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SECTION **WW**

WIPER & WASHER

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DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000003292722

DETAILED FLOW

1. LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. Get detailed information about the conditions and environment when the symptom occurs.

>> GO TO 2

2. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to [WW-10, "Diagnosis Description"](#).

>> GO TO 3

3. GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis. Refer to [WW-41, "Symptom Table"](#).

>> GO TO 4

4. REPAIR OR REPLACE

Repair or replace the specific parts.

>> GO TO 5

5. FINAL CHECK

Final check.

Is inspection result normal?

YES >> Inspection End.

NO >> Refer to [GI-51, "Intermittent Incident"](#).

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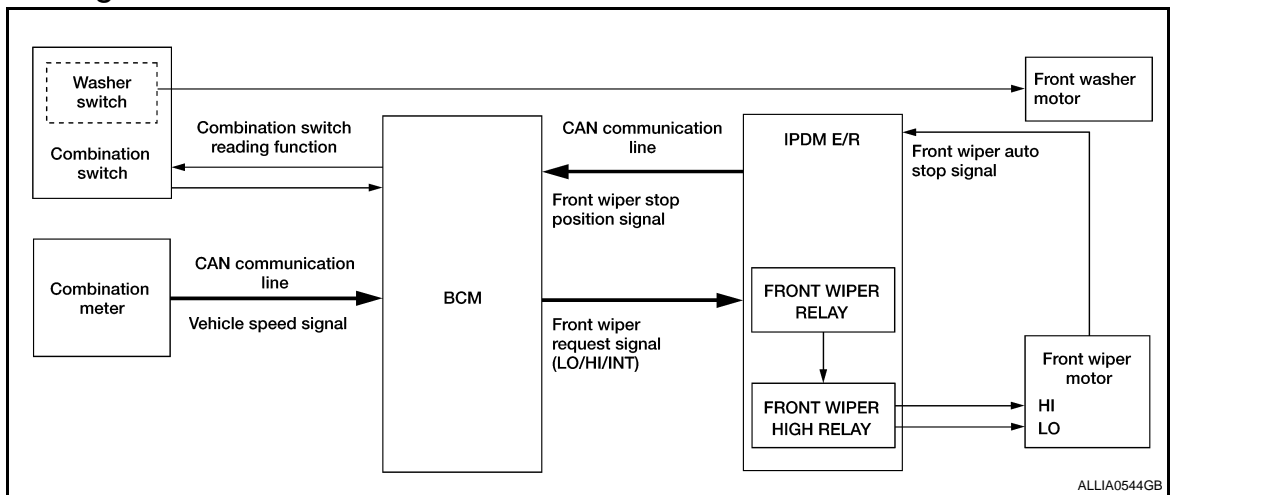
FRONT WIPER AND WASHER SYSTEM

< FUNCTION DIAGNOSIS >

FUNCTION DIAGNOSIS

FRONT WIPER AND WASHER SYSTEM

System Diagram



System Description

INFOID:000000003292724

OUTLINE

The front wiper is controlled by each function of BCM and IPDM E/R.

Control by BCM

- Combination switch reading function
- Front wiper control function

Control by IPDM E/R

- Front wiper control function
- Relay control function

FRONT WIPER BASIC OPERATION

- BCM detects the combination switch condition by the combination switch reading function.
- BCM transmits the front wiper request signal to IPDM E/R with CAN communication depending on each operating condition of the front wiper.
- IPDM E/R turns ON/OFF the integrated front wiper relay and the front wiper high relay according to the front wiper request signal. IPDM E/R provides the power supply to operate the front wiper HI/LO operation.

FRONT WIPER LO OPERATION

- BCM transmits the front wiper request signal (LO) to IPDM E/R with CAN communication according to the front wiper LO operating condition.

Front wiper LO operating condition

- Ignition switch ON
- Front wiper switch LO or front wiper switch MIST (while pressing)
- IPDM E/R turns ON the integrated front wiper relay according to the front wiper request signal (LO).

FRONT WIPER HI OPERATION

- BCM transmits the front wiper request signal (HI) to IPDM E/R with CAN communication according to the front wiper HI operating condition.

Front wiper HI operating condition

- Ignition switch ON
- Front wiper switch HI
- IPDM E/R turns ON the integrated front wiper relay and the front wiper high relay according to the front wiper request signal (HI).

FRONT WIPER INT OPERATION (LINKED WITH VEHICLE SPEED)

FRONT WIPER AND WASHER SYSTEM

< FUNCTION DIAGNOSIS >

- BCM transmits the front wiper request signal (INT) to IPDM E/R with CAN communication according to the front wiper INT operation condition and the intermittent operation delay interval judged value.

Front wiper INT operating condition

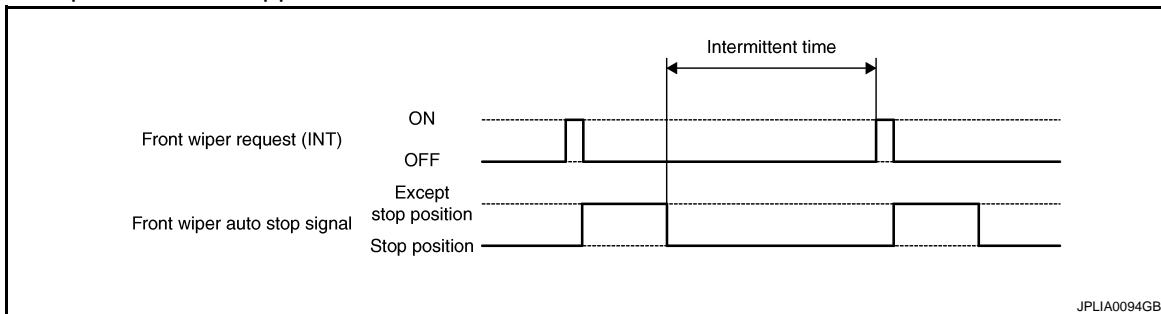
- Ignition switch ON
- Front wiper switch INT

Intermittent operation delay interval judgment

- BCM calculates the intermittent operation delay interval from the vehicle speed signal received from the wiper dial position and the combination meter with CAN communication.

Wiper intermittent dial position	Intermittent operation interval	Intermittent operation delay Interval (s)			
		Vehicle speed			
		Vehicle stopped or less than 5 km/h (3.1 MPH)	5 km/h (3.1 MPH) or more or less than 35 km/h (21.7 MPH)	35 km/h (21.7 MPH) or more or less than 65 km/h (40.4 MPH)	65 km/h (40.4 MPH) or more
1	Short ↑	0.8	0.6	0.4	0.24
2		4	3	2	1.2
3		10	7.5	5	3
4		16	12	8	4.8
5		24	18	12	7.2
6	Long ↓	32	24	16	9.6
7		42	31.5	21	12.6

- IPDM E/R turns the integrated front wiper relay ON so that the front wiper is operated only once according to the front wiper request signal (INT).
- BCM detects stop position/except stop position of the front wiper motor according to the front wiper stop position signal received from IPDM E/R with CAN communication.
- BCM transmits the front wiper request signal (INT) again after the intermittent operation delay interval after the front wiper motor is stopped.



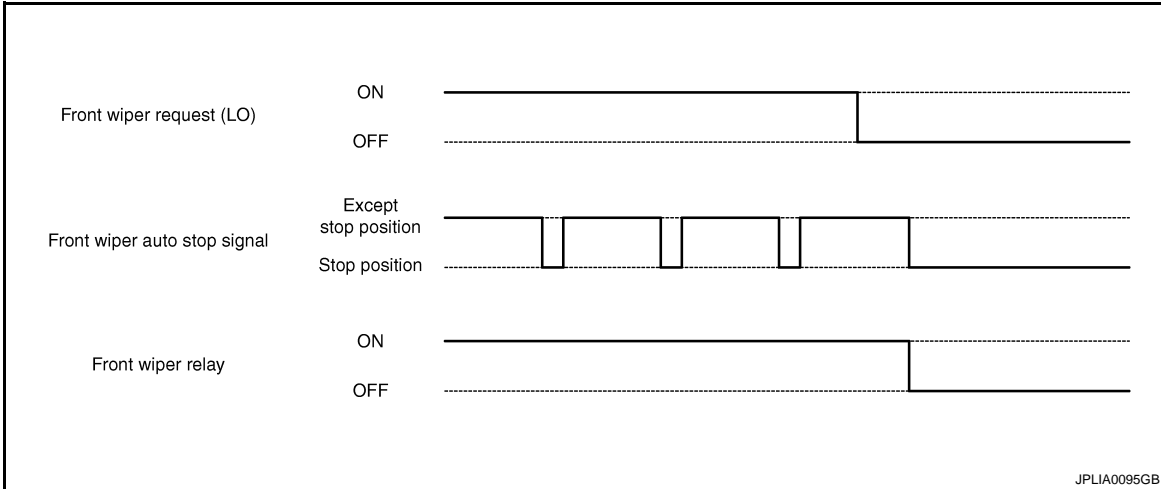
FRONT WIPER AUTO STOP OPERATION

- BCM stops transmitting the front wiper request signal when the front wiper switch is turned OFF.
- IPDM E/R detects the front wiper auto stop signal from the front wiper motor and detects the front wiper motor position (stop position/except stop position).

FRONT WIPER AND WASHER SYSTEM

< FUNCTION DIAGNOSIS >

- When the front wiper request signal is stopped, IPDM E/R turns ON the front wiper relay until the front wiper motor returns to the stop position.



NOTE:

- BCM stops the transmitting of the front wiper request signal when the ignition switch is OFF.
- IPDM E/R turns the front wiper relay OFF when the ignition switch is OFF.

FRONT WIPER OPERATION LINKED WITH WASHER

- BCM transmits the front wiper request signal (LO) to IPDM E/R with CAN communication according to the washer linked operating condition of the front wiper.
- BCM transmits the front wiper request signal (LO) so that the front wiper operates approximately 3 times when the front washer switch OFF is detected.

Washer linked operating condition of front wiper

- Ignition switch ON
- Front washer switch ON (0.4 second or more)
- IPDM E/R turns ON the integrated front wiper relay according to the front wiper request signal (LO).
- The front washer motor is grounded through the combination switch with the front washer switch ON.

FRONT WIPER DROP WIPE OPERATION

- BCM controls the front wiper to operate once according to the conditions of front wiper drop wipe operation.

Front wiper drop wipe operating condition

- Ignition switch ON
- Front wiper switch OFF
- Front washer switch OFF
- BCM transmits the front wiper request signal (LO) to IPDM E/R with CAN communication so that the front wiper operate once three seconds after front wiper operation linked with washer.
- IPDM E/R turns ON the integrated front wiper relay according to the front wiper request signal (LO).

FRONT WIPER FAIL-SAFE OPERATION

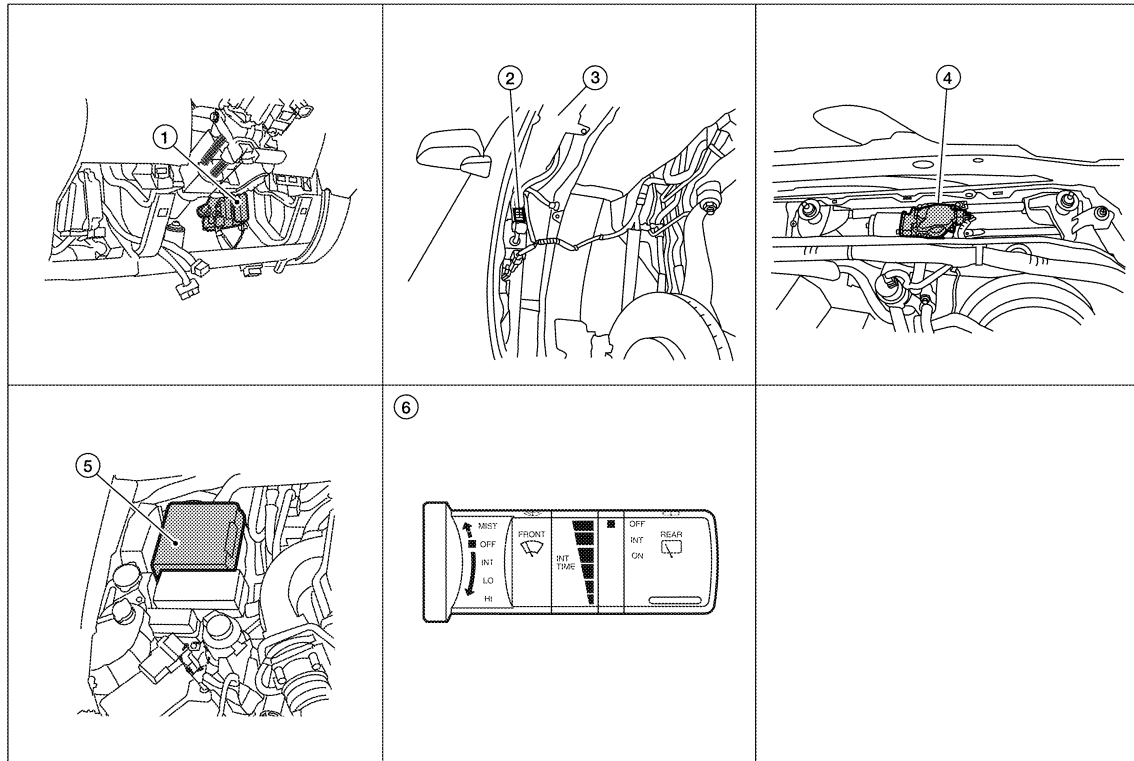
- IPDM E/R performs the fail-safe function when the front wiper auto stop circuit is malfunctioning. Refer to [PCS-29, "Fail Safe"](#).

FRONT WIPER AND WASHER SYSTEM

< FUNCTION DIAGNOSIS >

Component Parts Location

INFOID:000000003292725



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- | | | |
|---------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------|
| 1. BCM M18, M20 (view with instrument lower panel LH removed) | 2. Front washer motor E105 (view with front fender protector RH removed) | 3. Washer fluid reservoir |
| 4. Front wiper motor E23 (view with cowl top removed) | 5. IPDM E/R E121, E122, E124 | 6. Combination switch M28 |

Component Description

INFOID:000000003292726

Part	Description
BCM	<ul style="list-style-type: none"> Judges each switch status by the combination switch reading function. Requests (with CAN communication) the front wiper relay and the front wiper high relay ON to IPDM E/R.
IPDM E/R	<ul style="list-style-type: none"> Controls the integrated relay according to the request (with CAN communication) from BCM. Performs the auto stop control of the front wiper.
Combination switch (Wiper and washer switch)	Refer to WW-4, "System Diagram" .
Combination meter	Transmits the vehicle speed signal to BCM with CAN communication.

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DIAGNOSIS SYSTEM (BCM)

< FUNCTION DIAGNOSIS >

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:000000003292731

APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to BCS-46. "DTC Index" .
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	<ul style="list-style-type: none"> Enables to read and save the vehicle specification. Enables to write the vehicle specification when replacing BCM.

SYSTEM APPLICATION

BCM can perform the following functions for each system.

NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Combination switch	COMB SW		×	

WIPER

WIPER : CONSULT-III Function (BCM - WIPER)

INFOID:000000003292732

WORK SUPPORT

Service item	Setting item	Description
WIPER SPEED SETTING	ON*	With vehicle speed (Front wiper intermittent time linked with the vehicle speed and wiper intermittent dial position)
	OFF	Without vehicle speed (Front wiper intermittent time linked with the wiper intermittent dial position)

*:Factory setting

DATA MONITOR

Monitor Item [Unit]	Description
IGN ON SW	Ignition switch ON status judged from ignition power supply.
IGN SW CAN	Ignition switch ON status received from IPDM E/R with CAN communication.

DIAGNOSIS SYSTEM (BCM)

< FUNCTION DIAGNOSIS >

Monitor Item [Unit]	Description
FR WIPER HI [OFF/ON]	Each switch status that BCM judges from the combination switch reading function.
FR WIPER LOW [OFF/ON]	
FR WIPER INT [OFF/ON]	
FR WASHER SW [OFF/ON]	
INT VOLUME [1 – 7]	Each switch status that BCM judges from the combination switch reading function.
FR WIPER STOP [OFF/ON]	Front wiper motor (stop position) status received from IPDM E/R with CAN communication.
VEHICLE SPEED [km/h]	The value of the vehicle speed signal received from combination meter with CAN communication.

ACTIVE TEST

Test item	Operation	Description
FR WIPER	HI	Transmits the front wiper request signal (HI) to IPDM E/R with CAN communication to operate the front wiper HI operation.
	LO	Transmits the front wiper request signal (LO) to IPDM E/R with CAN communication to operate the front wiper LO operation.
	INT	Transmits the front wiper request signal (INT) to IPDM E/R with CAN communication to operate the front wiper INT operation.
	OFF	Stops transmitting the front wiper request signal to stop the front wiper operation.

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DIAGNOSIS SYSTEM (IPDM E/R)

< FUNCTION DIAGNOSIS >

DIAGNOSIS SYSTEM (IPDM E/R)

Diagnosis Description

INFOID:000000003292733

AUTO ACTIVE TEST

Refer to [PCS-13, "Diagnosis Description"](#).

CONSULT - III Function (IPDM E/R)

INFOID:000000003292734

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
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.
IGN RLY [Off/On]	×	Displays the status of the ignition relay judged by IPDM E/R.
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
FRONT WIPER	Off	OFF
	Lo	Operates the front wiper relay.
	Hi	Operates the front wiper relay and front wiper high relay.

WIPER AND WASHER FUSE

< COMPONENT DIAGNOSIS >

COMPONENT DIAGNOSIS

WIPER AND WASHER FUSE

Description

INFOID:000000003292735

Fuse list

Unit	Location	Fuse No.	Capacity
Front wiper motor	IPDM E/R	39	30 A
Front washer motor	Fuse block (J/B)	15	10 A

Diagnosis Procedure

INFOID:000000003292736

1. CHECK FUSES

Check that the following fuses are not blown.

Unit	Location	Fuse No.	Capacity
Front wiper motor	IPDM E/R	39	30 A
Front washer motor	Fuse block (J/B)	15	10 A

Is the fuse blown?

- YES >> Replace the fuse after repairing the applicable circuit.
- NO >> The fuse is normal.

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FRONT WIPER MOTOR LO CIRCUIT

< COMPONENT DIAGNOSIS >

FRONT WIPER MOTOR LO CIRCUIT

Component Function Check

INFOID:000000003292737

1. CHECK FRONT WIPER LO OPERATION

⊗ IPDM E/R AUTO ACTIVE TEST

1. Start IPDM E/R auto active test. Refer to [PCS-13, "Diagnosis Description"](#).
2. Check that the front wiper operates at the LO operation.

Ⓟ CONSULT-III ACTIVE TEST

1. Select "FRONT WIPER" of IPDM E/R active test item.
2. While operating the test item, check front wiper operation.

LO : Front wiper (LO) operation

OFF : Stop the front wiper.

Is front wiper (LO) operation normal?

- YES >> Front wiper motor LO circuit is normal.
 NO >> Refer to [WW-12, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003292738

1. CHECK FRONT WIPER MOTOR FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuse is not blown.

Unit	Location	Fuse No.	Capacity
Front wiper motor	IPDM E/R	39	30 A

Is the fuse blown?

- YES >> GO TO 2
 NO >> GO TO 3

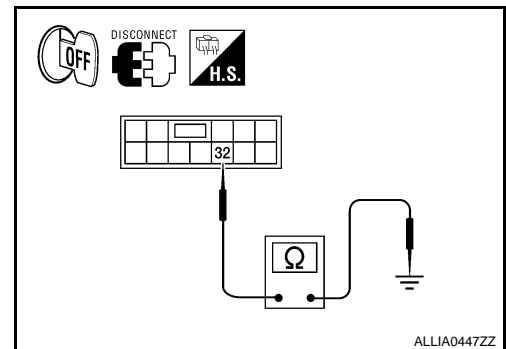
2. CHECK FRONT WIPER MOTOR (LO) SHORT CIRCUIT

1. Disconnect IPDM E/R and front wiper motor.
2. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E121	32		No

Does continuity exist?

- YES >> Repair or replace harness.
 NO >> Replace the fuse. (Replace IPDM E/R if the fuse is blown again.)



3. CHECK FRONT WIPER MOTOR (LO) OUTPUT VOLTAGE

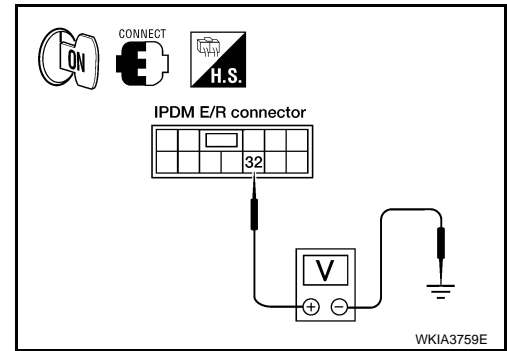
Ⓟ CONSULT-III ACTIVE TEST

FRONT WIPER MOTOR LO CIRCUIT

< COMPONENT DIAGNOSIS >

1. Turn the ignition switch ON.
2. Select "FRONT WIPER" of IPDM E/R active test item.
3. While operating the test item, check voltage between IPDM E/R harness connector and ground.

Terminals		Test item	Voltage (Approx.)
(+)	(-)		
IPDM E/R		FRONT WIPER	Battery voltage
Connector	Terminal		
E121	32	LO	Battery voltage
		OFF	0V



Is the measurement value normal?

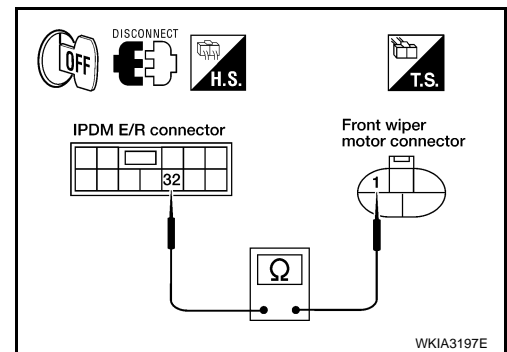
YES >> GO TO 4

NO >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation of IPDM E/R"](#).

4. CHECK FRONT WIPER MOTOR (LO) OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R and front wiper motor.
3. Check continuity between IPDM E/R harness connector and front wiper motor harness connector.

IPDM E/R		Front wiper motor		Continuity
Connector	Terminal	Connector	Terminal	
E121	32	E23	1	Yes



Does continuity exist?

YES >> Replace front wiper motor. Refer to [WW-47, "Removal and Installation"](#).

NO >> Repair or replace harness.

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FRONT WIPER MOTOR HI CIRCUIT

< COMPONENT DIAGNOSIS >

FRONT WIPER MOTOR HI CIRCUIT

Component Function Check

INFOID:000000003292739

1. CHECK FRONT WIPER HI OPERATION

⊗ IPDM E/R AUTO ACTIVE TEST

1. Start IPDM E/R auto active test. Refer to [PCS-13, "Diagnosis Description"](#).
2. Check that the front wiper operates at the HI operation.

Ⓟ CONSULT-III ACTIVE TEST

1. Select "FRONT WIPER" of IPDM E/R active test item.
2. While operating the test item, check front wiper operation.

HI : Front wiper (HI) operation

OFF : Stop the front wiper.

Is front wiper (HI) operation normal?

- YES >> Front wiper motor HI circuit is normal.
 NO >> Refer to [WW-14, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003292740

1. CHECK FRONT WIPER MOTOR FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuse is not blown.

Unit	Location	Fuse No.	Capacity
Front wiper motor	IPDM E/R	39	30 A

Is the fuse blown?

- YES >> GO TO 2
 NO >> GO TO 3

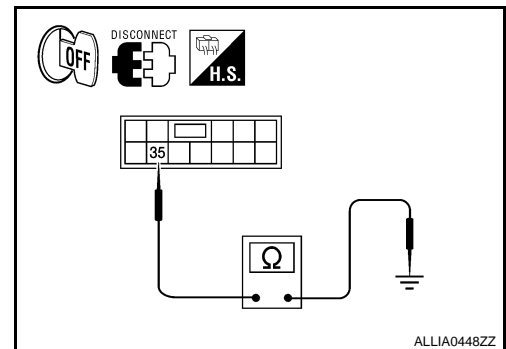
2. CHECK FRONT WIPER MOTOR (HI) SHORT CIRCUIT

1. Disconnect IPDM E/R and front wiper motor.
2. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E121	35		No

Does continuity exist?

- YES >> Repair or replace harness.
 NO >> Replace the fuse. (Replace IPDM E/R if the fuse is blown again.)



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3. CHECK FRONT WIPER MOTOR (HI) OUTPUT VOLTAGE

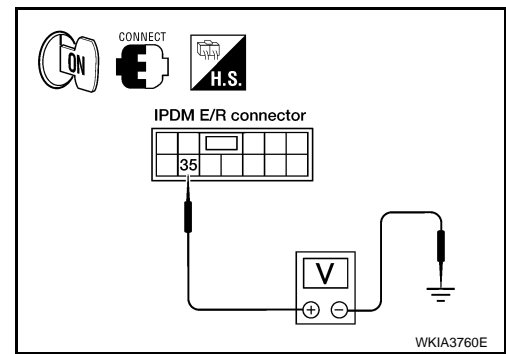
Ⓟ CONSULT-III ACTIVE TEST

FRONT WIPER MOTOR HI CIRCUIT

< COMPONENT DIAGNOSIS >

1. Turn the ignition switch ON.
2. Select "FRONT WIPER" of IPDM E/R active test item.
3. While operating the test item, check voltage between IPDM E/R harness connector and ground.

Terminals		Test item	Voltage (Approx.)
(+)	(-)		
IPDM E/R		FRONT WIPER	Battery voltage
Connector	Terminal		
E121	35	HI	Battery voltage
		OFF	0 V



Is the measurement value normal?

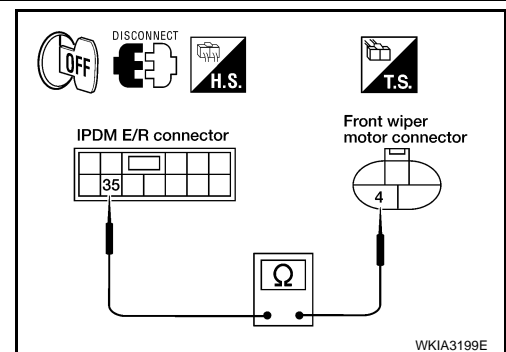
YES >> GO TO 4

NO >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation of IPDM E/R"](#).

4. CHECK FRONT WIPER MOTOR (HI) OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R and front wiper motor.
3. Check continuity between IPDM E/R harness connector and front wiper motor harness connector.

IPDM E/R		Front wiper motor		Continuity
Connector	Terminal	Connector	Terminal	
E121	35	E23	4	Yes



Does continuity exist?

YES >> Replace front wiper motor. Refer to [WW-47, "Removal and Installation"](#).

NO >> Repair or replace harness.

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FRONT WIPER AUTO STOP SIGNAL CIRCUIT

< COMPONENT DIAGNOSIS >

FRONT WIPER AUTO STOP SIGNAL CIRCUIT

Component Function Check

INFOID:000000003292741

1. CHECK FRONT WIPER (AUTO STOP) SIGNAL CHECK

CONSULT-III DATA MONITOR

1. Select "FR WIPER STOP" of IPDM E/R data monitor item.
2. Operate the front wiper.
3. Check that "FR WIPER STOP" changes to "ON" and "OFF" linked with the wiper operation.

Monitor item	Condition		Monitor status
FR WIPER STOP	Front wiper motor	Stop position	ON
		Except stop position	OFF

Is the status of item normal?

- YES >> Front wiper auto stop signal circuit is normal.
 NO >> Refer to [WW-16, "Diagnosis Procedure"](#).

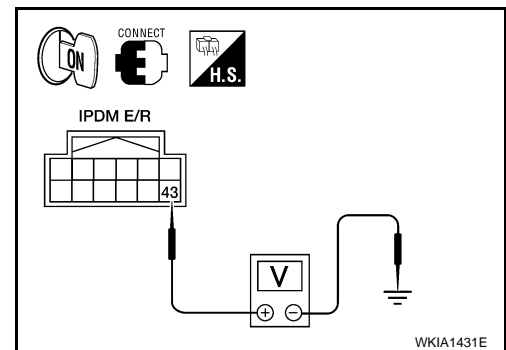
Diagnosis Procedure

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1. CHECK FRONT WIPER MOTOR (AUTO STOP) OUTPUT VOLTAGE

1. Turn the ignition switch ON.
2. Check voltage between IPDM E/R harness connector and ground.

Terminals		Voltage (Approx.)
(+)	(-)	
IPDM E/R		Ground
Connector	Terminal	
E122	43	
		Battery voltage



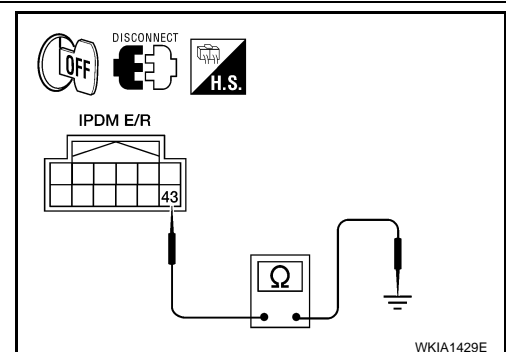
Is the measurement value normal?

- YES >> GO TO 3
 NO >> GO TO 2

2. CHECK FRONT WIPER MOTOR (AUTO STOP) SHORT CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect IPDM E/R and front wiper motor.
3. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E122	43		No



Does continuity exist?

- YES >> Repair or replace harness.
 NO >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation of IPDM E/R"](#).

3. CHECK FRONT WIPER MOTOR (AUTO STOP) CIRCUIT CONTINUITY

FRONT WIPER AUTO STOP SIGNAL CIRCUIT

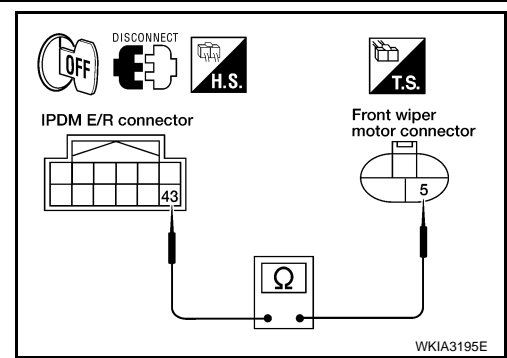
< COMPONENT DIAGNOSIS >

Check continuity between IPDM E/R harness connector and front wiper motor harness connector.

IPDM E/R		Front wiper motor		Continuity
Connector	Terminal	Connector	Terminal	
E122	43	E23	5	Yes

Does continuity exist?

- YES >> Replace front wiper motor. Refer to [WW-47. "Removal and Installation"](#).
- NO >> Repair or replace harness.



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FRONT WIPER MOTOR GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

FRONT WIPER MOTOR GROUND CIRCUIT

Diagnosis Procedure

INFOID:000000003292743

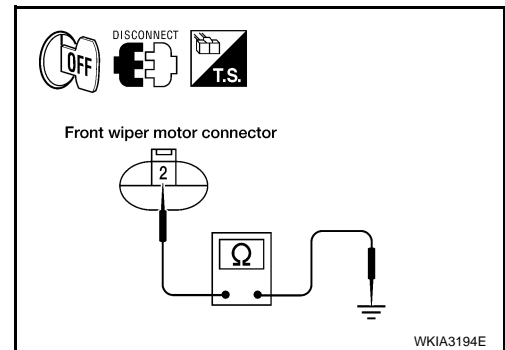
1. CHECK FRONT WIPER MOTOR (GROUND) OPEN CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect front wiper motor.
3. Check continuity between front wiper motor harness connector and ground.

Front wiper motor		Ground	Continuity
Connector	Terminal		
E23	2		Yes

Does continuity exist?

- YES >> Front wiper motor ground circuit is normal.
NO >> Repair or replace harness.



WASHER SWITCH

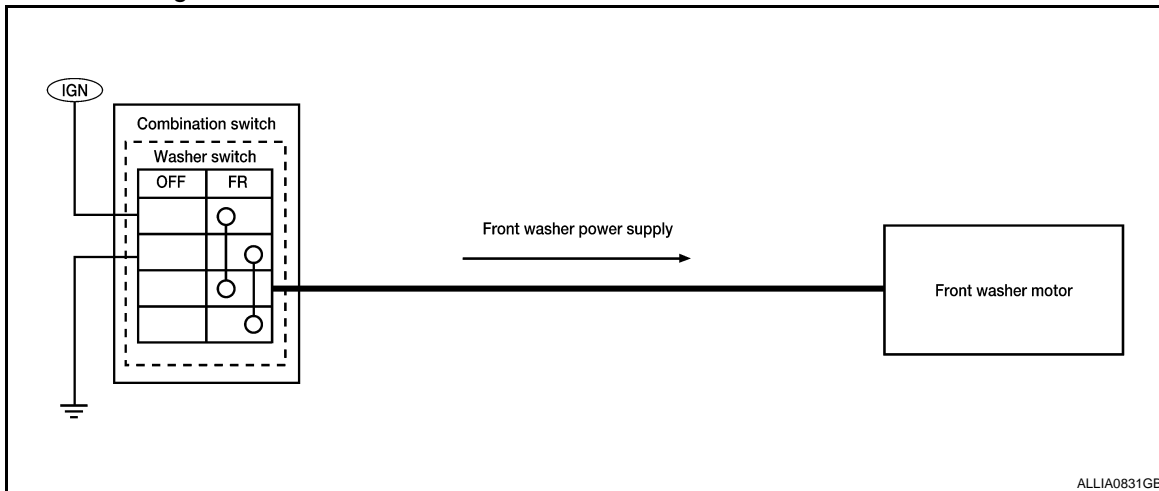
< COMPONENT DIAGNOSIS >

WASHER SWITCH

Description

INFOID:000000003292744

Washer switch is integrated with combination switch.



Component Inspection

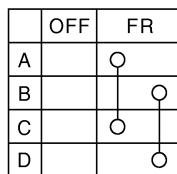
INFOID:000000003292745

1. CHECK FRONT WASHER SWITCH

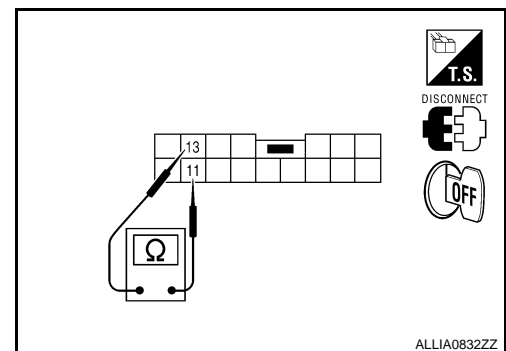
1. Turn the ignition switch OFF.
2. Disconnect combination switch.
3. Check continuity between the combination switch terminals.

- A: Terminal 14
- B: Terminal 12
- C: Terminal 13

- D: Terminal 11



ALLIA0833GB



Combination switch		Condition	Continuity
Terminal			
11	12	Front washer switch ON	Yes
13	14		

Does continuity exist?

- YES >> Wiper and washer switch is normal.
- NO >> Replace combination switch. Refer to [WW-47. "Removal and Installation"](#).

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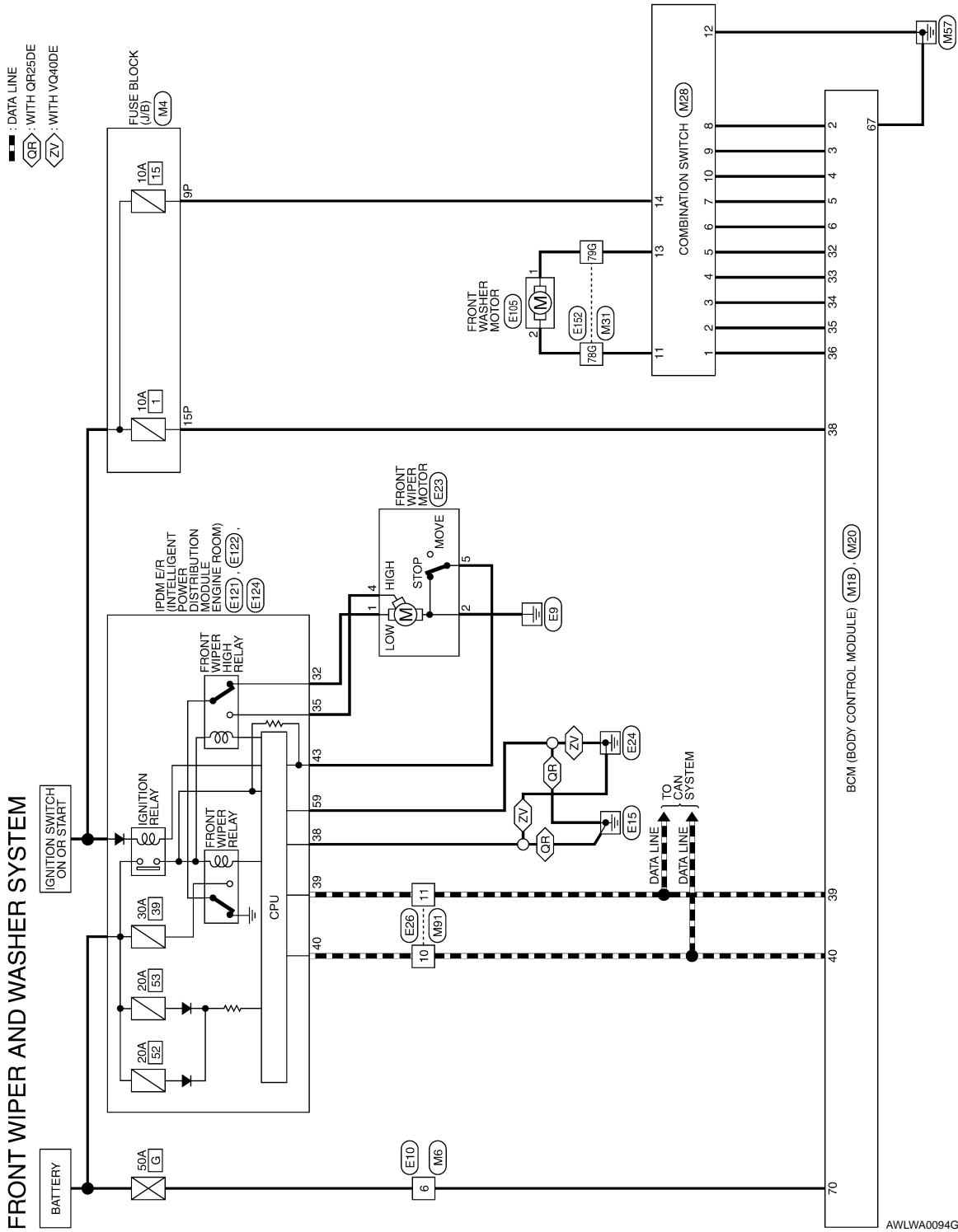
FRONT WIPER AND WASHER SYSTEM

< COMPONENT DIAGNOSIS >

FRONT WIPER AND WASHER SYSTEM

Wiring Diagram

INFOID:000000003292750



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FRONT WIPER AND WASHER SYSTEM

< COMPONENT DIAGNOSIS >

FRONT WIPER AND WASHER SYSTEM CONNECTORS

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
9P	W/G	-
15P	W/R	-

Connector No.	M6
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
6	W	-

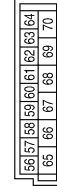
Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
2	P	COMBI SW INPUT5
3	SB	COMBI SW INPUT4

Terminal No.	Color of Wire	Signal Name
4	V	COMBI SW INPUT3
5	L	COMBI SW INPUT2
6	R	COMBI SW INPUT1
32	O	COMBI SW OUTPUT5
33	GR	COMBI SW OUTPUT4
34	G	COMBI SW OUTPUT3
35	BR	COMBI SW OUTPUT2
36	LG	COMBI SW OUTPUT1
38	W/R	IGN SW
39	L	CAN-H
40	P	CAN-L

Connector No.	M20
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
67	B	GND (POWER)
70	W	BAT (F/L)

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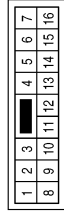
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FRONT WIPER AND WASHER SYSTEM

< COMPONENT DIAGNOSIS >

Connector No.	E26
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
10	P	-
11	L	-

Connector No.	E23
Connector Name	FRONT WIPER MOTOR
Connector Color	GRAY



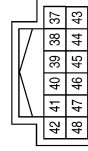
Terminal No.	Color of Wire	Signal Name
1	GR	-
2	B	-
3	-	-
4	L	-
5	G	-

Connector No.	E10
Connector Name	WIRE TO WIRE
Connector Color	WHITE



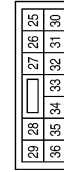
Terminal No.	Color of Wire	Signal Name
6	W	-

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



Terminal No.	Color of Wire	Signal Name
38	B	GND (SIGNAL)
39	L	CAN-H
40	P	CAN-L
43	G	AUTO_STOP_SW

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



Terminal No.	Color of Wire	Signal Name
32	GR	FR_WIPER_LO
35	L	FR_WIPER_HI

Connector No.	E105
Connector Name	FRONT WASHER MOTOR
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	L	-
2	O	-

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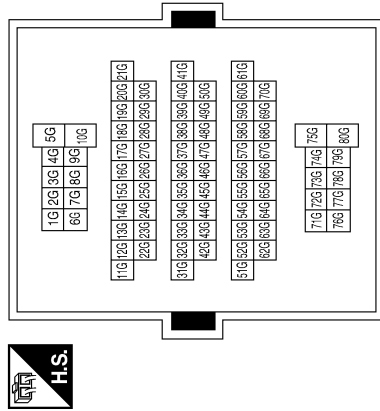


FRONT WIPER AND WASHER SYSTEM

< COMPONENT DIAGNOSIS >

Terminal No.	Color of Wire	Signal Name
78G	O	-
79G	L	-

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Color	WHITE



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



Terminal No.	Color of Wire	Signal Name
59	B	GND (POWER)

AWLIA0334GB

BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:000000003297030

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition	Value/Status
AIR COND SW	A/C switch OFF	OFF
	A/C switch ON	ON
CDL LOCK SW	Door lock/unlock switch does not operate	OFF
	Press door lock/unlock switch to the LOCK side	ON
CDL UNLOCK SW	Door lock/unlock switch does not operate	OFF
	Press door lock/unlock switch to the UNLOCK side	ON
DOOR SW-AS	Front door RH closed	OFF
	Front door RH opened	ON
DOOR SW-DR	Front door LH closed	OFF
	Front door LH opened	ON
DOOR SW-RL	Rear door LH closed	OFF
	Rear door LH opened	ON
DOOR SW-RR	Rear door RH closed	OFF
	Rear door RH opened	ON
ENGINE RUN	Engine stopped	OFF
	Engine running	ON
FR FOG SW	Front fog lamp switch OFF	OFF
	Front fog lamp switch ON	ON
FR WASHER SW	Front washer switch OFF	OFF
	Front washer switch ON	ON
FR WIPER LOW	Front wiper switch OFF	OFF
	Front wiper switch LO	ON
FR WIPER HI	Front wiper switch OFF	OFF
	Front wiper switch HI	ON
FR WIPER INT	Front wiper switch OFF	OFF
	Front wiper switch INT	ON
FR WIPER STOP	Any position other than front wiper stop position	OFF
	Front wiper stop position	ON
HAZARD SW	When hazard switch is not pressed	OFF
	When hazard switch is pressed	ON
LIGHT SW 1ST	Lighting switch OFF	OFF
	Lighting switch 1st	ON
HEADLAMP SW1	Headlamp switch OFF	OFF
	Headlamp switch 1st	ON
HEADLAMP SW2	Headlamp switch OFF	OFF
	Headlamp switch 1st	ON
HI BEAM SW	High beam switch OFF	OFF
	High beam switch HI	ON

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BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

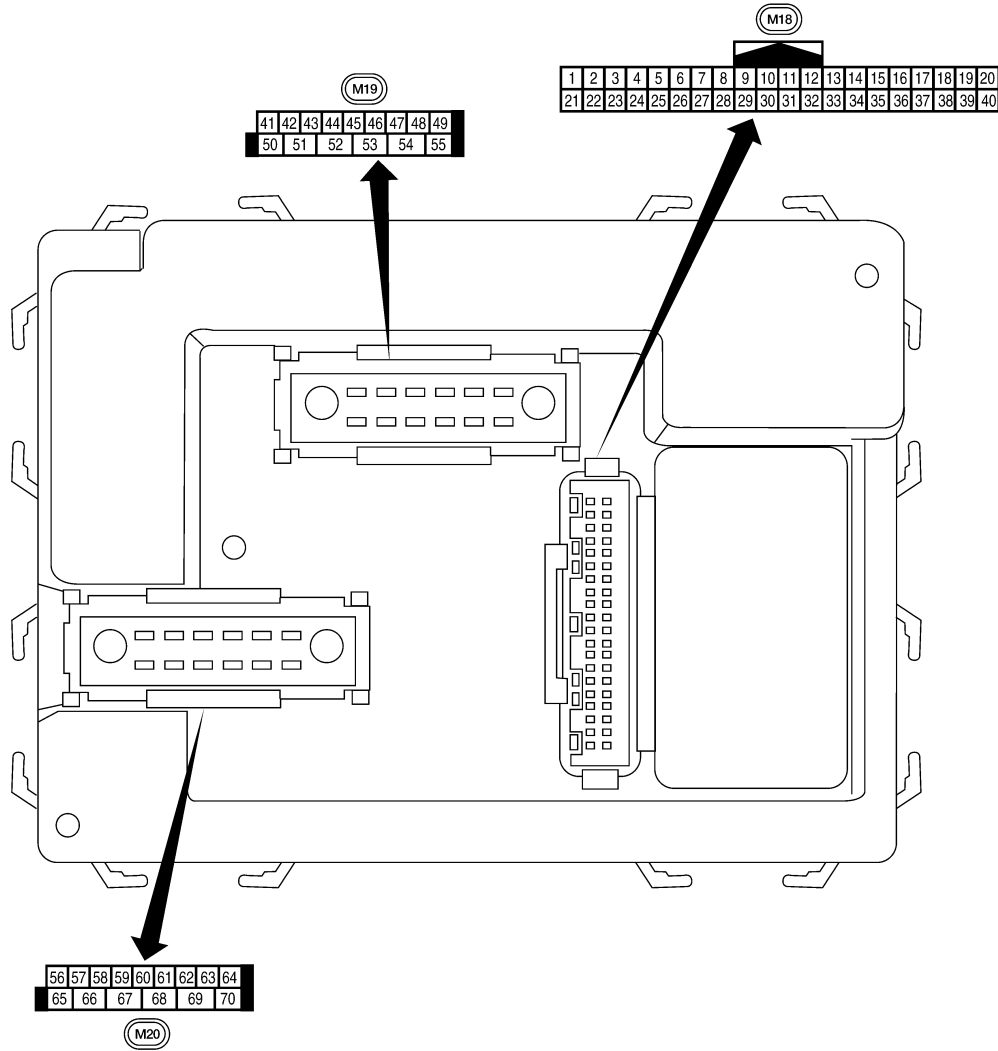
Monitor Item	Condition	Value/Status
H/L WASH SW	NOTE: The item is indicated, but not monitored	OFF
IGN ON SW	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
IGN SW CAN	Ignition switch OFF or ACC	OFF
	Ignition switch ON	ON
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7
KEY ON SW	Mechanical key is removed from key cylinder	OFF
	Mechanical key is inserted to key cylinder	ON
KEYLESS LOCK	LOCK button of key fob is not pressed	OFF
	LOCK button of key fob is pressed	ON
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	OFF
	UNLOCK button of key fob is pressed	ON
OIL PRESS SW	<ul style="list-style-type: none"> • Ignition switch OFF or ACC • Engine running 	OFF
	Ignition switch ON	ON
PASSING SW	Other than lighting switch PASS	OFF
	Lighting switch PASS	ON
RKE LOCK AND UN-LOCK	NOTE: The item is indicated, but not monitored	OFF
		ON
TAIL LAMP SW	Lighting switch OFF	OFF
	Lighting switch 1ST	ON
TURN SIGNAL L	Turn signal switch OFF	OFF
	Turn signal switch LH	ON
TURN SIGNAL R	Turn signal switch OFF	OFF
	Turn signal switch RH	ON
VEHICLE SPEED	While driving	Equivalent to speedometer reading

BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

Terminal Layout

INFOID:000000003297031



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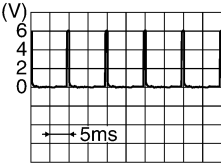

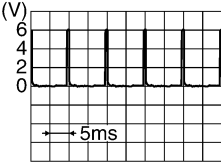
Physical Values

LIA2443E

INFOID:000000003297032

BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

Terminal	Wire color	Item	Signal input/output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
1	BR	Ignition keyhole illumination	Output	OFF	Door is locked (SW OFF)	Battery voltage
					Door is unlocked (SW ON)	0V
2	P	Combination switch input 5	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 <p style="text-align: right; font-size: small;">SKIA5291E</p>
3	SB	Combination switch input 4	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 <p style="text-align: right; font-size: small;">SKIA5292E</p>
4	V	Combination switch input 3	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 <p style="text-align: right; font-size: small;">SKIA5291E</p>
5	L	Combination switch input 2	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 <p style="text-align: right; font-size: small;">SKIA5292E</p>
6	R	Combination switch input 1				
7	GR	Front door lock assembly LH (key cylinder switch) unlock	Input	OFF	ON (open, 2nd turn)	Momentary 1.5V
8	SB	Front door lock assembly LH (key cylinder switch) lock			OFF (closed)	0V
			On (open)	Momentary 1.5V		
9	Y	Rear window defogger switch	Input	ON	Rear window defogger switch ON	0V
					Rear window defogger switch OFF	5V
11	G/B	Ignition switch (ACC or ON)	Input	ACC or ON	Ignition switch ACC or ON	Battery voltage
12	LG	Front door switch RH (All)	Input	OFF	ON (open)	0V
		Rear door switch upper RH (King Cab)			OFF (closed)	Battery voltage
		Rear door switch lower RH (King Cab)				

BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

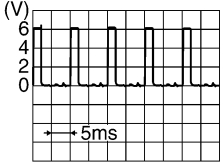
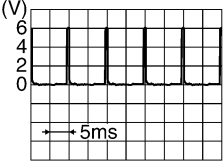
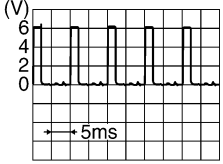
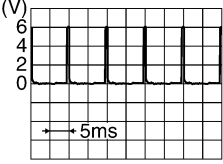
Terminal	Wire color	Item	Signal input/output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
13	L	Rear door switch RH (Crew Cab)	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
15	W	Tire pressure warning check connector	Input	OFF	—	5V
18	BR	Remote keyless entry receiver (Ground)	Output	OFF	—	0V
19	V	Remote keyless entry receiver (power supply)	Output	OFF	Ignition switch OFF	
20	G	Remote keyless entry receiver signal (Signal)	Input	OFF	Stand-by (keyfob buttons released)	
					When remote keyless entry receiver receives signal from keyfob (keyfob buttons pressed)	
21	GR	NATS antenna amp.	Input	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move.
23	G	Security indicator lamp	Output	OFF	Goes OFF → illuminates (Every 2.4 seconds)	Battery voltage → 0V
25	BR	NATS antenna amp.	Input	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move.
27	W	Compressor ON signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
28	R	Front blower monitor	Input	ON	Front blower motor OFF	Battery voltage
					Front blower motor ON	0V
29	G	Hazard switch	Input	OFF	ON	0V
					OFF	5V
31	GR	Cargo lamp switch	Input	OFF	ON	0V
					OFF	Battery voltage

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BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

Terminal	Wire color	Item	Signal input/output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
32	O	Combination switch output 5	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 <p style="text-align: right; font-size: small;">SKIA5291E</p>
33	GR	Combination switch output 4	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 <p style="text-align: right; font-size: small;">SKIA5292E</p>
34	G	Combination switch output 3	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 <p style="text-align: right; font-size: small;">SKIA5291E</p>
35	BR	Combination switch output 2	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 <p style="text-align: right; font-size: small;">SKIA5292E</p>
36	LG	Combination switch output 1				
37	B	Key switch	Input	OFF	Key inserted	Battery voltage
					Key removed	0V
38	W/R	Ignition switch (ON)	Input	ON	—	Battery voltage
39	L	CAN-H	—	—	—	—
40	P	CAN-L	—	—	—	—
45	V	Lock switch	Input	OFF	ON (lock)	0V
					OFF	Battery voltage
46	LG	Unlock switch	Input	OFF	ON (unlock)	0V
					OFF	Battery voltage
47	GR	Front door switch LH (All)	Input	OFF	ON (open)	0V
		Rear door switch upper LH (King Cab)			OFF (closed)	Battery voltage
		Rear door switch lower LH (King Cab)				
48	P	Rear door switch LH (Crew Cab)	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
50	P	Cargo lamp	Output	OFF	Any door open (ON)	0V
					All doors closed (OFF)	Battery voltage

BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

Terminal	Wire color	Item	Signal input/output	Measuring condition		Reference value or waveform (Approx.)	
				Ignition switch	Operation or condition		
51	G	Trailer turn signal (right)	Output	ON	Turn right ON	<p style="text-align: right; font-size: small;">SKIA3009J</p>	
52	V	Trailer turn signal (left)	Output	ON	Turn left ON	<p style="text-align: right; font-size: small;">SKIA3009J</p>	
56	V	Battery saver output	Output	OFF	30 minutes after ignition switch is turned OFF	0V	
				ON	—	Battery voltage	
57	R/Y	Battery power supply	Input	—	—	Battery voltage	
58	W	Optical sensor	Input	ON	When optical sensor is illuminated	3.1V or more	
					When optical sensor is not illuminated	0.6V or less	
59	GR	Front door lock assembly LH (unlock)	Output	OFF	OFF (neutral)	0V	
					ON (unlock)	Battery voltage	
60	LG	Turn signal (left)	Output	ON	Turn left ON	<p style="text-align: right; font-size: small;">SKIA3009J</p>	
61	G	Turn signal (right)	Output	ON	Turn right ON	<p style="text-align: right; font-size: small;">SKIA3009J</p>	
63	BR	Interior room/map lamp	Output	OFF	Any door switch	ON (open)	0V
						OFF (closed)	Battery voltage
65	V	All door lock actuators (lock)	Output	OFF	OFF (neutral)	0V	
					ON (lock)	Battery voltage	
66	L	Front door lock actuator RH, rear door lock actuators LH/RH (unlock)	Output	OFF	OFF (neutral)	0V	
					ON (unlock)	Battery voltage	
67	B	Ground	Input	ON	—	0V	

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BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

Terminal	Wire color	Item	Signal input/output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
68	O	Power window power supply (RAP)	Output	—	Ignition switch ON	Battery voltage
					Within 45 seconds after ignition switch OFF	Battery voltage
					More than 45 seconds after ignition switch OFF	0V
					When front door LH or RH is open or power window timer operates	0V
69	P	Power window power supply (BAT)	Output	OFF	—	Battery voltage
70	W	Battery power supply	Input	OFF	—	Battery voltage

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

< ECU DIAGNOSIS >

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

Reference Value

INFOID:000000003297033

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
H L 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	NOTE: This item is displayed, but cannot be monitored.		OFF
HOOD SW	NOTE: This item is displayed, but cannot be monitored.		OFF

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

< ECU DIAGNOSIS >

Monitor Item	Condition	Value/Status
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 keyfob or Intelligent Key (if equipped) (horn chirp mode)	ON

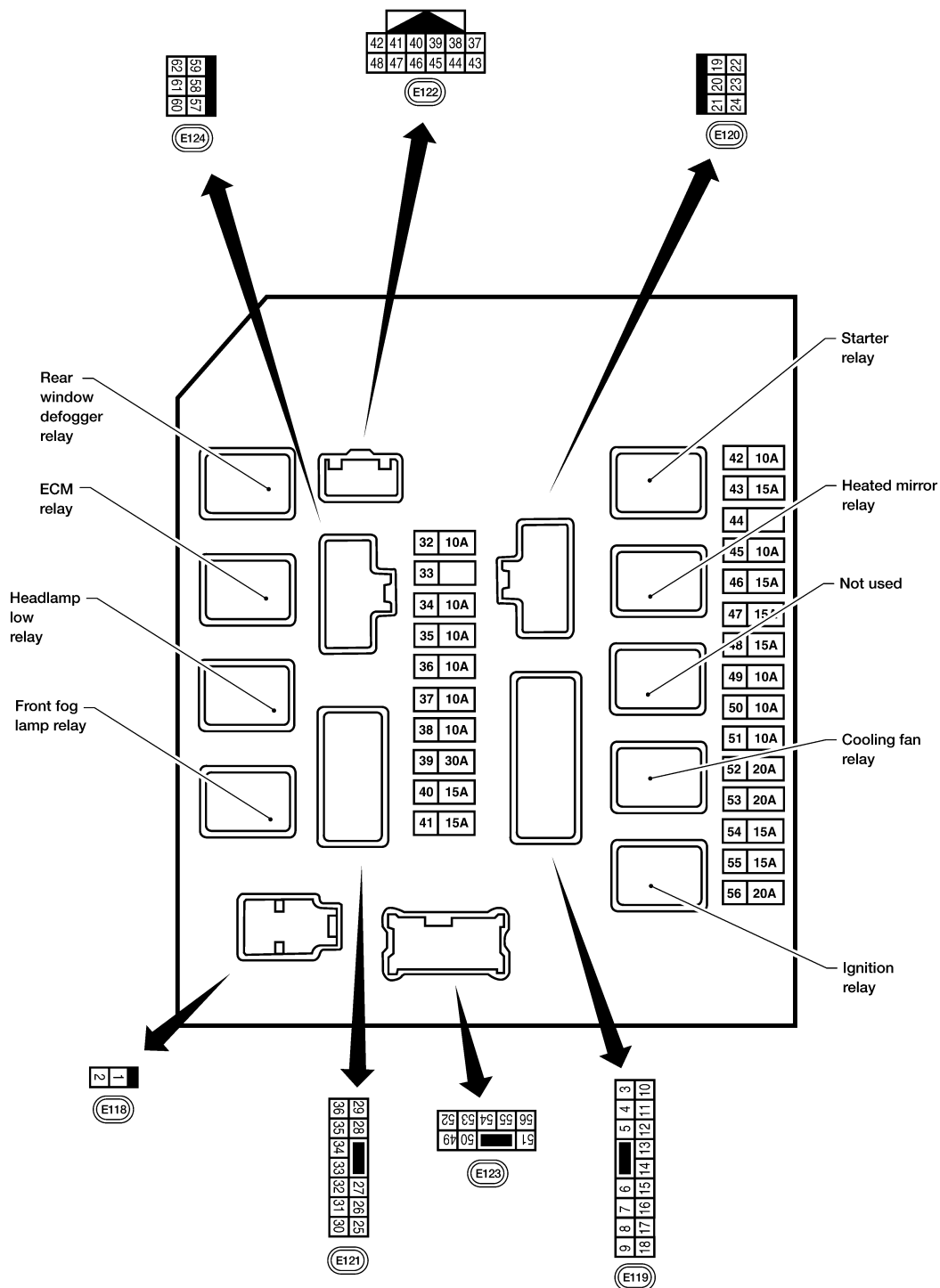
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

< ECU DIAGNOSIS >

Terminal Layout

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TERMINAL LAYOUT



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Physical Values

PHYSICAL VALUES

WKIA5852E

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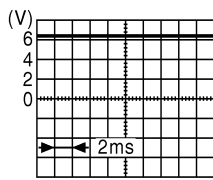
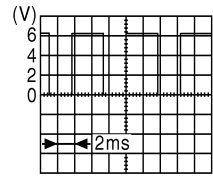
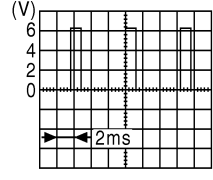
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

< ECU DIAGNOSIS >

Terminal	Wire color	Signal name	Signal input/output	Measuring condition		Reference value (Approx.)
				Ignition switch	Operation or condition	
1	W	Battery power supply	Input	OFF	—	Battery voltage
2	R	Battery power supply	Input	OFF	—	Battery voltage
3	G	ECM relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
4	P	ECM relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
6	V	Throttle control motor relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
7	BR	ECM relay control	Input	—	Ignition switch ON or START	0V
					Ignition switch OFF or ACC	Battery voltage
8	W/R	Fuse 54	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
10	R/B	Fuse 45	Output	ON	Daytime light system active	0V
					Daytime light system inactive	Battery voltage
11	Y	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	W/G	Ignition switch supplied power	Input	—	OFF or ACC	0V
					ON or START	Battery voltage
13	R	Fuel pump relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
14	W/G	Fuse 49	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
15	W/R	Fuse 50 (VDC)	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
15	W/R	Fuse 50 (ABS)	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
16	W/G	Fuse 51	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
17	W/G	Fuse 55	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
19	W	Starter motor	Output	START	—	Battery voltage
20	BR	Cooling fan motor (low)	Output	ON or START	—	Battery voltage
21	GR	Ignition switch supplied power	Input	—	OFF or ACC	0V
					START	Battery voltage
22	G	Battery power supply	Output	OFF	—	Battery voltage
23	LG	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 >

Terminal	Wire color	Signal name	Signal input/output	Measuring condition		Reference value (Approx.)
				Ignition switch	Operation or condition	
24	P	Cooling fan motor (high)	Output	—	Conditions correct for cooling fan operation	Battery voltage
					Conditions not correct for cooling fan operation	0V
27	W	Fuse 38	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
28	R	LH front parking and front side marker lamp	Output	OFF	Lighting switch 1st position OFF	0V
					Lighting switch 1st position ON	Battery voltage
29	G	Trailer tow relay	Output	ON	Lighting switch 1st position OFF	0V
					Lighting switch 1st position ON	Battery voltage
30	R/B	Fuse 53	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
32	GR	Wiper low speed signal	Output	ON or START	Wiper switch OFF	Battery voltage
					Wiper switch LO or INT	0V
35	L	Wiper high speed signal	Output	ON or START	Wiper switch OFF, LO, INT	Battery voltage
					Wiper switch HI	0V
37	Y	Power generation command signal	Output	—	Ignition switch ON	 <p style="text-align: right; margin-right: 20px;">JPMIA0001GB</p> <p style="text-align: center;">6.3 V</p>
					40% is set on "Active test," "ALTERNATOR DUTY" of "ENGINE"	 <p style="text-align: right; margin-right: 20px;">JPMIA0002GB</p> <p style="text-align: center;">3.8 V</p>
					40% is set on "Active test," "ALTERNATOR DUTY" of "ENGINE"	 <p style="text-align: right; margin-right: 20px;">JPMIA0003GB</p> <p style="text-align: center;">1.4 V</p>
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

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

< ECU DIAGNOSIS >

Terminal	Wire color	Signal name	Signal input/output	Measuring condition			Reference value (Approx.)
				Ignition switch	Operation or condition		
43	G	Wiper auto stop signal	Input		ON or START	Wiper switch	OFF, LO, INT
44	R	Daytime light relay control	Input	ON	Daytime light system active		0V
					Daytime light system inactive		Battery voltage
45	LG	Horn relay control	Input	ON	When door locks are operated using keyfob or Intelligent Key (if equipped) (OFF → ON)*		Battery voltage → 0V
46	V	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	R	Starter relay (inhibit switch)	Input	ON or START	Selector lever in "P" or "N"		0V
					Selector lever any other position		Battery voltage
49	GR	Front RH parking and front side marker lamp	Output	OFF	Lighting switch 1st position	OFF	0V
						ON	Battery voltage
50	W	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	V	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	P	LH low beam headlamp	Output	—	Lighting switch in 2nd position		Battery voltage
54	R	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	RH high beam headlamp	Output	—	Lighting switch in 2nd position and placed in HIGH or PASS position		Battery voltage
57	GR	Parking, license, and tail lamp	Output	ON	Lighting switch 1st position	OFF	0V
						ON	Battery voltage
59	B	Ground	Input	—	—		0V
60	GR	Rear window defogger relay	Output	ON or START	Rear defogger switch ON		Battery voltage
					Rear defogger switch OFF		0V
61	R/B	Fuse 32	Output	OFF	—		Battery voltage

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

< ECU DIAGNOSIS >

*: When horn reminder is ON

Fail Safe

INFOID:000000003297036

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	<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.

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

< ECU DIAGNOSIS >

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.

WIPER AND WASHER SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

WIPER AND WASHER SYSTEM SYMPTOMS

Symptom Table

INFOID:000000003292755

CAUTION:

Perform the self-diagnosis with CONSULT-III before performing the diagnosis by symptom. Perform the diagnosis by DTC if DTC is detected.

Symptom	Probable malfunction location	Inspection item	
Front wiper does not operate.	HI only	<ul style="list-style-type: none"> Combination switch Harness between combination switch and BCM BCM 	Combination switch Refer to BCS-48, "Symptom Table" .
		<ul style="list-style-type: none"> IPDM E/R Harness between IPDM E/R and front wiper motor Front wiper motor 	Front wiper motor (HI) circuit Refer to WW-14, "Component Function Check" .
		Front wiper request signal <ul style="list-style-type: none"> BCM IPDM E/R 	IPDM E/R DATA MONITOR "FR WIP REQ"
	LO and INT	<ul style="list-style-type: none"> Combination switch Harness between combination switch and BCM BCM 	Combination switch Refer to BCS-48, "Symptom Table" .
		<ul style="list-style-type: none"> IPDM E/R Harness between IPDM E/R and front wiper motor Front wiper motor 	Front wiper motor (LO) circuit Refer to WW-12, "Component Function Check" .
		Front wiper request signal <ul style="list-style-type: none"> BCM IPDM E/R 	IPDM E/R DATA MONITOR "FR WIP REQ"
	INT only	<ul style="list-style-type: none"> Combination switch Harness between combination switch and BCM BCM 	Combination switch Refer to BCS-48, "Symptom Table" .
		Front wiper request signal <ul style="list-style-type: none"> BCM IPDM E/R 	IPDM E/R DATA MONITOR "FR WIP REQ"
	HI, LO, and INT	SYMPTOM DIAGNOSIS "FRONT WIPER DOES NOT OPERATE" Refer to WW-44, "Diagnosis Procedure" .	

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WIPER AND WASHER SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

Symptom		Probable malfunction location	Inspection item
Front wiper does not stop.	HI only	<ul style="list-style-type: none"> Combination switch BCM 	Combination switch Refer to BCS-48. "Symptom Table" .
		Front wiper request signal <ul style="list-style-type: none"> BCM IPDM E/R 	IPDM E/R DATA MONITOR "FR WIP REQ"
		IPDM E/R	—
	LO only	<ul style="list-style-type: none"> Combination switch BCM 	Combination switch Refer to BCS-48. "Symptom Table" .
		Front wiper request signal <ul style="list-style-type: none"> BCM IPDM E/R 	IPDM E/R DATA MONITOR "FR WIP REQ"
		IPDM E/R	—
	INT only	<ul style="list-style-type: none"> Combination switch BCM 	Combination switch Refer to BCS-48. "Symptom Table" .
		Front wiper request signal <ul style="list-style-type: none"> BCM IPDM E/R 	IPDM E/R DATA MONITOR "FR WIP REQ"
	Front wiper does not operate normally.	Intermittent adjustment cannot be performed.	<ul style="list-style-type: none"> Combination switch Harness between combination switch and BCM BCM
BCM			—
Intermittent control linked with vehicle speed cannot be performed.		Check the vehicle speed detection wiper setting. Refer to WW-8. "WIPER : CONSULT-III Function (BCM - WIPER)" .	
Wiper is not linked to the washer operation.		<ul style="list-style-type: none"> Combination switch Harness between combination switch and BCM BCM 	Combination switch Refer to BCS-48. "Symptom Table" .
		BCM	—
Does not return to stop position (Repeatedly operates for 10 seconds and then stops for 20 seconds. After that, it stops the operation).	<ul style="list-style-type: none"> IPDM E/R Harness between IPDM E/R and front wiper motor Front wiper motor 	Front wiper auto stop signal circuit Refer to WW-16. "Component Function Check" .	

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

INFOID:000000003292756

FRONT WIPER MOTOR PROTECTION FUNCTION

- IPDM E/R may stop the front wiper to protect the front wiper motor if any obstruction (operation resistance) such as a large amount of snow is detected during the front wiper operation.
- At that time turn OFF the front wiper and remove the foreign object. Then wait for approximately 20 seconds or more and reactivate the front wiper. The wiper will operate normally.

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FRONT WIPER DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

FRONT WIPER DOES NOT OPERATE

Description

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The front wiper does not operate under any operation conditions.

Diagnosis Procedure

INFOID:000000003292758

1. CHECK WIPER RELAY OPERATION

⊗ IPDM E/R AUTO ACTIVE TEST

1. Start IPDM E/R auto active test. Refer to [PCS-13, "Diagnosis Description"](#).
2. Check that the front wiper operates at the LO/HI operation.

Ⓟ CONSULT-III ACTIVE TEST

1. Select "FRONT WIPER" of IPDM E/R active test item.
2. While operating the test item, check front wiper operation.

LO : Front wiper LO operation

HI : Front wiper HI operation

OFF : Stop the front wiper.

Is front wiper operation normal?

YES >> GO TO 5

NO >> GO TO 2

2. CHECK FRONT WIPER MOTOR FUSE

1. Turn the ignition switch OFF.
2. Check that the following fuse is not blown.

Unit	Location	Fuse No.	Capacity
Front wiper motor	IPDM E/R	39	30 A

Is the fuse blown?

YES >> Replace the fuse after repairing the applicable circuit.

NO >> GO TO 3

3. CHECK FRONT WIPER MOTOR GROUND OPEN CIRCUIT

1. Disconnect front wiper motor.
2. Check continuity between front wiper motor harness connector and ground.

Front wiper motor		Ground	Continuity
Connector	Terminal		
E23	2		Yes

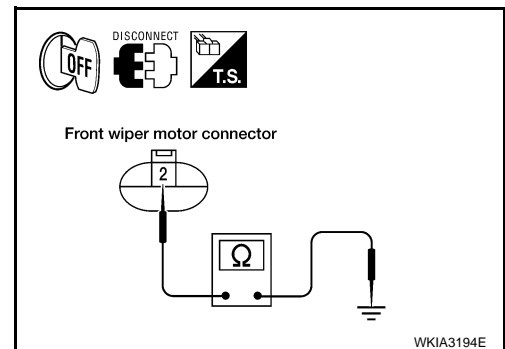
Does continuity exist?

YES >> GO TO 4

NO >> Repair or replace harness.

4. CHECK FRONT WIPER MOTOR OUTPUT VOLTAGE

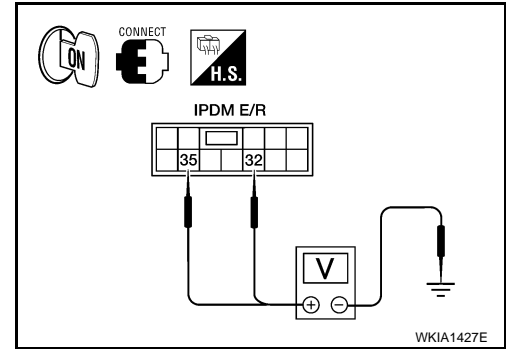
Ⓟ CONSULT-III ACTIVE TEST



FRONT WIPER DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

1. Turn the ignition switch ON.
2. Select "FRONT WIPER" of IPDM E/R active test item.
3. With operating the test item, check voltage between IPDM E/R harness connector and ground.



Terminals		Test item	Voltage (Approx.)
(+)	(-)		
IPDM E/R		FRONT WIPER	Battery voltage
Connector	Terminal		
E121	32	LO	Battery voltage
		OFF	0 V
	35	HI	Battery voltage
		OFF	0 V

Is the measurement value normal?

- YES >> Replace front wiper motor. Refer to [WW-47, "Removal and Installation"](#).
 NO >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation of IPDM E/R"](#).

5. CHECK FRONT WIPER REQUEST SIGNAL INPUT

CONSULT-III DATA MONITOR

1. Select "FR WIP REQ" of IPDM E/R data monitor item.
2. Switch the front wiper switch to HI and LO.
3. With operating the front wiper switch, check the status of "FR WIP REQ".

Monitor item	Condition		Monitor status
FR WIP REQ	Front wiper switch HI	HI	ON
		STOP	OFF
	Front wiper switch LO	1LOW	ON
		STOP	OFF

Is the status of item normal?

- YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation of IPDM E/R"](#).
 NO >> GO TO 6

6. CHECK COMBINATION SWITCH

1. Perform the inspection of the combination switch. Refer to [BCS-48, "Symptom Table"](#).

Is combination switch normal?

- YES >> Replace BCM. Refer to [BCS-49, "Removal and Installation"](#).
 NO >> Repair or replace the applicable parts.

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PRECAUTION

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PRECAUTION

PRECAUTION

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

INFOID:000000003303161

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.**

FRONT WIPER AND WASHER SYSTEM

< ON-VEHICLE REPAIR >

ON-VEHICLE REPAIR

FRONT WIPER AND WASHER SYSTEM

Removal and Installation

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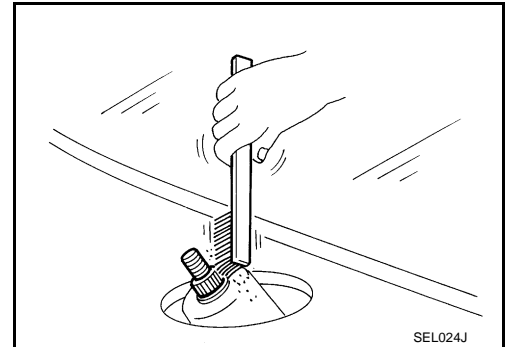
FRONT WIPER ARMS

Removal

1. Remove wiper arm covers and wiper arm nuts.
2. Remove front RH wiper arm and front LH wiper arm.
3. Remove front RH blade assembly and front LH blade assembly.

Installation

1. Operate wiper motor one full cycle, then turn "OFF" (Auto Stop).
2. Clean up the pivot area as shown. This will reduce possibility of wiper arm looseness.



3. Install front RH blade assembly and front LH blade assembly.
4. Install front RH wiper arm and front LH wiper arm.
5. Ensure that wiper blades stop within proper clearance. Refer to "FRONT WIPER ARM ADJUSTMENT" .
6. Tighten wiper arm nuts to specified torque, and install wiper arm covers.

Front wiper arm nuts : 23.6 N-m (2.4 kg-m, 17 ft-lb)

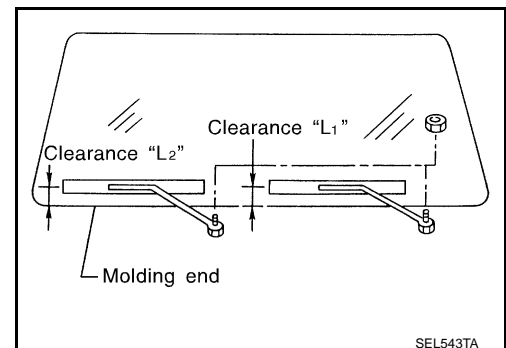
FRONT WIPER ARM ADJUSTMENT

1. Operate windshield washer and wiper motor one full cycle, then turn "OFF" (Auto Stop).
2. Lift the wiper blade up and then rest it onto glass surface, check the blade clearance "L1" and "L2".

Clearance "L1" : 24.5 - 39.5 mm (0.965 - 1.555 in)

Clearance "L2" : 23.5 - 38.5 mm (0.925 - 1.516 in)

3. Remove wiper arm covers and wiper arm nuts.
4. Adjust front wiper arms on wiper motor pivot shafts to obtain above specified blade clearances.
5. Tighten wiper arm nuts to specified torque, and install wiper arm covers.



Front wiper arm nuts : 23.6 N-m (2.4 kg-m, 17 ft-lb)

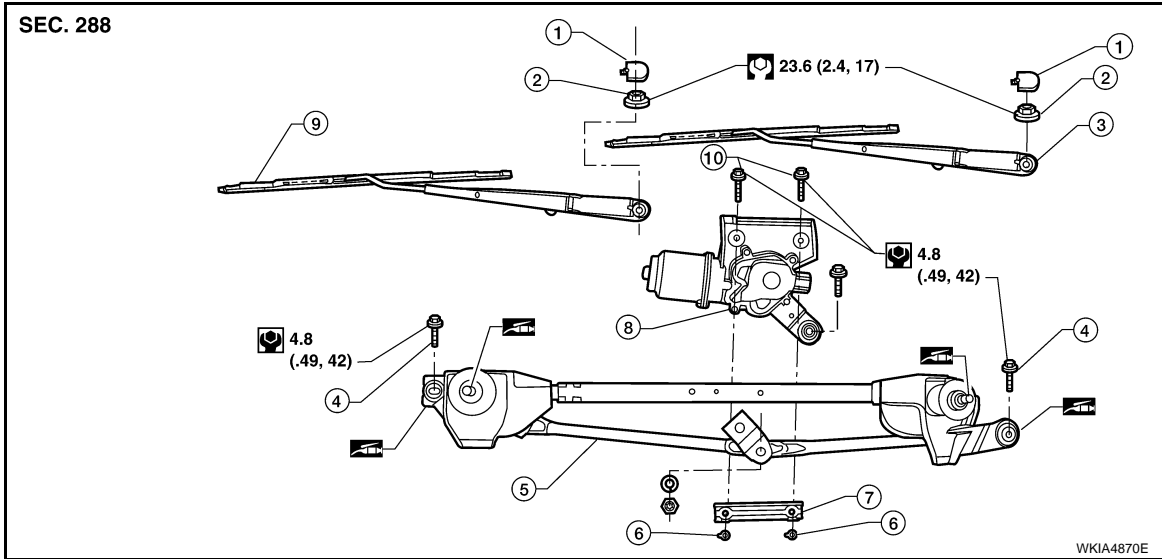
WIPER MOTOR AND LINKAGE

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FRONT WIPER AND WASHER SYSTEM

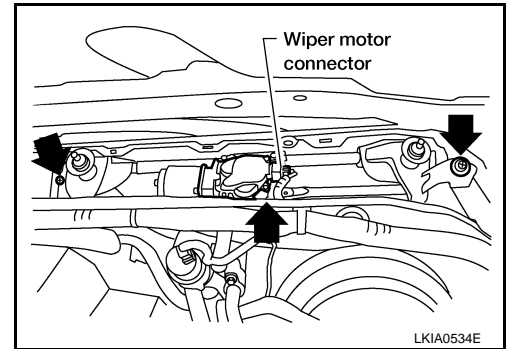
< ON-VEHICLE REPAIR >



- | | | |
|--------------------------------|-------------------------|------------------------------------------|
| 1. Wiper arm covers | 2. Wiper arm nuts | 3. Front LH wiper arm and blade assembly |
| 4. Wiper frame bolts | 5. Wiper frame assembly | 6. Wiper motor to frame nuts |
| 7. Wiper motor spacer | 8. Wiper motor | 9. Front RH wiper arm and blade assembly |
| 10. Wiper motor to frame bolts | | |

Removal

1. Remove the cowl top. Refer to [EXT-19, "Removal and Installation"](#).
2. Remove wiper frame bolts, and remove wiper frame assembly.



3. Remove wiper motor from wiper frame assembly.

Installation

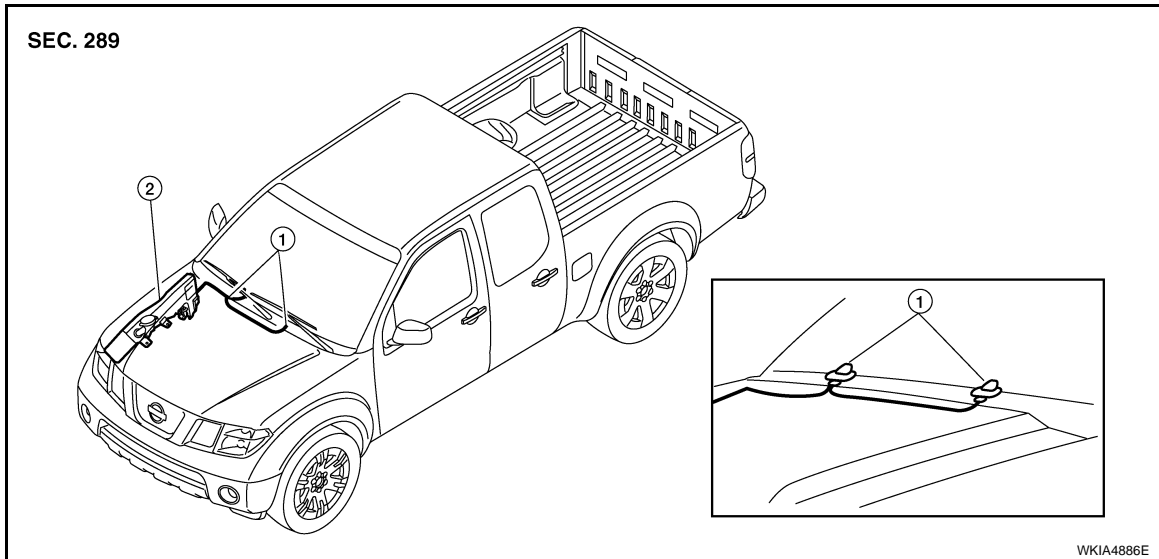
CAUTION:

- Do not drop the wiper motor or cause it to contact other parts.
 - Check the grease conditions of the motor arm and wiper link joint(s). Apply grease if necessary.
1. Connect wiper motor to connector. Turn the wiper switch ON to operate wiper motor, then turn the wiper switch OFF (auto stop).
 2. Disconnect wiper motor electrical connector.
 3. Install wiper motor to wiper frame assembly, and install wiper frame assembly.
 4. Connect wiper motor electrical connector.
 5. Install cowl top. Refer to [EXT-19, "Removal and Installation"](#).
 6. Ensure that wiper blades stop within proper clearance. Refer to "FRONT WIPER ARM ADJUSTMENT".

Washer Hose Layout

FRONT WIPER AND WASHER SYSTEM

< ON-VEHICLE REPAIR >



1. Washer nozzles
2. Washer nozzles
3. Washer fluid reservoir

WASHER NOZZLES

Removal

1. Remove the cowl top. Refer to [EXT-19, "Removal and Installation"](#).
2. Remove washer nozzles.

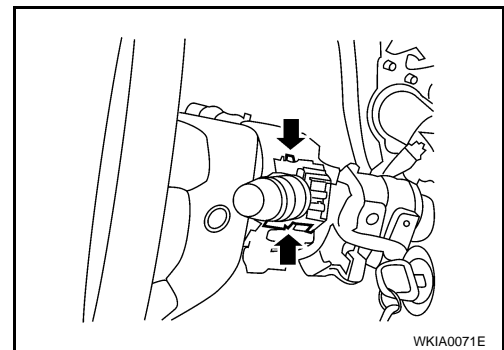
Installation

Installation is in the reverse order of removal.

WIPER AND WASHER SWITCH

Removal

1. Remove instrument lower cover LH. Refer to [IP-10, "Exploded View"](#).
2. Remove column cover lower and column cover upper.
3. Disconnect wiper washer switch connector.
4. Pinch tabs at wiper and washer switch base and slide switch away from steering column.



Installation

Installation is in the reverse order of removal.

WASHER FLUID RESERVOIR

Removal

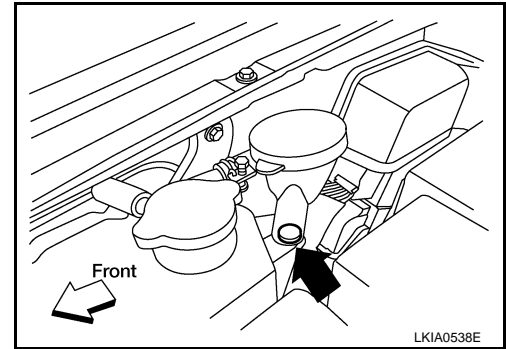
1. Remove passenger front fender protector. Refer to [EXT-22, "Removal and Installation of Front Fender Protector"](#).

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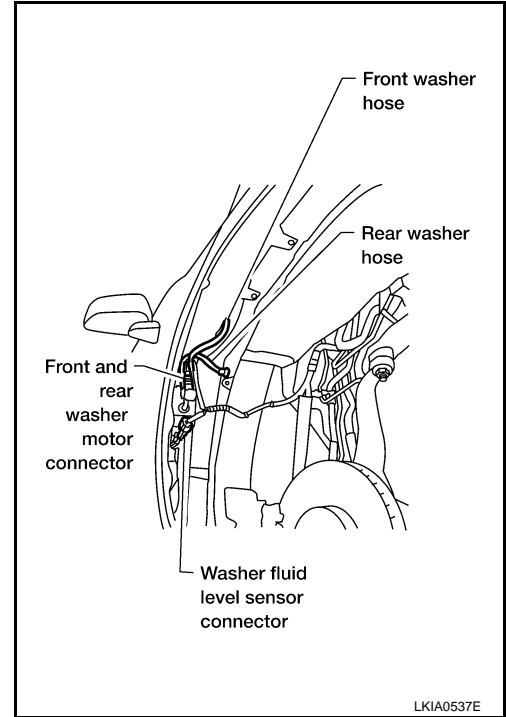
FRONT WIPER AND WASHER SYSTEM

< ON-VEHICLE REPAIR >

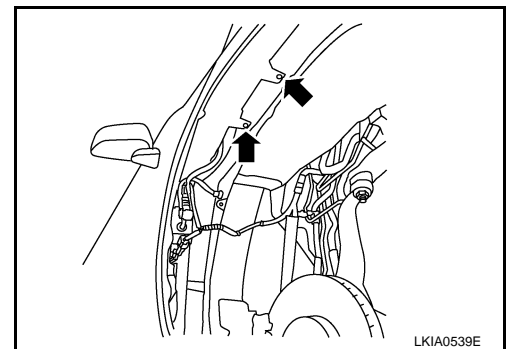
2. Remove clip, then remove washer fluid reservoir filler neck from washer fluid reservoir.



3. Disconnect washer hose.
4. Disconnect washer motor connector.
5. Disconnect washer fluid level sensor connector.



6. Remove washer fluid reservoir screws and remove washer fluid reservoir.



Installation

CAUTION:

After installation, add water up to the upper level of the washer fluid reservoir inlet and check for water leaks.

Installation is in the reverse order of removal.

WASHER MOTOR

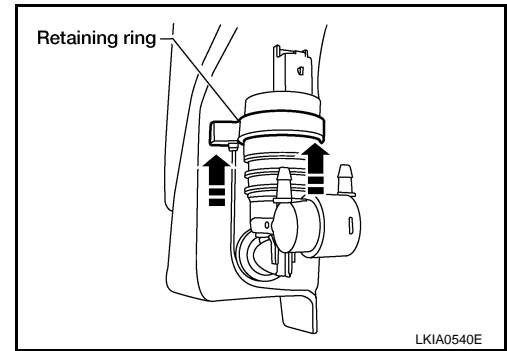
Removal

1. Remove RH front fender protector. Refer to [EXT-22. "Removal and Installation of Front Fender Protector"](#).
2. Disconnect the front and rear washer hoses.
3. Disconnect the washer motor connectors.

FRONT WIPER AND WASHER SYSTEM

< ON-VEHICLE REPAIR >

- Slide retaining ring upward to release front and rear washer motor.



- Remove front and rear washer motor from washer fluid reservoir.

Installation

CAUTION:

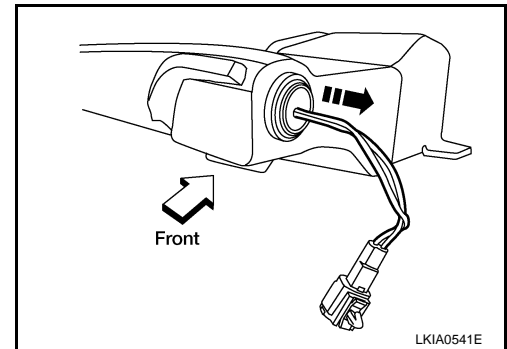
When installing washer motor, there should be no packing twists, etc.

Installation is in the reverse order of removal.

WASHER FLUID LEVEL SENSOR

Removal

- Remove washer fluid reservoir. Refer to "WASHER FLUID RESERVOIR".
- Lift level sensor out of washer fluid reservoir in the direction of the arrow as shown.



Installation

Installation is in the reverse order of removal.

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FRONT WASHER NOZZLE

< ON-VEHICLE REPAIR >

FRONT WASHER NOZZLE

Washer Nozzle Adjustment

INFOID:000000003303180

- This vehicle is equipped with adjustable washer nozzles which may be aimed with a needle pin or suitable tool as shown.
- If not satisfied with washer fluid spray coverage, confirm that the washer nozzle is installed correctly.

