Service Manual
Trucks

Group 88

SRS Airbag Fault Codes and Troubleshooting
MID232
VN, VHD VERSION2
Foreword

The descriptions and service procedures contained in this manual are based on designs and methods studies carried out up to January 2003.

The products are under continuous development. Vehicles and components produced after the above date may therefore have different specifications and repair methods. When this is believed to have a significant bearing on this manual, supplementary service bulletins will be issued to cover the changes.

The new edition of this manual will update the changes.

In service procedures where the title incorporates an operation number, this is a reference to an V.S.T. (Volvo Standard Times).

Service procedures which do not include an operation number in the title are for general information and no reference is made to an V.S.T.

The following levels of observations, cautions and warnings are used in this Service Documentation:

**Note:** Indicates a procedure, practice, or condition that must be followed in order to have the vehicle or component function in the manner intended.

**Caution:** Indicates an unsafe practice where damage to the product could occur.

**Warning:** Indicates an unsafe practice where personal injury or severe damage to the product could occur.

**Danger:** Indicates an unsafe practice where serious personal injury or death could occur.

Volvo Trucks North America, Inc.
Greensboro, NC USA

Order number: PV776-TSP180934

© 2003 Volvo Trucks North America, Inc., Greensboro, NC USA

All rights reserved. No part of this publication may be reproduced, stored in retrieval system, or transmitted in any forms by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of Volvo Trucks North America, Inc.
Contents

Specifications ................................................................. 3
SRS, Signals ................................................................. 3

Tools ................................................................. 4
Special Tools ................................................................. 4
Other Special Equipment .................................................. 4

Troubleshooting ........................................................... 5
Test Resistor, Checking .................................................. 5
Connecting the Test Resistor ......................................... 6
Reading Fault Codes .................................................... 7
Fault Code Table .......................................................... 8
MID 232 SID 1 Driver Air Bag Ignition Loop ......................... 10
MID 232 SID 1 Driver Air Bag Ignition Loop, Check ................. 12
MID 232 SID 240 Program Memory (Crash Data Stored) ............... 13
MID 232 SID 253 Calibration Memory ................................ 14
MID 232 SID 254 Control Unit ........................................ 15
MID 232 PSID 1 Wrong VIN Reply ................................... 16
MID 232 PSID 2 No VIN Reply ........................................ 17
Faults Which Do Not Generate a Fault Code ......................... 18
Routines for a Damaged/Faulty Airbag Module ....................... 19

Feedback
Specifications

SRS, Signals

Checks at Wiring Harness

Conditions:
- DMM J39200 and test probes J42449–1 and J42449–2 connected to wiring harness at ECU connector.
- Control unit disconnected.
- Ignition key in position II.

**R** = resistance in ohms (Ω)

**V** = direct current voltage (V)

**V_{bat}** = battery voltage

NEVER use an ohmmeter or other live measuring instrument to measure the resistance of SRS ECU pins 10 and 11 (signals to the airbag module). This practice could cause the airbag to deploy, causing serious injury.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Measurement points</th>
<th>Nominal value</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Supply voltage</td>
<td>5 - ground</td>
<td><strong>V</strong> ≈ <strong>V_{bat}</strong></td>
<td><strong>DR+</strong></td>
</tr>
<tr>
<td>6</td>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ground connection</td>
<td>8 - ground</td>
<td><strong>V</strong> ≈ 0 V</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>J1587/1708 data link (+)</td>
<td>9 - 8</td>
<td><strong>V</strong> ≈ 0-5 V</td>
<td>Fluctuating, use MIN/MAX to capture reading</td>
</tr>
<tr>
<td>10</td>
<td>Airbag, signal (+)</td>
<td></td>
<td></td>
<td>Do not test this pin</td>
</tr>
<tr>
<td>11</td>
<td>Airbag, signal (-)</td>
<td></td>
<td></td>
<td>Do not test this pin</td>
</tr>
<tr>
<td>12</td>
<td>J1587/1708 Data link (-)</td>
<td>12 - 8</td>
<td><strong>V</strong> ≈ 0-5 V</td>
<td>Fluctuating, use MIN/MAX to capture reading</td>
</tr>
<tr>
<td>13</td>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Collision unlock signal output</td>
<td>15 - ground</td>
<td><strong>V</strong> = 5 V (Active)</td>
<td>Central locking function is blocked when signal is active.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>V</strong> = 0 V (Inactive)</td>
<td></td>
</tr>
</tbody>
</table>
Tools

Special Tools
For special tool ordering instructions, see service information in group 08.

- **9988604 Adapter**
- **9988695 SRS Test Resistor**
- **9988699 Breakout box 62-pin**

- **VCADS Pro**
  Diagnostic Tool

- **85104409**
  Overlay for use with breakout box 9998699 and adapter 9998604

Other Special Equipment
For special equipment ordering instructions, see service information in group 08.

- **J39200 Fluke 87 Digital Multimeter**
- **J42449-1 Terminal Probe**
- **J42449-2 Terminal Probe**
Troubleshooting

Test Resistor, Checking

A simple special tool has been developed to simplify fault-tracing. The tool is used to check the SRS (supplemental restraint system) before the airbag module are positioned after fault-tracing or repair.

By removing the airbag module and connecting the special tool, the SRS system can be checked without the diagnostic system registering a fault code.

When fault tracing and checking the SRS system, it is important that there is no fault on the test resistor (9988695). A defective test resistor will cause the diagnostic system to give false readings and will make fault tracing and checking more difficult.

To be sure that there is no fault in the test resistor, it should always be checked using an ohmmeter before it is used. See “Testing Special Tool 9988695” page 6.
Testing Special Tool 9988695

When fault-tracing and checking the SRS (supplemental restraint system) it is important that the special tool is fault-free. A defective special tool causes incorrect readings in the on-board diagnostic (OBD) system and makes fault-tracing and checking more difficult.

Before use, check the special tool using a multimeter to ensure that the tool is not defective.

**Measure the resistance**

Use the multimeter to measure the resistance of the special tool. Measure the lower pins, as illustrated. The multimeter should display 1.8 - 2.5 Ω.

- **If the value displays 1.8 - 2.5 Ω:** the special tool is fault-free.
- **If the multimeter displays an incorrect value:** the special tool is defective.
  - Discard the tool and replace it with a new tool.

Connecting the Test Resistor

**DANGER**

The battery must not be connected when the airbag module is being removed or installed. If the battery is connected, deployment of the airbag may occur, possibly causing serious personal injury.

Unless otherwise stated in the instructions, the test resistor (9988695) should be connected to the airbag module connector when the airbag module has been removed.

If the ignition key is ON when an airbag module has been removed (and the test resistor is not connected), a fault will be registered in the SRS which must later be erased.
Reading Fault Codes

Active Faults

When a fault code is generated, there is a risk that the SRS system will not function.

The driver receives a warning that something is faulty if the SRS icon in the driver display comes on.

The indicator stays active until the active fault condition is repaired and the fault code cleared.

Inactive Faults

An active fault becomes inactive when the fault condition is repaired.

With an inactive fault, the fault is stored in the SRS control unit. If the fault is inactive, the dash indicator will still come on.

The dash indicator stays on until the inactive fault code is cleared.

How to Display Faults

Reading/Clearing Fault Codes with the Driver Info Display

The instrument cluster’s Driver Info Display will display fault codes. Faults may be displayed as J1587/1708 text messages or numeric codes. For instructions on reading or clearing fault codes, see service information on “Instrumentation” in group 38.

Reading/Clearing Fault Codes with VCADS Pro

VCADS Pro is a Windows 95–based tool that can be used to read and clear the SRS ECU (MID 232) fault codes. For detailed information on how to use the tool, see the most recent VCADS Pro user manual, or the “help” menu in the tool itself.

Note: Do not clear fault code MID 232 SID 240 FMI 14. This code is present after an SRS ECU has detected a crash. The SRS ECU, airbag module, contact reel, steering wheel and safety belts must be replaced after a crash. If the bunk restraint was in use, it must also be replaced.

Note: Do not clear fault code MID 232 SID 254 FMI 12. Replace the SRS ECU.
## Fault Code Table

### SRS, MID 232

**MID:**
Message Identification Description
(Identification of control unit).

**PID:**
(Parameter Identification Description)
(identification of parameter (value)).

**PPID:**
Proprietary Parameter Identification Description
(Volvo unique identification of parameter (value)).

**SID:**
Subsystem Identification Description
(identification of components).

**PSID:**
Proprietary Subsystem Identification Description
(Volvo unique identification of components).

**FMI:**
Failure Mode Identifier
(Identification of fault type).

<table>
<thead>
<tr>
<th>Fault code</th>
<th>Component / function</th>
<th>Display text</th>
<th>FMI</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>SID 1</td>
<td>Detonation circuit Airbag module</td>
<td></td>
<td>3, 4, 5, 6</td>
<td>“MID 232 SID 1 Driver Air Bag Ignition Loop” page 10</td>
</tr>
<tr>
<td>SID 240</td>
<td>Program memory</td>
<td>Program memory</td>
<td>14</td>
<td>“MID 232 SID 240 Program Memory (Crash Data Stored)” page 13</td>
</tr>
<tr>
<td>SID 253</td>
<td>Calibration memory</td>
<td></td>
<td>2</td>
<td>“MID 232 SID 253 Calibration Memory” page 14</td>
</tr>
<tr>
<td>SID 254</td>
<td>Defective unit or component</td>
<td></td>
<td>12</td>
<td>“MID 232 SID 254 Control Unit” page 15</td>
</tr>
<tr>
<td>PSID 1</td>
<td>Wrong VIN response</td>
<td>Incorrect VIN reply OR Incorrect Chassis-ID reply</td>
<td>2</td>
<td>“MID 232 PSID 1 Wrong VIN Reply” page 16</td>
</tr>
<tr>
<td>PSID 2</td>
<td>No VIN response</td>
<td>No VIN reply OR No Chassis-ID reply</td>
<td>2</td>
<td>“MID 232 PSID 2 No VIN Reply” page 17</td>
</tr>
</tbody>
</table>
# FMI table

## SAE standard

<table>
<thead>
<tr>
<th>FMI</th>
<th>Display text</th>
<th>SAE text</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Value too high</td>
<td>Data applicable, but above normal operating range.</td>
</tr>
<tr>
<td>1</td>
<td>Value too low</td>
<td>Data applicable, but below normal operating range.</td>
</tr>
<tr>
<td>2</td>
<td>Incorrect data</td>
<td>Intermittent or incorrect data.</td>
</tr>
<tr>
<td>3</td>
<td>Electrical fault</td>
<td>Abnormally high voltage or short-circuit to higher voltage.</td>
</tr>
<tr>
<td>4</td>
<td>Electrical fault</td>
<td>Abnormally low voltage or short-circuit to lower voltage.</td>
</tr>
<tr>
<td>5</td>
<td>Electrical fault</td>
<td>Abnormally low current or open-circuit.</td>
</tr>
<tr>
<td>6</td>
<td>Electrical fault</td>
<td>Abnormally high current or short-circuit to ground.</td>
</tr>
<tr>
<td>7</td>
<td>Mechanical fault</td>
<td>Incorrect response from the mechanical system.</td>
</tr>
<tr>
<td>8</td>
<td>Mechanical or electrical fault</td>
<td>Abnormal frequency.</td>
</tr>
<tr>
<td>9</td>
<td>Communication fault</td>
<td>Abnormal update rate.</td>
</tr>
<tr>
<td>10</td>
<td>Mechanical or electrical fault</td>
<td>Abnormally high variations.</td>
</tr>
<tr>
<td>11</td>
<td>Unknown fault</td>
<td>Unidentifiable fault.</td>
</tr>
<tr>
<td>12</td>
<td>Component fault</td>
<td>Defective unit or component.</td>
</tr>
<tr>
<td>13</td>
<td>Incorrect calibration</td>
<td>Calibration values outside the limits.</td>
</tr>
<tr>
<td>14</td>
<td>Unknown fault</td>
<td>Special instructions.</td>
</tr>
<tr>
<td>15</td>
<td>Unknown fault</td>
<td>Reserved for future use.</td>
</tr>
</tbody>
</table>
MID 232 SID 1 Driver Air Bag Ignition Loop

Fault code

**FMI 3**
Abnormally high voltage or short-circuit to another cable with higher voltage.

*Condition for fault code:*
- If the control unit detects voltage higher than 4 volts or a short-circuit to a higher voltage, the control unit interprets this as a fault and the fault code is stored.

*Possible cause:*
- Short-circuit in cable harness.

*Reaction from the control unit:*
- Fault code is stored.
- “CHECK” warning lamp requested.

*Noticeable external symptoms:*
- The “CHECK” warning lamp and the SRS icon are on.

*Appropriate check:*
- Per instructions in “MID 232 SID 1 Driver Air Bag Ignition Loop, Check” page 12, check the cable harness for the detonator circuit and check for a short-circuit.

**FMI 4**
Abnormally low voltage or short-circuit to lower voltage.

*Condition for fault code:*
- The control unit detects a short-circuit to ground and the fault code stored.

*Possible cause:*
- Short-circuit between the wires.

*Reaction from the control unit:*
- Fault code is stored.
- “CHECK” warning lamp requested.

*Noticeable external symptoms:*
- The “CHECK” warning lamp and the SRS icon are on.

*Appropriate check:*
- Per instructions in “MID 232 SID 1 Driver Air Bag Ignition Loop, Check” page 12, check the cable harness for the detonator circuit and check for a short-circuit to ground.

Component:
A15, control unit, SRS
X08, contact reel
Y44, airbag module
**FMI 5**
Abnormally low current or open-circuit.

*Condition for fault code:*
- If the control unit detects an open-circuit in the detonator circuit, the control unit interprets this as a fault and a fault code is stored.

*Possible cause:*
- Open-circuit in the detonator circuit.

*Reaction from the control unit:*
- Fault code is stored.
- “CHECK” warning lamp requested.

*Noticeable external symptoms:*
- The “CHECK” warning lamp and the SRS icon are on.
- The airbag does not deploy in the event of a collision.

*Appropriate check:*
- Per instructions in “MID 232 SID 1 Driver Air Bag Ignition Loop, Check” page 12, check the detonator circuit for an open-circuit.

---

**FMI 6**
Abnormally high current or short-circuit between wires in the detonator circuit.

*Condition for fault code:*
- If the control unit detects a short-circuit between the wires in the detonator circuit, the control unit interprets this as a fault and a fault code is stored.

*Possible cause:*
- Short-circuit between the wires.

*Reaction from the control unit:*
- Fault code is stored.
- “CHECK” warning lamp requested.

*Noticeable external symptoms:*
- The “CHECK” warning lamp and the SRS icon are on.
- The airbag does not deploy in the event of a collision.

*Appropriate check:*
- Per instructions in “MID 232 SID 1 Driver Air Bag Ignition Loop, Check” page 12, check the detonator circuit for a short-circuit between the wires.
Group 88 SRS Airbag Fault Codes and Troubleshooting

MID 232 SID 1 Driver Air Bag
Ignition Loop, Check

Special tools: 9988695, 9998699, 85104409, 9998604
Other special equipment: J39200

NOTE!
- Check for loose connections, contact resistance and oxidation.
- For a more detailed description of fault-tracing wires and connectors, see the service information under function group 371.

You must read and understand the precautions and guidelines in Service Information, group 80, "General Safety Practices" before performing this procedure. If you are not properly trained and certified in this procedure, ask your supervisor for training before you perform it.

Measurement at the component’s connector to the control unit
Note: If any of the following values are incorrect, it may mean that the component is defective. Therefore check the component if any of the readings are defective.

Signal wires:

1

**DANGER**
Remove the airbag module and install the test resistor when troubleshooting the wiring harness for the SRS system. Failure to do so could cause the airbag to deploy during troubleshooting, causing serious personal injury.

Conditions:
1. Battery disconnected.
2. Control unit connected.
3. Airbag module disconnected (component X08).
4. Special tool 9988695 connected in airbag connector.
5. Ignition off.
6. Measure resistance on pins 5 and 6 on contact reel connector (X08) using multimeter (J39200), breakout box (9998699) with overlay (85104409), and adapter (9998604).

<table>
<thead>
<tr>
<th>Measurement points</th>
<th>Nominal value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - 6</td>
<td>$R = 21.5 \pm 2 , k\Omega$</td>
</tr>
</tbody>
</table>

If the measured value is correct:
Fault in the contact reel or short in harness to airbag module.

If the measured value is incorrect:
Fault in the wiring or ECU.
Group 88 SRS Airbag Fault Codes and Troubleshooting

MID 232 SID 240 Program Memory (Crash Data Stored)

General information
In the event of a collision where the SRS system is activated, important information about the collision is stored in the control unit memory. A fault code is stored to indicate this.

Fault code

FMI 14
"Special instructions".

Condition for fault code:

- The SRS (supplemental restraint system) is activated in the event of an accident.

Possible cause:

- An accident event has occurred.
- Faulty control unit.

Reaction from the control unit:

- Fault code is stored.
- “CHECK” warning lamp requested.

Noticeable external symptoms:

- The “CHECK” warning lamp and the SRS icon are on.
- The SRS (supplemental restraint system) has deployed the airbag module.

Appropriate action:

- Replace the control unit.
- Replace the airbag module if it has deployed.
**General information**

At start-up a check sum is calculated for the data set in the control unit’s EEPROM memory. This is compared with a previously stored check sum to check that the data set is correct.

**Fault code**

*FMI 2*

Intermittent or incorrect data.

*Condition for fault code:*

- Check sum incorrect.

*Possible cause:*

- Error when programming.
- Incorrectly compounded data sets.

*Reaction from the control unit:*

- Fault code is stored.
- “CHECK” warning lamp requested.
- The control unit changes over to the general set up parameters.

*Noticeable external symptoms:*

- The “CHECK” warning lamp and the SRS icon are on.

*Appropriate action:*

- Reprogram the control unit (See VCADS Pro).
- Replace the control unit.
General information
The control unit contains the sensor for activation of the airbag module, along with a reserve energy unit. The SRS control unit continuously monitors for internal faults in the control unit and external faults in the system.

Fault code

FMI 12
Defective unit or component

Condition for fault code:
- Faulty self diagnostic in the control unit.

Possible cause:
- Internal fault in the control unit.

Reaction from the control unit:
- Fault code is stored.
- "CHECK" warning lamp requested.

Noticeable external symptoms:
- The "CHECK" warning lamp and the SRS icon are on.
- SRS deployment in the event of a collision cannot be guaranteed.

Appropriate action:
- Replace the control unit.
MID 232 PSID 1 Wrong VIN Reply

General information

A check is carried out on start up to ensure that the correct SRS control unit is installed in the vehicle. This occurs by the SRS control unit requesting the stored VIN number from the instrument cluster of the truck.

Note that in some models this fault may display in the instrument cluster or VCADS Pro as “Wrong Chassis ID Reply.”

Fault code

FMI 2
Intermittent or incorrect data.

Condition for fault code:

• The instrument cluster responds with the VIN number which does not correspond to the SRS control unit memory.

Possible cause:

• The incorrect SRS control unit was installed in the truck, after-market for example.
• The incorrect VIN number has been programmed into the instrument cluster or SRS control unit.

Reaction from the control unit:

• Fault code is stored.
• “CHECK” warning lamp requested.

Noticeable external symptoms:

• The “CHECK” warning lamp and the SRS icon are on.

Other:

• The SRS (supplemental restraint system) system now uses general set up trigger parameters.

Appropriate action:

• Check that the SRS system and instrument have the correct chassis number stored in memory (checked against the VDA).
MID 232 PSID 2 No VIN Reply

General information
A check is carried out on start up to ensure that the correct SRS control unit is installed in the vehicle. This occurs by the SRS control unit requesting the stored VIN number from the instrument cluster of the truck.

Note that in some models this fault may display in the instrument cluster or VCADS Pro as “No Chassis ID Reply.”

Fault code

FMI 2
Intermittent or incorrect data.

Condition for fault code:
- The truck instrument cluster does not respond to the request for a VIN number.

Possible cause:
- The instrumentation is not connected or is not functioning.
- Turning the starter motor with the battery discharged. (Voltage to the instrument cluster too low.)

Reaction from the control unit:
- Fault code is stored.
- “CHECK” warning lamp requested.

Noticeable external symptoms:
- The “CHECK” warning lamp and the SRS icon are on.

Appropriate check / action:
- Check the instrument cluster.
- Check the condition of the battery.
Faults Which Do Not Generate a Fault Code

Certain faults can occur without receiving any direct information via a fault code. To find the cause of the fault, fault tracing must be carried out step by step.

SRS Lamp Does not Illuminate

Conditions for Fault

The CHECK lamp (and all other telltales) should illuminate 3–5 seconds when the ignition key is turned to ON to verify that the telltale LEDs operate.

Fault Symptom

1. The SRS/CHECK lamp is always out.

Cause of Fault:

- Indicator LED or circuit fault (internal fault in instrument cluster).
- Incorrect voltage or improper ground in the instrument cluster.

The SRS Lamp is On but no Fault Code is Stored

Conditions for Fault

The CHECK lamp (and all other telltales) should illuminate 3–5 seconds when the ignition key is turned to ON to verify that the telltale LEDs operate. With no power to SRS ECU the CHECK lamp will illuminate and the SRS icon will appear on the graphic display. When accessed, the graphic display will read “AIR BAG, MID 232, NOT RESPONDING”.

Fault Symptom

1. CHECK lamp and SRS icon are always on with no fault code.

Cause of Fault:

- Open circuit on the ECU power supply wire (circuit 721).
- Blown SRS ECU fuse (F57) in fuse panel.
Routines for a Damaged/Faulty Airbag Module

Handling

An airbag module that has not deployed must not be detonated or deployed, neither in position in the truck nor when removed from the truck. The module and the control unit must be returned to Volvo. Additionally, if there is any damage to the engine tunnel, the control unit must always be returned.

When removing the unit, refer to service information, “Airbag Module Replacement” in group 88.

Storage and Transport

During transport, the airbag module should be handled in accordance with national regulations for transport of pyrotechnic material.

The airbag module and control unit should be sent back to:

Volvo Truck Corporation
Att: TMA, Haverikommissionen
Dept. 27273, X-hallen
S-405 08 Gothenburg
Sweden
One of our objectives is that workshop personnel should have access to correct and appropriate service manuals where it concerns fault tracing, repairs and maintenance of Volvo trucks.

In order to maintain the high standards of our literature, your opinions and experience when using this manual would be greatly appreciated.

If you have any comments or suggestions, make a copy of this page, write down your comments and send them to us, either via telefax or mailing directly to the address listed below.

To
Volvo Trucks North America, Inc.
Dept. 516 Service Publications
7825 National Service Road
P.O. Box 26115
Greensboro, NC 27402-6115
USA
Fax (336) 393-3170

From
...........................................................................................................................................................................
...........................................................................................................................................................................
...........................................................................................................................................................................
...........................................................................................................................................................................

Comments/proposals
...........................................................................................................................................................................
...........................................................................................................................................................................
...........................................................................................................................................................................
...........................................................................................................................................................................
...........................................................................................................................................................................
...........................................................................................................................................................................
...........................................................................................................................................................................
...........................................................................................................................................................................
...........................................................................................................................................................................

Concerns Service Manual:
...........................................................................................................................................................................