

SECTION **PCS**

POWER CONTROL SYSTEM

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DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[IPDM E/R]

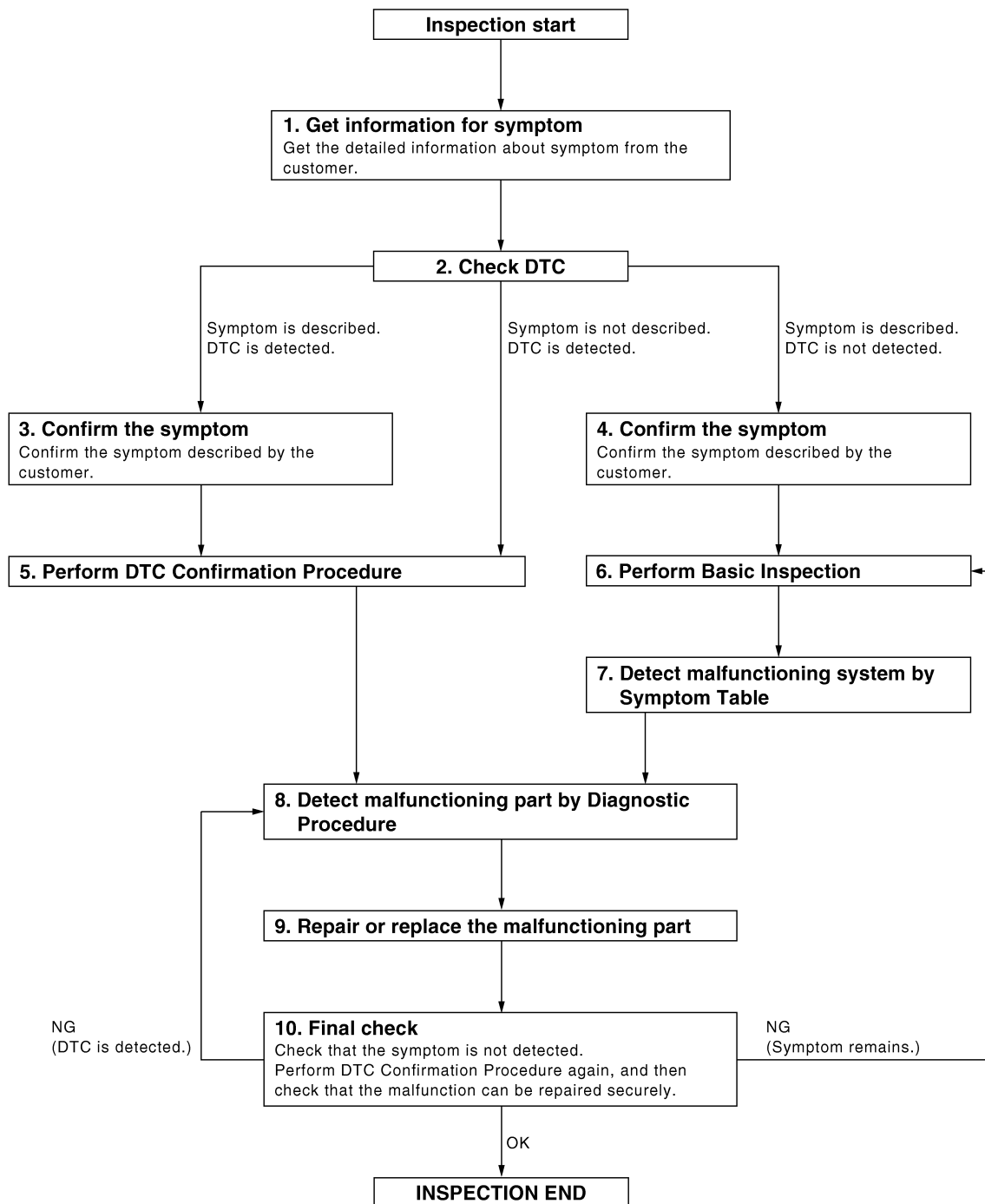
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000004868608

OVERALL SEQUENCE



JMKIA0101GB

DETAILED FLOW

Revision: March 2010

PCS-2

2008 QX56

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-III 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-III 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-III 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-38. "Intermittent Incident"](#).

6. PERFORM BASIC INSPECTION

Perform a basic inspection of the IPDM E/R.

Inspection End>>GO TO 7

7. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM

Detect malfunctioning system according to [PCS-6. "System Description"](#) based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

>> GO TO 8

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-III.

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

< FUNCTION DIAGNOSIS >

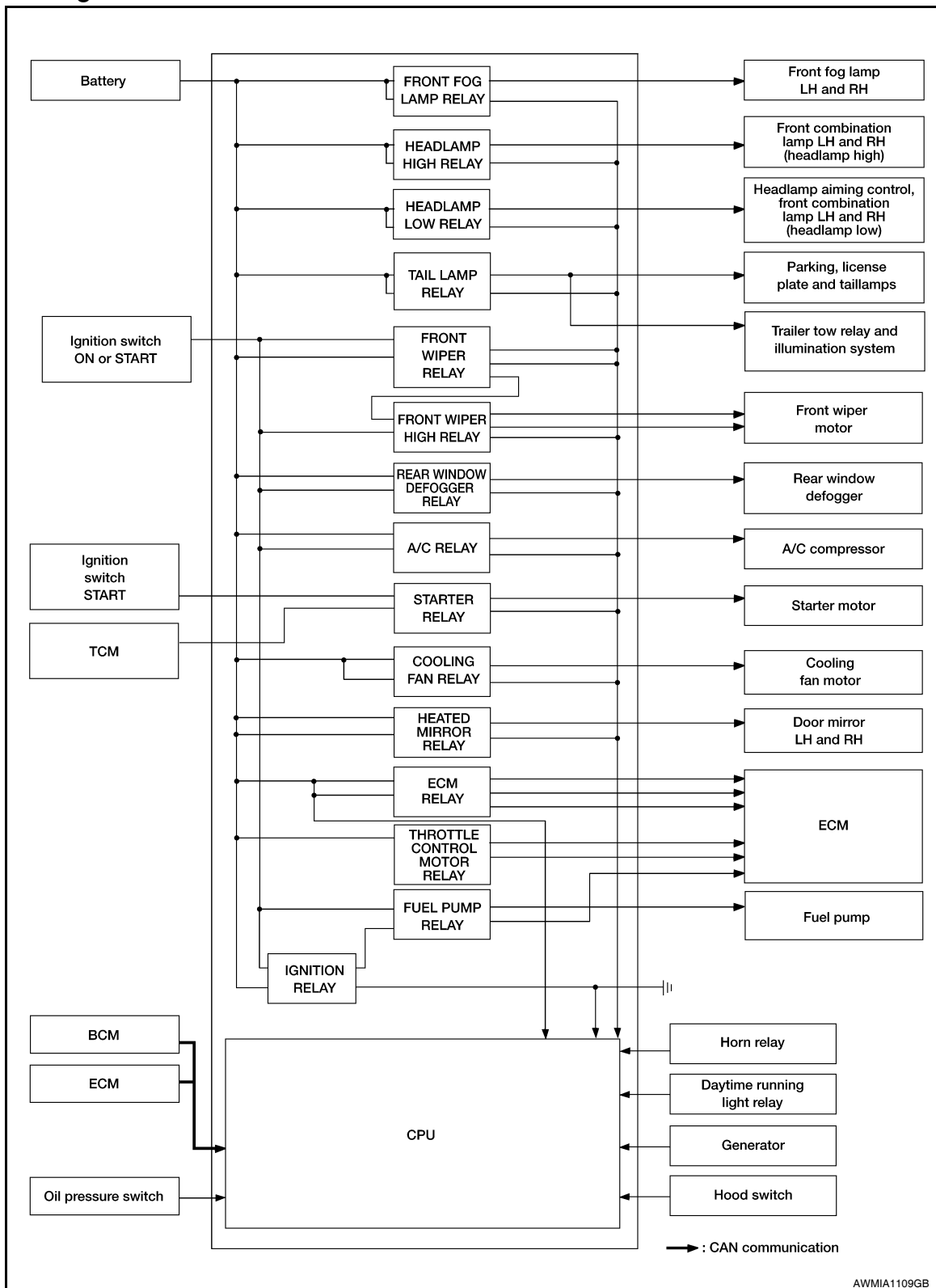
[IPDM E/R]

FUNCTION DIAGNOSIS

RELAY CONTROL SYSTEM

System Diagram

INFOID:000000001696480



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RELAY CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[IPDM E/R]

System Description

INFOID:000000001696481

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 |
|---|---|--|--|--|
| Front fog lamp relay | Front fog lamp request signal | BCM (CAN) | Front fog lamps | EXL-15 |
| <ul style="list-style-type: none"> • Headlamp high relay • Headlamp low relay | <ul style="list-style-type: none"> • High beam request signal • Low beam request signal | BCM (CAN) | <ul style="list-style-type: none"> • Headlamp high • Headlamp low | EXL-7 EXL-7 |
| Tail lamp relay | Position light request signal | BCM (CAN) | <ul style="list-style-type: none"> • Parking lamps • License plate lamps • Tail lamps • Trailer tow relay • Illumination system | EXL-18 |
| <ul style="list-style-type: none"> • Front wiper relay • Front wiper high relay | Front wiper request signal | BCM (CAN) | Front wiper motor | WW-4 |
| Rear window defogger relay | Rear window defogger request signal | BCM (CAN) | Rear window defogger | WW-8 |
| A/C relay | A/C request signal | <ul style="list-style-type: none"> • BCM (CAN) • ECM (CAN) | A/C compressor | HAC-20 |
| Starter relay | Ignition switch START signal | TCM | Starter motor | STR-8 |
| Cooling fan relay | Cooling fan request signal | ECM (CAN) | Cooling fan relay | EC-36 |
| Heated mirror relay | Heated mirror request signal | BCM (CAN) | Door mirrors | DEF-4 |
| ECM relay | ECM relay control signal | ECM (CAN) | ECM relay | EC-21 |
| Throttle control motor relay | Throttle control motor control signal | ECM (CAN) | Throttle control motor relay | EC-28 |
| Fuel pump relay | Fuel pump request signal | ECM (CAN) | Fuel pump | EC-28 |
| Ignition relay | Ignition switch ON signal | Ignition switch | Ignition relay | EC-31 |

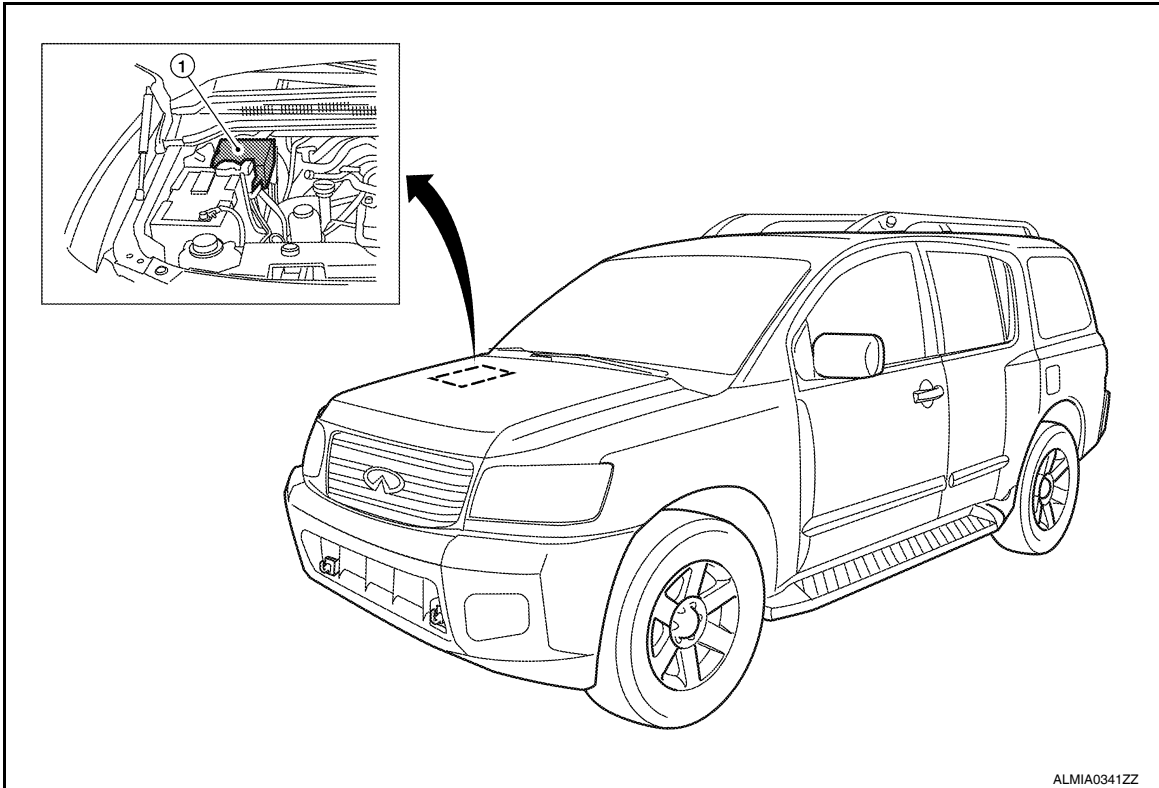
RELAY CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[IPDM E/R]

Component Parts Location

INFOID:000000001696482



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

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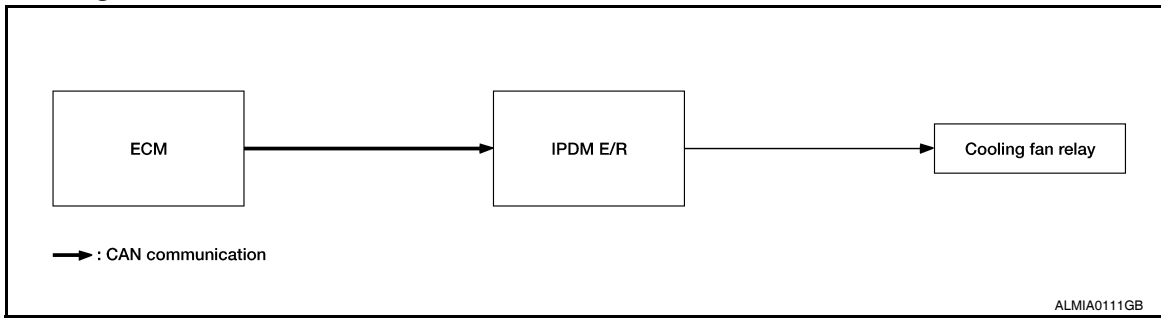
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POWER CONTROL SYSTEM

System Diagram

INFOID:000000001696483



System Description

INFOID:000000001696484

COOLING FAN CONTROL

IPDM E/R controls the cooling fan according to the status of the cooling fan speed request signal received from ECM via CAN communication. Refer to [LAN-4, "System Description"](#).

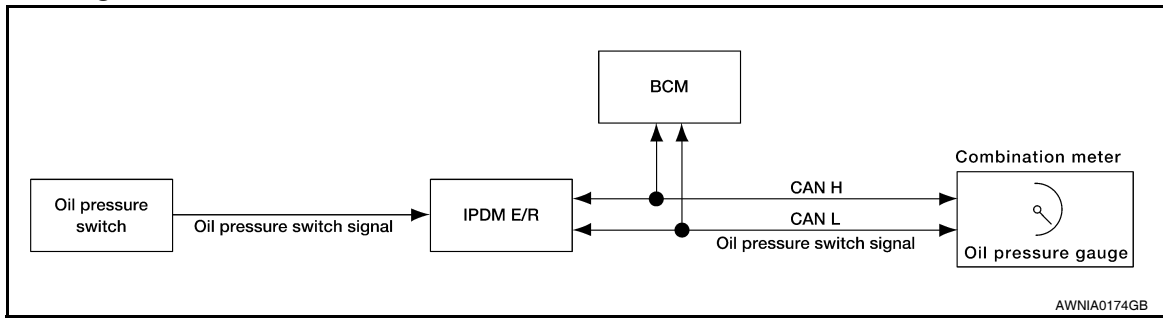
SIGNAL BUFFER SYSTEM

< FUNCTION DIAGNOSIS >

[IPDM E/R]

SIGNAL BUFFER SYSTEM

System Diagram



System Description

INFOID:000000001696486

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"](#).

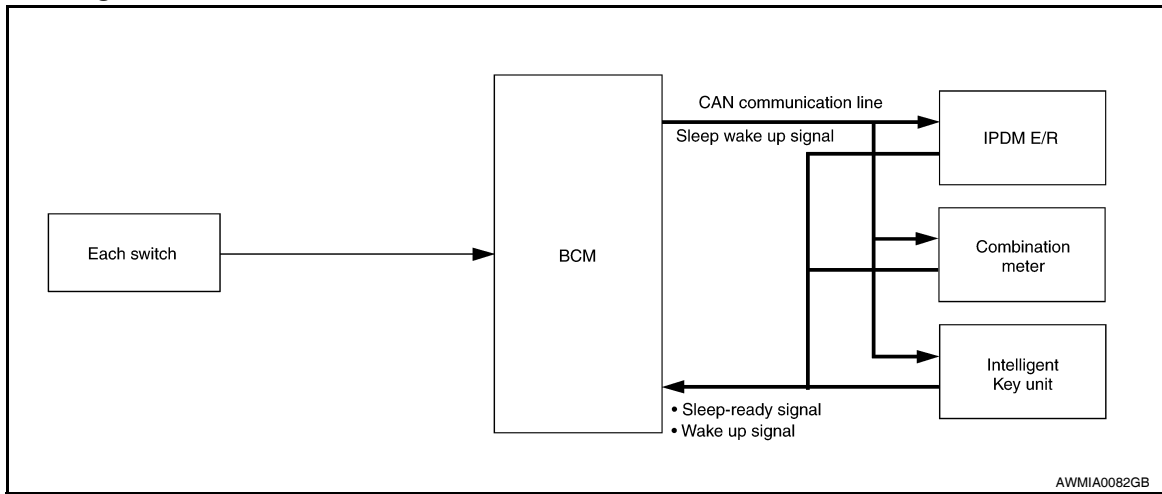
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POWER CONSUMPTION CONTROL SYSTEM

System Diagram



System Description

INFOID:000000001696488

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.

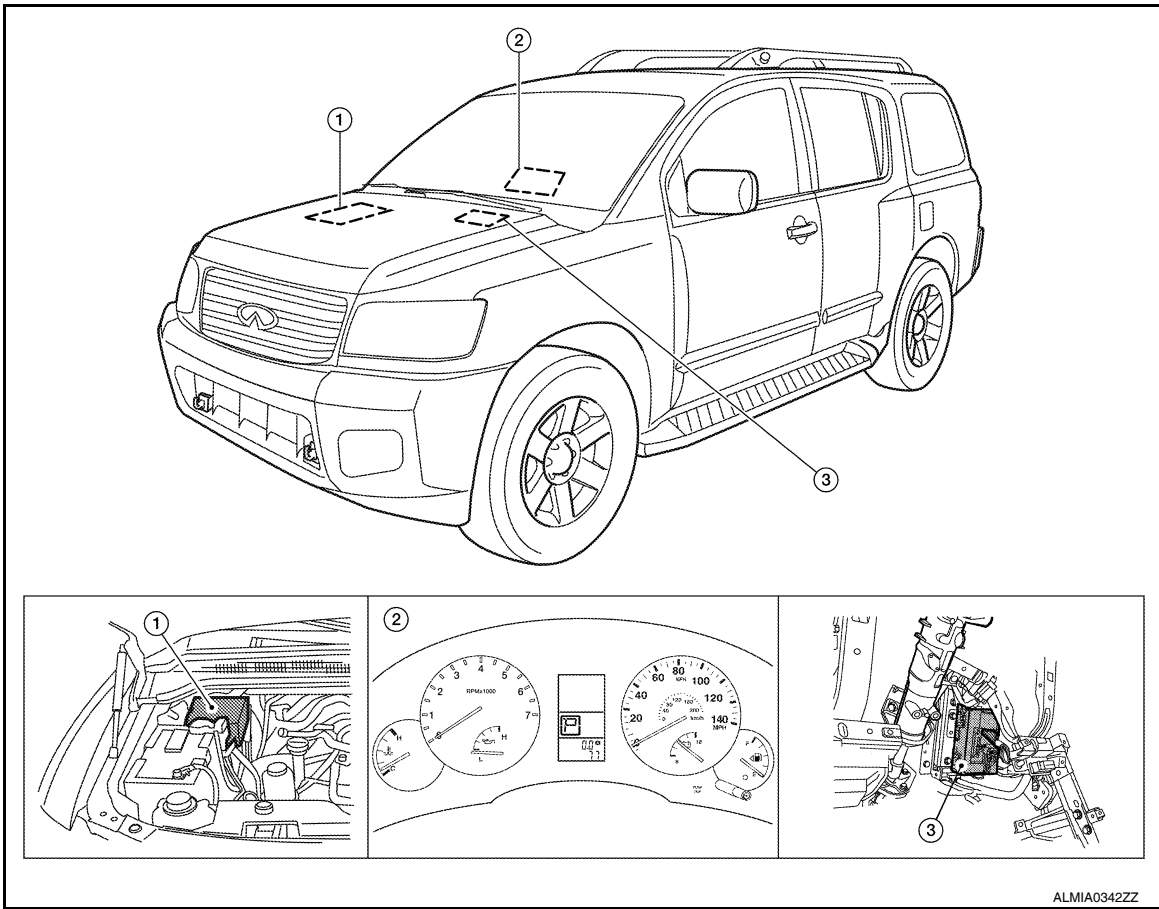
POWER CONSUMPTION CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[IPDM E/R]

Component Parts Location

INFOID:000000001696489



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

2. Combination meter M24

3. BCM M18, M19, M20 (view with instrument panel removed)

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DIAGNOSIS SYSTEM (IPDM E/R)

Diagnosis Description

INFOID:000000001696490

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
- Front wipers
- Tail, license and parking lamps
- Front fog lamps
- Headlamps (Hi, Lo)
- A/C compressor (magnetic clutch)
- Cooling fan

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:

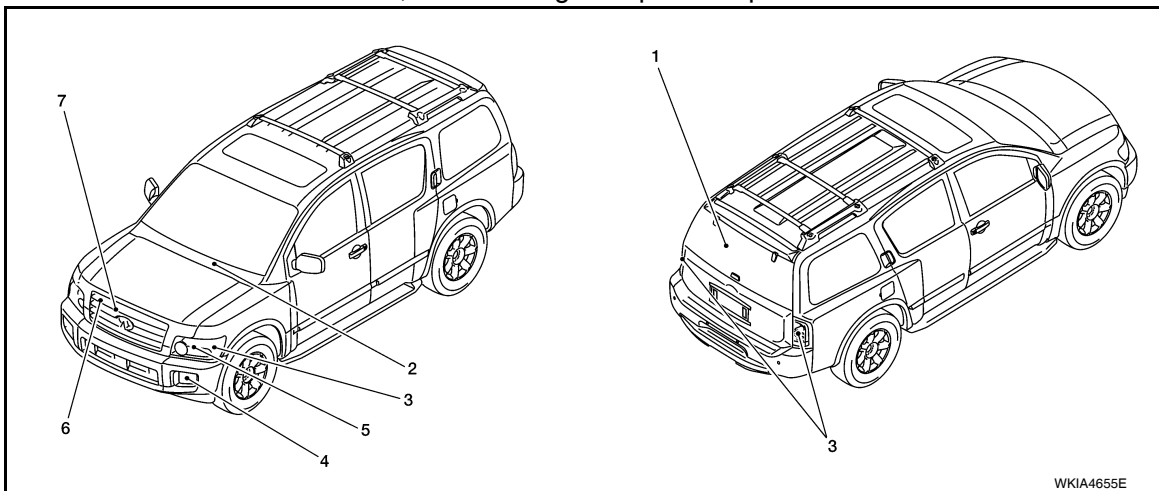
When auto active test mode has to be cancelled halfway through test, turn ignition switch OFF.

CAUTION:

- **If auto active test mode cannot be actuated, check door switch system. Refer to [DLK-67, "Description"](#).**
- **Do not start the engine.**

Inspection in Auto Active Test Mode

When auto active test mode is actuated, the following 7 steps are repeated 3 times.



WKIA4655E

| Operation sequence | Inspection Location | Operation |
|--------------------|----------------------|-------------------------------------|
| 1 | Rear window defogger | 10 seconds |
| 2 | Front wipers | LO for 5 seconds → HI for 5 seconds |

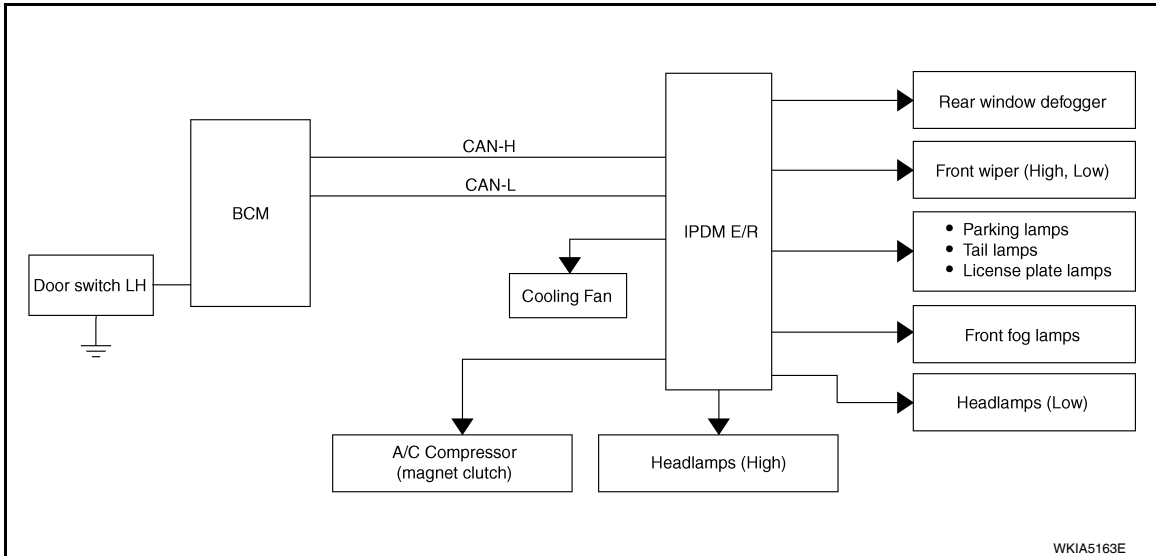
DIAGNOSIS SYSTEM (IPDM E/R)

< FUNCTION DIAGNOSIS >

[IPDM E/R]

| Operation sequence | Inspection Location | Operation |
|--------------------|---------------------------------|---|
| 3 | Tail, license and parking lamps | 10 seconds |
| 4 | Front fog lamps | 10 seconds |
| 5 | Headlamps | LO for 10 seconds → HI on-off for 5 seconds |
| 6 | A/C compressor (magnet clutch) | ON ⇔ OFF 5 times |
| 7 | Cooling fan | 10 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 |
|---|---|--|
| Oil pressure low warning indicator does not operate | Perform auto active test. Does the oil pressure low 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 does not operate | Perform auto active test. Does the rear window defogger operate? | YES BCM signal input circuit |
| | | NO • Harness or connector between A/C and AV switch assembly and AV control unit • CAN communication signal between BCM and IPDM E/R |

DIAGNOSIS SYSTEM (IPDM E/R)

< FUNCTION DIAGNOSIS >

[IPDM E/R]

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

CONSULT - III Function (IPDM E/R)

INFOID:000000001696491

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

DIAGNOSIS SYSTEM (IPDM E/R)

< FUNCTION DIAGNOSIS >

[IPDM E/R]

| Monitor Item [Unit] | MAIN SIG- NALS | Description | |
|----------------------------------|-------------------|--|---|
| MOTOR FAN REQ [1/2/3/4] | × | Displays the status of the cooling fan speed request signal received from ECM via CAN communication. | A |
| A/C COMP REQ [OFF/ON] | × | Displays the status of the A/C request signal received from AV control unit via CAN communication. | B |
| TAIL&CLR REQ [OFF/ON] | × | Displays the status of the position light request signal received from BCM via CAN communication. | C |
| HL LO REQ [OFF/ON] | × | Displays the status of the low beam request signal received from BCM via CAN communication. | D |
| HL HI REQ [OFF/ON] | × | Displays the status of the high beam request signal received from BCM via CAN communication. | E |
| FR FOG REQ [OFF/ON] | × | Displays the status of the front fog lamp request signal received from BCM via CAN communication. | F |
| HL WASHER REQ [OFF/ON] | | NOTE: This item is displayed, but cannot be monitored. | G |
| FR WIP REQ [STOP/1LOW/LOW/HI] | × | Displays the status of the front wiper request signal received from BCM via CAN communication. | H |
| WIP AUTO STOP [STOP P/ACT P] | × | Displays the status of the front wiper auto stop signal judged by IPDM E/R. | I |
| WIP PROT [OFF/Block] | × | Displays the status of the front wiper fail-safe operation judged by IPDM E/R. | J |
| ST RLY REQ [OFF/ON] | | Displays the status of the starter request signal received from ECM via CAN communication. | K |
| IGN RLY [OFF/ON] | × | Displays the status of the ignition relay judged by IPDM E/R. | L |
| RR DEF REQ [OFF/ON] | × | Displays the status of the rear defogger request signal received from AV control unit via CAN communication. | M |
| OIL P SW [OPEN/CLOSE] | | Displays the status of the oil pressure switch judged by IPDM E/R. | N |
| DTRL REQ [OFF] | | Displays the status of the daytime light request signal received from BCM via CAN communication. | O |
| HOOD SW [OPEN/CLOSE] | | Displays the status of the hood switch judged by IPDM E/R. | P |
| THFT HRN REQ [OFF/ON] | | Displays the status of the theft warning horn request signal received from BCM via CAN communication. | Q |
| HORN CHIRP [OFF/ON] | | Displays the status of the horn reminder signal received from BCM via CAN communication. | R |

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ACTIVE TEST

Test item

| Test item | Operation | Description | |
|---------------|-----------|--|---|
| REAR DEFOGGER | OFF | OFF | N |
| | ON | Operates rear window defogger relay. | O |
| FRONT WIPER | OFF | OFF | P |
| | LO | Operates the front wiper relay. | Q |
| | HI | Operates the front wiper relay and front wiper high relay. | R |
| MOTOR FAN | 1 | OFF | S |
| | 2 | OFF | T |
| | 3 | Operates the cooling fan relay. | U |
| | 4 | Operates the cooling fan relay. | V |

DIAGNOSIS SYSTEM (IPDM E/R)

[IPDM E/R]

< FUNCTION DIAGNOSIS >

| Test item | Operation | Description |
|----------------|-----------|---|
| 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. |

U1000 CAN COMM CIRCUIT

< COMPONENT DIAGNOSIS >

[IPDM E/R]

COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:000000001696492

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

DTC Logic

INFOID:000000001696493

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

DTC CONFIRMATION PROCEDURE

Diagnosis Procedure

INFOID:000000001696494

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-5, "CAN Communication Control Circuit"](#).
NO >> Refer to [GI-38, "Intermittent Incident"](#).

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POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[IPDM E/R]

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:000000001696495

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, D |
| 2 | Battery | C |
| 12 | Ignition switch ON or START | 59 |

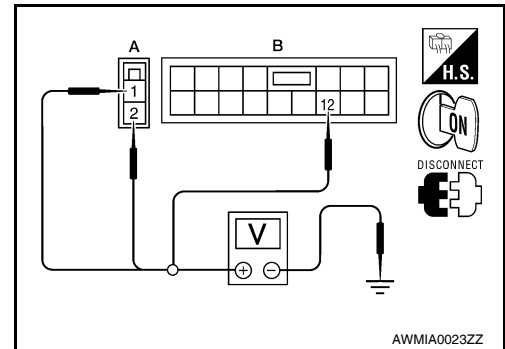
Is the fuse blown?

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



Is the measurement value normal?

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

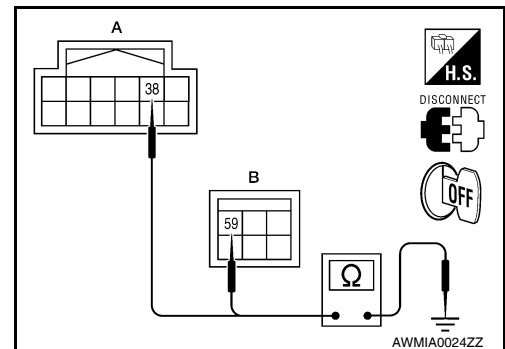
3. CHECK GROUND CIRCUIT

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

| IPDM E/R | | Ground | Continuity |
|-----------|----------|--------|------------|
| Connector | Terminal | | |
| E122 (A) | 38 | Ground | 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 >

[IPDM E/R]

ECU DIAGNOSIS

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

Reference Value

INFOID:000000001696496

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. | 0 - 100 % |
| 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"> • Front fog lamp switch ON • Daytime light activated (Canada only) | ON |
| HL WASHER REQ | NOTE: This item is displayed, but cannot be monitored. | | OFF |
| 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 | Daytime light system requested OFF with CONSULT-III. | | OFF |
| | Daytime light system requested ON with CONSULT-III. | | ON |

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

< ECU DIAGNOSIS >

[IPDM E/R]

| Monitor Item | Condition | Value/Status |
|--------------|---|--------------|
| HOOD SW | Hood closed. | OFF |
| | Hood open. | ON |
| THFT HRN REQ | Not operated | OFF |
| | <ul style="list-style-type: none">• Panic alarm is activated• Horn is activated with VEHICLE SECURITY (THEFT WARNING) SYSTEM | ON |
| HORN CHIRP | Not operated | OFF |
| | Door locking with Intelligent Key (horn chirp mode) | ON |

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

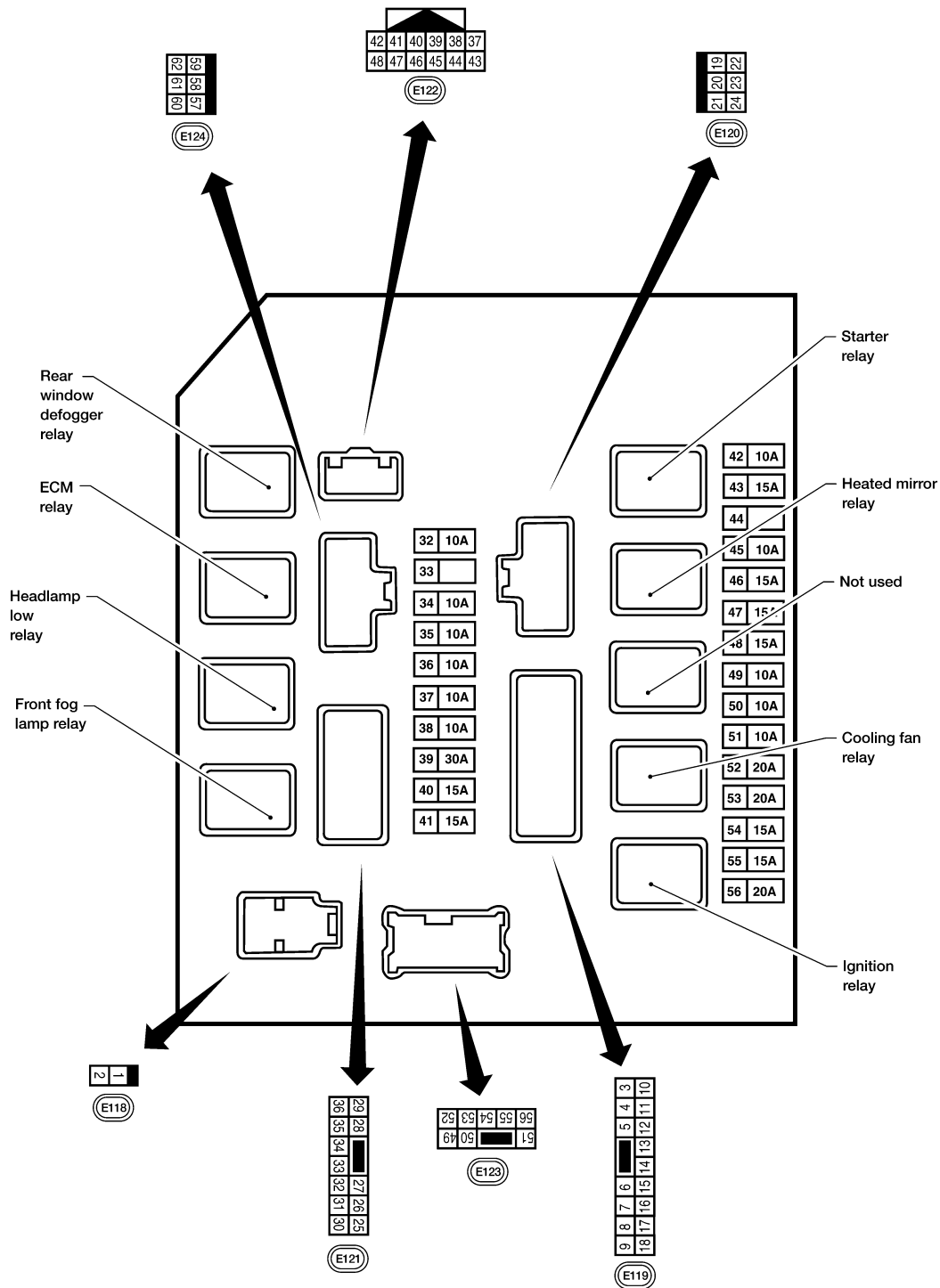
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[IPDM E/R]

Terminal Layout

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TERMINAL LAYOUT



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Physical Values

PHYSICAL VALUES

WKIA5852E

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

< ECU DIAGNOSIS >

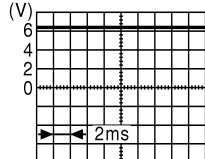
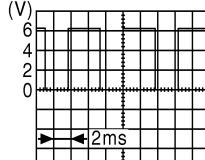
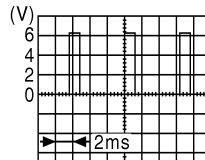
[IPDM E/R]

| 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 | 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 (VDC) | Output | — | Ignition switch ON or START | Battery voltage |
| | | | | | Ignition switch OFF or ACC | 0V |
| 15 | GR | Fuse 50 (ABS) | 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 | Output | — | When rear defogger switch is ON | Battery voltage |
| | | | | | When raker defogger switch is OFF | 0V |

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

< ECU DIAGNOSIS >

[IPDM E/R]

| Terminal | Wire color | Signal name | Signal input/output | Measuring condition | | Reference value (Approx.) | |
|----------|------------|---------------------------------|---------------------|---------------------|--|---|-----------------|
| | | | | Ignition switch | Operation or condition | | |
| 24 | L | Cooling fan relay | Output | — | Conditions correct for cooling fan operation | Battery voltage | |
| | | | | | Conditions not correct for cooling fan operation | 0V | |
| 26 | P/L | Headlamp aiming motors | Output | — | Lighting switch 2nd position or AUTO, headlamp aiming switch in position | OFF | 0V |
| | | | | | | ON | Battery voltage |
| 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 | Battery voltage |
| | | | | | | LO or INT | 0V |
| 35 | L/B | Wiper high speed signal | Output | ON or START | Wiper switch | OFF, LO, INT | Battery voltage |
| | | | | | | HI | 0V |
| 37 | Y | Power generation command signal | Output | — | Ignition switch ON |  <p style="text-align: right; margin-right: 50px;">JPMIA0001GB 6.3 V</p> | |
| | | | | | 40% is set on "Active test," "ALTERNATOR DUTY" of "ENGINE" |  <p style="text-align: right; margin-right: 50px;">JPMIA0002GB 3.8 V</p> | |
| | | | | | 40% is set on "Active test," "ALTERNATOR DUTY" of "ENGINE" |  <p style="text-align: right; margin-right: 50px;">JPMIA0003GB 1.4 V</p> | |
| 38 | B | Ground | Input | — | — | 0V | |
| 39 | L | CAN-H | — | ON | — | — | |
| 40 | P | CAN-L | — | ON | — | — | |

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

< ECU DIAGNOSIS >

[IPDM E/R]

| Terminal | Wire color | Signal name | Signal input/output | Measuring condition | | Reference value (Approx.) | |
|----------|------------|---|---------------------|---------------------|--|---------------------------|----------------------|
| | | | | Ignition switch | Operation or condition | | |
| 41 | Y/B | Hood switch | Input | — | Hood closed | OFF | 0V |
| | | | | | Hood open | ON | Battery voltage |
| 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 | 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 or Intelligent Key (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 (transmission range switch) | Input | ON or START | A/T shift selector lever in "P" or "N" | | 0V |
| | | | | | A/T shift selector lever any other position | | Battery voltage |
| 49 | R/L | Trailer tow relay | Output | ON | Lighting switch must be in the 1st position | OFF | 0V |
| | | | | | | ON | Battery voltage |
| 50 | W/R | Front fog lamp (LH) | Output | ON or START | Lighting switch must be in the 2nd position (LOW beam is ON) and the front fog lamp switch | OFF | 0V |
| | | | | | | ON | Battery voltage |
| 51 | W/R | Front fog lamp (RH) | Output | ON or START | Lighting switch must be in the 2nd position (LOW beam is ON) and the front fog lamp switch | OFF | 0V |
| | | | | | | ON | 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 | L/W | RH high beam headlamp | Output | — | Lighting switch in 2nd position and placed in HIGH or PASS position | | Battery voltage |

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

< ECU DIAGNOSIS >

[IPDM E/R]

| Terminal | Wire color | Signal name | Signal input/output | Measuring condition | | Reference value (Approx.) | |
|----------|------------|---------------------------------|---------------------|---------------------|------------------------------|---------------------------|-----------------|
| | | | | Ignition switch | Operation or condition | | |
| 57 | R/L | Parking, license, and tail lamp | Output | ON | Lighting switch 1st position | OFF | 0V |
| | | | | | | ON | Battery voltage |
| 59 | B | Ground | Input | — | — | 0V | |
| 60 | B/W | Rear window defogger relay | 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

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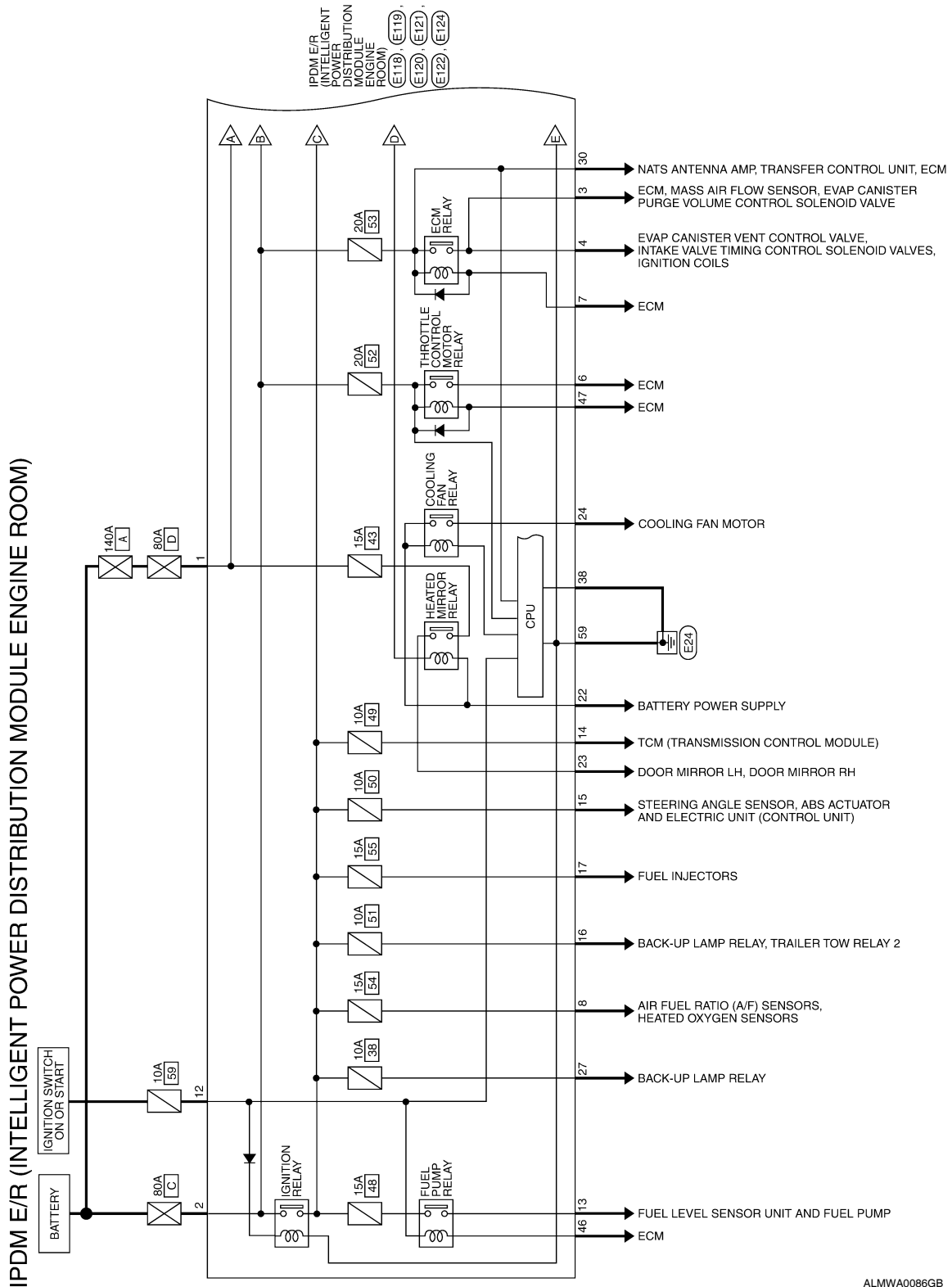
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

< ECU DIAGNOSIS >

[IPDM E/R]

Wiring Diagram

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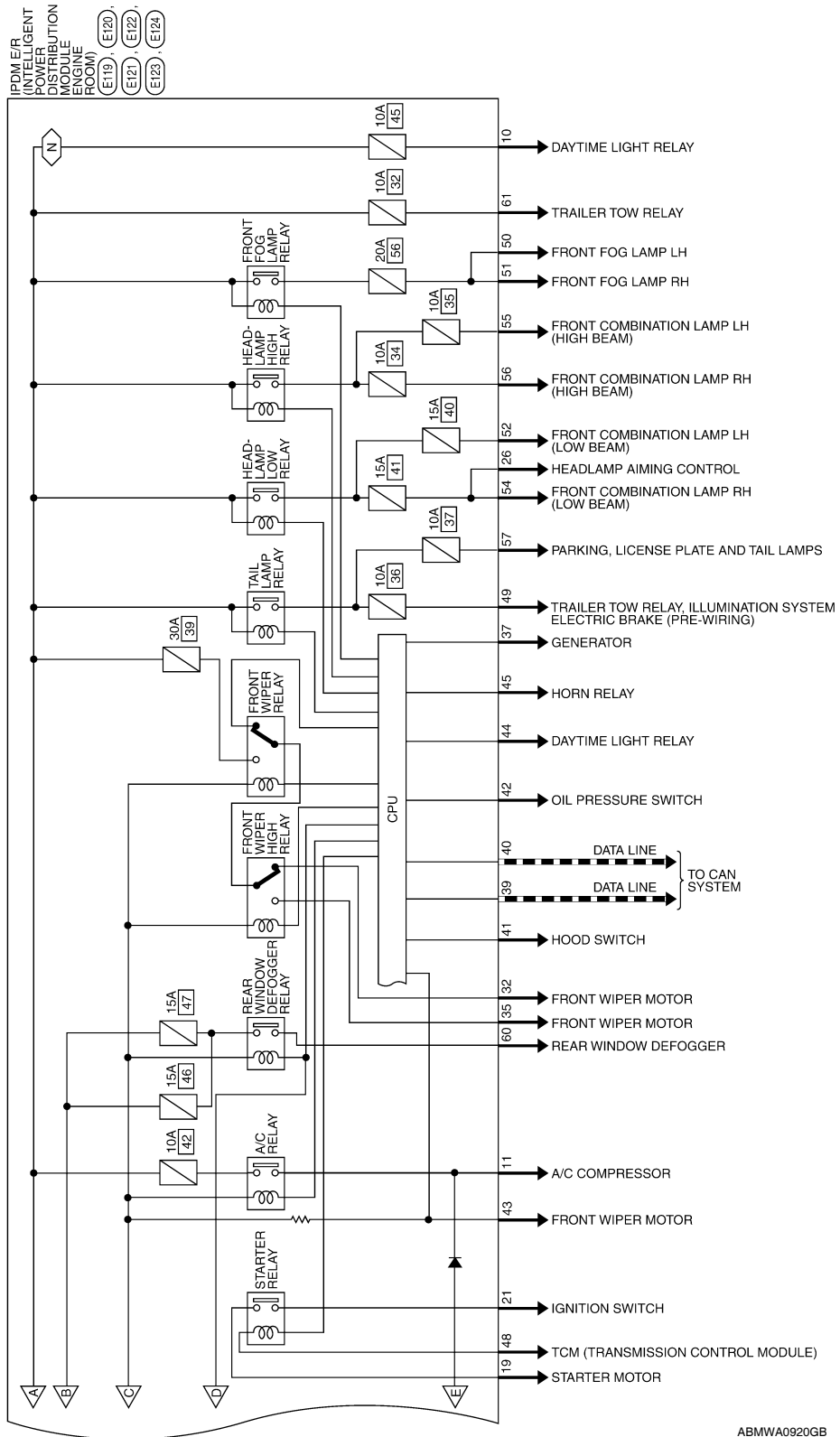
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IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

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[IPDM E/R]

(N) : FOR CANADA
 : DATA LINE



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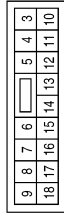
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) CONNECTORS

| | |
|-----------------|--|
| 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 | FL USM |
| 2 | R | FL MAIN |

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

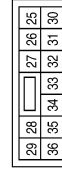


| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------------|
| 3 | BR | IGN COIL |
| 4 | W/L | ECM |
| 6 | L | ETC |
| 7 | W/B | ECM RLY CONT |
| 8 | R/B | 02_SENSOR |
| 10 | G | DTRL_RLY SUPPLY |
| 11 | Y/B | AC COMPRESSOR |
| 12 | L/W | IGN SW (IG) |
| 13 | B/Y | FUEL PUMP |
| 14 | Y/R | A/T CU IGN SUPPLY |
| 15 | LG/B | ABS IGN SUPPLY |
| 15 | GR | ABS IGN SUPPLY |
| 16 | G | REVERSE LAMP |
| 17 | W | INJECTOR |

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



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



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|---------------|
| 19 | W/R | STARTER MTR |
| 21 | BR | IGN SW(ST) |
| 22 | G | F/L MOTOR FAN |
| 23 | GR/W | HEATED MIRROR |
| 24 | L | MOTOR FAN 2 |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|------------------|
| 26 | P/L | H/LAMP LEVELIZER |
| 27 | W/B | TTOW REV LAMP |
| 30 | W | ECM BAT |
| 32 | L | FR WIPER LO |
| 35 | L/B | FR WIPER HI |

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| | |
|-----------------|--|
| 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 | |

| 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 |
| 54 | R/Y | H/LAMP LO RH |
| 55 | G | H/LAMP HI LH |
| 56 | L/W | H/LAMP HI RH |

| 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 | Y/B | HOOD SW |
| 42 | GR | OIL PRESSURE SW |
| 43 | L/Y | AUTO STOP SW |
| 44 | BR | DTRL RLY CONT |
| 45 | G/W | ANTI THEFT HORN |
| 46 | GR | FUEL PUMP RLY CONT |
| 47 | O | ETC RLY CONT |
| 48 | B/R | RANGE SW |

| | |
|-----------------|--|
| 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 |

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



| | | |
|----|----|----|
| 59 | 58 | 57 |
| 62 | 61 | 60 |

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

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Fail Safe

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

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

< ECU DIAGNOSIS >

[IPDM E/R]

| Control part | Fail-safe in operation |
|--------------|--|
| Cooling fan | <ul style="list-style-type: none"> • Turns ON the cooling fan relay when the ignition switch is turned ON • Turns OFF the cooling fan relay when the ignition switch is turned OFF |

If No CAN Communication Is Available With BCM

| Control part | Fail-safe in operation |
|--|--|
| Headlamp | <ul style="list-style-type: none"> • Turns ON the headlamp low relay when the ignition switch is turned ON • Turns OFF the headlamp low relay when the ignition switch is turned OFF • Headlamp high relay OFF |
| <ul style="list-style-type: none"> • Parking lamps • License plate lamps • Tail lamps | <ul style="list-style-type: none"> • Turns ON the tail lamp relay when the ignition switch is turned ON • Turns OFF the tail lamp relay when the ignition switch is turned OFF |
| Front wiper | <ul style="list-style-type: none"> • 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 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. |
| Rear window defogger | Rear window defogger relay OFF |
| A/C compressor | A/C relay OFF |
| Front fog lamps | 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 second activation and 20 second 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.

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

< ECU DIAGNOSIS >

[IPDM E/R]

DTC Index

INFOID:000000001696501

| CONSULT-III display | Fail-safe | TIME ^{NOTE} | | Refer to |
|--|-----------|----------------------|--------|------------------------|
| No DTC is detected. further testing may be required. | — | — | — | — |
| U1000: CAN COMM CIRCUIT | × | CRNT | 1 – 39 | PCS-17 |

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.

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< PRECAUTION >

PRECAUTION

PRECAUTIONS

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

INFOID:000000004857510

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.

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000004857511

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.

NOTE:

Supply power using jumper cables if battery is discharged.

2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

PRECAUTIONS

[IPDM E/R]

< PRECAUTION >

5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

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REMOVAL AND INSTALLATION

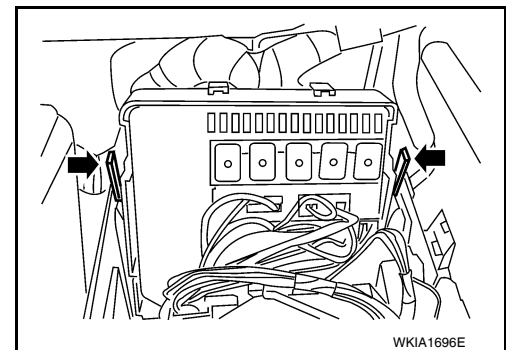
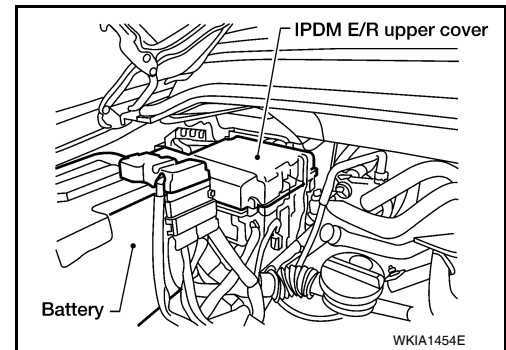
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Removal and Installation of IPDM E/R

INFOID:000000001539318

REMOVAL

1. Disconnect negative battery cable.
2. Remove IPDM E/R upper cover.
3. Release 2 clips and pull IPDM E/R up from case.
4. Disconnect IPDM E/R connectors and remove the IPDM E/R.



INSTALLATION

Installation is in the reverse order of removal.