SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

ABS

ESP/TCS/ABS

PRECAUTIONS

PFP:00001

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

EFS004LN

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

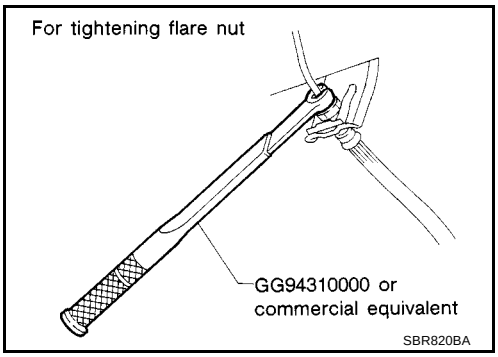
WARNING:

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

Precautions for Brake System

EFS004LO

- Recommended fluid is brake fluid “DOT 3” or “DOT 4”.
- Do not reuse the drained brake fluid.
- Be careful not to splash brake fluid on painted areas such as body. If brake fluid is splashed, wipe it off and flush area with water immediately.
- Do not use mineral oils such as gasoline or kerosene to clean. They will ruin rubber parts and cause improper operation.
- Using a flare nut torque wrench, securely tighten brake tube flare nuts.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble malfunctioning parts. If any malfunctioning part is found, replace the part with a new one.
- Before working, turn ignition switch OFF and disconnect connectors for ABS actuator and electric unit or battery terminals.
- When installing brake piping, be sure to check tightening torque.



Precautions for Brake Control

EFS004LP

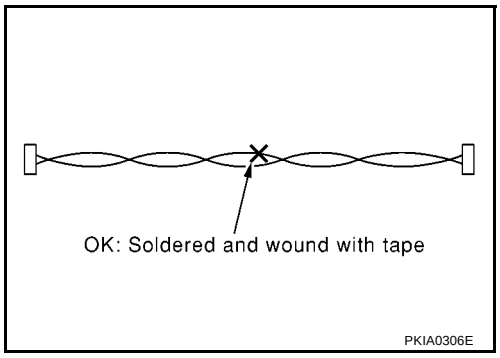
- During ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from the customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides the electrical system inspection, check booster operation, brake fluid level, and oil leaks.
- If tyre size and type are used in an improper combination, or brake pads are not Genuine Nissan parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna, or antenna lead-in wire (including wiring) near the control unit, ABS system may malfunction or return an error.
- If aftermarket parts (e.g. car stereo equipment, CD player) have been installed, check electrical harnesses for pinches, open, and improper wiring.

Precaution for Harness Repair

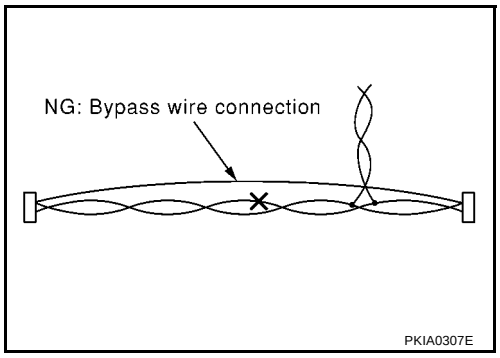
EFS005VW

CAN SYSTEM

- Area to be repaired shall be soldered, and wrapped with a tape (be sure that fraying of twisted wire shall be within 110 mm 4.33 in)).



- Do not make a bypass connection to repaired area. (If it is done, branch part will be removed and characteristics of twisted wire will be lost.)

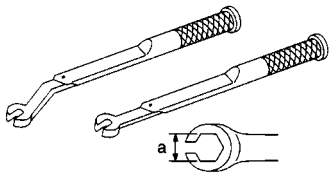


PREPARATION

PFP:00002

Special Service Tools

EFS004LQ

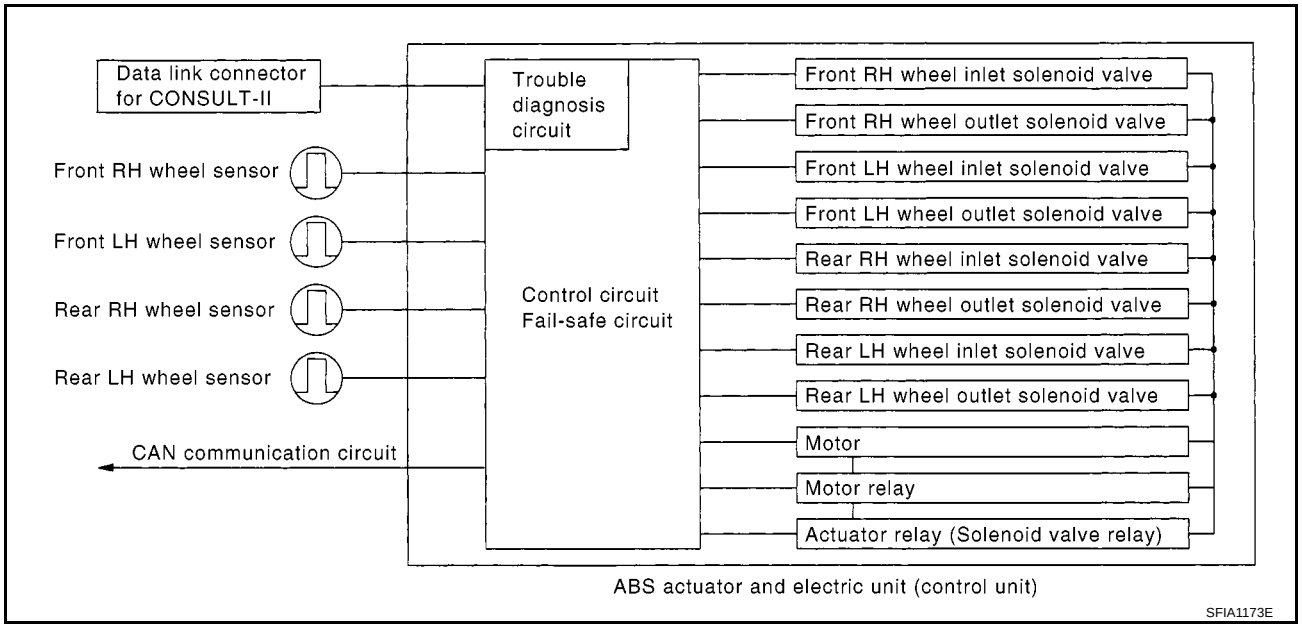
Tool number Tool name		Description
GG94310000 Flare nut torque wrench a: 10 mm (0.39 in)	 NT406	Removing and installing each brake piping

SYSTEM DESCRIPTION

PFP:00000

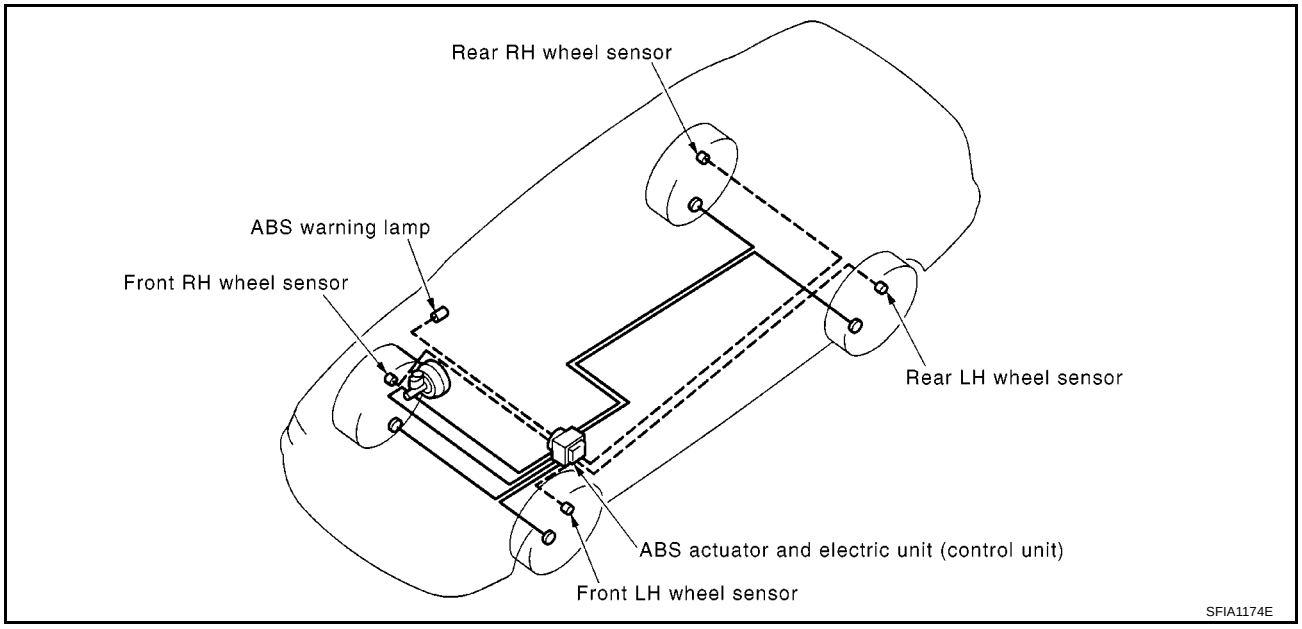
System Diagram

EFS004LR



System Components

EFS004LS



ABS Function

EFS004LT

- Anti-lock Brake System monitors wheel rotation in braking and electronically controls braking force (brake fluid pressure) to prevent wheel locking. Thus, it improves vehicle stability in abrupt braking and allows driver to clear obstacles more easily.
- In the event of an electric system malfunction, the fail-safe function will operate, the vehicle will enter the ABS non-operation state, and ABS warning lamp will come on.
- CONSULT-II can be used to diagnose the electrical system.

EBD Function

EFS004LU

- The electronically controlled braking force distribution unit detects the minute slips that occur in front and rear wheels during braking and uses electronic control to control rear wheel braking force (brake hydraulic pressure) to suppress rear wheel slipping as much as possible to improve stability during braking.
- In the event an electrical system malfunction occurs, the fail-safe function will operate and EBD and ABS will enter non-operational states, and ABS warning lamp and brake warning lamp will come on.
- CONSULT-II can be used to diagnose the electrical system.

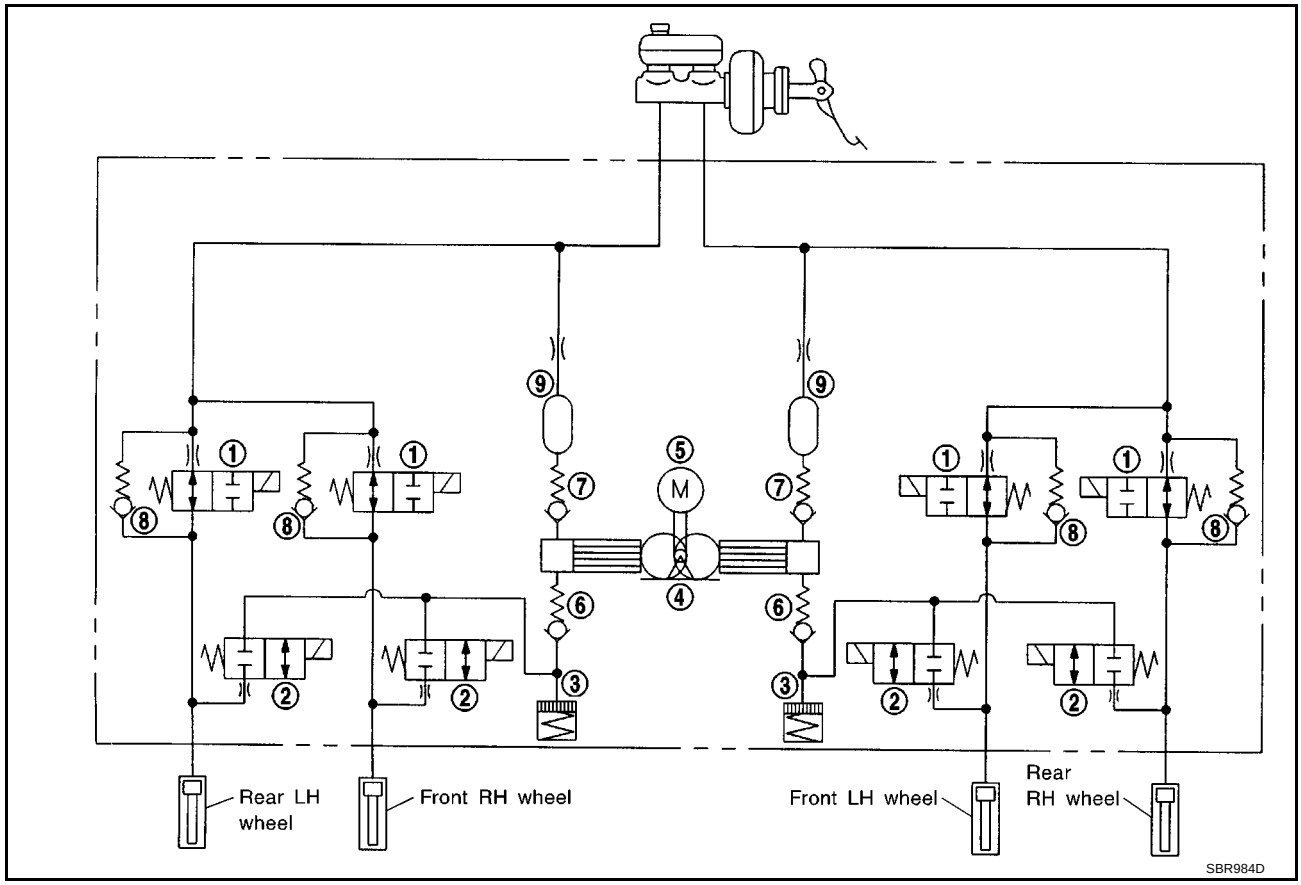
Fail-Safe Function

EFS004LV

- If a malfunction occurs in ABS system, “ABS warning lamp” turns ON.
- If a malfunction occurs in EBD, brake warning lamp and ABS warning lamp turn ON.

Hydraulic Circuit Diagram

EFS004LW



1. Inlet solenoid valve
2. Outlet solenoid valve
3. Reservoir
4. Pump
5. Motor
6. Inlet valve
7. Outlet valve
8. Bypass check valve
9. Damper

TROUBLE DIAGNOSIS

PFP:00004

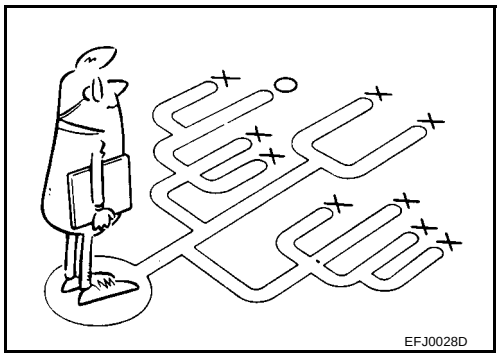
Diagnosis Procedure

EFS004LX

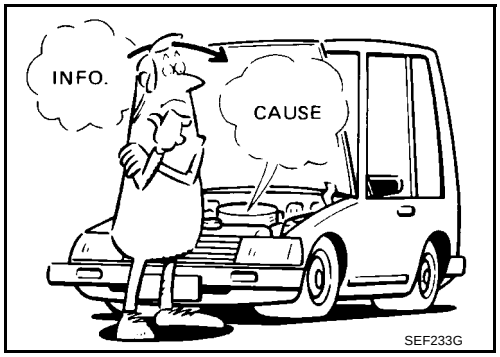
BASIC CONCEPT

- The most important point in performing trouble diagnosis is to thoroughly understand the vehicle systems (both control and mechanical).
- It is also important to clarify customer concerns before starting the inspection.
  First of all, reproduce the symptom, and understand it fully.
  Ask the customer about his/her complaints carefully. In some cases, it will be necessary to check the symptoms by driving the vehicle with the customer.

  CAUTION:
  Customers are not professional. It is dangerous to make an easy guess like “maybe the customer means that...,” or “maybe the customer mentions this symptom”.


EFJ0028D

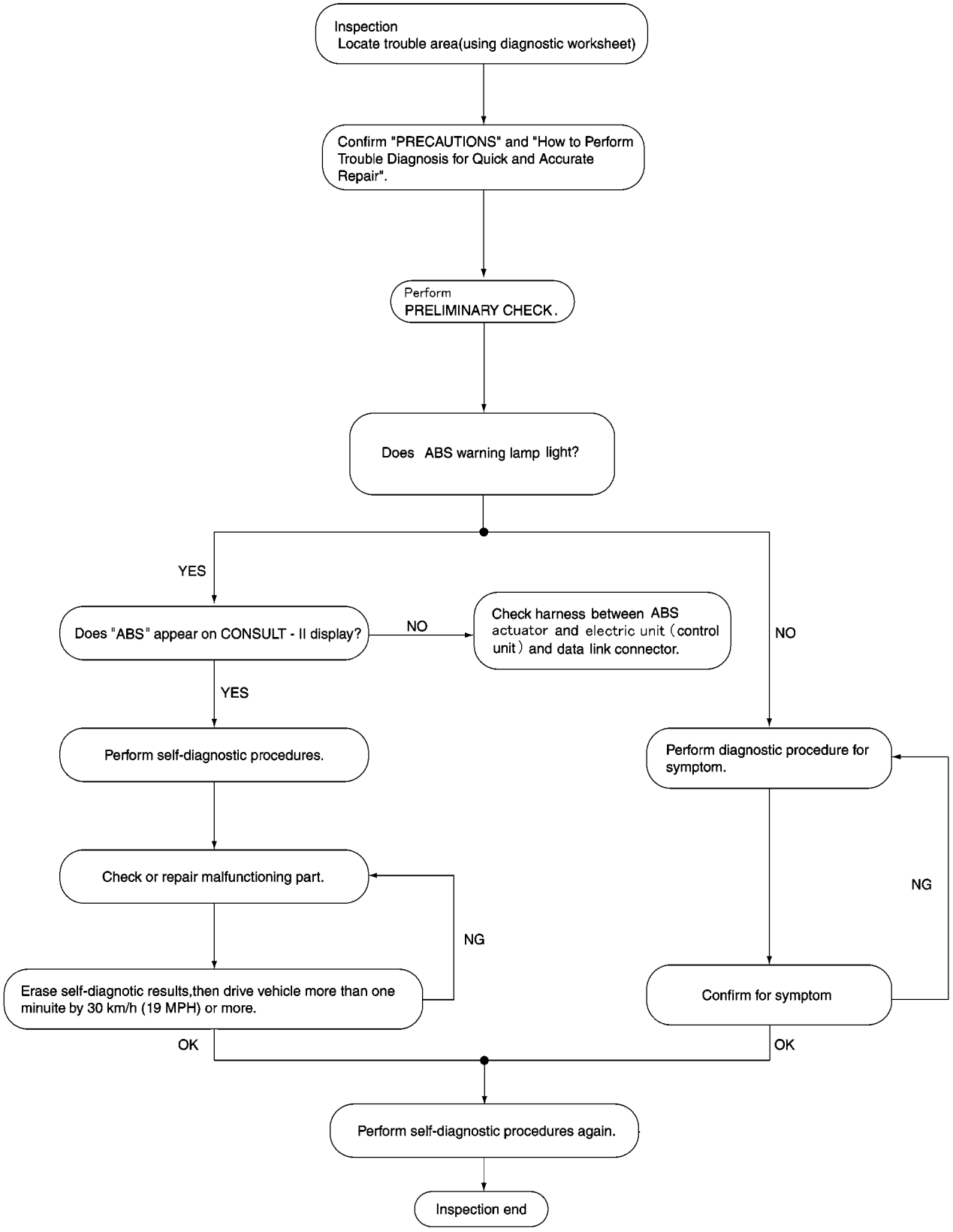
- It is essential to check symptoms right from the beginning in order to repair a error completely.
  For an intermittent error, it is important to reproduce the symptom based on an interview with the customer and past examples. Do not perform an inspection on an ad hoc basis. Most intermittent errors are caused by poor contacts. In this case, it will be effective to shake the suspected harness or connector by hand. When repairs are performed without any symptom diagnosis, no one can judge if the error has actually been eliminated.
- After completing trouble diagnosis, be sure to perform “erase memory”. Refer to BRC-22, "SELF-DIAGNOSIS" .
- For an intermittent error, move the harness or harness connector by hand to check for poor contact or false open circuit.



SEF233G

- Always read the GI section to be aware of the general precautions. Refer to GI-4, "General Precautions" .

DIAGNOSIS FLOW



SFIA0953E

QUESTIONNAIRE

- Complaints against a malfunction vary depending on each person. It is important to clarify the customer complaints.
- Ask the customer about what symptoms are present and under what conditions. Use the information to reproduce the symptom while driving.
- It is also important to use the diagnosis sheet so as not to miss the information.

KEY POINTS

WHAT ..... Vehicle model
WHEN ..... Date, Frequencies
WHERE ..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SBR339B

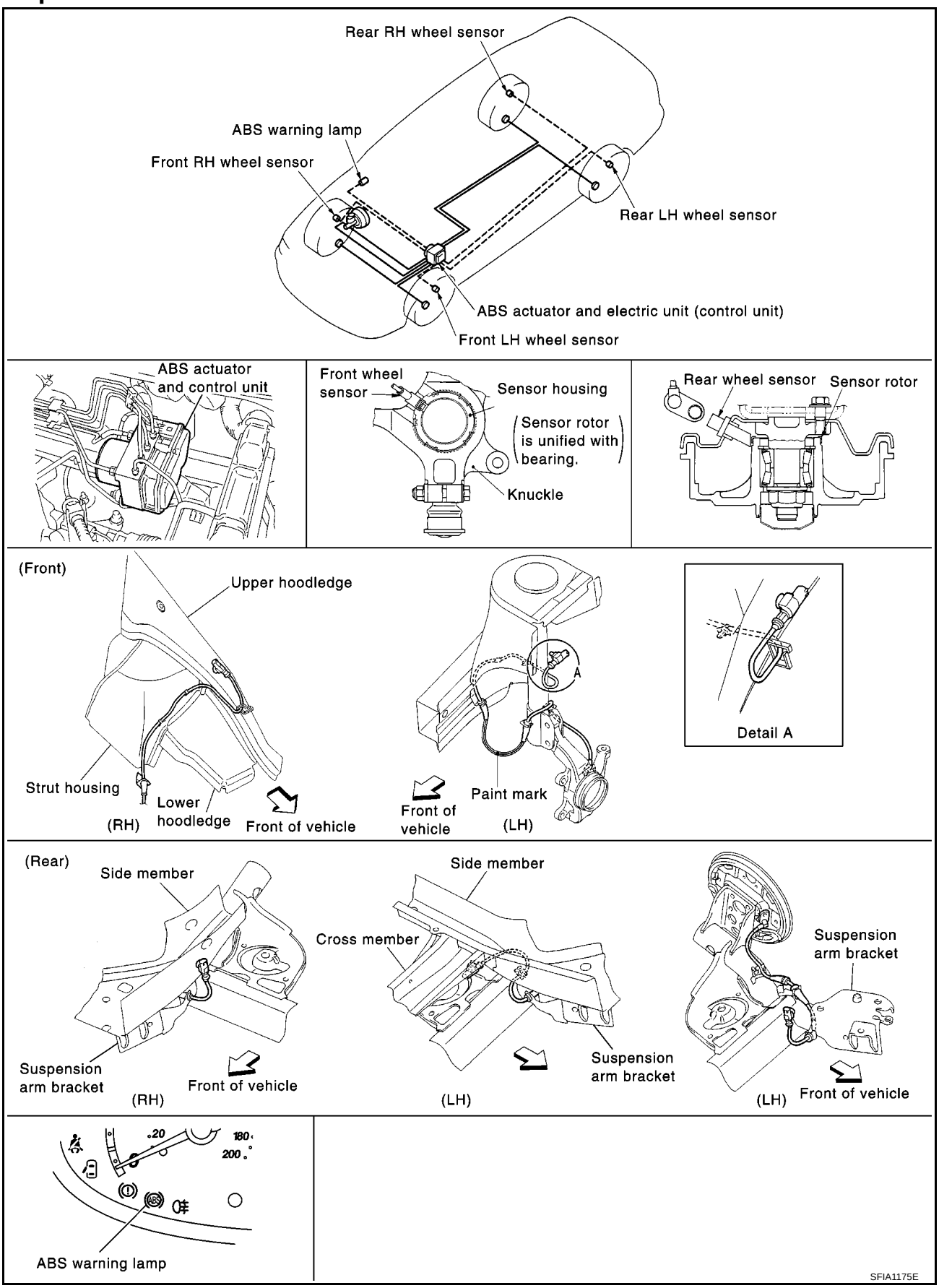
EXAMPLE OF DIAGNOSIS SHEET

Customer name MR/MS	Model & Year		VIN
Engine #	Trans.		Mileage
Incident Date	Manuf. Date		In Service Date
Symptoms	☐ Noise and vibration (from engine compartment) ☐ Noise and vibration (from axle)	☐ Warning / Indicator activate	☐ Firm pedal operation Large stroke pedal operation
	☐ TCS does not work (Rear wheels slip when accelerating)	☐ ABS does not work. (wheels slip when braking)	☐ Lack of sense of acceleration
Engine conditions	☐ When starting ☐ After starting		
Road conditions	☐ Low friction road (☐Snow ☐Gravel ☐Other) ☐ Bumps / potholes		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped		
Applying brake conditions	☐ Suddenly ☐ Gradually		
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions		

SFIA0791E

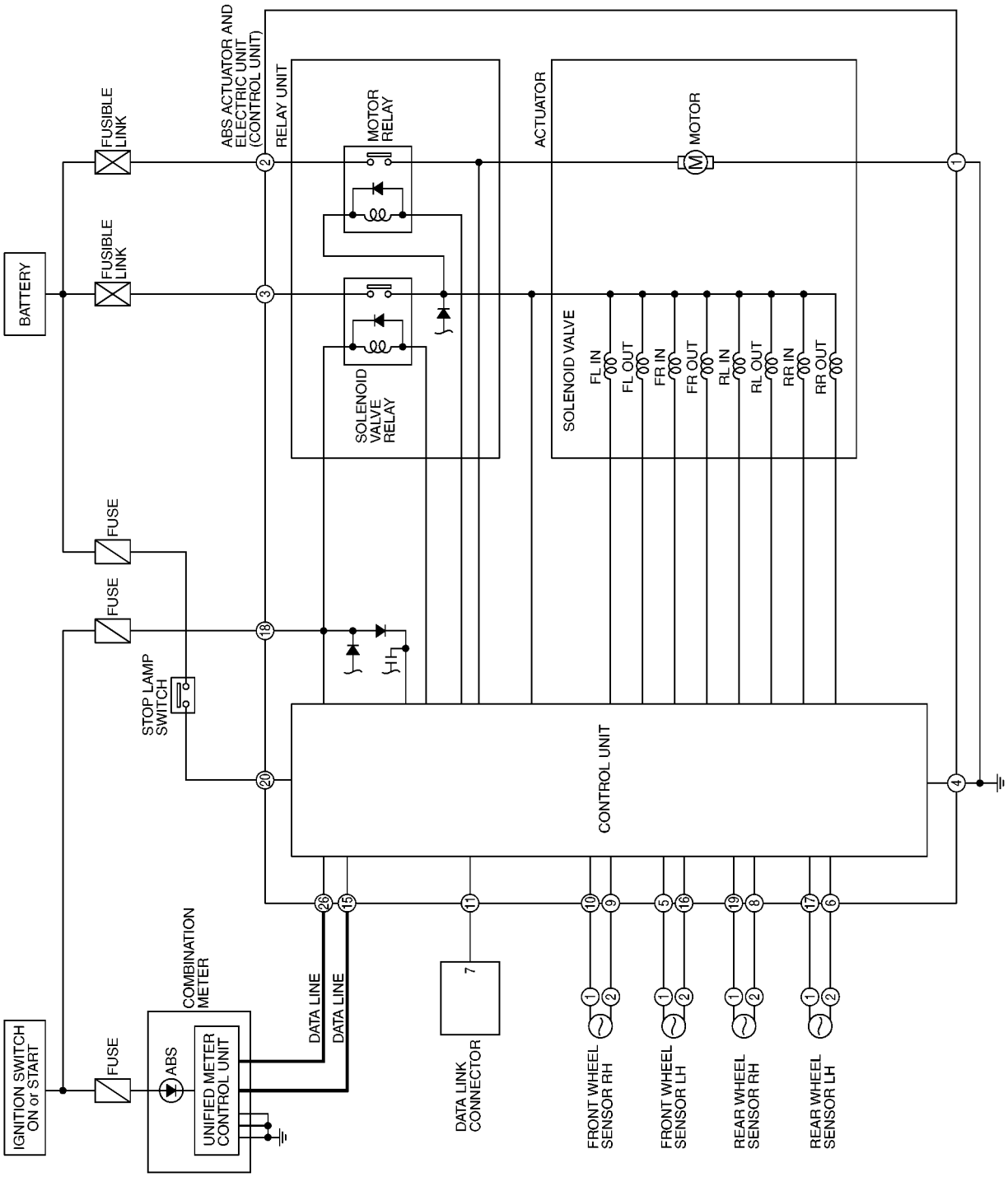
Component Parts Location

EFS004LY



Schematic

EFS004LZ

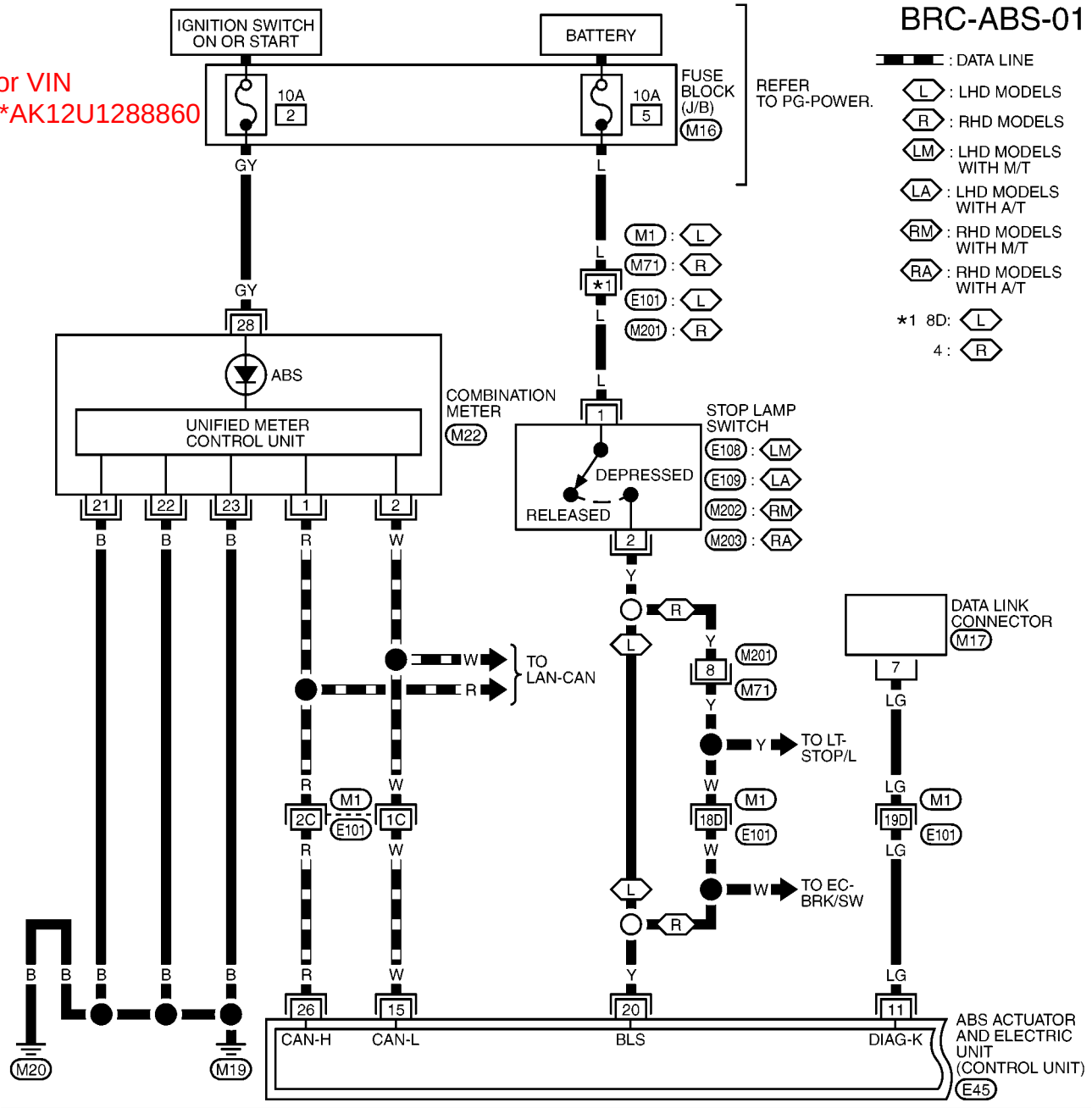


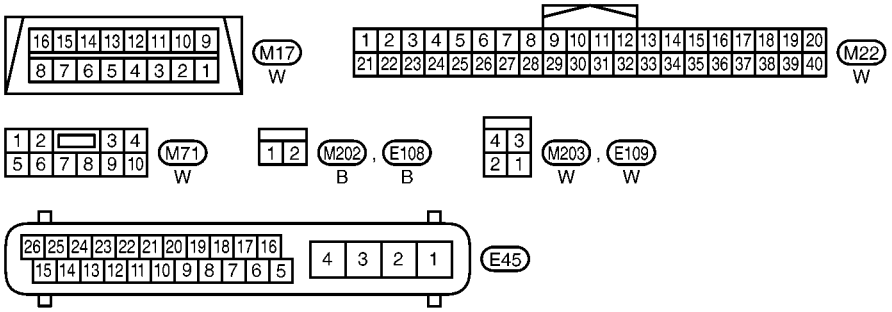
MFWA0016E

Wiring Diagram — ABS — Models with CR Engine

EFS004M0

SMA for VIN
>SJN**AK12U1288860

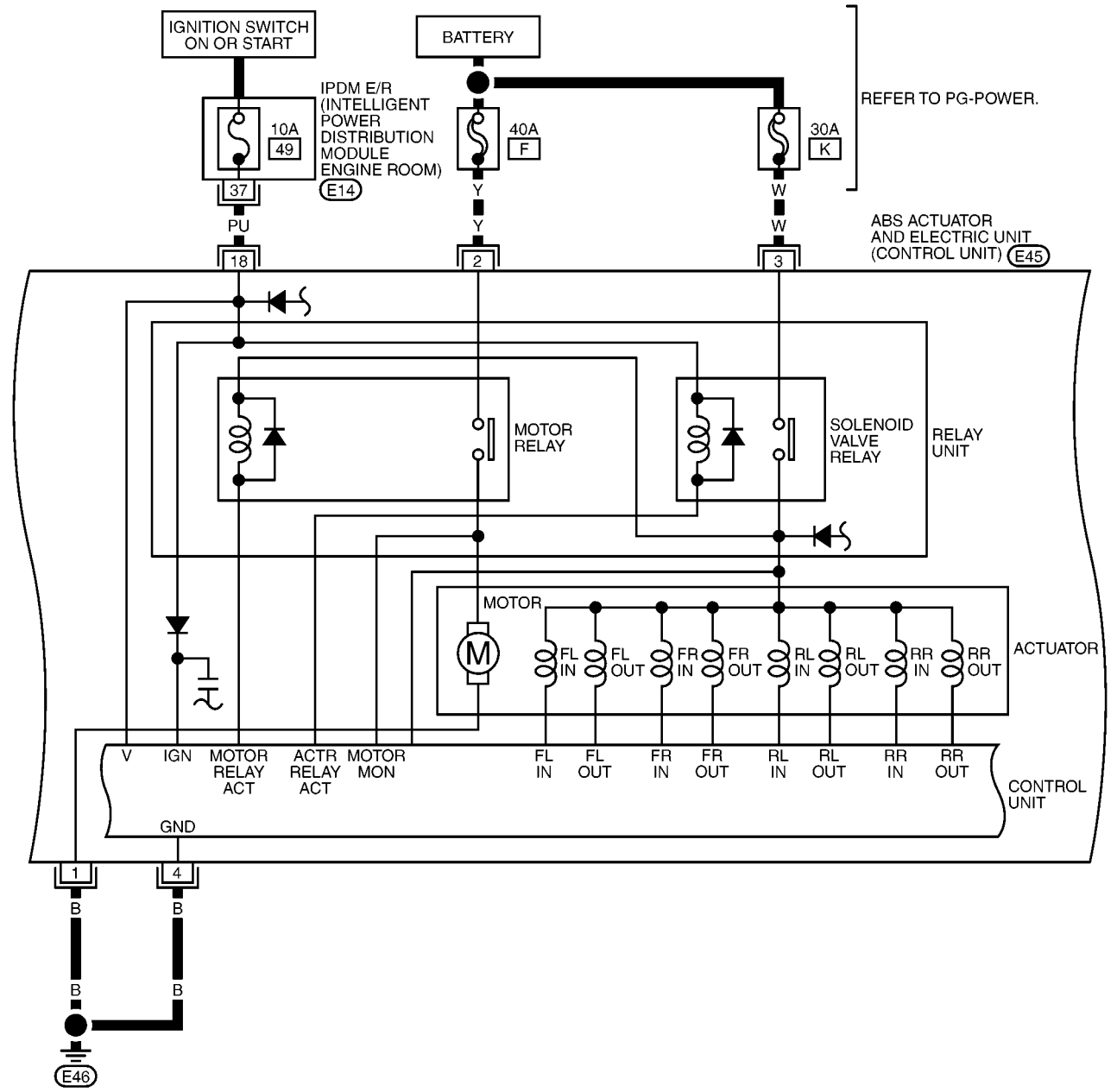


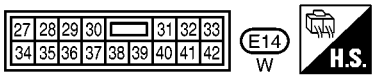


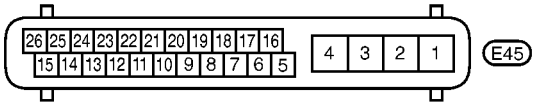
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MFWA0017E

BRC-ABS-02

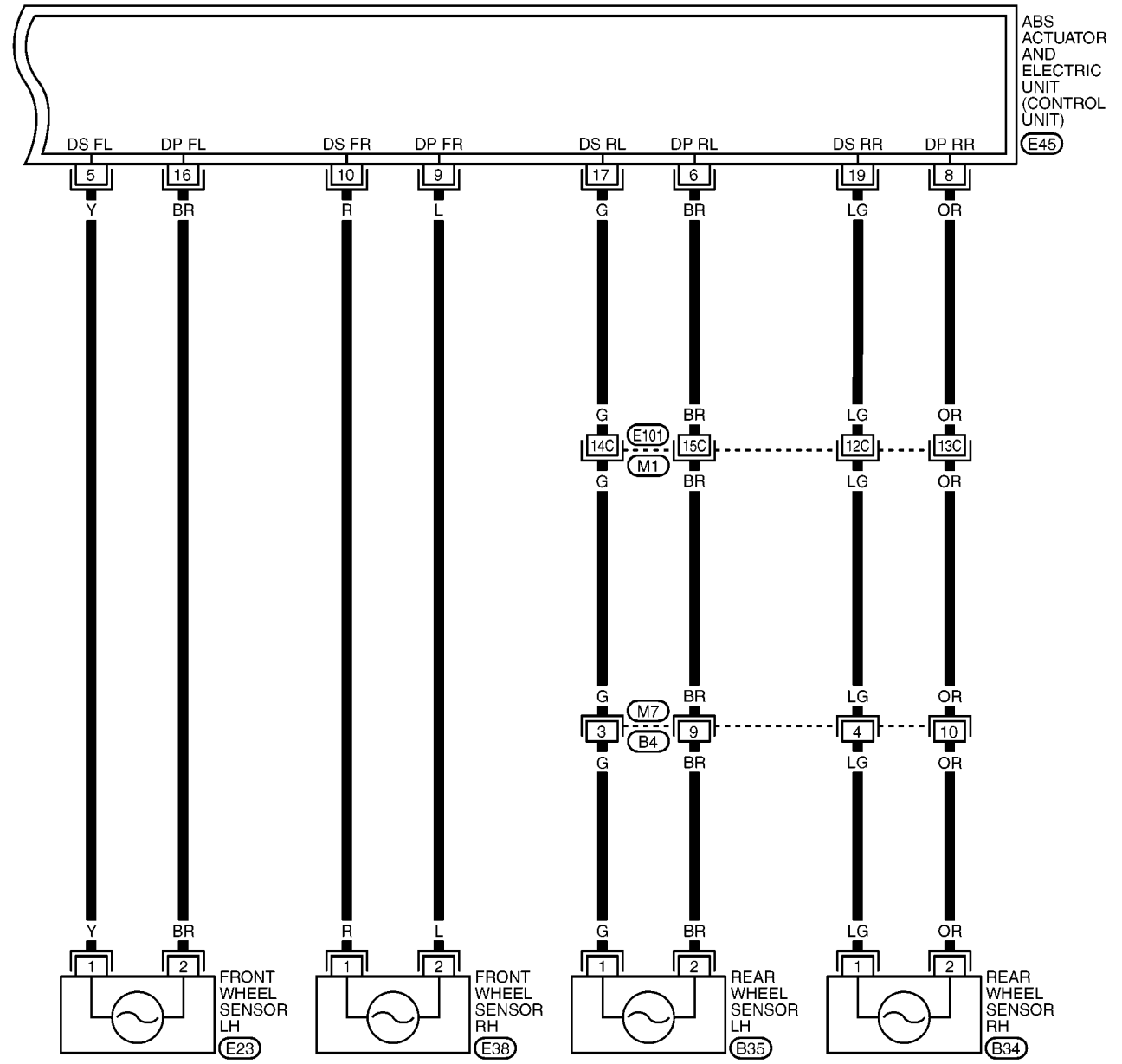






MFWA0018E

BRC-ABS-03

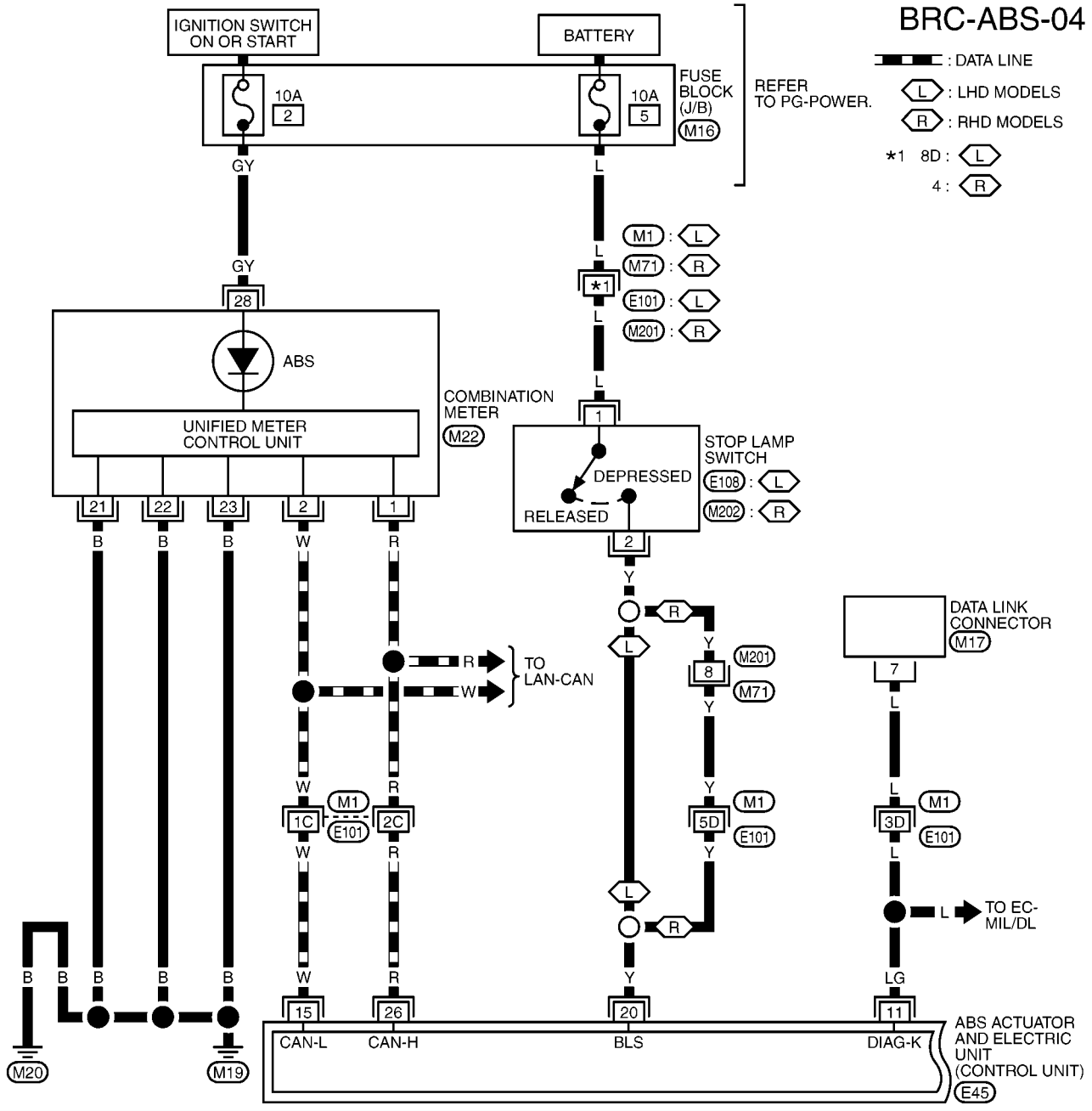


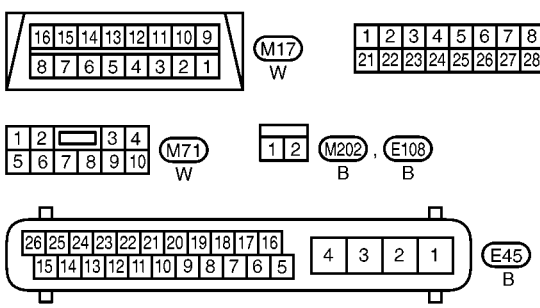
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

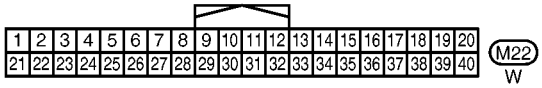
MFWA0019E

Wiring Diagram — ABS — Models with K9K Engine

EFS005YH







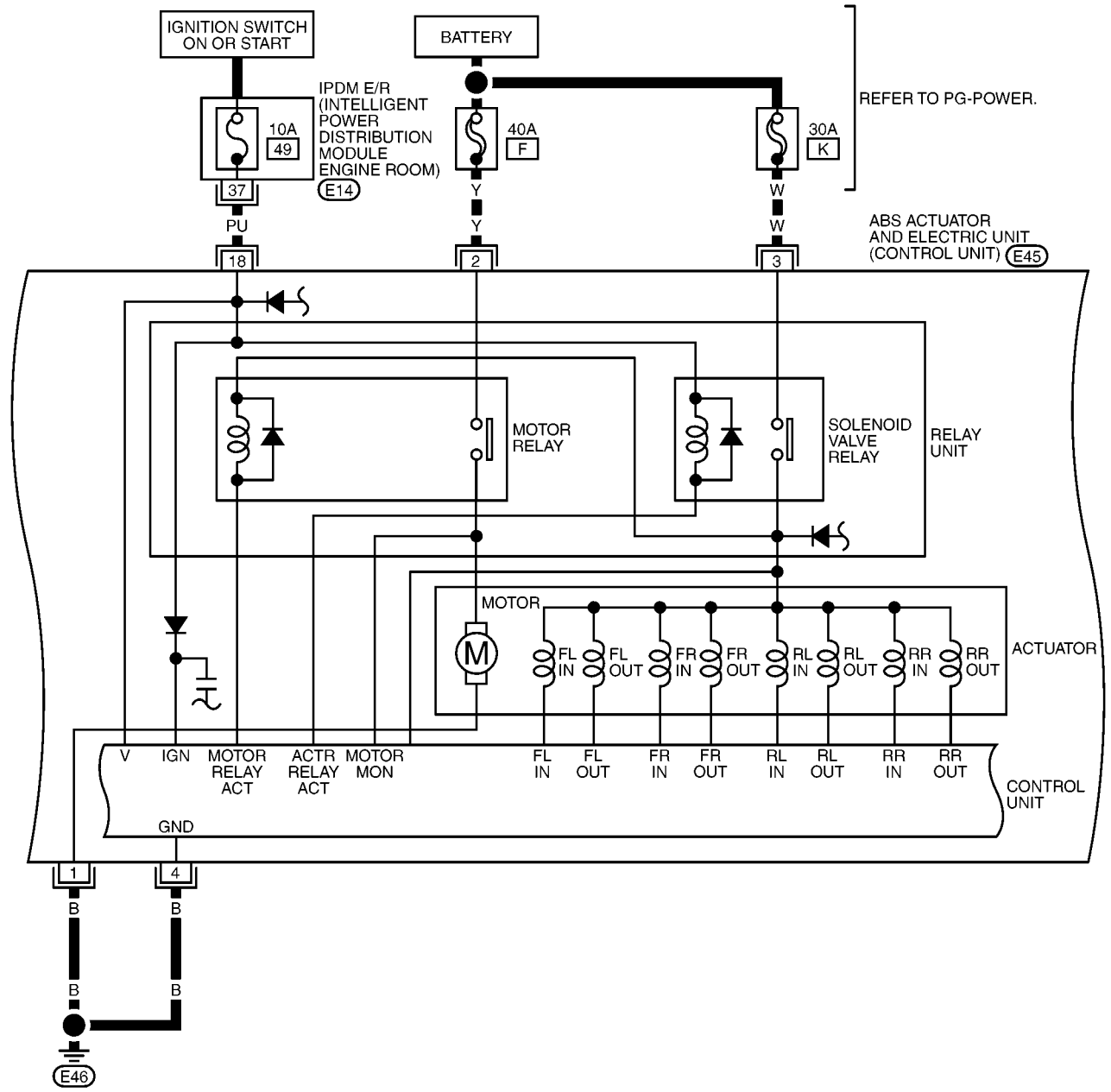
REFER TO THE FOLLOWING.

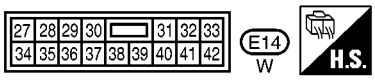
M1 -SUPER MULTIPLE JUNCTION (SMJ)

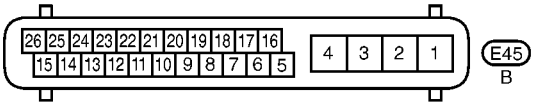
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MFWA0031E

BRC-ABS-05

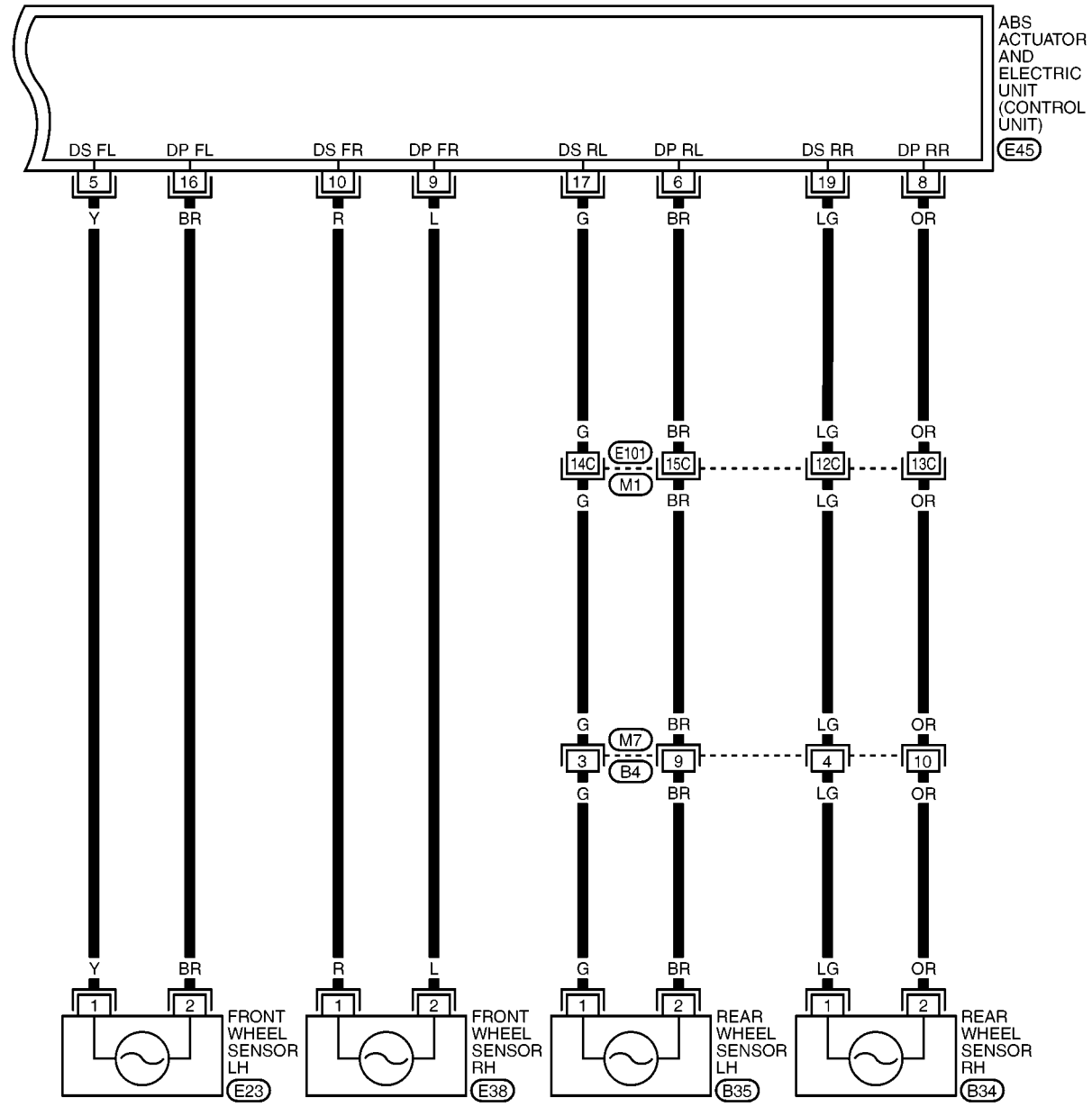


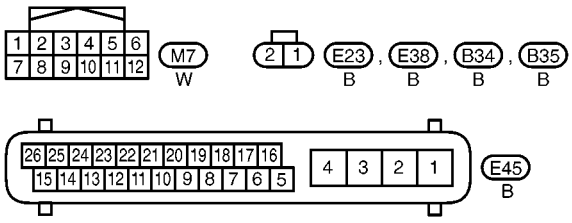




MFWA0032E

BRC-ABS-06





REFER TO THE FOLLOWING.

M1 -SUPER MULTIPLE JUNCTION (SMJ)

MFWA0033E

Control Unit Input/Output Signal Standard

EFS004M1

STANDARDS BY CONSULT-II

CAUTION:

The displayed item is the calculated data by the control unit, so it may indicate a normal value even if an output circuit (harness) is open or shorted.

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference values for normal operation	
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR	Vehicle wheel speed	Vehicle stopped	0 (km/h)	BRC-37, "Inspection 1 Wheel Sensor System"
		While driving (Note 1)	Almost in accordance with the speedometer display (within ±10 %)	
STOP LAMP SWITCH	Brake pedal operation	Brake pedal depressed	ON	BRC-41, "Inspection 6 Stop Lamp Switch System"
		Brake pedal not depressed	OFF	
IN SOL	Solenoid valve operation	ABS solenoid activated or fail-safe activated (Note 2)	ON	BRC-39, "Inspection 4 ABS Actuator Relay or ABS Motor Relay Power System"
OUT SOL		Actuator relay is activated and ABS solenoid is not activated	OFF	
ACTUATOR RLY	Actuator relay activated	Vehicle stop (Ignition switch ON)	ON	
		Vehicle stopped (engine running)	ON	
MOTOR RELAY	Motor relay and motor activated	Motor relay and motor activated	ON	
		Motor relay and motor not activated	OFF	
WARN LAMP	ABS warning lamp ON (Note 3)	ABS warning lamp ON	ON	BRC-35, "BASIC INSPECTION 3: ABS WARNING LAMP AND BRAKE WARNING LAMP INSPECTION"
		ABS warning lamp OFF	OFF	
BATTERY VOLT	Battery voltage supplied to control unit	Ignition switch ON	Approximately 10 - 16 V	BRC-38, "Inspection 2 ABS Actuator and Electric Unit Power and Ground System"
INITIAL DIAG	CAN communication condition	CAN communication is normal	OK	BRC-40, "Inspection 5 CAN Communication System"
		CAN communication error	NG	
TRANSMIT DIAG	CAN communication condition	CAN communication is normal	OK	
		CAN communication error	UNKWN	
ECM	CAN communication condition	CAN communication is normal	OK	
		CAN communication error	UNKWN	
EBD SIGNAL	EBD operation signal	EBD is operating	ON	—
		EBD is not operating	OFF	
ABS SIGNAL	ABS operation signal	ABS activated	ON	—
		ABS not activated	OFF	
ABS FAIL SIG	ABS fail signal status	During ABS fail-safe During EBD fail-safe	OFF	ABS system EBD system

NOTE:

1. Confirm tyre pressure is normal.
2. The solenoid turns off when the actuator relay is not operating.
3. ON/OFF timing of ABS warning lamp
   ON: When the switch is turned ON for approximately 1 second or when a malfunction is detected.
   OFF: Approximately 1 second after ignition switch is turned ON (when the system is in normal operation).

CONSULT-II Functions

EFS004M2

CONSULT-II FUNCTION APPLICATION TABLE

- "FUNCTION TEST" shall not be used for diagnosis. For details, refer to separately supplied "CONSULT-II Instruction Manual (FUNCTION TEST)".

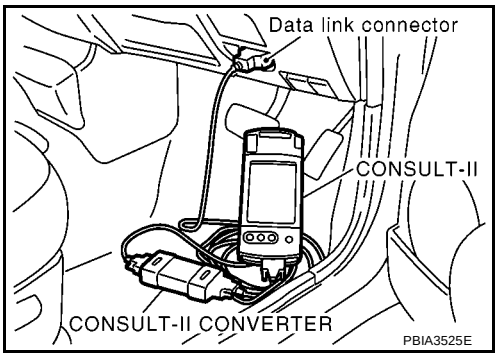
Items	Self-diagnosis	Data monitor	Active test
FR RH SENSOR	×	×	–
FR LH SENSOR	×	×	–
RR RH SENSOR	×	×	–
RR LH SENSOR	×	×	–
Stop lamp switch	×	×	–
FR RH IN ABS SOL	×	×	×
FR RH OUT ABS SOL	×	×	×
FR LH IN ABS SOL	×	×	×
FR LH OUT ABS SOL	×	×	×
RR RH IN ABS SOL	×	×	×
RR RH OUT ABS SOL	×	×	×
RR LH IN ABS SOL	×	×	×
RR LH OUT ABS SOL	×	×	×
ABS ACTUATOR RELAY	×	×	×
ABS MOTOR RELAY	×	×	×
ABS WARNING LAMP	–	×	–
BATTERY VOLTAGE	×	×	–
ABS CONTROL UNIT	×	–	–
CAN COMMUNICATION	×	×	–

×: Applicable
–: Not applicable

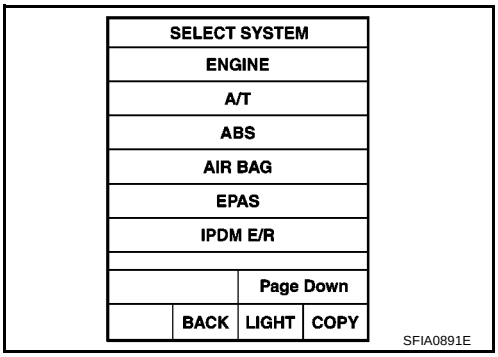
CONSULT-II BASIC OPERATION PROCEDURE

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER data link connector and turn ignition switch ON or start engine.

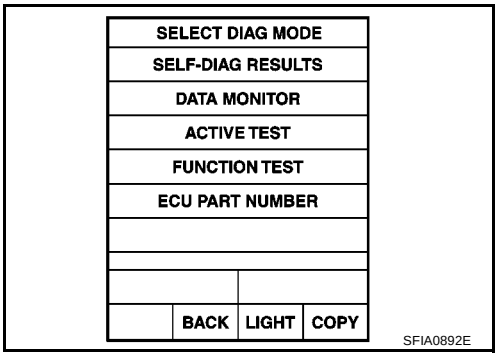
   CAUTION:
   If CONSULT-II is connected without the CONSULT-II CONVERTER, malfunction may be detected by self-diagnosis in Control units that use CAN communication.



3. Touch “START (NISSAN BASED VHCL)”.
4. Touch “ABS” on the “SELECT SYSTEM” screen.



5. Select desired part to be diagnosed on “SELECT DIAG MODE” screen.



SELF-DIAGNOSIS

Description

If a failure occurs in the ABS system, the “ABS warning lamp” turns ON.

Operation Procedure

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.
3. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.
4. After stopping the vehicle, with engine running, touch “START (NISSAN BASED VHCL)”, “ABS”, and “SELF-DIAGNOSIS” on CONSULT-II screen in this order.

   CAUTION:
   Just after starting the engine, or turning ignition switch ON, “ABS” may not be displayed on the system selection screen even if “START (NISSAN BASED VHCL)” is touched. In this case, start over from step 1
5. Self-diagnostic results is displayed. (If necessary, touch “PRINT” to print out self-diagnostic results.)
   - When “NO DTC IS DETECTED” is displayed, check ABS warning lamp. Refer to BRC-35, "Basic Inspection" .
6. Go to appropriate “Inspection” chart according to “Indication item list,” and repair or replace as necessary.
7. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.

   CAUTION:
   If wheel sensor [SHORT] is detected, the ABS warning lamp does not turn off until the vehicle is driven at 30km/h (19 MPH) for approximately 1 minute, even in normal conditions.
8. Turn ignition switch OFF to prepare for erasing the memory.
9. Start engine, and touch “START (NISSAN BASED VHCL)”, “ABS”, “SELF-DIAGNOSIS”, and “ERASE MEMORY” on CONSULT-II screen in this order to erase the diagnostic memory.

   CAUTION:
   If memory cannot be erased, start over from step 5.
10. As the final inspection, drive at approximately 30 km/h (19 MPH) for approximately 1 minute, and confirm that the ABS warning lamp is OFF.

Display Item List

Suspect systems	Malfunction detecting condition	Inspection system
FR RH SENSOR 1 (Note 1)	Circuit of FR RH wheel sensor is open or shorted.	Wheel sensor circuit [Inspection 1] (Note 2) BRC-37
FR LH SENSOR 1 (Note 1)	Circuit of FR LH wheel sensor is open or shorted.	
RR RH SENSOR 1 (Note 1)	Circuit of RR RH wheel sensor is open or shorted.	
RR LH SENSOR 1 (Note 1)	Circuit of RR LH wheel sensor is open or shorted.	
FR RH SENSOR 2	When there is a sensor power voltage error in the FR RH wheel sensor, and when the control unit cannot recognize sensor pulse because gap between wheel sensor and sensor rotor is large.	
FR LH SENSOR 2	When there is a sensor power voltage error in the FR LH wheel sensor, and when the control unit cannot recognize sensor pulse because gap between wheel sensor and sensor rotor is large.	
RR RH SENSOR 2	When there is a sensor power voltage error in the RR RH wheel sensor, and when the control unit cannot recognize sensor pulse because gap between wheel sensor and sensor rotor is large.	
RR LH SENSOR 2	When there is a sensor power voltage error in the RR LH wheel sensor, and when the control unit cannot recognize sensor pulse because gap between wheel sensor and sensor rotor is large.	
WHEEL SENSOR	When a rotation sensor signal error is detected in one or more of the four wheels, and when operation of one or more of the wheels continues beyond the specified time.	

Suspect systems	Malfunction detecting condition	Inspection system
FR RH IN ABS SOL	Displays when control unit detects error in FR RH IN SOL system.	ABS actuator relay or ABS motor relay power system (Note 3) [Inspection 3] BRC-39
FR LH IN ABS SOL	Displays when control unit detects error in FR LH IN SOL system.	
RR RH IN ABS SOL	Displays when control unit detects error in RR RH IN SOL system.	
RR LH IN ABS SOL	Displays when control unit detects error in RR LH IN SOL system.	
FR RH OUT ABS SOL	Displays when control unit detects error in FR RH OUT SOL system.	
FR LH OUT ABS SOL	Displays when control unit detects error in FR LH OUT SOL system.	
RR RH OUT ABS SOL	Displays when control unit detects error in RR RH OUT SOL system.	
RR LH OUT ABS SOL	Displays when control unit detects error in RR LH OUT SOL system.	
MAIN RELAY	Displayed when control unit detects malfunction in actuator relay system.	
PUMP MOTOR	Displays when control unit detects errors in motor or motor relay system.	
BATTERY VOLTAGE	Battery voltage of control unit is too high.	ABS control unit power and ground systems [Inspection 2] BRC-38
	Battery voltage of control unit is too low.	
STOP LAMP SWITCH	Stop lamp switch circuit is open.	Stop lamp switch system [Inspection 6] BRC-41
CONTROL UNIT	Processing function of control unit is malfunctioning.	ABS control unit system [Inspection 3] BRC-39
CAN COMM	CAN communication error.	CAN communication system [Inspection 5] BRC-40

NOTE:

1. Note 1: After completing repairs of the shorted sensor circuit, when ignition switch is turned ON, the ABS warning lamp turns on. Make sure the ABS warning lamp turns off while driving the vehicle at approx. 30 km/h for approx. 1 minute according to self-diagnosis procedure.
2. Note 2: Also, when each wheel sensor displays 2, check wheel sensor path and control unit power battery voltage.
3. Note 3: If there are no errors in 1 to 3 below, replace the actuator unit.

– Open or short-circuit in the solenoid power supply, motor power supply, or ground harness.
– Unit side connector pin terminal
– Fusible link

DATA MONITOR

Operation Procedure

1. Touch “DATA MONITOR”.
2. Return to monitor item selection screen, and touch any of “control unit INPUT ITEM”, “MAIN ITEM”, “SELECT ITEM MENU” or “CAN DIAGNOSIS SUPPORT MONITOR”. Refer to BRC-24, "Data Monitor Item Chart" .
3. Touch “START”.
4. Screen of data monitor is displayed.

Data Monitor Item Chart

Item (Unit)	Monitor item selection				Remarks
	ECM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
FR RH SENSOR (km/h)	×	×	×	–	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR (km/h)	×	×	×	–	Wheel speed calculated by front LH wheel sensor signal is displayed.
RR RH SENSOR (km/h)	×	×	×	–	Wheel speed calculated by RH rear wheel sensor signal is displayed.
RR LH SENSOR (km/h)	×	×	×	–	Wheel speed calculated by LH rear wheel sensor signal is displayed.
FR RH IN SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of front RH inlet ABS solenoid valve is displayed.
FR RH OUT SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of front RH outlet ABS solenoid valve is displayed.
FR LH IN SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of front LH inlet ABS solenoid valve is displayed.
FR LH OUT SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of front LH outlet ABS solenoid valve is displayed.
RR RH IN SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of rear RH inlet ABS solenoid valve is displayed.
RR RH OUT SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of rear RH outlet ABS solenoid valve is displayed.
RR LH IN SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of rear LH inlet ABS solenoid valve is displayed.
RR LH OUT SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of rear LH outlet ABS solenoid valve is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	–	Condition of stop lamp switch (ON/OFF) is displayed.
ACTUATOR RELAY (ON/OFF)	–	×	×	–	ABS actuator relay (ON/OFF) condition is displayed.
MOTOR RELAY (ON/OFF)	–	×	×	–	ABS motor relay (ON/OFF) condition is displayed.

Item (Unit)	Monitor item selection				Remarks
	ECM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
ABS WARN LAMP (ON/OFF)	–	×	×	–	ABS warning lamp (ON/OFF) status is displayed.
BATTERY VOLT (V)	×	×	×	–	Voltage supplied to ABS control unit is displayed.
EBD SIGNAL (ON/OFF)	–	–	×	–	EBD operation (ON/OFF) status is displayed.
ABS SIGNAL (ON/OFF)	–	–	×	–	ABS operation (ON/OFF) status is displayed.
INITIAL DIAG (OK/NG)	–	–	–	×	CAN communication (OK/NG) status is displayed.
TRANSMIT DIAG (OK/UNKWN)	–	–	–	×	CAN communication signal (OK/UNKWN) status is displayed.
ECM (OK/UNKWN)	–	–	–	×	

×: Applicable
–: Not applicable

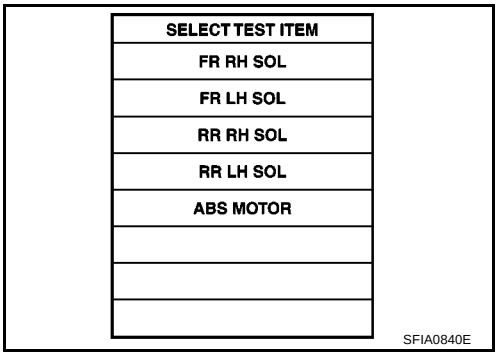
ACTIVE TEST

CAUTION:

- **Do not perform active test while driving.**
- **Make sure to completely bleed air from the brake system.**
- **During active test, ABS and brake warning lamps are on.**

Operation Procedure

1. Touch “ACTIVE TEST”.
2. The “SELECT TEST ITEM” screen is displayed.
3. Touch “TEST ITEM”.
4. Touch “START” with “MAIN SIGNALS” line inverted.
5. The “ACTIVE TEST” screen is displayed, and the following test can be performed.

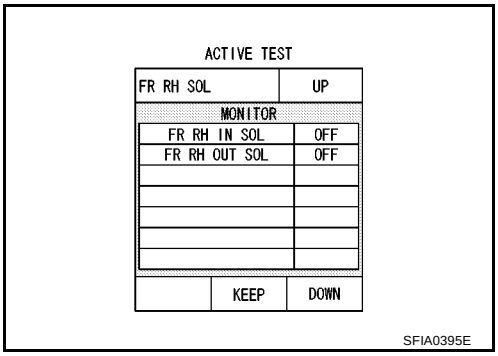


Test Item – ABS Solenoid Valve –

- Touch “UP”, “KEEP” and “DOWN” on the screen to confirm ABS solenoid valves (inlet/outlet) operate as in the following chart.

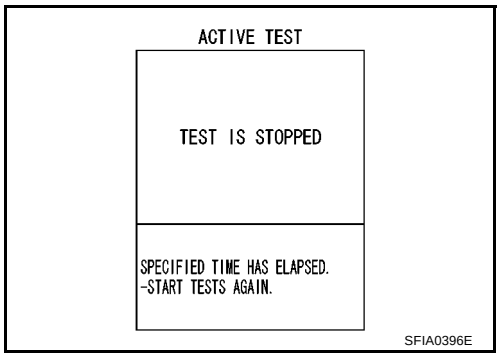
Operation	UP	KEEP	DOWN
ABS inlet S/V	OFF	ON	ON
ABS outlet S/V	OFF	OFF	ON*

*: ON for 1 to 2 seconds after touch, and then OFF



NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- "TEST STOP" is displayed 10 seconds after operation start.
- After "TEST STOP" is displayed, to perform test again, touch "BACK" and repeat step 6.



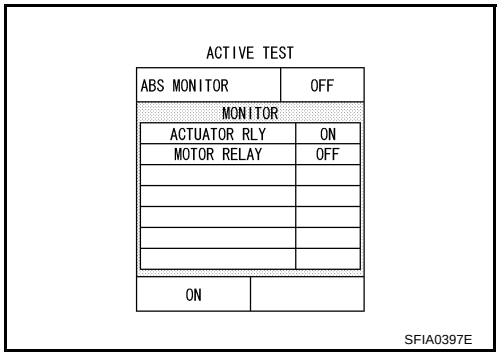
Test Item – ABS Motor –

- Touch "ON" and "OFF" on the screen to confirm the ABS motor relay operates as shown in the following chart.

Operation	ON	OFF
ABS actuator relay	ON	ON
ABS motor relay	ON	OFF

NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- "TEST STOP" is displayed 10 seconds after operation start.



CAN Communication

EFS005XA

SYSTEM DESCRIPTION

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

CAN Communication Unit

EFS005XB

Go to CAN system, when selecting your car model from the following table.

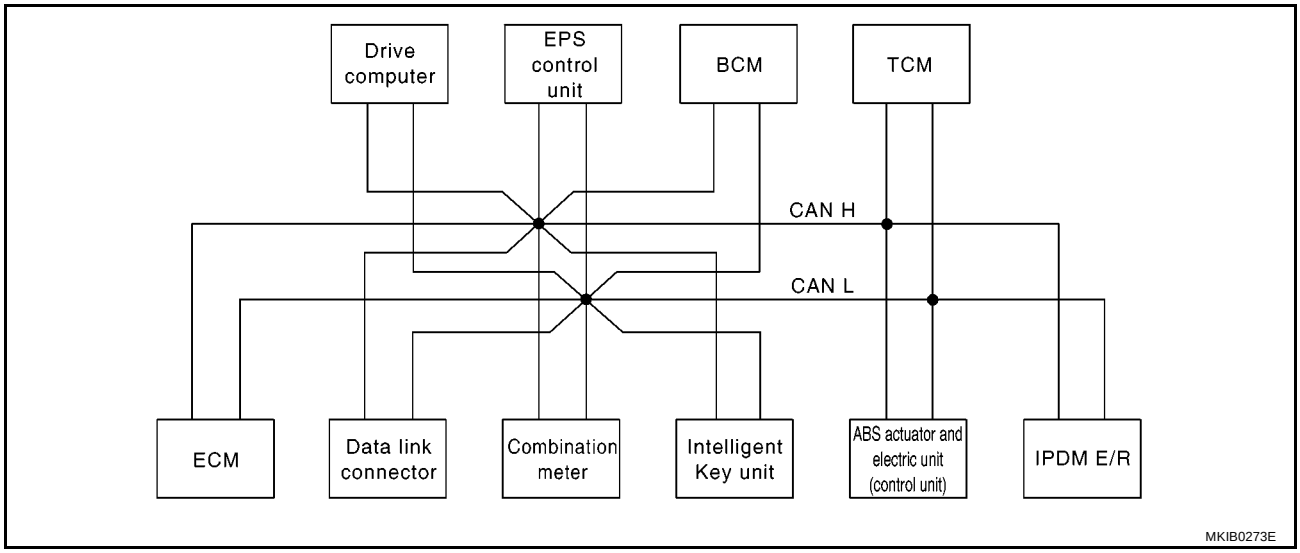
Body type	3door/5door											
Axle	2WD											
Engine	CR10DE/CR12DE/CR14DE								K9K			
Handle	LHD/RHD											
Brake control	ABS											
Transmission	A/T				M/T							
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit												
ECM	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	BRC-28, "TYPE 1/TYPE 2"				BRC-31, "TYPE 3/TYPE 4"				BRC-33, "TYPE 9/TYPE 10"			

×: Applicable

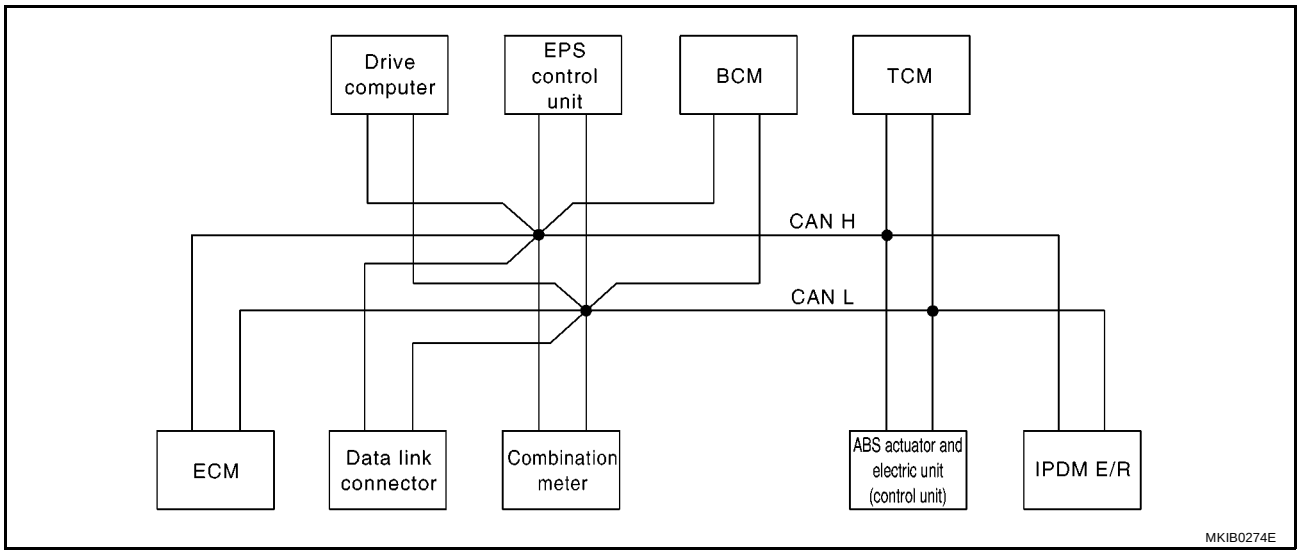
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

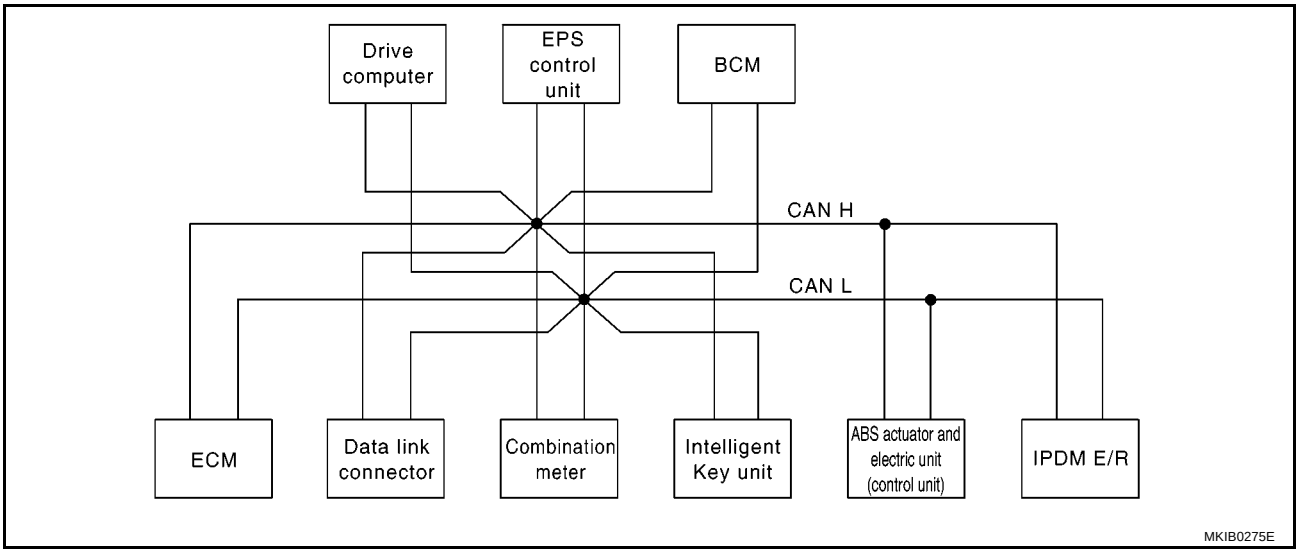
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

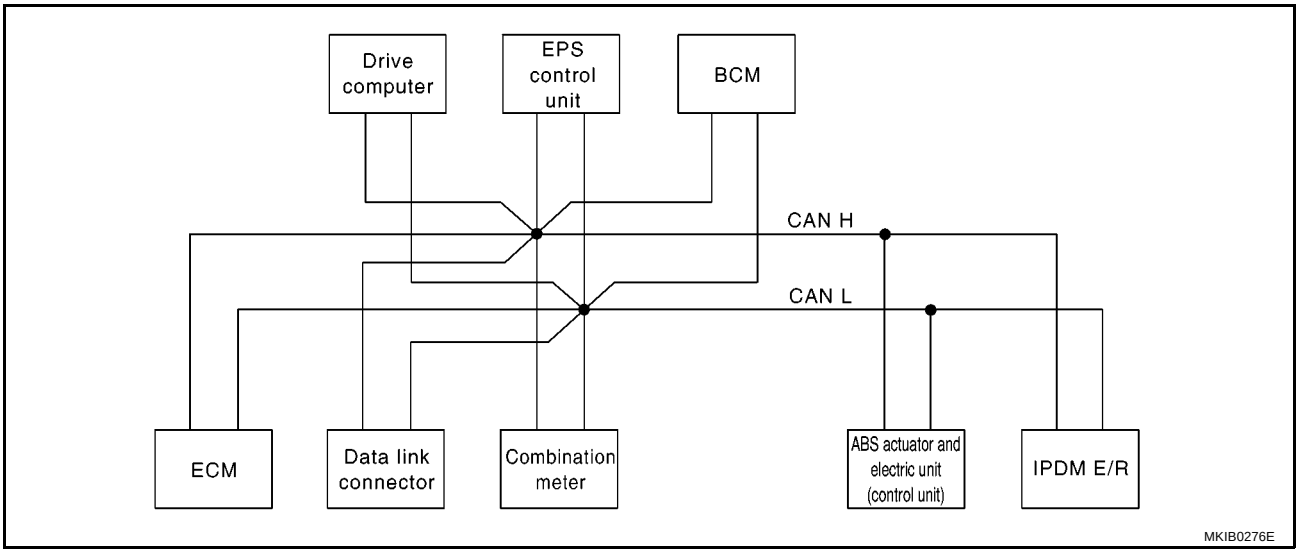
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

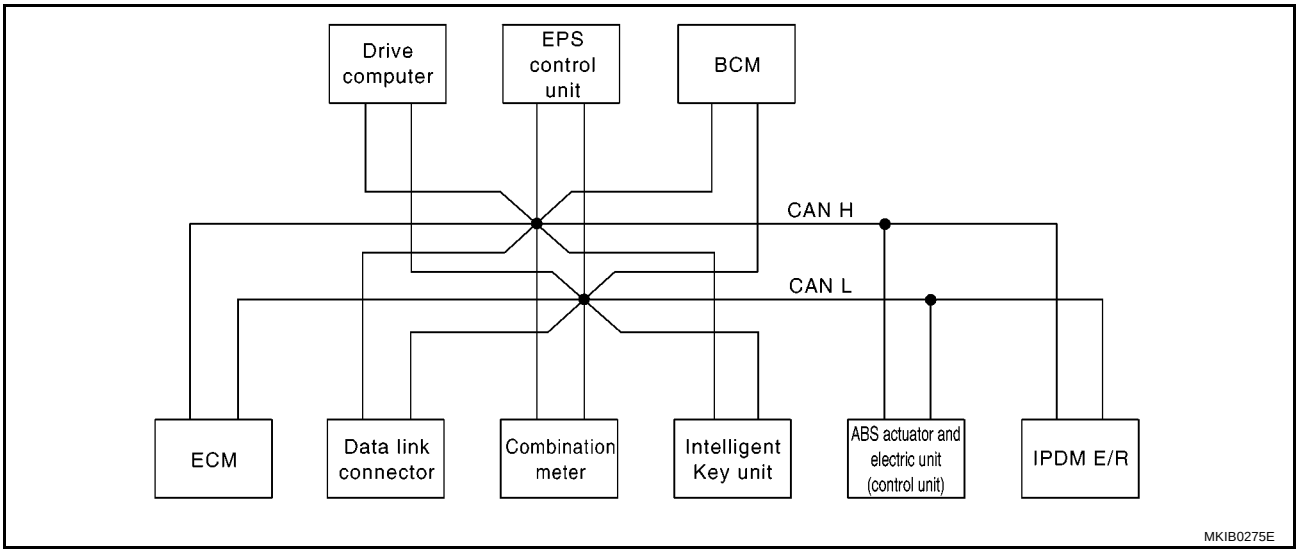
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

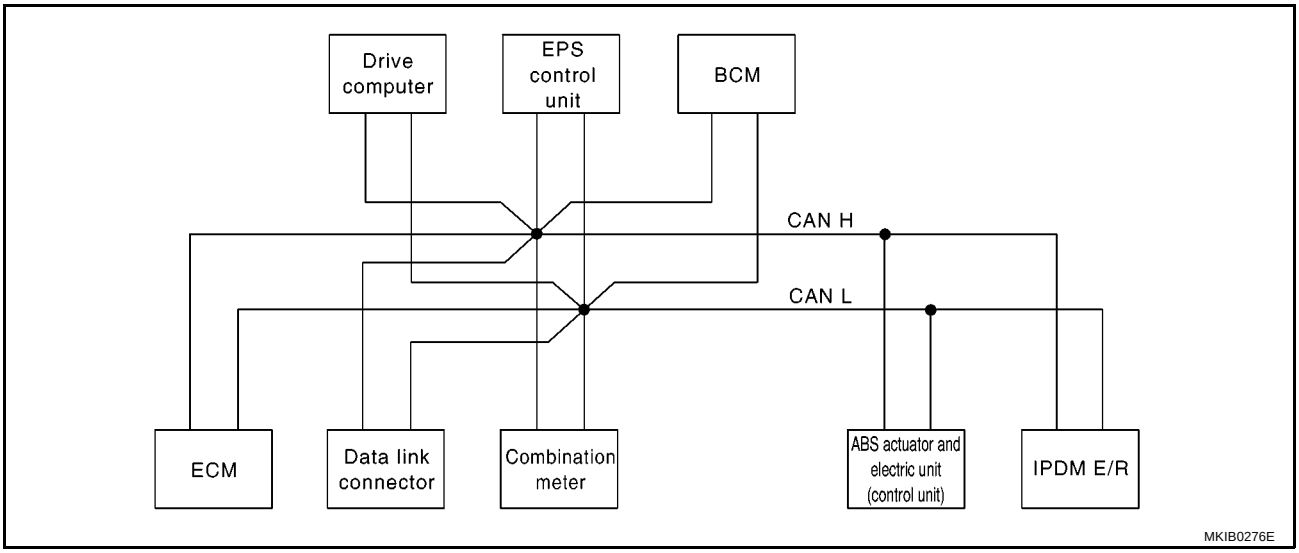
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

For Fast and Accurate Diagnosis

EFS004M4

PRECAUTIONS FOR TROUBLE DIAGNOSIS

- Always read the “GI General Information” to confirm the general precautions. Refer to GI-4, "General Precautions" .
- After completing the trouble diagnosis, always erase the fault memory. Refer to BRC-22, "SELF-DIAGNOSIS" .
- When inspection of the continuity or voltage between control units is performed, check connector terminals for disconnection, looseness, bend, or collapse. If any non-standard condition is detected, repair or replace applicable part.
- Intermittent errors may be caused by a poor connection in the harness, connector, or terminal.
- If a circuit tester is used for the check, be careful not to forcibly extend any connector terminal.

Basic Inspection

EFS004M5

BASIC INSPECTION 1: BRAKE FLUID LEVEL, LEAK AND BRAKE PAD INSPECTION

1. Check fluid level in brake reservoir tank. If fluid level is low, refill the brake fluid.
2. Check area around the brake piping and ABS actuator for leaks. If a leak or oozing is detected, check as follows:
   - If ABS actuator connections are loose, tighten piping to the specified torque. Check again for leaks, and make sure there is no fluid leakage.
   - If flare nuts at the connections and the threads of ABS actuator are damaged, replace damaged parts. Then check again for leaks, and make sure that there is no fluid leak.
   - If a leak or oozing is detected on other parts than ABS actuator connections, wipe the applicable part with a clean cloth. Then check again for leaks, and if there is still a leak or oozing, replace damaged part.
   - If leaks or oozing are detected on ABS actuator body, wipe with a clean cloth and check again. If there is still a leak or oozing, replace ABS actuator.

     CAUTION:
     ABS actuator body cannot be disassembled.
3. Check for brake pad wear. Refer to BR-21, "PAD WEAR INSPECTION" .

BASIC INSPECTION 2: INSPECTION OF POWER SUPPLY SYSTEM TERMINAL LOOSENESS AND BATTERY

Check battery for looseness on battery positive/negative cables and ground connection. Also Make sure battery voltage dose not drop.

BASIC INSPECTION 3: ABS WARNING LAMP AND BRAKE WARNING LAMP INSPECTION

1. Make sure ABS warning lamp and brake warning lamp turn on for approximately 1 sec. When ignition switch is turned ON. If they do not turn on, perform CAN communication system diagnosis. Refer to BRC-40, "Inspection 5 CAN Communication System" .
   If CAN communication system is normal, replace combination meter. Refer to DI-34, "Removal and Installation for Combination Meter" .
2. Make sure ABS warning lamp and brake warning lamp turn off after approximately 1 sec. When ignition switch is turned ON. If they do not turn OFF, perform self-diagnosis.
3. Make sure that ABS warning lamp remains off after the vehicle has been driven at approx. 30 km/h (19 MPH) for approx. 1 minute. If it turns on, perform self-diagnosis.
4. After completing self-diagnosis, always erase self-diagnostic results memory. Refer to BRC-22, "SELF-DIAGNOSIS" .

CAUTION:
The brake warning lamp comes on when the parking brake lever is pulled (when switch is on) and when the brake fluid level sensor operates (insufficient brake fluid).

Inspection 1 Wheel Sensor System

EFS004M6

INSPECTION PROCEDURE

After identifying malfunctioning wheel sensor position according to CONSULT-II self-diagnostic results, check the each part and identify the parts to be replaced.

1. CHECK TYRE

Check air pressure, wear and size.

Are air pressure, wear, and size within specifications?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tyre.

2. CHECK SENSOR AND SENSOR ROTOR

- Inspect the appearance of the sensor and sensor rotor.
- Check sensor rotor rubber bar for damage.
- Check sensor for disconnection or loose.

OK or NG

OK >> GO TO 3.
NG >> Replace sensor rotor.

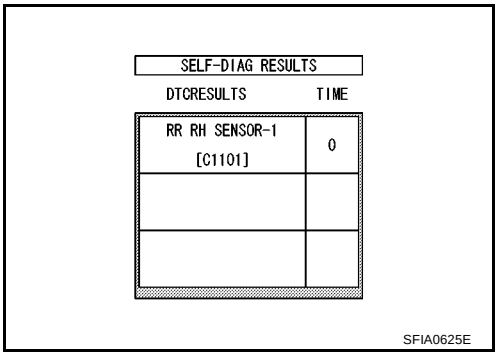
3. SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
FR RH SENSOR 1, 2
FR LH SENSOR 1, 2
RR RH SENSOR 1, 2
RR LH SENSOR 1, 2

Is any of above displayed on self-diagnosis display?

YES >> GO TO 4.
NO >> INSPECTION END



4. CHECK CONNECTOR

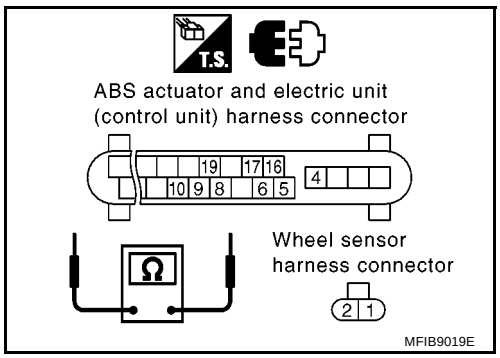
1. Disconnect control unit connector E45 and malfunctioning wheel sensor connector E23 (FL), E38 (FR), B35 (RL) or B34 (RR) and check for deformation, disconnected and loose. If there is any non-standard condition, repair the connector.
2. Reconnect connectors, drive the vehicle at 30km/h (19 MPH) for approximately 1 minute, and then perform self-diagnosis.

OK or NG

OK >> The connector terminal contact is loose, damage, open or shorted.
NG >> GO TO 5.

5. CHECK WHEEL SENSOR HARNESS

1. Disconnect control unit connector E45 and wheel sensor connector E23 (FL), E38 (FR), B35 (RL) and B34 (RR).
2. Check continuity between terminals. (Check resistance as well when turning the steering wheel to the right and left, or moving sensor harness in the wheel well.)



	Power supply system		Signal system		Ground system	
Wheel	Control unit	Wheel sensor	Control unit	Wheel sensor	Control unit (signal)	Control unit (Ground)
Front RH	10 (R)	1 (R)	9 (L)	2 (L)	9 (L), 10 (R)	4 (B)
Front LH	5 (Y)	1 (Y)	16 (BR)	2 (BR)	5 (Y), 16 (BR)	4 (B)
Rear RH	19 (LG)	1 (LG)	8 (OR)	2 (OR)	8 (OR), 19 (LG)	4 (B)
Rear LH	17 (G)	1 (G)	6 (BR)	2 (BR)	6 (BR), 17 (G)	4 (B)

Power supply system : Continuity should exist.
Signal System : Continuity should exist.
Ground system : Continuity should not exist.

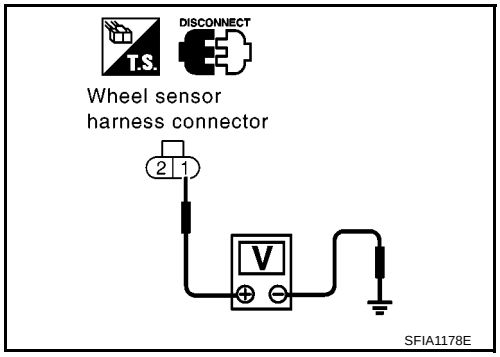
OK or NG

OK >> GO TO 6.
NG >> Repair or replace harness connector between ABS actuator and electric unit (control unit) and wheel sensor.

6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Connect control unit connector.
2. Turn ignition switch ON.
3. Check voltage between wheel sensor power supply terminal 1 and ground.

Voltage : Approx. 12 V



OK or NG

OK >> Replace wheel sensor.
NG >> Replace ABS actuator and electric unit (control unit).

Inspection 2 ABS Actuator and Electric Unit Power and Ground System

EFS004M7

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

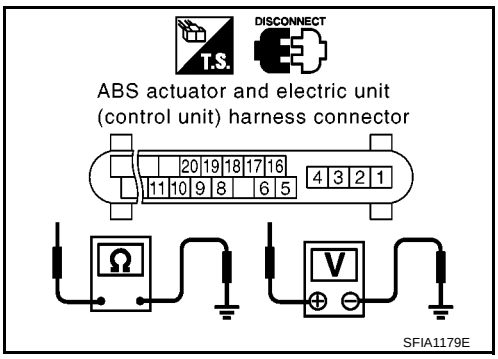
Self-diagnostic results
BATTERY VOLTAGE

Is any of above displayed on self-diagnosis display?

YES >> GO TO 2.
NO >> INSPECTION END

2. CHECK POWER SUPPLY AND GROUND CIRCUIT

1. Disconnect control unit connector E45.
2. Check continuity and voltage between control unit connector terminals and ground.



Terminal	Signal	Ignition switch	Measured value
18 (PU)	Power supply	ON	Battery voltage (approx. 12 V)
		OFF	Approx. 0 V
4 (B)	Ground	OFF	Continuity should exist.

OK or NG

OK >> Check battery for loose terminal and low voltage for malfunction. If it returns an error, repair it.
NG >> Repair or replace harness connector between ABS actuator and electric unit (control unit) and fuse or ground.

Inspection 3 ABS Control Unit System

EFS004M8

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
CONTROL UNIT

Is any of above displayed on self-diagnosis display?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> INSPECTION END

Inspection 4 ABS Actuator Relay or ABS Motor Relay Power System

EFS004M9

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
IN ABS SOL
OUT ABS SOL
MAIN RELAY
PUMP MOTOR

Is above displayed on self-diagnosis display?

YES >> GO TO 2.
NO >> INSPECTION END

2. CHECK CONNECTOR

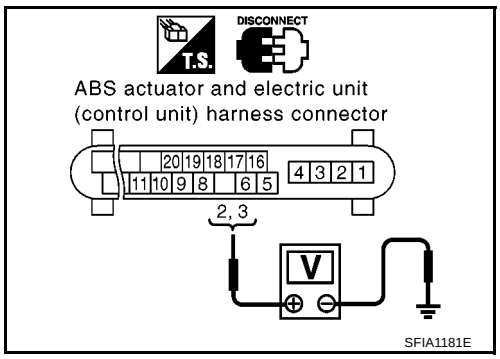
1. Disconnect control unit connector E45. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connector securely, and perform self-diagnosis.

OK or NG

OK >> The connector terminal contact is loose, damaged, open or shorted.
NG >> GO TO 3.

3. ABS ACTUATOR RELAY (SOLENOID VALVE RELAY) OR ABS MOTOR RELAY POWER SYSTEM

1. Disconnect control unit connector E45.
2. For ABS actuator relay (solenoid valve relay), check voltage between control unit connector E45 terminal 3 (W) and ground. For the ABS motor relay, check voltage between control unit connector E45 terminal 2 (Y) and ground.



ABS actuator relay (solenoid valve relay)

3 (W) – Ground : Battery voltage (approx. 12 V)

ABS motor relay

2 (Y) – Ground : Battery voltage (approx. 12 V)

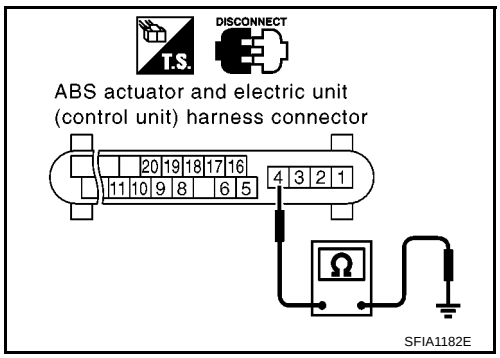
OK or NG

OK >> GO TO 4.

NG >> Repair or replace harness connector between ABS actuator and electric unit (control unit) and fusible link.

4. CHECK GROUND CIRCUIT

Check continuity between control unit connector E45 terminal 4 (B) and ground.



4 (B) – Ground : Continuity should exist.

OK or NG

OK >> Replace ABS actuator and electric unit (control unit).

NG >> Repair or replace ABS actuator and electric unit ground harness.

Inspection 5 CAN Communication System

EFS004MA

INSPECTION PROCEDURE

1. START INSPECTION

1. Using CONSULT-II, perform self-diagnosis.
2. Print the result of the self-diagnosis.
3. Check “CAN communication support monitor” in data monitor.

CAN Diagnosis Support Monitor

Normal	When failure occurs
INITIAL DIAG: OK	INITIAL DIAG: NG
TRANSMIT DIAG: OK	TRANSMIT DIAG: UNKWN
ECM: OK	ECM: UNKWN

>> After printing the monitor items, GO TO “CAN System”. Refer to LAN-4, "Precautions When Using CONSULT-II" .

Inspection 6 Stop Lamp Switch System

EFS004MB

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
STOP LAMP SW

Is above displayed on self-diagnosis display?

YES >> GO TO 2.
NO >> INSPECTION END

2. CHECK CONNECTOR

1. Disconnect control unit connector E45 and stop lamp switch connector E108, E109, M202 or M203.
2. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
3. Reconnect connector securely, and perform self-diagnosis.

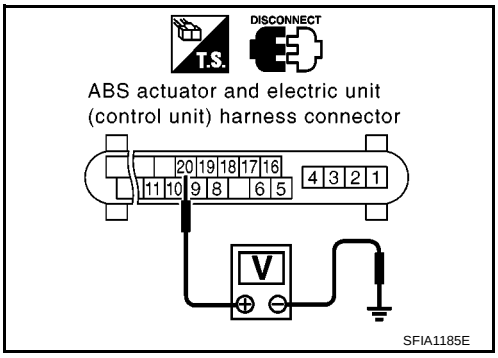
OK or NG

OK >> The connector terminal contact is loose, damaged, open or shorted.
NG >> GO TO 3.

3. CHECK STOP LAMP SWITCH CIRCUIT

1. Disconnect control unit connector E45.
2. Check voltage between control unit connector E45 terminal 20 (Y) and ground.

ABS actuator and electric unit (control unit)	Ground	Measuring condition	Voltage
20	—	Brake pedal depressed	Battery voltage (approx. 12 V)
		Brake pedal not depressed	0 V



OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair or replace harness connector between ABS actuator and electric unit (control unit) and stop lamp switch.

Symptom 1 ABS Works Frequently.

EFS004MC

1. START INSPECTION

Check brake force distribution.

OK or NG

OK >> GO TO 2.
NG >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Check front and real axle for significant “looseness”.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK WHEEL SENSOR

Wheel Sensor Inspection

- Sensor installation and damage inspection
- Sensor rotor installation and damage inspection
- Sensor connector engagement inspection
- Sensor harness inspection

OK or NG

OK >> GO TO 4.
NG >> ● Replace wheel sensor or sensor rotor.
● Repair harness.

4. CHECK INDICATOR DISPLAY OF WARNING LAMP

Make sure warning lamp is off approximately 1 second after ignition switch is turned ON or during driving.

OK or NG

OK >> Normal
NG >> Perform self-diagnosis. Refer to BRC-22, "SELF-DIAGNOSIS" .

Symptom 2 Unexpected Pedal Reaction

EFS004MD

1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke.

Is brake pedal stroke not excessive?

YES >> ● Bleed air from brake piping.
● Check for looseness of brake pedal, master back, and master cylinder. Also check brake system for oil leak. Repair as necessary.
NO >> GO TO 2.

2. PERFORMANCE CHECK

Disconnect control unit connector E45 to deactivate ABS. In this condition, make sure braking force is normal after inspection, reconnect connector.

OK or NG

OK >> GO TO 3. Wheel Sensor Inspection in BRC-41, "Symptom 1 ABS Works Frequently." .
NG >> Check brake system.

Symptom 3 Longer Stopping Distance

EFS004ME

CAUTION:
On slippery road, stopping distance could be longer when ABS is activated than when it is not.

1. CHECK FUNCTION

Disconnect control unit connector E45 to deactivate ABS. In this condition, check braking distance After inspection, reconnect connector.

OK or NG

OK >> ● Bleed air from brake piping.
● Check brake system.

NG >> GO TO 3. Wheel Sensor Inspection in BRC-41, "Symptom 1 ABS Works Frequently." .

Symptom 4 ABS Does Not Work

EFS004MF

CAUTION:
ABS does not operate when vehicle speed is 10 km/h (6 MPH) or lower.

1. CHECK INDICATOR DISPLAY OF WARNING LAMP

Make sure warning lamp is off approximately 1 second after ignition switch is turned ON or during driving.

OK or NG

OK >> GO TO 3. Wheel Sensor Inspection in BRC-41, "Symptom 1 ABS Works Frequently." .
NG >> Perform a self-diagnosis. Refer to BRC-22, "SELF-DIAGNOSIS" .

Symptom 5 Pedal Vibration and ABS Operation Noise

EFS004MG

CAUTION:
Under the following conditions, when brake pedal is lightly depressed (just place a foot on it), ABS is activated and vibration is felt. However, this is normal.

- **When shifting gears and operating clutch**
- **When driving on slippery road**
- **During cornering at high speed**
- **When passing over bumps or grooves [50 mm (1.97 in) or more]**
- **When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]**

1. SYMPTOM CHECK 1

Check brake system for pedal vibration or noise at engine start.

OK or NG

OK >> GO TO 2.
NG >> Perform self-diagnosis. Refer to BRC-22, "SELF-DIAGNOSIS" .

2. SYMPTOM CHECK 2

Operate electrical equipment (head lamp or equivalents), and confirm symptoms.

Does symptom occur when electrical switches (head lamp, etc.) are operated?

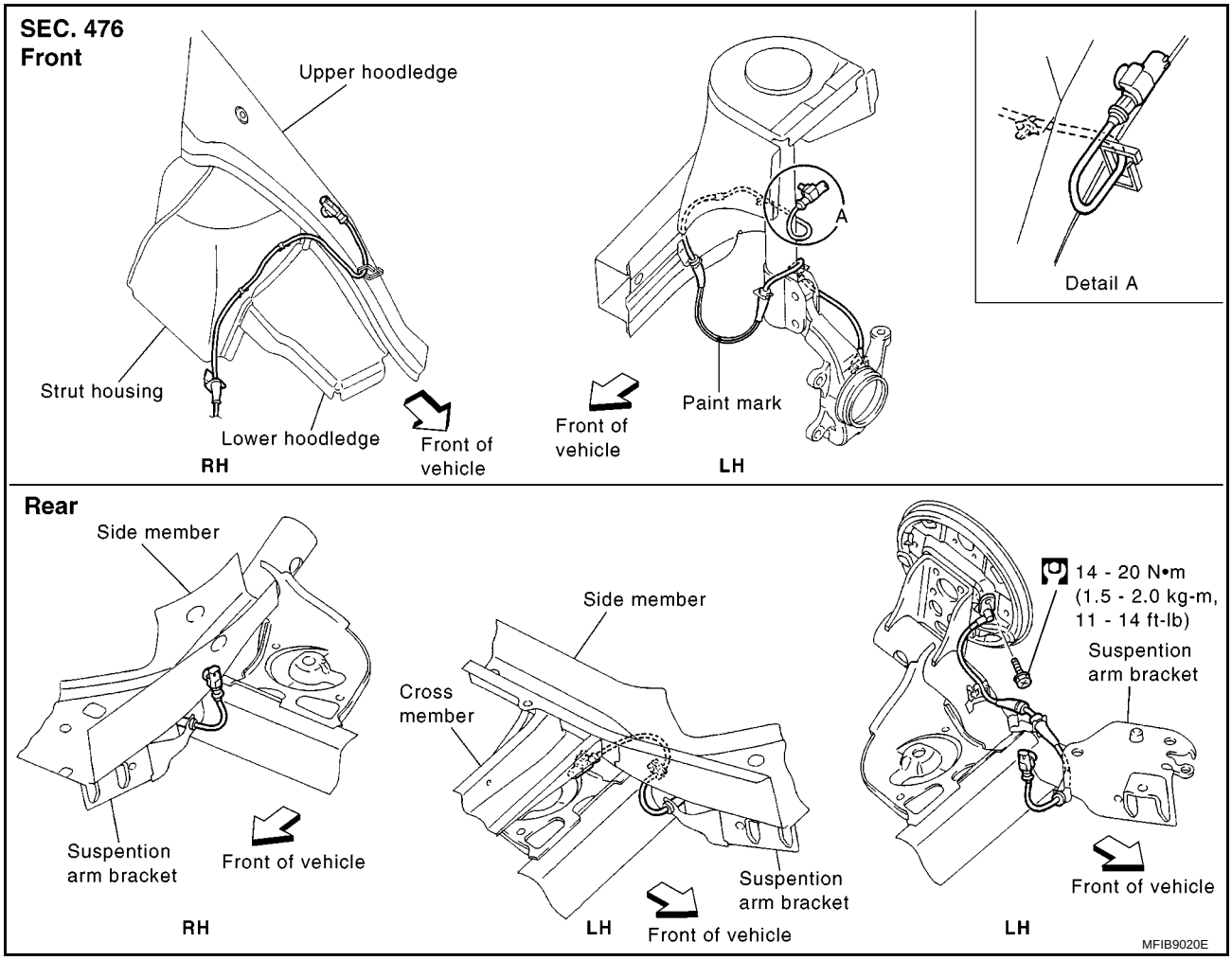
YES >> Check for radio, antenna, and antenna lead-in wires (including wiring) near the control unit. If they are near ABS actuator and electric unit (control unit), move them.
NO >> GO TO 3. Wheel Sensor Inspection in BRC-41, "Symptom 1 ABS Works Frequently." .

WHEEL SENSORS

PFP:47910

Removal and Installation

EFS004MH



REMOVAL

Be careful of the following.

CAUTION:

- **When removing the sensor, do not rotate it if possible, and not forcibly pull the sensor harness.**
- **Before removing front or rear wheel hub, remove wheel sensor to avoid sensor wiring damage.**

INSTALLATION

Be certain to tighten bolts to the specified torque. Be careful of the following:

- Check the inside of the sensor mounting hole for foreign material, the rotor surface for iron chips and other foreign material, and if anything is non-standard, clean it before installation, or replace it.
- When installing the front sensor, completely push in the strut bracket and body bracket rubber grommets until they lock so that the sensor harness does not become twisted. In addition, there should be no twists in the harness when installed. Install the harness so that the painted part faces the outside of the vehicle.
- When installing the rear sensor, completely push in the rubber bracket of the suspension arm bracket and lock the marking area of the side member harness mount so that the sensor harness will not be twisted. In addition, there should be no twists in the harness when installed.

SENSOR ROTOR

PFP:47970

Removal and Installation

EFS004MI

FRONT

- Because the sensor rotor is integrated with the wheel bearing, replace it together with the wheel bearing assembly. Refer to FAX-6, "FRONT WHEEL HUB AND KNUCKLE" .

REAR

- During removal and installation, remove the wheel hub (brake drum). Refer to RAX-5, "WHEEL HUB" .

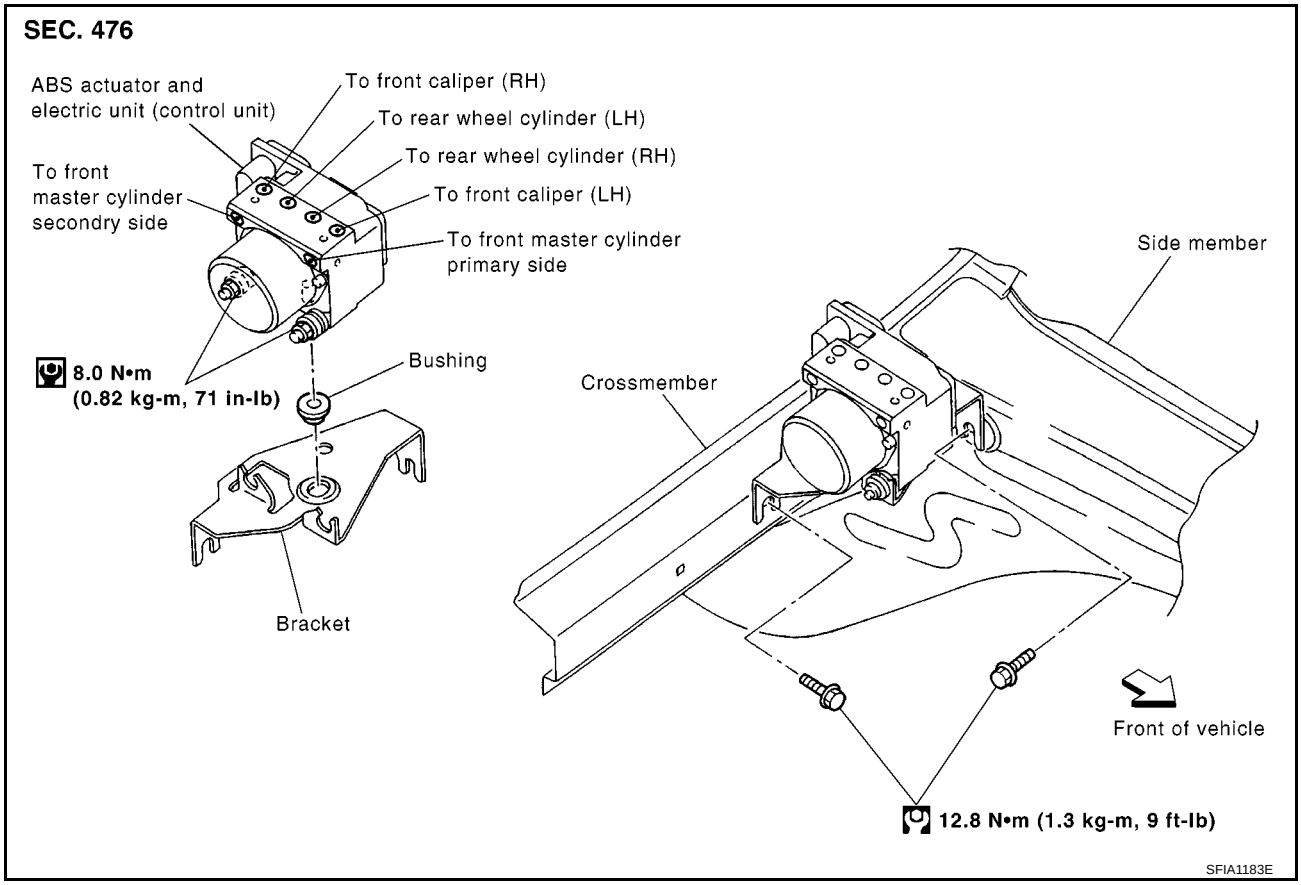
CAUTION:
The sensor rotor is a non-reusable part, it must be replaced by an new part when removing it.

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PFP:47660

Removal and Installation

EFS004MJ



REMOVAL

Be careful of the following.

CAUTION:

- **Before servicing, disconnect the battery cables.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use a flare nut torque wrench and tighten to the specified torque.**
- **Do not apply excessive impact to the actuator, such as dropping it.**

INSTALLATION

Be careful of the following.

- When setting the actuator in the bracket, push it in until it locks.
- Tighten the mounting bolts and nuts to the specified torque.
- After the work, breed the air from the brake piping. Refer to BR-10, "Bleeding Brake System" .
- After installing the vehicle harness connector in the actuator, make sure the connector is securely locked.

PRECAUTIONS

PFP:00001

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

EFS004JB

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

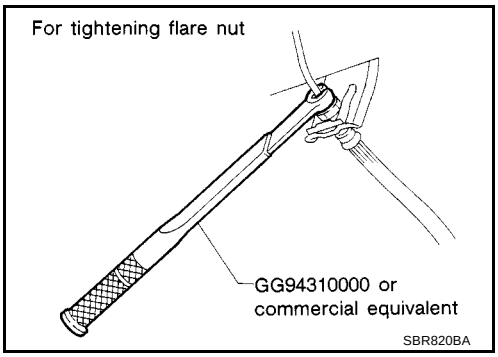
- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal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

Precautions for Brake System

EFS004JC

SMA for VIN >SJN**AK12U1072423

- Recommended fluid is brake fluid “DOT 3” or “DOT 4”.
- Do not reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas such as body. If brake fluid is splashed, wipe it off and flush area with water immediately.
- Do not use mineral oils such as gasoline or kerosene to clean. They will ruin rubber parts and cause improper operation.
- Using a flare nut torque wrench, securely tighten brake tube flare nuts.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect electrical connectors of ABS actuator and electric unit (control unit) or battery negative terminals.
- When installing brake piping, be sure to check torque.



Precautions for Brake Control

EFS004JD

- During ESP/TCS/ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noise may be heard from engine room. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from the customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides the electrical system inspection, check booster operation, brake fluid level, and fluid leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna, or antenna lead-in wire (including wiring) near control module, ESP/TCS/ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.

- If the following components are replaced with non-genuine components or converted, ESP OFF indicator lamp and SLIP indicator lamp may turn on or the ESP system may not operate properly. Components related to suspension (Shock Absorber, Strut, Spring, Bush, etc.), Tires, wheels (exclude specified size), components related to brake (Pad, Rotor, Caliper, etc.), components related to engine (Muffler, ECM, etc.), components related to body reinforcement (Roll bar, Tower bar, etc.).
- Driving in the condition of breakage or excessive wear of suspension, tires or components related to the brakes may cause ESP OFF indicator lamp and SLIP indicator lamp turn on, and the ESP system may not operate properly.
- When the TCS or ESP is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a result of the normal operation of the TCS and ESP.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp carves on a freeway), the ESP may not operate normally, or ESP warning lamp and SLIP indicator lamp may turn on. However, this is not a malfunction, if normal operation can be resumed after restarting engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. When ESP function is OFF (ESP SW ON) may cause the G -sensor system indicate a malfunction. However, this is not a malfunction, if normal operation can be resumed after restarting engine.

Diagnosis Precaution

EFS004JE

CAN SYSTEM

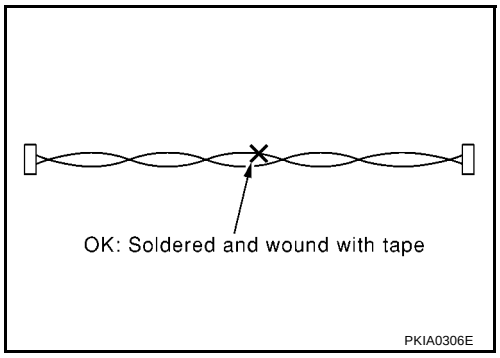
- Do not apply voltage of 7.0 V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use shall be 7.0 V or lower.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.

Precaution for Harness Repair

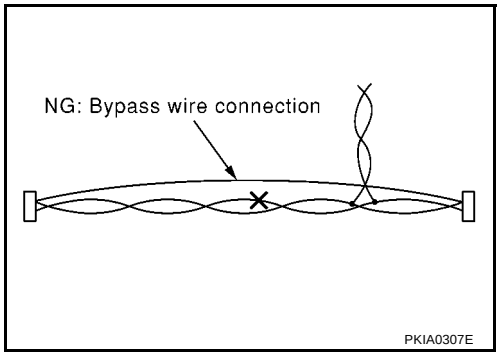
EFS004JF

CAN SYSTEM

- Area to be repaired shall be soldered, and wrapped with a tape [be sure that fraying of twisted wire shall be within 110 mm (4.33 in)].



- Do not make a bypass connection to repaired area. (If it is done, branch part will be removed and characteristics of twisted wire will be lost.)

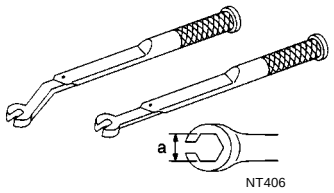


PREPARATION

PFP:00002

Special Service Tools

EFS004JG

Tool number Tool name		Description
GG94310000 Flare nut torque wrench a: 10 mm (0.39 in)	 NT406	Removing and installing each brake piping

ON-VEHICLE SERVICE

PFP:00000

Adjustment of Steering Angle Sensor Neutral Position

SMA for VIN >SJN**AK12U1309269 EFS004JH

In case of doing work that applies to the list below, make sure to adjust neutral position of steering angle sensor before running vehicle.

Situation	Adjustment of Steering Angle Sensor Neutral Position
Disconnecting/connecting the battery	×
Removing/Installing ABS actuator and electric unit (control unit)	–
Replacing ABS actuator and electric unit (control unit)	×
Removing/Installing steering angle sensor	×
Removing/Installing steering components	×
Removing/Installing suspension components	×
Removing/Installing the same tire to the same position	–
Change 4 tires to new ones	–
Change some of 4 tires to new ones (not 4 tires)	–
Tire rotation	–
Adjusting wheel alignment	×

×: Required
–: Not required

CAUTION:
To adjust neutral position of steering angle sensor, make sure to use CONSULT-II.
(Adjustment cannot be done without CONSULT-II.)

OPERATION PROCEDURE

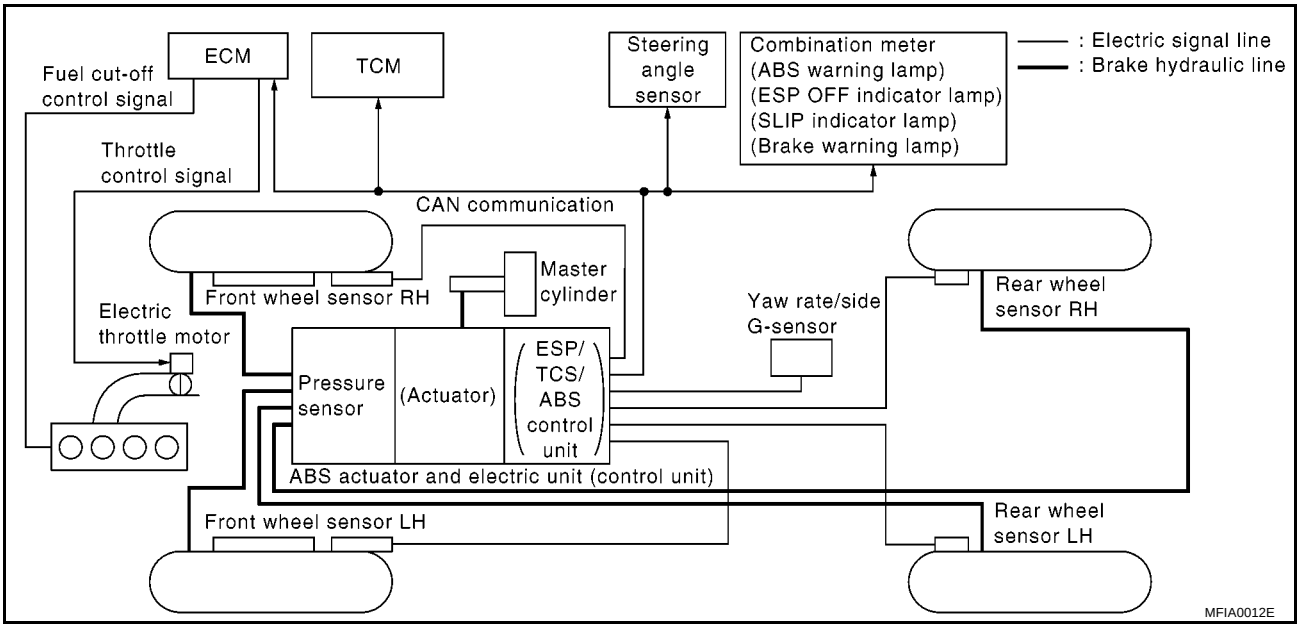
- For operation procedure, refer to STC-4, "Steering Angle Adjustment (WORK SUPPORT)" .

SYSTEM DESCRIPTION

PFP:00000

System Diagram

EFS004JI



ESP Function

EFS004JJ

- In addition to the TCS/ABS function, the driver steering amount and brake operation amount are detected from steering angle sensor and pressure sensor, and the vehicle's driving status (amount of under steering / over steering) is determined from information from G-sensor, wheel sensor, etc., and this information is used to improve vehicle stability by controlling the braking and engine power to all four wheels.
- SLIP indicator lamp flashes to inform the driver of ESP operation.
- During ESP operation, body and brake pedal lightly vibrate and mechanical noises may be heard. This is normal.
- ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp might turn on when vehicle is subject to strong shaking or large vibration, such as when vehicle is on a turn table, a ship or a steep slope such as bank while engine is running. In this case, restart engine on a normal road, and if ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp turn off, there is no problem.

TCS Function

EFS004JK

- The wheel spin of the drive wheels is detected by ABS actuator and electric unit (control unit) from the wheel speed signals from four wheels, so if wheel spin occurs, drive wheel right and left brake fluid pressure control and engine fuel cut are performed while throttle value is restricted to reduce the engine torque and decrease the amount of wheel spin. In addition, the degree throttle is opened is controlled to achieve the optimum engine torque.
- Depending on road circumstances, the driver may have a sluggish feel. This is normal, because the optimum traction has the highest priority under TCS operation.
- TCS may be activated any time vehicle suddenly accelerates, suddenly down/upshifts, or is driven on a road with a varying surface friction coefficient.
- During TCS operation, it informs a driver of system operation by flashing SLIP indicator lamp.

ABS Function

EFS004JL

- The anti-lock brake system is a function that detects wheel revolution while braking, and it improves handling stability during sudden braking by electrically preventing 4 wheel lock. Maneuverability is also improved for avoiding obstacles.
- If the electrical system breaks down, then the fail-safe function starts, the ABS becomes inoperative, and ABS warning lamp turns on.
- Electrical system diagnosis by CONSULT-II is available.
- During ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.

- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noises may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

EBD Function

EFS004JM

- Electronic brake distributor is a function that detects subtle slippages between front and rear wheels during braking, and it improves handling stability by electronically controlling the brake fluid pressure which results in reduced rear wheel slippage.
- In case of electrical system break down, the fail-safe function is activated, EBD and ABS becomes inoperative, and ABS warning lamp and brake warning lamp are turned on.
- Electrical system diagnosis by CONSULT-II is available.
- During EBD operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noises may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without EBD when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

Fail-Safe Function

EFS004JN

ESP / TCS SYSTEM

In case of malfunction in the ESP/TCS system, ESP OFF indicator lamp and SLIP indicator lamp are turned on, and the condition of vehicle is the same as the condition of vehicles without ESP/TCS system. In case of malfunction in the ESP/TCS system, the ABS control continues to operate normally without ESP/TCS control.

CAUTION:

If the fail-safe function is activated, then perform the self-diagnosis for ESP/TCS/ABS control system.

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the ESP/TCS/ABS become one of the following conditions of the fail-safe function.

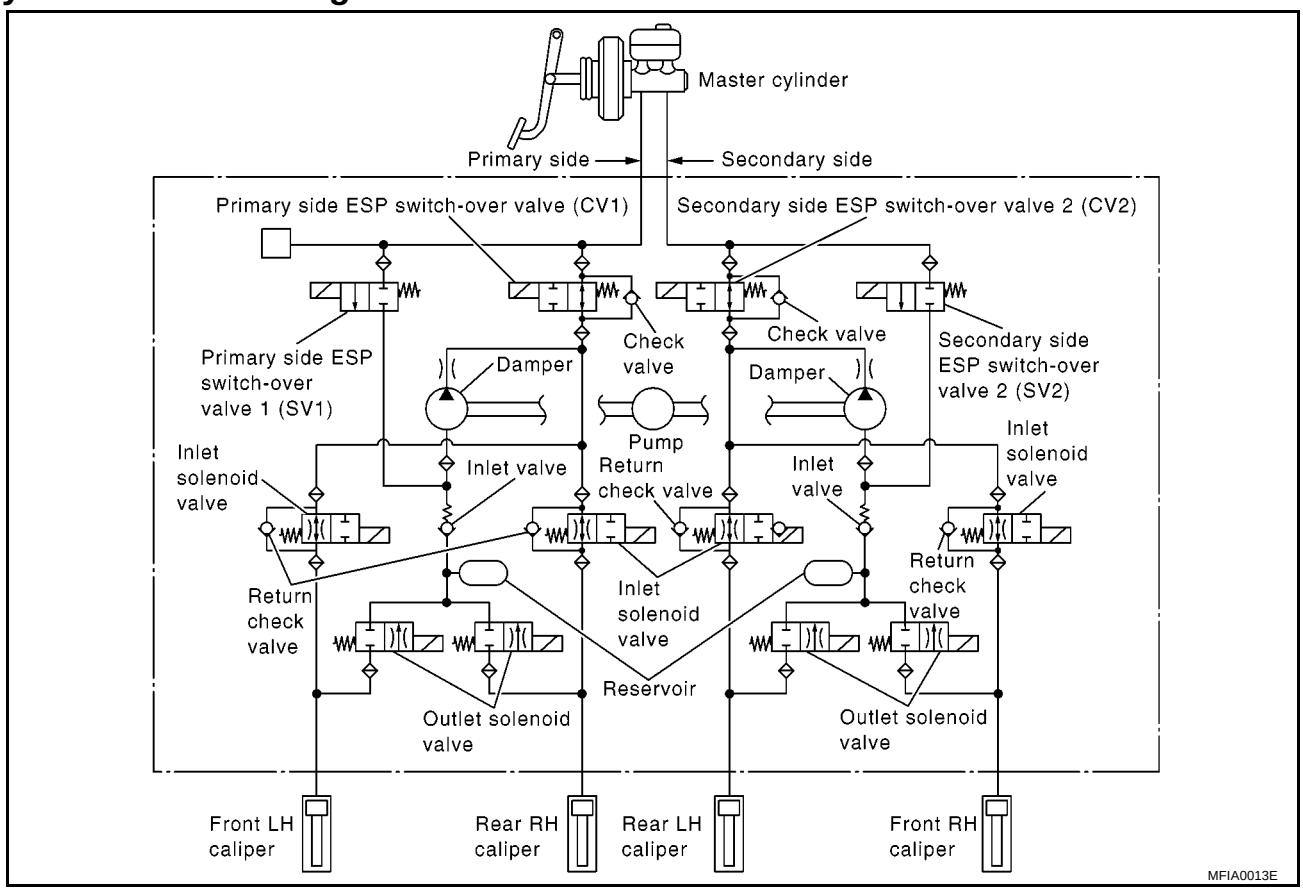
1. For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.
2. For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

NOTE:

In condition 1 described above, an ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for “Key Switch ON” and “the First Starting” are being performed.

Hydraulic Circuit Diagram

EFS004JO



CAN COMMUNICATION

PFP:23710

System Description

EFS005XC

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

CAN Communication Unit

EFS005XD

Go to CAN system, when selecting your car model from the following table.

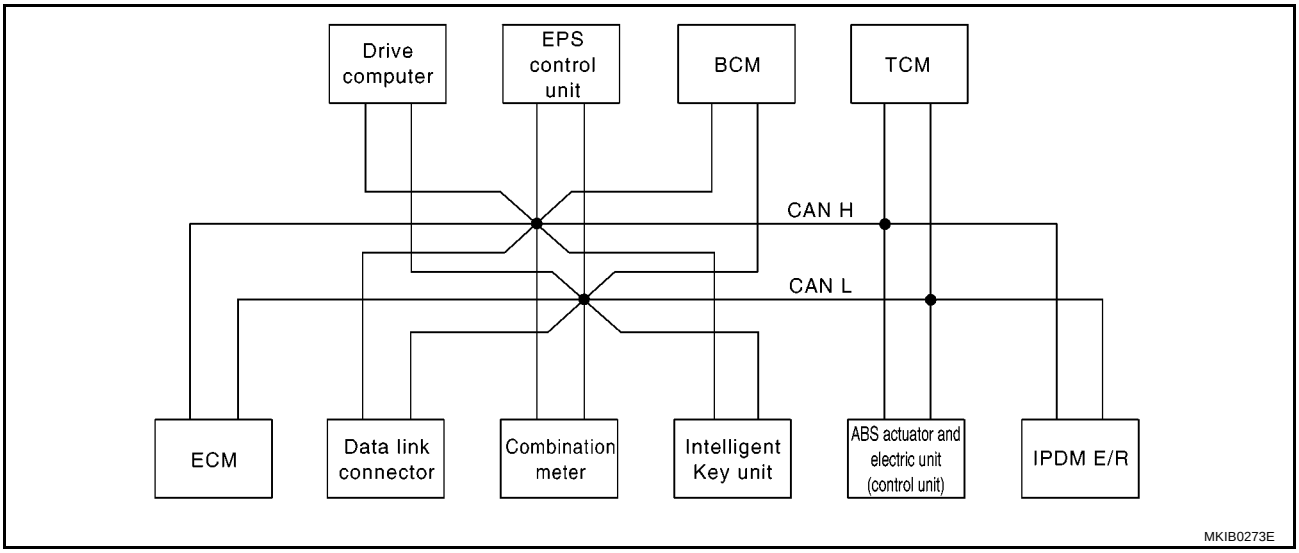
Body type	3door/5door							
Axle	2WD							
Engine	CR12DE/CR14DE							
Handle	LHD/RHD							
Brake control	ESP system							
Transmission	A/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit								
ECM	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×		
Drive computer	×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×
TCM	×	×	×	×				
IPDM E/R	×	×	×	×	×	×	×	×
CAN communication type	BRC-55, "TYPE 5/TYPE 6"				BRC-58, "TYPE 7/TYPE 8"			

×: Applicable

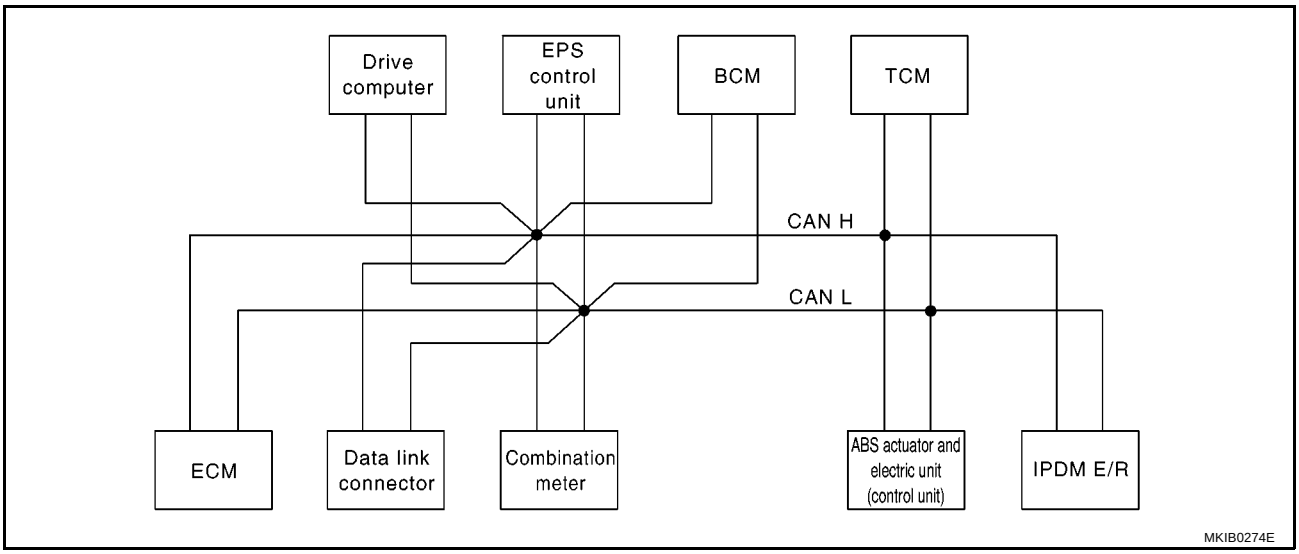
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T						R	R	

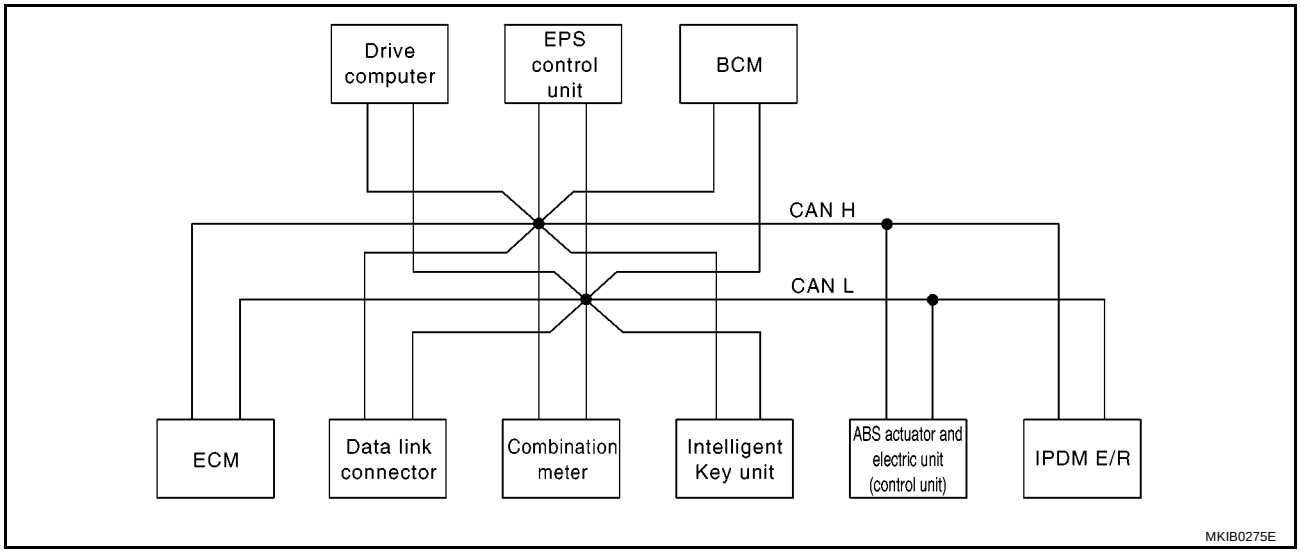
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

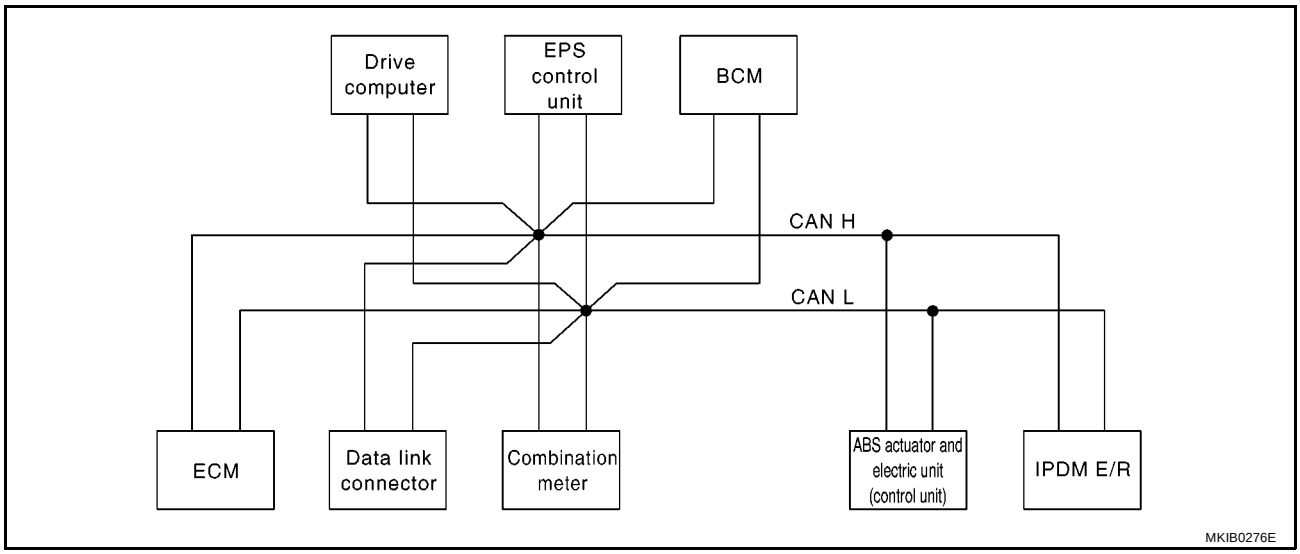
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

TROUBLE DIAGNOSIS

PFP:00004

How to Proceed With Diagnosis

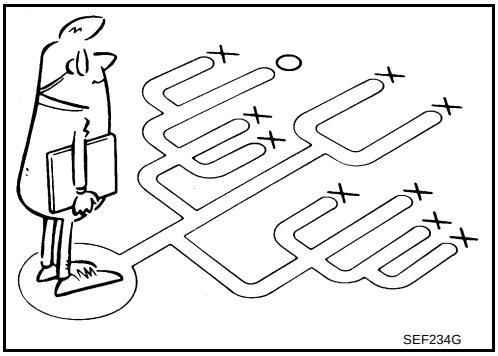
EFS004JR

BASIC CONCEPT

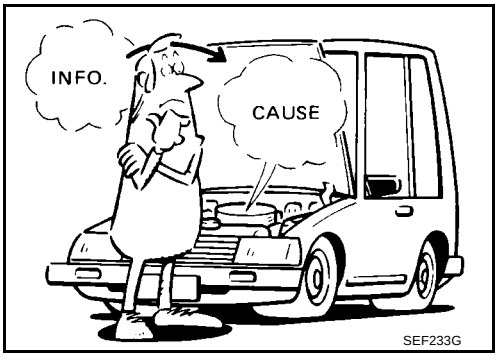
- Most important point to perform diagnosis is to understand systems (control and mechanism) in vehicle thoroughly.

- It is also important to clarify customer complaints before inspection.
  First of all, reproduce symptom, and understand it fully.
  Ask customer about his/her complaints carefully. In some cases, it will be necessary to check symptom by driving vehicle with customer.

  NOTE:
  Customers are not professionals. Do not assume “maybe customer means...” or “maybe customer mentioned this symptom”.


SEF234G

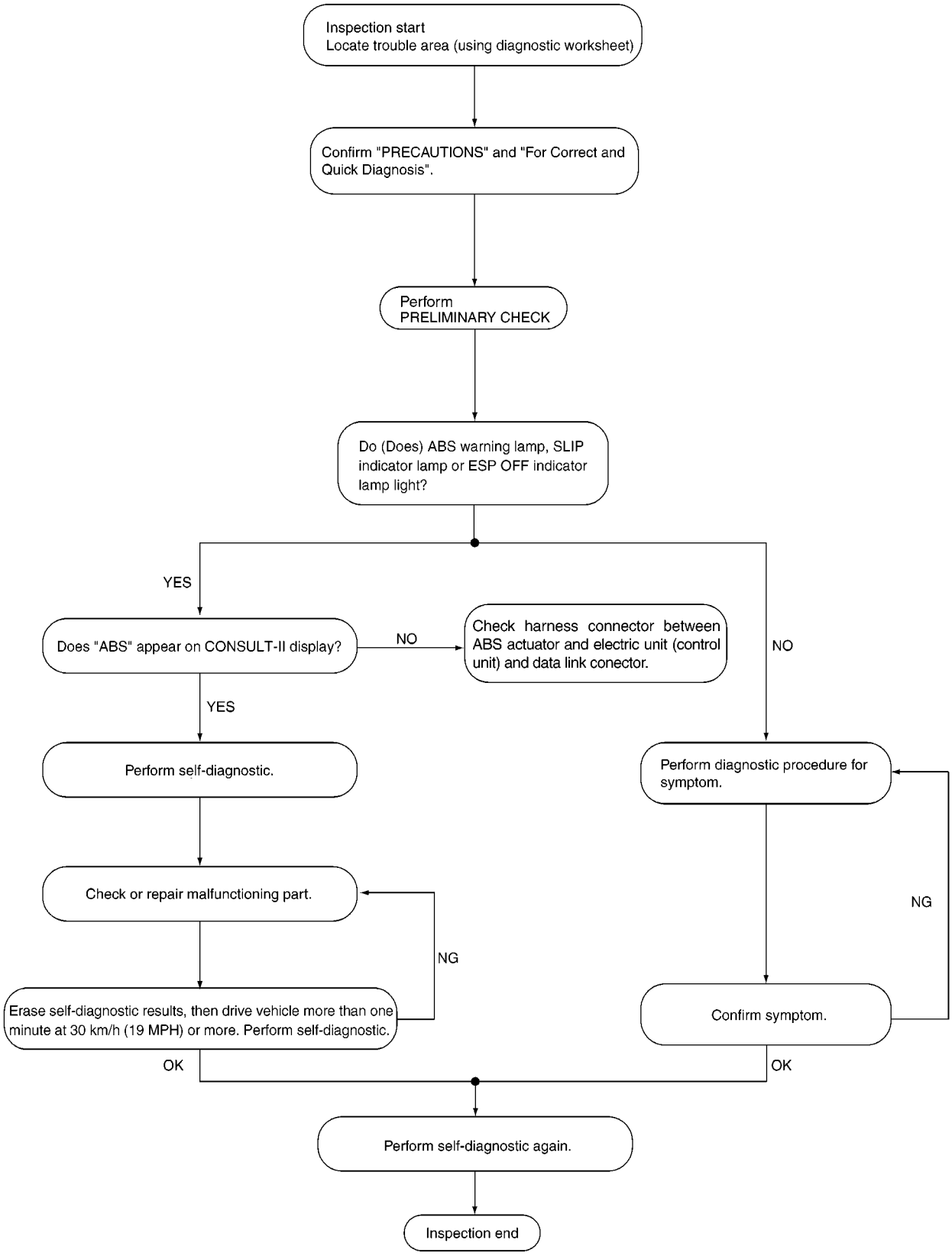
- It is essential to check symptoms right from beginning in order to repair a malfunction completely.
  For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairs are performed without any symptom check, no one can judge if malfunction has actually been eliminated.
- After diagnosis, make sure to carry out “erase memory”. Refer to BRC-75, "SELF-DIAGNOSIS" .
- For an intermittent malfunction, move harness or harness connector by hand to check poor contact or false open circuit.



SEF233G

- Always read “GI General Information” to confirm general precautions. Refer to GI-4, "General Precautions" .

DIAGNOSIS FLOWCHART



MFIA0017E

ASKING COMPLAINTS

- Complaints against malfunction vary depending on each person. It is important to clarify customer complaints.
- Ask customer about what symptoms are present and under what conditions. Use information to reproduce symptom while driving.
- It is also important to use diagnosis sheet so as not to miss information.

KEY POINTS

WHAT ..... Vehicle model
WHEN ..... Date, Frequencies
WHERE ..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SBR339B

EXAMPLE OF DIAGNOSIS SHEET

Customer name MR/MS	Model & Year	VIN	
Engine #	Trans.	Mileage	
Incident Date	Manuf. Date	In Service Date	
Symptoms	☐ Noise and vibration (from engine compartment) ☐ Noise and vibration (from axle)	☐ Warning / Indicator activate	☐ Firm pedal operation Large stroke pedal operation
	☐ TCS does not work (Rear wheels slip when accelerating)	☐ ABS does not work. (wheels slip when braking)	☐ Lack of sense of acceleration
Engine conditions	☐ When starting ☐ After starting		
Road conditions	☐ Low friction road (☐Snow ☐Gravel ☐Other) ☐ Bumps / potholes		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped		
Applying brake conditions	☐ Suddenly ☐ Gradually		
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions		

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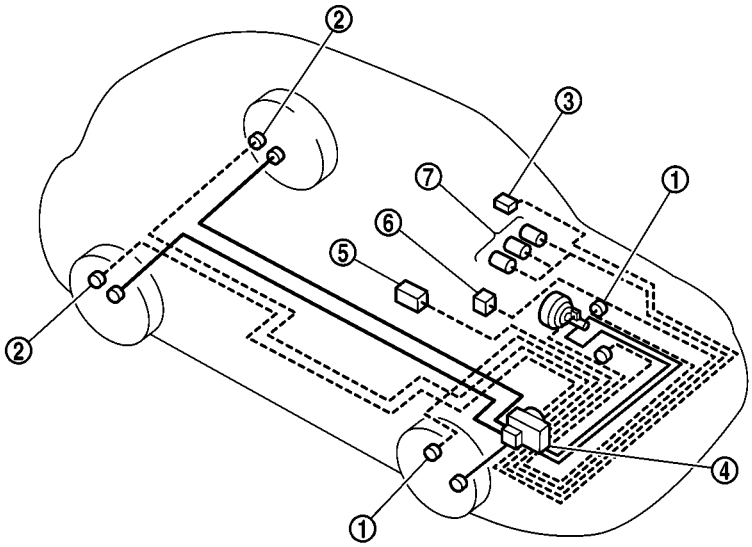
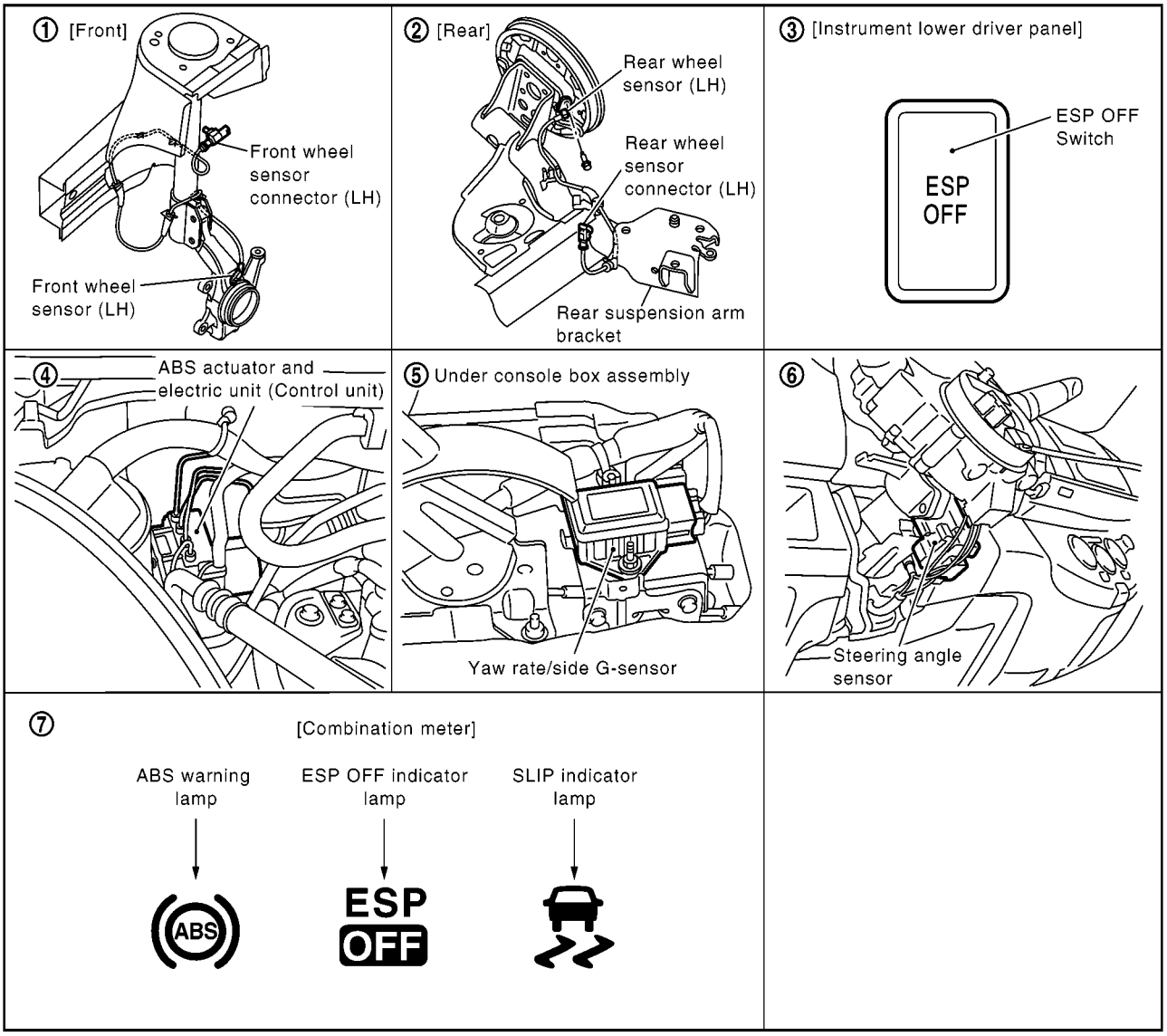
Component Installation Location

EFS004JS

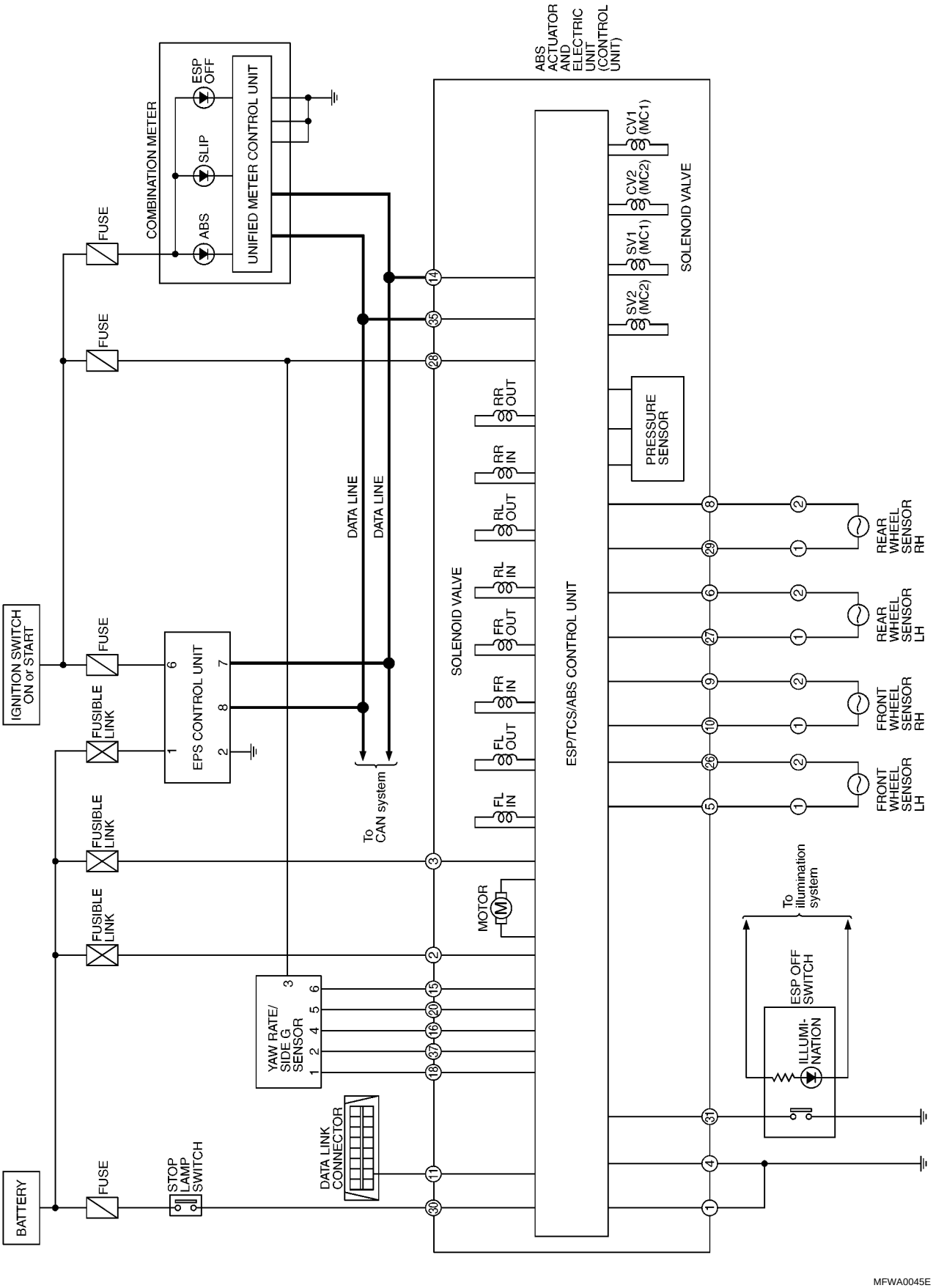




MFIA0011E

Schematic

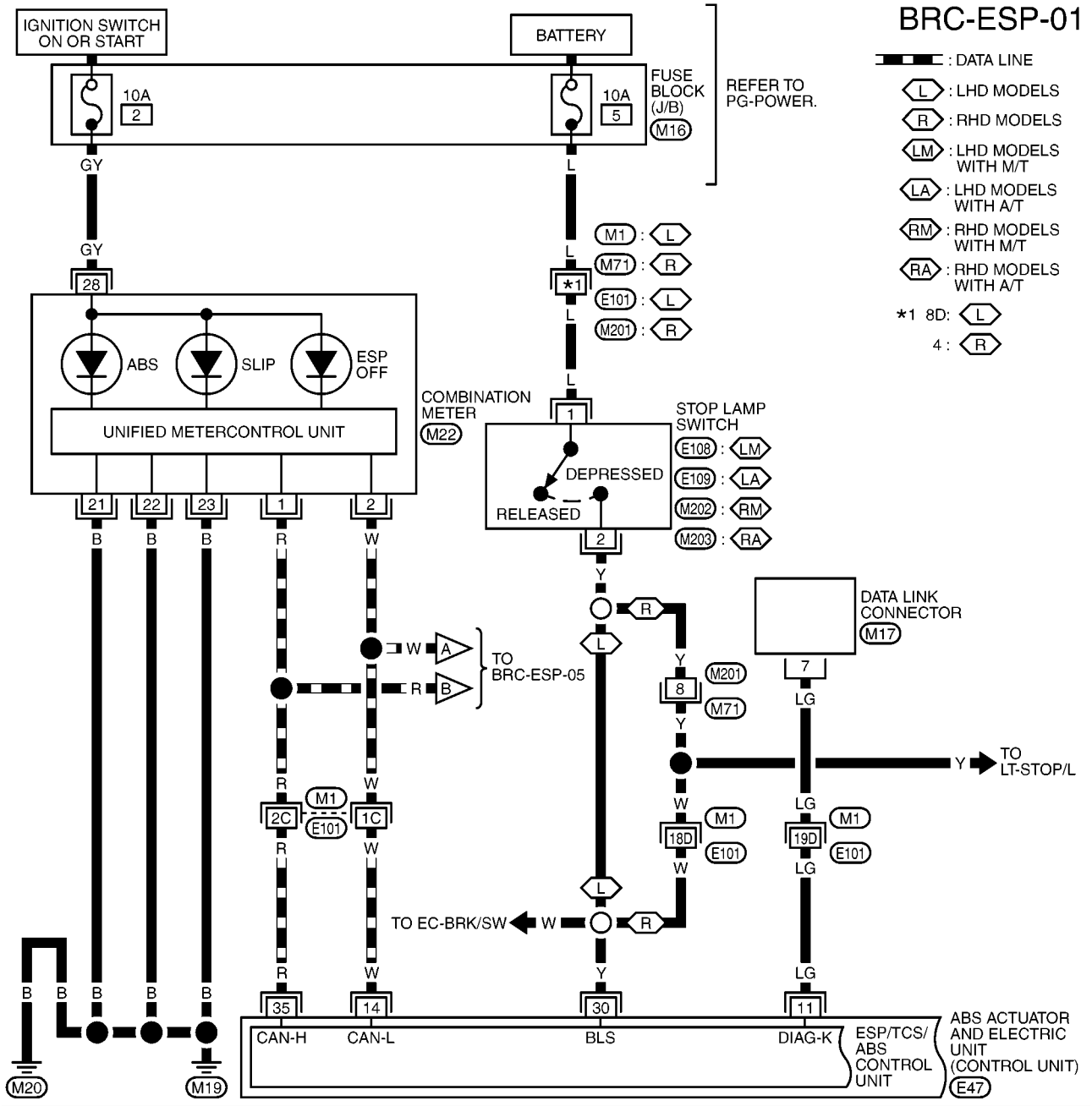
EFS004JT

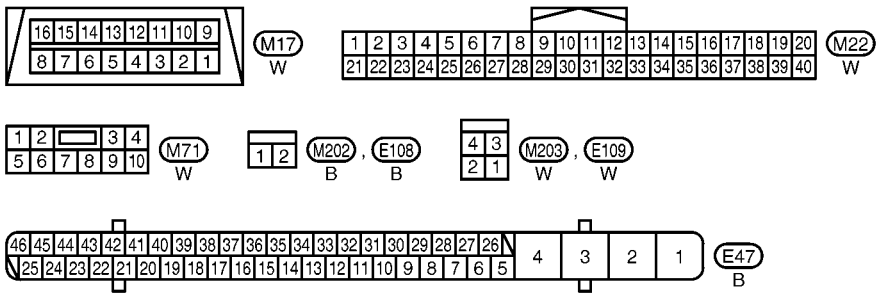


MFWA0045E

Wiring Diagram — ESP —

EFS004JU

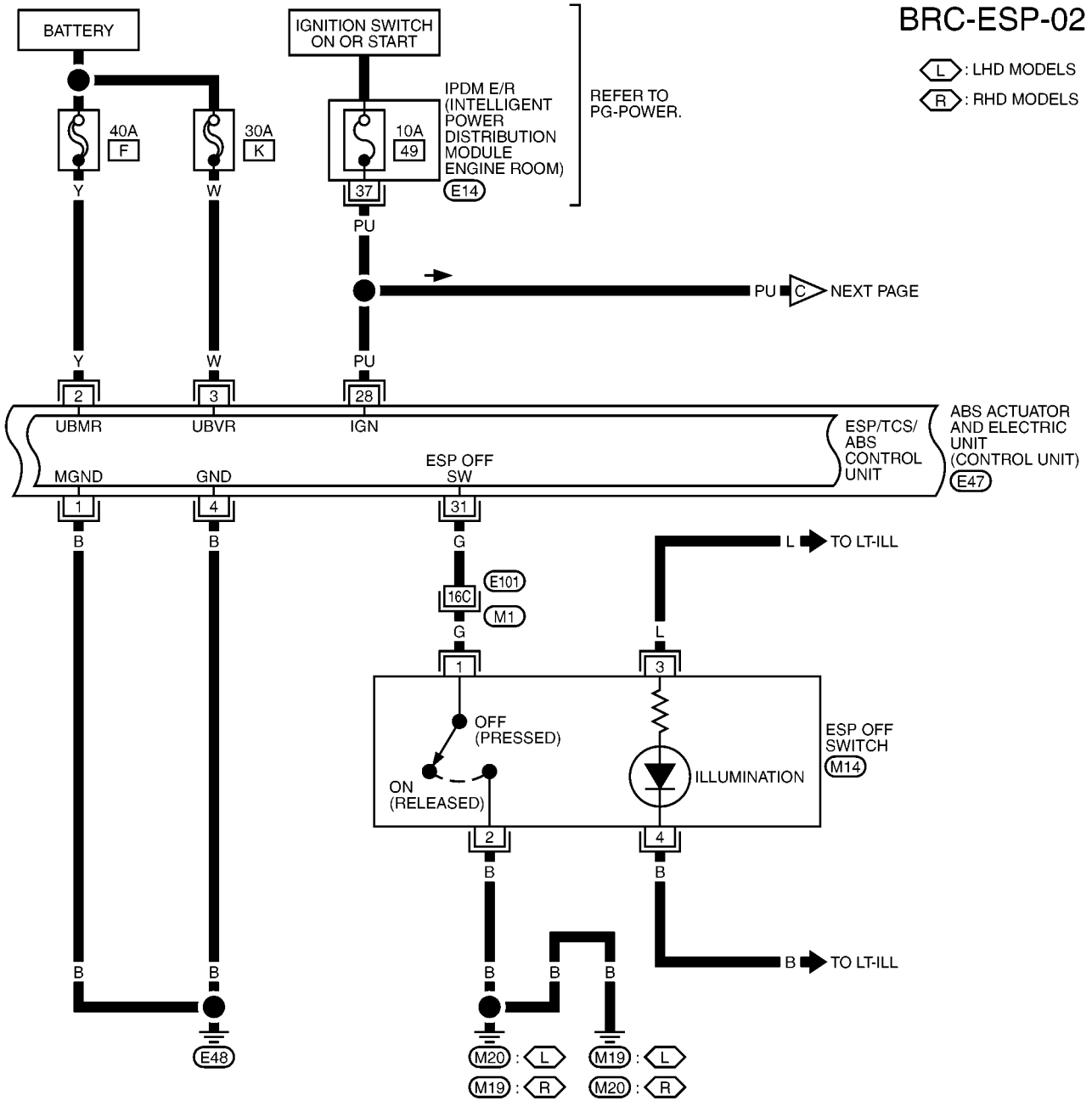


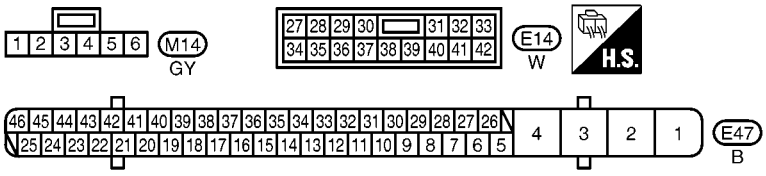


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK- JUNCTION BOX (J/B)

MFWA0046E

BRC-ESP-02

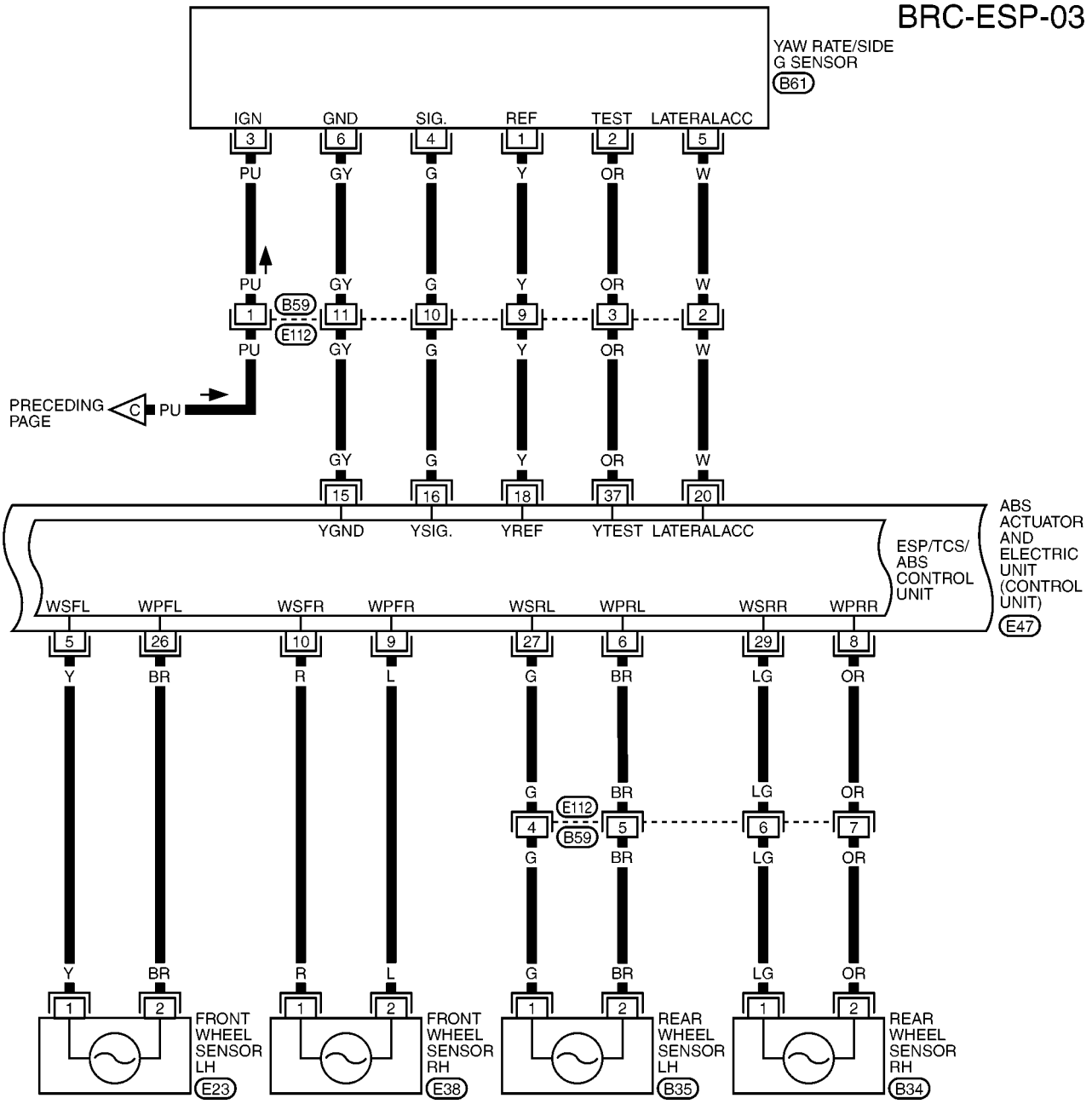


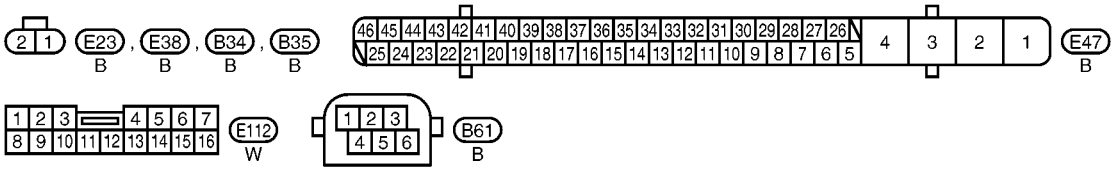


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MFWA0047E

BRC-ESP-03





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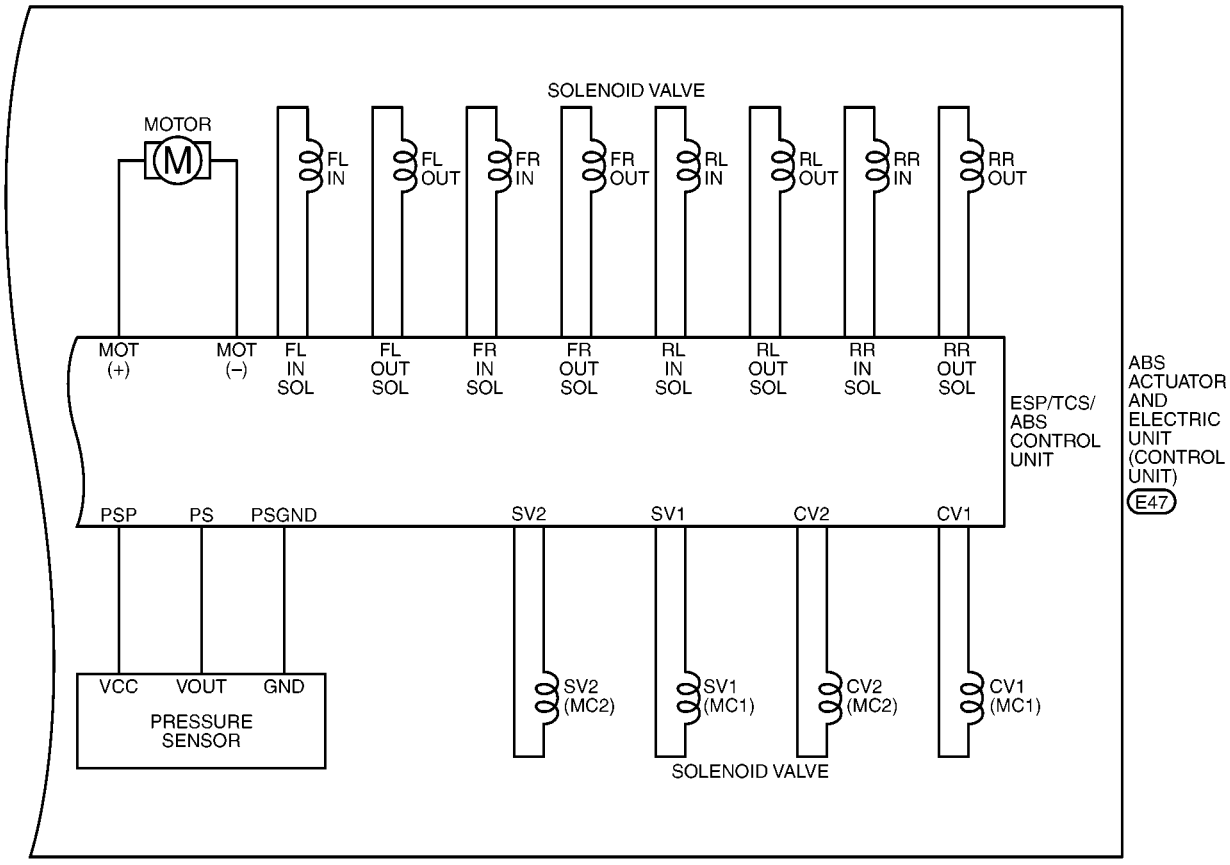
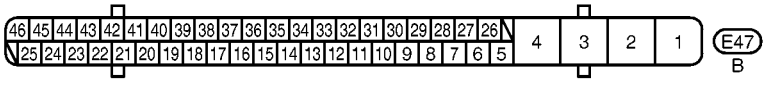

SOLENOID VALVE
MOTOR
M
FL IN
FL OUT
FR IN
FR OUT
RL IN
RL OUT
RR IN
RR OUT
MOT (+)
MOT (–)
FL IN SOL
FL OUT SOL
FR IN SOL
FR OUT SOL
RL IN SOL
RL OUT SOL
RR IN SOL
RR OUT SOL
ESP/TCS/ ABS CONTROL UNIT
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E47
PSP
PS
PSGND
SV2
SV1
CV2
CV1
VCC
VOUT
GND
PRESSURE SENSOR
SV2 (MC2)
SV1 (MC1)
CV2 (MC2)
CV1 (MC1)
SOLENOID VALVE


46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26
25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5
4 3 2 1
E47
B

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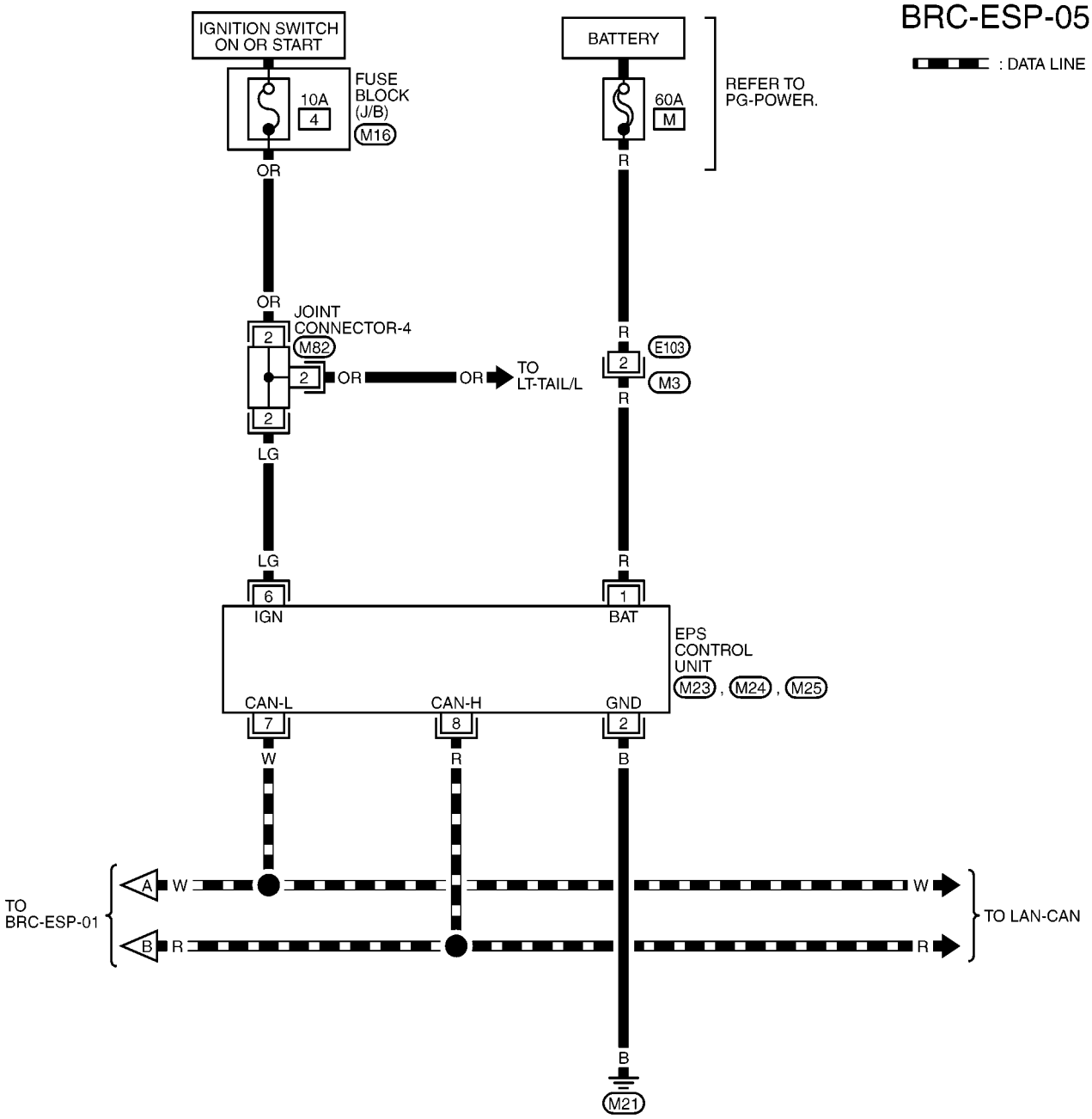
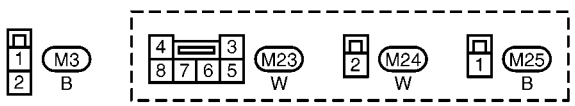
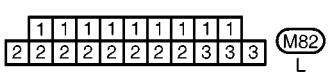
BRC-ESP-05







REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MFWA0050E

Control Unit Input/Output Signal Standard

EFS004JV

REFERENCE VALUE FROM CONSULT-II

CAUTION:

The display shows ABS actuator and electric unit (control unit) calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
GEAR	A/T gear position	1: 1st gear 2: 2nd gear 3: 3rd gear 4: 4th gear		—
FR RH SENSOR FR LH SENSOR RR RH SENSOR RR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]	BRC-85, "Inspection 1: Wheel Sensor System"
		Vehicle running (Note 1)	Almost in accordance with speedometer display (within ±10 %)	
ACCEL POS SIG	Open/close condition of throttle valve (linked with accelerator pedal).	Accelerator pedal is not depressed (ignition switch is ON)	0 %	EC section
		Accelerator pedal is depressed (ignition switch is ON)	0 to 100 %	
ENGINE SPEED	With engine running	With engine stopped	0 rpm	EC section
		Engine running	Almost in accordance with tachometer display	
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0 deg	BRC-89, "Inspection 4: Steering Angle Sensor System"
		Steering wheel turned	L600 to R600 deg	
YAW RATE SEN	Yaw rate detected by yaw rate sensor	Vehicle stopped	Approx. 0 d/s	BRC-90, "Inspection 5: Yaw Rate/Side G-Sensor System"
		Vehicle running	–200 to 200 d/s	
SIDE G-SENSOR	Transverse G detected by side G-sensor	Vehicle stopped	Approx. 0 G	BRC-90, "Inspection 5: Yaw Rate/Side G-Sensor System"
		Vehicle running	–1.8 to 1.8 G	
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar	BRC-89, "Inspection 3: ESP/TCS/ABS Control Unit System"
		With ignition switch turned ON and brake pedal depressed	–42.5 to 42.5 bar	
BATTERY VOLT	Battery voltage supplied to ABS actuator and electric unit (control unit)	Ignition switch ON	10 to 16 V	BRC-92, "Inspection 6: ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground System"
STOP LAMP SW	Brake pedal operation	Brake pedal is depressed	ON	BRC-94, "Inspection 7: Stop Lamp Switch System"
		Brake pedal is not depressed	OFF	
OFF SW	ESP OFF switch ON/OFF status	ESP OFF switch ON (When ESP OFF indicator lamp is ON)	ON	BRC-97, "ESP OFF SWITCH"
		ESP OFF switch OFF (When ESP OFF indicator lamp is OFF)	OFF	

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
ABS WARN LAMP	ABS warning lamp ON condition (Note 2)	ABS warning lamp ON	ON	BRC-85, "BASIC INSPECTION 3: ABS WARNING LAMP, ESP OFF INDICATOR LAMP and SLIP INDICATOR LAMP INSPECTION"
		ABS warning lamp OFF	OFF	
MOTOR RELAY	Operation status of motor and motor relay	Ignition switch ON or engine running (ABS not operated)	OFF	BRC-89, "Inspection 3: ESP/TCS/ABS Control Unit System"
		Ignition switch ON or engine running (ABS operated)	ON	
ACTUATOR RLY	Actuator relay operation status	Actuator (solenoid) is active	ON	BRC-89, "Inspection 3: ESP/TCS/ABS Control Unit System"
		When actuator relay is inactive (in fail-safe mode)	OFF	
OFF LAMP	ESP OFF indicator lamp status (Note 3)	When ESP OFF indicator lamp is ON	ON	BRC-85, "BASIC INSPECTION 3: ABS WARNING LAMP, ESP OFF INDICATOR LAMP and SLIP INDICATOR LAMP INSPECTION"
		When ESP OFF indicator lamp is OFF	OFF	
SLIP LAMP	SLIP indicator lamp status (Note 4)	When SLIP indicator lamp is ON	ON	
		When SLIP indicator lamp is OFF	OFF	
FR LH IN SOL FR LH OUT SOL FR RH IN SOL FR RH OUT SOL RR RH IN SOL RR RH OUT SOL RR LH IN SOL RR LH OUT SOL	Solenoid valve operation	Actuator (solenoid) is active (“ACTIVE TEST” with CONSULT-II) and actuator relay is active (ignition switch ON)	ON	BRC-89, "Inspection 3: ESP/TCS/ABS Control Unit System"
		When actuator (solenoid) is not active or actuator relay is inactive (in fail-safe mode)	OFF	
HSV [FL-RR] HSV [FR-RL] USV [FL-RR] USV [FR-RL]	ESP/TCS switch-over valve status	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT-II) and actuator relay is active (ignition switch ON)	ON	
		When actuator (switch-over valve) is not active or actuator relay is inactive (in fail-safe mode)	OFF	
FLUID LEV SW	ON/OFF status of brake fluid level switch	When brake fluid level switch ON	ON	BRC-96, "Inspection 8: Brake Fluid Level Switch System"
		When brake fluid level switch OFF	OFF	
EBD WARN LAMP	Brake warning lamp on condition (Note 5)	Brake warning lamp ON	ON	BRC-85, "BASIC INSPECTION 3: ABS WARNING LAMP, ESP OFF INDICATOR LAMP and SLIP INDICATOR LAMP INSPECTION"
		Brake warning lamp OFF	OFF	
PARK BRAKE SW	Condition of parking brake	When parking brake is applied	ON	—
		When parking brake is released	OFF	
CRANKING SIG	CRANKING status	Cranking	ON	—
		Not cranking	OFF	

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
CAN CIRC 1	CAN communication condition	CAN communications normal	OK	BRC-96, "Inspection 9: CAN Communication System"
		CAN communications error	UNKWN	
CAN CIRC 2		CAN communications normal	OK	
		CAN communications error	UNKWN	
CAN CIRC 3		CAN communications normal	OK	
		CAN communications error	UNKWN	
CAN CIRC 4		CAN communications normal	OK	
		CAN communications error	UNKWN	
CAN CIRC 5		CAN communications normal	OK	
		CAN communications error	UNKWN	
CAN 1 STAT (Note 6)	CAN communication condition	CAN communication normal	0	BRC-96, "Inspection 9: CAN Communication System"
		CAN communication error	40	
CAN 2 STAT		CAN communication normal	0	
		CAN communication error	40	
CAN 3 STAT		CAN communication normal	0	
		CAN communication error	40	
CAN 4 STAT		CAN communication normal	0	
		CAN communication error	40	
CAN 5 STAT		CAN communication normal	0	
		CAN communication error	40	

Note 1: Confirm tire pressure is normal.
Note 2: ON/OFF timing of ABS warning lamp
ON: Approx. Within 1.5 seconds after ignition switch is turned ON, or when a malfunction is detected.
OFF: Approx. 1.5 seconds after ignition switch is turned ON (when system is in normal operation) and ESP/TCS function is not activated.
Note 3: ON/OFF timing of ESP OFF indicator lamp
ON: Approx. Within 1.5 seconds after ignition switch is turned ON, or when a malfunction is detected and ESP OFF switch is ON.
OFF: Approx 1.5 seconds after ignition switch is turned ON (when system is in normal operation.) And when ESP OFF switch is OFF.
Note 4: SLIP indicator lamp ON/OFF timing
ON: Approx. Within 1.5 seconds after ignition switch is turned ON, or when a malfunction is detected and ESP/TCS function is activated while driving.
OFF: Approx. 1.5 seconds after ignition switch is turned ON (when system is in normal operation) and ESP/TCS function is not activated.
Blinking: ESP/TCS function is active during driving
Note 5: Serves as EBD warning lamp.
Note 6: CAN status indicates the condition of the CAN communication judged by each signal input.

- Normal: If any problems were not found in the past, CAN status indicated “0”. In case of operating properly at the present in spite of having problem in the past, then CAN status indicates “39-1”.
- Malfunction: If there is a malfunction, CAN indicates “40”.

After returning to normal condition, every time ignition switch is turned OFF from ON, the indication will change like “39”→ “38” → “37” ⋯ “1” and if a malfunction is detected again, CAN status indicates “40”. (Though returning to the normal condition, “0” is not indicated. To reset, select and press the “ERASE” on the “SEFL-DIAGNOSIS” screen.)

CONSULT-II Functions

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CAUTION:

- **Do not use the “function test” for diagnosis. For more information, refer to the separate volume “CONSULT-II OPERATION MANUAL (Function Test)”.**
- **When CONSULT-II is connected and communicating, ABS warning lamp, SLIP indicator lamp, and ESP OFF indicator lamp turn on, and when the communication is interrupted, the lamps will turn off after approximately 2 to 3 sec.**
- **When the self-diagnosis, data monitor, or active test functions are being executed, EBD, ABS, TCS, and ESP control is not performed.**
- **When using CONSULT-II to perform ABS actuator and electric unit (control unit) self-diagnosis, active test, work support, etc., first stop engine, connect CONSULT-II, and select “ABS”.**
- **When an error is shown by the CONSULT-II SELF-DIAG RESULTS and CONSULT-II is used to perform an active test, an engine system malfunction may be shown, but restarting engine will return the status to normal.**
- **When data monitoring is executed by using CONSULT-II, a malfunction code may be indicated as the result of the real time diagnosis. In such a case, execute data monitoring in manual mode. Refer to CONSULT-II Operation Manual.**

CONSULT-II FUNCTION APPLICATION TABLE (MAIN ITEMS)

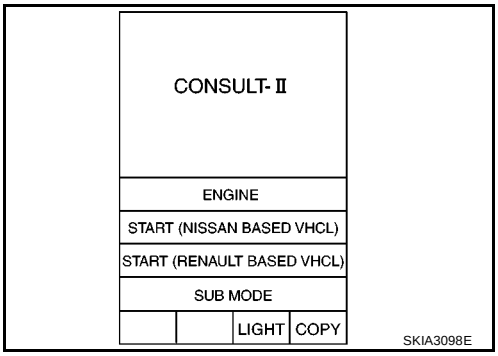
Item	Self-diagnosis	Data monitor	Active test
Wheel sensors	×	×	–
Wheel sensor rotor	×	–	–
Stop lamp switch	×	×	–
Solenoid valves	×	×	×
Switch-over solenoid valves (HSV, USV)	×	–	×
Yaw rate/side G-sensor	×	×	–
Pressure sensor	×	×	–
Steering angle sensor	×	×	–
Actuator relay	×	×	–
Motor relay	×	×	–
ABS warning lamp	–	×	–
Battery voltage	×	×	–
ABS actuator and electric unit (control unit)	×	–	–
ESP/TCS/ABS actuator motor	×	–	×
CAN communication	×	×	–
Engine speed signal	–	×	–
ESP OFF switch	–	×	–
ESP OFF indicator lamp	–	×	–
SLIP indicator lamp	–	×	–
Accel position signal	–	×	–
Gear	–	×	–
Brake fluid level switch	×	×	–
Engine signals	×	–	–
A/T signals	×	–	
EBD warning lamp	–	×	–

×:Applicable
–:Not applicable

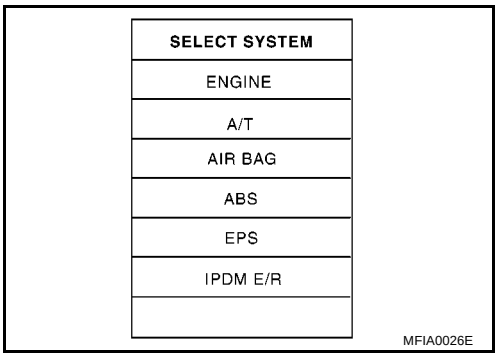
CONSULT-II BASIC OPERATION PROCEDURE

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.

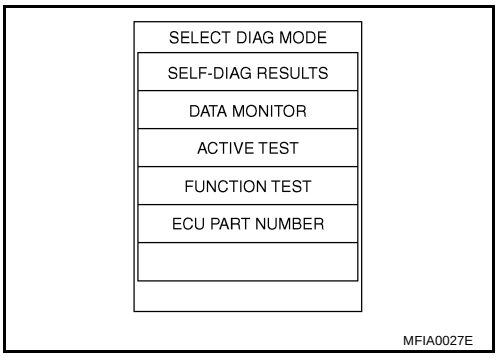
   CAUTION:
   If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



5. Touch “ABS” in the “SELECT SYSTEM” screen.
   If “ABS” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Select the required diagnostic location from the “SELECT DIAG MODE” screen.
   For further information, see CONSULT-II Operation Manual.



SELF-DIAGNOSIS

Description

- If an error is detected in the system, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp on the combination meter turn on. In this case, perform self-diagnosis as follows:
- While CONSULT-II is used, ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp may be turned on in a case of no malfunctioning.

Operation Procedure

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.

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

3. Turn ignition switch ON.
4. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.
5. After stopping vehicle, with the engine running, touch “START (NISSAN BASED VHCL)”, “ABS”, “SELF-DIAG RESULTS” in order on the CONSULT-II screen.

   CAUTION:
   If “START (NISSAN BASED VHCL)” is touched immediately after starting engine or turning on the ignition switch, “ABS” might not be displayed in the System Selection screen. In this case, repeat the operation from step 1. If it cannot be shown after several attempts, ABS actuator and electric unit (control unit) may have malfunctioned.
6. The self-diagnostic results are displayed. (If necessary, the self-diagnostic results can be printed out by touching “PRINT”.)
   - When “NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.” is displayed, check ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp.
7. Perform the appropriate inspection from the display item list, and repair or replace the malfunctioning component.
8. Drive the vehicle at approximately 30 km/h (19 MPH) for approximately 1 minute.

   CAUTION:
   - **In a case that a wheel sensor is malfunctioning, ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp will turn on. If vehicle is not driven at approximately 30 km/h (19 MPH) for at least approximately 1 minute after repair of the wheel sensor system, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp may not turn off even if everything is normal. Check again to make sure that there is no malfunction on other parts.**
9. Turn ignition switch OFF to prepare for erasing the memory.
10. Start engine and touch “START (NISSAN BASED VHCL)”, “ABS”, “SELF-DIAG RESULTS”, “ERASE” in order on the CONSULT-II screen to erase the error memory.
    If “ABS” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .

    CAUTION:
    If the error memory is not erased, re-perform the operation from step 5.
11. For the final inspection, drive at approximately 30 km/h (19 MPH) for approximately 1 minute and confirm that ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp are OFF.

Display Item List

Self-diagnostic item	Malfunction detecting condition	Check system
FR LH SENSOR [C101F]	Circuit of front LH wheel sensor is open, shorted or sensor power voltage is unusual.	BRC-85, "Inspection 1: Wheel Sensor System"
RR RH SENSOR [C102F]	Circuit of rear RH wheel sensor is open, shorted or sensor power voltage is unusual.	
FR RH SENSOR [C100F]	Circuit of front RH wheel sensor is open, shorted or sensor power voltage is unusual.	
RR LH SENSOR [C103F]	Circuit of rear LH wheel sensor is open, shorted or sensor power voltage is unusual.	
FR LH SENSOR ROTOR [C1042]	ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
RR RH SENSOR ROTOR [C1043]	ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
FR RH SENSOR ROTOR [C1041]	ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
RR LH SENSOR ROTOR [C1044]	ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
STOP LAMP SW CIRC [C10C6]	Stop lamp switch is fixed at “ON” position.	BRC-94, "Inspection 7: Stop Lamp Switch System"

Self-diagnostic item	Malfunction detecting condition	Check system
STOP LAMP OR CONT [C10C6]	Stop lamp switch circuit is open or shorted, or controller failure.	BRC-94, "Inspection 7: Stop Lamp Switch System"
ST ANG SEN [C1158]	Neutral position of steering angle sensor is dislocated, or steering angle sensor is malfunctioning initialize of steering angle sensor is not completed.	BRC-89, "Inspection 4: Steering Angle Sensor System"
YAW RATE/G-SEN [C10F4]	Yaw rate/G-sensor has generated an error, or yaw rate/G-sensor signal line is open or shorted.	BRC-90, "Inspection 5: Yaw Rate/Side G-Sensor System"
ABS SENSOR [C1046]	Wheel sensor input is malfunction or wheel sensor power voltage is too low.	BRC-85, "Inspection 1: Wheel Sensor System" (Note 1)
BATTERY VOLTAGE [C10CC]	Supply voltage for ABS actuator and electric unit (control unit) is too low or too high, or abnormal.	BRC-92, "Inspection 6: ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground System"
CONTROLLER FAILURE [C10C3]	Internal malfunction of ABS actuator and electric unit (control unit)	BRC-89, "Inspection 3: ESP/TCS/ABS Control Unit System"
CAN COMM CIRCUIT [U1000]	● CAN communication line is open or shorted. ● ABS actuator and electric unit (control unit) internal malfunction ● Battery voltage for ECM is suddenly interrupted for approximately 0.5 seconds or more.	BRC-96, "Inspection 9: CAN Communication System" (Note 1)
ECM [C1180]	● CAN communication line is open or shorted. ● CAN communication signal form ECM cannot be received.	BRC-88, "Inspection 2: Engine System", BRC-96, "Inspection 9: CAN Communication System"
AT [C1188]	● CAN communication line is open or shorted. ● CAN communication signal from TCM cannot be received.	BRC-96, "Inspection 9: CAN Communication System"
BR FLUID LEVEL LOW [C1155]	Brake fluid level drops or circuit between ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted.	BRC-96, "Inspection 8: Brake Fluid Level Switch System"

Note 1: If multiple malfunctions are detected including CAN communication line [U1000], perform diagnosis for CAN communication line first.

DATA MONITOR

Operation Procedure

1. After turning OFF ignition switch, connect CONSULT-II and CONVERTER to data link connector.

   CAUTION:
   If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.
2. Turn ignition switch ON.
3. Touch “START (NISSAN BASED VHCL)”, “ABS”, “DATA MONITOR” in order on the CONSULT-II screen. If “ABS” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .

   CAUTION:
   When “START (NISSAN BASED VHCL)” is touched immediately after starting engine or turning on ignition switch, “ABS” might not be displayed in the system selection screen. In this case, repeat the operation from step 1.
4. Return to the Monitor Item Selection screen, and touch “ECU INPUT SIGNALS”, “MAIN SIGNALS” or “SELECTION FROM MENU”. Refer to the following information.
5. When “START” is touched, the data monitor screen is displayed.

Display Item List

Item (Unit)	Data monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
GEAR	×	×	×	–	Gear position judged by PNP switch signal is displayed.
FR RH SENSOR (km/h, MPH)	×	×	×	–	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR (km/h, MPH)	×	×	×	–	Wheel speed calculated by front LH wheel sensor signal is displayed.
RR RH SENSOR (km/h, MPH)	×	×	×	–	Wheel speed calculated by rear RH wheel sensor signal is displayed.
RR LH SENSOR (km/h, MPH)	×	×	×	–	Wheel speed calculated by rear LH wheel sensor signal is displayed.
BATTERY VOLT (V)	×	×	×	–	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.
ACCEL POS SIG (%)	–	–	×	–	Throttle valve open/close status judged by CAN communication signal is displayed.
ENGINE SPEED (rpm)	–	–	×	–	Engine speed judged by CAN communication signal is displayed.
STR ANGLE SIG (deg)	–	–	×	–	Steering angle detected by steering angle sensor is displayed.
YAW RATE SEN (d/s)	–	–	×	–	Yaw rate detected by yaw rate sensor is displayed.
SIDE G-SENSOR (G)	–	–	×	–	Lateral acceleration detected by side G-sensor is displayed.
PRESS SENSOR (bar)	–	–	×	–	Brake fluid pressure detected by pressure sensor is displayed.
STOP LAMP SW (ON/OFF)	–	–	×	–	Stop lamp switch (ON/OFF) status is displayed.
OFF SW (ON/OFF)	–	–	×	–	ESP OFF switch (ON/OFF) status is displayed.
ABS WARN LAMP (ON/OFF)	–	×	×	–	ABS warning lamp (ON/OFF) status is displayed.
SLIP LAMP (ON/OFF)	–	–	×	–	SLIP indicator lamp (ON/OFF) status is displayed.
FR LH IN SOL (ON/OFF)	–	×	×	–	Front LH IN ABS solenoid (ON/OFF) status is displayed.
FR LH OUT SOL (ON/OFF)	–	×	×	–	Front LH OUT ABS solenoid (ON/OFF) status is displayed.
RR RH IN SOL (ON/OFF)	–	×	×	–	Rear RH IN ABS solenoid (ON/OFF) status is displayed.
RR RH OUT SOL (ON/OFF)	–	×	×	–	Rear RH OUT ABS solenoid (ON/OFF) status is displayed.
FR RH IN SOL (ON/OFF)	–	×	×	–	Front RH IN ABS solenoid (ON/OFF) status is displayed.

Item (Unit)	Data monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
FR RH OUT SOL (ON/OFF)	–	×	×	–	Front RH OUT ABS solenoid (ON/OFF) status is displayed.
RR LH IN SOL (ON/OFF)	–	×	×	–	Rear LH IN ABS solenoid (ON/OFF) status is displayed.
RR LH OUT SOL (ON/OFF)	–	×	×	–	Rear LH OUT ABS solenoid (ON/OFF) status is displayed.
OFF LAMP (ON/OFF)	–	–	×	–	OFF Lamp (ON/OFF) status is displayed.
MOTOR RELAY (ON/OFF)	–	×	×	–	ABS motor relay signal (ON/OFF) status is displayed.
ACTUATOR RLY (ON/OFF)	–	×	×	–	ABS actuator relay signal (ON/OFF) status is displayed.
HSV [FL-RR] (ON/OFF)	–	–	×	–	Primary side switch-over solenoid valve 1 (cut valve 1) (ON/OFF) status is displayed.
HSV [FR-RL] (ON/OFF)	–	–	×	–	Secondary side switch-over solenoid valve 2 (cut-valve 2) (ON/OFF) status is displayed.
USV [FL-RR] (ON/OFF)	–	–	×	–	Primary side switch-over solenoid valve 1 (suction valve 1) (ON/OFF) status is displayed.
USV [FR-RL] (ON/OFF)	–	–	×	–	Secondary side switch-over solenoid valve 2 (suction valve 2) (ON/OFF) status is displayed.
FLUID LEV SW (ON/OFF)	–	–	×	–	Brake fluid level switch (ON/OFF) status is displayed.
EBD WARN LAMP (ON/OFF)	–	–	×	–	Brake warning lamp (ON/OFF) status is displayed. (Note 1)
CRANKING SIG (ON/OFF)	–	–	×	–	Cranking condition (ON/OFF) status is displayed.
PARK BRAKE SW (ON/OFF)	–	–	×	–	Park brake operation (ON/OFF) status is displayed.
CAN CIRC 1 (OK/UNKWN)	–	–	–	×	CAN communication signal (OK/UNKWN) status is displayed.
CAN CIRC 2 (OK/UNKWN)	–	–	–	×	
CAN CIRC 3 (OK/UNKWN)	–	–	–	×	
CAN CIRC 4 (OK/UNKWN)	–	–	–	×	
CAN CIRC 5 (OK/UNKWN)	–	–	–	×	

Item (Unit)	Data monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
CAN 1 STAT (0 - 40)	–	–	–	×	CAN communication line (0 - 40) status is displayed.
CAN 2 STAT (0 - 40)	–	–	–	×	
CAN 3 STAT (0 - 40)	–	–	–	×	
CAN 4 STAT (0 - 40)	–	–	–	×	
CAN 5 STAT (0 - 40)	–	–	–	×	

×:Applicable
–:Not applicable
Note 1: Serves as EBD warning lamp.
Note 2: CAN status indicates the condition of the CAN communication judged by each signal input.

- Normal: If any problems were not found in the past, CAN status indicated “0”. In case of operating properly at the present in spite of having problem in the past, then CAN status indicates “39-1”.
- Malfunction: If there is a malfunction, CAN indicates “40”.

After returning to normal condition, every time ignition switch is turned OFF from ON, the indication will change like “39”→ “38” → “37” ⋯ “1” and if a malfunction is detected again, CAN status indicates “40”. (Though returning to the normal condition, “0” is not indicated. To reset, select and press the “ERASE” on the “SEFL-DIAGNOSIS” screen.)

ACTIVE TEST

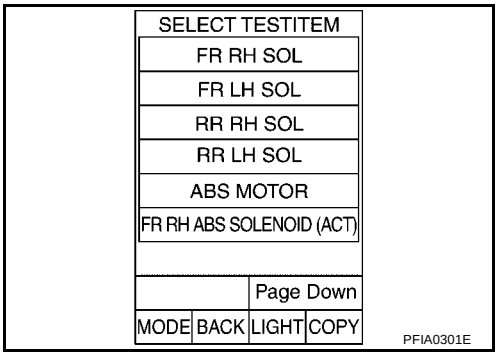
CAUTION:

- **Do not perform active test while driving.**
- **Make sure to completely bleed air from the brake system.**
- **Active test cannot be performed when EBD, ABS, TCS or ESP operation is malfunction.**
- **ABS and brake warning lamps turn on during the active test.**

Operation Procedure

1. Connect CONSULT-II and CONVERTER to data link connector and start engine.

   CAUTION:
   If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.
2. Touch “START (NISSAN BASED VHCL) ” on the display screen.
3. Touch “ABS”.
   If “ABS” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .
4. Touch “ACTIVE TEST”.
5. The test item selection screen is displayed.
6. Touch necessary test item.



7. With the “MAIN SIGNALS” display shown in reverse, touch “START”.
8. The “ACTIVE TEST” screen will be displayed, so perform the following test.

Solenoid Valve Operation Chart

Operation	ABS solenoid valve			ABS solenoid valve (ACT)		
	UP	KEEP	DOWN	UP	ACTUATOR UP	ACTUATOR KEEP
FR RH SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLENOID (ACT)	OFF	OFF	OFF	OFF	ON*	OFF
FR LH ABS SOLENOID (ACT)	OFF	OFF	OFF	OFF	ON	ON
RR RH ABS SOLENOID (ACT)	OFF	OFF	OFF	OFF	ON*	OFF
RR RL ABS SOLENOID (ACT)	OFF	OFF	OFF	OFF	ON	ON

*: ON for 1 to 2 seconds after the touch, and then OFF

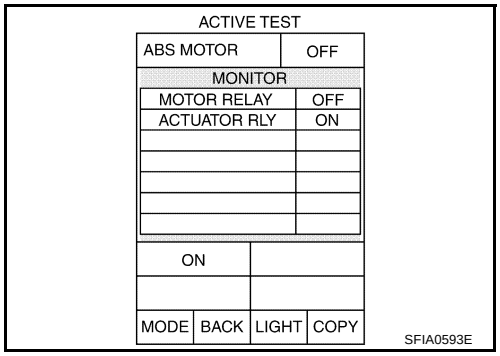
NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- “TEST IS STOPPED” is displayed approximately 10 seconds after operation starts.
- After “TEST IS STOPPED” is displayed, touch “BACK” and conduct the test from the Step 8.

ABS Motor

Touch “ON” and “OFF” on the screen. Make sure ABS motor relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RELAY	ON	ON



NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- “TEST IS STOPPED” is displayed approximately 10 seconds after operation starts.

For Fast and Accurate Diagnosis

EFS004JX

PRECAUTIONS FOR DIAGNOSIS

- Before performing diagnosis, always read precautions. Refer to BRC-61, "How to Proceed With Diagnosis" .
- If ABS actuator and electric unit (control unit), steering angle sensor, steering system parts or suspension system parts have been replaced, or if alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to BRC-50, "Adjustment of Steering Angle Sensor Neutral Position" .
- After diagnosis is finished, be sure to erase memory. Refer to BRC-75, "SELF-DIAGNOSIS" .
- When checking continuity and voltage between units, be sure to check for disconnection, looseness, bend, or collapse of connector terminals. If any malfunction is found, repair or replace connector terminals.
- For intermittent symptoms, possible cause is malfunction in harness, harness connector, or terminals. Move harness, harness connector, and terminals to check for poor connections.
- If a circuit tester is used for the check, be careful not to forcibly extend any connector terminal.
- To use CONSULT-II to perform self-diagnosis of ABS actuator and electric unit (control unit), active tests, or work support, first stop work, then connect CONSULT-II and select “ABS”.
- While self-diagnostic results of CONSULT-II shows malfunction, if CONSULT-II active test is performed, an engine system error may be indicated. In this case, start engine to resume the normal screen.
- ESP/TCS/ABS system electronically controls brake operation and engine output. The following symptoms may be caused by normal operations:

Symptom	Symptom description	Result
Motor operation noise	This is noise of motor inside ABS actuator and electric unit (control unit). Slight noise may occur during ESP, TCS, and ABS operation.	Normal
	When the vehicle speed goes over 10 km/h (6 MPH), motor and valves operating noise may be heard. It happens only once after IGN (ignition) is ON. This is a normal status of the system operation check.	
System operation check noise	When engine starts, slight “click” noise may be heard from engine room. This is normal and is part of system operation check.	Normal
ESP/TCS operation (SLIP indicator lamp blinking)	TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when up/downshifting, or when fully depressing accelerator pedal.	Normal Cancel the ESP/TCS function for the inspection on a chassis dynamometer.
	For inspection of speedometer or other instruments, press ESP OFF SW to turn ESP/TCS function off.	
	When accelerator pedal is depressed on a chassis dynamometer, vehicle speed will not increase. This is not normal. It is result of TCS being activated by stationary front wheels. Warning lamp may also illuminate to indicate “sensor system error”. This is also normal, and is the result of the stationary front wheels being detected. To be certain, restart engine, and drive vehicle at 30 km/h (19 MPH) or above. Make sure warning lamp does not illuminate.	
ABS operation (Longer stopping distance)	On roads with low friction coefficients, such as snowy roads or gravel roads, vehicles with ABS may require a longer stopping distance. Therefore, when driving on such roads, avoid overconfidence and keep speed sufficiently low.	Normal
Insufficient feeling of acceleration	Depending on road conditions, driver may feel that feeling of acceleration is insufficient. This is because traction control, which controls engine and brakes to achieve optimal traction, has the highest priority (for safety). As a result, there may be times when acceleration is slightly less than usual for the same accelerator pedal operation.	Normal

ON and OFF Timing for ABS Warning Lamp, ESP OFF Indicator Lamp, SLIP Indicator Lamp, Brake Warning Lamp

×: ON –: OFF

Condition	ABS warning lamp	ESP OFF indicator lamp	SLIP indicator lamp	Remarks
Ignition SW OFF.	–	–	–	—
Approx. 1.5 seconds after ignition switch is turned ON.	×	×	×	—
Approx. 1.5 seconds later after ignition switch ON.	–	–	–	Go out 1.5 seconds after ignition switch is turned ON.
ESP OFF SW is turned ON. (ESP/TCS function is OFF.)	–	×	–	—
ESP/TCS/ABS error.	×	×	×	There is an ABS actuator and electric unit (control unit) error. (Power, ground or system malfunction)
When ESP/TCS is not functioning normally.	–	×	×	—

NOTE:

1. Brake warning lamp will turn on in case of operating parking brake (switch turned on) or of actuating brake fluid level switch (brake fluid is insufficient).

Basic Inspection

SMA for VIN >SJN**AK12U1072423

EFS004JY

BASIC INSPECTION 1: BRAKE FLUID AMOUNT, LEAKS, AND BRAKE PADS INSPECTION

1. Check fluid level in the brake reservoir tank. If fluid level is low, refill brake fluid.
2. Check brake piping and around ABS actuator and electric unit (control unit) for leaks. If there is leaking or oozing fluid, check the following items.
   - If ABS actuator and electric unit (control unit) connection is loose, tighten piping to the specified torque and re-perform the leak inspection to make sure there are no leaks.
   - If there is damage to the connection flare nut or ABS actuator and electric unit (control unit) screw, replace the damaged part and re-perform the leak inspection to make sure there are no leaks.
   - When there is fluid leaking or oozing from a part other than ABS actuator and electric unit (control unit) connection, if fluid is just oozing out, use a clean cloth to wipe off the oozing fluid and re-check for leaks. If fluid is still oozing out, replace the damaged part.
   - When there is fluid leaking or oozing at ABS actuator and electric unit (control unit), if fluid is just oozing out, use a clean cloth to wipe off oozing fluid and re-check for leaks. If fluid is still oozing out, replace ABS actuator and electric unit (control unit) body.

     CAUTION:
     ABS actuator and electric unit (control unit) body cannot be disassembled.
3. Check brake pad degree of wear. Refer to BR-21, "FRONT DISC BRAKE" and BR-27, "REAR DRUM BRAKE" .

BASIC INSPECTION 2: POWER SYSTEM TERMINAL LOOSENESS AND BATTERY INSPECTION

Make sure battery positive cable, negative cable and ground connection are not loose. If looseness is detected, tighten the cables. In addition, check the battery voltage to make sure it has not dropped and alternator is normal.

BASIC INSPECTION 3: ABS WARNING LAMP, ESP OFF INDICATOR LAMP AND SLIP INDICATOR LAMP INSPECTION

1. Make sure ABS warning lamp, ESP OFF indicator lamp (when ESP OFF switch is OFF), and SLIP indicator lamp turns on approximately 1.5 second when ignition switch is turned ON. If they do not, check ESP OFF indicator lamp and then ESP OFF switch. Refer to BRC-97, "ESP OFF SWITCH" . Check CAN communications. Refer to “CAN Communication Inspection”. If there are no errors with ESP OFF switch and CAN communication system, check combination meter. Refer to DI-5, "COMBINATION METERS" .
2. Make sure ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp turn off approximately 1.5 second after turn ignition switch ON. If lamps do not turn off, perform self-diagnosis.
3. With engine running, make sure ESP OFF indicator lamp turns on and off when ESP OFF switch is turned ON and OFF. If indicator lamp status does not correspond to switch operation, check the ESP OFF switch system. Refer to BRC-97, "ESP OFF SWITCH" .
4. Make sure ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp turn off 1.5 seconds after engine is started. If ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp have not turned off 10 seconds after engine has been started, perform self-diagnosis of ABS actuator and electric unit (control unit).
5. After performing the self-diagnosis, be sure to erase the error memory. Refer to BRC-75, "SELF-DIAGNOSIS" .

Inspection 1: Wheel Sensor System

EFS004JZ

DTC C100F-C103F, C1041-C1043, C1046

After using the CONSULT-II SELF-DIAG RESULTS to determine the location of the malfunctioning wheel sensor, check all areas to determine the component to be replaced.

CAUTION:

- **Do not measure the resistance value and also voltage between sensor terminal with tester etc., because sensor is an active sensor.**
- **Do not expand terminal of connector with a tester terminal stick, when it does the inspection with tester.**

INSPECTION PROCEDURE

1. CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear, and size within the standard values?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

2. CHECK SENSOR AND SENSOR ROTOR

- Check the condition of the sensor mount (for looseness, etc.).
- Check the surface of front sensor rotor rubber for damage.
- Check rear sensor rotor for damage.

OK or NG

OK >> GO TO 3.
NG >> Repair sensor mount or replace sensor rotor.

3. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnosis results
FR RH SENSOR
FR LH SENSOR
RR RH SENSOR
RR LH SENSOR
FR RH SENSOR ROTOR
FR LH SENSOR ROTOR
RR RH SENSOR ROTOR
RR LH SENSOR ROTOR

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 4.
NO >> INSPECTION END.

4. CHECK CONNECTOR

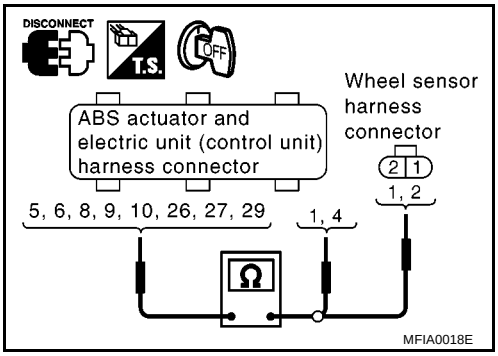
1. Disconnect ABS actuator and electric unit (control unit) connector E47 and malfunctioning wheel sensor connector E23 (FR-LH), E38 (FR-RH), B35 (RR-LH) or B34 (RR-RH). Check terminal for deformation, open circuit, poor contact, etc., and repair or replace if any malfunctioning condition is found.
2. Reconnect connectors, drive at a speed of approximately 30 km/h (19 MPH) for approximately 1minute, and perform self-diagnosis.

OK or NG

OK >> Connector terminal contact is loose, damaged, open or shorted.
NG >> GO TO 5.

5. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E23 (FR-LH), E38 (FR-RH), B34 (RR-RH) or B35 (RR-LH) and ABS actuator and electric unit (control unit) connector E47.
2. Check continuity between terminals. (Also check the continuity when steering wheel is turned right and left and when sensor harness inside wheel well is moved.)



	Power system		Signal system		Ground system	
Wheel	ABS actuator and electric unit (control unit) harness connector E47	Wheel sensor harness connector E23, E38, B35 or B34	ABS actuator and electric unit (control unit) harness connector E47	Wheel sensor harness connector E23, E38, B35 or B34	ABS actuator and electric unit (control unit) harness connector E47 (signal)	ABS actuator and electric unit (control unit) harness connector E47 (ground)
Front RH (E38)	9 (L)	2 (L)	10 (R)	1 (R)	10 (R), 9 (L)	1 (B), 4 (B)
Front LH (E23)	26 (BR)	2 (BR)	5 (Y)	1 (Y)	26 (BR), 5 (Y)	
Rear RH (B34)	8 (OR)	2 (OR)	29 (LG)	1 (LG)	8 (OR), 29 (LG)	
Rear LH (B35)	6 (BR)	2 (BR)	27 (G)	1 (G)	6 (BR), 27 (G)	

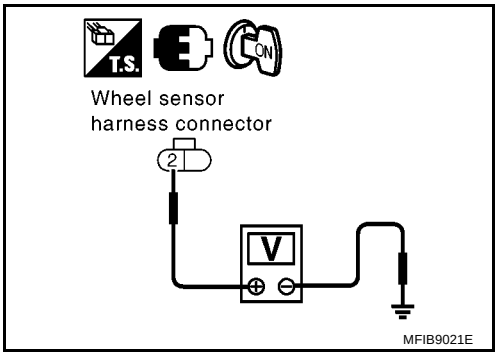
Power system : Continuity should exist.
Signal system : Continuity should exist.
Ground system : Continuity should not exist.

OK or NG

OK >> GO TO 6.
NG >> Repair harness and connector between ABS actuator and electric unit (control unit) and wheel sensor.

6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Connect ABS actuator and electric unit (control unit) connector E47.
2. Turn ignition switch ON and check voltage between malfunctioning wheel sensor harness connector power terminal and ground.



Voltage		
Front RH wheel sensor (Harness connector E38)	**2 (L) - Ground**	**8 V or more**
Front LH wheel sensor (Harness connector E23)	**2 (BR) - Ground**	**8 V or more**
Rear RH wheel sensor (Harness connector B34)	**2 (OR) - Ground**	**8 V or more**
Rear LH wheel sensor (Harness connector B35)	**2 (BR) - Ground**	**8 V or more**

OK or NG

OK >> Replace wheel sensor.
NG >> Replace ABS actuator and electric unit (control unit).

Inspection 2: Engine System

EFS004K0

DTC C1180

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
ECM

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.
NO >> INSPECTION END

2. CHECK ENGINE SYSTEM

1. Perform an ECM self-diagnosis refer to EC-69, "TROUBLE DIAGNOSIS" (with EURO-OBD), EC-515, "TROUBLE DIAGNOSIS" (without EURO-OBD) and repair or replace malfunctioning items. Re-perform ECM self-diagnosis.
2. Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

OK or NG

OK >> INSPECTION END
NG >> Repair or replace malfunctioning items. Re-perform the self-diagnosis.

Inspection 3: ESP/TCS/ABS Control Unit System

EFS004K1

DTC C10C3

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
CONTROLLER FAILURE

Is the above displayed in the self-diagnosis display items?

YES >> Replace ABS actuator and electric unit (control unit). Re-perform the self-diagnosis.
NO >> INSPECTION END

Inspection 4: Steering Angle Sensor System

EFS004K3

DTC C1158

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS-1

Check the self-diagnostic results.

Self-diagnosis results
CAN COMM CIRCUIT

Is the above displayed in the self-diagnosis item?

YES >> GO TO Inspection 9, refer to BRC-96, "Inspection 9: CAN Communication System" .
NO >> GO TO 2.

2. CHECK SELF-DIAGNOSTIC RESULTS-2

Check the self-diagnostic results.

Self-diagnosis results
ST ANG SEN

Is the above displayed in the self-diagnosis item?

YES >> GO TO 3.
NO >> INSPECTION END

3. CHECK EPS SYSTEM

1. Perform an EPS self-diagnosis refer to STC-6, "TROUBLE DIAGNOSIS" and repair or replace malfunctioning items. Re-perform EPS self-diagnosis.
2. Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

OK or NG

OK >> INSPECTION END
NG >> Repair or replace malfunctioning items. Re-perform the self-diagnosis.

Inspection 5: Yaw Rate/Side G-Sensor System

EFS004K4

DTC C10F4

CAUTION:

Sudden turns (such as spin turns, acceleration turns), drifting, etc. May cause the G-sensor system indicate a malfunction. However, this is not a malfunction, if normal operation can be resumed after restarting engine.

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
YAW RATE/G-SEN

CAUTION:

When on a turntable, such as at a parking structure entrance, or when on a moving object with engine running, ESP OFF indicator lamp might turn on and self-diagnosis using CONSULT-II the yaw rate/side G-sensor system might be displayed, but in this case there is no malfunction in yaw rate/side G-sensor system. As soon as vehicle leaves turntable or moving object, restart engine to return the system to normal.

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.
NO >> INSPECTION END

2. CHECK CONNECTOR

1. Disconnect yaw rate/side G-sensor connector B61 and ABS actuator and electric unit (control unit) connector E47 and check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
2. Reconnect connectors and re-perform a ABS actuator and electric unit (control unit) self-diagnosis.

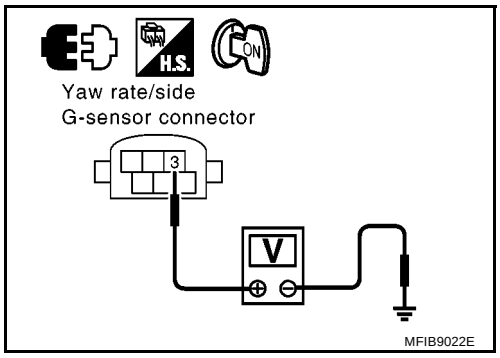
OK or NG

OK >> Connector terminal contact is loose, damaged, open or shorted.
NG >> GO TO 3.

3. CHECK YAW RATE/SIDE G-SENSOR POWER SUPPLY

1. Turn ignition switch OFF and disconnect yaw rate/side G-sensor harness connector B61.
2. Turn ignition switch ON.
3. Check voltage between yaw rate/side G-sensor harness connector B61 and ground.

Yaw rate/side G-sensor (harness connector B61)	Ground	Voltage (V) (Approx.)
3 (PU)	—	12 V

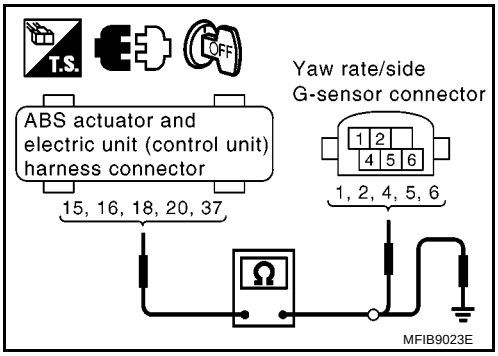


OK or NG

OK >> GO TO 4.
NG >> Repair or replace power supply circuit.

4. CHECK YAW RATE/SIDE G-SENSOR HARNESS

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E47.
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E47 and yaw rate/side G-sensor harness connector B61.



ABS actuator and electric unit (control unit) (Harness connector E47)	Yaw rate/side G-sensor (Harness connector B61)	Continuity
15 (GY)	6 (GY)	Yes
16 (G)	4 (G)	Yes
18 (Y)	1 (Y)	Yes
20 (W)	5 (W)	Yes
37 (OR)	2 (OR)	Yes

3. Check continuity between ABS actuator and electric unit (control unit) harness connector E47 terminals 15 (GY), 16 (G), 18 (Y), 20 (W) and 37 (OR) and ground. Continuity should not exist.

OK or NG

OK >> GO TO 5.
NG >> If the open or short in harness, repair or replace harness.

5. CHECK YAW RATE/SIDE G-SENSOR

1. Connect yaw rate/side G-sensor connector B61 and ABS actuator and electric unit (control unit) connector E47.
2. Use CONSULT-II “DATA MONITOR” to check if yaw rate/side G-sensor are normal.

Vehicle status	Yaw rate sensor (Data monitor standard)	Side G-sensor (Data monitor standard)
When stopped	–4 to +4 d/s	–1.1 to +1.1 G
Right turn	Negative value	Negative value
Left turn	Positive value	Positive value

OK or NG

OK >> Re-perform ABS actuator and electric unit (control unit) self-diagnosis.
NG >> Replace malfunctioning yaw rate/side G-sensor, and then re-perform self-diagnosis for ABS actuator and electric unit (control unit).

Inspection 6: ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground System

EFS004K7

DTC C10CC

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
BATTERY VOLTAGE

Does “BATTERY VOLTAGE” appear in self-diagnostic results display?

YES >> GO TO 2.
NO >> INSPECTION END

2. STARTING INSPECTION

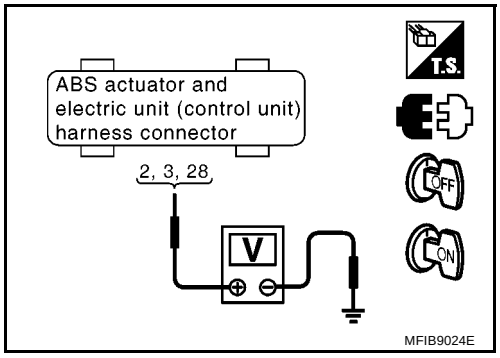
1. Disconnect ABS actuator and electric unit (control unit) connector E47. Then reconnect it securely.
2. Perform self-diagnosis.

Do any self-diagnosis item appear?

YES >> GO TO 3.
NO >> Poor connection. Repair or replace connector.

3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY (1)

1. Disconnect ABS actuator and electric unit (control unit) connector E47.
2. Turn ignition switch OFF. Check voltage between ABS actuator and electric unit (control unit) harness connector E47 and ground.



ABS actuator and electric unit (control unit) (Harness connector E47)	Ground	Voltage (V) (Approx.)
2 (Y), 3 (W)	—	12 V

3. Turn ignition switch ON (but do not start engine). Check voltage between ABS actuator and electric unit (control unit) harness connector E47 and ground.

ABS actuator and electric unit (control unit) (Harness connector E47)	Ground	Voltage (V) (Approx.)
28 (PU)	—	12 V

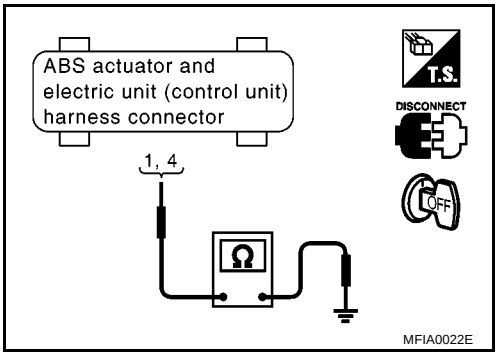
OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND SYSTEM

Check ABS actuator and electric unit (control unit) ground system.

ABS actuator and electric unit (control unit) (Harness connector E47)	Ground	Continuity
1 (B), 4 (B)	—	Yes



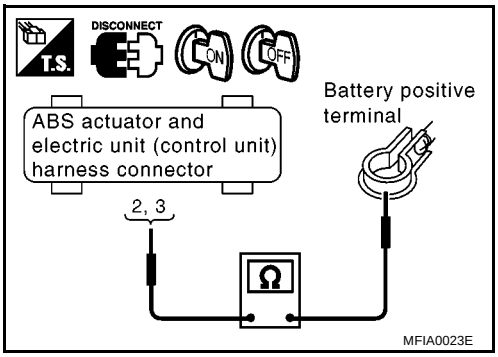
OK or NG

OK >> Perform ABS actuator and electric unit (control unit) self-diagnosis again.
NG >> Repair or replace harness or connectors.

5. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY (2)

1. Check fusible links 40A (terminal 2) and 30A (terminal 3).
2. Turn ignition switch OFF and check continuity between battery positive terminal and ABS actuator and electric unit (control unit) harness connector E47.

ABS actuator and electric unit (control unit) (Harness connector E47)	Battery positive terminal	Continuity
2 (Y), 3 (W)	—	Yes



3. Check fuse 10A (terminal 28)
4. Check continuity between 10A fuse and ABS actuator and electric unit (control unit) harness connector.

OK or NG

OK >> Check for non-standard conditions in battery (terminal looseness, low voltage, etc.) and alternator.
NG >>
- Replace fusible link 40A or 30A or fuse 10A.
- Open or short in harness.

Inspection 7: Stop Lamp Switch System

EFS004K8

DTC C10C6

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
STOP LAMP SW

Is the above displayed in the self-diagnosis display item?

YES >> GO TO 2.
NO >> INSPECTION END

2. CHECK CONNECTOR

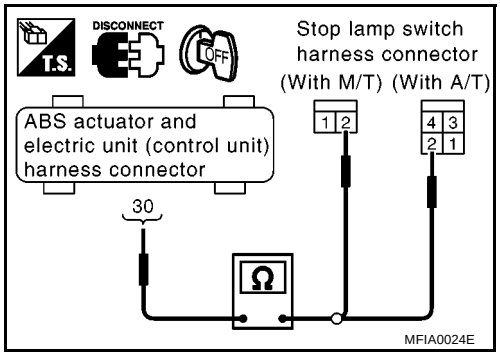
1. Disconnect stop lamp switch connector E108 (LHD MODELS WITH M/T), E109 (LHD MODELS WITH A/T), M202 (RHD MODELS WITH M/T) or M203 (RHD MODELS WITH A/T) and ABS actuator and electric unit (control unit) connector E47 and check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
2. Securely reconnect connectors.
3. perform self-diagnosis again.

OK or NG

OK >> Connector terminal contact is loose, damaged, open or shorted.
NG >> GO TO 3.

3. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF and disconnect stop lamp switch connector E108 (LHD MODELS WITH M/T), E109 (LHD MODELS WITH A/T), M202 (RHD MODELS WITH M/T) or M203 (RHD MODELS WITH A/T) and ABS actuator and electric unit (control unit) connector E47.
2. Check continuity between stop lamp switch harness connector E108 (LHD MODELS WITH M/T), E109 (LHD MODELS WITH A/T), M202 (RHD MODELS WITH M/T) or M203 (RHD MODELS WITH A/T) and ABS actuator and electric unit (control unit) harness connector E47.



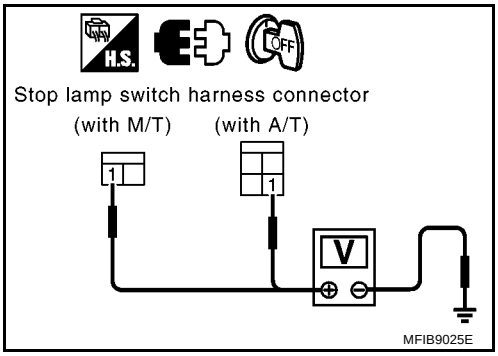
ABS actuator and electric unit (control unit) (Harness connector E47)	Stop lamp switch (Harness connector E108, E107, M202 or M203)	Continuity
30 (Y)	2 (Y)	Yes

OK or NG

OK >> GO TO 4.
NG >> Open or short in harness between stop lamp switch and ABS actuator and electric unit (control unit). Repair or replace applied harness.

4. CHECK STOP LAMP SWITCH POWER SUPPLY

1. Turn ignition switch OFF and disconnect stop lamp switch harness connector E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T) or M203 (RHD models with A/T).
2. Check voltage between stop lamp switch harness connector E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T) or M203 (RHD models with A/T) and ground.



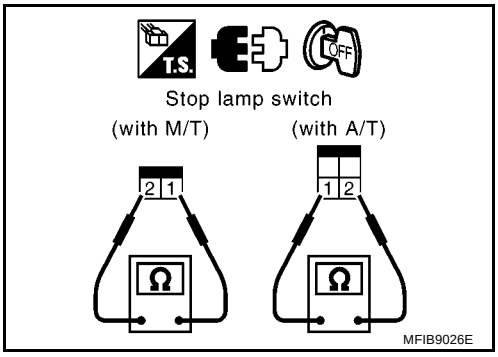
Stop lamp switch (harness connector E108, E109, M202 or M203)	Ground	Voltage (V) (approx.)
1 (L)	—	12 V

OK or NG

OK >> GO TO 5.
NG >> Repair or replace power supply circuit.

5. CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF and disconnect stop lamp switch E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T) or M203 (RHD models with A/T).
2. Check continuity between stop lamp switch harness connector E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T) or M203 (RHD models with A/T) terminals 1 and 2.



Terminals		Condition	Continuity
1	2	Depressed	Yes
		Released	No

OK or NG

OK >> Connect connectors and conduct an ABS actuator and electric unit (control unit) self-diagnosis.
NG >> Replace stop lamp switch.

Inspection 8: Brake Fluid Level Switch System

EFS004K9

DTC C1155

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS-1

Check the self-diagnostic results.

Self-diagnosis results
CAN COMM CIRCUIT

Is the above displayed in the self-diagnosis item?

YES >> GO TO Inspection 9, refer to BRC-96, "Inspection 9: CAN Communication System" .
NO >> GO TO 2.

2. CHECK SELF-DIAGNOSTIC RESULTS-2

1. Check fluid level in brake fluid reservoir tank. If the level is low, add brake fluid.
2. Clear the stored self-diagnostic results and check self-diagnosis results.

Self-diagnostic results
BR FLUID LEVEL LOW

Is the above displayed in the self-diagnosis display item?

YES >> GO TO 3.
NO >> INSPECTION END

3. CHECK WARNING LAMP SYSTEM

1. Perform an WARNING LAMP self-diagnosis refer to DI-65, "WARNING LAMPS" and repair or replace malfunctioning items. Re-perform WARNING LAMP self-diagnosis.
2. Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

OK or NG

OK >> INSPECTION END
NG >> Repair or replace malfunctioning items. Re-perform the self-diagnosis.

Inspection 9: CAN Communication System

EFS004KC

DTC U1000, C1180, C1188

INSPECTION PROCEDURE

1. CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E47. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
2. Securely reconnect connectors and perform self-diagnosis.

Is “CAN COMM CIRCUIT”, “ECM” or “A/T” displayed in the self-diagnosis display items?

YES >> Print out self-diagnostic results and go to 2.
NO >> Connector terminal connection is loose, damaged, open or shorted.

2. CHECK CAN COMMUNICATION SYSTEM

Check data monitor item “CAN Diagnosis Support Monitor”.

Normal	Error (example)
CAN CIRC 1: OK	CAN CIRC 1: UNKWN
CAN CIRC 2: OK	CAN CIRC 2: UNKWN
CAN CIRC 3: OK	CAN CIRC 3: UNKWN
CAN CIRC 4: UNKWN (Note 1)	CAN CIRC 4: UNKWN
CAN CIRC 5: OK	CAN CIRC 5: UNKWN
CAN 1 STAT: 0 (Note2)	CAN 1 STAT: 40
CAN 2 STAT: 0	CAN 2 STAT: 40
CAN 3 STAT: 0	CAN 3 STAT: 40
CAN 4 STAT: 0	CAN 4 STAT: 40
CAN 5 STAT: 0	CAN 5 STAT: 40

Note 1: Model with A/T is OK.
Note 2: CAN status indicates the condition of the CAN communication judged by each signal input.

- **Normal: If any problems were not found in the past, CAN status indicated “0”. In case of operating properly at the present in spite of having problem in the past, then CAN status indicates “39-1”.**
- **Malfunction: If there is a malfunction, CAN indicates “40”.**

After returning to normal condition, every time ignition switch is turned OFF from ON, the indication will change like “39” → “38” → “37” ··· “1” and if a malfunction is detected again, CAN status indicates “40”. (Though returning to the normal condition, “0” is not indicated. To reset, select and press the “ERASE” on the “SEFL-DIAGNOSIS” screen.)

>> After printing out the monitor items, go to CAN system. Refer to LAN-6, "CAN COMMUNICATION" .

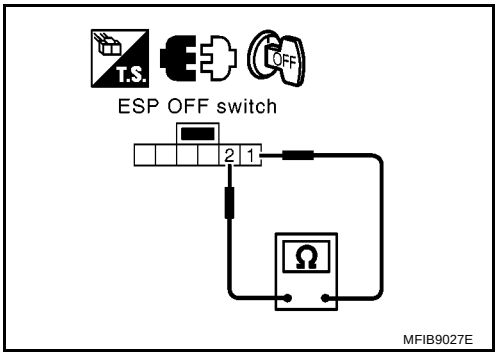
Component Inspection

EFS004KD

ESP OFF SWITCH

- Turn ignition switch OFF and disconnect ESP OFF switch connector M14, and check continuity between ESP OFF switch connector terminals 1 and 2.

1 -2 :Continuity should exist when pushing switch.
continuity should not exist when releasing switch.



Symptom 1: Excessive ABS Function Operation Frequency

EFS004KE

1. FRONT AND REAR AXLE INSPECTION

Make sure there is no excessive looseness in the front and rear axles.

OK or NG

OK >> GO TO 2.
NG >> Check front or rear axle system.

2. WHEEL SENSOR INSPECTION

Perform following inspection for wheel sensor:

- Sensor mount and damage inspection
- Sensor rotor mount and damage inspection
- Sensor connector connection inspection
- Sensor harness inspection

OK or NG

OK >> GO TO 3.
NG >> Sensor or sensor rotor replacement

3. ABS WARNING LAMP DISPLAY CHECK

Make sure warning lamp turns off approximately 2 sec. After turn ignition switch ON or when driving.

OK or NG

OK >> Normal
NG >> Perform self-diagnosis. Refer to BRC-75, "SELF-DIAGNOSIS" .

Symptom 2: Unexpected Pedal Reaction

EFS004KF

1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke.

Is the stroke too long?

YES >>
- Bleed air from brake piping.
- Check brake pedal, brake booster, and master cylinder mount for play, looseness, and brake system for fluid leaks, etc. If any malfunctions are found, make repair.

NO >> GO TO 2.

2. CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector E47 and make sure that braking force is sufficient when ABS in not operating. After the inspection, reconnect connector.

OK or NG

OK >> GO TO symptom 1 “Step 2”. Refer to BRC-97, "Symptom 1: Excessive ABS Function Operation Frequency" .
NG >> Check brake system.

Symptom 3: The Braking Distance Is Long

EFS004KG

CAUTION:
On slippery road surfaces, the stopping distance might be longer with the ABS operating than when the ABS is not operating.

1. CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector E47 to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

OK or NG

OK >>
- Bleed air from brake piping.
- Check brake system.

NG >> GO TO symptom 1 “Step 2”. Refer to BRC-97, "Symptom 1: Excessive ABS Function Operation Frequency" .

Symptom 4: The ABS Function Does Not Operate

EFS004KH

CAUTION:
The ABS does not operate when the speed is 10 km/h (6 MPH) or less.

1. CHECK ABS WARNING LAMP DISPLAY

Make sure warning lamp turns off approximately 2 second after the ignition switch is turned on or when driving.

OK or NG

OK >> GO TO symptom 1 “Step 2”. Refer to BRC-97, "Symptom 1: Excessive ABS Function Operation Frequency" .
NG >> Perform self-diagnosis. Refer to BRC-75, "SELF-DIAGNOSIS" .

Symptom 5: Pedal Vibration or ABS Operation Sound Occurs

EFS004KI

CAUTION:
Under the following conditions, when brake pedal is lightly depressed (just place a foot on it), ABS is activated and vibration is felt. However, this is normal.

- **When shifting gears**
- **When driving on slippery road**
- **During cornering at high speed**
- **When passing over bumps or grooves**
- **When pulling away just after starting engine [at approximately 10 km/h (6MPH) or higher]**

1. SYMPTOM CHECK 1

Check if pedal vibration or operation sound occurs when engine is started.

OK or NG

OK >> Perform self-diagnosis. Refer toBRC-75, "SELF-DIAGNOSIS" .
NG >> GO TO 2.

2. SYMPTOM CHECK 2

Check symptom when electrical component (headlamps, etc.) switches are operated.

Does the symptom occur when the electrical component (headlamp, etc.) switches are operated?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to ABS actuator and electric unit (control unit) (or its wiring), and if there is, move it farther away.
NO >> GO TO symptom 1 “Step 2”. Refer to BRC-97, "Symptom 1: Excessive ABS Function Operation Frequency" .

Symptom 6: Vehicle Jerks During ESP/TCS/ABS Control

EFS004KJ

1. CHECK ENGINE SPEED SIGNAL

Perform CONSULT-II “DATA MONITOR” to check engine speed.

Is engine speed at idle 400 rpm or higher?

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

2. ABS WARNING LAMP DISPLAY CHECK

Make sure warning lamp turns off approximately 2 sec. After turn ignition switch ON or when driving.

OK or NG

OK >> System is normal.
NG >> GO TO 3.

3. CHECK ECM SELF-DIAGNOSTIC RESULTS

Perform ECM self-diagnosis.

Are self-diagnosis items displayed?

YES >> Check the corresponding items. Refer to EC-69, "TROUBLE DIAGNOSIS" (with EURO-OBD), EC-515, "TROUBLE DIAGNOSIS" (without EURO-OBD).
NO >> GO TO 4.

4. CHECK A/T SELF-DIAGNOSTIC RESULTS

Perform A/T self-diagnosis.

OK or NG

OK >> GO TO 5.
NG >> Check the corresponding items. Refer to AT-35, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" (with EURO-OBD), AT-251, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" (without EURO-OBD).

5. CHECK SELF-DIAGNOSTIC RESULTS 1

Perform self-diagnosis of ABS actuator and electric unit (control unit).

Are self-diagnosis items displayed?

YES >> Check the corresponding items, make repairs, and re-perform ABS actuator and electric unit (control unit) self-diagnosis.
NO >> GO TO 6.

6. CHECK CONNECTOR

1. Disconnect ABS actuator and electric unit (control unit) connector E47 and ECM connector, check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace connector.
2. Securely reconnect connector and perform self-diagnosis.

OK or NG

OK >> If poor connect, damaged, open or short circuit is found, repair or replace connector terminal.
NG >> GO TO 7.

7. CHECK SELF-DIAGNOSTIC RESULTS 2

Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

Are self-diagnosis items displayed?

YES >> Repair or replace malfunctioning items.
NO >> GO TO 8.

8. CHECK CIRCUIT BETWEEN ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) AND ECM

Check CAN communication system. Refer to BRC-96, "Inspection 9: CAN Communication System" .

OK or NG

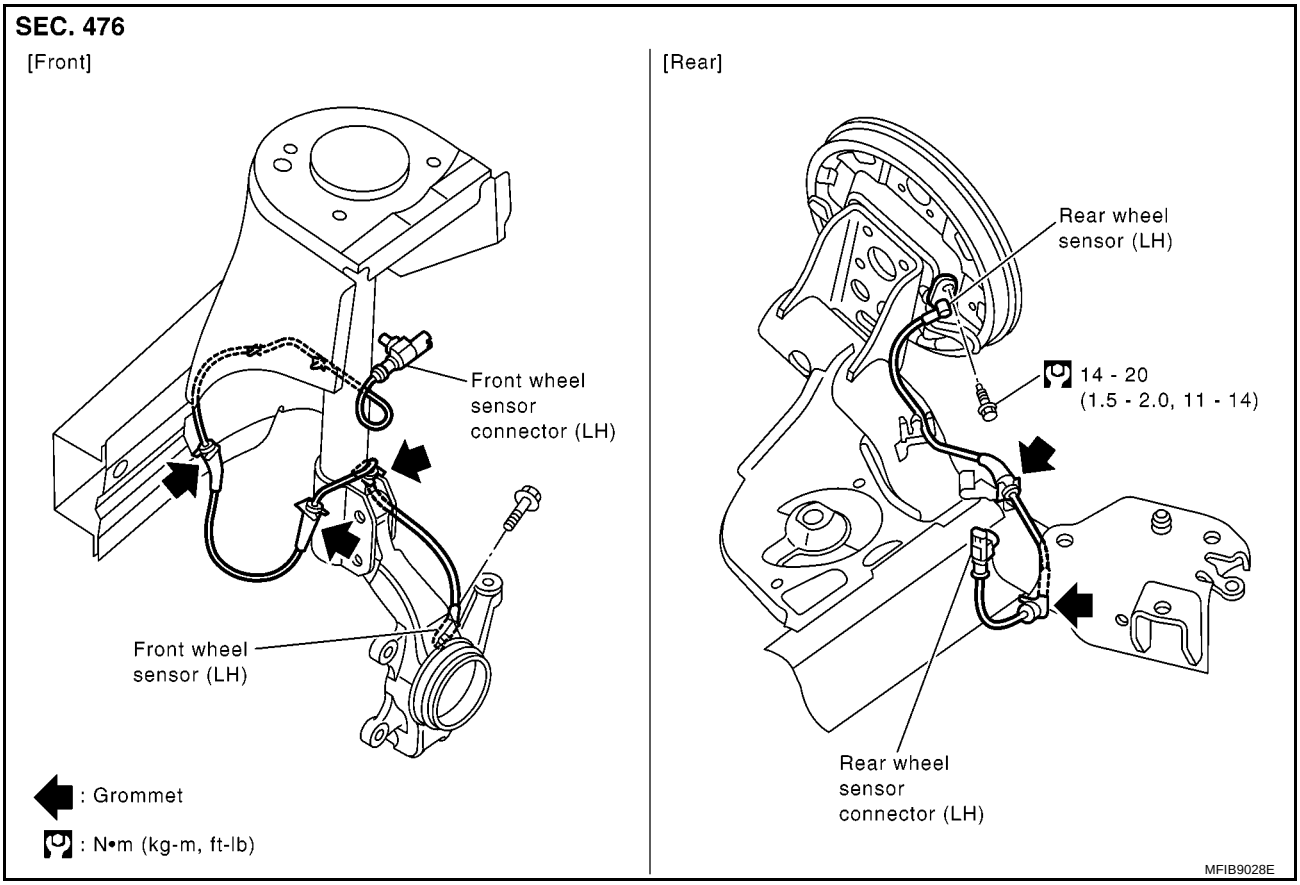
OK >> INSPECTION END
NG >> Connect connectors, and re-perform ABS actuator and electric unit (control unit) self-diagnosis.

WHEEL SENSORS

PFP:47910

Removal and Installation

EFS004KK



REMOVAL

Be careful of the following.

CAUTION:

- **When removing the sensor, do not rotate it if possible, and not forcibly pull the sensor harness.**
- **Before removing front or rear wheel hub, remove wheel sensor to avoid sensor wiring damage.**

INSTALLATION

Be certain to tighten bolts to the specified torque. Be careful of the following:

- Check the inside of the sensor mounting hole for foreign material, the rotor surface for iron chips and other foreign material, and if anything is non-standard, clean it before installation, or replace it.
- When installing the front sensor, completely push in the strut bracket and body bracket rubber grommets until they lock so that the sensor harness does not become twisted. In addition, there should be no twists in the harness when installed. Install the harness so that the painted part faces the outside of the vehicle.
- When installing the rear sensor, completely push in the rubber bracket of the suspension arm bracket and lock the marking area of the side member harness mount so that the sensor harness will not be twisted. In addition, there should be no twists in the harness when installed.

SENSOR ROTOR

PFP:47970

Removal and Installation

EFS004KL

FRONT

- Because the sensor rotor is integrated with the wheel bearing, replace it together with the wheel bearing assembly. Refer to FAX-6, "FRONT WHEEL HUB AND KNUCKLE" .

REAR

- During removal and installation, remove the wheel hub (brake drum). Refer to RAX-5, "WHEEL HUB" .

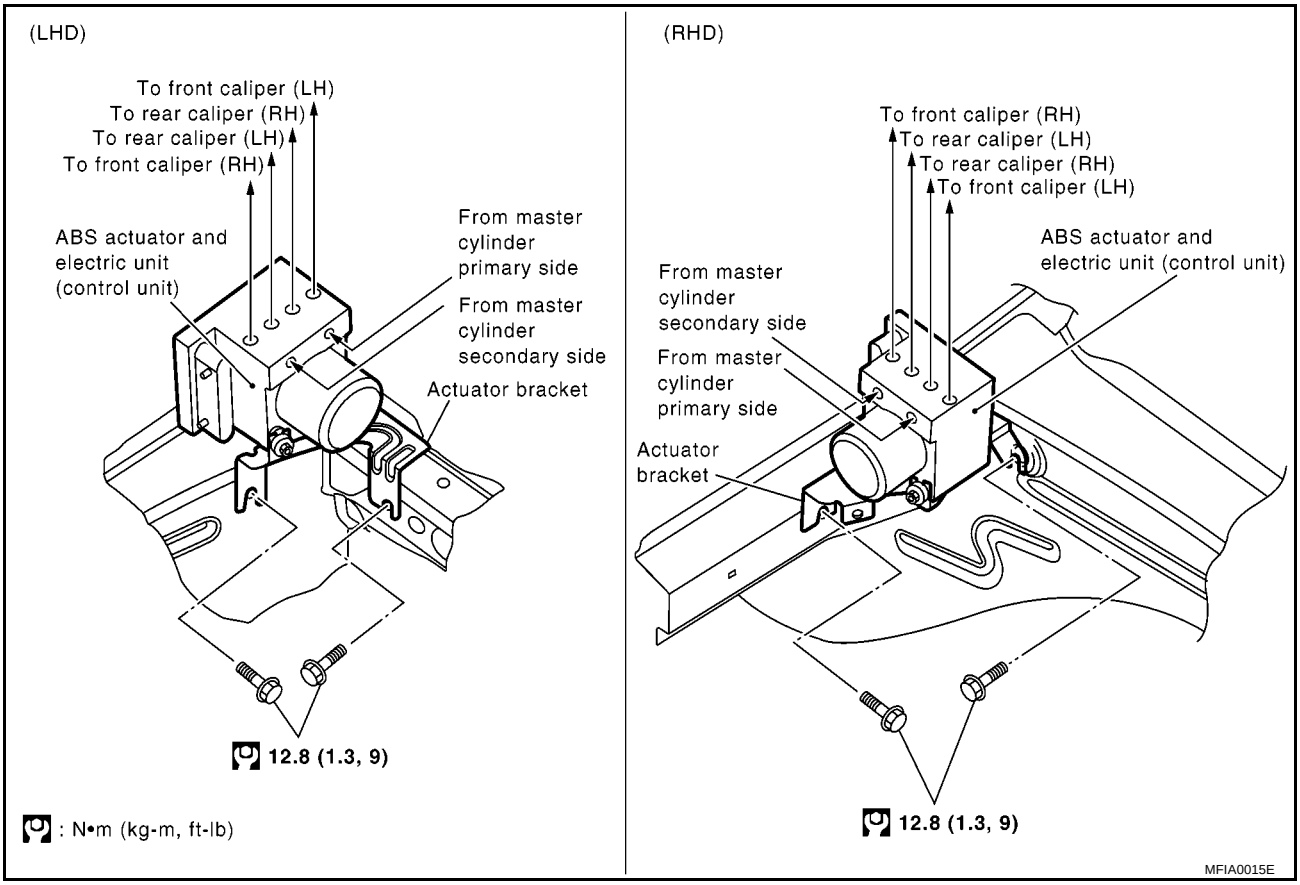
CAUTION:
The sensor rotor is a non-reusable part, it must be replaced by an new part when removing it.

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PFP:47660

Removal and Installation

EFS004KM



REMOVAL

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
3. Remove ABS actuator and electric unit (control unit) mounting nuts.
4. Remove ABS actuator and electric unit (control unit) from vehicle.

CAUTION:

Be careful of the following when removing ABS actuator and electric unit (control unit).

- **If the part number on the part number label (pasted on actuator upper surface) is the same, ABS actuator and electric unit (control unit) cannot be used on another vehicle.**
  If it is used on another vehicle, ABS warning lamp, SLIP indicator lamp and ESP OFF indicator lamp may turn ON or ESP/TCS/ABS may not operate normally.
  When replacing ABS actuator and electric unit (control unit), must use new service parts.
- **Before servicing, disconnect battery cables.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use a flare nut torque wrench (commercial service tool) and tighten to the specified torque.**
- **Do not apply excessive impact to actuator, such as dropping it.**
- **Do not remove and install ABS actuator and electric unit (control unit) by holding harness.**

INSTALLATION

To install, follow procedure for removal in reverse order.

CAUTION:

Be careful of the following when installing ABS actuator and electric unit (control unit).

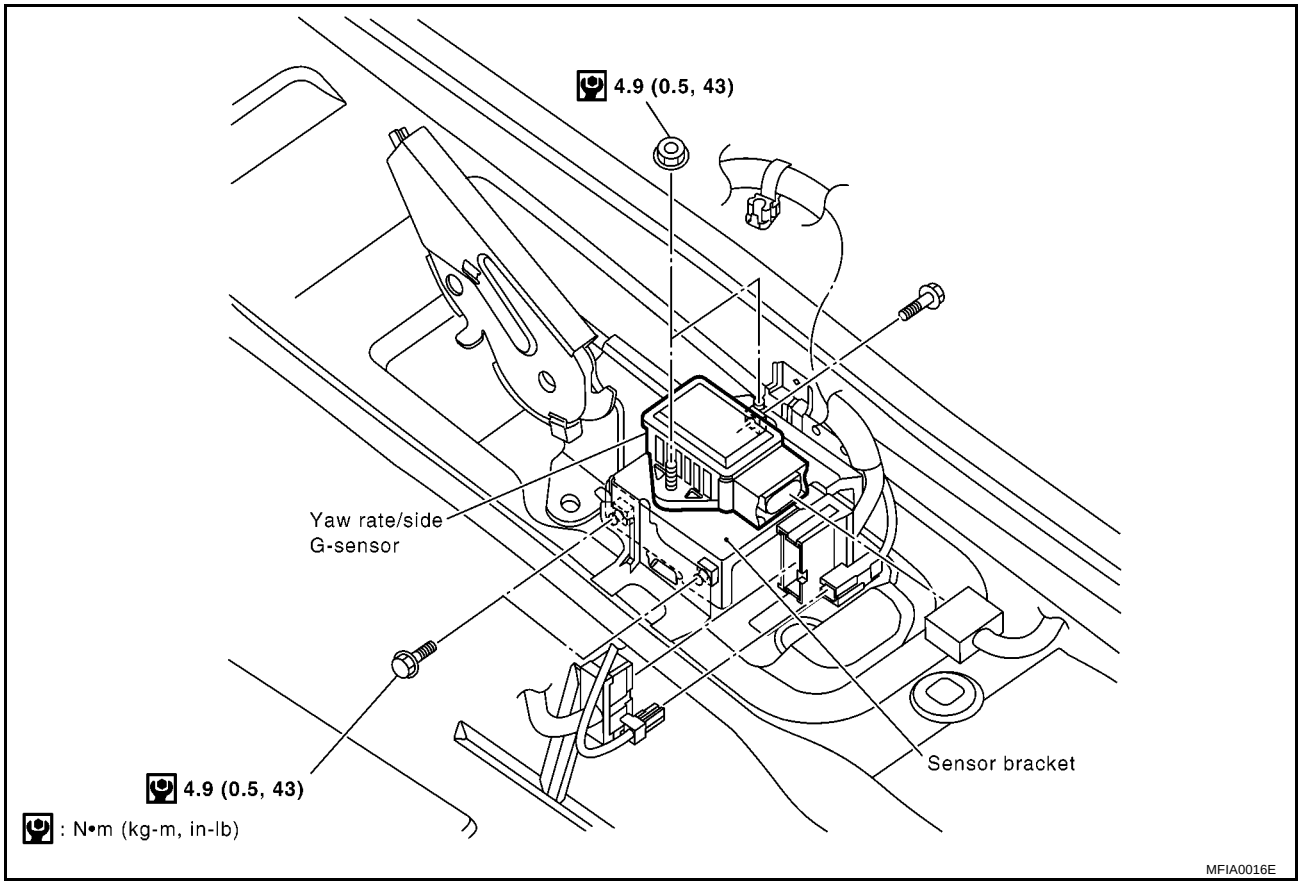
- **Tighten the mounting bolts and nuts to the specified torque.**
- **After the work, bleed air from brake piping. Refer to BR-10, "Bleeding Brake System" .**
- **After installing vehicle harness connector in the actuator, make sure connector is securely locked.**

YAW RATE/SIDE G SENSOR

PFP:47931

Removal and Installation

EFS004KN



REMOVAL

1. Remove center console. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Disconnect yaw rate/side G-sensor harness connector.
3. Remove yaw rate/side G-sensor mounting bolts. Then remove yaw rate/side G-sensor from vehicle.

CAUTION:

- **Do not drop or strike yaw rate/side G-sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because yaw rate/side G-sensor is weak for the impact.**

INSTALLATION

To install, follow procedure for removal in reverse order.

CAUTION:

- **Do not drop or strike yaw rate/side G-sensor, because it has little endurance to impact.**

STEERING ANGLE SENSOR

PFP:25554

Removal and Installation

EFS004KO

For removal and installation of steering angle sensor, refer to PS-7, "STEERING COLUMN" .