

ACCELERATOR CONTROL, FUEL & EXHAUST SYSTEMS

SECTION FE

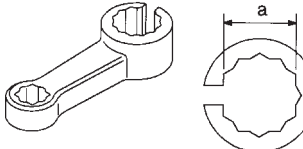
CONTENTS

	QG	
PREPARATION	2	
Special Service Tools	2	
Commercial Service Tools	2	
ACCELERATOR CONTROL SYSTEM	3	
Removal and Installation	3	
Adjusting Accelerator Wire	3	
MODELS WITH THROTTLE OPENER	3	
MODELS WITHOUT THROTTLE OPENER	4	
FUEL SYSTEM	5	
Checking Fuel Lines	5	
Removal and Installation	5	
Fuel Tank	6	
REMOVAL	6	
INSTALLATION	8	
Fuel Pump, Fuel Level Sensor Unit and Fuel Filter	9	
REMOVAL	9	
INSTALLATION	10	
EXHAUST SYSTEM	11	
Checking Exhaust System	11	
Removal and Installation	11	
	YD	
PREPARATION	15	

Special Service Tool	15	
Commercial Service Tool	15	
ACCELERATOR CONTROL SYSTEM	16	
Removal and Installation	16	
Inspection	16	
FUEL SYSTEM	17	
Checking Fuel Lines	17	
Water Draining from Fuel Filter	17	
DRAINING WATER	17	
FUEL FILTER CHECK	17	
Changing Fuel Filter	17	
REMOVAL	17	
INSTALLATION	17	
Bleeding Fuel Filter	18	
Checking Priming Pump	18	
Removal and Installation	19	
Fuel Tank	19	
REMOVAL	20	
INSTALLATION	21	
Fuel Level Sensor Unit	22	
REMOVAL	22	
INSTALLATION	23	
EXHAUST SYSTEM	24	
Checking Exhaust System	24	
Removal and Installation	24	

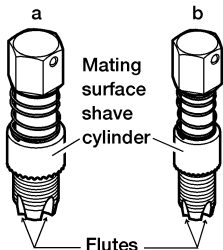
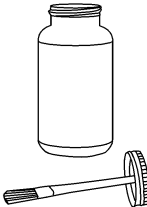
Special Service Tools

NLFE0029

Tool number Tool name	Description
KV10114400 Heated oxygen sensor wrench	 Loosening or tightening front and rear heated oxygen sensors a: 22 mm (0.87 in) NT636
KV999G0010 Fuel tank lock ring socket	 Removing and installing fuel tank lock ring NT057

Commercial Service Tools

NLFE0030

Tool number Tool name	Description
Oxygen sensor thread cleaner	 Reconditioning the exhaust system threads before installing a new oxygen sensor (Use with anti-seize lubricant shown below.) a: 18 mm dia. with pitch 1.5 mm for zirconia oxygen sensor b: 12 mm dia. with pitch 1.25 mm for titania oxygen sensor AEM488
Anti-seize lubricant (Permatex 133AR or equivalent meeting MIL specification MIL-A-907)	 Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads AEM489

Removal and Installation

NLFE0002

CAUTION:

- When removing accelerator wire, make a mark to indicate lock nut's initial position.
- Check that throttle valve opens fully when accelerator pedal is fully depressed. Also check that it returns to idle position when pedal is released.
- Check accelerator control parts for improper contact with any adjacent parts.
- When connecting accelerator wire, be careful not to twist or scratch wire.

GI

MA

EM

LC

EC

CC

CL

MT

AT

AX

SU

BR

ST

RS

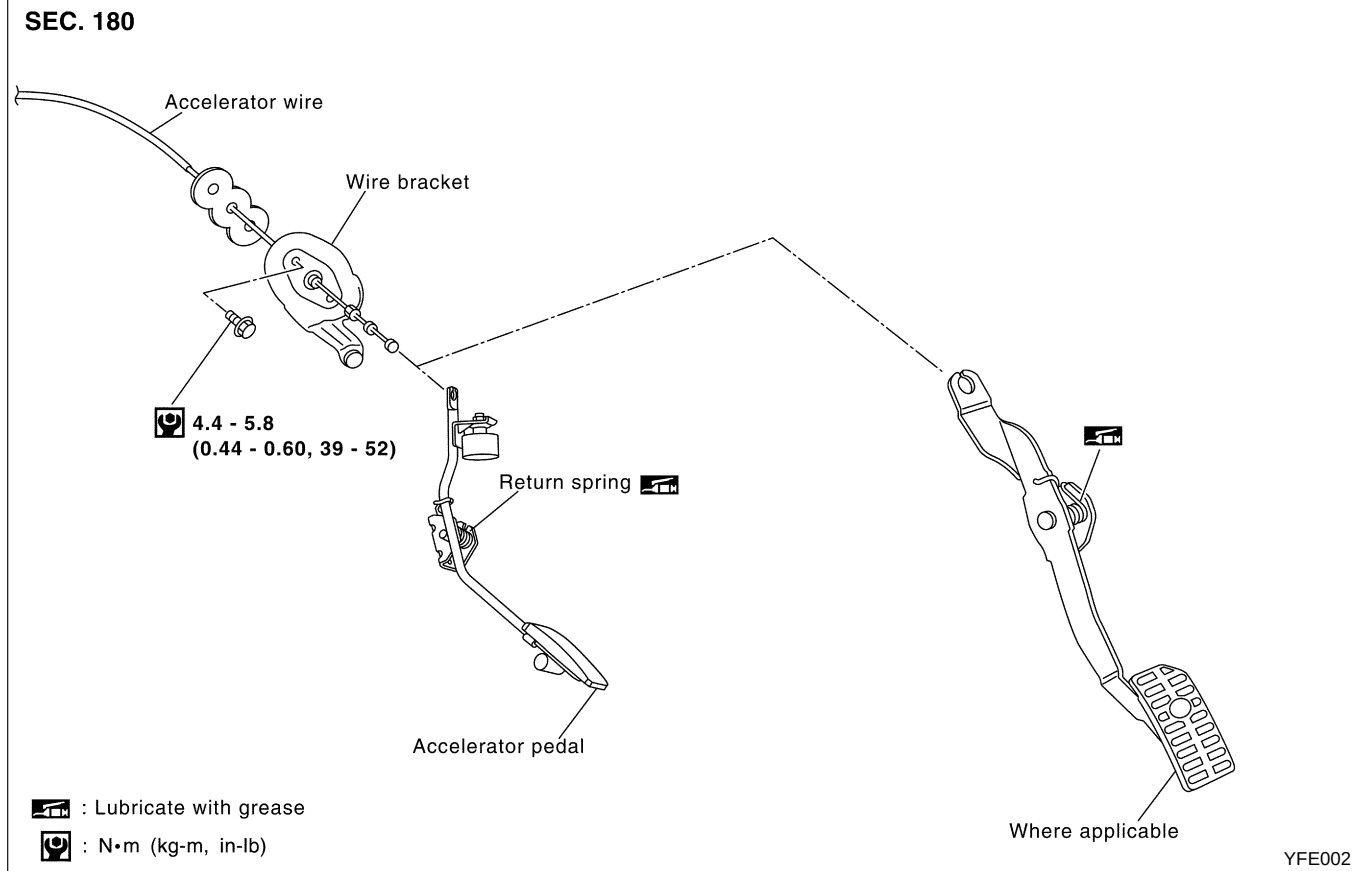
BT

HA

SC

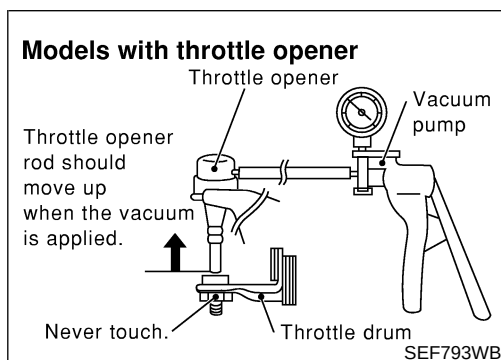
EL

IDX



: Lubricate with grease

: N·m (kg-m, in-lb)



Adjusting Accelerator Wire

NLFE0003

MODELS WITH THROTTLE OPENER

NLFE0003S01

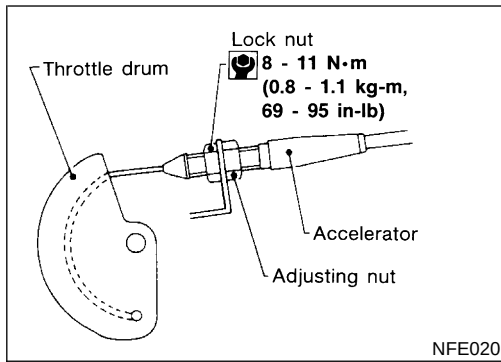
1. Remove the vacuum hose connected to the throttle opener.
2. Connect suitable vacuum hose to vacuum pump as shown left.
3. Apply vacuum [more than -40.0 kPa (-40.0 bar, -300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.

Make sure that there is clearance between the throttle drum and rod.

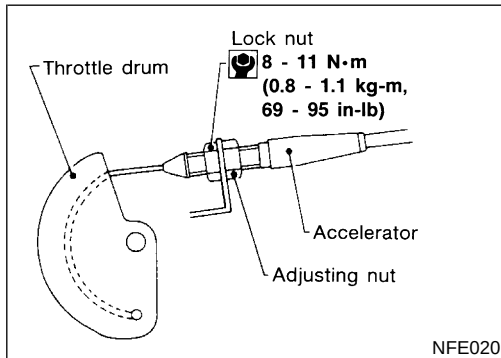
If NG, refer to EC-82 (QG), "Basic Inspection".

If OK, go to following step.

Adjusting Accelerator Wire (Cont'd)



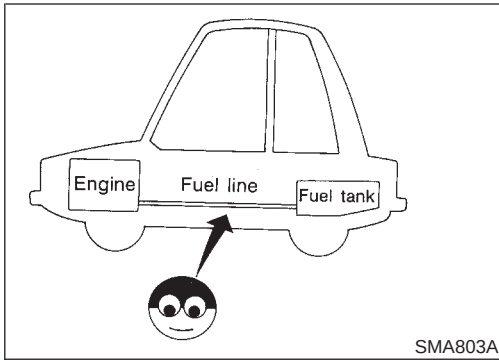
4. Loosen lock nut.
5. Tighten accelerator adjusting nut until throttle drum starts to move.
6. From that position, turn back adjusting nut 1.5 to 2 turns, and secure lock nut.
7. Release vacuum from the throttle opener.
8. Remove vacuum pump and vacuum hose from the throttle opener.
9. Reinstall the original vacuum hose to the throttle opener securely.



MODELS WITHOUT THROTTLE OPENER

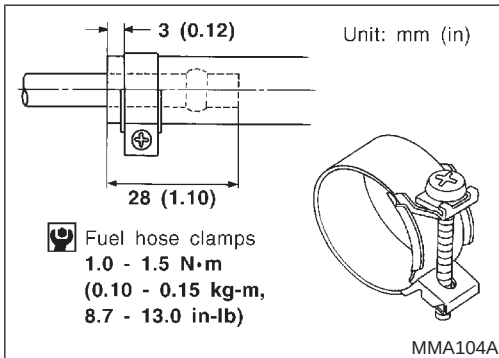
NLFE0003S02

1. Loosen lock nut, and tighten adjusting nut until throttle drum starts to move.
2. From that position turn back adjusting nut 1.5 to 2 turns, and secure lock nut.



Checking Fuel Lines

Inspect fuel lines and tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration. If necessary, repair or replace faulty parts.

NLFE0009


CAUTION:

Tighten high-pressure rubber hose clamp so that clamp end is 3 mm (0.12 in) from hose end.

Tightening torque specifications are the same for all rubber hose clamps.

Ensure that screw does not contact adjacent parts.

Removal and Installation

WARNING:

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

- Put a “CAUTION: FLAMMABLE” sign in workshop.
- Be sure to furnish workshop with a CO₂ fire extinguisher.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.

CAUTION:

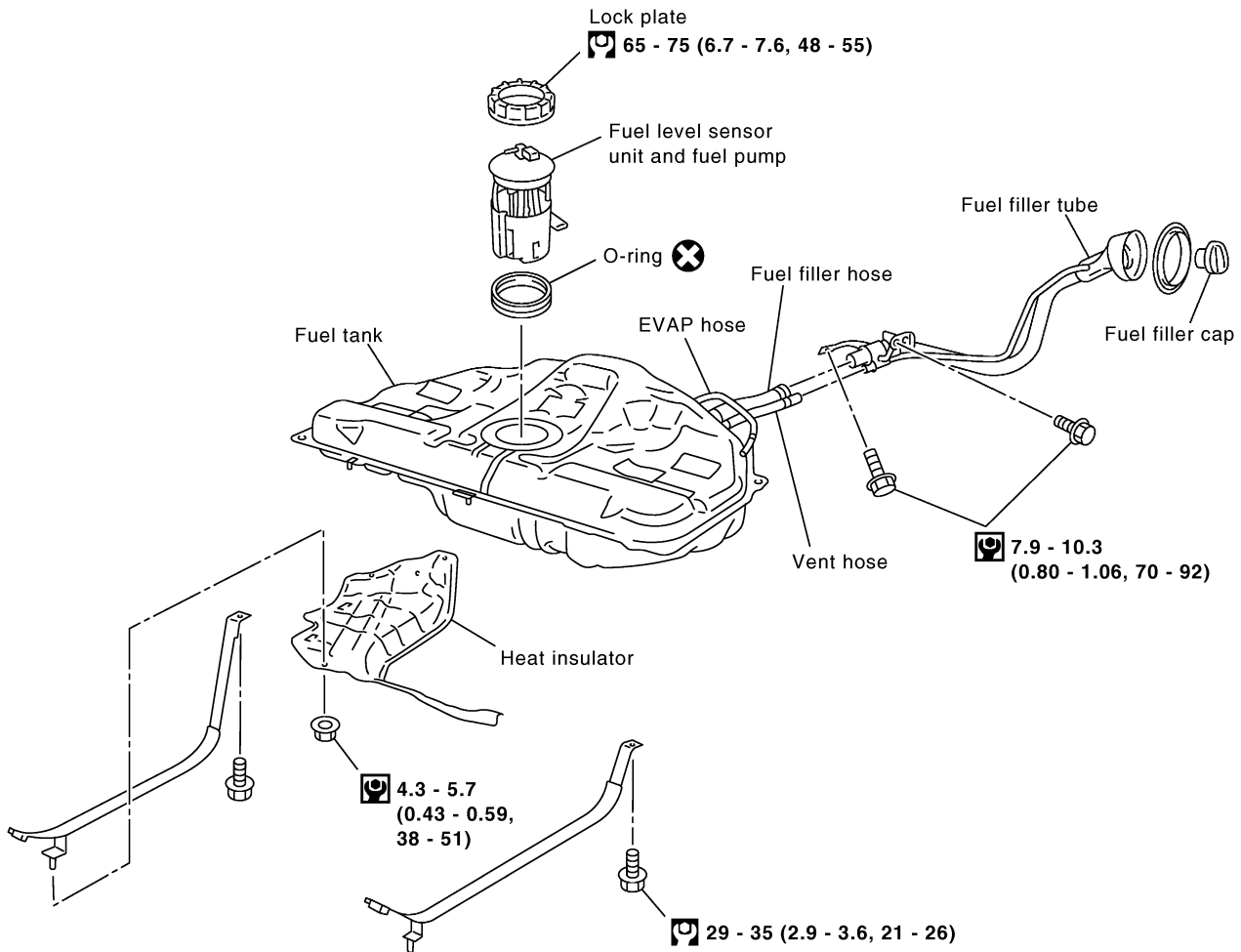
- Before removing fuel line parts, carry out the following procedures:
 - a) Put drained fuel in an explosion-proof container and put the lid on securely.
 - b) Release fuel pressure from fuel line. Refer to EC-47 (QG), “Fuel Pressure Release”.
 - c) Disconnect battery ground cable.
- Always replace O-ring and clamps with new ones.
- Do not kink or twist tubes when they are being installed.
- Do not tighten hose clamps excessively to avoid damaging hoses.
- After installing tubes, run engine and check for fuel leaks at connections.

NLFE0004

Fuel Tank

NLFE0006

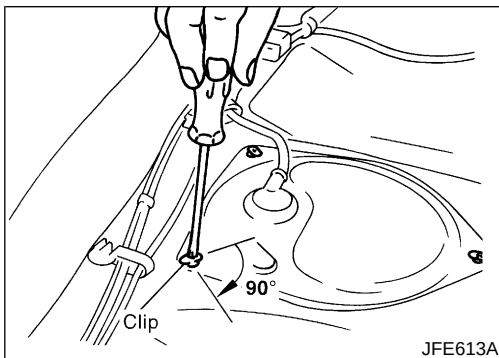
SEC. 172



: N•m (kg-m, in-lb)

: N•m (kg-m, ft-lb)

YFE031

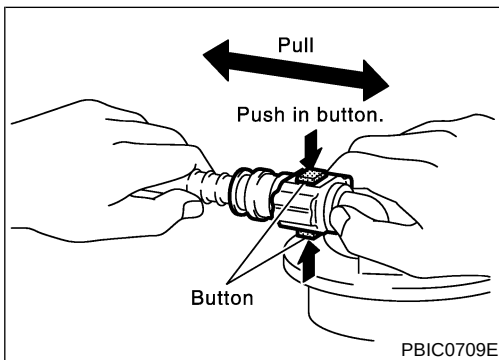
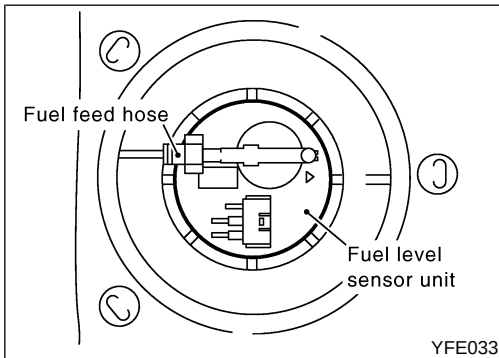
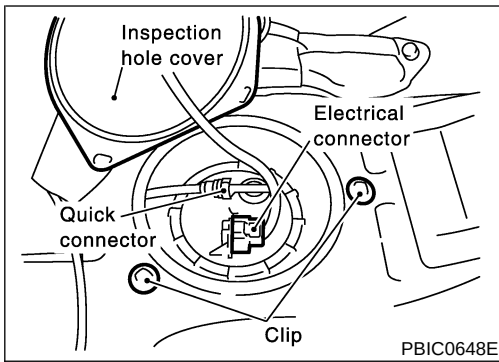


JFE613A

REMOVAL

1. Disconnect battery ground cable.
2. Open fuel filler lid and filler cap.
3. Drain fuel from fuel tank.
4. Remove rear seat cushion. Refer to BT-48, "Removal and Installation".
5. Remove inspection hole cover under the rear seat.

NLFE0006S01



6. Disconnect electrical connector.

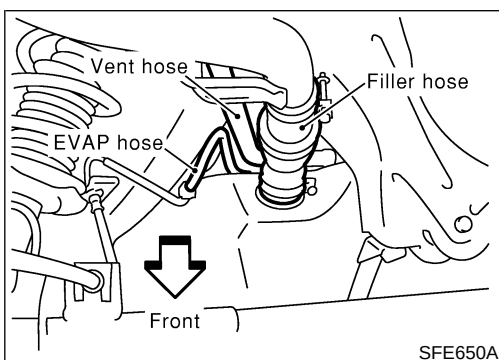
7. Remove the quick connector as follows.

NOTE:

- Hold the sides of the connector, push in tubs and pull out the tube.
- If the connector and the tube are stuck together, push and pull several times until they start to move. Then disconnect them by pulling.

CAUTION:

- The tube can be removed when the button are completely depressed. Do not twist it more than necessary.
- Do not use any tools to remove the quick connector.
- Keep the resin tube away from heat. Be especially careful when welding near the tube.
- Prevent acid liquid such as battery electrolyte etc. from getting on the resin tube.
- Do not bend or twist the tube during installation and removal.

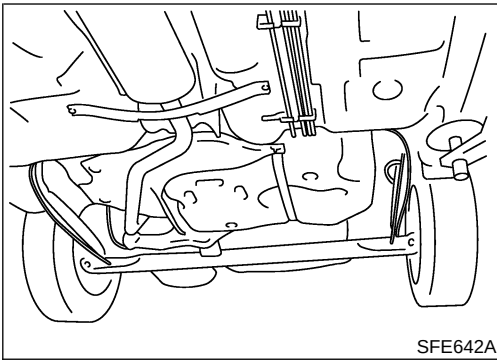


8. From rear left area of fuel tank, remove filler hose, vent hose, and EVAP hose.

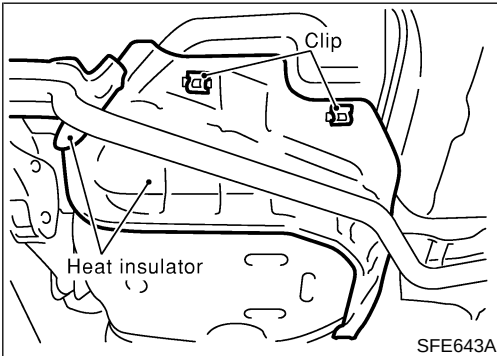
CAUTION:

To prevent fuel from flowing out, install a blind cap immediately after the fuel hose is disconnected.

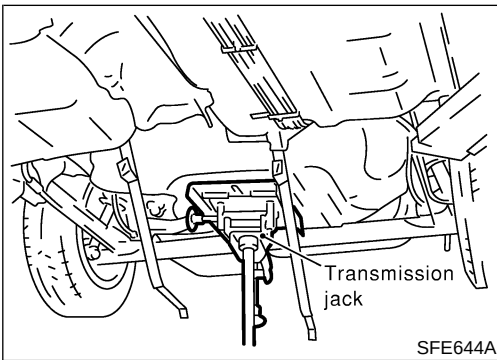
Fuel Tank (Cont'd)



9. Remove exhaust center tube.



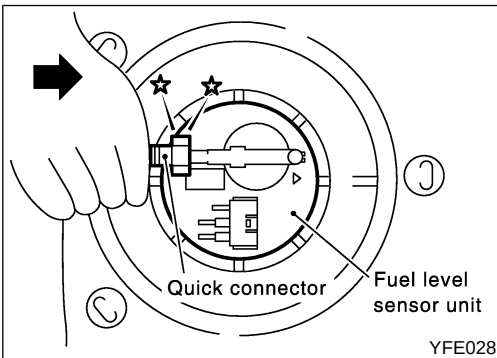
10. Remove heat insulators from fuel tank side.



11. Set a suitable transmission jack under fuel tank.

12. Remove fuel tank mounting band bolts while supporting fuel tank.

13. Remove fuel tank.

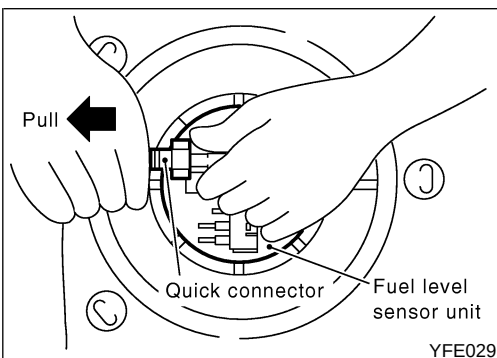


INSTALLATION

NLFE0006S02

To install, reverse the removal procedure. Connect the quick connector as follows:

- Insert tube into the center of the connector until you hear a click.

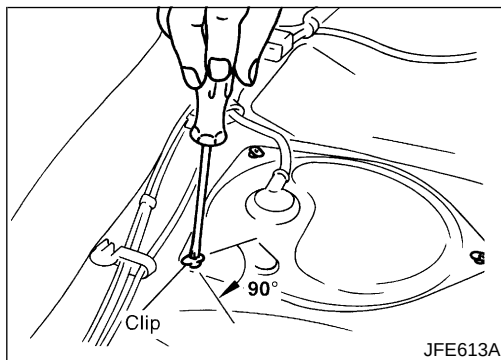
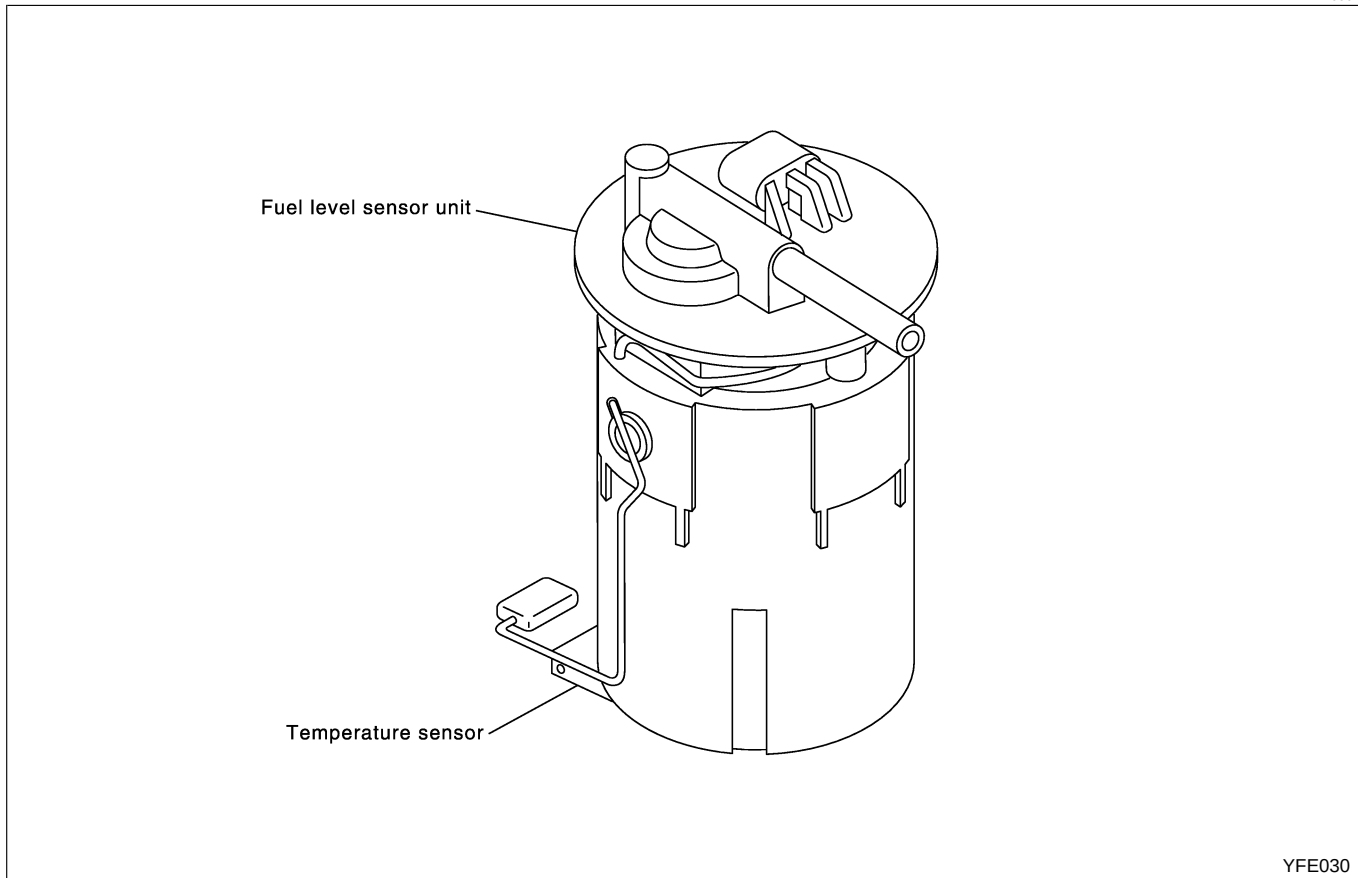


After connecting quick connector, make sure the connection is firmly made using the following method.

- Pull on the fuel tube and connector to make sure they are firmly connected.
- Start the engine, increase engine speed and verify that there are no leaks.

Fuel Pump, Fuel Level Sensor Unit and Fuel Filter

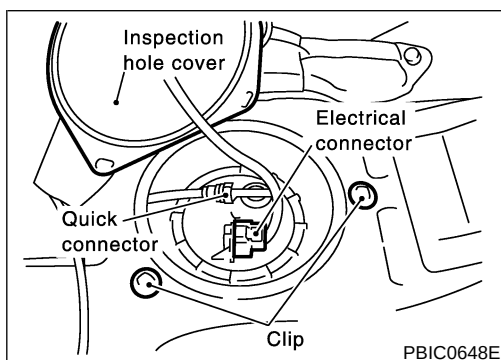
NLFE0007



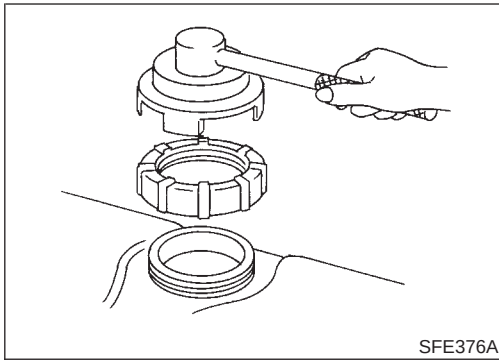
REMOVAL

NLFE0007S01

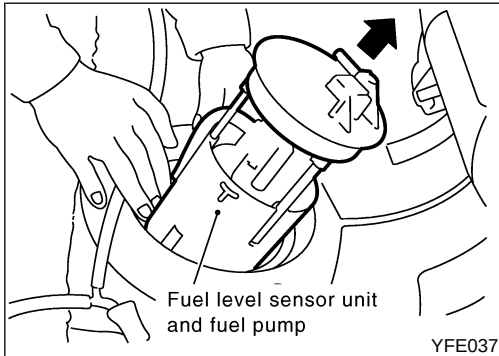
1. Disconnect battery ground cable.
2. Open fuel filler lid and filler cap.
3. Remove rear seat cushion. Refer to BT-48, "Removal and Installation".
4. Remove inspection hole cover under the rear seat.



5. Disconnect electrical connector.
6. Disconnect the quick connectors.
 - For disconnect of quick connectors, refer to step 7. of "Fuel Tank Removal".



7. Remove lock ring using a lock ring socket (SST).



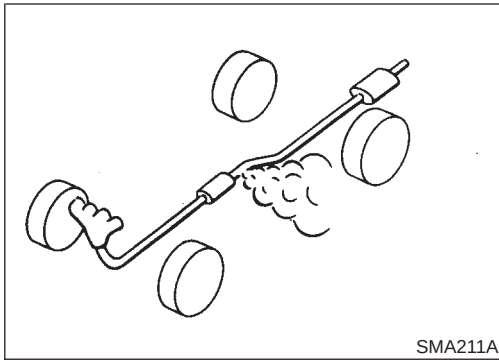
8. Pull out the fuel level sensor unit and fuel pump.

- **Do not damage the arm of the fuel level sensor unit and fuel tank temperature sensor.**

INSTALLATION

Installation is in reverse order of removal.

NLFE0007S02



Checking Exhaust System

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage, chafing or deterioration.

NLFE0010

GI

MA

EM

LC

Removal and Installation

NLFE0005

CAUTION:

- Always replace exhaust gaskets with new ones when reassembling.
- With engine running, check all tube connections for exhaust gas leaks, and entire system for unusual noises.
- Check to ensure that mounting brackets and mounting insulators are installed properly and free from undue stress. Improper installation could result in excessive noise or vibration.
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing a new oxygen sensor, clean exhaust system threads using oxygen sensor thread cleaner tool and apply anti-seize lubricant.
- Do not overtorque the oxygen sensor. Doing so may cause damage to the oxygen sensor, resulting in the MI coming on.
- Be sure to use genuine exhaust system parts which are designed especially for heat resistance, corrosion resistance, and shape.
- Perform the operation with the exhaust system fully cooled down because the system will be heated just after the engine stops.
- Be careful not to cut your hand on the insulator edge.

EC

CC

CL

MT

AT

AX

SU

BR

ST

RS

BT

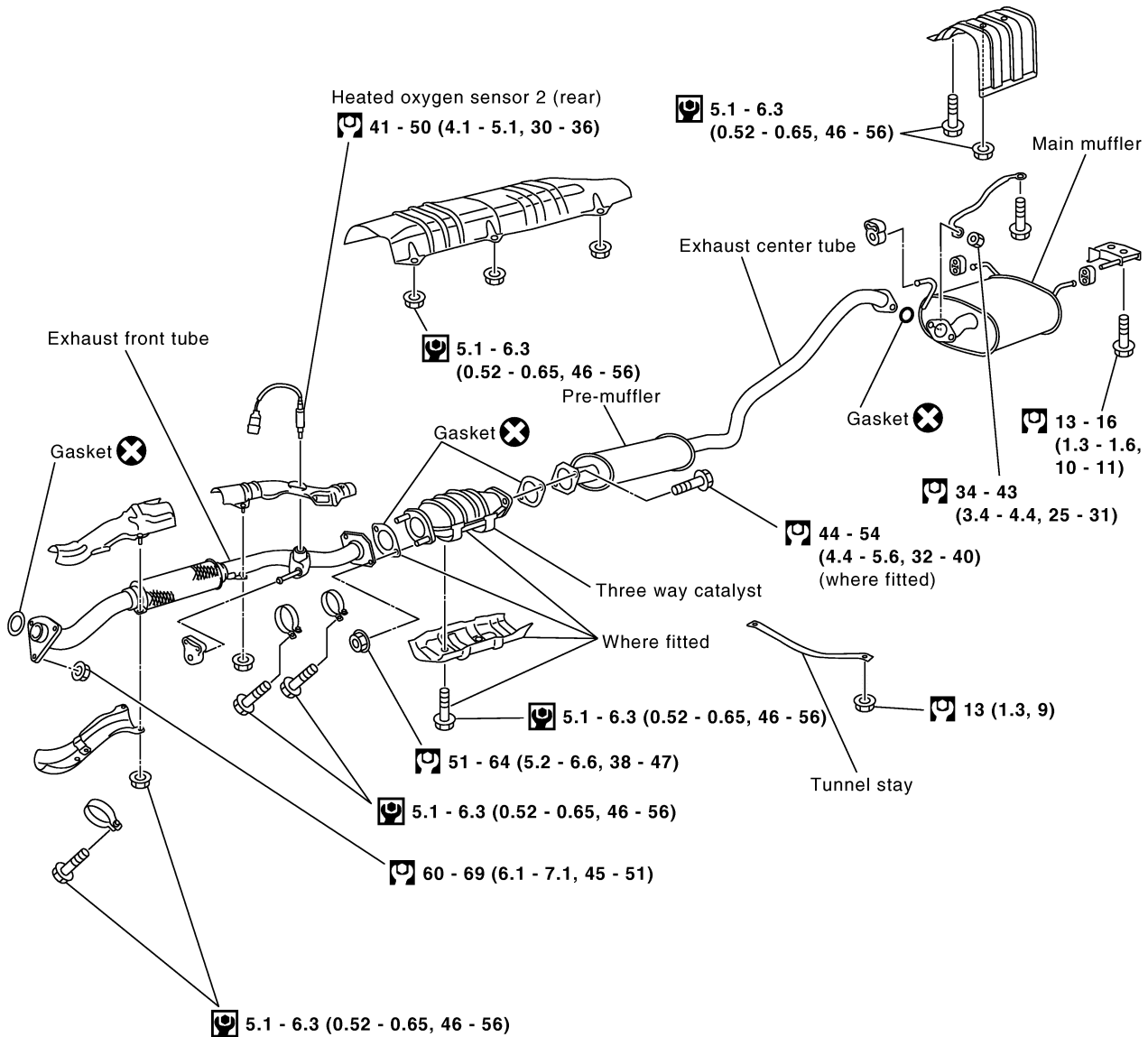
HA

SC

EL

IDX

With three way catalyst [Type A]

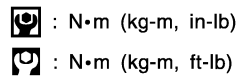


: N•m (kg-m, in-lb)

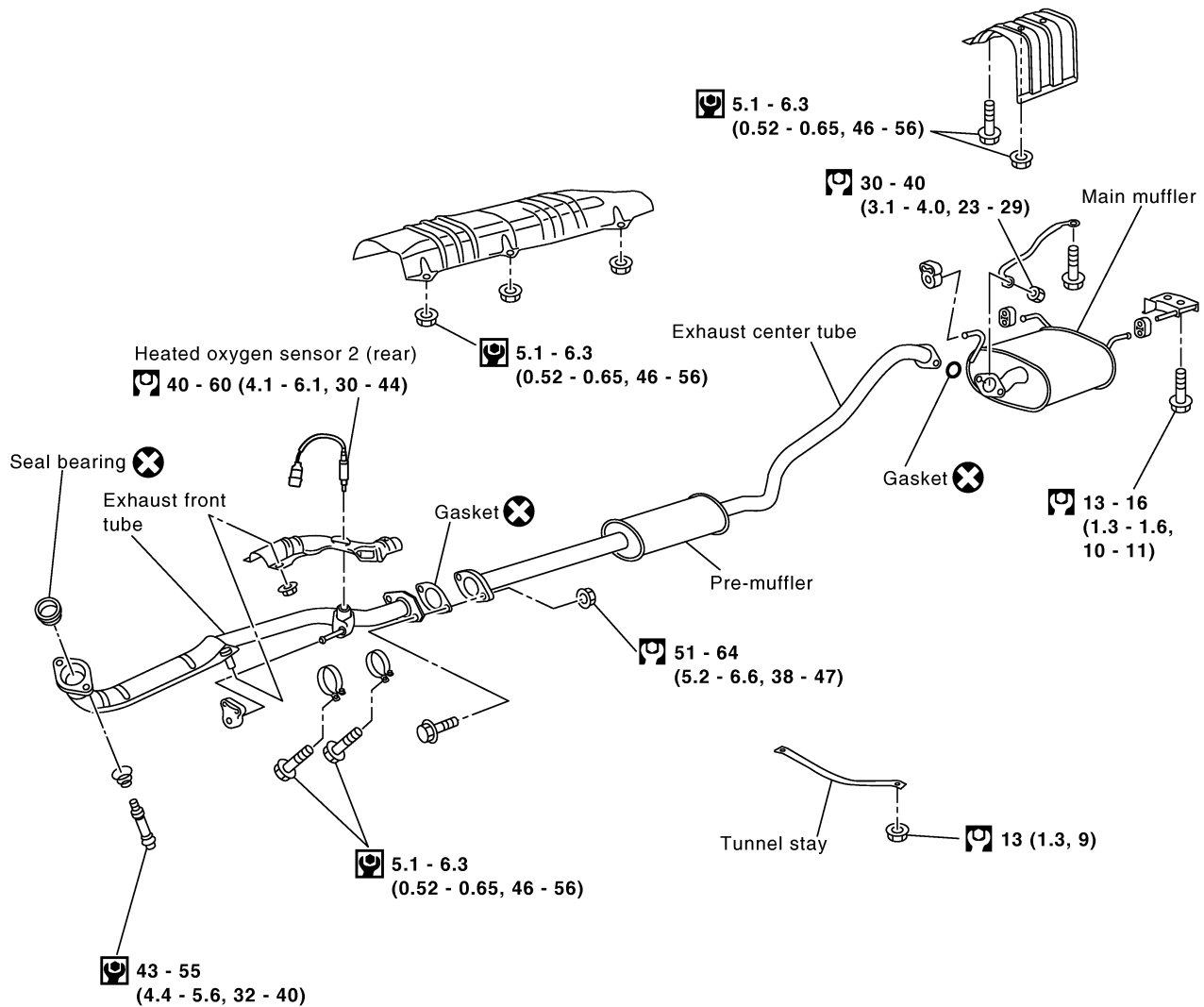
: N•m (kg-m, ft-lb)

QG

**With three way catalyst
[Type B]**

**FE-13**

Without three way catalyst



: N•m (kg-m, in-lb)

: N•m (kg-m, ft-lb)

Special Service Tool

NLFE0031

Tool number Tool name	Description	
KV999G0010 Fuel tank lock ring socket		Removing and installing fuel tank lock ring
	NT057	

GI

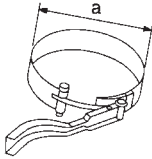
MA

EM

LC

Commercial Service Tool

NLFE0027

Tool name	Description	
Fuel filter wrench		Removing fuel filter a: Max. 100 mm (3.94 in) dia.
	NT553	

EC

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

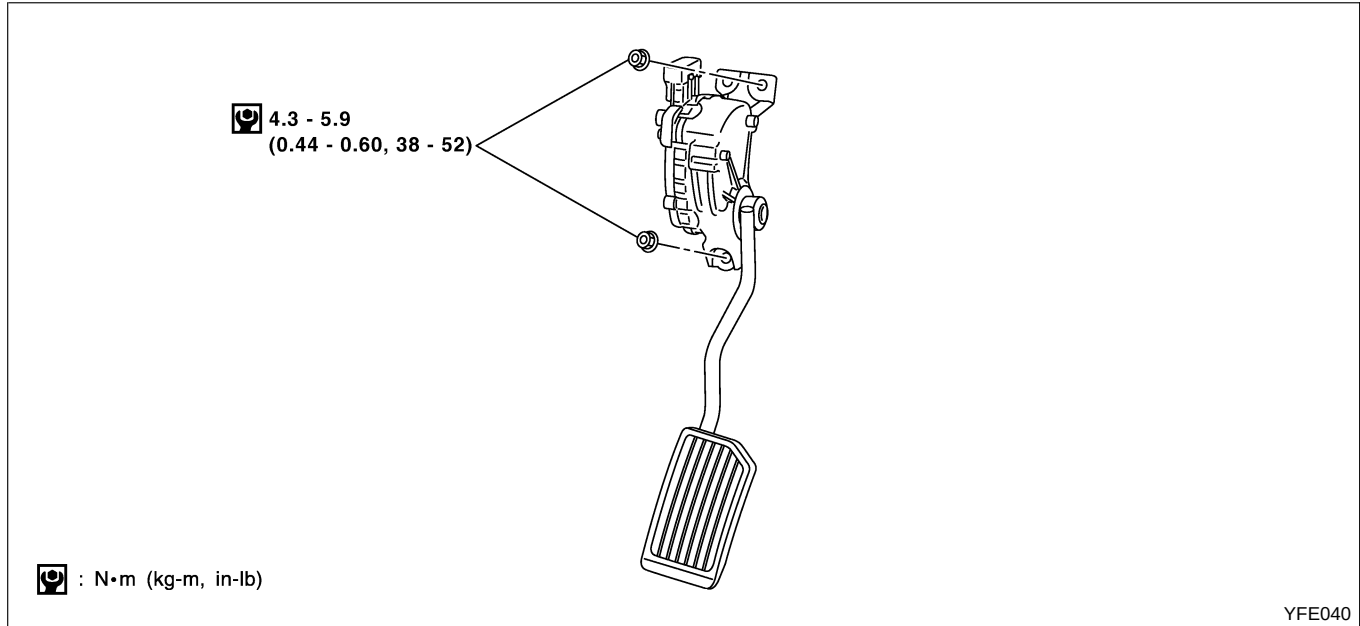
IDX

Removal and Installation

NLFE0013

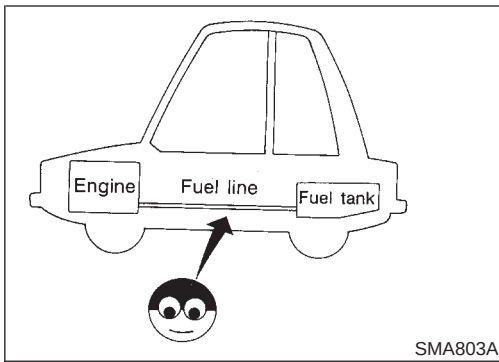
CAUTION:

- Do not disassemble the accelerator pedal assembly. Do not remove the sensors and the switches from the assembly.
- Avoid impact from dropping etc. during handling.
- Be careful to keep the assembly away from water.

**Inspection**

NLFE0020

- Check that the accelerator pedal moves smoothly within the whole operation range.
- Check that the accelerator pedal securely returns to the original position.
- Check that the drum of the accelerator work unit can be fully opened.
- Refer to EC-971 or EC-1280, "Basic Inspection" for the inspection of the accelerator work unit and the accelerator pedal switch.



Checking Fuel Lines

Inspect fuel lines and tank for improper attachment, leaks, cracks, damage, chafing and deterioration. If necessary, repair or replace.

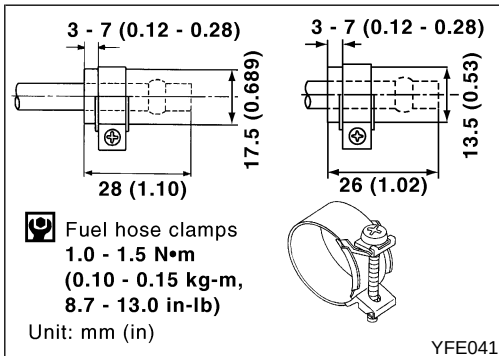
NLFE0019

GI

MA

EM

LC



CAUTION:

Tighten high-pressure rubber hose clamp so that clamp end is 3 to 7 mm (0.12 to 0.28 in) from hose end.

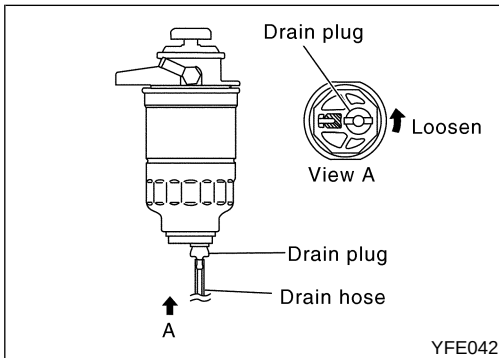
Tightening torque specifications are the same for all rubber hose clamps.

Ensure that screw does not contact adjacent parts.

EC

CL

MT



Water Draining from Fuel Filter

DRAINING WATER

Open drain plug at the bottom of fuel filter.

NLFE0028

NLFE0028S01

AT

FUEL FILTER CHECK

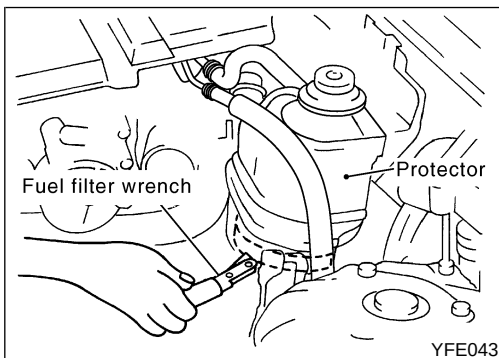
Check fuel filter for fuel leakage, damage and other abnormal sings.

NLFE0028S02

AX

SU

BR



Changing Fuel Filter

REMOVAL

1. Take out air duct and upper air cleaner case.
2. Remove fuel filter using a fuel filter wrench (commercial service tool).

NLFE0021

NLFE0021S01

ST

RS

CAUTION:

Do not spill the fuel during removal. If the fuel is spilt, immediately wipe it off. Be especially careful to prevent the fuel from adhering to the insulators of the engine mounts.

BT

HA

3. Remove drain plug from fuel filter.

INSTALLATION

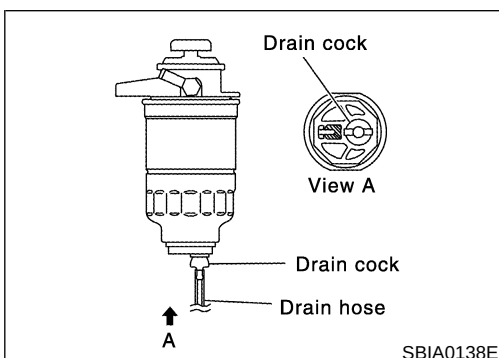
NLFE0021S02

SC

- Install in the reverse order of removal.
- Replace the O-ring of the drain plug with a new one.
- Tighten the fuel filter so that the sealing face contacts the packing, then retighten it manually by approximately 2/3 turn.
- After installation, operate the priming pump vertically to perform air bleeding. Refer to FE-18, "Bleeding Fuel Filter".

EL

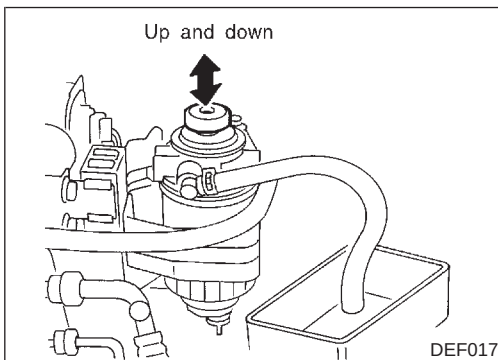
IDX



Bleeding Fuel Filter

NLFE0023

1. After the repair, bleed air from the piping by pumping the priming pump up and down until it becomes heavy.
 2. To start the engine, rotate the starter for a maximum of 30 seconds.
To start the engine more quickly, crank the engine while pumping the priming pump (requires two workers).
 3. If the engine does not start after rotating the starter for a maximum of 30 seconds, stop it once, and pump the priming pump again until it becomes heavy.
 4. Rotate the starter again until the engine starts running.
 5. After the engine starts, let it idle for at least 1 minute to stabilize the behavior.
- **When air is bled completely, the pumping of the priming pump suddenly becomes heavy. Stop the operation at that time.**
 - **If it is difficult to bleed air by the pumping of the priming pump (the pumping of the priming pump does not become heavy), disconnect the fuel supply hose between the fuel filter and the injection pump. Then, perform the operation described above, and make sure that fuel comes out. (Use a pan, etc. so as not to spill fuel. Do not let fuel get on engine and other parts.) After that, connect the hose, then bleed air again.**
 - **Start engine and let it idle for at least 1 minute after performing air bleeding.**



Checking Priming Pump

NLFE0024

Before checking priming pump, make sure that fuel filter is filled with fuel.

1. Disconnect fuel supply hose.
- Place a suitable container beneath hose end.**
2. Pump priming pump and check that the fuel overflows from the hose end. If not, replace priming pump.

Removal and Installation

=NLFE0015

WARNING:

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

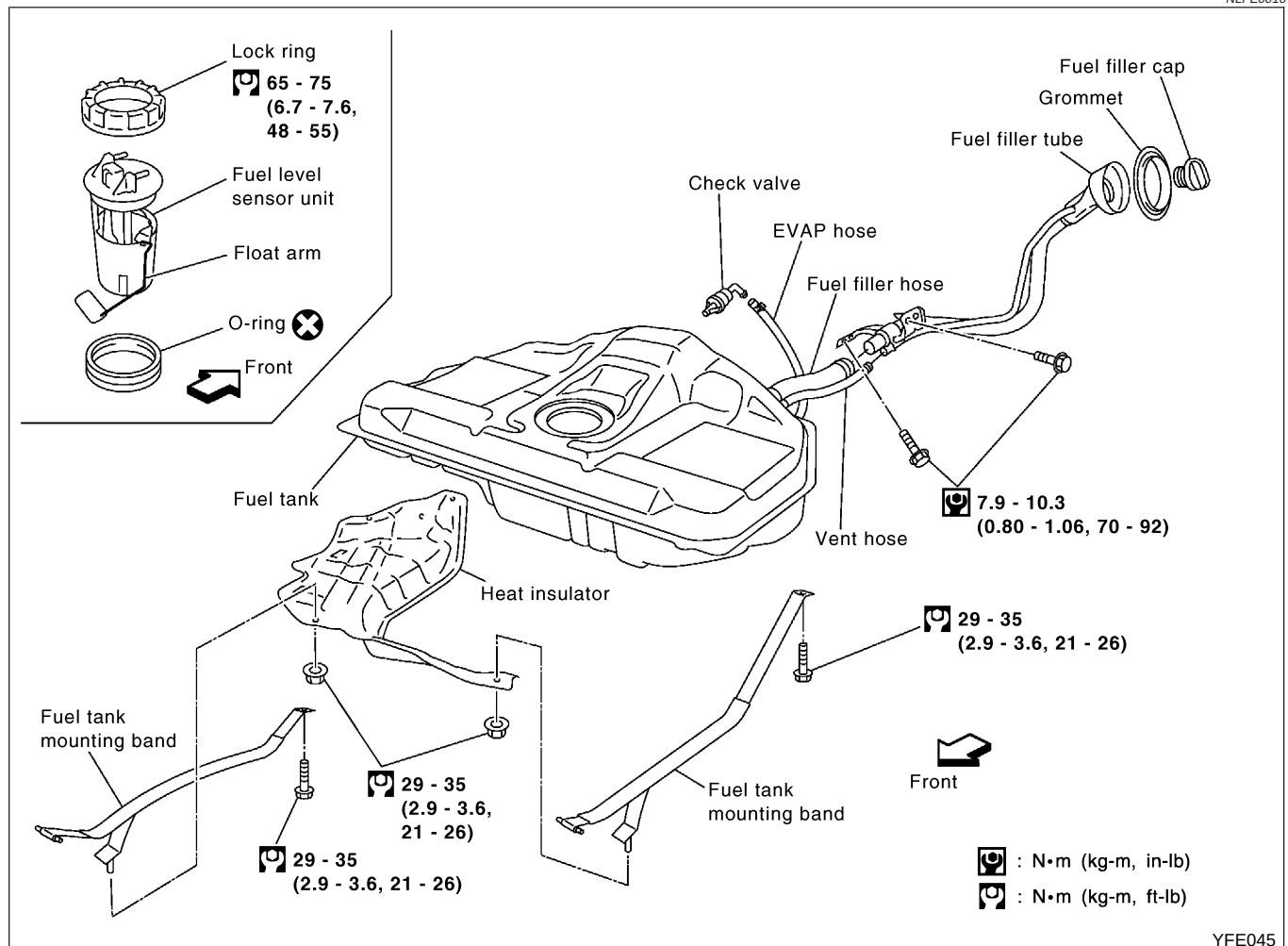
- Put a "CAUTION: FLAMMABLE" sign in workshop.
- Be sure to furnish workshop with a CO₂ fire extinguisher.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.

CAUTION:

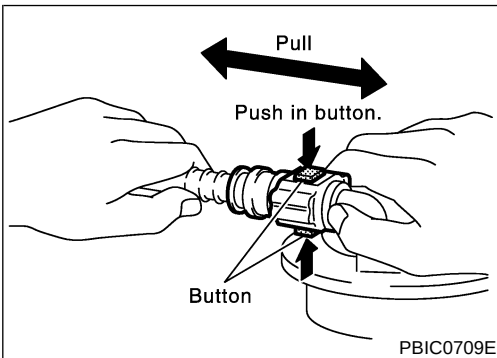
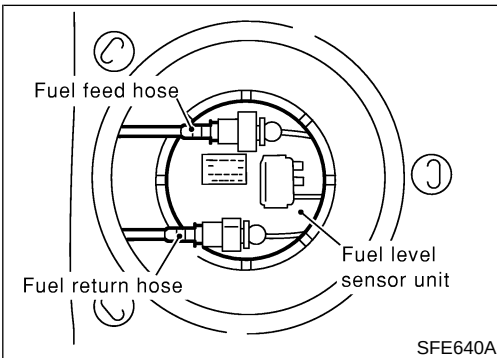
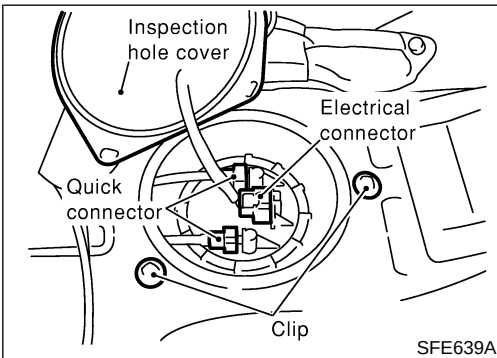
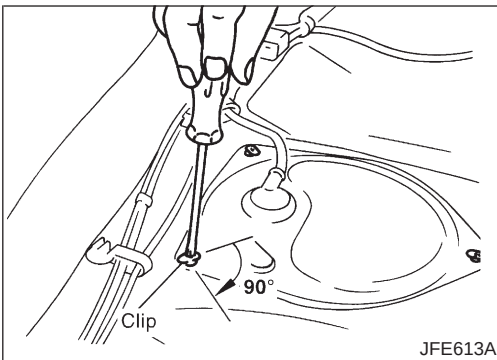
- Before removing fuel line parts, carry out the following procedures:
 - a) Put drained fuel in an explosion-proof container and put the lid on securely.
 - b) Disconnect battery ground cable.
- Always replace O-ring and clamps with new ones.
- Do not kink or twist tubes when they are being installed.
- Do not tighten hose clamps excessively to avoid damaging hoses.
- After installing tubes, run engine and check for fuel leaks at connections.

Fuel Tank

NLFE0016



YFE045



REMOVAL

NLFE0016S01

1. Disconnect battery ground cable.
2. Open fuel filler lid and filler cap.
3. Drain fuel from fuel tank.
4. Remove rear seat cushion. Refer to BT-48, "Removal and Installation".
5. Remove inspection hole cover under the rear seat.

6. Disconnect electrical connector.

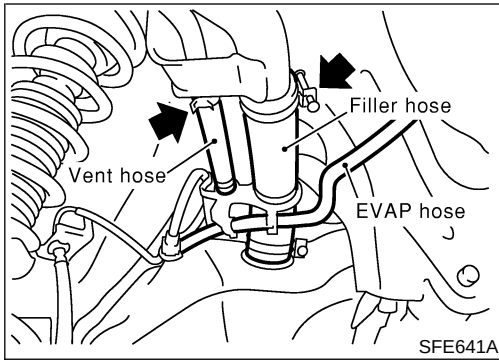
7. Remove the quick connector as follows.

NOTE:

- Hold the sides of the connector, push in tubs and pull out the tube.
- If the connector and the tube are stuck together, push and pull several times until they start to move. Then disconnect them by pulling.

CAUTION:

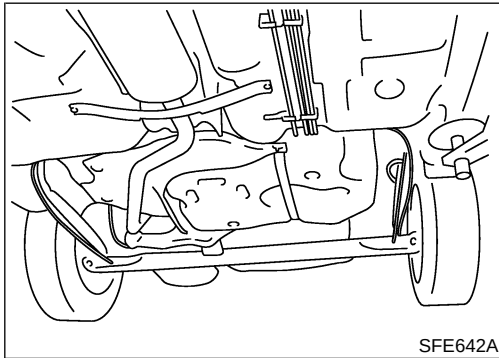
- The tube can be removed when the button are completely depressed. Do not twist it more than necessary.
- Do not use any tools to remove the quick connector.
- Keep the resin tube away from heat. Be especially careful when welding near the tube.
- Prevent acid liquid such as battery electrolyte etc. from getting on the resin tube.
- Do not bend or twist the tube during installation and removal.



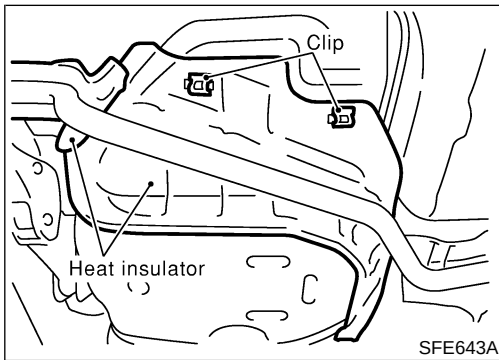
8. From rear left area of fuel tank, remove filler hose, vent hose, and EVAP hose.

CAUTION:

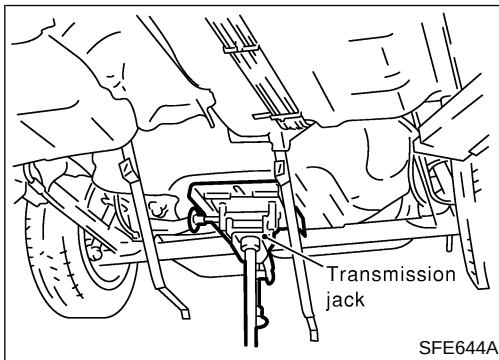
To prevent fuel from flowing out, install a blind cap immediately after the fuel hose is disconnected.



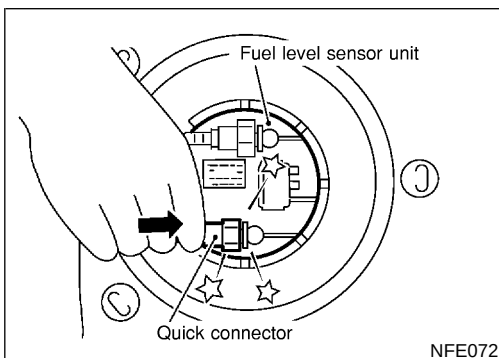
9. Remove exhaust center tube.



10. Remove heat insulators from fuel tank side.



11. Set a suitable transmission jack under fuel tank.
12. Remove fuel tank mounting band bolts while supporting fuel tank.
13. Remove fuel tank.

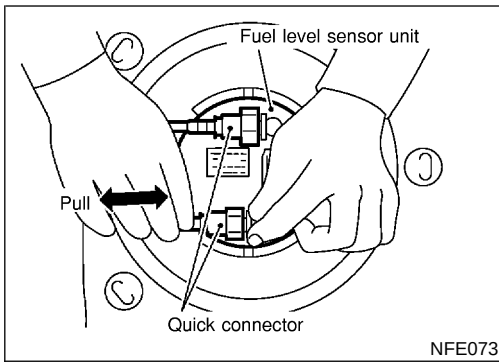


INSTALLATION

To install, reverse the removal procedure. Connect the quick connector as follows:

- Insert tube into the center of the connector until you hear a click.

Fuel Tank (Cont'd)

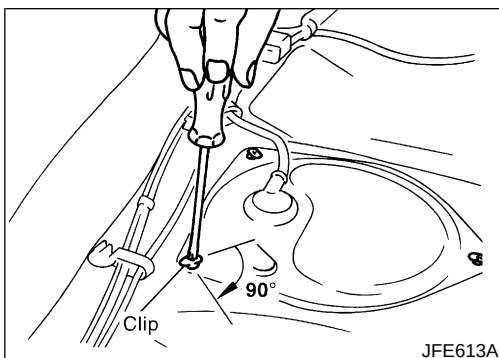
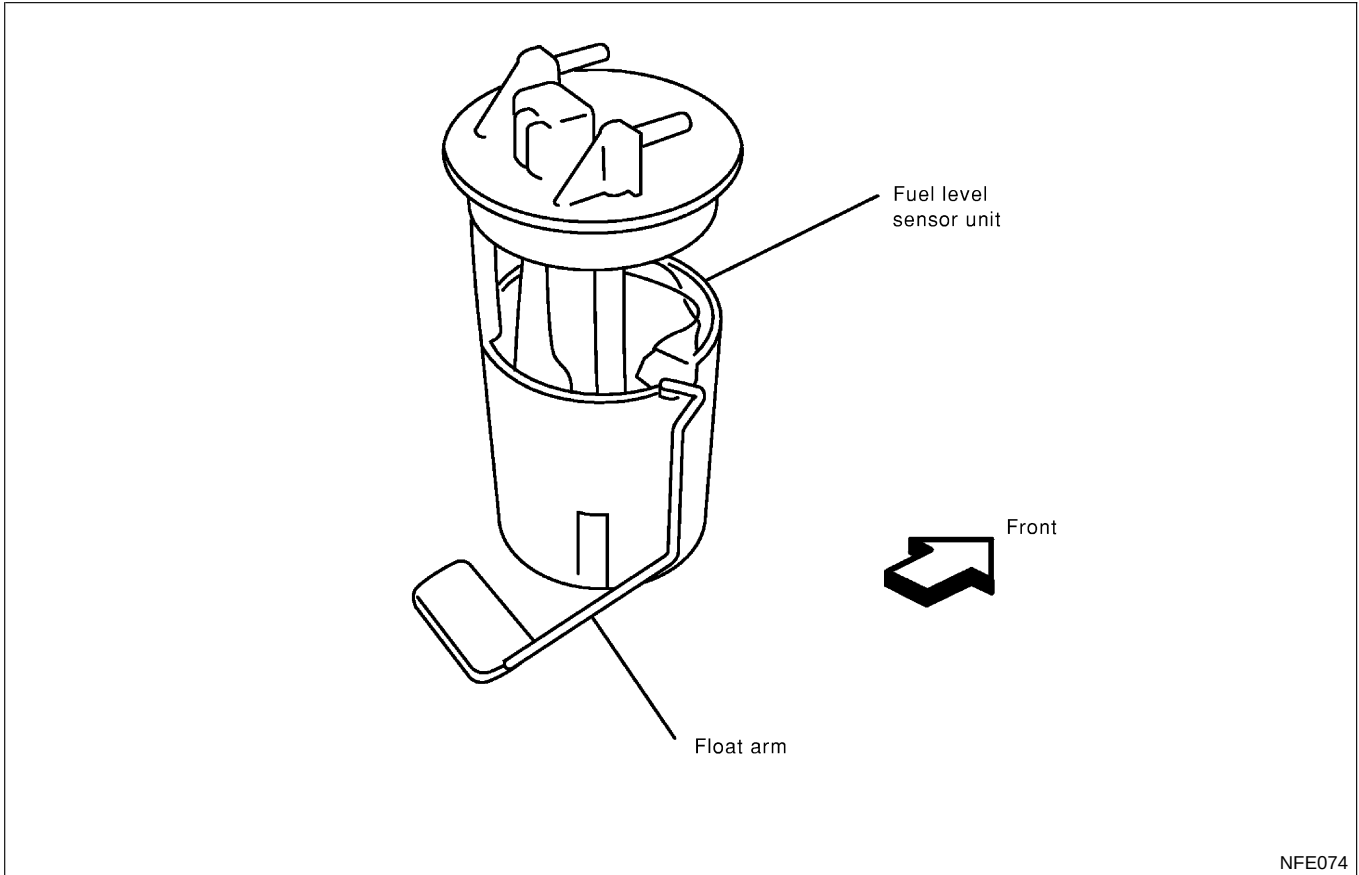


After connecting quick connector, make sure the connection is firmly made using the following method.

- Pull on the fuel tube and connector to make sure they are firmly connected.
- Start the engine, increase engine speed and verify that there are no leaks.

Fuel Level Sensor Unit

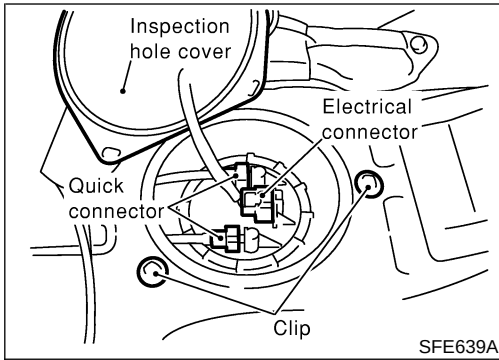
NLFE0032



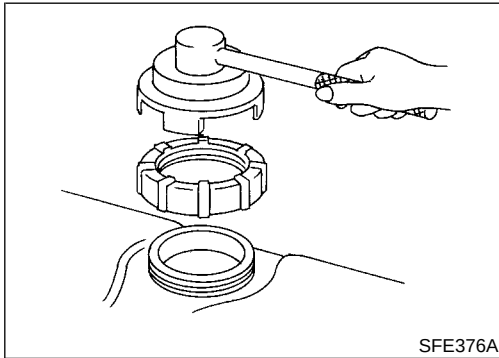
REMOVAL

NLFE0032S01

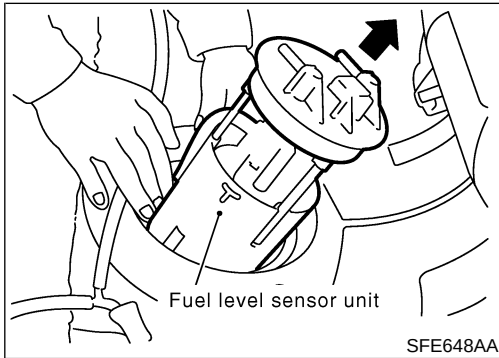
1. Disconnect battery ground cable.
2. Open fuel filler lid and filler cap.
3. Remove rear seat cushion. Refer to BT-48, "Removal and Installation".
4. Remove inspection hole cover under the rear seat.



5. Disconnect electrical connector.
6. Disconnect the quick connectors.
 - For disconnect of quick connectors, refer to step 7. of “Fuel Tank Removal”.



7. Remove lock ring using a lock ring socket (SST).

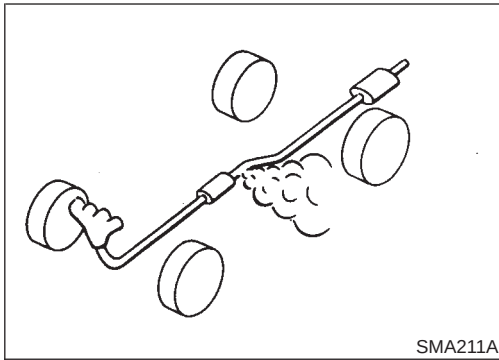


8. Pull out the fuel level sensor unit and fuel pump.
 - **Do not damage the arm of the fuel level sensor unit.**

INSTALLATION

Installation is in reverse order of removal.

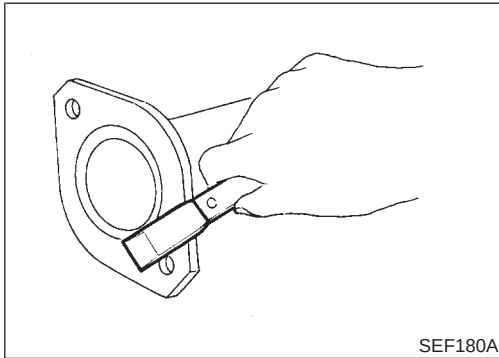
NLFE0032S02



Checking Exhaust System

NLFE0022

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage, chafing or deterioration.



Removal and Installation

NLFE0018

CAUTION:

- Always replace exhaust gaskets with new ones when reassembling. If gasket remains 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.
- Check to ensure that mounting brackets and mounting insulators are installed properly and free from undue stress. Improper installation could result in excessive noise or vibration.
- Be sure to use genuine exhaust system parts which are designed especially for heat resistance, corrosion resistance, and shape.
- Perform the operation with the exhaust system fully cooled down because the system will be heated just after the engine stops.
- Be careful not to cut your hand on the insulator edge.

YD

GI	
MA	
EM	
LC	
EC	
CL	
MT	
AT	
AX	
SU	
BR	
ST	
RS	
BT	
HA	
SC	
EL	
IDX	

YFE046

NOTES