SECTION WW
WIPER, WASHER & HORN

CONTENTS

PRECAUTIONS

PFP:00001

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

BKS0010Y

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.**

Maintenance Information

BKS0028L

If any of following part is replaced, always replace with new* one.
If it's not (or fail to do so), the electrical system may not be operated properly.
*: New one means a virgin control unit that has never been energized on-board.

RHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM
- IPDM E/R
- Combination meter
- EPS control unit

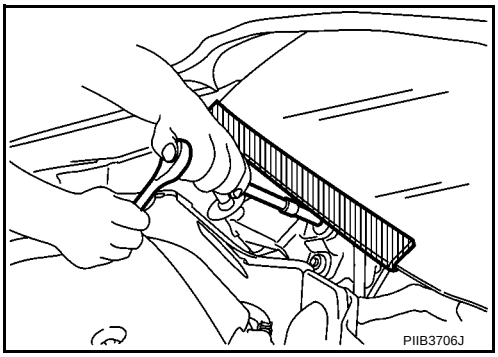
LHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM

Precautions for Procedures without Cowl Top Cover

BKS0010Z

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.

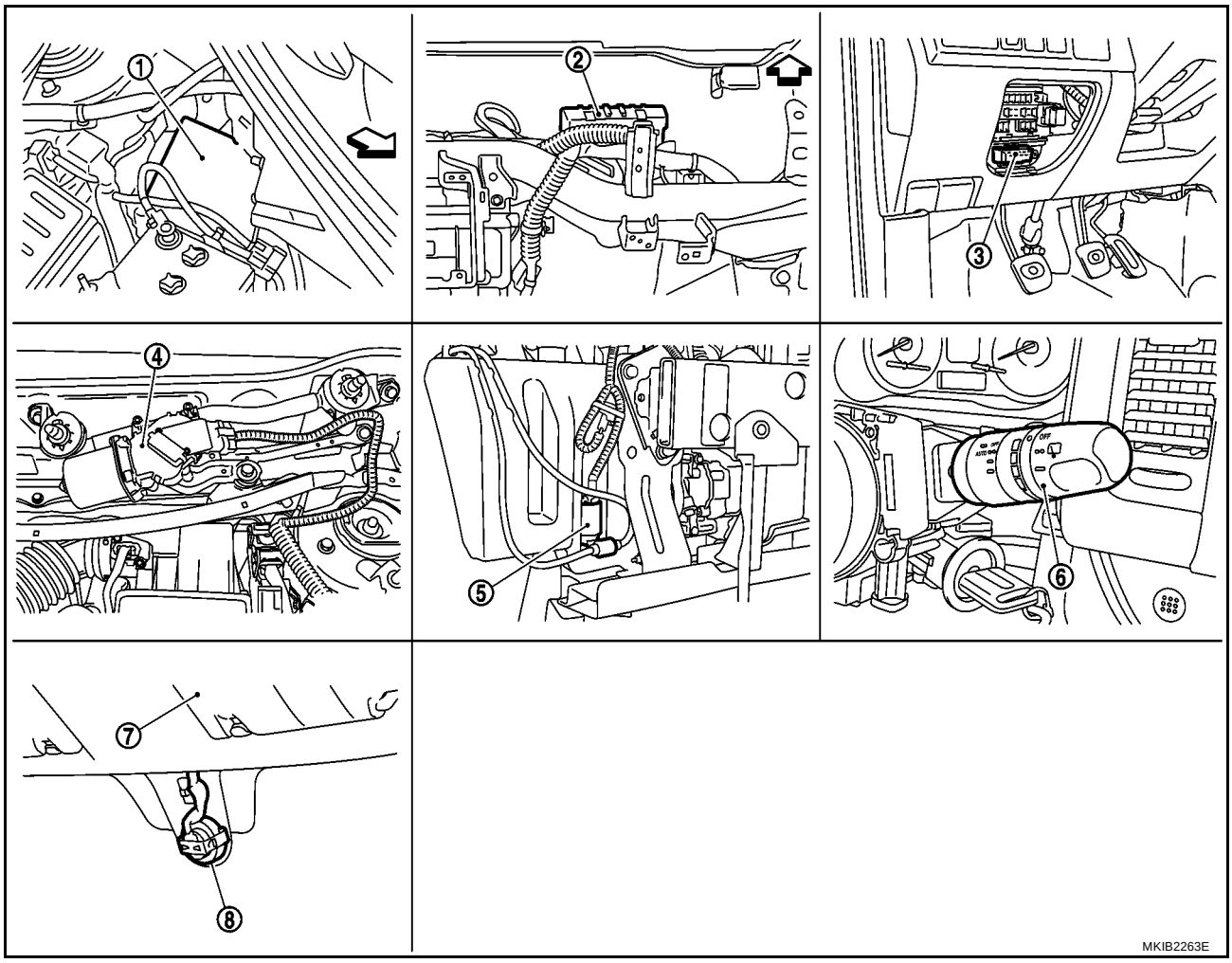


FRONT WIPER AND WASHER SYSTEM

PFP:28810

Components Parts and Harness Connector Location

BKS00111



⇦ : Vehicle front

1. IPDM E/R E10, E11, E12 [Engine room (left)]
2. BCM M57, M58, M59 (View with instrument panel removed)
3. Data link connector
4. Front wiper motor E39
5. Front and rear washer motor E24 (View with front bumper removed)
6. Combination switch (Wiper switch) M38
7. Sun-visor
8. Light and rain sensor R2

System Description

BKS00112

- Front wiper HI/LO relay and front wiper main relay are built into 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.

OUTLINE

Power is supplied at all times

- through 20A fuse (No.48, located in the IPDM E/R)
- to front wiper main relay.
- through 20A fuse (No.61 and 62, located in the IPDM E/R)
- to IPDM E/R (CPU).
- through 40A fusible link (letter J, located in fuse and fusible link box)
- to BCM terminals 74 and 79.

When ignition switch ON or START position, power is supplied

- through 10A fuse [No.5, located in fuse block (J/B)]
- to BCM terminal 24,
- through 10A fuse [No.3, located in fuse block (J/B)]
- to combination switch terminal 14, and
- to front wiper HI/LO relay, front wiper main relay and IPDM E/R (CPU)

Ground is supplied

- to front wiper motor terminal 2 and,
- to IPDM E/R terminals 3 and 54
- through body grounds E28, E44 and E45, and
- to combination switch terminal 12 and
- to BCM terminals 2 and 70
- through body grounds M21 and M66.

LOW SPEED WIPER OPERATION

When front wiper switch is placed in LO position, BCM reads combination switch condition (Refer to WW-8, "COMBINATION SWITCH READING FUNCTION"). And BCM sends front wiper request signal (LO) to IPDM E/R with CAN communication line. When IPDM E/R receives front wiper request signal (LO), it turns ON front wiper main relay (built into IPDM E/R).

Power is supplied

- through front wiper main relay and front wiper HI/LO relay and
- through IPDM E/R terminal 23
- to front wiper motor terminal 1.

Ground is supplied

- to front wiper motor terminal 2,
- through body grounds E28, E44 and E45.

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

HIGH SPEED WIPER OPERATION

When front wiper switch is placed in HI position, BCM reads combination switch condition (Refer toWW-8, "COMBINATION SWITCH READING FUNCTION"). And BCM sends front wiper request signal (HI) to IPDM E/R with CAN communication line. When IPDM E/R receives front wiper request signal (HI), it turns ON front wiper HI/LO relay and front wiper main relay (built into IPDM E/R).

Power is supplied

- through front wiper main relay and front wiper HI/LO relay and,
- through IPDM E/R terminal 24
- to front wiper motor terminal 4.

Ground is supplied

- to front wiper motor terminal 2
- through body grounds E28, E44 and E45.

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

INTERMITTENT OPERATION

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

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

Wiper Intermittent Dial Position Setting

Wiper intermittent dial position	Intermittent operation interval	Combination switch		
		Intermittent operation dial position 1	Intermittent operation dial position 2	Intermittent operation dial position 3
1	Short	ON	ON	ON
2		ON	ON	OFF
3		ON	OFF	OFF
4	↑ ↓	OFF	OFF	OFF
5		OFF	OFF	ON
6		OFF	ON	ON
7	Long	OFF	ON	OFF

Example: For wiper intermittent 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 intermittent dial position 1.

- Intermittent operation dial position 1: ON (Continuity exists between combination switch output 3 and input 1.)
- Intermittent operation dial position 2: ON (Continuity exists between combination switch output 5 and input 1.)
- Intermittent operation dial position 3: ON (Continuity exists between combination switch output 4 and input 2.)

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

AUTO WIPER OPERATION (MODELS WITH LIGHT AND RAIN SENSOR)

When front auto wiper switch is toggled to AUTO position (light and rain sensor equipped), BCM reads the current combination switch condition/position (refer to WW-8, "COMBINATION SWITCH READING FUNCTION") and change light and rain sensor into 4stages of wiper sensitivity level.
When light and rain sensor detect rain with ignition switch ON and auto wiper switch in AUTO position the front wiper will wipe the screen.
(Light and rain sensor will not react, if no raindrop is detected.)

- from light and rain sensor terminal 2
- to BCM terminal 63.

BCM send wiper request signal to IPDM E/R with CAN communication line. IPDM E/R operate front wiper.
Change the wiper speed by rainfall.
The light and rain sensor sensitivity is controlled by the wiper volume switch combined with front wiper and washer switch and BCM.

AUTO STOP OPERATION

With wiper switch turned OFF, wiper motor will continue to operate until wiper arms reach stop position.
When wiper arms are not located at stop position with wiper switch OFF, power is supplied

- from terminal 23 of the IPDM E/R
- to front wiper motor terminal 1, in order to continue wiper motor operation at low speed.

Ground is supplied

- to front wiper motor terminal 2
- through body grounds E28 and E44.

When wiper arms reach stop position, front wiper motor terminals 2 and 5 are connected.
Then the IPDM E/R sends auto stop operation signal to BCM with CAN communication line.
When BCM receives auto-stop operation signal, BCM sends wiper stop signal to IPDM E/R with CAN communication line.
IPDM E/R stops wiper motor. Wiper motor will then stop wiper arms at the STOP position.

MIST OPERATION

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

For additional information about wiper operation under this condition, refer to WW-5, "LOW SPEED WIPER OPERATION" .
If the front wiper switch is held in the mist position, low speed wiper operation continues.

WASHER OPERATION

When front wiper switch is pulled to washer position, power is supplied

- through combination switch terminal 13
- to washer motor terminal 1.

Ground is supplied

- to washer motor terminal 2
- through combination switch terminals 11 and 12, and
- through body grounds M21 and M66.

With power and ground supplied, the washer motor operates, and at the same time,
When the wiper switch is pulled to the WASH position for 1 second or more. BCM sends front wiper request signal (low) to IPDM E/R with CAN communication line. And the front wiper motor operates in low speed for 3 times to clean wind shield and then an additional wiping action will occur after 3 seconds to remove the moisture appear on the glass shortly after the wash/wipe action.

FAIL-SAFE FUNCTION

If CAN communication is malfunctioning, IPDM E/R maintains the condition of just before the fail-safe status until ignition switch is turned OFF. (If wipers operate in LO just before the fail-safe status, operating in LO continues until ignition switch turns OFF.)
Refer to PG-18, "Fail-safe Control" .

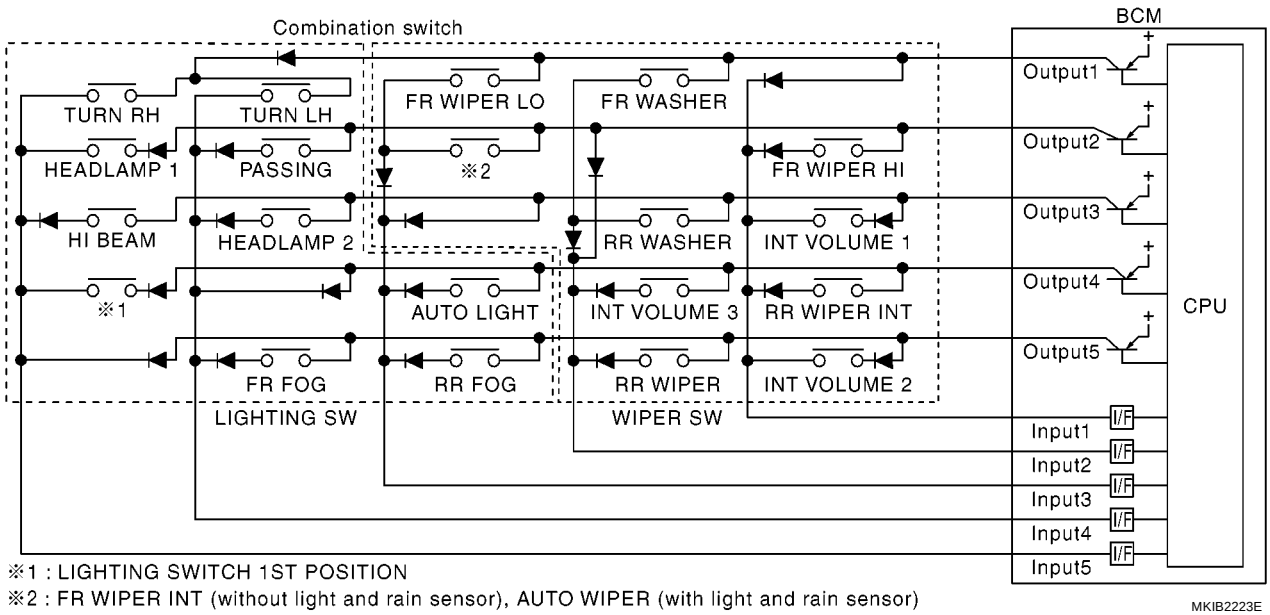
COMBINATION SWITCH READING FUNCTION

Description

- BCM reads combination switch (wiper) 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 5 output terminals (OUTPUT 1-5) and 5 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.



※1 : LIGHTING SWITCH 1ST POSITION
※2 : FR WIPER INT (without light and rain sensor), AUTO WIPER (with light and rain sensor)

MKIB2223E

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 LO ON	FR WIPER LO OFF	FR WIPER INT ON	FR WIPER INT OFF	—	—	AUTO LIGHT ON	AUTO LIGHT OFF	RR FOG ON	RR FOG 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	—	—

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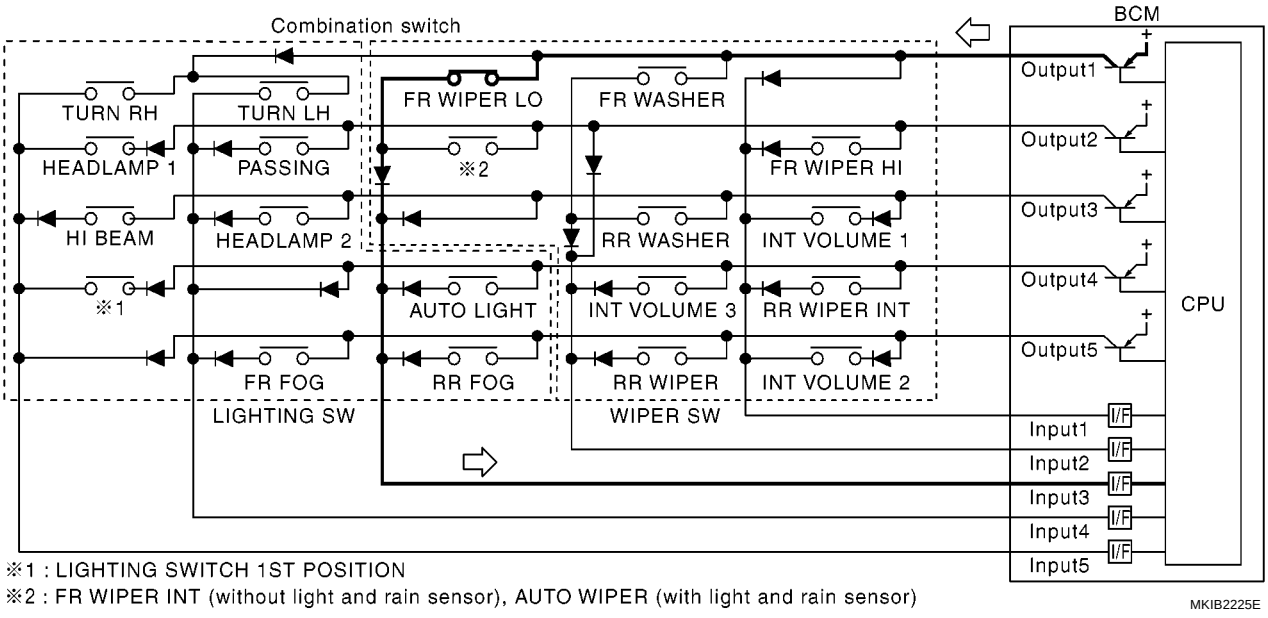
Sample Operation: (When Wiper Switch is Turned to LOW Position)

- When wiper switch is turned to LOW position, front wiper LOW contact in combination switch turns ON. At this time if OUTPUT 1 transistor is activated, BCM detects that voltage changes in INPUT 3.
- When BCM detects that voltage changes in INPUT 3 while OUTPUT 1 transistor is ON, it judges that front wiper switch is in LOW position. Then BCM sends front wiper request signal (LO) to IPDM E/R using CAN communication.
- If BCM detects that voltage changes in INPUT 3 when OUTPUT 1 transistor is activated again, it recognizes that wiper switch is still in LOW position.



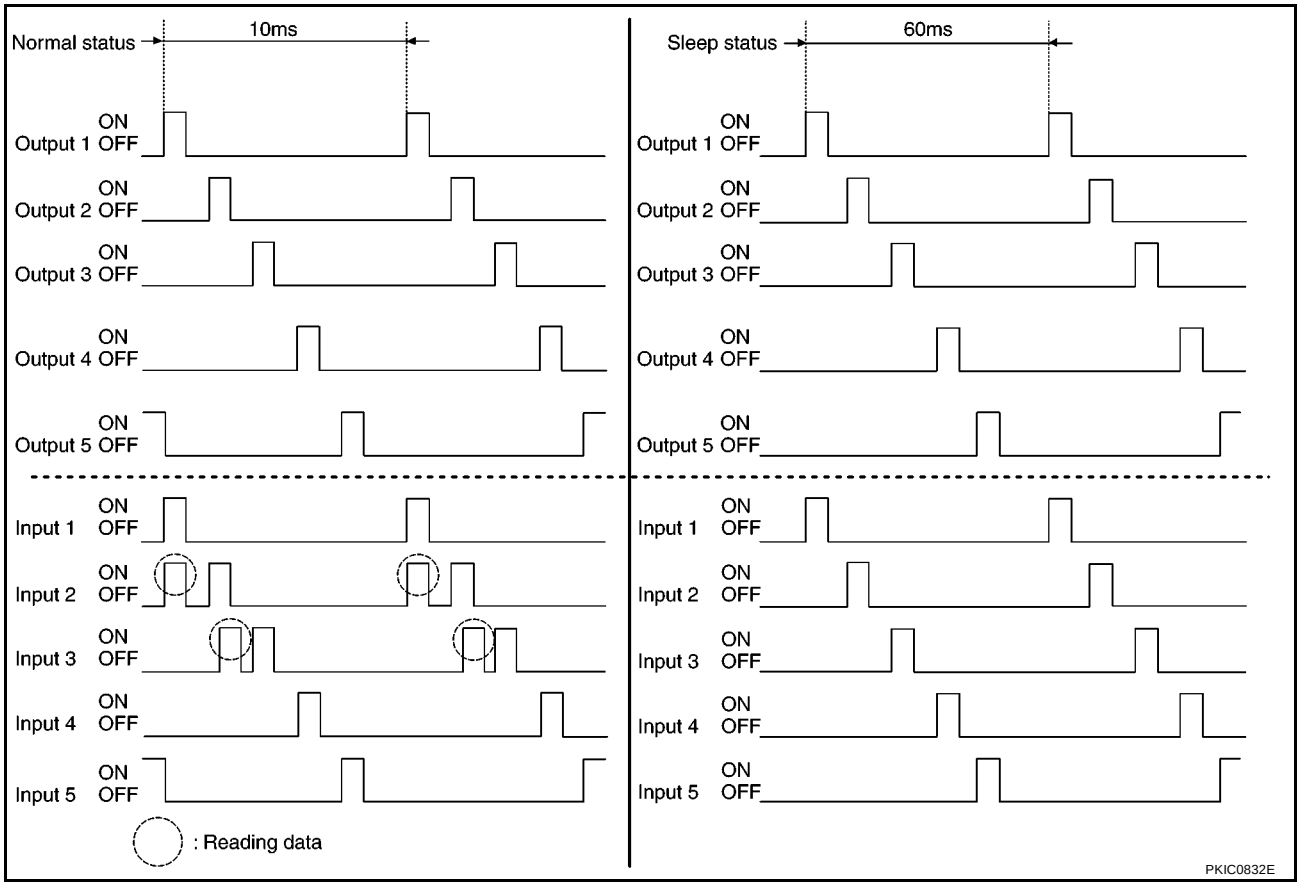
NOTE:
Each OUTPUT terminal transistor is activated at 10 ms intervals. Therefore after switch is turned ON, electrical loads are activated with time delay. But this time delay is so short that it cannot be detected by human senses.

Operation Mode

Combination switch reading function has operation modes shown below.

1. Normal status
   - When BCM is not in sleep status, output terminals (OUTPUT 1-5) send out ON signal every 10 ms.
2. Sleep status

- When BCM is in sleep status, BCM enters low power mode. Mean while out put terminals (OUTPUT 1-5) send out ON signal every 60ms, and accept only input from light switch system.



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.

CAN Communication

BKS00113

SYSTEM DESCRIPTION

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.

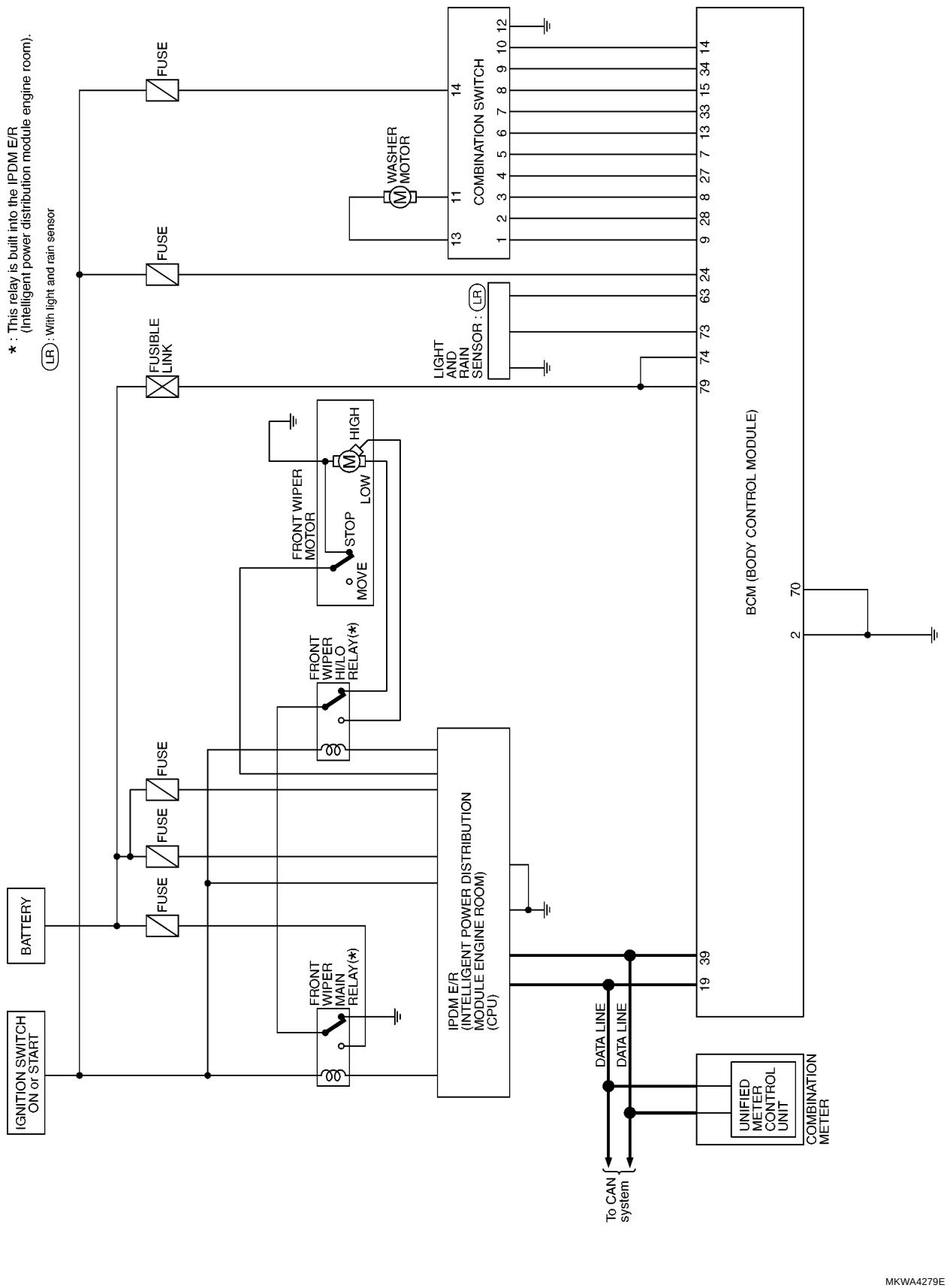
CAN Communication Unit

BKS00114

Refer to LAN-27, "CAN Communication Unit" .

Schematic

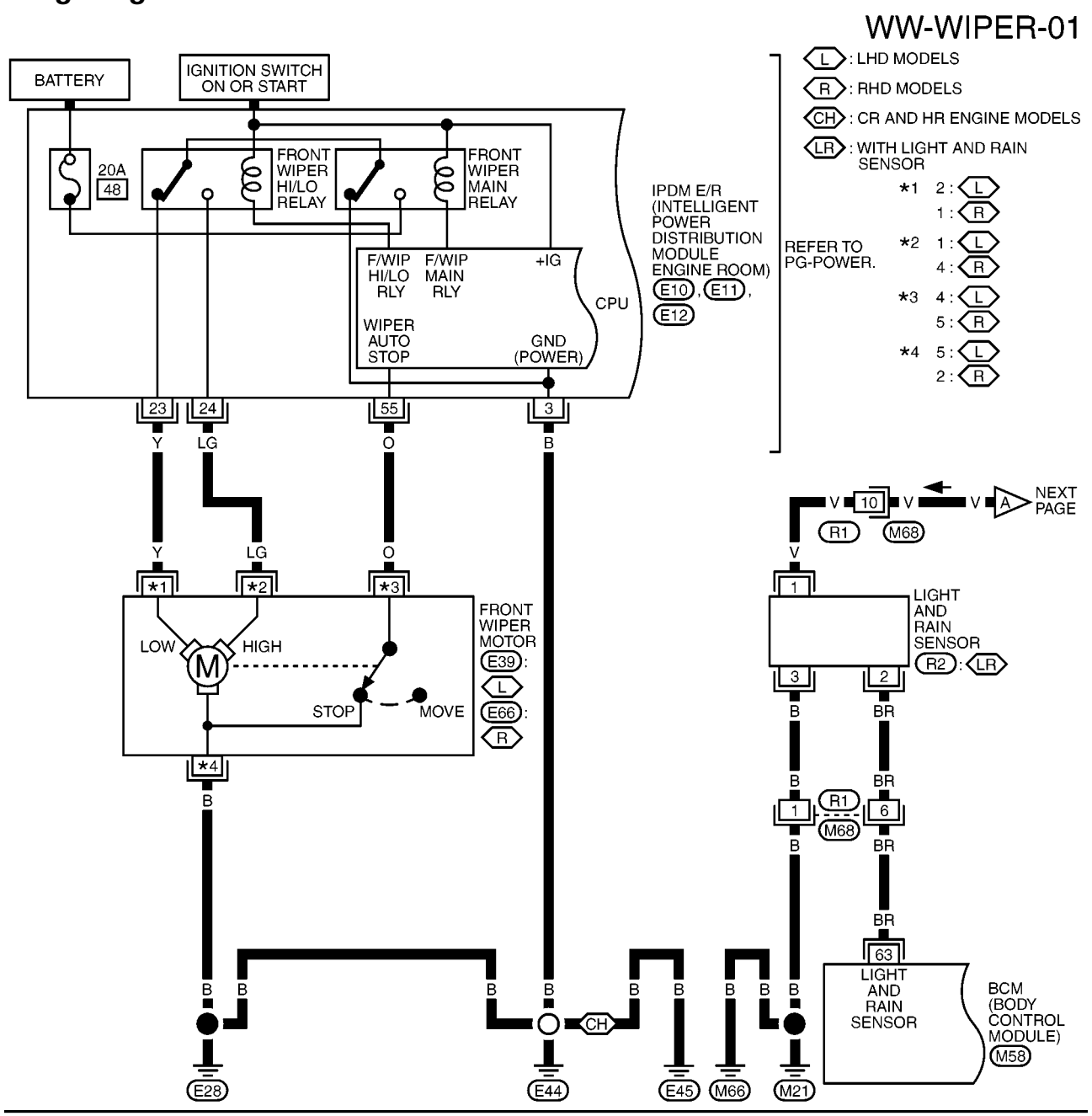
BKS00115



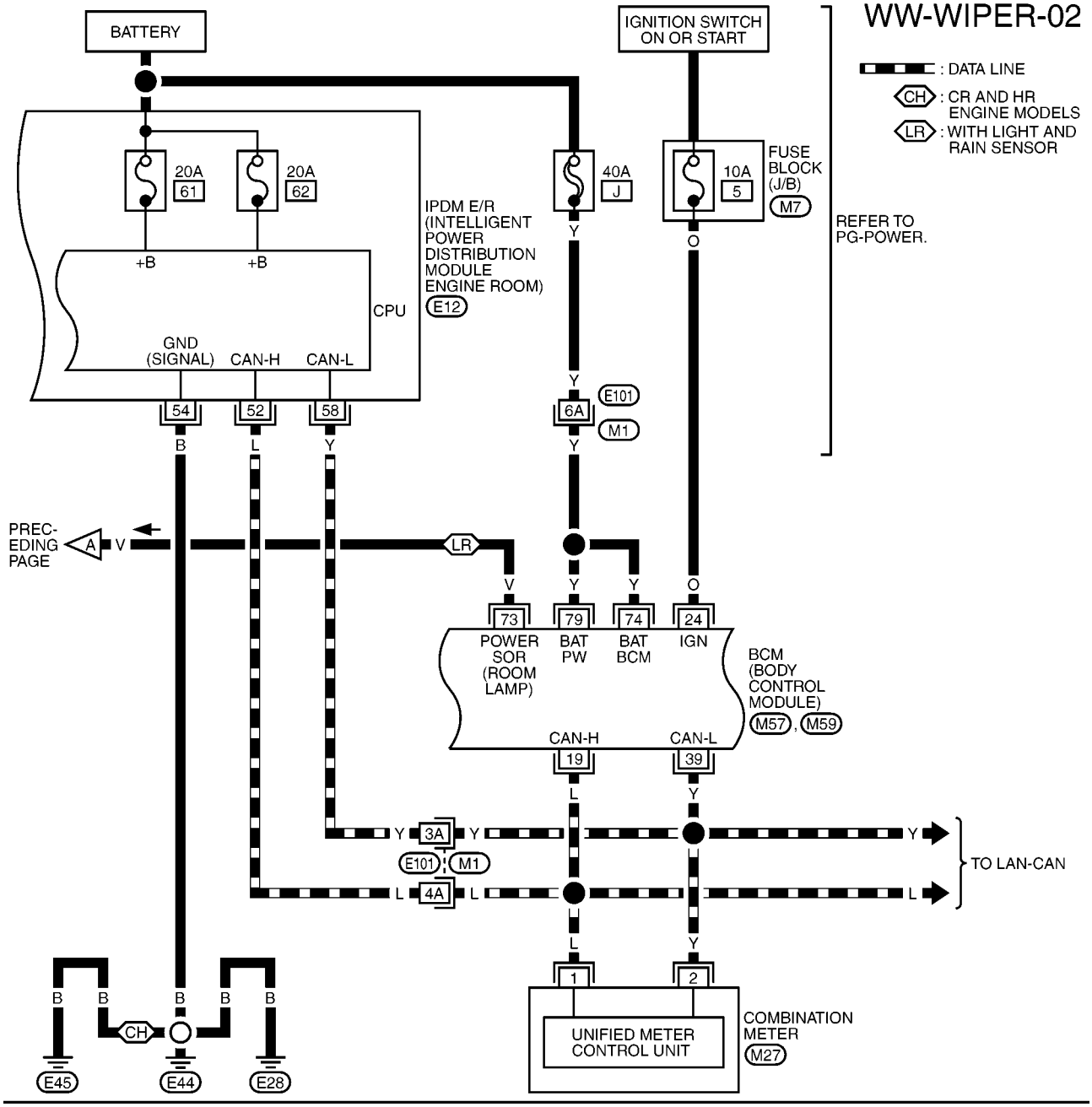
MKWA4279E

Wiring Diagram — WIPER —

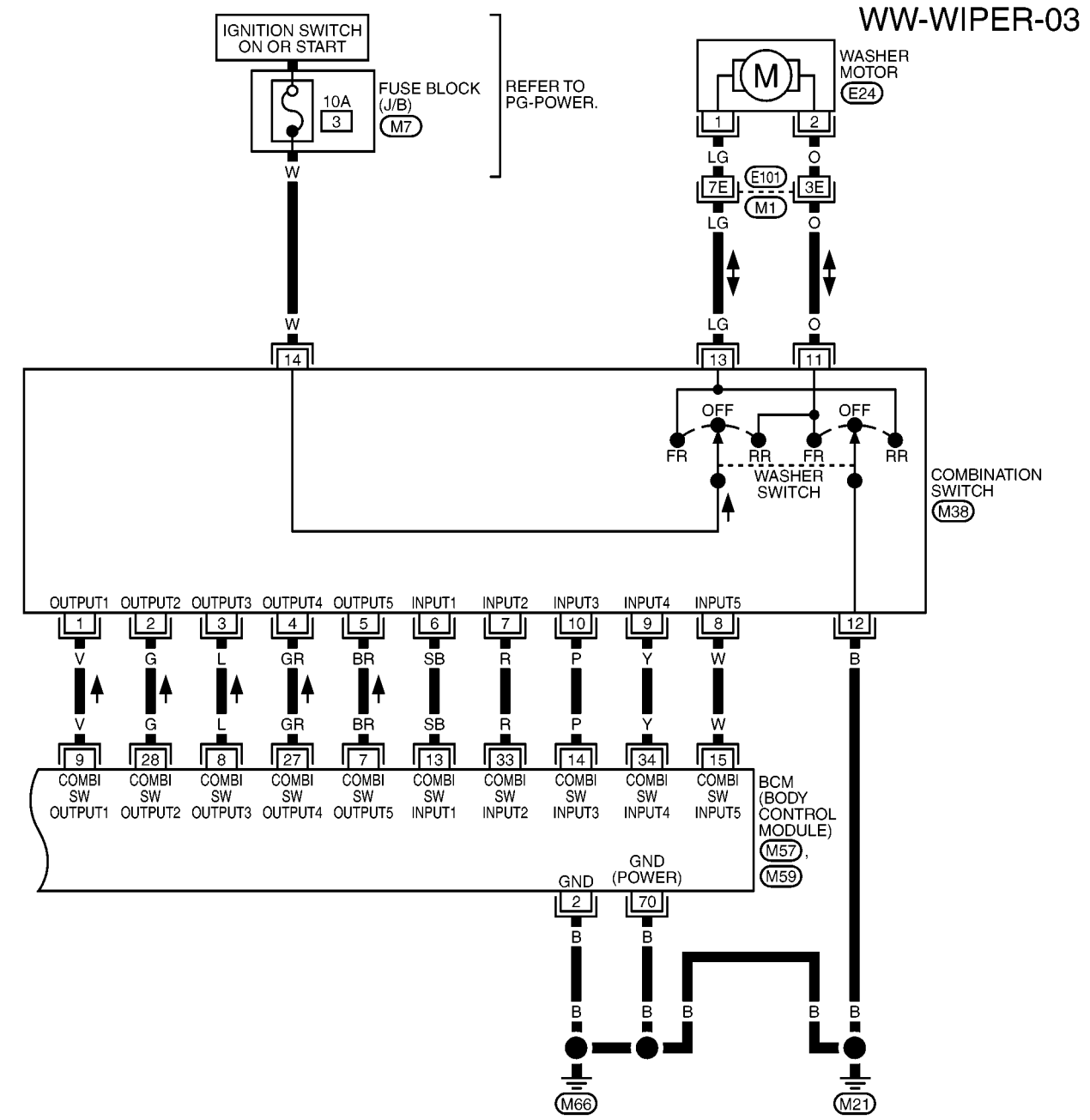
BKS00116

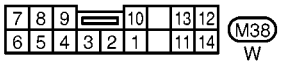


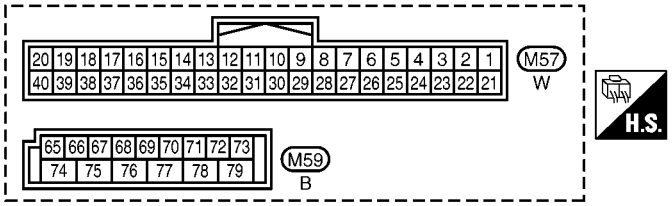
MKWA4280E

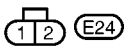

WW-WIPER-02
: DATA LINE
CH : CR AND HR ENGINE MODELS
LR : WITH LIGHT AND RAIN SENSOR
BATTERY
IGNITION SWITCH ON OR START
20A 61
20A 62
40A J
10A 5
FUSE BLOCK (J/B) M7
REFER TO PG-POWER.
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E12
+B
+B
CPU
GND (SIGNAL)
CAN-H
CAN-L
54
52
58
E101
6A
M1
PREC-EDING PAGE
A
LR
73
79
74
24
POWER SOR (ROOM LAMP)
BAT PW
BAT BCM
IGN
BCM (BODY CONTROL MODULE) M57, M59
CAN-H
CAN-L
19
39
3A
E101, M1
4A
TO LAN-CAN
1
2
UNIFIED METER CONTROL UNIT
COMBINATION METER M27
CH
E45
E44
E28
REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
M7 - FUSE BLOCK - JUNCTION BOX (J/B)
M27 W
M57 W
M59 B
H.S.
E12 W
H.S.

MKWA4281E







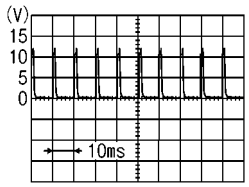
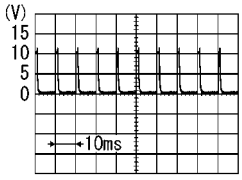
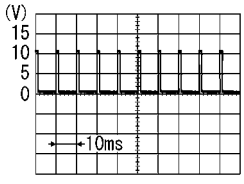
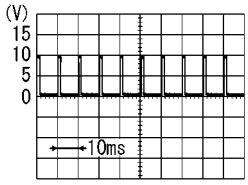
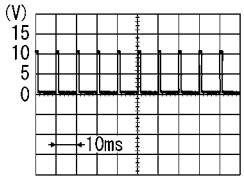


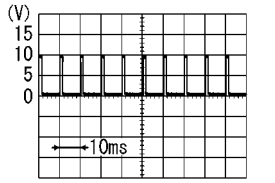
REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

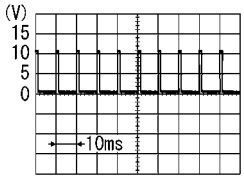
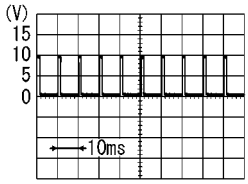
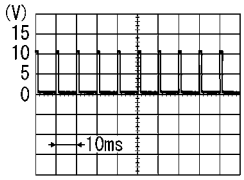
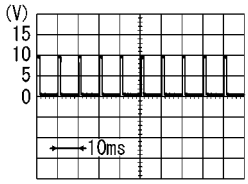
MKWA4282E

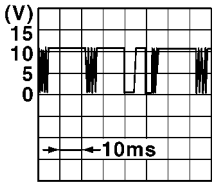
Terminals and Reference Values for BCM

BKS00117

Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V]
				Ignition switch	Operation or condition	
2	B	Ground	—	ON	—	0
7	BR	Combination switch output 5	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB8643J Approx. 1.2V
					Any of several conditions below ● Front fog lamp switch (Operates only front fog lamp switch) (Wiper intermittent dial position 4) ● Rear fog lamp switch (Wiper intermittent dial position 4) ● Rear wiper ON (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 2 ● Wiper intermittent dial position 6 ● Wiper intermittent dial position 7	 PKIB4956J Approx. 1.0V
8	L	Combination switch output 3	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V
					Any of several conditions below ● Lighting switch 2ND (Wiper intermittent dial position 4) ● Lighting switch HI beam (Operates only HI beam switch) (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 2 ● Wiper intermittent dial position 3	 PKIB4959J Approx. 1.0V
9	V	Combination switch output 1	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V

Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V]
				Ignition switch	Operation or condition	
					Any of several conditions below ● Turn signal switch to right ● Turn signal switch to left ● Front wiper switch MIST ● Front wiper switch LO ● Front washer switch	 PKIB4959J Approx. 1.0V
13	GB	Combination switch input 1	Input	ON	● OFF ● Front wiper switch HI (Wiper intermittent dial position 4) ● Rear wiper switch INT (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 2 ● Wiper intermittent dial position 3 ● Wiper intermittent dial position 6 ● Wiper intermittent dial position 7	WW-20, "Reference Values for BCM (Input)"
14	P	Combination switch input 3	Input	ON	● OFF ● Lighting switch AUTO ● Rear fog lamp switch ● Front wiper switch MIST ● Front wiper switch INT ● Front wiper switch LO	WW-20, "Reference Values for BCM (Input)"
15	W	Combination switch input 5	Input	ON	● OFF ● Lighting switch 1ST ● Lighting switch 2ND ● Lighting switch HIGH beam (Operates only HIGH beam switch) ● Turn signal switch to right	WW-20, "Reference Values for BCM (Input)"
19	L	CAN H	Input/ output	—	—	—
24	O	Ignition power supply	Input	ON	—	Battery voltage

Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V]
				Ignition switch	Operation or condition	
27	GR	Combination switch output 4	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V
					Any of several conditions below ● Lighting switch AUTO (Wiper intermittent dial position 4) ● Lighting switch 1ST (The same result with lighting switch 2ND) (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 5 ● Wiper intermittent dial position 6	 PKIB4959J Approx. 1.0V
28	G	Combination switch output 2	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V
					Any of several conditions below ● Lighting switch 2ND ● Lighting switch PASSING (Operates only PASSING switch) ● Front wiper switch INT ● Front wiper switch HI	 PKIB4959J Approx. 1.0V
33	R	Combination switch input 2	Input	ON	● OFF ● Front washer switch (Wiper intermittent dial position 4) ● Rear wiper switch ON (Wiper intermittent dial position 4) ● Rear washer switch ON (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 5 ● Wiper intermittent dial position 6	WW-20, "Reference Values for BCM (Input)"

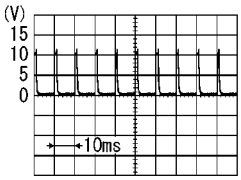
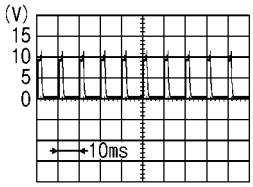
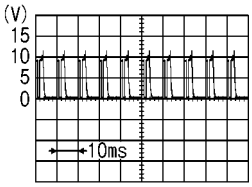
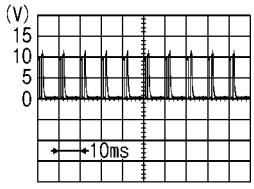
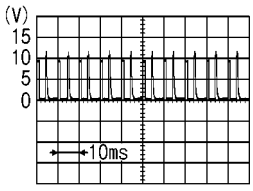
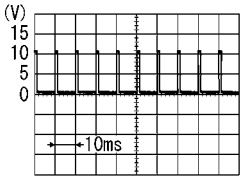
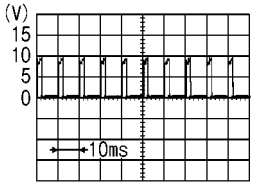
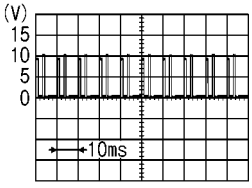
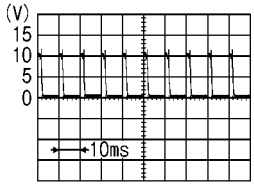
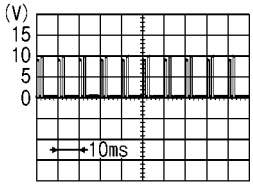
Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V]
				Ignition switch	Operation or condition	
34	Y	Combination switch input 4	Input	ON	● OFF ● Front fog lamp switch ON ● Lighting switch 2ND ● Lighting switch PASSING (Operates only PASSING switch) ● Turn signal switch to left	WW-20, "Reference Values for BCM (Input)"
39	Y	CAN L	Input/ output	—	—	—
63	BR	Light and rain sensor signal	Input	ON	—	 MKIB2017E Approx. 8.9V
70	B	Ground	—	ON	—	0
73	V	Room lamp power supply	Output	—	—	Battery voltage
74	Y	Power source (Fusible link)	Input	OFF	—	Battery voltage
79	Y	Power source (Fusible link)	Input	OFF	—	Battery voltage

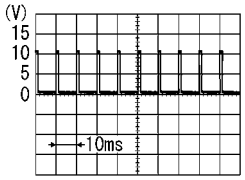
Reference Values for BCM (Input)

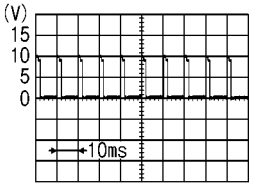
BKS001KE

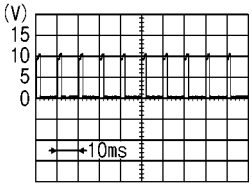
CAUTION:

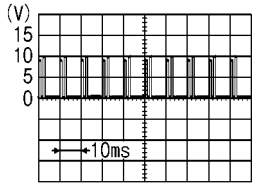
- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF not to be fluctuated by overloaded.**
- **Turn wiper dial position to 4 except when checking waveform or voltage of wiper dial position. Wiper dial position can be confirmed on CONSULT-II. Refer to WW-24, "DATA MONITOR" .**

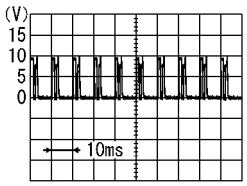
INPUT	Condition and reference value		
INPUT 5 (Wiper intermittent dial position 4)	OFF  PKIB4956J Approx. 0.9V	Lighting switch 1ST  PKIB8624J Approx. 1.5 - 2.0V	Lighting switch 2ND  PKIB8639J Approx. 2.5 - 3.0V
	Lighting switch HI beam (Operates only HI beam switch)  PKIB8644J Approx. 1.5 - 2.0V	Turn signal switch to right  PKIB8625J Approx. 1.5 - 2.0V	—
INPUT 4 (Wiper intermittent dial position 4)	OFF  PKIB4958J Approx. 1.0V	Lighting switch 2ND  PKIB8628J Approx. 1.5 - 2.0V	Turn signal switch to left  PKIB8630J Approx. 2.0V
	Front fog lamp switch (Operates only front fog lamp switch)  PKIB8627J Approx. 1.5 - 2.0V	Lighting switch PASSING (Operates only PASSING switch)  PKIB8629J Approx. 2.0V	—

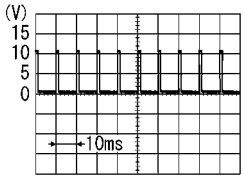
<table>
<tr><th>INPUT</th><th colspan="3">Condition and reference value</th></tr>
<tr><td rowspan="2">INPUT 3
(Wiper intermittent dial position 4)</td><td>OFF
 

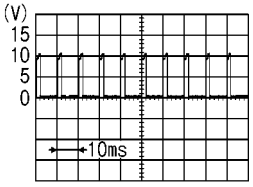
PKIB4958J
Approx. 1.0V</td><td>Lighting switch AUTO
 

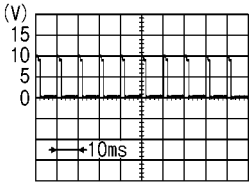
PKIB8631J
Approx. 2.0V</td><td>Front wiper switch INT
 

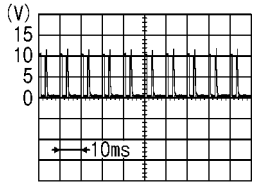
PKIB8632J
Approx. 2.0V</td></tr>
<tr><td>Any of several conditions below
●Front wiper switch LO
●Front wiper switch MIST
 

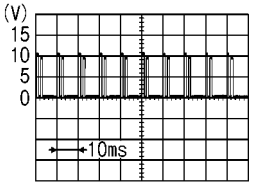
PKIB8629J
Approx. 2.0V</td><td>Rear fog lamp switch
 

PKIC1030E
Approx. 1.5V</td><td>—</td></tr>
<tr><td rowspan="2">INPUT 2</td><td>OFF
(Wiper intermittent dial position 4)
 

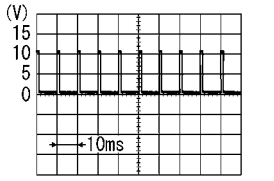
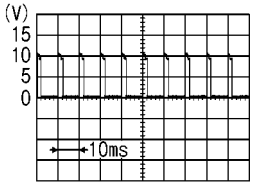
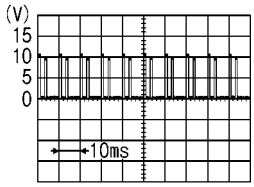
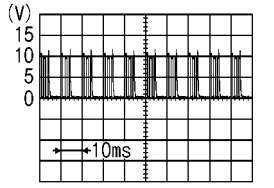
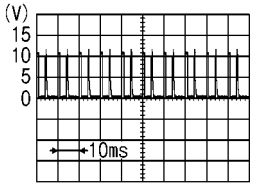
PKIB4958J
Approx. 1.0V</td><td>Front washer switch
(Wiper intermittent dial position 4)
 

PKIB8632J
Approx. 2.0V</td><td>Rear washer switch
(Wiper intermittent dial position 4)
 

PKIB8631J
Approx. 2.0V</td></tr>
<tr><td>Rear wiper switch ON
(Wiper intermittent dial position 4)
 

PKIB8634J
Approx. 1.5 - 2.0V</td><td>Any of the conditions below
●Wiper intermittent dial position 1
●Wiper intermittent dial position 5
●Wiper intermittent dial position 6
 

PKIB8633J
Approx. 2.0V</td><td>—</td></tr>
</table>

INPUT	Condition and reference value		
INPUT 1	OFF (Wiper intermittent dial position 4)  PKIB4958J Approx. 1.0V	Front wiper switch HI (Wiper intermittent dial position 4)  PKIB8635J Approx. 2.0V	Any of the conditions below ●Rear wiper switch INT (Wiper intermittent dial position 4) ●Wiper intermittent dial position 3  PKIB8636J Approx. 2.0V
	Any of the conditions below ●Wiper intermittent dial position 1 ●Wiper intermittent dial position 2  PKIB8637J Approx. 2.5 - 3.0V	Any of the conditions below ●Wiper intermittent dial position 6 ●Wiper intermittent dial position 7  PKIB8638J Approx. 2.0V	—

Terminals and Reference Values for IPDM E/R

BKS00118

Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition			Reference value [V]
				Ignition switch	Operation or condition		
3	B	Ground	—	ON	—		0
23	Y	Low speed power source	Output	ON	Wiper switch	OFF	0
						LO	Battery voltage
24	LG	High speed power source	Output	ON	Wiper switch	OFF	0
						HI	Battery voltage
52	L	CAN H	Input/ output	—	—		—
54	B	Ground	—	—	—		0
55	OR	Wiper auto stop signal	Input	ON	Wiper operating		Battery voltage
					Wiper stopped		0
58	W	CAN L	Input/ output	—	—		—

CONSULT-II Function (BCM)

BKS0011B

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

BCM diagnosis position	Diagnosis mode	Description
WIPER	WORK SUPPORT	Changes the setting for each function.
	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-DIAG RESULTS	BCM performs self-diagnosis of CAN communication.
	CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.

CONSULT-II BASIC OPERATION

Refer to GI-36, "CONSULT-II Start Procedure" .

WORK SUPPORT

Supported item	Description
RR WIP RVRS SET	Rear wiper reverse range operation setting can be changed.

DATA MONITOR

Monitor item “UNIT”		Contents
IGN ON SW	[ON/OFF]	Displays “ignition switch ON (ON)/Other OFF or ACC (OFF)” status as judged from ignition switch signal.
FR WIPER HI	[ON/OFF]	Displays “Front Wiper HI (ON)/Others (OFF)” status as judged from wiper switch signal.
FR WIPER LOW	[ON/OFF]	Displays “Front Wiper LOW (ON)/Others (OFF)” status as judged from wiper switch signal.
FR WIPER INT	[ON/OFF]	Displays “Front Wiper INT (ON)/Others (OFF)” status as judged from wiper switch signal.
FR WASHER SW	[ON/OFF]	Displays “Front Washer Switch (ON)/Others (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	[km/h]	Displays vehicle speed status as judged from vehicle speed signal.
H/L WASH SW	[ON/OFF]	Displays (Headlamp washer switch: ON/Others: OFF) as judged from headlamp washer switch signal
H/L SW POS	[ON/OFF]	Displays (Headlamp switch: ON/Others: OFF) as judged from lighting switch signal
RR WIPER ON	[ON/OFF]	Displays “Rear Wiper ON (ON)/Others (OFF)” status as judged from wiper switch signal.
RR WIPER INT	[ON/OFF]	Displays “Rear Wiper INT (ON)/Others (OFF)” status as judged from wiper switch signal.
RR WASHER SW	[ON/OFF]	Displays “Rear Washer Switch (ON)/Others (OFF)” status as judged from wiper switch signal.
RR WIPER STOP	[ON/OFF]	Displays “Rear Wiper Stop (ON)/Others (OFF)” status as judged from wiper switch signal.
REVERSE SW CAN	[ON/OFF]	Displays “Reverse position (ON)/Others (OFF)” status as judged from reverse signal.
R/WIP MTR SIG	[ON/OFF]	Displays “Rear wiper motor signal (ON)/Others (OFF)” status as judged to rear wiper motor output signal.

ACTIVE TEST

Test item	Indication CONSULT-II display	Description
Front wiper output (HI, LOW)	FR WIPER	Front wiper can be operated by ON (HI, LO)–OFF operation.
Rear wiper output	RR WIPER	Rear wiper can be operated by any ON-OFF operation.
Head lamp washer output	HEAD LAMP WASHER	Head lamp washer can be operated by any ON-OFF operation.

CONSULT-II Function (IPDM E/R)

BKS0011C

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

Diagnosis Mode	Description
SELF–DIAG RESULTS	Refer to PG-20, "SELF-DIAG RESULTS" .
DATA MONITOR	The input/output data of 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	IPDM E/R sends a drive signal to electronic components to check their operation.

CONSULT-II BASIC OPERATION

Refer to GI-36, "CONSULT-II Start Procedure" .

DATA MONITOR

Item name	Display or unit	Monitor item selection			Description
		All signals	Main signal	Select from menu	
HEADLAMP WASHER REQUEST	ON/OFF	×		×	Signal status input from BCM
FR WIPER REQUEST	OFF/LO/HI	×	×	×	Signal status input from BCM
WIPER AUTO STOP	ON/OFF	×	×	×	IPDM E/R output status
WIPER PROTECTION	OFF/LS/HS/Block	×		×	IPDM E/R control status (LS: low speed operation/ HS: high speed operation/ BLOCK: wiper arm is locked)

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

ACTIVE TEST

Test item	Indication on CONSULT-II display	Description
Front wiper (HI, LO)	FRONT WIPER	With a certain operation (HI, LO, OFF) front wiper relay can be operated.
Headlamp washer	HEADLAMP WASHER	Headlamp washer relay can be operated by switching (ON and OFF) optionally.

Diagnosis Chart by Symptom

BKS001HD

Symptom	Possible causes	Possible malfunctioning system and part	Inspection procedure	Reference page
Front wiper does not operate CAUTION 1	Combination switch reading function malfunction	BCM OUTPUT 2 - INPUT 1, BCM OUTPUT 1 - INPUT 3 and BCM OUTPUT 2 - INPUT 3 system ● 10A (M7) fuse ● 40A fusible link ● Combination switch (Front wiper HI, LOW, and INT systems malfunction) ● Harness and connector between combination switch and BCM ● BCM	CONSULT-II ● DATA MONITOR (BCM)	WW-28, "Front Wiper Does Not Operate"
	Front wiper request signal malfunction (CAN)	BCM - IPDM E/R system ● BCM (Transmission malfunction) ● IPDM E/R (Receiving malfunction)	CONSULT-II ● SELF-DIAGNOSIS (BCM) ● ACTIVE TEST (BCM) ● DATA MONITOR (IPDM E/R)	
	Front wiper HI/LO output malfunction	IPDM E/R - front wiper motor system ● 20A (#48, #62) fuse ● Front wiper motor ● Harness and connector between IPDM E/R and front wiper motor ● IPDM E/R	CONSULT-II ● ACTIVE TEST (IPDM E/R) Other than CONSULT-II ● Front wiper motor output inspection	
Front wiper does not return to stop position (after front wiper operate for 10 seconds, they stop for 20 seconds, and after repeating the operations five times, they become inoperative) CAUTION 2	Auto-stop signal malfunction	IPDM E/R - front wiper motor system ● Front wiper motor ● Harness and connector between IPDM E/R and front wiper motor ● IPDM E/R	CONSULT-II ● DATA MONITOR (IPDM E/R) Other than CONSULT-II ● Auto-stop signal malfunction Auto-stop signal system inspection	WW-31, "Front Wiper Does Not Return to Stop Position (After Front Wiper Operate for 10 Seconds, They Stop for 20 Seconds, and After Repeating the Operations Five Times, They Become Inoperative)"
Only front wiper LOW does not operate	Front wiper LO output malfunction	IPDM E/R - front wiper motor system ● Front wiper motor ● Harness and connector between IPDM E/R and front wiper motor ● IPDM E/R	CONSULT-II ● ACTIVE TEST (IPDM E/R) Other than CONSULT-II ● Front wiper motor LO output inspection	WW-33, "Only Front Wiper Low Does Not Operate"
Only front wiper HI does not operate	Front wiper HI output malfunction	IPDM E/R - Front wiper motor system ● Front wiper motor ● Harness and connector between IPDM E/R and front wiper motor ● IPDM E/R	CONSULT-II ● ACTIVE TEST (IPDM E/R) Other than CONSULT-II ● Front wiper motor HI output inspection	WW-35, "Only Front Wiper Hi Does Not Operate"

Symptom	Possible causes	Possible malfunctioning system and part	Inspection procedure	Reference page
Only front wiper INT does not operate	Combination switch reading function malfunction	BCM OUTPUT 1 - INPUT 3 or BCM OUTPUT 2 - INPUT 3 system ● Combination switch (Front wiper INT systems malfunction) ● Harness and connector between combination switch and BCM ● BCM	CONSULT-II ● DATA MONITOR (BCM)	WW-37, "Only Front Wiper Intermittent Does Not Operate"
Only front wiper AUTO does not operate	Light and rain sensor signal malfunction	BCM - light and rain sensor ● BCM ● Harness and connector between BCM and light and rain sensor ● Light and rain sensor	Other than CONSULT-II ● Light and rain sensor circuit inspection	WW-38, "Only Front Wiper Auto Dose Not Operate"
Front wiper interval time is not controlled by vehicle speed	Vehicle speed signal (meter) malfunction (CAN)	Combination meter - BCM (CAN communication) system ● Combination meter (Transmission malfunction) ● BCM (Receiving malfunction)	CONSULT-II ● SELF-DIAGNOSIS (METER, BCM) ● DATA MONITOR (METER, BCM)	WW-40, "Front Wiper Interval Time Is Not Controlled by Vehicle Speed"
Front wiper intermittent operation switch position cannot be adjusted	Combination switch reading function malfunction	BCM OUTPUT 3 - INPUT 1, BCM OUTPUT 5 - INPUT 1 and BCM OUTPUT 4 - INPUT 2 system ● Combination switch (Intermittent control 1, 2, and 3 systems malfunction) ● Harness and connector between combination switch and BCM ● BCM	CONSULT-II ● DATA MONITOR (BCM)	WW-40, "Front Wiper Intermittent Operation Switch Position Cannot Be Adjusted"
Wiper does not wipe when front washer operates	Combination switch reading function malfunction	BCM OUTPUT 1 - INPUT 2 system ● Combination switch (Front washer system malfunction) ● Harness and connector between combination switch and BCM ● BCM	CONSULT-II ● DATA MONITOR (BCM)	WW-41, "Wiper Does Not Wipe When Front Washer Operates"
Front wiper does not stop	Combination switch reading function malfunction	BCM OUTPUT 2 - INPUT 1, BCM OUTPUT 1 - INPUT 3 and BCM OUTPUT 2 - INPUT 3 system ● Combination switch (Front wiper HI, LOW, and INT systems malfunction) ● Harness and connector between combination switch and BCM ● BCM	CONSULT-II ● DATA MONITOR (BCM)	WW-41, "Front Wiper Does Not Stop"
	Front wiper HI/LO output malfunction	IPDM E/R - Front wiper motor system ● Harness and connector between IPDM E/R and front wiper motor ● IPDM E/R	Other than CONSULT-II ● Front wiper motor output inspection	

CAUTION:

1. **When the IPDM E/R is performing the fail-safe control, the front wiper may not be operated. Check if the system is not in the fail-safe condition.**
2. **This phenomenon occurs when IPDM E/R judges that front wiper is locked. It stops wiper output while IPDM E/R is operating front wiper and auto stop signal does not change for at least 10 seconds.**
   In this state, use IPDM E/R data monitor to check if “wiper protection” item is “BLOCK”.

Front Wiper Does Not Operate

BKS001HL

CAUTION:

- **During IPDM E/R fail-safe control, front wipers may not operate. Refer to PG-18, "CAN COMMUNICATION LINE CONTROL" in "PG IPDM E/R" to make sure that it is not in fail-safe status.**

1. CHECK FUSE

- Check fuse and fusible link for blown-out.

Unit	Power source	Fuse No.
Front and rear washer motor	Ignition ON or START	3
Front wiper main relay	Battery	48
IPDM E/R	Battery	61, 62
BCM	Battery	J
	Ignition switch ON or START position	5

Refer to WW-13, "Wiring Diagram — WIPER —" .

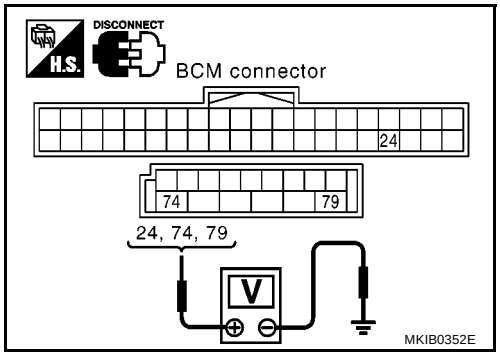
OK or NG

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 BCM POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.



Terminal			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal				
M59	74	Ground	Battery voltage	Battery voltage	Battery voltage
	79		Battery voltage	Battery voltage	Battery voltage
M57	24		0V	0V	Battery voltage

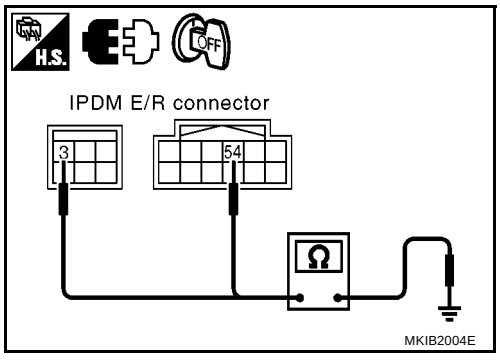
OK or NG

OK >> GO TO 3.

NG >> Check harness for open or short between fuse, fusible link and BCM.

3. CHECK IPDM E/R GROUND CIRCUIT

1. Disconnect IPDN E/R harness connector.
2. Check continuity between IPDM E/R harness connector and ground.



Connector	Terminal	Ground	Continuity
E11	3		Yes
E12	54		

OK or NG

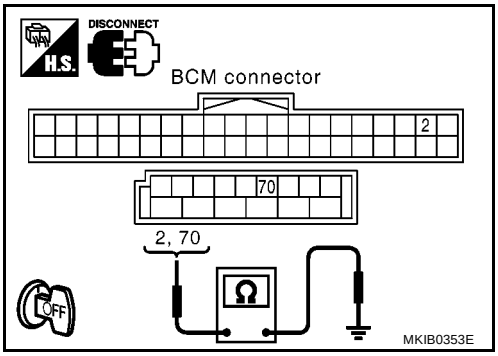
OK >> GO TO 4.

NG >> Harness for open ground circuit.

4. CHECK BCM GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

Connector	Terminal	Ground	Continuity
M57	2		Yes
M59	70		



OK or NG

OK >> GO TO 5.
NG >> Check harness ground circuit.

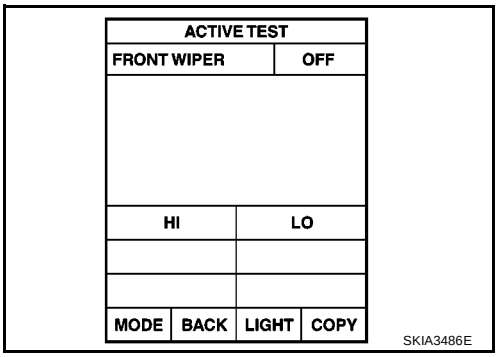
5. ACTIVE TEST

With CONSULT-II

1. Turn ignition switch ON.
2. Select “IPDM E/R” on CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
3. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
4. Touch “LO” or “HI” screen.

Without CONSULT-II

Start up auto active test. Refer to PG-22, "Auto Active Test" .



Does front wiper operate normally?

YES >> GO TO 6.
NO >> GO TO 8.

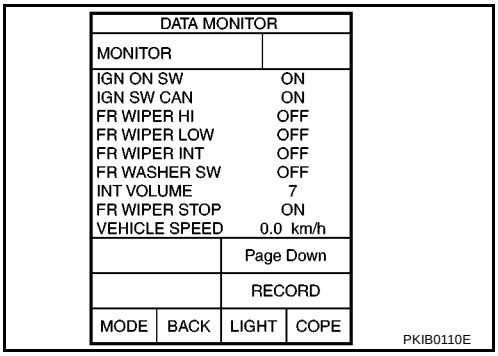
6. CHECK CIRCUIT BETWEEN COMBINATION SWITCH AND BCM

With CONSULT-II

1. Select “BCM” on CONSULT-II, and select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “FR WIPER INT”, “FR WIPER LOW”, and “FR WIPER HI” turn ON-OFF according to wiper switch operation.

Without CONSULT-II

Refer to LT-125, "Combination Switch Inspection" .



OK or NG

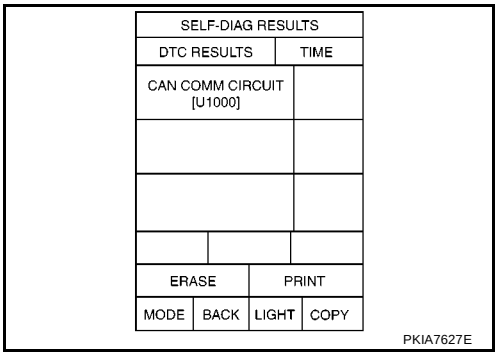
OK >> GO TO 7.
NG >> Check combination switch (wiper switch). Refer to LT-125, "Combination Switch Inspection" .

7. CHECK CIRCUIT BETWEEN IPDM E/R AND BCM

Select “BCM” on CONSULT-II, and perform self-diagnosis for “BCM”.

Displayed self-diagnosis results

NO DTC>>Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .
CAN COMM CIRCUIT>>Check CAN communication line of BCM. Refer to BCS-17, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" .



8. CHECK GROUND CIRCUIT

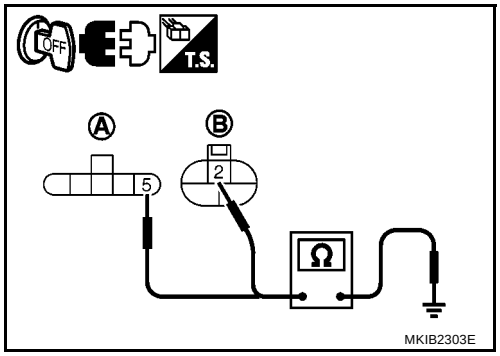
1. Turn ignition switch OFF.
2. Disconnect front wiper motor connector.
3. Check continuity between front wiper motor harness connector [A (LHD models) or B (RHD models)] and ground.

LHD models (A)

Front wiper motor connector	Terminal	Ground	Continuity
E39	5		Yes

RHD models (B)

Front wiper motor connector	Terminal	Ground	Continuity
E66	2		Yes



OK or NG

OK >> GO TO 9.
NG >> Repair harness or connector.

9. CHECK FRONT WIPER CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check continuity between IPDM E/R harness connector (A) and front wiper motor harness connector [B (LHD models) or C (RHD models)].

LHD models

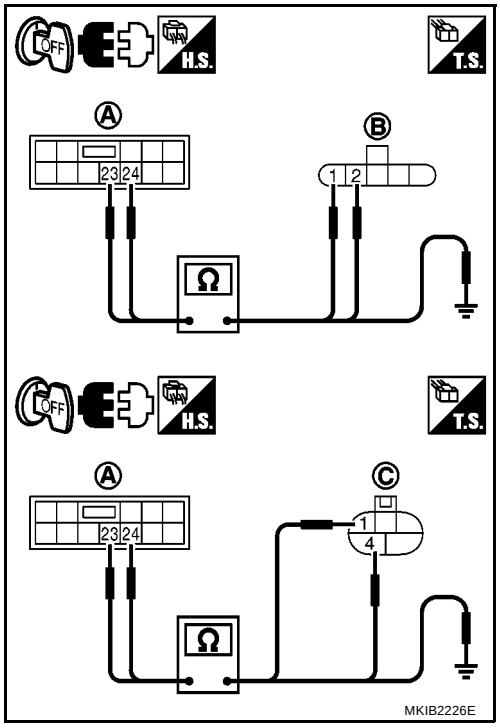
A		B		Continuity
Connector	Terminal	Connector	Terminal	
E10	23	E39	2	Yes
	24		1	

RHD models

A		C		Continuity
Connector	Terminal	Connector	Terminal	
E10	23	E66	1	Yes
	24		4	

3. Check continuity between IPDM E/R harness connector (A) and Ground.

A		Ground	Continuity
Connector	Terminal		
E10	23		No
	24		



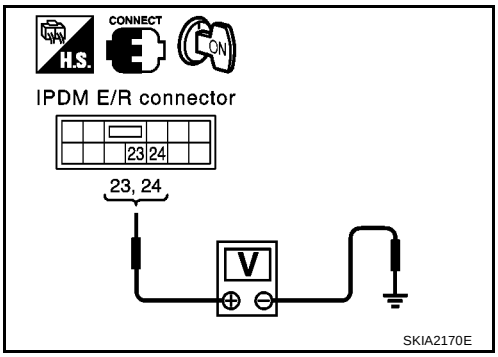
OK or NG

OK >> GO TO 10.
NG >> Repair harness or connector.

10. CHECK IPDM E/R

With CONSULT-II

1. Connect IPDM E/R connector.
2. Turn ignition switch ON.
3. Select “IPDM E/R” by CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
4. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
5. Touch “LO” or “HI” screen.
6. Check voltage between IPDM E/R harness connector and ground while front wiper (HI, LO) is operating.



Terminal			Condition	Voltage
(+)		(-)		
IPDM E/R connector	Terminal			
E10	23	Ground	Stopped	Approx. 0V
			LO operation	Battery voltage
	24		Stopped	Approx. 0V
			HI operation	Battery voltage

Without CONSULT-II

1. Connect IPDM E/R connector.
2. Turn ignition switch ON.
3. Start up auto active test. Refer to PG-22, "Auto Active Test" .
4. Check voltage between IPDM E/R harness connector and ground while front wiper (HI, LO) is operating.

Terminal			Condition	Voltage
(+)		(-)		
IPDM E/R connector	Terminal			
E10	23	Ground	Stopped	Approx. 0V
			LO operation	Battery voltage
	24		Stopped	Approx. 0V
			HI operation	Battery voltage

OK or NG

OK >> Replace front wiper drive assembly. Refer to WW-43, "Removal and Installation of Front Wiper Drive Assembly" .

NG >> Replace IPDM E/R. Refer to PG-37, "Removal and Installation of IPDM E/R" .

Front Wiper Does Not Return to Stop Position (After Front Wiper Operate for 10 Seconds, They Stop for 20 Seconds, and After Repeating the Operations Five Times, They Become Inoperative)

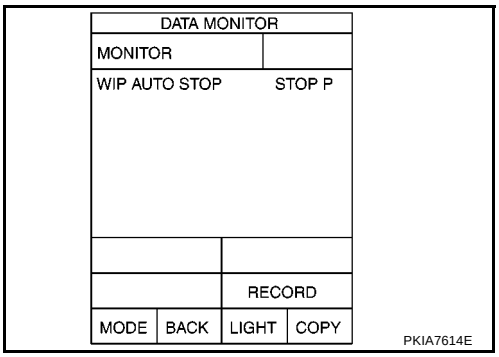
BKS001HM

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 that front wipers are locked, and stops wiper output. That causes this symptom.**
- **This status can be checked by “DATA MONITOR” of “IPDM E/R” on which “WIPER PROT” item shows “BLOCK”.**

1. CHECK FRONT WIPER STOP SIGNAL

With CONSULT-II
Select “IPDM E/R” on CONSULT-II. With “DATA MONITOR”, make sure that “WIP AUTO STOP” turns “ACT P” - “STOP P” linked with wiper operation.



Without CONSULT-II
GO TO 2.

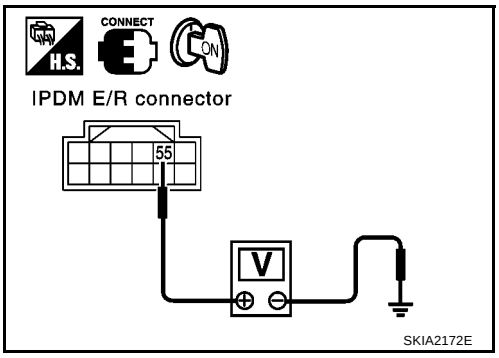
OK or NG

OK >> Replace IPDM E/R. Refer to PG-37, "Removal and Installation of IPDM E/R" .
NG >> GO TO 2.

2. CHECK IPDM E/R

Check voltage between IPDM E/R harness connector and ground while front wiper motor is stopped and while it is operating.

Terminal			Condition	Voltage
(+)		(-)		
IPDM E/R connector	Terminal			
E12	55	Ground	Wiper stopped	Approx. 0V
			Wiper operating	Battery voltage



OK or NG

OK >> Replace IPDM E/R. Refer to PG-37, "Removal and Installation of IPDM E/R" .
NG >> GO TO 3.

3. CHECK FRONT WIPER AUTO STOP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and wiper motor connector.
3. Check continuity between IPDM E/R harness connector (A) and front wiper motor harness connector [B (LHD models) or C (RHD models)].

LHD models

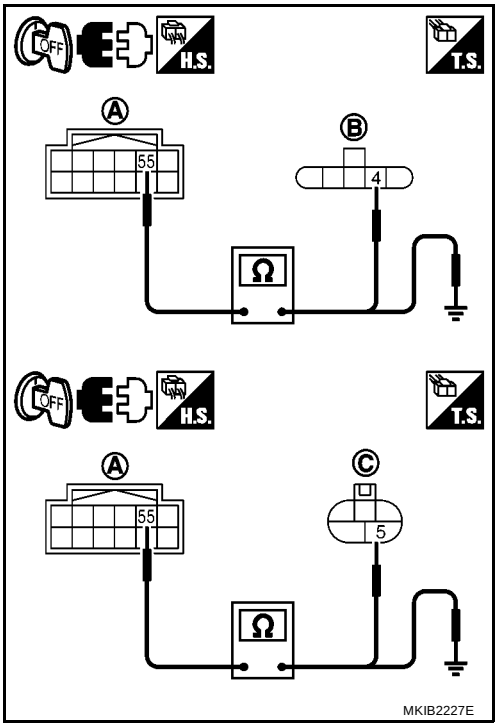
A		B		Continuity
Connector	Terminal	Connector	Terminal	
E12	55	E39	4	Yes

RHD models

A		C		Continuity
Connector	Terminal	Connector	Terminal	
E12	55	E66	5	Yes

4. Check continuity between IPDM E/R harness connector (A) and Ground.

A		Ground	Continuity
Connector	Terminal		
E12	55		No



MKIB2227E

OK or NG

OK >> Replace front wiper drive assembly. Refer to WW-43, "Removal and Installation of Front Wiper Drive Assembly" .

NG >> Repair harness or connector.

Only Front Wiper Low Does Not Operate

BKS001HN

1. ACTIVE TEST

With CONSULT-II

1. Select “IPDM E/R” on CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
3. Touch “LO” screen.

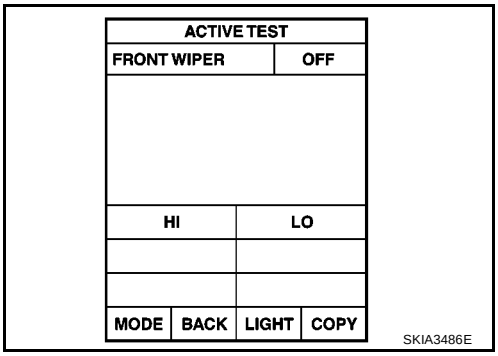
Without CONSULT-II

Start up auto active test. Refer to PG-22, "Auto Active Test" .

Does front wiper operate normally?

YES >> Refer to LT-125, "Combination Switch Inspection" .

NO >> GO TO 2.



SKIA3486E

2. CHECK FRONT WIPER MOTOR CIRCUIT

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 (A) and front wiper motor harness [B (LHD models) or C (RHD models)].

LHD models

A		B		Continuity
Connector	Terminal	Connector	Terminal	
E10	23	E39	2	Yes

RHD models

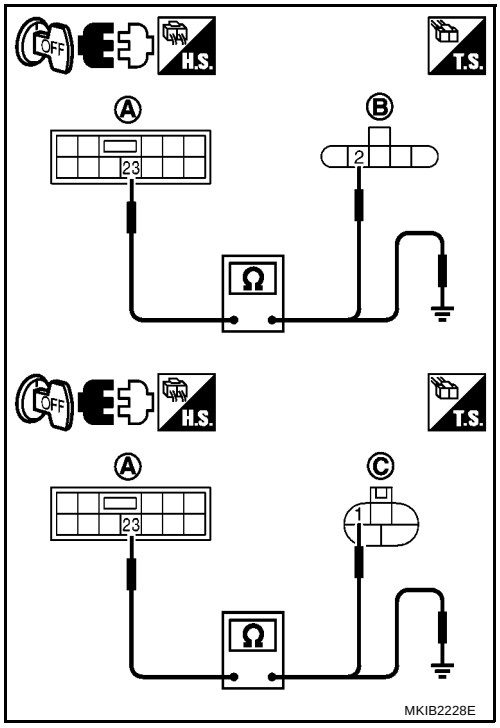
A		C		Continuity
Connector	Terminal	Connector	Terminal	
E10	23	E66	1	Yes

4. Check continuity between IPDM E/R harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
E10	23		No

OK or NG

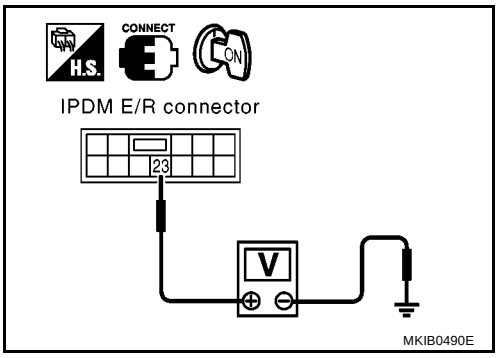
OK >> GO TO 3.
NG >> Repair harness or connector.



3. CHECK IPDM E/R

With CONSULT-II

1. Connect IPDM E/R connector.
2. Turn ignition ON.
3. Select “IPDM E/R” on CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
4. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
5. Touch “LO” screen.
6. Check voltage between IPDM E/R harness connector terminal and ground while front wiper LO is operating.



Terminal			Continuity
(+)		(-)	
IPDM E/R connector	Terminal		
E10	23	Ground	Battery voltage

Without CONSULT-II

1. Connect IPDM E/R connector.
2. Turn ignition ON.
3. Start up auto active test. Refer to PG-22, "Auto Active Test" .
4. Check voltage between IPDM E/R harness connector terminal and ground while front wiper LO is operating.

Terminal			Continuity
(+)		(-)	
IPDM E/R connector	Terminal		
E10	23	Ground	Battery voltage

OK or NG

OK >> Replace front wiper drive assembly. Refer to WW-43, "Removal and Installation of Front Wiper Drive Assembly" .

NG >> Replace IPDM E/R. Refer to PG-37, "Removal and Installation of IPDM E/R" .

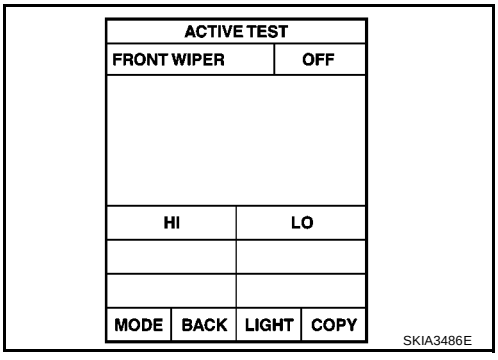
Only Front Wiper Hi Does Not Operate

BKS001HO

1. ACTIVE TEST

With CONSULT-II

1. Select “IPDM E/R” on CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
3. Touch “HI” screen.



Without CONSULT-II

Start up auto active test. Refer to PG-22, "Auto Active Test" .

Does front wiper operate normally?

YES >> Refer to LT-125, "Combination Switch Inspection" .

NO >> GO TO 2.

2. CHECK FRONT WIPER MOTOR CIRCUIT

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 (A) and front wiper motor harness connector [B (LHD models) or C (RHD models)].

LHD models

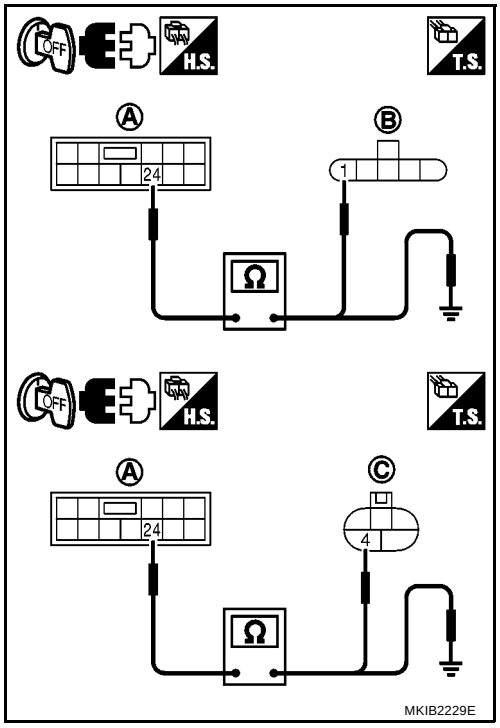
A		B		Continuity
Connector	Terminal	Connector	Terminal	
E10	24	E39	1	Yes

RHD models

A		C		Continuity
Connector	Terminal	Connector	Terminal	
E10	24	E66	4	Yes

4. Check continuity between IPDM E/R harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
E10	24		No



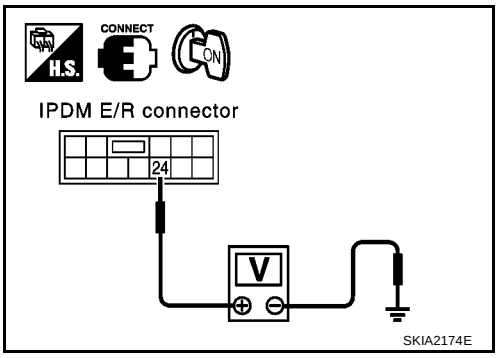
OK or NG

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

3. CHECK IPDM E/R

With CONSULT-II

1. Connect IPDM E/R connector.
2. Turn ignition ON.
3. Select “IPDM E/R” on CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
4. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
5. Touch “HI” screen.
6. Check voltage between IPDM E/R harness connector terminal and ground while front wiper HI is operating.



Terminal			Continuity
(+)		(-)	
IPDM E/R connector	Terminal		
E10	24	Ground	Battery voltage

Without CONSULT-II

1. Connect IPDM E/R connector.
2. Turn ignition ON.
3. Start up auto active test. Refer to PG-22, "Auto Active Test" .
4. Check voltage between IPDM E/R harness connector terminal and ground while front wiper HI is operating.

Terminal			Continuity
(+)		(-)	
IPDM E/R connector	Terminal		
E10	24	Ground	Battery voltage

OK or NG

OK >> Replace front wiper drive assembly. Refer to WW-43, "Removal and Installation of Front Wiper Drive Assembly" .

NG >> Replace IPDM E/R. Refer to PG-37, "Removal and Installation of IPDM E/R" .

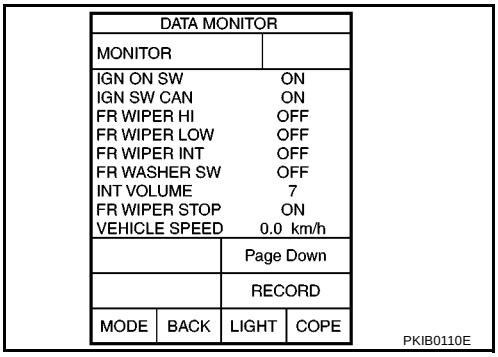
Only Front Wiper Intermittent Does Not Operate

BKS001HP

1. CHECK COMBINATION SWITCH

With CONSULT-II

1. Select “BCM” on CONSULT-II, and select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “FR WIPER INT”, turn ON-OFF according to wiper switch operation.



Without CONSULT-II

Refer to LT-125, "Combination Switch Inspection" .

OK or NG

OK >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .

NG >> Check combination switch (wiper switch) Refer to LT-125, "Combination Switch Inspection" .

Only Front Wiper Auto Dose Not Operate

BKS001KR

1. CHECK CONDITIONS OF WINDSHIELD (LIGHT AND RAIN SENSOR DETECTION AREA)

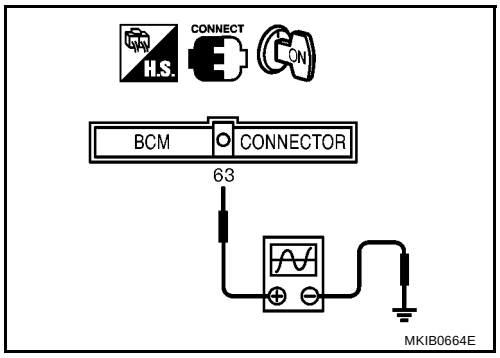
Check “light and rain sensor” detection area of windshield for dirt such as greases.

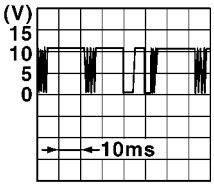
OK or NG

OK >> GO TO 2.
NG >> Clean “light and rain sensor” detection area of windshield fully.

2. CHECK LIGHT AND RAIN SENSOR SIGNAL

1. Turn ignition switch ON.
2. Check signal between BCM harness connector and ground with oscilloscope.



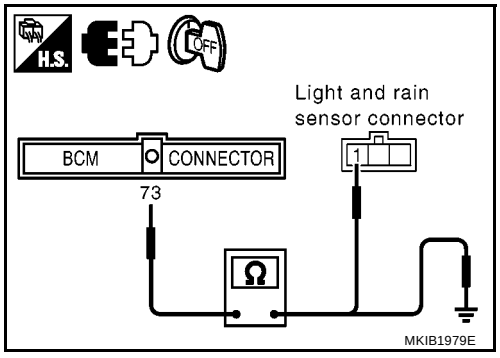
(+)		(-)	Condition	Signal (Reference value.)
Connector	Terminals (Wire color)			
M58	63	Ground	IGN ON	 MKIB2017E Approx. 8.9V

OK or NG

OK >> Replace light and rain sensor. Refer to WW-47, "Removal and Installation of Light and Rain Sensor" . If front wiper does not operate, replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .
NG >> GO TO 3.

3. CHECK LIGHT AND RAIN SENSOR POWER SUPPLY CIRCUIT

1. Check continuity between BCM harness connector and “light and rain sensor” harness connector.



BCM		Light and rain sensor		Continuity
Connector	Terminal	Connector	Terminal	
M59	73	R2	1	Yes

2. Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M59	73		No

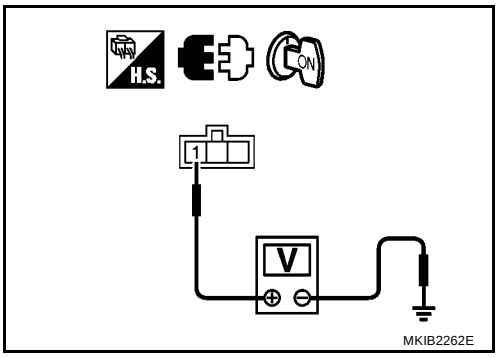
OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK LIGHT AND RAIN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect “light and rain sensor” harness connector.
3. Turn ignition switch ON.
4. Check voltage between “light and rain sensor” harness connector and ground.

Terminal			Voltage
(+)		(-)	
Light and rain sensor connector	Terminal		
R2	1	Ground	Battery voltage



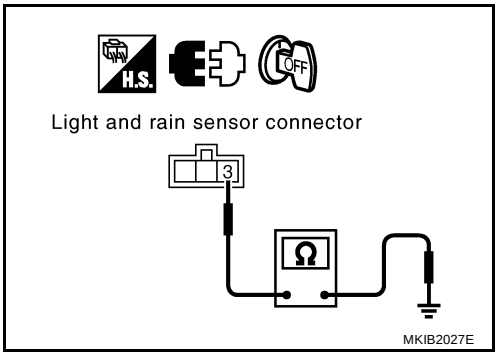
OK or NG

OK >> GO TO 5.
NG >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .

5. CHECK LIGHT AND RAIN SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between “light and rain sensor” harness connector and ground.

Light and rain sensor connector	Terminal	Ground	Continuity
R2	3		Yes



OK or NG

OK >> GO TO 6.
NG >> Repair or replace harness.

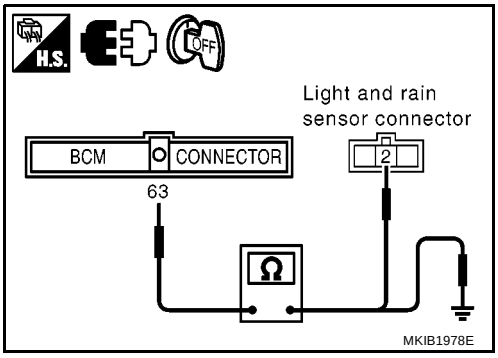
6. CHECK LIGHT AND RAIN SENSOR SIGNAL CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM harness connector and “light and rain sensor” harness connector.

BCM		Light and rain sensor		Continuity
Connector	Terminal	Connector	Terminal	
M58	63	R2	2	Yes

3. Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M58	63		No



OK or NG

OK >> Replace light and rain sensor. Refer to WW-47, "Removal and Installation of Light and Rain Sensor" .
NG >> Repair or replace harness.

Front Wiper Interval Time Is Not Controlled by Vehicle Speed

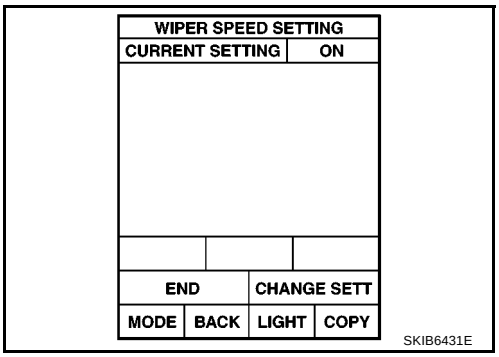
BKS001HQ

1. CHECK WIPER SPEED SETTING

1. Select “BCM” on CONSULT-II screen. Select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “WORK SUPPORT” on “SELECT DIAG MODE”. Select “WIPER SPEED SETTING” on “SELECT WORK ITEM” screen. Touch “START”.
3. Confirm “CURRENT SETTING” is “ON”.

OK or NG

OK >> GO TO 2.
NG >> Change “CURRENT SETTING” to “ON”.



2. CHECK FUNCTION OF COMBINATION METER

Confirm that speedometer operates normally.

Does front wiper operate normally?

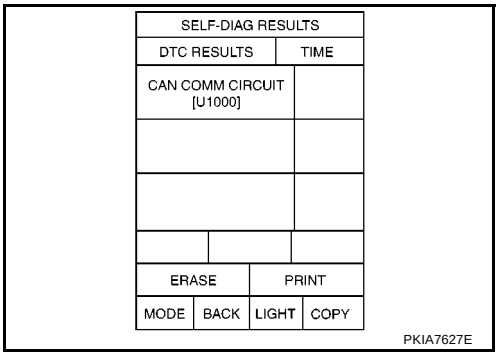
YES >> GO TO 2.
NO >> Combination meter vehicle speed system is malfunction. Refer to DI-16, "Check Vehicle Speed Signal" .

3. CHECK CAN COMMUNICATION BETWEEN BCM AND COMBINATION METER

Select “BCM” on CONSULT-II, and perform self-diagnosis for “BCM”.

Displayed self-diagnosis results

NO DTC>>Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .
CAN COMM CIRCUIT>>Check CAN communication line of BCM. Refer to BCS-17, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" .



Front Wiper Intermittent Operation Switch Position Cannot Be Adjusted

BKS001HR

1. CHECK CIRCUIT BETWEEN COMBINATION SWITCH AND BCM

With CONSULT-II

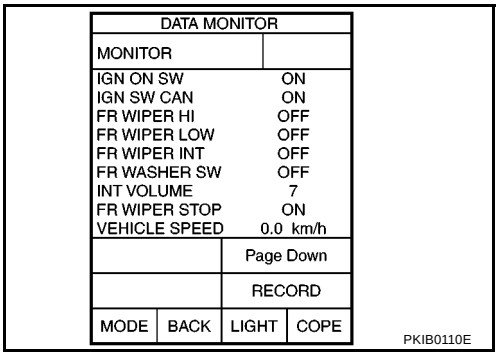
1. Select “BCM” on CONSULT-II, and select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “INT VOLUME”, changes in order from 1 to 7 according to wiper switch operation.

Without CONSULT-II

Refer to LT-125, "Combination Switch Inspection" .

OK or NG

OK >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .
NG >> Check combination switch (wiper switch). Refer to LT-125, "Combination Switch Inspection" .



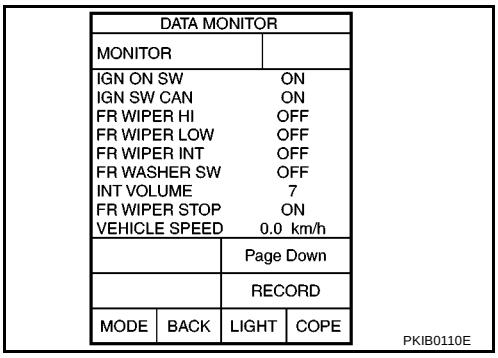
Wiper Does Not Wipe When Front Washer Operates

BKS001HS

1. CHECK CIRCUIT BETWEEN COMBINATION SWITCH AND BCM

With CONSULT-II

1. Select “BCM” on CONSULT-II, and select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “FR WASHER SW” turns ON-OFF according to front wiper switch operation.



Without CONSULT-II

Refer to LT-125, "Combination Switch Inspection" .

OK or NG

OK >> Replace BCM Refer to BCS-17, "Removal and Installation of BCM" .

NG >> Check front wiper switch. Refer to LT-125, "Combination Switch Inspection" .

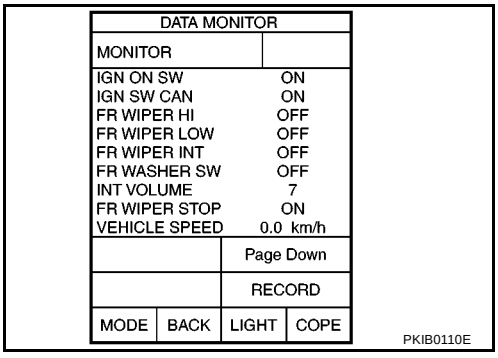
Front Wiper Does Not Stop

BKS001HT

1. CHECK CIRCUIT BETWEEN COMBINATION SWITCH AND BCM

With CONSULT-II

1. Select “BCM” on CONSULT-II, and select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “FR WIPER INT”, “FR WIPER LOW”, “FR WIPER HI”, and “FR WASHER SW” turns ON-OFF according to front wiper switch operation.



Without CONSULT-II

Refer to LT-125, "Combination Switch Inspection" .

OK or NG

OK >> Replace IPDM E/R. Refer to PG-37, "Removal and Installation of IPDM E/R" .

NG >> Check combination switch (wiper switch). Refer to LT-125, "Combination Switch Inspection" .

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

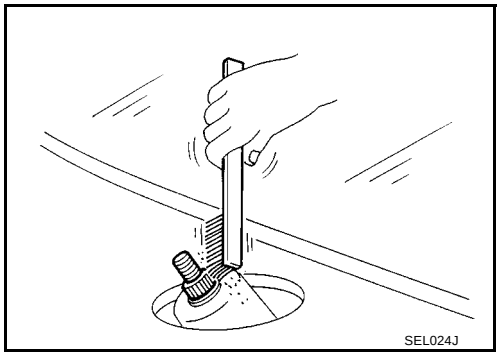
BKS0011L

REMOVAL

1. Turn wiper switch ON to operate wiper motor, and then turn wiper switch OFF (auto stop).
2. Open hood, remove arm caps, and remove wiper arm nuts.
3. Raise wiper arm, and remove wiper arm from the vehicle.

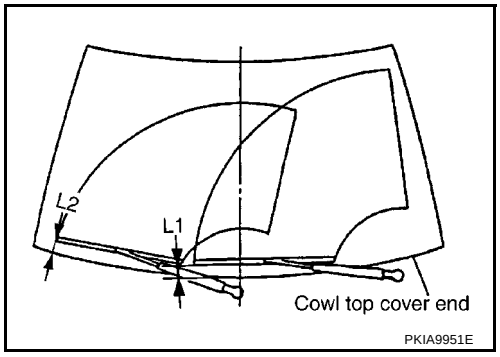
INSTALLATION

1. Clean up the pivot area as shown in the figure. This will reduce possibility of wiper arm looseness.
2. Prior to wiper arm installation, turn on wiper switch to operate wiper motor and then turn it “OFF” (auto stop).
3. Push wiper arm onto pivot shaft, paying attention to blind spline.



4. Lift the blade up and then set it down onto glass surface to set the blade center to clearance “L1” & “L2” immediately before tightening nuts.

   NOTE:
   This illustration is for LHD models. The layout for RHD models is symmetrically opposite.
5. Spray washer fluid. Turn on wiper switch to operate wiper motor and then turn it “OFF”.
6. Make sure that wiper blades stop within clearance “L1” & “L2”.



Clearance “L1”	RHD	48.0 ± 7.5 mm (1.890 ± 0.295 in)
	LHD	
Clearance “L2”	RHD	46.0 ± 7.5 mm (1.811 ± 0.295 in)
	LHD	43.0 ± 7.5 mm (1.693 ± 0.295 in)

- Tighten wiper arm nuts to specified torque.

  Front wiper arm nuts : 23.5 N·m (2.4 kg-m, 17 ft-lb)

7. Attach wiper arm caps.

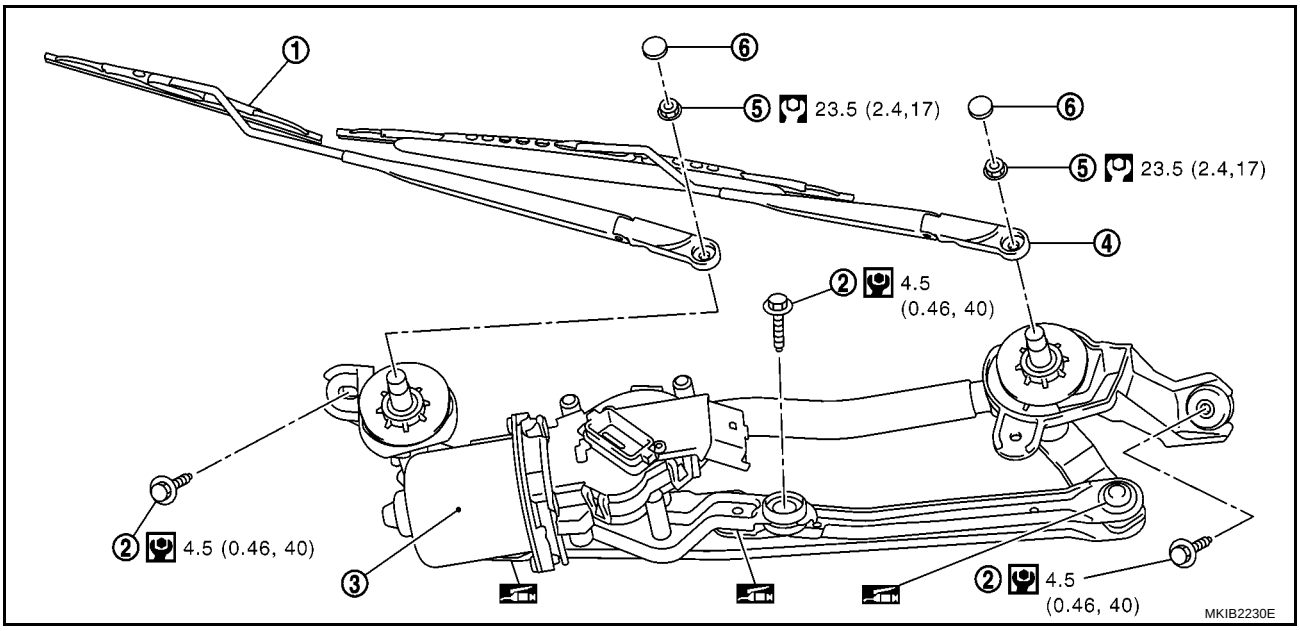
ADJUSTMENT

Refer to WW-42, "INSTALLATION" .

Removal and Installation of Front Wiper Drive Assembly

BKS0011N

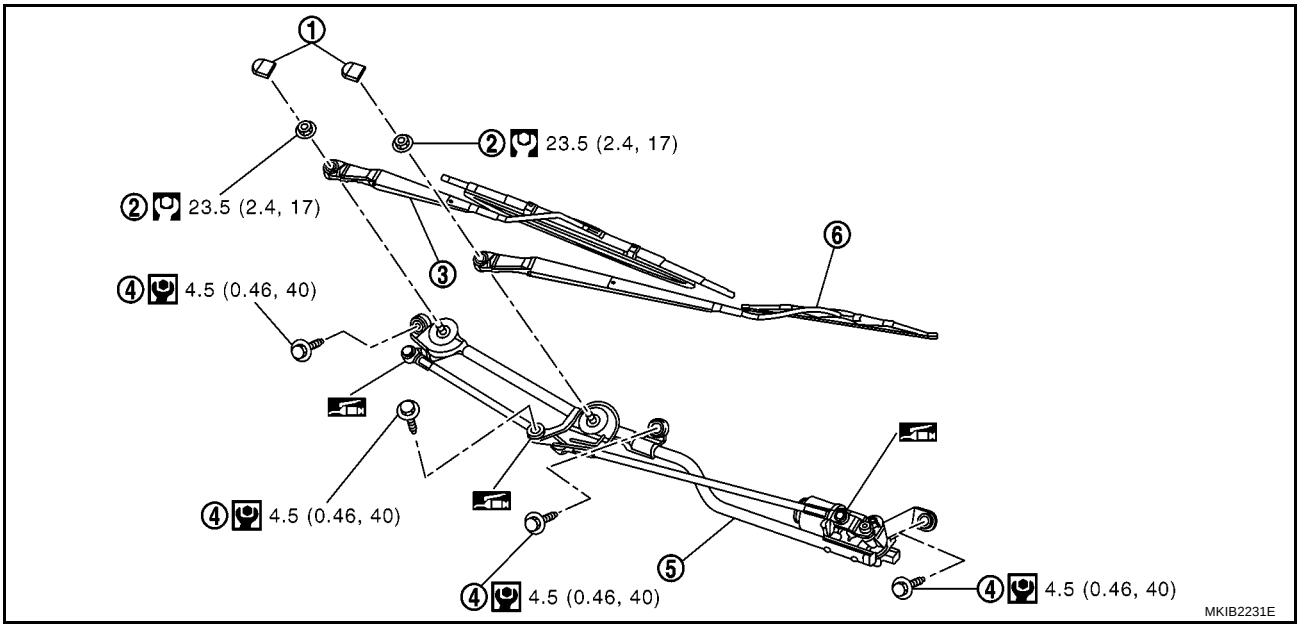
LHD models



1. Wiper arm and blade assembly (RH)
2. Wiper drive assembly mounting bolts
3. Wiper drive assembly
4. Wiper arm and blade assembly (LH)
5. Wiper arm mounting nuts
6. Wiper arm caps

: N·m (kg-m, ft-lb)
: N·m (kg-m, in-lb)
: Should be lubricated with grease.

RHD models



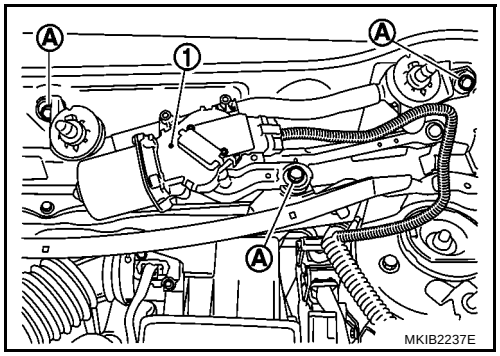
1. Wiper arm caps
2. Wiper arm mounting nuts
3. Wiper arm and blade assembly (RH)
4. Wiper drive assembly mounting bolts
5. Wiper drive assembly
6. Wiper arm and blade assembly (LH)

: N·m (kg-m, ft-lb)
: N·m (kg-m, in-lb)
: Should be lubricated with grease.

REMOVAL

1. Operate front wiper motor, and stop at the auto stop position.
2. Remove wiper arms. Refer to WW-42, "REMOVAL" .
3. Remove cowl top cover. Refer to EI-12, "COWL TOP" .

4. Disconnect wiper motor connector and remove connector clips.
5. Remove front wiper drive assembly mounting bolts (A), and remove front wiper drive assembly (1) from the vehicle.



INSTALLATION

1. Install front wiper drive assembly to the vehicle.

Front wiper drive assembly mounting bolts : 4.5 N- m (0.46kg-m, 40 in-lb)

2. Connect wiper motor connector. Turn wiper switch ON to operate wiper motor, then turn wiper switch OFF (auto stop).
3. Install connector clips to the wiper frame, and install cowl top cover. Refer to EI-12, "COWL TOP" .
4. Attach wiper arms. Refer to WW-42, "INSTALLATION" .
5. Adjustment of wiper arm stop location.
6. Install arm caps.

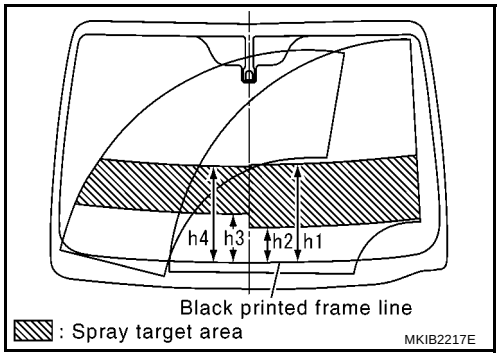
Washer Nozzle Adjustment

BKS0011O

- In this model, the washer nozzle has a non-adjustment nozzle and requires no adjusting.
- If necessary, ensure that washer fluid spray covers at least the area as shown in the figure.

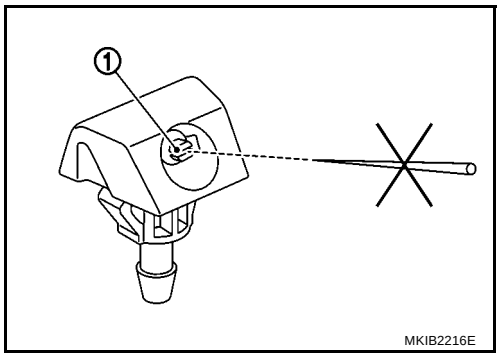
h1: 320 mm (12.60 in)
h2: 115 mm (4.53 in)
h3: 160 mm (6.30 in)
h4: 315 mm (12.40 in)

NOTE:
This illustration is for LHD models. The layout for RHD models is symmetrically opposite.



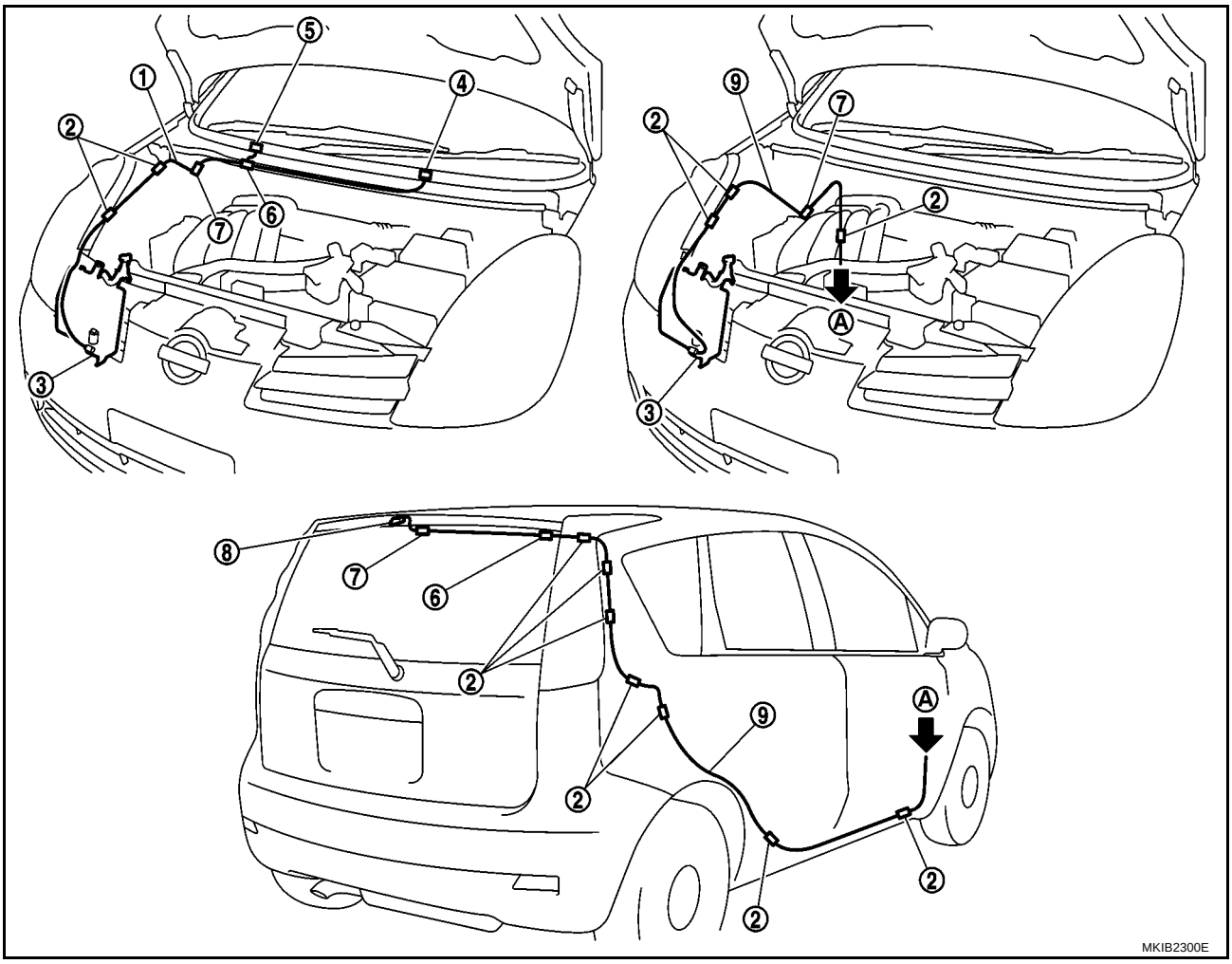
- If the above is not satisfied, confirm that the washer nozzle is installed correctly on the cowl top cover and/or cowl top cover is installed correctly on the body.
- If they are installed correctly, and the fluid is still spraying out of the shooting target areas, replace them with new washer nozzle and/or cowl top cover.

CAUTION:
Never adjust the washer nozzle (1) with needle pin. If attempts are made to adjust the washer nozzle with needle pin, the nozzle may be damaged.



Washer Tube Routing

BKS0011P



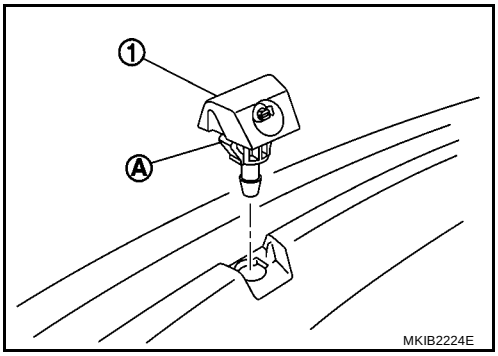
1. Front washer tube
2. Clip
3. Front and rear washer tank
4. Front washer nozzle (LH)
5. Front washer nozzle (RH)
6. Check valve
7. Joint washer tube
8. Rear washer nozzle
9. Rear washer tube

Removal and Installation of Front Washer Nozzle

BKS001C5

REMOVAL

1. Remove cowl top cover. Refer to EI-12, "COWL TOP" .
2. Remove washer tube.
3. While pressing pawl (A) on the reverse side of front washer nozzle (1), remove front washer nozzle from cowl top cover.



INSTALLATION

Note the following, and installation is the reverse order of removal.

CAUTION:

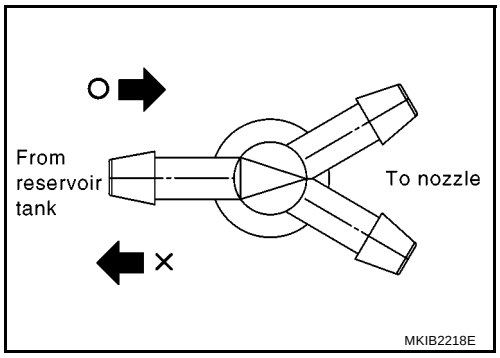
Install left and right nozzle correctly. Incorrect side nozzle can be installed, but spray points wrong.

Inspection for Washer Nozzle

BKS001C6

CHECK VALVE INSPECTION

A check valve is provided in the washer fluid line. Be careful not to connect check valve to washer tube in the wrong direction.



Inspection of Front Wiper and Washer Switch Circuit

BKS001C7

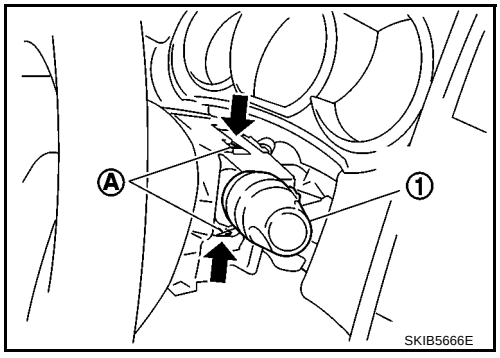
Refer to LT-125, "Combination Switch Inspection" .

Removal and Installation of Front Wiper and Washer Switch

BKS001C8

REMOVAL

1. Remove steering column cover. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Disconnect the wiper and washer switch connector.
3. Pull wiper and washer switch (1) toward the passenger door while pressing pawls (A) in direction shown by the arrow (⬅) in the figure, and remove it from the base.



INSTALLATION

Installation is the reverse order of removal.

Removal and Installation of Washer Tank

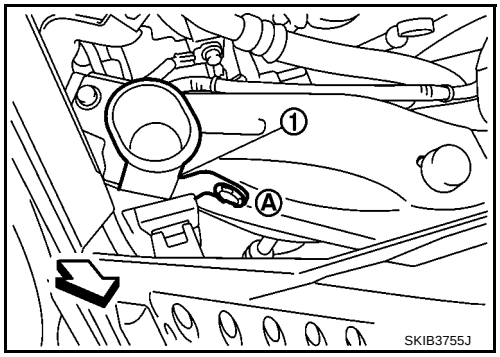
BKS001C9

REMOVAL

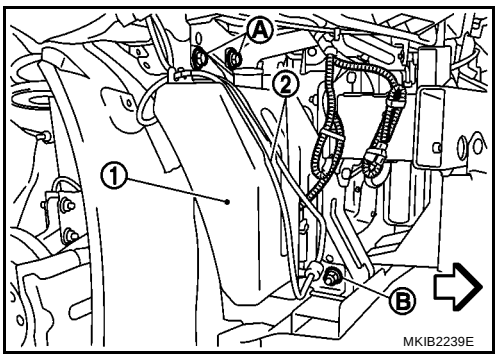
1. Remove clip (A) and pull washer tank inlet (1) out of washer tank.

– ⇦: Vehicle front

2. Remove front bumper. Refer to EI-4, "FRONT BUMPER" .
3. Disconnect washer motor connector.



4. Remove screws (A) and nut (B).
   - ⇦: Vehicle front
5. Remove washer tube (2), and remove washer tank (1) from vehicle.



INSTALLATION

Note the following, and installation is the reverse order of removal.

CAUTION:

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

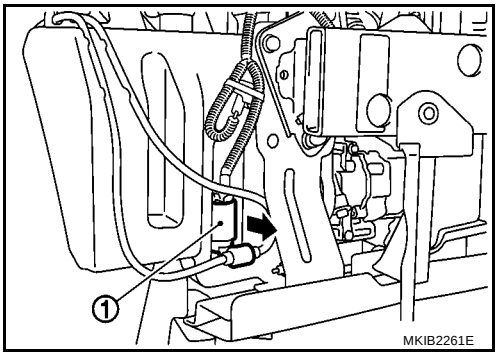
Washer tank mounting nut		**: 4.5 N·m (0.46 kg-m, 40 in-lb)**
Washer tank mounting screws		**: 4.5 N·m (0.46 kg-m, 40 in-lb)**

Removal and Installation of Front Washer Motor

BKS001CA

REMOVAL

1. Remove fender protector (front) RH. Refer to EI-14, "FENDER PROTECTOR" .
2. Disconnect washer motor (1) connector and remove washer tube.
3. Pull out front washer motor in direction shown by the arrow (⬅) in the figure. Remove front washer motor from washer tank.



INSTALLATION

Note the following, and installation is the reverse order of removal.

CAUTION:

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

Removal and Installation of Light and Rain Sensor

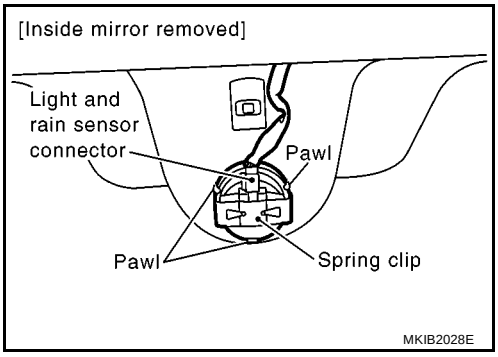
BKS001KS

REMOVAL

1. Remove inside mirror. Refer to GW-104, "INSIDE MIRROR" .
2. Remove clip and pawl.
3. Pull out the light and rain sensor.
4. Remove light and rain sensor harness connector.

CAUTION:

Do not touch the electronic circuit board on rain sensor.



INSTALLATION OF RAIN SENSOR

Install in the reverse order of removal.

INSTALLATION OF LIGHT AND RAIN SENSOR HOUSING

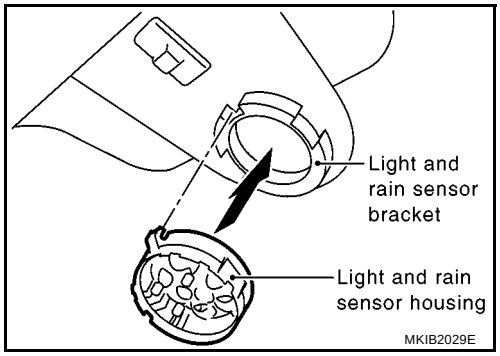
CAUTION:

When windshield is replaced, always replace rain sensor housing.

1. Clean the surface of bonded area on the windshield.
2. Fix rain sensor housing against light and rain sensor bracket from the top, then press it in a downward motion until it is completely attach together.

   CAUTION:

   Do not touch the adhesive.

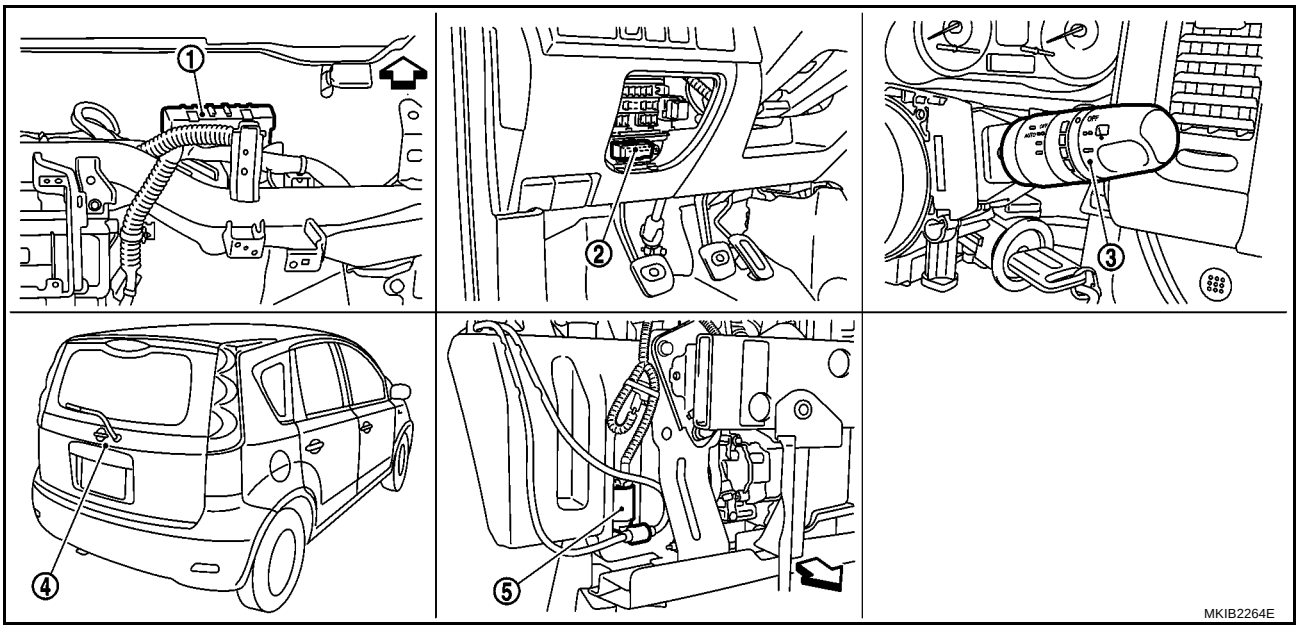


REAR WIPER AND WASHER SYSTEM

PFP:28710

Components Parts and Harness Connector Location

BKS0012O



⇦ : Vehicle front

1. BCM M57, M58, M59 (View with instrument panel removed)
2. Data link connector
3. Combination switch (Wiper switch) M38
4. Rear wiper motor B45
5. Front and rear washer motor E24 (View with front bumper removed)

System Description

BKS0012P

- 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 rear wiper and INT (intermittent) operation.

OUTLINE

Power is supplied at all times

- through 40A fusible link (letter J, located in fuse and fusible link box)
- to BCM terminals 74 and 79.

When ignition switch turned ON or START position, power is supplied

- through 10A fuse [No. 5 located in the fuse block (J/B)]
- to BCM terminal 24.
- through 10A fuse [No. 3 located in the fuse block (J/B)]
- to combination switch terminal 14.

Ground is supplied

- to BCM terminals 2 and 70,
- to combination switch terminal 12.
- through body grounds M21 and M66,
- to rear wiper motor terminal 3.
- through body ground B13, B28, B38 and B48

REAR WIPER OPERATION

When wiper switch is in the rear wiper ON position, BCM detect rear wiper ON signal by BCM wiper switch reading function.
BCM operate rear wiper motor, power is supplied

- through BCM terminal 71
- to rear wiper motor terminal 1.

Ground is supplied

- to rear wiper motor terminal 3
- through body grounds B13, B28, B38 and B48.

With power and ground supplied, the rear wiper motor operates.

INTERMITTENT OPERATION

The rear wiper motor operates the wiper arms at low speed approximately every 7 seconds.
When wiper switch is in the rear wiper INT position, BCM detect rear wiper INT signal by BCM wiper switch reading function (Refer to WW-8, "COMBINATION SWITCH READING FUNCTION").
BCM operate rear wiper motor, power supplied

- through BCM terminal 71.
- to rear wiper motor terminal 1

Ground is supplied.

- to rear wiper motor terminal 3
- through body ground B13, B28, B38 and B48.

The wiper motor operates at intermittent.

AUTO STOP OPERATION

With rear wiper switch turned OFF, rear wiper motor will continue to operate until wiper arm reaches rear wiper stopper.

WASHER OPERATION

When rear wiper switch is pushed to WASH position,
Power is supplied.

- through combination switch terminal 11
- to washer motor terminal 2.

Ground is supplied

- to washer motor terminal 1
- to combination switch terminals 12 and 13, and
- through body grounds M21 and M66.

With power and ground supplied, the rear washer motor is operated, and at the same time,
When the wiper switch is pushed to the WASH position for 1 second or more, BCM reads combination switch condition (Refer to WW-8, "COMBINATION SWITCH READING FUNCTION"), rear wiper motor is operated by BCM, and the rear wiper motor operates approximately 3 times after wiper switch is released.

REAR WIPER REVERSE RANGE OPERATION (IF AUTO WIPER IS EQUIPPED)

- When front wiper is active in auto operation with shift in reverse position, front and rear wiping action is synchronous. If front wiper becomes continuous, the rear wiper will intermittent, wiping every 7 seconds.
- When shift is in reverse position then front wiper switch toggle from OFF to AUTO, rear wiping action will occur once.
- When front wiper switch is in auto position with shift is in reverse position, if front washer pull more than 0.4second, front wiper and rear wiper once.

COMBINATION SWITCH READING FUNCTION

Refer to WW-8, "COMBINATION SWITCH READING FUNCTION" .

CAN Communication

BKS0012Q

SYSTEM DESCRIPTION

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.

CAN Communication Unit

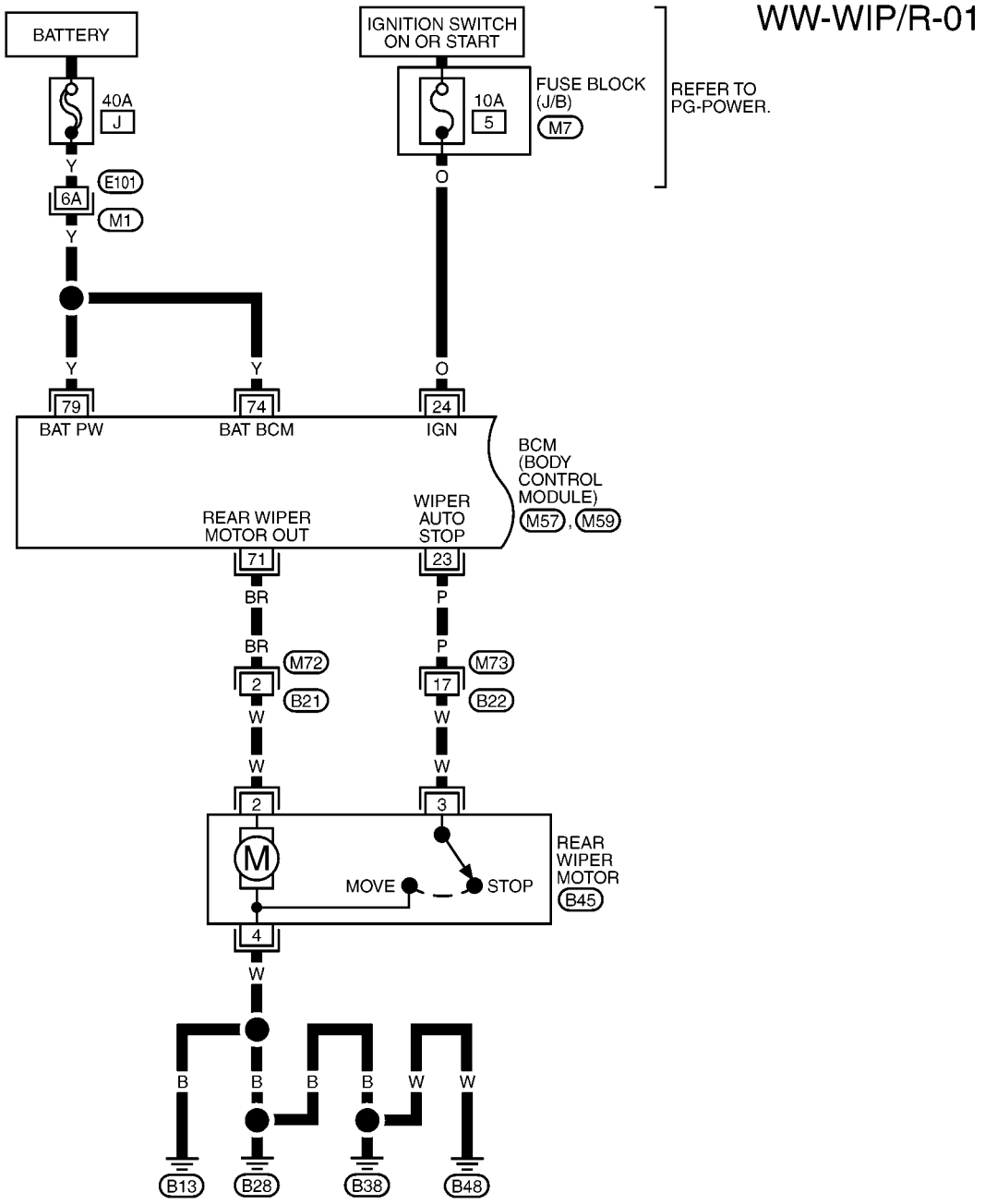
BKS0012R

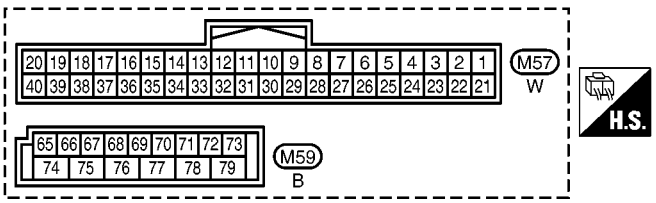
Refer to LAN-27, "CAN Communication Unit" .

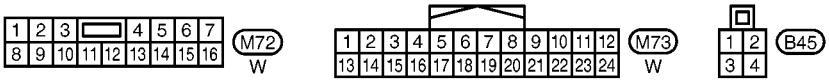
Wiring Diagram — WIP/R —

BKS0012S

WITHOUT RAIN SENSOR

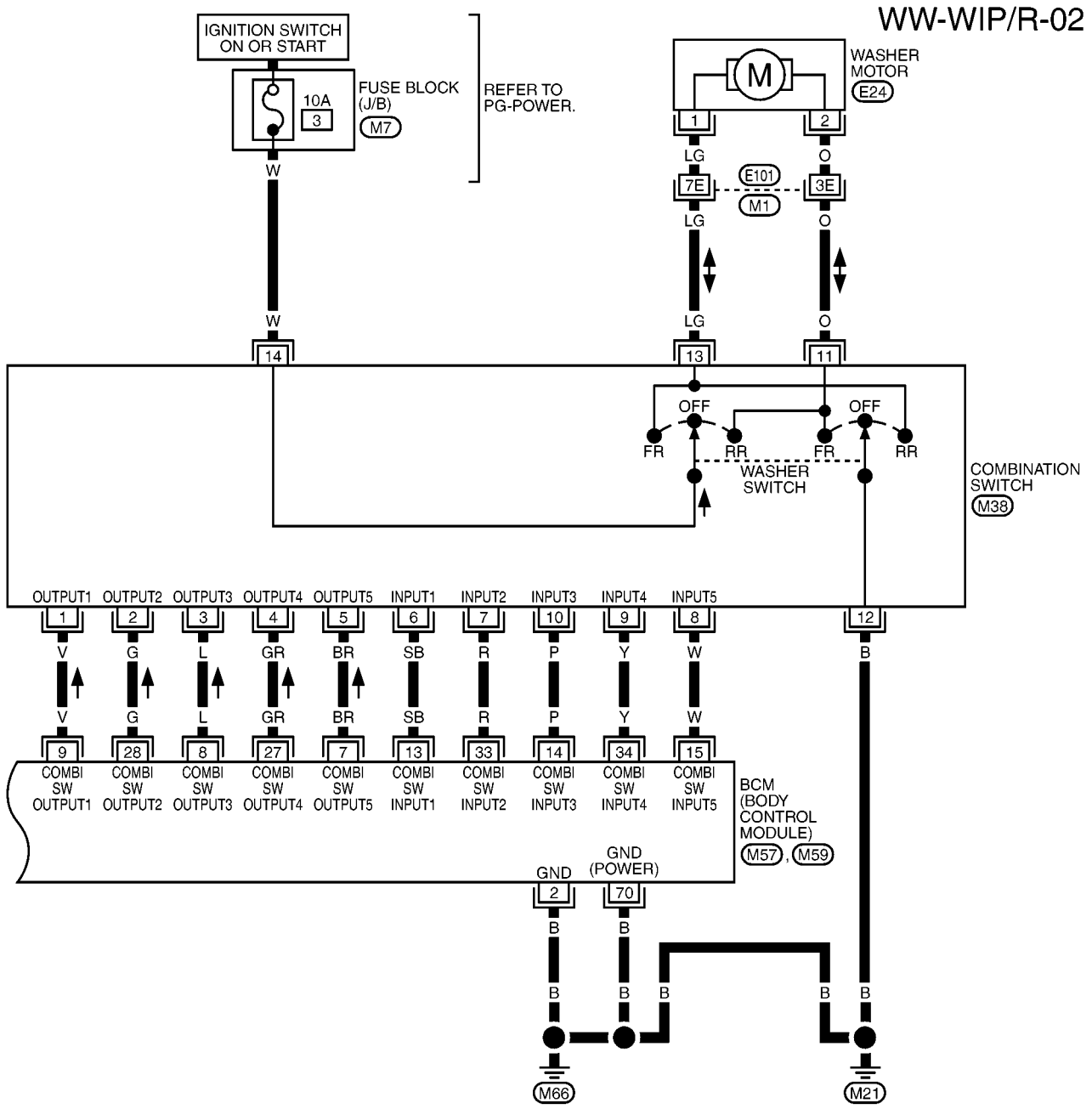


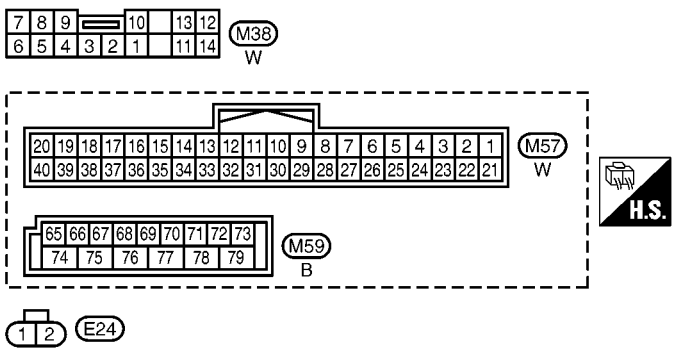




REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

MKWA4283E



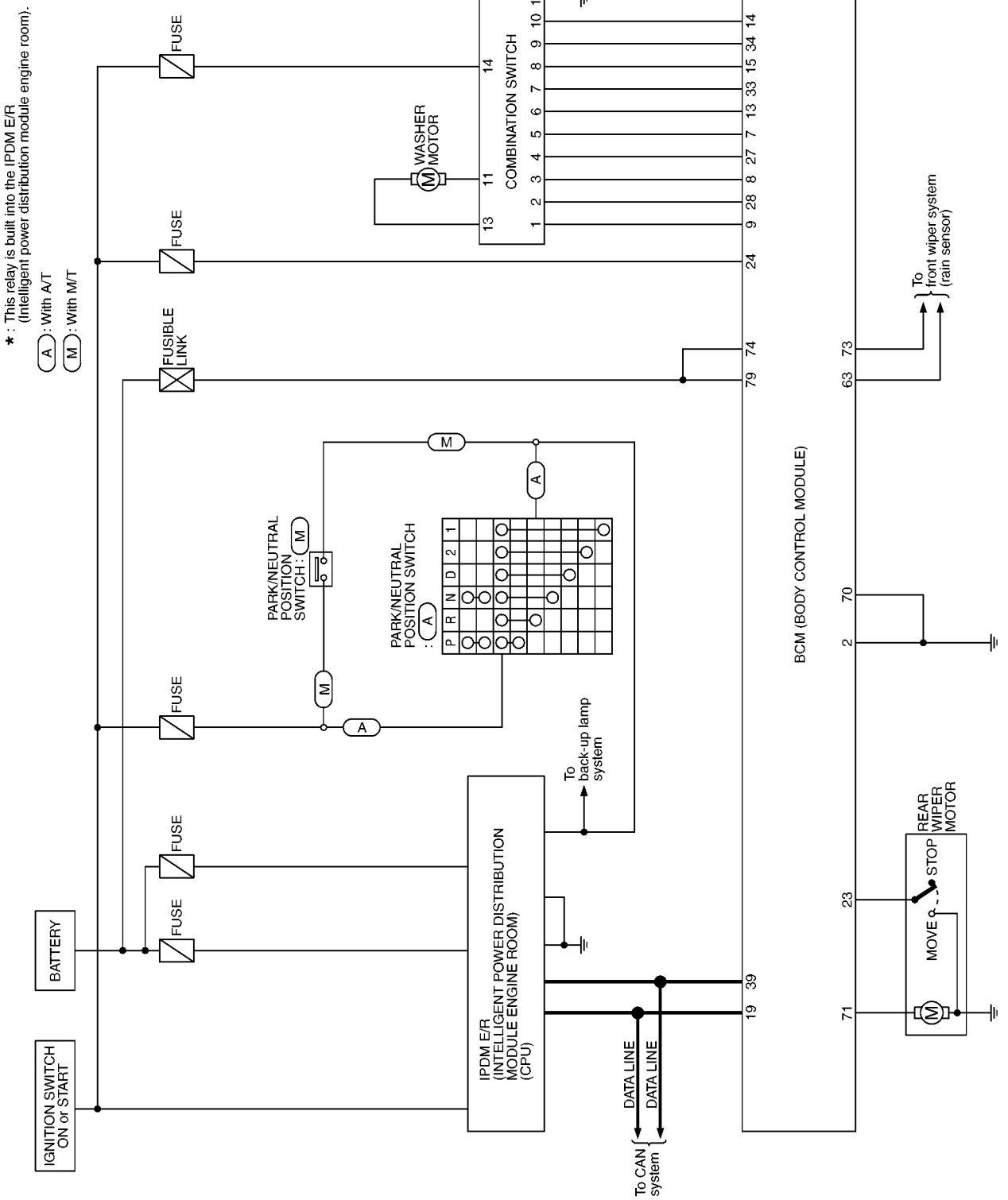


REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

MKWA4284E

Schematic
WITH RAIN SENSOR

BKS0012T

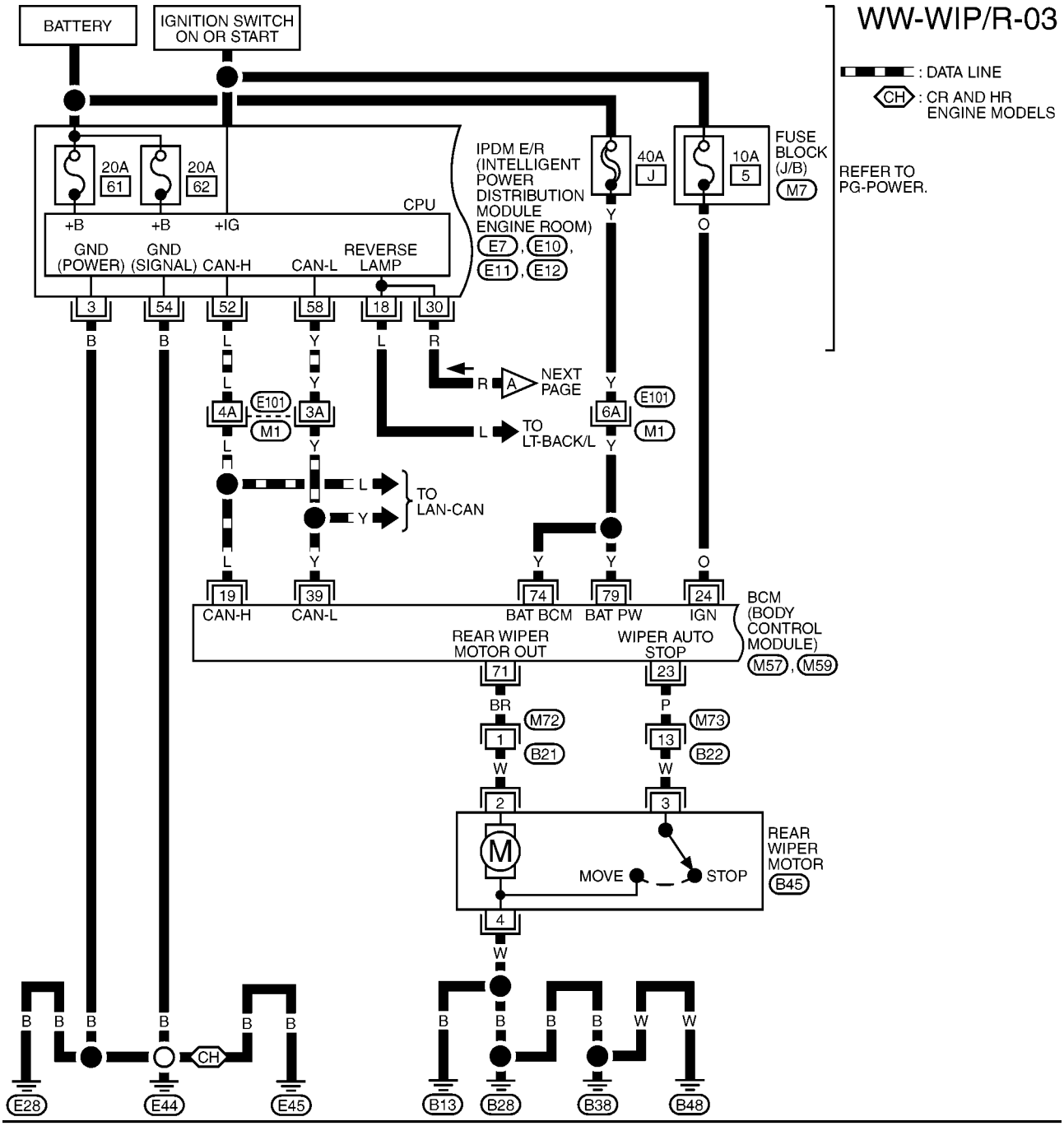


MKWA4285E

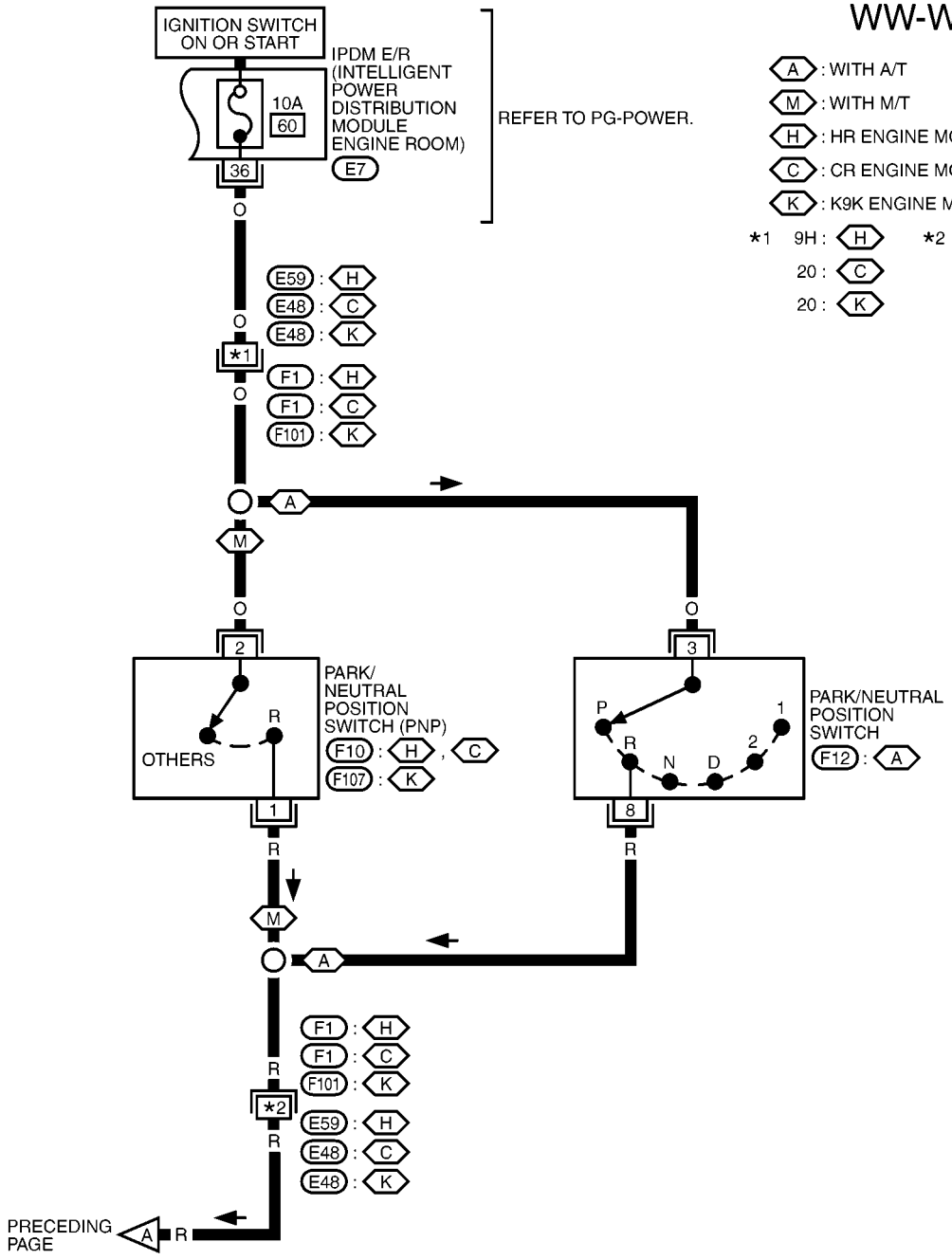
Wiring Diagram — WIP/R —

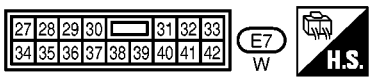
BKS0012U

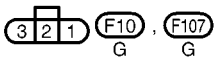
WITH RAIN SENSOR

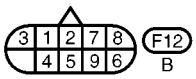


MKWA4286E





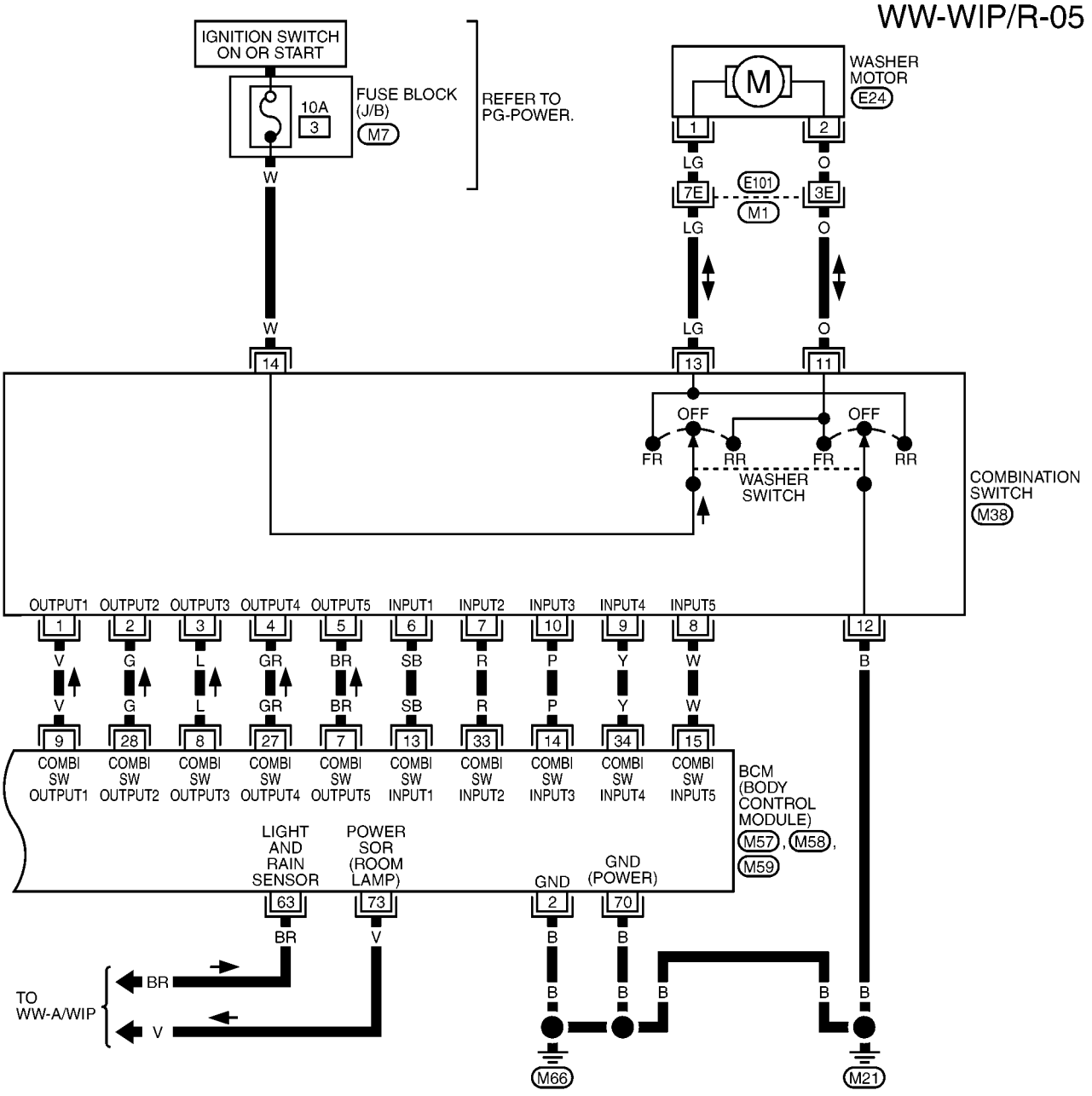


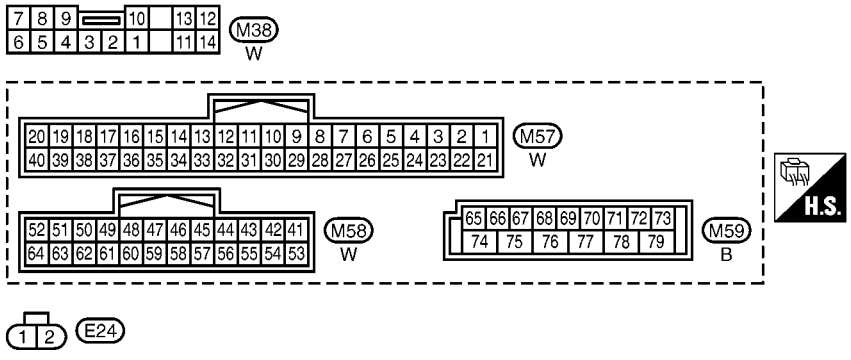


REFER TO THE FOLLOWING.
F1 , F101 - SUPER MULTIPLE JUNCTION (SMJ)

MKWA4287E

WW-WIP/R-05



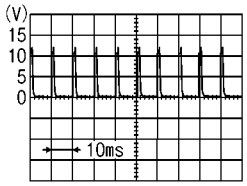
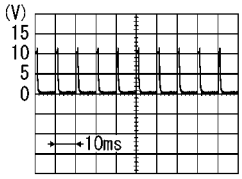
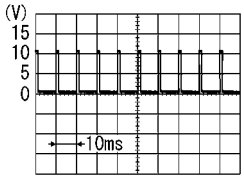
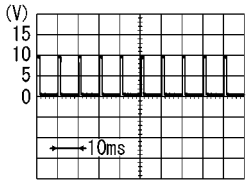
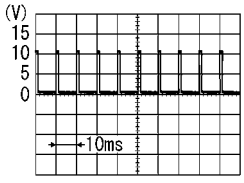


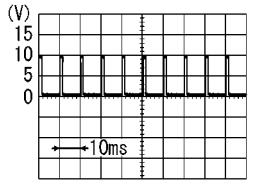
REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

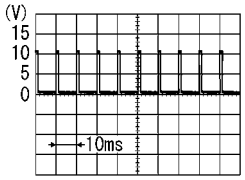
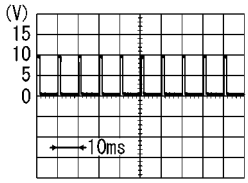
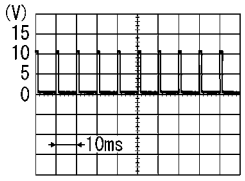
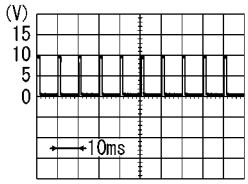
MKWA4288E

Terminals and Reference Values for BCM

BKS0012V

Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V] (Approx.)
				Ignition switch	Operation or condition	
2	B	Ground	—	ON	—	0
7	BR	Combination switch output 5	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB8643J Approx. 1.2V
					Any of several conditions below ● Front fog lamp switch (Operates only front fog lamp switch) (Wiper intermittent dial position 4) ● Rear fog lamp switch (Wiper intermittent dial position 4) ● Rear wiper ON (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 2 ● Wiper intermittent dial position 6 ● Wiper intermittent dial position 7	 PKIB4956J Approx. 1.0V
8	L	Combination switch output 3	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V
					Any of several conditions below ● Lighting switch 2ND (Wiper intermittent dial position 4) ● Lighting switch HI beam (Operates only HI beam switch) (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 2 ● Wiper intermittent dial position 3	 PKIB4959J Approx. 1.0V
9	V	Combination switch output 1	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V

Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V] (Approx.)
				Ignition switch	Operation or condition	
					Any of several conditions below ● Turn signal switch to right ● Turn signal switch to left ● Front wiper switch MIST ● Front wiper switch LO ● Front washer switch	 PKIB4959J Approx. 1.0V
13	GB	Combination switch input 1	Input	ON	● OFF ● Front wiper switch HI (Wiper intermittent dial position 4) ● Rear wiper switch INT (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 2 ● Wiper intermittent dial position 3 ● Wiper intermittent dial position 6 ● Wiper intermittent dial position 7	WW-60, "Reference Values for BCM (Input)"
14	P	Combination switch input 3	Input	ON	● OFF ● Lighting switch AUTO ● Rear fog lamp switch ● Front wiper switch MIST ● Front wiper switch INT ● Front wiper switch LO	WW-60, "Reference Values for BCM (Input)"
15	W	Combination switch input 5	Input	ON	● OFF ● Lighting switch 1ST ● Lighting switch 2ND ● Lighting switch HIGH beam (Operates only HIGH beam switch) ● Turn signal switch to right	WW-60, "Reference Values for BCM (Input)"
19	L	CAN-H	Input/ output	—		—
23	P	Rear wiper position detection signal	Input	ON	Rear wiper operating	0
					Rear wiper not operating	Battery voltage
24	O	Ignition power supply	Input	ON	—	Battery voltage

Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V] (Approx.)
				Ignition switch	Operation or condition	
27	GR	Combination switch output 4	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V
					Any of several conditions below ● Lighting switch AUTO (Wiper intermittent dial position 4) ● Lighting switch 1ST (The same result with lighting switch 2ND) (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 5 ● Wiper intermittent dial position 6	 PKIB4959J Approx. 1.0V
28	G	Combination switch output 2	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V
					Any of several conditions below ● Lighting switch 2ND ● Lighting switch PASSING (Operates only PASSING switch) ● Front wiper switch INT ● Front wiper switch HI	 PKIB4959J Approx. 1.0V
33	R	Combination switch input 2	Input	ON	● OFF ● Front washer switch (Wiper intermittent dial position 4) ● Rear wiper switch ON (Wiper intermittent dial position 4) ● Rear washer switch ON (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 5 ● Wiper intermittent dial position 6	WW-60, "Reference Values for BCM (Input)"
34	Y	Combination switch input 4	Input	ON	● OFF ● Front fog lamp switch ON ● Lighting switch 2ND ● Lighting switch PASSING (Operates only PASSING switch) ● Turn signal switch to left	WW-60, "Reference Values for BCM (Input)"

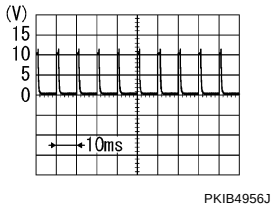
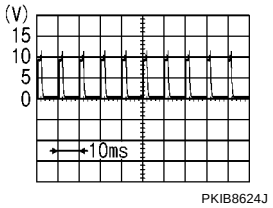
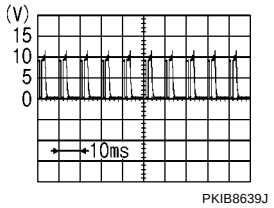
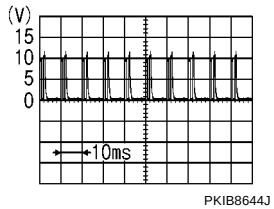
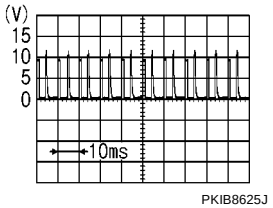
Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V] (Approx.)
				Ignition switch	Operation or condition	
39	Y	CAN-L	Input/ output	—		—
70	B	Ground	—	ON	—	0
71	BR	Rear wiper operation signal	Output	ON	Rear wiper operating	Battery voltage
					Rear wiper not operating	0
74	Y	Power source (Fusible link)	Input	OFF	—	Battery voltage
79	Y	Power source (Fusible link)	Input	OFF	—	Battery voltage

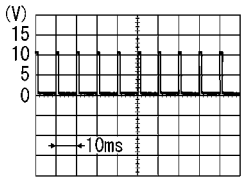
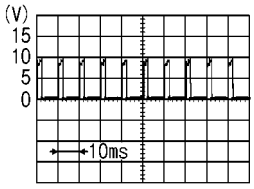
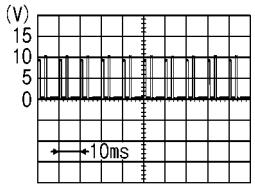
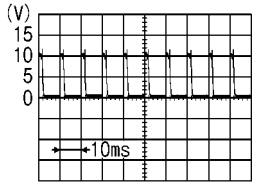
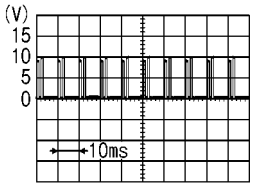
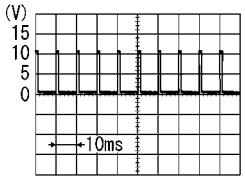
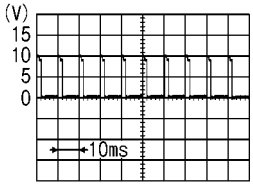
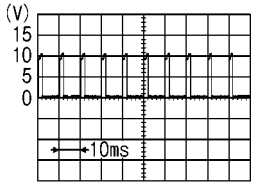
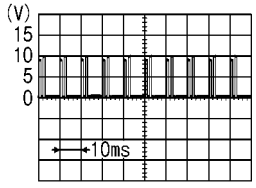
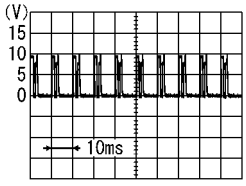
Reference Values for BCM (Input)

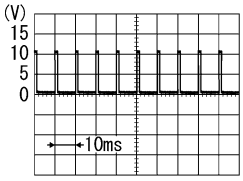
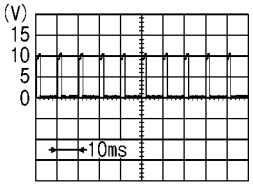
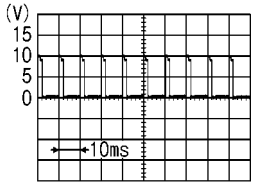
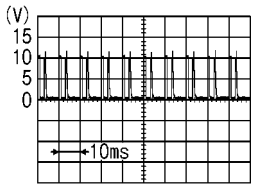
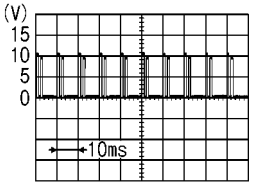
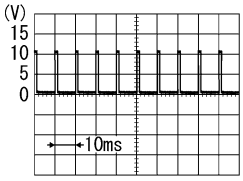
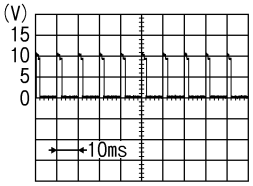
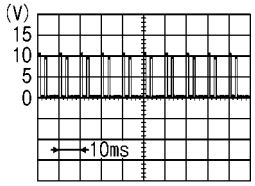
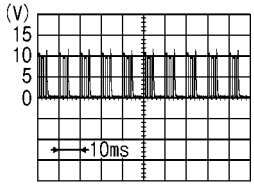
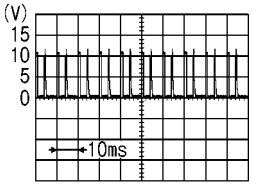
BKS001KP

CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF not to be fluctuated by overloaded.**
- **Turn wiper dial position to 4 except when checking waveform or voltage of wiper dial position. Wiper dial position can be confirmed on CONSULT-II. Refer to WW-24, "DATA MONITOR" .**

INPUT	Condition and reference value		
INPUT 5 (Wiper intermittent dial position 4)	OFF  PKIB4956J Approx. 0.9V	Lighting switch 1ST  PKIB8624J Approx. 1.5 - 2.0V	Lighting switch 2ND  PKIB8639J Approx. 2.5 - 3.0V
	Lighting switch HI beam (Operates only HI beam switch)  PKIB8644J Approx. 1.5 - 2.0V	Turn signal switch to right  PKIB8625J Approx. 1.5 - 2.0V	—

INPUT	Condition and reference value		
INPUT 4 (Wiper intermittent dial position 4)	OFF  PKIB4958J Approx. 1.0V	Lighting switch 2ND  PKIB8628J Approx. 1.5 - 2.0V	Turn signal switch to left  PKIB8630J Approx. 2.0V
	Front fog lamp switch (Operates only front fog lamp switch)  PKIB8627J Approx. 1.5 - 2.0V	Lighting switch PASSING (Operates only PASSING switch)  PKIB8629J Approx. 2.0V	—
INPUT 3 (Wiper intermittent dial position 4)	OFF  PKIB4958J Approx. 1.0V	Lighting switch AUTO  PKIB8631J Approx. 2.0V	Front wiper switch INT  PKIB8632J Approx. 2.0V
	Any of several conditions below ●Front wiper switch LO ●Front wiper switch MIST  PKIB8629J Approx. 2.0V	Rear fog lamp switch  PKIC1030E Approx. 1.5V	—

INPUT	Condition and reference value		
INPUT 2	OFF (Wiper intermittent dial position 4)  PKIB4958J Approx. 1.0V	Front washer switch (Wiper intermittent dial position 4)  PKIB8632J Approx. 2.0V	Rear washer switch (Wiper intermittent dial position 4)  PKIB8631J Approx. 2.0V
	Rear wiper switch ON (Wiper intermittent dial position 4)  PKIB8634J Approx. 1.5 - 2.0V	Any of the conditions below ●Wiper intermittent dial position 1 ●Wiper intermittent dial position 5 ●Wiper intermittent dial position 6  PKIB8633J Approx. 2.0V	—
INPUT 1	OFF (Wiper intermittent dial position 4)  PKIB4958J Approx. 1.0V	Front wiper switch HI (Wiper intermittent dial position 4)  PKIB8635J Approx. 2.0V	Any of the conditions below ●Rear wiper switch INT (Wiper intermittent dial position 4) ●Wiper intermittent dial position 3  PKIB8636J Approx. 2.0V
	Any of the conditions below ●Wiper intermittent dial position 1 ●Wiper intermittent dial position 2  PKIB8637J Approx. 2.5 - 3.0V	Any of the conditions below ●Wiper intermittent dial position 6 ●Wiper intermittent dial position 7  PKIB8638J Approx. 2.0V	—

Terminals and Reference Values for IPDM E/R

BKS0012W

Terminal No.	Wire color	Signal designation	Signal Input/ Output	Measuring condition			Reference value [V] (Approx.)
				Ignition switch	Operation or condition		
3	B	Ground	—	ON	—		0
18 30	L R	Reverse switch signal	Input	ON	Shift knob	Reverse	Battery voltage
						Other than above	0
52	L	CAN H	Input/ output	—	—		—

Terminal No.	Wire color	Signal designation	Signal Input/ Output	Measuring condition		Reference value [V] (Approx.)
				Ignition switch	Operation or condition	
54	B	Ground	—	—	—	0
58	Y	CAN L	Input/ output	—	—	—

CONSULT-II Function (BCM)

BKS0012Z

Refer to WW-24, "CONSULT-II Function (BCM)" .

Diagnosis Chart by Symptom

BKS001HE

Symptom	Possible causes	Possible malfunctioning system and part	Inspection procedure	Reference page
Rear wiper does not operate	Combination switch reading function malfunction	BCM OUTPUT 5 - INPUT 2 and BCM OUTPUT 4 - INPUT 1 system ● Combination switch (Rear wiper ON and INT systems malfunction) ● Harness and connector between combination switch and BCM ● BCM	CONSULT-II ● DATA MONITOR (BCM)	WW-65, "Rear Wiper Does Not Operate"
	Rear wiper motor output malfunction	BCM - Rear wiper motor system ● 40A fusible link ● 10A fuse ● Rear wiper motor ● Harness and connector between BCM and rear wiper motor ● Harness and connector between rear wiper motor and ground ● BCM	CONSULT-II ● ACTIVE TEST (BCM) Other than CONSULT-II ● Rear wiper motor output inspection	
Rear wiper does not return to stop position	Auto-stop signal malfunction	BCM - Rear wiper motor system ● Rear wiper motor ● Harness and connector between BCM and rear wiper motor ● Harness and connector between rear wiper motor and ground ● BCM	CONSULT-II ● DATA MONITOR (BCM) Other than CONSULT-II ● Auto-stop signal system inspection	WW-67, "Rear Wiper Does Not Return to Stop Position"
Only rear wiper ON does not operate	Combination switch reading function malfunction	BCM OUTPUT 5 - INPUT 2 system ● Combination switch (Rear wiper ON system malfunction) ● Harness and connector between combination switch and BCM ● BCM	CONSULT-II ● DATA MONITOR (BCM)	WW-68, "Only Rear Wiper ON Does Not Operate"
Only rear wiper INT does not operate	Combination switch reading function malfunction	BCM OUTPUT 4 - INPUT 1 system ● Combination switch (Rear wiper INT system malfunction) ● Harness and connector between combination switch and BCM ● BCM	CONSULT-II ● DATA MONITOR (BCM)	WW-69, "Only Rear Wiper Intermittent Does Not Operate"
Wiper does not wipe when rear washer operates	Combination switch reading function malfunction	BCM OUTPUT 3 - INPUT 2 system ● Combination switch (Rear washer system malfunction) ● Harness and connector between combination switch and BCM ● BCM	CONSULT-II ● DATA MONITOR (BCM)	WW-69, "Wiper Does Not Wipe When Rear Washer Operates"

Rear Wiper Does Not Operate

BKS001HG

1. CHECK FUSES

- Check fuse and fusible link for blown-out.

UNIT	POWER SOURCE	FUSE No.
IPDM E/R	Battery	61, 62
BCM	Battery	J
	Ignition switch ON or START position	5
Combination switch	Ignition switch (ON)	3

Refer to WW-51, "Wiring Diagram — WIP/R —" (without light and rain sensor), WW-54, "Wiring Diagram — WIP/R —" (with light and rain sensor).

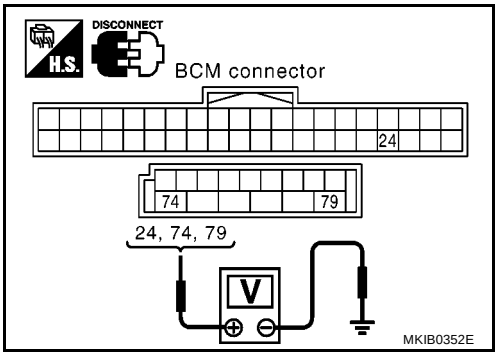
OK or NG

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

2. CHECK BCM POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.

Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal				
M59	74	Ground	Battery voltage	Battery voltage	Battery voltage
	79		Battery voltage	Battery voltage	Battery voltage
M57	24		0V	0V	Battery voltage



OK or NG

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

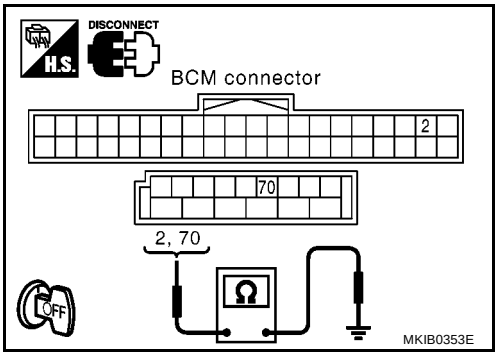
3. CHECK BCM GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

Connector	Terminal		Continuity
M57	2	Ground	Yes
M59	70		

OK or NG

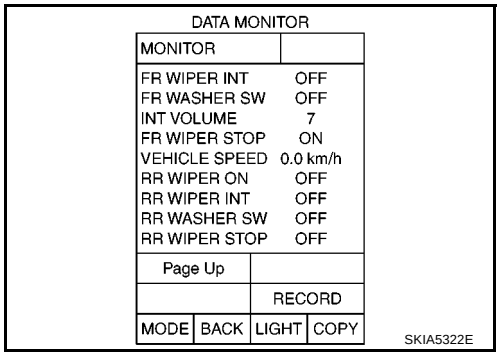
OK >> GO TO 4.
NG >> Check harness ground circuit.



4. CHECK CIRCUIT BETWEEN COMBINATION SWITCH AND BCM

With CONSULT-II

1. Select “BCM” on CONSULT-II. Select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen.
3. Make sure that “RR WIPER ON”, turn ON-OFF according to combination switch (wiper switch) operation.



Without CONSULT-II

Refer to LT-125, "Combination Switch Inspection" .

OK or NG

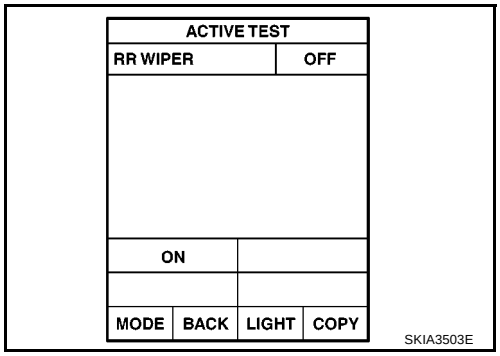
OK >> GO TO 5.

NG >> Check combination switch (wiper switch). Refer to LT-125, "Combination Switch Inspection" .

5. ACTIVE TEST

With CONSULT-II

1. Select “BCM” on CONSULT-II. Select “WIPER” on “SELECT SYSTEM” screen.
2. Select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
3. Select “REAR WIPER” on “SELECT TEST ITEM” screen.
4. Touch “ON” screen.



Without CONSULT-II

GO TO 6.

Does rear wiper operate normally?

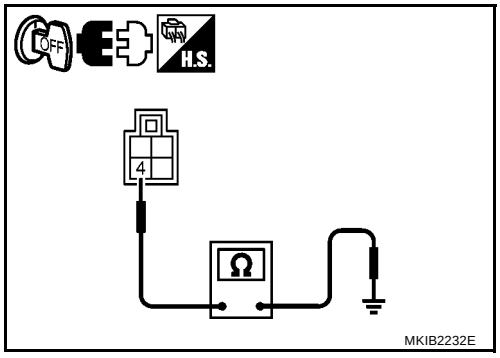
YES >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .

NO >> GO TO 6.

6. CHECK REAR WIPER MOTOR GROUND CIRCUIT

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

Rear wiper motor connector	Terminal	Ground	Continuity
B45	4		Yes



OK or NG

OK >> GO TO 7.

NG >> Repair harness or connector.

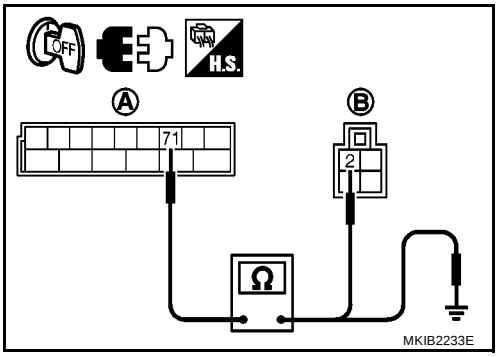
7. CHECK CIRCUIT BETWEEN BCM AND REAR WIPER MOTOR

1. Disconnect BCM harness connector.
2. Check continuity between BCM harness connector (A) and rear wiper motor harness connector (B).

A		B		Continuity
Connector	Terminal	Connector	Terminal	
M59	71	B45	2	Yes

3. Check continuity between BCM harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
M59	71		No



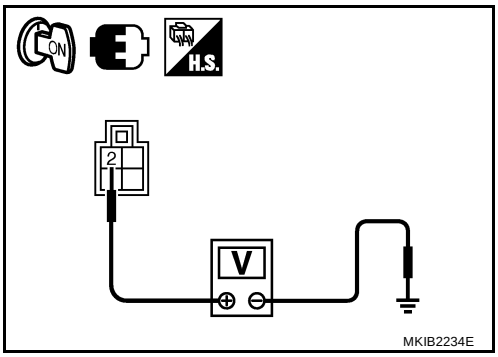
OK or NG

OK >> GO TO 8.
NG >> Repair harness or connector.

8. CHECK REAR WIPER MOTOR POWER SUPPLY

1. Connect BCM harness connector.
2. Turn ignition switch ON.
3. Check voltage between rear wiper motor harness connector and ground.

Terminal			Condition	Voltage
(+)		(-)		
Rear wiper motor connector	Terminal			
B45	2	Ground	Wiper stopped	Approx. 0V
			Wiper operating	Battery voltage



OK or NG

OK >> Replace rear wiper motor. Refer to WW-70, "Removal and Installation of Rear Wiper Motor" .
NG >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .

Rear Wiper Does Not Return to Stop Position

BKS001HH

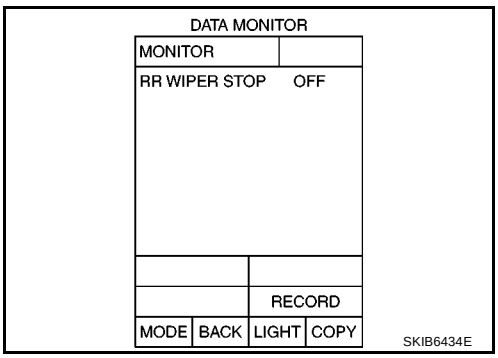
1. CHECK REAR WIPER MOTOR CIRCUIT

With CONSULT-II

1. Select “BCM” on CONSULT-II. Select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen.
3. Make sure that “RR WIPER STOP”, turn ON-OFF linked with rear wiper operation.

Without CONSULT-II

GO TO 2.

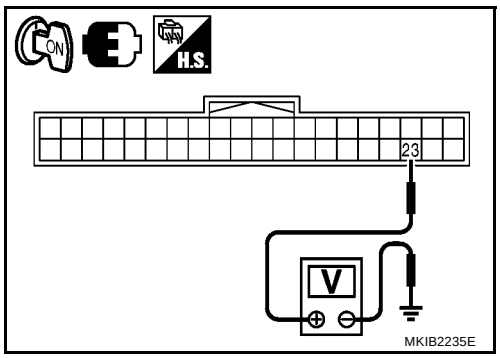


OK or NG

OK >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .
NG >> GO TO 2.

2. CHECK REAR WIPER MOTOR AUTO STOP SIGNAL

Check voltage between BCM harness connector terminal and ground while rear wiper motor is stopped and while it is operating.



Terminal			Condition	Voltage
(+)		(-)		
BCM connector	Terminal			
M57	23	Ground	Wiper stopped	Battery voltage
			Wiper operating	Approx. 0V

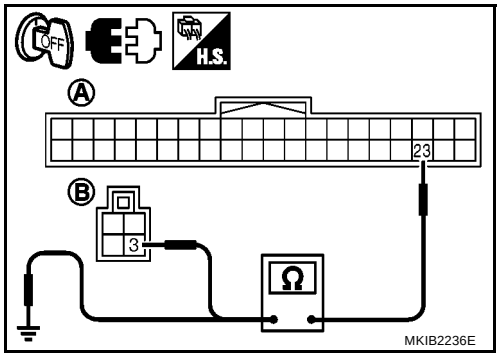
OK or NG

OK >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .

NG >> GO TO 3.

3. CHECK REAR WIPER AUTO STOP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and rear wiper motor connector.
3. Check continuity between BCM harness connector (A) and rear wiper motor harness connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
M57	23	B45	3	Yes

4. Check continuity between BCM harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
M57	23		No

OK or NG

OK >> Replace rear wiper motor. Refer to WW-70, "Removal and Installation of Rear Wiper Motor" .

NG >> Repair harness or connector.

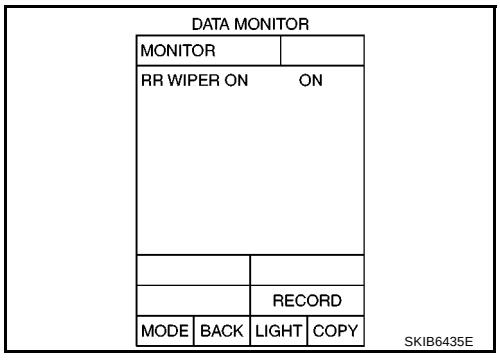
Only Rear Wiper ON Does Not Operate

BKS001HI

1. CHECK COMBINATION SWITCH INPUT SIGNAL

1. Select “BCM” on CONSULT-II.
2. Select “WIPER” on “SELECT TEST ITEM” screen. Then select “DATA MONITOR” on “SELECT DIAG MODE” screen.
3. Make sure “RR WIPER ON” turns ON-OFF according to operation of combination switch (wiper switch).

When rear wiper switch is in ON position : RR WIPER ON



OK or NG

OK >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .

NG >> Check combination switch (wiper switch). Refer to WW-8, "COMBINATION SWITCH READING FUNCTION" .

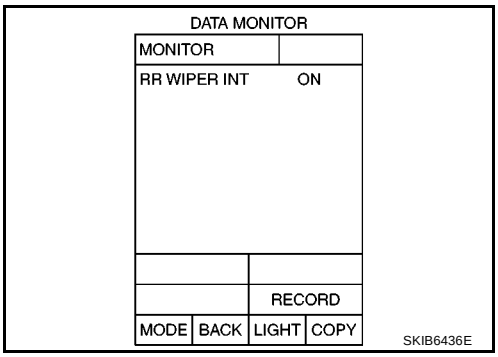
Only Rear Wiper Intermittent Does Not Operate

BKS001HJ

1. CHECK COMBINATION SWITCH INPUT SIGNAL

1. Select “BCM” on CONSULT-II.
2. Select “WIPER” on “SELECT TEST ITEM” screen. Then select “DATA MONITOR” on “SELECT DIAG MODE” screen.
3. Make sure “RR WIPER INT” turns ON-OFF according to operation of combination switch (wiper switch).

When rear wiper switch is in INT position : RR WIPER INT ON



OK or NG

OK >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .

NG >> Check combination switch (wiper switch). Refer to WW-8, "COMBINATION SWITCH READING FUNCTION" .

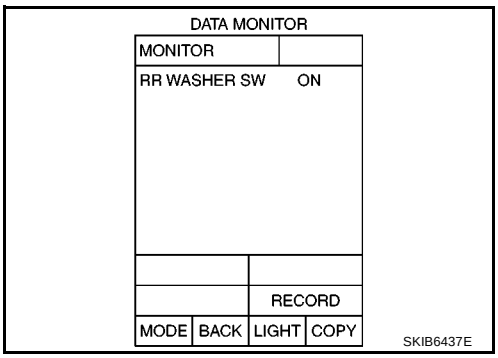
Wiper Does Not Wipe When Rear Washer Operates

BKS001HK

1. CHECK COMBINATION SWITCH INPUT SIGNAL

1. Select “BCM” on CONSULT-II.
2. Select “WIPER” on “SELECT TEST ITEM” screen. Then select “DATA MONITOR” on “SELECT DIAG MODE” screen.
3. Make sure “RR WASHER SW” turns ON-OFF according to operation of rear washer switch.

When rear wiper switch is in WASHER position : RR WASHER SW ON



OK or NG

OK >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .

NG >> Check combination switch (wiper switch). Refer to WW-8, "COMBINATION SWITCH READING FUNCTION" .

Removal and Installation of Rear Wiper Arm, Adjustment of Wiper Arm Stop Location

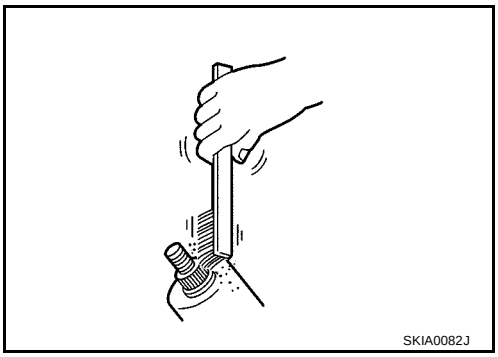
BKS00134

REMOVAL

1. Turn rear wiper switch ON to operate wiper motor, and then turn rear wiper switch OFF (auto stop).
2. Remove rear wiper arm cap, and remove rear wiper arm nut.
3. Raise rear wiper arm, and remove rear wiper arm from the vehicle.

INSTALLATION

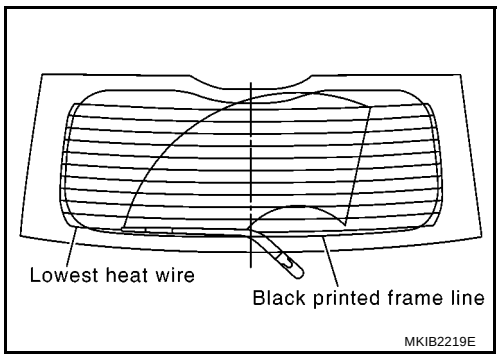
1. Clean up the pivot area as shown in the figure. This will reduce possibility of rear wiper arm nut looseness.
2. Prior to rear wiper arm installation, turn rear wiper switch ON to operate wiper motor, and then turn rear wiper switch OFF (auto stop).



3. Lift the blade up and then set it down onto glass surface to set the blade center to lowest heat wire immediately.
4. Tighten rear wiper arm nut to specified torque.

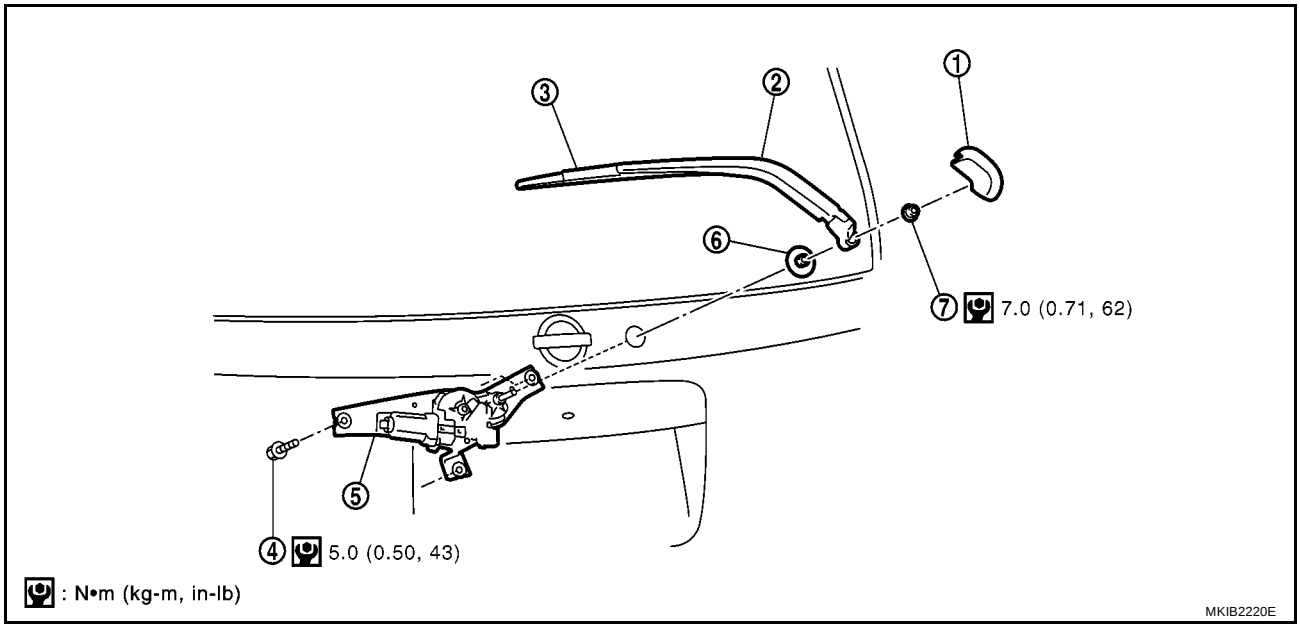
Rear wiper arm nut :7.0 N·m (0.71 kg-m, 62 in-lb)

5. Spray washer fluid. Turn rear wiper switch ON to operate wiper motor, and then turn rear wiper switch OFF (auto stop).
6. Make sure that wiper blade stop within lowest heat wire.
7. Install rear wiper arm cap.



Removal and Installation of Rear Wiper Motor

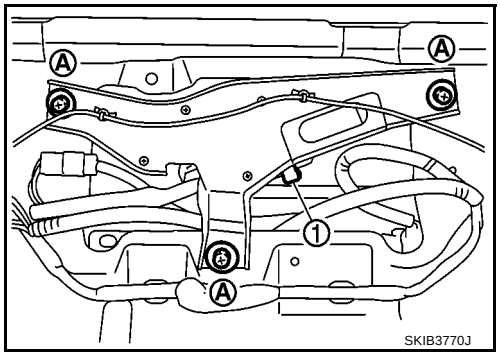
BKS00136



1. Rear wiper arm cap
2. Rear wiper arm
3. Rear wiper blade
4. Rear wiper motor mounting bolt
5. Rear wiper motor
6. Pivot seal
7. Rear wiper arm nut

REMOVAL

1. Remove rear wiper arm. Refer to WW-69, "Removal and Installation of Rear Wiper Arm, Adjustment of Wiper Arm Stop Location" .
2. Remove pivot seal.
3. Remove back door finisher. Refer to EI-22, "Removal and Installation" .
4. Disconnect rear wiper motor connector.
5. Remove rear wiper motor mounting bolts (A), and remove rear wiper motor (1) from the vehicle.



INSTALLATION

CAUTION:

Never drop the rear wiper motor or cause it to interfere with other parts.

1. Install pivot seal.

2. Install rear wiper motor to the vehicle.

Rear wiper motor mounting bolts : 5.0 N·m (0.50 kg-m, 43 in-lb)

3. Connect rear wiper motor connector. Turn rear wiper switch ON to operate wiper motor, and then turn rear wiper switch OFF (auto stop).
4. Install back door finisher. Refer to EI-22, "Removal and Installation" .
5. Install rear wiper arm and arm cap.

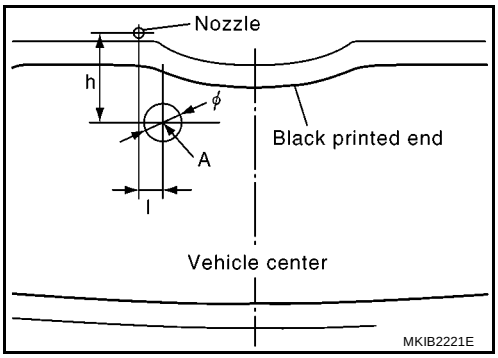
Rear Washer Nozzle Adjustment

BKS00137

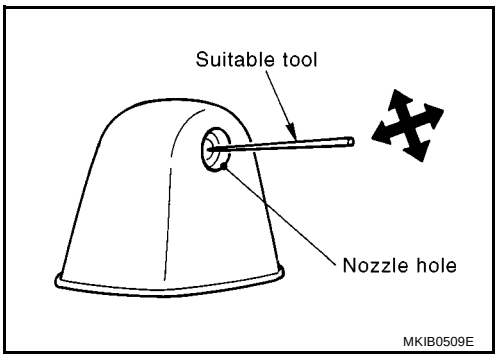
Adjust spray position as shown in the figure.

Unit: mm (in)

Spray position	h (hight)	l (width)	ϕ (spray point area)
A	140 (5.51)	38 (1.50)	60 (2.36)



Insert a needle or suitable tool into the nozzle hole and move it to adjust the spray position.



Rear Washer Tube Layout

BKS00139

Refer to WW-45, "Washer Tube Routing" .

Removal and Installation of Rear Washer Nozzle

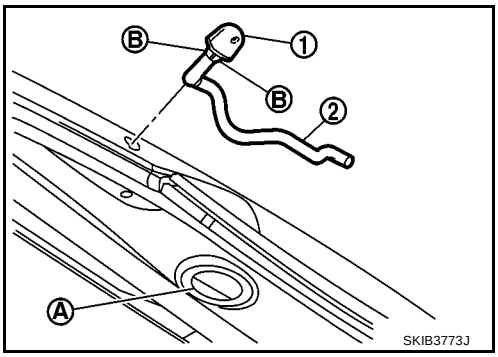
BKS0013A

REMOVAL

1. Remove high-mounted stop lamp. Refer to LT-130, "Removal and Installation of High-Mounted Stop Lamp" .
2. Disconnect washer tube (2) at the joint.

   NOTE:
   Washer tube can be accessed through the opening where the high-mounted stop lamp was located.
3. While pressing pawl (B) on the reverse side of rear washer nozzle (1), remove rear washer nozzle from back door.

   NOTE:
   Rear washer nozzle can be accessed through the opening of the back door inner panel (A).
4. Remove washer hose from washer nozzle.

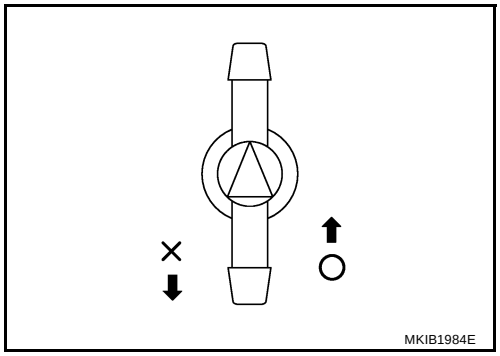


INSTALLATION

Installation is the reverse order of removal. Adjust nozzle spray location. Refer to WW-71, "Rear Washer Nozzle Adjustment" .

CHECK VALVE INSPECTION

Make sure air can pass through the hose by blowing forward (toward the nozzle) and air cannot pass through by suction.



Inspection of Rear Wiper and Washer Switch Circuit

BKS0013B

Refer to LT-125, "Combination Switch Inspection" .

Removal and Installation of Rear Wiper and Washer Switch

BKS0013C

Refer to LT-128, "Removal and Installation" .

Removal and Installation of Rear Wiper and Washer Tank

BKS0013D

Refer to.WW-46, "Removal and Installation of Washer Tank" .

Removal and Installation of Rear Wiper and Washer Pump

BKS0013E

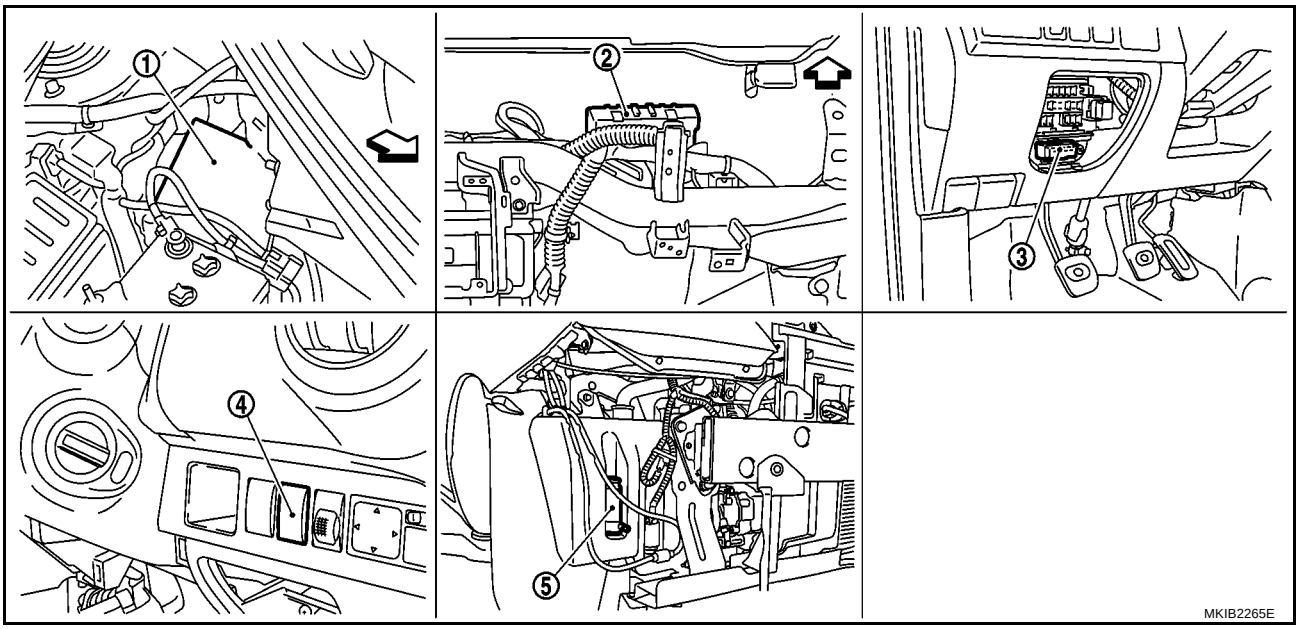
Refer to WW-47, "Removal and Installation of Front Washer Motor" .

HEADLAMP WASHER

PFP:28620

Components Parts and Harness Connector Location

BKS001M3



⇦ : Vehicle front

1. IPDM E/R E10, E11, E12 [Engine room (left)]
2. BCM M57, M58, M59 (View with instrument panel removed)
3. Data link connector
4. Headlamp washer switch M18 (RHD models)
5. Headlamp washer motor E25 (View with front bumper removed)

System Description

BKS0013F

Headlamp washer operates under the following conditions.

- When lighting switch is in 1ST position
- When daytime light system is operating
- When auto light system is operating (low beam is ON)

When the headlamp washer switch is ON position the BCM (body control module) receives input signal requesting the headlamp washer operates. The CPU (central processing unit) of the IPDM E/R (intelligent power distribution module engine room) controls the headlamp washer relay coil. When activated this relay directs power headlamp washer motor.

OUTLINE

Power is supplied at all times

- through 30A fusible link (letter L, located in fuse and fusible link box).
- to headlamp washer relay terminals 1 and 3.
- through 40A fusible link (letter J, located in fuse and fusible link box).
- to BCM terminals 74 and 79.
- through 20A fuse (No.61, 62, located in IPDM E/R).
- to IPDM E/R (CPU).

When ignition switch ON or START position, power is supplied

- to IPDM E/R (CPU), and
- through 10A fuse [No.5, located in fuse block (J/B)]
- to BCM terminal 24.

Ground is supplied

- to IPDM E/R terminals 3 and 54, and
- to head lamp washer motor terminal 1,
- through body grounds E28, E44 and E45.

- to BCM terminals 2 and 70, and
- to head lamp washer switch terminal 2,
- through body grounds M21 and M66.

HEADLAMP WASHER OPERATION

When lighting switch is placed in 2nd position, BCM read combination switch condition (Refer to WW-8, "COMBINATION SWITCH READING FUNCTION").
And headlamp washer switch ON, ground is supplied.

- to BCM terminal 62, and
- through headlamp washer switch terminal 1 and 2.
- through body grounds M21 and M66.

BCM sends headlamp washer request signal to IPDM E/R with CAN communication line.
And IPDM E/R is grounded to headlamp washer relay terminal 2 through IPDM E/R terminal 56.
Then headlamp washer relay is energized, power is supplied.

- through headlamp washer relay terminal 5
- to headlamp washer motor terminal 2.

Ground is supplied.

- to terminal 1 of headlamp washer motor
- through body grounds E28, E44 and E45.

With power and ground supplied, the headlamp washer operates.

CAN Communication

BKS0013G

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.

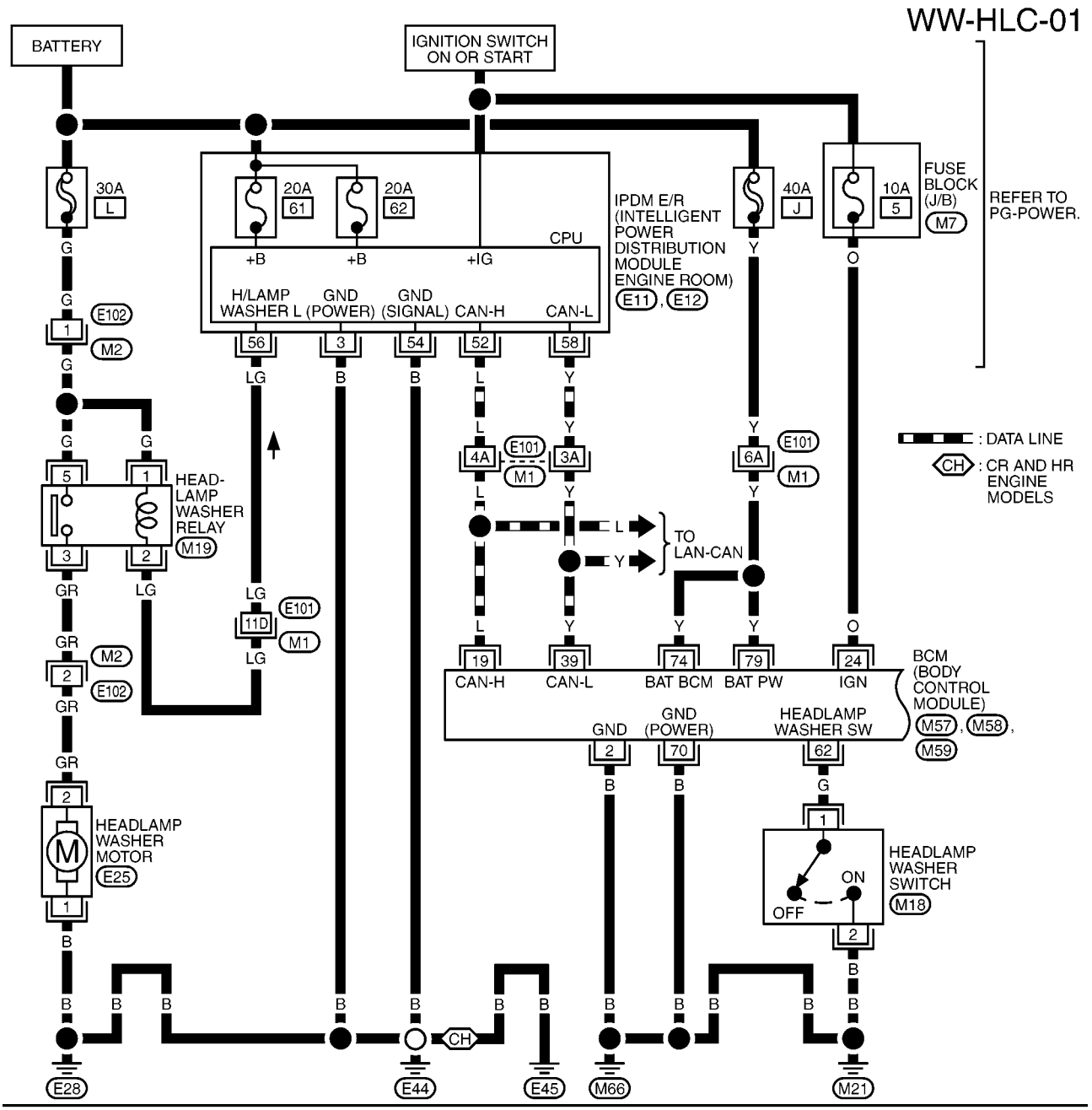
CAN Communication Unit

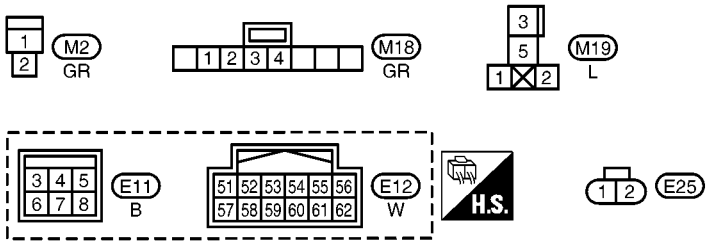
BKS0013H

Refer to LAN-27, "CAN Communication Unit" .

Wiring Diagram —HLC—

BKS0013I

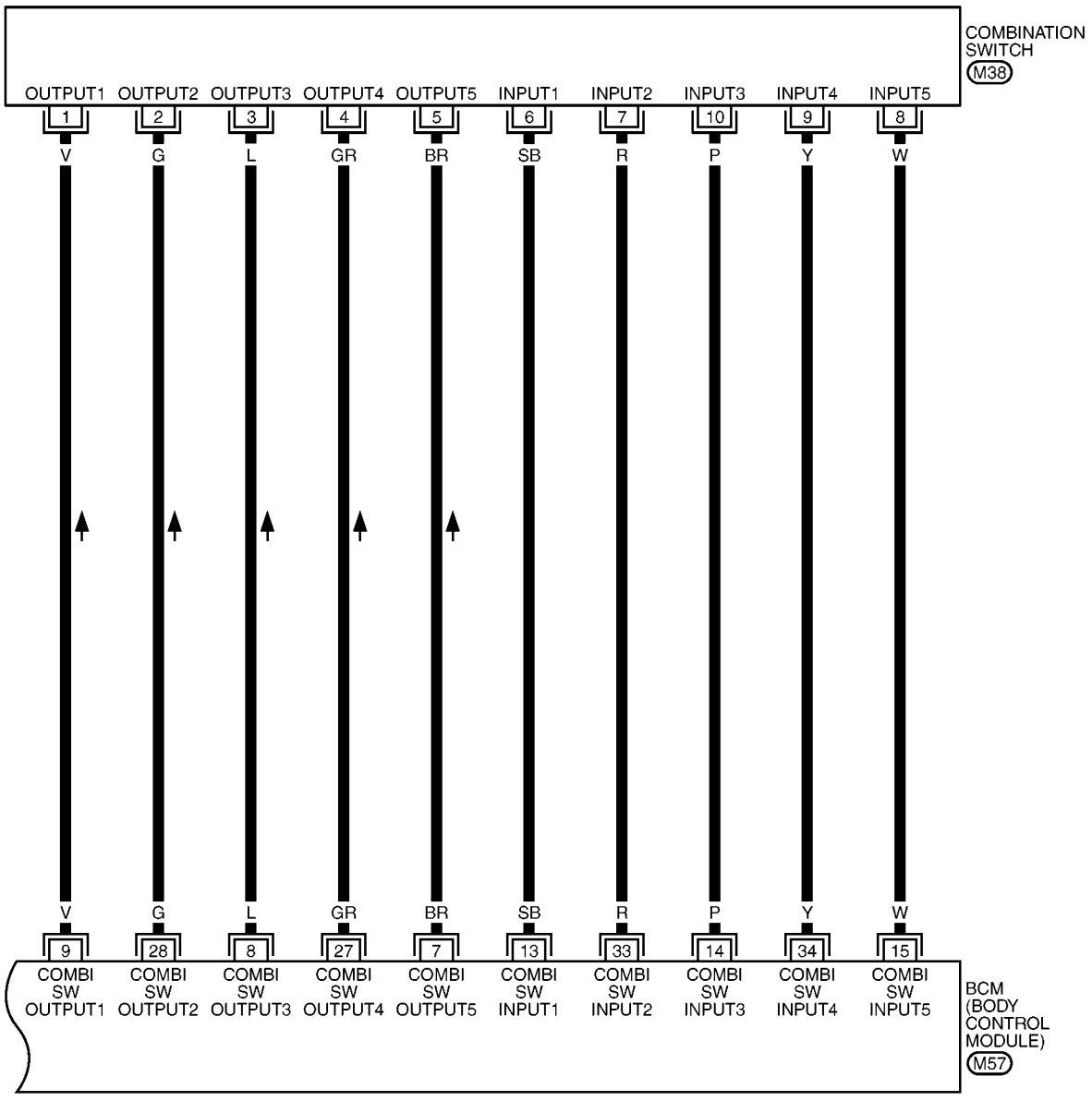


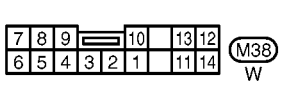


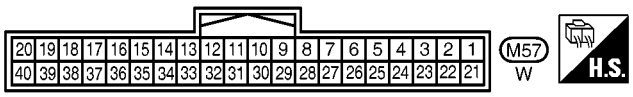
REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
M7 - FUSE BLOCK - JUNCTION BOX (J/B)
M57, M58, M59 - ELECTRICAL UNITS

MKWA4289E

WW-HLC-02



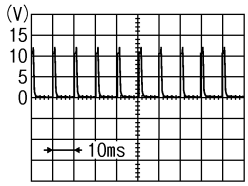
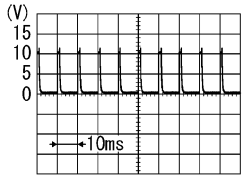
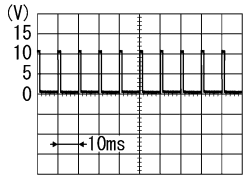
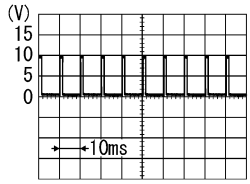


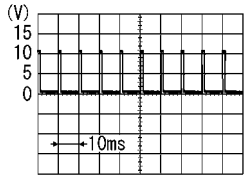
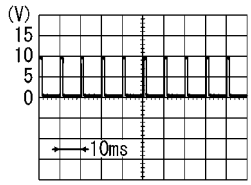


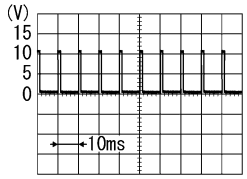
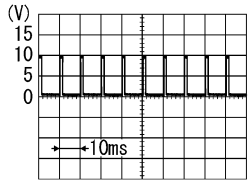
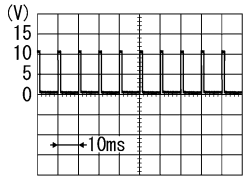
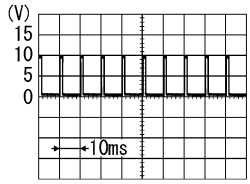
MKWA4290E

Terminals and Reference Values for BCM

BKS0013J

Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V]
				Ignition switch	Operation or condition	
2	B	Ground	—	ON	—	0
7	BR	Combination switch output 5	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB8643J Approx. 1.2V
					Any of several conditions below ● Front fog lamp switch (Operates only front fog lamp switch) (Wiper intermittent dial position 4) ● Rear fog lamp switch (Wiper intermittent dial position 4) ● Rear wiper ON (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 2 ● Wiper intermittent dial position 6 ● Wiper intermittent dial position 7	 PKIB4956J Approx. 1.0V
8	L	Combination switch output 3	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V
					Any of several conditions below ● Lighting switch 2ND (Wiper intermittent dial position 4) ● Lighting switch HI beam (Operates only HI beam switch) (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 2 ● Wiper intermittent dial position 3	 PKIB4959J Approx. 1.0V

Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V]
				Ignition switch	Operation or condition	
9	V	Combination switch output 1	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V
					Any of several conditions below ● Turn signal switch to right ● Turn signal switch to left ● Front wiper switch MIST ● Front wiper switch LO ● Front washer switch	 PKIB4959J Approx. 1.0V
13	GB	Combination switch input 1	Input	ON	● OFF ● Front wiper switch HI (Wiper intermittent dial position 4) ● Rear wiper switch INT (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 2 ● Wiper intermittent dial position 3 ● Wiper intermittent dial position 6 ● Wiper intermittent dial position 7	WW-80, "Reference Values for BCM (Input)"
14	P	Combination switch input 3	Input	ON	● OFF ● Lighting switch AUTO ● Rear fog lamp switch ● Front wiper switch MIST ● Front wiper switch INT ● Front wiper switch LO	WW-80, "Reference Values for BCM (Input)"
15	W	Combination switch input 5	Input	ON	● OFF ● Lighting switch 1ST ● Lighting switch 2ND ● Lighting switch HIGH beam (Operates only HIGH beam switch) ● Turn signal switch to right	WW-80, "Reference Values for BCM (Input)"
19	L	CAN H	Input/ output	—	—	—
24	O	Ignition power supply	Input	ON	—	Battery voltage

Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V]
				Ignition switch	Operation or condition	
27	GR	Combination switch output 4	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V
					Any of several conditions below ● Lighting switch AUTO (Wiper intermittent dial position 4) ● Lighting switch 1ST (The same result with lighting switch 2ND) (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 5 ● Wiper intermittent dial position 6	 PKIB4959J Approx. 1.0V
28	G	Combination switch output 2	Output	ON	OFF (Wiper intermittent dial position 4)	 PKIB4958J Approx. 1.2V
					Any of several conditions below ● Lighting switch 2ND ● Lighting switch PASSING (Operates only PASSING switch) ● Front wiper switch INT ● Front wiper switch HI	 PKIB4959J Approx. 1.0V
33	R	Combination switch input 2	Input	ON	● OFF ● Front washer switch (Wiper intermittent dial position 4) ● Rear wiper switch ON (Wiper intermittent dial position 4) ● Rear washer switch ON (Wiper intermittent dial position 4) ● Wiper intermittent dial position 1 ● Wiper intermittent dial position 5 ● Wiper intermittent dial position 6	WW-80, "Reference Values for BCM (Input)"

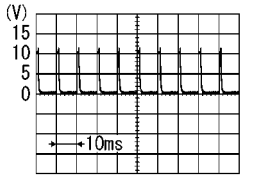
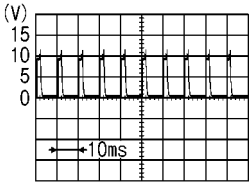
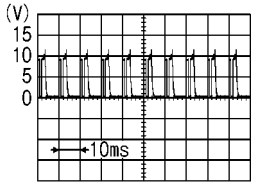
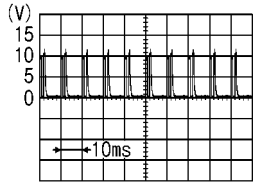
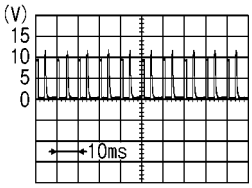
Terminal No.	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value [V]
				Ignition switch	Operation or condition	
34	Y	Combination switch input 4	Input	ON	● OFF ● Front fog lamp switch ON ● Lighting switch 2ND ● Lighting switch PASSING (Operates only PASSING switch) ● Turn signal switch to left	WW-80, "Reference Values for BCM (Input)"
39	Y	CAN L	Input/ output	—	—	—
62	G	Headlamp washer switch	Input	ON	Headlamp washer switch: Operated	0
					Headlamp washer switch: Other than above	Battery voltage
70	B	Ground	—	ON	—	0
74	Y	Power source (Fusible link)	Input	OFF	—	Battery voltage
79	Y	Power source (Fusible link)	Input	OFF	—	Battery voltage

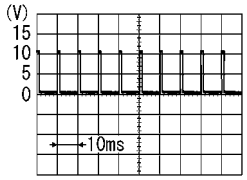
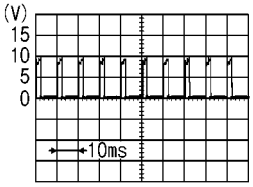
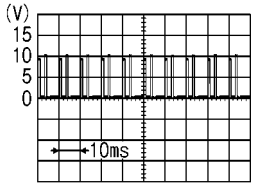
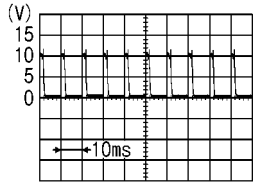
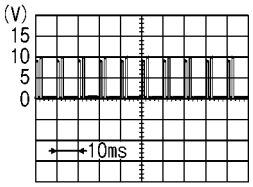
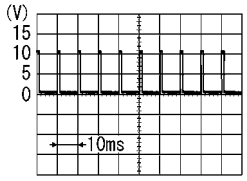
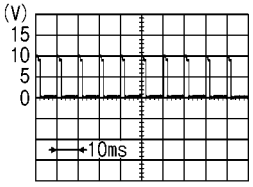
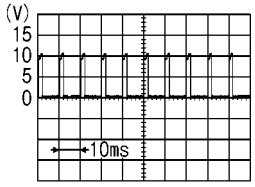
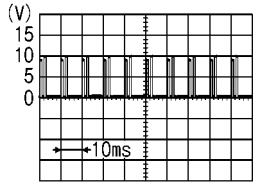
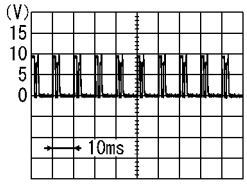
Reference Values for BCM (Input)

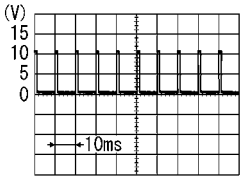
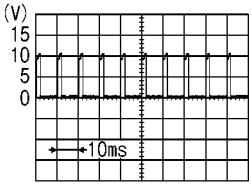
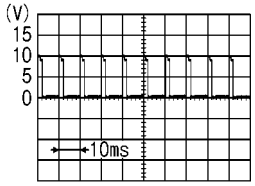
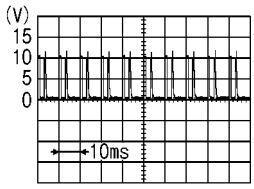
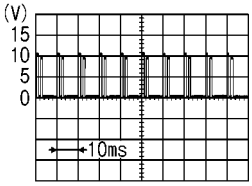
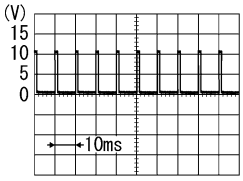
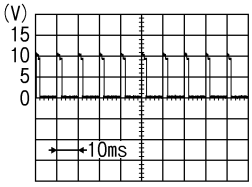
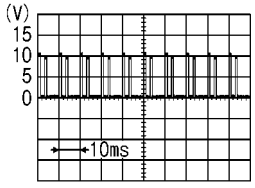
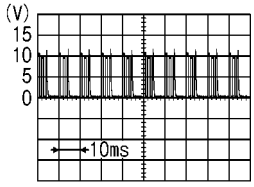
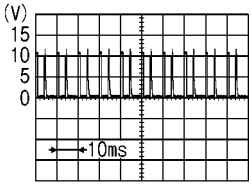
BKS001KQ

CAUTION:

- **Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF not to be fluctuated by overloaded.**
- **Turn wiper dial position to 4 except when checking waveform or voltage of wiper dial position. Wiper dial position can be confirmed on CONSULT-II. Refer to WW-24, "DATA MONITOR" .**

INPUT	Condition and reference value		
INPUT 5 (Wiper intermittent dial position 4)	OFF  PKIB4956J Approx. 0.9V	Lighting switch 1ST  PKIB8624J Approx. 1.5 - 2.0V	Lighting switch 2ND  PKIB8639J Approx. 2.5 - 3.0V
	Lighting switch HI beam (Operates only HI beam switch)  PKIB8644J Approx. 1.5 - 2.0V	Turn signal switch to right  PKIB8625J Approx. 1.5 - 2.0V	—

INPUT	Condition and reference value		
INPUT 4 (Wiper intermittent dial position 4)	OFF  PKIB4958J Approx. 1.0V	Lighting switch 2ND  PKIB8628J Approx. 1.5 - 2.0V	Turn signal switch to left  PKIB8630J Approx. 2.0V
	Front fog lamp switch (Operates only front fog lamp switch)  PKIB8627J Approx. 1.5 - 2.0V	Lighting switch PASSING (Operates only PASSING switch)  PKIB8629J Approx. 2.0V	—
INPUT 3 (Wiper intermittent dial position 4)	OFF  PKIB4958J Approx. 1.0V	Lighting switch AUTO  PKIB8631J Approx. 2.0V	Front wiper switch INT  PKIB8632J Approx. 2.0V
	Any of several conditions below ●Front wiper switch LO ●Front wiper switch MIST  PKIB8629J Approx. 2.0V	Rear fog lamp switch  PKIC1030E Approx. 1.5V	—

INPUT	Condition and reference value		
INPUT 2	OFF (Wiper intermittent dial position 4)  PKIB4958J Approx. 1.0V	Front washer switch (Wiper intermittent dial position 4)  PKIB8632J Approx. 2.0V	Rear washer switch (Wiper intermittent dial position 4)  PKIB8631J Approx. 2.0V
	Rear wiper switch ON (Wiper intermittent dial position 4)  PKIB8634J Approx. 1.5 - 2.0V	Any of the conditions below ●Wiper intermittent dial position 1 ●Wiper intermittent dial position 5 ●Wiper intermittent dial position 6  PKIB8633J Approx. 2.0V	—
INPUT 1	OFF (Wiper intermittent dial position 4)  PKIB4958J Approx. 1.0V	Front wiper switch HI (Wiper intermittent dial position 4)  PKIB8635J Approx. 2.0V	Any of the conditions below ●Rear wiper switch INT (Wiper intermittent dial position 4) ●Wiper intermittent dial position 3  PKIB8636J Approx. 2.0V
	Any of the conditions below ●Wiper intermittent dial position 1 ●Wiper intermittent dial position 2  PKIB8637J Approx. 2.5 - 3.0V	Any of the conditions below ●Wiper intermittent dial position 6 ●Wiper intermittent dial position 7  PKIB8638J Approx. 2.0V	—

Terminals and Reference Values for IPDM E/R

BKS0013K

Terminal No.	Wire color	Signal name	Signal Input/ output	Measuring condition		Reference value [V]
				Ignition switch	Operation or condition	
3	B	Ground	—	ON	—	0
52	L	CAN H	Input/ output	—	—	—
54	B	Ground	—	—	—	0

Termi-nal No.	Wire color	Signal name	Signal Input/ output	Measuring condition			Reference value [V]
				Ignition switch	Operation or condition		
56	LG	Headlamp washer signal	Output	ON	Headlamp washer	: Operating	Battery voltage
						: Other than above	0
58	Y	CAN L	Input/ output	—	—		—

CONSULT-II Function (BCM)

BKS0013M

Refer to WW-24, "CONSULT-II Function (BCM)" .

CONSULT-II Function (IPDM E/R)

BKS0013N

Refer to WW-25, "CONSULT-II Function (IPDM E/R)" .

Diagnosis Chart by Symptom

BKS001HF

Symptom	Possible causes	Possible malfunctioning system and part	Inspection procedure	Reference page
Headlamp washer does not operate	Headlamp washer switch signal mal-function	BCM - headlamp washer switch system ● 40A fusible link ● 10A fuse ● Headlamp washer switch ● Harness and connector between headlamp washer switch and BCM ● Harness and connector between headlamp washer switch and ground ● BCM	CONSULT-II ● ACTIVE TEST (BCM) Other than CONSULT-II ● Headlamp washer switch output inspection	WW-84, "Headlamp Washer Does Not Operate"
	Headlamp washer motor output mal-function	IPDM E/R - Headlamp washer motor system ● 30A fusible link ● 20A fuse ● Headlamp washer motor ● Headlamp washer relay ● Harness and connector between IPDM E/R and headlamp washer relay ● Harness and connector between headlamp washer relay and headlamp washer motor ● Harness and connector between headlamp washer motor and ground ● IPDM E/R	CONSULT-II ● ACTIVE TEST (IPDM E/R) Other than CONSULT-II ● Headlamp washer motor output inspection	

Headlamp Washer Does Not Operate

BKS0013O

1. CHECK FUSE

- Check fuse and fusible link for blown-out.

Unit	Power source	Fuse No.
Headlamp washer relay	Battery	L
IPDM E/R	Battery	61, 62
BCM	Battery	J
	Ignition switch ON or START position	5

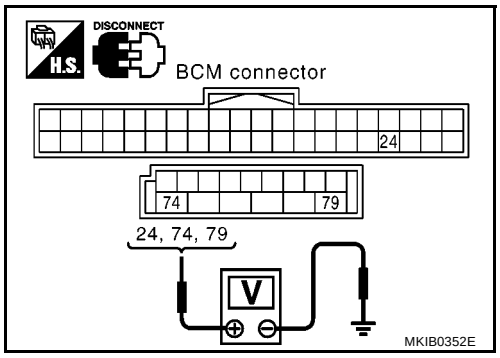
Refer to WW-75, "Wiring Diagram —HLC—" .

OK or NG

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

2. CHECK BCM POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.



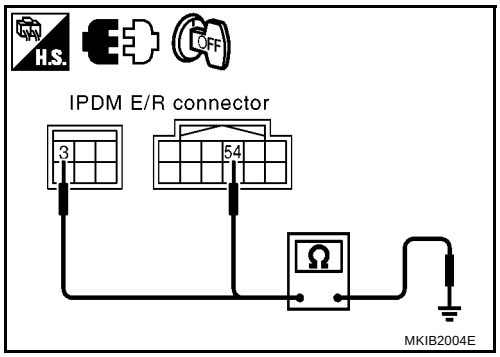
Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M59	74	Ground	Battery voltage	Battery voltage	Battery voltage
M59	79		Battery voltage	Battery voltage	Battery voltage
M57	24		0V	0V	Battery voltage

OK or NG

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

3. CHECK IPDM E/R GROUND CIRCUIT

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



Connector	Terminal (Wire color)	Continuity	
E11	3	Ground	Yes
E12	54		

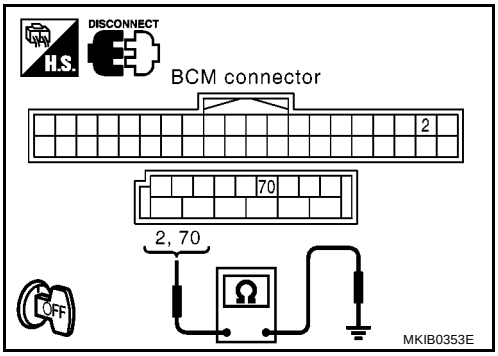
OK or NG

OK >> GO TO 4.
NG >> Harness for open ground circuit.

4. CHECK BCM GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

Terminals		Continuity	
Connector	Terminal (Wire color)		
M57	2	Ground	Yes
M59	70	Ground	Yes



OK or NG

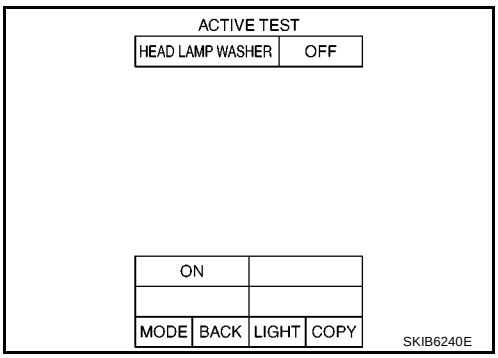
OK >> GO TO 5.
NG >> Check harness ground circuit.

5. ACTIVE TEST

1. Select “BCM” on CONSULT-II. Select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “HEAD LAMP WASHER” on “SELECT TEST ITEM” screen.
3. Touch “ON” screen.

Does headlamp washer operate normally?

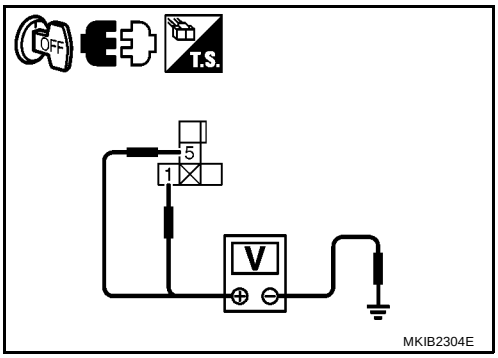
YES >> GO TO 12.
NO >> GO TO 6.



6. CHECK POWER SUPPLY CIRCUIT TO HEADLAMP WASHER RELAY

1. Turn ignition switch OFF.
2. Remove headlamp washer relay.
3. Check voltage between headlamp washer relay harness connector and ground.

Terminal			
(+)		(-)	Voltage
Headlamp washer relay connector	Terminal		
M19	1	Ground	Battery voltage
	5		



OK or NG

OK >> GO TO 7.
NG >> Repair harness or connector.

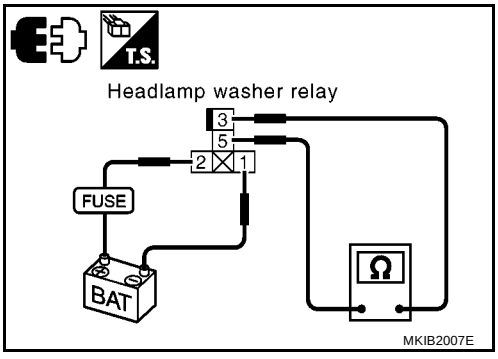
7. CHECK HEADLAMP WASHER RELAY

1. Apply battery voltage to between headlamp washer relay terminal 1 and 2.
2. Check continuity between terminal 3 and 5.

3 – 5 : Continuity should exist.

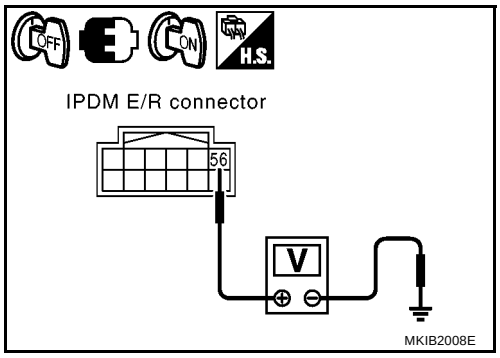
OK or NG

OK >> GO TO 8.
NG >> Replace headlamp washer relay.



8. CHECK IPDM E/R

1. Turn ignition switch OFF.
2. Install headlamp washer relay.
3. Turn ignition switch ON.
4. Select “IPDM E/R” on CONSULT-II. Select “HEAD LAMP WASHER” active test. Refer to WW-25, "ACTIVE TEST" . When headlamp washer operating, check voltage between IPDM E/R harness connector and ground.



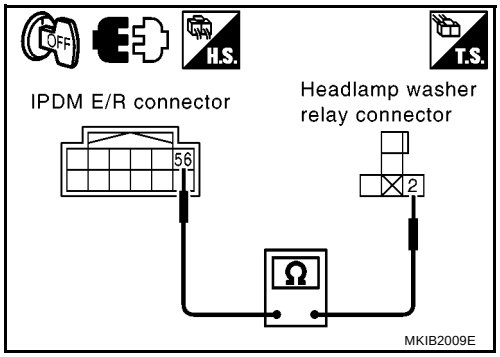
Terminals				Voltage [V] (Approx.)
(+)		(-)	Headlamp washer condition	
Connector	Terminal			
E12	56	Ground	OFF	Battery voltage
			ON	0

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. CHECK CONTINUITY BETWEEN IPDM E/R AND HEADLAMP WASHER RELAY

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector and remove headlamp washer relay.
3. Check continuity between IPDM E/R harness connector and headlamp washer relay harness connector.

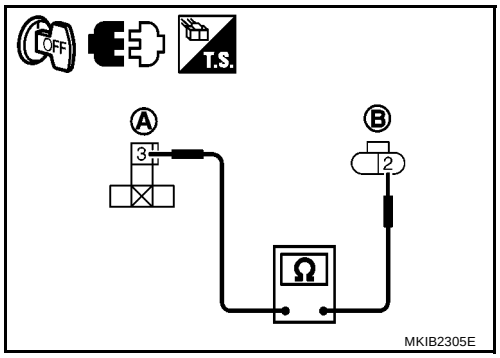


IPDM E/R		Headlamp washer relay		Continuity
Connector	Terminal	Connector	Terminal	
E12	56	M19	2	Yes

OK >> Replace IPDM E/R. Refer to PG-37, "Removal and Installation of IPDM E/R" .
NG >> Repair harness or connector.

10. CHECK HEADLAMP WASHER MOTOR CIRCUIT

1. Disconnect headlamp washer motor connector.
2. Check continuity between headlamp washer relay harness connector (A) and headlamp washer motor harness connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
M19	3	E25	2	Yes

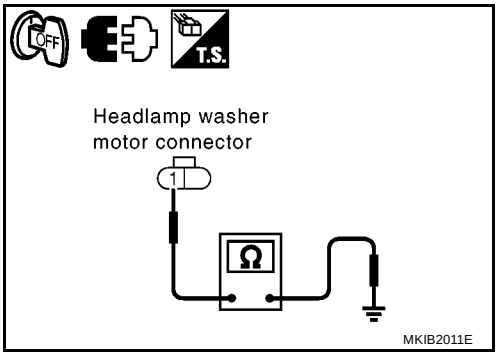
OK or NO

OK >> GO TO 11.
NO >> Repair harness or connector.

11. CHECK HEADLAMP WASHER MOTOR GROUND CIRCUIT

Check continuity between headlamp washer motor harness connector and ground.

Headlamp washer motor connector	Terminal	Ground	Continuity
E25	1		Yes



OK or NG

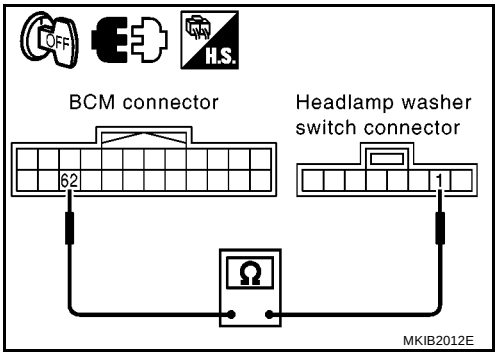
OK >> Replace headlamp washer motor. Refer to WW-88, "Removal and Installation for Headlamp Washer Motor" .

NG >> Repair harness or connector.

12. CHECK HEADLAMP WASHER SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and headlamp washer switch connector.
3. Check continuity between BCM harness connector and headlamp washer switch harness connector.

BCM		Headlamp washer switch		Continuity
Connector	Terminal	Connector	Terminal	
M58	62	M18	1	Yes



OK or NO

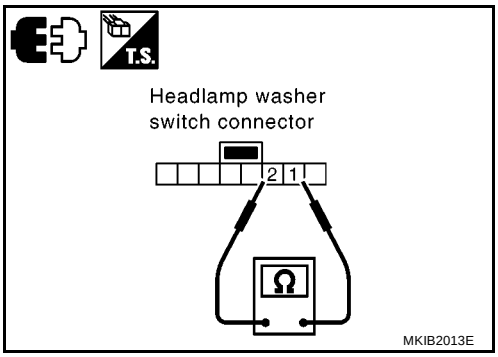
OK >> GO TO 13.

NO >> Repair harness or connector.

13. CHECK HEADLAMP WASHER SWITCH

Check continuity between headlamp washer switch terminals 1 and 2.

Headlamp washer switch terminal		Switch condition	Continuity
1	2	OFF	No
		ON	Yes



OK or NG

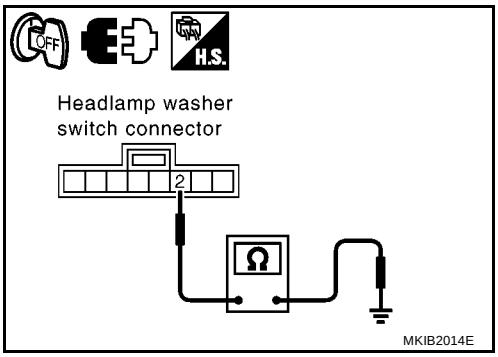
OK >> GO TO 14.

NG >> Replace headlamp washer switch.

14. CHECK HEADLAMP WASHER SWITCH GROUND CIRCUIT

Check continuity between headlamp washer switch harness connector and ground.

Headlamp washer switch connector	Terminal	Ground	Continuity
M18	2		Yes



OK or NG

OK >> Replace BCM. Refer to BCS-17, "Removal and Installation of BCM" .

NG >> Repair harness or connector.

Removal and Installation for Headlamp Washer Nozzle

BKS0013P

REMOVAL

1. Remove front bumper. Refer to EI-4, "FRONT BUMPER"
2. Remove headlamp washer tube.
3. Remove headlamp washer nozzle from front bumper.

INSTALLATION

Install in the reverse order of removal.

Removal and Installation for Washer Tank

BKS0013Q

Refer to WW-46, "Removal and Installation of Washer Tank" ,

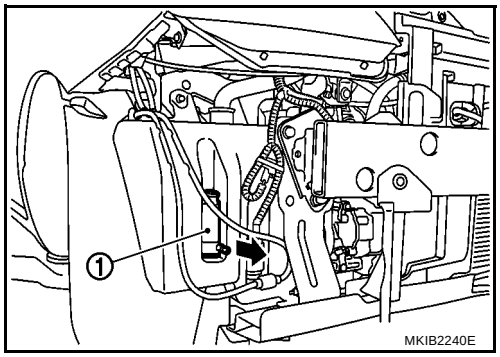
Removal and Installation for Headlamp Washer Motor

BKS0013R

1. Remove front bumper. Refer to EI-4, "FRONT BUMPER"
2. Remove headlamp washer motor (1) connector and hose.
3. Pull out headlamp washer motor in the direction of the arrow (⬅) in the figure, and remove the washer pump from the washer tank.

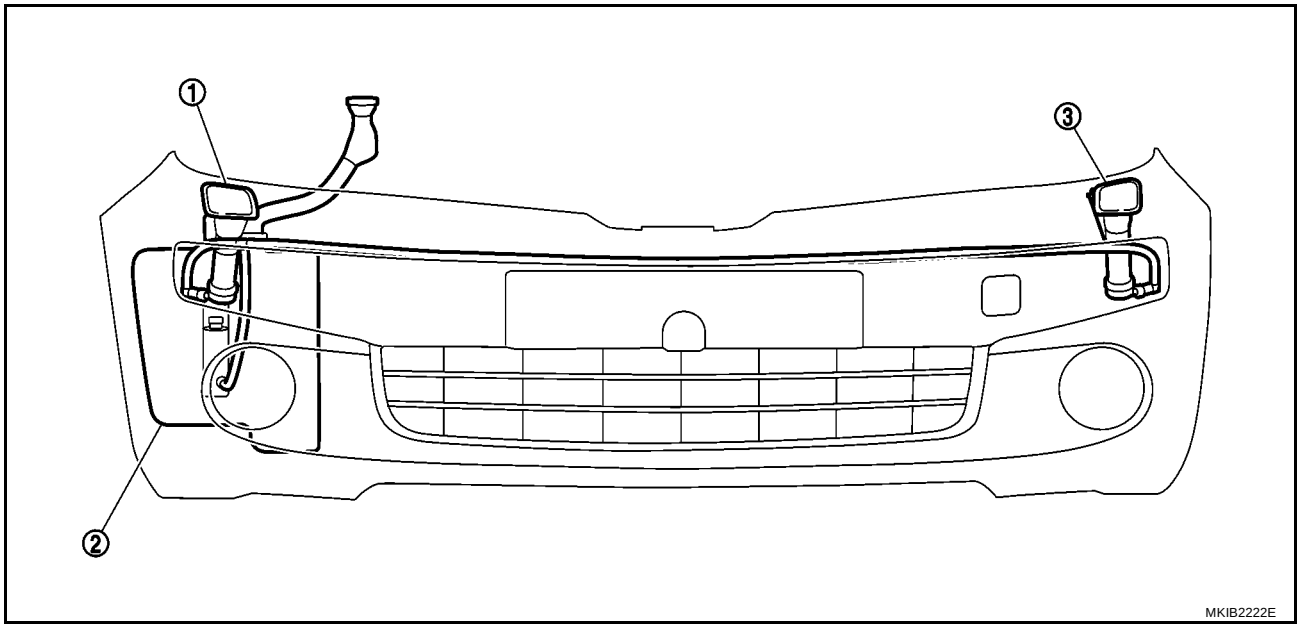
CAUTION:

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



Headlamp Washer Tube Layout

BKS0013S



1. Headlamp cleaner RH
2. Washer tank
3. Headlamp cleaner LH

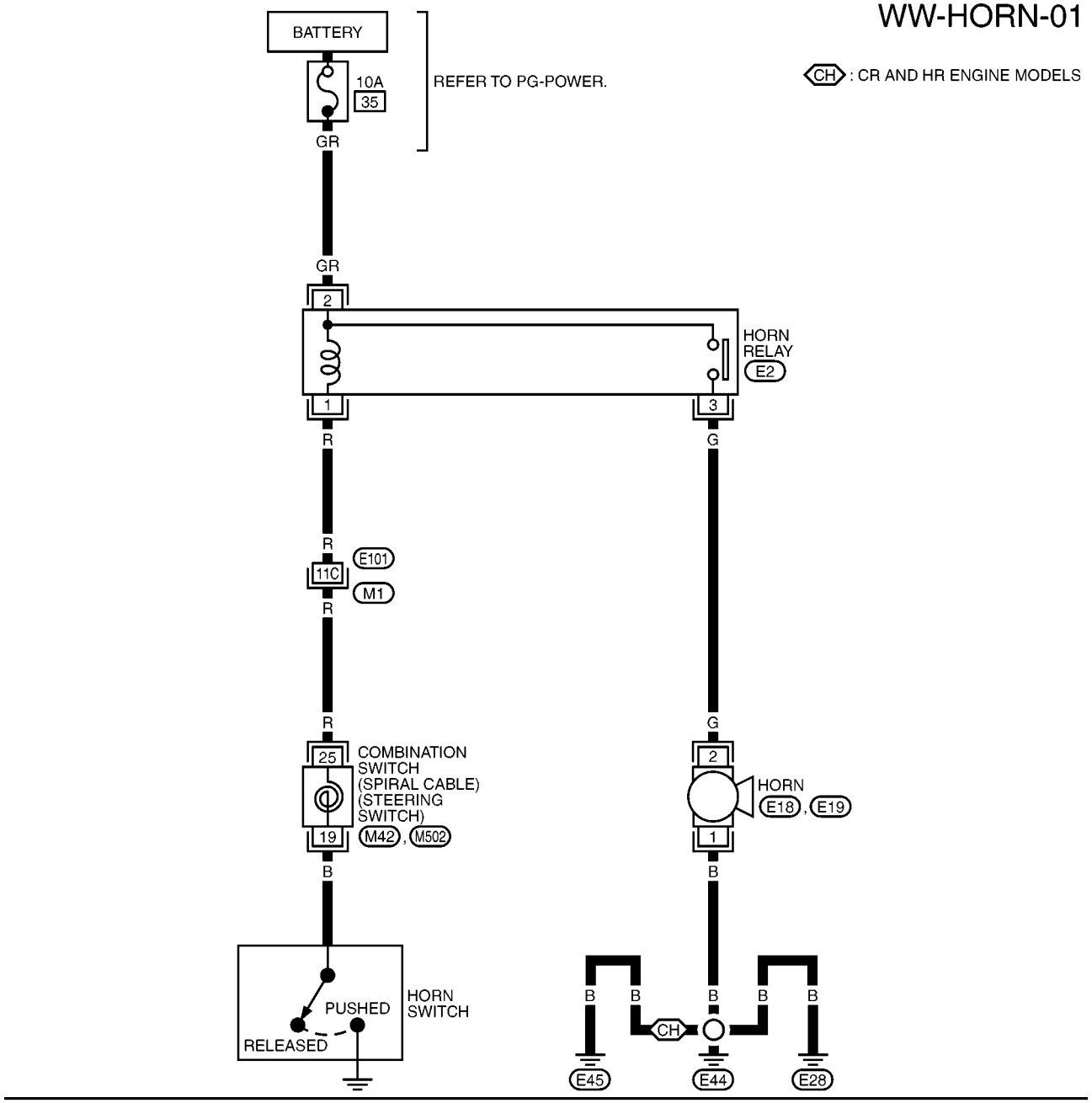
HORN

PFP:25610

Wiring Diagram —HORN—

BKS0013T

WW-HORN-01



★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

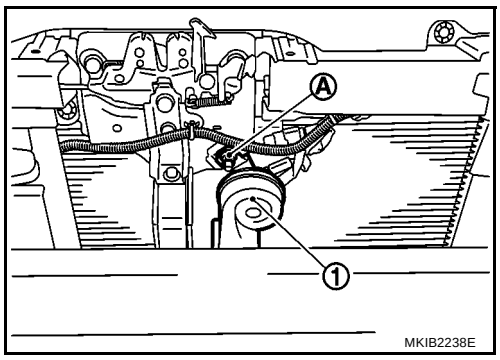
MKWA4291E

Removal and Installation

BKS0013U

REMOVAL

1. Remove front grille. Refer to EI-10, "Removal and Installation" .
2. Disconnect horn connector.
3. Remove horn mounting nut (A) and remove horn (1) from vehicle.



INSTALLATION

Installation is the reverse order of removal.

- Tighten horn bolt to specified torque.

Horn mounting bolt : 17.1 N·m (1.74 kg-m, 12.6 in-lb)

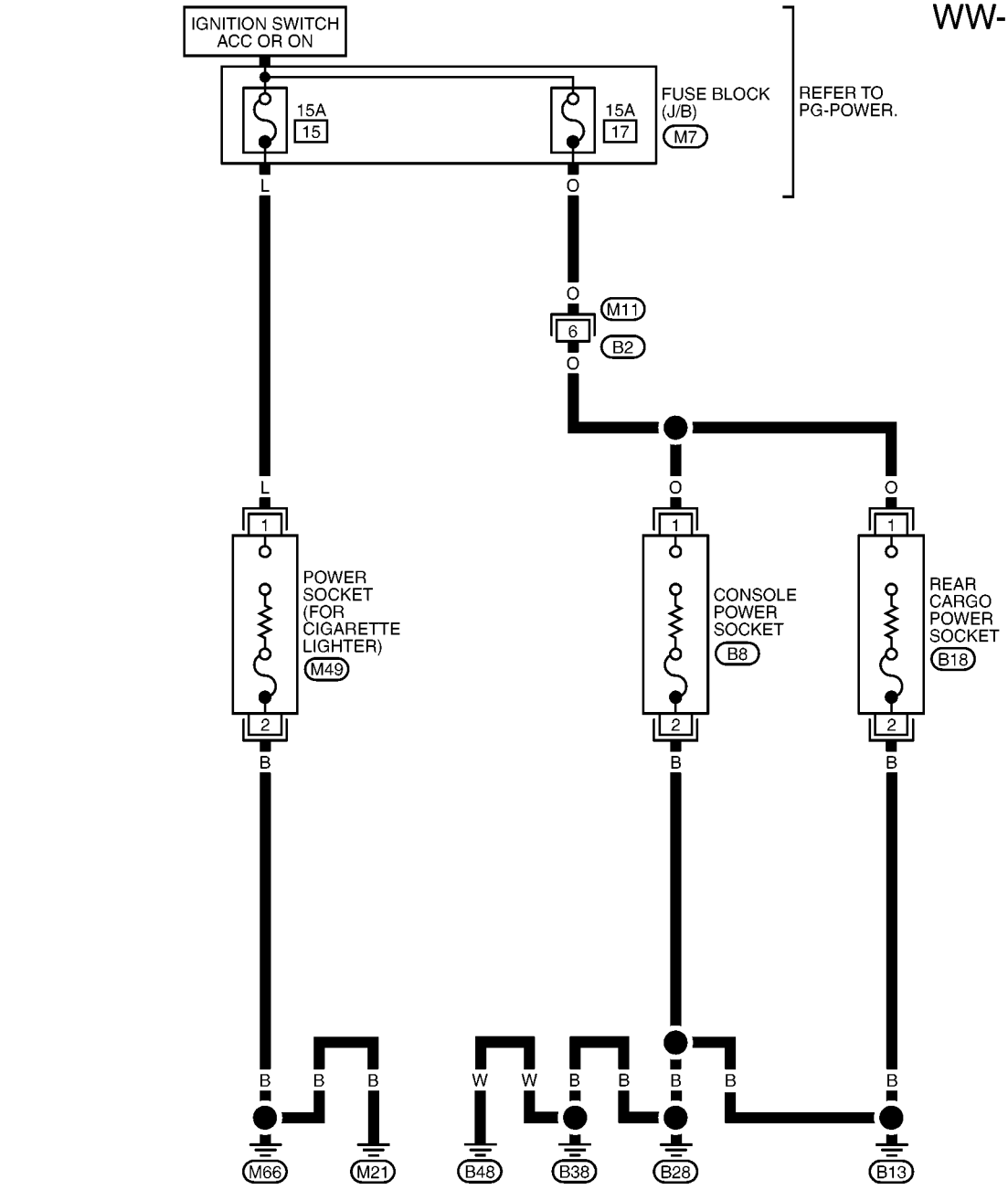
POWER SOCKET

PFP:253A2

Wiring Diagram —P/SCKT—

BKS0013V

WW-P/SCKT-01



2 1 M49 B, B8 B, B18 B

REFER TO THE FOLLOWING.
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

MKWA4292E

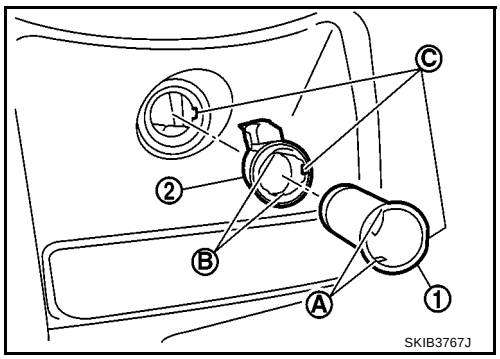
Removal and Installation

BKS0013W

REMOVAL

1. Remove center console assembly. Refer to IP-13, "CENTER CONSOLE ASSEMBLY" .
2. Remove instrument panel stay cover. Refer to IP-9, "M. Instrument Pad (Driver Side)" .
3. Disconnect the power socket connector.
4. Remove inner socket (1) from the ring (2), while pressing the hook (B) on the ring out from square hole (A).

– Cut out (C)



INSTALLATION

Note the following, and install in the reverse order of the removal.

NOTE:

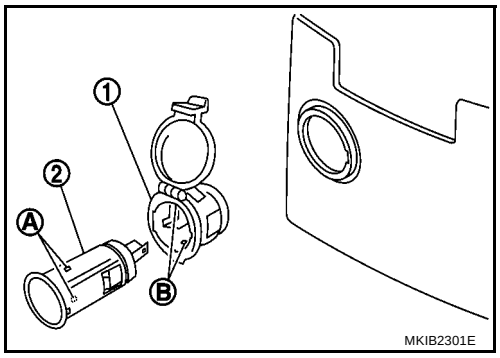
Install the inner socket with its cut out aligned with that on the ring.

Removal and Installation of Console Power Socket

BKS001HA

REMOVAL

1. Remove center console assembly. Refer to IP-13, "CENTER CONSOLE ASSEMBLY" .
2. Disconnect power socket connector.
3. Remove inner socket (2) from the ring (1), while pressing the hook (B) on the ring out from square hole (A).



INSTALLATION

Note the following, and install in the reverse order of the removal.

NOTE:

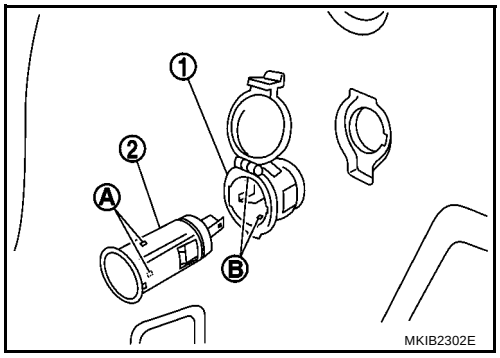
Install the inner socket with its cut out aligned with that on the ring.

Removal and Installation of Luggage Room Power Socket

BKS001HB

REMOVAL

1. Remove luggage side finisher lower (left). Refer to EI-32, "LUGGAGE FLOOR TRIM" .
2. Disconnect power socket connector.
3. Remove inner socket (2) from the ring (1), while pressing the hook (B) on the ring out from square hole (A).



INSTALLATION

Note the following, and install in the reverse order of the removal.

NOTE:

Install the inner socket with its cut out aligned with that on the ring.