AB10 FRONTAL IMPACT and SIDE ROLL SYSTEM WITH AB10 GEN2 SLAVE INSTALLATION & TROUBLESHOOTING GUIDE

This troubleshooting guide pertains to vehicles with Side Roll Protection systems and/or Frontal Impact Protection systems.

Only certified personnel are qualified to work on the Supplemental Restraint System. Failure to follow all of these instructions can result in injury or death from accidental discharge of the pyrotechnic squib devices.

Learn and follow the steps below to diagnose faults in the SRS Protection system.

**WARNING**

- The AB10 master sensor triggers airbags and seat restraints.
- Accidental deployment could cause serious injury and property damage.
- NEVER remove AB10 master sensor from mounted location if connected.
- NEVER connect harness to an un-mounted sensor.
  - Devices could be activated! The sensor should NOT be removed except for replacement.
  - Movement from a connected sensor can deploy devices!
- Airbags and seat cylinders contain explosives and pressurized gas that can be dangerous if punctured, damaged, cut or drilled into.
- ALWAYS disconnect SRS system when welding on the vehicle.
- BEFORE disconnecting SRS sensor:
  1. ALWAYS turn battery switch OFF and WAIT 1 minute before connecting or disconnecting the AB10 master sensor.
  2. Apply anti-static grounding strap from wrist to vehicle grounding surface
  3. Disconnect YELLOW pyrotechnic device connectors that have RED label.
    - b. Steering Wheel Airbag (option) - Connector at base of steering column.
    - c. Driver Seat Air Curtain (option) - Connector in seat back.
  4. Disconnect SRS sensor connector(s).
  5. Install shorting device Pierce Part number 63-3011 into harness end of open SRS sensor connector(s).
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<th>Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>3/3/2014</td>
<td>NCT</td>
<td>Initial release</td>
</tr>
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Table 1: Revision History
SQUIB PYROTECHNIC DEVICES:

Squib Pyrotechnic Devices are various types of airbags and seat restraint systems. They are also sometimes referred to as igniter circuits. These airbags and seat cylinders contain explosives and pressurized gas that can be dangerous if punctured, damaged, cut or drilled into. Accidental deployment can result in property damage, serious injury and death. Outputs from the sensor to the squib pyrotechnic devices are closed loop. The battery power and battery ground signal both must be given to the squib pyrotechnic device to activate it. There is never a continuous ground or power path.

If a seating position is not used, a terminating resistor is installed at the connector end of the harness in place of that seating position. The resistor used is 2.2 ohm, +/- 5%, ¼ watt.

AB10 MASTER SENSOR FUNCTIONALITY:

The AB10 master sensor provides sensing elements that detect both frontal impact and side roll events. It has two embedded central acceleration sensors to detect frontal events. Its internal roll rate sensor, y/z acceleration sensors allow detection of side roll events. In case of power loss due to disconnection of the vehicle’s battery during an event, deployment of restraint devices will still be possible through its energy reserve capacitors. Crash-relevant parameters will be saved in the AB10 master sensor. The AB10 master sensor can deploy up to 12 igniter circuits (application dependent). Deployment strategy is application dependent and developed during the design phase of the project.

Normal operating voltage: 8-16 VDC ignition power. (If available, wired to auxiliary battery)
Operating Current: 300mA at 12 VDC, during startup the maximum current consumption is 1.4A

Temperature Range: -40° to +85°C

AB10 master sensor diagnostics continuously monitors internal functions and external connections. Fault conditions are indicated via the SRS warning lamp and the SAE J1939 diagnostic bus.
The AB10 master sensor performs self-test after ignition ON, this test takes approximately 5s. During the self-test, the warning lamp is turned on. After all tests pass, the warning lamp is switched off. An active fault condition will cause the warning lamp to switch back on after self-test sequence.

The warning lamp should remain active if the AB10 master sensor or the AB10 Gen2 slave sensor is disconnected and the battery switch is ON.

APPLICATION SUMMARY

There are three different configurations developed:
1. Frontal Impact Protection only (F1, F2)
2. Side Roll Protection only with slave (all seats)
3. Frontal Impact and Side Roll Protection with slave (all seats)

Frontal Impact Protection (FIP) only application:
In the FIP only application, four pyrotechnic devices deploy during a frontal event. In this application, the driver and the front passenger are protected by the frontal airbag and the buckle pretensioner.

The following depicts this application’s system diagram.
FIP application deploys the following pyrotechnic devices, as illustrated in the graph to its right:

1. Driver frontal airbag (F1)
2. Driver buckle pretensioner (F1)
3. Passenger knee airbag (F2)
4. Passenger buckle pretensioner (F2)

All pyrotechnic devices in this application will deploy as soon as a crash situation is detected and its plausibility requirement is met. Crash detection and firing performance are based on the calibration of the deployment algorithm.

Note that for this application, connector B is connected to an empty mating connector. This is to protect the bare pins at the AB10 master sensor.

**Side Roll Protection (SRP) only with slave application:**

During a side roll event, the AB10 master sensor will deploy all its corresponding safety devices. SRP applications require more than 12 safety system devices. A “Slave” sensor is used in conjunction with the AB10 master to deploy the additional safety devices. The AB10 master sensor is connected to the AB10 Gen2 slave sensor through the Slave 1 and Slave 2 outputs via twisted pairs. The two outputs provide deployment signals to the slave sensor, commanding it to deploy its connected safety devices. The AB10 Gen2 slave sensor constantly monitors these two inputs to ensure connectivity to the system. Should the connection between the AB10 master sensor and the AB10 Gen2 slave sensor be disrupted, the warning lamp will be switched on. The warning lamp output of the AB10 master is connected to the AB10 Gen2 slave warning lamp input, and then ran in series out the AB10 Gen2 slave sensor to the SRS warning lamp. This enables one warning lamp to show fault conditions of both sensors. The following diagram depicts this system.
Figure 3: Side Roll Only application system diagram
The AB10 master sensor with SRP only application deploys the following pyrotechnic devices:

1. Buckle pretensioner, Front Passenger (F2)
2. Buckle pretensioner, Front Driver (F1)
3. M1 – SRA/IHC
4. R1 - SRA/IHC
5. SRA - Front Passenger (F2)
6. M4 – SRA/IHC
7. R4 - SRA/IHC
8. Side Airbag, Front Driver (F1)
9. Slave #1
10. Slave #2

Figure 4: Graphical representation of devices deployed by AB10 master sensor

The AB10 Gen2 slave sensor has the capability to deploy the following pyrotechnic devices:

1. R1 – Buckle
2. R2 – Buckle
3. R3 – Buckle
4. R4 – Buckle
5. M1 – Buckle
6. M2 – Buckle
7. M3 – Buckle
8. M4 – Buckle

Figure 5: Graphical representation of devices deployed by AB10 Gen2 slave sensor

A 2.2 ohm, +/- 5%, ¼ watt resistor is used if the seating position is not applicable.

Deployment strategy of the AB10 master sensor is developed during the design phase of the project. When a Side Roll event is detected by the roll rate sensor and its plausibility requirement...
is met, all buckle pretensioner outputs will be deployed to secure the passenger into the seat. SRA / IHC will be deployed approximately 90ms afterwards.

**Frontal Impact and Side Roll Combined Applications:**
The AB10 master sensor is capable of detecting both frontal impact and side roll events. The AB10 master sensor and the AB10 Gen2 slave sensor are both used for all FIP and SRP combined applications. The AB10 master sensor is connected to the AB10 Gen2 slave sensor through the Slave 1 and Slave 2 outputs via twisted pairs. The two outputs provide deployment signals to the AB10 Gen2 slave sensor, commanding it to deploy its connected safety devices. The AB10 Gen2 slave sensor constantly monitors these two inputs, to ensure its connectivity to the system. Should the connection between the AB10 master sensor and the AB10 Gen2 slave sensor is disrupted, the warning lamp will be switched on. The warning lamp output of the AB10 master is also connected to the AB10 Gen2 slave warning lamp input, and then ran in series out the AB10 Gen2 slave sensor to the SRS warning lamp. This enables one warning lamp to show fault conditions of both sensors. The following diagram depicts this system.

![Figure 5: Frontal and Side Roll application system diagram](image-url)
The AB10 Master sensor with Frontal impact and Side Roll application deploys the following pyrotechnic devices:

1. Buckle pretensioner, Front Passenger (F2)
2. Buckle pretensioner, Front Driver (F1)
3. M1 – SRA/IHC
4. R1 - SRA/IHC
5. SRA - Front Passenger (F2)
6. M4 – SRA/IHC
7. R4 - SRA/IHC
8. Side Airbag, Front Driver (F1)
9. Airbag – Front Driver (F1)
10. Airbag – Front Passenger (F2)
11. Slave #1
12. Slave #2

The AB10 Slave sensor has the capability to deploy the following pyrotechnic devices:

9. R1 – Buckle
10. R2 – Buckle
11. R3 – Buckle
12. R4 – Buckle
13. M1 – Buckle
14. M2 – Buckle
15. M3 – Buckle
16. M4 – Buckle

A 2.2 ohm, +/- 5%, ¼ watt resistor can be used if the seating position is not applicable. During a frontal impact event, all bags will be deployed immediately. During a Side Roll only event, the Driver Front Airbag and the Passenger Front Airbag will not be deployed. All buckle
pretensioner outputs will be deployed immediately. SRA / IHC will be deployed approximately 90ms afterwards.

**ELECTRICAL CONNECTIONS**

The electrical connections to the AB10 master sensor and AB10 Gen2 slave sensor are application dependent. Refer to customer drawing for application specific pin assignments. Wiring harness with twisted pairs (≥ 1 turn/in) must be used for device outputs, communication lines, and power supply input. Wire should be 20 AWG, stranded.

Use only approved crimped tool and extraction tool when repair of wiring harness is necessary.

**IMMI RECOMMENDED END OF LINE TEST PROCEDURE**

This procedure is intended to perform an electrical functional test of a RollTek and/or 4Front SRS system in a commercial vehicle before the vehicle is put into service. It should be performed on each SRP/FIP equipped vehicle after all advanced components are installed and the vehicle electrical system is operational. This procedure should be incorporated into the vehicle manufacturer’s standard inspection procedure format.

![WARNING]

Before applying power to the RollTek/4Front SRS system, verify that all sensors are firmly and appropriately mounted in accordance with the mounting guideline.

Tilting a powered AB10 master sensor that is connected to output devices will cause a sudden and unexpected deployment of the safety devices.

Accidental deployment could cause serious injury and property damage.

ALWAYS follow warning label directions when connecting or disconnecting AB10 master sensor.

**Equipment Required**

1. J1939 diagnostic tool (e.g. IMMI’s Diagnostic tool), with proper cables to connect to the vehicle diagnostic port. If using other SAE J1939 diagnostic tools, make sure that it will search for address 0x53 for the AB10 master sensor and 0x58 for the AB10 Gen2 slave sensor (if applicable).

2. Wiring diagram for the Side Roll Protection/Frontal Impact Protection portion of the vehicle.
Procedure

1. Connect the SAE J1939 diagnostic tool to the vehicle diagnostic port.
2. Exit and clear all personnel from cab. Completely Open Driver’s door.
3. Apply power to the RollTek/4Front SRS system. Verify that the system warning light illuminates for 5-7 seconds, and then turns off.
   a. If the light remains ON, either faults are active or there is a lack of power.
4. Verify that the diagnostic tool is powered. Verify (DM1) messages are received from the AB10 master sensor (address = 0x53) and the AB10 Gen2 slave sensor (address = 0x58, if applicable).
   a. If the diagnostic tool does not read messages from above two addresses, verify the wiring to the diagnostic port, the power wiring to the sensors, and ensure there are two 120 ohm terminating resistors connected between the J1939 HI line and the J1939 LOW line.
5. Read the active faults (Active DTC) and previously active faults (Stored DTC).
   a. If the warning lamp is OFF, there should be no active faults reported.
   b. Previously active (stored) faults may exist in the sensors, even though the warning lamp is turned off. If using the IMMI Diagnostics software, Stored DTC appear blue in color. If using other diagnostic software, use request DM2 message to specific address (0x53, or 0x58) to retrieve its stored DTC information.
6. If the warning lamp is illuminated and faults are reported, locate the source of the fault and repair.
   a. Refer to Table 3 at the end of this document for the failure mode identification and the fault location.
   b. Once the fault status changes from active to inactive (stored), the warning lamp turns off.
7. Clear the stored faults by clicking the Clear Stored Faults button in the J1939 Diagnostic Software, or by sending a DM3 (clear previously active fault) message to the faulted sensor.
   a. Ensure the warning lamp turns on after faults are cleared successfully. This ensures the power to the sensors is cycled after this operation.
   b. Turn off power to the sensor, wait 1 minute.
   c. Turn on power to the sensor; verify warning lamp turns off after 5-7 seconds.
8. Create a fault on the AB10 master sensor by unplugging a safety device.
9. If the wiring harness outputs are of a length that allows cross wiring to inappropriate safety devices, unplug the safety devices at these connections after power is turned off to the sensor. Disconnect only one device at a time to verify safety device connections.
   a. Turn power on to the sensor.

GUIDE, TROUBLESHOOT, AB10SRP/FIP
INSTALLATION & DIAGNOSTIC CODE
b. Verify that the warning lamp turns on after 5-7 seconds, then off for 1 second, and then remains on.

c. Verify that the fault code on the diagnostic tool matches the code for the safety device unplugged. Refer to the vehicle wiring diagram or fault code table. If the fault code does not match the safety device location, check and fix the wiring.

d. Once the correct fault code is verified, reconnect the safety device. Verify that the fault code changes from active to inactive (stored). Verify that the warning lamp turns off.

e. Clear the stored faults.

f. Ensure the warning lamp turns on after faults are cleared successfully. This ensures the power to the sensors is cycled after this operation.

g. Turn off power to the sensor.

h. Turn on power to the sensor; verify warning lamp turns off after 5-7 seconds.

10. Repeat Step 7 to verify wiring to other safety devices that could be cross-wired to the wrong device.

11. Repeat Steps 7 and 8 for safety devices connected to the AB10 Gen2 slave sensor.
Figure 8: End Of Line procedure flow chart
TROUBLESHOOTING GUIDE

TOOLS FOR DIAGNOSTIC TROUBLESHOOTING:

- SAE J1939 Diagnostic tools. The troubleshooting procedure will vary depending on the diagnostic tool used. Choose one of the following:
  - Laptop with RollTek Diagnostic Software and proper interface cable to connect to vehicle.
  - Laptop with Heavy-duty truck diagnostics software and proper interface cables to connect to vehicle.
  - Digital Voltmeter (DVM.)
  - Side Roll/Frontal Impact System Wiring Diagram.
  - Resistor module 2.2 ohm, +/- 5%, ¼ watt, for seating positions.
  - 66-3000-**** Seating Layout (Special Print diagram that is completed for the job.)

ELECTRICAL CONNECTIONS

The electrical connections to the AB10 master sensor and AB10 Gen2 slave are application dependent. Refer to customer drawing for application specific pin assignments. Wiring harness with twisted pairs (≥ 1 turn/in) must be used for device outputs, communication lines, and power supply input. Wire should be 20 AWG, stranded.

Use only approved crimped tool and extraction tool when repair of wiring harness is necessary. Follow the instructions as illustrated below when repairing a contact. The following table includes part numbers of the connector mating to the AB10 master sensor and AB10 Gen2 slave sensor.

<table>
<thead>
<tr>
<th>Location</th>
<th>Manufacturer and Part number</th>
<th>Tool used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector A Housing</td>
<td>Tyco 1924685-1</td>
<td>N/A</td>
</tr>
<tr>
<td>Connector B Housing</td>
<td>Tyco 1438618-1</td>
<td>N/A</td>
</tr>
<tr>
<td>Contacts for A and B</td>
<td>Tyco 1393365-1</td>
<td>Crimp tool : 6-1393462-5 Get B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extraction tool: 3-1579007-6</td>
</tr>
</tbody>
</table>

Table 2: AB10 Master sensor and AB10 Gen2 slave sensor mating connector and contact information
CONNECTING OR DISCONNECTING AB10 MASTER SENSOR

NEVER remove AB10 master sensor from mounted location if connected. Air bag deployment and/or seat belt retraction may result from Failure to follow this procedure.

BEFORE disconnecting AB10 master sensor:
1: Turn battery switch OFF and WAIT 1 minute.
2: Apply anti-static grounding strap from wrist to vehicle grounding surface
3: Disconnect YELLOW pyrotechnic device connectors that have RED label.
   - Driver Seat - Connector underneath seat.
   - Steering Wheel Airbag (option) - Connector at base of steering column.
   - Driver Seat Air Curtain (option) - Connector in seat back.
4: Disconnect AB10 master sensor connector(s).
5: Install shorting device into harness end of open AB10 master sensor connector(s).

To connect SRS system follow procedure in reverse order.

Air bag deployment can injure or kill!

Below instructions on how to extract pins from its connector housing (Information provided by Tyco Electronics)
Figure 9: Connector A terminal numbers

Figure 10: Connector B terminal numbers

Figure 11: Connector A terminal removal instructions
Figure 12: Connector A terminal insertion instructions
Figure 13: Connector B terminal removal instructions

Figure 14: Connector B terminal insertion instructions
SECTION 1: AB10 SENSOR WARNING LAMP FUNCTIONALITY TEST:

1.1 Test for Normal Indicator Lamp Functionality:

1. Park the vehicle in a level, stationary position with cab lowered.
2. Turn battery switch to OFF position.
3. Turn battery switch to ON position and the ignition switch to the OFF position. SRS warning indicator lamp shall be illuminated.
4. Turn ignition switch to the ON position. SRS warning lamp will brighten to full intensity and be active for 5-7 seconds from the time ignition power is applied. During this time, internal tests verify system functionality. If no faults exist, the light will turn off.

If the SRS Warning lamp does Not turn ON with the battery switch or ignition switch, perform the steps in section 1.2.

If the SRS Warning lamp remains ON with battery and ignition switch ON, perform the steps in section 1.3.

1.2 SRS Warning Lamp Does Not Turn On:

1. Check the bulb. Use only approved bulbs for replacement.
2. Verify that wire connections to the bulb are intact (battery+ and ground).
3. Verify battery + fuse power and ground are available to the indicator light.
4. Verify sufficient voltage at the power and ground pins of both connectors to the sensors.
5. Verify proper sensors are installed for your application.
6. Verify connection to the AB10 master sensor and the AB10 Gen2 slave sensor (where applicable).
7. If above steps does not solve the problem, replace sensors.

1. SRS Warning Lamp Remains ON:

The light will remain ON if a fault is active, the AB10 master or the AB10 Gen2 slave sensor are disconnected, or power to either of the sensors is lost.
1. Check the 5A or 10A fuse power to the AB10 system. The fuse is labeled "SRPFR". A blown fuse will cause the indicator light to remain ON. Replace fuse if necessary.
2. Verify the warning lamp is approved. The SRS sensor warning lamp output is a 250 mA. This output causes an LED indicator to always appear dimly lit.
3. Verify the yellow SRS connector is properly mated in the cab power distribution box. If the connector is unplugged, the warning lamp ground circuit shorts to the warning lamp output circuit, turning ON the SRS warning lamp.

**WARNING**

ALWAYS follow warning label directions when connecting or disconnecting AB10 master sensor.

1: Turn battery switch OFF and WAIT 1 minute.
2: Apply anti-static grounding strap from wrist to vehicle grounding surface
3: Disconnect YELLOW pyrotechnic device connectors that have RED label.
   - Driver Seat - Connector underneath seat.
   - Steering Wheel Airbag (option) - Connector at base of steering column.
   - Driver Seat Air Curtain (option) - Connector in seat back.
4: Disconnect AB10 master sensor connector(s).
5: Install shorting device into harness end of open AB10 master sensor connector(s).

To connect SRS system follow procedure in reverse order.

Air bag deployment can injure or kill!

4. Check the AB10 master sensor and the AB10 Gen2 slave sensor connection. The SRS Warning lamp will remain ON if either the AB10 master sensor and the AB10 Gen2 slave sensor is disconnected and the battery switch is ON. If the connector to the sensor is unplugged, the warning lamp ground circuit shorts to the warning lamp output circuit, turning ON the SRS warning lamp.
5. Check Voltage of electrical system. Normal operating voltage: 8-16 VDC ignition power.
   (System is wired to auxiliary battery, If available)

If the warning lamp remains illuminated after completing the steps in section 1.3, system diagnostics will need to be performed to identify the fault. Go to Section 2.

**NOTE:** If the vehicle warning lamp is ON, The FIP/SRP system might or might not be operational. However the status of the FIP or SRP system will not affect other vehicle operations. You must use the diagnostic tool to determine the source of the fault.
SECTION 2: SYSTEM DIAGNOSTICS – RETRIEVING AND CLEARING CODES:

If the SRS warning lamp remains illuminated, the recorded AB10 sensor(s) fault codes may be read with a J1939 diagnostic reader or the IMMI Diagnostic Software.

*SRS warning lamp turns off when the faults become inactive (stored).*

2.1 Using a J1939 diagnostic reader.

1. Park the vehicle in a level, stationary position.

2. Turn ignition switch off.

3. Connect SAE J1939 diagnostic reader to the 9-Pin SRS sensor diagnostic port below cab instrument panel. Turn ignition switch ON. The diagnostic tool should power up, and the SRS warning lamp should illuminate to full intensity. The light will remain on if a fault is present, the AB10 master sensor or the AB10 Gen2 slave sensor (where applicable) is disconnected, or power to sensors is lost or low. The light will deactivate if no faults exist.

4. Set the diagnostic tool to read active faults (DM1) from the AB10 master sensor (Address = 0x53) and the AB10 Gen2 slave sensor (Address = 0x58). Record the Suspect Parameter Number (SPN) and Failure Mode Identifier (FMI) faults with the tables below.

5. Use the SAE J1939 diagnostic reader to request previously active faults (Stored faults DM2) from both the AB10 master sensor and the AB10 Gen2 slave sensor. Record the SPN and the FMI with the tables below.

6. Always carefully check the wiring to resolve both active and inactive (stored) faults before returning the vehicle to service. Inactive (stored) faults are often due to intermittent wiring issues.

   If you have a warning lamp on with NO active codes:

   a) Power loss or disconnected sensor(s).

   b) Wrong sensor installed.

7. Before performing any repairs to the system, deactivate both the AB10 Master sensor and the AB10 Gen2 slave sensor by turning OFF the ignition and battery switch. NEVER perform service on a powered system! ALWAYS follow warning label directions when connecting or disconnecting sensor(s).

Use

8. Table 3: Fault Code Table to determine the source of the fault.
9. After troubleshooting is complete, Save or Print history for recording purposes.

10. Identify and document all stored and active DTC codes.

11. Include the occurrence count on the documentation.

12. This information should be recorded with the job number.

13. If the AB10 master sensor must be disconnected for troubleshooting, reference the warning tag attached to the harness at the connector.

14. Clear all stored faults by sending a DM3 message to both sensors.

15. Cycle ignition power. Power should be off for approximately 1 minute. Warning light will not deactivate until active codes are cleared and power is cycled.

If a terminating resistor is used in place of a seating position, the resistor used is 2.2 ohm, +/- 5%, ¼ watt.

**WARNING**

ALWAYS follow warning label directions when connecting or disconnecting AB10 master sensor. NEVER remove AB10 master sensor from mounted location if connected.

NEVER connect harness to an un-mounted AB10 master sensor.

Movement from a connected sensor can activate devices!

NEVER remove sensor, except for replacement.

**PYROTECNIC DEVICE FAULT TABLE: Diagnostic Codes for Pyrotechnic Device Igniter Circuits.**

Identify the source of the open or short circuit, repair, clear codes. Verify fault light operation.

Reference the

1. Table 3: Fault Code Table below to identify the source of the problem.

2. Identify and document all stored and active DTC codes.

3. Include the occurrence count on the documentation.

4. This information should be documented with the job number.

If the AB10 master sensor must be disconnected for troubleshooting, reference the warning tag attached to the harness at the connector.
Troubleshooting Pyrotechnic Device Fault Codes:

Step 1: Turn battery switch OFF and WAIT one minute

Step 2: Disconnect YELLOW pyrotechnic device connectors that have RED label.
- Driver Seat - Connector underneath seat.
- Steering Wheel Airbag (option) - Connector at base of steering column.
- Driver Seat Air Curtain (option) - Connector in seat back.

Step 3: Apply anti-static grounding strap from wrist to vehicle.

Step 4: Remove ECU connector.

Step 5: Install shorting device into open connector(s).
- A. Check the cab harness, resistors and connectors for short or open circuits.
- B. Inspect the terminals on the pyrotechnic devices to ensure proper connection.
- C. For a Slave 1 and Slave 2 fault, inspect communication wires from the AB10 master sensor to the AB10 Gen2 slave sensor. Check wiring circuits “R0540, R0550 and R0610, R0600.”

NEVER apply 12VDC power and ground to Pyrotechnic Cylinder wires when troubleshooting pyrotechnic pigtail. The device will deploy! The voltage will cause pyrotechnic to release the stored gas and deploy the device!

If the harness needs repair, fix terminals or connectors as necessary. A proper crimping tool must be used to repair the terminals and connectors.

If harness tests okay and a device fault still exists, continue to next step.
- D. Install a 2.2 ohm, +/- 5%, ¼ watt resistor across the disconnected pyrotechnic device branch of the harness. The resistor simulates a functioning pyrotechnic device.
- E. Apply anti-static grounding strap from wrist to vehicle.
- F. Remove shorting device.
- G. Reconnect sensor
- H. Reconnect YELLOW pyrotechnic device connectors that have RED label.
  - b. Steering Wheel Airbag (option) - Connector at base of steering column.
  - c. Driver Seat Air Curtain (option) - Connector in seat back.
- I. Connect diagnostic reader to a 9-pin diagnostic port below cab dash.
- J. Turn battery and ignition switch to ON.
- K. Verify that the SRS warning lamp turns On then OFF.
- L. Replace the pyrotechnic device if the resistor changes the code to inactive (stored).
- M. Contact Pierce Customer service for a new part.
For troubleshooting a seating position that is not used, a 2.2 ohm, +/- 5%, ¼ watt resistor should be installed in place of the pyrotechnic device. Follow next two steps.

A. Inspect the terminals on the resistor to ensure proper connection.

B. Replace the resistor with another resistor. If the new resistor clears the codes, contact Pierce Customer service for a new part.

Table 3: Fault Code Table

<table>
<thead>
<tr>
<th>SPN (Dec)</th>
<th>SPN (Hex)</th>
<th>FMI (Dec)</th>
<th>FMI (Hex)</th>
<th>FMI Description</th>
<th>Sensor</th>
<th>Pin</th>
<th>Location</th>
<th>Vehicle Connections</th>
<th>Wire Ckt #</th>
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<tbody>
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<td>4818</td>
<td>12D2</td>
<td>03</td>
<td>03</td>
<td>Short to Vbat</td>
<td>Master</td>
<td>A-5</td>
<td>Driver Air Bag</td>
<td>Front Air Bag DS Steering Column.</td>
<td>R0330, R0340</td>
</tr>
<tr>
<td></td>
<td></td>
<td>04</td>
<td>04</td>
<td>Short to Ground</td>
<td></td>
<td>A-6</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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<td>Slave</td>
<td>A-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03 03</td>
<td>49267</td>
<td>C073</td>
<td>11 0B</td>
<td>CAN Busoff</td>
<td>Master</td>
<td>A-19</td>
<td>CAN-H and CAN-L</td>
<td>Driveline Datalink</td>
<td>CANHO, CANLO</td>
</tr>
<tr>
<td>14 0E</td>
<td></td>
<td></td>
<td></td>
<td>Deployment Fault</td>
<td>Master</td>
<td>A-20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>136D</td>
<td>4973</td>
<td></td>
<td></td>
<td></td>
<td>Master</td>
<td></td>
<td></td>
<td>Master sensor was deployed. Contact Pierce customer service. If system is activated or damaged, trained authorized personnel must replace the components and sensors.</td>
<td></td>
</tr>
<tr>
<td>8EEE</td>
<td>36590</td>
<td></td>
<td>12 0C</td>
<td>Internal fault</td>
<td>Master</td>
<td></td>
<td></td>
<td>Master sensor has component issue. Contact Pierce customer service for new component. All internal faults must be investigated; you must not send a Clear Fault (DM3) message.</td>
<td></td>
</tr>
<tr>
<td>FE</td>
<td>254</td>
<td></td>
<td>12 0C</td>
<td>Internal Fault</td>
<td>Slave</td>
<td></td>
<td></td>
<td>• If SPN 4828 is also active, check R0550, R0540, connection to AB10 Gen2 Slave 1 output</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• If SPN 4832 is also active, check R0610, R0600, connection to AB10 Gen2 Slave 2 output</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• If resolving above issues does not clear the fault, this indicates a faulty component. Sensor must be replaced. Contact Pierce Customer Service for a new component.</td>
<td></td>
</tr>
<tr>
<td>SPN (Dec)</td>
<td>SPN (Hex)</td>
<td>FMI (Dec)</td>
<td>FMI (Hex)</td>
<td>Sensor Description</td>
<td>Pin</td>
<td>Location</td>
<td>Vehicle Connections</td>
<td>Wire Ckt #</td>
<td></td>
</tr>
<tr>
<td>----------</td>
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</tr>
<tr>
<td>240</td>
<td>F0</td>
<td>14</td>
<td>0E</td>
<td>Program Memory</td>
<td>Slave</td>
<td>• A trigger is stored in the sensor. This fault code cannot be cleared. Contact Pierce Customer Service for a new component. If system is activated or damaged, trained authorized personnel must replace the components and sensors.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION 3: DIAGNOSTIC SOFTWARE:

If a fault occurs, system diagnostics must be performed to determine the source of the fault. Diagnostics will be performed with a laptop computer using RollTek Diagnostic software and an RP1210A complaint adaptor. Before attempting troubleshooting procedures, the adaptor driver must be installed in the laptop computer. The RollTek Diagnostic software must also be installed in the laptop computer.

Before starting the RollTek Diagnostics software, the following procedure must be followed:

1. Park the vehicle in a level, stationary position.
2. Turn ignition switch off.
3. Connect adaptor to the J1939 diagnostic port that the sensors are connected to.
4. Connect the other end of the adaptor to the laptop.
5. Turn ignition switch on.

To start troubleshooting using RollTek Diagnostics, start the application by double clicking the RollTek Diagnostics Icon. The following startup screen appears (Figure 15: RollTek Diagnostic Software Start Screen):
Choose the “Run Diagnostics” radio button, then press “Select”

You should then see this screen:

![IMMI SAE J1939 Diagnostics](image)

Select RP1210A adapter from list. The adapter must be connected to the diagnostic port and the vehicle must have battery and ignition switch turned on.

In Figure 16, all the RP1210A compliant adapters drivers installed in your computer are displayed inside the adapter list. Select the adaptor that is physically connected between the sensor and the computer, then press “Continue”
If you receive an error window after this procedure, there is problem with your adaptor. Please contact your adaptor manufacturer with the error code to resolve the issue before continuing to the next step.

The operating screen appears as shown in Figure 17. Please note the green text in the top left corner: (1) Adaptor manufacturer name and (2) ID for each sensor on the vehicle. (3) The Message Window. The message window shows the status of communications between the program and the sensors.

![Operating Screen Diagram](image)

Figure 17: Operating Screen

If you don’t see the ID numbers in area 2 or area 1 is red in color and states “Not Connected”, the software cannot communicate to the sensors. This can be caused by the followings:

2. Connected to wrong J1939 diagnostic port. There can be multiple J1939 bus in your vehicle. Consult the vehicle wiring diagram to confirm that you are connected to the correct diagnostic port.

3. No power to the sensors. Consult the vehicle wiring diagram to make sure there is power supplied to the sensors and that the fuse is not blown.

4. Adaptor not connected to the computer. Make sure the Adaptor is connected, not used by other software, and ready to be used by this software. Usually, you can monitor its status using Device Manager.

5. Lack of activity on the J1939 bus. Cycling the power may re-establish bus communications.

Areas 1 and 2 must be green in color and sensor IDs must be recorded before proceeding to the next step. If you experience problems, call technical support after you have verified the following:

1. Proper operation of the adaptor
2. No bus errors
3. Correct diagnostic port

Select the radio button that suits your vehicle type. Selecting a different Vehicle Type will cause the pictorial representation of the application to change.

![Select Vehicle Type](image)

**Figure 18: Fire Truck selected**

Press the “Read Sensors” button, located at the top left corner, to start communicating with the sensors.

![Read Sensors button](image)

**Figure 19: Read Sensors button**
The Warning Lamp under each sensor shows status of the SRS warning lamp. If this status is not the same as the physical SRS warning lamp in the vehicle, check the wiring to the warning lamp before proceeding to the next step.

![Figure 16: Warning Lamp ON](image16.png)  ![Figure 17: Warning Lamp Off](image17.png)

Figure 16: Warning Lamp ON  Figure 17: Warning Lamp Off

After retrieving information from the sensor(s), you should see a screen similar to the following diagram (Figure 18) for a fire truck application.

![Figure 18: Fire truck with DTCs screen](image18.png)
Description of each area

1. **Active DTC**: this area shows all the active Diagnostic Trouble Codes (DTC). The sensor broadcasting the fault is shown followed by the SPN number, FMI number and the occurrence count. The sensor’s active DTCs are also displayed graphically as RED in the picture to the left.

2. **Stored DTC**: this area shows all the DTC’s that were previously active and are now stored. The sensor broadcasting the fault is shown followed by the SPN number, FMI number and the occurrence count. The sensor’s stored DTCs are also displayed graphically as BLUE in the picture to the left.

3. **Red box**: a red box illustrates an active DTC. The text inside this box represents its fault state (FMI number). “Open” means there’s an open in the firing loop circuit at this location. “Short” means there’s a short between the two leads in the firing loop circuit at this location. “High” means one or both of the firing loop circuit is shorted to power. “Low” means one or both of the firing loop circuit is shorted to ground.

4. **Blue box**: a blue box represents a stored DTC. The text inside this box represents its previously active fault state.

5. **Seat**: this is a graphical representation of the location of each potential firing loop. Note that not all vehicles have all seating locations.

6. **Internal Fault**: An internal fault can be created when the cab is tilted for servicing, or if there are excessive vibrations at the sensor location.

   a. The AB10 Gen2 slave sensor can generate this fault code if the communication is lost between the Master and Slave. Check Fault Code Table 4 and the wiring diagram for troubleshooting connections and circuit numbers. After ensuring proper connections, clear the fault(s) by pressing the “Clear Stored Faults” button.

   b. It is rare that the AB10 master sensor generates this fault. An AB10 master sensor can generate if there is internal component issues. If such fault occurs in the master sensor, and the “Clear Stored Faults” button is pressed, the following window appears.
All AB10 master sensor internal faults must be investigated. It is recommended that you do not clear faults if there is internal fault in the AB10 master sensor. Contact Pierce Customer Service for assistance.

c. If the fault will not clear, the module must be replaced and returned to the manufacturer. ALWAYS follow warning label directions when connecting or disconnecting AB10 master sensor.

7. Trigger: This indicates that a trigger is stored in program memory. Contact Pierce Customer Service for assistance. Trigger events cannot be cleared with standard diagnostic tools. If the system is activated or damaged, authorized technician must replace the unit.

Refer to the vehicle’s Side Roll/Frontal Impact wiring diagram to determine the wiring details. Stored faults may be due to an intermittent wiring issue, so the wiring should be checked before putting the vehicle into service.

Before correcting any faults, deactivate the SRS system by turning off the ignition and battery switch. Do NOT perform service to a live system. Accidental deployment could cause serious injury and property damage. ALWAYS follow warning label directions when connecting or disconnecting AB10 master sensor.

Identify the source of the open or short circuit, then refer to SECTION 2: SYSTEM DIAGNOSTICS – RETRIEVING AND CLEARING CODES

After the wiring is repaired, the fault indicator will change from red to blue.
Identify and document all stored and active codes to include:

1. Occurrence count of all stored and active codes.
2. Job number

If the AB10 master sensor must be disconnected for troubleshooting, reference the warning tag attached to the harness at the connector.

Press “Clear Stored Faults”. Warning light will not deactivate until the battery switch is cycled.

Verify that vehicle warning lamp matches diagnostic warning lamp status.

**Note:** The connectors going to the pyrotechnic devices are shorted when disconnected. If a digital volt meter is connected to a shorted plug it will not provide an accurate indication of component status.

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