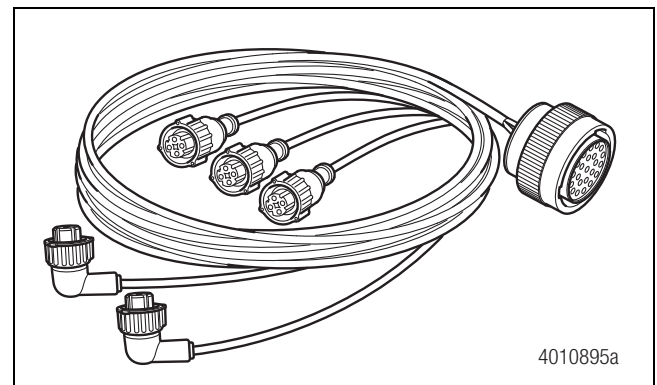
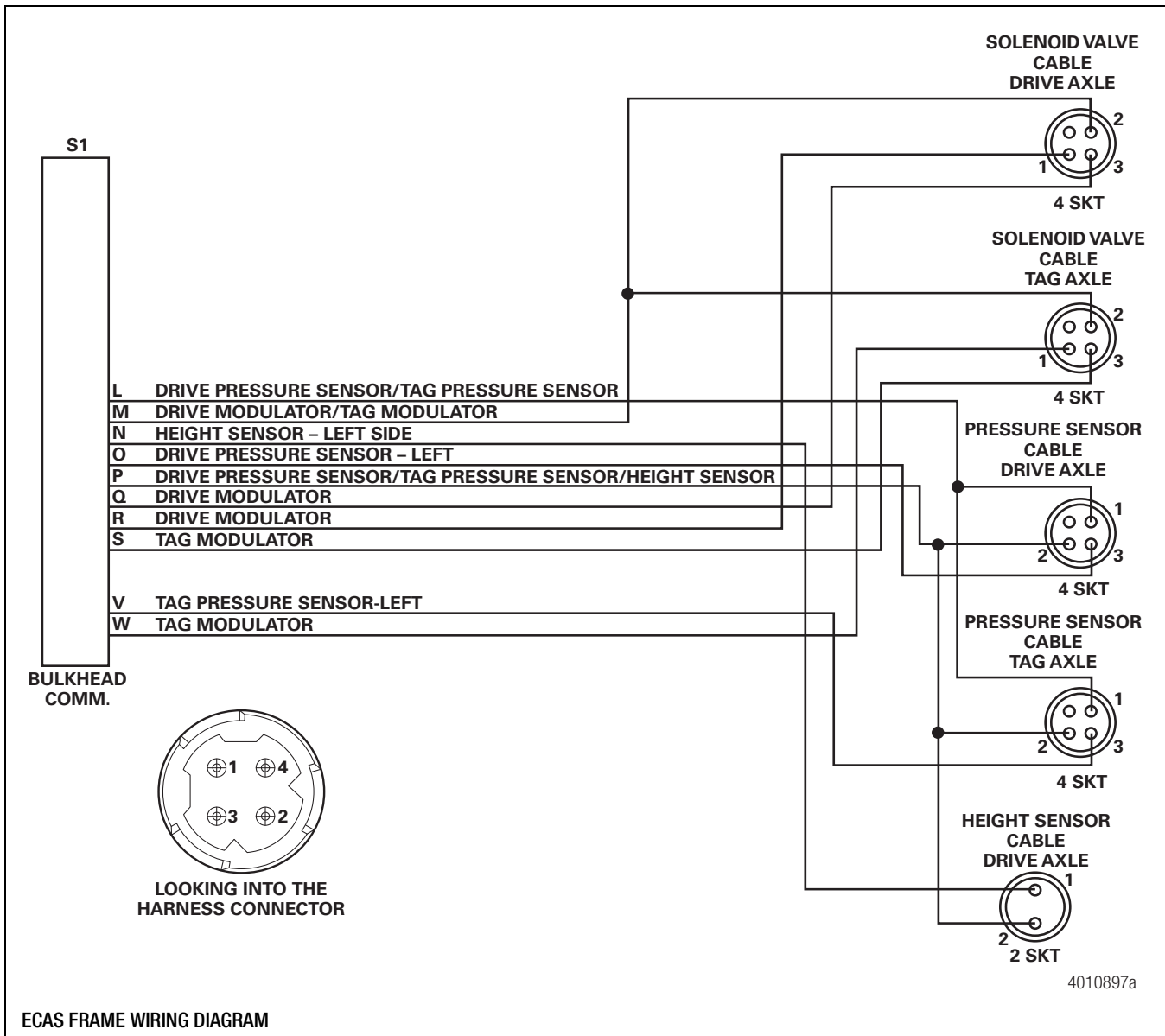


Figure 13



ECAS FRAME WIRING DIAGRAM

Figure 14

2. Locate the entry point for the Deutsch connector at the front of the cab. Secure the retaining nut from the pass through connector for reuse. Note: The retaining nut is not included in the kit. The unit may have a blank on the passenger side that may be used or installation may require use of the existing Deutsch connector location. This will require re-pinning of the existing OEM connector. These pins may be installed in the ECAS CAN II Deutsch connector as there are 13 vacant pin outs that can be used.
3. Route the harness to the corresponding valve and pressure sensor, making sure to allow for correct installation of Deutsch connector. Verify all connections prior to securing the harness.
4. Make the following connections with the wiring harness as labeled.
 - Pressure sensor cable drive axle with a 90-degree connector
 - Solenoid valve cable drive axle with a straight connector
 - Height sensor cable drive axle with a straight connector
 - Pressure sensor cable tag axle with a 90-degree connector
 - Solenoid valve cable tag axle with a straight connector

ECAS Cab Harness Installation

1. Untie the ECAS cab harness bundle (part number S400 850 916 0) and stretch it out on the floor. Note that one end has a 23-pin male Deutsch connector. The other has three separate pre-pinned ECU connectors and a blunt cut wiring section. Figure 15. Refer to Figure 16 for pin locations. For a wiring diagram, refer to Figure 17.

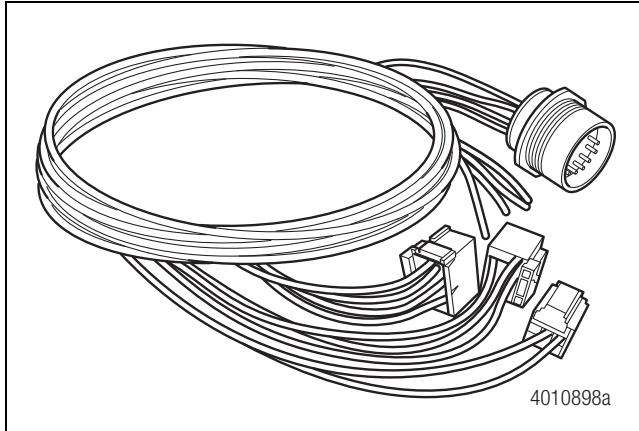


Figure 15

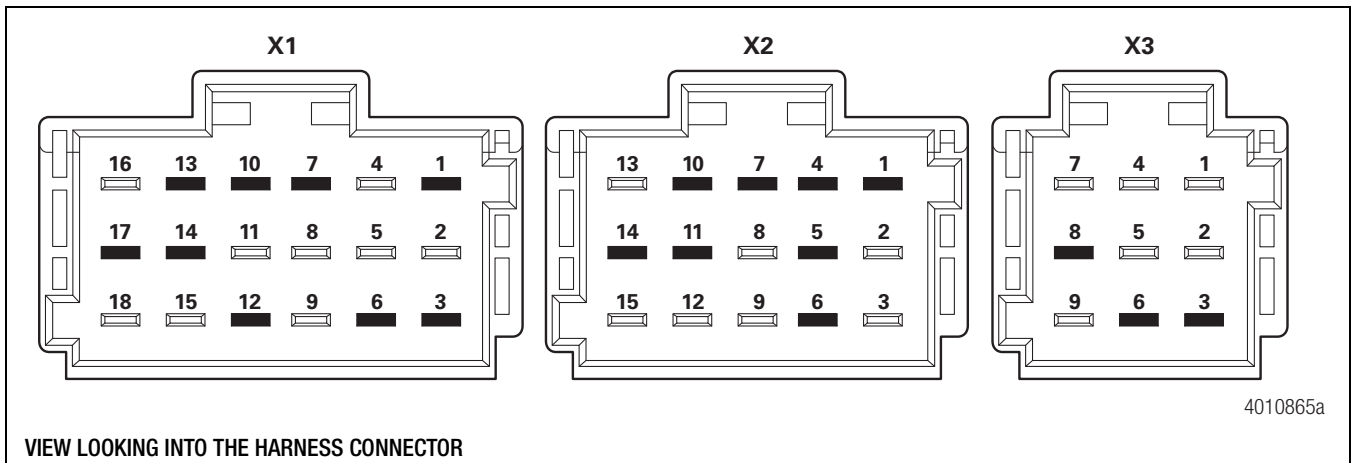


Figure 16

Table C: X-1 ECU 18-Pin Connector

Pin Location	Description	Component/Pin Location
1	J1939 Low Twisted Pair	Blunt Cut — 1939 Low
3	J1939 High Twisted Pair	Blunt Cut — 1939 High
4	LiftAxleSW	NOT USED
6	Traction Switch	Blunt Cut — Connect to Traction Switch/Manual Load Transfer
7	Battery +	Blunt Cut — Connect to Fused Power Source/ Location per OEM
10	Ignition +	Blunt Cut — Connect to Fused Power Source/ Location per OEM
12	Ground –	Blunt Cut — Connect to Ground Source/Verify Location per OEM
13	RaiserLowSW+	Blunt Cut — Connect to Switch
14	RideHeightLP AMBER	Blunt Cut — Connected to Lamp/Ignition Power Source per OEM
17	RaiseLow SW	Blunt Cut — Connected to Switch

Table D: X-2 ECU 15-Pin Connector

Pin Location	Description	Deutsch Connector	Component/Pin Location
1	PressSens	L	Power to Pressure Sensors Drive and Tag
4	Valves	M	Power to Solenoid Valves Drive and Tag
5	Height SEN	N	Signal to ECU from Height Sensor
6	DrivePres	O	Signal to ECU from Drive Pressure Sensor
7	SensGnd	P	Ground to Pressure Sensor Drive/Tag/ Height Sensor
10	2/2DValve	Q	Ground from ECU to Drive Solenoid 2/2 Valve
11	3/2DValve	R	Ground from ECU to Drive Solenoid 3/2 Valve
14	2/2TValve	S	Ground from ECU to Tag Solenoid 2/2 Valve

Table E: X-3 ECU 9-Pin Connector

Pin Location	Description	Deutsch Connector	Component/Pin Location
3	TagPres	V	Signal to ECU from Tag Pressure Sensor
6	3/2TValve	W	Ground from ECU to Tag Solenoid 3/2 Valve
7	SafetyLP RED		Blunt Cut — Connected to Lamp/Ignition Power Source per OEM
9	LiftAxleLP		NOT USED

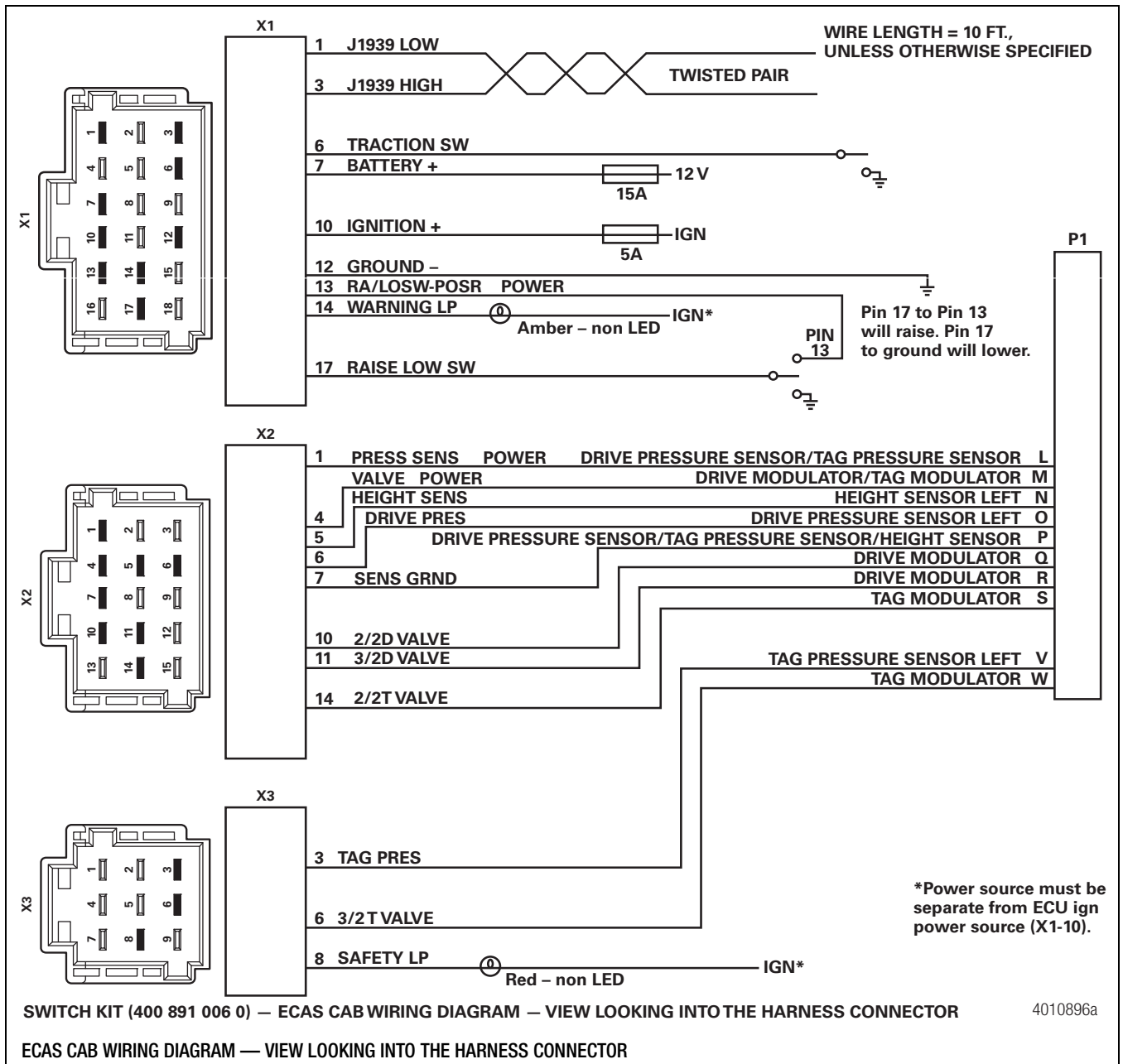


Figure 17

2. Obtain and refer to the following location information provided by the OEM.
 - Ignition power supply
 - Battery power supply
 - Ground
 - J1939 HI and LOW connection
 - Incandescent red lamp — Non LED
 - Three-position momentary switch
 - Two-position momentary switch
 - J1939 Y connector
 - J1939 connectors
 - Fuse tap
3. Have the following parts ready to complete the cab harness installation.
 - Incandescent amber lamp — Non LED
4. Determine the switch, lamp and ECAS ECU mounting locations in the cab.

5. Create access to the ECU mounting location, power sources and indicator light location. These will vary depending on the manufacturer of the tractor. Contact the OEM for specific locations. You may need to remove the dash panel, glove box and lower dash covers to create access. Refer to the vehicle manufacturer's recommended procedures for removal.
6. Locate the Deutsch connector on the inside of the cab bulkhead. Secure the retaining nut from the pass through connector for reuse. Note: This is not included in the kit. The unit may have a blank on the passenger side that may be used or installation may require use of the existing Deutsch connector location. This will require re-pinning of the existing OEM connector. These pins may be installed in the ECAS CAN II Deutsch connector as there are 13 vacant pin outs that can be used.
7. Route the harness, verifying correct reach to switches, lamps, ECU and the Deutsch connector.
8. Once the location and routing have been determined, make the correct modifications to the dash panel to accommodate and install the following.
 - Three-position momentary switch
 - Two-position momentary switch
 - Red incandescent lamp — X3, pin 8
 - Amber incandescent lamp — X1, pin 14

NOTE: You must use incandescent indicator lights.

NOTE: Indicator light (X1-14 and X3-8) ignition power source must be separate from ECU ignition power source (X1-10).

9. Deactivate the manual air suspension dump valve in the cab. Refer to the valve manufacturer or OEM information for correct procedures.
10. Once the lamps and switches are installed, make the appropriate connections according to the diagram.

NOTE: Use the J1939 Y connector and J1939 connectors to complete the J1939 installation with terminating resistor, if necessary.

Check Suspension Lifting and Lowering/ Calibration

1. After verifying all connections, build air in the system to verify correct component installation.
2. With accessory power on, connect the TOOLBOX™ Software 11.0 and select ECAS CAN II (TRUCK AND BUS).
3. Select diagnostic port 3 (CANII bus front and truck) and verify communication with the ECAS ECU information in the upper left corner.
4. Click "Lifting and Lowering" (6th button from left side). When the warning screen appears, click "OK".
5. Activate "Rear axle" and "Lifting axle" by clicking both "Middle" buttons and lower the frame totally by clicking "Vent".
6. Check the current level and pressure screen to make sure the values move in the correct direction and are within approximately 2.9 psi (20 kPa) of each other.
7. Click the "Middle" button of the "lifting axle" so only the rear axle is activated.
8. Raise the frame by clicking "Charge".
9. Check that the air bags at the rear axle are full and the air bags at the lifting axle are empty.
10. Lower the ride height again.
11. Click both "Middle" buttons so the lifting axle is activated.
12. Raise the frame by clicking "Charge".
13. Check that the air bags at the lifting axle are full and the air bags at the rear axle are empty.
14. Lower the ride height again. If the ride height does not move as expected, the air line plumbing or electrical system should be changed and the ECAS retested.
15. Charge the bellows until the nominal ride height is reached. Refer to the ride height and measurement location per OEM specifications.
16. Secure the electronic height sensor rod at a 90-degree angle.
17. Refer to Maintenance Manual MM-1315 for calibration procedures. To obtain this publication, visit meritorwabco.com.

MERITOR WABCO

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