

SECTION **WW**
WIPER & WASHER

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DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000003789931

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-53, "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-38, "Intermittent Incident"](#).

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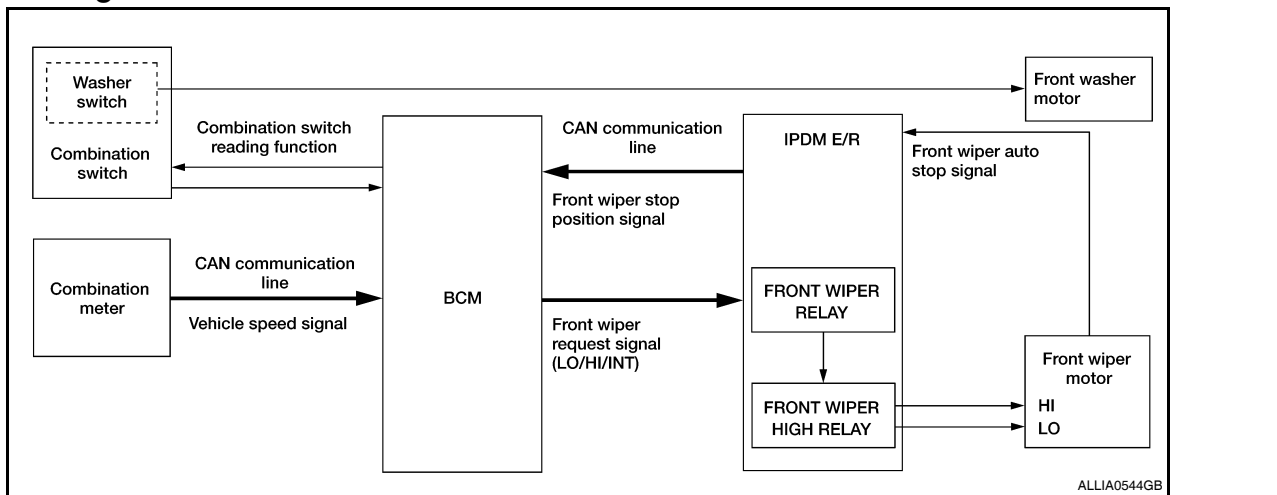
FRONT WIPER AND WASHER SYSTEM

< FUNCTION DIAGNOSIS >

FUNCTION DIAGNOSIS

FRONT WIPER AND WASHER SYSTEM

System Diagram



System Description

INFOID:000000003789933

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

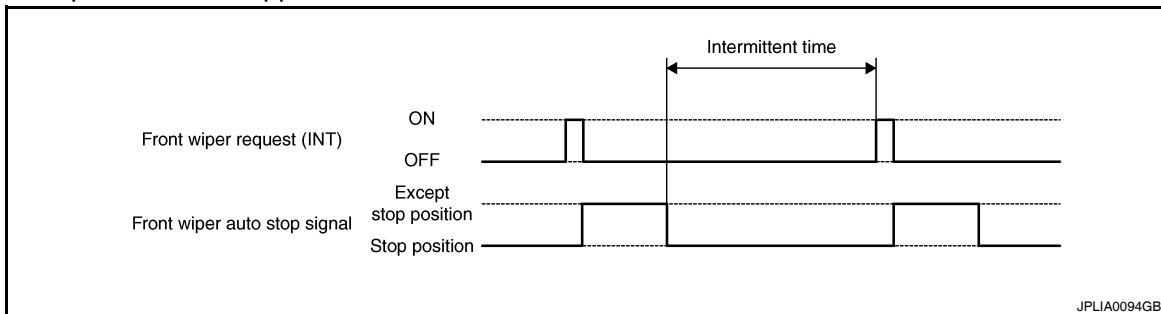
- Ignition switch ON
- Front wiper switch INT

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.



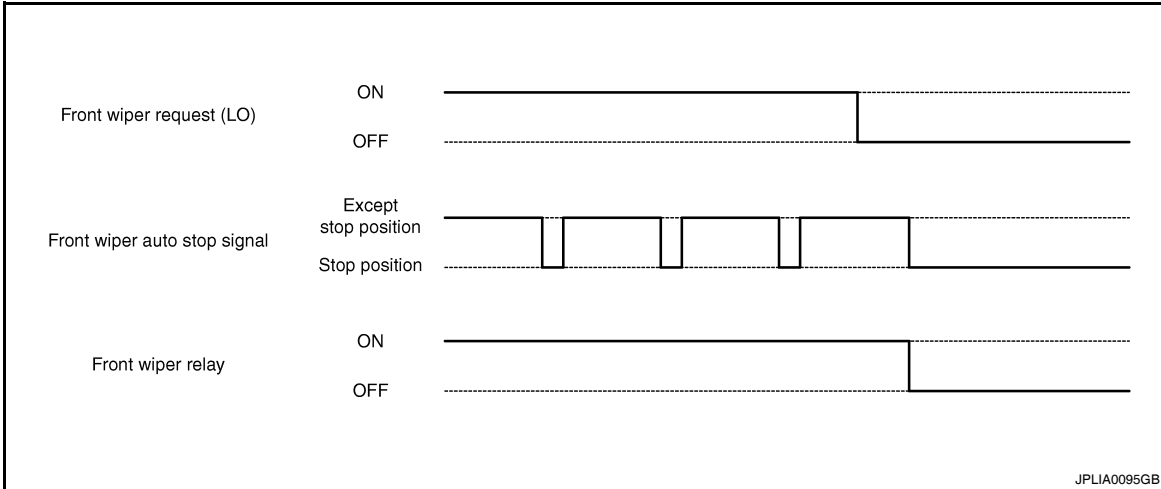
FRONT WIPER AUTO STOP OPERATION

- 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 operates 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

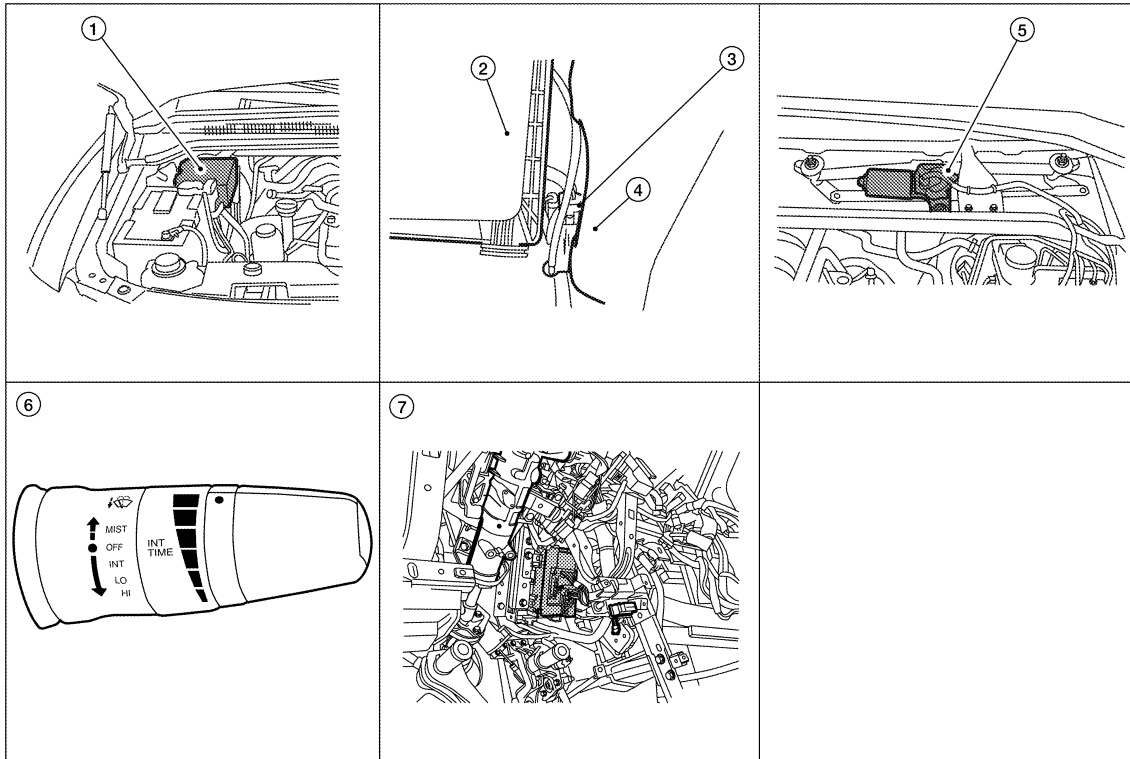
- IPDM E/R performs the fail-safe function when the front wiper auto stop circuit is malfunctioning. Refer to [PCS-26. "Fail Safe"](#).

FRONT WIPER AND WASHER SYSTEM

< FUNCTION DIAGNOSIS >

Component Parts Location

INFOID:000000003789934



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1. IPDM E/R E121, E122, E124
2. Air cleaner case
3. Front washer motor E105
4. Washer fluid reservoir
5. Front wiper motor E23
6. Combination switch M28
7. BCM M18, M20 (view with instrument panel removed)

Component Description

INFOID:000000003789935

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:000000004134078

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-49. "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	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
RAP (retained accessory power)	RETAINED PWR	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
TPMS (tire pressure monitoring system)	AIR PRESSURE MONITOR	×	×	×
Vehicle security system	PANIC ALARM			×

WIPER

WIPER : CONSULT-III Function (BCM - WIPER)

INFOID:000000004134079

WORK SUPPORT

DIAGNOSIS SYSTEM (BCM)

< FUNCTION DIAGNOSIS >

Work 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 [ON/OFF]	Ignition switch ON status judged from ignition power supply
FR WIPER HI [ON/OFF]	Each switch status that BCM judges from the combination switch reading function
FR WIPER LOW [ON/OFF]	
FR WIPER INT [ON/OFF]	
FR WASHER SW [ON/OFF]	
INT VOLUME [1 - 7]	Each switch status that BCM judges from the combination switch reading function
FR WIPER STOP [ON/OFF]	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.
RISE UP WIPER TEST	ON	Outputs the voltage to operate the rear wiper motor.
	OFF	Stops the voltage to stop.

DIAGNOSIS SYSTEM (IPDM E/R)

< FUNCTION DIAGNOSIS >

DIAGNOSIS SYSTEM (IPDM E/R)

Diagnosis Description

INFOID:000000004244457

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:

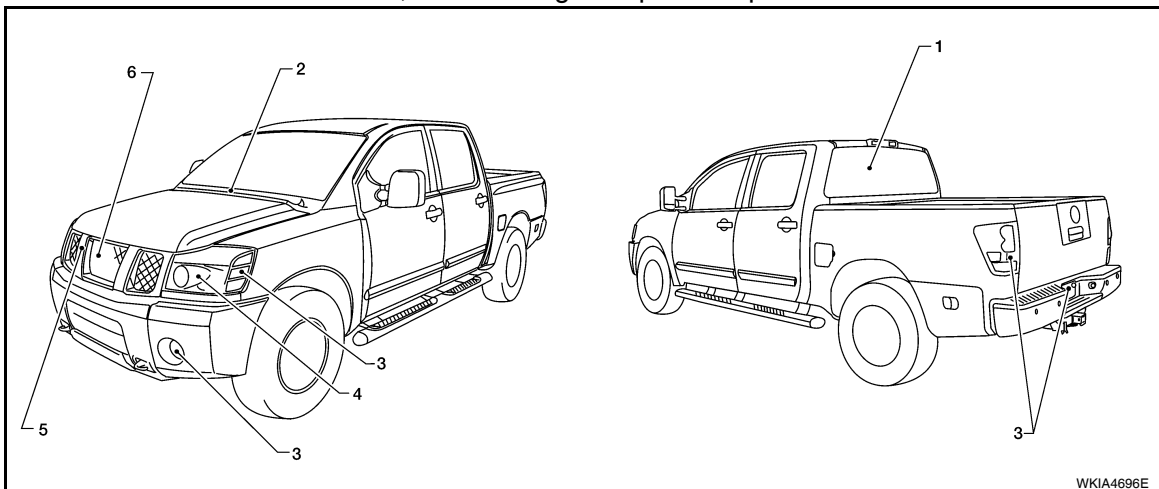
When auto active test mode has to be cancelled halfway through test, turn ignition switch OFF.

CAUTION:

- If auto active test mode cannot be actuated, check door switch system. Refer to [DLK-26, "KING CAB : Description"](#) (King Cab) or [DLK-27, "CREW CAB : Description"](#) (Crew Cab).
- Do not start the engine.

Inspection in Auto Active Test Mode

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



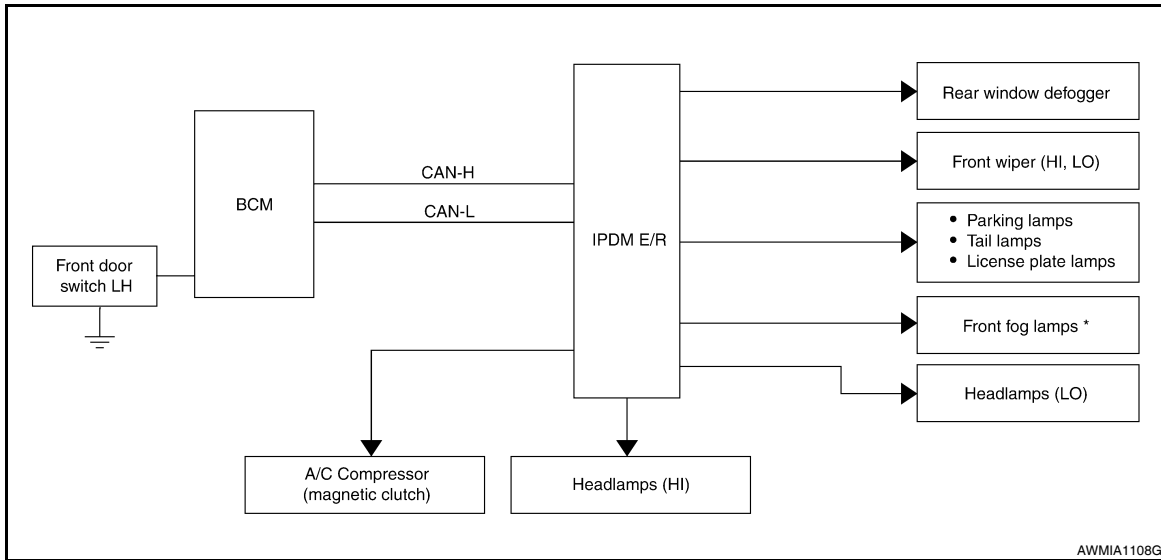
Operation sequence	Inspection Location	Operation
1	Rear window defogger (Crew Cab only)	10 seconds
2	Front wipers	LO for 5 seconds → HI for 5 seconds

DIAGNOSIS SYSTEM (IPDM E/R)

< FUNCTION DIAGNOSIS >

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

Concept of auto active test



*: If equipped

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

Diagnosis chart in auto active test mode

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

DIAGNOSIS SYSTEM (IPDM E/R)

< FUNCTION DIAGNOSIS >

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)

CONSULT - III Function (IPDM E/R)

INFOID:000000004244458

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-27, "DTC Index"](#).

DATA MONITOR

Monitor item

Monitor Item [Unit]	MAIN SIGNALS	Description
A/C COMP REQ [OFF/ON]	×	Displays the status of the A/C request signal.
TAIL&CLR REQ [OFF/ON]	×	Displays the status of the position light request signal received from BCM via CAN communication.
HL LO REQ [OFF/ON]	×	Displays the status of the low beam request signal received from BCM via CAN communication.
HL HI REQ [OFF/ON]	×	Displays the status of the high beam request signal received from BCM via CAN communication.
FR FOG REQ* [OFF/ON]	×	Displays the status of the front fog lamp request signal received from BCM via CAN communication.
HL WASHER REQ [OFF/ON]		NOTE: This item is displayed, but cannot be monitored.
FR WIP REQ [STOP/1LOW/LOW/HI]	×	Displays the status of the front wiper request signal received from BCM via CAN communication.

DIAGNOSIS SYSTEM (IPDM E/R)

< FUNCTION DIAGNOSIS >

Monitor Item [Unit]	MAIN SIG- NALS	Description
WIP AUTO STOP [STOP P/ACT P]	×	Displays the status of the front wiper auto stop signal judged by IPDM E/R.
WIP PROT [OFF/Block]	×	Displays the status of the front wiper fail-safe operation judged by IPDM E/R.
ST RLY REQ [OFF/ON]		Displays the status of the starter request signal received from ECM via CAN communication.
IGN RLY [OFF/ON]	×	Displays the status of the ignition relay judged by IPDM E/R.
RR DEF REQ* [OFF/ON]	×	Displays the status of the rear defogger request signal.
OIL P SW [OPEN/CLOSE]		Displays the status of the oil pressure switch judged by IPDM E/R.
DTRL REQ [OFF]		NOTE: This item is displayed, but cannot be monitored.
HOOD SW [OPEN/CLOSE]		NOTE: This item is displayed, but cannot be monitored.
THFT HRN REQ [OFF/ON]		Displays the status of the theft warning horn request signal received from BCM via CAN communication.
HORN CHIRP [OFF/ON]		Displays the status of the horn reminder signal received from BCM via CAN communication.

*: If equipped

ACTIVE TEST

Test item

Test item	Operation	Description
REAR DEFOGGER*	OFF	OFF
	ON	Operates rear window defogger relay.
FRONT WIPER	OFF	OFF
	LO	Operates the front wiper relay.
	HI	Operates the front wiper relay and front wiper high relay.
EXTERNAL LAMPS	OFF	OFF
	TAIL	Operates the tail lamp relay.
	LO	Operates the headlamp low relay.
	HI	Operates the headlamp low relay and the headlamp high LH/RH relays at 1 second intervals.
	FOG	Operates the front fog lamp relay*
HORN	ON	Operates horn relay for 20 ms.

*: If equipped

WIPER AND WASHER FUSE

< COMPONENT DIAGNOSIS >

COMPONENT DIAGNOSIS

WIPER AND WASHER FUSE

Description

INFOID:000000003789940

Fuse list

Unit	Location	Fuse No.	Capacity
Front wiper motor	IPDM E/R	39	30 A
Front washer motor	Fuse block (J/B)	9	10 A

Diagnosis Procedure

INFOID:000000003789941

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)	9	10 A

Is the fuse blown?

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

FRONT WIPER MOTOR LO CIRCUIT

< COMPONENT DIAGNOSIS >

FRONT WIPER MOTOR LO CIRCUIT

Component Function Check

INFOID:000000003789942

1. CHECK FRONT WIPER LO OPERATION

⊗ IPDM E/R AUTO ACTIVE TEST

1. Start IPDM E/R auto active test. Refer to [PCS-11, "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-15, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003789943

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

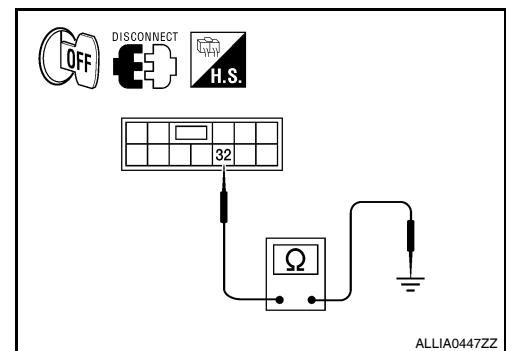
2. CHECK FRONT WIPER MOTOR (LO) SHORT CIRCUIT

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.)



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3. CHECK FRONT WIPER MOTOR (LO) OUTPUT VOLTAGE

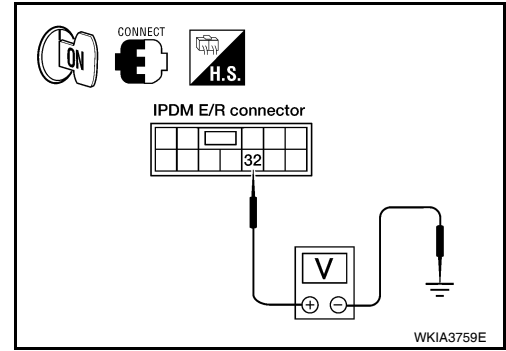
Ⓜ CONSULT-III ACTIVE TEST

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-30, "Removal and Installation of IPDM E/R"](#).

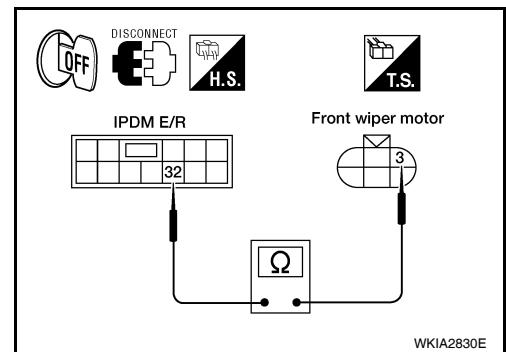
4. CHECK FRONT WIPER MOTOR (LO) OPEN CIRCUIT

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	3	Yes

Does continuity exist?

- YES >> Replace front wiper motor. Refer to [WW-60, "Wiper Motor and Linkage"](#).
 NO >> Repair or replace harness.



FRONT WIPER MOTOR HI CIRCUIT

< COMPONENT DIAGNOSIS >

FRONT WIPER MOTOR HI CIRCUIT

Component Function Check

INFOID:000000003789944

1. CHECK FRONT WIPER HI OPERATION

⊗ IPDM E/R AUTO ACTIVE TEST

1. Start IPDM E/R auto active test. Refer to [PCS-11, "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-17, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003789945

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

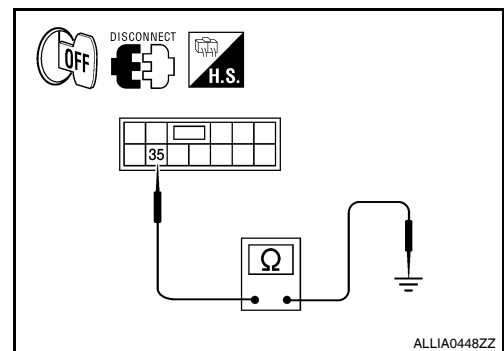
2. CHECK FRONT WIPER MOTOR (HI) SHORT CIRCUIT

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

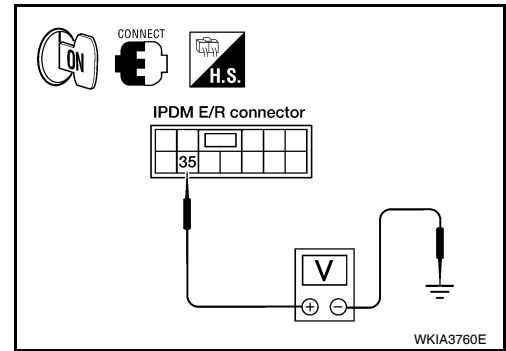
Ⓜ CONSULT-III ACTIVE TEST

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-30, "Removal and Installation of IPDM E/R"](#).

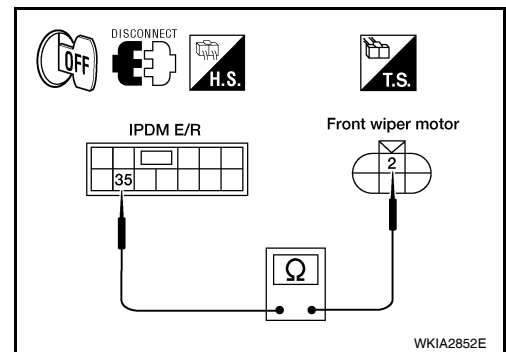
4. CHECK FRONT WIPER MOTOR (HI) OPEN CIRCUIT

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	2	Yes

Does continuity exist?

- YES >> Replace front wiper motor. Refer to [WW-60, "Wiper Motor and Linkage"](#).
 NO >> Repair or replace harness.



FRONT WIPER AUTO STOP SIGNAL CIRCUIT

< COMPONENT DIAGNOSIS >

FRONT WIPER AUTO STOP SIGNAL CIRCUIT

Component Function Check

INFOID:000000003789946

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-19, "Diagnosis Procedure"](#).

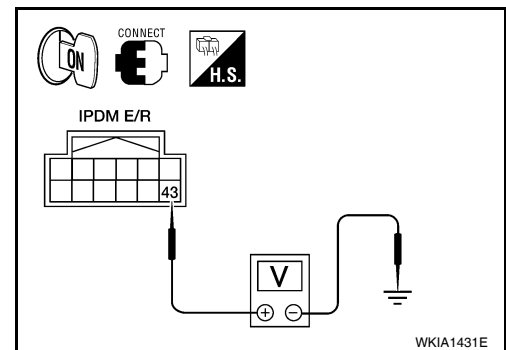
Diagnosis Procedure

INFOID:000000003789947

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



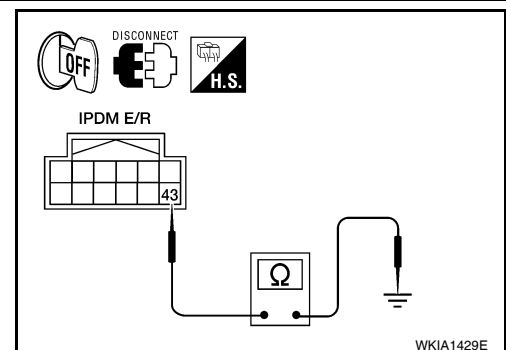
Is the measurement value normal?

- 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-30, "Removal and Installation of IPDM E/R"](#).

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

FRONT WIPER AUTO STOP SIGNAL CIRCUIT

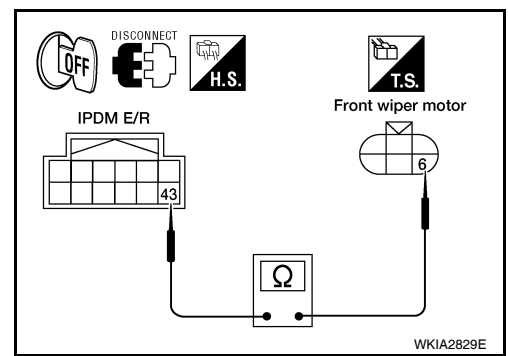
< COMPONENT DIAGNOSIS >

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	6	Yes

Does continuity exist?

- YES >> Replace front wiper motor. Refer to [WW-60. "Wiper Motor and Linkage"](#).
- NO >> Repair or replace harness.



FRONT WIPER MOTOR GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

FRONT WIPER MOTOR GROUND CIRCUIT

Diagnosis Procedure

INFOID:000000003789948

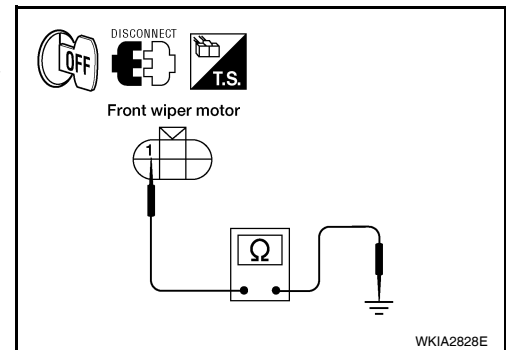
1. CHECK FRONT WIPER MOTOR (GROUND) OPEN CIRCUIT

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	1		Yes

Does continuity exist?

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



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WASHER SWITCH

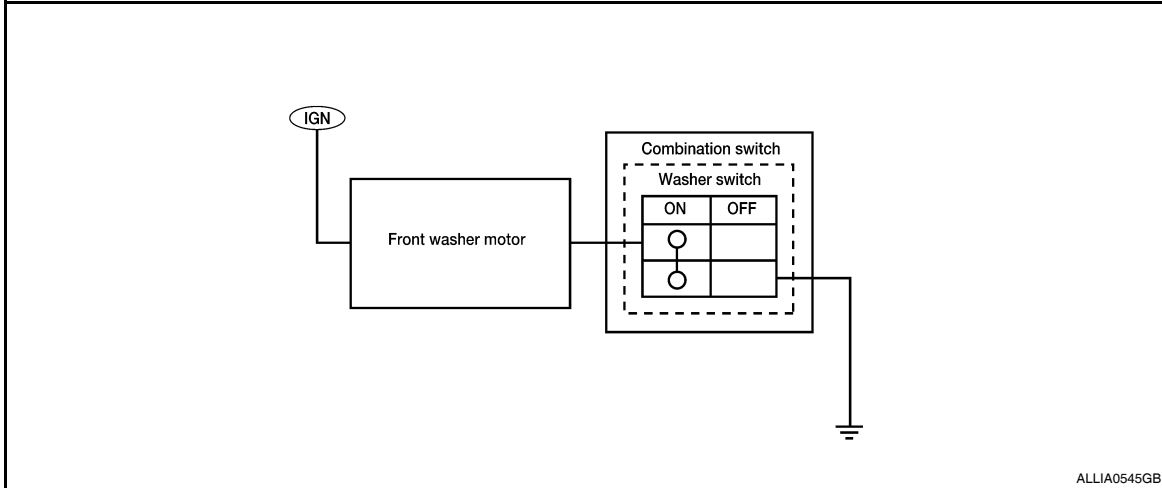
< COMPONENT DIAGNOSIS >

WASHER SWITCH

Description

INFOID:000000003789949

- Washer switch is integrated with combination switch.
- Combination switch switches polarity between front washer operating to supply power to the front washer motor on ground.



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Component Inspection

INFOID:000000003789950

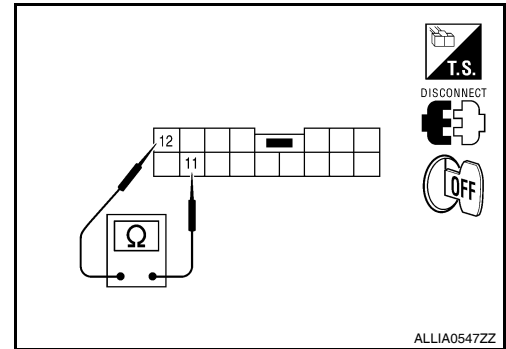
1. CHECK FRONT WASHER SWITCH

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

A: Terminal 11
B: Terminal 12

	OFF	ON
A		○
B		○

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

Does continuity exist?

YES >> Refer to [WW-22, "Diagnosis Procedure"](#).

NO >> Replace combination switch. Refer to [WW-63, "Wiper and Washer Switch"](#).

Diagnosis Procedure

INFOID:000000003789951

1. CHECK FRONT WASHER MOTOR FUSE

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

Unit	Location	Fuse No.	Capacity
Front washer motor	Fuse block (J/B)	9	10A

Is the fuse blown?

WASHER SWITCH

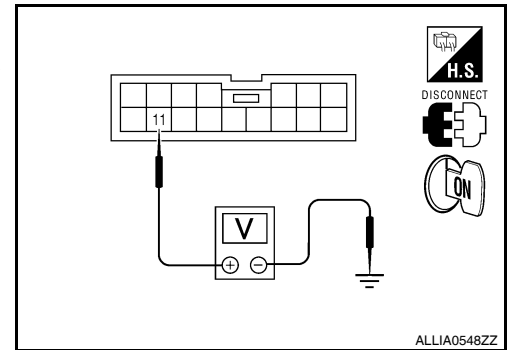
< COMPONENT DIAGNOSIS >

- YES >> Replace the fuse after repairing the applicable circuit.
 NO >> GO TO 2

2. CHECK FRONT WASHER SWITCH INPUT VOLTAGE

1. Disconnect combination switch.
2. Turn the ignition switch ON.
3. Check voltage between combination switch harness connector and ground.

Terminals		Voltage (Approx.)
(+)	(-)	
Combination switch		Ground
Connector	Terminal	
M28	11	
		Battery voltage



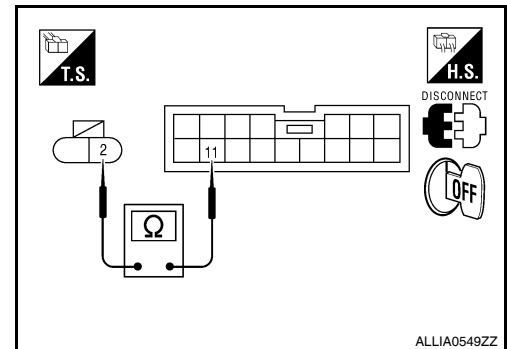
Is the measurement value normal?

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

3. CHECK FRONT WASHER CIRCUIT CONTINUITY

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

Combination switch		Front washer motor		Continuity
Connector	Terminal	Connector	Terminal	
M28	11	E105	2	Yes



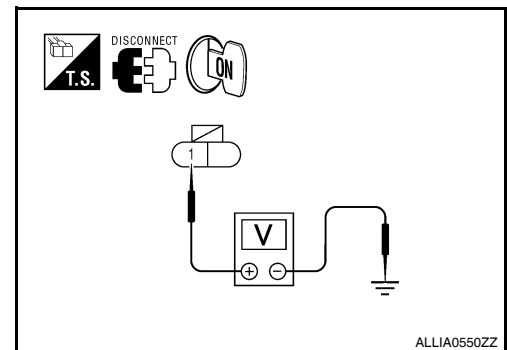
Does continuity exist?

- YES >> GO TO 4
 NO >> Repair or replace harness.

4. CHECK FRONT WASHER MOTOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between front washer motor harness connector and ground.

Terminals		Voltage (Approx.)
(+)	(-)	
Combination switch		Ground
Connector	Terminal	
E105	1	
		Battery voltage



Is the measurement value normal?

- YES >> Replace front washer motor. Refer to [WW-64. "Washer Motor"](#).
 NO >> Repair or replace harness.

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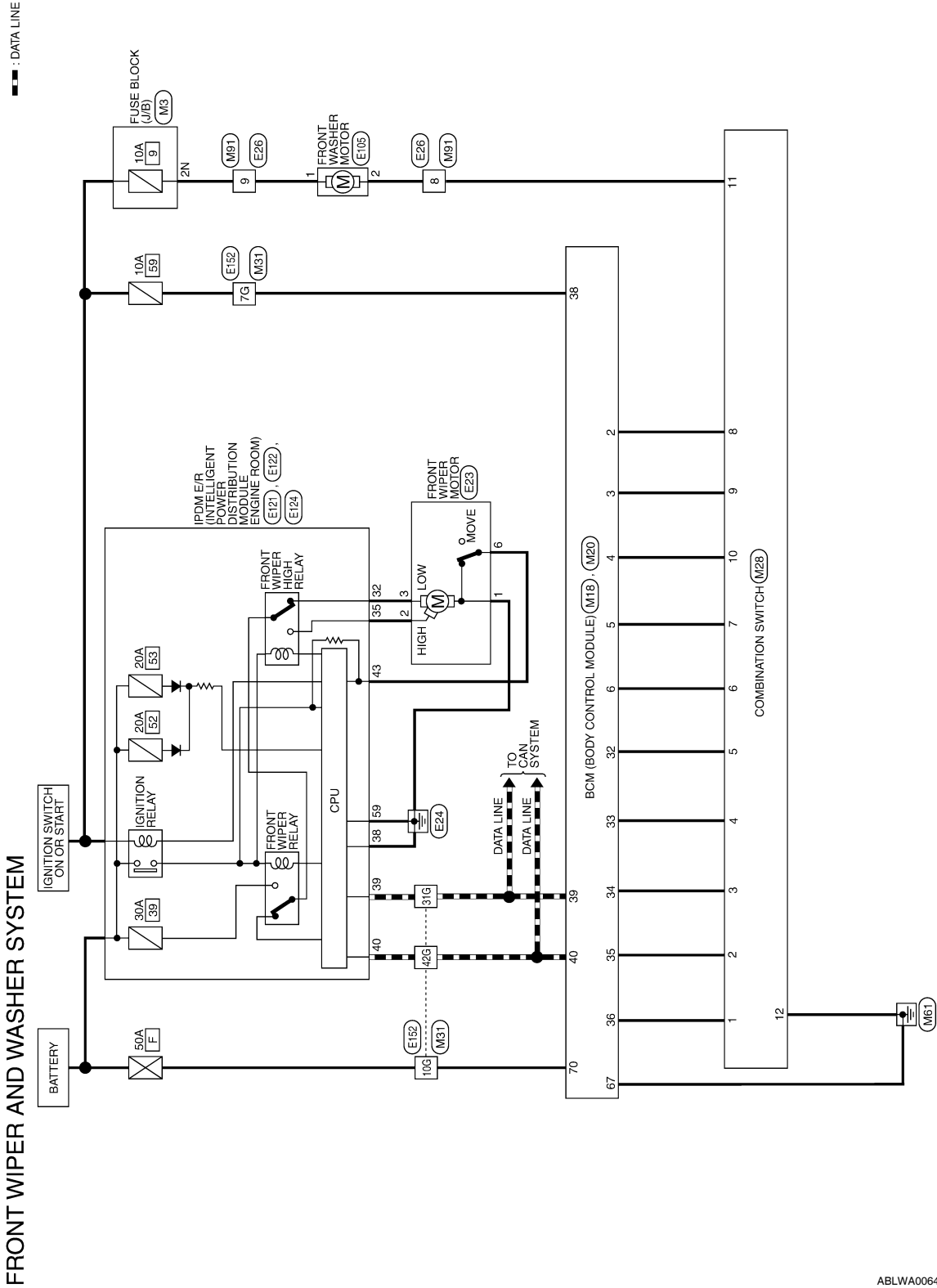
FRONT WIPER AND WASHER SYSTEM

< COMPONENT DIAGNOSIS >

FRONT WIPER AND WASHER SYSTEM

Wiring Diagram

INFOID:000000003789952



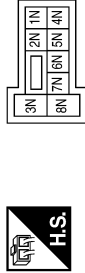
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FRONT WIPER AND WASHER SYSTEM

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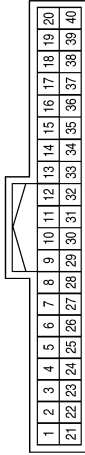
FRONT WIPER AND WASHER SYSTEM CONNECTORS

Connector No.	M3
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE



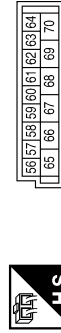
Terminal No.	Color of Wire	Signal Name
2N	W/R	-

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

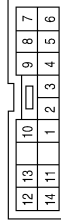


Terminal No.	Color of Wire	Signal Name
2	SB	INPUT 5
3	G/Y	INPUT 4
4	Y	INPUT 3
5	G/B	INPUT 2
6	V	INPUT 1
32	R/G	OUTPUT 5
33	R/Y	OUTPUT 4
34	L	OUTPUT 3
35	O/B	OUTPUT 2
36	R/W	OUTPUT 1
38	W/L	IGN SW
39	L	CAN-H
40	P	CAN-L

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



Connector No.	M28
Connector Name	COMBINATION SWITCH
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	R/W	INPUT 1
2	O/B	INPUT 2
3	L	INPUT 3
4	R/Y	INPUT 4
5	R/G	INPUT 5
6	V	OUTPUT 1
7	G/B	OUTPUT 2
8	SB	OUTPUT 5
9	G/Y	OUTPUT 4
10	Y	OUTPUT 3
11	V/W	WASHER MOTOR
12	B	GND

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

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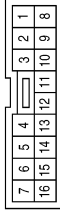
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FRONT WIPER AND WASHER SYSTEM

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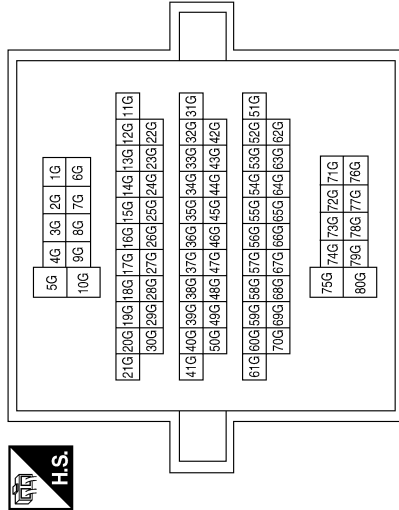
Connector No.	M91
Connector Name	WIRE TO WIRE
Connector Color	WHITE



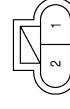
Terminal No.	Color of Wire	Signal Name
8	V/W	-
9	W/R	-

Terminal No.	Color of Wire	Signal Name
7G	W/L	-
10G	W/B	-
31G	L	-
42G	P	-

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE

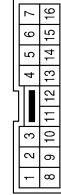


Connector No.	E105
Connector Name	FRONT WASHER MOTOR
Connector Color	BROWN



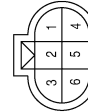
Terminal No.	Color of Wire	Signal Name
1	W/R	-
2	V/W	-

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



Terminal No.	Color of Wire	Signal Name
8	V/W	-
9	W/R	-

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



Terminal No.	Color of Wire	Signal Name
1	B	-
2	L/B	-
3	L	-
6	L/Y	-

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FRONT WIPER AND WASHER SYSTEM

< COMPONENT DIAGNOSIS >

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
59	B	GND(POWER)

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



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

Terminal No.	Color of Wire	Signal Name
38	B	GND(SIGNAL)
39	L	CAN-H
40	P	CAN-L
43	L/Y	AUTO STOP SW

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

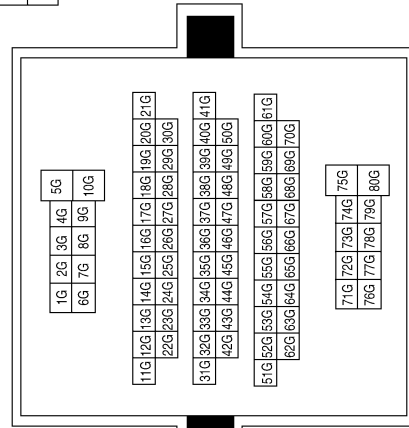


29	28	27	26	25		
36	35	34	33	32	31	30

Terminal No.	Color of Wire	Signal Name
32	L	FR WIPER LO
35	L/B	FR WIPER HI

Terminal No.	Color of Wire	Signal Name
7G	L/W	-
10G	W/B	-
31G	L	-
42G	P	-

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



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BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

ECU DIAGNOSIS

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:000000004134282

VALUES ON THE DIAGNOSIS TOOL

Monitor Item	Condition	Value/Status
AIR COND SW	A/C switch OFF	OFF
	A/C switch ON	ON
AUT LIGHT SYS	Outside of the room is dark	OFF
	Outside of the room is bright	ON
AUTO LIGHT SW	Lighting switch OFF	OFF
	Lighting switch AUTO	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

BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

Monitor Item	Condition	Value/Status
HEADLAMP SW2	Headlamp switch OFF	OFF
	Headlamp switch 1st	ON
HI BEAM SW	High beam switch OFF	OFF
	High beam switch HI	ON
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	Key is removed from key cylinder	OFF
	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
REAR DEF SW	Rear window defogger switch OFF	OFF
	Rear window defogger switch ON	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

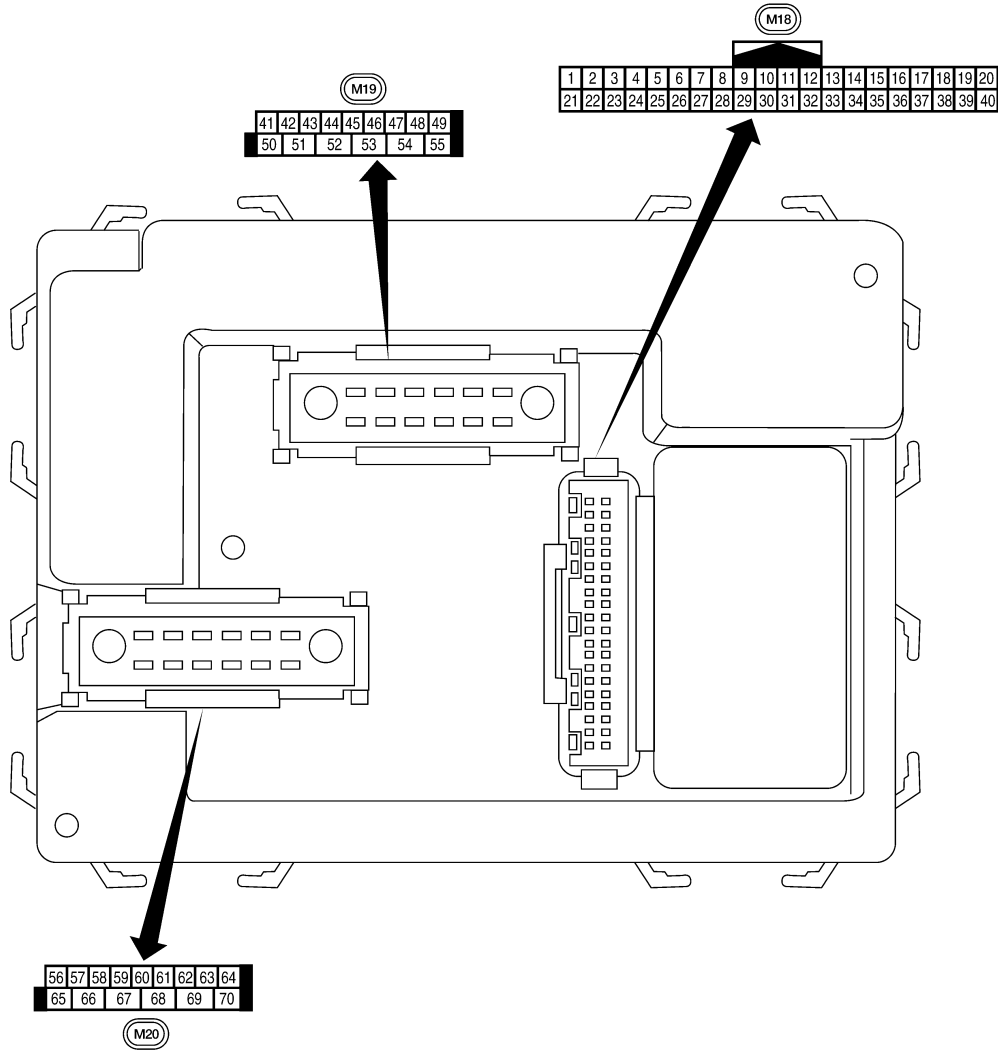
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BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

Terminal Layout

INFOID:000000004134283




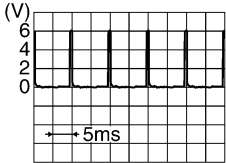

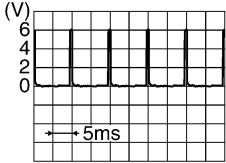
Physical Values

LIA2443E

INFOID:000000004134284

BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

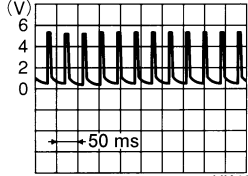
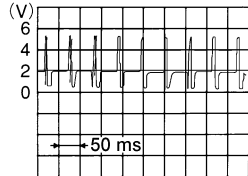
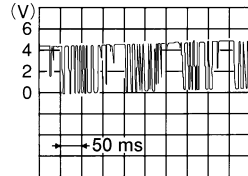
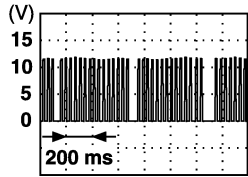
Terminal	Wire color	Signal name	Signal input/output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
1	BR/W	Ignition keyhole illumination	Output	OFF	Door is locked (SW OFF)	Battery voltage
					Door is unlocked (SW OFF)	0V
2	SB	Combination switch input 5	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
3	G/Y	Combination switch input 4	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
4	Y	Combination switch input 3	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
5	G/B	Combination switch input 2	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
6	V	Combination switch input 1				
9	Y/B	Rear window defogger switch (Crew Cab)	Input	ON	Rear window defogger switch ON	0V
					Rear window defogger switch OFF	5V
11	O	Ignition switch (ACC or ON)	Input	ACC or ON	Ignition switch ACC or ON	Battery voltage
12	R/L	Front door switch RH (All)	Input	OFF	ON (open)	0V
		Rear door switch lower RH (King Cab)			OFF (closed)	Battery voltage
		Rear door switch upper RH (King Cab)				
13	GR	Rear door switch RH (Crew Cab)	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
15	L/W	Tire pressure warning check connector	Input	OFF	—	5V

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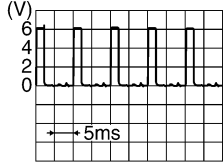

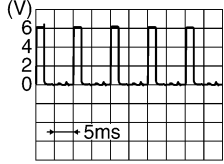
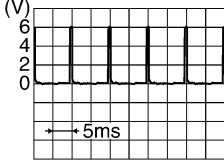
BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

Terminal	Wire color	Signal name	Signal input/output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
18	P	Remote keyless entry receiver and optical sensor (ground)	Output	OFF	—	0V
19	V/W	Remote keyless entry receiver (power supply)	Output	OFF	Ignition switch OFF	 LIA1893E
20	G/W	Remote keyless entry receiver (signal)	Input	OFF	Stand-by (keyfob buttons released)	 LIA1894E
					When remote keyless entry receiver receives signal from keyfob (keyfob buttons pressed)	 LIA1895E
21	G	NATS antenna amp.	Input	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
22	G	BUS	—	—	Ignition switch ON or power window timer operates	 PIA2344E
23	G/O	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 for approx. 1 second, then return to battery voltage.
27	W/R	Compressor ON signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
28	L/R	Front blower monitor	Input	ON	Front blower motor OFF	Battery voltage
					Front blower motor ON	0V
29	W/B	Hazard switch	Input	OFF	ON	0V
					OFF	5V
31	P/L	Cargo lamp switch	Input	OFF	Cargo lamp switch ON	0
					Cargo lamp switch OFF	Battery voltage

BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

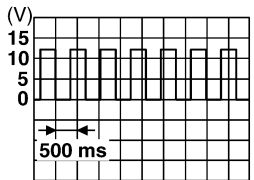
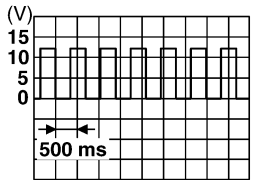
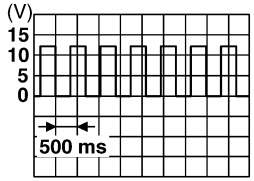
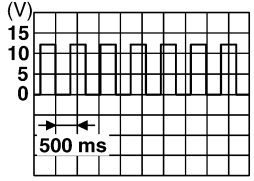
Terminal	Wire color	Signal name	Signal input/output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
32	R/G	Combination switch output 5	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 <p style="text-align: right; font-size: small;">SKIA5291E</p>
33	R/Y	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	L	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	O/B	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	R/W	Combination switch output 1				
37	B/R	Key switch and key lock solenoid	Input	OFF	Key inserted	Battery voltage
					Key inserted	0V
38	W/L	Ignition switch (ON)	Input	ON	—	Battery voltage
39	L	CAN-H	—	—	—	—
40	P	CAN-L	—	—	—	—
47	SB	Front door switch LH (All)	Input	OFF	ON (open)	0V
		Rear door switch lower LH (King Cab)			OFF (closed)	Battery voltage
48	R/Y	Rear door switch LH (Crew Cab)	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
50	R/Y	Cargo bed lamp control	Output	OFF	Cargo lamp switch (ON)	0V
					Cargo lamp switch (OFF)	Battery voltage

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BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

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

BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

Terminal	Wire color	Signal name	Signal input/output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
67	B	Ground	Input	ON	—	0V
68	W/L	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	W/R	Power window power supply	Output	—	—	Battery voltage
70	W/B	Battery power supply	Input	OFF	—	Battery voltage

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BCM (BODY CONTROL MODULE)

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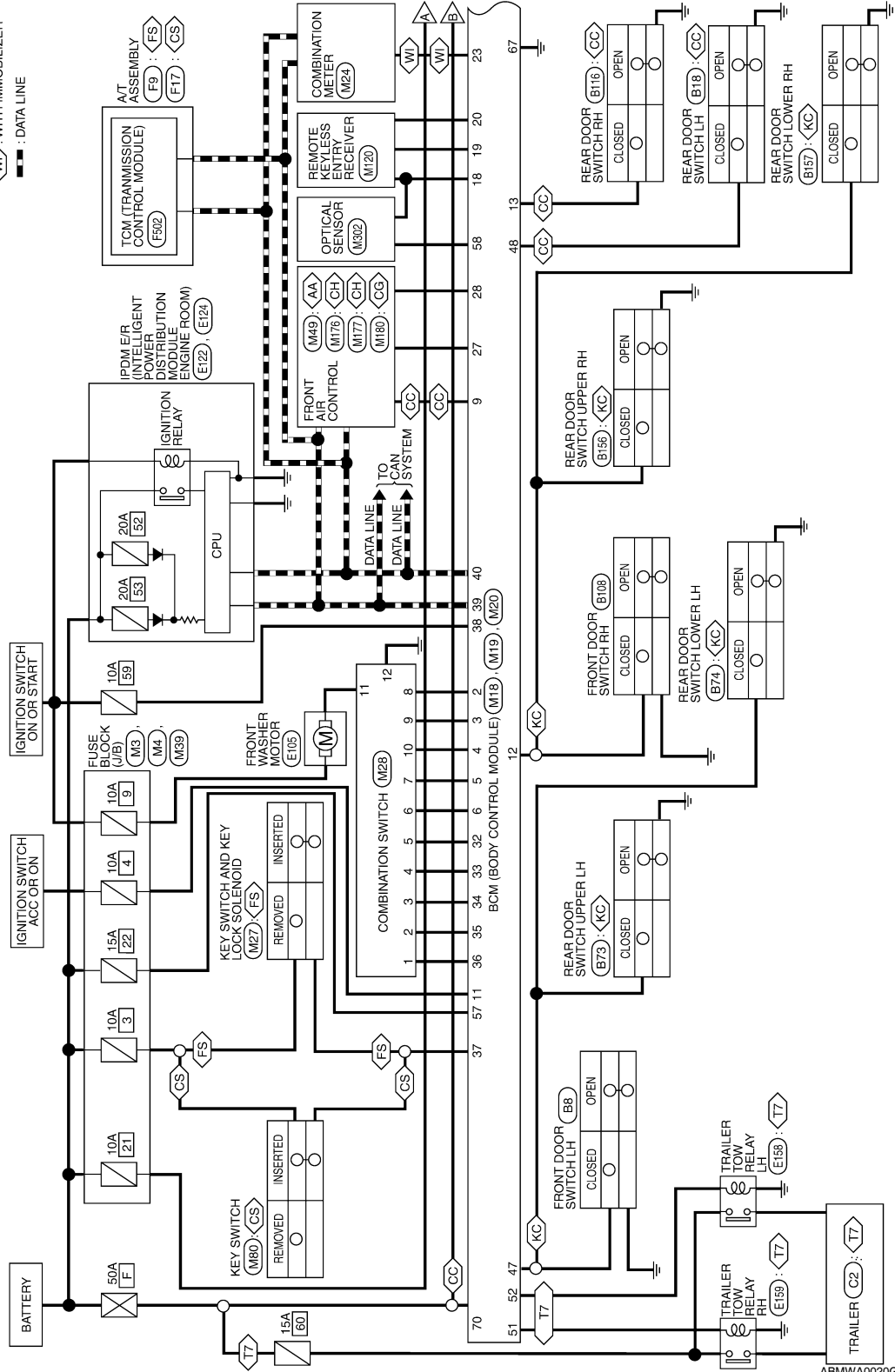
Wiring Diagram

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BCM (BODY CONTROL MODULE)

- : COLUMN SHIFT
- : FLOOR SHIFT
- : KING CAB
- : TRAILER TOW 7 PIN
- : WITH IMMOBILIZER
- : DATA LINE

- : WITH AUTO A/C
- : CREW CAB
- : WITH MANUAL 2 CONTROL DIAL SYSTEM
- : WITH MANUAL 3 CONTROL DIAL SYSTEM

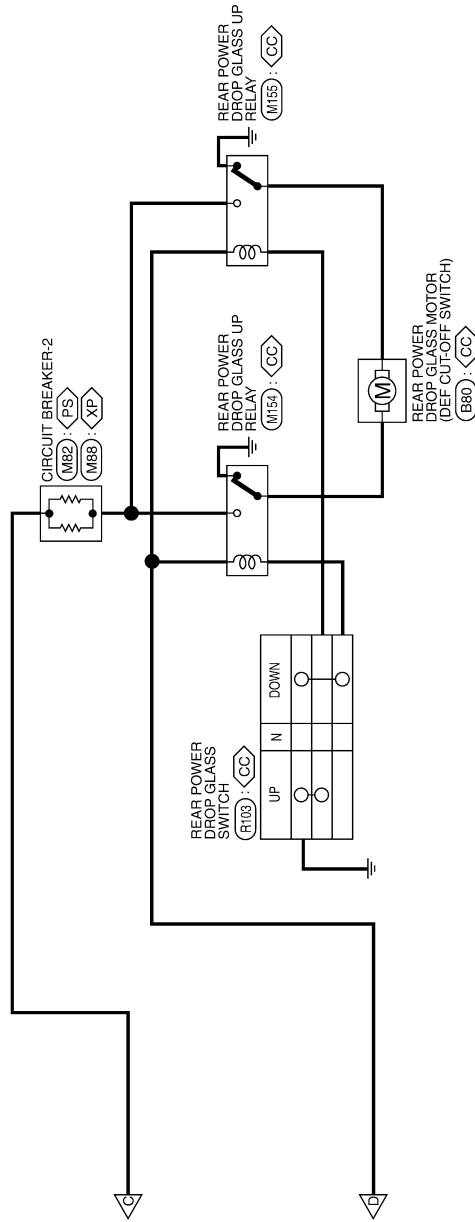


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BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

◊ CC ◊ : CREW CAB
 ◊ PS ◊ : WITH POWER SEAT
 ◊ XP ◊ : WITHOUT POWER SEAT



ABMWA0022GI

BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

BCM (BODY CONTROL MODULE) CONNECTORS

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



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name
1	BR/W	KEY RING OUTPUT
2	SB	INPUT 5
3	G/Y	INPUT 4
4	Y	INPUT 3
5	G/B	INPUT 2
6	V	INPUT 1
7	-	-
8	-	-
9	Y/B	REAR DEFOGGER SW
10	-	-
11	O	ACC SW
12	R/L	DOOR SW (AS)
13	GR	DOOR SW (RR)
14	-	-
15	L/W	TPMS MODE TRIGGER SW

Terminal No.	Color of Wire	Signal Name
16	-	-
17	-	-
18	P	KEYLESS AND AUTO LIGHT SENSOR GND
19	V/W	KEYLESS TUNER POWER SUPPLY OUTPUT
20	GW	KEYLESS TUNER SIGNAL
21	G	IMMOBILIZER ANTENNA SIGNAL (CLOCK)
22	G	ANTI-PINCH SERIAL LINK (RX, TX)
23	G/O	SECURITY INDICATOR OUTPUT
24	-	-
25	BR	IMMOBILIZER ANTENNA SIGNAL (RX, TX)
26	-	-
27	W/R	AIRCON SW
28	L/R	BLOWER FAN SW
29	W/B	HAZARD SW
30	-	-
31	P/L	CARGO LAMP SW
32	R/G	OUTPUT 5
33	R/Y	OUTPUT 4
34	L	OUTPUT 3
35	O/B	OUTPUT 2
36	R/W	OUTPUT 1
37	B/R	KEY SW
38	W/L	IGN SW
39	L	CAN-H
40	P	CAN-L

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE



41	42	43	44	45	46	47	48	49
50	51	52	53	54	55			

Terminal No.	Color of Wire	Signal Name
41	-	-
42	-	-
43	-	-
44	-	-
45	-	-
46	-	-
47	SB	DOOR SW (DR)
48	R/Y	DOOR SW (RL)
49	-	-
50	R/Y	CARGO LAMP OUTPUT
51	G/Y	TRAILER FLASHER OUTPUT (RIGHT)
52	G/B	TRAILER FLASHER OUTPUT (LEFT)
53	-	-
54	-	-
55	-	-

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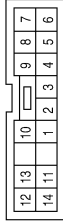
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BCM (BODY CONTROL MODULE)

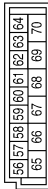
< ECU DIAGNOSIS >

Connector No.	M28
Connector Name	COMBINATION SWITCH
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	R/W	INPUT 1
2	O/B	INPUT 2
3	L	INPUT 3
4	R/Y	INPUT 4
5	R/G	INPUT 5
6	V	OUTPUT 1
7	G/B	OUTPUT 2
8	SB	OUTPUT 5
9	G/Y	OUTPUT 4
10	Y	OUTPUT 3
11	V/W	WASHER MOTOR
12	B	GND
13	-	-
14	-	-

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



Terminal No.	Color of Wire	Signal Name
56	R/G	BATTERY SAVER OUTPUT
57	Y/R	BAT (FUSE)
58	W/R	AUTO LIGHT SENSOR INPUT 2
59	G	DOOR UNLOCK OUTPUT (DR)
60	G/B	FLASHER OUTPUT (LEFT)
61	G/Y	FLASHER OUTPUT (RIGHT)
62	R/W	STEP LAMP OUTPUT
63	L	ROOM LAMP
64	-	-
65	V	DOOR LOCK OUTPUT (ALL)
66	G/Y	DOOR UNLOCK OUTPUT (OTHER)
67	B	GND (POWER)
68	W/L	POWER WINDOW POWER SUPPLY (RAP)
69	W/R	POWER WINDOW POWER SUPPLY (BAT)
70	W/B	BAT (F/L)

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

< ECU DIAGNOSIS >

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

Reference Value

INFOID:000000004134430

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	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 (horn chirp mode)	ON

*: If equipped

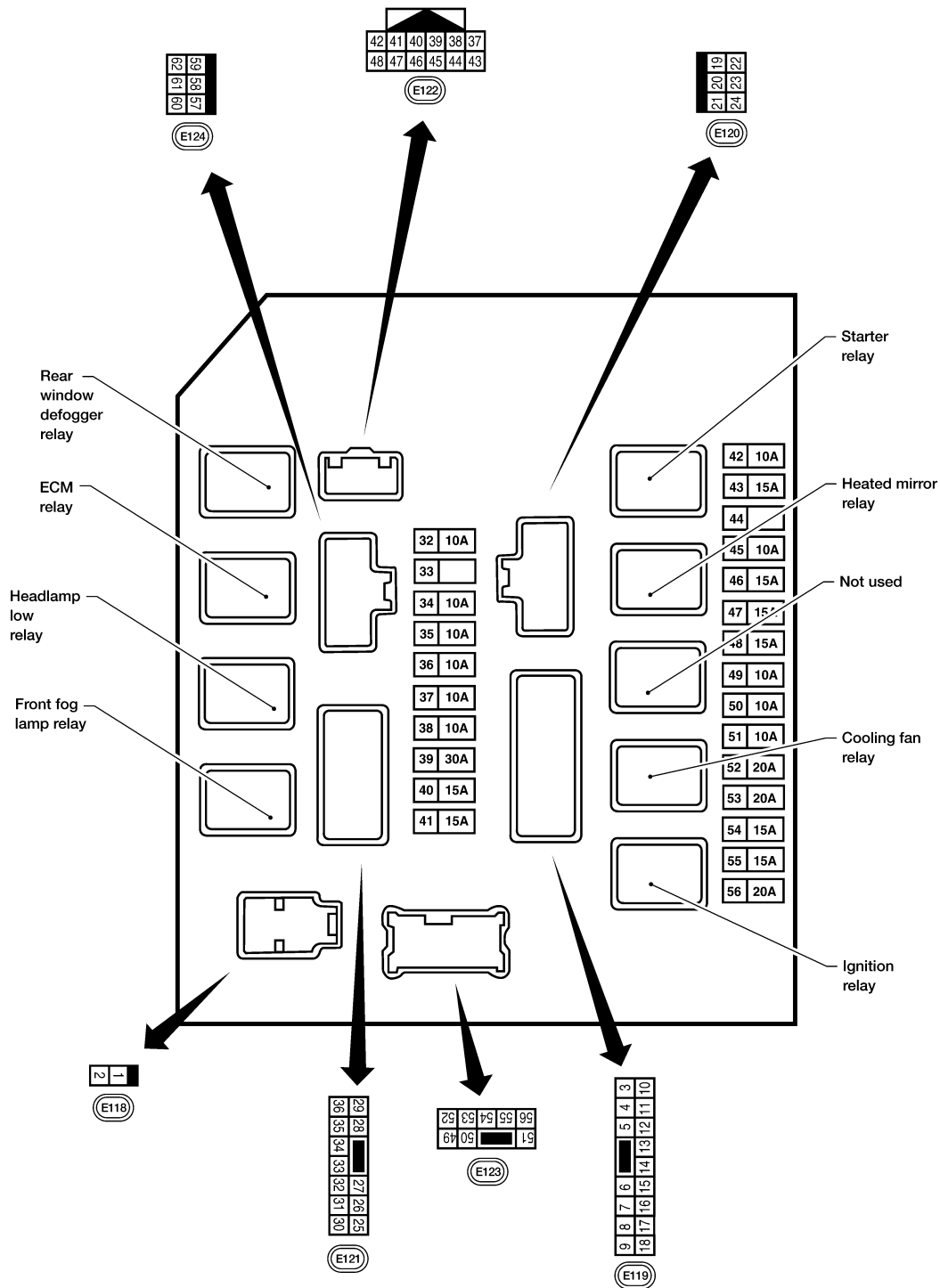
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

< ECU DIAGNOSIS >

Terminal Layout

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TERMINAL LAYOUT



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Physical Values

PHYSICAL VALUES

WKIA5852E

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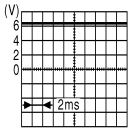
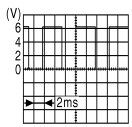
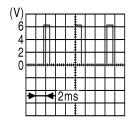
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

< ECU DIAGNOSIS >

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

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					
35	L/B	Wiper high speed signal	Output	ON or START	Wiper switch	<table border="1"> <tr> <td>OFF, LO, INT</td> <td>Battery voltage</td> </tr> <tr> <td>HI</td> <td>0V</td> </tr> </table>	OFF, LO, INT	Battery voltage	HI	0V
OFF, LO, INT	Battery voltage									
HI	0V									
37	Y	Power generation command signal	Output	—	Ignition switch ON	 <p style="text-align: right;">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;">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;">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				
43	L/Y	Wiper auto stop signal	Input	ON or START	Wiper switch	OFF, LO, INT Battery voltage				
44	BR	Daytime light relay control (Canada ony)	Input	ON	Daytime light system active	0V				
					Daytime light system inactive	Battery voltage				
45	G/W	Horn relay control	Input	ON	When door locks are operated using keyfob (OFF → ON)*	Battery voltage → 0V				
46	GR	Fuel pump relay control	Input	—	Ignition switch ON or START	0V				
					Ignition switch OFF or ACC	Battery voltage				
47	O	Throttle control motor relay control	Input	—	Ignition switch ON or START	0V				
					Ignition switch OFF or ACC	Battery voltage				
48	B/R	Starter relay (inhibit switch)	Input	ON or START	Selector lever in "P" or "N"	0V				
					Selector lever any other position	Battery voltage				

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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		
49	R/L	Trailer tow relay (With trailer tow) Illumination (Without trailer tow)	Output	ON	Lighting switch must be in the 1st position	OFF	0V
						ON	Battery voltage
50	W/R	Front fog lamp (LH) (if equipped)	Output	ON or START	Lighting switch must be in the 2nd position (LOW beam is ON) and the front fog lamp switch	OFF	0V
						ON	Battery voltage
51	W/R	Front fog lamp (RH) (if equipped)	Output	ON or START	Lighting switch must be in the 2nd position (LOW beam is ON) and the front fog lamp switch	OFF	0V
						ON	Battery voltage
52	L	LH low beam head-lamp	Output	—	Lighting switch in 2nd position	Battery voltage	
54	R/Y	RH low beam head-lamp	Output	—	Lighting switch in 2nd position	Battery voltage	
55	G	LH high beam head-lamp	Output	—	Lighting switch in 2nd position and placed in HIGH or PASS position	Battery voltage	
56	Y (With DTRL) L/W (Without DTRL)	RH high beam head-lamp	Output	—	Lighting switch in 2nd position and placed in HIGH or PASS position	Battery voltage	
57	R/L	Parking, license, tail lamp and rear audio remote control unit	Output	ON	Lighting switch 1st position	OFF	0V
						ON	Battery voltage
59	B	Ground	Input	—	—	0V	
60	B/W	Rear window defogger relay (if equipped)	Output	ON or START	Rear defogger switch ON	Battery voltage	
					Rear defogger switch OFF	0V	
61	BR	Fuse 32 (With trailer tow)	Output	OFF	—	Battery voltage	

*: When horn reminder is ON

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

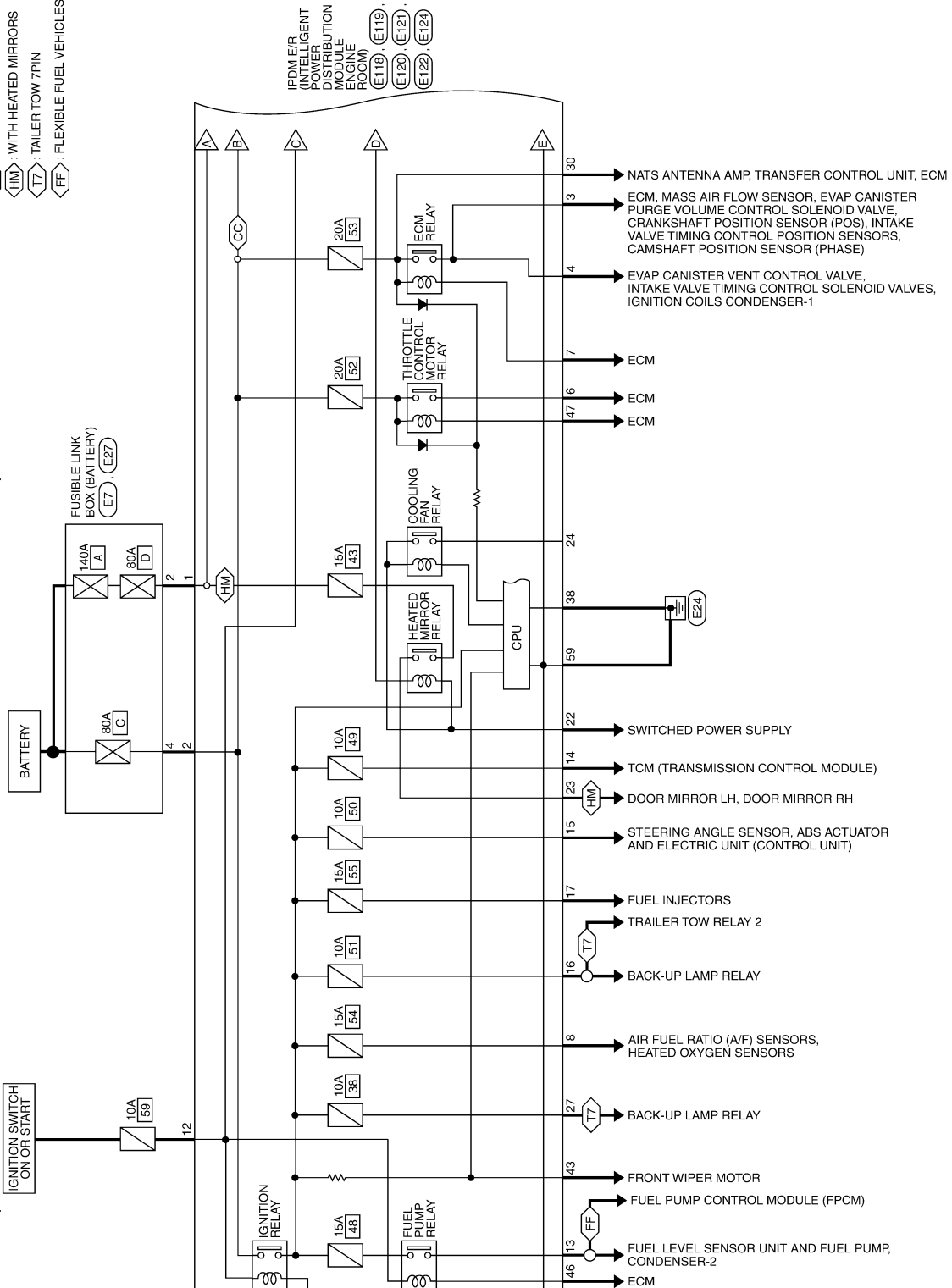
< ECU DIAGNOSIS >

Wiring Diagram

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- CREW CAB
- WITH HEATED MIRRORS
- TAILER TOW 7PIN
- FLEXIBLE FUEL VEHICLES

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



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

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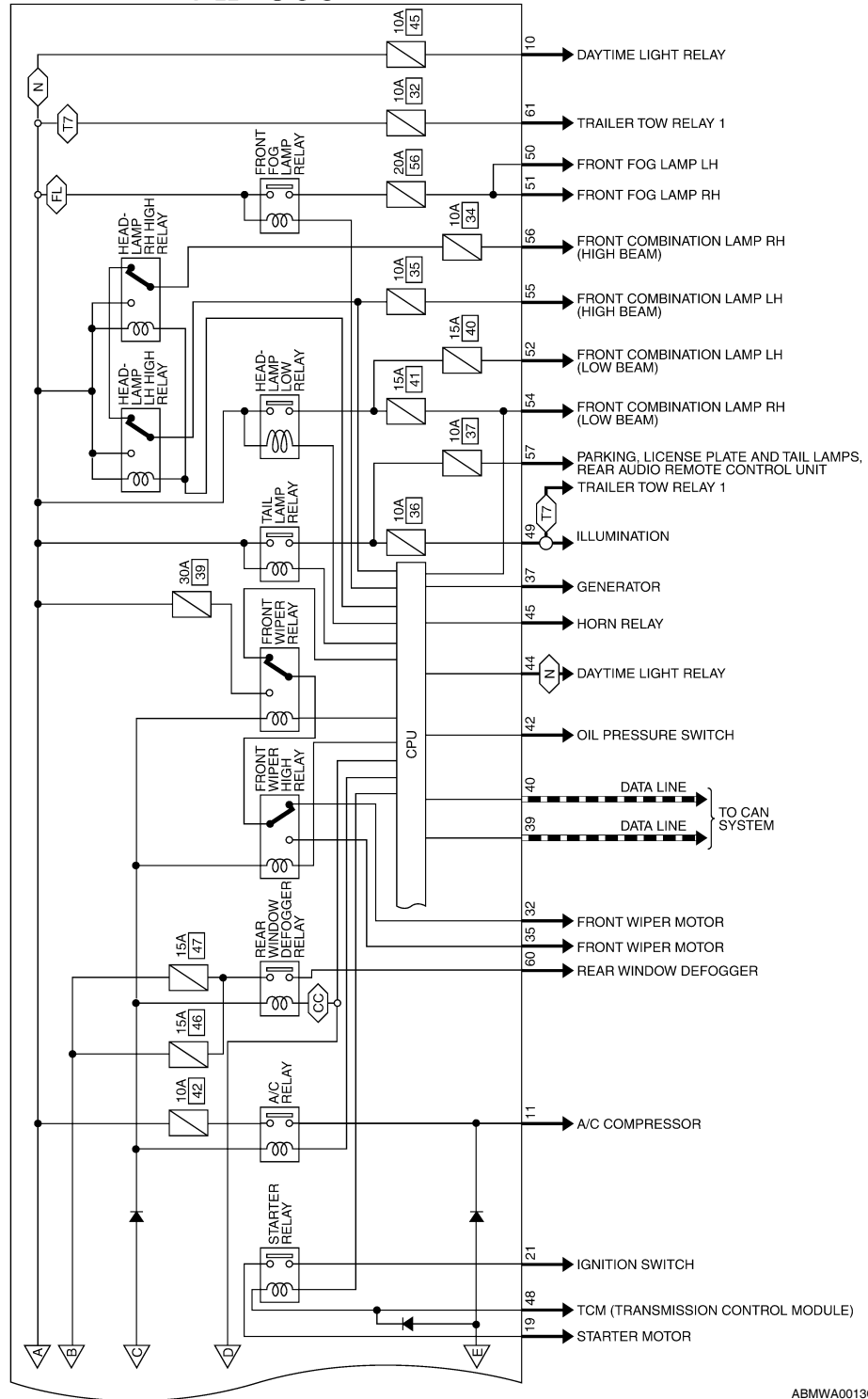
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IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

< ECU DIAGNOSIS >

- : TRAILER TOW 7PIN
- : CREW CAB
- : WITH FRONT FOG LAMP
- : FOR CANADA
- : DATA LINE

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



ABMWA0013GI

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

< ECU DIAGNOSIS >

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

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



Terminal No.	Color of Wire	Signal Name
4	R	-

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



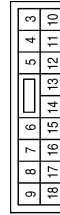
Terminal No.	Color of Wire	Signal Name
2	B/Y	-

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



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

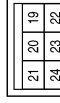
Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



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

Terminal No.	Color of Wire	Signal Name
8	R/B	02_SENSOR
9	-	-
10	G	DTRL RLY SUPPLY
11	Y/B	A/C COMPRESSOR
12	L/W	IGN SW (IG)
13	B/Y	FUEL PUMP
14	Y/R	A/T CU IGN SUPPLY
15	LG/B	ABS IGN SUPPLY (WITH VDC)
15	GR	ABS IGN SUPPLY (WITH ABS)
15	G/R	ABS IGN SUPPLY (WITH ABL)
16	G	REVERSE LAMP
17	W	INJECTOR
18	-	-

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



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

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WW

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

< ECU DIAGNOSIS >

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

51	50	49
56	55	54
53	52	51



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

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

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



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

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

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



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

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

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

59	58	57
62	61	60



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INFOID:000000004134434

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

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

< ECU DIAGNOSIS >

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 LH/RH relays 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 (if equipped)	Rear window defogger relay OFF
A/C compressor	A/C relay OFF
Front fog lamps (if equipped)	Front fog lamp relay OFF

IGNITION RELAY MALFUNCTION DETECTION FUNCTION

- IPDM E/R monitors the voltage at the contact circuit and excitation coil circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit and the excitation coil circuit.
- If the ignition relay cannot turn OFF due to contact seizure, it activates the tail lamp relay for 10 minutes to alert the user to the ignition relay malfunction when the ignition switch is turned OFF.

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

NOTE:

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

FRONT WIPER CONTROL

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

When a front wiper auto stop signal is in the conditions listed below, IPDM E/R stops power supply to wiper after repeating a front wiper 10 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 >

DTC Index

INFOID:000000004134435

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-15

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.

WIPER AND WASHER SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

WIPER AND WASHER SYSTEM SYMPTOMS

Symptom Table

INFOID:000000003789962

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-51, "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-17, "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-51, "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-15, "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-51, "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-56, "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-51, "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-51, "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-51, "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 BCS-21, "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-51, "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-19, "Component Function Check" .	
Front washer does not operate.	ON	Combination switch	Combination switch Refer to BCS-51, "Symptom Table" .
		<ul style="list-style-type: none"> Harness between combination switch and front washer switch Front washer motor 	Washer switch Refer to WW-22, "Component Inspection" .
		<ul style="list-style-type: none"> Low washer fluid Obstructed or disconnected washer hose or nozzle 	—

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

INFOID:000000003789963

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

INFOID:000000003789964

The front wiper does not operate under any operation conditions.

Diagnosis Procedure

INFOID:000000003789965

1. CHECK WIPER RELAY OPERATION

⊗ IPDM E/R AUTO ACTIVE TEST

1. Start IPDM E/R auto active test. Refer to [PCS-11, "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	1		Yes

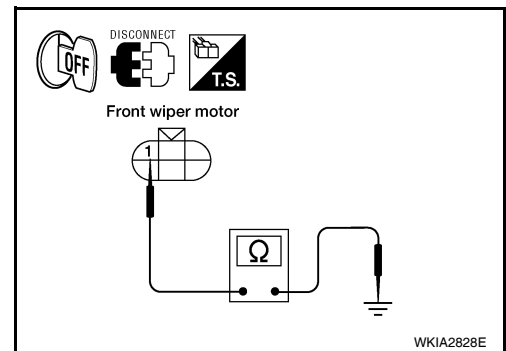
Does continuity exist?

YES >> GO TO 4

NO >> Repair or replace harness.

4. CHECK FRONT WIPER MOTOR OUTPUT VOLTAGE

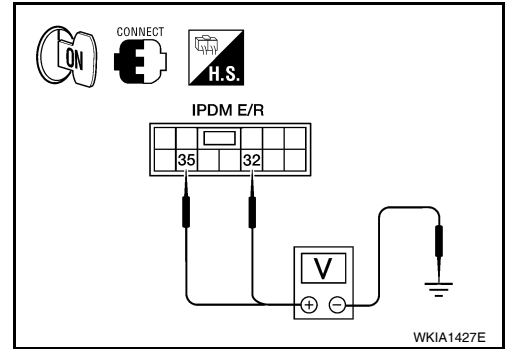
Ⓟ CONSULT-III ACTIVE TEST



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-60, "Wiper Motor and Linkage"](#).
 NO >> Replace IPDM E/R. Refer to [PCS-30, "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-30, "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-51, "Symptom Table"](#).

Is combination switch normal?

- YES >> Replace BCM. Refer to [BCS-53, "Removal and Installation"](#).
 NO >> Repair or replace the applicable parts.

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PRECAUTION

< PRECAUTION >

PRECAUTION

PRECAUTION

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

INFOID:000000003789966

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 ARM

< ON-VEHICLE REPAIR >

ON-VEHICLE REPAIR

FRONT WIPER ARM

Front Wiper Arms

INFOID:000000003789967

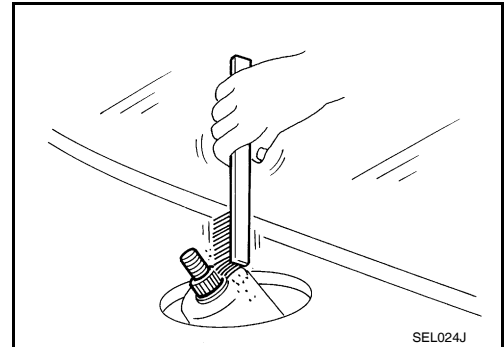
REMOVAL AND INSTALLATION

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.



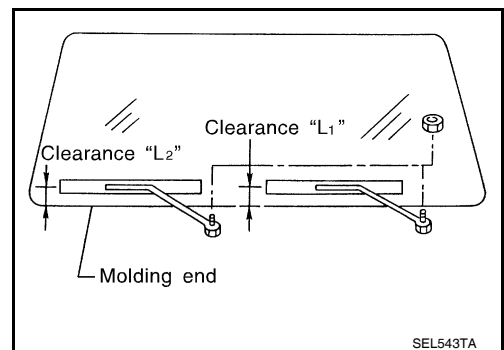
3. Install front RH blade assembly and front LH blade assembly on wiper arms.
4. Install front RH wiper arm and front LH wiper arm.
5. Tighten wiper arm nuts to specified torque, and install wiper arm covers. Refer to [WW-60. "Wiper Motor and Linkage"](#).
6. Ensure that wiper blades stop within proper clearance. See Front Wiper Arm Adjustment.

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" : 41.5 - 56.5 mm (1.634 - 2.224 in)

Clearance "L2" : 52.5 - 67.5 mm (2.067 - 2.657 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. Refer to [WW-60. "Wiper Motor and Linkage"](#).

FRONT WIPER DRIVE ASSEMBLY

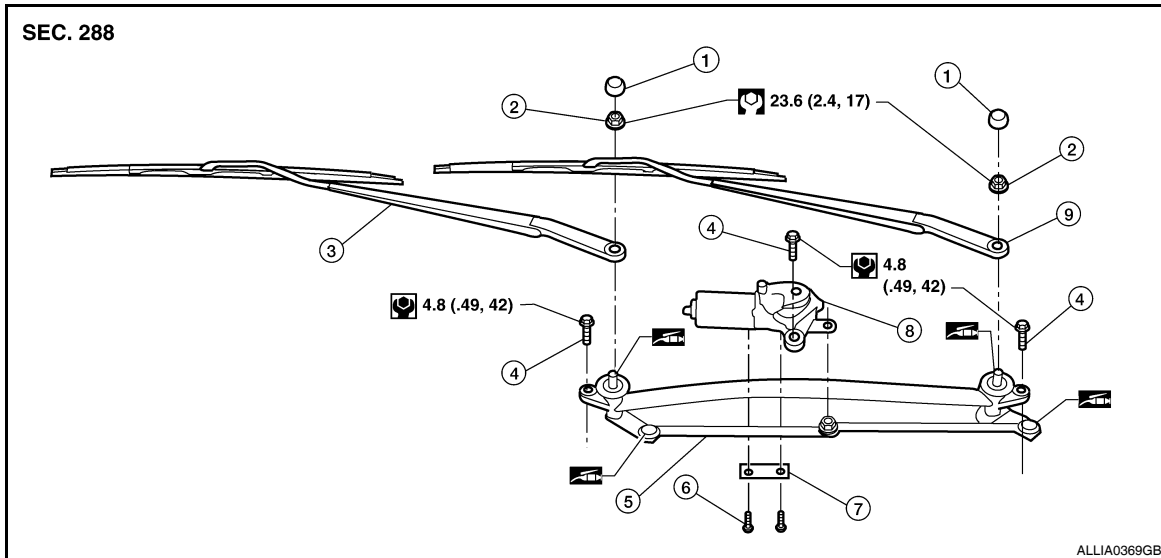
< ON-VEHICLE REPAIR >

FRONT WIPER DRIVE ASSEMBLY

Wiper Motor and Linkage

INFOID:000000003789968

REMOVAL AND INSTALLATION



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

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 condition 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 connector.
 3. Install wiper motor to wiper frame assembly, and install wiper frame assembly.
 4. Install cowl top. Refer to [EXT-19, "Removal and Installation"](#).
 5. Ensure that wiper blades stop within proper clearance. Refer to front wiper arm adjustment [WW-59, "Front Wiper Arms"](#).

WASHER TANK

< ON-VEHICLE REPAIR >

WASHER TANK

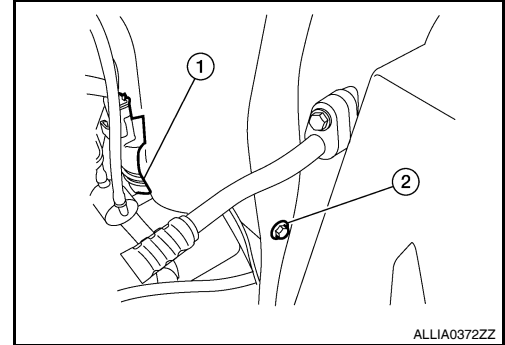
Washer Fluid Reservoir

INFOID:000000003789969

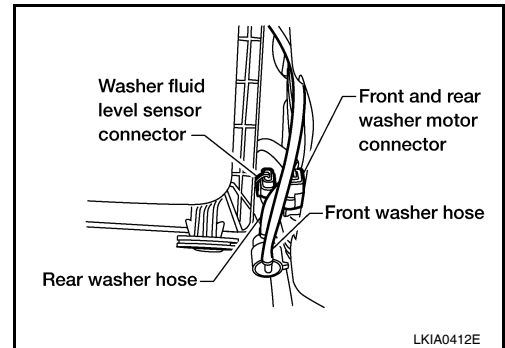
REMOVAL AND INSTALLATION

Removal

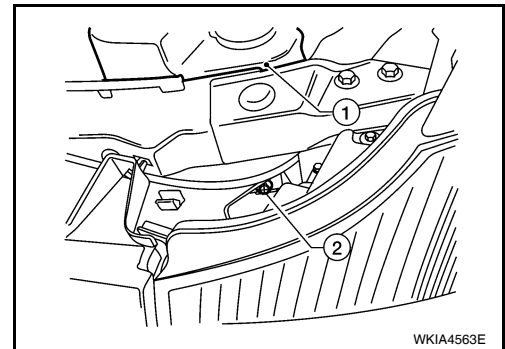
1. Remove side washer fluid reservoir screw (2).
 - Front and rear washer motor (1).



2. Remove front and rear washer motor connector.
3. Remove washer fluid level sensor connector.



4. Disconnect front and rear washer hoses.
5. Remove front washer fluid reservoir screw (2).
6. Remove washer fluid reservoir (1) from the vehicle.



Installation

Installation is in the reverse order of removal.

CAUTION:

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

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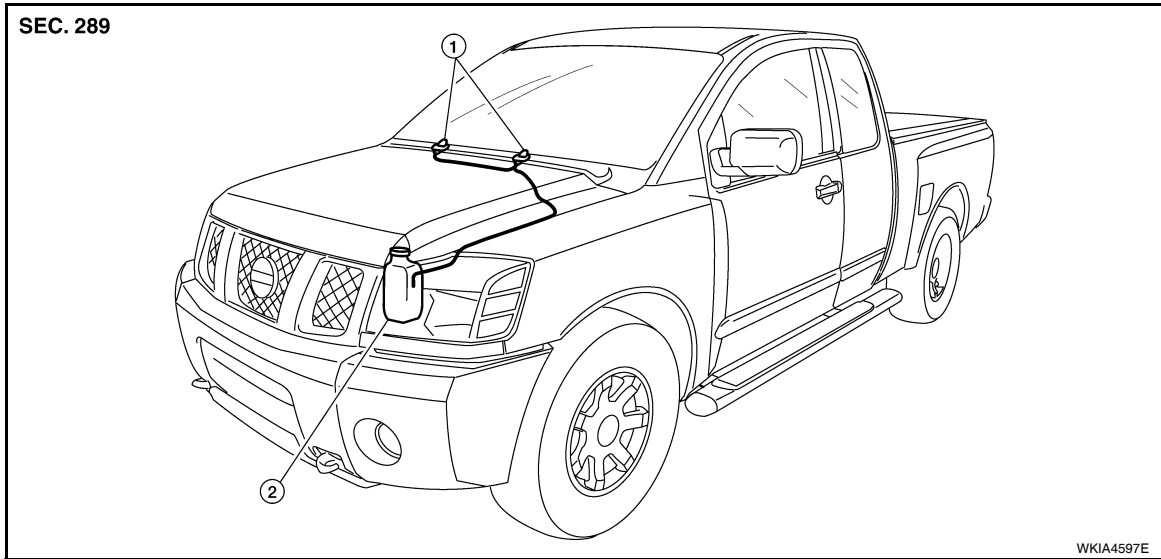
FRONT WASHER NOZZLE AND TUBE

< ON-VEHICLE REPAIR >

FRONT WASHER NOZZLE AND TUBE

Washer Tube Layout

INFOID:000000003789970

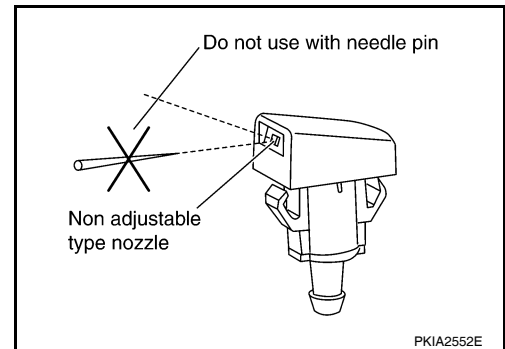


1. Washer nozzles
2. Washer fluid reservoir

Washer Nozzle Adjustment

INFOID:000000003789971

- This vehicle is equipped with non-adjustable washer nozzles.
- If not satisfied with washer fluid spray coverage, confirm that the washer nozzle is installed correctly.
- If the washer nozzle is installed correctly, and the washer fluid spray coverage is not satisfactory, replace washer nozzle.



FRONT WIPER AND WASHER SWITCH

< ON-VEHICLE REPAIR >

FRONT WIPER AND WASHER SWITCH

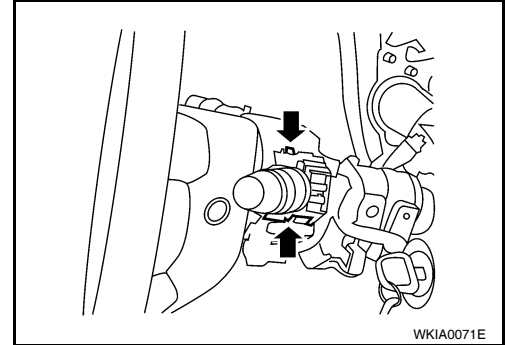
Wiper and Washer Switch

INFOID:000000003789972

REMOVAL AND INSTALLATION

Removal

1. Remove steering column covers.
2. Remove wiper washer switch connector.
3. Pinch tabs at wiper and washer switch base and slide switch away from steering column to remove.



Installation

Installation is in the reverse order of removal.

A
B
C
D
E
F
G
H
I
J
K
M
N
O
P

WW

WASHER PUMP

< ON-VEHICLE REPAIR >

WASHER PUMP

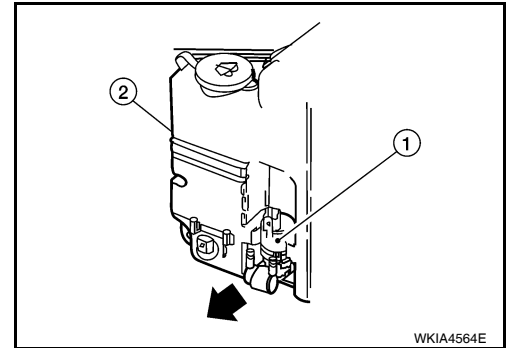
Washer Motor

INFOID:000000003789973

REMOVAL AND INSTALLATION

Removal

1. Remove washer fluid reservoir. Refer to [WW-61. "Washer Fluid Reservoir"](#).
2. Remove washer motor (1) in the direction of the arrow as shown, from washer fluid reservoir (2).



Installation

Installation is in the reverse order of removal.