

MERITOR WABCO

Installation Guide

Enhanced Easy-Stop™ Trailer ABS 2S/2M Standard with PLC Installation 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:

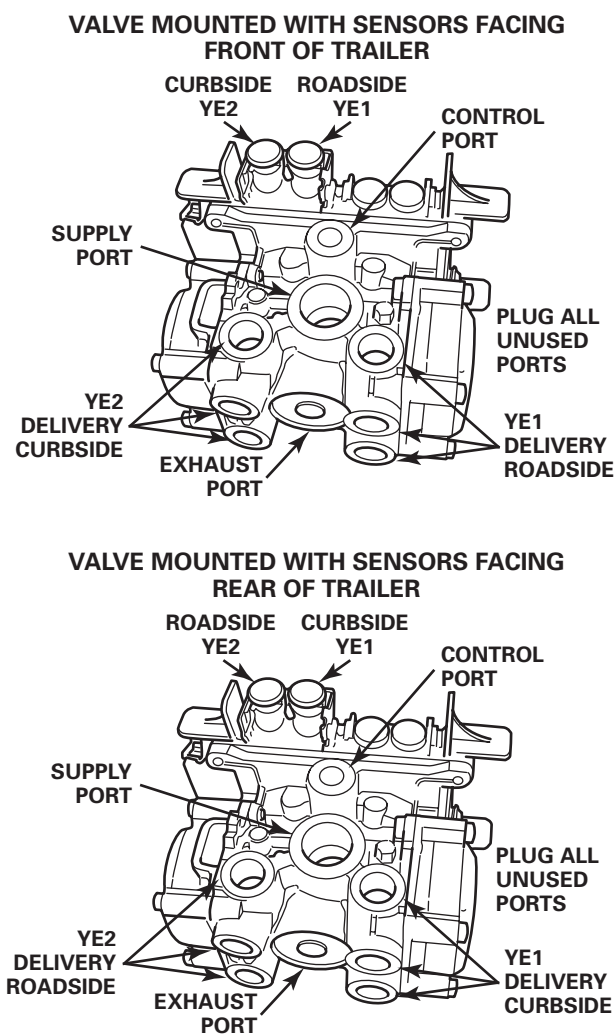
- Enhanced Easy-Stop includes Power Line Communication (PLC) function.
- The ECU/dual modulator valve assembly must be mounted as one unit.
- The LED on top of the ECU has been eliminated.
- The blink code tool LED does not operate simultaneously with the ABS lamp on the trailer.

The valve portion of the ECU/dual modulator valve assembly contains two separate modulator valves that share common control and exhaust ports.

Each valve has its own delivery ports (3). Therefore, the mounting orientation — whether the valve is facing the front or the rear of the trailer — determines sensor hookup.

If this assembly is mounted facing forward — toward the front of the trailer — sensor connection YE2 goes to the curbside and sensor connection YE1 goes to the roadside. If this assembly is mounted facing the rear, sensor connection YE2 goes to the roadside, and YE1 goes to the curbside. **Figure 1.**

Figure 1



Preparation

1. Before beginning the installation procedure, inspect the ECU/dual 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.
 - Do not install a damaged ECU/dual modulator valve assembly. Notify your supervisor, or contact Meritor WABCO if there is any apparent damage.
2. Have installation material available:
 - * ECU/dual 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 mount)

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



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.

Installation

I. Install the ECU/dual 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/dual modulator valve assembly securely to the air tank to avoid possible serious personal injury and damage to the component.

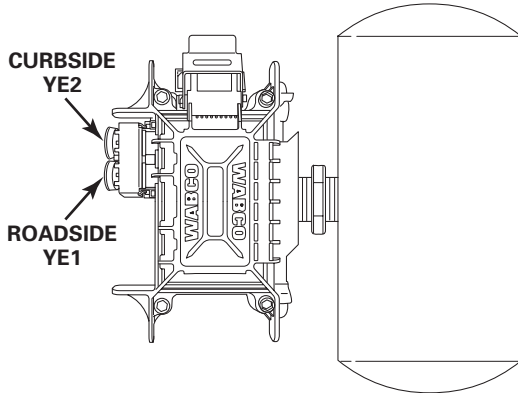
1. Use a 3/4-inch Schedule 80 hex nipple to attach ECU/dual modulator valve assembly to a reinforced air tank. Do not overtighten.

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/dual modulator valve assembly.

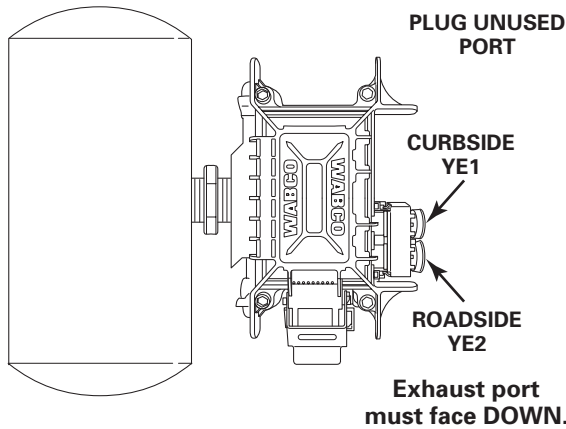
2. Use a 3/4-inch pipe plug to plug unused supply port. Apply SAE-standard, DOT-approved Teflon tape or paste-type thread sealant to all pipe threads beyond the first two threads. Pipes with pre-applied thread sealant may also be used.
3. Rotate and tighten the ECU/dual modulator valve assembly until 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. Figure 2.

Figure 2

VALVE MOUNTED WITH SENSORS FACING FRONT OF TRAILER



VALVE MOUNTED WITH SENSORS FACING REAR OF TRAILER



Mounted to Cross Member of Vehicle (Mounting Bracket Not Supplied)

NOTE: When mounting the ECU/dual modulator valve assembly to the trailer cross member, refer to SAE specification J447, *Prevention of Corrosion of Motor Vehicle Body and Chassis Components*. Follow all recommendations and procedures. Your supervisor should have a copy of this specification.

1. Install a 3/4-inch NPTF fitting in supply port. 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 plugs beyond the first two threads. Pipes with pre-applied thread sealant may also be used.
2. Attach the assembly to vehicle cross member midway between the side rails, close to the brake chambers the valve serves.

- Drill two 3/8-inch mounting holes. Distance between the two holes (O.D.) must be 6.06-inches (154 mm) and mount directly to cross member.

OR


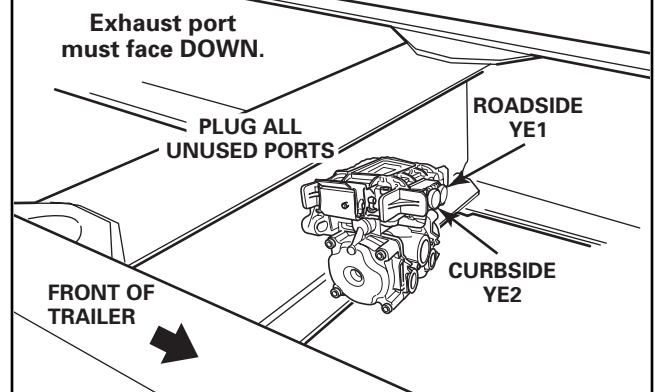
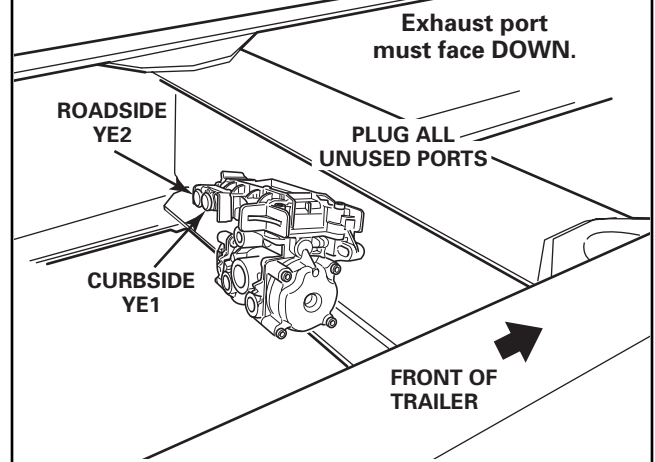
- Build a mounting bracket with two 3/8-inch mounting holes with 6.06-inches (154 mm O.D.) between the two holes.
3. Use two 3/8-inch Grade 8 bolts with prevailing torque nuts to attach assembly. Tighten bolts to 18 lb-ft (24 N•m). 

Figure 3

VALVE MOUNTED WITH SENSORS FACING FRONT OF TRAILER



VALVE MOUNTED WITH SENSORS FACING REAR OF TRAILER



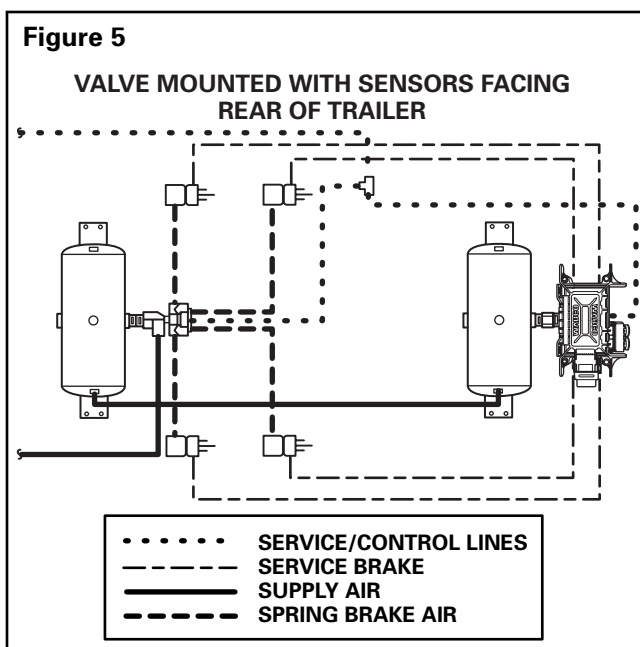
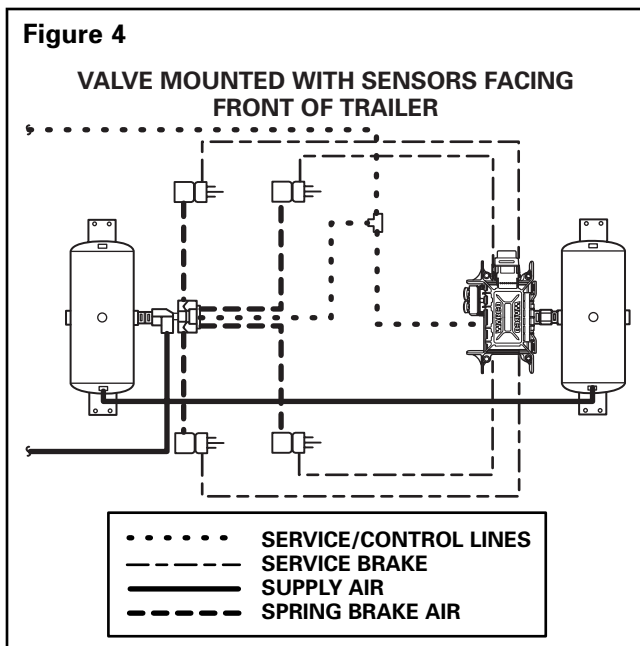
II. Connect the air lines.

1. Connect the air supply line from the supply tank to ECU/dual modulator valve assembly supply Port 1. Plug unused port.

Use 5/8-inch O.D. min. nylon tubing or heavy-walled Schedule 80 pipe nipple (3/4-inch NPTF) if the ECU/dual modulator valve assembly is mounted directly to supply tank.

2. Connect the air delivery lines to the ECU/dual modulator valve assembly Port 2 (3/8-inch NPTF).
3. Connect the air delivery lines to the appropriate brake chambers (3/8-inch NPT). **Figures 4 and 5.**

NOTE: The valve portion of this assembly contains two separate valves; one dedicated to roadside wheel ends, the other dedicated to curbside wheel ends. This is illustrated in **Figure 1.**



4. Connect the brake service (control) line to the ECU/dual modulator valve assembly Port 4 (1/4-inch NPTF).
5. Plug any unused delivery ports.

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.

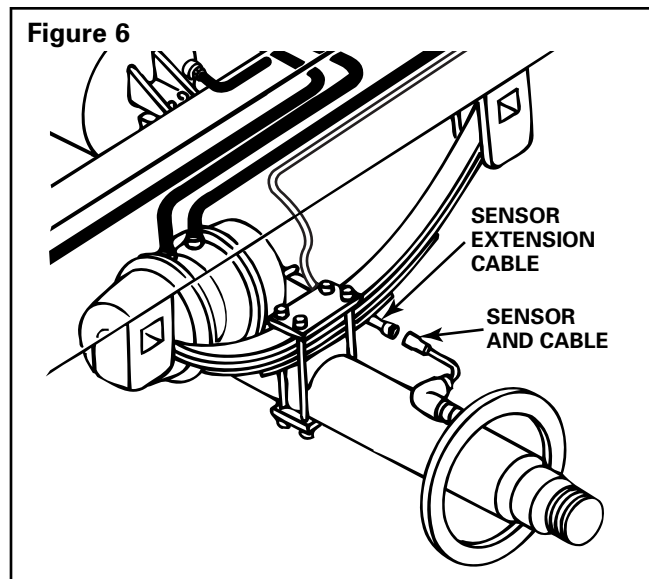
1. Visually inspect the tooth wheel and sensor to ensure there was no damage during shipping. Make necessary repairs.
2. Connect sensor and cables on the prepped axles to the sensor extension cables. **Figure 6.**

Make sure each connection is secure.

3. Route sensor cable along back side of the trailer axle to the ECU/dual modulator valve assembly. Route with brake hose. **Figure 6.**

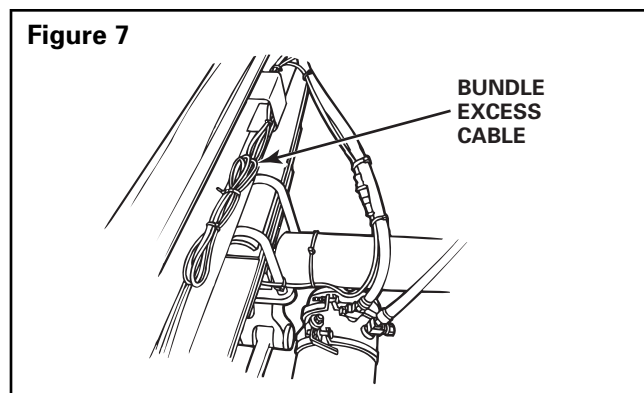
NOTE: Do not overtighten tie wraps on a cable. Overtightening can damage the cable. Do not tie wrap the molded sensor plug. Sensor extension cable must follow brake hose to ECU/dual modulator valve assembly to allow for axle jounce and rebound.

4. Secure every eight inches with tie wraps or cable clips.



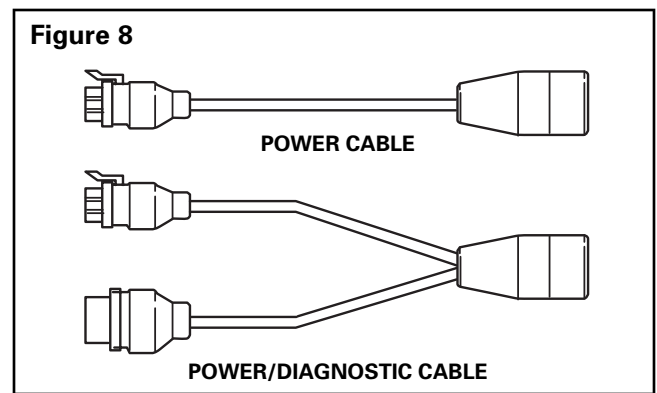
5. Push sensor retainer clip on ECU/dual modulator valve assembly UP.
6. Remove protective caps from YE2 and YE1 sensor connectors.
7. Plug sensor extension cables into ECU/dual modulator valve assembly. To secure connection, push sensor retainer clip DOWN. Retainer clips must fit in groove of sensor connectors to ensure proper connection. Connect sensors.
 - Forward Mounted (Sensors facing front of trailer)
 - Connect curbside sensor at YE2.
 - Connect roadside sensor at YE1.
 - Rear Mounted (Sensors facing rear of trailer)
 - 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.

NOTE: Various cable lengths are available.



IV. Install the power and lamp or power and lamp/diagnostic cable.

1. Identify the type of cable to be installed. **Figure 8.**
 - ABS trailer industry-standard pigtail connector power cable
 - Blunt-cut power cable (not shown)

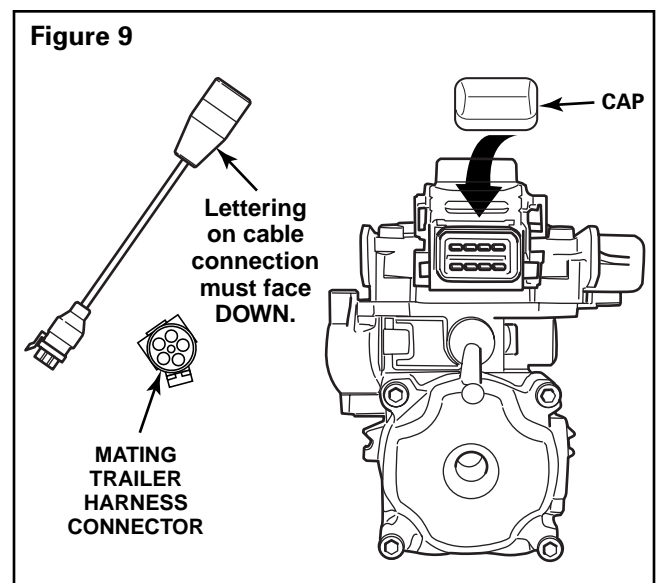


2. For industry-standard pigtail connector power cables, route cable from harness connector to ECU/dual modulator valve assembly and secure to prevent damage.

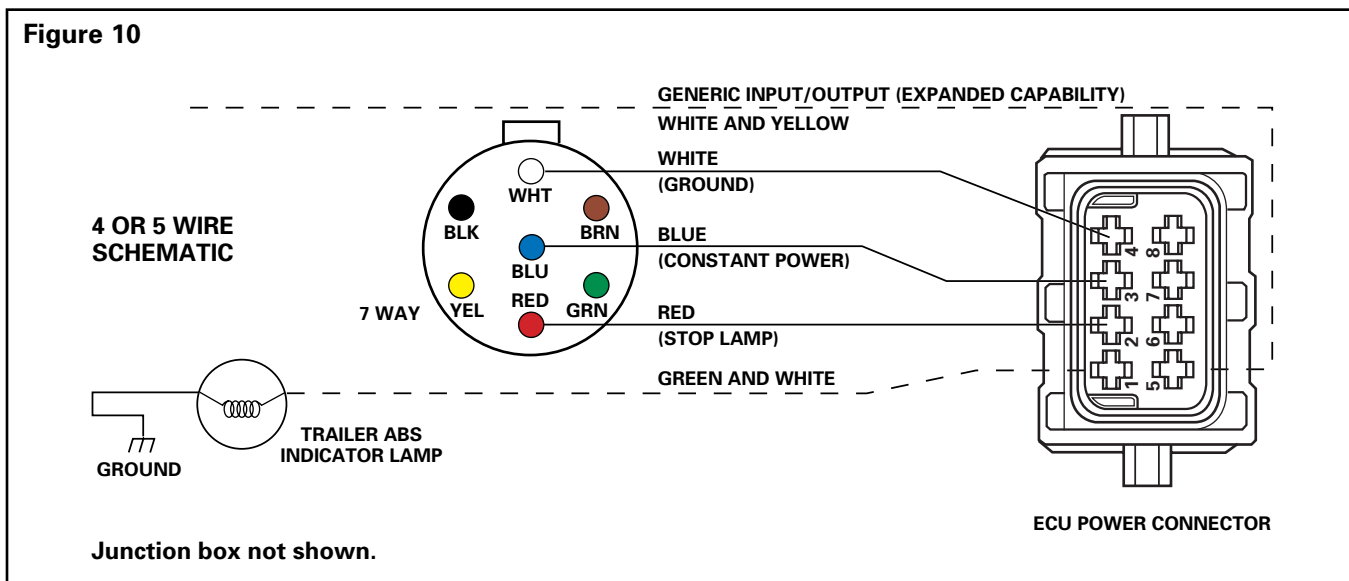
For blunt-cut power cable, route the cable from the ECU/dual modulator valve assembly to a junction box which interfaces with the seven-way connector at the front of the trailer.

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/diagnostic connector retainer clip UP and remove the protective cap from the ECU/dual modulator valve assembly. **Figure 9.**



5. Plug the power 8-pin connector on the power or power/diagnostic cable into the ECU/dual modulator valve assembly. WABCO identification on cable connection must face DOWN.
 6. Pull the hinged power/diagnostic connector retainer clip on ECU/dual modulator valve assembly DOWN to secure connection.
 7. If installing the power cable only, 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/dual 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 in loop (bow tie) and secure the cable in the sub-frame. **Figure 7.**
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 9.**
- 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 10.**



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.

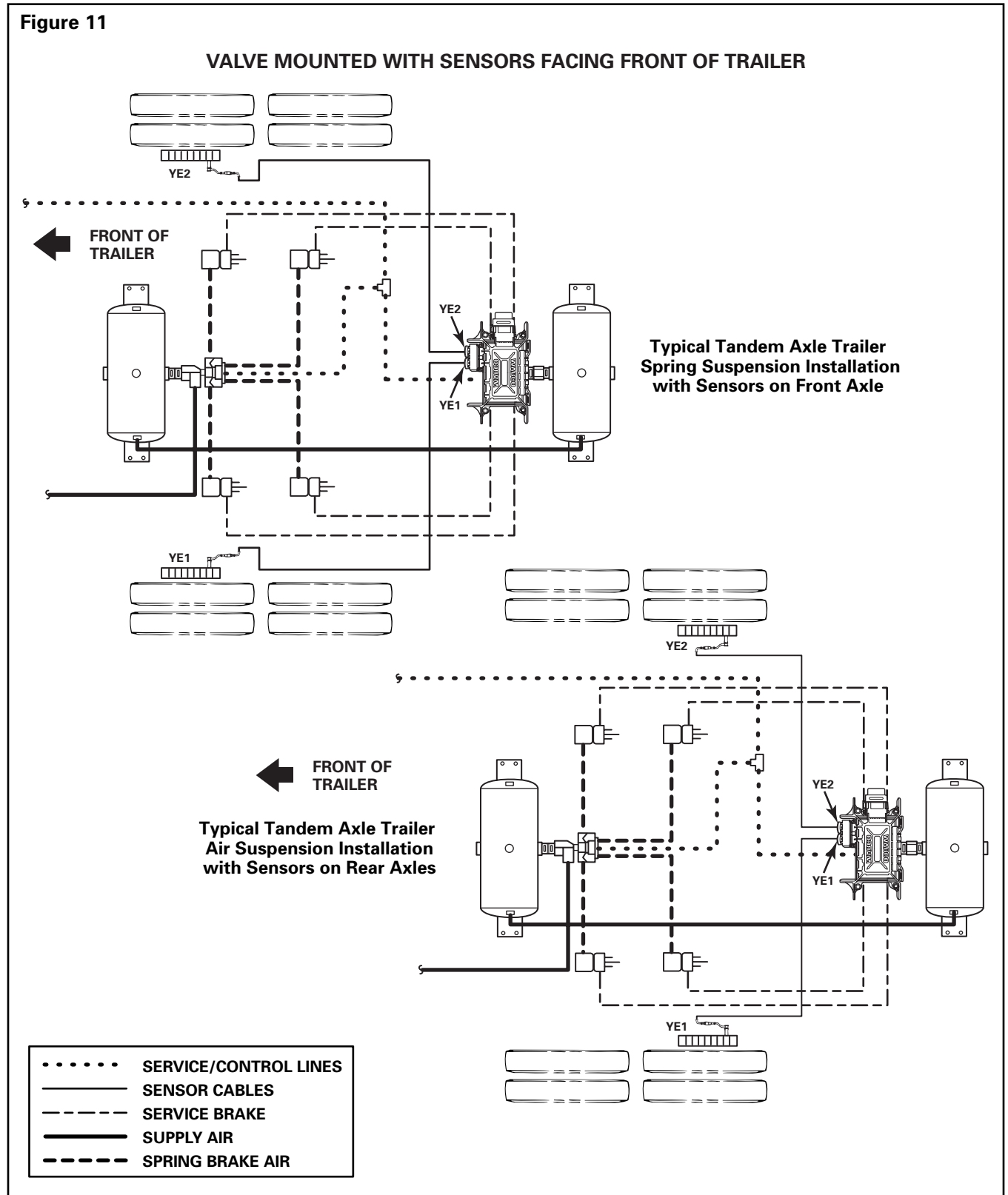
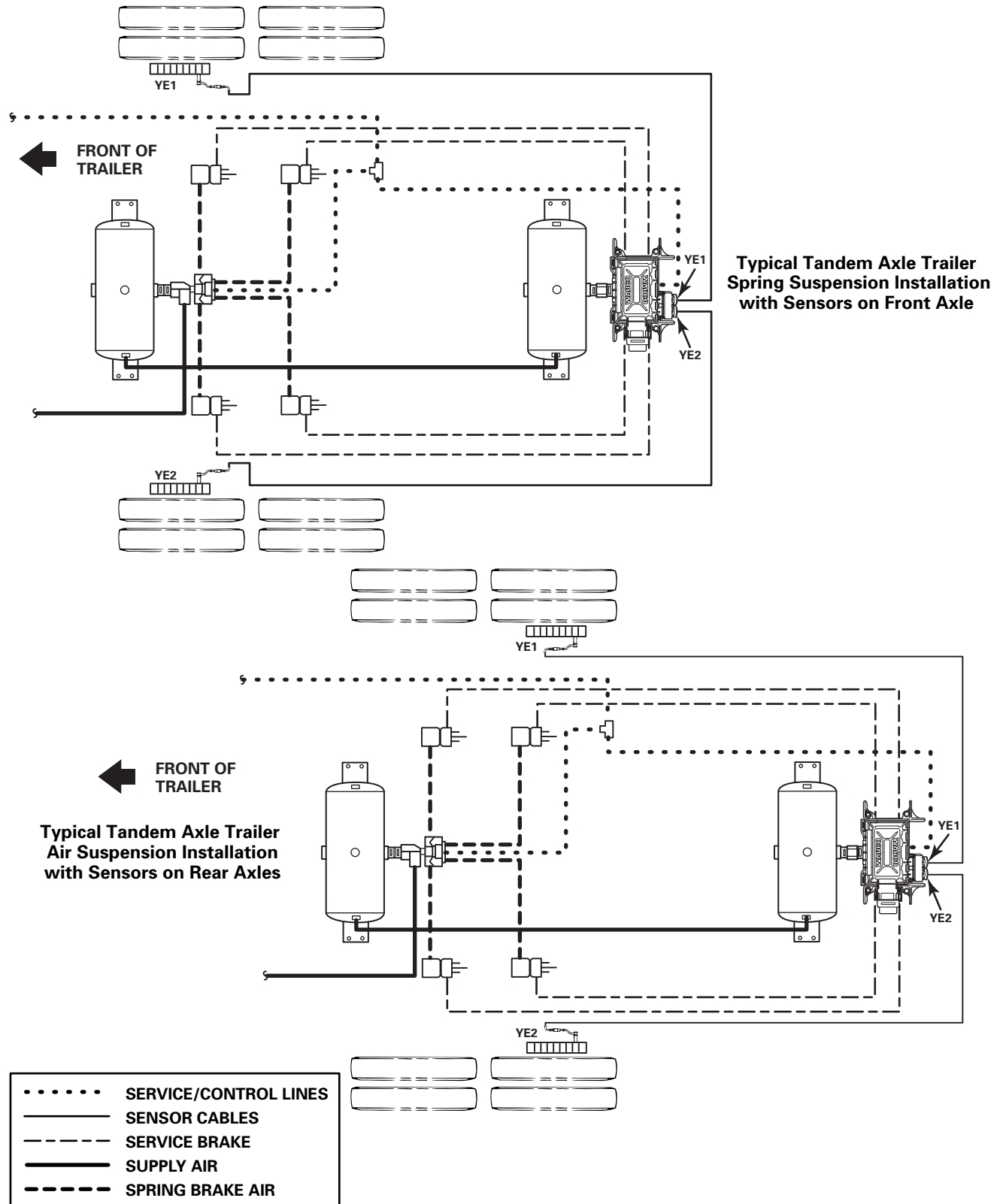


Figure 12

VALVE MOUNTED WITH SENSORS FACING REAR OF TRAILER



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/2M Standard Installation — End of Line Testing Procedure with 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.

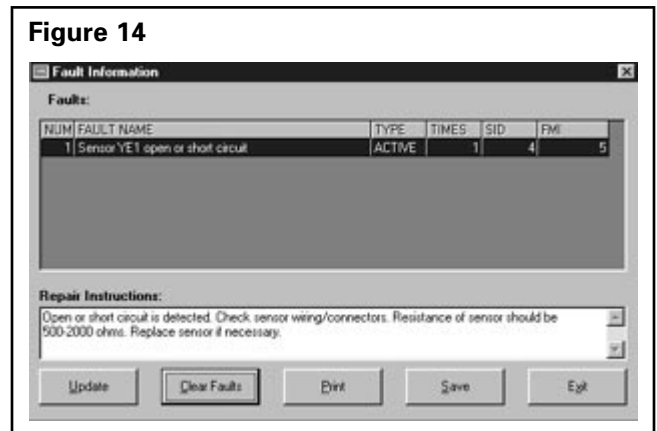
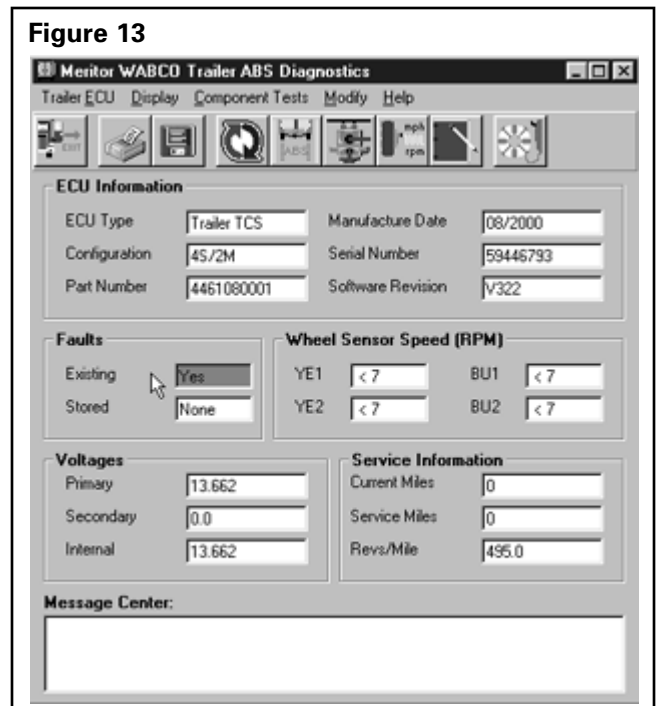
2. Display the **Trailer ABS Main Screen**.
3. Verify power supply:
 - Apply 12 volts DC to the blue wire (constant). Check the screen for proper voltage (9.4 to 14 volts). Constant power voltage is displayed in the **Primary** field. **Figure 13**.
 - Apply 12 volts DC to the red wire (stoplight power). Check the screen for proper voltage (9.4 to 14 volts). Stoplight power voltage is displayed in the **Secondary** field. **Figure 13**.

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. Apply 12 volts DC to the ABS.
2. Apply air to the emergency line to fill the air tanks and release the spring brakes.
3. Apply air to the control line.
4. At the Trailer **Main Screen** click on **Component Test**, then select **Valves/Lamp** to display the **Valve Activation** Screen. The **Yellow** valve indicator will be highlighted. **Figure 15**.

5. Click on the Activate button.
6. Check for proper air line installation. To do this, observe the slack adjusters:
 - If the ECU faces **the front of the trailer**, the slack adjusters will move in and out as the **curbside** portion of the dual modulator valve cycles. If this does not happen, the air lines are not properly connected. Make the necessary repairs.
 - If the ECU faces **the rear of the trailer**, the slack adjusters will move in and out as the **roadside** portion of the dual modulator valve cycles. If this does not happen, the air lines are not properly connected. Make the necessary repairs.

NOTE: The Test Status box at the bottom of the menu will display the status of this test.

7. Repeat this test for the **Blue** valve.
 - A. Repeat Steps 1-3.
 - B. Select the **Blue** valve from the valve activation screen.
 - C. Click on the activate button to verify proper valve installation (**Blue**).
 - D. Check for proper air line installation. To do this, observe the slack adjusters.
 - If the ECU faces **the front of the trailer**, the slack adjusters will move in and out as the **roadside** portion of the dual modulator valve cycles. If this does not happen, the air lines are not properly connected. Make the necessary repairs.
 - If the ECU faces **the rear of the trailer**, the slack adjusters will move in and out as the **curbside** portion of the dual modulator valve cycles. If this does not happen, the air lines are not properly connected. Make the necessary repairs.

8. 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 display the status of this test.

9. Click on **Close** to exit.

Sensor Installation Test

To test the sensor installation:

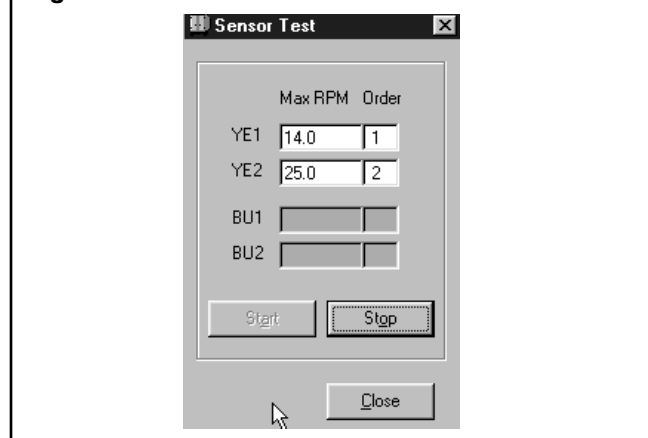
1. Raise both sensed wheel ends off of the ground.
2. Apply air to the emergency line to fill the air tanks and release the spring brakes so that the wheels can be rotated.

Figure 15



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 16**.
 - Make sure there is sensor output in the YE1 and YE2 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 based on orientation of the valves. Refer to **Figures 11 and 12**.

Figure 16



End of Line Testing without TOOLBOX Software

Inspect the Sensor and Air Line Installation.

Sensor Installation

1. Look at the YE2 and YE1 sensor connectors on the ECU/dual modulator valve assembly. Make sure the connectors are routed to the proper wheel end location, as follows:
 - If the ECU/dual modulator valve assembly is mounted with sensors facing the front of the trailer:
 - Sensor YE2 must be routed to the curbside wheel end location
 - Sensor YE1 must be routed to the roadside wheel end location
 - If the ECU/dual modulator valve assembly is mounted with sensors facing the rear of the trailer:
 - Sensor YE2 must be routed to the roadside wheel end location
 - Sensor YE1 must be routed to the curbside wheel end location
2. If sensors are not properly installed, make the necessary repairs.

Air Line Installation

1. Make sure all unused air ports are plugged and that the exhaust port is facing DOWN.
2. Look at the air line installation to make sure all air lines are properly installed.
 - If the ECU/dual modulator valve assembly is mounted with the sensors facing the **front** of the trailer, the air lines for the three delivery ports located under the YE2 sensor connector must be routed to **curbside**; the air lines for the three delivery ports on the opposite side of the valve must be routed to roadside.

Figure 17.

 - If the ECU/dual modulator valve assembly is mounted with the sensors facing the **rear** of the trailer, the air lines for the three delivery ports located under the YE2 sensor connector must be routed to **roadside**; the air lines for the three delivery ports on the opposite side of the valve must be routed to curbside.

Figure 18.
3. If air lines are not properly routed, make the necessary repairs.

Figure 17

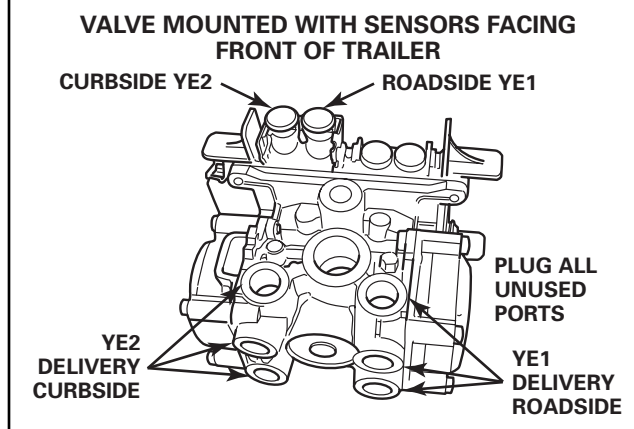
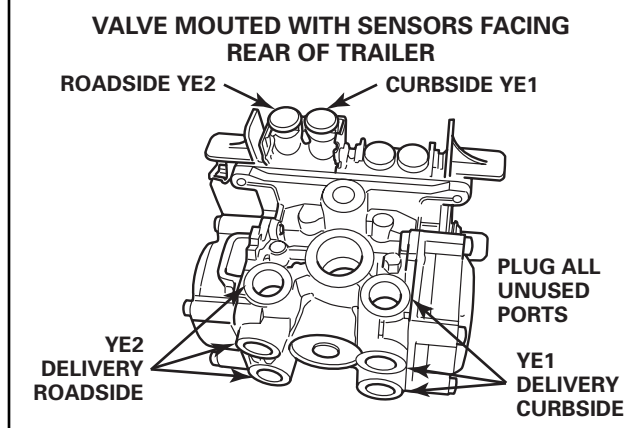


Figure 18



Perform End of Line Test

1. Apply 12 volts DC power to the ABS.
2. The ECU/dual modulator valve assembly should click four times.
3. If the indicator lamp **comes on** for three seconds then **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. Apply emergency air to fill the air tanks and release the spring brakes so that the wheels may be rotated.
- C. Repeat Step 1 and Step 2.

- D. 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 the end of line test. 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/dual modulator valve assembly **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.

BLINK CODE CHART		
Blink Code	Problem Area	Action
4	Sensor YE1	Determine sensor location. Check sensor installation. Make necessary repairs.
6	Sensor YE2	Determine sensor location. Check sensor installation. Make necessary repairs.
9	Internal modulator failure, inlet valve #2	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
10	Internal modulator failure, inlet valve #1	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
11	Internal modulator failure, outlet valve	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.



Meritor WABCO
 Vehicle Control Systems
 3331 West Big Beaver Road, Suite 300
 Troy, MI 48084 USA
 800-535-5560
www.arvinmeritor.com

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