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WABCO

Repair Guide

WABCO Electronic Brake System EBS 3.1 Repair Guide

Content

Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠ WARNING

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

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.

⚠ WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

How to Obtain Additional Maintenance, Service and Product Information

If you have any questions regarding the material covered in this bulletin, or for more information about the WABCO product line, please contact the WABCO Customer Care Center at 855-228-3203, by email at wnacustomercare@wabco-auto.com, or visit our website: wabco-na.com.

Electronic Brake System (EBS) 3.1 Diagnostic and Repair Guide

This publication provides instructions for diagnosing and repairing issues with the electronic brake system using TOOLBOX™ Software.

EBS3 Diagnostic Session

Diagnostic Software and Equipment Required

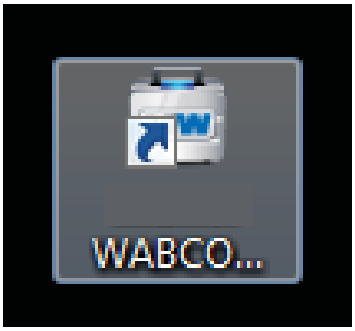
For diagnostic communications with the EBS3 system, the following items are required:

WABCO TOOLBOX™ Software 12.0 or later **NOTE:** To download TOOLBOX™ Software, visit wabco-na.com.	 4012395a
WABCO Diagnostic Interfaces. • Noregon • Nexiq • Dearborn Group	 4012396a

Establishing Communication

Use the following steps to establish communications between EBS 3 and TOOLBOX™ Software.

1. To access the WABCO TOOLBOX™ Software from the desktop screen, double-click on the WABCO TOOLBOX™ icon or click "All Programs" and select the program from the list. Figure 1.



4012397a

Figure 1

The following screen will appear. Figure 2.

4012502a

Figure 2

2. The first time that the WABCO TOOLBOX™ Software is used, it is necessary to select the correct WABCO Interface in order to establish communication with the ECU. From the WABCO TOOLBOX™ main menu, click on “Utilities”. Figure 3.

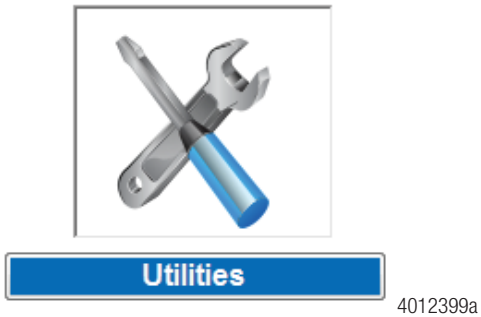


Figure 3

3. Click on “Adapter Selection”. Figure 4.

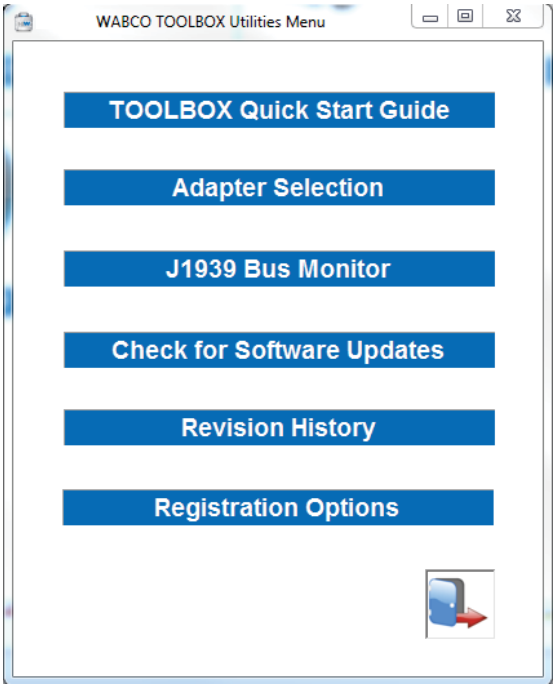


Figure 4

4. The Adapter Selection window will appear. Under "Vendor", click the down-arrow to select from a list of diagnostic adapters previously installed. If your diagnostic adapter is not on the list, download and install the correct drivers and firmware from the diagnostic adapter manufacturer’s website. Figure 5.

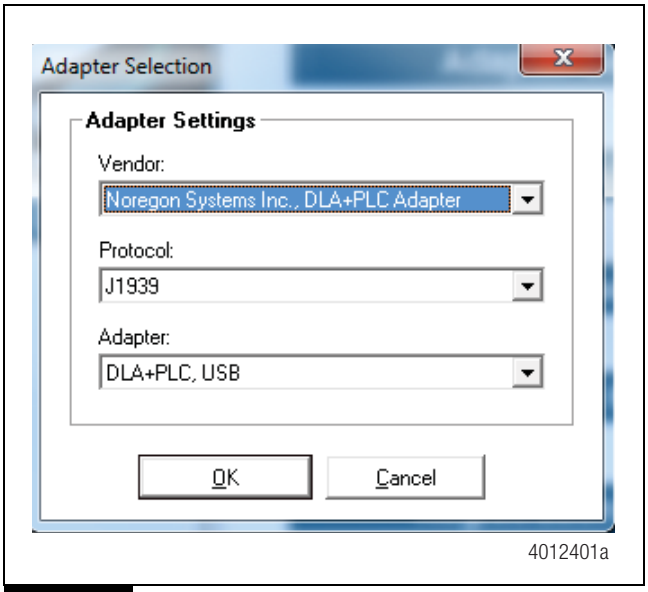


Figure 5

5. Under "Protocol", click the down-arrow to select the desired CAN protocol from the pull-down list. Figure 6.

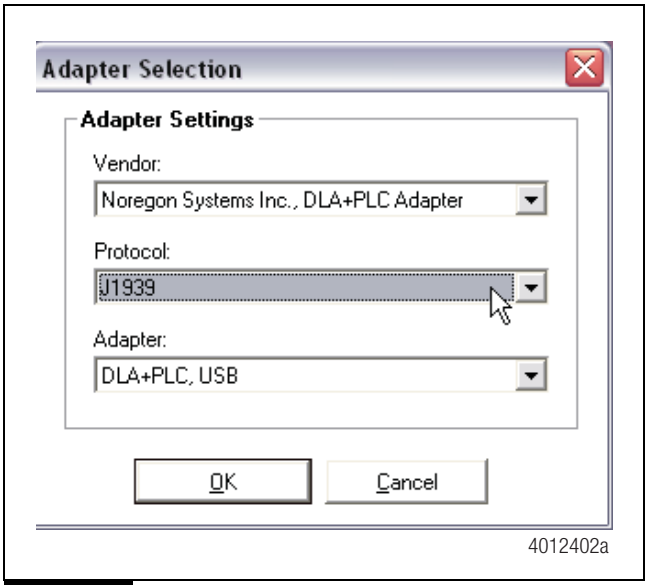
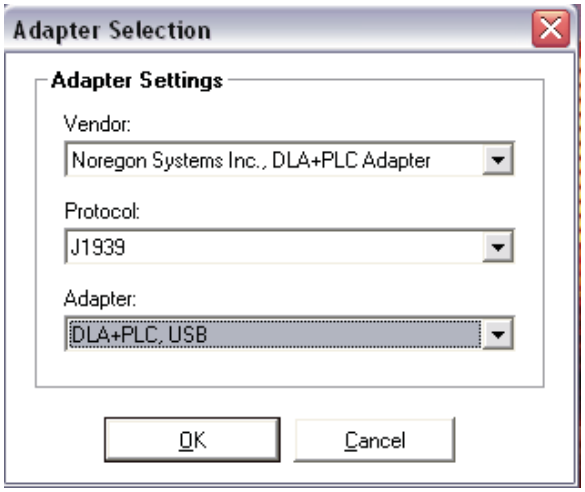


Figure 6

NOTE: Changing protocols during the use of TOOLBOX™ Software 11 requires an ignition or power cycle. This is required to reset the hardware and establish communications.

6. Under “Adapter Selection”, click the down-arrow to select from a list of adapter choices. Figure 7.



4012403a

Figure 7

NOTE: Some vendors may have multiple adapter selections. Please refer to your specific hardware manufacturer's manual to determine specific adapter type and capabilities.

7. When all the selections are made, click "OK".

   NOTE: EBS will only communicate on J1939. Verify that the correct device and protocol are selected under "Adapter Selection" in "Utilities". If the protocol was changed, you will need to cycle the key.

8. From the following screen, click on the EBS (J1939) button. Figure 8.

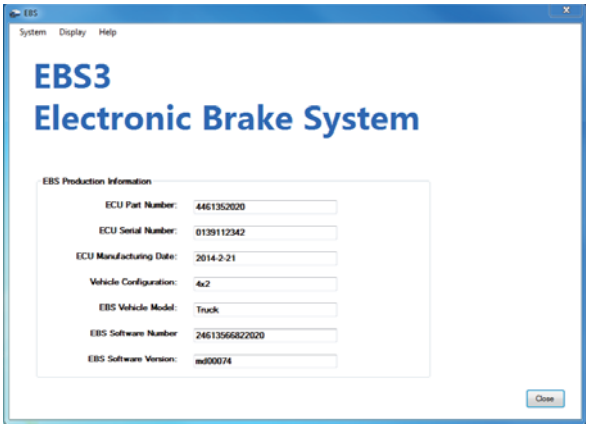
4012502a

Figure 8

Displaying EBS Information

To retrieve EBS information, select "Diagnostic Information" from the home screen.

The screen will then display the EBS part number and EBS software version as well as other important information. Information regarding the ECU Data and vehicle configuration can also be found in this screen. Figure 9.



4012404a

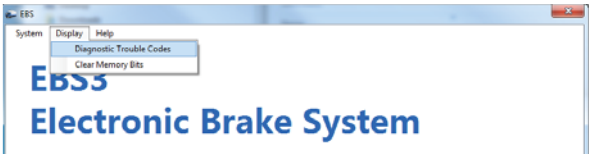
Figure 9

EBS3 Diagnostics

Accessing Diagnostic Trouble Codes (DTCs)

Issues in the EBS can be diagnosed viewing active and stored DTCs:

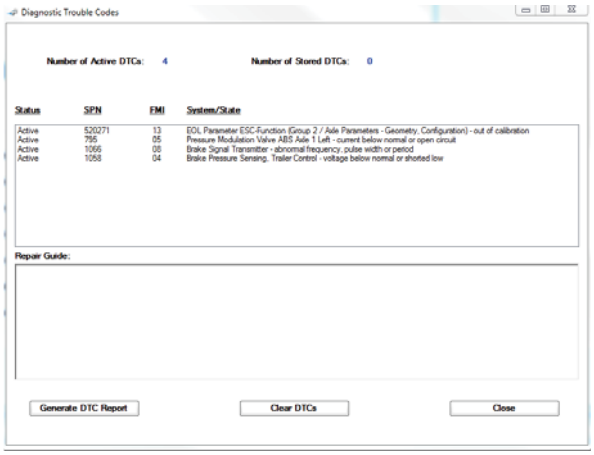
1. Select the "Display" option from the menu bar.
2. From the pull-down menu, select "Diagnostic Trouble Codes" to bring up the DTC information screen. Figure 10.



4012405a

Figure 10

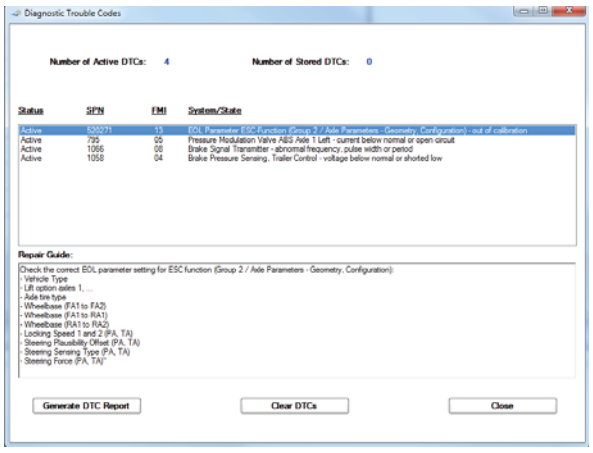
A description of the DTC, the number of times the DTC occurred, the suspect parameter number (SPN) and the failure mode identifier (FMI) are all displayed in the Diagnostic Trouble Codes window. Basic repair instructions for each DTC are also provided. This will show a list of all the “active” and/or “stored” faults in the ECU memory. After making the necessary repairs, use the “Clear Faults” button to clear the DTCs. Figure 11.



4012406a

Figure 11

3. Click on the “status” of each fault to get the details on each of the faults. The fault’s SPN and FMI numbers can be found in the DTC tables in this publication. Figure 12.



4012407a

Figure 12

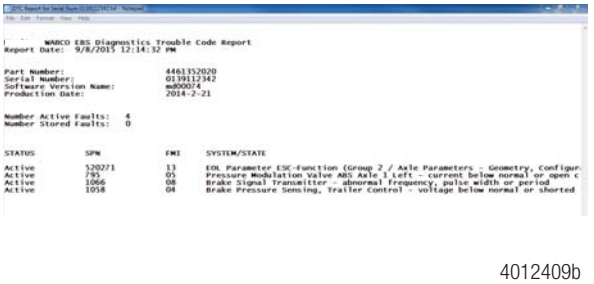
DTC Report

4. Double click on any fault and the following screen will display. Figure 13.

4012408b

Figure 13

5. To generate a fault report, select the “Generate Fault Report“ button from the “Diagnostic Trouble Codes” screen. **Note:** A DTC Report can also be generated by selecting the “Generate DTC Report” button, on the “Diagnostic Trouble Codes” screen. Figure 12. The “Fault Report” screen provides additional information that is not included in the “Diagnostic Trouble Codes” screen. Figure 14.



4012409b

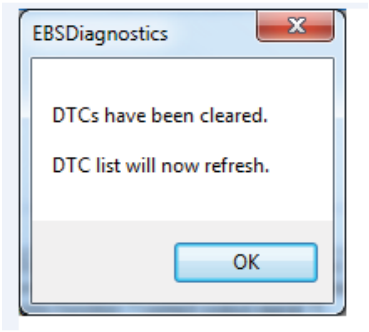
Figure 14

6. When the “Save As” screen opens, provide a name for the file and select the location where it will be saved.

7. After generating a fault report, DTCs can be cleared by clicking the “Clear DTCs” button. Only stored DTCs will clear. Figure 15. The following message will appear when the DTCs have been cleared. Figure 16.

4012496a

Figure 15



4012410a

Figure 16

8. Click “OK”.

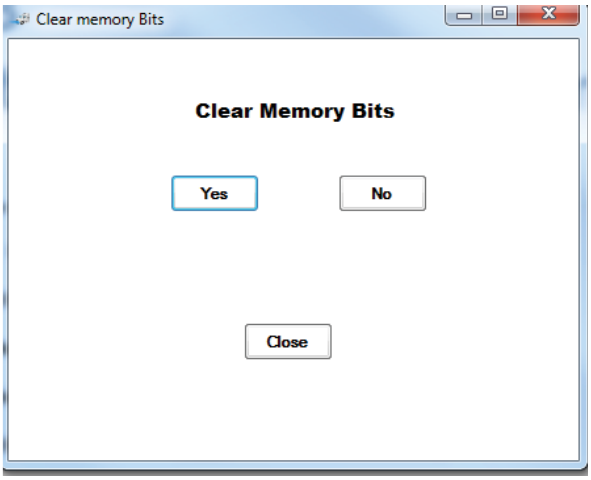
Clearing Memory Bits

1. From the “Display” menu, select “Clear Memory Bits”. Figure 17.

4012411a

Figure 17

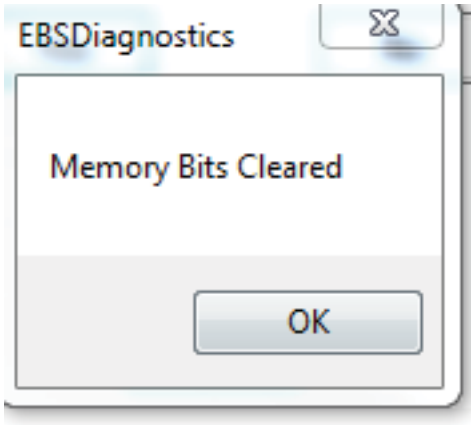
2. When the following screen appears, click “Yes”. Figure 18.



4012412a

Figure 18

3. When the memory bits are cleared, the following screen will appear. Click “OK” to close the screen. Figure 19.



4012413a

Figure 19

Accessing Other Functions

1. To display Maintenance Manual, Contact Information and About Information, select the desired option from the pull-down list from the "Help" menu. Figure 20.

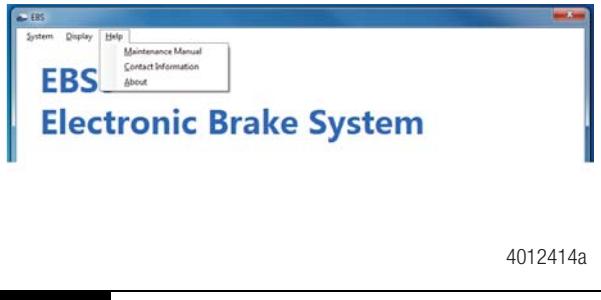


Figure 20

2. The following screen will appear. Click the “Close” button to close the screen. Figure 21.

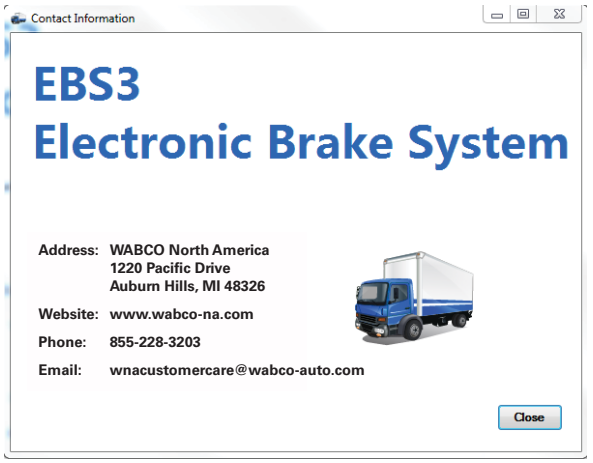


Figure 21

3. To display information about the EBS3 Diagnostic Software, select “About” from the “Help” menu. Figure 20.
4. The following screen will appear. Click the “Close” button to close the screen. Figure 22.

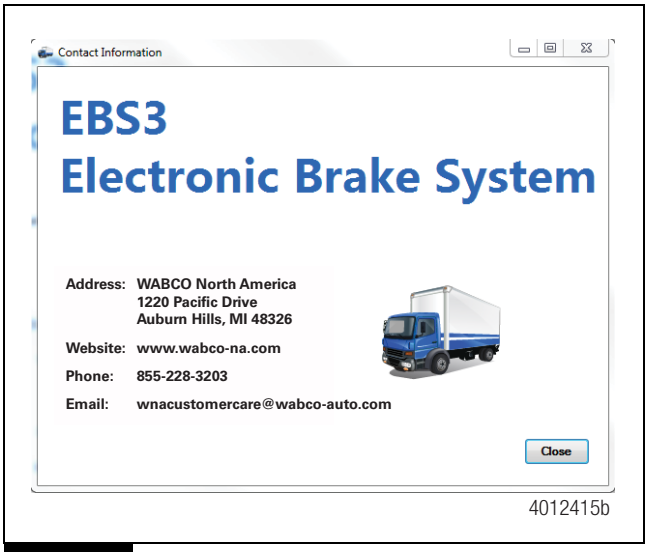


Figure 22

Recording J1939 Data

1. To record J1939 data, select “J1939 Bus Monitor” from the TOOLBOX™ Software Utilities menu. Figure 23.

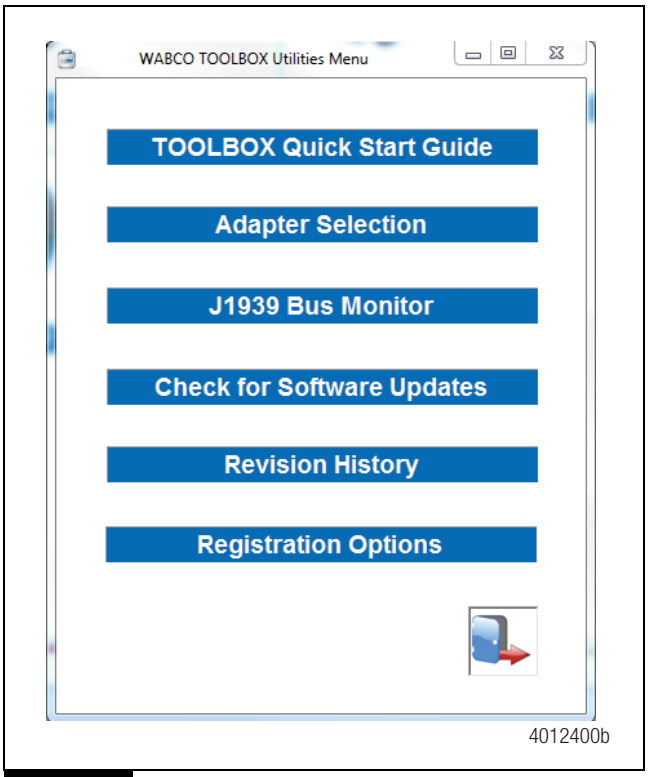


Figure 23

2. To capture a log file, click on “Start Logging”. A single log file will capture up to five minutes of information. To pause a log file, click on “Pause”; to resume logging, click on “Resume”. Figure 24.

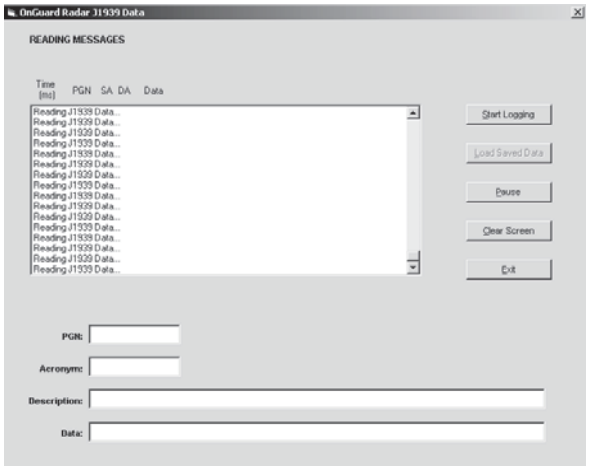


Figure 24

3. Once the required data has been captured, click on “Stop Logging”. Figure 25.

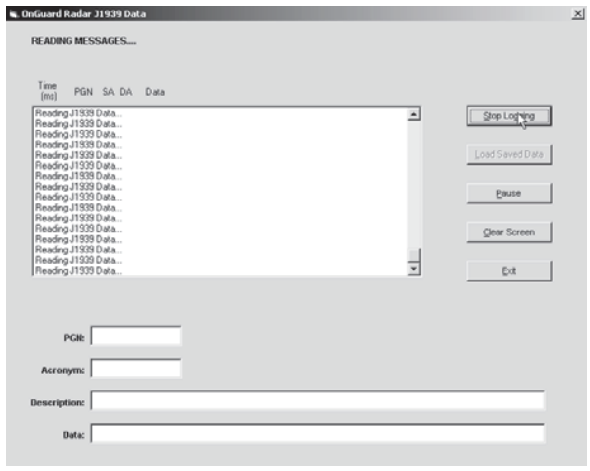


Figure 25

4. A “Save As” screen will then come up asking you to name the file and select where it will be saved. Figure 26.

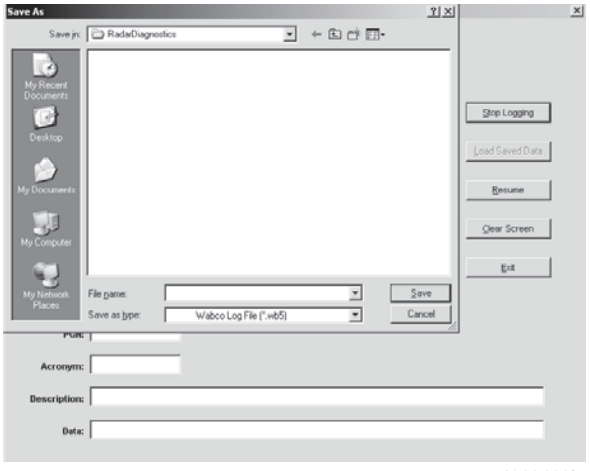


Figure 26

5. Specific messages can also be viewed after saving the file by clicking on “Load Saved Data”, and then highlighting the desired message. Figure 27.

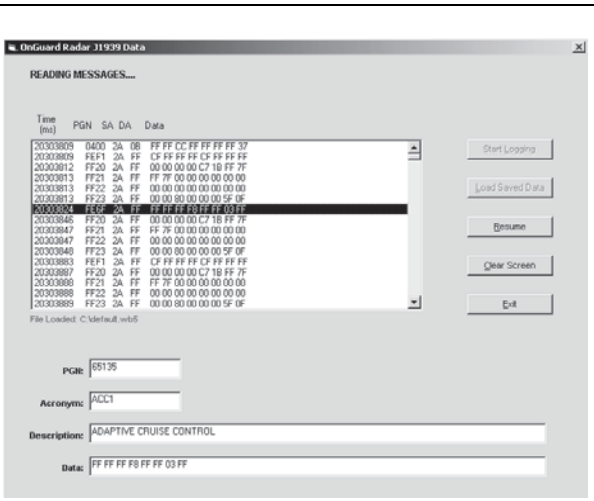


Figure 27

EBS Diagnostic Trouble Code Table

The following table provides repair instructions for SPN/FMI DTCs that are readable using TOOLBOX™ Software. If the display shows a code not listed in the table, contact the WABCO Customer Care Center at 855-228-3203 for assistance.

Figure 28

SPN	FMI	DTC	DTC-Text	Repair Instructions
158	4	158 - 4	158 - 4/Battery Potential (Voltage), Switched - voltage below normal or shorted low	- Check the electric supply line “terminal 15” (increased electric resistance?). - Check the ignition switch (increased electric resistance?). - Check the “terminal 15” line for other voltage drops while ignition is switched on. - Does the voltage at “terminal 15” decrease very slowly after ignition off? (It is not permissable, if the voltage decrease lasts several seconds.) - Replace the EBS central module.
241	1	241 - 1	241 - 1/Tire Pressure - data valid, but below normal operation range (most severe level)	- Check the tire pressure.
251	9	251 - 9	251 - 9/Time - abnormal update rate	- Check the failure memory of the ECU that transmits the time and date message and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the relevant ECU.
521	2	521 - 2	521 - 2/Brake Pedal Position - data erratric, intermittent or incorrect	- Check whether the brake pedal is always slightly activated (cannot return to 0-position). - Check whether the accelerator pedal is always slightly activated (cannot return to 0-position). - Replace the EBS brake signal transmitter if the other two items were faultless.
620	3	620 - 3	620 - 3/5 Volts DC Supply - voltage above normal or shorted high	- Check the supply line of the TCV pressure sensor (short circuit to +UB?). - Replace the EBS central module.
620	4	620 - 4	620 - 4/5 Volts DC Supply - voltage below normal or shorted low	- Check the supply line of the TCV pressure sensor (short circuit to GND?). - Check the pressure sensor in the TCV (supply current too high? internal short circuit to GND?). - Replace the EBS central module.
627	0	627 - 0	627 - 0/Power Supply - data valid, but above normal operation range (most severe level)	- Check the voltage supply of the vehicle (battery defect? voltage governer defect?).
627	1	627 - 1	627 - 1/Power Supply - data valid, but below normal operation range (most severe level)	- Check the voltage supply of the vehicle (battery defect? voltage governer defect?).
629	12	629 - 12	629 - 12/Controller #1 - bad intelligent device or component	- Replace EBS central module.
630	12	630 - 12	630 - 12/Calibration Memory - bad intelligent device or component	- Replace EBS central module.
639	2	639 - 2	639 - 2/J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link) - data erratric, intermittent or incorrect	- Check the wiring of the chassis CAN data connection and the related electric connectors between the EBS central module and the other chassis CAN ECUs.
639	9	639 - 9	639 - 9/J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link) - abnormal update rate	- Check the wiring of the chassis CAN data connection and the related electric connectors between the EBS central module and the other chassis CAN ECUs.
789	0	789 - 0	789 - 0/Wheel Sensor ABS Axle 1 Left - data valid, but above normal operation range (most severe level)	- Check whether there are inadmissable oscillation effects at the relevant foundation brake. - Check whether there are inadmissable oscillation effects at the fitting of the relevant wheel speed sensor. - Check the isolation of the wheel-speed sensor wiring (high frequencies might be induced). - Replace the front axle modulator if the other effects were already checked.

4012426a

Figure 29

SPN	FMI	DTC	DTC-Text	Repair Instructions
789	1	789 - 1	789 - 1/Wheel Sensor ABS Axle 1 Left - data valid, but below normal operation range (most severe level)	- Check the relevant wheel speed sensor and its fitting. Is the distance between pole wheel and sensor (airgap) too wide? - Check the wheel speed sensor for correct voltage output (is voltage output sufficient?). - Replace the front axle modulator if sensor and airgap are correct.
789	3	789 - 3	789 - 3/Wheel Sensor ABS Axle 1 Left - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left wheel speed sensor at the front axle (short circuit to UB?). - Replace the front axle modulator if the wiring of the relevant wheel speed sensor is not faultless.
789	4	789 - 4	789 - 4/Wheel Sensor ABS Axle 1 Left - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left wheel speed sensor at the front axle (short circuit to GND?). - Check the left wheel speed sensor at the front axle (internal short circuit to GND?). - Replace the front axle modulator if the relevant wheel speed sensor and its wiring are faultless.
789	5	789 - 5	789 - 5/Wheel Sensor ABS Axle 1 Left - current below normal or open circuit	- Check the wiring and the related electric connectors of the left wheel speed sensor at the front axle (interruption?). - Check the left wheel speed sensor at the front axle (internal interruption?). - Replace the front axle modulator if the relevant wheel speed sensor and its wiring are faultless.
789	6	789 - 6	789 - 6/Wheel Sensor ABS Axle 1 Left - current above normal or grounded circuit	- Check the wiring and the related electric connectors of the left wheel speed sensor at the front axle (shorted coil?). - Check the left wheel speed sensor at the front axle (internal shorted coil?). - Replace the front axle modulator if the relevant wheel speed sensor and its wiring are faultless.
789	7	789 - 7	789 - 7/Wheel Sensor ABS Axle 1 Left - mechanical system not responding correctly or out of adjustment	- Check the relevant pole-wheel (is it damaged? dirty?).
789	11	789 - 11	789 - 11/Wheel Sensor ABS Axle 1 Left - failure mode not identifiable/root cause not known	If the failure is not sporadic and occurs several times, then the following workshop activity is suitable: - Check the fitting and mounting of the relevant wheel speed sensor (can vibrations cause chattering?). - Check the relevant foundation brake for inadmissable vibrations (return spring defect? brake linings loosened?).
789	14	789 - 14	789 - 14/Wheel Sensor ABS Axle 1 Left - special instructions	- Check the relevant pole wheel (is it damaged?). - Check the relevant wheel-bearing (is it loosened?).
790	0	790 - 0	790 - 0 Wheel Sensor ABS Axle 1 Right - data valid, but above normal operation range (most severe level)	- Check whether there are inadmissable oscillation effects at the relevant foundation brake. - Check whether there are inadmissable oscillation effects at the fitting of the relevant wheel speed sensor. - Check the isolation of the wheel speed sensor wiring (high frequencies might be induced). - Replace the front axle modulator if the other effects were already checked.
790	1	790 - 1	790 - 1/Wheel Sensor ABS Axle 1 Right - data valid, but below normal operation range (most severe level)	- Check the relevant wheel speed sensor and its fitting. Is the distance between pole wheel and sensor (airgap) too wide? - Check the wheel speed sensor for correct voltage output (is voltage output sufficient?). - Replace the front axle modulator if sensor and airgap are correct.

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Figure 30

SPN	FMI	DTC	DTC-Text	Repair Instructions
790	3	790-3	790 - 3/Wheel Sensor ABS Axle 1 Right - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the right wheel speed sensor at the front axle (short circuit to UB?). - Replace the front axle modulator if the wiring of the relevant wheel speed sensor is faultless.
790	4	790 - 4	790 - 4/Wheel Sensor ABS Axle 1 Right - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the right wheel speed sensor at the front axle (short circuit to GND?). - Check the right wheel speed sensor at the front axle (internal short circuit to GND?). - Replace the front axle modulator if the relevant wheel speed sensor and its wiring are faultless.
790	5	790 - 5	790 - 5/Wheel Sensor ABS Axle 1 Right - current below normal or open circuit	- Check the wiring and the related electric connectors of the right wheel speed sensor at the front axle (interruption?). - Check the right wheel speed sensor at the front axle (internal interruption?). - Replace the front-axle modulator if the relevant wheel speed sensor and its wiring are faultless.
790	6	790 - 6	790 - 6/Wheel Sensor ABS Axle 1 Right - current above normal or grounded circuit	- Check the wiring and the related electric connectors of the right wheel speed sensor at the front axle (shorted coil?). - Check the right wheel speed sensor at the front axle (internal shorted coil?). - Replace the front axle modulator if the relevant wheel speed sensor and its wiring are faultless.
790	7	790 - 7	790 - 7/Wheel Sensor ABS Axle 1 Right - mechanical system not responding correctly or out of adjustment	- Check the relevant pole-wheel (is it damaged? dirty?).
790	11	790 - 11	790 - 11/Wheel Sensor ABS Axle 1 Right - failure mode not identifiable/root cause not known	If the failure is not sporadic and occurs several times, then the following workshop activity is suitable: - Check the fitting and mounting of the relevant wheel speed sensor (can vibrations cause chattering?). - Check the relevant foundation brake for inadmissable vibrations (return spring defect? brake linings loosened?).
790	14	790 - 14	790 - 14/Wheel Sensor ABS Axle 1 Right - special instructions	- Check the relevant pole wheel (is it damaged?). - Check the relevant wheel-bearing (is it loosened?).
791	0	791 - 0	791 - 0/Wheel Sensor ABS Axle 2 Left - data valid, but above normal operation range (most severe level)	- Check whether there are inadmissable oscillation effects at the relevant foundation brake. - Check whether there are inadmissable oscillation effects at the fitting of the relevant wheel speed sensor. - Check the isolation of the wheel-speed sensor wiring (high frequencies might be induced). - Replace the rear axle modulator if the other effects were already checked.
791	1	791 - 1	791 - 1/Wheel Sensor ABS Axle 2 Left - data valid, but below normal operation range (most severe level)	- Check the relevant wheel speed sensor and its fitting. Is the distance between pole wheel and sensor (airgap) too wide? - Check the wheel speed sensor for correct voltage output (is voltage output sufficient?). - Replace the rear axle modulator if sensor and airgap are correct.
791	3	791 - 3	791 - 3/Wheel Sensor ABS Axle 2 Left - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left wheel speed sensor at the rear axle (short circuit to UB?). - Replace the rear axle modulator if the wiring of the relevant wheel speed sensor is faultless.

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Figure 31

SPN	FMI	DTC	DTC-Text	Repair Instructions
791	4	791 - 4	791 - 4/Wheel Sensor ABS Axle 2 Left - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left wheel speed sensor at the rear axle (short circuit to GND?). - Check the left wheel speed sensor at the rear axle (internal short circuit to GND?). - Replace the rear axle modulator if the relevant wheel speed sensor and its wiring are faultless.
791	5	791 - 5	791 - 5/Wheel Sensor ABS Axle 2 Left - current below normal or open circuit	- Check the wiring and the related electric connectors of the left wheel speed sensor at the rear axle (interruption?). - Check the left wheel speed sensor at the rear axle (internal interruption?). - Replace the rear axle modulator if the relevant wheel speed sensor and its wiring are faultless.
791	6	791 - 6	791 - 6/Wheel Sensor ABS Axle 2 Left - current above normal or grounded circuit	- Check the wiring and the related electric connectors of the left wheel speed sensor at the rear axle (shorted coil?). - Check the left wheel speed sensor at the rear axle (internal shorted coil?). - Replace the rear axle modulator if the relevant wheel speed sensor and its wiring are faultless.
791	7	791 - 7	791 - 7/Wheel Sensor ABS Axle 2 Left - mechanical system not responding properly or out of adjustment	- Check the relevant pole-wheel (is it damaged? dirty?).
791	11	791 - 11	791 - 11/Wheel Sensor ABS Axle 2 Left - failure mode not identifiable/root cause not known	If the failure is not sporadic and occurs several times, then the following workshop activity is suitable: - Check the fitting and mounting of the relevant wheel speed sensor (can vibrations cause chattering?). - Check the relevant foundation brake for inadmissable vibrations (return spring defect? brake linings loosened?).
791	14	791 - 14	791 - 14/Wheel Sensor ABS Axle 2 Left - special instructions	- Check the relevant pole wheel (is it damaged?). - Check the relevant wheel-bearing (is it loosened?).
792	0	792 - 0	792 - 0/Wheel Sensor ABS Axle 2 Right - data valid, but above normal operation range (most severe level)	- Check whether there are inadmissable oscillation effects at the relevant foundation brake. - Check whether there are inadmissable oscillation effects at the fitting of the relevant wheel speed sensor. - Check the isolation of the wheel-speed sensor wiring (high frequencies might be induced). - Replace the rear axle modulator if the other effects were already checked.
792	1	792 - 1	792 - 1/Wheel Sensor ABS Axle 2 Right - data valid, but below normal operation range (most severe level)	- Check the relevant wheel speed sensor and its fitting. Is the distance between pole wheel and sensor (airgap) too wide? - Check the wheel speed sensor for correct volt output (is voltage output sufficient?). - Replace the rear axle modulator if sensor and airgap are correct.
792	3	792 - 3	792 - 3/Wheel Sensor ABS Axle 2 Right - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the right wheel speed sensor at the rear axle (short circuit to UB?). - Replace the rear axle modulator if the wiring of the relevant wheel speed sensor is faultless.
792	4	792 - 4	792 - 4/Wheel Sensor ABS Axle 2 Right - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the right wheel speed sensor at the rear axle (short circuit to GND?). - Check the right wheel speed sensor at the rear axle (internal short circuit to GND?). - Replace the rear axle modulator if the relevant wheel speed sensor and its wiring are faultless.

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SPN	FMI	DTC	DTC-Text	Repair Instructions
792	5	792 - 5	792 - 5/Wheel Sensor ABS Axle 2 Right - current below normal or open circuit	- Check the wiring and the related electric connectors of the right wheel speed sensor at the rear axle (interruption?). - Check the right wheel speed sensor at the rear axle (internal interruption?). - Replace the rear axle modulator if the relevant wheel speed sensor and its wiring are faultless.
792	6	792 - 6	792 - 6/Wheel Sensor ABS Axle 2 Right - current above normal or grounded circuit	- Check the wiring and the related electric connectors of the right wheel speed sensor at the rear axle (shorted coil?). - Check the right wheel speed sensor at the rear axle (internal shorted coil?). - Replace the rear axle modulator if the relevant wheel speed sensor and its wiring are faultless.
792	7	792 - 7	792 - 7/Wheel Sensor ABS Axle 2 Right - mechanical system not responding properly or out of adjustment	- Check the relevant pole-wheel (is it damaged? dirty?).
792	11	792 - 11	792 - 11/Wheel Sensor ABS Axle 2 Right - failure mode not identifiable/root cause not known	If the failure is not sporadic and occurs several times, then the following workshop activity is suitable: - Check the fitting and mounting of the relevant wheel speed sensor (can vibrations cause chattering?). - Check the relevant foundation brake for inadmissable vibrations (return spring defect? brake linings loosened?).
792	14	792 - 14	792 - 14/Wheel Sensor ABS Axle 2 Right - special instructions	- Check the relevant pole wheel (is it damaged?). - Check the relevant wheel-bearing (is it loosened?).
793	0	793 - 0	793 - 0/Wheel Sensor ABS Axle 3 Left - data valid, but above normal operation range (most severe level)	- Check whether there are inadmissable oscillation effects at the relevant foundation brake. - Check whether there are inadmissable oscillation effects at the fitting of the relevant wheel speed sensor. - Check the isolation of the wheel-speed sensor wiring (high frequencies might be induced). - Replace the additional axle modulator if the other effects were already checked.
793	1	793 - 1	793 - 1/Wheel Sensor ABS Axle 3 Left - data valid, but below normal operation range (most severe level)	- Check the relevant wheel speed sensor and its fitting. Is the distance between pole wheel and sensor (airgap) too wide? - Check the wheel speed sensor for correct volt output (is voltage output sufficient?). - Replace the additional axle modulator if sensor and airgap are correct.
793	3	793 - 3	793 - 3/Wheel Sensor ABS Axle 3 Left - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left wheel speed sensor at the additional axle (short circuit to UB?). - Replace the additional axle modulator if the wiring of the relevant wheel speed sensor is faultless.
793	4	793 - 4	793 - 4/Wheel Sensor ABS Axle 3 Left - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left wheel speed sensor at the additional axle (short circuit to GND?). - Check the left wheel speed sensor at the additional axle (internal short circuit to GND?). - Replace the additional axle modulator if the relevant wheel speed sensor and its wiring are faultless.
793	5	793 - 5	793 - 5/Wheel Sensor ABS Axle 3 Left - current below normal or open circuit	- Check the wiring and the related electric connectors of the left wheel speed sensor at the additional axle (interruption?). - Check the left wheel speed sensor at the additional axle (internal interruption?). - Replace the additional axle modulator if the relevant wheel speed sensor and its wiring are faultless.

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Figure 32

Figure 33

SPN	FMI	DTC	DTC-Text	Repair Instructions
793	6	793 - 6	793 - 6/Wheel Sensor ABS Axle 3 Left - current above normal or grounded circuit	- Check the wiring and the related electric connectors of the left wheel speed sensor at the additional axle (shorted coil?). - Check the left wheel speed sensor at the additional axle (internal shorted coil?). - Replace the additional axle modulator if the relevant wheel speed sensor and its wiring are faultless.
793	7	793 - 7	793 - 7/Wheel Sensor ABS Axle 3 Left - mechanical system not responding correctly or out of adjustment	- Check the relevant pole-wheel (is it damaged? dirty?).
793	11	793 - 11	793 - 11/Wheel Sensor ABS Axle 3 Left - failure mode not identifiable/root cause not known	If the failure is not sporadic and occurs several times, then the following workshop activity is suitable: - Check the fitting and mounting of the relevant wheel speed sensor (can vibrations cause chattering?). - Check the relevant foundation brake for inadmissable vibrations (return spring defect? brake linings loosened?).
793	14	793 - 14	793 - 14/Wheel Sensor ABS Axle 3 Left - special instructions	- Check the relevant pole wheel (is it damaged?). - Check the relevant wheel-bearing (is it loosened?).
794	0	794 - 0	794 - 0/Wheel Sensor ABS Axle 3 Right - data valid, but above normal operation range (most severe level)	- Check whether there are inadmissable oscillation effects at the relevant foundation brake. - Check whether there are inadmissable oscillation effects at the fitting of the relevant wheel speed sensor. - Check the isolation of the wheel-speed sensor wiring (high frequencies might be induced). - Replace the additional axle modulator if the other effects were already checked.
794	1	794 - 1	794 - 1/Wheel Sensor ABS Axle 3 Right - data valid, but below normal operation range (most severe level)	- Check the relevant wheel speed sensor and its fitting. Is the distance between pole wheel and sensor (airgap) too wide? - Check the wheel speed sensor for correct voltage output (is voltage output sufficient?). - Replace the additional axle modulator if sensor and airgap are correct.
794	3	794 - 3	794 - 3/Wheel Sensor ABS Axle 3 Right - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the right wheel speed sensor at the additional axle (short circuit to UB?). - Replace the additional axle modulator if the wiring of the relevant wheel speed sensor is faultless.
794	4	794 - 4	794 - 4/Wheel Sensor ABS Axle 3 Right - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the right wheel speed sensor at the additional axle (short circuit to GND?). - Check the right wheel speed sensor at the additional axle (internal short circuit to GND?). - Replace the additional axle modulator if the relevant wheel speed sensor and its wiring are faultless.
794	5	794 - 5	794 - 5/Wheel Sensor ABS Axle 3 Right - current below normal or open circuit	- Check the wiring and the related electric connectors of the right wheel speed sensor at the additional axle (interruption?). - Check the right wheel speed sensor at the additional axle (internal interruption?). - Replace the additional axle modulator if the relevant wheel speed sensor and its wiring are faultless.
794	6	794 - 6	794 - 6/Wheel Sensor ABS Axle 3 Right - current above normal or grounded circuit	- Check the wiring and the related electric connectors of the right wheel speed sensor at the additional axle (shorted coil?). - Check the right wheel speed sensor at the additional axle (internal shorted coil?). - Replace the additional axle modulator if the relevant wheel speed sensor and its wiring are faultless.

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SPN	FMI	DTC	DTC-Text	Repair Instructions
794	7	794 - 7	794 - 7/Wheel Sensor ABS Axle 3 Right - mechanical system not responding correctly or out of adjustment	- Check the relevant pole-wheel (is it damaged? dirty?).
794	11	794 - 11	794 - 11/Wheel Sensor ABS Axle 3 Right - failure mode not identifiable/root cause not known	If the failure is not sporadic and occurs several times, then the following workshop activity is suitable: - Check the fitting and mounting of the relevant wheel speed sensor (can vibrations cause chattering?). - Check the relevant foundation brake for inadmissable vibrations (return spring defect? brake linings loosened?).
794	14	794 - 14	794 - 14/Wheel Sensor ABS Axle 3 Right - special instructions	- Check the relevant pole wheel (is it damaged?). - Check the relevant wheel-bearing (is it loosened?).
795	3	795 - 3	795 - 3/Pressure Modulation Valve ABS Axle 1 Left - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left ABS valve (short circuit to UB?). - Replace the EBS central module if the wiring of the left ABS valve is faultless.
795	4	795 - 4	795 – 4/Pressure Modulation Valve ABS Axle 1 Left - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left ABS valve (short circuit to GND?). - Check the left ABS valve (internal short circuit to GND?). - Replace the EBS central module if the left ABS valve and its wiring are faultless.
795	5	795 - 5	795 - 5/Pressure Modulation Valve ABS Axle 1 Left - current below normal or open circuit	- Check the wiring and the related electric connectors of the left ABS valve (interruption?). - Check the left ABS valve (internal interruption?). - Replace the EBS central module if the left ABS valve and its wiring are faultless.
795	14	795 - 14	795 - 14/Pressure Modulation Valve ABS Axle 1 Left - special instructions	- Check the wiring and the related electric connectors of the left ABS valve (short circuits to UB and/or GND?). - Check the left ABS valve (internal short circuit to GND?). - Replace the EBS central module if the left ABS valve and its wiring are faultless.
796	3	796 - 3	796 - 3/Pressure Modulation Valve ABS Axle 1 Right - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the right ABS valve (short circuit to UB?). - Replace the EBS central module if the wiring of the right ABS valve is faultless.
796	4	796 - 4	796 - 4/Pressure Modulation Valve ABS Axle 1 Right - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the right ABS valve (short circuit to GND?). - Check the right ABS valve (internal short circuit to GND?). - Replace the EBS central module if the right ABS valve and its wiring are faultless.
796	5	796 - 5	796 - 5/Pressure Modulation Valve ABS Axle 1 Right - current below normal or open circuit	- Check the wiring and the related electric connectors of the right ABS valve (interruption?). - Check the right ABS valve (internal interruption?). - Replace the EBS central module if the right ABS valve and its wiring are faultless.
796	14	796 - 14	796 - 14/Pressure Modulation Valve ABS Axle 1 Right - special instructions	- Check the wiring and the related electric connectors of the right ABS valve (short circuits to UB and/or GND?). - Check the right ABS valve (internal short circuit to GND?). - Replace the EBS central module if the right ABS valve and its wiring are faultless.
801	3	801 - 3	801 - 3/Retarder Control Relay - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the retarder control relay (short circuit to UB?). - Check the retarder control relay (Internal short circuit to UB?). - Replace the EBS central module if the retarder control relay and the relevant wiring is faultless.

4012432a

Figure 34

Figure 35

SPN	FMI	DTC	DTC-Text	Repair Instructions
801	4	801 - 4	801 - 4/Retarder Control Relay - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the retarder control relay (short circuit to GND?). - Check the retarder control relay (internal short circuit to GND?). - Replace the EBS central module if the retarder control relay and the relevant wiring are faultless.
801	5	801 - 5	801 - 5/Retarder Control Relay - current below normal or open circuit	- Check the EOL configuration in the EBS central module (retarder control relay yes/no). - Check the wiring and the related electric connectors of the retarder control relay (interruption?). - Check the retarder control relay (internal interruption?). - Replace the EBS central module if the retarder control relay and the relevant wiring are faultless.
801	13	801 - 13	801 - 13/Retarder Control Relay - out of calibration	- Check EBS central module for correct EOL configuration (retarder control relay yes/no). - Is something connected to the relevant retarder control relay pins of the central module? - Replace the EBS central module.
802	3	802 - 3	802 - 3/Relay Diagonal 1 - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left and right ABS valve (lowline has short circuit to UB?). - Replace the EBS central module if the wiring of both ABS valves is faultless.
802	4	802 - 4	802 - 4/Relay Diagonal 1 - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left and right ABS valve (lowline has short circuit to GND?). - Check the left and right ABS valve (internal short circuit to GND?). - Replace the EBS central module if both ABS valves and its wiring are faultless.
810	2	810 - 2	810 - 2/Speed Signal Input - data erratic, intermittent or incorrect	- Check the air gap of all wheel speed sensors (might be too wide). - Check the parameters “wheel diameter” and “pole wheel teeth numbers” (if applicable). - Is the speed signal of the tachograph ECU (on chassis CAN data link) correct? - Is the speed signal of the tachograph ECU (chassis CAN data link) not available?
810	9	810 - 9	810 - 9/Speed Signal Input - abnormal update rate	- Check the failure memory of the tachograph ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the tachograph ECU.
810	13	810 - 13	810 - 13/Speed Signal Input - out of calibration	a) When tires were changed, the speedometer must be calibrated to the new tire dimensions. - Check the TCO signal (function of speedometer). - Is the TCO speed signal correctly calibrated? - Check the vehicle-specific parameters of the speedometer. b) The EBS central module must have correct parameters. - Check the parameters in the EBS central module (speedometer signal source, tire dimensions). c) The ESC function requires a correct assembly of the ESC module. - Check the assembly position of the ESC module (mechanical hardware-coding between ESC module and vehicle-frame). - Check the correct electric connection of the ESC module. - Check the fitting of the ESC module.
917	9	917 - 9	917 - 9/High Resolution Total Vehicle Distance - abnormal update rate	- Check the failure memory of the ECU, that transmits the vehicle-distance message and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the relevant ECU.

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SPN	FMI	DTC	DTC-Text	Repair Instructions
924	1	924 - 1	924 - 1/Auxiliary Output #1 - data valid, but below normal operation range (most severe level)	- Check the supply line (+UB) of the front axle modulator (increased resistance? corroded contacts?). - Check the supply line (GND) of the front axle modulator (increased resistance? corroded contacts?). - Replace the front axle modulator.
924	3	924 - 3	924 - 3/Auxiliary Output #1 - voltage above normal or shorted high	- Check the supply line of the front axle modulator (permanent short circuit to +UB?). - Replace the EBS central module.
924	6	924 - 6	924 - 6/Auxiliary Output #1 - current above normal or grounded circuit	- Check the supply line of the front axle modulator (short circuit to GND?). - Check the front axle modulator (supply current too high? internal short circuit to GND?). - Replace the EBS central module.
925	1	925 - 1	925 - 1/Auxiliary Output #2 - data valid, but below normal operation range (most severe level)	- Check the supply line (+UB) of the rear axle modulator (increased resistance? corroded contacts?). - Check the supply line (GND) of the rear axle modulator (increased resistance? corroded contacts?). - Replace the rear axle modulator.
925	3	925 - 3	925 – 3/Auxiliary Output #2 - voltage above normal or shorted high	- Check the supply line of the rear axle modulator and the additional axle modulator (permanent short circuit to +UB?). - Replace the EBS central module.
926	1	926 - 1	926 - 1/Auxiliary Output #3 - data valid, but below normal operation range (most severe level)	- Check the supply line (+UB) of the additional axle modulator (increased resistance? corroded contacts?). - Check the supply line (GND) of the additional axle modulator (increased resistance? corroded contacts?). - Replace the additional axle modulator.
1042	1	1042 - 1	1042 - 1/Electronic Tractor/Trailer Interface (ISO 11992) - data valid, but below normal operation range (most severe level)	- Check wiring and related connectors between EBS central module and trailer connector (ISO 11992, the CAN Low Line might be faulty). - Check wiring, connectors and ECU within trailer EBS system (ISO 11992, the CAN Low Line might be faulty). - Check EBS central module.
1042	9	1042 - 9	1042 - 9/Electronic Tractor/Trailer Interface (ISO 11992) - abnormal update rate	- Check wiring and related connectors between EBS central module and trailer connector (ISO 11992). - Check wiring, connectors and ECU within trailer EBS system. - Check EBS central module.
1042	11	1042 - 11	1042 - 11/Electronic Tractor/Trailer Interface (ISO 11992) - failure mode not identifiable/root cause not known	- Check wiring and related connectors between EBS central module and trailer connector (ISO 11992). - Check wiring, connectors and ECU within trailer EBS system. - Check EBS central module.
1042	12	1042 - 12	1042 - 12/Electronic Tractor/Trailer Interface (ISO 11992) - bad intelligent device or component	- Check the electronic brake system of the trailer (trailer has sent a failure message to the tractor).
1042	14	1042 - 14	1042 - 14/Electronic Tractor/Trailer Interface (ISO 11992) - special instructions	- Check wiring and related connectors between EBS central module and trailer connector (ISO 11992, the CAN High Line might be faulty). - Check wiring, connectors and ECU within trailer EBS system (ISO 11992, the CAN High Line might be faulty). - Check EBS central module.
1043	3	1043 - 3	1043 - 3/Internal Sensor Voltage Supply - voltage above normal or shorted high	- Check the supp line of the brake signal transmitter (permanent short circuit to UB?). - Replace the EBS central module.

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Figure 36

Figure 37

SPN	FMI	DTC	DTC-Text	Repair Instructions
1043	4	1043 - 4	1043 - 4/Internal Sensor Voltage Supply - voltage below normal or shorted low	- Check the supply line of the brake signal transmitter (short circuit to GND?). - Check the brake signal transmitter (supply current too high? internal short circuit to GND?). - Replace the EBS central module.
1045	4	1045 - 4	1045 - 4/Brake Light Switch 1 - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the EBS-BST (short to GND at first switch signal?). - Check the EBS brake signal transmitter for correct function of first brake switch. - Replace the central module if the BST and its wiring are faultless.
1045	5	1045 - 5	1045 - 5/Brake Light Switch 1 - current below normal or open circuit	- Check the wiring and the related electric connectors of the EBS-BST (interruption of first switch signal?). - Check the EBS brake signal transmitter for correct function of first brake switch. - Replace the central module if the BST and its wiring are faultless.
1046	4	1046 - 4	1046 - 4/Brake Light Switch 2 - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the EBS-BST (short to GND at second switch signal?). - Check the EBS brake signal transmitter for correct function of second brake switch. - Replace the central module if the BST and its wiring are faultless.
1046	5	1046 - 5	1046 - 5/Brake Light Switch 2 - current below normal or open circuit	- Check the wiring and the related electric connectors of the EBS-BST (interruption of second switch signal?). - Check the EBS brake signal transmitter for correct function of second brake switch. - Replace the central module if the BST and its wiring are faultless.
1047	2	1047 - 2	1047 - 2/Electronic Pressure Control Axle 1 - data erratric, intermittent or incorrect	- Replace front axle modulator. - Replace EBS central module.
1047	9	1047 - 9	1047 - 9/Electronic Pressure Control Axle 1 - abnormal update rate	- Check the wiring (voltage supply and CAN) and the related electric connectors between EBS central module and front axle modulator (interruption? short circuit?). - Replace front axle modulator. - Replace EBS central module.
1047	11	1047 - 11	1047 - 11/Electronic Pressure Control Axle 1 - failure mode not identifiable/root cause not known	- Replace front axle modulator. - Replace EBS central module.
1047	12	1047 - 12	1047 - 12/Electronic Pressure Control Axle 1 - bad intelligent device or component	- Replace front axle modulator.
1047	13	1047 - 13	1047 - 13/Electronic Pressure Control Axle 1 - out of calibration	- Check the correctness of the front axle modulator version (right number?). - Check the front axle configuration parameters in the EBS central module (pn. backup, lining-wear-sensors, number of control-circuits 1m/2m, etc.).
1047	19	1047 - 19	1047 - 19/Electronic Pressure Control Axle 1 - received network data in error	- Replace front axle modulator.
1048	7	1048 - 7	1048 - 7/Pneumatic Back-up Pressure Control Axle 1 - mechanical system not responding correctly or out of adjustment	- Check if there is a leakage during brake pedal activation. - Are the pneumatic lines between BST and front axle modulator blocked? - Is the supply pressure sensing (front axle circuit) faulty? - Change the front axle modulator. - Change the brake signal transmitter (BST).
1049	0	1049 - 0	1049 - 0/Brake Pressure Sensing Axle 1 - data valid, but above normal operation range (most severe level)	- Check left and right spring brake chambers at the front axle for internal leakage (check not necessary for normal brake chambers). - Replace the front axle modulator.
1049	2	1049 - 2	1049 - 2/Brake Pressure Sensing Axle 1 - data erratric, intermittent or incorrect	- Replace front axle modulator.

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SPN	FMI	DTC	DTC-Text	Repair Instructions
1049	7	1049 - 7	1049 - 7/Brake Pressure Sensing Axle 1 - mechanical system not responding correctly or out of adjustment	- Check the supply pressure of the front axle modulator (supply sensing correct?). - Check the pneumatic supply lines of the front axle modulator (blocked? kinked?). - Check the pneumatic brake lines of the front axle modulator (broken? leaky?). - Replace the front axle modulator.
1049	14	1049 - 14	1049 - 14/Brake Pressure Sensing Axle 1 - special instructions	- Check left and right spring brake chambers at the front axle for internal leakage (check not necessary for normal brake chambers). - Check the pneumatic backup brake lines of the front axle modulator (kinked? captured or residual brake pressure?). - Replace front axle modulator.
1050	2	1050 - 2	1050 - 2/Electronic Pressure Control Axle 2 - data erratic, intermittent or incorrect	- Replace rear axle modulator. - Replace EBS central module.
1050	9	1050 - 9	1050 - 9/Electronic Pressure Control Axle 2 - abnormal update rate	- Check the wiring (voltage supply and CAN) and the related electric connectors between EBS central module and rear axle modulator (interruption? short circuit?). - Replace rear axle modulator. - Replace EBS central module.
1050	11	1050 - 11	1050 - 11/Electronic Pressure Control Axle 2 - failure mode not identifiable/root cause not known	- Replace rear axle modulator. - Replace EBS central module.
1050	12	1050 - 12	1050 - 12/Electronic Pressure Control Axle 2 - bad intelligent device or component	- Replace rear axle modulator.
1050	13	1050 - 13	1050 - 13/Electronic Pressure Control Axle 2 - out of calibration	- Check the correctness of the rear axle modulator version (right number?). - Check the rear axle configuration-parameters in the EBS central module (pn. backup, lining-wear-sensors, number of control-circuits 1m/2m, etc.).
1050	19	1050 - 19	1050 - 19/Electronic Pressure Control Axle 2 - received network data in error	- Replace rear axle modulator.
1051	7	1051 - 7	1051 - 7/Pneumatic Back-up Pressure Control Axle 2 - mechanical system not responding correctly or out of adjustment	- Check if there is a leakage during brake pedal activation. - Are the pneumatic lines between BST and rear axle modulator blocked? - Is the supply pressure sensing (rear axle circuit) faulty? - Change the rear axle modulator. - Change the brake signal transmitter (BST).
1052	0	1052 - 0	1052 - 0/Brake Pressure Sensing Axle 2 - data valid, but above normal operation range (most severe level)	- Check left spring brake chamber at the rear axle for internal leakage (check not necessary for normal brake chambers). - Replace the rear axle modulator.
1052	1	1052 - 1	1052 - 1/Brake Pressure Sensing Axle 2 - data valid, but below normal operation range (most severe level)	- Check the supply pressure of the rear axle modulator (supply sensing correct?). - Check the pneumatic supply line (left channel) of the rear axle modulator (blocked? kinked?). - Check the pneumatic brake line (left channel) of the rear axle modulator (broken? leaky?). - Replace the rear axle modulator.
1052	2	1052 - 2	1052 - 2/Brake Pressure Sensing Axle 2 - data erratic, intermittent or incorrect	- Replace rear axle modulator.
1052	7	1052 - 7	1052 - 7/Brake Pressure Sensing Axle 2 - mechanical system not responding correctly or out of adjustment	- Check the supply pressure of the rear axle modulator (supply sensing correct?). - Check the pneumatic supply lines of the rear axle modulator (blocked? kinked?). - Check the pneumatic brake lines of the rear axle modulator (broken? leaky?). - Replace the rear axle modulator.

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Figure 38

Figure 39

SPN	FMI	DTC	DTC-Text	Repair Instructions
1052	15	1052 - 15	1052 - 15/Brake Pressure Sensing Axle 2 - data valid, but above normal operation range (least severe level)	- Check right spring brake chamber at the rear axle for internal leakage (check not necessary for normal brake chambers). - Replace the rear axle modulator.
1052	16	1052 - 16	1052 - 16/Brake Pressure Sensing Axle 2 - data valid, but above normal operation range (moderately severe level)	- Check right spring brake chamber at the rear axle for internal leakage (check not necessary for normal brake chambers). - Check the pneumatic backup brake lines of the rear axle modulator (kinked? captured or residual brake pressure?). - Replace rear axle modulator.
1052	17	1052 - 17	1052 - 17/Brake Pressure Sensing Axle 2 - data valid, but below normal operation range (least severe level)	- Check the supply pressure of the rear axle modulator (supply sensing correct?). - Check the pneumatic supply line (right channel) of the rear axle modulator (blocked? kinked?). - Check the pneumatic brake line (right channel) of the rear axle modulator (broken? leaky?). - Replace the rear axle modulator.
1053	2	1053 - 2	1053 - 2/Electronic Pressure Control Axle 3 - data erratic, intermittent or incorrect	- Replace additional axle modulator. - Replace EBS central module.
1053	9	1053 - 9	1053 - 9/Electronic Pressure Control Axle 3 - abnormal update rate	- Check the correct configuration of the EBS central module (EOL parameter: EBS-system-type -> additional axle modulator yes/no). - Check the wiring (voltage supply and CAN) and the related electric connectors between EBS central module and additional axle modulator (interruption? short circuit?). - Check the wiring of the Configuration-Pin (“bridge”) of the additional axle modulator. - Replace additional axle modulator. - Replace EBS central module.
1053	11	1053 - 11	1053 - 11/Electronic Pressure Control Axle 3 - failure mode not identifiable/root cause not known	- Replace additional axle modulator. - Replace EBS central module.
1053	12	1053 - 12	1053 - 12/Electronic Pressure Control Axle 3 - bad intelligent device or component	- Replace additional axle modulator.
1053	13	1053 - 13	1053 - 13/Electronic Pressure Control Axle 3 - out of calibration	- Check the correctness of the additional axle modulator version (right number?). - Check the additional axle configuration-parameters in the EBS central module (pn. backup, lining-wear-sensors, number of control-circuits 1m/2m, etc.).
1053	14	1053 - 14	1053 - 14/Electronic Pressure Control Axle 3 - special instructions	- Check the correct EOL parameter setting for EBS system type. - Check the correct axle modulator type (correct number?).
1053	19	1053 - 19	1053 - 19/Electronic Pressure Control Axle 3 - received network data in error	- Replace additional axle modulator.
1054	7	1054 - 7	1054 - 7/Pneumatic Back-up Pressure Control Axle 3 - mechanical system not responding correctly or out of adjustment	- Check if there is a leakage during brake-pedal activation. - Are the pneumatic lines between BST and additional axle modulator blocked? - Is the supply pressure sensing (additional axle circuit) faulty? - Change the additional axle modulator. - Change the brake signal transmitter (BST).
1055	0	1055 - 0	1055 - 0/Brake Pressure Sensing Axle 3 - data valid, but above normal operation range (most severe level)	- Check left and right spring brake chambers at the additional axle for internal leakage (check not necessary for normal brake chambers). - Replace the additional axle modulator.

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SPN	FMI	DTC	DTC-Text	Repair Instructions
1055	1	1055 - 1	1055 - 1/Brake Pressure Sensing Axle 3 - data valid, but below normal operation range (most severe level)	- Check the supply pressure of the additional axle modulator (supply sensing correct?). - Check the pneumatic supply lines of the additional axle modulator (blocked? kinked?). - Check the pneumatic brake lines of the additional axle modulator (broken? leaky?). - Replace the additional axle modulator.
1055	2	1055 - 2	1055 - 2/Brake Pressure Sensing Axle 3 - data erratric, intermittent or incorrect	- Replace additional axle modulator.
1055	7	1055 - 7	1055 - 7/Brake Pressure Sensing Axle 3 - mechanical system not responding correctly or out of adjustment	- Check the supply pressure of the additional axle modulator (supply sensing correct?). - Check the pneumatic supply lines of the additional axle modulator (blocked? kinked?). - Check the pneumatic brake lines of the additional axle modulator (broken? leaky?). - Replace the additional axle modulator.
1055	14	1055 - 14	1055 - 14/Brake Pressure Sensing Axle 3 - special instructions	- Check left and right spring brake chambers at the additional axle for internal leakage (check not necessary for normal brake chambers). - Check the pneumatic backup brake lines of the additional axle modulator (kinked? captured or residual brake pressure?). - Replace additional axle modulator.
1055	15	1055 - 15	1055 - 15/Brake Pressure Sensing Axle 3 - data valid, but above normal operation range (least severe level)	- Check left and right spring brake chambers at the additional axle for internal leakage (check not necessary for normal brake chambers). - Replace the additional axle modulator.
1055	16	1055 - 16	1055 - 16/Brake Pressure Sensing Axle 3 - data valid, but above normal operation range (moderately severe level)	- Check left and right spring brake chambers at the additional axle for internal leakage (check not necessary for normal brake chambers). - Check the pneumatic backup brake lines of the additional axle modulator (kinked? captured or residual brake pressure?). - Replace additional axle modulator.
1055	17	1055 - 17	1055 - 17/Brake Pressure Sensing Axle 3 - data valid, but below normal operation range (least severe level)	- Check the supply pressure of the additional axle modulator (supply sensing correct?). - Check the pneumatic supply lines of the additional axle modulator (blocked? kinked?). - Check the pneumatic brake lines of the additional axle modulator (broken? leaky?). - Replace the additional axle modulator.
1056	3	1056 - 3	1056 - 3/Electronic Pressure Control, Trailer Control - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the TCV solenoids (short circuit to UB?). - Check the TCV solenoids (Internal short circuit to UB?). - Replace the EBS central module, if the TCV solenoids and the relevant wiring is faultless.
1056	4	1056 - 4	1056 - 4/Electronic Pressure Control, Trailer Control - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the TCV solenoids (short circuit to GND?). - Check the TCV solenoids (internal short circuit to GND?). - Replace the EBS central module if the TCV solenoids and the relevant wiring are faultless.

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Figure 40

SPN	FMI	DTC	DTC-Text	Repair Instructions
1056	5	1056 - 5	1056 - 5/Electronic Pressure Control, Trailer Control - current below normal or open circuit	- Check the EOL configuration in the EBS central module (parameter TCV yes/no). - Check the wiring and the related electric connectors of the TCV solenoids (interruption?). - Check the TCV solenoids (internal interruption?). - Replace the EBS central module if the TCV solenoids and the relevant wiring are faultless.
1056	7	1056 - 7	1056 - 7/Electronic Pressure Control, Trailer Control - mechanical system not responding correctly or out of adjustment	- Check the supply pressure of the trailer control (insufficient supply pressure during driving?). - Check the pneumatic supply lines of the trailer control (blocked? kinked?). - Check the pneumatic brake lines of the trailer control (broken? leaky?). - Replace the trailer control valve.
1056	13	1056 - 13	1056 - 13/Electronic Pressure Control, Trailer Control - out of calibration	- Check EBS central module for correct EOL configuration (TCV yes/no). - Is something connected to the relevant TCV pins of the central module? - Replace the EBS central module.
1057	7	1057 - 7	1057 - 7/Pneumatic Back-up Pressure Control, Trailer Control - mechanical system not responding correctly or out of adjustment	- Check if there is a leakage during brake pedal activation. - Are the pneumatic lines between BST and trailer control valve blocked? - Is the supply pressure sensing (3rd circuit trailer) faulty? - Change the trailer control valve. - Change the brake signal transmitter (BST).
1058	0	1058 - 0	1058 - 0/Brake Pressure Sensing, Trailer Control - data valid, but above normal operation range (most severe level)	- Check the relevant pneumatic brake lines (trailer control) for captured or residual brake pressure. - Check the wiring and the related connectors between central module and trailer control valve. - Check the pressure sensor of the trailer control valve. - Replace EBS central module.
1058	3	1058 - 3	1058 - 3/Brake Pressure Sensing, Trailer Control - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the TCV pressure sensor (interruption? short circuits?). - Check the TCV pressure sensor (correct electric function? correct output signal?). - Replace the EBS central module if the TCV sensor and its wiring are faultless.
1058	4	1058 - 4	1058 - 4/Brake Pressure Sensing, Trailer Control - voltage below normal or shorted low	- Check the EBS central module for correct EOL configuration (parameter: TCV yes/no). - Check the wiring and the related electric connectors of the TCV pressure sensor (interruption? short circuits?). - Check the TCV pressure sensor (correct electric function? correct output signal?). - Replace the EBS central module if the TCV sensor and its wiring are faultless.
1060	3	1060 - 3	1060 - 3/Lining Wear Sensor Axle 1 Left - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left lining wear sensor at the front axle (interruption? short circuits?). - Check the left lining wear sensor at the front axle (output voltage signal too high?). - Replace the front axle modulator if the relevant lining wear sensor and its wiring are faultless.
1060	4	1060 - 4	1060 - 4/Lining Wear Sensor Axle 1 Left - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left lining wear sensor at the front axle (interruption? short circuits?). - Check the left lining wear sensor at the front axle (output voltage signal too low?). - Replace the front axle modulator if the relevant lining wear sensor and its wiring are faultless.

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Figure 41

SPN	FMI	DTC	DTC-Text	Repair Instructions
1061	3	1061 - 3	1061 - 3/Lining Wear Sensor Axle 1 Right - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the right lining wear sensor at the front axle (interruption? short circuits?). - Check the right lining wear sensor at the front axle (output voltage signal too high?). - Replace the front axle modulator if the relevant lining wear sensor and its wiring are faultless.
1061	4	1061 - 4	1061 - 4/Lining Wear Sensor Axle 1 Right - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the right lining wear sensor at the front axle (interruption? short circuits?). - Check the right lining wear sensor at the front axle (output voltage signal too low?). - Replace the front axle modulator if the relevant lining wear sensor and its wiring are faultless.
1062	3	1062 - 3	1062 - 3/Lining Wear Sensor Axle 2 Left - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left lining wear sensor at the rear axle (interruption? short circuits?). - Check the left lining wear sensor at the rear axle (output voltage signal too high?). - Replace the rear axle modulator if the relevant lining wear sensor and its wiring are faultless.
1062	4	1062 - 4	1062 - 4/Lining Wear Sensor Axle 2 Left - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left lining wear sensor at the rear axle (interruption? short circuits?). - Check the left lining wear sensor at the rear axle (output voltage signal too low?). - Replace the rear axle modulator if the relevant lining wear sensor and its wiring are faultless.
1063	3	1063 - 3	1063 - 3/Lining Wear Sensor Axle 2 Right - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the right lining wear sensor at the rear axle (interruption? short circuits?). - Check the right lining wear sensor at the rear axle (output voltage signal too high?). - Replace the rear axle modulator if the relevant lining wear sensor and its wiring are faultless.
1063	4	1063 - 4	1063 - 4/Lining Wear Sensor Axle 2 Right - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the right lining wear sensor at the rear axle (interruption? short circuits?). - Check the right lining wear sensor at the rear axle (output voltage signal too low?). - Replace the rear axle modulator if the relevant lining wear sensor and its wiring are faultless.
1064	3	1064 - 3	1064 - 3/Lining Wear Sensor Axle 3 Left - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left lining wear sensor at the additional axle (interruption? short circuits?). - Check the left lining wear sensor at the additional axle (output voltage signal too high?). - Replace the additional axle modulator if the relevant lining wear sensor and its wiring are faultless.
1064	4	1064 - 4	1064 - 4/Lining Wear Sensor Axle 3 Left - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left lining wear sensor at the additional axle (interruption? short circuits?). - Check the left lining wear sensor at the additional axle (output voltage signal too low?). - Replace the additional axle modulator if the relevant lining wear sensor and its wiring are faultless.
1065	3	1065 - 3	1065 - 3/Lining Wear Sensor Axle 3 Right - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the right lining wear sensor at the additional axle (interruption? short circuits?). - Check the right lining wear sensor at the additional axle (output voltage signal too high?). - Replace the additional axle modulator if the relevant lining wear sensor and its wiring are faultless.

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Figure 42

Figure 43

SPN	FMI	DTC	DTC-Text	Repair Instructions
1065	4	1065 - 4	1065 - 4/Lining Wear Sensor Axle 3 Right - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the right lining wear sensor at the additional axle (interruption? short circuits?). - Check the right lining wear sensor at the additional axle (output voltage signal too low?). - Replace the additional axle modulator if the relevant lining wear sensor and its wiring are faultless.
1066	2	1066 - 2	1066 - 2/Brake Signal Transmitter - data erratic, intermittent or incorrect	- Check/replace the EBS brake signal transmitter (are both sensor signals identical when applying the brake?). - Replace the EBS central module if both sensor signals of BST are correct.
1066	8	1066 - 8	1066 - 8/Brake Signal Transmitter - abnormal frequency, pulse width or period	- Check the wiring and the related electric connectors of the EBS brake signal transmitter (interruption? short circuits?). - Check the EBS brake signal transmitter for correct function. - Replace the EBS central module if the BST and its wiring are faultless.
1066	12	1066 - 12	1066 - 12/Brake Signal Transmitter - bad intelligent device or component	- Check/replace the EBS brake signal transmitter (are both sensor signals identical when applying the brake?). - Replace the EBS central module if both sensor signals of BST are correct.
1067	0	1067 - 0	1067 - 0/Brake Signal Sensor 1 - data valid, but above normal operation range (most severe level)	- Check the EBS brake signal transmitter for correct function of first sensor signal (signal too high in unbraked condition?). - Replace the central module if the BST is faultless.
1067	2	1067 - 2	1067 - 2/Brake Signal Sensor 1 - data erratic, intermittent or incorrect	- Check the wiring and the related electric connectors of the EBS-BST (interruptions or short circuits in first circuit?). - Check the EBS brake signal transmitter for correct function of first sensor signal. - Replace the central module if the BST and its wiring are faultless.
1067	4	1067 - 4	1067 - 4/Brake Signal Sensor 1 - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the EBS-BST (interruptions or short circuits in first circuit?). - Check the EBS brake signal transmitter for correct function of first sensor signal. - Replace the central module if the BST and its wiring are faultless.
1068	0	1068 - 0	1068 - 0/Brake Signal Sensor 2 - data valid, but above normal operation range (most severe level)	- Check the EBS brake signal transmitter for correct function of second sensor signal (signal too high in unbraked condition?). - Replace the central module if the BST is faultless.
1068	2	1068 - 2	1068 - 2/Brake Signal Sensor 2 - data erratic, intermittent or incorrect	- Check the wiring and the related electric connectors of the EBS-BST (interruptions or short circuits in second circuit?). - Check the EBS brake signal transmitter for correct function of second sensor signal. - Replace the central module if the BST and its wiring are faultless.
1068	4	1068 - 4	1068 - 4/Brake Signal Sensor 2 - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the EBS-BST (interruptions or short circuits in second circuit?). - Check the EBS brake signal transmitter for correct function of second sensor signal. - Replace the central module if the BST and its wiring are faultless.
1069	11	1069 - 11	1069 - 11/Tire Dimension Supervision - failure mode not identifiable/root cause not known	- Check all tires of the vehicle concerning correct size. - Check the EOL parameters of the EBS central module (tire circumference, pole wheel teeth numbers).
1070	7	1070 - 7	1070 - 7/Vehicle Deceleration Control - mechanical system not responding correctly or out of adjustment	- Unfavorable way of driving (fading-effect)? - Control line to the trailer (e.g. yellow coupling head) not connected? - Faulty foundation brakes in the towing vehicle? - Faulty foundation brakes in the trailer? - Wrong parameters inside central module (limit values, characteristics of foundation brake, etc.)?

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SPN	FMI	DTC	DTC-Text	Repair Instructions
1079	3	1079 - 3	1079 - 3/Sensor Supply Voltage 1 (+5V DC) - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left and right lining wear sensor at the front axle (short circuits?). - Replace the front axle modulator if the wiring of the relevant lining wear sensors is faultless.
1079	4	1079 - 4	1079 - 4/Sensor Supply Voltage 1 (+5V DC) - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left and right lining wear sensor at the front axle (short circuits?). - Check the left and right lining wear sensor at the front axle (supply current too high? internal short circuits?). - Replace the front axle modulator if the relevant lining wear sensors and their wiring are faultless.
1080	3	1080 - 3	1080 - 3/Sensor Supply Voltage 2 (+5V DC) - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left and right lining wear sensor at the rear axle (short circuits?). - Replace the rear axle modulator if the wiring of the relevant lining wear sensors is faultless.
1080	4	1080 - 4	1080 - 4/Sensor Supply Voltage 2 (+5V DC) - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left and right lining wear sensor at the rear axle (short circuits?). - Check the left and right lining wear sensor at the rear axle (supply current too high? internal short circuits?). - Replace the rear axle modulator if the relevant lining wear sensors and their wiring are faultless.
1090	9	1090 - 9	1090 - 9/Air Suspension Supply Pressure - abnormal update rate	- Check the failure memory of the ECU that transmits the AIR1 message and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the relevant ECU.
1099	1	1099 - 1	1099 - 1/Brake Lining Remaining, Front Axle, Left Wheel - data valid, but below normal operation range (most severe level)	- The relevant brake lining might be worn out. - Replace the relevant brake lining.
1100	1	1100 - 1	1100 - 1/Brake Lining Remaining, Front Axle, Right Wheel - data valid, but below normal operation range (most severe level)	- The relevant brake lining might be worn out. - Replace the relevant brake lining.
1101	1	1101 - 1	1101 - 1/Brake Lining Remaining, Rear Axle #1, Left Wheel - data valid, but below normal operation range (most severe level)	- The relevant brake lining might be worn out. - Replace the relevant brake lining.
1102	1	1102 - 1	1102 - 1/Brake Lining Remaining, Rear Axle #1, Right Wheel - data valid, but below normal operation range (most severe level)	- The relevant brake lining might be worn out. - Replace the relevant brake lining.
1103	1	1103 - 1	1103 - 1/Brake Lining Remaining, Rear Axle #2, Left Wheel - data valid, but below normal operation range (most severe level)	- The relevant brake lining might be worn out. - Replace the relevant brake lining.
1104	1	1104 - 1	1104 - 1/Brake Lining Remaining, Rear Axle #2, Right Wheel - data valid, but below normal operation range (most severe level)	- The relevant brake lining might be worn out. - Replace the relevant brake lining.
1230	2	1230 - 2	1230 - 2/Current Data Link - data erratric, intermittent or incorrect	- Replace rear axle modulator. - Replace additional axle modulator.
1230	19	1230 - 19	1230 - 19/Current Data Link - received network data in error	- Replace front axle modulator. - Replace rear axle modulator.

4012442a

Figure 44

Figure 45

SPN	FMI	DTC	DTC-Text	Repair Instructions
1439	12	1439 - 12	1439 - 12/EBS Red Warning Signal - bad intelligent device or component	- Check EBS central module for correct EOL configuration (parameter “red lamp” yes/no). - Check the wiring and the related electric connectors of the red failure lamp (interruption? short circuits?). - Check the red failure lamp (faulty?). - Replace the EBS central module if the red-lamp and the wiring is faultless.
1482	8	1482 - 8	1482 - 8/Source Address of Controlling Device for Transmission Control - abnormal frequency, pulse width or period	- Check the failure memory of the transmission ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the transmission ECU.
1482	9	1482 - 9	1482 - 9/Source Address of Controlling Device for Transmission Control - abnormal update rate	- Check the failure memory of the transmission ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the transmission ECU.
1482	10	1482 - 10	1482 - 10/Source Address of Controlling Device for Transmission Control - abnormal rate of change	- Check the failure memory of the transmission ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the transmission ECU.
1482	19	1482 - 19	1482 - 19/Source Address of Controlling Device for Transmission Control - received network data in error	- Check the failure memory of the transmission ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the transmission ECU.
1483	8	1483 - 8	1483 - 8/Source Address of Controlling Device for Engine Control - abnormal frequency, pulse width or period	- Check the failure memory of the engine ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the engine ECU.
1483	9	1483 - 9	1483 - 9/Source Address of Controlling Device for Engine Control - abnormal update rate	- Check the failure memory of the engine ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the engine ECU.
1483	10	1483 - 10	1483 - 10/Source Address of Controlling Device for Engine Control - abnormal rate of change	- Check the failure memory of the engine ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the engine ECU.
1542	1	1542 - 1	1542 - 1/ECU Power Supply Voltage #2 - data valid, but below normal operation range (most severe level)	- Check the relevant fuse at terminal 30a (might be blown). - Check the electric supply line “terminal 30a” (broken? increased electric resistance?). - Check the terminal 30a line for other voltage drops. - Replace EBS central module.
1542	4	1542 - 4	1542 - 4/ECU Power Supply Voltage #2 - voltage below normal or shorted low	- Check the relevant fuse at terminal 30a (might be blown). - Check the electric supply line “terminal 30a” (broken? increased electric resistance?). - Check the terminal 30a line for other voltage drops. - Replace EBS central module.
1543	1	1543 - 1	1543 - 1/ECU Power Supply Voltage #3 - data valid, but below normal operation range (most severe level)	- Check the relevant fuse at terminal 30b (might be blown). - Check the electric supply line “terminal 30b” (broken? increased electric resistance?). - Check the terminal 30b line for other voltage drops. - Check the voltage supply lines to the rear axle modulator and the additional axle modulator (there might be short circuits to ground). - Check the rear axle modulator and the additional axle modulator (there might be internal short circuits of the voltage supply to ground potential). - Replace the EBS central module.

4012443a

SPN	FMI	DTC	DTC-Text	Repair Instructions
1543	4	1543 - 4	1543 - 4/ECU Power Supply Voltage #3 - voltage below normal or shorted low	- Check the relevant fuse at terminal 30b (might be blown). - Check the electric supply line "terminal 30b" (broken? increased electric resistance?). - Check the terminal 30b line for other voltage drops. - Check the voltage supply lines to the rear axle modulator and the additional axle modulator (there might be short circuits to ground). - Check the rear axle modulator and the additional axle modulator (there might be internal short circuits of the voltage supply to ground potential). - Replace the EBS central module.
1743	7	1743 - 7	1743 - 7/Lift Axle 1 Position - mechanical system not responding correctly or out of adjustment	- Check if airgap at wheelspeed sensors (additional axle) is too high. - Check that ECAS sends correct ASC1 liftaxle info.
1743	8	1743 - 8	1743 - 8/Lift Axle 1 Position - abnormal frequency, pulse width or period	- Check the failure memory of the ECAS-ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and ECAS-ECU.
1743	9	1743 - 9	1743 - 9/Lift Axle 1 Position - abnormal update rate	- Check the failure memory of the ECAS-ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and ECAS-ECU.
1743	10	1743 - 10	1743 - 10/Lift Axle 1 Position - abnormal rate of change	- Check the failure memory of the ECAS-ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and ECAS-ECU.
1807	0	1807 - 0	1807 - 0/Steering Wheel Angle - data valid, but above normal operation range (most severe level)	- Check EOL parameter for mounting-direction (SAS). - Check the mechanical steering elements at the front axle (defect, twisted, faulty assembly, etc.). - Check the mounting position of the steering angle sensor on the steering shaft (cranky, faulty assembly, etc.). - Replace the steering angle sensor.
1807	1	1807 - 1	1807 - 1/Steering Wheel Angle - data valid, but below normal operation range (most severe level)	- Check the wiring and connectors (voltage supply) to the steering wheel sensor.
1807	2	1807 - 2	1807 - 2/Steering Wheel Angle - data erratric, intermittent or incorrect	- Check the EBS central module concerning correct EOL parameter (steering ratio, wheelbase, wheel diameter, etc.). - Check whether the SAS is correctly assembled. - Replace the steering angle sensor.
1807	7	1807 - 7	1807 - 7/Steering Wheel Angle - mechanical system not responding correctly or out of adjustment	- Check the EBS central module concerning correct EOL parameter (steering ratio, wheelbase, wheel diameter, etc.). - Check whether the SAS is correctly assembled. - Replace the steering angle sensor.
1807	8	1807 - 8	1807 - 8/Steering Wheel Angle - abnormal frequency, pulse width or period	- Check the wiring (CAN) to the steering wheel sensor. Failure is detected by the steering wheel sensor. - Check/replace the steering wheel sensor.
1807	9	1807 - 9	1807 - 9/Steering Wheel Angle - abnormal update rate	- Check central module for correct EOL configuration (steering wheel sensor yes/no). - Check the wiring between EBS central module and steering wheel sensor. - Check the steering wheel sensor/replace the steering wheel sensor.
1807	10	1807 - 10	1807 - 10/Steering Wheel Angle - abnormal rate of change	- Check if SAS is mechanically connected to the steering-column (does is rotate?). - Check and replace steering angle sensor.
1807	11	1807 - 11	1807 - 11/Steering Wheel Angle - failure mode not identifiable/root cause not known	- Check if the correct SAS ype is assembled.

4012444a

Figure 46

Figure 47

SPN	FMI	DTC	DTC-Text	Repair Instructions
1807	12	1807 - 12	1807 - 12/Steering Wheel Angle - bad intelligent device or component	- Replace steering angle sensor.
1807	13	1807 - 13	1807 - 13/Steering Wheel Angle - out of calibration	- Check the EBS central module concerning correct EOL parameters of the steering wheel sensor. - SAS assembled (yes/no). - SAS type.
1807	14	1807 - 14	1807 - 14/Steering Wheel Angle - special instructions	- Check the EBS central module concerning correct EOL parameter (steering wheel sensor type) - Check whether the correct SAS type is assembled at the vehicle. - Check the steering angle sensor/replace the steering angle sensor. - Check the central module/replace the central module.
1807	18	1807 - 18	1807 - 18/Steering Wheel Angle - data valid, but below normal operation range (moderately severe level)	- Check the mechanical connection between steering angle sensor and steering shaft (loosened?). - Replace the steering angle sensor.
1807	19	1807 - 19	1807 - 19/Steering Wheel Angle - received network data in error	- Check the EOL parameter “SAS Type”. - Check the steering wheel sensor/replace the steering wheel sensor.
1807	31	1807 - 31	1807 - 31/Steering Wheel Angle - condition exists	- Perform calibration procedure of SAS. - If SAS cannot be calibrated, replace SAS.
1808	0	1808 - 0	1808 - 0/Yaw Rate - data valid, but above normal operation range (most severe level)	- Replace ESC module.
1808	1	1808 - 1	1808 - 1/Yaw Rate - data valid, but below normal operation range (most severe level)	- Replace ESC module.
1808	2	1808 - 2	1808 - 2/Yaw Rate - data erratic, intermittent or incorrect	- Replace ESC module.
1808	7	1808 - 7	1808 - 7/Yaw Rate - mechanical system not responding correctly or out of adjustment	- Check EOL parameters for mounting direction (ESC module, SAS). - Check correct mounting direction (assembly position) of ESC module. - Check correct mounting direction of steering angle sensor. - Replace ESC module.
1808	11	1808 - 11	1808 - 11/Yaw Rate - failure mode not identifiable/root cause not known	- Check/replace ESC module. - Check/replace steering angle sensor.
1808	12	1808 - 12	1808 - 12/Yaw Rate - bad intelligent device or component	- Replace ESC module.
1808	13	1808 - 13	1808 - 13/Yaw Rate - out of calibration	- Check EOL parameter for mounting direction of ESC module. - Check correct mounting direction (assembly position) of ESC module. - Check and replace ESC module. - Check and replace steering angle sensor.
1808	14	1808 - 14	1808 - 14/Yaw Rate - special instructions	- Check the EBS central module concerning correct EOL parameter (steering ratio, wheelbase, wheel diameter, etc.). - Check whether the ESC module is assembled in correct position. - Replace the ESC module.
1808	15	1808 - 15	1808 - 15/Yaw Rate - data valid, but above normal operation range (least severe level)	- Replace ESC module.
1808	16	1808 - 16	1808 - 16/Yaw Rate - data valid, but above normal operation range (moderately severe level)	- Replace ESC module.

4012445a

SPN	FMI	DTC	DTC-Text	Repair Instructions
1808	17	1808 - 17	1808 - 17/Yaw Rate - data valid, but below normal operation range (least severe level)	- Check EOL parameter for mounting-direction of ESC module. - Check correct mounting direction (assembly position) of ESC module. - Replace ESC module.
1808	19	1808 - 19	1808 - 19/Yaw Rate - received network data in error	- Check/replace ESC module.
1809	1	1809 - 1	1809 - 1/Lateral Acceleration - data valid, but below normal operation range (most severe level)	- Replace ESC module.
1809	2	1809 - 2	1809 - 2/Lateral Acceleration - data erratric, intermittent or incorrect	- Replace ESC module.
1809	7	1809 - 7	1809 - 7/Lateral Acceleration - mechanical system not responding correctly or out of adjustment	- Check EOL parameters for mounting-direction (ESC module, SAS) - Check correct mounting direction (assembly position) of ESC module. - Check correct mounting direction of steering angle sensor. - Replace ESC module.
1809	12	1809 - 12	1809 - 12/Lateral Acceleration - bad intelligent device or component	- Replace ESC module.
1809	14	1809 - 14	1809 - 14/Lateral Acceleration - special instructions	- Check the EBS central module concerning correct EOL parameter (steering ratio, wheelbase, wheel diameter, etc.). - Check whether the ESC module is assembled in correct position. - Replace the ESC module.
1809	15	1809 - 15	1809 - 15/Lateral Acceleration - data valid, but above normal operation range (least severe level)	- Check EOL parameter for mounting-direction of ESC module. - Check correct mounting direction (assembly position) of ESC module. - Replace ESC module.
1809	16	1809 - 16	1809 - 16/Lateral Acceleration - data valid, but above normal operation range (moderately severe level)	- Check EOL parameter for mounting-direction of ESC module. - Check correct mounting direction (assembly position) of ESC module. - Replace ESC module.
1809	17	1809 - 17	1809 - 17/Lateral Acceleration - data valid, but below normal operation range (least severe level)	- Check EOL parameter for mounting-direction of ESC module. - Check correct mounting dire.ction (assembly position) of ESC module. - Replace ESC module.
1811	7	1811 - 7	1811 - 7/Steering Wheel Turn Counter - mechanical system not responding correctly or out of adjustment	- Check EOL parameter for mounting-direction (SAS). - Check the mechanical steering elements at the front axle (defect, twisted, faulty assembly, etc.). - Check the mounting position of the steering angle sensor on the steering shaft (cranky, faulty assembly, etc.). - Replace the steering angle sensor.
2000	8	2000 - 8	2000 - 8/Source Address 0 (engine #1?) - abnormal frequency, pulse width or period	- Check the failure memory of the CCVS-ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the CCVS-ECU.
2000	9	2000 - 9	2000 - 9/Source Address 0 (engine #1?) - abnormal update rate	- Check the failure memory of the engine ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the engine ECU.
2015	9	2015 - 9	2015 - 9/Source Address 15 (engine retarder?) - abnormal update rate	- Check the failure memory of the engine ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the engine ECU.
2015	10	2015 - 10	2015 - 10/Source Address 15 (engine retarder?) - abnormal rate of change	- Check the failure memory of the engine ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the engine ECU.

4012446a

Figure 48

Figure 49

SPN	FMI	DTC	DTC-Text	Repair Instructions
2016	9	2016 - 9	2016 - 9/Source Address 16 (driveline retarder?) - abnormal update rate	- Check the failure memory of the driveline retarder ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the driveline retarder ECU.
2016	10	2016 - 10	2016 - 10/Source Address 16 (driveline retarder?) - abnormal rate of change	- Check the failure memory of the driveline retarder ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the driveline retarder ECU.
2041	9	2041 - 9	2041 - 9/Source Address 41 (exhaust retarder?) - abnormal update rate	- Check the failure memory of the exhaust retarder ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the exhaust retarder ECU.
2041	10	2041 - 10	2041 - 10/Source Address 41 (exhaust retarder?) - abnormal rate of change	- Check the failure memory of the exhaust retarder ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the exhaust retarder ECU.
2047	9	2047 - 9	2047 - 9/Source Address 47 - abnormal update rate	- Check the failure memory of the ECU that transmits the vehicle weight message and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the relevant ECU.
2048	9	2048 - 9	2048 - 9/Source Address 48 - abnormal update rate	- Check the failure memory of the ECU that transmits the BRAKES message and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the relevant ECU.
2622	9	2622 - 9	2622 - 9/Hillholder system/Haltbrake - abnormal update rate	- Check the failure memory of the haltbrake ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the haltbrake ECU.
2927	2	2927 - 2	2927 - 2/Actual Inner wheel steering angle - data erratric, intermittent or incorrect	- Check EBS system for correct parameters concerning steeraxle-function (3rd axle). - Check the sensing of the steering-system. Possible causes are: a) Failure of sensing by defect sensor or broken wiring etc. or b) De-adjustment of sensor by external influences or loosened screws - Check steering wheel angle sensing/replace SAS if necessary.
2927	9	2927 - 9	2927 - 9/Actual Inner wheel steering angle - abnormal update rate	- Check the failure memory of the ESC-ECU (steering system, 3rd axle) and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the ESC-ECU (steering system, 3rd axle).
3509	3	3509 - 3	3509 - 3/Sensor supply voltage 1 - voltage above normal or shorted high	- Check the supply line of the ESC module (permanent short circuit to +UB?). - Replace the EBS central module.
3509	4	3509 - 4	3509 - 4/Sensor supply voltage 1 - voltage below normal or shorted low	- Check the supply line of the ESC module (short circuit to GND?). - Check the ESC module (supply current too high? internal short circuit to GND?). - Replace the EBS central module.
3510	3	3510 - 3	3510 - 3/Sensor supply voltage 2 - voltage above normal or shorted high	- Check the supply line of the steering angle sensor (permanent short circuit to +UB?). - Replace the EBS central module.
3510	4	3510 - 4	3510 - 4/Sensor supply voltage 2 - voltage below normal or shorted low	- Check the supply line of the steering angle sensor (short circuit to GND?). - Check the steering angle sensor (supply current too high? internal short circuit to GND?). - Replace the EBS central module.

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SPN	FMI	DTC	DTC-Text	Repair Instructions
3511	3	3511 - 3	3511 - 3/Sensor supply voltage 3 - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the left and right lining wear sensor at the additional axle (short circuits?). - Replace the additional axle modulator if the wiring of the relevant lining wear sensors is faultless.
3511	4	3511 - 4	3511 - 4/Sensor supply voltage 3 - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the left and right lining wear sensor at the additional axle (short circuits?). - Check the left and right lining wear sensor at the additional axle (supply current too high? internal short circuits?). - Replace the additional axle modulator if the relevant lining wear sensors and their wiring is faultless.
3541	12	3541 - 12	3541 - 12/Brake Light Relay - bad intelligent device or component	- Check EBS central module for correct EOL configuration (brake-light relay yes/no). - Check the wiring and the related electric connectors of the brake-light relay (interruption, short circuits?). - Check the brake-light relay (internal interruption or short circuits?). - Replace the EBS central module if the brake-light relay and the relevant wiring is faultless.
3541	13	3541 - 13	3541 - 13/Brake Light Relay - out of calibration	- Check EBS central module for correct EOL configuration (brake-light relay yes/no). - Is something connected to the relevant brake light relay pins of the central module? - Replace the EBS central module.
3839	0	3839 - 0	3839 - 0/Brake Temperature Warning - data valid, but above normal operation range (most severe level)	- Was the vehicle operated on long distance slopes? - Unfavorable way of driving or an insufficient use of retarders? - Wrong parameters inside central module (limit values, characteristics of foundation brake, etc.)?
3839	15	3839 - 15	3839 - 15/Brake Temperature Warning - data valid, but above normal operation range (least severe level)	- Was the vehicle operated on long distance slopes? - Unfavorable way of driving or an insufficient use of retarders? - Wrong parameters inside central module (limit values, characteristics of foundation brake, etc.)?
520205	13	520205 - 13	520205 - 13/EBS system/module compatibility (central module) - out of calibration	- For a correct EBS function, a right combination of EBS central module, front axle modulator, rear axle modulator, additional axle modulator (optional) and ESC module (optional) must be assembled in the vehicle. Please read the numbers of all these components and check them for compatibility against each other.
520206	13	520206 - 13	520206 - 13/EBS system/module compatibility (front axle modulator) - out of calibration	- For a correct EBS function, a right combination of EBS central module, front axle modulator, rear axle modulator, additional axle modulator (optional) and ESC module (optional) must be assembled in the vehicle. Please read the numbers of all these components and check them for compatibility against each other.
520207	13	520207 - 13	520207 - 13/EBS system/module compatibility (rear axle modulator) - out of calibration	- For a correct EBS function, a right combination of EBS central module, front axle modulator, rear axle modulator, additional axle modulator (optional) and ESC module (optional) must be assembled in the vehicle. Please read the numbers of all these components and check them for compatibility against each other.
520208	13	520208 - 13	520208 - 13/EBS system/module compatibility (additional axle modulator) - out of calibration	- For a correct EBS function, a right combination of EBS central module, front axle modulator, rear axle modulator, additional axle modulator (optional) and ESC module (optional) must be assembled in the vehicle. Please read the numbers of all these components and check them for compatibility against each other.
520210	2	520210 - 2	520210 - 2/ESC module - data erratric, intermittent or incorrect	- Replace ESC module. - Replace rear axle modulator.

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Figure 50

Figure 51

SPN	FMI	DTC	DTC-Text	Repair Instructions
520210	9	520210 - 9	520210 - 9/ESC module - abnormal update rate	- Check central module for correct EOL configuration (ESC yes/no). - Check the wiring between EBS central module and ESC module. - Check the ESC module/replace ESC module (correct assembly position of ESP module is important).
520210	10	520210 - 10	520210 - 10/ESC module - abnormal rate of change	- Check and replace the ESC module (correct CAN data block counter?).
520210	11	520210 - 11	520210 - 11/ESC module - failure mode not identifiable/root cause not known	- Check/replace ESC module. - Check/replace EBS central module.
520210	12	520210 - 12	520210 - 12/ESC module - bad intelligent device or component	- Check the assembly position, the lateral inclination and correct fitting of the ESC module. - Check and replace the ESC module (correct assembly position is important).
520210	13	520210 - 13	520210 - 13/ESC module - out of calibration	- Check the EBS central module concerning correct ESC specific EOL parameters.
520210	14	520210 - 14	520210 - 14/ESC module - special instructions	- Replace ESC module. - Replace additional axle modulator.
520210	19	520210 - 19	520210 - 19/ESC module - received network data in error	- Replace ESC module. - Replace EBS central module.
520211	13	520211 - 13	520211 - 13/EBS system/module compatibility (ESC module) - out of calibration	- For a correct EBS function, a right combination of EBS central module, front axle modulator, rear axle modulator, additional axle modulator (optional) and ESC module (optional) must be assembled in the vehicle. Please read the numbers of all these components and check them for compatibility against each other.
520213	31	520213 - 31	520213 - 31/ESC-Calibration Procedure - condition exists	The ESC calibration procedure was started by diagnosis. - The ESC calibration-procedure must be executed by use of the diagnostic documentation. Remark: If the ESC calibration procedure cannot be finished in time, please check the failure memory for other active ESC failures.
520214	0	520214 - 0	520214 - 0/Steering Angle Ratio - data valid, but above normal operation range (most severe level)	- Check the assembly of the steering angle sensor (was the sensor rotated several times before connected to the steering shaft?). - Check if the steering ratio EOL parameters (if available) are correct.
520214	2	520214 - 2	520214 – 2/Steering Angle Ratio - data erratric, intermittent or incorrect	- Has the driver executed normal driving-maneuvres since the last ESC-calibration phase? If not, the ESC calibration-phase must be repeated and the driver must drive in a normal way (not too aggressive) in the following period. Remark: If the way of driving is too aggressive, then the calibration values are not determined within an admissable time. - Check the EBS central module concerning correct ESC specific EOL parameters (e.g. wheel base, pole-wheel teeth-numbers, tire-circumference, etc.). - Is the vehicle damaged at the front axle? - Check/replace the ESC module. - Check/replace the steering wheel sensor.
520215	31	520215 - 31	520215 - 31/ESC Function is Temporary Not Available - condition exists	- The ESC function was temporary not available (e.g. invalid or missing external CAN-data/engine, steering system, trailer, etc.). - Repair EMAS system or EMAS signal line (if assembled at the vehicle). - Repair faulty external system. Remark: It is not necessary to repair the EBS/ESC System in the towing vehicle, if no other failures are stored in the EBS failure memory.
520216	31	520216 - 31	520216 - 31/ESC function is reduced (trailer ABS not OK) - condition exists	- Check brake system of the trailer.

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SPN	FMI	DTC	DTC-Text	Repair Instructions
520235	3	520235 - 3	520235 - 3/ASR switch-off valve tag-axle - voltage above normal or shorted high	- Check the wiring and the related electric connectors of the ASR/ATC solenoid (short circuit to UB?). - Check the ASR/ATC solenoid (internal short circuit to UB?). - Replace the EBS central module if the ASR/ATC solenoid and the relevant wiring is faultless.
520235	4	520235 - 4	520235 - 4/ASR switch-off valve tag-axle - voltage below normal or shorted low	- Check the wiring and the related electric connectors of the ASR/ATC solenoid (short circuit to GND?). - Check the ASR/ATC solenoid (internal short circuit to GND?). - Replace the EBS central module if the ASR/ATC solenoid and the relevant wiring is faultless.
520235	5	520235 - 5	520235 - 5/ASR switch-off valve tag-axle - current below normal or open circuit	- Check the EOL configuration in the EBS central module (ASR/ATC valve yes/no). - Check the wiring and the related electric connectors of the ASR/ATC solenoid (interruption?). - Check the ASR/ATC solenoid (internal interruption?). - Replace the EBS central module if the ASR/ATC solenoid and the relevant wiring is faultless.
520235	13	520235 - 13	520235 - 13/ASR switch-off valve tag-axle - out of calibration	- Check EBS central module for correct EOL-configuration (ASR/ATC valve yes/no). - Is something connected to the relevant ASR/ATC valve pins of the central module? - Replace the EBS central module.
520241	2	520241 - 2	520241 - 2/External Brake Demand System (XBR, Source 3, Customer Specific System) - data erratric, intermittent or incorrect	- Check the XBR electronic device (customer specific system) and replace it if necessary. - Check the EBS central module and replace it if necessary.
520241	9	520241 - 9	520241 - 9/External Brake Demand System (XBR, Source 3, Customer Specific System) - abnormal update rate	- Check the failure memory of the XBR-ECU (customer specific system) and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the XBR-ECU.
520241	10	520241 - 10	520241 - 10/External Brake Demand System (XBR, Source 3, Customer Specific System) - abnormal rate of change	- Check the failure memory of the XBR-ECU (customer specific system) and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the XBR-ECU.
520242	2	520242 - 2	520242 - 2/External Brake Demand System (XBR, Source 1, ACC, etc.) - data erratric, intermittent or incorrect	- Check the XBR-electronic device (ACC system) and replace it if necessary. - Check the EBS central module and replace it if necessary.
520242	9	520242 - 9	520242 – 9/External Brake Demand System (XBR, Source 1, ACC, etc.) - abnormal update rate	- Check the failure memory of the XBR ECU (ACC) and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the XBR ECU.
520242	10	520242 - 10	520242 - 10/External Brake Demand System (XBR, Source 1, ACC, etc.) - abnormal rate of change	- Check the failure memory of the XBR ECU (ACC) and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the XBR ECU.
520243	2	520243 - 2	520243 - 2/External Brake Demand System (XBR, Source 2, EPH, AEBS, etc.) - data erratric, intermittent or incorrect	- Check the XBR electronic device (EPH/AEBS) and replace it, if necessary. - Check the EBS central module and replace it, if necessary.
520243	9	520243 - 9	520243 - 9/External Brake Demand System (XBR, Source 2, EPH, AEBS, etc.) - abnormal update rate	- Check the failure memory of the XBR-ECU (EPH/AEBS) and repair all failures - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the XBR-ECU.
520243	10	520243 - 10	520243 - 10/External Brake Demand System (XBR, Source 2, EPH, AEBS, etc.) - abnormal rate of change	- Check the failure memory of the XBR ECU (EPH/AEBS) and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the XBR ECU.

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Figure 52

SPN	FMI	DTC	DTC-Text	Repair Instructions
520245	31	520245 - 31	520245 - 31/Failure Memory Bit (Yellow) - condition exists	- Check and repair all failures stored in failure memory. - After repair, clear the failure memory and reset the failure memory bit. Remark: Memory bit can be resetted e.g. by diagnostic command.
520246	31	520246 - 31	520246 - 31/Failure Memory Bit (Red) - condition exists	- Check and repair all failures stored in failure-memory - After repair clear the failure memory and reset the failure-memory bit. Remark: Memory bit can be resetted e.g. by diagnostic command.
520247	31	520247 - 31	520247 - 31/Failure Memory Bit (ESC) - condition exists	- Check and repair all failures stored in failure memory. - After repair clear the failure memory. Remark: ESC Memory bit might not be eraseable by diagnostic command. To delete the memory bit, it is necessary to drive approximately 100 m straight on and then turn the steering wheel by minimum 180 degrees.
520250	31	520250 - 31	520250 - 31/Wheel Speed Sensing, Failure Memory - condition exists	- Check and repair all wheel speed sensor failures stored in failure memory. - After repair, clear the failure memory.
520261	13	520261 - 13	520261 - 13/EOL Parameter STOP-Function - out of calibration	- Check the correct EOL parameter setting for STOP function (stability optimization). - If these EOL parameters are correct, replace EBS central module.
520262	13	520262 - 13	520262 - 13/EOL Parameter ARB-Function - out of calibration	- Check the correct EOL parameter setting for ARB function (halt brake, anti roll brake). - If these EOL parameters are correct, replace EBS central module.
520263	13	520263 - 13	520263 - 13/EOL Parameter RAG-Function - out of calibration	- Check the correct EOL parameter setting for RAG function (wheel speed calibration function). - If these EOL parameters are correct, replace EBS central module.
520264	13	520264 - 13	520264 - 13/EOL Parameter ZC3F-Function - out of calibration	- Check the correct EOL parameter setting for speedometer-adjustment function. - If these EOL parameters are correct, replace EBS central module.
520265	13	520265 - 13	520265 - 13/EOL Parameter KENN-Function - out of calibration	- Check the correct EOL parameter setting for KENN function (brake feeling curve). - If these EOL parameters are correct, replace EBS central module.
520266	13	520266 - 13	520266 - 13/EOL Parameter SPGV-Function - out of calibration	- Check the correct EOL parameter setting for SPGV function (voltage supply). - If these EOL parameters are correct, replace EBS central module.
520267	13	520267 - 13	520267 - 13/EOL Parameter END-Function - out of calibration	- Check the correct EOL parameter setting for END function (valve activation). - If these EOL parameters are correct, replace EBS central module.
520268	13	520268 - 13	520268 - 13/EOL Parameter EEFU-Function - out of calibration	- Check the correct EOL parameter setting for EEFU function (general configuration). - If these EOL parameters are correct, replace EBS central module.
520269	13	520269 - 13	520269 - 13/EOL Parameter XBR-Function - out of calibration	- Check the correct EOL parameter setting for XBR function (external brake function). - If these EOL parameters are correct, replace EBS central module.
520270	13	520270 - 13	520270 - 13/EOL Parameter ESC-Function (Group 1/ General Configuration Parameters) - out of calibration	Check the correct EOL parameter setting for ESC function (Group 1/General Configuration Parameters): - EBS vehicle model - ESC config - Vehicle Type - All Wheel Drive - SAS type - RSC limitation - RSC/YC control speed limitation

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Figure 53

SPN	FMI	DTC	DTC-Text	Repair Instructions
520271	13	520271 - 13	520271 - 13/EOL Parameter ESC-Function (Group 2/Axle Parameters - Geometry, Configuration) - out of calibration	Check the correct EOL parameter setting for ESC function (Group 2/Axle Parameters - Geometry, Configuration): - Vehicle Type - Lift option axles 1 - Axle tire type - Wheelbase (FA1 to FA2) - Wheelbase (FA1 to RA1) - Wheelbase (RA1 to RA2) - Locking Speed 1 and 2 (PA, TA) - Steering Plausibility Offset (PA, TA) - Steering Sensing Type (PA, TA) - Steering Force (PA, TA)
520272	13	520272 - 13	520272 - 13/EOL Parameter ESC-Function (Group 3/ Steering Ratio Parameters) - out of calibration	Check the correct EOL parameter setting for ESC function (Group 3/Steering Ratio Parameters): - Steering angle inner/outer left/right - Steering ratio inner/outer left/right - Mode of Steering ratio Determination
520273	13	520273 - 13	520273 - 13/EOL Parameter ESC-Function (Group 4/Roll Stability Control Parameters) - out of calibration	Check the correct EOL parameter setting for ESC function (Group 4/Roll Stability Control Parameters): - RSC characteristic - RSC Speed characteristic - Only optional: Trailer pulse function
520274	13	520274 - 13	520274 - 13/EOL Parameter ESC-Function (Group 5/ Additional Geometry Parameters) - out of calibration	Check the correct EOL parameter setting for ESC function (Group 5/Additional Geometry Parameters): - Track width front/drive axle - Wheelbase between AM-FA/AM-RA/AM-AA - Sensor distance to reference axle
520279	13	520279 - 13	520279 - 13/EOL Parameter AEBS function - out of calibration	- Check the correct EOL parameter setting for AEBS function (autonomous emergency brake system). - If these EOL parameters are correct, replace EBS central module.
520281	31	520281 - 31	520281 - 31/PowerOff Delay Circuit Cannot be Switched On - condition exists	- Replace EBS central module.
520282	31	520282 - 31	520282 - 31/PowerOff Delay Circuit Cannot be Switched Off - condition exists	- Replace EBS central module.
520285	31	520285 - 31	520285 - 31 EOL Parameter Setting Not Yet Done - condition exists	- Execute EOL parameter setting for the relevant vehicle. The parameters are still on default setting.
520293	9	520293 - 9	520293 - 9/SAE J 1939 Datalink (AEBS-messages) - abnormal update rate	- Check the failure memory of the AEBS-ECU and repair all failures. - Check the wiring of the chassis CAN data connection and the related electric connectors between EBS central module and the AEBS-ECU.

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Figure 54

Wiring Schematics and Component Pin-Outs

Refer to Figure 55, Figure 56, Figure 57, Figure 58, Figure 59, Figure 60 and Figure 61.

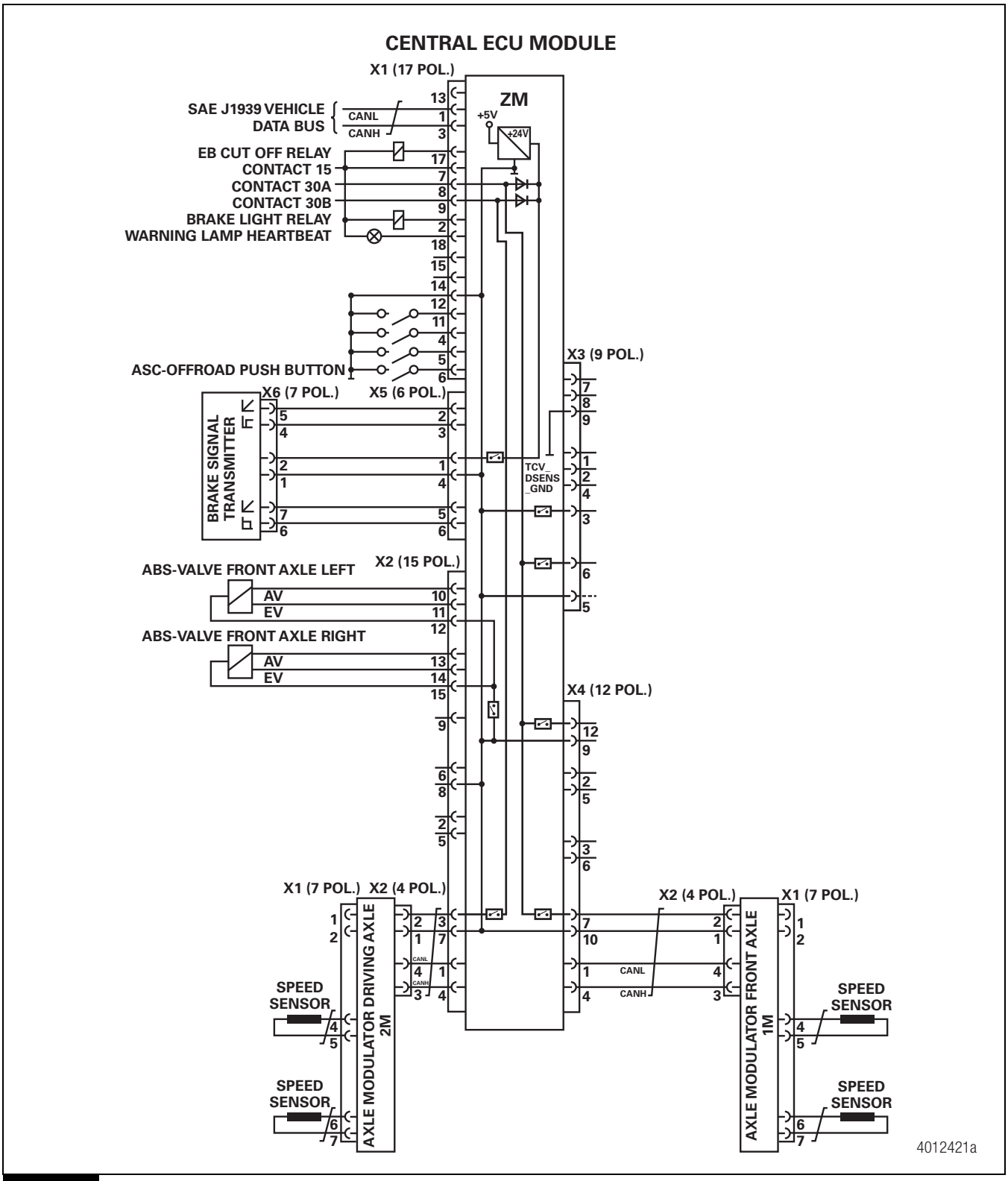
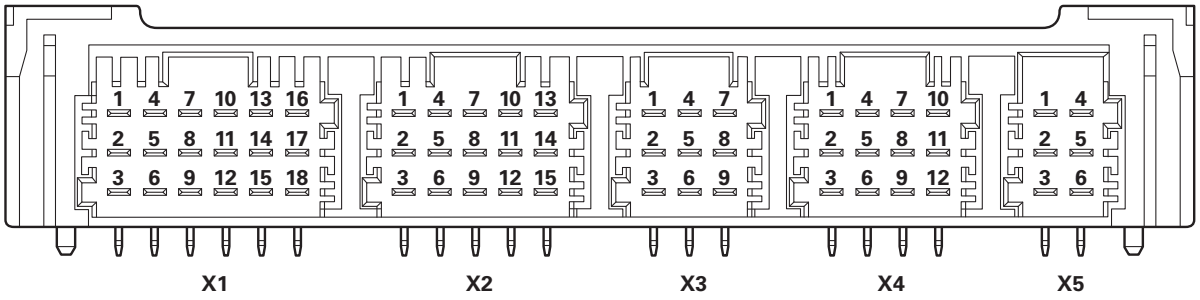


Figure 55



Connector	Pin	EBS3	Abbreviation	Description
X1	1	X	FZB_CANL	CAN-L dataline to the vehicle bus
	2	X	BRK_LGHT	Brake light relay output
	3	X	FZB_CANH	CAN-H dataline to the vehicle bus
	4	X	HSA	Hill Holder switch
	5		LAX	Lift Axle switch (not used for DAF)
	6	X	ASR	ASC offroad push button
	7	X	KL_15	Terminal Pin 15 (supply voltage via drive switch)
	8	X	KL_30A	Permanent supply from battery
	9	X	KL_30B	Permanent supply from battery
	11	X	HSB	Halt brake Switch
	12	X	GND	Vehicle GND
	14	X	EMAS	Steering Axle status input
	15	X	ABS_TR_ERR	ABS Trailer error input
	17	X	DBR	Endurance brake cut off relay
	18	X	WL1	Red warning lamp / Heartbeat
X2	1	X	AA_CANL	CAN-L data line to the rear axle modulators
			AA_CANL	CAN-L data line to the drive axle modulator
	2	X	ESP_CANL	CAN-L data line for the VSC-module
	3	X	AA_UB	Power supply for the rear axle modulators
			AA_UB	Power supply for the drive axle modulator
	4	X	AA_CANH	CAN-H data line for the rear axle modulators
			AA_CANH	CAN-H data line for the drive axle modulator

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Figure 56

	5	X	ESP_CANH	CAN-H data line for the VSC-module
	6	X	ESP_UB	Power supply for the VSC-module
	7	X	AA_GND	GND line for the rear axle modulator
			AA_GND	GND line for the drive axle modulator
	8	X	ESP_GND	GND line for the VSC-module
	9	X	EBI	EBI switch input
	10	X	AV_VLI	Left ABS output valve for the front axle
	11	X	EV_VLI	Left ABS input valve for the front axle
	12	X	ABS_GND_VLI	GND terminal for the left ABS valve
	13	X	AV_VRE	Right ABS output valve for the front axle
	14	X	EV_VRE	Right ABS input valve for the front axle
	15	X	ABS_GND_VRE	GND terminal for the lright ABS valve
X3	1	X	TCV_AV	Highside switch driving the trailer control valve (output)
	2	X	TCV_EV	Highside switch driving the trailer control valve (input)
	3	X	TCV_LOW	Lowside switch driving the trailer control valves
	4	X	TCV_BUV	Highside switch driving the trailer control valve (BUV)
	5	X	ASR_GND	GND ASC Cut Off Valve
	6	X	ASR_ZA	ASC Cut Off Valve
	7	X	TCV_DSENS_U	Trailer control valve pressure sensor supply
	8	X	TCV_DSENS	Trailer control valve pressure signal
	9	X	TCV_DSENS_GND	GND terminal TCV pressure sensor
X4	1	X	VA_CANL	CAN-L data line for the front axle modulator
	2	X	SAS_CANL	CAN-L data line for the steering angle sensor
			ZA_CANL	CAN-L data line for the additional axle modulator
	3	X	AS_CANL	CAN-L data line for the truck-trailer interface
	4	X	VA_CANH	CAN-H data line for the front axle modulator
	5	X	SAS_CANH	CAN-H data line for the steering angle modulator
	6	X	AS_CANH	CAN-H data line for the truck-trailer interface
	7	X	VA_UB	Front axle modulator power supply
	9	X	SAS_GND	GND terminal steering angle sensor
	10	X	VA_GND	GND terminal front axle modulator
	12	X	SAS_UB	Steering angle sensor power supply
X5	1	X	BWG_UB	Brake signal transmitter power supply
	2	X	BWG1	Brake signal transmitter signal 1
	3	X	BS1	Brake switch signal 1
	4	X	BWG_GND	Brake signal transmitter GND
	5	X	BWG2	Brake signal transmitter signal 2
	6	X	BS2	Brake switch signal 2

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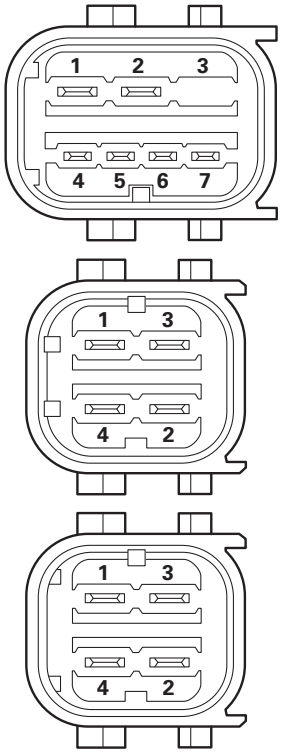
Figure 57

FRONT AXLE MODULATOR



Terminal	Pin	Function
X1	1	Selection Additional Axle In
	2	Selection Additional Axle Out
	3	No pin
	4	Sensor High L
	5	Sensor Low L
	6	Sensor High R
	7	Sensor Low R
X2	1	Ground
	2	Voltage supply ECU
	3	CAN High
	4	CAN Low
X3		No pins

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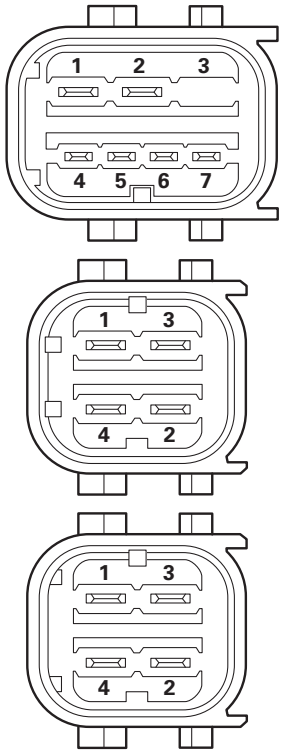
Figure 58

REAR AXLE MODULATOR



Terminal	Pin	Function
X1	1	Selection Additional Axle In
	2	Selection Additional Axle Out
	3	No pin
	4	Sensor High L
	5	Sensor Low L
	6	Sensor High R
	7	Sensor Low R
X2	1	Ground
	2	Voltage supply ECU
	3	CAN High
	4	CAN Low
X3		No pins

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Figure 59

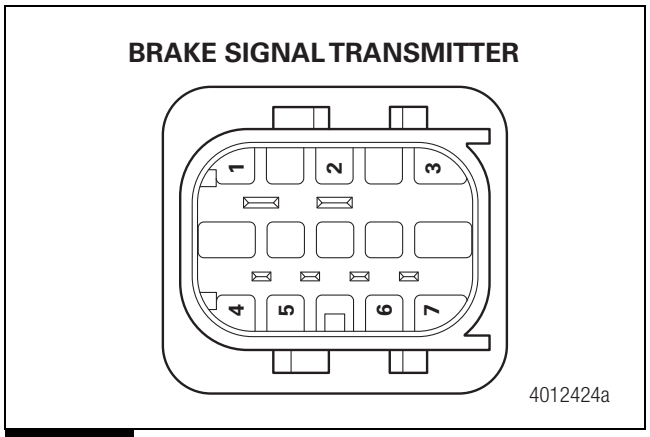

Figure 60

Pin	Cross-Section	Abbreviation	Function
1	2.8 mm	GND	Common valve pin
2	2.8 mm	Ub	Voltage supply
3			Not connected
4	1.5 mm	S1	Switch signal 1
5	1.5 mm	PWM1	PWM signal 1
6	1.5 mm	S2	Switch signal 2
7	1.5 mm	PWM2	PWM signal 2

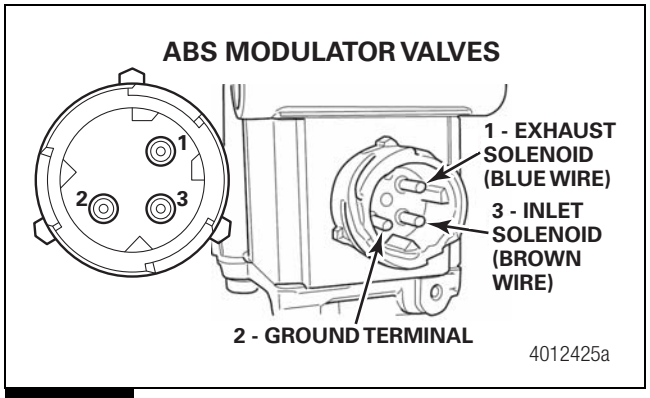

Figure 61

Appendix

Abbreviations

BST — Brake Signal Transmitter

FA — Front axle

RA — Rear axle, drive axle

FL — Front axle, left side

FR — Front axle, right side

RL — Rear axle, left side

RR — Rear axle, right side

ABS — Anti-Lock brake system

ATC — Automatic traction control

SAE J 1939 — Vehicle CAN data link

PWM — Pulse width modulated

CAN — Controller Area Network

AM — Axle modulator

GND — Ground

ESC — Electronic stability control

SAS — Steering angle sensor

OEM — Original Equipment Manufacturer (= vehicle manufacturer)

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