BMW Air bag fault from an unlikely source

A 2009 BMW 520D was brought to A.D.S Ryan recently with an air bag light on. Seamus Ryan recounts the steps, including a simulated circuit, that made the repair possible.

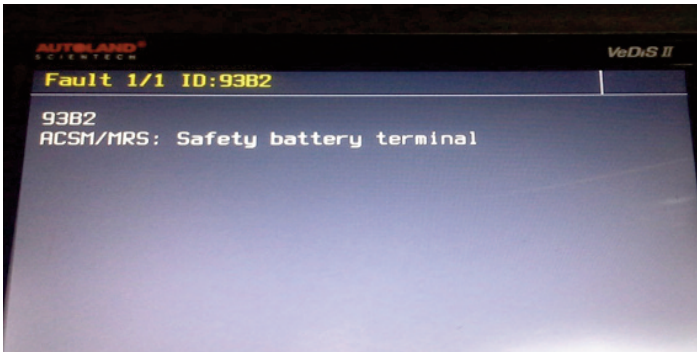
The BMW 520D was brought into our work shop with the air bag light on, so we connected up the Vedis II and read the following fault: 9382 ACSM/MRS Safety battery terminal. The BMW abbreviations for the air bag system are as follows:
ACSM = Crash safety module
MRS = Multiple restraint system

Most modern BMWs are equipped with a safety battery terminal. The purpose of the safety battery terminal is to disconnect battery power to the entire car in the event of a crash of sufficient severity. The positive connection on the battery terminal is disconnected by a command from the air bag control module, that triggers a pyrotechnic device inside the battery terminal. The charge physically and permanently disconnects the positive cable inside the battery terminal. After a crash, the safety battery terminal must be replaced.

But in this case, this car had not been involved in an accident and the lead had not been disconnected. The next step was to see if it was a terminal fault, a wiring fault or a module fault.

The battery connection was closely checked. Contact cleaner was sprayed on the connection. Even after inspection and cleaning, the fault could still not be cleared.

From previous research on this safety battery terminal, we knew the resistance of the safety battery terminal should be between 2.2 and 2.8 ohms. With this information and the aid of connections from the ATA95 test lead set, the circuit was simulated to help narrow down the fault. Many circuits and components can be successfully simulated with the wide variety of test leads that come with the ATA95 Test Lead Kit. The set contains 95 pieces of test aids that can be used for tracing, checking, capturing, or fixing complex vehicle circuitry. An appropriately sized resistor to mimic the safety battery terminal was inserted into the test lead, that was designed to hold a resistor. The clips at the ends of the test lead were then attached to the connector for the safety battery terminal.

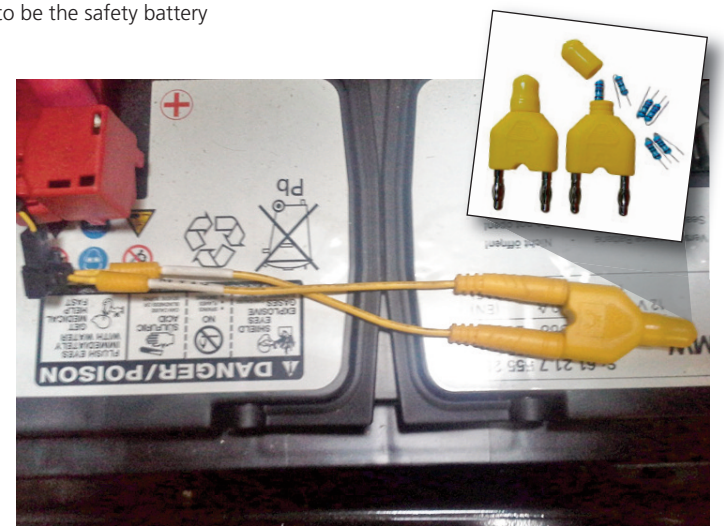


With the simulated safety battery terminal attached to the loom side of the safety battery connector, it was possible to clear the fault. This proved that the wiring back to the control unit was fine, and that the control module was also fine. The fault had to be the safety battery terminal. With this information, we were confident that replacing the safety battery terminal would cure the fault. The safety battery terminal was replaced and the fault was cleared, and didn't return.

The reason why the safety battery terminal unit failed is unknown. The safety battery terminal is normally very reliable, and should only have to be replaced after it has been triggered in a crash. It is possible the safety battery terminal was somehow damaged during a battery replacement.

A.D.S
Automotive Diagnostic Services

Most modern BMWs have a safety battery terminal. The air bag control module fires a pyrotechnical device within the terminal that disconnects the battery when a collision occurs.



A test lead from the ATA95 Test Lead Kit (inset) holds a resistor to mimic the safety battery terminal. This allowed the rest of the circuit to be tested, narrowing the fault to the battey terminal itself.