SECTION POWER WINDOW CONTROL SYSTEM

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< PRECAUTION > PRECAUTION

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

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

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery and wait at least three minutes before performing any service.

Precaution for Work

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with a new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components:
- Water soluble dirt:
- Dip a soft cloth into lukewarm water, wring the water out of the cloth and wipe the dirty area.
- Then rub with a soft, dry cloth.
- Oily dirt:
- Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%) and wipe the dirty area.
- Then dip a cloth into fresh water, wring the water out of the cloth and wipe the detergent off.
- Then rub with a soft, dry cloth.
- Do not use organic solvent such as thinner, benzene, alcohol or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

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< PREPARATION >

PREPARATION PREPARATION

Special Service Tool

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The actual shape of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name		Description
 (J-46534) Trim Tool Set	AWJIA0483ZZ	Removing trim components

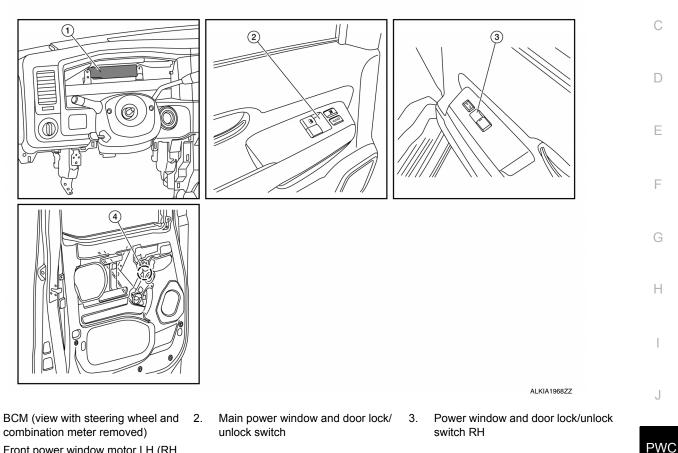
< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION COMPONENT PARTS

Component Parts Location

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4. Front power window motor LH (RH similar)

Component Description

1.

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Component	Function
BCM	Supplies power supply to power window switch.Controls retained power.
Main power window and door lock/un- lock switch	 Directly controls power window motors of both doors. Contains a lock switch that opens or completes the ground circuit of the power window and door lock/unlock switch RH, disabling or enabling the RH switch operation.
Power window and door lock/unlock switch RH	Controls front power window motor RH.

COMPONENT PARTS

< SYSTEM DESCRIPTION >

Component	Function
Front power window motor LH	 Integrates the encoder and power window motor. Receives voltage and ground from main power window and door lock/unlock switch. Polarity of voltage and ground is controlled by the main power window and door unlock switch
Front power window motor RH	 Receives voltage and ground from main power window and door lock/unlock switch and from the power window and door lock switch RH. Polarity of voltage and ground is controlled by the main power window and door unlock switch or the power window and door lock switch RH. The lock switch located in the main power window and door lock/unlock switch, when switched to the lock position, opens the ground circuit of the power window and door lock/unlock switch RH.

< SYSTEM DESCRIPTION >

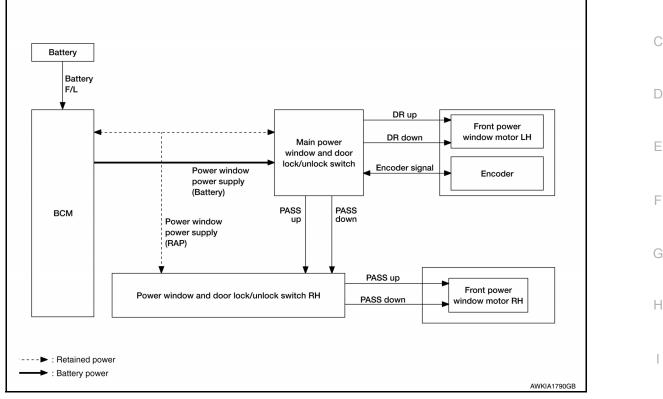
SYSTEM

System Diagram

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FRONT WINDOW SYSTEM



System Description

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POWER WINDOW OPERATION

- The power window system is controlled by the power window switches when the ignition switch is ON, or during the retained power operation after the ignition switch turns OFF.
- Main power window and door lock/unlock switch can open/close the LH and RH door glass.
- Power window and door lock/unlock switch RH can only open/close the RH door glass.

POWER WINDOW AUTO-OPERATION

- AUTO DOWN operation can be performed when the main power window and door lock/unlock switch is placed in the AUTO position.
- The encoder detects the movement of the power window motor and transmits a pulse signal to the main power window and door lock/unlock switch while the power window motor is operating.
- The main power window and door lock/unlock switch reads the changes of the encoder signal and stops AUTO operation when the door glass is at the fully opened position.
- AUTO function does not operate if encoder is malfunctioning.

RETAINED POWER OPERATION

• Retained power operation is an additional power supply function that enables power window system to operate for an additional 45 seconds even when ignition switch is turned OFF.

RETAINED ACCESSORY POWER CANCEL CONDITIONS:

- Front door CLOSE (door switch OFF)→OPEN (door switch ON).
- When ignition switch is ON again.
- When timer expires. (45 seconds)

POWER WINDOW LOCK FUNCTION

• The main power window and door lock/unlock switch window lock switch can lock the RH power window operation from the RH switch. With the lock engaged, the main power window and door lock/unlock switch can still operate the RH door glass.

PWC-7

SYSTEM

< SYSTEM DESCRIPTION >

The ground circuit inside the main power window and door lock/unlock switch opens when the power window lock switch is ON. This inhibits the power window and door lock/unlock switch RH operation.

< SYSTEM DESCRIPTION > DIAGNOSIS SYSTEM (BCM) COMMON ITEM

COMMON ITEM : CONSULT Function (BCM - COMMON ITEM)

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APPLICATION ITEM

CONSULT performs the following functions via CAN communication with BCM.

Direct Diagnostic Mode	Description	
Ecu Identification	The BCM part number is displayed.	
Self Diagnostic Result	The BCM self diagnostic results are displayed.	
Data Monitor	The BCM input/output data is displayed in real time.	
Active Test	The BCM activates outputs to test components.	E
Work support	The settings for BCM functions can be changed.	
Configuration	The vehicle specification can be read and saved.The vehicle specification can be written when replacing BCM.	F
CAN Diag Support Mntr	The result of transmit/receive diagnosis of CAN communication is displayed.	

SYSTEM APPLICATION

BCM can perform the following functions.

			Direct Diagnostic Mode						
System	Sub System		Self Diagnostic Result	Data Monitor	Active Test	Work support	Configuration	CAN Diag Support Mntr	- H I J
Door lock	DOOR LOCK			×	×	×			
Rear window defogger	REAR DEFOGGER			×	×				PWC
Warning chime	BUZZER			×	×				
Interior room lamp timer	INT LAMP			×	×	×			-
Remote keyless entry system	MULTI REMOTE ENT			×	×	×			- L
Exterior lamp	HEAD LAMP			×	×	×			_
Wiper and washer	WIPER			×	×	×			M
Turn signal and hazard warning lamps	FLASHER			×	×				_
Air conditioner	AIR CONDITIONER			×					-
Combination switch	COMB SW			×					- N
BCM	BCM	×	×			×	×	×	_
Immobilizer	IMMU		×		×				0
Interior room lamp battery saver	BATTERY SAVER			×		×			_
Vehicle security system	THEFT ALM			×	×	×			_
RAP system	RETAINED PWR			×		×			P
Signal buffer system	SIGNAL BUFFER			×	×				_
Panic alarm system	PANIC ALARM				×				_

RETAINED POWER

DIAGNOSIS SYSTEM (BCM)

< SYSTEM DESCRIPTION >

RETAINED POWER : CONSULT Function (BCM - RETAINED PWR)

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DATA MONITOR

Monitor Item [Unit]	Description
IGN ON SW [On/Off]	Indicates condition of ignition switch ON position.
DOOR SW-DR [On/Off]	Indicates condition of front door switch LH.
DOOR SW-AS [On/Off]	Indicates condition of front door switch RH.

WORK SUPPORT

Support Item	Setting		Description
	MODE3	2 min	
RETAINED PWR SET	T MODE2 OFF	Sets the retained accessory power operating time.	
	MODE1*	45 sec	

*: Initial setting

MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH

< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION

MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH

Reference Value

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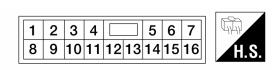
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TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Voltage (V)
+	-	Signal name	Input/ Output	Condition	(Approx.)
3 (W)	Ground	ENCODER SIG1	Input	When power window motor operates.	(V) 6 2 0 10 ms JMKIA0070GB
4 (R)	Ground	ENCODER POWER	Output	When ignition switch ON or power window timer operates.	10V
7 (B)	Ground	ENCODER GND	_	_	0
8 (R)	Ground	DR UP	Output	Main power window and door lock/unlock switch driver side switch is operated UP	Battery voltage
9 (L)	Ground	BAT (+)	Input	— Battery voltage	
10 (B)	Ground	GND	_	_	0
11 (Y)	Ground	DR DOWN	Output	Main power window and door lock/unlock switch driver side switch is operated DOWN	Battery voltage
				IGN SW ON	Battery voltage
13 (W)	Ground	RAP signal	Input	Within 45 second after ignition switch is turned to OFF.	Battery voltage
()				When front LH or RH door is opened dur- ing retained power operation.	0
14 (V)	Ground	PASS UP	Output	Main power window and door lock/unlock switch passenger side switch is operated UP	Battery voltage
15 (G)	Ground	PASS DN	Output	Main power window and door lock/unlock switch passenger side switch is operated DOWN	Battery voltage

POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH RH

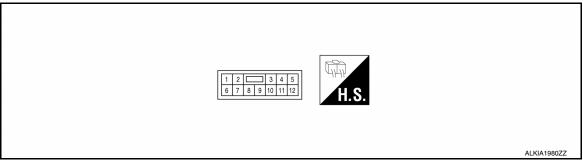
< ECU DIAGNOSIS INFORMATION >

POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH RH

Reference Value

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TERMINAL LAYOUT



PHYSICAL VALUES

Termina (Wire d		Descripti	on	Condition	Voltage (V)
+	-	- Signal name Input/ Output		(Approx.)	
3 (B)	Ground	Ground	Input	With ignition switch ON	0V
6 (L)	Ground	PASS DN	Output	Power window and door lock/unlock switch RH window switch is operated DOWN	Battery voltage
7 (R)	Ground	PASS UP	Output	Power window and door lock/unlock switch RH window switch is operated UP	Battery voltage
8 (W)	Ground	—	Output	With ignition switch ON	Battery voltage
11 (G)	Ground	PASS DN	Output	Main power window and door lock/unlock switch passenger side switch is operated DOWN	Battery voltage
12 (V)	Ground	PASS UP	Output	Main power window and door lock/unlock switch passenger side switch is operated UP	Battery voltage

BCM

BCM List of ECU Reference

ECU

BCM

< ECU DIAGNOSIS INFORMATION >

Reference
BCS-28. "Reference Value"

BCS-39, "DTC Index"

BCS-39, "DTC Inspection Priority Chart"

BCS-39, "Fail-safe"

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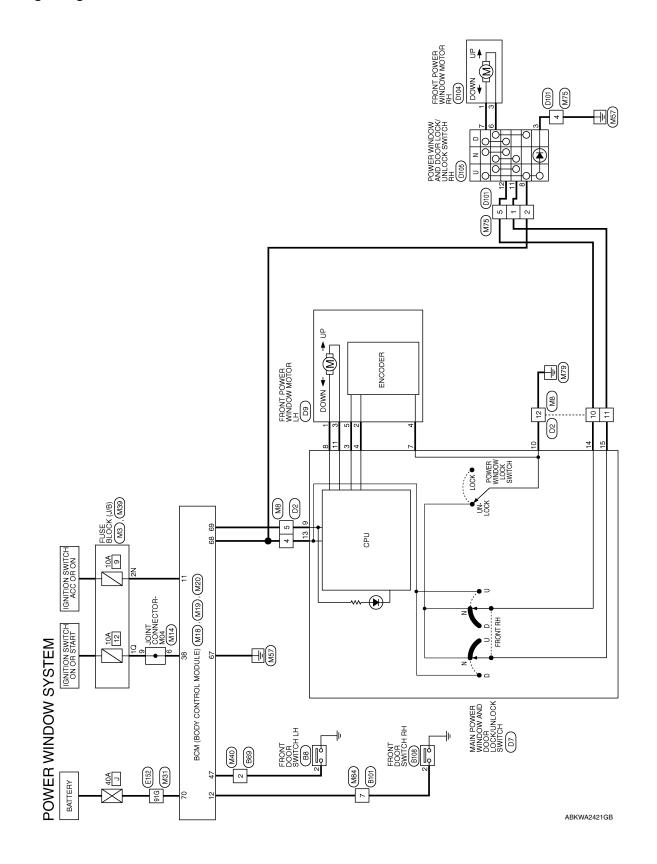
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< WIRING DIAGRAM >

WIRING DIAGRAM POWER WINDOW SYSTEM

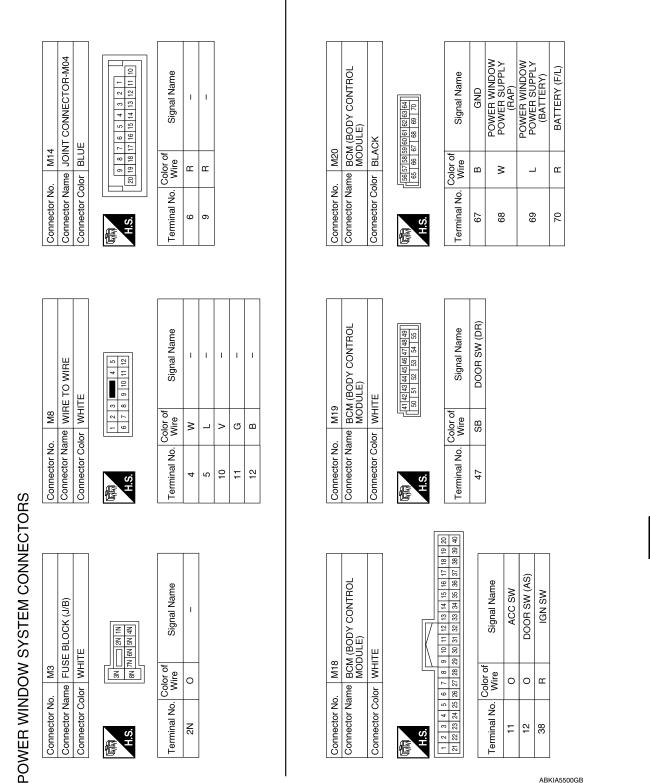
Wiring Diagram

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POWER WINDOW SYSTEM

< WIRING DIAGRAM >



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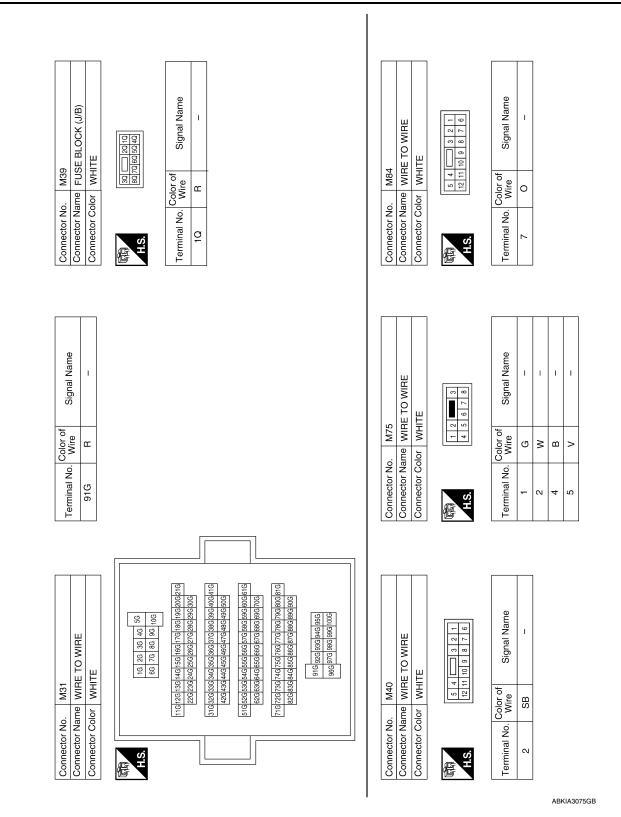
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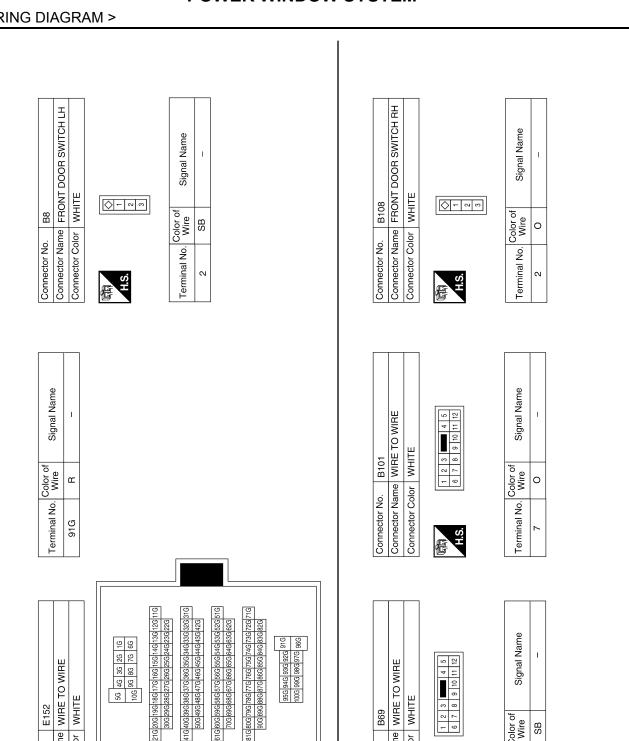
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POWER WINDOW SYSTEM

< WIRING DIAGRAM >





POWER WINDOW SYSTEM

Connector Name WIRE TO WIRE

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Connector No.

Connector Color WHITE

95G 94G 93G 92G 91G 100G 99G 98G 97G 96G

41G40G39G38G37G36G35G34G33G32G3 50G49G48G47G46G45G44G43G42G

5G 4G 3G 2G 1G 10G 9G 8G 7G 6G

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Signal Name L

Color of Wire SB

Terminal No. \sim

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Connector Name WIRE TO WIRE

Connector No. B69

Connector Color WHITE

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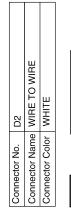
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D9 FRONT POWER WINDOW MOTOR LH	GREEN		r of Signal Name	1	1	1	1	-						D105	POWER WINDOW AND DOOR LOCK/UNLOCK	SWITCH RH Multe	WIIIL	8 9 10 11	r of Signal Name	1	1	1	1	
Connector No. Connector Name	Connector Color	品. H.S.	Terminal No. Wire	с -	2 R	3	4 B	5 W						Connector No.	Connector Name	Connector Color		<u></u>	Terminal No. Color of Wire	B v	9 9	7 R	8	
D7 MAIN POWER WINDOW AND DOOR LOCKUNLOCK	TCH	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	Signal Name	ENCODER SIG1	ENCODER POWER	ENCODER GND	DR UP	BAT (+)	GND	DR DOWN	IGN	PASS UP	PASS DN	4	FRONT POWER WINDOW MOTOR RH	EN			Signal Name	1	1			
Connector No. D7 MAII Connector Name AND		研 H.S.	Terminal No. Wire	3	4 R	7 B	8	9 L	10 B	11 Y	13 W	14 V	15 G	Connector No. D104	e	Connector Color GREEN		H.S.	Terminal No. Wire	- Н	3			
]									_						





Signal Name	I	I	I	Ι	Ι	
Color of Wire	M	_	^	5	В	
Terminal No.	4	£	10	11	12	

Signal Name	L	I	I	I	
Color of Wire	G	×	ш	>	
Terminal No.	t	2	4	£	

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POWER WINDOW SYSTEM

< WIRING DIAGRAM >

< BASIC INSPECTION >

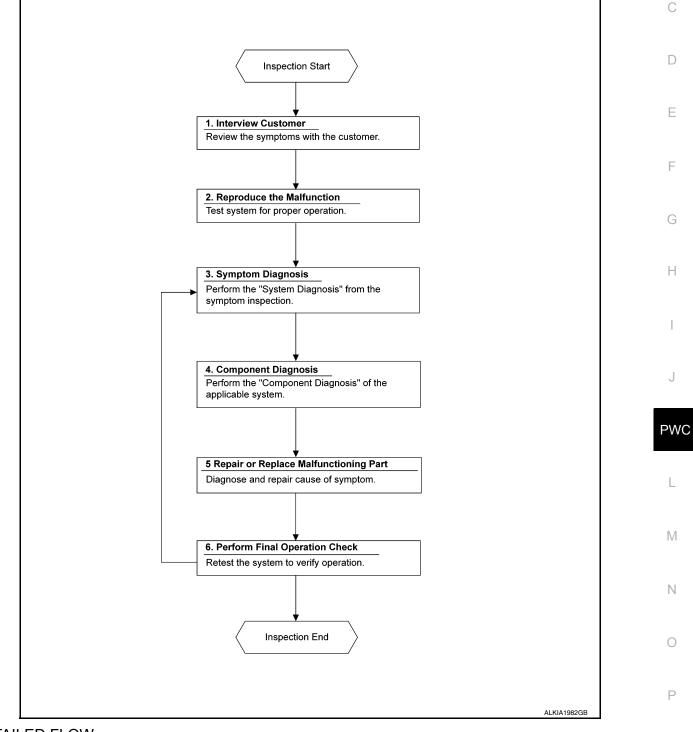
BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

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DETAILED FLOW

1. OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain as much information as possible about the conditions and environment under which the malfunction occurred.

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

>> GO TO 2

$2. \ {\sf Reproduce the malfunction information}$

Check the malfunction on the vehicle that the customer describes. Inspect the relation of the symptoms and the condition when the symptoms occur.

>> GO TO 3

3. IDENTIFY THE MALFUNCTIONING SYSTEM WITH "SYMPTOM DIAGNOSIS"

Use "Symptom diagnosis" from the symptom inspection result in step 2 and then identify where to start performing the diagnosis based on possible causes and symptoms.

>> GO TO 4

4. PERFORM THE COMPONENT DIAGNOSIS OF THE OF THE APPLICABLE SYSTEM

Perform the diagnosis with "Component diagnosis" of the applicable system.

>> GO TO 5

5. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 6

6. FINAL CHECK

Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 2.

Are the malfunctions corrected?

YES >> Inspection End. NO >> GO TO 3 < DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS POWER SUPPLY AND GROUND CIRCUIT BCM

BCM : Diagnosis Procedure

Regarding Wiring Diagram information, refer to BCS-41, "Wiring Diagram".

1. CHECK FUSES AND FUSIBLE LINK

Check that the following fuses and fusible link are not blown.

Terminal No.	Signal name	Fuses and fusible link No.	
57	Detters accordingly	22 (10A)	
70	Battery power supply	J (40A)	— F
11	Ignition ACC or ON	9 (10A)	
38	Ignition ON or START	12 (10A)	G

Is the fuse blown?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit.

NO >> GO TO 2.

2. CHECK POWER SUPPLY CIRCUIT

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

	Terminals			Innition outitab positio		0
(+	+)			Ignition switch positic)[]	
BC	M	(–)	OFF	ACC	ON	PWC
Connector	Terminal		OFF	ACC	ON	
M20	70		Detter weltere	Dettemusellese	Detten welten	_
M20	57	Cround	Battery voltage	Battery voltage	Battery voltage	L
144.0	11	Ground	Approx. 0 V	Battery voltage	Battery voltage	_
M18	38		Approx. 0 V	Approx. 0 V	Battery voltage	Μ

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

Check continuity between BCM connector and ground.

B	CM		Continuity	-
Connector	Terminal	Ground	Continuity	Ρ
M20	67		Yes	_

Is the inspection result normal?

YES >> Inspection End.

NO >> Repair harness or connector.

POWER WINDOW MAIN SWITCH

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< DTC/CIRCUIT DIAGNOSIS >

POWER WINDOW MAIN SWITCH : Diagnosis Procedure

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Regarding Wiring Diagram information, refer to <u>PWC-14, "Wiring Diagram"</u>.

1. CHECK POWER SUPPLY

- 1. Turn ignition switch ON.
- 2. Check voltage between main power window and door lock/unlock switch connector D7 terminals 9, 13 and ground.

Main power window and	d door lock/unlock switch	Ground	Voltage	
Connector	Terminal	Ground	vollage	
D7	9		Batteny voltage	
	13		Battery voltage	

Is the inspection result normal?

YES >> GO TO 3 NO >> GO TO 2

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

- 2. Disconnect BCM connector M20 and main power window and door lock/unlock switch connector.
- 3. Check continuity between BCM connector M20 terminals 68, 69 and main power window and door lock/ unlock switch connector D7 terminals 13, 9.

B	СМ	Main power window and	d door lock/unlock switch	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M20	68	D7	13	Yes	
WZO	69		9	165	

4. Check continuity between BCM connector M20 terminals 68, 69 and ground.

В	BCM		Continuity	
Connector	Terminal	Ground	Continuity	
M20	M20 68		No	
	69		NO	

Is the inspection result normal?

YES >> Replace BCM. Refer to <u>BCS-62, "Removal and Installation"</u>.

NO >> Repair or replace harness.

3. CHECK GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect main power window and door lock/unlock switch connector.
- 3. Check continuity between main power window and door lock/unlock switch connector D7 terminal 10 and ground.

Main power window and	d door lock/unlock switch	Ground	Continuity	
Connector	Terminal	Ground	Continuity	
D7	10	—	Yes	

Is the inspection result normal?

YES >> Inspection End.

NO >> Repair or replace harness.

< DTC/CIRCUIT DIAGNOSIS >

POWER WINDOW MAIN SWITCH : Component Inspection

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1. CHECK MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH

1. Disconnect main power window and door lock/unlock switch connector.

2. Check continuity between main power window and door lock/unlock switch terminals.

Main power window and door lock/unlock switch terminals		Condition	Continuity	
13	14	FRONT RH switch UP	Yes	
15	14	FRONT RH switch DOWN	No	
12	13 15 FRONT RH switch UP FRONT RH switch DOWN	FRONT RH switch UP	NU	
15		FRONT RH switch DOWN	Yes	
14	10	LOCK switch LOCK	No	
14	10	LOCK switch UNLOCK	Yes	
45	10	LOCK switch LOCK	No	
15	10	LOCK switch UNLOCK	Yes	

Is the inspection result normal?

YES >> Main power window and door lock/unlock switch is OK.

NO >> Replace main power window and door lock/unlock switch. Refer to <u>PWC-42, "Removal and Instal-</u> G lation".

FRONT POWER WINDOW SWITCH (PASSENGER SIDE)

FRONT POWER WINDOW SWITCH (PASSENGER SIDE) : Diagnosis Procedure

INFOID:000000012520382

Regarding Wiring Diagram information, refer to PWC-14, "Wiring Diagram".

1. CHECK POWER SUPPLY

1. Turn ignition switch ON.

Check voltage between power window and door lock/unlock switch RH connector D105 terminal 8 and ground.

Power window and door lock/unlock switch RH		Ground	Voltage	L
Connector	Terminal		vollage	
D105	8	_	Battery voltage	N

Is the inspection result normal?

YES >> GO TO 3

NO >> GO TO 2

2. CHECK POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect BCM connector M20, main power window and door lock/unlock switch connector and power window and door lock/unlock switch RH connector.
- 3. Check continuity between BCM connector M20 terminal 68 and power window and door lock/unlock switch RH connector D105 terminal 8.

BCM		Power window and door lock/unlock switch RH		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M20	68	D105	8	Yes

4. Check continuity between BCM connector M20 terminal 68 and ground.

< DTC/CIRCUIT DIAGNOSIS >

BCM		Ground	Continuity	
Connector	Terminal	Ground	Continuity	
M20	68	_	No	

Is the inspection result normal?

YES >> Replace BCM. Refer to <u>BCS-62, "Removal and Installation"</u>.

NO >> Repair or replace harness.

3. CHECK GROUND CIRCUITS

1. Turn ignition switch OFF.

- 2. Disconnect main power window and door lock/unlock switch and power window and door lock/unlock switch RH connectors.
- 3. Check continuity between main power window and door lock/unlock switch connector D7 terminals 14, 15 and power window and door lock/unlock switch RH connector D105 terminals 12, 11.

Main power window an	Main power window and door lock/unlock switch		Power window and door lock/unlock switch RH	
Connector	Terminal	Connector	Terminal	Continuity
D7	14	D105	12	Yes
Di	15	D103	11	165

4. Check continuity between main power window and door lock/unlock switch connector D7 terminals 14, 15 and ground.

Main power window an	Main power window and door lock/unlock switch		Continuity	
Connector	Terminal	Ground	Continuity	
D7	14		No	
Di	15		NO	

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace harness.

4. CHECK MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH

Perform the main power window and door lock/unlock switch component inspection. Refer to <u>PWC-23</u>, <u>"POWER WINDOW MAIN SWITCH : Component Inspection"</u>.

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace main power window and door lock/unlock switch. Refer to <u>PWC-42</u>, "<u>Removal and Instal-</u><u>lation</u>".

FRONT POWER WINDOW SWITCH (PASSENGER SIDE) : Component Inspection

INFOID:000000012520383

1. CHECK POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH RH

- 1. Disconnect power window and door lock/unlock switch RH connector.
- 2. Check continuity between power window and door lock/unlock switch RH terminals.

Power window and door lock/unlock switch RH terminals		Condition	Continuity
	7	Switch UP	Yes
8	1	Switch DOWN	No
o	6	Switch UP	INO
	0	Switch DOWN	Yes

3. Connect a jumper wire between terminal 6 and terminal 7 of the power window and door lock/unlock switch RH.

< DTC/CIRCUIT DIAGNOSIS >

4. Check continuity between power window and door lock/unlock switch RH terminals.

Power window and door loc	/unlock switch RH terminals	Condition	Continuity	
8 11	11	Switch UP	Yes	
		Switch DOWN	No	
	10	Switch UP	No	
	12	Switch DOWN	Yes	

Is the inspection result normal?

Revision: August 2015

YES >> Power window and door lock/unlock switch RH is OK.

NO >> Replace power window and door lock/unlock switch RH. Refer to <u>PWC-43, "Removal and Installa-</u> D <u>tion"</u>.

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< DTC/CIRCUIT DIAGNOSIS >

POWER WINDOW MOTOR DRIVER SIDE

DRIVER SIDE : Component Function Check

INFOID:000000012520384

1. CHECK POWER WINDOW MOTOR CIRCUIT

Check front power window motor LH operation when operating main power window and door lock/unlock switch.

Is the inspection result normal?

YES >> Front power window motor LH is OK.

NO >> Refer to <u>PWC-26</u>, "DRIVER SIDE : Diagnosis Procedure".

DRIVER SIDE : Diagnosis Procedure

INFOID:000000012520385

Regarding Wiring Diagram information, refer to PWC-14, "Wiring Diagram".

1. CHECK MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH OUTPUT SIGNALS

- 1. Turn ignition switch OFF.
- 2. Disconnect front power window motor LH.
- 3. Turn ignition switch ON.
- 4. Check voltage between front power window motor LH connector D9 terminals 1, 3 and ground.

Front power w	Front power window motor LH		Condition	Voltage	
Connector	Ground Terminal	Condition	vollage		
D9	1		FRONT LH switch UP	Battery voltage	
D9	3		FRONT LH switch I	FRONT LH switch DOWN	Ballery Vollage

Is the inspection result normal?

YES >> Replace power window motor LH. Refer to <u>GW-15, "Removal and Installation"</u>.

NO >> GO TO 2

 $\mathbf{2}$. CHECK MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH OUTPUT SIGNAL CIRCUITS

- 1. Turn ignition switch OFF.
- 2. Disconnect main power window and door lock/unlock switch.
- 3. Check continuity between main power window and door lock/unlock switch connector D7 terminals 8, 11 and front power window motor LH connector D9 terminals 1, 3.

Main power window an	Main power window and door lock/unlock switch		Front power window motor LH	
Connector	Terminal	Connector	Terminal	Continuity
D7	8	D9 -	1	Yes
וט	11		3	165

4. Check continuity between main power window and door lock/unlock switch connector D7 terminals 8, 11 and ground.

Main power window and door lock/unlock switch		Ground	Continuity
Connector	Terminal	Ground	Continuity
D7	8		No
	11	— No	NO

Is the inspection result normal?

YES >> Replace main power window and door lock/unlock switch. Refer to <u>PWC-42</u>, "<u>Removal and Instal-</u> lation".

POWER WINDOW MOTOR

NO >> Repair or	replace harness.				
	•	oction			
DRIVER SIDE : Component Inspection					
COMPONENT INSP					
1. CHECK FRONT P	OWER WINDOW MC	TOR LH			
Check motor operation	n by connecting the ba	attery voltage direc	tly to power window motor.		
	Terminal		Motor conditi	on	
(+)		(-)			
1		3	UP		
3 s the inspection result	1	1	DOWN		
PASSENGER SI PASSENGER SIL	DE DE : Component	Function Chec	W-15, "Removal and Install	INFOID:000000012520387	
. CHECK POWER W	WINDOW MOTOR CI	RCUIT			
power window and do the inspection result	or lock/unlock switch t normal?	RH.	power window and door lo	ock/unlock switch or	
	ver window motor RH PWC-27, "PASSENGE		s Procedure".		
PASSENGER SI		-	<u> </u>		
AUDENCER OIL				INFOID:000000012520388	
Regarding Wiring Diag	gram information, refe	r to <u>PVVC-14, "VVIII</u>	ng Diagram".	1	
1	YOWER WINDOW SW				
I. CHECK FRONT P			T SIGNALS		
 Disconnect front p Turn ignition switc 	bower window motor F ch ON.	RH.	T SIGNALS	and ground.	
 Turn ignition switc Disconnect front p Turn ignition switc 	oower window motor F ch ON. tween front power win	RH. Idow motor RH con	nector D104 terminals 1, 3		
 Turn ignition switc Disconnect front p Turn ignition switc Check voltage bet 	oower window motor F ch ON. tween front power win	RH.	Condition	and ground. Voltage	
Turn ignition switc Disconnect front p Turn ignition switc Check voltage bei Front power wir Connector	oower window motor F ch ON. tween front power win	RH. Idow motor RH con	nector D104 terminals 1, 3	Voltage	
 Turn ignition switc Disconnect front p Turn ignition switc Check voltage bet 	oower window motor F ch ON. tween front power win ndow motor RH Terminal	RH. Idow motor RH con	Condition		
 Turn ignition switc Disconnect front p Turn ignition switc Check voltage being Front power wire Connector D104 s the inspection result 	oower window motor F ch ON. tween front power win ndow motor RH Terminal 1 3 <u>t normal?</u>	RH. Idow motor RH con Ground	Condition Power window and door lock/unlock switch RH UP Power window and door lock/unlock switch RH DOWN	Voltage Battery voltage	
1. Turn ignition switc 2. Disconnect front p 3. Turn ignition switc 4. Check voltage bel Front power wir Connector D104 Is the inspection result YES >> Replace fi NO >> GO TO 2	bower window motor F ch ON. tween front power win ndow motor RH Terminal 1 3 <u>t normal?</u> front power window mo	RH. dow motor RH con Ground 	Condition Condition Power window and door lock/unlock switch RH UP Power window and door lock/unlock switch RH DOWN	Voltage Battery voltage	
 Turn ignition switc Disconnect front p Turn ignition switc Check voltage best Front power wir Connector D104 Is the inspection result YES >> Replace from the second second	bower window motor F ch ON. tween front power win ndow motor RH Terminal 1 3 <u>t normal?</u> front power window mo	RH. dow motor RH con Ground 	Condition Condition Power window and door lock/unlock switch RH UP Power window and door lock/unlock switch RH DOWN	Voltage Battery voltage	

POWER WINDOW MOTOR

< DTC/CIRCUIT DIAGNOSIS >

Power window and do	oor lock/unlock switch RH	Front power wi	ndow motor RH	Continuity
Connector	Terminal	Connector	Terminal	Continuity
D105	7	D104	1	Yes
D105	6	D104	3	165

4. Check continuity between power window and door lock/unlock switch RH connector D105 terminals 7, 6 and ground.

Power window and door lock/unlock switch RH		Ground	Continuity
Connector	Terminal	Giouna	Continuity
D105	7		No
D105	6	—	INU

Is the inspection result normal?

YES >> Replace power window and door lock/unlock switch RH. Refer to <u>PWC-43</u>, "<u>Removal and Installa-</u> tion".

NO >> Repair or replace harness.

PASSENGER SIDE : Component Inspection

COMPONENT INSPECTION

1. CHECK FRONT POWER WINDOW MOTOR RH

Check motor operation by connecting the battery voltage directly to front power window motor RH.

Terminal		Motor condition	
(+)	(-)		
1	3	UP	
3	1	DOWN	

Is the inspection result normal?

YES >> Front power window motor RH is OK.

NO >> Replace front power window motor RH. Refer to <u>GW-15, "Removal and Installation"</u>.

INFOID:000000012520389

< DTC/CIRCUIT DIAGNOSIS > ENCODER CIRCUIT А Component Function Check INFOID:000000012520390 1. CHECK ENCODER OPERATION В Check that front door glass LH performs AUTO open operation normally when operating main power window and door lock/unlock switch. Is the inspection result normal? YES >> Encoder operation is OK. NO >> Refer to PWC-29, "Diagnosis Procedure" D Diagnosis Procedure INFOID:000000012520391 Ε Regarding Wiring Diagram information, refer to PWC-14, "Wiring Diagram".

1. CHECK ENCODER OPERATION

1. Turn ignition switch ON.

2. Check signal between main power window and door lock/unlock switch connector D7 terminal 3 and ground with oscilloscope.

Main power window and door lock/unlock switch		Ground	Signal (Reference value)	Н
Connector	Terminal	Ground	(Reference value)	
D7	3	_	(V) 6 4 2 0 10 ms	l J

Is the inspection result normal?

YES	>> Replace main power window and door lock/unlock switch. Refer to PWC-42, "Removal and Instal-	
	lation".	
NO	>> GO TO 2	

2. CHECK ENCODER SIGNAL CIRCUIT

1. Turn ignition switch OFF.

Disconnect main power window and door lock/unlock switch and front power window motor LH connectors.

3. Check continuity between main power window and door lock/unlock switch connector D7 terminal 3 and front power window motor LH connector D9 terminal 5.

Main power window and	door lock/unlock switch	Front power	window motor LH	Continuity	-
Connector	Terminal	Connector	Terminal	Continuity	C
D7	3	D9	5	Yes	_

4. Check continuity between main power window and door lock/unlock switch connector D7 terminal 3 and pround.

Main power window and door lock/unlock switch		Ground	Continuity
Connector	Terminal	Ground	Continuity
D7	3	—	No

Is the inspection result normal?

Ν

ENCODER CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

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

3. CHECK ENCODER POWER

- 1. Connect main power window and door lock/unlock switch connector.
- 2. Turn ignition switch ON.

3. Check voltage between front power window motor LH connector D9 terminal 2 and ground.

Front power win	Front power window motor LH		Voltage
Connector	Terminal	Ground	voltage
D9	2	—	Battery voltage

Is the inspection result normal?

YES >> GO TO 5

NO >> GO TO 4

4. CHECK ENCODER POWER CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect main power window and door lock/unlock switch.

3. Check continuity between main power window and door lock/unlock switch connector D7 terminal 4 and front power window motor LH connector D9 terminal 2.

Main power window and	door lock/unlock switch	Front power v	vindow motor LH	Continuity
Connector	Terminal	Connector	Terminal	Continuity
D7	4	D9	2	Yes

4. Check continuity between main power window and door lock/unlock switch connector D7 terminal 4 and ground.

Main power window and door lock/unlock switch		Ground	Continuity	
Connector	Terminal	Ground	Continuity	
D7	4	—	No	

Is the inspection result normal?

YES >> Replace main power window and door lock/unlock switch. Refer to <u>PWC-42</u>, "<u>Removal and Instal-</u> lation".

NO >> Repair or replace harness.

5. CHECK ENCODER GROUND

1. Turn ignition switch OFF.

2. Check continuity between front power window motor LH connector D9 terminal 4 and ground.

Front power window motor LH		Ground	Continuity	
Connector	Terminal	Ground	Continuity	
D9	4	—	Yes	

Is the inspection result normal?

YES >> Replace front power window motor LH. Refer to <u>GW-15, "Removal and Installation"</u>.

NO >> Repair or replace harness.

DOOR SWITCH

< DTC/CIRCUIT DIAGNOSIS >		
DOOR SWITCH		^
Description	INFOID:000000012819746	A
Detects door open/close condition.		В
Component Function Check	INFOID:000000012819747	D
1.CHECK FUNCTION		С
Check door switches in data monitor mode with CON	SULT.	D
Monitor item	Condition	
DOOR SW-DR (Front door LH)		Е
DOOR SW-AS (Front door RH)		
DOOR SW-RL (Sliding door or back doors)	$CLOSE \to OPEN: OFF \to ON$	
DOOR SW-RR (Back door RH)		F
Is the inspection result normal?		
YES >> Door switch is OK. NO >> Refer to <u>PWC-31</u> , "Diagnosis Procedure"	<u>.</u>	G
Diagnosis Procedure	INFQ/D:000000012819748	
	IN 012.000000012013170	Н
Regarding Wiring Diagram information, refer to <u>DLK-</u>	20, "Wiring Diagram".	
1. CHECK DOOR SWITCHES INPUT SIGNAL		
		J
	S, DOOR SW-RL, DOOR SW-RR) in DATA MONITOR	0
mode in BCM with CONSULT.		
When doors are open:		PWC
DOOR SW-DR (Front door LH)	:ON	
DOOR SW-AS (Front door RH)	:ON	I
DOOR SW-RL (Sliding door or back doors)		L
DOOR SW-RR (Back door RH)	:ON	
When doors are closed:		M
DOOR SW-DR (Front door LH)	:OFF	NI
DOOR SW-AS (Front door RH)	:OFF	Ν
DOOR SW-RL (Sliding door or back doors)	:OFF	
DOOR SW-RR (Back door RH)	:OFF	0
Without CONSULT		
Close all doors. Check suspect door switch circuit vol	Itage between BCM connector M18 or M19 terminals 12,	D
13, 47, 48 and ground. Cycle suspect door open and	closed while monitoring voltage.	Р

 Connector
 Item
 Terminals
 Condition
 Voltage (V) (approx.)

DOOR SWITCH

< DTC/CIRCUIT DIAGNOSIS >

	Front door switch LH	47			
M19	Sliding door switch, back door switch lower LH, back door switch lower RH, secondary sliding door switch	48	Ground	Open ↓ Closed	0 ↓ Battery voltage
M10	Front door switch RH	12			
M18	Back door switch upper RH	13	-		

Is the inspection result normal?

YES >> Refer to GI-43, "Intermittent Incident".

NO >> GO TO 2.

2. CHECK DOOR SWITCH CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect suspect door switch and BCM.

3. With sliding side door closed, check continuity between suspect door switch and BCM.

Item	Connector	Terminal	Item	Connector	Terminal	Continuity
	12	Front door switch RH	B108	2		
	M18	13	Back door switch upper RH (Cargo van)	R21		
BCM M19	15	Back door switch upper RH (Passenger van)	B70			
	47	Front door switch LH	B8	2	Yes	
		Sliding door switch	B116	Z		
		Back door switch lower LH	D407			
		48 Back door switch lower RH Secondary sliding door switch	Back door switch lower RH	D607	1	
			D301			

4. Check continuity between BCM and ground.

Item	Connector	Terminal	—	Continuity	
	M18	12	Ground		
BCM		13		No	
	M19	47			
		48			

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness.

 $\mathbf{3}$. Check door switches and ground circuit

1. Reconnect door switch harness.

2. With suspect door open (switch in closed position) and all other doors in the closed position (switches in open position), check continuity between BCM connector and ground for suspected door. Close suspect door and insure continuity to ground switches relative to door open/close status.

Item	Connector	Terminal	Item	 Continuity

DOOR SWITCH

< DTC/CIRCUIT DIAGNOSIS >

M18	M10	12	Front door switch RH			٥
	13	Back door switch upper RH			A	
		47	Front door switch LH		Yes	
BCM M19			Sliding door switch	Ground	\downarrow	В
	M19 48	Back door switch lower LH		No		
		40	Back door switch lower RH			
		Secondary sliding door switch			С	

Is the inspection result normal?

YES >> Replace BCM. Refer to <u>BCS-62, "Removal and Installation"</u>. NO >> GO TO 4.

4.CHECK DOOR SWITCHES

1. Disconnect door switch harness.

2. Check continuity between door switch terminals while cycling suspect switch open and closed.

Item	Terminals	Continuity	
Front door switch LH			
Front door switch RH	2 - Switch body		
Sliding door switch		No	
Back door switch upper RH		\downarrow	
Back door switch lower LH	2.1	Yes	
Back door switch lower RH	2 - 1		
Secondary sliding door switch			

Is the inspection result normal?

YES >> Repair or replace harness or ground.

NO >> Replace door switch. Refer to <u>DLK-108, "Removal and Installation"</u>.

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< DTC/CIRCUIT DIAGNOSIS >

POWER WINDOW LOCK SWITCH

Diagnosis Procedure

INFOID:000000012520394

1. CHECK POWER WINDOW LOCK SWITCH

Perform the main power window and door lock/unlock switch component inspection. Refer to <u>PWC-23</u>, <u>"POWER WINDOW MAIN SWITCH : Component Inspection"</u>.

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace main power window and door lock/unlock switch. Refer to <u>PWC-42</u>, "<u>Removal and Instal-</u><u>lation</u>".

POWER WINDOW CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS POWER WINDOW CONTROL SYSTEM SYMPTOMS

Symptom Table

INFOID:000000012520395

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Symptom	Reference page
None of the power windows can be operated using any switch.	Refer to PWC-36, "Diagnosis Procedure".
Driver side power window alone does not operate.	Refer to PWC-37, "Diagnosis Procedure".
Front passenger side power window alone does note operate.	Refer to PWC-38, "Diagnosis Procedure".
Auto operation does not operate but manual operates normally.	Refer to PWC-39, "Diagnosis Procedure".
Power window retained power operation does not operate properly.	Refer to PWC-40, "Diagnosis Procedure".
Power window lock switch does not function.	Refer to PWC-41, "Diagnosis Procedure".

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NONE OF THE POWER WINDOWS CAN BE OPERATED USING ANY SWITCH < SYMPTOM DIAGNOSIS >

NONE OF THE POWER WINDOWS CAN BE OPERATED USING ANY SWITCH

Diagnosis Procedure

INFOID:000000012520396

1. CHECK BCM POWER SUPPLY AND GROUND CIRCUIT

Check BCM power supply and ground circuit. Refer to BCS-55, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace the malfunctioning parts.

 $\mathbf{2}$. CHECK MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH

Check main power window and door lock/unlock switch. Refer to <u>PWC-23, "POWER WINDOW MAIN</u> <u>SWITCH : Component Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 3

NO >> Replace main power window and door lock/unlock switch. Refer to <u>PWC-42</u>. "Removal and Installation".

3. CHECK MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH POWER SUPPLY AND GROUND CIRCUIT

Check main power window and door lock/unlock switch power supply and ground circuit. Refer to <u>PWC-22</u>, <u>"POWER WINDOW MAIN SWITCH : Diagnosis Procedure"</u>.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to <u>GI-43, "Intermittent Incident"</u>.
- NO >> Repair or replace the malfunctioning parts.

DRIVER SIDE POWER WINDOW ALONE DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

DRIVER SIDE POWER WINDOW ALONE DOES NOT OPERATE

	Λ
Diagnosis Procedure	A
1. CHECK MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH	В
Check main power window and door lock/unlock switch. Refer to <u>PWC-23</u> , "POWER WINDOW MAIN <u>SWITCH : Component Inspection"</u> .	
Is the inspection result normal?	С
YES >> GO TO 2 NO >> Replace main power window and door lock/unlock switch. Refer to <u>PWC-42, "Removal and Instal-</u> lation".	D
2. CHECK FRONT POWER WINDOW MOTOR LH	
Check front power window motor LH circuit. Refer to <u>PWC-26, "DRIVER SIDE : Diagnosis Procedure"</u> .	Ε
Is the inspection result normal?	
 YES >> Check intermittent incident. Refer to <u>GI-43, "Intermittent Incident"</u>. NO >> Replace front power window motor LH. Refer to <u>GW-15, "Removal and Installation"</u>. 	F
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FRONT PASSENGER SIDE POWER WINDOW ALONE DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

FRONT PASSENGER SIDE POWER WINDOW ALONE DOES NOT OPER-ATE

Diagnosis Procedure

INFOID:000000012520398

1. CHECK POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH RH

Check power window and door lock/unlock switch RH. Refer to <u>PWC-24</u>, "FRONT POWER WINDOW <u>SWITCH (PASSENGER SIDE) : Component Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2

NO >> Replace power window and door lock/unlock switch RH. Refer to <u>PWC-43</u>, "<u>Removal and Installa-</u> tion".

2. CHECK FRONT POWER WINDOW MOTOR RH CIRCUIT

Check front power window motor RH circuit. Refer to <u>PWC-27, "PASSENGER SIDE : Diagnosis Procedure"</u>. <u>Is the inspection result normal?</u>

YES >> Check intermittent incident. Refer to <u>GI-43, "Intermittent Incident"</u>.

NO >> Replace front power window motor RH. Refer to <u>GW-15, "Removal and Installation"</u>.

AUTO OPERATION DOES NOT OPERATE BUT MANUAL OPERATES NORMAL-LY

< SYMPTOM DIAGNOSIS >

AUTO OPERATION DOES NOT OPERATE BUT MANUAL OPERATES NORMALLY

Diagnosis Procedure	¹⁹ B
1. CHECK ENCODER	D
Check encoder. Refer to PWC-29, "Component Function Check".	- C
Is the inspection result normal?	0
 YES >> Check intermittent incident. Refer to <u>GI-43, "Intermittent Incident"</u>. NO >> Replace front power window motor LH. Refer to <u>GW-15, "Removal and Installation"</u>. 	D

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POWER WINDOW RETAINED POWER OPERATION DOES NOT OPERATE PROPERLY

< SYMPTOM DIAGNOSIS >

POWER WINDOW RETAINED POWER OPERATION DOES NOT OPER-ATE PROPERLY

Diagnosis Procedure

INFOID:000000012520400

1. CHECK FRONT DOOR SWITCHES

Check front door switches. Refer to DLK-50, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-43, "Intermittent Incident"</u>.

NO >> Replace the appropriate door switch. Refer to <u>DLK-108</u>, "Removal and Installation".

POWER WINDOW LOCK SWITCH DOES NOT FUNCTION

< SYMF	PTOM DIAGNOSIS >	
POWER WINDOW LOCK SWITCH DOES NOT FUNCTION		
Diagno	osis Procedure	INFOID:000000012520401
1. CHE	CK POWER WINDOW LOCK SWITCH	
Check p	ower window lock switch. Refer to <u>PWC-34, "Diagnosis Procedure"</u> .	
<u>Is the in</u>	spection result normal?	
YES NO	 >> Check intermittent incident. Refer to <u>GI-43, "Intermittent Incident"</u>. >> Replace main power window and door lock/unlock switch. Refer to <u>PWC-42, '</u> lation". 	Removal and Instal-

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MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH

< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH

Removal and Installation

INFOID:000000012520402

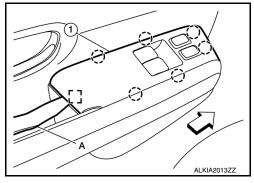
CAUTION:

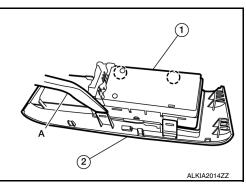
Wrap a cloth around suitable tool to protect components from damage.

REMOVAL

- 1. Beginning at the rear edge, insert a suitable tool (A) and release the metal clip of the main power window and door lock/unlock switch finisher (1).
 - : Metal clip
 - (): Pawl
 - ✓⊐: Front
- 2. Working forward, release the remaining pawls, then remove the main power window and door lock/unlock switch finisher (1) and the main power window and door lock/unlock switch as an assembly from the front door finisher.
- 3. Disconnect the harness connector from main power window and door lock/unlock switch.
- 4. Release the four pawls that retain the main power window and door lock/unlock switch (1) to the main power window and door lock/unlock switch finisher (2) and separate them using a suitable tool (A).

(_): Pawl





INSTALLATION Installation is in the reverse order of removal.

POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH RH

< REMOVAL AND INSTALLATION >

POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH RH

Removal and Installation

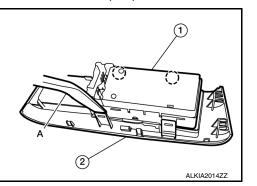
CAUTION:

Wrap a cloth around suitable tool to protect components from damage.

REMOVAL

- 1. Beginning at the rear edge, insert a suitable tool (A) and release the metal clip of the power window and door lock/unlock switch (RH) finisher (1).
 - : Metal clip
 - (): Pawl
 - <⊡: Front</p>
- 2. Working forward, release the remaining pawls, then remove the power window and door lock/unlock switch (RH) finisher (1) and power window and door lock/unlock switch (RH) as an assembly from the front door finisher.
- 3. Disconnect the harness connector from power window and door lock/unlock switch (RH).
- Release the four pawls that retain the power window and door lock/unlock switch (RH) (1) to the power window and door lock/ unlock switch (RH) finisher (2) and seperate them using a suitable tool (A).

(): Pawl



INSTALLATION Installation is in the reverse order of removal.



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