SECTION PCS
POWER CONTROL SYSTEM

CONTENTS

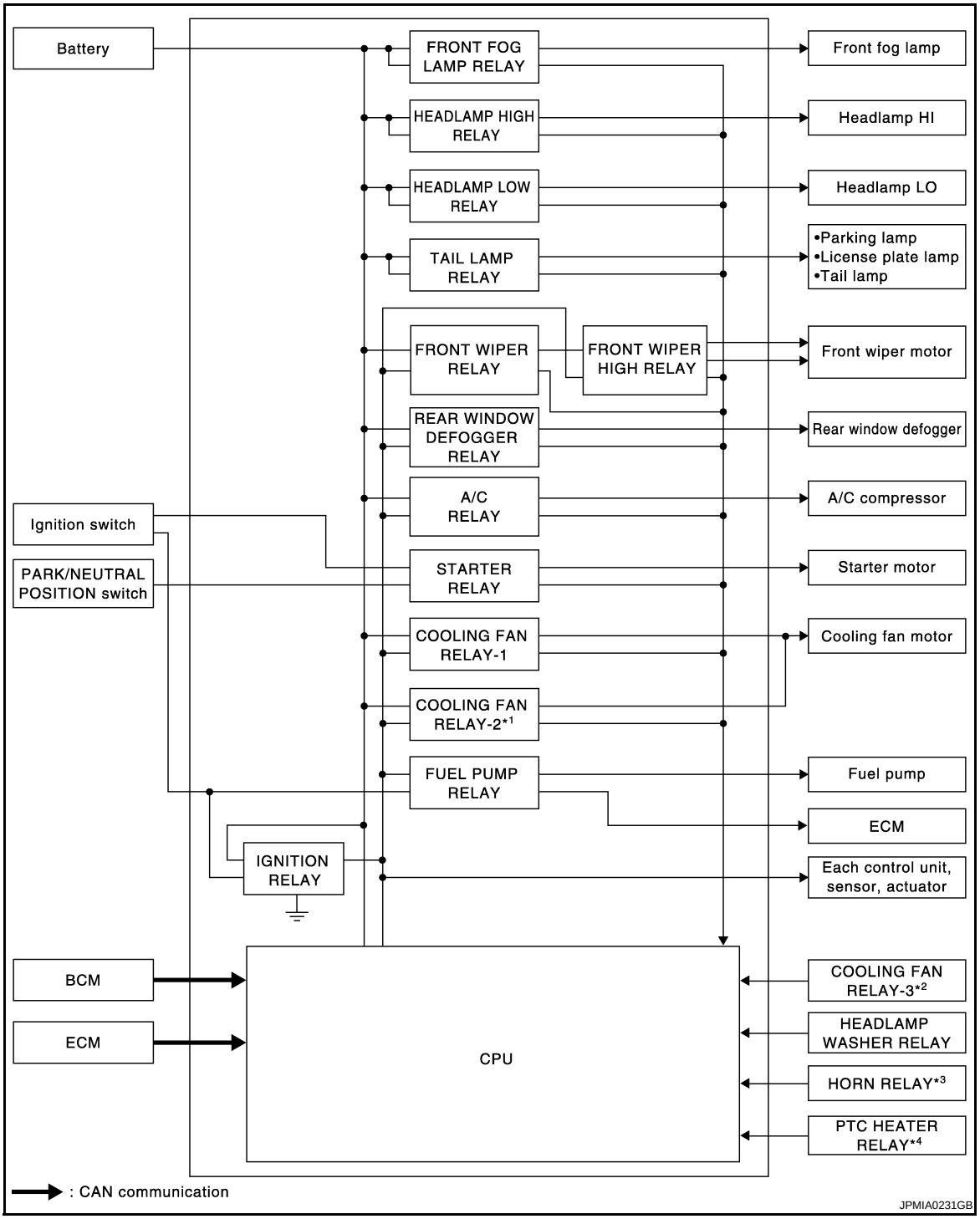
IPDM E/R

FUNCTION DIAGNOSIS

RELAY CONTROL SYSTEM

System Diagram

INFOID:0000000001191162



NOTE:

- *1: HR engine models
- *2: MR engine, K9K engine and M9R engine models
- *3: With vehicle security (theft warning) system
- *4: K9K engine and M9R engine models

System Description

INFOID:0000000001191163

IPDM E/R activates the internal control circuit to perform the relay ON-OFF control according to the input signals from various sensors and the request signals received from control units via CAN communication.

CAUTION:

IPDM E/R integrated relays cannot be removed.

Control relay	Input/output	Transmit unit	Control part	Reference page
• Headlamp low relay • Headlamp high relay	• Low beam request signal • High beam request signal	BCM (CAN)	• Headlamp low • Headlamp high	• EXL-12 (xenon type headlamp) • EXL-193 (halogen type headlamp)
Front fog lamp relay	Front fog light request signal	BCM (CAN)	Front fog lamp	• EXL-18 (xenon type headlamp) • EXL-197 (halogen type headlamp)
Tail lamp relay	Position light request signal	BCM (CAN)	• Parking lamp • License plate lamp • Tail lamp	• EXL-24 (xenon type headlamp) • EXL-201 (halogen type headlamp)
			Illuminations	INL-12
• Front wiper relay • Front wiper high relay	Front wiper request signal	BCM (CAN)	Front wiper	WW-5
	Front wiper auto stop signal	Front wiper motor		
Rear window defogger relay	Rear window defogger switch signal	BCM (CAN)	Rear window defogger	DEF-4
Starter relay	Ignition and starter request signal	BCM (CAN)	Starter motor	• SEC-10 (with INTELLIGENT KEY) • SEC-171 (without INTELLIGENT KEY)
• Cooling fan relay-1 • Cooling fan relay-2 • Cooling fan relay-3	Cooling fan speed request signal	ECM (CAN)	Cooling fan	• ECH-56 [HR16DE (with EURO-OBD)] • ECH-395 [HR16DE (without EURO-OBD)] • ECM-57 [MR20DE (with EURO-OBD)] • ECM-400 [MR20DE (without EURO-OBD)] • ECK-57 (K9K) • ECR-49 (M9R)
A/C relay	A/C compressor request signal	ECM (CAN)	A/C compressor (magnet clutch)	• HAC-45 (automatic air conditioner) • HAC-156 (manual air conditioner)
Ignition relay	Ignition switch ON signal	Ignition switch	Ignition relay	PCS-15
Headlamp washer relay	Headlamp washer request signal	BCM (CAN)	Headlamp washer	WW-14
Horn relay	Theft warning horn request signal	BCM (CAN)	Horn	• SEC-20 (with INTELLIGENT KEY) • SEC-175 (without INTELLIGENT KEY)
• PTC heater relay 1 • PTC heater relay 2	PTC relay request signal	BCM (CAN)	PTC heater	• HAC-46 (automatic air conditioner) • HAC-157 (manual air conditioner)

Component Parts Location

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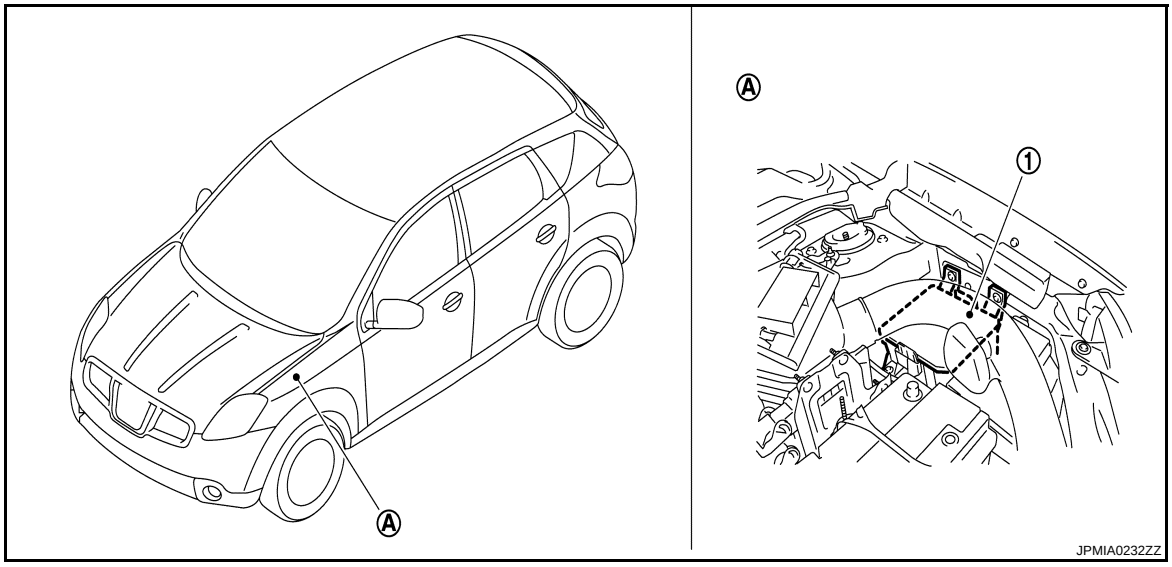
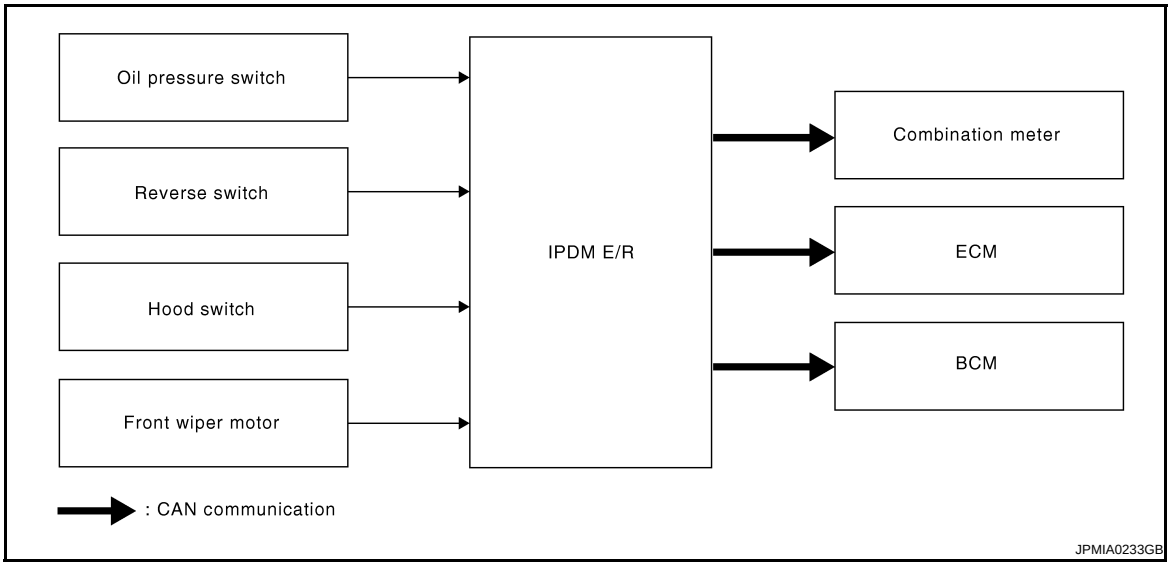


1. IPDM E/R
A. Engine room (left side)

SIGNAL BUFFER SYSTEM

System Diagram

INFOID:0000000001191165



System Description

INFOID:0000000001191166

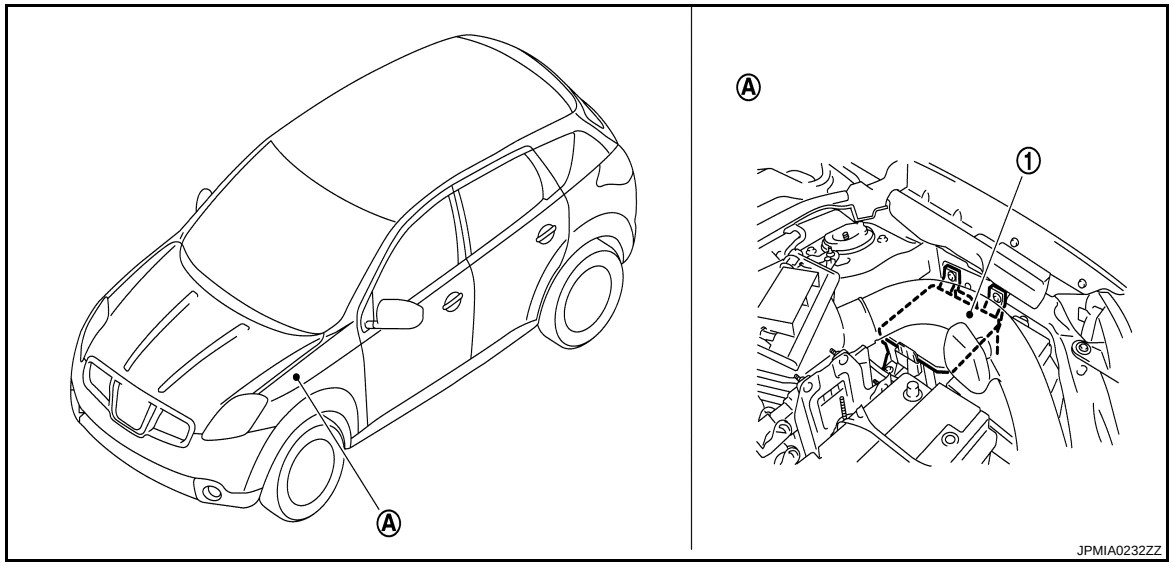
- IPDM E/R reads the status of the oil pressure switch and transmits the oil pressure switch signal to BCM and ECM*1 via CAN communication. Refer to MWI-19, "WARNING LAMPS/INDICATOR LAMPS : System Diagram".
- IPDM E/R reads the status of the reverse switch and transmits the reverse switch signal to BCM and ECM*2 via CAN communication. Refer to ECK-147, "DTC Logic".
- IPDM E/R reads the status of the hood switch and transmits the hood switch signal to BCM via CAN communication. Refer to SEC-20, "System Diagram" (with INTELLIGENT KEY system), SEC-175, "System Diagram" (without INTELLIGENT KEY system).
- IPDM E/R receives the front wiper auto stop signal status from front wiper motor and transmits the front wiper auto stop signal to BCM via CAN communication. Refer to WW-5, "System Diagram".

NOTE:

- *1: HR engine and MR engine models
- *2: K9K engine and M9R engine models

Component Parts Location

INFOID:0000000001191167



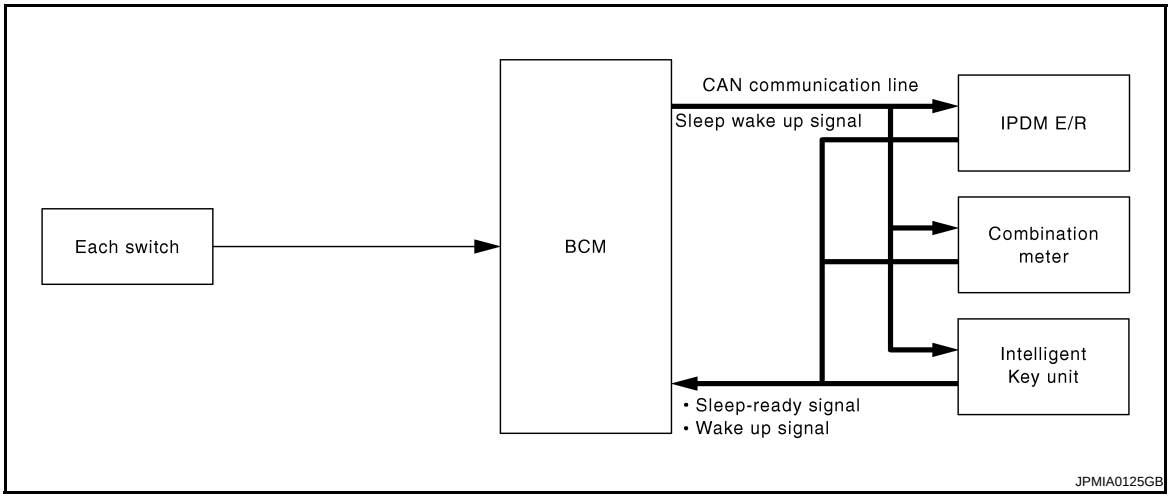
1. IPDM E/R

A. Engine room (left side)

POWER CONSUMPTION CONTROL SYSTEM

System Diagram

INFOID:0000000001191168



System Description

INFOID:0000000001191169

OUTLINE

- IPDM E/R incorporates a power consumption control function that reduces the power consumption according to the vehicle status.
- IPDM E/R changes its status (control mode) with the sleep wake up signal received from BCM via CAN communication.

Normal mode (wake-up)
- CAN communication is normally performed with other control units.
- Individual unit control by IPDM E/R is normally performed.

Low power consumption mode (sleep)
- Low power consumption control is active.
- CAN transmission is stopped.

Sleep mode activation

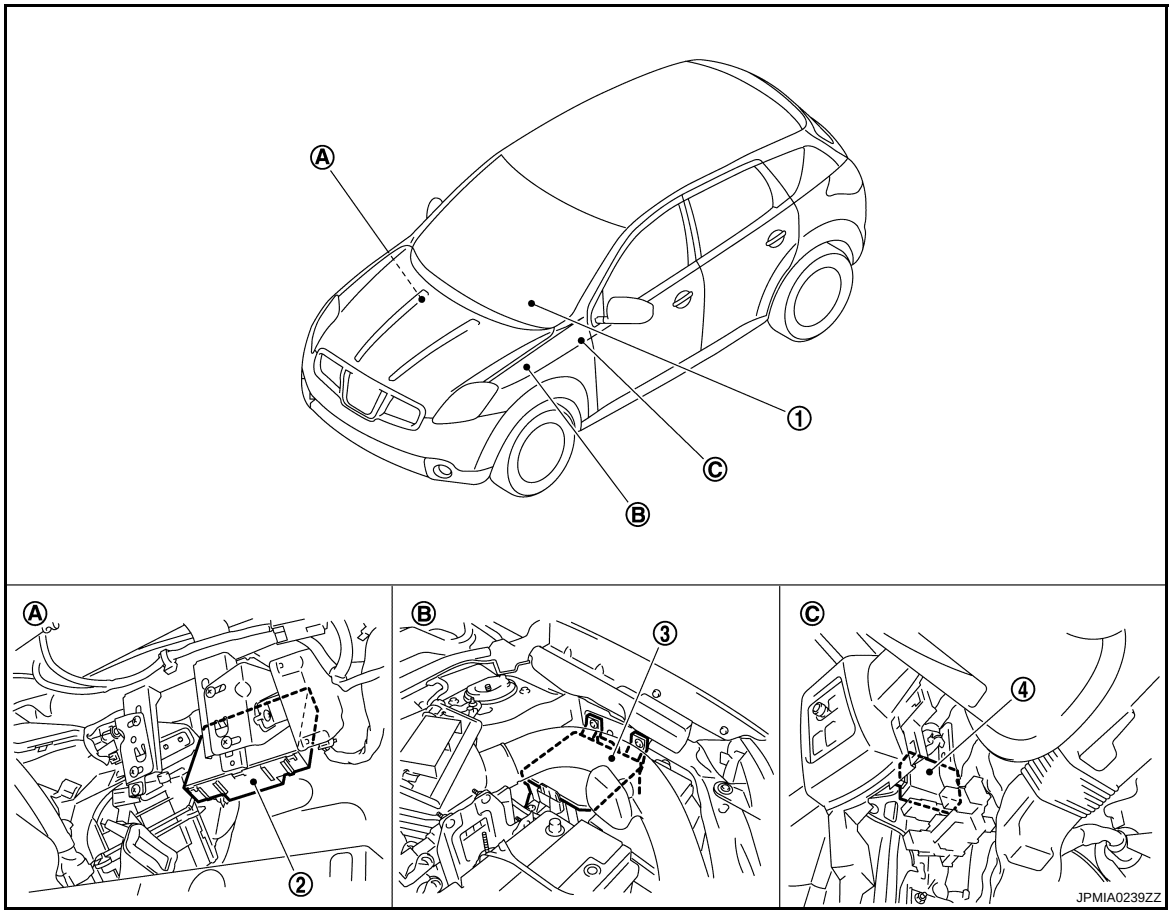
- IPDM E/R judges that the sleep-ready conditions are fulfilled when the ignition switch is OFF and none of the conditions below are present. Then it transmits a sleep-ready signal (ready) to BCM via CAN communication.
  - Front wiper fail-safe operation
  - Ignition relay ON or OFF stuck detection
  - Outputting signals to actuators
  - Switches or relays operating
  - Auto active test is starting
  - Communicating with CONSULT-III
  - Hood switch status is changed
  - Output requests are being received from control units via CAN communication.
- IPDM E/R stops CAN communication and enters the low power consumption mode when it receives a sleep wake up signal (sleep) from BCM and the sleep-ready conditions are fulfilled.

Wake-up operation

- IPDM E/R changes from the low power consumption mode to the normal mode when it receives a sleep wake-up signal (wake up) from BCM or any of the following conditions is fulfilled. In addition, it transmits a sleep-ready signal (not-ready) to BCM via CAN communication to report the CAN communication start.
  - Ignition switch ON
  - The hood switch status changes.
  - An output request is received from a control unit via CAN communication.

Component Parts Location

INFOID:0000000001191170



1. Combination meter
2. BCM
3. IPDM E/R
4. Intelligent Key unit

A. Over the glove box
B. Engine room (left side)
C. Over the instrument lower panel (driver side)

DIAGNOSIS SYSTEM (IPDM E/R)

Diagnosis Description

INFOID:0000000001191171

Auto active test

Description

In auto active test mode, the IPDM E/R sends a drive signal to the following systems to check their operation.

- Oil pressure warning lamp
- Rear window defogger
- Front wiper (LO, HI)
- Parking lamps
- License plate lamps
- Tail lamps
- Front fog lamps
- Headlamps (LO, HI)
- A/C compressor (magnet clutch)
- Cooling fan (LO, HI)

Operation procedure

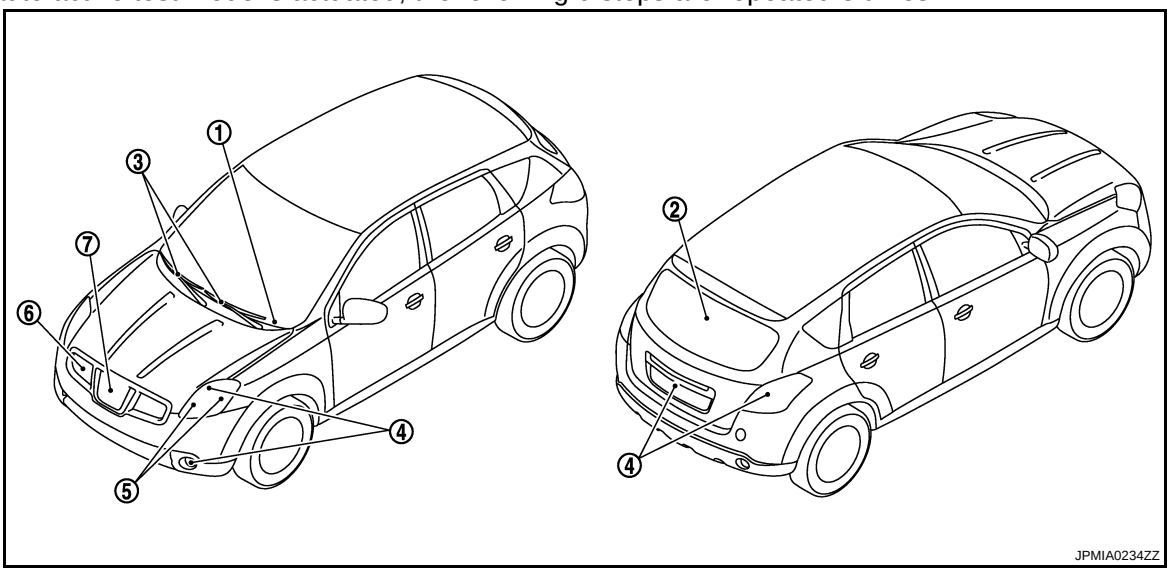
1. Close the hood and lift the wiper arms from the windshield. (Prevent windshield damage due to wiper operation)
   NOTE:
   When auto active test is performed with hood opened, sprinkle water on windshield beforehand.
2. Turn ignition switch OFF.
3. Turn the ignition switch ON, and within 20 seconds, press the driver door switch 10 times. Then turn the ignition switch OFF.
   CAUTION:
   Close passenger door.
4. Turn the ignition switch ON within 10 seconds. Then the horn sounds once and the auto active test starts.
5. The oil pressure warning lamp starts blinking when the auto active test starts.
6. After a series of the following operations is repeated 3 times, auto active test is completed.

NOTE:
When auto active test mode has to be cancelled halfway through test, turn ignition switch OFF.

CAUTION:
- **If auto active test mode cannot be actuated, check door switch system.**
- **Never start the engine.**

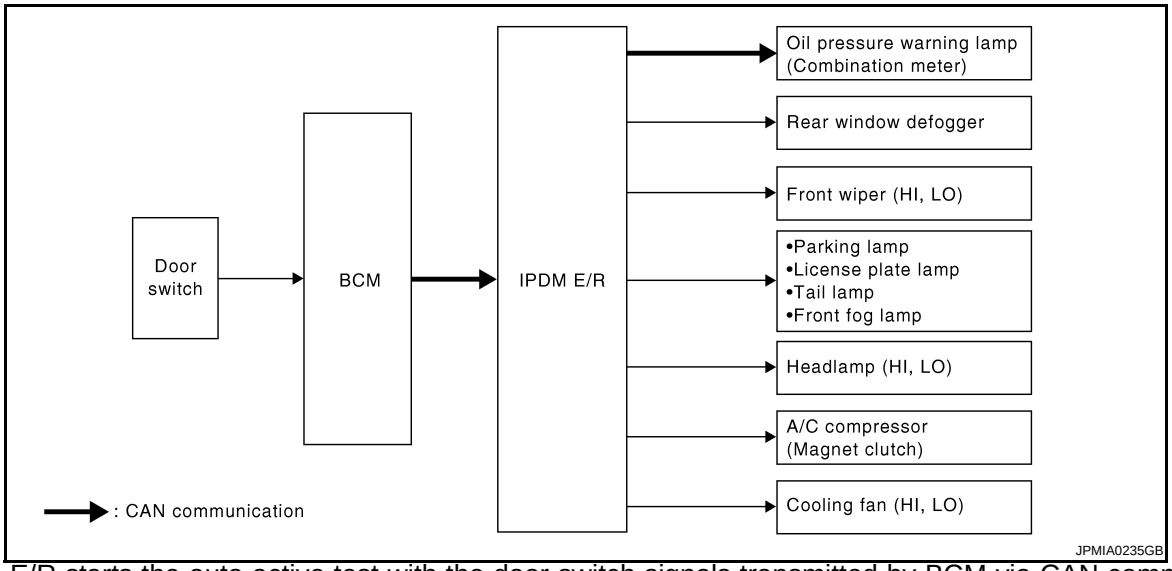
Inspection in auto active test mode

When auto active test mode is actuated, the following 6 steps are repeated 3 times.



Operation sequence	Inspection location	Operation
1	Oil pressure warning lamp	Blinks continuously during operation of auto active test.
2	Rear window defogger	10 seconds
3	Front wiper	LO for 5 seconds → HI for 5 seconds
4	• Parking lamps • License plate lamps • Tail lamps • Front fog lamps	10 seconds
5	Headlamps	LO ⇔ HI 5 times
6	A/C compressor (magnet clutch)	ON ⇔ OFF 5 times
7	Cooling fan	LO for 5 seconds → HI for 5 seconds

Concept of auto active test



- IPDM E/R starts the auto active test with the door switch signals transmitted by BCM via CAN communication. Therefore, the CAN communication line between IPDM E/R and BCM is considered normal if the auto active test starts successfully.
- The auto active test facilitates troubleshooting if any systems controlled by IPDM E/R cannot be operated.

Diagnosis chart in auto active test mode

Symptom	Inspection contents		Possible cause
Rear window defogger does not operate	Perform auto active test. Does the rear window defogger operate?	YES	BCM signal input circuit
		NO	• Rear window defogger • Rear window defogger ground circuit • Harness or connector between IPDM E/R and rear window defogger • IPDM E/R
Any of the following components do not operate • Parking lamps • License plate lamps • Tail lamps • Front fog lamps • Headlamp (HI, LO) • Front wiper (HI, LO)	Perform auto active test. Does the applicable system operate?	YES	BCM signal input circuit
		NO	• Lamp or motor • Lamp or motor ground circuit • Harness or connector between IPDM E/R and applicable system • IPDM E/R

Symptom	Inspection contents		Possible cause
A/C compressor does not operate	Perform auto active test. Does the magnet clutch operate?	YES	• Communication signal between BCM and auto amp. (with auto A/C) • Communication signal between BCM and heater control panel (without auto A/C, with manual A/C) • BCM • CAN communication signal between BCM and ECM • CAN communication signal between ECM and IPDM E/R
		NO	• Magnet clutch • Harness or connector between IPDM E/R and magnet clutch • IPDM E/R
Oil pressure warning lamp does not operate	Perform auto active test. Does the oil pressure warning lamp blink?	YES	• Harness or connector between IPDM E/R and oil pressure switch • Oil pressure switch • IPDM E/R
		NO	• CAN communication signal between IPDM E/R and BCM • CAN communication signal between BCM and combination meter • Combination meter
Cooling fan does not operate	Perform auto active test. Does the cooling fan operate?	YES	• ECM signal input circuit • CAN communication signal between ECM and IPDM E/R
		NO	• Cooling fan • Cooling fan ground circuit • Harness or connector between IPDM E/R and cooling fan • IPDM E/R • Cooling fan relay-3* • Harness or connector between IPDM E/R and cooling fan relay-3* • Harness or connector between cooling fan and cooling fan relay-3*

NOTE:

*: MR engine and K9K engine models

CONSULT - III Function (IPDM E/R)

INFOID:0000000001191172

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with IPDM E/R.

Diagnosis mode	Description
Ecu Identification	Allows confirmation of IPDM E/R part number.
Self Diagnostic Result	Displays the diagnosis results judged by IPDM E/R.
Data Monitor	Displays the real-time input/output data from IPDM E/R input/output data.
Active Test	IPDM E/R can provide a drive signal to electronic components to check their operations.
CAN Diag Support Monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF DIAGNOSTIC

Refer to PCS-31, "DTC Index".

DATA MONITOR

Monitor item

Monitor Item [Unit]	MAIN SIGNALS	Description
MOTOR FAN REQ [1 - 4]	×	Displays the value of the cooling fan speed signal received from ECM via CAN communication.
AC COMP REQ [Off/On]	×	Displays the status of the A/C compressor request signal received from ECM via CAN communication.
TAIL&CLR REQ [Off/On]	×	Displays the status of the position light request signal received from BCM via CAN communication.
HL LO REQ [Off/On]	×	Displays the status of the low beam request signal received from BCM via CAN communication.
HL HI REQ [Off/On]	×	Displays the status of the high beam request signal received from BCM via CAN communication.
FR FOG REQ [Off/On]	×	Displays the status of the front fog light request signal received from BCM via CAN communication.
HL WASHER REQ [Off/On]		Displays the status of the headlamp washer request signal received from BCM via CAN communication.
FR WIP REQ [Stop/1LOW/Low/Hi]	×	Displays the status of the front wiper request signal received from BCM via CAN communication.
WIP AUTO STOP [STOP P/ACT P]	×	Displays the status of the front wiper auto stop signal judged by IPDM E/R.
WIP PROT [Off/BLOCK]	×	Displays the status of the front wiper fail-safe operation judged by IPDM E/R.
ST RLY REQ [Off/On]		Displays the status of the ignition and starter request signal received from BCM via CAN communication.
IGN RLY [Off/On]	×	Displays the status of the ignition relay judged by IPDM E/R.
RR DEF REQ [Off/On]	×	Displays the status of the rear defogger request signal received from BCM via CAN communication.
OIL P SW [Open/Close]		Displays the status of the oil pressure switch judged by IPDM E/R.
REV SW [Off/On]		Displays the status of the reverse switch judged by IPDM E/R.
HOOD SW [Off/On]		Displays the status of the hood switch judged by IPDM E/R. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
THFT HRN REQ [Off/On]		Displays the status of the theft warning horn request signal received from BCM via CAN communication. **NOTE:** This item is monitored only the vehicle with the Vehicle Security (Theft Warning) system.
HORN CHIRP [Off/On]		**NOTE:** This item is indicated, but not monitored.
IGN ON SW [Off/On]		Displays the status of the ignition switch judged by IPDM E/R.

ACTIVE TEST

Test item

Test item	Operation	Description
REAR DEFOGGER	Off	OFF
	On	Operates the rear window defogger relay.
FRONT WIPER	Off	OFF
	Lo	Operates the front wiper relay.
	Hi	Operates the front wiper relay and front wiper high relay.

Test item	Operation	Description
MOTOR FAN	1	OFF
	2	Operates the cooling fan relay (low operation).
	3	Operates the cooling fan relay (high operation).
	4	
HEAD LAMP WASHER	On	Operates the headlamp washer relay for 1 second.
EXTERNAL LAMPS	Off	OFF
	TAIL	Operates the tail lamp relay.
	Lo	Operates the headlamp low relay.
	Hi	Operates the headlamp low relay and ON/OFF the headlamp high relay at 1 second intervals.
	Fog	Operates the front fog lamp relay.
HORN	On	Operates horn relay for 20 ms.

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000001191173

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control unit, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H, CAN-L) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
CAN Communication Signal Chart. Refer to LAN-28, "CAN Communication Signal Chart".

DTC Logic

INFOID:0000000001191174

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
U1000	CAN COMM CIRCUIT	When IPDM E/R cannot communicate CAN communication signal continuously for 2 seconds or more.	Any item (or items) of the following listed below is malfunctioning in CAN communication system. • Transmission • Receiving (ECM) • Receiving (BCM)

Diagnosis Procedure

INFOID:0000000001191175

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Check “Self Diagnostic Result”.

Is “CAN COMM CIRCUIT” displayed?

YES >> Refer to LAN-13, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-39, "Intermittent Incident".

B2099 IGNITION RELAY OFF STUCK

Description

INFOID:0000000001191179

The ignition relay integrated in IPDM E/R is operated with ignition switch ON signal from the ignition switch.

DTC Logic

INFOID:0000000001191180

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible causes
B2099	IGN RELAY OFF	The ignition relay OFF is detected for 1 second at ignition switch ON (The CPU integrated IPDM E/R monitors the status at the contact circuits of the ignition relay inside it)	Ignition relay

Diagnosis Procedure

INFOID:0000000001191181

1.PERFORM SELF DIAGNOSIS

1. Turn the ignition switch ON.
2. Select “Self Diagnostic Result” of “IPDM E/R”. Erase DTC.
3. Turn ignition switch OFF.
4. Turn the ignition switch ON. Check “Self Diagnostic Result” again.

Is “IGN RELAY OFF” displayed?

YES >> Replace IPDM E/R.
NO >> Refer to GI-39, "Intermittent Incident".

B209A RAM ERROR

DTC Logic

INFOID:0000000001301312

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
B209A	RAM ERROR	IPDM E/R detected CPU malfunction.	IPDM E/R

Diagnosis Procedure

INFOID:0000000001301313

1.REPLACE IPDM E/R

When DTC [B209A] is detected, replace IPDM E/R.

>> Replace IPDM E/R.

B209B ROM ERROR

DTC Logic

INFOID:0000000001301314

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
B209B	ROM ERROR	IPDM E/R detected CPU malfunction.	IPDM E/R

Diagnosis Procedure

INFOID:0000000001301315

1.REPLACE IPDM E/R

When DTC [B209B] is detected, replace IPDM E/R.

>> Replace IPDM E/R.

B2100 EEPROM

DTC Logic

INFOID:0000000001191182

DTC DETECTION LOGIC

DTC	CONSULT-III display description	DTC Detection Condition	Possible cause
B2100	EEPROM	IPDM E/R detected CPU malfunction.	IPDM E/R

Diagnosis Procedure

INFOID:0000000001191183

1.REPLACE IPDM E/R

When DTC [B2100] is detected, replace IPDM E/R.

>> Replace IPDM E/R.

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000001191184

1.CHECK FUSIBLE LINK

Check that the following IPDM E/R fusible link is not blown.

Terminal No.	Signal name	Fusible link No.
1	Battery power supply	D (with gasoline engine)
		B (with diesel engine)
2		C (with gasoline engine)
		D (with diesel engine)
53		L (except HR engine models)
		M (HR engine models)

Is the fusible link fusing?

YES >> Replace the blown fusible link after repairing the affected circuit if a fusible link is blown.
NO >> GO TO 2.

2.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check voltage between IPDM E/R harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
IPDM E/R			
Connector	Terminal	Ground	
E9	1		Battery voltage
	2		
E14	53		

Is the measurement value normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

1. Disconnect IPDM E/R connectors.
2. Check continuity between IPDM E/R harness connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E10	5		Exist
	6		

Does continuity exist?

YES >> INSPECTION END
NO >> Repair harness or connector.

ECU DIAGNOSIS

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Reference Value

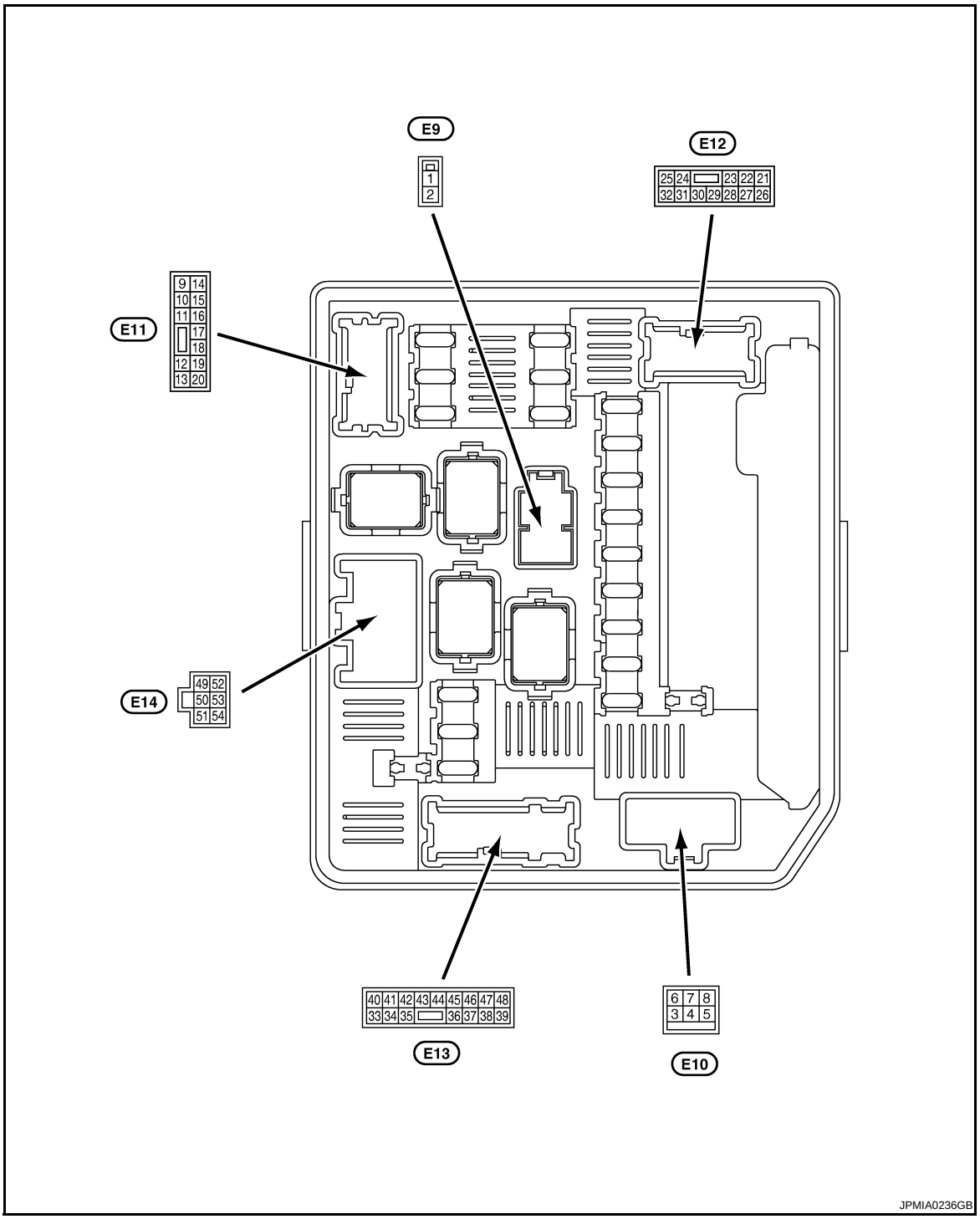
INFOID:0000000001191185

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
MOTOR FAN REQ	Engine idle speed	Changes depending on engine coolant temperature, air conditioner operation status, vehicle speed, etc.	1 - 3
AC COMP REQ	Engine running	A/C switch OFF	Off
		A/C switch ON (Compressor is operating)	On
TAIL&CLR REQ	Lighting switch OFF		Off
	Lighting switch 1ST, 2ND or AUTO (Light is illuminated)		On
HL LO REQ	Lighting switch OFF		Off
	Lighting switch 2ND or AUTO (Light is illuminated)		On
HL HI REQ	Lighting switch OFF		Off
	Lighting switch HI (Light is illuminated)		On
FR FOG REQ	Lighting switch 2ND or AUTO (Light is illuminated)	Front fog lamp switch OFF	Off
		Front fog lamp switch ON	On
HL WASHER REQ	Ignition switch ON, and low beam headlamp is ON	Front washer switch OFF	Off
		Front washer switch ON (When headlamp washer is operating)	On
FR WIP REQ	Ignition switch ON	Front wiper switch OFF	STOP
		Front wiper switch INT	1LOW
		Front wiper switch LO	Low
		Front wiper switch HI	Hi
WIP AUTO STOP	Ignition switch ON	Front wiper stop position	STOP P
		Any position other than front wiper stop position	ACT P
WIP PROT	Ignition switch ON	Front wiper operates normally	Off
		Front wiper stops due to fail-safe operation (cut-out operation)	BLOCK
ST RLY REQ **NOTE:** Vehicle without Intelligent Key system indicates only “ON”, and it does not change.	When Intelligent Key is outside the vehicle, and the push switch is pushed		Off
	When Intelligent Key is inside the vehicle, and the push switch is pushed		On
IGN RLY	Ignition switch OFF or ACC		Off
	Ignition switch ON		On
RR DEF REQ	Ignition switch ON	Rear window defogger switch OFF	Off
		Rear window defogger switch ON (Rear window defogger is operating)	On
OIL P SW	Ignition switch OFF, ACC or engine running		Open
	Ignition switch ON		Close

Monitor Item	Condition	Value/Status
REV SW	Except selector lever R position	Off
	Selector lever R position	On
HOOD SW **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Close the hood	Off
	Open the hood	On
THFT HRN REQ **NOTE:** This item is monitored only on the vehicle with the Vehicle Security (Theft Warning) system.	Not operation	Off
	Horn is activated with Vehicle Security (Theft Warning) system.	On
HORN CHIRP	**NOTE:** This item is indicated, but not monitored.	Off
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
		Signal name	Input/ Output		
+	–				
1 (G)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
2 (R)	Ground	Battery power supply	Input	Ignition switch OFF	Battery voltage
5 (B)	Ground	Ground	—	Ignition switch ON	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
6 (B)	Ground	Ground	—	Ignition switch ON		0 V
7 (Y)	Ground	Front wiper LO	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch LO	Battery voltage
8 (Y/R)	Ground	Front wiper HI	Output	Ignition switch ON	Front wiper switch OFF	0 V
					Front wiper switch HI	Battery voltage
9 (G)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
10*1 (L/R)	Ground	ECM relay power supply	Output	Ignition switch ON		Battery voltage
11*2 (O)	Ground	PTC heater 1 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
12*2 (G/Y)	Ground	PTC heater 2 relay control	Output	PTC heater OFF		Battery voltage
				PTC heater ON		0 V
14 (R/B)	Ground	Ignition power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
15 (Y/L)*1 (B/R)*2	Ground	ECM relay control	Input	• Engine running • Ignition switch OFF (For a few seconds after turning ignition switch OFF)		0 - 1.0 V*1
						0.6 V*2
				Ignition switch OFF or ACC (More than a few seconds after turning ignition switch OFF)		Battery voltage
16*3 (Y/R)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
19*1 (R/O)	Ground	Ignition relay power supply	Output	Ignition switch ON		Battery voltage
				Ignition switch OFF or ACC		0 V
21*4 (GR)	Ground	Hood switch	Input	Close the hood		0 V → Battery voltage → 0 V
				Open the hood		0 V
22 (Y/G)	Ground	Reverse switch	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON	• Selector lever “R” (Except M/T models) • M/T control lever “R” (M/T models)	Battery voltage
					• Selector lever in any position other than “R” (Except M/T models) • M/T control lever in any position other than “R” (M/T models)	0 V
23 (Y/B)	Ground	A/C relay power supply	Output	Engine stopped		0 V
				Engine running	A/C switch OFF	0 V
					A/C switch ON (A/C compressor is operating)	Battery voltage
24 (R/Y)	Ground	Headlamp LO (RH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
25*1 (G/L)	Ground	ETC relay control	Input	Ignition switch OFF or ACC		Battery voltage
				Ignition switch ON		0 - 1.0 V
26 (O)	Ground	Front wiper auto stop	Input	Ignition switch ON	Front wiper stop position	0 V
					Any position other than front wiper stop position	Battery voltage
27 (W)	Ground	Oil pressure switch	Input	Engine stopped		0 V
				Engine running		Battery voltage
28 (L)	—	CAN-H	Input/ Output	—		—
29 (P)	—	CAN-L	Input/ Output	—		—
30*4 (L)	Ground	Horn relay control	Output	The horn is not activated		Battery voltage
				The horn is activated		0 V
31 (R)	Ground	Headlamp LO (sensor)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage
32*1 (R/Y)	Ground	ETC relay power supply	Output	Ignition switch ON		Battery voltage
33*1 (B/O)	Ground	Fuel pump relay control	Input	• Engine running • Ignition switch ON (For 1 second after turning ignition switch ON)		0 - 1.0 V
				Ignition switch ON (More than 1 second after turning ignition switch ON)		Battery voltage
34 (R/B)	Ground	Starter relay power supply	Input	Ignition switch ON (Except M/T models)	Selector lever “P” or “N”	Battery voltage
					Selector lever in any position other than “P” or “N”	0 V
				Ignition switch ON (M/T models)		Battery voltage
35 (W/L)	Ground	Ignition switch ON	Input	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
36 (W)	Ground	Front fog lamp (RH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
37 (R/W)	Ground	Parking lamp (RH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
38 (R/L)	Ground	Tail, license plate lamps and illuminations	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
39 (GR)	Ground	Headlamp washer relay control	Output	Ignition switch ON	When headlamp washer is operating	0 V
					When headlamp washer is not operating	Battery voltage
40*1 (BR/Y)*5 (SB)*6	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage
41 (P)	Ground	Ignition relay power supply	Output	Ignition switch OFF or ACC		0 V
				Ignition switch ON		Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
42*1 (B/Y)	Ground	Fuel pump relay power supply	Output	• Ignition switch OFF or ACC • Approximately 1 second or more after turning the ignition switch ON		0 V
				• Approximately 1 second after turning the ignition switch ON • Engine running		Battery voltage
43 (W/B)	Ground	Front fog lamp (LH)	Output	Lighting switch 1ST	Front fog lamp switch ON	Battery voltage
					Front fog lamp switch OFF	0 V
44 (L)	Ground	Headlamp LO (LH)	Output	Lighting switch OFF		0 V
				Lighting switch 2ND		Battery voltage
45 (L/W)	Ground	Headlamp HI (RH)	Output	• Lighting switch 2ND and HI • lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
46 (G)	Ground	Headlamp HI (LH)	Output	• Lighting switch 2ND and HI • Lighting switch PASS		Battery voltage
				Lighting switch OFF		0 V
47 (R/L)	Ground	Parking lamp (LH)	Output	Lighting switch 1ST		Battery voltage
				Lighting switch OFF		0 V
48*7 (Y)	Ground	Cooling fan relay-3 control	Output	When cooling fan does HI operation		0 V
				When cooling fan does OFF or LO operation		Battery voltage
49 (B)	Ground	Rear window defogger relay power supply	Output	Ignition switch ON	Rear window defogger switch ON	Battery voltage
					Rear window defogger switch OFF	0 V
50 (B/R)	Ground	Starter relay power supply	Output	When engine is cranking		Battery voltage
				When engine is not cranking		0 V
51 (P)	Ground	Ignition switch START	Input	Ignition switch START		Battery voltage
				Ignition switch OFF, ACC or ON		0 V
52 (W)	Ground	Cooling fan relay-1 power supply	Output	When cooling fan does LO or HI operation		Battery voltage
				When cooling fan does OFF operation		0 V
53 (W/B)	Ground	Battery power supply (Cooling fan relay)	Input	Ignition switch OFF		Battery voltage
54*5 (R)	Ground	Cooling fan relay-2 power supply	Input	When cooling fan does HI operation		Battery voltage
				When cooling fan does OFF or LO operation		0 V

*1: HR engine and MR engine models

*2: K9K engine and M9R engine models

*3: Except M/T models only

*4: With vehicle security (theft warning) system

*5: HR engine models

*6: MR engine models

*7: MR engine, K9K engine and M9R engine models

Wiring Diagram - IPDM E/R -

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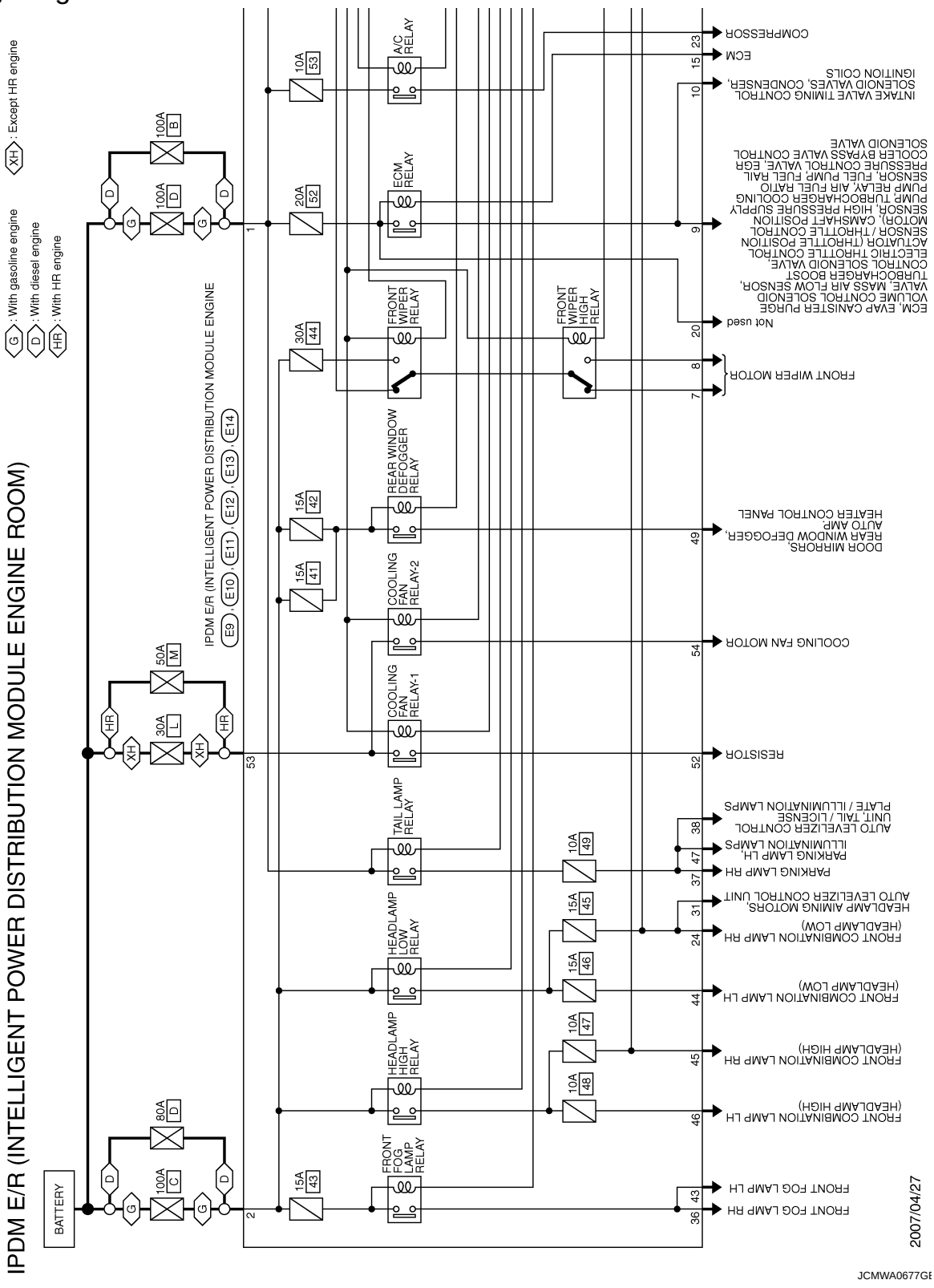

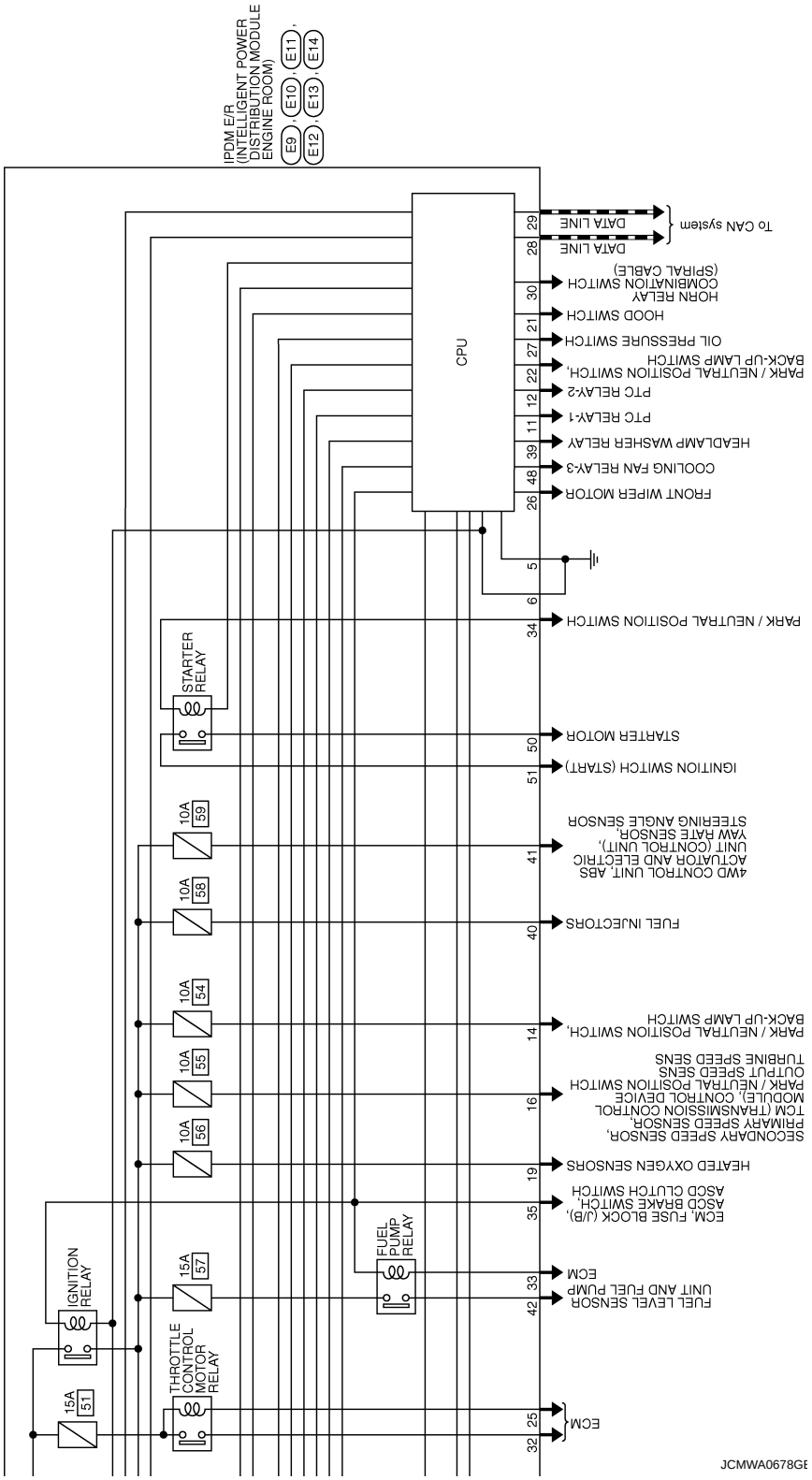
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E9, E10, E11, E12, E13, E14
CPU
To CAN system
DATA LINE
DATA LINE
HORN RELAY CONTROL SIGNAL (SPIRAL CABLE)
HOOD SWITCH
OIL PRESSURE SWITCH
PARK / NEUTRAL POSITION SWITCH, BACK-UP LAMP SWITCH
PTC RELAY-2
PTC RELAY-1
HEADLAMP WASHER RELAY
COOLING FAN RELAY-3
FRONT WIPER MOTOR
PARK / NEUTRAL POSITION SWITCH
STARTER MOTOR
IGNITION SWITCH (START)
4WD CONTROL UNIT, ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT), YAW RATE SENSOR, STEERING ANGLE SENSOR
FUEL INJECTORS
PARK / NEUTRAL POSITION SWITCH, BACK-UP LAMP SWITCH
SECONDARY SPEED SENSOR, PRIMARY SPEED SENSOR, TCM (TRANSMISSION CONTROL MODULE), CONTROL DEVICE, PARK / NEUTRAL POSITION SWITCH, OUTPUT SPEED SENS, TURBINE SPEED SENS
HEATED OXYGEN SENSORS
ECM, FUSE BLOCK (J/B), ASCD BRAKE SWITCH, ASCD CLUTCH SWITCH
FUEL LEVEL SENSOR UNIT AND FUEL PUMP
ECM
ECM
STARTER RELAY
IGNITION RELAY
THROTTLE CONTROL MOTOR RELAY
FUEL PUMP RELAY
10A 59
10A 58
10A 54
10A 55
10A 56
15A 57
15A 51
JCMWA0678GE

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector No.	E9
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	L02FB-MC

H.S.

1 2

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	R	–

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC

H.S.

5 4 3
8 7 6

Terminal No.	Color of Wire	Signal Name [Specification]
5	B	–
6	B	–
7	Y	–
8	Y/R	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

H.S.

13 12 11 10 9
20 19 18 17 16 15 14

Terminal No.	Color of Wire	Signal Name [Specification]
9	G	–
10	L/R	–
11	O	–
12	G/Y	–
14	R/B	–
15	Y/L	–[With gasoline engine]
15	B/R	–[With diesel engine]
16	Y/R	–
19	R/O	–
20	–	–

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS

H.S.

25 24 23 22 21
32 31 30 29 28 27 26

Terminal No.	Color of Wire	Signal Name [Specification]
21	GR	–
22	Y/G	–
23	Y/B	–
24	R/Y	–
25	G/L	–
26	O	–
27	W	–
28	L	–
29	P	–
30	L	–
31	R	–

32	R/Y	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

H.S.

39 38 37 36 35 34 33
48 47 46 45 44 43 42 41 40

Terminal No.	Color of Wire	Signal Name [Specification]
33	B/O	–
34	W/B	–[With A/T]
34	R/B	–[Except A/T]
35	W/L	–
36	W	–
37	R/W	–
38	R/L	–
39	GR	–
40	SB	–[With MR engine]
40	BR/Y	–[With HR engine]
41	P	–
42	B/Y	–
43	W/B	–
44	L	–
45	L/W	–
46	G	–
47	R/L	–
48	Y	–[Except M9R engine]
48	W	–[With M9R engine]

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IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	Y2K 7283-5591-40-F

Terminal No.	Color of Wire	Signal Name [Specification]
49	B	–[Except M9R engine]
49	G	–[With M9R engine]
50	B/R	–
51	P	–
52	W	–
53	W/B	–
54	R	–

JCMWA0680GE

Fail Safe

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CAN communication control

When CAN communication with ECM and BCM is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.

If no CAN communication is available with ECM

Control part	Fail-safe in operation
Cooling fan	• The cooling fan relay-2*1 or the cooling fan relay-3*2 turns ON when the ignition switch is turned ON • Turns off the fan motor low relay when the ignition switch is turned OFF
A/C compressor	A/C relay OFF

*1: HR engine models

*2: MR engine, K9K engine and M9R engine models

If no CAN communication is available with BCM

Control part	Fail-safe in operation
Headlamp	• The headlamp low relay turns ON when the ignition switch is turned ON • The headlamp low relay turns OFF when the ignition switch is turned OFF • Headlamp high relay OFF
• Parking lamps • License plate lamps • Tail lamps • Illuminations	• The tail lamp relay turns ON when the ignition switch is turned ON • The tail lamp relay turns OFF when the ignition switch is turned OFF
Front wiper	• The status just before activation of fail-safe control is maintained until the ignition switch is turned OFF while the front wiper is operating at LO or HI speed. • The front wiper is operated at LO speed until the ignition switch is turned OFF if the fail-safe control is activated while the front wiper is set in the INT mode and the front wiper motor is operating.
Front fog lamps	Front fog lamp relay OFF
Starter motor	Starter relay OFF
Rear window defogger	Rear window defogger relay OFF
Headlamp washer	Headlamp washer relay OFF
PTC heater	PTC heater relay OFF

Ignition relay malfunction detection function

- The CPU integrated IPDM E/R monitors the voltage at the contact circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the ignition relay condition is different from the ignition switch ON signal.
- If the ignition relay cannot turn OFF due to contact seizure, it activates the tail lamp relay for 10 minutes to alert the user to the ignition relay malfunction when the ignition switch is turned OFF.

DTC	Ignition switch	Ignition relay	Tail lamp relay
—	ON	ON	—
—	OFF	OFF	—
—	OFF	ON	ON (10 minutes)
B2099: IGN RLY OFF	ON	OFF	—

NOTE:

The tail lamp relay is turned OFF when the ignition switch is turned ON.

Front wiper control

IPDM E/R detects the front wiper stop position with the front wiper auto stop signal.
When the front wiper auto stop signal is in the conditions listed below, IPDM E/R repeats a front wiper 10 seconds operation and 20 seconds stop until ignition switch is turned OFF.

Ignition switch	Front wiper switch	Front wiper auto stop signal
ON	OFF	The front wiper auto stop signal (stop position) cannot be input for 10 seconds.
	ON	The front wiper auto stop signal does not change for 10 seconds.

NOTE:

This operation status can be confirmed on the IPDM E/R “Data Monitor” that displays “BLOCK” for the item “WIP PROT” while the wiper is stopped.

DTC Index

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CONSULT display	Fail-safe	Timing[NOTE]		Reference page
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	×	CRNT	PAST	PCS-14
B2099: IGN RELAY OFF	—	CRNT	PAST	PCS-15
B209A: RAM ERROR	—	CRNT	PAST	PCS-16
B209B: ROM ERROR	—	CRNT	PAST	PCS-17
B2100: EEPROM	—	CRNT	PAST	PCS-18

NOTE:

The details of time display are as follows.

- CRNT: The malfunctions that are detected now.
- PAST: The number is indicated when it is normal at present and a malfunction was detected in the past.

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001191189

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the “SRS AIRBAG”.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

ON-VEHICLE REPAIR

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Exploded View

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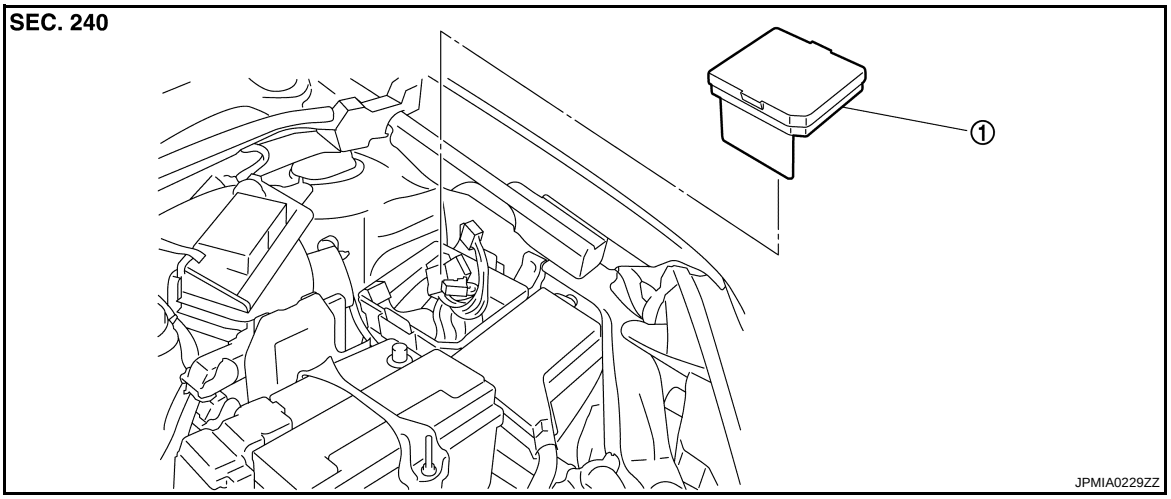


1. IPDM E/R

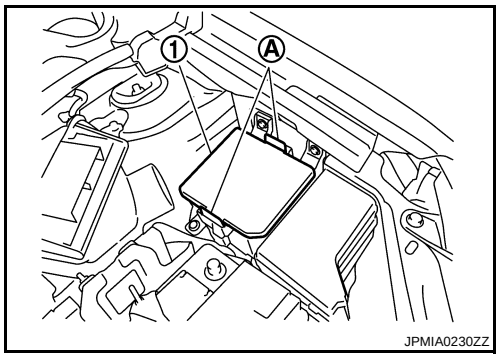
Removal and Installation

INFOID:0000000001191191

CAUTION:
IPDM E/R integrated relays are not serviceable parts, and must not be removed from the unit.

REMOVAL

1. Remove air duct (inlet). Refer to EM-28, "Exploded View" (HR16DE), EM-145, "Exploded View" (MR20DE), EM-266, "Exploded View" (K9K), EM-354, "Exploded View" (M9R).
2. Remove the IPDM E/R (1) while pushing and opening pawls (A).
3. Disconnect connectors from IPDM E/R.



INSTALLATION
Install in the reverse order of removal.