

MERITOR WABCO

Technical Bulletin

Anti-Lock Braking System (ABS) Installation Guide for OEM Reference

E-Version Air Brake ABS

Includes Optional Automatic Traction Control (ATC)

This publication does not cover Roll Stability Control (RSC). If your installation includes RSC, please contact the ArvinMeritor Customer Service Center at 800-535-5560 for assistance.

For Complete Maintenance Instructions for Meritor WABCO's Anti-Lock Braking System

Refer to Maintenance Manual MM-0112, Anti-Lock Braking System (ABS) for Trucks, Tractors and Buses. Call ArvinMeritor's Customer Service Center at 800-535-5560 to obtain this publication. Meritor WABCO publications are also available on our website:

www.meritorwabco.com

Installation Procedure

Purpose of This Publication

This publication addresses frequently asked questions regarding Meritor WABCO ABS and ABS with ATC components and installation procedures. It is for use with all E-version ECUs. Refer to the ABS and ATC installation information in this bulletin.

This publication is intended to be used as an OEM installation reference guide only. Follow the complete instructions and procedures found in Maintenance Manual MM-0112, Anti-Lock Braking System (ABS) for Trucks, Tractors and Buses, whenever you maintain or service ABS/ATC and related components.

WARNING

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

General Guidelines

- Do not store the ABS components in areas where temperatures exceed 194°F (90°C).
- Complete all chassis welding prior to connecting the ABS/ATC to the chassis. If welding is necessary after installation of the ABS/ATC, disconnect all connections from the ECU.

- An inspection of each vehicle installation must be performed using Meritor WABCO TOOLBOX™ Software or other Meritor WABCO-approved diagnostics. It is recommended that the results be permanently recorded. Refer to the sample checklist in this bulletin.
- ABS/ATC components should be installed where they are best protected from the environment, yet accessible for service.

Electronic Control Unit (ECU)

- Mount the ECU away from extreme heat sources such as cab heaters, engine exhaust, etc.
- Install the ECU and all other ABS components away from RFI emitting devices, such as radios, electric motors or pumps, to help isolate the system from RFI.
- Install cab-mounted ECUs with the connectors facing DOWN or to the side. Do not mount the ECU with the connectors facing UP.
- Install frame-mounted ECUs with connectors facing to the side (not facing UP).

Tire Size Range

Most ECUs are set for a tire size range of 437 to 591 revolutions per mile.

For correct ABS/ATC operation, front and rear tire sizes must be within ±14% of each other. When this tire size range is exceeded without electronically modifying the ECU, the system performance can be affected and the indicator lamp can illuminate.

Contact Meritor WABCO at 800-535-5560 for applications outside of the 437 to 591 rpm range, or if you plan a tire size difference greater than 14%.

Calculate tire size with the following equation:

$$\% \text{ Difference} = \left\{ \frac{\text{RPM Steer}}{\text{RPM Drive}} - 1 \right\} \times 100$$

RPM — tire revolutions per mile

Electrical Wiring, Cables and Connectors

Wiring diagrams or product specification sheets can be obtained from your engineering department.

- Use only weatherproof connectors when the electrical connection is exposed to the environment.
- Protect wiring exposed to extreme environmental or mechanical conditions. For example, wiring routed near an engine exhaust must be shielded from heat.
- Excess component wiring must be secured lengthwise to the frame rail, not coiled. Coiled wire can act as an antenna and increase susceptibility to Radio Frequency Interference (RFI).
- Wiring must be within strain relief and bend radius allowance (approximately seven times the cable diameter).
- Use grommets when passing cable through flanges or frame members.
- Do not overtighten the cable tie wraps. Overtightening the tie wraps will damage the cable.
- Correctly route and secure the ABS/ATC component wiring using cable clamps, grommets and tie straps. Ensure sufficient cable is available for steering and suspension travel. Single cables such as sensor leads should be routed along brake chamber delivery hoses and supported every 12 inches (304.8 mm). Loose, dangling cables are unacceptable. The preferred method of securing sensor cables to the brake delivery hose is with plastic ABS wire clips.
- Sensor cable must be twisted pair wire with a minimum of 20 turns per meter. Splicing of these wires is not recommended.
- Sensor and solenoid cables may be routed together unless the distance they are routed exceeds 33 feet (10 meters). If sensor and solenoid cables are routed together over 33 feet (10 meters), they must be separated by at least one inch (25.4 mm) to prevent signal interference.

ABS/ATC Dash Indicator Lamps

- Per the Motor Vehicle Safety Standard number 101, the ABS indicator lamps must be amber or yellow.
- Mount the ABS/ATC indicator lamps in front of, and in clear view of, the driver.
- Lamps easily seen in daylight but not excessively bright at night should be selected. Follow OEM lumens rating recommendations.
- For LED applications, contact Meritor WABCO for lumens rating approval.
- The trailer ABS indicator lamp applies to the trailer ABS only.

ABS/ATC Valves

CAUTION

Moisture can affect the performance of all ABS/ATC systems, as well as the standard braking system. Moisture in air lines can cause air lines to freeze in cold weather. Precautions should be made to prevent moisture from accumulating in the air system. Incorrect installation can result in component damage and serious personal injury.

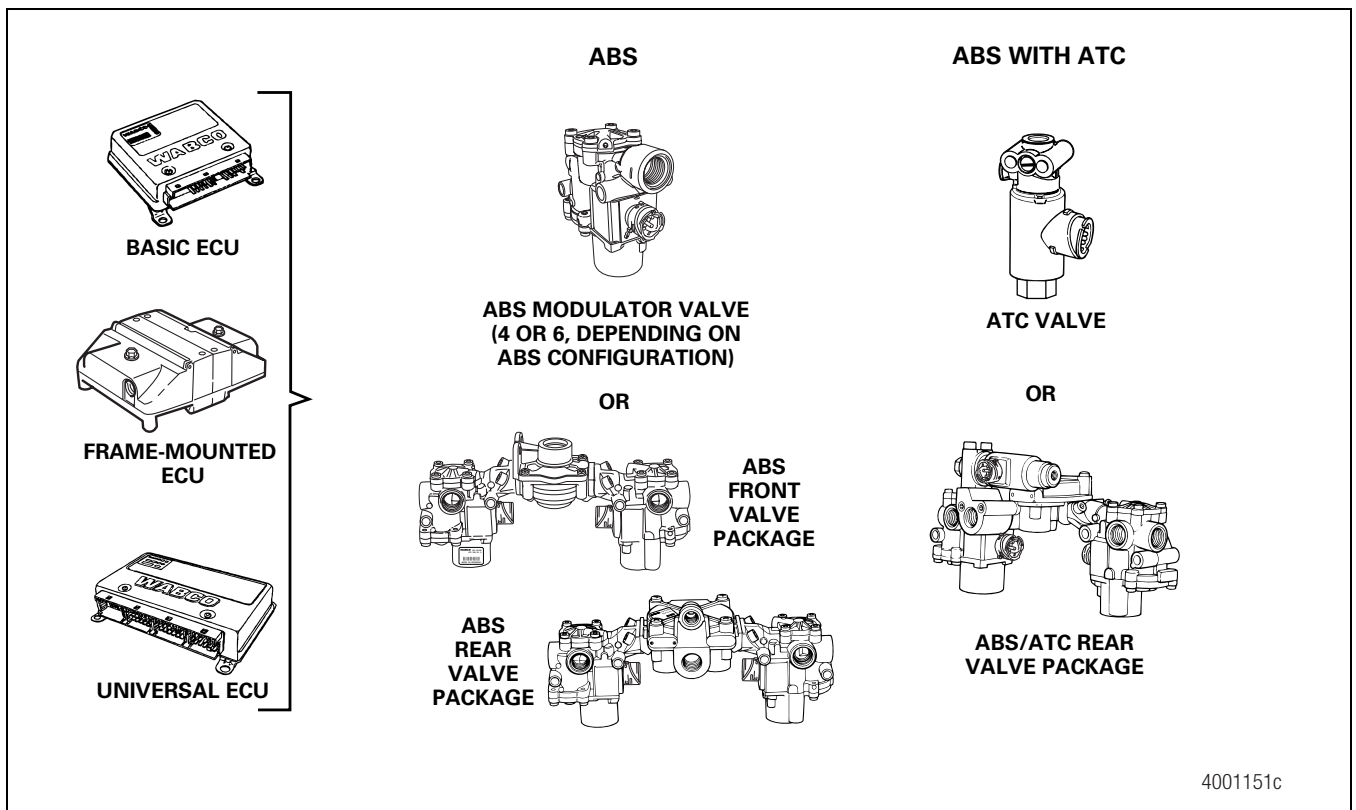
- Mount all ABS/ATC valves with exhaust port facing DOWN and ensure there is at least 1.5 inches (38.1 mm) between the bottom of the exhaust port and any obstruction such as the frame rail.
- For maximum ABS performance, position the ABS valves as close as possible to the brake chamber but not directly on the chamber. Maximum hose length of 6.56 feet (2 meters) and minimum hose diameter of 0.393 inch (10 mm) with no restrictions is recommended.
- Position all ABS valves and valve packages in a position to reduce delivery line variance between the brake chambers. Extreme delivery line variance can affect ABS performance, brake timing and balance.
- ABS modulator valve solenoid connections must be tight to ensure weatherproof connection. Tighten the bayonet collar on the ABS valve cable until the molded connector contacts the solenoid surface, then tighten it until you hear it click.
- Minimize the use of 90° air system fittings. These fittings can restrict airflow and affect air brake application and release times for FMVSS 121 compliance.
- Apply thread sealant as recommended to avoid air line leaks at the pneumatic pipe thread connections.

Sensor/Tooth Wheel

- Ensure tooth wheel runout does not exceed 0.008 inch (0.203 mm) at final axle assembly.
- Do not install tooth wheels that show signs of damage such as chipped or missing teeth.
- The sensor should be installed to initially contact the tooth wheel. The center of the sensor should contact the tooth wheel near the center of the tooth width, at least 0.0035 inch (0.0889 mm) from the edge of the tooth.

- Use a mineral oil based lubricant containing molydisulfide with a temperature range of -40°F to 300°F (-40°C to 150°C) on the sensor and sensor spring clip. Lubricants approved for use on Meritor WABCO sensors and spring clips are:
 - Mobilith SHC-220 (Mobil)
 - TEK 662 (Roy Dean Products)
 - Staburags NBU 30 PTM (Kluber Lubrication)
 - Valvoline Moly-Fortified Multi-Purpose Grease
- Meritor WABCO Sensor Maintenance Wall Chart, TP-0465, is an excellent reference guide for ABS sensor maintenance. Contact the ArvinMeritor Customer Service Center (800-535-5560) to request a copy.

Components



ATC Function Switch (Deep Snow/Mud)

- Mount the switch where it is easily accessible for the driver. It is strongly recommended this optional switch be installed when the vehicle is equipped with ATC.

ABS Function Switch (Off-Road) for Use with Off-Road Vehicle Application Only

- Mount the switch where it is easily accessible for the driver. This switch is not recommended for installation in on-highway vehicles.

Blink Code Diagnostic Switch

- Install the blink code diagnostic switch for on-board diagnostics accessibility for service but not for easy access by the driver.

Retarder Control

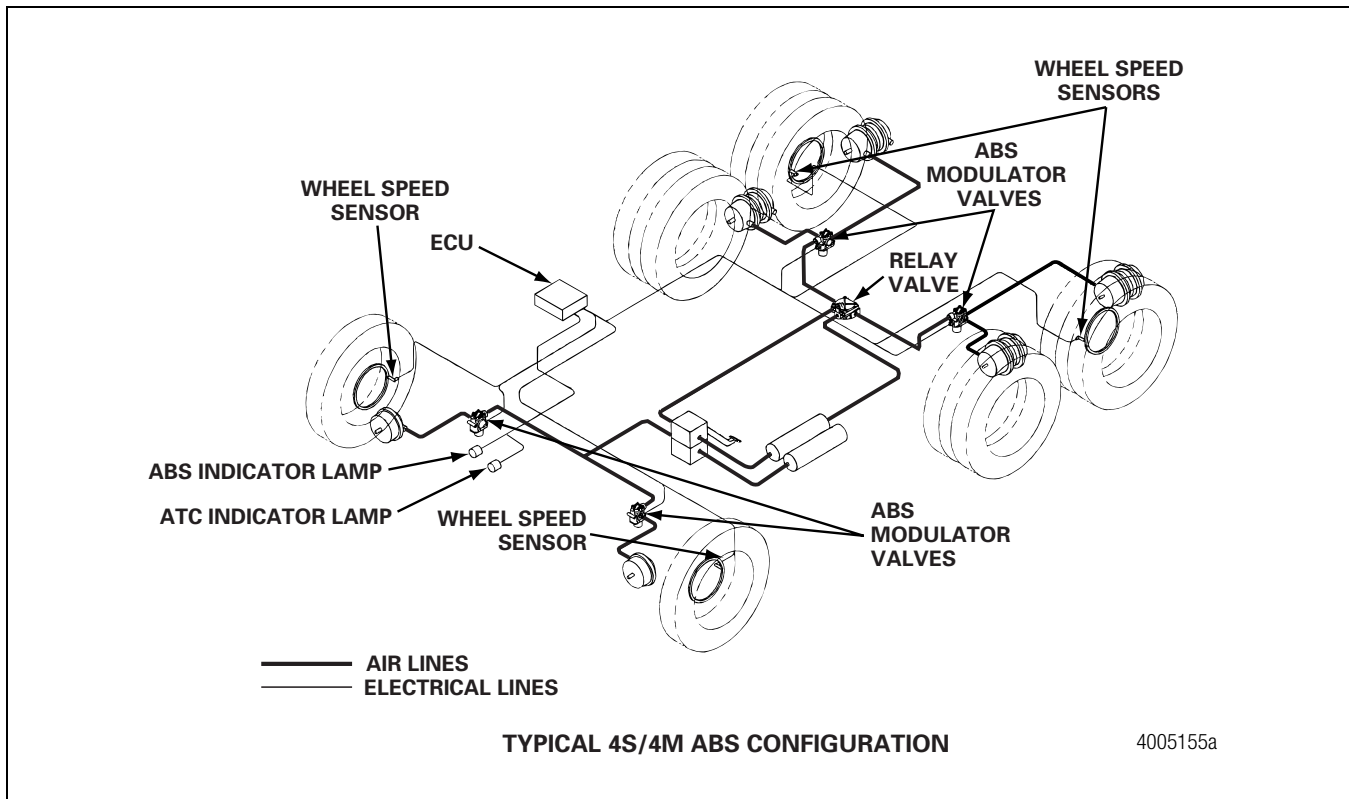
- The ABS ECU is required to control the vehicle retarder system such as an engine brake or driveline retarder. Use a relay when the J1939 is not available and a retarder is installed.

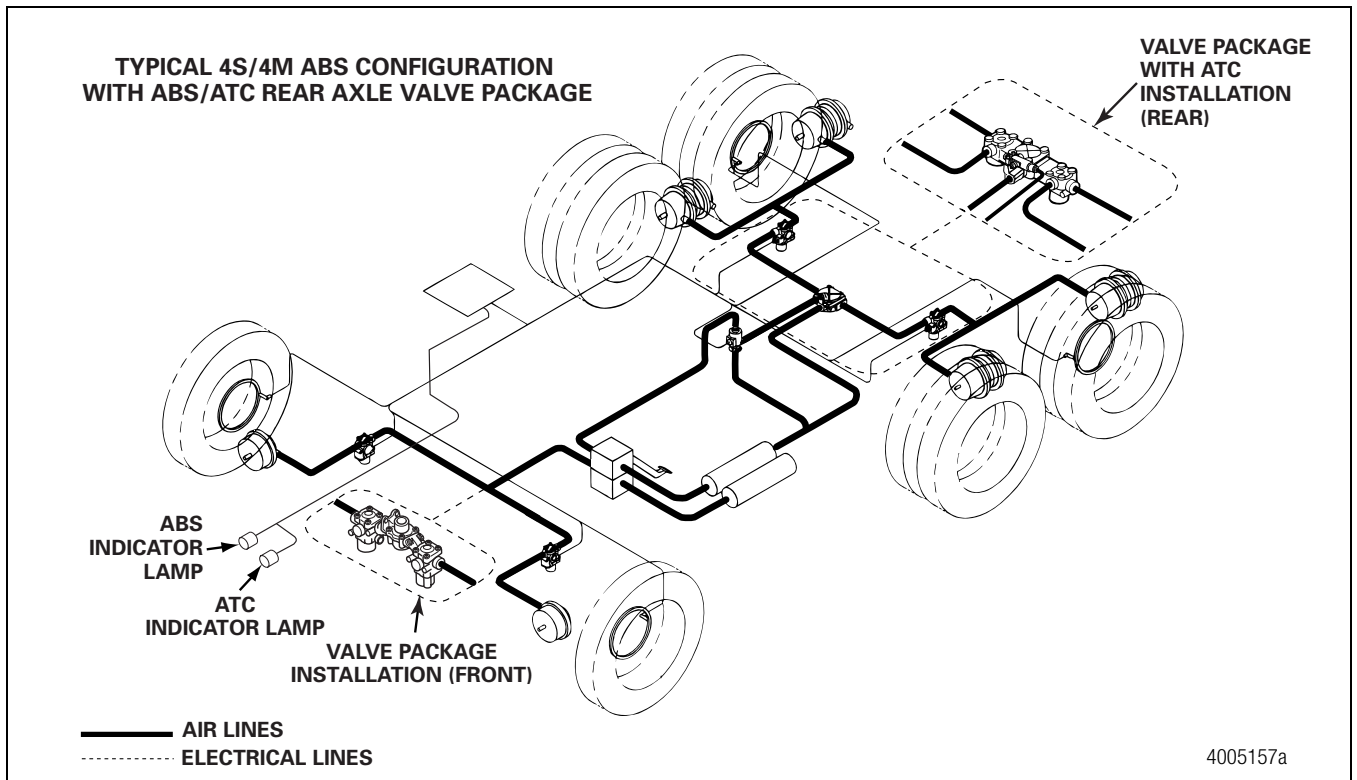
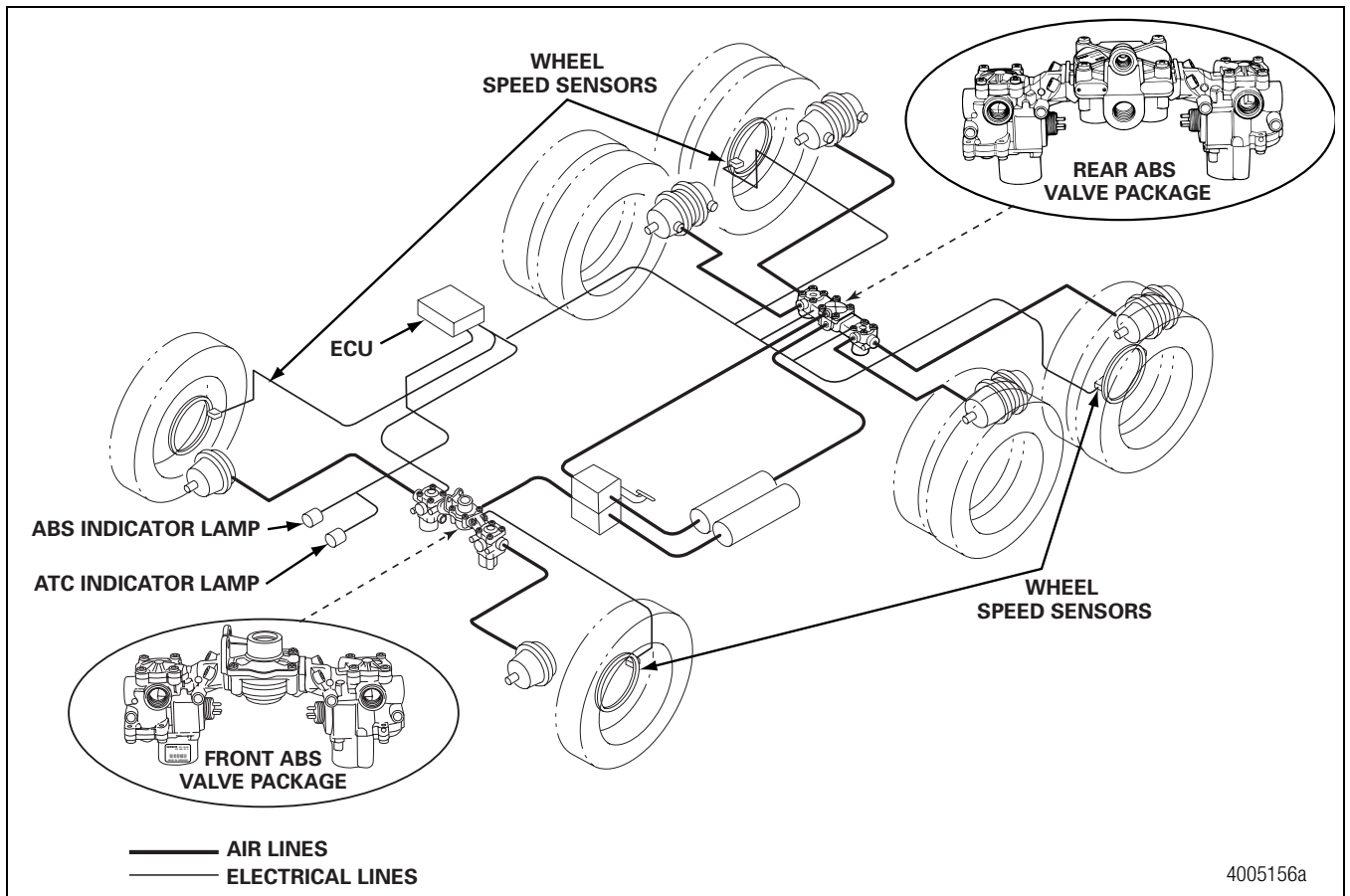
SAE J1587 Diagnostics Data Link

- This is the SAE Standard Heavy Vehicle Data Link used for communicating diagnostic information to standard diagnostic tools. Use a standard 9-pin connector that conforms to SAE J1939-13 specifications.
- Install the connector for easy access to technicians (normally under dash left of steering wheel).
- Cable wiring used to connect ABS ECU to J1587 connector must be a minimum of 18 gauge twisted pair wire with no less than one turn per inch in accordance with SAE J1708.

SAE J1939 Powertrain Control Interface

- This is the SAE Standard Heavy Vehicle Data Link used for communication between powertrain controllers, such as ABS ECU and Engine ECM, transmission and retarder.
- The J1939 wires must conform to SAE (J1939/15) recommended practice.





Meritor WABCO E-Version ABS Checklist

Table A: ABS Identification

Vehicle ID Number _____ Inspector's Name _____ Date _____

Step 1. Turn ignition on. Connect diagnostic program.

Step 2. Record the following ECU information.
 ECU Part Number _____
 ECU Manufacturer Date Code _____ ECU Serial Number _____

Step 3. Component test for ABS Modulator Valve operation. Check the location and function of each valve. With the brake pedal applied, you should hear four short air exhausts (Decreasing) and one long air pressure hold (Holding).

Table B: Valve Function Tests

Valve Function Tests	Identification	OK	Not OK	N/A
Modulator Valve Cycle	Left Front Steer Axle			
Modulator Valve Cycle	Right Front Steer Axle			
Modulator Valve Cycle	Left Rear Drive Axle			
Modulator Valve Cycle	Right Rear Drive Axle			
Function Test	6 Channel System Only	OK	Not OK	N/A
Modulator Valve Cycle	Left Rear Drive Axle			
Modulator Valve Cycle	Right Rear Drive Axle			
ATC Valve Function Test	For ATC, use TOOLBOX™ Automated Test			

Step 4. Component test for sensors. Check the location and voltage output of each sensor. The AC voltage output should be greater than 0.5 volts @ 30 rpm.

Table C: Sensor Function Tests

Sensor Function Tests	Identification	OK	Not OK	N/A
Sensor Output	Left Front Wheel Steer Axle			
Sensor Output	Right Front Wheel Steer Axle			
Sensor Output	Left Rear Drive Axle			
Sensor Output	Right Rear Drive Axle			
Function Test	6 Sensor System Only	OK	Not OK	N/A
Sensor Output	Second Left Rear Drive Axle			
Sensor Output	Second Right Rear Drive Axle			

Step 5. Component Testing

Table D: Other Function Tests

Other Function Tests	Identification	OK	Not OK	N/A
ATC Lamp (AISG if installed)	On/Off			
ABS Lamp (Tractor ABS)	On/Off			
Trailer ABS Lamp	On/Off			
ATC Switch, Deep Mud/Snow				
ABS Switch, Off-Road	Full System Only (when equipped)			
ABS Blink Code Switch				
ATC Switch				
Engine Data Link				
Relay	Basic and Full (when equipped)			

Step 6. The ABS Indicator lamp goes out a few seconds after starting the engine. Yes No
 (After an initial drive of five mph)

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