

Technical Service Bulletin

SUBJECT:			No:	TSB-20-54-003
ADDITIONAL PROCEDURES FOR ON BOARD				April 2020
CHARGER/D	C-DC CONVERT	ER – SMR	MODEL:	2012-2013 i-MiEV
CIRCULATE TO:	[] GENERAL MANAGER	[X] PARTS MANAGER		[X] TECHNICIAN
[X] SERVICE ADVISOR	[X] SERVICE MANAGER	[] WARRANTY PROCESSOR		[] SALES MANAGER

PURPOSE

This TSB updates the Chassis Electrical section of the affected Service Manuals to add procedures to On Board Charger/DC-DC Converter diagnosis in 54D, Electric Motor Unit and Traction Battery section. These procedures have been added because a new service part is available for the on board charger/DC-DC converter.

Use the procedures in this bulletin for servicing the new on board charger/DC-DC converter.

- New part has a marking on the part number label. (Refer to the procedures in this TSB for details.)
- Previous part has <u>no</u> marking on the part number label.

AFFECTED VEHICLES

• 2012 - 2013 i-MiEV (2013 sold in Canada only)

AFFECTED SERVICE MANUALS

• 2012 - 2013 i-MiEV Service Manual, Group 54-Chassis Electrical

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Please make the indicated changes below to the 2012 and 2013 i-MiEV Service Manual, Group 54-Chassis Electrical -> 54D-Electric Motor Unit And Traction Battery -> Electric Motor Control Unit (EMCU) And Motor (Electric Motor Unit) -> Diagnosis Function.

ELECTRIC MOTOR UNIT AND TRACTION BATTERY ON BOARD CHARGER/DC-DC CONVERTER (OBC)



To prevent damage to scan tool MB991958, always turn the electric motor switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- 1. Connect scan tool MB991958 to the data link connector.
- 2. Turn the electric motor switch to the "ON" position.
- 3. Select "System select."
- 4. Choose "from 2006 MY" under "MODEL YEAR".
- 5. Check that "Vehicle Information" contents are correct.
- 6. Choose "OBC".
- 7. Select "Diagnostic Trouble Code"
- 8. If a DTC is set, it is shown.
- 9. Choose "Erase DTCs" to erase the DTC.

<Added>
See next 3 pages





PRECAUTIONS ON SYSTEM SELECTION SCREEN

Required Special Tool:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991910: Main Harness A

There are two kinds of service parts for on board charger/DC-DC converter, perform the following procedure on the "System Select" screen before using each diagnosis of OBC.

- 1. Remove the luggage compartment floor carpet.
- 2. Remove the electric motor unit inspection lid.

 Confirm whether the marking is shown in the part number label of onboard charger/DC-DC converter, as shown in the illustration.

<Added>



-0+ OBC DESTI MCU MAKER CMU1 CMU2 CMU3 TYPE CLASS MODEL YEAR CMU4 CMU5 MODEL SINE/MOTOR EN Chassis No./VIN OBC (Not selected) 🖏 🗮 🌌 SP [企] ACI00429

System List		Vehicle	information	
OBC		DESTIN		•
MCU		MAKER		•
CMU1		TYPE		
CMU2		CLASS		
CMU3		MODEL YEAR		
CMU4		MODEL		•
CMU5	•	ENGINE/MOTOR		•
Londing Online Satur	_	TRANSMISSION		•
OBC (Net selected)	- 4	Chassis No./VIN		Unmatch
(Not selected) (Not selected) w/ marking on P/N label w/o marking on P/N label	V	Ĩij ∰ ØSP		
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- To prevent damage to scan tool MB991958, always turn the electric motor switch to the "LOCK/OFF" position before connecting or disconnecting scan tool MB991958.
- While the scan tool MB991958 is communicating with the vehicle, the electric motor switch must not be turned to the "LOCK/OFF" position. If the electric motor switch is turned to the "LOCK/OFF" position, wait several seconds before turning the electric motor switch back ON (do not turn it back ON immediately).
- 4. Connect scan tool MB991958 to the data link connector.
- 5. Turn the electric motor switch to the "ON" position.
- 6. Select "System select."

7. Select "OBC".

When you select a wrong item, you cannot obtain a proper result.

 When the "OBC" selection screen in the equipments option field is opened, two selection items are displayed. Correctly select either "w/ marking on P/N label" or "w/o marking on P/ N label" depending on the marking of the part number label.

<Added>

9. Confirm with the OK button to proceed to a diagnosis function screen.

<There is no marking on part number label>

- Inspection chart for diagnostic trouble code: Refer to attached sheet 15.
- Inspection chart for trouble symptoms: Refer to attached sheet 19.

<There is marking on part number label>

- Inspection chart for diagnostic trouble code: Refer to attached sheet 16.
- Inspection chart for trouble symptoms: Refer to attached sheet 20.

Please make the indicated changes below to the 2012 and 2013 i-MiEV Service Manual, Group 54-Chassis Electrical -> 54D-Electric Motor Unit And Traction Battery -> On Board Charger/DC-DC Converter (OBC) -> Inspection Chart for Diagnostic Trouble Code.

ELECTRIC MOTOR UNIT AND TRACTION BATTERY ON BOARD CHARGER/DC-DC CONVERTER (OBC)

INSPECTION CHART FOR DIAGNOSTIC TROUBLE CODE

Code No.	Diagnosis item	Reference page
01	Output voltage abnormal	P.54D-681
02	Load connection abnormal (traction battery not connected)	P.54D-682
03	Output current abnormal	P.54D-685
04	Control power supply voltage abnormal	P.54D-686
06	AC input voltage abnormal	P.54D-690
11	Voltage command abnormal	P.54D-691
12	Current command abnormal	P.54D-692
13	EV-ECU lost	P.54D-693
15	Power factor correction (PFC) circuit temperature abnormal	P.54D-694
16	Temperature in increasing voltage area abnormal	P.54D-695
17	Inside ambient temperature abnormal (boost circuit rectifier temperature abnormal)	P.54D-696
26	Charging current limited (temperature increase)	P.54D-698
27	AC input current abnormal	P.54D-699
28 ^{*1}	EEPROM abnormal	P.54D-700
29	Pilot signal abnormal	P.54D-701
30	Electric motor circuit abnormal	P.54D-703
31	Temperature in increasing voltage area abnormal 2	P.54D-703
32	Charging current limited (input voltage decrease)	P.54D-705
33 ^{*1}	ROM/RAM abnormal	P.54D-705
35 ^{*1}	AD conversion module abnormal	P.54D-706
39	Power factor correction (PFC) circuit output voltage abnormal	P.54D-707
41	Input current sensor 0 point abnormal	P.54D-707
42	Output current sensor 0 point abnormal	P.54D-708
43 ^{*1}	Inverter overcurrent abnormal	P.54D-709
44 ^{*1}	Rectification overvoltage abnormal	P.54D-709
45 ^{*1}	Rectification overcurrent abnormal	P.54D-710

NOTE: When detecting a malfunction for the first time, the on board charger should store it, marked with *1 in the diagnostic trouble code chart. If the on board charger detects the same malfunction when it is next activated, the on board charger should determine that the malfunction is occurring and the first detection was not false.

<THERE IS NO MARKING ON PART NUMBER LABEL>

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INSPECTION CHART FOR DIAGNOSTIC TROUBLE CODE <THERE IS MARKING ON PART NUMBER LABEL>

M1549500600209

Code No.	Diagnosis item	Reference page
P1C00	DCDC input voltage abnormal	
P1C02	DCDC output voltage abnormal	Refer to corresponding
P1C04	DCDC output voltage reduction	code in the "DIAGNOSTIC
P1C06	DCDC IGCT voltage abnormal	
P1C08	DCDC rectifier temperature	MARKING ON PART
P1C09	DCDC inside temperature	NUMBER LABEL>"
P1C13	DCDC A/D converter	the new part
P1C19	DCDC low temperature	
P1C21	DCDC input voltage abnormal (2)	
P1C22	DCDC output voltage abnormal (2)	
P1C23	Battery sensing voltage abnormal	
U1100	EV ECU CAN timeout (1)	
ON BOAR	D CHARGER	1
Code No.	Diagnosis item	Reference page
P1D00	AC input voltage (low)	
P1D01	AC input voltage (high)	Refer to corresponding
P1D02	AC input voltage (over)	code in the "DIAGNOSTIC
P1D03	AC input current (high)	
P1D06	Output voltage (high)	MARKING ON PART
P1D07	Output voltage (over)	NUMBER LABEL>"
P1D08	Load connection abnormal	section in this TSB for
P1D09	Output current (high)	the new part
P1D10	Output current (control fail)	
P1D11	Output current (over)	
P1D13	IGCG voltage abnormal	
P1D14	Voltage command abnormal	
P1D15	Current command abnormal	
P1D16	Pilot signal (Charge Not allowed)	
P1D23	Power circuit (Pre-charge fail)	
P1D25	Inverter output current	
P1D26	Internal temperature	
P1D27	PFC temperature	
P1D31	ROM/RAM fail	
P1D32	EEPROM fail	
P1D33	AD converter abnormal	

<Added>

Code No. Diagnosis item		Reference page	
P1D34	Input current sensor fail	Refer to corresponding	
P1D35	Output current sensor fail	code in the "DIAGNOSTIC	
P1D40	Rectifier coil temperature		
P1D41	Input diode temperature	MARKING ON PART	
P1D42	Temperature sensor	NUMBER LABEL>"	
P1D45	Failure detection circuit	section in this TSB for	
U1100 EV ECU CAN timeout (1)		the new part	

Please make the indicated changes below to the 2012 and 2013 i-MiEV Service Manual, Group 54-Chassis Electrical -> 54D-Electric Motor Unit And Traction Battery -> On Board Charger/DC-DC Converter (OBC) -> Diagnosis Code Procedures.

ELECTRIC MOTOR UNIT AND TRACTION BATTERY ON BOARD CHARGER/DC-DC CONVERTER (OBC)

DIAGNOSIS CODE PROCEDURES THERE IS NO MARKING ON PART NUMBER LABEL> <Added>

Code No. 01: Output Voltage Abnormal

TROUBLE JUDGEMENT

Check Conditions

- The on board charger control power supply voltage is more than 8 volts.
- While the on board charger is allowed to be charged from the EV-ECU.

Judgement Criterion

• The output (terminal) voltage is more than 400 volts.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSES

- The EV-ECU is failed.
- The on board charger is failed.

DIAGNOSIS PROCEDURE

STEP 1. Scan tool MB991958 diagnosis code

Q: Is diagnosis code of code No. 11 set?

- **YES :** Check request voltage malfunction (Refer to Code No. 11: Voltage command abnormal P.54D-691).
- NO: Go to Step 2.

STEP 2. Scan tool MB991958 other system diagnosis code.

Q: Is diagnosis code of EV-ECU system set?

YES : Check EV-ECU system (Refer to P.54D-44). **NO :** Go to Step 3 .

STEP 3. Scan tool MB991958 diagnosis code

Q: Is the diagnosis code set?

- YES : Replace the on board charger/DC-DC converter.
- NO: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-15).

Please make the indicated changes below to the 2012 and 2013 i-MiEV Service Manual, Group 54-Chassis Electrical -> 54D-Electric Motor Unit And Traction Battery -> On Board Charger/DC-DC Converter (OBC) -> Diagnostic Trouble Code Procedures.

NOTE: Refer to the added "DIAGNOSTIC TROUBLE CODE PROCEDURES <THERE IS MARKING ON PART NUMBER LABEL>" in this TSB (40 pages) when diagnosing DTCs on the <u>new</u> On Board Charger/DC-DC Converter.

DIAGNOSTIC TROUBLE CODE PROCEDURES <THERE IS MARKING ON PART NUMBER LABEL>

DTC P1C00: DCDC Input Voltage Abnormal



NOTE

★:Indicates the high voltage cables, wiring harnesses or connectors.

Wire color code

B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray R: Red P: Pink V: Violet PU: Purple SI: Silver





TROUBLE JUDGMENT

Check Conditions

• The EV-ECU allows the DC-DC converter to operate.

Judgment Criterion

• The input voltage is less than 200 V or more than 420 V.

FAIL-SAFE AND BACKUP FUNCTION

• The output of DC-DC converter is stopped.

PROBABLE CAUSES

- Traction battery assembly is failed.
- High voltage system component of except DC-DC converter is failed.
- EV-ECU is failed.
- Fuse meltdown between DC-DC converter and inverter
- Open circuits or damage of high voltage circuits between DC-DC converter and traction battery; or poor contact of connector
- The DC-DC converter is failed.

DIAGNOSIS

A DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 – Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.

STEP 1. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is the diagnostic trouble code of EV-ECU system set?

- **YES** : Check EV-ECU system (Refer to GROUP 54D EV-ECU – Inspection Chart for Diagnostic Trouble Code).
- NO: Go to Step 2.



STEP 2. Continuity check on fuse between DC-DC converter and inverter

\land DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.
- Check continuity of fuse both ends.

OK: Continuity

- Q: Is the check result normal?
 - YES : Go to Step 3.
 - **NO :** Replace the fuse.

STEP 3. Connector check: G-13 intermediate connector, G-05 inverter (– terminal) connector, G-06 inverter (+ terminal) connector

Q: Is the check result normal?

- YES : Go to Step 4.
- NO: Repair.

STEP 4. Check harness between G-13 intermediate connector and on board charger/DC-DC converter connector.

• Check power supply line for open circuit and damage.

Q: Is the check result normal?

- YES : Go to Step 5.
- **NO :** Repair or replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).

STEP 5. Check harness between G-06 inverter (+ terminal) connector, G-05 inverter (– terminal) connector and G-19 traction battery (+ terminal) connector, G-18 traction battery (– terminal) connector.

• Check power supply line for open circuit and damage.

Q: Is the check result normal?

- YES : Go to Step 6.
- **NO:** Repair or replace the traction battery cable.

STEP 6. Recheck for diagnostic trouble code.

Check again if the diagnostic trouble code is set in the DC-DC converter.

- (1) Erase the DTC.
- (2) Set the electric motor switch from the LOCK (OFF) position to the ON, and then to the START position temporarily.
- (3) Check if the DTC is set.

Q: Is the DTC set?

YES : Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).

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

DTC P1C02: DCDC Output Voltage Abnormal DTC P1C22 DCDC Output Voltage Abnormal (2)

TROUBLE JUDGMENT

Check Conditions

• The EV-ECU allows the DC-DC converter to operate.

Judgment Criterion

- The output (B terminal) voltage is more than 16.0 V.
 <P1C02>
- The system detects a failure "overvoltage abnormal detection circuit" in the output section by predetermined times or more.<P1C22>

FAIL-SAFE AND BACKUP FUNCTION

• The output of DC-DC converter is stopped.

PROBABLE CAUSE

• The DC-DC converter is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the DC-DC converter.

- (1) Erase the DTC.
- (2) Set the electric motor switch from the LOCK (OFF) position to the ON, and then to the START position temporarily.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- NO: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).





FAIL-SAFE AND BACKUP FUNCTION

• The output of DC-DC converter is restricted.

PROBABLE CAUSES

- The Auxiliary battery is failed
- The installation of the auxiliary battery terminal is failed.
- The fusible link is fused.
- Open circuits of output (B terminal) voltage, damage or poor contact of connector
- The DC-DC converter is failed.



(B)

TROUBLE JUDGMENT

Check Conditions

 The EV-ECU allows the DC-DC converter to operate.

DIAGNOSIS

STEP 1. Check auxiliary battery.

 Check auxiliary battery (Refer to GROUP 54A – Auxiliary battery – On-vehicle Service – Battery Test).

Q: Is the check result normal?

- YES : Go to Step 2.
- **NO:** Replace the auxiliary battery.

STEP 2. Connector check: E-01 on board charger/DC-DC converter connector, fusible link (No. 26)

Check the terminals for deformation, looseness, etc.

Q: Is the check result normal?

- YES: Go to Step 3.
- **NO:** Repair the damaged connector.

STEP 3. Check the wiring harness between E-01 on board charger/DC-DC converter connector (terminal No. 1) and the fusible link (No. 26).

Check the power supply line for open, short circuit and damage.

Q: Is the check result normal?

- YES: Go to Step 4.
- **NO:** Repair the wiring harness.

STEP 4. Recheck for diagnostic trouble code.

Check again if the DTC is set in the DC-DC converter.

- (1) Erase the DTC.
- (2) Set the electric motor switch from the "LOCK" (OFF) position to the ON, and then to the START position temporarily.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- NO: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points How to Cope with Intermittent Malfunctions).





TROUBLE JUDGMENT

Check Condition

• The EV-ECU is activated.

Judgment Criterion

- The DC-DC converter control power supply voltage is less than 7.2 V.
- or
 - The DC-DC converter control power supply voltage is more than 17.6 V.

FAIL-SAFE AND BACKUP FUNCTION

• The output of DC-DC converter is stopped.

PROBABLE CAUSES

- The Auxiliary battery incorrect connection by user
- The installation of the auxiliary battery terminal is failed.
- The EV control relay is failed.
- Open circuits of DC-DC converter power supply, short circuits to ground, damage or poor contact of connector
- The DC-DC converter is failed.

DIAGNOSIS

STEP 1. Check auxiliary battery.

 Check auxiliary battery (Refer to GROUP 54A – Auxiliary battery – On-vehicle Service – Battery Test).

Q: Is the check result normal?

- YES : Go to Step 2.
- **NO:** Replace the auxiliary battery.

STEP 2. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

YES : Check EV-ECU system (Refer to GROUP 54D – EV-ECU – Inspection Chart for Diagnostic Trouble Code

NO: Go to Step 3.

STEP 3. Connector check: E-03 on board charger/DC-DC converter connector, A-08X EV control relay (relay box) connector

Q: Is the check result normal?

- YES: Go to Step 4.
- **NO :** Repair the damaged connector. Correct or replace the relay box.

STEP 4. Check the wiring harness between A-08X EV control relay (relay box) connector (terminal No. 1) and E-03 on board charger/DC-DC converter connector (terminal No. 8).

Check the power supply line for open, short circuit and damage.

Q: Is the check result normal?

- YES : Go to Step 5.
- **NO :** Repair the wiring harness.

STEP 5. Recheck for diagnostic trouble code.

Check again if the DTC is set in the DC-DC converter.

- (1) Erase the DTC.
- (2) Set the electric motor switch from the LOCK (OFF) position to the ON, and then to the START position temporarily.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1C08: DCDC Rectifier Temperature DTC P1C09 DCDC Inside Temperature

TROUBLE JUDGMENT

Check Conditions

• The EV-ECU allows the DC-DC converter to operate.

Judgment Criterion

- The rectification area temperature sensor is more than 105° C (221° F). <P1C08>
- The temperature sensor in the DC-DC converter is more than 105° C (221° F). <P1C09>

FAIL-SAFE AND BACKUP FUNCTION

• The output of DC-DC converter is stopped.

PROBABLE CAUSES

• The EV-ECU is failed.

- There is not enough coolant.
- The water pump is failed.
- The radiator fan is failed.
- The temperature sensor installed in the DC-DC converter is failed.

DIAGNOSIS

STEP 1. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

- **YES** : Check EV-ECU system (Refer to GROUP 54D EV-ECU – Inspection Chart for Diagnostic Trouble Code).
- NO: Go to Step 2.

STEP 2. Check the coolant.

NOTE: If the coolant largely decreases, check whether the coolant leakage exists or not. Repair it if necessary.

Check on coolant (Refer to GROUP 14 – On-vehicle Service – Coolant Check).

Q: Is the check result normal?

- YES: Go to Step 3.
- NO: Replace or supply the coolant.

STEP 3. Scan tool MB991958 actuator test.

- Refer to the Actuator Test Reference Table of the EV-ECU.
 - a. Item 3: Water pump actuate
 - b. Item 4: Radiator fan 1 actuate
 - c. Item 5: Radiator fan 2 actuate
 - d. Item 9: Water pump actuate 2

Q: Is the check result normal?

- YES: Go to Step 4.
- NO: Go to the check procedures for the diagnostic trouble code for the actuator which has an abnormal drive (Refer to GROUP 54D – EV-ECU – Inspection Chart for Diagnostic Trouble Code).

STEP 4. Recheck for diagnostic trouble code.

Check again if the DTC is set in the DC-DC converter.

- (1) Erase the DTC.
- (2) Set the electric motor switch from the LOCK (OFF) position to the ON, and then to the START position temporarily.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- NO: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1C13: DCDC A/D Converter	
	TROUBLE JUDGMENT
	 Check Condition The EV-ECU allows the DC-DC converter to operate.
	 Judgment Criterion When it is detected that the AD conversion module is abnormal (if the conversion time is a time-out in the AD con- version module).
	 FAIL-SAFE AND BACKUP FUNCTION The output of DC-DC converter is stopped.
	 PROBABLE CAUSE The DC-DC converter is failed.
	DIAGNOSIS
	 STEP 1. Recheck for diagnostic trouble code. Check again if the DTC is set in the DC-DC converter. (1) Erase the DTC. (2) Set the electric motor switch from the LOCK (OFF) position to the ON, and then to the START position temporarily. (3) Check if the DTC is set.
	Q: Is the DTC set? YES : Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).

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

DTC P1C19: DCDC Low Temperature

TROUBLE JUDGMENT

Check Condition

• The EV-ECU allows the DC-DC converter to operate.

Judgment Criterion

 The temperature difference between the rectifier and the internal DC-DC converter temperature sensor is less than -70° C (-158° F) or more than 70° C (158° F).

FAIL-SAFE AND BACKUP FUNCTION

• The output of DC-DC converter is stopped.

PROBABLE CAUSE

• The DC-DC converter is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the DC-DC converter.

- (1) Erase the DTC.
- (2) Set the electric motor switch from the LOCK (OFF) position to the ON, and then to the START position temporarily.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1C21: DCDC Input Voltage Abnormal (2)

TROUBLE JUDGMENT

Check Conditions

• The EV-ECU allows the DC-DC converter to operate.

Judgment Criterion

 The system detects a failure "overvoltage abnormal detection circuit" in the input section by predetermined times or more.

FAIL-SAFE AND BACKUP FUNCTION

• The output of DC-DC converter is stopped.

PROBABLE CAUSE

- The EV-ECU is failed.
- The high voltage system component except DC-DC converter is failed.
- The DC-DC converter is failed.

DIAGNOSIS

STEP 1. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

- **YES** : Check EV-ECU system (Refer to GROUP 54D EV-ECU – Inspection Chart for Diagnostic Trouble Code
 -).
- NO: Go to Step 2.

STEP 2. Recheck for diagnostic trouble code.

Check again if the DTC is set in the DC-DC converter.

- (1) Erase the DTC.
- (2) Set the electric motor switch from the LOCK (OFF) position to the ON, and then to the START position temporarily.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1C23: Battery Sensing Voltage Abnormal





TROUBLE JUDGMENT

Check Conditions

• The EV-ECU allows the DC-DC converter to operate.

Judgment Criterion

• The output (S terminal) voltage is 4.0 V or less.

FAIL-SAFE AND BACKUP FUNCTION

• The output of DC-DC converter is restricted.

PROBABLE CAUSES

- Open circuits of output (S terminal) voltage, damage or poor contact of connector
- Open circuits of output (B terminal) voltage
- The DC-DC converter is failed.

DIAGNOSIS

STEP 1. Use scan tool MB991958 to confirm a DTC.

Q: Is DTC P1C04 set?

- YES : Check output (B terminal) voltage reduction (Refer to DTC P1C04 DCDC output voltage reduction). Then go to Step 2.
- NO: Go to Step 2.

STEP 2. Connector check: E-03 on board charger/DC-DC converter connector, fuse (No. 11) (relay box connector)

Q: Is the check result normal?

- YES: Go to Step 3.
- **NO :** Repair the damaged connector. Correct or replace the relay box.

STEP 3. Check the wiring harness between E-03 on board charger/DC-DC converter connector (terminal No. 7) and the fuse (No. 11) (relay box connector terminal).

Check the power supply line for open, short circuit and damage.

Q: Is the check result normal?

- YES: Go to Step 4.
- **NO:** Repair the wiring harness.

<Added>

STEP 4. Recheck for diagnostic trouble code.

Check again if the DTC is set in the DC-DC converter.

- (1) Erase the DTC.
- (2) Set the electric motor switch from the LOCK (OFF) position to the ON, and then to the START position temporarily.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points How to Cope with Intermittent Malfunctions).

DTC P1D00: AC Input Voltage (Low) DTC P1D01: AC Input Voltage (High) DTC P1D02: AC Input Voltage (Over)

TROUBLE JUDGMENT

Check Conditions

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

- The effective value of AC input voltage is more than 40 V and less than 80 V. <P1D00>
- The effective value of AC input voltage is more than 270 V.
 <P1D01>
- The effective value of AC input voltage is more than 300 V for a moment. <P1D02>

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSES

- The AC power supply (at the supply side) is failed.
- The charging cable is failed.
- The on board charger is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- YES : Go to Step 2.
- **NO :** Check the AC power supply usage conditions used by the users.

<Added>

STEP 2. Check charging cable.

• Check the trouble symptom for charging cable.

Q: Is the check result normal?

- YES: Go to Step 3.
- **NO**: Replace the charging cable.

STEP 3. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D03: AC Input Current (High)

TROUBLE JUDGMENT

Check Conditions

- While the on board charger is allowed to be charged from the EV-ECU.
- While the AC power supply is being input.

Judgment Criterion

• The effective current of AC input current is more than input current maximum value.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSE

- The AC power supply (at the supply side) is failed.
- The charging cable is failed.
- The on board charger is failed.

DIAGNOSIS

STEP 1. Check charging cable

• Check the trouble symptom for charging cable.

Q: Is the check result normal?

- YES : Go to Step 2.
- **NO :** Replace the charging cable.

STEP 2. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.
- Q: Is the DTC set?
 - **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
 - NO: Check the AC power supply usage conditions used by the users. If there are no problems, the fault is determined as an intermittent Malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D06: Output Voltage (High)

TROUBLE JUDGMENT

Check Conditions

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

• The output (terminal) voltage is more than 400 V.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSES

- The EV-ECU is failed.
- The on board charger is failed.

DIAGNOSIS

STEP 1. Use scan tool MB991958 to confirm a DTC.

Q: Is DTC P1D14 set?

- **YES :** Check request voltage malfunction (Refer to DTC P1D14 Voltage command abnormal).
- **NO :** Go to Step 2.

STEP 2. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

YES : Check EV-ECU system (Refer to GROUP 54D – EV-ECU – Inspection Chart for Diagnostic Trouble Code).

NO: Go to Step 3.

STEP 3. Recheck for diagnostic trouble code.

- Check again if the DTC is set in the on board charger. (1) Erase the DTC.
- (1) Elase the DTC.
- (2) Perform the regular charge.(2) Observing the DTC is not.
- (3) Check if the DTC is set.
- Q: Is the DTC set?
 - **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
 - **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D07: Output Voltage (Over)

TROUBLE JUDGMENT

Check Conditions

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

• The system detects overvoltage detection signal by predetermined times or more at the rectification area.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSE

- The traction battery assembly is failed.
- The EV-ECU is failed.
- The on board charger is failed.

DIAGNOSIS

STEP 1. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

YES : Check EV-ECU system (Refer to GROUP 54D – EV-ECU – Inspection Chart for Diagnostic Trouble Code).

NO: Go to Step 2.

STEP 2. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES**: Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).



 Indicates the high voltage cables, wiring harnesses or connectors.

Wire color code

B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray R: Red P: Pink V: Violet PU: Purple SI: Silver

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TROUBLE JUDGMENT

Check Conditions

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

• The output (terminal) voltage is less than 180 V.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSES

- The traction battery assembly is failed.
- Fuse meltdown between on board charger and inverter
- Open circuits or damage of high voltage circuits between on board charger and traction battery; or poor contact of connector
- The on board charger is failed.

DIAGNOSIS

\land DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.

STEP 1. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is the diagnostic trouble code of EV-ECU system set?

- **YES :** Check EV-ECU system (Refer to GROUP 54D EV-ECU – Inspection Chart for Diagnostic Trouble Code
- NO: Go to Step 2.



STEP 2. Continuity check on fuse between on board charger and inverter.

\land DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 – Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.
- Check continuity of fuse both ends.

OK: Continuity

- Q: Is the check result normal?
 - YES : Go to Step 3.
 - **NO :** Replace the fuse.

STEP 3. Connector check: G-13 intermediate connector, G-05 inverter (– terminal) connector, G-06 inverter (+ terminal) connector

Q: Is the check result normal?

- YES : Go to Step 4.
- NO: Repair.

STEP 4. Check harness between G-13 intermediate connector and inverter and on board charger/DC-DC converter connector.

• Check power supply line for open circuit and damage.

Q: Is the check result normal?

- YES : Go to Step 5.
- **NO**: Repair or replace the on board charger/DC-DC
- converter (Refer to OBC Removal & Installation in this TSB).

STEP 5. Check harness between G-06 inverter (+ terminal) connector, G-05 inverter (– terminal) connector and G-19 traction battery (+ terminal) connector, G-18 traction battery (– terminal) connector.

• Check power supply line for open circuit and damage.

Q: Is the check result normal?

- YES : Go to Step 6.
- **NO:** Repair or replace the traction battery cable.

<Added>

STEP 6. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES** : Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- **NO**: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D09: Output Current (High) DTC P1D10 Output Current (Control Fail)

TROUBLE JUDGMENT

Check Conditions

- While the on board charger is allowed to be charged from the EV-ECU.
- While the AC power supply is being input.

Judgment Criterion

- When the input voltage is AC 100 V, the output current is more than 7.0 A. <P1D09>
- When the input voltage is AC 200 V, the output current is more than 10.0 A. <P1D09>
- The difference between the target output current and the output current is more than 1.0 A or less than -1.0 A.
 <P1D10>

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSES

- The EV-ECU is failed.
- The on board charger is failed.

DIAGNOSIS

STEP 1. Use scan tool MB991958 to confirm a DTC.

Q: Is diagnostic trouble code No. P1D15 set?

- **YES :** Check current command abnormal (Refer to DTC P1D15 Current command abnormal).
- NO: Go to Step 2.

STEP 2. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

- **YES** : Check EV-ECU system (Refer to GROUP 54D EV-ECU – Inspection Chart for Diagnostic Trouble Code).
- NO: Go to Step 3.

STEP 3. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D11: Output Current (Over)

TROUBLE JUDGMENT

Check Conditions

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

• The system detects overcurrent detection signal in the output section by predetermined times or more.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSE

• The on board charger is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.
- Q: Is the DTC set?
 - **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
 - NO: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).



Wire colour code

B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Grey R: Red P: Pink V: Violet PU: Purple SI: Silver





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TROUBLE JUDGMENT

Check Condition

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

- The on board charger control power supply voltage is less than 7.2 V.
- or
- The on board charger control power supply voltage is more than 17.6 V.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSES

- The auxiliary battery incorrect connection by user
- The installation of the auxiliary battery terminal is failed.
- The on board charger relay is failed.
- Open circuits of on board charger power supply, short circuits to ground or damage; poor contact of connector
- The on board charger is failed.

DIAGNOSIS

STEP 1. Check auxiliary battery

• Check auxiliary battery (Refer to GROUP 54A – Auxiliary battery – On-vehicle Service, Battery Test).

Q: Is the check result normal?

- YES : Go to Step 2.
- **NO:** Replace the auxiliary battery.

STEP 2. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

- **YES** : Check EV-ECU system (Refer to GROUP 54D EV-ECU – Inspection Chart for Diagnostic Trouble Code).
- NO: Go to Step 3.

STEP 3. Perform voltage measurement at A-06X on boar charger relay (relay box) connector.

- (1) Disconnect the A-06X on board charger relay, and measure the voltage at the wiring harness side.
- (2) Voltage between terminal No. 4 and ground.

OK: Battery voltage

Q: Is the check result normal?

- YES : Go to Step 6.
- **NO**: Go to Step 4.

STEP 4. Connector check: A-06X on boar charger relay (relay box) connector

Q: Is the check result normal?

- YES: Go to Step 5.
- **NO :** Correct or replace the relay box.

STEP 5. Check the wiring harness between A-06X on boar charger relay (relay box) connector (terminal No. 4) and the relay box fuse (No. 11).

Check the power supply line for open, short circuit and damage.

Q: Is the check result normal?

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

STEP 6. Check A-06X on board charger relay itself.

 Check on board charger relay itself (Refer to GROUP 54D – On Board Charger/DC-DC Converter – On-vehicle Service).

Q: Is the check result normal?

- YES: Go to Step 7.
- **NO :** Replace the on board charger relay.

STEP 7. Connector check: E-03 on board charger/DC-DC converter, A-06X on board charger relay (relay box) connector

Q: Is the check result normal?

- YES: Go to Step 8.
- **NO :** Repair the damaged connector. Or, correct or replace the relay box.

STEP 8. Check harness between A-06X on board charger relay connector (terminal No. 1) and E-03 on board charger/DC-DC converter connector (terminal No. 2).

NOTE: Before checking harness, check intermediate connector A-107, and repair if necessary.

• Check output line for damage.

Q: Is the check result normal?

- YES: Go to Step 9.
- NO: Repair.
<Added>

STEP 9. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- NO: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points How to Cope with Intermittent Malfunctions).

DTC P1D14: Voltage Command Abnormal

TROUBLE JUDGMENT

Check Conditions

- While the on board charger is allowed to be charged from the EV-ECU.
- While the AC power supply is being input.

Judgment Criterion

- The charging voltage command from the EV-ECU exceeds 370 V (upper limit).
- or
- The charging voltage command from the EV-ECU is less than 0 V.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSES

- The EV-ECU is failed.
- The on board charger is failed.

DIAGNOSIS

STEP 1. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

YES : Check EV-ECU system (Refer to GROUP 54D – EV-

- ECU Inspection Chart for Diagnostic Trouble Code
- NO: Go to Step 2.

<Added>

STEP 2. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES** : Replace the on board charger/DC-DC converter (Refer to OBC Removal & Installation in this TSB).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D15: Current Command Abnormal

TROUBLE JUDGMENT

Check Conditions

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

- The charging current command from the EV-ECU is more than 5.5 A (upper limit of judgment that 100 V is received).
- or
 - The charging current command from the EV-ECU is more than 10 A (upper limit of judgment that 200 V is received).

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSES

- The EV-ECU is failed.
- The on board charger is failed.

DIAGNOSIS

STEP 1. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

- **YES** : Check EV-ECU system (Refer to GROUP 54D EV-ECU – Inspection Chart for Diagnostic Trouble Code
- NO: Go to Step 2.



Wire color code

B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray R: Red P: Pink V: Violet PU: Purple SI: Silver

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TROUBLE JUDGMENT

Check Conditions

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

• The pilot frequency is from 970 to 1,030Hz and the pilot signal duty ratio is less than 7 %.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSES

- The charging cable is failed.
- Open circuits of pilot signal circuit, short circuits to ground, short circuits to power supply system, damage or poor contacts of connector
- The on board charger is failed.
- The ground of power supply facility is failed.

DIAGNOSIS

A DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.

STEP 1. Check the control box status of the charging cable.

• During the regular charging.

Q: Is the FAULT indicator lit or blinked?

- **YES :** Refer to Inspection Procedure: FAULT indicator is lit (Refer to attached sheet 20), FAULT indicator blinks (Refer to attached sheet 20).
- NO: Go to Step 2.

STEP 2. Check pilot signal terminal itself.

 Check charging cable (Refer to GROUP 54D – On Board Charger/DC-DC Converter – On-vehicle Service).

Q: Is the check result normal?

- YES : Go to Step 3.
- **NO :** Replace the charging cable.

STEP 3. Connector check: G-03 regular charging connector and E-03 on board charger/DC-DC converter connector

Q: Are the check results normal?

- YES : Go to Step 4.
- NO: Repair or replace the connector.

STEP 4. Check harness between G-03 regular charging connector (terminal No. 3) and E-03 on board charger/DC-DC converter connector (terminal No. 9).

NOTE: Before checking harness, check intermediate connector G-12, and repair if necessary.

• Check the signal line for open circuits, short circuits to ground and damage.

Q: Is the check result normal?

- YES : Go to Step 5.
- **NO :** Repair the damaged harness wire.

STEP 5. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- YES : Go to Step 6.
- NO: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

STEP 6. Check ground of power supply facility.

Q: Is the check result normal?

- YES : Go to Step 7.
- NO: Repair the power supply facility.

STEP 7. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D23: Power Circuit (Pre-charge fail)

TROUBLE JUDGMENT

Check Conditions

- While the on board charger is allowed to be charged from the EV-ECU.
- While the AC power supply is being input.

Judgment Criterion

• The power factor improvement circuit voltage is more than overcurrent detection signal by predetermined times.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSE

• The on board charger is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D25: Inverter Output Current	
	TROUBLE JUDGMENT
	 Check Conditions While the on board charger is allowed to be charged from the EV-ECU.
	 Judgment Criterion The system detects overcurrent detection signal by predetermined times or more at the section where voltage rises.
	 FAIL-SAFE AND BACKUP FUNCTION The AC power supply (at the supply side) is failed. The charge is stopped.
	PROBABLE CAUSEThe on board charger is failed.
	DIAGNOSIS
	 STEP 1. Recheck for diagnostic trouble code. Check again if the DTC is set in the on board charger. (1) Erase the DTC. (2) Perform the regular charge. (3) Check if the DTC is set.
	 Q: Is the DTC set? YES : Replace the on board charger/DC-DC converter (Refer to attached sheet 23). NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D26: Internal Temperature DTC P1D27: PFC Temperature DTC P1D40: Rectifier Coil Temperature DTC P1D41: Input Diode Temperature

TROUBLE JUDGMENT

Check Conditions

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

- The inside ambient temperature sensor is more than 110° C (230° F). <P1D26>
- The power factor improvement circuit temperature sensor is more than 110° C (230° F). <P1D27>
- The coil of rectification area temperature sensor is more than 110° C (230° F). <P1D40>
- The input diode area temperature sensor is more than 110° C (230° F). <P1D41>

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSES

- The EV-ECU is failed.
- There is not enough coolant.
- The water pump is failed.
- The radiator fan is failed.
- The temperature sensor installed in the on board charger is failed.

DIAGNOSIS

STEP 1. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

- **YES** : Check EV-ECU system (Refer to GROUP 54D EV-ECU – Inspection Chart for Diagnostic Trouble Code).
- NO: Go to Step 2.

STEP 2. Check the coolant.

NOTE: If the coolant largely decreases, check whether the coolant leakage exists or not. Repair it if necessary.

Check on coolant (Refer to GROUP 14 – On-vehicle Service – Coolant Check).

Q: Is the check result normal?

- YES: Go to Step 3.
- NO: Replace or supply the coolant.

STEP 3. Scan tool MB991958 actuator test.

- Refer to the Actuator Test Reference Table of the EV-ECU.
 - a. Item 3: Water pump actuate
 - b. Item 4: Radiator fan 1 actuate
 - c. Item 5: Radiator fan 2 actuate
 - d. Item 9: Water pump actuate 2

Q: Is the check result normal?

YES : Go to Step 4.

NO: Go to the check procedures for the diagnostic trouble code for the actuator which has an abnormal drive (Refer to GROUP 54D – EV-ECU – Inspection Chart for Diagnostic Trouble Code).

STEP 4. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.
- Q: Is the DTC set?
 - **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
 - **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D31: ROM/RAM Fail

TROUBLE JUDGMENT

Check Condition

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

- The ROM is abnormal (checksum is abnormal).
- or
- The RAM writing/reading error is detected.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSE

• The on board charger is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- NO: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D32: EEPROM Fail

TROUBLE JUDGMENT

Check Condition and Judgment Criterion

• The abnormality is detected when the EEPROM data are read.

FAIL-SAFE AND BACKUP FUNCTION

• The charge continues at the initial value.

PROBABLE CAUSE

• The on board charger is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D33: AD Converter Abnormal

TROUBLE JUDGMENT

Check Condition

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

• When it is detected that the AD conversion module is abnormal (if the conversion time is a time-out in the AD conversion module).

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSE

• The on board charger is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D34: Input Current Sensor Fail DTC P1D35 Output Current Sensor Fail

TROUBLE JUDGMENT

Check Conditions

• When the charging cable is connected.

Judgment Criterion

- Input current is abnormal value. <P1D34>
- The output current is abnormal value. <P1D35>

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSE

• The on board charger is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D42: Temperature Sensor

TROUBLE JUDGMENT

Check Condition

• While the on board charger is allowed to be charged from the EV-ECU.

Judgment Criterion

 The difference between the maximum value and mean value which the temperature sensors detect is less than -50° C (122° F) or more than 50° C (122° F).

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

PROBABLE CAUSE

• The on board charger is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC P1D45: Failure Detection Circuit

TROUBLE JUDGMENT

Check Conditions

• When the charging cable is connected.

Judgment Criterion

 The system detects overcurrent detection signal by predetermined times or more at the section where voltage rises.

or

- The system detects overvoltage detection signal by predetermined times or more at the rectification area.
- or
 - The system detects overcurrent detection signal by predetermined times or more at the rectification area.

FAIL-SAFE AND BACKUP FUNCTION

• The charge is stopped.

<Added>

PROBABLE CAUSE

• The on board charger is failed.

DIAGNOSIS

STEP 1. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

DTC U1100: EV ECU CAN Timeout (1)

TROUBLE JUDGMENT

Check Condition

- While the on board charger is allowed to be charged from the EV-ECU. <On board charger>
- or
 - EV-ECU is being activated. <DC-DC converter>

Judgment Criterion

• The CAN communication data cannot be received from the EV-ECU.

FAIL-SAFE AND BACKUP FUNCTION

- The charge is stopped. <On board charger>
- or
- The output is restricted. <DC-DC converter>

PROBABLE CAUSES

- The CAN bus is failed.
- The EV-ECU is failed.
- The on board charger is failed.
- or
- The DC-DC converter is failed.

DIAGNOSIS

STEP 1. Scan tool MB991958 CAN bus diagnosis.

 Using Scan tool MB991958, perform CAN bus line diagnosis.

Q: Is the check result normal?

- YES : Go to Step 2.
- **NO**: Repair CAN bus line (Refer to GROUP 54C Troubleshooting – CAN Bus Diagnostics Table).

STEP 2. Use scan tool MB991958 to confirm a DTC of other systems.

Check if DTC No. P1C16 is set.

Q: Is diagnostic trouble code set?

- **YES :** Carry out troubleshooting for DTC No. P1C16 (Refer to attached sheet 16).
- NO: Go to Step 3.

STEP 3. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is diagnostic trouble code of EV-ECU system set?

- **YES :** Check EV-ECU system (Refer to GROUP 54D EV-ECU – Inspection Chart for Diagnostic Trouble Code).
- NO: Go to Step 4.

STEP 4. Use scan tool MB991958 to confirm a DTC of other systems.

Q: Is DTC U1100 set in other ECU?

- **YES :** Replace the EV-ECU (Refer to GROUP 54D EV-ECU).
- NO: Go to Step 5.

STEP 5. Recheck for diagnostic trouble code.

Check again if the DTC is set in the on board charger.

- (1) Erase the DTC.
- (2) Perform the regular charge.
- (3) Check if the DTC is set.

Q: Is the DTC set?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

Please make the indicated changes below to the 2012 and 2013 i-MiEV Service Manual, Group 54-Chassis Electrical -> 54D-Electric Motor Unit And Traction Battery -> On Board Charger/DC-DC Converter (OBC) -> Inspection Chart for Trouble Symptoms.

ELECTRIC MOTOR UNIT AND TRACTION BATTERY ON BOARD CHARGER/DC-DC CONVERTER (OBC)

INSPECTION CHART FOR TROUBLE SYMPTOMS

M1549500800032

Item	Trouble Symptom	Inspection Procedure No.
Communication with scan tool MB991958	Communications cannot be done between scan tool MB991958 and on board charger	1
Auxiliary battery charge warning indicator	Charge warning lamp of auxiliary battery lit in READY status	2
Charging cable (charging circuit interrupting device)	Although regular charging is possible, READY indicator (green lamp) and CHARGE indicator (orange lamp) are not lit.	3
	READY indicator (green lamp) is not lit. (Regular charging is impossible.)	4
	Although READY indicator (green lamp) is lit, CHARGE indicator (orange lamp) is not lit. (Regular charging is impossible.)	5
	Although READY indicator (green lamp) and CHARGE indicator (orange lamp) are lit, regular charging is impossible.	6
	FAULT indicator (red lamp) is lit.	7
	FAULT indicator (red lamp) blinks.	8
	READY indicator (green lamp) blinks.	9

CHERE IS NO MARKING ON PART NUMBER LABEL>
<Added>

<Added>

INSPECTION CHART FOR TROUBLE SYMPTOMS <THERE IS MARKING ON PART NUMBER LABEL>

M1549500800225

Inspection Procedure No.	Inspection Item	Reference page	
1	Communications cannot be done between scan tool MB991958 and on board charger.	Refer to corresponding	
2	Charge warning light of auxiliary battery lit in READY status.	Inspection Procedure No. in the "SYMPTOM PROCEDURES <there is="" marking="" on="" part<br="">NUMBER LABEL>" section in this TSB for the new part</there>	
3	Although regular charging is possible, POWER indicator and CHARGING indicator are not lit.		
4	POWER indicator is not lit. (Regular charging is impossible.)		
5	Although POWER indicator is lit, CHARGING indicator is not lit. (Regular charging is impossible.)		
6	Although POWER indicator and CHARGING indicator are lit, regular charging is impossible.		
7	FAULT indicator is lit.		
8	FAULT indicator blinks.		
9	Power supply system of on board charger.		
10	Charging does not start, or the charging indicator is not illuminated when the charger is connected to domestic power supply.		
11	Charging time is longer than usual, or charging does not stop.		
12	Domestic circuit breaker interrupts the power supply.		
13	Electric shock.	1	

Please make the indicated changes below to the 2012 and 2013 i-MiEV Service Manual, Group 54-Chassis Electrical -> 54D-Electric Motor Unit And Traction Battery -> On Board Charger/DC-DC Converter (OBC) -> Symptom Procedures.

NOTE: Refer to the added "SYMPTOM PROCEDURES <THERE IS MARKING ON PART NUMBER LABEL>" in this TSB (37 pages) for inspection procedures on the <u>new</u> On Board Charger/DC-DC Converter.

ELECTRIC MOTOR UNIT AND TRACTION BATTERY **ON BOARD CHARGER/DC-DC CONVERTER (OBC)**

<Added>

SYMPTOM PROCEDURES

<THERE IS NO MARKING ON PART NUMBER LABEL>

Inspection Procedure 1: Communications cannot be done between scan tool MB991958 and on board charger





Wire color code

B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray R: Red P: Pink V: Violet PU: Purple SI: Silver

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TSB Revision	

SYMPTOM PROCEDURES <THERE IS MARKING ON PART NUMBER LABEL>

Inspection Procedure 1: Communications cannot be done between scan tool MB991958 and on board charger.



Wire color code B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray R: Red P: Pink V: Violet PU: Purple SI: Silver

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COMMENT ON TROUBLE SYMPTOM

• If the communications cannot be done between the scan tool MB991958 and the on board charger, the CAN bus line would be failed, the power supply circuit of the data link connector would be failed and the ground circuit would be failed. If the vehicle type is not correctly selected in the scan tool MB991958, the communication would be disabled.

PROBABLE CAUSES

- The data link connector is failed.
- Open circuits or short circuits of data link connector; or poor contact of connector
- The CAN communication is failed.
- The scan tool MB991958 is failed.
- The on board charger is failed.

DIAGNOSIS

STEP 1. Check the Vehicle Communication Interface (V.C.I.) operations.

- Connect the scan tool MB991958 to the data link connector.
- The power of Vehicle Communication Interface (V.C.I.) is turned to ON,

OK: The indicator light of the Vehicle Communication Interface (V.C.I.) illuminates in green

Q: Is the check result normal?

- YES : Go to Step 7.
- NO: Go to Step 2.



STEP 2. Check auxiliary battery.

 Check auxiliary battery (Refer to GROUP 54A – Auxiliary battery – On-vehicle Service – Battery Test).

Q: Is the check result normal?

- YES: Go to Step 3.
- **NO :** Replace the auxiliary battery.

STEP 3. Connector check: B-20 data link connector

Q: Is the check result normal?

- YES: Go to Step 4.
- NO: Repair.

STEP 4. Perform voltage measurement at B-20 data link connector.

Voltage between terminal No. 16 and ground.

OK: System voltage

Q: Is the check result normal?

- YES: Go to Step 5.
- NO: Check intermediate connectors B-303 and B-310, and repair if necessary. If intermediate connectors are normal, check and repair harness between B-20 data link connector (terminal No. 16) and auxiliary battery.
 - Check power supply line for open circuit, short circuit to ground.

STEP 5. Perform resistance measurement at B-20 data link connector.

- Resistance between terminal No. 4, No. 5 and ground.
 OK: Continuity (2 Ω or less)
- Q: Is the check result normal?
 - YES : Go to Step 6.
 - **NO :** Check intermediate connector B-34, and repair if necessary. If intermediate connector is normal, check and repair harness between B-20 data link connector (terminal No. 4 or terminal No. 5) and body ground.
 - Check grounding line for open circuit and damage.

STEP 6. Check harness between auxiliary battery and B-20 data link connector (terminal No. 16).

NOTE: Before checking harness, check intermediate connectors B-303, B-310, and repair if necessary.

• Check power supply line for damage.

Q: Is the check result normal?

YES : Refer to the scan tool MB991958 reference manual. **NO :** Repair.

STEP 7. Scan tool MB991958 CAN bus diagnosis.

• Use scan tool MB991958, perform CAN bus line diagnosis.

Q: Is the check result normal?

- **YES :** Check on board charger power supply system (Refer to Inspection Procedure 9).
- **NO :** Perform troubleshooting for CAN (Refer to GROUP 54C Troubleshooting CAN Bus Diagnostics Table).



Wire color code B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray R: Red P: Pink V: Violet PU: Purple SI: Silver

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COMMENT ON TROUBLE SYMPTOM

- When detects abnormalities, the DC-DC converter should send the signal to the EV-ECU. The EV-ECU receives the signal and then lights the charge warning lamp of the auxiliary battery of the combination meter.
- If the charge warning lamp of the auxiliary battery is lit in the READY state, the DC-DC converter can be failed, or the circuit of the DC-DC converter would be failed.

PROBABLE CAUSES

- The auxiliary battery is failed.
- The DC-DC converter is failed.
- Open circuits of DC-DC converter, short circuits to ground or damage; poor contact of connector
- The EV-ECU is failed.

DIAGNOSIS

A DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.

STEP 1. Check auxiliary battery.

- Connect the scan tool MB991958 to the data link connector.
- Check auxiliary battery (Refer to GROUP 54A Auxiliary battery On-vehicle Service Battery Test).

Q: Is the check result normal?

- YES : Go to Step 2.
- **NO:** Replace the auxiliary battery.

STEP 2. Perform the voltage measurement at the fusible link box.

- Electric motor switch: READY
- Voltage between fuse (120 A) terminal of terminal No. 26 and ground.

OK: 14.0 V or more

Q: Is the check result normal?

- YES : Go to Step 3.
- NO: Go to Step 8.

STEP 3. Connector check: E-03 on board charger/DC-DC converter connector

Q: Is the check result normal?

- YES : Go to Step 4.
- NO: Repair.

STEP 4. Perform voltage measurement at E-03 on board charger/DC-DC converter connector.

- Disconnect connector, and measure at harness side.
- Electric motor switch: ON
- Voltage between terminal No. 7 and ground.

OK: System voltage

Q: Is the check result normal?

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



STEP 5. Check harness between auxiliary battery and E-03 on board charger/DC-DC converter connector (terminal No. 7).

NOTE: Before checking harness, check intermediate connector A-107, and repair if necessary.

• Check power supply line for open circuit, short circuit to 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 Malfunctions).
- NO: Repair.

STEP 6. Check harness between auxiliary battery and E-03 on board charger/DC-DC converter connector (terminal No. 7).

NOTE: Before checking harness, check intermediate connector A-107, and repair if necessary.

• Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 7.

NO: Repair.

STEP 7. Check the trouble symptom.

Q: Does the trouble symptom persist?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

STEP 8. Connector check: E-03 on board charger/DC-DC converter connector

Q: Is the check result normal?

YES : Go to Step 9. **NO :** Repair.

STEP 9. Perform resistance measurement at E-03 on board charger/DC-DC converter connector.

- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 10 and ground.

OK: Continuity (2 Ω or less)

Q: Is the check result normal?

YES: Go to Step 10.

- NO: Check intermediate connector C-104, and repair if necessary. If intermediate connector is normal, check and repair harness between E-03 on board charger/DC-DC converter connector (terminal No. 10) and body ground.
 - Check grounding line for open circuit and damage.

STEP 10. Perform voltage measurement at E-03 on board charger/DC-DC converter connector.

- Disconnect connector, and measure at harness side.
- Electric motor switch: ON
- Voltage between terminal No. 8 and ground.

OK: System voltage

Q: Is the check result normal?

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

STEP 11. Connector check: A-08X EV control relay connector

Q: Is the check result normal?

- YES : Check intermediate connectors B-27, C-40, C-102 and C-112, and repair if necessary. If intermediate connector is normal, check and repair harness between A-08X EV control relay connector (terminal No. 1) and E-03 on board charger/DC-DC converter connector (terminal No. 8).
 - Check power supply line for open circuit, short circuit to ground.

NO: Repair.

STEP 12. Connector check: A-08X EV control relay connector

Q: Is the check result normal?

- YES : Go to Step 13.
- NO: Repair.

STEP 13. Check harness between A-08X EV control relay connector (terminal No. 1) and E-03 on board charger/DC-DC converter connector (terminal No. 8).

NOTE: Before checking harness, check intermediate connectors B-27, C-40, C-102 and C-112, and repair if necessary.

- Check power supply line for damage.
- Q: Is the check result normal?
 - YES: Go to Step 14.
 - NO: Repair.

STEP 14. Connector check: C-111 EV-ECU connector

Q: Is the check result normal?

- YES : Go to Step 15.
- NO: Repair.

STEP 15. Check harness between C-111 EV-ECU connector (terminal No. 116) and E-03 on board charger/DC-DC converter connector (terminal No. 4).

• Check signal line for open circuits, short circuits to ground and damage.

Q: Is the check result normal?

- YES: Go to Step 16.
- NO: Repair.

STEP 16. Check harness between C-111 EV-ECU connector (terminal No. 127) and E-03 on board charger/DC-DC converter connector (terminal No. 11).

• Check signal line for open circuits, short circuits to ground and damage.

Q: Is the check result normal?

- YES: Go to Step 17.
- NO: Repair.

STEP 17. Connector check: E-01 on board charger/DC-DC converter connector

Q: Is the check result normal?

- YES : Go to Step 18.
- NO: Repair.

STEP 18. Check harness between auxiliary battery and E-01 on board charger/DC-DC converter connector (terminal No. 1).

• Check output line for open circuits, short circuits to ground and damage.

Q: Is the check result normal?

- YES : Go to Step 19.
- NO: Repair.



STEP 19. Fuse continuity check between on board charger and inverter.

\land DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.
- Check continuity of fuse both ends
 OK: Continuity
- Q: Is the check result normal?
 - YES : Go to Step 20.
 - **NO :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23) and the fuse.

STEP 20. Connector check: G-13 intermediate connector

Q: Is the check result normal?

- YES: Go to Step 21.
- NO: Repair.

STEP 21. Check harness between G-13 intermediate connector and inverter and on board charger/DC-DC converter connector.

• Check power supply line for open circuit and damage.

Q: Is the check result normal?

- YES : Go to Step 22.
- **NO :** Repair or replace the on board charger/DC-DC converter (Refer to attached sheet 23).

STEP 22. Connector check: G-05 inverter (– terminal) connector

Q: Is the check result normal?

- YES: Go to Step 23.
- NO: Repair.

STEP 23. Check harness between G-13 intermediate connector (terminal No. 2) and G-05 inverter (– terminal) connector (terminal No. 1).

• Check power supply line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 7.

NO: Repair.

Inspection Procedure 3: Although regular charging is possible, POWER indicator and CHARGING indicator are not lit.

COMMENTS ON TROUBLE SYMPTOM

If the POWER indicator and the CHARGING indicator are not lit although the regular charging is enabled, the indicator circuit may be failed.

PROBABLE CAUSE

• The charging cable is failed.

DIAGNOSIS

STEP 1. Check the trouble symptom.

• Connect the charging cable with home sockets. At that time, check that the POWER indicator is lit, also the CHARGING indicator and the FAULT indicator are momentarily lit.

Q: Does the trouble symptom persist?

- **YES** : Replace the charging cable.
- NO: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points How to Cope with Intermittent Malfunctions).

Inspection Procedure 4: POWER indicator is not lit. (Regular charging is impossible.)

COMMENTS ON TROUBLE SYMPTOM

When the charging cable is connected with electrical outlets, the POWER indicator should be lit. If the POWER indicator is not lit, the AC power supply (supply side) or the charging cable may be failed.

PROBABLE CAUSES

- The AC power supply (supply side) is failed.
- The charging cable is failed.

DIAGNOSIS

STEP 1. Check the trouble symptom.

• Connect the charging cable with electrical outlets. At that time, check that the POWER indicator is lit, also the CHARGING indicator and the FAULT indicator are momentarily lit.

Q: Does the trouble symptom persist?

- **YES :** Replace the charging cable.
- **NO :** Check the AC power supply usage conditions used by the users.

Inspection Procedure 5: Although POWER indicator is lit, CHARGING indicator is not lit. (Regular charging is impossible.)



Wire color code

B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray R: Red P: Pink V: Violet PU: Purple SI: Silver



COMMENTS ON TROUBLE SYMPTOM

When the regular charging starts, the CHARGING indicator should be lit. When the traction battery is fully charged, the CHARGING indicator should be extinguished. If the CHARGING indicator is not lit even though the traction battery is not fully charged, the pilot signal from the regular charging may be failed.



PROBABLE CAUSES

- The charging cable is failed.
- Open circuits of pilot signal circuit and damage; poor contacts of connector
- The on board charger is failed.

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DIAGNOSIS

A DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.

STEP 1. Check the trouble symptom.

Q: Does the trouble symptom persist?

- YES : Go to Step 2.
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

STEP 2. Check pilot signal terminal itself.

 Check Charging Cable (Refer to GROUP 54D – On Board Charger/DC-DC Converter – On-vehicle Service).

Q: Is the check result normal?

- YES: Go to Step 3.
- NO: Replace the charging cable.

STEP 3. Connector check: G-03 regular charging connector and E-03 on board charger/DC-DC converter connector

Q: Is the check results normal?

- YES: Go to Step 4.
- NO: Repair or replace the connector.

STEP 4. Check harness between G-03 regular charging connector (terminal No. 3) and E-03 on board charger/DC-DC converter (terminal No. 9).

NOTE: Before checking harness, check intermediate connector G-12, and repair if necessary.

• Check signal line for open circuits and damage.

Q: Is the check result normal?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Repair the damaged harness wire.

Inspection Procedure 6: Although POWER indicator and CHARGING indicator are lit, regular charging is impossible.



NOTE

★:Indicates the high voltage cables, wiring harnesses or connectors.

Wire color code B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray R: Red P: Pink V: Violet PU: Purple SI: Silver

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COMMENTS ON TROUBLE SYMPTOM

When the regular charging starts, the CHARGING indicator should be lit. When the traction battery is fully charged, the CHARGING indicator should be extinguished.

If charging is disabled although the POWER indicator and the CHARGING indicator are lit, the regular charging connector connection signal circuits or the regular charging high voltage system circuits may be failed.

PROBABLE CAUSES

- The charging cable is failed.
- Open circuits of regular charging connector signal circuits, short circuits to ground and damage; poor contacts of connector
- Open circuits of regular charging high voltage system circuits or poor contacts of connector
- The on board charger is failed.

DIAGNOSIS

A DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.

STEP 1. Use scan tool MB991958 to confirm a DTC.

Q: Is diagnostic trouble code set?

- **YES :** Inspection chart for diagnostic trouble code (Refer to attached sheet 16).
- NO: Go to Step 2.

STEP 2. Scan tool MB991958 data list.

- EV-ECU Data list reference table (GROUP 54D EV-ECU
 - Service Data Reference Table).
 - a. Item 207: OBC connecting signal

Q: Is the check result normal?

- YES : Go to Step 8.
- NO: Go to Step 3.

STEP 3. Check the regular charging plug built-in switch itself.

 Check Charging Cable (Refer to GROUP 54D – On Board Charger/DC-DC Converter – On-vehicle Service).

Q: Is the check result normal?

- YES : Go to Step 4.
- NO: Replace the charging cable.

STEP 4. Connector check: G-03 regular charging connector and E-03 on board charger/DC-DC converter connector

Q: Is the check results normal?

- YES: Go to Step 5.
- NO: Repair or replace the connector.

STEP 5. Check harness between G-03 regular charging connector (terminal No. 3) and E-03 on board charger/DC-DC converter connector (terminal No. 9).

NOTE: Before checking harness, check intermediate connector G-12, and repair if necessary.

• Check signal line for open circuits, short circuits to ground and damage.

Q: Is the check result normal?

- YES: Go to Step 6.
- **NO :** Repair the damaged harness wire.

STEP 6. Check harness between G-03 regular charging connector (terminal No. 5) and ground.

• Check grounding line for open circuit and damage.

Q: Is the check result normal?

- YES : Go to Step 7.
- **NO :** Repair the damaged harness wire.

STEP 7. Check the trouble symptom.

Q: Does the trouble symptom persist?

- **YES :** Replace the EV-ECU (Refer to GROUP 54D EV-ECU).
- NO: Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points How to Cope with Intermittent Malfunctions).

STEP 8. Connector check: G-03 regular charging connector and G-11 on board charger/DC-DC converter connector

- A DANGER
- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.
- Q: Are the check results normal?
 - YES : Go to Step 10.
 - **NO :** Repair or replace the connector.

STEP 10. Check harness between G-03 regular charging connector and G-11 on board charger/DC-DC converter connector.

- a. Check and repair harness between G-03 regular charging connector (terminal No. 1) and G-11 on board charger/DC-DC converter connector (terminal No. 1).
- b. Check and repair harness between G-03 regular charging connector (terminal No. 2) and G-11 on board charger/DC-DC converter connector (terminal No. 2).
 - Check power supply line for open circuit.
- Q: Are the check results normal?
 - YES : Go to Step 11.
 - **NO :** Repair the damaged harness wire.

STEP 11. Check the trouble symptom.

Q: Does the trouble symptom persist?

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).
Inspection Procedure 7: FAULT indicator is lit.

COMMENTS ON TROUBLE SYMPTOM

When detecting the internal circuit abnormalities, the charging circuit interrupting device should light the FAULT indicator.

PROBABLE CAUSE

• The charging cable is failed.

DIAGNOSIS

STEP 1. Check the trouble symptom.

Q: Does the trouble symptom persist?

- **YES :** Replace the charging cable.
- **NO :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunctions).

Inspection Procedure 8: FAULT indicator blinks.

Regular charge port signal circuit and regular charging high voltage system circuit



NOTE

★:Indicates the high voltage cables, wiring harnesses or connectors.

Wire color code

B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray R: Red P: Pink V: Violet PU: Purple SI: Silver

Connector: E-03



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COMMENTS ON TROUBLE SYMPTOM

When detecting pilot signal abnormalities or ground leakages of regular charging high voltage circuits, the charging circuit interrupting device should blink the FAULT indicator.

PROBABLE CAUSE

- The charging cable is failed.
- Ground leakage of regular charging high voltage system circuits.
- Short circuit to ground of pilot signal circuit.
- The on board charger is failed.

DIAGNOSIS

\land DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.

STEP 1. Check charging cable itself.

 Check Charging Cable (Refer to GROUP 54D – On Board Charger/DC-DC Converter – On-vehicle Service).

Q: Is the check result normal?

- YES : Go to Step 2.
- **NO :** Replace the charging cable.

STEP 2. Connector check: G-03 regular charging connector and E-03 on board charger/DC-DC converter connector

Q: Are the check results normal?

- YES: Go to Step 3.
- **NO:** Repair or replace the connector.

STEP 3. Check harness between G-03 regular charging connector (terminal No. 3) and E-03 on board charger/DC-DC converter (terminal No. 9).

NOTE: Before checking harness, check intermediate connector G-12, and repair if necessary.

• Check signal line for short circuits to ground.

- YES : Go to Step 4.
- **NO :** Repair the damaged harness wire.

A DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.

Q: Is the check result normal?

- YES : Go to Step 5.
- NO: Repair or replace the connector.

STEP 5. Check the G-03 regular charging connector for the insulation resistance.

When the insulation resistance is measured, set the range of the special tool electric insulation tester (MB992355) to 500 V. When the insulation resistance is measured at the range more than 500 V, the component may be damaged.

- Disconnect connector, and measure at harness side.
- Disconnect G-11 on board charger/DC-DC converter connector.
- Use special tool electric insulation tester (MB992355), to set the range to 500 V.
- Insulation resistance between (terminal No. 1) and body ground.
 - OK: 10 M Ω or more

- YES : Go to Step 6.
- **NO :** Replace harness between G-03 regular charging connector (terminal No. 1) and G-11 on board charger/DC-DC converter connector (terminal No. 1).

STEP 6. Check the G-03 regular charging connector for the insulation resistance.

When the insulation resistance is measured, set the range of the special tool electric insulation tester (MB992355) to 500 V. When the insulation resistance is measured at the range more than 500 V, the component may be damaged.

- Disconnect connector, and measure at harness side.
- Disconnect G-11 on board charger/DC-DC converter connector.
- Use special tool electric insulation tester (MB992355), to set the range to 500 V.
- Insulation resistance between terminal No. 2 and body ground.
 - OK: 10 $M\Omega$ or more

- **YES :** Replace the on board charger/DC-DC converter (Refer to attached sheet 23).
- **NO :** Replace harness between G-03 regular charging connector (terminal No. 2) and G-11 on board charger/DC-DC converter connector (terminal No. 2).



Wire colour code

B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Grey R: Red P: Pink V: Violet PU: Purple SI: Silver

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C-106 (GR)



AKA00723AC

PROBABLE CAUSES

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- The on board charger is failed.
- The relay of the on board charger is failed.
- Open circuits of on board charger power supply, short circuits to ground or damage; poor contact of connector
- The EV-ECU is failed.

DIAGNOSIS

STEP 1. Check auxiliary battery

 Check auxiliary battery (Refer to GROUP 54A – Auxiliary battery – On-vehicle Service – Battery Test).

- YES : Go to Step 2.
- **NO :** Replace the auxiliary battery.

STEP 2. Connector check: A-06X on board charger relay connector

Q: Is the check result normal?

- YES: Go to Step 3.
- NO: Repair.

STEP 3. Check on board charger relay itself.

Check on board charger relay itself (Refer to GROUP 54D – On Board Charger/DC-DC Converter – On-vehicle Service).

Q: Is the check result normal?

- YES: Go to Step 4.
- NO: Replace the on board charger relay.

STEP 4. Perform voltage measurement at A-06X on board charger relay.

- Remove the relay, and measure at relay box side.
- Voltage between terminal No. 4 and ground.

OK: System voltage

Q: Is the check result normal?

- YES : Go to Step 5.
- **NO :** Check and repair harness between A-06X on board charger relay connector (terminal No. 4) and auxiliary battery.
 - Check power supply line for open circuit, short circuit to ground.

STEP 5. Perform voltage measurement at A-06X on board charger relay.

- Remove the relay, and measure at relay box side.
- Electric motor switch: ON
- Voltage between terminal No. 3 and ground.

OK: System voltage

Q: Is the check result normal?

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

STEP 6. Connector check: A-08X EV control relay connector

Q: Is the check result normal?

- **YES :** Check and repair harness between A-08X EV control relay connector (terminal No. 1) and A-06X on board charger relay connector (terminal No. 3).
 - Check power supply line for open circuit, short circuit to ground.
- NO: Repair.

STEP 7. Connector check: C-108 EV-ECU connector

- YES : Go to Step 8.
- NO: Repair.

STEP 8. Perform voltage measurement at C-108 EV-ECU connector.

- Disconnect connector, and measure at harness side.
- Electric motor switch: ON (Do not connect the scan tool MB991958 with the data link connector.)
- Voltage between terminal No. 66 and ground.

OK: System voltage

Q: Is the check result normal?

YES: Go to Step 9.

- NO: Check intermediate connector B-27, and repair if necessary. If intermediate connector is normal, check and repair harness between A-06X on board charger relay connector (terminal No. 2) and C-108 EV-ECU connector (terminal No. 66).
 - Check power supply line for open circuit, short circuit to ground.

STEP 9. Check harness between auxiliary battery and A-06X on board charger relay connector (terminal No. 4).

• Check power supply line for damage.

Q: Is the check result normal?

- YES: Go to Step 10.
- NO: Repair.

STEP 10. Check harness between A-08X EV control relay connector (terminal No. 1) and A-06X on board charger relay connector (terminal No. 3).

• Check power supply line for damage.

Q: Is the check result normal?

- YES: Go to Step 11.
- NO: Repair.

STEP 11. Check harness between A-06X on board charger relay connector (terminal No. 2) and C-108 EV-ECU connector (terminal No. 66).

NOTE: Before checking harness, check intermediate connector *B*-27, and repair if necessary.

• Check power supply line for damage.

Q: Is the check result normal?

- YES : Go to Step 12.
- NO: Repair.

STEP 12. Connector check: E-03 on board charger/DC-DC converter connector

Q: Is the check result normal?

YES : Go to Step 13.

NO: Repair.

STEP 13. Check harness between A-06X on board charger relay connector (terminal No. 1) and E-03 on board charger/DC-DC converter connector (terminal No. 2).

NOTE: Before checking harness, check intermediate connector A-105, and repair if necessary.

• Check power supply line for open circuit, short circuit to ground and damage to ground.

Q: Is the check result normal?

YES: Go to Step 14.

NO: Repair.

STEP 14. Perform resistance measurement at E-03 on board charger/DC-DC converter connector.

- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 10 and ground.

OK: Continuity (2 Ω or less)

Q: Is the check result normal?

YES: Go to Step 15.

- NO: Check intermediate connector C-104, and repair if necessary. If intermediate connector is normal, check and repair harness between E-03 on board charger/DC-DC converter connector (terminal No. 10) and body ground.
 - Check grounding line for open circuit and damage.

STEP 15. Check of connection state: ground cable terminal.

 Check of the on board charger/DC-DC converter side terminal or body ground side terminal.

Q: Is the check result normal?

- YES: Go to Step 16.
- NO: Repair.

STEP 16. Perform resistance measurement at ground cable terminal of the on board charger/DC-DC converter side.

- Disconnect terminal of he on board charger/DC-DC converter side, and measure at ground cable side.
- Resistance between ground cable terminal and body ground.

OK: Continuity (2 Ω or less)

- YES: Go to Step 17.
- **NO :** Replace and check ground cable for open circuit and damage.

STEP 17. Perform voltage measurement at E-03 on board charger/DC-DC converter connector.

- Disconnect connector, and measure at harness side.
- Voltage between terminal No. 7 and ground.
 - OK: System voltage

Q: Is the check result normal?

YES: Go to Step 18.

- NO: Check intermediate connector C-107, and repair if necessary. If intermediate connector is normal, check and repair harness between E-03 on board charger/DC-DC converter connector (terminal No. 7) and auxiliary battery.
 - Check power supply line for open circuit, short circuit to ground.

STEP 18. Check harness between auxiliary battery and E-03 on board charger/DC-DC converter connector (terminal No. 7).

NOTE: Before checking harness, check intermediate connector A-107, and repair if necessary.

• Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 19.

NO: Repair.

STEP 19. Connector check: C-106 EV-ECU connector

Q: Is the check result normal?

YES : Go to Step 20. **NO :** Repair.

STEP 20. Check harness between C-106 EV-ECU connector (terminal No. 11) and E-03 on board charger/DC-DC converter connector (terminal No. 12).

NOTE: Before checking harness, check intermediate connector C-102, and repair if necessary.

• Check signal line for damage.

Q: Is the check result normal?

YES: Go to Step 21.

NO: Repair.

STEP 21. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Go to Step 22.

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

STEP 22. After replacing the on board charger/DC-DC converter, check the malfunction phenomenon.

• After replacing the on board charger/DC-DC converter (Refer to attached sheet 23), the malfunction phenomenon reoccurs or not.

Q: Does the trouble symptom persist?

- **YES :** Replace the EV-ECU (Refer to GROUP 54D EV-ECU).
- NO: Check end.





COMMENTS ON TROUBLE SYMPTOM

- The cause is assumed to be malfunction of backup power supply in the EV-ECU.
- The cause is assumed to be low environment temperature at charging.

PROBABLE CAUSES

- Damaged wiring harness or connector(s)
- Malfunction of the fuse and fusible link
- · Malfunction of the charging cable
- Malfunction of the on board charger/DC-DC converter
- Malfunction of the domestic power supply facility

DIAGNOSIS

\land DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.

STEP 1. Charging cable check.

Check if the fault indication of the electric leakage breaker incorporated in the charging cable is flashing.

- YES : Go to Step 2.
- **NO :** Replace the charging cable.

STEP 2. Connector check: C-106 EV-ECU connector

Q: Is the check result normal?

- YES : Go to Step 3.
- **NO :** Repair the damaged connector.

STEP 3. Voltage measurement at C-106 EV-ECU connector.

- (1) Disconnect the connector and measure at the wiring harness side.
- (2) Measure the voltage between the C-106 EV-ECU connector (terminal No. 1) and the ground.

OK: Battery voltage

Q: Is the check result normal?

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

STEP 4. Check the wiring harness between C-106 EV-ECU connector (terminal No. 1) and the fusible link No. 25.

Check the power supply line for open circuit and short circuit. *NOTE:*

- Before the wiring harness check, check fuse No. 13, and repair if necessary.
- Before the wiring harness check, check B-301 and B-310 junction block connector, and repair if necessary.

Q: Is the check result normal?

- YES : Check to the combination meter troubeshooting (Refer to GROUP 54A – Combination meter – Inspection Procedure "When the reset witch is operated with the electric motor switch at OFF position, the odo/trip meter is not displayed").
- **NO:** Repair the fuse or wiring harness. Then go to Step 5.

STEP 5. Check whether the DTC is set.

Check if the diagnostic trouble code is set in the EV-ECU.

Q: Is the DTC set?

- **YES** : Carry out the troubleshooting for the relevant DTC (Refer to GROUP 54D – EV-ECU – Inspection Chart for Diagnostic Trouble Code).
- **NO**: Go to Step 6.

STEP 6. Charging lamp check.

Check that the charging lamp flashes when the charging cable is connected, and it is illuminated permanently when the charging starts.

- **YES :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction).
- **NO :** Check the charging cable (Refer to GROUP 54D On Board Charger/DC-DC Converter – On-vehicle Service). Then go to Step 7.

STEP 7. Connector check: G-03 regular charging connector, G-11 on board charger/DC-DC converter connector

Q: Is the check result normal?

- YES : Go to Step 8.
- **NO :** Repair the damaged connector. Or replace the charging cable (Refer to GROUP 54D On Board Charger/DC-DC Converter Charging Cable).

STEP 8. Check the wiring harness between G-03 regular charging connector (terminal No. 1, 2, 4, 5) to G-11 on board charger/DC-DC converter connector (terminal No. 1, 2) and the body ground.

Check the power supply and ground lines for open circuit.

Q: Is the check result normal?

- YES: Go to Step 9.
- NO: Repair the wiring harness. Or replace the charging cable (Refer to GROUP 54D On Board Charger/DC-DC Converter Charging Cable).

STEP 9. Connector check: E-03 on board charger/DC-DC converter connector

Q: Is the check result normal?

- YES: Go to Step 10.
- **NO :** Repair the damaged connector.

STEP 10. Check the wiring harness between C-106 EV-ECU connector (terminal No. 11) and E-03 on board charger/DC-DC converter connector (terminal No. 12).

Check the signal lines for open circuit.

Q: Is the check result normal?

- YES: Go to Step 11.
- **NO :** Repair the wiring harness.

STEP 11. Check the wiring harness between E-03 on board charger/DC-DC converter connector (terminal No. 7) and relay box fuse (No. 11).

Check the signal lines for open circuit.

Q: Is the check result normal?

- YES: Go to Step 12.
- **NO :** Repair the wiring harness.

STEP 12. Check the trouble symptom.

- **YES :** The diagnosis is complete.
- **NO**: Check the domestic power supply facility. Or replace the on board charger/DC-DC converter (Refer to attached sheet 23).

Inspection Procedure 11: Charging time is longer than usual, or charging does not stop.

COMMENTS ON TROUBLE SYMPTOM

• The cause is assumed to be low environment temperature at charging.

PROBABLE CAUSES

- Use of an extension cable
- Malfunction of the domestic power supply facility
- Simultaneous use with other electric products in the home

DIAGNOSIS

STEP 1. Check whether the DTC is set.

Check if the DTC is set in the on board charger.

Q: Is the DTC set?

- **YES :** Carry out the troubleshooting for the relevant DTC (Refer to attached sheet 16).
- **NO :** Go to Step 2.

STEP 2. Check the trouble symptom.

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 Malfunctions).
- **NO :** Check the domestic power supply facility.

Inspection Procedure 12: Domestic circuit breaker interrupts the power supply.

PROBABLE CAUSES

- Simultaneous use with other household electric appliances in the home
- An adapter or the like is connected to the charging cable plug
- Malfunction of the charging cable
- Malfunction of the on board charger
- Malfunction of the domestic power supply facility

DIAGNOSISE

STEP 1. Charging cable check.

Check if the fault indication of the electric leakage breaker incorporated in the charging cable is flashing. Then, check the charging cable (Refer to GROUP 54D – On Board Charger/DC-DC Converter – On-vehicle Service).

- YES : Go to Step 2.
- **NO :** Replace the charging cable. Then go to Step 2.

STEP 2. Check the current capacity of the domestic power supply facility.

Check if the current capacity is lower than the current limit of the electric leakage breaker incorporated in the charging cable.

Q: Is the check result normal?

YES: Go to Step 3.

NO: Repair the domestic power supply facility.

STEP 3. Check the trouble symptom.

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 Malfunctions).
- **NO :** Check the domestic power supply facility for electric leakage.

Inspection Procedure 13: Electric shock

REGULAR CHARGING CONTROL SYSTEM CIRCUIT



- Use of an extension cable
- Malfunction of the domestic power supply facility
- Malfunction of the charging cable

DIAGNOSIS

\land DANGER

- When high voltage system components are serviced, be sure to remove service plug to shut down high voltage (Refer to GROUP 00 Precautions before service, Precautions on how to use the high-voltage vehicle).
- When removing service plug, wear the specified protective equipment.

STEP 1. Connector check: G-03 regular charging connector

Q: Is the check result normal?

- YES : Go to Step 2.
- NO : Correct the connector, or replace the charging cable (Refer to GROUP 54D On Board Charger/DC-DC Converter Charging Cable).

STEP 2. Check the wiring harness between G-03 regular charging connector (terminal No. 5) and the body ground. Check the ground line for open circuit.

Q: Is the check result normal?

- YES: Go to Step 3.
- NO: Correct the wiring harness or replace the charging cable (Refer to GROUP 54D – On Board Charger/ DC-DC Converter – Charging Cable).

STEP 3. Check the trouble symptom.

- **YES :** Intermittent malfunction (Refer to GROUP 00 How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction).
- **NO :** Check the ground circuit of the domestic power supply facility.

Please make the indicated changes below to the 2012 and 2013 i-MiEV Service Manual, Group 54-Chassis Electrical -> 54D-Electric Motor Unit And Traction Battery -> On Board Charger/DC-DC Converter (OBC) -> Removal and Installation.

ELECTRIC MOTOR UNIT AND TRACTION BATTERY ON BOARD CHARGER/DC-DC CONVERTER (OBC)

ON BOARD CHARGER/DC-DC CONVERTER (OBC)

REMOVAL AND INSTALLATION

A DANGER

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- When servicing the high-voltage system parts, be sure to wear the specified protection equipment and disconnect the service plug to interrupt the high-voltage supply (Refer to P.54D-3).
- Do not disassemble any on board charger/DC-DC converter other than those described in this manual.



ELECTRIC MOTOR UNIT AND TRACTION BATTERY **ON BOARD CHARGER/DC-DC CONVERTER (OBC)**



ing hoses.<There is marking on part number label>



<Added>



>>BB<< CONNECTOR COVER INSTALLATION<THERE IS MARKING ON PART NUMBER LABEL>

- 1. Connect the connector.
- 2. Mount the connector cover according to the rotation stop and tighten the mounting bolt

Tightening torque: 5.5 \pm 1.5 N·m (49 \pm 13 in-lb) NOTE:

- The connector cover is mounted on an angle by the rotation stop.
- After installing the connector cover, the harness is bent (A part in the illustration), but there is no problem with the performance as a harness.

>>CC<< GROUND CABLE INSTALLATION<THERE IS MARKING ON PART NUMBER LABEL>

Mount the ground cable according to the rotation stop and tighten the mounting bolt with the specified torque.

Tightening torque: 5.0 \pm 1.0 N·m (44 \pm 8 in-lb)