

MERITOR WABCO

Installation Guide

Enhanced Easy-Stop™ Trailer ABS 2S/1M Basic with PLC Installation Instructions

This bulletin contains instructions for mounting the ECU/single modulator valve assembly as one unit. If you are mounting the ECU and valve separately, please contact Meritor WABCO at 800-535-5560 for specific installation requirements and instructions.

Differences Between Easy-Stop and Enhanced Easy-Stop

There are some changes to Enhanced Easy-Stop that you need to be aware of before you begin the installation:

- Enhanced Easy-Stop includes Power Line Communication (PLC) function.
- The ECU/single modulator valve assembly may be mounted as one unit or the ECU and the valve may be mounted or serviced separately.
- The assembly is shipped with valve cable between the ECU and valve disconnected from the ECU.
- The LED on top of the ECU has been eliminated.
- The blink code tool LED does not operate simultaneously with the ABS lamp on the trailer.
- The control port on the Enhanced Easy-Stop single modulator valve is 3/8-inch — on previous versions it was 1/4-inch.

WARNING

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

The Anti-lock Braking System (ABS) is an electrical system. When you work on the ABS, take the same precautions that you must take with any electrical system to avoid serious personal injury. As with any electrical system, the danger of electrical shock or sparks exists that can ignite flammable substances. You must always disconnect the battery ground cable before working on the electrical system.

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 can result.

NOTE: End of line testing must be done after all installations. Meritor WABCO recommends using TOOLBOX Software to perform this testing. If you do not have TOOLBOX Software, this bulletin also includes instructions for testing without the software.

Preparation

- Before beginning the installation procedure, inspect the ECU/single modulator valve assembly for damage that may have occurred during shipping or storage:
 - Look for crushed or bent connectors.
 - Make sure the retainer clips have not been bent or otherwise damaged.
 - Attach the ABS relay valve cable to the ECU with the WABCO ID face down. Make sure the cable is free from cuts or breaks.
 - Do not install a damaged ECU/single modulator valve assembly. Notify your supervisor, or contact Meritor WABCO if there is any apparent damage.

- Have installation material available:
 - ECU/single modulator valve assembly
 - Power cable or power/diagnostic cable
 - Sensor extension cables (two pcs.)
 - Sensors (2) for non-ABS prepped axles
 - ABS Indicator Label (TP-95172)

5/8-inch O.D. nylon tubing for supply (frame mounts)

Pipe plug (3/4-inch NPTF)

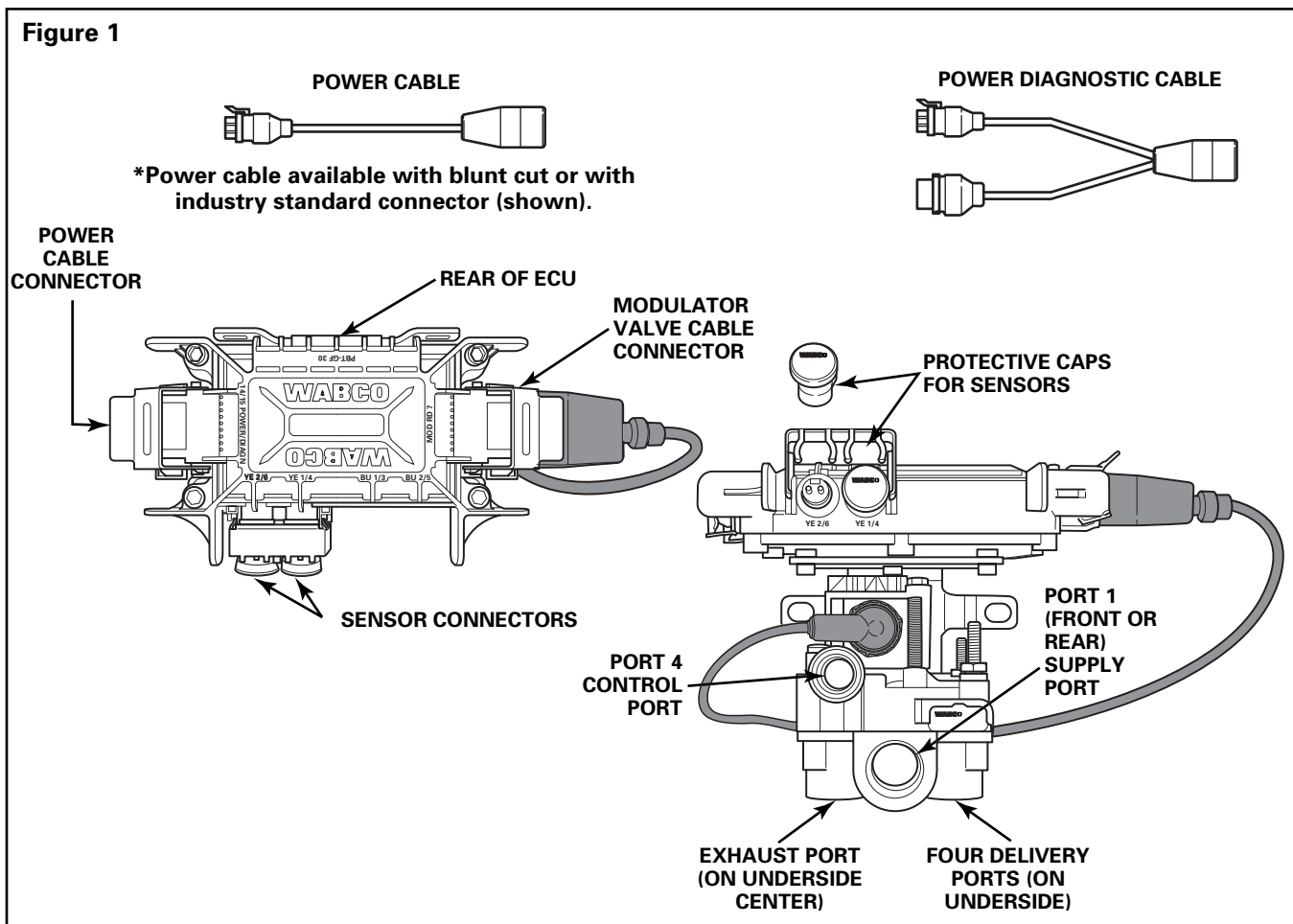
Schedule 80 pipe nipple (3/4-inch NPTF) for air tank mounts or two Grade 8 bolts (3/8-inch) and prevailing torque nuts for frame mounts

SAE-standard, DOT-approved thread sealant

ABS Indicator lamp (DOT-approved)

* Meritor WABCO components

- Study the ECU/single modulator valve assembly. Note location of various ports and electrical connections on the ECU. **Figure 1.**



Installation

I. Attach the ECU/single modulator valve assembly.

NOTE: Assembly may be mounted on the air tank (Figure 2) or on the cross member of the vehicle (Figure 3).

Tank-Mounted

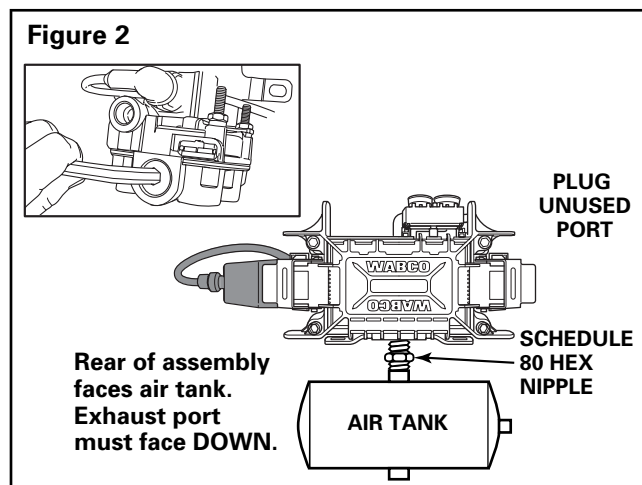


WARNING
You must use a Schedule 80 hex nipple (3/4-inch NPTF) to mount the ECU/single modulator valve assembly securely to the air tank to avoid possible serious personal injury and damage to the component.


1. Use a 3/4-inch Schedule 80 hex nipple to attach ECU/single modulator valve assembly to a reinforced air tank. Do not overtighten.

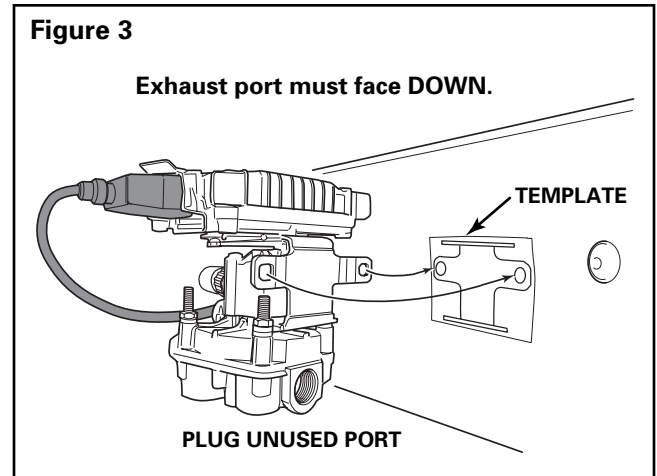
NOTE: Meritor WABCO does not recommend use of a vise when installing the hex nipple. Use of a vise may cause overclamping. Overclamping may damage the internal components of the ECU/single modulator valve assembly.

2. Use a 3/4-inch pipe plug to plug unused supply port (Port 1). Apply SAE-standard, DOT-approved Teflon tape or paste-type thread sealant to all pipe threads beyond the first two threads. Pipes with pre-applied thread sealant may also be used.
3. Rotate and tighten the ECU/single modulator valve assembly until the exhaust port faces down and the connection is secure. Use a torque wrench or ratchet with extension at the 3/4-inch pipe plug installed on the front supply port (Port 1). **Figure 2.**



Bracket-Mounted to Cross Member of Vehicle

1. Install a 3/4-inch NPTF fitting in supply port (Port 1). Use a 3/4-inch pipe plug to plug unused supply port (Port 1).
 - Use a 3/4-inch pipe plug to plug unused supply port (Port 1). Apply SAE-standard, DOT-approved Teflon tape or paste-type thread sealant to all pipe threads beyond the first two threads. Pipes with pre-applied thread sealant may also be used.
2. Use the enclosed template to mark the location of two mounting holes on the vehicle cross member. **Figure 3.**
3. Drill two 3/8-inch holes into the vehicle cross member.
4. Attach mounting bracket to vehicle cross member midway between the side rails, close to the brake chambers the valve serves.
5. Use two 3/8-inch Grade 8 bolts with prevailing torque nuts and washers to attach assembly to the vehicle cross member. Tighten bolts to 18 lb-ft (24 N•m). 

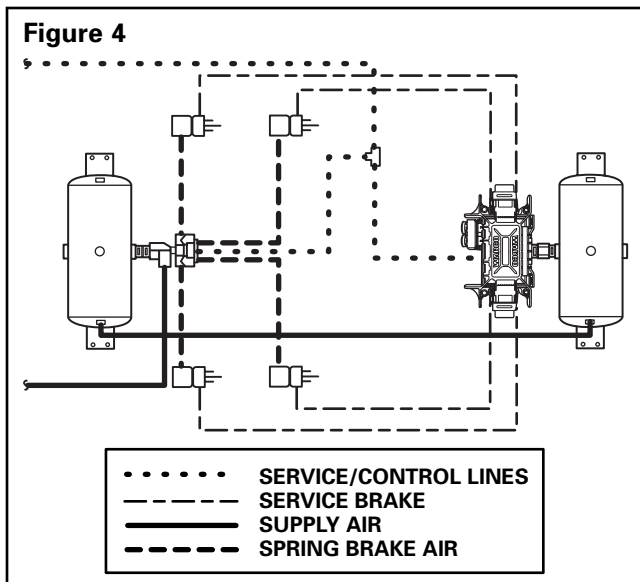


II. Connect the air lines.

NOTE: Plumb the spring brake relay or emergency relay valve into system as usual.

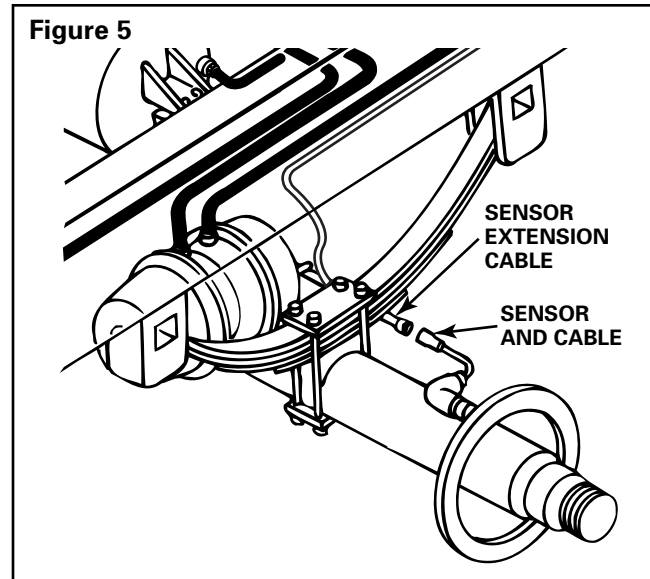
1. For bracket mounts, connect air supply line from supply tank to ECU/single modulator valve assembly supply Port 1.
Use 5/8-inch O.D. min. nylon tubing for frame mounts.

2. Connect air delivery lines from service chambers to the ECU/single modulator valve assembly Port 2 (3/8-inch NPTF). **Figure 4.**
 - Attach the opposite ends of air delivery lines to appropriate brake chambers (3/8-inch NPT).
3. Connect brake service control line to ECU/single modulator valve assembly control Port 4 (3/8-inch NPTF). **Figure 4.**
4. Plug any unused delivery ports. Apply SAE-standard, DOT-approved Teflon tape or paste-type thread sealant to all pipe threads beyond the first two threads. Pipes with pre-applied thread sealant may also be used.



3. Route sensor cable along back side of the trailer axle to the ECU/single modulator valve assembly. Route with brake hose. **Figure 5.**

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



4. Secure every eight inches with tie wraps or cable clips.
5. Push sensor retainer clip on ECU/single modulator valve assembly UP.

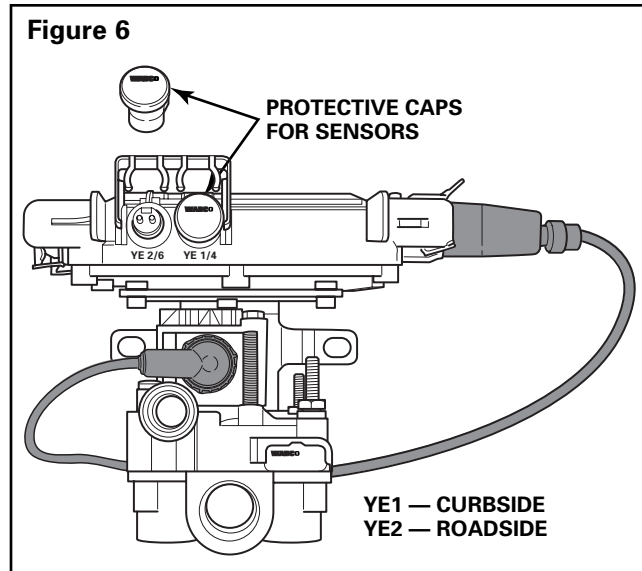
III. Install the two sensor extension cables.

NOTE: Meritor WABCO recommends placing sensors on the axle that will provide the most braking performance. The suspension manufacturer can provide this information.

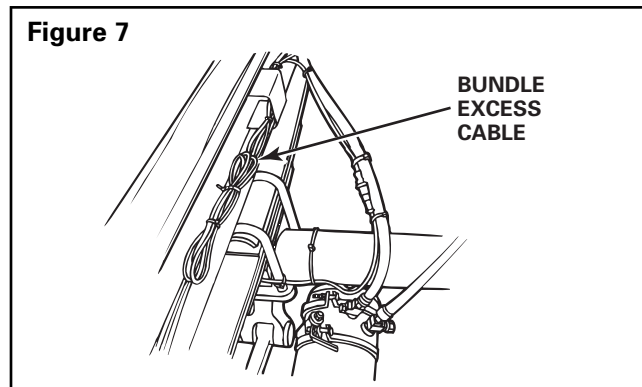
1. Visually inspect the tooth wheel and sensor to ensure there was no damage during shipping. Make necessary repairs.
2. Connect sensor and cables on the prepped axles to the sensor extension cables. **Figure 5.**

Make sure each connection is secure.

6. Remove protective caps from YE2 and YE1 sensor connectors. **Figure 6.**
7. Plug sensor extension cable into ECU/single modulator valve assembly. To secure connection, push sensor retainer clip **DOWN**. Retainer clips must fit in groove of sensor connectors to ensure proper connection.
 - Connect curbside sensor at YE1.
 - Connect roadside sensor at YE2.



8. Bundle any excess cable in loop (bow tie) as illustrated. **Figure 7.**
9. Secure excess cable in sub-frame of vehicle or along air hoses as appropriate. Excess cable should not exceed two feet.



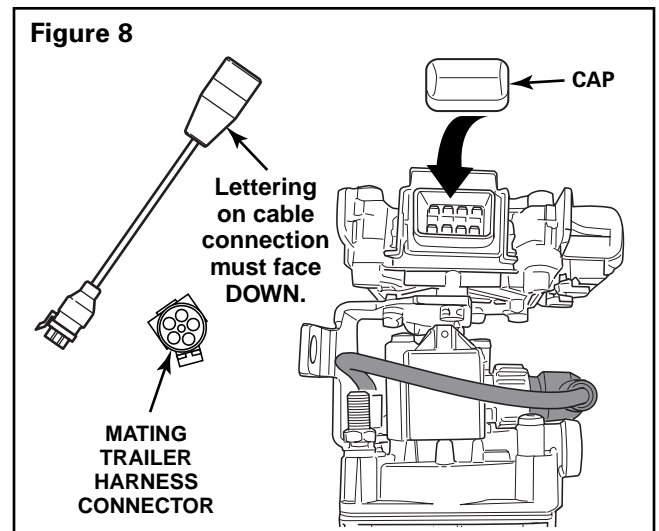
IV. Install the power or power/diagnostic cable.

1. Identify the type of cable to be installed:
 - ABS trailer industry-standard pigtail connector cable
 - Blunt-cut power cable
2. For industry-standard pigtail connector cables, route cable from harness connector to ECU/single modulator valve assembly and secure to prevent damage.

For blunt-cut power cable, route the cable from the ECU/single modulator valve assembly to a junction box which interfaces with the seven-way connector at the front of the trailer.

NOTE: Leave enough slack in cable to compensate for flexing of trailer and sub-frame.

3. Bundle any excess cable in loop (bow tie) and secure in sub-frame of trailer body to prevent cable damage.
4. Push the hinged power connector retaining clip **UP** and remove the protective cap from the ECU/single modulator valve assembly. **Figure 8.**



5. Plug the power 8-pin connector on the power or power/diagnostic cable into the ECU/single modulator valve assembly. WABCO identification on cable connection must face **DOWN**.
6. Pull the hinged power connector retainer clip **DOWN** to secure connection.

7. If installing the power cable, go to Step 9.
8. If installing the power/diagnostic "Y" cable:
 - A. Install the diagnostic cable bracket so that the diagnostic plug is accessible. Normal location is on the right front corner of the sub-frame, but will vary depending on the type of trailer.
 - B. Route the diagnostic cable from the ECU/single modulator valve assembly to the diagnostic cable bracket.
 - C. Properly secure the cable in the sub-frame to prevent cable damage.

NOTE: Leave enough slack in the cable to compensate for flexing of the trailer and sub-frame.

- D. Bundle excess cable and secure the cable in the sub-frame.

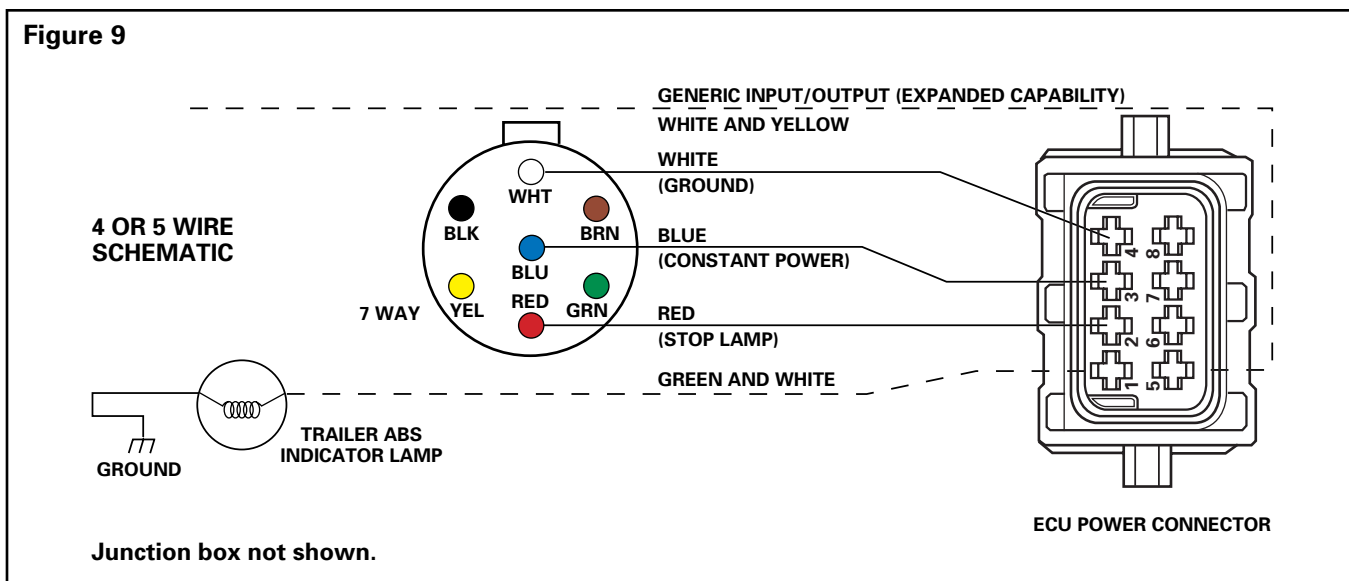
9. Install the ABS indicator lamp on the trailer. Refer to the vehicle specification sheet for exact location of indicator lamp. Use a DOT-approved lamp with ABS etched on the lens (available from major trailer parts suppliers).

NOTE: If you are using the industry-standard connector cable and do not have access to the mating trailer harness, mask the open connector to protect it from paint or grease.

10. Connect power. Use the industry-standard connector cable or a blunt-cut power cable.

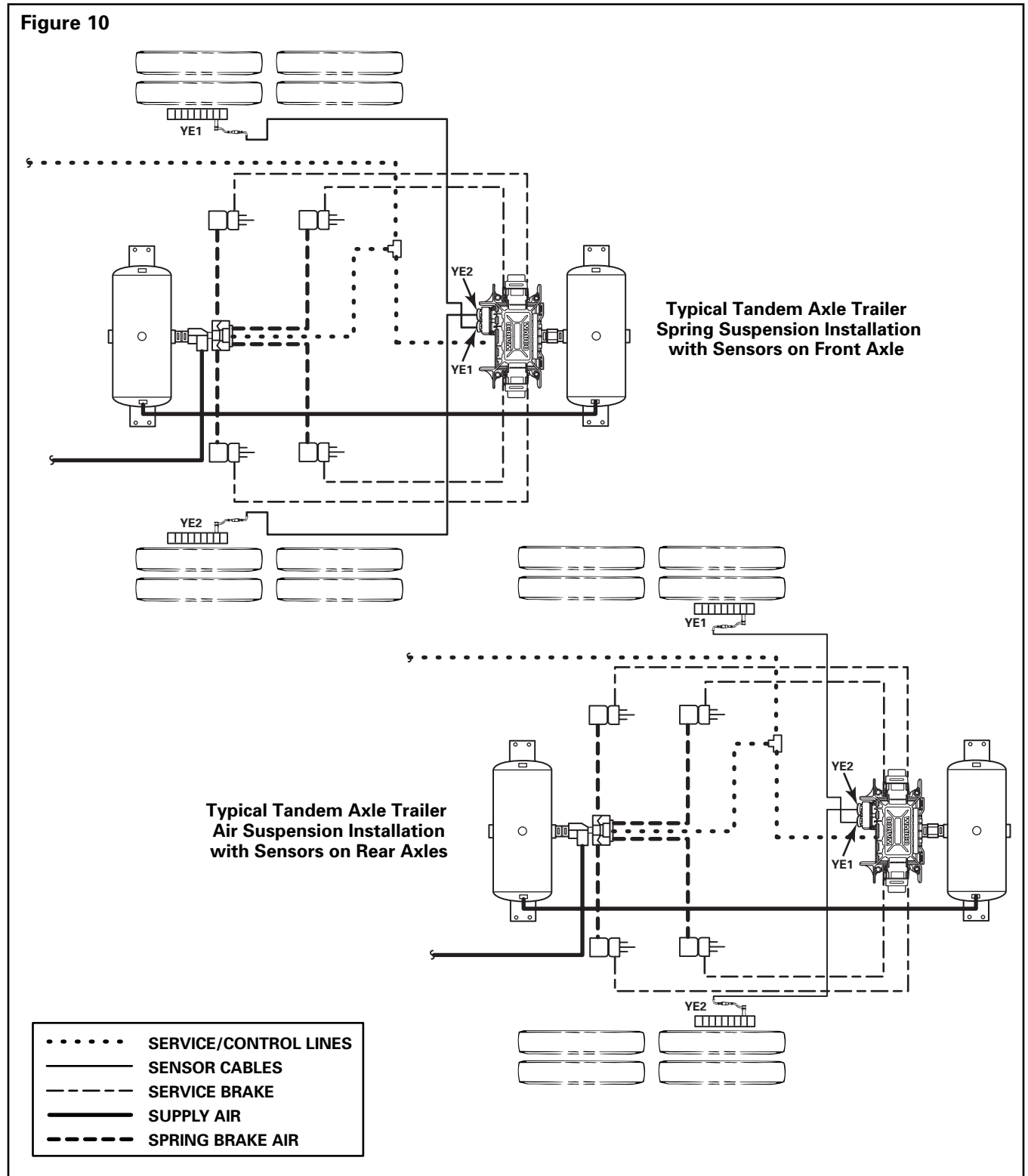
Industry-standard connector cable: Attach power cable to harness on trailer. **Figure 8.**

Optional blunt-cut power cable: Wire the cable and ABS indicator lamp to the seven-way connector on the trailer per the following diagram. **Figure 9.**



Typical Easy-Stop Trailer ABS installations are illustrated below:

NOTE: Meritor WABCO recommends placing sensors on the axle that will provide the most braking performance. The suspension manufacturer can provide this information.



End of Line Testing

End of line testing is required on all Enhanced Easy-Stop installations. To run these tests, Meritor WABCO recommends you use TOOLBOX Software.

TOOLBOX Software and general test procedures are included in this bulletin. If you are using a Pro-Link, refer to the operating manual for test instructions.

Enhanced Easy-Stop 2S/1M Basic Installation — End of Line Testing Procedure Using TOOLBOX Software

NOTE: If you are testing an installation that has a power only cable, temporarily install a Meritor WABCO combination power/diagnostics “Y” style cable.

1. Connect the diagnostic connector on the cable to the PC serial port/SAE diagnostic interface (J1587/J1708 to RS232 interface).

NOTE: Refer to the Software Owner’s Manual, TP-99102, for instructions for running TOOLBOX Software.

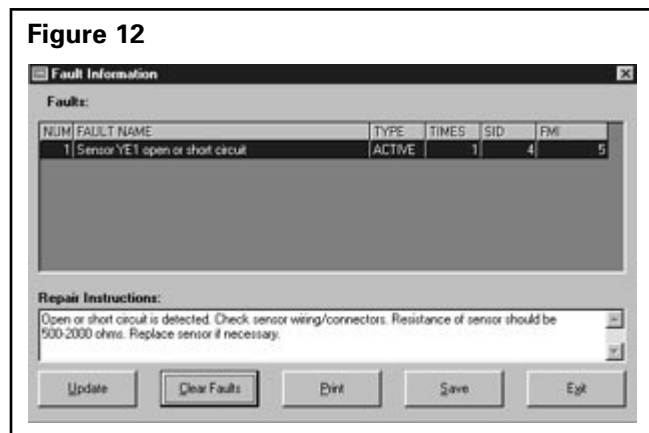
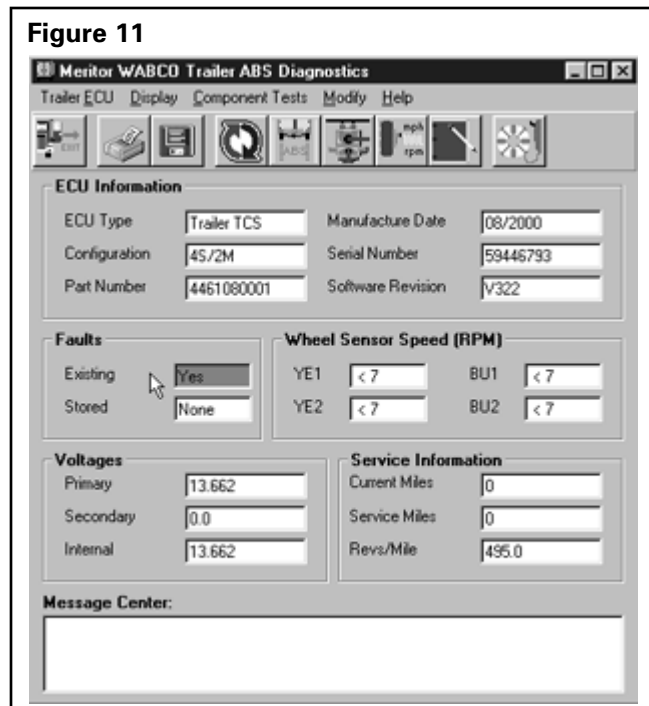
2. Display the **Trailer ABS Main Screen**.
3. Verify power supply:
 - Apply 12 volts DC to the blue wire (constant). Check the screen for proper voltage (9.4 to 14 volts). Constant power voltage is displayed in the **Primary** field. **Figure 11**.
 - Apply 12 volts DC to the red wire (stoplight power). Check the screen for proper voltage (9.4 to 14 volts). Stoplight power voltage is displayed in the **Secondary** field. **Figure 11**.

NOTE: The internal field is not applicable to this test.

4. Check the Faults field on the Main Screen:

NONE = No faults present, proceed with end of line test.

YES = Faults present, double-click on “YES” to bring up the fault information screen.



Use the information in the **Repair Instructions** field to make the necessary repairs.

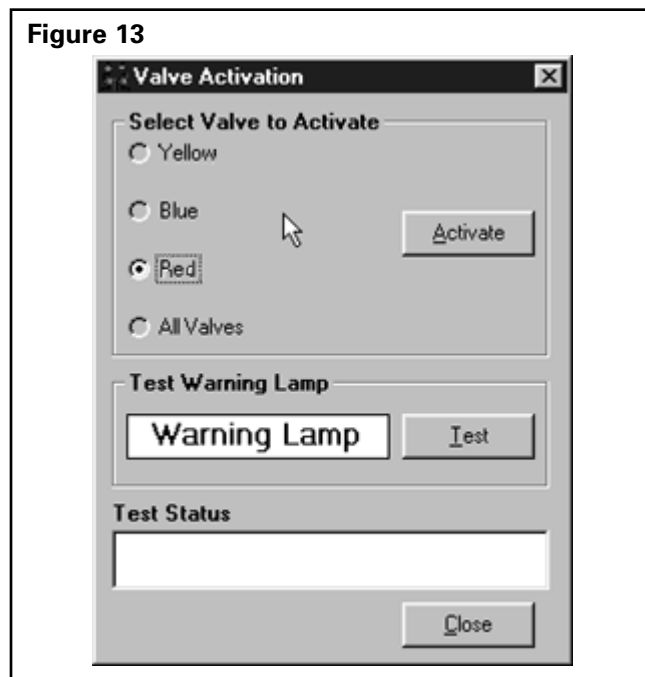
End of Line Test with TOOLBOX Software

Verify Proper Valve and Lamp Installation

To verify valve and lamp installations with TOOLBOX Software:

1. At the Trailer **Main Screen** click on **Component Test**, then select **Valves/Lamp** to display the **Valve Activation** screen. **Figure 13**.
2. The Red valve indicator will be selected. Click on the **Activate** button and listen for the valve to click, indicating a good installation. The **Test Status** box at the bottom of the menu will also display the status of this test.
3. Click on the **Test** button to activate the ABS indicator lamp — this is the lamp that is mounted on the side of the trailer. The lamp will flash eight times, indicating lamp installation is OK. The **Test Status** box at the bottom of the menu will also display the status of this test.
4. Click on **Close** to exit.

Figure 13

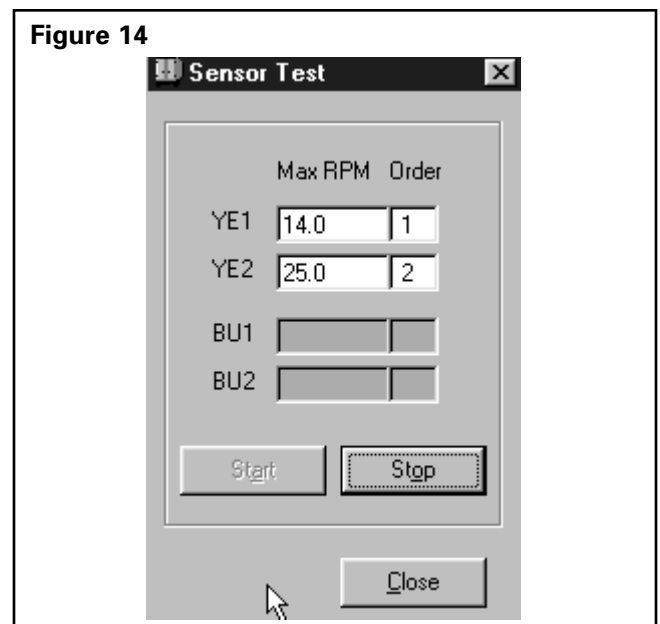


Sensor Installation Test

To test the sensor installation:

1. Raise both sensed wheel ends off of the ground.
2. Apply air to the emergency line to fill the air tanks and release the spring brakes so that the wheels can be rotated.
3. Apply 12 volts DC to the ABS.
4. At the **Trailer Main Menu** click on **Component Test**, then select **Sensor Test** to display the **Sensor Test** screen.
5. Click on the **Start** button to start the test.
6. Rotate the sensed wheel ends at a rate of 1/2 revolution per second. This rate equals a wheel speed of approximately 4 mph (7 kph).
7. Check the screen for sensor output. **Figure 14**.
 - Make sure there is sensor output in the YE1 (curbside) and YE2 (roadside) fields. If sensor output is displayed, sensor test is complete.
 - If there is no sensor output, verify that a tone ring has been installed and that the sensor is pushed all the way in against the tone ring. Make the necessary repairs and repeat the sensor test. If the problem persists, contact Meritor WABCO.
8. Check **Order** fields to verify sensors were installed in the right location.

Figure 14



End of Line Testing without TOOLBOX Software

1. Apply 12 volts DC power to the ABS.
2. The ECU/single modulator valve assembly should click two times.
3. If the indicator lamp **comes on** for three seconds and **goes out**:

This indicates a proper installation. The end of line test is complete.

If the ABS indicator lamp **comes on** and **stays on**, check the sensor installation:

- A. Remove the power from the ABS and raise the sensed wheels so they may be rotated.
- B. Repeat Step 1 and Step 2.
- C. Rotate each sensed wheel — one at a time — at a rate of 1/2 revolution per second. This rate equals a wheel speed of approximately 4 mph (7 kph).

The ABS indicator lamp should now go out and stay out indicating a proper installation. The end of line test is complete.

4. If the ABS lamp does not go out, there is a sensor gap problem or hardware fault. Adjust the sensor and, if necessary, perform a fault code check.

Sensor Gap Adjustment

Push sensor into its holder until it contacts the tooth wheel. At installation, there must be no gap between the sensor and the tooth wheel.

Measure the AC voltage output. Value should be 0.2 volt AC when wheel is rotated at a rate of 1/2 revolution per second.

Make necessary repairs.

Repeat sensor installation check. If trailer lamp still does not go out, a system fault exists. Perform a fault code check.

Fault Code Check

Use constant power activation to perform the fault code check, as follows:

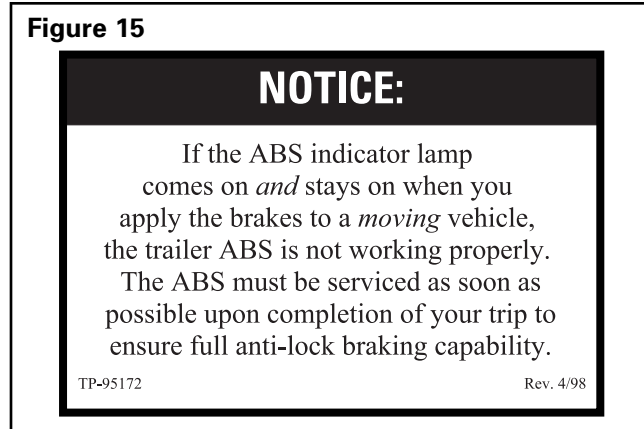
1. Apply constant power to the ECU/single modulator valve assemble **for more than one, but less than five seconds**.
2. Remove power.
3. Reapply power.

4. Check the trailer ABS indicator lamp on the side of the trailer. The fault code will be displayed three times.
5. Find the fault on the chart and make the necessary repairs.
6. After making the necessary corrections, repeat the end of line test to verify proper sensor installation.

BLINK CODE CHART		
Blink Code	Problem Area	Action
4	Sensor YE1 (curbside sensor)	Check sensor installation. Make necessary repairs.
6	Sensor YE2 (roadside sensor)	Check sensor installation. Make necessary repairs.
7	ECU/single modulator valve assembly	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
14	Power Supply	Verify proper electrical installation. Check power supply. Make necessary corrections.
15	ECU Failure	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
16	SAE J1708 Failure	Internal failure, contact Meritor WABCO.
17	SAE J2497 Failure	Internal failure, contact Meritor WABCO.
18	Generic I/O Failure	Verify proper electrical installation. Check power supply. Make necessary corrections.

Trailer Identification

After ensuring the Enhanced Easy-Stop Trailer ABS has been properly installed, attach the ABS indicator label included with the ECU/single modulator valve assembly to the trailer. Generally, this will be applied near the ABS trailer indicator lamp. **Figure 15.** Refer to the vehicle specification sheet for the proper location.



NOTE: If this label is not included with the assembly, let your supervisor know. Labels are available from Meritor WABCO. Ask for part number TP-95172.

For additional assistance, contact Meritor WABCO at 800-535-5560.

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