SERVICE BULLETIN

MITSUBISHI MOTORS

GLOBAL AFTER SALES OFFICE, MITSUBISHI MOTORS CORPORATION

PURPOSE : CHANGE	ISSUE NO. : MSB-14EXML42-002A	DATE : 2014-12-2
SUBJECT : Changes and additions of the troubleshooting about KOS		<DESTINATION/MODEL> <M/Y> (As per attached sheet 1) 15 MIRAGE/SPACE STAR (A03A) ATTRAGE(A10)
GROUP : Gr:42(Body)		

1. Description :

Please refer to the attached document for the information about the change of mention in the applicable service manual.

2. Affected service manuals :

Please refer to the attached document (Attached sheet 1)

3. About the details :

Please refer to the attached document (Attached sheet 4-7)

4. Effective time : From 15MY of the related vehicles

※ Revised A(MSB-14EXML42-002A : issued on Jan 12, 2016)
Only the attached sheet 6(21/32) for MMNA/USTP has been revised.

＜**For overseas market**＞ Attached sheet 1

＜EU＞

Applicable manual	Pub. No.	Applicable title (INFO ID)	Contents
2015 MIRAGE/SPACE STAR Workshop Manual CD-ROM	CA0E15E1-CD (ENG) CA0F15E1-CD (FRE) CA0G15E1-CD (GER) CA0S15E1-CD (SPA) CA0I15E1-CD (ITA)	DIAGNOSIS CODE CHART (M429-60-021-17200-01)	Attached sheet 4 (3/28)
		CODE NO.B1130 IGNITION POWER SUPPLY (M429-62-100-13600-01)	Attached sheet 4 (4/28)-(9/28) (16/28)-(18/28)
		CODE NO.B1137 P RANGE DETECT SW (M429-62-170-13500-01) after	Attached sheet 4 (19/28)-(20/28)
		CODE NO.B1155 EEPROM FAIL (ESL) (M429-62-340-08800-01) after	Attached sheet 4 (21/28)-(22/28)
		CODE NO.B1166 SPECIAL MODE (M429-62-430-08400-01) after	Attached sheet 4 (23/28)-(28/28)
~~2015 MIRAGE/SPACE STAR KEYLESS OPERATION REGISTRATION PROCEDURE~~	—	~~ID CODES REGISTRATION PROCEDURE~~	~~Attached sheet 5 (1/7)-(4/7)~~
2015 ATTRAGE Workshop Manual CD-ROM	CA1E15E1-CD (ENG) CA1F15E1-CD (FRE) CA1G15E1-CD (GER) CA1S15E1-CD (SPA) CA1I15E1-CD (ITA)	GENERAL INFORMATION (M429-60-010-72900-01)	Attached sheet 4 (2/28)
		DIAGNOSIS CODE CHART (M429-60-021-17201-01)	Attached sheet 4 (3/28)
		CODE NO.B1130 IGNITION POWER SUPPLY (M429-62-100-22200-01)	Attached sheet 4 (4/28)-(9/28) (16/28)-(18/28)
		CODE NO.B1137 P RANGE DETECT SW (M429-62-170-20900-01) after	Attached sheet 4 (19/28)-(20/28)
		CODE NO.B1155 EEPROM FAIL (ESL) (M429-62-340-10701-01) after	Attached sheet 4 (21/28)-(22/28)
		CODE NO.B1166 SPECIAL MODE (M429-62-430-10301-01) after	Attached sheet 4 (23/28)-(28/28)
~~2015 ATTRAGE KEYLESS OPERATION REGISTRATION PROCEDURE~~	—	~~ID CODES REGISTRATION PROCEDURE~~	~~Attached sheet 5 (1/7), (5/7)-(6/7)~~

＜THAILAND/General Export/GCC＞

Applicable manual	Pub. No.	Applicable title (INFO ID)	Contents
2015 MIRAGE/SPACE STAR Workshop Manual CD-ROM	PWFE1405R(ENG) PWFE1406R(SPA)	DIAGNOSIS CODE CHART (M429-60-021-17201-01)	Attached sheet 4 (3/28)
		CODE NO.B1130 IGNITION POWER SUPPLY (M429-62-100-13601-01)	Attached sheet 4 (4/28)-(9/28) (16/28)-(18/28)
		CODE NO.B1137 P RANGE DETECT SW (M429-62-170-20900-01) after	Attached sheet 4 (19/28)-(20/28)
		CODE NO.B1155 EEPROM FAIL (ESL) (M429-62-340-08801-01) after	Attached sheet 4 (21/28)-(22/28)
		CODE NO.B1166 SPECIAL MODE (M429-62-430-08401-01) after	Attached sheet 4 (23/28)-(28/28)
~~2015 MIRAGE/SPACE STAR KEYLESS OPERATION REGISTRATION PROCEDURE~~	~~—~~	~~ID CODES REGISTRATION PROCEDURE~~	~~Attached sheet 5 (1/7)-(4/7)~~

Applicable manual	Pub. No.	Applicable title (INFO ID)	Contents
2015 ATTRAGE Workshop Manual CD-ROM	PWFE1410R(ENG) PWFS1411R(SPA)	GENERAL INFORMATION (M429-60-010-65500-01)	Attached sheet 4 (1/28)
		DIAGNOSIS CODE CHART (M429-60-021-17201-01)	Attached sheet 4 (3/28)
		CODE NO.B1130 IGNITION POWER SUPPLY (M429-62-100-22200-01)	Attached sheet 4 (4/28)-(9/28) (16/28)-(18/28)
		CODE NO.B1137 P RANGE DETECT SW (M429-62-170-20900-01) after	Attached sheet 4 (19/28)-(20/28)
		CODE NO.B1155 EEPROM FAIL (ESL) (M429-62-340-10701-01) after	Attached sheet 4 (21/28)-(22/28)
		CODE NO.B1166 SPECIAL MODE (M429-62-430-10301-01) after	Attached sheet 4 (23/28)-(28/28)
~~2015 ATTRAGE KEYLESS OPERATION REGISTRATION PROCEDURE~~	~~—~~	~~ID CODES REGISTRATION PROCEDURE~~	~~Attached sheet 5 (1/7)-(4/7)~~

＜MMAL/NZ＞

Applicable manual	Pub. No.	Applicable title (INFO ID)	Contents
2015 MIRAGE Workshop Manual CD-ROM	AU900425 NZ:DRAFT	GENERAL INFORMATION (M429-60-010-65500-01)	Attached sheet 4 (1/28)
		DIAGNOSIS CODE CHART (M429-60-021-17201-01)	Attached sheet 4 (3/28)
		CODE NO.B1130 IGNITION POWER SUPPLY (M429-62-100-22200-01)	Attached sheet 4 (4/28)-(9/28) (16/28)-(18/28)
		CODE NO.B1137 P RANGE DETECT SW (M429-62-170-20900-01) after	Attached sheet 4 (19/28)-(20/28)
		CODE NO.B1155 EEPROM FAIL (ESL) (M429-62-340-10701-01) after	Attached sheet 4 (21/28)-(22/28)
		CODE NO.B1166 SPECIAL MODE (M429-62-430-10301-01) after	Attached sheet 4 (23/28)-(28/28)
~~2015 MIRAGE KEYLESS OPERATION REGISTRATION PROCEDURE~~	~~—~~	~~ID CODES REGISTRATION PROCEDURE~~	~~Attached sheet 5 (1/7), (7/7)~~
2015 ATTRAGE Workshop Manual CD-ROM	AU900435 NZ:DRAFT	GENERAL INFORMATION (M429-60-010-65500-01)	Attached sheet 4 (1/28)
		DIAGNOSIS CODE CHART (M429-60-021-17200-01)	Attached sheet 4 (3/28)
		CODE NO.B1130 IGNITION POWER SUPPLY (M429-62-100-16900-01)	Attached sheet 4 (10/28)-(18/28)
		CODE NO.B1137 P RANGE DETECT SW (M429-62-170-16800-01) after	Attached sheet 4 (19/28)-(20/28)
		CODE NO.B1155 EEPROM FAIL (ESL) (M429-62-340-10700-01) after	Attached sheet 4 (21/28)-(22/28)
		CODE NO.B1166 SPECIAL MODE (M429-62-430-10300-01) after	Attached sheet 4 (23/28)-(28/28)
~~2015 ATTRAGE KEYLESS OPERATION REGISTRATION PROCEDURE~~	~~—~~	~~ID CODES REGISTRATION PROCEDURE~~	~~Attached sheet 5 (1/7), (7/7)~~

＜MMNA＞

Applicable manual	Pub. No.	Applicable title (INFO ID)	Contents
2015 MIRAGE Service Manual CD-ROM	MSCD-016B-2015	DIAGNOSIS TROUBLE CODE CHART (M429-60-021-19400-01)	Attached sheet 6 (1/32)
		DTC B1130: IGNITION POWER SUPPLY (M429-62-100-18100-01)	Attached sheet 6 (2/32)-(17/32)
		DTC B1137: P RANGE DETECT SW (M429-62-170-18000-01) after	Attached sheet 6 (18/32)-(22/32)
		DTC B1166: SPECIAL MODE (M429-62-430-11400-01) after	Attached sheet 6 (23/32)-(32/32)
~~2015 MIRAGE KEYLESS OPERATION REGISTRATION PROCEDURE~~	~~—~~	~~ID CODES REGISTRATION PROCEDURE~~	~~Attached sheet 7 (1/3)-(3/3)~~

Attached sheet 4(1/28)

GENERAL INFORMATION

M1429600100655

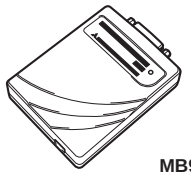
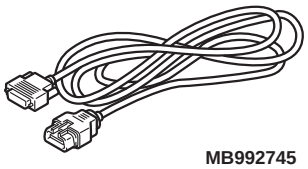
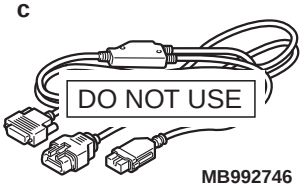
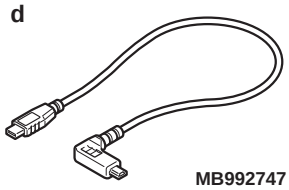
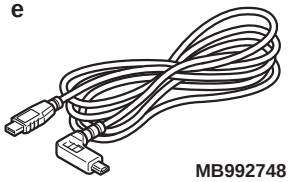
OUTLINE OF CHANGE

As the KOS-ECU and the OSS-ECU have been combined in a single unit, the service procedure has been changed as follows. The other service procedures are the same as before.

<Incorrect>

SPECIAL TOOLS

M1429604300145

Tool	Number	Name	Use
a  MB992744 b  MB992745 c  MB992746 d  MB992747 e  MB992748	a. MB992744 b. MB992745 c. MB992746 d. MB992747 e. MB992748	a. Vehicle communication interface-Lite (V.C.I.-Lite) b. V.C.I.-Lite main harness A (for vehicles with CAN communication) c. V.C.I.-Lite main harness B (for vehicles without CAN communication) d. V.C.I.-Lite USB cable short e. V.C.I.-Lite USB cable long	• Diagnosis code, service data, actuator test check • Registration of ID codes <Correct>

OUTLINE OF CHANGE

・As the KOS-ECU and the OSS-ECU have been combined in a single unit, the service procedure has been changed as follows.
・The system shuts down the ACC power supply when 30 or 60 minutes has elapsed with the power supply mode in the ACC position. This prevents the battery from being discharged.
・The driver can customise the KOS and ACC power supply cut functions.
The other service procedures are the same as before.

Attached sheet 4(2/28)

GENERAL INFORMATION

M1429600100729

OUTLINE OF CHANGE

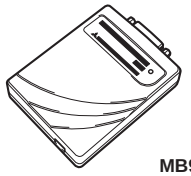
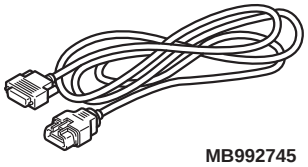
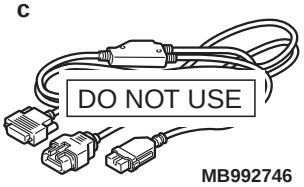
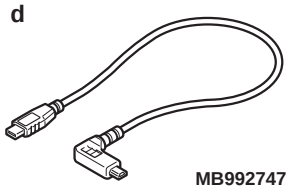
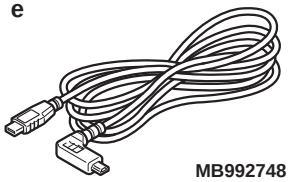
- As the KOS-ECU and the OSS-ECU have been combined in a single unit, the service procedure has been changed as follows.
- An ACC power auto cut function is added into the customisation function.

The other service procedures are the same as before.

<Incorrect>

SPECIAL TOOLS

M1429604300145

Tool	Number	Name	Use
a  MB992744 b  MB992745 c  MB992746 d  MB992747 e  MB992748	a. MB992744 b. MB992745 c. MB992746 d. MB992747 e. MB992748	a. Vehicle communication interface-Lite (V.C.I.-Lite) b. V.C.I.-Lite main harness A (for vehicles with CAN communication) c. V.C.I.-Lite main harness B (for vehicles without CAN communication) d. V.C.I.-Lite USB cable short e. V.C.I.-Lite USB cable long	• Diagnosis code, service data, actuator test check • Registration of ID codes <Correct>

OUTLINE OF CHANGE

・As the KOS-ECU and the OSS-ECU have been combined in a single unit, the service procedure has been changed as follows.
・The system shuts down the ACC power supply when 30 or 60 minutes has elapsed with the power supply mode in the ACC position. This prevents the battery from being discharged.
・The driver can customise the KOS and ACC power supply cut functions.

The other service procedures are the same as before.

Attached sheet 4(3/28)

Diagnosis code No.	Diagnostic item	Reference page
B1133	IG1 setting circuit fail	
B1134	ECU power supply <Added>	
B1135	Engine switch	
B1136	Stop lamp switch	
B1137	P range detect SW	
B1141	ESL authentification timeout*	
B1142	ESL authentification error*	
B1143	ESL status fail*	
B1144	ESL actuation not completed*	
B1145	ESL drive circuit fail*	
B1146	ESL internal circuit fail*	
B1147	LIN communication stop control	
B1148	ESL power supply*	
B1149	ESL drive circuit fail*	
B1150	OSS authentification T/O.(ESL)*	
B1151	OSS authentification error (ESL)*	
B1152	ESL drive circuit fail (ESL)*	
B1153	ESL internal circuit fail (ESL)*	
B1154	ESL power supply fail (ESL)*	
B1155	EEPROM fail (ESL)*	
B1157	EEPROM fail	
B1158	ECU internal fail	
B1160	Key code not programmed	<Added>
B1161	Chassis No. mismatch	
B1163	Coding data mismatch	
B1164	Chassis No. not programmed (ESL)	
B1165	Key code not programmed (ESL)	
B1166	Special mode	
B1731	ENG ECU authentification timeout	
B1A08	Keyless/KOS key1 performance	
B1A09	Keyless/KOS key2 performance	
B1A0A	Keyless/KOS key3 performance	
B1A0B	Keyless/KOS key4 performance	

B1138 Vehicles speed data fail

B1156 Power supply voltage low

B1168	ACC system fail
B1169	IG2 system fail

<Added>

Attached sheet 4(4/28)

Diagnosis code No.	Diagnostic item	Reference page
B1A10	Keyless/KOS key 1 low battery	
B1A11	Keyless/KOS key 2 low battery	
B1A12	Keyless/KOS key 3 low battery	
B1A13	Keyless/KOS key 4 low battery	
B1A24	Transponder ID not registered	
B1A25	Transponder ID unmatched	
B1A28	ENG ECU authentification error	
B2352	Antenna fail	
B2400	KOS key registration fail	
B2401	KOS 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	
U0100	Engine CAN timeout	
U0101	T/M CAN timeout	
U0141	ETACS CAN timeout	
U0155	Meter CAN timeout	
U0164	A/C CAN timeout	
U1190	No receive fault detect signal	
U1195	Coding not completed	
U1199	Chassis No. not programmed	

NOTE:

- **: ESL = Electronic steering lock*

<Correct>

DIAGNOSIS CODE PROCEDURES

From attached sheet 4(16/28) - (18/28)

<Incorrect>

Code No.B1130 Ignition power supply

⚠ CAUTION

- **If diagnosis code No. B1130 is set, always diagnose the CAN bus lines.**
- **Before replacing ECU, ensure that the communication circuit is normal.**

DIAGNOSTIC FUNCTION

If the output power supply status is different from the engine switch status information received from ETACS-ECU via CAN, KOS&OSS-ECU sets diagnosis code No.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.

JUDGEMENT CRITERIA

Check Conditions

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

Judgement Criterion

- Any of the following conditions is met, and 2 seconds or more have elapsed.
  a. The CAN information (ACC, IG1 or IG2) received from ETACS-ECU is ON when the power supply mode is OFF.
  b. The CAN information (ACC) received from ETACS-ECU is OFF when the power supply mode is ACC.
  c. The CAN information (IG1 or IG2) received from ETACS-ECU is ON when the power supply mode is ACC.
  d. The CAN information (ACC, IG1 or IG2) received from ETACS-ECU is OFF when the power supply mode is ON.
  e. The CAN information (ACC, IG1 or IG2) from ETACS-ECU not receive.

PROBABLE CAUSES

- Malfunction of the CAN bus line
- Damaged wiring harness or connector (short to earth, short to power supply, or open circuit in ACC line, IG1 line or IG2 line)
- Malfunction of ACC relay
- Malfunction of IG1 relay
- Malfunction of IG2 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 PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics

After performing the forced power supply output IG-ON using the M.U.T.-III, diagnose the CAN bus line.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. M.U.T.-III diagnosis code

Check if KOS&OSS-ECU diagnosis code No.B1133 is set.

Q: Is the diagnosis code set?
YES : Troubleshoot for the relevant diagnosis code.
NO : Go to Step 3.

STEP 3. M.U.T.-III other system data list

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
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ACC.

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ON.

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	ON
44	Ignition switch(IG2)	ON

OK: Normal conditions are displayed for all the items.

Q: Are the check result normal?
YES (Normal conditions are displayed for all the items.) : Go to Step 27.
NO (Normal condition is not displayed for item No. 29.) : Go to Step 4.
NO (Normal condition is not displayed for item No. 30.) : Go to Step 11.
NO (Normal condition is not displayed for item No. 44.) : Go to Step 18.

STEP 4. ACC relay check

Check that the ACC relay works normally.

Q: Is the check result normal?
YES : Go to Step 5.
NO : Replace the ACC relay.

STEP 5. Resistance measurement at ACC relay connector (earth line)

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the resistance between the ACC relay connector (earth line) and the body earth.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?
YES : Go to Step 7.
NO : Go to Step 6.

STEP 6. Check of open circuit in earth line between the ACC relay connector and the body earth

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 wiring harness.

STEP 7. Voltage measurement at ACC relay connector (ACC line and power supply 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 earth.

OK: System voltage

(3) Turn the engine switch from LOCK (OFF) position to ON position.
(4) Measure the voltage between the ACC relay connector (ACC line) and the body earth.

OK: System voltage

(5) Turn the engine switch from ON position to LOCK (OFF) position.
(6) Measure the voltage between the ACC relay connector (ACC line) and the body earth.

OK: 1 V or less

Q: Is the check result normal?
YES : Go to Step 10.
NO : Go to Step 8.

STEP 8. 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 : Go to Step 9.
NO : Repair the connector(s) or wiring harness.

STEP 9. Check of short to power supply, short to earth 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 10. Voltage measurement at ETACS-ECU connector (ACCI line)

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the engine switch from LOCK (OFF) position to ON position.
(3) Measure the voltage between the ETACS-ECU connector (ACCI line) and the body earth.

OK: System voltage

(4) Turn the engine switch from ON position to LOCK (OFF) position.
(5) Measure the voltage between the ETACS-ECU connector (ACCI line) and the body earth.

OK: 1 V or less

Q: Is the check result normal?
YES : Go to Step 25.
NO : Repair the wiring harness, ACCI line between the ETACS-ECU connector and the fusible link.

STEP 11. IG1 relay check

Check that the IG1 relay works normally.

Q: Is the check result normal?
YES : Go to Step 12.
NO : Replace the IG1 relay.

STEP 12. Resistance measurement at IG1 relay connector (earth line)

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the resistance between the IG1 relay connector (earth line) and the body earth.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?
YES : Go to Step 14.
NO : Go to Step 13.

STEP 13. Check of open circuit in earth line between the IG1 relay connector and the body earth

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 wiring harness.

STEP 14. Voltage measurement at IG1 relay connector (IG1 line and power supply 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 earth.
OK: System voltage
(3) Turn the engine switch from LOCK (OFF) position to ON position.
(4) Measure the voltage between the IG1 relay connector (IG1 line) and the body earth.
OK: System voltage
(5) Turn the engine switch from ON position to LOCK (OFF) position.
(6) Measure the voltage between the IG1 relay connector (IG1 line) and the body earth.
OK: 1 V or less

Q: Is the check result normal?
YES : Go to Step 17.
NO : Go to Step 15.

STEP 15. 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 : Go to Step 16.
NO : Repair the connector(s) or wiring harness.

STEP 16. Check of short to power supply, short to earth 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 17. Voltage measurement at ETACS-ECU connector (IG1 line)
(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the engine switch from LOCK (OFF) position to ON position.
(3) Measure the voltage between the ETACS-ECU connector (IG1 line) and the body earth.
OK: System voltage
(4) Turn the engine switch from ON position to LOCK (OFF) position.
(5) Measure the voltage between the ETACS-ECU connector (IG1 line) and the body earth.
OK: 1 V or less

Q: Is the check result normal?
YES : Go to Step 25.
NO : Repair the wiring harness, IG1 line between the ETACS-ECU connector and the fusible link.

STEP 18. IG2 relay check
Check that the IG2 relay works normally.

Q: Is the check result normal?
YES : Go to Step 19.
NO : Replace the IG2 relay.

STEP 19. Resistance measurement at IG2 relay connector (earth line)
(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the resistance between the IG2 relay connector (earth line) and the body earth.
OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?
YES : Go to Step 21.
NO : Go to Step 20.

STEP 20. Check of open circuit in earth line between the IG2 relay connector and the body earth

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 wiring harness.

STEP 21. Voltage measurement at IG2 relay connector (IG2 line and power supply 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 earth.

OK: System voltage

(3) Turn the engine switch from LOCK (OFF) position to ON position.
(4) Measure the voltage between the IG2 relay connector (IG2 line) and the body earth.

OK: System voltage

(5) Turn the engine switch from ON position to LOCK (OFF) position.
(6) Measure the voltage between the IG2 relay connector (IG2 line) and the body earth.

OK: 1 V or less

Q: Is the check result normal?
YES : Go to Step 24.
NO : Go to Step 22.

STEP 22. 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 : Go to Step 23.
NO : Repair the connector(s) or wiring harness.

STEP 23. Check of short to power supply, short to earth 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.

STEP 24. Voltage measurement at ETACS-ECU connector (IG2 line)

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

OK: System voltage

(4) Turn the engine switch from ON position to LOCK (OFF) position.
(5) Measure the voltage between the ETACS-ECU connector (IG2 line) and the body earth.

OK: 1 V or less

Q: Is the check result normal?
YES : Go to Step 25.
NO : Repair the wiring harness, IG2 line between the ETACS-ECU connector and the fusible link.

STEP 25. M.U.T.-III other system data list

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
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ACC.

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ON.

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	ON
44	Ignition switch(IG2)	ON

OK: Normal conditions are displayed for all the items.

Q: Are the check result normal?
YES (Normal conditions are displayed for all the items.) : Go to Step 26.
NO (Normal condition is not displayed for item No. 29.) : Go to Step 27.
NO (Normal condition is not displayed for item No. 30.) : Go to Step 27.
NO (Normal condition is not displayed for item No. 44.) : Go to Step 27.

Attached sheet 4(9/28)

STEP 26. Check whether the diagnosis code is set again.

Check again if the diagnosis code is set in the KOS&OSS-ECU.

(1) Erase the diagnosis code.
(2) Turn the engine switch from LOCK (OFF) position to ON position.
(3) On completion, check that the diagnosis code is set again.

Q: Is the diagnosis code set?

YES : Replace the 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 27. Check whether the diagnosis code is set again.

Check again if the diagnosis code is set in the KOS&OSS-ECU.

(1) Erase the diagnosis code.
(2) Turn the engine switch from LOCK (OFF) position to ON position.
(3) On completion, check that the diagnosis code is not set again.

Q: Is the diagnosis code set?

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

<Incorrect> <Correct>

From attached sheet 4(16/28) - (18/28)

Code No.B1131 Starter setting circuit fail

⚠ CAUTION

- **When replacing the ECU, always check that the communication circuit is normal.**

DIAGNOSTIC FUNCTION

When a short circuit of starter setting circuit system is detected, KOS&OSS-ECU sets diagnosis code No.B1131. 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.

JUDGEMENT CRITERIA

Check Conditions

- After KOS&OSS-ECU activation

Judgement Criterion

- Starter setting circuit system is detected

PROBABLE CAUSES

- Damaged wiring harness or connector (short to earth or short to power supply in ST line)
- Malfunction of KOS&OSS-ECU
- Malfunction of engine-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check of short to power supply, short to earth or open circuit in ST line between KOS&OSS-ECU connector and engine-ECU connector

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the connector(s) or wiring harness.

STEP 2. Voltage measurement at engine-ECU connector (ST terminal)

(1) Disconnect the engine-ECU connector, and measure at the wiring harness side.
(2) Using the M.U.T.-III, set the forced power supply output to other than IG-ST.
(3) Measure the voltage between the engine-ECU connector (ST terminal) and body earth.

OK: 1 V or less

(4) Using the M.U.T.-III, set the forced power supply output to IG-ST.
(5) Measure the voltage between the engine-ECU connector (ST terminal) and body earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 3.
NO : Replace the KOS&OSS-ECU and register the chassis number.

STEP 3. Check whether the diagnosis code is set again.

Q: Is the diagnosis code set?

Attached sheet 4(10/28)

Diagnosis code No.	Diagnostic item	Reference page
B1A10	Keyless/KOS key 1 low battery	
B1A11	Keyless/KOS key 2 low battery	
B1A12	Keyless/KOS key 3 low battery	
B1A13	Keyless/KOS key 4 low battery	
B1A24	Transponder ID not registered	
B1A25	Transponder ID unmatched	
B1A28	ENG ECU authentification error	
B2352	Antenna fail	
B2400	KOS key registration fail	
B2401	KOS 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	
U0100	Engine CAN timeout	
U0101	T/M CAN timeout	
U0141	ETACS CAN timeout	
U0155	Meter CAN timeout	
U0164	A/C CAN timeout	
U1190	No receive fault detect signal	
U1195	Coding not completed	
U1199	Chassis No. not programmed	

NOTE:

- **: ESL = Electronic steering lock*

<Correct>

DIAGNOSIS CODE PROCEDURES

From attached sheet 4(16/28) - (18/28)

<Incorrect>

Code No.B1130 Ignition power supply

⚠ CAUTION

- **If diagnosis code No. B1130 is set, always diagnose the CAN bus lines.**
- **Before replacing ECU, ensure that the communication circuit is normal.**

DIAGNOSTIC FUNCTION

If the output power supply status is different from the engine switch status information received from ETACS-ECU via CAN, KOS&OSS-ECU sets diagnosis code No.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.

JUDGEMENT CRITERIA

Check Conditions

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

Judgement 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 other than OFF when the power supply mode is OFF.
  b. The engine switch status information received from ETACS-ECU is other than ACC when the power supply mode is ACC.
  c. The engine switch status information received from ETACS-ECU is other than ON when the power supply mode is ON.
  d. KOS&OSS-ECU (IG2 terminal) is Hi with the power supply mode OFF
  e. KOS&OSS-ECU (IG2 terminal) is Hi with the power supply mode ACC
  f. KOS&OSS-ECU (IG2 terminal) is Lo with the power supply mode ON

PROBABLE CAUSES

- Malfunction of the CAN bus line
- Damaged wiring harness or connector (short to earth, short to power supply, or open circuit in ACC line, IG1 line or IG2 line)
- Malfunction of ACC relay
- Malfunction of IG1 relay
- Malfunction of IG2 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 PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics

After performing the forced power supply output IG-ON using the M.U.T.-III, diagnose the CAN bus line.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. M.U.T.-III diagnosis code

Check if KOS&OSS-ECU diagnosis code No.B1133 is set.

Q: Is the diagnosis code set?
YES : Troubleshoot for the relevant diagnosis code.
NO : Go to Step 3.

STEP 3. M.U.T.-III other system data list

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
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ACC.

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ON.

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	ON
44	Ignition switch(IG2)	ON

OK: Normal conditions are displayed for all the items.

Q: Are the check result normal?
YES (Normal conditions are displayed for all the items.) : Go to Step 27.
NO (Normal condition is not displayed for item No. 29.) : Go to Step 4.
NO (Normal condition is not displayed for item No. 30.) : Go to Step 11.
NO (Normal condition is not displayed for item No. 44.) : Go to Step 18.

STEP 4. ACC relay check

Check that the ACC relay works normally.

Q: Is the check result normal?
YES : Go to Step 5.
NO : Replace the ACC relay.

STEP 5. Resistance measurement at ACC relay connector (earth line)

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the resistance between the ACC relay connector (earth line) and the body earth.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?
YES : Go to Step 7.
NO : Go to Step 6.

STEP 6. Check of open circuit in earth line between the ACC relay connector and the body earth

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 wiring harness.

STEP 7. Voltage measurement at ACC relay connector (ACC line and power supply line)

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

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 10.
NO : Go to Step 8.

STEP 8. 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 : Go to Step 9.
NO : Repair the connector(s) or wiring harness.

STEP 9. Check of short to power supply, short to earth 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 10. Voltage measurement at ETACS-ECU connector (ACCI line)

(1) Turn the engine switch from LOCK (OFF) position to ON position.
(2) Disconnect the connector, and measure at the wiring harness side.
(3) Measure the voltage between the ETACS-ECU connector (ACCI line) and the body earth.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 25.
NO : Repair the wiring harness, ACCI line between the ETACS-ECU connector and the fusible link.

STEP 11. IG1 relay check

Check that the IG1 relay works normally.

Q: Is the check result normal?
YES : Go to Step 12.
NO : Replace the IG1 relay.

STEP 12. Resistance measurement at IG1 relay connector (earth line)

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the resistance between the IG1 relay connector (earth line) and the body earth.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?
YES : Go to Step 14.
NO : Go to Step 13.

STEP 13. Check of open circuit in earth line between the IG1 relay connector and the body earth

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 wiring harness.

STEP 14. Voltage measurement at IG1 relay connector (IG1 line and power supply line)

(1) Disconnect the connector, and measure at the

wiring harness side.
(2) Measure the voltage between the IG1 relay connector (IG1 line) and the body earth.
(3) Measure the voltage between the IG1 relay connector (power supply line) and the body earth.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 17.
NO : Go to Step 15.

STEP 15. 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 : Go to Step 16.
NO : Repair the connector(s) or wiring harness.

STEP 16. Check of short to power supply, short to earth 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 17. Voltage measurement at ETACS-ECU connector (IG1 line)
(1) Turn the engine switch from LOCK (OFF) position to ON position.
(2) Disconnect the connector, and measure at the wiring harness side.
(3) Measure the voltage between the ETACS-ECU connector (IG1 line) and the body earth.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 25.
NO : Repair the wiring harness, IG1 line between the ETACS-ECU connector and the fusible link.

STEP 18. IG2 relay check
Check that the IG2 relay works normally.

Q: Is the check result normal?
YES : Go to Step 19.
NO : Replace the IG2 relay.

STEP 19. Resistance measurement at IG2 relay connector (earth line)
(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the resistance between the IG2 relay connector (earth line) and the body earth.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?
YES : Go to Step 21.
NO : Go to Step 20.

STEP 20. Check of open circuit in earth line between the IG2 relay connector and the body earth

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 wiring harness.

STEP 21. Voltage measurement at IG2 relay connector (IG2 line and power supply line)
(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the voltage between the IG2 relay connector (IG2 line) and the body earth.
(3) Measure the voltage between the IG2 relay connector (power supply line) and the body earth.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 24.
NO : Go to Step 22.

STEP 22. 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 : Go to Step 23.
NO : Repair the connector(s) or wiring harness.

STEP 23. Check of short to power supply, short to earth 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.

STEP 24. Voltage measurement at ETACS-ECU connector (IG2 line)
(1) Turn the engine switch from LOCK (OFF) position to ON position.
(2) Disconnect the connector, and measure at the wiring harness side.
(3) Measure the voltage between the ETACS-ECU connector (IG2 line) and the body earth.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 25.
NO : Repair the wiring harness, IG2 line between the ETACS-ECU connector and the fusible link.

STEP 25. M.U.T.-III other system data list
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
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ACC.

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ON.

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	ON
44	Ignition switch(IG2)	ON

OK: Normal conditions are displayed for all the items.

Q: Are the check result normal?
YES (Normal conditions are displayed for all the items.) : Go to Step 26.
NO (Normal condition is not displayed for item No. 29.) : Go to Step 27.
NO (Normal condition is not displayed for item No. 30.) : Go to Step 27.
NO (Normal condition is not displayed for item No. 44.) : Go to Step 27.

STEP 26. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the KOS&OSS-ECU.
(1) Erase the diagnosis code.
(2) Turn the engine switch from LOCK (OFF) position to ON position.
(3) On completion, check that the diagnosis code is set again.

Q: Is the diagnosis code set?

Attached sheet 4(15/28)

YES : Replace the 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 27. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the KOS&OSS-ECU.
(1) Erase the diagnosis code.
(2) Turn the engine switch from LOCK (OFF) position to ON position.
(3) On completion, check that the diagnosis code is not set again.

Q: Is the diagnosis code set?
YES : Replace the KOS&OSS-ECU.
NO : Intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunctions).

<Incorrect>

<Correct>

From attached sheet 4(16/28) - (18/28)

Code No.B1131 Starter setting circuit fail

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

DIAGNOSTIC FUNCTION
When a short circuit of starter setting circuit system is detected, KOS&OSS-ECU sets diagnosis code No.B1131. 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.

JUDGEMENT CRITERIA

Check Conditions
- After KOS&OSS-ECU activation

Judgement Criterion
- Starter setting circuit system is detected

PROBABLE CAUSES
- Damaged wiring harness or connector (short to earth or short to power supply in ST line)
- Malfunction of KOS&OSS-ECU
- Malfunction of engine-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check of short to power supply, short to earth or open circuit in ST line between KOS&OSS-ECU connector and engine-ECU connector

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the connector(s) or wiring harness.

STEP 2. Voltage measurement at engine-ECU connector (ST terminal)
(1) Disconnect the engine-ECU connector, and measure at the wiring harness side.
(2) Using the M.U.T.-III, set the forced power supply output to other than IG-ST.
(3) Measure the voltage between the engine-ECU connector (ST terminal) and body earth.
OK: 1 V or less
(4) Using the M.U.T.-III, set the forced power supply output to IG-ST.
(5) Measure the voltage between the engine-ECU connector (ST terminal) and body earth.
OK: System voltage

Q: Is the check result normal?
YES : Go to Step 3.
NO : Replace the KOS&OSS-ECU and register the chassis number.

STEP 3. Check whether the diagnosis code is set again.

Q: Is the diagnosis code set?
YES : Replace the engine-ECU and register the chassis number and key codes [Refer to GROUP 00 – How to Perform Chassis Number (Chassis No.) Writing].
NO : Intermittent malfunction is suspected (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction).

Attached sheet 4(16/28)

Diagnosis code No.	Diagnostic item	Reference page
B1A10	Keyless/KOS key 1 low battery	
B1A11	Keyless/KOS key 2 low battery	
B1A12	Keyless/KOS key 3 low battery	
B1A13	Keyless/KOS key 4 low battery	
B1A24	Transponder ID not registered	
B1A25	Transponder ID unmatched	
B1A28	ENG ECU authentification error	
B2352	Antenna fail	
B2400	KOS key registration fail	
B2401	KOS 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	
U0100	Engine CAN timeout	
U0101	T/M CAN timeout	
U0141	ETACS CAN timeout	
U0155	Meter CAN timeout	
U0164	A/C CAN timeout	
U1190	No receive fault detect signal	
U1195	Coding not completed	
U1199	Chassis No. not programmed	

NOTE:

- **: ESL = Electronic steering lock*

<Incorrect>

From attached sheet 4(4/28) - (9/28)
From attached sheet 4(10/28) - (15/28)

DIAGNOSIS CODE PROCEDURES

<Correct>

Code No.B1130 Ignition power supply

⚠ CAUTION

- **If diagnosis code No. B1130 is set, always diagnose the CAN bus lines.**
- **Before replacing ECU, ensure that the communication circuit is normal.**

DIAGNOSTIC FUNCTION

If the output power supply status is different from the engine switch status information received from ETACS-ECU via CAN, KOS&OSS-ECU sets diagnosis code No.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.

JUDGEMENT CRITERIA

Check Conditions

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

Judgement 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.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics

After performing the forced power supply output IG-ON using the M.U.T.-III, diagnose the CAN bus line.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. M.U.T.-III diagnosis code

Check if KOS&OSS-ECU diagnosis code No.B1133 is set.

Q: Is the diagnosis code set?
YES : Troubleshoot for the relevant diagnosis code.
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 engine switch from "LOCK" (OFF) position to "ON" position.
(3) Measure the voltage between the IG1 relay connector (IG1 line) and the body earth.

OK: System voltage

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

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.

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

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 fusible link connector.

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 earth 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.

From attached sheet 4(4/28) - (9/28) , (10/28) - (15/28)

<Incorrect> <Correct>

Attached sheet 4(18/28)

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

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

OK: System voltage

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

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.

STEP 10. M.U.T.-III other system data list

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. Check whether the diagnosis code is set again.

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

Q: Is the diagnosis code 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 12. Check whether the diagnosis code is set again.

Check again if the diagnosis code is set in the KOS&OSS-ECU.
(1) Erase the diagnosis code.
(2) Turn the engine switch from "LOCK" (OFF) position to "ON" position.
(3) On completion, check that the diagnosis code is not set again.

Q: Is the diagnosis code set?

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

Code No.B1131 Starter setting circuit fail

⚠ CAUTION

- **When replacing the ECU, always check that the communication circuit is normal.**

DIAGNOSTIC FUNCTION

When a short circuit of starter setting circuit system is detected, KOS&OSS-ECU sets diagnosis code No.B1131. 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.

JUDGEMENT CRITERIA

Check Conditions

- After KOS&OSS-ECU activation

Attached sheet 4(19/28)

From attached sheet 4(20/28) <Added>

Code No. B1141 ESL authentification timeout

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

DIAGNOSTIC FUNCTION

If the necessary data cannot be received from the electric steering lock via LIN during the certification communication with electric steering lock, KOS&OSS-ECU sets diagnosis code No.B1141, and displays the immobilizer certification system inspection warning to the combination meter.

JUDGEMENT CRITERIA

Check Conditions

- At electric steering lock certification

Judgement Criterion

- During the certification communication with electric steering lock, the necessary data cannot be received from the electric steering lock via LIN.

PROBABLE CAUSES

- LIN bus line malfunction (open circuit, short to earth, or short to power supply in LIN line)
- Damaged wiring harness or connector (open circuit or short to earth in PCO line, or open circuit in PWR line)
- Electric steering lock malfunction
- Malfunction of KOS&OSS-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check of open circuit in PWR line between electric steering lock connector and relay box (fuse) connector

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the connector(s) or wiring harness.

STEP 2. Check of short to earth or open circuit in PCO line between electric steering lock connector and KOS&OSS-ECU connector

NOTE: Because the conformity cannot be determined even when the digital tester is used to measure the voltage of PCO line between the electric steering lock connector and KOS&OSS-ECU connector, be sure to use the analogue tester (With the keyless operation key placed outside of the vehicle, if the tester needle swings to the battery voltage when the engine switch is operated, it is judged normal.).

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the connector(s) or wiring harness.

STEP 3. Check of short to earth, short to power supply or open circuit in LIN line between electric steering lock connector and KOS&OSS-ECU connector

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the connector(s) or wiring harness.

STEP 4. After performing the locking and unlocking operations of the electric steering lock, recheck the diagnosis code

Q: Is the diagnosis code set?
YES : Replace the electric steering lock and register the chassis number.
Then go to Step 5.
NO : Intermittent malfunction is suspected (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction).

STEP 5. Check whether the diagnosis code is set again.

Q: Is the diagnosis code set?
YES : Replace the KOS&OSS-ECU and register the chassis number.
NO : The diagnosis is complete.

<Added>

Code No.B1138 Vehicle speed data fail

⚠ CAUTION
- **If diagnosis code No. B1138 is set, diagnose the CAN bus lines.**
- **If diagnosis code No. B1138 is set, check whether diagnosis code No. B1156 is also set.**
- **When replacing the ECU, always check that the communication circuit is normal.**

DIAGNOSIS FUNCTION
When the engine-ECU receives invalid or no vehicle speed signal via CAN, the KOS&OSS-ECU will set diagnosis code No. B1138.

JUDGEMENT CRITERIA

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.

PROBABLE CAUSES
- Malfunction of the CAN bus line
- Malfunction of engine-ECU
- Malfunction of KOS&OSS-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. M.U.T.-III diagnosis code
Check whether the KOS&OSS-ECU sets diagnosis code No. B1156.

Q: Is the diagnosis code set?
YES : Refer to Diagnosis code chart .
NO : Go to Step 3.

STEP 3. M.U.T.-III other system diagnosis code
(1) Check that the vehicle power can be turned "ON" and engine is started.
(2) Check the diagnosis code of engine-ECU.

Q: Is the diagnosis code set?
YES : Troubleshoot the engine-ECU (Refer to GROUP 13A – Troubleshooting). Then go to Step 4.
NO : Go to Step 4.

STEP 4. Check whether the diagnosis code is set again.
(1) Check that the vehicle power can be turned "ON" .
(2) Check again if the diagnosis code is set in the KOS&OSS-ECU.

Q: Is the diagnosis code set?
YES : Replace the KOS&OSS-ECU and register the chassis number.
NO : Intermittent malfunction is suspected (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction).

Code No. B1141 ESL authentification timeout

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

DIAGNOSTIC FUNCTION
If the necessary data cannot be received from the electric steering lock via LIN during the certification communication with electric steering lock, KOS&OSS-ECU sets diagnosis code No.B1141, and displays the immobilizer certification system inspection warning to the combination meter.

JUDGEMENT CRITERIA

Check Conditions
- At electric steering lock certification

Attached sheet 4(21/28)

Judgement Criterion
- During the certification communication, the electric steering lock cannot receive the necessary data from KOS&OSS-ECU via LIN.

PROBABLE CAUSES
- Malfunction of KOS&OSS-ECU
- LIN bus malfunction <at past trouble>

DIAGNOSIS PROCEDURE
1. KOS&OSS-ECU diagnosis code recheck

Code No. B1155 EEPROM fail (ESL)

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

DIAGNOSTIC FUNCTION
When the EEPROM writing/reading error of the electric steering lock is detected, KOS&OSS-ECU sets diagnosis code No.B1155.

JUDGEMENT CRITERIA

Check Conditions
- After KOS&OSS-ECU activation

Judgement Criterion
- When the following conditions are met:
  a. EEPROM writing/reading error is detected.

PROBABLE CAUSES
- Electric steering lock malfunction
- Malfunction of KOS&OSS-ECU

DIAGNOSIS PROCEDURE

STEP 1. After performing the locking and unlocking operations of the electric steering lock, recheck the diagnosis code

Q: Is the diagnosis code set?
YES : Replace the electric steering lock and register the chassis number.
Then go to Step 2.
NO : Intermittent malfunction is suspected (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction).

STEP 2. Check whether the diagnosis code is set again.

Q: Is the diagnosis code set?
YES : Replace the KOS&OSS-ECU and register the chassis number.
NO : The diagnosis is complete.

From attached sheet 4(22/28) <Added>

Code No. B1157 EEPROM fail
Code No. B1158 ECU internal fail

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

DIAGNOSTIC FUNCTION
- When an EEPROM writing/reading error of KOS&OSS-ECU is detected, KOS&OSS-ECU sets diagnosis code No.B1157, and flashes the indicator of engine switch in orange.
- When an error is detected to the microcomputer in KOS&OSS-ECU sets diagnosis code No.B1158, and flashes the indicator of engine switch in orange.

JUDGEMENT CRITERIA

Check Conditions
- After KOS&OSS-ECU activation

Judgement Criterion
- When the following conditions are met:
  a. EEPROM writing/reading error is detected.
  b. ECU internal circuit error is detected.

PROBABLE CAUSES
- Malfunction of KOS&OSS-ECU

DIAGNOSIS PROCEDURE

Check whether the diagnosis code is set again.
(1) Disconnect the negative (–) battery terminal.
(2) Connect the negative (–) battery terminal.
(3) Start the engine.
(4) Check again if the diagnosis code is set.

To attached sheet 4(21/28)

Attached sheet 4(22/28)

<Added>

Code No.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 diagnosis code No. B1156.

JUDGEMENT CRITERIA

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 earth or open circuit)
- Malfunction of KOS&OSS-ECU
- Deteriorated battery

DIAGNOSIS PROCEDURE

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 earth.

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 earth 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. Check whether the diagnosis code is set again.

Q: Is the diagnosis code set?
YES : Replace the KOS&OSS-ECU and register the chassis number.
NO : Intermittent malfunction is suspected (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction).

Code No. B1157 EEPROM fail
Code No. B1158 ECU internal error

DIAGNOSTIC FUNCTION
- When an EEPROM writing/reading error of KOS&OSS-ECU is detected, KOS&OSS-ECU sets diagnosis code No.B1157, and flashes the indicator of engine switch in orange.
- When an error is detected to the microcomputer in KOS&OSS-ECU sets diagnosis code No.B1158, and flashes the indicator of engine switch in orange.

JUDGEMENT CRITERIA

Check Conditions
- After KOS&OSS-ECU activation

Judgement Criterion
- When the following conditions are met:
  a. EEPROM writing/reading error is detected.
  b. ECU internal circuit error is detected.

PROBABLE CAUSES
- Malfunction of KOS&OSS-ECU

DIAGNOSIS PROCEDURE

Check whether the diagnosis code is set again.
(1) Disconnect the negative (–) battery terminal.
(2) Connect the negative (–) battery terminal.
(3) Start the engine.
(4) Check again if the diagnosis code is set.

Q: Is the diagnosis code set?

Attached sheet 4(23/28)

PROBABLE CAUSES
- Chassis number not written
- Key code not written
- Malfunction of KOS&OSS-ECU
- KOS&OSS-ECU malfunction
- Malfunction of keyless operation key
- Malfunction of electric steering lock

DIAGNOSIS PROCEDURE
1. Check the KOS diagnosis code.
2. Check if KOS&OSS-ECU diagnosis code No.B1160, B1164, B1165, U1195 or U1199 is set.
3. After operating the engine switch from ON to OFF twice, recheck the diagnosis code of KOS&OSS-ECU.

From attached sheet 4(24/28) - (28/28)

<Added>

Code No. B1731 ENG ECU authentification timeout

⚠ CAUTION
- **When diagnosis code No. B1731 is set, be sure to diagnose the CAN bus line.**
- **When replacing the ECU, always check that the communication circuit is normal.**

DIAGNOSTIC FUNCTION

If the necessary data cannot be received from engine-ECU via CAN bus line during the engine starting certification with engine-ECU, KOS&OSS-ECU determines that a problem has occurred, and sets diagnosis code No.B1731. At the same time, KOS&OSS-ECU displays the immobilizer certification system inspection warning to the combination meter.

JUDGEMENT CRITERIA

Check Conditions
- At engine starting certification

Judgement Criterion
- At the engine starting certification with engine-ECU, necessary data cannot be received from engine-ECU via CAN bus line.

PROBABLE CAUSES
- Malfunction of the CAN bus line
- Malfunction of engine-ECU
- Malfunction of KOS&OSS-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics

Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. M.U.T.-III other system diagnosis code

(1) Check that the vehicle power can be turned ON and engine is started.
(2) Check the diagnosis code of engine-ECU.

Q: Is the diagnosis code set?
YES : Troubleshoot the engine-ECU (Refer to GROUP 13A – Troubleshooting). Then go to Step 3.
NO : Go to Step 3.

STEP 3. Check whether the diagnosis code is set again.

(1) Turn the engine switch OFF and ON several times without depressing the brake pedal (Perform quickly within approximately five seconds).
(2) Check again if the diagnosis code is set in the KOS&OSS-ECU.

Q: Is the diagnosis code set?
YES : Replace the KOS&OSS-ECU and register the chassis number. Then go to Step 4.
NO : Intermittent malfunction is suspected (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction).

STEP 4. Check whether the diagnosis code is set again.

Check again if the diagnosis code is set in the KOS&OSS-ECU.

Q: Is the diagnosis code set?
YES : Replace the engine-ECU.
NO : Intermittent malfunction is suspected (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction).

Attached sheet 4(24/28)

JUDGEMENT CRITERIA

Judgement Criterion
- During special operation mode

PROBABLE CAUSES
- Chassis number not written
- Key code not written
- Malfunction of KOS&OSS-ECU
- KOS&OSS-ECU malfunction
- Malfunction of keyless operation key
- Malfunction of electric steering lock

DIAGNOSIS PROCEDURE
1. Check the KOS diagnosis code.
2. Check if KOS&OSS-ECU diagnosis code No.B1160, B1164, B1165, U1195 or U1199 is set.
3. After operating the engine switch from "ON" to "OFF" twice, recheck the diagnosis code of KOS&OSS-ECU.

From attached sheet 4(23/28)

<Added>

Code No.B1168 ACC system

⚠ CAUTION
- **If diagnosis code No. B1168 is set, always diagnose the CAN bus lines.**
- **Before replacing ECU, ensure that the communication circuit is normal.**

DIAGNOSTIC FUNCTION

If the output power supply status is different from the engine switch status information received from ETACS-ECU via CAN, KOS&OSS-ECU sets diagnosis code No.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.

JUDGEMENT CRITERIA

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

Judgement 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.

PROBABLE CAUSES
- Malfunction of the CAN bus line
- Damaged wiring harness or connector (short to earth or 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 PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics

After performing the forced power supply output IG-ON using the M.U.T.-III, diagnose the CAN bus line.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

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.

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

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Turn the engine switch from "LOCK" (OFF) position to "ON" position.
(3) Measure the voltage between the ACC relay connector (ACC line) and the body earth.
OK: System voltage
(4) Turn the engine switch from "ON" position to "LOCK" (OFF) position.
(5) Measure the voltage between the ACC relay

connector (ACC line) and the body earth.

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 earth line between the ACC relay connector and the body earth

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 fusible link connector.

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

OK: System voltage

(4) Turn the engine switch from "ON" position to "LOCK" (OFF) position.
(5) Measure the voltage between the ETACS-ECU connector (ACC line) and the body earth.

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.

STEP 9. M.U.T.-III other system data list
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 the items.

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

STEP 10. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the KOS&OSS-ECU.
(1) Erase the diagnosis code.
(2) Turn the engine switch from "LOCK" (OFF) position to "ON" position.

(3) On completion, check that the diagnosis code is set again.

Q: Is the diagnosis code 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. Check whether the diagnosis code is set again.
Check again if the diagnosis code is set in the KOS&OSS-ECU.
(1) Erase the diagnosis code.
(2) Turn the engine switch from "LOCK" (OFF) position to "ON" position.
(3) On completion, check that the diagnosis code is not set again.

Q: Is the diagnosis code set?
YES : Replace the KOS&OSS-ECU and register the chassis number.
NO : Intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunctions).

Code No.B1169 IG2 system fail

⚠ CAUTION
- **If diagnosis code No. B1169 is set, always diagnose the CAN bus lines.**
- **Before replacing ECU, ensure that the communication circuit is normal.**

DIAGNOSTIC FUNCTION
If the output power supply status is different from the engine switch status information received from ETACS-ECU via CAN, KOS&OSS-ECU sets diagnosis code No.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.

JUDGEMENT CRITERIA

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

Judgement 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.

PROBABLE CAUSES
- Malfunction of the CAN bus line
- Damaged wiring harness or connector (short to earth or short to power supply or open circuit in IG2 line)
- Malfunction of IG2 relay
- Malfunction of KOS&OSS-ECU
- Malfunction of ETACS-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
After performing the forced power supply output IG-ON using the M.U.T.-III, diagnose the CAN bus line.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

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 engine switch from "LOCK" (OFF) position to "ON" position.

<Added>

(3) Measure the voltage between the IG2 relay connector (IG2 line) and the body earth.

OK: System voltage

(4) Turn the engine switch from "ON" position to "LOCK" (OFF) position.

(5) Measure the voltage between the IG2 relay connector (IG2 line) and the body earth.

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 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 earth line between the IG2 relay connector and the body earth

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 fusible link connector.

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 earth 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.

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

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

(2) Turn the engine switch from "LOCK" (OFF) position to "ON" position.

(3) Measure the voltage between the ETACS-ECU connector (IG2 line) and the body earth.

OK: System voltage

(4) Turn the engine switch from "ON" position to "LOCK" (OFF) position.

(5) Measure the voltage between the ETACS-ECU connector (IG2 line) and the body earth.

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. M.U.T.-III other system data list

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 the items.

Q: Is the check result normal?

YES : Go to Step 10.

NO : Go to Step 11.

<Added>

STEP 10. Check whether the diagnosis code is set again.

Check again if the diagnosis code is set in the KOS&OSS-ECU.

(1) Erase the diagnosis code.
(2) Turn the engine switch from "LOCK" (OFF) position to "ON" position.
(3) On completion, check that the diagnosis code is set again.

Q: Is the diagnosis code 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. Check whether the diagnosis code is set again.

Check again if the diagnosis code is set in the KOS&OSS-ECU.

(1) Erase the diagnosis code.
(2) Turn the engine switch from "LOCK" (OFF) position to "ON" position.
(3) On completion, check that the diagnosis code is not set again.

Q: Is the diagnosis code set?

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

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

Code No. B1731 ENG ECU authentification timeout

⚠ CAUTION

- **When diagnosis code No. B1731 is set, be sure to diagnose the CAN bus line.**
- **When replacing the ECU, always check that the communication circuit is normal.**

DIAGNOSTIC FUNCTION

If the necessary data cannot be received from engine-ECU via CAN bus line during the engine starting certification with engine-ECU, KOS&OSS-ECU determines that a problem has occurred, and sets diagnosis code No.B1731. At the same time, KOS&OSS-ECU displays the immobilizer certification system inspection warning to the combination meter.

JUDGEMENT CRITERIA

Check Conditions

- At engine starting certification

Judgement Criterion

- At the engine starting certification with engine-ECU, necessary data cannot be received from engine-ECU via CAN bus line.

PROBABLE CAUSES

- Malfunction of the CAN bus line
- Malfunction of engine-ECU
- Malfunction of KOS&OSS-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics

Use the M.U.T.-III to diagnose the CAN bus lines.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the CAN bus line (Refer to GROUP 54C – Troubleshooting).

STEP 2. M.U.T.-III other system diagnosis code

(1) Check that the vehicle power can be turned "ON" and engine is started.
(2) Check the diagnosis code of engine-ECU.

Q: Is the diagnosis code set?

YES : Troubleshoot the engine-ECU (Refer to GROUP 13A – Troubleshooting). Then go to Step 3.

NO : Go to Step 3.

STEP 3. Check whether the diagnosis code is set again.

(1) Turn the engine switch "OFF" and "ON" several times without depressing the brake pedal (Perform quickly within approximately five seconds).
(2) Check again if the diagnosis code is set in the KOS&OSS-ECU.

Q: Is the diagnosis code set?

B1138 Vehicles speed data fail
B1156 Power supply voltage low

Attached sheet 6(1/32)

DIAGNOSIS TROUBLE CODE CHART

M1429600201194

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	EEPROM fail	
B1158	ECU internal error	
B1160	Key code not programmed	
B1161	VIN mismatch	
B1163	Coding data mismatch	
B1166	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	

<Added>
<Added>

B1168 ACC system fail
B1169 IG2 system fail

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Attached sheet 6(2/32)

Diagnostic trouble code No.	Diagnostic item	Reference page
U1199	VIN not programmed	

DIAGNOSTIC TROUBLE CODE PROCEDURES

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 CAN information (ACC, IG1 or IG2) received from ETACS-ECU is ON when the power supply mode is "OFF".
  b. The CAN information (ACC) received from ETACS-ECU is "OFF" when the power supply mode is "ACC".
  c. The CAN information (IG1 or IG2) received from ETACS-ECU is "ON" when the power supply mode is "ACC".
  d. The CAN information (ACC, IG1 or IG2) received from ETACS-ECU is "OFF" when the power supply mode is "ON".
  e. The CAN information (ACC, IG1 or IG2) from ETACS-ECU not receive.

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, IG1 line, IG2 line or IGM2 line)
- Malfunction of ACC relay
- Malfunction of IG1 relay
- Malfunction of IG2 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.

<Incorrect>

<Correct>

From attached sheet 6(13/32) - (17/32)

Attached sheet 6(3/32)

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 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.

<Incorrect>

<Correct>

From attached sheet 6(13/32) - (17/32)

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Attached sheet 6(4/32)

STEP 3. 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
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ACC.

<Incorrect>

<Correct>

From attached sheet 6(13/32) - (17/32)

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ON.

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	ON
44	Ignition switch(IG2)	ON

OK: Normal conditions are displayed for all the items.

Q: Are the check result normal?

YES (Normal conditions are displayed for all the items) : Go to Step 27.
NO (Normal condition is not displayed for item No. 29) : Go to Step 4.
NO (Normal condition is not displayed for item No. 30) : Go to Step 11.

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Attached sheet 6(5/32)

NO (Normal condition is not displayed for item No. 44) :
Go to Step 18.

STEP 4. ACC relay check.
Check that the ACC relay works normally.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Replace the ACC relay.

STEP 5. Resistance measurement at ACC relay connector (ground line).
(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the resistance between the ACC relay connector (ground line) and the body ground.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 7.
NO : Go to Step 6.

<Incorrect>

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

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.

<Correct>

From attached sheet 6(13/32) - (17/32)

STEP 7. Voltage measurement at ACC relay connector (ACC line and power supply 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

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

OK: System voltage

(5) Turn the power supply mode of the power supply mode of the engine switch from ON position to LOCK (OFF) position.
(6) 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 10.
NO : Go to Step 8.

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Attached sheet 6(6/32)

STEP 8. Check of short and open circuit in ACC line between the KOS&OSS-ECU connector and the ACC relay connector.

Q: Is the check result normal?

YES : Go to Step 9.
NO : Repair the connector(s) or wiring harness.

STEP 9. Check of short and open circuit in power supply line between the junction block 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 10. Voltage measurement at ETACS-ECU connector (ACC 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 (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 25.
NO : Repair the wiring harness, ACC line between the ETACS-ECU connector and the fusible link.

STEP 11. IG1 relay check.

Check that the IG1 relay works normally.

Q: Is the check result normal?

YES : Go to Step 12.
NO : Replace the IG1 relay.

<Incorrect>

<Correct>

From attached sheet 6(13/32) - (17/32)

Attached sheet 6(7/32)

STEP 12. Resistance measurement at IG1 relay connector (ground line).

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

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 14.
NO : Go to Step 13.

STEP 13. Check of open circuit in ground line between the IG1 relay connector and the body ground.

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 14. Voltage measurement at IG1 relay connector (IG1 line and power supply 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

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

OK: System voltage

(5) Turn the power supply mode of the engine switch from ON position to LOCK (OFF) position.
(6) 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 17.
NO : Go to Step 15.

STEP 15. Check of short and open circuit in IG1 line between the KOS&OSS-ECU connector and the IG1 relay connector.

Q: Is the check result normal?

YES : Go to Step 16.
NO : Repair the connector(s) or wiring harness.

<Incorrect>

<Correct>

From attached sheet 6(13/32) - (17/32)

Attached sheet 6(8/32)

STEP 16. Check of short and open circuit in power supply line between the junction block 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 17. 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

<Incorrect>

Q: Is the check result normal?

YES : Go to Step 25.

NO : Repair the wiring harness, IG1 line between the ETACS-ECU connector and the fusible link.

<Correct>

From attached sheet 6(13/32) - (17/32)

STEP 18. IG2 relay check.

Check that the IG2 relay works normally.

Q: Is the check result normal?

YES : Go to Step 19.

NO : Replace the IG2 relay.

STEP 19. Resistance measurement at IG2 relay connector (ground line).

(1) Disconnect the connector, and measure at the wiring harness side.
(2) Measure the resistance between the IG2 relay connector (ground line) and the body ground.

OK: Continuity exists (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 21.

NO : Go to Step 20.

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Attached sheet 6(9/32)

STEP 20. Check of open circuit in ground line between the IG2 relay connector and the body ground.

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 21. 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 IG1 relay connector (power supply line) and the body ground.

OK: System voltage

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

(4) Measure the voltage between the IG2 relay connector (IG2 line) and the body ground.

OK: System voltage

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

(6) 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 24.

NO : Go to Step 22.

<Incorrect>

<Correct>

From attached sheet 6(13/32) - (17/32)

STEP 22. Check of short and open circuit in IG2 line between the KOS&OSS-ECU connector and the IG2 relay connector.

Q: Is the check result normal?

YES : Go to Step 23.

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

STEP 23. Check of short and open circuit in power supply line between the junction block 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.

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Attached sheet 6(10/32)

STEP 24. 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 25.
NO : Repair the wiring harness, IG2 line between the ETACS-ECU connector and the fusible link.

<Incorrect>

<Correct>

From attached sheet 6(13/32) - (17/32)

Attached sheet 6(11/32)

STEP 25. 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
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

- When power supply mode is ACC.

<Incorrect>

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	OFF
44	Ignition switch(IG2)	OFF

<Correct>

From attached sheet 6(13/32) - (17/32)

- When power supply mode is ON.

ETACS-ECU data list		
Item No.	**Item name**	**Normal condition**
29	Ignition switch(ACC)	ON
30	Ignition switch(IG1)	ON
44	Ignition switch(IG2)	ON

OK: Normal conditions are displayed for all the items.

Q: Are the check result normal?

YES (Normal conditions are displayed for all the items) : Go to Step 26.
NO (Normal condition is not displayed for item No. 29) : Go to Step 27.
NO (Normal condition is not displayed for item No. 30) : Go to Step 27.

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Attached sheet 6(12/32)

NO (Normal condition is not displayed for item No. 44) :
Go to Step 27.

STEP 26. 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.
NO : Intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

STEP 27. 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 diagnostic trouble code 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).

<Incorrect>

<Correct>

From attached sheet 6(13/32) - (17/32)

DTC B1131: Starter setting circuit fail

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

DIAGNOSTIC FUNCTION
When a short circuit of starter setting circuit system is detected, KOS&OSS-ECU stores DTC B1131. 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.

DTC SET CONDITION

Check Conditions
- After KOS&OSS-ECU activation

Judgment Criterion
- Starter setting circuit system is detected

TROUBLESHOOTING HINTS
- Damaged wiring harness or connector (short to ground or short to power supply in ST line)
- Malfunction of KOS&OSS-ECU
- Malfunction of engine control module

Attached sheet 6(13/32)

Diagnostic trouble code No.	Diagnostic item	Reference page
U1199	VIN not programmed	

DIAGNOSTIC TROUBLE CODE PROCEDURES

To attached sheet 6(2/32) - (12/32)

<Incorrect>

<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).

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Attached sheet 6(14/32)

To attached sheet 6(2/32) - (12/32)

<Incorrect>

<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.

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Attached sheet 6(15/32)

To attached sheet 6(2/32) - (12/32)

<Incorrect>

<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.

Attached sheet 6(16/32)

To attached sheet 6(2/32) - (12/32)

<Incorrect>

<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).

Attached sheet 6(17/32)

To attached sheet 6(2/32) - (12/32)

<Incorrect>

<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).

DTC B1131: Starter setting circuit fail

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

DIAGNOSTIC FUNCTION
When a short circuit of starter setting circuit system is detected, KOS&OSS-ECU stores DTC B1131. 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.

DTC SET CONDITION

Check Conditions
- After KOS&OSS-ECU activation

Judgment Criterion
- Starter setting circuit system is detected

TROUBLESHOOTING HINTS
- Damaged wiring harness or connector (short to ground or short to power supply in ST line)
- Malfunction of KOS&OSS-ECU
- Malfunction of engine control module

DIAGNOSIS

STEP 1. Check of short or open circuit in ST line between KOS&OSS-ECU connector and engine control module connector.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the connector(s) or wiring harness.

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Attached sheet 6(18/32)

STEP 5. Recheck for diagnostic trouble code.
(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).

<Added>

From attached sheet 6(19/32) - (22/32)

DTC B1157: EEPROM fail
DTC B1158: ECU internal error

TECHNICAL DESCRIPTION (COMMENT)

- When an EEPROM writing/reading error of KOS&OSS-ECU is detected, KOS&OSS-ECU stores DTC B1157, and flashes the indicator of engine switch in orange.
- When an error is detected to the microcomputer in KOS&OSS-ECU stores DTC B1158, and flashes the indicator of engine switch in orange.

DTC SET CONDITION

Check Conditions

- After KOS&OSS-ECU activation

Judgment Criterion

- When the following conditions are met:
  a. EEPROM writing/reading error is detected.
  b. ECU internal circuit error is detected.

TROUBLESHOOTING HINT

- Malfunction of KOS&OSS-ECU

DIAGNOSIS

Recheck for diagnostic trouble code.
(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).

Attached sheet 6(19/32)

STEP 5. Recheck for diagnostic trouble code.
(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).

From attached sheet 6(18/32)

<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

Attached sheet 6(20/32)

From attached sheet 6(18/32)

<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.

<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>

A

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

Attached sheet 6(22/32)

From attached sheet 6(18/32)

<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).

DTC B1157: EEPROM fail
DTC B1158: ECU internal error

TECHNICAL DESCRIPTION (COMMENT)

- When an EEPROM writing/reading error of KOS&OSS-ECU is detected, KOS&OSS-ECU stores DTC B1157, and flashes the indicator of engine switch in orange.
- When an error is detected to the microcomputer in KOS&OSS-ECU stores DTC B1158, and flashes the indicator of engine switch in orange.

DTC SET CONDITION

Check Conditions

- After KOS&OSS-ECU activation

Judgment Criterion

- When the following conditions are met:
  a. EEPROM writing/reading error is detected.
  b. ECU internal circuit error is detected.

TROUBLESHOOTING HINT

- Malfunction of KOS&OSS-ECU

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Attached sheet 6(23/32)

DTC SET CONDITION

Judgment Criterion
- A coding data is received which is different from the current coding status.

TROUBLESHOOTING HINTS
- Malfunction of the CAN bus line
- ETACS-ECU malfunction
- ETACS-ECU has been interchanged between two vehicles
- Malfunction of KOS&OSS-ECU

DIAGNOSIS
1. Using scan tool MB991958, diagnose the CAN bus line.
2. ETACS-ECU diagnostic trouble code check
3. ETACS-ECU coding data check
4. KOS&OSS-ECU diagnostic trouble code recheck

DTC B1166: Special mode

TECHNICAL DESCRIPTION (COMMENT)
When KOS&OSS-ECU is in the special operation mode (ECU is new), KOS&OSS-ECU stores DTC B1166, and flashes the indicator of engine switch in green.

NOTE: The diagnostic trouble code B1166 will be erased and the system will resume normal functionality when you register the VIN and the keyless operation key code, execute the global coding, and then operate the engine switch to authorize the key.

DTC SET CONDITION

Judgment Criterion
- During special operation mode <Added>

TROUBLESHOOTING HINTS
- VIN not written
- Key code not written
- Malfunction of KOS&OSS-ECU
- Malfunction of keyless operation key

DIAGNOSIS
1. Check the KOS diagnostic trouble code.
2. Check if KOS&OSS-ECU DTC B1160, U1195 or U1199 is set.
3. After operating the engine switch from ON to OFF twice, recheck the diagnostic trouble code of KOS&OSS-ECU.

From attached sheet 6(24/32) - (32/32)

DTC B1731: PCM authentification timeout

⚠ CAUTION
- **When DTC B1731 is set, be sure to diagnose the CAN bus line.**
- **When replacing the ECU, always check that the communication circuit is normal.**

DTC SET CONDITION
If the necessary data cannot be received from engine control module via CAN bus line during the engine starting certification with engine control module, KOS&OSS-ECU determines that a problem has occurred, and stores DTC B1731. At the same time, KOS&OSS-ECU displays the immobilizer certification system inspection warning to the combination meter.

TECHNICAL DESCRIPTION (COMMENT)

Check Conditions
- At engine starting certification

Judgment Criterion
- At the engine starting certification with engine control module, necessary data cannot be received from engine control module via CAN bus line.

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

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

<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.

Attached sheet 6(25/32)

To attached sheet 6(23/32)

<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.

Attached sheet 6(26/32)

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.

To attached sheet 6(23/32)

<Added>

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

Attached sheet 6(27/32)

To attached sheet 6(23/32)

<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.

<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

<Added>

- 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.

Attached sheet 6(30/32)

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.

To attached sheet 6(23/32)

<Added>

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.

Attached sheet 6(31/32)

To attached sheet 6(23/32)

<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.

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Attached sheet 6(32/32)

To attached sheet 6(23/32)

<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 B1731: PCM authentification timeout

⚠ CAUTION
- **When DTC B1731 is set, be sure to diagnose the CAN bus line.**
- **When replacing the ECU, always check that the communication circuit is normal.**

DTC SET CONDITION
If the necessary data cannot be received from engine control module via CAN bus line during the engine starting certification with engine control module, KOS&OSS-ECU determines that a problem has occurred, and stores DTC B1731. At the same time, KOS&OSS-ECU displays the immobilizer certification system inspection warning to the combination meter.

TECHNICAL DESCRIPTION (COMMENT)

Check Conditions
- At engine starting certification

Judgment Criterion
- At the engine starting certification with engine control module, necessary data cannot be received from engine control module via CAN bus line.

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

DIAGNOSIS
1. Using scan tool MB991958, diagnose the CAN bus line.
2. Engine control module diagnostic trouble code check
3. KOS&OSS-ECU diagnostic trouble code recheck

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