

# SECTION PCS

## POWER CONTROL SYSTEM

### CONTENTS

<b>IPDM E/R</b>	Diagnosis Procedure .....	15	F
<b>BASIC INSPECTION</b> .....	<b>POWER SUPPLY AND GROUND CIRCUIT</b> ....	16	G
<b>DIAGNOSIS AND REPAIR WORKFLOW</b> .....	Diagnosis Procedure .....	16	
Work Flow .....	<b>ECU DIAGNOSIS INFORMATION</b> .....	17	H
<b>SYSTEM DESCRIPTION</b> .....	<b>IPDM E/R (INTELLIGENT POWER DISTRI- BUTION MODULE ENGINE ROOM)</b> .....	17	I
<b>RELAY CONTROL SYSTEM</b> .....	Reference Value .....	17	J
System Diagram .....	Terminal Layout .....	18	
System Description .....	Physical Values .....	18	K
Component Parts Location .....	Fail Safe .....	21	L
<b>SIGNAL BUFFER SYSTEM</b> .....	DTC Index .....	22	
System Diagram .....	<b>WIRING DIAGRAM</b> .....	23	
System Description .....	<b>IPDM E/R (INTELLIGENT POWER DISTRI- BUTION MODULE ENGINE ROOM)</b> .....	23	
<b>POWER CONSUMPTION CONTROL SYS- TEM</b> .....	Wiring Diagram .....	23	
System Diagram .....	<b>PRECAUTION</b> .....	27	
System Description .....	<b>PRECAUTIONS</b> .....	27	
Component Parts Location .....	Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TEN- SIONER" .....	27	PCS
<b>DIAGNOSIS SYSTEM (IPDM E/R)</b> .....	<b>UNIT REMOVAL AND INSTALLATION</b> .....	28	N
Diagnosis Description .....	<b>IPDM E/R (INTELLIGENT POWER DISTRI- BUTION MODULE ENGINE ROOM)</b> .....	28	O
CONSULT Function (IPDM E/R) .....	Removal and Installation of IPDM E/R .....	28	P
<b>DTC/CIRCUIT DIAGNOSIS</b> .....			
<b>U1000 CAN COMM CIRCUIT</b> .....			
Description .....			
DTC Logic .....			

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[IPDM E/R]

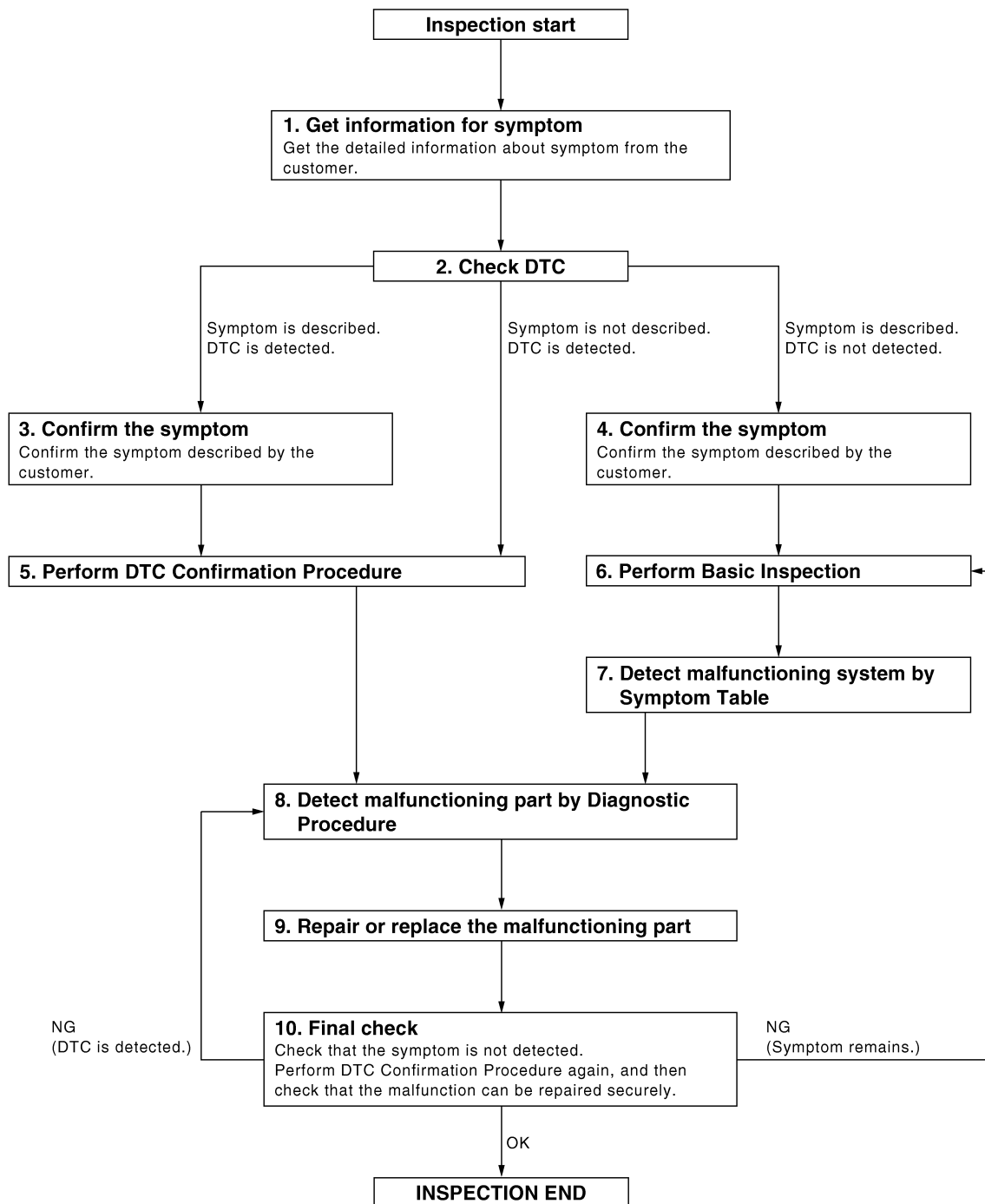
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000007946538

OVERALL SEQUENCE



DETAILED FLOW

JMKIA0101GB

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[IPDM E/R]

## 1. GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred).

>> GO TO 2

## 2. CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.
  - Record DTC and freeze frame data.
  - Erase DTC.
  - Study the relationship between the cause detected by DTC and the symptom described by the customer.
3. Check related service bulletins for information.

Is any symptom described and any DTC detected?

Symptom is described, DTC is displayed>>GO TO 3

Symptom is described, DTC is not displayed>>GO TO 4

Symptom is not described, DTC is displayed>>GO TO 5

## 3. CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.

Connect CONSULT to the vehicle in "DATA MONITOR" mode and check real time diagnosis results.

Verify relationship between the symptom and the condition when the symptom is detected.

>> GO TO 5

## 4. CONFIRM THE SYMPTOM

Confirm the symptom described by the customer.

Connect CONSULT to the vehicle in "DATA MONITOR" mode and check real time diagnosis results.

Verify relationship between the symptom and the condition when the symptom is detected.

>> GO TO 6

## 5. PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC Confirmation Procedure for the displayed DTC, and then check that DTC is detected again. At this time, always connect CONSULT to the vehicle, and check diagnostic results in real time.

### NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC Confirmation Procedure is not included in Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check. If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC Confirmation Procedure.

Is DTC detected?

YES >> GO TO 8

NO >> Refer to [GI-42. "Intermittent Incident"](#).

## 6. PERFORM BASIC INSPECTION

Perform basic inspection of system.

Inspection End>>GO TO 7

## 7. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

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## 8. DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

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# DIAGNOSIS AND REPAIR WORKFLOW

[IPDM E/R]

## < BASIC INSPECTION >

Inspect according to Diagnostic Procedure of the system.

### **NOTE:**

The Diagnostic Procedure described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure.

### Is malfunctioning part detected?

YES >> GO TO 9

NO >> Check voltage of related BCM terminals using CONSULT.

## **9. REPAIR OR REPLACE THE MALFUNCTIONING PART**

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnostic Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it.

>> GO TO 10

## **10. FINAL CHECK**

When DTC was detected in step 2, perform DTC Confirmation Procedure or Component Function Check again, and then check that the malfunction have been fully repaired.

When symptom was described from the customer, refer to confirmed symptom in step 3 or 4 and check that the symptom is not detected.

### Is the inspection result normal?

YES >> Inspection End.

NO (DTC is detected)>>GO TO 8

NO (Symptom remains)>>GO TO 6

# RELAY CONTROL SYSTEM

< SYSTEM DESCRIPTION >

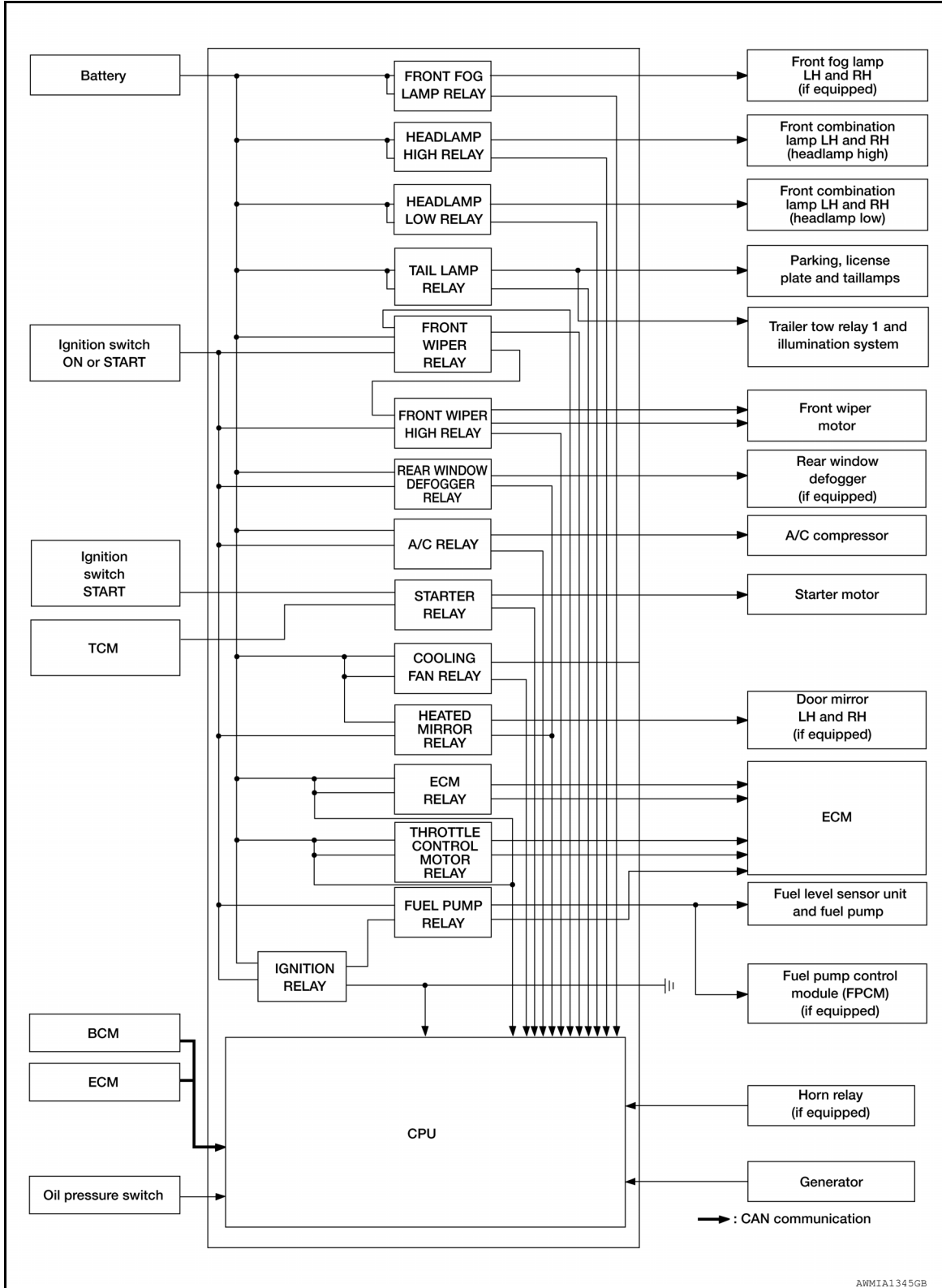
[IPDM E/R]

## SYSTEM DESCRIPTION

### RELAY CONTROL SYSTEM

#### System Diagram

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# RELAY CONTROL SYSTEM

< SYSTEM DESCRIPTION >

[IPDM E/R]

## System Description

INFOID:000000007946540

IPDM E/R controls relays based on input signals from various sensors and from request signals received via CAN communication.

**CAUTION:**

**IPDM E/R integrated relays cannot be removed.**

Relay	Signal Type	Transmitting Unit	Control Part	Reference page
Front fog lamp relay*	Front fog lamp request signal	BCM (CAN)	Front fog lamps*	<a href="#">EXL-13</a>
<ul style="list-style-type: none"> <li>• Headlamp high relay</li> <li>• Headlamp low relay</li> </ul>	<ul style="list-style-type: none"> <li>• High beam request signal LH</li> <li>• High beam request signal RH</li> <li>• Low beam request signal</li> </ul>	BCM (CAN)	<ul style="list-style-type: none"> <li>• Headlamp high LH</li> <li>• Headlamp high RH</li> <li>• Headlamp low</li> </ul>	<a href="#">EXL-7</a>
Tail lamp relay	Position light request signal	BCM (CAN)	<ul style="list-style-type: none"> <li>• Parking lamps</li> <li>• License plate lamps</li> <li>• Tail lamps</li> <li>• Trailer tow relay 1</li> <li>• Illumination system</li> </ul>	<a href="#">EXL-16</a>
<ul style="list-style-type: none"> <li>• Front wiper relay</li> <li>• Front wiper high relay</li> </ul>	Front wiper request signal	BCM (CAN)	Front wiper motor	<a href="#">WW-4</a>
Rear window defogger relay*	Rear window defogger request signal	BCM (CAN)	Rear window defogger*	<a href="#">DEF-5</a>
A/C relay	A/C request signal	<ul style="list-style-type: none"> <li>• BCM (CAN)</li> <li>• ECM (CAN)</li> </ul>	A/C compressor	<a href="#">HAC-13</a> <a href="#">HAC-107</a> <a href="#">HAC-190</a>
Starter relay	Ignition switch START signal	TCM	Starter motor	<a href="#">STR-10</a>
Heated mirror relay*	Heated mirror request signal	BCM (CAN)	Door mirrors*	<a href="#">DEF-5</a>
ECM relay	ECM relay control signal	ECM (CAN)	ECM relay	<a href="#">EC-23</a>
Throttle control motor relay	Throttle control motor control signal	ECM (CAN)	Throttle control motor relay	<a href="#">EC-23</a>
Fuel pump relay	Fuel pump request signal	ECM (CAN)	<ul style="list-style-type: none"> <li>• Fuel level sensor unit and fuel pump</li> <li>• Fuel pump control module (FPCM)*</li> </ul>	<a href="#">EC-23</a>
Ignition relay	Ignition switch ON signal	Ignition switch	Ignition relay	<a href="#">EC-26</a>

\*: If equipped

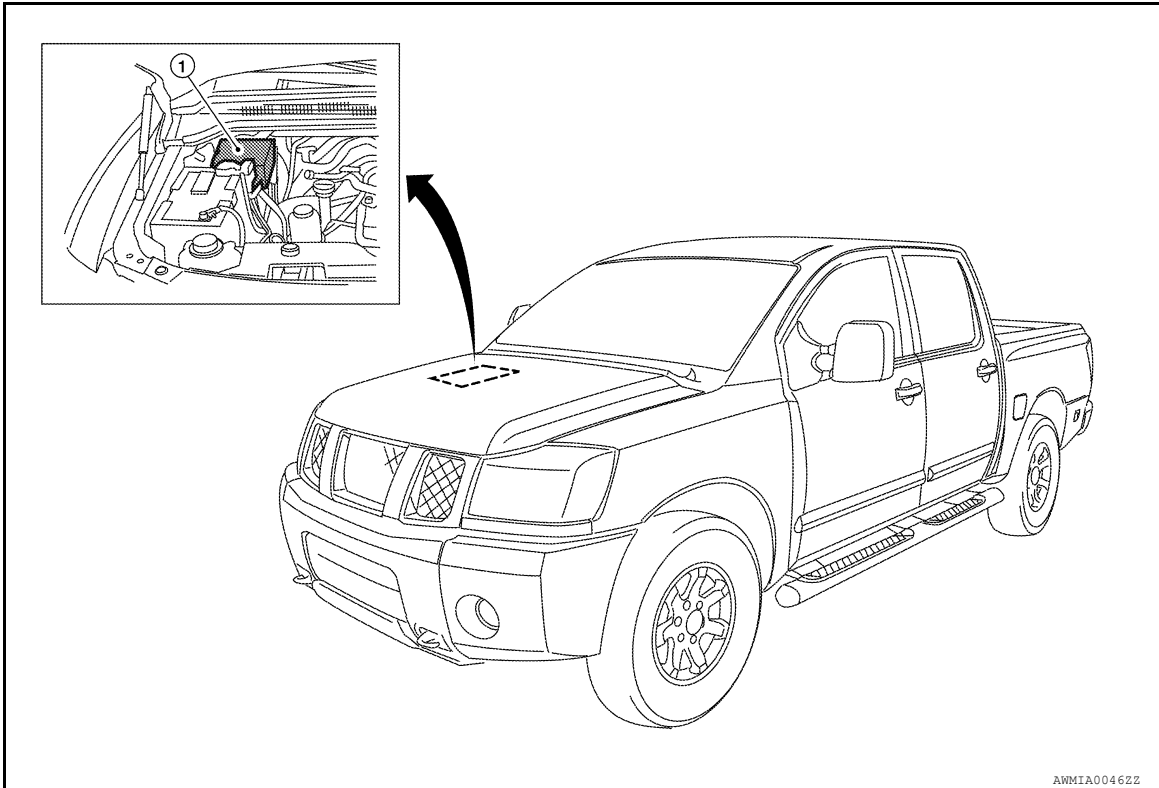
# RELAY CONTROL SYSTEM

< SYSTEM DESCRIPTION >

[IPDM E/R]

## Component Parts Location

INFOID:000000007946541



1. IPDM E/R E118, E119, E120, E121, E122, E123, E124

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# SIGNAL BUFFER SYSTEM

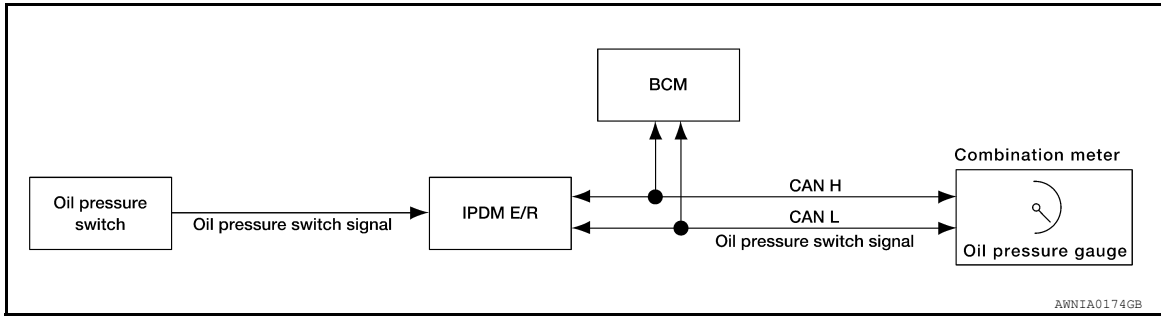
< SYSTEM DESCRIPTION >

[IPDM E/R]

## SIGNAL BUFFER SYSTEM

### System Diagram

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### System Description

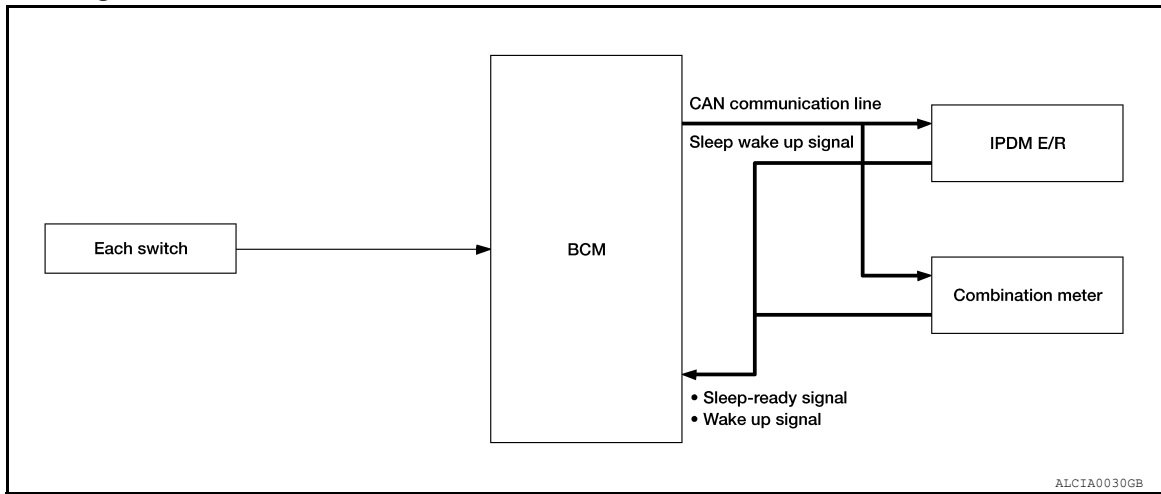
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IPDM E/R reads the status of the oil pressure switch and transmits the oil pressure switch signal to BCM via CAN communication. Refer to [LAN-4, "System Description"](#).



## POWER CONSUMPTION CONTROL SYSTEM

### System Diagram



### System Description

INFOID:000000007946545

#### 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
  - Outputting signals to actuators
  - Switches or relays operating
  - Auto active test is starting
  - Emergency OFF
  - 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
  - An output request is received from a control unit via CAN communication.

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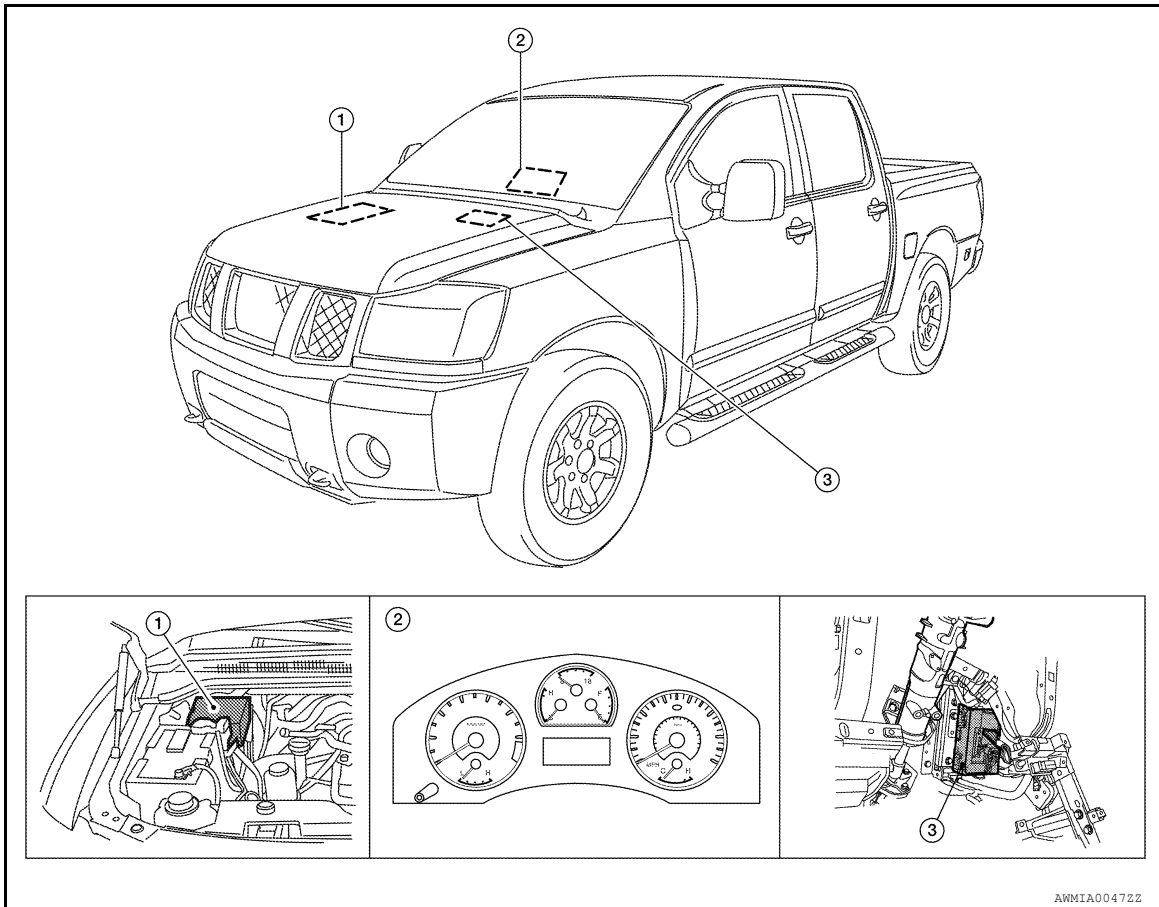
# POWER CONSUMPTION CONTROL SYSTEM

< SYSTEM DESCRIPTION >

[IPDM E/R]

## Component Parts Location

INFOID:000000007946546



1. IPDM E/R

2. Combination meter

3. BCM (view with instrument panel removed)

## DIAGNOSIS SYSTEM (IPDM E/R)

### Diagnosis Description

INFOID:000000007946547

#### 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 low/coolant pressure high warning indicator
- Oil pressure gauge
- Rear window defogger (if equipped)
- Front wipers (HI, LO)
- Tail, license and parking lamps
- Front fog lamps (if equipped)
- Headlamps (HI, LO)
- A/C compressor (magnetic clutch)

##### Operation Procedure

1. Close the hood and front door RH, and lift the wiper arms from the windshield (to prevent windshield damage due to wiper operation).  
**NOTE:**  
 When auto active test is performed with hood opened, sprinkle water on windshield before hand.
2. Turn ignition switch OFF.
3. Turn the ignition switch ON and, within 20 seconds, press the front door switch LH 10 times. Then turn the ignition switch OFF.
4. Turn the ignition switch ON within 10 seconds. After that the horn sounds once and the auto active test starts.
5. After a series of the following operations is repeated 3 times, auto active test is completed.

##### **NOTE:**

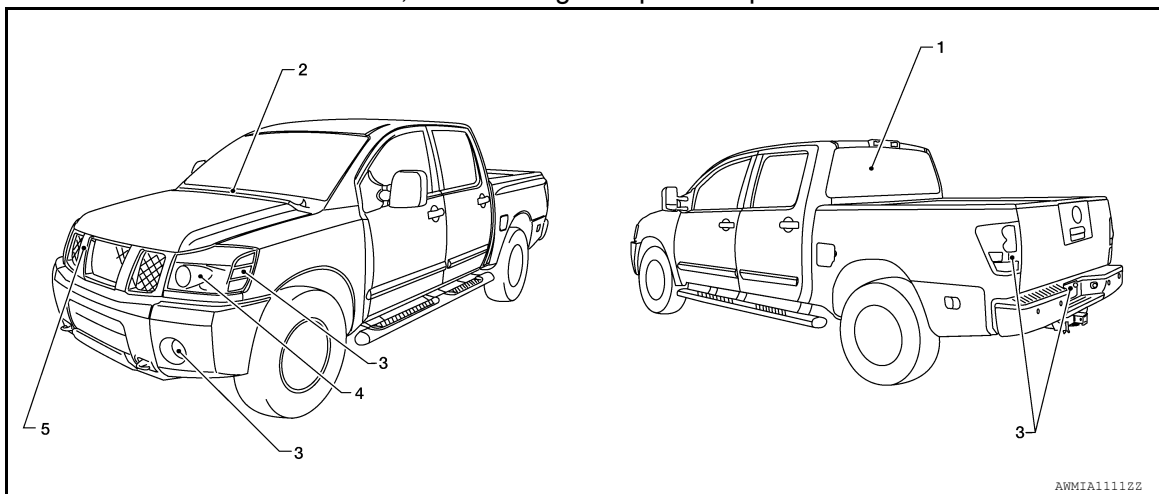
When auto active test mode has to be cancelled halfway through test, turn ignition switch OFF.

##### **CAUTION:**

- If auto active test mode cannot be actuated, check door switch system. Refer to [DLK-26. "KING CAB : Description"](#) (King Cab) or [DLK-27. "CREW CAB : Description"](#) (Crew Cab).
- Do not 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	Rear window defogger (Crew Cab only)	10 seconds
2	Front wipers	LO for 5 seconds → HI for 5 seconds

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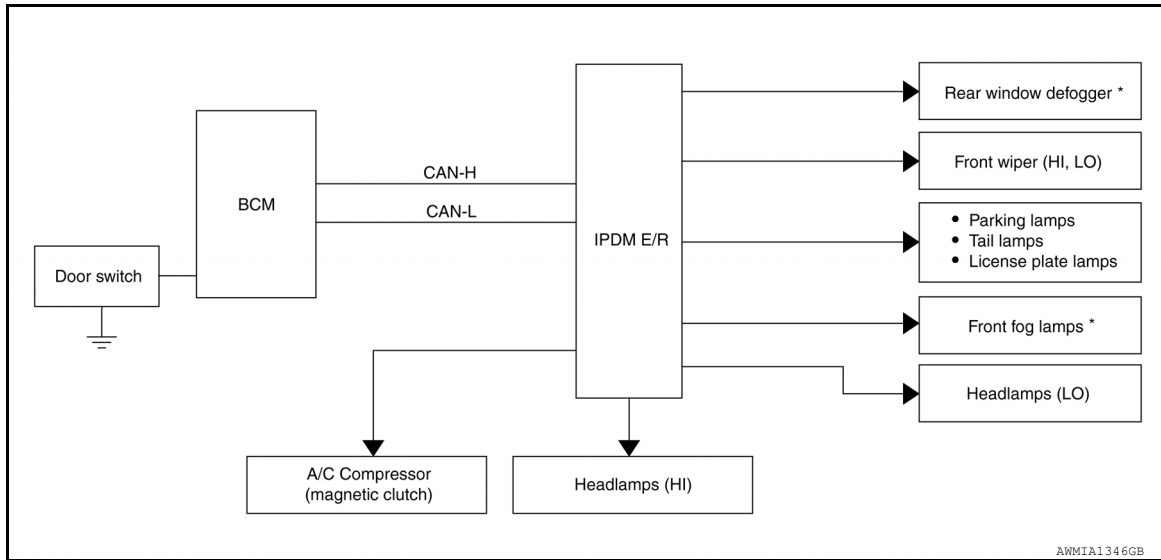
# DIAGNOSIS SYSTEM (IPDM E/R)

< SYSTEM DESCRIPTION >

[IPDM E/R]

Operation sequence	Inspection Location	Operation
3	Tail, license, parking lamps and front fog lamps (if equipped)	10 seconds
4	Headlamps	LO for 10 seconds → HI on-off for 5 seconds
5	A/C compressor (magnetic clutch)	ON ↔ OFF 5 times

Concept of auto active test



\*: If equipped

- 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
Oil pressure low/coolant temperature high warning indicator does not operate	Perform auto active test. Does the oil pressure low/coolant temperature high warning indicator operate?	YES • IPDM E/R signal input circuit • ECM signal input circuit • CAN communication signal between ECM and combination meter
		NO CAN communication signal between IPDM E/R, BCM and combination meter
Oil pressure gauge does not operate	Perform auto active test. Does the oil pressure gauge operate?	YES IPDM E/R signal input circuit
		NO CAN communication signal between IPDM E/R, BCM and combination meter
Rear window defogger (if equipped) does not operate	Perform auto active test. Does the rear window defogger (if equipped) operate?	YES BCM signal input circuit
		NO CAN communication signal between BCM and IPDM E/R

# DIAGNOSIS SYSTEM (IPDM E/R)

< SYSTEM DESCRIPTION >

[IPDM E/R]

Symptom	Inspection contents	Possible cause
Any of the following components do not operate <ul style="list-style-type: none"> <li>• Front wipers (HI, LO)</li> <li>• Tail lamps</li> <li>• License plate lamps</li> <li>• Parking lamps</li> <li>• Front fog lamps (if equipped)</li> <li>• Headlamps (HI, LO)</li> </ul>	Perform auto active test. Does the applicable system operate?	YES BCM signal input system
		NO <ul style="list-style-type: none"> <li>• Lamp or front wiper motor malfunction</li> <li>• Lamp or front wiper motor ground circuit</li> <li>• Harness or connector between IPDM E/R and applicable system</li> <li>• IPDM E/R (integrated relay malfunction)</li> </ul>
A/C compressor does not operate	Perform auto active test. Does the A/C compressor operate?	YES <ul style="list-style-type: none"> <li>• BCM signal input circuit</li> <li>• CAN communication signal between BCM and ECM</li> <li>• CAN communication signal between ECM and IPDM E/R</li> </ul>
		NO <ul style="list-style-type: none"> <li>• Magnetic clutch malfunction</li> <li>• Harness or connector between IPDM E/R and magnetic clutch</li> <li>• IPDM E/R (integrated relay malfunction)</li> </ul>

## CONSULT Function (IPDM E/R)

INFOID:000000007946548

### APPLICATION ITEM

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

Direct Diagnostic Mode	Description
Self Diagnostic Result	The IPDM E/R self diagnostic results are displayed.
Data Monitor	The IPDM E/R input/output data is displayed in real time.
Active Test	The IPDM E/R activates outputs to test components.
CAN Diag Support Mntr	The result of transmit/receive diagnosis of CAN communication is displayed.

### SELF DIAGNOSTIC RESULT

Refer to [PCS-22, "DTC Index"](#).

### DATA MONITOR

Monitor Item [Unit]	Main Signals	Description
AC COMP REQ [On/Off]	×	Indicates A/C compressor request signal received from ECM on CAN communication line
TAIL&CLR REQ [On/Off]	×	Indicates position light request signal received from BCM on CAN communication line
HL LO REQ [On/Off]	×	Indicates low beam request signal received from BCM on CAN communication line
HL HI REQ [On/Off]	×	Indicates high beam request signal received from BCM on CAN communication line
FR FOG REQ [On/Off]	×	Indicates front fog light request signal received from BCM on CAN communication line
FR WIP REQ [Stop/1LOW/Low/Hi]	×	Indicates front wiper request signal received from BCM on CAN communication line
WIP AUTO STOP [STOP P/ACT P]	×	Indicates condition of front wiper auto stop signal
WIP PROT [Off/BLOCK]	×	Indicates condition of front wiper fail-safe operation
ST RLY REQ [On/Off]		Indicates starter request signal received from ECM on CAN communication line
IGN RLY [On/Off]	×	Indicates condition of ignition relay

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# DIAGNOSIS SYSTEM (IPDM E/R)

< SYSTEM DESCRIPTION >

[IPDM E/R]

Monitor Item [Unit]	Main Signals	Description
RR DEF REQ [On/Off]	×	Indicates rear defogger request signal received from AV control unit on CAN communication line
OIL P SW [Open/Close]		Indicates condition of oil pressure switch
DTRL REQ [Off]		Indicates daytime light request signal received from BCM on CAN communication line
THFT HRN REQ [On/Off]		Indicates theft warning horn request signal received from BCM on CAN communication line
HORN CHIRP [On/Off]		Indicates horn reminder signal received from BCM on CAN communication line

## ACTIVE TEST

Test item	Description
REAR DEFOGGER	This test is able to check rear defogger operation [On/Off].
FRONT WIPER	This test is able to check wiper motor operation [Hi/Lo/Off].
EXTERNAL LAMPS	This test is able to check external lamp operation [Fog/Hi/Lo/TAIL/Off].
HORN	This test is able to check horn operation [On].

# U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[IPDM E/R]

## DTC/CIRCUIT DIAGNOSIS

### U1000 CAN COMM CIRCUIT

#### Description

INFOID:000000007946549

Refer to [LAN-4, "System Description"](#).

#### DTC Logic

INFOID:000000007946550

#### DTC DETECTION LOGIC

DTC	CONSULT 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	In CAN communication system, any item (or items) of the following listed below is malfunctioning. <ul style="list-style-type: none"><li>• Receiving (TCM)</li><li>• Receiving (ECM)</li><li>• Receiving (BCM)</li><li>• Receiving (Combination meter)</li></ul>

#### DTC CONFIRMATION PROCEDURE

#### Diagnosis Procedure

INFOID:000000007946551

#### 1. PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Check "SELF-DIAG RESULTS" of IPDM E/R.

Is "CAN COMM CIRCUIT" displayed?

- YES >> Refer to [LAN-14, "Trouble Diagnosis Flow Chart"](#).  
NO >> Refer to [GI-42, "Intermittent Incident"](#).

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# POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[IPDM E/R]

## POWER SUPPLY AND GROUND CIRCUIT

### Diagnosis Procedure

INFOID:000000007946552

Regarding Wiring Diagram information, refer to [PCS-23. "Wiring Diagram"](#).

### 1. CHECK FUSES AND FUSIBLE LINK

Check that the following IPDM E/R fuses or fusible link are not blown.

Terminal No.	Signal name	Fuses and fusible link No.
1	Battery	A (140A), D (80A)
2	Battery	C (80A)
12	Ignition switch ON or START	59 (10A)

Is the fuse blown?

- YES >> Replace the blown fuse or fusible link after repairing the affected circuit.  
 NO >> GO TO 2

### 2. CHECK BATTERY POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect IPDM E/R.
- Check voltage between IPDM E/R harness connectors and ground.

Terminals		(-)	Ignition switch position		
(+)	Connector		Terminal	OFF	ON
E118	1	Ground	Battery voltage	Battery voltage	Battery voltage
	2		Battery voltage	Battery voltage	Battery voltage
E119	12		0V	Battery voltage	Battery voltage

Is the measurement value normal?

- YES >> GO TO 3  
 NO >> Repair or replace harness.

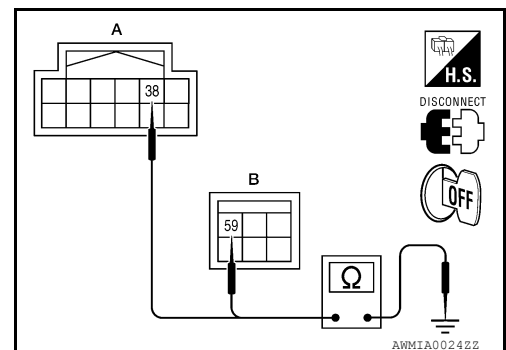
### 3. CHECK GROUND CIRCUIT

- Turn ignition switch OFF.
- Check continuity between IPDM E/R harness connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E122 (A)	38		Yes
E124 (B)	59		

Does continuity exist?

- YES >> Inspection End.  
 NO >> Repair or replace harness.





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

< ECU DIAGNOSIS INFORMATION >

[IPDM E/R]

## ECU DIAGNOSIS INFORMATION

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

Reference Value

INFOID:000000007946553

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition		Value/Status
A/C COMP REQ	A/C switch OFF		Off
	A/C switch ON		On
TAIL&CLR REQ	Lighting switch OFF		Off
	Lighting switch 1ST, 2ND, HI or AUTO (Light is illuminated)		On
HL LO REQ	Lighting switch OFF		Off
	Lighting switch 2ND HI or AUTO (Light is illuminated)		On
HL HI REQ	Lighting switch OFF		Off
	Lighting switch HI		On
FR FOG REQ	Lighting switch 2ND or AUTO (Light is illuminated)	Front fog lamp switch OFF	Off
		<ul style="list-style-type: none"> <li>Front fog lamp switch ON</li> <li>Daytime light activated (Canada only)</li> </ul>	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 at fail-safe operation	BLOCK
ST RLY REQ	Ignition switch OFF or ACC		Off
	Ignition switch START		On
IGN RLY	Ignition switch OFF or ACC		Off
	Ignition switch ON		On
RR DEF REQ	Rear defogger switch OFF		Off
	Rear defogger switch ON		On
OIL P SW	Ignition switch OFF, ACC or engine running		Open
	Ignition switch ON		Close
DTRL REQ	Not operated		Off
	Daytime Running Lights ON		On
THFT HRN REQ	Not operated		Off
	<ul style="list-style-type: none"> <li>Panic alarm is activated</li> <li>Horn is activated with VEHICLE SECURITY (THEFT WARNING) SYSTEM</li> </ul>		On
HORN CHIRP	Not operated		Off
	Door locking with keyfob (horn chirp mode)		On

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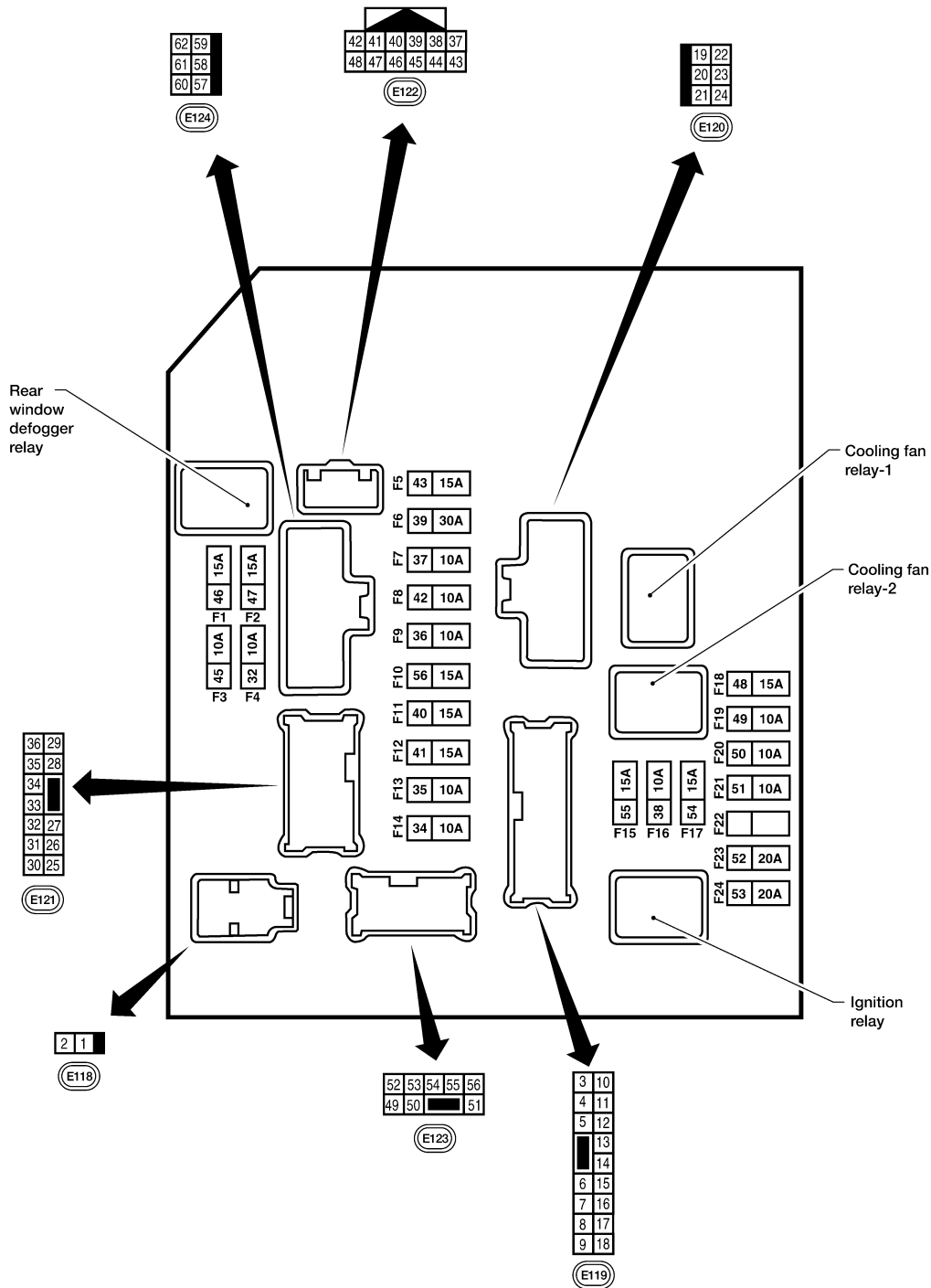
# IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

< ECU DIAGNOSIS INFORMATION >

[IPDM E/R]

## Terminal Layout

INFOID:000000007946554



### NOTE:

Numbers preceded by an "F" represent the fuse numbers imprinted on the IPDM E/R. The other numbers represent the fuse numbers as they appear in the wiring diagrams.

### Physical Values

### PHYSICAL VALUES

AAMIA0386GB

INFOID:000000007946555

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

< ECU DIAGNOSIS INFORMATION >

[IPDM E/R]

Terminal	Wire color	Signal name	Signal input/output	Measuring condition		Reference value (Approx.)
				Ignition switch	Operation or condition	
1	B/Y	Battery power supply	Input	OFF	—	Battery voltage
2	R	Battery power supply	Input	OFF	—	Battery voltage
3	BR	ECM relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
4	W/L	ECM relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
6	L	Throttle control motor relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
7	W/B	ECM relay control	Input	—	Ignition switch ON or START	0V
					Ignition switch OFF or ACC	Battery voltage
8	R/B	Fuse 54	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
10	G	Fuse 45 (Canada only)	Output	ON	Daytime light system active	0V
					Daytime light system inactive	Battery voltage
11	Y/B	A/C compressor	Output	ON or START	A/C switch ON or defrost A/C switch	Battery voltage
					A/C switch OFF or defrost A/C switch	0V
12	L/W	Ignition switch supplied power	Input	—	OFF or ACC	0V
					ON or START	Battery voltage
13	B/Y	Fuel pump relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
14	Y/R	Fuse 49	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
15	LG/B	Fuse 50	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
16	G	Fuse 51	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
17	W	Fuse 55	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
19	W/R	Starter motor	Output	START	—	Battery voltage
21	BR	Ignition switch supplied power	Input	—	OFF or ACC	0V
					START	Battery voltage
22	G	Battery power supply	Output	OFF	—	Battery voltage
23	GR/W	Door mirror defogger output signal (if equipped)	Output	—	When rear defogger switch is ON	Battery voltage
					When rear defogger switch is OFF	0V
27	W/B	Fuse 38	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
30	W	Fuse 53	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
32	L	Wiper low speed signal	Output	ON or START	Wiper switch	OFF
						LO or INT

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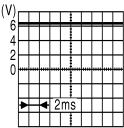
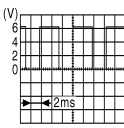
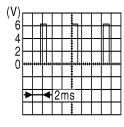
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# IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

< ECU DIAGNOSIS INFORMATION >

[IPDM E/R]

Terminal	Wire color	Signal name	Signal input/output	Measuring condition		Reference value (Approx.)	
				Ignition switch	Operation or condition		
35	L/B	Wiper high speed signal	Output	ON or START	Wiper switch	OFF, LO, INT	0V
						HI	Battery voltage
37	Y	Power generation command signal	Output	—	Ignition switch ON	 <p style="text-align: right; font-size: small;">JPMIA0001GB</p>	6.3 V
						 <p style="text-align: right; font-size: small;">JPMIA0002GB</p>	3.8 V
						 <p style="text-align: right; font-size: small;">JPMIA0003GB</p>	1.4 V
38	B	Ground	Input	—	—	0V	
39	L	CAN-H	—	ON	—	—	
40	P	CAN-L	—	ON	—	—	
42	GR	Oil pressure switch	Input	—	Engine running	Battery voltage	
					Engine stopped	0V	
43	L/Y	Wiper auto stop signal	Input	ON or START	Wiper switch	OFF, LO, INT	Battery voltage
44	BR	Daytime light relay control (Canada only)	Input	ON	Daytime light system active	0V	
					Daytime light system inactive	Battery voltage	
45	G/W	Horn relay control	Input	ON	When door locks are operated using keyfob (OFF → ON)*	Battery voltage → 0V	
46	GR	Fuel pump relay control	Input	—	Ignition switch ON or START	0V	
					Ignition switch OFF or ACC	Battery voltage	
47	O	Throttle control motor relay control	Input	—	Ignition switch ON or START	0V	
					Ignition switch OFF or ACC	Battery voltage	
48	B/R	Starter relay (inhibit switch)	Input	ON or START	Selector lever in "P" or "N"	0V	
					Selector lever any other position	Battery voltage	
49	R/L	Trailer tow relay Illumination	Output	ON	Lighting switch must be in the 1st position	OFF	0V
						ON	Battery voltage

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

< ECU DIAGNOSIS INFORMATION >

[IPDM E/R]

Terminal	Wire color	Signal name	Signal input/output	Measuring condition		Reference value (Approx.)
				Ignition switch	Operation or condition	
50	W/R	Front fog lamp (LH) (if equipped)	Output	ON or START	Lighting switch must be in the 2nd position (LOW beam is ON) and the front fog lamp switch	0V
					OFF	Battery voltage
51	W/R	Front fog lamp (RH) (if equipped)	Output	ON or START	Lighting switch must be in the 2nd position (LOW beam is ON) and the front fog lamp switch	0V
					OFF	Battery voltage
52	L	LH low beam headlamp	Output	—	Lighting switch in 2nd position	Battery voltage
54	R/Y	RH low beam headlamp	Output	—	Lighting switch in 2nd position	Battery voltage
55	G	LH high beam headlamp	Output	—	Lighting switch in 2nd position and placed in HIGH or PASS position	Battery voltage
56	Y (With DTRL) L/W (Without DTRL)	RH high beam headlamp	Output	—	Lighting switch in 2nd position and placed in HIGH or PASS position	Battery voltage
57	R/L	Parking, license and tail lamp	Output	ON	Lighting switch 1st position	0V
					OFF	Battery voltage
59	B	Ground	Input	—	—	0V
60	B/W	Rear window defogger relay (if equipped)	Output	ON or START	Rear defogger switch ON	Battery voltage
					Rear defogger switch OFF	0V
61	BR	Fuse 32	Output	OFF	—	Battery voltage

\*: When horn reminder is ON

## 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 BCM

Control part	Fail-safe in operation
Headlamp	<ul style="list-style-type: none"> <li>Turns ON the headlamp low relay when the ignition switch is turned ON</li> <li>Turns OFF the headlamp low relay when the ignition switch is turned OFF</li> <li>Headlamp high relay OFF</li> </ul>
<ul style="list-style-type: none"> <li>Parking lamps</li> <li>License plate lamps</li> <li>Tail lamps</li> </ul>	<ul style="list-style-type: none"> <li>Turns ON the tail lamp relay when the ignition switch is turned ON</li> <li>Turns OFF the tail lamp relay when the ignition switch is turned OFF</li> </ul>
Front wiper	<ul style="list-style-type: none"> <li>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.</li> <li>The 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.</li> </ul>
Rear window defogger (if equipped)	Rear window defogger relay OFF

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

< ECU DIAGNOSIS INFORMATION >

[IPDM E/R]

Control part	Fail-safe in operation
A/C compressor	A/C relay OFF
Front fog lamps (if equipped)	Front fog lamp relay OFF

## IGNITION RELAY MALFUNCTION DETECTION FUNCTION

- IPDM E/R monitors the voltage at the contact circuit and excitation coil circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit and the excitation coil circuit.
- 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.

Ignition switch	Ignition relay	Tail lamp relay
ON	ON	—
OFF	OFF	—

### NOTE:

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

## FRONT WIPER CONTROL

IPDM E/R detects front wiper stop position by a front wiper auto stop signal.

When a front wiper auto stop signal is in the conditions listed below, IPDM E/R stops power supply to wiper after repeating a front wiper 10 seconds activation and 20 seconds stop five times.

Ignition switch	Front wiper switch	Auto stop signal
ON	OFF	Front wiper stop position signal cannot be input 10 seconds.
	ON	The 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.

## STARTER MOTOR PROTECTION FUNCTION

IPDM E/R turns OFF the starter control relay to protect the starter motor when the starter control relay remains active for 90 seconds.

## DTC Index

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CONSULT display	Fail-safe	TIME <sup>NOTE</sup>		Refer to
No DTC is detected. further testing may be required.	—	—	—	—
U1000: CAN COMM CIRCUIT	×	CRNT	1 – 39	<a href="#">PCS-15</a>

### NOTE:

The details of TIME display are as follows.

- CRNT: The malfunctions that are detected now
- 1 - 39: The number is indicated when it is normal at present and a malfunction was detected in the past. It increases like 0 → 1 → 2 … 38 → 39 after returning to the normal condition whenever IGN OFF → ON. It is fixed to 39 until the self-diagnosis results are erased if it is over 39. It returns to 0 when a malfunction is detected again in the process.



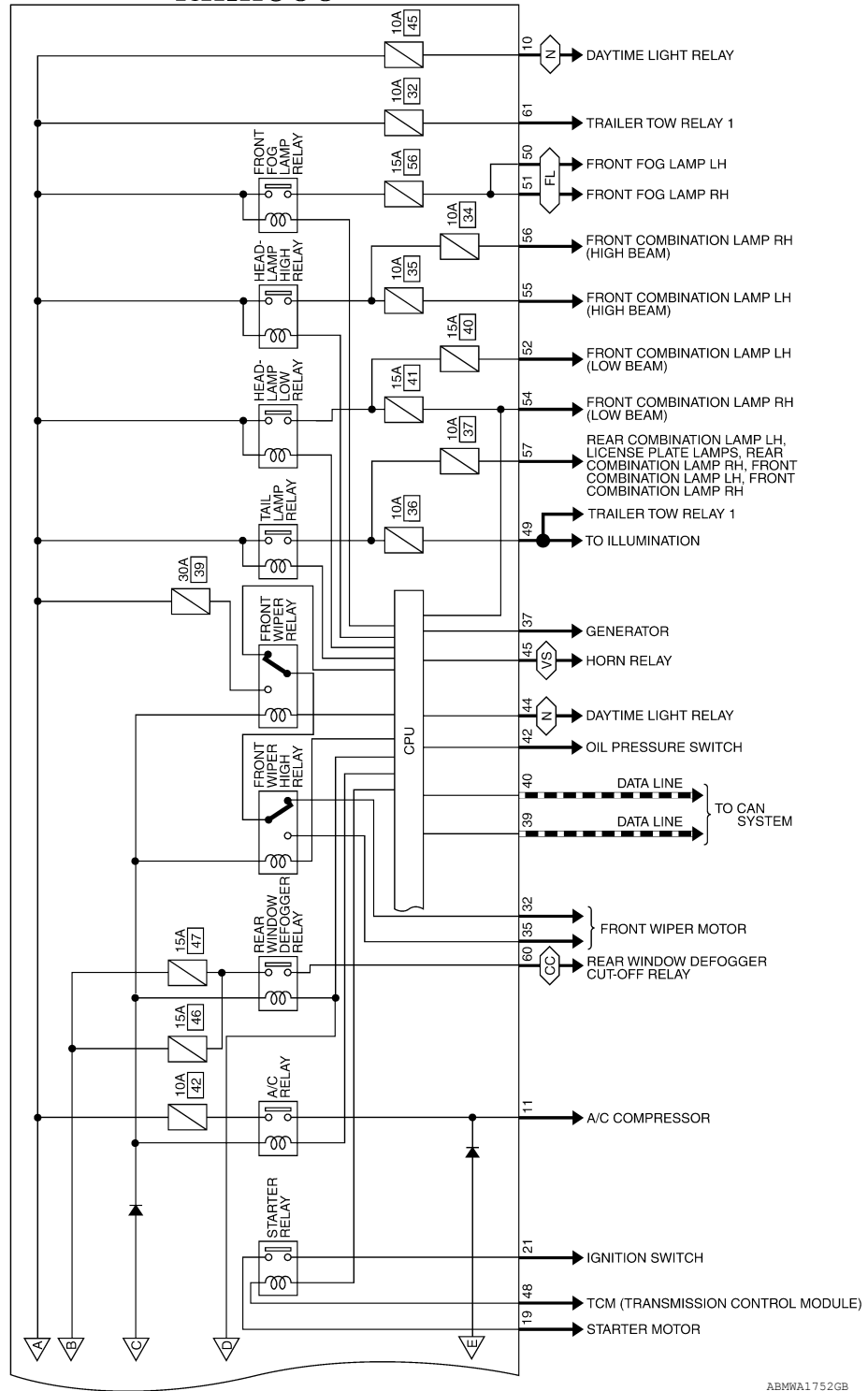
# IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

< WIRING DIAGRAM >

[IPDM E/R]

- CC: CREW CAB
- FL: WITH FRONT FOG LAMPS
- N: FOR CANADA
- VS: WITH VEHICLE SECURITY SYSTEM

IPDM E/R  
(INTELLIGENT  
POWER  
DISTRIBUTION  
MODULE  
ENGINE  
ROOM)  
(E119), (E120),  
(E121), (E122),  
(E123), (E124)



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

< WIRING DIAGRAM >

[IPDM E/R]

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

Connector No.	E7
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
4	R	-

Connector No.	E27
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	BROWN



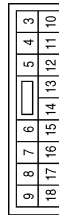
Terminal No.	Color of Wire	Signal Name
2	B/Y	-

Connector No.	E118
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	B/Y	F/L USM
2	R	F/L MAIN

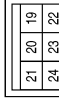
Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
3	BR	IGN COIL
4	W/L	ECM
5	-	-
6	L	ETC
7	W/B	ECM RLY CONT

Terminal No.	Color of Wire	Signal Name
8	R/B	O2 SENSOR
9	-	-
10	G	DTRL RLY SUPPLY
11	Y/B	A/C COMPRESSOR
12	L/W	IGN SW (IG)
13	B/Y	FUEL PUMP
14	Y/R	A/T CU IGN SUPPLY
15	LG/B	ABS IGN SUPPLY
16	G	REVERSE LAMP
17	W	INJECTOR
18	-	-

Connector No.	E120
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
19	W/R	STARTER MTR
20	-	-
21	BR	IGN SW(ST)
22	G	F/L MOTOR FAN
23	GR/W	HEATED MIRROR
24	-	-

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

< WIRING DIAGRAM >

[IPDM E/R]


Connector No.	E123
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BROWN



51	50	49
56	55	54
53	52	51

Terminal No.	Color of Wire	Signal Name
49	R/L	ILLUMINATION
50	W/R	FR FOG LAMP LH
51	W/R	FR FOG LAMP RH
52	L	H/LAMP LO LH
53	-	-
54	R/Y	H/LAMP LO RH
55	G	H/LAMP HI LH
56	L/W	H/LAMP HI RH (WITHOUT DAYTIME LIGHT SYSTEM)
56	Y	H/LAMP HI RH (WITH DAYTIME LIGHT SYSTEM)


Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



42	41	40	39	38	37
48	47	46	45	44	43

Terminal No.	Color of Wire	Signal Name
37	Y	ALT-C CONT
38	B	GND (SIGNAL)
39	L	CAN-H
40	P	CAN-L
41	-	-
42	GR	OIL PRESSURE SW
43	L/Y	AUTO STOP SW
44	BR	DTRL RLY CONT
45	G/W	ANT THEFT HORN
46	GR	FUEL PUMP RLY CONT
47	O	ETC RLY CONT
48	B/R	RANGE SW

Connector No.	E121
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BROWN



29	28	27	26	25
36	35	34	33	32
31	30	29	28	27

Terminal No.	Color of Wire	Signal Name
25	-	-
26	-	-
27	W/B	T TOW REV LAMP
28	-	-
29	-	-
30	W	ECM BAT
31	-	-
32	L	FR WIPER LO
33	-	-
34	-	-
35	L/B	FR WIPER HI
36	-	-

Terminal No.	Color of Wire	Signal Name
57	R/L	TAIL LAMP
58	-	-
59	B	GND (POWER)
60	B/W	RR DEF
61	BR	TRAIL RLY SUPPLY
62	-	-

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BLACK



59	58	57
62	61	60

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# PRECAUTION

## PRECAUTIONS

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

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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 SR and SB section 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 SR section.
- 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.

### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

**WARNING:**

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

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## UNIT REMOVAL AND INSTALLATION

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

#### Removal and Installation of IPDM E/R

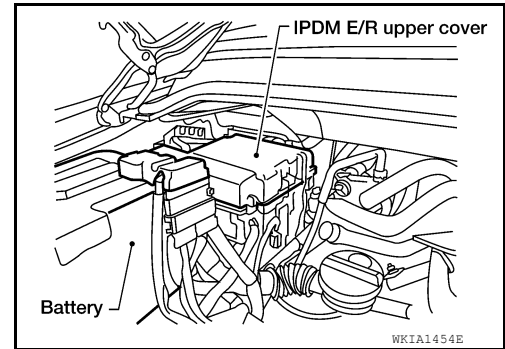
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#### REMOVAL

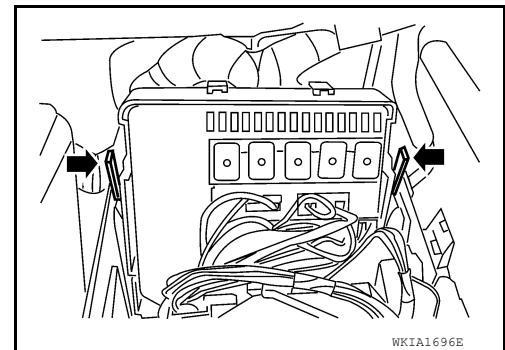
**CAUTION:**

Do not remove the relays from the IPDM. Except for the fuses, the IPDM must be replaced as an assembly.

1. Disconnect negative battery terminal. Refer to [PG-80. "Removal and Installation"](#).
2. Remove IPDM E/R upper cover.



3. Release two clips and pull IPDM E/R up from case.
4. Disconnect the harness connectors from the IPDM E/R and remove.



#### INSTALLATION

Installation is in the reverse order of removal.