SECTION WW
WIPER, WASHER & HORN

CONTENTS

PRECAUTION

PFP:00011

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

EKS007PJ

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 harnesses or harness connectors.**

Wiring Diagrams and Trouble Diagnosis

EKS007PK

When you read wiring diagrams, refer to the following:

- Refer to GI-15, "How to Read Wiring Diagrams"
- Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" for power distribution circuit.

When you perform trouble diagnosis, refer to the following:

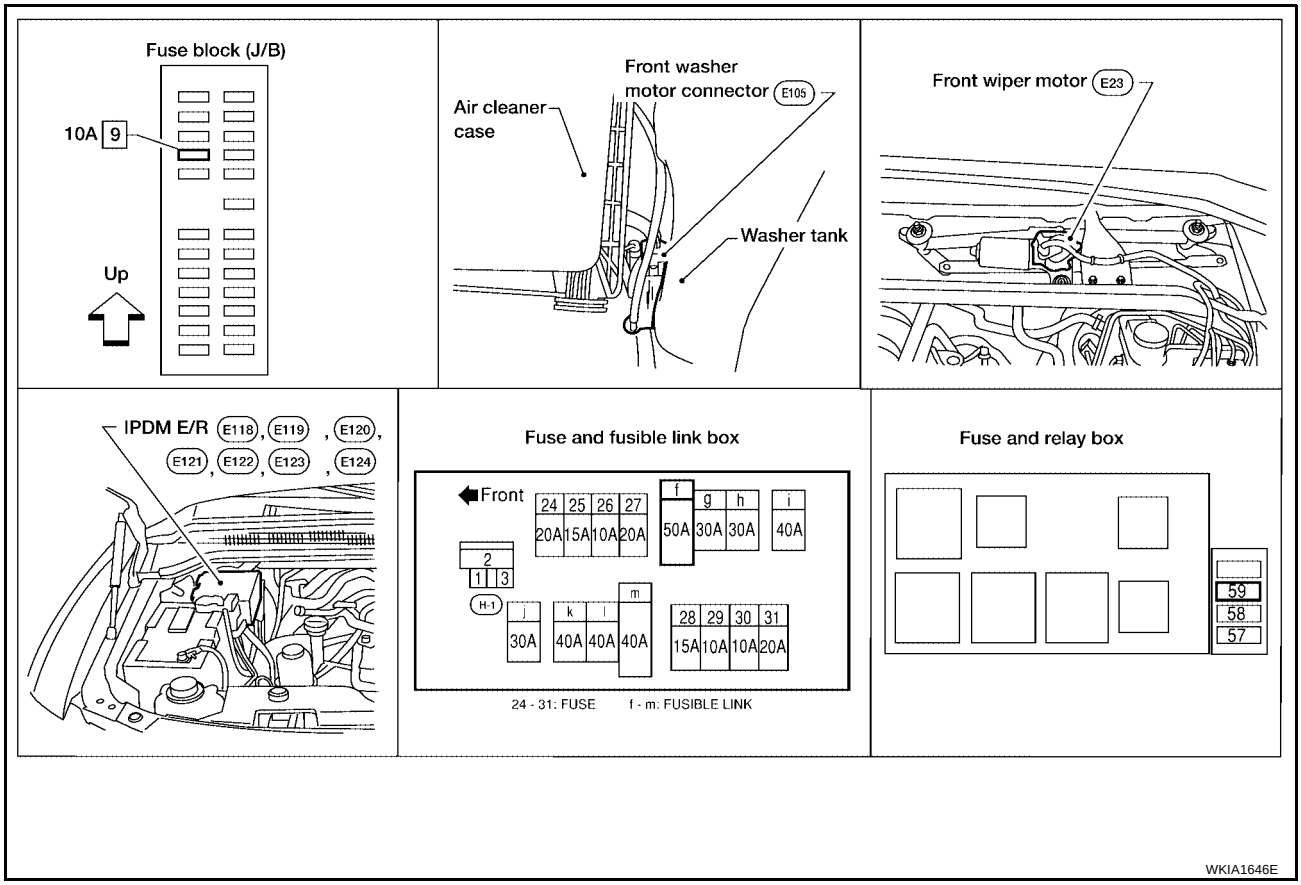
- Refer to GI-11, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- Refer to GI-27, "How to Perform Efficient Diagnosis for an Electrical Incident" .

FRONT WIPER AND WASHER SYSTEM

PFP:28810

Components Parts and Harness Connector Location

EKS007PL



System Description

EKS007PM

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

Power is supplied at all times

- through 50A fusible link (letter **f** , located in the fuse and fusible link box)
- to BCM terminal 70, and
- through 30A fuse (No. 39, located in the IPDM E/R)
- to front wiper relay (located in the IPDM E/R).

With the ignition switch in ON or START position, power is supplied at all times

- through 10A fuse (No. 59, located in the fuse and relay box)
- to BCM terminal 38.

Ground is supplied at all times

- to BCM terminal 67, and
- to combination switch terminal 12
- through body grounds M61, M57, and M79, and
- to IPDM E/R terminals 38 and 59, and
- to front wiper motor terminal 1
- through body grounds E24, E15, and E9.

LOW SPEED WIPER OPERATION

When the ignition switch is in the ON or START position, and the front wiper switch is turned to the low position, the BCM detects a low speed wiper ON request through the combination switch (wiper switch) reading function.
The BCM then sends a front wiper (low) request signal over CAN communication lines

- from BCM terminals 39 and 40
- to IPDM E/R terminals 39 and 40.

When IPDM E/R receives front wiper (low) request signal, it supplies ground to energize the front wiper relay.
With the front wiper relay energized, power is supplied

- from front wiper relay
- to front wiper HI relay
- through IPDM E/R terminal 32
- to front wiper motor terminal 3.

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

HI SPEED WIPER OPERATION

When the ignition switch is in the ON or START position, and the front wiper switch is turned to the high position, the BCM detects a high speed wiper ON request through the combination switch (wiper switch) reading function.
The BCM then sends a front wiper (high) request signal over CAN communication lines

- from BCM terminals 39 and 40
- to IPDM E/R terminals 39 and 40.

When the IPDM E/R receives a front wiper (high) request signal, it supplies ground to energize the front wiper and the front wiper HI relays.
With the front wiper and the front wiper HI relays energized, power is supplied

- from front wiper relay
- to front wiper HI relay
- through IPDM E/R terminal 35
- to front wiper motor terminal 2.

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

INTERMITTENT OPERATION

Wiper intermittent operation delay interval is determined from the combination of the intermittent wiper dial position inputs and vehicle speed. During each intermittent operation delay interval, the BCM sends a front wiper request signal to the IPDM E/R to operate the wipers.
When the ignition switch is in the ON or START position, and the front wiper switch is turned to an intermittent position, the BCM detects a front wiper (intermittent) ON request through the combination switch (wiper switch) reading function.
The BCM then sends a front wiper (intermittent) request signal over CAN communication lines

- from BCM terminals 39 and 40
- to IPDM E/R terminals 39 and 40.

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

- BCM detects ON/OFF status of intermittent wiper dial position
- BCM calculates operation interval from wiper dial position and vehicle speed signal received through CAN communications.
- BCM sends front wiper request signal (INT) to IPDM E/R at calculated operation interval.

When the IPDM E/R receives a front wiper request signal (INT), it supplies ground to energize the front wiper relay. It then sends an auto-stop signal to the BCM, and conducts intermittent front wiper motor operation.

AUTO STOP OPERATION

When the wiper arms are not located at the base of the windshield, and the wiper switch is turned OFF, the wiper motor will continue to operate until the wiper arms reach the windshield base. When the wiper arms reach the base of windshield, front wiper motor terminals 6 and 1 are connected.
Ground is supplied

- to terminal 43 of the IPDM E/R
- through front wiper motor terminal 6
- through front wiper motor terminal 1
- through body grounds E24, E15, and E9.

The IPDM E/R sends an auto stop operation signal to the BCM through CAN communication lines.
When the BCM receives an auto stop operation signal, the BCM sends wiper stop signal to the IPDM E/R over CAN communication lines. The IPDM E/R then de-energizes the front wiper relay.
The wiper motor will then stop the wiper arms at the STOP position.

FRONT WASHER OPERATION

When the ignition switch is in the ON or START position, and the front washer switch is OFF, the front washer motor is supplied power

- through 10A fuse (No. 9, located in the fuse block J/B)
- to front washer motor terminal 1.

When the front wiper switch is in the front washer position, the BCM detects a front washer signal request through the combination switch (wiper switch) reading function.
Combination switch ground is supplied

- to front washer motor terminal 2
- through combination switch (wiper switch) terminal 11
- through combination switch (wiper switch) terminal 12
- through grounds M61, M57, and M79.

With ground supplied, the front washer motor operates.
When the BCM detects that front washer motor has operated for 0.4 seconds or longer, the BCM uses CAN communication and sends a wiper request signal to the IPDM E/R for low speed operation of wipers.
When the BCM detects that the washer switch is OFF, low speed operation cycles approximately 3 times and then stops.

MIST OPERATION

When the wiper switch is temporarily placed in 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

The BCM includes fail-safe function to prevent malfunction of electrical components controlled by CAN communications if a malfunction in CAN communications occurs.
The BCM uses CAN communications to stop output of electrical components it controls.
Until the ignition switch is turned off, the front wiper system 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, the BCM remains in standby until normal signals are received.
When normal signals are received, fail-safe status is canceled.

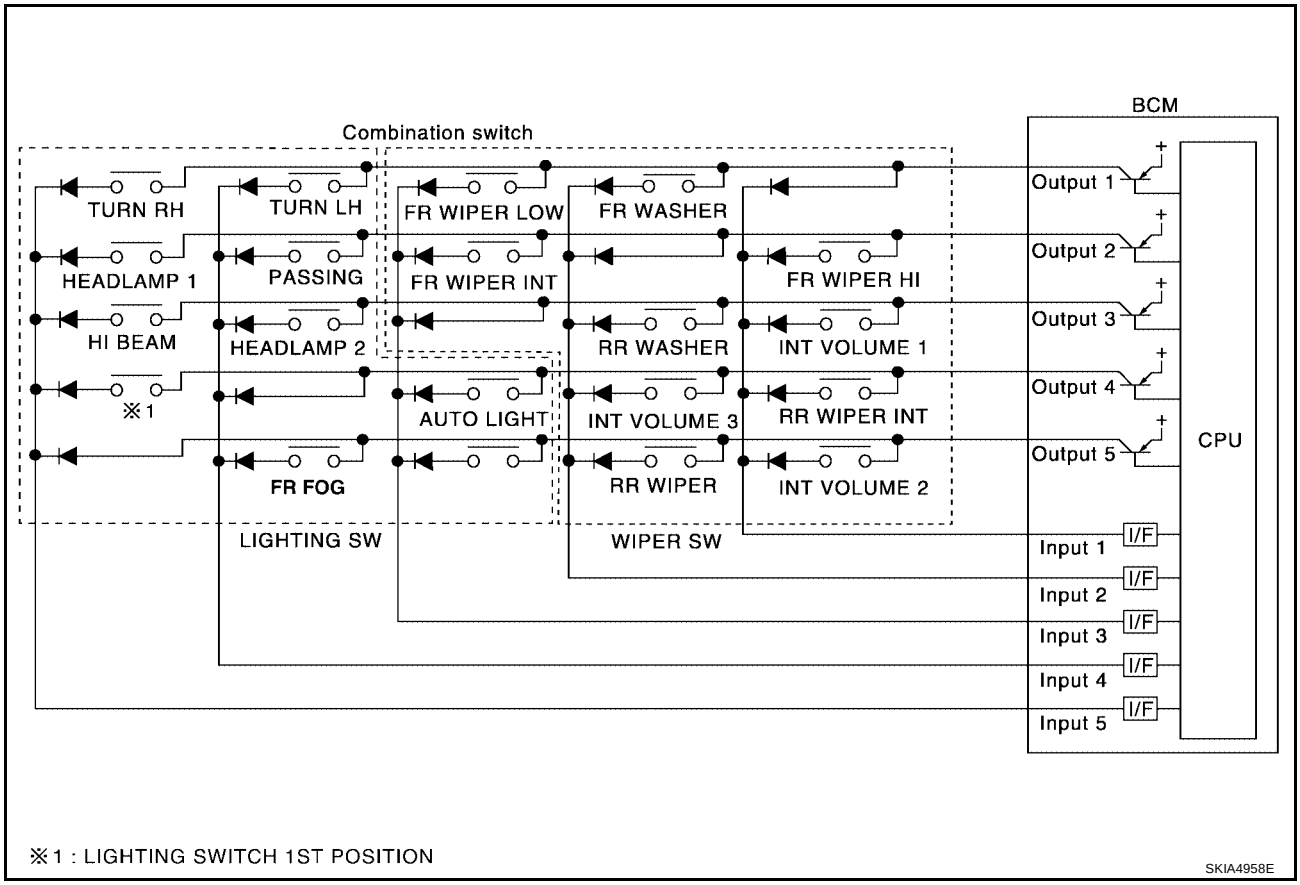
COMBINATION SWITCH READING FUNCTION

Description

- BCM reads combination switch status, and controls related systems such as headlamps and wipers, according to the results.
- BCM reads information for a maximum of 20 switches by combining five output terminals (OUTPUT 1-5) and five input terminals (INPUT 1-5).

Operation Description

- BCM activates transistors of output terminals (OUTPUT 1-5) periodically, and allows current to flow in turn.
- If any (1 or more) switches are turned ON, the circuit of output terminals (OUTPUT 1-5) and input terminals (INPUT 1-5) becomes active.
- At this time, transistors of output terminals (OUTPUT 1-5) are activated to allow current to flow. When voltage of the input terminal (INPUT 1-5) corresponding to that switch changes, the interface in the BCM detects a voltage change, and the BCM determines that the switch is ON.



BCM - Operation Table of Combination Switches

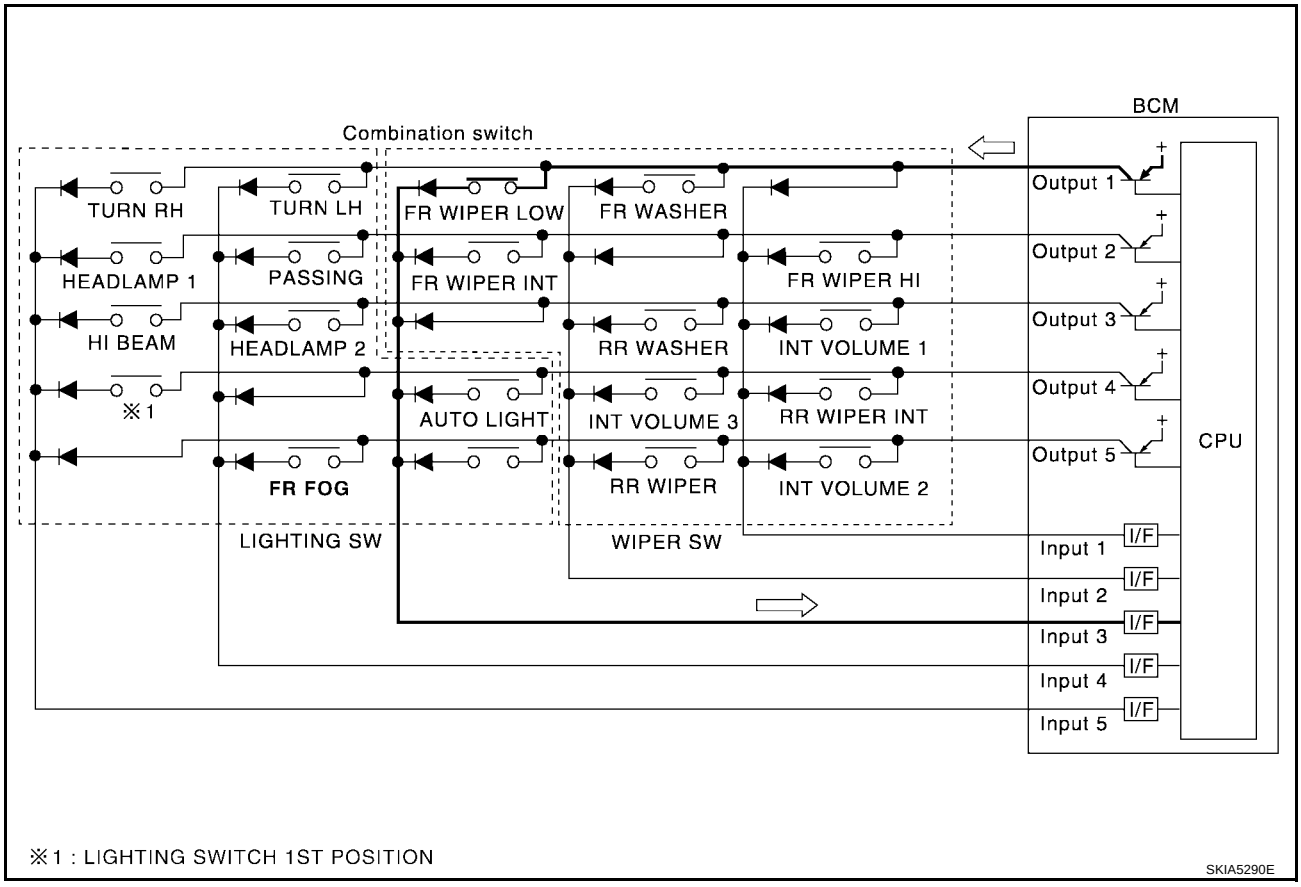
- BCM reads operation status of the combination switch using combinations shown in the table below.

	COMB SW OUTPUT 1		COMB SW OUTPUT 2		COMB SW OUTPUT 3		COMB SW OUTPUT 4		COMB SW OUTPUT 5	
	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
COMB SW INPUT 1	—	—	FR WIPER HI ON	FR WIPER HI OFF	INT VOLUME 1 ON	INT VOLUME 1 OFF	RR WIPER INT ON	RR WIPER INT OFF	INT VOLUME 2 ON	INT VOLUME 2 OFF
COMB SW INPUT 2	FR WASHER ON	FR WASHER OFF	—	—	RR WASHER ON	RR WASHER OFF	INT VOLUME 3 ON	INT VOLUME 3 OFF	RR WIPER ON	RR WIPER OFF
COMB SW INPUT 3	FR WIPER LOW ON	FR WIPER LOW OFF	FR WIPER INT ON	FR WIPER INT OFF	—	—	AUTO LIGHT ON	AUTO LIGHT OFF	—	—
COMB SW INPUT 4	TURN LH ON	TURN LH OFF	PASSING ON	PASSING OFF	HEAD-LAMP 2 ON	HEAD-LAMP 2 OFF	—	—	FR FOG ON	FR FOG OFF
COMB SW INPUT 5	TURN RH ON	TURN RH OFF	HEAD-LAMP 1 ON	HEAD-LAMP 1 OFF	HI BEAM ON	HI BEAM OFF	LIGHTING SW (1st) ON	LIGHTING SW (1st) OFF	—	—

SKIA4959E

Sample Operation: (When Wiper Switch is Turned ON)

- When the wiper switch is turned ON, contact in the combination switch turns ON. At this time if OUTPUT 1 transistor is activated, the BCM detects that voltage changes in INPUT 3.
- When the OUTPUT 1 transistor is ON, the BCM detects that voltage changes in INPUT 3, and judges that front wiper low is ON. Then the BCM sends a front wiper request signal (LO) to the IPDM E/R using CAN communication.
- When OUTPUT 1 transistor is activated again, BCM detects that voltage changes in INPUT 3, and recognizes that the wiper switch is continuously ON.



NOTE:
Each OUTPUT terminal transistor is activated at 10 ms intervals. Therefore, after the switch is turned ON, electrical loads are activated with time delay. This time delay is so short that it cannot be detected by human senses.

Operation Mode

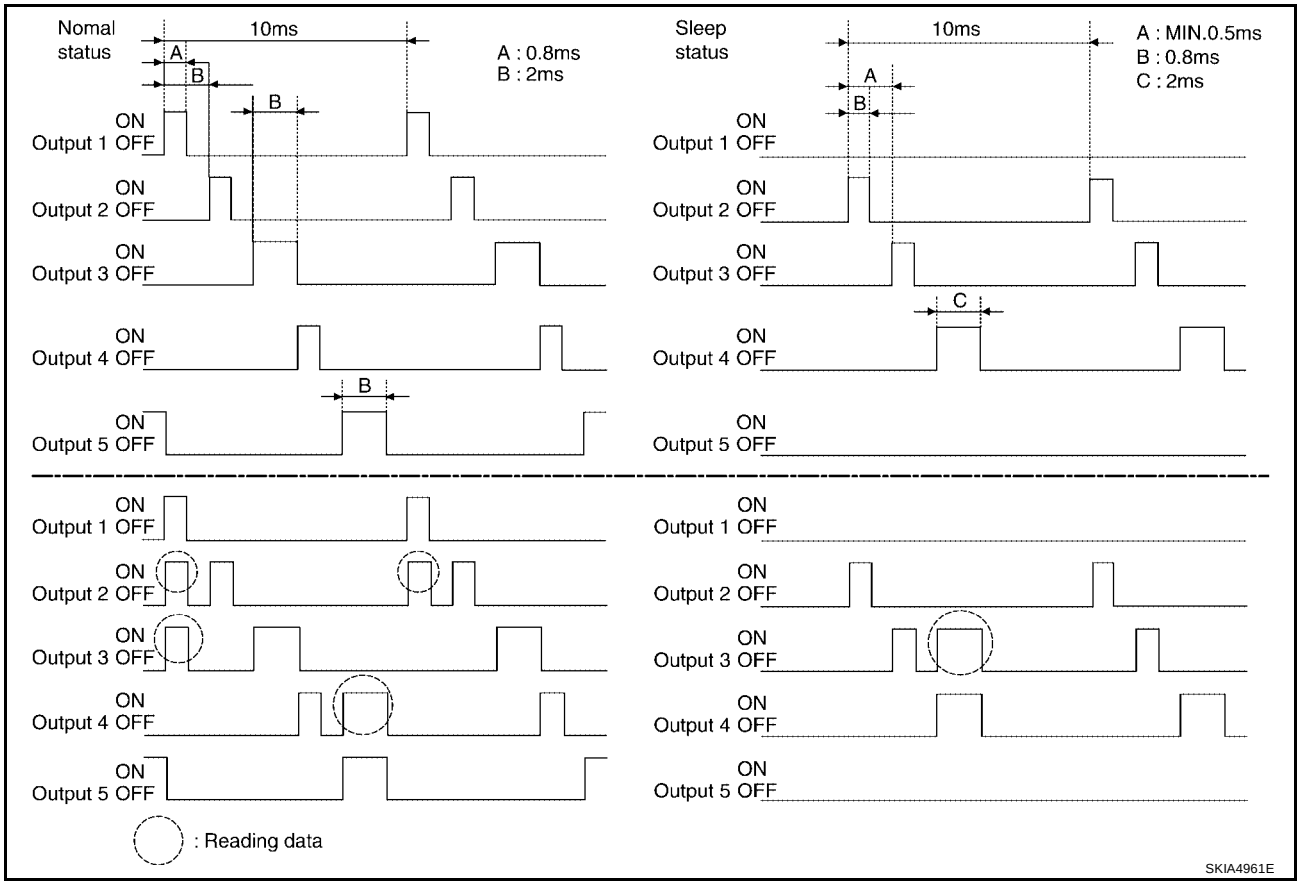
The combination switch reading function has the operation modes shown below.

1. Normal status

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

2. Sleep status

– When BCM is in sleep status, transistors of OUTPUT 1 stop the output, and BCM enters low current consumption mode. OUTPUT (2, 3, and 4) turn ON-OFF every 10 ms, and only input from light switch system is accepted.



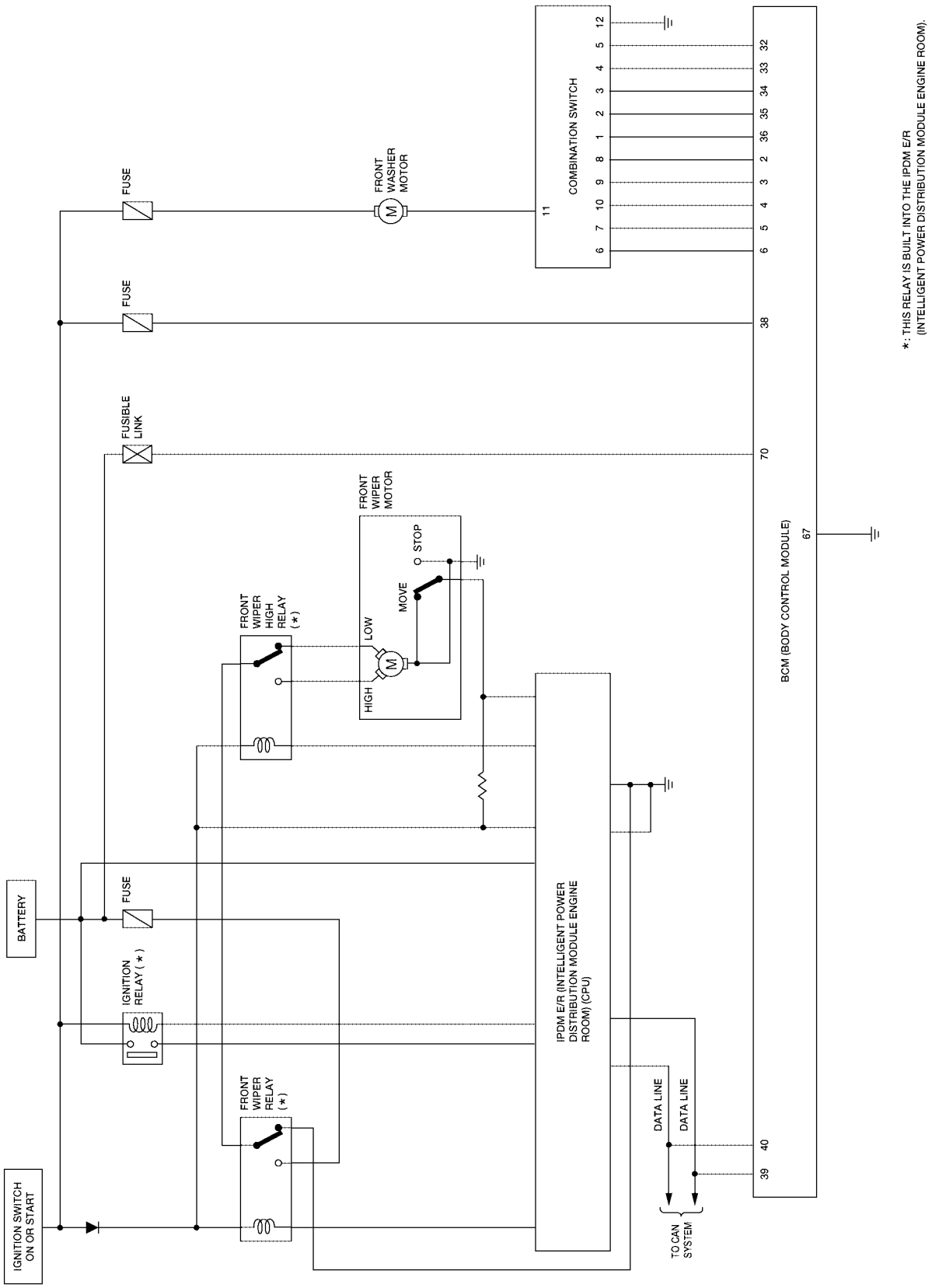
CAN Communication System Description

EKS007PN

Refer to LAN-8, "CAN COMMUNICATION" .

Schematic

EKS007PO



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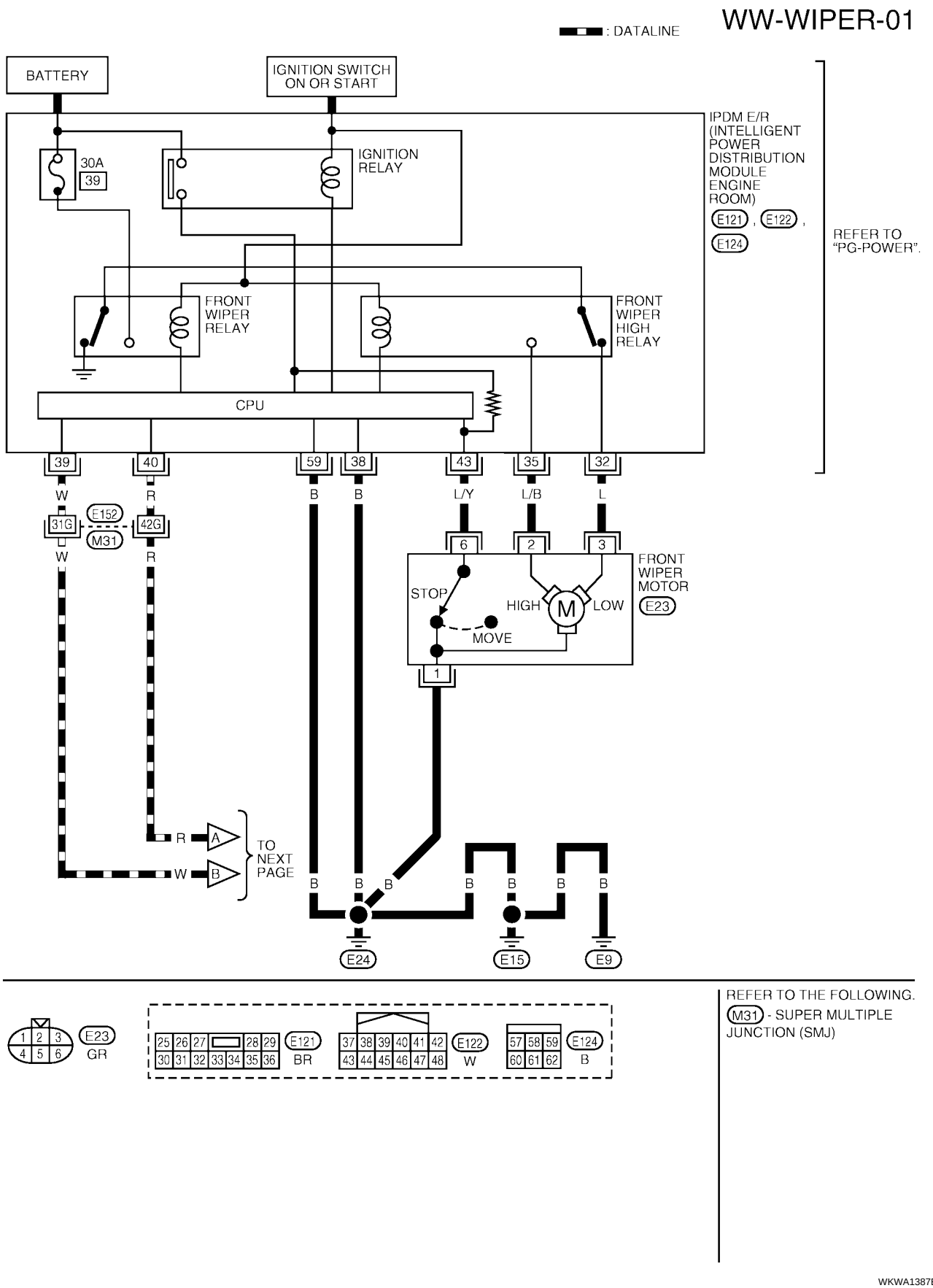
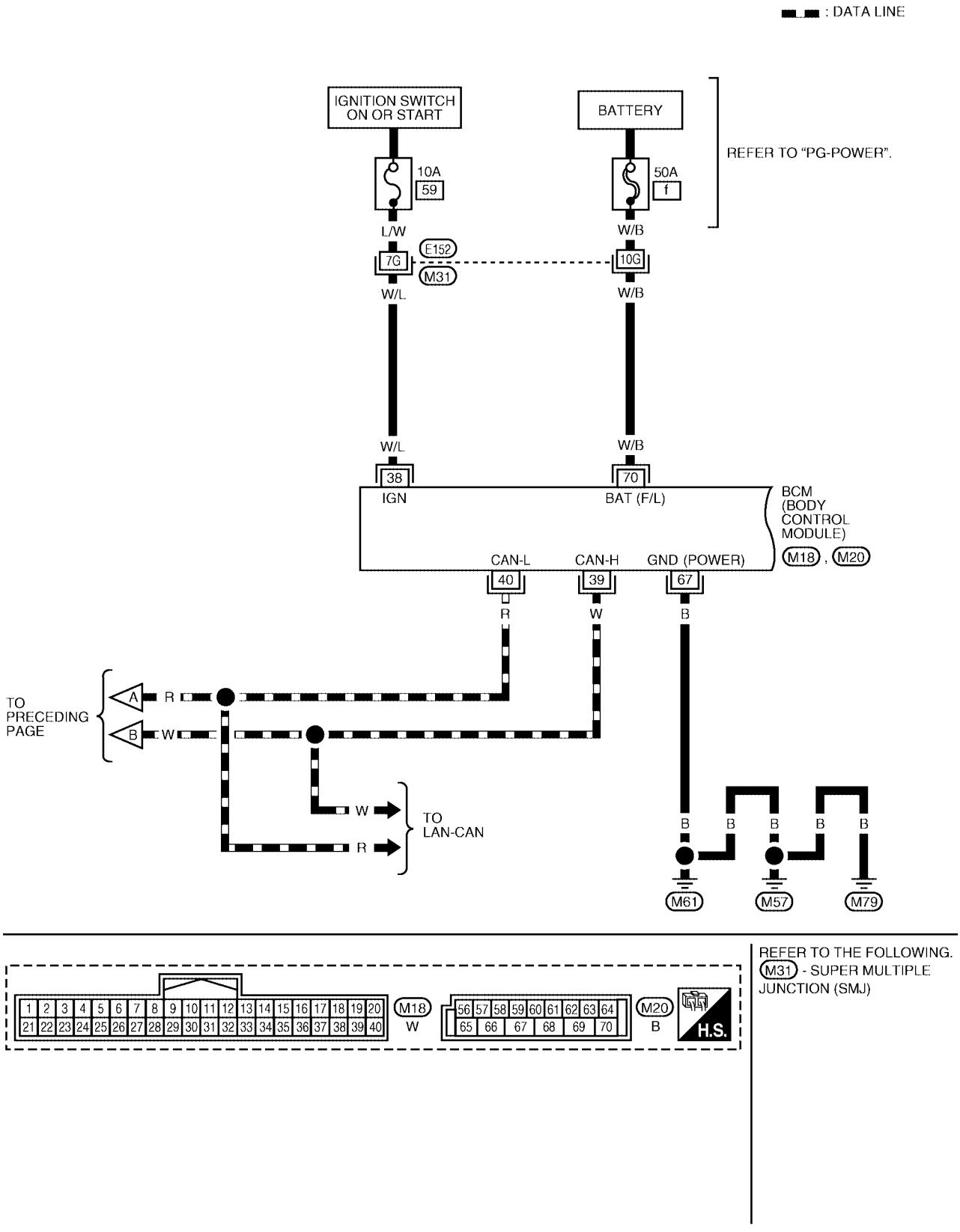
Wiring Diagram — WIPER —

EKS007PP

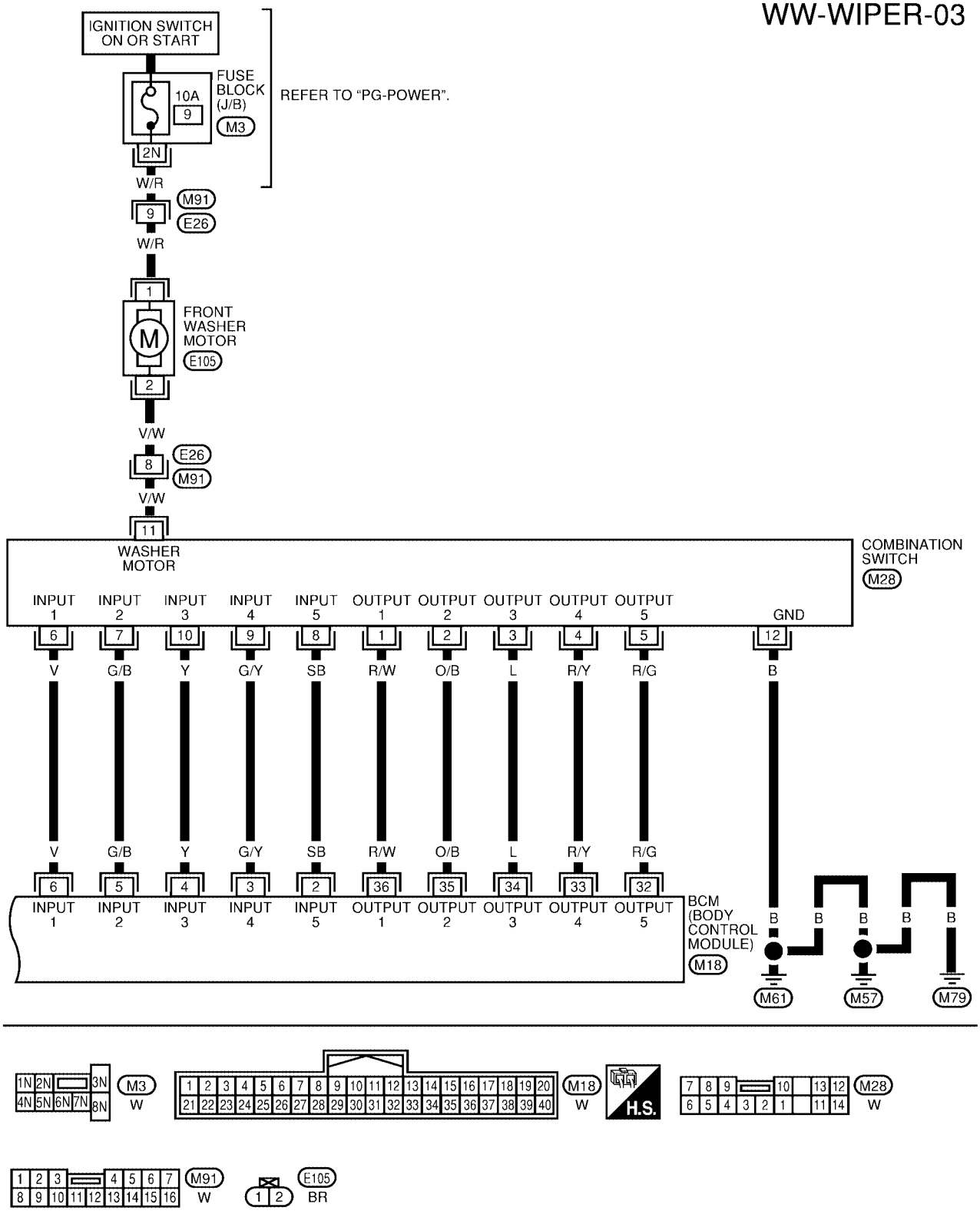


WW-WIPER-02



WKWA1388E

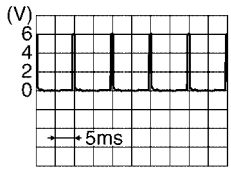
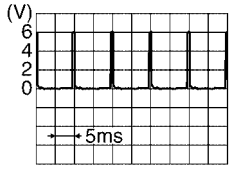
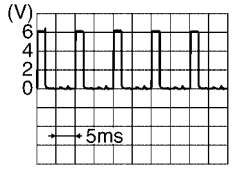
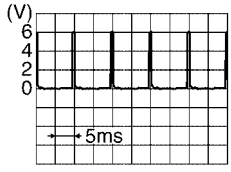
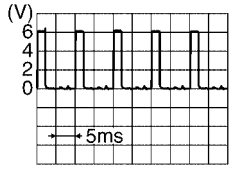
WW-WIPER-03

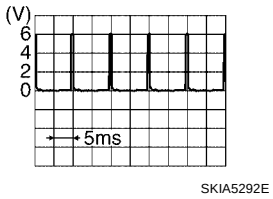


WKWA1006E

Terminals and Reference Value for BCM

EKS007PQ

Terminal No. (Wire color)	Signal name	Measuring condition		Reference Value (V) (Approx.)
		Ignition switch	Operation or condition	
2 (SB)	Combination switch input 5	ON	● Light switch and wiper switch OFF ● Wiper dial position 4	 SKIA5291E
3 (G/Y)	Combination switch input 4	ON	● Light switch and wiper switch OFF ● Wiper dial position 4	 SKIA5292E
4 (Y)	Combination switch input 3	ON	● Light switch and wiper switch OFF ● Wiper dial position 4	 SKIA5291E
5 (G/B)	Combination switch input 2	ON	● Light switch and wiper switch OFF ● Wiper dial position 4	 SKIA5292E
6 (V)	Combination switch input 1	ON		
32 (R/G)	Combination switch output 5	ON	● Light switch and wiper switch OFF ● Wiper dial position 4	 SKIA5291E
33 (R/Y)	Combination switch output 4	ON	● Light switch and wiper switch OFF ● Wiper dial position 4	 SKIA5292E
34 (L)	Combination switch output 3	ON	● Light switch and wiper switch OFF ● Wiper dial position 4	 SKIA5291E

Terminal No. (Wire color)	Signal name	Measuring condition		Reference Value (V) (Approx.)
		Ignition switch	Operation or condition	
35 (O/B)	Combination switch output 2	ON	● Light switch and wiper switch OFF ● Wiper dial position 4	 SKIA5292E
36 (R/W)	Combination switch output 1			
38 (W/L)	Ignition switch (ON)	ON	—	Battery
39 (W)	CAN-H	ON	—	—
40 (R)	CAN-L	ON	—	—
67 (B)	Ground	—	—	0
70 (W/B)	Battery power	OFF	—	Battery

Terminals and Reference Values for IPDM E/R

EKS007PR

Terminal No. (Wire color)	Signal name	Measuring condition			Reference value (V) (Approx.)
		Ignition switch	Operation or condition		
32 (L)	Low speed signal	ON	Wiper switch	OFF	0
				LO	Battery
35 (L/B)	High speed signal	ON	Wiper switch	OFF	0
				HI	Battery
43 (L/Y)	Wiper auto - stop signal	ON	Wiper operating		Battery
			Wiper stopped		0
38 (B)	Ground	—	—		0
39 (W)	CAN-H	ON	—		—
40 (R)	CAN-L	ON	—		—
59 (B)	Ground	—	—		0

Work Flow

EKS007PS

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-15, "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. Inspection End.

Preliminary Inspection

EKS007PT

INSPECTION FOR POWER SUPPLY AND GROUND CIRCUIT

Inspection procedure

1. CHECK FUSE

Check if wiper or washer fuse is blown.

Unit	Power source	Fuse No.
Front washer motor	Ignition ON or START	9
Front wiper relay	Battery	39
BCM	Ignition ON or START	59
BCM	Battery	**f**

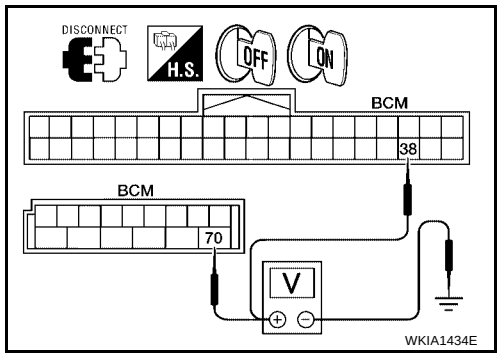
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of problem before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

2. CHECK POWER SUPPLY CIRCUIT

1. Disconnect BCM connector.
2. Check voltage between BCM harness connector terminals and ground.

Terminals			Ignition switch position	
(+)		(–)	OFF	ON
Connector	Terminal (Wire color)			
M18	38 (W/L)	Ground	0V	Battery voltage
M20	70 (W/B)		Battery voltage	



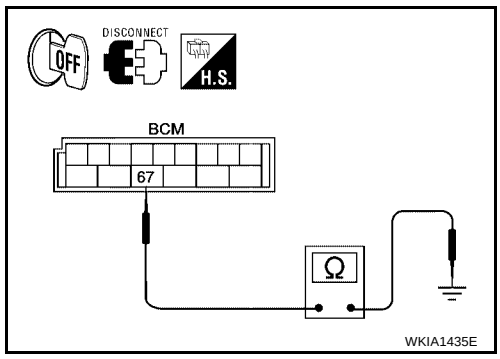
OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between BCM and fuse.

3. GROUND CIRCUIT INSPECTION (BCM)

Check for continuity between BCM terminal and body ground.

Terminals			Ignition switch condition	Continuity
(+)		(–)		
Connector	Terminal (wire color)			
M20	67 (B)	Ground	OFF	YES



OK or NG

OK >> Inspection End.
NG >> Repair/replace BCM ground circuit.

CONSULT-II Functions (BCM)

EKS007PU

CONSULT-II can display each diagnostic item using the diagnostic test modes shown following.

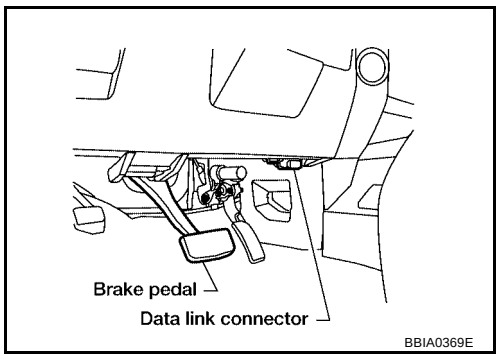
BCM diagnosis location	Check item, diagnosis mode	Description
Wiper	Data monitor	Displays BCM input data in real time.
	Active test	Device operation can be checked by applying a drive signal to device.
BCM	Self-diagnosis	BCM performs self-diagnosis of CAN communications.
	CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.

CONSULT-II OPERATION

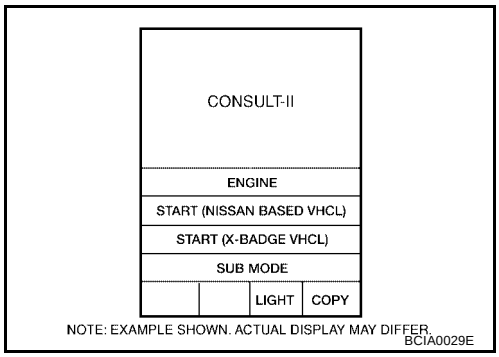
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carries out CAN communication.

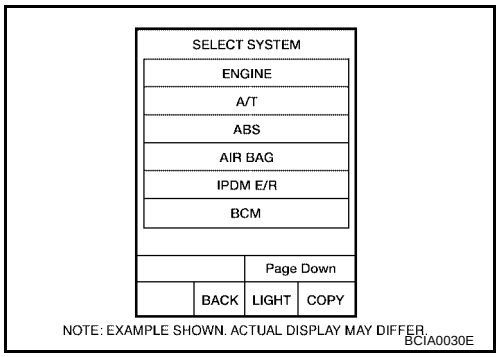
1. With the ignition switch OFF, connect CONSULT-II and CONSULT-II CONVERTER to the data link connector, then turn the ignition switch ON.



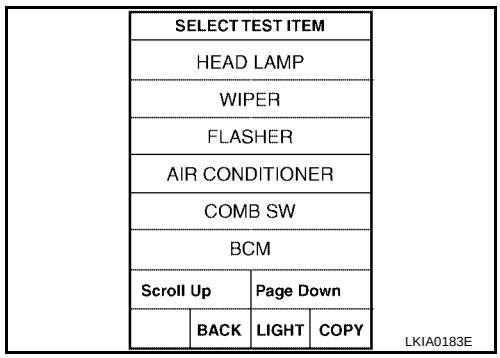
2. Touch “START (NISSAN BASED VHCL)”.



3. Touch “BCM” on the “SELECT SYSTEM” screen. If "BCM" is not indicated, go to GI-38, "CONSULT-II Data Link Connector (DLC) Circuit" .



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 to record the status of the item being monitored. 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.
IGN SW CAN	“ON/OFF”	Displays “IGN switch ON (ON)/Other OFF or ACC (OFF)" status as judged from CAN communications.
FR WIPER HI	“ON/OFF”	Displays “Front Wiper HI (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 INT	“ON/OFF”	Displays “Front Wiper INT (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.
FR WIPER STOP	“ON/OFF”	Displays “Stopped (ON)/Operating (OFF)” status as judged from the auto-stop signal.
VEHICLE SPEED	“0.0 km/h”	Displays vehicle speed as received from CAN communication.

ACTIVE TEST

Operation Procedure

1. Touch “WIPER” on the “SELECT TEST ITEM” screen.
2. Touch “ACTIVE TEST” on the “SELECT DIAG MODE” screen.
3. Touch item(s) to be tested and check operation of the selected item(s).
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.

CONSULT-II Functions (IPDM E/R)

EKS007PV

CONSULT-II can display each diagnostic item using the diagnostic test modes shown following.

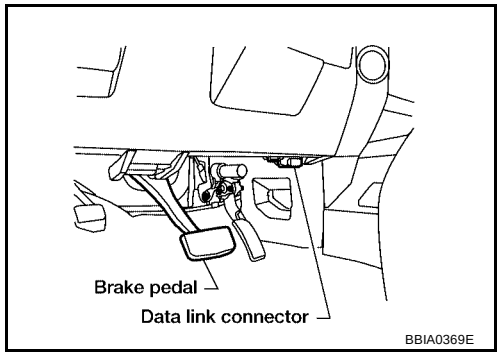
Inspection Item, Diagnosis Mode	Description
DATA MONITOR	The input/output data of the IPDM E/R is displayed in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	The IPDM E/R sends a drive signal to electronic components to check their operation.

CONSULT-II OPERATION

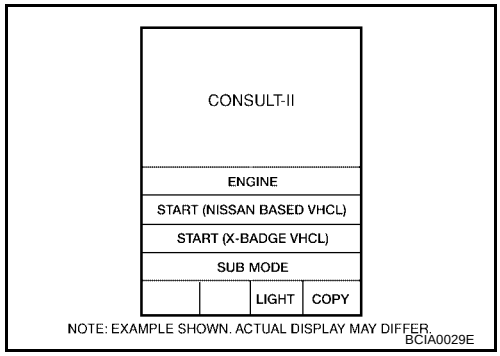
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carries out CAN communication.

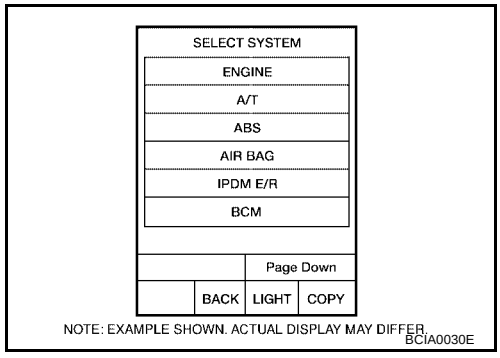
1. With the ignition switch OFF, connect CONSULT-II and CONSULT-II CONVERTER to the data link connector, then turn the ignition switch ON.



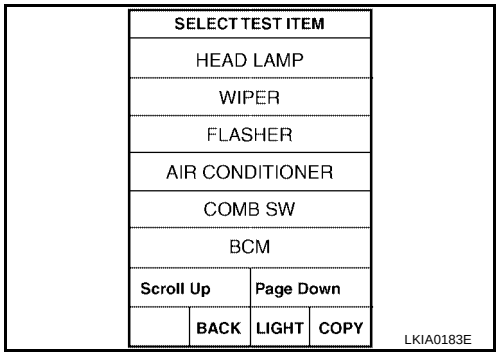
2. Touch “START (NISSAN BASED VHCL)”.



3. Touch “BCM” on the “SELECT SYSTEM” screen. If "BCM" is not indicated, go to GI-38, "CONSULT-II Data Link Connector (DLC) Circuit" .



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 “ALL SIGNALS”, "MAIN SIGNALS" or “SELECTION FROM MENU” on the “DATA MONITOR” screen.

ALL SIGNALS	Monitors all the items.
MAIN SIGNALS	Monitors predetermined 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 to record the status of the item being monitored. To stop recording, touch “STOP”.

All Items, Main Items, Select Item Menu

Item name	CONSULT-II screen display	Display or unit	Monitor item selection			Description
			ALL SIGNALS	MAIN SIGNALS	SELECT FROM MENU	
FR wiper request	FR WIP REQ	STOP/1LO/LO/HI	x	x	x	Signal status input from BCM.
Wiper auto stop	WIP AUTO STOP	ACT P/STOP P	x	x	x	Output status of IPDM E/R.
Wiper protection	WIP PROT	OFF/LS/HS/BLOCK	x	x	x	Control status of IPDM E/R.

NOTE:
Perform monitoring of IPDM E/R data with the ignition switch ON. When the ignition switch is at ACC, the display may not be correct.

ACTIVE TEST

Operation Procedure

1. Touch “WIPER” on the “SELECT TEST ITEM” screen.
2. Touch “ACTIVE TEST” on the “SELECT DIAG MODE” screen.
3. Touch item(s) to be tested and check operation of the selected item(s).
4. During the operation check, touching “BACK” deactivates the operation.

Display Item List

Test item	CONSULT–II screen display	Description
Front wiper (HI, LO) output	FRONT WIPER	With a certain operation (OFF, HI ON, LO ON) front wiper relays can be operated.

Trouble Diagnosis

EKS007PW

FRONT WIPER DOES NOT OPERATE

CAUTION:

During IPDM E/R fail-safe control, front wipers may not operate. Refer to PG-16, "CAN COMMUNICATION LINE CONTROL" to make sure that it is not in fail-safe status.

Inspection Procedure

1. CHECK IPDM E/R TO FRONT WIPERS (1)

With CONSULT-II

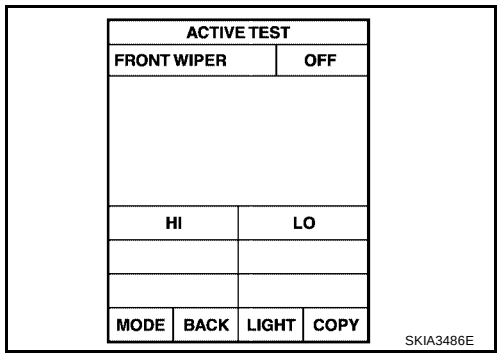
1. Select "IPDM E/R" with CONSULT-II, and select "ACTIVE TEST" on "SELECT DIAG MODE" screen.
2. Select "FRONT WIPER" on "SELECT TEST ITEM" screen.

Without CONSULT-II

1. Turn on front wipers using auto active test. Refer to PG-22, "Auto Active Test" .
2. Confirm front wiper operation.

OK or NG

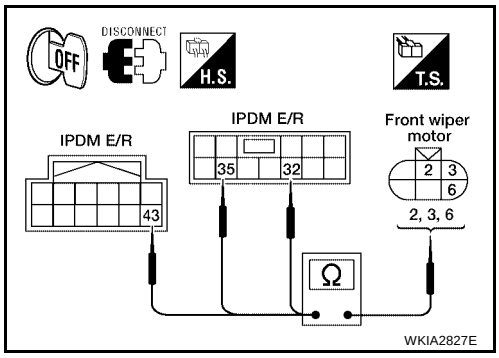
OK >> GO TO 4.
NG >> GO TO 2.



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

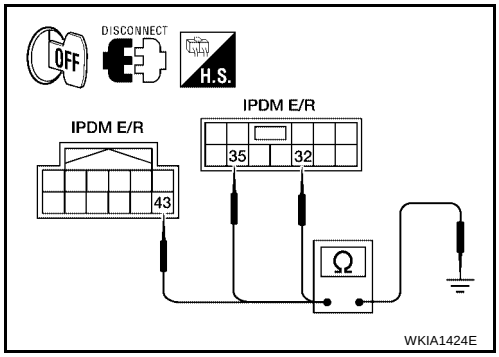
1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and front wiper motor connector.
3. Check continuity between IPDM E/R harness connector terminals and front wiper motor harness connector terminals.

Terminals				Continuity
(+)		(–)		
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
E121	32 (L)	E23	3 (L)	YES
	35 (L/B)		2 (L/B)	
E122	43 (L/Y)		6 (L/Y)	



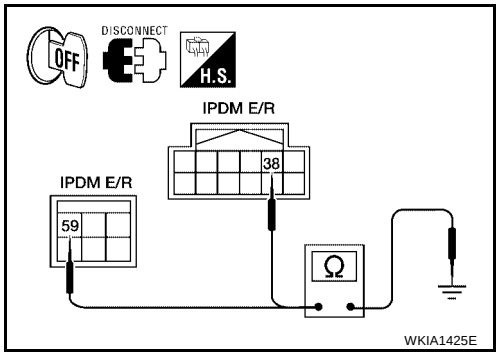
4. Check continuity between IPDM E/R harness connector terminals and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal (wire color)		
E121	32 (L)	Ground	NO
	35 (L/B)		
E122	43 (L/Y)		



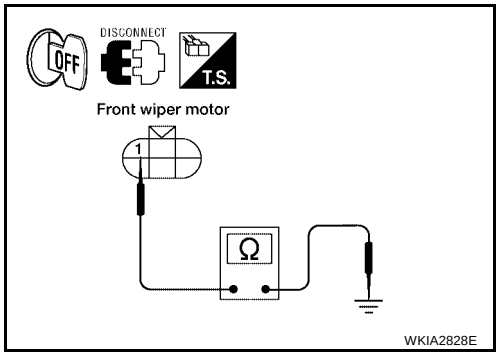
5. Check continuity between IPDM E/R harness connector terminal and body ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal (wire color)		
E122	38 (B)	Ground	YES
E124	59 (B)		



6. Check continuity between front wiper motor harness connector terminal 1 and body ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal (wire color)		
E23	1 (B)	Ground	YES



OK or NG

OK >> Connect connector. GO TO 3.
NG >> Check for open circuit in harness between front wiper motor and body ground.

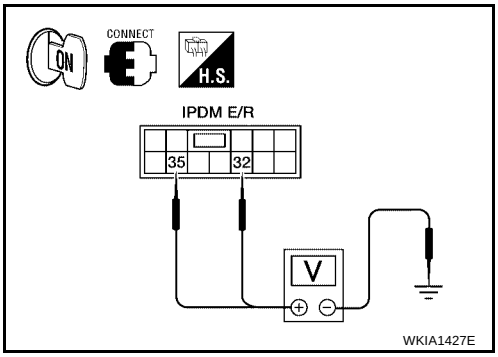
3. IPDM E/R INSPECTION

With CONSULT-II

1. Connect IPDM E/R connector and front wiper motor connector.
2. Select "FR WIPER HI" during "ACTIVE TEST".
3. When front wiper relay, and front wiper HI relay are operating, check voltage between IPDM E/R terminals and body ground.

Without CONSULT-II

1. Connect IPDM E/R connector and front wiper motor connector.
2. Turn on front wipers using the auto active test. Refer to PG-22, "Auto Active Test" .
3. When front wiper relay, and front wiper HI relay are operating, check voltage between IPDM E/R terminals and body ground.



Terminals				Voltage (Approx.)
(+)		(–)	Condition	
Connector	Terminal (wire color)			
E121	32 (L)	Ground	Stopped	0
			LO operation	Battery voltage
	35 (L/B)		Stopped	0
			HI operation	Battery voltage

OK or NG

OK >> Replace the front wiper motor. Refer to WW-32, "Removal and Installation for Wiper Motor and Linkage" .

NG >> Replace IPDM E/R. Refer to PG-28, "Removal and Installation of IPDM E/R" .

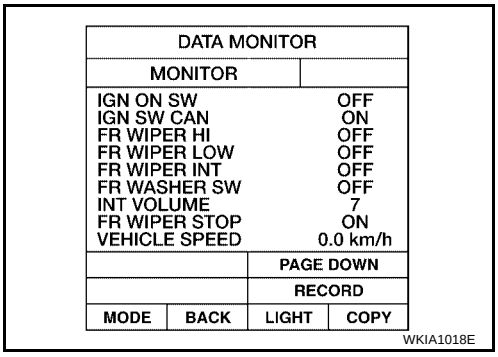
4. COMBINATION SWITCH TO BCM (1) INSPECTION

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 >> GO TO 5.

NG >> Check wiper switch. Refer to WW-6, "COMBINATION SWITCH READING FUNCTION" .



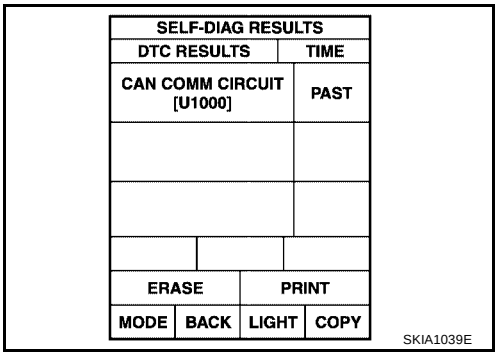
5. COMBINATION SWITCH TO BCM (2) INSPECTION

Select "BCM" on CONSULT-II. Carry out self-diagnosis of “BCM”.

Displayed self-diagnosis results

NO DTC>> Replace the BCM. Refer to BCS-25, "Removal and Installation of BCM" .

CAN COMM CIRCUIT>> Check CAN communication line of BCM. GO TO BCS-13, "CAN Communication Inspection Using CONSULT-II (Self-Diagnosis)" .



FRONT WIPER STOP POSITION IS INCORRECT

Inspection Procedure

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

With CONSULT-II

Select "IPDM E/R" with CONSULT-II. With data monitor, confirm that "WIP AUTO STOP" changes from "ACT P" to "STOP P" according to wiper operation.

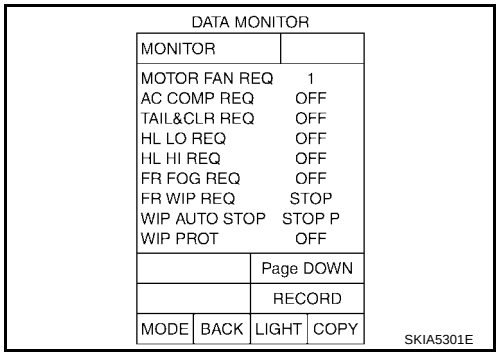
Without CONSULT-II

GO TO 2.

OK or NG

OK >> Replace IPDM E/R. Refer to PG-28, "Removal and Installation of IPDM E/R" .

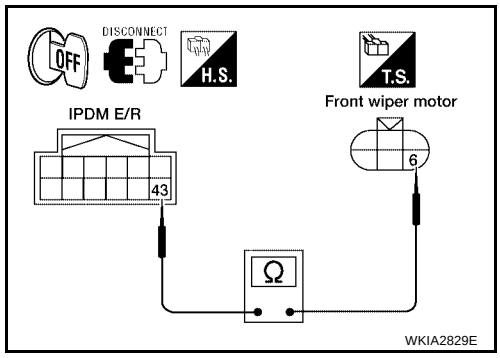
NG >> GO TO 2.



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

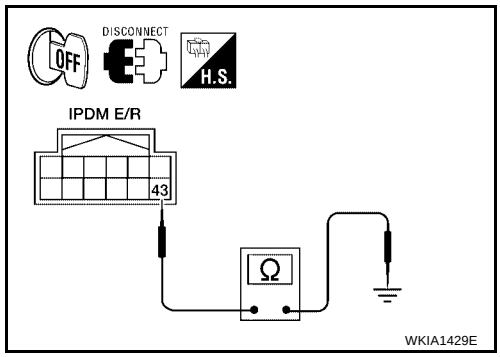
1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and front wiper motor connector.
3. Check continuity between IPDM E/R harness connector and front wiper motor harness connector.

Terminals				Continuity
(+)		(–)		
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
E122	43 (L/Y)	E23	6 (L/Y)	YES



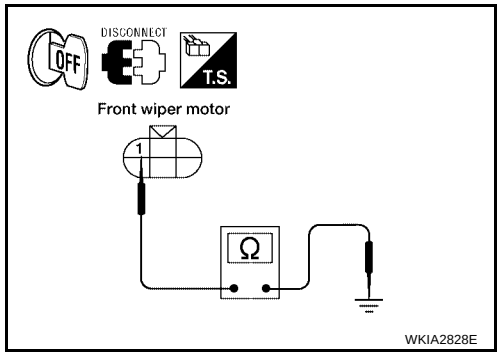
4. Check continuity between IPDM E/R harness connector terminal and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal (wire color)	Ground	NO
E122	43 (L/Y)		



5. Check continuity between front wiper motor harness connector terminal 1 and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal (wire color)	Ground	YES
E23	1 (B)		



OK or NG

OK >> 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.

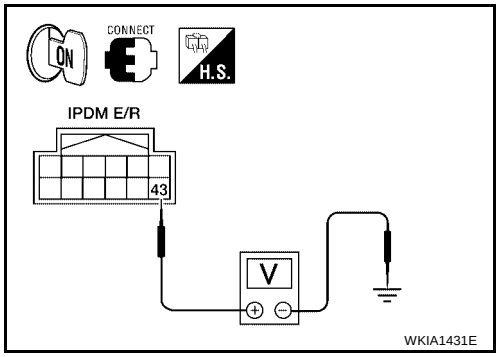
3. IPDM E/R INSPECTION

With CONSULT-II

1. Connect IPDM E/R connector and front wiper motor connector.
2. Select "FR WIPER LO" during "ACTIVE TEST".
3. When front wipers are operating and when stopped, measure voltage between IPDM E/R terminal 43 and ground.

Without CONSULT-II

1. Connect IPDM E/R connector and front wiper motor connector.
2. Turn on front wipers using the auto active test. Refer to PG-22, "Auto Active Test" .
3. When front wipers are operating and when stopped, measure voltage between IPDM E/R terminal 43 and ground.



Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Connector	Terminal (wire color)	Ground		
E122	43 (L/Y)		Wiper operating	Fluctuating
			Wiper stopped	0V

OK or NG

OK >> Replace IPDM E/R. Refer to PG-28, "Removal and Installation of IPDM E/R" .
NG >> Replace front wiper motor. Refer to WW-32, "Removal and Installation for Wiper Motor and Linkage" .

ONLY FRONT WIPER LOW DOES NOT OPERATE

Inspection Procedure

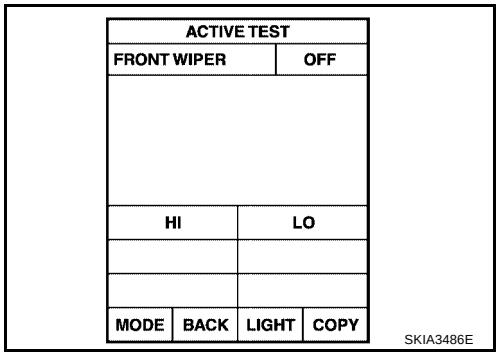
1. IPDM E/R TO FRONT WIPERS (1) INSPECTION

With CONSULT-II

1. Select "IPDM E/R" with CONSULT-II, and select "ACTIVE TEST" on "SELECT DIAG MODE" screen.
2. Select "FRONT WIPER" on "SELECT TEST ITEM" screen.
3. Select "FRONT WIPER LO" during "ACTIVE TEST".
4. Confirm front wiper low operation.

Without CONSULT-II

1. Turn on front wipers using auto active test. Refer to PG-22, "Auto Active Test" .
2. Confirm front wiper low operation.

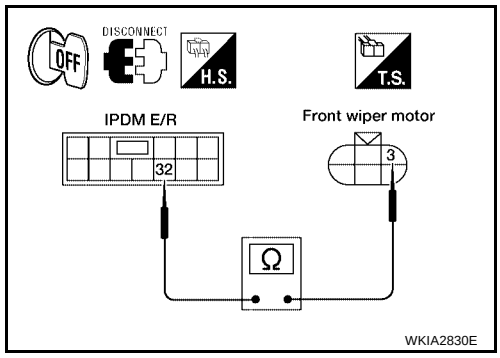


OK or NG

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

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

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



Terminals				Continuity
(+)		(–)		
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
E121	32 (L)	E23	3 (L)	YES

OK or NG

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

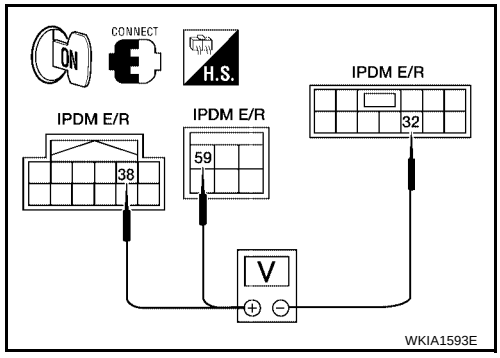
3. IPDM E/R INSPECTION

With CONSULT-II

1. Connect IPDM E/R connector and front wiper motor connector.
2. Select "FR WIPER LO" during "ACTIVE TEST".
3. When front wiper relay is operating, check voltage between IPDM E/R terminals.

Without CONSULT-II

1. Connect IPDM E/R connector and front wiper motor connector.
2. Turn on front wipers using the auto active test. Refer to PG-22, "Auto Active Test" .
3. When front wiper relay is operating, check voltage between IPDM E/R terminals.



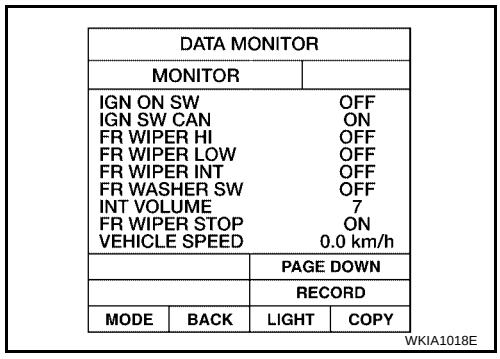
Terminals				Voltage (Approx.)
(+)		(-)		
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
E122	38 (B)	E121	32 (L)	Battery
E124	59 (B)			

OK or NG

OK >> Replace the wiper motor. Refer to WW-32, "Removal and Installation for Wiper Motor and Linkage" .
NG >> Replace IPDM E/R. Refer to PG-28, "Removal and Installation of 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. Refer to BCS-25, "Removal and Installation of BCM" .
NG >> Replace wiper switch. Refer to WW-34, "Removal and Installation for Wiper and Washer Switch" .

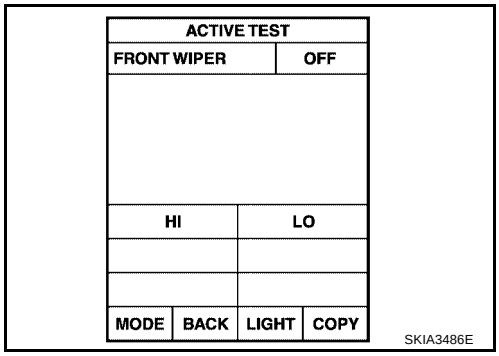
ONLY FRONT WIPER HI DOES NOT OPERATE

Inspection Procedure

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

With CONSULT-II

1. Select "IPDM E/R" with CONSULT-II, and select "ACTIVE TEST" on "SELECT DIAG MODE" screen.
2. Select "FRONT WIPER" on "SELECT TEST ITEM" screen.
3. Select "FRONT WIPER HI" during "ACTIVE TEST".
4. Confirm front wiper high operation.



Without CONSULT-II

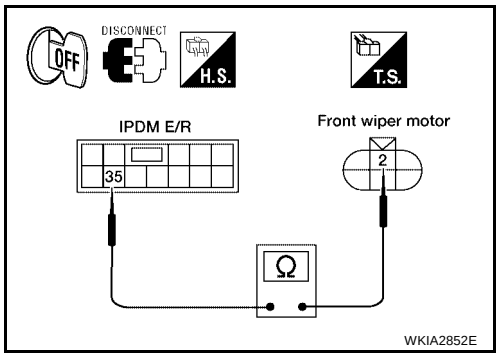
1. Turn on front wipers using auto active test. Refer to PG-22, "Auto Active Test" .
2. Confirm front wiper operation.

OK or NG

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

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

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



Terminals				Continuity
(+)		(–)		
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
E121	35 (L/B)	E23	2 (L/B)	YES

OK or NG

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

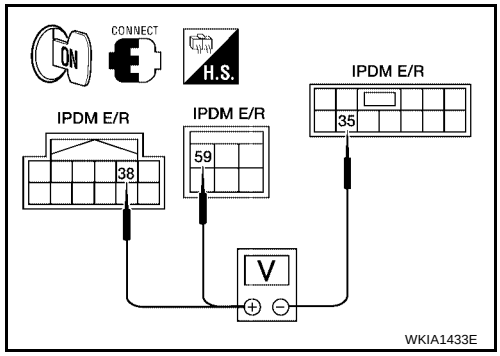
3. IPDM E/R INSPECTION

With CONSULT-II

1. Connect IPDM E/R connector and front wiper motor connector.
2. Select "FR WIPER HI" during "ACTIVE TEST".
3. When front wiper relay (HI) is operating, check voltage between IPDM E/R terminals.

Without CONSULT-II

1. Connect IPDM E/R connector and front wiper motor connector.
2. Turn on front wipers using the auto active test. Refer to PG-22, "Auto Active Test" .
3. When front wiper relay (HI) is operating, check voltage between IPDM E/R terminals.



Terminals				Voltage (Approx.)
(+)		(-)		
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
E122	38 (B)	E121	35 (L/B)	Battery
E124	59 (B)			

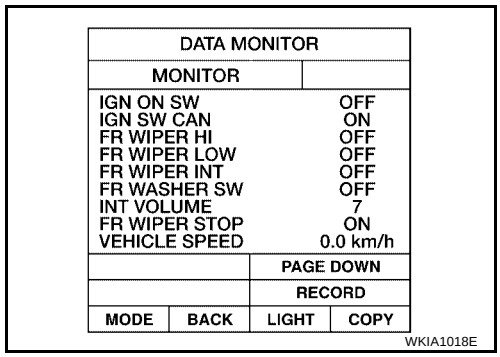
OK or NG

OK >> Replace the wiper motor. Refer to WW-32, "Removal and Installation for Wiper Motor and Linkage" .

NG >> Replace IPDM E/R. Refer to PG-28, "Removal and Installation of 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. Refer to BCS-25, "Removal and Installation of BCM" .

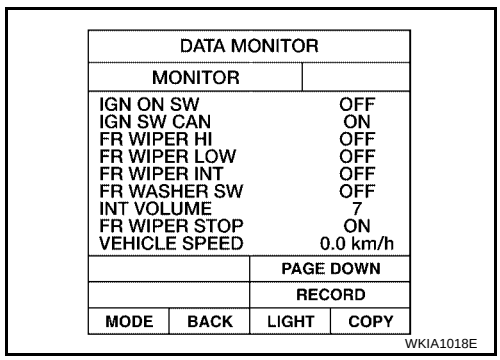
NG >> Replace wiper switch. Refer to WW-34, "Removal and Installation for Wiper and Washer Switch" .

ONLY FRONT WIPER INT DOES NOT OPERATE

Inspection Procedure

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. Refer to BCS-25, "Removal and Installation of BCM" .

NG >> Replace wiper switch. Refer to WW-34, "Removal and Installation for Wiper and Washer Switch" .

FRONT WIPER INTERMITTENT OPERATION SWITCH POSITION CANNOT BE ADJUSTED

Inspection Procedure

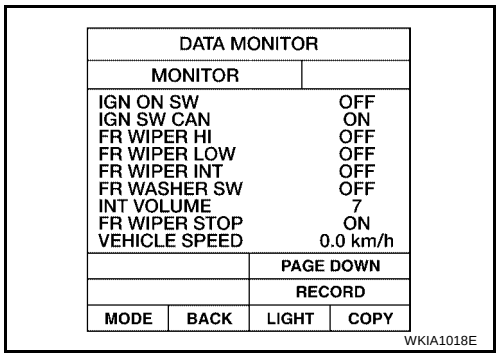
1. COMBINATION SWITCH TO BCM INSPECTION

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. Refer to BCS-25, "Removal and Installation of BCM" .

NG >> Replace wiper switch. Refer to WW-34, "Removal and Installation for Wiper and Washer Switch" .



WIPERS DO NOT WIPE WHEN FRONT WASHER OPERATES

Inspection Procedure

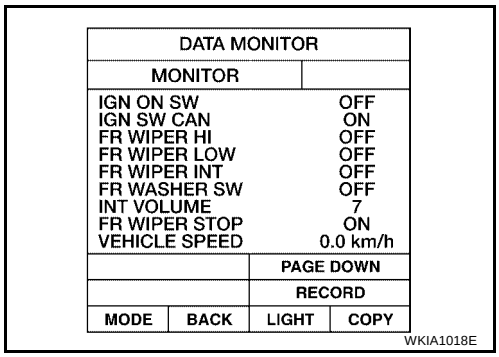
1. COMBINATION SWITCH TO BCM INSPECTION

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. Refer to BCS-25, "Removal and Installation of BCM" .

NG >> Replace wiper switch. Refer to WW-34, "Removal and Installation for Wiper and Washer Switch" .



FRONT WIPERS OPERATE FOR 10 SECONDS, STOP FOR 20 SECONDS, AND AFTER REPEATING THIS OPERATION FIVE TIMES, THEY BECOME INOPERATIVE

CAUTION:

- **When auto stop signal has not varied for 10 seconds or longer while IPDM E/R is operating front wipers, IPDM E/R considers front wipers locked and stops wiper output, which causes this symptom.**
- **This status can be checked by using IPDM E/R "DATA MONITOR". Under this condition, "WIPER PROT" reads "BLOCK".**

Inspection Procedure

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

With CONSULT-II

Select "IPDM E/R" with CONSULT-II. With data monitor, confirm that "WIP AUTO STOP" changes from "ACT P" to "STOP P" according to wiper operation.

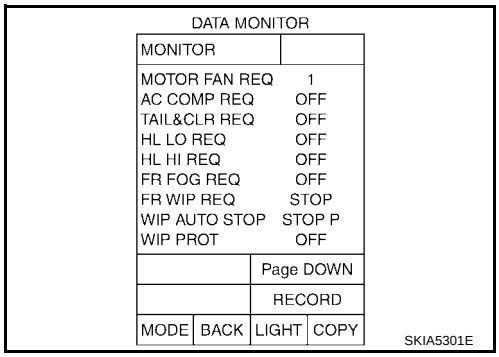
Without CONSULT-II

GO TO 2.

OK or NG

OK >> Replace IPDM E/R. Refer to PG-28, "Removal and Installation of IPDM E/R" .

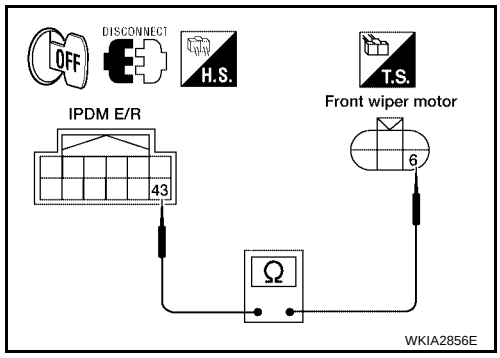
NG >> GO TO 2.



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

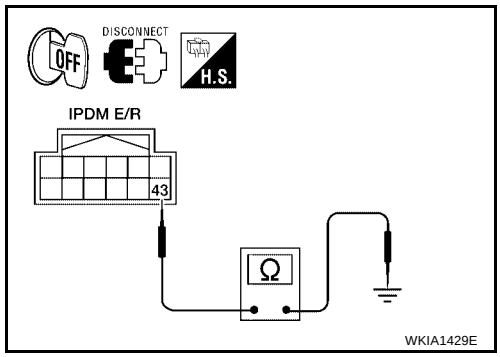
1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and front wiper motor connector.
3. Check continuity between IPDM E/R harness connector terminal and front wiper motor harness connector terminal.

Terminals				Continuity
(+)		(–)		
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
E122	43 (L/Y)	E23	6 (L/Y)	YES



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

Terminals			Continuity
(+)		(–)	
Connector	Terminal (wire color)	Ground	NO
E122	43 (L/Y)		



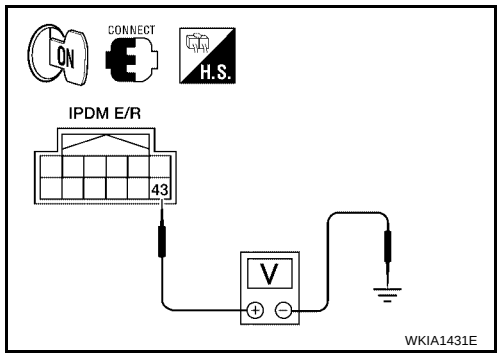
OK or NG

OK >> Connect connectors. GO TO 3.
NG >> Repair harness or connector.

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 43 and ground.

Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Connector	Terminal (wire color)	Ground		
E122	43 (L/Y)		Wiper operating	Fluctuating
			Wiper stopped	0V



OK or NG

OK >> Replace IPDM E/R. Refer to PG-28, "Removal and Installation of IPDM E/R" .
NG >> Replace front wiper motor. Refer to WW-32, "Removal and Installation for Wiper Motor and Linkage" .

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

EKS007PX

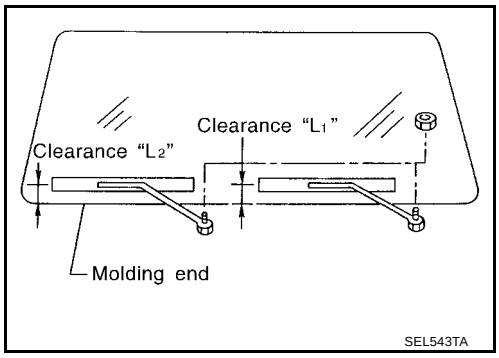
REMOVAL

1. Operate the wiper motor, and stop it at the auto stop position.
2. Remove the wiper arm mounting covers.
3. Remove the wiper arm mounting nuts, then remove the wiper arms.

INSTALLATION

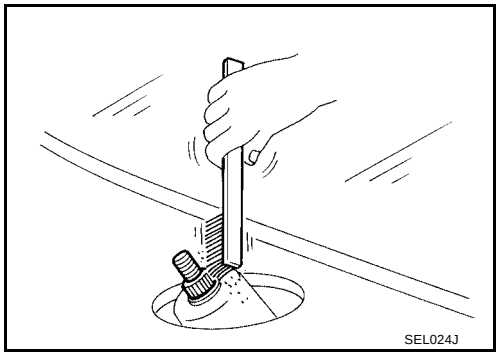
1. Prior to wiper arm installation, turn on wiper switch to operate wiper motor and then turn it “OFF” (Auto Stop).
2. Lift the blade up and then set it down onto glass surface to set the blade center to clearance “L1” & “L2” immediately before tightening nut.
3. Eject washer fluid. Turn on wiper switch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

Clearance “L1” : 41.5 - 56.5 mm (1.634 - 2.224 in)
Clearance “L2” : 52.5 - 67.5 mm (2.067 - 2.657 in)



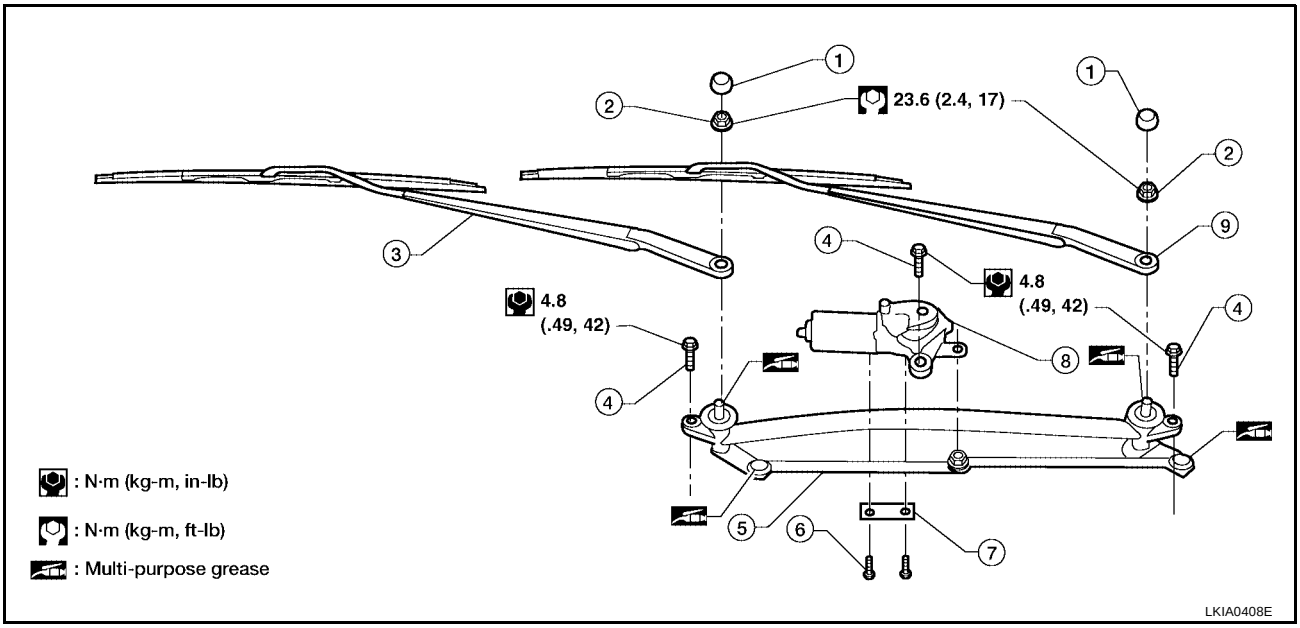
- Before reinstalling wiper arm, clean up the pivot area as illustrated. This will reduce possibility of wiper arm looseness.
- Tighten wiper arm nuts to specified torque.

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



Removal and Installation for Wiper Motor and Linkage

EKS008XL

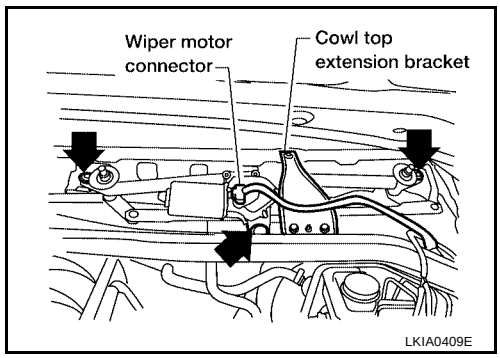


1. Wiper arm mounting covers
2. Wiper arm mounting nuts
3. Front RH wiper arm and blade assembly
4. Wiper frame mounting bolts
5. Wiper frame assembly
6. Wiper motor to frame mounting bolts
7. Wiper motor mounting spacer
8. Wiper motor
9. Front LH wiper arm and blade assembly

REMOVAL

1. Operate the wiper motor, and stop it at the auto stop position.
2. Remove the cowl top RH/LH. Refer to EI-21, "COWL TOP" .
3. Disconnect wiper motor connector.
4. Remove cowl top extension bracket.

5. Remove wiper frame assembly mounting bolts, and remove wiper frame assembly.
6. Remove wiper motor from wiper frame assembly.



INSTALLATION

CAUTION:

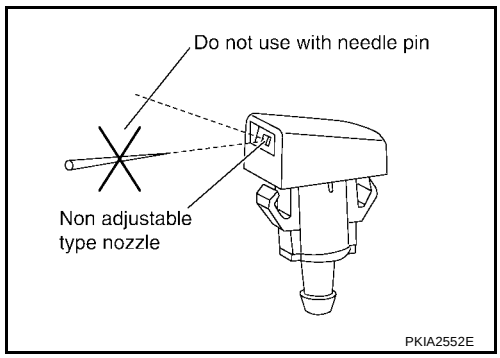
- **Do not drop the wiper motor or cause it to contact other parts.**
- **Check the grease conditions of the motor arm and wiper link joint(s). Apply grease if necessary.**

1. Connect wiper motor to connector. Turn the wiper switch ON to operate wiper motor, then turn the wiper switch OFF (auto stop).
2. Disconnect wiper motor connector.
3. Install wiper motor to wiper frame assembly, and install assembly into the vehicle.
4. Install cowl top extension bracket.
5. Connect wiper motor connector. Turn the wiper switch ON to operate the wiper motor, then turn wiper switch OFF (auto stop).
6. Install cowl top RH/LH. Refer to EI-21, "COWL TOP" .

Washer Nozzle Adjustment

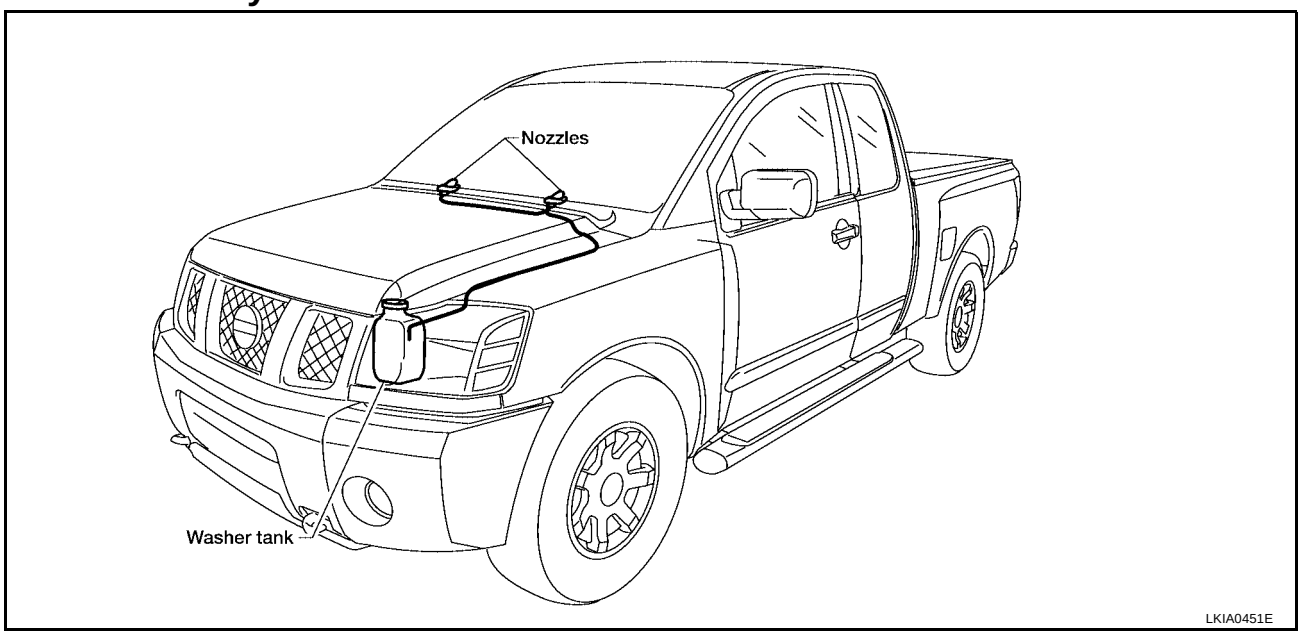
EKS007PZ

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



Washer Tube Layout

EKS007Q0

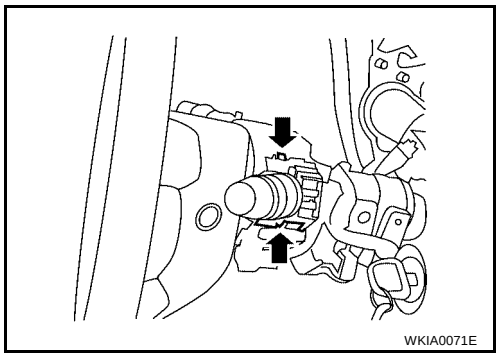


Removal and Installation for Wiper and Washer Switch

EKS007Q1

REMOVAL

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



INSTALLATION

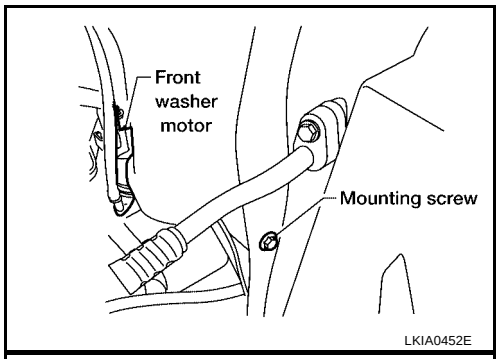
Installation is in the reverse order of removal.

Removal and Installation for Washer Tank

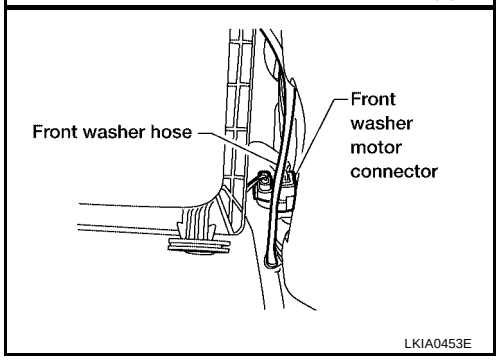
EKS007Q2

REMOVAL

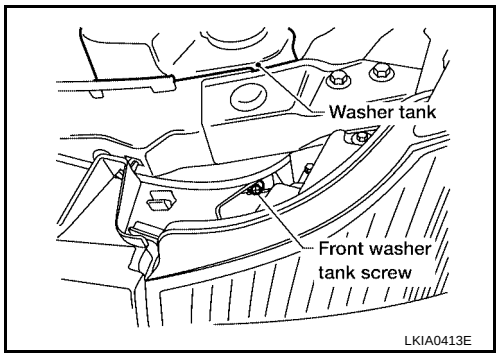
1. Remove side washer tank screw.



2. Remove front washer motor connector, washer fluid level sensor connector, and front washer hoses.



3. Remove front washer tank screw, then remove washer tank.



INSTALLATION

CAUTION:

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

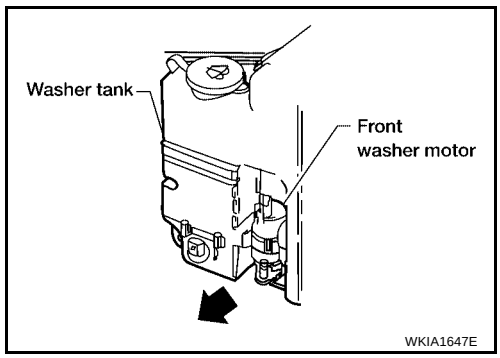
Installation is in the reverse order of removal.

Washer tank installation screws: 5.5 N·m (0.56 kg-m, 49 in-lb)

Removal and Installation for Washer Motor

EKS007Q3

1. Remove washer tank. Refer to WW-34, "Removal and Installation for Washer Tank" .
2. Pull out front washer motor in the direction of the arrow as shown, and remove the front washer motor from the washer tank.



CAUTION:

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

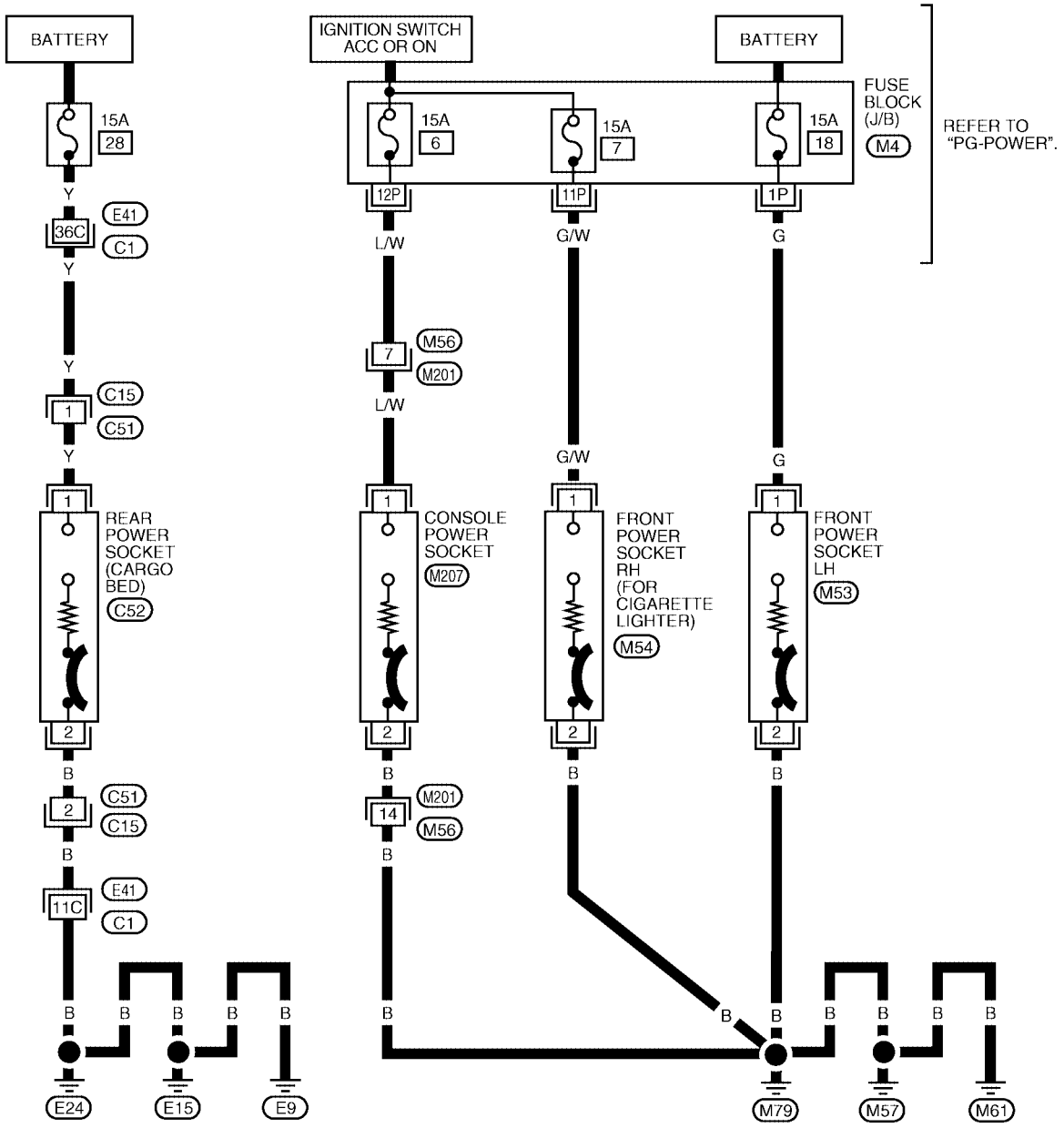
POWER SOCKET

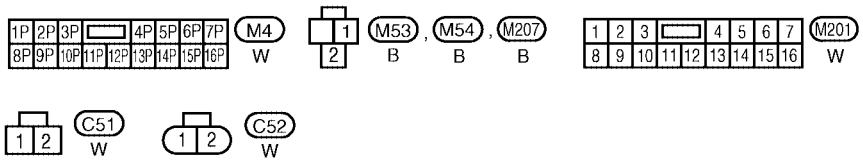
PFP:253A2

Wiring Diagram — P/SCKT —

EKS007Q5

WW-P/SCKT-01





REFER TO THE FOLLOWING.
(C1) - SUPER MULTIPLE JUNCTION (SMJ)

WKWA1535E

Removal and Installation of Power Sockets

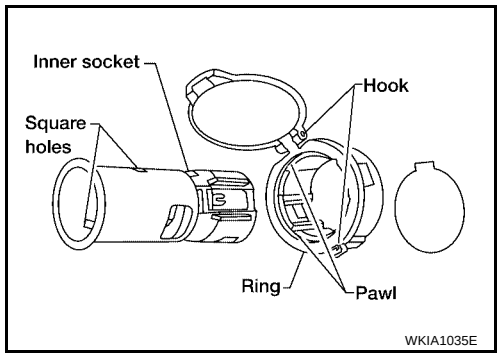
EKS007Q6

REMOVAL

NOTE:

Removal and Installation is common for all four power sockets.

1. Remove inner socket from the ring, while pressing the hook on the ring out from square hole.
2. Disconnect power socket connector.
3. Remove ring from power socket finisher while pressing pawls.



INSTALLATION

Installation is in reverse order of removal.

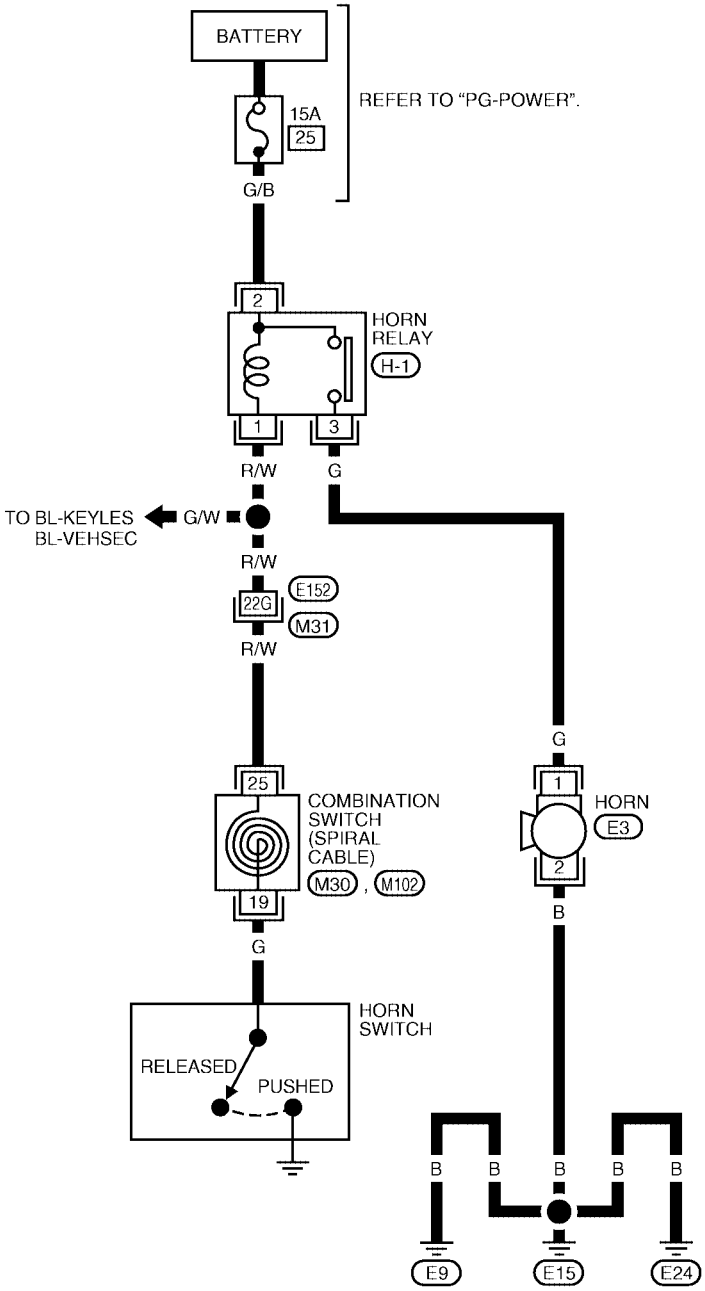
HORN

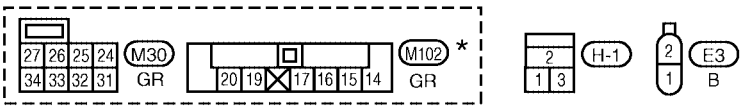
PFP:25610

Wiring Diagram — HORN —

EKS007Q7

WW-HORN-01





REFER TO THE FOLLOWING.
M31 - SUPER MULTIPLE JUNCTION (SMJ)

* : This connector is not shown in "HARNESS LAYOUT" of PG section.

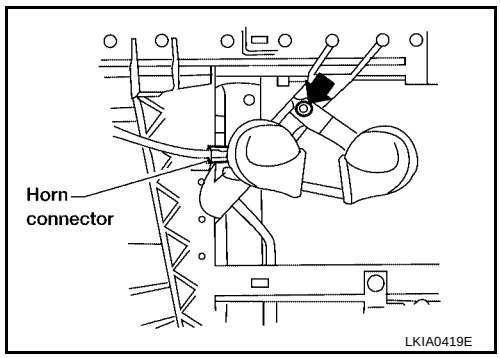
WKWA1484E

Removal and Installation

EKS007Q8

REMOVAL

1. Remove the front grille. Refer to EI-20, "FRONT GRILLE" .
2. Disconnect horn connector.
3. Remove horn bolt and remove horn from vehicle.



INSTALLATION

1. Tighten horn bolt to specified torque.

Horn bolt : 17 N·m (1.7 kg-m, 13 ft-lb)

2. Reconnect horn connector.
3. Install front grille. Refer to EI-20, "FRONT GRILLE" .