# SECTION WW
# WIPER, WASHER & HORN

## CONTENTS

# PRECAUTION

PFP:00011

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

EKS002IH

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. 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 harnesses or harness connectors.**

## Wiring Diagrams and Trouble Diagnosis

EKS002II

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:

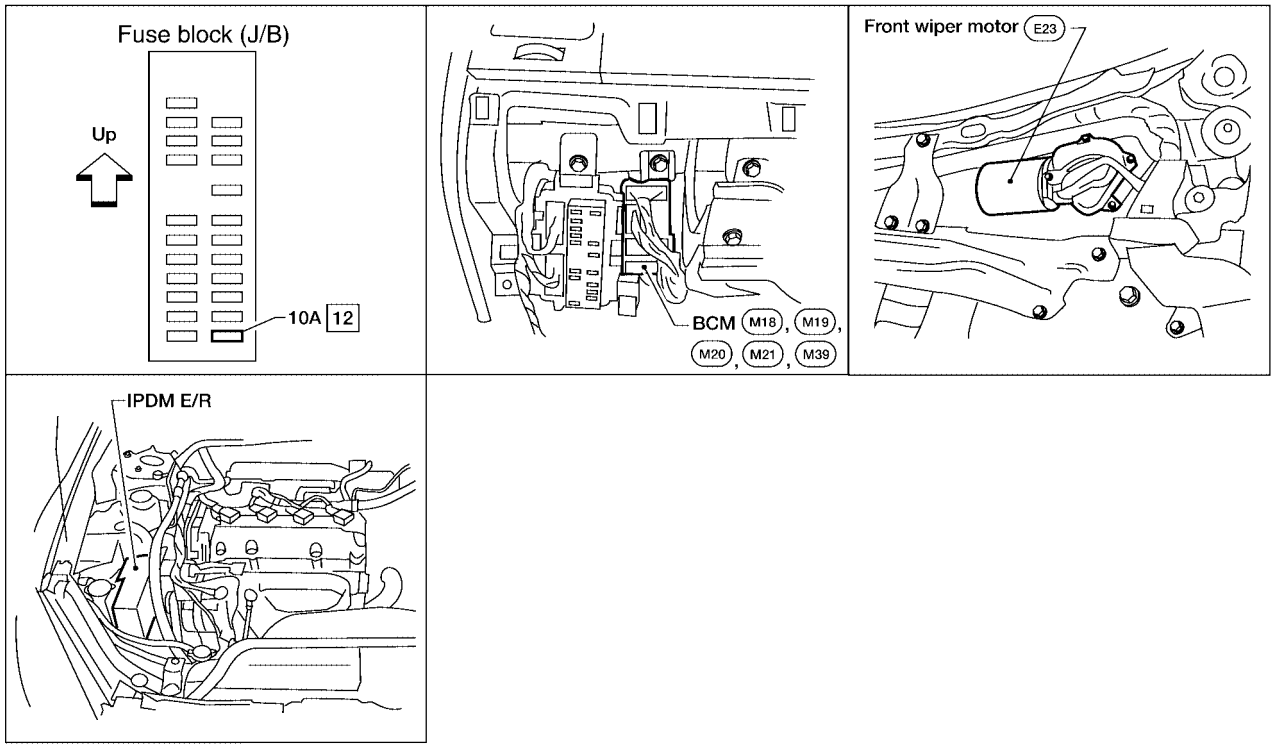
- Refer to GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" .
- Refer to GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident" .

# FRONT WIPER AND WASHER SYSTEM

PFP:28810

## Components Parts and Harness Connector Location

EKS002IJ




WKIA0065E

## System Description

EKS002IK

- All front wiper relays (HI, LO) are included 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
- to 20A fuse (No. 39, located in the IPDM E/R) and
- through IPDM E/R terminal 42
- to wiper motor terminal B.

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 (output 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 turns ON front wiper relay (in IPDM E/R).
Ground is supplied

- from wiper motor terminal L,
- through IPDM E/R terminal 31 and front wiper relay
- to IPDM E/R terminal 16
- 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
- to 20A fuse (No. 39, located in the IPDM E/R) and
- through IPDM E/R terminal 42
- to wiper motor terminal B.

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,
Ground is supplied

- to front wiper motor terminal H
- through IPDM E/R terminal 30 and front wiper relay and front wiper HI relay
- to IPDM E/R terminal 16
- 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 1
- 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.
- 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

- from terminal 31 of the IPDM E/R
- to front wiper motor terminal L, in order to continue wiper motor operation at low speed.

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 B are connected instead of terminals P and E.
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 washer motor terminal +.

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

- to washer motor terminal -
- through combination switch terminal 11
- through combination switch terminal 12
- from 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-3, "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.

## CAN Communication System Description

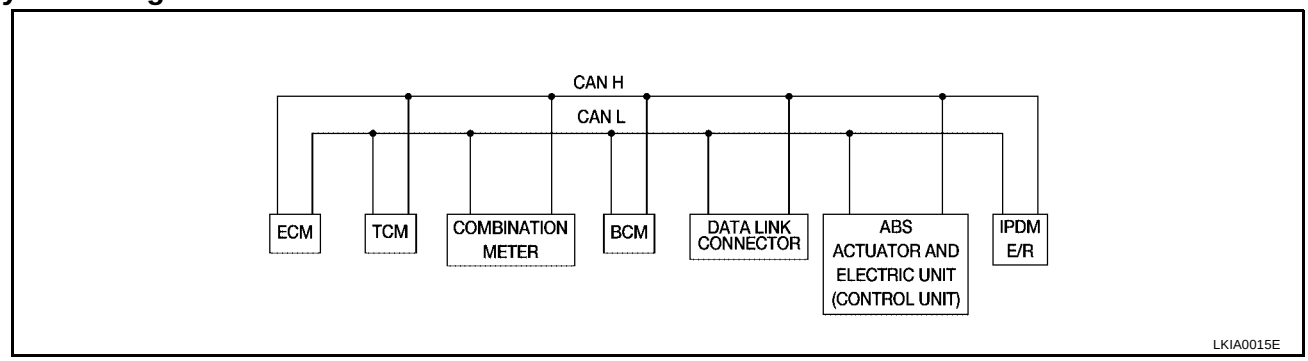
EKS002IL

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




### Input/Output Signal Chart

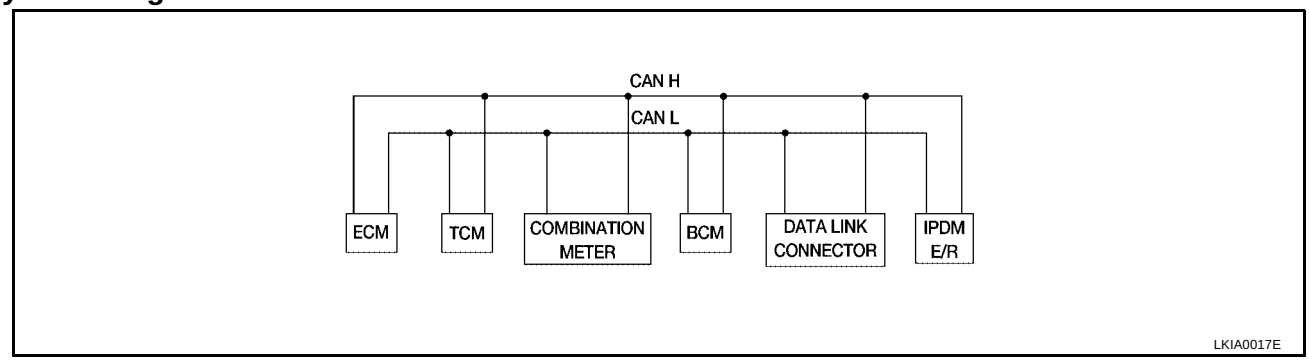
T: Transmit R: Receive

| 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 | | |
| Oil pressure switch | | | R | | | T |
| Sleep request1 | | | R | T | | |
| Sleep request2 | | | | T | | R |
| N range switch signal | | R | T | | | |

| Signals | ECM | TCM | COMBINATION METER | BCM | ABS/TCS control unit | IPDM E/R |
|---|---|---|---|---|---|---|
| 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

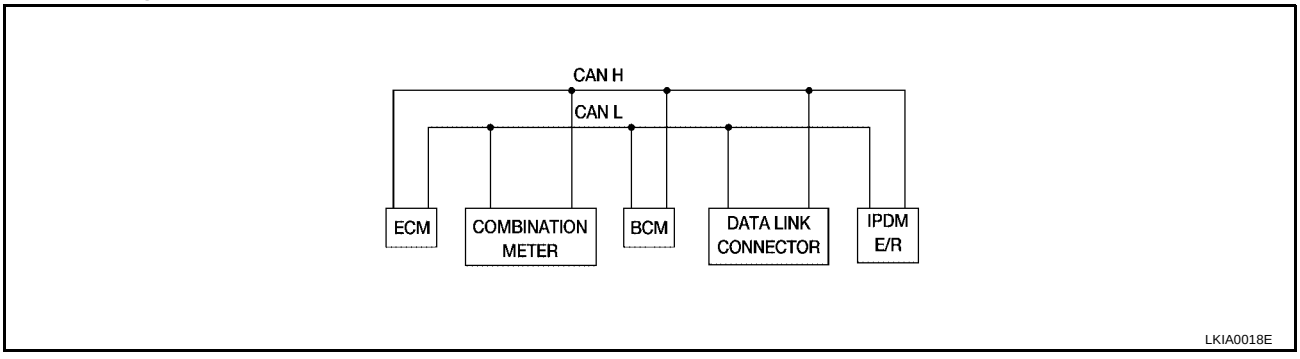
T: Transmit R: Receive

| 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(QR25DE) | | | 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 |

| Signals | ECM | TCM | COMBINATION METER | BCM | IPDM E/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




### Input/Output Signal Chart

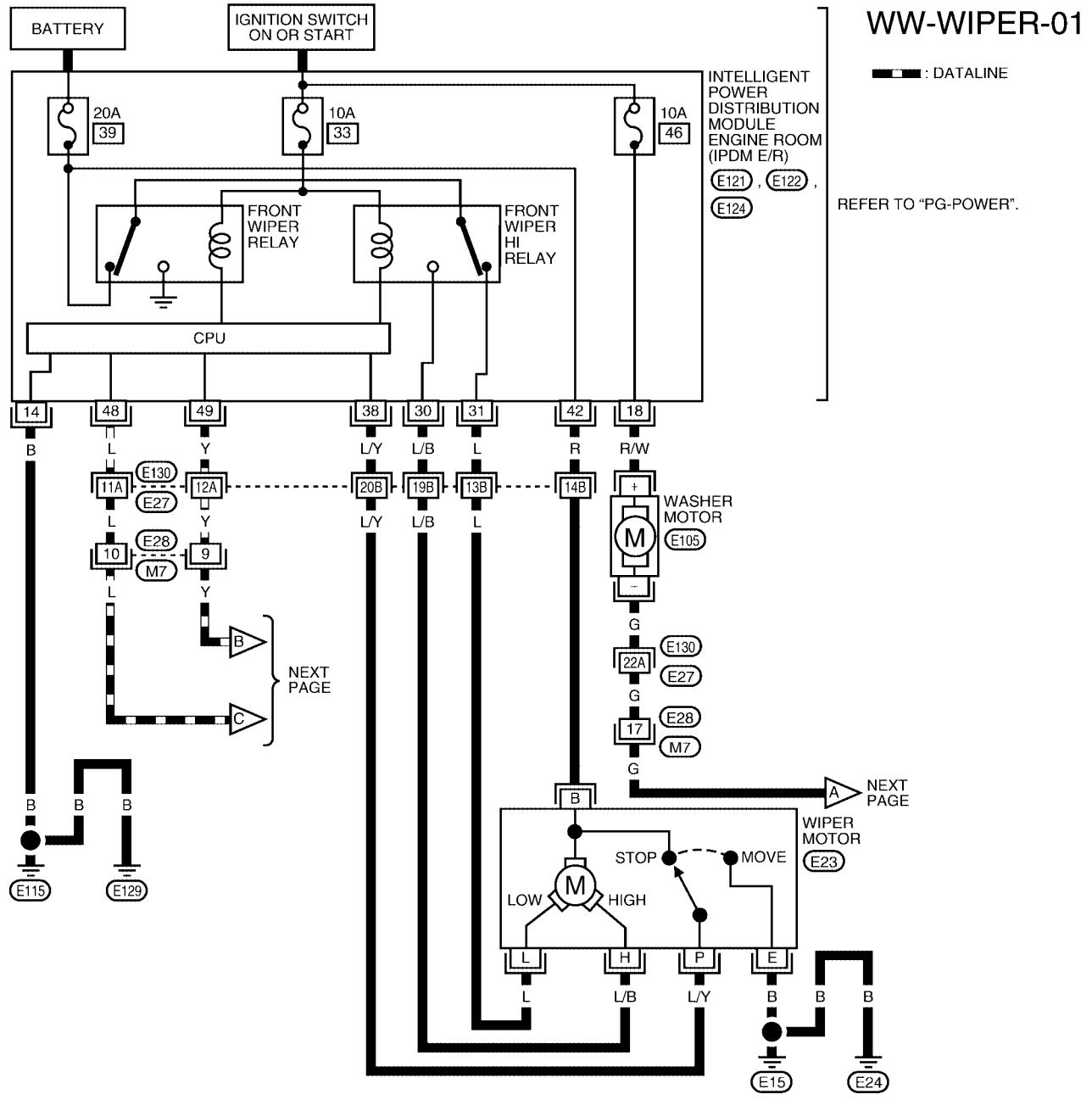
T: Transmit R: Receive

| 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 | |

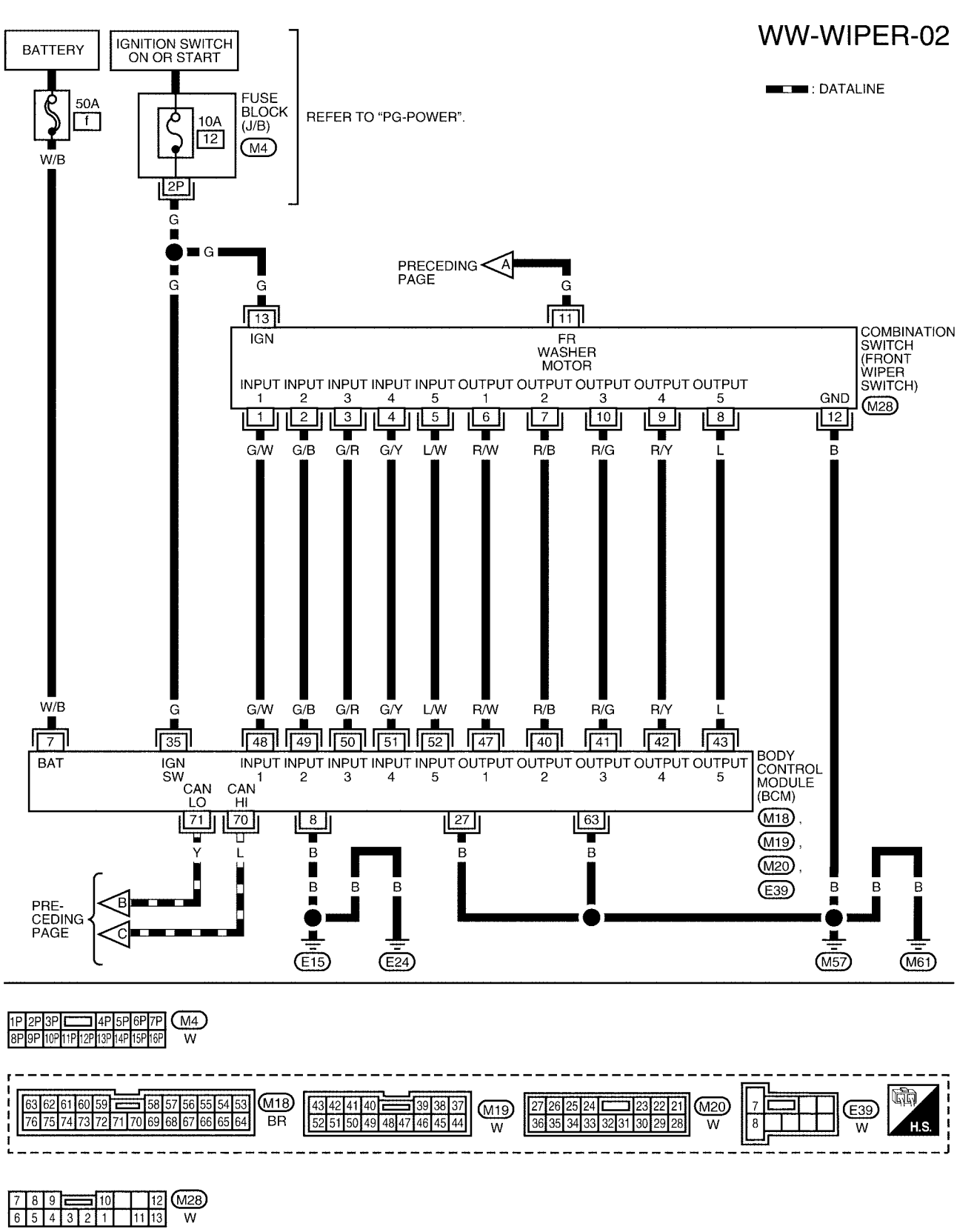
| Signals | ECM | COMBINATION METER | BCM | IPDM E/R |
|---|---|---|---|---|
| Air conditioner compressor signal | R | | | T |
| A/C compressor request signal | T | | | R |
| Blower fan switch signal | R(QR25DE) | | T | |
| Cooling fan motor operation signal | R | | | T |
| Cooling fan speed request 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 |

## Wiring Diagram — WIPER —

EKS002IM



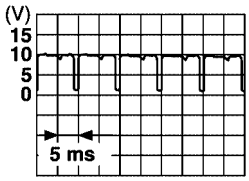
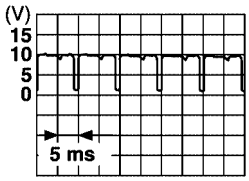
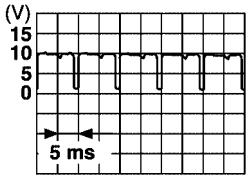

WKWA0116E


WW-WIPER-02
: DATALINE
BATTERY
IGNITION SWITCH ON OR START
50A
f
W/B
10A
12
FUSE BLOCK (J/B)
M4
REFER TO "PG-POWER".
2P
PRECEDING PAGE
A
13
IGN
11
FR WASHER MOTOR
COMBINATION SWITCH (FRONT WIPER SWITCH)
INPUT INPUT INPUT INPUT INPUT OUTPUT OUTPUT OUTPUT OUTPUT OUTPUT
1 2 3 4 5 1 2 3 4 5
GND
M28
12
G/W G/B G/R G/Y L/W R/W R/B R/G R/Y L B
7
35
48 49 50 51 52 47 40 41 42 43
BAT
IGN SW
CAN LO
CAN HI
INPUT INPUT INPUT INPUT INPUT OUTPUT OUTPUT OUTPUT OUTPUT OUTPUT
1 2 3 4 5 1 2 3 4 5
BODY CONTROL MODULE (BCM)
71
70
8
27
63
M18
M19
M20
E39
Y L B B B B B B B B
PRE-CEDING PAGE
B
C
E15
E24
M57
M61
1P 2P 3P 4P 5P 6P 7P
8P 9P 10P 11P 12P 13P 14P 15P 16P
M4
W
63 62 61 60 59 58 57 56 55 54 53
76 75 74 73 72 71 70 69 68 67 66 65 64
M18
BR
43 42 41 40 39 38 37
52 51 50 49 48 47 46 45 44
M19
W
27 26 25 24 23 22 21
36 35 34 33 32 31 30 29 28
M20
W
7
8
E39
W
H.S.
7 8 9 10 12
6 5 4 3 2 1 11 13
M28
W

WKWA0394E

## Terminals and Reference Values for BCM

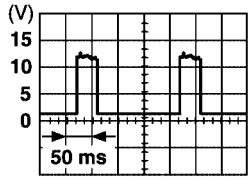
EKS002IN

| Terminal No. (Wire color) | Signal name | Measuring condition | | Standard (V) |
|---|---|---|---|---|
| | | Ignition switch | Operation or condition | |
| 7 (W/B) | Battery | ON | — | Approx. 12V |
| 8 (B) | Ground | ON | — | Approx. 0 |
| 35 (G) | IGN power | ON | — | Approx. 12V |
| 40 (R/B) | Combination switch output 2 | ON | Light switch and wiper switch OFF |  SKIA1119J |
| 41 (R/G) | Combination switch output 3 | ON | Light switch and wiper switch OFF |  SKIA1119J |
| 47 (R/W) | Combination switch output 1 | ON | Light switch and wiper switch OFF |  SKIA1119J |
| 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 |
| 51 (G/Y) | Combination switch input 4 (intermittent operation dial position 2) | ON | Light switch and wiper switch OFF | 4.5 or more |
| 52 (L/W) | Combination switch input 5 (intermittent operation dial position 3) | ON | Light switch and wiper switch OFF | 4.5 or more |

## Terminals and Reference Values for IPDM E/R

EKS002IO

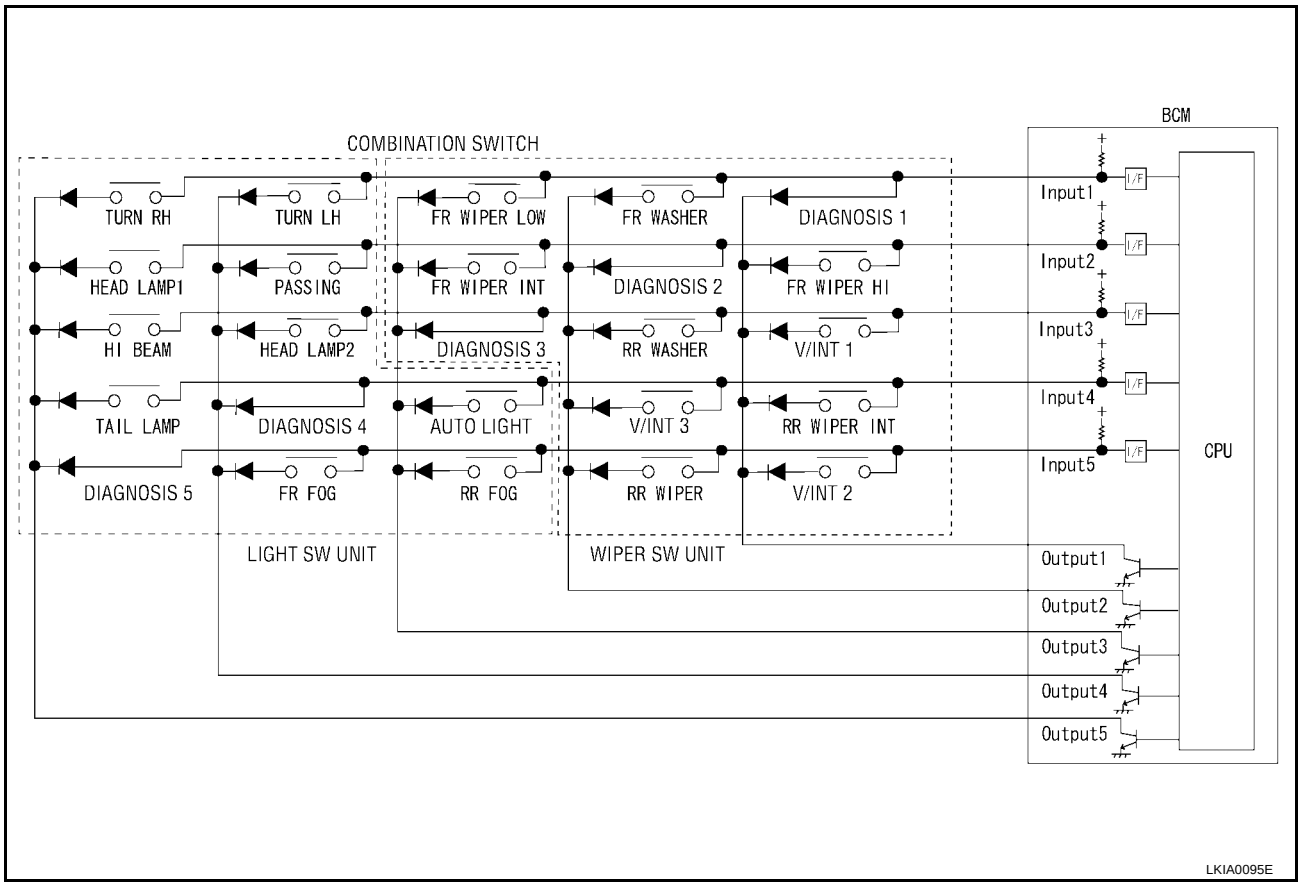
| Terminal No. (Wire color) | Signal name | Measuring condition | | | Reference value (V) (Approx.) |
|---|---|---|---|---|---|
| | | Ignition switch | Operation or condition | | |
| 14 (B) | Ground | ON | — | | 0 |
| 18 (R/WL) | Washer motor power | ON | Wiper switch | OFF | 12V |
| | | | | LO | 0 |

| Terminal No. (Wire color) | Signal name | Measuring condition | | | Reference value (V) (Approx.) |
|---|---|---|---|---|---|
| | | Ignition switch | Operation or condition | | |
| 30 (L/B) | Hi speed signal | ON | Wiper switch | OFF | 12V |
| | | | | HI | 0 |
| 31 (L) | Low speed signal | ON | Wiper switch | OFF | 12V |
| | | | | LO | 0 |
| 38 (L/Y) | Wiper position detection signal | ON | Wiper switch: LO position | |  SKIA1132J |
| 42 (R) | Wiper motor power source | ON | — | | 12V |
| 48 (L) | CAN HI | ON | — | | — |
| 49 (Y) | CAN LO | ON | — | | — |

## BCM Wiper Switch Reading Function

EKS002IP

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



LKIA0095E

### 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.

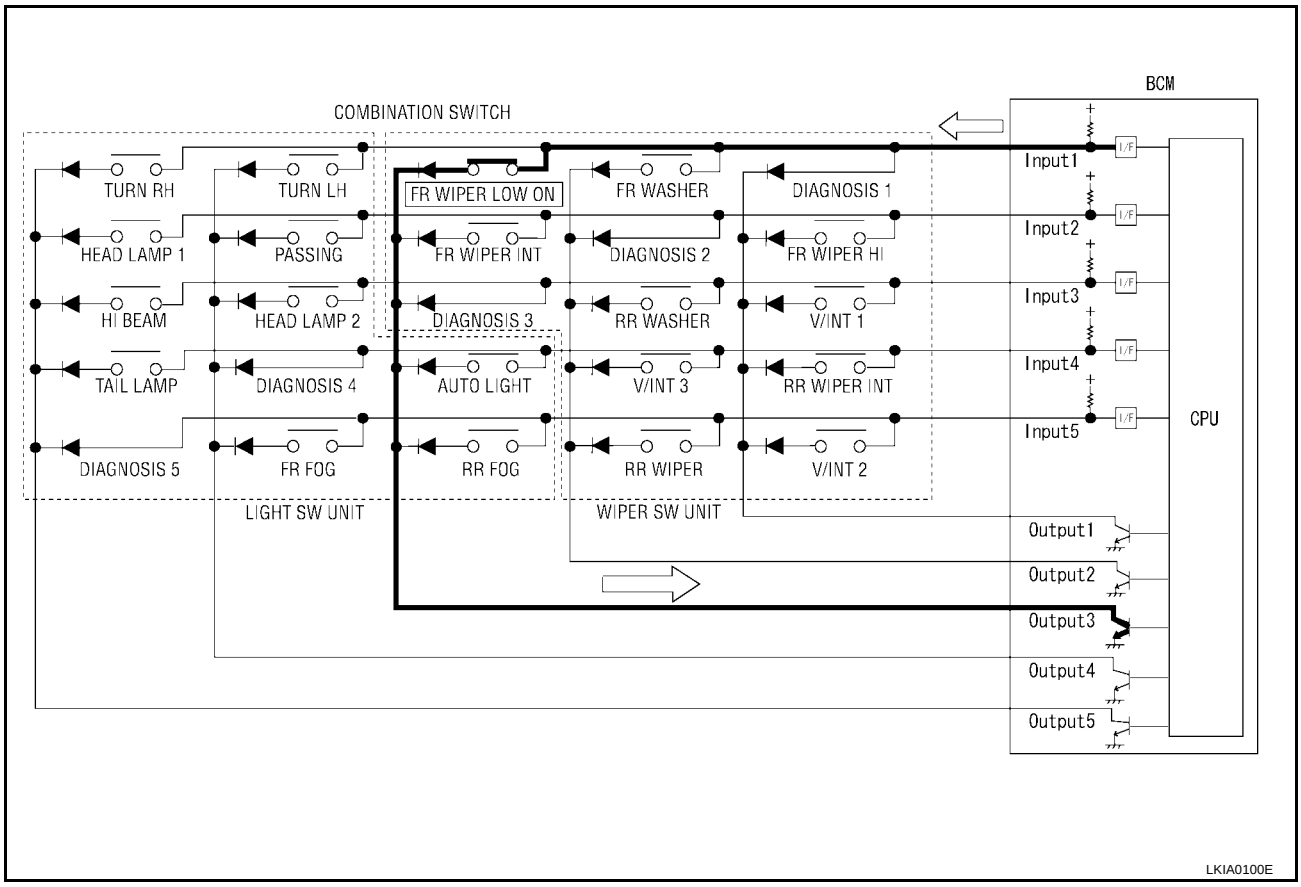
| | COMB SW INPUT 1 | | COMB SW INPUT 2 | | COMB SW INPUT 3 | | COMB SW INPUT 4 | | COMB SW INPUT 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ON | OFF | ON | OFF | ON | OFF | ON | OFF | ON | OFF |
| COMB SW OUTPUT 1 | DIAGNOSIS 1 OK | DIAGNOSIS 1 NG | FR WIPER HI ON | FR WIPER HI OFF | V/INT 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 |

LKIA0097E

### SAMPLE OPERATION: (WIPER SWITCH TURNED TO LO POSITION)

- When wiper switch is turned to LO position, front wiper LO contact inside combination switch becomes ON. At this time, OUTPUT 3 transistor operates and BCM detects flow of current at INPUT 1.
- When OUTPUT 3 transistor is ON and BCM detects current flowing at INPUT 1, BCM determines that wiper switch is at LO. BCM uses CAN communication and sends front wiper signals to IPDM E/R.
- When OUTPUT 3 transistor operates again and BCM again detects current flowing at INPUT 1, it confirms that front wiper LO operation is continuing.

**NOTE:**
Each OUTPUT terminal transistor operates at 10 ms intervals. Therefore, a delay occurs between the switch becoming ON and operation of the electric load. However, this delay is so small it is undetectable by human senses.




## OPERATING MODES

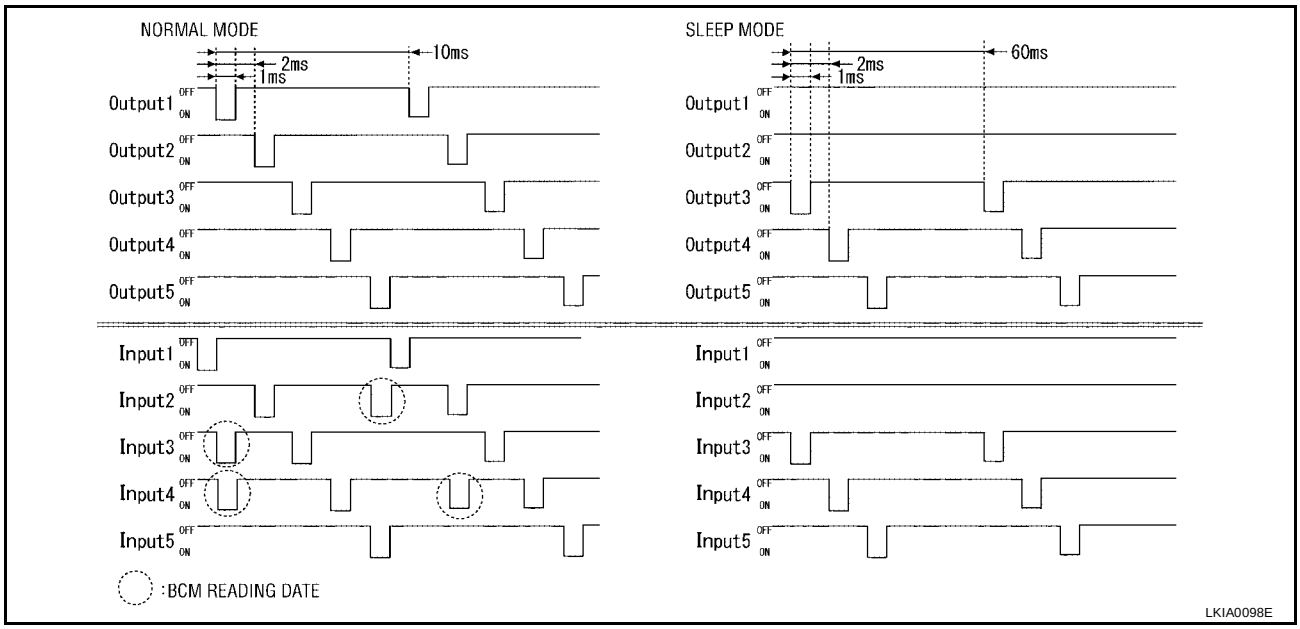
The following operation modes exist for combination switch reading function.

### Normal status

When BCM is not in sleep status, OUTPUT terminals (1 - 5) each turn ON-OFF every 10 ms.

### 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 | OFF |

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

EKS002IQ

1. Confirm the trouble symptom or customer complaint.
2. Understand the system description, refer to WW-3, "System Description" .
3. Perform preliminary inspection, refer to WW-17, "Preliminary Inspection" .
4. According to the trouble diagnosis chart, repair or replace the cause of the malfunction.

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

## Preliminary Inspection

EKS002IR

### INSPECTION FOR POWER SUPPLY AND GROUND CIRCUIT

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 motor, front wiper relay, front wiper HI 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 >> Replace the harness BCM ground circuit.

## CONSULT-II Functions

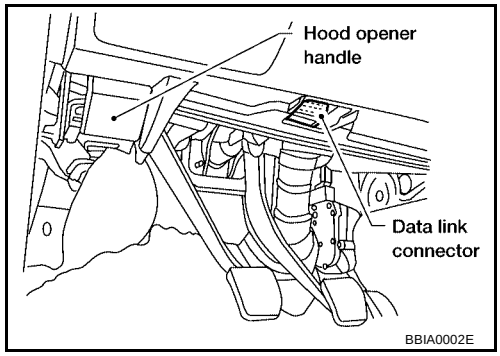
EKS002IS

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.

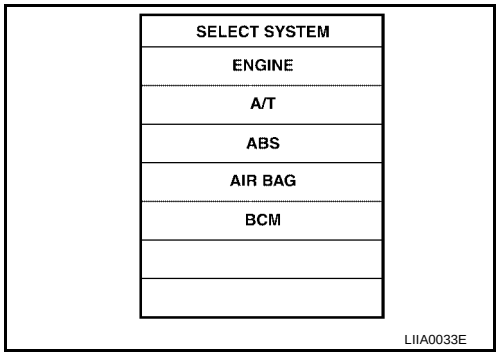
| BCM diagnosis location | Check item, diagnosis mode | Description |
|---|---|---|
| Wiper | Data monitor | Displays BCM input data in real time. |
| | Active test | Load operation can be checked by applying a drive signal to load. |

### CONSULT-II OPERATION

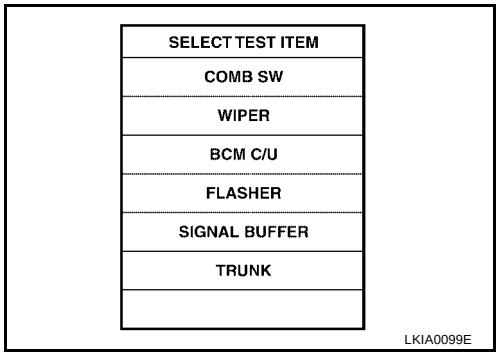
1. With the ignition switch OFF, connect CONSULT-II to the vehicle-side data link connector, then turn the ignition switch ON.
2. Touch “START”.



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.
6. Touch “RECORD” while monitoring, then the status of the monitored item can be recorded. To stop recording, touch “STOP”.

### 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.
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

EKS002IT

### FRONT WIPER DOES NOT OPERATE

### 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.

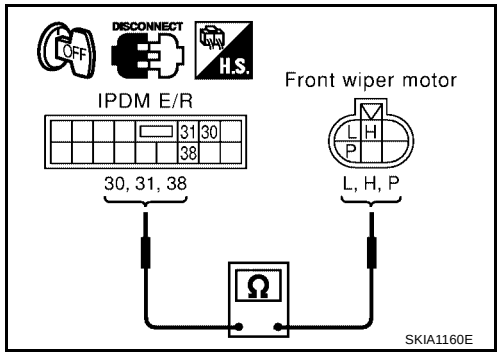
OK or NG

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

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

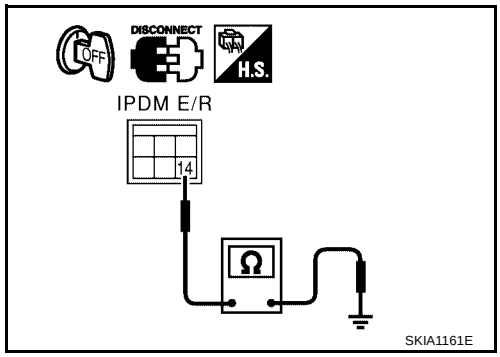
1. Disconnect IPDM E/R connector and front wiper motor connector.
2. Check continuity between IPDM E/R harness connector terminals and front wiper motor harness connector terminals.

| 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) | | |

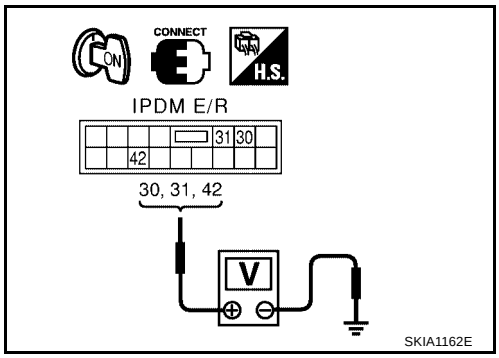



OK or NG

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.

## 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 | | | | Voltage |
|---|---|---|---|---|
| IPDM E/R(+) | | Ground | Condition | |
| Connector | Terminal (wire color) | | | |
| E122 | 31 (L) | | Stopped | Battery voltage |
| | | | LO operation | Approx. 0V |
| | 30 (L/B) | | Stopped | Battery voltage |
| | | | HI operation | Approx. 0V |
| | 42 (R) | | — | Battery voltage |

OK or NG

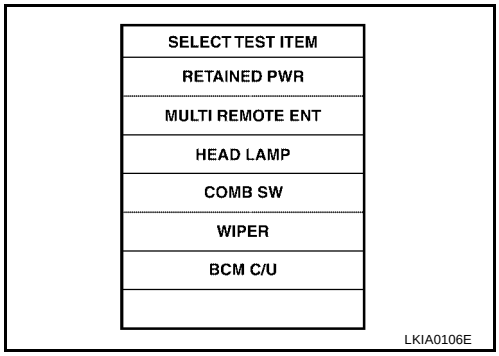
OK >> Replace wiper motor.
NG >> Replace IPDM E/R.

## 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" .

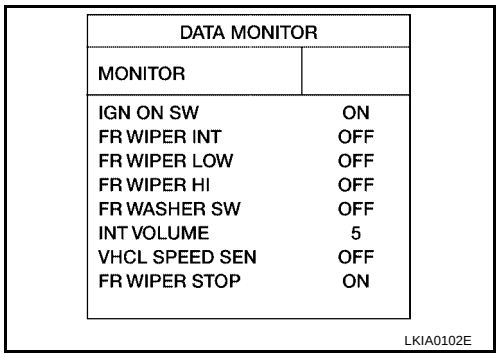



## 5. COMBINATION SWITCH TO BCM (2) INSPECTION

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.



## FRONT WIPER STOP POSITION IS INCORRECT

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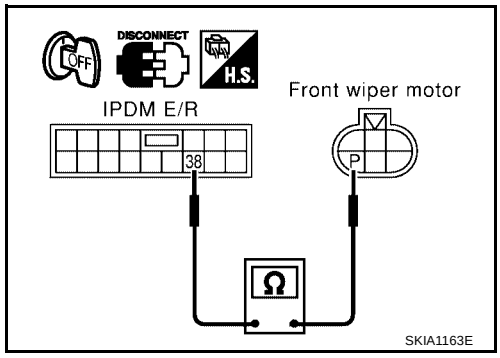
### 2. IPDM E/R TO WIPER MOTOR (2) INSPECTION

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.

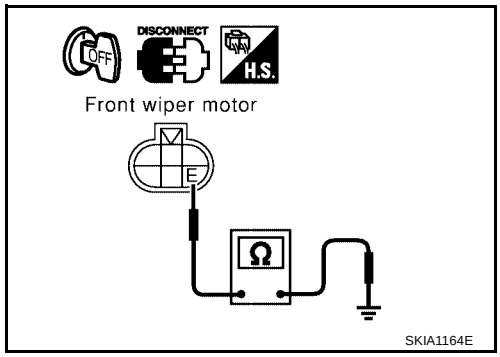
| Terminals | | | | Continuity |
|---|---|---|---|---|
| IPDM E/R | | Front wiper motor | | |
| Connector | Terminal (wire color) | Connector | Terminal (wire color) | |
| E122 | 38 (L/Y) | E23 | P (L/Y) | YES |



SKIA1163E

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

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



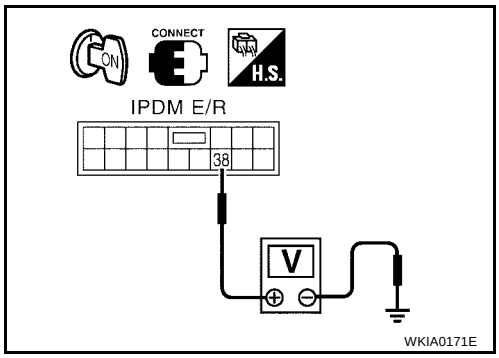
SKIA1164E

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.

## 3. IPDM E/R TO 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 (Approx.) |
|---|---|---|---|---|
| IPDM E/R (+) | | Ground (–) | Condition | |
| Connector | Terminal (wire color) | | | |
| E122 | 38 (L/Y) | | Wiper operating | 0V |
| | | | Wiper stopped | 12V |

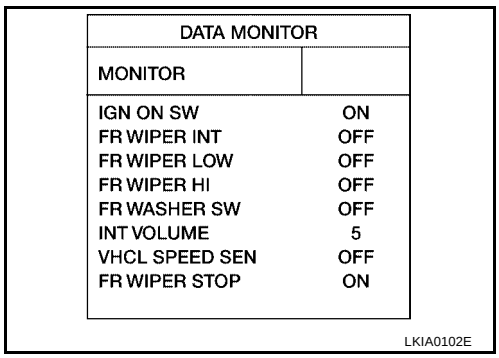
OK or NG

OK >> Replace IPDM E/R.
NG >> Replace front wiper motor.

### 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.

### ONLY FRONT WIPER HI DOES NOT OPERATE

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

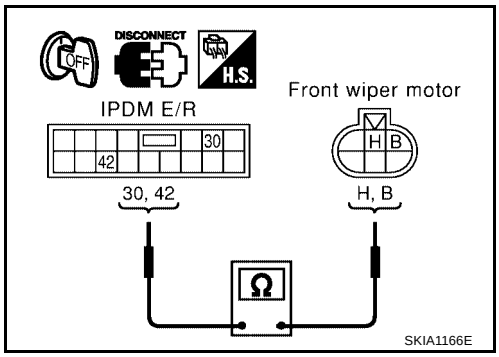
1. Select "FR WIPER HI" during active test. Refer to WW-19, "ACTIVE TEST" .
2. Verify that front wipers operate in HI operation mode.

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 |
| | 42 (R) | | B (R) | |

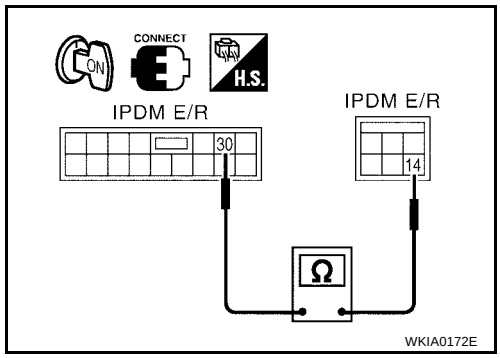
OK or NG

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

## 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 continuity between IPDM E/R terminal 30 and terminal 14.

| Terminals | | | Continuity |
|---|---|---|---|
| IPDM E/R | | | |
| Connector | Terminal (wire color) | Terminal (wire color) | |
| E122 | 30 (L/B) | 14 (B) | YES |




OK or NG

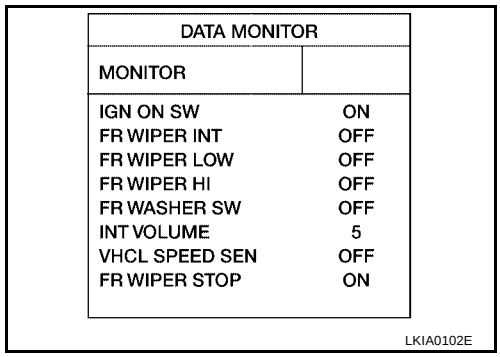
OK >> Replace wiper motor.
NG >> Replace IPDM E/R.

## 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.



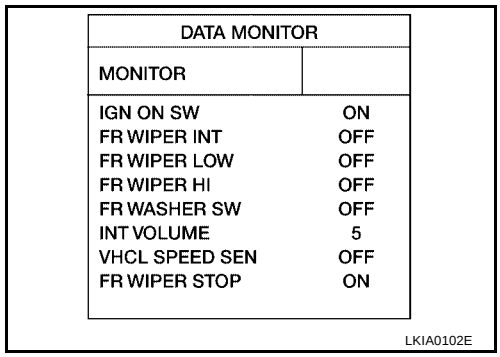

### ONLY FRONT WIPER INT DOES NOT OPERATE

## 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.



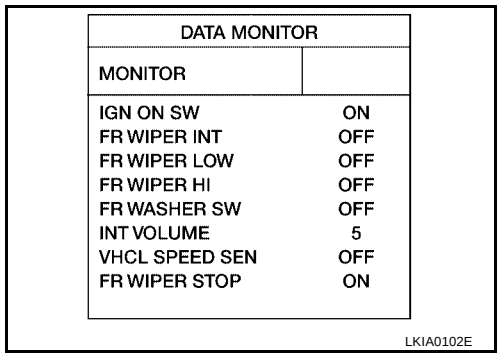

### FRONT WIPER INTERMITTENT OPERATION SWITCH POSITION CANNOT BE ADJUSTED

## 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.



## 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.

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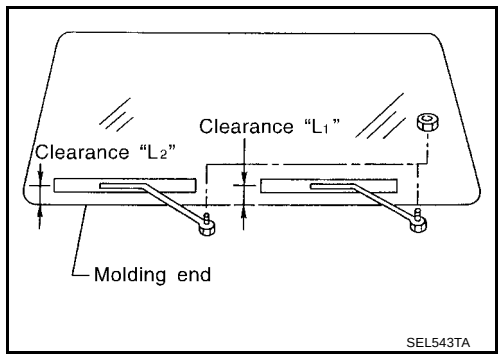
## Removal and Installation for Front Wiper Arms, Adjustment for Wiper Arms Stop Location

EKS002IU

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”.

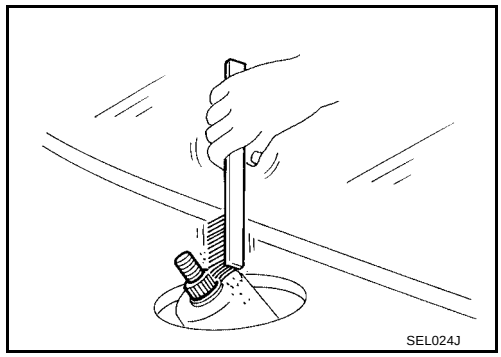
**Clearance “L1” : 24.5 - 39.5 mm (0.965 - 1.555 in)**
**Clearance “L2” : 32.5 - 47.5 mm (1.280 - 1.870 in)**



SEL543TA

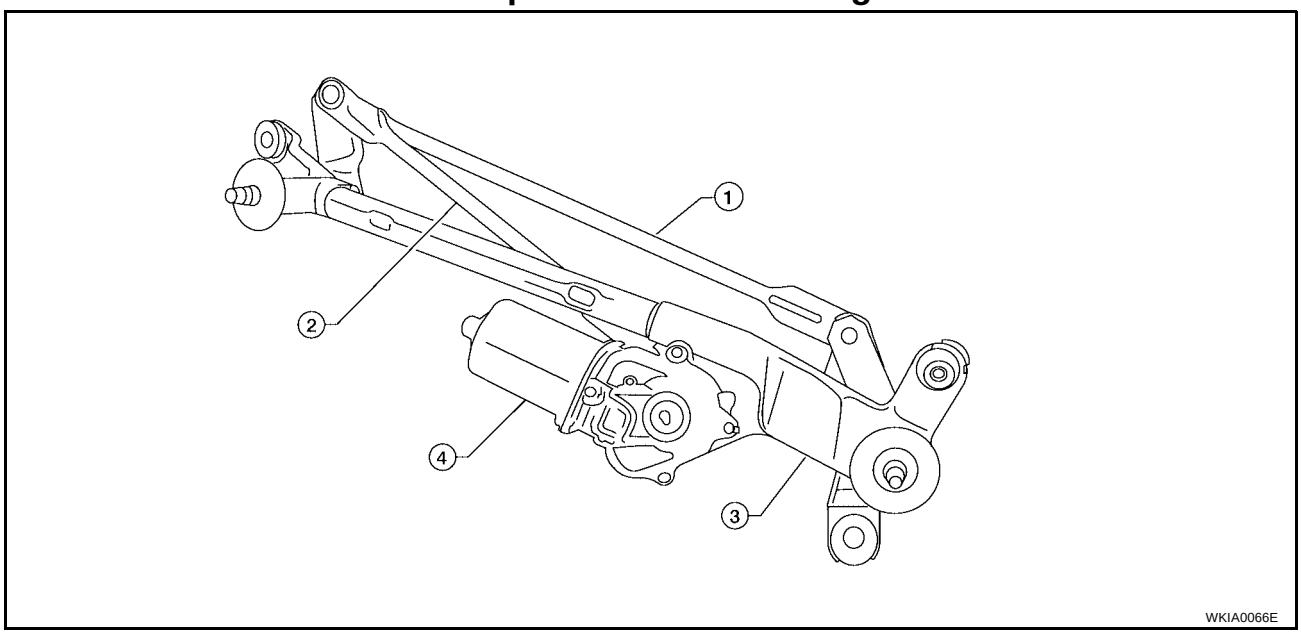
- Before reinstalling wiper arm, clean up the pivot area as illustrated. This will reduce possibility of wiper arm looseness.
- Tighten wiper arm nuts to specified torque.

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


SEL024J

## Removal and Installation for Wiper Motor and Linkage

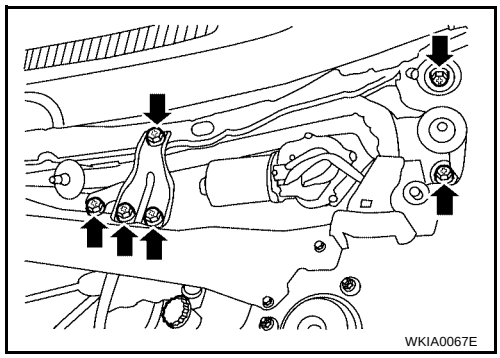
EKS002IV




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

### REMOVAL

1. Operate the wiper motor, and stop it at the auto stop position.
2. Remove wiper arm from the vehicle.
3. Remove the cowl top cover, refer to EI-18, "Removal and Installation" .
4. Disconnect wiper motor connector.
5. Remove bracket and wiper motor assembly.




### INSTALLATION

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 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-24, "Removal and Installation for Front Wiper Arms, Adjustment for Wiper Arms Stop Location" .

**CAUTION:**

- **Do not drop the wiper motor or cause it to contact other parts.**

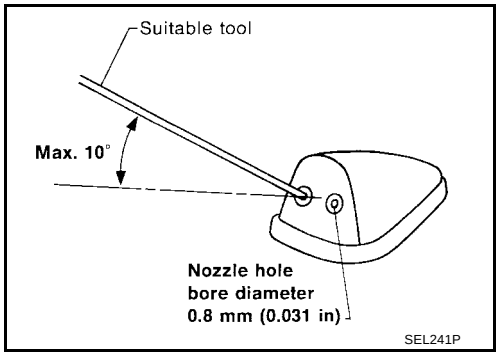
- **Check the grease conditions of the motor arm and wiper link joint (at retainer). Apply grease if necessary.**

## Washer Nozzle Adjustment

EKS002IW

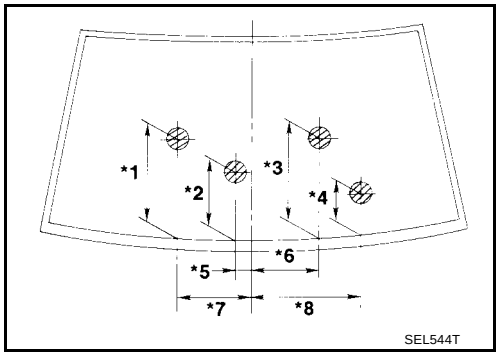
- Adjust washer nozzle with suitable tool as shown.

**Adjustable range:** **±10°**



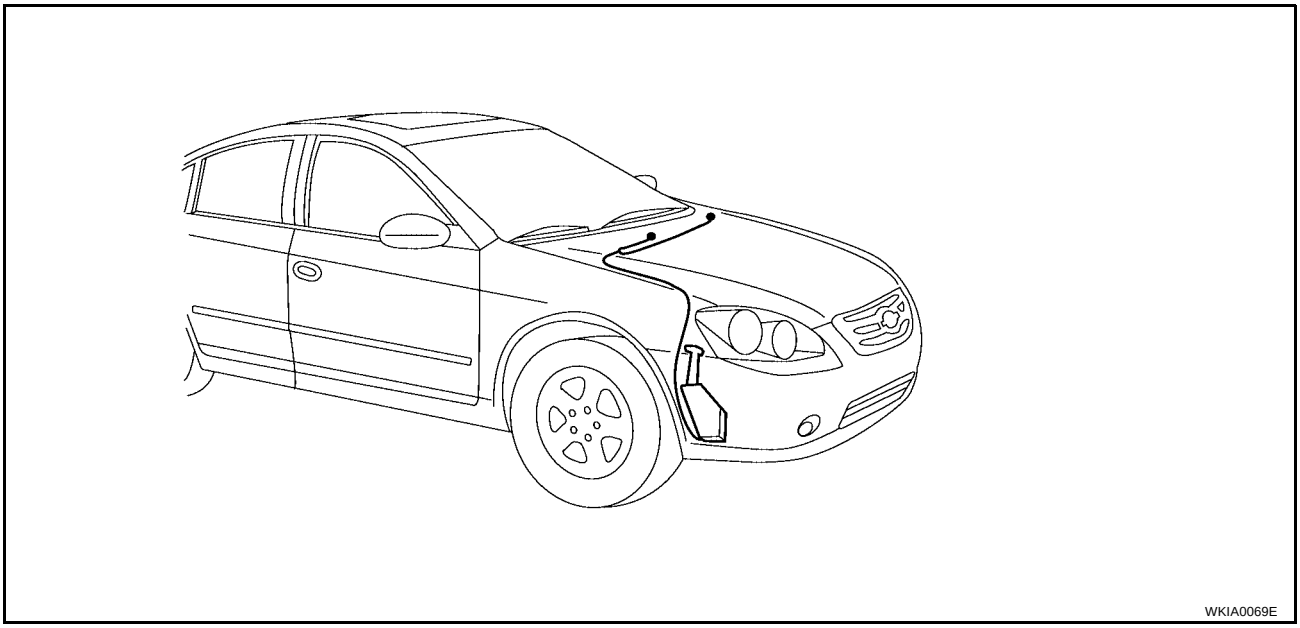

Unit: mm (in)

| | | | |
|---|---|---|---|
| *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

EKS002IX

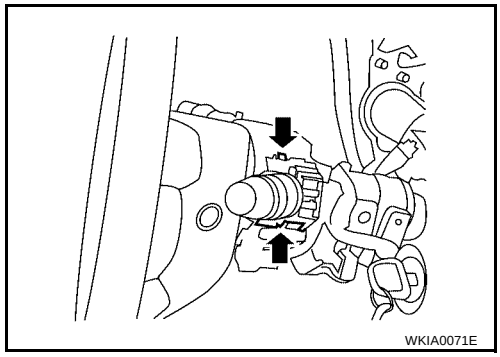


## Removal and Installation for Wiper and Washer Switch

EKS002IY

### 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.



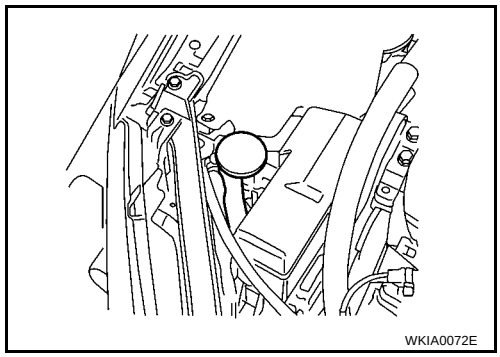

### INSTALLATION

Installation is in the reverse order of removal.

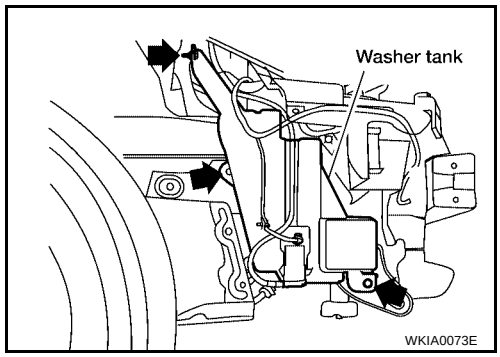
## Removal and Installation for Washer Tank

EKS002IZ

1. Pull out washer tank inlet.




2. Remove fender protector, refer to EI-20, "Removal and Installation" .
3. Remove washer pump connector.
4. Remove washer tank installation screw.
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.**

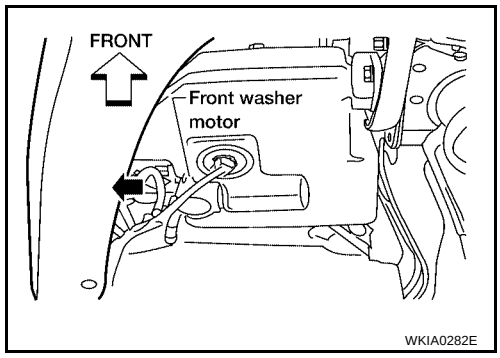
Washer tank installation screw

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

## Removal and Installation for Washer Pump

EKS002J0

1. Remove fender protector, refer to EI-20, "Removal and Installation" .
2. Remove washer pump connector and hose.
3. Pull out washer pump in the direction of the arrow as shown, and remove the washer pump from the washer tank.




**CAUTION:**

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

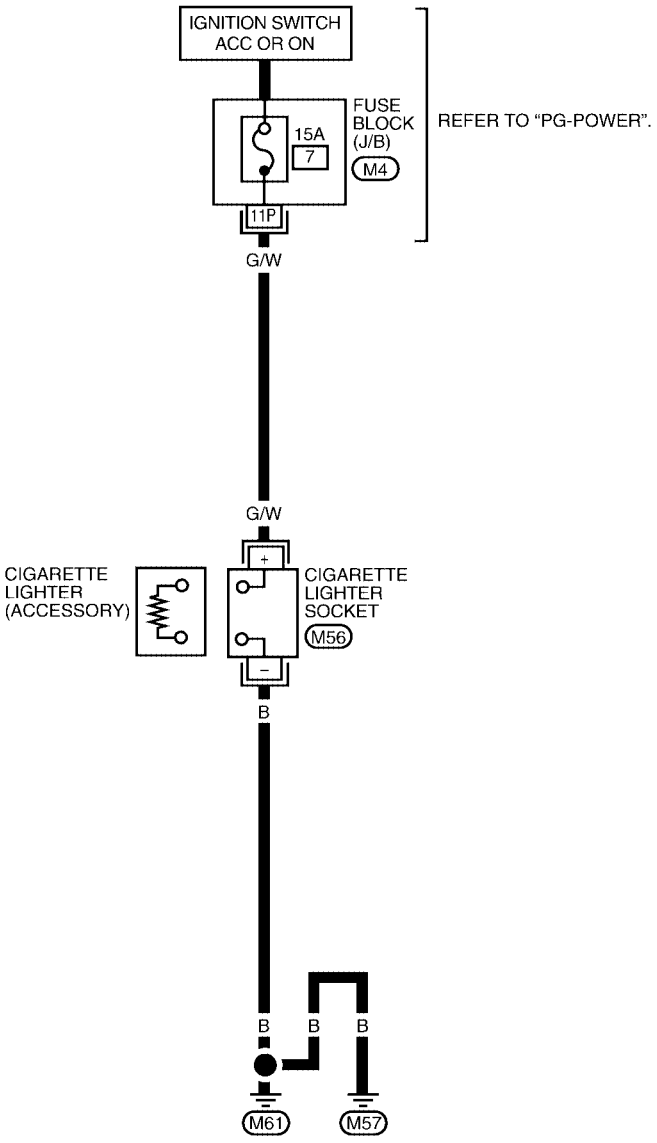
# CIGARETTE LIGHTER

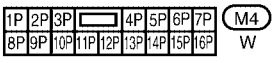
PFP:35330

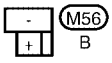
## Wiring Diagram — CIGAR —

EKS002J1

WW-CIGAR-01



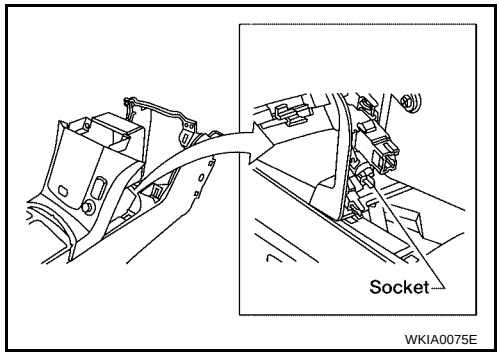




WKWA0081E

## Removal and Installation

EKS002J2

1. Remove the A/T finisher (A/T models), refer to IP-14, "A/T Finisher" , or remove the M/T finisher (M/T models), refer to IP-14, "M/T Finisher" .
2. Remove console box finisher.
3. Remove socket.
4. Press out ring from the back of console box finisher.



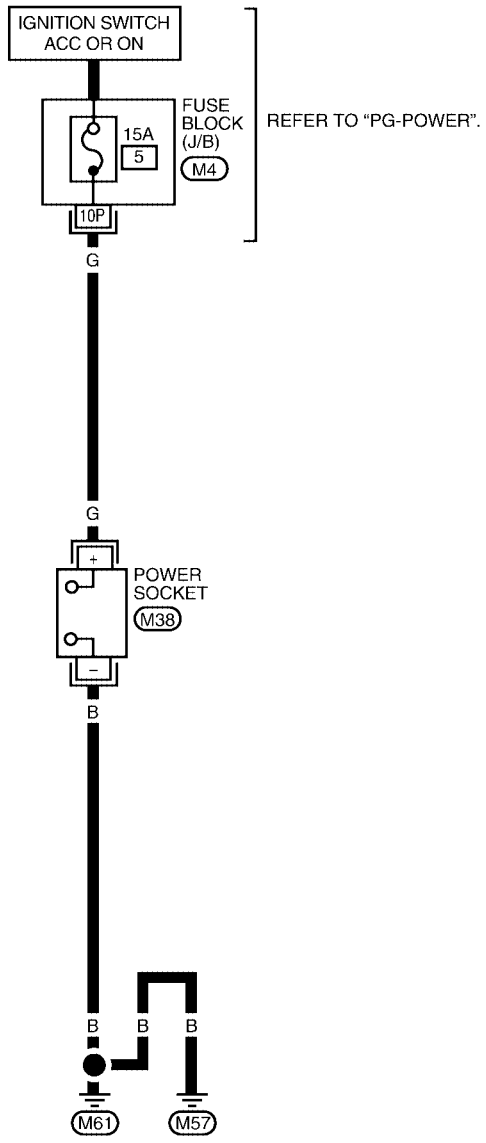
# POWER SOCKET

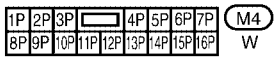
PFP:253A2

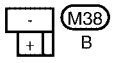
## Wiring Diagram — CIGAR —

EKS002J3

WW-CIGAR-02



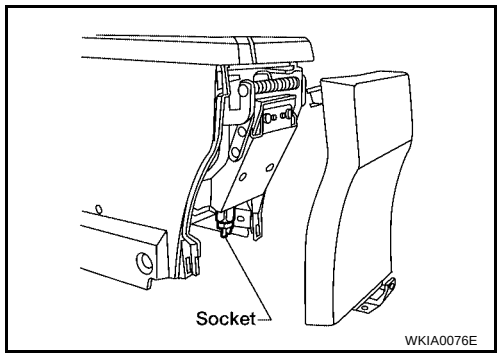




WKWA0082E

## Removal and Installation

EKS002J4

1. Remove the console finisher, refer to IP-16, "Center Console" .
2. Disconnect power socket connector.
3. Remove socket from the console.

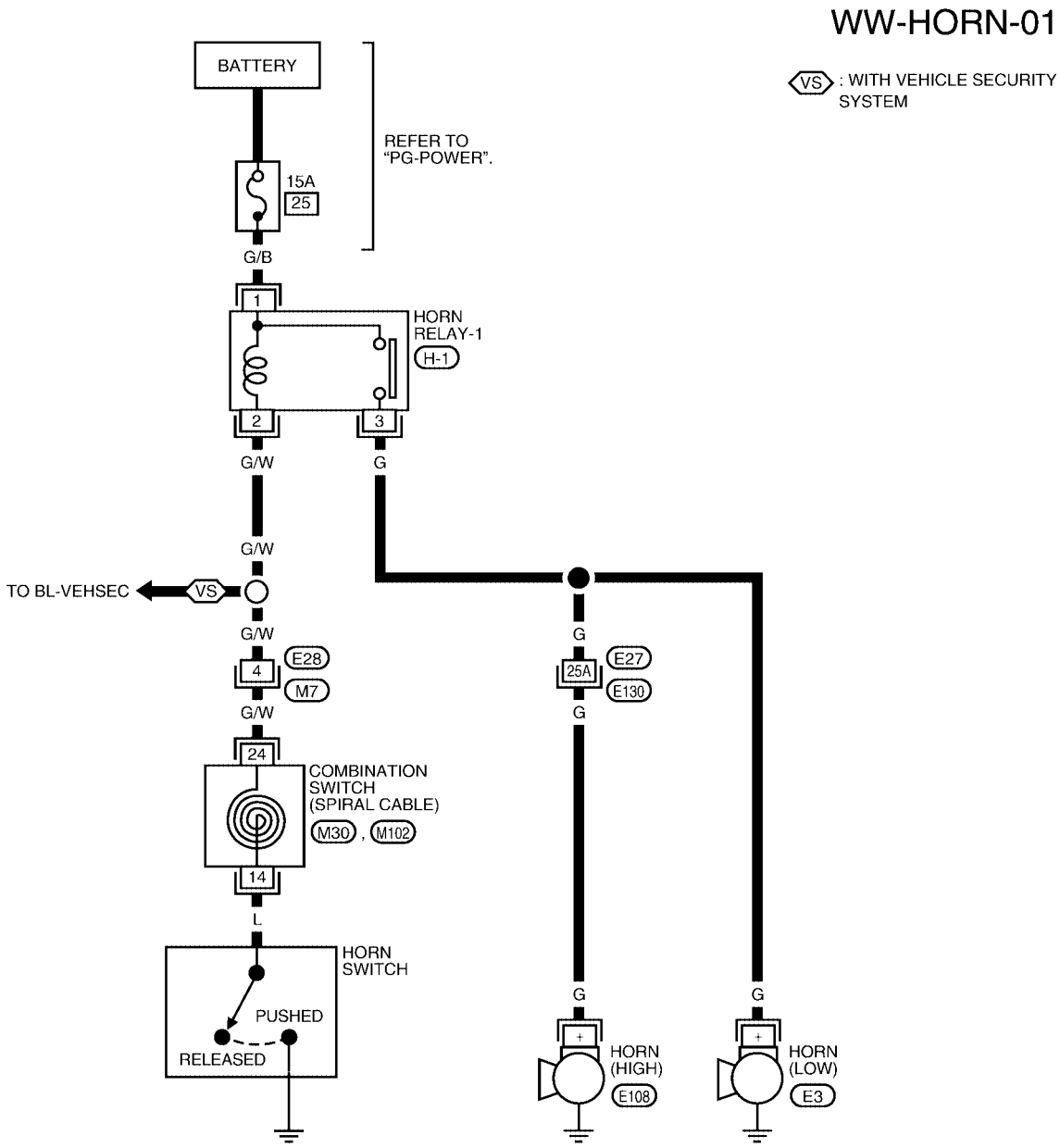


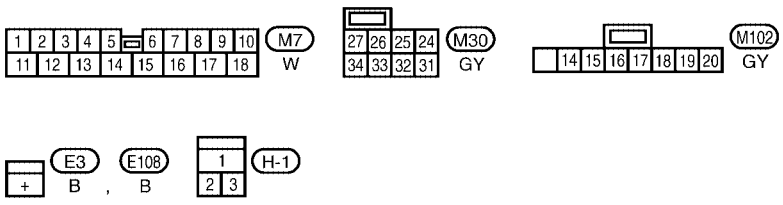
# HORN

PFP:25610

## Wiring Diagram — HORN —

EKS002J5




REFER TO THE FOLLOWING.
E130 - SUPER MULTIPLE JUNCTION (SMJ)

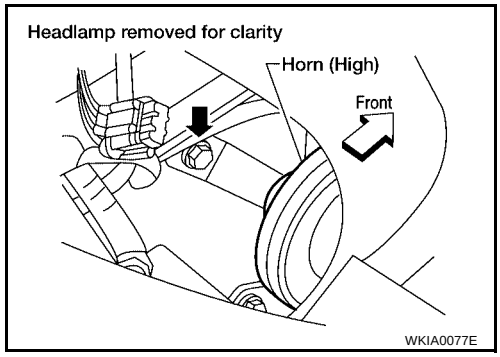
WKWA0083E

## Removal and installation

EKS002J6

### REMOVAL (HORN HIGH)

1. Remove right headlamp, refer to LT-25, "Removal and Installation" .
2. Disconnect horn connector.
3. Remove horn.



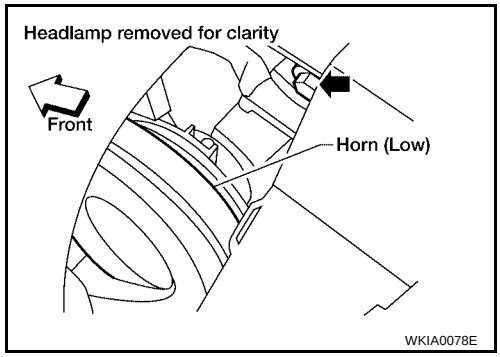

### INSTALLATION (HORN HIGH)

Tighten horn bolt to specified torque.

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

### REMOVAL (HORN LOW)

1. Remove left headlamp, refer to LT-25, "Removal and Installation" .
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)**