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## SECTION

### WIPER, WASHER & HORN

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# PRECAUTION

## PRECAUTION

PFP:00011

### Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EKS003LC

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

### Wiring Diagrams and Trouble Diagnosis

EKS003GO

When you read wiring diagrams, refer to the following:

- Refer to [GI-12, "How to Read Wiring Diagrams"](#) .
- Refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#) for power distribution circuit.

When you perform trouble diagnosis, refer to the following:

- Refer to [GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#) .
- Refer to [GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident"](#) .

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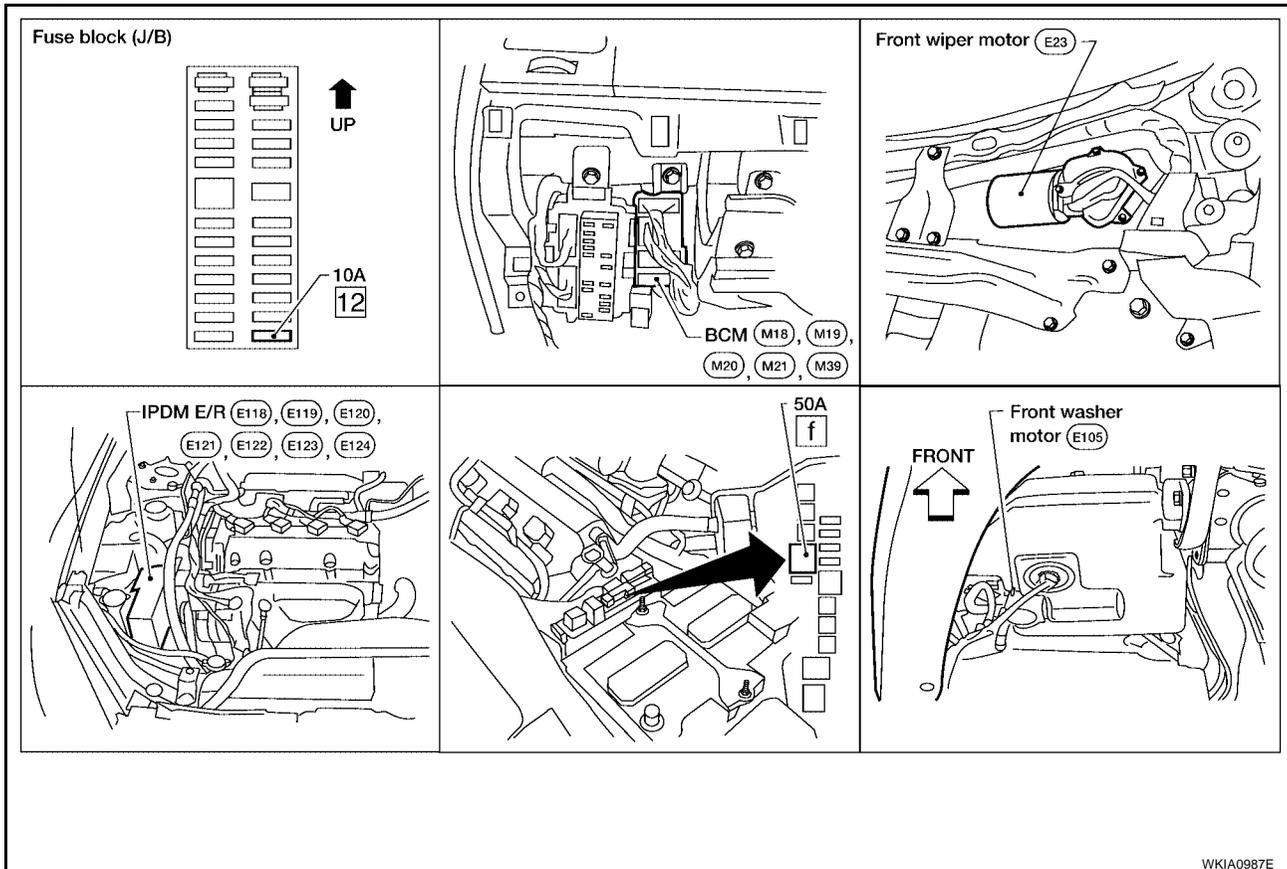
# FRONT WIPER AND WASHER SYSTEM

## FRONT WIPER AND WASHER SYSTEM

PF2:28810

### Components Parts and Harness Connector Location

EKS003GP



### System Description

EKS003GQ

- Both front wiper relays are located in IPDM E/R.
- Wiper switch (combination switch) is composed of a combination of 5 output terminals and 5 input terminals. Terminal combination status is read by BCM when switch is turned ON.
- BCM controls front wiper LO, HI, and INT (intermittent) operation.
- IPDM E/R operates wiper motor according to CAN communication signals from BCM.

### LOW SPEED WIPER OPERATION

Power is supplied at all times

- from BCM (input 1) terminal 48
- to combination switch terminal 1, and
- to 20A fuse (No. 39, located in the IPDM E/R).

When the ignition switch is in the ON or START position, and front wiper switch is turned to LO position, front wiper LO contact in combination switch comes ON, and

Power is supplied

- through combination switch terminal 3
- to BCM (input 3) terminal 50.

When BCM determines that wiper switch is in LO position, it uses CAN communications and Front wiper request signal (LO) is sent

- from BCM terminals 70 and 71
- to IPDM E/R terminals 48 and 49.

When IPDM E/R receives front wiper request signal (LO), it energizes front wiper relay (in IPDM E/R). Power is then supplied

- from 20A fuse (No. 39, located in the IPDM E/R)
- through front wiper relay (located in the IPDM E/R)

# FRONT WIPER AND WASHER SYSTEM

- through front wiper HI relay (located in the IPDM E/R)
- to IPDM E/R terminal 31
- to front wiper motor terminal L.

Ground is supplied

- to front wiper motor terminal E, and
- to IPDM E/R terminal 14 (and to front wiper relay)
- through body grounds E15 and E24.

With power and ground supplied, the front wiper motor operates at low speed.

## HI SPEED WIPER OPERATION

Power is supplied at all times

- from BCM (input 2) terminal 49
- to combination switch terminal 2, and
- to 20A fuse (No. 39, located in the IPDM E/R).

When the ignition switch is the ON or START position, and the front wiper switch is turned to HI position, front wiper HI contact in combination switch comes ON, and

Power is supplied

- through combination switch terminal 10
- to BCM (output 3) terminal 41.

When BCM determines that wiper switch is in HI position, it uses CAN communications and Front wiper request signal (HI) is sent to IPDM E/R

- from BCM terminals 70 and 71
- to IPDM E/R terminals 48 and 49.

When the IPDM E/R receives front wiper request signal (HI), it energizes the front wiper relay and front wiper HI relay. Under this condition,

Power is then supplied

- from 20A fuse (No. 39, located in the IPDM E/R)
- through front wiper relay (located in the IPDM E/R)
- through front wiper HI relay (located in the IPDM E/R)
- to IPDM E/R terminal 30
- to front wiper motor terminal H.

Ground is supplied

- to front wiper motor terminal E, and
- to IPDM E/R terminal 14 (and to front wiper relay and front wiper hi relay)
- through body grounds E15 and E24.

With power and ground supplied, the front wiper motor operates at high speed.

## INTERMITTENT OPERATION

Power is supplied at all times

- from BCM (input 2) terminal 49
- to combination switch terminal 2.

When the ignition switch is in ON or START position, and the front wiper switch is turned to INT position, the front wiper INT contact in the combination switch comes ON, and

Power is supplied

- from combination switch terminal 6
- to BCM (output 1) terminal 47.

When BCM determines that combination switch status is front wiper INT ON, it performs the following operations.

- When BCM detects ON/OFF status of intermittent operation dial positions 1, 2, and 3 (in same way as wiper INT), it determines wiper dial position status.
- BCM calculates operation interval from wiper dial position and vehicle speed signal received from combination meter through CAN communications.

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# FRONT WIPER AND WASHER SYSTEM

- BCM sends front wiper request signal (INT) to IPDM E/R at calculated operation interval.

When IPDM E/R receives front wiper request signal (INT), it turns ON internal front wiper relay. It then sends auto-stop signal to BCM, and conducts intermittent front wiper motor operation.

## AUTO STOP OPERATION

With wiper switch turned OFF, wiper motor will continue to operate until wiper arms reach windshield base. When wiper arms are not located at base of windshield with wiper switch OFF, ground is provided

- to the front wiper motor terminal E
- through body grounds E15 and E24.

Ground is also supplied

- through terminal 38 of the IPDM E/R
- to front wiper motor terminal P
- through terminal E of the front wiper motor and
- through body grounds E15 and E24.

When wiper arms reach base of windshield, front wiper motor terminals P and E are no longer connected. Then the IPDM E/R sends auto stop operation signal to BCM with CAN communication line.

When BCM receives auto stop operation signal, BCM sends wiper stop signal to IPDM E/R with CAN communication line.

IPDM E/R stops wiper motor. Wiper motor will then stop wiper arms at the STOP position.

## WASHER OPERATION

When the ignition switch is in ON or START position, power is supplied

- through 10A fuse (No. 46 located in the IPDM E/R)
- through IPDM E/R terminal 18
- to front washer motor terminal +.

When front wiper switch is turned to washer position, Ground is supplied

- to front washer motor terminal -
- through combination switch terminal 11
- through combination switch terminal 12
- through body grounds M57 and M61.

With ground supplied, the front washer motor is operated, and at the same time, Power is supplied

- through combination switch terminal 7
- to BCM (output 2) terminal 40.

When BCM detects that front washer motor has operated for 0.4 seconds or longer, BCM uses CAN communication and sends wiper request signal to IPDM E/R for low speed operation of wipers.

When BCM detects that washer switch is OFF, low speed operation cycles approximately 3 times and then stops.

## MIST OPERATION

When the wiper switch is turned to the mist position, wiper low speed operation cycles once and then stops.

For additional information about wiper operation under this condition, refer to [WW-4, "LOW SPEED WIPER OPERATION"](#).

If the switch is held in the mist position, low speed operation continues.

## FAIL-SAFE FUNCTION

BCM includes fail-safe function to prevent malfunction of electrical components controlled by CAN communications if a malfunction in CAN communications occurs.

BCM uses CAN communications to stop output of electrical components it controls.

Until ignition switch is turned off, front wiper remains in same status as just before fail-safe control was initiated. (If wiper was in low speed operation just before fail-safe, it continues low speed operation until ignition switch is turned OFF.)

When fail-safe status is initiated, BCM remains in standby until normal signals are received.

When normal signals are received, fail-safe status is canceled.

# FRONT WIPER AND WASHER SYSTEM

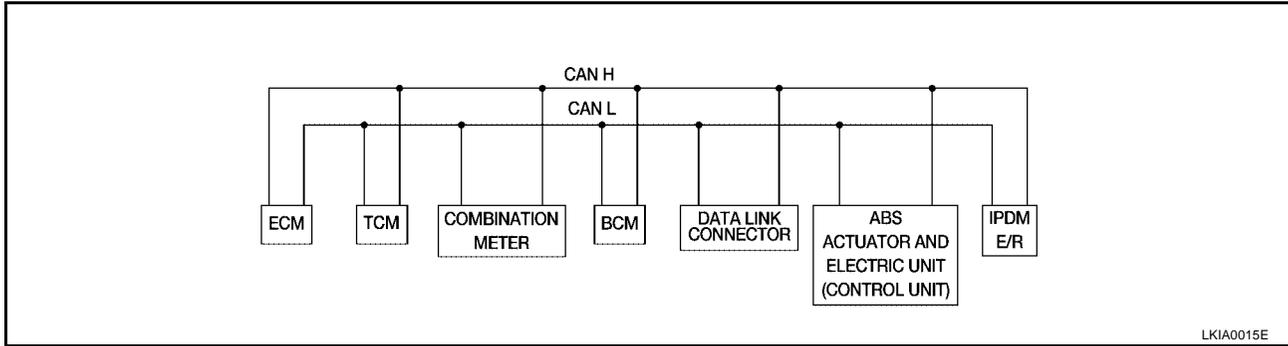
## CAN Communication System Description

EKS003GR

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

### FOR TCS MODELS

#### System Diagram



LKIA0015E

#### Input/Output Signal Chart

T: Transmit R: Receive

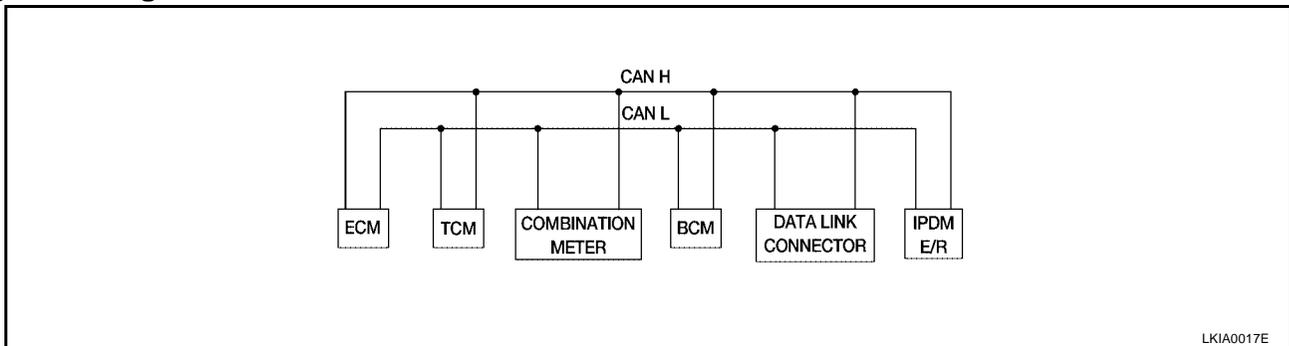
Signals	ECM	TCM	COMBINATION METER	BCM	ABS/TCS control unit	IPDM E/R
Engine speed signal	T		R		R	
Engine coolant temperature signal	T		R			
Accelerator pedal position signal	T					
Fuel consumption monitor signal	T		R			
A/T warning lamp signal		T	R			
A/T position indicator signal	R	T	R	R (R range only)	R	
ABS operation signal	R				T	
TCS operation signal	R	R			T	
Air conditioner switch signal	R			T		
Air conditioner compressor signal	R					T
A/C compressor request signal	T					R
Cooling fan motor operation signal	R					T
Cooling fan speed request signal	T					R
Position lights request			R	T		R
Position lights status				R		T
Low beam request				T		R
Low beam status	R			R		T
High beam request			R	T		R
High beam status	R			R		T
Front fog lights request				T		R
Front fog light status				R		T
OD cancel switch signal		R	T			R
Brake switch signal		R	T			
Vehicle speed signal	R		T			
	R		T	R		

# FRONT WIPER AND WASHER SYSTEM

Signals	ECM	TCM	COMBINATION METER	BCM	ABS/TCS control unit	IPDM E/R
Oil pressure switch			R			T
Sleep request1			R	T		
Sleep request2				T		R
N range switch signal		R	T			
P range switch signal		R	T			
Seat belt buckle switch signal			T	R		
Door switch signal			R	T		R
Tail lamp request			R	T		R
Turn indicator signal			R	T		
Buzzer output signal			R	T		
Trunk switch signal			R	T		
ASCD main switch signal	T		R			
ASCD cruise signal	T		R			
Wiper operation				R		T
Wiper stop position signal				R		T
Rear window defogger switch signal				T		R
Rear window defogger control signal	R			R		T

## FOR A/T MODELS

### System Diagram



### Input/Output Signal Chart

T: Transmit R: Receive

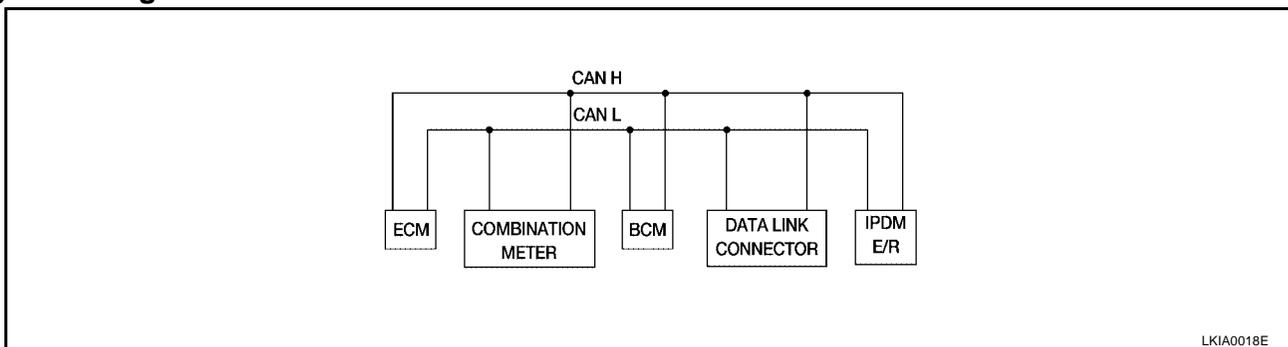
Signals	ECM	TCM	COMBINATION METER	BCM	IPDM E/R
Engine speed signal	T		R		
Engine coolant temperature signal	T		R		
Accelerator pedal position signal	T				R
Fuel consumption monitor signal	T		R		
A/T warning lamp signal		T	R		
A/T position indicator signal	R	T	R	R (R range only)	
Air conditioner switch signal	R			T	
Air conditioner compressor signal	R				T
A/C compressor request signal	T				R
Blower fan switch signal	R <sup>(QR25DE)</sup>			T	
Cooling fan motor operation signal	R			T	

# FRONT WIPER AND WASHER SYSTEM

Signals	ECM	TCM	COMBINATION METER	BCM	IPDM E/R
Cooling fan speed request signal	T				R
Position lights request			R	T	R
Position lights status				R	T
Low beam request				T	R
Low beam status	R			R	T
High beam request			R	T	R
High beam status	R			R	T
Front fog lights request				T	R
Front fog light status				R	T
OD cancel switch signal		R	T		R
Brake switch signal		R	T		
Vehicle speed signal	R		T		
	R		T	R	
Oil pressure switch			R		T
Sleep request1			R	T	
Sleep request2				T	R
N range switch signal		R	T		
P range switch signal		R	T		
Seat belt buckle switch signal			T	R	
Door switch signal			R	T	R
Tail lamp request			R	T	R
Turn indicator signal			R	T	
Buzzer output signal			R	T	
Trunk switch signal			R	T	
ASCD main switch signal	T		R		
ASCD cruise signal	T		R		
Wiper operation				R	T
Wiper stop position signal				R	T
Rear window defogger switch signal				T	R
Rear window defogger control signal	R			R	T

## FOR M/T MODELS

### System Diagram



LKIA0018E

# FRONT WIPER AND WASHER SYSTEM

## Input/Output Signal Chart

T: Transmit R: Receive

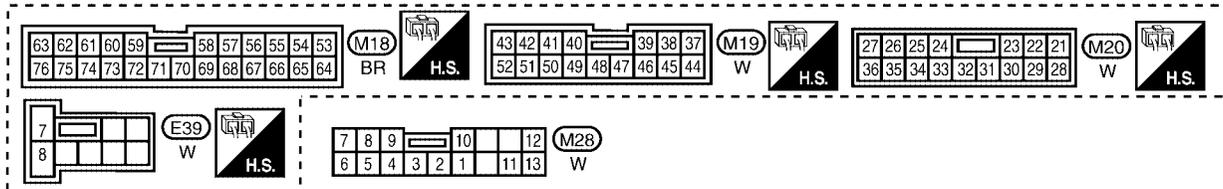
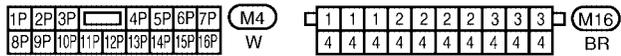
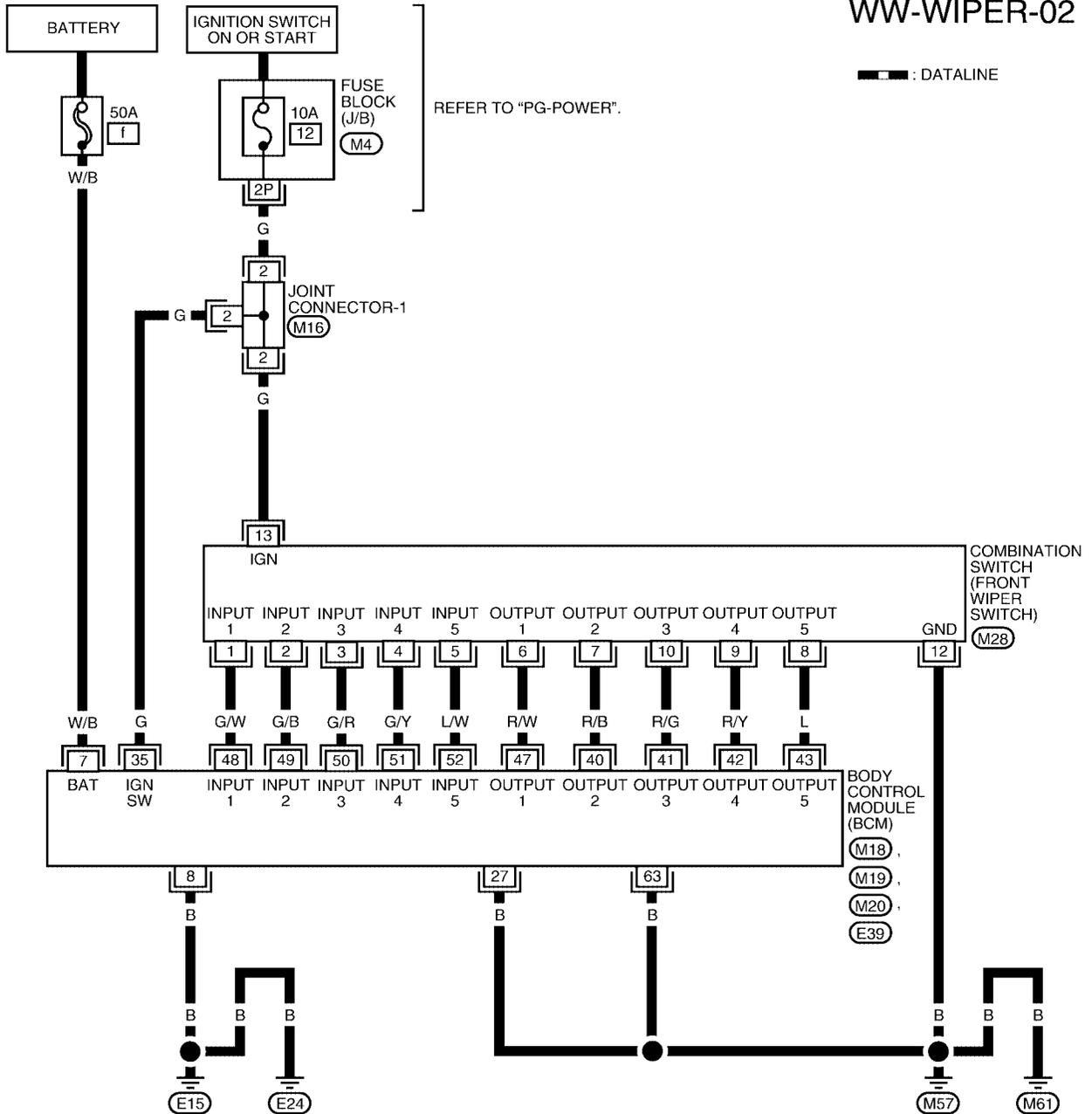
Signals	ECM	COMBINATION METER	BCM	IPDM E/R
Engine speed signal	T			
Engine coolant temperature signal	T			
Fuel consumption monitor signal	T			
Air conditioner switch signal	R		T	
Air conditioner compressor signal	R			T
A/C compressor request signal	T			R
Blower fan switch signal	R <sup>(QR25DE)</sup>		T	
Cooling fan motor operation signal	R			T
Cooling fan speed request signal	T			R
Position lights request		R	T	R
Position lights status			R	T
Low beam request			T	R
Low beam status	R		R	T
High beam request		R	T	R
High beam status	R		R	T
Front fog lights request			T	R
Front fog light status			R	T
Vehicle speed signal	R	T		
Oil pressure switch		R		T
Sleep request1		R	T	
Sleep request2			T	R
Seat belt buckle switch signal		T	R	
Door switch signal		R	T	R
Tail lamp request		R	T	R
Turn indicator signal		R	T	
Buzzer output signal		R	T	
Trunk switch signal		R	T	
ASCD main switch signal	T	R		
ASCD cruise signal	T	R		
Wiper operation			R	T
Wiper stop position signal			R	T
Rear window defogger switch signal			T	R
Rear window defogger control signal	R		R	T



# FRONT WIPER AND WASHER SYSTEM

WW-WIPER-02

— : DATALINE



WKWA0273E

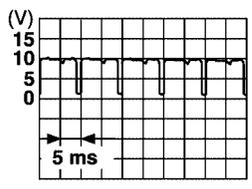
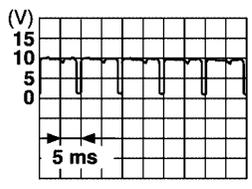
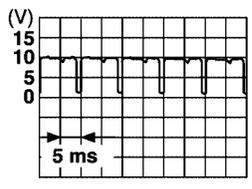
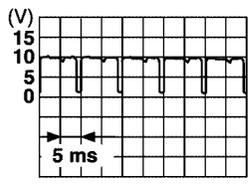
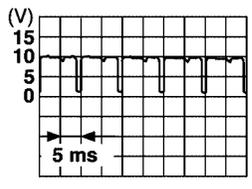
# FRONT WIPER AND WASHER SYSTEM

## Terminals and Reference Value for BCM

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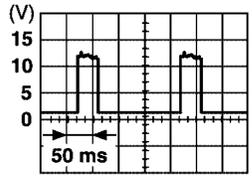
Terminal No. (Wire color)	Signal name	Measuring condition		Standard (V) (Pyrex.)
		Ignition switch	Operation or condition	
7 (W/B)	Battery power	—	—	12
8 (B)	Ground	—	—	0
35 (G)	IGN power	ON	—	12
40 (R/B)	Combination switch output 2	ON	Light switch and wiper switch OFF	 <p style="text-align: right; font-size: small;">SKIA1119J</p>
41 (R/G)	Combination switch output 3	ON	Light switch and wiper switch OFF	 <p style="text-align: right; font-size: small;">SKIA1119J</p>
42 (R/Y)	Combination switch output 4	ON	Light switch and wiper switch OFF	 <p style="text-align: right; font-size: small;">SKIA1119J</p>
43 (L)	Combination switch output 5	ON	Light switch and wiper switch OFF	 <p style="text-align: right; font-size: small;">SKIA1119J</p>
47 (R/W)	Combination switch output 1	ON	Light switch and wiper switch OFF	 <p style="text-align: right; font-size: small;">SKIA1119J</p>
48 (G/W)	Combination switch input 1 (Front washer, front wiper LO)	ON	Light switch and wiper switch OFF	4.5 or more
49 (G/B)	Combination switch input 2 (Front wiper HI, front wiper INT)	ON	Light switch and wiper switch OFF	4.5 or more
50 (G/R)	Combination switch input 3 (intermittent operation dial position 1)	ON	Light switch and wiper switch OFF	4.5 or more

# FRONT WIPER AND WASHER SYSTEM

Terminal No. (Wire color)	Signal name	Measuring condition		Standard (V) (Pyrex.)
		Ignition switch	Operation or condition	
51 (G/Y)	Combination switch input 4 (intermittent operation dial position 3)	ON	Light switch and wiper switch OFF	4.5 or more
52 (L/W)	Combination switch input 5 (intermittent operation dial position 2)	ON	Light switch and wiper switch OFF	4.5 or more
70 (L)	CAN HI	ON	—	—
71 (Y)	CAN LO	ON	—	—

## Terminals and Reference Values for IPDM E/R

EKS003GU

Terminal No. (Wire color)	Signal name	Measuring condition		Reference value (V) (Pyrex.)	
		Ignition switch	Operation or condition		
14 (B)	Ground	—	—	0	
18 (R/W)	Front washer motor power	ON	—	12	
30 (L/B)	Hi speed signal	ON	Wiper switch	OFF	0
				HI	12
31 (L)	Low speed signal	ON	Wiper switch	OFF	0
				LO	12
38 (L/Y)	Wiper position detection signal	ON	Wiper switch	OFF	12
				LO	
48 (L)	CAN HI	ON	—	—	
49 (Y)	CAN LO	ON	—	—	

SKIA1132J

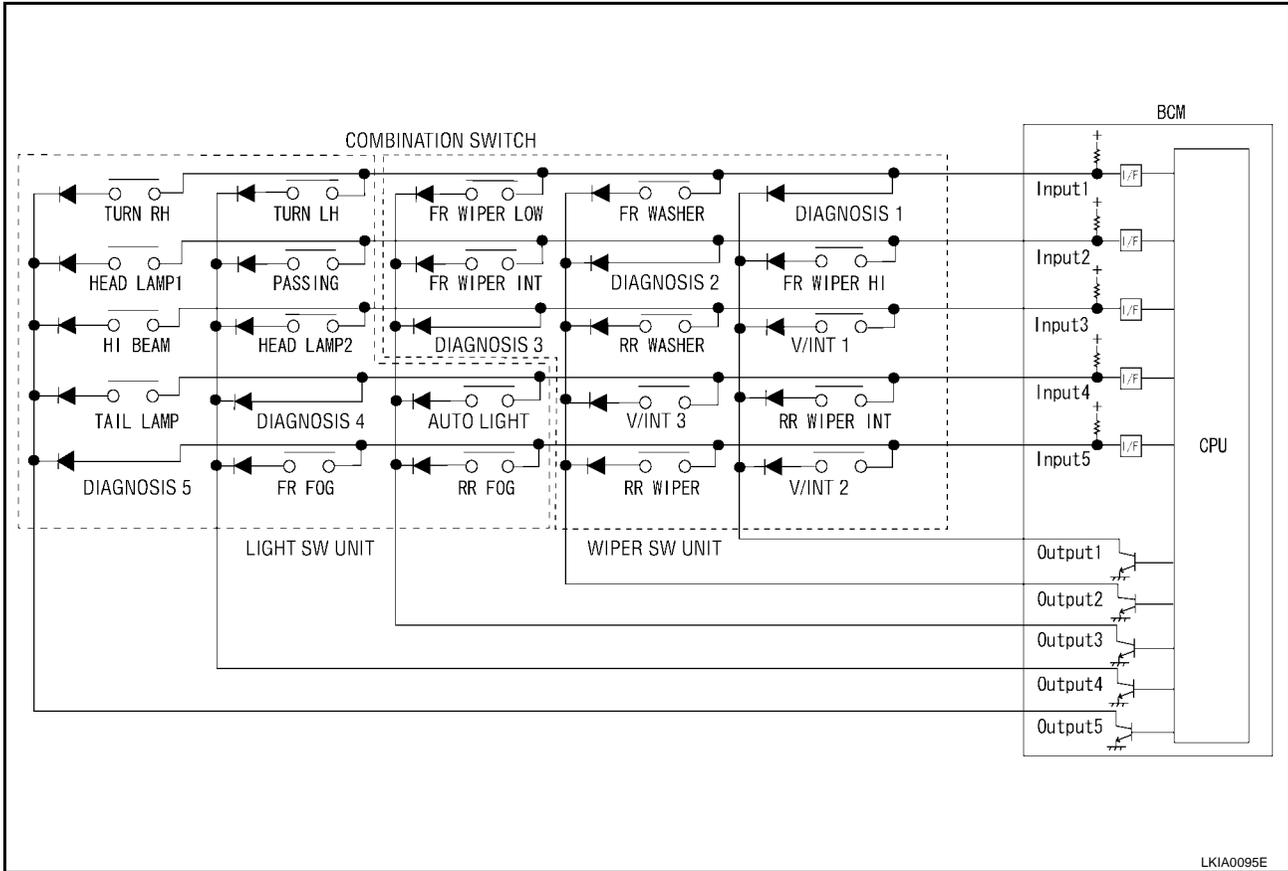
## BCM Wiper Switch Reading Function

EKS003GV

BCM reads combination switch (wiper switch) status, and controls front wipers based on the results.

# FRONT WIPER AND WASHER SYSTEM

BCM is a combination of 5 output terminals (OUTPUT 1 - 5) and 5 input terminals (INPUT 1 - 5). It reads 20 types of switch data and 5 types of diagnosis data.



## OPERATION DESCRIPTION

BCM continuously outputs power voltage from input terminals (INPUT 1 - 5). At this time, output terminals (OUTPUT 1 - 5) operate transistors in sequence and carry current. If any switch (or switches) become ON at this time, the input terminal corresponding to that switch detects current flowing, and BCM determines that the switch is ON.

## TABLE OF BCM - COMBINATION SWITCH OPERATIONS

BCM reads operation status of combination switch using combinations shown in table below.

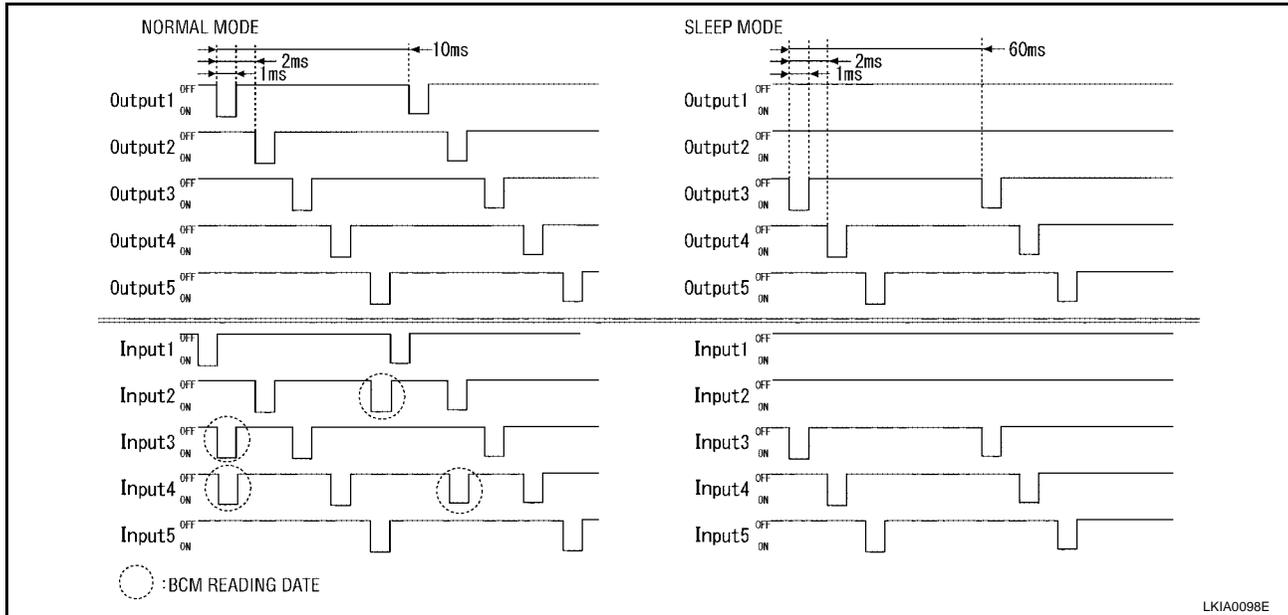
	COMB SW INPUT 1		COMB SW INPUT 2		COMB SW INPUT 3		COMB SW INPUT 4		COMB SW INPUT 5	
	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
COMB SW OUTPUT 1	DIAGNOSIS 1 OK	DIAGNOSIS 1 NG	FR WIPER HI ON	FR WIPER HI OFF	V/INT 1 ON	V/INT 1 OFF	RR WIPER INT ON	RR WIPER INT OFF	V/INT 2 ON	V/INT 2 OFF
COMB SW OUTPUT 2	FR WASHER ON	FR WASHER OFF	DIAGNOSIS 2 OK	DIAGNOSIS 2 NG	RR WASHER ON	RR WASHER OFF	V/INT 3 ON	V/INT 3 OFF	RR WIPER ON	RR WIPER OFF
COMB SW OUTPUT 3	FR WIPER LOW ON	FR WIPER LOW OFF	FR WIPER INT ON	FR WIPER INT OFF	DIAGNOSIS 3 OK	DIAGNOSIS 3 NG	AUTO LIGHT ON	AUTO LIGHT OFF	RR FOG ON	RR FOG OFF
COMB SW OUTPUT 4	TURN LH ON	TURN LH OFF	PASSING ON	PASSING OFF	HEAD LAMP 2 ON	HEAD LAMP 2 OFF	DIAGNOSIS 4 OK	DIAGNOSIS 4 NG	FR FOG ON	FR FOG OFF
COMB SW OUTPUT 5	TURN RH ON	TURN RH OFF	HEAD LAMP ON	HEAD LAMP OFF	HI BEAM ON	HI BEAM OFF	LIGHTING SWITCH 1ST POSITION ON	LIGHTING SWITCH 1ST POSITION OFF	DIAGNOSIS 5 OK	DIAGNOSIS 5 NG



# FRONT WIPER AND WASHER SYSTEM

## Sleep status

When BCM is in sleep status, output from OUTPUT 1 and 2 transistors stops, with BCM entering a power-saving mode. OUTPUT (3 - 5) turn ON-OFF every 60 ms, and only input from light switch system is accepted.



## INTERMITTENT OPERATION

Wiper intermittent operation delay interval is determined from a combination of 3 switches (intermittent operation dial position 1, intermittent operation dial position 2, and intermittent operation dial position 3) and vehicle speed signal.

During each intermittent operation delay interval, BCM sends front wiper request signal to IPDM E/R.

## Wiper Dial Position Setting

Wiper dial position	Intermittent operation interval	Combination switch		
		Intermittent operation dial position 1	Intermittent operation dial position 2	Intermittent operation dial position 3
Wiper dial position 1	Small	ON	ON	ON
Wiper dial position 2		ON	ON	OFF
Wiper dial position 3		ON	OFF	OFF
Wiper dial position 4	↓	OFF	OFF	OFF
Wiper dial position 5		OFF	OFF	ON
Wiper dial position 6		OFF	ON	ON
Wiper dial position 7		Large	OFF	ON

Example: For wiper dial position 1...

Using combination switch reading function, BCM detects ON/OFF status of intermittent operation dial positions 1, 2, and 3.

When combination switch status is as listed below, BCM determines that it is wiper dial position 1.

- Intermittent operation dial position 1: ON (input 3 and output 1 are conducting.)
- Intermittent operation dial position 2: ON (input 5 and output 1 are conducting.)
- Intermittent operation dial position 3: ON (input 4 and output 2 are conducting.)

BCM determines front wiper intermittent operation delay interval from wiper dial position 1 and vehicle speed, and sends wiper request signal (INT) to IPDM E/R.

## Work Flow

EKS003GW

1. Confirm the trouble symptom or customer complaint.
2. Understand the system description, refer to [WW-4, "System Description"](#) .
3. Perform preliminary inspection, refer to [WW-18, "Preliminary Inspection"](#) .
4. According to the trouble diagnosis chart, repair or replace the cause of the malfunction.

# FRONT WIPER AND WASHER SYSTEM

5. Does wiper function operate normally? If it operates normally, GO TO 6. If not, GO TO 4.  
 6. End.

## Preliminary Inspection INSPECTION FOR POWER SUPPLY AND GROUND CIRCUIT

EKS003GX

Inspection procedure

### 1. CHECK FUSE

- Check if wiper and washer fuse is blown.

Unit	Power source	Fuse No.
Front washer motor	Ignition ON or START	46
Front wiper relay	Battery	39
Front wiper relay, front wiper HI relay	Ignition ON or START	33

OK or NG

OK >> GO TO 2.

NG >> If fuse is blown, be sure to eliminate cause of problem before installing new fuse, refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#) .

### 2. GROUND CIRCUIT INSPECTION (BCM)

Check for continuity between the following terminals on BCM connector and body ground.

Unit (Connector)	Terminals (wire color)		Ignition switch condition	Continuity
	(+)	(-)		
BCM (E39)	8 (B)	Body ground	OFF	Continuity should exist
BCM (M20)	27 (B)			
BCM (M18)	63 (B)			

OK or NG

OK >> INSPECTION END.

NG >> Repair/replace BCM ground circuit.

## CONSULT-II Functions

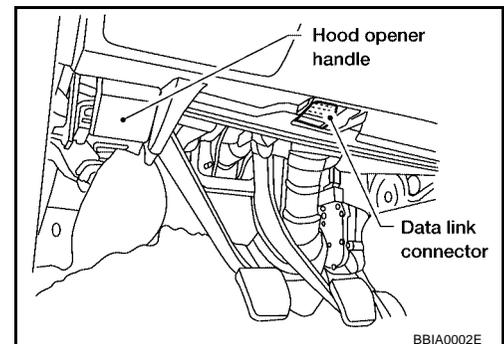
EKS003GY

CONSULT-II has functions for display of work support, self-diagnosis, data monitor, and active tests for each part, using received data and transmitted commands through communications lines from BCM.

BCM diagnosis location	Check item, diagnosis mode	Description
Wiper	Data monitor	Displays BCM input data in real time.
	Active test	Load operation can be checked by applying a drive signal to load.

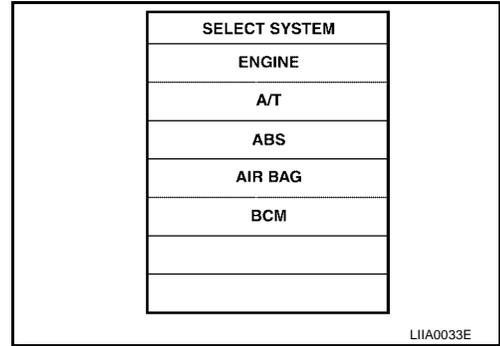
## CONSULT-II OPERATION

1. With the ignition switch OFF, connect CONSULT-II to the vehicle-side data link connector, then turn the ignition switch ON.
2. Touch "START".

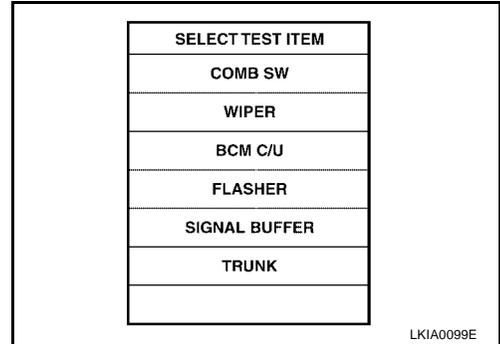


# FRONT WIPER AND WASHER SYSTEM

3. Touch "BCM" on the "SELECT SYSTEM" screen.



4. Select the desired part to be diagnosed on the "SELECT TEST ITEM" screen.



## DATA MONITOR

### Operation Procedure

1. Touch "WIPER" on the "SELECT TEST ITEM" screen.
2. Touch "DATA MONITOR" on the "SELECT DIAG MODE" screen.
3. Touch either "ALL SIGNALS" or "SELECTION FROM MENU" on the "DATA MONITOR" screen.

All signals	Monitors all the items.
Selection from menu	Selects and monitors the individual item selected.

4. Touch "START".
5. When "SELECTION FROM MENU" is selected, touch items to be monitored. When "ALL SIGNALS" is selected, all the items will be monitored.

### Display Item List

Monitor item name "OPERATION OR UNIT"	Contents
IGN ON SW "ON/OFF"	Displays "IGN Position (ON)/OFF, ACC Position (OFF)" status as judged from ignition switch signal.
FR WIPER INT "ON/OFF"	Displays "Front Wiper INT (ON)/Other (OFF)" status as judged from wiper switch signal.
FR WIPER LOW "ON/OFF"	Displays "Front Wiper LOW (ON)/Other (OFF)" status as judged from wiper switch signal.
FR WIPER HI "ON/OFF"	Displays "Front Wiper HI (ON)/Other (OFF)" status as judged from wiper switch signal.
FR WASHER SW "ON/OFF"	Displays "Front Washer Switch (ON)/Other (OFF)" status as judged from wiper switch signal.
INT VOLUME (1 - 7)	Displays intermittent operation dial position setting (1 - 7) as judged from wiper switch signal.
VHCL SPEED SEN "ON/OFF"	Displays "Driving (ON)/Stopped (OFF)" status as judged from vehicle speed signal.
FR WIPER STOP "ON/OFF"	Displays "Stopped (ON)/Operating (OFF)" status as judged from the auto-stop signal.

## ACTIVE TEST

### Operation Procedure

1. Touch "WIPERS" on the "SELECT TEST ITEM" screen.

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
WW

# FRONT WIPER AND WASHER SYSTEM

2. Touch "ACTIVE TEST" on the "SELECT DIAG MODE" screen.
3. Touch item to be tested and check operation of the selected item.
4. During the operation check, touching "BACK" deactivates the operation.

## Display Item List

Test item	Display on CONSULT-II screen	Description
Front wiper HI output	FR WIPER (HI)	Front wiper HI can be operated by any ON-OFF operation.
Front wiper LO output	FR WIPER (LO)	Front wiper LO can be operated by any ON-OFF operation.
Front wiper INT output	FR WIPER (INT)	Front wiper INT can be operated by any ON-OFF operation.

## Trouble Diagnosis FRONT WIPER DOES NOT OPERATE

EKS003GZ

### 1. IPDM E/R TO FRONT WIPERS (1) INSPECTION

1. Turn on front wipers using active test. Refer to [WW-19, "ACTIVE TEST"](#) .
2. Confirm front wiper operation.

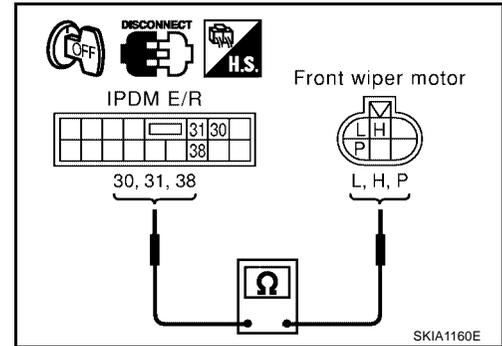
OK or NG

- OK    >> GO TO 4.  
 NG    >> GO TO 2.

### 2. IPDM E/R TO FRONT WIPERS (2) INSPECTION

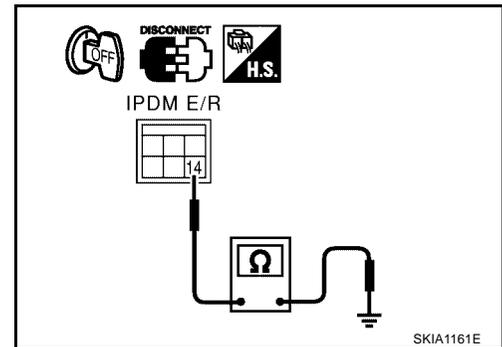
1. Disconnect IPDM E/R connector and front wiper motor connector.
2. Check continuity between IPDM E/R harness connector terminals and front wiper motor harness connector terminals.

Terminals				Continuity
IPDM E/R		Front wiper motor		
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
E122	30 (L/B)	E23	H (L/B)	YES
	31 (L)		L (L)	
	38 (L/Y)		P (L/Y)	



3. Check continuity between IPDM E/R harness connector terminal and body ground.

Terminals			Continuity
IPDM E/R		Body ground	YES
Connector	Terminal (wire color)		
E123	14 (B)		



OK or NG

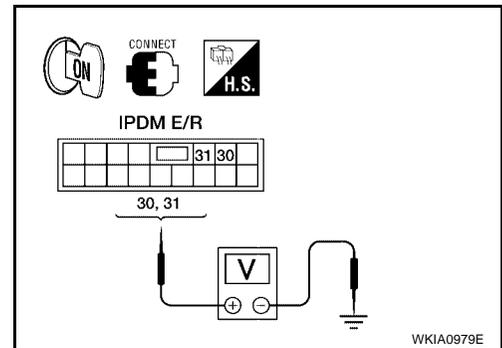
- OK    >> Connect connector. GO TO 3.  
 NG    >> ● Check for short circuit or open circuit in harness between IPDM E/R and front wiper motor.  
       ● Check for open circuit in harness between IPDM E/R and body ground.

# FRONT WIPER AND WASHER SYSTEM

## 3. IPDM E/R INSPECTION

Select "FR WIPER HI" during active test. Refer to [WW-19, "ACTIVE TEST"](#). When front wiper relay, and front wiper HI relay are operating, check voltage between IPDM E/R terminals and body ground.

Terminals			Condition	Voltage (Pyrex.)
IPDM E/R(+)		Ground		
Connector	Terminal (wire color)			
E122	31 (L)		Stopped	0
			LO operation	Battery voltage
	30 (L/B)		Stopped	0
			HI operation	Battery voltage



OK or NG

- OK >> Replace wiper motor, refer to [WW-26, "Removal and Installation for Wiper Motor and Linkage"](#).
- NG >> Replace IPDM E/R, refer to [PG-24, "Removal and Installation of IPDM E/R"](#).

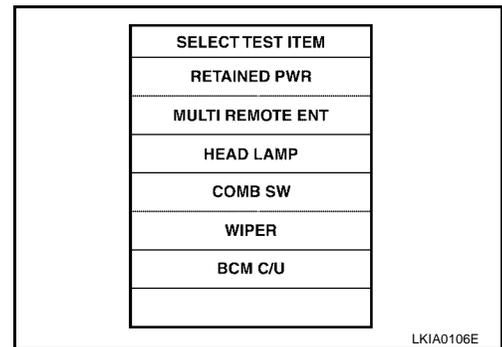
## 4. COMBINATION SWITCH TO BCM (1) INSPECTION

Select BCM on Consult-II. Carry out self-diagnosis of "BCM C/U".  
Displayed self-diagnosis results

No malfunction detected>> GO TO 5.

CAN communications or CAN system>> Inspect the BCM CAN communications system. Go to [BCS-15, "CAN Communication Inspection Using CONSULT-II \(Self-Diagnosis\)"](#)

OPEN DETECT 1 - 5>>Combinations switch system malfunction.  
Go to [BCS-16, "Combination Switch Inspection According to Self-Diagnostic Results"](#).

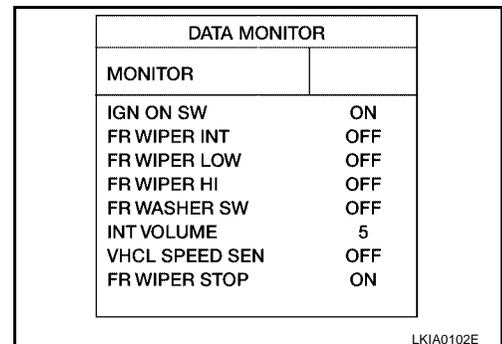


## 5. COMBINATION SWITCH TO BCM (2) INSPECTION

Select BCM on Consult-II. With "WIPER" data monitor, check that "FR WIPER INT", "FR WIPER LOW" and "FR WIPER HI" turn ON-OFF according to operation of wiper switch.

OK or NG

- OK >> Replace BCM.
- NG >> Replace wiper switch, refer to [WW-29, "Removal and Installation for Wiper and Washer Switch"](#).



# FRONT WIPER AND WASHER SYSTEM

## FRONT WIPER STOP POSITION IS INCORRECT

### 1. IPDM E/R TO FRONT WIPER MOTOR (1) INSPECTION

Select BCM on Consult-II. With "WIPER" data monitor, check that "FR WIPER STOP" turns ON-OFF according to wiper operation.

OK or NG

- OK >> Replace IPDM E/R, refer to [PG-24, "Removal and Installation of IPDM E/R"](#) .
- NG >> GO TO 2.

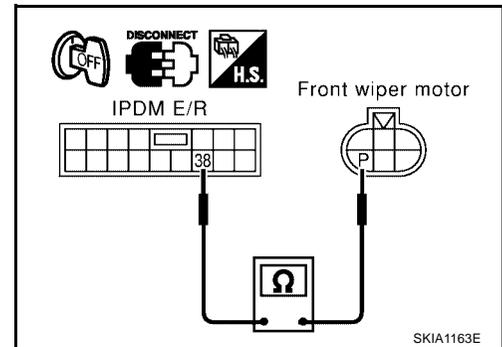
DATA MONITOR	
MONITOR	
IGN ON SW	ON
FR WIPER INT	OFF
FR WIPER LOW	OFF
FR WIPER HI	OFF
FR WASHER SW	OFF
INT VOLUME	5
VHCL SPEED SEN	OFF
FR WIPER STOP	ON

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### 2. IPDM E/R TO FRONT WIPER MOTOR (2) INSPECTION

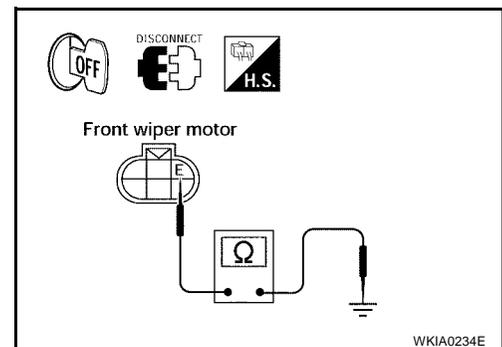
1. Disconnect IPDM E/R connector and front wiper motor connector.
2. Check continuity between IPDM E/R harness connector terminal and front wiper motor harness connector terminal.

Terminals				Continuity
IPDM E/R		Front wiper motor		
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
E122	38 (L/Y)	E23	P (L/Y)	YES



3. Check continuity between front wiper motor harness connector terminal E and body ground.

Terminals			Continuity
IPDM E/R		Ground	
Connector	Terminal (wire color)		
E23	E (B)	YES	



OK or NG

- OK >> Connect connector. GO TO 3.
- NG >> ● Check for short circuit or open circuit in harness between IPDM E/R and front wiper motor.
- Check for open circuit in harness between front wiper motor and body ground.

# FRONT WIPER AND WASHER SYSTEM

## 3. IPDM E/R TO FRONT WIPER MOTOR (3) INSPECTION

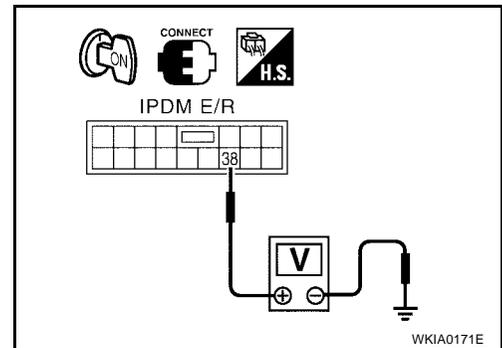
While front wiper motor is stopped and while operating, measure voltage between IPDM E/R terminal 38 and body ground.

Terminals				Voltage (Pyrex.)
IPDM E/R (+)		Ground (-)	Condition	
Connector	Terminal (wire color)			
E122	38 (L/Y)		Wiper operating	Fluctuating
			Wiper stopped	12V

OK or NG

OK >> Replace IPDM E/R, refer to [PG-24, "Removal and Installation of IPDM E/R"](#).

NG >> Replace front wiper motor, refer to [WW-26, "Removal and Installation for Wiper Motor and Linkage"](#).



## ONLY FRONT WIPER LOW DOES NOT OPERATE

### 1. COMBINATION SWITCH TO BCM INSPECTION

Select BCM on Consult-II. With "WIPER" data monitor, check that "FR WIPER LOW" turns ON-OFF according to operation of wiper switch.

OK or NG

OK >> Replace BCM.

NG >> Replace wiper switch, refer to [WW-29, "Removal and Installation for Wiper and Washer Switch"](#).

DATA MONITOR	
MONITOR	
IGN ON SW	ON
FR WIPER INT	OFF
FR WIPER LOW	OFF
FR WIPER HI	OFF
FR WASHER SW	OFF
INT VOLUME	5
VHCL SPEED SEN	OFF
FR WIPER STOP	ON

## ONLY FRONT WIPER HI DOES NOT OPERATE

### 1. IPDM E/R TO FRONT WIPERS (1) INSPECTION

1. Select "FR WIPER HI" during active test. Refer to [WW-19, "ACTIVE TEST"](#).

2. Verify that front wipers operate in HI operation mode.

OK or NG

OK >> GO TO 4.

NG >> GO TO 2.

### 2. IPDM E/R TO FRONT WIPERS (2) INSPECTION

1. Disconnect IPDM E/R connector and front wiper motor connector.

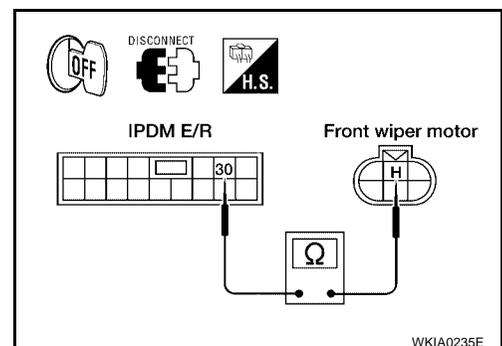
2. Check continuity between IPDM E/R vehicle side connector terminals and front wiper motor harness connector terminals.

Terminals				Continuity
IPDM E/R		Front wiper motor		
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
E122	30 (L/B)	E23	H (L/B)	YES

OK or NG

OK >> Connect connector. GO TO 3.

NG >> Check for short circuit or open circuit in harness between IPDM E/R and front wiper motor.



# FRONT WIPER AND WASHER SYSTEM

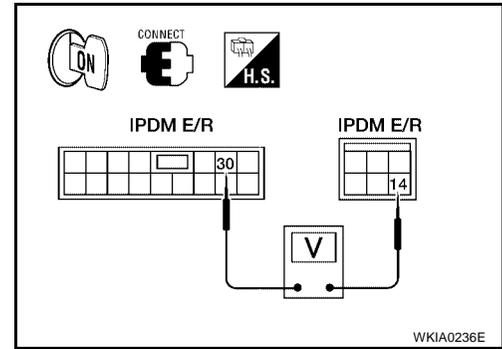
## 3. IPDM E/R INSPECTION

Select "FR WIPER HI" during active test. Refer to [WW-19, "ACTIVE TEST"](#) . When front wiper relay (HI) is operating, check voltage between IPDM E/R terminal 30 and terminal 14.

Terminals			Voltage (Pyrex.)
IPDM E/R			
Connector	Terminal (wire color)	Terminal (wire color)	
E122	30 (L/B)	14 (B)	12

OK or NG

- OK >> Replace wiper motor, refer to [WW-26, "Removal and Installation for Wiper Motor and Linkage"](#) .
- NG >> Replace IPDM E/R, refer to [PG-24, "Removal and Installation of IPDM E/R"](#) .



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## 4. COMBINATION SWITCH TO BCM INSPECTION

Select BCM on Consult-II. With "WIPER" data monitor, check that "FR WIPER HI" turns ON-OFF according to operation of wiper switch.

OK or NG

- OK >> Replace BCM.
- NG >> Replace wiper switch, refer to [WW-29, "Removal and Installation for Wiper and Washer Switch"](#) .

DATA MONITOR	
MONITOR	
IGN ON SW	ON
FR WIPER INT	OFF
FR WIPER LOW	OFF
FR WIPER HI	OFF
FR WASHER SW	OFF
INT VOLUME	5
VHCL SPEED SEN	OFF
FR WIPER STOP	ON

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### ONLY FRONT WIPER INT DOES NOT OPERATE

#### 1. COMBINATION SWITCH TO BCM INSPECTION

Select BCM on Consult-II. With "WIPER" data monitor, check that "FR WIPER INT" turns ON-OFF according to operation of wiper switch.

OK or NG

- OK >> Replace BCM.
- NG >> Replace wiper switch, refer to [WW-29, "Removal and Installation for Wiper and Washer Switch"](#) .

DATA MONITOR	
MONITOR	
IGN ON SW	ON
FR WIPER INT	OFF
FR WIPER LOW	OFF
FR WIPER HI	OFF
FR WASHER SW	OFF
INT VOLUME	5
VHCL SPEED SEN	OFF
FR WIPER STOP	ON

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# FRONT WIPER AND WASHER SYSTEM

## FRONT WIPER INTERMITTENT OPERATION SWITCH POSITION CANNOT BE ADJUSTED

### 1. COMBINATION SWITCH TO BCM INSPECTION

Select BCM on Consult-II. With "WIPER" data monitor, check that "INT VOLUME" changes in order from 1 to 7 according to operation of the intermittent switch dial position.

OK or NG

OK >> Replace BCM.

NG >> Replace wiper switch, refer to [WW-29, "Removal and Installation for Wiper and Washer Switch"](#) .

DATA MONITOR	
MONITOR	
IGN ON SW	ON
FR WIPER INT	OFF
FR WIPER LOW	OFF
FR WIPER HI	OFF
FR WASHER SW	OFF
INT VOLUME	5
VHCL SPEED SEN	OFF
FR WIPER STOP	ON

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## WIPERS DO NOT WIPE WHEN FRONT WASHER OPERATES

### 1. COMBINATION SWITCH TO BCM INSPECTION

Select BCM on Consult-II. With "WIPER" data monitor, check that "FR WASHER SW" turns ON-OFF according to operation of front washer switch.

OK or NG

OK >> Replace BCM.

NG >> Replace wiper switch, refer to [WW-29, "Removal and Installation for Wiper and Washer Switch"](#) .

DATA MONITOR	
MONITOR	
IGN ON SW	ON
FR WIPER INT	OFF
FR WIPER LOW	OFF
FR WIPER HI	OFF
FR WASHER SW	OFF
INT VOLUME	5
VHCL SPEED SEN	OFF
FR WIPER STOP	ON

LKIA0102E

A  
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M

WW

# FRONT WIPER AND WASHER SYSTEM

## Removal and Installation for Front Wiper Arms, Adjustment for Wiper Arms Stop Location

EKS003H0

### REMOVAL

1. Operate wiper motor, and stop it at the auto stop position.
2. Remove the wiper arm caps and mounting nuts, and remove wiper arms from vehicle.

### INSTALLATION

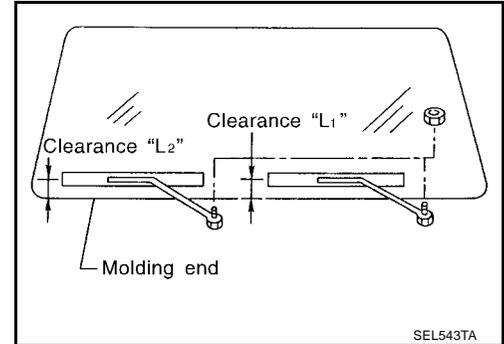
1. Prior to wiper arm installation, turn on wiper switch to operate wiper motor and then turn it "OFF" (Auto Stop).
2. Lift the blade up and then set it down onto glass surface to set the blade center to clearance "L1" & "L2" immediately before tightening nut.
3. Eject washer fluid. Turn on wiper switch to operate wiper motor and then turn it "OFF".
4. Ensure that wiper blades stop within clearance "L1" & "L2".

**Clearance "L1" : 24.5 - 39.5 MM. (0.965 - 1.555 in)**

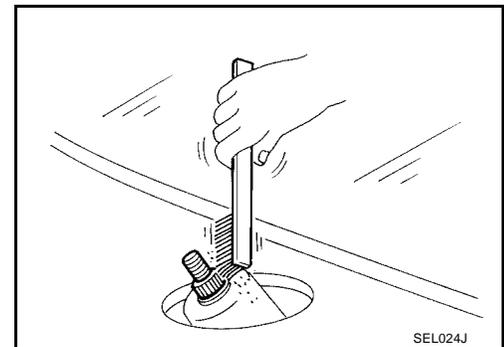
**Clearance "L2" : 32.5 - 47.5 MM. (1.280 - 1.870 in)**

- Before reinstalling wiper arm, clean up the pivot area as illustrated. This will reduce possibility of wiper arm looseness.
- Tighten wiper arm nuts to specified torque.

**Front wiper arm nuts : 20.6 - 26.5 N·m  
(2.1 - 2.7 kg-m, 16 - 19 ft.-lb.)**



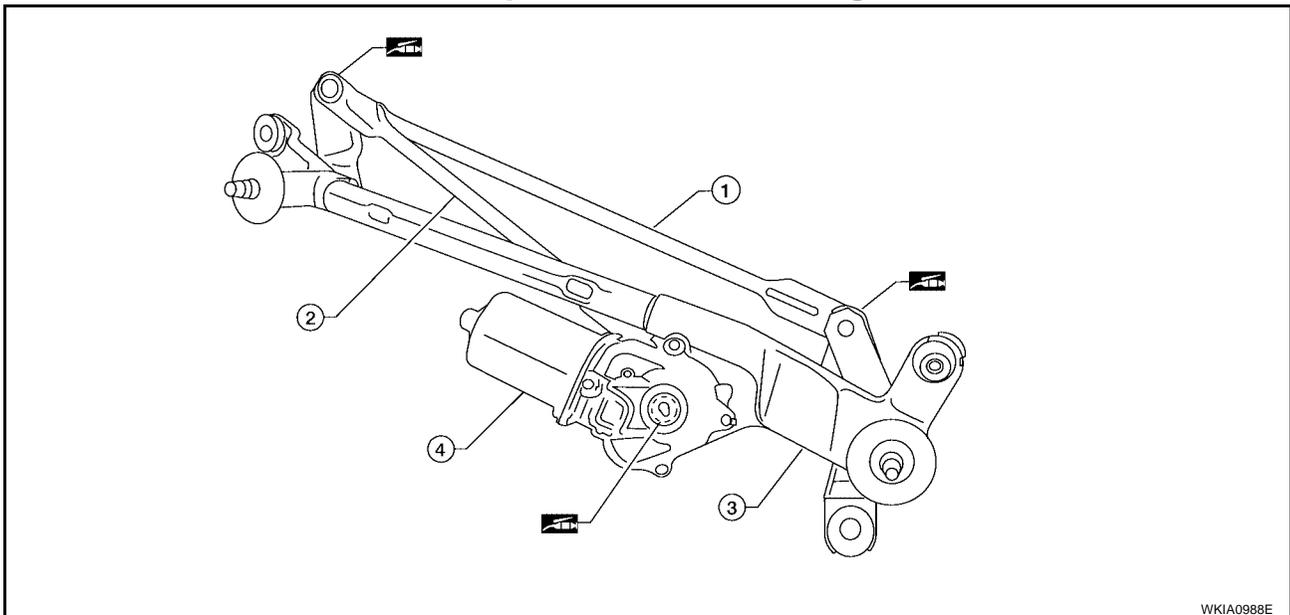
SEL543TA



SEL024J

## Removal and Installation for Wiper Motor and Linkage

EKS003H1



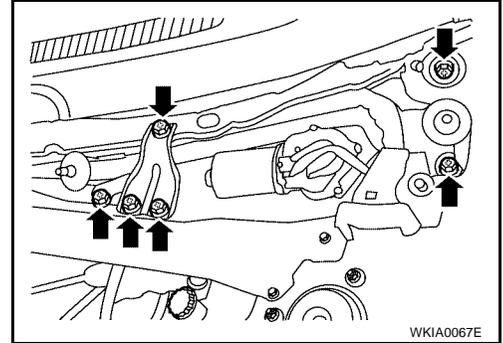
WKIA0988E

1. Wiper link
2. Wiper link
3. Wiper frame
4. Front wiper motor

# FRONT WIPER AND WASHER SYSTEM

## REMOVAL

1. Operate the wiper motor and then turn it "OFF" (Auto Stop).
2. Remove wiper arms from the vehicle, refer to [WW-26, "Removal and Installation for Front Wiper Arms, Adjustment for Wiper Arms Stop Location"](#) .
3. Remove the cowl top cover, refer to [EI-18, "Removal and Installation"](#) .
4. Disconnect wiper motor connector.
5. Remove bracket and wiper frame, link and motor assembly.
6. Remove wiper motor from wiper frame and link 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 connector.
  3. Install wiper motor to bracket and wiper frame and link assembly, and install assembly to the vehicle.

**Wiper motor assembly bolts** : 3.8 - 5.1 N·m  
(0.39 - 0.52 kg·m, 33.9 - 45.1 in·lb.)

4. Connect wiper motor connector. Turn the wiper switch ON to operate the wiper motor, then turn wiper switch OFF (auto stop).
5. Install cowl top cover, refer to [EI-18, "Removal and Installation"](#) .
6. Install wiper arms, refer to [WW-26, "Removal and Installation for Front Wiper Arms, Adjustment for Wiper Arms Stop Location"](#) .

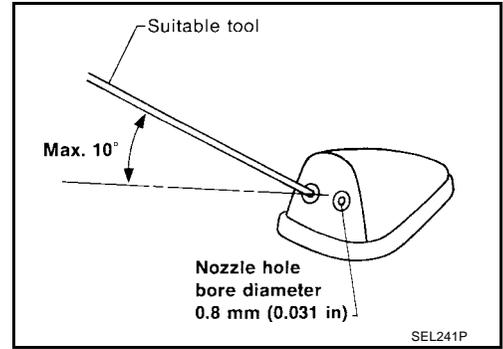
# FRONT WIPER AND WASHER SYSTEM

EKS003H2

## Washer Nozzle Adjustment

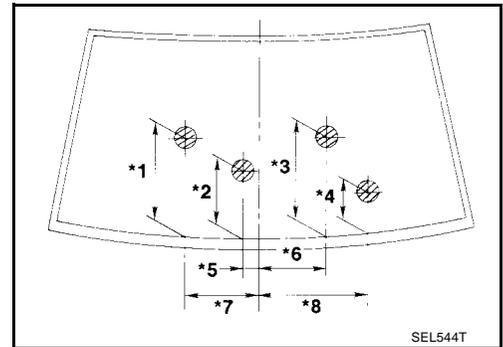
- Adjust washer nozzle with suitable tool as shown.

**Adjustable range:**  $\pm 10^\circ$



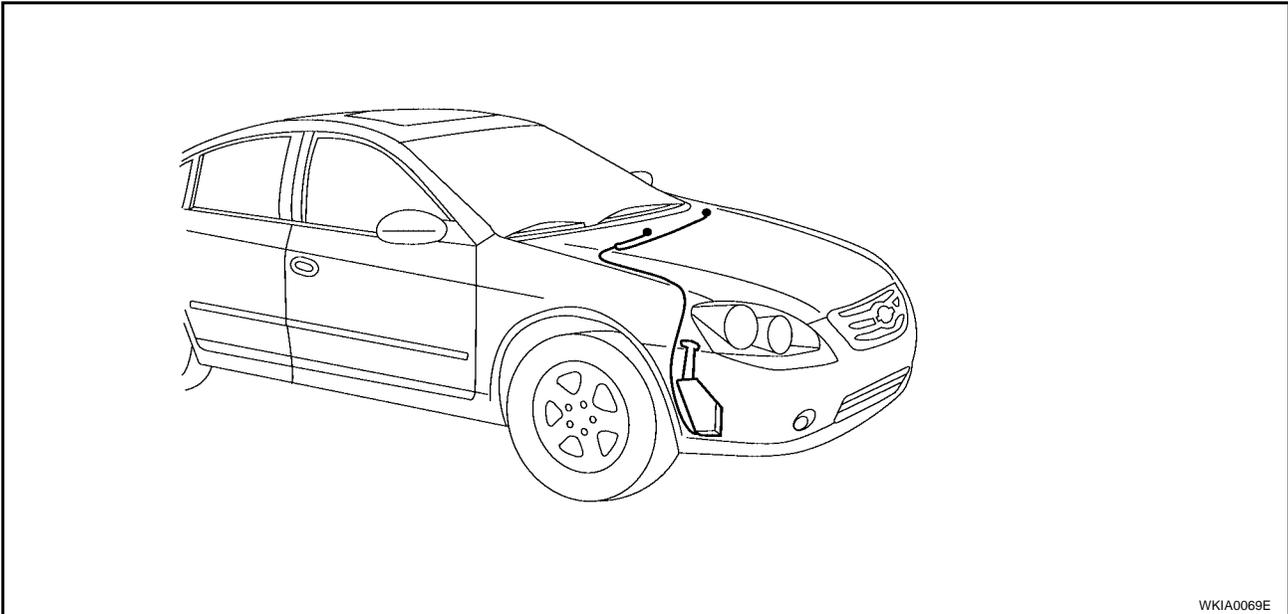
Unit: MM. (in)

*1	350 (13.78)	*5	135 (5.31)
*2	190 (7.48)	*6	230 (9.06)
*3	320 (12.60)	*7	275 (10.83)
*4	135 (5.31)	*8	440 (17.32)



## Washer Tube Layout

EKS003H3



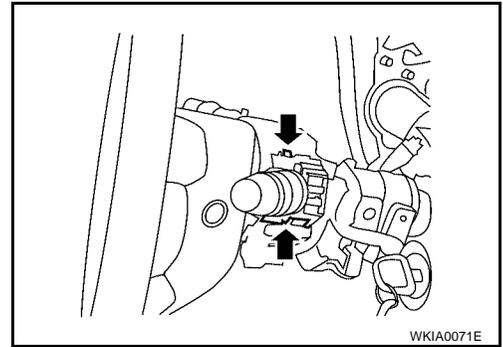
# FRONT WIPER AND WASHER SYSTEM

## Removal and Installation for Wiper and Washer Switch

EKS003H4

### REMOVAL

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



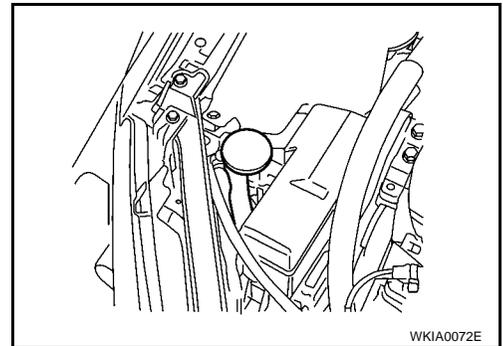
### INSTALLATION

Installation is in the reverse order of removal.

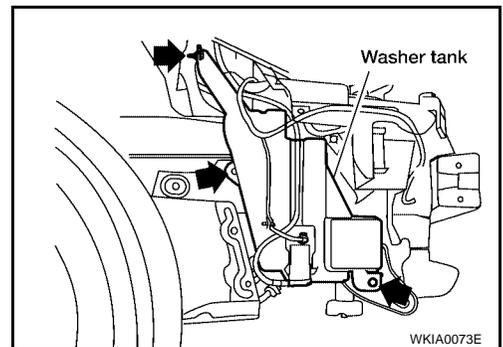
## Removal and Installation for Washer Tank

EKS003H5

1. Pull out washer tank inlet.



2. Remove fender protector, refer to [EI-20, "Removal and Installation"](#).
3. Remove front washer motor connector and washer fluid level sensor connector (if equipped).
4. Remove washer tank screws.
5. Remove washer hose, and remove the washer tank from the vehicle.



### CAUTION:

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

Washer tank installation screws

**Tightening torque:** 3.9 - 5.0 N·m  
(0.39 - 0.52 kg-m, 34 - 45 in-lb.)

## Removal and Installation for Washer Motor

EKS003H6

1. Remove fender protector, refer to [EI-20, "Removal and Installation"](#).
2. Remove front washer motor connector and hose.

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
L  
M

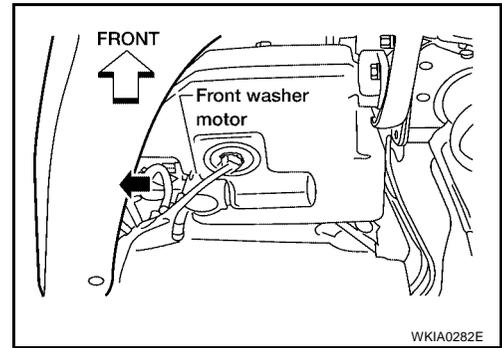
WW

## FRONT WIPER AND WASHER SYSTEM

3. Pull out front washer motor in the direction of the arrow as shown, and remove the washer motor from the washer tank.

**CAUTION:**

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



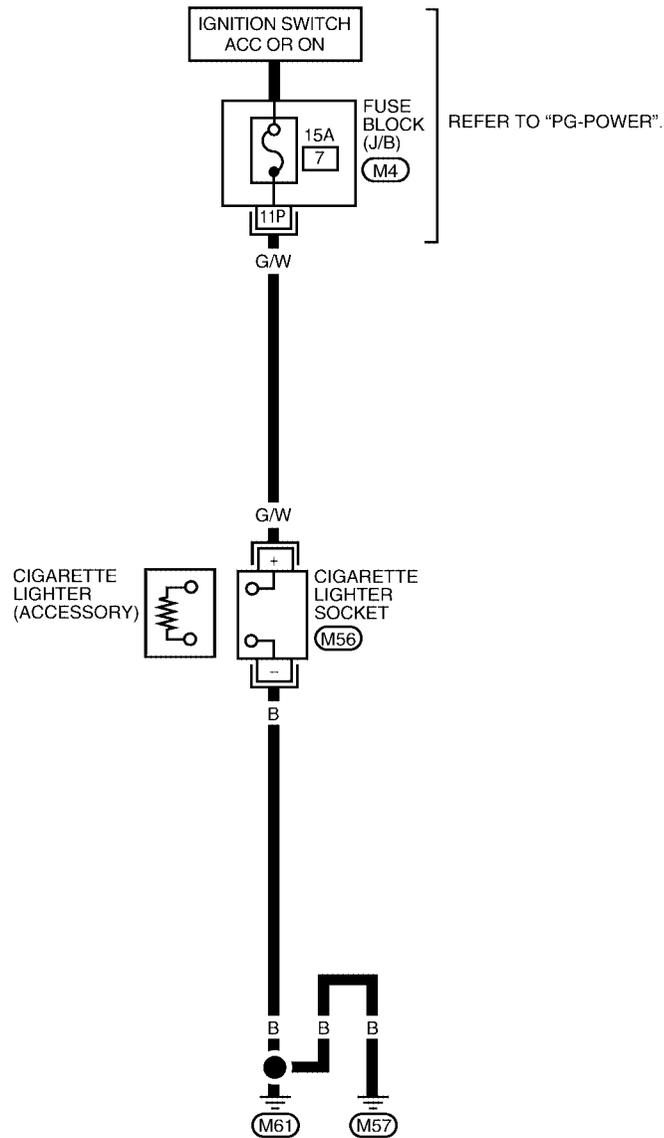
# CIGARETTE LIGHTER

## CIGARETTE LIGHTER Wiring Diagram — CIGAR —

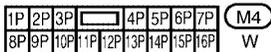
PDF:35330

EKS003H7

WW-CIGAR-01



A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
WW  
L  
M



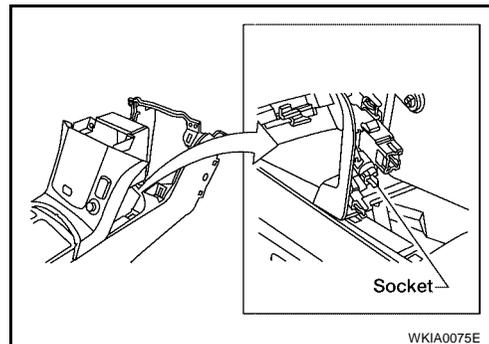
WKWA0274E

# CIGARETTE LIGHTER

EKS003H8

## Removal and Installation

1. Remove the A/T finisher (A/T models), refer to [IP-13, "A/T Finisher"](#) , or remove the M/T finisher (M/T models), refer to [IP-13, "M/T Finisher"](#) .
2. Remove console box finisher, refer to [IP-15, "Center Console"](#) .
3. Remove socket.
4. Press out ring from the back of console box finisher.



# POWER SOCKET

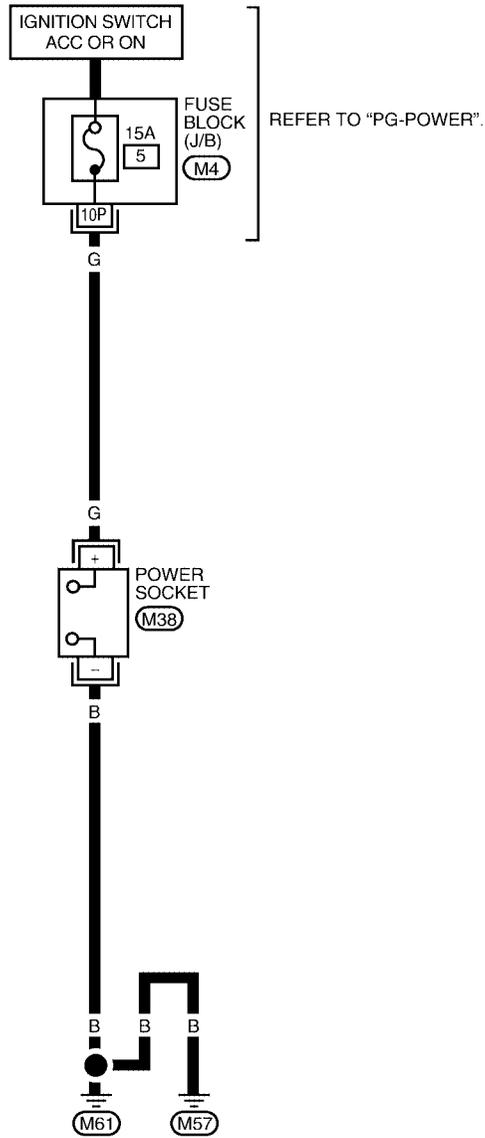
PF253A2

## POWER SOCKET

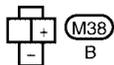
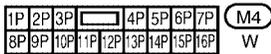
### Wiring Diagram — CIGAR —

EKS003H9

## WW-CIGAR-02



A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
WW  
L  
M

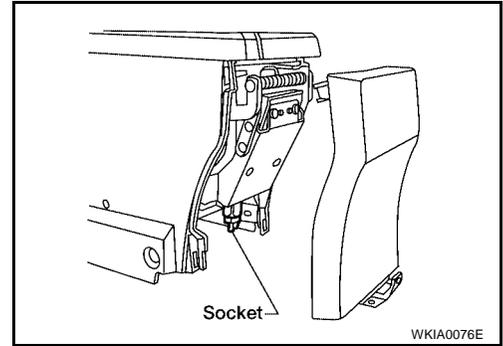


# POWER SOCKET

## Removal and Installation

EKS003HA

1. Remove the console finisher, refer to [IP-15, "Center Console"](#) .
2. Disconnect power socket connector.
3. Remove socket from the console.



# HORN

PF25610

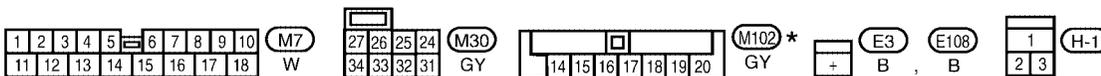
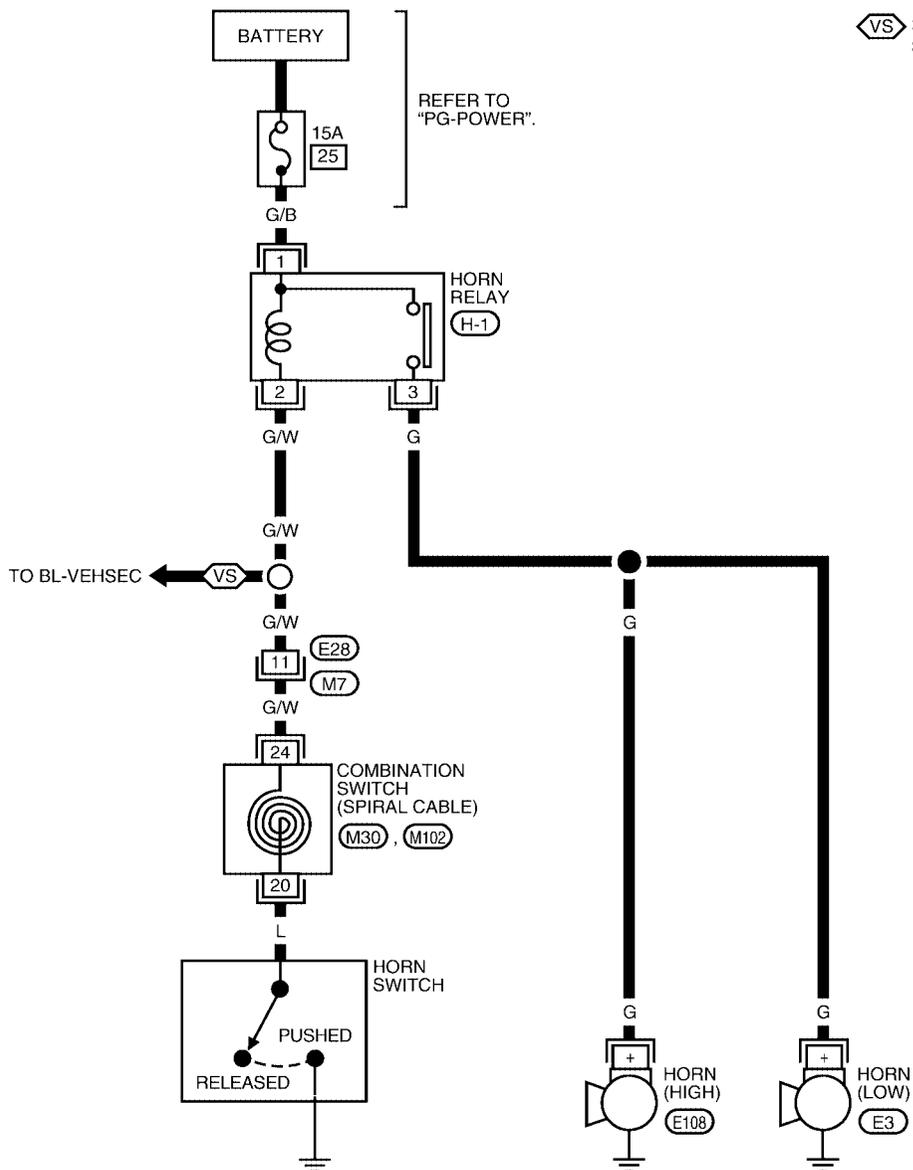
## HORN

### Wiring Diagram — HORN —

EKS003HB

#### WW-HORN-01

 : WITH VEHICLE SECURITY SYSTEM



\*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WKWA0276E

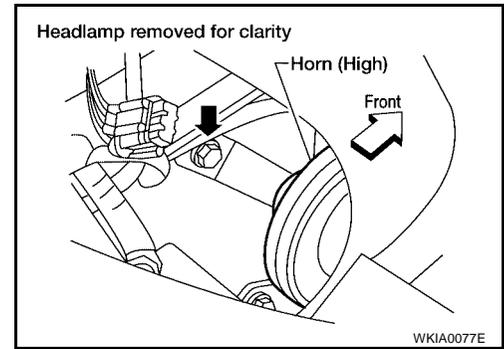
# HORN

EKS003HC

## Removal and Installation

### REMOVAL (HORN HIGH)

1. Remove right headlamp, refer to [LT-26, "REMOVAL"](#) .
2. Disconnect horn connector.
3. Remove horn.



### INSTALLATION (HORN HIGH)

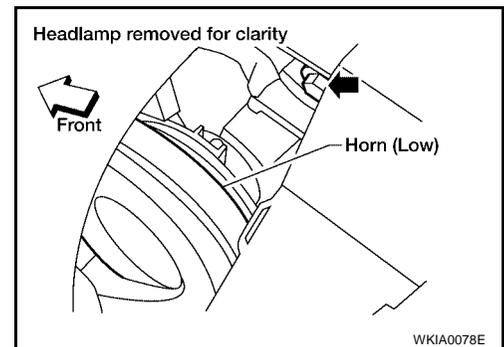
Tighten horn bolt to specified torque.

**Horn bolt** : 15.6-18.6 N·m (1.6-1.8 kg-m, 12-13 ft.-lb.)

1. Reconnect horn connector.
2. Install right headlamp, refer to [LT-26, "INSTALLATION"](#) .

### REMOVAL (HORN LOW)

1. Remove left headlamp, refer to [LT-26, "REMOVAL"](#) .
2. Disconnect horn connector.
3. Remove horn.



### INSTALLATION (HORN LOW)

Tighten horn bolt to specified torque.

**Horn bolt** : 15.6-18.6 N·m (1.6-1.8 kg-m, 12-13 ft.-lb.)

1. Reconnect horn connector.
2. Install left headlamp, refer to [LT-26, "INSTALLATION"](#) .