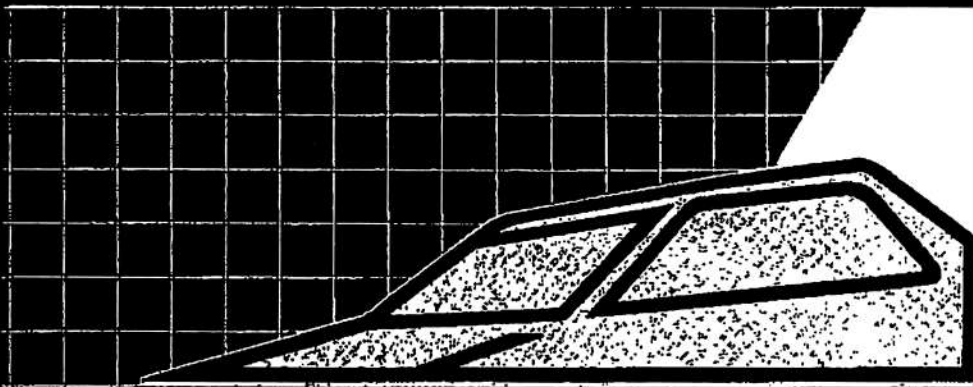

Autozam
AZ-1
Service Manual



E - P G 6 S A

1992-10 WM3035 ① **AUTOZAM**

Service Information

Service Manager

AUTOZAM Corporation
Service department

Date 1992.10.16 P. 1/1

Archive from	End of year 95	Archive until	End of year —
情報名	発行年	No.	
整備資料	1992	019⑤	

拠点

Maintenance Material

Preamble to the AZ-1 LSD disassembly and assembly procedure

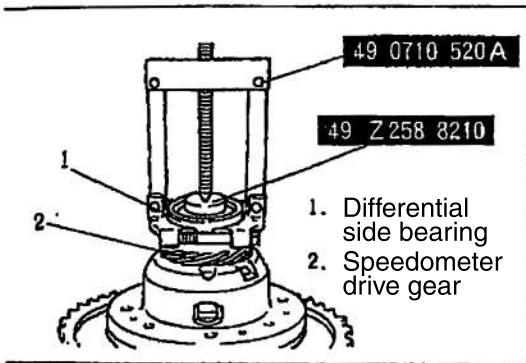
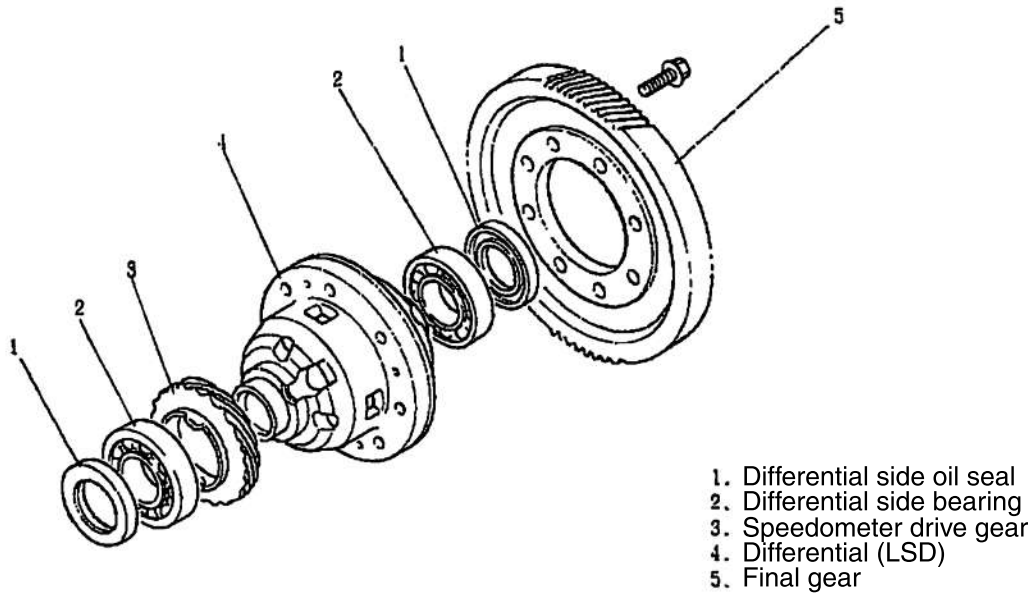
This section is about the LSD (Limited Slip Differential) of the AZ-1. Disassembly and assembly are described. Please use this section as LSD assembly instructions.

This section of the document is to be used in conjunction with the AZ-1 Service Manual (WM3035, 1992-10).

Related sections: B, J, M of WM3035.

Disassembly

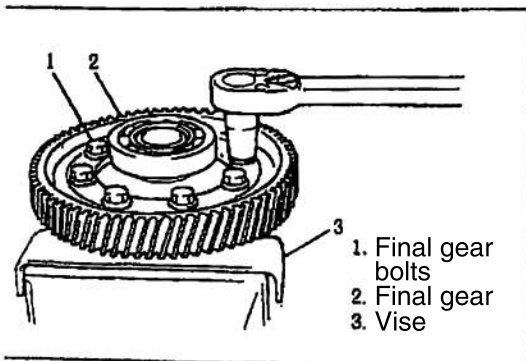
Differential (LSD)



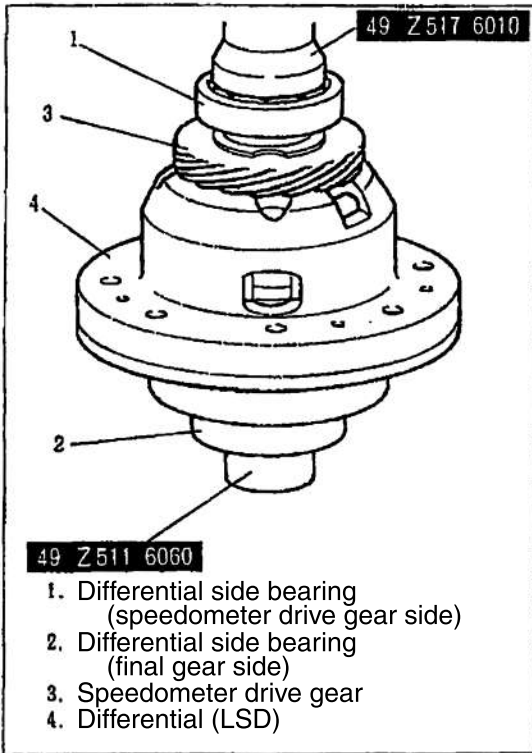
Disassembly

Procedures for disassembling the transmission are described in the service manual (WM 3035) section J

1. Remove the differential side bearings using the SST.
2. Remove the speedometer drive gear.



3. Remove the final gear.



Assembly

Assembly is the reverse of disassembly, but please pay attention to the following points.

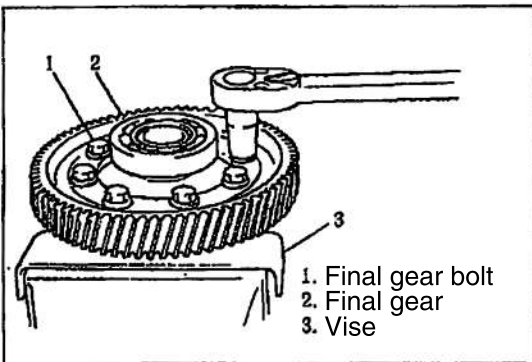
- Using the SST, press in the differential side bearing.

Note: The left and right differential side bearings are different sizes. Be careful.

Differential side bearing outer diameters:

Speedometer drive gear side: 62mm

Final gear side: 72mm



- Tighten the final gear bolts to the specified torque.

Torque: 79 - 98 N·m (8.0 - 10.0 kg f·m)

Autozam AZ-1

Service Manual

E - PG6SA series (PG6SA-100001)

Preface

This book describes maintenance procedures for the AZ-1.

Please read it carefully, and note that the following documents are available with additional information:

Related Documents

AZ-1 Service Manual (1992-10)
(Document No. WM3035)

AZ-1 Electrical Wiring Diagram (1992-10)
(Document No. WM3012)

AZ-1 Service Schedule (1992-10)
(Document No. WM3016)

AZ-1 Body Repair Manual (1992-10)
(Document No. WM3037)

This book is based on the vehicle as of October 1992.
Because the specification of the vehicle may change over time, be aware that the contents of this manual may not be consistent with future revisions.

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Maintenance Schedule	A
Engine	B
Lubrication System	D
Cooling System	E
EFI and Emission Controls	F
Engine Electrical	G
Clutch	H
Manual Transmission	J
Front and Rear Axles	M
Steering	N
Brakes	P
Wheels and Tyres	Q
Suspension	R
Body Exterior and Interior	S
Body Electrical Equipment	T
Heater and Air Conditioning	U
Servicing Table	TD
Special Service Tools	ST

How to use this book	G I – 2
Description	G I – 2
The structure of explanations	G I – 2
Symbols for Lubricant Application	G I – 3
Symbols for Special Service Tools	G I – 3
Glossary of Terms	G I – 3
Notes on Maintenance	G I – 4
Before Starting Maintenance Work	G I – 4
Working Safely	G I – 4
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How to use this book

What this book contains:

This manual gives an overview of the car from a practical perspective, and describes maintenance and troubleshooting procedures.

The Structure of Explanations

Work Procedures

1. At the beginning of each section about a certain part of the vehicle, a component parts diagram is given to show the name of the components in the overall assembly, and the way they are mounted.
2. The numbers in the component parts diagram correspond to work procedures. Also, any lubricant application, use of special service tools (SSTs), non-reusable parts, and the tightening torque will also be shown in the illustration.
3. Related procedures and processes are described below the component parts diagram.
4. Refer to the numbering in the component diagram when carrying out the procedures.

Example:

Indicates the type of lubricant to apply, and where it should be applied.

Indicates the prescribed torque to tighten to.*1

Maps the numbers in the diagram to work procedures.

Shows the main points of the procedure that are not shown in the component parts diagram.

Indicates that a Special Service Tool (SST) should be used.

Shows the work procedure number.

Indicates parts that are non-reusable.*2

Torque units

For parts requiring visual inspection, a description of the inspection is provided.

1. ロックナット
取外し時の留意点...p. M-5
取付け時の留意点...p. M-6

2. ブレーキ・キャリバASSY
整備.....セクションP

3. ディスク・プレート
点検.....セクションP

4. ボール・ジョイント
取外し時の留意点...p. M-5
取付け時の留意点...p. M-6

5. ロー・アーム

6. フロント・ホイール・ハブ、
ステアリング・ナックル
分解/点検/組付け.....
.....p. M-6

フロント・ホイール・ハブの損傷、亀裂を点検する
ステアリング・ナックルの損傷、亀裂を点検する
ダスト・カバーの損傷、変形を点検する

取外し時の留意点
ロックナット

注意
・取外したロックナットを再使用しない。
・タガネでドライブシャフトを損傷させない。







1. ブレーキを動作させ、ディスク・プレートを固定する。
2. タガネを使用して、ロックナットのカシメを起こした後、ロックナットを取外す。
3. ブレーキ・キャリバASSYをひも等で吊り下げる。

* 1 An example of a torque specification:
4.0 - 4.9N·m (40 - 50kg f·cm)

* 2 For diagrams showing both assembly and disassembly, "REPLACE" will be stated.
For diagrams showing only disassembly, "REPLACE" will also be stated.
However, diagrams showing only assembly will use the word "NEW" instead.

Symbols for Lubricant Application

In the component parts diagram, there are six types of fluids that may be applied, as shown in the table below.

Symbol	Meaning of Symbol	Types
	Oil (not ATF or brake fluid)	Engine oil, transaxle gear oil, etc.
	Brake fluid	Brake fluid
	Automatic transmission fluid (ATF)	Automatic transmission fluid (ATF)
	Grease	Multi-purpose grease
	Sealant	Gasket maker, etc.
	Petroleum jelly (e.g. Vaseline®)	General purpose petroleum jelly

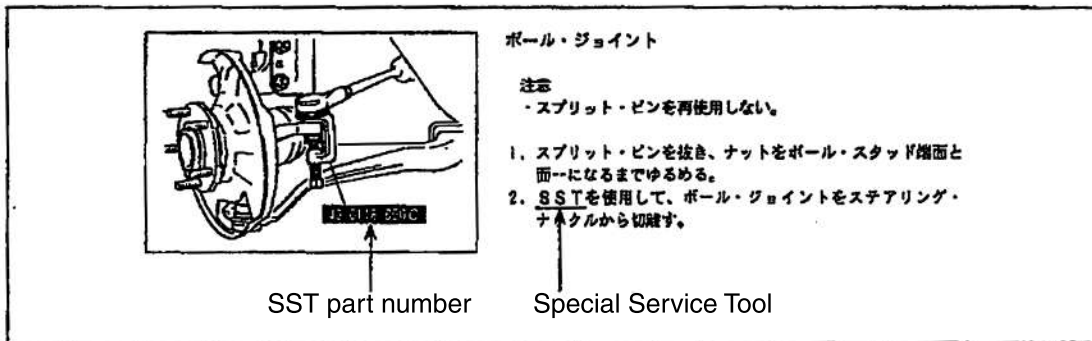
Note:

- For special oils and greases, the types and methods of application are described in the illustration.

Symbols for Special Service Tools

If a procedure requires a Special Service Tool, "SST" will be written in the instructions, and the required tool will be given in the illustration for the procedure.

Example:

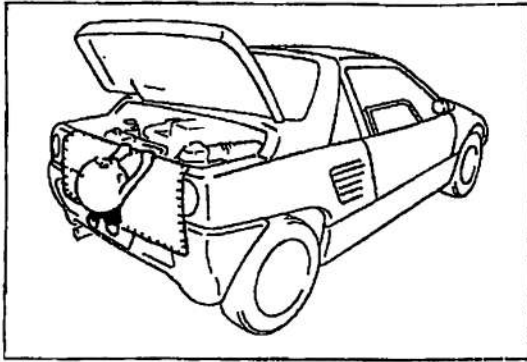


Glossary of Terms

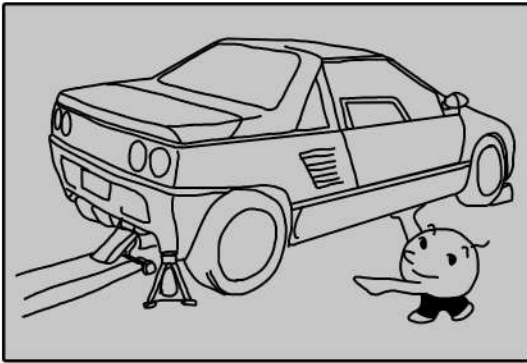
- Note : Additional information to help you efficiently carry out the repair.
- Caution : Indicates that there is the potential to damage the vehicle or parts if due care is not taken.
- Warning : Indicates that you SHOULD NOT perform an action.
- Standard value : The allowable range of values during assembly or adjustment.
- Inspection value : The allowable range of values for a component being inspected that is already on the vehicle.

GI

How to use this book

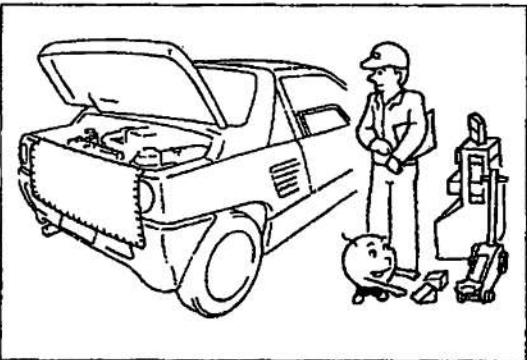
**Notes on Maintenance****Before starting maintenance work**

Always place a cover over the fender, seat, steering wheel, and floor.

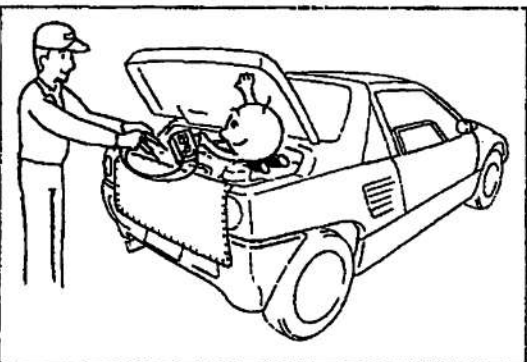
**Working safely**

When jacking the car up, be sure to follow these steps:

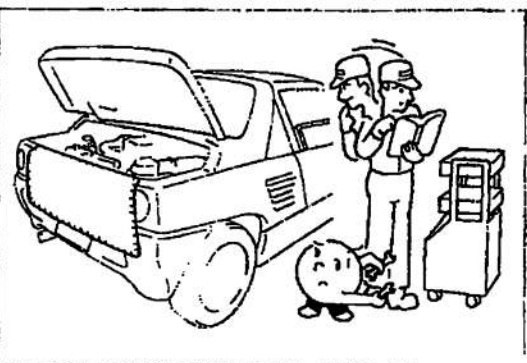
- Chock the wheels
- Only use the jack on the specified jack positions
- Once raised, place the car on jack stands (rigid rack)
- Always check the safety of the engine compartment before starting the engine

**Preparing tools and measuring instruments**

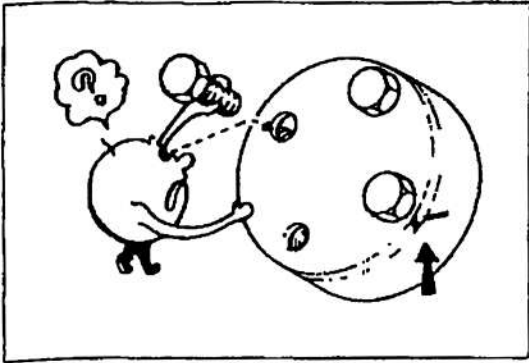
Set aside the tools you will need to carry out the work before you get started.

**Special Service Tools**

When the procedure calls for a particular Special Service Tool, be sure to use it.

**Troubleshooting process**

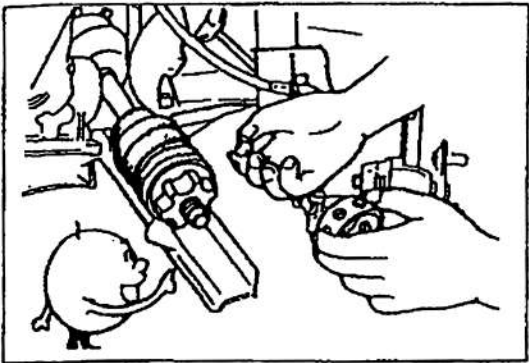
Find the defective part, remove it, and identify the cause of the failure, which may require disassembly.



Disassembling parts

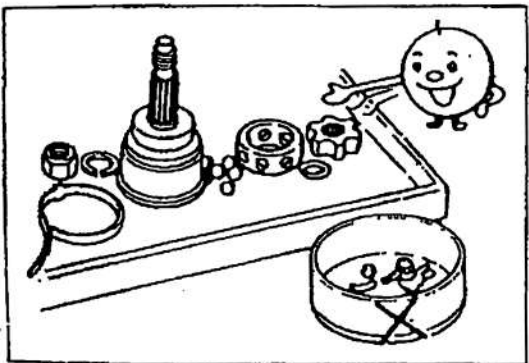
When disassembling complex parts, label the components and draw matchmarks to help with alignment so that the assembly will be easier. These marks should be in discreet locations that don't impede functionality.

G



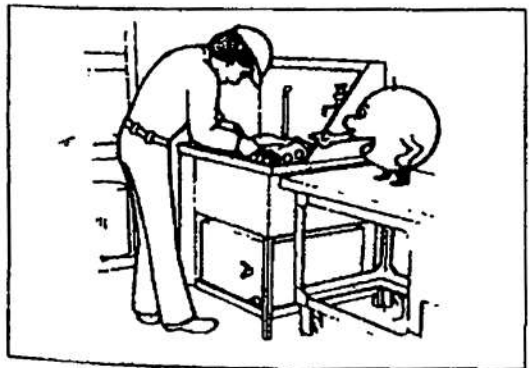
Inspecting disassembled parts

For every part which is removed from the car, check for damage, deformation, overall condition, etc.



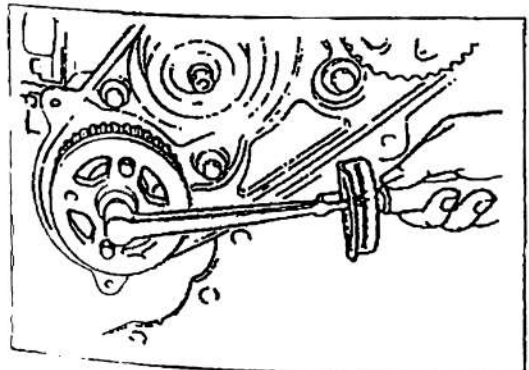
Organising disassembled parts

Arrange the disassembled parts in an orderly fashion.



Cleaning disassembled parts

Thoroughly clean parts that you intend to reuse.

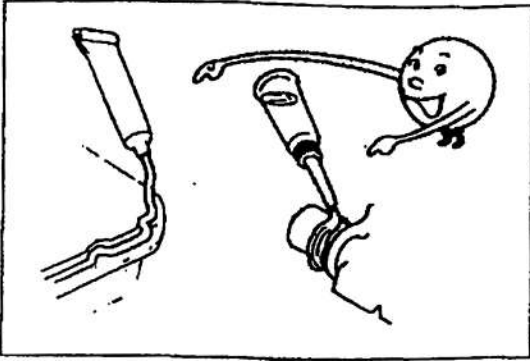


Reassembly

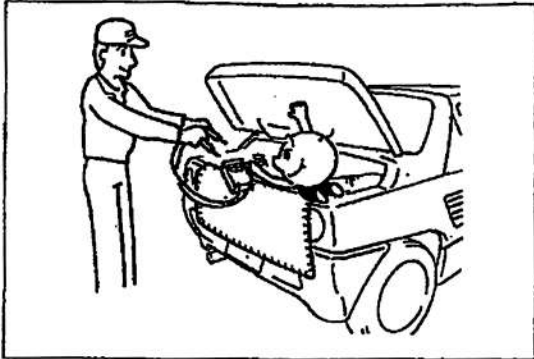
Assemble using working parts, in accordance with the procedures in this manual. Observe the standard values for tightening torque, adjustment values, timing numbers, etc.

As a general rule, when the following parts are removed, replace them with new parts instead of reusing the old ones:

- Oil seals
- Gaskets
- O-rings
- Locking washers
- Split pins
- Nylon nuts
- Spring pins

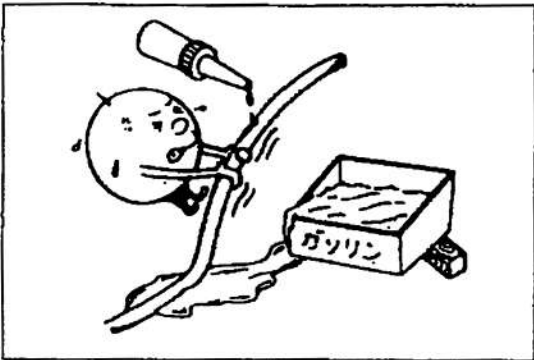


Some gaskets require sealant to be applied. Likewise, sliding parts and oil seals require a coating of oil or grease. Apply these as specified in the manual.



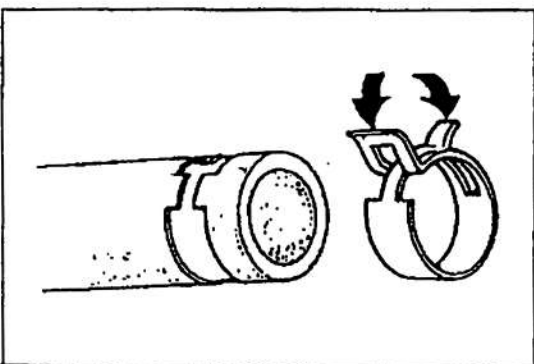
Adjustment

Use gauges, testers etc. to adjust to the specified standard values.



Rubber tubes and hoses

Do not allow petrol or oils to come in contact with rubber or tubing.



Hose clamps

- If reusing hoses, be sure to re-install the hose clamps so that the hose won't slide off the barb.
- After attaching the hose, fit the clamp to the clamp imprint by applying force in the direction of the arrows (see diagram).

Dynamometer precautions

If you want to run the vehicle on a dynamometer, take note of the following:

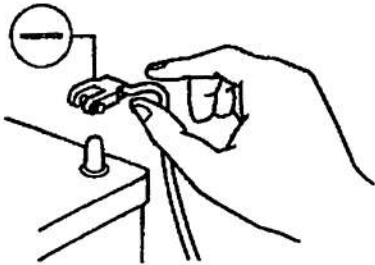
- Have a sufficiently powerful cooling fan blowing on the front of the vehicle (ideally proportional to vehicle speed).
- If indoors, ensure there is a system to extract the exhaust gases.
- Because the rear bumper may be deformed by extreme heat, cool the vicinity of the exhaust pipe with a fan (surface temperature: 70°C or less)
- Ideally, open the bonnet ("frunk") and engine cover.
- Pay attention to the coolant temperature gauge. Do not overheat the engine.
- Avoid unnecessary high-load operation. Give the engine time to cool between runs.

Electrical Work

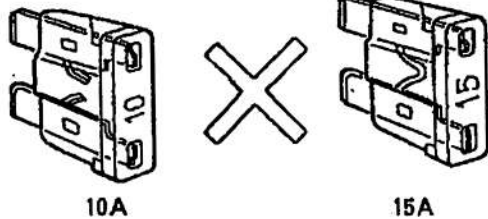
Precautions to take when working on electrical systems:

- Please pay attention to the following items when working on the electrical system.
- Don't change or modify electric equipment and wiring outside of the design specifications, as it may lead to shorts, malfunctions, or even electrical fires.

- Always disconnect the negative battery terminal when performing electrical work.



- If a fuse is blown, only ever replace it with a fuse of the same amperage rating.



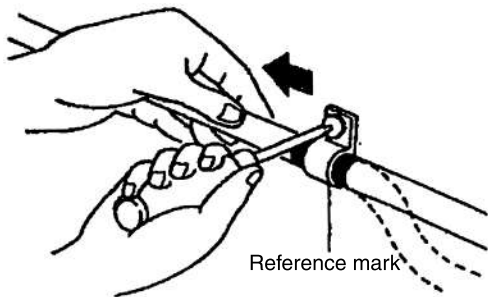
Caution

- Be sure to turn off the ignition switch and lighting before disconnecting the battery cable.

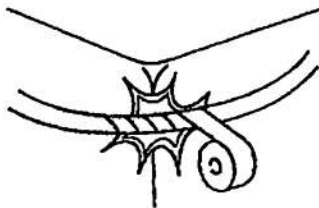
Caution

- Using a fuse of a higher capacity than the specified fuse could cause parts to burn out and potentially start a fire.

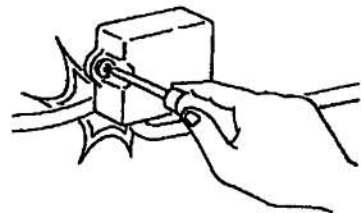
- Use clamps to get rid of slack in the wiring harness.



- Protect the harness from being damaged by sharp edges using electrical tape (or similar).



- When mounting parts, take care not to damage or pinch the harness.

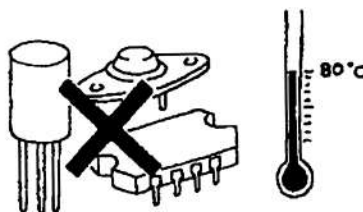


Caution

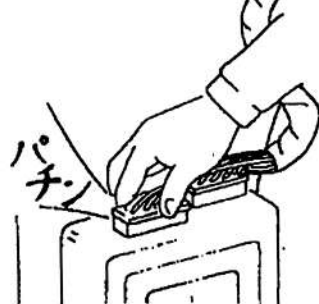
- Parts of the harness that connect moving or vibrating parts, such as the engine, to the bodywork have intentional slack, and are clamped such that the harness does not contact other parts when the parts move.
- Do not drop or throw sensor or relays.



- Do not subject sensors, computer chips, relays etc. to temperatures over 80°C



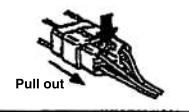
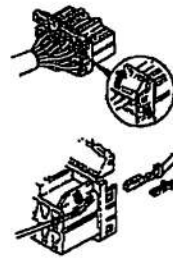
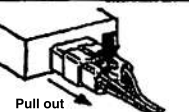
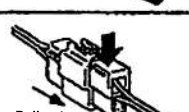

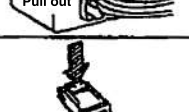
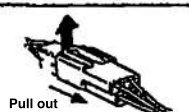

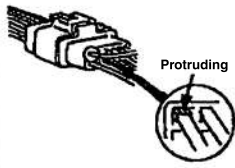
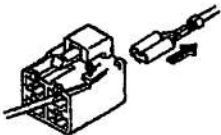


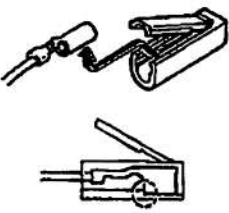

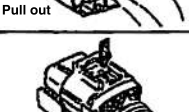
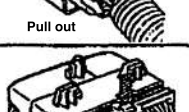

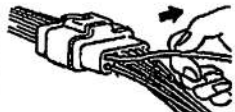
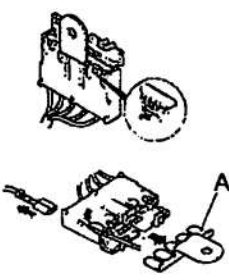
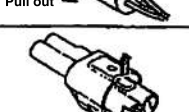
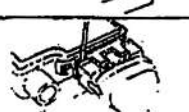
- Make sure connectors are securely plugged in.



Caution

- When installing or removing a connector, always hold the connector with two hands.

Handling of connectors

	Unplugging	Testing connections	Finding missing terminals	Fixing terminals
Push type	 Pull out	<p>Note</p> <ul style="list-style-type: none"> • If the connector is not correctly mated, there will be poor electrical contact. 	<p>Note</p> <ul style="list-style-type: none"> • A missing terminal will cause the connection to fail. 	<p>CPU connectors</p>  <ol style="list-style-type: none"> 1. Release the rear cover. 2. Insert a flat-blade screwdriver and push up on the stopper, then pull out the harness.
	 Pull out			
	 Pull out			
	 Pull out			
	 Pull out			
Pull-up type	 Pull out			<p>General purpose connectors</p>  <ol style="list-style-type: none"> 1. Insert a flat-blade screwdriver and push up on the stopper, then pull out the harness.
	 Pull out			
Push type	 Pull out	<p>Connect the male and female connectors and check for looseness.</p>	<p>Check for terminals which are protruding on the harness side when the connector is mated.</p>	<p>Round connectors</p>  <ol style="list-style-type: none"> 1. Open the cover. 2. Pull the terminal up and out. 3. When putting the connector back together, ensure the terminals are securely attached to the connector.
	 Pull out			
	 Pull out			
	 Pull out			
Pull-up type	 Pull out			<p>Ground connectors</p>  <ol style="list-style-type: none"> 1. Open the cover. 2. Remove part A (see diagram) 3. Insert a flat-blade screwdriver and push up on the stopper, then pull out the harness.
	 Pull out			
Spring type	 Pull out			

Precautions for Mounting Radios

Although the engine computer has electrical shielding, attaching a radio device to the vehicle can cause electrical interference. Please take note of the following points for mounting radios:

Install the radio equipment as far away as possible from the computer.

Because radio waves can radiate from the antenna feed, ensure that there is a minimum distance of 30cm from the computer and E.G.I. harness. Where the radio wiring joins the vehicle wiring, it should come off at a right angle.

Carefully impedance-match the antenna feed and antenna to minimise the SWR (Standing Wave Ratio).

Do not install high-powered radio equipment on the vehicle (maximum output: 10W).

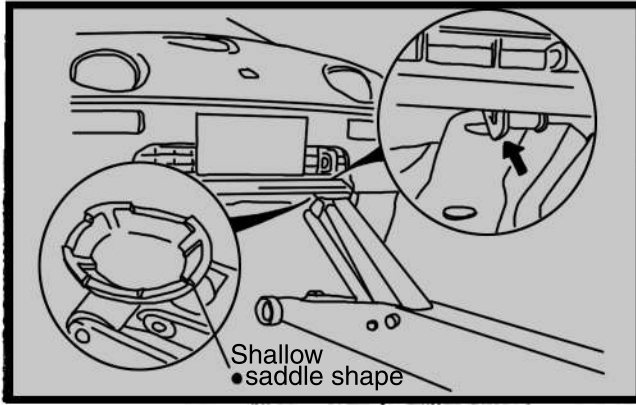
After installing the radio, let the engine idle, then start the radio and ensure that the engine is not affected.

Jack and Jack Stand Positions

Front

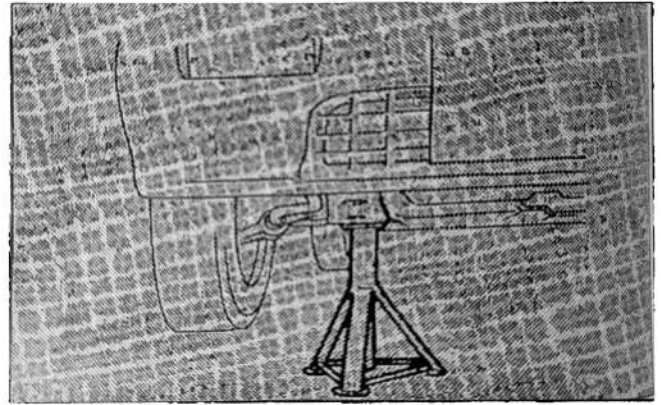
Jack position

- Tie down hook (on the anti roll bar mount)



Safety stand position

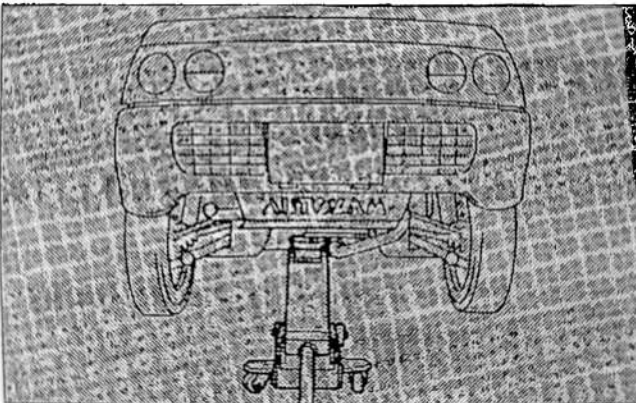
- Tie bar rear ends



Rear

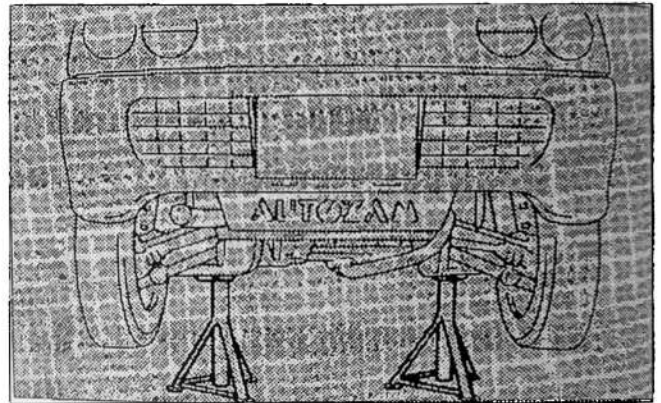
Jack position

- Engine crossmember at rear engine mount



Safety stand position

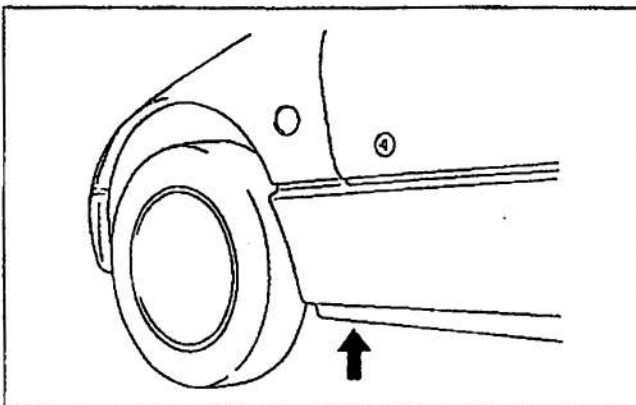
- Rear subframe (has anti roll bar mounts at the front)



Car Lift (2-post) Mounting Positions

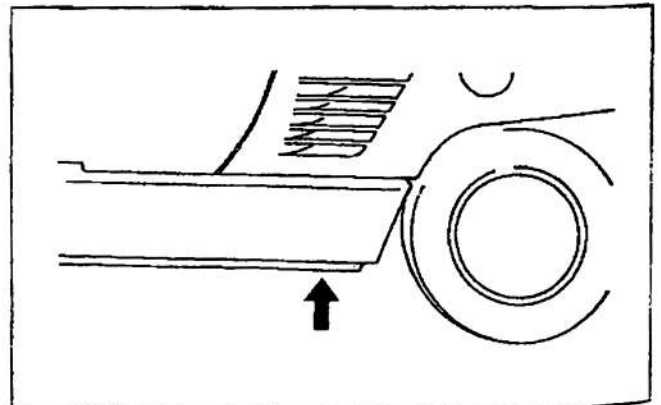
Front

- Side sills (front)



Rear

- Side sills (rear)



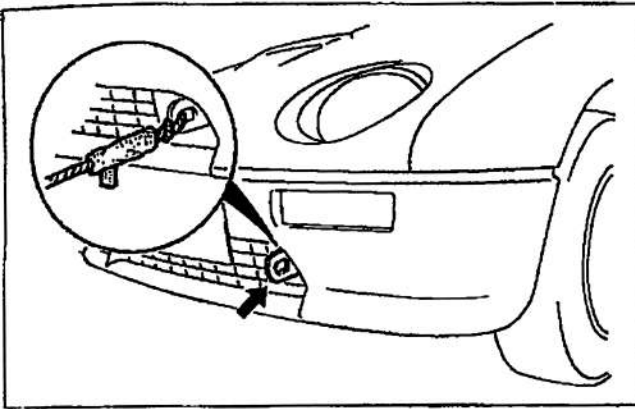
Tow Rope Mounting Position

Attach the tow rope to one of the chassis-mounted tow hooks.

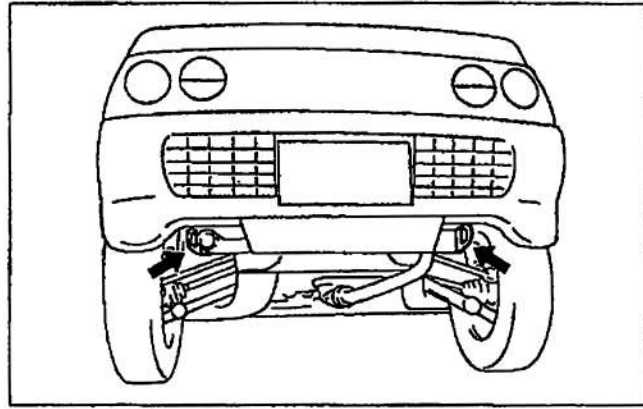
Caution

- When towing the vehicle, do not make sharp turns.
- Do not use the rear suspension as a tow hook.
- When towing, if the rope is allowed to come in contact with the bumper, it can cause scratching and damage. To prevent this, wind cloth around the rope near the bumper and tape it in place.

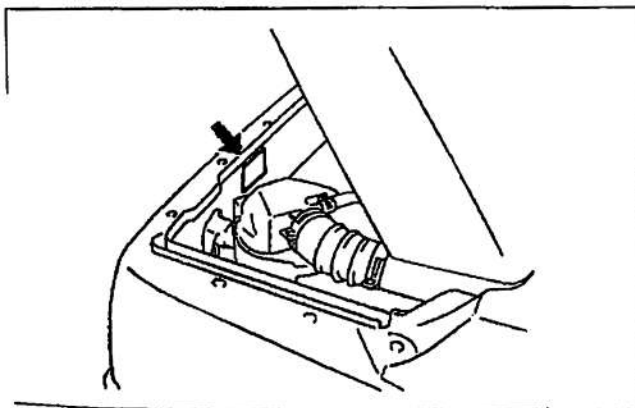
Front



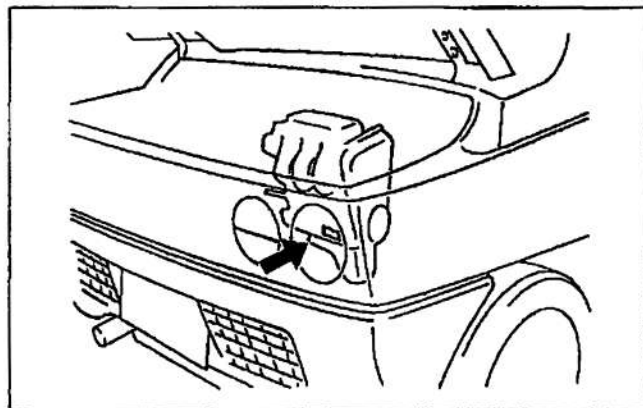
Rear



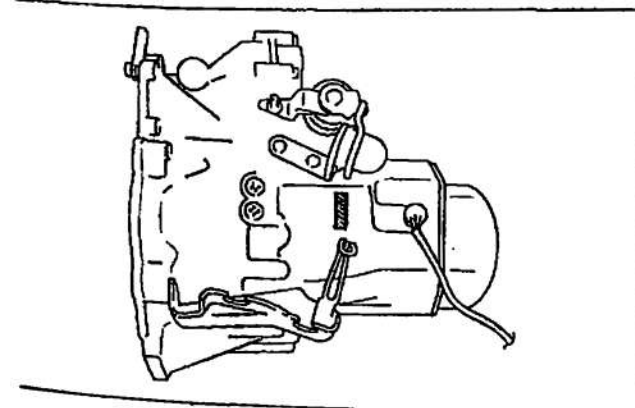
Chassis number position



Engine number position



Transaxle number position



Units

In this manual, in addition to giving the SI unit, the conventional unit is given in brackets.

Note: "SI unit" is the abbreviation of the French *Système International d'Unités*.

Unit	Quantity name	Remarks
N·m (kg f ·m)	Torque	N·m (newton-metres)
kPa (kg f ·cm ²)	Pressure (boost)	kPa (kilopascals)
kPa (mmHg)	Pressure (vacuum)	kPa (kilopascals)
N (kg f)	Force	N (newtons)
rpm	Engine speed / RPM	—
°	Angle	—
°C	Temperature	—
A	Amperes (current)	—
V	Volts (potential)	—
Ω	Ohms (resistance)	—
W	Watts (power)	—

Acronyms

AAS	Air Adjustment Screw	HU	Hydraulic Unit
ABDC	After Bottom Dead Centre	ISC	Idle Speed Control
ABS	Antilock Brake System	IG	Ignition
A/C	Air Conditioner	IN	Intake
ACC	Accessory	INT	Intermittent
ATX	Automatic Transaxle	LH	Left Hand (left side)
ATDC	After Top Dead Centre	Lo	Low
ATF	Automatic Transmission Fluid	LSD	Limited Slip Differential
BAC	Bypass Air Control	M	Medium
BBDC	Before Bottom Dead Centre	MTX	Manual Transaxle
BTDC	Before Top Dead Centre	O/D	Overdrive
CA	Crank Angle	P/S	Power Steering
CO	Carbon Monoxide	P/W	Power Windows
CU	Control Unit	RH	Right Hand (right side)
DOHC	Double Overhead Cam	SOL	Solenoid
EC-AT	Electronically-Controlled Automatic Transaxle	St	Starter
ECU	Engine Control Unit	Sol. V.	Solenoid Valve
EGI	Electronic Gasoline Injection (also known as EFI - Electronic Fuel Injection)	SST	Special Service Tool
ETR	Electronic Tuning Ratio	SW	Switch
EX	Exhaust	TNS	Turn Number Side (???)
GND	Ground	TWS	Total Wiring System
HC	Hydrocarbons	UP	Upper
Hi	High	V_B	Battery Voltage
HVLA	Hydraulic Valve Lash Adjusters	VRIS	Variable Resonance Induction System

Model List

Model Code	Body Style	Engine Type	Trans. Type	Grade	Class Number	Extra Equipment			Vehicle Type Number	Variant
						A/C	ABS	LSD		
E-PG6SA	2-door coupe	F6A	5MT	-	001	○			PG131AZ5311	P102
						○	○		PG131AZ5511	P110
						○		○	PG131AZ5611	P111

How to interpret the vehicle type number

PG
1
31
AZ
5
3
1
1

①
②
③
④
⑤
⑥
⑦
⑧

No.	Category	Value	Value Meaning
①	Vehicle family	PG	AZ-1
②	Revision	1	Autozam
③	Body style	31	2-door coupe
④	Engine type	AZ	CE660 Intercooled Turbocharged
⑤	Transmission type	5	5MT
⑥	Extras	3	4 Wheel Disc Brakes + Air Conditioning
		5	4 Wheel Disc Brakes + ABS + Air Conditioning
		6	4 Wheel Disc Brakes + LSD + Air Conditioning
⑦	Bodywork	1	No additional bodywork
⑧	Destination market	1	Japan

MAINTENANCE SCHEDULE

A

Periodic Inspection Table A - 2



A

Periodic Inspection Table

Periodic Inspection Table

- 1) The table below lists the criteria for inspecting the various parts of the vehicle. The symbols are explained below:
- 2) 「●」 The inspection interval required by law. 「○」 The inspection interval recommended by the manufacturer.
- 3) 「×」 Denotes that the item is not applicable.
- 4) 「☆」 Indicates periodic replacement of safety parts. The replacement time is an approximation based on typical vehicle usage. If the vehicle is used in significantly different driving conditions, the interval required may differ.
- 5) 「※」 Means only for the initial inspection.
(however, ※1 means the earliest of 1 month or 1,000 hours of driving; ※5 means 6 months or 5,000 hours)
- 6) 「 [] 」 The period before this part is replaced for the first time.

Inspection / maintenance item		Maintenance period						Criteria	Remarks						
		Before Driving	Private use			Business use				Distance (1000 km)					
			6 Months	12 Months	24 Months	1 Month	3 Months				12 Months				
S t e e r i n g s y s t e m	Steering wheel	Looseness & play		●	●		●	●	※1 ※5	Measured at the rim of the wheel, facing straight ahead M : 0 ~ 30mm	M : Manual				
		Correct operation		●	●		●	●	※1 ※5						
	Steering box	Leaking oil			●		●	●							
		Looseness of the mounts			●		●	●	※1						
		Bearing backlash / play						●							
		Gear backlash						●				No inspection necessary for rack & pinion type			
	Rods and arms	Looseness, play, damage		●	●		●	●							
		Cracking and damage to ball joint dust boots		●	●		●	●	※1						
		Mounts worn or not secured						●							
		Arms worn, cracked, or not connected to the knuckles						●							
	Wheel knuckles	Loose attachments			●		●	●							
		Clearance between knuckle and front axle (if applicable)						●				No inspection necessary for independent type			
	Front wheels	Wheel alignment			●			●		Toe - 1 ~ 5mm Camber - 0°05' ± 45' Caster 3°35' ± 45'					
		Steering angle at full lock			●			●		Inside 34° ± 3° Outside 31° ± 3°					
	Power steering system	Looseness or damage to the belt driving the power steering pump	●	●	●	●	●	●		Deflection of the belt when the centre of the belt has a 10kg load applied (mm): <table border="1" style="margin-left: 20px;"> <tr> <td>New belt</td> <td>7 ~ 9</td> </tr> <tr> <td>Used belt</td> <td>7 ~ 11</td> </tr> </table>	New belt	7 ~ 9	Used belt	7 ~ 11	
New belt		7 ~ 9													
Used belt		7 ~ 11													
Fluid leaks and fluid level		●	●	●	●	●		◇ Fluid level is between the HIGH and LOW marks		×					
Looseness in mounting			●		●	●				×					

Periodic Inspection Table

A

Inspection / maintenance item		Maintenance period						Criteria	Remarks								
		Before Driving	Private use			Business use				Distance (1000 km)							
			6 Months	12 Months	24 Months	1 Month	3 Months				12 Months						
Brake pedal	Gap between the pedal and the floor		●	●	●	●	●	●	※1 ※5	◇4-12mm, when 30kg of force is applied. With no force applied, the gap is at least 120mm.							
	Smooth pedal operation	●															
	Braking effectiveness		●	●	●	●	●	●	※1 ※5	◇ <table border="1"> <thead> <tr> <th colspan="2">Braking force</th> </tr> </thead> <tbody> <tr> <td>Rear wheel sum</td> <td>Over 20% vehicle weight</td> </tr> <tr> <td>Left-right difference</td> <td>Over 8% vehicle weight</td> </tr> <tr> <td>Sum total</td> <td>Over 50% vehicle weight</td> </tr> </tbody> </table> <p>Note: if the front wheels lock up, the total braking force will be calculated in this state.</p>	Braking force		Rear wheel sum	Over 20% vehicle weight	Left-right difference	Over 8% vehicle weight	Sum total
Braking force																	
Rear wheel sum	Over 20% vehicle weight																
Left-right difference	Over 8% vehicle weight																
Sum total	Over 50% vehicle weight																
Parking brake lever	Lever travel distance	●	●	●	●	●	●	●	※1 ※5	A force of 20 kg raises the lever 7-11 notches. Full stroke: 20 notches.							
	Braking effectiveness			●	●	●	●	●		50kg of cable tension gives braking of at least 20% of the vehicle weight Note: The force exerted on the lever will be less than 50kg.							
	Damage or wear to ratchet mechanism							●									
Rods and cables	Looseness and play			●		●	●										
Brake lines	Leaks, damage, and loose mounting		●	●	●	●	●	●	※1 ※5								
Fluid reservoir	Brake fluid level	●	●	●	●	●	●	●	※1 ※5	◇Brake fluid level between MIN and MAX.							
Brake pistons	Fluid leakage		●	●													
	Function, wear, and damage			●				●									

B r a k e S y s t e m

A

Periodic Inspection Table

Inspection / maintenance item		Maintenance period						Criteria	Remarks	
		Before Driving	Private use			Business use				Distance (1000 km)
			6 Months	12 Months	24 Months	1 Month	3 Months			
B r a k e S y s t e m	Booster	Braking power			●					
		Air-tight and fluid-tight						●		
	Drum brakes and brake shoes	Clearance between drum and shoes		●	●	●	●	●	×	
		Wear of brake shoes and drum lining		●	●		●	●	×	
		Drum wear and damage			●			●	×	
	Backing plate	Condition of backing plate						●		
	Disc brakes and brake pads	Gap between rotors and pads		●	●		●	●		
		Brake pad wear		●	●		●	●	New thickness F. 9.0mm R. 8.0mm Min. thickness F. 1.0mm R. 1.0mm	
		Rotor wear and damage			●			●	New thickness F. 10.0mm R. 10.0mm Min. thickness F. 9.0mm R. 8.0mm	
A x l e s	Front axle	Damage and deformation					●		No inspection for independent suspension type	
	Rear axle	Damage and deformation					●		Same as above	
	Wheels	Tyre pressure	●	●	●	●	●	●	※5	

◇ (unit: bar)

Tyre specification	Front	Rear
155/65R13 73H	2.1	2.2
T105/80D 13	4.2	

Periodic Inspection Table

A

Inspection / maintenance item		Maintenance period							Criteria	Remarks	
		Before Driving	Private use			Business use					Distance (1000 km)
			6 Months	12 Months	24 Months	1 Month	3 Months	12 Months			
Axles	Wheels	Tyre cracking and damage	●	●	●	●	●	●	●	※5	
		Tread depth and abnormal wear	●	●	●	●	●	●	●	※5	Minimum tread 1.6mm
		Metal, stones, and foreign objects stuck in tyres	●	●	●	●	●	●	●	※5	
		Loose wheel nuts			●	●	●	●	●	※1	◇Wheel nut torque 4.0 - 7.0kg·m
		Wheel disc and rim damage				●					
		Wheel disc, rim, and sidewall damage					●	●	●		
		Front wheel bearings				●		●	●		◇Bearing play along axis 0 - 0.4mm
		Rear wheel bearings				●			●		◇Bearing play along axis 0 - 0.35mm
	Springs	Damage			●		●	●			
		Difference in deflection between left and right sides							●		
	Mounts and connections	Loose mounting or damage to mounts			●					※1	
		Damage to mounting parts (excluding brackets)						●	●		
		Loose connecting parts			●				●		
		Leaf spring deviation							●		No inspection required for coil springs
		Loose brackets or damage to brackets							●		
	Suspension arms	Damage to suspension arms and play in joints			●				●		
	Shock absorbers	Oil leakage and damage			●		●	●			
		Loose mounting			●		●	●			

A

Periodic Inspection Table

Inspection / maintenance item		Maintenance period						Criteria	Remarks		
		Before Driving	Private use			Business use				Distance (1000 km)	
			6 Months	12 Months	24 Months	1 Month	3 Months				12 Months
T r a n s m i s s i o n	Clutch	Gap between the pedal and the floor	●	●	●	●	●	●	※1 ※5	10 - 30mm depressed 100mm when no force applied.	
		Clutch action		●	●	●	●	●			
		Fluid level (if applicable)		●	●		●	●			×
	Transmission	Check oil level and check for leaks		●	●	●	●	●	※1	◇M / T cars Ensure the oil is at the level of the filler brim	
		Slop / backlash in operation			●			●	※1		
	P r o p e l l o r s h a 	Loose connections		●	●		●	●			×
		Damage or cracking to dust boots of universal joints		●	●		●	●	※1		
		Play in the splines			●			●			
		Looseness of universal joints			●			●			
		Prop. shaft alignment						●			×
Looseness of centre bearing				●			●			×	
Twisting or cracking of drive shaft							●			×	
Differ-entia	Check oil level and check for leaks		●	●	●	●	●			×	
E l e c t r i c a l	Ignition system	Spark plug condition		●	●	●	●	●		Plug gap 0.8 - 0.9mm	
		Ignition timing		●	●	●	●	●	※1	◇5° BTDC @ 950rpm	

Periodic Inspection Table

A

Inspection / maintenance item		Maintenance period							Criteria	Remarks								
		Before Driving	Private use			Business use					Distance (1000 km)							
			6 Months	12 Months	24 Months	1 Month	3 Months	12 Months										
E l e c t r i c a l	Ignition system	Distributor contact breaker		●	●	●	●	●		No inspection required for contactless type								
		Distributor cap condition		●	●		●	●										
		Function of the mechanical and vacuum timing advance		●	●		●	●		No inspection for electrical advance type								
	Battery	Fluid volume		●	●	●	●	●	※1 ※5	◇ Fluid level between upper and lower limit								
		Fluid specific gravity			●	●		●	●	With fluid at 20°C, Specific gravity 1.27 - 1.29								
		Condition of the terminal connections			●	●		●	●	※1								
	Wires	Loose or damaged connections				●	●	●	●									
	E n g i n e	E n g i n e	External damage and abnormal noise		●	●	●	●	●	※1 ※5								
			Low-speed operation			●	●	●	●	●	※1 ※5	◇ Idle speed 950 ±50rpm						
			Exhaust condition			●	●	●	●	●	※5							
Air cleaner element condition					●	●	●	●	●									
Cylinder head, and exhaust and intake manifolds correctly tightened									●		Tightening torque Cylinder head (cold): 6.0 - 6.5kg·m Manifolds: Intake 0.8 - 1.2kg·m Exhaust 1.8 - 2.8kg·m							
Compression pressure									●		◇ Unit: kg/cm ² (rpm) <table border="1" style="margin-left: 20px;"> <tr> <td rowspan="2"></td> <td>Cyl. pressure</td> <td rowspan="2">Cylinder variation</td> </tr> <tr> <td>3 Cylinder</td> </tr> <tr> <td>With turbo</td> <td>9.0 (400rpm)</td> <td>kg/cm² < 1.0</td> </tr> </table>		Cyl. pressure	Cylinder variation	3 Cylinder	With turbo	9.0 (400rpm)	kg/cm ² < 1.0
			Cyl. pressure	Cylinder variation														
	3 Cylinder																	
With turbo	9.0 (400rpm)	kg/cm ² < 1.0																
Valve lash adjustment				●			●		No inspection for self-adjusting type									

Periodic Inspection Table

Inspection / maintenance item		Maintenance period							Criteria	Remarks				
		Before Driving	Private use			Business use		Distance (1000 km)						
			6 Months	12 Months	24 Months	1 Month	3 Months				12 Months			
Lubrication system	Oil level and oil condition		●	●	●	●	●	●	※1 ※5	◇ Oil level within the range indicated on the oil dipstick				
	Oil leaks			●	●	●	●	●	※1					
	Oil level	●												
Fuel system	Fuel leaks			●	●	●	●	●	※1					
	Carburettor linkages				●		●	●		No inspection required for fuel injection type				
	Throttle body and choke valve condition				●		●	●						
	Fuel injector nozzle sprays correctly and has pressure				●		●	●		×				
	Injection timing and volume				●			●		×				
	Fuel pump functionality							●		×				
	Fuel level	●												
Cooling system	Coolant level	●	●	●	●	●	●	●	※1 ※5	◇ Fluid level in reservoir between FULL and LOW				
	Belt tension and condition	●	●	●	●	●	●	●	※1 ※5	Deflection of the belt when the centre of the belt has a 10kg load applied (mm): <table border="1" style="margin-left: 20px;"> <tr> <td>New belt</td> <td>7 - 11mm</td> </tr> <tr> <td>Used belt</td> <td>9 - 11mm</td> </tr> </table>	New belt	7 - 11mm	Used belt	9 - 11mm
	New belt	7 - 11mm												
	Used belt	9 - 11mm												
Coolant leaks	●		●	●		●	●							
Radiator cap				●		●	●		Valve opens at a pressure of 0.75 - 1.05kg/cm ²					

Periodic Inspection Table

A

Inspection / maintenance item		Maintenance period						Criteria	Remarks		
		Before Driving	Private use			Business use				Distance (1000 km)	
			6 Months	12 Months	24 Months	1 Month	3 Months				12 Months
Emissions control equipment	Positive crankcase ventilation	PCV valve operation			●			●		x	
		Damage to hoses			●			●			
	Fuel evaporation emission control	Damage to piping, etc.			●			●			
		Charcoal canister clogging and damage			●			●			
		Check valve			●			●			
	Exhaust gas emission control	Looseness or damage to catalytic converter		●	●		●	●	※1		
		Secondary air injection system working		●	●		●	●			x
		Exhaust gas recirculation working		●	●		●	●		Described in detail at the end of this table (A-12)	
		Overrun fuel cut working		●	●		●	●			x
		Damage to piping or mounts		●	●		●	●			
	Thermal protection	Loose mounting or damage to heat shield		●	●		●	●			
		Correct operation		●	●	●	●	●	※1 ※5		
	Lighting & directional indicators	Check for dirt and damage. Check indicators work.	●								
Correct operation			●	●		●	●	※1 ※5			
Horn, wipers, window spray, defroster, door locks	Correct operation		●	●		●	●	※1 ※5			
Rear mirror & reflector	View angle	●								Rear view mirror only	

A

A

Periodic Inspection Table

Inspection / maintenance item		Maintenance period							Criteria	Remarks	
		Before Driving	Private use			Business use					Distance (1000 km)
			6 Months	12 Months	24 Months	1 Month	3 Months	12 Months			
Reflectors, registration, licence plates	Dirt, damage, and mounting condition	●									
Gauges	Correct operation		●	●		●	●	※1 ※5			
Exhaust pipes & muffler	Loose mounting & damage		●	●		●	●				
	Muffler works properly			●			●				
LPG fuel system	Gas leakage and damaged conduits and joints		●	●		●	●			×	
	Vaporiser tarring		●	●		●	●			×	
	Loose mounting & damage of gas cylinder			●			●			×	
	Airtightness of passenger compartment			●			●			×	
Car frame & body	Door locks			●		●	●	※1			
	Loose or damaged parts			●		●	●	※1			
Seats	Seatbelt condition			●			●				
If abnormalities were found on the previous drive	Check that the abnormality is no longer present	●									
Other	Ensure that the chassis is well oiled		●	●	●	●	●				

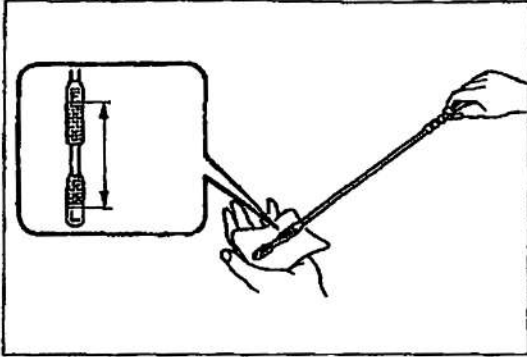
Periodic Inspection Table

A

Inspection / maintenance item			Maintenance period							Criteria	Remarks		
			Before Driving	Private use			Business use					Distance (1000 km)	Interval (year)
				6 Months	12 Months	24 Months	1 Month	3 Months	12 Months				
B r a k e s	Safety parts	Change brake fluid								☆ 2			
		Replace brake lines								☆ 4 (5)		The number in parentheses is for the first time	
		Replace rubber parts, such as master cylinder, pistons, dust boots and seals								☆ 2 (3)		The number in parentheses is for the first time	
		Replace vacuum hose for brake booster								☆ 4 (5)		The number in parentheses is for the first time	
D r i v e t r a i n	Transmission	Manual transmission oil change						20	2				
E n g i n e	Engine	Replace air filter element						30					
		Replace timing belt						100					
	Lubrication	Change engine oil						5	0.5				
		Replace oil filter						10					
	Fuel System	Replace fuel filter						40					
	Safety parts	Replace fuel lines								☆ 4 (5)		The number in parentheses is for the first time	
	Cooling system	Change coolant								2 (3)		The () number is for the first time Use long life coolant	

Inspection / maintenance item	Inspection method and criteria				
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Emissions control equipment</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Exhaust gas emission control</p> <p>Behaviour of exhaust gas recirculation system</p>	<p>(1) Install a vacuum gauge between the EGR valve and EGR port of the throttle body to test the vacuum generated.</p> <table border="1" data-bbox="657 460 1450 573"> <thead> <tr> <th data-bbox="657 460 1059 501">Engine state</th> <th data-bbox="1059 460 1450 501">Vacuum indicated on gauge</th> </tr> </thead> <tbody> <tr> <td data-bbox="657 501 1059 573">Put load on the engine by pressing both brake and throttle</td> <td data-bbox="1059 501 1450 573">Vacuum: 60mmHg</td> </tr> </tbody> </table> <p>(2) When the engine is idling, and a negative pressure of 120mmHg is applied to the EGR valve using a vacuum pump, the EGR valve should open, and the engine will idle unstably or stall.</p>	Engine state	Vacuum indicated on gauge	Put load on the engine by pressing both brake and throttle	Vacuum: 60mmHg
Engine state	Vacuum indicated on gauge				
Put load on the engine by pressing both brake and throttle	Vacuum: 60mmHg				

In-vehicle inspection	B - 2
Engine oil	B - 2
Coolant	B - 2
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Procedure.....	B - 6
Disassembly / inspection / assembly	B - 11
Timing belt, tensioner.....	B - 11
Cylinder head, camshafts, valves, rocker arms	B - 14
Pistons, piston rings, connecting rods, cylinders	B - 23
Crankshaft bearings, crankshaft, engine block	B - 30
Installation	B - 35
Procedure.....	B - 35



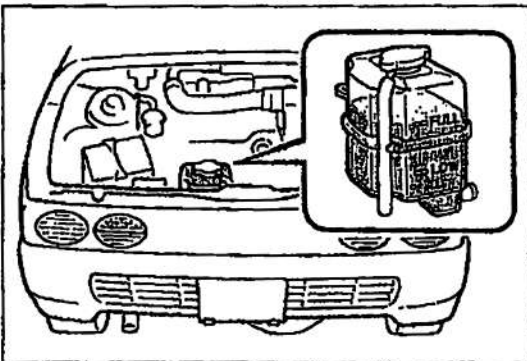
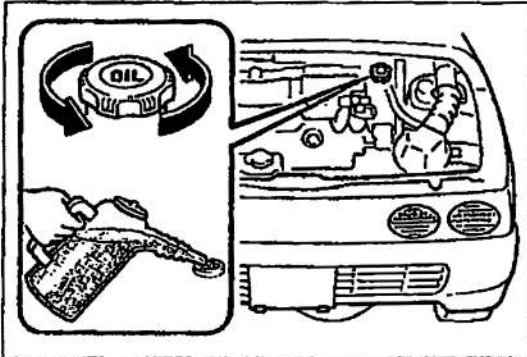
In-vehicle inspection

Engine oil

Checking the oil

1. Park the car on a level surface, with the engine warm.
2. Stop the engine, and leave it for about 5 minutes.
3. Check that the engine oil level is between the L and F marks on the dipstick. The oil should have a moderate viscosity, and should not be significantly contaminated.
4. Top up if necessary.

Note: The difference between the L and F marks is about 1 litre.



Coolant

Warning: Do not remove the coolant reservoir cap when the engine is hot.

Wrap the cap in a cloth when removing it.

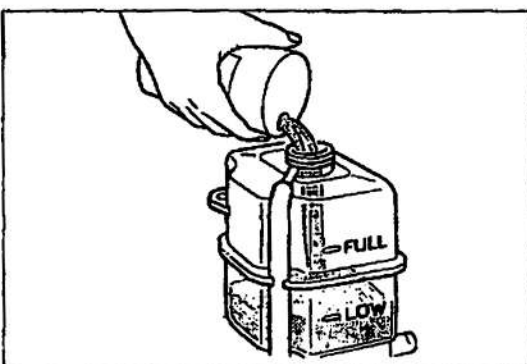
Checking coolant level

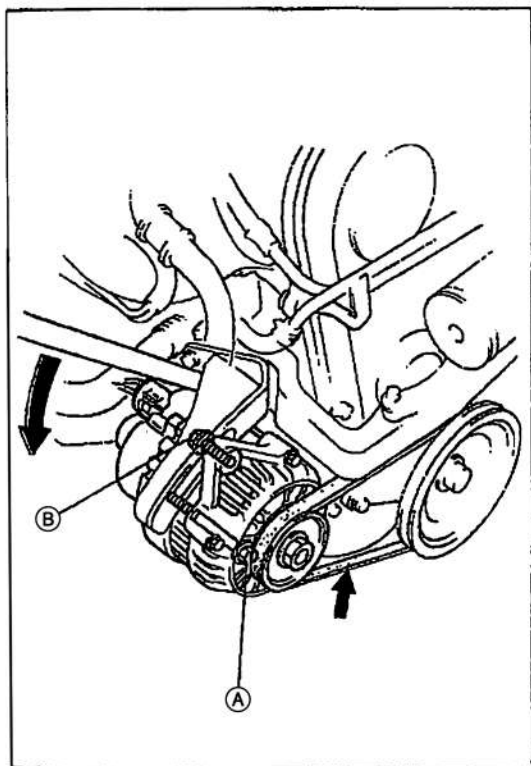
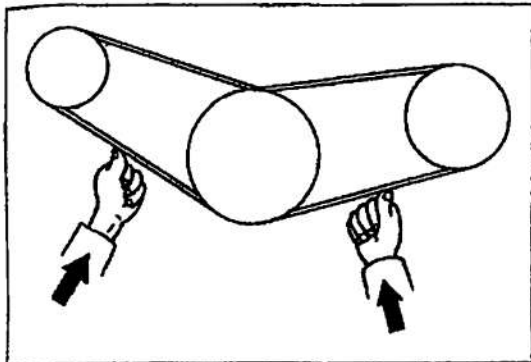
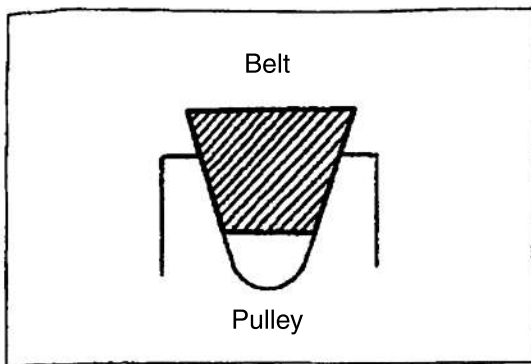
1. Check that the coolant in the coolant reservoir is between the LOW and FULL marks.
2. Top up if necessary.

Note: The difference between the LOW and FULL marks is about 0.5 litres.

Checking coolant condition

1. Check for fouling due to dirt, oil, and other contaminants in the coolant.
2. If there is significant contamination, change the coolant.





Drive belt

Inspection

1. Make sure the belt is properly sitting in the pulley groove.
2. Visually check for cuts, splitting, scratches, or damage to the belt or pulley.
3. Measure the belt deflection when pressing with 98N (10 kg f) on the back of the belt, at the position shown by the arrows.

B

Note: The measurement must be taken at the positions shown in the diagram, otherwise the deflection will be lower. The engine should have cooled for at least 30 minutes before measuring the belt tension.

Alternator belt		9 - 11mm
A / C belt	New	7.5 - 8.8mm
	Used	9.0 - 11.0mm

✱The A / C belt deflection should be checked after 1,000km

Adjustment

For alternator

1. Loosen the alternator mounting bolt (A), and the adjustment fixing bolt (B).
2. Using a bar (or similar) for leverage, swivel the alternator to adjust the belt tension.
3. Temporarily tighten the bolts to hold the tension in the belt.
4. Check the belt deflection.
Apply a 98N (10kg f) load in the position indicated above.
Belt deflection for a new belt should be 9 - 11mm.
5. If the amount of deflection is within the target value, tighten both (A) and (B) to the torque specified below. Otherwise, repeat this procedure from step 1.

Bolt torque: (A) 38 - 51N·m (3.8 - 5.3kg f·m)
(B) 19 - 25N·m (1.9 - 2.6kg f·m)

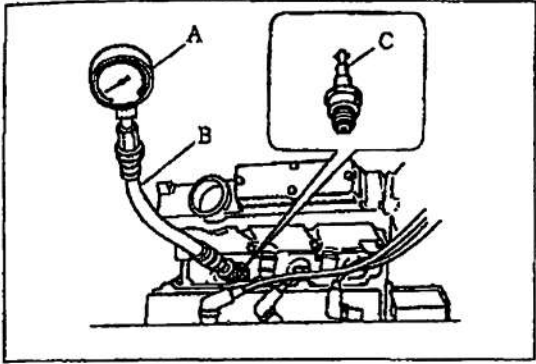
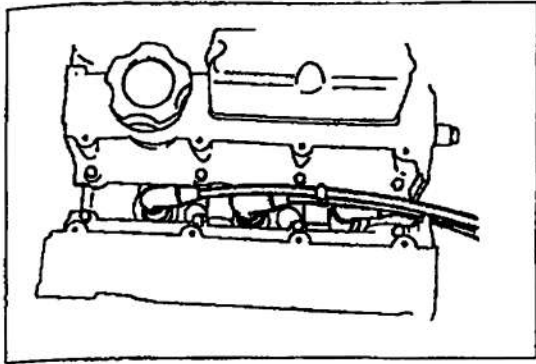
B

In-vehicle inspection

HVLA (hydraulic valve lash adjuster) troubleshooting

Symptom	Cause	Remedy
1. A strange sound when starting after an oil change. 2. A strange sound when starting a car that hasn't been used for a while.	Oil has drained from the oil passages	Hold the engine between 2,000 - 4,000rpm for between 2 seconds and 10 minutes, and see if the sound disappears. If it does not, replace the hydraulic tappets.
3. Abnormal sound after start when cranking for at least 3 seconds. 4. Abnormal sound when the HVLA is replaced, and the car is started.	The valvetrain is not receiving oil	
5. Abnormal sound continues for more than 10 minutes.	Low oil pressure	Check the oil pressure with a pressure gauge. It should be at least the standard value. Standard value: 265 - 362kPa (2.7 - 3.7 kg f/cm ²) at 4,000rpm
	HVLA failure	If you press the top of the HVLA with your finger, it should not move. If it moves, replace the HVLA. If there is more than zero valve clearance, replace the HVLA.
6. Abnormal sound when idling after driving at high speed.	Low oil level	Check the oil level. Remove oil if above the F mark. Add oil if below the L mark.
	Oil degradation.	Change the oil with appropriate engine oil.

✘ It takes time for the oil to reach the whole engine, depending on outside temperature and the type of oil used.



Compression pressure

Inspection

1. Fully warm up the engine
2. After stopping the engine, remove all spark plugs and unplug the distributor lead.

B

3. Screw in the SST in the spark plug hole of the cylinder to be measured.

SST A: 49 Z156 451001

B: 49 Z156 4530

C: 49 Z156 4550

4. Fully depress the accelerator and clutch pedals to reduce pumping and frictional load on the engine respectively.
5. Crank the engine, and take the maximum gauge value.

Pressure (at 400rpm) (kg f/cm ²)	Reference	12.0
	Limit	9.0
	Difference	Under 1.0

6. Measure each cylinder using steps 3 - 5.
7. If the measured value is below the "limit" value, or over the maximum difference between cylinders, add a small amount of engine oil through the spark plug hole, and repeat steps 3 - 5. The results can be interpreted using the steps below.
 - 7.a If the pressure rises after adding oil, that indicates wear or damage to the piston rings and/or cylinder walls.
 - 7.b If the pressure does not change, that indicates valve sticking, poor valve seating, or a failed head gasket.
8. After measuring, re-install the spark plugs and plug in the distributor lead.

Engine removal

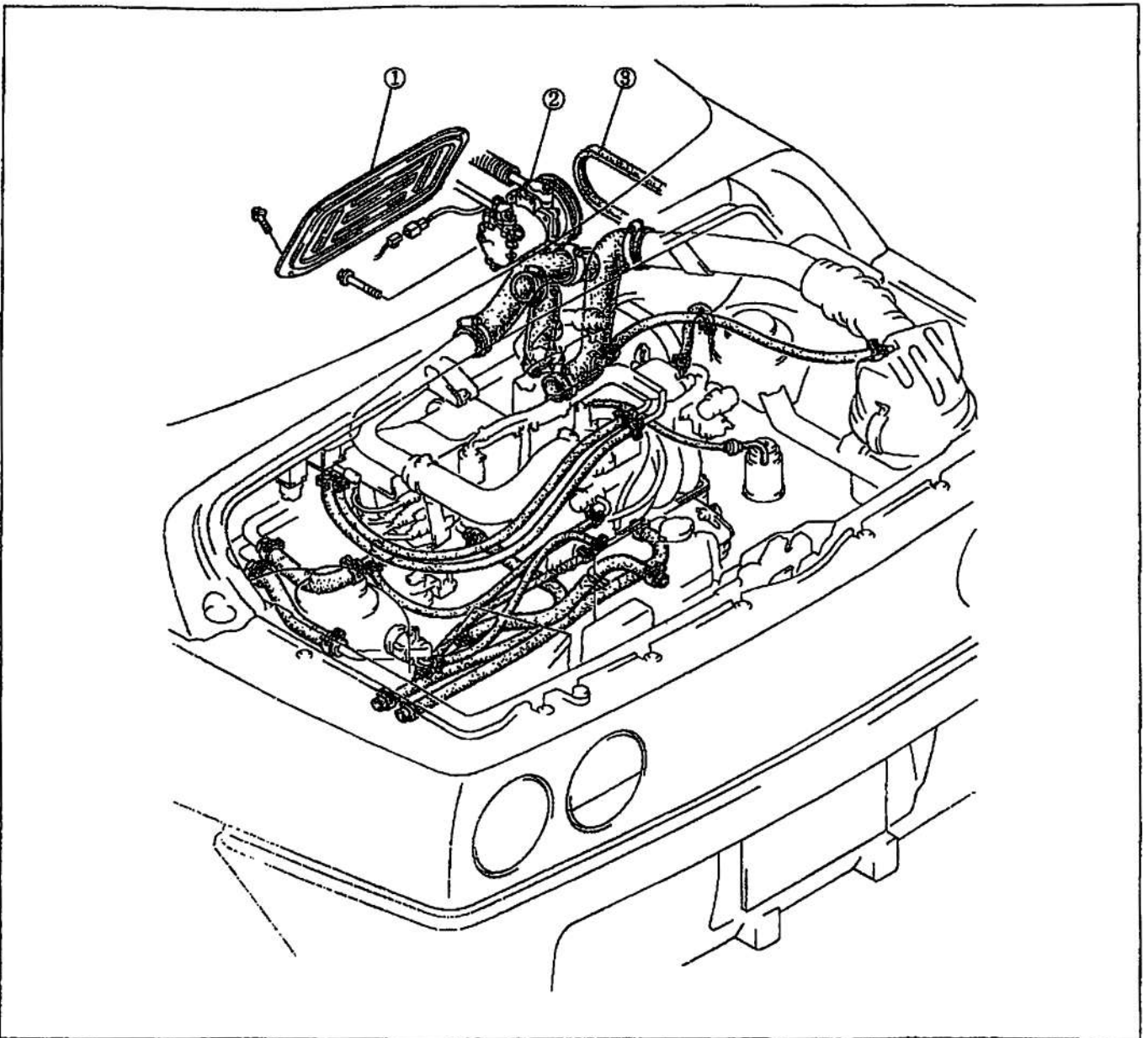
Procedure

Warning: To prevent fuel spillage, see section F.

1. Disconnect battery negative terminal.
2. Remove coolant (see section F).
3. Remove transmission oil (see section J).
4. Jack up the vehicle.
5. Follow the procedure below to remove the engine.

Step 1

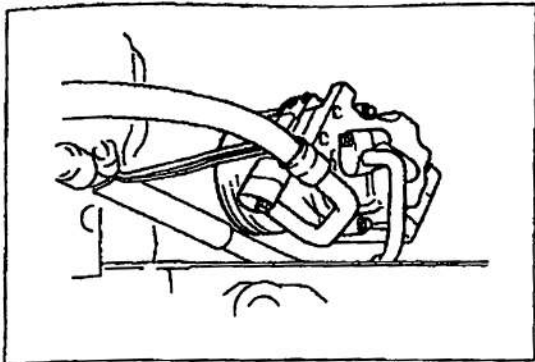
Remove the hoses and parts shown in the figure below.



1. Engine service hatch.

3. A / C drive belt

2. Considerations when removing
A / C compressor..... B-7



Considerations when removing A / C compressor

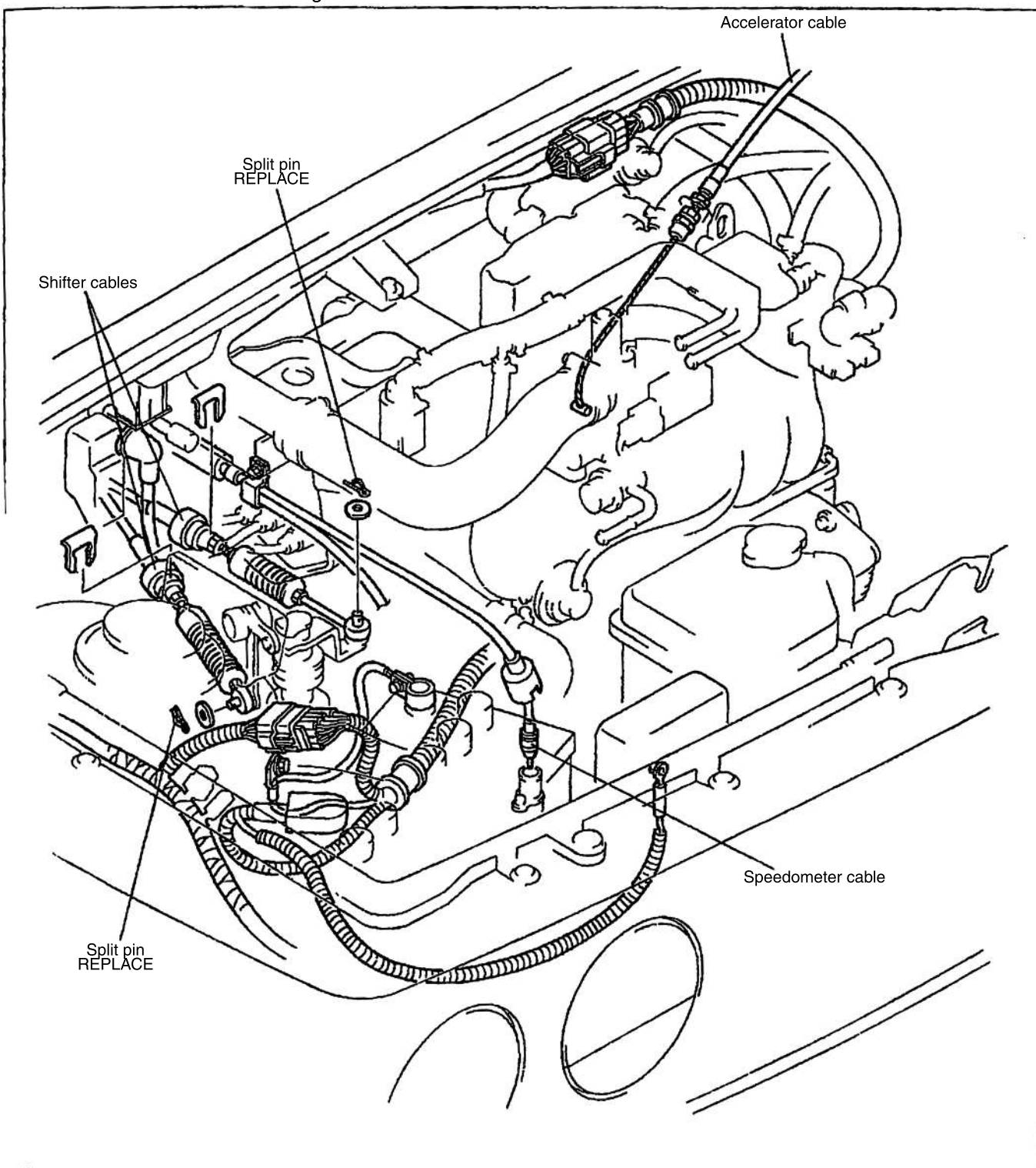
1. Remove the A / C compressor from its bracket.
2. Do not disconnect the A / C compressor hoses. Hang the compressor using string or wire so that it is out of the way during the engine removal, but without the hoses supporting the compressor's weight.

Caution: Do not damage the A / C compressor, hose, or piping.

E

Step 2

Remove the cables shown in the figure below.

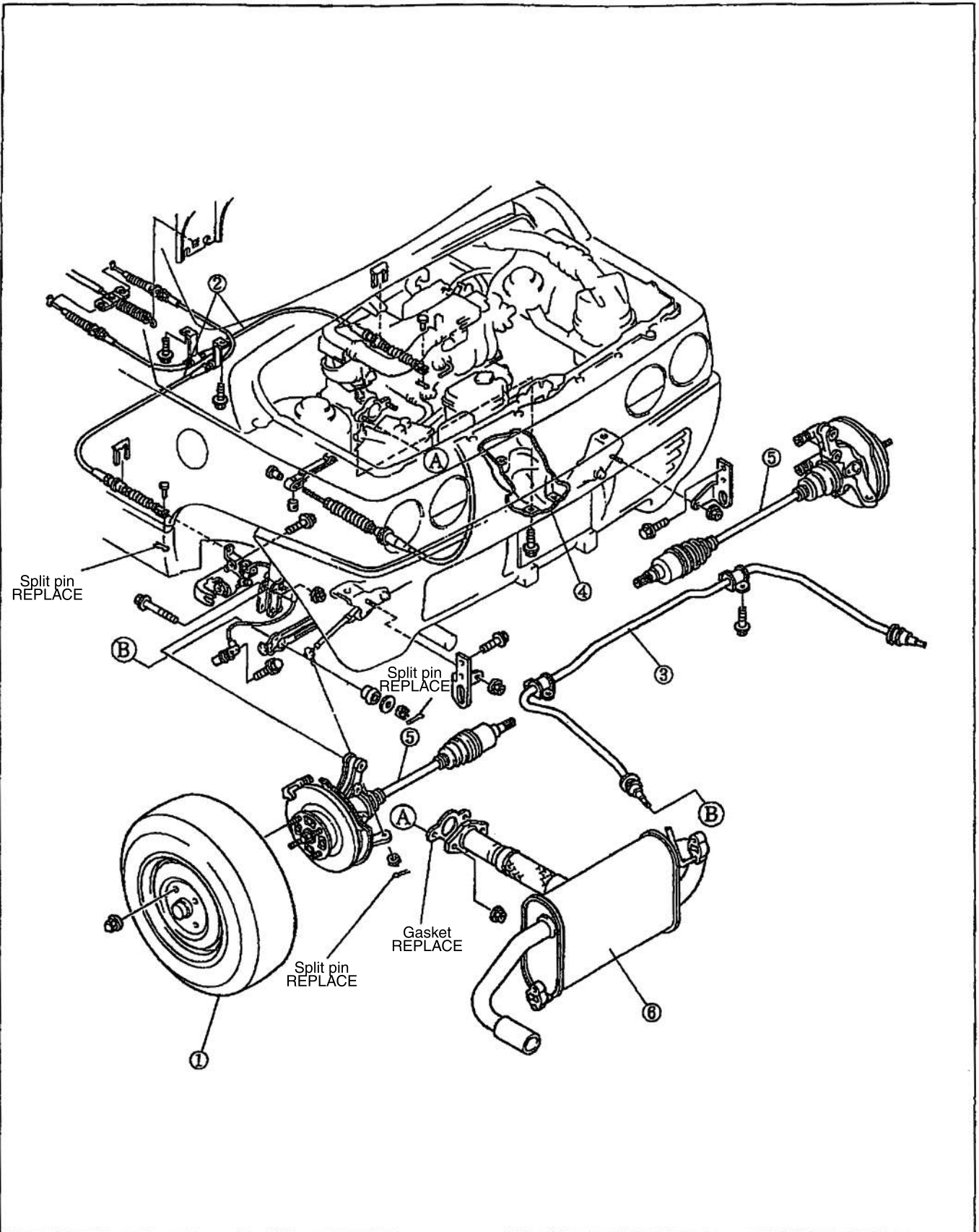


B

Engine removal

Step 3

Remove the parts shown in the figure below.

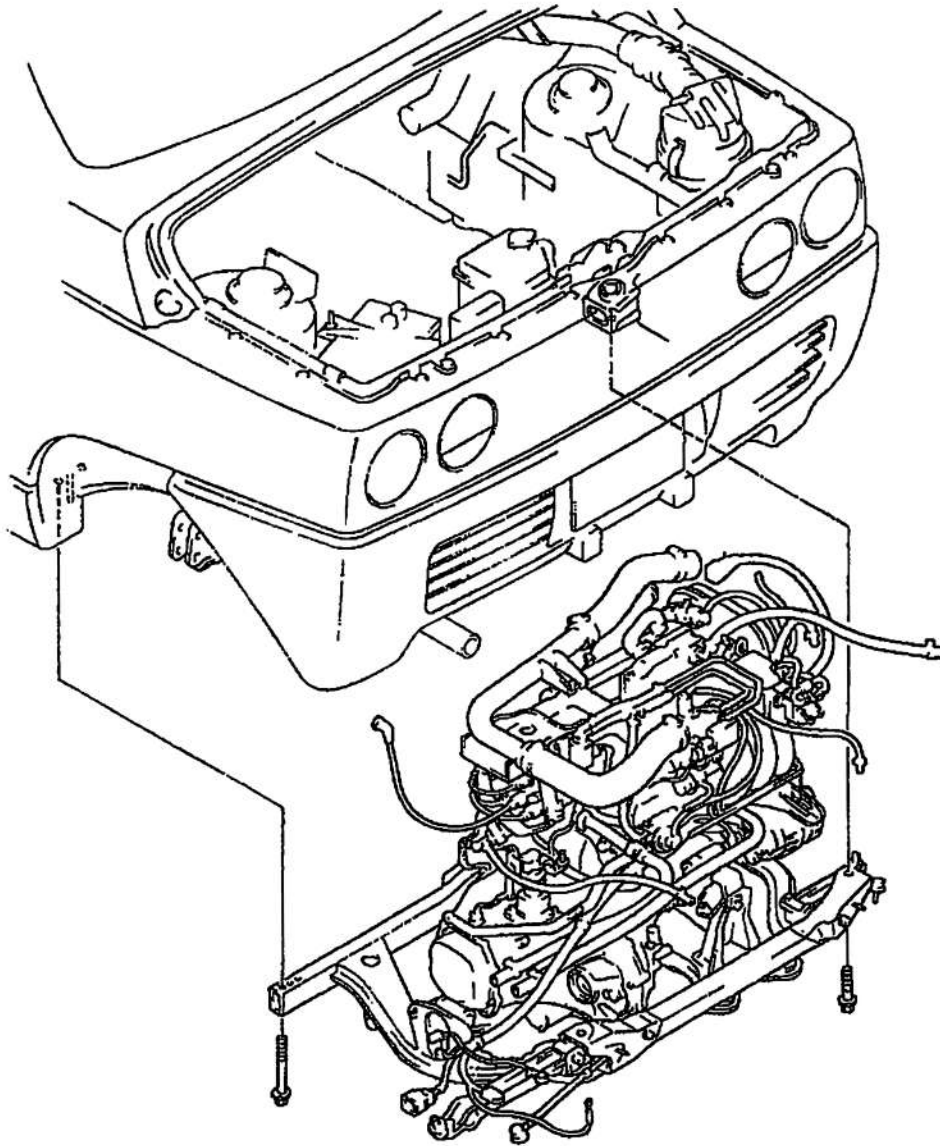


1. Wheel and tyre
2. Parking brake cable
3. Anti-roll bar

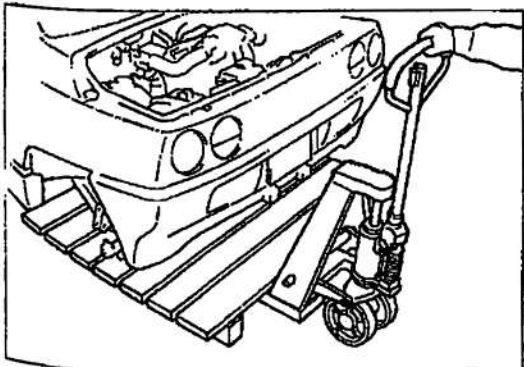
4. Heat shield
5. Drive shaft assembly
6. Muffler and mid-pipe

Step 2

Remove the engine and transmission from the vehicle.



E



Considerations for removing engine and transmission assembly

1. Prepare an appropriate pallet jack and set it underneath the engine.
2. Slowly lower the vehicle until the engine crossmember rests on the pallet jack.
3. Remove the crossmember bolts, as in the figure above.

Caution: Ensure that all cables, hoses, and wiring is detached.

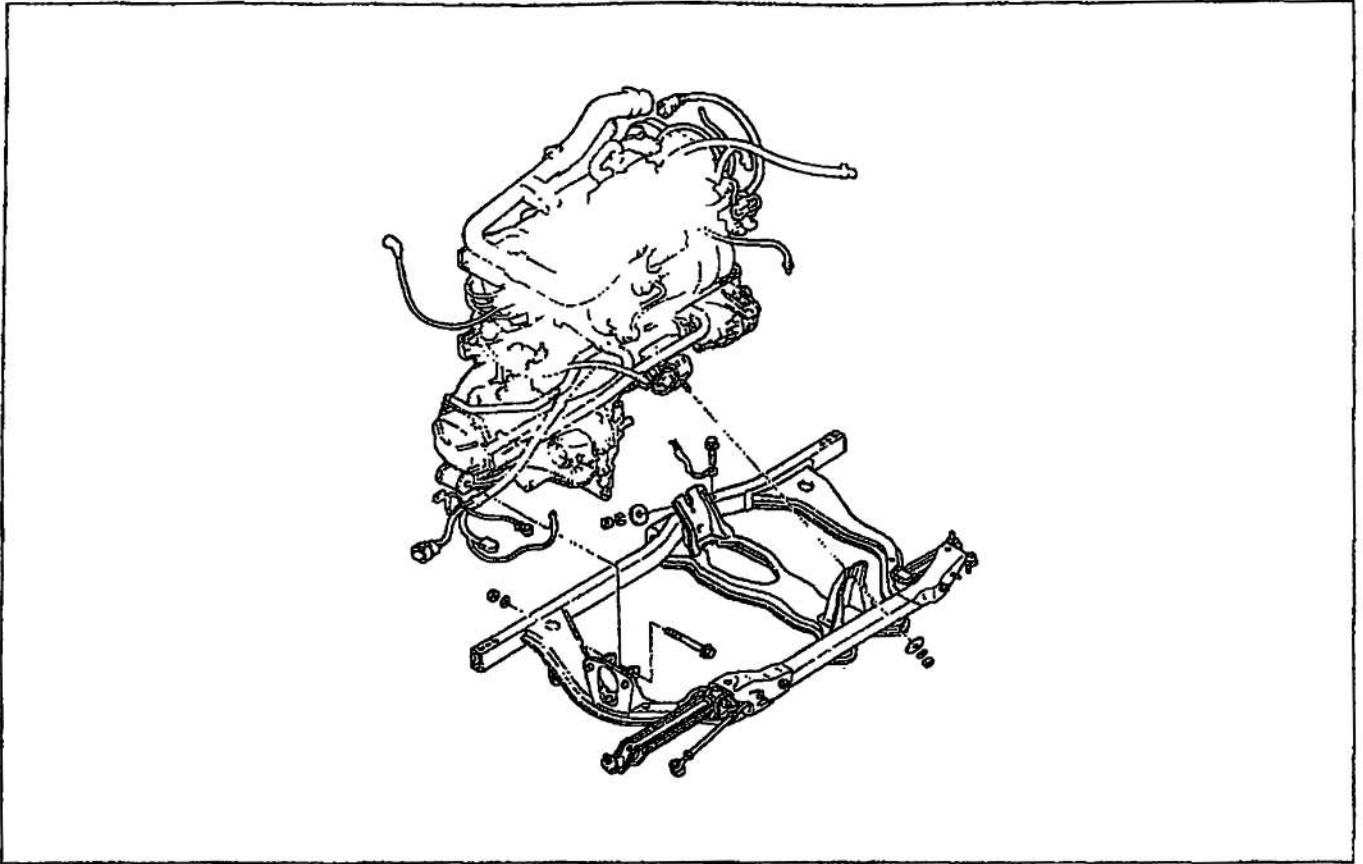
4. Raise the vehicle again, leaving the engine and transmission assembly resting on the pallet jack.

B

Engine removal

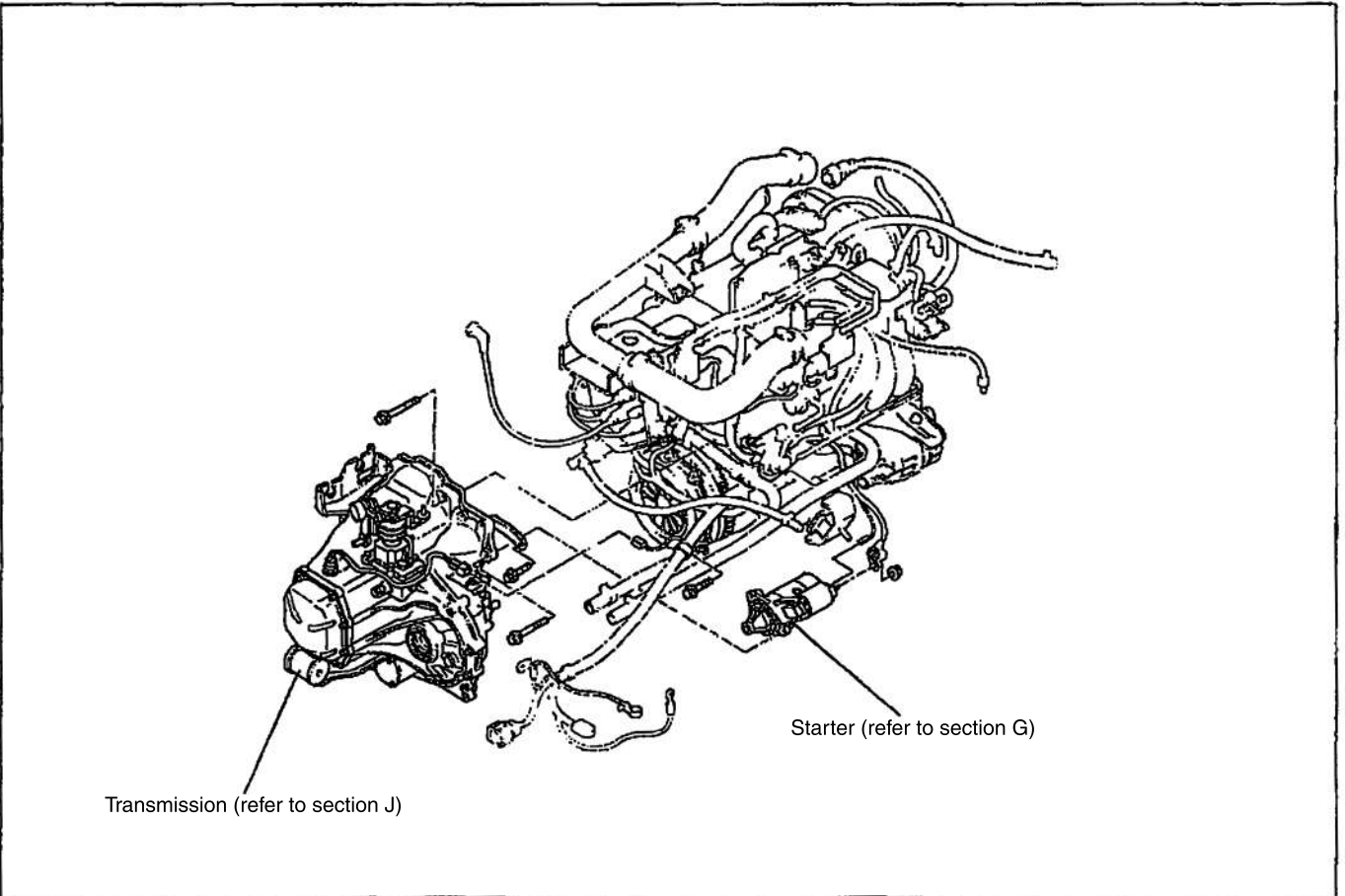
Step 5

Remove the engine and transmission assembly from the engine crossmember.



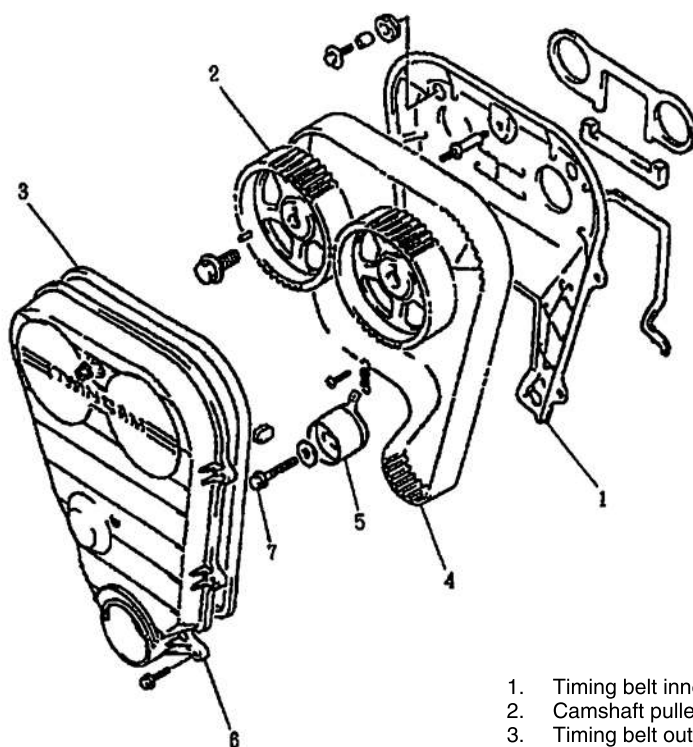
Step 6

Separate the engine and transmission.

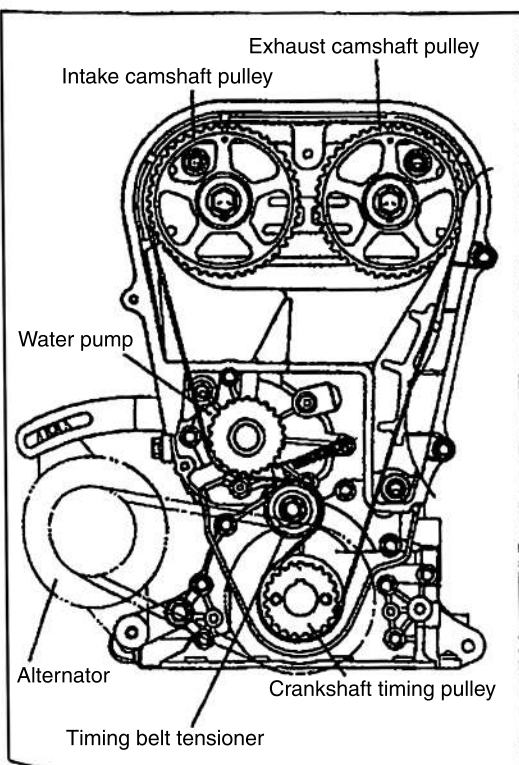


Disassembly / Inspection / Assembly

Timing belt, tensioner



1. Timing belt inner cover
2. Camshaft pulleys
3. Timing belt outer cover seal
4. Timing belt
5. Timing belt tensioner
6. Timing belt outer cover
7. Timing belt tensioner bolt



Removal

1. Remove the engine from the vehicle (see B-6)
2. Remove the oil dipstick and dipstick tube.
3. Remove the tensioner and timing belt, as in the figure.

Caution: Do not turn the camshaft or crankshaft when removing the timing belt.

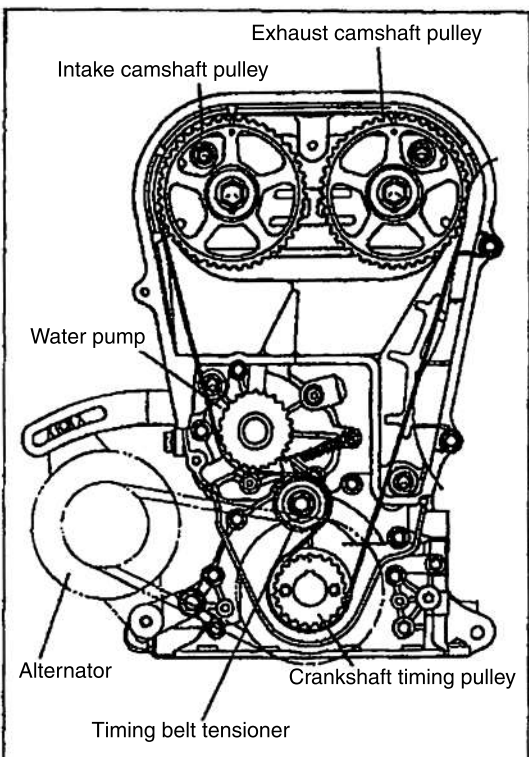
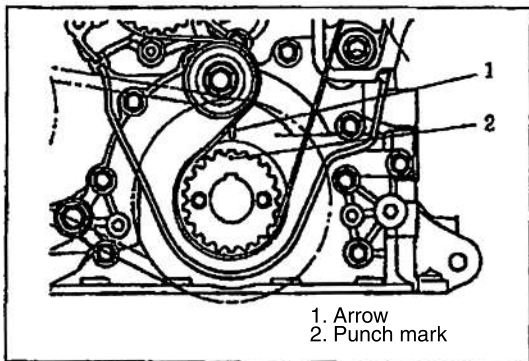
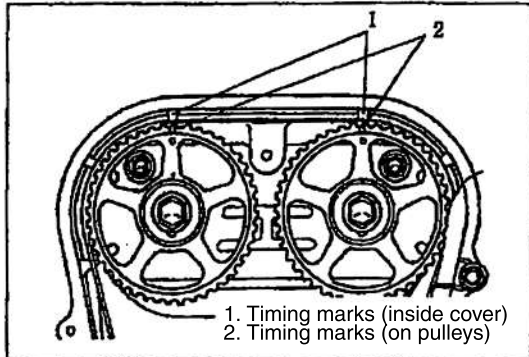
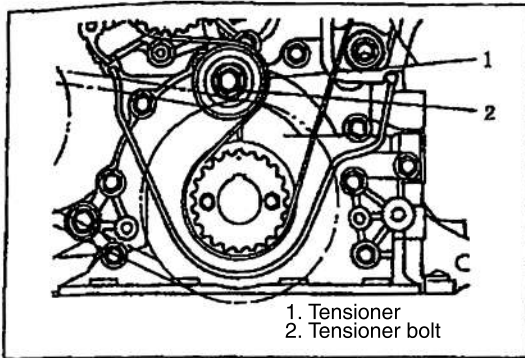
Inspection

Timing belt

Check the timing belt, and replace if it shows signs of cracks or wear.

Tensioner

Check the tensioner for smooth operation, and replace if defective.



Assembly

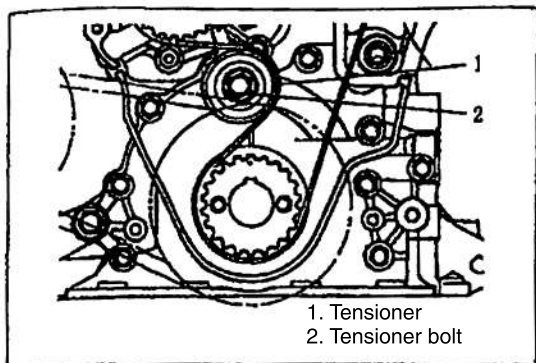
Assembly is the reverse of disassembly, but take note of these following points.

1. When installing the tensioner, first temporarily tighten the tensioner by hand, then tighten fully after getting the correct belt tension.
2. Align the timing marks (scored lines) on the intake and exhaust pulleys with the corresponding timing marks on the inside cover.
3. Align the punch mark on the crankshaft timing pulley with the arrow timing mark on the oil pump.

Caution: Turning the crankshaft more than 60° from the timing mark will cause one of the pistons to strike its valves.

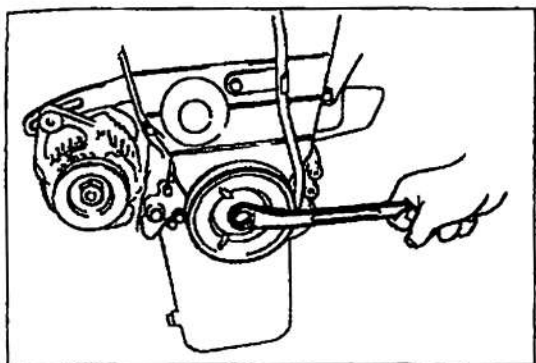
4. Keeping the pulleys for the crankshaft and camshafts aligned with their timing marks, attach the timing belt so that the tight side (right side of the figure) does not have any slack.
5. Attach the tensioner spring to the tensioner bolt, then tighten the tensioner bolt by hand.

Note: When installing the timing belt, make sure the arrows (→) on the belt point clockwise around the belt path.



6. After attaching the timing belt, rotate the crankshaft clockwise through two revolutions to remove the slack in the belt. Check that the timing marks are still aligned, then tighten the tensioner bolt to the specified torque.

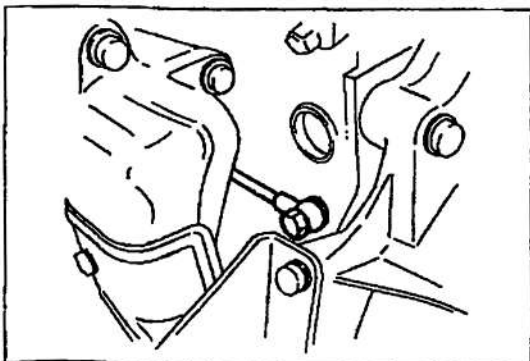
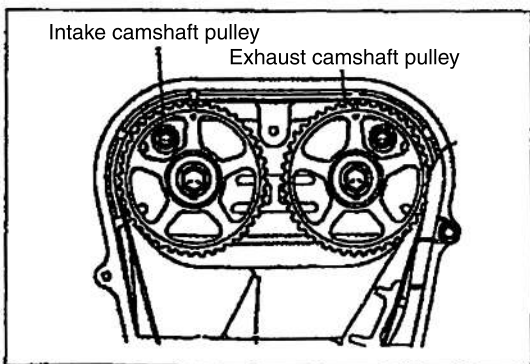
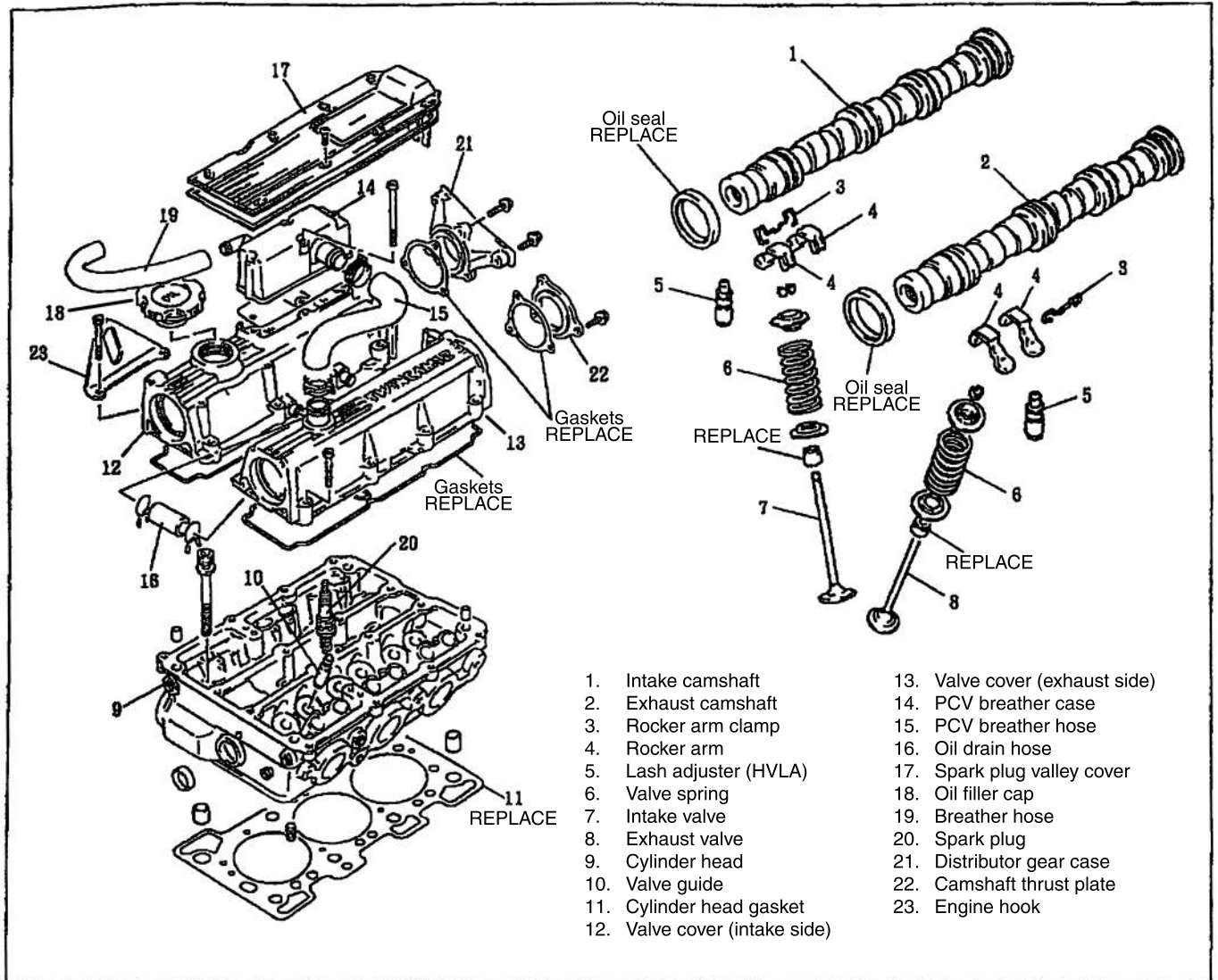
Tightening torque: 15 - 22 N·m (1.5 - 2.3 kg f·m)



7. Lock the flywheel in place using the SST.
8. Install the crankshaft pulley, tightening the bolts to the specified torque.

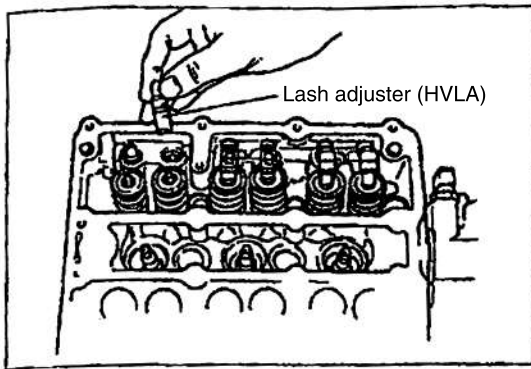
Tightening torque: 64 - 73 N·m (6.5 - 7.5 kg f·m)

Cylinder head, camshafts, valves, rocker arms



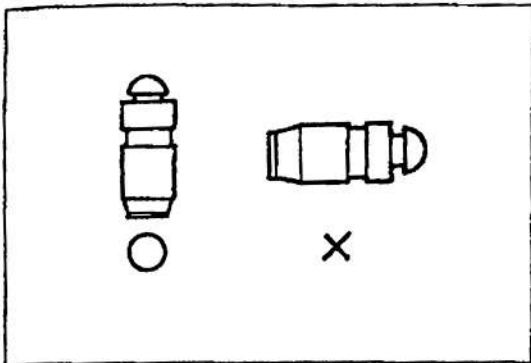
Removal

1. Remove the engine from the vehicle (see B-6).
2. Remove the timing belt (see B-11).
3. Remove the intake and exhaust camshaft pulleys.
4. Remove the timing belt inner cover, dust seal, and grommets.
5. Remove the banjo bolt for the turbo oil feed line (see figure).
6. Remove the coolant hoses.
7. Remove the spark plug valley cover.
8. Remove the distributor assembly.
9. Remove both valve covers, then remove the intake and exhaust camshafts.
10. Remove the cylinder head bolts, then remove the cylinder head.

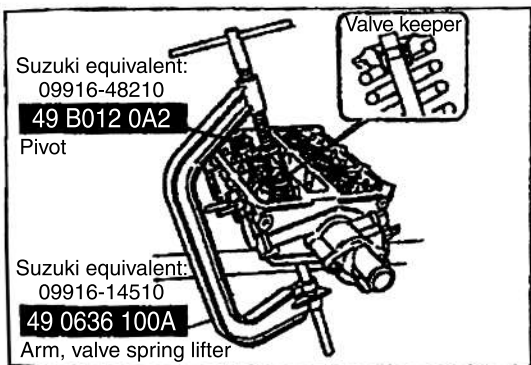


Disassembly

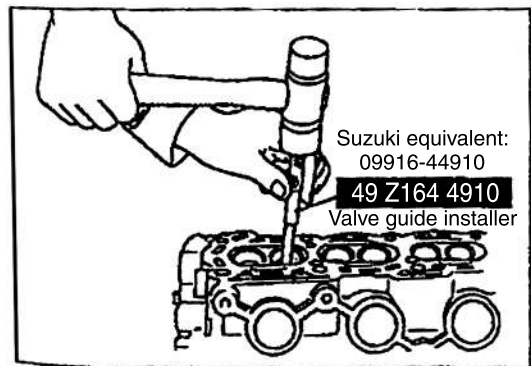
1. Remove the distributor gear case and intake manifold to make access easier.
2. Remove the rocker arms and lash adjusters (HVLA).



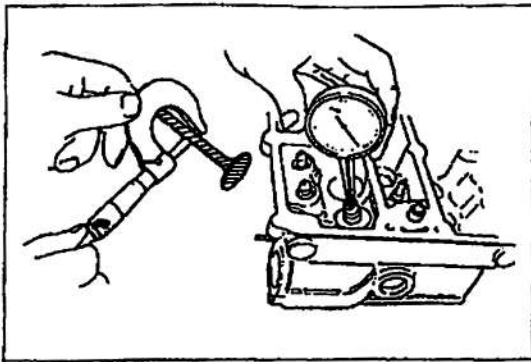
- Note:
- Keep the lash adjusters (HVLA) upright, because the oil will drain out if they tip over.
 - Store the lash adjusters (HVLA) in oil if they will be out of the engine for a long time.
 - Don't put any load on the valve contact surface area at the top of the valve adjusters (HVLA).



3. Compress each valve spring using the SST, then remove the valve keepers with forceps (e.g. Suzuki SST 09916-84510).
4. Remove the valve spring retainers, valve springs, and valves.
5. Remove the valve stem oil seals and valve spring seats.



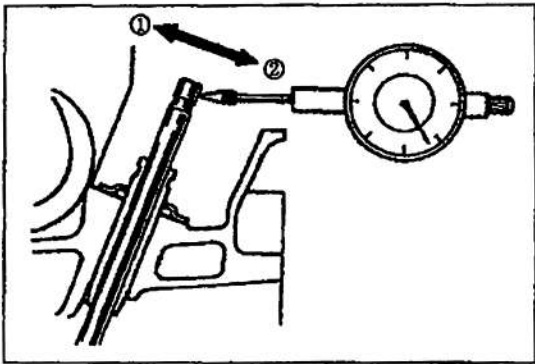
6. Using the SST, punch out the valve from the combustion chamber side.



Valve guide

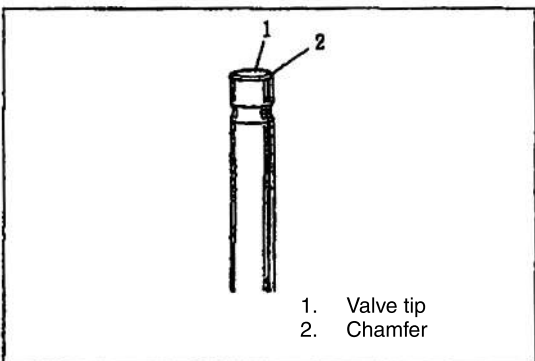
1. Measure the outer diameter of the valve stem using a micrometer, and the inner diameter of the valve guide with a bore gauge, to get the gap between the guide and stem.

		Reference value	Limit
Valve stem outer diameter (mm)	IN	5.465 - 5.480	---
	EX	5.440 - 5.455	---
Valve guide inner diameter (mm)	IN	5.500 - 5.512	5.54
	EX	5.500 - 5.512	5.54
Gap between stem and guide (mm)	IN	0.020 - 0.047	0.07
	EX	0.045 - 0.072	0.09



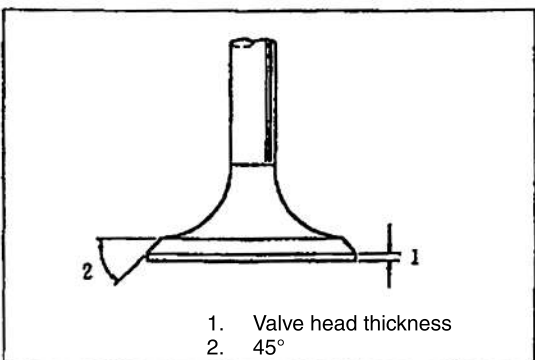
2. If a bore gauge is not available, an alternative method is to use a dial gauge to measure the amount of play when the stem is moved from side to side, as in the figure. If the value is above the limit given below, replace the guide and stem.

Maximum amount of play (mm) Intake : 0.14
 Exhaust : 0.18



Valve

1. Remove carbon deposits from the valve.
2. Check for wear on the valve and stem, or signs of burning or distortion. Replace the valve if these are apparent.
3. Check for wear on the valve tip. Since this surface comes in contact with the rocker arm, it may be dented or uneven. If necessary, the tip can be reground, but if more than 0.5mm needs to be cut from the valve tip, replace the valve instead.



4. Measure the thickness of each valve head. If the measured value is below the limit, replace the valve.

		Reference value	Limit
Valve head thickness (mm)	IN	1.0	0.6
	EX	1.2	0.7

Cylinder head

1. Remove the carbon buildup from the combustion chamber.

Note: Do not scrape the carbon off with a sharp knife or similar.

Take care not to damage the metal surface. This also applies to cleaning the valves and valve seats.

2. Check the combustion chamber, head surface, and around the intake and exhaust ports for cracks.

3. Check the cylinder head distortion:

Measure the flatness in 6 lines across the head surface, using a straight edge and feeler gauge. If the measured value is above the limit, resurface the cylinder head to bring it back within the specified flatness. If the distortion cannot be corrected, replace the cylinder head. If the mating surface of the cylinder head is distorted, the combustion gases will leak around the gasket and cause a reduction in power.

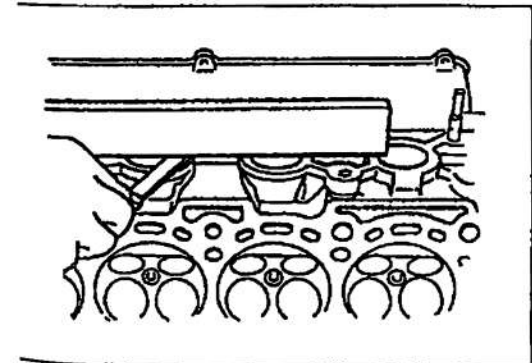
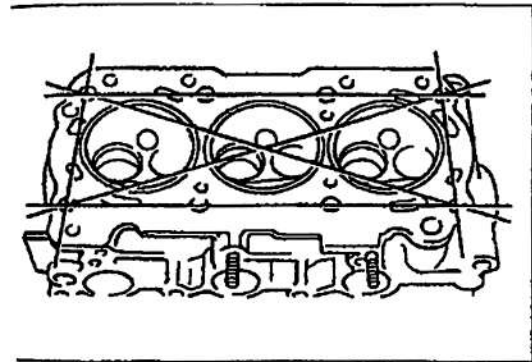
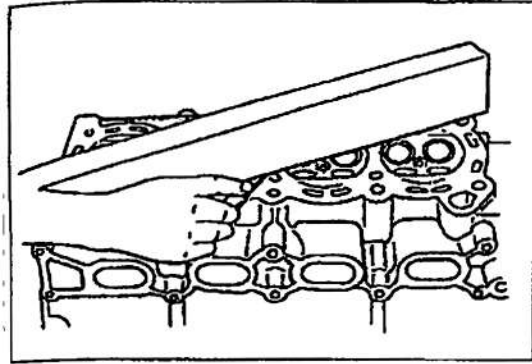
Distortion limit (mm): 0.05

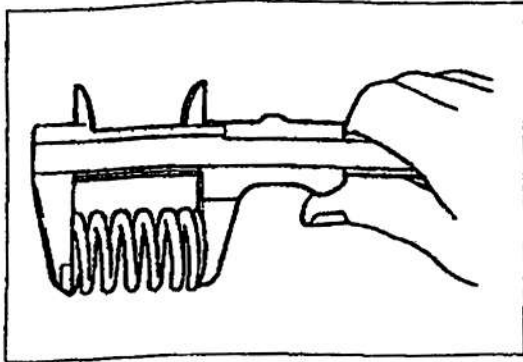
Note: The distortion measurement is done on the four sides, and across both diagonals.

4. Check the intake and exhaust manifold mating surfaces:

Measure the distortion using a straight edge and a feeler gauge. If the measured value is above the limit, mill the mating surface flat or replace the cylinder head.

Distortion limit (mm): 0.10



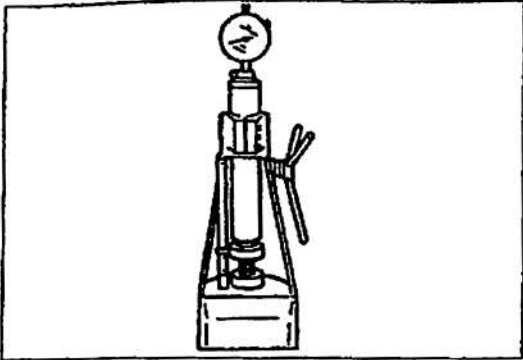


Valve spring

1. Measure the free length and mounting stress of each valve spring, as shown in the figure, and replace the valve spring if the measured value is below the limit.

If a spring's mounting stress reduces, the valve will not close properly, which will lead to combustion gases leaking from the valve and an abnormal noise.

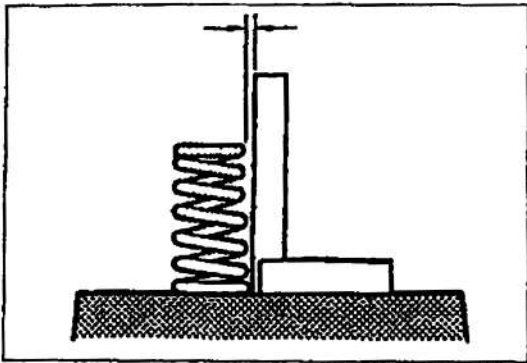
	Reference value	Limit
Free length (mm)	46.9	45.8
Mounting stress (kg f @ 37.5mm)	19.8 - 22.8	18.4



2. Spring straightness

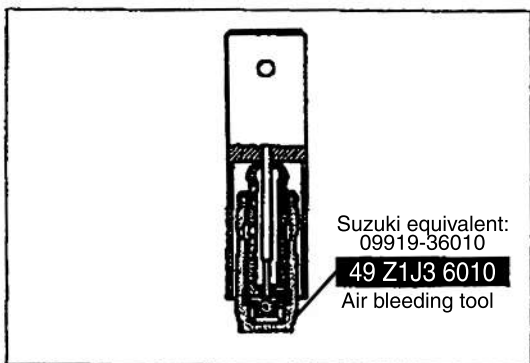
Measure the gap between the edge of each spring and a right angle ruler on a flat surface. If the measured value is over the limit, replace the valve spring.

Right angle limit (mm): 2.1

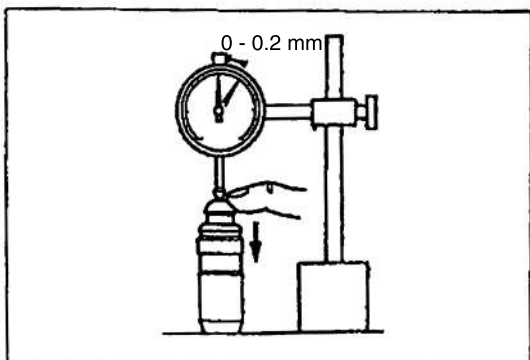


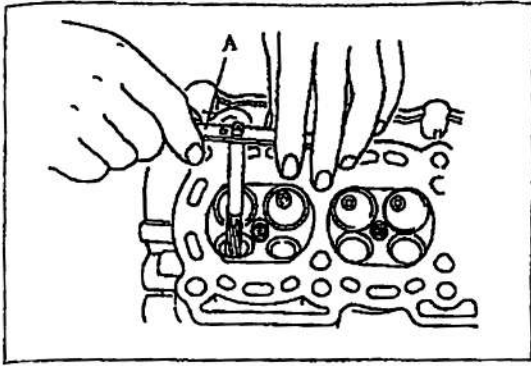
Lash adjuster (HVLA)

1. Immerse the lash adjuster in kerosine.
2. Insert the SST into the hole at the tip of the lash adjuster plunger, then with the check ball pushed down, operate the plunger up and down 10 to 20 times.



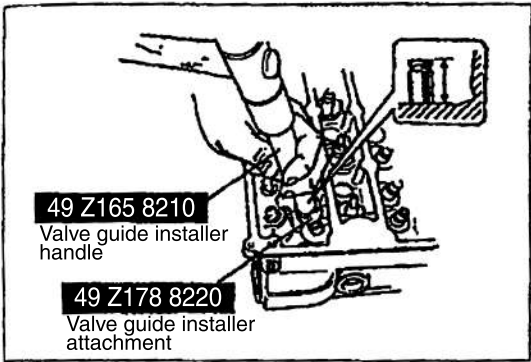
3. Press the lash adjuster (HVLA) plunger strongly with your finger. If it moves up to 0.2 mm, repeat step 2 to remove the air from the lash adjuster. If it moves more than 0.2 mm, replace the lash adjuster.





Assembly

1. Before attaching the valve guides to the cylinder head, use an 11mm reamer to make the guide holes perfectly circular.



3. When installing the valve guides, heat them to 80 - 100°C, then drive them into the cylinder head with the SST until the SST touches the head. The heating prevents distortion of the cylinder head.

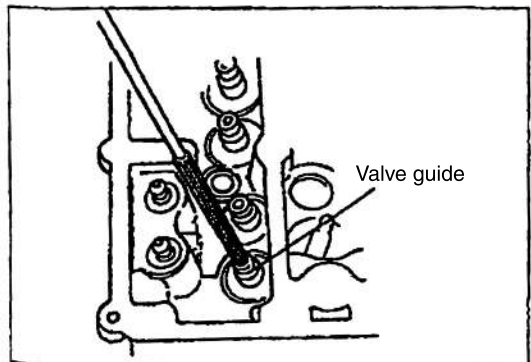
After installation, measure how far the guides protrude from the cylinder head.

- Note:
- Once a valve guide is removed, do not reuse it. Replace with a new (oversized) guide.
 - The valve guides on the exhaust and intake sides are exactly the same.

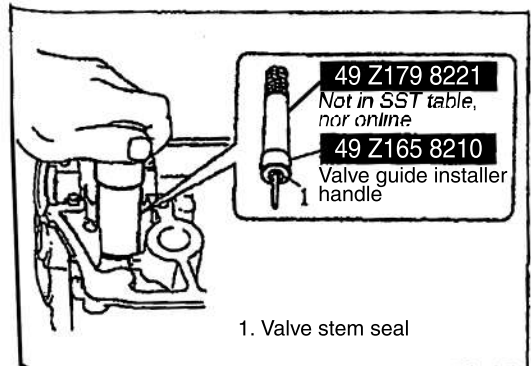
Oversize amount (mm) : 0.03

Valve guide protrusion (mm) IN : 17

EX : 17

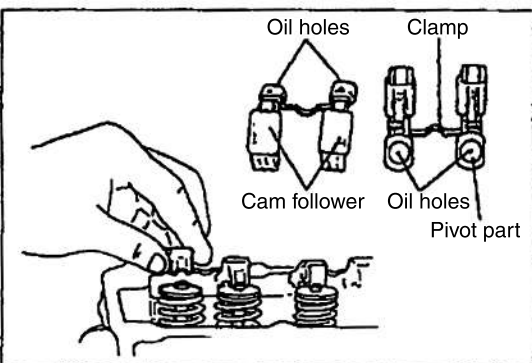
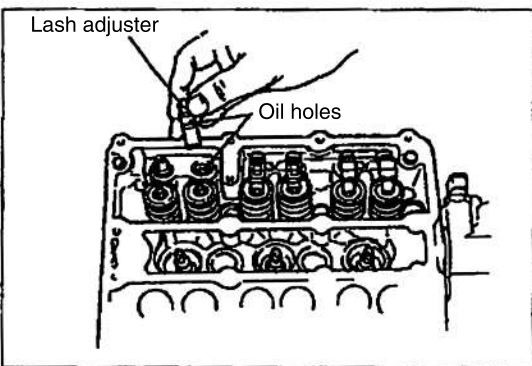
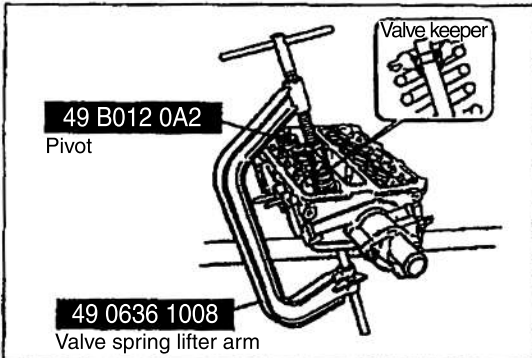
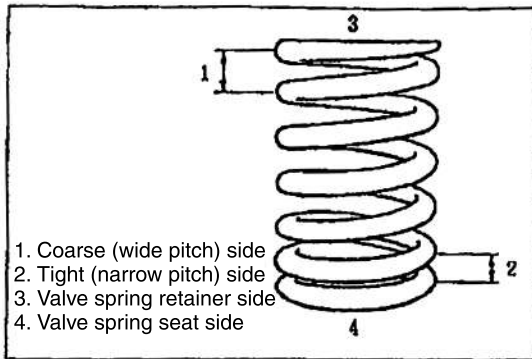


3. Use a 5.5mm reamer to correct the valve guide holes. After correction, remove any dirt or debris from the holes.
4. Attach the valve spring seats to the cylinder head.



5. Smear some engine oil on the valve stem seals, then attach the seals to the valve guides using the SST.

- Note:
- Don't reuse old stem seals, replace them with new seals.
 - Don't hit the SST with a hammer (or similar) when attaching the seals, as it may damage them.



6. With engine oil on the stem seals, valve guide holes, and valve stems, attach the valves to the valve guides.
7. Install the valve springs and spring retainers. Each valve spring should be installed with the tightly-coiled (narrow pitch) side facing down, against the spring seat.

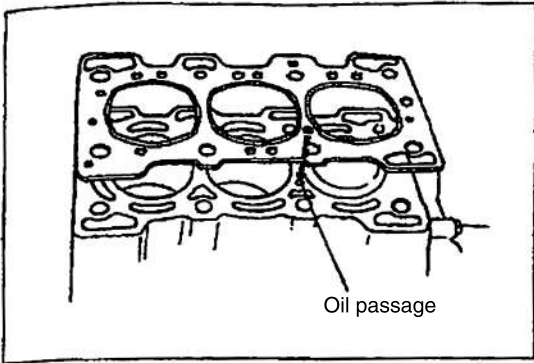
8. Compress each valve spring with the SST, then attach the valve keeper to the groove in the valve stem.

9. Attach each lash adjuster, lining up the oil hole of the lash adjuster with the corresponding oil hole in the cylinder head.

Note:

- Ensure the air has been bled from the lash adjuster. (See B-18)
- Do not crank the engine for at least 30 minutes after installing the camshaft.
- When first starting the engine, a valve tapping sound may occur. It should disappear after about 30 minutes.

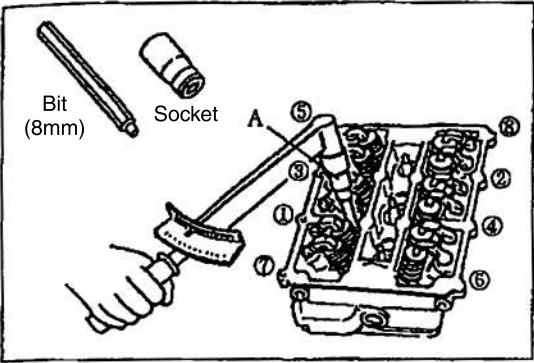
10. Attach the clamps securely to each pair of rocker arms.
11. Ensure that no debris is lodged in the oil holes of the rocker arms. Apply engine oil to the pivot and cam follower of each arm, and securely attach the rocker arm to the valve end of the lash adjuster.



Assembly

Assembly is the reverse of disassembly, with these provisions:

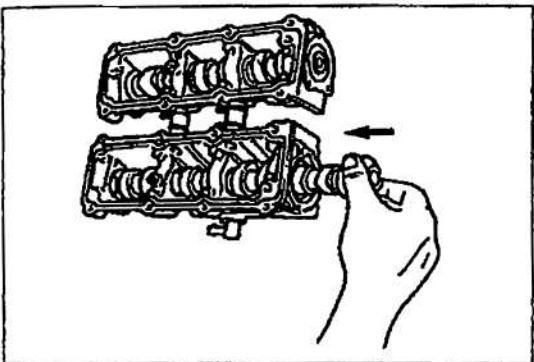
1. Ensure the head gasket is installed with the oil passages aligned with the oil passages of the engine block.



2. Attach the cylinder head, then tighten the head bolts to the specified torque in the order shown in the diagram, using an 8mm hex bit.

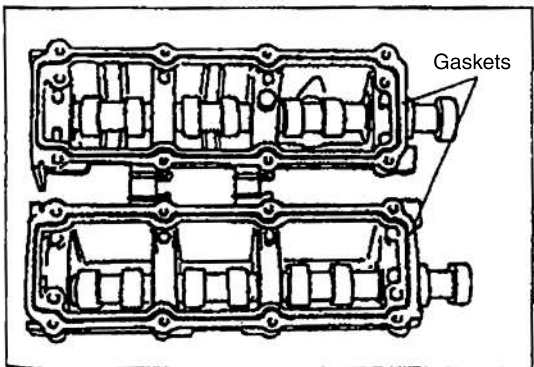
Tightening torque: 57 - 60 N·m (5.8 - 6.2 kg f·m)

Note: When tightening the head bolts, apply engine oil to the threads of the bolt, and the surface around the bolt hole.

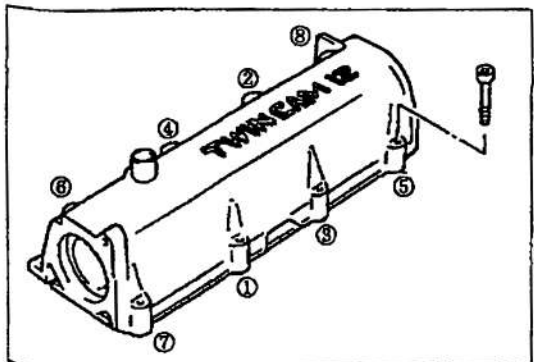


3. Apply engine oil to the camshaft journal. Insert the camshaft from the flywheel side (rear of the engine), and fix the exhaust side in place with the thrust plate.

4. Clean any oil off the mating surface between the cylinder head and valve cover.



5. The valve cover gaskets must be precisely aligned with the grooves in the valve covers. Make sure the gasket does not come free when attaching the covers to the cylinder head.

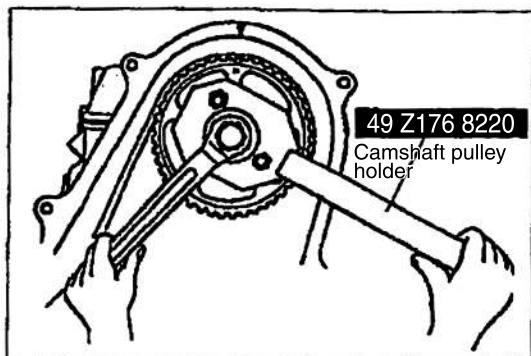


6. Tighten the bolts on the camshaft housing to the specified torque, and in the order shown in the figure.

Tightening torque: 7.9 - 11.7 N·m (80 - 120 kg f·cm)

B

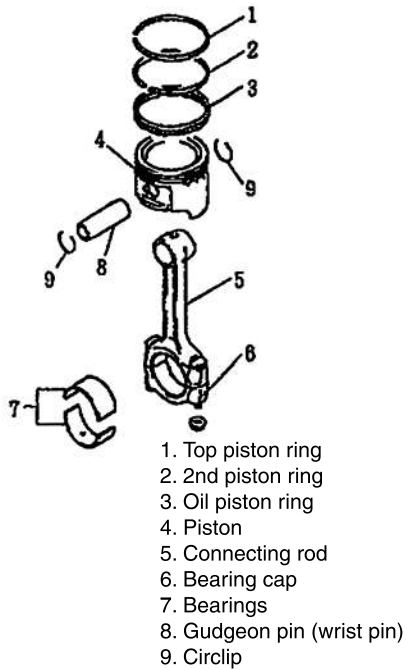
Disassembly / Inspection / Assembly



7. Attach the camshaft timing pulleys and tighten to the specified tightening torque, using the SST to hold the camshaft stationary.

Tightening torque: 69.0 - 98.0 N·m (7.0 - 10.0 kg f·m)

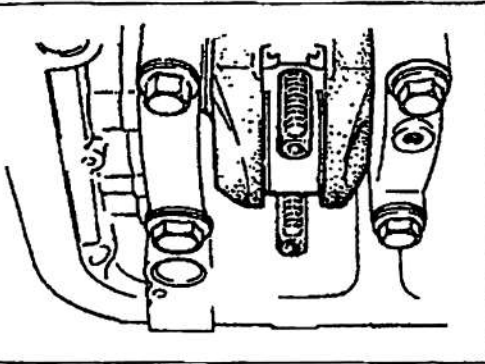
8. For mounting timing belts, see B-11.
9. For installing the distributor, see section G. After installation, inspect and adjust the ignition timing.
10. When installation is complete, check for leaks of coolant, oil, fuel, etc. from each connected part.



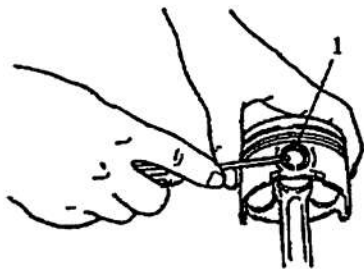
Pistons, piston rings, connecting rods, cylinders

Removal

1. Remove the engine from the vehicle (see B-6)
2. Remove the cylinder head from the engine block (see B-14)
3. Remove the oil pan and oil filter.
4. On each piston, connecting rod, and each rod bearing cap, write the cylinder number with a quick-drying ink pen.



5. After removing the rod bearing caps, protect the exposed threads of the rod bolts from damage by fitting a section of hose over each one.
6. Remove built up carbon from the top of the cylinder bore.
7. Push each piston and connecting rod out through the top of the cylinder.



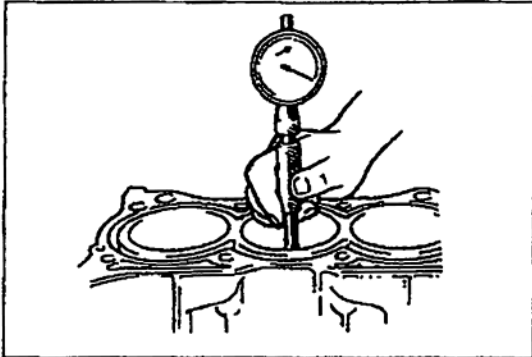
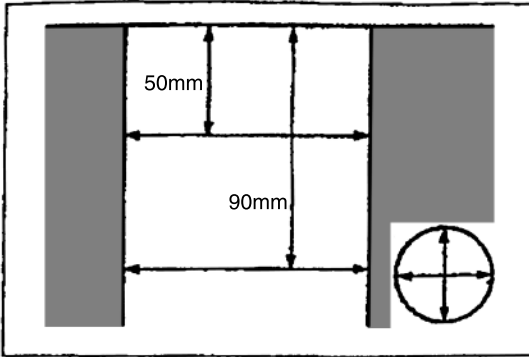
1. Gudgeon pin circlip

Disassembly

1. Using a piston ring expander, remove the piston rings and oil ring from the piston.
2. Remove the circlip, then remove the gudgeon pin (wrist pin) from the connecting rod and piston.

Washing

Remove carbon deposits from the piston crown and ring grooves using an appropriate tool.



Inspection

Cylinder

1. Inspect the cylinder wall for wear or damage, and if damaged severely, re-bore all cylinders or replace the engine block.
2. Using a bore gauge, measure the cylinder bore diameter in both the thrust and axial directions, at the two depths shown in the diagram. If the following apply, re-bore to oversized.
 - When the cylinder bore is over the the diameter limit.
 - When the difference between the bore at the two depths is over the taper limit.
 - When the difference between the diameter across the thrust and axial directions is greater than the shake limit.

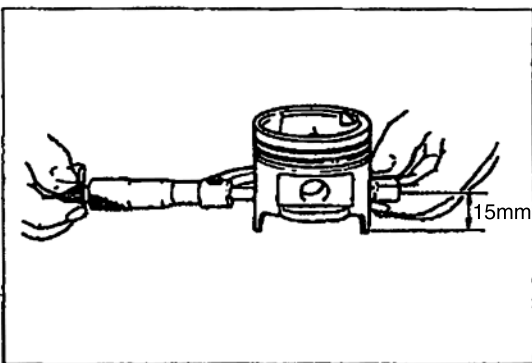
Bore diameter limit (mm): 65.070

Taper & shake limits (mm): 0.10

Caution: If you need to re-bore one of the cylinders, you must re-bore ALL of the cylinders to maintain balance.

Pistons

1. Inspect the pistons for cracks and damage. Replace the piston if there is a problem.

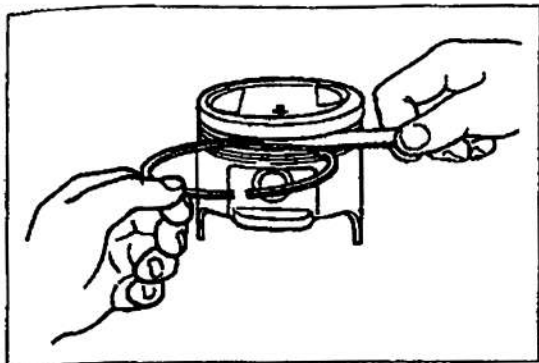


2. Measure the cylinder bore diameter and piston diameter and calculate the gap from the difference. If the gap is over the clearance limit, replace the piston with an oversized one. The piston diameter is measured at a point 15mm from the bottom of the piston skirt, as shown in the figure.

Piston diameter (mm)	Reference value	64.965 - 64.985
	Oversized 0.25 mm	65.215 - 65.235
	Oversized 0.50 mm	65.465 - 65.485

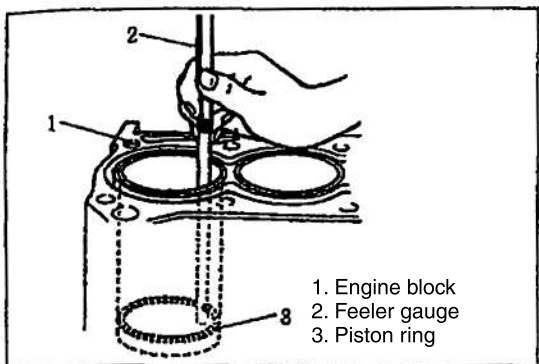
Piston clearance (mm) : 0.040 - 0.050

Note: The piston bore diameter is defined as the average of the two diameter measurements along the thrust axis.



- Remove any carbon from the ring grooves, dry it, then insert the new piston rings and measure the clearance between the ring and the ringland above using a feeler gauge. If the clearance is above the limit, replace the piston.

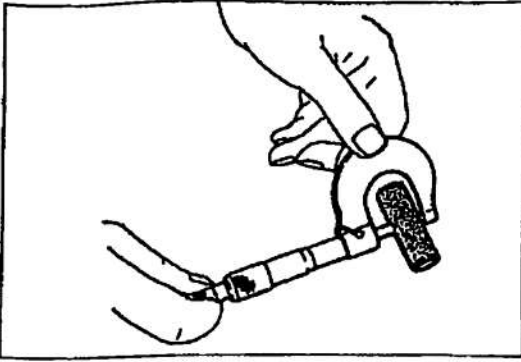
Ring groove clearance (mm)	Piston ring	Reference	Limit
	Top ring	0.03 - 0.07	0.12
	2nd ring	0.02 - 0.06	0.10



Piston rings

Insert a piston ring in the bottom of the cylinder bore using the piston. Using a feeler gauge, measure the piston ring gap. If the measured gap is above the limit, replace the piston ring.

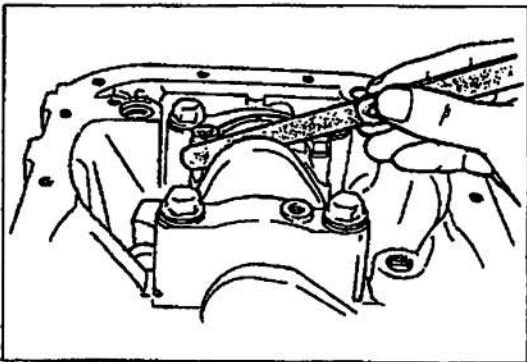
		Reference	Limit
Piston ring gap (mm)	Top ring	0.12 - 0.27	0.7
	2nd ring	0.20 - 0.35	0.7
	Oil ring	0.20 - 0.27	1.8



Gudgeon pins (wrist pins)

Measure the outer diameter of the gudgeon pin, and the inner diameter of the piston boss. Calculate the clearance. If outside of the reference value, replace the piston or gudgeon pin.

	Reference value
Gudgeon pin diameter (mm)	17.995 - 18.000
Piston boss diameter (mm)	18.006 - 18.014
Gudgeon pin clearance (mm)	0.006 - 0.019



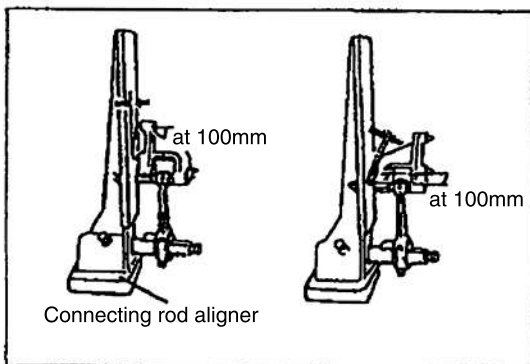
Connecting rods

1. Measure the thrust gap at the big end of the connecting rod.
If the measured value is over the limit, or if there is damage to the thrust face at either end, replace the connecting rod.

Thrust gap (mm)	Reference : 0.10 - 0.20
	Limit : 0.35

2. Measure the bending and twist of the connecting rod using the connecting rod aligner. If the measured value is over the limit, replace the connecting rod.

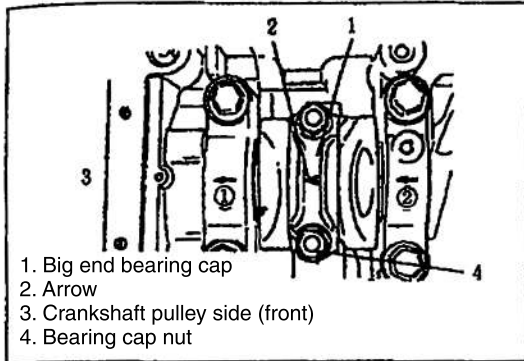
Bending limit (mm) :	0.05 (at 100mm)
Twist limit (mm) :	0.10 (at 100mm)



Big end bearings

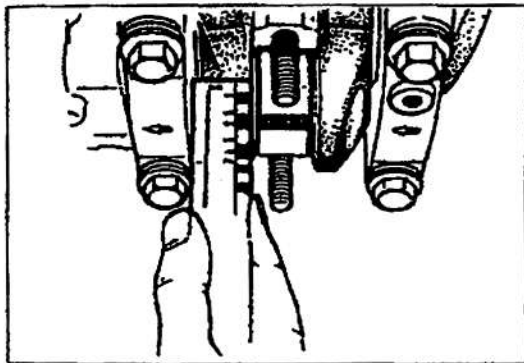
1. Check the bearings for delamination, melting, seizure, and abnormal wear. If there is a problem, replace the bearing.

2. Measure the oil clearance of the big end bearings using Plastigauge.
 - ① Remove dirt or foreign matter adhering to the crank journals and big end bearings.
 - ② Remove the bearing caps and big end bearings.
 - ③ Cut the Plastigauge to the same length as the width of the bearing and place it on the crank journal, avoiding the oil hole.



- ④ Attach the connecting rod so that the arrow on the bearing cap faces the crankshaft pulley side (front). Apply engine oil to the rod bolts and tighten the cap nuts with the specified torque. Do not turn the crankshaft.

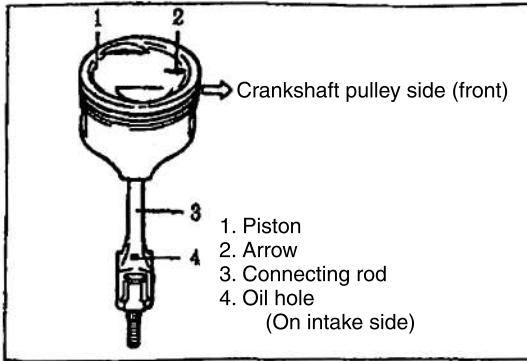
Tightening torque: 31 - 34 N·m (3.1 - 3.5 kg f·m)



- ⑤ Remove the bearing cap and measure the widest part of the Plastigauge using the scale printed on the Plastigauge bag. If the measured value is over the limit, replace the bearing and measure again.

Oil clearance (mm) Reference value : 0.040

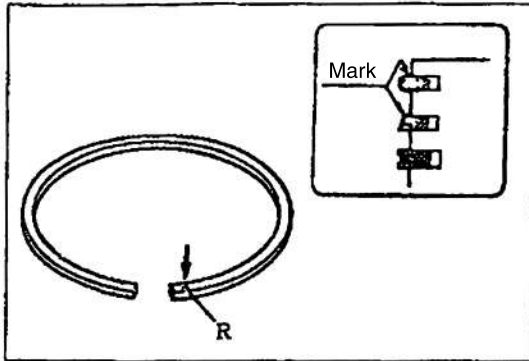
Limit : 0.065



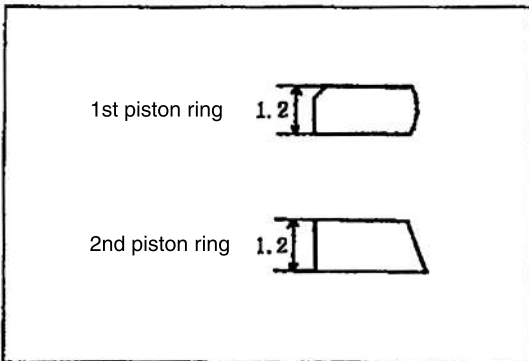
Assembly

Assembly is the reverse of disassembly, but take note of the following.

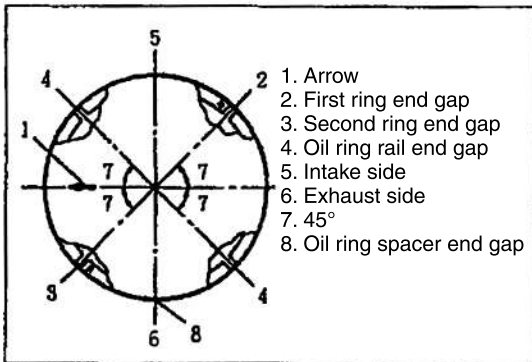
1. Align the piston with the wrist of the connecting rod, insert the wrist pin, and secure with the circlip. The direction that the piston faces is important, so ensure the arrow on the piston and the oil hole of the connecting rod match the figure shown on the left.



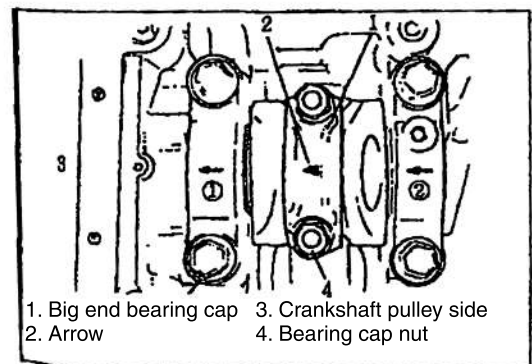
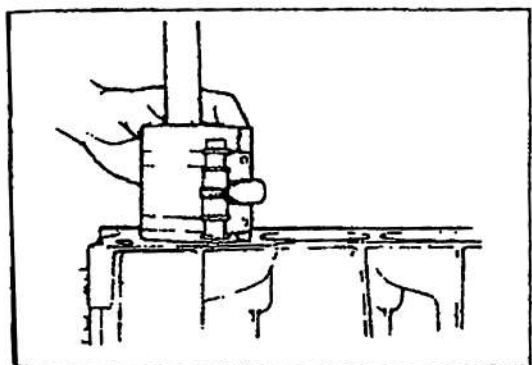
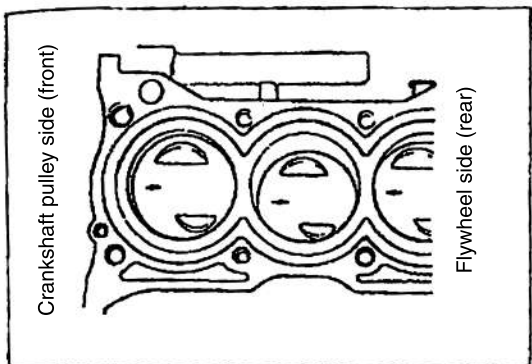
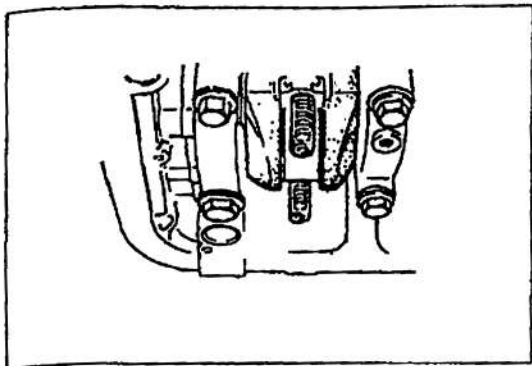
2. Attach the piston rings to the piston.
For the first and second rings, an "R" or "N" mark is visible at the position shown in the figure. When attaching the rings to the piston, install with the marked side facing upwards.



The first and second rings are shaped differently. They can be identified by examining the surface that contacts the cylinder wall, and comparing the shapes to the figure on the left. When installing the oil ring, install the spacer before installing the two rails on either side.



3. After installing the three piston rings, align the positions of the end gaps to the positions shown in the figure.

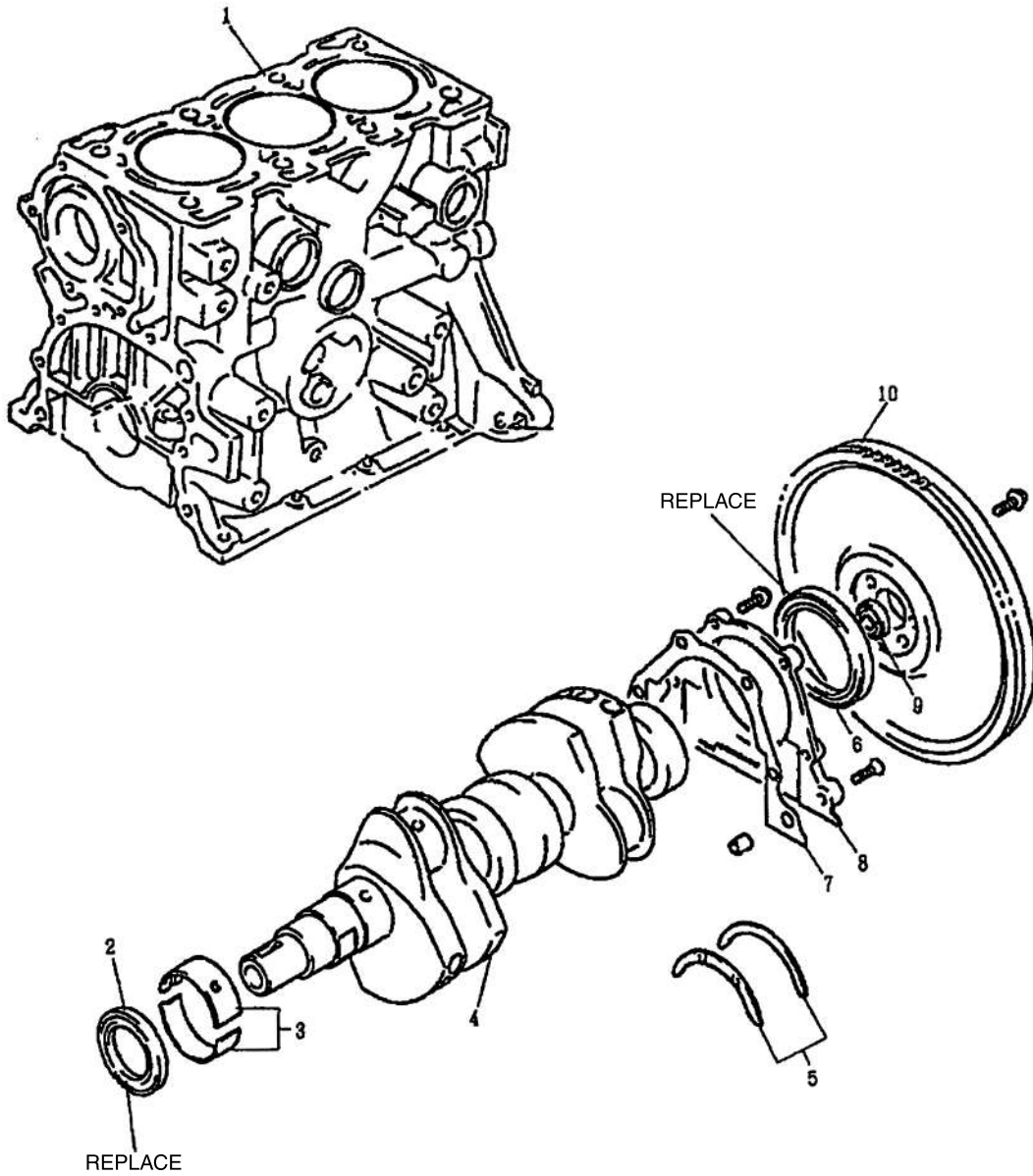


- Installation
1. Apply engine oil to the pistons, piston rings, cylinder walls, big end bearings, and crankpins.
 2. Protect the threads of the connecting rod bolts using small sections of hose, so that they are not damaged when installing the connecting rods and pistons.
 3. Insert the connecting rods and pistons into the cylinder, so that the arrow of the piston faces the crankshaft pulley side (front).
 4. Compress the piston rings using a piston ring compressor, and tap the piston crown lightly with a hammer handle (or similar) to insert the piston and connecting rod into the cylinder.
 5. Attach the bearing cap so that the arrow faces the crankshaft pulley side (front), and tighten the cap nuts to the specified torque.

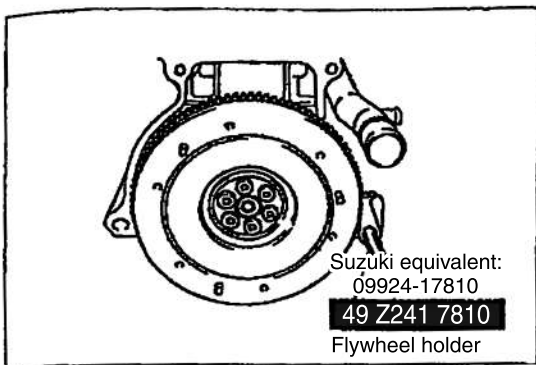
Tightening torque: 31 - 34 N·m (3.1 - 3.5 kg f·m)

6. For mounting the cylinder head, refer to B-14.
7. For mounting the timing belt, refer to B-11.
8. Replenish the engine oil.
9. Replenish the engine coolant, with reference to section E.
10. For installing the distributor, refer to section G. After installing, inspect and adjust ignition timing.
11. After installing the engine in the vehicle, check for leaks of oil, coolant, fuel, etc.

Crankshaft bearings, crankshaft, and cylinder block

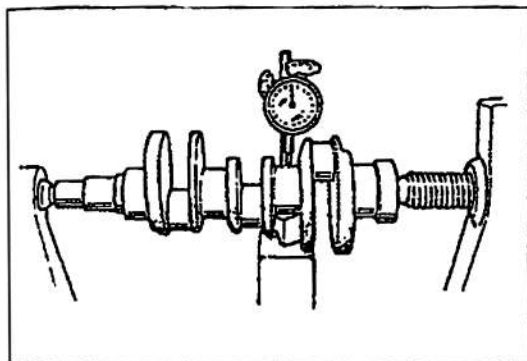


1. Cylinder block
2. Front main seal
3. Main bearing
4. Crankshaft
5. Thrust bearing
6. Rear main seal
7. Oil seal housing gasket
8. Oil seal housing
9. Input shaft bearing
10. Flywheel



Removal

1. Remove the engine from the car. (Refer to B-6)
2. After removing the clutch, remove the flywheel with the SST. (Refer to Section H for information on removing the clutch assembly)
3. Remove the alternator bracket, crankshaft pullet, timing belt, and timing belt pulley. (Refer to B-11)
4. Remove the cylinder head. (Refer to B-14)
5. Remove the oil pan and oil strainer.
6. Remove the pistons and connecting rods. (Refer to B-20)
7. Remove the oil pump and oil seal housing.
8. Remove the crankshaft bearing caps and crankshaft.



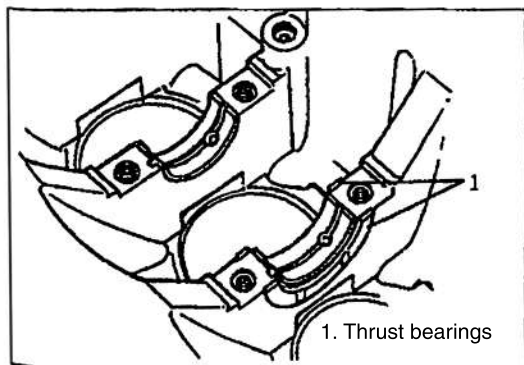
Inspection

Crankshaft

1. With a dial gauge, slowly turn the crankshaft. Measure the runout of the centre journal. If the measured runout is above the limit, replace the crankshaft.

Maximum runout (mm) : 0.03

Note: To measure the runout, place a dial gauge on the journal section, then rotate the crankshaft one revolution and take the maximum value indicated on the gauge.



2. Install the crankshaft, thrust bearings, and journal bearings in the cylinder block, and tighten the bearing cap bolts to the specified torque. Once completed, measure the thrust play using a dial gauge. If the measured value exceeds the limit, renew the thrust bearings with replacements of either the standard size, or oversized as appropriate.

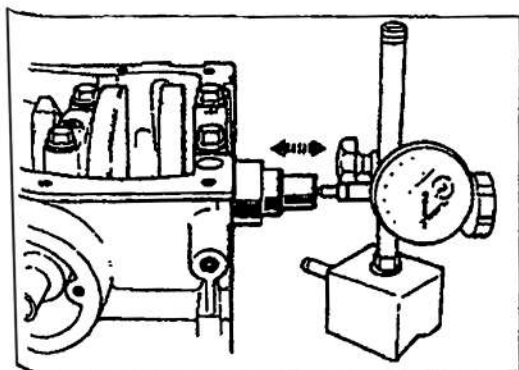
Bearing cap bolt torque: 54 - 58 N·m (5.5 - 6.0 kg f·m)

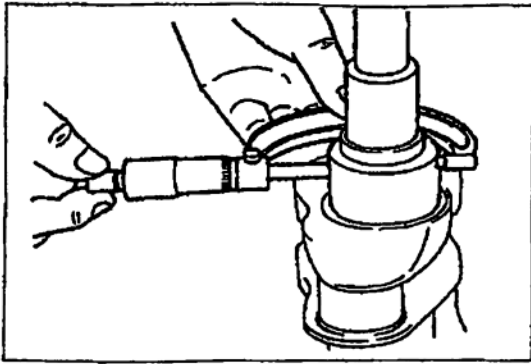
Thrust play (mm) : Reference value : 0.11 ~ 0.31

Limit : 0.35

Bearing thickness (mm) : Standard : 2.500

Oversize : 2.563





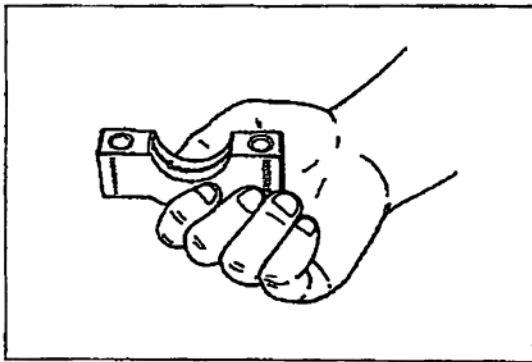
3. Uneven wear of the crankshaft journal causes changes in journal diameter between the transverse and longitudinal directions, which can be measured by a micrometer. If any journal is damaged, or if the runout or taper is over the limit, either replace the crankshaft or correct it with grinding.

Journal runout & taper limit (mm): 0.01

Crankshaft bearing

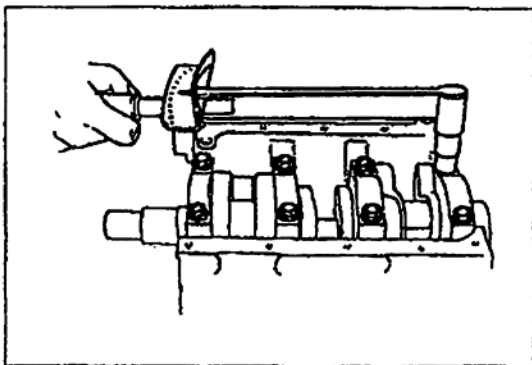
1. Check for delamination, melting, seizure and wear. If there is a defect, replace the crankshaft bearing.

Note: Do not attempt to repair or modify the bearing.



2. With plastic gauge, measure the oil clearance of the bearing.

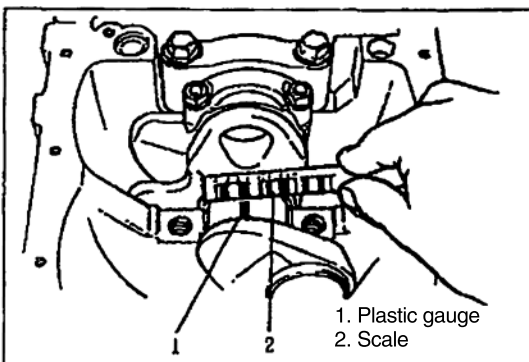
- ① Remove foreign matter on the bearing and journal surfaces.
- ② Apply oil to the bearing surfaces on the engine block side of the journal. Leave the surfaces on the bearing cap side dry.
- ③ Cut the plastic gauge to a length that matches the width of the bearing, and place it on the journal. Avoid placing the gauge on or near the oil holes.



- ④ Attach the bearing caps in order from front to back, and with the arrows pointing towards the crankshaft pulley side (front).

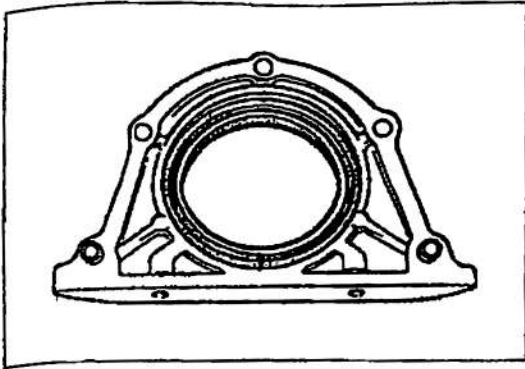
- ⑤ Tighten the bearing cap bolts to the specified torque. Do not turn the crankshaft at this time.

Bearing cap bolt torque: 54 - 58 N·m (5.5 - 6.0 kg f·m)



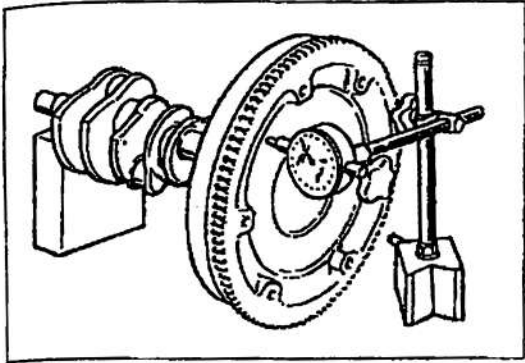
- ⑥ Remove the bearing cap and measure the widest part of the plastic gauge using the scale supplied with the gauge. If the measured value is over the limit, replace the bearing and measure again.

Oil gap (mm)	Reference value	: 0.020 - 0.040
	Limit	: 0.065



Rear main seal

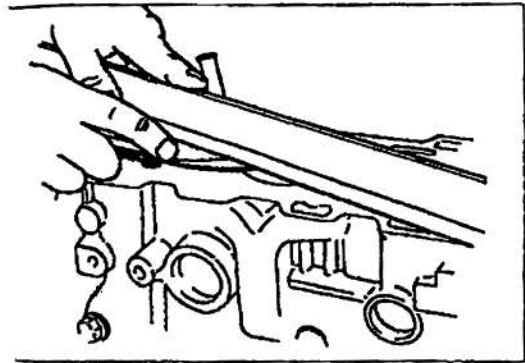
Inspect the lip of the rear main seal. If the seal is worn or has signs of damage, replace the rear main seal.



Flywheel

1. Check the starter ring gear for damage, cracking and wear. Check the friction plate for damage and abnormal wear. If the inspection reveals a problem, replace the flywheel.
2. Measure the runout of the surface using a dial gauge and replace the flywheel if the measured value is above the limit.

Runout limit (mm) : 0.2

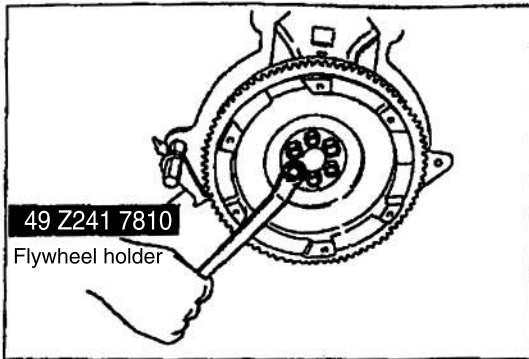


Cylinder block

As with the cylinder head, measure the distortion of the block deck along six lines (top, bottom, left, right, both diagonals) using a straight edge. If the measured value exceeds the limit, resurface the deck.

If more than 0.15mm of material needs to be removed, replace the cylinder block.

Distortion limit (mm) : 0.05



7. Secure the flywheel with the SST, and tighten the bolt to the specified torque.

Bolt torque : 40 - 44 N·m (4.0 - 4.5 kg f·m)

8. Insert the pistons and connecting rods. (Refer to B-23)
9. Mount the cylinder head. (Refer to B-14)

Note: When mounting the cylinder head to a new cylinder block, tighten the cylinder head bolts to the specified torque, then loosen to zero torque, and finally retighten to the specified torque.

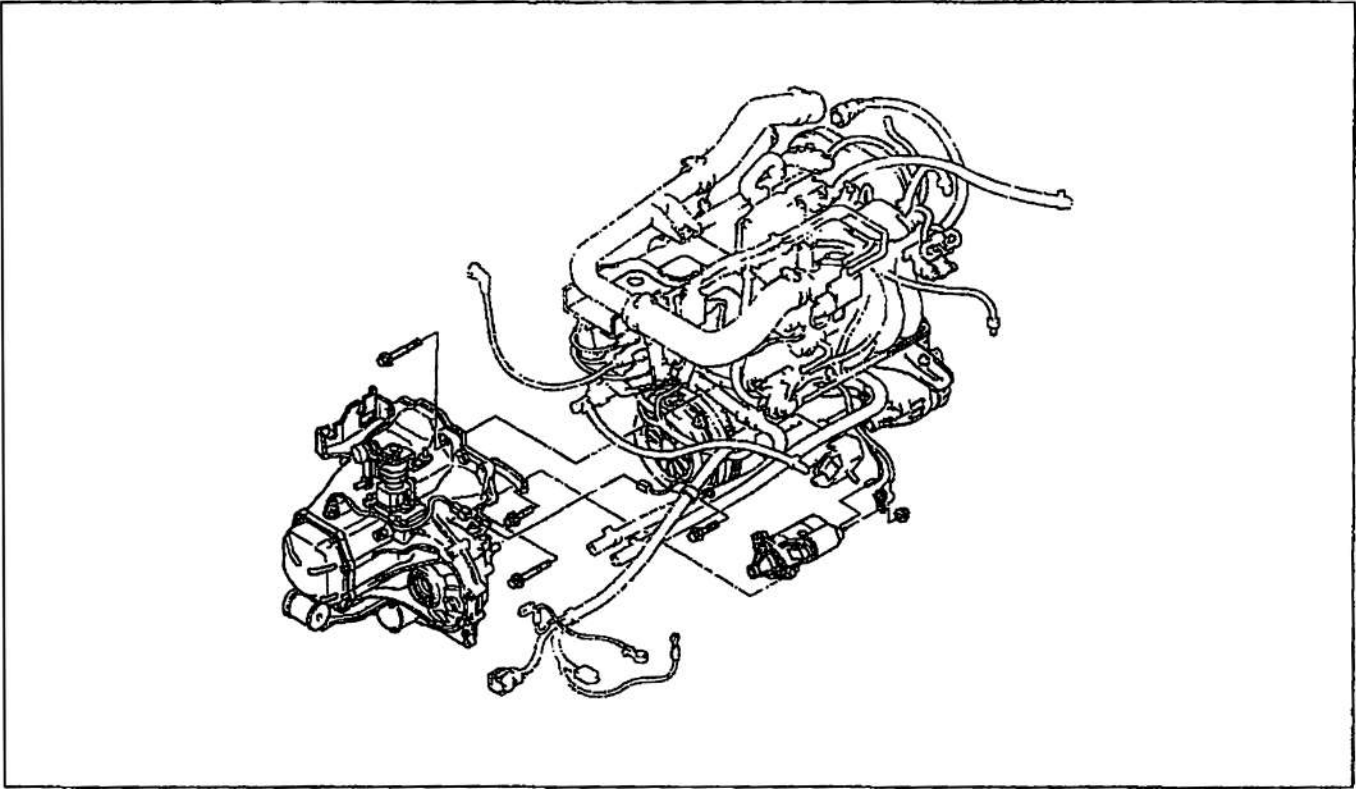
10. Install the timing belt. (Refer to B-11)
11. Install the clutch. (Refer to Section H)
12. Mount the engine in the car. (Refer to B-35)

Mounting

Procedure

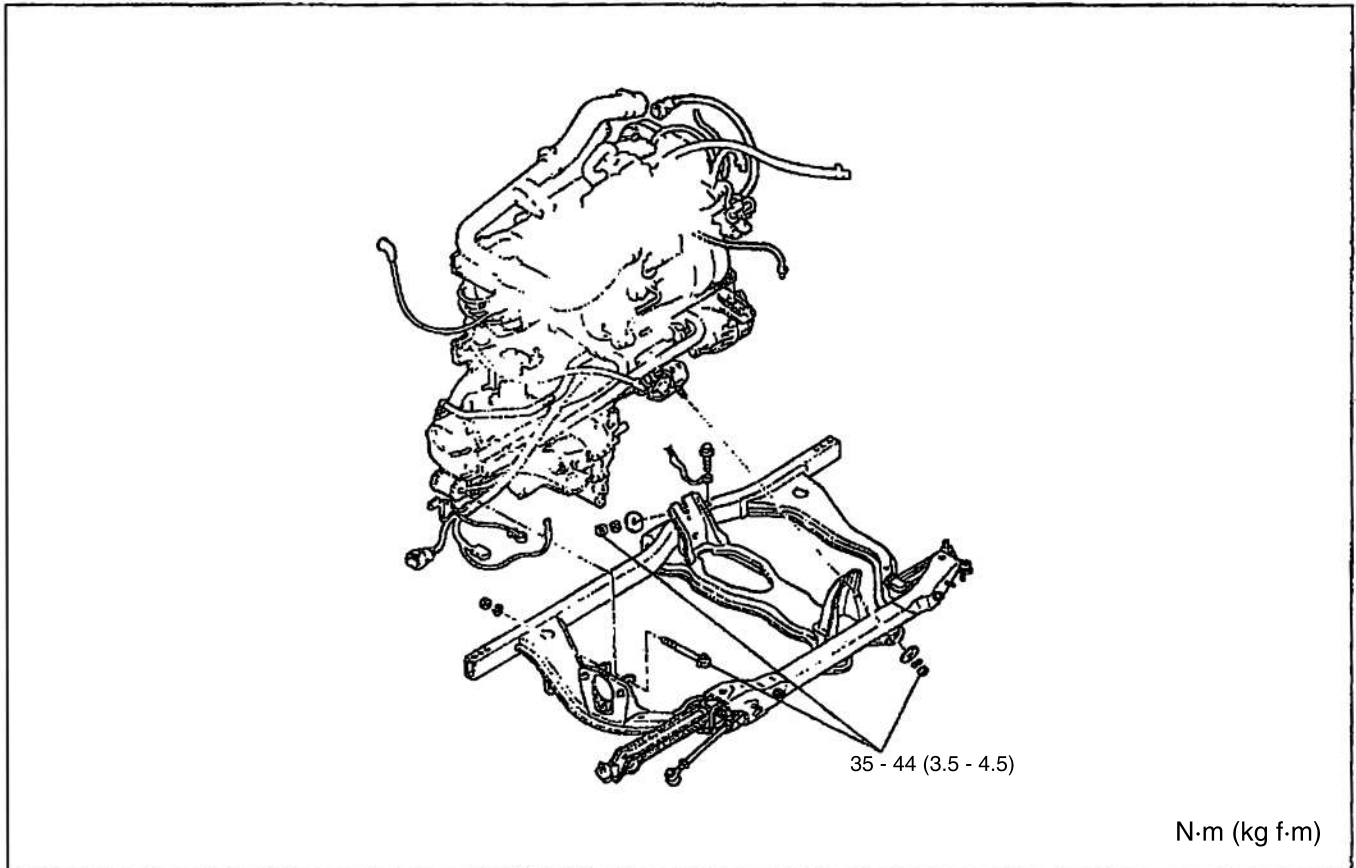
Step 1

Mount the transmission and starter motor to the engine.



Step 2

Attach the engine and transmission assembly to the engine crossmember.

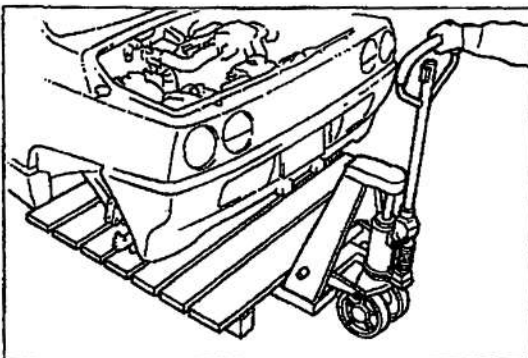
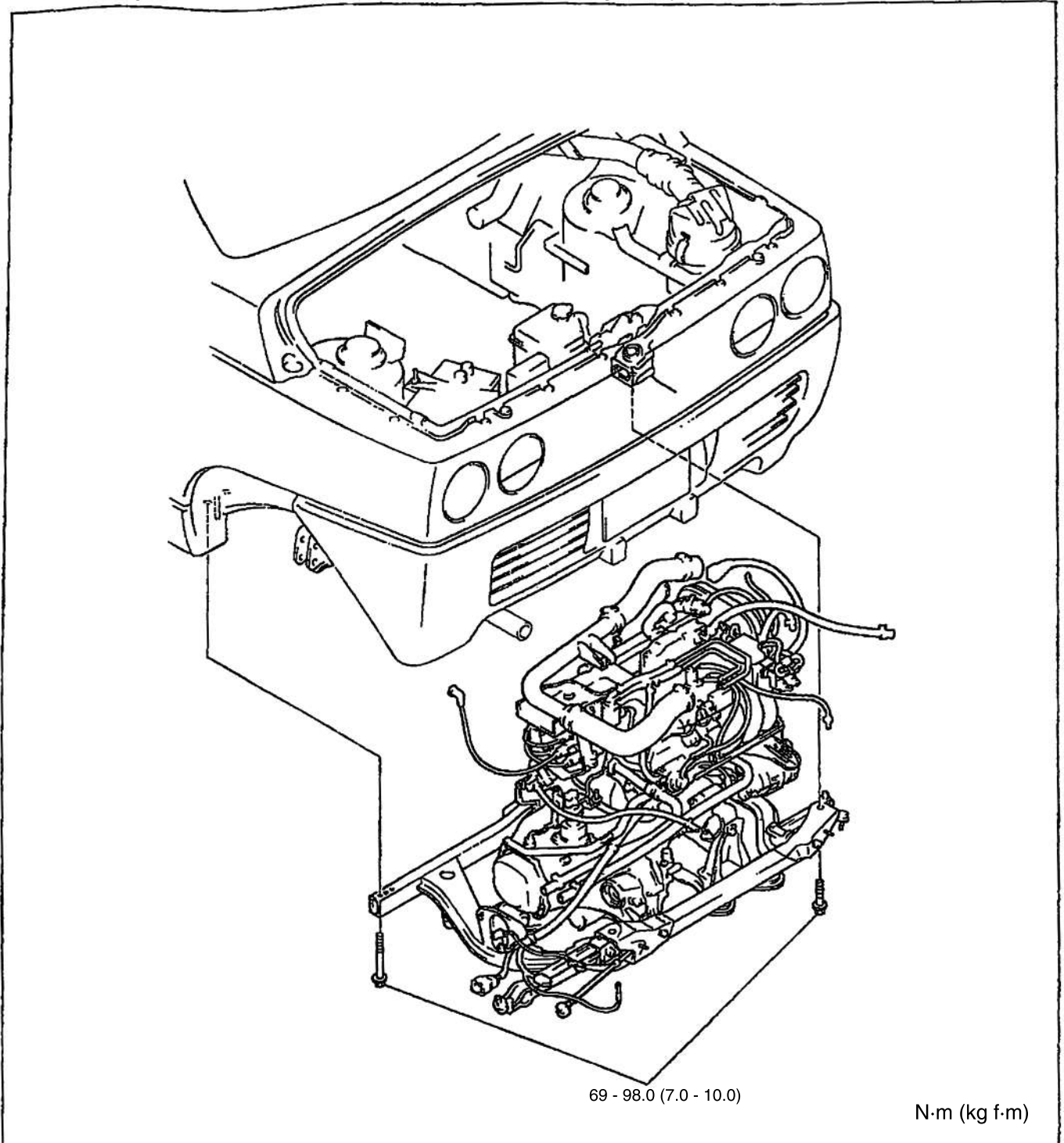


B

Mounting

Step 3

Mount the engine, transmission, and crossmember within the engine bay.

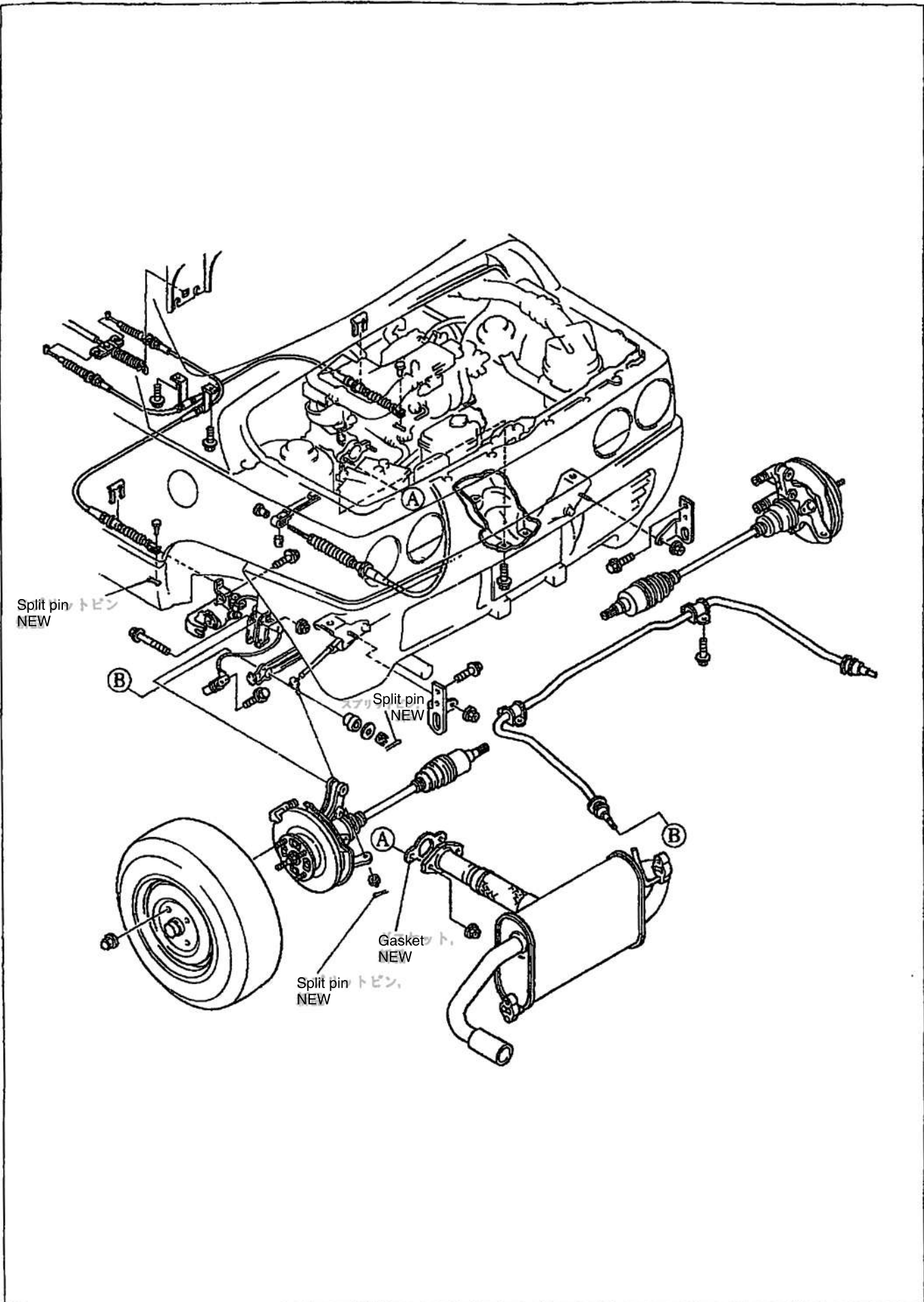


Mounting the engine and transmission assembly

1. Raise the engine and transmission assembly into the engine bay using a pallet and pallet jack, or equivalent.
2. Lower the vehicle into position and align the bolt holes.
3. Tighten the bolts to the torque setting in the diagram above.
4. Raise the vehicle and remove the pallet jack.

Step 4 74

Attach each part as shown.

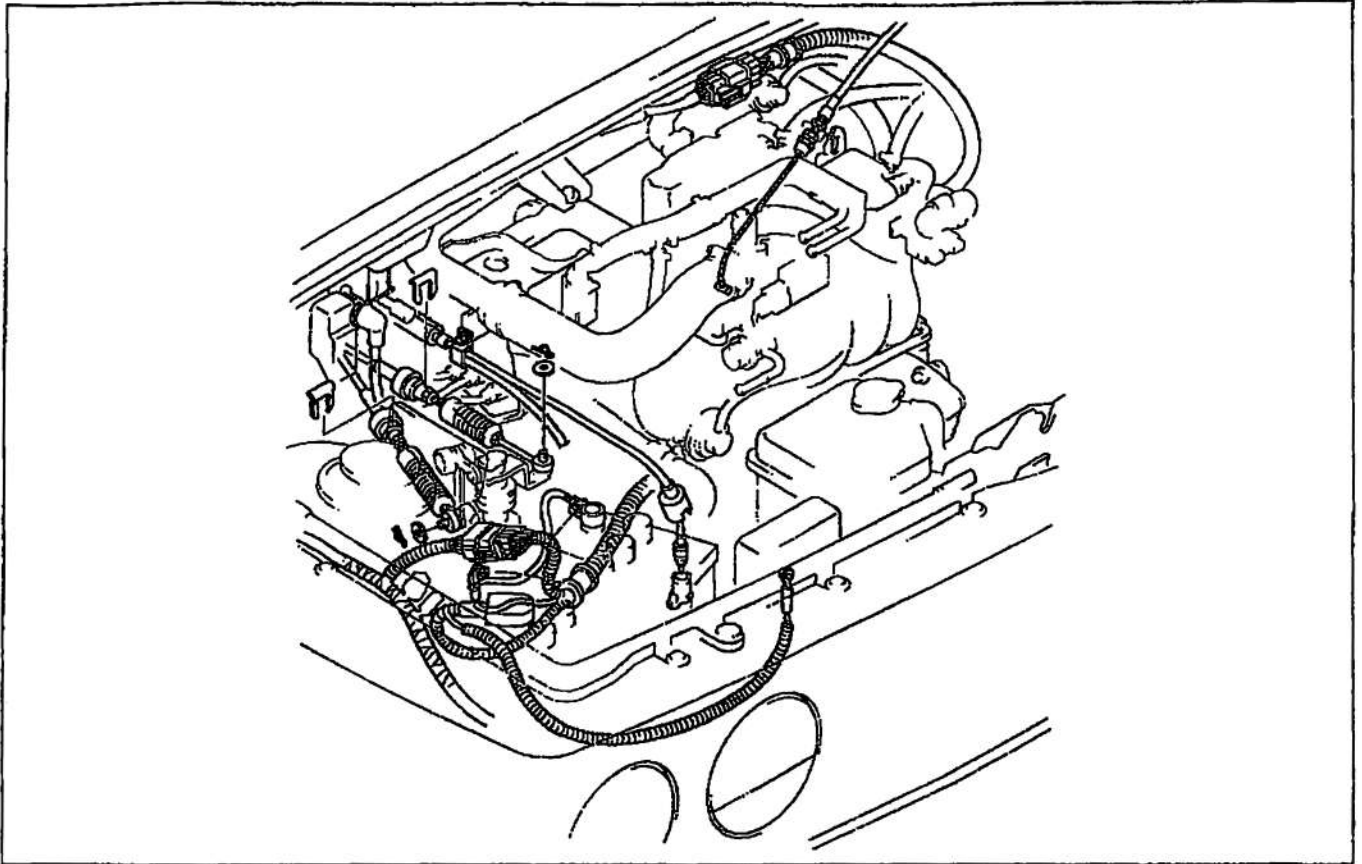


B

Mounting

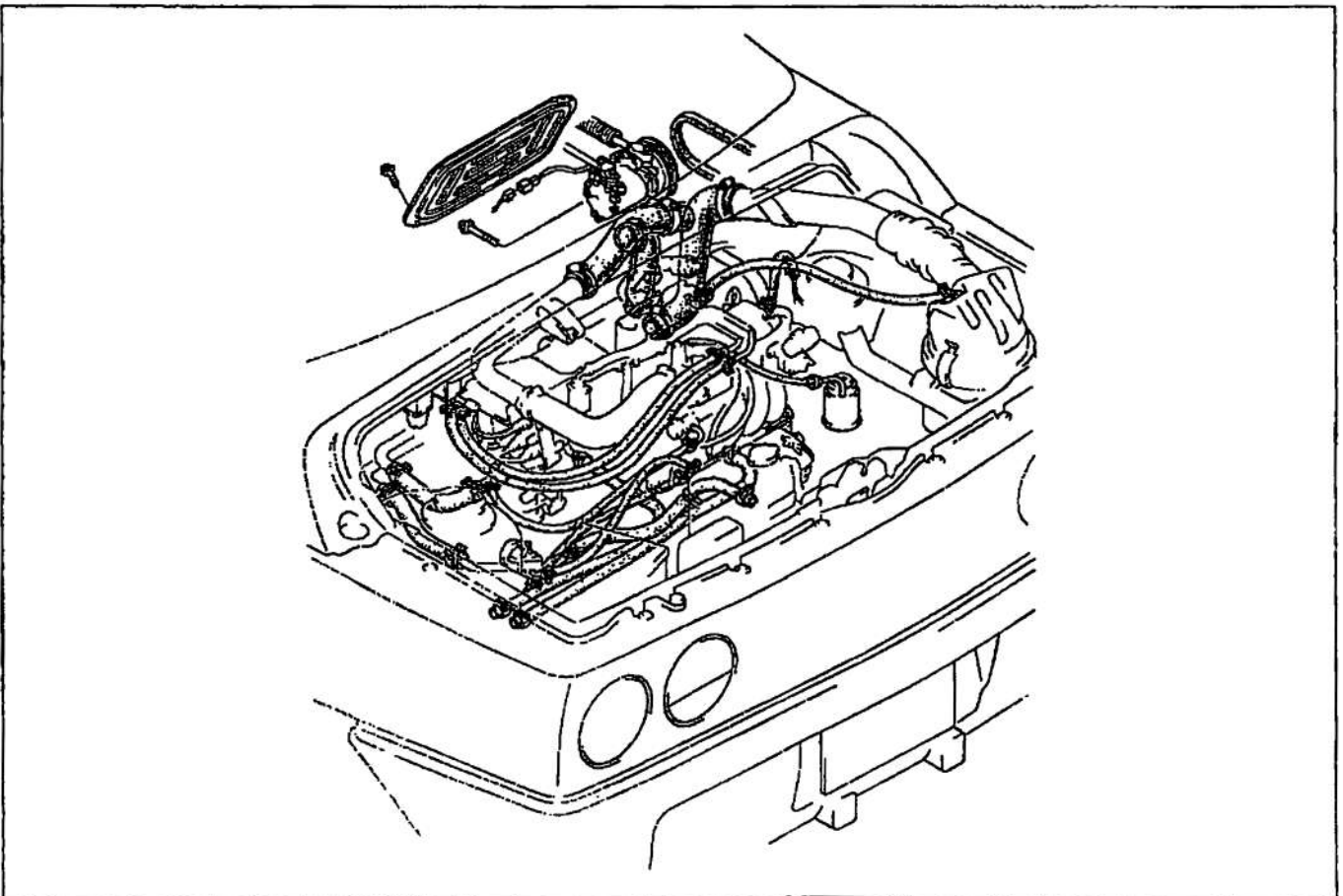
Step 5

Attach the connectors, cables, and wires as shown below.



Step 6

Install the parts shown, and attach the hoses as illustrated below.



Final steps after installation

1. Add the engine coolant. (Refer to Section E)
2. If the engine oil has been drained, refill the engine oil. (Refer to Section D)
3. Connect the battery cable.
4. Start the engine, and check and adjust the following items:
 - (1) Engine oil, transmission oil, coolant, and fuel leaks.
 - (2) Accessory belt deflection. (Refer to B-3)
 - (3) Ignition timing, idle speed, HC emissions, CO emissions at idle. (Refer to Section F)
 - (4) Correct operation of auxiliary equipment.
5. Perform a driving test.
6. Recheck the oil level and coolant level, and top up if necessary.

LUBRICATION SYSTEM

D

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Vehicle maintenance	D - 3
Engine oil	D - 3
Oil filter	D - 3
Oil pressure	D - 4
Oil pump	D - 5

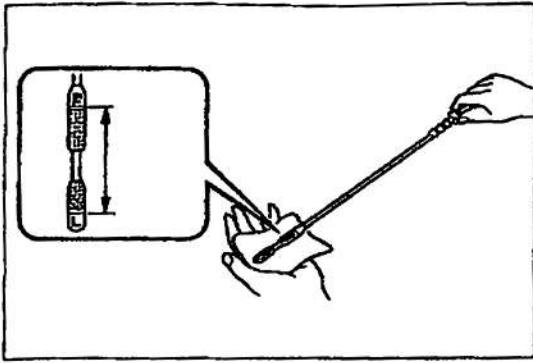
I

D

Troubleshooting guide

Troubleshooting guide

Condition	Possible cause	Treatment
Hard starting	<ul style="list-style-type: none"> ● Oil deterioration ● Not enough oil 	Change oil Top up oil
Excessive oil consumption	Oil consumed from below <ul style="list-style-type: none"> ● Worn or sticky piston ring ● Piston or cylinder wear 	Replace Replace
	Oil consumed from above <ul style="list-style-type: none"> ● Worn or damaged valve stem seal ● Worn valve stem and valve guide 	Replace Replace
	Oil leak	Fix or replace
Low oil pressure	<ul style="list-style-type: none"> ● Not enough oil ● Oil leak ● Functional deterioration of oil pump ● Worn oil pump relief valve ● Clogged oil strainer ● Excessive oil clearance in various moving parts, such as the main crankshaft or connecting rod bearings. 	Top up oil Fix or replace Replace Replace Clean Replace



Vehicle maintenance

Engine oil

Checking engine oil

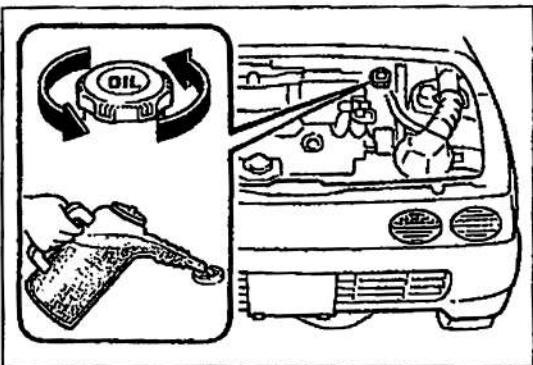
1. Warm up the engine, and park the car on a level surface.
2. After turning off the engine, remove the oil dipstick and check that the oil level is within the indicated range. If the oil level is less than the LOW level, check for oil leaks and fill the oil to the HIGH level mark.



Oil change

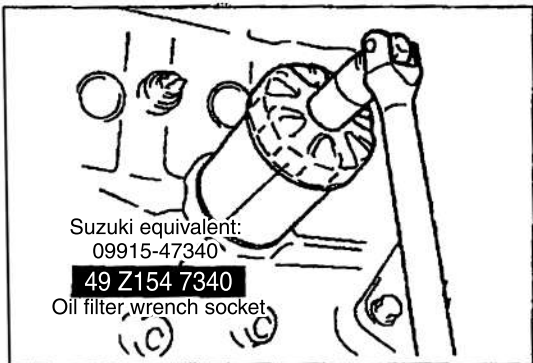
1. Remove the oil drain plug in the oil pan and allow the oil to drain.
2. When the oil has completely drained, screw in the oil drain plug and tighten to the specified torque.

Tightening torque : 30.0 - 39.0 N·m (300 - 400 kg f·cm)



3. Add oil through the oil filler hole on the valve cover. Add to the HIGH level as indicated on the oil dipstick.

Oil volume to add when changing oil only (L) : 2.8



Oil filter

Changing

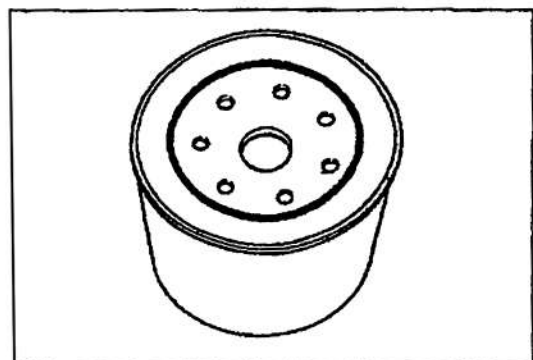
1. Remove the oil filter using the SST.
2. Apply engine oil to the new oil filter o-ring, then screw in the new oil filter by hand until the o-ring touches the cylinder block.

3. With the SST, tighten the oil filter to the specified torque.

Tightening torque : 11.8 - 15.0 N·m (120 - 160 kg f·cm)
(¾ rotation)

Oil volume to add when replacing filter (L) : 3.0

Oil replacement interval : every 10,000km



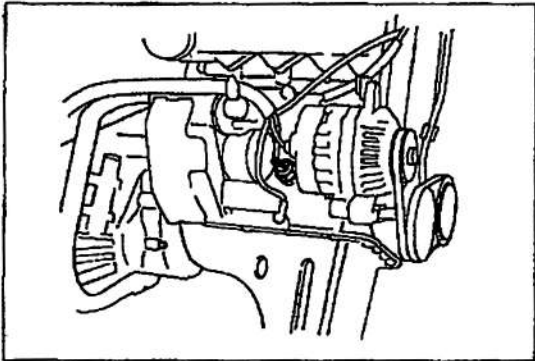
Oil pressure

Oil pressure

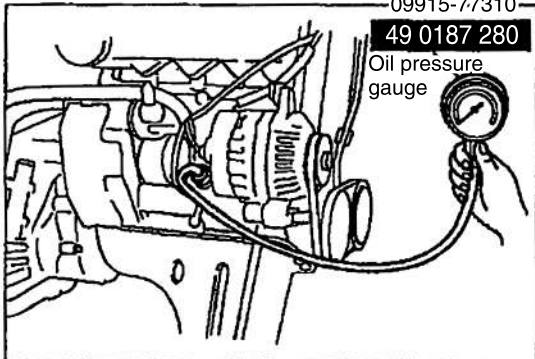
Inspection

Note: Check the following items before testing oil pressure:

1. Oil level
2. Dirt or deterioration of the engine oil
3. Oil leaks



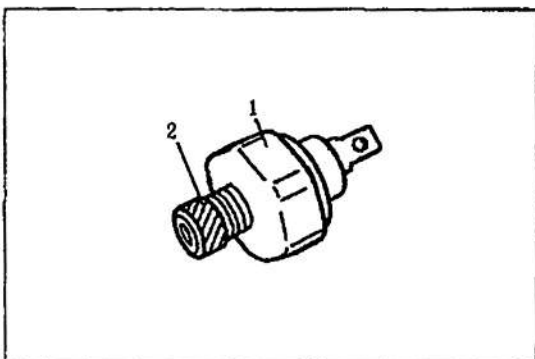
1. Remove the oil pressure sender from the cylinder block.



2. Screw the SST into the hole for the oil pressure sender.
3. Start the engine and warm it up to operating temperature.
4. Hold the engine at 4000rpm and measure the oil pressure.
If the pressure deviates from the reference value, use the following table to help you find the cause of the problem.

Oil pressure (kg f / cm² ≈ bar) : 2.7 - 3.7 (4000rpm)

Condition	Likely cause
Low oil pressure	Use the troubleshooting guide "Low oil pressure" in Section B.
High oil pressure	<ul style="list-style-type: none"> ● Oil viscosity too high ● Oil pressure relief valve sticking



5. After performing the test, remove the SST.
6. Apply sealing tape to the thread of the oil pressure sender, then insert it and tighten to the specified torque.

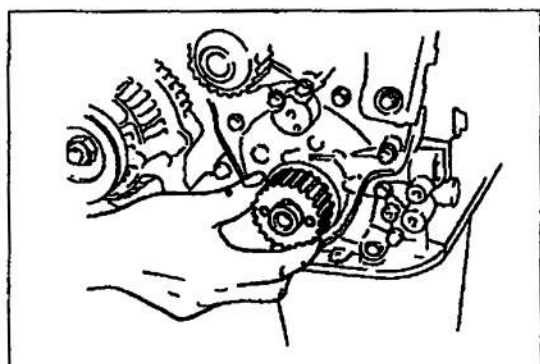
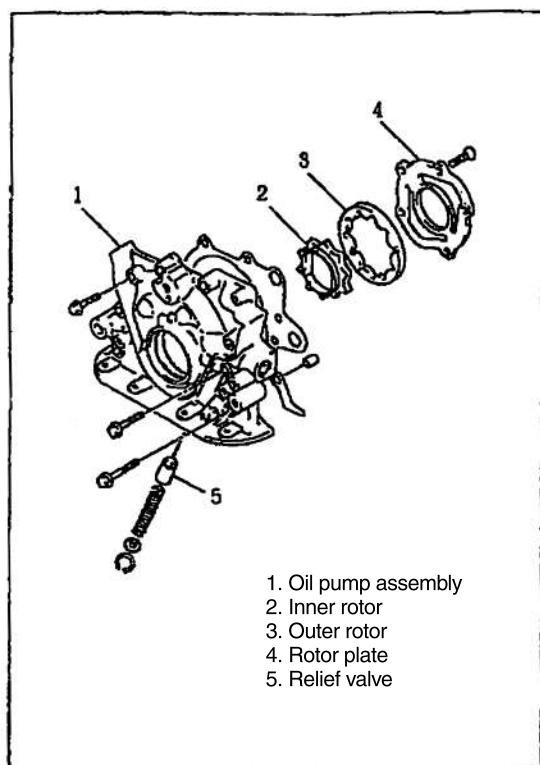
Tightening torque : 11.8 - 14.0 N·m (120 - 150 kg f·cm)

7. After installation, start the engine and check the oil pressure sender for oil leaks.

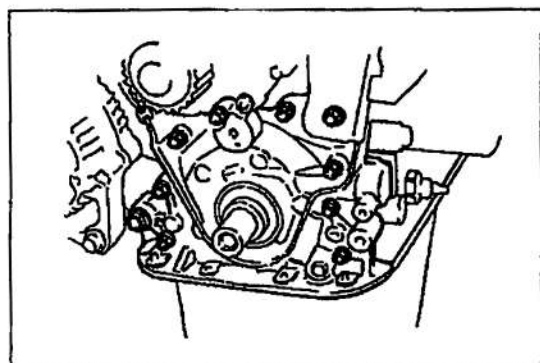
Oil pump

Removal

1. Remove the engine from the vehicle. (See Section B)
2. Remove the crankshaft pulley, outside cover, timing belt tensioner, and the timing belt. (See Section B)



3. Remove the crank pulley.
4. Remove the oil pan and oil strainer.



5. Remove the 10 mounting bolts of the oil pump, then remove the oil pump.

Inspection

- Check the oil seal lip for damage, and replace if defective.
- Check the outer and inner rotors, rotor plate, and oil pump case for wear and damage. Replace if defective.

D

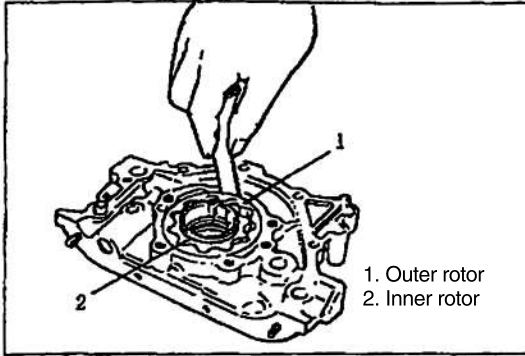
Oil pump

Measurement

Radial clearance

Use a feeler gauge to measure the clearance between the outer rotor and the pump case. If the measured value deviates from the reference value, replace the outer rotor or pump case.

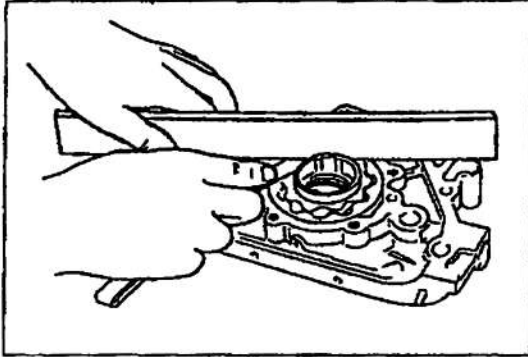
Radial clearance (mm) : 0.31 or less



Side clearance

Measure the side clearance using a straight edge and feeler gauge, as shown in the illustration to the left.

Side clearance (mm) : 0.15 or less

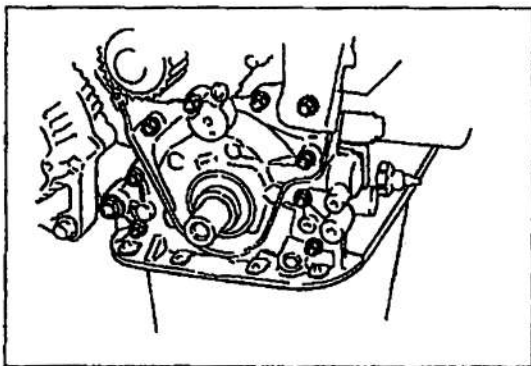
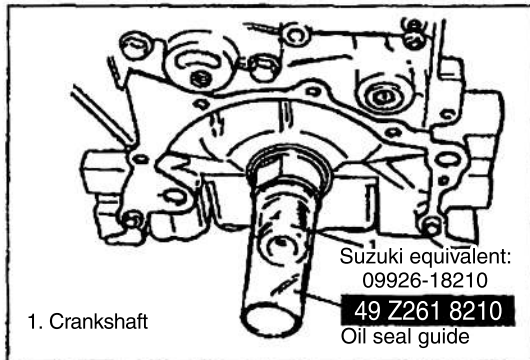


Mounting

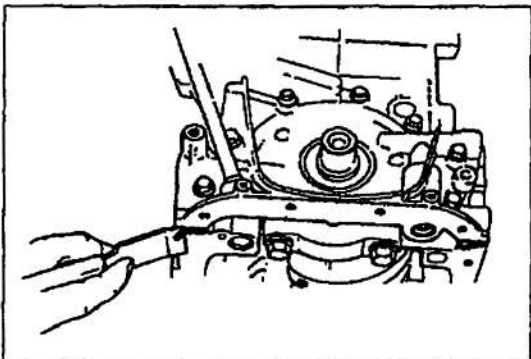
Installation is the reverse of removal, but pay attention to the following points.

1. To prevent the oil seal lip from being damaged or upturned when installing the oil pump to the crankshaft, apply engine oil to the SST and fit it to the end of the crankshaft.
2. Tighten the oil pump mounting bolt with the specified torque.

Tightening torque : 8.9 - 11.7 N·m (90 - 120 kg f·m)

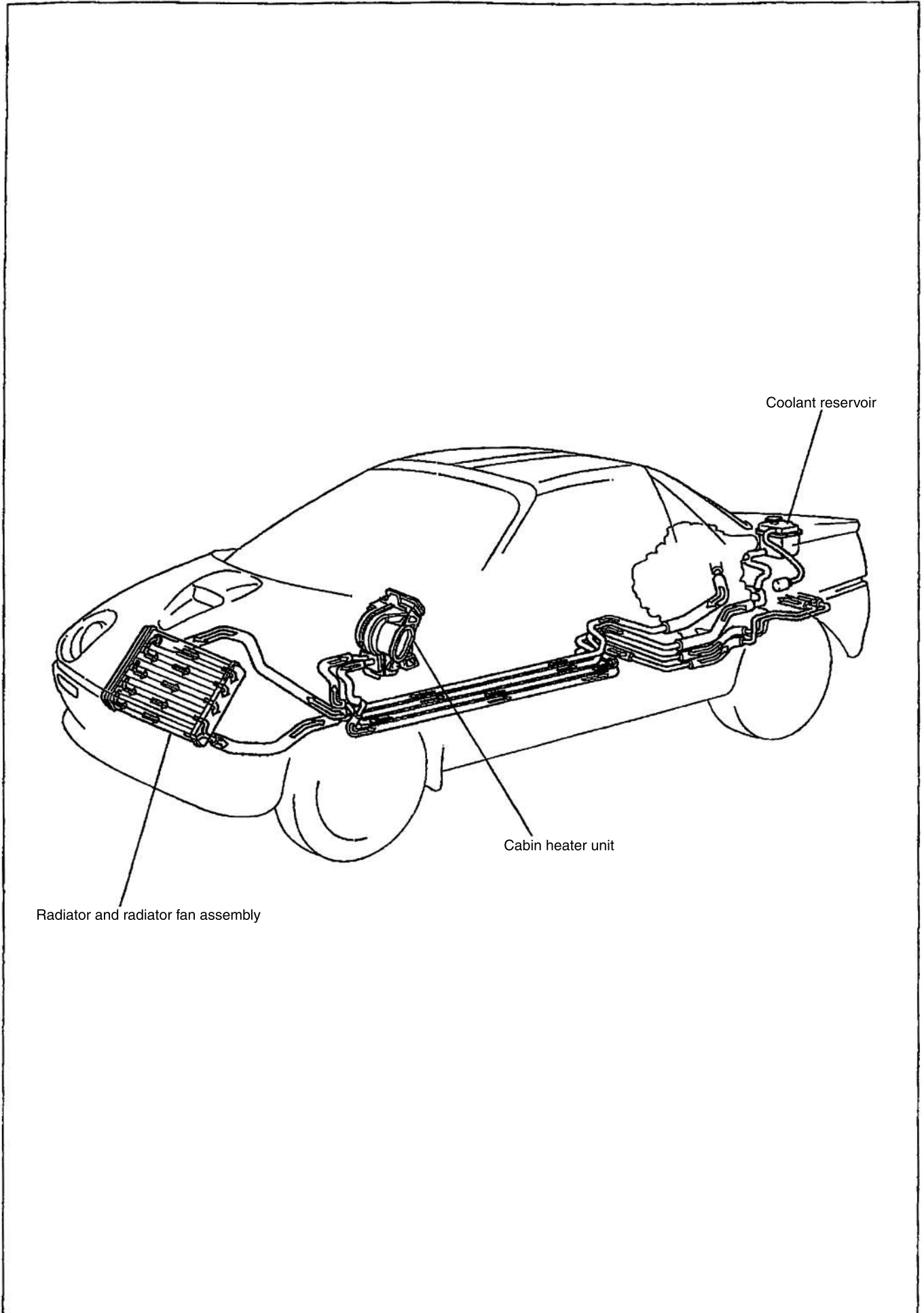


3. The edge of the new oil pump gasket might bulge out. If it does, trim it with a sharp knife to make the gasket flush with the end faces of the pump case and cylinder block.



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Cooling fan thermo switch.....	E - 10
Cooling fan relay.....	E - 11

System diagram



Troubleshooting guide

Condition	Possible cause	Treatment
Overheating	<ul style="list-style-type: none"> ● Low coolant level ● Coolant leak ● Radiator fin blockage ● Defective coolant cap ● Radiator fan failure ● Defective thermostat ● Coolant passage blockage ● Water pump failure 	Top up coolant Fix or replace Flush radiator Replace Fix or replace Replace Wash Replace
Corrosion	Contaminated coolant	Flush coolant

E

Vehicle maintenance

Coolant

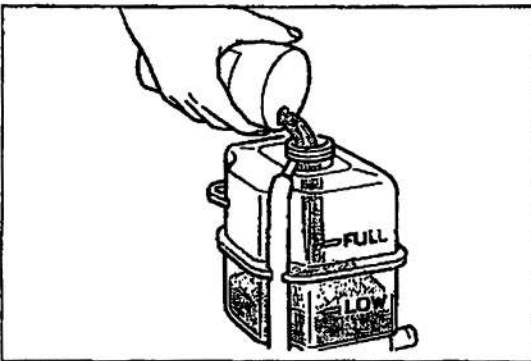
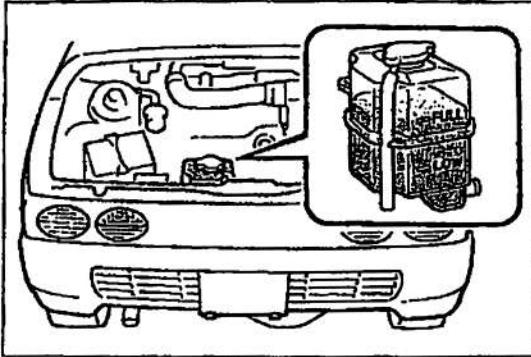
Note: Only work on the cooling system when the engine is cold.
Do not remove the reservoir tank cap when the coolant temperature is high.

Coolant level check

1. Check that the coolant in the reservoir tank is between the LOW and FULL marks.
2. If the coolant level is lower than LOW, remove the reservoir tank cap and add coolant mixture up to the FULL mark.

Reservoir tank capacity (L) : 1.2 or more

Note: When the correct antifreeze solution is used, it is not necessary to use an anticorrosion agent or additive.
When screwing on the reservoir cap, align the arrow on the reservoir cap to the arrow on the tank.



Coolant change

1. Remove the reservoir tank cap.
2. Remove the radiator drain plug and drain the coolant.
3. Re-plug the drain plug after the coolant has drained.
4. Prepare a coolant mixture of at least 30% concentration, as per the table below. Add it to the reservoir tank (up to the FULL line), and re-attach the reservoir tank cap.

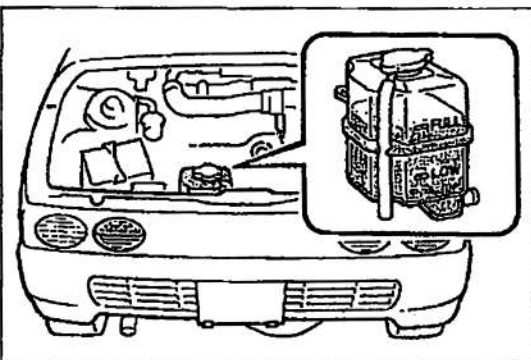
Coolant total capacity (L) : 6.0

Coolant change interval : Every inspection

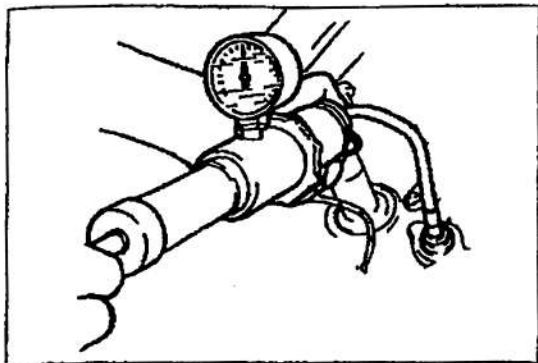
Lowest temp. (°C)	~ -10	-15	-20	-25	-30
Concentration (%)	30	35	40	45	50

Note: Aside from antifreeze effects, the coolant mixture also has excellent anticorrosion and antifoaming properties. In order to work effectively, the concentration must be at least 30%.

5. Warm up the engine until the radiator inlet hose heats up, indicating that the thermostat has opened.
6. While idling, top up the coolant to the FULL mark, then attach the coolant reservoir cap.



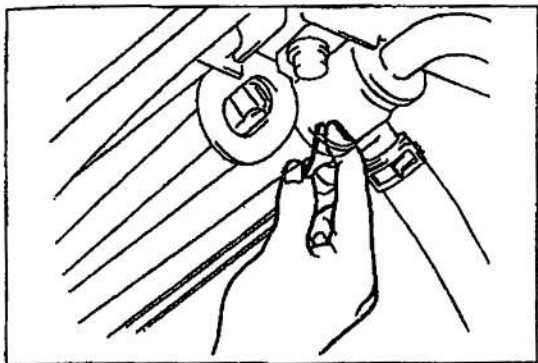
Note: Secure the cap of the reservoir tank firmly, so that the cap's ears point in the same direction as the hose, as shown.



Cooling system

Coolant leak check

1. Remove the reservoir cap and flush the reservoir tank's inlet hose with clean water.
2. Attaching a radiator cap tester to the water inlet and apply a pressure of 1.05 kg f / cm^2 ($\sim 1.07 \text{ bar}$) with the tester.
3. Watch for a drop in the indicated pressure on the tester. If a drop is observed, there may be a coolant leak in the system. Try to identify and repair the coolant leak.



Flushing

1. Remove the reservoir cap.
2. Warm up engine until the radiator inlet hose warms up from the thermostat opening and sending coolant to the radiator.
3. Stop the engine, then open the radiator drain plug and drain the coolant mixture from the car.
Close the drain plug after the coolant has drained.
4. Refill the coolant reservoir with water, replace the reservoir cap, and warm the vehicle up until the inlet hose gets hot.
5. Repeat the above procedure until the extracted coolant is nearly colourless.
6. Remove the reservoir tank, wash it thoroughly, and reinstall it.

Air bleeding

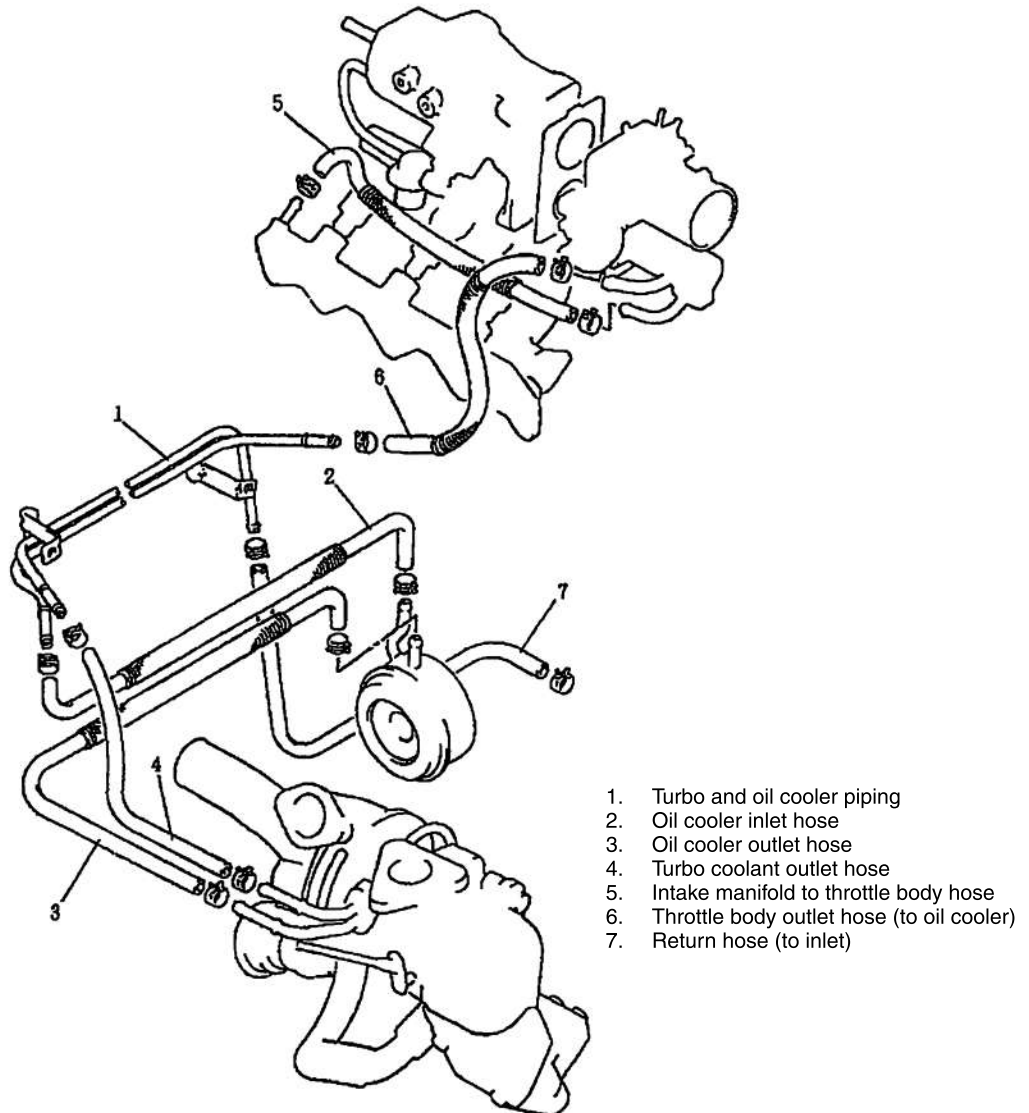
Note: Always bleed the air after the has had the coolant changed.

1. Remove the reservoir tank cap.
2. Loosen the air vent on the top of the radiator and attach a bleeder hose to it.
3. Fill the reservoir with coolant mix to the FULL mark. Raise the bleeder hose upright, and keep the end of it above the level of the coolant reservoir's FULL mark.
4. Close the reservoir cap and air vent plug.
5. Wait for a while with the engine idling to warm up the engine.

Note: If the radiator upper hose is hot, coolant is flowing from the engine, the thermostat is open and the car has warmed up.

6. Remove the reservoir tank cap and pour in coolant mix up to the FULL level.
7. Repeat steps 5 to 6 for 2 or 3 times. If there is no change in coolant level, the air bleeding is complete.
If the coolant level still changes, repeat steps 5 to 6.

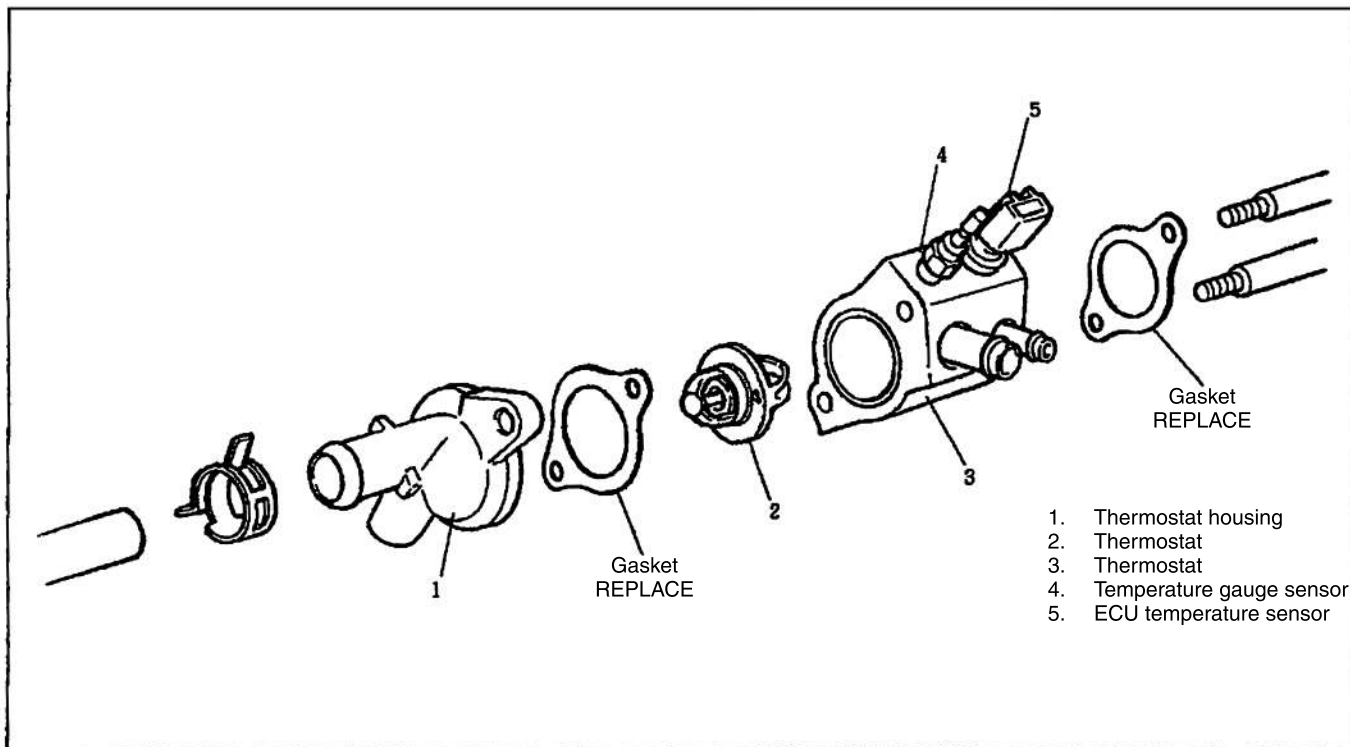
Coolant piping



Removal and installation

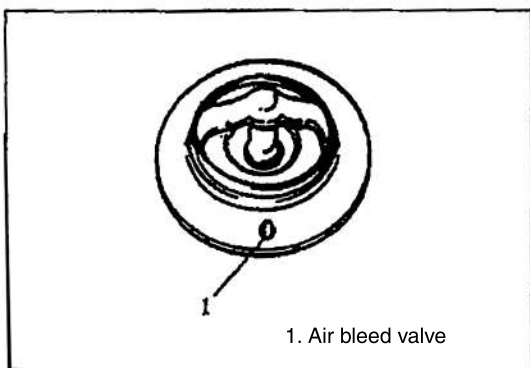
1. Drain the coolant.
2. Loosen and remove each hose clamp, pipe, and hose as shown above.
3. Installation is the reverse of removal.

Thermostat



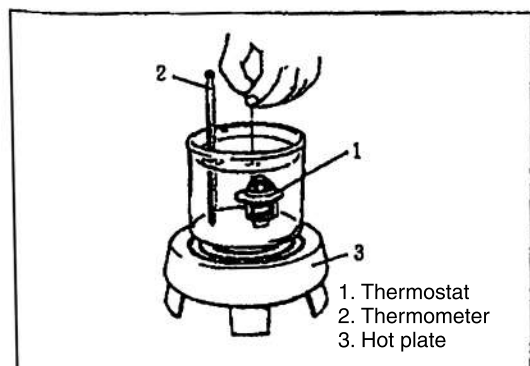
Removal / Installation

1. Drain the coolant
2. Remove the thermostat housing from the intake manifold.
3. Remove the thermostat.
4. Installation is the reverse of removal, but be sure to use new gaskets.



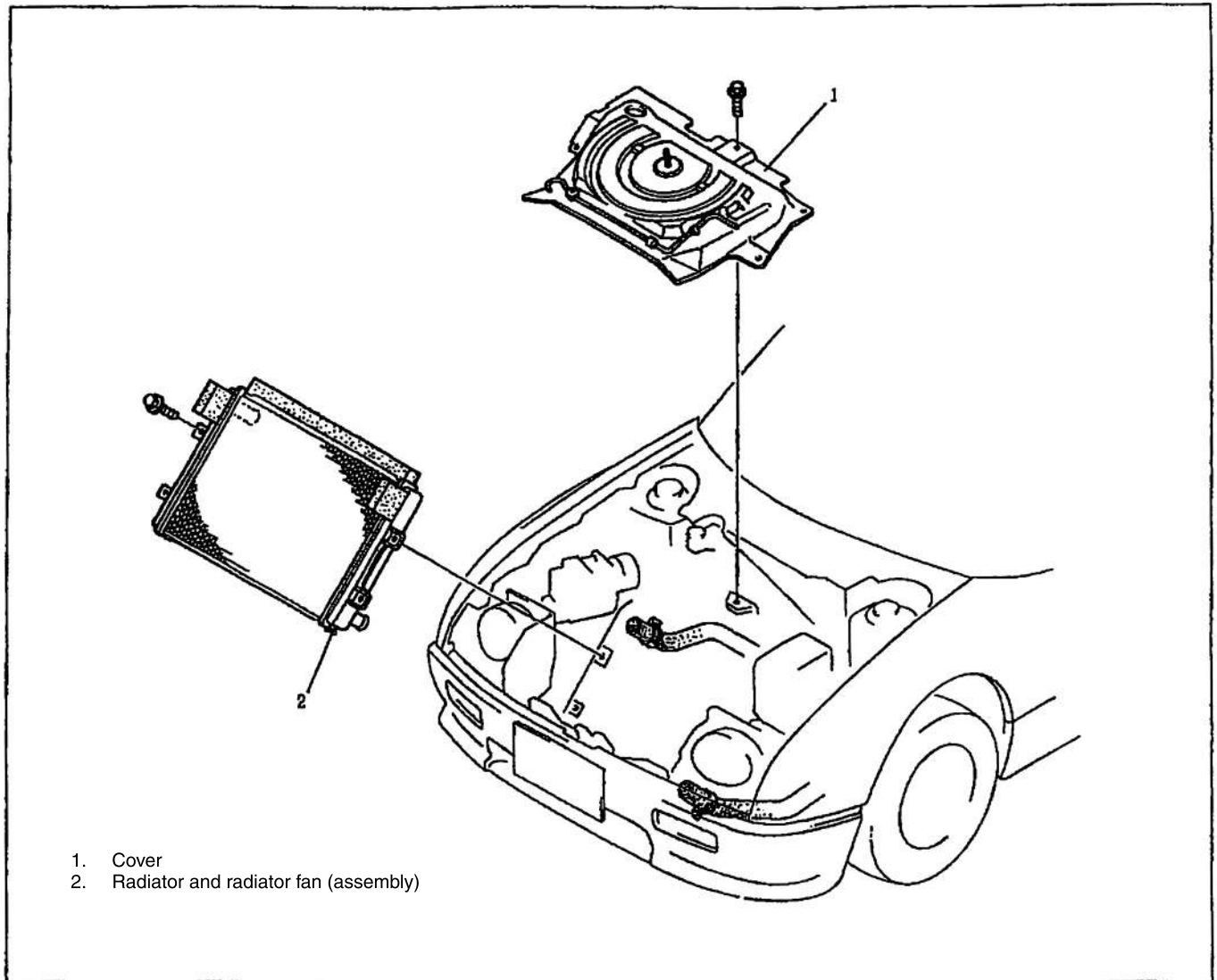
Inspection

1. Check the thermostat's air bleed valve for clogging. (Clogging can cause overheating).
2. Check the thermostat valve seat for any dirt or debris that may prevent sealing.



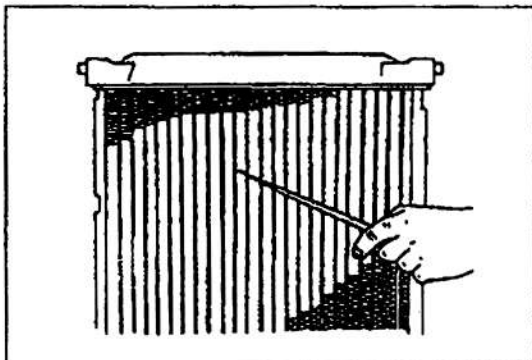
3. Check the temperature control function of the wax element using the following method:
 - (1) Immerse the thermostat in water, and slowly warm it up.
 - (2) Check that the valve opens at 82°C
 - (3) If a thermostat that opens at a different temperature is used, it will cause overcooling or overheating, so replace the thermostat with a new one.

Radiator and radiator fan



Removal / Installation

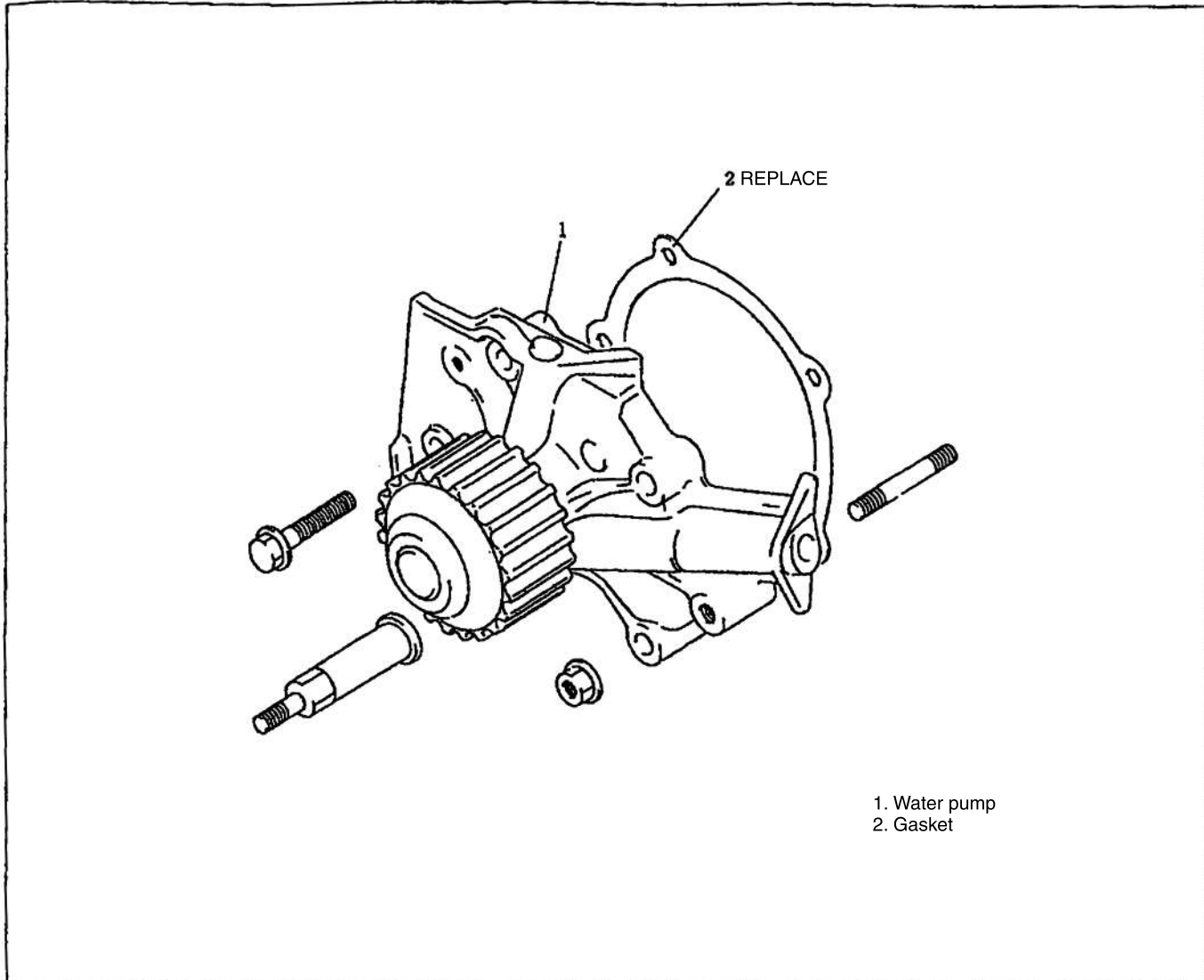
1. Disconnect the negative terminal of the battery.
2. Drain the coolant.
3. Disconnect the radiator fan switch.
4. Disconnect both coolant hoses from the radiator.
5. Remove the radiator and radiator fan as a single unit.
6. Installation is the reverse of removal.



Inspection / Cleaning

1. Check the radiator for leaks or damage, and straighten any bent fins.
2. Check the radiator core for dirt or debris, etc.

Water pump



Removal / Installation

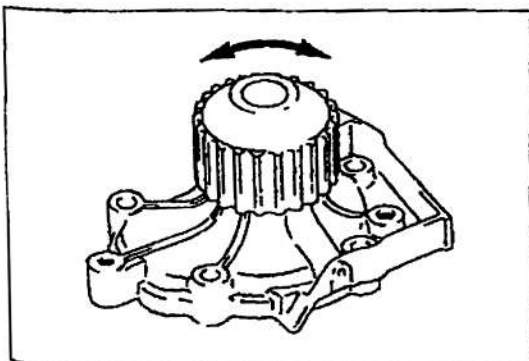
1. Disconnect the negative terminal of the battery.
2. Drain the coolant.
3. Remove the timing belt. (See Section B)
4. Remove the water pump.
5. Installation is the reverse of removal, but each bolt and nut must be tightened to the specified torque.

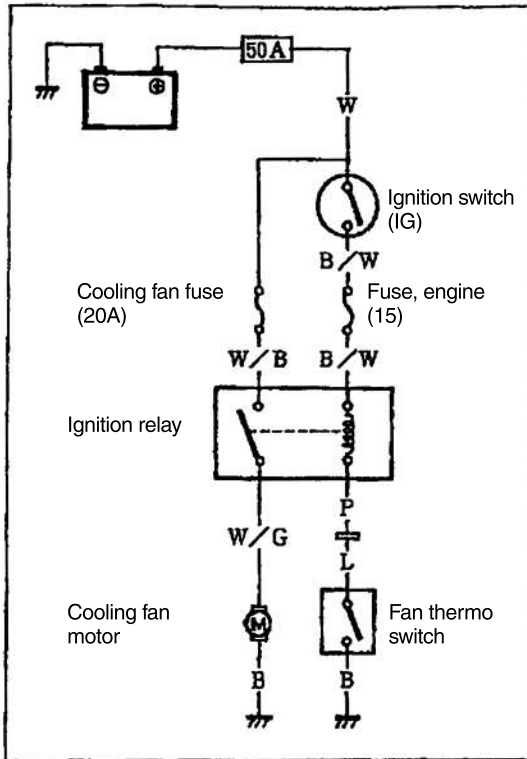
Tightening torque : 9.81 - 12.7 N·m (100 - 130 kg f·cm)

Inspection

Smoothly turn the water pump by hand, and check for abnormal noises. If there is a defect, replace with a new water pump.

Note: The water pump is not designed to be disassembled. If there is a problem, replace the complete water pump assembly.

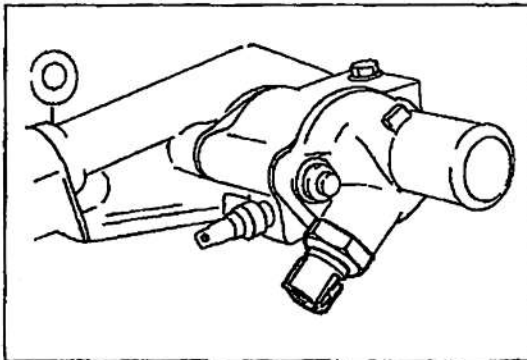




Cooling fan system

Inspection

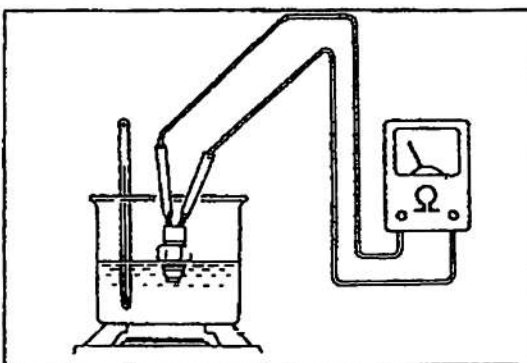
1. Remove the radiator cap to insert a thermometer.
2. Start the engine, and check that the cooling fan turns on when the coolant temperature reaches 93°C.
3. If the fan does not turn on at this temperature, check the switch and relay for defects, and check for loose or broken connections in the wiring harness.



Cooling fan thermo switch

Removal

1. Disconnect the battery negative terminal.
2. Drain the coolant.
3. Remove the switch connector, then remove the switch.



Inspection

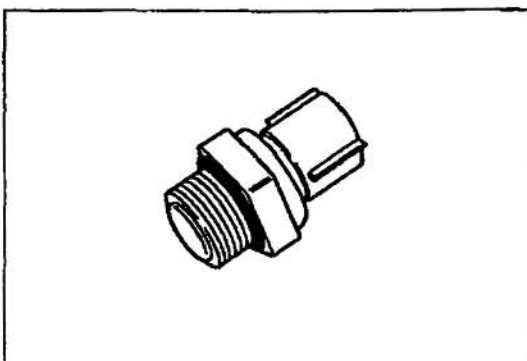
1. Immerse the heat-sensitive part of the thermo switch in a container filled with water, then heat the water gradually.
2. Check the switch's continuity as the water heats up, and compare it to the following:
 - Above 93°C : Switch closed
 - Below 93°C : Switch open

Installation

Installation is the reverse of removal, but keep in mind:

1. Always use a new o-ring, and apply engine oil to the o-ring when installing it.
2. The switch must be tightened to the specified torque:

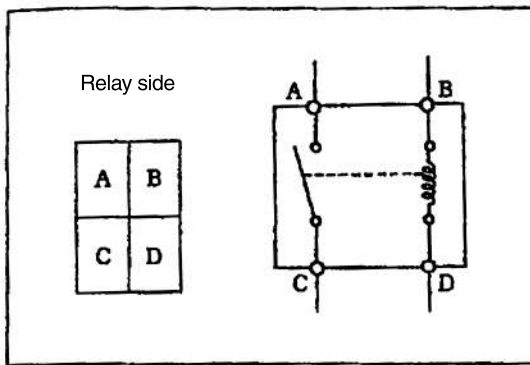
Tightening torque : 5.9 - 8.8 N·m (80 - 90 kg f·cm)



Cooling fan relay

Note: As there are several relays, use the colours of the wires to tell the relays apart. The radiator cooling fan has:

- A terminal : White/black wire
- B terminal : Black/white wire
- C terminal : White/green wire
- D terminal : Peach wire

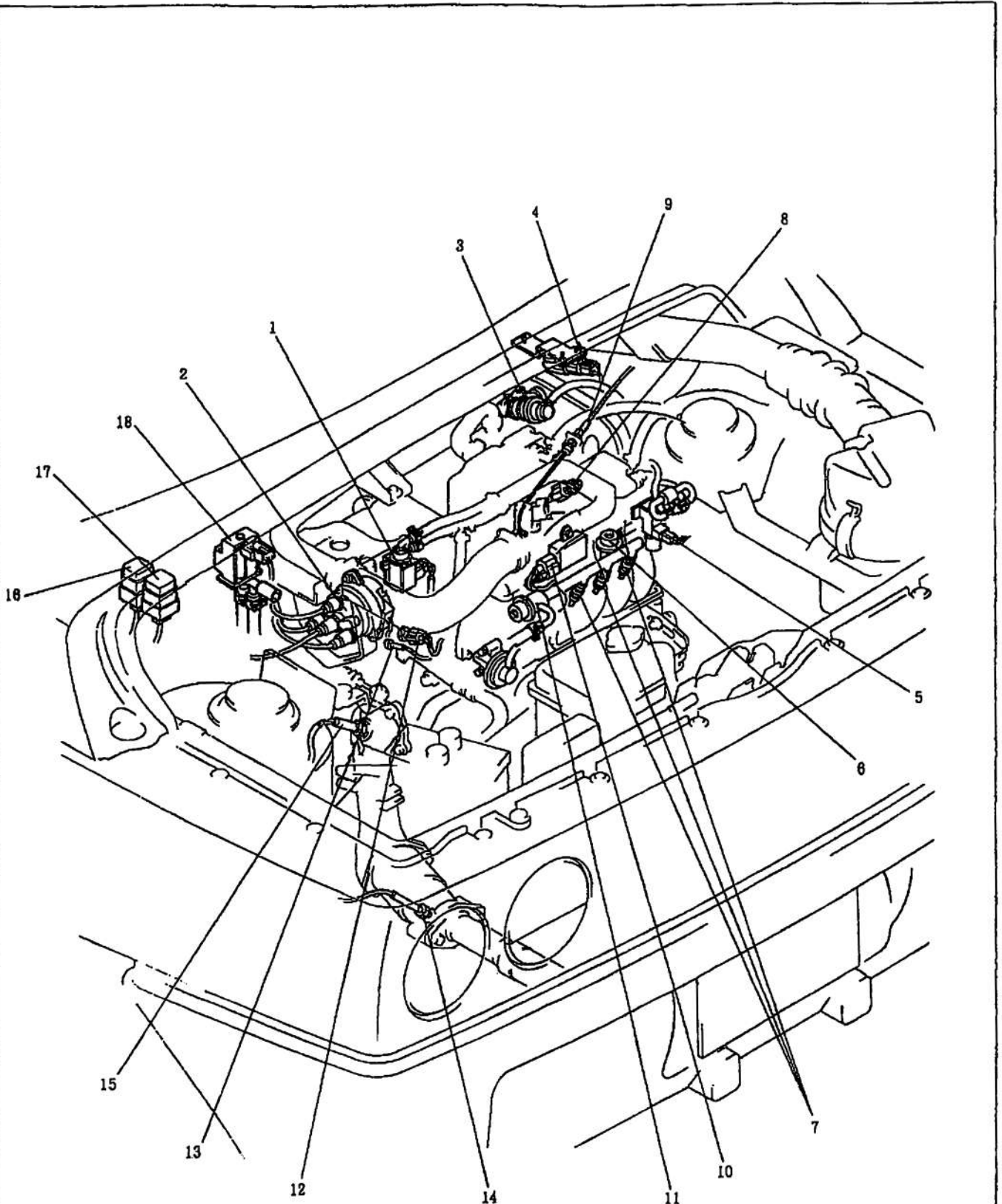


Inspection

1. Check continuity between relay terminals.
 - A – C: No continuity
 - B – D: Continuity
2. Apply battery voltage across terminals B and D, and check for continuity across A and C. If there is no continuity, replace the relay.

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