

SUB FUEL TANK CONTROL SYSTEM

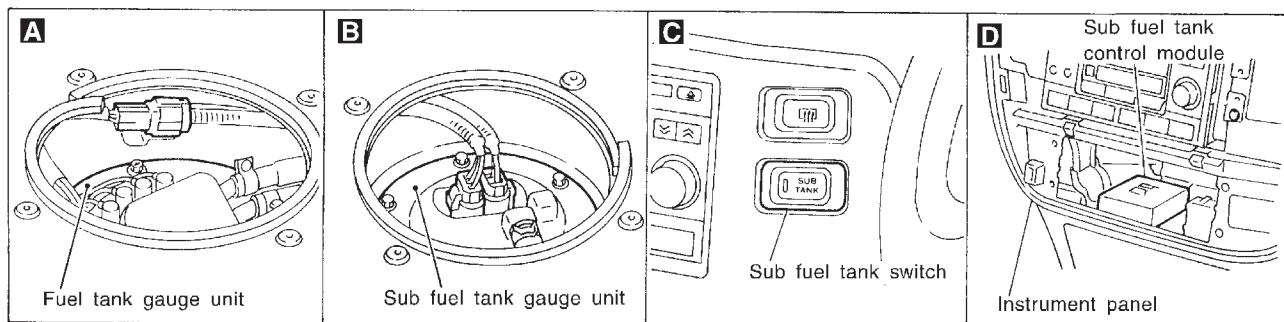
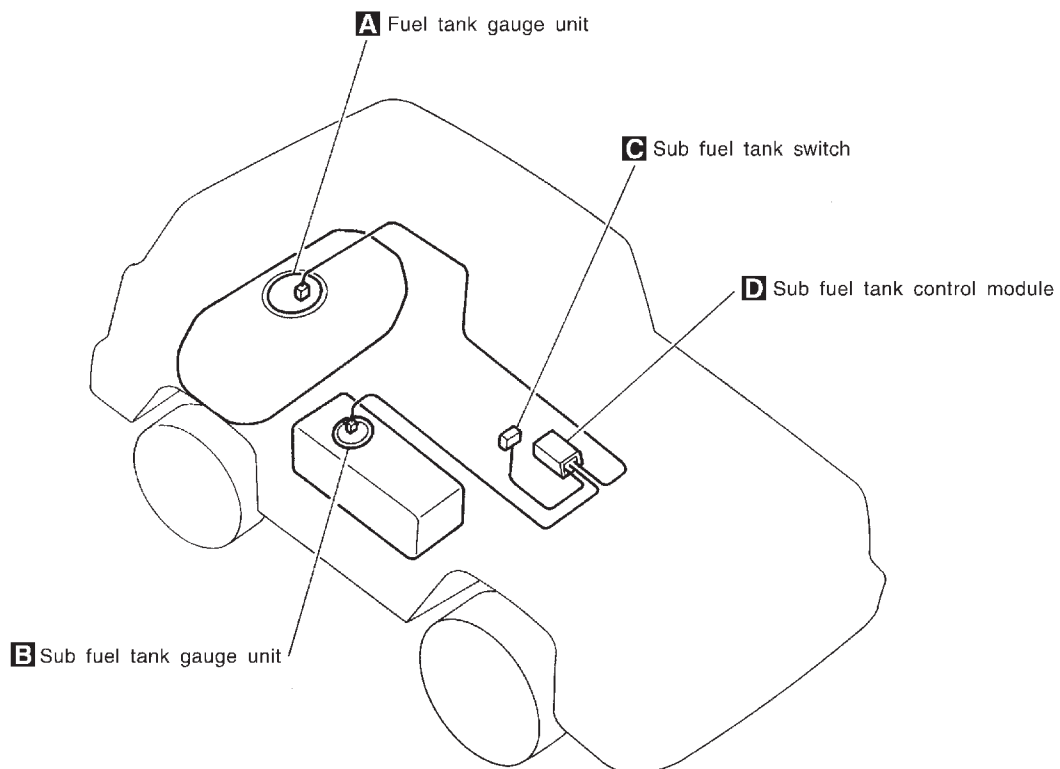
Sub Fuel Tank Control System Operation

This system controls the sub fuel pump operation based on the signals sent from the full switch (main fuel tank), the empty switch (sub fuel tank) and the sub fuel tank switch.

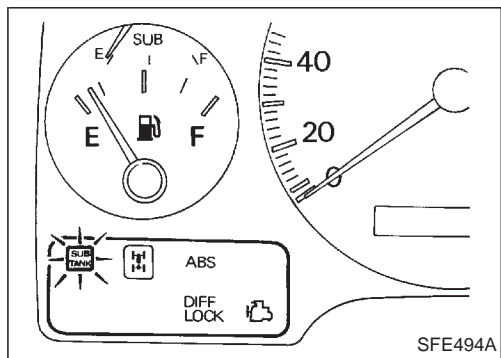
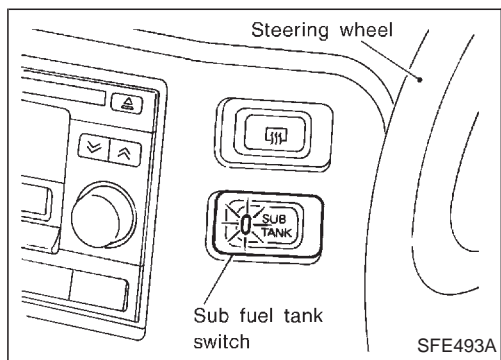
The full switch is built into the main fuel tank. It senses the main fuel tank fuel level. When the specified level is exceeded, the full switch operates to suspend sub fuel pump operation, preventing excess fuel from flowing into the main fuel tank.

The empty switch is located inside the sub fuel tank. It senses the sub fuel tank fuel level. When fuel in the sub fuel tank drops below the specified level, the empty switch operates to suspend sub fuel pump operation. If the sub fuel pump stop conditions are not met after the sub fuel pump has been operated for 1 hour, the sub fuel pump automatically stops.

Component Parts Location



SFE492A



Self-diagnosis for Sub Fuel Tank Control Module

SELF-DIAGNOSIS PROCEDURE

After turning the ignition switch ON, turn the sub fuel tank switch ON and OFF more than 5 times. Make sure the indicator lamp directly above the sub fuel tank switch flashes every 2 seconds. If the indicator lamp does not flash, repeat the check procedures.
(The self-diagnosis system will then start.)

Wait at least 10 seconds before starting the engine. After starting the engine, the indicator lamp located directly above the sub fuel tank switch flashes. A trouble code then appears on the display.

Determine trouble areas using "Malfunction code chart".
Repair affected area.

After repairing the trouble area, erase the trouble code retained in the sub fuel tank control module memory. Refer to FE-6.

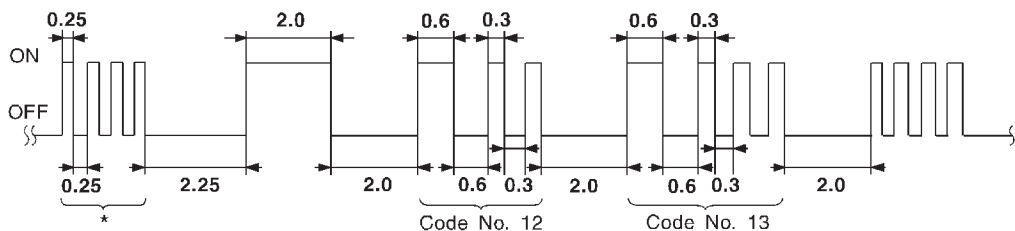
Start the self-diagnostic system again and make sure the malfunction code is erased from memory. (After starting the engine, the indicator lamp will flash at one second intervals.)

Check to ensure that sub tank warning lamp remains off.

HOW TO READ SELF-DIAGNOSTIC RESULTS (Malfunction codes)

- Count the number of indicator lamp flashes (ten digits and unit digits).
If multiple problems occur at the same time, the corresponding trouble codes repeatedly appear on the display in the order of increasing numerical sequence.
- The malfunction code chart is given on the next page.

Example: Code No. 12 and Code No. 13



* Indicates that the system is in the fail-safe mode because a malfunction is retained in the sub fuel tank control module memory.
This signal is not indicated when a malfunction occurs while performing the self-diagnosis.

Unit: second

SFE495AA

- If a fail-safe signal appears on the display, read the trouble code following it. Repair or replace the malfunctioning part corresponding to the trouble code. Refer to "MALFUNCTION CODE CHART". After repairs, erase the memory for the sub fuel tank control unit because the sub fuel tank control module does not work. Re-perform the self-diagnostic procedure to make sure the sub fuel tank warning lamp does not light.

TROUBLE DIAGNOSES

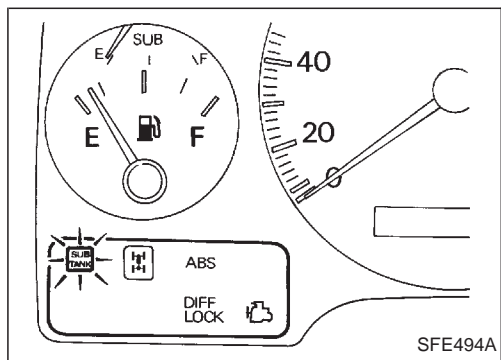
Self-diagnosis for Sub Fuel Tank Control Module (Cont'd)

HOW TO ERASE SELF-DIAGNOSTIC RESULTS (Malfunction codes)

Self-diagnostic results are erased from the memory by disconnecting the battery ground terminal.

MALFUNCTION CODE CHART

Code number (Number of flashes)	Malfunctioning part	Fail-safe	Diagnostic procedure
11	Main fuel tank gauge unit circuit or full switch circuit	X	1
12	Sub fuel tank gauge unit circuit or empty switch circuit	X	2
13	Sub fuel pump power supply circuit	X	3
14	Sub fuel pump circuit	X	4



If the system becomes inoperative, the sub fuel tank control system function will be suspended.

The fail-safe system function will then activate, illuminating the sub fuel tank warning lamp.

- The sub fuel tank warning lamp will light up when the ignition switch is turned ON without the engine running. This is to check the blown lamp.

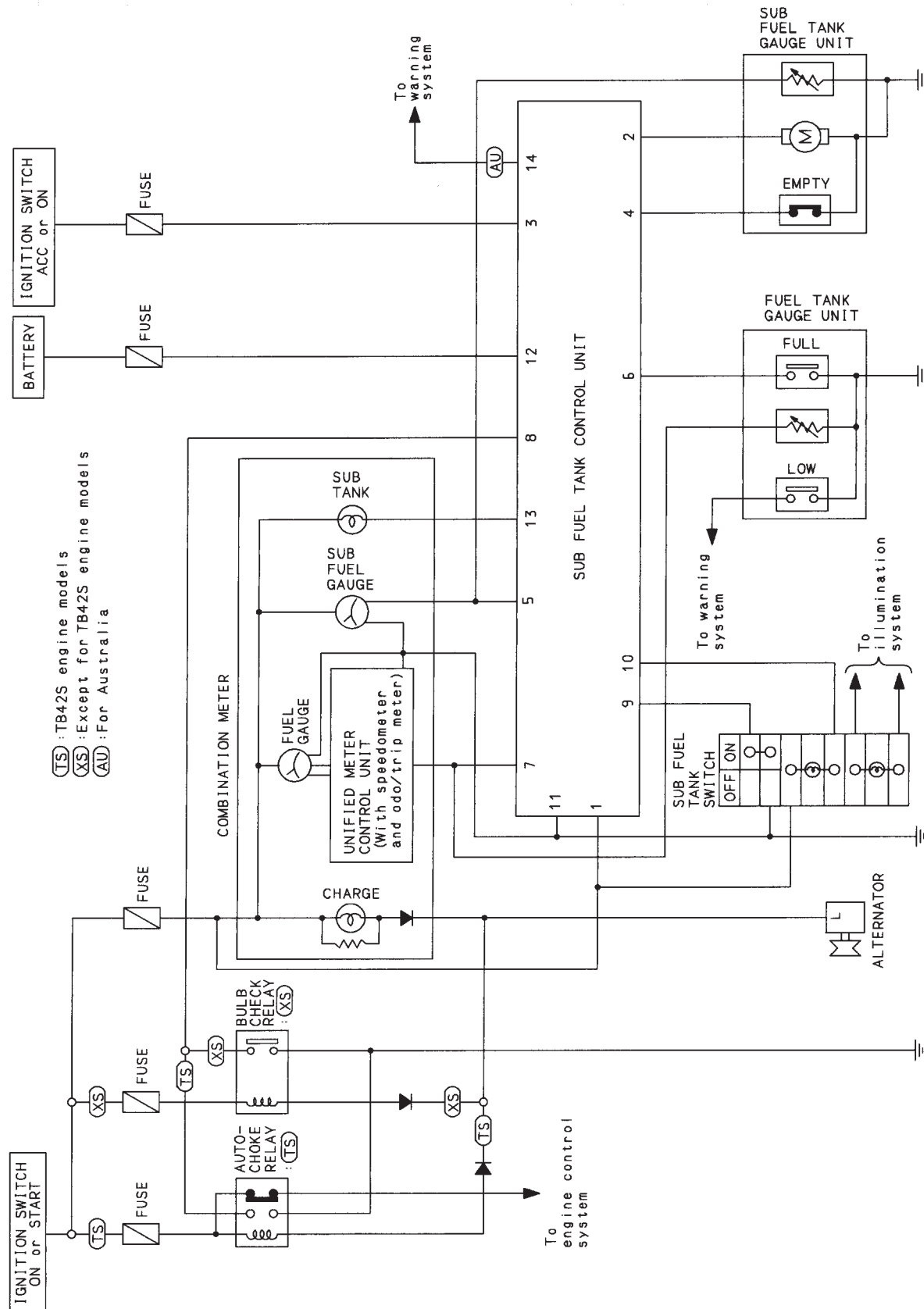
TROUBLE DIAGNOSES

Self-diagnosis for Sub Fuel Tank Control Module (Cont'd)

SUB FUEL TANK CONTROL MODULE TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values, and measured between each terminal and ⑪ (ground) with a voltmeter.

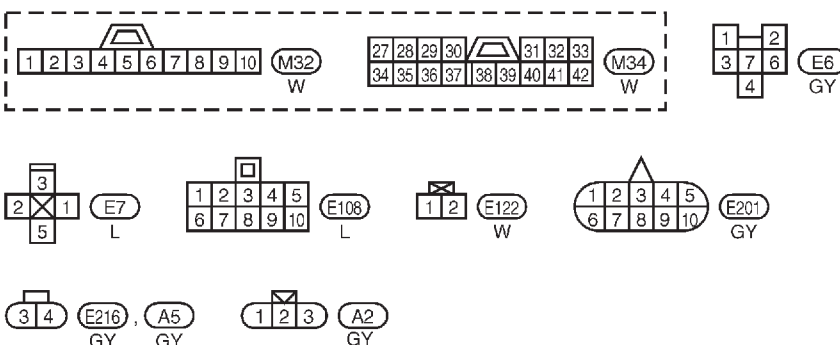
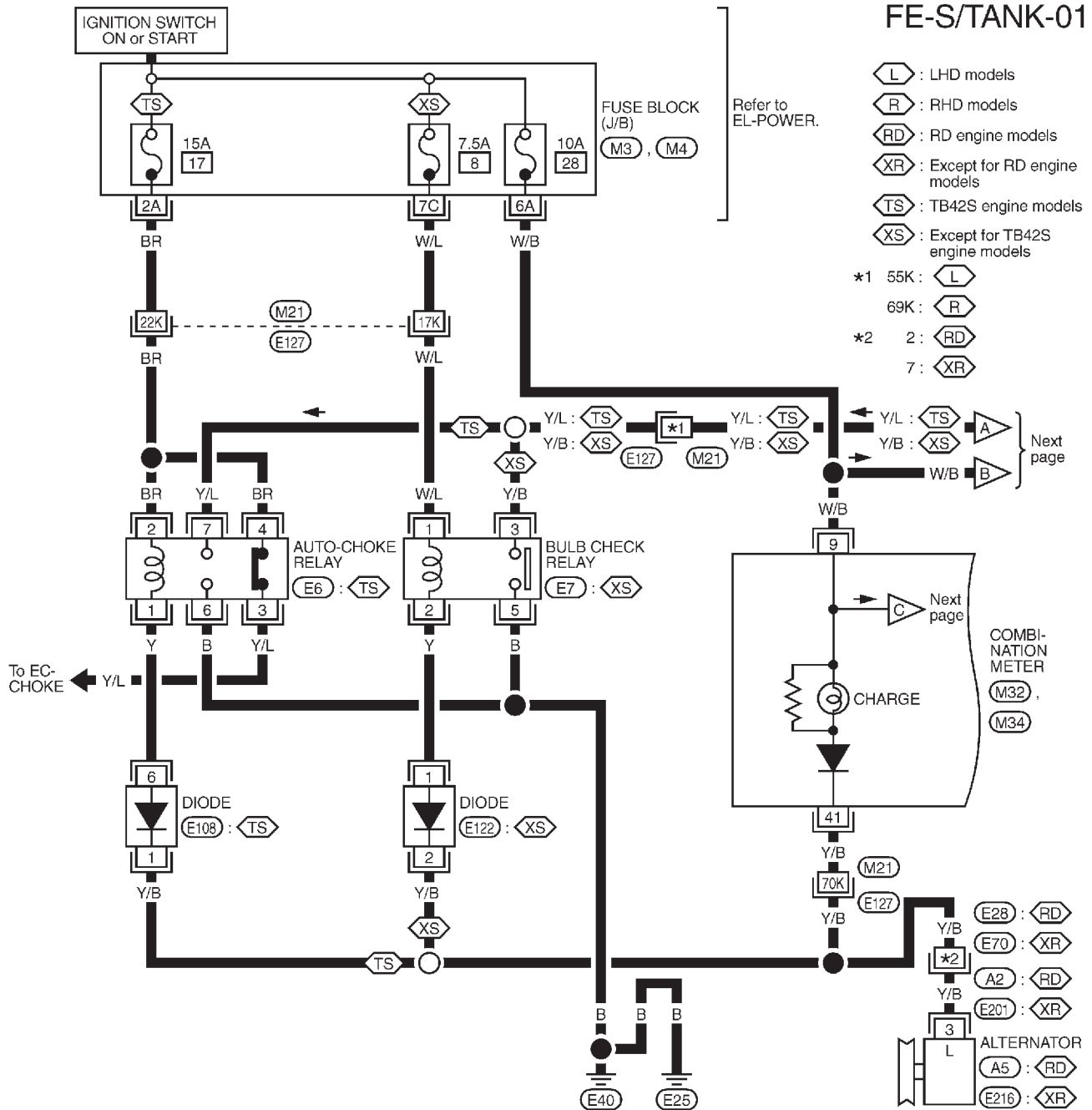
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC voltage)
1	W/B	Power source	Ignition switch "ON"	Approximately 12V
2	G/B	Sub fuel pump	Ignition switch "ON" — Sub fuel tank switch is "ON". — Main fuel tank is not full. — Sub fuel tank is not empty.	Approximately 12V
3	G/W	Power source	Ignition switch "ON" or "ACC"	Approximately 12V
4	Y/L	Empty switch	Ignition switch "ON" — Sub fuel tank is empty.	Approximately 5V
5	G/Y	Sub fuel tank gauge	Ignition switch "ON"	Approximately 0 - 4V
6	G	Full switch	Ignition switch "ON" — Main fuel tank is not full.	Approximately 5V
7	Y	Fuel gauge	Ignition switch "ON"	Approximately 0 - 2.5V
9	G/B	Sub fuel tank switch	Ignition switch "ON"	Approximately 5V
10	G	Indicator	Ignition switch "ON" — Sub fuel tank switch is "OFF".	Approximately 12V

FE-8

TROUBLE DIAGNOSES

Wiring Diagram — S/TANK —

FE-S/TANK-01



Refer to last page (Foldout page).

(M21), (E127)

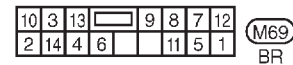
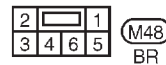
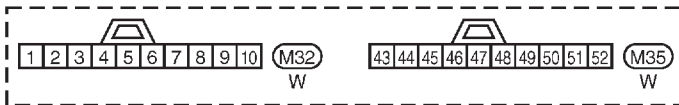
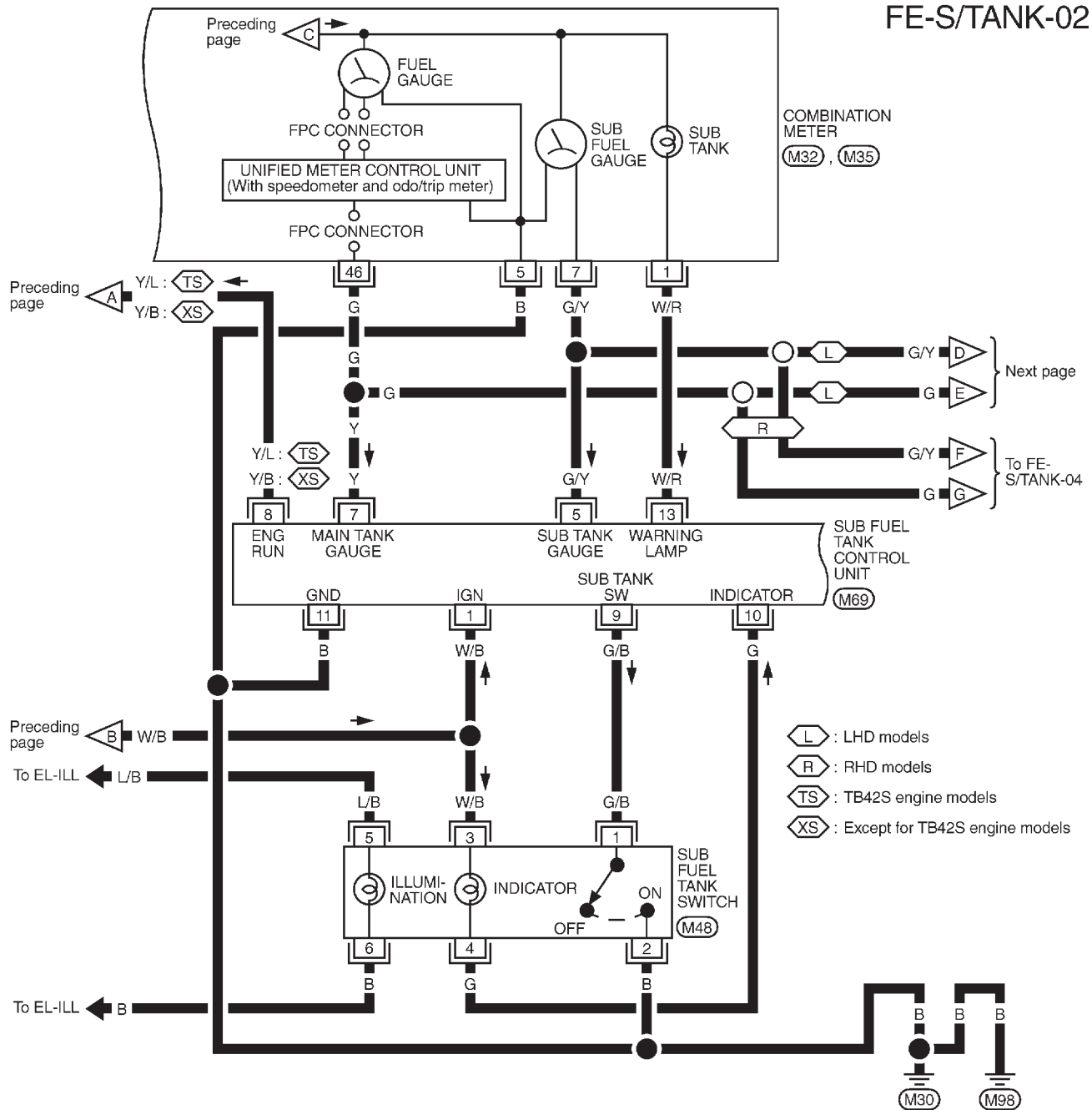
(M3)

(M4)

TROUBLE DIAGNOSES

Wiring Diagram — S/TANK — (Cont'd)

FE-S/TANK-02

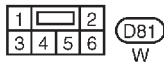
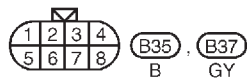
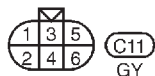
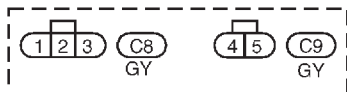
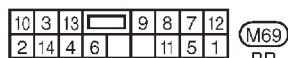
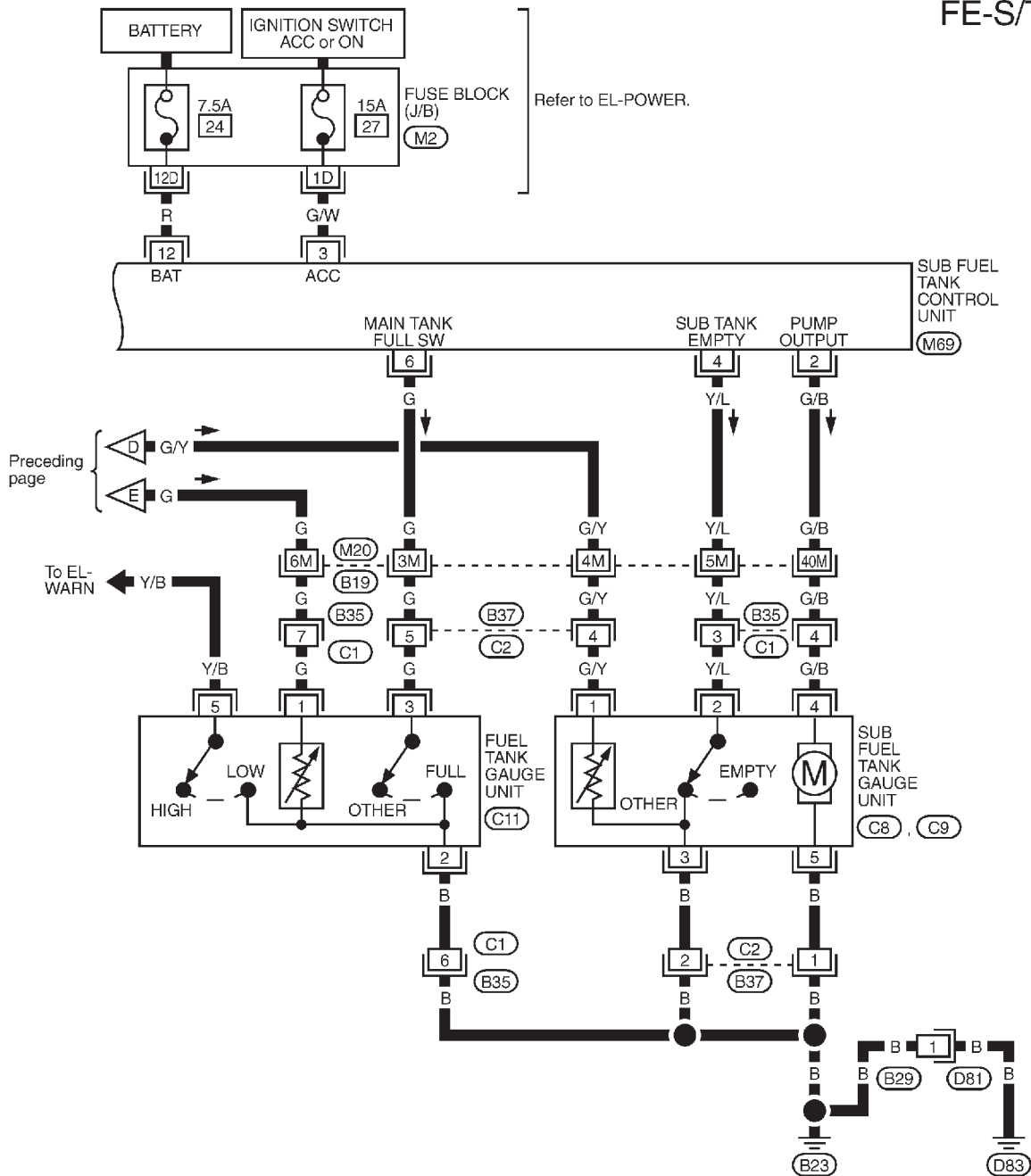


TROUBLE DIAGNOSES

Wiring Diagram — S/TANK — (Cont'd)

LHD MODELS

FE-S/TANK-03



Refer to last page (Foldout page).

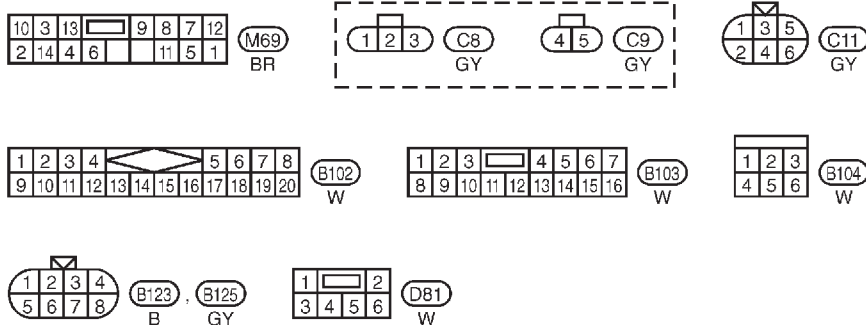
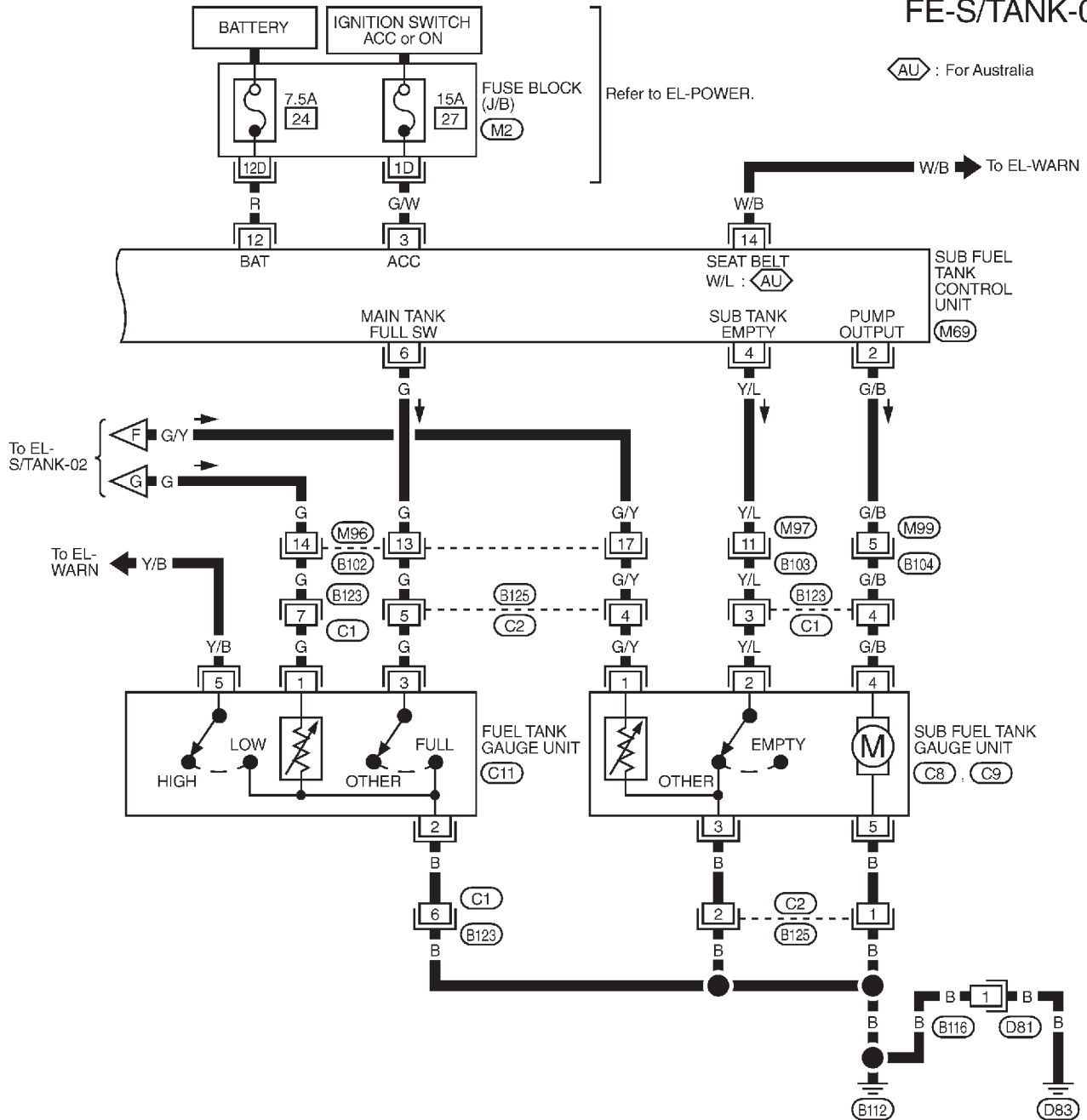
M20, B19
M2

Wiring Diagram — S/TANK — (Cont'd)

RHD MODELS

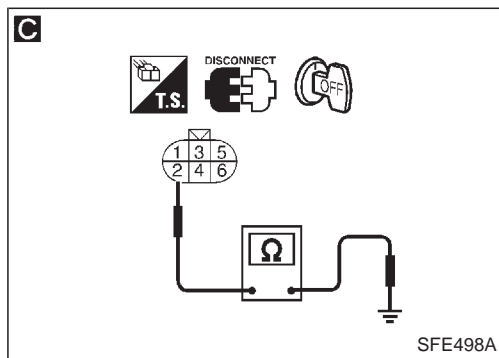
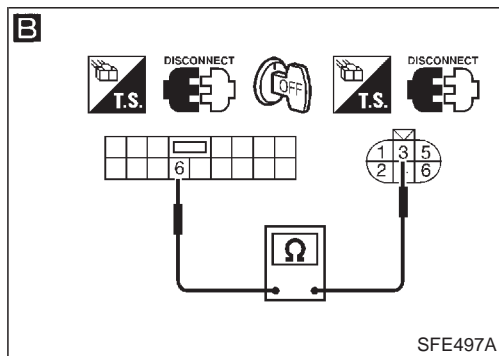
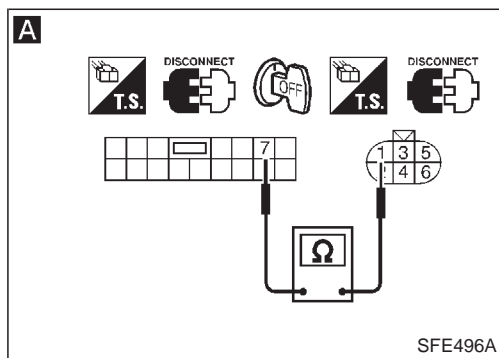
FE-S/TANK-04

 : For Australia



Refer to last page (Foldout page).

M2



Diagnostic Procedure 1

MALFUNCTION CODE NO. 11

INSPECTION START

A**CHECK INPUT SIGNAL CIRCUIT-1.**

1. Turn ignition switch "OFF".
 2. Disconnect sub fuel tank control module harness connector and fuel tank gauge unit harness connector.
 3. Check harness continuity between sub fuel tank control module connector terminal ⑦ and fuel tank gauge unit connector terminal ①.
- Continuity should exist.**

NG

Check the following.

- Harness connectors
LHD models (M20), (B19)
RHD models (M96), (B102)
 - Harness connectors
LHD models (B35), (C1)
RHD models (B123), (C1)
 - Harness for open or short between sub fuel tank control module and fuel tank gauge unit
- If NG, repair harness or connectors.

OK

B**CHECK INPUT SIGNAL CIRCUIT-2.**

- Check harness continuity between sub fuel tank control module harness connector terminal ⑥ and fuel tank gauge unit harness connector terminal ③.
- Continuity should exist.**

NG

Check the following.

- Harness connectors
LHD models (M20), (B19)
RHD models (M96), (B102)
 - Harness connectors
LHD models (B35), (C1)
RHD models (B123), (C1)
 - Harness for open or short between sub fuel tank control module and fuel tank gauge unit
- If NG, repair harness or connectors.

OK

C**CHECK GROUND CIRCUIT.**

- Check harness continuity between fuel tank gauge unit connector terminal ② and body ground.

NG

Check the following.

- Harness connectors
LHD models (C1), (B35)
RHD models (B123), (C1)
 - Harness connectors
LHD models (B29), (D81)
RHD models (B116), (D81)
 - Harness for open or short between fuel tank gauge unit and body ground
- If NG, repair harness or connectors.

OK

CHECK COMPONENT
(Fuel tank gauge unit).

Refer to "Component Inspection", FE-19.

NG

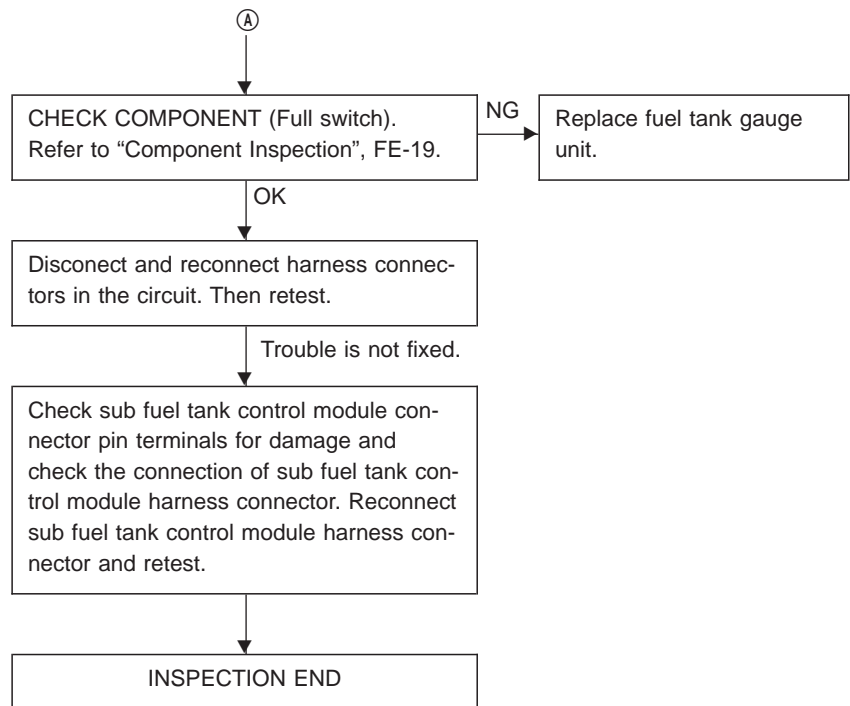
Replace fuel tank gauge unit.

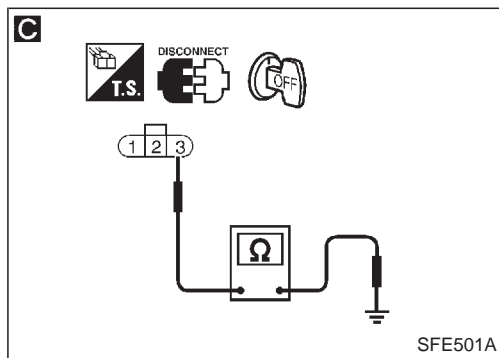
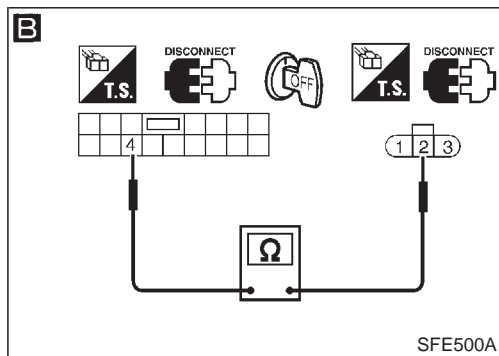
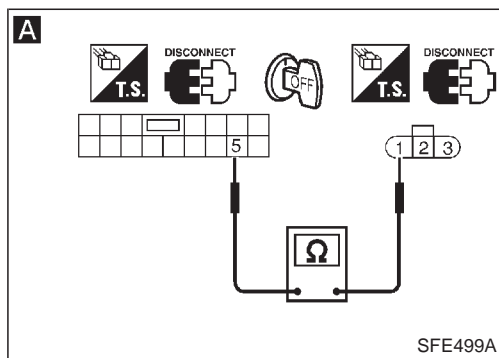
OK

A

TROUBLE DIAGNOSES

Diagnostic Procedure 1 (Cont'd)





Diagnostic Procedure 2

MALFUNCTION CODE NO. 12

INSPECTION START

A**CHECK INPUT SIGNAL CIRCUIT-1.**

1. Turn ignition switch "OFF".
2. Disconnect sub fuel tank control module connector and sub fuel tank gauge unit connector.
3. Check harness continuity between sub fuel tank control module connector terminal ⑤ and sub fuel tank gauge unit connector terminal ①.
Continuity should exist.

NG

Check the following.

- Harness connectors
LHD models (M20), (B19)
RHD models (M96), (B102)
- Harness connectors
LHD models (C2), (B37)
RHD models (B125), (C2)
- Harness for open or short between sub fuel tank control module and sub fuel tank gauge unit
If NG, repair harness or connectors.

OK

B**CHECK INPUT SIGNAL CIRCUIT-2.**

- Check harness continuity between sub fuel tank control module connector terminal ④ and sub fuel tank gauge unit connector terminal ②.
Continuity should exist.

NG

Check the following.

- Harness connectors
LHD models (M20), (B19)
RHD models (M97), (B103)
- Harness connectors
LHD models (C1), (B35)
RHD models (B123), (C1)
- Harness for open or short between sub fuel tank control module and sub fuel tank gauge unit
If NG, repair harness or connectors.

OK

C**CHECK GROUND CIRCUIT.**

- Check harness continuity between sub fuel tank gauge unit connector terminal ③ and body ground.
Continuity should exist.

NG

Check the following.

- Harness connectors
LHD models (C2), (B37)
RHD models (C2), (B125)
- Harness connectors
LHD models (B29), (D81)
RHD models (B116), (D81)
- Harness for open or short between sub fuel tank gauge unit and body ground
If NG, repair harness or connectors.

OK

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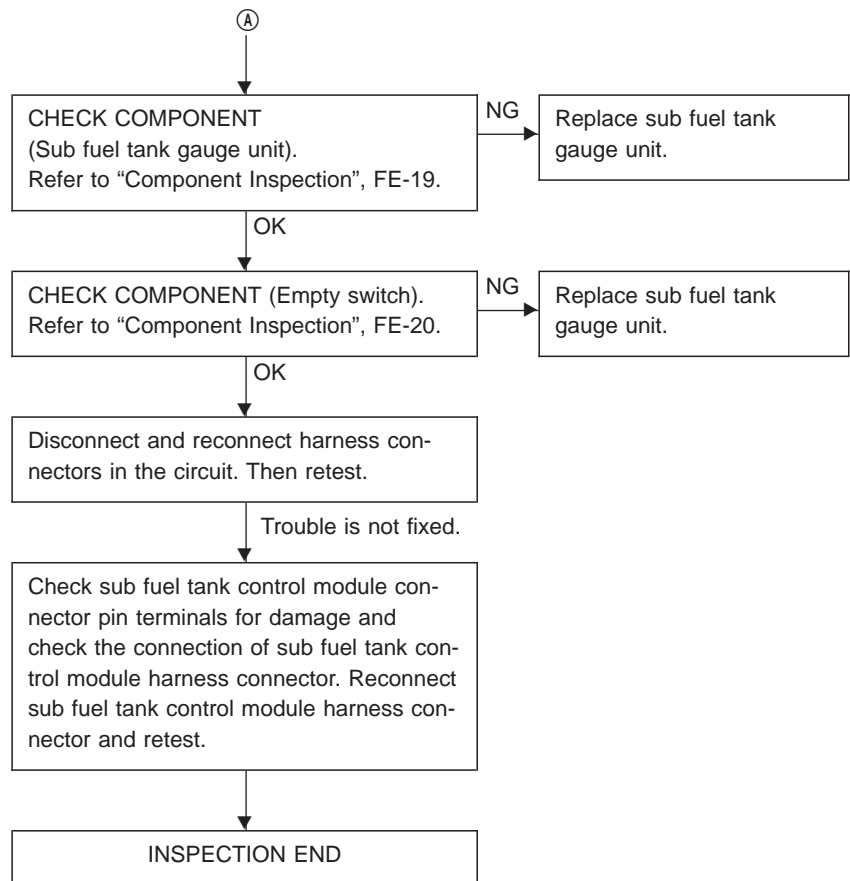
EL

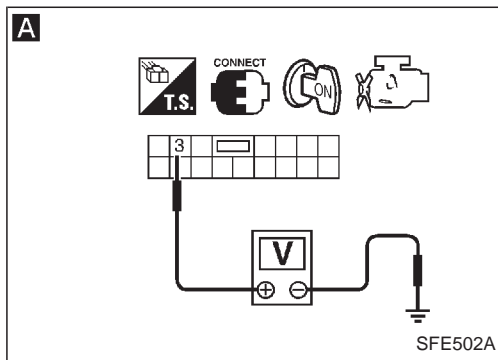
SE

IDX

TROUBLE DIAGNOSES

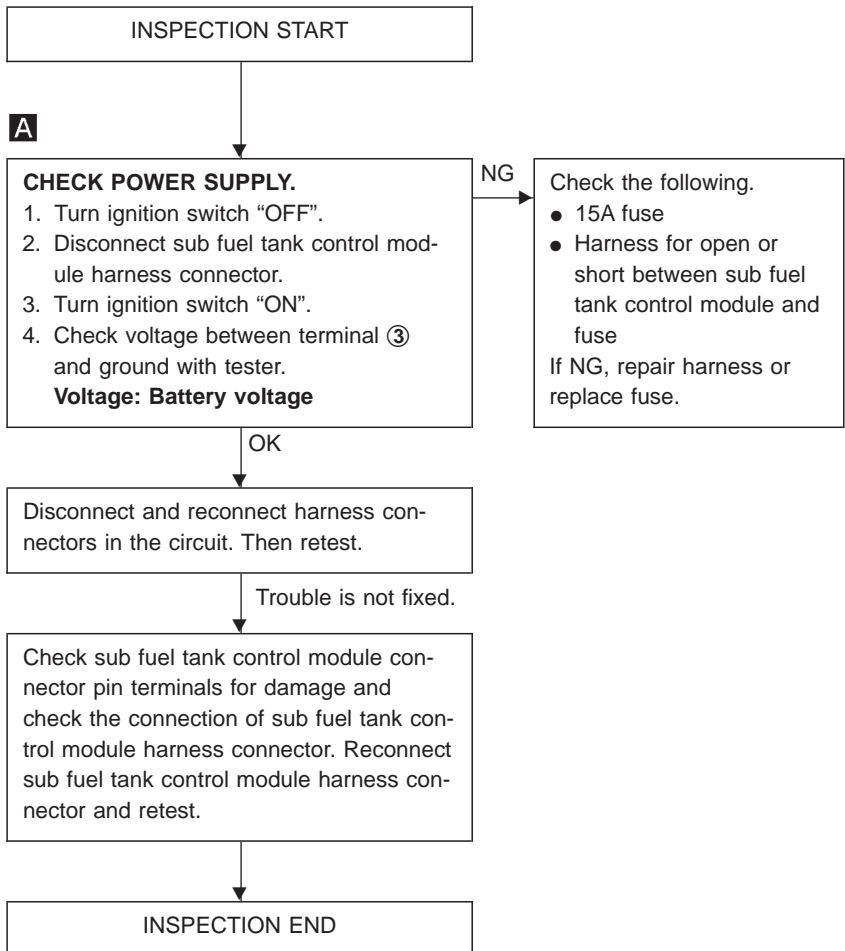
Diagnostic Procedure 2 (Cont'd)





Diagnostic Procedure 3

MALFUNCTION CODE NOS. 13 AND 14



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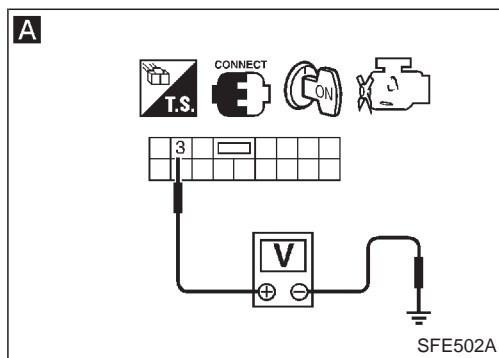
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Diagnostic Procedure 4

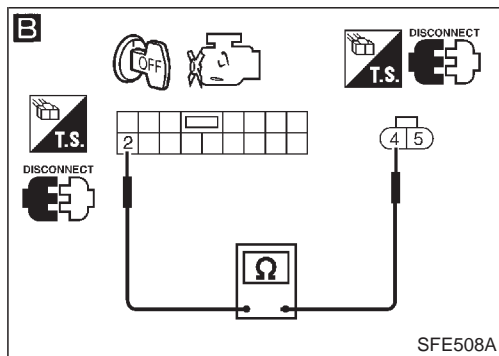
MALFUNCTION CODE NO. 14



- A**
- CHECK POWER SUPPLY.**
1. Turn ignition switch "OFF".
 2. Disconnect sub fuel tank control module harness connector.
 3. Turn ignition switch "ON".
 4. Check voltage between terminal ③ and ground with tester.
- Voltage: Battery voltage**

NG → Check the following.

- 15A fuse
- Harness for open or short between sub fuel tank control module and fuse

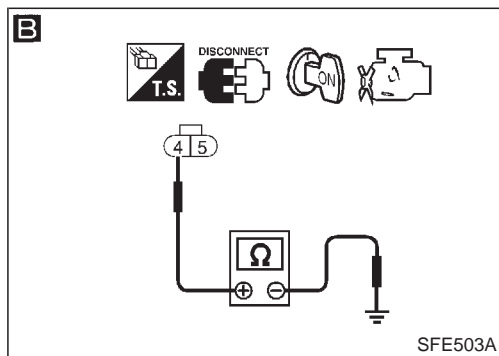


- B**
- CHECK INPUT SIGNAL CIRCUIT.**
1. Turn ignition switch "OFF".
 2. Disconnect sub fuel tank gauge unit harness connector.
 3. Check harness continuity between sub fuel tank control module harness connector terminal ② and sub fuel tank gauge unit harness connector terminal ④.
 4. Check harness continuity between sub fuel tank gauge unit harness connector terminal ④ and body ground.
- Continuity should exist.**
- Continuity should not exist.**

NG → Check the following.

- Harness connectors
LHD models (M20), (B19)
RHD models (M99), (B104)
- Harness connectors
LHD models (B35), (C1)
RHD models (B123), (C1)
- Harness for open or short between sub fuel tank gauge unit and body ground

If NG, repair harness or connectors.

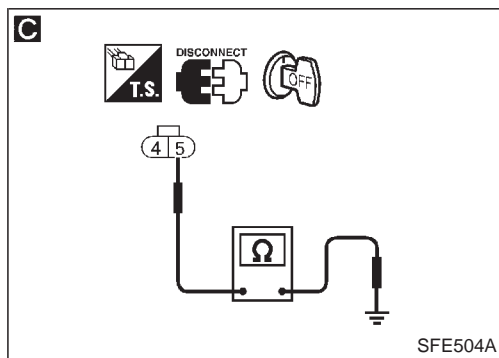


- C**
- CHECK GROUND CIRCUIT.**
- Check harness continuity between sub fuel tank gauge unit connector terminal ⑤ and body ground.

NG → Check the following.

- Harness connectors
LHD models (C2), (B37)
RHD models (C2), (B125)
- Harness connectors
LHD models (B29), (D81)
RHD models (B116), (D81)
- Harness for open or short between sub fuel tank gauge unit and body ground

If NG, repair harness or connectors.



CHECK COMPONENT (Sub fuel pump).
Refer to "Component Inspection", FE-20.

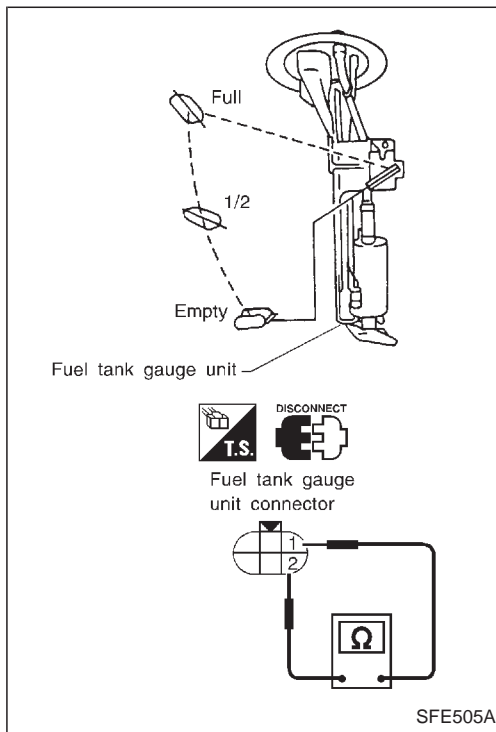
NG → Replace sub fuel tank gauge unit.

OK → Disconnect and reconnect harness connectors in the circuit. Then retest.

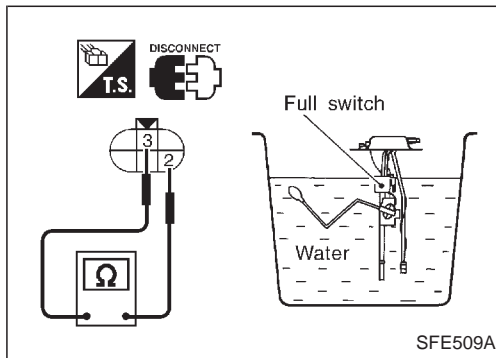
Trouble is not fixed.

Check sub fuel tank control module connector pin terminals for damage and check the connection of sub fuel tank control module harness connector. Reconnect sub fuel tank control module harness connector and retest.

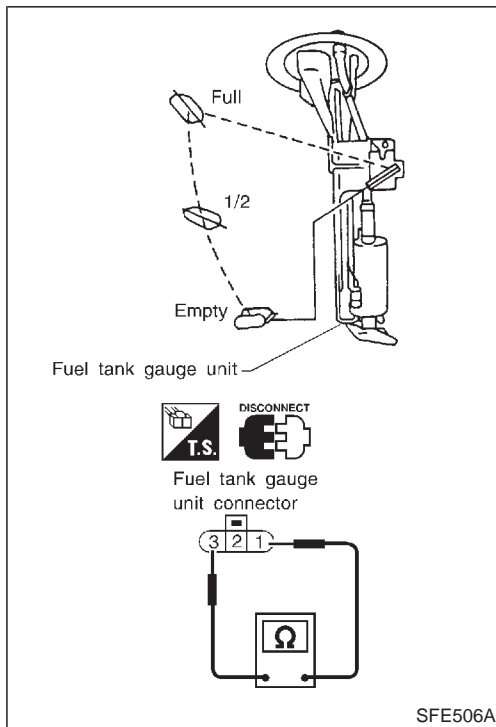
INSPECTION END



SFE505A



SFE509A



SFE506A

Component Inspection

FUEL TANK GAUGE UNIT

Remove fuel tank gauge unit.

Check resistance between terminals ① and ② with ohmmeter.

Float position	Resistance value (Ω)
Full	Approximately 6.0
1/2	Approximately 33.0
Empty	Approximately 80.0

Full and Empty: When float rod is in contact with stopper.

If NG, replace fuel tank gauge unit.

Full switch

Check circuit continuity between fuel tank gauge unit terminals ② and ③ using a circuit tester.

Measuring procedure	Result
Dip the empty switch vertically into the water.	Continuity does not exist.
Expose the empty switch to the air.	Continuity exists.

If NG, replace fuel tank gauge unit.

SUB FUEL TANK GAUGE UNIT

Sub fuel tank gauge

1. Remove sub fuel tank gauge unit.
2. Measure resistance between terminals ① and ③.

Float position	Resistance value (Ω)
Full	Approximately 6.0
1/2	Approximately 33.0
Empty	Approximately 80.0

Full and Empty: When float rod is in contact with stopper.

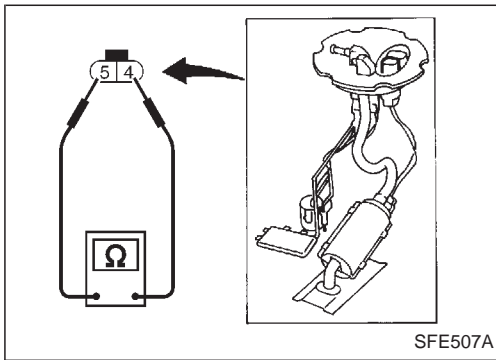
TROUBLE DIAGNOSES

Component Inspection (Cont'd)

Sub fuel pump

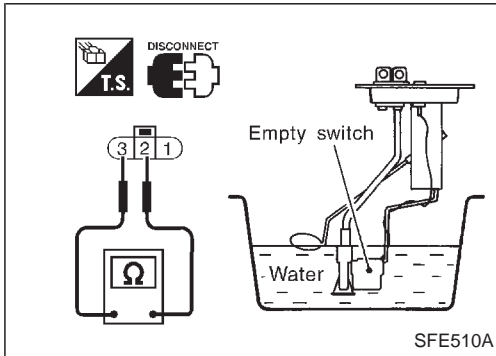
Check resistance between terminals ④ and ⑤ with ohmmeter.

Resistance: Approximately less than 2Ω



Empty switch

Check circuit continuity between fuel tank gauge unit terminals ② and ③ using a circuit tester.



Measuring procedure	Result
Dip the empty switch vertically into the water.	Continuity exists.
Expose the empty switch to the air.	Continuity does not exist.

If NG, replace sub fuel tank gauge unit.

IDX

FUEL SYSTEM

WARNING:

When replacing fuel line parts, be sure to observe the following:

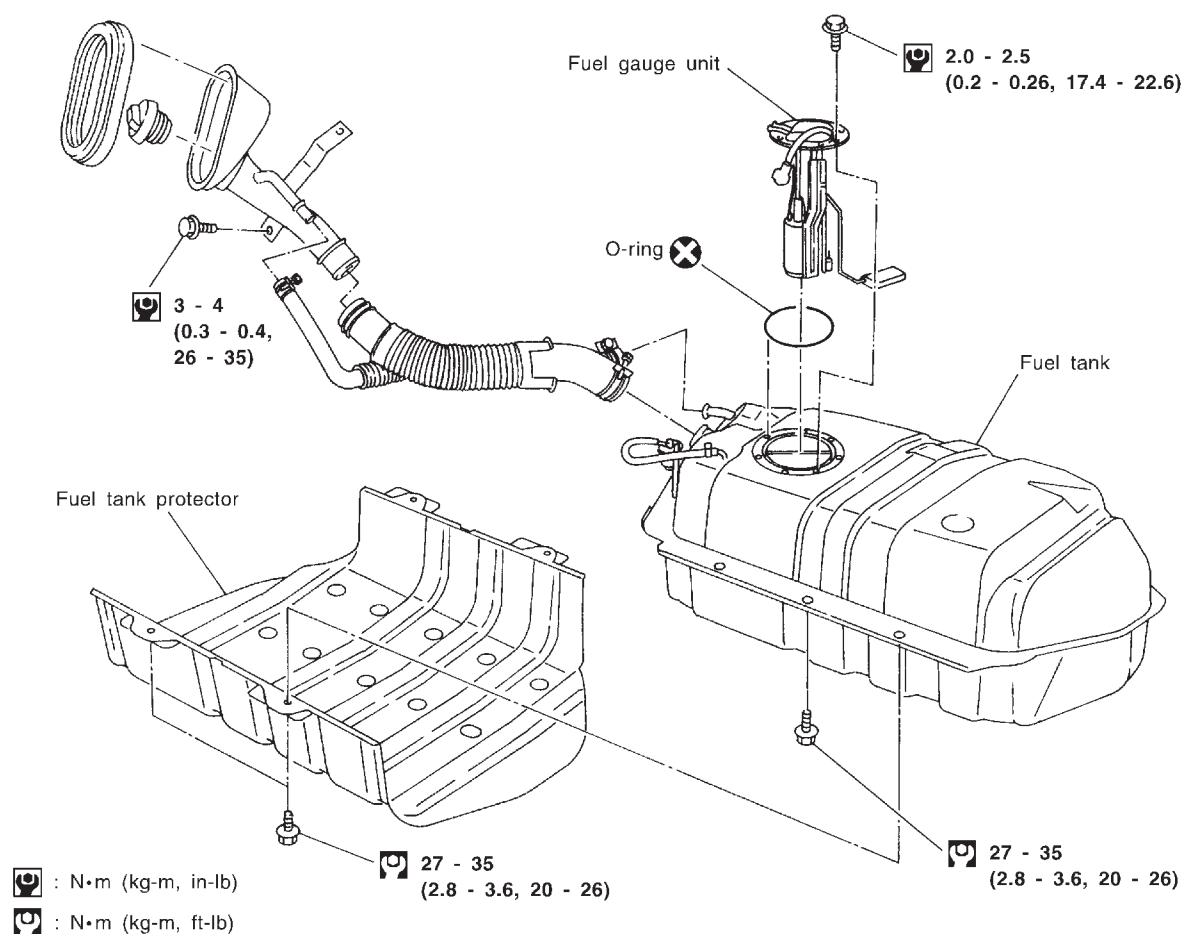
- Put a “CAUTION: INFLAMMABLE” sign in workshop.
- Be sure to furnish the workshop with a CO₂ fire extinguisher.
- Be sure to disconnect battery ground cable before conducting operations.
- Put drained fuel in an explosion-proof container and put lid on securely.

CAUTION:

- Do not disconnect any fuel line unless absolutely necessary.
- Plug hose and pipe openings to prevent entry of dust or dirt.
- Always replace O-ring and clamps with new ones.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose clamps excessively to avoid damaging hoses.
- When installing fuel check valve, be careful of its designated direction. (Refer to EC section.)
- Run the engine and check for leaks at connections.

SEC. 172

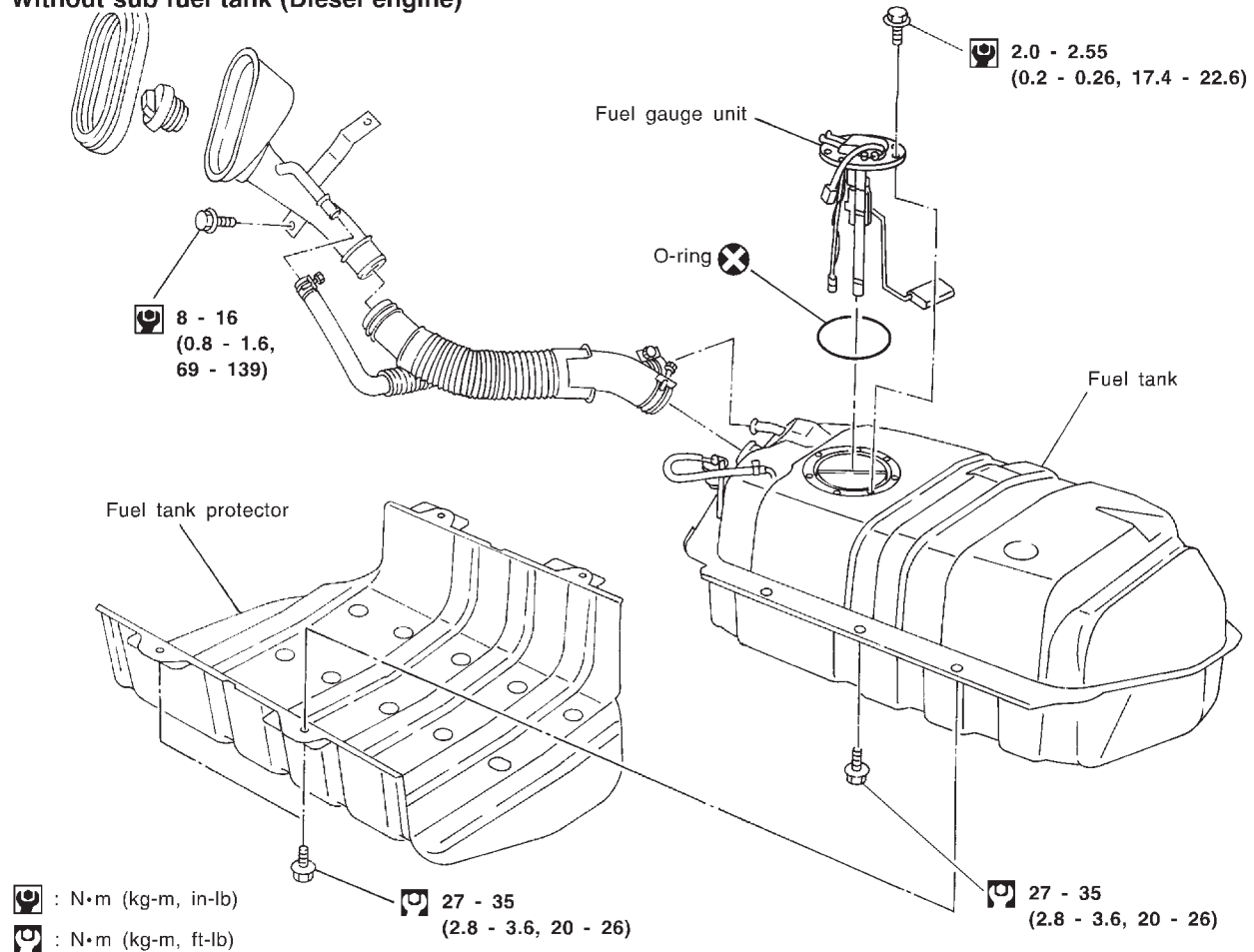
Without sub fuel tank (Gasoline engine)



SFE486A

SEC. 172

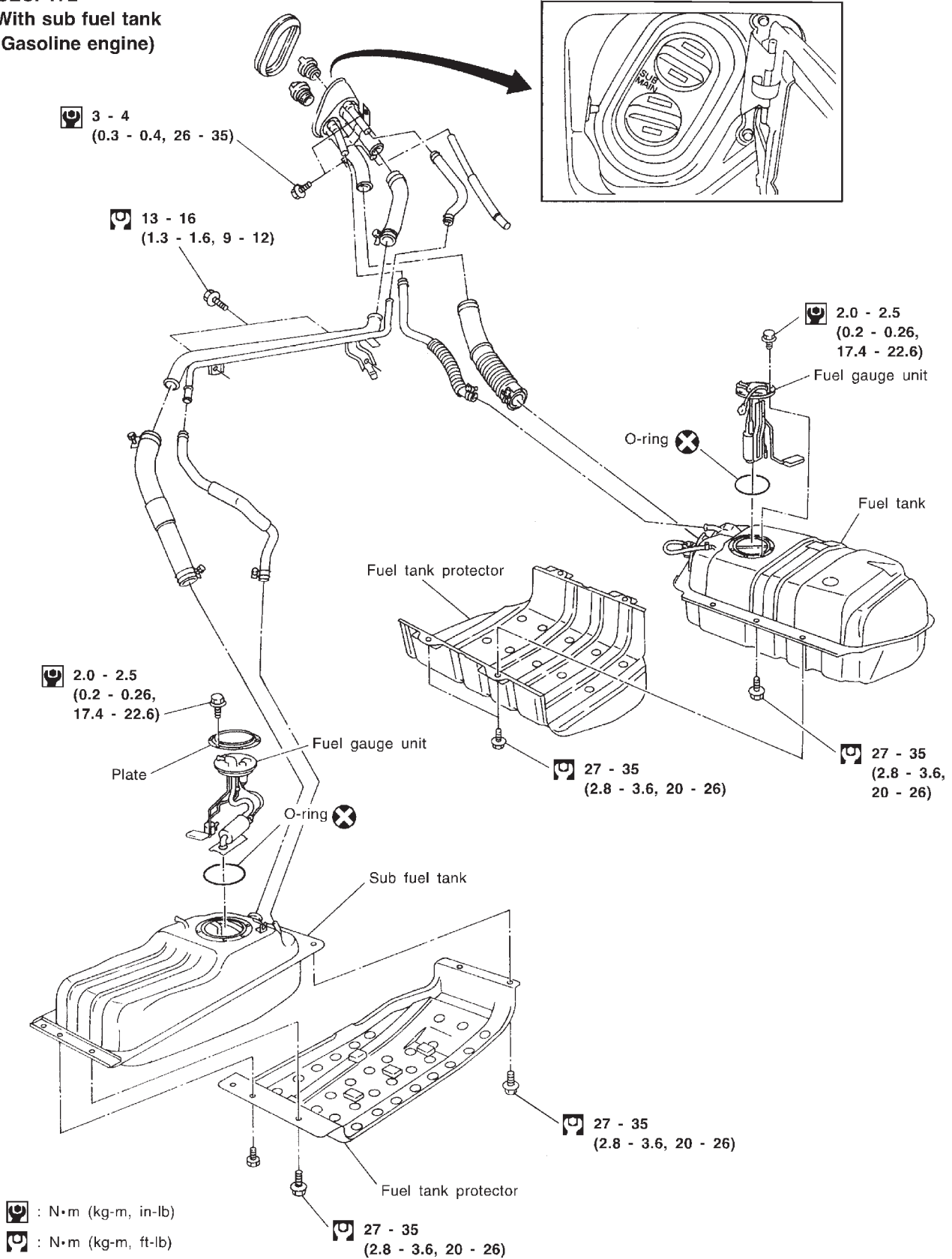
Without sub fuel tank (Diesel engine)



SFE514A

SEC. 172

With sub fuel tank
(Gasoline engine)

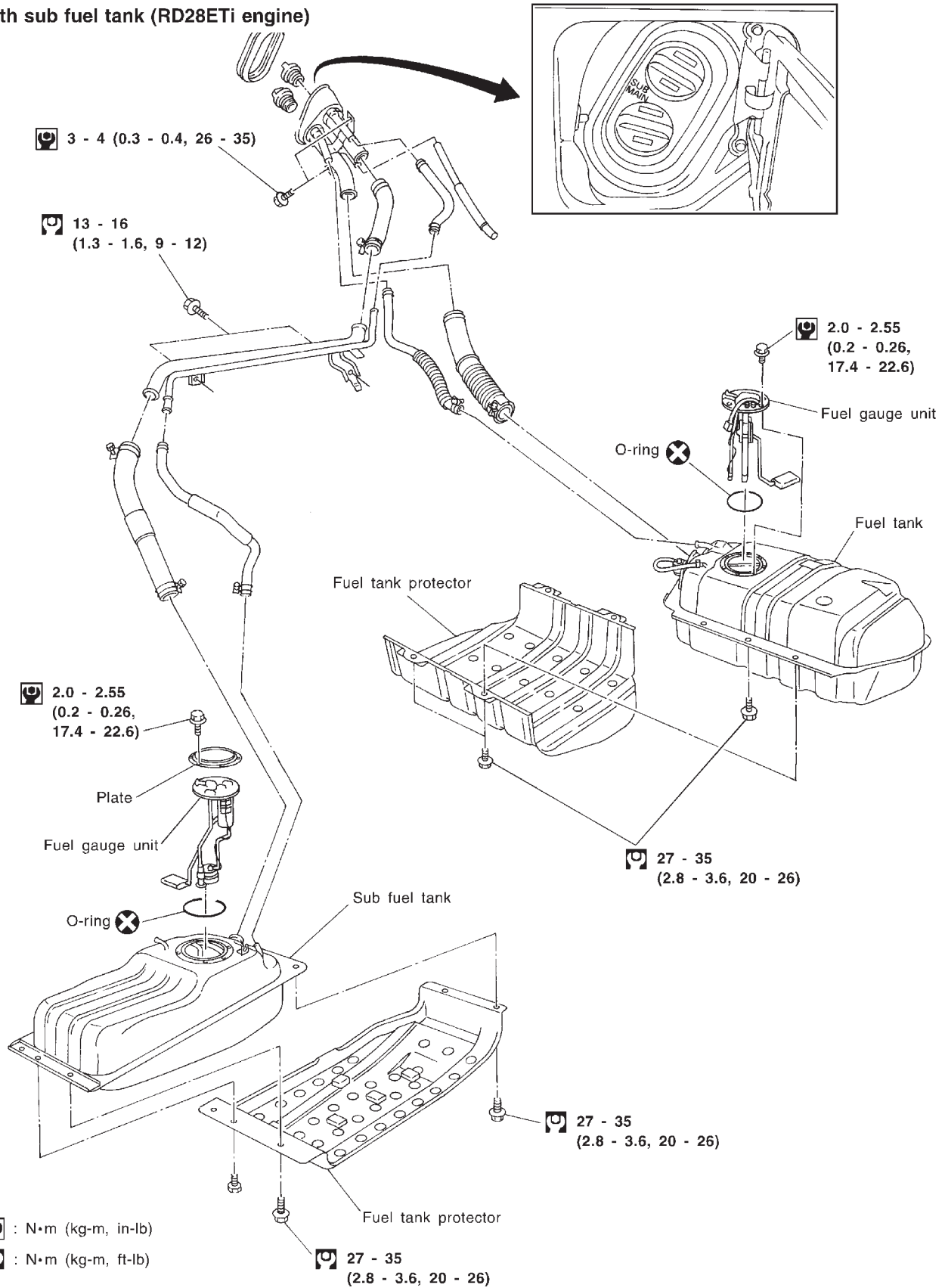


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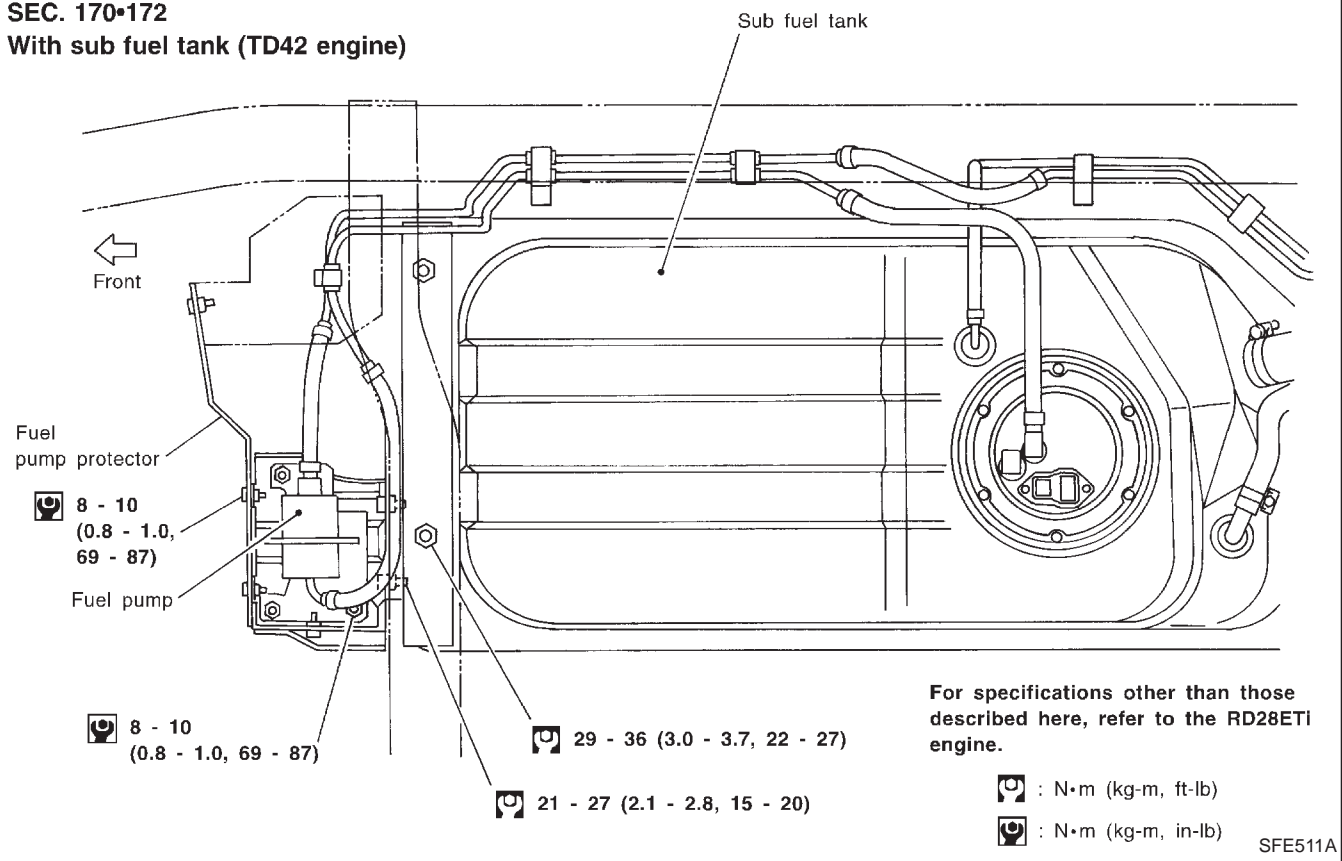
FUEL SYSTEM

SEC. 172

With sub fuel tank (RD28ETi engine)

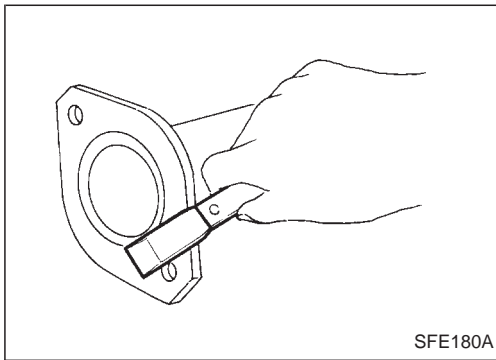


SEC. 170•172
With sub fuel tank (TD42 engine)



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EXHAUST SYSTEM

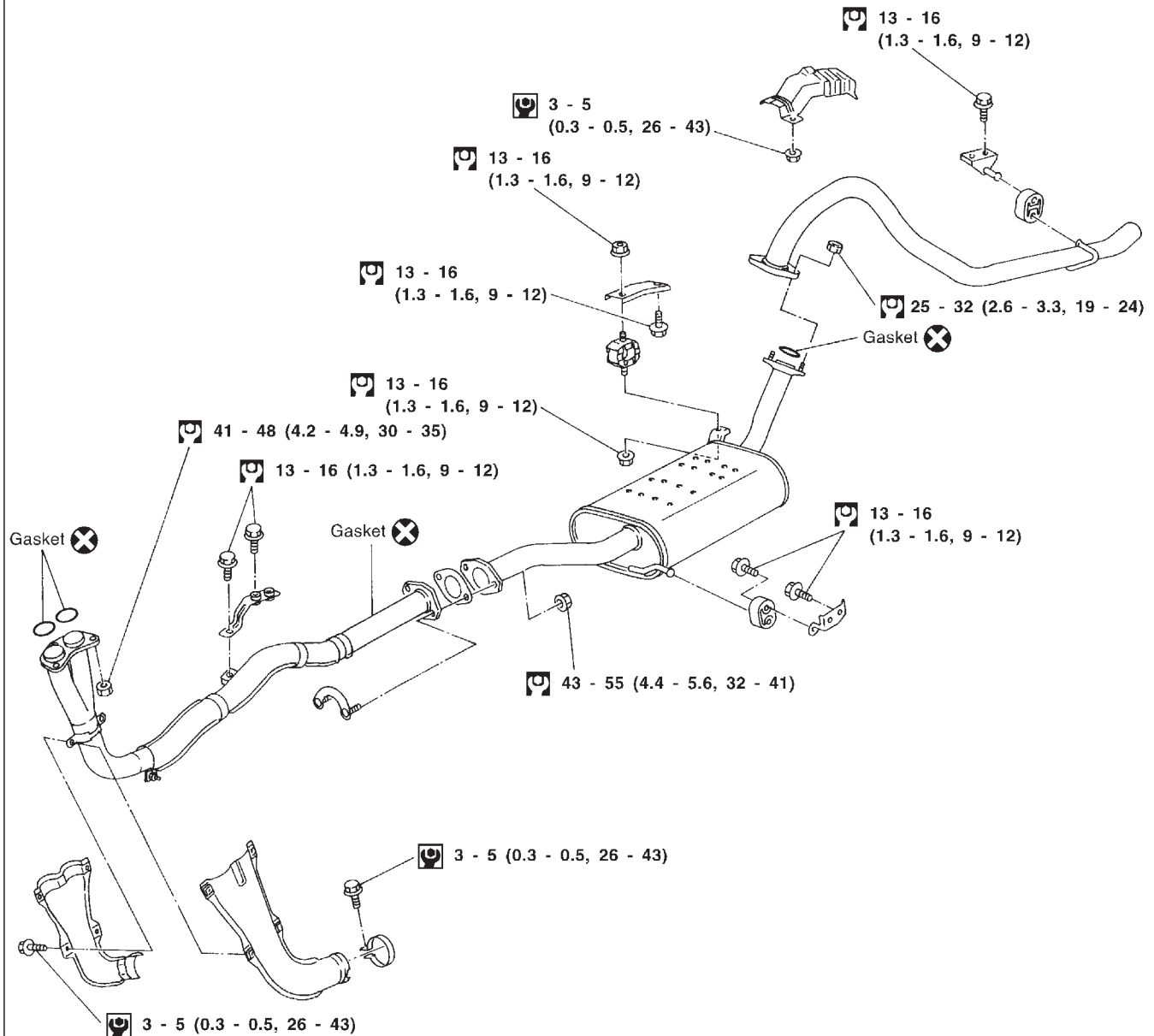


CAUTION:

- Always replace exhaust gaskets with new ones when reassembling. If gasket is left on flange surface, scrape off completely as shown at left.
- With engine running, check all tube connections for exhaust gas leaks, and entire system for unusual noises.
- Ensure that mounting brackets and mounting insulators are installed properly and free from undue stress. Improper installation could result in excessive noise or vibration.

SEC. 200

Wagon with TB42S engine



: N·m (kg-m, in-lb)

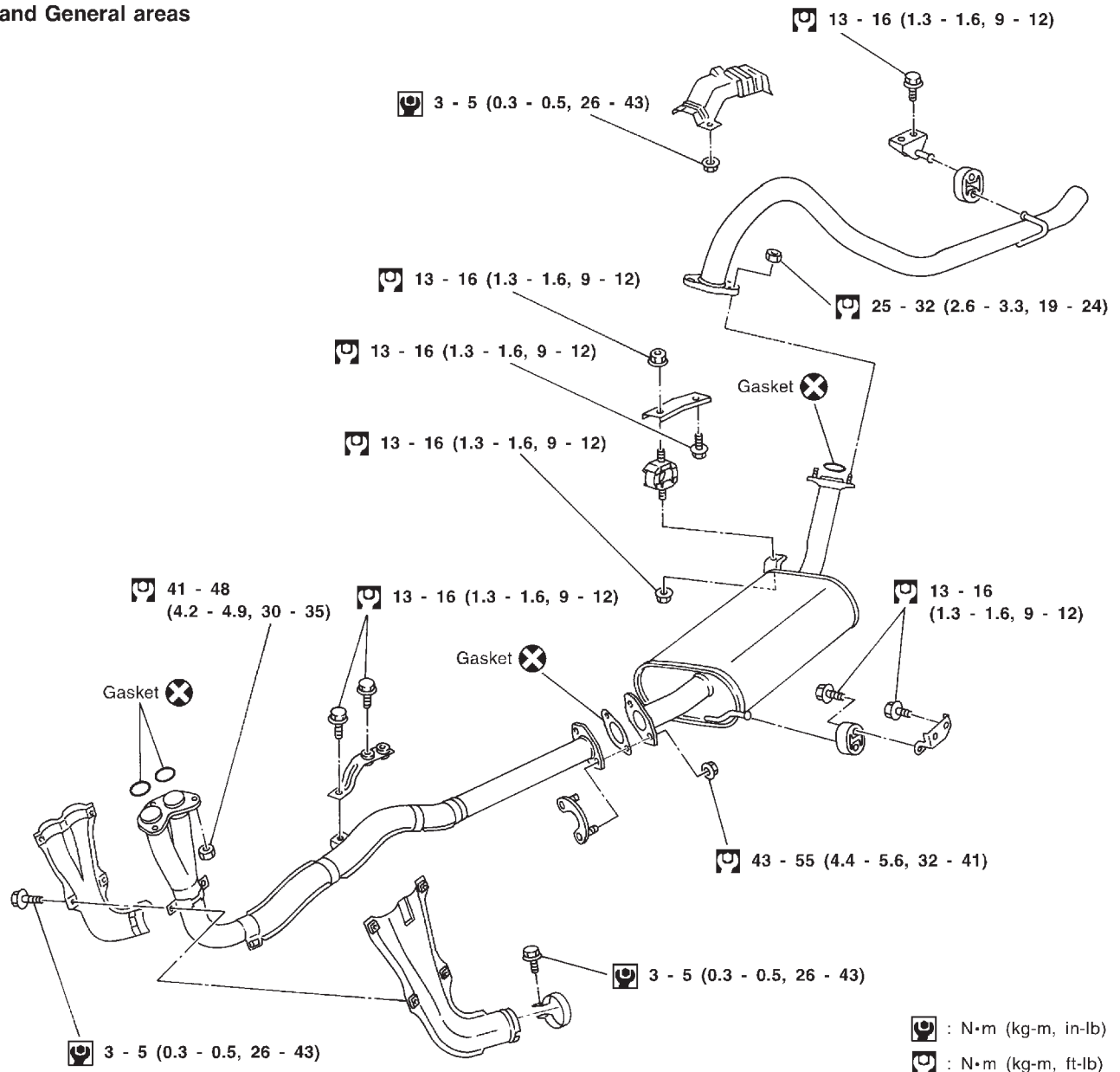
: N·m (kg-m, ft-lb)

SFE488A

EXHAUST SYSTEM

SEC. 200

Hardtop with TB42S engine for the Middle East
and General areas

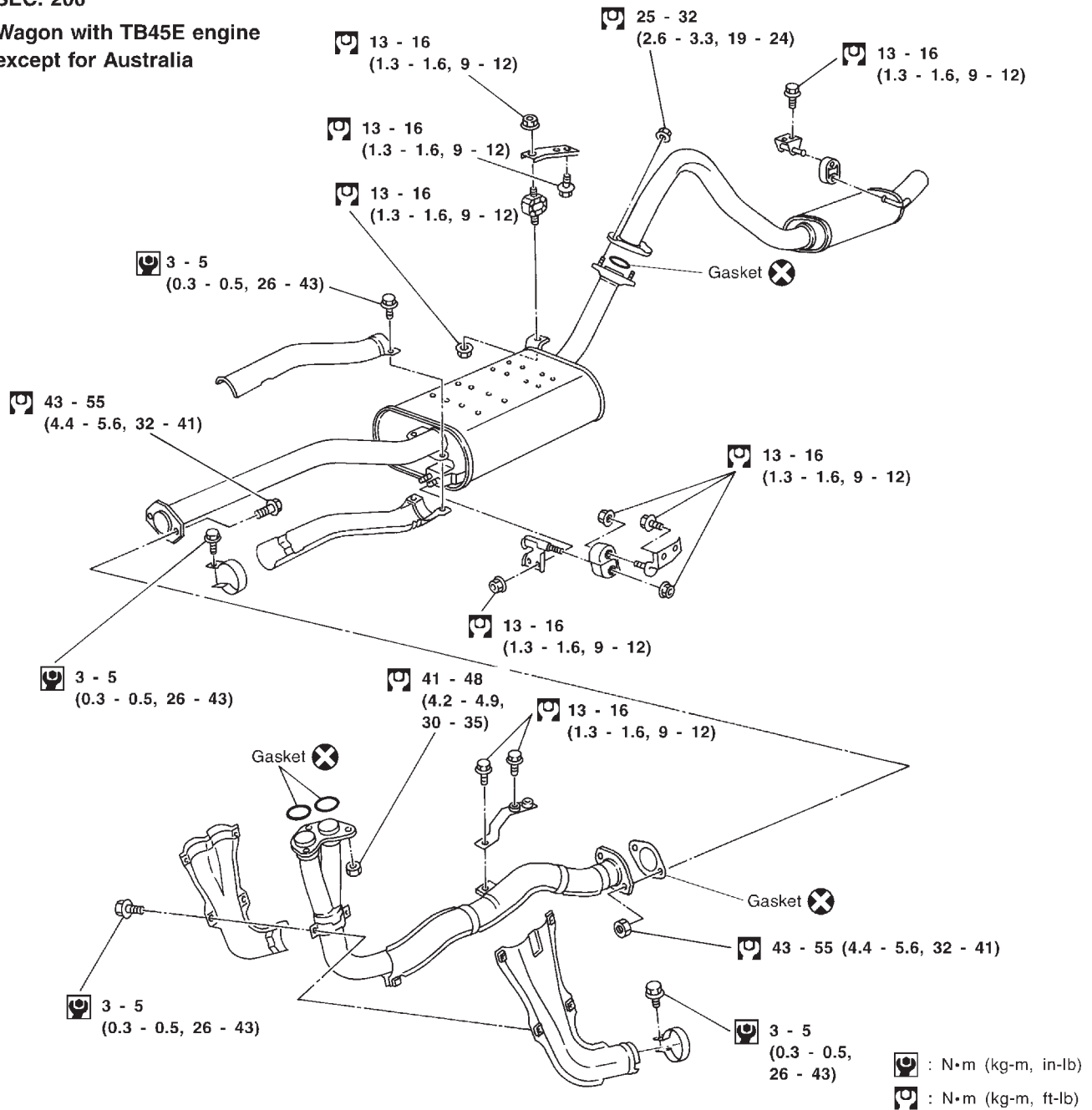


SFE490A

EXHAUST SYSTEM

SEC. 200

Wagon with TB45E engine
except for Australia

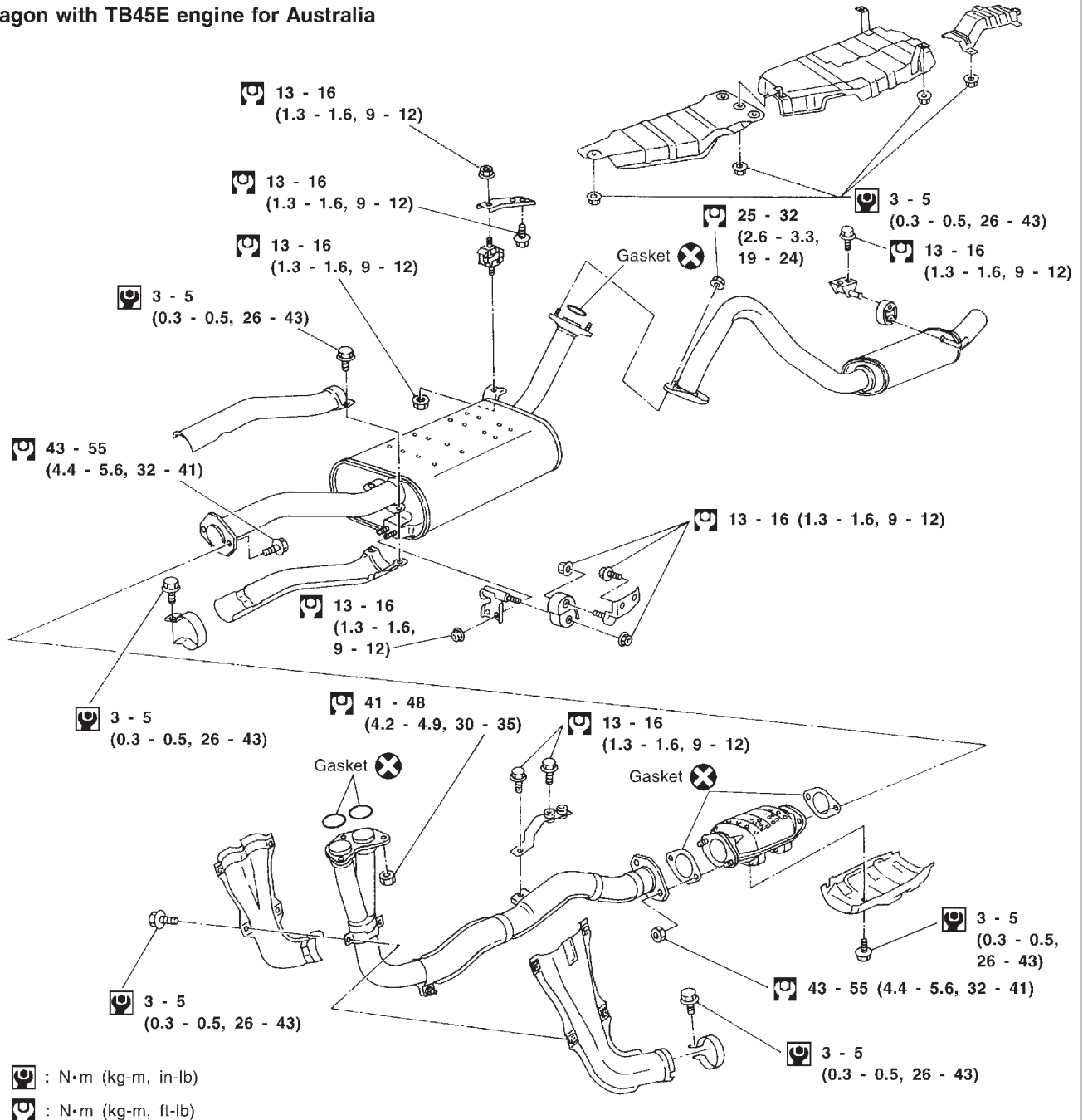


SFE491A

EXHAUST SYSTEM

SEC. 200

Wagon with TB45E engine for Australia

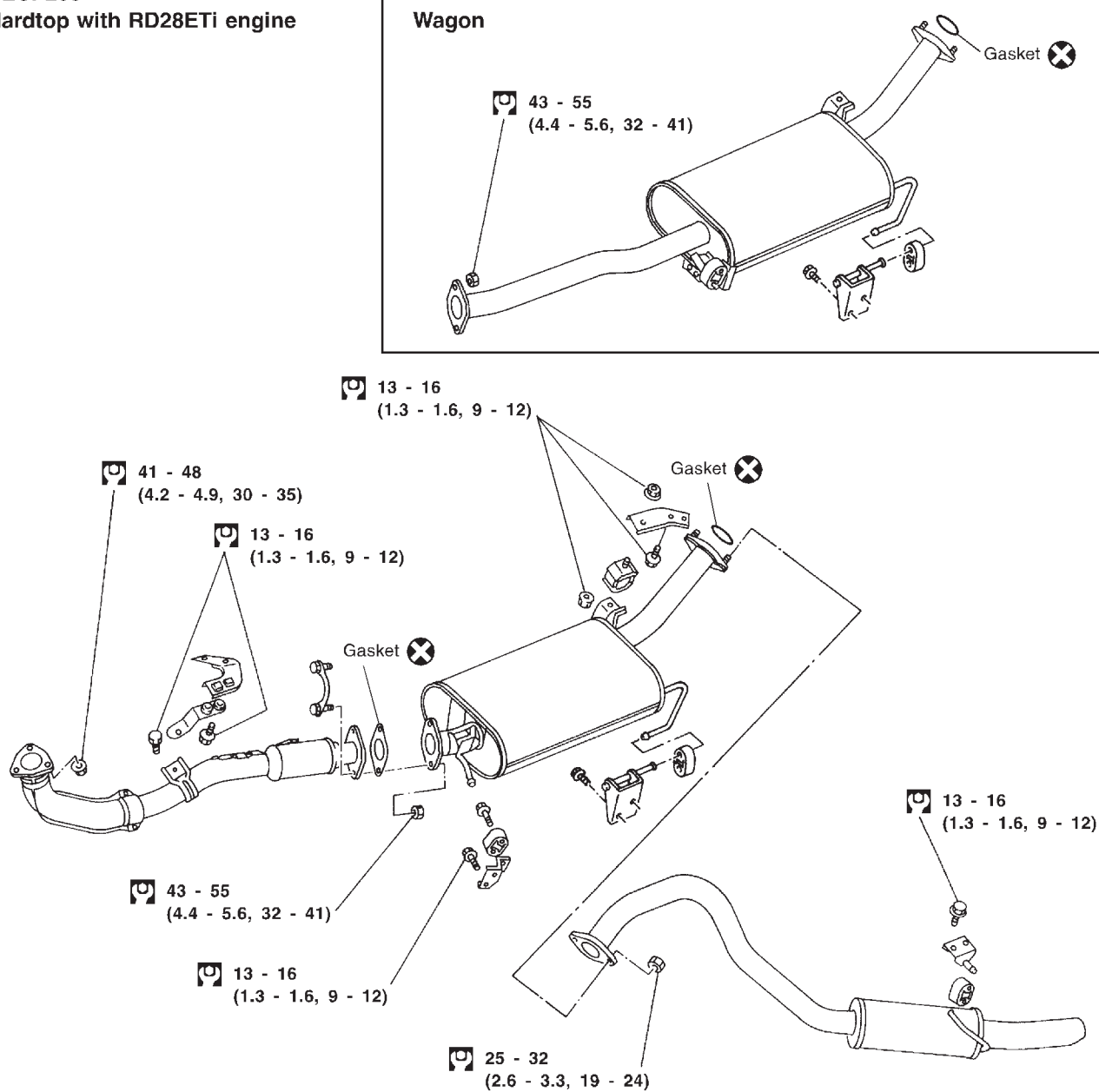



SFE489A

EXHAUST SYSTEM

SEC. 200 Hardtop with RD28ETi engine

Wagon

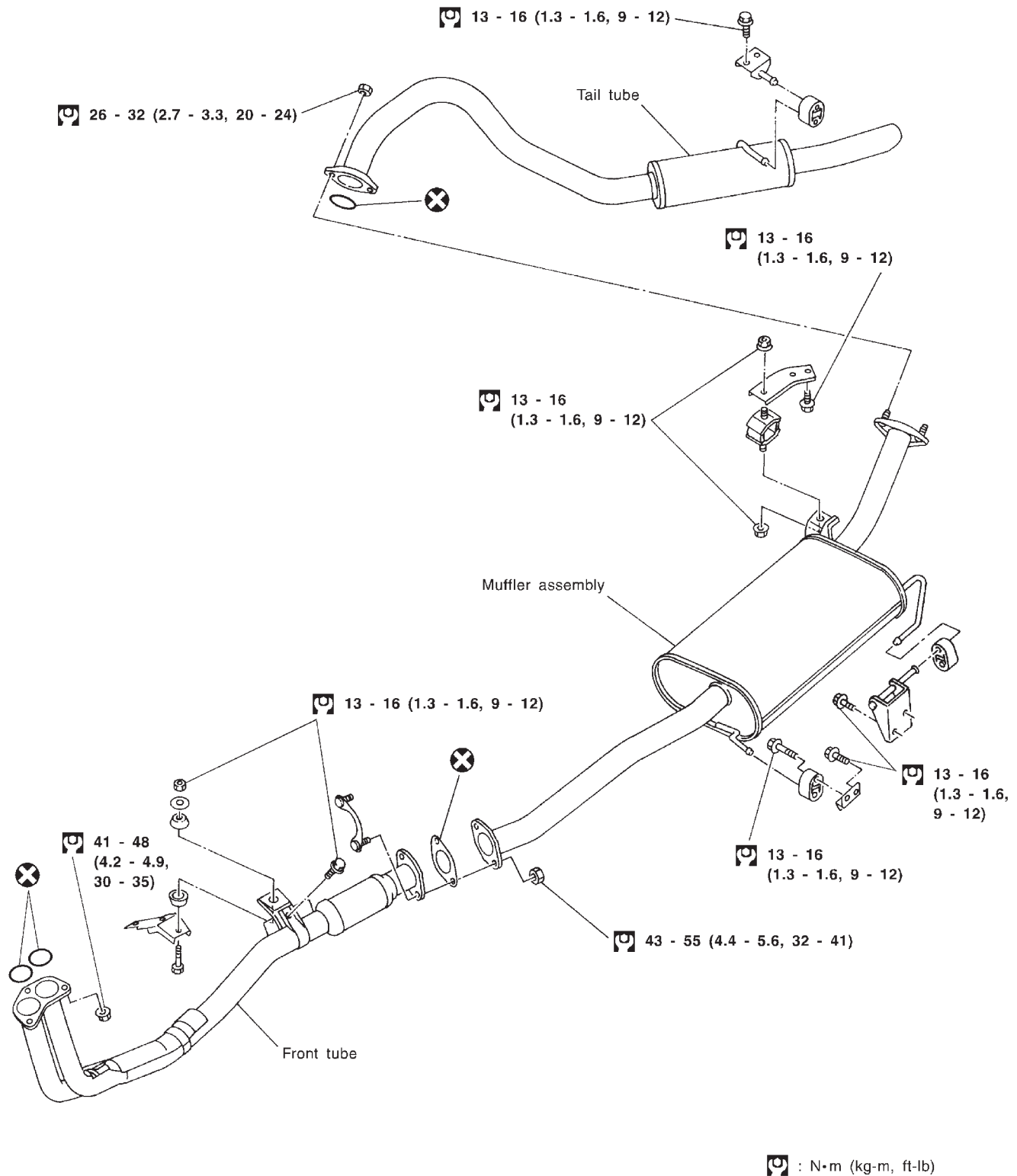


 : N•m (kg-m, ft-lb)

SFE516A

EXHAUST SYSTEM

SEC. 200
TD42 engine



GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
SE
IDX