

MERITOR WABCO

Installation Guide

R955344 and R955345 Meritor WABCO Enhanced Easy-Stop™ Trailer ABS Replacement Kits for Easy-Stop™ ECU/Modulator Valve Assembly Part Number 472 500 021 0

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.

The 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 and damage to components can result.

For Complete Maintenance and Service Instructions for Meritor WABCO Enhanced Easy-Stop™ Trailer ABS, Including Information About Power Line Carrier (PLC)

Refer to Maintenance Manual MM-0180, Enhanced Easy-Stop™ Trailer ABS. To obtain a copy of the manual or if you require technical assistance, contact ArvinMeritor's Customer Service Center at 800-535-5560. Technical publications are also available on our website:

www.meritorwabco.com

Overview

Enhanced Easy-Stop™ Trailer ABS ECU/modulator valve assembly, Part Number 400 500 101 0, has replaced ECU/modulator valve assembly, Part Number 472 500 021 0. This replacement assembly meets the March 1, 2001 FMVSS 121 in-cab trailer indicator lamp mandate. The new assemblies are packaged as a kit, so that you will have all of the necessary components and instructions to complete an installation. Replacement kits contain the following:

Replacement Kits

2S/1M ECU/Single Modulator Valve Assembly with Power Adapter Cable, Replacement Kit R955344

- Installation Guide, TP-0356
- 12-volt integrated ECU/modulator valve assembly, Part Number 400 500 101 0
- Power adapter cable, Part Number 894 607 312 0

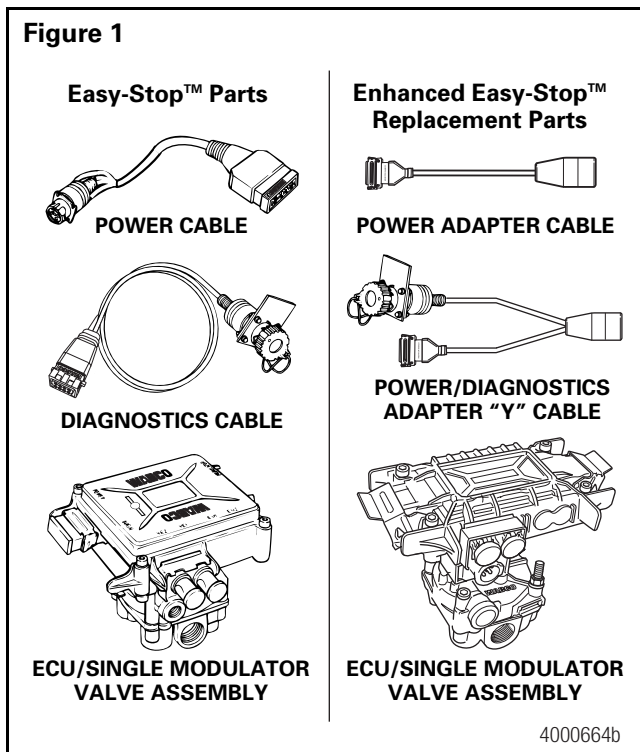
2S/1M ECU/Single Modulator Valve Assembly with Power/Diagnostics Adapter Cable, Replacement Kit R955345

- Installation Guide, TP-0356
- 12-volt integrated ECU/modulator valve assembly, Part Number 400 500 101 0
- Power/Diagnostics adapter cable with mounting bracket, Part Number 894 607 313 0

Enhanced Easy-Stop™ Blink Code Diagnostics

Meritor WABCO recommends using TOOLBOX™ Software version 4.6 or higher to troubleshoot and test Enhanced Easy-Stop™ Trailer ABS, however you can use blink code diagnostics. The new ECU does not have an LED on top of the ECU, but blink codes are easily displayed on the ABS indicator lamp mounted on the side of the trailer. Refer to Maintenance Manual MM-0180, Enhanced Easy-Stop™ Trailer ABS, for more information about diagnostic procedures, including blink code diagnostics.

Enhanced Easy-Stop™ replacement parts, as well as the Easy-Stop™ components, are illustrated in **Figure 1**.



Removal and Installation

Remove the Easy-Stop™ ECU/Modulator Valve Assembly

1. Park the vehicle on a level surface and block the wheels to prevent the vehicle from moving.
2. Discharge all pressure from the air system.
3. Attach labels to identify all air lines.
4. Disconnect and remove the air lines from the ECU/modulator valve assembly.

5. A. **Replacement Kit R955344:** Disconnect the Easy-Stop™ power cable from the ECU/modulator valve assembly. Do not remove the existing power cable.
B. **Replacement Kit R955345:** Disconnect both the Easy-Stop™ power and diagnostic cables from the ECU/modulator valve assembly. Remove the diagnostics cable from the trailer. Do not remove the power cable.
6. Disconnect the sensor cables from the ECU/modulator valve assembly.
7. Remove the ECU/modulator valve assembly from its mounting location (either on the air tank or on the frame of the vehicle).

Install the New Enhanced ECU/Modulator Valve Assembly

Attach the replacement ECU/modulator valve assembly to a cross member of the trailer or to the air tank. Most likely, you will mount the replacement assembly in the same location as the old assembly and will mount it as one unit. However, the 2S/1M replacement assembly may be taken apart and the ECU and valve may be mounted separately. Contact ArvinMeritor's Customer Service Center at 800-535-5560 for more information.

Air Tank-Mounted



WARNING

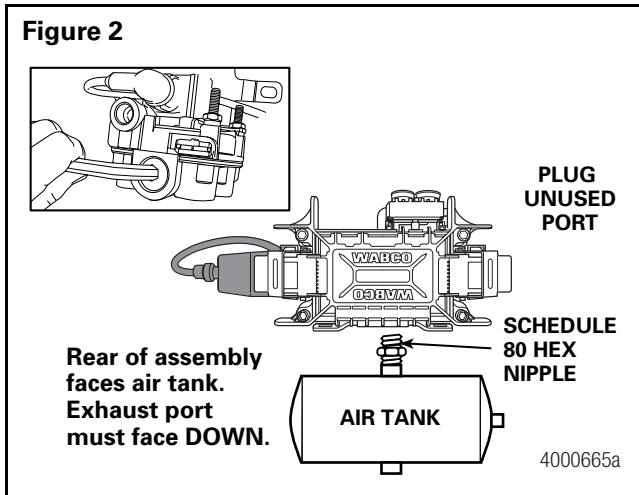
You must use a Schedule 80 hex nipple (3/4-inch NPTF) to mount the ECU/modulator valve assembly securely to the air tank to avoid possible serious personal injury and damage to the component.

1. Use a 3/4-inch Schedule 80 hex nipple to attach the ECU/modulator valve assembly to a reinforced air tank. Do not overtighten. 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 assembly.
2. Use a 3/4-inch pipe plug to plug the 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/modulator valve assembly until the exhaust port faces down and the connection is secure. Use a torque wrench or ratchet with the extension at the 3/4-inch pipe plug installed on the front supply port. **Figure 2.**

Figure 2



Attach the Air Lines to the Replacement Assembly

1. Remove the markers from the air lines.
2. Attach the air delivery lines from the service chambers to the delivery ports (Port 2) on the ECU/single modulator valve assembly. Delivery ports are located on the bottom of the assembly.
3. Connect the brake service control line to Port 4 on the ECU/modulator valve assembly.
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.

Air line installation is illustrated in **Figure 4**.

Cross Member-Mounted

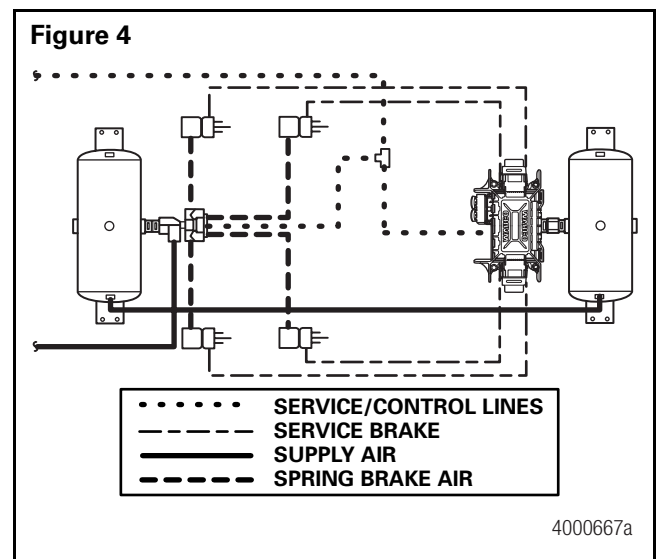
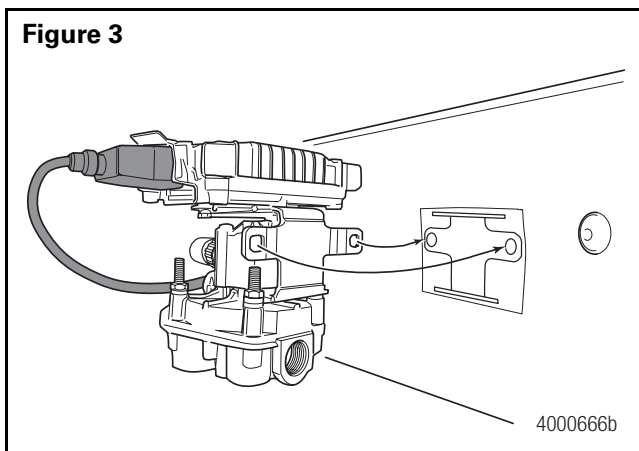
NOTE: If attaching the replacement assembly to the vehicle cross member, it will be necessary to drill new mounting holes.

1. Install a 3/4-inch NPTF fitting in the supply port.
2. Use a 3/4-inch pipe plug to plug the 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.

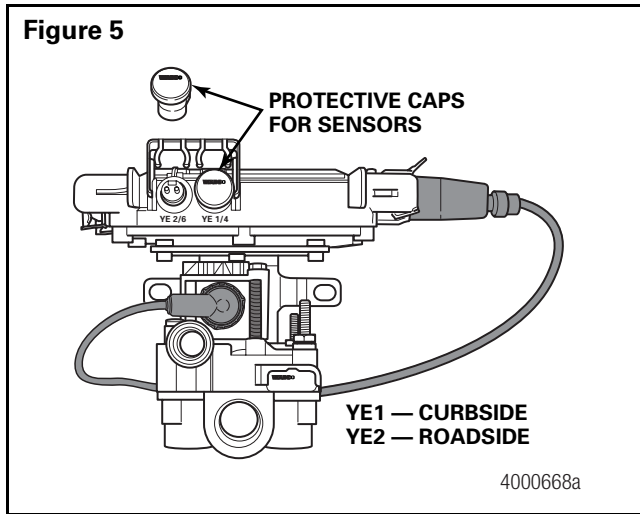
3. Mark the location of the two mounting holes on the vehicle cross member, then drill two 3/8-inch holes into the vehicle cross member. Recommended mounting location is midway between the side rails, close to the brake chambers the valve serves.
4. Attach the replacement assembly to vehicle.
5. Use two 3/8-inch Grade 8 bolts with prevailing torque nuts and washers to attach the assembly to the vehicle cross member. Tighten the bolts to 18-lb-ft (24 N•m). **Figure 3.**

Figure 3



Attach the Two Sensor Extension Cables to the Replacement Assembly

1. Remove the protective caps from YE2 and YE1 sensor connectors on the ECU/modulator valve assembly. **Figure 5.**



2. Plug the sensor extension cable into the ECU/single modulator valve assembly. To secure the connection, push the sensor retainer clip DOWN. The retainer clips must fit in the groove of the sensor connectors to ensure correct connection.
 - Connect curbside sensor at YE1
 - Connect roadside sensor at YE2

Install the Power or Power/Diagnostics Adapter Cable

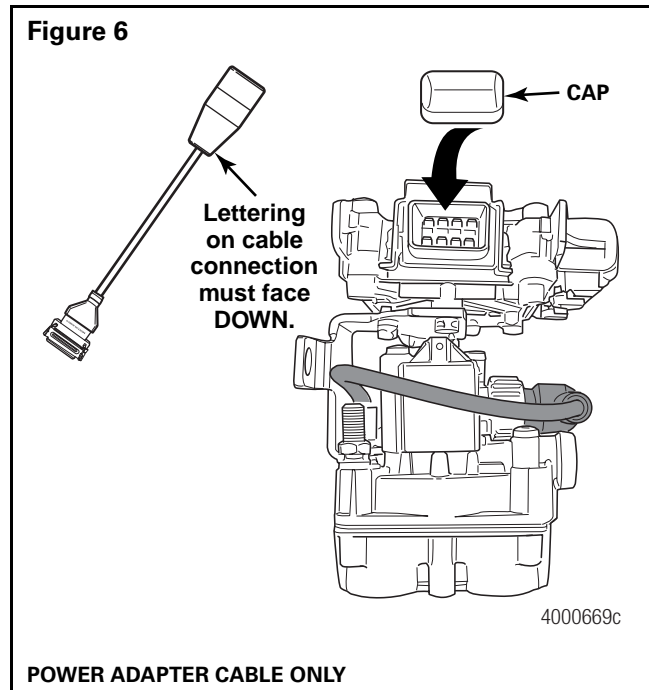
Replacement Kit R955344: Power Adapter Cable

Replacement Kit R955345: Power/Diagnostics Adapter Cable

- Both the straight and "Y" replacement power adapter cables have a WABCO 8-pin power connector on one end and a mating Easy-Stop™ power adapter connector on the other end. The Easy-Stop™ power adapter connector eliminates the need to replace the existing Easy-Stop™ power cable. The WABCO 8-pin power connector is different from the connector on the old cable. Therefore, the replacement cable **MUST** be used with the replacement ECU/modulator valve assembly.
- The power portion of the power/diagnostics adapter cable is 1.6 feet (0.5 meter). The diagnostic portion of the adapter cable is 10 feet (3 meters).

To install the power or power/diagnostics adapter cable:

1. Push the hinged power connector retaining clip UP and remove the protective cap from the ECU/modulator valve assembly. Plug the 8-pin power connector on the power or power/diagnostics adapter cable into the ECU/modulator valve assembly. WABCO identification (lettering on the 8-pin cable connection) must face DOWN. Pull the hinged power connector retainer clip on the ECU/modulator valve assembly DOWN to secure the connection. **Figure 6.**



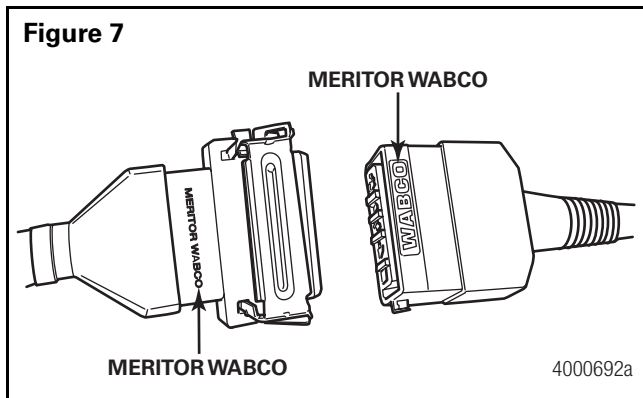
2. **For power cable installations,** go to Step 3.

For power/diagnostics cable installations:

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.

3. Connect the 5-pin power adapter cable to the existing Easy-Stop™ power cable.

When connecting the power adapter cable to the existing Easy-Stop™ power cable, the lettering on both connectors must face the same direction, usually UP. **Figure 7.**



Testing the Installation

Testing is required on all Enhanced Easy-Stop™ installations. To run these tests, Meritor WABCO recommends you use TOOLBOX™ Software version 4.6 or higher.

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.

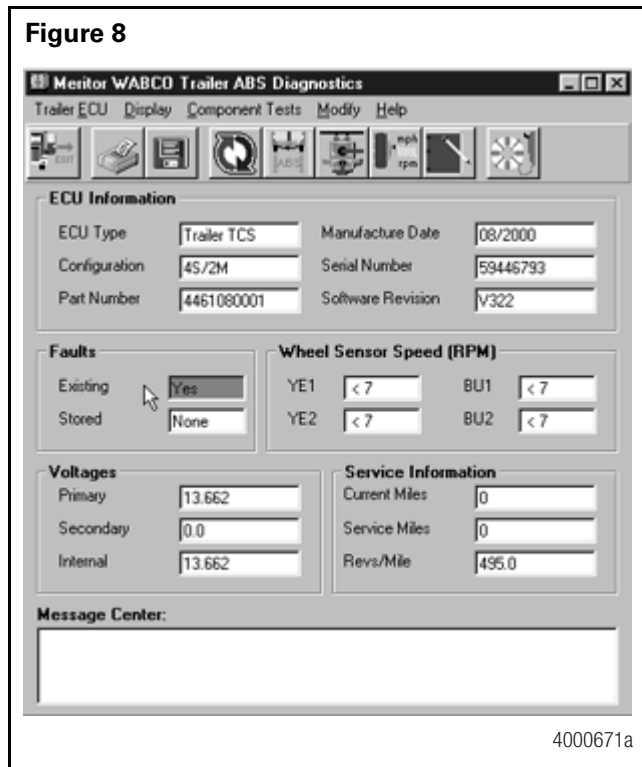
Enhanced Easy-Stop™ 2S/1M Basic Installation — End of Line Testing Procedure Using TOOLBOX™ Software

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. For additional information about TOOLBOX™ setup (e.g., devices), contact ArvinMeritor’s Customer Service Center at 800-535-5560.

2. Display the **Trailer ABS Main Screen**.
3. Verify power supply:
 - Apply 12 volts DC to the blue wire (constant). Check the screen for correct voltage (9.5 to 14 volts). Constant power voltage is displayed in the **Primary** field. **Figure 8**.
 - Apply 12 volts DC to the red wire (stoplight power). Check the screen for correct voltage (9.5 to 14 volts). Stoplight power voltage is displayed in the **Secondary** field. **Figure 8**.



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.

Verify Correct 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 9**.

Figure 9



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.

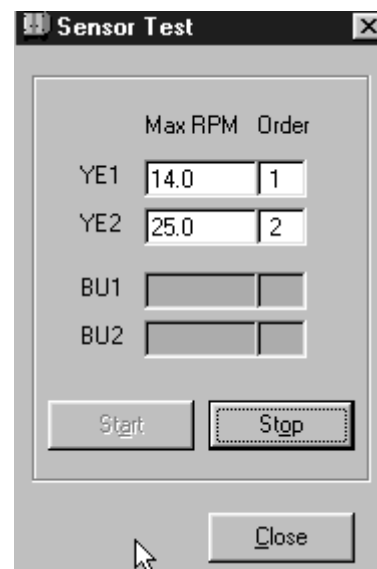
Sensor Installation Test

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 10**.
 - Make sure there is sensor output in the YE1 (curbside) and YE2 (roadside) fields. If sensor output is displayed, the 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.

Figure 10



8. Check **Order** fields to verify sensors were installed in the right location.

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 correct 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 correct 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.

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 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 in **Table A** and make the necessary repairs.
6. After making the necessary corrections, repeat the end of line test to verify correct sensor installation.

Table A: 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 correct installation. If code continues, contact Meritor WABCO for assistance.
14	Power Supply	Verify correct electrical installation. Check power supply. Make necessary corrections.
15	ECU Failure	Verify correct 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 correct electrical installation. Check power supply. Make necessary corrections.

Sensor Gap Adjustment

Push the 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. The value should be 0.2 volt AC when the wheel is rotated at a rate of 1/2 revolution per second.

Make necessary repairs.

Repeat the end of line test. If the trailer lamp still does not go out, a system fault exists. Perform a fault code check.

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Printed in the USA

TP-0356
Issued 06-03
16579/24240