

DAIHATSU

L500, L501

MA

ED-10, ED-20, EF-EL

MAINTENANCE

MAINTENANCE

REQUIREMENTS MA-2

MAINTENANCE SCHEDULE MA-3

COLD ENGINE OPERATION MA-5

1. Inspection of engine coolant level MA-5
2. Inspection of radiator cap and radiator filling port MA-5
3. Inspection of engine coolant leakage MA-6
4. Inspection of the battery MA-7
5. Inspection of drive belt MA-9
6. Inspection of air filter element MA-10
7. Inspection of blow-by gas recirculation device MA-11
8. Inspection of heat preventive device MA-12
9. Inspection of the fuel line and connection MA-12
10. Replacement of fuel filter MA-12
11. Inspection of fuel evaporative emission control device MA-13
12. Inspection of the ignition timing advance device.
[ED-10 Engine] MA-15
13. Inspection of throttle valve MA-15
14. Inspection of choke valve
[ED-10 Engine] MA-16
15. Inspection of carburetor linkage
[ED-10 Engine] MA-16

16. Inspection of exhaust emission control device tightness and damage MA-16

17. Replacement of timing belt MA-17

HOT ENGINE OPERATION MA-26

1. Inspection of engine oil MA-26
2. Change of engine oil and oil filter MA-27
3. Inspection of engine starting and abnormal noise. MA-29
4. Inspection of spark plug MA-29
5. Inspection of distributor cap and rotor MA-31
6. Inspection and adjustment of valve clearances MA-32
[ED-20 Engine] MA-32
[EF-EL Engine] MA-32
[ED-10 Engine] MA-33
[ED-20 Engine] MA-36
[EF-EL Engine] MA-36
[ED-10 Engine] MA-36
7. Inspection and adjustment of ignition timing
[ED-20, EF-EL Engine] MA-38
[ED-10 Engine] MA-38
8. Inspection and adjustment of idle speed
[ED-10 Engine] MA-41
9. Check and adjustment of CO/HC concentrations
[ED-10 Engine] MA-42
10. Change of coolant MA-44

LEMA00001-00000

NO. 9198-LE

MAINTENANCE REQUIREMENTS

The scheduled maintenance service is important to ensure trouble-free, safe and economical driving. Failure to perform the scheduled maintenance may cause an accident or serious damage.

If you conduct the periodical maintenance, Daihatsu car owners may reduce the chance of accidents or car problems. Furthermore, it becomes possible for you to find at an earlier stage malfunctions which may lead to serious damages. Consequently, potential vehicle damage can be prevented or the degree of the damage can be minimized.

Therefore, all of the persons who are concerned with servicing the Daihatsu vehicles should offer the periodical maintenance service to Daihatsu car owners in order that they may be protected from accidents or unexpected problems.

To prevent malfunctions in advance, however, conducting the periodical maintenance service only is insufficient. It is essential that owners themselves perform maintenance, such as the pre-starting check described in the owner's manual, so that the vehicle exhibits no abnormal change or phenomenon. Hence, please explain to owners about the necessity of maintenance performed by them.

However, malfunction may occur on those vehicles which are always checked by their owners. For instance, if a part instructed to be replaced periodically should be used beyond the replacement intervals and the life of the part has expired, there are cases where malfunction occurs suddenly despite the fact that no malfunction has taken place until yesterday. To prevent such malfunction in advance, be sure to replace parts recommended to be replaced periodically at the specified replacement intervals.

This section describes those items of the scheduled maintenance service recommended by the Daihatsu and their intervals. Be sure to observe the check schedule.

LEMA00002-00000

10-AM	Engine oil	1
11-AM	Oil filter	1
12-AM	Spark plugs	1
13-AM	Ignition timing	1
14-AM	Valve clearance	1
15-AM	Water pump	1
16-AM	Timing belt	1
17-AM	Water pump	1
18-AM	Water pump	1
19-AM	Water pump	1
20-AM	Water pump	1
21-AM	Water pump	1
22-AM	Water pump	1
23-AM	Water pump	1
24-AM	Water pump	1
25-AM	Water pump	1
26-AM	Water pump	1
27-AM	Water pump	1
28-AM	Water pump	1
29-AM	Water pump	1
30-AM	Water pump	1
31-AM	Water pump	1
32-AM	Water pump	1
33-AM	Water pump	1
34-AM	Water pump	1
35-AM	Water pump	1
36-AM	Water pump	1
37-AM	Water pump	1
38-AM	Water pump	1
39-AM	Water pump	1
40-AM	Water pump	1
41-AM	Water pump	1
42-AM	Water pump	1
43-AM	Water pump	1
44-AM	Water pump	1
45-AM	Water pump	1
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95-AM	Water pump	1
96-AM	Water pump	1
97-AM	Water pump	1
98-AM	Water pump	1
99-AM	Water pump	1
100-AM	Water pump	1

1-AM	Engine oil	1
2-AM	Oil filter	1
3-AM	Spark plugs	1
4-AM	Ignition timing	1
5-AM	Valve clearance	1
6-AM	Water pump	1
7-AM	Timing belt	1
8-AM	Water pump	1
9-AM	Water pump	1
10-AM	Water pump	1
11-AM	Water pump	1
12-AM	Water pump	1
13-AM	Water pump	1
14-AM	Water pump	1
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94-AM	Water pump	1
95-AM	Water pump	1
96-AM	Water pump	1
97-AM	Water pump	1
98-AM	Water pump	1
99-AM	Water pump	1
100-AM	Water pump	1

○ ... Check or inspect ● ... Change or replace

Section	Items	What to check	× 1,000 km	1	10	20	30	40	50	60	70	80	90	100	See page
			× 1,000 miles	0.6	6	12	18	24	30	36	42	48	54	60	
			Years	—	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	
Exhaust emission control system	Brow-by gas recirculation device	• Connection • Damage						○				○			11
	Fuel evaporative emission control device	Piping	• Damage					○				○			13
		Charcoal canister	• Clogging • Damage					○				○			13
	Emission control device	• Tightness • Damage				○		○		○		○		○	16
	Piping	• Damage • Attaching condition				○		○		○		○		○	13
	Heat preventive device	• Tightness • Damage				○		○		○		○		○	12
Engine electrical system	Battery	• Electrolyte level			○	○	○	○	○	○	○	○	○	○	7
		• Specific gravity • Connection of terminal section				○		○		○		○		○	7
	Ignition timing	Spark plug	• Condition		○	●	○	●	○	●	○	●	○	●	29
		Ignition system	• Timing	○		○		○		○		○		○	38
		Distributor cap and rotor	• Condition			○		○		○		○		○	31
		Ignition timing	Timing advance Device [ED-10 Engine]			○		○		○		○		○	15

NOTE:

- If the vehicle should be operated under severe driving conditions, vehicle operated occasionally or vehicle operated dusty area, more frequent maintenance are required.

LEMA00003-00000

COLD ENGINE OPERATION

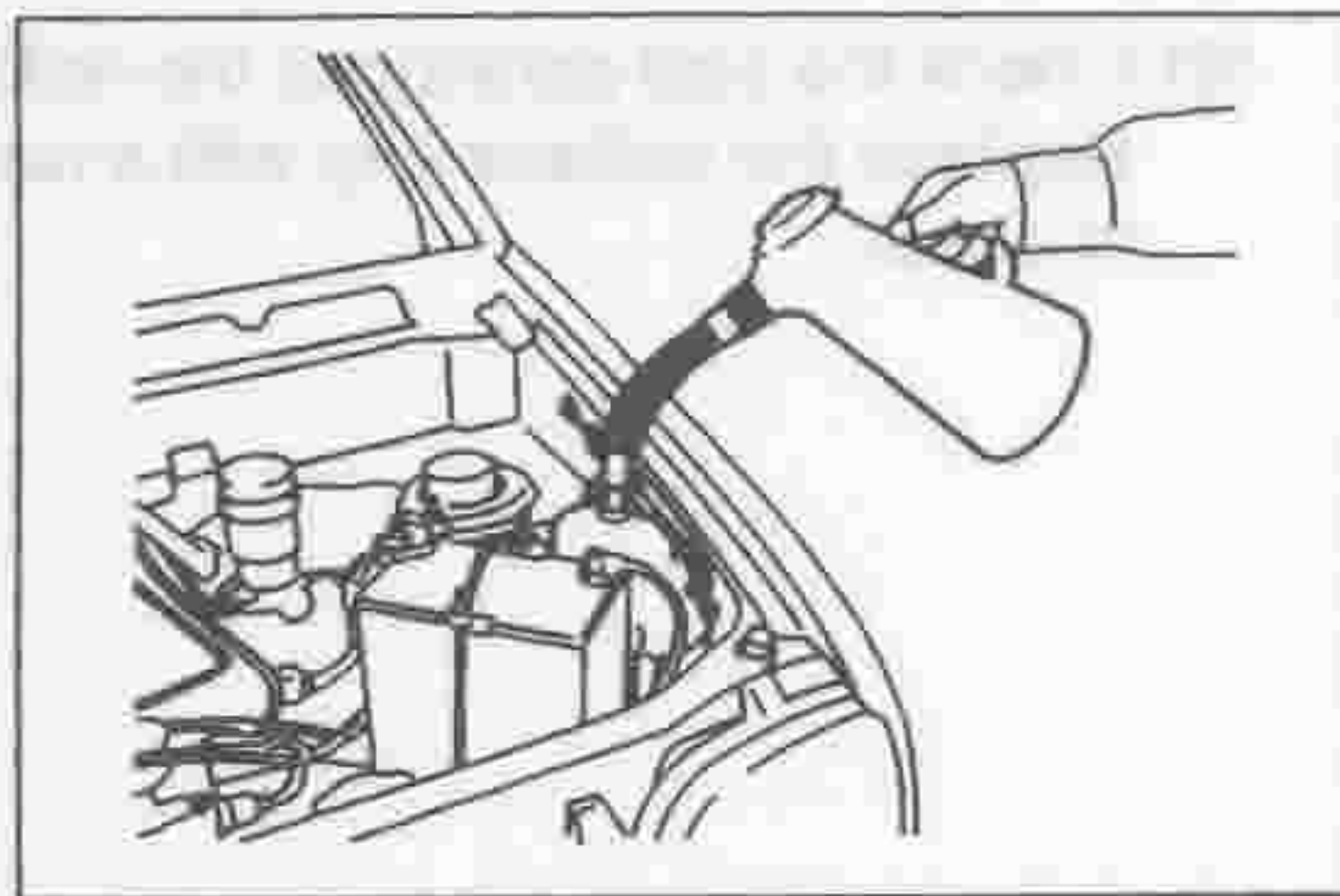
1. Inspection of engine coolant level

Check to see if coolant level is between the LOW and FULL lines of the reserve tank.

If coolant level is near the LOW level or below the LOW level, add the coolant up to the full level.

WARNING:

- Never open the radiator cap when the engine is still hot. Failure to observe this caution will cause you to get scalded.



LEMA00004-00001

NOTE:

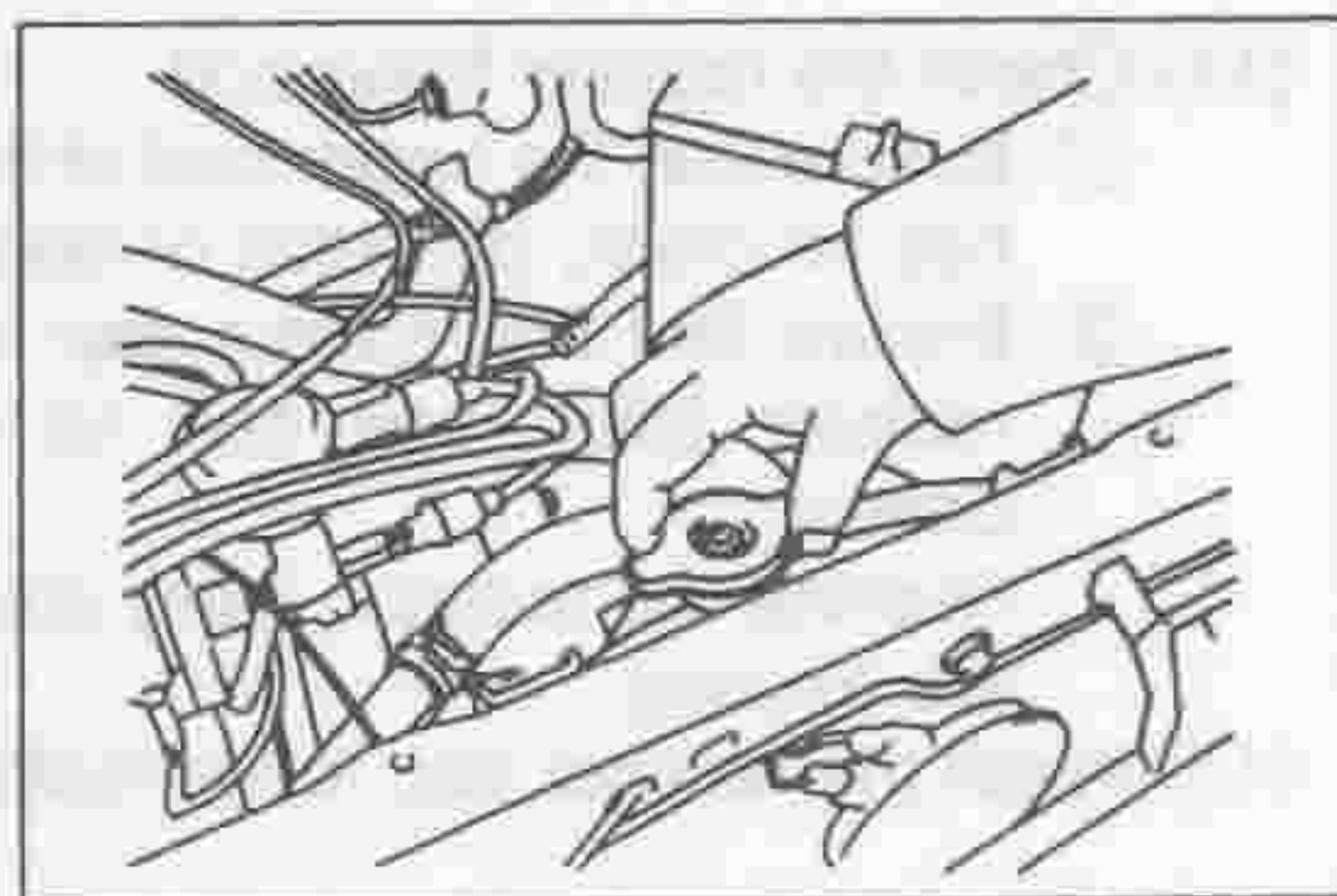
- If no coolant is present in the reserve tank or the coolant level is very low, check for water leakage, using a radiator cap tester.
- Here, the coolant refers to the coolant having an adequate freezing protection rating.

2. Inspection of radiator cap and radiator filling port

WARNING:

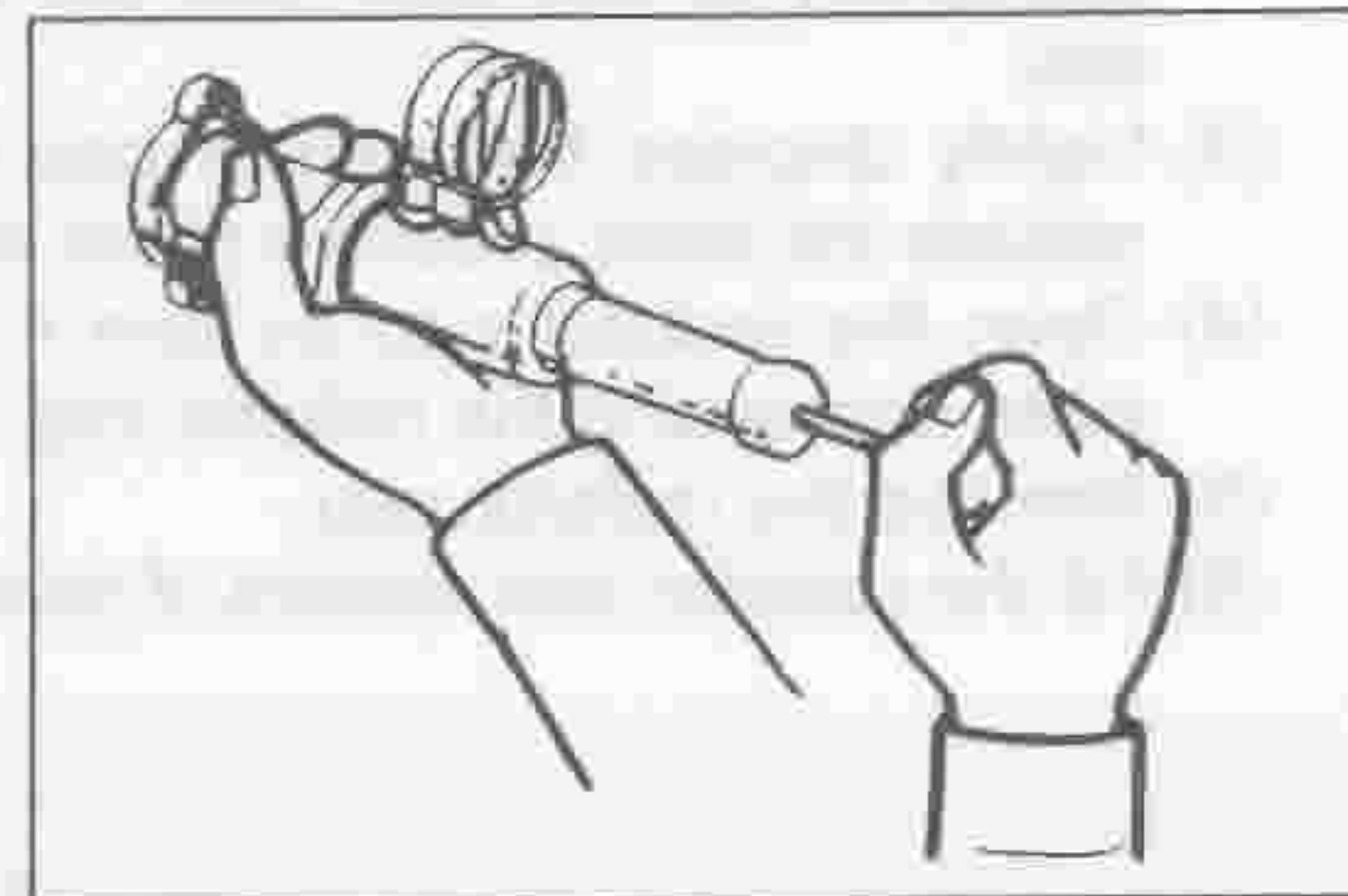
- Never open the radiator cap when the engine is still hot. Failure to observe this caution will cause you to get scalded.

- (1) Ensure that the engine coolant temperature is nearly atmosphere temperature.
- (2) Turn the radiator cap to opening direction (counterclockwise) for one step (until the first detention will be felt).
- (3) Lightly depress the radiator cap one to two times to release the inner pressure of radiator.
- (4) Open the radiator cap by turn it to counterclockwise while depressing the radiator cap.
- (5) Remove the radiator cap.



LEMA00005-00002

- (6) Install the radiator cap to the radiator cap tester.
- (7) Check the radiator cap by means of a radiator cap tester to see if the relief valve opens at a pressure of 88 ± 14.7 kPa (0.9 ± 0.15 kgf/cm²).
If the radiator cap fails to confirm to the specification, replace the radiator cap.
- (8) Remove the radiator cap from the radiator cap tester.



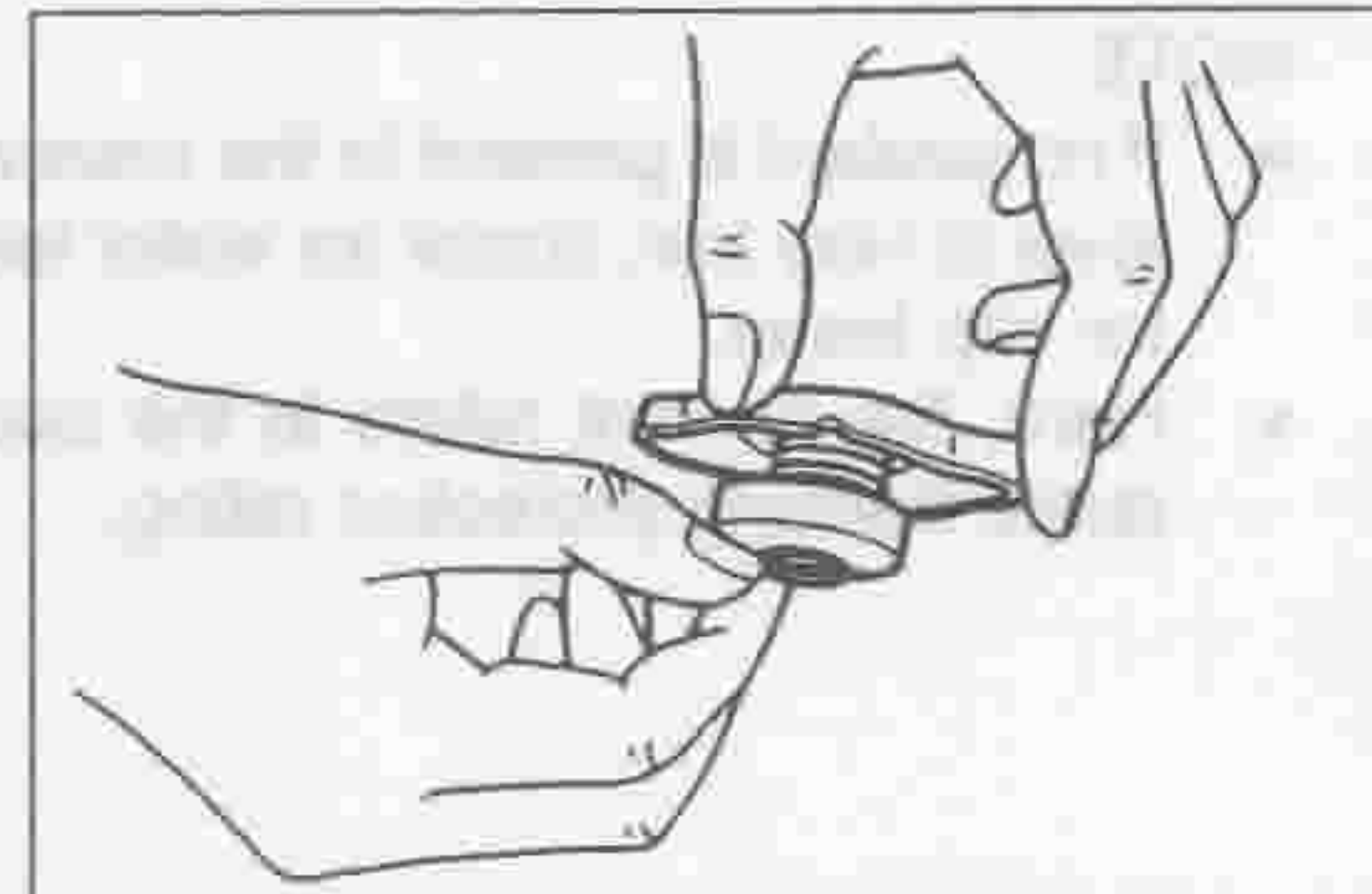
LEMA00006-00003



- (10) Lift the valve at the vacuum side with your fingers. Ensure that the valve is functioning properly. Replace the radiator cap with a new one, if the valve fails to function.

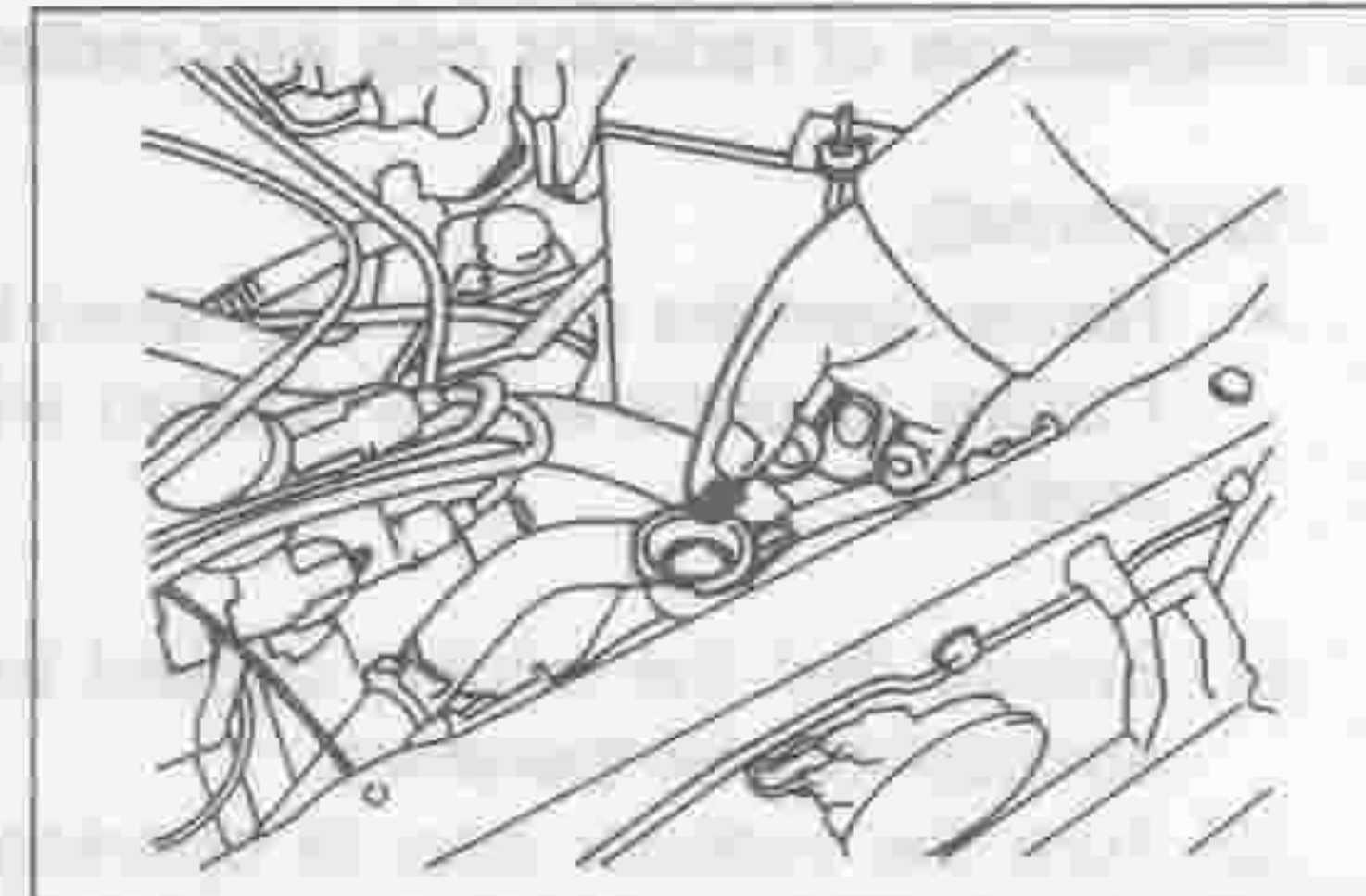


LEMA00007-00004



LEMA00008-00005

- (11) Check the radiator filling port
- ① Ensure that the upper part of the radiator filling port has no crack, distortion or dented.
 - ② Ensure that the radiator cap locked section of the radiator filling port has no crack, distortion or dented.
- Replace the radiator, if any crack, distortion or dent are existing.



LEMA00009-00006

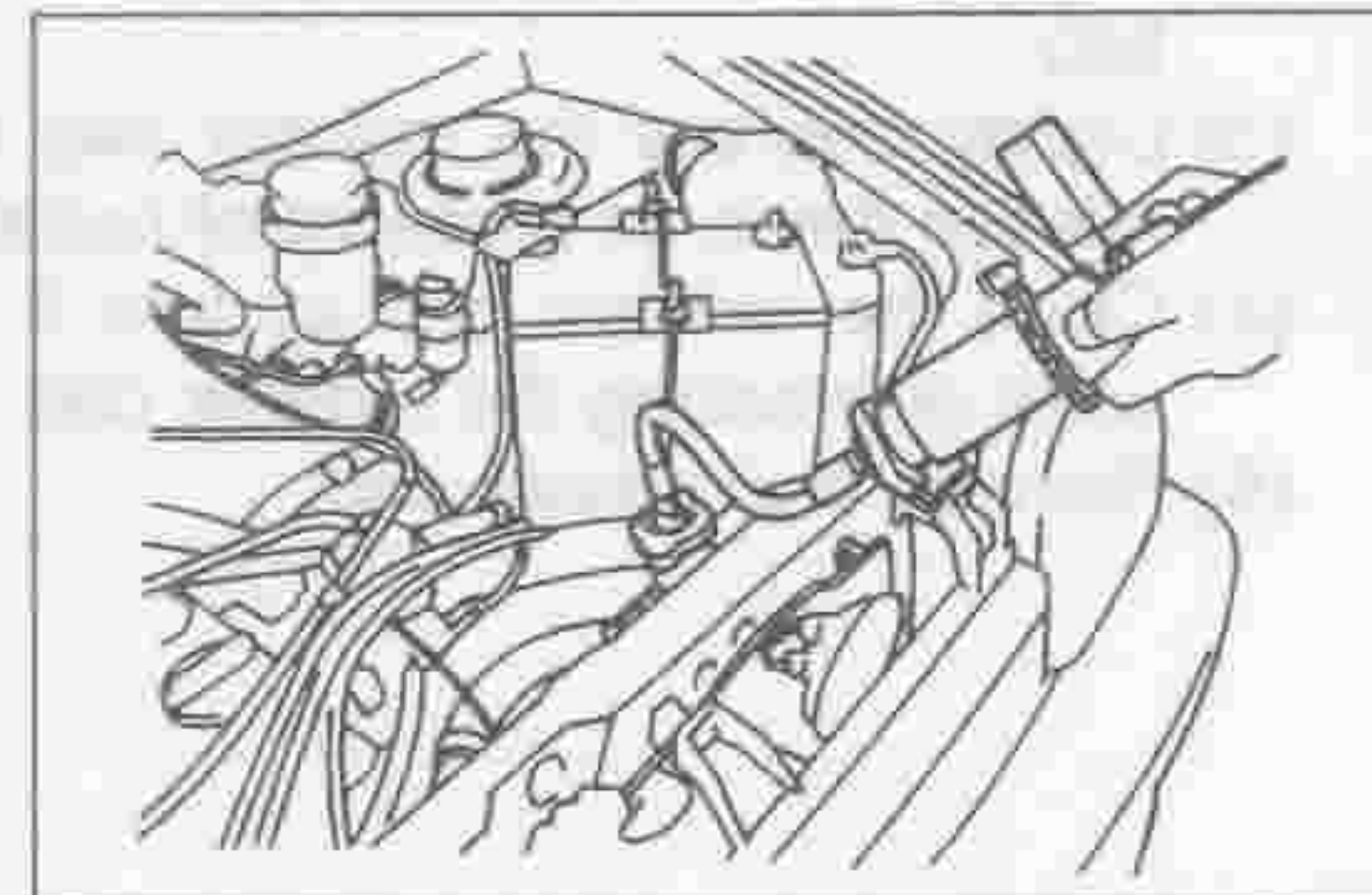
- (12) Install the radiator cap to the radiator securely.

3. Inspection of engine coolant leakage

WARNING:

- Never open the radiator cap or drain plug when the coolant is still hot. Failure to observe this caution will cause you to get scalded.

- (1) Ensure that the engine coolant temperature is nearly atmosphere temperature.
- (2) Turn the radiator cap to opening direction (counterclockwise) for one step (until the first detention will be felt).
- (3) Lightly depress the radiator cap one to two times to release the inner pressure of the radiator.
- (4) Open the radiator cap by turn it to counterclockwise while depressing the radiator cap.
- (5) Remove the radiator cap.
- (6) Fill the radiator with coolant, if necessary.



LEMA00010-00007

- (7) Attach a radiator cap tester.
- (8) Apply a pressure of 117 kPa (1.2 kgf/cm², 17 psi) to the cooling system by means of a radiator cap tester.
If the pressure drops, check the hoses, radiator, water pump and heater for evidence of leakage.
If no external leakage is found, check the heater core, cylinder block, cylinder head, oil cooler and throttle body for evidence of leakage.
Check the hoses for deterioration, cracks, bulge or damage.
Replace the damaged part (s) if necessary.
- (9) Remove the radiator cap tester from the radiator.
- (10) Secure the radiator cap to the radiator.

LEMA00011-00000

4. Inspection of the battery

WARNING:

- Never touch at the battery terminals immediately after the engine is stopped.
- Be certain to turn OFF the ignition key switch during the inspection.

- (1) Check the battery terminal case for proper installing condition and cracks.

If battery case exhibits improper installing condition or cracks, replace or repair the battery case, as required.

- (2) Check to see if the battery terminals exhibit corrosion and loose connection.

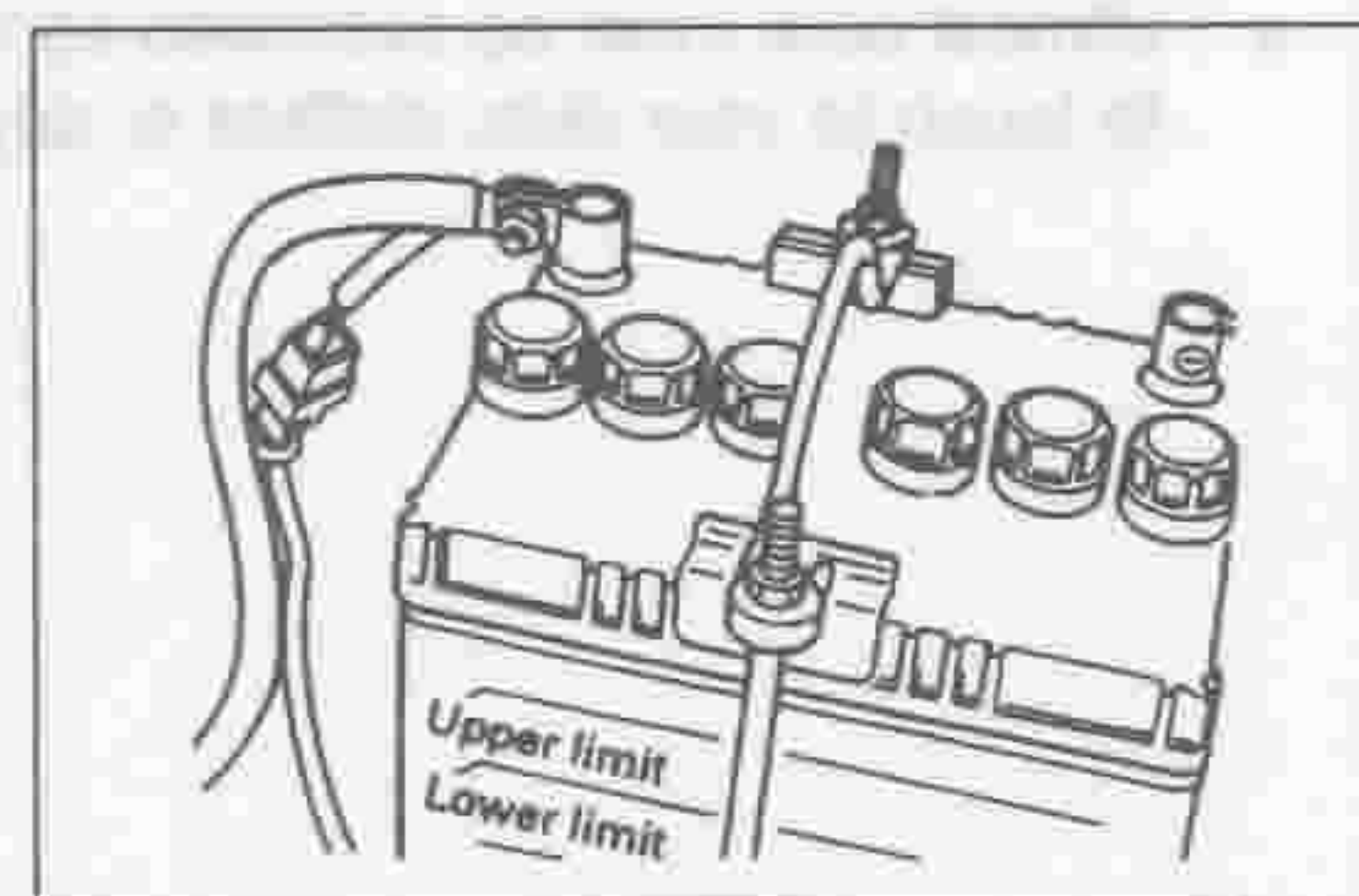
If the battery terminal exhibit corrosion and loose condition, disconnect the battery cable terminal which connected to the battery terminals.

Remove the any rust, using a wire brush or a fine abrasive paper.

After the battery cable terminals have been connected, coat these terminal with a thin film of lithium grease.

CAUTION:

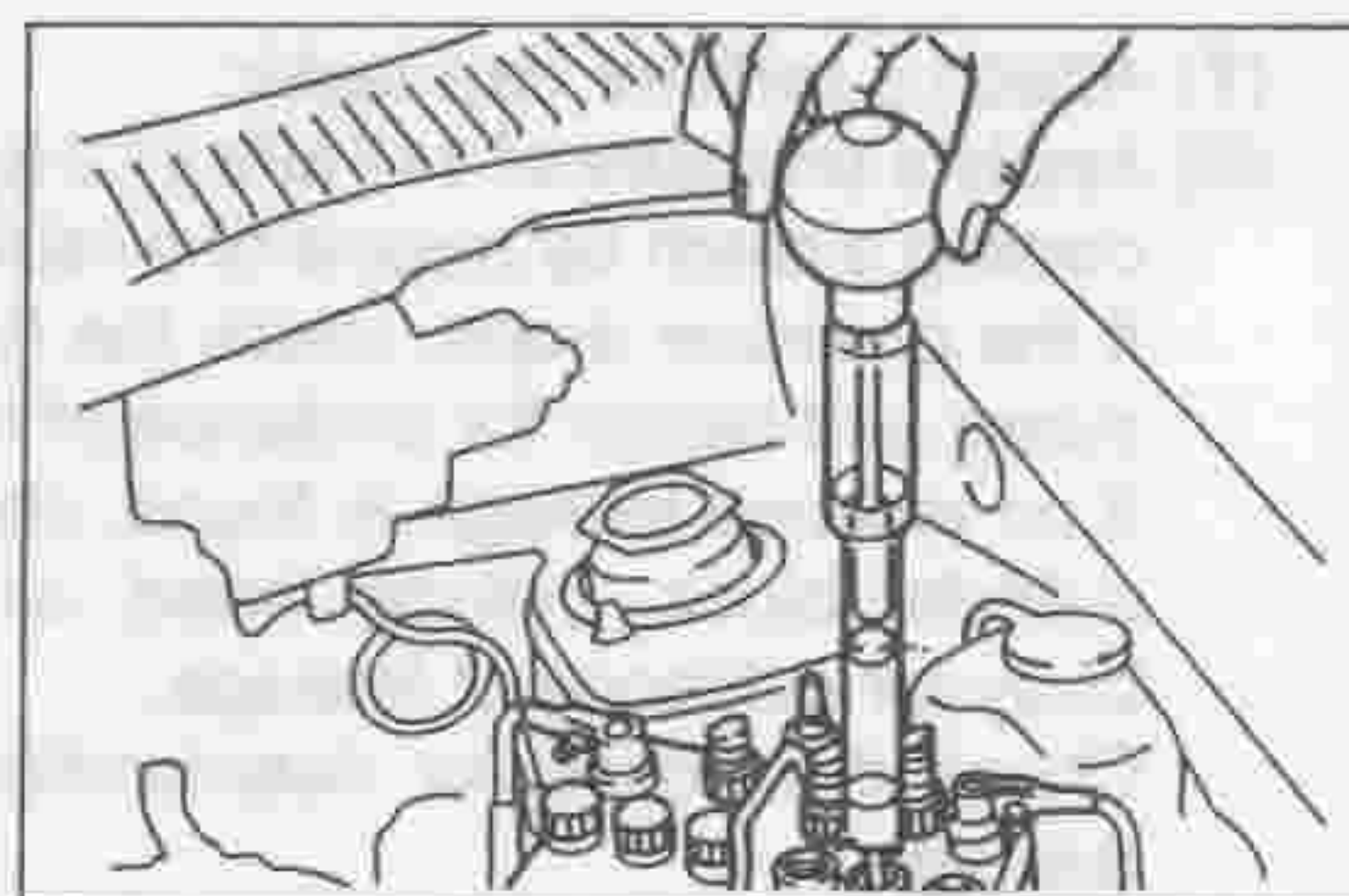
- After the battery terminals have been cleaned, make sure that no rust particle remains on the terminals.
- Do not shorten the terminals of the battery with tools of metal objects. If the battery terminals are shorted, it will cause the battery to overheat and can cause damage or explosion.



LEMA00012-00008

- (3) Check of specific gravity of battery electrolyte
Measure the specific gravity of the electrolyte of each cell, using a hydrometer. Ensure that the specific gravity is within the specified value.

Standard Specific Gravity: 1.25 or more
When fully charged at
20°C (68°F)



LEMA00013-00009

If the specific gravity is not within the specified value, check the electrolyte level and replenish distilled water. Then, charge the battery until the specific gravity reaches the specified value.

<Reference>

$$\text{Specific gravity at standard temperature} = \text{Measured specific gravity} + 0.0007 \times \left(\text{Electrolyte temperature at time of measurement } ^\circ\text{C} - 20 \right)$$

CAUTION:

- Utmost care must be exercised as to the handling of electrolyte. Be careful not to allow the electrolyte to touch to your skin, clothes or any parts of the vehicle.



LEMA00014-00000

- (4) Inspection of battery electrolyte level
Ensure that the battery electrolyte level is in the upper limit level.

If the battery electrolyte level of any cell is not at the upper limit level, replenish distilled water to the upper limit level.

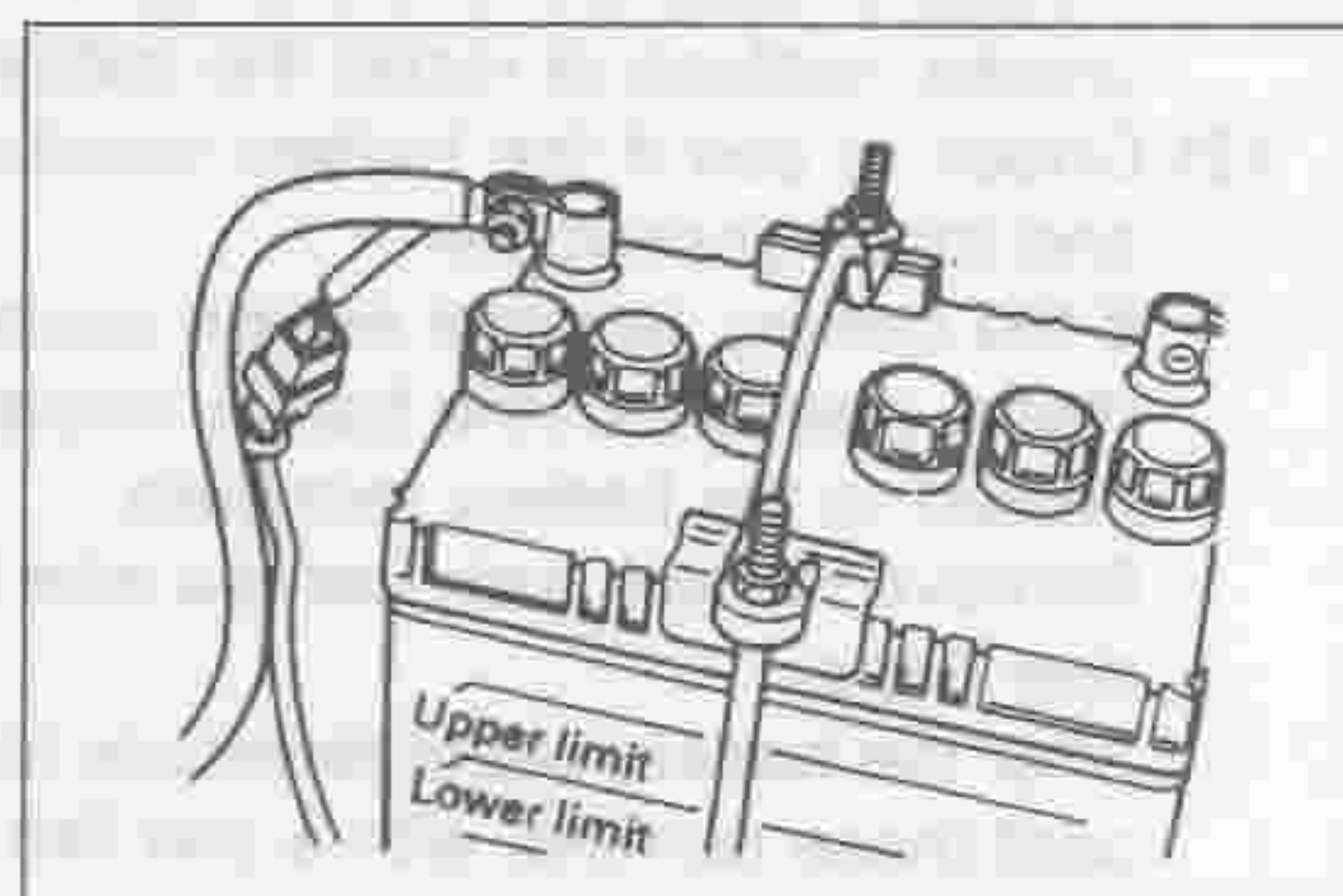
WARNING:

- Tighten the battery vent caps securely after adding distilled water. Otherwise the battery electrolyte may be splashed out and damage your vehicle or even cause serious bodily injury.

- Battery contains sulfuric acid which is poisonous and corrosive.

Therefore, be careful not to splash battery fluid on yourself or clothes and wash the part immediately if it happens. Furthermore, wear protective safety glasses to protect the eyes.

- If you have swallowed battery fluid, drink as much water or milk as possible and immediately see a doctor.
- Keep fire away from the battery. It could cause battery explosion.
- Keep children away from the battery.



LEMA00015-00010

CAUTION:

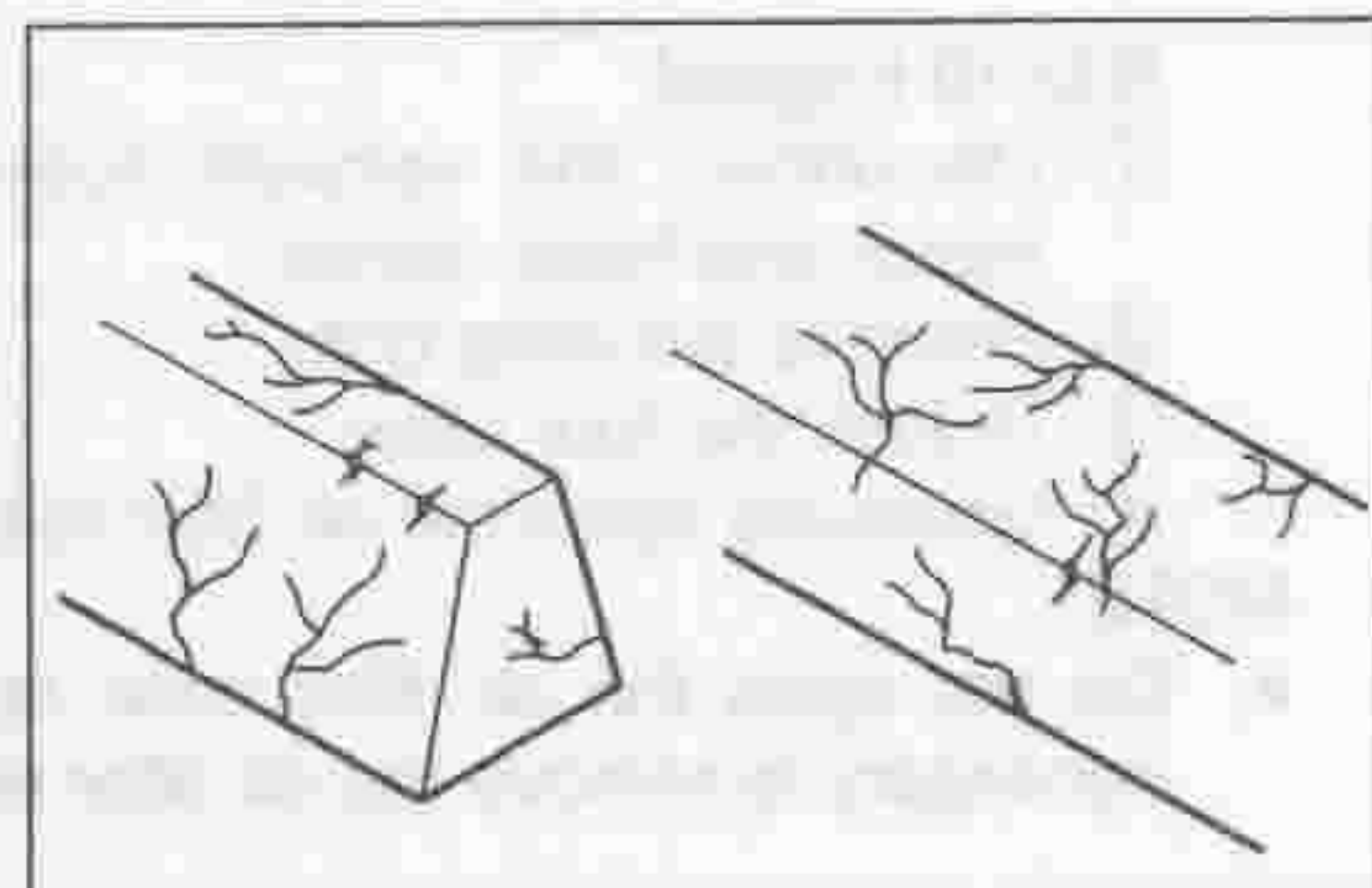
- Wash splashed battery fluid away from paint finish immediately.

NOTE:

- Never add city tap water or sulfuric acid, etc. instead of distilled water.
- If the electrolyte level of each battery cell differs greatly, it is advisable to inspect to see if any electrolyte leakage is present.

5. Inspection of drive belt
(1) Visual inspection of the drive belt

Visually check the belt for separation of the adhesive rubber above and below the core, core separation from the belt side, severed core, separation of the rib from the adhesive rubber, cracks or separation of the ribs, torn or worn ribs or cracks in the inner ridges of the ribs. Replace the drive belt, if necessary.



LEMA00017-00011

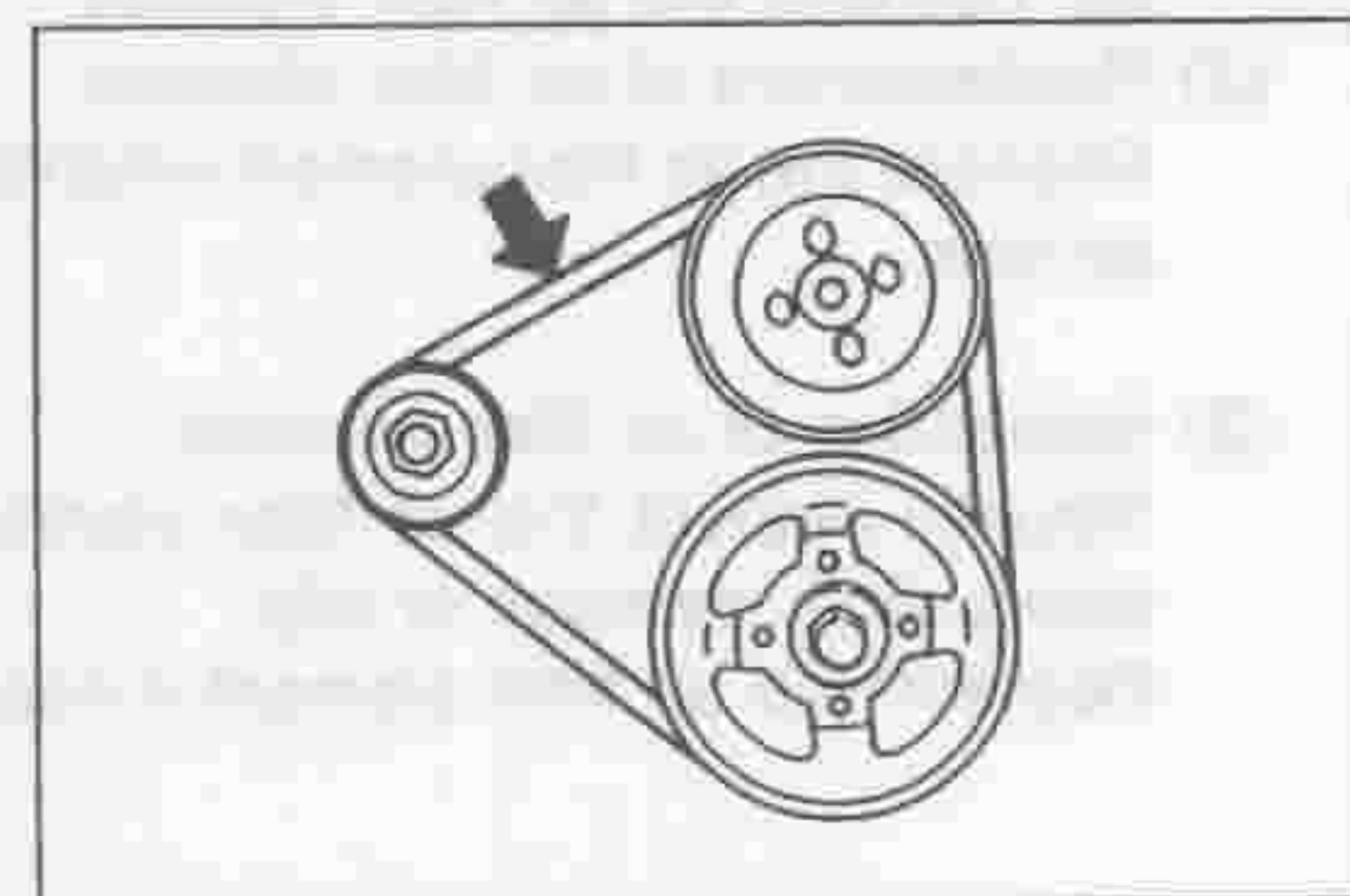
(2) Inspection of the drive belt tension

Measure the amount of the drive belt deflection when the midpoint of the drive belt between the alternator and the water pump pulley is pushed with a force of 98 N (10 kgf, 22 lb).

Specified Belt Deflection

New Belt: 6 - 7 mm (0.24 - 0.28 inch)
[with a force of 98 N (10kgf) applied at the point shown in the figure.]

Used Belt: 7.5 - 8.5 mm (0.30 - 0.33 inch)
[with a force of 98 N (10kgf) applied at the point shown in the figure.]



LEMA00018-00012

NOTE:

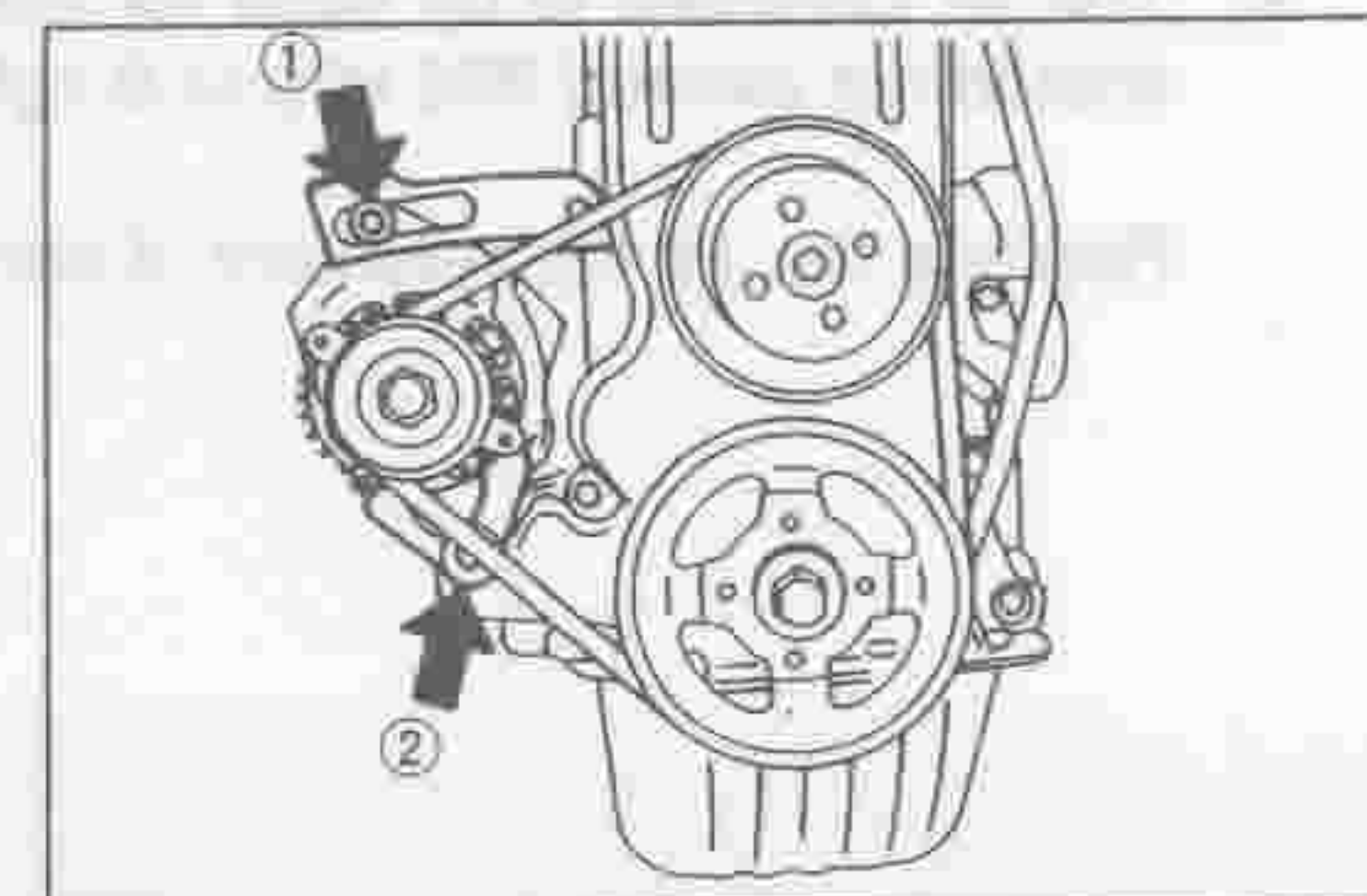
- "New belt" refers to a belt which has been used on a running engine for less than five minutes.
- "Used belt" refers to a belt which has been used on a running engine for more than five minutes or more.
- After replacing the drive belt, check that it fits properly in the ribbed grooves, especially in the places difficult to see.
- After installing a new belt, run the engine for about five minutes and then recheck the tension.

(3) Adjustment of drive belt tension

- ① Ensure that the ignition switch turned OFF.
- ② Slacken the alternator attaching bolts.
- ③ Adjust the drive belt tension to the specified value described in the step (2).
- ④ Tighten the alternator attaching bolts to the specified torque.

Tightening Torque:

- ① 23.5 - 35.3 N·m (2.4 - 3.6 kgf-m)
- ② 31.4 - 47.0 N·m (3.2 - 4.8 kgf-m)



LEMA00019-00013

6. Inspection of air filter element

(1) Removal of air filter element

[ED-10 Engine]

- ① Disconnect the vacuum hose from the vacuum motor and hose clamp
- ② Remove the wing bolt.
- ③ Unlock the four clips.
- ④ Gradually open the air filter case cover.

NOTE:

- Do not open the air filter case cover more than that necessary to remove the air filter element.

- ⑤ Remove the air filter element.

(2) Replacement of air filter element

Replace the air filter element when the replacement time arrives.

(3) Inspection of air filter element

Visually inspect the air filter element for being excessively dirty, damage or oily.

Replace the air filter element if necessary.

(4) Cleaning of air filter element

Clean the air filter element with compressed air.

First, blow compressed air from the back side of the element thoroughly. Then, blow off the upper side of the element.

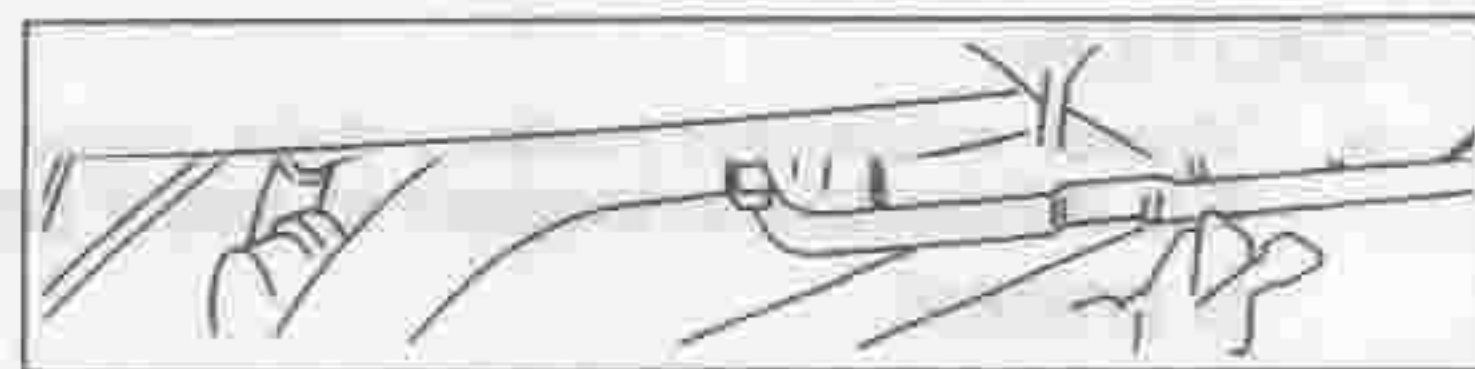
WARNING:

- Protect your eyes with safety goggles during the cleaning operation.

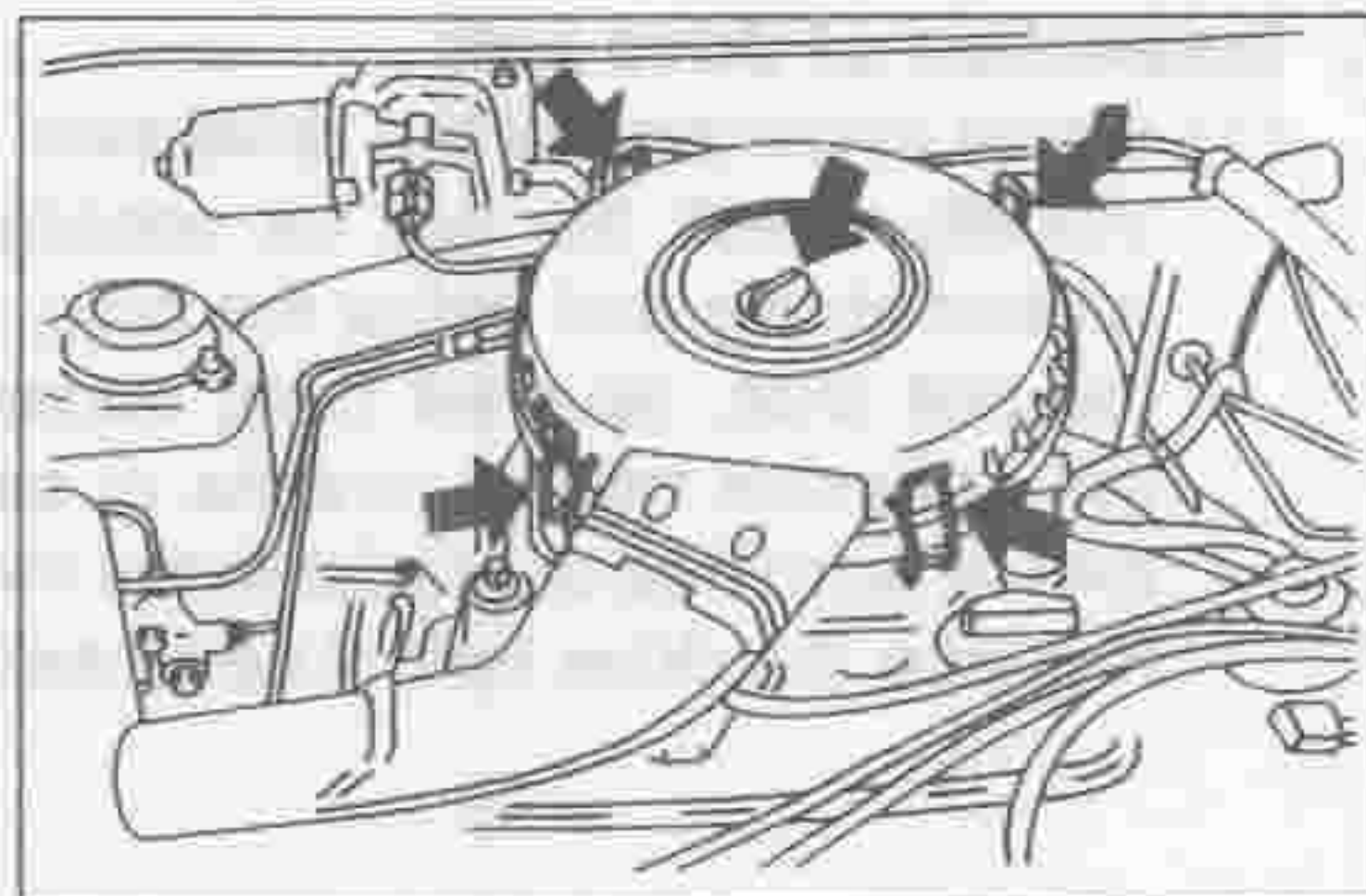
CAUTION:

- The air pressure to be used for this cleaning operation should not exceed 392 kPa (4.0 kgf/cm²).

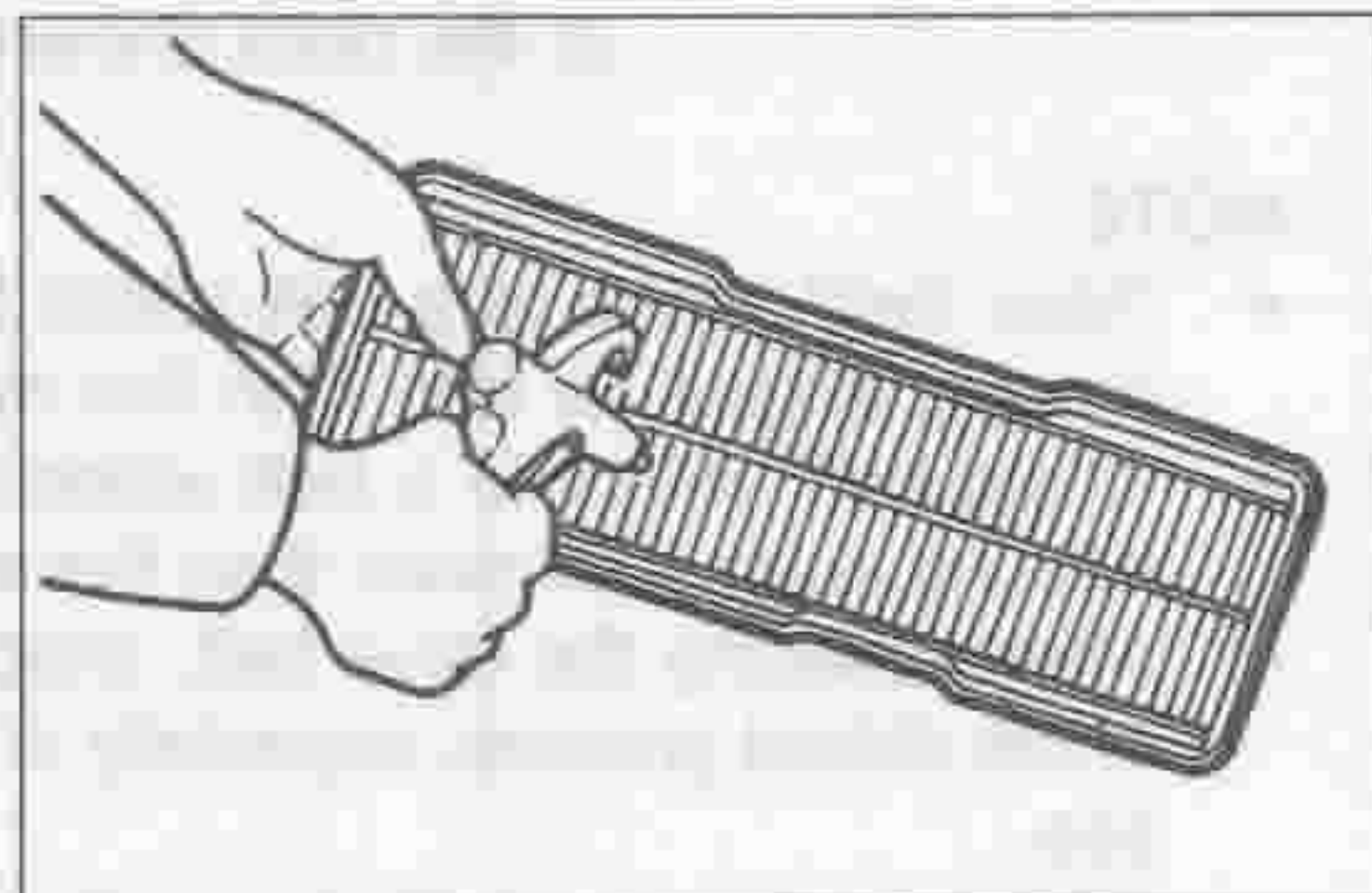
Replace the air filter element, if necessary.



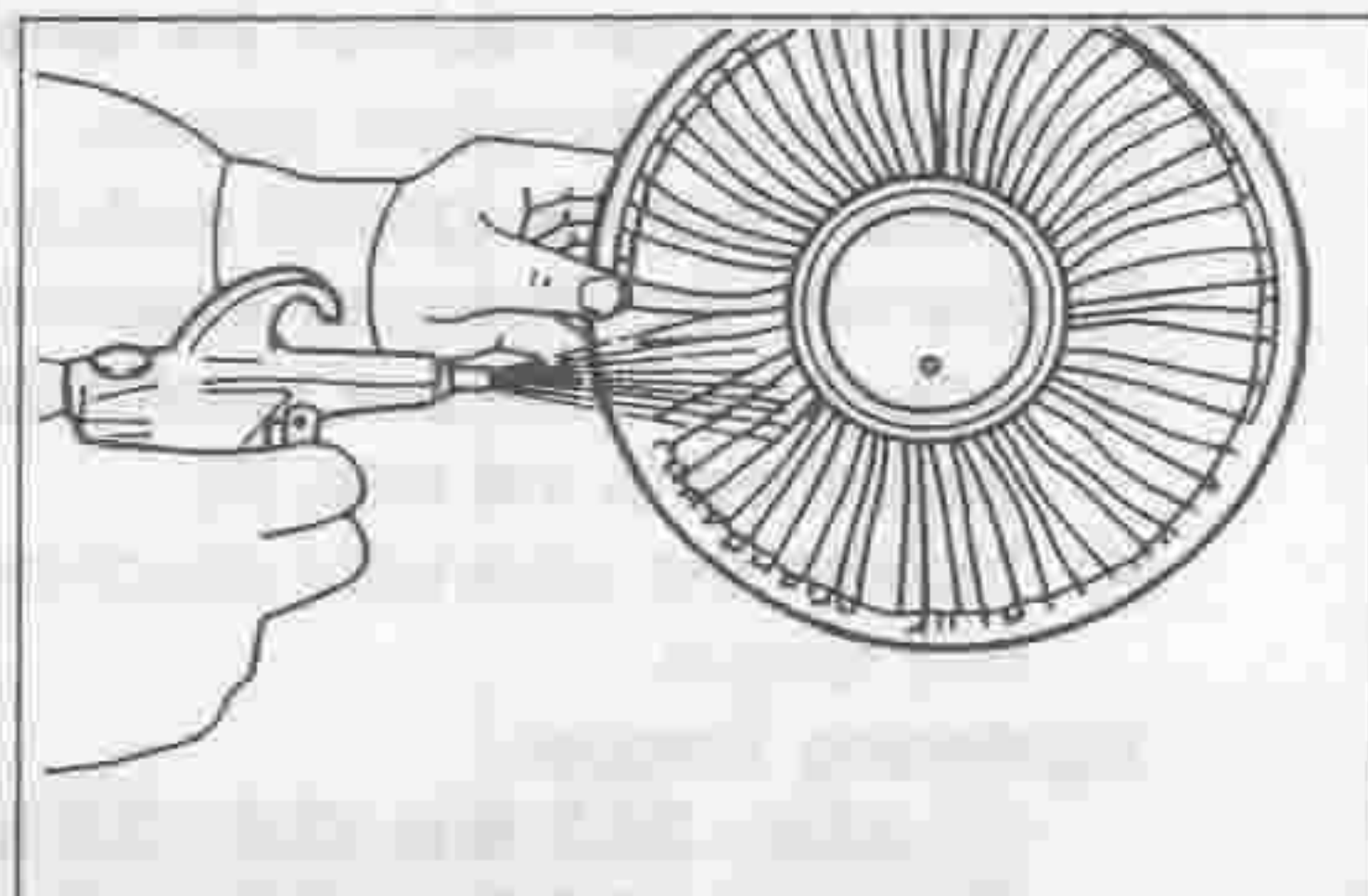
LEMA00020-00014



LEMA00021-00015



LEMA00022-00016

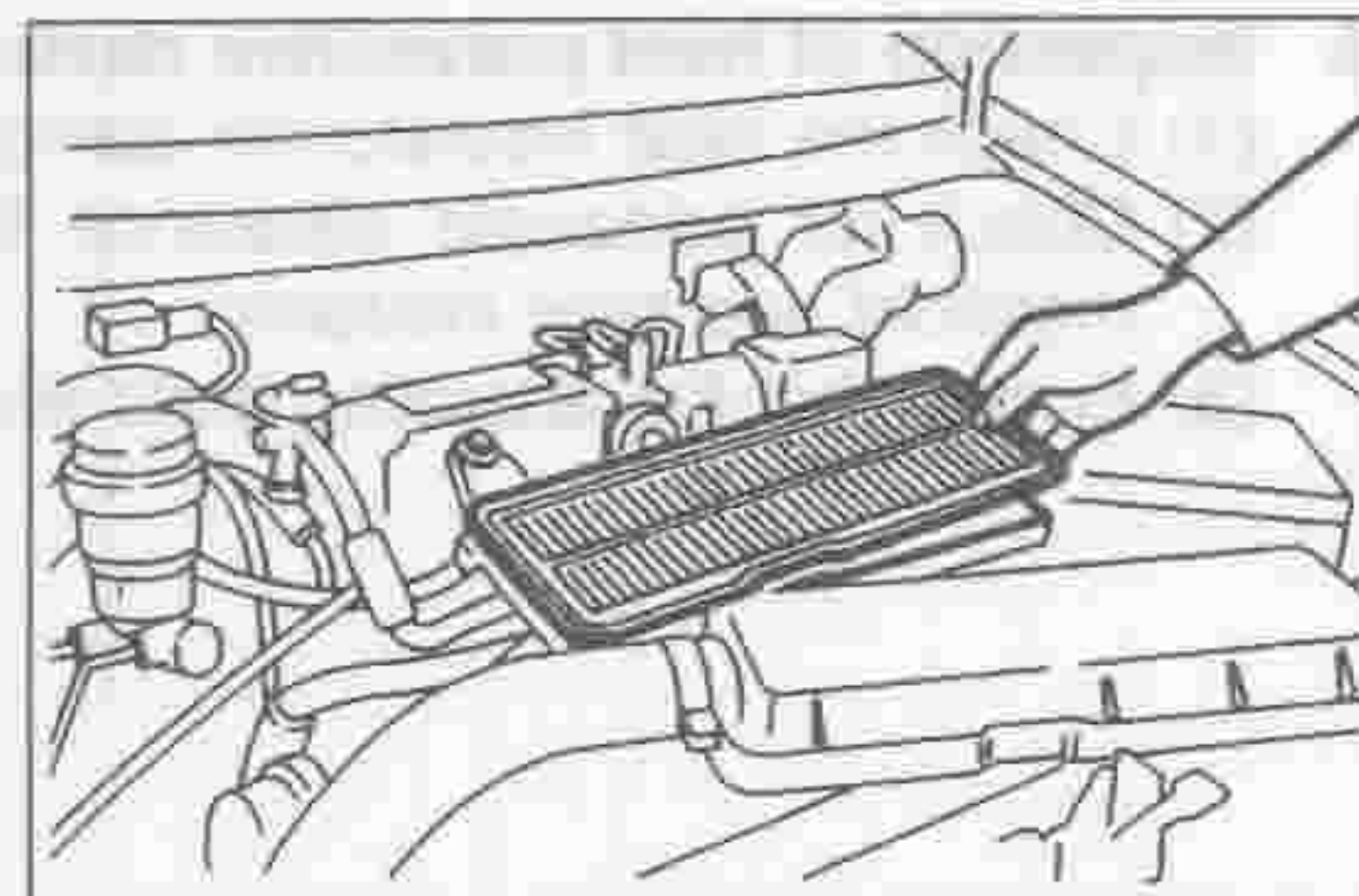


LEMA00000-00017

(5) Installation of the air filter element

[ED-20, EF-EL Engine]

- ① Install the air filter element in the air cleaner case.
- ② Place the air filter upper case.
- ③ Latch the five clips.



LEMA00023-00018

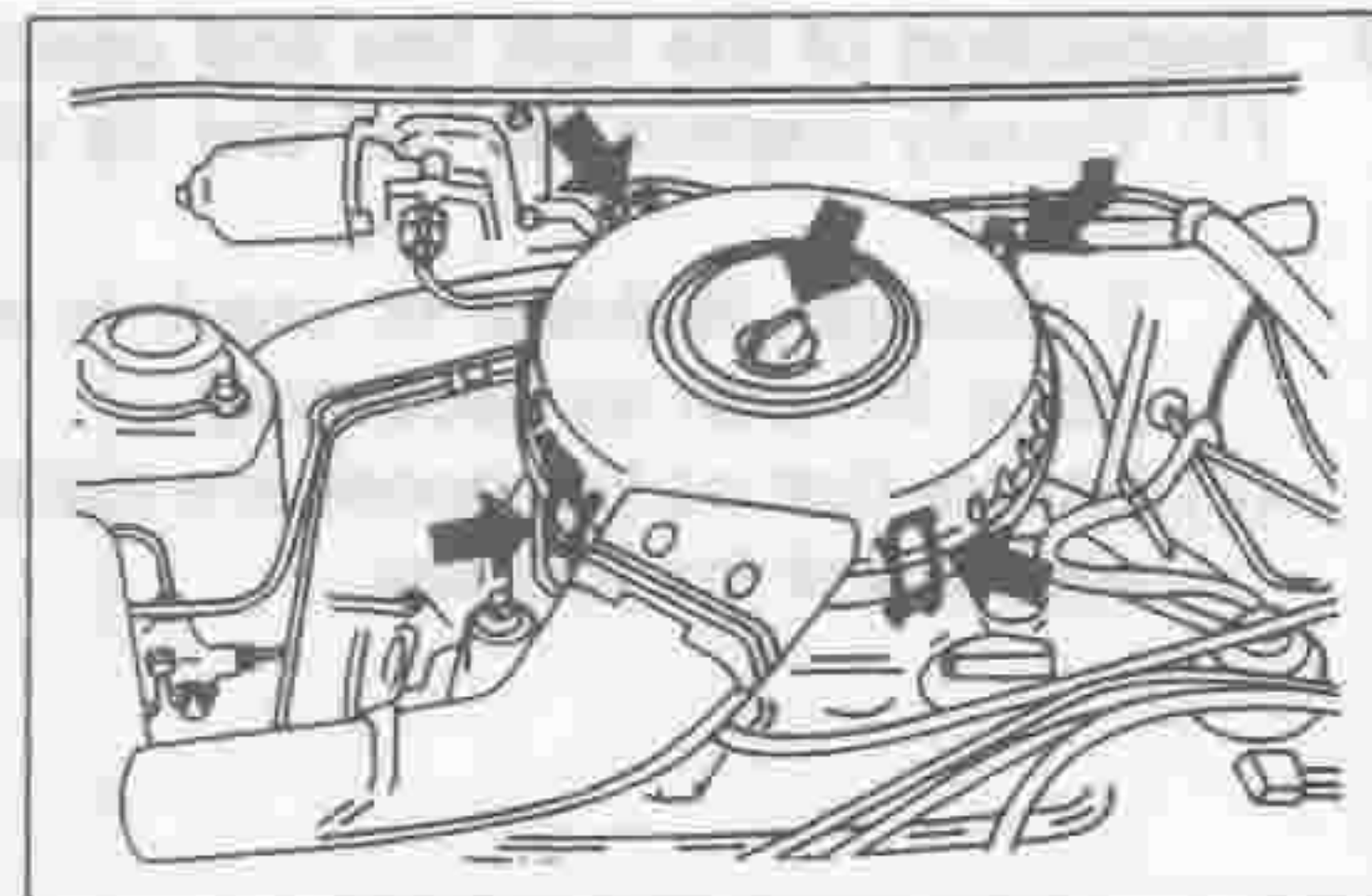
[ED-10 Engine]

- ① Install the air filter element in the air cleaner case.

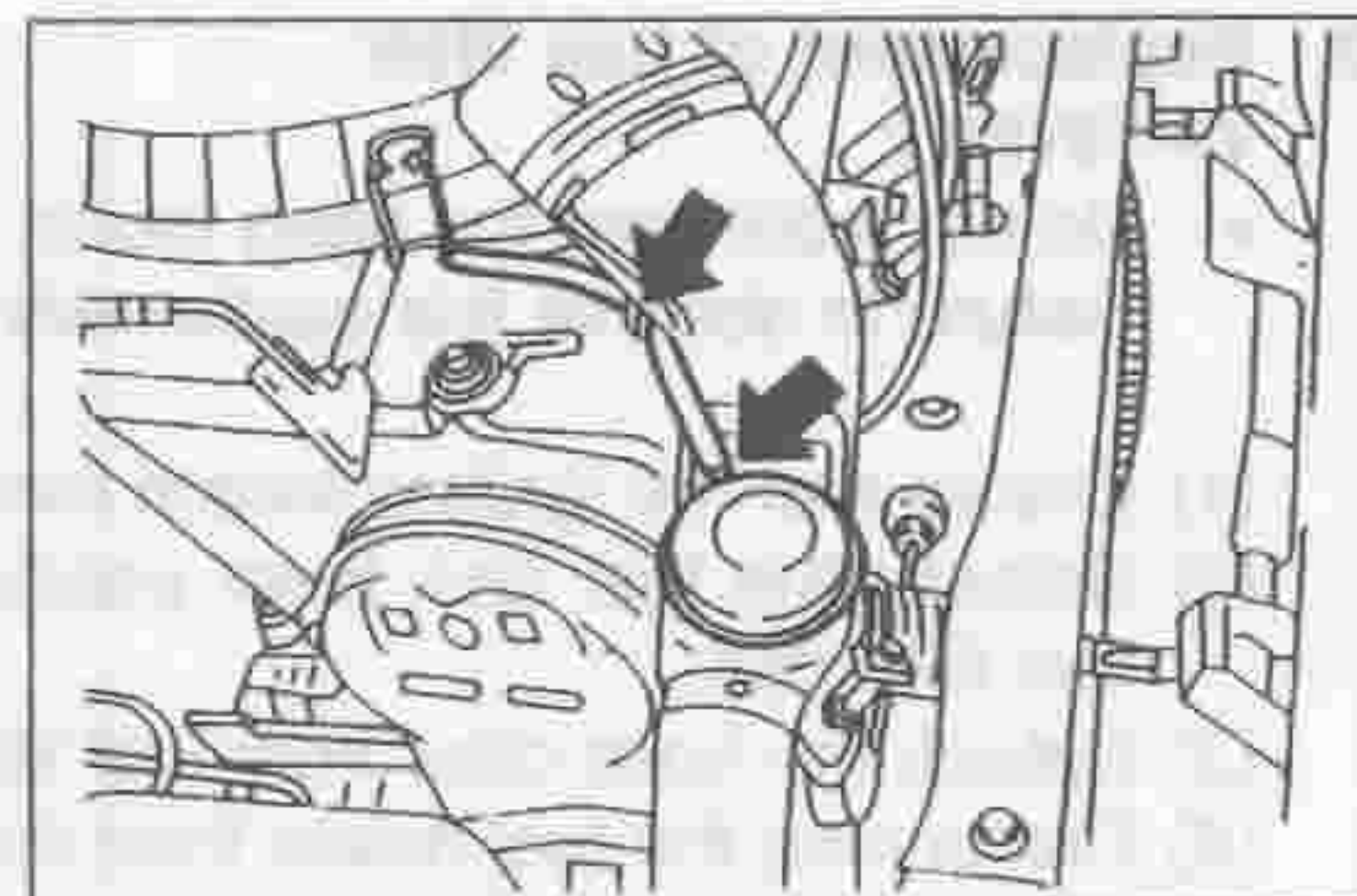
NOTE:

- The air filter element has the correct installation direction to be observed. Turn the air filter element so that the element may be fitted securely in the air cleaner case.

- ② Install the wing bolt and latch the four clips.
- ③ Connect the vacuum hose to the vacuum motor and hose clamp.



LEMA00024-00019

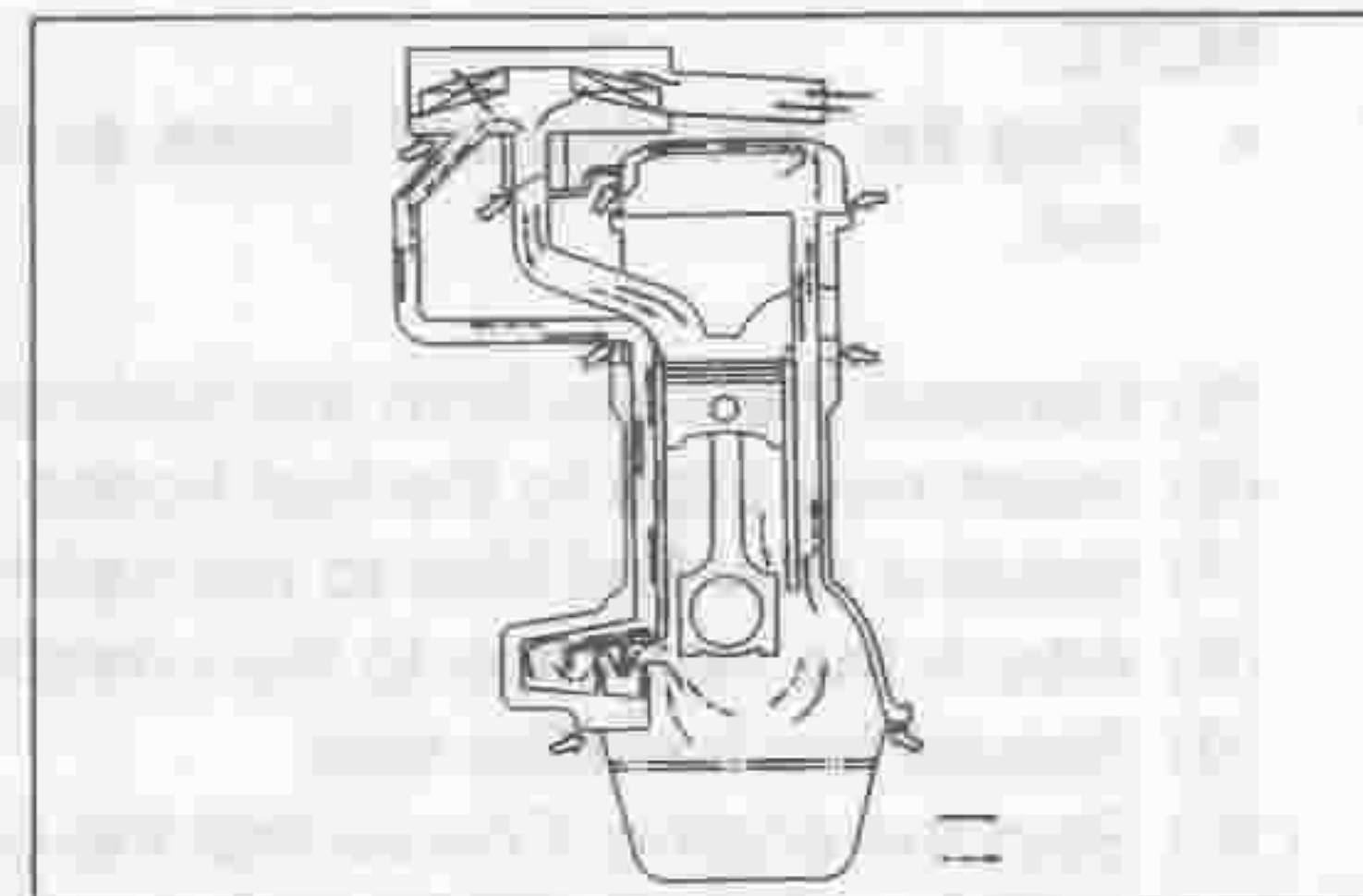


LEMA00000-00020

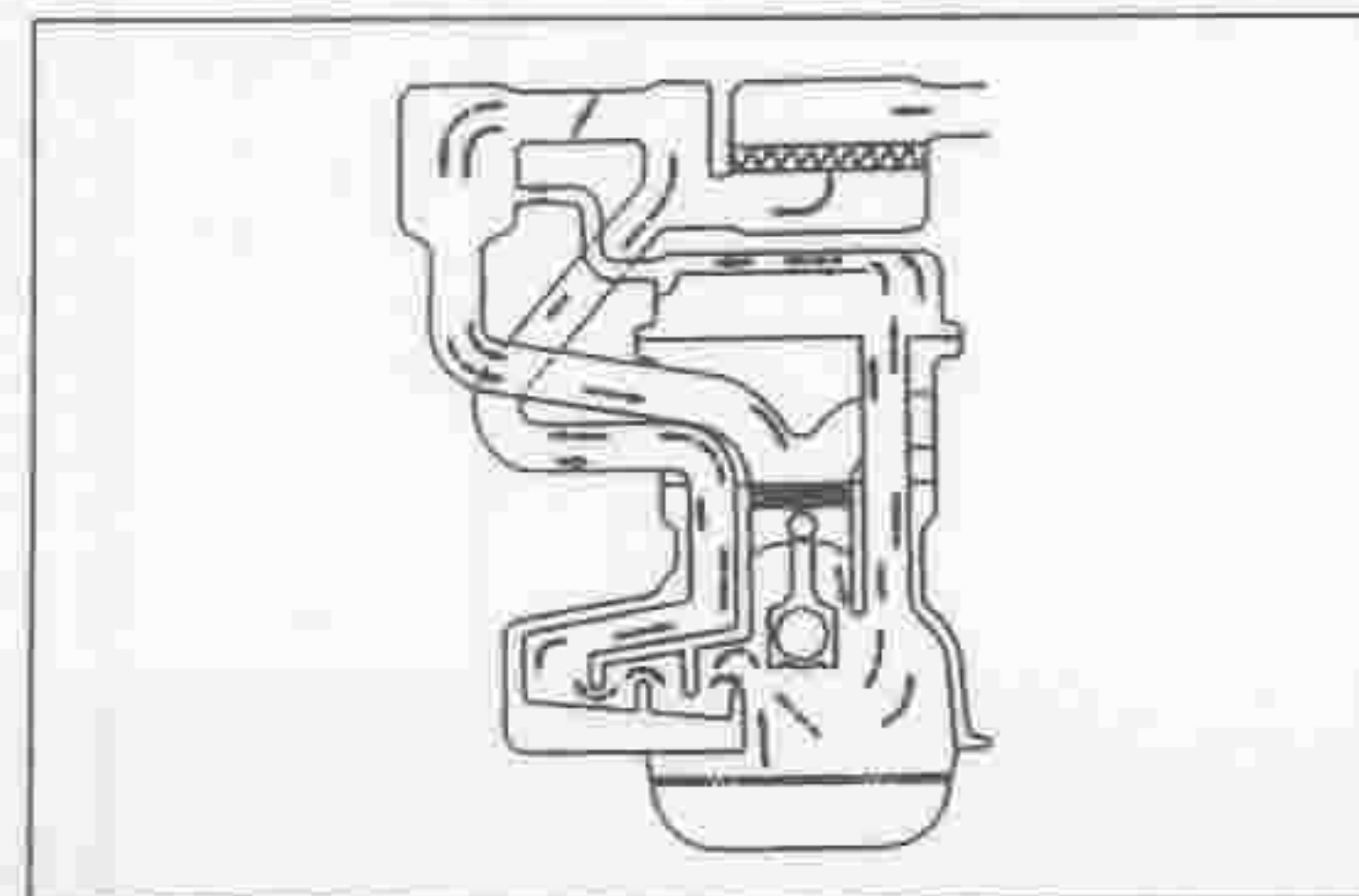
7. Inspection of blow-by gas recirculation device

Visually inspect the hoses for improper connections, cracks, leak or damage.

Replace or repair any part which exhibit defects.



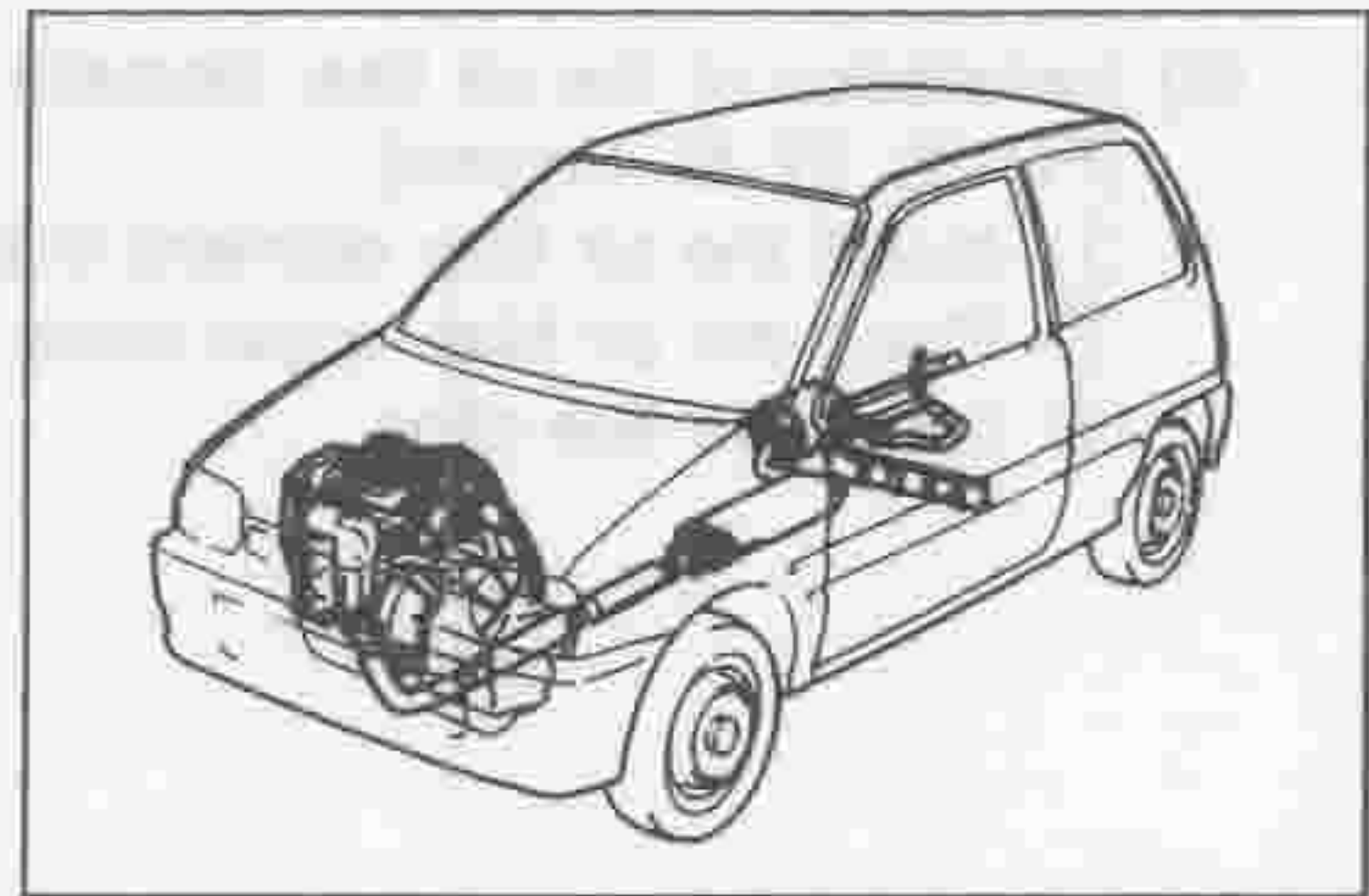
LEMA00025-00021



LEMA00000-00022

8. Inspection of heat preventive device

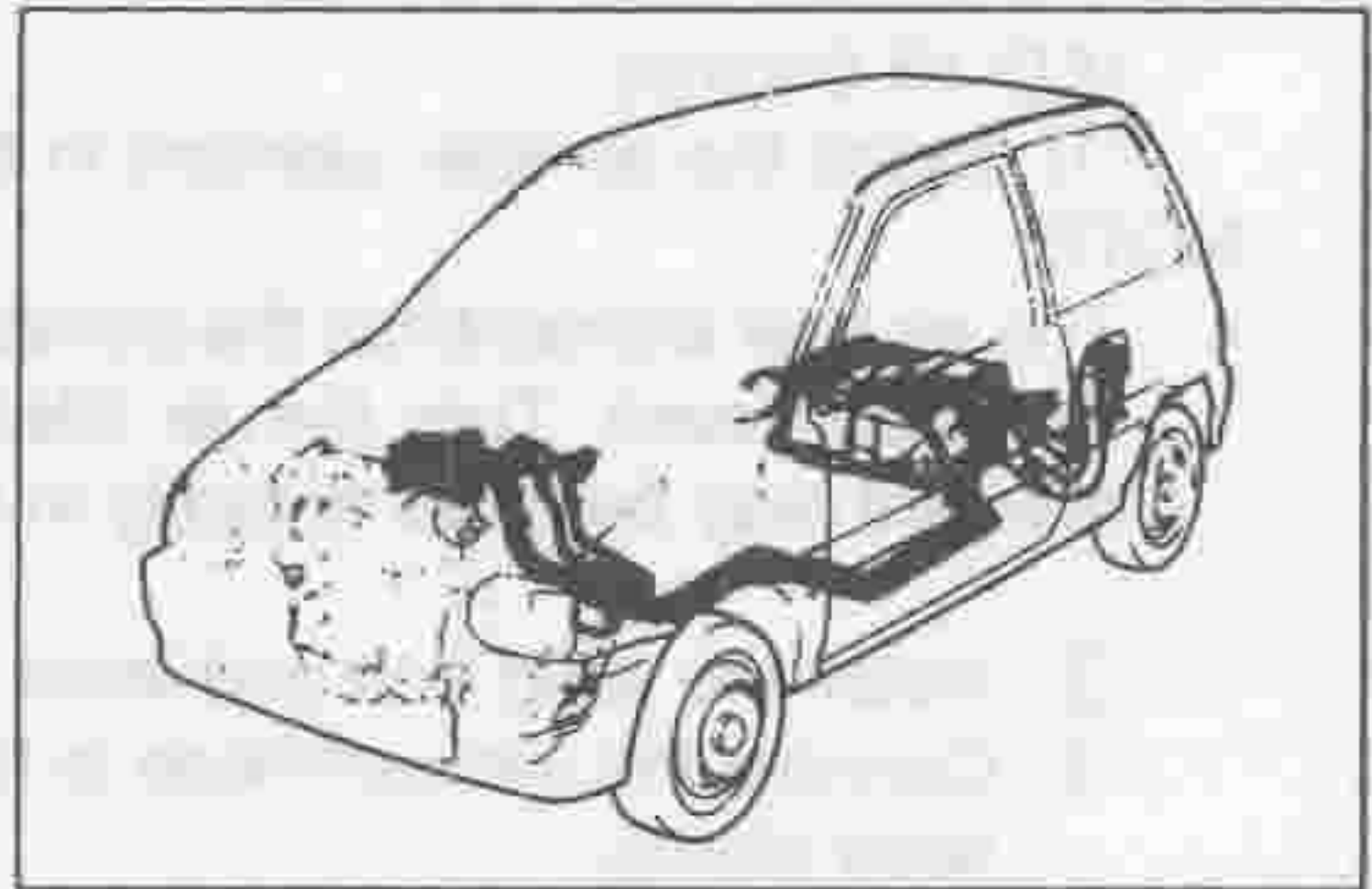
- (1) Check the heat insulator for damage.
- (2) Check for adequate clearance between the exhaust manifold and heat insulator.
- (3) Ensure that the attaching bolts are tightened properly.



LEMA00026-00023

9. Inspection of the fuel line and connection

- (1) Visually inspect the fuel line for damage, leakage and crack.
If damage, leakage or crack is existing, repair or replace the part as necessary.
- (2) Ensure that no looseness are existing on the connected sections of the fuel line.

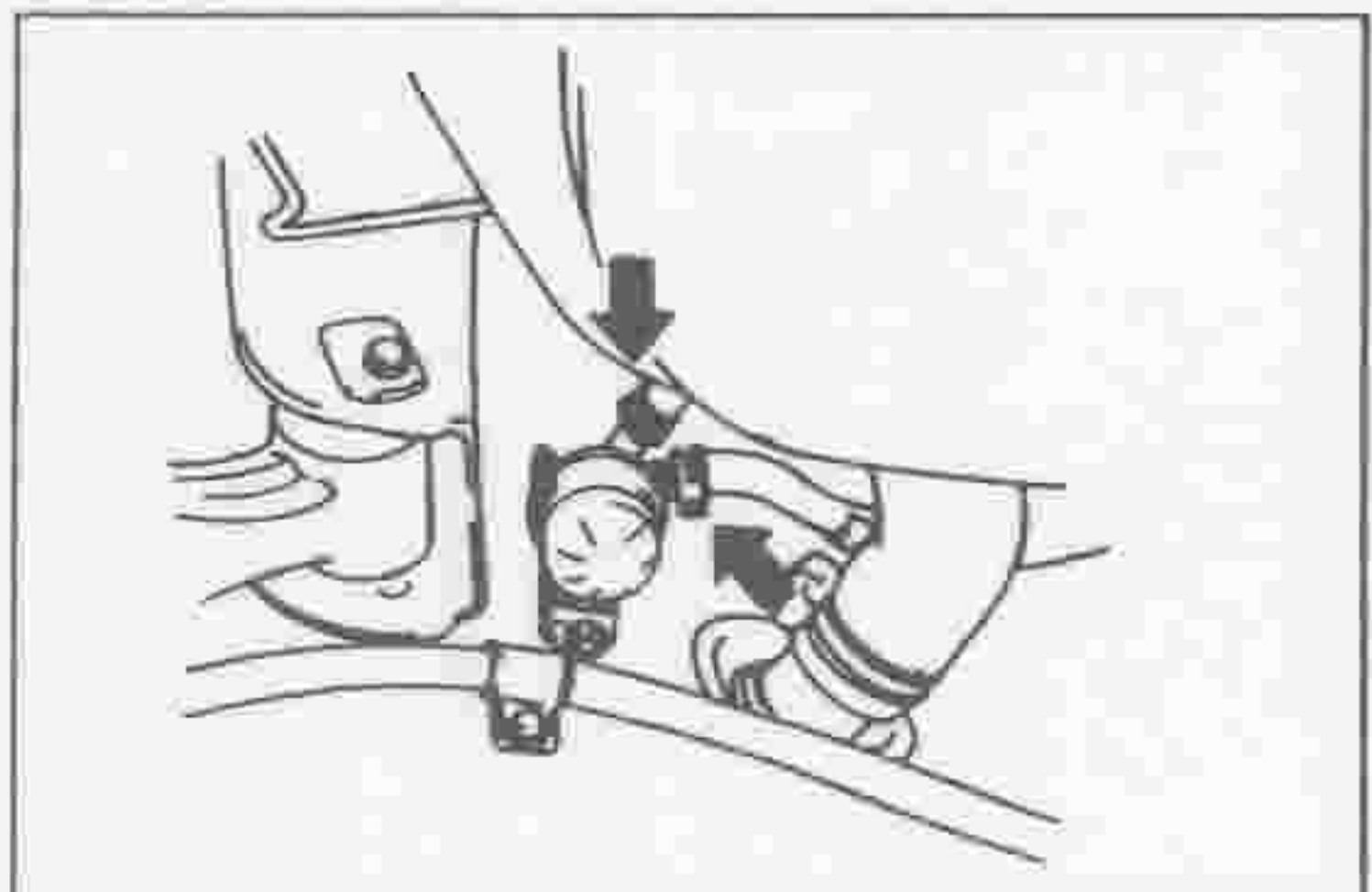


LEMA00028-00025

10. Replacement of fuel filter

WARNING:

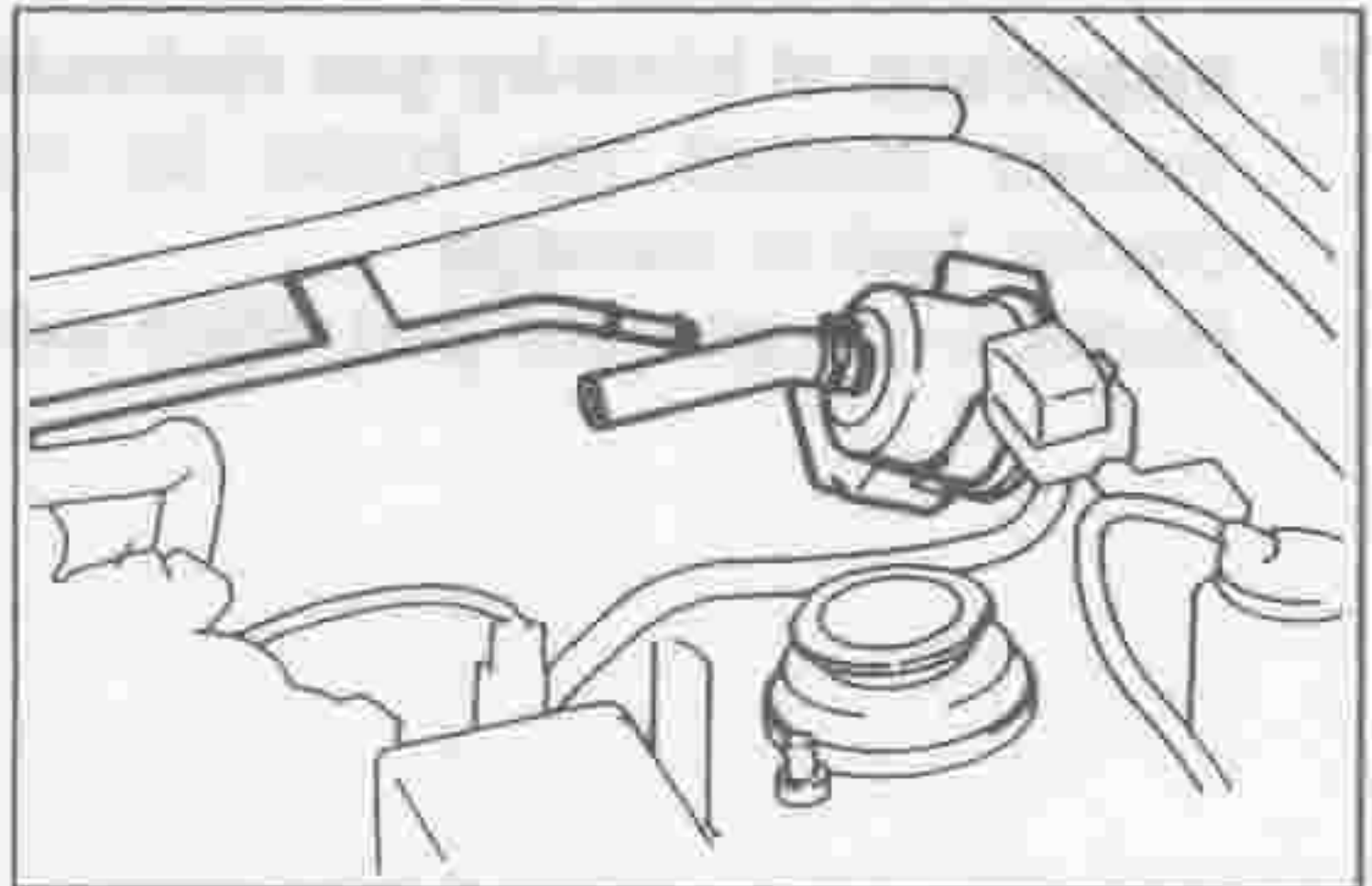
- Do not work near the open flame.
Failure to observe this caution will cause fire.
- (1) Ensure that the ignition switch turned OFF.
 - (2) Release the fuel tank inner pressure by removing the fuel filler cap.
 - (3) Detach the hose clips from fuel filter side.
 - (4) Disconnect the fuel hoses from the fuel filter.



LEMA00029-00026

NOTE:

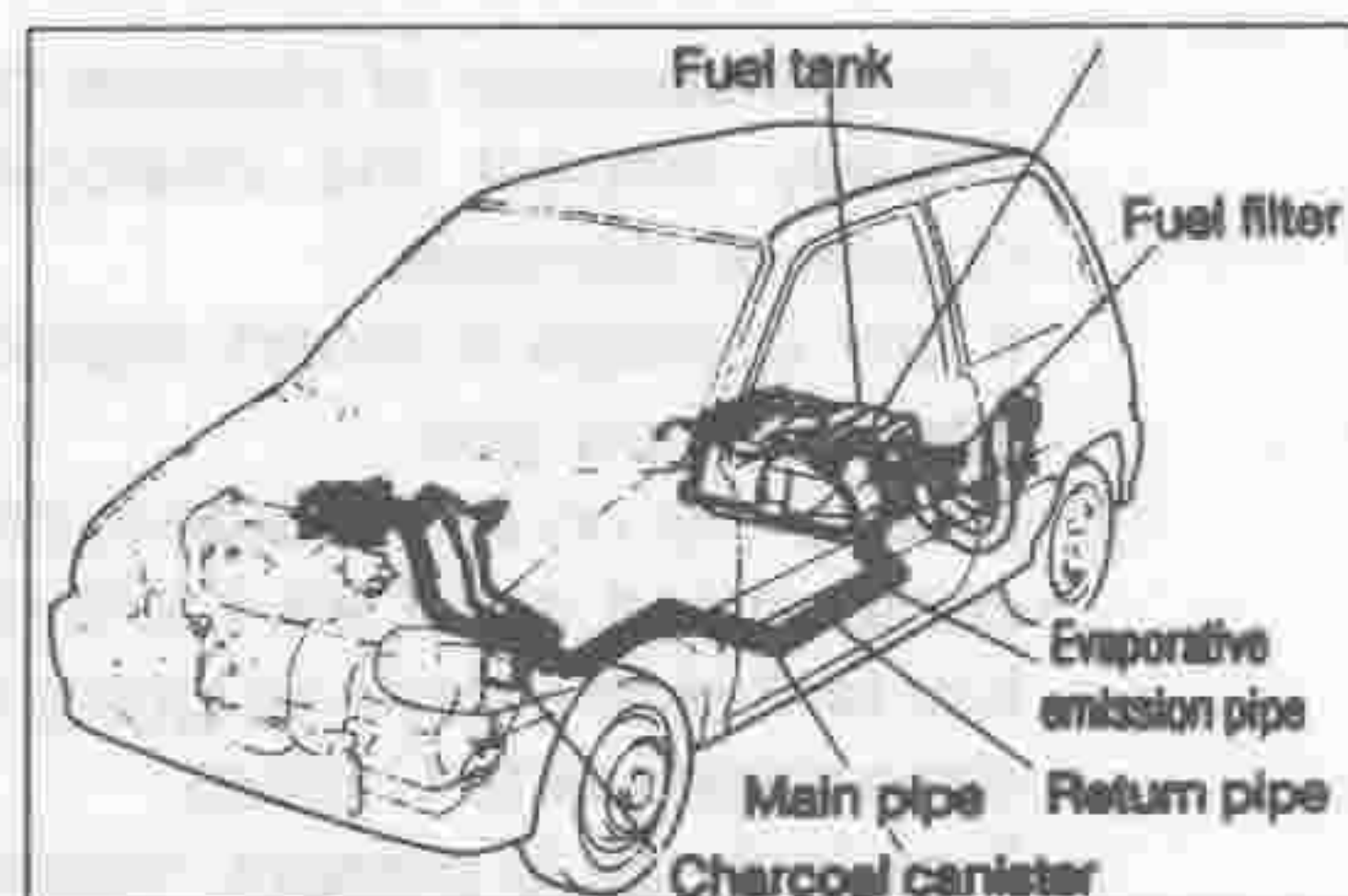
- Plug the disconnected hoses so that no fuel may flow out.
- (5) Remove the clips from the fuel hoses.
 - (6) Insert new clips to the fuel hoses.
 - (7) Install a new fuel filter to the fuel hoses.
 - (8) Attach the new clips to the correct position.
 - (9) Secure the fuel filler cap.
 - (10) Start the engine. Ensure that the engine exhibits no fuel leakage.



LEMA00030-00027

11. Inspection of fuel evaporative emission control device

- (1) Visual inspection of fuel vapor line and connections
Check the line and connections for loose connections, kinks or damage.
- (2) Visual inspection of fuel tank
Check the fuel tank for deformation, cracks or fuel leakage.
Replace the fuel tank, if necessary.



LEMA00031-00028

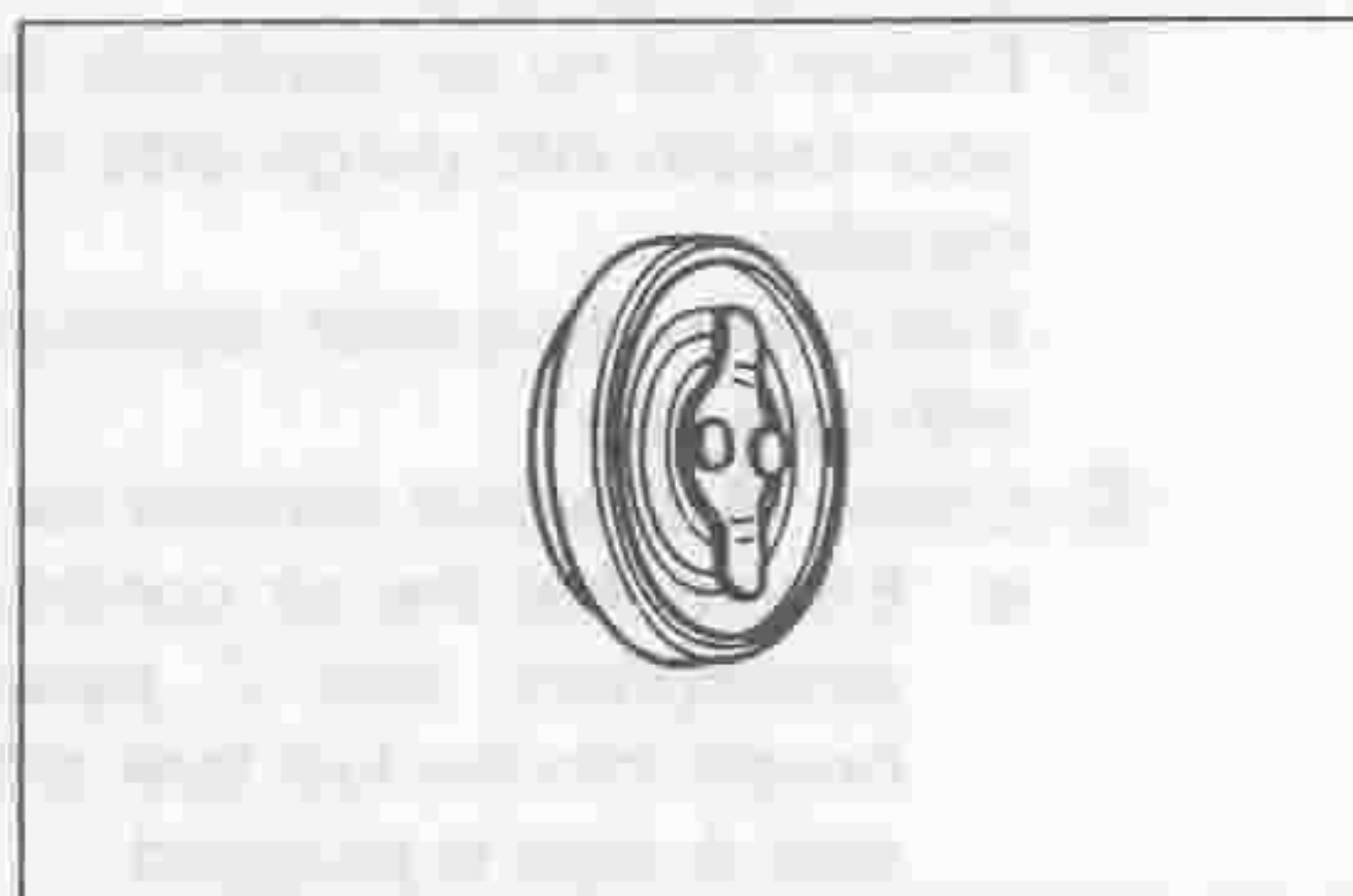
- (3) Visual inspection of fuel filler cap
Check the cap and the gasket for damage or deformation.
Replace the cap and/or gasket, if necessary.

NOTE:

- If fuel tank deformed by negative pressure, be sure to replace the fuel filler cap with new one.

WARNING:

- Do not inhale the air during the checking.
Inhalation of air, you may inhale the gas remain in the fuel filler cap.



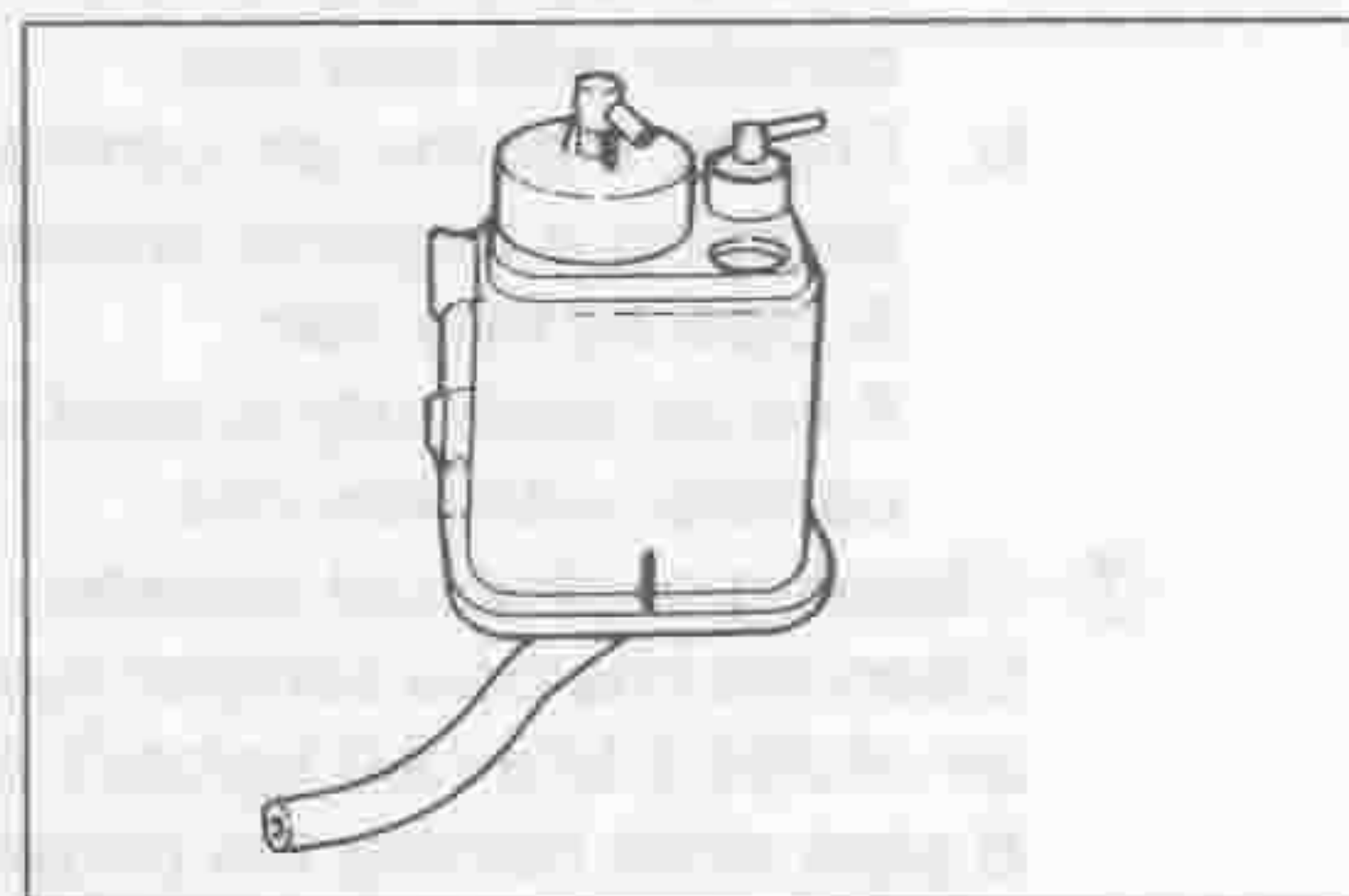
LEMA00032-00029

- (4) Inspection of the charcoal canister

- ① Detach the hose band from charcoal canister.
- ② Disconnect the rubber hoses and remove the charcoal canister.

NOTE:

- Prior to disconnection of the rubber hose, put a tag on each of the rubber hoses so that they may be reconnected correctly to the original position.

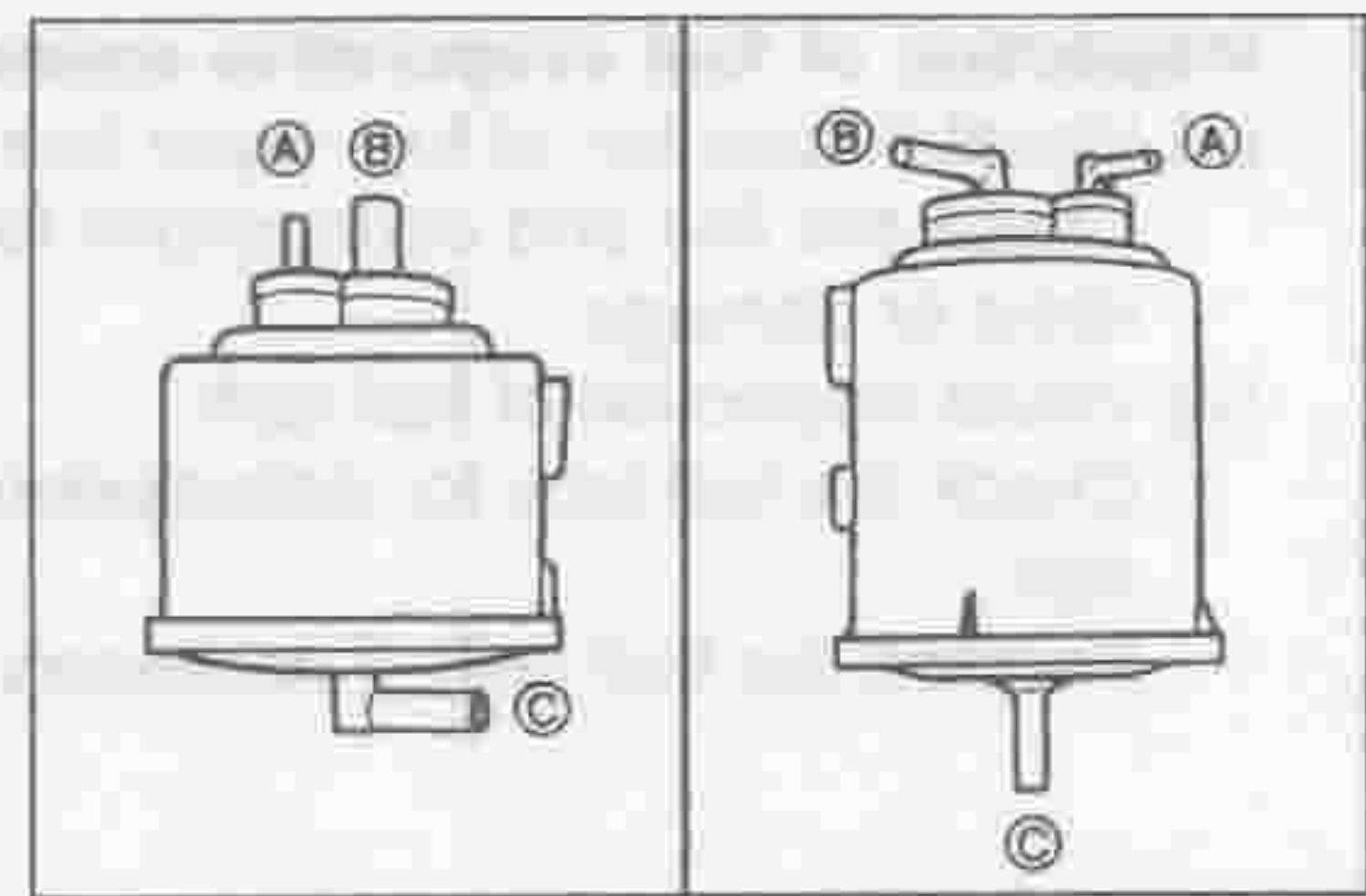


LEMA00033-00030

- ③ Visual inspection of charcoal canister
Visually inspect the charcoal canister case for cracks or damage.
If any damage is found, replace the charcoal canister with new one.
- ④ Ensure that no air leakage is present when applying compressed air of 29.4 kPa (0.3 kgf-cm²) into the fuel tank side B while plugging the purge side A and atmosphere side C pipes.
If air leakage is present, replace the charcoal canister with new one.
- ⑤ Ensure that no air continuity is exist when blowing your breath into purge side A pipe of the charcoal canister.
If air continuity is exist, replace the charcoal canister with new one.
- ⑥ Check of charcoal canister for restriction
 - a. Ensure that the air continuity is existing to the atmosphere side C pipes, when blow your breath into the fuel tank side B while the purge side A pipe is plugged.
If no air continuity is exist, replace the charcoal canister with new one.
 - b. Ensure that the air continuity is existing when applying a negative pressure to the purge side A pipe by Mity Vac.
If no air continuity is exist, replace the charcoal canister with new one.
- ⑦ Cleaning of charcoal canister
Clean the charcoal canister by blowing compressed air of 294.2 kPa (3.0 kg/cm²) into the fuel tank side B pipe while holding the purge side A pipe closed.

NOTE:

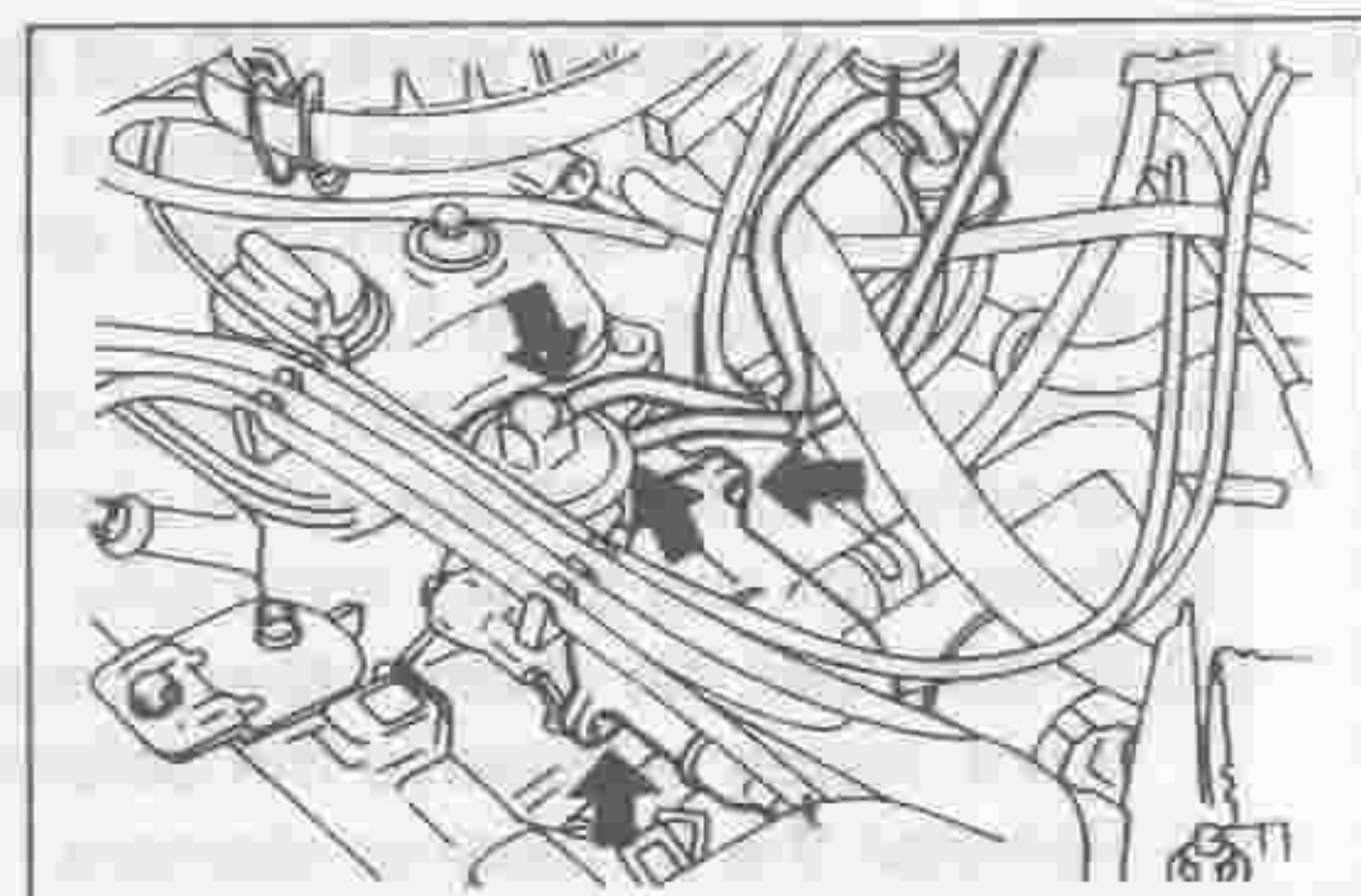
- Do not attempt to wash the charcoal canister.
 - No activated carbon should come out during the test.
If activated carbon comes out, replace the charcoal canister.
- ⑧ Install the charcoal canister to the vehicle, then re-connect the rubber hoses and attach the new hose bands.



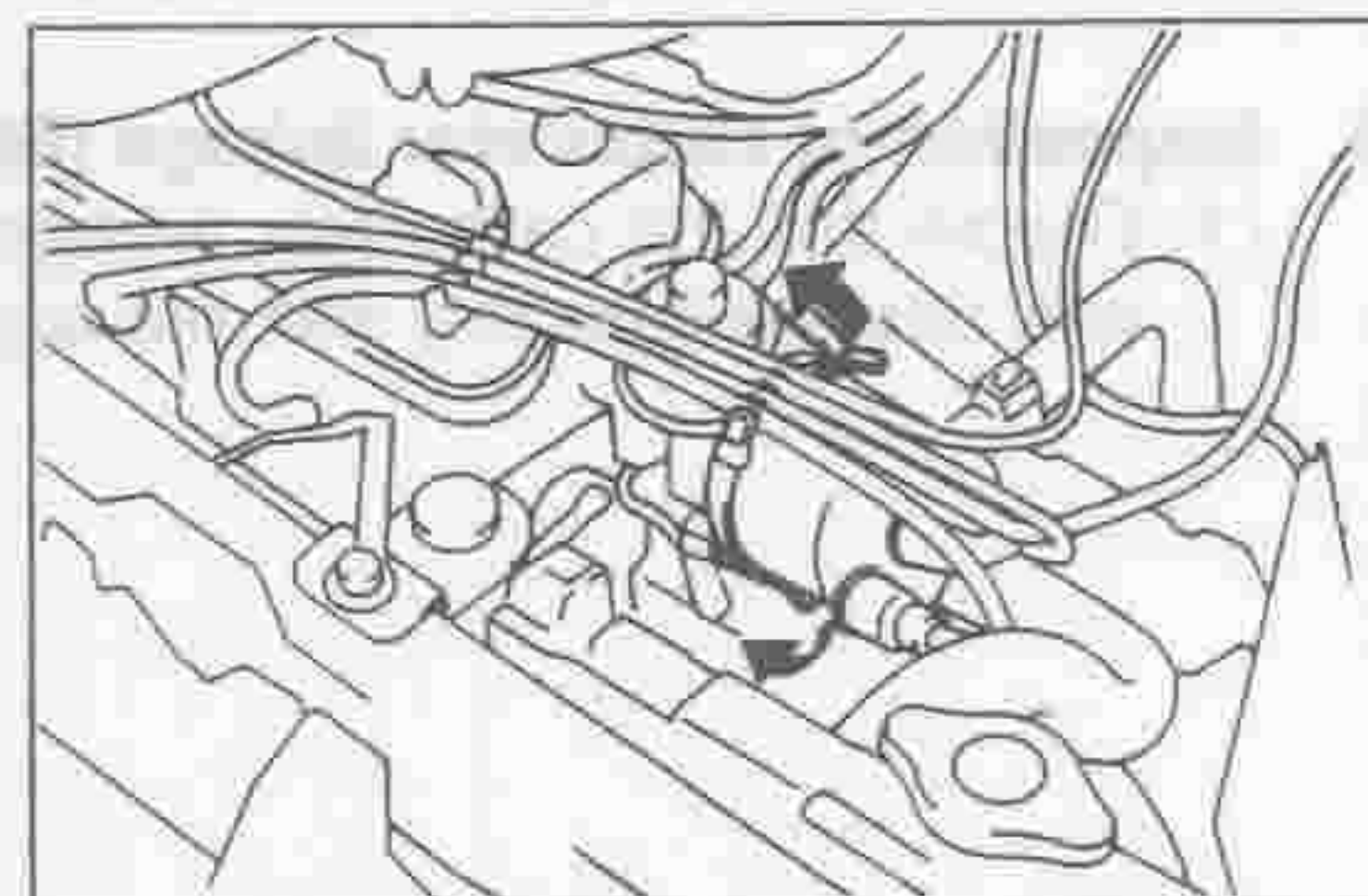
LEMA00034-00031

12. Inspection of the ignition timing advance device. [ED-10 Engine]

- (1) Disconnect the vacuum hose from the vacuum advancer.
- (2) Remove the distributor cap.



LEMA00035-00032



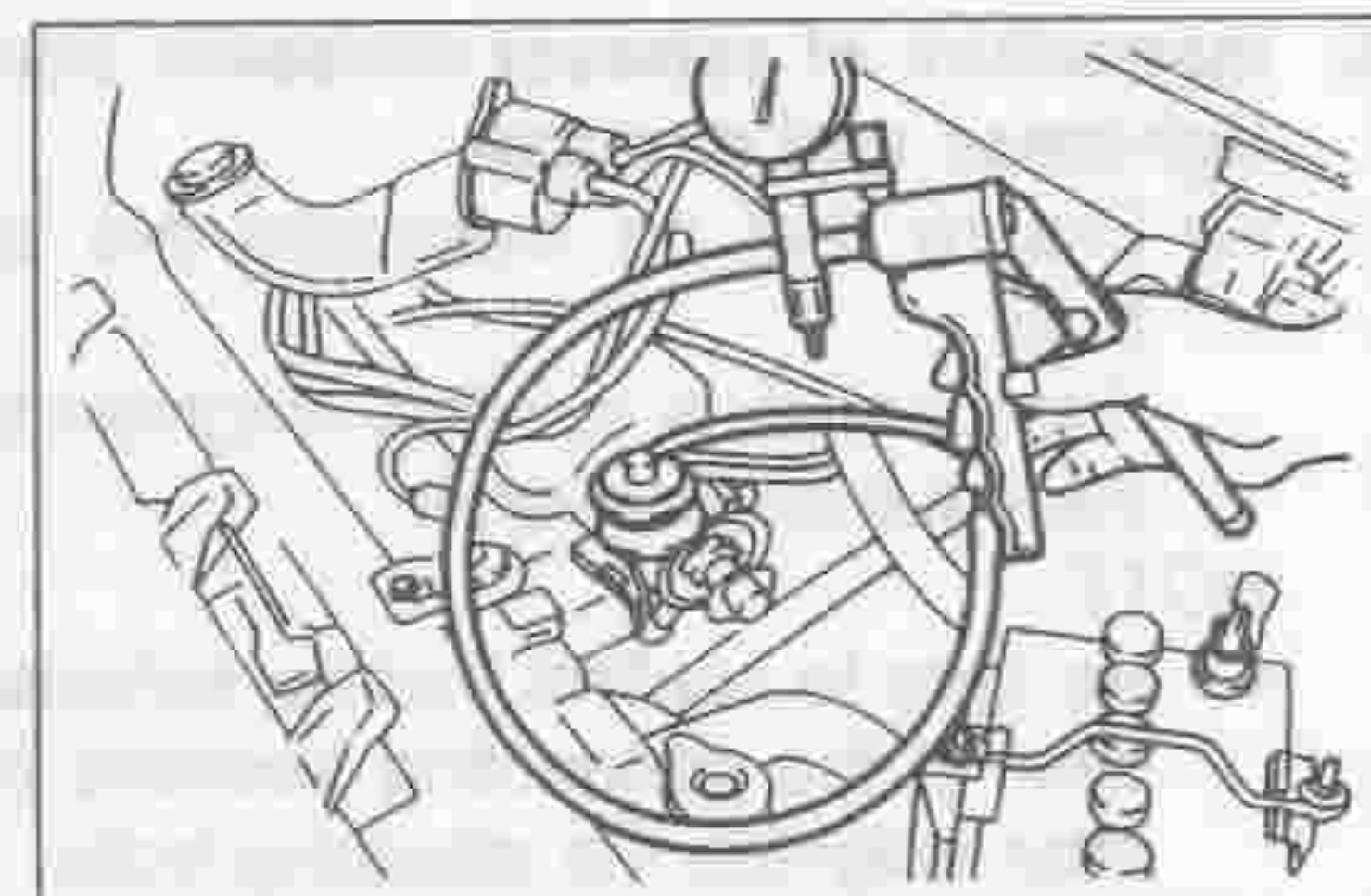
LEMA00035-00033

- (3) Connect a MityVac to the vacuum advancer.
- (4) Ensure that the vacuum advancer will operate when the vacuum is applied to the vacuum advancer.

NOTE:

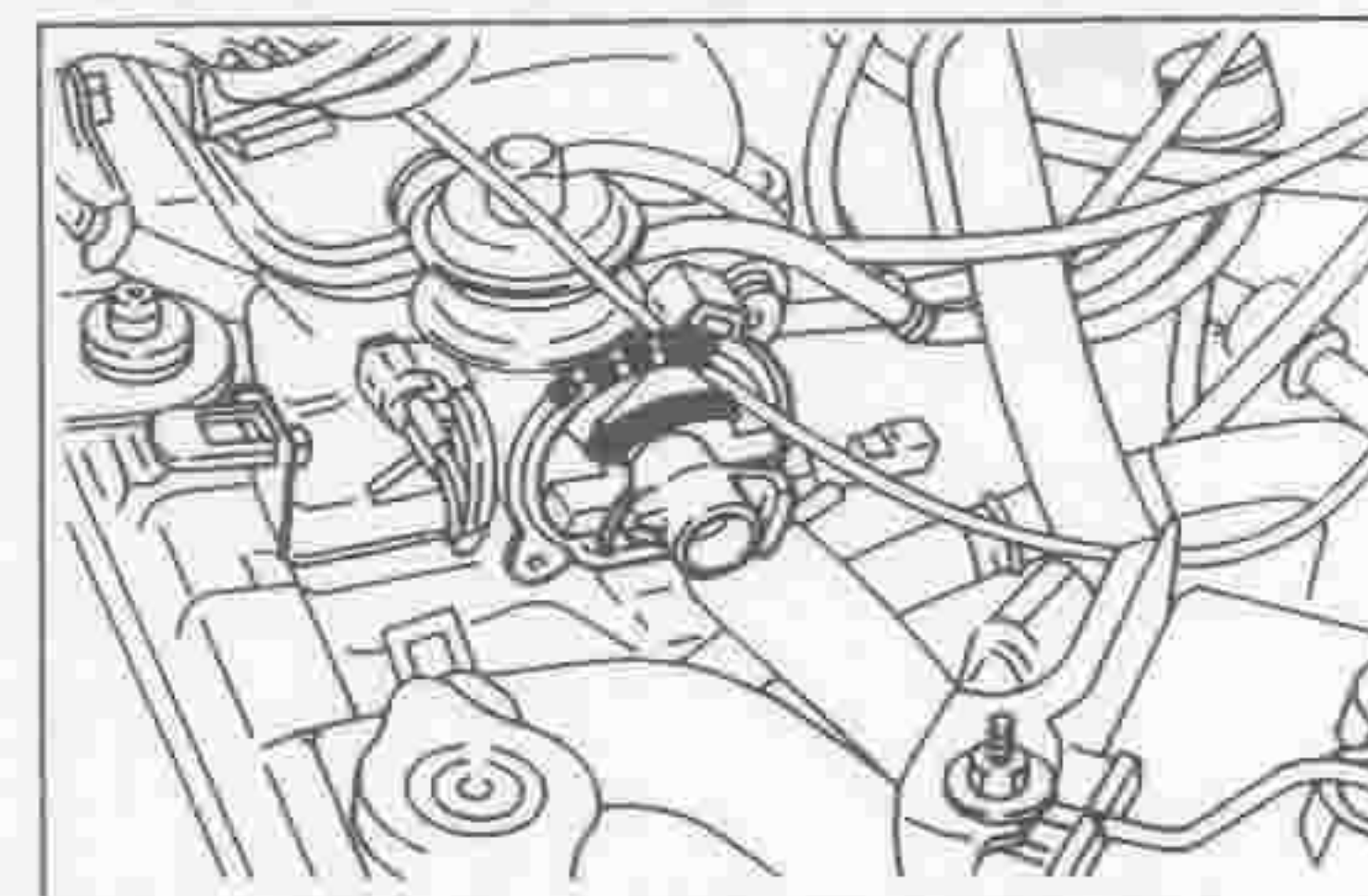
- The inspection should be performed at the main chamber and sub-chamber.

If the vacuum advancer will not operate, check or repair the vacuum advancer.



LEMA00036-00034

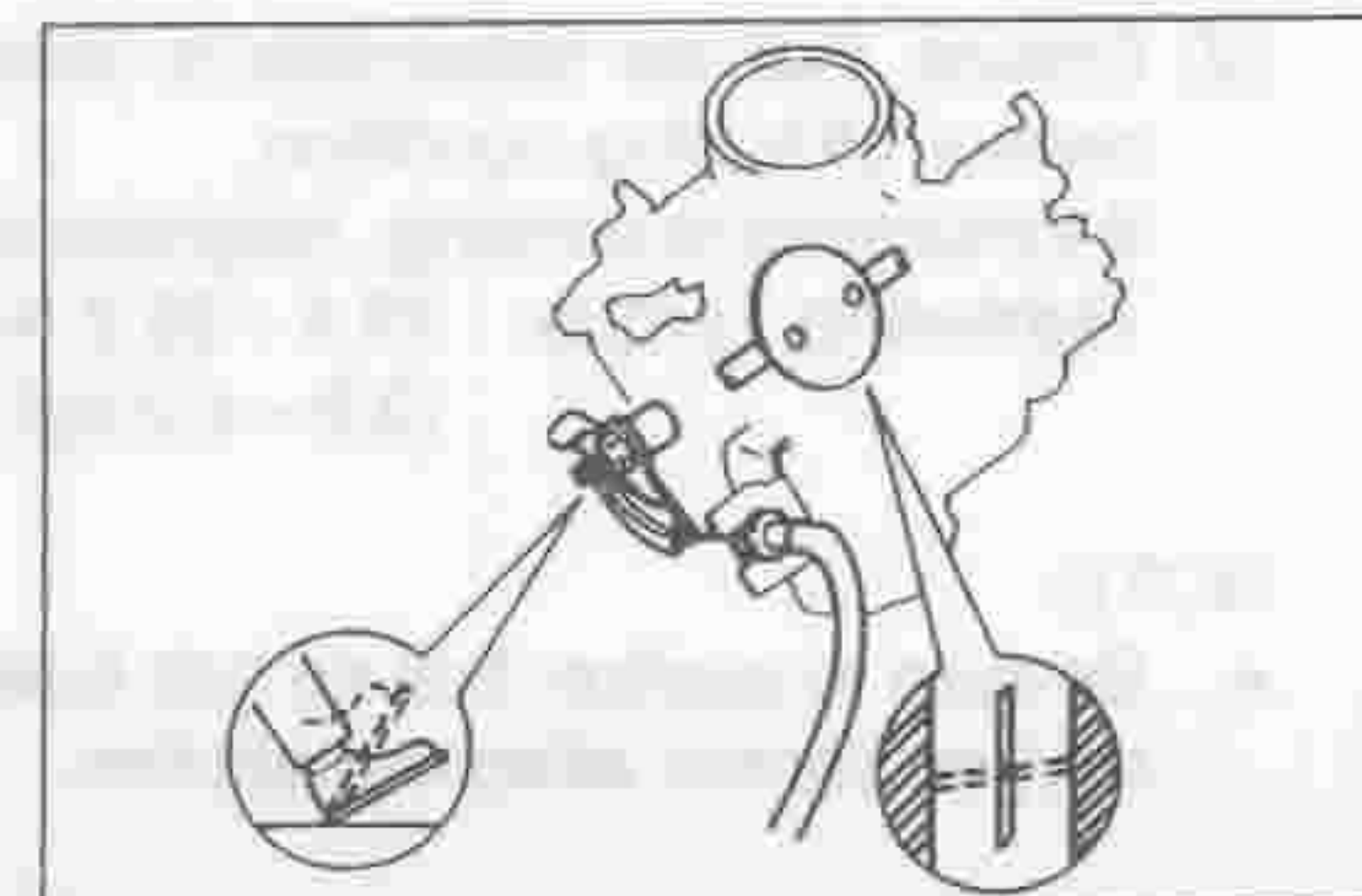
- (5) Turn the rotor counterclockwise and release it. Ensure that the rotor returns clockwise rapidly. Repair or replace the governor advancer, as required, if the rotor will not return to the original position. Check the rotor for excessive play. Repair or replace the governor advancer, if it exhibits an excessive play.



LEMA00037-00035

13. Inspection of throttle valve

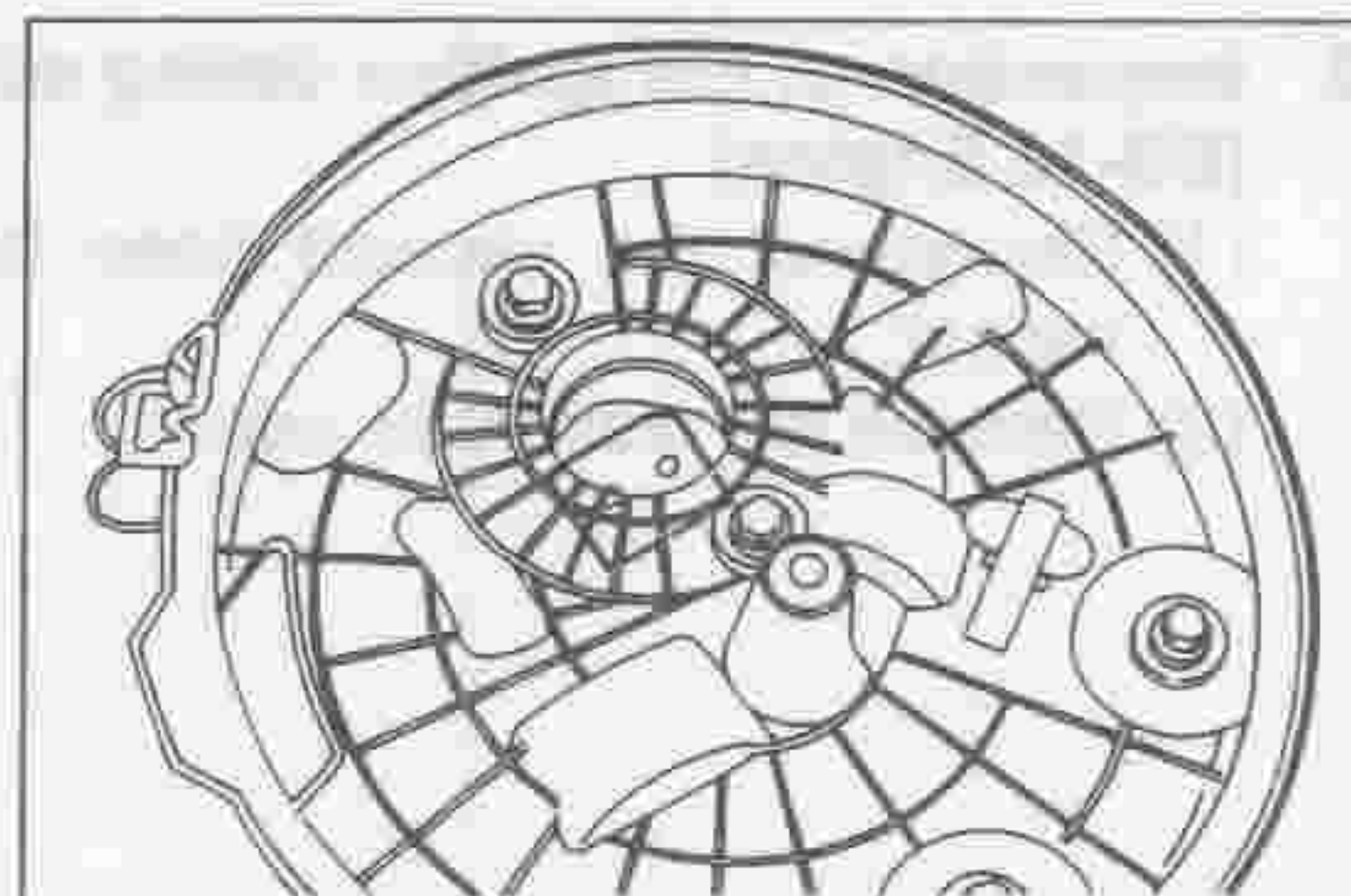
- (1) Remove the air cleaner element.
(Refer to the inspection of the air cleaner element.)
- (2) Ensure that the throttle valve operates smoothly with out rattle, when the accelerator pedal is depressed gradually.
If not, check and repair the accelerator pedal, linkage or throttle valve.
- (3) Reinstall the air cleaner element.
(Refer to the inspection of the air cleaner element.)



LEMA00038-00036

14. Inspection of choke valve [ED-10 Engine]

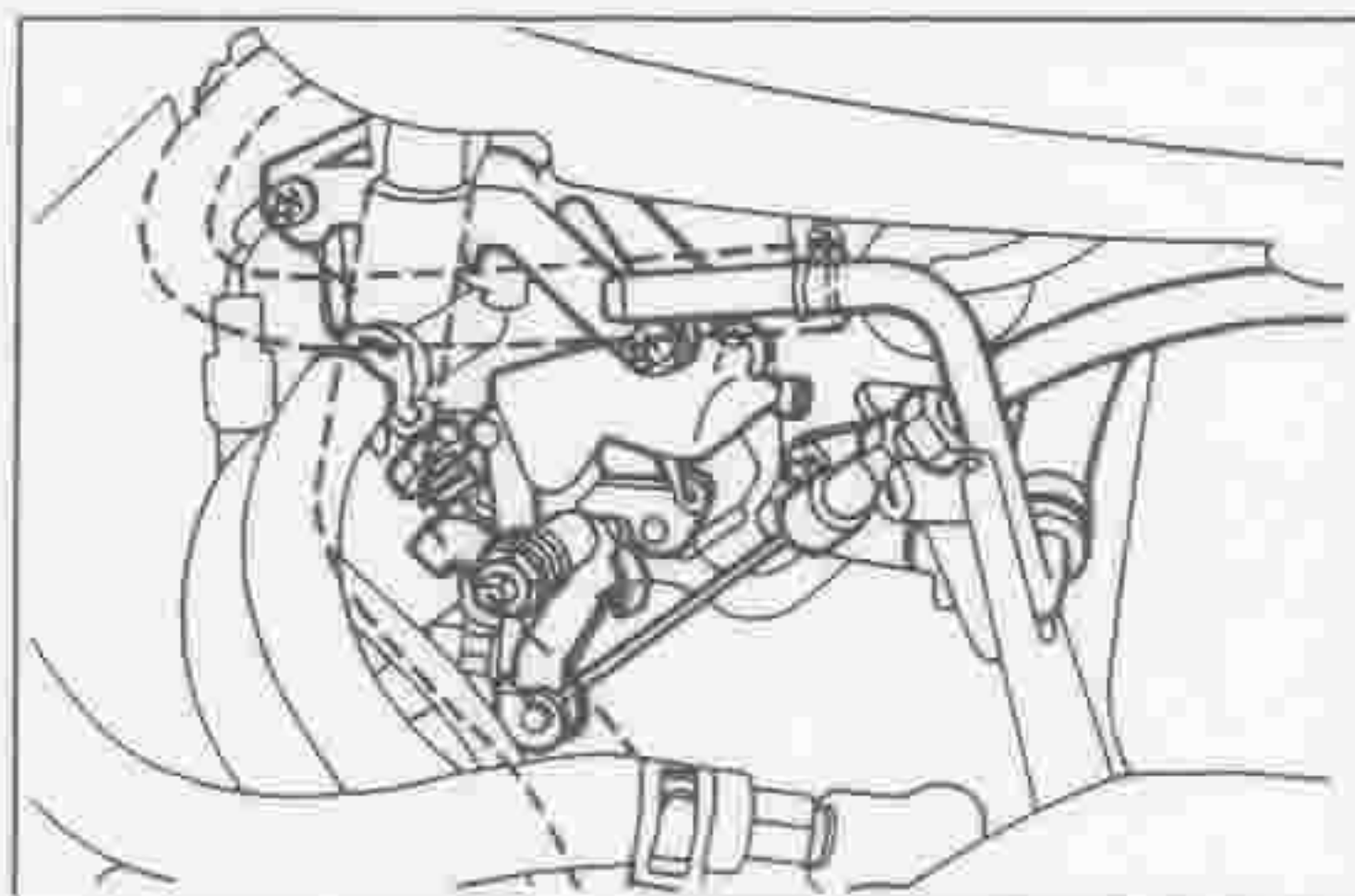
- (1) Remove the air cleaner element.
(Refer to the inspection of the air cleaner element.)
- (2) Pull the choke knob fully.
- (3) Depress the accelerator pedal once.
- (4) Ensure that the choke valve closed fully.
- (5) Push back the choke knob fully.
- (6) Ensure that the choke valve opened fully.
If not, repair or replace the defective part.
- (7) Reinstall the air cleaner element.
(Refer to the inspection of the air cleaner element.)



LEMA00039-00037

15. Inspection of carburetor linkage [ED-10 Engine]

- (1) Ensure that the carburetor linkage connected properly and operate smoothly with out any rattled.



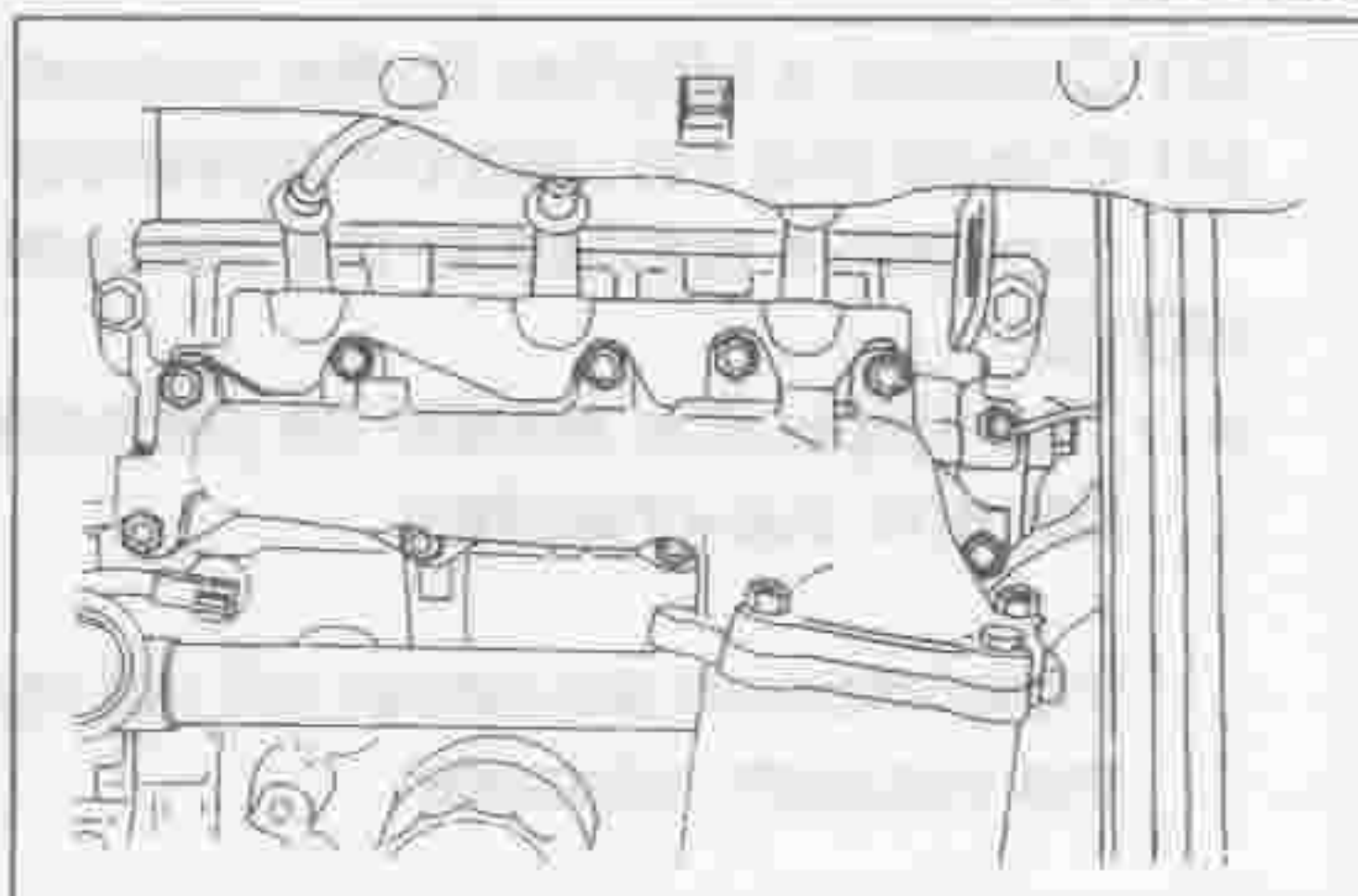
LEMA00040-00038

16. Inspection of exhaust emission control device tightness and damage

- (1) Ensure that no looseness are existing on attaching bolts.
If looseness is existing retighten the attaching bolts of the catalytic converter.

NOTE:

- Be sure to confirm that no exhaust gas leakage is present at the connecting sections of catalytic converter, after retighten the attaching bolts.
- If gas leakage is present, replace the gasket with new one.

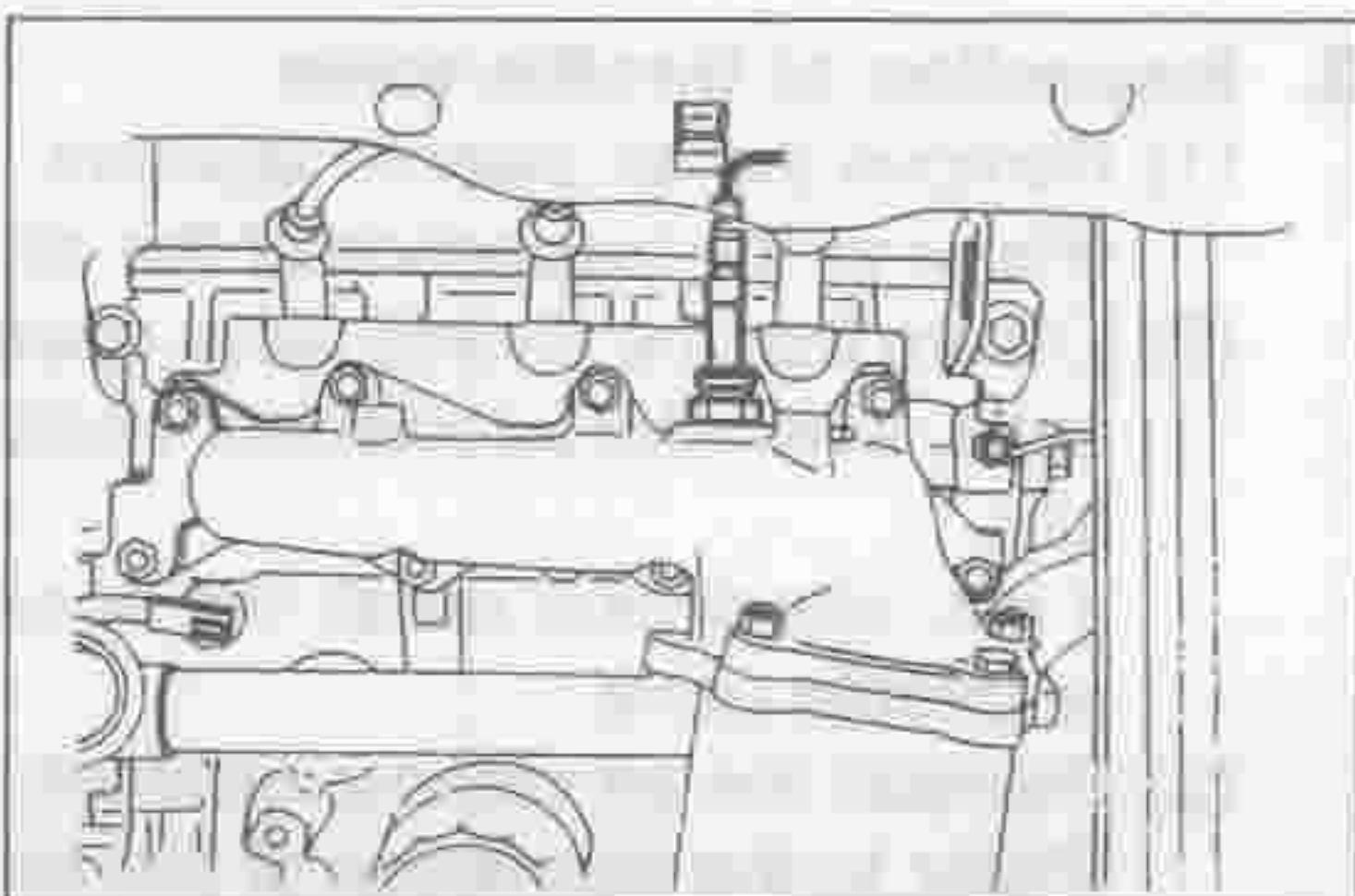


LEMA00041-00039

- (2) Ensure that no looseness is existing on the oxygen sensor attaching condition.
If looseness is existing, retighten the oxygen sensor.
Tightening Torque: 29.4 - 39.2 N·m
(3.0 - 4.0 kgf-m, 21.7 - 28.9 ft-lb)

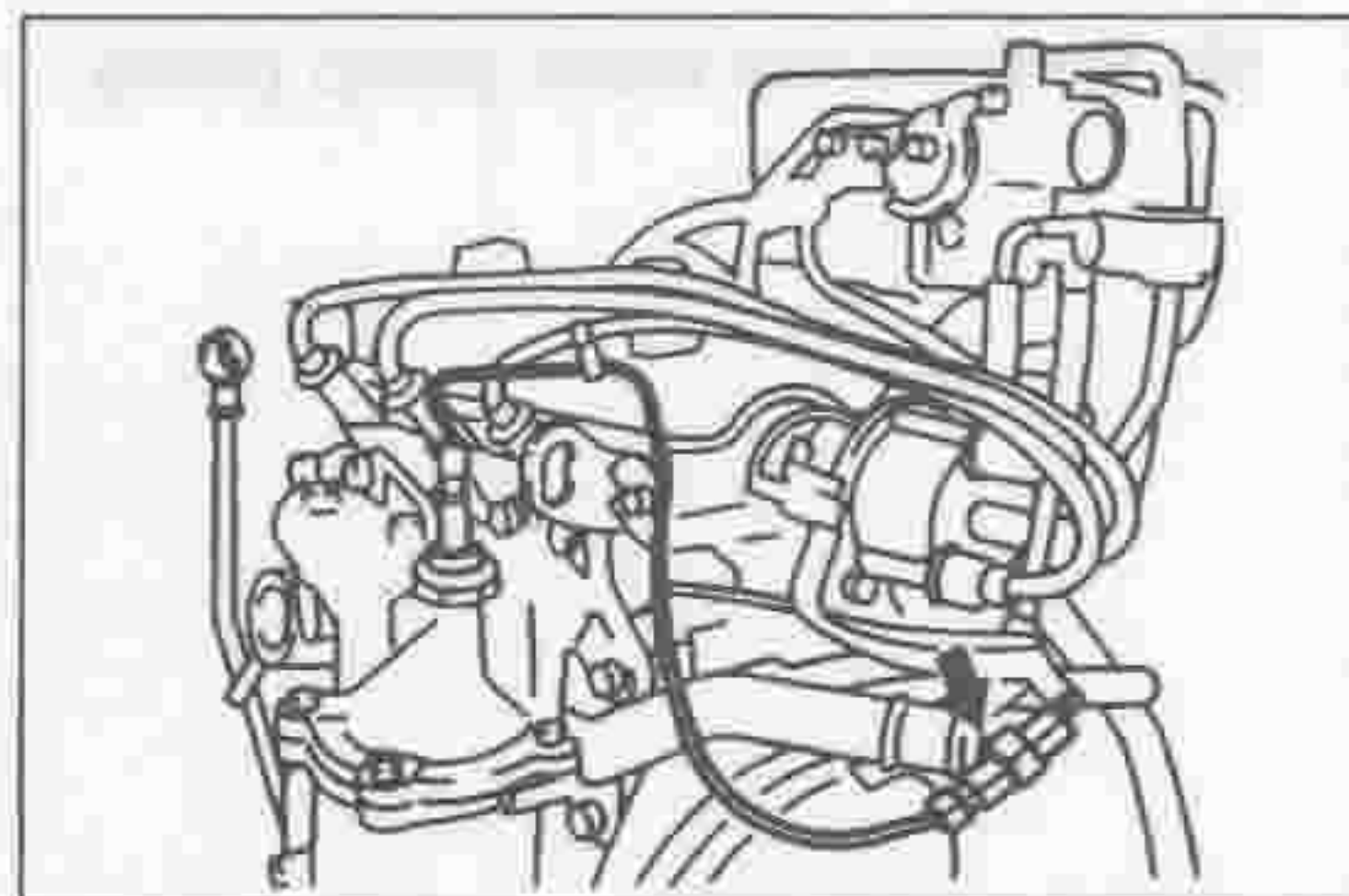
NOTE:

- Be sure to confirm that no gas leakage is present at the oxygen sensor attaching section.



LEMA00042-00040

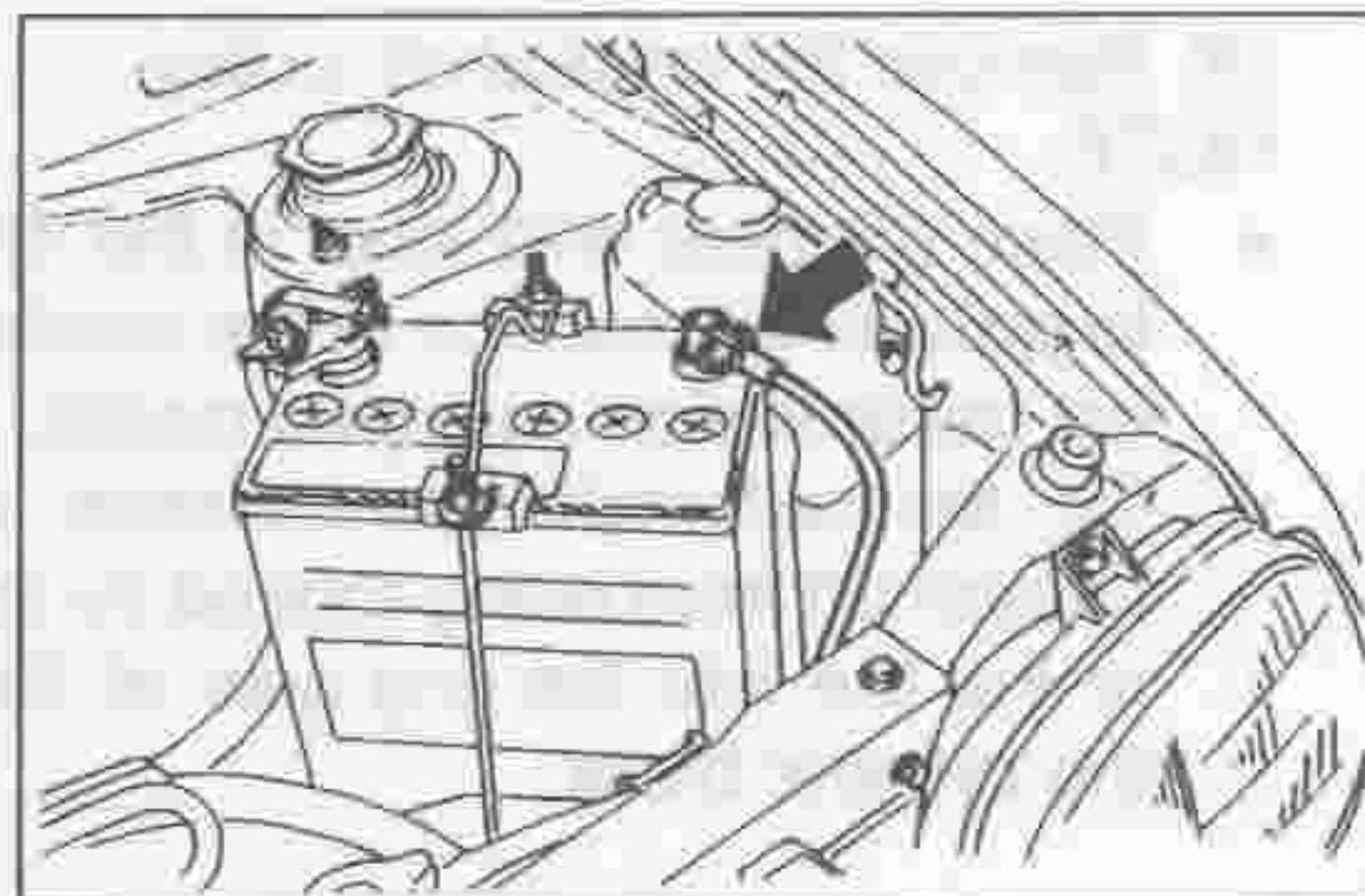
- (3) Ensure that no crack or no any other damage is present on the oxygen sensor cord section.
If any damage is present replace the oxygen sensor with new one.
- (4) Ensure that the connector of the oxygen sensor is connected securely and clamped to connector clamp properly.
If not, securely connect and clamp the connector.



LEMA00043-00041

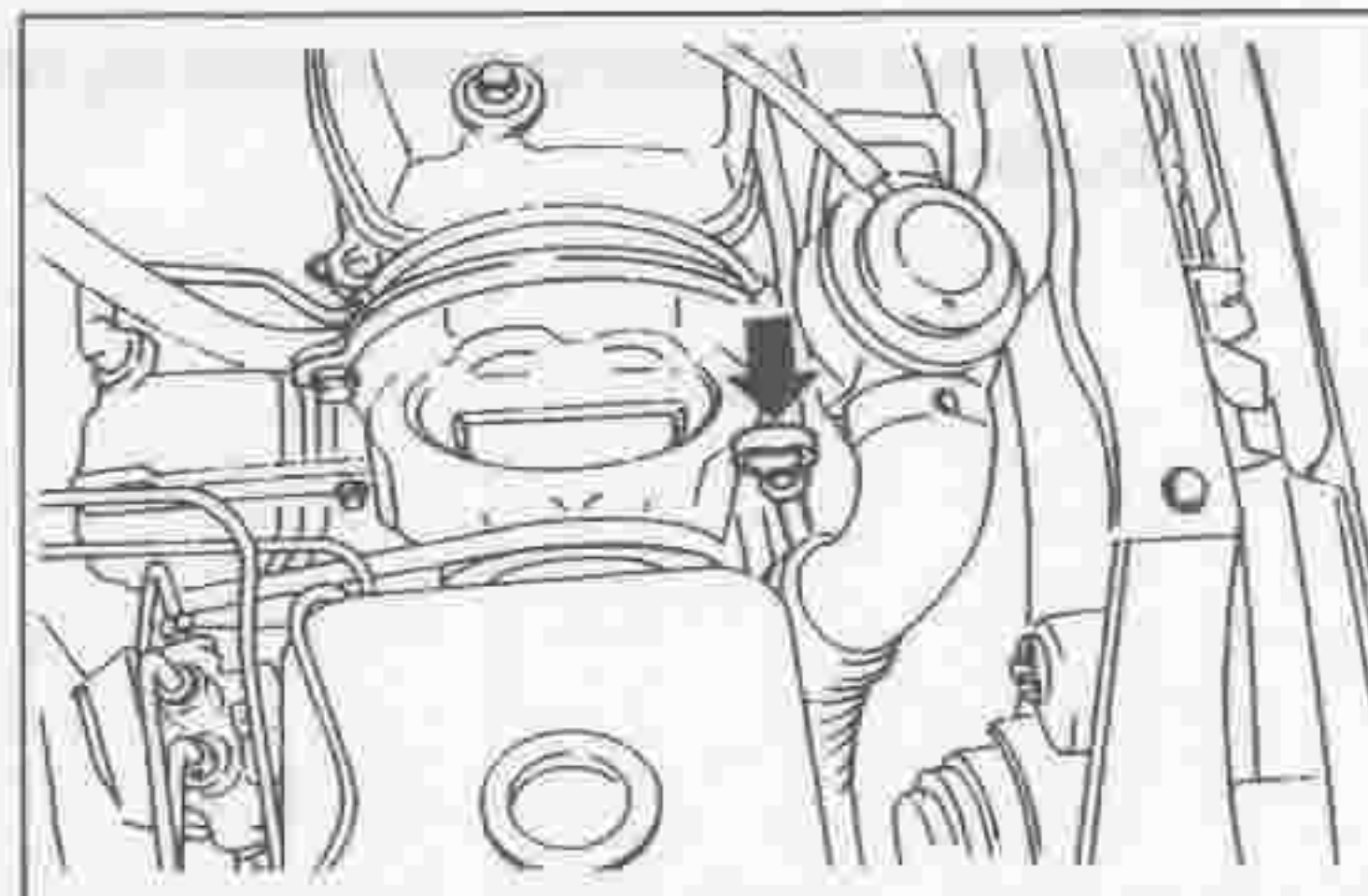
17. Replacement of timing belt

- (1) Ensure that the ignition switch turned OFF.
- (2) Disconnect the battery ground cable from the negative (-) terminal of the battery.
- (3) Remove the air cleaner assembly with air intake duct.



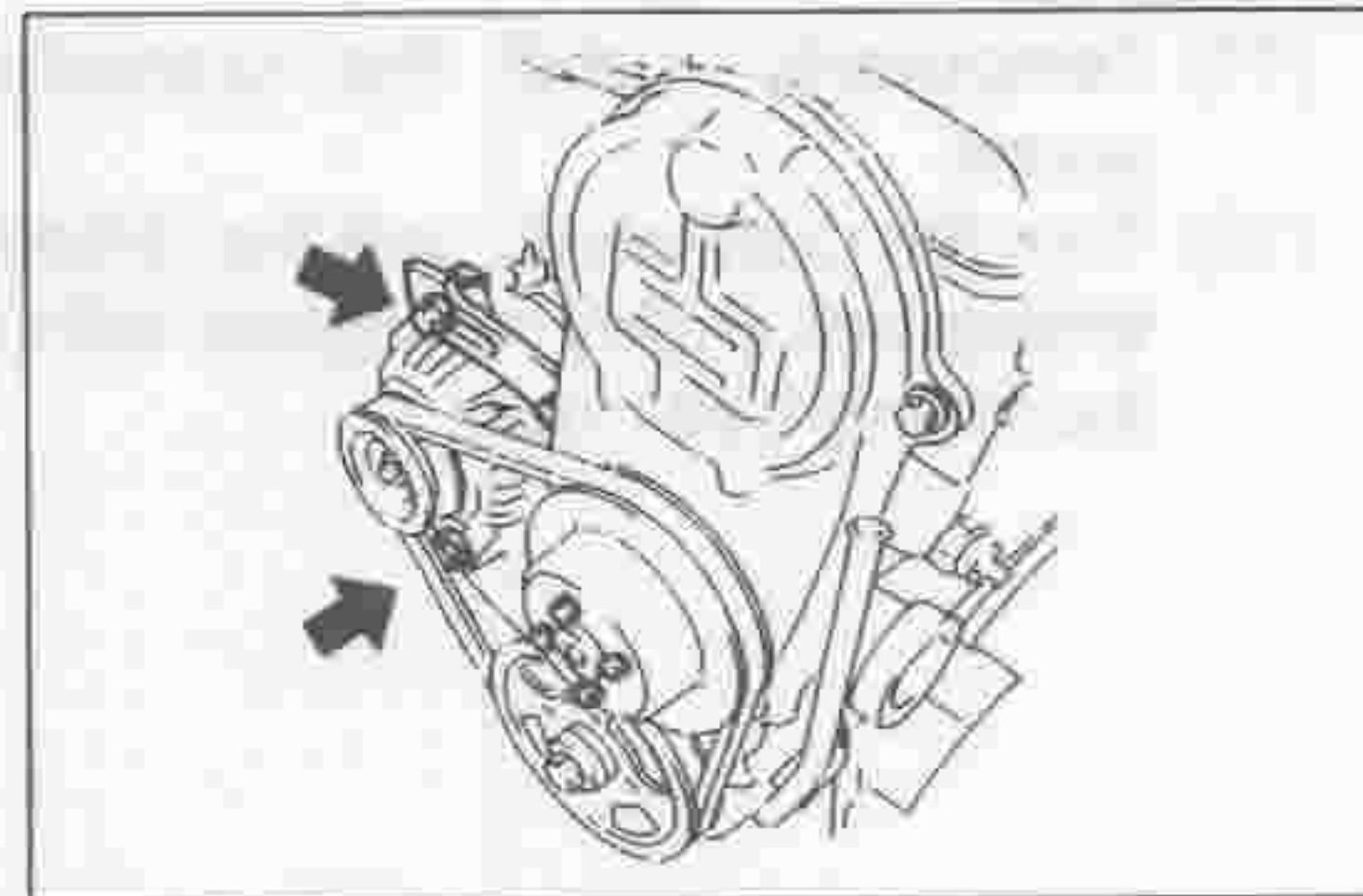
LEMA00044-00042

- (4) Pull out the oil level gauge.



LEMA00045-00043

- (5) Loosen the all attaching bolts of the water pump pulley, utilizing the tension of the drive belt.
- (6) Loosen the alternator attaching bolts.

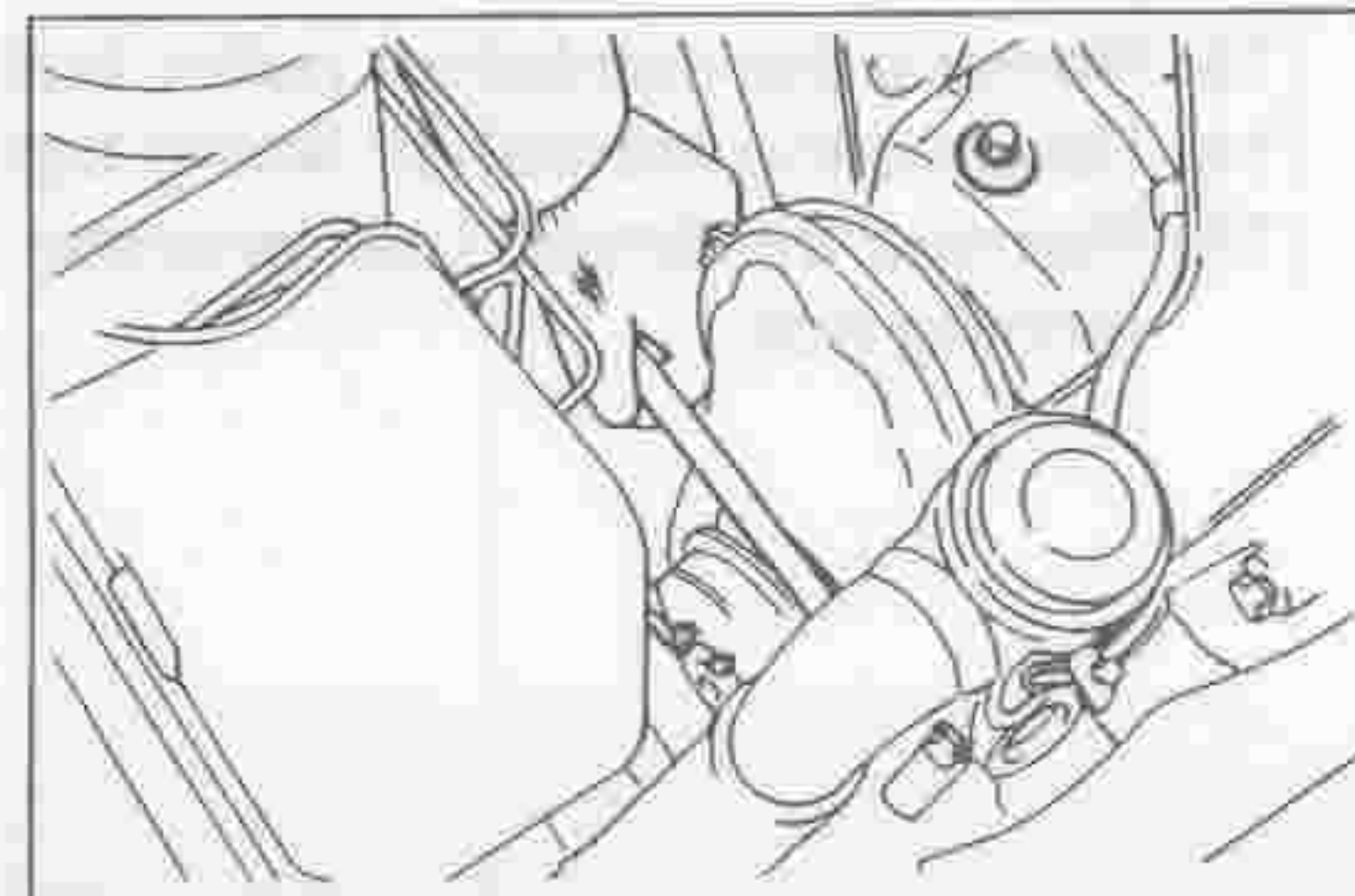


LEMA00046-00044

- (7) Remove the alternator drive belt.

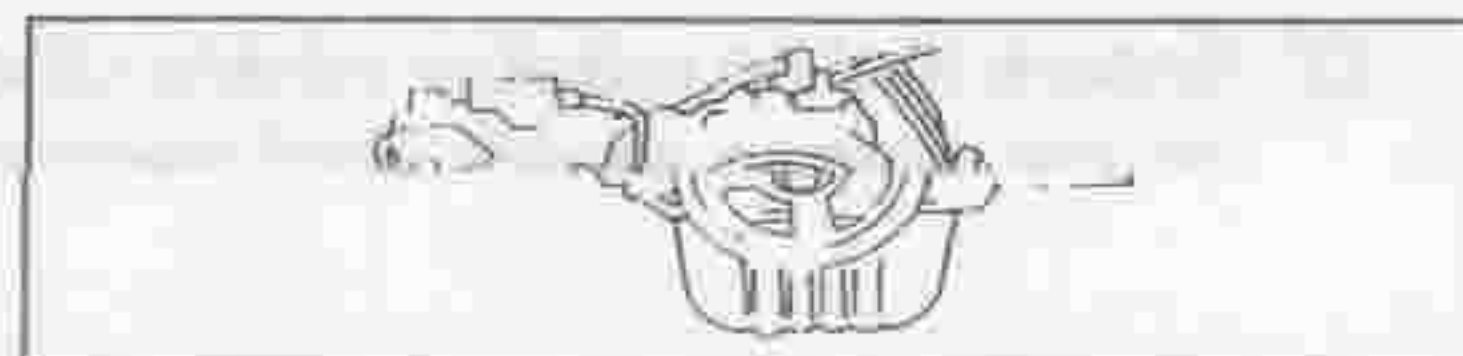
NOTE:

- Be very careful not to allow any oil or dust to get to the belt.



LEMA00047-00045

(8) Remove the water pump pulley.

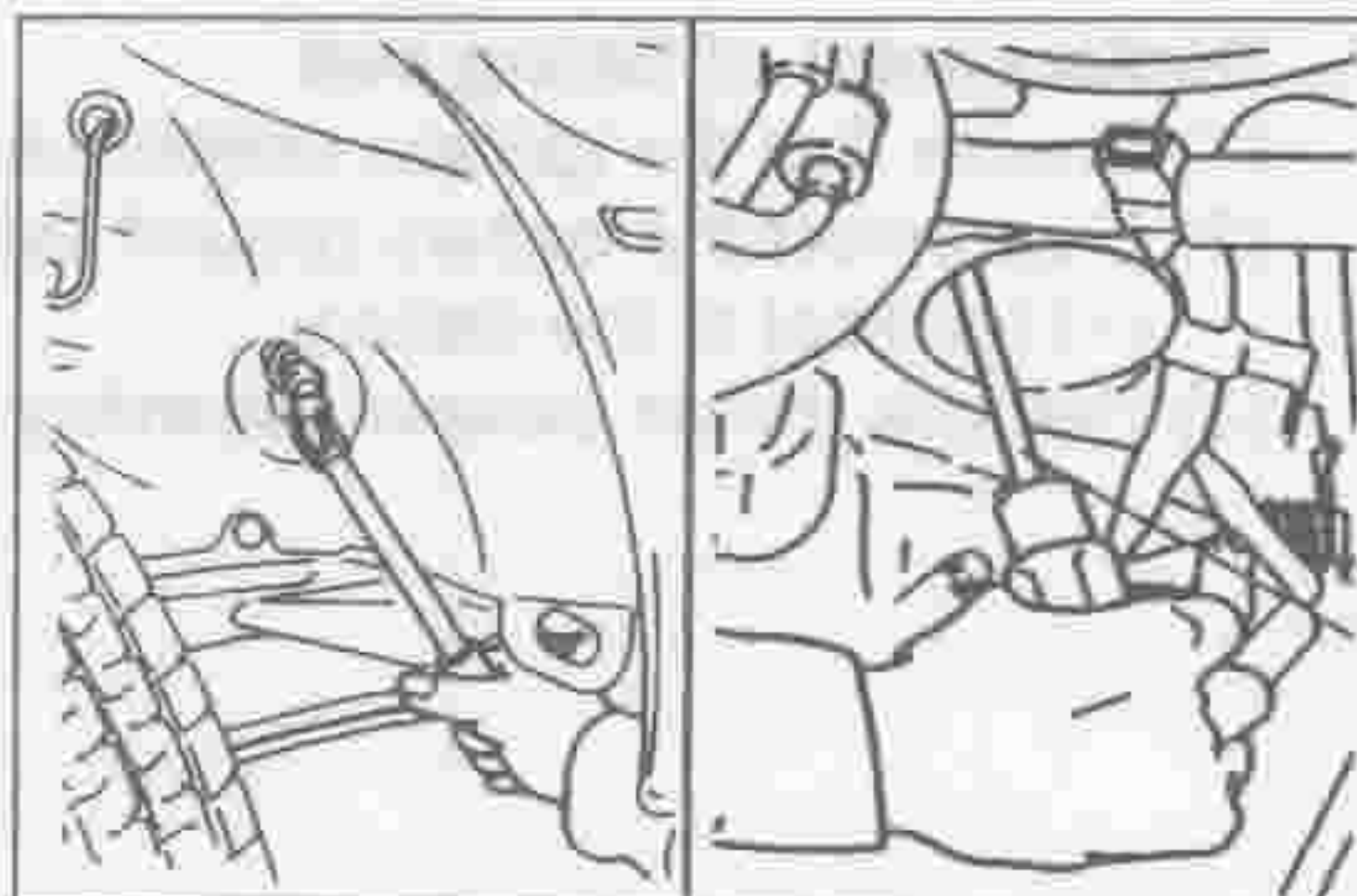


LEMA00048-00046

(9) Remove the crankshaft pulley.

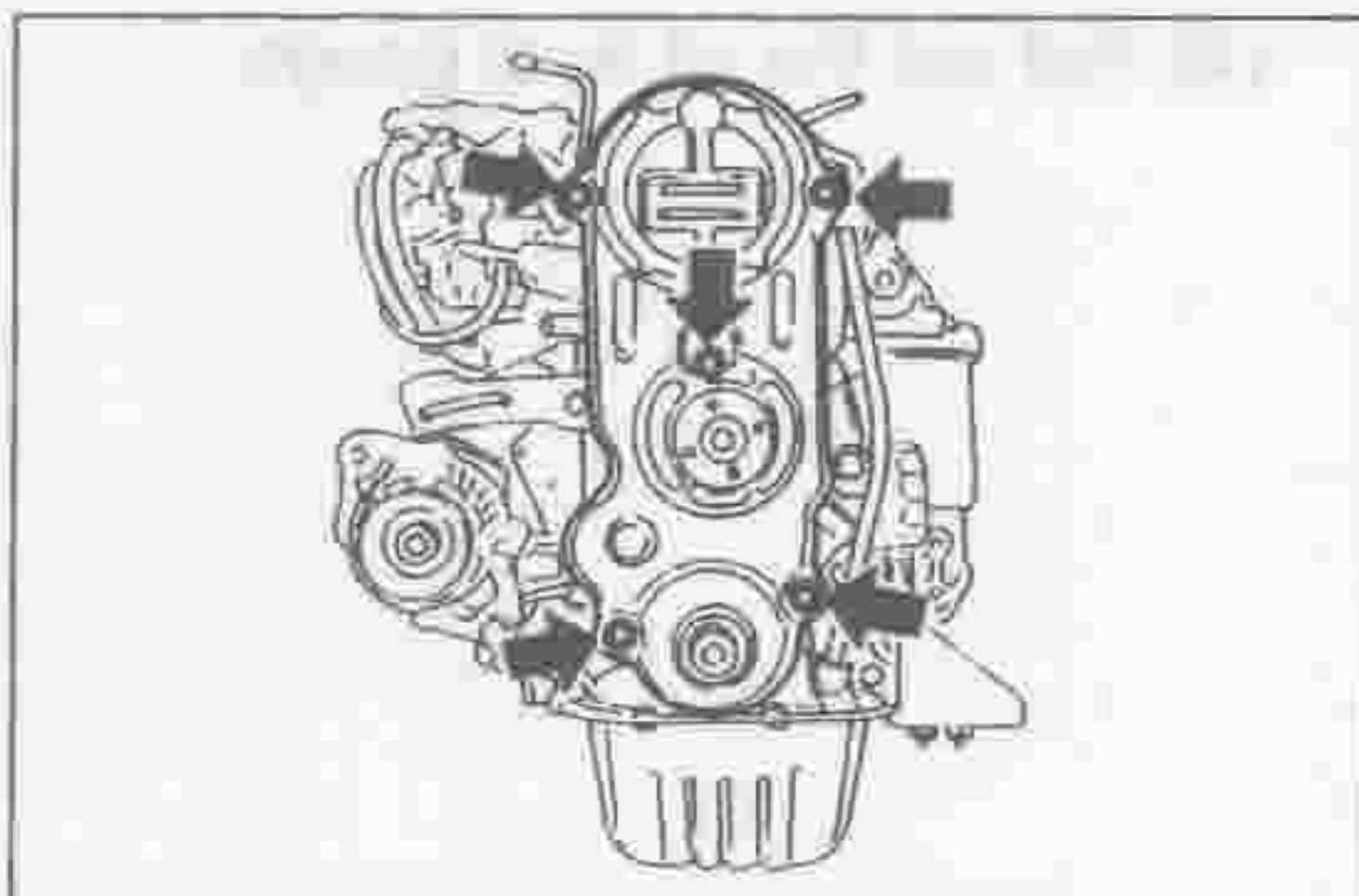
NOTE:

- Place the gear shift lever in the 4th gear position so as to prevent the rotation of the crankshaft in case of manual transmission equipped model.
- On the automatic transmission vehicle, prevent the crankshaft from being rotated by inserting a screwdriver or the like into the ring gear at the rear end section of the cylinder block.



LEMA00049-00047

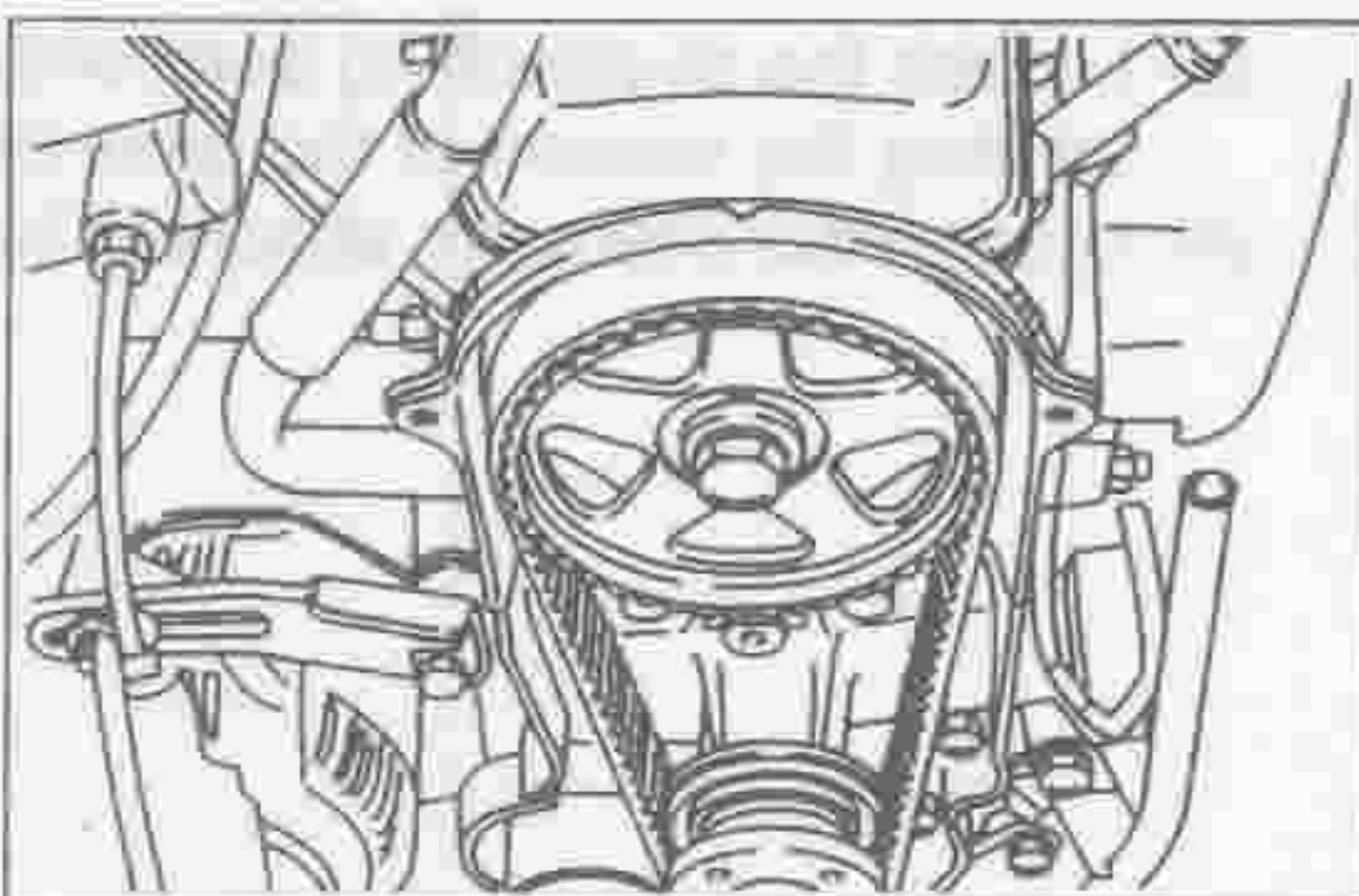
(10) Remove the timing belt cover by removing the attaching bolts.



LEMA00050-00048

(11) Temporarily install the crankshaft pulley attaching screw.

(12) Turn the crankshaft, until the drilled hole of the camshaft timing belt pulley is aligned with the pressed mark of the timing belt cover.

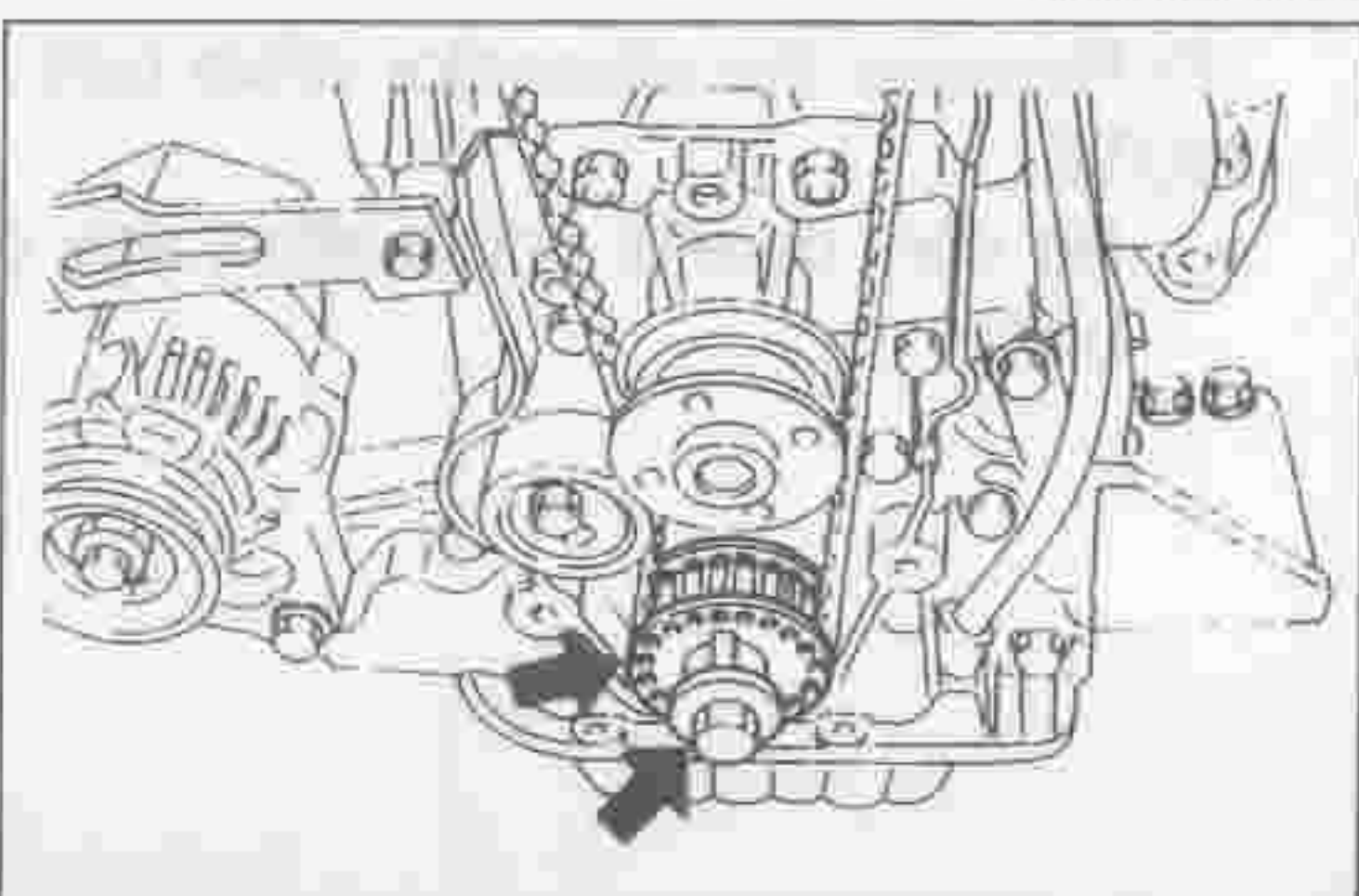


LEMA00051-00049

(13) Remove the crankshaft pulley bolt.

(14) Remove the crankshaft timing belt pulley flange.

(15) Remove the timing belt tensioner by removing the attaching bolt.

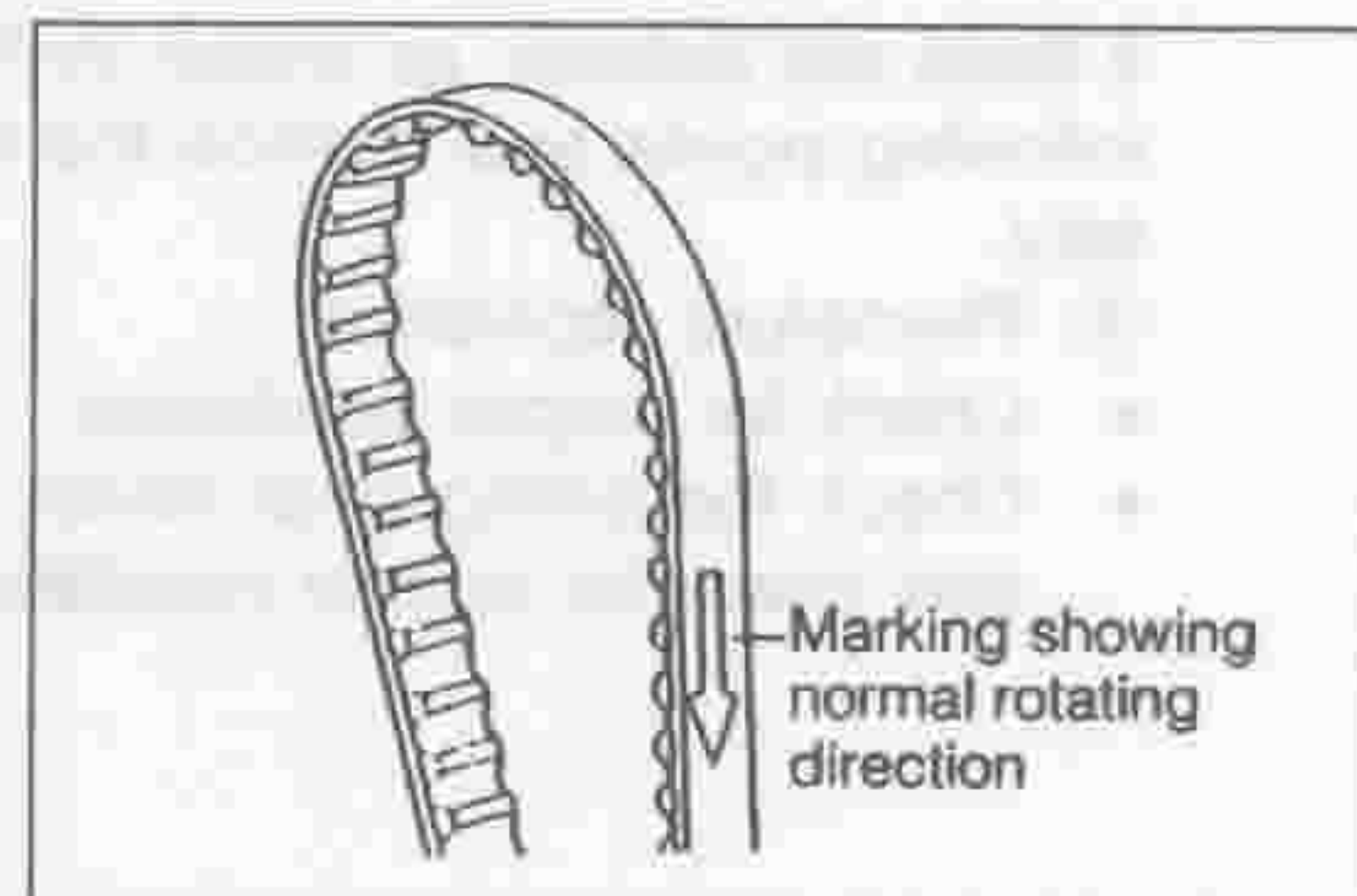


LEMA00052-00050

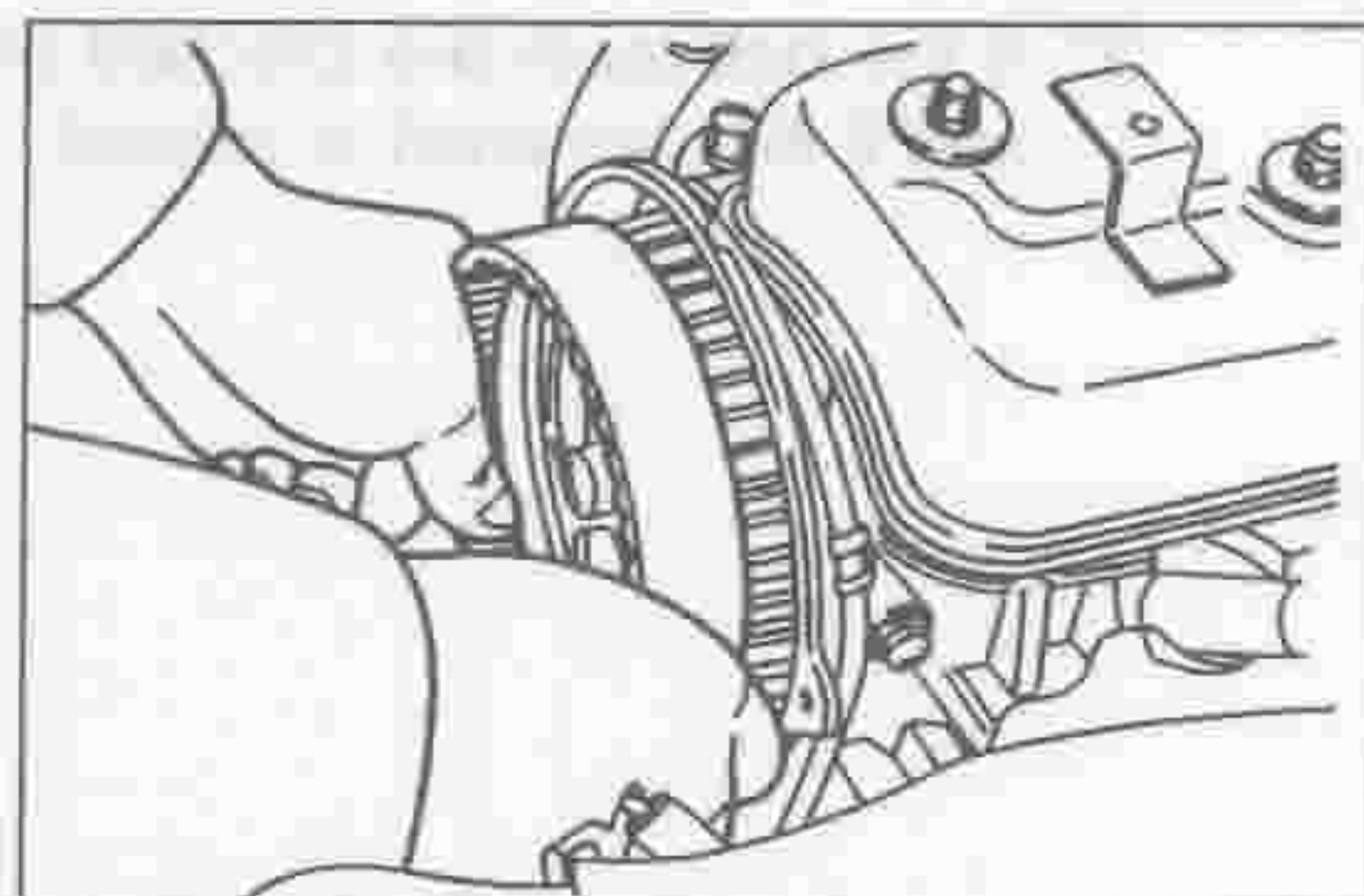
(16) Remove the timing belt.

NOTE:

- Prior to removal of the timing belt, put an arrow mark indicating the normal rotating direction on the belt, using a chalk or the like.
- Do not try to pry the timing belt with a screwdriver or the like during the removal or installation.
- Do not allow the belt to come into contact with oil, water or dust.
- Do not bend the belt at a sharp angle or turn the belt inside out, for it is very vulnerable to bending.
- Do not utilize the tension of the timing belt when loosening the set bolt of the camshaft timing belt pulley.
- Never turn the camshaft or crankshaft independently before the timing belt installation is completed.

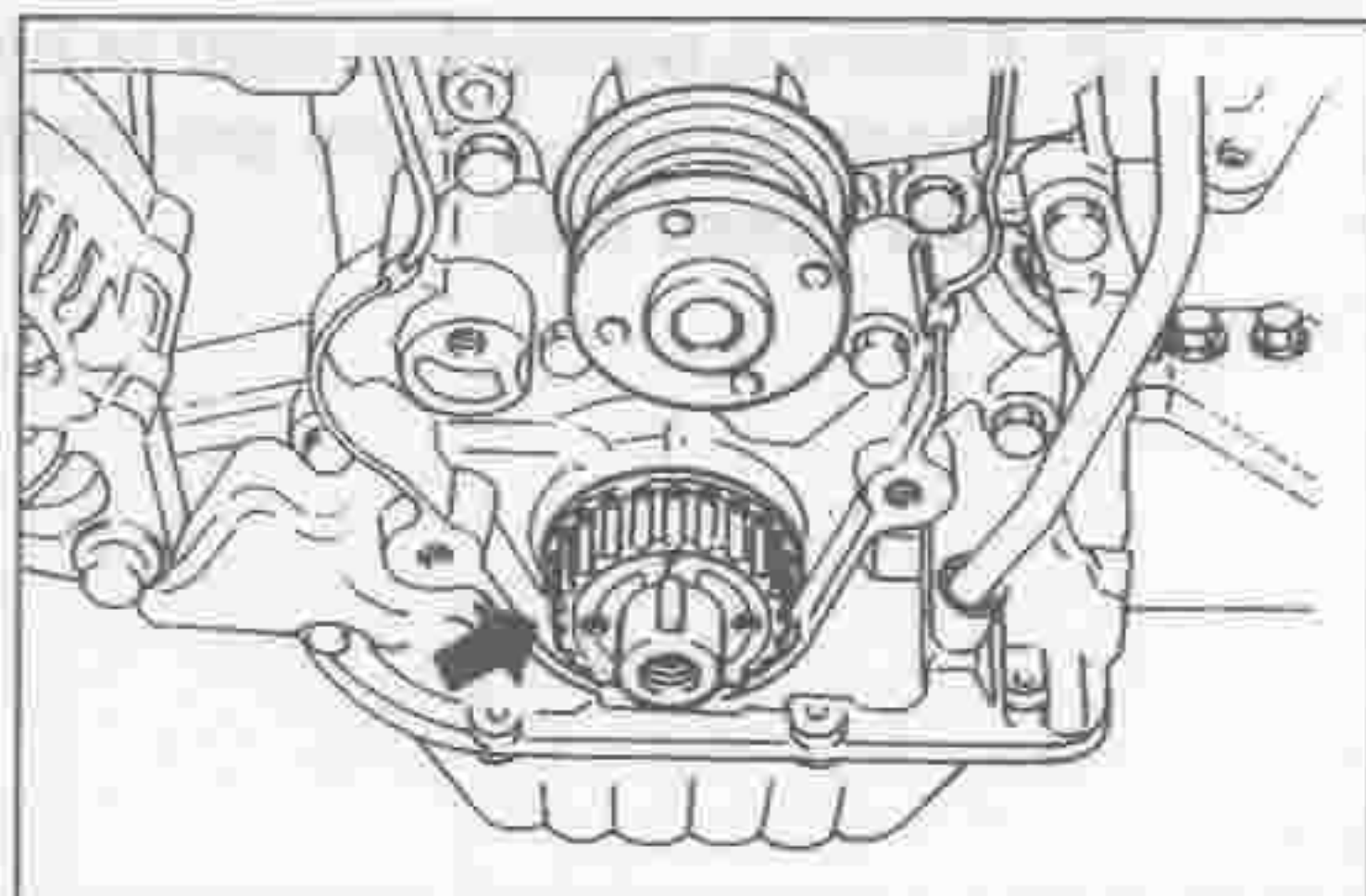


LEMA00053-00051



LEMA00054-00052

(17) Remove the crankshaft timing belt pulley and flange.



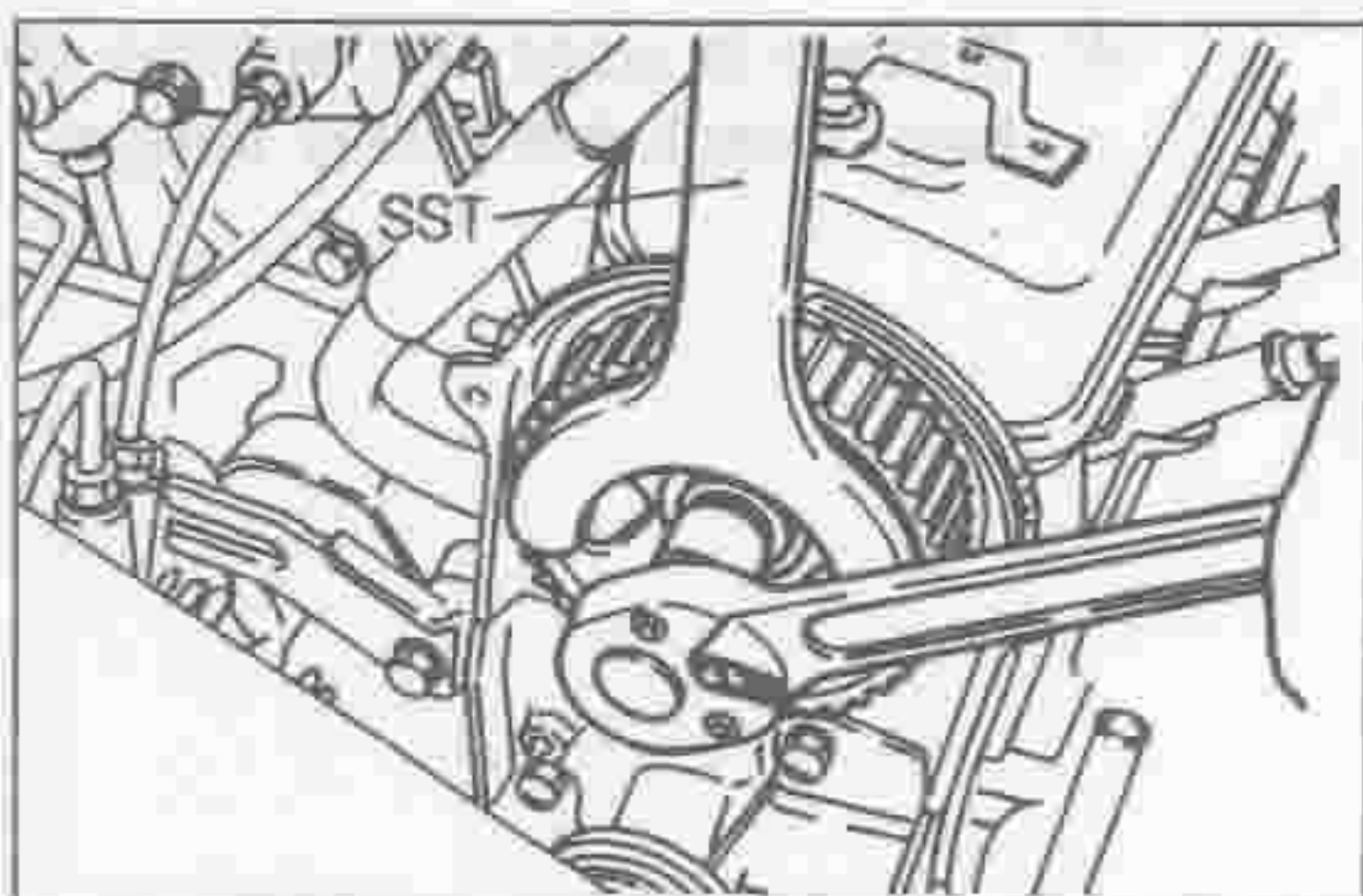
LEMA00055-00053

(18) Removal of the timing belt pulley

While preventing the camshaft timing belt pulley from turning with the following SST, remove the attaching bolt. Then, remove the camshaft timing belt pulley.

SST: 09511-87202-000 (ED-10, ED-20)

09278-87201-000 (EF-EL)



LEMA00056-00054

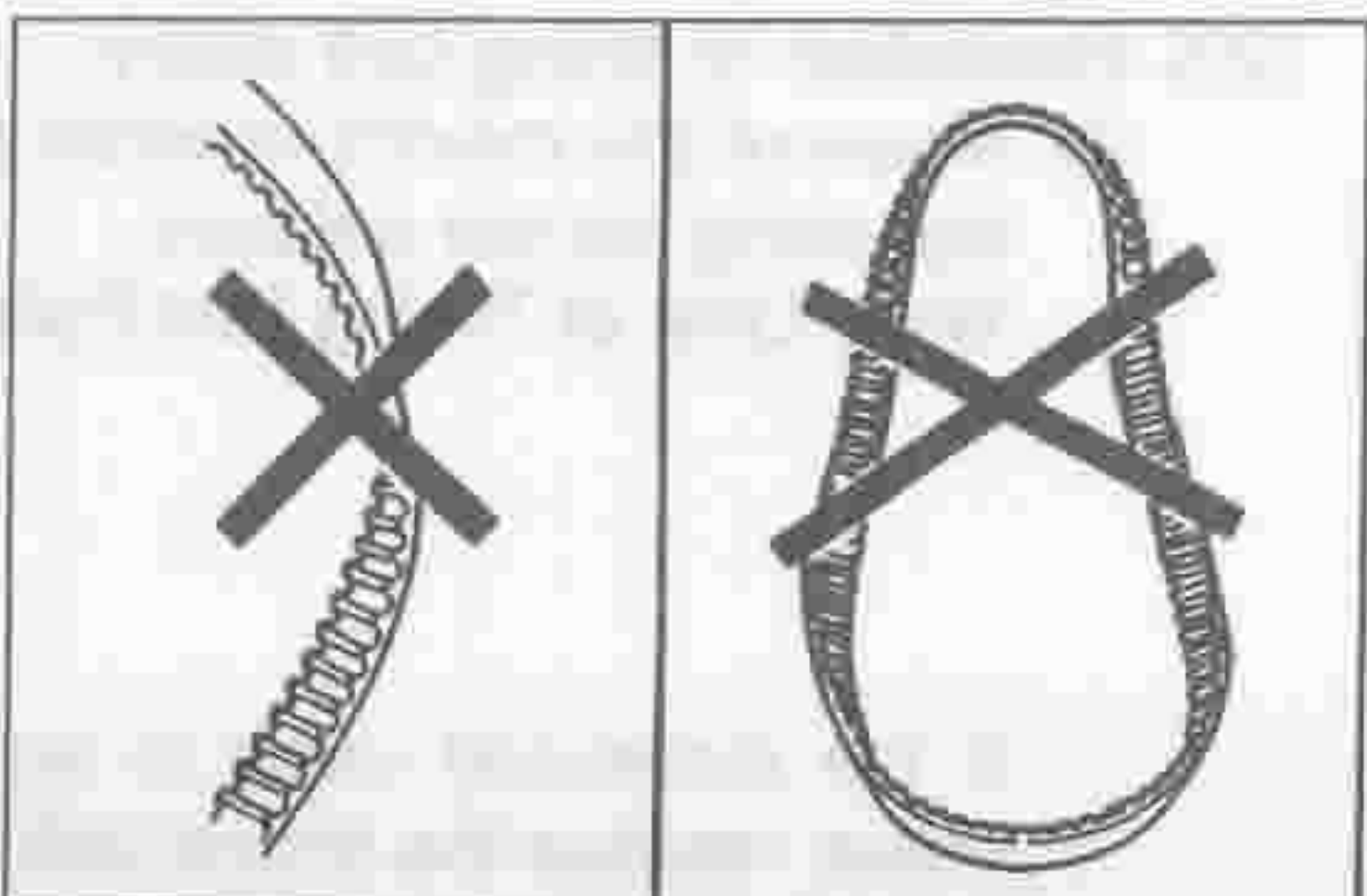
CAUTION:

- If the camshaft alone should be turned, damage may be made to the engine because of interference of the pistons with the valves. Hence, never turn the camshaft alone.

(19) Inspection of the timing belt.

CAUTION:

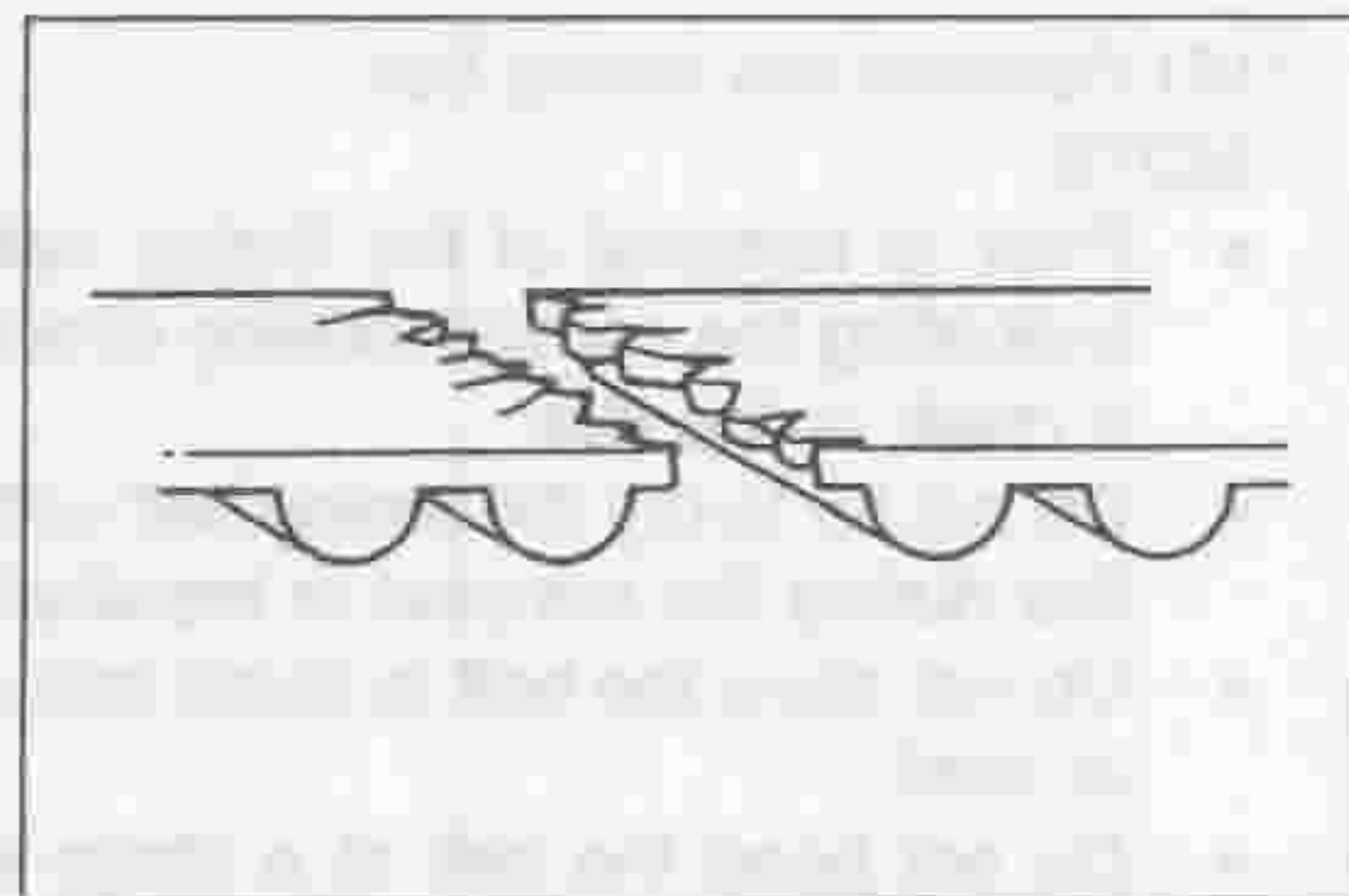
- Do not bend, twist or turn the belt inside out.
- Do not allow the belt to come into contact with oil, water or steam.



LEMA00057-00055

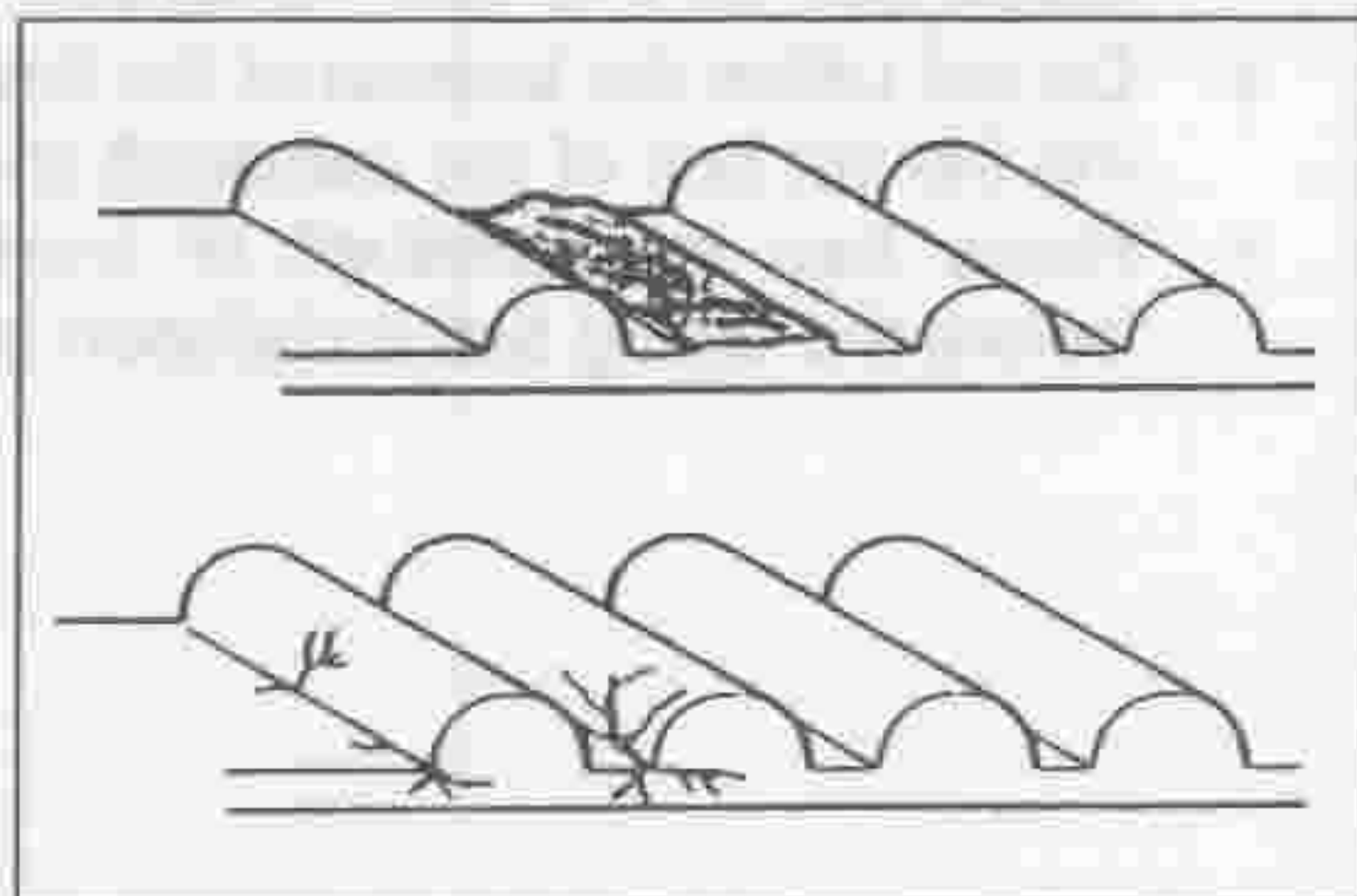
If there are defects, as shown in the figures, check the following points and replace the timing belt, if necessary.

- ① Premature separation
 - Check for proper installation.
 - Check the timing gear cover gaskets for damage and check for correct installation.



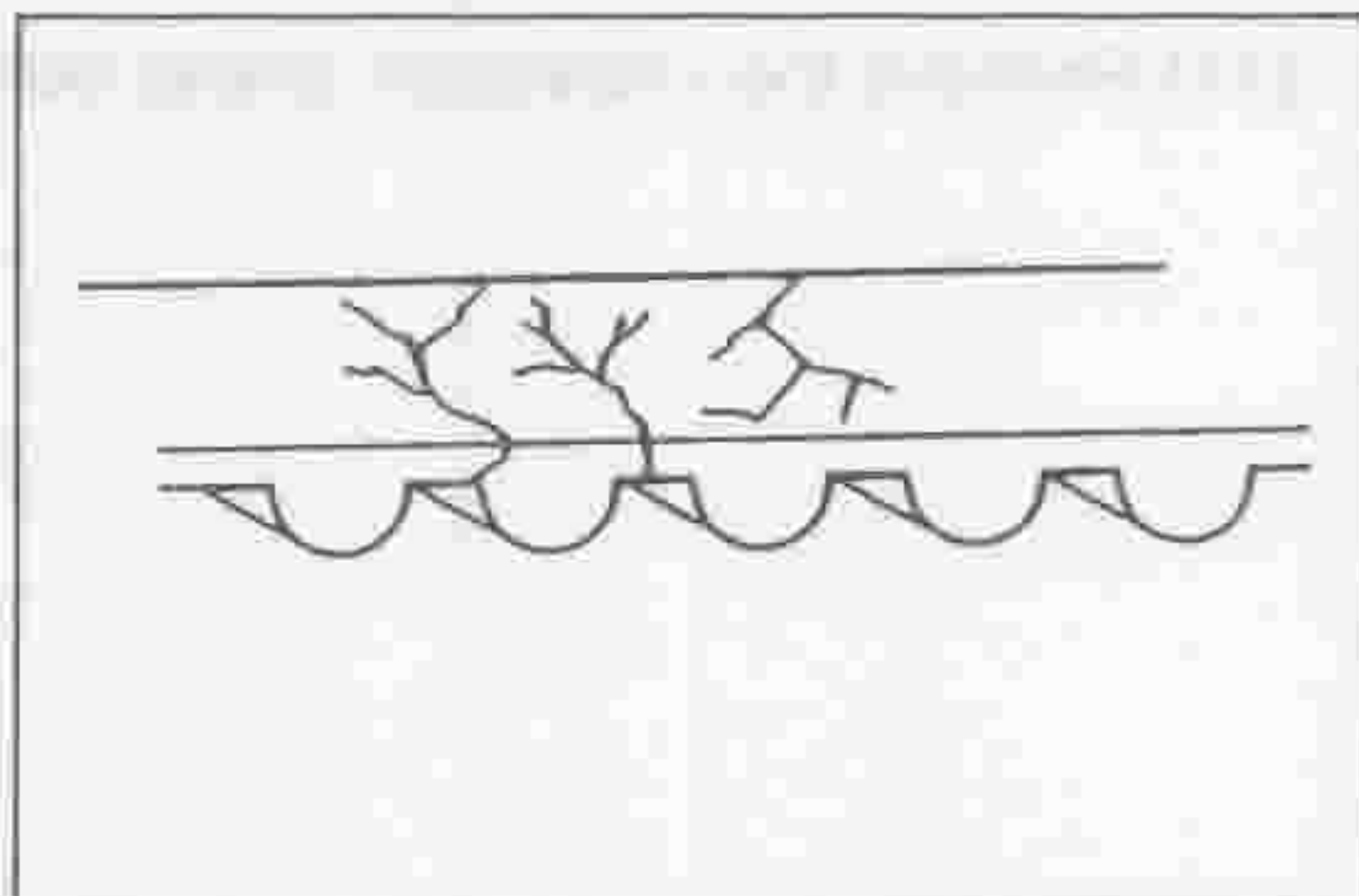
LEMA00058-00056

- ② If the belt teeth are cracked or damaged, check to see if the camshaft is seized.



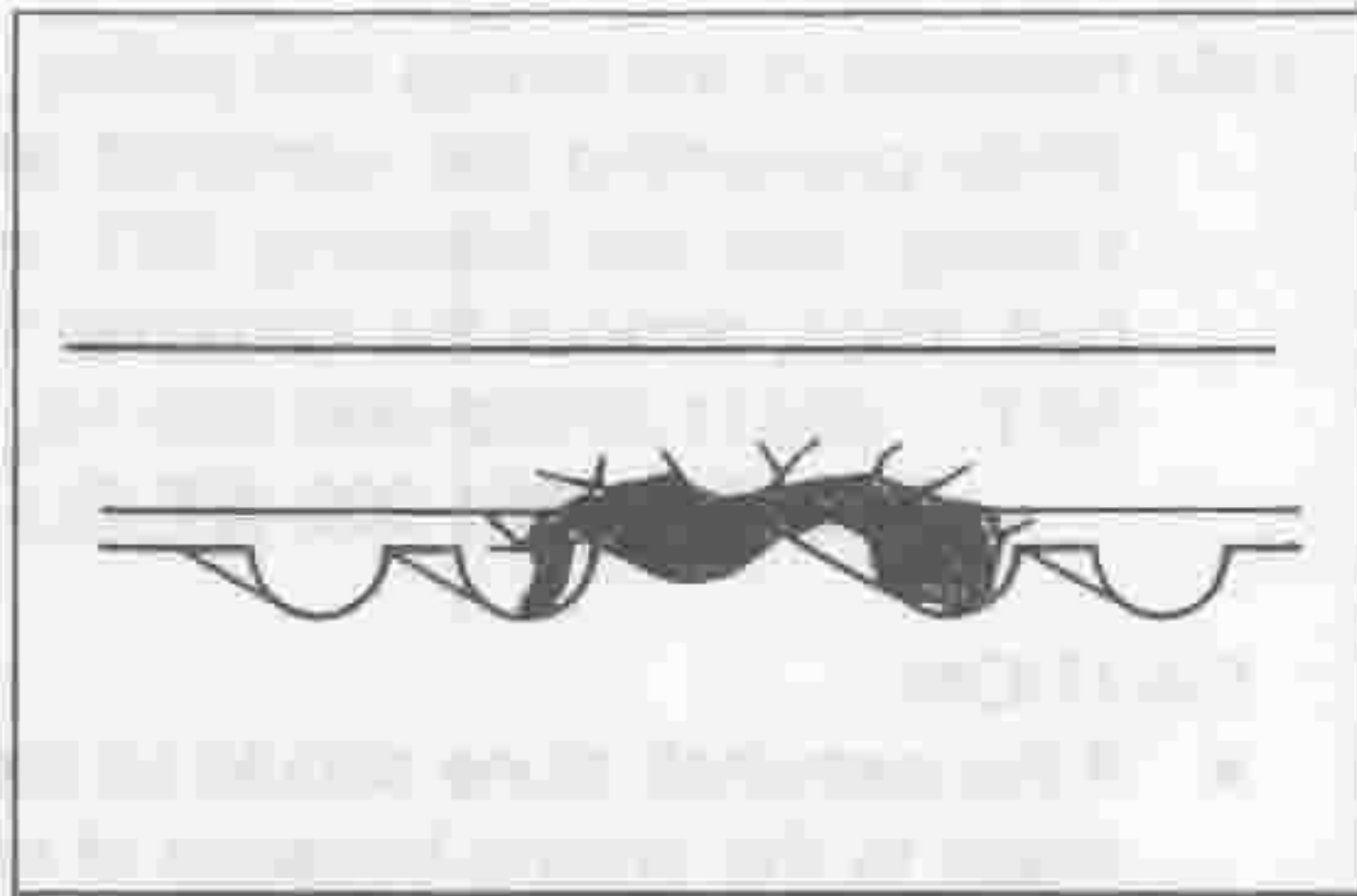
LEMA00059-00057

- ③ If there is noticeable wear or cracks on the belt face, check to see if there are nicks on one side of the idler pulley lock.



LEMA00060-00058

- ④ If there is wear or damage on only one side of the belt, check the pulley flange.

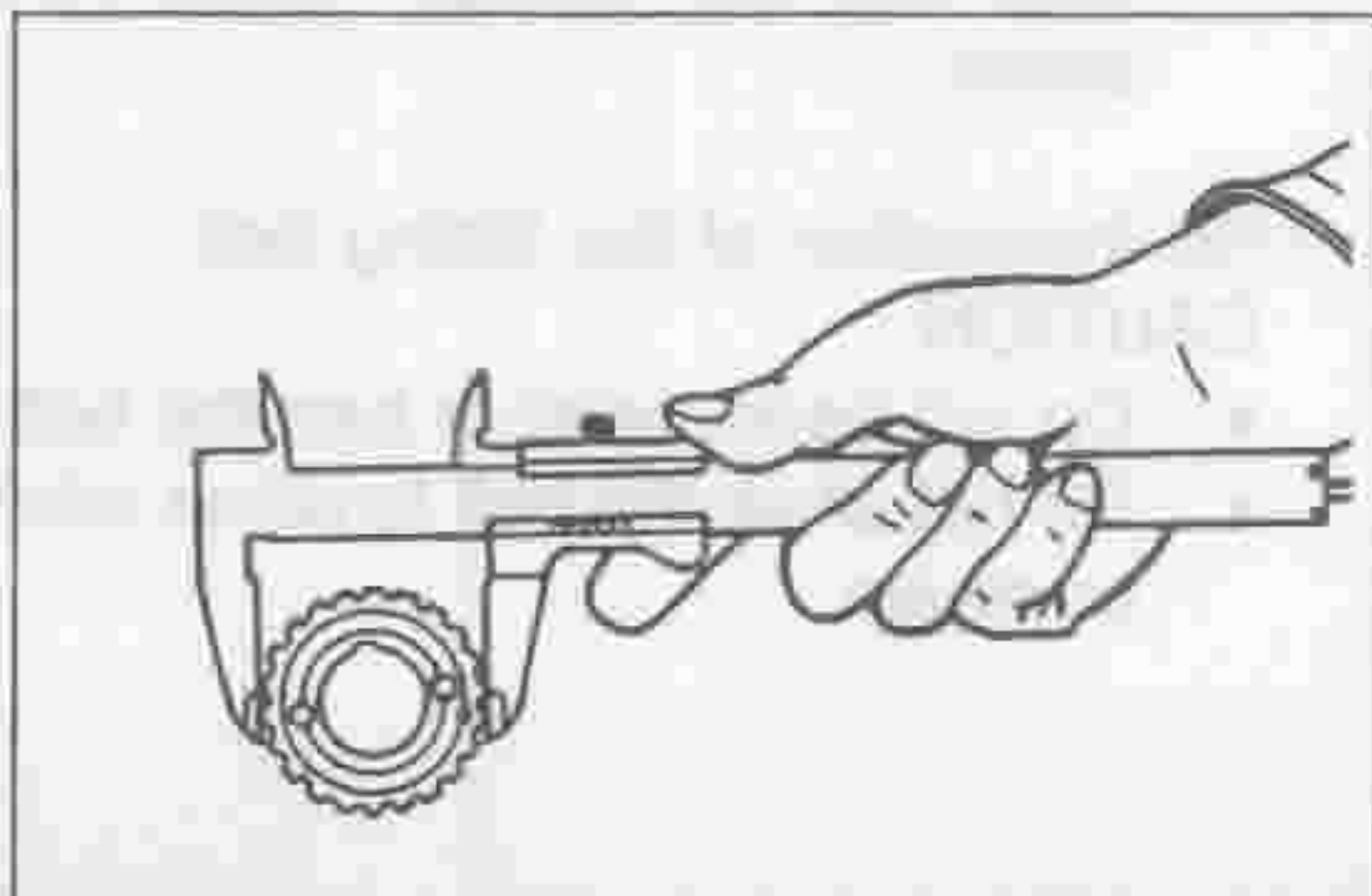


LEMA00061-00059

(20) Inspection of timing belt pulley

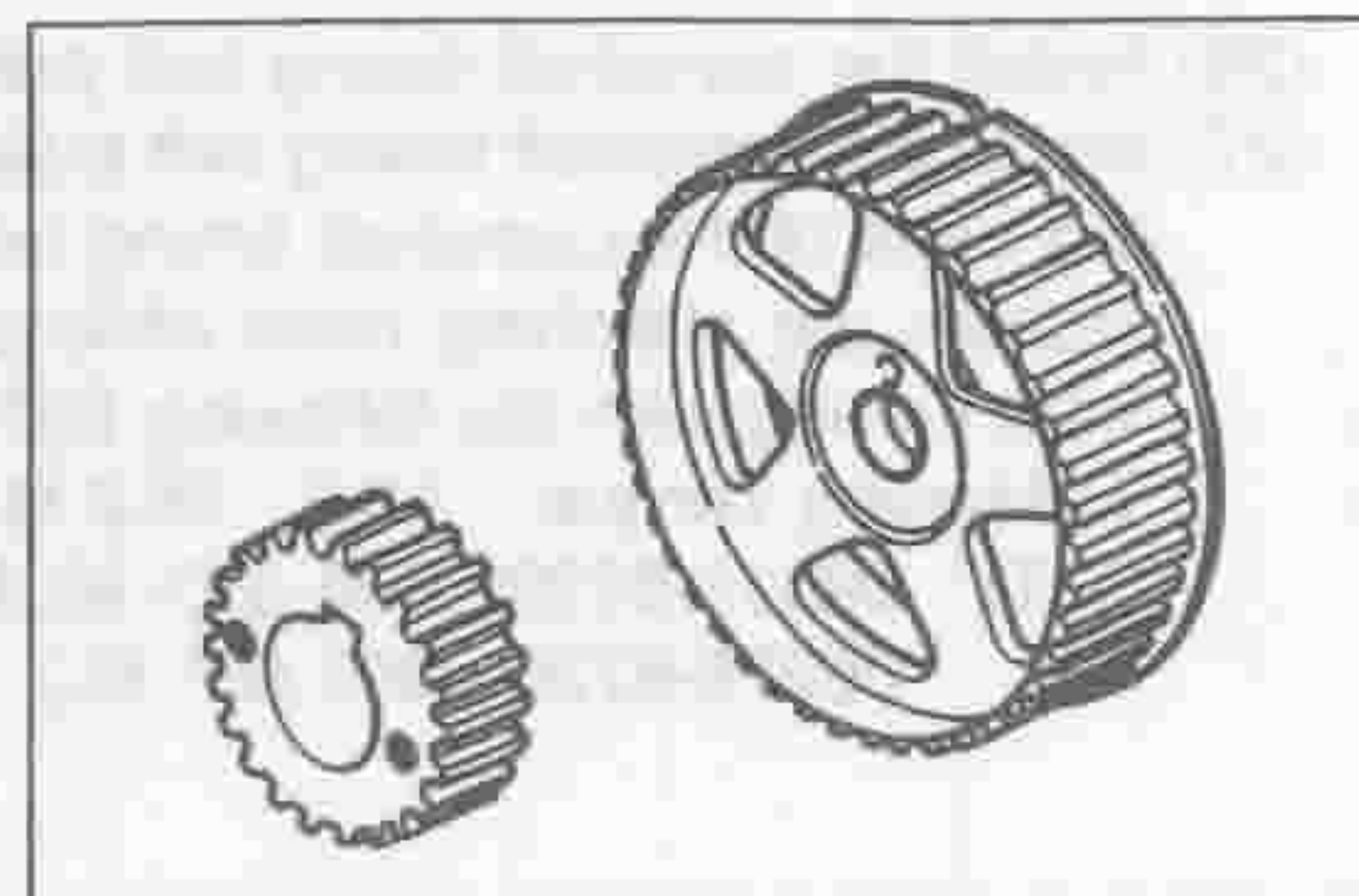
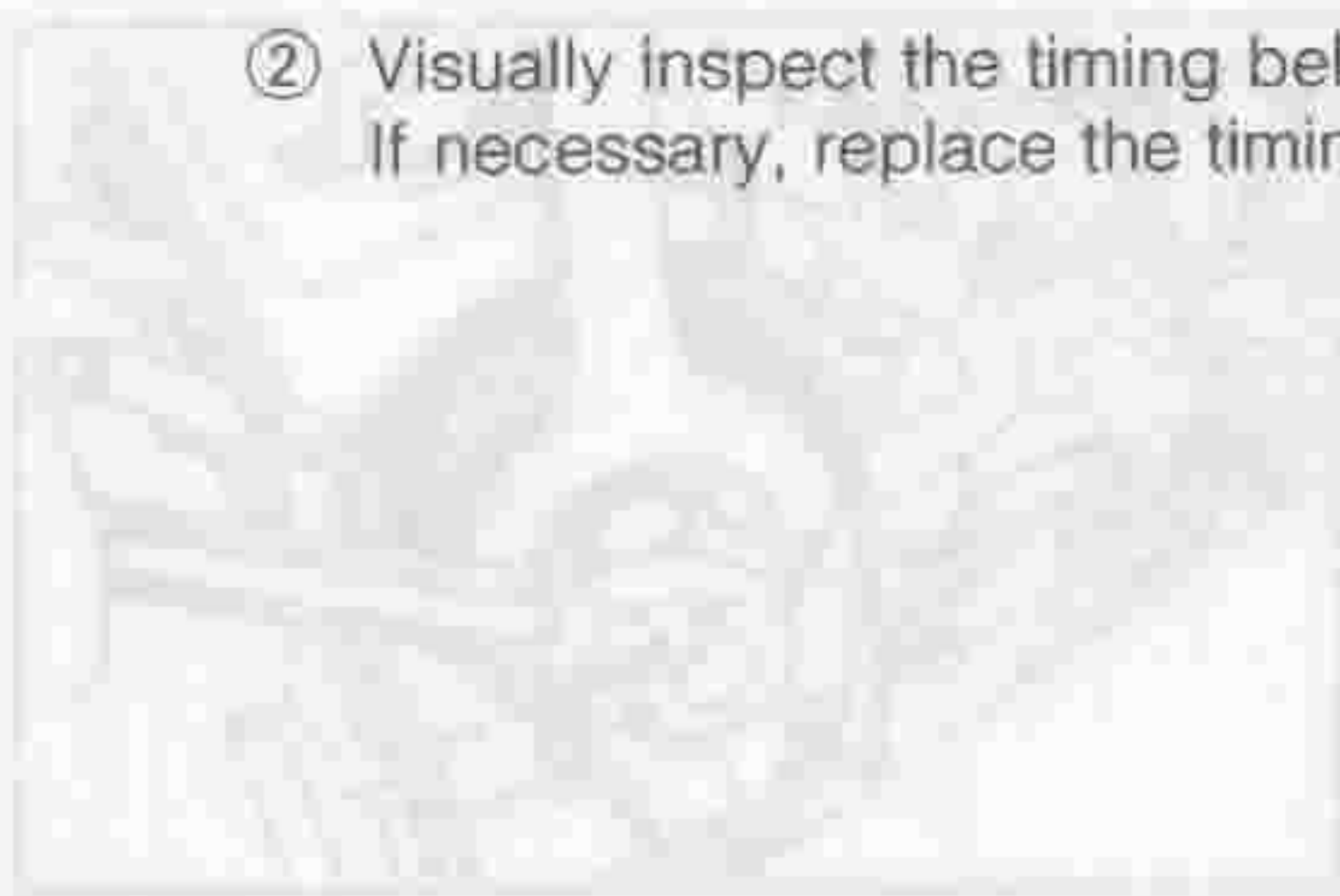
- ① Measure the maximum width of the timing belt pulley, using vernier calipers.
- Wear Limit of Timing Belt Pulley:

If the measured value is less than the specified value, replace the timing belt pulley.



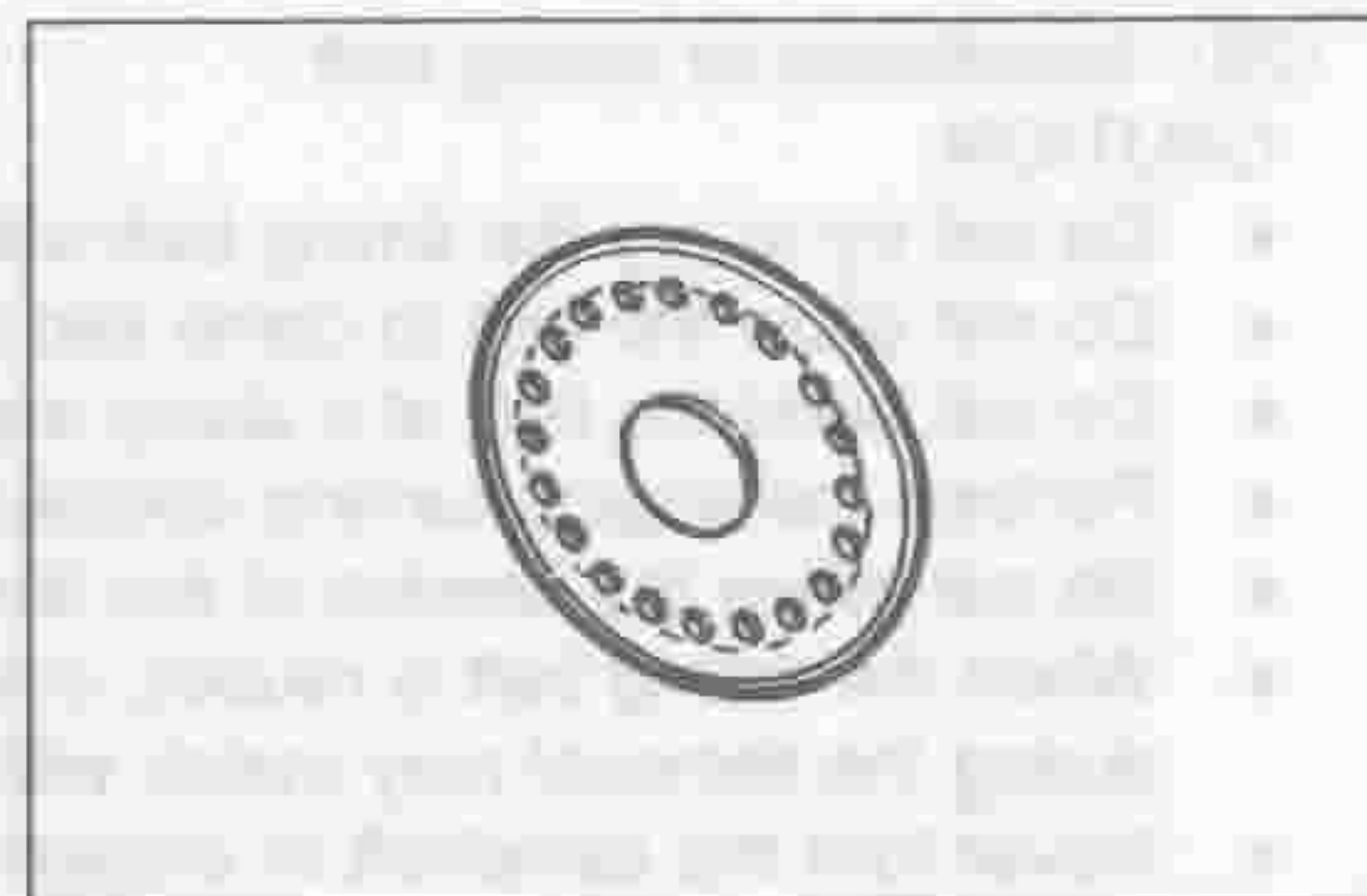
LEMA00062-00060

- ② Visually inspect the timing belt pulley for damage.
If necessary, replace the timing belt pulley.



LEMA00063-00061

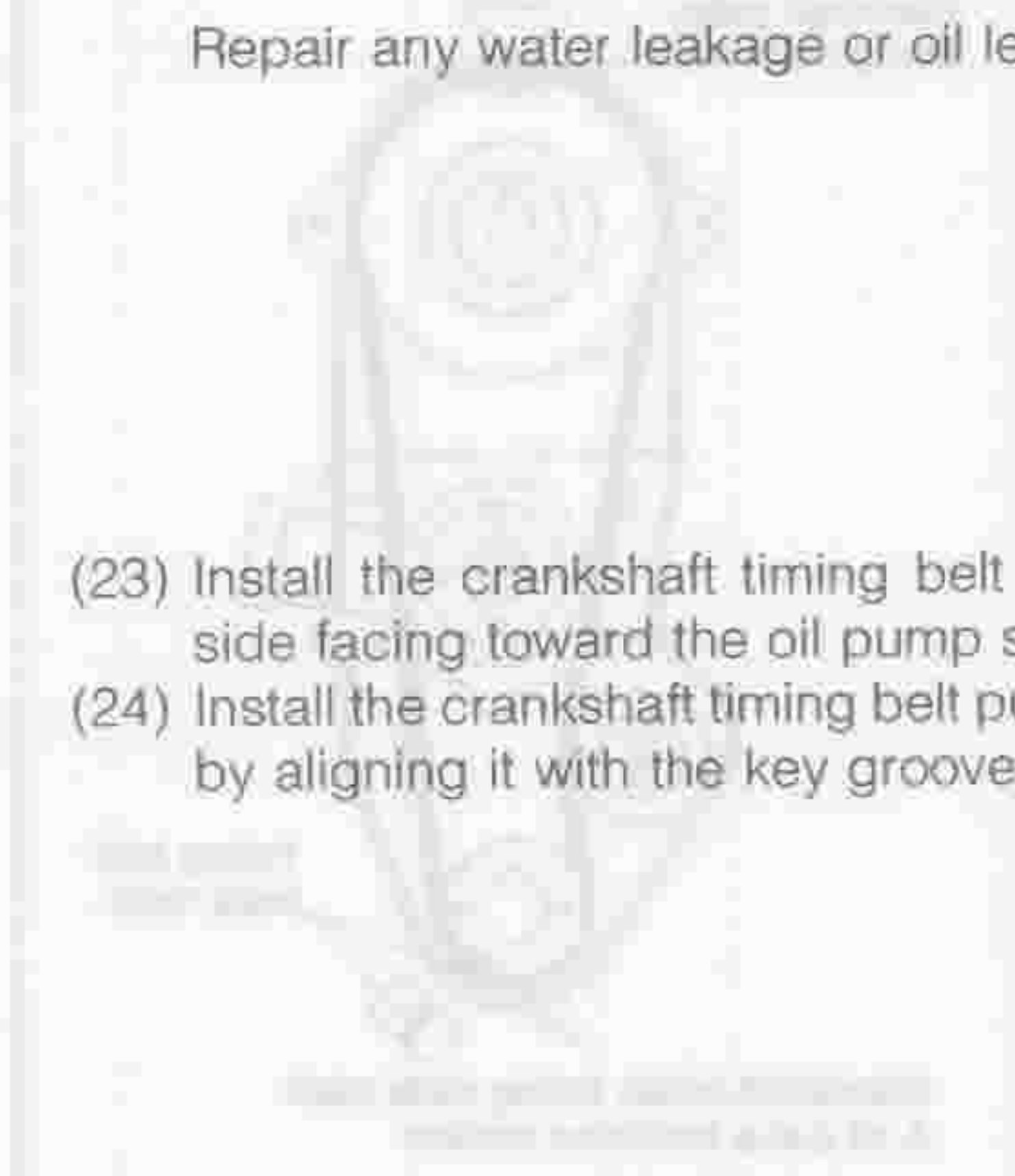
- (21) Inspection of crankshaft timing belt pulley flange
Check the crankshaft timing belt pulley flange for bend, damage and wear.
If necessary, replace the crankshaft timing belt pulley flange.



LEMA00064-00062

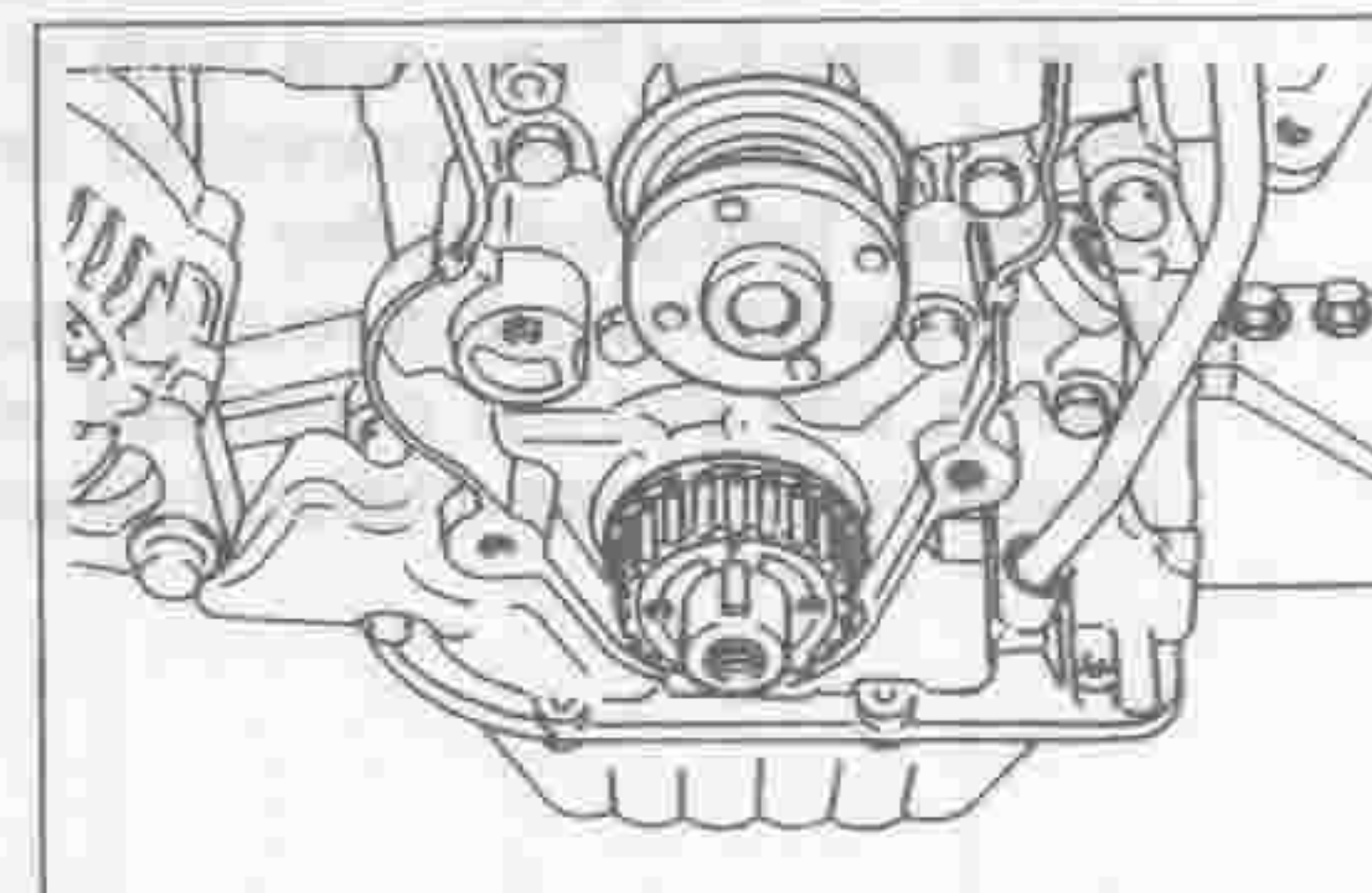
- (22) Check the water pump for water leakage and the oil seal for oil leakage.

Repair any water leakage or oil leakage, if necessary.



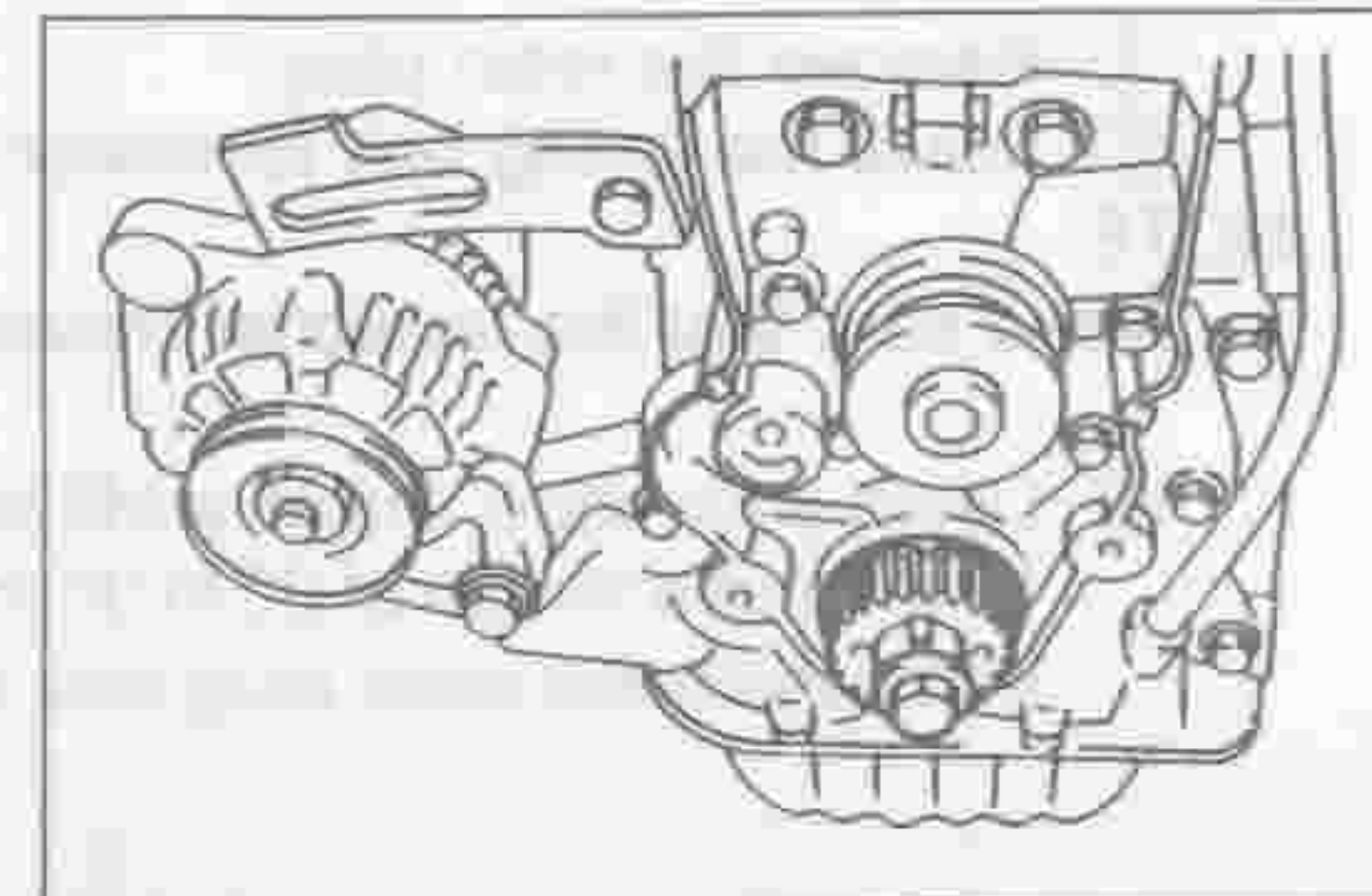
LEMA00065-00000

- (23) Install the crankshaft timing belt pulley flange with its side facing toward the oil pump side.
(24) Install the crankshaft timing belt pulley on the crankshaft by aligning it with the key groove.



LEMA00066-00063

- (25) Install the set bolt of the crankshaft pulley temporarily.



LEMA00067-00064

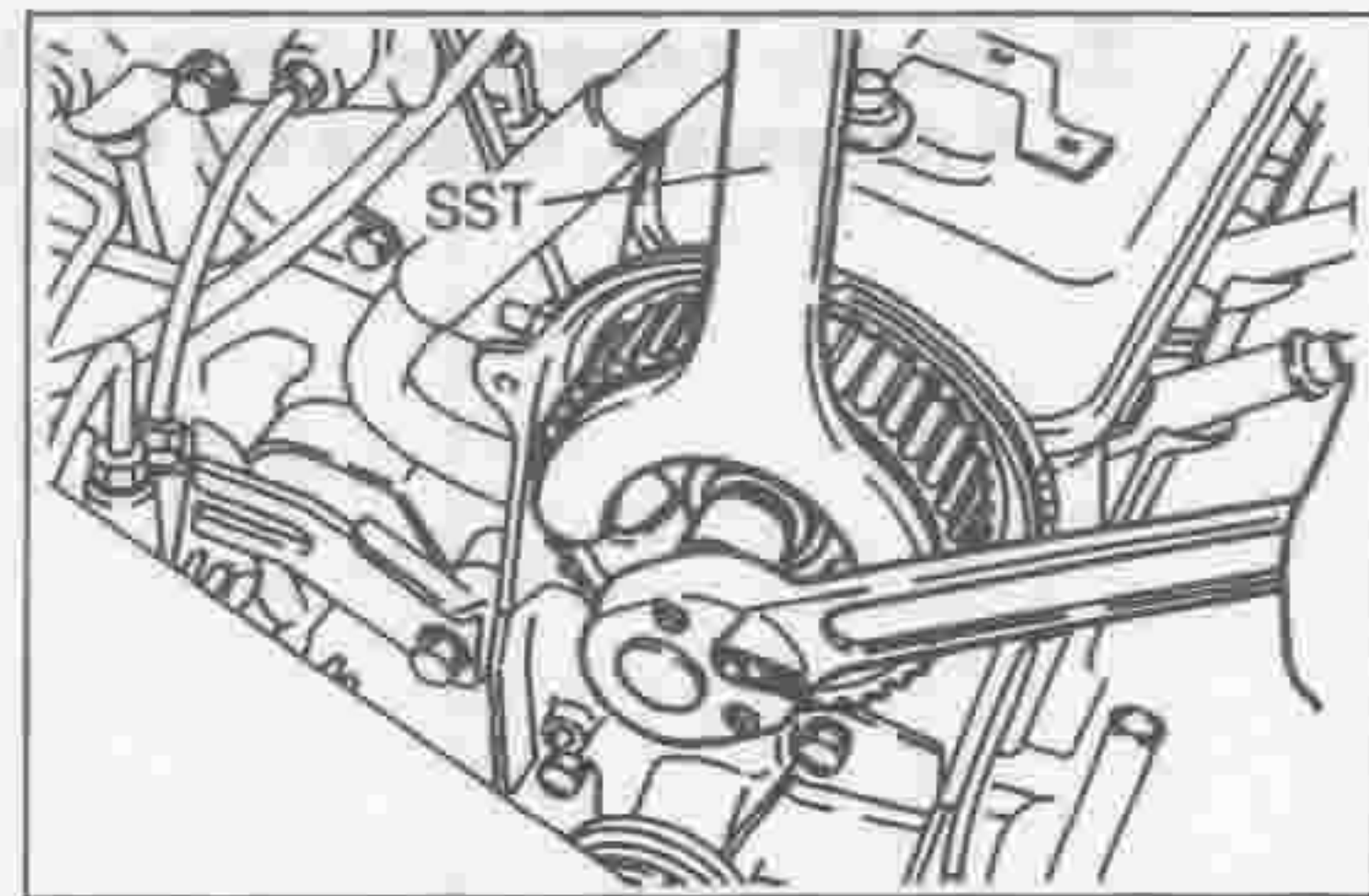
- (26) Install the camshaft timing belt pulley on the camshaft.
- (27) Install the camshaft timing belt pulley flange and attaching bolts of the camshaft timing belt pulley.

Tighten the attaching bolts while preventing the pulley from turning with the following SST.

Tightening Torque: 58.8 - 88.2 N·m (6 - 9 kgf-m)

SST: 09511-87202-000 (ED-10, ED-20)

09278-87201-000 (EF-EL)



LEMA00068-00065

- (28) Installation of timing belt

CAUTION:

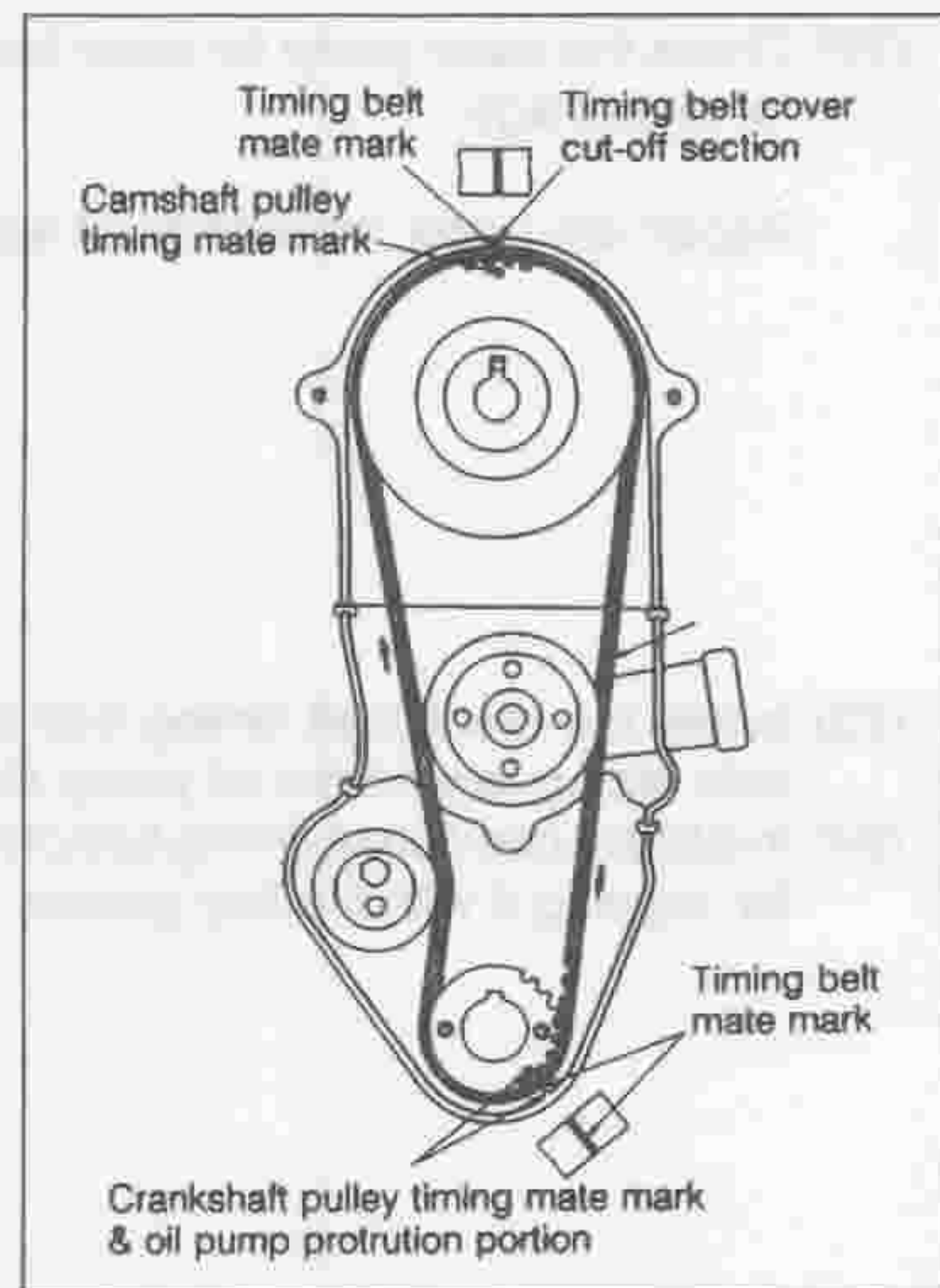
- Do not try to pry the timing belt with a screwdriver or the like during the installation.
- Do not allow the belt to come into contact with oil, water or dust.
- Do not bend the belt at a sharp angle or turn the belt inside out, for it is very vulnerable to bending.
- Perform the engine turning operation at the crankshaft side.
- Do not utilize the tension of the timing belt when tightening the set bolt of the timing belt pulley.
- When the timing belt is reused, install the timing belt in such a way that the direction of the arrow put during the removal may match with the engine rotation direction.
- Never turn the camshaft or crankshaft independently before the timing belt installation is completed.

LEMA00069-00000

- ① Align the drilled mark of the camshaft timing belt pulley with the pressed line mark of the timing belt cover.
- ② Align the drilled mark of the crankshaft timing belt pulley with the indicator.
- ③ Assemble the timing belt in such a way that the two mating marks on the timing belt may be aligned with the corresponding drilled marks on the crankshaft timing belt pulley and camshaft timing belt pulley.

NOTE:

- When the timing belt is reused, install the timing belt in such a way that there exist teeth of the belt between the drilled marks of the crankshaft timing belt pulley and camshaft timing belt pulley.
- When the timing belt is reused, install the timing belt in such a way that the arrowhead which was put during disassembly comes rotational direction of the timing belt.

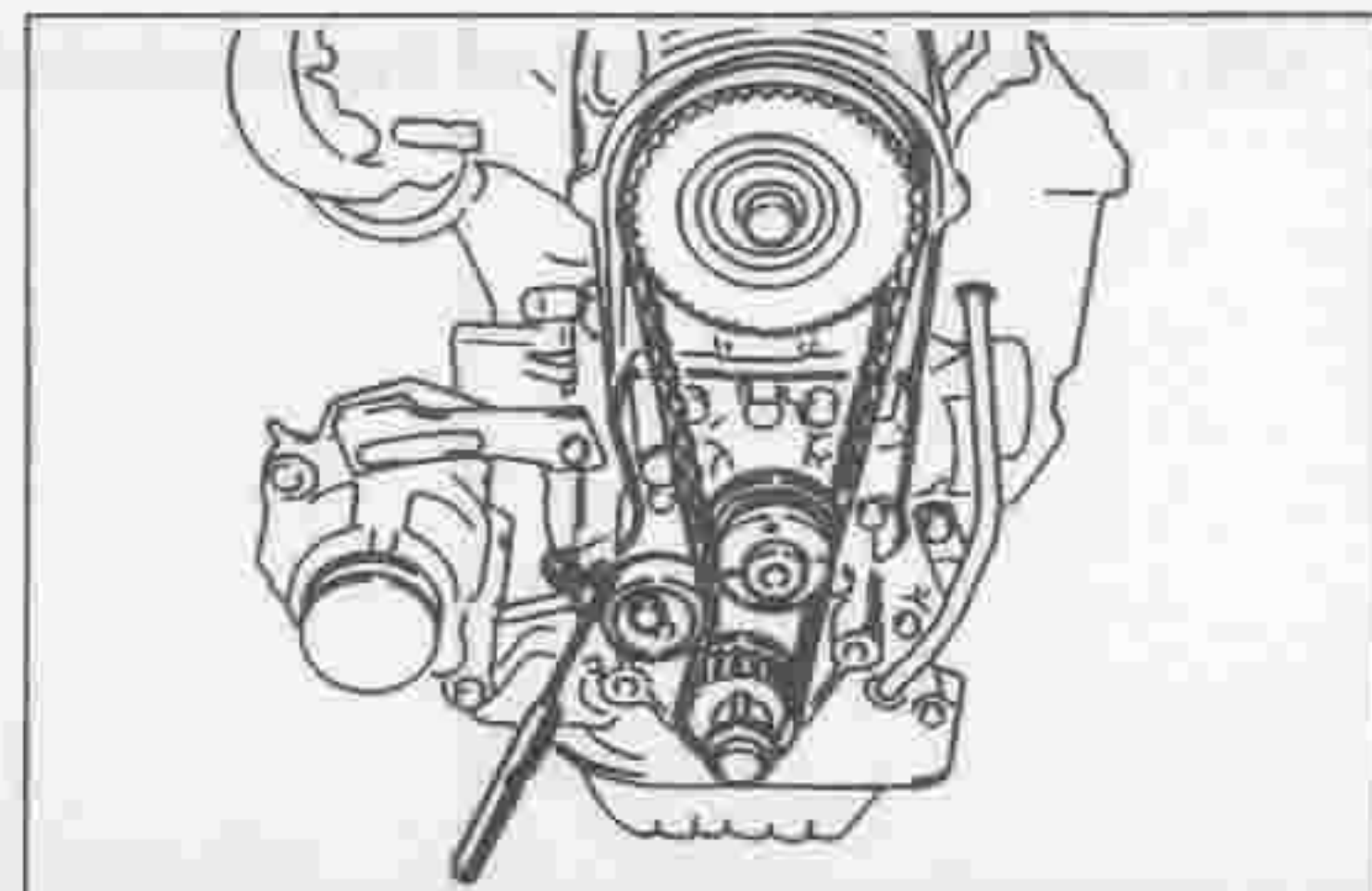


LEMA00070-00066

- ④ Remove the resin plug
- ⑤ Install the timing belt tensioner temporarily.

NOTE:

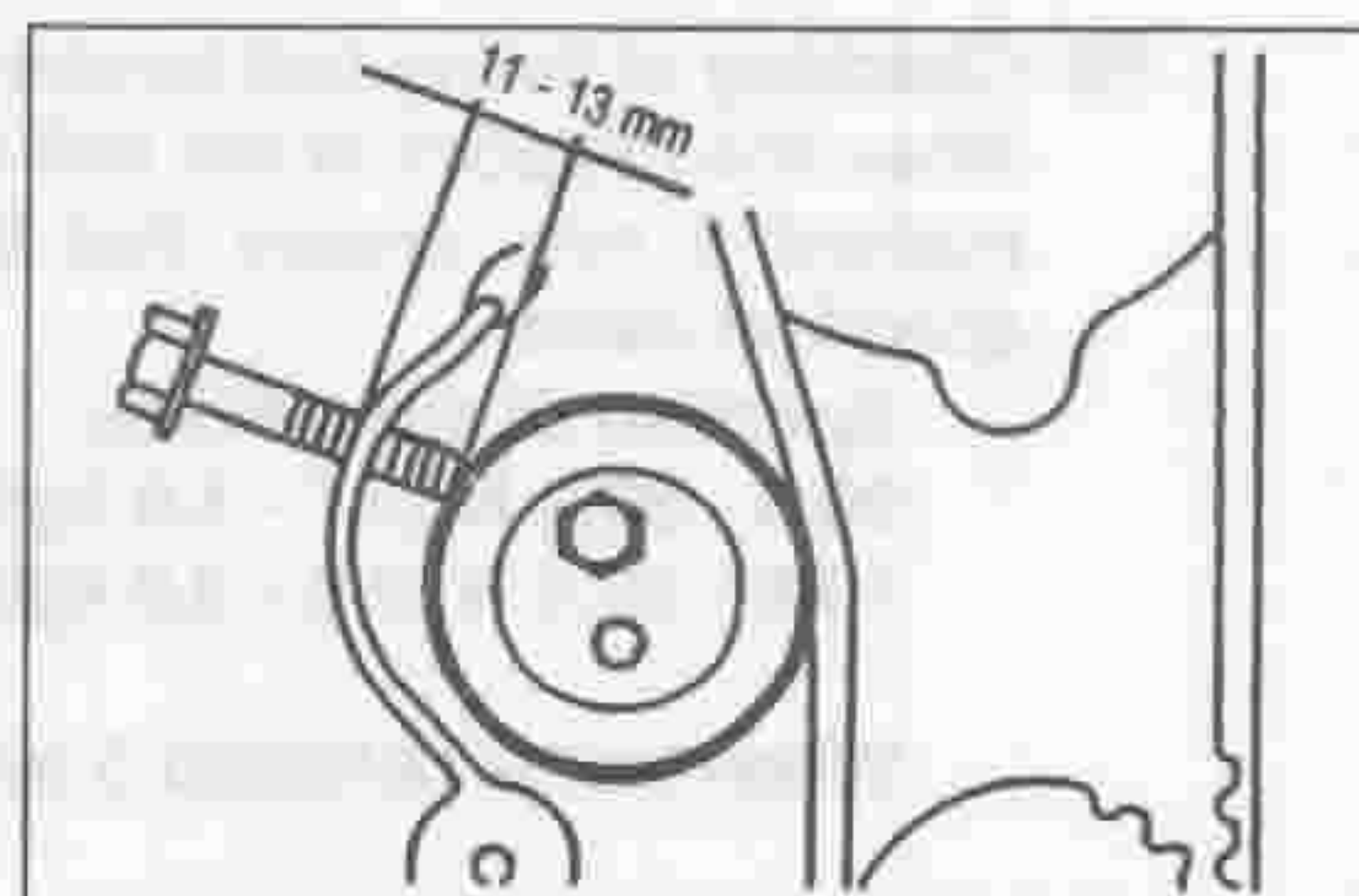
- Make sure that the tensioner moves freely.
- ⑥ Using your hand, install a M6 screw (with a pitch of 1 mm and a length of 20 to 30 mm) fully into the hole from which the resin plug has been removed.



LEMA00071-00067

NOTE:

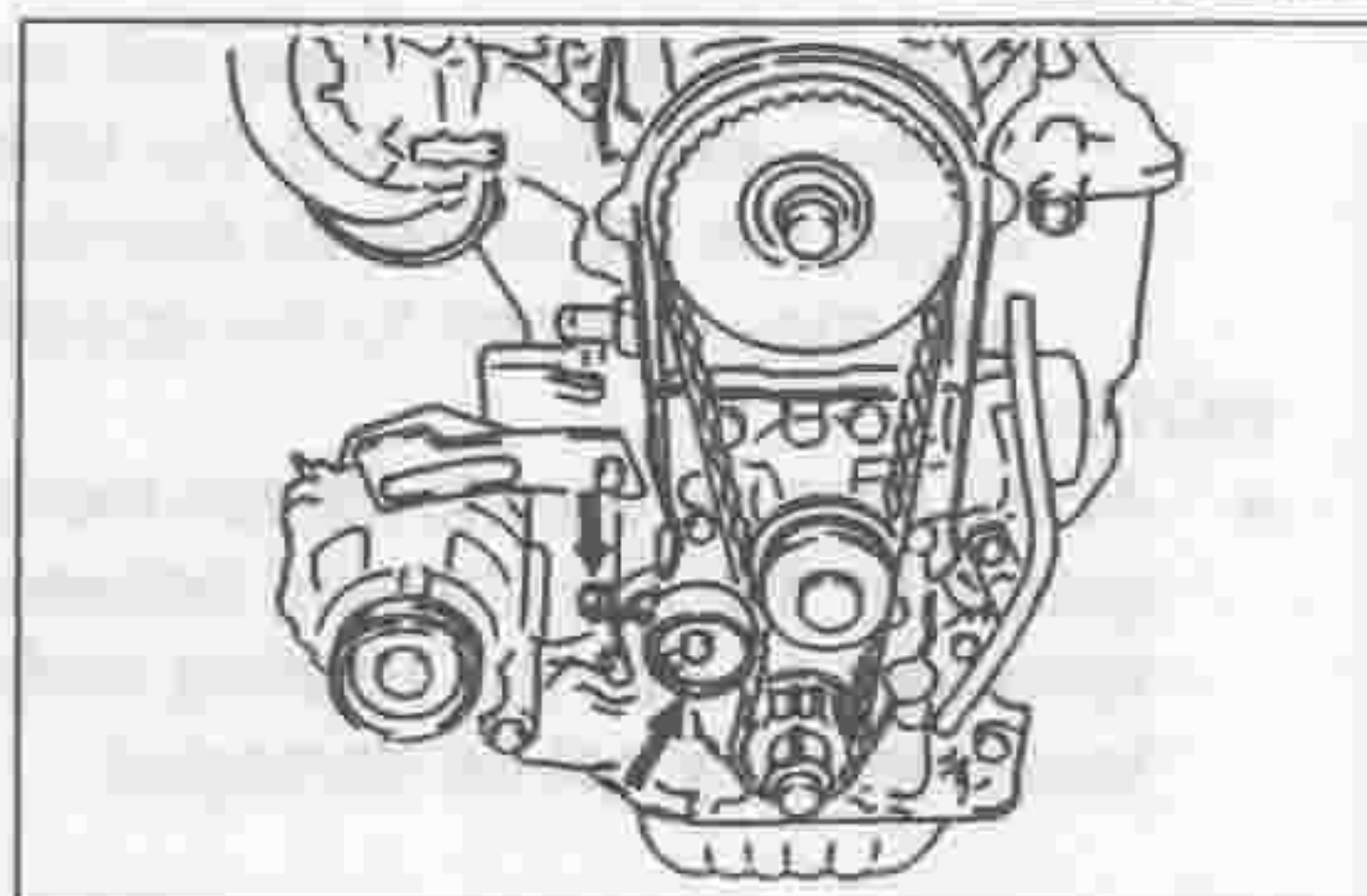
- Before this screw is installed, be certain to insert a thickness gauge between the screw and the tensioner in order that no damage may be made to the turning surface of the timing belt tensioner.
- Measure the distance between the outside of the oil pump body and the tensioner.
Specified Distance: 11 - 13 mm



LEMA00072-00068

- ⑦ Tighten the timing belt tensioner attaching bolt.
Tightening Torque: 31.4 - 47.0 N·m (3.2 - 4.8 kgf·m)

- ⑧ Back off the M6 screw two or three turns so that the screw may not interfere with the tensioner.

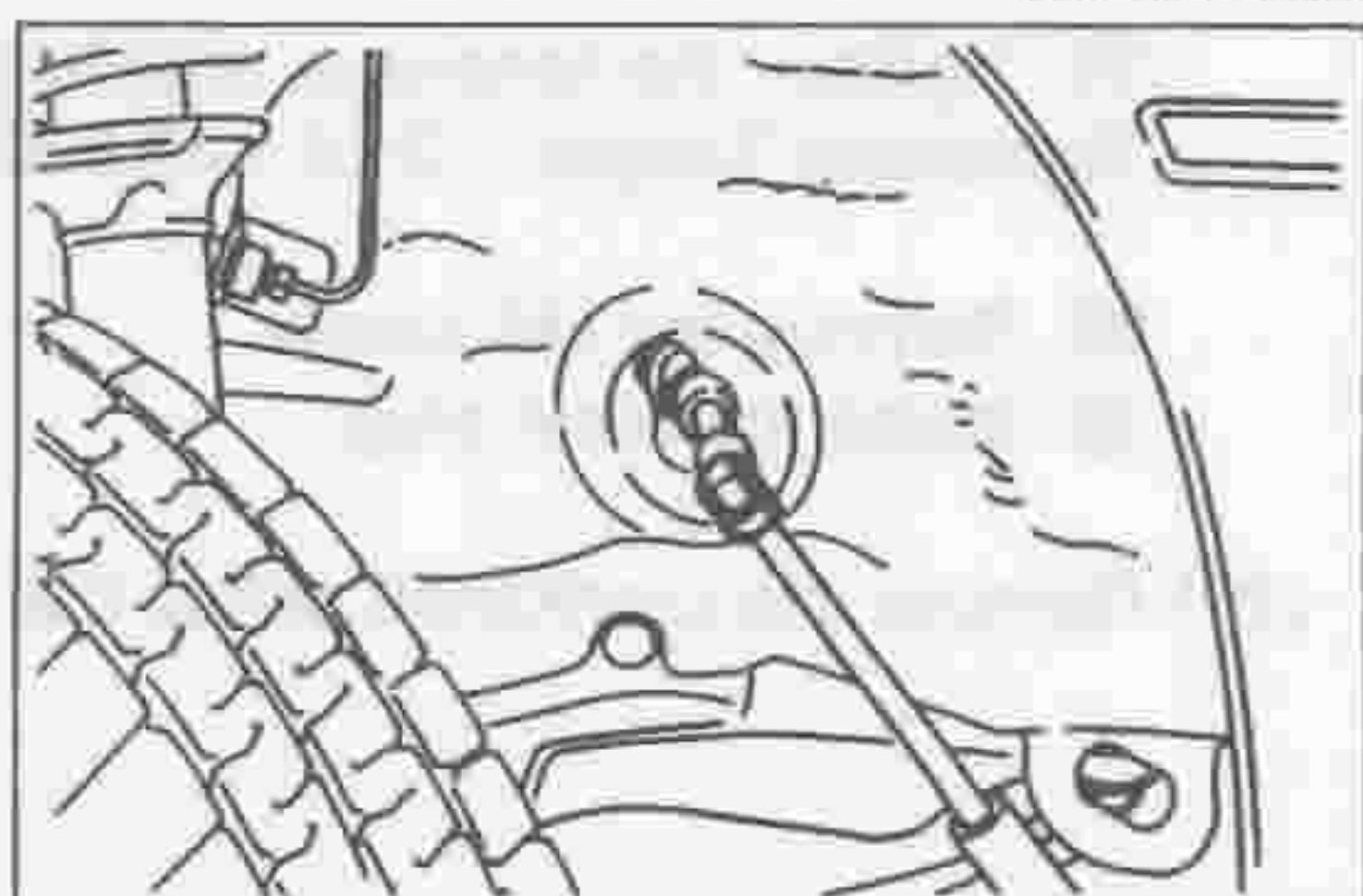


LEMA00073-00069

- ⑨ Turn the crankshaft 2 turns in the normal direction (clockwise as viewed from the timing belt side) so that the drilled mark of the camshaft timing belt pulley is aligned with the pressed line mark of the timing belt cover.

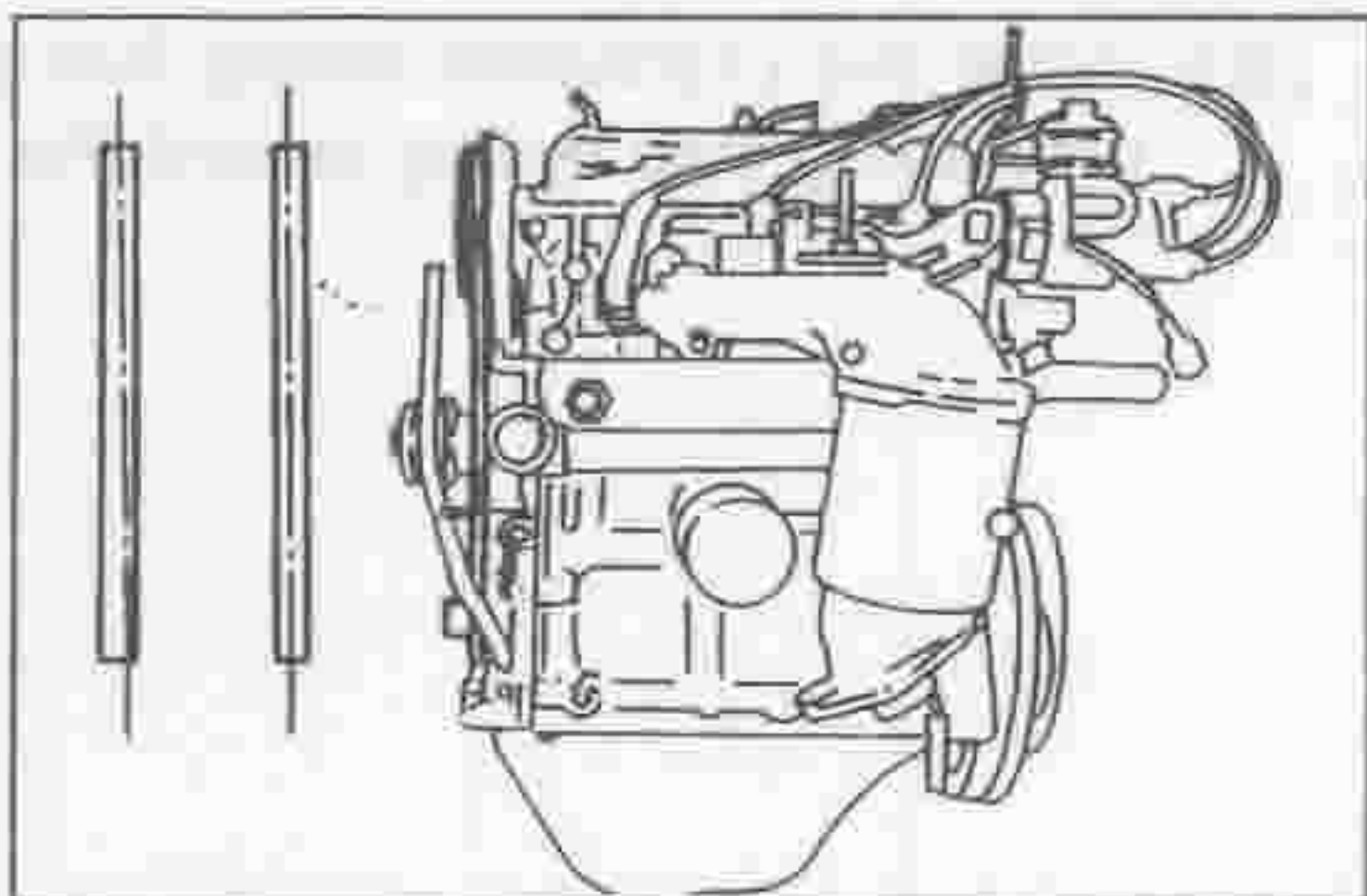
CAUTION:

- At this time, never turn the crankshaft reversely.
- Make sure that the belt is not tilted between the crankshaft timing belt pulley and the camshaft timing belt pulley.



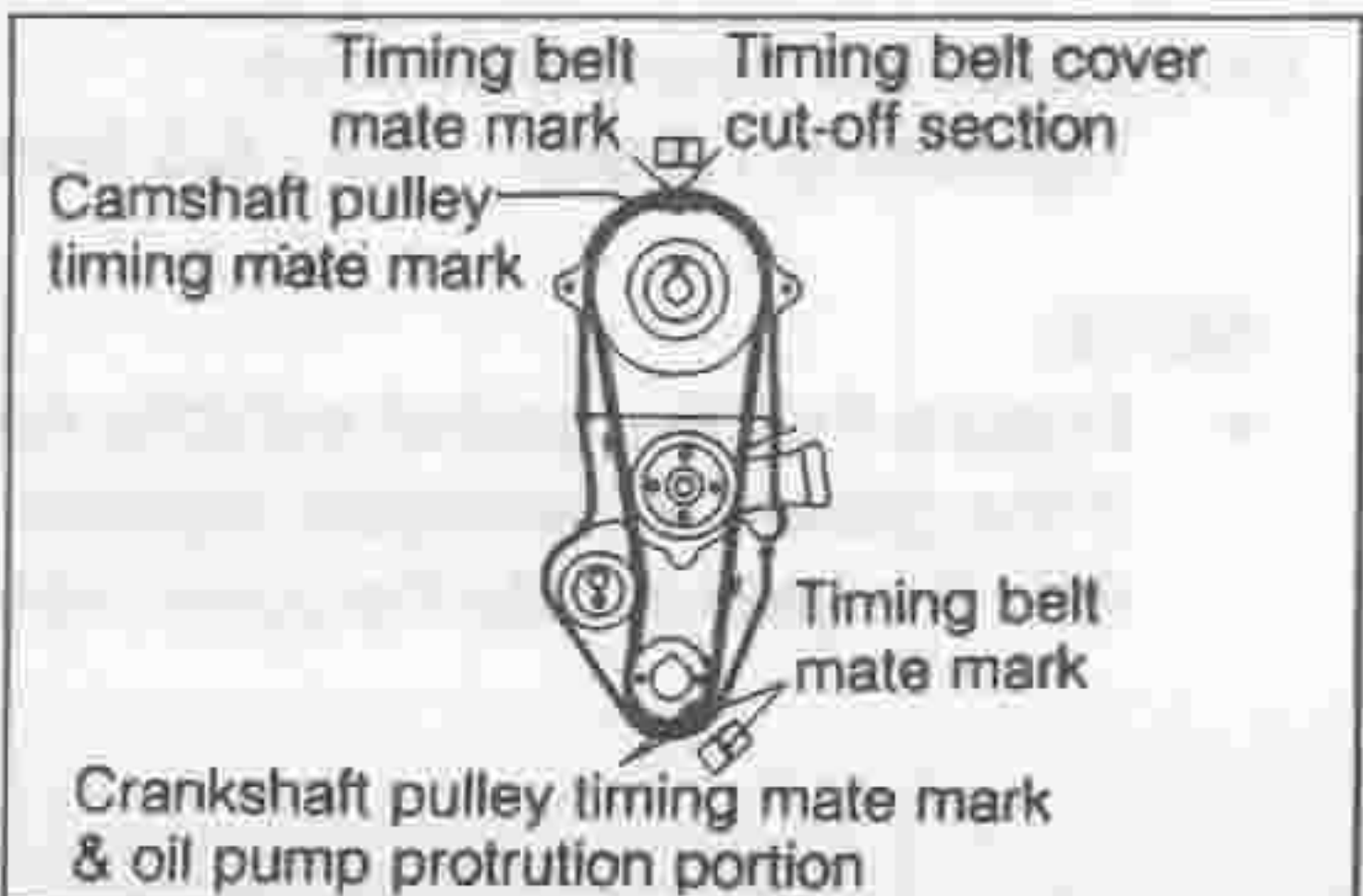
LEMA00074-00070

- ⑩ Ensure that the timing belt is not tilted.
If it is tilted, repeat the operation described in the step 9.



LEMA00075-00071

- ⑪ Ensure that the drilled marks of the crankshaft timing belt pulley and camshaft timing belt pulley are aligned with the corresponding indicators.
If the drilled mark is not aligned with the indicator, repeat the operations from the step 1 onward after removing the timing belt.



LEMA00076-00072

⑫ Checking of timing belt tension

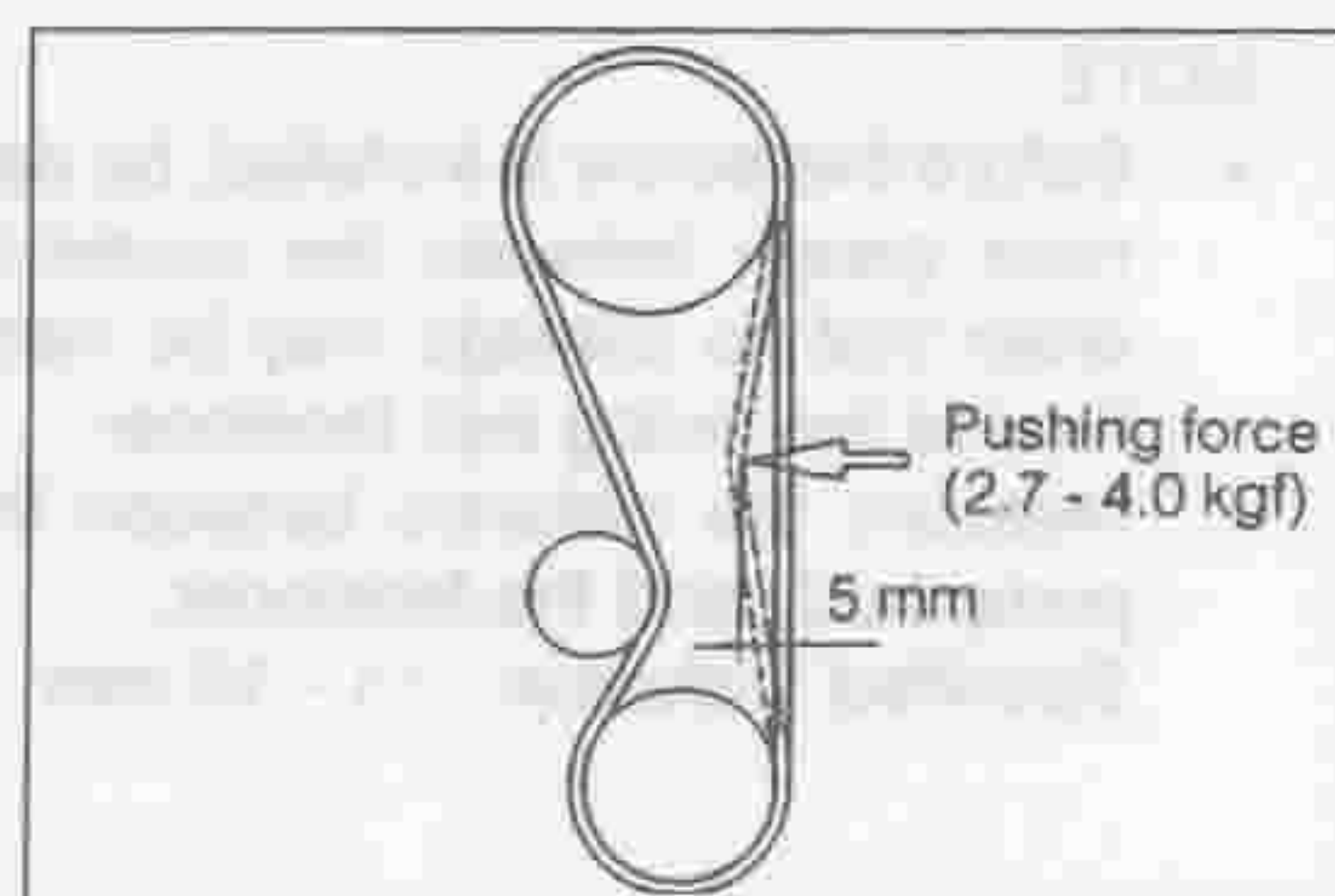
When the midpoint of the belt at the tension side is pushed 5 mm, ensure that the pushing force is specified value.

Specified Pushing Force:

26.5 - 39.2 N (2.7 - 4.0 kgf) [ED-10, ED-20]

19.6 - 29.4 N (2.0 - 3.0 kgf) [EF-EL]

When belt is deflected 5 mm

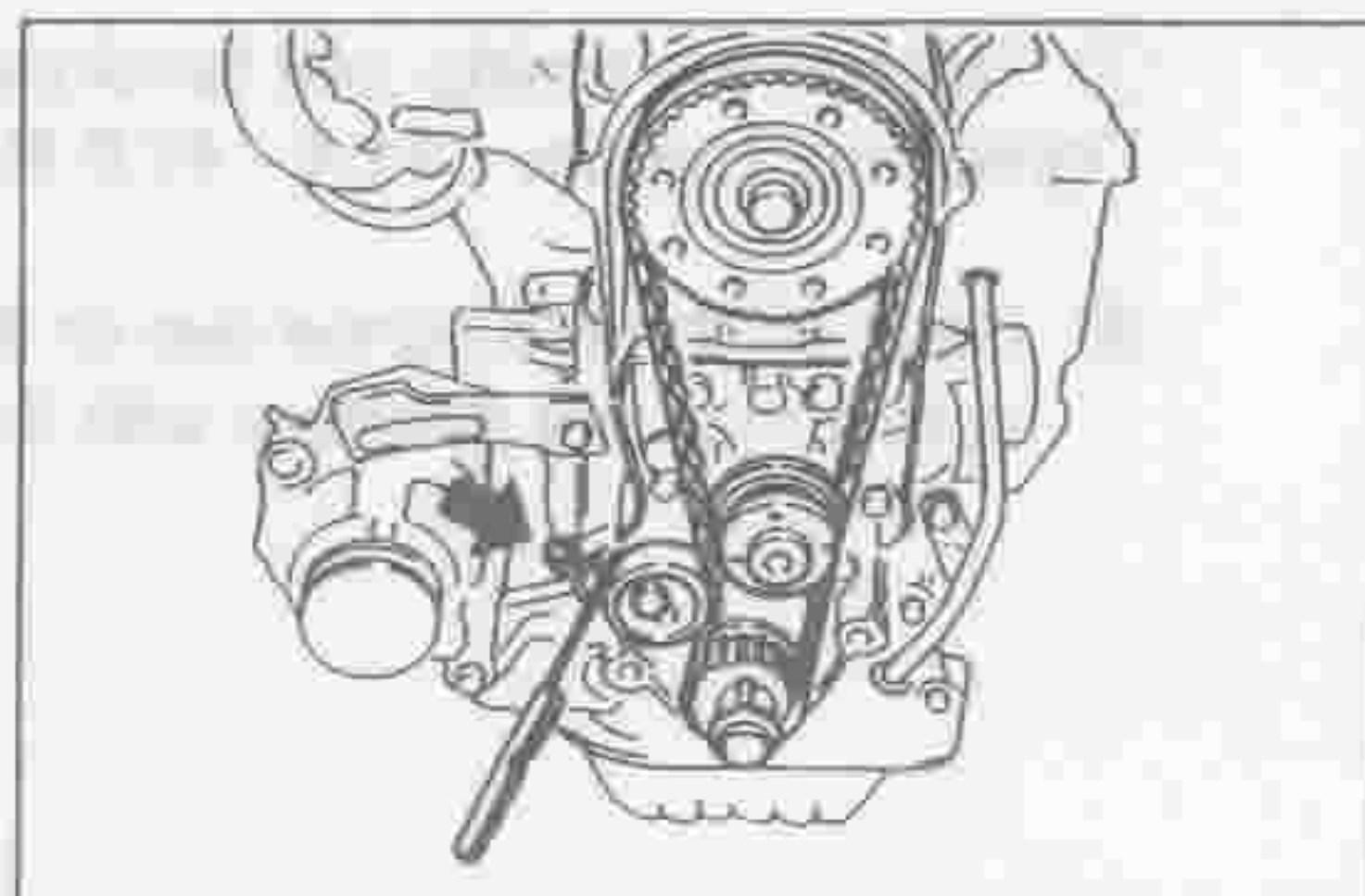


LEMA00077-00073

- ⑬ If the belt tension does not conform to the specification, after loosening the tensioner attaching bolt, adjust the M6 screw so that the tension of the timing belt may conform to the specified value.

NOTE:

- At this time, be sure to tighten the screw with a thickness gauge or the like inserted between the screw and the tensioner so that the rotating surface of the timing belt tensioner may not be damaged.



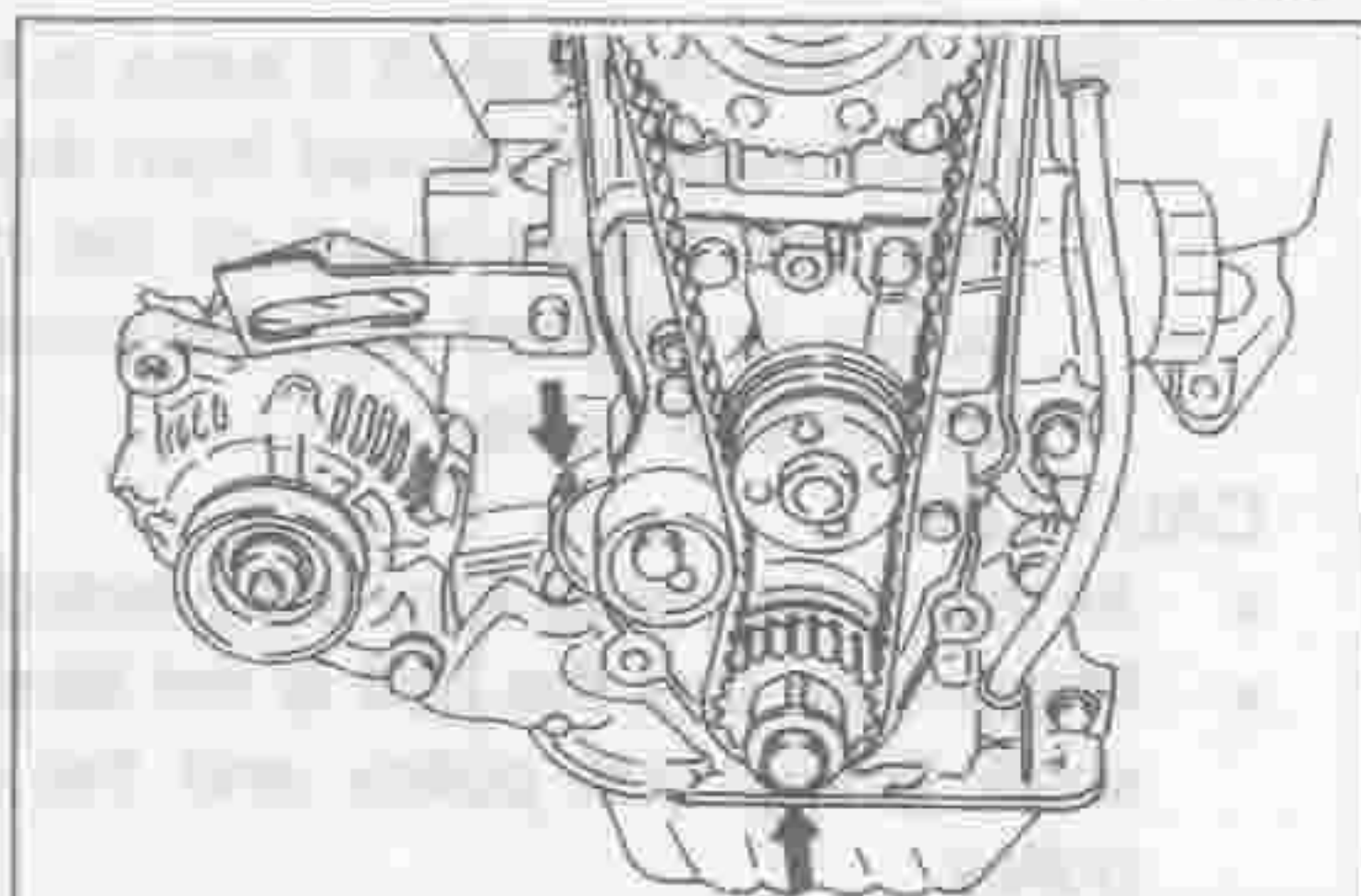
LEMA00078-00074

- ⑭ Tighten the tensioner attaching bolt.

Tightening Torque: 31.4 - 47.0 N·m (3.2 - 4.8 kgf·m)

- ⑮ Remove the M6 screw.

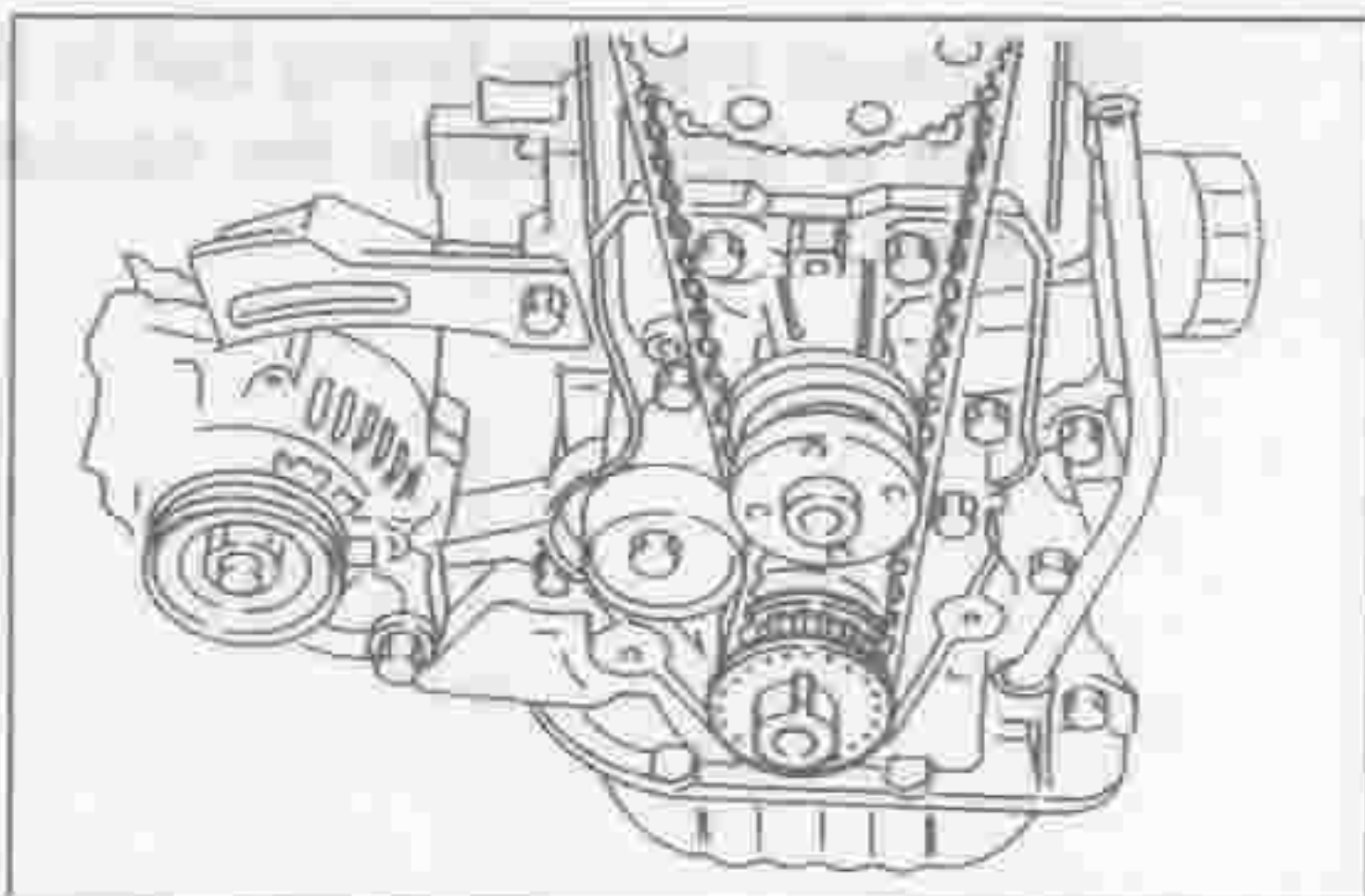
- ⑯ Install the resin plug.



LEMA00079-00075

- (29) Remove the crankshaft pulley bolt.

- (30) Install the crankshaft timing belt pulley flange with its protruding side facing toward the timing belt pulley.



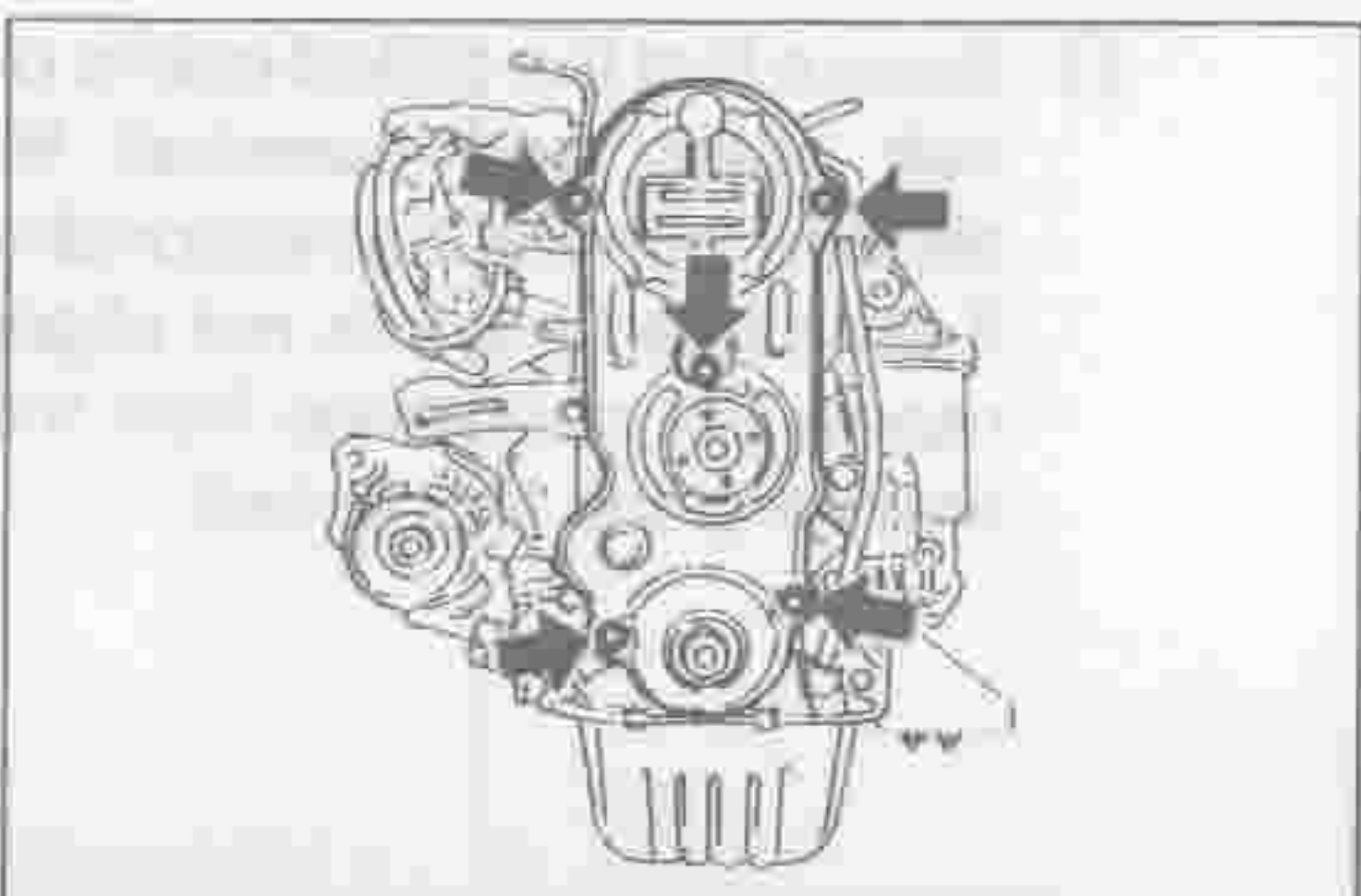
LEMA00080-00076

- (31) Install the timing belt cover.

Tightening Torque: 4.3 - 6.5 N·m (0.44 - 0.66 kgf·m)

NOTE:

- Ensure that the gasket exhibits no damage. If the gasket is damaged, replace it with a new one. Affix the gasket onto the cover, using an adhesive agent.

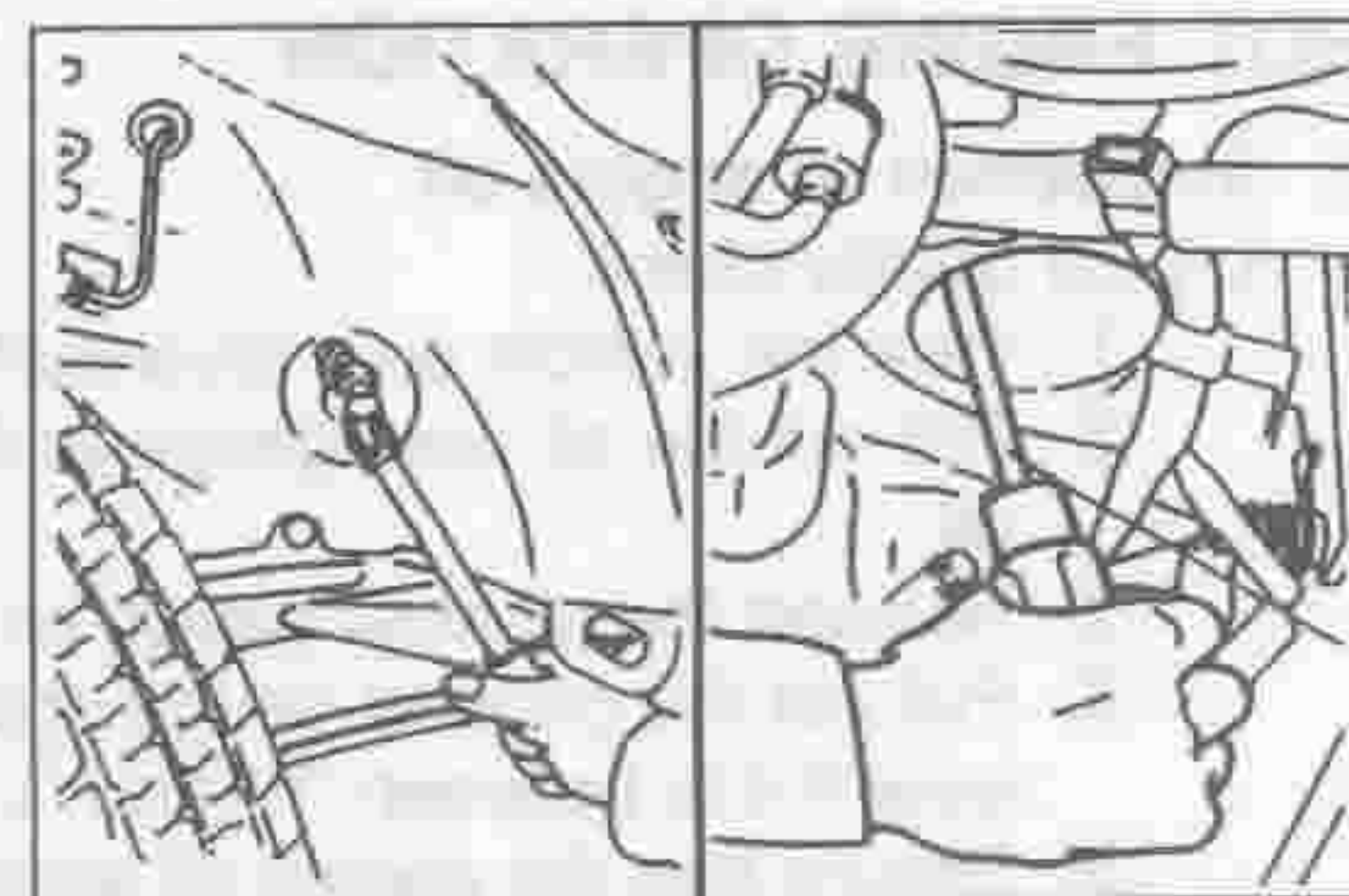


LEMA00081-00077

(32) Installation of crankshaft pulley bolt

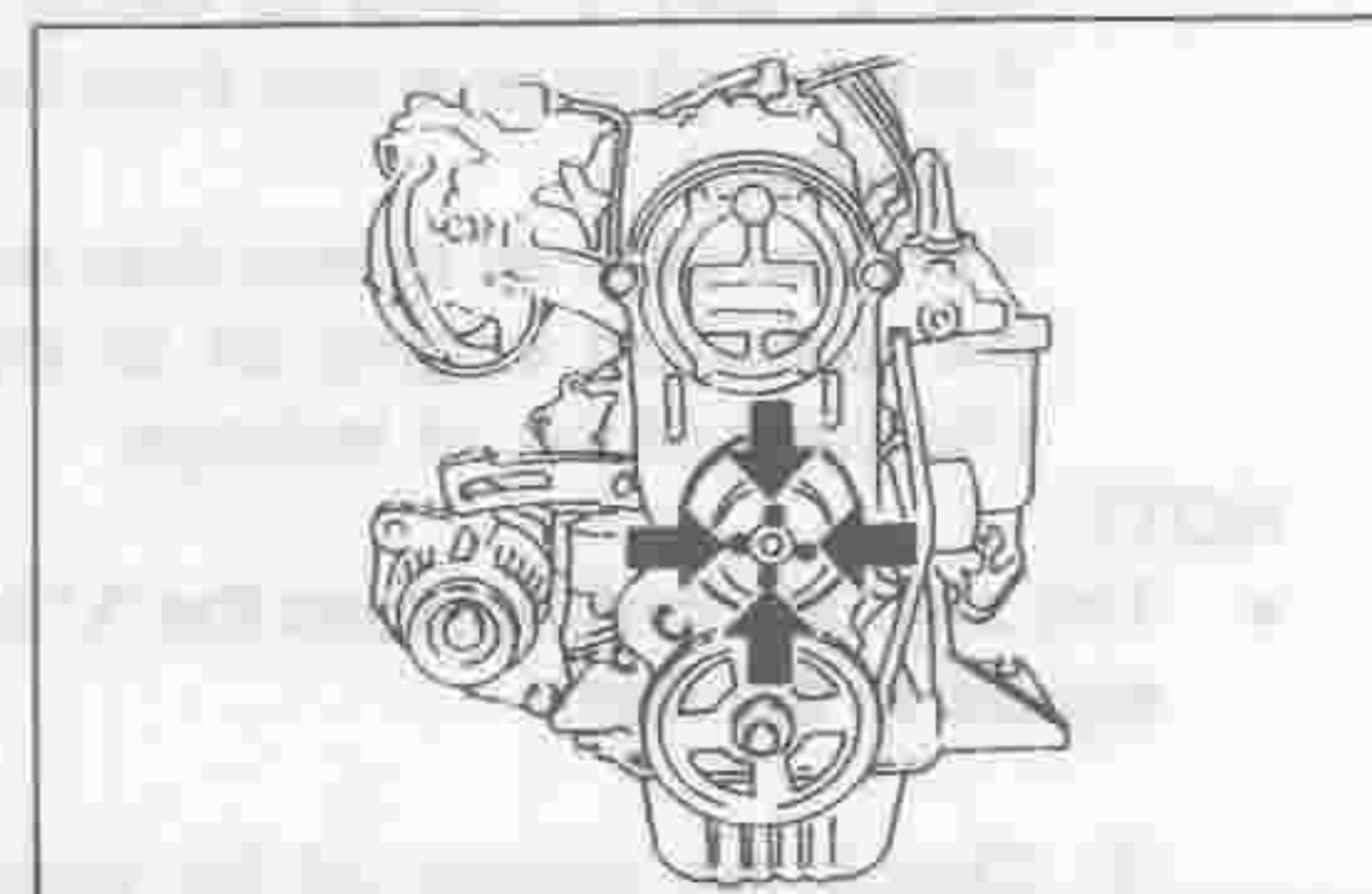
- ① Install the crankshaft pulley.
- ② Tighten the crankshaft pulley bolt while preventing the ring gear from turning with the screwdriver.

Tightening Torque: 88.3 - 108 N·m
(9.0 - 11.0 kgf-m)



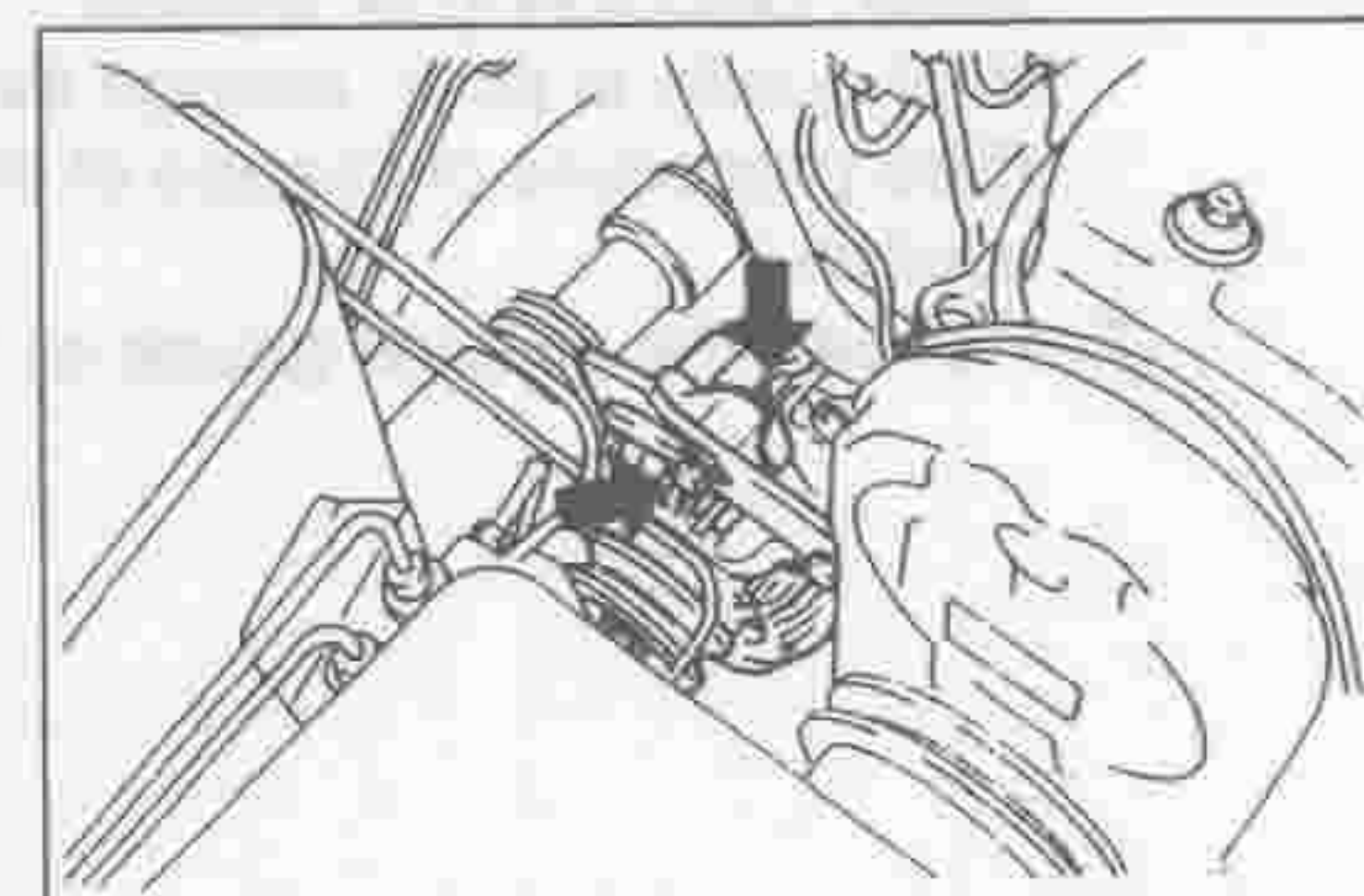
LEMA00082-00078

(33) Temporarily install the water pump pulley with the four bolts.



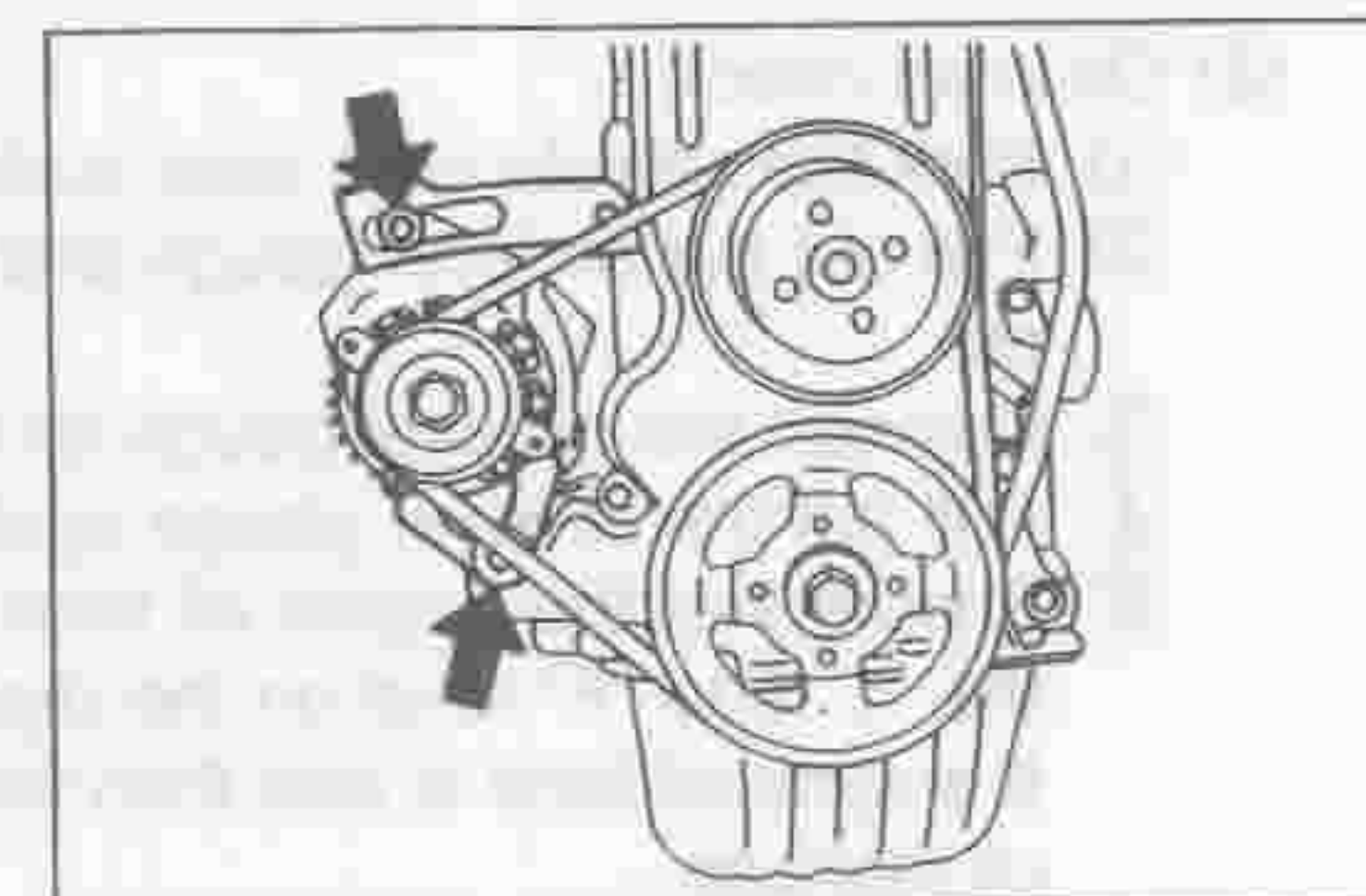
LEMA00083-00079

(34) Install the alternator adjusting bar side bolt and nut.



LEMA00084-00080

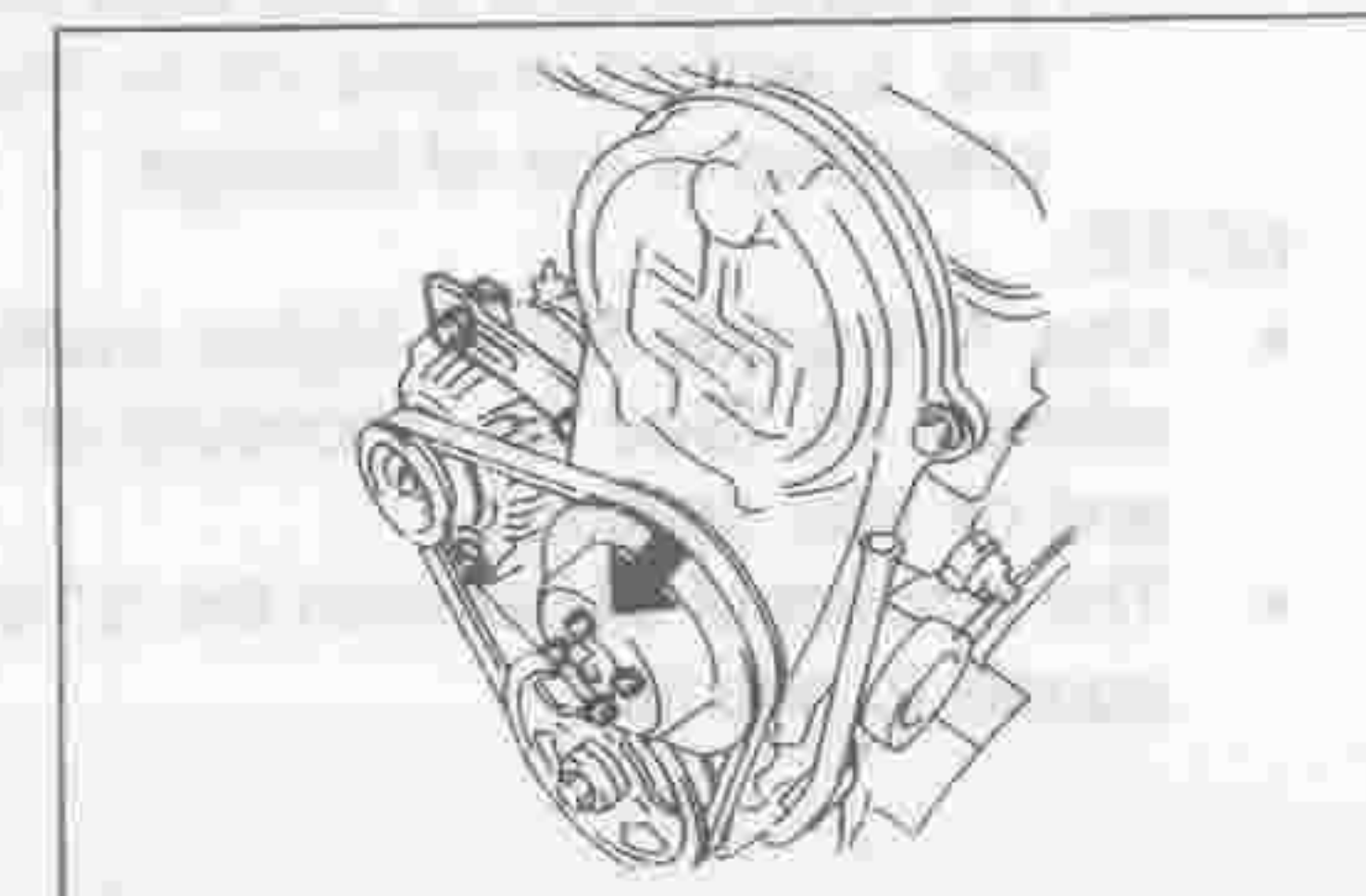
- (35) Install the drive belt.
- (36) Adjust the drive belt tension.
(See page EM-9.)



LEMA00085-00081

(37) Tighten the water pump pulley attaching bolts. Tightening Torque: 4.3 - 6.5 N·m (0.44 - 0.66 kgf-m)

- (38) Insert the oil level gauge into the oil level gauge guide.
- (39) Install the air cleaner assembly with air intake duct.
- (40) Connect the battery ground cable to the negative (-) terminal of the battery.



LEMA00086-00082

HOT ENGINE OPERATION

1. Inspection of engine oil

(1) Oil quality check

- ① Park the vehicle on a level surface.
- ② Pull out the oil level gauge and wipe off the engine oil.
- ③ Reinsert the oil level gauge as far as it will go.
- ④ Pull out the oil level gauge again and check the oil level if it is between "F" and "L" marks.
- ⑤ Ensure that the engine oil level should be between the "L" and "F" level on the oil level gauge.

If engine oil level is less than the "L" level, check the oil leakage.

If engine oil level is less than the "L" level, replenish the specified engine oil to the "F" level after the checking of the oil leakage.

NOTE:

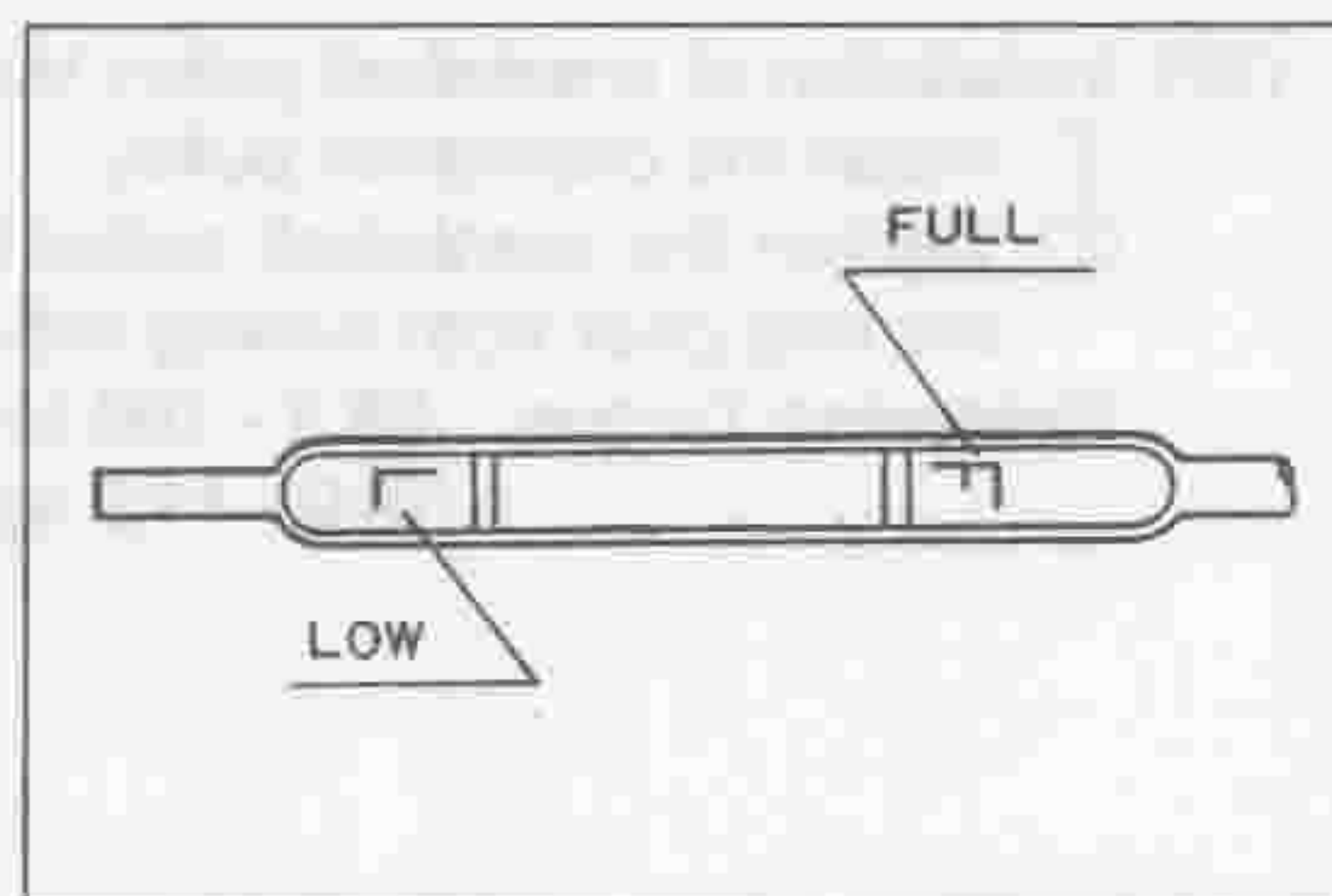
- The amount of oil between the "L" level and the "F" level equals to 0.8 liter.

- ⑥ Check the engine oil for deterioration, ingress of water, discoloring or dilution.

If oil quality is poor, change the engine oil.

(See procedure of change of engine oil and oil filter section.)

- ⑦ Reinsert the oil level gauge as far as it will go.



LEMA00087-00083

(2) Oil level check

- ① Park the vehicle on a level surface.
- ② Pull out the oil level gauge and wipe off the engine oil.
- ③ Reinsert the oil level gauge as far as it will go.
- ④ Pull out the oil level gauge again.
- ⑤ Ensure that the engine oil level should be between the "L" and "F" level on the dipstick.

If engine oil level is less than the "L" level check the oil leakage.

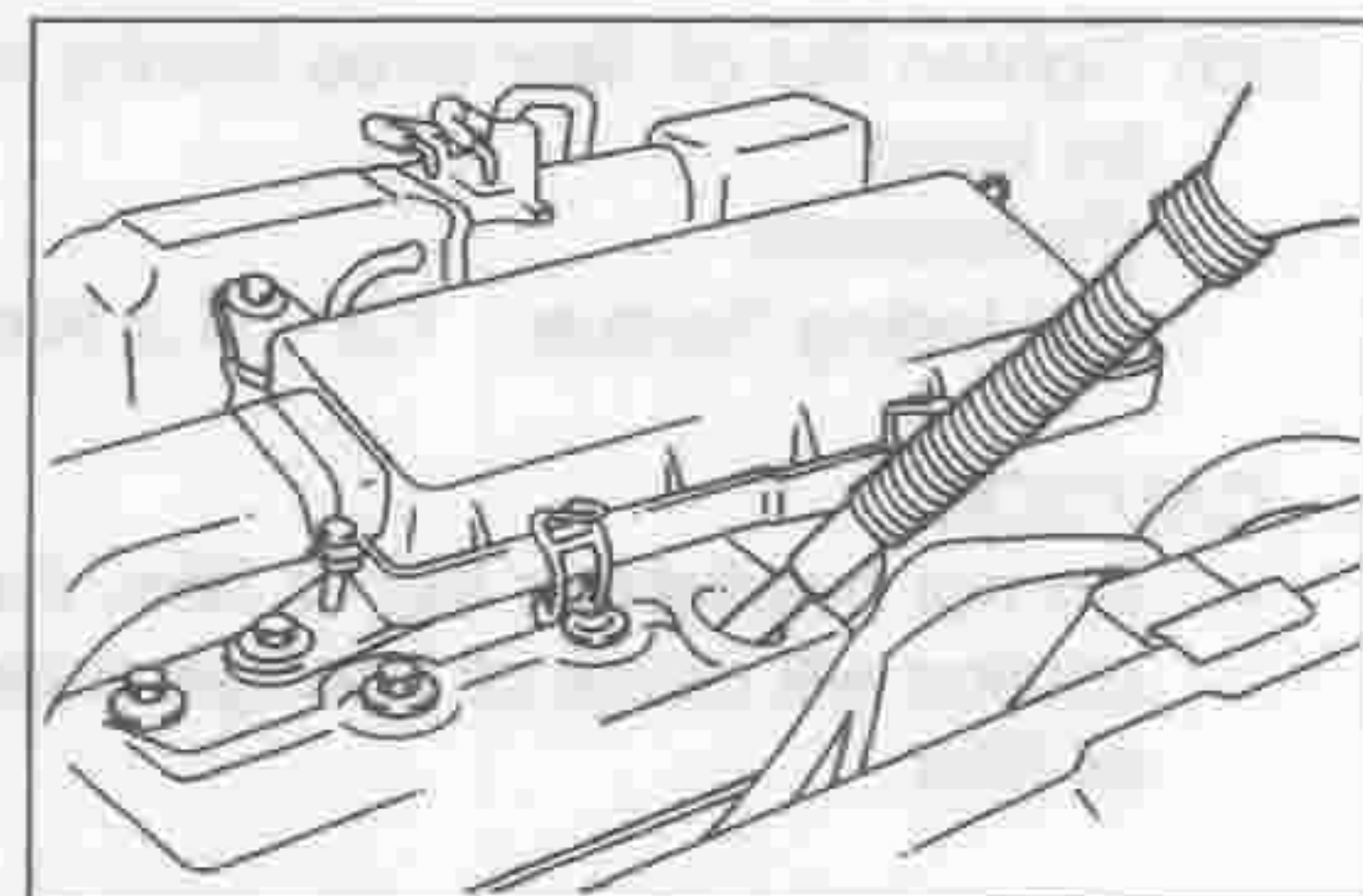
If engine oil level is less than the "L" level, replenish the specified engine oil to the "F" level after the checking of the oil leakage.

NOTE:

- Use API grade SE or higher multigrade viscosity, fuel-efficient oil. (See the procedure of change of engine oil and oil filter section.)
- The amount of oil between the "L" level and the "F" level equals to one liter.

LEMA00088-00000

- ⑥ Warm up the engine to normal operating temperature.
 - ⑦ Stop the engine.
 - ⑧ After few minutes, slowly pull out the oil level gauge and wipe off the engine oil.
 - ⑨ Reinsert the oil level gauge as far as it will go.
 - ⑩ Pull out the oil level gauge again and check the oil level if it is between "F" and "L" marks.
If the engine oil level is low, replenish the specified engine oil to the "F" level of the oil level gauge.
(See procedure under pour engine oil to the engine.)
 - ⑪ Reinsert the oil level gauge as far as it will go.
- (3) Inspection of engine oil leakage
- ① Check the oil level.
(See the inspection of the oil level.)
 - ② Start the engine.
 - ③ Ensure that the no oil leakage is present.
Repair or replace the defective part, if oil leakage is present.



LEMA00089-00084

2. Change of engine oil and oil filter

WARNING:

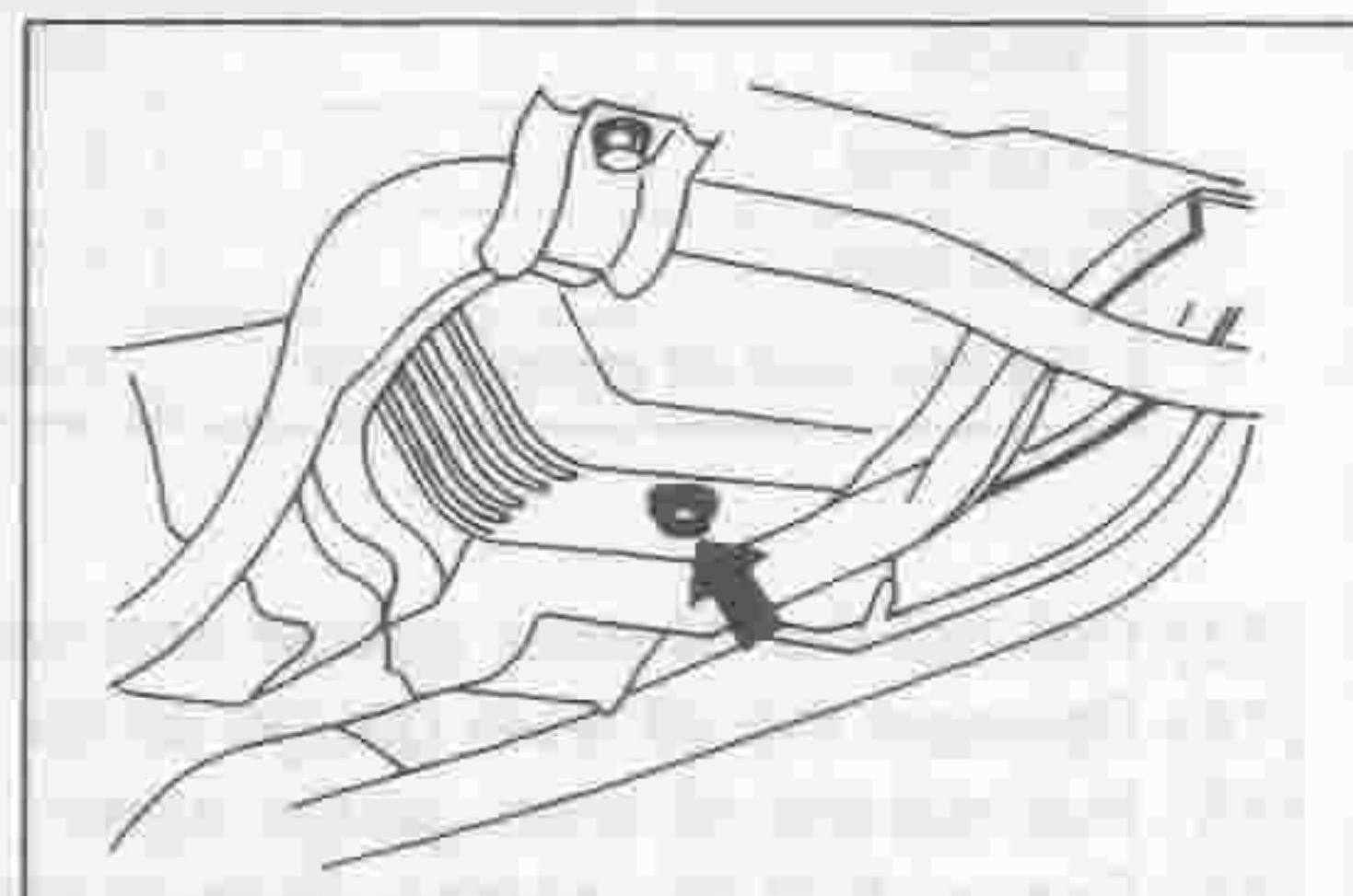
- Protect your eyes by wearing the safety glasses.
- Be very careful not to burn yourself with hot engine oil or hot engine components.

- (1) Warm up the engine to normal operating temperature.
- (2) Place a suitable container under the oil drain plug.
- (3) Remove the drain plug and gasket, and drain the engine oil into the placed container completely.
- (4) Place a suitable container under the oil filter.
- (5) Slacken the oil filter with an oil filter wrench.

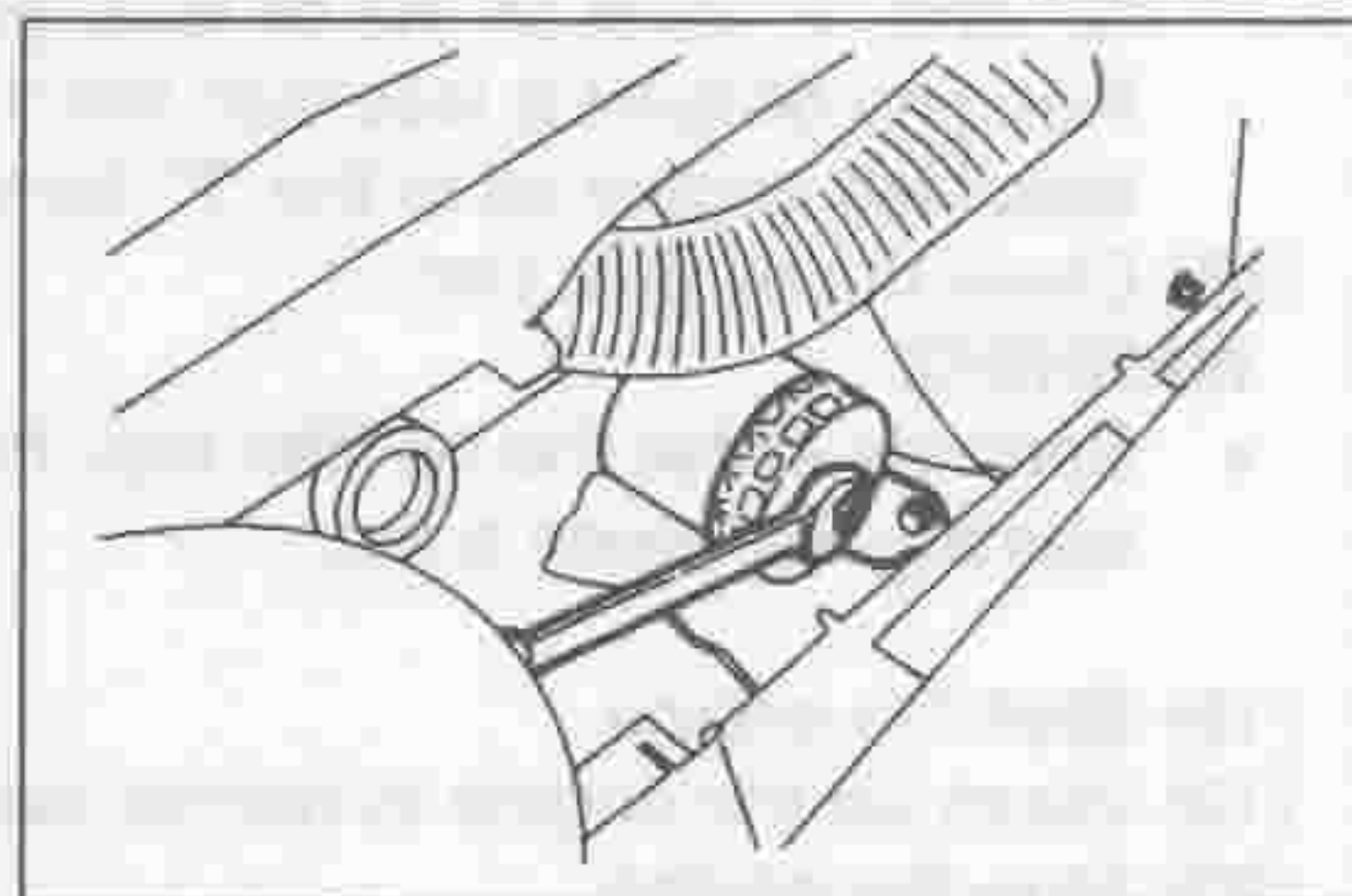
CAUTION:

- Be careful, at this time oil may flow out.

- (6) Remove the oil filter by hand.
- (7) Wipe off the engine oil from the oil filter attaching part of the engine.

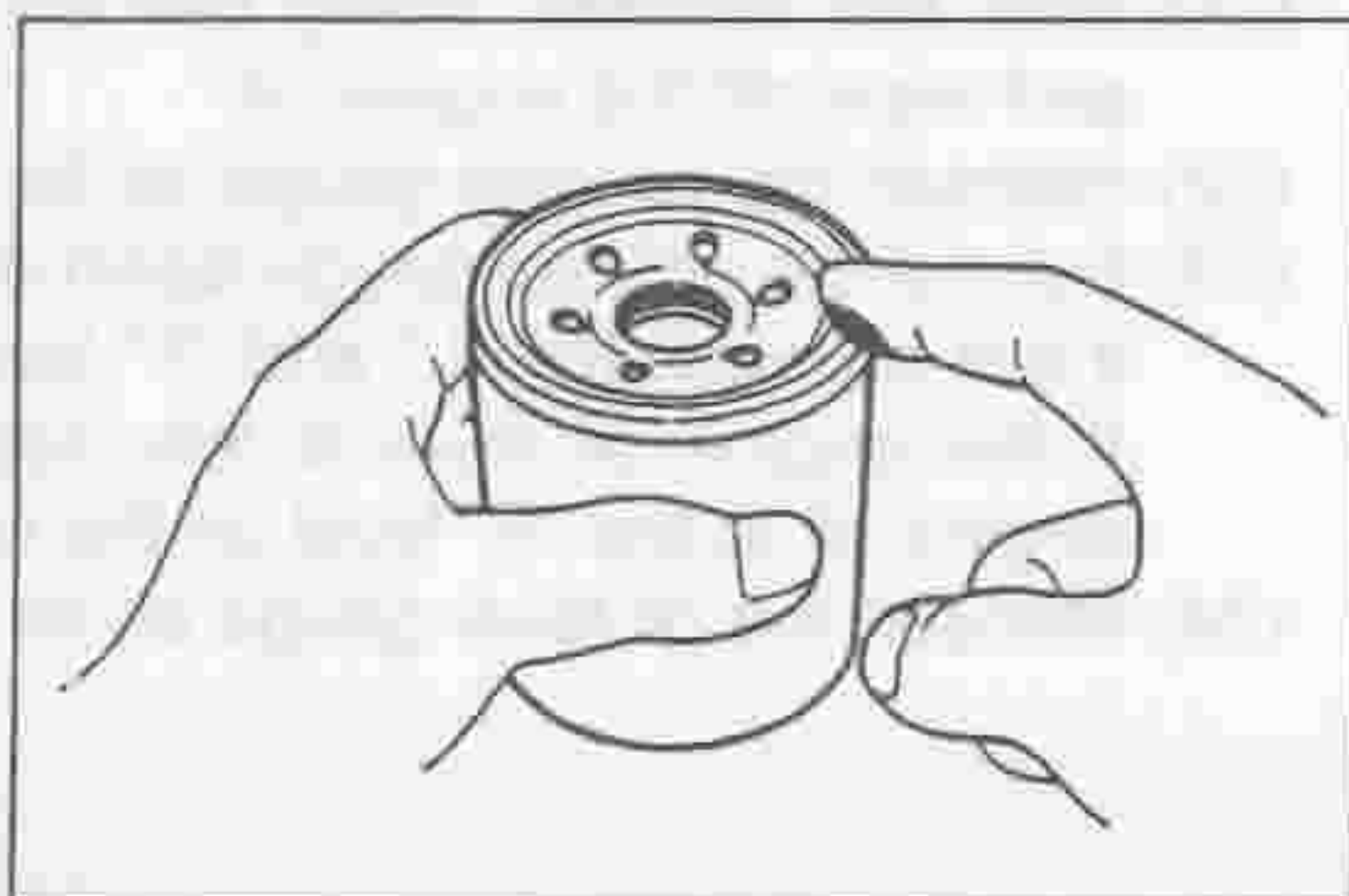


LEMA00090-00085



LEMA00091-00086

- (8) Thinly apply engine oil to the O-ring of the new oil filter.
- (9) Screw in the oil filter by hand, until the O-ring of the oil filter contacts the oil filter installing surface.



LEMA00092-00087

- (10) Tighten the oil filter three fourths to one complete turn, by hand.
(Reference)
Tightening Torque: 7.8 - 11.8 N·m (0.8 - 1.2 kgf-m)

CAUTION:

- Do not overtighten the oil filter. Failure to observe this caution will cause oil leakage or damage of oil pump or oil filter.

- (11) Tighten the drain plug to the specified torque with a new gasket interposed.
Tightening Torque: 19.6 - 29.4 N·m (2.0 - 3.0 kgf-m)

- (12) Pour engine oil to the engine.

NOTE:

- Use API grade SE or higher multigrade viscosity, fuel-efficient oil.
- The amount of oil between the "L" level and the "F" level equals to 0.8 liter.

Oil Capacity	Unit: Liter
Whole	2.6
Full level	2.2
Low level	1.4
Oil filter and oil replacement	2.48

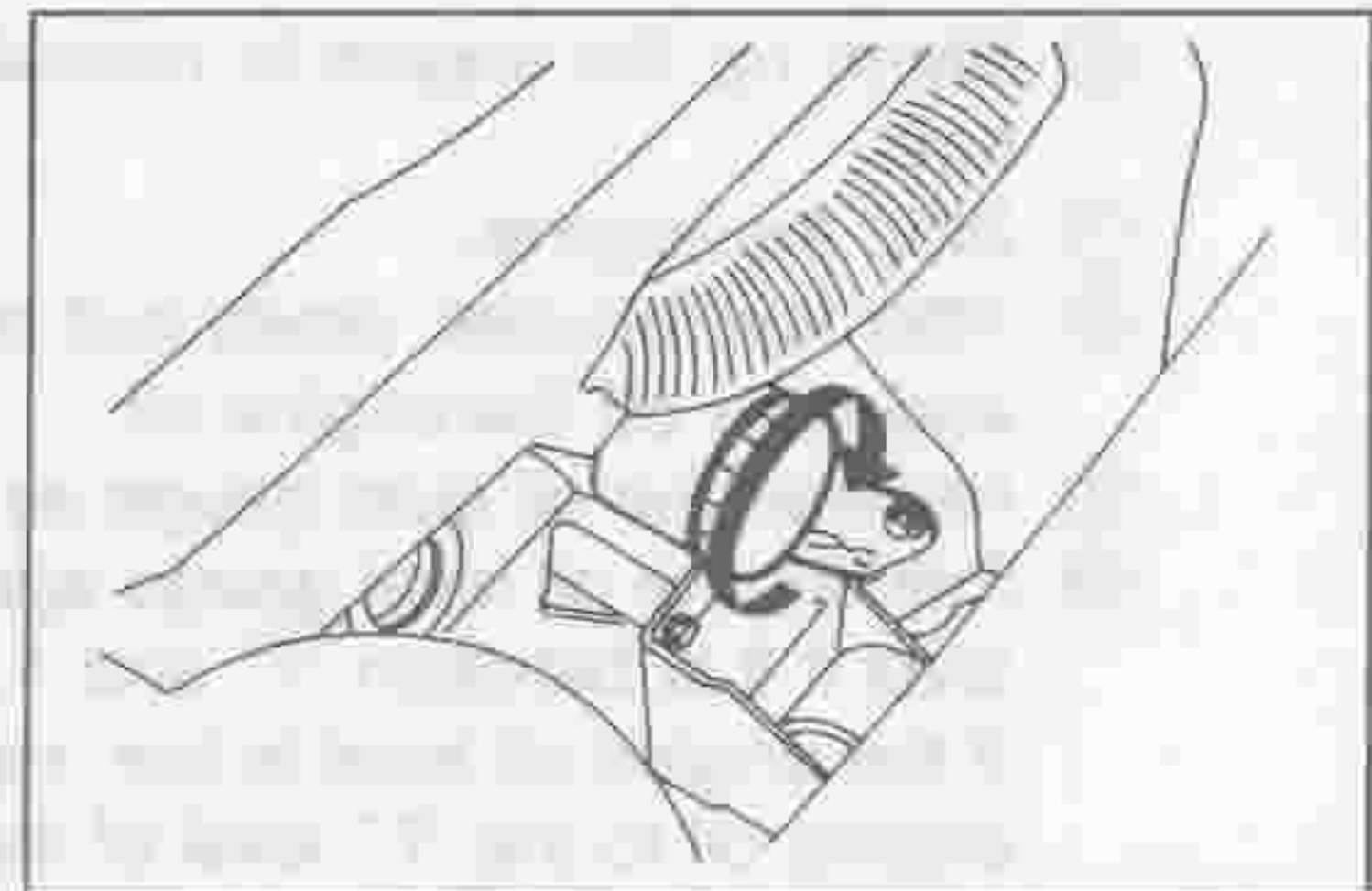
- (13) Pull out the oil level gauge and wipe off the engine oil.
(14) Reinsert the oil level gauge as far as it will go.
(15) Pull out the oil level gauge again.
(16) Ensure that the engine oil level should be between the "L" and "F" level on the oil level gauge.
If engine oil level is less than the "L" level, replenish the specified engine oil to the "F" level.

- (17) Close the oil filler cap.

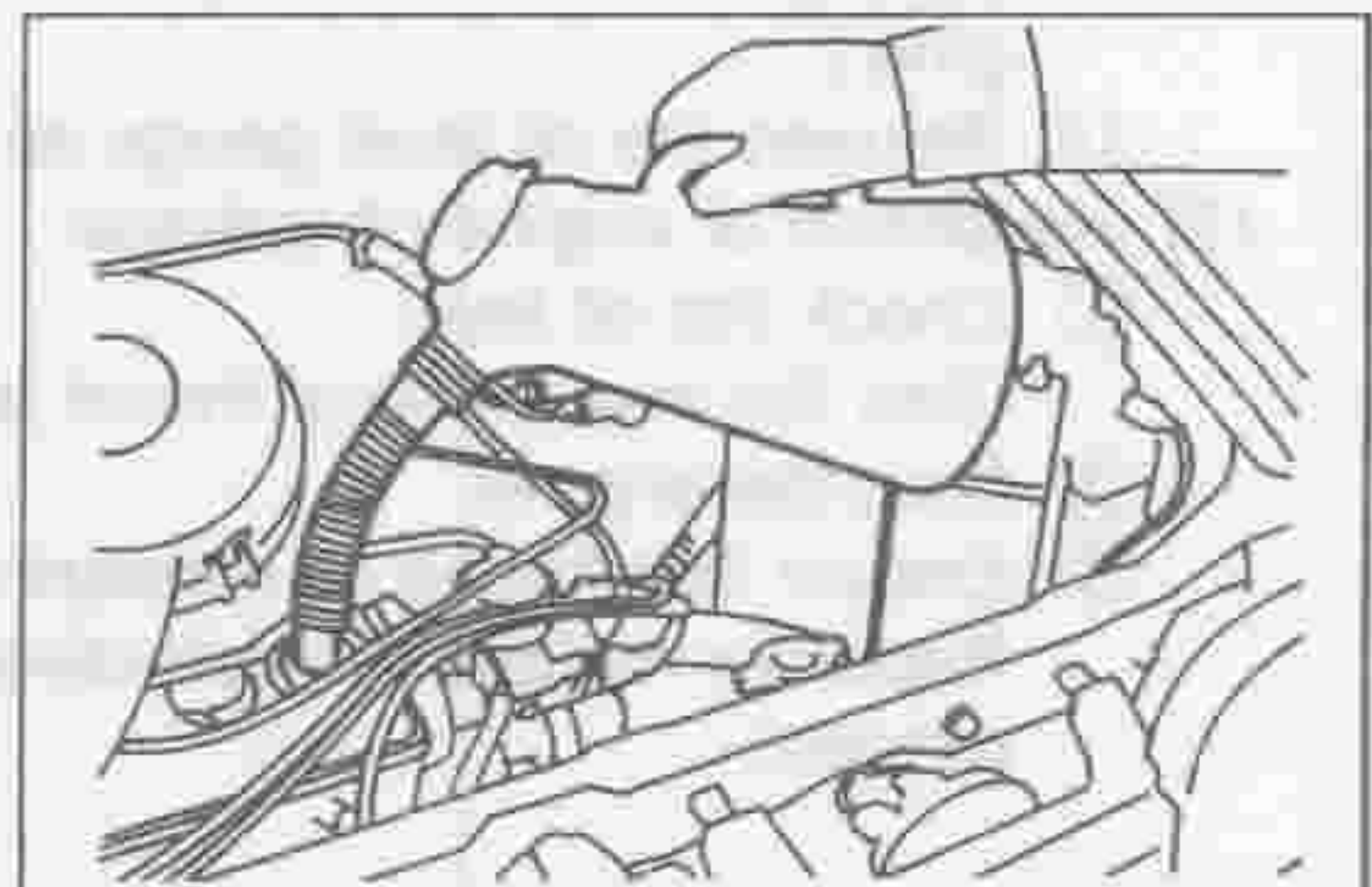
WARNING:

- Securely install the oil filler cap. Failure to observe this warning will cause a fire.

- (18) Start the engine.
(19) Warm up the engine to normal operating temperature.
(20) Stop the engine.
(21) After few minutes, slowly pull out the oil level gauge and wipe off the engine oil
(22) Reinsert the oil level gauge as far as it will go.
(23) Pull out the oil level gauge again and check the oil level if it is between the "L" and "F" level.
If the engine oil level is low, replenish the specified engine oil to the "F" level on the oil level gauge.
(24) Reinsert the oil level gauge as far as it will go.



LEMA00093-00088



LEMA00094-00089

Engine lubrication

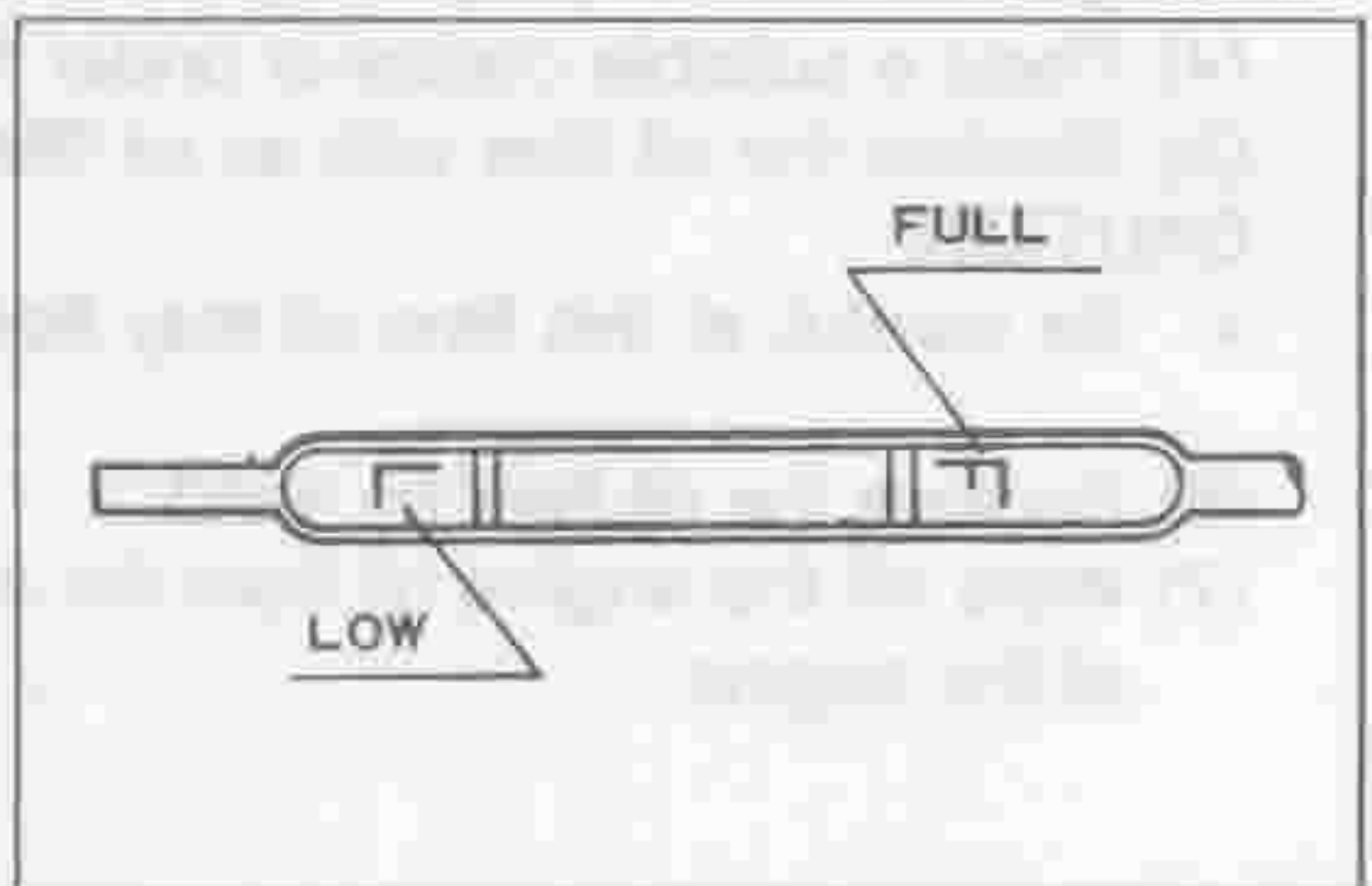
Classification

API SE or higher multigrade viscosity

TEMP °C (°F)	-25 (-10)	-18 (-10)	-7 (20)	4 (40)	16 (60)	27 (80)	38 (100)
Viscosity	10W-30, 10W-40, 10W-50, 20W-40, 30W-50						
	3W-30			30			
				20			

Atmosphere temperature range anticipated before next oil change

LEMA00095-00090



LEMA00096-00091

3. Inspection of engine starting and abnormal noise.

- (1) Ensure that the engine can start smoothly without any abnormal noise.
- (2) Ensure that the engine cannot start with the shift lever placed other than the Neutral or Parking range if vehicles equipped with the automatic transmission.

LEMA00096-00000

4. Inspection of spark plug

- (1) Carefully remove the resistive cords from the spark plugs by holding their rubber boots.
- (2) Inspection of electrode
 - ① When a megger (Insulation resistance meter) is used:
Measure the insulation resistance of the spark plug.
Minimum Insulation Resistance: 15 MΩ

If the measured insulation resistance is less than specified, proceed to the step (3).

- ② When a megger is not available:
 - 1 Start the engine. Warm up the engine completely.
 - 2 Race the engine at 4000 rpm for five seconds.
 - 3 Remove the spark plug.

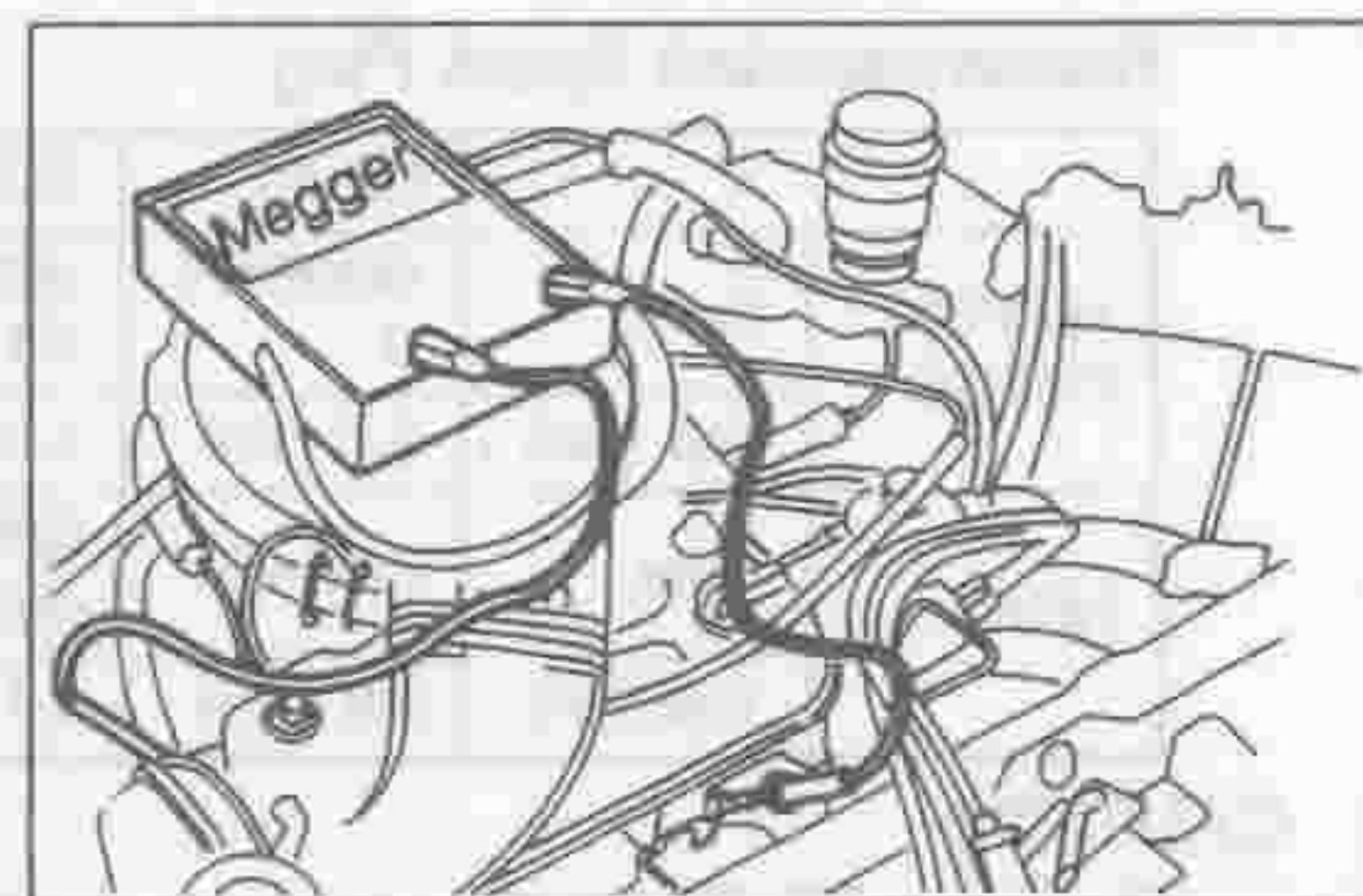
WARNING:

- Since the spark plugs are hot, care must be exercised to avoid getting scalded.

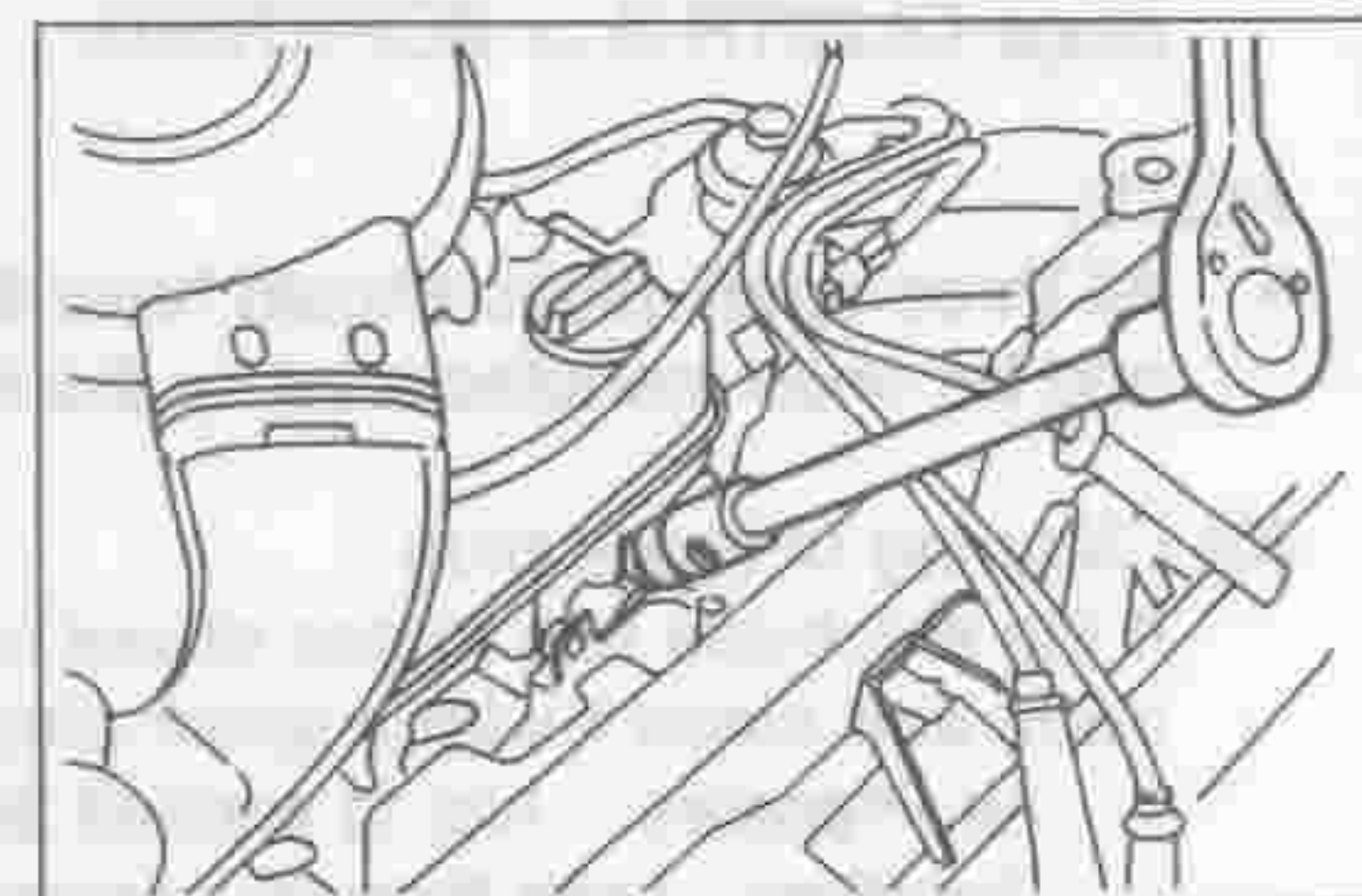
- 4 Visually inspect the spark plug.
If the electrode is dry: Satisfactory
If the electrode is wet: Proceed to the step (5).

- (3) Remove the spark plug.

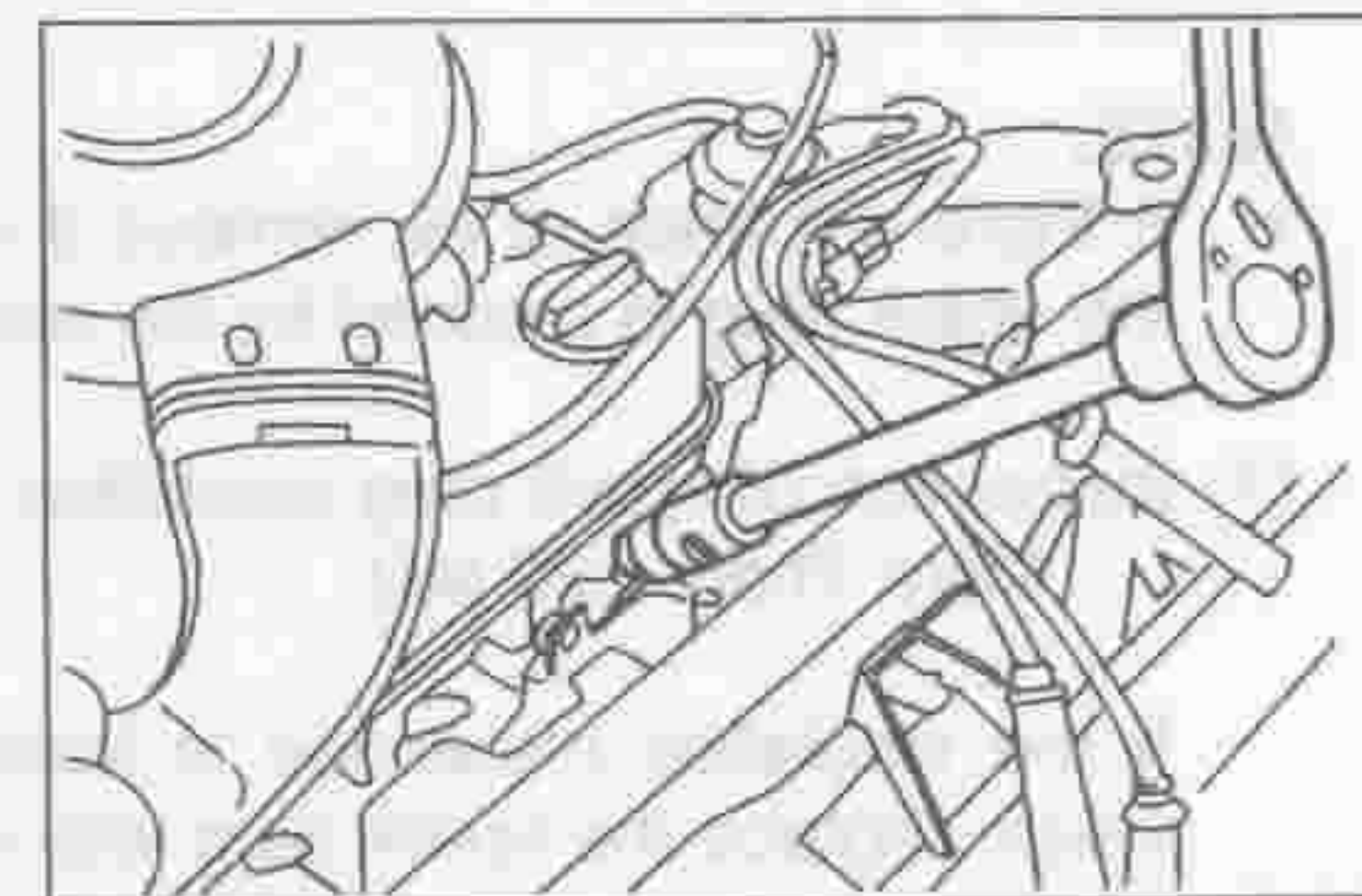
- (4) Visual inspection of spark plug
Visually inspect the spark plug for electrode wear, thread or insulator damage.
Replace the spark plug if it exhibits damage.



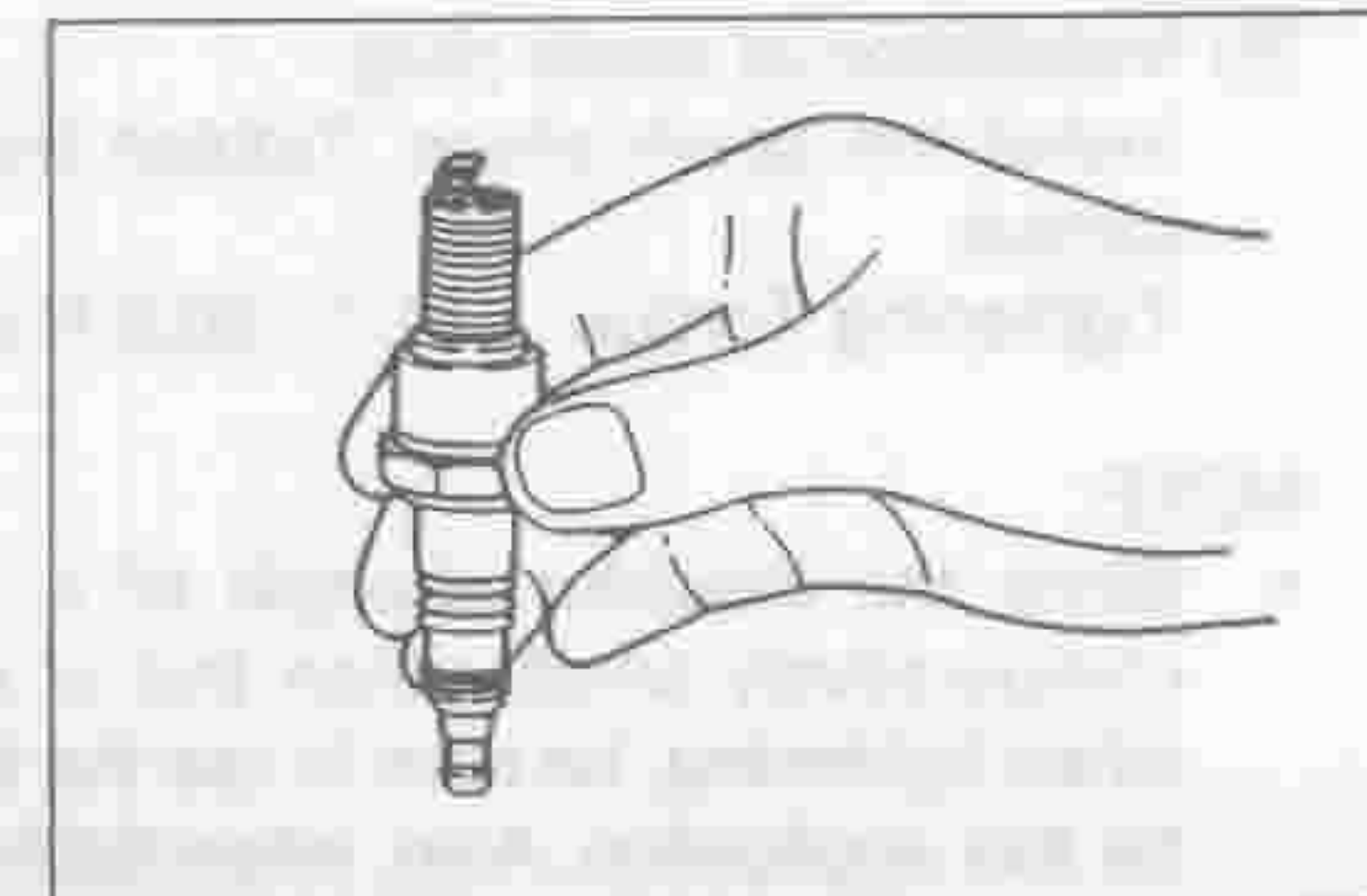
LEMA00097-00092



LEMA00098-00094



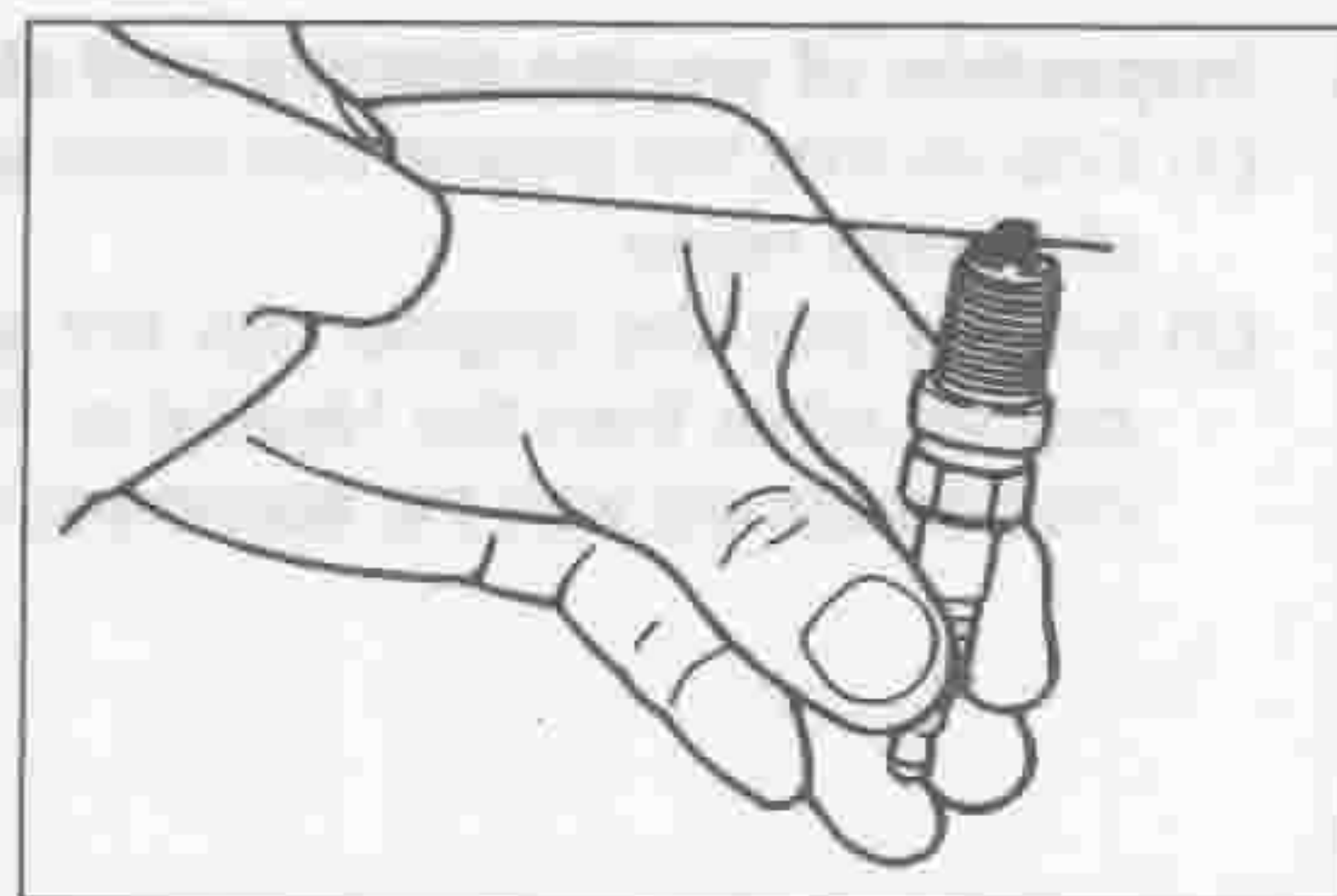
LEMA00099-00094



LEMA00100-00095

(5) Inspection of electrode gap

Measure the electrode gap, using a plug gap gauge. If the electrode gap of a used spark plug is not within the specification, replace the spark plug with a new one. If the electrode gap of a new spark plug is not within the specification, adjust the gap by bending the base of the ground electrode, being careful not to touch the center electrode.



LEMA00101-00096

Recommended Spark Plug

		ED-10	ED-20	EF-EL
NIPPON DENSO	Type	W20EXR-U	W20EXR-U11	QL22TR-S
	Gap (mm)	0.7 - 0.8	1.0 - 1.1	0.9 - 1.0
NGK	Type	BPR-6EY	BPR6EY (6ES)-11	BCPR7EK D
	Gap (mm)	0.8 - 0.9	1.1 - 1.2	0.9 - 1.0

CAUTION:

- On Type EF-EL engine, be sure to install either the spark plugs QL22TR-S or BCPR7EKD.

NOTE:

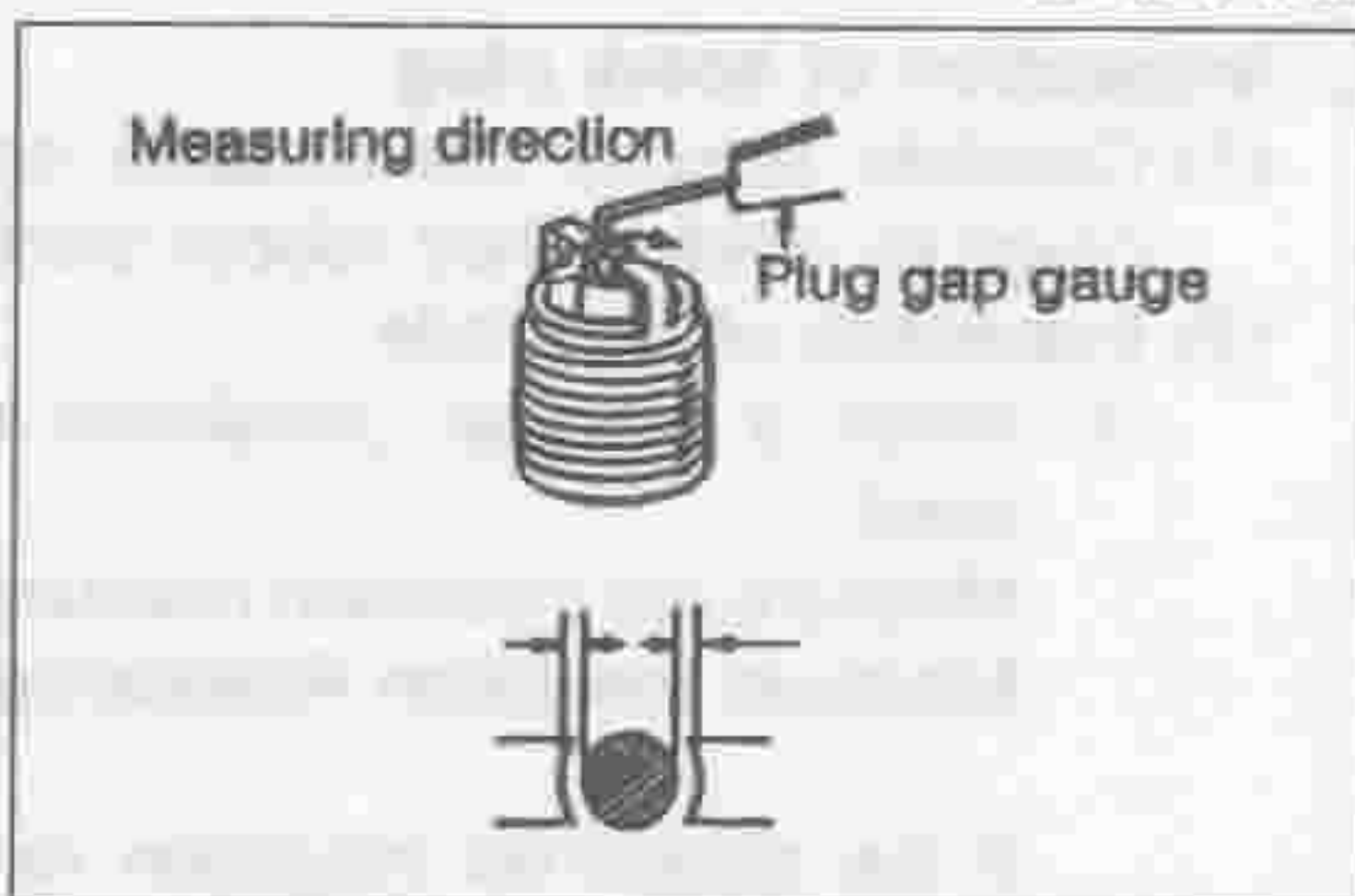
- All three spark plugs should have the same heat range and be ones manufactured by the same manufacturer.

(6) Cleaning of spark plug

If the electrode has traces of wet carbon, dry the electrode and clean it with a spark plug cleaner.

Air Pressure: Not to exceed 588 kPa (6 kgf/cm²)

Duration: Less than 20 seconds



LEMA00102-00097



LEMA00103-00098

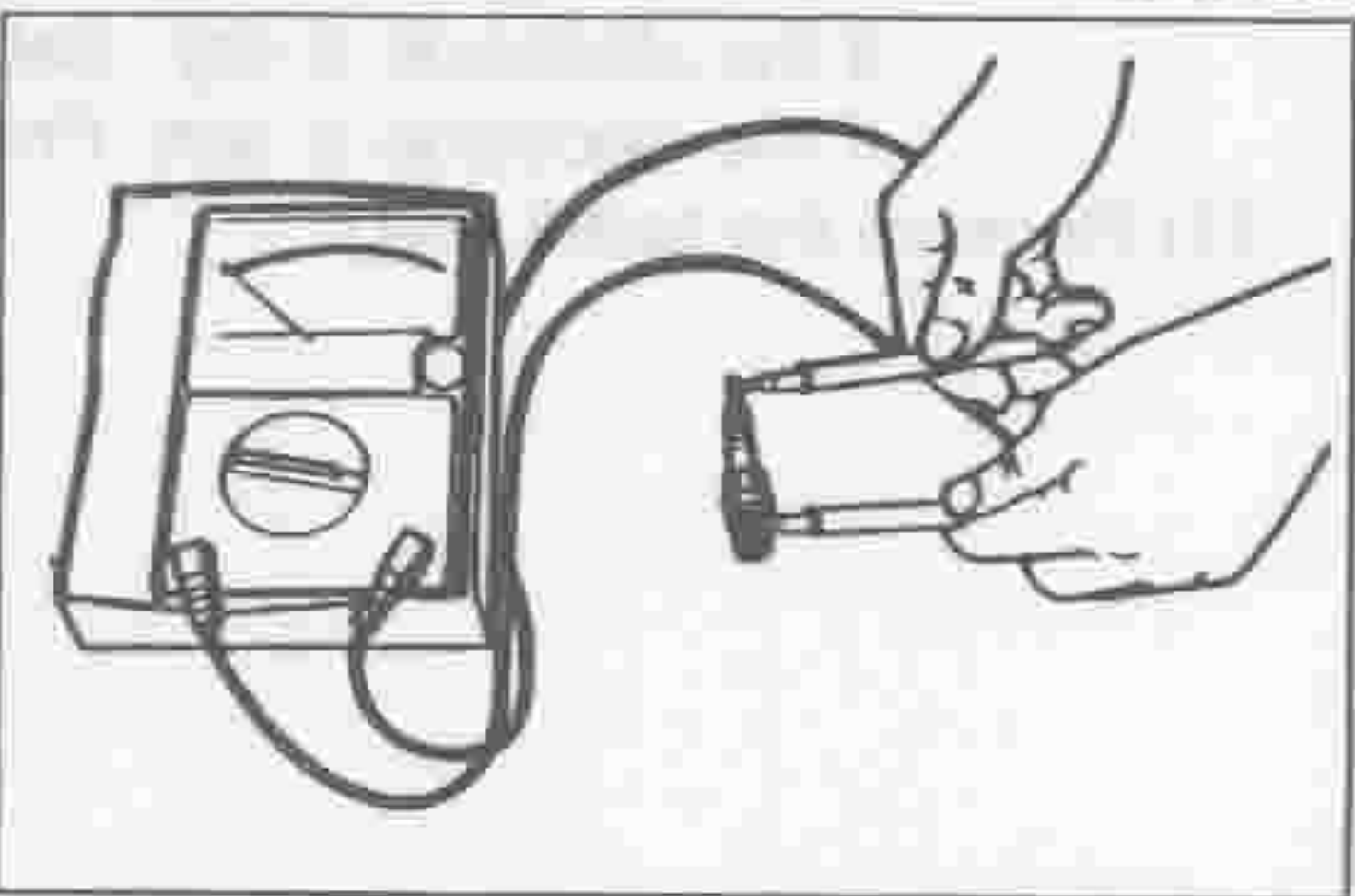
NOTE:

- If there are trace of oil, remove it with gasoline before the spark plug is cleaned by the spark plug cleaner.

(7) Inspection of spark plug insulation resistance

More Than: 20 MΩ

If the insulation resistance is less than the specified value, replace the spark plug with a new one.



LEMA00104-00099

(8) Installation of spark plug

Install the spark plugs. Tighten them to the specified torque.

Tightening Torque: 14.7 - 20.6 N·m (1.5 - 2.1 kgf·m)

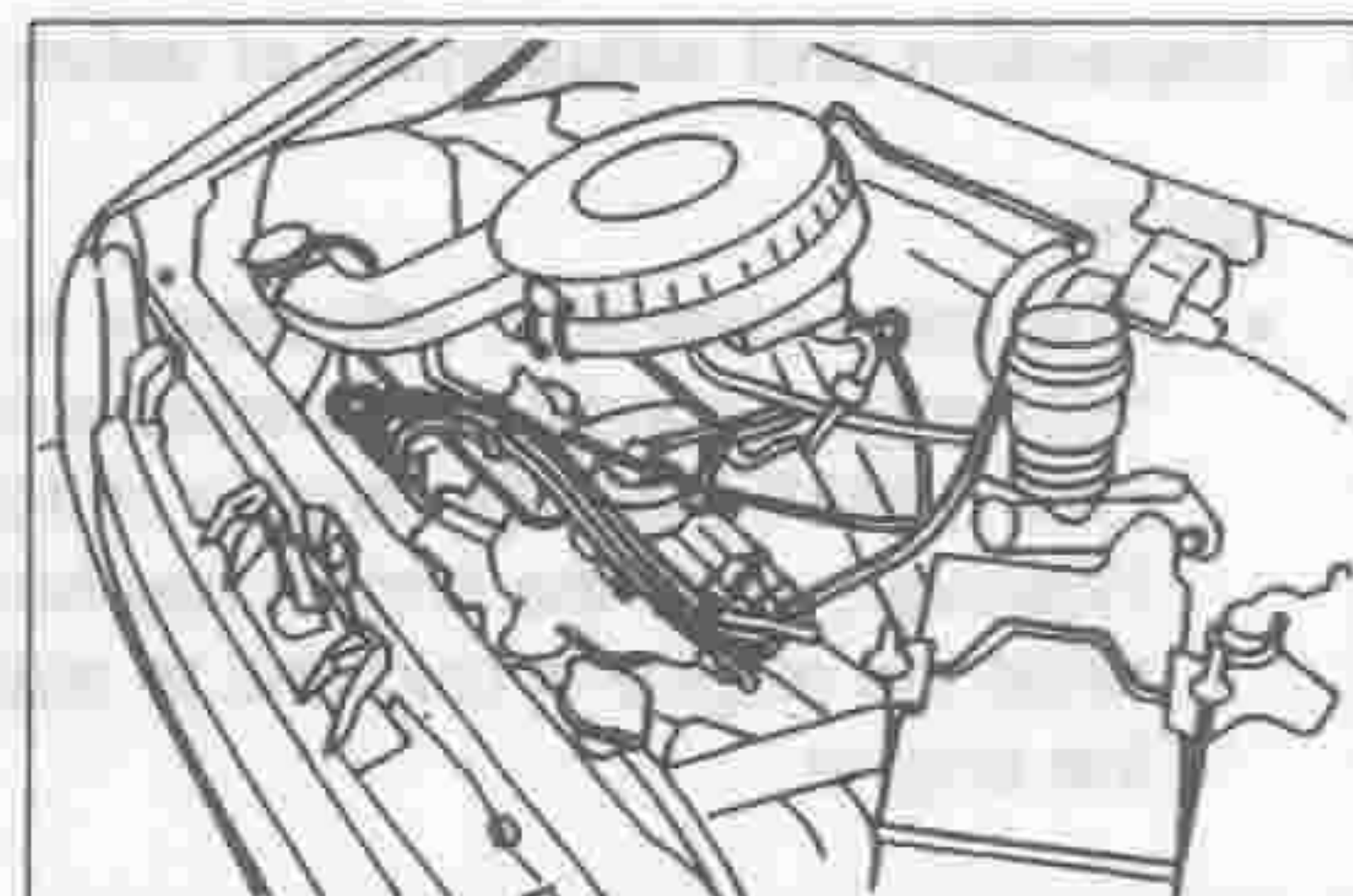
NOTE:

- Since the insulator strength of a small spark plug is comparatively smaller than that of regular spark plugs, when tightening, be sure to use the tool exclusively used for this application. Also, when tightening, never use the wrench in a crooked way.



LEMA00105-00100

- (9) Connect the resistive cords to the spark plug.



LEMA00106-00101

5. Inspection of distributor cap and rotor

- (1) Ensure that the ignition switch is turned OFF.
(2) Disconnect the resistive cords from the distributor cap.

NOTE:

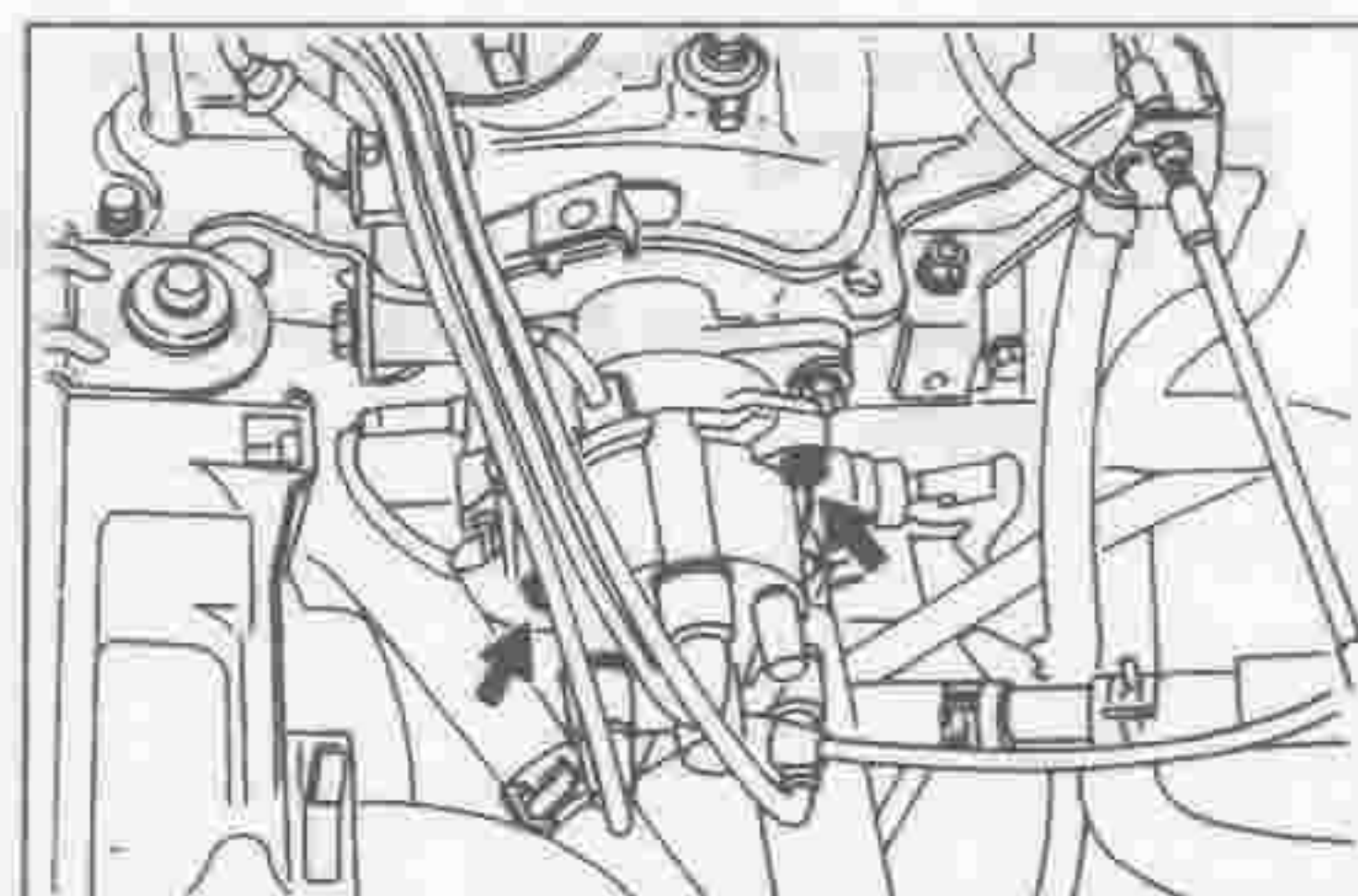
- Do not hold the wire section of the resistive cord during the disconnection, be sure to disconnect the resistive cord by holding the grommet section of the resistive cord.

- (3) Remove the distributor cap by removing the attaching bolts of the distributor cap.
(4) Ensure that the distributor cap have no cracks or any other damage.
(5) Ensure that the center carbon has no noticeably wear. If the excessive wear is found replace the center carbon.

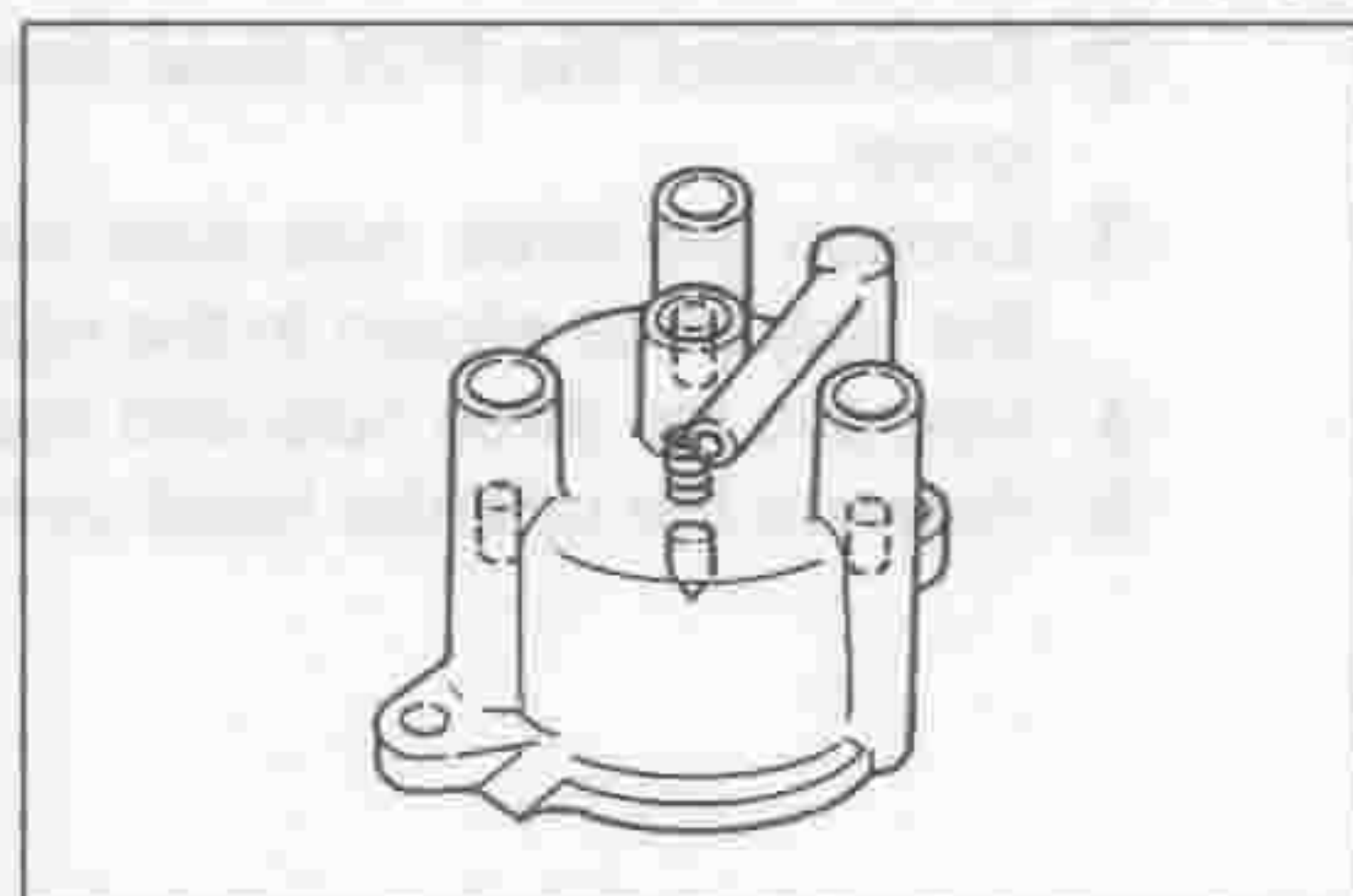
NOTE:

- Replacement should be performed with rotor and center carbon as a set.

- (6) Ensure that the electrode has no excessive electrical corrosion.
If excessive electrical corrosion is found remove it by the baking soda water. Do not remove it by screw driver or the like.



LEMA00107-00102

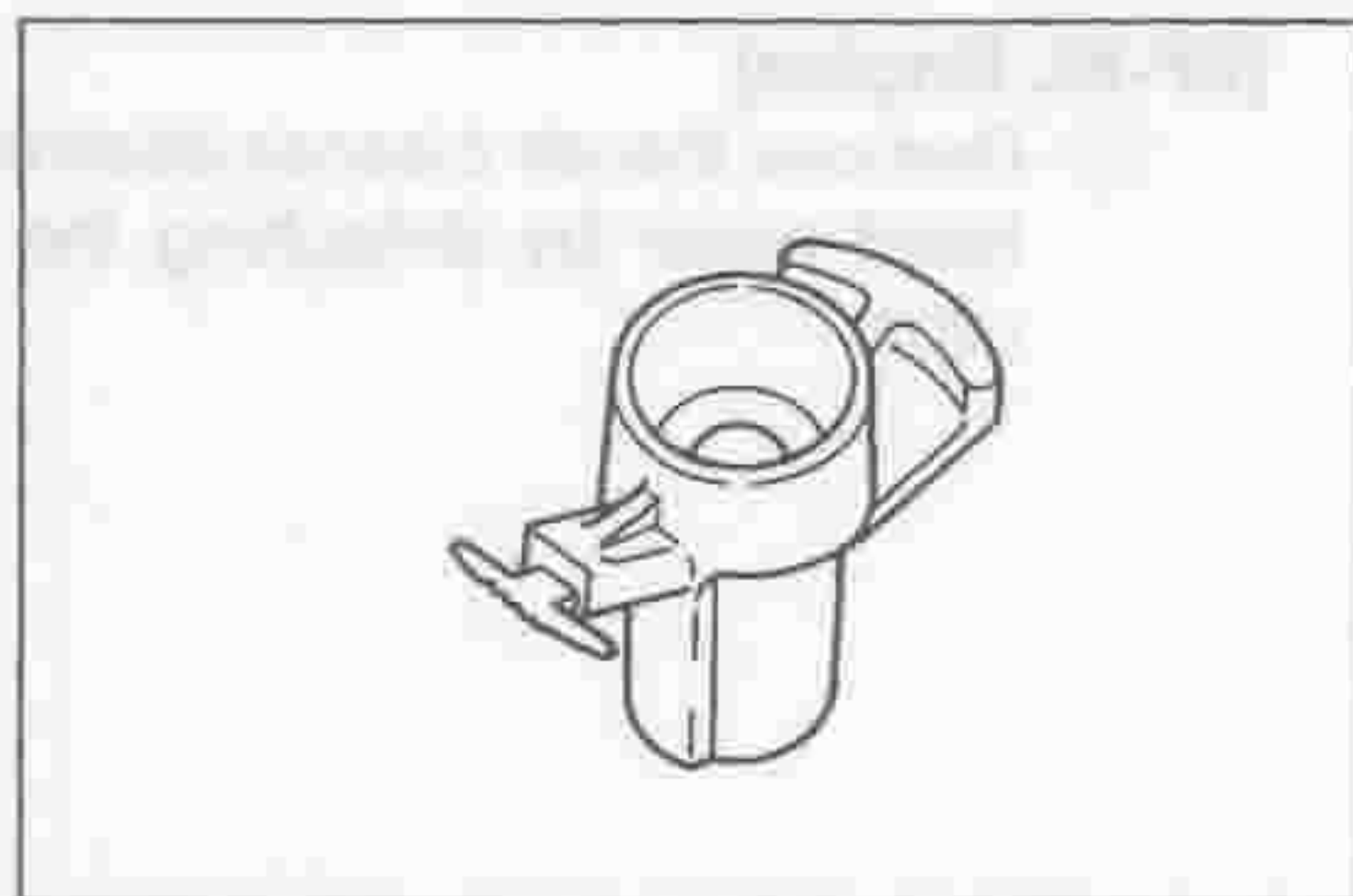


LEMA00108-00103

- (7) Remove the distributor rotor by pull it out.
(8) Ensure that the distributor rotor has no cracks or other damage.
If damage is found replace the rotor with a new one.

NOTE:

- Replacement should be performed with rotor and center carbon as a set.



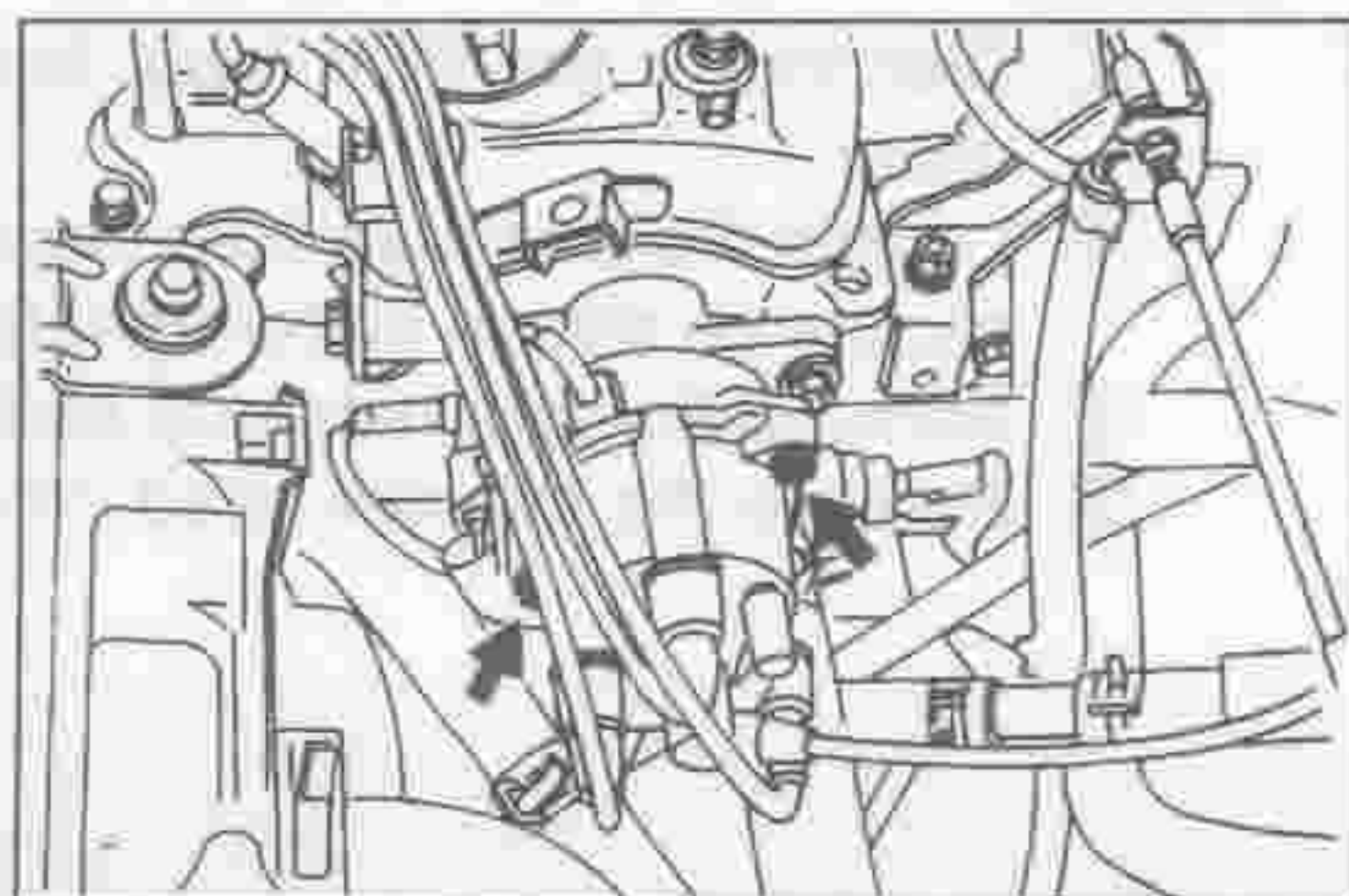
LEMA00109-00104

- (9) Ensure that the electrode has no corrosion.
If corrosion is found, remove the electrical corrosion by baking soda water.

NOTE:

- Do not remove the electrical corrosion by file or hard material made tools.

- (10) Install the distributor rotor to the distributor securely.
(11) Replace the distributor cap gasket with a new one.
(12) Install the distributor cap to the distributor.
(13) Connect the resistive cords to the distributor cap.



LEMA00110-00105

6. Inspection and adjustment of valve clearances

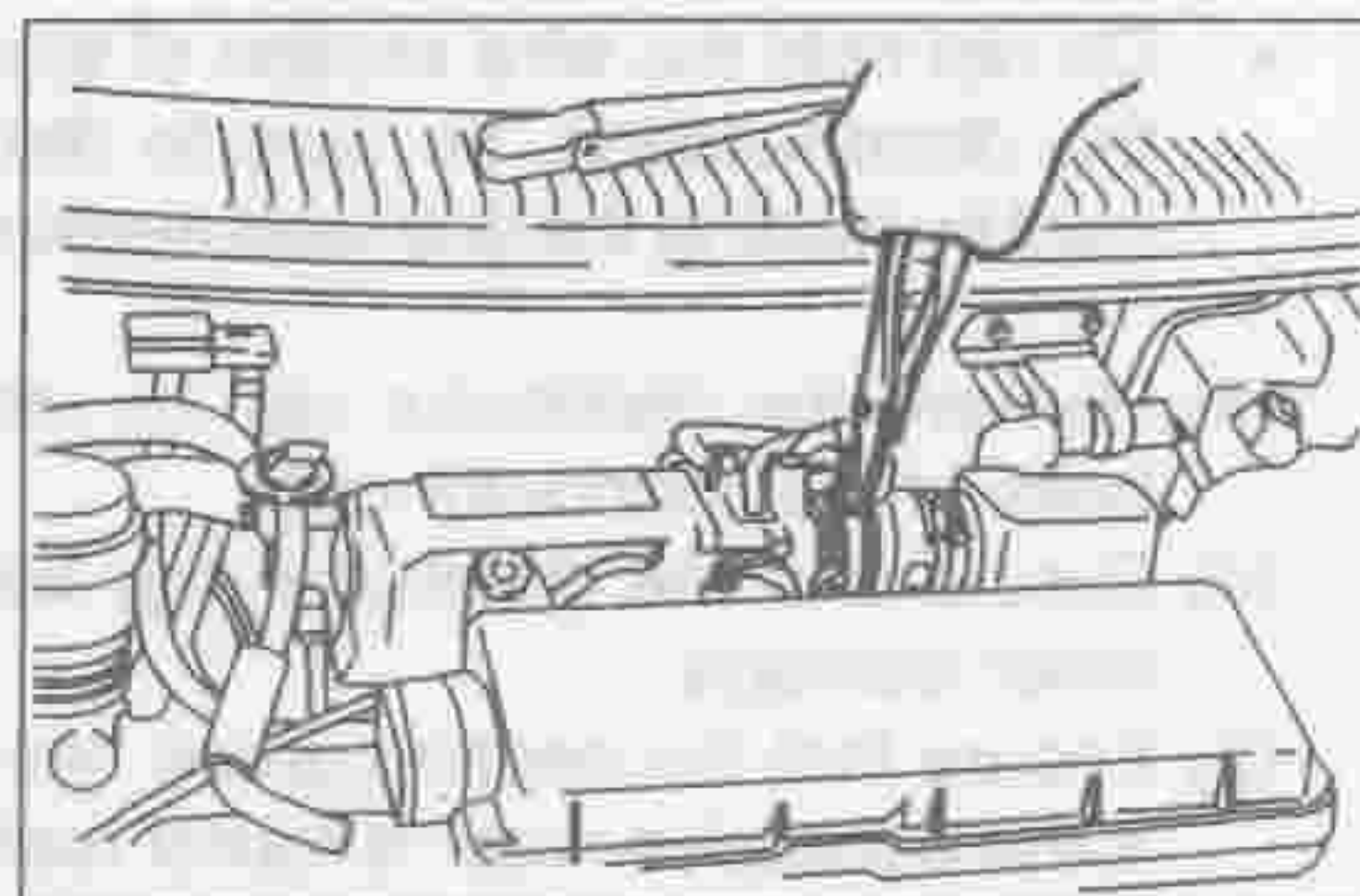
NOTE:

- The valve clearance adjustment is performed normally when the engine is in a hot condition. "Hot engine condition" denotes a condition in which the cooling water temperature is 75 - 85°C (167 - 185°F) and the engine oil temperature is above 65°C (149°F). However, when the engine has been overhauled, it is necessary to adjust the valve clearances while the engine is cold and to readjust the valve clearance in a hot condition after warming up the engine.

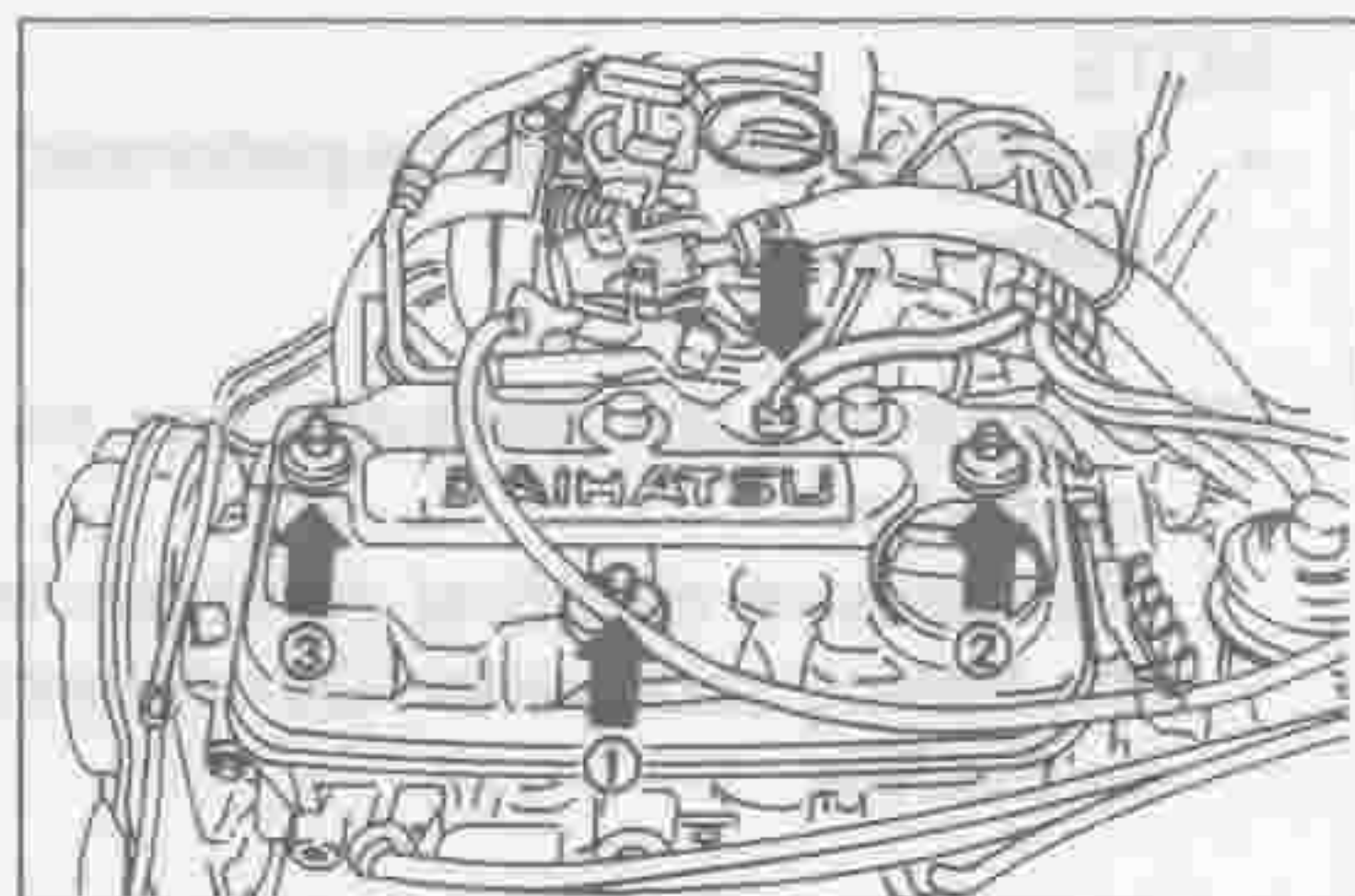
LEMA00111-00000

(1) Removal of cylinder head cover [ED-20 Engine]

- Remove the air cleaner assembly from the cylinder head cover by detaching the three bolts and two clips.
- Disconnect the PCV hose from the cylinder head cover.
- Loosen the three nuts over two or three stages in the sequence shown in the right figure.
- Remove the three nuts and seal washers.
- Remove the cylinder head cover.



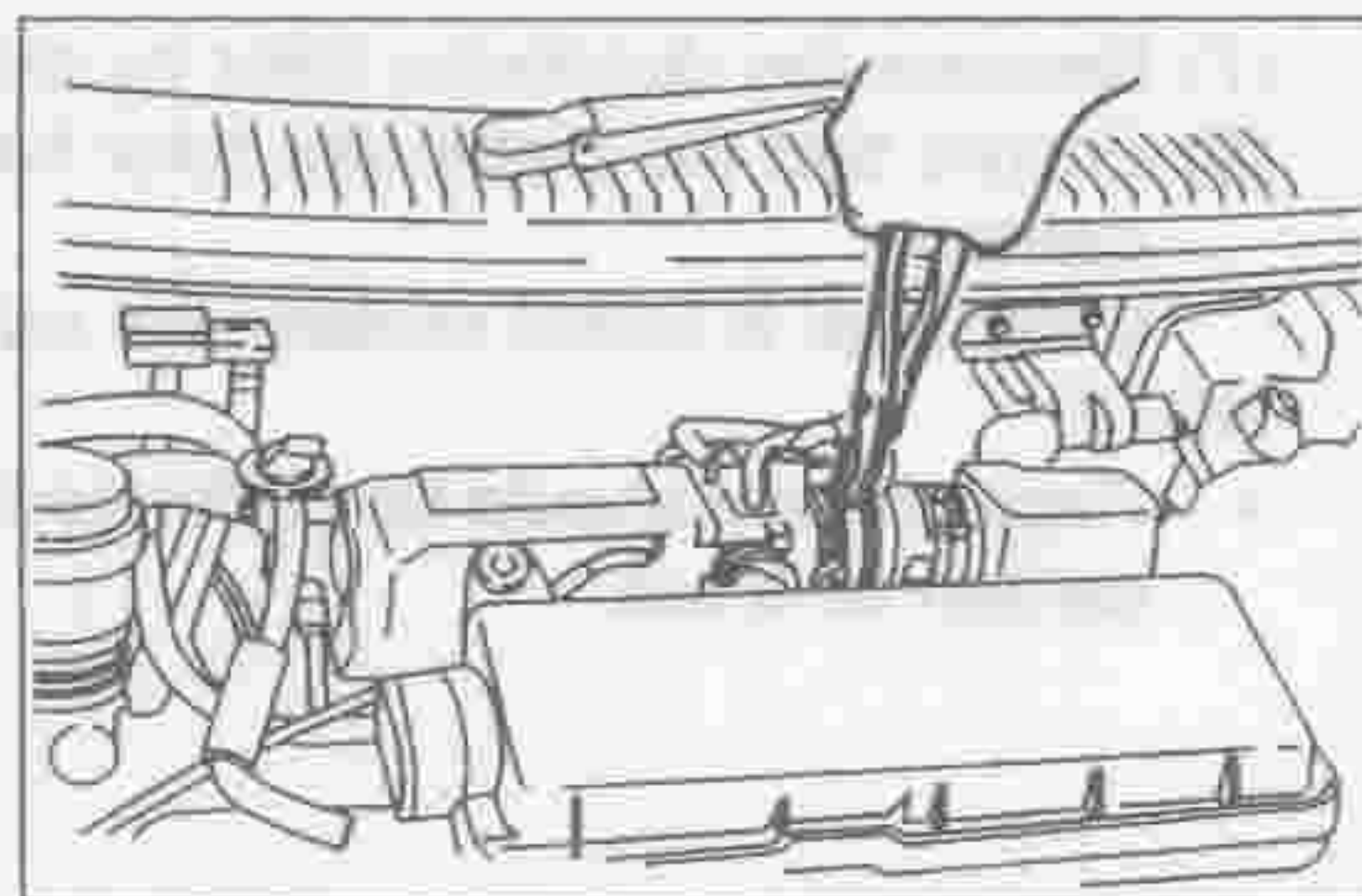
LEMA00112-00106



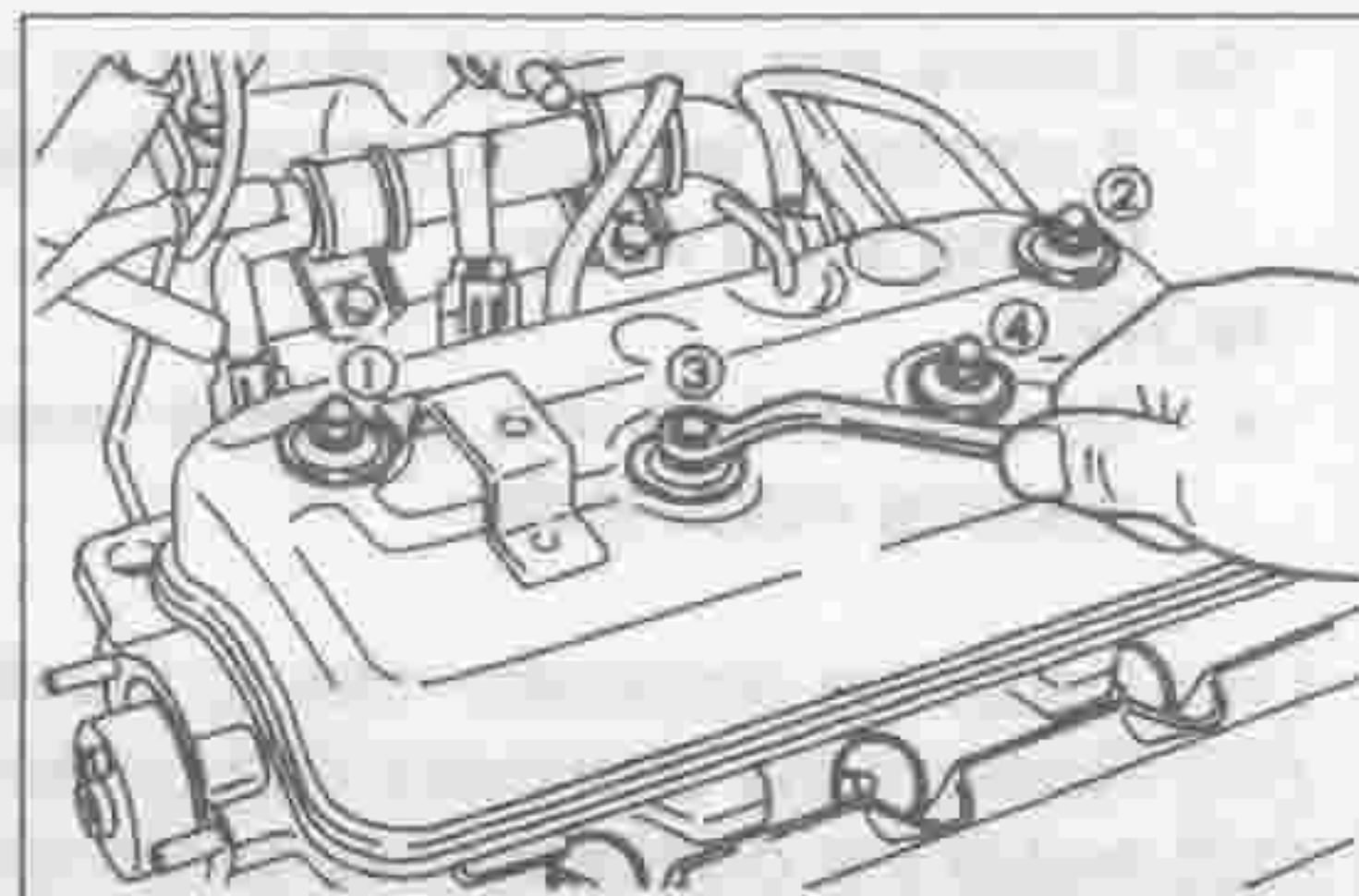
LEMA00113-00107

[EF-EL Engine]

- Remove the air cleaner assembly from the cylinder head cover by detaching the three bolts and two clips.
- Disconnect the PCV hose from the cylinder head cover.
- Loosen the four nuts over two or three stages in the sequence shown in the right figure.
- Remove the four nuts and seal washers.
- Remove the cylinder head cover.



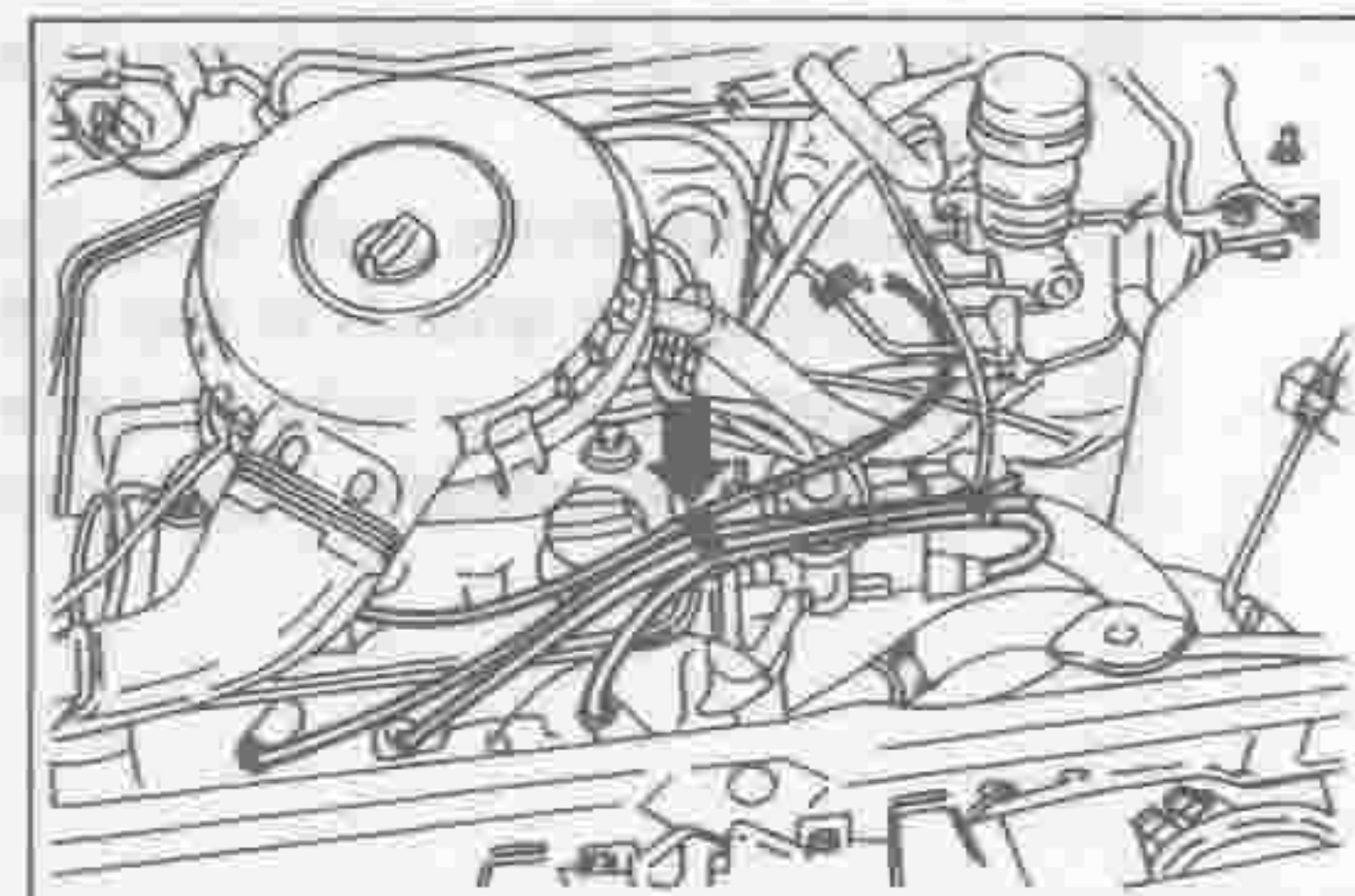
LEMA00114-00108



LEMA00115-00109

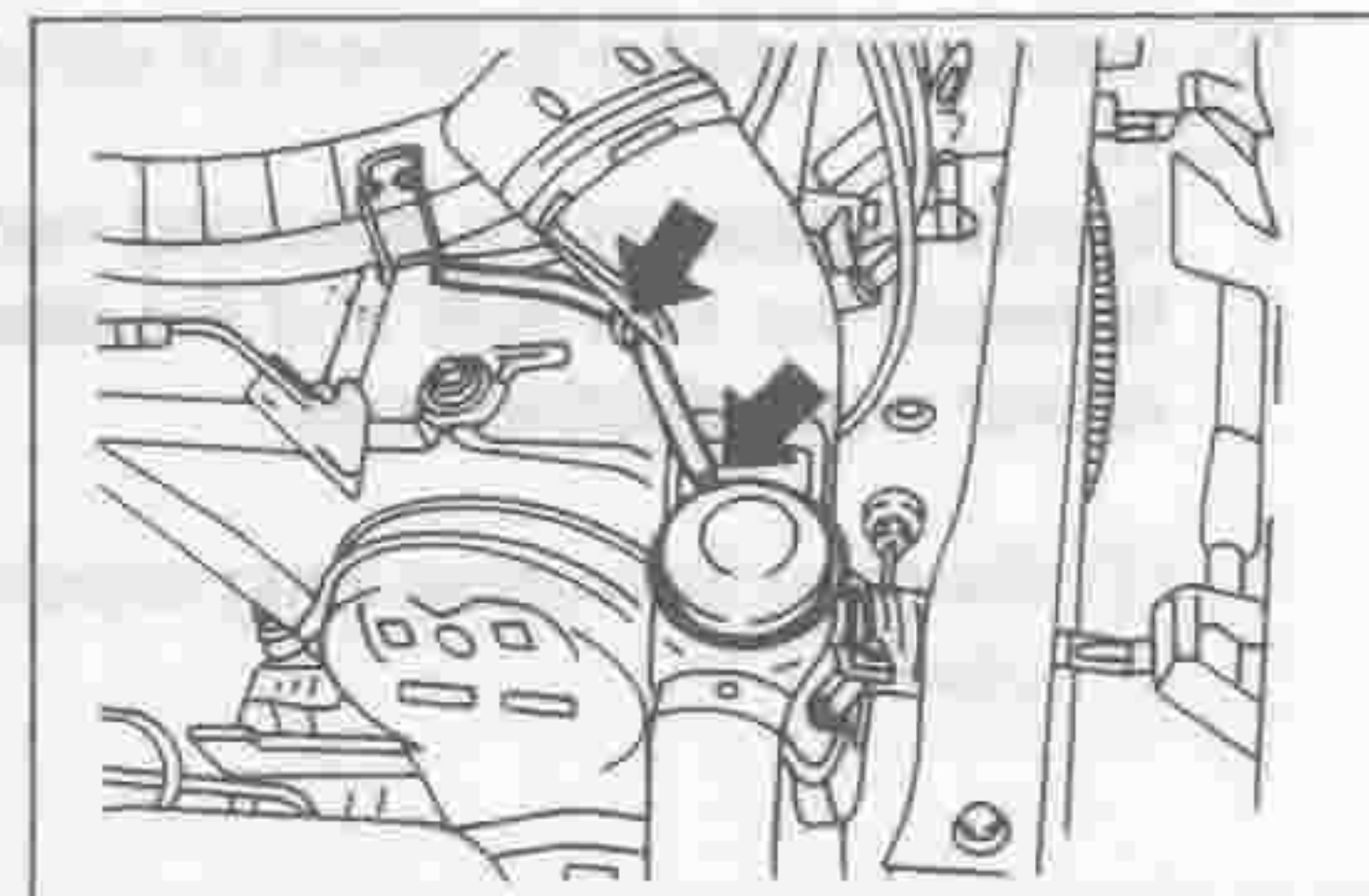
[ED-10 Engine]

- ① Detach the resistive cords and choke cable or accelerator cable from the clamps.



LEMA00116-00110

- ② Disconnect the vacuum hose from the vacuum motor and hose clamp.



LEMA00117-00111

- ③ Disconnect the cool air intake hose from the air cleaner.

NOTE:

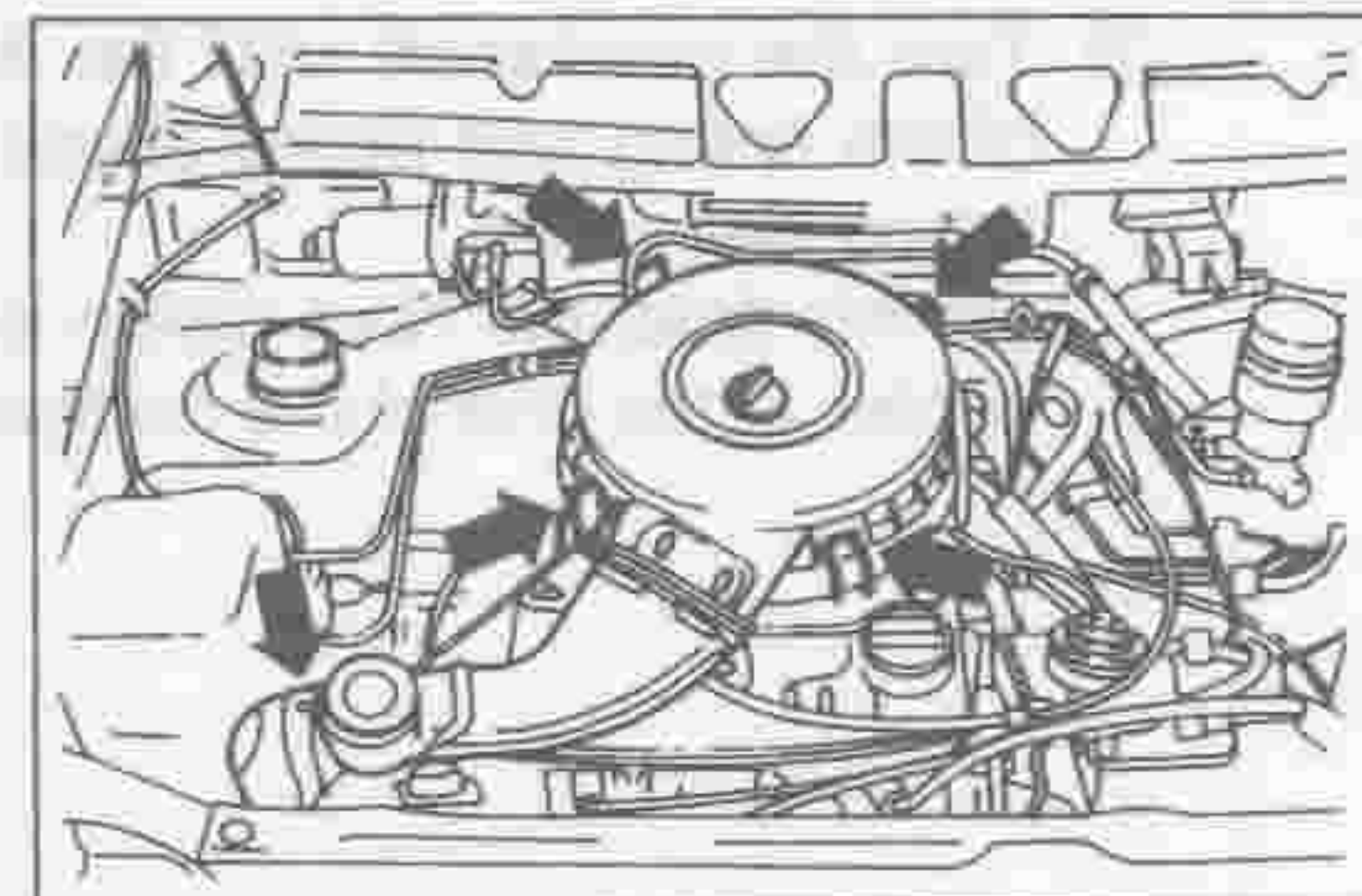
- Be very careful not to damage the cool air intake hose.

- ④ Remove the wing bolt and detach the clamps.

- ⑤ Remove the air cleaner cap.

NOTE:

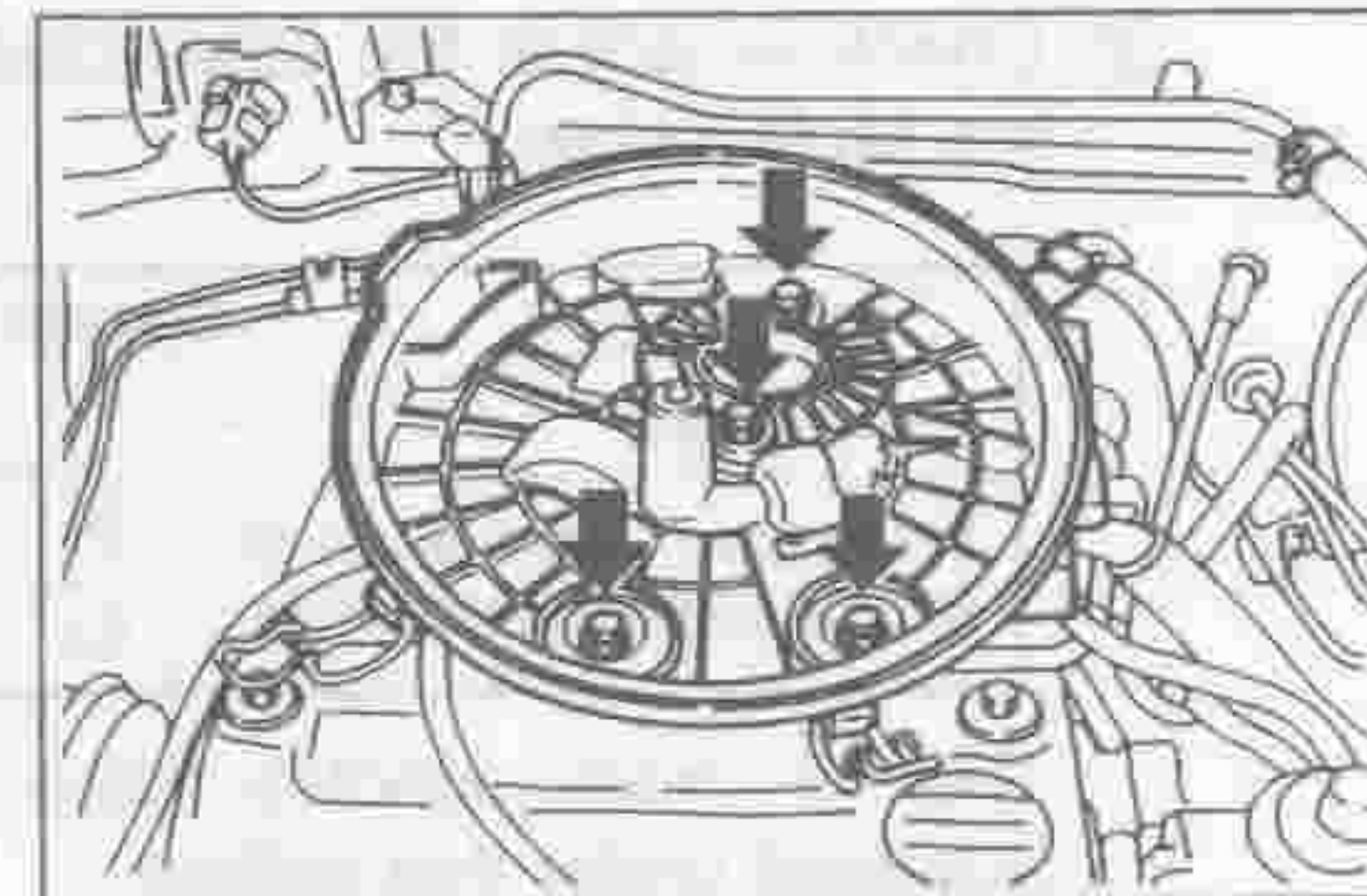
- Be very careful not to damage the hot air intake hose during the removal.



LEMA00118-00112

- ⑥ Remove the air cleaner element.

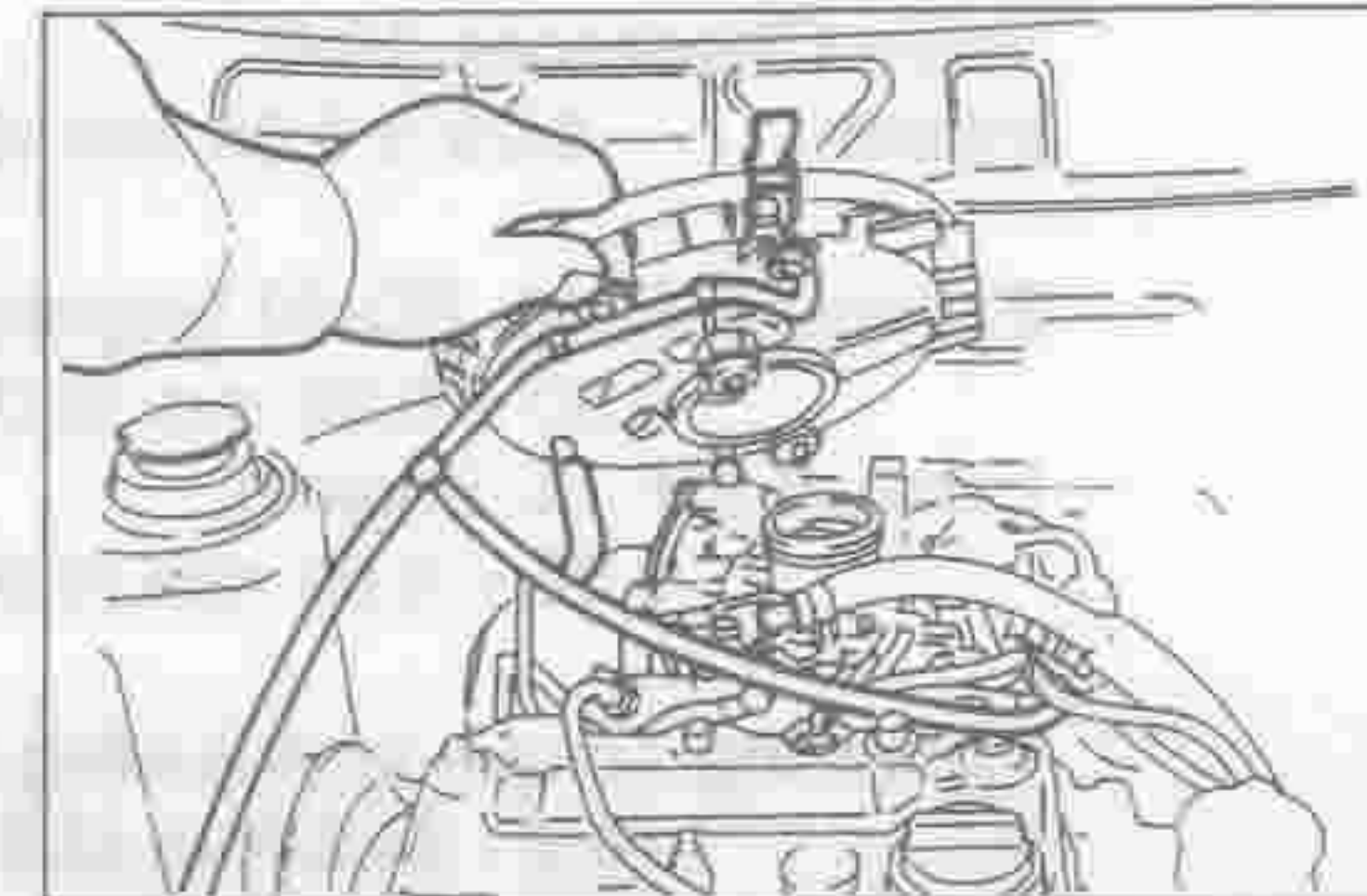
- ⑦ Remove the air cleaner case attaching bolts.



LEMA00119-00113

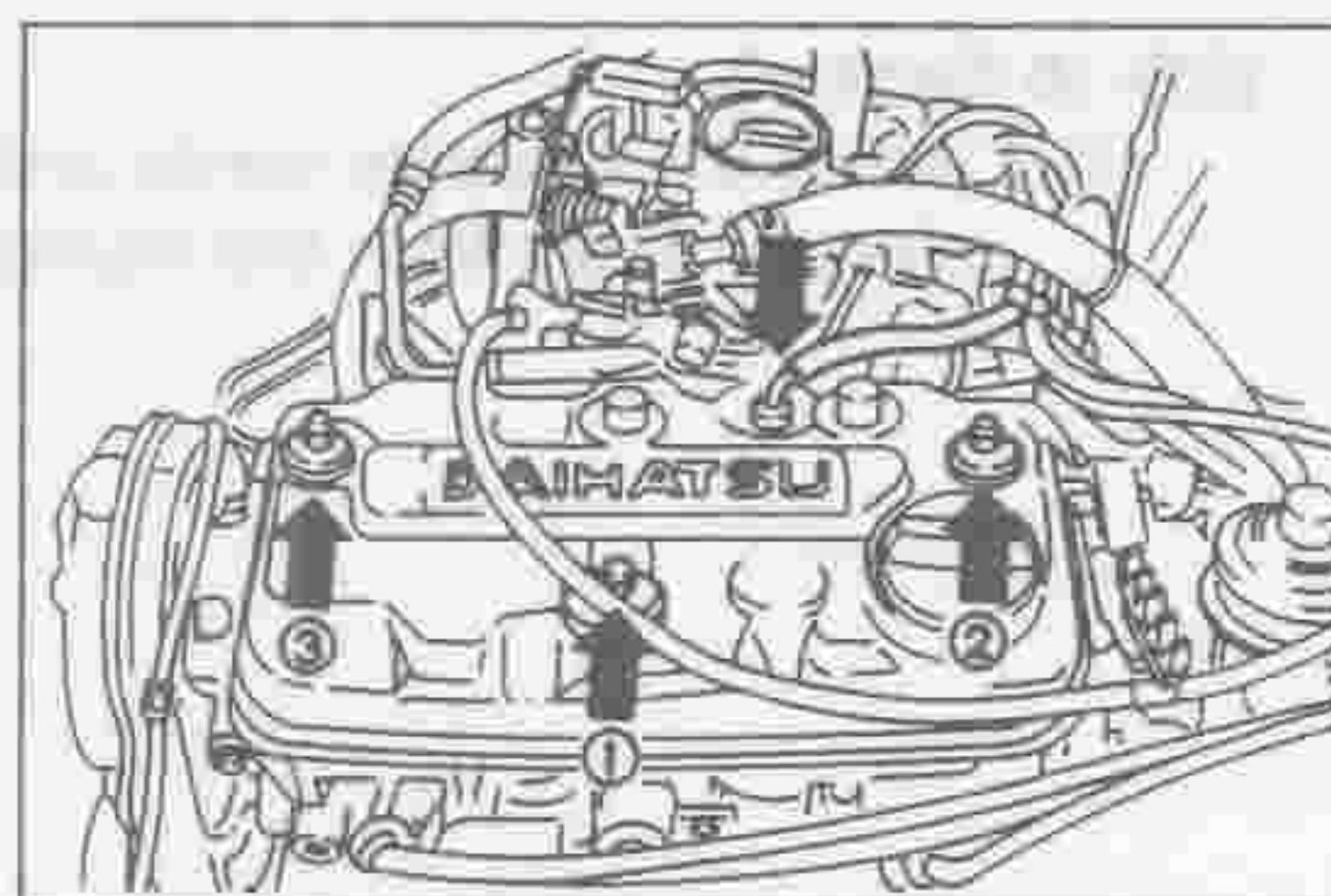
- ⑧ Slowly lift the air cleaner case.

- ⑨ Disconnect the PCV hose and vacuum hose from the air cleaner case.



LEMA00120-00114

- ⑩ Disconnect the PCV hose from the cylinder head cover.
- ⑪ Loosen the three nuts over two or three stages in the sequence shown in the right figure.
- ⑫ Remove the three nuts and the seal washer.
- ⑬ Remove the cylinder head cover.



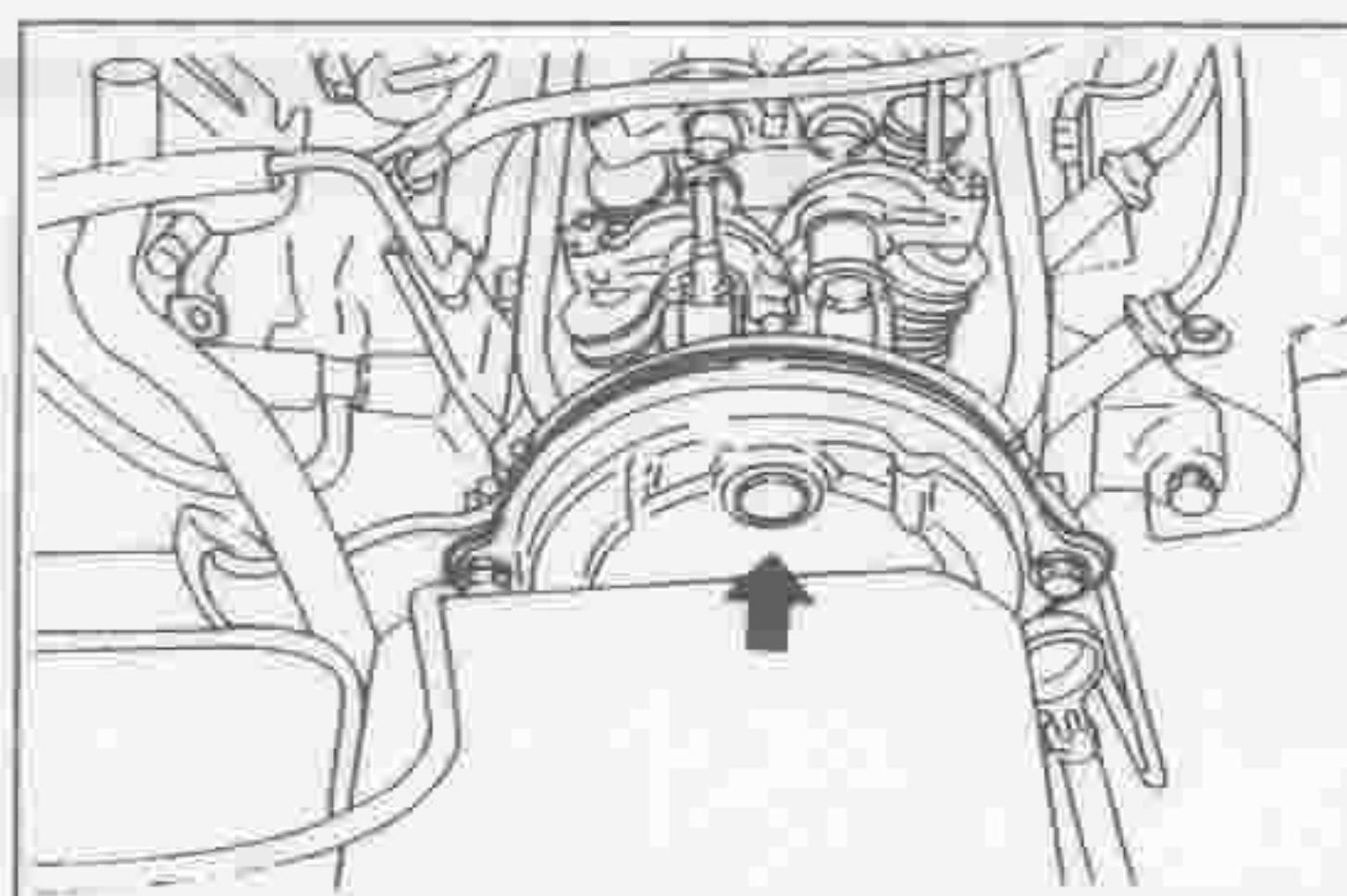
LEMA00121-00115

(2) Inspection and adjustment of valve clearances

NOTE:

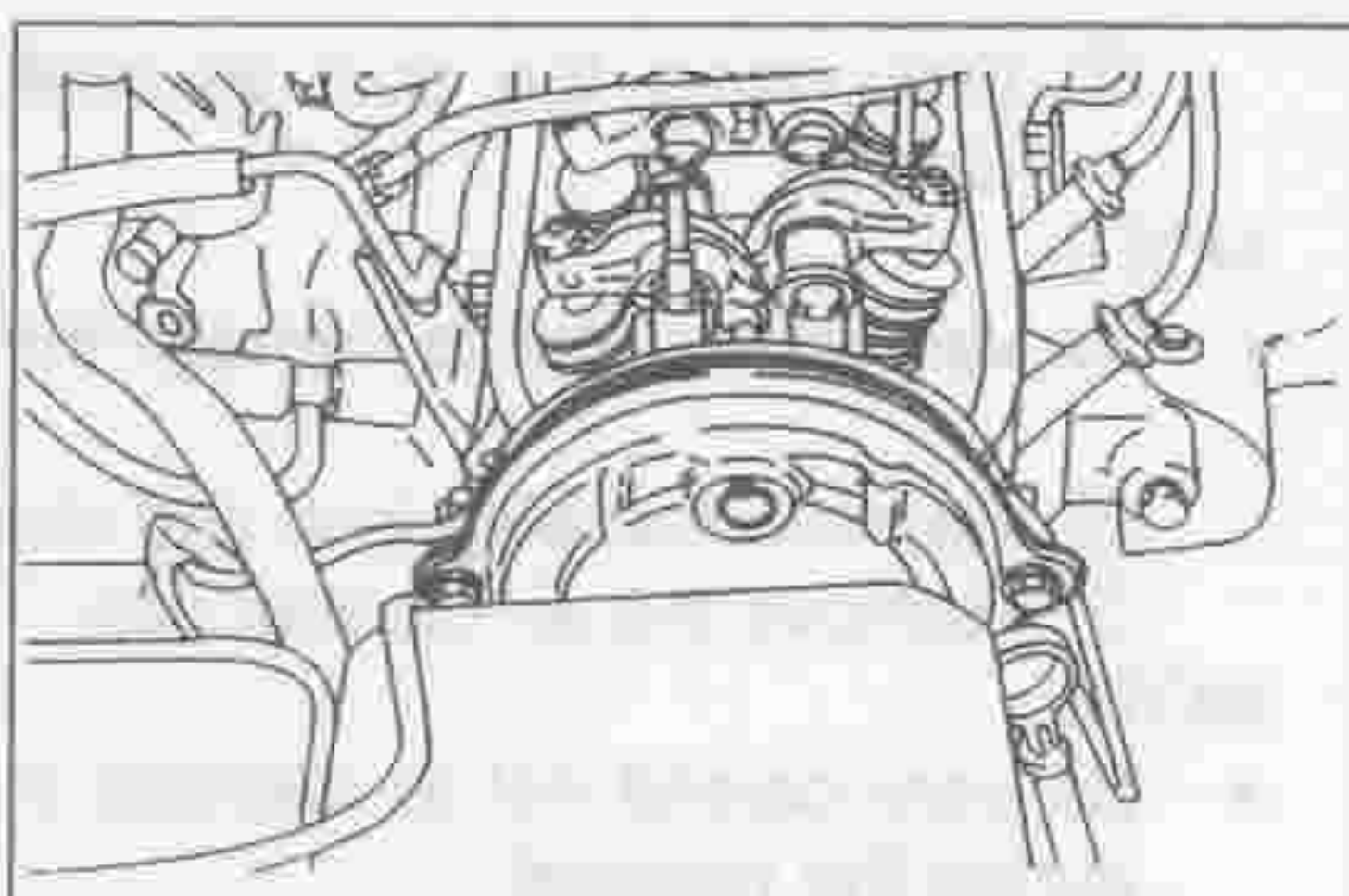
- Before tightening the adjusting nut, apply engine oil to between the lock nuts and the attaching surface of the rocker arm adjusting bolts.

- ① Remove the rubber plug attached to the timing belt cover.



LEMA00122-00116

- ② Turn the crankshaft, until the drill hole or "F" mark of the timing belt pulley aligns with the hole of the timing belt cover.
(At this time, the No.1 piston is set to the top dead center at the end of the compression stroke.)



LEMA00123-00117

- ③ Check or adjust the valve clearances specified in the table below.

Cylinder		1	2	3
Crank angle	IN	○		○
	EX	○	○	

The "O" mark denotes those valves that can be adjusted under that setting.

Valve Clearances (Hot)

Intake: 0.25 ± 0.05 mm (0.0098 ± 0.002 inch)

Exhaust (ED-10, ED-20 Engine):

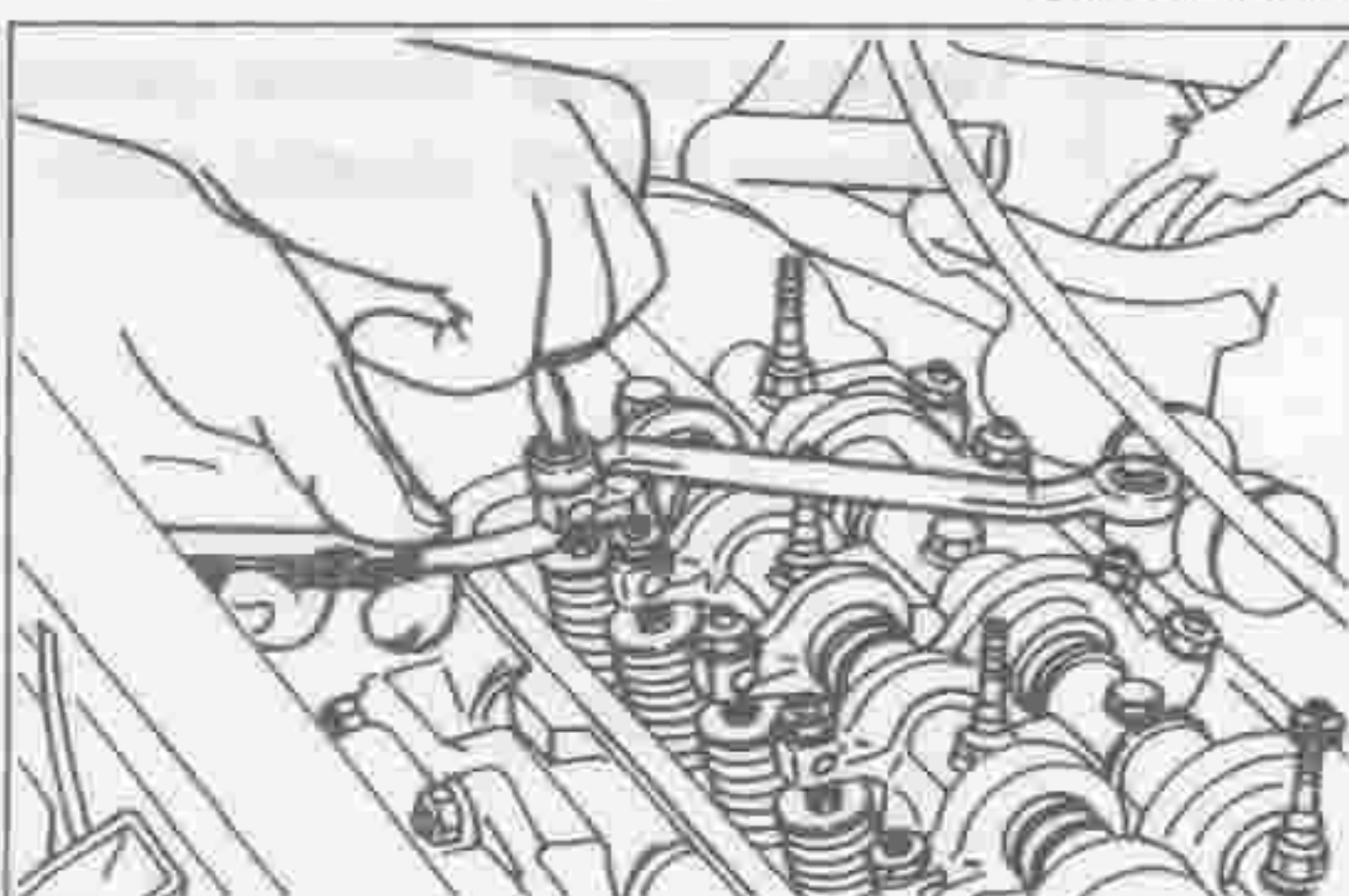
0.30 ± 0.05 mm (0.0118 ± 0.002 inch)

Exhaust (EF-EL Engine):

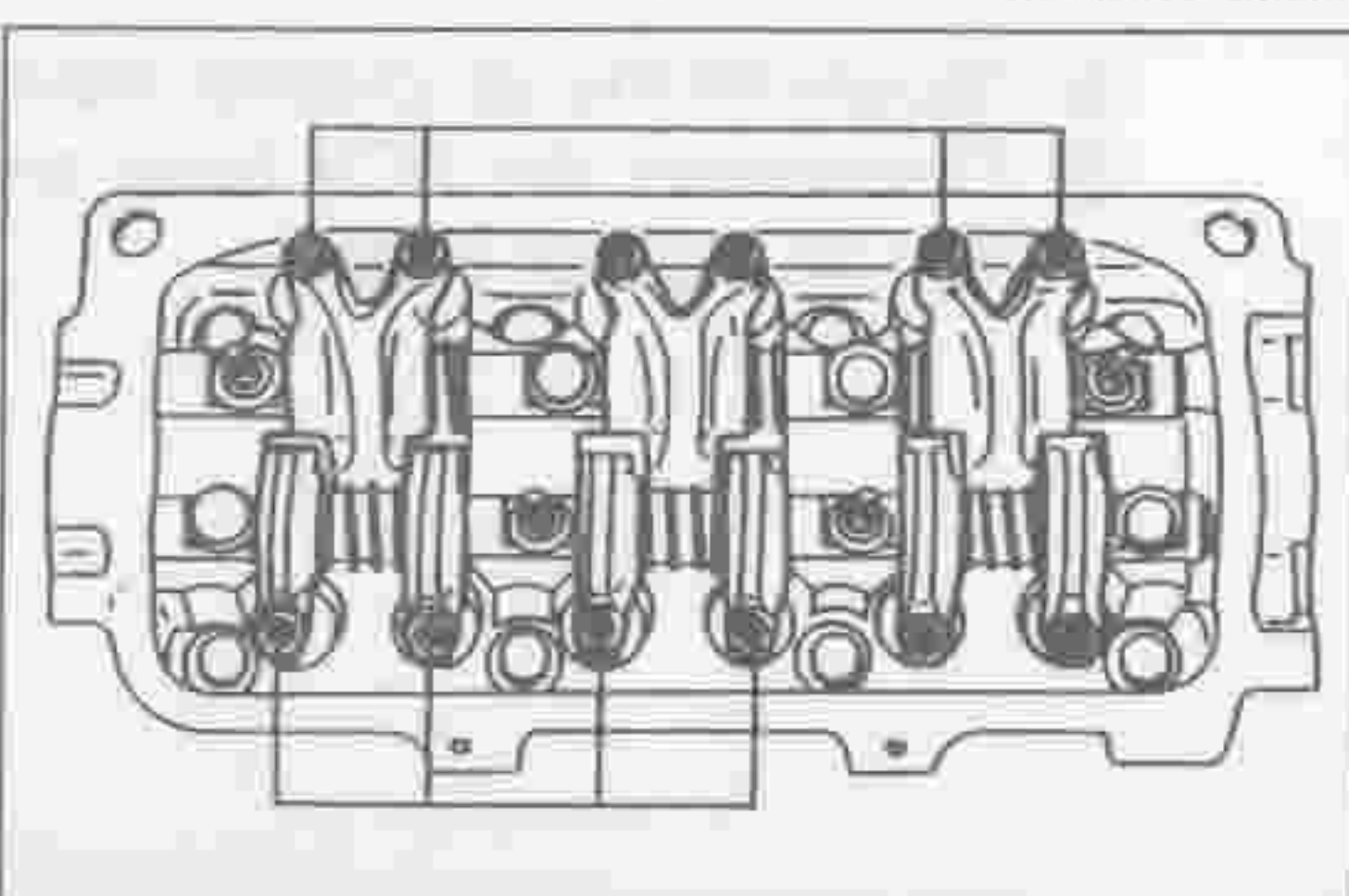
0.35 ± 0.05 mm (0.0138 ± 0.002 inch)

Tightening Torque of Adjusting Nut:

19.6 - 24.5 N·m (2.0 - 2.5 kgf·m)



LEMA00124-00118



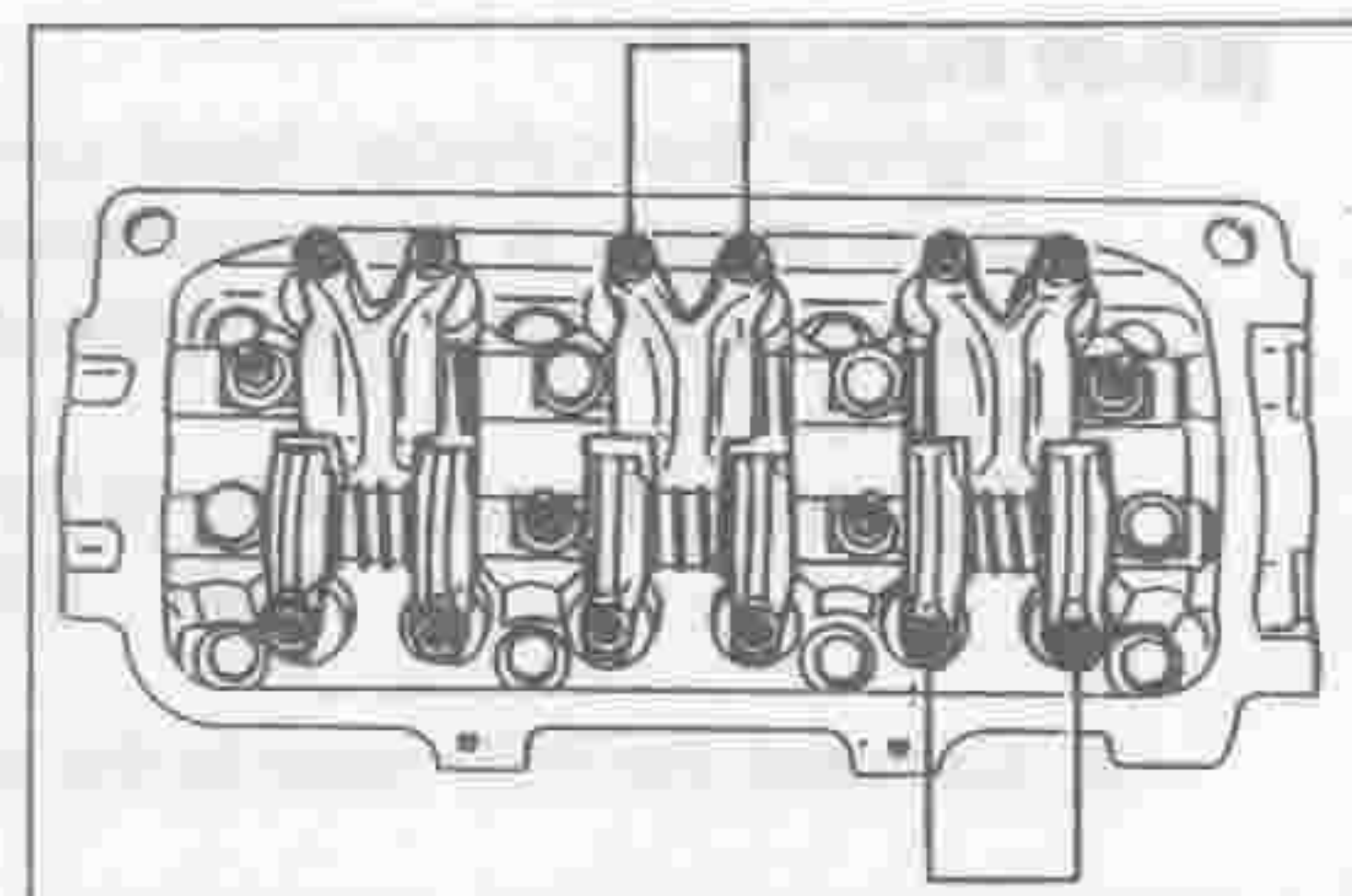
LEMA00125-00119

- ④ Turn the crankshaft 360 degrees.
(At this time, the No.1 piston is set to the top dead center at the end of the exhaust stroke.)
- ⑤ Proceed to check and adjust the remaining valve clearances.

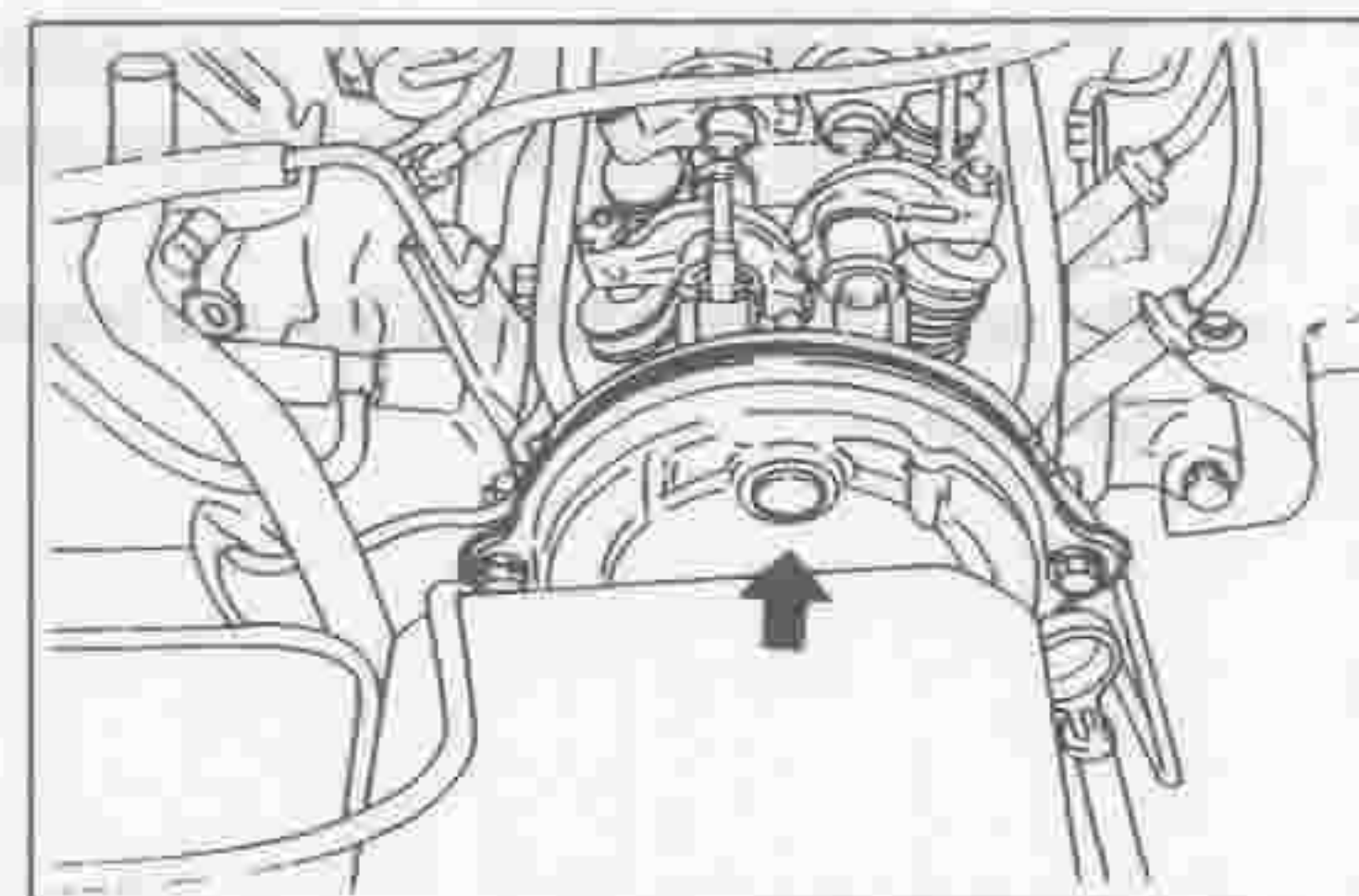
Cylinder		1	2	3
Crank angle	IN		○	
	EX			○

The "O" mark denotes those valves that can be adjusted under that setting.
The specified values are the same as with the step 3.

- ⑥ Install the hole plug of the timing belt cover.



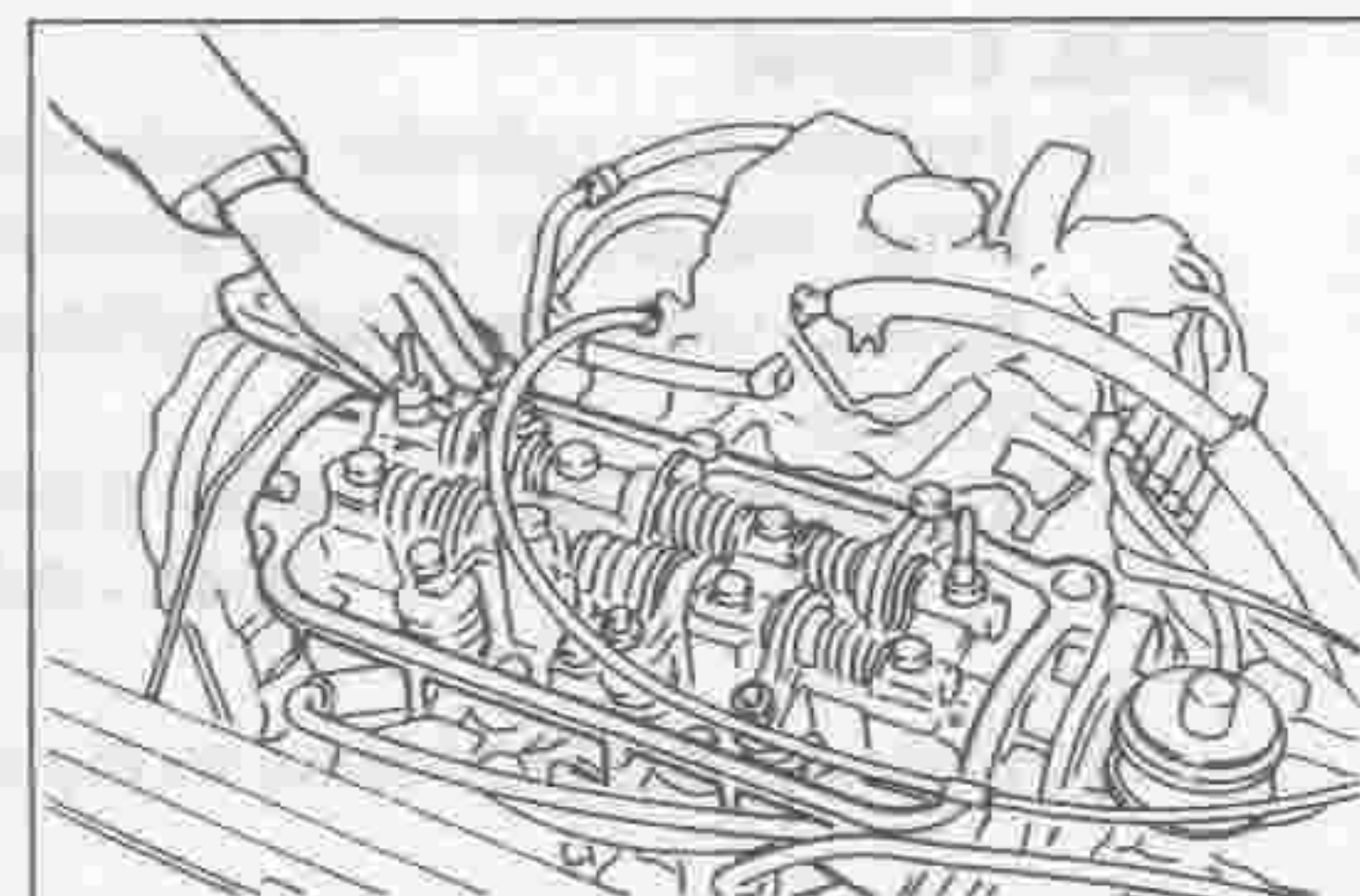
LEMA00126-00120



LEMA00127-00121

(3) Installation of cylinder head cover

- ① Wipe off the oil from the gasket attaching surface of the cylinder head.

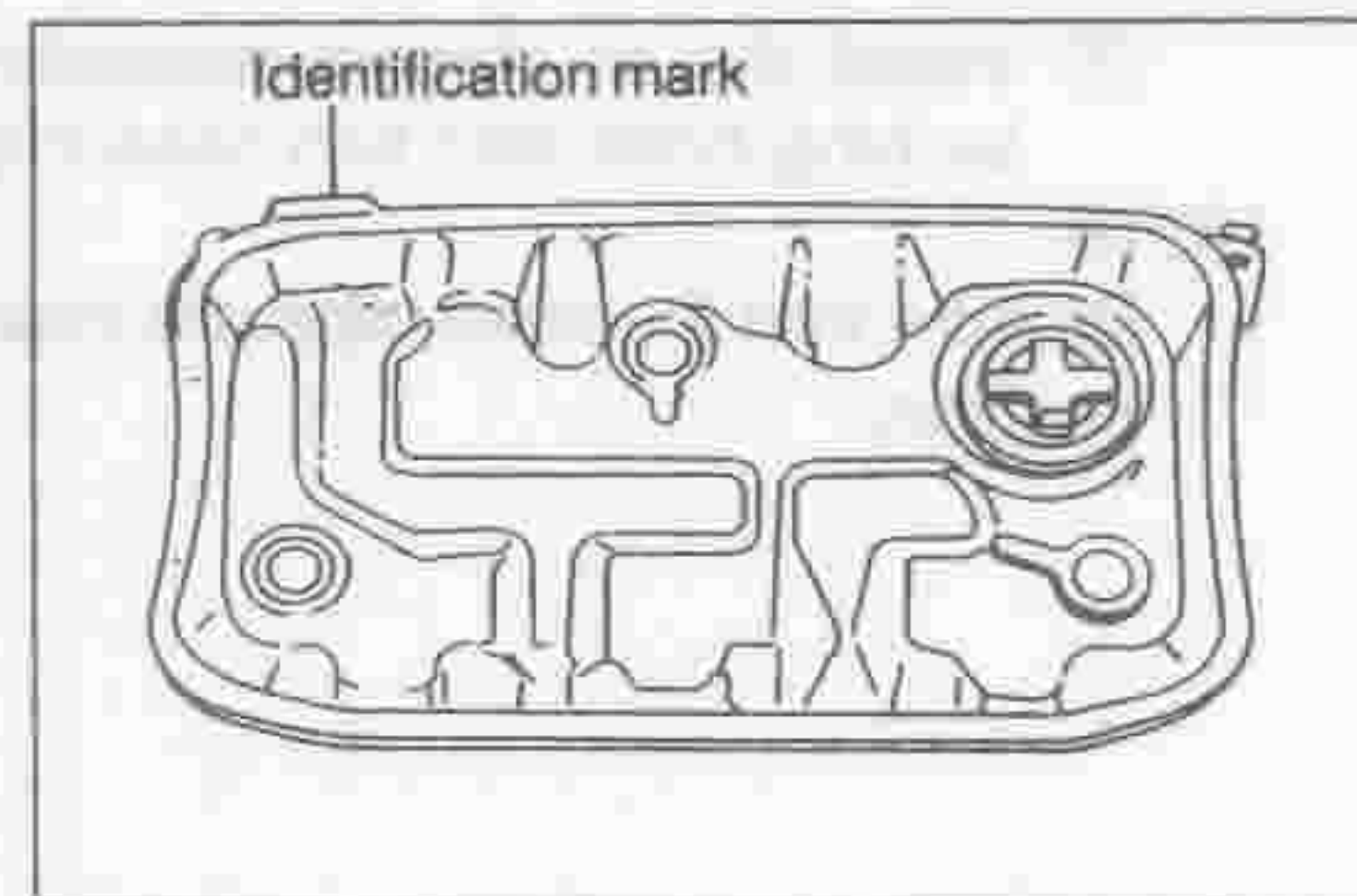


LEMA00128-00122

- ② Check the cylinder head cover gasket for evidence of damage.
Replace the gasket, as required.

NOTE:

- Install the cylinder head cover gasket in such a direction that the identification mark may come at the exhaust side.

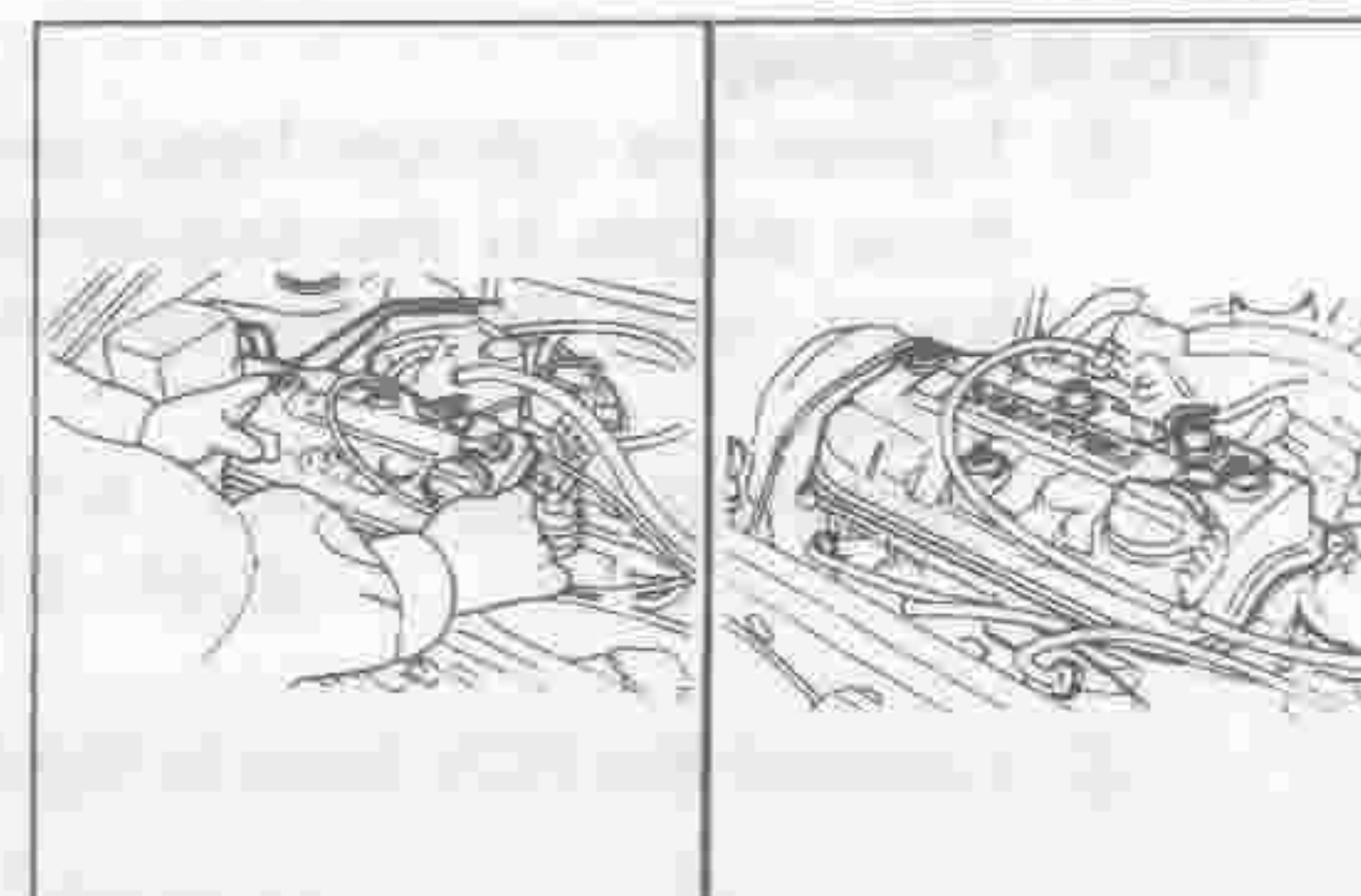


LEMA00129-00123

- ③ Install the cylinder head cover on the cylinder head.
- ④ Install the seal washer.

NOTE:

- Ensure that the seal washer exhibits no damage.
- If the seal washer exhibits damage, replace the seal washer with a new part.



LEMA00130-00124

[ED-20 Engine]

- ⑤ Tighten the cylinder head cover nuts over two or three stages in the sequence shown in the right figure, until they are tightened to the specified torque.

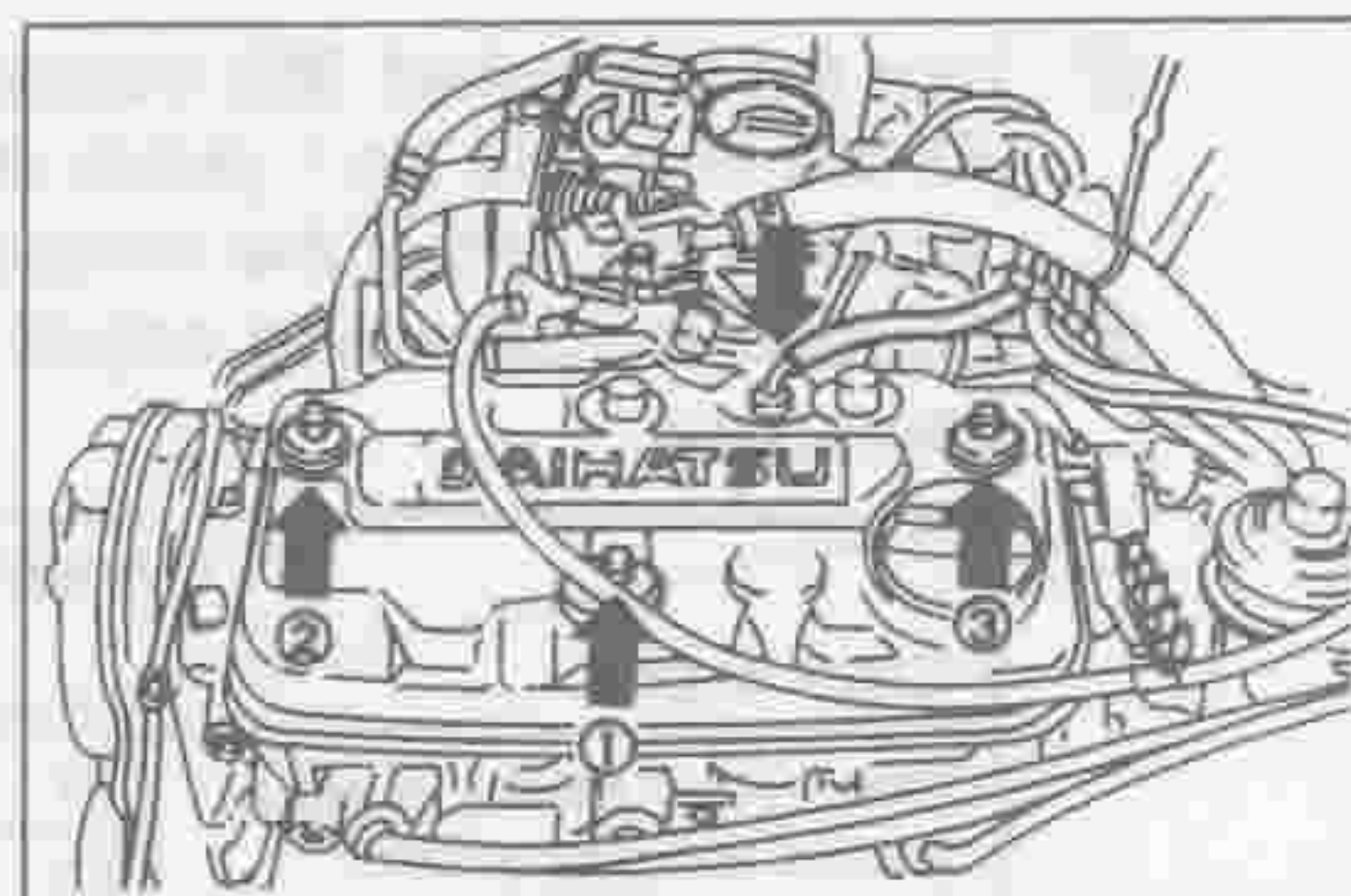
Tightening Torque: 4.3 - 6.5 N·m
(0.44 - 0.66 kgf·m)

- ⑥ Connect the PCV hose to the cylinder head cover.

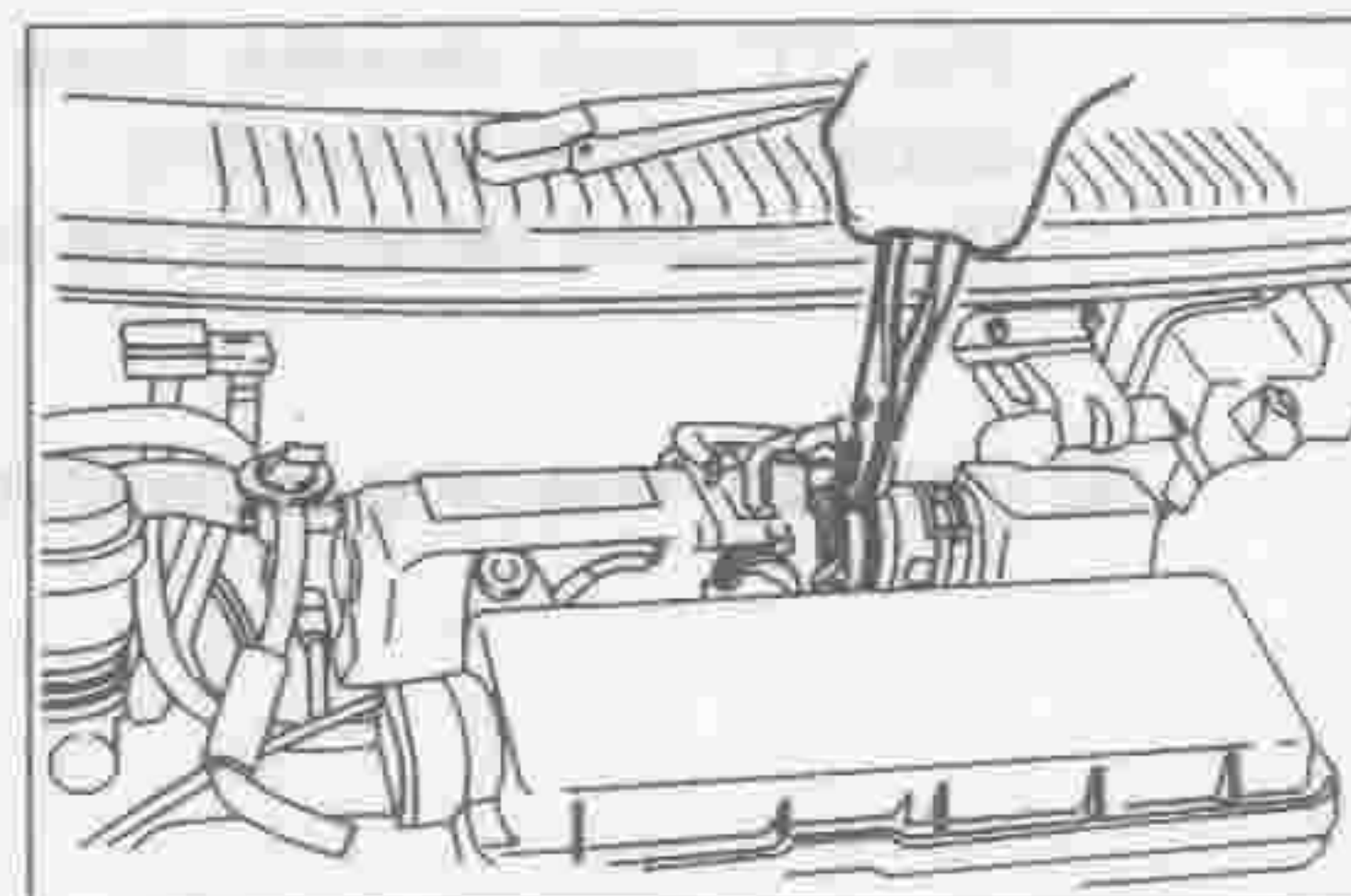
- ⑦ Install the air cleaner assembly using the three attaching bolts and two hose clips.

NOTE:

- Be sure that the hose clips are installed securely to each position.



LEMA00131-00125



LEMA00132-00126

[EF-EL Engine]

- ⑤ Tighten the cylinder head cover nuts over two or three stages in the sequence shown in the right figure, until they are tightened to the specified torque.

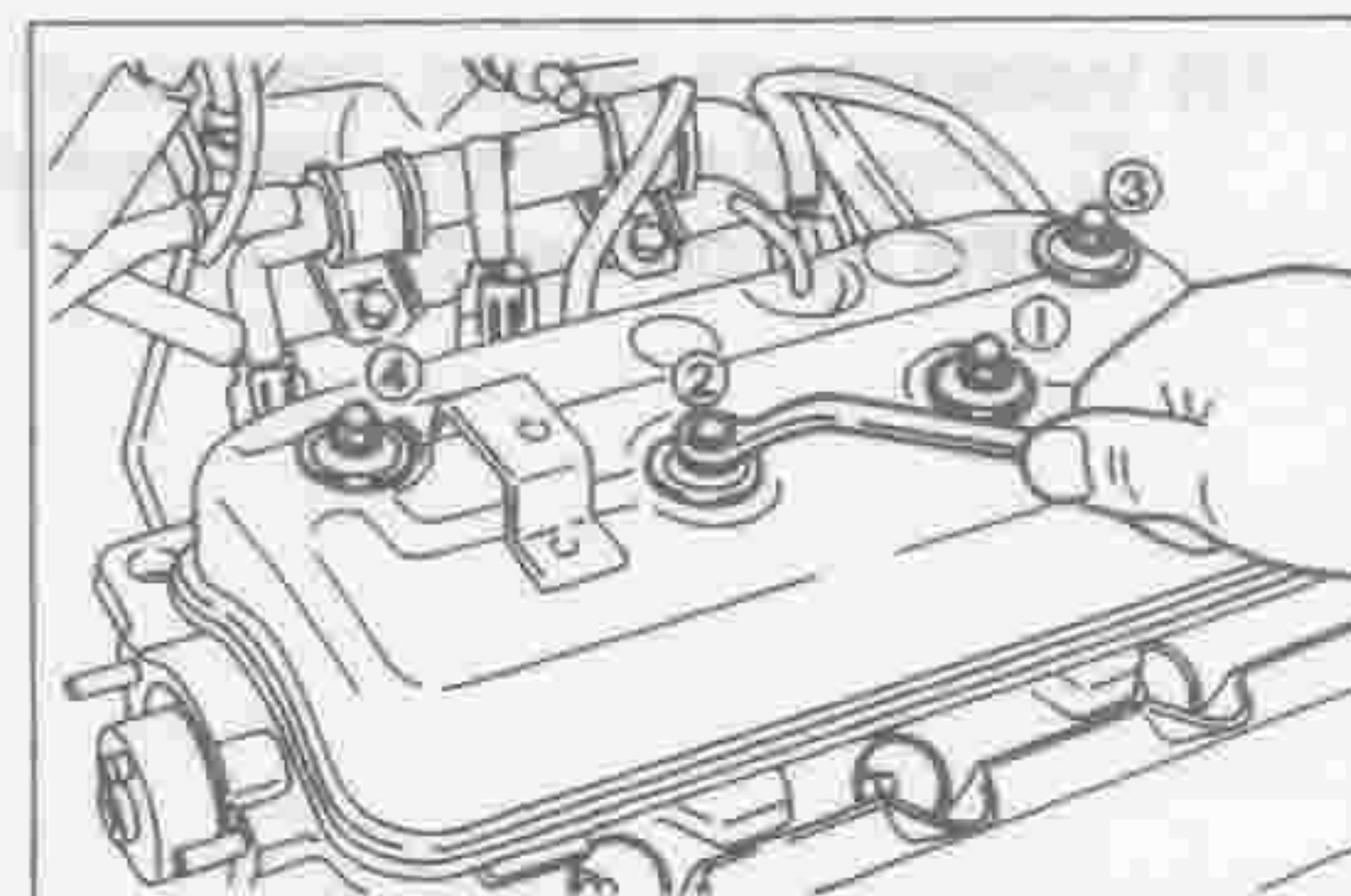
Tightening Torque: 4.3 - 6.5 N·m
(0.44 - 0.66 kgf·m)

- ⑥ Connect the PCV hose to the cylinder head cover.

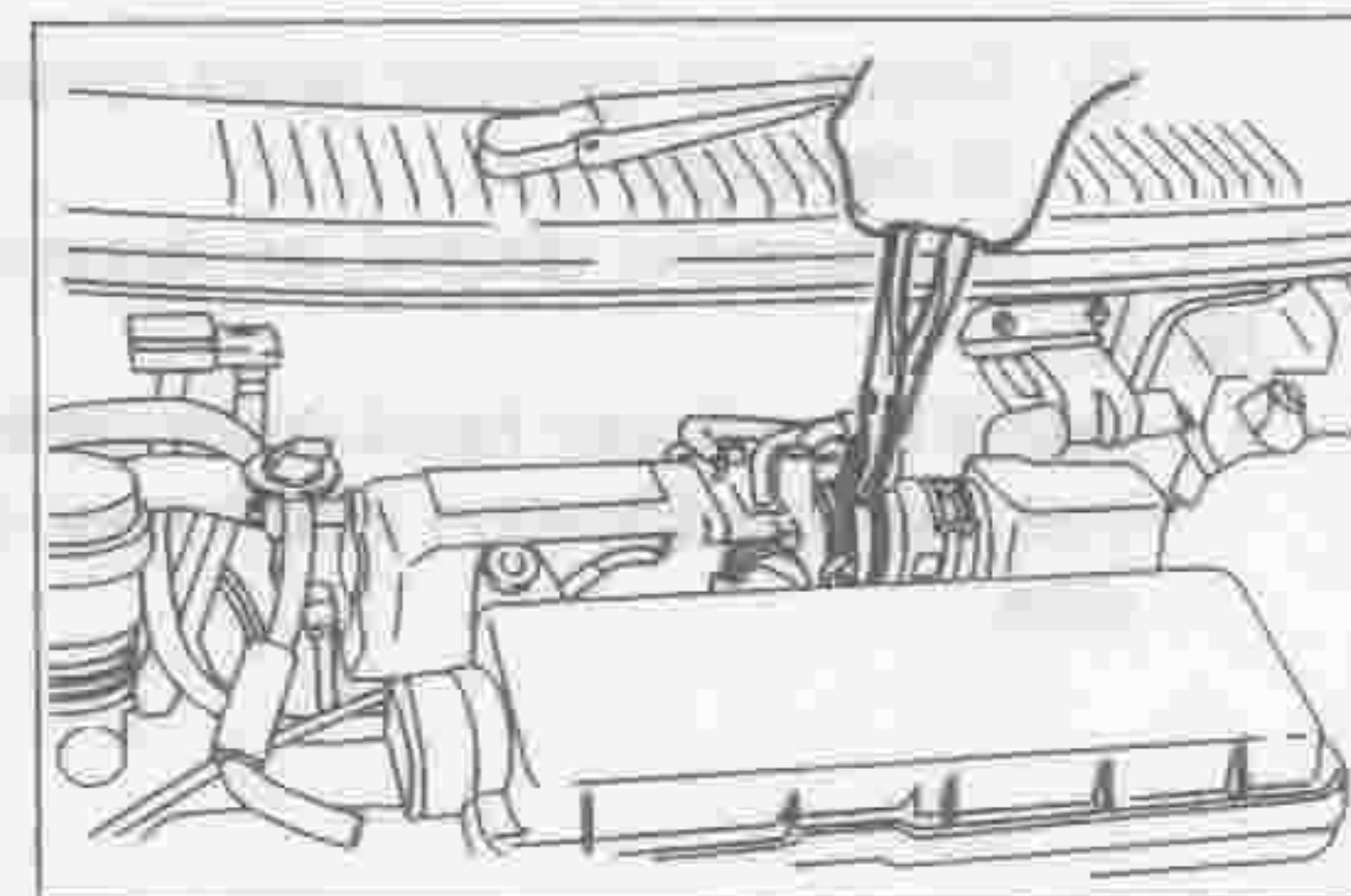
- ⑦ Install the air cleaner assembly using the three attaching bolts and two hose clips.

NOTE:

- Be sure that the hose clips are installed securely to each position.



LEMA00133-00127



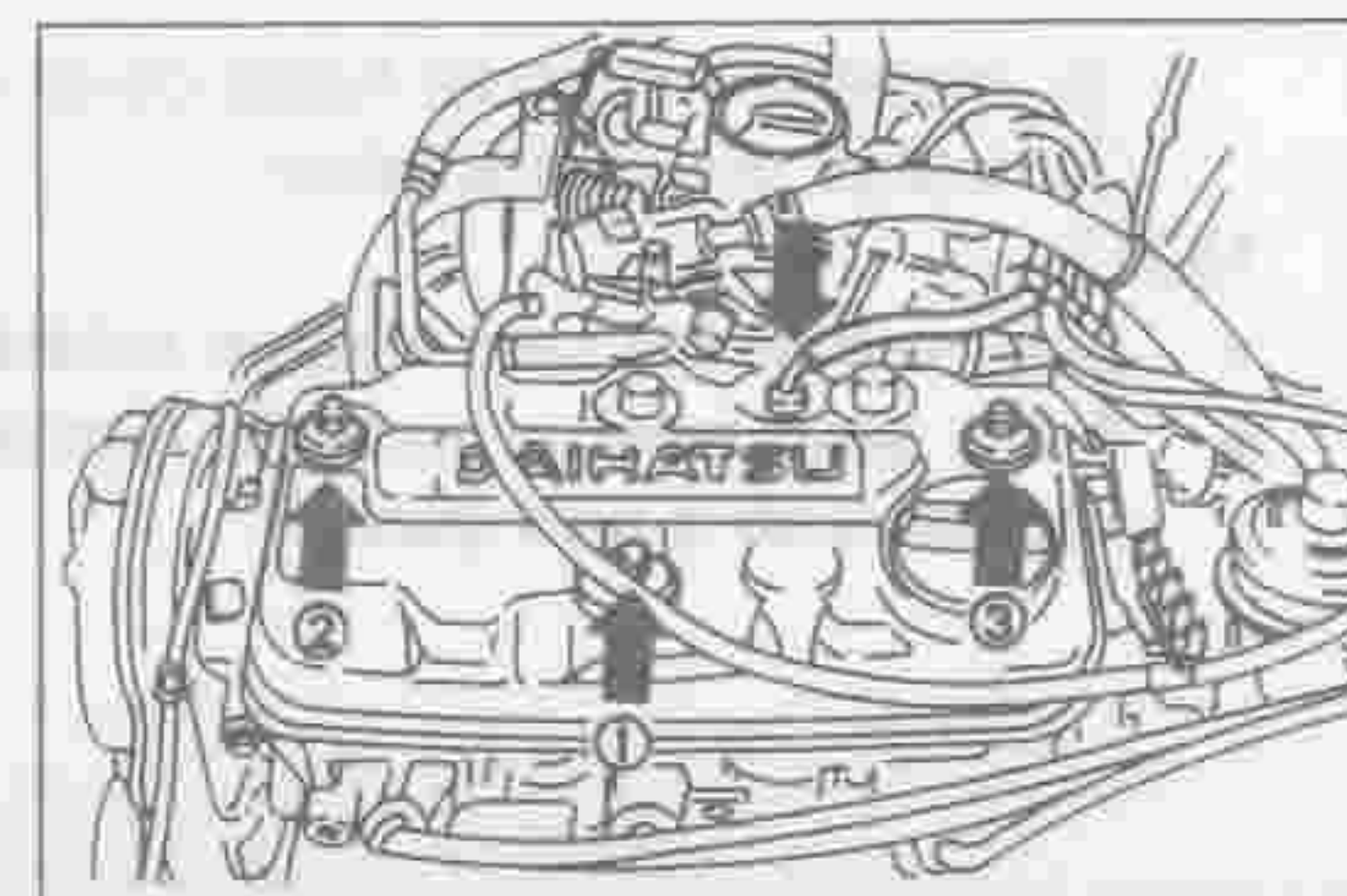
LEMA00134-00128

[ED-10 Engine]

- ⑤ Tighten the cylinder head cover nuts over two or three stages in the sequence shown in the right figure, until they are tightened to the specified torque.

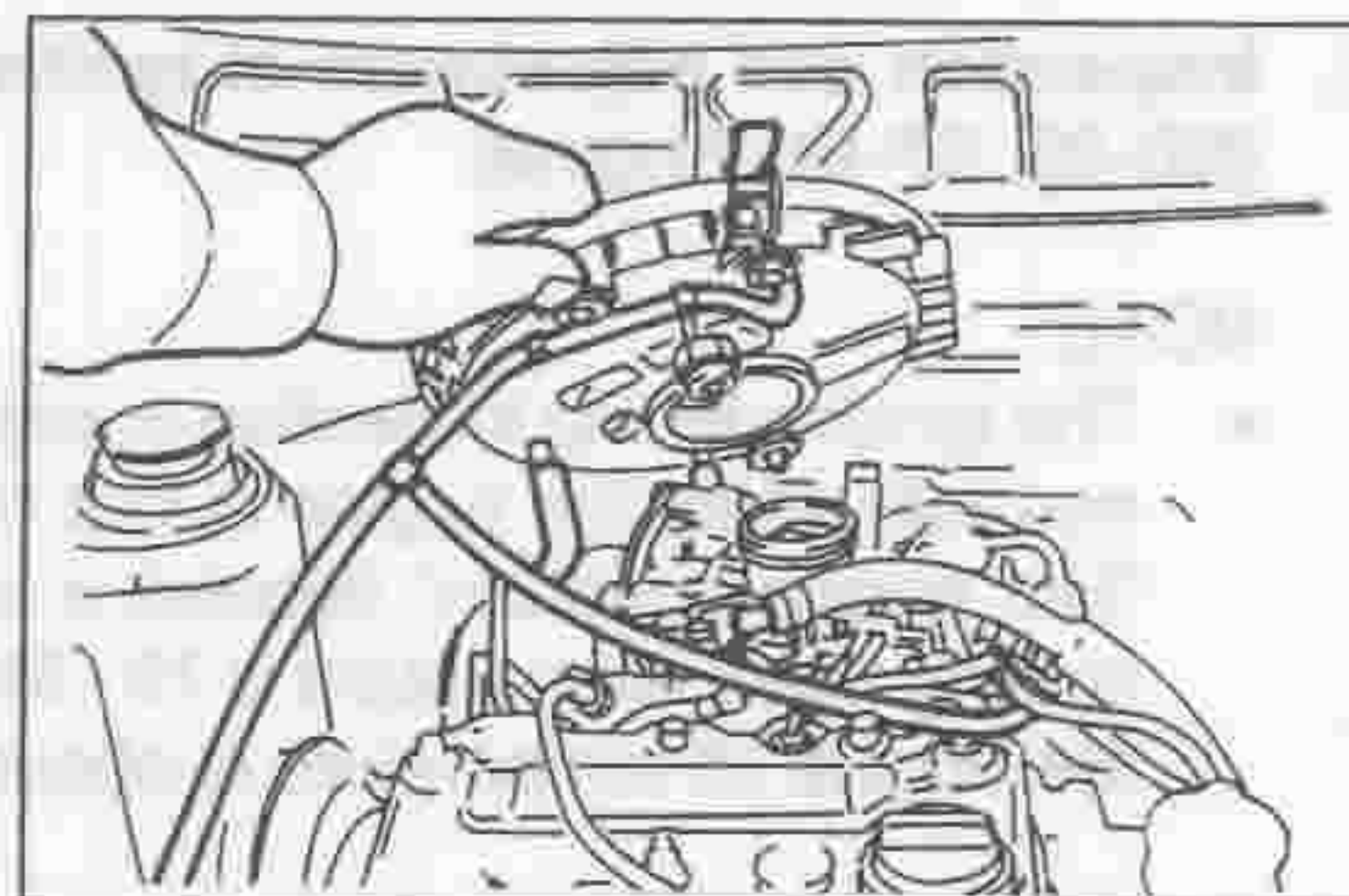
Tightening Torque: 4.3 - 6.5 N·m
(0.44 - 0.66 kgf·m)

- ⑥ Connect the PCV hose to the cylinder head cover.



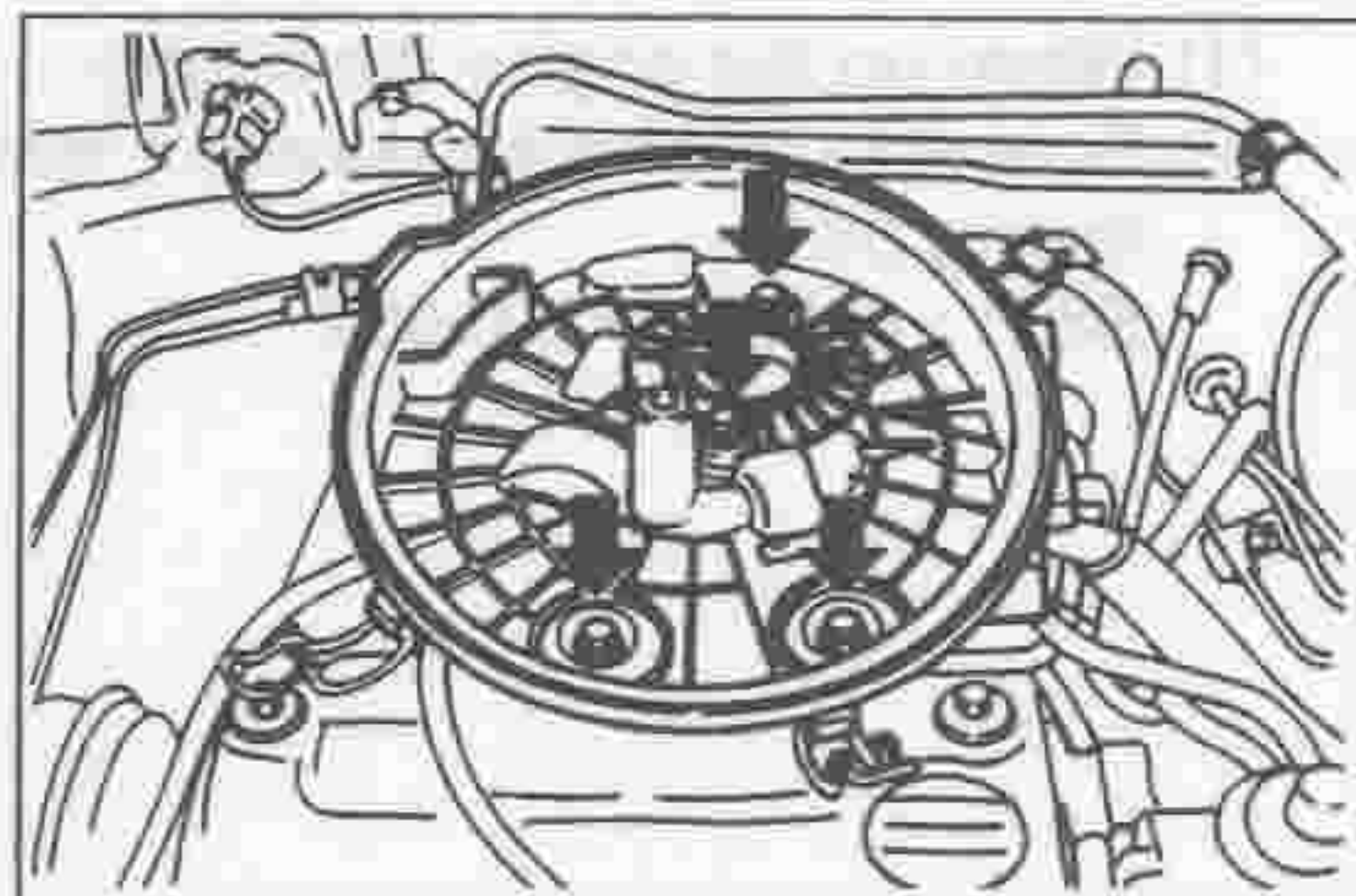
LEMA00135-00129

- ⑦ Connect the PCV hose and vacuum hose to the air cleaner case.



LEMA00136-00130

- ⑧ Install the air cleaner case to the engine.



LEMA00137-00131

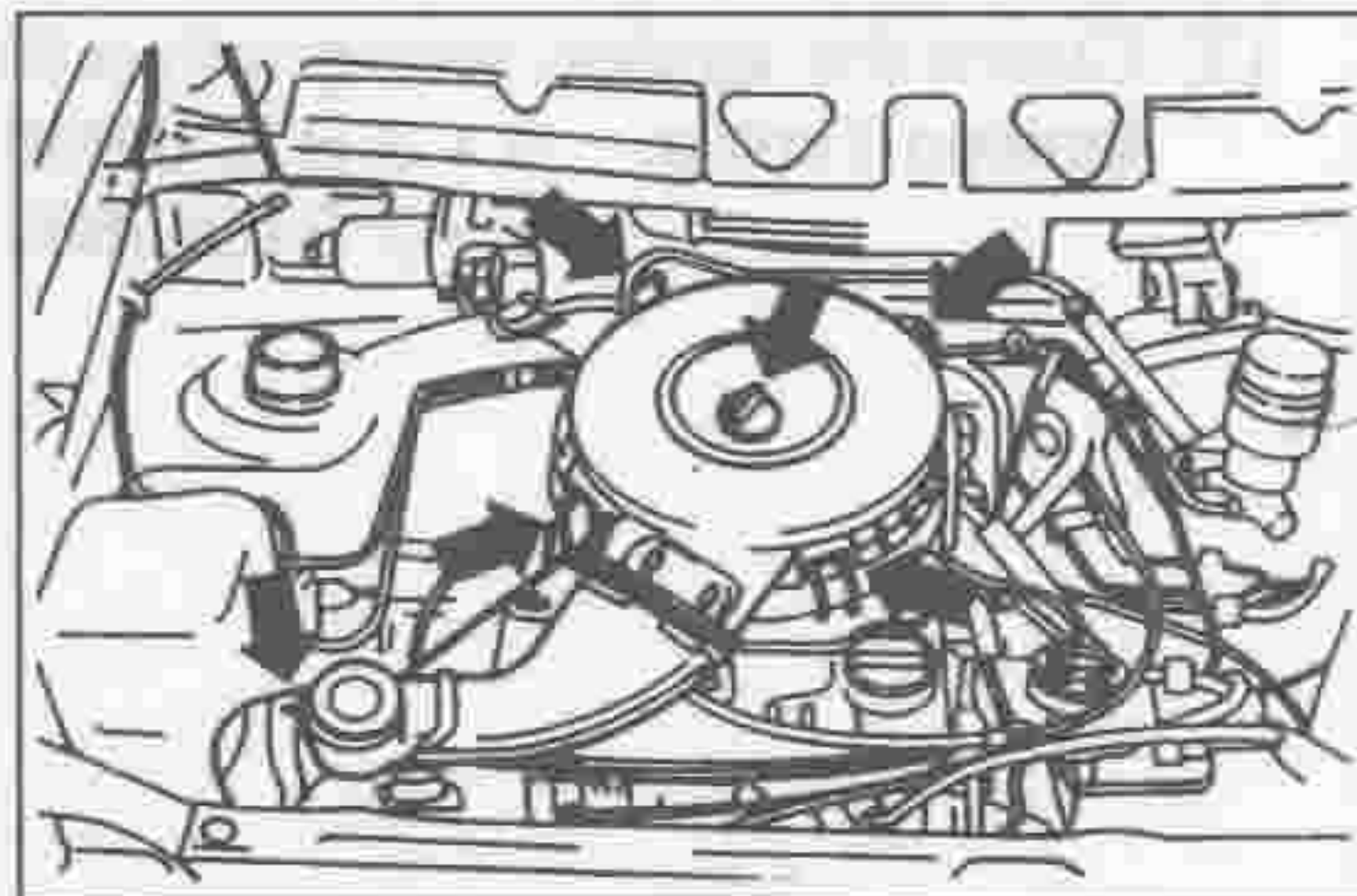
- ⑨ Install the air cleaner filter element in the air cleaner case.

- ⑩ Install the air cleaner cap.

NOTE:

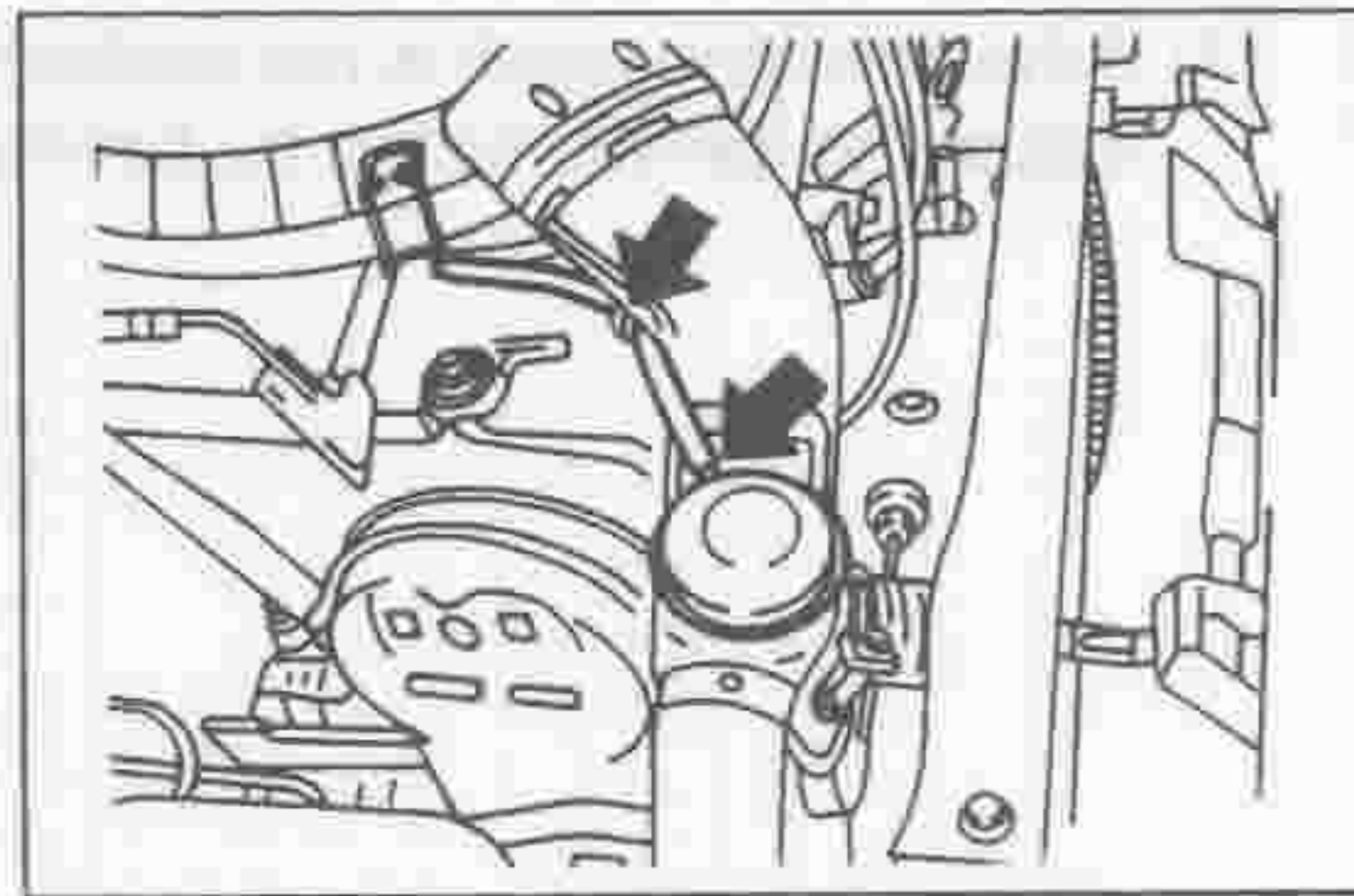
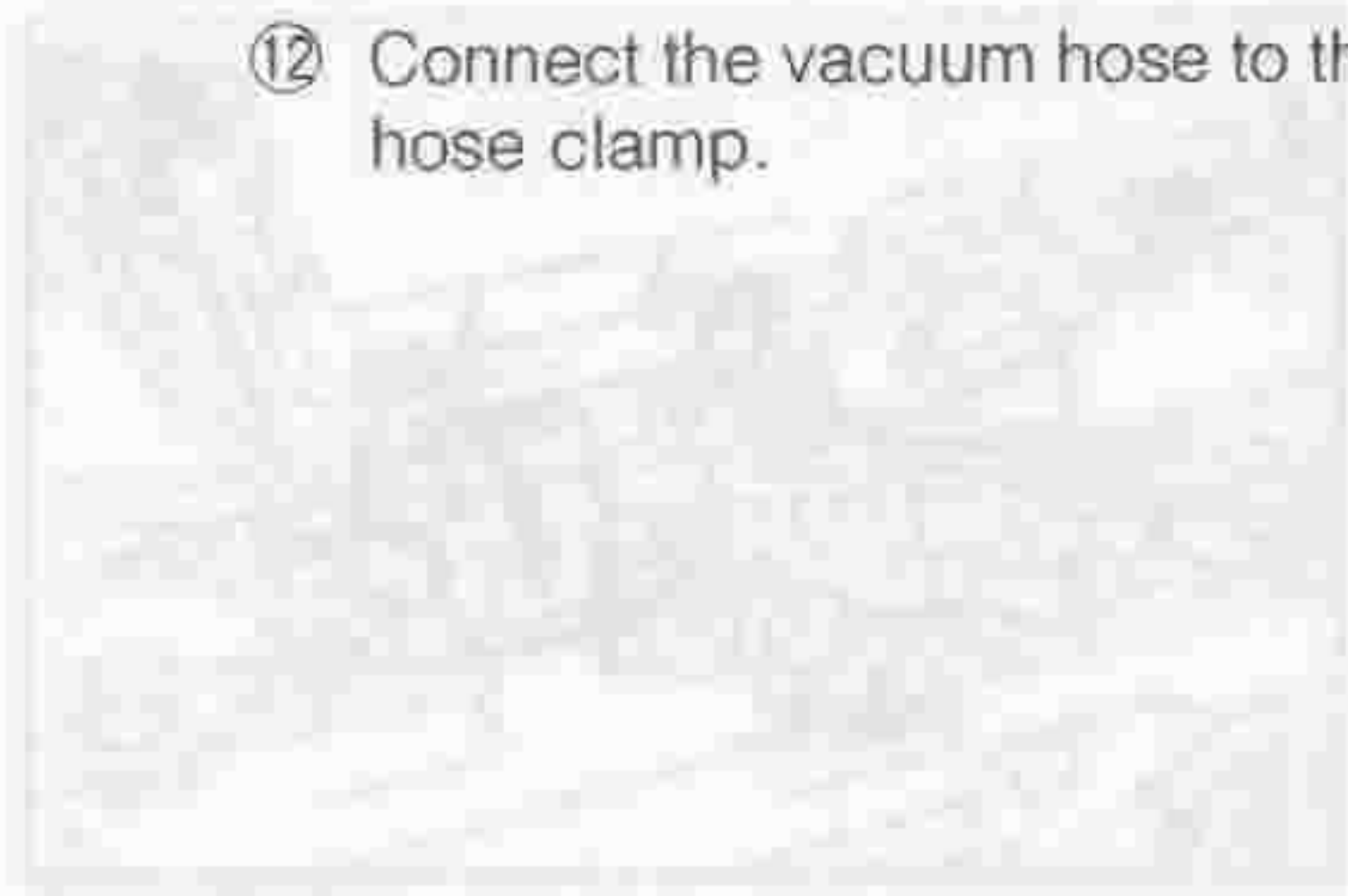
- Be very careful not to damage the hot air intake hose during the installation.

- ⑪ Install the wing bolt and secure the clamps.



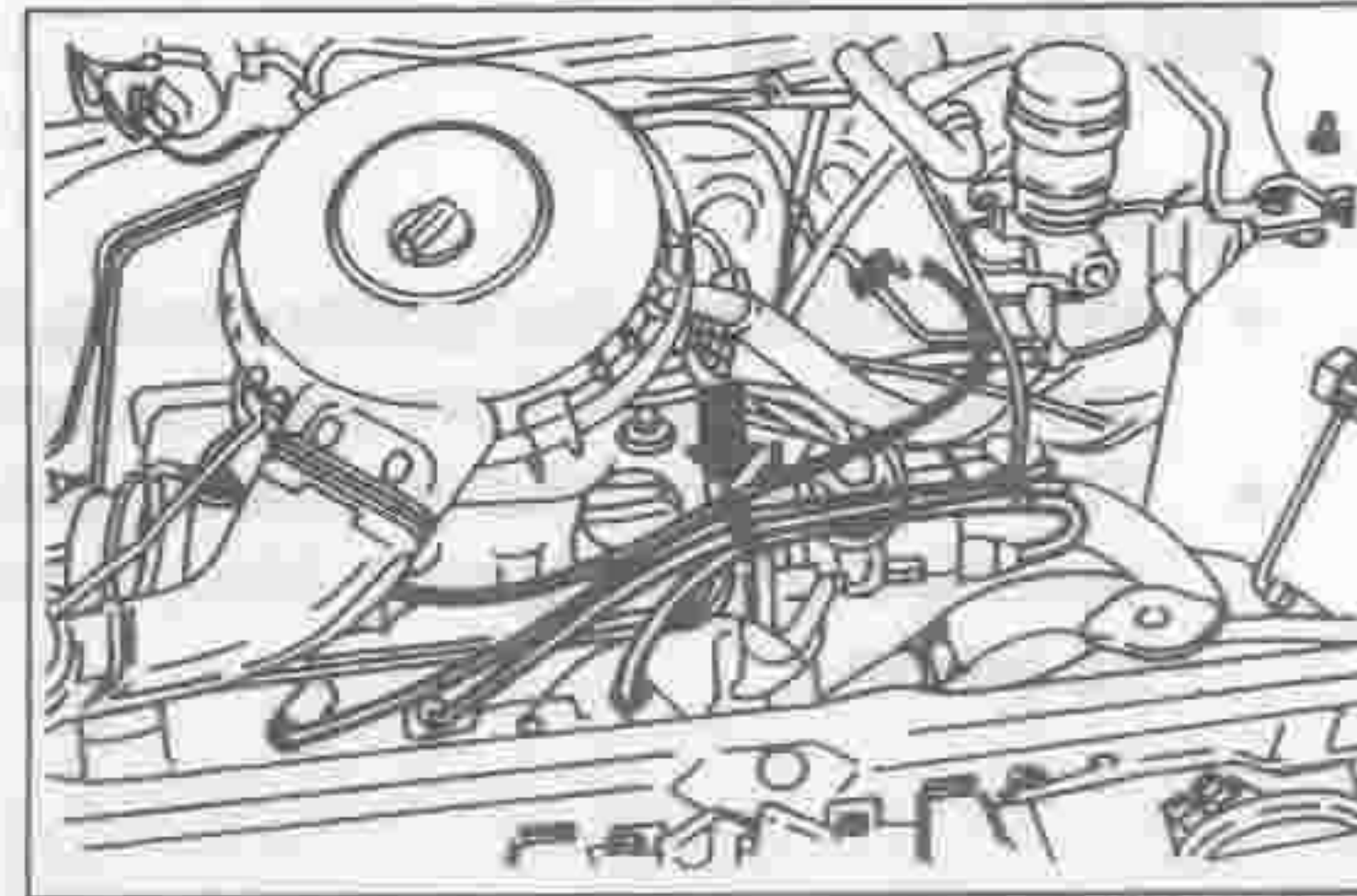
LEMA00138-00132

- ⑫ Connect the vacuum hose to the vacuum motor and hose clamp.



LEMA00139-00133

- ⑬ Connect the resistive cords and choke cable or accelerator cable to the clamps.



LEMA00140-00134

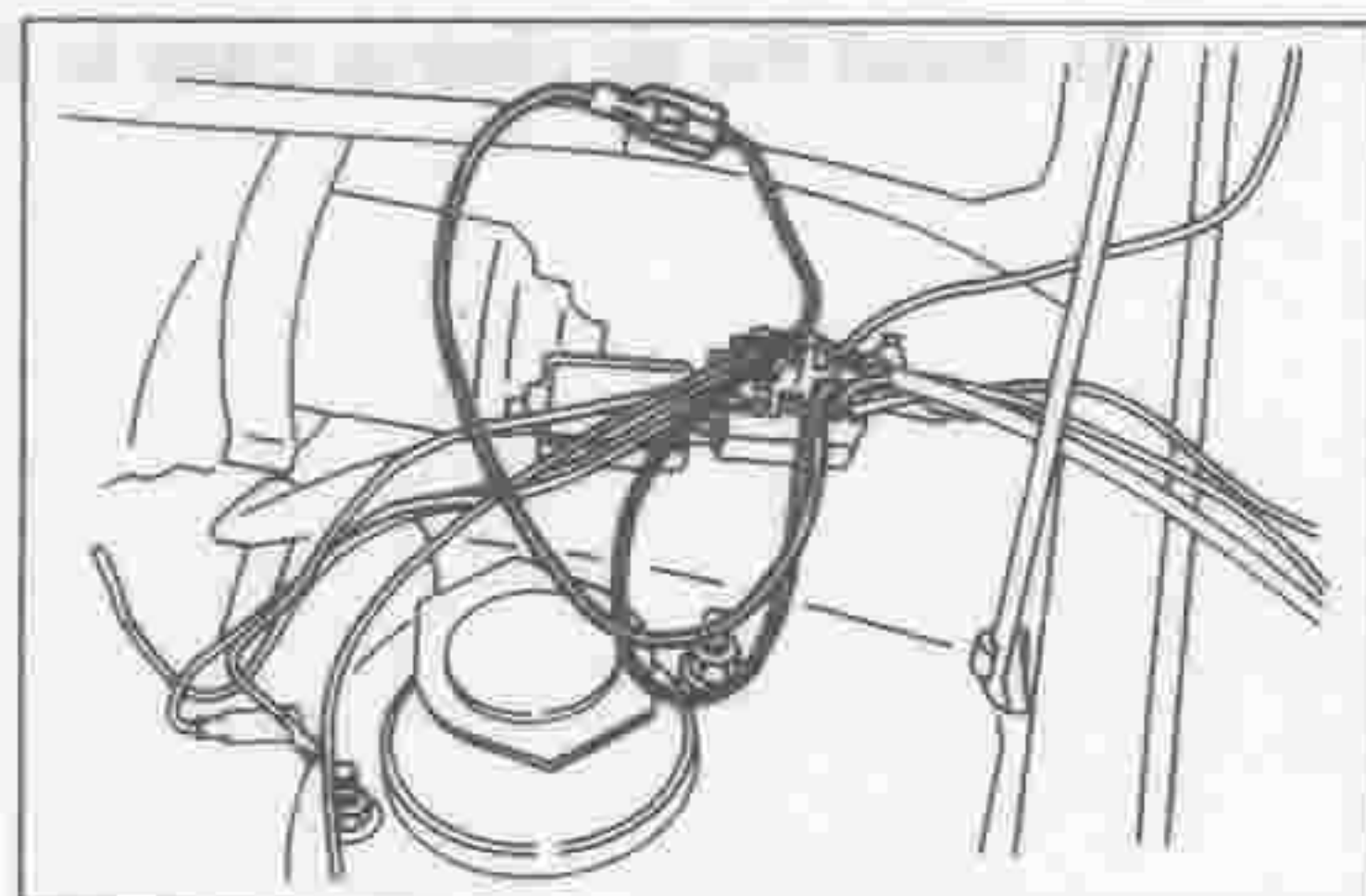
7. Inspection and adjustment of ignition timing [ED-20, EF-EL Engine]

NOTE:

- The ignition timing inspection or adjustment is performed normally when the engine is in a Hot condition.
"Hot engine condition" denotes a condition in which the cooling water temperature is 75 - 85°C (167 - 185°F) and the engine oil temperature is above 65°C (149°F).

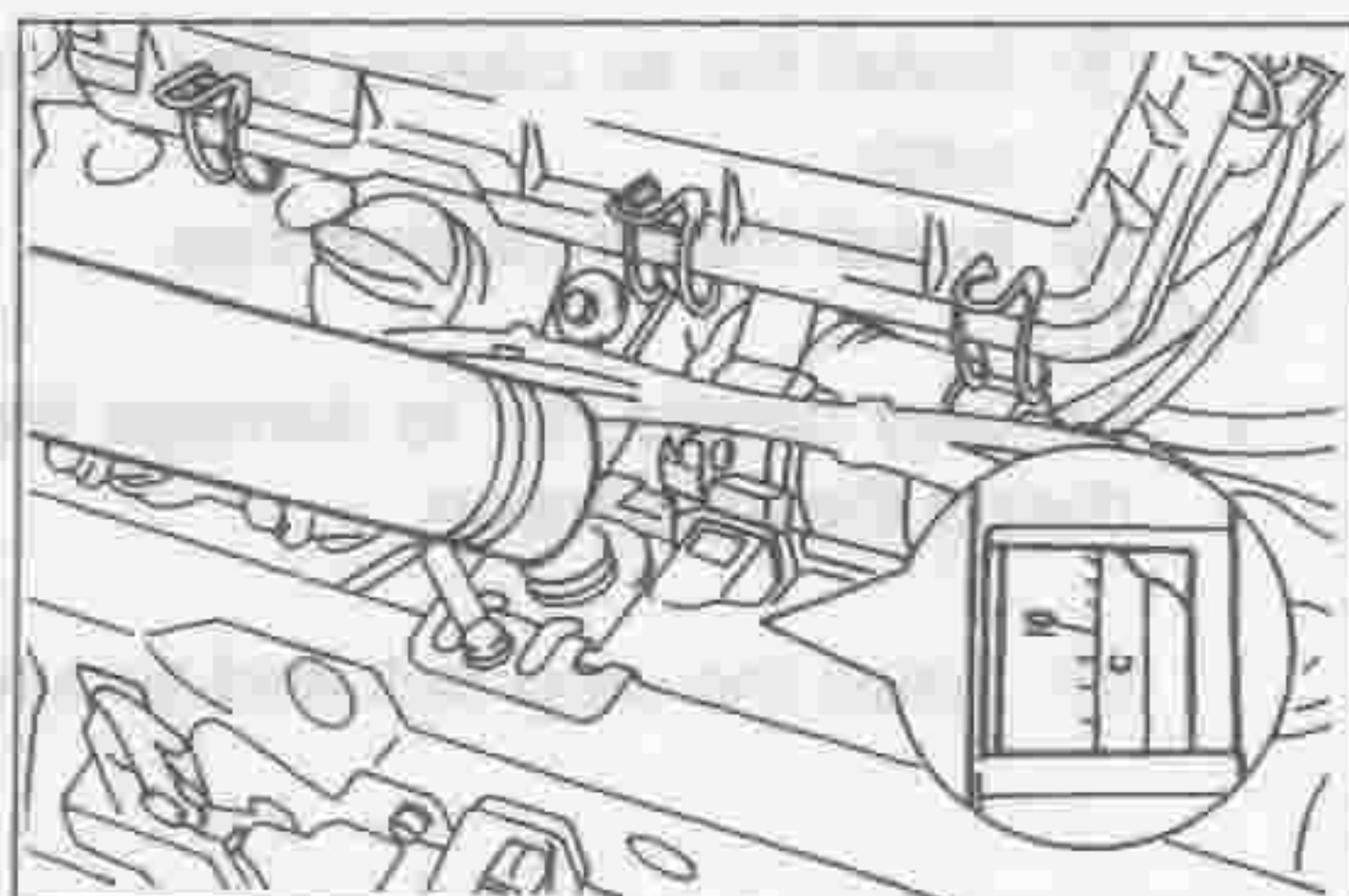
LEMA00141-00000

- Warm up the engine thoroughly.
- Connect the check connector terminals, using the following SST.
SST: 09991-87210-000



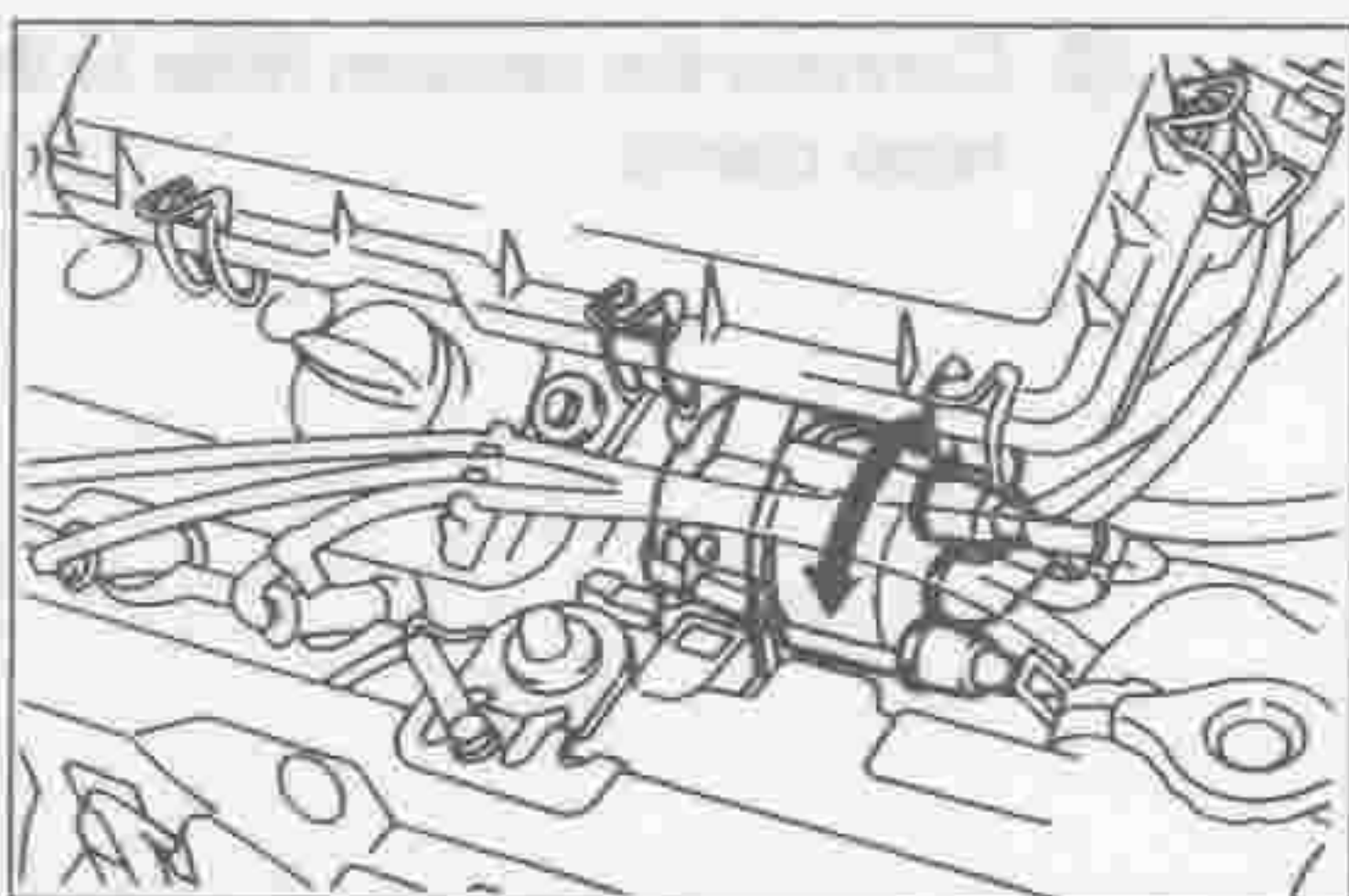
LEMA00142-00135

- Check the ignition timing with a timing light.
Ignition Timing: 5 + 2 BTDC/900 rpm (ED-20 Engine)
5 + 2 BTDC/800 rpm (EF-EL Engine)



LEMA00143-00136

- If the checking result is not conform to the specification, adjust the ignition timing by turning the distributor.



LEMA00144-00137

[ED-10 Engine]

NOTE:

- When adjusting the ignition timing, be sure to disconnect the vacuum hose from the vacuum advancer.
- The engine revolution speed should not exceed the specified engine speed. Also, the ignition timing should be stable.

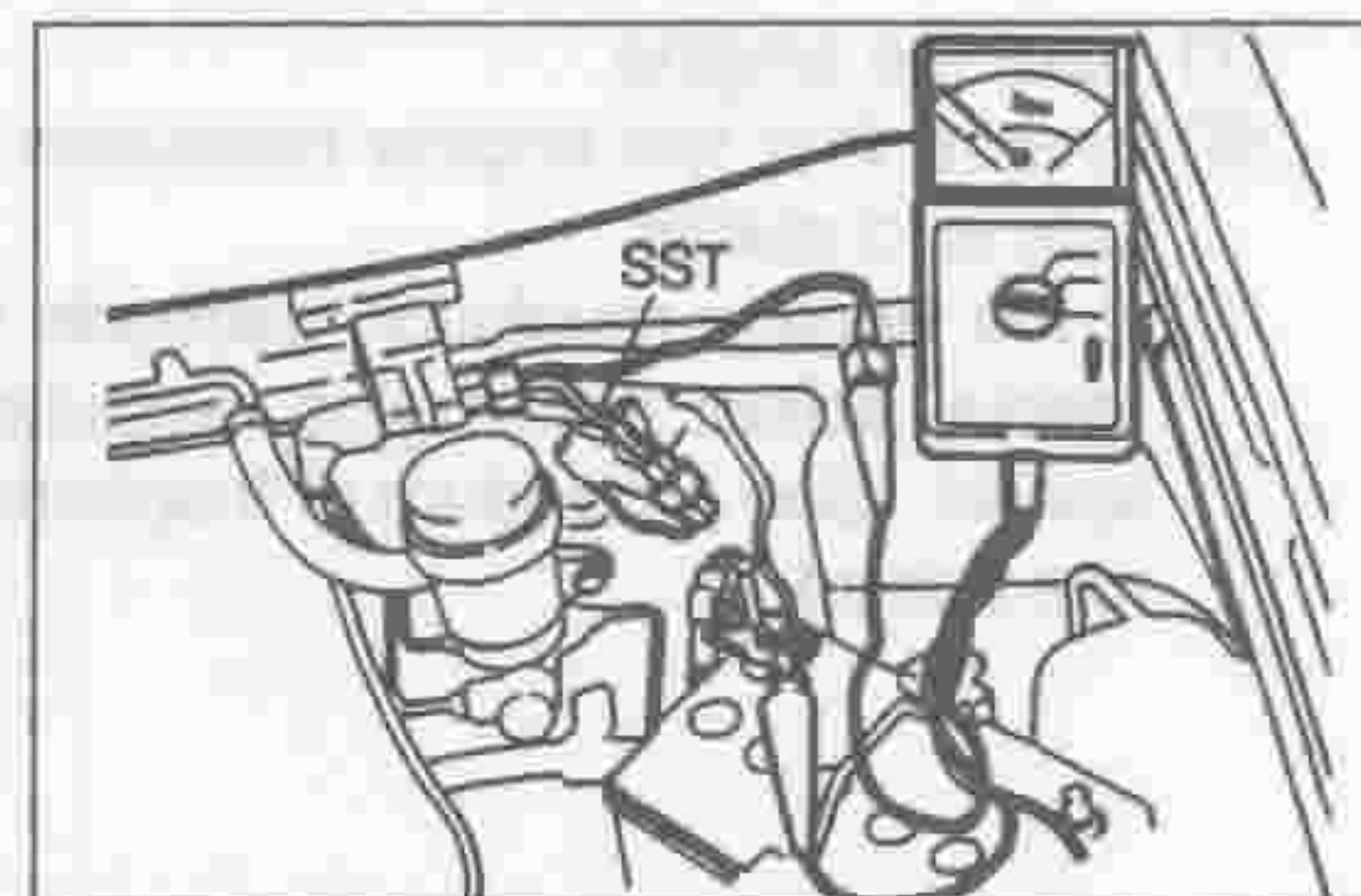
LEMA00145-00000

- (1) Warm up the engine thoroughly.
- (2) Connect the measuring terminal of a tachometer to the engine.

NOTE:

- If your tachometer is of such a type that it is to be connected to the negative terminal of the ignition coil, connect the following SST to the ignition coil connector. Then, connect the measuring terminal of the tachometer to the SST.

SST: 09991-87604-000



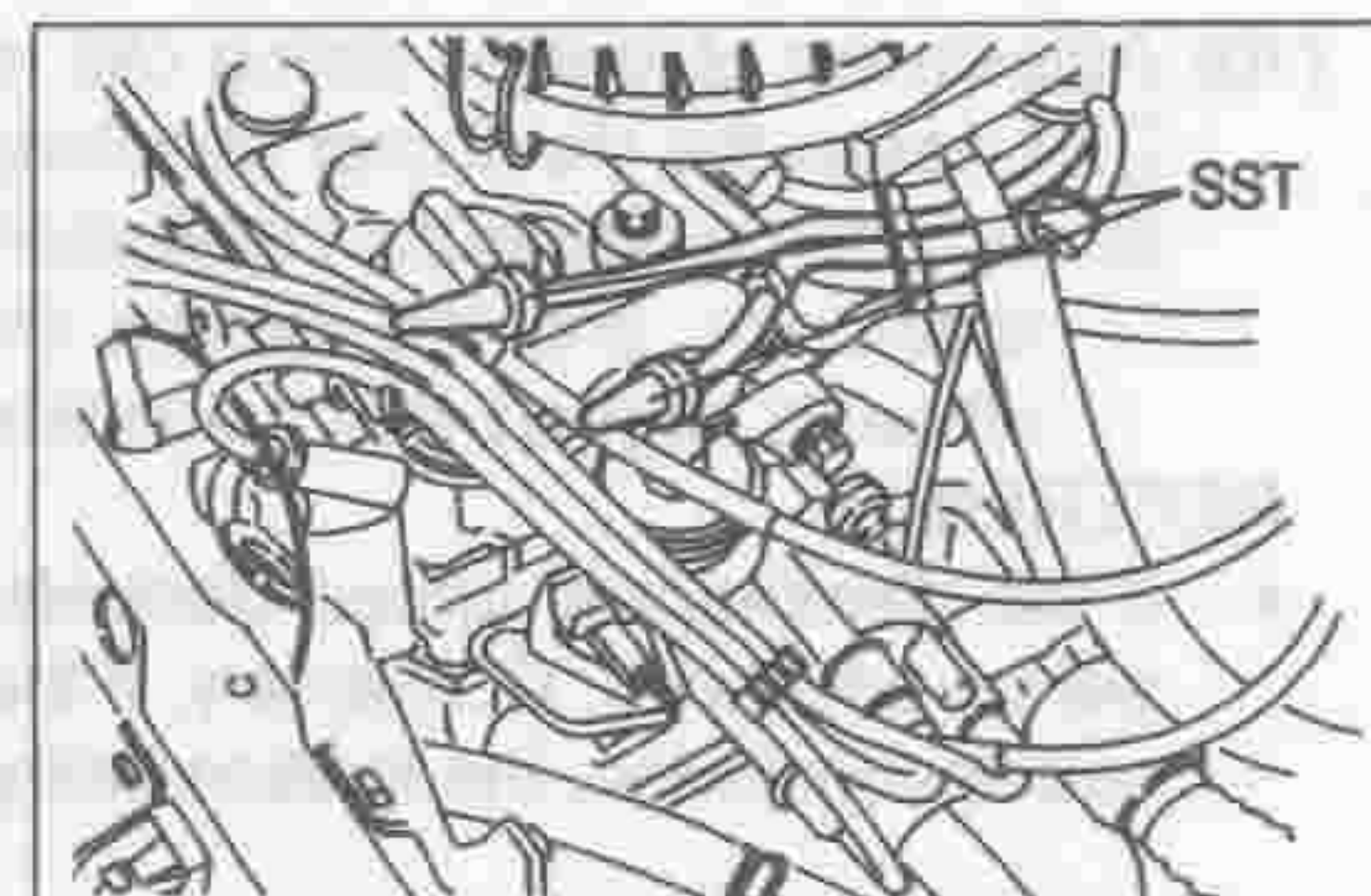
LEMA00146-00138

CAUTION:

- Never allow the tachometer terminal to touch with the ground. It could result in damage of the ignition system.
- As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility of your tachometer with this ignition system prior to use.

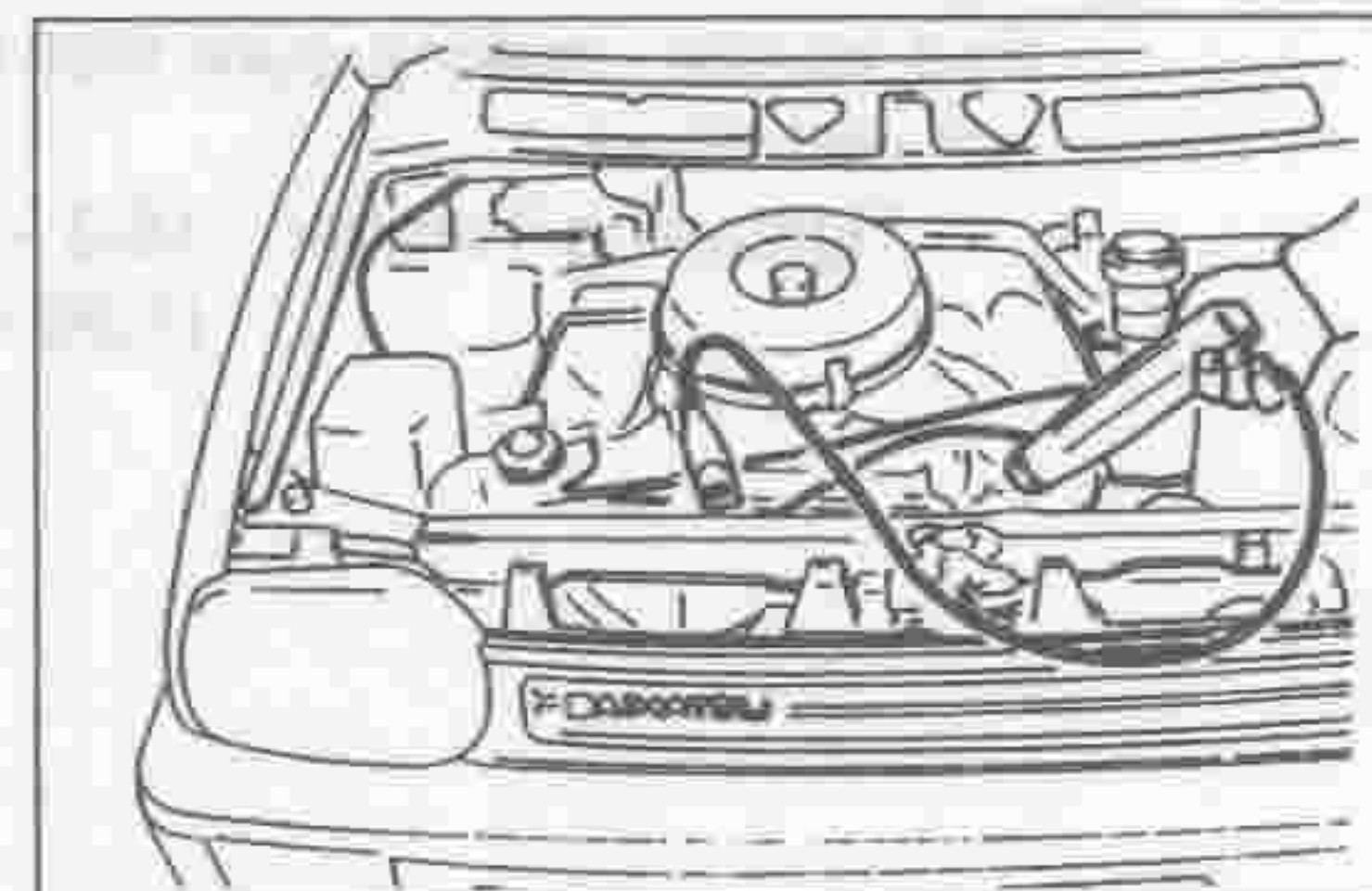
- (3) Disconnect the vacuum hoses from the vacuum advancer of distributor.
- (4) Plug the disconnected vacuum hoses, using the following SST.

SST: 09258-00030-000



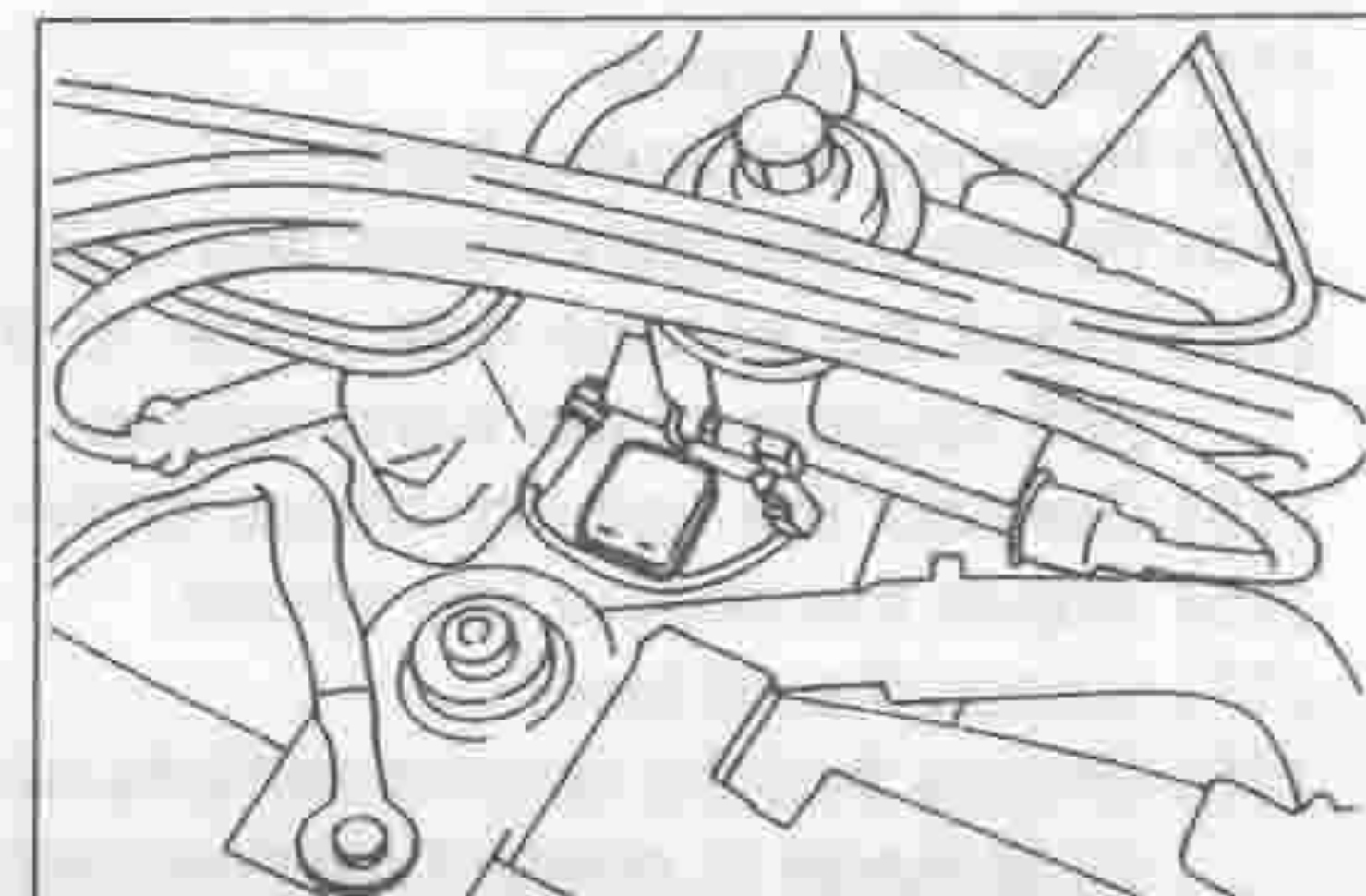
LEMA00147-00139

- (5) Connect a timing light to the resistive cord of the No. 1 cylinder (at the timing belt side).



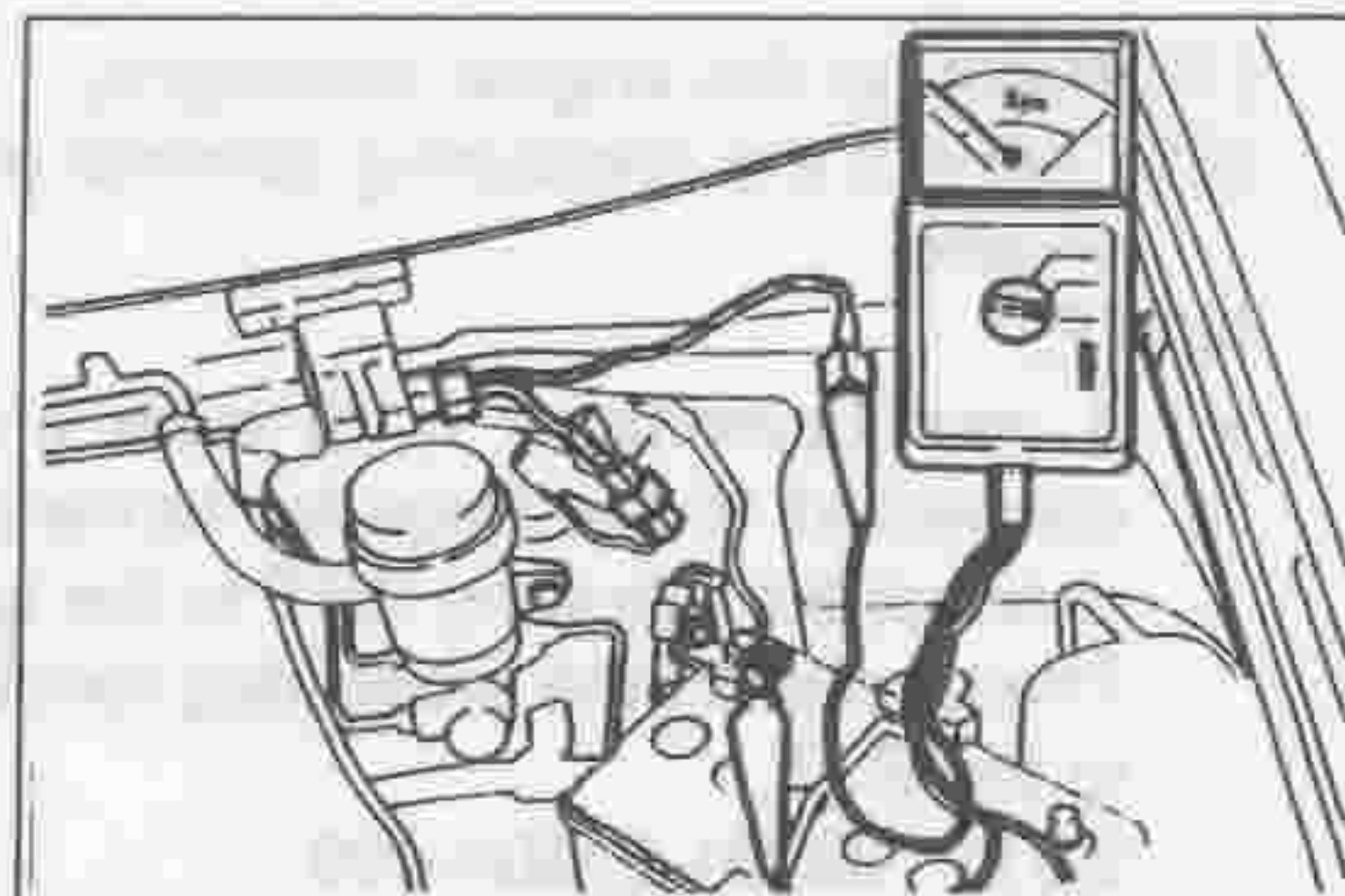
LEMA00148-00140

- (6) Remove the service hole cover from the upper side of the bell housing of the transmission.



LEMA00149-00141

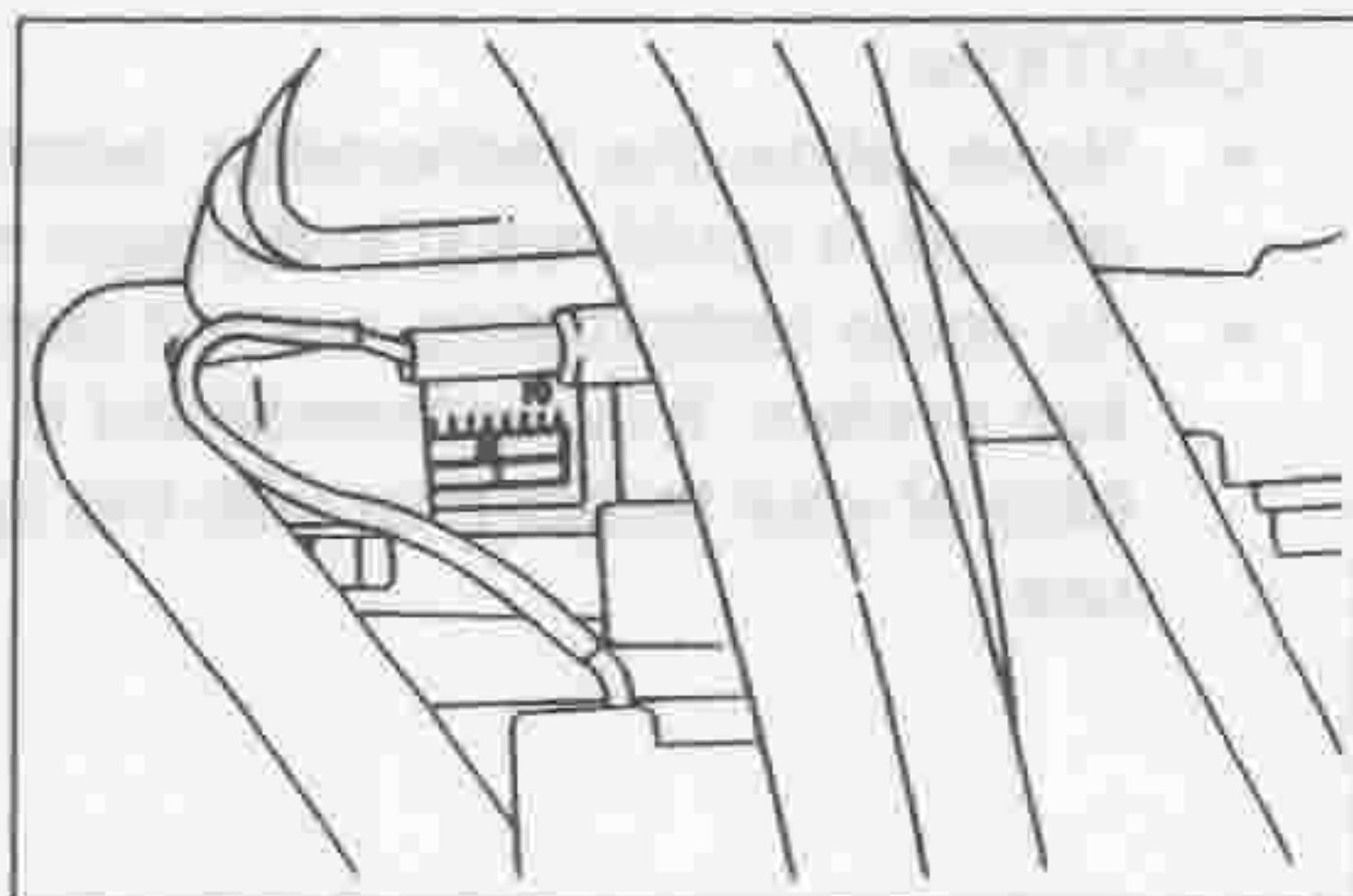
- (7) Start the engine.
- (8) Ensure that the engine revolution speed is under 900 rpm and stable.
If the engine revolution exceeds 900 rpm or it is unstable, adjust the engine revolution speed to the idle speed. (See procedure of Inspection and adjustment of idle speed.)



LEMA00150-00142

- (9) Check to see if the ignition timing mark of the flywheel is aligned with the indicator.

Ignition Timing: 5 ± 2 BTDC/900 rpm

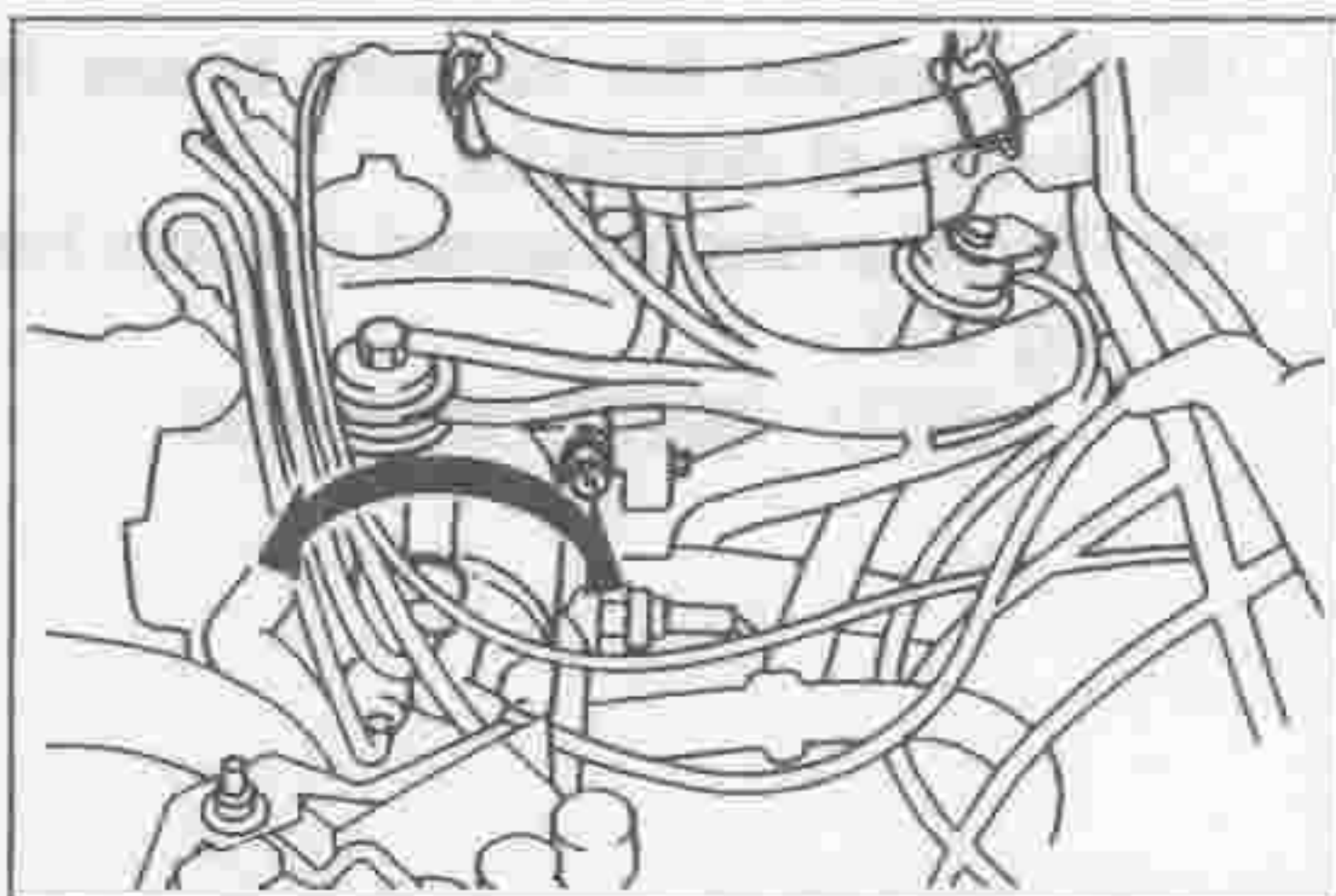


LEMA00151-00143

- (10) Adjustment of ignition timing (As required)
 - ① Loosen the distributor attaching bolts.
 - ② Adjust the distributor installation angle by turning the distributor, until the ignition timing mark of the flywheel is aligned with the indicator.

REFERENCE:

- If the distributor is turned clockwise, the ignition timing will be advanced. Conversely, if the distributor is turned counterclockwise, the ignition timing will be retarded.



LEMA00152-00144

- ③ Tighten the distributor attaching bolts to the specified torque, making sure that the ignition timing is not disturbed.

Tightening Torque: $15.3 - 22.9$ N·m
($1.56 - 2.34$ kgf-m)

- (11) Stop the engine.
- (12) Remove the timing light.
- (13) Remove the tachometer and SST.
- (14) Install the service hole cover to the upper side of the bell housing of the transmission.
- (15) Connect the vacuum hoses to the vacuum advancer.
- (16) Adjust the engine idle speed.
- (17) Check the oil level.
- (18) Ensure that the engine exhibits no oil leakage. If any oil leakage is present, perform repairs, as required.

8. Inspection and adjustment of idle speed [ED-10 Engine]

NOTE:

- Do not perform the engine idle speed adjustment while the fan motor is functioning.

Preparation to be made prior to idle speed adjustment

- Warm up the engine thoroughly. (Continue engine warming-up for another 10 minutes after the cooling fan motor has started its operation.)
- Ensure that all accessory switches are turned OFF.
- Ensure that the air cleaner element is installed.
- Ensure that all vacuum hoses are connected.
- Ensure that the intake system exhibits no air leakage.
- Ensure that the exhaust system exhibits no air leakage.
- Ensure that the shift lever is placed in the neutral range.
- Apply the parking brake fully.
- Ensure that the accelerator cable is adjusted properly.
- Ensure that the choke cable is adjusted properly.
- Ensure that the choke knob has been returned to its original position completely.

LEMA00154-00000

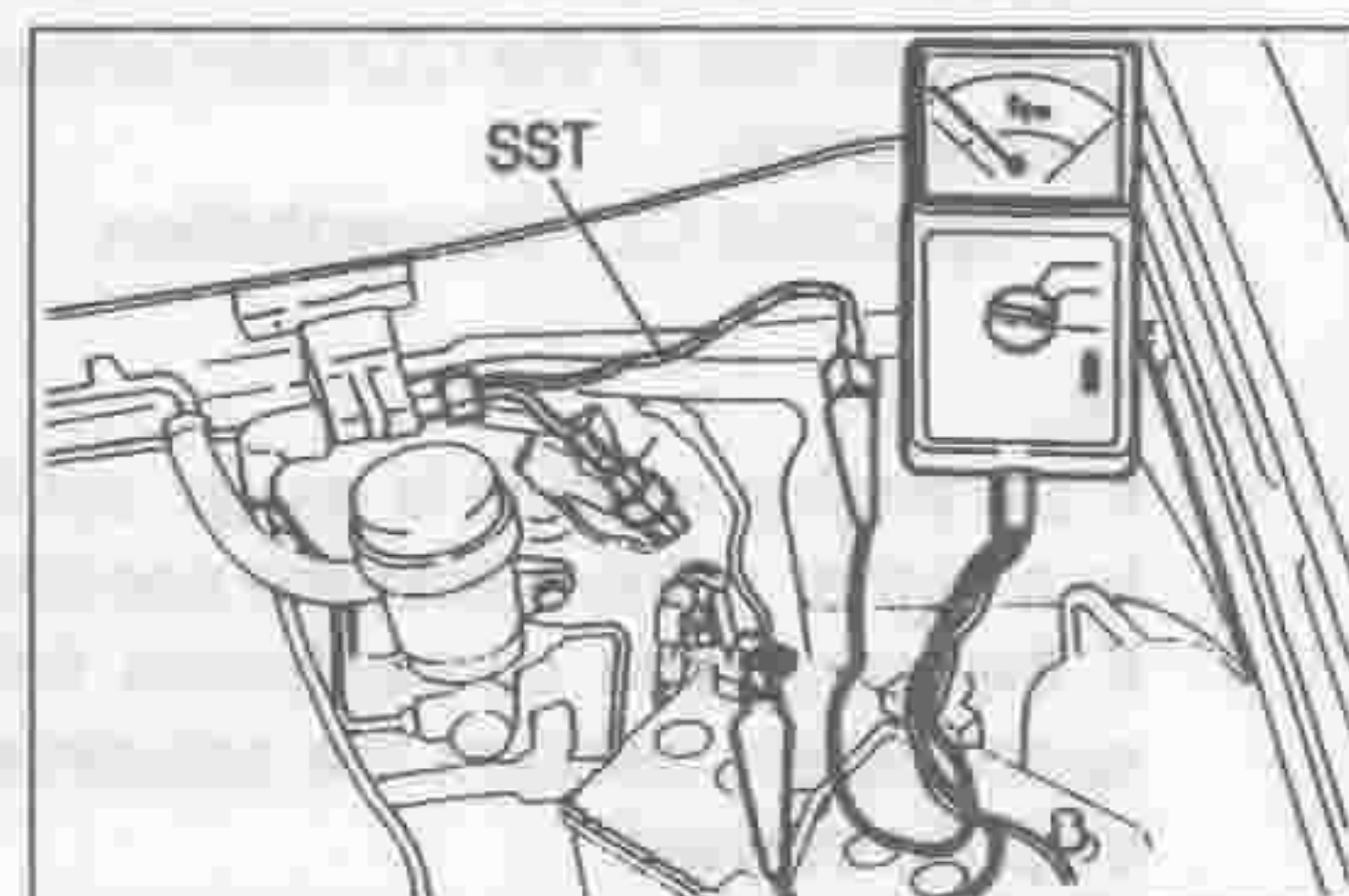
(1) Connection of tachometer

Connect the measuring terminal of a tachometer to the engine.

NOTE:

- If your tachometer is of such a type that it is to be connected to the negative terminal of the ignition coil, connect the following SST to the ignition coil connector. Then, connect the measuring terminal of the tachometer to the SST.

SST: 09991-87604-000



LEMA00155-00145

CAUTION:

- Never allow the tachometer terminal to touch with the ground. It could result in damage of the ignition system.
- As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility of your tachometer with this ignition system prior to use.

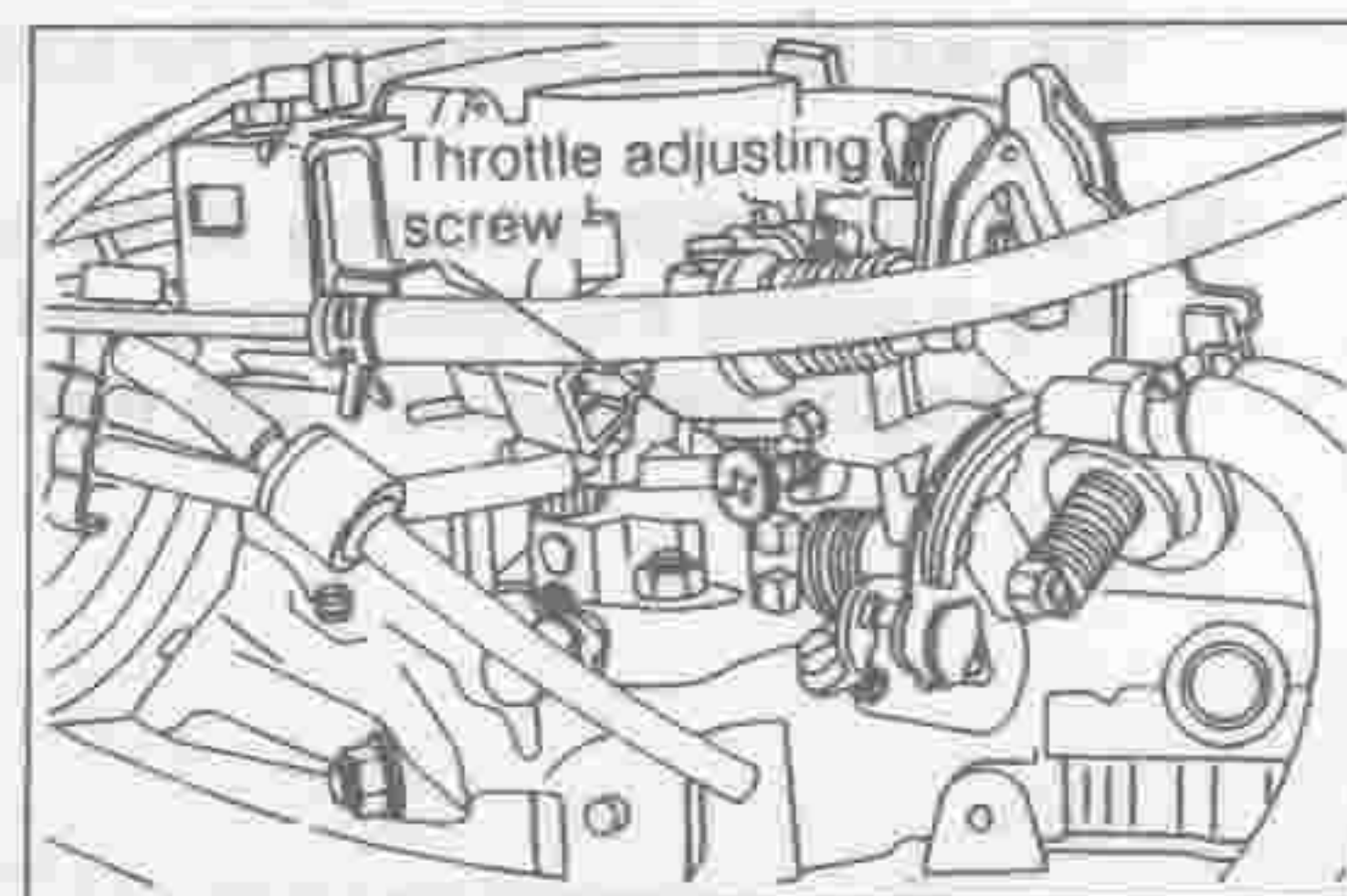
LEMA00156-00000

(2) Race the engine at about 2,000 rpm for about 20 seconds.

(3) Adjust the throttle adjusting screw so that the engine idle speed may become the specified value.

Specified Idle Speed: 900 $\begin{smallmatrix} +100 \\ -50 \end{smallmatrix}$ rpm

- Turn off the ignition switch.
- Remove the tachometer.
- Remove the SST.
- Connect the Ignition coil.



LEMA00157-00146

9. Check and adjustment of CO/HC concentrations [ED-10 Engine]

NOTE:

- Do not perform the measurement while the radiator cooling fan motor is still functioning.

Preparation to be made prior to check and adjustment of CO/HC concentrations.

- Use the SST (09243-87201-000) to adjust the idle mixture adjusting screw.
- Be sure to prepare the CO/HC meter by following with the instruction of its manufacturer before put into use.

(CO adjustment)

- Insert the sampling pipe of the CO/HC meter into the exhaust pipe.
- Adjust the idle speed.
(See page MA-41.)

NOTE:

- Do not remove the tachometer.

- Race the engine at approximate 2,000 rpm for about 20 seconds.
- Measure the CO concentration at the idle speed.
Check to see if the CO concentration conforms to the specification.

Specified CO Concentration: $1.5 \pm 0.5 \%$

NOTE:

- If the engine rotation is rough, set the CO concentration to a higher value within the specifications.
- If the measured concentration fails to conform to the specification, perform the adjustments described in the step (5) onward.

- Gradually turn the idle mixture adjusting screw, using the following SST, so that the CO concentration may conform to the specification.

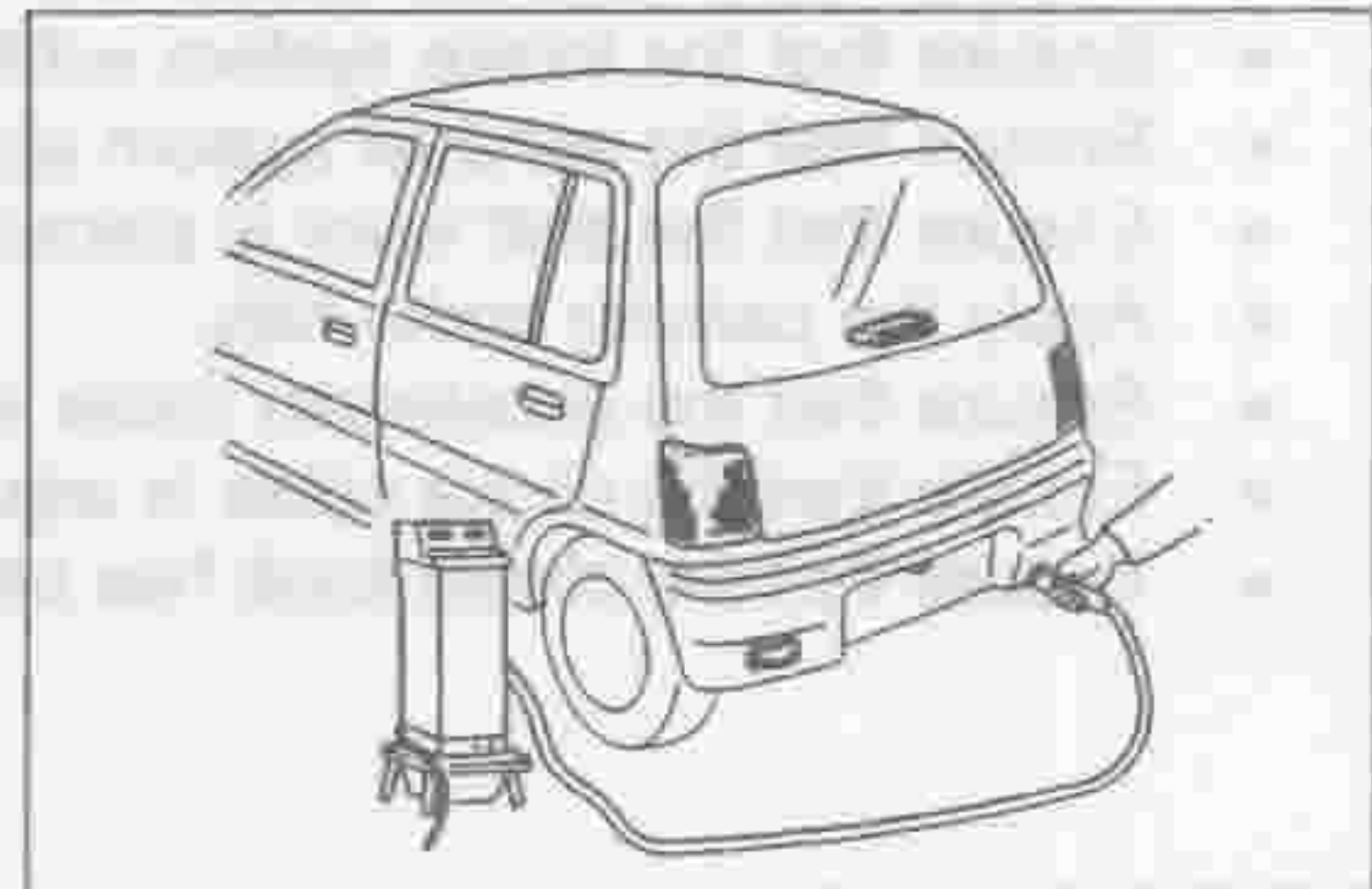
SST: 09243-87201-000

NOTE:

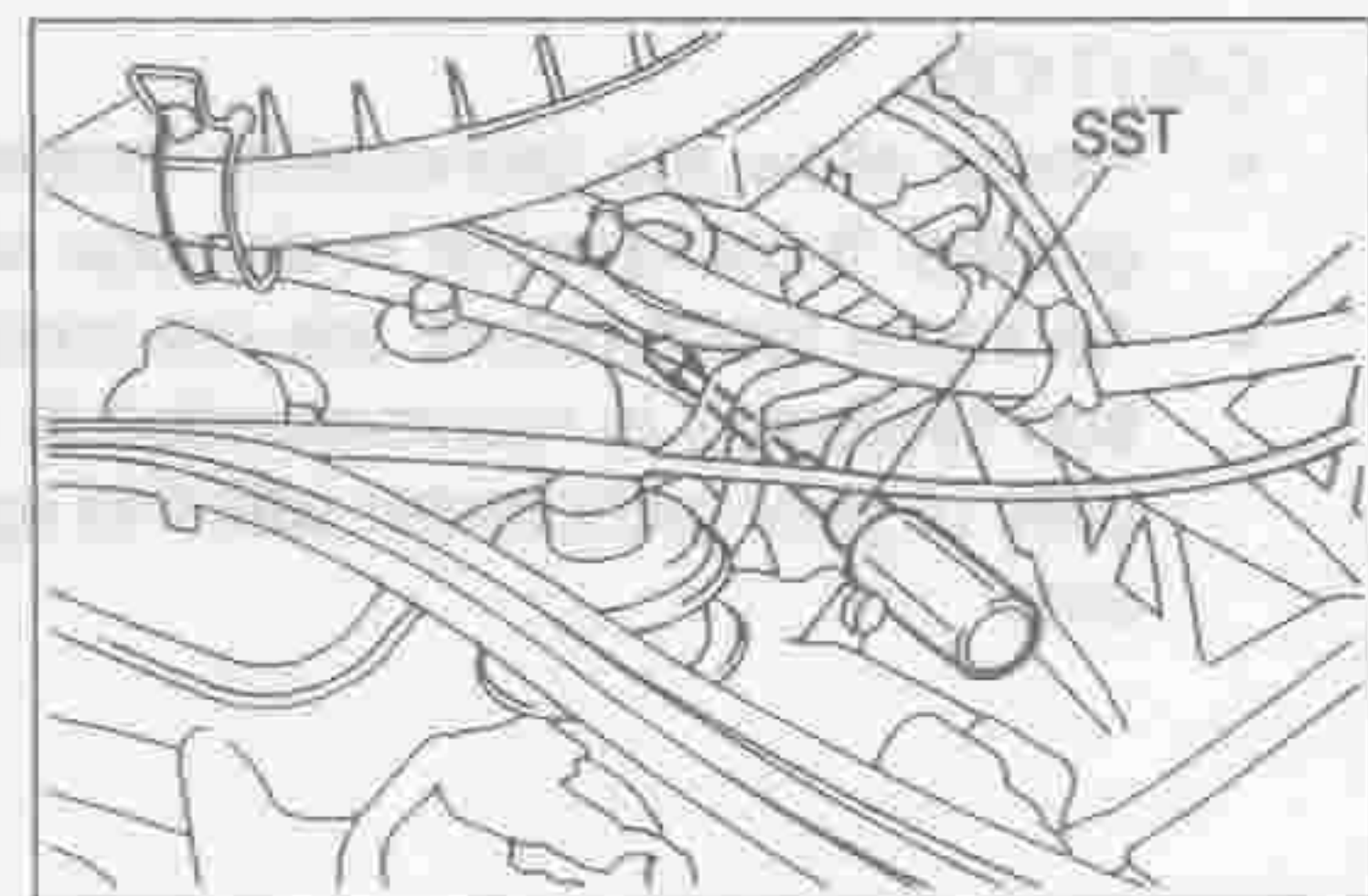
- If the CO concentration is greatly deviated from the specification, set the mixture condition to the initial setting. The initial setting can be achieved first by setting the idle mixture adjusting screw to the fully-closed position and then by backing off the screw four and half turns.

- Turn the throttle adjusting screw so that the idle speed may become the specified speed.

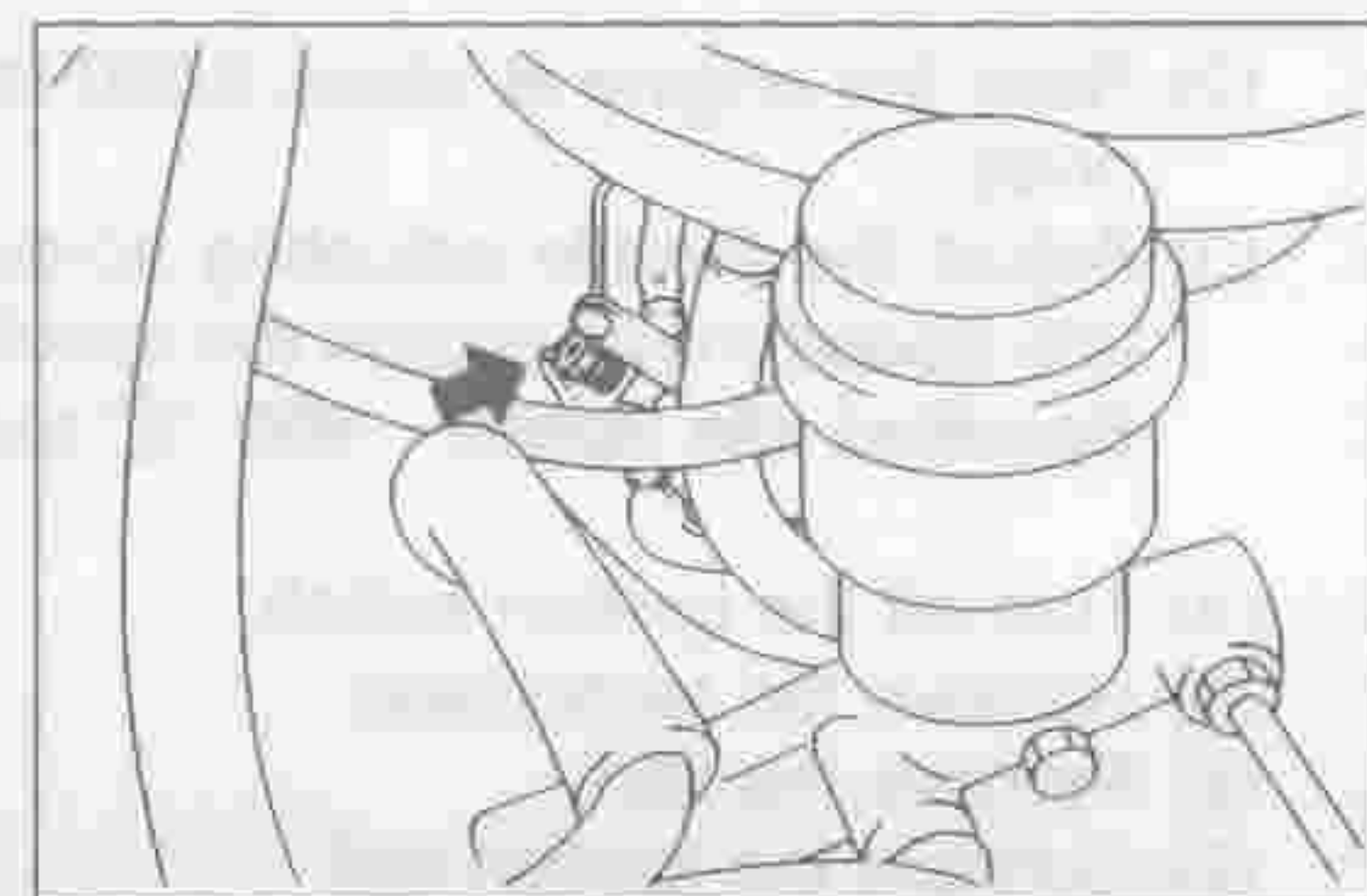
Engine Idle Speed: 900 rpm



LEMA00159-00147



LEMA00160-00148



LEMA00161-00149

(7) Measurement of CO concentration

Check to see if the CO concentration conforms to the specification.

Specified CO Concentration: $1.5 \pm 0.5 \%$

If the CO concentration fails to conform to the specification, perform the operations described in the step (3) onward.

However, if the repeated adjustment will not get the conformity to the specification, carry out the trouble shooting in accordance with the table mentioned below.

LEMA00162-00000

(HC adjustment)

(8) Measure the HC concentration at the idle speed.

Check to see if the HC concentration conforms to the specification.

Specified HC Concentration: Not exceed 2000 PPM

If the measured concentration fail to conform to the specification, carry out the trouble shooting in accordance with the table mentioned below.

Possible Causes for Improper CO/HC Concentrations

Possible causes	CO concentration	HC concentration	Remarks
Improper CO concentration		○	
Improper valve clearance		○	Check compression pressure
Improper valve seating		○	
Ignition system problems Spark plugs Resistive cord Distributor Ignition coil	○	○	
Air leakage in intake system	○		
HIC valve malfunctioning	○		
Great mechanical loss of engine inner parts	○		

(9) Turn OFF the ignition switch.

(10) Disconnect the sample hose of the CO/HC meter from the engine.

(11) Remove the tachometer from the engine.

(12) Start the engine. Ensure that the engine runs smoothly.

LEMA00163-00000

10. Change of coolant

WARNING:

- Never open the radiator cap when the engine is still hot.

CAUTION:

- As regards water to be used cooling water, use soft water which does not contain salts of minerals, calcium, magnesium and so forth.
- If the coolant gets to the vehicle body, immediately flush away the coolant, using fresh water.

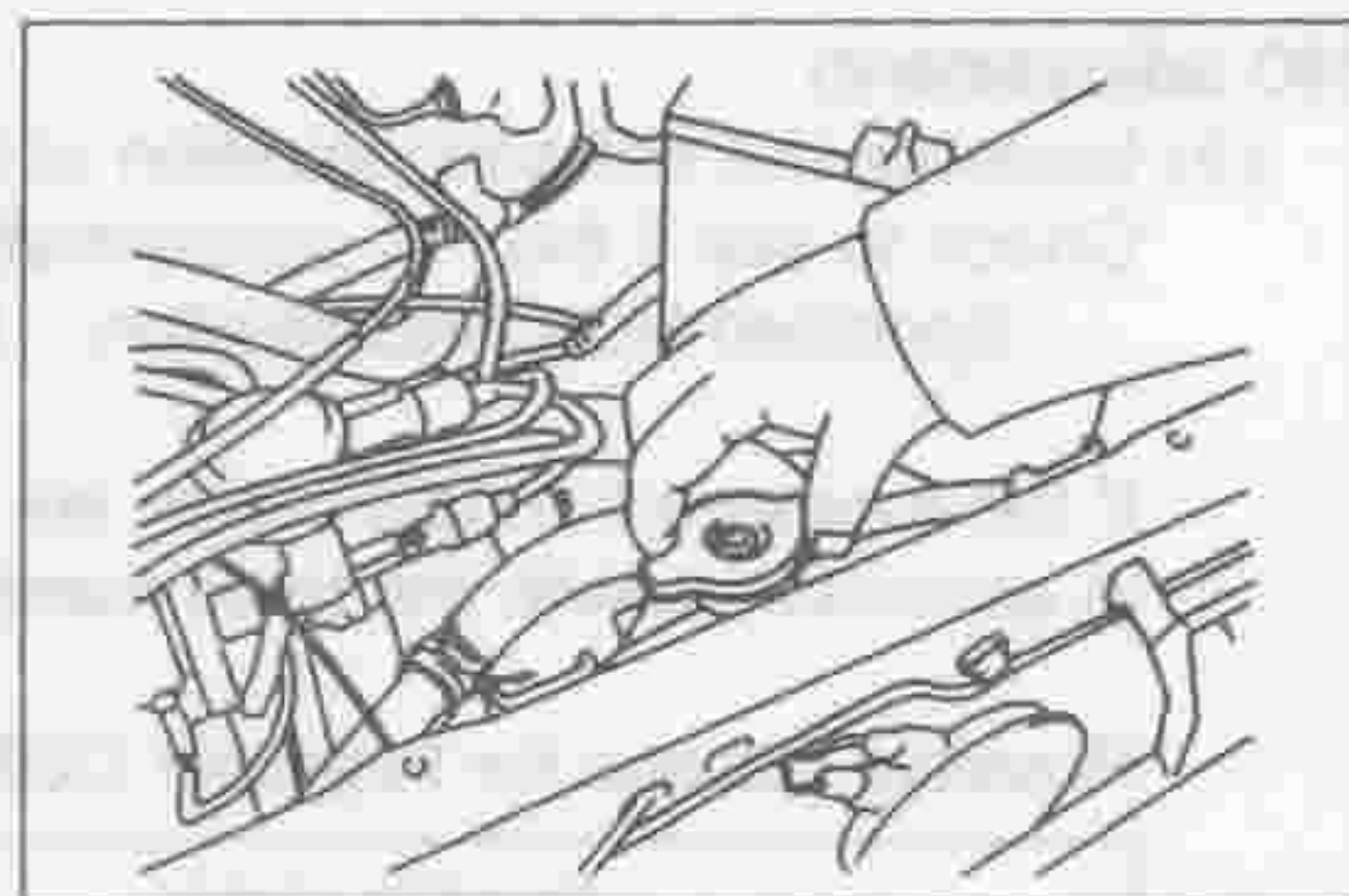
- (1) Ensure that the coolant temperature is nearly the ambient temperature.
- (2) Turn the radiator cap one step in an opening direction (counterclockwise direction) until you feel the first resistance.
- (3) Lightly press the radiator cap for two three times to release the inner pressure of the radiator.
- (4) Close the radiator cap.
- (5) Place an adequate container under the drain plug.
- (6) Drain the coolant by loosen the drain plug.
- (7) Remove the radiator cap.
- (8) Drain the coolant in the reserve tank.
- (9) Close the drain plug, after draining the coolant.
- (10) Fill the water to the radiator and reserve tank.
- (11) Start the engine.

NOTE:

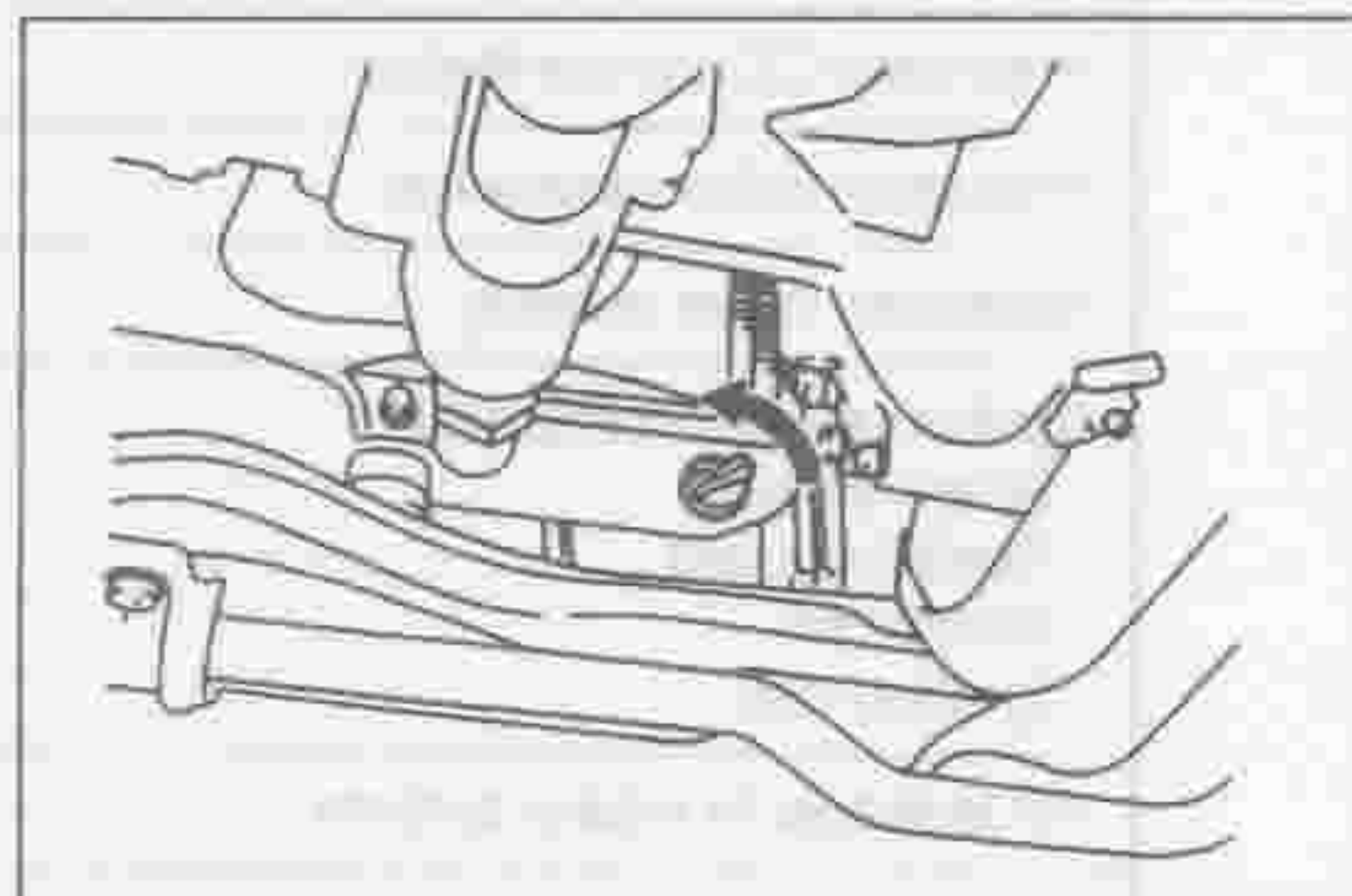
- If the water level in the radiator drops, replenish the water to full level.

- (12) Close the radiator cap.
- (13) Warm up the engine.
- (14) Stop the engine.
- (15) Cool down the water temperature to the ambient temperature.
- (16) Repeat the steps (1) through (15) two or three times.
- (17) Ensure that the coolant temperature is nearly the ambient temperature.
- (18) Turn the radiator cap one step in an opening direction (counterclockwise direction) until you feel the first resistance.
- (19) Lightly press the radiator cap for two three times to release the inner pressure of the radiator.
- (20) Close the radiator cap.
- (21) Place an adequate container under the drain plug.
- (22) Drain the water by loosen the drain plug.
- (23) Remove the radiator cap.
- (24) Drain the water in the reserve tank.
- (25) Replace the O-ring of the radiator drain plug with new one, after draining the water.
- (26) Install the radiator drain plug to the radiator securely.
- (27) Slowly pour a proper amount of antifreeze solution into the radiator in accordance with the instruction of the manufacturer of antifreeze solution.

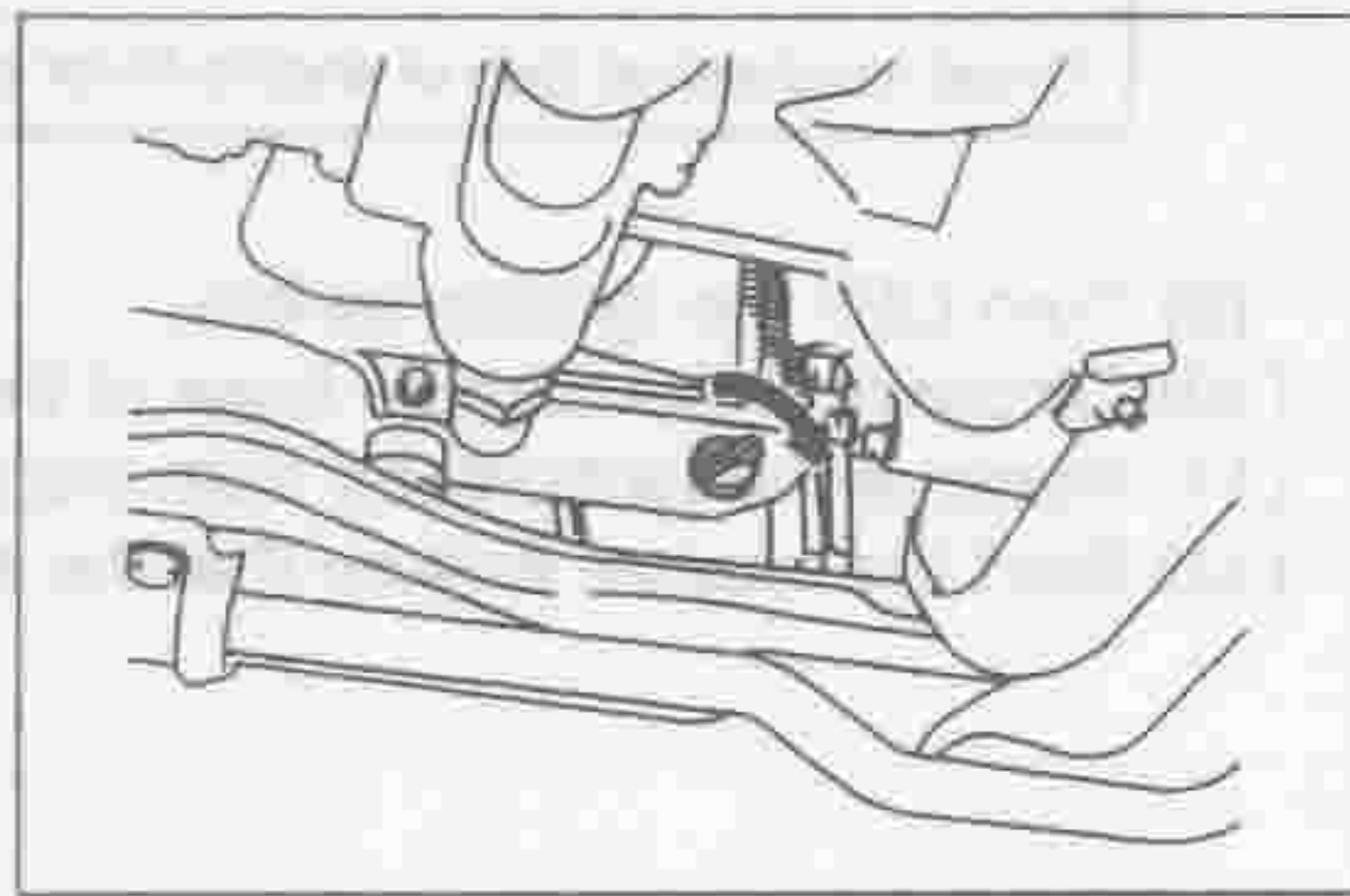
LEMA00164-00000



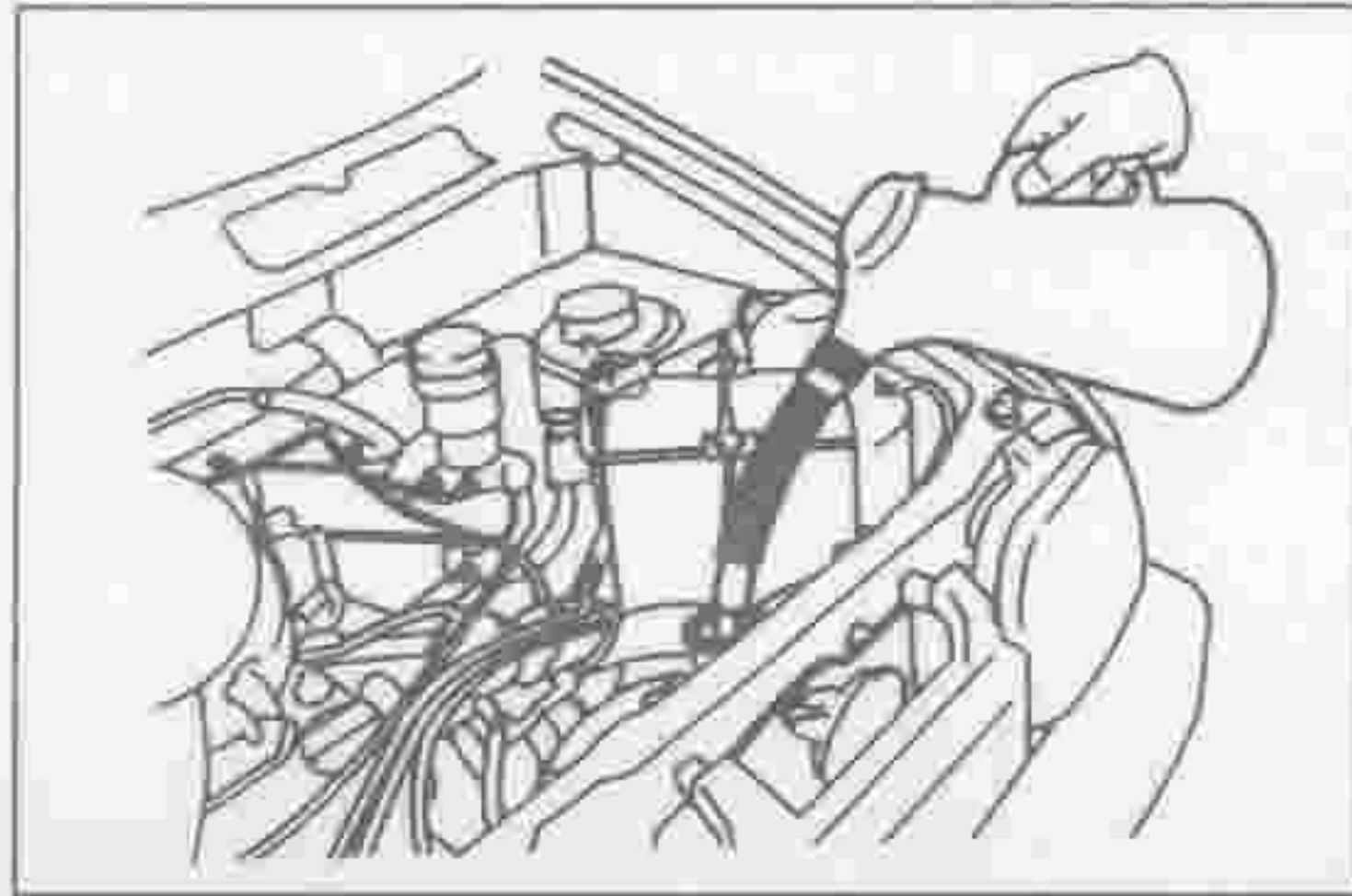
LEMA00165-00150



LEMA00166-00151



LEMA00167-00152



LEMA00168-00153

CAUTION:

- Use a good brand of ethylene-glycol base antifreeze solution.

Coolant Capacity:

Unit: Liter

	EF-EL Engine	ED-20 Engine	ED-10 Engine
General specification	—	—	3.4
European specification	—	3.4 M/T, 3.3 A/T	—
Hong Kong specification	3.3 M/T 3.5 A/T	—	—
Australian specification		—	—

NOTE:

- The amount above includes 0.6 liter for the reserve tank.

(28) Fill the water to the radiator and reserve tank.

(29) Start the engine.

NOTE:

- If the water level in the radiator drops, replenish the water to full level.

(30) Close the radiator cap.

(31) Ensure that no water leakage is present.

If water leakage is present, repair the water leakage.

(32) Warm up the engine, until the radiator fan motor starts to rotate.

(33) Stop the engine.

(34) Cool down the coolant temperature to the ambient temperature.

(35) Ensure that the coolant level in the reserve tank is not decrease.

If the coolant level in the reserve tank is decreased excessively or no coolant remain in the reserve tank, check the coolant level in the radiator whether coolant in the radiator is in full or not. If not replenish the water to the radiator, and repeat the steps (28) through (35) again.

(36) Turn the radiator cap one step in an opening direction (counterclockwise direction) until you feel the first resistance.

(37) Lightly press the radiator cap for two three times to release the inner pressure of the radiator.

(38) Remove the radiator cap.

(39) Ensure that the concentration of antifreeze solution in the radiator is meets to the instruction of the manufacturer of antifreeze solution by the densitometer.

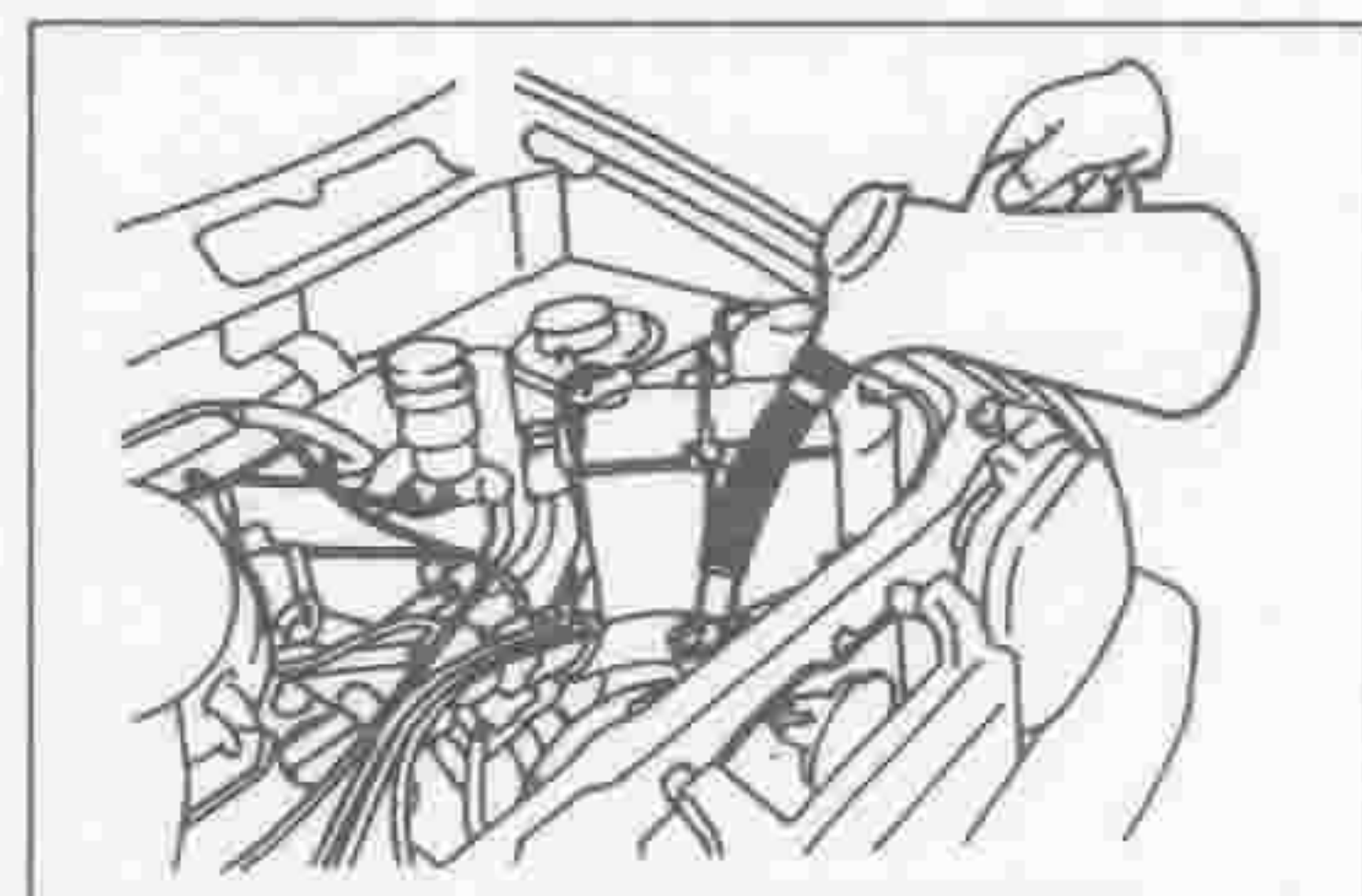
Adjust the concentration of the antifreeze solution in the radiator to the instruction of the manufacturer of antifreeze solution, if concentration dose not meets to the instruction of the manufacturer of antifreeze solution.

(40) Secure the radiator cap.

(41) Drain the water in the reserve tank.

(42) Pour the coolant as mixed with antifreeze solution and water in accordance with the instruction of the manufacturer of antifreeze solution to the full level of the reserve tank.

(43) Secure the reserve tank cap.



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