SECTION STC
STEERING CONTROL SYSTEM

CONTENTS

EPS

PRECAUTIONS 2
Maintenance Information 2
RHD MODELS 2
LHD MODELS 2
SYSTEM DESCRIPTION 3
Components 3
Electric Power Steering Function 3
Fail-Safe Function 3
TROUBLE DIAGNOSIS 4
How to Perform Trouble Diagnosis 4
BASIC CONCEPT 4
Component Parts Location 5
Schematic 6
Wiring Diagram — EPS — 7
Control Unit Input/Output Signal Standard 10
CIRCUIT TESTER REFERENCE VALUE 10
STANDARD BY CONSULT-II 10
CONSULT-II Function (EPS) 11
CONSULT-II MAIN FUNCTION 11
CONSULT-II START PROCEDURE 11
SELF-DIAGNOSIS 11
DATA MONITOR 12
ECU PART NUMBER 13
CAN COMMUNICATION 13
For Fast and Accurate Trouble Diagnosis 13
Basic Inspection 13
BASIC INSPECTION 1: POWER SUPPLY CIRCUIT TERMINAL LOOSENESS AND BATTERY... 13
BASIC INSPECTION 2: EPS WARNING LAMP INSPECTION 13
BASIC INSPECTION 3: EPS CONTROL UNIT POWER SUPPLY CIRCUIT AND GROUND CIRCUIT INSPECTION 14
Inspection 1: Battery Voltage Malfunction 15
Inspection 2: Torque Sensor Malfunction 16
Inspection 3: Motor Malfunction 17
Inspection 4: EEPROM Malfunction 18
Inspection 5: Control unit malfunction 18
Inspection 6: Vehicle Speed Signal Malfunction 19
Inspection 7: Engine Signal Malfunction 19
Inspection 8: CAN Communication Circuit 20
Symptom 1: Steering is Heavy or Light 20
Symptom 2: There is a Difference in the Steering Turning/Returning Force of Left and Right (Biased to One Side) 21
Symptom 3: Steering Wheel Turning Force is Uneven (Torque Variation) 21
Symptom 4: EPS Warning Lamp Stays ON 22

PRECAUTIONS

PFP:00001

Maintenance Information

BGS0004A

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

RHD MODELS

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

LHD MODELS

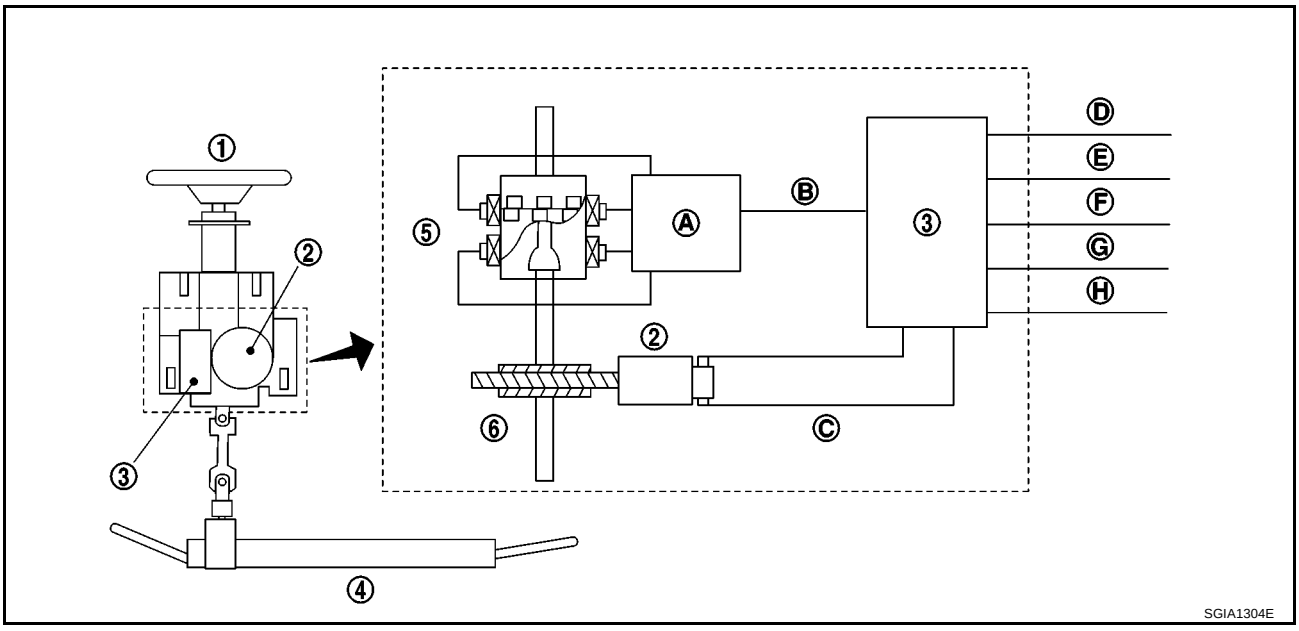
- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM

SYSTEM DESCRIPTION

PFP:00000

Components

BGS0002W



1. Steering wheel
2. Motor
3. EPS control unit
4. Steering gear assembly
5. Torque sensor
6. Reduction gear
A. Sensor processing signal
B. Sensor signal
C. Assist torque signal (motor drive)
D. Ignition power
E. CAN (H)
F. CAN (L)
G. Power supply
H. Ground

Electric Power Steering Function

BGS0002X

Parts name	Function
Electric power steering (EPS) control unit	● Outputs optimum assist torque signal to motor by steering wheel turning force (sensor signal) from torque sensor and vehicle speed signal from CAN communication. ● Reduces output signals to motor and protects motor and EPS control unit when using power steering continuously and excessively. ● Under unusual conditions of electric system, fail-safe function starts, output signal to motor is turned off, and then changes to manual steering. EPS warning lamp turns on to indicate system error. ● Controls communication with other control units by using CAN communication. ● Allows system diagnosis with CONSULT-II
Motor	● Produces assist torque by control signal from EPS control unit.
Torque sensor	● Detects steering wheel turning force and outputs sensor signal to EPS control unit.
Reduction gear	● Increases motor-produced assist torque by worm gear and transmits it to column shaft.
EPS warning lamp	● Turns on when fail-safe function operates, and indicates manual steering state. ● Turns on when key switch is turned on to check value, and turns off after engine starts

Fail-Safe Function

BGS0002Y

In case an unusual condition is encountered in the system, fail-safe function stops EPS control and the system enters a fail-safe state. EPS warning lamp turns on to indicate unusual state, and enters a manual steering state. (Control turning force of steering wheel becomes heavy.)

TROUBLE DIAGNOSIS

PFP:00004

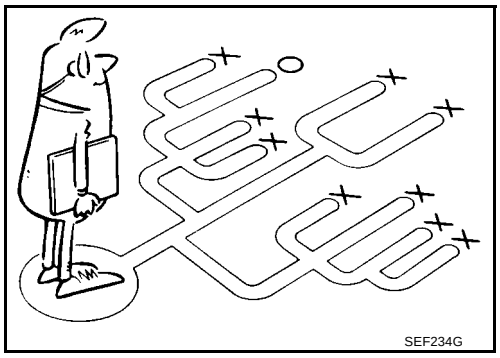
How to Perform Trouble Diagnosis

BGS0002Z

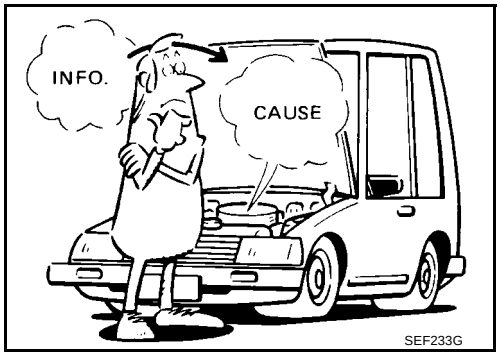
BASIC CONCEPT

- The most important point to perform trouble 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.

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


SEF234G

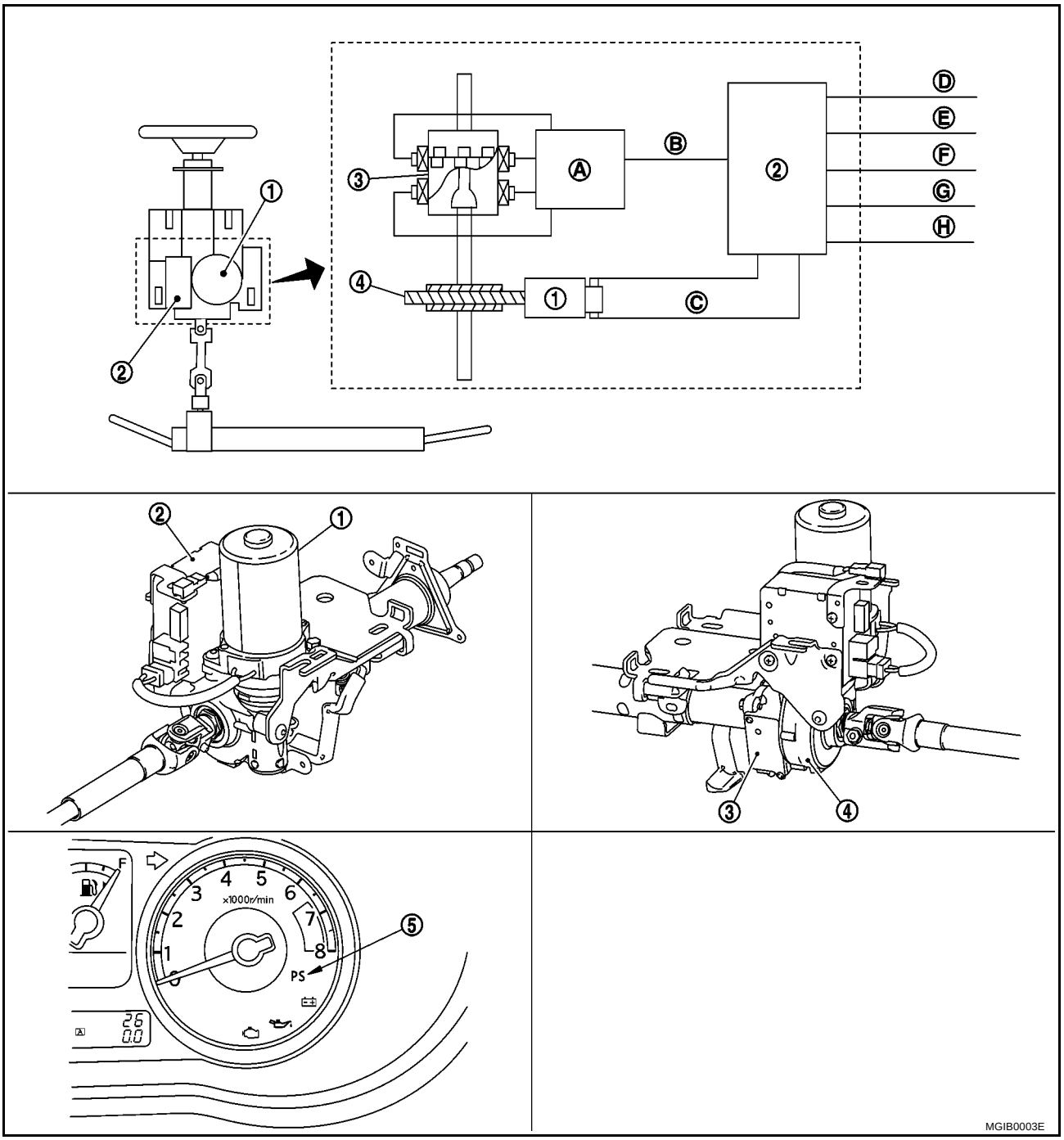
- It is essential to check symptoms right from beginning in order to repair a malfunction completely.
  For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are 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 perform “ERASE MEMORY”. Refer to STC-11, "Erase Memory" .
- Always read “GI General Information” to confirm general precautions. Refer to GI-4, "General Precautions" .



SEF233G

Component Parts Location

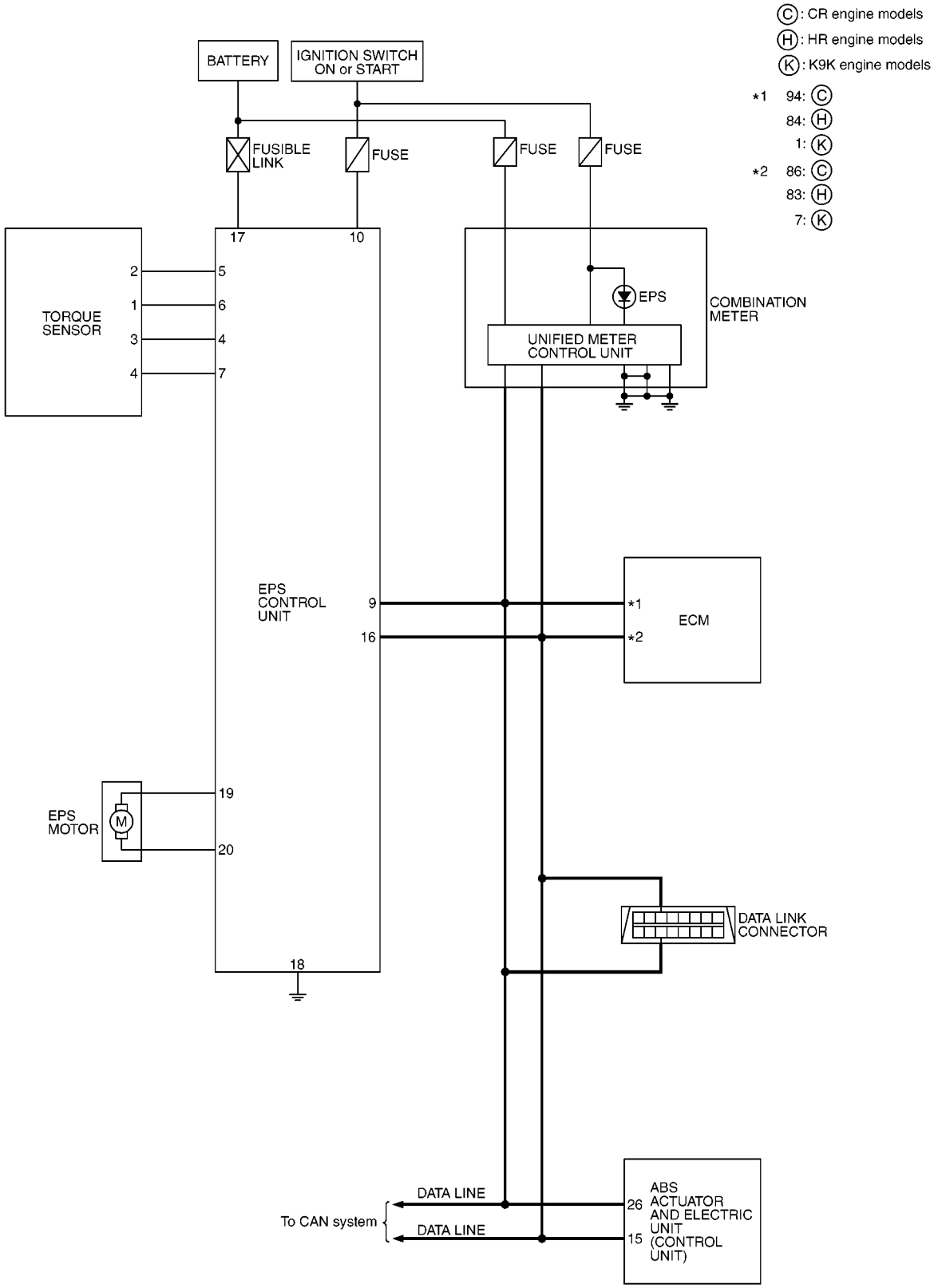
BGS00030



1. Motor
2. EPS control unit
3. Torque sensor (built-in)
4. Reduction gear (built-in)
5. EPS warning lamp
A. Sensor processing signal
B. Sensor signal
C. Assist torque signal (motor drive)
D. Ignition power
E. CAN (H)
F. CAN (L)
G. Power supply
H. Ground

Schematic

BGS00031

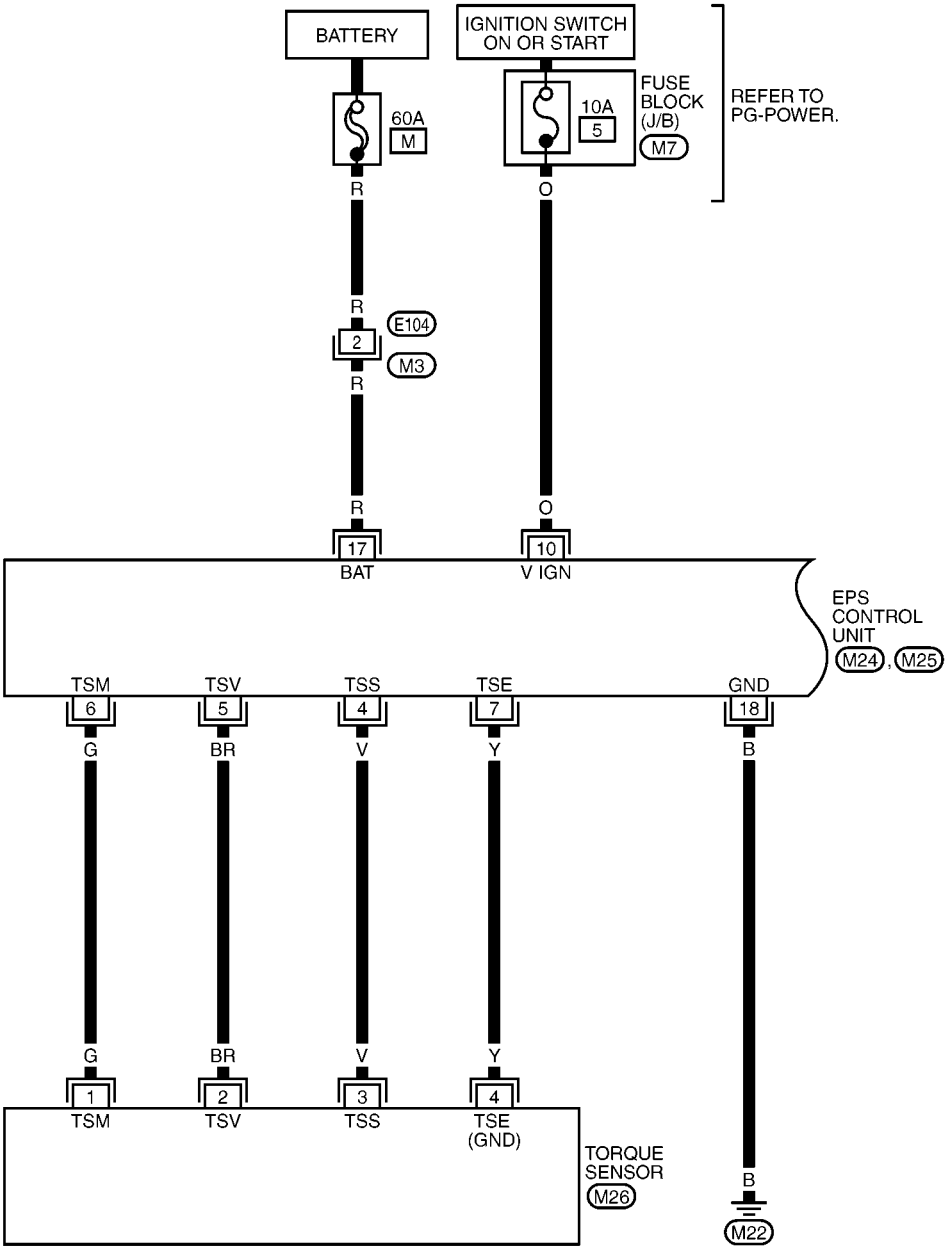


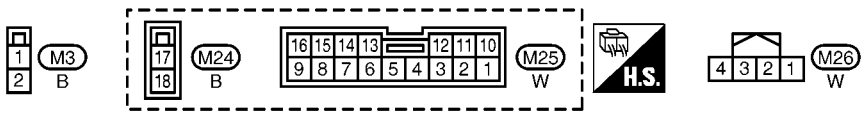
MGWA0006E

Wiring Diagram — EPS —

BGS00032

STC-EPS-01

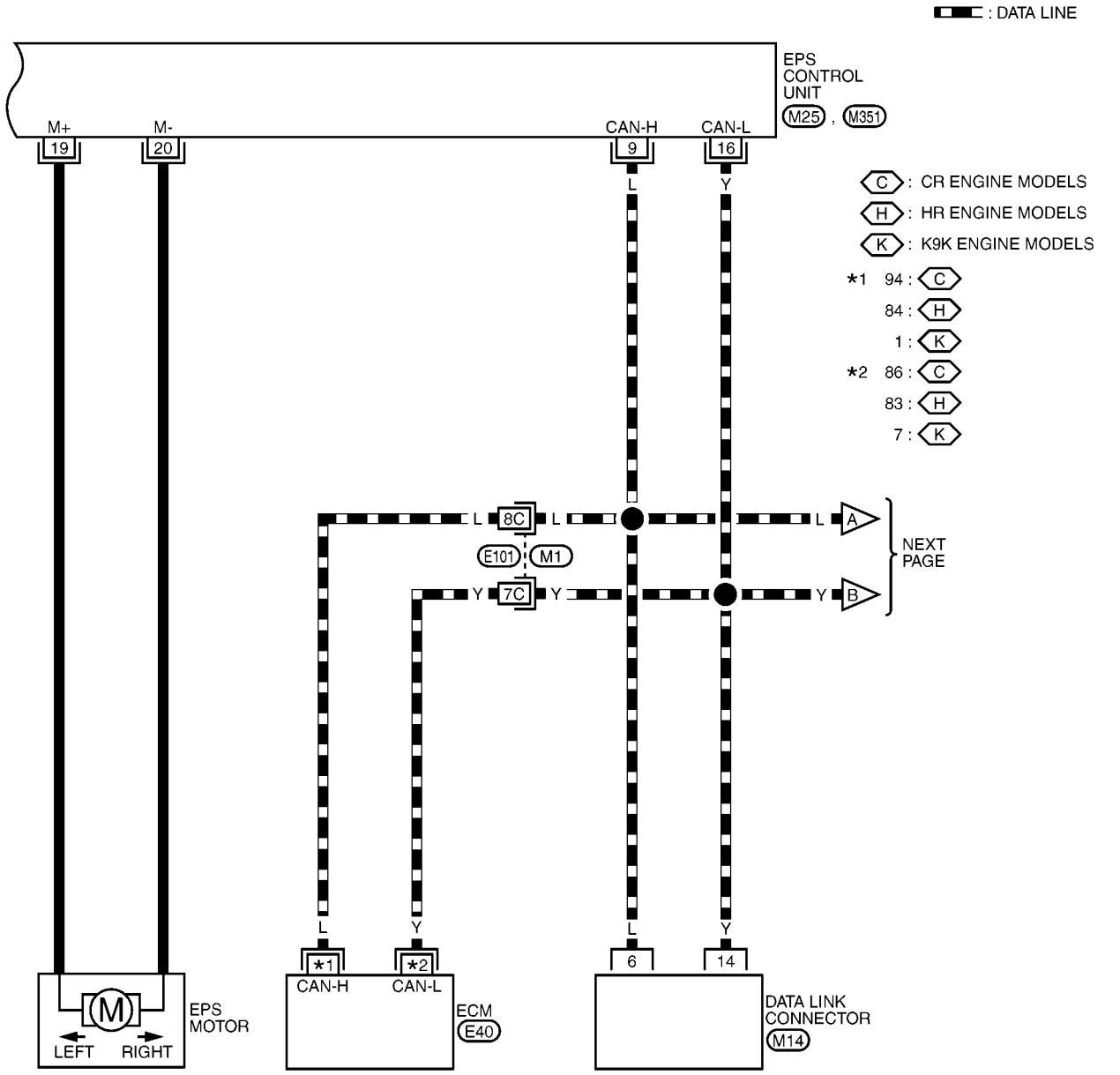


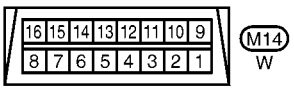


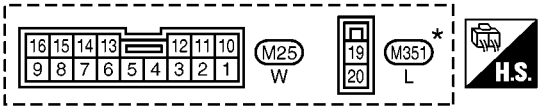
REFER TO THE FOLLOWING.
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

MGWA0005E

STC-EPS-02



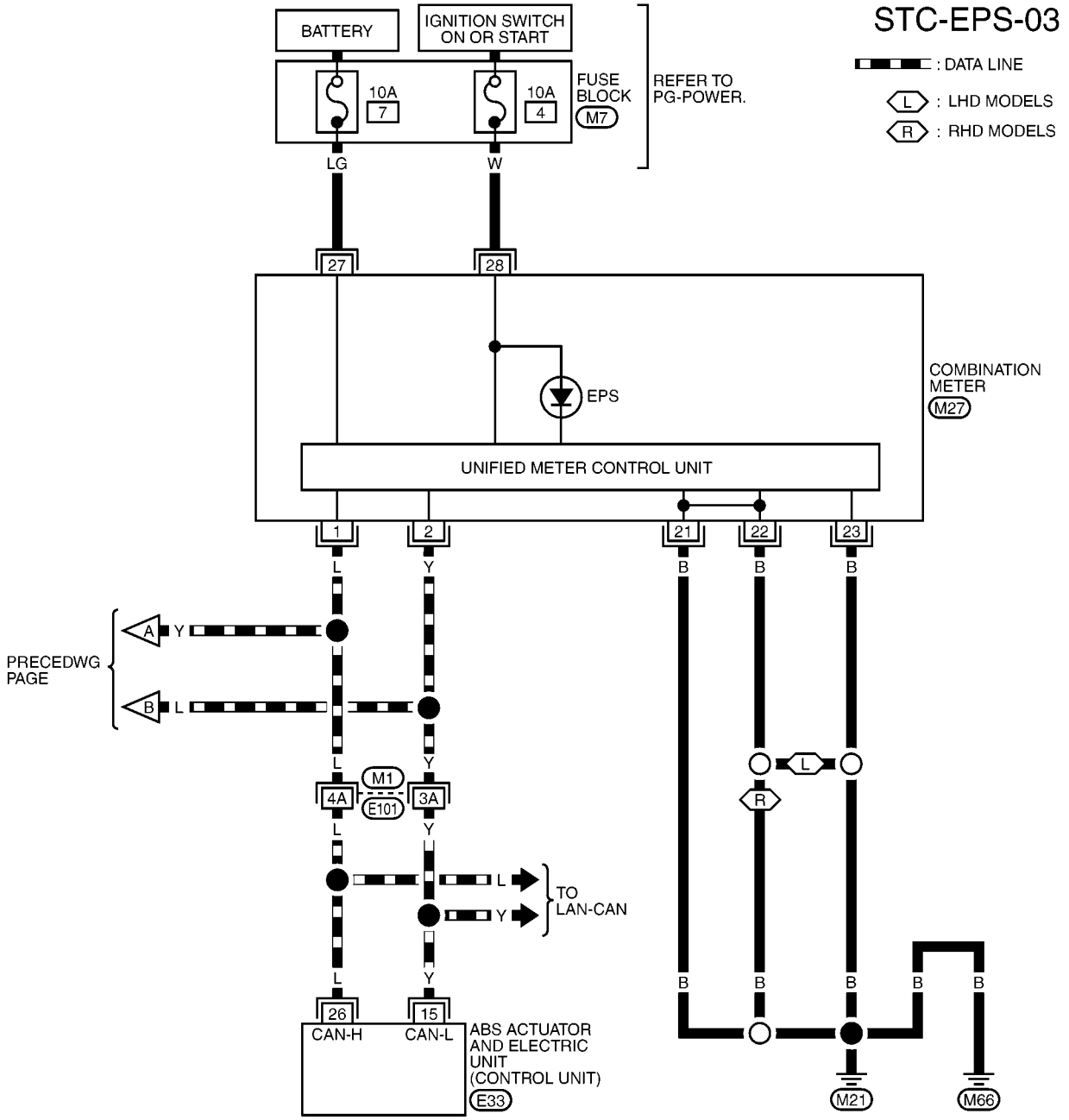


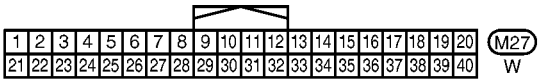


*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
E40 - ELECTRICAL UNITS

MGWA0007E





REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
E33 - ELECTRICAL UNITS
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

MGWA0008E

Control Unit Input/Output Signal Standard

BGS00033

CIRCUIT TESTER REFERENCE VALUE

CAUTION:

When checked using a circuit tester for voltage measurement, connector terminals should not be forcefully extended.

Terminal		Measuring point	Measuring condition	Standard
+ (wire color)	–			
4 (V)	Ground	Torque sensor (sub)	Ignition switch ON, steering wheel in neutral position	Approx. 2.5 V
5 (BR)		Torque sensor power supply	Ignition switch ON	Approx. 8 V
6 (G)		Torque sensor (main)	Ignition switch ON, steering wheel in neutral position	Approx. 2.5 V
7 (Y)		Torque sensor ground	–	Continuity exit
9 (L)	–	CAN H	–	–
10 (O)	Ground	Ignition power	Ignition switch ON	Battery voltage (Approx. 12 V)
			Ignition switch OFF	Approx. 0 V
16 (Y)	–	CAN L	–	–
17 (R)	Ground	Battery power supply	Ignition switch ON or OFF	Battery voltage (Approx. 12 V)
18 (B)	Ground	Ground	–	Continuity exit
19 (–)	–	Motor (+)	–	–
20 (–)		Motor (–)	–	–

STANDARD BY CONSULT-II

CAUTION:

The output signal indicates the EPS control unit calculation date. The normal values will be displayed even in the event that the output circuit (harness) is open.

Monitor item	DATA MONITOR		Malfunction inspection checklist
	Condition	Reference values for normal operation	
MOTOR VOL (V)	Ignition switch ON or engine running	Battery voltage (Approx. 12 V)	STC-15, "Inspection 1: Battery Voltage Malfunction"
TORQUE SENSOR (Nm)	Turning steering wheel clockwise or counter clockwise at ignition switch ON or running engine	Neutral (Steering force is zero): Approx. 0 N·m. The value is changed according to steering left or right.	STC-16, "Inspection 2: Torque Sensor Malfunction"
MOTOR SIG (A)		Neutral (Steering force is zero and in vehicle is in straight-ahead position): Approx. 0 A. The value is changed according to steering left or right.	STC-16, "Inspection 2: Torque Sensor Malfunction", STC-17, "Inspection 3: Motor Malfunction" , STC-18, "Inspection 5: Control unit malfunction"
MOTOR CURRENT (A)			
VEHICLE SPEED (km/h)	Ignition switch ON or engine running	Almost in accordance with the speedometer display. It is not a malfunction, though it might not be corresponding just after ignition switch is turned ON.	STC-19, "Inspection 6: Vehicle Speed Signal Malfunction"
WARNING LAMP (ON/OFF)		EPS warning lamp ON: ON EPS warning lamp OFF: OFF	Warning lamp circuit inspection
DERATING STAT (ON/OFF)		Usually OFF. Turn ON when the stationary steering is performed excessively. Return to OFF when leaving it for a while.	This is normal.
ENGINE STATUS (stop, stall, run, and crank)		Displays engine status.	STC-19, "Inspection 7: Engine Signal Malfunction"

CONSULT-II Function (EPS)

BGS00034

CONSULT-II MAIN FUNCTION

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

Mode	Function	Reference
SELF-DIAG RESULTS	Receives self-diagnosis results from EPS control unit and indicates DTCs.	STC-11, "SELF-DIAGNOSIS"
DATA MONITOR	Receives input/output signals from EPS control unit and indicates and stores them to facilitate locating cause of malfunctions.	STC-12, "DATA MONITOR"
ECU PART NUMBER	Displays EPS control unit part number.	STC-13, "ECU PART NUMBER"
CAN DIAG SUPPORT MNTR	Monitors transmitting/receiving status of CAN communication.	STC-13, "CAN COMMUNICATION"

CONSULT-II START PROCEDURE

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

SELF-DIAGNOSIS

Operation Procedure

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)” “EPS” “SELF-DIAG RESULTS”.
   - If EPS is not displayed, print the “SELECT SYSTEM” screen. Then refer to LAN-3, "Precautions When Using CONSULT-II" .

   NOTE:
   Just after starting engine, or turning ignition switch ON, it may not be displayed even if “START (NISSAN BASED VHCL)” is touched. In this case, reconnect CONSULT-II and CONSULT-II CONVERTER.
5. The self-diagnostic results are displayed. (Touch “PRINT” to print out the self-diagnostic results if necessary.) Check EPS warning lamp if “NO FAILURE” is displayed.
6. Perform the appropriate inspection from the display item list, and repair or replace the malfunctioning component. Refer to STC-12, "Display Item List" .

Erase Memory

1. Turn ignition switch OFF.
2. Start engine, and touch “START (NISSAN BASED VHCL)” “EPS” “SELF-DIAG RESULTS” and “ERASE” in this order to erase the diagnostic memory.

   CAUTION:
   If memory cannot be erased, repeat step 1, 2.
3. Perform self-diagnosis again, and make sure that DTC memory is erased.

Display Item List

CAUTION:

When malfunctions are detected in several system, including the “CAN COMM [U1000]”, inspect the CAN communication system.

DTC code	Diagnostic item	Diagnostic item is detected when....	Check items
C1601	BATTERY_VOLT	Power supply malfunction supplied to EPS.	STC-15
C1604	TORQUE_SENSOR	Torque sensor malfunction assembled in column assembly.	STC-16
C1606	EPS_MOTOR	Motor driver malfunction of motor or EPS control unit.	STC-17
C1607	EEPROM	EEPROM malfunction of EPS control unit.	STC-18
C1608	CONTROL_UNIT	EPS control unit internal malfunction.	STC-18
C1609	CAN_VHCL_SPEED	Vehicle speed signal malfunction received via CAN communication.	STC-19
C1610	CAN_ENG_PRM	Engine signal malfunction received via CAN communication.	STC-19
U1000	CAN_COMM_CIRCUIT	Malfunction is detected in CAN communication circuit.	STC-20

DATA MONITOR

Operation Procedure

1. Touch “START (NISSAN BASED VHCL)” “EPS” “DATA MONITOR”.
   - If EPS is not displayed, print the “SELECT SYSTEM” screen. Then refer to LAN-3, "Precautions When Using CONSULT-II" .

     NOTE:
     Just after starting engine, or turning ignition switch ON, it may not be displayed even if “START (NISSAN BASED VHCL)” is touched. In this case, reconnect CONSULT-II and CONSULT-II CONVERTER.
2. Return to the monitor item selection screen, and touch any of “ALL SIGNALS”, “SELECTION FROM MENU”.
3. Touch “START”.
4. “DATA MONITOR” screen is displayed.

Display Item List

Item (Display or Unit)	Remarks
MOTOR VOL (V)	Displays power supply voltage supplied EPS control unit
TORQUE SENSOR (Nm)	Displays steering wheel turning force detected by torque sensor
MOTOR SIG (A)	Displays command value of a current sent to motor
MOTOR CURRENT (A)	Displays current value used by EPS. **NOTE:** Quick steering may cause mismatch with a command value. This is not a malfunction.
VEHICLE SPEED (km/h)	In close agreement with a vehicle speed read by speedometer. It may not agree immediately after ignition key switch ON, however, this is not a malfunction.
WARNING LAMP (ON/OFF)	EPS warning lamp operation condition is displayed
DERATING STAT (ON/OFF)	Under normal conditions OFF. It turns on if the steering wheel is turned excessively. When left standing, it recovers to OFF.
ENGINE STATUS (stop, stall, run, and crank)	Displays engine status

ECU PART NUMBER

Operation Procedure

1. Touch “START (NISSAN BASED VHCL)” “EPS” “ECU PART NUMBER”.
   - If EPS is not displayed, print the “SELECT SYSTEM” screen. Then refer to LAN-3, "Precautions When Using CONSULT-II" .

   NOTE:
   Just after starting engine, or turning ignition switch ON, it may not be displayed even if “START (NISSAN BASED VHCL)” is touched. In this case, reconnect CONSULT-II and CONSULT-II CONVERTER.
2. The part number described on EPS control unit sticker is displayed.

CAN COMMUNICATION

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. Refer to LAN-21, "CAN COMMUNICATION" .

For Fast and Accurate Trouble Diagnosis

BGS00035

Check the following items with the vehicle stopped

- Is air pressure and size of tires proper?
- Is the specified part used for the steering wheel?
- Is control unit a genuine part?
- Is the conditions (looseness of mounting bolts, damage on rod of main body, damage on boot or fire wall seal and leakage of grease) of installation for steering column assembly and steering gear assembly are normal?
- Is the wheel alignment adjusted properly? Refer to FSU-6, "Wheel Alignment" .
- Are there any damage or modification to suspension or body resulting in increased weight or altered ground clearance?
- Check each link installation condition of suspension and axle.
- Is the battery voltage proper?
- Check each connector connection condition.

Check the following items while driving the vehicle

- Conditions when the error occurred (5W 1H).
- Is the engine is normal?

Basic Inspection

BGS00036

BASIC INSPECTION 1: POWER SUPPLY CIRCUIT TERMINAL LOOSENESS AND BATTERY

Check battery terminals for looseness on both positive and negative ones and ground connection. Also make sure that battery voltage does not drop.

BASIC INSPECTION 2: EPS WARNING LAMP INSPECTION

1. Make sure EPS warning lamp turns on when ignition switch is turned ON.
   - If it does not turn on, refer to STC-20, "Inspection 8: CAN Communication Circuit" .
   - Check combination meter if CAN communication is normal. Refer to DI-4, "COMBINATION METERS" .
2. Make sure that EPS warning lamp turns off when the engine is started after ignition switch is turned ON. If it does not turn off, perform self-diagnosis. Refer to STC-11, "SELF-DIAGNOSIS" .
3. Always erase DTC memory after completing self-diagnosis. Refer to STC-11, "Erase Memory" .

BASIC INSPECTION 3: EPS CONTROL UNIT POWER SUPPLY CIRCUIT AND GROUND CIRCUIT INSPECTION

1. CHECK EPS CONTROL UNIT CONNECTOR

Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.

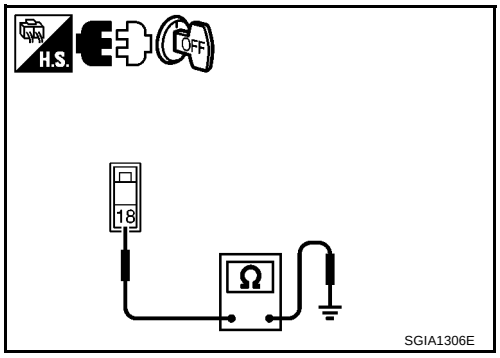
OK or NG

OK >> GO TO 2.
NG >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace the terminal.

2. CHECK EPS CONTROL UNIT GROUND CIRCUIT

Disconnect EPS control unit harness connector M24, and then check continuity between EPS control unit harness connector M24 and ground.

18 – Ground : Continuity exist.



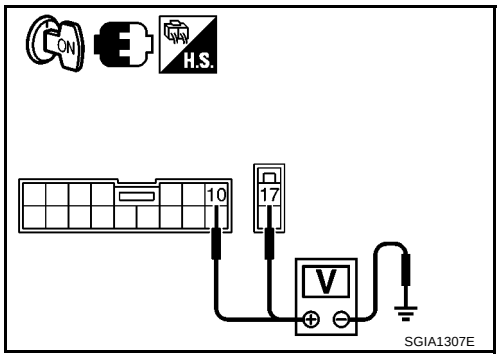
OK or NG

OK >> GO TO 3.
NG >> Ground circuit open or shorted. Repair or replace any inoperative parts.

3. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Turn ignition switch on.
2. Check voltage between EPS control unit harness connector M24, M25 and ground.

10, 17 – Ground : Battery voltage (Approx. 12 V)



OK or NG

OK >> Power supply and ground circuit are normal.
NG >> Power supply circuit open or shorted. Repair or replace any inoperative parts.

Inspection 1: Battery Voltage Malfunction

BGS00037

1. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

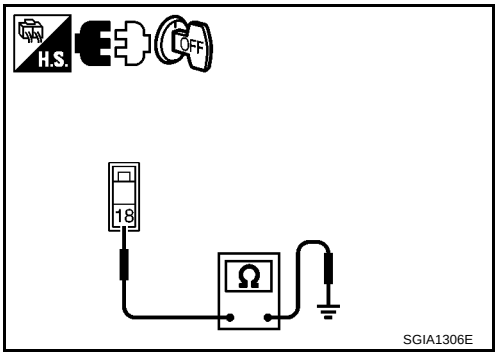
Is “BATTERY_VOLT” indicated in self-diagnosis display?

YES >> GO TO 2.
NO >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace the terminal.

2. CHECK EPS CONTROL UNIT GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector M24, and then check continuity between EPS control unit harness connector M24 and ground.

18 – Ground : Continuity exist.



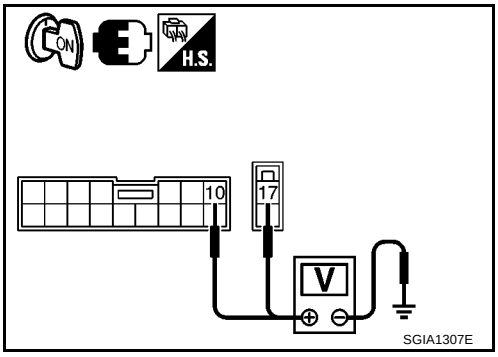
OK or NG

OK >> GO TO 3.
NG >> Ground circuit open or shorted. Repair or replace any inoperative parts.

3. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between EPS control unit harness connector M24, M25 and ground.

10, 17 – Ground : Battery voltage (Approx. 12 V)



OK or NG

OK >> GO TO 4.
NG >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace any inoperative parts.

4. CHECK EPS CONTROL UNIT

1. Turn ignition switch OFF, disconnect EPS control unit harness connector. Start engine.
2. Check “MOTOR VOL” in CONSULT-II data monitor.

Voltage : 10 – 16 V

OK or NG

OK >> GO TO 5.
NG >> EPS control unit malfunction. (Replace EPS control unit)

5. CHECK POWER SUPPLY CIRCUIT

Turn head lamp, A/C, blower fan and rear window defogger OFF. Turn steering wheel until it stops. At that time, check “MOTOR VOL” in CONSULT-II data monitor.

Voltage : 10 – 16 V

OK or NG

OK >> INSPECTION END
NG >> Power supply circuit open or shorted. Repair or replace any inoperative pars.

Inspection 2: Torque Sensor Malfunction

BGS00038

1. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

Is “TORQUE SENSOR” indicated in self-diagnosis display?

YES >> GO TO 2.
NO >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace the terminal.

2. CHECK TORQUE SENSOR CONNECTOR

1. Turn ignition switch OFF, disconnect torque sensor harness connector, and check terminal for deformation, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

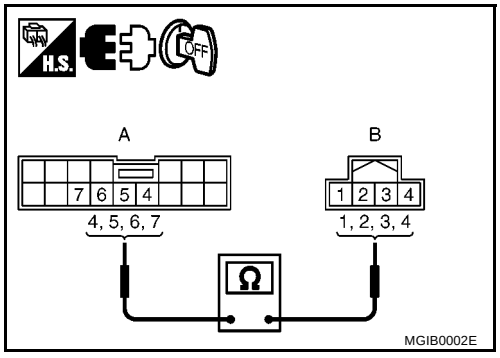
Is “TORQUE SENSOR” indicated in self-diagnosis display?

YES >> GO TO 3.
NO >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace the terminal.

3. CHECK TORQUE SENSOR HARNESS

1. Turn ignition switch OFF, disconnect the harness connectors of EPS control unit and torque sensor.
2. Check continuity between EPS control unit harness connector and torque sensor harness connector.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
EPS control unit: M25	4	Torque sensor: M26	3	Yes
	5		2	
	6		1	
	7		4	



OK or NG

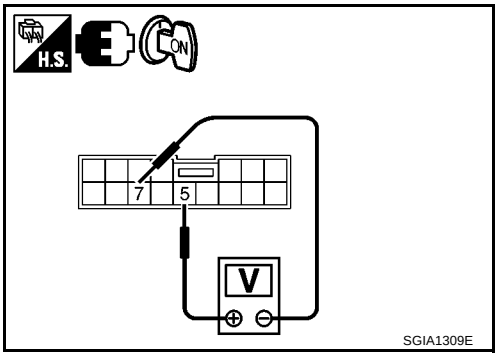
OK >> GO TO 4.
NG >> Open or short in harness between EPS control unit and torque sensor. Repair applicable harness.

4. CHECK TORQUE SENSOR POWER SUPPLY

1. Connect the harness connectors of EPS control unit and torque sensor. Turn ignition switch ON.
2. Turn steering to the neutral position (steering force: zero), and then check voltage EPS control unit harness connector M25.

Torque sensor power supply

5 – 7 : Approx. 8 V



OK or NG

OK >> GO TO 5.
NG >> EPS control unit malfunction. (Replace EPS control unit)

5. CHECK TORQUE SENSOR SIGNAL

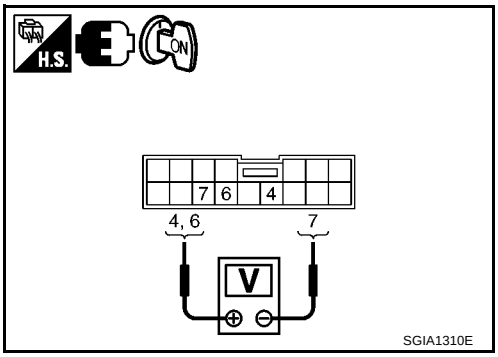
Turn steering to the neutral position (steering force: zero), and then check voltage EPS control unit harness connector M25.

Torque sensor (sub)

4 – 7 : Approx. 2.5 V

Torque sensor (main)

6 – 7 : Approx. 2.5 V



OK or NG

OK >> EPS control unit malfunction. (Replace EPS control unit)
NG >> Torque sensor malfunction. (Replace steering column assembly [with motor, reduction gear, sensor])

Inspection 3: Motor Malfunction

BGS00039

1. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

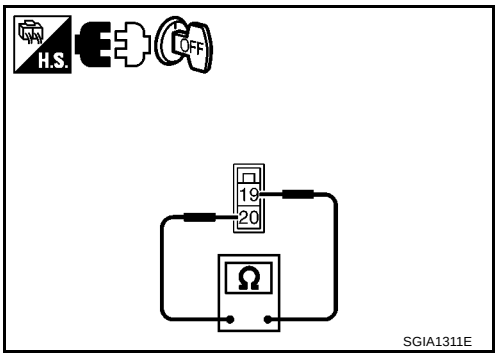
Is “EPS MOTOR” indicated in self-diagnosis display?

YES >> GO TO 2.
NO >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace the terminal.

2. CHECK MOTOR RESISTANCE

1. Turn ignition switch OFF, disconnect motor harness connector M 351 from EPS control unit.
2. Check resistance between motor harness connector M351.

19 – 20 : Approx. 0.1 Ω or less



OK or NG

OK >> EPS control unit malfunction. (Replace EPS control unit)
NG >> Motor malfunction. (Replace steering column assembly [with motor, reduction gear, sensor])

Inspection 4: EEPROM Malfunction

BGS0003A

1. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

Is “EEPROM” indicated in self-diagnosis display?

YES >> EPS control unit malfunction. (Replace EPS control unit)
NO >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace the terminal.

Inspection 5: Control unit malfunction

BGS0003B

1. CHECK EPS CONTROL UNIT CONNECTOR

Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.

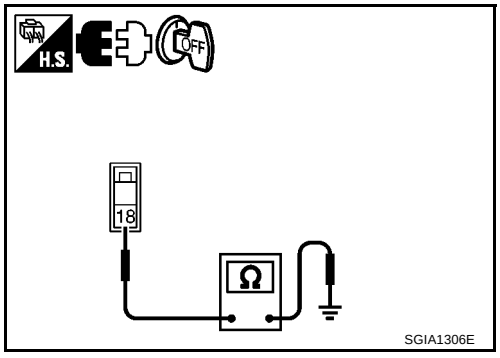
OK or NG

OK >> GO TO 2.
NG >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace the terminal.

2. CHECK EPS CONTROL UNIT GROUND CIRCUIT

Disconnect EPS control unit harness connector M24, and then check continuity between EPS control unit harness connector M24 and ground.

18 – Ground : Continuity exist.



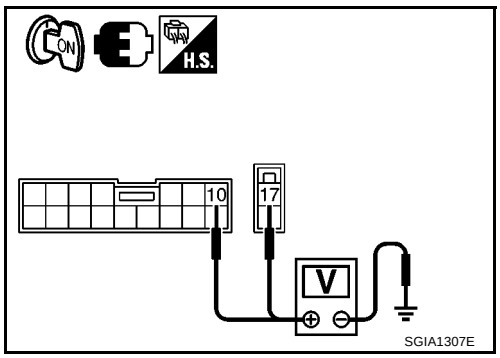
OK or NG

OK >> GO TO 3.
NG >> Ground circuit open or shorted. Repair or replace any inoperative parts.

3. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Turn ignition switch turned ON.
2. Check voltage between EPS control unit harness connector M24, M25 and ground.

10, 17 – Ground : Battery voltage (Approx. 12 V)



OK or NG

OK >> GO TO 4.
NG >> Power supply circuit open or shorted. Repair or replace any inoperative parts.

4. CHECK EPS CONTROL UNIT

Connect EPS control unit harness connector securely, and perform self-diagnosis.

Is “CONTROL UNIT” indicated in self-diagnosis display?

YES >> EPS control unit malfunction. (Replace EPS control unit)
NO >> INSPECTION END.

Inspection 6: Vehicle Speed Signal Malfunction

BGS0003C

1. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) CIRCUIT

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

OK or NG

OK >> GO TO 2.
NG >> Repair or replace the affect part.

2. CHECK SPEEDOMETER

Perform combination meter (speedometer) self-diagnosis.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace the affect part.

3. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

SELF-DIAG RESULTS
CAN_VHCL_SPEED
CAN_COMM_CIRCUIT

Is above displayed on self-diagnosis display?

YES >> ● EPS control unit malfunction. (Replace EPS control unit)
● If “CAN_COMM_CIRCUIT” is displayed, refer to STC-20, "Inspection 8: CAN Communication Circuit" .

NO >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace the terminal.

Inspection 7: Engine Signal Malfunction

BGS0003D

1. CHECK ENGINE SPEED SIGNAL

Make sure that the engine speed signal in CONSULT II data monitor is the almost same as the tachometer.

OK or NG

OK >> GO TO 2.
NG >> Check tachometer and circuit. Refer to DI-4, "COMBINATION METERS" .

2. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

SELF-DIAG RESULTS
CAN_ENG_RPM
CAN_COMM_CIRCUIT

Is above displayed on self-diagnosis display?

YES >> ● EPS control unit malfunction. (Replace EPS control unit)
● If “CAN_COMM_CIRCUIT” is displayed, refer to STC-20, "Inspection 8: CAN Communication Circuit" .

NO >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace the terminal.

Inspection 8: CAN Communication Circuit

BGS0003E

1. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

Is “CAN COMM CIRCUIT” displayed on self-diagnosis display?

YES >> Print out the self-diagnosis results and refer to STC-20, "Inspection 8: CAN Communication Circuit" .
NO >> Connector terminal connection is loose, damaged, open, or shorted. Repair or replace the terminal.

Symptom 1: Steering is Heavy or Light

BGS0003F

1. CHECK SELF-DIAGNOSIS RESULTS

Check self-diagnosis results.

Are there malfunctioning systems in self-diagnosis results?

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

Are there malfunctioning systems in self-diagnosis results?

YES >> Repair malfunctioning circuit, and GO TO 3.
NO >> GO TO 3.

3. CHECK SYMPTOM

Make sure that the steering does not have the symptoms of “Heavy” or “Light”.

OK or NG

OK >> INSPECTION END.
NG >> GO TO 4.

4. CHECK CAN COMMUNICATION CIRCUIT AGAIN

Check CAN communication circuit. Refer to STC-20, "Inspection 8: CAN Communication Circuit" .

OK or NG

OK >> GO TO 5.
NG >> Repair malfunctioning circuit.

5. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

Check EPS control unit power supply circuit. Refer to STC-15, "Inspection 1: Battery Voltage Malfunction" .

OK or NG

OK >> Check steering wheel turning force. Refer to PS-5, "STEERING TORQUE INSPECTION" .
NG >> Repair power supply circuit.

Symptom 2: There is a Difference in the Steering Turning/Returning Force of Left and Right (Biased to One Side)

BGS0003G

1. CHECK SELF-DIAGNOSIS RESULTS

Check self-diagnosis results.

Are there malfunctioning systems in self-diagnosis results?

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

Are there malfunctioning systems in self-diagnosis results?

YES >> Repair malfunctioning circuit, and GO TO3.
NO >> GO TO 3.

3. CHECK SYMPTOM

Make sure that the steering does not have the symptoms of “Heavy” or “Light”.

OK or NG

OK >> INSPECTION END.
NG >> GO TO 4.

4. WHEEL ALIGNMENT INSPECTION

Check wheel alignment. Refer to FSU-6, "Wheel Alignment" .

OK or NG

OK >> Check steering wheel turning force. Refer to PS-5, "STEERING TORQUE INSPECTION" .
NG >> Adjust wheel alignment. Refer to FSU-6, "Wheel Alignment" .

Symptom 3: Steering Wheel Turning Force is Uneven (Torque Variation)

BGS0003H

1. CHECK SELF-DIAGNOSIS RESULTS

Check self-diagnosis results.

Are there malfunctioning systems in self-diagnosis results?

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

Are there malfunctioning systems in self-diagnosis results?

YES >> Repair malfunctioning circuit, and GO TO 3.
NO >> GO TO 3.

3. CHECK SYMPTOM

Make sure that the steering does not have the symptoms of “Heavy” or “Light”.

OK or NG

OK >> INSPECTION END.
NG >> GO TO 4.

4. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

Check EPS control unit power supply circuit. Refer to STC-15, "Inspection 1: Battery Voltage Malfunction" .

OK or NG

OK >> GO TO 5.
NG >> Repair malfunctioning circuit.

5. CHECK STEERING COLUMN INTERMEDIATE SHAFT

1. Check the connection between the intermediate shaft and the mounting part of steering column assembly and steering gear assembly. Refer to PS-7, "STEERING COLUMN" .
2. Make sure that steering wheel turning force is uneven (torque variation).

OK or NG

OK >> INSPECTION END.
NG >> Check steering wheel turning force. Refer to PS-5, "STEERING TORQUE INSPECTION" .

Symptom 4: EPS Warning Lamp Stays ON

BGS0003I

1. CHECK SELF-DIAGNOSIS RESULTS

Check self-diagnosis results.

Are there malfunctioning systems in self-diagnosis results?

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK EPS CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF, disconnect EPS control unit harness connector, and check terminal for deformation, disconnection, looseness, etc.
2. Reconnect harness connector securely, and perform self-diagnosis.

Are there malfunctioning systems in self-diagnosis results?

YES >> Repair malfunctioning circuit, and GO TO 3.
NO >> GO TO 3.

3. CHECK SYMPTOM

Make sure that the steering does not have the symptoms of “Heavy” or “Light”.

OK or NG

OK >> INSPECTION END.
NG >> GO TO 4.

4. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

Check EPS control unit power supply circuit. Refer to STC-15, "Inspection 1: Battery Voltage Malfunction" .

OK or NG

OK >> GO TO 5.
NG >> Repair malfunctioning circuit.

5. CHECK STEERING WHEEL TURNING FORCE

Check the EPS assist force when the steering is operated. Refer to PS-5, "STEERING TORQUE INSPECTION" .

OK or NG

OK >> Check CAN communication circuit. Refer to STC-20, "Inspection 8: CAN Communication Circuit" .
NG >> EPS control unit malfunction.