



MALFUNCTION INDICATOR LAMP (MIL) MULTIPLE MOTOR POSITION SENSOR FAULTS STORED IN EME

MODEL

F15 PHEV (X5 xDrive40e)

SITUATION

The following check control messages are displayed:

- CCM 34 "Malfunction indicator lamp (MIL)"
- CCM 633 "Powertrain Malfunction!"

One or more of the following faults may be stored in the EME (electrical machine electronics):

- 222014 - Motor position sensor: Acquisition of measured values or tilt sensor angle faulty
- 222021 - Motor position sensor: Phase difference between sine input and cosine input greater than threshold value
- 222022 - Motor position sensor: Engine speed exceeds threshold value
- 222029 - Motor position sensor: Offset of signal breakdown of amplitude difference between sine input and cosine input greater than threshold value
- 2223B6 - Motor position sensor: Interrupt of sine coil or cosine coil or excitation coil
- 222724 - Longitudinal dynamics level 2: Group fault torque limits (collective error moment limits)
- 222725 - Longitudinal dynamics level 2: Angle sensor fault

CAUSE

1. Chafing damage on the wiring harness leading to the EME connector.
2. Contact resistance at the EME's 58-pin signal connector A190*1B is too high.
3. The wires going to pins 41, 42, 43, 54, 55, and 56 in connector A190*1B are under tension. Vibrations may sporadically increase the resistance values of these connections outside of the acceptable range, leading to the activation of the Malfunction Indicator Lamp.

CORRECTION

1. Verify there is no chafing on the harness leading to EME connector A190*1B.
2. Change the harness routing and/or outer tape wrap to allow some slack, then release the tension at the EME connector.
3. Change the cable tie direction on EME connector.



Note:

- This repair overlaps with SI [B65 05 18](#) F15 PHEV – AIR BAG LAMP ILLUMINATED- FAULT CODE 9309A0.
- Replacing the EME will not provide a solution to this situation.



Important warning for working on the high-voltage systems on the F15 PHEV:

Only properly trained personnel, who have passed all applicable technical training courses, should perform any maintenance or repairs on any Hybrid or Electric Vehicle. Work performed by unqualified persons may result in severe injury or damage to the vehicle. Additional information is found in Repair Instruction 61 00... Observe safety instructions when handling electric vehicles.

PROCEDURE

Refer to the enclosure.

- Observe the note concerning handling the wiring harnesses and the lines. Refer to Repair Operation REP 6100... Notes on handling wiring harnesses and cables.
- Use a suitable tool for the repair wiring harness. Refer to Repair Operation REP 6113... Special tools for wiring harness repairs.

PARTS INFORMATION

Part Number	Description	Quantity
61 13 1 367 599	Cable tie	1
61 13 6 902 588	Fabric-tape (B=19mm/L=15m)	As required

WARRANTY INFORMATION

Covered under the terms of the BMW New Vehicle Limited Warranty for Passenger Cars and Light Trucks or the BMW Certified Pre-Owned Program.

Defect Code:	1251068100	
Labor Operation:	Labor Allowance:	Description:
00 00 006	Refer to KSD2/AIR	Performing "vehicle test" (with vehicle diagnosis system – checking faults) (Main work)
Or:		
00 00 556	Refer to KSD2/AIR	Performing "vehicle test" (with vehicle diagnosis system – checking faults) (Plus work)
And:		
		Connect an approved battery charger/power

61 21 528	Refer to KSD2/AIR	supply (indicated in KSD2 as “Charging battery”)
And:		
61 25 910	Refer to KSD2/AIR	Recharging high-voltage battery unit (to high voltage charging socket)
And:		
12 00 009	13 FRU	Work time to change the harness routing and/or outer tape wrap to allow slack and release the tension

If you are using a Main labor code for another repair, use the Plus code labor operation 00 00 556 instead of 00 00 006.

Refer to KSD2/AIR for the corresponding flat rate unit (FRU) allowances.

Work time labor operation code 12 00 009 is not considered a Main labor operation. Also, since the “work time” FRU allowance to be claimed is specified, a separate punch time is not required. However, it still requires an explanation on the repair order and in the claim comments section.

Additionally, as needed:

Sublet – Bulk Materials

Sublet Code 4	Up to \$5.00	Reimbursement for the repair-related bulk materials (Do not use part numbers for claim submission)
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Sublet reimbursement calculation for claiming the applicable repair-related bulk materials (BMW part numbers) is at the dealer net price for the “quantities used” plus your center’s handling.

Enter this material cost in sublet and itemize the amount on the repair order and in claim comment section.

ATTACHMENTS

View PDF attachment [B122818 Attachment 1 Procedure to inspect and repair the EME connector wiring harness](#).

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Procedure to inspect and repair the EME connector wiring harness: F15 PHEV**Important warning for working on the high-voltage systems on the F15 PHEV:**

Only properly trained personnel, who have passed all applicable technical training courses, should perform any maintenance or repairs on any Hybrid or Electric Vehicle. Work performed by unqualified persons may result in severe injury or damage to the vehicle. Additional information is found in Repair Instruction 61 00... Observe safety instructions when handling electric vehicles.



Note: This repair overlaps with SI **B65 05 18** F15 PHEV – AIR BAG LAMP ILLUMINATED FAULT CODE 9309A0.

1. Position the vehicle on a lift.
2. Visually inspect the EME wiring harness for chafe marks throughout entire visible area.

If there are chafe marks on the wiring harness (arrows) per the examples below, the harness must be repaired. Go to Step 3.

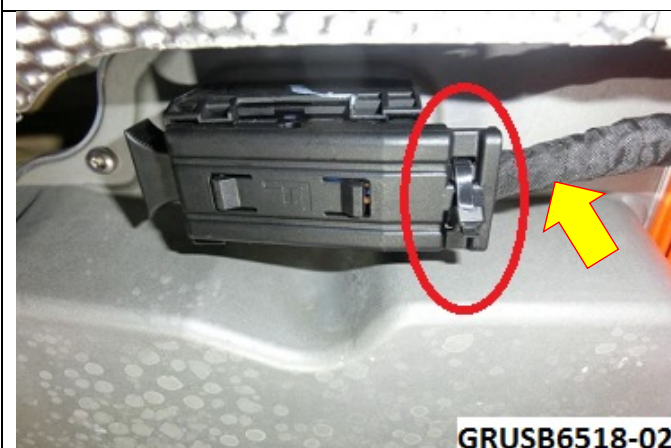


3. De-energize high-voltage system. Refer to Repair Instructions 61 25 900.
4. Disconnect the 12V battery. Refer to Repair Instructions 61 20 900
5. Remove the underbody paneling on the right side. Refer to Repair Instructions 51 71 016.



6. Perform a visual inspection of connector A190*1B on the bottom of the EME.

If there are noticeable problems (e.g. damage, traces of water, etc.) contact BMW of North America's Technical Service Department by submitting a PuMA case.



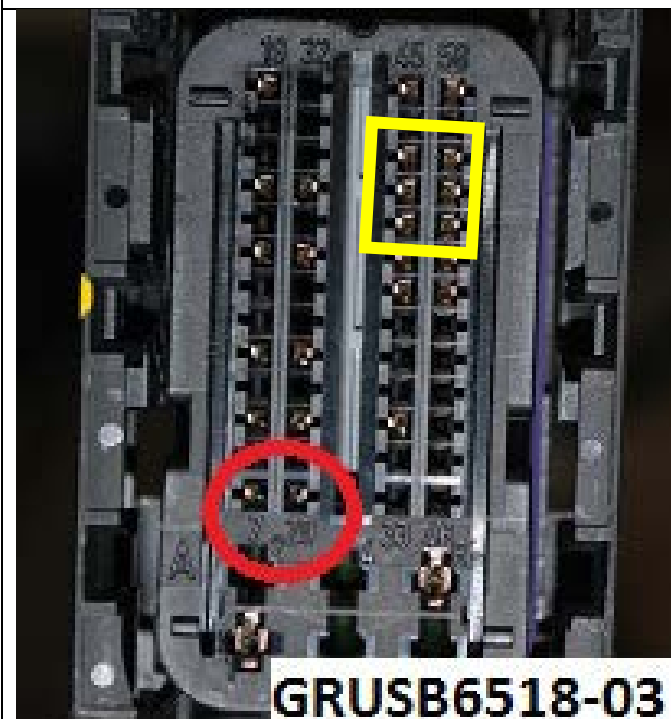
7. Remove connector A190*1B from the EME. Cut the cable tie holding the harness to the EME connector (circled).



Note:

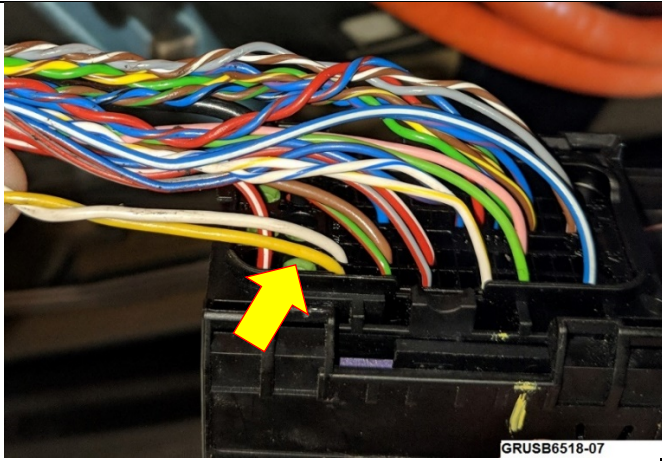
- Observe the note concerning handling the wiring harnesses and the lines. Refer to Repair Operation REP 6100... Notes on handling wiring harnesses and cables.
- Use a suitable tool for the repair wiring harness. Refer to Repair Operation REP 6113... Special tools for wiring harness repairs.

8. Remove the wiring harness tape wrapping from the connector (arrow).



9. Release the connector cover.

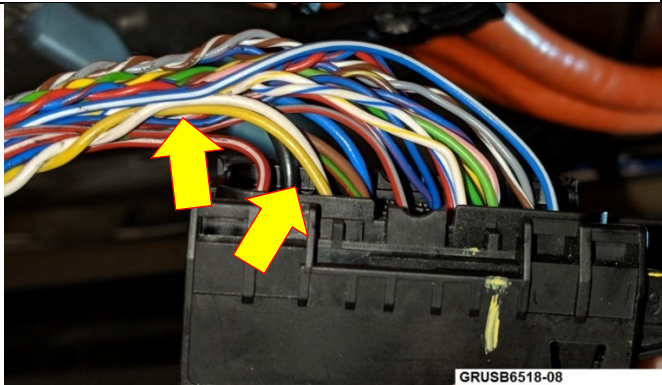
- Examine pins 41, 42, 43, 54, 55, and 56 at the EME connector (outlined in yellow)
- Also examine pins 7 and 20 (outlined in red) which are for the ACSM signal
- Submit a PuMA case if there is visual/water damage to these pins



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10. Remove the last 8" of tape from the harness at the EME connector to reduce the pull tension of this connection at the EME.

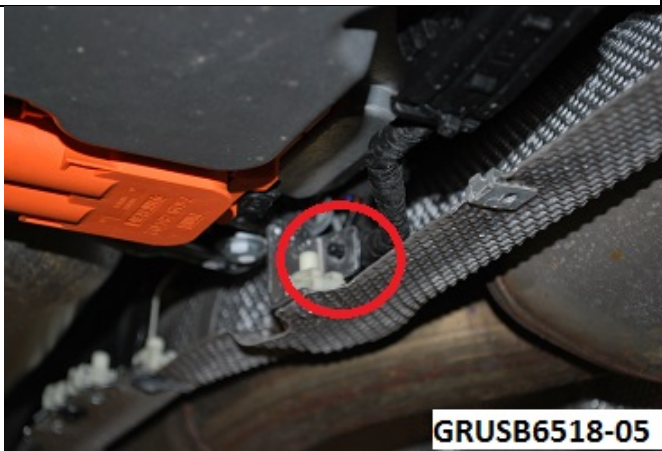
The two wires white and yellow are under strong tension, entering the connector at a tight angle (arrow).



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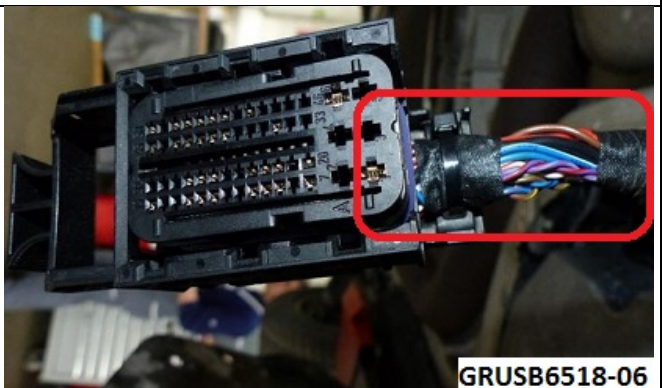
11. The wires between the cable tie location and the EME electrical connector/pins should **NOT** be under tension!

The white and yellow wires have been reformed in a larger radius (arrows) to enable a partial relief bend. This eliminates tension on the electrical pins.



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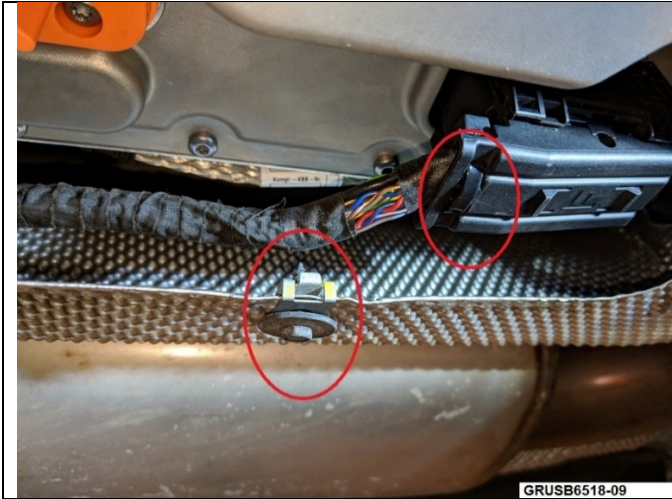
12. If more slack is needed at the connector to enable the larger radius relief bend, locate the last body tie down approx. 6" back from this EME connector. Slightly pull on the harness carefully.



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13. Wrap Fabric-tape (P/N 61 13 6 902 588) twice around the wiring harness at the location where the cable tie will be fastened.

There should be a 2" or larger gap (circled) between this wrap for the cable tie, and where the harness' main wrap begins.



14. When reinstalling the cable tie (P/N 61 13 1 367 599) on the end of the EME connector, point the end of the tie upwards so it can't rub on the underbody panel of the vehicle (right circle).

Also check to make certain there is minimal tension on the harness so that it won't droop and contact the tip of the underbody panel hold down screw (left circle).

15. Reinstall the underbody paneling on the right side (refer to Repair Operation 51 71 016).
16. Reconnect the vehicle battery (refer to Repair Operation 61 20 900).
17. Reconnect the high-voltage system (refer to Repair Operation 61 25 900).
18. Clear the fault memory.
19. Briefly drive the vehicle in electric mode to verify that the MIL no longer illuminates.
20. Fully charge the high-voltage battery as a courtesy to the customer.