Technical Service Bulletin

SUBJECT:	No:	TSB-19-42B-004
KOS DTCs B1130, B1138, B1156, B1168, B1169 DIAGNOSIS - SMR - REVISED	DATE:	**May 2019**
	MODEL:	**2015 Mirage**

CIRCULATE TO:	[ ] GENERAL MANAGER	[ ] PARTS MANAGER	[X] TECHNICIAN
[X] SERVICE ADVISOR	[X] SERVICE MANAGER	[X] WARRANTY PROCESSOR	[ ] SALES MANAGER

This bulletin supercedes TSB-15-42B-001, issued November, 2015, to add more instructions for DTC B1138. Revisions are indicated by ◀.

PURPOSE

This TSB corrects Keyless Operation System (KOS) DTC B1130 diagnostic trouble code procedures and adds diagnostic procedures for KOS DTCs B1138, B1156, B1168, and B1169 to the Service Manual.

AFFECTED VEHICLES

2015 Mirage

AFFECTED SERVICE MANUAL

2015 Mirage Service Manual, Group 42-Body

Continued

Please make the indicated changes to the 2015 Mirage Service Manual, Group 42-Body -> 42B-Keyless Operation System (KOS) -> Diagnosis -> Diagnosis Trouble Code Chart

DIAGNOSIS TROUBLE CODE CHART

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Diagnostic trouble code No.	Diagnostic item	Reference page
B1130	Ignition power supply	
B1131	Starter setting circuit fail	
B1132	Starter circuit fail	
B1133	IG1 setting circuit fail	
B1134	ECU power supply	
B1135	Engine switch	
B1136	Stop light switch	
B1137	P range detect SW	
B1157 <Added>	EEPROM fail	
B1158	ECU internal error	
B1160	Key code not programmed	
B1161	VIN mismatch	
B1163	Coding data mismatch	
B1166 <Added>	Special mode	
B1731	PCM authentification timeout	
B1A08	F.A.S.T. key1 fail	
B1A09	F.A.S.T. key2 fail	
B1A0A	F.A.S.T. key3 fail	
B1A0B	F.A.S.T. key4 fail	
B1A10	F.A.S.T. key 1 low battery	
B1A11	F.A.S.T. key 2 low battery	
B1A12	F.A.S.T. key 3 low battery	
B1A13	F.A.S.T. key 4 low battery	
B1A24	Transponder ID not registered	
B1A25	Transponder ID unmatched	
B1A28	PCM authentification error	
B2352	Antenna fail	
B2400	F.A.S.T. key registration fail	
B2401	F.A.S.T. key ID not registered	
B240A	DR side antenna(outdoor) open	
B240B	PS side antenna(outdoor) open	
B240C	Tail gate antenna(outdoor) open	
B240D	Front antenna(indoor) open	
B240E	RR antenna(indoor) open	
B1168	ACC system fail	
B1169	IG2 system fail	

Please replace the existing DTC B1130 Diagnostic Trouble Code Procedure in the 2015 Mirage Service Manual, Group 42-Body -> 42B-Keyless Operation System (KOS) -> Diagnosis -> Diagnostic Trouble Code Procedures with the following information.

KEYLESS OPERATION SYSTEM (KOS)
DIAGNOSIS

DIAGNOSTIC TROUBLE CODE PROCEDURES

<Correct>

DTC B1130: Ignition power supply

⚠ CAUTION
- **If DTC B1130 is set, always diagnose the CAN bus lines.**
- **Before replacing ECU, ensure that the communication circuit is normal.**

DTC SET CONDITION

If the output power supply status is different from the engine switch status information received from ETACS-ECU via CAN, KOS&OSS-ECU stores DTC B1130. At the same time, KOS&OSS-ECU displays the power supply system error warning to the combination meter, and flashes the indicator of engine switch in orange.

TECHNICAL DESCRIPTION (COMMENT)

Check Conditions
- The terminal voltage of IOD and +B is between 10 and 16 V.

Judgment Criterion
- Any of the following conditions is met, and 2 seconds or more have elapsed.
  a. The engine switch status information received from ETACS-ECU is "ON" when the power supply mode is at OFF.
  b. The engine switch status information received from ETACS-ECU is "ON" when the power supply mode is at ACC.
  c. The engine switch status information received from ETACS-ECU is "OFF" when the power supply mode is at ON.

TROUBLESHOOTING HINTS
- Malfunction of the CAN bus line
- Damaged wiring harness or connector (short to ground, short to power supply, or open circuit in IG1 line)
- Malfunction of IG1 relay
- Malfunction of KOS&OSS-ECU
- Malfunction of ETACS-ECU

DIAGNOSIS

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

⚠ CAUTION
To prevent damage to scan tool (M.U.T.-III), always turn the power supply mode of the engine switch to the "OFF" position before connecting or disconnecting scan tool (M.U.T.-III).

(1) Connect scan tool (M.U.T.-III) [Refer to "How to connect scan tool (M.U.T.-III) "].
(2) Turn the power supply mode of the engine switch to "ON".
(3) Diagnose the CAN bus line.
(4) Turn the power supply mode of the engine switch to "OFF".

Q: Is the CAN bus line found to be normal?

YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C, Diagnosis).

KEYLESS OPERATION SYSTEM (KOS)
DIAGNOSIS

<Correct>

STEP 2. Using scan tool MB991958, read the diagnostic trouble code.

⚠ CAUTION
To prevent damage to scan tool (M.U.T.-III), always turn the power supply mode of the engine switch to the "OFF" position before connecting or disconnecting scan tool (M.U.T.-III).

(1) Connect scan tool (M.U.T.-III) [Refer to "How to connect scan tool (M.U.T.-III) "].
(2) Turn the power supply mode of the engine switch to "ON".
(3) Check if KOS&OSS-ECU DTC B1133 is set.
(4) Turn the power supply mode of the engine switch to "OFF".

Q: Is the DTC set?

YES : Refer to diagnostic trouble code chart .
NO : Go to Step 3.

STEP 3. IG1 relay check.

Check that the IG1 relay works normally.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Replace the IG1 relay.

STEP 4. Voltage measurement at IG1 relay connector (IG1 line).

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the power supply mode of the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) Measure the voltage between the IG1 relay connector (IG1 line) and the body ground.

OK: System voltage

(4) Turn the power supply mode of the power supply mode of the engine switch from "ON" position to "LOCK" (OFF) position.
(5) Measure the voltage between the IG1 relay connector (IG1 line) and the body ground.

OK: 1 V or less

Q: Is the check result normal?

YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Check of short to power supply, short to earth or open circuit in IG1 line between the KOS&OSS-ECU connector and the IG1 relay connector.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction).
NO : Repair the connector(s) or wiring harness.

KEYLESS OPERATION SYSTEM (KOS)
DIAGNOSIS

<Correct>

STEP 6. Check of open circuit in ground line between the IG1 relay connector and the body ground.

Q: Is the check result normal?

YES : Go to Step 7.
NO : Repair the wiring harness.

STEP 7. Voltage measurement at IG1 relay connector (IG1 line).

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the voltage between the IG1 relay connector (power supply line) and the body ground.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 9.
NO : Go to Step 8.

STEP 8. Check of short to ground or open circuit in power supply line between the fusible link connector and the IG1 relay connector.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction).
NO : Repair the connector(s) or wiring harness.

STEP 9. Voltage measurement at ETACS-ECU connector (IG1 line).

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) Measure the voltage between the ETACS-ECU connector (IG1 line) and the body ground.

OK: System voltage

(4) Turn the power supply mode of the engine switch from "ON" position to "LOCK" (OFF) position.
(5) Measure the voltage between the ETACS-ECU connector (IG1 line) and the body ground.

OK: 1 V or less

Q: Is the check result normal?

YES : Go to Step 10.
NO : Repair the wiring harness, IG1 line between the ETACS-ECU connector and the fusible link.

<Correct>

STEP 10. Using scan tool MB991958, check data list.

⚠ CAUTION

To prevent damage to scan tool (M.U.T.-III), always turn the power supply mode of the engine switch to the OFF position before connecting or disconnecting scan tool (M.U.T.-III).

(1) Connect scan tool (M.U.T.-III) [Refer to "How to connect the Scan Tool (M.U.T.-III) "].
(2) Turn the power supply mode of the engine switch to OFF.
(3) Operate the engine switch to change the power supply mode, and check that the data list display of ETACS-ECU is changed.

- When power supply mode is "OFF".

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
30	Ignition switch(IG1)	OFF

- When power supply mode is "ON".

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
30	Ignition switch(IG1)	ON

OK: Normal conditions are displayed for all the items.

Q: Is the check result normal?

YES : Go to Step 11.
NO : Go to Step 12.

STEP 11. Recheck for diagnostic trouble code.

Check again if the DTC is set in the KOS&OSS-ECU.
(1) Erase the DTC.
(2) Turn the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) On completion, check that the DTC is set again.

Q: Is the DTC set?

YES : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS-ECU).
NO : Intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

KEYLESS OPERATION SYSTEM (KOS)
DIAGNOSIS

<Correct>

STEP 12. Recheck for diagnostic trouble code.
Check again if the DTC is set in the KOS&OSS-ECU.
(1) Erase the DTC.
(2) Turn the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) On completion, check that the DTC is not set again.

Q: Is the DTC set?

YES : Replace the KOS&OSS-ECU and register the VIN .

NO : Intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

Please add the following information for new DTCs B1138 and B1156 after DTC B1137 (P range detect SW) to the 2015 Mirage Service Manual, Group 42-Body -> 42B-Keyless Operation System (KOS) -> Diagnosis -> Diagnostic Trouble Code Procedures.

KEYLESS OPERATION SYSTEM (KOS)
DIAGNOSIS

<Added>

DTC B1138: Vehicle speed data fail

⚠ CAUTION
- **If DTC B1138 is set, diagnose the CAN bus lines.**
- **If DTC B1138 is set, check whether DTC B1156 is also set.**
- **When replacing the ECU, always check that the communication circuit is normal.**

DIAGNOSIS FUNCTION

When the engine control module receives invalid or no vehicle speed signal via CAN, the KOS&OSS-ECU will set DTC B1138.

DTC SET CONDITION

Check Conditions
- The power supply mode is at ON without cranking.

Judgement Criterion
- Any of the following conditions is met, and two seconds or more have elapsed.
  - The system does not receive any vehicle speed signal from the engine-ECU.
  - The system receives invalid vehicle speed signal from the engine-ECU.

TROUBLESHOOTING HINTS
- Malfunction of the CAN bus line
- Malfunction of engine control module
- Malfunction of KOS&OSS-ECU

<Added>

DIAGNOSIS

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

⚠ CAUTION
To prevent damage to scan tool (M.U.T.-III), always turn the power supply mode of the engine switch to the "OFF" position before connecting or disconnecting scan tool (M.U.T.-III).

(1) Connect scan tool (M.U.T.-III) [Refer to "How to connect scan tool (M.U.T.-III) "].
(2) Turn the power supply mode of the engine switch to "ON".
(3) Diagnose the CAN bus line.
(4) Turn the power supply mode of the engine switch to "OFF".

Q: Is the CAN bus line found to be normal?

YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Diagnosis).

STEP 2. Using scan tool MB991958, read the diagnostic trouble code.

⚠ CAUTION
To prevent damage to scan tool (M.U.T.-III), always turn the power supply mode of the engine switch to the "OFF" position before connecting or disconnecting scan tool (M.U.T.-III).

(1) Connect scan tool (M.U.T.-III) [Refer to "How to connect scan tool (M.U.T.-III) "].
(2) Turn the power supply mode of the engine switch to "ON".
(3) Check if KOS&OSS-ECU DTC B1156 is set.
(4) Turn the power supply mode of the engine switch to "OFF".

Q: Is the DTC set?

YES : Refer to diagnosis code chart .
NO : Go to Step 3.

KEYLESS OPERATION SYSTEM (KOS)
DIAGNOSIS

<Added>

STEP 3. Using scan tool MB991958, read the other system diagnostic trouble code.
Check again if the DTC is set in the engine control module.

⚠ CAUTION
To prevent damage to scan tool (M.U.T.-III), always turn the power supply mode of the engine switch to the "OFF" position before connecting or disconnecting scan tool (M.U.T.-III).

(1) Connect scan tool (M.U.T.-III) [Refer to "How to connect scan tool (M.U.T.-III) "].
(2) Erase the DTC.
(3) Turn the power supply mode of the engine switch to "ON".
(4) Check if DTC is set.
(5) Turn the power supply mode of the engine switch to "OFF".

Q: Is the DTC set?

YES : Perform troubleshooting for the engine control module (Refer to GROUP 13A, Troubleshooting). Then go to Step 4.
NO : Go to Step 4.

STEP 4. Recheck for diagnostic trouble code.
Check again if the DTC is set in the KOS&OSS-ECU.
(1) Erase the DTC.
(2) Turn the power supply mode of the engine switch to "ON".
(3) Check if DTC is set.

<Added>

Q: Is the DTC set?

YES : Replace the KOS&OSS-ECU and register the VIN

NO : Intermittent malfunction is suspected (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction).

DTC B1156: Power supply voltage low

⚠ CAUTION
When replacing the ECU, always check that the communication circuit is normal.

DIAGNOSTIC FUNCTION
If the system detects that +B voltage decreases, the KOS&OSS-ECU will set DTC B1156.

DTC SET CONDITION

Check Conditions
- The power supply mode is NOT at ON without cranking with the KOS&OSS-ECU activated

Judgement Criterion
- +B voltage remains 9.0 V or less for at least five seconds.

PROBABLE CAUSES
- Damaged wiring harness or connector (+B line short to ground or open circuit)
- Malfunction of KOS&OSS-ECU
- Deteriorated battery

<Added>

DIAGNOSIS

NOTE: Prior to diagnosis, check the battery. (Refer to GROUP 54A – Battery Test .)

STEP 1. Voltage measurement at +B connector (+B line)

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the voltage between the +B connector (+B line) and the body ground.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 3.
NO : Go to Step 2.

STEP 2. Check of short to ground or open circuit in +B line between the KOS&OSS-ECU connector and the battery

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the connector(s) or wiring harness.

STEP 3. Recheck for diagnostic trouble code.

Check again if the DTC is set in the KOS&OSS-ECU.
(1) Erase the DTC.
(2) Turn the power supply mode of the engine switch from "OFF" to "ON".
(3) Check if DTC is set.
(4) Turn the power supply mode of the engine switch from "ON" to "OFF".

Q: Is the DTC set?

YES : Replace the KOS&OSS-ECU and register the VIN .
NO : Intermittent malfunction is suspected (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction).

Please add the following information for new DTCs B1168 and B1169 after DTC B1166 (Special mode) to the 2015 Mirage Service Manual, Group 42-Body -> 42B-Keyless Operation System (KOS) -> Diagnosis -> Diagnostic Trouble Code Procedures.

KEYLESS OPERATION SYSTEM (KOS)
DIAGNOSIS

<Added>

DTC B1168: ACC system fail

⚠ CAUTION
- **If DTC B1168 is set, always diagnose the CAN bus lines.**
- **Before replacing ECU, ensure that the communication circuit is normal.**

DTC SET CONDITION

If the output power supply status is different from the engine switch status information received from ETACS-ECU via CAN, KOS&OSS-ECU stores DTC B1168. At the same time, KOS&OSS-ECU displays the power supply system error warning to the combination meter, and flashes the indicator of engine switch in orange.

TECHNICAL DESCRIPTION (COMMENT)

Check Conditions
- The terminal voltage of IOD and +B is between 10 and 16 V.

Judgment Criterion
- Any of the following conditions is met, and 2 seconds or more have elapsed.
  a. The engine switch status information received from ETACS-ECU is "ACC" when the power supply mode is at OFF.
  b. The engine switch status information received from ETACS-ECU is "OFF" when the power supply mode is at ACC.

TROUBLESHOOTING HINTS
- Malfunction of the CAN bus line
- Damaged wiring harness or connector (short to ground, short to power supply, or open circuit in ACC line)
- Malfunction of ACC relay
- Malfunction of KOS&OSS-ECU
- Malfunction of ETACS-ECU
- Commercial electric products that are connected to the accessory socket

  NOTE: Be sure to remove the commercial electric products that are connected to the accessory socket before troubleshooting. Otherwise troubleshooting cannot be performed correctly.

DIAGNOSIS

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

⚠ CAUTION
To prevent damage to scan tool (M.U.T.-III), always turn the power supply mode of the engine switch to the "OFF" position before connecting or disconnecting scan tool (M.U.T.-III).

(1) Connect scan tool (M.U.T.-III) [Refer to "How to connect scan tool (M.U.T.-III) "].
(2) Turn the power supply mode of the engine switch to "ON".
(3) Diagnose the CAN bus line.
(4) Turn the power supply mode of the engine switch to "OFF".

Q: Is the CAN bus line found to be normal?

YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C, Diagnosis).

STEP 2. ACC relay check.

Check that the ACC relay works normally.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Replace the ACC relay.

<Added>

STEP 3. Voltage measurement at ACC relay connector (ACC line).

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the power supply mode of the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) Measure the voltage between the ACC relay connector (ACC line) and the body ground.

OK: System voltage

(4) Turn the power supply mode of the power supply mode of the engine switch from "ON" position to "LOCK" (OFF) position.
(5) Measure the voltage between the ACC relay connector (ACC line) and the body ground.

OK: 1 V or less

Q: Is the check result normal?

YES : Go to Step 5.
NO : Go to Step 4.

STEP 4. Check of short to power supply, short to earth or open circuit in ACC line between the KOS&OSS-ECU connector and the ACC relay connector.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction).
NO : Repair the connector(s) or wiring harness.

STEP 5. Check of open circuit in ground line between the ACC relay connector.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the wiring harness.

STEP 6. Voltage measurement at ACC relay connector (ACC line).

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the voltage between the ACC relay connector (power supply line) and the body ground.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 8.
NO : Go to Step 7.

STEP 7. Check of short to ground or open circuit in power supply line between the fusible link connector and the ACC relay connector.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction).

NO : Repair the connector(s) or wiring harness.

STEP 8. Voltage measurement at ETACS-ECU connector (ACC line).

<Added>

(1) Disconnect the connector, and measure at the wiring harness side.

(2) Turn the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.

(3) Measure the voltage between the ETACS-ECU connector (ACCI line) and the body ground.

OK: System voltage

(4) Turn the power supply mode of the engine switch from "ON" position to "LOCK" (OFF) position.

(5) Measure the voltage between the ETACS-ECU connector (ACC line) and the body ground.

OK: 1 V or less

Q: Is the check result normal?

YES : Go to Step 9.

NO : Repair the wiring harness, ACC line between the ETACS-ECU connector and the fusible link.

KEYLESS OPERATION SYSTEM (KOS)
DIAGNOSIS

<Added>

STEP 9. Using scan tool MB991958, check data list.

⚠ CAUTION
To prevent damage to scan tool (M.U.T.-III), always turn the power supply mode of the engine switch to the OFF position before connecting or disconnecting scan tool (M.U.T.-III).

(1) Connect scan tool (M.U.T.-III) [Refer to "How to connect the Scan Tool (M.U.T.-III) "].
(2) Turn the power supply mode of the engine switch to "OFF".
(3) Operate the engine switch to change the power supply mode, and check that the data list display of ETACS-ECU is changed.

- When power supply mode is "OFF".

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	OFF

- When power supply mode is "ACC".

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON

- When power supply mode is "ON".

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON

OK: Normal conditions are displayed for all the items.

Q: Is the check result normal?
YES : Go to Step 10.
NO : Go to Step 11.

KEYLESS OPERATION SYSTEM (KOS)
DIAGNOSIS

<Added>

STEP 10. Recheck for diagnostic trouble code.
Check again if the DTC is set in the KOS&OSS-ECU.
(1) Erase the DTC.
(2) Turn the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) On completion, check that the DTC is set again.

Q: Is the DTC set?

YES : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS-ECU).

NO : Intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

STEP 11. Recheck for diagnostic trouble code.
Check again if the DTC is set in the KOS&OSS-ECU.
(1) Erase the DTC.
(2) Turn the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) On completion, check that the DTC is not set again.

Q: Is the DTC set?

YES : Replace the KOS&OSS-ECU and register the VIN .

NO : Intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

DTC B1169: IG2 system fail

⚠ CAUTION
- **If DTC B1169 is set, always diagnose the CAN bus lines.**
- **Before replacing ECU, ensure that the communication circuit is normal.**

DTC SET CONDITION
If the output power supply status is different from the engine switch status information received from ETACS-ECU via CAN, KOS&OSS-ECU stores DTC B1169. At the same time, KOS&OSS-ECU displays the power supply system error warning to the combination meter, and flashes the indicator of engine switch in orange.

TECHNICAL DESCRIPTION (COMMENT)

Check Conditions
- The terminal voltage of IOD and +B is between 10 and 16 V.

Judgment Criterion
- Any of the following conditions is met, and 2 seconds or more have elapsed.
  a. The engine switch status information received from ETACS-ECU is "IG2-ON" when the power supply mode is at OFF.
  b. The engine switch status information received from ETACS-ECU is "IG2-ON" when the power supply mode is at ACC.

TROUBLESHOOTING HINTS
- Malfunction of the CAN bus line
- Damaged wiring harness or connector (short to ground, short to power supply, or open circuit in IG2 line)
- Malfunction of IG2 relay
- Malfunction of KOS&OSS-ECU

- Malfunction of ETACS-ECU

DIAGNOSIS

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

⚠ CAUTION
To prevent damage to scan tool (M.U.T.-III), always turn the power supply mode of the engine switch to the "OFF" position before connecting or disconnecting scan tool (M.U.T.-III).

(1) Connect scan tool (M.U.T.-III) [Refer to "How to connect scan tool (M.U.T.-III) "].
(2) Turn the power supply mode of the engine switch to "ON".
(3) Diagnose the CAN bus line.
(4) Turn the power supply mode of the engine switch to "OFF".

Q: Is the CAN bus line found to be normal?

YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C, Diagnosis).

STEP 2. IG2 relay check.
Check that the IG2 relay works normally.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Replace the IG2 relay.

STEP 3. Voltage measurement at IG2 relay connector (IG2 line).

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the power supply mode of the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) Measure the voltage between the IG2 relay connector (IG2 line) and the body ground.

OK: System voltage

(4) Turn the power supply mode of the power supply mode of the engine switch from "ON" position to "LOCK" (OFF) position.
(5) Measure the voltage between the IG2 relay connector (IG2 line) and the body ground.

OK: 1 V or less

Q: Is the check result normal?

YES : Go to Step 5.
NO : Go to Step 4.

<Added>

STEP 4. Check of short to power supply, short to earth or open circuit in IG2 line between the KOS&OSS-ECU connector and the IG2 relay connector.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction).

NO : Repair the connector(s) or wiring harness.

STEP 5. Check of open circuit in ground line between the IG2 relay connector and the body ground.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair the wiring harness.

STEP 6. Voltage measurement at IG2 relay connector (IG2 line).

(1) Disconnect the connector, and measure at the wiring harness side.

(2) Measure the voltage between the IG2 relay connector (power supply line) and the body ground.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 8.

NO : Go to Step 7.

STEP 7. Check of short to ground or open circuit in power supply line between the fusible link connector and the IG2 relay connector.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction).

NO : Repair the connector(s) or wiring harness.

<Added>

STEP 8. Voltage measurement at ETACS-ECU connector (IG2 line).

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) Measure the voltage between the ETACS-ECU connector (IG2 line) and the body ground.

OK: System voltage

(4) Turn the power supply mode of the engine switch from "ON" position to "LOCK" (OFF) position.
(5) Measure the voltage between the ETACS-ECU connector (IG2 line) and the body ground.

OK: 1 V or less

Q: Is the check result normal?

YES : Go to Step 9.
NO : Repair the wiring harness, IG2 line between the ETACS-ECU connector and the fusible link.

STEP 9. Using scan tool MB991958, check data list.

⚠ CAUTION
To prevent damage to scan tool (M.U.T.-III), always turn the power supply mode of the engine switch to the OFF position before connecting or disconnecting scan tool (M.U.T.-III).

(1) Connect scan tool (M.U.T.-III) [Refer to "How to connect the Scan Tool (M.U.T.-III) "].
(2) Turn the power supply mode of the engine switch to "OFF".
(3) Operate the engine switch to change the power supply mode, and check that the data list display of ETACS-ECU is changed.

- When power supply mode is "OFF".

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
44	Ignition switch(IG2)	OFF

- When power supply mode is "ON".

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
44	Ignition switch(IG2)	ON

OK: Normal conditions are displayed for all the items.

Q: Is the check result normal?

YES : Go to Step 10.
NO : Go to Step 11.

KEYLESS OPERATION SYSTEM (KOS)
DIAGNOSIS

<Added>

STEP 10. Recheck for diagnostic trouble code.
Check again if the DTC is set in the KOS&OSS-ECU.
(1) Erase the DTC.
(2) Turn the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) On completion, check that the DTC is set again.

Q: Is the DTC set?

YES : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS-ECU).

NO : Intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

STEP 11. Recheck for diagnostic trouble code.
Check again if the DTC is set in the KOS&OSS-ECU.
(1) Erase the DTC.
(2) Turn the power supply mode of the engine switch from "LOCK" (OFF) position to "ON" position.
(3) On completion, check that the DTC is not set again.

Q: Is the DTC set?

YES : Replace the KOS&OSS-ECU and register the VIN .

NO : Intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).