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HOW TO USE THIS MANUAL

HOW TO USE THIS MANUAL

Description

INFOID:0000000013501529

This volume explains “Removal, Disassembly, Installation, Inspection and Adjustment” and “Trouble Diagnoses”.

Terms

INFOID:0000000013501530

- The captions **WARNING** and **CAUTION** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the vehicle.
  WARNING indicates the possibility of personal injury if instructions are not followed.
  CAUTION indicates the possibility of component damage if instructions are not followed.
  BOLD TYPED STATEMENTS except **WARNING** and **CAUTION** give you helpful information.
  Standard value: Tolerance at inspection and adjustment.
  Limit value: The maximum or minimum limit value that should not be exceeded at inspection and adjustment.

Units

INFOID:0000000013501531

- The **UNITS** given in this manual are primarily expressed as the SI UNIT (International System of Unit), and alternatively expressed in the metric system and in the yard/pound system.
  Also with regard to tightening torque of bolts and nuts, there are descriptions both about range and about the standard tightening torque.

“Example”

Range

Outer Socket Lock Nut : 59 - 78 N·m (6.0 - 8.0 kg-m, 43 - 58 ft-lb)

Standard

Drive Shaft Installation Bolt : 44.3 N·m (4.5 kg-m, 33 ft-lb)

Contents

INFOID:0000000013501532

- **A QUICK REFERENCE INDEX**, a black tab (e.g. BR) is provided on the first page. You can quickly find the first page of each section by matching it to the section's black tab.
- **THE CONTENTS** are listed on the first page of each section.
- **THE TITLE** is indicated on the upper portion of each page and shows the part or system.
- **THE PAGE NUMBER** of each section consists of two or three letters which designate the particular section and a number (e.g. “BR-5”).
- **THE SMALL ILLUSTRATIONS** show the important steps such as inspection, use of special tools, knacks of work and hidden or tricky steps which are not shown in the previous large illustrations.
  Assembly, inspection and adjustment procedures for the complicated units such as the automatic transaxle or transmission, etc. are presented in a step-by-step format where necessary.

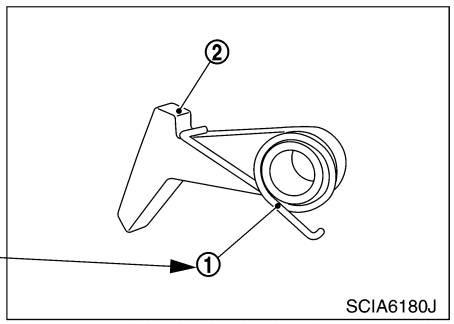
Relation between Illustrations and Descriptions

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The following sample explains the relationship between the part description in an illustration, the part name in the text and the service procedures.

< Example 1 >

1. Remove return spring ① from parking pawl ②.

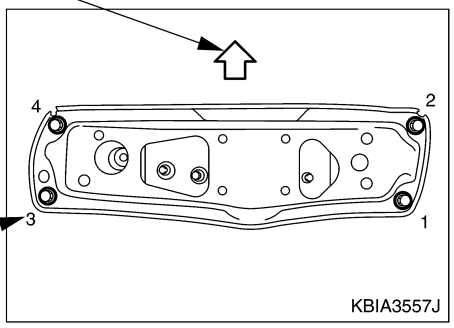


The identifier number of the part name in the text is consistent with the identifier part number in the illustration.

Direction mark

< Example 2 >

- ⇨ : Vehicle front
- Tighten rear member mounting bolts following the numerical order shown in the illustration.
- Note : View upward



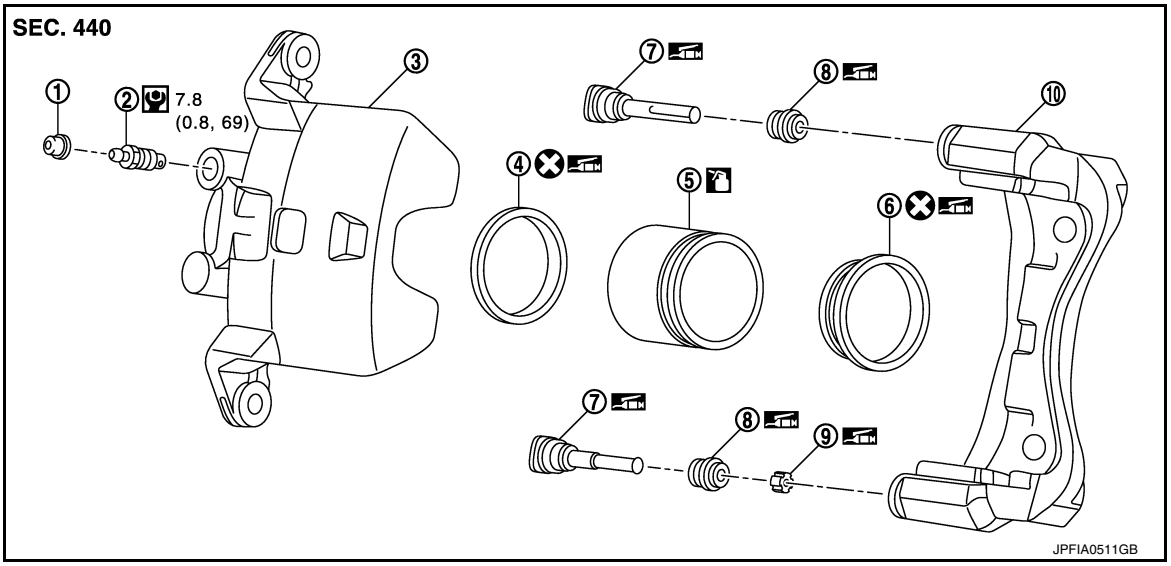
The numbers in the illustration are consistent with the service operation instructions.

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Components

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- **THE LARGE ILLUSTRATIONS** are exploded views (see the following) and contain tightening torques, lubrication points, section number of the **PARTS CATALOG** (e.g. SEC. 440) and other information necessary to perform repairs.
  The illustrations should be used in reference to service matters only. When ordering parts, refer to the appropriate **PARTS CATALOG**.
  Components shown in an illustration may be identified by a circled number. When this style of illustration is used, the text description of the components will follow the illustration.



① Cap
② Bleeder valve
③ Cylinder body
④ Piston seal
⑤ Piston
⑥ Piston boot
⑦ Sliding pin
⑧ Sliding pin boot
⑨ Bushing
⑩ Torque member

: Apply rubber grease.
: Apply brake fluid.
: N·m (kg-m, in-lb)
: Always replace after every disassembly

SYMBOLS

SYMBOL	DESCRIPTION		SYMBOL	DESCRIPTION
	N·m (kg-m, ft-lb)	Tightening torque The tightening torque specifications of bolts and nuts may be presented as either a range or a standard tightening torque.		Always replace after every disassembly.
	N·m (kg-m, ft-lb)		★	Select with proper thickness.
	Should be lubricated with oil.		☆	Adjustment is required.
	Sealing point		⇦	Direction
	Should be lubricated with grease. Unless otherwise indicated, use recommended multi-purpose grease.			Metal clip
Ⓟ	Apply petroleum jelly.			Clip
Ⓛ	Sealing point with locking sealant.			Pawl
ATF	Apply ATF.			

HOW TO FOLLOW TROUBLE DIAGNOSES

Description

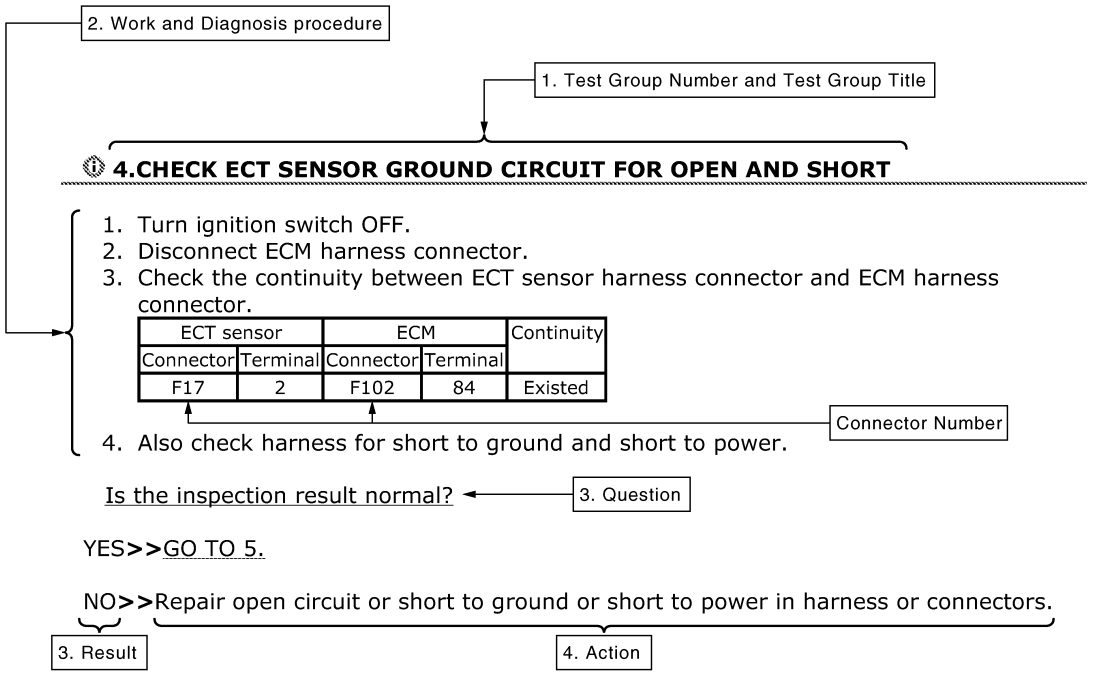
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NOTICE:
Trouble diagnoses indicate work procedures required to diagnose problems effectively. Observe the following instructions before diagnosing.

- Before performing trouble diagnoses, read the “Work Flow” in each section.
- After repairs, re-check that the problem has been completely eliminated.
- Refer to Component Parts and Harness Connector Location for the Systems described in each section for identification/location of components and harness connectors.
- When checking circuit continuity, ignition switch should be OFF.
- Refer to the Circuit Diagram for quick pinpoint check.
  If you need to check circuit continuity between harness connectors in more detail, such as when a sub-harness is used, refer to Wiring Diagram in each individual section and Harness Layout in PG section for identification of harness connectors.
- Before checking voltage at connectors, check battery voltage.
- After accomplishing the Diagnosis Procedures and Electrical Components Inspection, check that all harness connectors are reconnected as they were.

How to Follow Test Groups in Trouble Diagnosis

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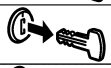
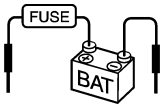


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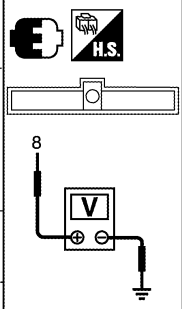
1. Test group number and test group title
   - Test group number and test group title are shown in the upper portion of each test group.
2. Work and diagnosis procedure
   - Start to diagnose a problem using procedures indicated in enclosed test groups.
3. Questions and results
   - Questions and required results are indicated in test group.
4. Action
   - Next action for each test group is indicated based on result of each question.

Key to Symbols Signifying Measurements or Procedures

INFOID:0000000013501537

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	Check after disconnecting the connector to be measured.		Procedure with Generic Scan Tool. (GST, OBD-II scan tool)
	Check after connecting the connector to be measured.		Procedure without CONSULT or GST
	Insert key into ignition switch.		A/C switch is “OFF”.
	Remove key from ignition switch.		A/C switch is “ON”.
	Insert and remove key repeatedly.		REC switch is “ON”.
	Turn ignition switch to “OFF” position.		REC switch is “OFF”.
	Turn ignition switch to “ACC” position.		Fan switch is “ON”. (At any position except for “OFF” position)
	Turn ignition switch to “ON” position.		Fan switch is “OFF”.
	Turn ignition switch to “START” position.		Apply fuse.
	Turn ignition switch from “OFF” to “ACC” position.		Apply positive voltage from battery with fuse directly to components.
	Turn ignition switch from “ACC” to “ON” position.		
	Turn ignition switch from “ACC” to “OFF” position.		

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SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	Turn ignition switch from “OFF” to “ON” position.		Drive vehicle.
	Turn ignition switch from “ON” to “OFF” position.		
	Do not start engine, or check with engine stopped.		Disconnect battery negative cable.
	Start engine, or check with engine running.		Depress brake pedal.
	Apply parking brake.		Release brake pedal.
	Release parking brake.		Depress accelerator pedal.
	Check after engine is warmed up sufficiently.		Release accelerator pedal.
	Voltage should be measured with a voltmeter.		Pin terminal check for SMJ type ECM or TCM connectors. **For details regarding the terminal arrangement, refer to the “ELECTRICAL UNITS” electrical reference page at the end of the manual.**
	Circuit resistance should be measured with an ohmmeter.		
	Current should be measured with an ammeter.		
	Pulse signal should be checked with an oscilloscope.		
	Procedure with CONSULT		
	Procedure without CONSULT		
	Place selector lever in “P” position.		
	Place selector lever in “N” position.		
	Jack up front portion.		
	Jack up rear portion.		
	Inspect under engine room.		
	Inspect under floor.		
	Inspect rear under floor.		

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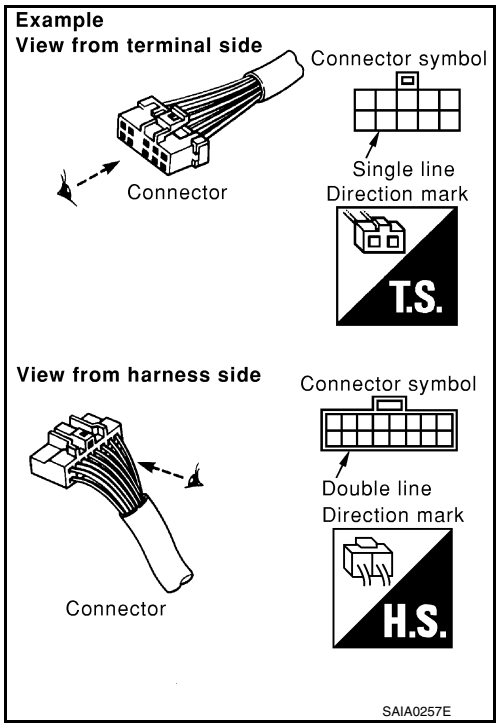
HOW TO READ WIRING DIAGRAMS

Connector Symbols

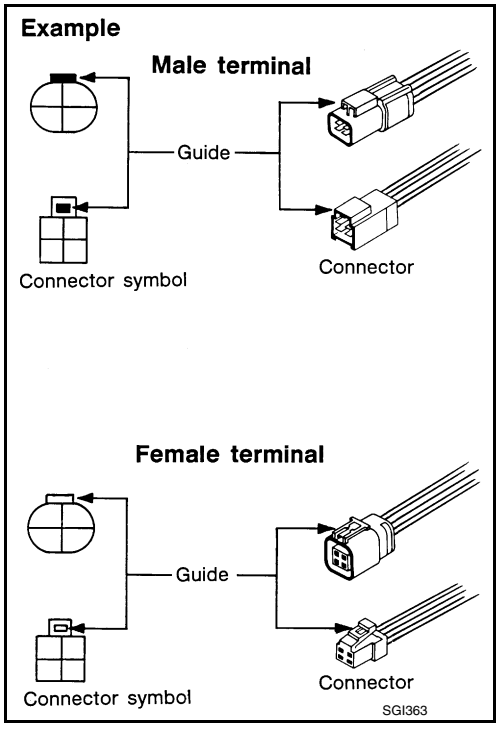
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Most of connector symbols in wiring diagrams are shown from the terminal side.

- Connector symbols shown from the terminal side are enclosed by a single line and followed by the direction mark.
- Connector symbols shown from the harness side are enclosed by a double line and followed by the direction mark.
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG section, “Description”, “HARNESS CONNECTOR”.



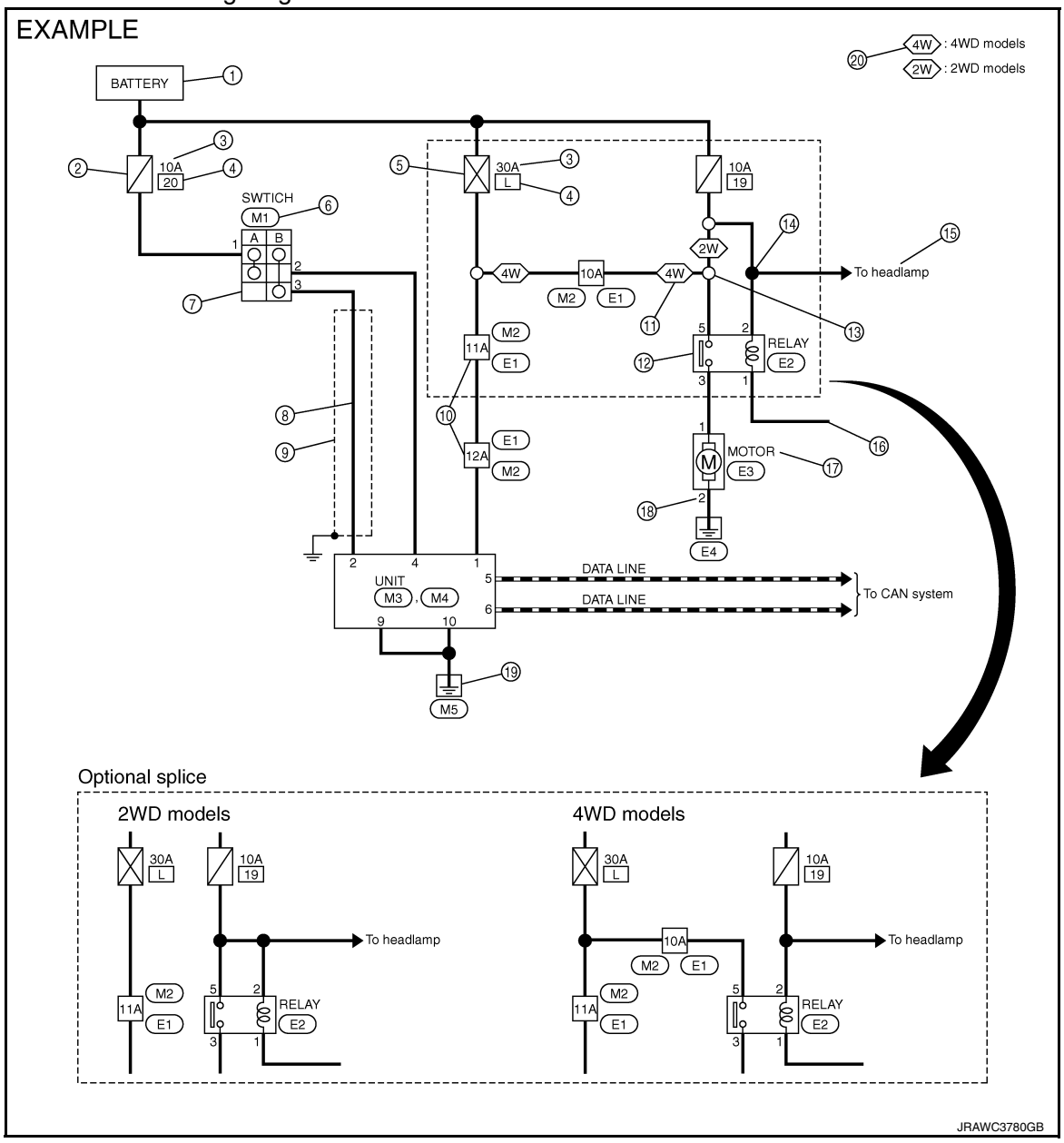
- Male and female terminals
  Connector guides for male terminals are shown in black and female terminals in white in wiring diagrams.



Sample/Wiring Diagram -Example-

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Each section includes wiring diagrams.



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Description

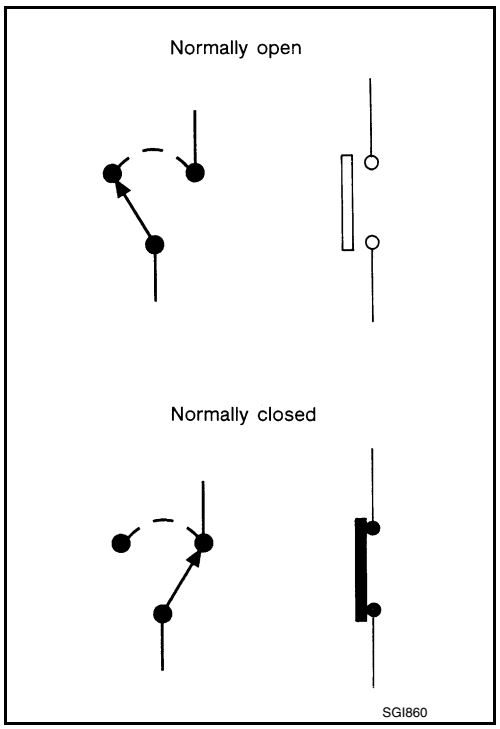
Number	Item	Description
①	Power supply	• This means the power supply of fusible link or fuse.
②	Fuse	• "/" means the fuse.
③	Current rating of fusible link/fuse	• This means the current rating of the fusible link or fuse.
④	Number of fusible link/ fuse	• This means the number of fusible link or fuse location.
⑤	Fusible link	• "X" means the fusible link.
⑥	Connector number	• Alphabetic characters show to which harness the connector is placed. • Numeric characters show the identification number of connectors.
⑦	Switch	• This shows that continuity exists between terminals 1 and 2 when the switch is in the A position. Continuity exists between terminals 1 and 3 when the switch is in the B position.
⑧	Circuit (Wiring)	• This means the wiring.

Number	Item	Description
⑨	Shielded line	• The line enclosed by broken line circle shows shield wire.
⑩	Connectors	• This means that a transmission line bypasses two connectors or more.
⑪	Option abbreviation	• This means the vehicle specifications which layouts the circuit between "○".
⑫	Relay	• This shows an internal representation of the relay.
⑬	Optional splice	• The open circle shows that the splice is optional depending on vehicle application.
⑭	Splice	• The shaded circle "●" means the splice.
⑮	System branch	• This shows that the circuit is branched to other systems.
⑯	Page crossing	• This circuit continues to an adjacent page.
⑰	Component name	• This shows the name of a component.
⑱	Terminal number	• This means the terminal number of a connector.
⑲	Ground (GND)	• This shows the ground connection.
⑳	Explation of option description	• This shows a description of the option abbreviation used on the page.

SWITCH POSITIONS

Switches are shown in wiring diagrams as if the vehicle is in the "normal" condition.
A vehicle is in the "normal" condition when:

- ignition switch is "OFF"
- doors, hood and trunk lid/back door are closed
- pedals are not depressed
- parking brake is released



MULTIPLE SWITCH

The continuity of multiple switch is described in two ways as shown below.

- The switch chart is used in schematic diagrams.

- The switch diagram is used in wiring diagrams.

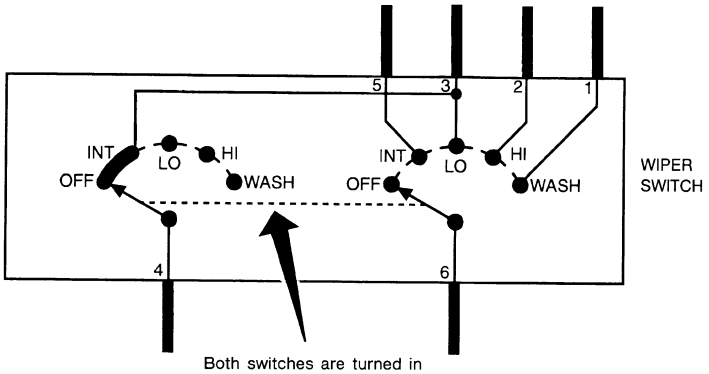
Example

(SWITCH CHART)

WIPER SWITCH

	OFF	INT	LO	HI	WASH
1					○
2				○	
3	○	○	○		
4	○	○			
5		○			
6		○	○	○	○

(SWITCH DIAGRAM)



Continuity circuit of wiper switch

SWITCH POSITION	CONTINUITY CIRCUIT
OFF	3 - 4
INT	3 - 4, 5 - 6
LO	3 - 6
HI	2 - 6
WASH	1 - 6

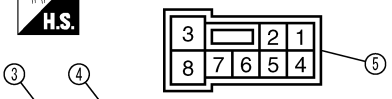
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Connector Information

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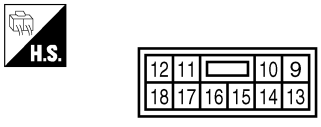
HOW TO USE CONNECTOR INFORMATION

Connector No.	M3
Connector Name	UNIT
Connector Type	NS06FW-M2



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	BAT
2	G	SWITCH B
4	V	SWITCH A
5	L	CAN-H
6	P	CAN-L

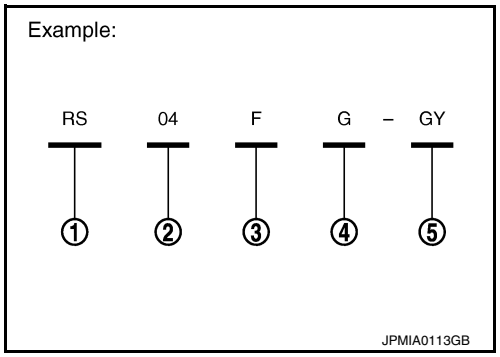
Connector No.	M4
Connector Name	UNIT
Connector Type	NS10FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
9	B	GND
10	B	GND

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Description

Number	Item	Description
①	Connector number	• Alphabetic characters show to which harness the connector is placed. • Numeric characters show the identification number of connectors.
②	Connector type	①: Connector model ②: Cavity ③: Male (M) and female (F) terminals ④: Connector color ⑤: Special type 
③	Terminal number	• This means the terminal number of a connector.
④	Wire color	• This shows a code for the color of the wire. B = Black W = White R = Red G = Green L = Blue Y = Yellow LG = Light Green BG or BE = Beige LA = Lavender BR = Brown OR or O = Orange P = Pink PU or V (Violet) = Purple GY or GR = Gray SB = Sky Blue CH = Dark Brown DG = Dark Green • When the wire color is striped, the base color is given first, followed by the stripe color as shown below: Example: L/W = Blue with White Stripe
⑤	Connector	• This means the connector information. • This unit-side is described by the connector symbols.

ABBREVIATIONS

Abbreviation List

INFOID:0000000013501541

The following **ABBREVIATIONS** are used:

A

ABBREVIATION	DESCRIPTION
A/C	Air conditioner
A/C	Air conditioning
ADCM	AdBlue® dosing control module
A/F sensor	Air fuel ratio sensor
A/T	Automatic transaxle/transmission
ABS	Anti-lock braking system
ACCS	Advance climate control system
ACL	Air cleaner
AGM	Absorbed glass mat
AP	Accelerator pedal
APP	Accelerator pedal position
ASR	Acceleration skid control
ATF	Automatic transmission fluid
AV	Audio visual
AWD	All wheel drive

NOTE:
AdBlue® is the registered trademark of the Verband der Automobilindustrie e.V. (VDA).

B

ABBREVIATION	DESCRIPTION
BARO	Barometric pressure
BAS	Brake assist system
BCI	Back-up collision intervention
BCM	Body control module
BLSD	Brake limited slip differential
BPP	Brake pedal position
BSW	Blind spot warning

C

ABBREVIATION	DESCRIPTION
CKP	Crankshaft position
CL	Closed loop
CMP	Camshaft position
CPP	Clutch pedal position
CTP	Closed throttle position
CVT	Continuously variable transaxle/transmission

D

ABBREVIATION	DESCRIPTION
D_1	Drive range first gear
D_2	Drive range second gear
D_3	Drive range third gear
D_4	Drive range fourth gear

ABBREVIATION	DESCRIPTION
DCA	Distance control assist
DDS	Downhill drive support
DFI	Direct fuel injection system
DLC	Data link connector
DTC	Diagnostic trouble code

E

ABBREVIATION	DESCRIPTION
E/T	Exhaust temperature
EBD	Electric brake force distribution
EC	Engine control
ECL	Engine coolant level
ECM	Engine control module
ECT	Engine coolant temperature
ECV	Electrical control valve
EEPROM	Electrically erasable programmable read only memory
EFT	Engine fuel temperature
EGR	Exhaust gas recirculation
EGRT	Exhaust gas recirculation temperature
EGT	Exhaust gas temperature
EOP	Engine oil pressure
EP	Exhaust pressure
EPR	Exhaust pressure regulator
EPS	Electronically controlled power steering
ESP	Electronic stability program system
ETS	Electronic traction system
EVAP canister	Evaporative emission canister
EVSE	Electric vehicle supply equipment
EXC	Exhaust control

F

ABBREVIATION	DESCRIPTION
FC	Fan control
FCW	Forward collision warning
FEB	Forward emergency braking
FIC	Fuel injector control
FP	Fuel pump
FPCM	Fuel pump control module
FR	Front
FRP	Fuel rail pressure
FRT	Fuel rail temperature
FTP	Fuel tank pressure
FTT	Fuel tank temperature

G

ABBREVIATION	DESCRIPTION
GND	Ground

ABBREVIATION	DESCRIPTION
GPS	Global positioning system
GST	Generic scan tool

H

ABBREVIATION	DESCRIPTION
HBMC	Hydraulic body-motion control system
HDD	Hard disk drive
HO2S	Heated oxygen sensor
HOC	Heated oxidation catalyst
HPCM	Hybrid power train control module

I

ABBREVIATION	DESCRIPTION
I/M	Inspection and maintenance
IA	Intake air
IAC	Idle air control
IAT	Intake air temperature
IBA	Intelligent brake assist
IC	Ignition control
ICC	Intelligent cruise control
ICM	Ignition control module
IPDM E/R	Intelligent power distribution module engine room
ISC	Idle speed control
ISS	Input shaft speed

K

ABBREVIATION	DESCRIPTION
KS	Knock sensor

L

ABBREVIATION	DESCRIPTION
LBC	Li-ion battery controller
LCD	Liquid crystal display
LCU	Local control unit
LDP	Lane departure prevention
LDW	Lane departure warning
LED	Light emitting diode
LH	Left-hand
LIN	Local interconnect network

M

ABBREVIATION	DESCRIPTION
M/T	Manual transaxle/transmission
MAF	Mass airflow
MAP	Manifold absolute pressure
MDU	Multi display unit
MI	Malfunction indicator
MIL	Malfunction indicator lamp

N

ABBREVIATION	DESCRIPTION
NOX	Nitrogen oxides

O

ABBREVIATION	DESCRIPTION
O2	Oxygen
O2S	Oxygen sensor
OBD	On board diagnostic
OC	Oxidation catalytic converter
OD	Overdrive
OL	Open loop
OSS	Output shaft speed

P

ABBREVIATION	DESCRIPTION
P/S	Power steering
PBR	Potentio balance resistor
PCM	Powertrain control module
PCV	Positive crankcase ventilation
PFCW	Predictive forward collision warning
PNP	Park/Neutral position
PSP	Power steering pressure
PTC	Positive temperature coefficient
PTO	Power takeoff
PWM	Pulse width modulation

R

ABBREVIATION	DESCRIPTION
RAM	Random access memory
RAS	Rear active steer
RH	Right-hand
ROM	Read only memory
RPM	Engine speed
RR	Rear

S

ABBREVIATION	DESCRIPTION
SAE	Society of Automotive Engineers, Inc.
SCK	Serial clock
SCR	Selective Catalytic Reduction
SDS	Service Data and Specifications
SRT	System readiness test
SSC	Standstill control
SST	Special Service Tools

T

ABBREVIATION	DESCRIPTION
TC	Turbocharger
TCM	Transmission control module
TCS	Traction control system

ABBREVIATION	DESCRIPTION
TCU	Telematics communication unit
TP	Throttle position
TPMS	Tire pressure monitoring system
TSS	Turbine shaft speed
TWC	Three way catalytic converter

U

ABBREVIATION	DESCRIPTION
USS	Uphill start support

V

ABBREVIATION	DESCRIPTION
VCM	Vehicle control module
VDC	Vehicle dynamics control system
VIN	Vehicle identification number
VSS	Vehicle speed sensor

W

ABBREVIATION	DESCRIPTION
WOT	Wide open throttle

1

ABBREVIATION	DESCRIPTION
1_1	1st range first gear
1_2	1st range second gear
1GR	First gear

2

ABBREVIATION	DESCRIPTION
2_1	2nd range first gear
2_2	2nd range second gear
2GR	Second gear
2WD	2-wheel drive

3

ABBREVIATION	DESCRIPTION
3GR	Third gear

4

ABBREVIATION	DESCRIPTION
4GR	Fourth gear
4WAS	Four wheel active steer
4WD	Four wheel drive

5

ABBREVIATION	DESCRIPTION
5GR	Fifth gear

6

ABBREVIATION	DESCRIPTION
6GR	Sixth gear

7

ABBREVIATION	DESCRIPTION
7DCT	7-speed Dual Clutch Transmission
7GR	Seventh gear

TIGHTENING TORQUE OF STANDARD BOLTS

Description

INFOID:0000000013501542

This vehicle has both new standard based on ISO* and previous standard bolts/nuts. There are some differences between these two types of bolts/ nuts; shape of the head, grade of strength, hexagonal width across flats and the standard tightening torque.

- For guidance in discriminating, refer to GI-20, "Tightening Torque Table (New Standard Included)".
- The new standard machine screws and tapping screws have a head of ISO standard torx recess.
- If the tightening torque is not described in the description or figure, refer to GI-20, "Tightening Torque Table (New Standard Included)".

*ISO: International Organization for Standardization

Tightening Torque Table (New Standard Included)

INFOID:0000000013501543

CAUTION:

- **The special parts are excluded.**
- **The bolts/nuts in these tables have a strength (discrimination) number/symbol assigned to the head or the like. As to the relation between the strength grade in these tables and the strength (discrimination) number/symbol, refer to “DISCRIMINATION OF BOLTS AND NUTS”.**

PREVIOUS STANDARD

Grade (Strength grade)	Bolt size	Bolt diameter mm	Hexagonal width across flats mm	Pitch mm	Tightening torque (Without lubricant)							
					Hexagon head bolt				Hexagon flange bolt			
					N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4T	M6	6.0	10	1.0	5.5	0.56	4	49	7	0.71	5	62
	M8	8.0	12	1.25	13.5	1.4	10	—	17	1.7	13	—
				1.0	13.5	1.4	10	—	17	1.7	13	—
	M10	10.0	14	1.5	28	2.9	21	—	35	3.6	26	—
				1.25	28	2.9	21	—	35	3.6	26	—
	M12	12.0	17	1.75	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	65	6.6	48	—
	M14	14.0	19	1.5	80	8.2	59	—	100	10	74	—
7T	M6	6.0	10	1.0	9	0.92	7	80	11	1.1	8	97
	M8	8.0	12	1.25	22	2.2	16	—	28	2.9	21	—
				1.0	22	2.2	16	—	28	2.9	21	—
	M10	10.0	14	1.5	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	55	5.6	41	—
	M12	12.0	17	1.75	80	8.2	59	—	100	10	74	—
				1.25	80	8.2	59	—	100	10	74	—
	M14	14.0	19	1.5	130	13	96	—	170	17	125	—
9T	M6	6.0	10	1.0	11	1.1	8	—	13.5	1.4	10	—
	M8	8.0	12	1.25	28	2.9	21	—	35	3.6	26	—
				1.0	28	2.9	21	—	35	3.6	26	—
	M10	10.0	14	1.5	55	5.6	41	—	80	8.2	59	—
				1.25	55	5.6	41	—	80	8.2	59	—
	M12	12.0	17	1.75	100	10	74	—	130	13	96	—
				1.25	100	10	74	—	130	13	96	—
	M14	14.0	19	1.5	170	17	125	—	210	21	155	—

CAUTION:

TIGHTENING TORQUE OF STANDARD BOLTS

The parts with aluminum or the cast iron washer surface/thread surface are excluded.

NEW STANDARD BASED ON ISO

Grade (Strength grade)	Bolt size	Bolt diameter mm	Hexagonal width across flats mm	Pitch mm	Tightening torque							
					Hexagon head bolt				Hexagon flange bolt			
					N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4.8 (Without lubricant)	M6	6.0	10	1.0	5.5	0.56	4	49	7	0.71	5	62
	M8	8.0	13	1.25	13.5	1.4	10	—	17	1.7	13	—
				1.0	13.5	1.4	10	—	17	1.7	13	—
	M10	10.0	16	1.5	28	2.9	21	—	35	3.6	26	—
				1.25	28	2.9	21	—	35	3.6	26	—
	M12	12.0	18	1.75	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	65	6.6	48	—
	M14	14.0	21	1.5	80	8.2	59	—	100	10	74	—
4.8 (With lubricant)	M6	6.0	10	1.0	4	0.41	3	35	5.5	0.56	4	49
	M8	8.0	13	1.25	11	1.1	8	—	13.5	1.4	10	—
				1.0	11	1.1	8	—	13.5	1.4	10	—
	M10	10.0	16	1.5	22	2.2	16	—	28	2.9	21	—
				1.25	22	2.2	16	—	28	2.9	21	—
	M12	12.0	18	1.75	35	3.6	26	—	45	4.6	33	—
				1.25	35	3.6	26	—	45	4.6	33	—
	M14	14.0	21	1.5	65	6.6	48	—	80	8.2	59	—
8.8 (With lubricant)	M6	6.0	10	1.0	8	0.82	6	71	10	1.0	7	89
	M8	8.0	13	1.25	21	2.1	15	—	25	2.6	18	—
				1.0	21	2.1	15	—	25	2.6	18	—
	M10	10.0	16	1.5	40	4.1	30	—	50	5.1	37	—
				1.25	40	4.1	30	—	50	5.1	37	—
	M12	12.0	18	1.75	70	7.1	52	—	85	8.7	63	—
				1.25	70	7.1	52	—	85	8.7	63	—
	M14	14.0	21	1.5	120	12	89	—	140	14	103	—
10.9 (With lubricant)	M6	6.0	10	1.0	10	1.0	7	89	12	1.2	9	106
	M8	8.0	13	1.25	27	2.8	20	—	32	3.3	24	—
				1.0	27	2.8	20	—	32	3.3	24	—
	M10	10.0	16	1.5	55	5.6	41	—	65	6.6	48	—
				1.25	55	5.6	41	—	65	6.6	48	—
	M12	12.0	18	1.75	95	9.7	70	—	110	11	81	—
				1.25	95	9.7	70	—	110	11	81	—
	M14	14.0	21	1.5	160	16	118	—	180	18	133	—

CAUTION:

1. **Use tightening torque with lubricant for the new standard bolts/nuts in principle. Friction coefficient stabilizer is applied to the new standard bolts/nuts.**
2. **However, use tightening torque without lubricant for the following cases. Friction coefficient stabilizer is not applied to the following bolts/nuts.**

- **Grade 4.8, M6 size bolt, Conical spring washer installed**
- **Paint removing nut (Size M6 and M8) for fixing with weld bolt**

DISCRIMINATION OF BOLTS AND NUTS

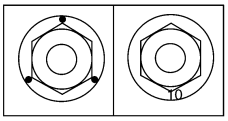
BOLTS

	Grade (Strength)	Discrimination	
Previous standard	4T ($392N/mm^2$)	4	(No number/ symbol)
	7T ($686N/mm^2$)	7	
	9T ($883N/mm^2$)	9	
New Standard	4.8 ($420N/mm^2$)	4.8	(No number/ symbol)
	8.8 ($800N/mm^2$)	8.8	
	10.9 ($1040N/mm^2$)	10.9	

NUTS

	Grade (Proof load stress)	Discrimination		
Previous standard	7N ($686N/mm^2$)	(No number/ symbol)		
	9N ($883N/mm^2$)	9		
New Standard	8 ($800N/mm^2$)	8		(No number/ symbol)
	10 ($1040N/mm^2$)	10		

NOTICE:
- A number is assigned on the side of the nuts in some cases.
- A number or symbol is assigned on the upper surface of the flange for the nut with flange.



MACHINE SCREWS AND TAPPING SCREWS

Shape of the head :
Cross recess for the previous standard
Torx recess for the new standard

Screw size	Screw diameter	Torx size
M4	4.0	T20
M5	5.0	T20
M6	6.0	T30

NOTICE:
Use torx size T20 (united with M4 screw) for M5 screw although ISO standard specifies T25.

SAIA0453E

PRECAUTION

PRECAUTIONS

Description

INFOID:0000000013501544

Observe the following precautions to ensure safe and proper servicing. These precautions are not described in each individual section.

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

INFOID:0000000013501545

Risk of injury

There is a risk of injury caused by parts becoming projectiles if uncontrolled deployment of air bag or seat belt pre-tensioner occurs, or by storing air bag with the deployment side facing downwards. When scrapping air bag or seat belt pre-tensioner by means of controlled deployment, there is also a danger present if a sufficiently safe distance is not maintained, or if opening using cutting torches or other cutting tools, or due to smelting or if parts that are not yet triggered are exposed to a blaze or a smoldering fire at landfills.

Safety instructions/precautions

- Removed air bag must always be stored with deployment side facing up.
- Acquisition, transportation, storage, testing and assembly work should only be performed or supervised by properly trained personnel.
- Install air bag or seat belt pre-tensioner immediately following retrieval from storage.
- Air bag and seat belt pre-tensioner must be protected from flying sparks, open fires and temperature exceeding 100°C (212°F).
- Never transport air bag and seat belt pre-tensioner in the passenger compartment. Store them securely in the luggage room of the vehicle in their original replacement part packaging and secure them so that they cannot slip around.
- Never allow air bag and seat belt pre-tensioner to come into contact with grease, oil, or cleaning agents.
- Perform system tests using approved testing equipment only, and only when the units are properly installed and the vehicle is unoccupied.
- Before the initial hookup of the battery or an external power supply, the ignition must be switched on and the vehicle unoccupied.
- Air bag and seat belt pre-tensioner that fall from a height of more than 0.5 m must be replaced.
- When scrapping by means of controlled deployment of air bag and seat belt pre-tensioner, a safe distance of at least 10 m must be maintained.
- Before starting work on air bag and seat belt pre-tensioner and work on components that are connected to air bag and seat belt pre-tensioner or require and intervention in their electric circuit (e.g. when removing the steering wheel):

- Disconnect any external power sources (e.g. charger).
- Disconnect and insulate ground line of battery

- Before starting bodywork in combination with welding or retrofitting, during which work is performed on uninsulated, current-carrying lines or require an intervention in their electric circuit (e.g. when removing the steering wheel):

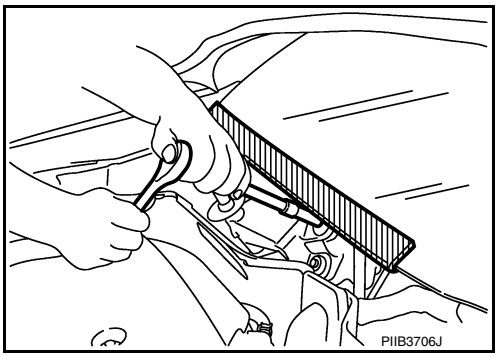
- Disconnect any external power sources (e.g. charger).
- Disconnect and insulate ground line of battery.
- During welding, disconnect plug connection and from control unit of air bag.

- When the air bag deploys, the pyrofuse activates and the power source from the battery is disconnected. This prevents possible fires caused by electric leakage after an accident occurs.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000013501546

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

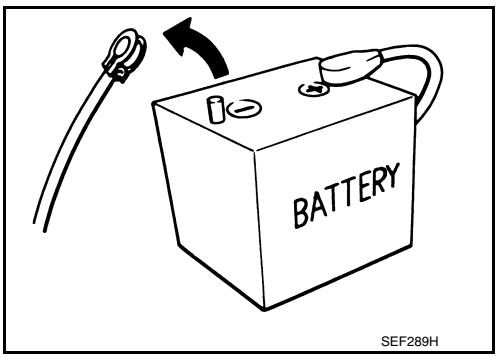


Precautions for Removing Battery Terminal

INFOID:0000000013501547

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:



BR08DE	: 4 minutes	YD25DDTi	: 2 minutes
D4D engine	: 20 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		
V9X engine	: 4 minutes		

NOTE:
ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

NOTE:
- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
  - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
  - Driving for 30 minutes or more on a steep slope.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

NOTE:
If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

NOTE:
The removal of 12V battery may cause a DTC detection error.

Notes on the Use of Paint Scraping Nuts on Ground Connections

INFOID:0000000013501548

To ensure that an electrically conductive connection process can be made through a painted ground connection to the body, it is absolutely essential that only the new developed paint scraping nut is used for the ground connections. The paint scraping nut technique ensures that paint is removed during the screwing-on process and therefore an electrical connection set up between the external thread of the ground connection and the inside thread of the nut.

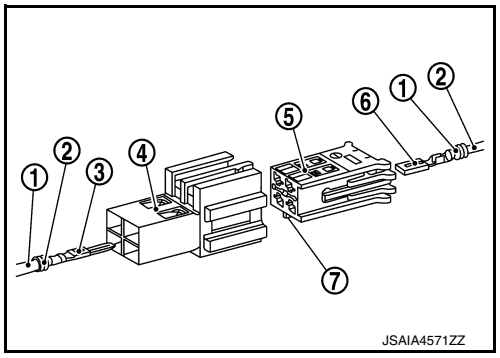
The following should still be observed:

1. Assignment of new ground connections:
   If, for retrofits, a ground connection that was not previously used is assigned, make sure that the contact surface of the cable lug is flat (no welding splatter or suchlike), to ensure that the threaded connection does not result in tension or deformation to the cable lug.
2. Repeated use of paint-scraping nut:
   Before screwing on the paint-scraping nut to the ground connection again, paint abrasion in the grooves of the paint-scraping nut must be removed (e.g. using compressed air).
3. Paintwork rectification in ground connection area:
   To avoid any excessively thick paint coats, paintwork protection must be applied to the connection prior to any paintwork rectification in the ground connection area (e.g. screwed-on nut or cap).

Notes Regarding Plug Connections

INFOID:0000000013501549

Terminology of plug connections:
The coupling and the plug from a plug connection. The female contact and the contact pin from the contact pair.



① Cable
② Single-strand insulation (only on watertight connections)
③ Contact pin (male)
④ Connector (male)
⑤ Coupling (female)
⑥ Female contact
⑦ Coding lug (identification)

Plugs and couplings
The plugs and couplings are grouped into families in the same way as the contact groups. The type and shape of the receptacle chambers in the housing is the major differentiating characteristic. Different contact families may be installed in the same housing. In addition, different codings (e.g. A, B, C) may exist within the same plug/coupling family.
Codings are special profiles or teeth on the housings of the coupling and the plug, which may be marked in different colors (e.g. black, white, violet).
These ensure that connector pairings can only be made with the same codings.

Safety and restraint systems (air bag, emergency tensioning retractor, roll bar) have yellow, orange, or red plug connections for easy identification.

Part number assignments
the housings are assigned according to the part numbers on the housings. On housings made up of several components, the number on the external housing is critical. (When ordering, all the individual part number must be ascertained).
This method of identification by means of part numbers can be used when referring to the literature.

Contacts
A distinction is made between the contact pin and the female contact. Each contact pin and each female contact can be clearly assigned to one group or “family”. Within these families distinctions are made according to the cable cross section and whether there is single-strand insulation for watertight connections. The contacts are also distinguished by their coating (tin, gold or silver).
The contacts are fastened to the cables by means of crimping.

Crimp connections
Crimped connections are used to connect female contacts or contact pins to the line. Each contact type must be crimped with the aid of specifically assigned die sets using a pair of pliers.
Determining factors: contact family, size of cable cross section, with or without single-strand insulation.
NOTE:
Only lines up to 4 mm^2 shall be crimped.

Unpinning
This requires a release tool appropriate to the contact family in order to remove female contacts and contact pins from plugs and couplings.
On some plugs and couplings the housings must first be disassemble and unlocked (secondary release) according to the instructions before the actual unpinning.

Contact materials
The contacts used in the interior of the vehicle are primarily tin/tin combinations. Those used on the exterior and in the splash zone are generally silver/silver. Safety systems (particularly the air bag) are equipped with gold/gold contacts.
NOTE:
“Similar” contact pairs with the same contact surface (coating) are required for the repair.

Notes on Cable Protection

INFOID:0000000013501550

An attempt should be made to restore the cable protection to its original condition after all repairs to wiring harnesses.
In areas exposed to particularly high stresses (e.g. dampness, scouring), additional safety precautions may however be required.
Perform the following measures to match the application:
- Protection of repair area with heat-shrinkable tube
- Protection of repair point by corrugated hose
- Protect repair point by wrapping with fabric tape

Notes on Threaded Connections with Aluminum Screws/Bolts

INFOID:0000000013501551

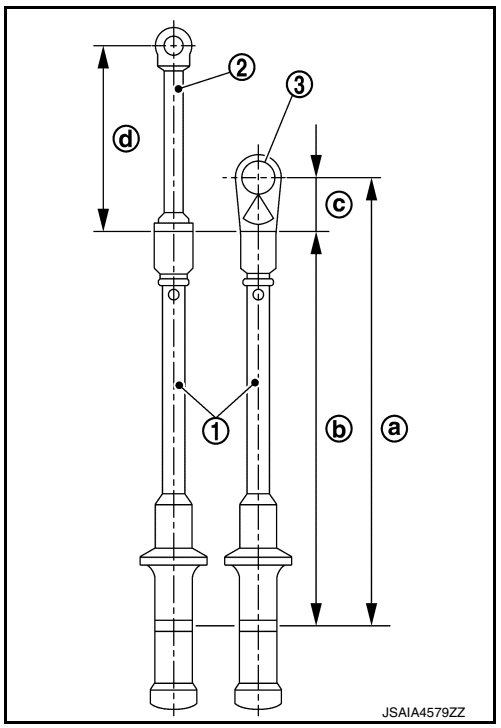
For bolted connections with aluminum bolts, the aluminum bolts must always be replaced once they have been used. However, before new aluminum bolts are screwed in, the mating thread has to be cleaned thoroughly.
Otherwise, the threaded connection may be released or work its way loose unintentionally.
CAUTION:
When releasing bolted connections with aluminum bolts the sudden loosening torque may present a risk of injury.

Notes on Calculating Tightening Torque when Using Insertion Tool with Various Effective Lengths.

INFOID:0000000013501552

The working length of the insertion tool② plugged onto the torque wrench① changes the leverage of the torque wrench①. This in turn alters the actual tightening torque. Therefore the tightening torque to be set has to be calculated as a function of the working length of the insertion tool② and the specified tightening torque.

① Torque wrench
② Insertion tool
③ Adjusting tool
ⓐ Standard adjusting length using adjusting tool
ⓑ Working length of torque wrench
ⓒ Internal caliper of adjusting tool
ⓓ Internal caliper of insertion tool



The following formula is used to calculate the torque to be set.
MDE: Torque to be set
MDE=(MDV*(b+c))/(b+d)

Notes on Soft Soldering

INFOID:0000000013501553

General
Soft-soldering is a process for creating an inseparable join between two or more metal parts using additional metals (e.g. soldering tin). The solder melting temperature lies below the melting temperature of the metals to be joined and is lower than 450 °C (842 °F).
The connection is created by wetting the joint locations with hot liquid solder, without melting the parts to be jointed.
The joining procedure is assisted by used a flux, which releases surface oxides on the parts to be joined, eliminating and preventing surface films (e.g. greases).

Soft soldering materials
The soldering alloy determines its melting point and thus the working temperature during the soft soldering process. Additives modify the properties. Silver components improve, e.g. the surfaces and joining properties. Ensure that lead-free solder is used.

Soft solders are identified according to DIN EN 61190-1-3 or DIN EN 294453/ISO 9453.
Example: ELSOLD soft solder FLOWTIN TC07 Sn99, 7Cu0.7
The alloy consists of 99.7 % tin (SN) and 0.7 % copper (Cu)
The melting range is 227 °C (440.6 °F).
In the electrical system/electronic sector for vehicle, fast solders with a melting point range of approx. 180 °C (356 °F) to 227 °C (440.6 °F) should be used. These solders are available in the form of wires. They have flux from resins dissolved in alcohol (e.g. colophonium) in their hollow center.

Soldering equipment
Soldering equipment with soldering tips that can reach a temperature of 250 °C (482 °F) to 300 °C (572 °F) are suitable for the repairs specified. The aim is to use automatic temperature regulated equipment (e.g. soldering stations).

Preparation, general
- Use suitable work clothing.
- Use safety glasses.
- Use any available soldering fume extractors, aeration.
- Verify clamping devices and work surfaces.
- Clean soldering tips with small wet sponge.
- Protect surrounding working area from heat damage.

Preconditions for soldering
Soldering points must be clean, free of grease and oxides.

Notes on Replacing Safety-relevant Components

INFOID:0000000013501554

- General
  With the enabling of repair solutions on wiring harnesses (in particular air bags, side air bags, window bags as well as seat belt retractor wiring harnesses) it is necessary to introduce a modified order placement routine for the procurement of safety-relevant components (SRC). The ordering formalities are essentially similar to the previously mentioned, theft-relevant components (DRT).

- Procedure
  Safety-relevant parts can only be ordered by quoting the vehicle identification number (observe parts ordering notes on replacement part microfiche).
  The repair orders and invoices are to be filed in the known manner.
  All incoming orders for safety-relevant components are also automatically recorded in the vehicle documentation system.

Advantages of Repairing Wiring Harnesses

INFOID:0000000013501555

Advantages of repairing wiring harnesses
- Wiring harnesses are essentially repaired to reduce repair costs.
- If repairs are carried out properly, there is no difference in function or quality between the repaired wiring harness and a brand new wiring harness.
- Repairing wiring harnesses helps to save resources.
- This also complies with the “Technical Alliance Center” requirements on reducing disassembly and assembly work.

Notes on Bolted Connections with Self Tapping Screws

INFOID:0000000013501556

- Terms
  “Self-forming” is the generic term and includes both “thread-rolling” and “thread- cutting”. Only thread forming screws of the globally applicable “TAPTITE” standard are dealt with in the following.

- Properties
  Thread forming screws create a screw-in thread in prefabricated core holes, usually by means of beveled crests.
  The screw-in thread that are created by thread-forming screws can accommodate screws with ISO metric threads (standard screws) without problems.
  Self-tapping screws are automatically centered when they are first manually screwed in.
  The screw-in thread has to be cleaned using compressed air; wear safety glasses while doing so.

Repairs and replacements:
- The reuse of an existing or another used thread rolling screw is permissible if the screw is undamaged.
- It is permissible to fit a new thread-rolling screw into a screw-in thread that already exists.
- A thread-rolling screw may be replaced with a new or used standard screw. The length of the standard screw must be three threads (tapping point) smaller than the length of the originally installed thread rolling screw.

CAUTION:
With safety-relevant components (e.g. front axle integral carrier), no standard screws/bolts may be used.
Only self-tapping screws may be installed here.

Measures for Preventing Damage to Vehicles or Components when Performing Electric Welding Work

INFOID:0000000013501557

The following measures must be observed prior to the start of welding, to avoid damage to diverse vehicle components:
1. Have fire extinguishers at the ready.
2. The negative terminal clamp of the battery must be disconnected and the negative terminal covered up.

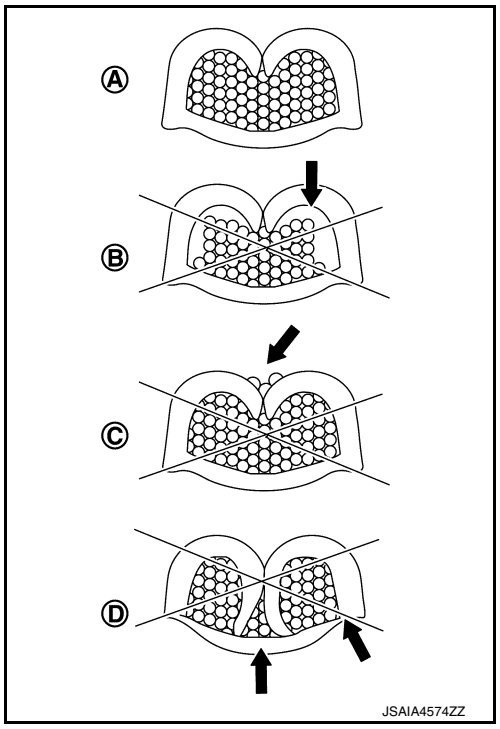
3. On vehicles with air bag, detach the red, 12-pin test connector / connector at the earliest two seconds after disconnecting the battery (risk of inadvertent activation).
4. Attach protective shields to prevent flying sparks and radiated heat in endangered areas.
5. Do not touch electronics housings or electrical lines with the welding electrode or the welder′s ground connection.
6. If two parts are welded to one another, connect the negative clamp of the welding equipment to both parts.
7. Make direct connection between the electrical welder′s ground connection and the part being welded. Ensure that there are no electrically insulating parts between the ground connection and the point being welded.
8. Protect or remove any parts that are sensitive to heat such as plastic cables.
9. Before welding, be sure to remove routed electrical lines and/or pipelines as well as concealed containers or electronic components from the hazard area.
10. The connection points on the part to be welded on the vehicle and the ground terminal on the electric welder must be as bright as possible; for this reason, thoroughly remove paint, corrosion, oil, grease and contamination.
11. The ground terminal of the welding equipment must not be attached to the transmission. The welding current can cause arcing at the bearing points inside the transmission. The structural changes that this causes lead to premature failure of the equipment.

Notes on Crimping

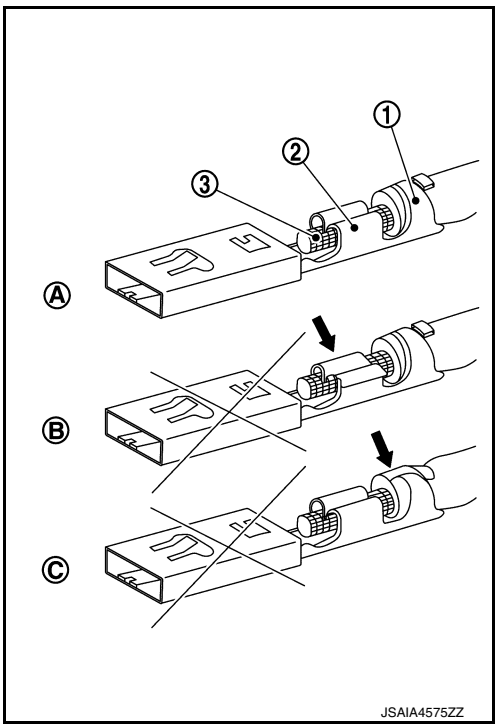
INFOID:0000000013501558

1. Check crimped connections for correct forming and filling (cross-section, ensure leads are enclosed correctly).
   - Correct crimped connectionⒶ:
     The strands of the cable are evenly enclosed.
     The crimp tab is evenly shaped.
   - Incorrect crimped connectionⒷ:
     The crimp tab has an incorrect cross-section and is not full enough.
   - Incorrect crimped connectionⒸ:
     Individual wire strands are outside the crimp shackle.
     The crimp tab is too full.
   - Incorrect crimped connectionⒹ:
     The crimp claws touch the bottom of the crimped fitting.
     The crimp tab is too full.
     The crimp tab is deformed and therefore damaged.

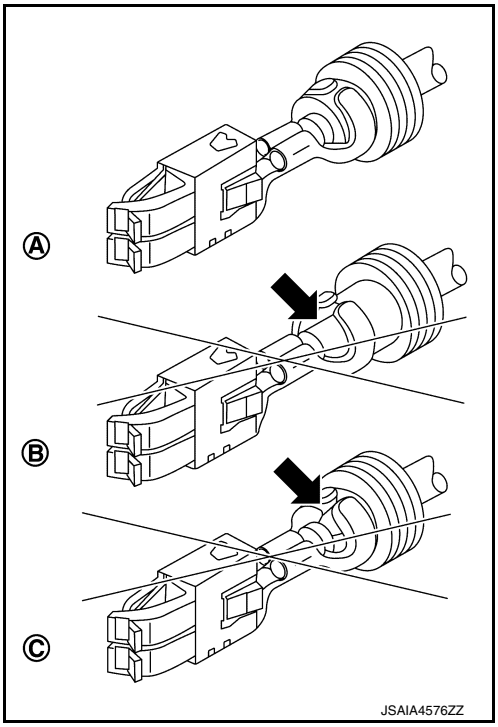
   Shown with circular conductor



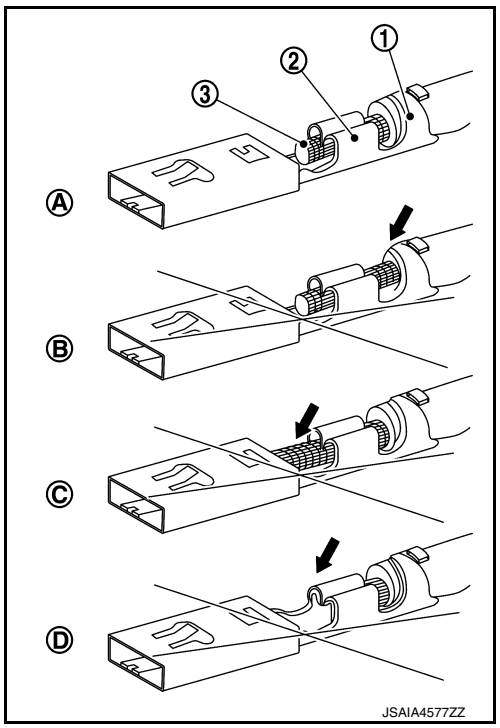
2. Check crimped connection without single-strand insulation (ensure line is enclosed correctly).
   - Correct crimped connectionⒶ:
     Leads③ enclosed correctly by the tab②.
     Insulation is enclosed correctly by the tab①.
   - Incorrect crimped connectionⒷⒸ:
     Leads③ are damaged due to deformed tab②.
     Insulation is pinched by deformed tab① and damaged.



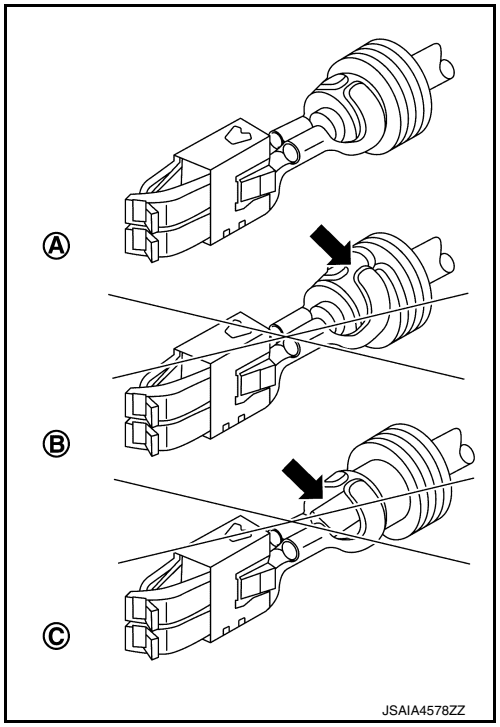
3. Check crimped connection with single-strand insulation (ensure line is enclosed correctly).
   Insulation and single-strand insulation must be positioned in the center and enclosed completely by the crimp tab and they must be able to take up tensile force.
   Single strand insulation must not be pinched, as otherwise water ingress can cause contact corrosion.
   - Correct crimped connectionⒶ:
     Wire strands are enclosed correctly by the shackle. Insulation and single-strand insulation are enclosed correctly by the large shackle. All parts can withstand the required tensile force.
   - Incorrect crimped connectionⒷⒸ:
     The single-strand insulation is not enclosed by the shackle because it was inserted incorrectly during the crimping procedure.
     The Crimped area of the single-strand insulation is damaged because the wrong die set or wrong single-strand insulation was used.



4. Check crimped connection without single-strand insulation (ensure leads and insulation are of correct length).
   - Correct crimped connectionⒶ:
     Correct length of insulation is enclosed by the shackle①.
     wires③ are the correct length in the tab②.
   - Incorrect crimped connectionⒷ:
     Insulation is too short and is not correctly enclosed by the tab①.
     Therefore insulation cannot withstand the required tensile load.
   - Incorrect crimped connectionⒸⒹ:
     Wire strands③ are too long.
     Leads③ are too short.



5. Check crimped connection with single-strand insulation (check for correct length and distance of leads and insulation, as well as position and condition of seal).
   - Correct crimped connectionⒶ:
     Insulation and wires are of the correct length in the shackles. Correct distance between the single-strand insulation and the end of insulation.
   - Incorrect crimped connectionⒷⒸ:
     The single-strand insulation is damaged because the distance between seal and end of insulation is too small.
     Stripped strands are too long, single-strand insulation is therefore not crimped.



Notes on Replacement of Safety-relevant and Special Components

INFOID:0000000013501559

Yellow, orange or red-colored plugs and connectors are reserved for the supplemental restraint system (SRS), roll bars and high-voltage components.
Work on high-voltage components or hybrid components may only be conducted by skilled workshop personnel. All electrical lines installed in vehicle′s high-voltage on-board electrical system are marked with the warning color orange. If the chafe protection on the electrical lines of the high-voltage on-board electrical system is damaged or the lines are damaged due to external influences (e.g. animal bite), the lines must be replaced immediately. Repair is not permissible.
Always observe the following when repairing connectors for squibs [supplement restraint system (SRS)]:
The repair point must be between 100 mm (3.937 in) and 1,000 mm (39.37 in) behind the squib, Lines which have already been repaired are provided with a yellow marking. This is to be applied retroactively to repair lines without color coding.

Before cutting through the lines, it is absolutely essential to assign the lines to the corresponding pins in accordance with the wiring diagram. Do not mix up the pin assignment.
The line colors of the repair kit may deviate from the original fitting. Shielded lines and light plastic-sheathed lines must never be repaired.
In general, the following applies for line repairs:
If more than ten lines per branch-off line are damaged, the wiring harness module must be replaced.

- Overview of lines/contacts which may not be repaired
  Any damage to the following lines/contacts always results in the replacement of the wiring harness or the line:
- Antenna lines
- Digital data bus (D2B)
- Media Oriented System Transport (MOST)
- Telephone receiver lines
- Electronic Stability Program (ESP®) lines
- 115 V / 230 V socket inverter
- Magic Sky inverter
- Solar roof inverter
- Dynamic seat
- Multicontour seat
- Supplemental restraint system (SRS) control unit connector
- Cables more than 6 mm
- Aluminum lines
- “High Speed Data” video lines

- Overview of lines/contacts which may be repaired using a repair wiring harness
  Damage to the following lines/contacts may only be repaired using genuine repair kits:
- SRS squib connector
- Pyrofuse connector
- LED ambient lighting
- Contacts on 0.13 mm^2 lines

- Overview of shielded lines at the engine wiring harness, on which only the contacts may be repaired
  In case of damage to the following lines, the wiring harness must always be replaced. If only the contacts are damaged, these may be repaired:
- Knock sensor lines
- Injector lines
- Oxygen sensor lines
  NOTE:
  Oxygen sensor lines are partially shielded; please observe the wiring diagram.

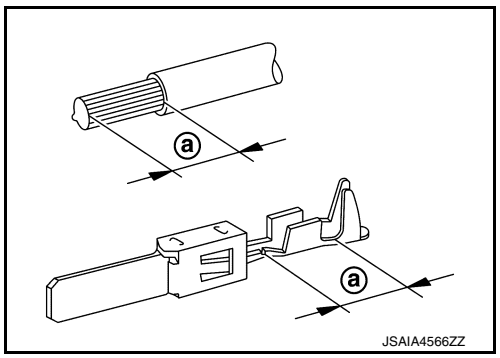
Repair Methods for Wiring Harnesses

INFOID:0000000013501560

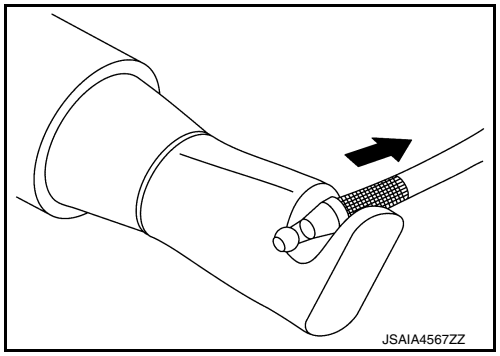
The following methods have been approved for repairing wiring harness.
Repair methods:
- Crimping
- Solder connection (Raychem)
- Axial solder connection (Raychem)
- Combination of Ryachem and cable tail
- Soldering
- Rapid connection technology
- Flat conductor pliers

Application
Individual cases must be analyzed in detail to decide which method can and cannot be used to repair wiring harnesses (wires, contacts and connectors).

- Crimping repair method
  In crimping, a cable is stripped off beforehand to a distance ⓐ with the aid of a preformed die, the cable is then crimped to the contact pin using special pliers. Crimping is performed quickly and with ease. A special crimper is required.
  NOTE:
  Only cables up to 4 mm^2 may be crimped.



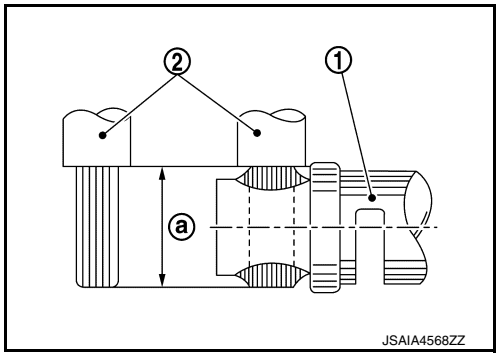
- Raychem repair method
  With this method, special solder connectors are used. The solder connections contain the solder and they also feature insulation and a seal. A special hot air blower provides the heat required for soldering and shrinking the insulation. A special reflector is fitted to the hot air blower.
  The temperature for this repair method is 400 °C (752 °F).
  NOTE:
  Raychem is the manufacturer of the solder connectors that are required for this method. The Raychem repair method is mainly used for integrating repair wiring harnesses (cable tails).



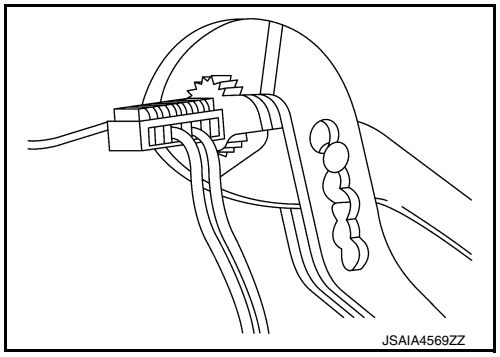
- Combination of Raychem repair method and cable tail repair
  Cable tails are prefabricated partial wiring harness kits available as replacement parts. They have the appropriate cable cross-sections and crimped contacts. The Raychem repair method is to be used to integrate the cable tails into the wiring harnesses.
  NOTE:
  Use cable tails for cables from 4 to 10 mm^2 only. As from 10 mm^2 the wiring harnesses have to be replaced.

- Soldering repair method
  The strands of the cable ② are soldered in the solder contact (axial or radial version) ① using a soldering iron. Commercially available solder is used for the soldered connection. This method is only used for repairing connectors.

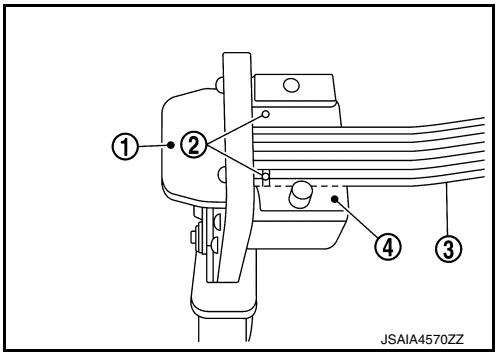
  ⓐ Distance of the conducting wire



- Repair method using rapid connection technology
  The method uses special rapid-connection wire connector blocks. They contain tin-plated rapid connection contacts, which are pressed together to touch the wires of the cables using pliers. The lines do not have to be separated or stripped.
  This method can be used for connection to cables with a cross section 0.35 to 0.75 mm^2 and as an end-to-end cable connection.
  NOTE:
  The rapid connection method must only be used inside the vehicle or it the trunk because the connection is not watertight. They are not permissible for CAN lines.



- Flat conductor cable repair method
  Select crimp contacts in the wiring harness repair lit and insert into the tool head of the open manual crimp pliers①. The flat conductor cable③ must make contact with the tool head, and the correct edge of the flat conductor cable③ must make contact with the adjusting stop④. The optical adjusting device② in the manual crimp pliers① must be fully visible between 2 conductor tracks. Press the manual crimp pliers① together all the way.After it has been pressed down all the way, it can be opened again. Remove the finished crimp connection.



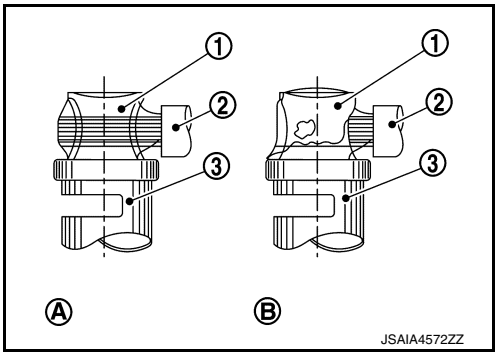
Notes on Soldering

INFOID:0000000013501561

Ensure that lead-free solder is used. Heat the parts to be joined and the solder evenly. Avoid heat-dissipating mounts and brackets. When connecting wires and component connections, the soldering process takes 2 to 4 seconds depending on the cross-section. It takes the same amount of time for hardening. Unnecessarily high heating and associated damage to components must be avoided.
During pauses in soldering, it must be ensured that the soldering tip remains adequately tin-plated.

Surface of the soldering join

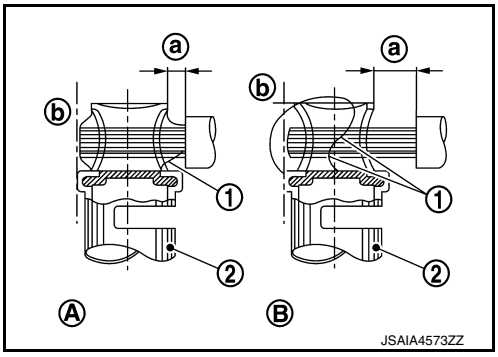
- Correct solder connectionⒶ:
  The solder surface① is smooth, shiny, no sharp edges, no interruptions, fluid and free of residues and oxidation.
- Incorrect solder connectionⒷ:
  The surface of the solder① is matt and uneven, it has sharp-edged ends, interruptions, has not flown, covered with residue.



① Plumb line (Solder surface)
② Cable
③ Solder connector

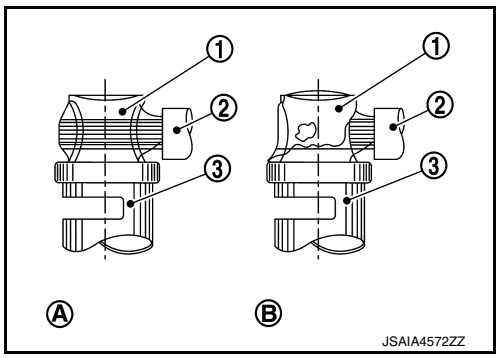
Wire position and contour of soldering join

- Correct solder connectionⒶ:
  The distanceⓐ between the solder connector② and the line insulation is about 1 mm. The soldered area does not extend beyond the collar of the solder connector②. Solder flows in a radius towards the line insulation and surrounds at least 2/3 of the lead outside the solder connector②. There are no bare copper wires visible in the soldering area.
- Incorrect solder connectionⒷ:
  If the distanceⓐ between the solder connector② and the line insulationⓐ is greater than 2 mm (0.078 in), the line is incorrectly inserted. The solder protrudes beyond the extension lineⓑ from the collar of the solder connector②. The solder flows in the wrong direction, the transition from solder to lead is jagged, the solder surface① has not flown and is thus a dry solder joint.



① Solder surface
② Solder connector
ⓐ Distance
ⓑ Extension line

Solder covering and solder quantity for the soldering join
- Correct solder connection Ⓐ:
  The quantity of solder① is adequate. Lead of wire② is completely surrounded. Solder connector③ is not covered with solder① around the collar.
- Incorrect solder connection Ⓑ:
  The quantity of solder① is inadequate. Lead of wire② is not completely surrounded. Single wires are not incorporated by the solder①.



① Plump line
② Cable
③ Solder connector

Assessment of Damage in Wiring Harnesses

INFOID:0000000013501562

Always assess the damage thoroughly before repairing the wiring harnesses.

The following criteria must be observed:
Type of damage:
- Damage caused by scorching/overheating, chafing, clamping, crushing, severing, fatigue, corrosion, cable chewed by an animal, assembly fault.

Cause of damage:
- The cause for the damage must be determined to ensure that the damage does not reoccur after the wiring harness has been repaired.

Scope of the damage:
- Which components are damaged?
- Can the extent of the damage be exactly determined?
- Can you be sure that no other components are damaged?

Repair options:
- What are the options for repair?
- Which replacement parts are available?

Overview of authorized reworking on wiring harnesses
- Contact fault
- Contact part missing / wrong / deformed → Replace contact part.
- Contact part not engaged → Engage, check and replace contact part, if necessary.
- Individual wires not detected → Cut off and replace contact part.
- Insulation also crimped → Cut off and replace contact part.
- Cable not far enough into contact part → Cut off and replace contact part.
- Contact part not tin-plated → Cut off and replace contact part.
- Sleeve oxidized / wrong → Cut off and replace contact part.
- Improperly soldered / dry solder joint → Resolder contact part, replace if necessary.
- Plug-in area full of solder → Cut off and replace contact part.

- Fault with housing
- Screw connections loose → Tighten screw connections again using configured torque wrench, replace if necessary.
- Screw connections wrong / damaged → Replace screw connections (cable connector).
- Coupling or connector housing damaged → Replace connector or housing.
- Cap screw in handle recess missing / loose → Tighten cap screw, replace if necessary.
- Coupling or connector housing not closed exactly → Firmly seal connector or housing.

- Cable fault

- Insulating tubing damaged → Rewind with PVC tape.
- Insulation damaged → Cut through affected line at damaged area and repair using Raychem repair method.
- Insulation pulled up → Cut through affected line at damaged area and repair using Raychem repair method.
- Winding faulty → Rewind.
- Carefully remove splashes of solder on cable using a suitable tool without sharp edges.
- Grommet missing / wrong / wrongly mounted or damaged → Fit new grommet, mount correctly, if necessary.

Notes on Avoiding Damage Through Contamination and Foreign Objects

INFOID:0000000013501563

During all maintenance and repair work on the engine, including its ancillary assemblies and detachable parts, there is a risk of damage due to contamination, soiling or foreign objects.
Particularly at risk are:

- Hot film mass air flow sensor
- Turbocharger and compressor
- All components involved in gas exchange
- Emission control system

Remove/install
Openings through which contamination or foreign objects can be brought into the engine, its ancillary assemblies or its detachable parts must be immediately sealed off using suitable, clean covers or plugs or clean, lint-free rags.

- Installation:
  Do not leave behind any covers, plugs or rags during installation to avoid damage and complaints about engine running characteristics.
  Before assembly, check all components for contaminants, soiling, foreign objects and fluids and remove if found.

Cleaning
For cleaning, use only clean tools and clean, lint-free rags. Residues of cleaning agents and removed contaminants must be cleared from the engine, ancillary assemblies and detachable parts.
NOTE:
Do not remove soiling by means of compressed air, because components (for example, heating wire of the hot film mass air flow sensor) could be damaged or contamination could enter the engine, ancillary assemblies and detachable parts unnoticed.

Notes on Self-locking Nuts and Bolts

INFOID:0000000013501564

- General notes
- Bolts and nuts with locking splines, self-locking nuts, and microencapsulated bolts and nuts must be replaced after they have been used once. Furthermore, the bolts must always be replaced on bolted connections with self-locking nuts.
  Otherwise, if this is not observed, external influences may lead to unwanted loosening or unfastening of a bolted connection.
- No greases, oils, waxes or other lubricants may come into contact with or be applied to bolted connections and their contact surfaces.
  Otherwise, the preload forces for the bolted connection no longer meet the specifications.
- Bolts and nuts with locking splines
  If several components are bolted to each other using bolts and nuts with locking splines, care should be taken to ensure that both the bolt and the nut have a locking spline.
  Otherwise the bolted connection may work its way loose again.
- Self-locking nuts
  The elastic deformation when tightening or plastic deformation of the vinyl ring when being unfastened wears out the nut after it is used once thereby removing its ability to secure properly.
  This is why self-locking nuts must always be replaced after having been used once.
- Microencapsulated bolts and nuts
  Because hardening occurs shortly after installation, the microencapsulated bolts and nuts may not be retightened or tightened in several stages.
  Otherwise the retightening or further tightening will destroy the threadlock rendering it ineffective.

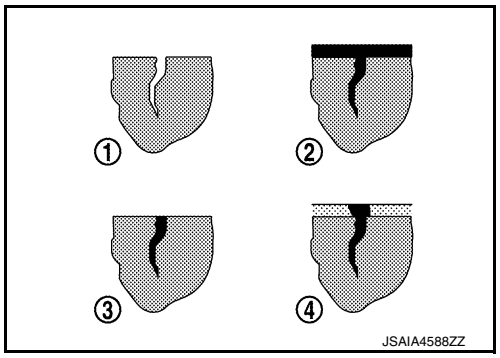
General Information on Crack Diagnosis of Aluminum Parts

INFOID:0000000013501565

It is necessary to check whether any cracks, inclusions or other weld faults are present before and after performing repair work on aluminum components.
A suitable method of testing is the simple dye penetration test, which accentuates faults starting at the surface or in immediate connection with it which cannot be seen with the naked eye, through color contrast. This method utilizes the capillary effect of fine surface openings. Liquids containing dyes with low surface tension penetrate into these openings and can be verified there with suitable contrasting agents.
Usually luminous red or yellow-green fluorescent dyes are used a penetration agents, which can be washed off with water. The penetration agent can be sprayed on or applied with a brush.
During the penetration time, the penetration agent should never be allowed to dry out. The smaller the surface faults, the longer the penetration time (approx. 5 to 30 minutes).
The developer used subsequently requires a high absorption capacity, to suck the penetration agent out of the damaged spot.
This makes the fault visible by contrast in the developer layer. The development time is analog to the penetration time. As a matter of principle, however, faults can only be verified on the material surface.
Always observe the specific Safety instructions of the individual manufacturers before using the cleaner, contrast agent, and developer.
All three diagnostic agents are highly inflammable. The contrast agent also poses a health hazard.

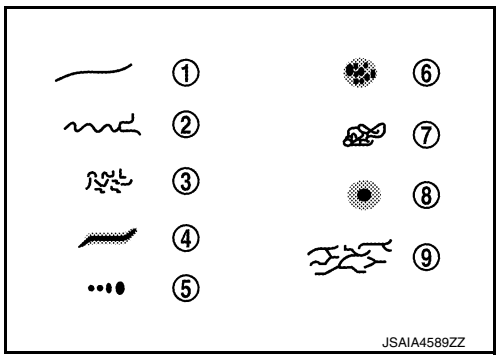
Detection process:

① Crack after cleaning
② Crack after application of contrast agent
③ After removal of quantities which have not penetrated into the damaged point
④ After application of the developer, the damaged point is indicated



Typical damage indications with dye penetration method

① Cold fissures
② Hot fissures
③ Ground fissures
④ Fissures with strong blistering
⑤ Pores of various sizes
⑥ Nests of pores
⑦ Spongy structure
⑧ Pores with strong blistering
⑨ Stress corrosion cracking



Measures for Preventing Damage to Components when Performing Electric Welding and Soldering Work

INFOID:0000000013501566

Before and during the welding or soldering work always observe the following measures, to avoid any damage to the vehicle components:
1. Disconnect ignition key and disconnect/insulate ground line from battery.
2. When performing electrical welding or soldering work in the area of the air bag control unit [distance < 0.5 m (0.02 in)], detach electrical connector from air bag control unit.
3. The high-voltage battery, the gas tank and the gas-routing components should not exceed a temperature of > 60 °C.
4. Before welding and soldering, cover all components to protect against flying sparks and radiant heat or remove from hazardous area (including lines and components in hollow cavities).

5. Do not touch electronics housings or electrical lines with welding electrode or ground line from the welder or solder.
6. Directly connect ground terminal from electrical welding and soldering unit to component to be welded or soldered. Ensure that there are no electrically insulating parts between the ground terminal and the welding or soldering point.
7. Do not connect ground terminal from electrical welding or soldering unit to major assemblies (e.g. transmission, engine, etc.).

Information on Machining/Treating Magnesium Components

INFOID:0000000013501567

General:
Magnesium has the property of forming a compound with oxygen extremely quickly. Nevertheless it is corrosion-resistant when exposed to air, because it forms a tight, continuous thin oxide skin which protects the metal beneath from further oxidation.
If magnesium ignites, then it burns at approx. > 500 °C (932 °F) with a blinding white light and strong heat development [approx. 2400 °C (4352 °F)].
Magnesium dust combusts and explodes just as easily as aluminum dust.
For additional information see Accident Prevention Regulations or the regulations of the trade association.

Machining/treating magnesium:
- Machining/treating magnesium components by means of an open flame (welding, cutting, soldering, heating, etc.) or by spark creating grinding is prohibited.
- Any components that suffer structural damage must be replaced completely.

Corrosion protection:
- Faulty coatings and points affected by corrosion should never be repaired for corrosion reasons.
- Repair over large surfaces should not be performed for reasons of corrosion.
- To prevent contact corrosion on the threaded connections of the components (e.g. internal door parts); the contact surfaces and screw shanks must be coated with paint or the screws must be replaced after dismantling.

CAUTION:
Do not use zinc dust paint.
- **Plastic bushings and disks installed as standard must not be removed and damaged parts must be replaced.**
- **Due to extremely severe contact corrosion, damaged threads in the magnesium pressure castings may only be repaired with the MB-approved Helicoil thread inserts made of aluminum.**

Notes on Preventing Damage to Electrinic Components Due to a Magnetic Tool

INFOID:0000000013501568

General
Tools that are metallic or equipped with fixed magnets, will generate magnetic fields around them. Magnetic fields generated by magnetic screwdriver tips or bar magnets may be strong enough to cause sustainable damage to electronic components such as radar sensors.

Measures for activities
When working directly on electronic components such as radar sensors or in their immediate environment, care must be taken to ensure that tools with magnetic properties are not used.

Information o Preventing Damage to Electronic Components Due to Electrostatic Discharge

INFOID:0000000013501569

Electrostatic charge
Every contact and every physical separation of materials or every movement of solids, liquids or charged particle-containing gases can generate electrostatic charge. Plastics generally produce the highest electrostatic charge.
We come across electrostatic charge or discharge in lots of everyday situations, e.g. with:
- Combs
- Walking on carpets or plastic floors
- Putting on and taking off textiles with synthetic fiber content

- Disembarking from the vehicle
- Contact between various electrostatically chargeable packaging materials in shelves or in the transport container

The resulting electrostatic discharge [Electrostatic Discharge (ESD)] can be so strong that a small electric shock is detected. Even the smallest discharges which people cannot detect can cause lasting damage to electronic components and control units.

Effects and consequences of ESD
Electronic components and control units are very sensitive to ESD.
The damage is often not immediately obvious, but becomes apparent some time later. In order to avoid failures and damage due to ESD in vehicle electronics, various procedures and safety precautions must be taken into account and followed.
Risk of damage arises during the transportation, handling, testing, removal and installation of electronic components during production and repair work.

The following electronic components listed as an example can be damaged by ESD:
- Airbag components
- Control units, in particular their bus connections
- [Controller Area Network (data bus/CAN bus) (CAN), Local Interconnect Network (LIN) etc.]
- Sensors
- Mechatronic components (actuators etc.)
- Antenna amplifier
- Receivers and displays (Radio, TV, GPS, telephone etc.)

Modes of behavior and safety precautions]
- Electrostatic discharge from the fitter (e.g. due to brief contact with the vehicle body).
- Suitable clothing, e.g. made of cotton.
- Wear ESD safety shoes with conductive soles.
- Keep workplace clean and clear away unnecessary objects such as conventional plastics.
- Special antistatic seat cushion protectors should be used when performing repair work inside a vehicle.
- Leave replacement parts in the original packing for as long as possible, do not tear open seals but cut them open carefully.
- The ESD workplace must conform to the ESD guidelines.

Commercially available devices/tools
- Before unpacking, discharge ESD protective packaging at the ESD workplace.
- Avoidance of contact with electrostatic chargeable materials such as PE, PVC, styrofoam.
- Use only original packaging or specially labeled and defined packaging and transport materials.
- Electronic components which have been removed must be put down on an ESD workplace.
- Touch connections on electronic components and in the wiring harness on housing only. Do not touch pins or contacts!
- Electronic components must be installed before they are connected so that potential equalization with the body can take place.
- Shelves and worktables must stand directly on the floor, there must not be any insulating materials between the base of the shelves/feet and the floor. If the above mentioned insulators cannot be removed, the shelves and work tables must be grounded (e.g. low-resistance electrical connection/line from metal shelf to a coolant pipe).
- Do not park conductive shipping containers/crates when insulated
  (e.g. on a wooden pallet), as otherwise potential equalization will not take place.
- Do not place control units and electronic components removed from the vehicle on electrostatically chargeable materials, such as PE, PVC, styrofoam. The electrostatic charge is transferred to the control unit or electronic component. An ESD service kit or a connected ESD table mat must be used.

Training
It is strongly recommended that every company has an ESD officer trained in accordance with DIN EN 61340-5-1.
The ESD officer can carry out staff training courses.
The aim of the training measures is to communicate the main problems and effects of ESD to staff:
- Discharge generation

- Reasoning for safety precautions
- Effects and consequences of ESD
- ESD rules of conduct and safety precautions

Return of electronic components in warranty and goodwill cases
When returning electronic components it is absolutely essential to observe the procedure and safety precautions listed. The original fault may be falsified or hidden by electrostatic charge/discharge.
This can lead to distorted fault symptoms in the case of the fault analysis of the component concerned.

Notes on Battery

INFOID:0000000013501570

General information on batteries
- Do not store batteries over a longer period at a storage point with direct solar radiation.
- Discharged or defective batteries can freeze, therefore store free from frost.
- Avoid polarity reversal and short-circuits.
- Discharged or defective batteries can freeze, therefore store free from frost.
- Do not place any tools or other conducting objects on the battery (risk of short-circuit).
- Before removal and installation of batteries all switchable current consumers should be switched off, as well as the engine switched off so that inadvertent arcing is ruled out.
- Always detach the negative terminal first and always connect the positive terminal first.
- Only charge batteries with DC, 10 % of the capacity is recommended as charging current for slow charging and 50 % of the capacity recommended for fast charging.
- Only switch on the charger after connecting to the terminals and switch off before disconnecting.
- If the battery is to remain in the parked vehicle for an extended period, the negative terminal should be disconnected.
- If possible batteries should be kept clean and dry.

Notes on lead gel batteries or absorbent glass mat batteries (VRLA, AGM)
- The battery is leaktight and can therefore be installed in any position.
- The battery is maintenance free.
- The battery housing is encapsulated.
- When quick-charging, it is important to ensure that the housing of the battery does not heat up too much, otherwise damage can occur.

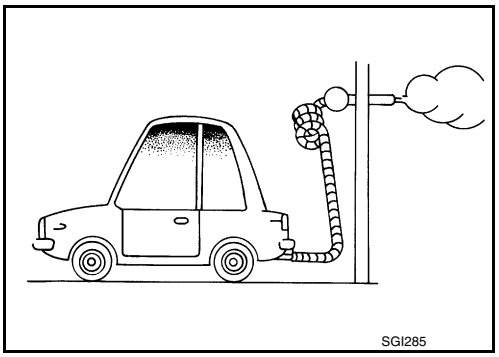
Notes on lead acid batteries
- Always store lead-acid batteries horizontally to prevent acid leaking out and do not tilt during transportation.
- When fast charging ensure that the housing of the lead-acid battery does not heat up excessively.

Notes on lithium-ion batteries
- The battery is leaktight and can therefore be installed in any position.
- The battery is maintenance free.
- The battery housing is bolted and must not be opened.
- When quick-charging, it is important to ensure that the housing of the battery does not heat up too much, otherwise damage can occur.
- At battery temperatures < 0 °C (32 °F), the charging voltage must be limited to 13.5 V or the battery must be conditioned to room temperature prior to charging.
- The battery should only be stored in its original packaging when it is removed from the vehicle.
- The battery belongs to hazardous material class 9, II and must be handled in accordance with the relevant regulations.

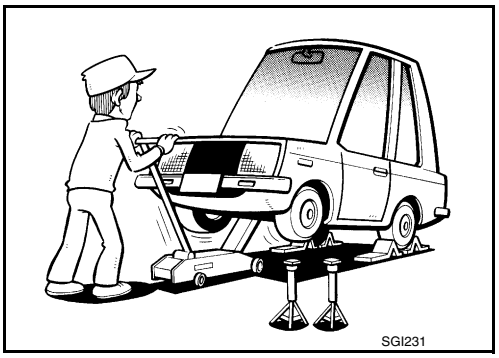
General Precautions

INFOID:0000000013501571

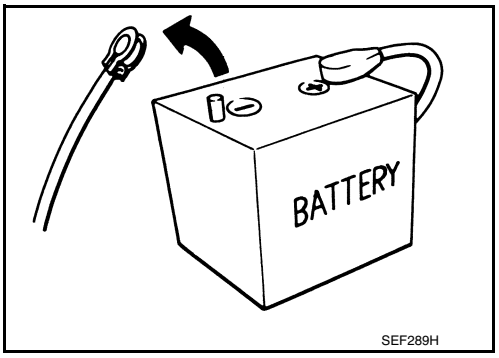
- Do not operate the engine for an extended period of time without proper exhaust ventilation.
  Keep the work area well ventilated and free of any inflammable materials. Special care should be taken when handling any inflammable or poisonous materials, such as gasoline, refrigerant gas, etc. When working in a pit or other enclosed area, be sure to properly ventilate the area before working with hazardous materials.
  Do not smoke while working on the vehicle.


SGI285

- Before jacking up the vehicle, apply wheel chocks or other tire blocks to the wheels to prevent the vehicle from moving. After jacking up the vehicle, support the vehicle weight with safety stands at the points designated for proper lifting before working on the vehicle.
  These operations should be done on a level surface.
- When removing a heavy component such as the engine or transaxle/transmission, be careful not to lose your balance and drop them. Also, do not allow them to strike adjacent parts, especially the brake tubes and master cylinder.


SGI231

- Before starting repairs which do not require battery power:
  Turn off ignition switch.
  Disconnect the negative battery terminal.
- If the battery terminals are disconnected, recorded memory of radio and each control unit is erased.
- For vehicles with two batteries, be sure to remove both batteries when instructed to remove 12V battery in the service manual. If specified as main battery of sub battery, then do as instructed.



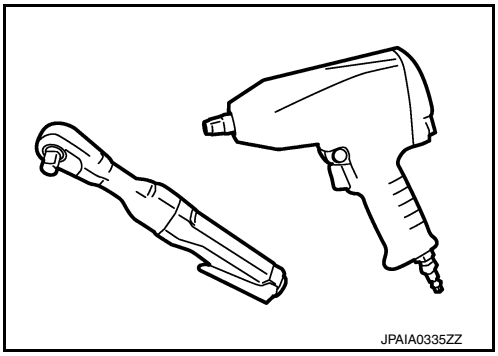
SEF289H

- To prevent serious burns:
  Avoid contact with hot metal parts.
  Do not remove the radiator cap when the engine is hot.
- Dispose of drained oil or the solvent used for cleaning parts in an appropriate manner.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically.
  Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.
- Clean all disassembled parts in the designated liquid or solvent prior to inspection or assembly.
- Replace oil seals, gaskets, packings, O-rings, locking washers, cotter pins, self-locking nuts, etc. with new ones.

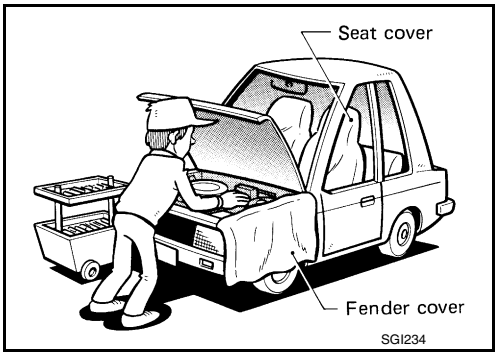

SGI233

- Replace inner and outer races of tapered roller bearings and needle bearings as a set.
- Arrange the disassembled parts in accordance with their assembled locations and sequence.
- Do not touch the terminals of electrical components which use microcomputers (such as ECM).
  Static electricity may damage internal electronic components.
- After disconnecting vacuum or air hoses, attach a tag to indicate the proper connection.
- Use only the fluids and lubricants specified in this manual.
- Use approved bonding agent, sealants or their equivalents when required.

- Use hand tools, power tools (disassembly only) and recommended special tools where specified for safe and efficient service repairs.
- When repairing the fuel, oil, water, vacuum or exhaust systems, check all affected lines for leakage.



- Before servicing the vehicle:
  Protect fenders, upholstery and carpeting with appropriate covers.
  Take caution that keys, buckles or buttons do not scratch paint.



WARNING:
To prevent ECM from storing the diagnostic trouble codes, never carelessly disconnect the harness connectors which are related to the engine control system and TCM (transmission control module) system. The connectors should be disconnected only when working according to the WORK FLOW of TROUBLE DIAGNOSES in EC and TM sections.

Three Way Catalyst

INFOID:0000000013501572

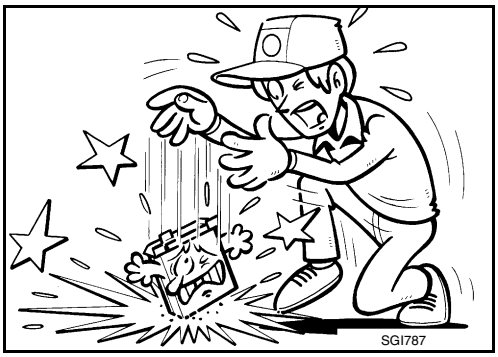
If a large amount of unburned fuel flows into the catalyst, the catalyst temperature will be excessively high. To prevent this, follow the instructions.
- Use unleaded gasoline only. Leaded gasoline will seriously damage the three way catalyst.
- When checking for ignition spark or measuring engine compression, make tests quickly and only when necessary.
- Do not run engine when the fuel tank level is low, otherwise the engine may misfire, causing damage to the catalyst.

Do not place the vehicle on flammable material. Keep flammable material off the exhaust pipe and the three way catalyst.

Multiport Fuel Injection System or Engine Control System

INFOID:0000000013501573

- Before connecting or disconnecting any harness connector for the multiport fuel injection system or ECM:
  Turn ignition switch to “OFF” position.
  Disconnect negative battery terminal.
  Otherwise, there may be damage to ECM.
- Before disconnecting pressurized fuel line from fuel pump to injectors, be sure to release fuel pressure.
- Be careful not to jar components such as ECM and mass air flow sensor.

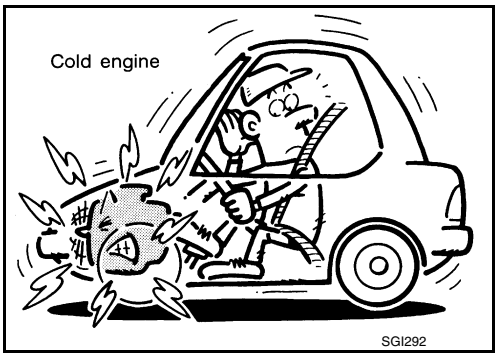


Turbocharger (If Equipped)

INFOID:0000000013501574

The turbocharger turbine revolves at extremely high speeds and becomes very hot. Therefore, it is essential to maintain a clean supply of oil flowing through the turbocharger and to follow all required maintenance instructions and operating procedures.

- Always use the recommended oil. Follow the instructions for proper time to change the oil and proper oil level.
- Avoid accelerating engine to a high rpm immediately after starting.
- If engine had been operating at high rpm for an extended period of time, let it idle for a few minutes prior to shutting if off.

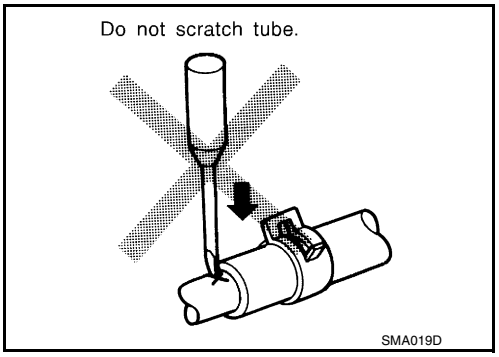


Hoses

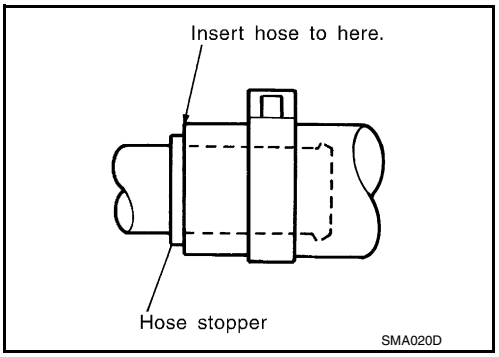
INFOID:0000000013501575

HOSE REMOVAL AND INSTALLATION

- To prevent damage to rubber hose, do not pry off rubber hose with tapered tool or screwdriver.

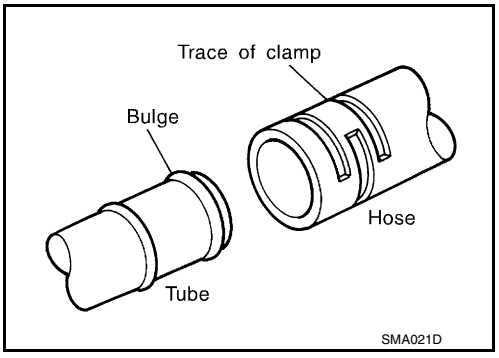


- To reinstall the rubber hose securely, check that hose insertion length and orientation is correct. (If tube is equipped with hose stopper, insert rubber hose into tube until it butts up against hose stopper.)

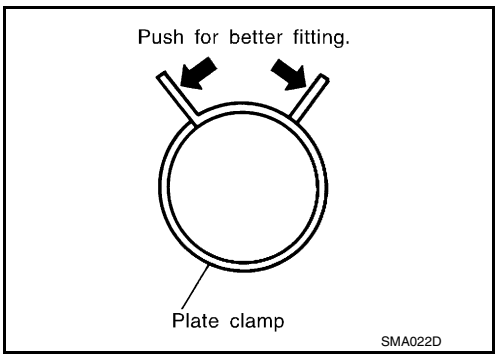


HOSE CLAMPING

- If old rubber hose is re-used, install hose clamp in its original position (at the indentation where the old clamp was). If there is a trace of tube bulging left on the old rubber hose, align rubber hose at that position.
- Discard old clamps; replace with new ones.



- After installing plate clamps, apply force to them in the direction of the arrow, tightening rubber hose equally all around.



Engine Oils

INFOID:0000000013501576

Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used oil.
If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.

HEALTH PROTECTION PRECAUTIONS

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Do not put oily rags in pockets.
- Avoid contaminating clothes, particularly underpants, with oil.
- Heavily soiled clothing and oil-impregnated footwear should not be worn. Overalls must be cleaned regularly.
- First aid treatment should be obtained immediately for open cuts and wounds.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin.
- Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help). Preparations containing lanolin replace the natural skin oils which have been removed.
- Do not use gasoline, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practical, degrease components prior to handling.
- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.

ENVIRONMENTAL PROTECTION PRECAUTIONS

Dispose of used oil and used oil filters through authorized waste disposal contractors to licensed waste disposal sites, or to the waste oil reclamation trade. If in doubt, contact the local authority for advice on disposal facilities.
It is illegal to pour used oil on to the ground, down sewers or drains, or into water sources.
The regulations concerning pollution vary between regions.

Air Conditioning

INFOID:0000000013501577

Use an approved refrigerant recovery unit any time the air conditioning system must be discharged. Refer to HA section “REFRIGERANT” for specific instructions.

Fuel

INFOID:0000000013501578

Use unleaded premium gasoline with an octane rating of at least 91 AKI (Anti-Knock Index) number (Research octane number 96).

If unleaded premium gasoline is not available, unleaded regular gasoline with an octane rating of at least 87 AKI number (Research octane number 91) may be temporarily used, but only under the following precautions:

- Have the fuel tank filled only partially with unleaded regular gasoline, and fill up with unleaded premium gasoline as soon as possible.
- Avoid full throttle driving and abrupt acceleration.

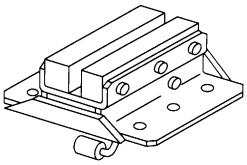
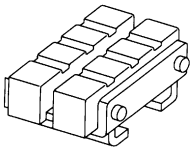
Use leaded premium gasoline for maximum vehicle performance.
CAUTION:

- **Using a fuel other than that specified could adversely affect the emission control system, and may also affect warranty coverage.**
- **Under no circumstances should a leaded gasoline be used, because this will damage the three-way catalyst.**
- **Do not use E-15 or E-85 fuel in the vehicle. The vehicle is not designed to run on E-15 or E-85 fuel. Using E-15 or E-85 fuel in a vehicle not specifically designed for E-15 or E-85 fuel can adversely affect the emission control devices and systems of the vehicle. Damage caused by such fuel is not covered by the INFINITI new vehicle limited warranty.**
- **Do not use fuel that contains the octane booster methylcyclopentadienyl manganese tricarbonyl (MMT). Using fuel containing MMT may adversely affect vehicle performance and vehicle emissions. Not all fuel dispensers are labeled to indicate MMT content, so you may have to consult your gasoline retailer for more details. Note that Federal and California laws prohibit the use of MMT in reformulated gasoline.**
- **U.S. government regulations require ethanol dispensing pumps to be identified by a small, square, orange and black label with the common abbreviation or the appropriate percentage for that region.**

LIFTING POINT

Commercial Service Tools

INFOID:0000000013501579

Tool name	Description
Board on attachment	 S-NT001
Safety stand attachment	 S-NT002

CAUTION:

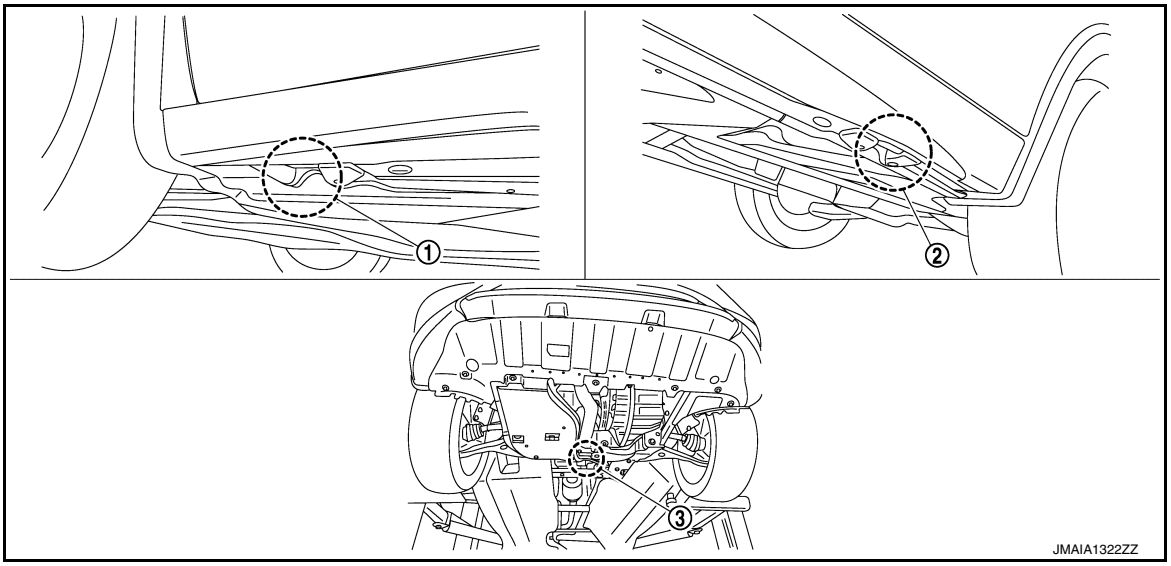
- **Every time the vehicle is lifted up, maintain the complete vehicle curb condition.**
- **Since the vehicle's center of gravity changes when removing main parts on the front side (engine, transmission, suspension etc.), support a jack up point on the rear side garage jack with a mission jack or equivalent.**
- **Since the vehicle's center of gravity changes when removing main parts on the rear side (rear axle, suspension, etc.), support a jack up point on the front side garage jack with a mission jack or equivalent.**
- **Be careful not to smash or never do anything that would affect piping parts.**

Garage Jack and Safety Stand and 2-Pole Lift

INFOID:0000000013501580

WARNING:

- **Park the vehicle on a level surface when using the jack. Check to avoid damaging pipes, tubes, etc. under the vehicle.**
- **Never get under the vehicle while it is supported only by the jack. Always use safety stands when you have to get under the vehicle.**
- **Place wheel chocks at both front and back of the wheels on the ground.**
- **When lifting the vehicle, open the lift arms as wide as possible and ensure that the front and rear of the vehicle are well balanced.**
- **When setting the lift arm, never allow the arm to contact the brake tubes, brake cable, fuel lines and sill spoiler.**



① Safety stand point and lift up point (front)
② Safety stand point and lift up point (rear)
③ Garage jack point (front)

Board-On Lift

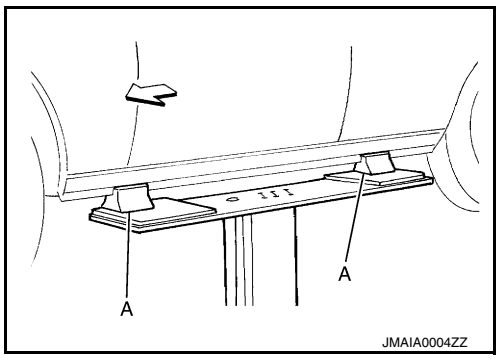
INFOID:0000000013501581

CAUTION:

Check that vehicle is empty when lifting.

- **The board-on lift attachment (A) set at front end of vehicle should be set on the front of the sill under the front door opening.**
- **Position attachments at front and rear ends of board-on lift.**

⇦ : Vehicle front



TOW TRUCK TOWING

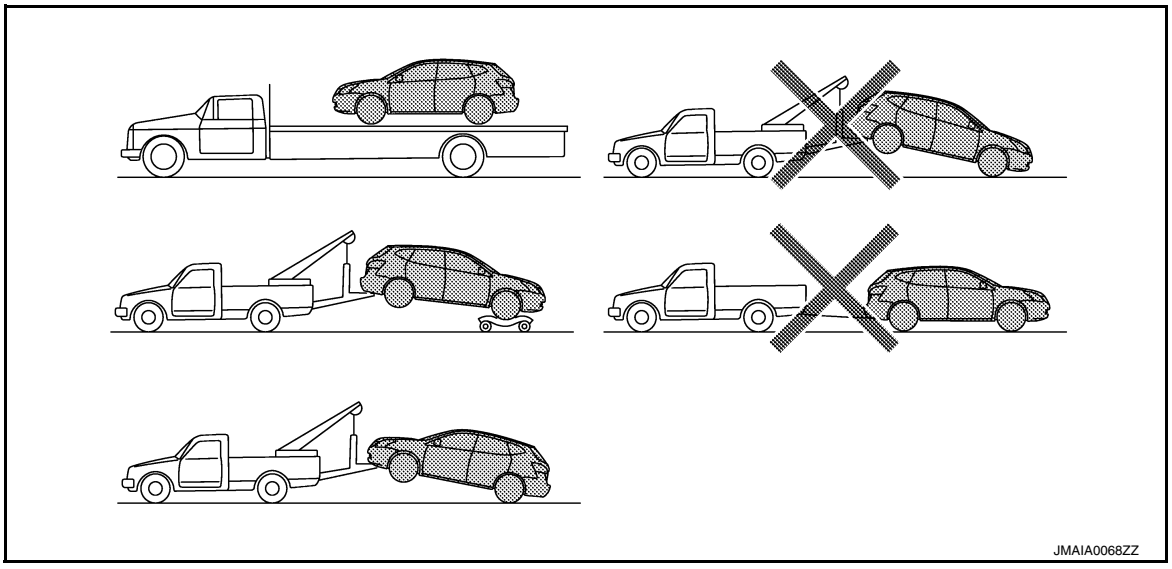
Tow Truck Towing

INFOID:0000000013501582

CAUTION:

- **All applicable state or Provincial laws and local laws regarding the towing operation must be obeyed.**
- **It is necessary to use proper towing equipment to avoid possible damage to the vehicle during towing operation. Towing is in accordance with Towing Procedure Manual at dealer.**
- **Always attach safety chains before towing.**
- **When towing, check that the transmission, steering system and powertrain are in good order. If any unit is damaged, dollies must be used.**
- **Never tow a AT (DCT) model from the rear (that is backward) with four wheels on the ground. This may cause serious and expensive damage to the transmission.**

2WD MODELS

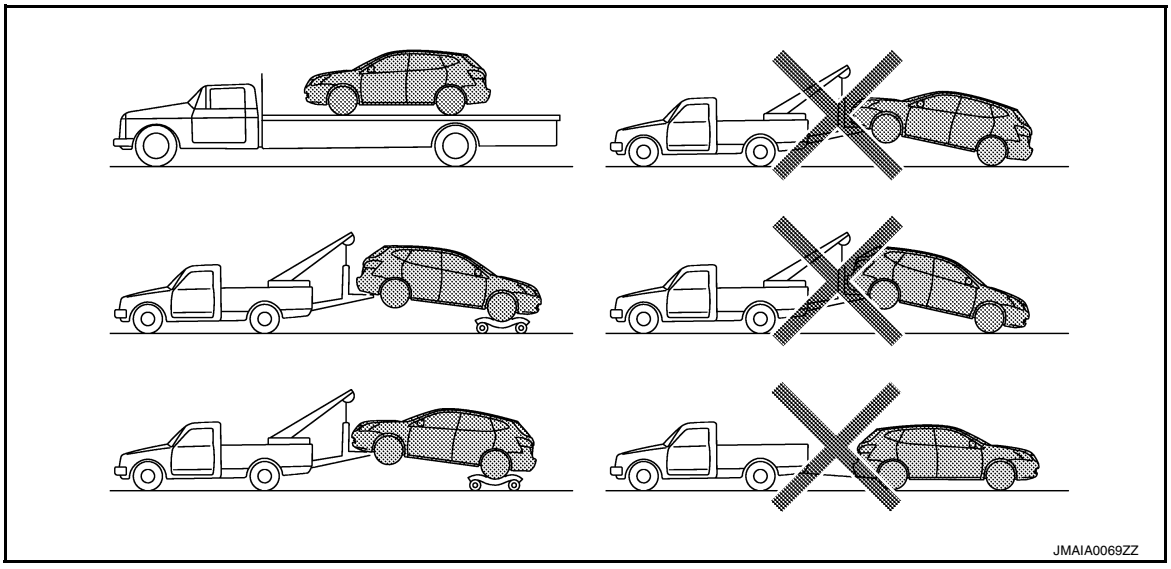


INFINITI recommends that vehicle be towed with the driving (front) wheels off the ground or that a dolly be used as illustrated.

CAUTION:

- **Never tow AT (DCT) models with the front wheels on the ground or four wheels on the ground (forward or backward), as this may cause serious and expensive damage to the transmission.**
  If it is necessary to tow the vehicle with the rear wheels raised, always use towing dollies under the front wheels.
- **When towing AT (DCT) models with the front wheels on towing dollies:**
- **Turn the ignition switch to the OFF position, and secure the steering wheel in a straight ahead position with a rope or similar device. Never secure the steering wheel by turning the ignition switch to the LOCK position. This may damage the steering lock mechanism.**
- **Move the selector lever to the N (Neutral) position.**
- **When the battery of vehicle equipped with the Intelligent Key system is discharged, your vehicle should be towed with the front wheels on towing dollies or place the vehicle on a flat bed truck.**
- **When towing two wheel drive AT (DCT) model with the rear wheels on the ground (if you do not use towing dollies): Always release the parking brake.**

AWD MODELS



INFINITI recommends that a dolly be used as illustrated when towing AWD models.

CAUTION:

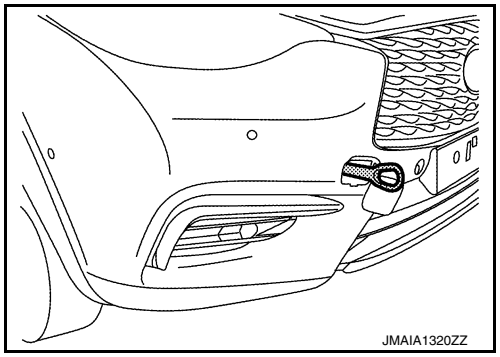
Never tow AWD models with any of the wheels on the ground as this may cause serious and expensive damage to the powertrain.

Vehicle Recovery (Freeing a Stuck Vehicle)

INFOID:0000000013501583

FRONT

Securely install the vehicle recovery hook stored with jacking tools.
Check that the hook is properly secured in the stored place after use.



WARNING:

- **Stand clear of a stuck vehicle.**
- **Never spin your tires at high speed. This could cause them to explode and result in serious injury. Parts of your vehicle could also overheat and be damaged.**

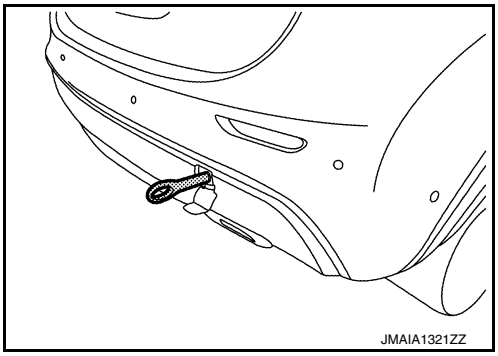
CAUTION:

- **Tow chains or cables must be attached only to the vehicle recovery hooks or main structural members of the vehicle. Otherwise, the vehicle body will be damaged.**
- **Never use the vehicle tie downs to free a vehicle stuck in sand, snow, mud, etc. Never tow the vehicle using the vehicle tie downs or recovery hooks.**
- **Always pull the cable straight out from the front of the vehicle. Never pull on the hook at an angle.**
- **Pulling devices should be routed so they never touch any part of the suspension, steering, brake or cooling systems.**
- **Pulling devices such as ropes or canvas straps are not recommended for use in vehicle towing or recovery.**

REAR

Recovery Hook

Securely install the vehicle recovery hook stored with jacking tools.
Check that the hook is properly secured in the stored place after use.



WARNING:

- **Stand clear of a stuck vehicle.**
- **Never spin your tires at high speed. This could cause them to explode and result in serious injury. Parts of your vehicle could also overheat and be damaged.**

CAUTION:

- **Tow chains or cables must be attached only to the vehicle recovery hooks or main structural members of the vehicle. Otherwise, the vehicle body will be damaged.**
- **Never use the vehicle tie downs to free a vehicle stuck in sand, snow, mud, etc. Never tow the vehicle using the vehicle tie downs or recovery hooks.**
- **Always pull the cable straight out from the front of the vehicle. Never pull on the hook at an angle.**
- **Pulling devices should be routed so they never touch any part of the suspension, steering, brake or cooling systems.**
- **Pulling devices such as ropes or canvas straps are not recommended for use in vehicle towing or recovery.**

VEHICLE INFORMATION

IDENTIFICATION INFORMATION

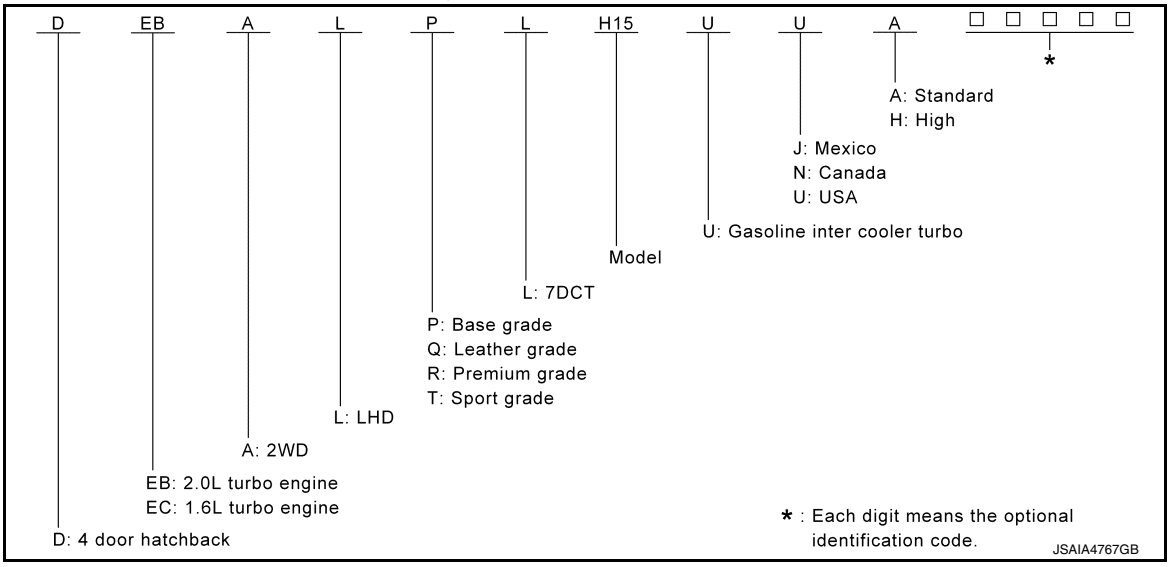
Model Variation

INFOID:0000000013501584

2WD MODELS

Destination	Body	Engine	Axle	Handle	Transmission	Grade	Model
USA	4 door hatchback	2.0L turbo engine	2WD	LHD	7DCT	Base	DEBALPL-UUA
						Leather	DEBALQL-UUA
						Premium	DEBALRL-UUA
						Sport	DEBALTL-UUA
Canada						Base	DEBALPL-UUA
						Leather	DEBALQL-UNA
						Premium	DEBALRL-UNA
						Sport	DEBALTL-UNA
Mexico		1.6L turbo engine				Base	DECALPL-UJH
		2.0L turbo engine				Premium	DEBALRL-UJA
						Sport	DEBALTL-UJA

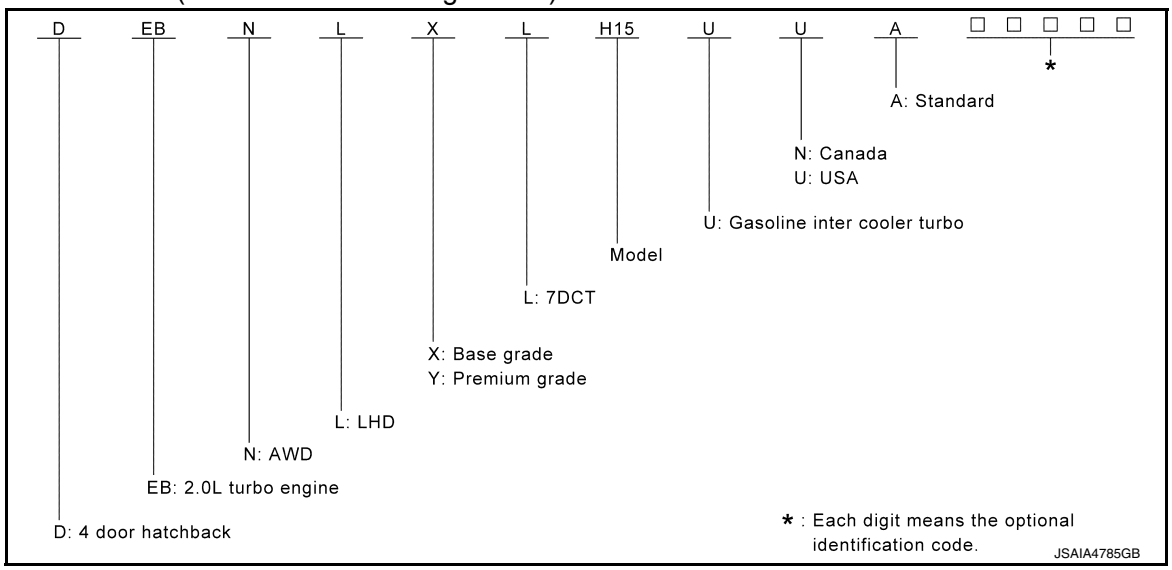
Model variation code (Prefix and suffix designations)



AWD MODELS

Destination	Body	Engine	Axle	Handle	Transmission	Grade	Model
USA	4 door hatchback	2.0L turbo engine	AWD	LHD	7DCT	Base	DEBNLXL-UUA
						Premium	DEBNLYL-UUA
Canada						Base	DEBNLXL-UNA
						Premium	DEBNLYL-UNA

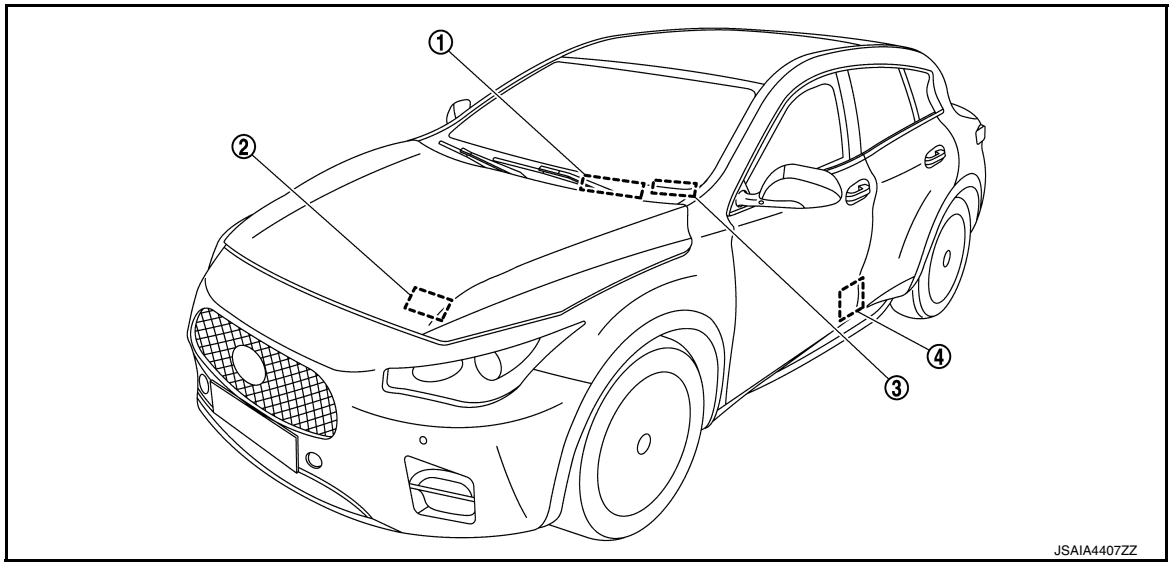
Model variation code (Prefix and suffix designations)



Information About Identification or Model Code

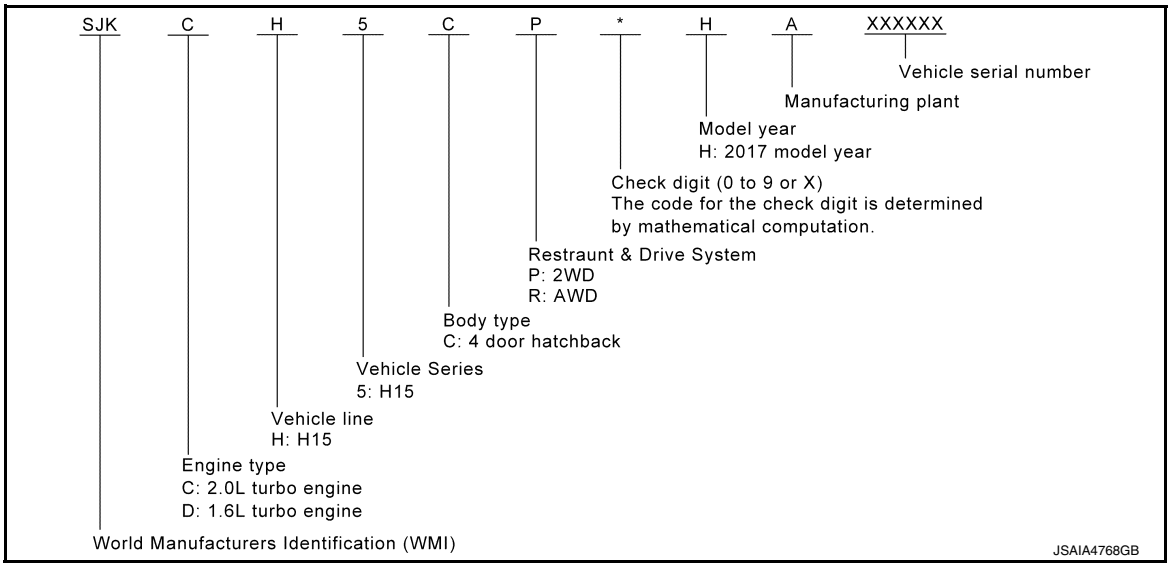
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IDENTIFICATION NUMBER



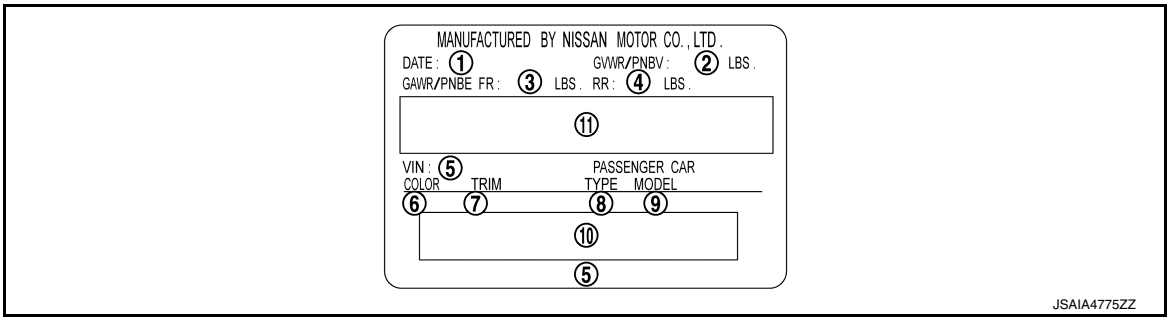
① Vehicle identification number plate
② Air conditioner specification label
③ Vehicle identification number (Chassis number)
④ Tire placard (Driver side)

VEHICLE IDENTIFICATION NUMBER ARRANGEMENT



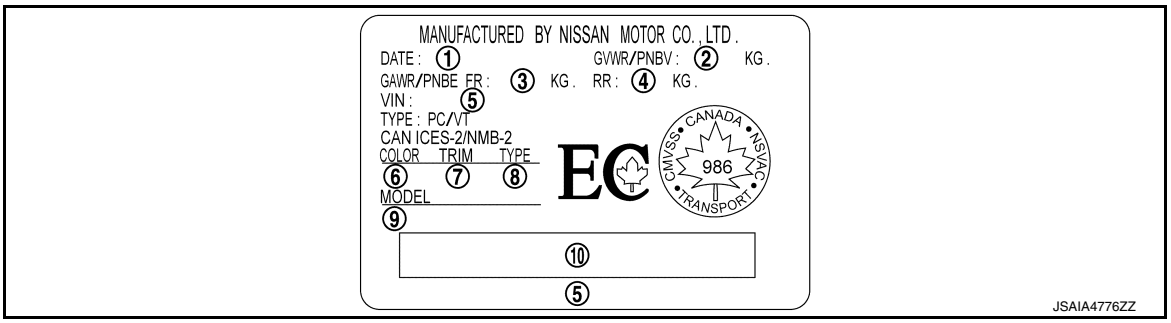
CERTIFICATION LABEL

For USA



① MFR Month/Year
② Gross vehicle weight rating
③ Gross axle weight rating (Front)
④ Gross axle weight rating (Rear)
⑤ Vehicle idenification number
⑥ Body color code
⑦ Trim color code
⑧ Type
⑨ Model
⑩ VIN bar code
⑪ Compliance statement

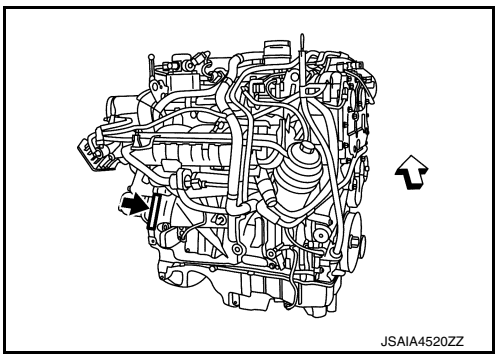
For Canada



① MFR Month/Year
② Gross vehicle weight rating
③ Gross axle weight rating (Front)
④ Gross axle weight rating (Rear)
⑤ Vehicle idenification number
⑥ Body color code
⑦ Trim color code
⑧ Type
⑨ Model
⑩ VIN bar code

ENGINE SERIAL NUMBER

⇦ : Vehicle front



Dimensions

INFOID:0000000013501586

Unit: mm (in)

Overall length	4,425 (174.2)
Overall width	2,083 (82.0)
Overall height	1,515 (58.7)*1 1,530 (61.2)*2
Front tread	1,561 (61.5)*3 1,566 (61.7)*4
Rear tread	1,566 (61.7)*3 1,574 (62.0)*4
Wheelbase	2,700 (106.3)

*1: Model without roof rail.

*2: Model with roof rail.

*3: Fitted with standard 7.0J × 18 wheels.

*4: Fitted with standard 6.5J× 17 wheels.

Wheels & Tires

INFOID:0000000013501587

Conventional	18 inch	Tire		235/50R18 97V 235/50R18 97H
		Road wheel (Aluminum)	Size	18×7J
			Inset	46 mm (1.81 in)
		Tire		235/50R18 97H
		Road wheel (Aluminum)	Size	18×7J
			Inset	41 mm (1.61 in)
	19 inch	Tire		235/45R19 95V
		Road wheel (Aluminum)	Size	19×8J
			Inset	43.5 mm (1.71 in)
Spare	Tire			Puncture repair kit
	Road wheel		Size	
			Inset	

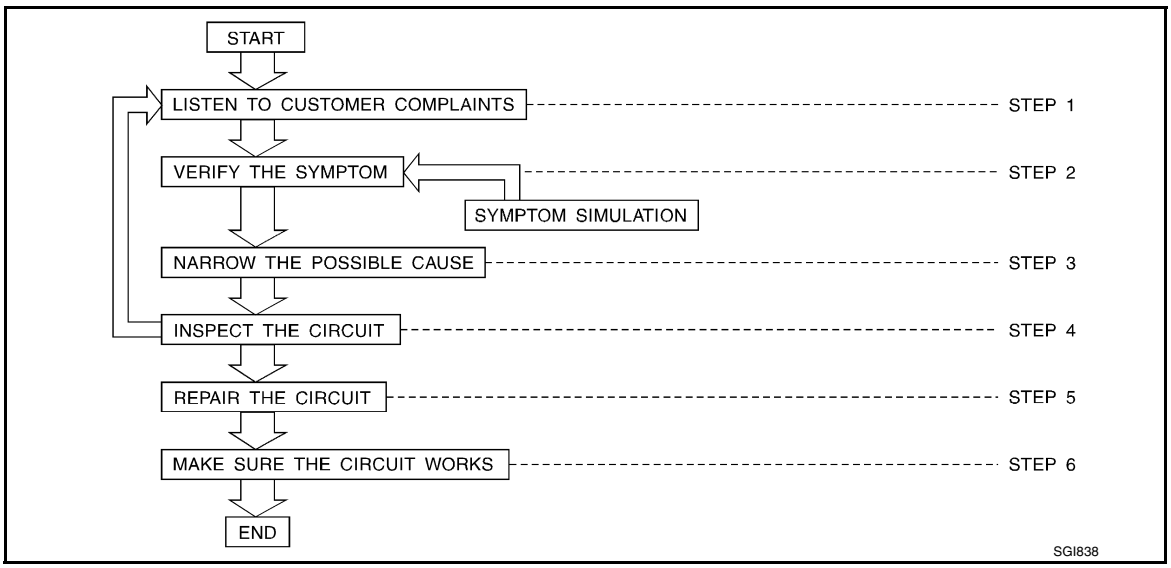
BASIC INSPECTION

SERVICE INFORMATION FOR ELECTRICAL INCIDENT

Work Flow

INFOID:0000000013501588

WORK FLOW



STEP	DESCRIPTION	
STEP 1	Get detailed information about the conditions and the environment when the incident occurred. The following are key pieces of information required to make a good analysis:	
	WHAT	Vehicle Model, Engine, Transmission/Transaxle and the System (i.e. Radio).
	WHEN	Date, Time of Day, Weather Conditions, Frequency.
	WHERE	Road Conditions, Altitude and Traffic Situation.
	HOW	System Symptoms, Operating Conditions (Other Components Interaction). Service History and if any After Market Accessories have been installed.
STEP 2	Operate the system, road test if necessary. Verify the parameter of the incident. If the problem cannot be duplicated, refer to “Incident Simulation Tests”.	
STEP 3	Get the proper diagnosis materials together including: • Power Supply Routing • System Operation Descriptions • Applicable Service Manual Sections • Check for any Service Bulletins Identify where to begin diagnosis based upon your knowledge of the system operation and the customer comments.	
STEP 4	Inspect the system for mechanical binding, loose connectors or wiring damage. Determine which circuits and components are involved and diagnose using the Power Supply Routing and Harness Layouts.	
STEP 5	Repair or replace the incident circuit or component.	
STEP 6	Operate the system in all modes. Verify the system works properly under all conditions. Check you have not inadvertently created a new incident during your diagnosis or repair steps.	

Control Units and Electrical Parts

INFOID:0000000013501589

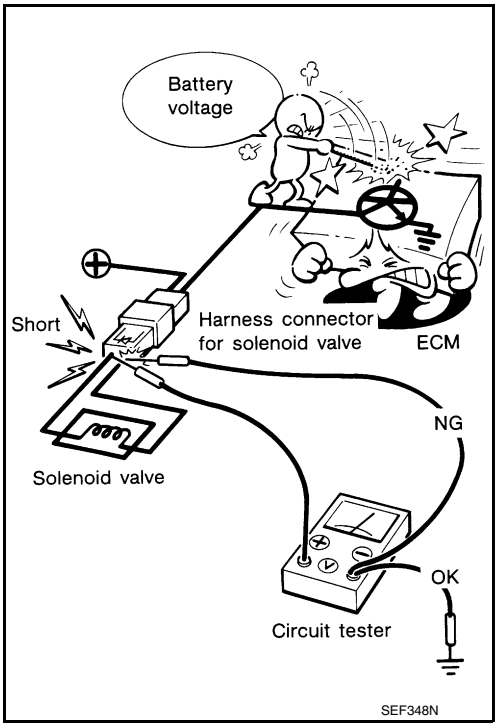
PRECAUTIONS

- Never reverse polarity of battery terminals.
- Install only parts specified for a vehicle.
- Before replacing the control unit, check the input and output and functions of the component parts.
- Do not apply excessive force when disconnecting a connector.

- Do not apply excessive shock to the control unit by dropping or hitting it.
- Be careful to prevent condensation in the control unit due to rapid temperature changes and do not let water or rain get on it. If water is found in the control unit, dry it fully and then install it in the vehicle.
- Be careful not to let oil to get on the control unit connector.
- Avoid cleaning the control unit with volatile oil.
- Do not disassemble the control unit, and do not remove the upper and lower covers.



- When using a DMM, be careful not to let test probes get close to each other to prevent the power transistor in the control unit from damaging battery voltage because of short circuiting.
- When checking input and output signals of the control unit, use the specified check adapter.



Intermittent Incident

INFOID:0000000013501590

DESCRIPTION

Sometimes the symptom is not present when the vehicle is brought in for service. If possible, re-create the conditions present at the time of the incident. Doing so may help avoid a No Trouble Found Diagnosis. The following section illustrates ways to simulate the conditions/environment under which the owner experiences an electrical incident.

The section is broken into the six following topics:

- Vehicle vibration
- Heat sensitive
- Freezing
- Water intrusion
- Electrical load
- Cold or hot start up

Get a thorough description of the incident from the customer. It is important for simulating the conditions of the problem.

VEHICLE VIBRATION

The problem may occur or become worse while driving on a rough road or when engine is vibrating (idle with A/C on). In such a case, you will want to check for a vibration related condition. Refer to the following illustration.

Connector & Harness

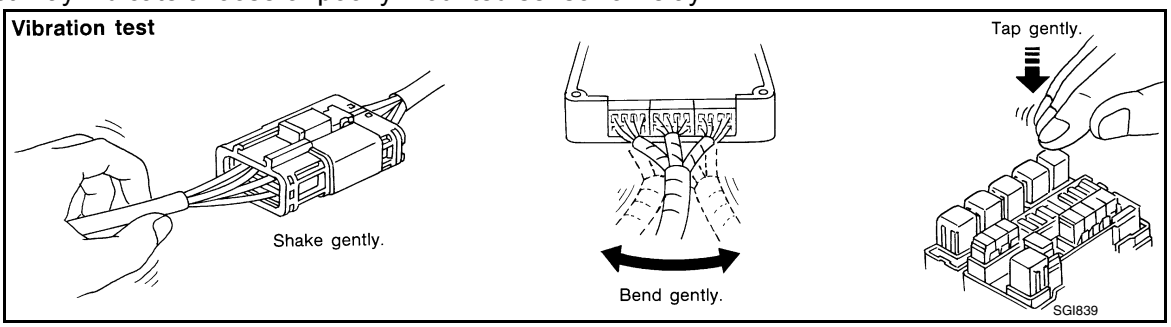
Determine which connectors and wiring harness would affect the electrical system you are inspecting. Gently shake each connector and harness while monitoring the system for the incident you are trying to duplicate. This test may indicate a loose or poor electrical connection.

Hint

Connectors can be exposed to moisture. It is possible to get a thin film of corrosion on the connector terminals. A visual inspection may not reveal this without disconnecting the connector. If the problem occurs intermittently, perhaps the problem is caused by corrosion. It is a good idea to disconnect, inspect and clean the terminals on related connectors in the system.

Sensor & Relay

Gently apply a slight vibration to sensors and relays in the system you are inspecting.
This test may indicate a loose or poorly mounted sensor or relay.



Engine Compartment

There are several reasons a vehicle or engine vibration could cause an electrical complaint. Some of the things to check for are:

- Connectors not fully seated.
- Wiring harness not long enough and is being stressed due to engine vibrations or rocking.
- Wires laying across brackets or moving components.
- Loose, dirty or corroded ground wires.
- Wires routed too close to hot components.

To inspect components under the hood, start by verifying the integrity of ground connections. (Refer to Ground Inspection described later.) First check that the system is properly grounded. Then check for loose connection by gently shaking the wiring or components as previously explained. Using the wiring diagrams inspect the wiring for continuity.

Behind the Instrument Panel

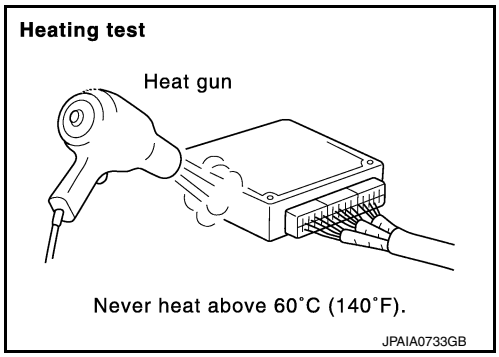
An improperly routed or improperly clamped harness can become pinched during accessory installation. Vehicle vibration can aggravate a harness which is routed along a bracket or near a screw.

Under Seating Areas

An unclamped or loose harness can cause wiring to be pinched by seat components (such as slide guides) during vehicle vibration. If the wiring runs under seating areas, inspect wire routing for possible damage or pinching.

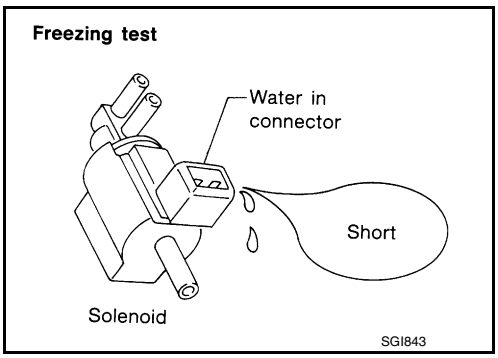
HEAT SENSITIVE

- The customer's concern may occur during hot weather or after car has sat for a short time. In such cases you will want to check for a heat sensitive condition.
- To determine if an electrical component is heat sensitive, heat the component with a heat gun or equivalent.
  CAUTION:
  Never heat components above 60°C (140°F).
- If incident occurs while heating the unit, either replace or properly insulate the component.



FREEZING

- The customer may indicate the incident goes away after the car warms up (winter time). The cause could be related to water freezing somewhere in the wiring/electrical system.
- There are two methods to check for this. The first is to arrange for the owner to leave his car overnight. Check it will get cold enough to demonstrate his complaint. Leave the car parked outside overnight. In the morning, do a quick and thorough diagnosis of those electrical components which could be affected.
- The second method is to put the suspect component into a freezer long enough for any water to freeze. Reinstall the part into the car and check for the reoccurrence of the incident. If it occurs, repair or replace the component.

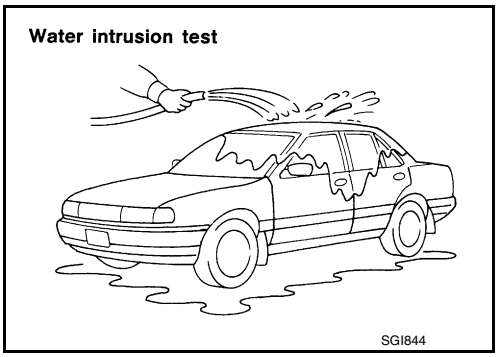


WATER INTRUSION

The incident may occur only during high humidity or in rainy/snowy weather. In such cases the incident could be caused by water intrusion on an electrical part. This can be simulated by soaking the car or running it through a car wash.

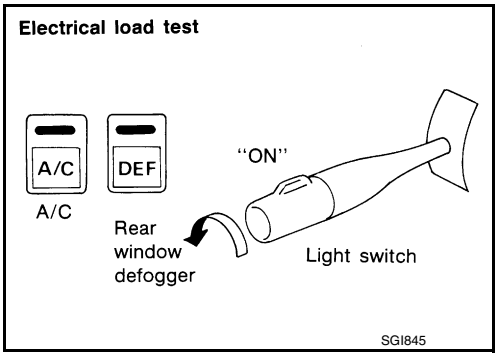
CAUTION:

Never spray water directly on any electrical components.



ELECTRICAL LOAD

The incident may be electrical load sensitive. Perform diagnosis with all accessories (including A/C, rear window defogger, radio, fog lamps) turned on.



COLD OR HOT START UP

On some occasions an electrical incident may occur only when the car is started cold, or it may occur when the car is restarted hot shortly after being turned off. In these cases you may have to keep the car overnight to make a proper diagnosis.

Circuit Inspection

INFOID:0000000013501591

DESCRIPTION

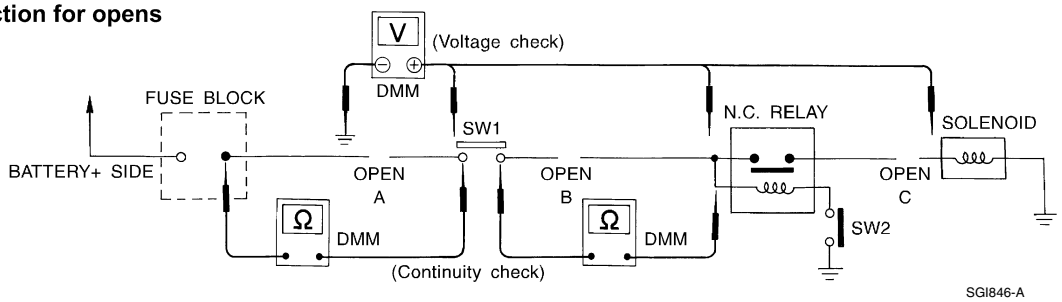
- In general, testing electrical circuits is an easy task if it is approached in a logical and organized method. Before beginning it is important to have all available information on the system to be tested. Also, get a thorough understanding of system operation. Then you will be able to use the appropriate equipment and follow the correct test procedure.
- You may have to simulate vehicle vibrations while testing electrical components. Gently shake the wiring harness or electrical component to do this.

OPEN	A circuit is open when there is no continuity through a section of the circuit.	
SHORT	There are two types of shorts.	
	• SHORT CIRCUIT	When a circuit contacts another circuit and causes the normal resistance to change.
	• SHORT TO GROUND	When a circuit contacts a ground source and grounds the circuit.

TESTING FOR “OPENS” IN THE CIRCUIT

Before you begin to diagnose and test the system, you should rough sketch a schematic of the system. This will help you to logically walk through the diagnosis process. Drawing the sketch will also reinforce your working knowledge of the system.

Inspection for opens



Continuity Check Method

The continuity check is used to find an open in the circuit. The digital multimeter (DMM) set on the resistance function will indicate an open circuit as over limit (no beep tone or no ohms symbol). Check to always start with the DMM at the highest resistance level.

To help in understanding the diagnosis of open circuits, please refer to the previous schematic.

- Disconnect the battery negative cable.
- Start at one end of the circuit and work your way to the other end. (At the fuse block in this example)
- Connect one probe of the DMM to the fuse block terminal on the load side.
- Connect the other probe to the fuse block (power) side of SW1. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point A)
- Connect the probes between SW1 and the relay. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point B)
- Connect the probes between the relay and the solenoid. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point C)

Any circuit can be diagnosed using the approach in the previous example.

Voltage Check Method

To help in understanding the diagnosis of open circuits please refer to the previous schematic.

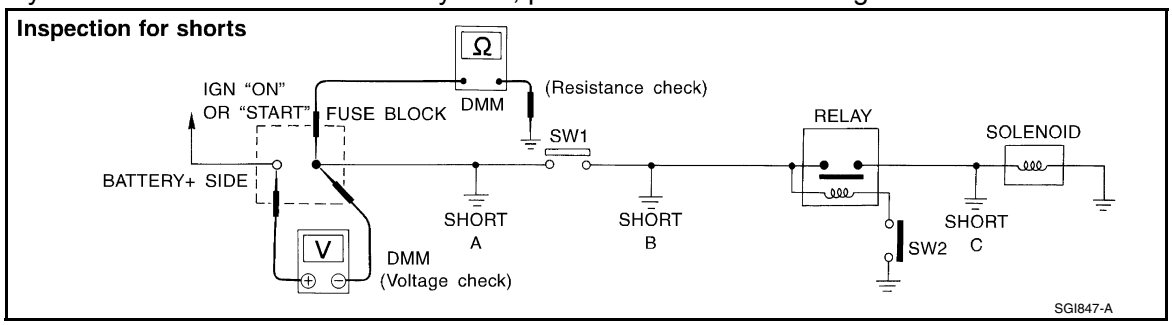
In any powered circuit, an open can be found by methodically checking the system for the presence of voltage. This is done by switching the DMM to the voltage function.

- Connect one probe of the DMM to a known good ground.
- Begin probing at one end of the circuit and work your way to the other end.
- With SW1 open, probe at SW1 to check for voltage.
  voltage: open is further down the circuit than SW1.
  no voltage: open is between fuse block and SW1 (point A).
- Close SW1 and probe at relay.
  voltage: open is further down the circuit than the relay.
  no voltage: open is between SW1 and relay (point B).
- Close the relay and probe at the solenoid.
  voltage: open is further down the circuit than the solenoid.
  no voltage: open is between relay and solenoid (point C).

Any powered circuit can be diagnosed using the approach in the previous example.

TESTING FOR “SHORTS” IN THE CIRCUIT

To simplify the discussion of shorts in the system, please refer to the following schematic.



Resistance Check Method

- Disconnect the battery negative cable and remove the blown fuse.
- Disconnect all loads (SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Connect one probe of the DMM to the load side of the fuse terminal. Connect the other probe to a known good ground.
- With SW1 open, check for continuity.
  continuity: short is between fuse terminal and SW1 (point A).
  no continuity: short is further down the circuit than SW1.
- Close SW1 and disconnect the relay. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity: short is between SW1 and the relay (point B).
  no continuity: short is further down the circuit than the relay.
- Close SW1 and jump the relay contacts with jumper wire. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity: short is between relay and solenoid (point C).
  no continuity: check solenoid, retrace steps.

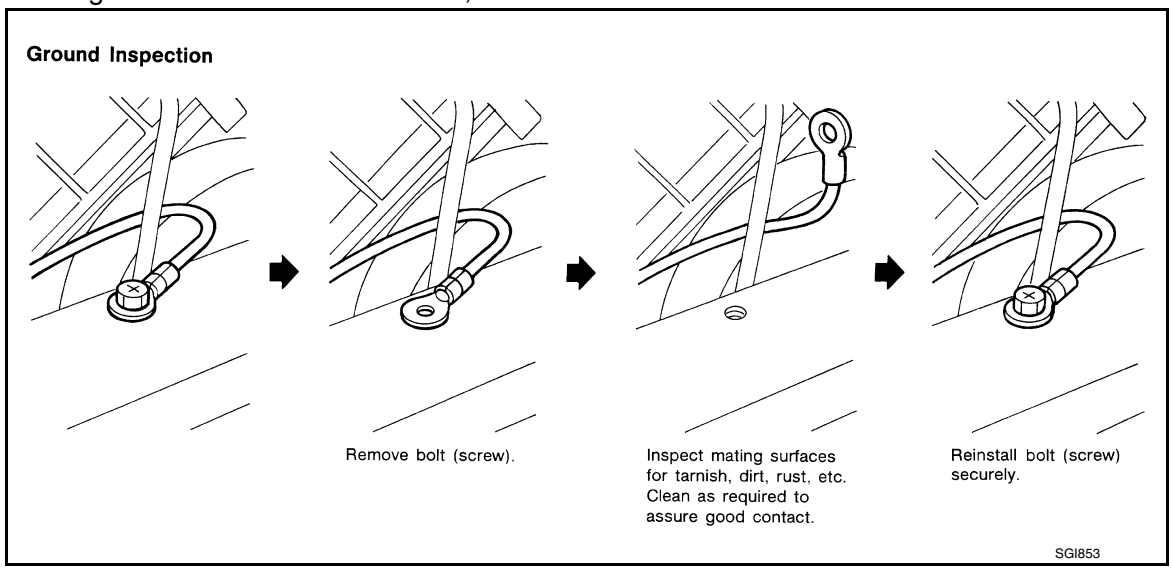
Voltage Check Method

- Remove the blown fuse and disconnect all loads (i.e. SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Turn the ignition switch to the ON or START position. Verify battery voltage at the battery + side of the fuse terminal (one lead on the battery + terminal side of the fuse block and one lead on a known good ground).
- With SW1 open and the DMM leads across both fuse terminals, check for voltage.
  voltage: short is between fuse block and SW1 (point A).
  no voltage: short is further down the circuit than SW1.
- With SW1 closed, relay and solenoid disconnected and the DMM leads across both fuse terminals, check for voltage.
  voltage: short is between SW1 and the relay (point B).
  no voltage: short is further down the circuit than the relay.
- With SW1 closed, relay contacts jumped with fused jumper wire check for voltage.
  voltage: short is down the circuit of the relay or between the relay and the disconnected solenoid (point C).
  no voltage: retrace steps and check power to fuse block.

GROUND INSPECTION

- Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.
- Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.
- When inspecting a ground connection follow these rules:
- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.
- Reinstall bolt or screw securely.
- Inspect for "add-on" accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Check all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet check no ground wires have excess wire insulation.

- For detailed ground distribution information, refer to “Ground Distribution” in PG section.



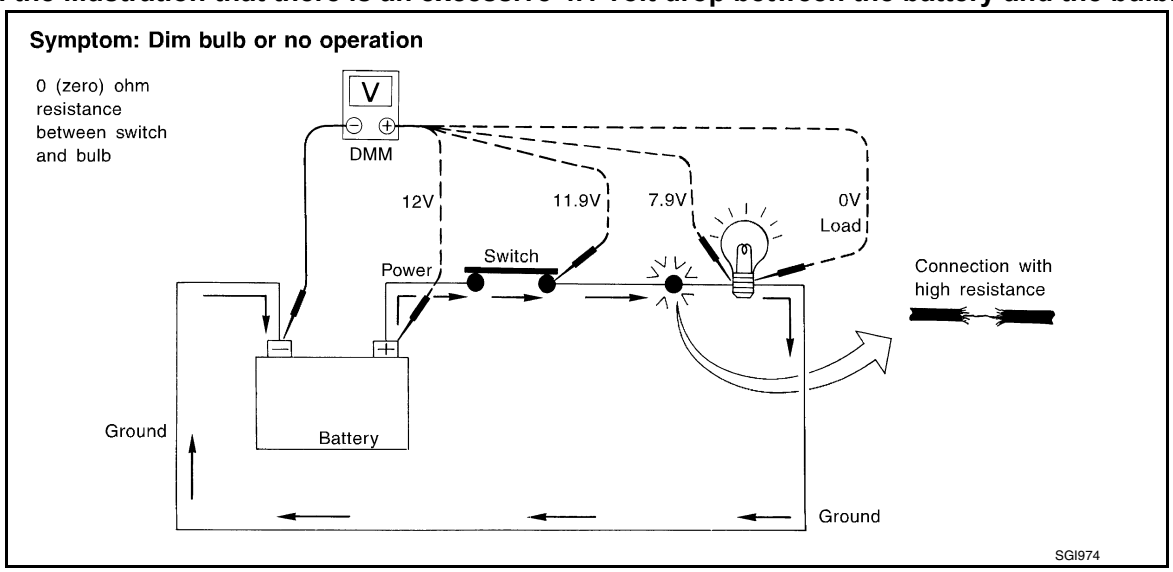
VOLTAGE DROP TESTS

- Voltage drop tests are often used to find components or circuits which have excessive resistance. A voltage drop in a circuit is caused by a resistance when the circuit is in operation.
- Check the wire in the illustration. When measuring resistance with DMM, contact by a single strand of wire will give reading of 0 ohms. This would indicate a good circuit. When the circuit operates, this single strand of wire is not able to carry the current. The single strand will have a high resistance to the current. This will be picked up as a slight voltage drop.
- Unwanted resistance can be caused by many situations as follows:
- Undersized wiring (single strand example)
- Corrosion on switch contacts
- Loose wire connections or splices.
- If repairs are needed always use wire that is of the same or larger gauge.

Measuring Voltage Drop — Accumulated Method

- Connect the DMM across the connector or part of the circuit you want to check. The positive lead of the DMM should be closer to power and the negative lead closer to ground.
- Operate the circuit.
- The DMM will indicate how many volts are being used to “push” current through that part of the circuit.

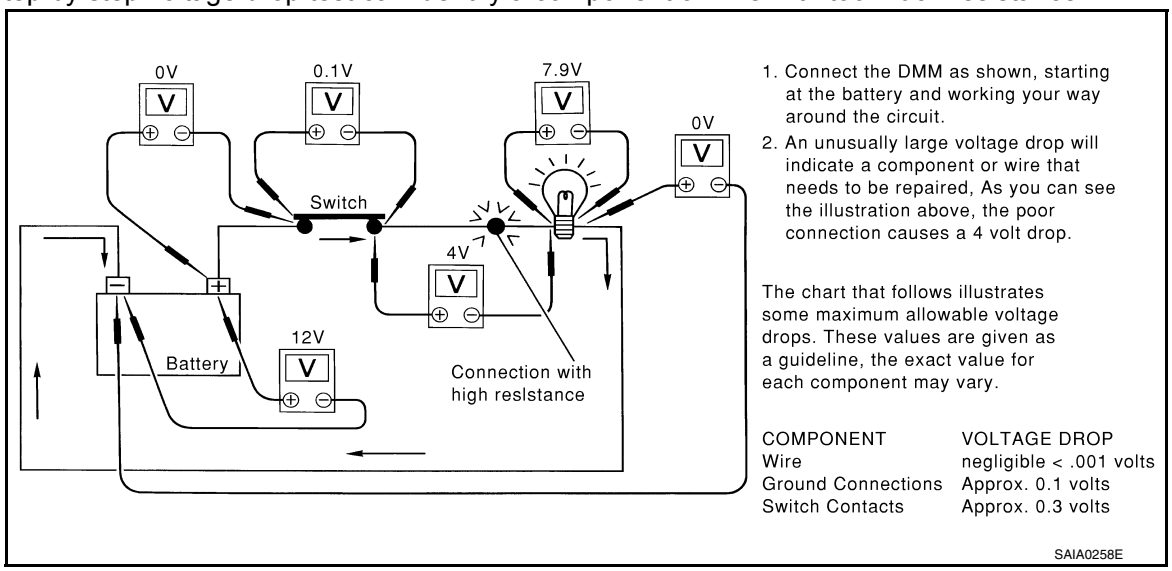
Note in the illustration that there is an excessive 4.1 volt drop between the battery and the bulb.



Measuring Voltage Drop — Step-by-Step

- The step-by-step method is most useful for isolating excessive drops in low voltage systems (such as those in “Computer Controlled Systems”).
- Circuits in the “Computer Controlled System” operate on very low amperage.

- The (Computer Controlled) system operations can be adversely affected by any variation in resistance in the system. Such resistance variation may be caused by poor connection, improper installation, improper wire gauge or corrosion.
- The step by step voltage drop test can identify a component or wire with too much resistance.

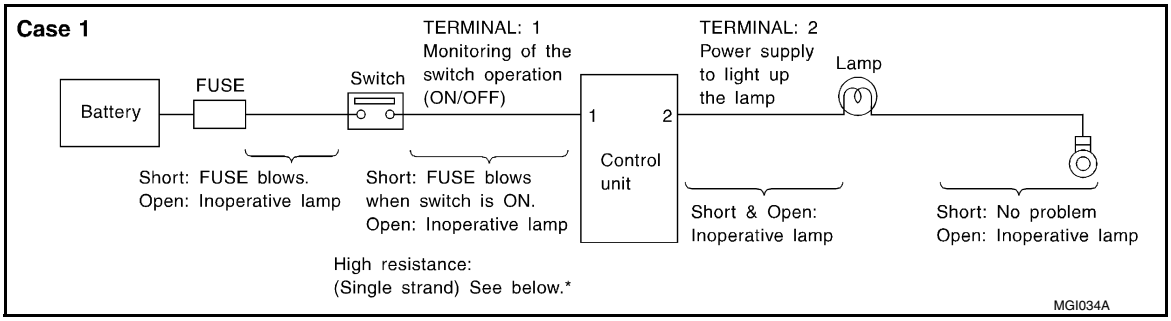


CONTROL UNIT CIRCUIT TEST

System Description

- When the switch is ON, the control unit lights up the lamp.

CASE 1

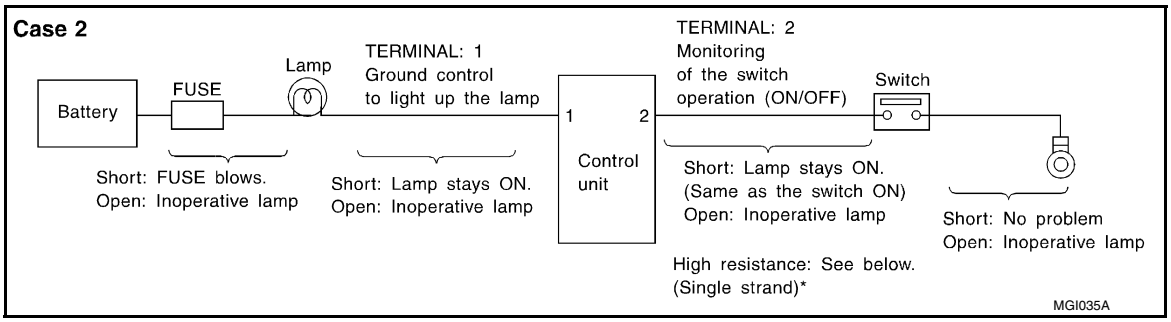


INPUT-OUTPUT VOLTAGE CHART

Terminal No.		Description		Condition	Value (Approx.)	In case of high resistance such as single strand (V) *
+	–	Signal name	Input/ Output			
1	Body ground	Switch	Input	Switch ON	Battery voltage	Lower than battery voltage Approx. 8 (Example)
				Switch OFF	0 V	Approx. 0
2	Body ground	Lamp	Output	Switch ON	Battery voltage	Approx. 0 (Inoperative lamp)
				Switch OFF	0 V	Approx. 0

- The voltage value is based on the body ground.
- *: If high resistance exists in the switch side circuit (caused by a single strand), terminal 1 does not detect battery voltage. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not supply power to light up the lamp.

CASE 2



INPUT-OUTPUT VOLTAGE CHART

Terminal No.		Description		Condition	Value (Approx.)	In case of high resistance such as single strand (V) *
+	–	Signal name	Input/ Output			
1	Body ground	Lamp	Output	Switch ON	0 V	Battery voltage (Inoperative lamp)
				Switch OFF	Battery voltage	Battery voltage
2	Body ground	Switch	Input	Switch ON	0 V	Higher than 0 Approx. 4 (Example)
				Switch OFF	5 V	Approx. 5

- The voltage value is based on the body ground.
- *: If high resistance exists in the switch side circuit (caused by a single strand), terminal 2 does not detect approx. 0 V. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not control ground to light up the lamp.

CONSULT/GST CHECKING SYSTEM

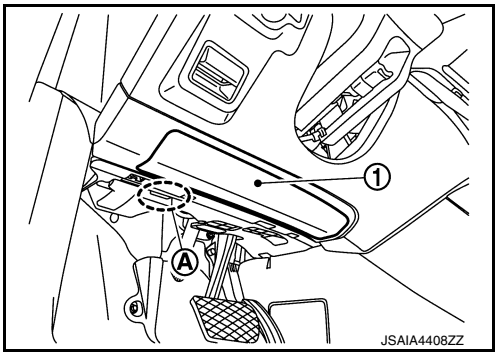
Description

INFOID:0000000013501592

- When CONSULT/GST is connected with a data link connector Ⓐ equipped on the vehicle side, it will communicate with the control unit equipped in the vehicle and then enable various kinds of diagnostic tests.

  ① : Instrument lower panel LH

- Refer to CONSULT Software Operation Manual for more information.



CONSULT Function and System Application*1

INFOID:0000000013501593

FUNCTION

NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Mode	Function
All DTC Reading	Display all DTCs or diagnostic items that all ECUs are recording and judging.
Work Support	This mode enables a technician to adjust some devices faster and more accurately.
Self Diagnostic Results	Retrieve DTC from ECU and display diagnostic items.
Data Monitor	Monitor the input/output signal of the control unit in real time.
CAN Diagnosis	This mode displays a network diagnosis result about CAN by diagram.
CAN Diagnosis Support Monitor	It monitors the status of CAN communication.
Active Test	Send the drive signal from CONSULT to the actuator. The operation check can be performed.
ECU Identification	Display the ECU identification number (part number etc.) of the selected system.
Configuration	Function to READ/WRITE vehicle configuration.
SRT&P-DTC Confirmation	The state of System Readiness Test (SRT) items, the presence or absence of permanent DTC*, and driving conditions can be checked.
DTC work support	DTC reproduction procedure can be performed speedily and precisely.
Others	Other results or histories, etc. that are recorded in ECU are displayed.

*: Permanent DTC is not applied for regions where it is not mandated.

SYSTEM APPLICATION*1

System	All DTC Reading	Work Support	Self Diagnostic Results	Data Monitor	CAN Diagnosis	CAN Diagnosis Support Monitor	Active Test	ECU Identification	Configuration	SRT&P-DTC Confirmation	DTC work support	Others	Reference page
ENGINE	x	x	x	x	x	-	x	x	x	-	-	-	EC-97, "CONSULT Function"
TRANSMISSION	x	x	x	x	x	-	x	x	x	-	-	-	TM-36, "CONSULT Function"
AIR BAG	x	x	x	x	x	-	-	x	x	-	-	-	SRC-16, "CONSULT Function"
METER / M&A	x	x	x	x	x	-	x	x	x	-	-	-	MWI-68, "CONSULT Function"
BCM	x	x	x	x	x	-	x	x	x	-	-	-	BCS-24, "CONSULT Function (BCM)"
ABS	x	x	x	x	x	-	x	x	x	-	-	-	BRC-49, "CONSULT Function"
AIR PRESSURE MONITOR	x	x	x	x	x	-	x	x	x	-	-	-	WT-20, "CONSULT Function"
Parking assist	x	x	x	x	x	-	-	x	x	-	-	-	SN-30, "CONSULT Function"
MULTI AV	-	x	x	x	x	x	-	x	x	-	-	-	AV-71, "CONSULT Function"
HVAC	x	x	x	x	x	-	x	x	x	-	-	-	HAC-25, "CONSULT Function"
CAN GATEWAY	x	-	x	x	x	-	-	x	x	-	-	-	LAN-153, "CONSULT Function"

System	All DTC Reading	Work Support	Self Diagnostic Results	Data Monitor	CAN Diagnosis	CAN Diagnosis Support Monitor	Active Test	ECU Identification	Configuration	SRT&P-DTC Confirmation	DTC work support	Others	Reference page
AVM	x	x	x	x	x	x	-	x	x	-	-	-	AV-280, "CONSULT Function"
ESP / DAST 3	x	x	x	x	x	-	-	x	-	-	-	-	STC-12, "CONSULT Function"
FPCM	x	-	x	x	x	-	x	x	x	-	-	-	EC-117, "CONSULT Function"
EHS/PKB	x	x	x	x	x	-	-	x	x	-	-	-	PB-18, "CONSULT Function"
ALL MODE AWD/4WD	x	x	x	x	x	-	x	x	-	-	-	-	DLN-16, "CONSULT Function"
Electric ign switch cont unit	x	x	x	x	x	-	x	x	x	-	-	-	PCS-8, "CONSULT Function"
Light & rain sensor	-	x	-	x	-	-	-	x	x	-	-	-	WW-21, "CONSULT Function"
Overhead control panel unit	-	-	-	-	-	-	-	x	x	-	-	-	INL-22, "CONSULT Function"
INTELLIGENT KEY	x	-	x	x	x	-	x	x	x	-	-	-	DLK-29, "CONSULT Function (INTELLIGENT KEY)"
Left front door control unit	x	-	x	x	x	-	x	x	x	-	-	-	DLK-31, "CONSULT Function (Left Front Door Control Unit)"

System	All DTC Reading	Work Support	Self Diagnostic Results	Data Monitor	CAN Diagnosis	CAN Diagnosis Support Monitor	Active Test	ECU Identification	Configuration	SRT&P-DTC Confirmation	DTC work support	Others	Reference page
Right front door control unit	x	-	x	x	x	-	x	x	x	-	-	-	DLK-35, "CONSULT Function (Right Front Door Control Unit)"
AUTO DRIVE POS.	x	x	x	x	x	-	x	x	x	-	-	-	ADP-16, "DRIVER SIDE : CONSULT Function"
Passenger seat control unit	x	x	x	x	x	-	x	x	x	-	-	-	ADP-17, "PASSENGER SIDE : CONSULT Function"
Upper control panel cont unit	-	-	-	-	-	-	-	x	-	-	-	-	BCS-31, "CONSULT Function (Upper Control Panel Control Unit)"
Steering column cont module	x	-	x	x	x	-	x	x	-	-	-	-	BCS-30, "CONSULT Function (Steering Column Control Module)"
ICC sensor	x	x	x	x	x	-	x	x	x	-	-	-	CCS-38, "CONSULT Function (ICC Sensor)"

System	All DTC Reading	Work Support	Self Diagnostic Results	Data Monitor	CAN Diagnosis	CAN Diagnosis Support Monitor	Active Test	ECU Identification	Configuration	SRT&P-DTC Confirmation	DTC work support	Others	Reference page
Side radar RH	x	-	x	x	x	-	x	x	-	-	-	-	DAS-32, "CONSULT Function (SIDE RADAR RIGHT)"
Side reader LH	x	-	x	x	x	-	x	x	-	-	-	-	DAS-31, "CONSULT Function (SIDE RADAR LEFT)"
Front camera unit	x	x	x	x	x	-	x	x	x	-	-	-	DAS-29, "CONSULT Function (LANE CAMERA)"
SHIFT	x	x	x	x	x	-	x	-	x	-	-	-	TM-41, "CONSULT Function"
H/L control module LH	x	x	x	x	x	-	x	x	-	-	-	-	EXL-64, "CONSULT Function (H/L control module LH)" (LED headlamp) or EXL-354, "CONSULT Function (H/L control module LH)" (Halogen headlamp)

System	All DTC Reading	Work Support	Self Diagnostic Results	Data Monitor	CAN Diagnosis	CAN Diagnosis Support Monitor	Active Test	ECU Identification	Configuration	SRT&P-DTC Confirmation	DTC work support	Others	Reference page
H/L control module RH	x	x	x	x	x	-	x	x	-	-	-	-	EXL-67, "CONSULT Function (H/L control module RH)" (LED headlamp) or EXL-357, "CONSULT Function (H/L control module RH)" (Halogen headlamp)
LED H/L control module LH	-	x	-	x	-	-	x	x	-	-	-	-	EXL-70, "CONSULT Function (LED H/L CONTROL MODULE LH)"
LED H/L control module RH	-	x	-	x	-	-	x	x	-	-	-	-	EXL-72, "CONSULT Function (LED H/L control module RH)"
Occupant classification unit	-	x	-	x	-	-	-	x	x	-	-	-	SRC-18, "CONSULT Function"

System	All DTC Reading	Work Support	Self Diagnostic Results	Data Monitor	CAN Diagnosis	CAN Diagnosis Support Monitor	Active Test	ECU Identification	Configuration	SRT&P-DTC Confirmation	DTC work support	Others	Reference page
TELEMATICS	x	x	x	x	x	x	-	x	x	-	-	-	AV-415, "CONSULT Function"
Universal Garage Door Opener	-	x	-	-	-	-	-	x	-	-	-	-	DLK-39, "CONSULT Function (GARAGE DOOR OPENER CONTROL UNIT)"

x: Applicable

*1: If GST application is equipped, functions in accordance with SAE J1979 and ISO 15031-5 can be used.

CONSULT/GST Data Link Connector (DLC) Circuit

INFOID:0000000013501594

INSPECTION PROCEDURE

If the CONSULT/GST cannot diagnose the system properly, check the following items.

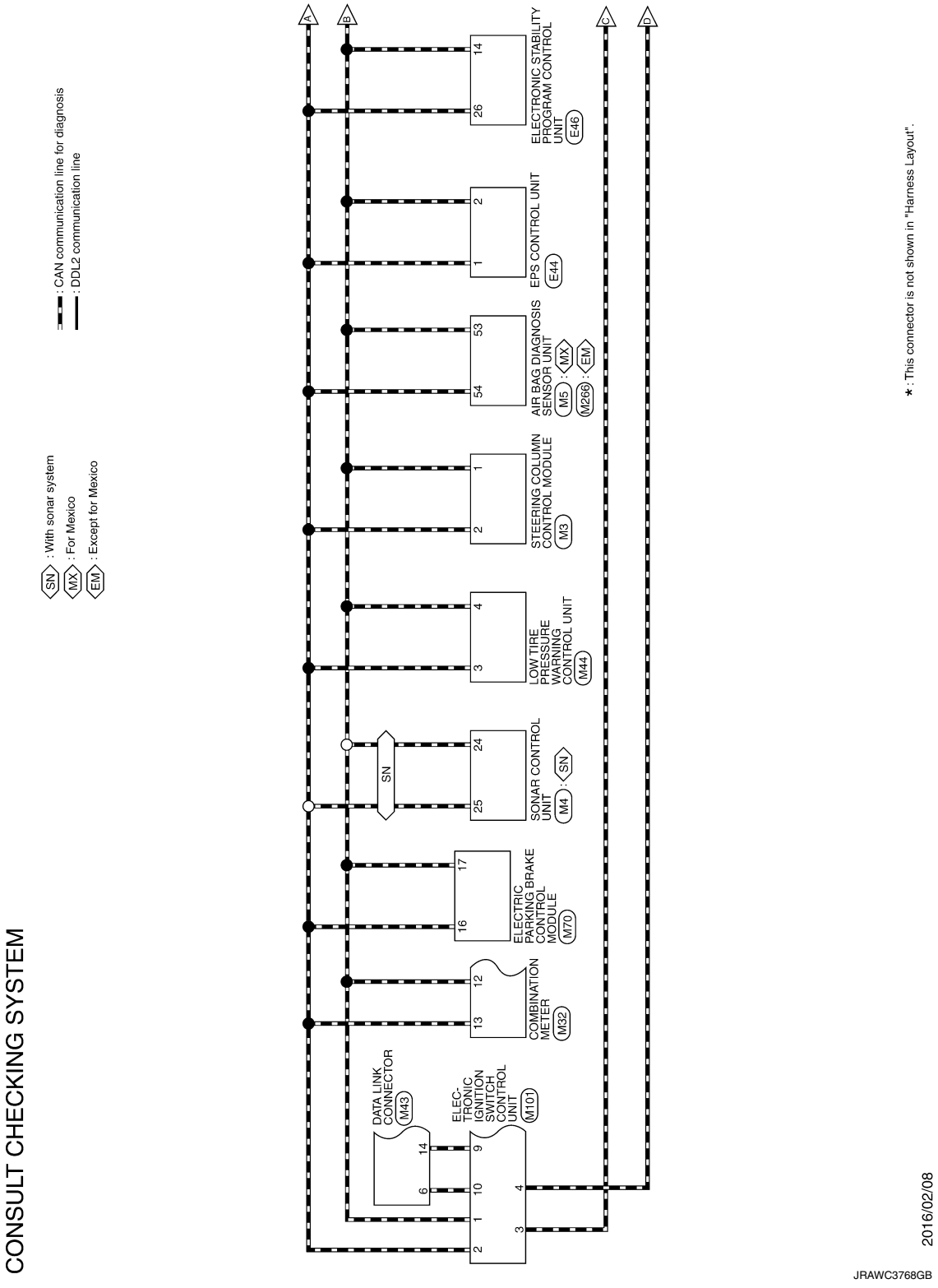
Symptom	Check item
CONSULT/GST cannot access any system.	• CONSULT/GST DLC power supply circuit (Terminal 8 and 16) and ground circuit (Terminal 4 and 5)
CONSULT cannot access individual system. (Other systems can be accessed.)	• Power supply and ground circuit for the control unit of the system (For detailed circuit, refer to wiring diagram for each system.) • Open or short circuit between the system and CONSULT DLC (For detailed circuit, refer to wiring diagram for each system.) • Open or short circuit CAN communication line. Refer to LAN-58, "Trouble Diagnosis Flow Chart" .

NOTE:

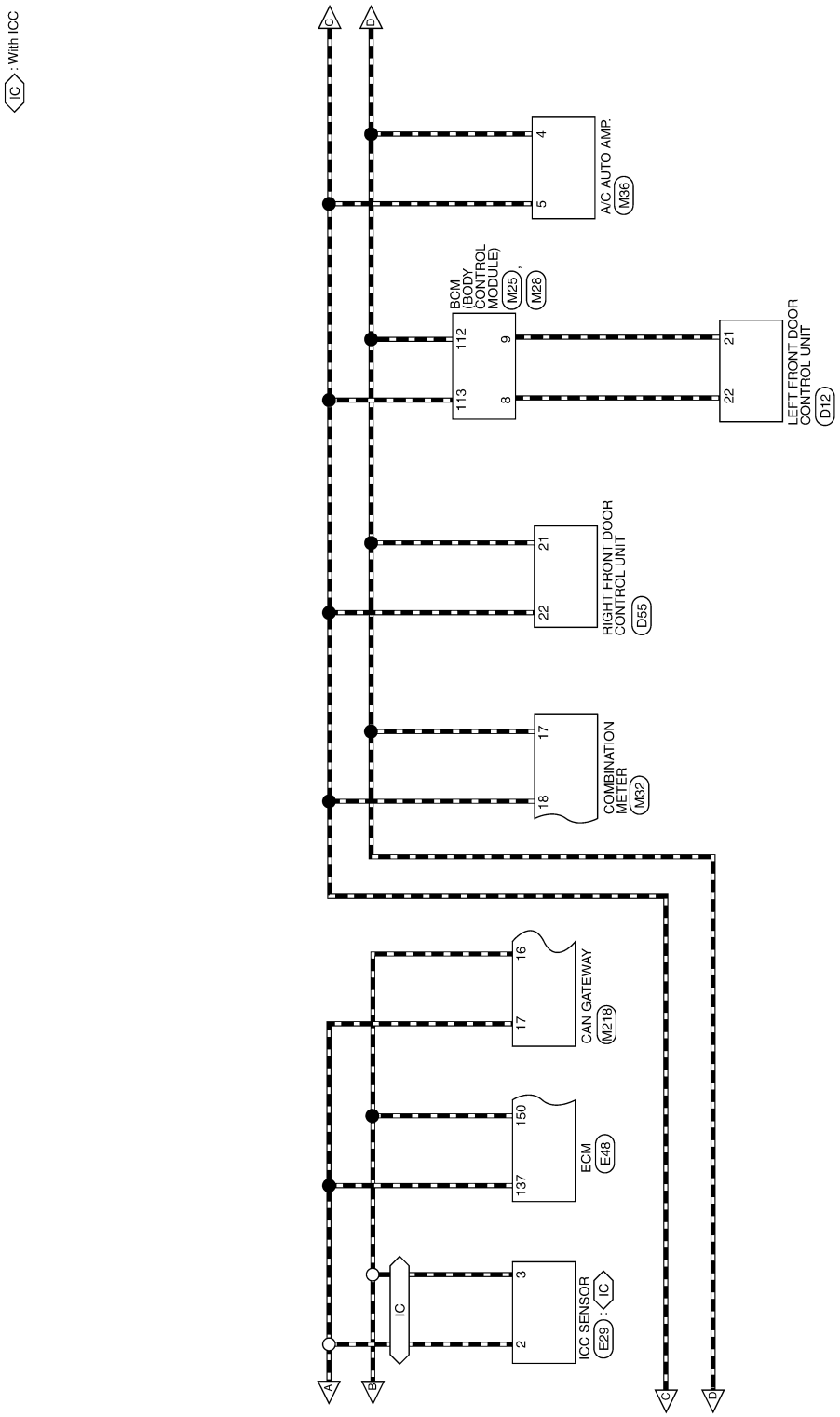
The DDL1 and DDL2 circuits from DLC pins 12, 13, 14 and 15 may be connected to more than one system. A short in a DDL circuit connected to a control unit in one system may affect CONSULT access to other systems. If the GST cannot operate properly, check the circuit based on the information of SAE J1962 and ISO 15031-3.

Wiring Diagram - CONSULT/GST CHECKING SYSTEM -

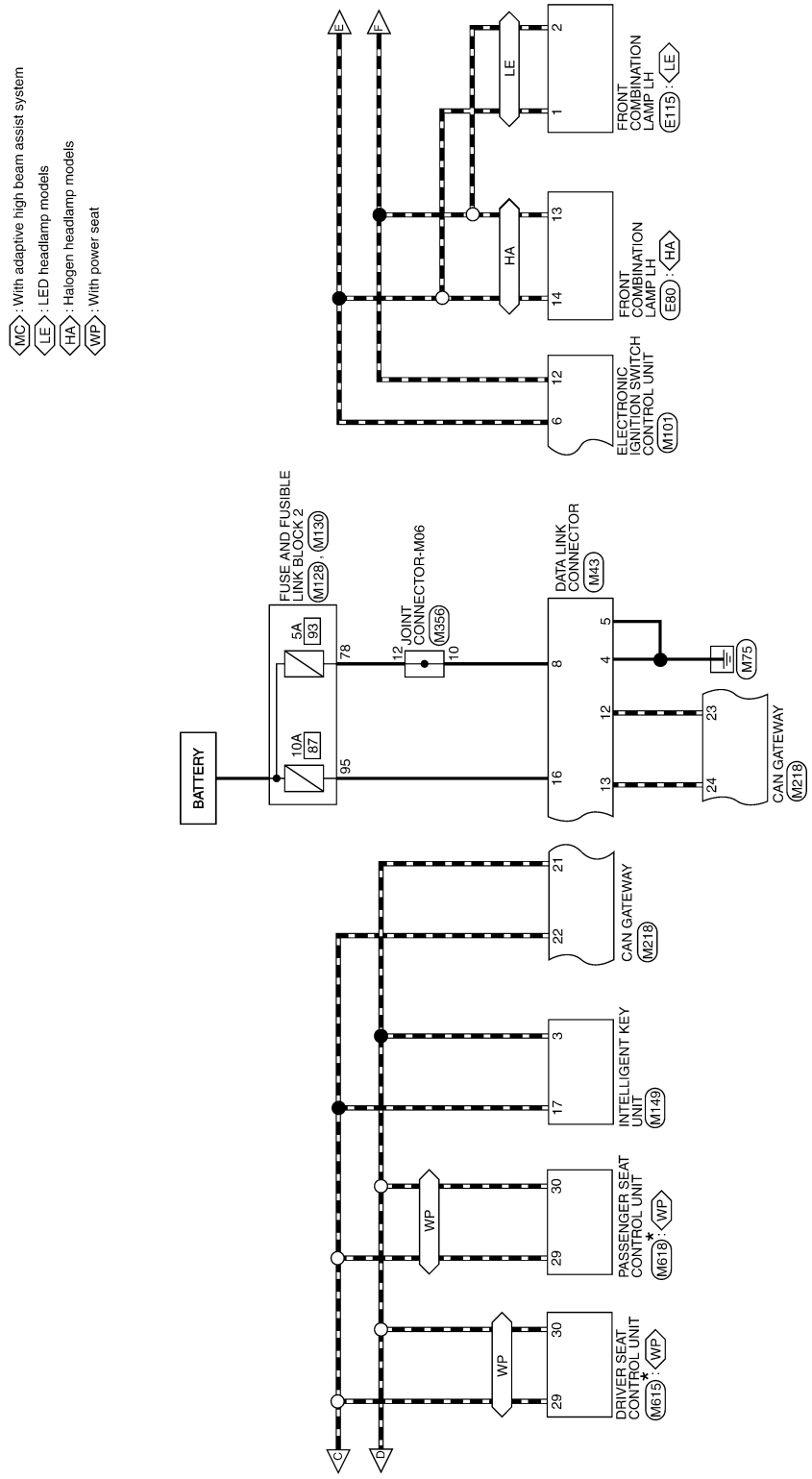
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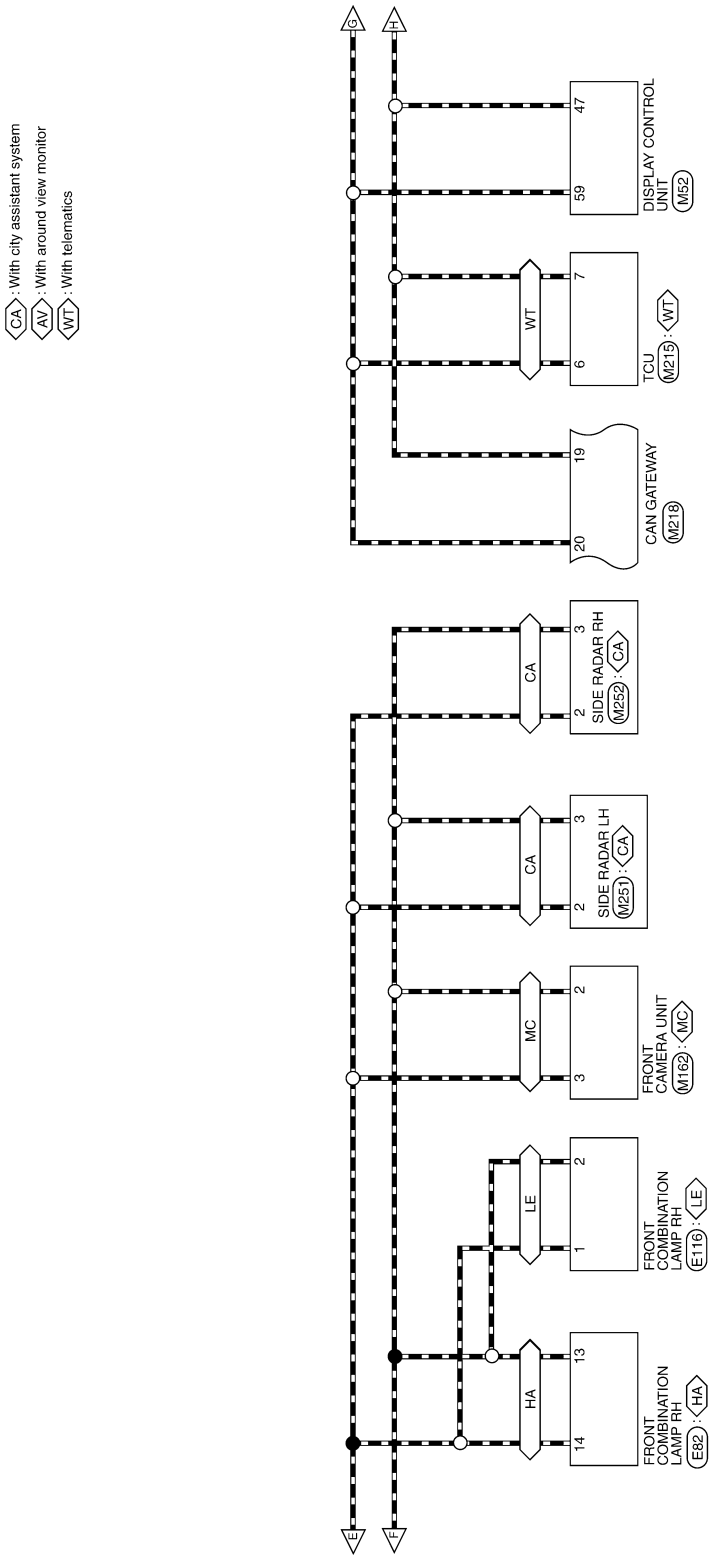
CONSULT CHECKING SYSTEM



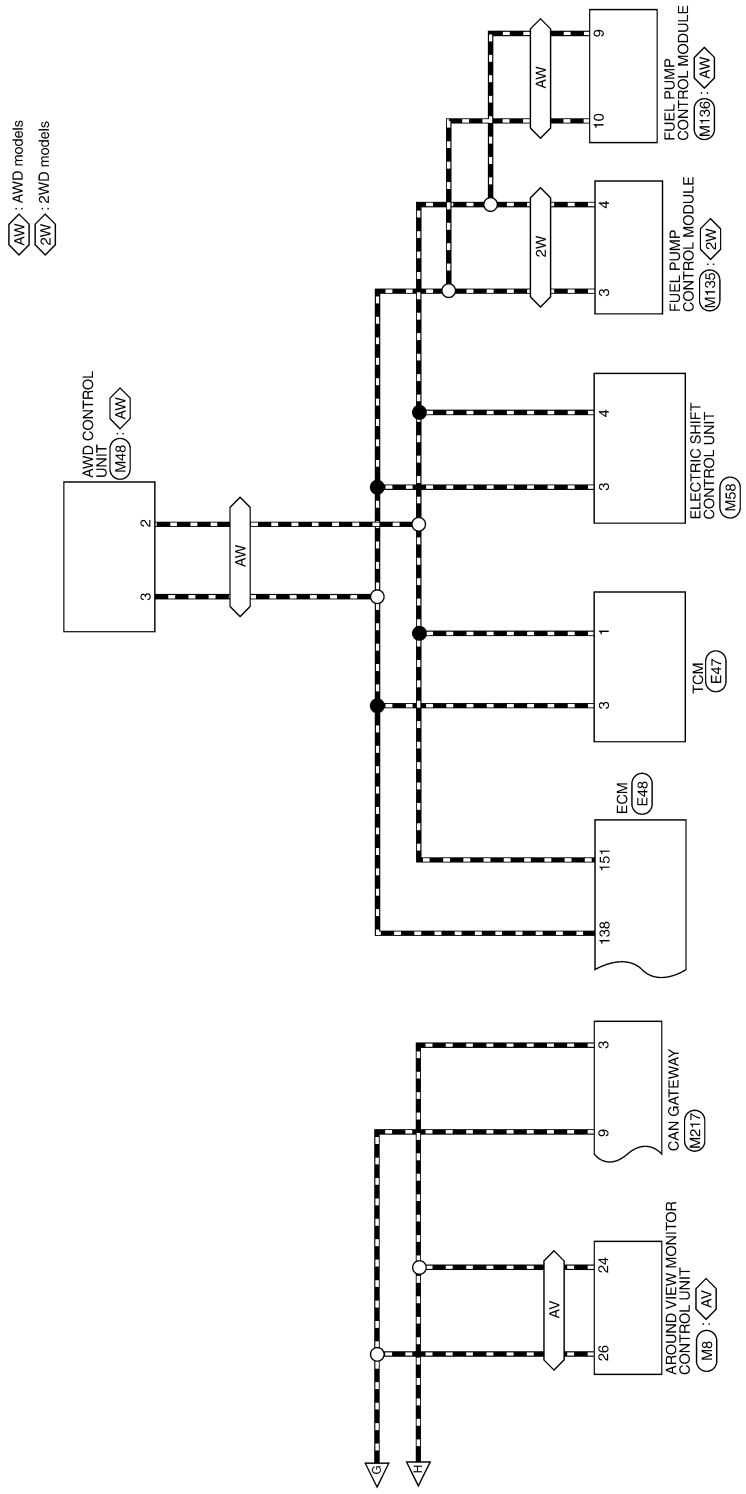
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CONSULT CHECKING SYSTEM

Connector No.	D12
Connector Name	LEFT FRONT DOOR CONTROL UNIT
Connector Type	MB_A0025406281

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
21	BR	BODY CAN 2-L
22	R	BODY CAN 2-H
23	L	ROTARY CATCH SIGNAL
24	BR	GROUND
25	R	BATTERY POWER SUPPLY

Connector No.	D55
Connector Name	RIGHT FRONT DOOR CONTROL UNIT
Connector Type	MB_A0025406281

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
21	BR	BODY CAN 1-L
22	R	BODY CAN 1-H
24	BR	GROUND
25	R	BATTERY POWER SUPPLY

Connector No.	E29
Connector Name	ICC SENSOR
Connector Type	MB_A2105404581

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	GROUND
2	W	CAN-H
3	G	CAN-L
8	B	BATTERY POWER SUPPLY

Connector No.	E44
Connector Name	EPS CONTROL UNIT
Connector Type	MB_A0065401981

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	CAN-H
2	G	CAN-L

Connector No.	E46
Connector Name	ELECTRONIC STABILITY PROGRAM CONTROL UNIT
Connector Type	MB_A2465400581

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	MOTOR POWER SUPPLY
2	W	BRAKE PEDAL
4	P	RIGHT FRONT AXLE RPM SENSOR SIGNAL
5	GR	BRAKE VACUUM SENSOR POWER SUPPLY
6	B	BRAKE LIGHT SWITCH-L
7	R	BATTERY POWER SUPPLY
8	Y	LFET FRONT AXLE RPM SENSOR SIGNAL
10	O	STANDSTILL CONTROL (SSC) STATUS
12	P	BRAKE VACUUM SENSOR SIGNAL
13	BR	GROUND (MOTOR)
14	G	CAN-L
16	B	RIGHT FRONT AXLE RPM SENSOR POWER SUPPLY
17	Y	RIGHT REAR AXLE RPM SENSOR POWER SUPPLY
18	BR	LFET REAR AXLE RPM SENSOR SIGNAL
19	W	LFET FRONT AXLE RPM SENSOR POWER SUPPLY
23	B	BRAKE VACUUM SENSOR GROUND
25	P	VALVE RELAY POWER SUPPLY
26	W	CAN-H
28	R	BATTERY POWER SUPPLY
29	P	RIGHT REAR AXLE RPM SENSOR SIGNAL
30	V	BRAKE LIGHT SWITCH-H
31	GR	LFET REAR AXLE RPM SENSOR POWER SUPPLY
32	L	BRAKE LIGHT SWITCH GROUND
35	R	BRAKE LIGHT SWITCH POWER SUPPLY
38	B	GROUND (VALVE)

Connector No.	E47
Connector Name	TCM
Connector Type	MB_A2465450026

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	CAN-L
2	V	NOT P
3	GR	CAN-H
5	W	BATTERY POWER SUPPLY

Connector No.	E48
Connector Name	ECM
Connector Type	MB_A0075406981

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
97	R	POWER SUPPLY (ECM)
98	BR	ECM GROUND
99	V	POWER SUPPLY (ECM)
100	BR	ECM GROUND
101	R	POWER SUPPLY (ECM)
102	B	ECM GROUND
103	L	COOLING FAN CONTROL SIGNAL
104	R	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 2)
105	G	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 1)
106	BR	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR1)
111	B	IGNITION SIGNAL
112	Y	POWER SUPPLY (BATTERY)
116	W	STARTER RELAY-L
119	GR	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 2)
120	O	SENSOR GROUND

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122	R	HOT START SIGNAL
123	GR	MOTOR RELAY CONTROL SIGNAL
127	O	FUEL PUMP ON SIGNAL
132	G	ACCELERATOR PEDAL POSITION SENSOR 1
136	Y	POWERTRAIN SENSOR CAN-H
137	W	CAN-H
138	GR	POWERTRAIN CAN-H
141	B	WATER PUMP RELAY CONTROL SIGNAL
145	W	ACCELERATOR PEDAL POSITION SENSOR 2
146	G	FUEL TANK PRESSURE SENSOR
147	L	CRASH SIGNAL
148	W	STARTER RELAY-H
149	B	POWERTRAIN SENSOR CAN-L
150	G	CAN-L
151	L	POWERTRAIN CAN-L
152	V	EVAP CANISTER VENT CONTROL VALVE
153	BR	EVAP PURGE CONTROL VALVE

Connector No.	E80
Connector Name	FRONT COMBINATION LAMP LH
Connector Type	RS06FGY-PR

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
10	BR	GROUND
11	R	BATTERY POWER SUPPLY
12	GR	PARKING LAMP SIGNAL
13	L	CAN-H
14	W	CAN-L

Connector No.	E82
Connector Name	FRONT COMBINATION LAMP RH
Connector Type	RS06FGY-PR

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
10	BR	GROUND
11	R	BATTERY POWER SUPPLY
12	GR	PARKING LAMP SIGNAL
13	L	CAN-H
14	W	CAN-L

Connector No.	E115
Connector Name	FRONT COMBINATION LAMP LH
Connector Type	RS08FGY-PR

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	CAN-H
2	L	CAN-L
3	Y	HEADLAMP POWER SUPPLY
4	V	BATTERY POWER SUPPLY
5	B	GROUND
11	GR	HEADLAMP POWER SUPPLY
12	BR	BATTERY POWER SUPPLY
13	B	GROUND

Connector No.	E116
Connector Name	FRONT COMBINATION LAMP RH
Connector Type	RS08FGY-PR

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	CAN-H
2	L	CAN-L
3	GR	HEADLAMP POWER SUPPLY
4	BR	BATTERY POWER SUPPLY
5	B	GROUND
11	Y	HEADLAMP POWER SUPPLY
12	BR	BATTERY POWER SUPPLY
13	B	GROUND

Connector No.	M3
Connector Name	STEERING COLUMN CONTROL MODULE
Connector Type	MB_A2045401281

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	CAN-L (CHASIS)
2	W	CAN-H (CHASIS)
3	BR	GND
4	R	KL30G
6	R	KL30
7	BR	GND
8	L	AB1+
9	Y	AB1-
10	V	AB2+
11	G	AB2-

Connector No.	M4
Connector Name	SONAR CONTROL UNIT
Connector Type	MB_A0015403081

H.S.

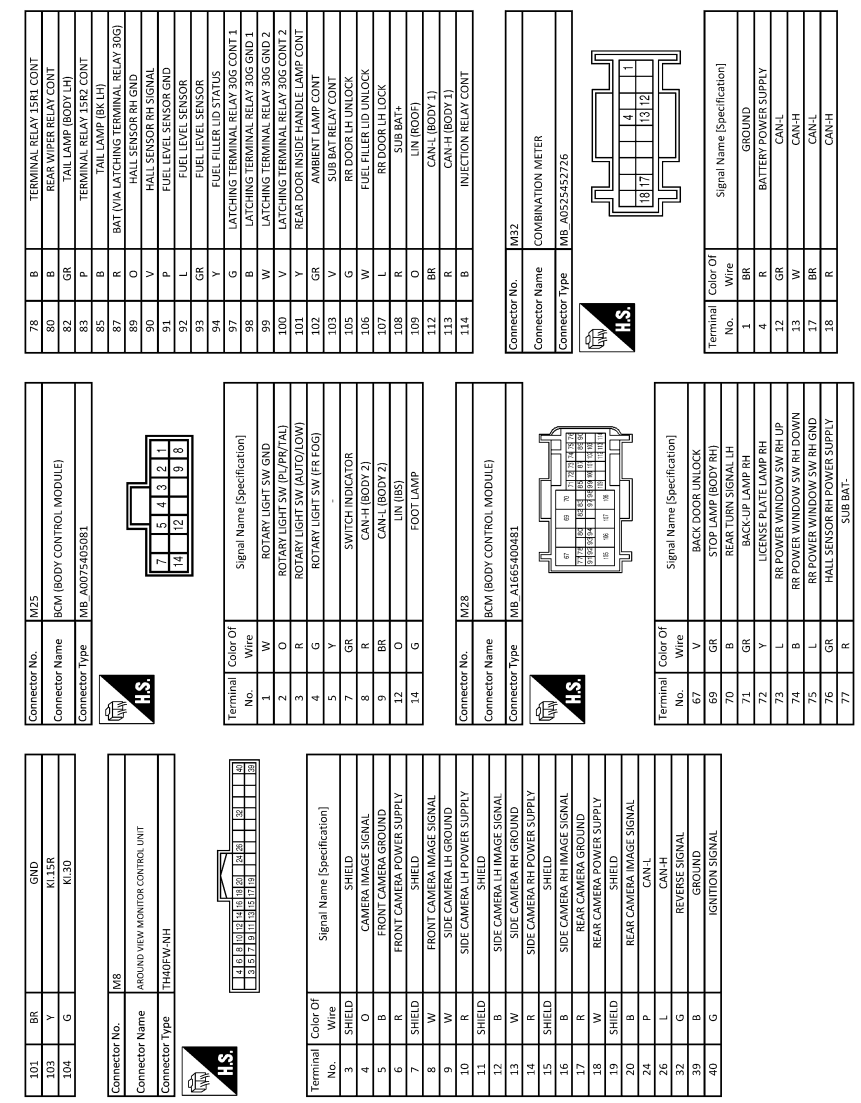
Terminal No.	Color Of Wire	Signal Name [Specification]
6	L	CORNER SENSAR SIGNAL REAR LH
7	R	CENTER SENSAR SIGNAL REAR RH
8	Y	SIDE SENSAR SIGNAL REAR RH
13	BR	GROUND
15	R	BATTERY POWER SUPPLY
19	BR	REAR SENSOR POWER SUPPLY
20	V	SIDE SENSAR SIGNAL REAR LH
21	W	CENTER SENSAR SIGNAL REAR LH
22	Y	CORNER SENSAR SIGNAL REAR RH
23	B	REAR SENSOR GROUND
24	G	CAN-L
25	W	CAN-H

Connector No.	M5
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	MB_A0095405681

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	BUMPER SENSOR RH GROUND
2	W	BUMPER SENSOR RH SIGNAL
3	B	BUMPER SENSOR LH SIGNAL
4	W	BUMPER SENSOR LH GROUND
9	L/G	POP-UP ENGINE HOOD ACTUATOR RH (-)
10	BR/B	POP-UP ENGINE HOOD ACTUATOR RH (+)
11	O	POP-UP ENGINE HOOD ACTUATOR LH (+)
12	BR/W	POP-UP ENGINE HOOD ACTUATOR LH (-)

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Connector No.	M36
Connector Name	A/C AUTO AMP.
Connector Type	MB_A0023540553

Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	REFRIGERANT PRESSURE SENSOR GROUND
2	B	REFRIGERANT PRESSURE SENSOR SIGNAL
4	BR	CAN-L
5	R	CAN-H
6	V	COMPRESSOR (ECV) CONTROL SIGNAL
8	L	REFRIGERANT PRESSURE SENSOR POWER SUPPLY
10	Y	REAR WINDOW DEFOGGER RELAY CONTROL SIGNAL
11	V	LIN (BLOWER MOTOR)
12	G	COMPRESSOR (ECV) GROUND
13	P	COMPRESSOR (MAGNET CLUTCH) CONTROL SIGNAL
14	R	COOLANT CIRCULATION PUMP CONTROL SIGNAL
15	BR	GROUND
16	O	BATTERY POWER SUPPLY

Connector No.	M43
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color Of Wire	Signal Name [Specification]
4	B	CHASSIS_GND
5	B	ELECTRONICS_GND
6	GR	DIAGNOSTICS-CAN_H_DAI
8	W	IGN_SW
12	L	DIAGNOSTIC-CAN-L_NIS
13	V	DIAGNOSTIC-CAN_H_NIS
14	GR	DIAGNOSTICS-CAN_L_DAI

16	R	BATTERY

Connector No.	M44
Connector Name	LOW TIRE PRESSURE WARNING CONTROL UNIT
Connector Type	MB_A2105404381

Terminal No.	Color Of Wire	Signal Name [Specification]
1	O	BATTERY POWER SUPPLY
2	BR	GROUND
3	W	CAN-H
4	G	CAN-L

Connector No.	M48
Connector Name	AWD CONTROL UNIT
Connector Type	MB_A0525451826

Terminal No.	Color Of Wire	Signal Name [Specification]
2	L	CAN-L
3	W	CAN-H
6	L	BATTERY POWER SUPPLY
7	BR	GROUND
10	BR	AWD SOL (-)
11	O	AWD SOL (+)
12	R	BATTERY POWER SUPPLY

Connector No.	M52
Connector Name	DISPLAY CONTROL UNIT
Connector Type	TH24FW-NH

Terminal No.	Color Of Wire	Signal Name [Specification]
46	G	AV COMMUNICATION SIGNAL (L)
47	P	CAN-L
49	R	DIMMER SIGNAL
50	BR	REVERSE SIGNAL
52	B	GROUND
56	BR	CAMERA SWITCH SIGNAL
58	Y	AV COMMUNICATION SIGNAL (H)
59	L	CAN-H
60	W	IGNITION SIGNAL
61	R	VEHICLE SPEED SIGNAL (8-PULSE)
63	L	ACC POWER SUPPLY
64	Y	BATTERY POWER SUPPLY

Connector No.	M58
Connector Name	ELECTRIC SHIFT CONTROL UNIT
Connector Type	MB_A0385457228

Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	BATTERY POWER SUPPLY
2	BR	GROUND
3	W	CAN-H
4	L	CAN-L

Connector No.	M70
Connector Name	ELECTRIC PARKING BRAKE CONTROL MODULE
Connector Type	MB_A0085409281

Terminal No.	Color Of Wire	Signal Name [Specification]
9	G	ELECTRIC PARKING BRAKE SWITCH 1
10	P	ELECTRIC PARKING BRAKE SWITCH 2
12	R	MOTOR RH (+)
13	W	MOTOR POWER SUPPLY (RH)
14	R	MOTOR LH (+)
15	R	MOTOR POWER SUPPLY (LH)
16	W	CAN-H
17	G	CAN-L
18	O	ELECTRIC PARKING BRAKE SWITCH 3
19	G	ELECTRIC PARKING BRAKE SWITCH 4
22	B	POWER SUPPLY
27	Y	MOTOR RH (-)
28	BR	GROUND (MOTOR RH)
29	V	MOTOR LH (-)
30	BR	GROUND (MOTOR LH)

Connector No.	M101
Connector Name	ELECTRONIC IGNITION SWITCH CONTROL UNIT
Connector Type	MB_A0265458426

Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	CHASSIS CAN-L
2	W	CHASSIS CAN-H
3	R	BODY CAN 1-H
4	BR	BODY CAN 1-L
6	W	STEERING LOCK OPERATION

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9	GR	REMOTE KEYLESS
10	W	POWER SUPPLY
11	BR	DIAGNOSTIC CAN-L
12	L	DIAGNOSTIC CAN-H

Connector No.	M128
Connector Name	FUSE AND FUSIBLE LINK BLOCK 2
Connector Type	MB_A0395456128

H.S.

75	74	73	71	70	69
82	81	79	78	77	76

Terminal No.	Color Of Wire	Signal Name [Specification]
69	B	-
70	P	-
71	B	-
73	BR	-
74	B	-
75	G	-
76	R	-
77	Y	-
78	P	-
79	GR	-
81	O	-
82	B	-

Connector No.	M130
Connector Name	FUSE AND FUSIBLE LINK BLOCK 2
Connector Type	MB_A2205453728

H.S.

99	97	96	95
104	103	101	102

Terminal No.	Color Of Wire	Signal Name [Specification]
95	R	-
96	R	-
97	B	-
99	R	-
102	P	-
104	GR	-
105	V	-
106	W	-

Connector No.	M135
Connector Name	FUEL PUMP CONTROL MODULE
Connector Type	MB_A0255458826

H.S.

4	3	2
8	7	6	5

Terminal No.	Color Of Wire	Signal Name [Specification]
2	L	FUEL PUMP ACTIVATION REQUEST
3	W	POWERTRAIN CAN-H
4	L	POWERTRAIN CAN-L
5	GR	BATTERY POWER SUPPLY
6	O	SENSOR GROUND
7	V	FUEL PRESSURE SENSOR
8	G	SENSOR POWER SUPPLY

Connector No.	M136
Connector Name	FUEL PUMP CONTROL MODULE
Connector Type	MB_A0265456226

H.S.

9	10	11
3	4	5	6

Terminal No.	Color Of Wire	Signal Name [Specification]
3	G	SENSOR POWER SUPPLY
4	V	FUEL PRESSURE SENSOR
5	O	SENSOR GROUND
6	GR	IGNITION SIGNAL
9	L	POWERTRAIN CAN-L
10	W	POWERTRAIN CAN-H
11	L	FUEL PUMP ACTIVATION REQUEST

Connector No.	M149
Connector Name	INTELLIGENT KEY UNIT
Connector Type	MB_A0045407281

H.S.

13	11	8	7	6	3	1
26	25	23	20	19	18	15

Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	GND
3	BR	BODY CAN 1-L
5	L	REAR INSIDE KEY ANTENNA SIG 1
6	Y	OUTSIDE KEY ANTENNA RH SIG 1
7	G	OUTSIDE KEY ANTENNA LH SIG 1
8	W	FRONT INSIDE KEY ANTENNA SIG 1
11	GR	FR I-KEY DOOR HANDLE RH GND
12	B	FR I-KEY DOOR HANDLE LH GND
15	R	BATTERY POWER SUPPLY
17	R	BODY CAN 1-H
18	B	KEYLESS COMMUNICATION SIG
19	R	REAR INSIDE KEY ANTENNA SIG 2
20	O	OUTSIDE KEY ANTENNA RH SIG 2
21	V	OUTSIDE KEY ANTENNA LH SIG 2
22	B	FRONT INSIDE KEY ANTENNA SIG 2
25	V	FR I-KEY DOOR HANDLE RH SIG
26	P	FR I-KEY DOOR HANDLE LH SIG

Connector No.	M162
Connector Name	FRONT CAMERA UNIT
Connector Type	MB_A0255458826

H.S.

4	3	2	1
		6	5

Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	GROUND
2	L	CAN-L
3	W	CAN-H
4	R	BATTERY POWER SUPPLY
5	O	HEATER GROUND
6	Y	HEATER POWER SUPPLY

Connector No.	M215
Connector Name	TCU
Connector Type	TH40FB-NH

H.S.

18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
				30	29	28	27	26	25	24	23	22	21	20	19		

Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	BATTERY POWER SUPPLY
2	L	ACC POWER SUPPLY
3	V	ACC OUT PUT
5	GR	SOS SWITCH LED SIGNAL
6	L	CAN-H
7	P	CAN-L
10	W	IGNITION SIGNAL
11	SHIELD	MICROPHONE SIGNAL GROUND
12	O	MICROPHONE SIGNAL
16	SHIELD	SHIELD
17	R	MICROPHONE SIGNAL
18	L	MICROPHONE VCC
26	Y	AV COMMUNICATION (H)
27	G	AV COMMUNICATION (L)

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CONSULT CHECKING SYSTEM

Terminal No.	Color Of Wire	Signal Name [Specification]
28	B	GROUND
29	B	GROUND
30	SHIELD	SHIELD
31	B	SOUND SIGNAL (+)
32	W	SOUND SIGNAL (-)
37	G	SOS CALL SWITCH SIGNAL

Connector No.	M217
Connector Name	CAN GATEWAY
Connector Type	MB_A0225400481

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	SOS SWITCH LED SIGNAL
2	R	DIMMER SIGNAL
3	P	MULTIFUNCTION MEDIA CAN-L
4	O	ENGINE SPEED SIGNAL
7	BR	REVERSE SIGNAL
8	V	ACC POWER SUPPLY
9	L	MULTIFUNCTION MEDIA CAN-H
10	W	SOS CALL SWITCH SIGNAL
11	Y	VEHICLE SPEED SIGNAL
12	W	ILLUMINATION CONTROL SIGNAL

Connector No.	M218
Connector Name	CAN GATEWAY
Connector Type	MB_A0225400583

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
13	B	GROUND
14	G	AV COMMUNICATION-L
15	L	AV COMMUNICATION-H
16	G	CHASSIS CAN-L
17	W	CHASSIS CAN-H
18	O	BATTERY POWER SUPPLY
19	P	MULTIFUNCTION MEDIA CAN-L
20	L	MULTIFUNCTION MEDIA CAN-H
21	BR	BODY CAN 1-L
22	R	BODY CAN 1-H
23	L	DIAGNOSTIC CAN-L
24	V	DIAGNOSTIC CAN-H

Connector No.	M251
Connector Name	SIDE RADAR LH
Connector Type	MB_A2215400981

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	GROUND
2	P	CAN-H
3	P/W	CAN-L
4	B	BATTERY POWER SUPPLY

Connector No.	M252
Connector Name	SIDE RADAR RH
Connector Type	MB_A2215400981

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	GROUND
2	G/W	CAN-H
3	G	CAN-L
4	B	BATTERY POWER SUPPLY
5	BR	GROUND
6	Y	GROUND

Connector No.	M266
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	MB_A0105404681

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
5	B	ACTIVE VENT PS(-)
6	Y	ACTIVE VENT PS(+)
37	V	FUSE-
38	W	FUSE+
40	Y	OCCUPANT LIN SIGNAL
41	V/G	RPRH(+)
42	BR/Y	RPRH(-)
43	BR/Y	RPLH(-)
44	V/G	RPLH(+)
51	Y	AIR BAG SIGNAL
52	P	AIR BAG SIGNAL
53	G	CAN-L
54	W	CAN-H
57	R	B-SATELITE LH(+)

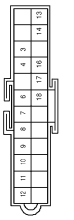
58	B	B-SATELITE LH(-)
59	BR	B-SATELITE RH(-)
60	L	B-SATELITE RH(+)
61	BR	FRONT DOOR SATELLITE RH(-)
62	G	FRONT DOOR SATELLITE RH(+)
63	B	FRONT DOOR SATELLITE LH(+)
64	BR	FRONT DOOR SATELLITE LH(-)
65	G	SEAT POS PS(+)
66	BR	SEAT POS PS(-)
67	W	REAR DOOR SATELLITE RH(-)
68	B	REAR DOOR SATELLITE RH(+)
69	R	REAR DOOR SATELLITE LH(+)
70	W	REAR DOOR SATELLITE LH(-)
71	Y	BUCKLE_SWITCH_PS+
72	O	BUCKLE_SWITCH_PS-
73	Y	BUCKLE_SWITCH_DR+
74	O	BUCKLE_SWITCH_DR-
75	V/G	CLH(+)
76	BR/Y	CLH(-)
77	W/BR	CRH(+)
78	R/V	CRH(-)
81	R	FORCE LIMITER PS(-)
82	B	FORCE LIMITER PS(+)
85	P	CZS RH(-)
86	W	CZS RH(+)
87	BR	CZS LH(-)
88	L	CZS LH(+)
89	O	SAB AS(-)
90	Y	SAB AS(+)
93	Y	SAB DR(+)
94	O	SAB DR(-)
95	BR	FPRH(-)
96	L/W	FPRH(+)
97	G	FPLH(+)
98	V	FPLH(-)
100	BR	GND
101	BR	GND
103	Y	KL15R
104	G	KL30

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CONSULT CHECKING SYSTEM

Connector No.	M356
Connector Name	JOINT CONNECTOR-M06
Connector Type	FEA24W

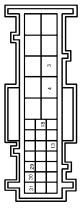
H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
3	W	-
4	V	-
6	W	-
7	G	-
8	W	-
9	W	-
10	W	-
11	B	-
12	P	-
13	G	-
14	G	-
16	GR	-
17	GR	-
18	GR	-

Connector No.	M618
Connector Name	PASSENGER SEAT CONTROL UNIT
Connector Type	A0085402281

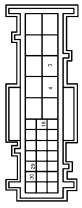
H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
3	R	BATTERY POWER SUPPLY
4	BR	GROUND
13	BR	GROUND
18	R	BATTERY POWER SUPPLY
29	R	CAN-H
30	BR	CAN-L
31	-	-

Connector No.	M615
Connector Name	DRIVER SEAT CONTROL UNIT
Connector Type	A24654005O9

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
3	R	BATTERY POWER SUPPLY
4	BR	GROUND
18	R	BATTERY POWER SUPPLY
29	R	CAN-H
30	BR	CAN-L

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INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Required Procedure After Battery Disconnection

INFOID:0000000013501596

SYSTEM	ITEM	REFERENCE
Automatic air conditioning system	Temperature setting trimmer	—
	Inlet port memory function (REC)	—
	Inlet port memory function (FRE)	—
	Foot position setting trimmer	—
	Setting of target evaporator temperature upper limit value	—
	Exhaust gas/outside odor detecting sensor sensitivity adjustment function	—
	Auto intake switch interlocking movement change function	—
	Setting of air inlet change control during stop/start operation	—
	Setting of air flow reduction control during stop/start operation	—
Automatic drive positioner	Automatic drive positioner system	—
Power window control	Power window control system	—
Sunroof system*	Sunroof system	—
Sunshade system	Sunshade system	—
Rear view monitor	Rear view monitor predictive course line center position adjustment	—
Around view monitor	Predictive course line center position adjustment	—
Automatic back door system*	Automatic back door system	—
Engine oil level read*	Engine oil level read	—

*: Not equipped.