IMPORTANT

WARNING/CAUTION/NOTE

Please read this manual and follow its instructions carefully. To emphasize special information, the words **⚠ WARNING**, **⚠ CAUTION** and **NOTE** have special meanings. Pay special attention to the messages highlighted by these signal words.

⚠ WARNING

Indicates a potential hazard that could result in death or injury.

⚠ CAUTION

Indicates a potential hazard that could result in vehicle damage.

NOTE:

Indicates special information to make maintenance easier or instructions clearer.

⚠ WARNING

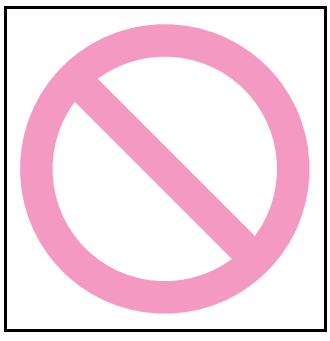
This service manual is intended for authorized Suzuki dealers and qualified service technicians only. Inexperienced technicians or technicians without the proper tools and equipment may not be able to properly perform the services described in this manual.
Improper repair may result in injury to the technician and may render the vehicle unsafe for the driver and passengers.

⚠ WARNING

For vehicles equipped with a Supplemental Restraint (Air Bag) System:

- **Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to "Air Bag System Components and Wiring Location View" under "General Description" in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and "Service Precautions" under "On-Vehicle Service" in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.**
- **If the air bag system and another vehicle system both need repair, Suzuki recommends that the air bag system be repaired first, to help avoid unintended air bag system activation.**
- **Do not modify the steering wheel, instrument panel or any other air bag system component on or around air bag system components or wiring. Modifications can adversely affect air bag system performance and lead to injury.**
- **If the vehicle will be exposed to temperatures over 93 °C (200 °F), for example, during a paint baking process, remove the air bag system components, that is air bag (inflator) modules, SDM and/or seat belt with pretensioner, beforehand to avoid component damage or unintended activation.**

The circle with a slash in this manual means "Don't do this" or "Don't let this happen".



FOREWORD

This SUPPLEMENTARY SERVICE MANUAL is a supplement to SX4 (RW415/RW416) SERVICE MANUAL.
It has been prepared exclusively for the following applicable model.

Applicable model:
SX4 (RW416) TAIWAN model

This supplementary service manual describes only different service information of the above applicable model as compared with SX4 (RW415/RW416) SERVICE MANUAL. Therefore, whenever servicing the above applicable models, consult this supplement first. And for any section, item or description not found in this supplement, refer to the related manual below.

When replacing parts or servicing by disassembling, it is recommended to use SUZUKI genuine parts, tools and service materials as specified in each description.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. And used as the main subject of description is the vehicle of standard specifications among others.
Therefore, note that illustrations may differ from the vehicle being actually serviced.
The right is reserved to make changes at any time without notice.

Related Manuals:

Manual Name	Manual No.
SX4 (RW415/RW416) SERVICE MANUAL	99500-52L10-01E

SUZUKI MOTOR CORPORATION

TABLE OF CONTENTS

Section 10

Control Systems

CONTENTS

Body Electrical Control System

Precautions

Precautions in Diagnosing Trouble

S7RW0BA200001

- Diagnostic information stored in BCM memory can be cleared as well as checked by using SUZUKI scan tool. Before using scan tool, read its Operator's (Instruction) Manual carefully to have good understanding as to what functions are available and how to use it.
- Be sure to read "Precautions for Electrical Circuit Service in Section 00 in related manual" before inspection and observe what is written there.
- Communication of ECM, TCM (A/T model), ABS control module, keyless start control module (if equipped), combination meter and BCM is established by CAN (Controller Area Network). For detail of CAN communication for BCM, refer to "CAN Communication System Description". Therefore, handle CAN communication line with care referring to "Precaution for CAN Communication System in Section 00 in related manual".

General Description

BCM General Description

S7RW0BA201001

The BCM incorporates relays and controllers which are used for the following systems and controls them.

- Power door lock
- Keyless entry
- Door lock function of keyless start system (if equipped)
- Rear wiper (if equipped)
- Combination meter
- Interior light
- Warning buzzer
- Rear end door window / back window defogger
- Rear end door opener (Hatchback)
- Trunk lid opener function of keyless start system (if equipped)
- Theft deterrent light
- Clearance light
- Front fog light (if equipped)
- Panic alarm function

Also, the BCM has a function to cause the interior light and open door warning light in the combination meter to turn off when any door is left open for longer than 15 minutes to reduce wasteful battery consumption.
In addition, it is possible to check operation of actuator which is controlled by BCM by using the output test function of SUZUKI scan tool to operate actuator simulatively.

CAN Communication System Description

S7RW0BA201002

Refer to "CAN Communication System Description in Section 1A in related manual" for CAN communication system description.
BCM communication control data with each control module as follows.

BCM Transmission Data

				ECM	Combination Meter	Keyless Start Control Module (if equipped)
BCM	Transmit	DATA	A/C switch ON signal	○		
			Electric load signal	○		
			Brake fluid level switch signal		○	
			Parking brake switch signal		○	
			Diagnostic trouble code (DTC)		○	
			Illumination ON signal		○	
			Seat belt buckle switch signal		○	
			Charging system signal		○	○
			Engine oil pressure switch signal		○	○
			Door switch status		○	○
			Door lock status			○
			Trunk lid switch status			○

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BCM Reception Data

				ECM	TCM (A/T model)	Combination Meter	Keyless Start Control Module (if equipped)
BCM	Receive	DATA	Engine speed signal	○			
			Engine coolant temperature signal	○			
			Vehicle speed signal	○			
			Brake pedal switch signal	○			
			A/C compressor clutch signal	○			
			A/C refrigerant pressure signal	○			
			Fuel consumption signal	○			
			Engine type signal	○			
			Transmission range sensor signal		○		
			Combination meter spec signal			○	
			Ignition knob switch signal				○
			Door lock/unlock request signal				○
			Trunk lid open request signal				○
			Buzzer request signal				○
			Answer back request signal				○
			Panic alarm request signal				○

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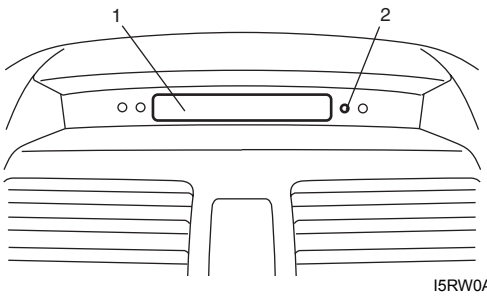
Theft Deterrent Light Description

S7RW0BA201003

The information display or clock (1) of this vehicle includes a theft deterrent light (2) for the theft preventive purpose. The BCM makes the theft deterrent light flash at certain intervals after the ignition switch is turned off until it is turned on again. Also, DTCs stored in BCM can be checked by reading the flashing patterns of the theft deterrent light when diagnosing troubles.



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Schematic and Routing Diagram

Body Electrical Control System Wiring Circuit Diagram

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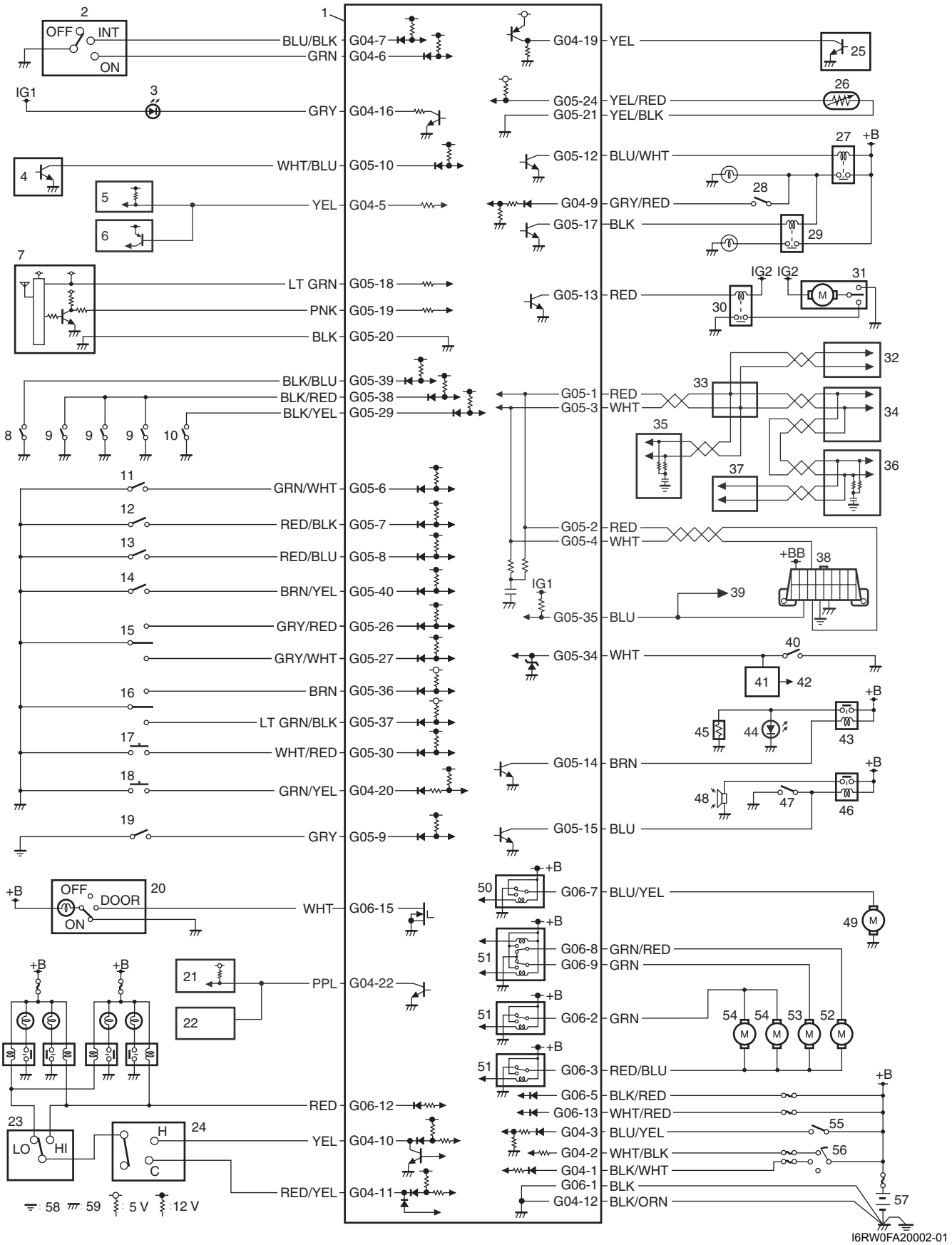

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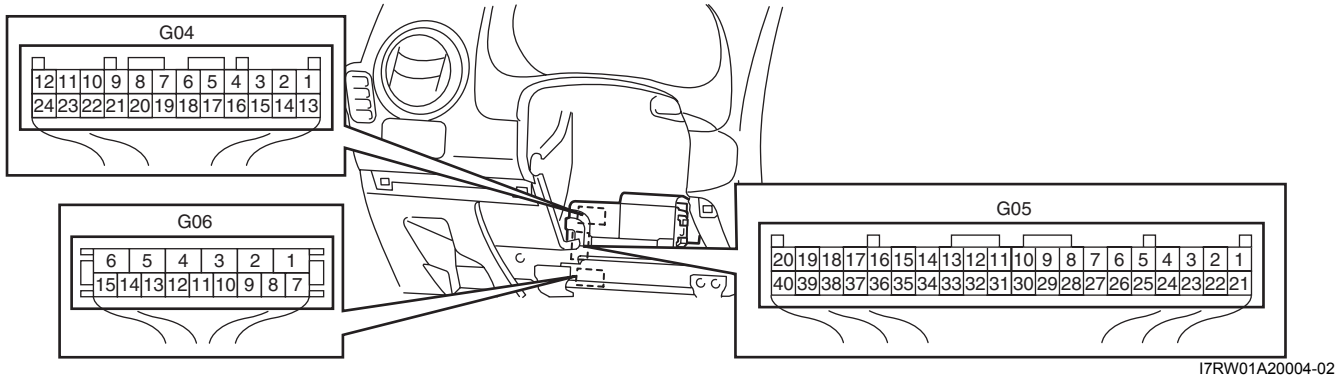
1. BCM	23. Dimmer and passing switch	45. Rear end door window / back window defogger
2. Rear wiper and washer switch	24. Lighting switch	46. Horn relay
3. Theft deterrent light	25. SDM	47. Horn switch
4. Generator	26. Outside air temperature sensor (if equipped)	48. Horn
5. Information display (if equipped)	27. Tail light relay	49. Rear end door / trunk lid opener actuator
6. HVAC control module (if equipped)	28. Front fog light switch (if equipped)	50. Rear end door / trunk lid opener relay
7. Keyless entry receiver (if equipped)	29. Front fog light relay (if equipped)	51. Door lock actuator relay
8. Driver side door switch	30. Rear wiper relay	52. Driver side door lock actuator
9. Other than driver side door switch	31. Rear wiper motor	53. Passenger side door lock actuator
10. Rear end door / trunk lid switch	32. Keyless start control module (if equipped)	54. Rear door lock actuator
11. A/C switch (if equipped)	33. CAN junction connector	55. Key reminder switch
12. Brake fluid level switch	34. ABS control module	56. Ignition switch
13. Parking brake switch	35. Combination meter	57. Battery
14. Driver side seat belt switch	36. ECM	58. Engine ground
15. Manual door lock switch	37. TCM (A/T model)	59. Body ground
16. Door key cylinder switch (included in door lock actuator)	38. DLC	INT: Rear wiper intermittent position
17. Rear end door opener switch	39. To SDM and HVAC control module	ON: Rear wiper ON position
18. Rear end door window / back window defogger switch	40. Hazard warning switch	LO: Low beam position
19. Oil pressure switch	41. Turn signal and hazard warning relay	HI: High beam position
20. Interior light	42. To turn signal light	C: Clearance position
21. P/S control module	43. Rear end door window / back window defogger relay	H: Head position
22. Audio unit (if equipped)	44. Rear end door window / back window defogger indicator light	

Connector Layout Diagram of BCM

S7RW0BA202002

BCM Connectors (Viewed from Harness Side)



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1. BCM

Component Location

BCM and Related System Component Location

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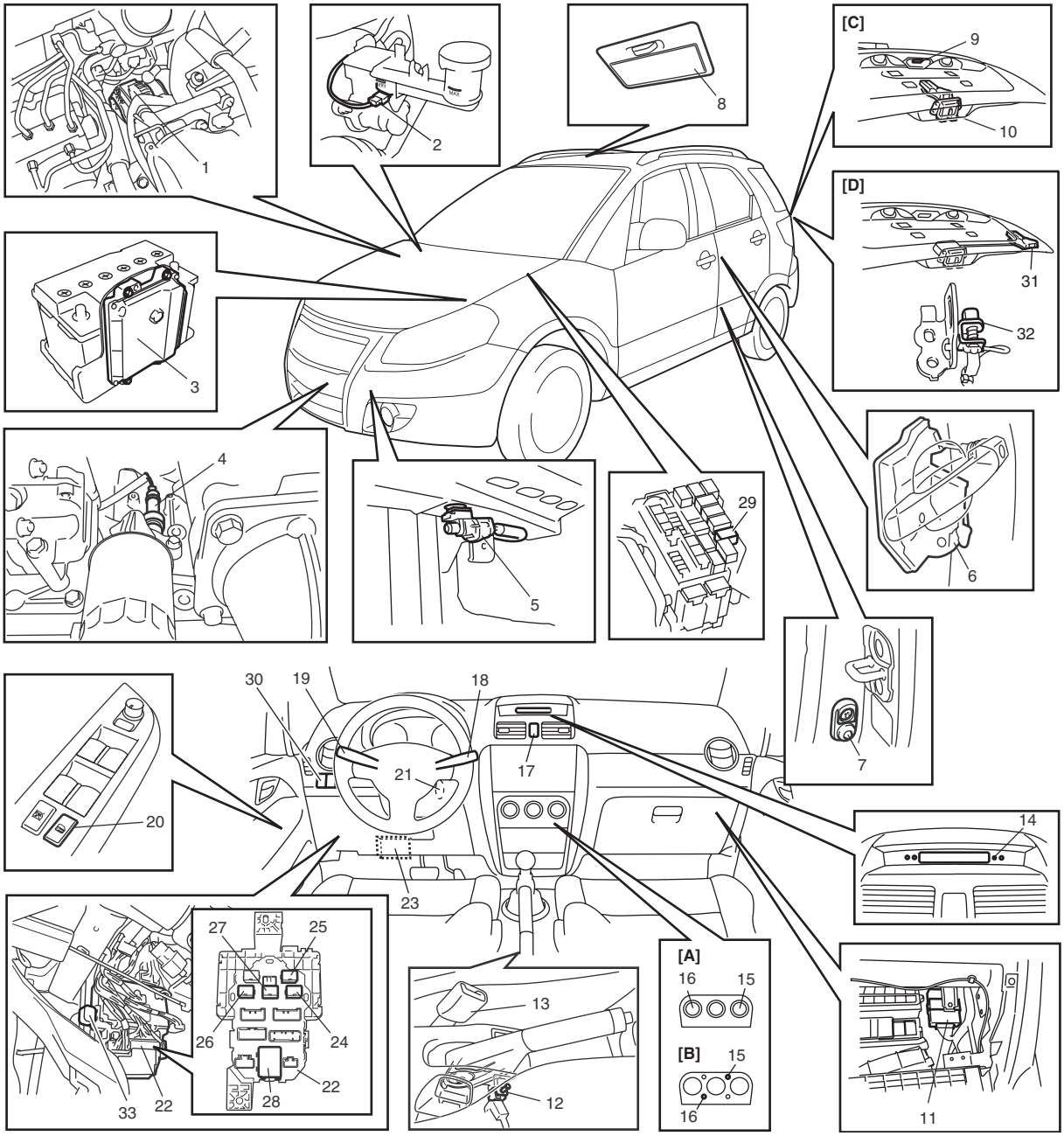

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[A]: Auto A/C	10. Rear end door opener actuator (incorporated in door switch)	23. BCM
[B]: Manual A/C	11. Keyless entry receiver or keyless start control module (if equipped)	24. Tail light relay
[C]: Hatchback	12. Parking brake switch	25. Horn relay
[D]: Sedan	13. Seat belt buckle switch	26. Rear wiper relay
1. Generator	14. Theft deterrent light	27. Rear end door window defogger relay
2. Brake fluid level switch	15. Rear end door window / back window defogger switch	28. Turn signal and hazard warning relay
3. ECM	16. A/C switch (if equipped)	29. Front fog light relay (if equipped)
4. Oil pressure switch	17. Hazard warning switch	30. Front fog light switch (if equipped)
5. Outside air temperature sensor (if equipped)	18. Rear wiper switch	31. Trunk lid opener actuator (keyless start model)
6. Door lock actuator (incorporated in key cylinder switch)	19. Lighting switch	32. Trunk lid switch (keyless start model)
7. Door switch	20. Manual door lock switch (if equipped)	33. Back window defogger relay
8. Interior light	21. Key reminder switch (included in ignition switch)	

9. Rear end door opener switch (if equipped)	22. Junction block	

Diagnostic Information and Procedures

BCM Self-Diagnosis Function

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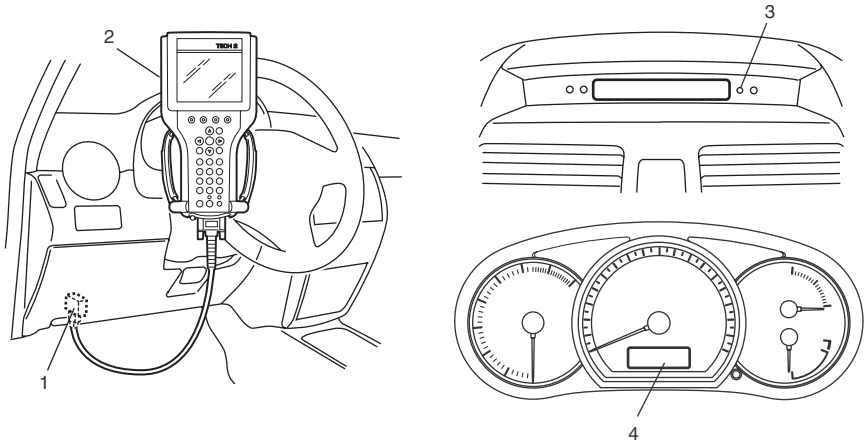
- BCM monitors conditions of the system components and its circuit with ignition switch turned to ON position. When an abnormality in the system occurs, the area where that abnormality lies is stored in the memory of EEPROM in BCM.
- DTC can be checked in either one of following ways.
  - DTC can be checked by SUZUKI scan tool (2) connected to DLC (1).
  - DTC can be read from flashing pattern of Theft deterrent light (3). In addition, when theft deterrent light is flashing for DTC outputting DTC is displayed on combination meter (4) at the same time.



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BCM Input / Output Table

Control	Input	Output
Power door lock system	• Key cylinder switch • Manual door lock switch	• Each door lock actuator
Keyless entry system	• Key reminder switch • Keyless entry receiver • Each door switch	• Each door lock actuator • Turn signal and hazard warning relay • Interior light
Keyless start system (Door lock function) (if equipped)	• Keyless start control module	• Each door lock actuator • Turn signal and hazard warning relay • Interior light
Keyless start system (Trunk lid opener function)	• Keyless start control module	• Trunk lid opener actuator
Rear wiper	• Rear wiper INT switch • Rear wiper LO switch	• Rear wiper relay
Combination meter	• Tail light switch • Oil pressure switch • Parking brake switch • Driver side seat belt switch • Brake fluid level switch • Generator • Each door switch	• Combination meter
Interior light	• Each door switch • Key reminder switch	• Interior light

Control	Input	Output
Warning buzzer	• Key reminder switch • Tail light switch • Driver side door switch • Keyless start control module (if equipped) • TCM (reverse signal) (if equipped)	• Warning buzzer (located in BCM)
Rear end door window / back window defogger	• Rear end door window / back window defogger switch • Generator	• Rear end door window / back window defogger relay
Rear end door opener	• Manual door lock switch (unlock signal) • Key cylinder switch (unlock signal) • Keyless entry transmitter (unlock signal) • Rear end door opener switch	• Rear end door opener relay
Door lock canceller	• SDM (air bag deployment signal)	• Each door lock actuator
Theft deterrent light	• Key reminder switch	• Theft deterrent light (located in information display or clock)
Panic alarm function	• Panic alarm request signal	• Headlight low beam • Tail light relay • Horn relay
Tail light	• Lighting switch	• Tail light relay
Front fog light (if equipped)	• Lighting switch • Front fog light switch	• Front fog light relay

Body Electrical Control System Check

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Step	Action	Yes	No
1	☞ **Customer complaint analysis** 1) Perform customer complaint analysis. *Was customer complaint analysis performed?*	Go to Step 2.	Perform customer complaint analysis.
2	☞ **Problem symptom confirmation** 1) Perform problem symptom confirmation. *Does trouble recur?*	Go to Step 3.	Go to Step 7.
3	☞ **DTC check** 1) Check DTC. *Is it malfunction code?*	Go to Step 4.	Go to Step 5.
4	☞ **Troubleshooting for DTC** 1) Check and repair according to DTC diag. flow. *Are check and repair completed?*	Go to Step 7.	Check and repair malfunction part(s).
5	☞ **Body electrical control system symptom diagnosis** 1) Perform check and repair referring to “Symptom Diagnosis” of system having a trouble. *Is there faulty condition?*	Repair or replace malfunction part(s).	Go to Step 6.
6	☞ **Check for intermittent problem** 1) Check for intermittent problem. *Is there faulty condition?*	Repair or replace malfunction part(s).	Go to Step 7.
7	☞ **Final confirmation test** 1) Clear DTC referring to “DTC Clearance”. 2) Check DTC referring to “DTC Check”. *Is there any DTC?*	Go to Step 4.	End.

Customer Complaint Analysis
Record details of the problem (failure, complaint) and how it occurred as described by the customer.
For this purpose, use of such a questionnaire form as shown in the figure will facilitate collecting information to the point required for proper analysis and diagnosis.

Customer questionnaire (example)

Customer's name:	Model:	VIN:	
Date of issue:	Date Reg:	Date of problem:	Mileage:

Problem Symptoms	・Power door lock system does not operate ・Keyless entry system does not operate ・Rear end door window defogger does not operate ・Rear wiper does not operate ・Rear end door opener does not operate ・Warning buzzer does not sound ・Interior light does not light ・Theft deterrent light does not flush ・Other_____
Frequency of Occurrence	・Continuous / Intermittent (times a day, a month) / Other_____
Environmental Condition	・Weather: Fine / Cloudy / Rain / Snow / Other_____ ・Temperature: ℃(°F)
Diagnostic Trouble Code	・Normal code / Malfunction code ( )

I5RS0DA20006-01

Problem Symptom Confirmation
Check if what the customer claimed in "Customer Questionnaire" is accurately found in the vehicle. If that symptom is found, check whether the symptom is identified as a failure. (This step should be shared with the customer if possible.)

DTC Check
Check DTC stored in BCM memory referring to "DTC Check", record it and then clear it referring to "DTC Clearance". DTC indicates malfunction that occurred in the system but does not indicate whether it exists now or it occurred in the past and the normal condition has been restored now. To check which case applies, clear DTC once and check whether or not any fault exists.

Troubleshooting for DTC
Based on the DTC indicated in Step 3 and referring to applicable DTC flow, locate the cause of the trouble, namely in a sensor, wire harness, connector, BCM or other part and repair or replace faulty parts.

Body Electrical Control System Symptom Diagnosis
Check the parts or system suspected as a possible cause referring to symptom diagnosis of each system.

Check for Intermittent Problem
Check parts where an intermittent trouble is easy to occur (e.g., wire harness, connector, etc.), referring to "Intermittent and Poor Connection Inspection in Section 00 in related manual".

Final Confirmation Test
Confirm that the problem symptom has gone and the body electrical control system is free from any abnormal conditions. If what has been repaired is related to the malfunction DTC, check DTC again and confirm that no DTC is indicated.

Scan Tool Data

S7RW0BA204003

Scan tool data	Condition	Normal condition / reference value
☞ Vehicle Speed	At stop with ignition switch turned ON	0 km/h
☞ Outside air Temp	Reference value is relative to outside air temperature	–40 °C – 70 °C (–40 °F – 158 °F)
☞ Battery Voltage	At specified idle speed after warming up	10 – 14 V
☞ Coolant Temp	At specified idle speed after warming up	80 °C – 100 °C (176 °F – 212 °F)
☞ Engine Speed	Engine idling with no load applied after warming up	Desired idle speed ± 50 rpm
☞ Fuel Consumption	At specified idle speed after warming up	0.0 km/l
☞ Key Reminder Sw	Ignition key inserted in ignition key cylinder	Key in
	Ignition key pulled out from ignition key cylinder	Pulled
☞ Rear Wiper Sw	Rear wiper switch at ON position and ignition switch turned ON	ON
	Rear wiper switch at INT position and ignition switch turned ON	INT
	Rear wiper switch at OFF position and ignition switch turned ON	OFF
☞ Door key Sw	Key cylinder switch of driver side door at lock position	LOCK
	Key cylinder switch of driver side door not turned	Neutral
	Key cylinder switch of driver side door at unlock position	Unlock
☞ Door Lock Sw	Lock side of manual door lock switch pressed	LOCK
	Manual door lock switch not pressed	Neutral
	Unlock side of manual door lock switch pressed	Unlock
☞ Driv Door Sw	Driver side door open	Open
	Driver side door closed	Close
☞ Pass Door Sw	Doors other than driver side door open	Open
	Doors other than driver side door closed	Close
☞ Brake Fluid Level	Brake fluid level at MIN level or higher	Normal
	Brake fluid level lower than MIN level	Low
☞ Parking Brake Sw	Parking brake lever pulled	ON
	Parking brake lever released	OFF
☞ Rear Defogger Sw	Rear end door window / back window defogger switch pressed with engine running	ON
	Rear end door window / back window defogger switch not pressed with engine running	OFF
☞ Headlight Sw	Lighting switch at HEAD position	ON
	Lighting switch at OFF position	OFF
☞ Tail Light Sw	Lighting switch at HEAD or CLEARANCE position	ON
	Lighting switch at OFF position	OFF
☞ Front Fog Light Sw	Lighting switch at HEAD position and front fog light switch at ON position	ON
	Lighting switch at HEAD position and front fog light switch at OFF position	OFF
☞ Driv Seatbelt Sw	Driver side seat belt fastened	Fasten
	Driver side seat belt unfastened	Unfasten
☞ Rear end door opener	Rear end door opener switch pressed	ON
	Rear end door opener switch not pressed	OFF
☞Trunk Sw	Trunk lid opened	ON
	Trunk lid closed	OFF
☞ Charge light	Engine at stop with ignition switch turned ON	ON
	Engine running	OFF
☞ Oil pressure switch	Engine at stop with ignition switch turned ON	ON
	Engine running	OFF

Scan tool data	Condition	Normal condition / reference value
☞ A/C Switch	A/C and ignition switch turned ON	ON
	A/C switch turned OFF	OFF

Scan Tool Data Definitions

Vehicle Speed (km/h, mph)
This parameter indicates the vehicle speed computed by ECM.

Outside air Temp (°C, °F)
It is detected by outside air temperature sensor.

Battery Voltage (V)
This parameter indicates battery positive voltage inputted to BCM.

Coolant Temp (Engine coolant temperature) (°C, °F)
This parameter indicates the engine coolant temperature computed by ECM.

Engine Speed (RPM)
This parameter indicates the engine speed computed by ECM.

Fuel Consumption (km/l)
This parameter indicates the fuel consumption computed by ECM.

Key Reminder Sw (Key reminder switch) (Pulled / Key in)
This parameter indicates the state of the key reminder switch.

Rear Wiper Sw (Rear wiper switch) (ON / INT / OFF)
This parameter indicates the state of the rear wiper switch.

Door key Sw (Door key cylinder switch) (Lock / Neutral / Unlock)
This parameter indicates the state of the door key cylinder switch.

Door Lock Sw (Manual door lock switch) (Lock / Neutral / Unlock)
This parameter indicates the state of the manual door lock switch.

Driv Door Sw (Driver side door switch) (Open / Close)
This parameter indicates the state of the driver side door switch.

Pass Door Sw (Other than driver side door switch) (Open / Close)
This parameter indicates the state of the door switches other than driver side door switch.

Brake Fluid Level (Low / Normal)
Low: Brake fluid level is lower than specified level.
Normal: Brake fluid level is higher than MIN level.

Parking Brake Sw (Parking brake switch) (ON / OFF)
ON: Parking brake lever is pulled up.
OFF: Parking brake lever is released.

Rear Defogger Sw (Rear end door window / back window defogger switch) (ON / OFF)
This parameter indicates the state of the rear end door window / back window defogger switch.

Headlight Sw (Headlight switch) (ON / OFF)
This parameter indicates the state of the lighting switch.

Tail Light Sw (Lighting switch) (ON / OFF)
This parameter indicates the state of the lighting switch.

Front Fog Light Sw (Front fog light switch) (ON / OFF)
This parameter indicates the state of the front fog light switch.

Driv Seatbelt Sw (Driver seat belt switch) (Fasten / Unfasten)
This parameter indicates the state of the driver side seat belt buckle switch.

Rear end door opener (Rear end door opener switch) (ON / OFF)
This parameter indicates the state of the rear end door opener switch.

Trunk Sw (Trunk lid switch) (ON / OFF) (keyless start model)
This parameter indicates the state of the trunk lid switch.

Charge light (ON / OFF)
This parameter indicates the state of the charge system monitor switch.

Oil pressure switch (ON / OFF)
This parameter indicates the state of the oil pressure switch.

A/C Switch (ON / OFF)
This parameter indicates the state of the air conditioning switch.

Diagnosis Using Output Test Function of SUZUKI Scan Tool

SUZUKI scan tool has the output test function which can force operation of following actuators and relays of the system controlled by BCM. When a malfunction is found in the system controlled by BCM, execute the output test which enables easy judgment whether the malfunction is on the input side or output side of BCM. For detailed information on operation of SUZUKI scan tool, refer to “SUZUKI Scan Tool Operator’s Manual”.

Output Test Item	Controlled Parts
Hazard Warning Light	Turn signal and hazard warning relay
Interior (Dome) Light	Interior (Dome) light (when interior light switch is at DOOR position)
Tail Light	Tail light relay
Front Fog Light	Front fog light relay (when lighting switch is at HEAD position)
Rear defogger	Rear end door window / back window defogger relay
Dead lock	Each door lock actuator
Rear end door (trunk) open	Rear end door / trunk lid opener relay
Door	Each door lock actuator
Warning buzzer	Warning buzzer (in BCM)
Rear wiper	Rear wiper relay
Alarm indicator	Theft deterrent light (in information display or clock)
Horn	Horn relay

DTC Table

S7RW0BA204004

DTC (displayed on SUZUKI scan tool)	DTC (indicated by theft deterrent light)	DTC (displayed on odometer in combination meter)	Detected item	Detecting condition
NO DTC	0000	0000	—	No DTC detected
☞ B1133	1133	b1133	Battery voltage too high	Battery voltage too high
☞ B1141	1141	b1141	Outside air temperature (ambient temperature) sensor circuit open	Sensor output voltage too high
☞ B1142	1142	b1142	Outside air temperature (ambient temperature) sensor circuit short to ground	Sensor output voltage too low
☞ B1150	1150	b1150	Air bag communication circuit malfunction	Air bag communication circuit open or short to ground
☞ B1157	1157	b1157	Air bag deployment signal input	Air bag deployment signal inputted
☞ B1170	1170	b1170	EEPROM access error	Memory error
☞ U0073	0073	U0073	Control module communication bus off	Transmitting and receiving error of BCM for specified time continuously
☞ U0100	0100	U0100	Lost communication with ECM	Receiving error of BCM from ECM for specified time continuously
☞ U0101	0101	U0101	Lost communication with TCM	Receiving error of BCM from TCM for specified time continuously
☞ U0155	0155	U0155	Lost communication with instrument panel cluster (IPC) control module	Receiving error of BCM from combination meter for specified time continuously
☞ U1144	1144	U1144	Lost communication with keyless start control module	Receiving error of BCM from keyless start control module for specified time continuously

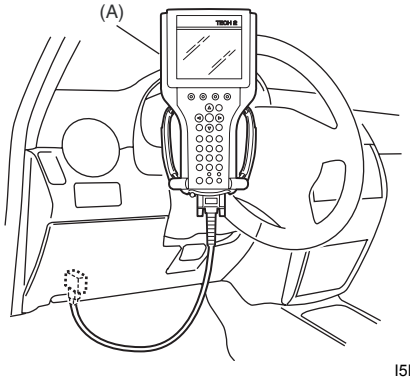
DTC Check

S7RW0BA204005

Using SUZUKI Scan Tool

1) Prepare SUZUKI scan tool.
2) With ignition switch turned OFF, connect it to data link connector (DLC) located on underside of instrument panel of driver's side.

   Special tool
   (A): SUZUKI scan tool



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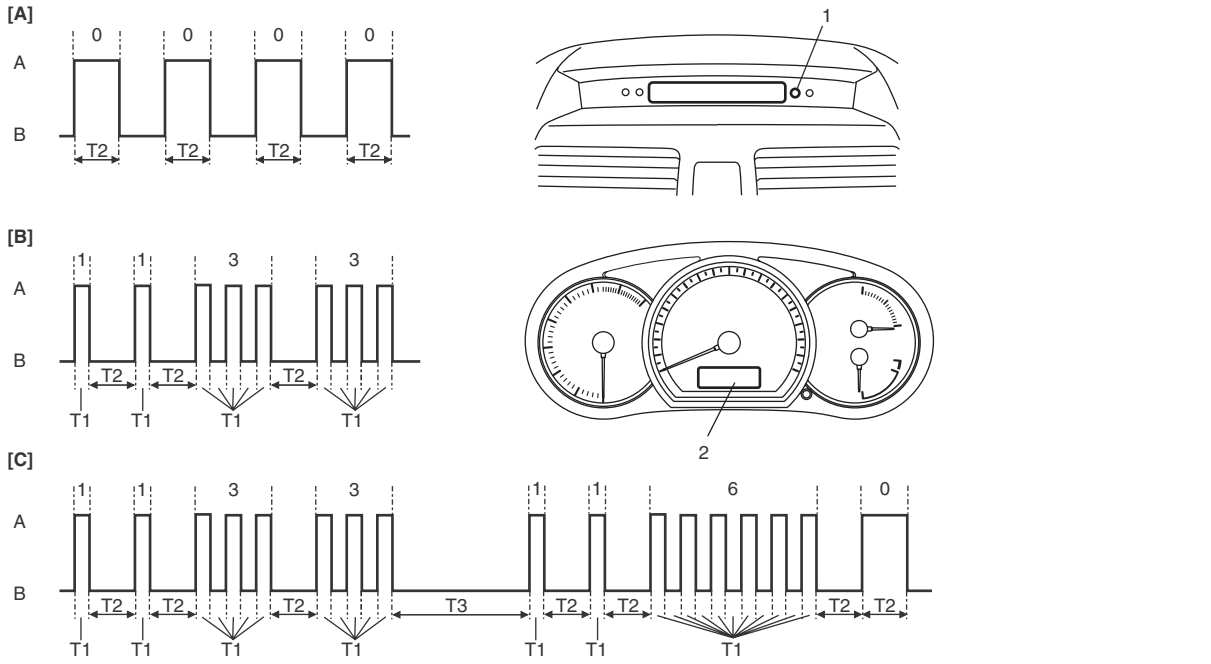
3) Turn ignition switch ON.
4) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down.
   Refer to SUZUKI scan tool operator's manual for further details.
   If communication between SUZUKI scan tool and BCM is not possible, check if SUZUKI scan tool is communicable by connecting it to BCM in another vehicle. If communication is possible in this case, SUZUKI scan tool is in good condition. Then check data link connector and serial data line (circuit) in the vehicle with which communication was not possible.
5) After completing the check, turn ignition switch off and disconnect SUZUKI scan tool from data link connector.

Without Using SUZUKI Scan Tool

1) Turn ignition switch to OFF position.
2) Perform following Steps a) to d) within 10 seconds after ignition switch is turned ON and engine stops.
   a) Turn headlight switch to “SMALL” position.
   b) Turn headlight switch to “OFF” position.
   c) Repeat Steps a) and b) 2 times.
   d) Press and release driver side door switch 3 times.
3) Check DTC displayed on odometer of combination meter or read flashing pattern of theft deterrent light which represents DTC as shown in the following example and write it down.
   When more than 2 DTCs are stored in memory, flashing for each DTC starts with the smallest DTC number in increasing order. Also, DTC is indicated repeatedly until the ignition switch is turned OFF.



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[A]: No DTC (No. 0000)	A: Indicator light turned ON	T2: 1.0 seconds	2. Odometer
[B]: DTC B1133 (No. 1133)	B: Indicator light turned OFF	T3: 3.0 seconds	
[C]: When 2 DTCs are detected	T1: 0.3 seconds	1. Theft deterrent light	

4) After completing the check, turn ignition switch to OFF position.

DTC Clearance

S7RW0BA204006

After repair or replace of malfunction part(s), clear all DTCs by performing the following procedure.

Using SUZUKI Scan Tool

1) Connect SUZUKI scan tool to data link connector in the same manner as when making this connection for DTC check.
2) Turn ignition switch ON and engine stops.
3) Erase DTC according to instructions displayed on scan tool. Refer to scan tool operator’s manual for further details.
4) After completing the clearance, turn ignition switch off and disconnect scan tool from data link connector.

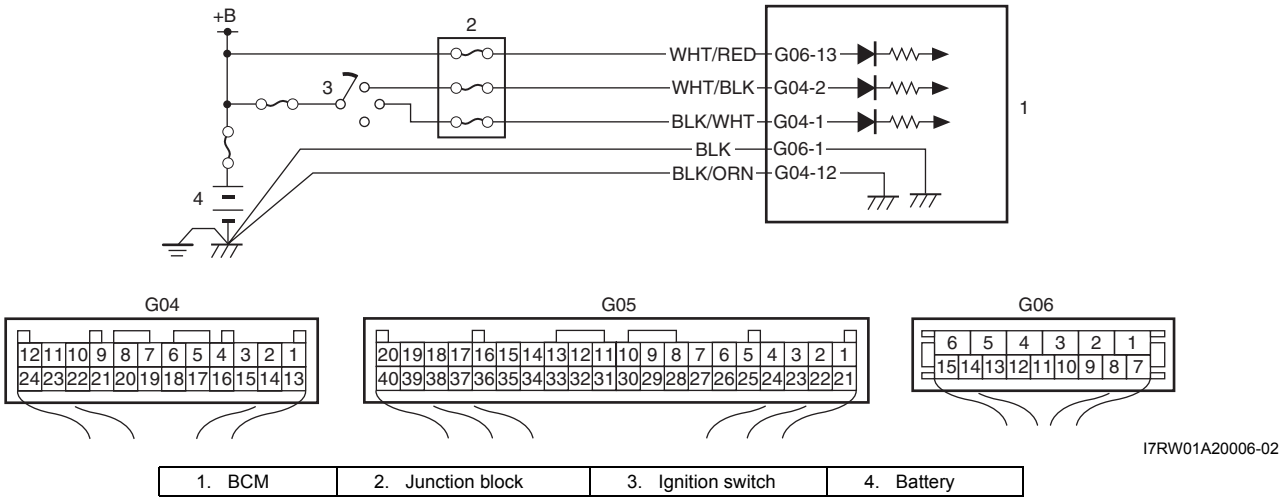
Without Using SUZUKI Scan Tool

1) Turn ignition switch to OFF position.
2) Perform following Steps a) to d) within 10 seconds after ignition switch is turned ON and engine stops.
   a) Turn headlight switch to “SMALL” position.
   b) Turn headlight switch to “OFF” position.
   c) Repeat Steps a) and b) 3 times.
   d) Press and release driver side door switch 4 times.
3) After completing above Steps, confirm that no malfunction DTC is detected.

BCM Power Circuit and Ground Circuit Check

S7RW0BA204007

Wiring Diagram



I7RW01A20006-02

1. BCM	2. Junction block	3. Ignition switch	4. Battery

Troubleshooting

Step	Action	Yes	No
1	**Fuse check** 1) Turn ignition switch to OFF position. 2) Check circuit fuses for condition. *Are circuit fuses in good condition?*	Go to Step 2.	Replace fuse and check for short circuit to ground.
2	**Power supply circuit check** 1) Disconnect connectors from BCM. 2) Check for proper connection to BCM connector at terminal “G06-13”. 3) If OK, then measure voltage between “G06-13” terminal of BCM connector and vehicle body ground. *Is voltage 10 – 14 V?*	Go to Step 3.	Repair power supply circuit.
3	**Power supply circuit check** 1) Check for proper connection to BCM connector at terminals “G04-1” and “G04-2”. 2) If OK, turn ignition switch to ON position. 3) Measure voltage between following terminals. • Between “G04-1” terminal of BCM connector and vehicle body ground • Between “G04-2” terminal of BCM connector and vehicle body ground *Is each voltage 10 – 14 V?*	Go to Step 4.	Repair power supply circuit.

Step	Action	Yes	No
4	**Ground circuit check** 1) Turn ignition switch to OFF position. 2) Check for proper connection to BCM connector at terminals “G06-1” and “G04-12”. 3) If OK, then measure resistance between following terminals. • Between “G06-1” terminal of BCM connector and vehicle body ground • Between “G04-12” terminal of BCM connector and vehicle body ground *Is each resistance 2 Ω or less?*	BCM power supply circuit and ground circuit are in good condition.	Repair ground circuit.

DTC B1133 (No. 1133): Battery Voltage Too High

S7RW0BA204008

Wiring Diagram

Refer to “BCM Power Circuit and Ground Circuit Check”.

DTC Detecting Condition and Possible Cause

DTC detecting condition	Possible cause
Power voltage supplied from battery to BCM is higher than 16 V.	• Charging system malfunction • BCM malfunction

Flow Test Description

Step 1: Check charging system

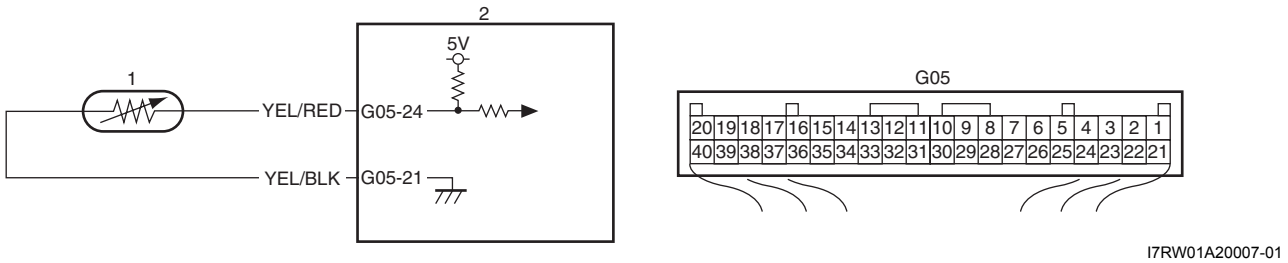
DTC Troubleshooting

Step	Action	Yes	No
1	**Charging system operation check** 1) Check generator for operation referring to “Generator Test (Overcharged Battery Check) in Section 1J in related manual”. *Is it in good condition?*	Substitute a known good BCM and recheck.	Repair charging system.

DTC B1141 / B1142 (No. 1141 / No. 1142): Outside Air Temperature (Ambient Temp.) Sensor Circuit Malfunction

S7RW0BA204009

Wiring Diagram



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1. Outside air temperature sensor	2. BCM

DTC Detecting Condition and Possible Cause

DTC detecting condition	Possible cause
DTC B1141 (DTC No. 1141): Input signal from outside air temperature sensor is higher than 4.88 V.	• Open in outside air temperature sensor circuit • Outside air temperature sensor malfunction • BCM malfunction
DTC B1142 (DTC No. 1142): Input signal from outside air temperature sensor is lower than 0.1 V.	• Short in outside air temperature sensor circuit • Outside air temperature sensor malfunction • BCM malfunction

Flow Test Description
Step 1: Check whether malfunction is in outside air temperature sensor.
Step 2: Check outside air temperature sensor circuit.

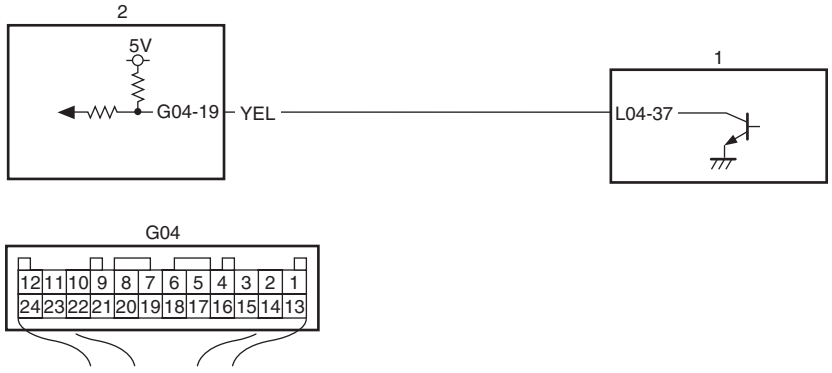
DTC Troubleshooting

Step	Action	Yes	No
1	**Outside air temperature sensor check** 1) Turn ignition switch to OFF position. 2) Disconnect connector from outside air temperature sensor. 3) Check outside air temperature sensor for resistance referring to “Outside Air Temperature Sensor Inspection (If Equipped) in Section 9C in related manual”. *Is it in good condition?*	Go to Step 2.	Replace outside air temperature sensor.
2	**Outside air temperature sensor circuit check** 1) Disconnect connector from BCM and check for proper terminal connection to BCM connector. 2) If connections are OK, check outside air temperature sensor circuit for open, short and high resistance. *Is each circuit in good condition?*	Substitute a known-good BCM and recheck.	Repair circuit.

DTC B1150 (No. 1150): Air Bag Communication Circuit Malfunction

S7RW0BA204010

Wiring Diagram



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1. SDM	2. BCM

DTC Detecting Condition and Possible Cause

DTC detecting condition	Possible cause
After ignition switch is turned ON, abnormal signal is fed from SDM to BCM.	• Air bag communication circuit open or short • SDM malfunction • BCM malfunction

Flow Test Description
Step 1: Check air bag communication circuit.
Step 2: Check air bag communication circuit.

DTC Troubleshooting

Step	Action	Yes	No
1	**Air bag communication circuit check** 1) Turn ignition switch to OFF position. 2) Disconnect connectors from BCM and SDM. 3) Check for proper terminal connection to BCM and SDM connectors. 4) If connections are OK, check air bag communication circuit for open, short and high resistance. *Is circuit in good condition?*	Go to Step 2.	Repair circuit.
2	**Air bag communication circuit check** 1) Turn ignition switch to OFF position. 2) Connect connectors to BCM. 3) Turn ignition switch to ON position. 4) Measure voltage between “G04-19” terminal of BCM connector and vehicle body ground. *Is voltage 4 – 6 V?*	Substitute a known-good SDM and recheck.	Substitute a known-good BCM and recheck.

DTC B1157 (No. 1157): Air Bag Deployment Signal Input

S7RW0BA204011

Wiring Diagram
Refer to “DTC B1150 (No. 1150): Air Bag Communication Circuit Malfunction”.

DTC Detecting Condition and Possible Cause

DTC detecting condition	Possible cause
Air bag deployment signal is fed from SDM to BCM.	• Air bag component parts • BCM malfunction

Flow Test Description
Step 1: Check DTC for SDM.

DTC Troubleshooting

Step	Action	Yes	No
1	**DTC check of SDM** 1) Check DTC stored in SDM referring to “DTC Check in Section 8B in related manual”. *Is DTC B1021 detected?*	Go to “DTC B1021: Front Air Bag Deployment Record in Section 8B in related manual”.	Substitute a known-good BCM and recheck.

DTC B1170 (No. 1170): EEPROM Access Error

S7RW0BA204012

DTC Detecting Condition and Possible Cause

DTC detecting condition	Possible cause
Data write error or check sum error.	BCM malfunction

DTC Troubleshooting

NOTE

Before performing steps below, be sure to perform "Body Electrical Control System Check".

1) Ignition switch OFF.
2) Replace BCM.
3) Repeat BCM Check Flow Table.

DTC U0073 (No. 0073): Control Module Communication Bus Off

S7RW0BA204013

Refer to "Troubleshooting for CAN-DTC in Section 1A in related manual".

DTC U0100 (No. 0100): Lost Communication with ECM

S7RW0BA204014

Refer to "Troubleshooting for CAN-DTC in Section 1A in related manual".

DTC U0101 (No. 0101): Lost Communication with TCM

S7RW0BA204015

Refer to "Troubleshooting for CAN-DTC in Section 1A in related manual".

DTC U0155 (No. 0155): Lost Communication with Instrument Panel Cluster (IPC) Control Module

S7RW0BA204016

Refer to "Troubleshooting for CAN-DTC in Section 1A in related manual".

DTC U1144 (No. 1144): Lost Communication with Keyless Start Control Module

S7RW0BA204017

Refer to "Troubleshooting for CAN-DTC in Section 1A in related manual".

Inspection of BCM and Its Circuits

S7RW0BA204018

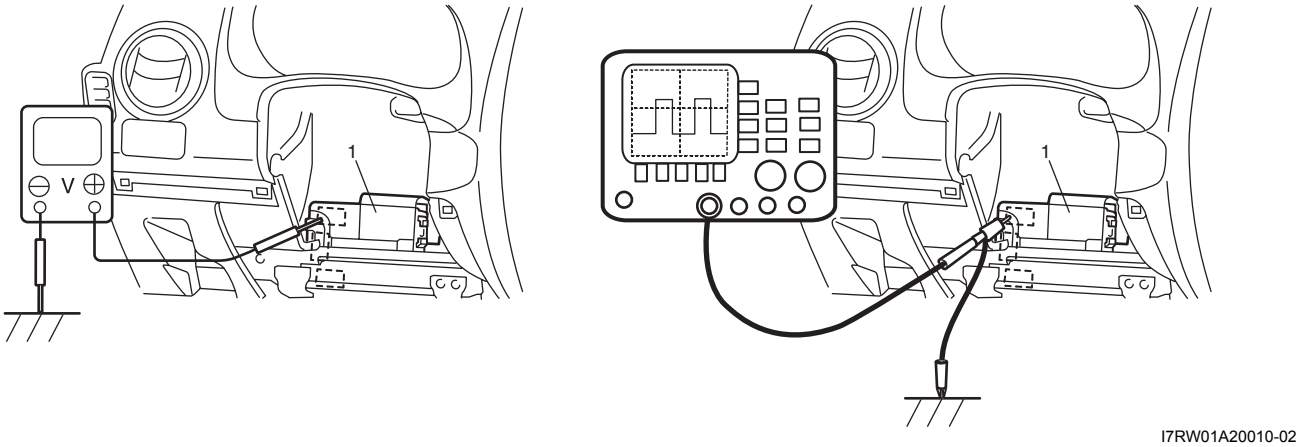
BCM and its circuits can be checked at BCM wiring couplers by measuring voltage and resistance.

⚠ CAUTION

BCM cannot be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to BCM with couplers disconnected from it.

Voltage Check

1) Remove BCM referring to “BCM Removal and Installation”.
2) Connect connectors to BCM (1).
3) Check voltage at each terminal number of couplers connected.
   For connector and terminal number, refer to “Connector Layout Diagram of BCM”.



I7RW01A20010-02

NOTE

- **As each terminal voltage is affected by the battery voltage, confirm that it is 11 V or more when ignition switch is ON.**
- **Voltage with asterisk (*) can not be measured by voltmeter because it is pulse signal. Check it with oscilloscope if necessary.**

BCM connector “G04”

Terminal	Circuit	Normal voltage	Condition
G04-1	Ignition switch signal (IG ON)	10 – 14 V	Ignition switch is at ON position
		0 V	Ignition switch is at any position other than ON position
G04-2	Power source (ACC)	10 – 14 V	Ignition switch is at ACC or ON position
		0 V	Ignition switch is at any position other than ACC or ON position
G04-3	Key reminder switch	10 – 14 V	Ignition key is inserted to ignition key cylinder
		0 V	Ignition key is pulled out from ignition key cylinder
G04-4	—	—	—
G04-5	Serial communication line for information display and HVAC control module	*0 – 1 V ↑↓ 10 – 14 V	Refer to “Reference waveform No. 1: ”
G04-6	Rear wiper switch	*0 – 1 V ↑↓ 10 – 14 V	Refer to “Reference waveform No. 2: ”
		0 V	Ignition switch is at ON position and rear wiper switch is at ON position

Terminal	Circuit	Normal voltage	Condition
G04-7	Rear wiper INT switch	*0 – 1 V ↑↓ 10 – 14 V	Refer to “Reference waveform No. 2: ”
		0 V	Ignition switch is at ON position and rear wiper switch is at INT position
G04-8	—	—	—
G04-9	Front fog light switch (if equipped)	10 – 14 V	Lighting switch is at HEAD position and front fog light switch is at ON position
		0 V	Lighting switch is at HEAD position and front fog light switch is at OFF position
G04-10	Lighting switch (HEAD)	10 – 14 V	Lighting switch is at any position other than HEAD position
		0 V	Lighting switch is at HEAD position
G04-11	Lighting switch (CLEARANCE)	10 – 14 V	Lighting switch is at OFF position
		0 V	Lighting switch is at any position other than OFF position
G04-12	Ground for BCM	0 V	Ignition switch is at each position
G04-13	—	—	—
G04-14	—	—	—
G04-15	—	—	—
G04-16	Theft deterrent light	10 – 14 V	Theft deterrent light is not lit up
		0 V	Theft deterrent light is lit up
G04-17	—	—	—
G04-18	—	—	—
G04-19	Serial communication line of SDM	*0 – 1 V ↑↓ 4 – 6 V	Refer to “Reference waveform No. 3: ”
G04-20	Rear end door window / back window defogger switch	*3 – 14 V	Refer to “Reference waveform No. 4: ”
		0 V	Ignition switch is at ON position and rear end door window / back window defogger switch is pushed
G04-21	—	—	—
G04-22	Vehicle speed signal output (if equipped)	*0 – 1 V ↑↓ 4 – 6 V	Refer to “Reference waveform No. 5: ”
G04-23	—	—	—
G04-24	—	—	—

BCM connector “G05”

Terminal	Circuit	Normal voltage	Condition
G05-1	CAN communication line (high) for each control module	*2.5 – 3.6 V	Refer to “Reference waveform No. 6: ”
G05-2	CAN communication line (high) for DLC	*2.5 – 3.6 V	
G05-3	CAN communication line (low) for each control module	*1.6 – 2.5 V	
G05-4	CAN communication line (low) for DLC	*1.6 – 2.5 V	
G05-5	—	—	—
G05-6	A/C switch (if equipped)	*3 – 14 V	Refer to “Reference waveform No. 4: ”
		0 V	Ignition switch is at ON position, blower speed selector is at any position other than OFF position and A/C switch is at ON position
G05-7	Brake fluid level switch	*5 – 12 V	Refer to “Reference waveform No. 7: ”
		0 V	Ignition switch is at ON position and brake fluid level is lower than MIN level
G05-8	Parking brake switch	*5 – 12 V	Refer to “Reference waveform No. 7: ”
		0 V	Ignition switch is at ON position and parking brake lever is pulled up

Terminal	Circuit	Normal voltage	Condition
G05-9	Oil pressure switch	*6 – 14 V	Refer to “Reference waveform No. 8: ”
		0 V	Ignition switch is at ON position and engine is at stop
G05-10	Generator “L” terminal	11 – 16 V	Engine is running
		0 V	Ignition switch is at ON position
G05-11	—	—	—
G05-12	Tail light relay control	10 – 14 V	Lighting switch is at OFF position
		0 V	Lighting switch is at any position other than OFF position
G05-13	Rear wiper control	10 – 14 V	Ignition switch is at ON position and rear wiper is not in operation
		0 V	Ignition switch is at ON position and rear wiper is in operation
G05-14	Rear end door window / back window defogger control	10 – 14 V	Engine is running and rear end door window / back window defogger is not in operation
		0 V	Engine is running and rear end door window / back window defogger is in operation
G05-15	Horn control	10 – 14 V	Horn is not in operation
		0 V	Horn is in operation
G05-16	—	—	—
G05-17	Front fog light control (if equipped)	10 – 14 V	Lighting switch is at HEAD position and front fog light switch is at OFF position
		0 V	Lighting switch is at HEAD position and front fog light switch is at ON position
G05-18	Power supply for keyless entry receiver (if equipped)	4 – 6 V	Ignition switch is at ON position
G05-19	Signal for keyless entry receiver (if equipped)	*0 – 1 V ↑↓ 4 – 6 V	Refer to “Reference waveform No. 9: ”
G05-20	Ground for keyless entry receiver (if equipped)	0 V	Ignition switch is at each position
G05-21	Sensor ground for outside air temperature sensor (if equipped)	0 V	Ignition switch is at each position
G05-22	—	—	—
G05-23	—	—	—
G05-24	Outside air temperature sensor (if equipped)	About 1.5 V	Ignition switch is at ON position and outside air temperature approx. 20 °C (68 °F)
G05-25	—	—	—
G05-26	Manual door lock switch (Unlock)	10 – 14 V	Manual door lock switch is at any position other than unlock position
		0 V	Manual door lock switch is at unlock position
G05-27	Manual door lock switch (Lock)	10 – 14 V	Manual door lock switch is at any position other than lock position
		0 V	Manual door lock switch is at lock position.
G05-28	—	—	—
G05-29	Rear end door switch (hatchback)	10 – 14 V	Rear end door is closed
		0 V	Rear end door is opened
	Trunk lid switch (sedan) (keyless start model)	10 – 14 V	Trunk lid is closed
		0 V	Trunk lid is opened
G05-30	Rear end door opener switch	10 – 14 V	Rear end door opener switch is not pushed
		0 V	Rear end door opener switch is pushed
G05-31	—	—	—
G05-32	—	—	—
G05-33	—	—	—
G05-34	Turn signal / hazard warning relay control	0 V	Hazard warning switch is at ON position
		10 – 14 V	Hazard warning switch is at OFF position
G05-35	Serial communication line of DLC	7 – 12 V	Ignition switch is at ON position

Terminal	Circuit	Normal voltage	Condition
G05-36	Driver side door key cylinder switch (Unlock)	10 – 14 V	Driver side key cylinder switch is at any position other than unlock position
		0 V	Driver side key cylinder switch is at unlock position
G05-37	Driver side door key cylinder switch (lock)	10 – 14 V	Driver side key cylinder switch is at any position other than lock position
		0 V	Driver side key cylinder switch is at lock position
G05-38	Door switch (other than driver side door and rear end door)	10 – 14 V	Rear right and left side door and passenger side door are closed
		0 V	Any one of the door is opened (except driver side door and rear end door)
G05-39	Driver side door switch	10 – 14 V	Driver side door is closed
		0 V	Driver side door is opened
G05-40	Driver side seat belt switch	*5 – 12 V	Refer to “Reference waveform No. 7: ”
		0 V	Ignition switch is at ON position and driver side seat belt is unfastened

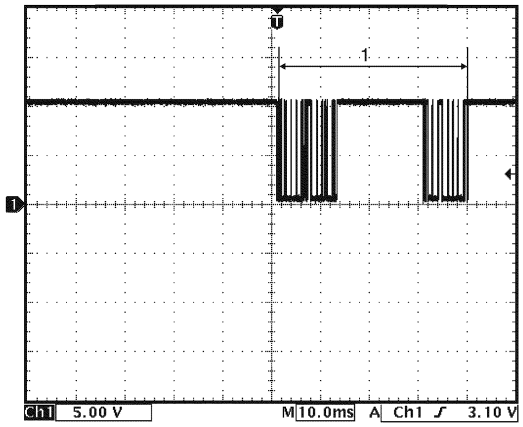
BCM connector “G06”

Terminal	Circuit	Normal voltage	Condition
G06-1	Ground for BCM	0 V	Ignition switch is at each position
G06-2	Rear door lock actuator control (Unlock)	10 – 14 V	Unlock signal is output for rear door lock actuators
		0 V	Unlock signal is not output for rear door lock actuators
G06-3	Door lock actuator control (Lock)	10 – 14 V	Lock signal is output for all door lock actuators
		0 V	Lock signal is not output for all door lock actuators
G06-4	—	—	—
G06-5	Power supply for door lock actuator	10 – 14 V	Ignition switch is at each position
G06-6	—	—	—
G06-7	Rear end door / trunk lid opener actuator control	10 – 14 V	Rear end door / trunk lid opener actuator is in operation
		0 V	Rear end door / trunk lid opener actuator is not in operation
G06-8	Driver side door lock actuator control (Unlock)	10 – 14 V	Unlock signal is output for driver side door lock actuator
		0 V	Unlock signal is not output for driver side door lock actuator
G06-9	Passenger side door lock actuator control (Unlock)	10 – 14 V	Unlock signal is output for passenger side door lock actuator
		0 V	Unlock signal is not output for passenger side door lock actuator
G06-10	—	—	—
G06-11	—	—	—
G06-12	Headlight high beam monitor signal	10 – 14 V	Lighting switch is at HEAD position and dimmer switch is at low beam position
		0 V	Lighting switch is at HEAD position and dimmer switch is at high beam position
G06-13	Power supply for BCM	10 – 14 V	Ignition switch is at each position
G06-14	—	—	—
G06-15	Interior light control	10 – 14 V	Interior light switch is at DOOR position and interior light is not lit up
		0 V	Interior light switch is at DOOR position and interior light is lit up

Reference waveform No. 1

HVAC control module and information display serial communication signal (1)

Measurement terminal	CH1: “G04-5” to “G04-12”
Oscilloscope setting	CH1: 5 V/DIV TIME: 10 ms/DIV
Measurement condition	Ignition switch is at ON position



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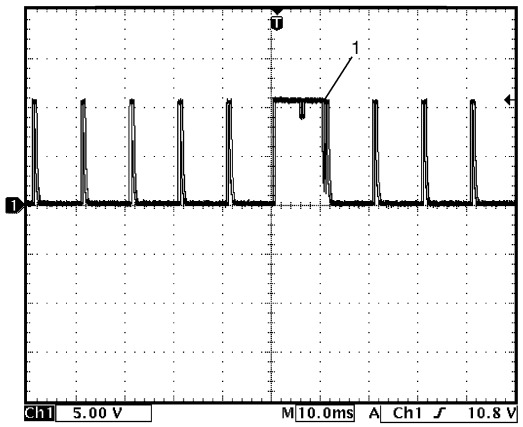
Reference waveform No. 2

Rear wiper LOW or INT signal (1)

Measurement terminal	Rear wiper LOW signal: CH1: “G04-6” to “G04-12” Rear wiper INT signal: CH1: “G04-7” to “G04-12”
Oscilloscope setting	CH1: 5 V/DIV TIME: 10 ms/DIV
Measurement condition	Rear wiper LOW signal: • Ignition switch is at ON position, rear wiper switch is at any position other than LOW position Rear wiper INT signal: • Ignition switch is at ON position, rear wiper switch is at any position other than INT position



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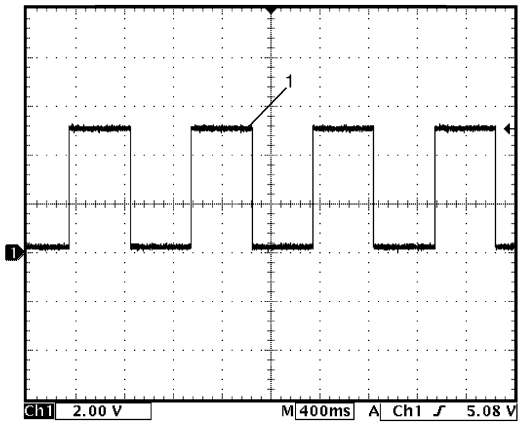
Reference waveform No. 3

SDM communication signal (1)

Measurement terminal	CH1: “G04-19” to “G04-12”
Oscilloscope setting	CH1: 2 V/DIV TIME: 400 ms/DIV
Measurement condition	Ignition switch is at ON position



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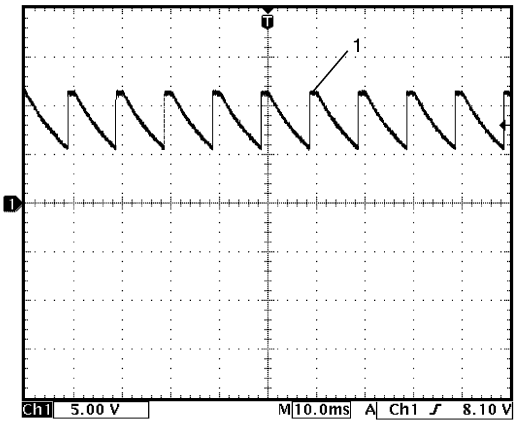
Reference waveform No. 4

A/C or rear end door window / back window defogger switch signal (1)

Measurement terminal	Rear end door window / back window defogger switch CH1: “G04-20” to “G04-12” A/C switch CH1: “G05-6” to “G04-12”
Oscilloscope setting	CH1: 5 V/DIV TIME: 10 ms/DIV
Measurement condition	Rear end door window / back window defogger switch: • Ignition switch is at ON position and rear end door window / back window defogger switch is not pushed A/C switch: • Ignition switch is at ON position, A/C switch or blower speed selector is at OFF position



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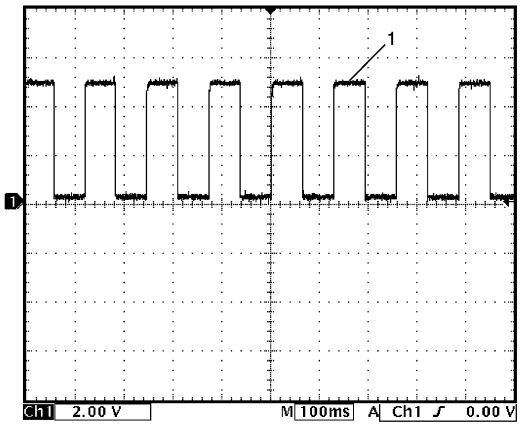
Reference waveform No. 5

Vehicle speed pulse output signal (1)

Measurement terminal	CH1: “G04-22” to “G04-12”
Oscilloscope setting	CH1: 2 V / DIV TIME: 100 ms / DIV
Measurement condition	Vehicle speed at 10 km/h (6 mph)



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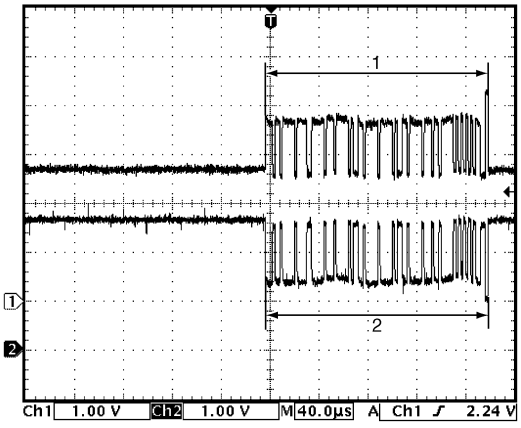
Reference waveform No. 6

CAN communication signal

Measurement terminal	CAN communication signal for each control module CH1: “G05-1” to “G04-12” CH2: “G05-3” to “G04-12” CAN communication signal for DLC CH1: “G05-2” to “G04-12” CH2: “G05-4” to “G04-12”
Oscilloscope setting	CH1: 1 V / DIV CH2: 1 V / DIV TIME: 40 μs / DIV
Measurement condition	Ignition switch is at ON position



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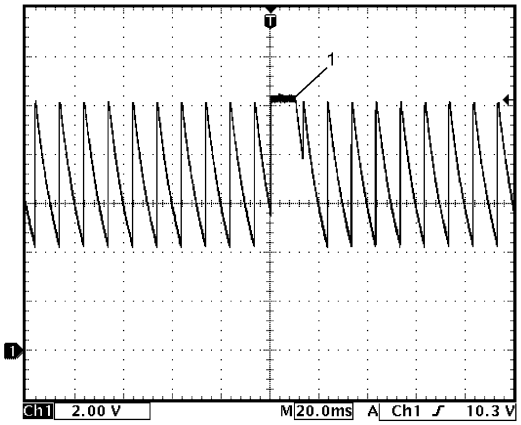
1.	CAN communication line signal (High)
2.	CAN communication line signal (Low)

Reference waveform No. 7

Brake fluid level, parking brake or driver side seat belt switch signal (1)

Measurement terminal	Brake fluid level switch signal: CH1: “G05-7” to “G04-12” Parking brake switch signal: CH1: “G05-8” to “G04-12” Driver side seat belt switch signal: CH1: “G05-40” to “G04-12”
Oscilloscope setting	CH1: 2 V / DIV TIME: 20 ms / DIV
Measurement condition	Brake fluid level switch: • Ignition switch is at ON position and brake fluid level is at specified level Parking brake switch: • Ignition switch is at ON position and parking brake lever is released. Driver side seat belt switch: • Ignition switch is at ON position and driver seat belt is fastened



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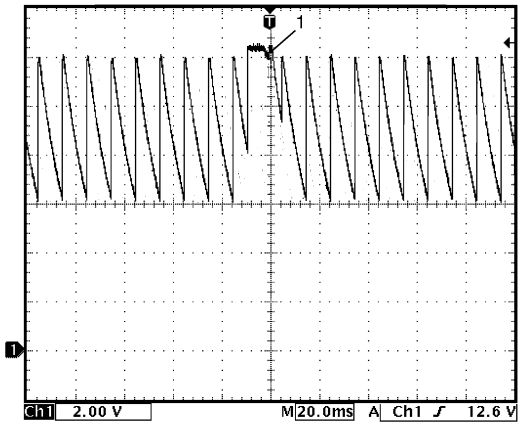
Reference waveform No. 8

Oil pressure switch signal (1)

Measurement terminal	CH1: “G05-9” to “G04-12”
Oscilloscope setting	CH1: 2 V / DIV TIME: 20 ms / DIV
Measurement condition	Engine is running and oil pressure is in normal condition

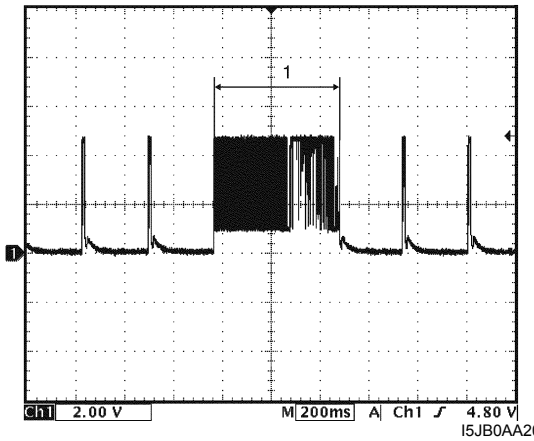


I5JB0AA20020-01

Reference waveform No. 9

Keyless entry receiver signal (1)

Measurement terminal	CH1: “G05-19” to “G04-12”
Oscilloscope setting	CH1: 2 V / DIV TIME: 200 ms / DIV
Measurement condition	Lock or unlock button of keyless entry transmitter is pushed



I5JB0AA20021-01

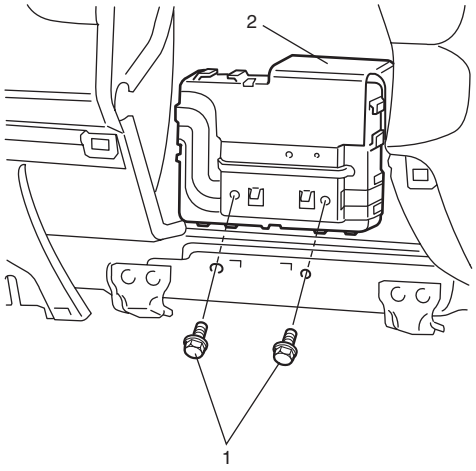
Repair Instructions

BCM Removal and Installation

S7RW0BA206001

Removal

1) Remove dash side trim and steering column hole cover.
2) Remove BCM mounting bolts (1).



I7RW01A20014-01

3) Disconnect connectors from BCM (2).

Installation

Reverse removal procedure for installation, noting following points.

- Connect connectors securely.
- With keyless entry system (other than keyless start model), if BCM is replaced, register transmitter code into BCM, referring to “Programming Transmitter Code for Keyless Entry System (Other than Keyless Start Model) in Section 9F in related manual”.

Outside Air Temperature Sensor Removal and Installation

S7RW0BA206002

For removal and installation, refer to “Outside Air Temperature Sensor Removal and Installation (If Equipped) in Section 9C in related manual”.

Outside Air Temperature Sensor Inspection

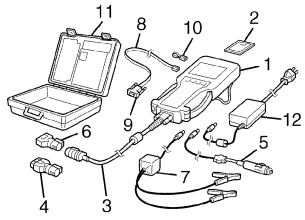
S7RW0BA206003

For inspection, refer to “Outside Air Temperature Sensor Inspection (If Equipped) in Section 9C in related manual”.

Special Tools and Equipment

Special Tool

S7RW0BA208001

SUZUKI scan tool — This kit includes following items. 1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE 16/19 adapter, 5. Cigarette cable, 6. DLC loop back adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loop back connector, 11. Storage case, 12. ☞		

Prepared by
SUZUKI MOTOR CORPORATION

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1.0 mm

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SX4

SUPPLEMENTARY SERVICE MANUAL

RW416

TAIWAN MODEL

USE THIS MANUAL WITH MANUALS MENTIONED IN FOREWORD OF THIS MANUAL.

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