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## HIGH VOLTAGE SYSTEM: ISOLATION FAULTS

### MODEL

|                                       |
|---------------------------------------|
| F60 PHEV (Cooper S E Countryman ALL4) |
|---------------------------------------|

### SITUATION

The Check Control message (CCM), "Powertrain malfunction!" is displayed.

The following fault codes are entered in the fault memory of the electrical machine electronics (EME) or the battery management electronics (SME):

#### EME:

- 22280F - High-voltage electrical system: Insulation resistance below threshold (fault)
- 222814 - High-voltage electrical system: Insulation resistance below warning threshold

#### SME:

- 21F14C - High-voltage system: Isolation resistance below the warning threshold value (fault) when switch contactors closed
- 21F14D - High-voltage system: Isolation resistance below the warning threshold value when switch contactors closed

### CAUSE

Possible moisture in the plug connection of the electric heater (EH) and/or the high voltage (HV) cable.

### CORRECTION

Diagnose with ISTA and replace EH and/or HV cable, as indicated.

### PROCEDURE

For conditions that are similar to the situation described:

To locate the isolation fault, diagnose the high-voltage electrical system, with ISTA test module:

High-voltage electrical system: Locate insulation fault (ABL-DIT-AT6100\_HVISOGEN3)

**Did the test module identify the EH as the single cause of the isolation fault?**

**YES-** replace the EH according to the repair instructions.

**NO** – go to next question.

**Did the test module identify the high-voltage cable between the EH and convenience charging electronics (KLE) as the single cause of the isolation fault?**

**YES** - replace the EH **AND** the HV cable between the EH and the KLE according to the repair instructions.

**NO-** continue diagnosis with ISTA.

## PARTS INFORMATION

| Part Number     | Description               | Quantity |
|-----------------|---------------------------|----------|
| 64 12 7 944 088 | Electric auxiliary heater | 1        |
| 61 12 6 821 406 | High-voltage wire for EDH | 1        |

### Bulk Materials

| Part Number     | Description             | Quantity  |
|-----------------|-------------------------|-----------|
| 82 14 0 031 133 | Antifreeze (One Gallon) | As needed |

## WARRANTY INFORMATION

Covered under the terms of the MINI New Passenger Car Limited Warranty or the MINI NEXT/MINI Certified Pre-Owned Limited Warranty.

|                         |                         |                                                                                                   |
|-------------------------|-------------------------|---------------------------------------------------------------------------------------------------|
| <b>Defect Code:</b>     | <b>6421054800</b>       |                                                                                                   |
|                         |                         |                                                                                                   |
| <b>Labor Operation:</b> | <b>Labor Allowance:</b> | <b>Description:</b>                                                                               |
| 00 00 006               | Refer to KSD2           | Performing "vehicle test" (with vehicle diagnosis system – checking faults) (Main work)           |
| Or:                     |                         |                                                                                                   |
| 00 00 556               | Refer to KSD2           | Performing "vehicle test" (with vehicle diagnosis system – checking faults) (Plus work)           |
| And:                    |                         |                                                                                                   |
| 61 21 528               | Refer to KSD2           | Connect an approved battery charger/power supply (indicated in KSD2 as "Charging battery to EME") |
| And:                    |                         |                                                                                                   |
| 61 25 910               | Refer to KSD2           | Recharging high-voltage battery unit (to high voltage charging unit)                              |
| And, as applicable:     |                         |                                                                                                   |
| 61 00 006               | Work time (WT)          | Performing vehicle diagnosis – test module                                                        |
| And                     |                         |                                                                                                   |
| 64 99 000               | 20 FRU                  | Work time* to replace electrical heating (after vehicle diagnosis)                                |
| And, if necessary       |                         |                                                                                                   |
| 61 99 000               | 10 FRU                  | Work time for the additional work replace the high-voltage cable set between the EH and           |

|  |  |               |
|--|--|---------------|
|  |  | the KLE (EDH) |
|--|--|---------------|

**\*Temporary Procedure:** Flat rate labor operation code 64 12 821 is planned to be available for the F60 with the release of the KSD2 04/2018. Once it becomes available, please use and claim labor operation 64 12 821 instead of work time labor operation 64 99 000.

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

Work time (WT) labor operation codes 61 00 006, 64 99 000 and 61 99 000 are not considered a Main labor operations.

- WT labor operation code 61 00 006 does require an individual punch time.
- Since the FRU allowances to be claimed for WT labor operations codes 64 99 0009 and 61 99 000 are specified, separate punch times are not required.

However, these WT labor operation codes, when claimed, all require an explanation on the repair order and in the claim comments section.

And, as needed:

#### **Sublet – Bulk Materials**

|               |                                            |                                                                                                                                                                                               |
|---------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sublet Code 4 | See sublet reimbursement calculation below | Reimbursement for replacing the drained quantity of antifreeze/coolant (Bulk container reference P/N 82 14 0 031 133, one gallon container. Do not use this part number for claim submission) |
|---------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Sublet calculation: MINI antifreeze/coolant (Bulk container reference P/N 82 14 0 031 133) – replacing the drained quantity (50/50 mixture) is at the dealer net price plus your center's handling.

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

#### **Overlapping Labor Procedure – Other Repairs**

If invoicing the KSD2 flat rate labor operation codes for other repair work results in overlapping labor, for those flat rate labor operations that are affected, you can now:

- Replace the stated KSD2 “FRU allowance” with a “reduced FRU value” to eliminate the overlapping labor.

For help in identifying the overlapping labor, please refer to the AIR FRU Plausibility Check (Overlapping Labor Tool) that is located in the AIR Client.

Eligible other repair work being claimed under a different defect code will require separate punch times.

On the repair order and in the claim comment section, please identify and itemize those labor operations being claimed with a “reduced FRU value.”

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