

User's Manual

TOOLBOXTM SOFTWARE

Diagnostic and On-Screen Service Instructions For:

- ▶ Pneumatic ABS (D and E Versions)
- ▶ Trailer ABS (Easy-StopTM and Enhanced Easy-StopTM with PLC)
- ▶ Hydraulic ABS (HABS)
- ▶ Hydraulic Power Brake (HPB)
- ▶ Electronic Leveling Module (ELM) for Tractors
- ▶ Electronic Leveling Module (ELM) for Trailers
- ▶ Electronically Controlled Air Suspension (ECAS) for Buses

MERITOR WABCO

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Introduction

Meritor WABCO TOOLBOX™ Software provides PC diagnostic capabilities for Meritor WABCO tractor and trailer pneumatic ABS, hydraulic ABS, the electronic leveling module (ELM) for both tractor and trailer and Electronically Controlled Air Suspensions (ECAS) for buses. The program provides four basic functions:

- Displays both constant (e.g., ECU number) and changing (e.g., RPMs) information from the system under test.
- Displays both active and stored system faults, as well as the appropriate repair instructions.
- Provides a link to service information testing procedures, etc. (ABS and HABS only)
- Activates system components to verify system integrity, correct component operation and installation wiring.

NOTE: For complete Meritor WABCO maintenance information, refer to the appropriate maintenance manual which is listed in this manual at the beginning of each product section. For copies of Meritor WABCO service literature, contact the ArvinMeritor Customer Service Center at 800-535-5560 or visit our website: meritorwabco.com

System Requirements

- Pentium-based personal computer
- Microsoft Windows® 98^①, Me, 2000, NT or XP^②. Internet Explorer version 3.02 or higher must be installed.

NOTE: You must have Administrator Privileges to install TOOLBOX™ Software, versions 5.0 and higher, on Windows® NT. For earlier versions, Administrator Privileges are required to install and run TOOLBOX™ on Windows® NT.

- 64 MB RAM
- Approximately 10.0 MB hard disk space for each program. 60 MB hard disk space for full install
- CD-ROM drive
- RS232 to SAE J1708 or RS232 to PLC converter cable
- Serial Port. RS232-SAE J1708 interface adapter required
- Meritor WABCO recommends using a mouse with this program

Windows® is a registered trademark of the Microsoft Corporation.

① Windows® 98 is not recommended for TOOLBOX™ versions 4.2 or higher.

② Windows® versions approved for use with TOOLBOX™ as of 08/05.

Installation

Follow the instructions included with TOOLBOX™ Software to install the program on your computer.

The installation screen offers three types of installations: Typical, Compact and Custom. Select **Typical** or **Compact** to install tractor, trailer and hydraulic ABS diagnostic programs. Select **Custom** to install only one or two of these programs.



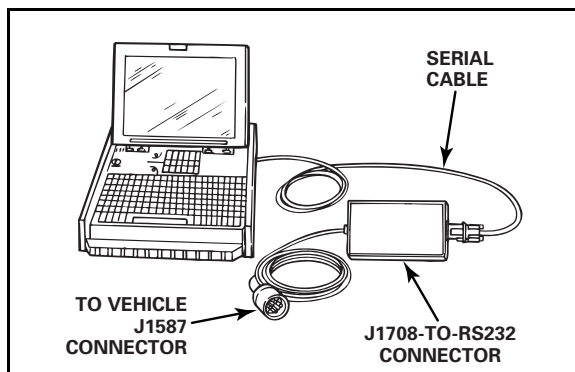
After installation, Meritor WABCO TOOLBOX™ Software will be available on your desktop as an icon and under the Windows® start menu.

Refer to "System Setup" on page 5 for first-time use instructions.

NOTE: An RS232 to J1708 or RS232 to PLC converter box attached to the communications port on your computer (COM1 or COM2) is required. Converter boxes that have been tested and proven satisfactory are Noregon, MPSI, B&B Devices, Kent-Moore and Dearborn Group.

Starting TOOLBOX™ Software

1. Attach the RS232 to J1708 converter cable from your computer's serial port to the converter box.
2. Attach the diagnostic cable (Deutsch) to the vehicle.



At start-up, select the **TOOLBOX™ Software** icon from Desktop or from the Windows® Start Menu to display the MAIN MENU.

Main Menu



ABS Menus and Toolbars are illustrated and explained in this manual, as follows:

| | |
|-----------------------------|-------------|
| Tractor ABS | pages 11-21 |
| Trailer ABS | pages 23-36 |
| Hydraulic ABS | pages 37-47 |
| Hydraulic Power Brake (HPB) | pages 49-57 |
| ELM for Tractors | pages 61-65 |
| ELM for Trailers | pages 67-72 |
| ECAS for Buses | pages 73-88 |

Most TOOLBOX™ features are accessible through pull down menus. Many of these features may also be accessed by a shortcut icon. When a shortcut is available, the appropriate icon is illustrated to the left of the copy.

At the **Main Menu** you may select a shortcut icon to:



Exit TOOLBOX™

Go to Tractor ABS diagnostics

Go to Trailer ABS diagnostics

Go to Hydraulic ABS (HABS) diagnostics
OR Go to Hydraulic Power Brake (HPB) diagnostics

Go to Electronic Leveling Module (ELM) for Tractors

Go to Electronic Leveling Module (ELM) for Trailers

Go to Electronically Controlled Air Suspension (ECAS) for Buses

Main Menu

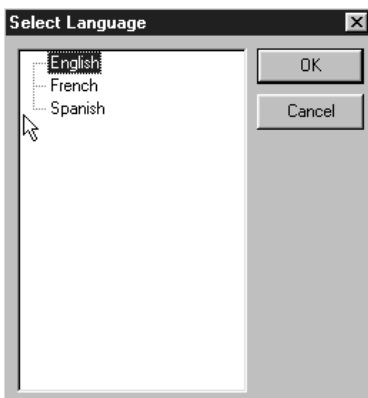
System Setup Select **System Setup** from the **Main Menu**.



Language

Select **Language** from the **System Setup** menu. The default is English. To change the default to French or Spanish (ABS only):

1. Select the appropriate language.
2. Click OK to accept the selection.



Select ECU



Tractor
ABS



ELM
Tractor



Trailer
ABS



ELM
Trailer



Hydraulic
ABS/HPB

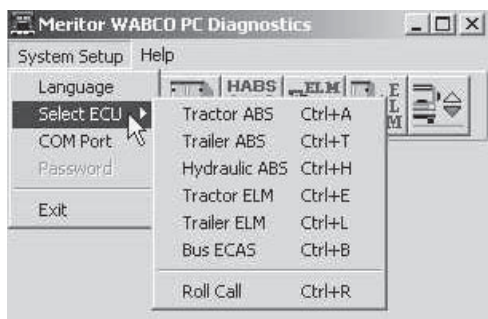


ECAS

Click on **Select ECU** from the **System Setup** menu, then select the type of ABS to be tested. Click on the appropriate Meritor WABCO product icon to display the **Main Menu** for that program.

Roll Call displays all actively broadcasting ECUs.

NOTE: TOOLBOX™ diagnostics cover only Meritor WABCO ECUs.



The correct **Vendor**, **Protocol** and **Device** selections are essential. TOOLBOX™ will not operate correctly if these selections are not accurate. For assistance, contact the ArvinMeritor Customer Service Center at 800-535-5560.

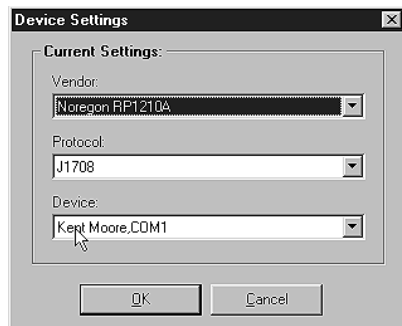
COM Port

Palm Pilot Conflict:

- Go to Palm Pilot Setup Menu.
- Change COM port to COM port 3.
- Reboot PC.

TOOLBOX™ cannot be installed on a Palm Pilot.

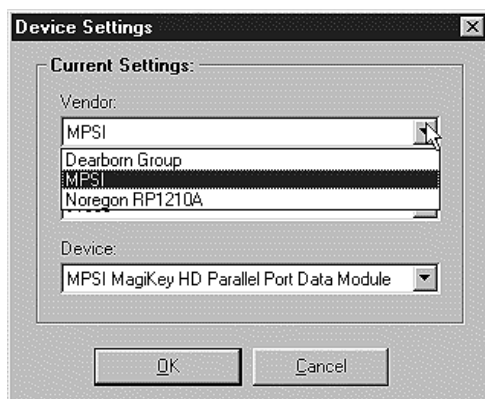
From the **System Setup** pull down menu, select **COM Port** to display the **Device Settings** menu. Current settings will be shown.



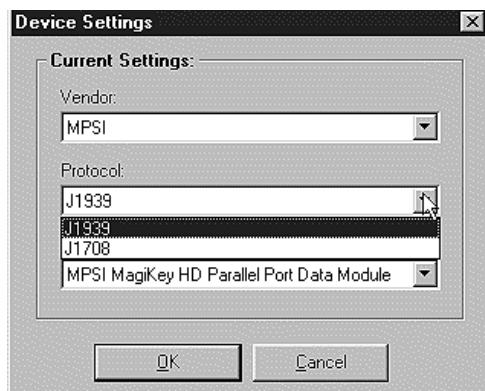
To change these selections:**Vendor**

(Vendor name should appear on the parts label on the connector box)

Click on the down arrow for a list of **vendor** choices. Select the appropriate vendor.

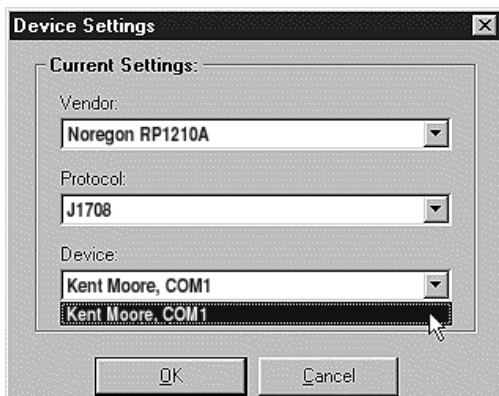
**Protocol**

Click on the down arrow for the **protocol** choices.



Device

Click on the down arrow for the **device** choices. Select the device and port to which the data cable is connected.



Click OK to accept the selections and close the **Device Settings** window.

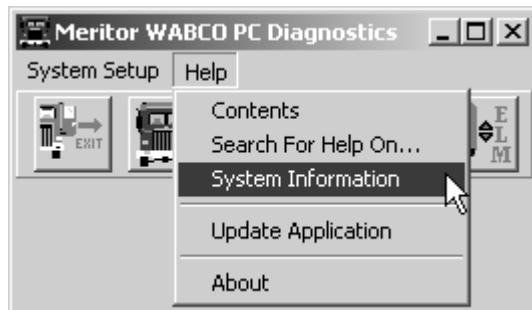
Help



Select the **Help** icon for help in using Meritor WABCO TOOLBOX™ Software. Help is accessible from all TOOLBOX™ pages. Search by title (**contents**) or type in a specific topic (**search for help on**).

System Information

Select **System Information** and follow the screen prompts to print a report of system hardware: operating system version, drivers, etc. Run this report whenever you contact the ArvinMeritor Customer Service Center.



Update Application

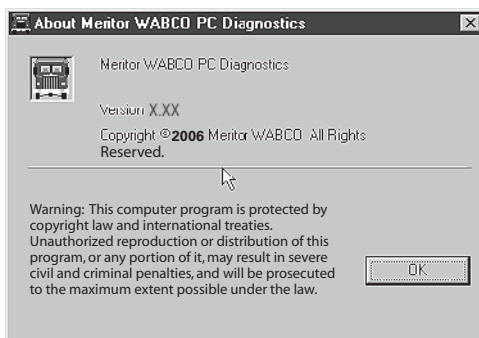
(Versions 5.0 and Higher)

Select **Update Application** to download future revisions to TOOLBOX™. This option is available for TOOLBOX™ version 5.0 and higher. Follow the screen prompts to complete the download.



About

Select **About** from the pull down menu for information about Meritor WABCO TOOLBOX™ Software, including the version number. You may need this information if you call the ArvinMeritor Customer Service Center.



Tractor ABS

Reference Material

For maintenance and repair information, refer to the appropriate Meritor WABCO Truck, Tractor and Bus ABS Maintenance Manual:

MM-30 D Version ABS
MM-0112 E Version ABS



NOTE: TOOLBOX™ Software must be connected to the vehicle and the vehicle ignition must be ON in order to display information.

TRACTOR ABS MENUS AND TOOLBARS

Select **Tractor ABS** from the **TOOLBOX™ Main Menu**. The **Tractor ABS Main Menu** will appear.

Main Menu

ENGINE DATA LINK —
If ECU has Roll Stability Control (RSC), engine data link will indicate J1989-RSC.

This screen provides icons and pull down menu task selections. It also provides information about the current state of Meritor WABCO ABS. ECU information is read once from the ECU and does not change. All other information (e.g., wheel sensors, control status, voltages, faults and road speed) is read and updated continuously.

The status of ABS switches and lamps as well as other data may be observed from this screen.

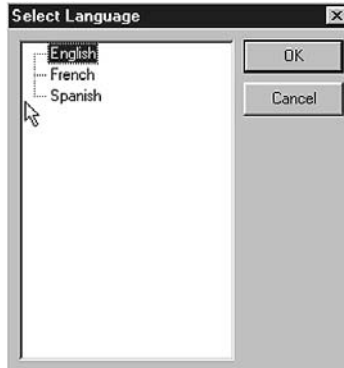
Restart Exit Help

From the **Main Menu** you can select **Restart**, **Exit** or **Help**.



Tractor ECU

Select **Tractor ECU** from the **Tractor ABS Main Menu**. A pull down menu will appear.

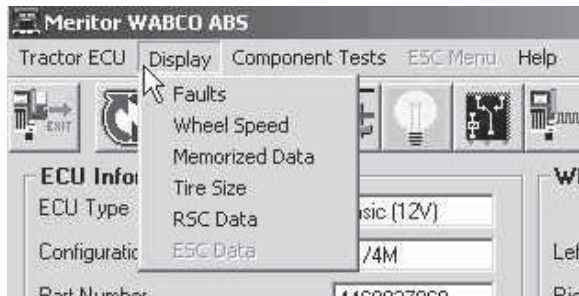


Refer to page 5 of this manual for information about using the **Language** selection.

Select **Restart** to refresh (update) ECU information.

Display

Select **Display** from the **Tractor ABS Main Menu**. A pull down menu will appear.



Faults



Select **Faults** from the pull down menu. The **Fault Information** screen will appear.

| Num | Fault Name | Type | Times | SID | FMI |
|-----|------------------|--------|-------|-----|-----|
| 1 | Retarder - Open | Stored | 3 | 13 | 5 |
| 2 | ATC Valve - Open | Stored | 3 | 18 | 5 |

Repair Instructions:

Retarder output pin is not connected to a load. Load was once detected or SAE engine message is missing, but was once received.

Update Clear Faults Print Save Exit

A description of the fault, the number of times the fault occurred, the system identifier (SID) and the failure mode (FMI) are all displayed in the fault information window. Basic repair instructions for each fault are also provided.

- Bookmarks — Complete listing of ABS fault codes by SID/FMI. Click to display.
- Thumbnails — Click individual pages to display.

For detailed repair instructions, click on the fault to display a troubleshooting information sheet. **Bookmark** and **Thumbnail** tabs at the side of the troubleshooting information sheet provide additional information. A sample troubleshooting information sheet appears in the Appendix. This screen also provides a link to the appropriate system schematic.

Faults that may occur after the screen is displayed will not appear until a screen update is requested. Use the **update** button to refresh the fault information table.

After making the necessary repairs, use the **clear faults** button to clear the fault. Use the update button to refresh the fault information table and display the new list of faults.

Use the **Save** or **Print** button to save or print the fault information data.

Wheel Speed

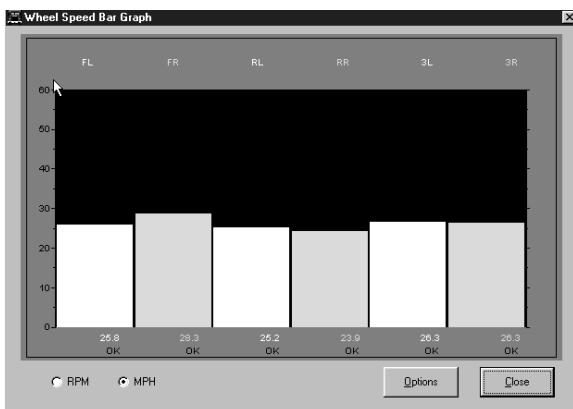
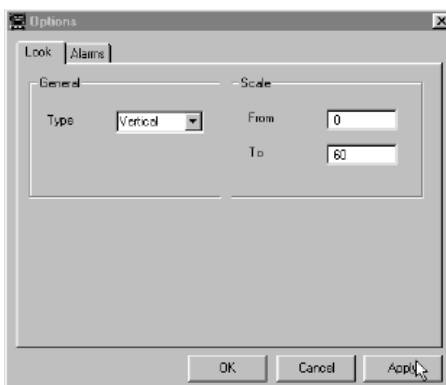


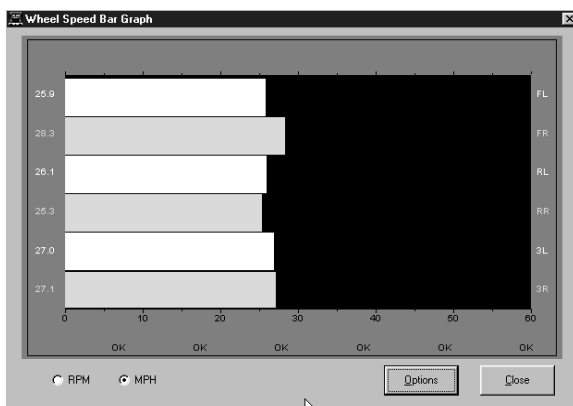
Select **wheel speed** from the pull down menu to display wheel speed data in both numeric and graph form.



Wheel speed information may be viewed in RPM (revolutions per minute) or MPH (miles per hour). Select the appearance and style from the **options** menu.

Display wheel speed data vertically or horizontally.



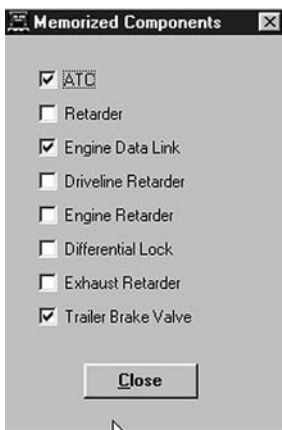


Memorized Data

(E Version
ABS Only)

Select **Memorized Components** from the pull down menu.

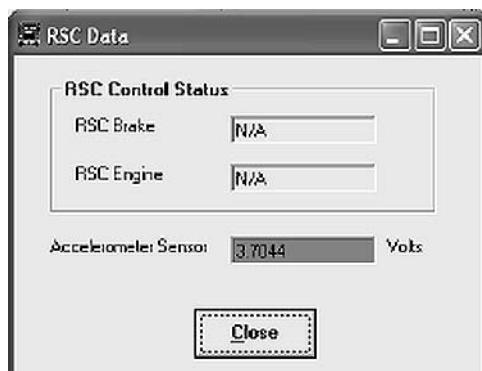
NOTE: Use Display/Memorized Components to view data. To clear a memorized component, use the Memorized Components function that appears on the Component Tests Menu.



RSC Data

*(E Version
ABS Only)*

Select **RSC Data** from the pull down menu for RSC status information:



For RSC Control Status:

NA — RSC is not an option

OFF — RSC is installed but is not currently active

For Accelerometer sensor:

Acceptable range is 2.21-2.78 volts

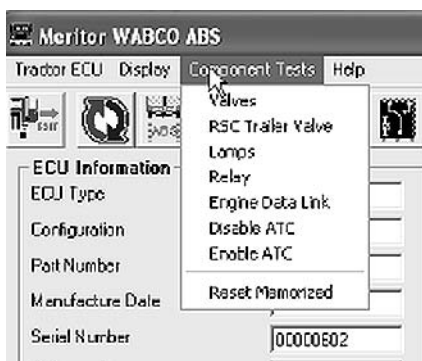
A **red** background in this field indicates voltage is outside of the acceptable range.

A **green** background in this field indicates voltage is within the acceptable range.

Component Tests

Select **Component Tests** from the **Tractor ABS Main Menu**. A pull down menu will appear.

NOTE: Components for test may also be selected from the icons on the **Tractor ABS Main Menu**.



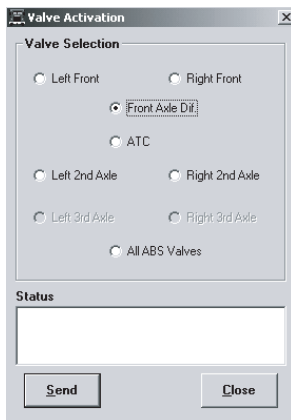
Valves



Select **Valves** from the pull down menu to select and cycle individual ABS modulator valves. Then, listen to ensure the correct valve is cycling. This is also helpful in verifying correct operation, installation and wiring.

Select **all valves** from the menu to cycle all available ABS valves in the order shown below.

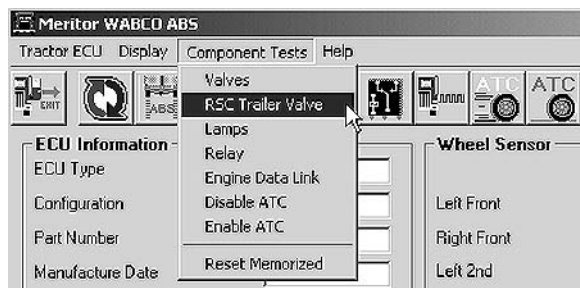
NOTE: Verification of the ATC valve is also available from this menu.



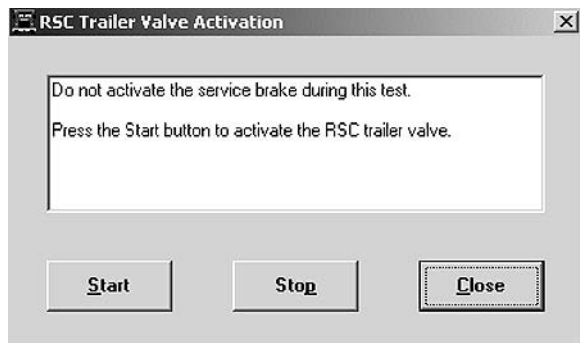
RSC Trailer Valve

(E Version
ABS Only)

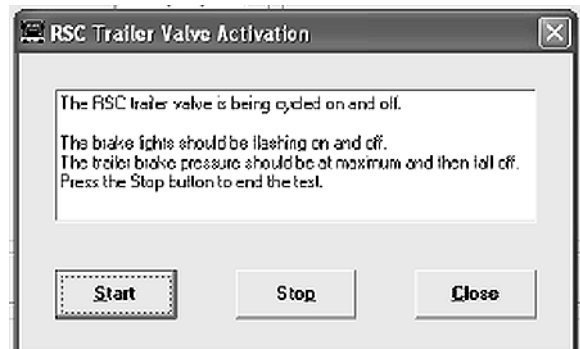
Select **RSC Trailer Valve** from the pull down menu to cycle the RSC trailer valve.



NOTE: Do not activate the service brake while testing the RSC trailer valve.



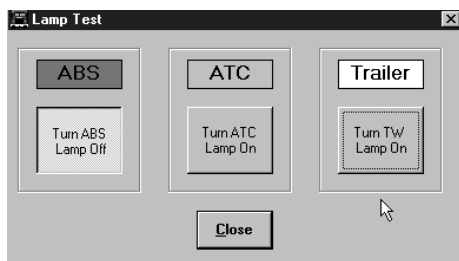
Press **Start** to begin the test.



Lamps



Select **Lamps** from the pull down menu to turn the tractor ABS, trailer ABS or ATC (wheel spin) indicator lamps on or off.



This is helpful in verifying correct operation, installation and wiring of the lamps to the ECU.

Relay



Select **Relay** from the pull down menu to turn the Retarder Relay on or off.

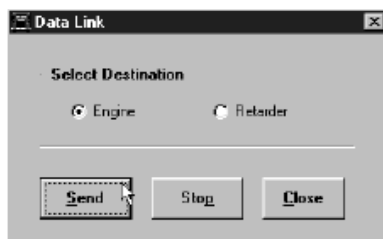
This is helpful in verifying correct operation, installation and wiring of the unit under test.



Engine Data Link



Select **Engine Data Link** from the pull down menu to send a “limit engine torque” command to the engine or a “disable retarder” command to the retarder.

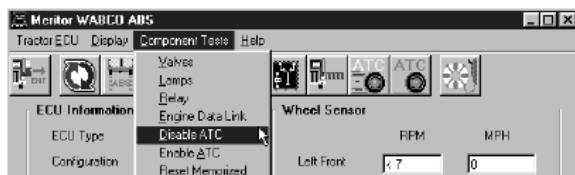


Disable ATC



Select **Disable ATC** from the pull down menu to send a command to the ECU to disable automatic traction control. ATC will remain disabled until the enable command is sent or the vehicle ignition is cycled. The status bar on the Main Menu reflects the current state of the ATC function, either Enabled, Disabled or N/A (not available).

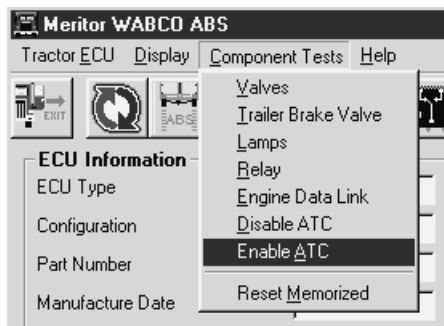
Using the **Disable ATC** command is useful and essential for dynamometer testing.



Enable ATC



Select **Enable ATC** from the pull down menu to send a command to the ECU to enable automatic traction control. This is the normal state of the ECU. The status bar on the Main Screen reflects the current state of the ATC function, either Enabled, Disabled or N/A (not available).



Reset Memorized

Select **Reset Memorized** from the pull down menu to tell the ECU to reset the memorized or “learned” components.

The ECU has the ability to learn the following components: ATC valve, engine data link and retarder relay. Once any of these have been detected, the ECU expects to see them each time the ECU is powered on. If they are not seen, the ECU records a fault.

Because there are times when an ECU is moved to another vehicle — or during diagnostic testing — you may want the ECU to disregard these learned components. Use the **Reset Memorized** command for this purpose.

Trailer ABS

Reference Material

For maintenance and repair information, refer to the appropriate Meritor WABCO Trailer ABS Maintenance Manual:

- MM-33 Easy-Stop™ Trailer ABS
- MM-0180 Enhanced Easy-Stop™ with PLC Trailer ABS



NOTE: TOOLBOX™ Software must be connected to the vehicle and the vehicle ignition must be ON in order to display information.

TRAILER ABS MENUS AND TOOLBARS

Select **Trailer ABS** from the **TOOLBOX™ Main Menu**. The **Trailer ABS Main Menu** will appear.

Main Menu

Meritor WABCO Trailer ABS Diagnostics

Trailer ECU Display Component Tests Modify Help

ECU Information

| | | | |
|---------------|-------------|-------------------|----------|
| ECU Type | Trailer TCS | Manufacture Date | 41/1997 |
| Configuration | 4S/2M | Serial Number | 70000160 |
| Part Number | 4461080011 | Software Revision | V321 |

Faults

| | |
|----------|------|
| Existing | None |
| Stored | None |

Wheel Sensor Speed (RPM)

| | | | |
|-----|-----|-----|-----|
| YE1 | < 7 | BU1 | < 7 |
| YE2 | < 7 | BU2 | < 7 |

Voltages

| | |
|-----------|--------|
| Primary | 13.662 |
| Secondary | 0.0 |
| Internal | 13.662 |

Service Information

| | |
|---------------|-------|
| Current Miles | 16 |
| Service Miles | 16 |
| Revs/Mile | 493.0 |

Message Center:

This menu provides icons and pull down menu task selections. It also provides information about the current status of Meritor WABCO ABS.

ECU information is read once from the ECU and does not change. All other information (e.g., wheel sensors, voltages and fault information) is read and updated continuously.

NOTE: Double click on Yes in the Existing or Stored Faults fields to bring up the Fault Information screen. This screen is illustrated on page 76.

Service Information may also be observed from the **Trailer ABS Main Menu**.

Restart Exit Help

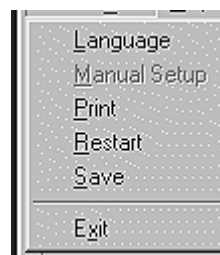
From the **Main Menu**, you can select **Restart**, **Exit** or **Help**.



Trailer ECU

Select **Trailer ECU** from the **Trailer ABS Main Menu**. A pull down menu will appear.

Language Restart



Refer to page 5 of this manual for information about using the **Language** selection.

Select **Restart** to refresh (update) ECU information.

Manual Setup

The **Manual Setup** menu selection is not available.

Print

To print vehicle data in a report format.

1. From the Trailer ECU pull down menu, select **Print**. The **Report Information Screen** will appear.
2. Enter the VIN and Employee number for the report you want to print.
3. Click OK to print and close the window.

NOTE: Selecting the **Print** function does not save report data. You must save all data according to the instructions given in Save, above.



Save

To save vehicle data in a report format:

1. From the Trailer ECU pull down menu, select **Save**. The **Report Information Screen with path selections** will appear.
2. Enter the VIN and Employee number.
3. Select the file where vehicle reports are stored; e.g., Main.
4. Click OK to close the window.

Report Information

Enter Report Information

VIN:

1234

Employee:

9876

Select the path to store the file:

c: [VCS98TS]

C:\

Program Files

WABCO

WIN95

Main

OK

Cancel

NOTE: Trailer ABS reports are not displayed in TOOLBOX™. To view a report, use Windows Explorer to find and open the report file. The following is a sample report.

| Meritor WABCO ABS Fault Report | | | | | | |
|--------------------------------|---|-----------------------------|-----|-----|-------|--|
| Date: | | September 13, 2000 | | | | |
| Time: | | 5:25 PM | | | | |
| Page: | | 1 | | | | |
| VIN: | | 12345678 | | | | |
| Employee Information: | | KILEY | | | | |
| ABS System Configuration: | | 4S/2M | | | | |
| ECU Revision: | | V 3 2 2xxxx | | | | |
| Part Number: | | 446-108-000-1 | | | | |
| Serial Number: | | 5 9 3 0 3 9 4 8 8xxxxxxxxxx | | | | |
| Date of Manufacture: | | 13/1999 | | | | |
| Current Miles: | | 0.0 | | | | |
| Service Miles: | | 0.0 | | | | |
| Tire Calibration: | | 495.0 | | | | |
| Fault# | Description | Status | SID | FMI | Count | |
| 1 | Ext. modulator BLUE open circuit detected | Active | 9 | 5 | 1 | |
| 2 | Ext. modulator BLUE open circuit detected | Stored | 9 | 5 | 1 | |
| Sensor Test Results: | | | | | | |
| Sensor | Max RPM | Order | | | | |
| YE1 | 40.0 | 1 | | | | |
| YE2 | 59.0 | 2 | | | | |
| BU1 | 50.0 | 3 | | | | |
| BU2 | 38.0 | 4 | | | | |
| Valve Tests Performed: | | | | | | |
| Valve | Status (Tested / Not Tested / NA) | | | | | |
| Yellow | Tested | | | | | |
| Blue | Tested | | | | | |
| Red | N/A | | | | | |

Display

Select **Display** from the **Trailer ABS Main Menu**. A pull down menu will appear.



Faults

Select **Faults** to display the Fault Information Screen.

NOTE: The Fault Information Screen is also accessible from the **Trailer ABS Main Menu**. Refer to page 23.

Fault Information

A screenshot of the 'Fault Information' window. It contains a table of faults and a section for repair instructions.

| NUM | FAULT NAME | TYPE | TIMES | SID | FMI |
|-----|----------------------------------|--------|-------|-----|-----|
| 1 | Sensor YE1 open or short circuit | ACTIVE | 1 | 4 | 5 |

Repair Instructions:
Open or short circuit is detected. Check sensor wiring/connectors. Resistance of sensor should be 500-2000 ohms. Replace sensor if necessary.

Buttons at the bottom: Update, Clear Faults, Print, Save, Exit.

The **Fault Information Screen** contains a description of each fault, including the type of fault (Active or Stored), SID and FMI number. Repair instructions for the fault appear at the bottom of the screen.

- Bookmarks — Complete listing of ABS fault codes by SID/FMI. Click to display.
- Thumbnails — Click individual pages to display.

For detailed repair instructions, click on the fault to display a troubleshooting information sheet. **Bookmark** and **Thumbnail** tabs at the side of the troubleshooting information sheet provide additional information. A sample troubleshooting information sheet appears in the Appendix. This screen also provides a link to the appropriate system schematic.

Faults that occur after the screen is displayed will not appear until a screen update is requested. Use the **Update** button at the bottom of the screen to refresh the fault information table and display a new list of faults.

After making any required repairs, use the **Clear Faults** button to clear the fault. Clear each fault as it is repaired.

Use the **Save** or **Print** button to save or print the fault information data. Please refer to page 25 for complete information about Save and Print functions.

Component Tests

Select **Component Tests** from the **Trailer ABS Main Menu**. A pull down menu will appear.

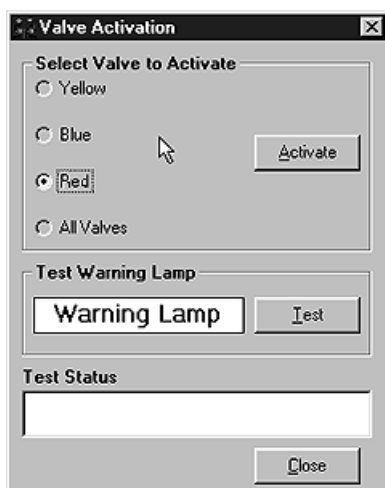


NOTE: Sensor Orientation Test option is only available with TCSII (Enhanced Easy-Stop™) ECUs. It will not appear as a menu choice for Easy-Stop™ ECUs.

Valve and Lamp Activation



Select **Valves/Lamp** to display the **Valve Activation** screen. From this screen you can check the status of the trailer ABS valves and the ABS indicator lamp mounted on the trailer.



Valves

2S/1M Systems

S = Sensors

M = Modulator Valves

The **Red** valve indicator will be selected. Click on the **Activate** button and listen for the valve to click, indicating a good installation.

2S/2M, 4S/2M and 4S/3M Systems

The **Yellow** valve indicator will be selected. Click on the **Activate** button and listen for the valve to click, indicating a good installation. Repeat for the **Blue** valve.

NOTE: Selecting **All Valves** will sequence all of the valves, beginning with the Yellow valve.

As each valve is cycled, the **Test Status** box at the bottom of the screen will display the status of the test.

Lamp

Click on the **Warning Lamp Test** button on the bottom of the valve and lamp activation screen to activate the lamp that is mounted on the side of the trailer. The lamp will flash eight times, indicating the lamp is OK. The test status box at the bottom of the menu will display the status.

| Message | Status |
|----------------|---|
| Complete | OK |
| Critical Error | Communication error (If this message occurs, check the cable connections, recycle power.) |

Sensors



This test requires rotating the vehicle wheels. Refer to the maintenance manual to make sure the vehicle is correctly prepared for this test. Follow all of the warnings and cautions printed in the manual.

Select **Sensor Test** to display the **Sensor Test** screen.

| | Max RPM | Order |
|-----|---------|-------|
| YE1 | 14.0 | 1 |
| YE2 | 25.0 | 2 |
| BU1 | 47.0 | 3 |
| BU2 | 29.0 | 4 |

Start Stop

Close



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.

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.

1. Make sure sensed wheel ends are 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. Click on the **Start** button on the **Sensor Test** screen to start the test.
5. 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).
6. Check the screen for sensor output: If Sensor Output is displayed, the sensor test is complete. If there is no Sensor Output, verify tone ring installation and sensor placement (sensor must be pushed all the way in against the tone ring). Refer to the maintenance manual for complete information.

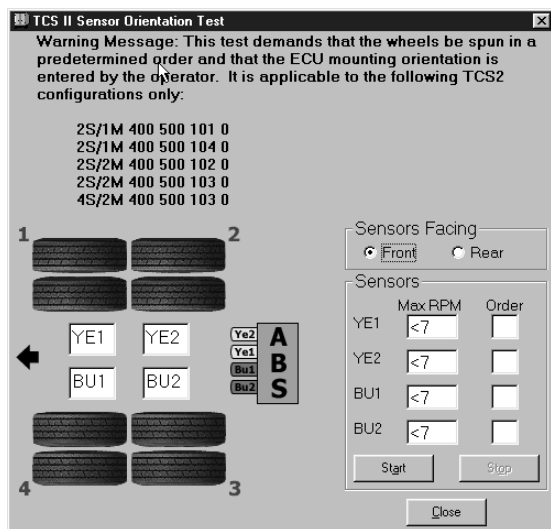
7. Check the **Order** fields to verify sensors were installed in the right location, based on the orientation of the valves.

Sensor Orientation Test

(For Enhanced Easy-Stop™ Only)

If you are using TOOLBOX™ to test an Enhanced Easy-Stop™ system, you can check sensor installation by performing a sensor orientation test.

Select **Sensor Orientation Test** from the pull down menu. The **Sensor Orientation Test** screen will appear.



This test requires that the sensed wheels be spun in a predetermined order and that you enter the ECU mounting orientation. The sensed wheels are rotated in turn, starting at the front curbside, moving to the rear, and ending at the front roadside.

- A correct sensor installation will be displayed in green (Pass).
- An incorrect installation will be displayed in red (Fail).

The results of the sensor orientation test will also appear on the test page printout.

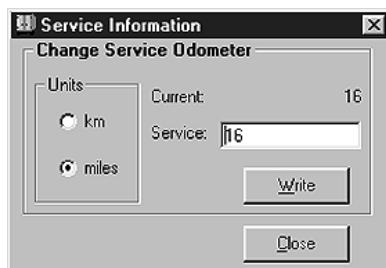
Modify

Select **Modify** from the **Trailer ABS Main Menu**. A pull down menu will appear.



Service Information

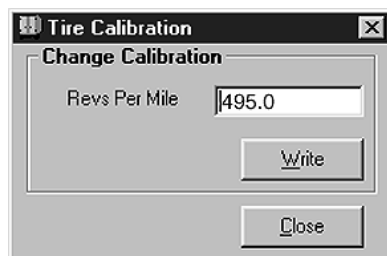
Select **Service Information** to set, change or display the odometer reading for scheduled maintenance.



When the mileage setting selected for scheduled maintenance is reached, the ABS indicator lamp on the side of the trailer will flash eight times. The lamp will continue to flash eight times whenever the ignition switch is turned on, or until service is performed and this parameter is changed. To change the mileage for the next scheduled maintenance, type in the new odometer reading, then press the **Write** button. Maintenance settings may be entered in miles or kilometers.

Tire Calibration

Select ***Tire Calibration*** to set, change or display the revolutions per mile.



Tip: TOOLBOX™ will automatically change some numeric values; e.g., you may type in a number and see a number that is slightly higher or lower displayed. This does not affect calibration accuracy.

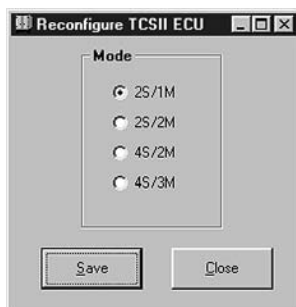
The RPM entry range is 150.0 to 634.0 RPM. The default value is 502.0. RPM figures are calculated based on a 100-tooth tone ring. To change a value, type in the RPM figure, then press the ***Write*** button.

- Trailers with 12-1/4-inch brakes use an 80-tooth tone ring. Use a value of 80 percent of the tire manufacturer's recommended RPM (revolutions x 0.80).

Reconfigure

This option is used to reconfigure an ECU that has been installed on a system with **fewer** sensors or modulator valves than the original system. It is not necessary to reconfigure an ECU installed on a system with **more** sensors or modulator valves than the original system. In these cases, reconfiguration is automatic.

Select **Reconfigure** to display the following screen, then mark the appropriate configuration.



Notebook



Select **Notebook** to enter or view information about a specific vehicle.

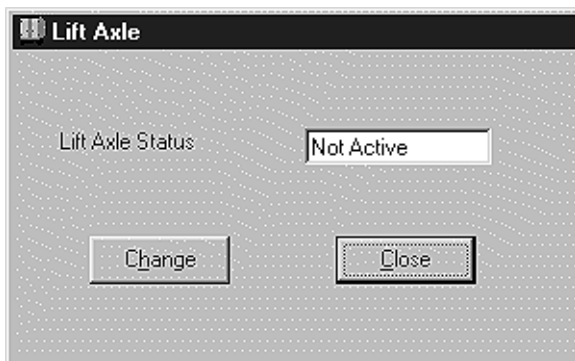
NOTE: The O.E.M. location and production date are automatically saved in Notebook and will appear on this screen once they have been saved to the registry. V.I.N. and inspector must be saved after entering.

Tip: The registry function of Notebook is especially useful to an OEM.

To enter information, type the data, then click on the **Write** button to send the information to the ECU. Use the **Print** button to print the displayed data.

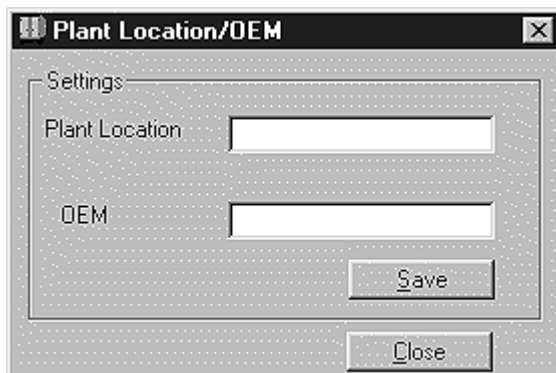
Lift Axle

Select **Lift Axle** to observe or change lift axle status.



Plant Location/ OEM

Select **Plant Location/OEM** to observe or enter plant and OEM information.



Hydraulic ABS

Reference Material

For maintenance and repair information, refer to the Meritor WABCO Trailer ABS Maintenance Manual:

MM-39 Hydraulic ABS for Medium-Duty Trucks, Buses and Motor Home Chassis



NOTE: TOOLBOX™ Software must be connected to the vehicle and the vehicle ignition must be ON in order to display information.

HYDRAULIC ABS MENUS AND TOOLBARS

Select **Hydraulic ABS** from the **TOOLBOX™ Main Menu**. TOOLBOX™ will recognize the HABS or Hydraulic Power Brake (HPB) ECU and display the appropriate screen. If you are working with HPB, refer to the HPB section of this manual.

Main Menu

| ECU Information | |
|------------------|------------|
| ECU Type | HABS (12V) |
| Part Number | 4461090090 |
| Manufacture Date | 48/01 |
| Serial Number | 00013135 |
| Software Rev. | HABS |

| Wheel Sensor | | |
|--------------|-----|-----|
| | RPM | MPH |
| Front Left | 9 | 1.1 |
| Front Right | 9 | 1.1 |
| Rear Left | 9 | 1.1 |
| Rear Right | 9 | 1.1 |

| Faults | |
|--------|----------|
| Yes | Existing |
| None | Stored |

| Learned Component | |
|--|--|
| <input checked="" type="checkbox"/> Retarder Relay | |

| Controller Information | |
|------------------------|-----------|
| Project # | Version # |
| 8 | 10 |
| Channel | Safety |
| 5 | 7 |

| Status | |
|--------------|-------|
| ABS Lamp | On |
| ABS Brake | Off |
| ABS Retarder | Error |

| Voltages | |
|----------|-------|
| Battery | 11.18 |
| Ignition | 11.18 |

1/21/03 9:05 AM

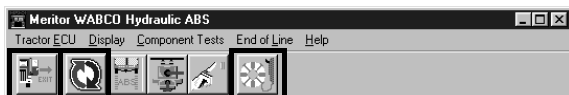
The **Main Menu** provides icons and pull down menu task selections. It also provides information about the current status of Meritor WABCO HABS.

ECU information is read once from the ECU and does not change. All other information (e.g., wheel sensors, voltages and fault information) is read and updated continuously.

NOTE: Double click on Yes in the Existing or Stored Faults fields of the **HABS Main Menu** to bring up the Fault Information screen. Service Information may also be observed from this screen.

From the **Main Menu**, you can select **Restart**, **Exit** or **Help**.

**Restart
Exit
Help**



Tractor ECU

Select **Tractor ECU** from the **HABS Main Menu**. A pull down menu will appear.



**Language
Restart**

Refer to page 5 of this manual for information about using the **Language** selection.

Select **Restart** to refresh (update) ECU information.

Exit

Select **Exit** to exit HABS and return to the TOOLBOX™ **Main Menu**.

Display

Select **Display** from the **HABS Main Menu**. A pull down menu will appear.



Faults

Select **Faults** to display the **Fault Information** screen.

NOTE: The **Fault Information** Screen is also accessible from the **HABS Main Menu**.

| NUM | FAULT NAME | TYPE | SID | FMI |
|-----|------------------------------------|--------|-----|-----|
| 1 | Right Rear Sensor - Incorrect data | ACTIVE | 4 | 2 |

Repair Instructions:

Sensor measurement not correct. Check for broken wire, short to power, or short to ground.

Update Clear Faults Print Save Exit

The **Fault Information** screen contains a description of each fault, including the type of fault (Active or Stored), SID and FMI number. Repair instructions for the fault appear at the bottom of the screen.

- Bookmarks — Complete listing of ABS fault codes by SID/FMI. Click to display.
- Thumbnails — Click individual pages to display.

For detailed repair instructions, click on the fault to display a troubleshooting information sheet. **Bookmark** and **Thumbnail** tabs at the side of the troubleshooting information sheet provide additional information. A sample troubleshooting information sheet appears in the Appendix. This screen also provides a link to the appropriate system schematic.

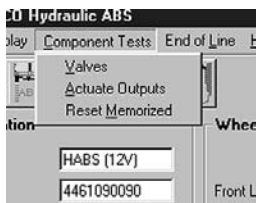
Faults that occur after the screen is displayed will not appear until a screen update is requested. Use the **Update** button at the bottom of the screen to refresh the fault information table and display a new list of faults.

After making any required repairs, use the **Clear Faults** button to clear the fault. Clear each fault as it is repaired.

Use the **Save** or **Print** button to save or print the fault information data. Please refer to page 25 for more information about Save and Print functions. Select **Exit** to close this screen.

Component Tests

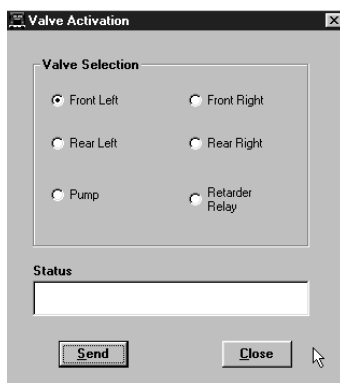
Select **Component Tests** from the **HABS Main Menu**. A pull down menu will appear.



Valves



Select **Valves** to display the **Valve Activation** screen.



The **Valve Activation** screen lets you activate the four valves, the pump and the retarder relay. In addition to checking for correct activation, this screen provides an easy way to make sure the valves are wired correctly — and that wiring is not reversed.

Click on the valve, pump or retarder relay you wish to test, then click on the **Send** button to actuate the component. Component activation status appears in the **status box** field. Use the **Close** button to close this screen.

Actuate Outputs

Select **Actuate Outputs** to display the **Actuate Miscellaneous Output** screen.

Actuate Miscellaneous Output

Output Selection

- ☒ Front Left Inlet
- ☐ Front Left Outlet
- ☐ Front Right Inlet
- ☐ Front Right Outlet
- ☐ Rear Left Inlet
- ☐ Rear Left Outlet
- ☐ Rear Right Inlet
- ☐ Rear Right Outlet
- ☐ Pump Relay
- ☐ Retarder Output
- ☐ ABS Lamp On
- ☐ ABS Lamp Off
- ☐ Valve Relay Off

Status

Send **Close**

This screen provides a check of the ABS indicator lamp. In addition, it provides a way to check either inlet or outlet activity of the valves, pump or retarder relay.

Click on the component you wish to test, then click on the **Send** button to actuate the component. Component activation status appears in the **status box** field. Use the **Close** button to close this screen.

Reset Memorized

Select **Reset Memorized** to display the **Learned Component** screen.



The screenshot shows a rectangular box with a light gray background. Inside the box, the word "Component" is written in a small, dark font at the top left. To the right of "Component", there is a checked checkbox followed by the word "Relay".

Relay is an automatic default and cannot be de-selected. It indicates the ECU has memorized the installed retarder relay. Once the ECU has seen a retarder, it expects to see it every time the vehicle is powered up.

Because there are times when an ECU is moved to another vehicle — or during diagnostic testing — you may want the ECU to disregard this learned component. Use the **Reset Memorized** command for this purpose.

End of Line

Tip: Have a copy of MM 39 or Installation Guide TP-99124 available **BEFORE** you perform a brake bleed. For your convenience, these publications are posted on meritorwabco.com.

The End of Line Brake Bleed Procedure is accessed from the **HABS Main Menu**. Use the Brake Bleed feature to bleed the expansion chambers. (See page 45.)

NOTE: Before connecting the vehicle to the computer, bleed the circuit and master cylinder. Follow the standard bleed procedures used by your facility, or use the procedures listed in Meritor WABCO HABS Installation Guide TP-99124 or HABS Maintenance Manual 39.



WARNING

Failure to bleed the system whenever any hydraulic system fitting is loosened or disconnected will allow air to remain in the system. This will prevent the hydraulic pressure in the brake system from rising enough to apply the brakes correctly. This will cause the stopping distance to increase and can result in serious personal injury.

Correctly discard hydraulic brake fluid that is removed from the brake system. Hydraulic brake fluid that is removed can be contaminated and can cause damage, loss of braking and serious personal injury.

Use only the type of hydraulic brake fluid specified by the equipment manufacturer. Do not use or mix different types of hydraulic brake fluid. The wrong hydraulic brake fluid will damage the rubber parts of the brake caliper and can cause damage, loss of braking and serious personal injury.

Do not let the brake master cylinder fluid get below the minimum level during the bleeding operation. Keep the master cylinder reservoir filled with new DOT-approved brake fluid, as specified by the original equipment manufacturer. Failure to keep the brake reservoir level above minimum could result in more air entering system, making it impossible to effectively bleed the system.

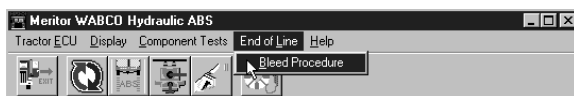
NOTE: Use DOT 3 or DOT 4 hydraulic brake fluid. Refer to the vehicle specifications to determine which fluid to use.



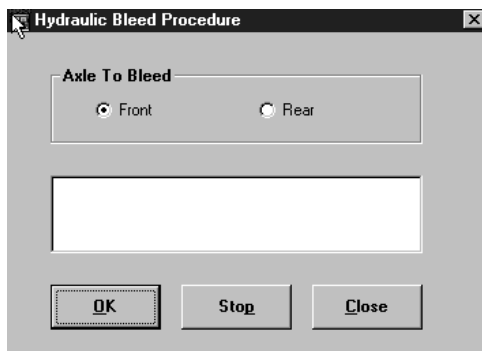
CAUTION

Hydraulic brake fluid is a caustic substance. Contact with hydraulic brake fluid can cause skin irritation. Do not let hydraulic brake fluid touch any painted surfaces, as it will remove the paint. Hydraulic brake fluid may also damage certain non-metal surfaces. Do not let fluid get on brake pads, shoes, rotors or disks.

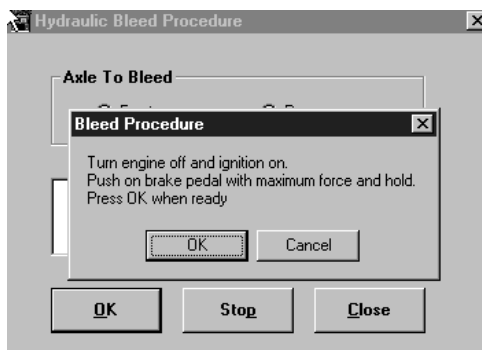
1. Apply the parking brake and block the tires. Turn the ignition off.
2. Perform brake bleed procedure for wet module, bleeding the circuit and master cylinder if required, prior to connecting laptop to truck.
3. Connect laptop to the vehicle using the J1587 diagnostic port in the cab of the truck.
4. Launch Meritor WABCO TOOLBOX™ Diagnostic Software.
5. From the **Main Menu** select the HABS icon.
6. Select **End of Line** from the **HABS Main Menu**.
7. Select **Bleed Procedure** from the **End of Line Menu**.



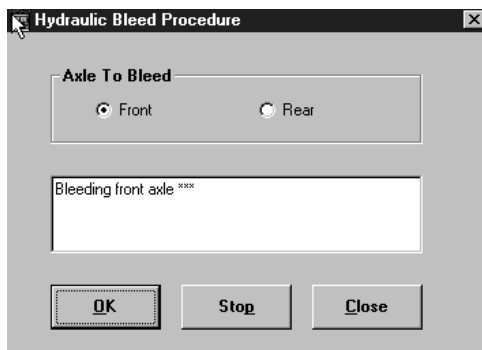
8. Choose axle to bleed from the select axle screen.



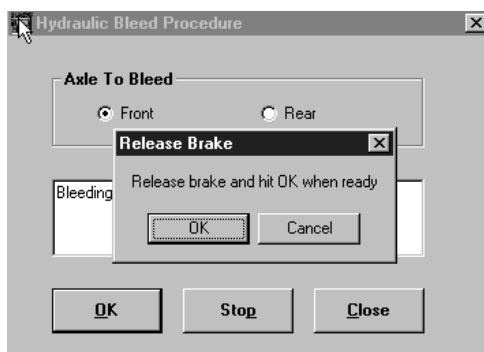
9. Follow on-screen prompts.



Click OK to continue.



Click OK to continue.



10. Repeat procedure two additional times on this axle. This should eliminate all of the air in the chamber.
11. Perform manual bleed on this axle.
12. Repeat Steps 8-11 for the other axle.
13. Test drive the vehicle after bleeding the brakes.
 - If a firm brake pedal resistance is felt and the brake pedal pushes back when you perform an ABS stop, the system bleed procedure is complete.
 - If there is no firm pedal resistance, check the brake system for defects (leaks, etc.) and make the necessary repairs, then repeat the bleed procedure.

Hydraulic Power Brake (HPB)

Reference Material



For maintenance and repair information, refer to the Meritor WABCO HPB Maintenance Manual:

MM-0401 Meritor WABCO Hydraulic Power Brake (HPB) System

NOTE: TOOLBOX™ Software must be connected to the vehicle and the vehicle ignition must be ON in order to display information.

HYDRAULIC POWER BRAKE MENUS AND TOOLBARS

Select **Hydraulic ABS** from the **TOOLBOX™ Main Menu**. TOOLBOX™ will sense the type of ECU being used and will display the **HPB Main Menu**.

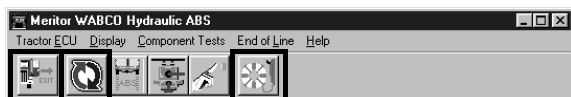
Main Menu

This screen provides icons and pull down menu task selections. It also provides information about the current status of Meritor WABCO HPB.

ECU information is read once from the ECU and does not change. All other information (e.g., wheel sensors, voltages and fault information) is read and updated continuously.

From the Main Menu you can select **Restart**, **Exit** or **Help**.

Restart Exit Help



Tractor ECU

Select **Tractor ECU** from the **HPB Main Menu**. A pull down menu will appear.



Language

Refer to page 5 of this manual for information about using the Language selection.

Restart

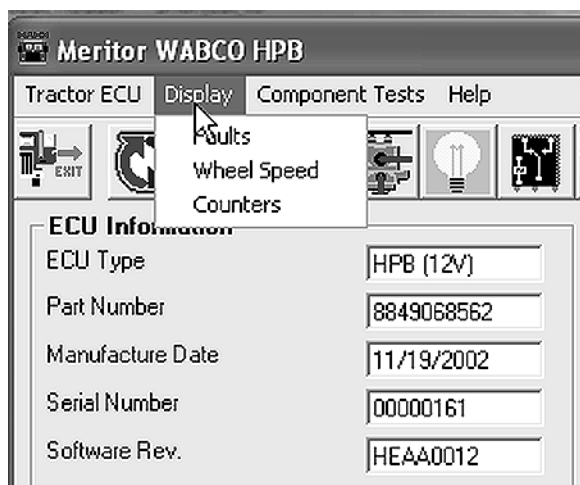
Select **Restart** to refresh (update) ECU information.

Exit

Select **Exit** to exit HPB and return to the TOOLBOX™ **Main Menu**.

Display

Select **Display** from the **HPB Main Menu**. A pull down menu will appear.



Faults

Select **Faults** to display the **Fault Information** screen.

NOTE: The **Fault Information** screen is also accessible from the **HPB Main Menu**.

The screenshot shows a window titled "Fault Information". Inside, there is a table with the following data:

| NUM | FAULT NAME | TYPE | TIMES | SID | FMI |
|-----|---|--------|-------|-----|-----|
| 1 | Right Rear Sensor - Open | ACTIVE | 1 | 4 | |
| 2 | Left Rear Sensor - Open | ACTIVE | 1 | 1 | |
| 3 | Left Rear Sensor - Open | ACTIVE | 1 | 3 | |
| 4 | Right Front Sensor - Open | ACTIVE | 1 | 2 | |
| 5 | J1939 Communication - Message timeout | ACTIVE | 1 | 248 | |
| 6 | Brake Press. Sensor Rear - Shorted to 12V | ACTIVE | 1 | 62 | |

Below the table, there is a section titled "Repair Instructions:" with the text: "Open circuit is detected. Check sensor wiring and connectors for intermittent contact. Replace sensor if necessary."

At the bottom of the window, there are five buttons: "Update", "Clear Faults", "Print", "Save", and "Exit".

The **Fault Information** screen contains a description of each fault, including the type of fault (Active or Stored), SID and FMI number. Repair instructions for the fault appear at the bottom of the screen.

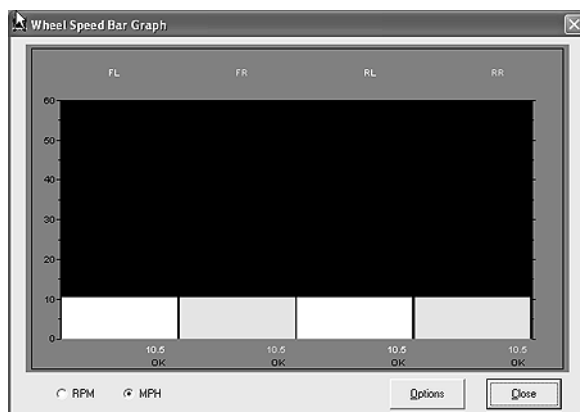
Faults that occur after the screen is displayed will not appear until a screen update is requested. Use the **Update** button at the bottom of the screen to refresh the fault information table and display a new list of faults.

After making any required repairs, use the **Clear Faults** button to clear the fault. Clear each fault as it is repaired.

Use the **Save** or **Print** button to save or print the fault information data. Please refer to page 25 for more information about Save and Print functions. Select **Exit** to close this section.

Wheel Speed

Select **Wheel Speed** to display the **Wheel Speed** screen.



Use the **Wheel Speed** screen to verify that sensors are connected at each wheel. Speed at a sensed wheel (FL, FR, RL, RR) indicates sensors are installed, but does not verify correct sensor installation.

Counters

Select Counters to display the **Counters** screen.

The 'HPB Counters' window displays the following data:

| Operating Time (hours) | |
|------------------------|----|
| | 58 |

| Pump Motor Hours | |
|------------------|-------|
| Front Axle | 56.00 |
| Rear Axle | 58.00 |

Buttons: Clear Hours [Front], Clear Hours [Rear]

| Brake Event Counters | |
|----------------------|-------|
| Decel < 0.2 g | 19627 |
| Decel 0.2 g - 0.5 g | 103 |
| Decel > 0.5 g | 0 |

Button: Clear Counters

| Miscellaneous Counters | |
|------------------------|------|
| Parking Brake Events | 0 |
| ABS Events | 4422 |
| ATC Events | 524 |
| Ignition Cycles | 4673 |

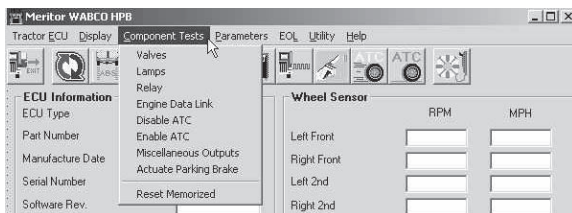
Buttons: Clear Parking Brake Events, Clear ABS Events, Clear ATC Events, Clear Ignition Cycles

Button: Done

The **Counters** screen provides an overview of HPB component performance (pump hours, brake events, etc.) as well as general vehicle activity such as ignition cycles. Occurrences displayed on this screen accumulate until the Clear button is selected.

Component Tests

Select **Component Tests** from the **HPB Main Menu**. A pull down menu will appear.



Valves

Select **Valves** to display the **Valve Activation** test screen.

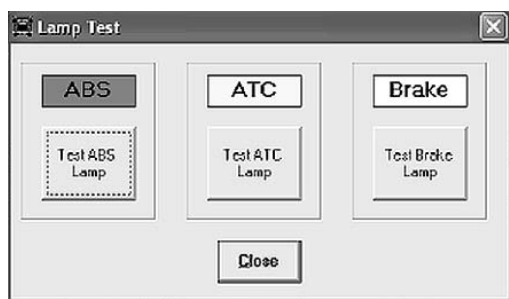


The Valve Activation test screen lets you activate the HPB valves and verify correct brake line installation.

Click on the valve you wish to test, then click the **send** button to actuate the component. Component activation status appears in the **Status** box field. Select **Close** to exit this screen.

Lamps

Select **Lamps** to display the **Lamp Test** screen.



As each lamp is tested, check the actual lamp to verify correct operation. Select **Close** to exit this screen.

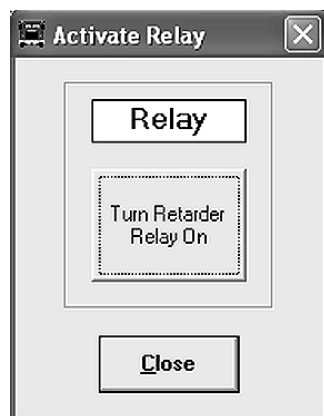


WARNING

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.

Relay

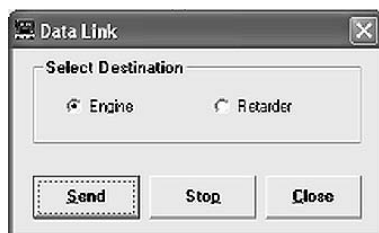
Select **Relay** to display the **Activate Relay** test screen.



This screen allows you to turn the Retarder Relay on or off. This is helpful in verifying correct operation, installation and wiring of the unit under test. Select **Close** to exit this screen.

Engine Data Link

Select Engine Data Link to display the **Data Link** test screen.



This screen allows you to send a “limit engine torque” command to the engine or a “disable retarder” command to the retarder.

Select the data link destination (engine or retarder), then select **Send** to test. Use the **Stop** button to end testing. Select **Close** to exit this screen.

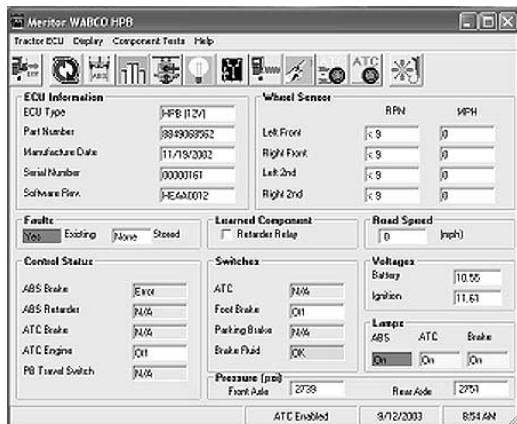
Disable ATC

Select Disable ATC to send a command to the ECU to disable automatic traction control. ATC will remain disabled until the enable command is sent, or until the vehicle ignition is cycled. ATC must be disabled for ATC testing.

Enable ATC

Select Enable ATC to send a command to the ECU to enable automatic traction control. This is the normal state of the ECU.

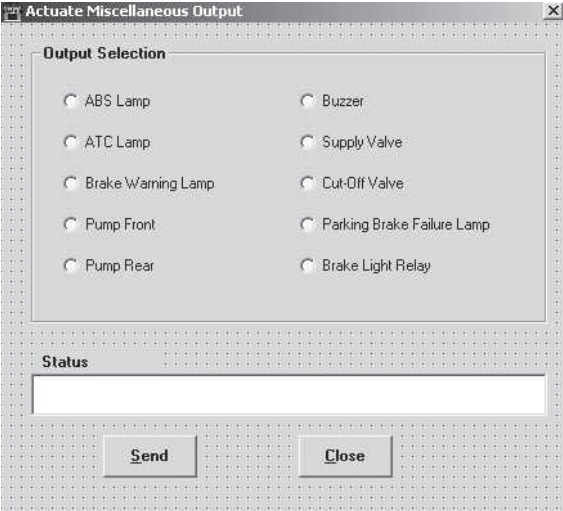
NOTE: The status bar on the **HPB Main Menu** reflects the current ATC status (enabled, disabled or not available).



Miscellaneous Outputs

Select Miscellaneous Outputs to display the Activate Miscellaneous Outputs test screen.

NOTE: Use TOOLBOX™ to test the following components: **Retarder Relay, Brake Light Relay, Supply Valve, Cut-Off Valve, ABS Lamp, Traction Lamp, Brake Warning, Pump Front, Pump Rear, Buzzer.**



This screen provides a check of several HPB components, as well as a way to check either inlet or outlet activity of the valves, pump or retarder relay.

Highlight the component you wish to test, then select the **Send** button to actuate the component. Component activation status appears in the **Status Box** field. Select **Close** to exit this screen.

**Actuate
Parking Brake**

Select **Actuate Parking Brake** to display the **Parking Brake** test screen.



Select **Release** or **Apply**, then select **Send** to test the parking brake. Select **Close** to exit this screen.

**Reset
Memorized**

Select **Reset Memorized** to display the **Learned Component** screen.

*(For Systems
Equipped with a
Retarder Relay)*



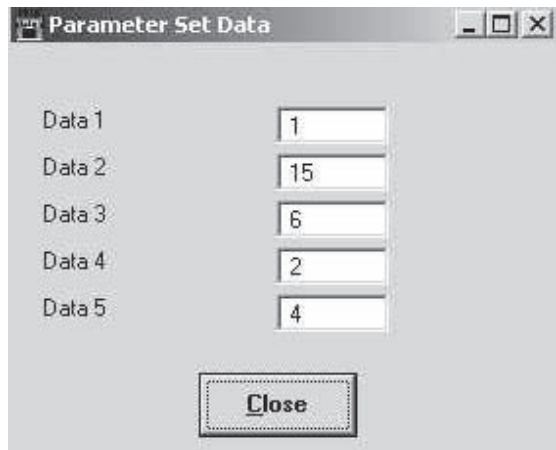
Relay is an automatic default and cannot be de-selected. It indicates the ECU has memorized the installed retarder relay. Once the ECU has seen a retarder, it expects to see it every time the vehicle is powered up.

Parameters

Select **Parameters** from the **HPB Main Menu**. A pull down menu will appear.



Select **Read Parameters** or **Write Parameters**. The **Parameters** screen will appear.

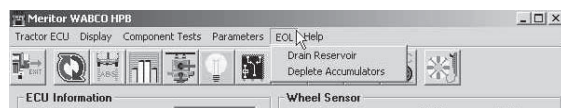


Read Parameters Write Parameters

Please contact the ArvinMeritor Customer Service Center at 800-535-5560 for information about using these screens.

End of Line

Select **End of Line** from the **HPB Main Menu**. A pull down menu will appear.



Drain Reservoir

This option sends a command to drain the HCU reservoir. For information about using this option, please contact the ArvinMeritor Customer Service Center at 800-535-5560.

Deplete Accumulators

Before selecting **Deplete Accumulators** from the **HPB Main Menu**, make sure the accumulators are fully charged, approximately 2100 psi (144.79 bar). Review the **Pressure** field of the **HPB Main Menu** to verify pressure.

The screenshot shows the HPB Main Menu interface. The 'Pressure (psi)' field is highlighted with a red box. The 'Front Axle' and 'Rear Axle' both show a value of 2004. Other fields include 'ATC' (Off), 'Foot Brake' (Off), 'Parking Brake' (Centered), 'Brake Fluid' (OK), 'Battery' (11.15), 'Ignition' (11.32), 'Lamps' (ABS, ATC, Brake), and 'ATC Enabled' (8/16/2005 1:16 PM).

Select **Deplete Accumulators** from the pull down menu. A status message screen will appear. When the system pressure has been depleted from both the front and rear accumulators, the message screen will indicate the procedure has been completed.

(Depleting Accumulators)

The screenshot shows the HPB Main Menu with the 'Deplete Accumulators' option selected from the pull-down menu. A status message screen is displayed, showing the progress of depleting the front and rear accumulators. The status message screen has a 'Close' button.

(Complete)

The screenshot shows the HPB Main Menu after the depleting process is complete. The 'Pressure (psi)' field now shows 2064 for the Front Axle and 0 for the Rear Axle. The 'ATC' field is now 'Disabled' (8/16/2005 1:14 PM). The status message screen is still visible, showing the completion of the depleting process.

Electronic Leveling Module (ELM) for Tractors

Reference Material

For Maintenance and Repair information, refer to Meritor WABCO ELM Service Bulletin number TP0324. A copy of this bulletin is posted on our website, www.meritorwabco.com.

Computer to Vehicle



NOTE: TOOLBOX™ Software must be connected to the vehicle and the vehicle ignition must be on in order to display information.

ELM ABS MENUS AND TOOLBARS

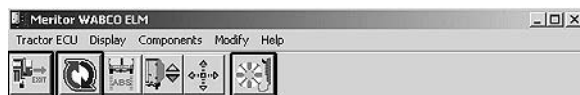
Select *Tractor ELM* from the **TOOLBOX™ Main Menu**. The **ELM Main Menu** will appear.

Main Menu

This screen provides icons and pull down menu task selections. It also provides information about the current state of the Meritor WABCO ELM. ECU information (e.g., part number, serial number, etc.) is read once and does not change. All other information, such as wheel sensor speed and voltages, is read and updated continuously.

Restart Exit Help

From the **Main Menu** you can select **Restart**, **Exit** or **Help**.



ELM

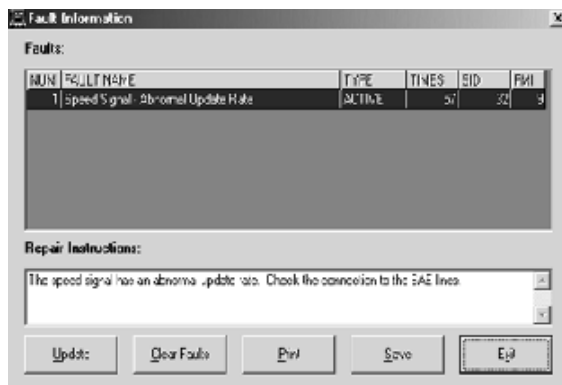
Select **ELM** from the **ELM Main Menu**. A pull down menu will appear with English listed. This program is available in English only.

Display

Select Display from the **ELM Main Menu**. A pull down menu will appear.

Faults

Select faults from the pull down menu. The **Fault Information** screen will appear.



A description of the fault, the number of times the fault occurred, the system identifier (SID) and the failure mode (FMI) are all displayed in the fault information window. Repair instructions for each fault are also provided.

Faults that may occur after the screen is displayed will not appear until a screen update is requested. Use the **Update** button to refresh the fault information table.

After making the necessary repairs, use the **Clear Faults** button to clear the fault. Use the update button to refresh the fault information table and display the new list of faults.

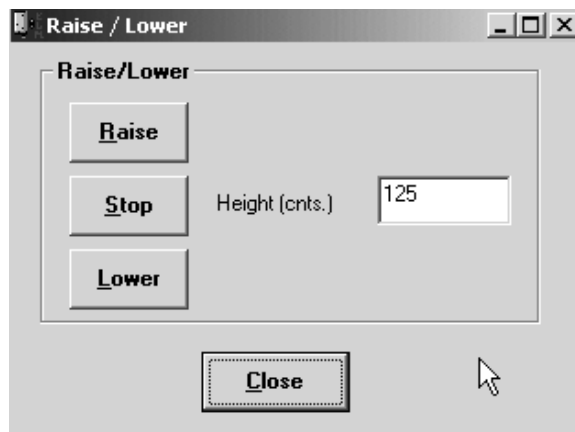
Use the **Save** or **Print** button to save or print the fault information data.

Components

Select **Component Tests** from the **ELM Main Menu**. A pull down menu will appear.



Select **Raise/Lower** to raise or lower the chassis. The **Raise/Lower** screen will appear.



Select **Raise** to raise the vehicle chassis to the ride height or **Lower** to lower the vehicle chassis to the ride height low level.

Select **Stop** to halt the raising or lowering. The height of the vehicle chassis during raising or lowering is displayed on the screen in the **Height** field. Note that the measurement is in centimeters.

Select **Close** to return to the **ELM Main Menu**.

Modify

CAUTION:
Do not modify ELM parameters unless instructed to do so by the fleet or terminal manager.

Select Modify from the **ELM Main Menu**. The **Edit ELM Parameters** screen will appear.

Calibrate

At the **ELM Main Menu** click on the **Calibration** icon.

CALIBRATION ICON

Select **Start Calibration**. The **Calibrate ELM** screen will appear.

Calibrate ELM

Raise/Lower

Raise Height (cnts.) 127

Stop

Lower **Calibrate**

Calibration Values

High Level :

Normal Level :

Low Level :

Status:

Calibrating NORMAL Level..
Adjust vehicle to the normal level and then select the
Calibrate button

Cancel

- Follow the on-screen prompts to raise and lower the vehicle to the normal ride height selected by the vehicle manufacturer. Press **Calibrate** to set.
- After ride height is set, raise the vehicle to the upper level. Press **Calibrate** to set.
- After upper level is set, lower the vehicle to the low level. Press **Calibrate** to set.
- Check the screen to verify that the calibration was successful.

Electronic Leveling Module (ELM) for Trailers

Reference Material

For Maintenance and Repair information, refer to Meritor WABCO ELM Service Bulletin number TP0326. A copy of this bulletin is posted on our website, www.meritorwabco.com.

Computer to Vehicle



NOTE: TOOLBOX™ Software must be connected to the vehicle and the vehicle ignition must be ON in order to display information.

ELM ABS MENUS AND TOOLBARS

Select **Trailer ELM** from the **TOOLBOX™ Main Menu**. The **ELM Main Menu** will appear.

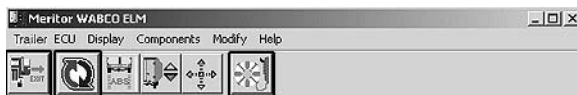
Main Menu

| Meritor WABCO ELM | | | |
|--|----------------|-------------------|----------|
| Trailer ECU Display Components Modify Help | | | |
| ECU Information | | | |
| ECU Type | Trailer ELM | | |
| Part Number | 9840132200 | | |
| Manufacture Date | 12/17/2003 | | |
| Serial Number | 000014 | | |
| Software Rev. | 5.0.0.A | | |
| Faults | | | |
| None | Existing | None | Stored |
| Control Status | | | |
| Operating Mode | Stop | | |
| ELM Height | At Ride Height | | |
| Calibration Values | | | |
| Low | 117 | Normal | 141 |
| | | | High 222 |
| Valves | | | |
| Main | Deactivated | | |
| Bellow | Deactivated | | |
| Tag Axle | Activated | | |
| Sensors | | | |
| Height (cnts) | 140 | | |
| Pressure (psi) | 0.0 | | |
| Switches | | | |
| Raising | Deactivated | | |
| Lowering | Deactivated | | |
| | | 4/1/2004 11:32 AM | |

This screen provides icons and pull down menu task selections. It also provides information about the current state of the Meritor WABCO ELM. ECU information (e.g., part number, serial number, etc.) is read once and does not change. All other information, such as wheel sensor speed and voltages, is read and updated continuously.

Restart Exit Help

From the **Main Menu** you can select **Restart**, **Exit** or **Help**.



ELM

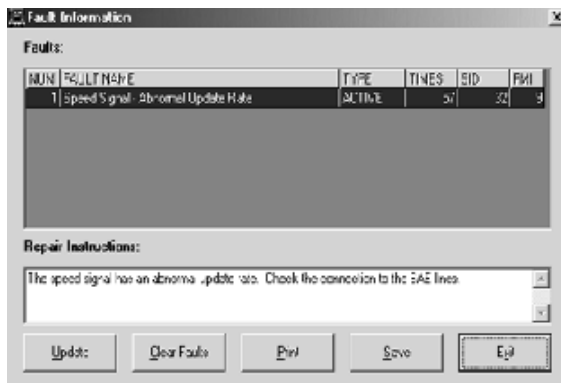
Select **ELM** from the **ELM Main Menu**. A pull down menu will appear with English listed. This program is available in English only.

Display

Select Display from the **ELM Main Menu**. A pull down menu will appear.

Faults

Select faults from the pull down menu. The **Fault Information** screen will appear.



A description of the fault, the number of times the fault occurred, the system identifier (SID) and the failure mode (FMI) are all displayed in the fault information window. Repair instructions for each fault are also provided.

Faults that may occur after the screen is displayed will not appear until a screen update is requested. Use the **Update** button to refresh the fault information table.

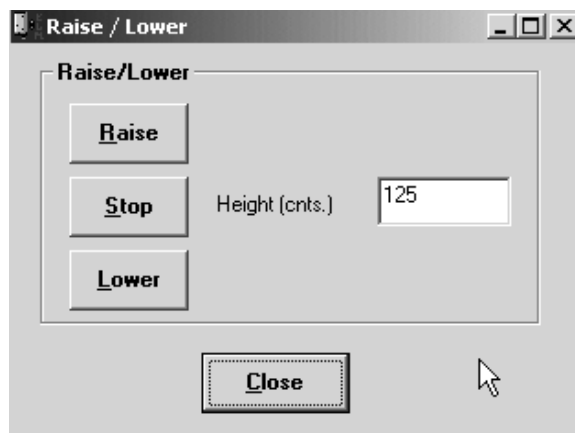
After making the necessary repairs, use the **Clear Faults** button to clear the fault. Use the update button to refresh the fault information table and display the new list of faults.

Use the **Save** or **Print** button to save or print the fault information data.

Components

Select Components from the **ELM Main Menu**. A pull down menu will appear.

Select **Raise/Lower** to raise or lower the chassis. The **Raise/Lower** screen will appear.



Select **Raise** to raise the vehicle chassis to the ride height or **Lower** to lower the vehicle chassis to the ride height low level.

Select **Stop** to halt the raising or lowering. The height of the vehicle chassis during raising or lowering is displayed on the screen in the **Height** field. Note that the measurement is in centimeters.

Select **Close** to return to the **ELM Main Menu**.

Modify

CAUTION:
Do not modify
ELM parameters
unless instructed
to do so by the
fleet or terminal
manager.

Select Modify from the **ELM Main Menu**. The **Edit ELM Parameters** screen will appear.

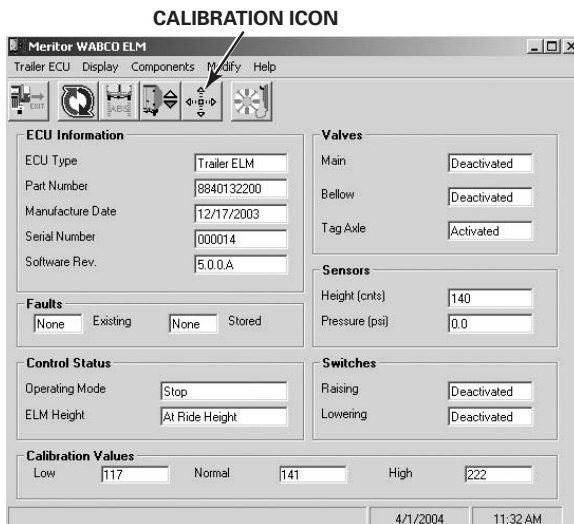
The screenshot shows the 'Edit ELM Parameters' window with the following settings:

| Section | Parameter | Value | Unit |
|-------------------|-------------------------------------|-----------|--------|
| Lift / Tag Axle | Lift/Tag Axle Available | Yes | |
| | Auto Lift/Tag Axle Control | Disabled | |
| | Normal Level Increase | 0 | counts |
| | Low Pressure for Auto Control | 0 | psi |
| | High Pressure for Auto Control | 0 | psi |
| | Speed to Start Discharging | 0 | mph |
| Traction Help | Traction Help Available | Yes | |
| | Speed Limit | 20 | mph |
| | Time Limit | 6000 | ms |
| | Pressure Limit | 0 | psi |
| Miscellaneous | Switch Mode | Automatic | |
| | Neutral Deadband | 3 | counts |
| | Ride Level Auto Adjust Speed | 10 | mph |
| Delays | Standstill Height Adjustment | 1500 | ms |
| | Driving Height Adjustment | 60 | sec |
| Second Ride Level | Auto Adjust Speed | 40 | mph |
| | Height Adjustment to 2nd Ride Level | 0 | counts |

Buttons at the bottom: Default, Save, Close.

Calibrate

At the **ELM Main Menu**, click on the **Calibration** icon.



Select **Start Calibration**. The **Calibrate ELM screen** will appear.

Calibrate ELM

Raise/Lower

Raise

Height (cnts.)

Stop

Lower

Calibrate

Calibration Values

High Level :

Normal Level :

Low Level :

Status:

Calibrating NORMAL Level..
Adjust vehicle to the normal level and then select the Calibrate button

Cancel

- Follow the on-screen prompts to raise and lower the vehicle to the normal ride height selected by the vehicle manufacturer. Press **Calibrate** to set.
- After ride height is set, raise the vehicle to the upper level. Press **Calibrate** to set.
- After upper level is set, lower the vehicle to the low level. Press **Calibrate** to set.
- Check the screen to verify that the calibration was successful.

ECAS for Buses

Reference Material

For maintenance and repair information, refer to the appropriate Meritor WABCO ECAS Maintenance Manual:

MM37 Electronically Controlled Air Suspension (ECAS) for Buses

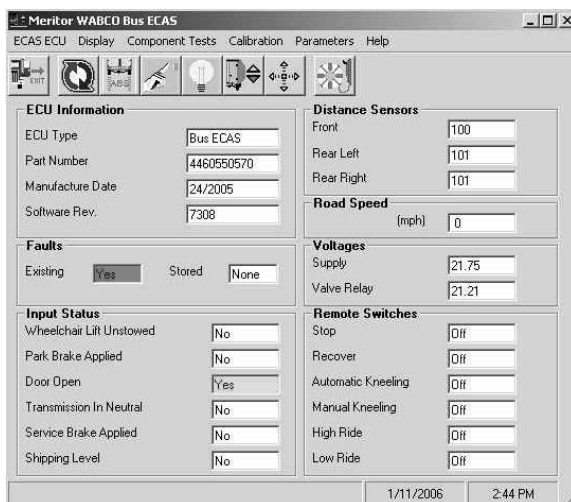
Computer to Vehicle



NOTE: TOOLBOX™ Software must be connected to the vehicle and the vehicle ignition must be ON in order to display information.

Main Menu

ECAS MENUS AND TOOLBARS



The **ECAS Main Menu** contains icons and pull down menu task selection. It also provides information about the ECU and the current status of the ECAS system.

- Several features have been built into the ECAS system to help ensure correct level changes. The status of the bus door, parking brake, transmission and bus height are all considered by the ECU before a level change is initiated. The following table explains how these features apply to each function and lists the switches used to initiate manual ECAS level changes. These ECAS height change requirements will appear in the **Input Status** and **Remote Switches** fields of the **Main Menu**.

| ECAS Function | Doors | Parking Brake | Transmission | Speed | Kneel | Height | Switches |
|-----------------------------------|-----------|---------------|--------------|---|-----------------|---------------------------------|--|
| Normal/Recover | Closed | No effect | No effect | No effect | No effect | No effect | Normal/Recover |
| Lifting | Closed | Released | Not neutral | Less than or equal to V_{LIMIT} (param. 17) | Not active | — | High ride |
| Lowering | Closed | Released | Not neutral | Less than or equal to V_{LIMIT} (param. 17) | Not active | — | High ride |
| Kneeling | Closed | Applied | Neutral | Less than or equal to 5 mph (no speed signal fault) | Not interrupted | Greater than or equal to normal | Kneeling |
| Shipping level | Closed | Applied | Neutral | Less than or equal to V_{LIMIT} (param. 17) | Not active | — | Shipping level |
| * Disable all suspension movement | No effect | No effect | No effect | No effect | No effect | No effect | Wheel chair stowed signal from lift controller |

*Wheel chair lift inhibits feature for systems with ECAS ECU serial numbers of 4000 and higher.

- The **Distance Sensors** field reflects the current normal, upper and lower calibration levels and will appear as part of the screen display when manual vehicle calibration is performed.

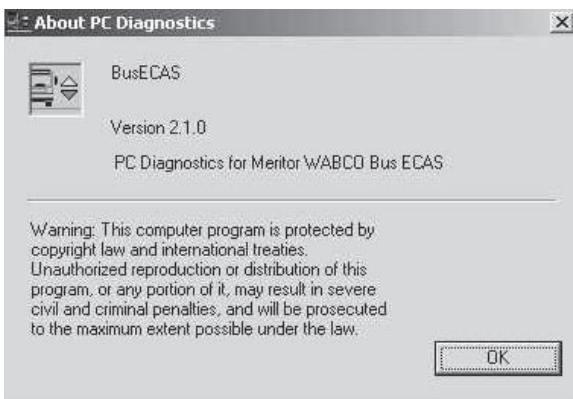
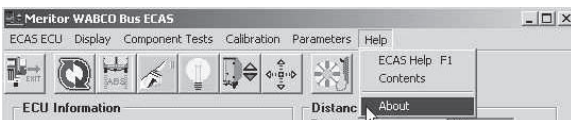
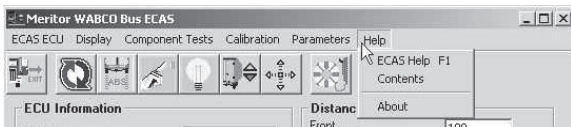
NOTE: Double click on **Yes** in the Existing or Stored **Faults** field on the **Main Menu** to bring up the Fault Information screen. This screen is illustrated on page 76.

Restart Exit Help

From the **Main Menu** you can select **Restart**, **Exit** or **Help**. These features are explained in the Introduction.



From the **Help** menu you can also verify the version of Bus ECAS included in TOOLBOX™ 7.0. Select **About** from the **Help** pull down menu.



ECAS ECU

Select **ECAS ECU** from the **ECAS Main Menu**. A pull down menu will appear.



Language

Refer to page 5 of this manual for information about using the **Language** selection.

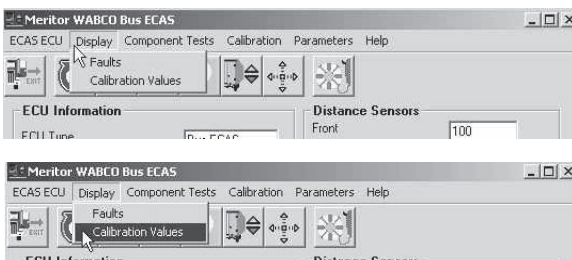
NOTE: The TOOLBOX™ ECAS program is available in English only.

Restart

Select **Restart** to refresh (update) ECU information.

Display

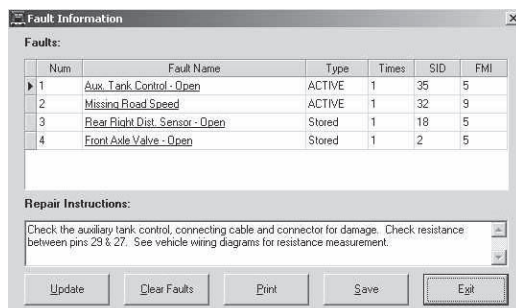
Select **Display** from the **ECAS Main Menu**. A pull down menu will appear.



Faults

Select **Faults** to display the **Fault Information** screen.

NOTE: The **Fault Information** screen is also accessible from the **ECAS Main Menu**. Refer to page 40.



Fault Information

The **Fault Information** screen contains a description of each fault, the number of times the fault occurred, the system identified (SID) and the failure mode (FMI). Basic repair instructions for each fault are also provided.

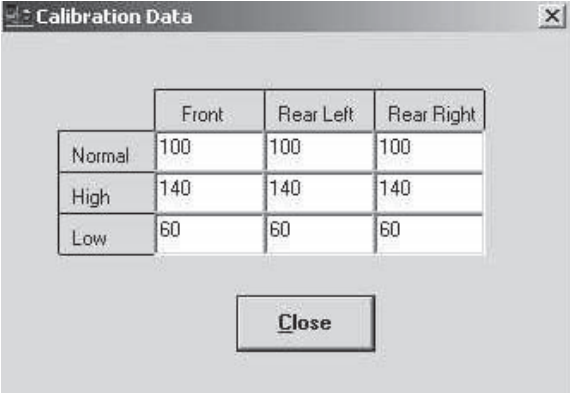
Faults that may occur after the screen is displayed will not appear until a screen update is requested. Use the **Update** button to refresh the fault information table.

After making the necessary repairs, use the **Clear Faults** button to clear the fault. Use the **Update** button to refresh the fault information table and display the new list of faults.

Use the **Save** or **Print** button to save or print the fault information data.

Calibration Values

Select **Display Calibration Values** to view the current calibration levels



| | Front | Rear Left | Rear Right |
|--------|-------|-----------|------------|
| Normal | 100 | 100 | 100 |
| High | 140 | 140 | 140 |
| Low | 60 | 60 | 60 |

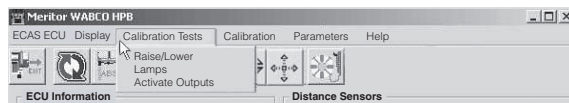
Close

When selecting **Calibration Values** from the **Display** menu, data is for review only. Values cannot be changed from this screen. To change existing values, select the **Calibration** menu. Refer to page 80.

Component Tests

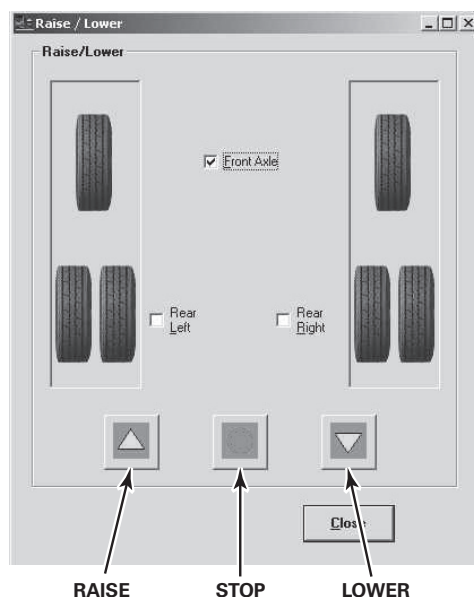
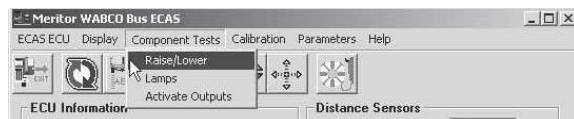
This option lets you test various ECAS functions.

Select **Component Tests** from the **ECAS Main Menu**. A pull down menu will appear.



Raise/Lower

Raise/Lower is used to verify the function of the valve body of the ECAS system. Select **Raise/Lower** to display the **Raise/Lower** screen.

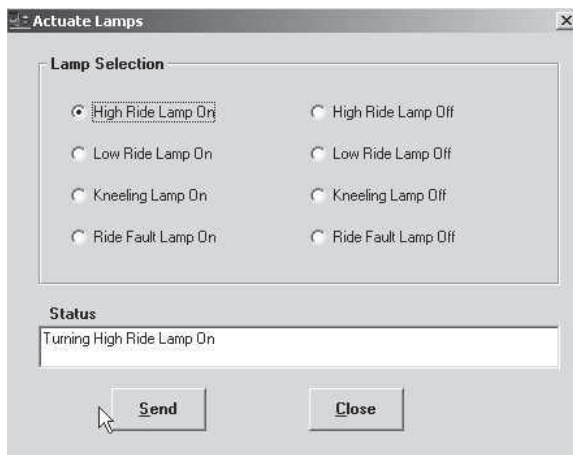


Select the axle, or axles, to be tested (front, rear left or rear right). Use the up or down arrows on the screen to raise or lower the appropriate axle. Use the round **Stop** key to end the raising or lowering.

Select **Close** to exit **Raise/Lower**.

Lamps

The vehicle may not have all of the lamps displayed on the screen.



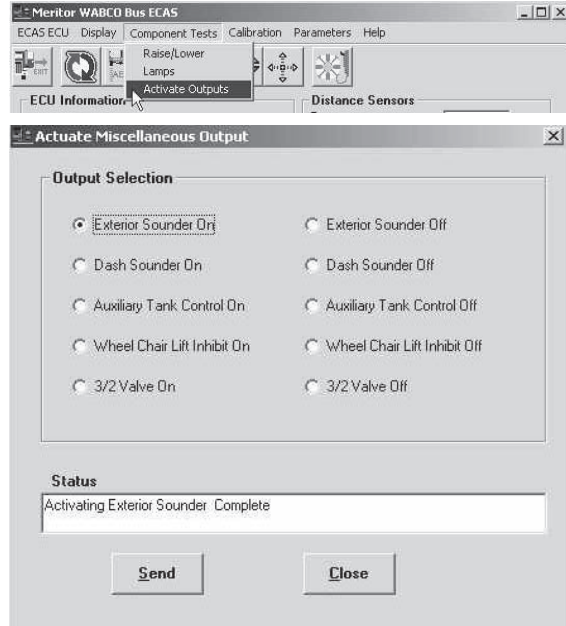
Select the lamp to actuate, then select **Send**. The status of the lamp is displayed in the **Status** field.

Select **Off** to turn the lamp off. When all of the lamps have been tested, select **Close** to exit **Actuate Lamps**.

Activate Outputs

The vehicle may not have all of the outputs displayed on the screen.

Select **Activate Outputs** from the **Component Tests** menu to display the **Actuate Miscellaneous Output** screen. This option tests the various optional ECAS outputs.

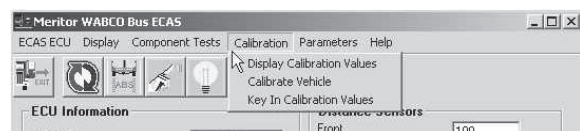


Select the function to be tested, then select **Send**. The status of the function being tested is displayed in the **Status** field.

Select **Close** to exit **Activate Outputs**.

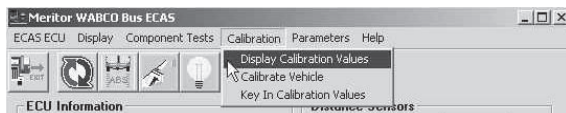
Calibration

Select **Calibration** from the **ECAS Main Menu**. A pull down menu will appear. This menu option lets you view, enter or change the upper, lower and normal ECAS calibration values. For complete instructions for selecting these values refer to Meritor WABCO Maintenance Manual MM37.



Display Calibration Values

Select the **Display Calibration Values** option to view the Calibration Data. This screen is for display only. Use the **Calibrate Vehicle** screen to set levels.



Calibrate Vehicle

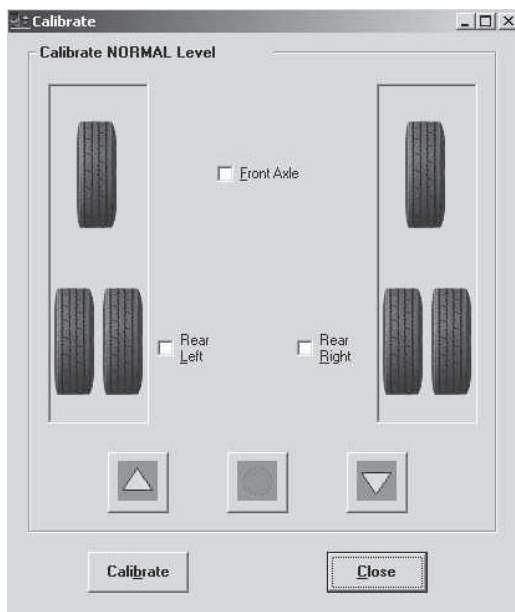
Select the **Calibrate Vehicle** option to set upper, lower and normal vehicle levels. Calibration must be done for each of the three levels.

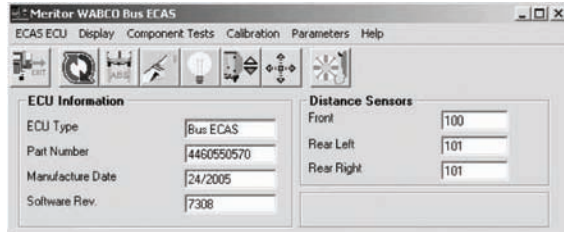
Manual calibration is not recommended. Whenever possible use the Key in Calibration Screen to calibrate the normal, upper and lower vehicle levels.

Refer to MM37 for complete calibration instructions.



Select **Calibrate Vehicle** to display the first Calibrate screen. The **ECAS Main Menu** will also appear. As vehicle levels are calibrated, the values in the **Distance from Sensors** field will change to reflect the selected levels.



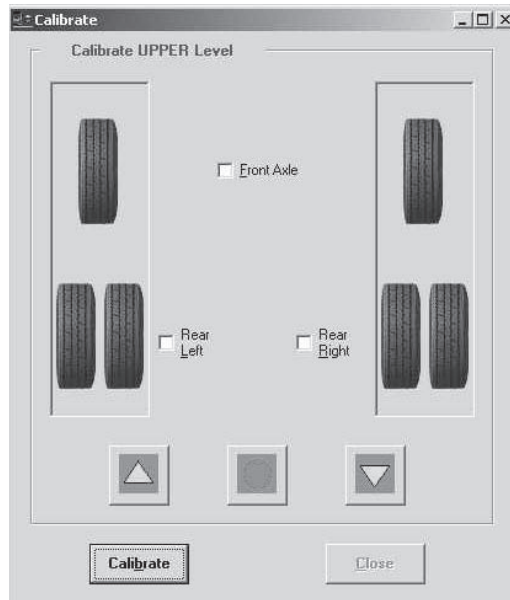


Select the appropriate axle and use the arrows on the screen to raise or lower the vehicle to the desired level. Select **Calibrate** to set.

The PC keyboard may be used to raise or lower levels during manual calibration:

- Press **ALT** and the **up** arrow to **raise** levels.
- Press **ALT** and the **down** arrow on the keyboard to **lower** levels.
- Press **ALT** and the **side** arrow to stop the vehicle from raising or lowering.

When the normal level calibration is complete, select **Calibrate** to display the second (upper) screen.



Repeat the calibration process described above to set the upper level, then select **Calibrate** to display the third (lower) screen.



Select **Calibrate** to display the Calibration Complete screen.



Select **OK** to return to the Calibration pull down menu.

Key In Calibration Values

(Password Required)

Use this option to enter numeric vehicle calibration levels. Refer to the vehicle manufacturer's specifications for the appropriate values.

Select **Key In Calibration Values**. TOOLBOX™ will ask for a password.



Customer ID:

Password:

Enter the **Customer ID** and **Password** assigned to you. Once the password information has been entered, the **Calibration Data** screen will appear

| | Front | Rear Left | Rear Right |
|--------|-------|-----------|------------|
| Normal | 100 | 100 | 100 |
| High | 140 | 140 | |
| Low | 60 | 60 | |

Fill in the normal, high and low values for the Front, Rear Left and Rear Right axles. These values are predetermined by previous calibration or by the vehicle manufacturer.

Select **Save** to retain the settings. The **Calibration Complete** screen will appear, indicating that all calibration values have been entered.

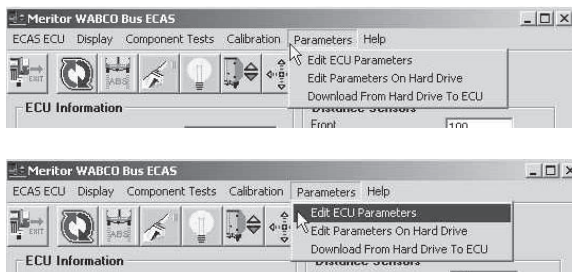


Select **OK** to return to the **ECAS Main Menu**.

Parameters

Contact Meritor WABCO **before** changing any of the vehicle parameters.

Select **Parameters** from the **ECAS Main Menu**. A pull down menu will appear.



TOOLBOX™ lets you edit, or change, the existing parameters in two ways:

- Directly to the ECU
- Edit a file on the PC hard drive, then download that file to the ECU

Edit ECU Parameters

Use this option to change existing ECU ECAS parameters.

Contact Meritor WABCO **before** changing any of the vehicle parameters.

| Page 1 | Page 2 | Page 3 | Page 4 |
|-----------|--------|--------|--------|
| On | | | |
| Both | | | |
| No | | | |
| No | | | |
| 2 | | | |
| Left | | | |
| 3 | | | |
| Parameter | | | |
| Yes | | | |
| No | | | |
| Yes | | | |
| No | | | |

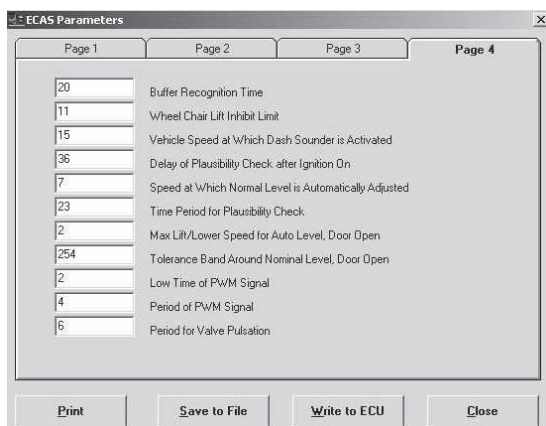
Print Save to File Write to ECU Close

| Page 1 | Page 2 | Page 3 | Page 4 |
|--------|--------|--------|--------|
| | No | | |
| | No | | |
| | No | | |
| | No | | |
| | Yes | | |
| | No | | |
| | Yes | | |
| | Yes | | |
| | 180 | | |
| | 210 | | |
| | 20 | | |
| | 20 | | |

Print Save to File Write to ECU Close

| Page 1 | Page 2 | Page 3 | Page 4 |
|--------|--------|--------|--------|
| | | 4 | |
| | | 4 | |
| | | 3 | |
| | | 5 | |
| | | 255 | |
| | | 255 | |
| | | 33 | |
| | | 5 | |
| | | 255 | |
| | | 7 | |
| | | 40 | |
| | | 60 | |

Print Save to File Write to ECU Close



Use the **Print**, **Save to File** or **Write to ECU** button at the bottom of the page to print, establish a file or send the new values to the ECU. You will be prompted to enter your user ID and password before performing these functions.

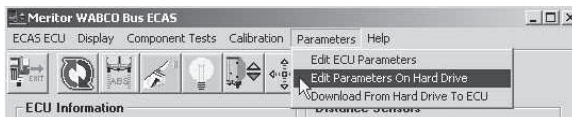
When finished, select **Close** to return to the **Parameters** pull down menu.

Edit Parameters on Hard Drive

Contact Meritor WABCO **before** changing any of the vehicle parameters.

Use this option to edit the ECU ECAS parameter file on the PC hard drive. This function changes the hard drive file only. It does not change parameters in the ECU until it is downloaded.

Select **Edit Parameters on Hard Drive**. You will be prompted to enter your user ID and password. Provide the information requested. The four parameter screens will appear.

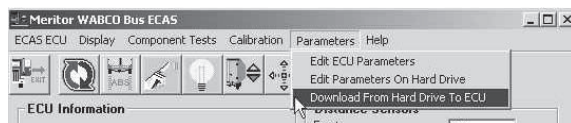


After making any changes, use the **Print**, **Save to File** or **Write to ECU** button at the bottom of the page to print, establish a file or send the new values to the ECU.

Download From Hard Drive to ECU

Contact Meritor WABCO **before** changing any of the vehicle parameters.

Use this option to send the changes made to the hard drive file to the ECU.



Use the **Print**, **Save to File** or **Write to ECU** button at the bottom of the ECAS Parameters page to print, establish a file or send the new values to the ECU. You will be prompted to enter your user ID and password before performing these functions.

When the download is complete the **File Downloaded** screen will appear, indicating a successful download.



Select OK to return to the **ECAS Main Menu**.

Appendix

Device Select Information

Before using TOOLBOX™ Software for the first time, you must indicate which COM port and adapter box will be used. If you have questions about Com Ports, Adapter Boxes or Drivers, the following information will answer many of your questions. Please review this material before you select the COM port and device. If you need further clarification, please contact the ArvinMeritor Customer Service Center at 1-800-535-5560.

Communication Drivers

Communication drivers are software programs that control the passing of data between the PC and the vehicle. Messages are sent and received via the PC's Com port and an adapter box.

Noregon communication drivers are included with the TOOLBOX™ installation CD. These drivers are RP1210A compliant and work with most adapter boxes (refer to adapter boxes). Some adapter boxes (i.e., MPSI MagiKey and Dearborn) require communication drivers other than Noregon. These drivers must be procured from the manufacturer and installed separately.

Adapter Box

An adapter box is an electronic device that connects the PC's COM port to the vehicle's diagnostic connector. It converts the computer's voltages to the levels used in the truck.

Selecting an Adapter Box in TOOLBOX™

To communicate correctly with the vehicle, TOOLBOX™ needs to know which adapter box is being used. To select an adapter box, run TOOLBOX™. Go to the **System Setup** menu and select **COM Port** from the pull down menu. All of the installed communication drivers will be displayed on the **Vendor** listing.

Once a vendor has been selected, the **Protocol** and **Device** lists will be updated, and the adapter can then be selected under **Devices**.

Connecting the Adapter Box

Most adapter boxes require two cables, one that connects the PC to the adapter box and a second that connects the adapter box to the vehicle. The first cable is usually connected to the serial (COM) port on the PC, but in the case of the MPSI Parallel Data Module, the connection is made to the parallel (printer) port. The second cable goes to the diagnostic connector located in the vehicle.

Fault Information Sheet

This is an example of a Fault Information Sheet. These sheets are available in version 5.0 for Tractor ABS, Trailer ABS and Hydraulic ABS.

Bookmarks

Thumbnails

SID001FMI007

MERITOR WABCO
Vehicle Control Systems

SAE Fault Code: SID 1
FMI 7

Description: Left Front Wheel Sensor Incorrect Tooth Wheel

The ABS ECU has detected a recurring pulse drop out condition. Check the tooth wheel for damaged or missing teeth that could cause pulses to be missing on each rotation of the wheel. Replace tooth wheel if damaged.

Sensor Resistance Check

TOOLBOX™ Technical Support

For technical assistance, contact the ArvinMeritor Customer Service Center at 800-535-5560. Or, visit the Meritor WABCO website at www.meritorwabco.com and use the Contact Us feature to email your request to a customer service representative.

To expedite your request, you should be prepared to provide the following information.

- TOOLBOX™ Software Version Number.
To find the version number:

Open TOOLBOX™.

Click on Help, then on About PC Diagnostics.

The version number will appear on the screen.

- ECU Type
- ABS Tractor: Basic, Universal or Frame
- ABS Trailer:

Look at the ECU field on the **ABS Tractor Main Menu**. If ECU type is not listed, refer to the vehicle specification sheet for this information.

Electronic Leveling Module (ELM)

System Information

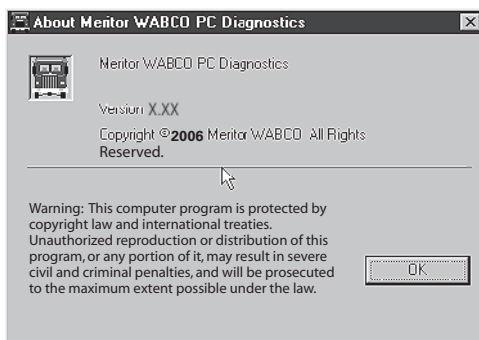
*(Versions 5.0 and
Higher)*

Select **System Information** and follow the screen prompts to print a report of system hardware: operating system version, drivers, etc. Run this report whenever you contact the ArvinMeritor Customer Service Center.



About

Select **About** from the pull down menu for information about Meritor WABCO TOOLBOX™ Software, including the version number. You may need this information if you call the ArvinMeritor Customer Service Center.



Meritor WABCO components are integral members of
Drivetrain Plus™ by Meritor, the industry's most complete drivetrain.
For more information, call **800-535-5560**.

MERITOR WABCO

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