

NISSAN

180 SX

Maintenance Manual (Amendment I)

January 1991

E-RPS13 型

E-KRPS 13 型

Section B1 - SR20DET mechanical.

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A008011

1991

B1 engine overview

SR20DE.DET Adopted Nijoji maintenance guidelines.

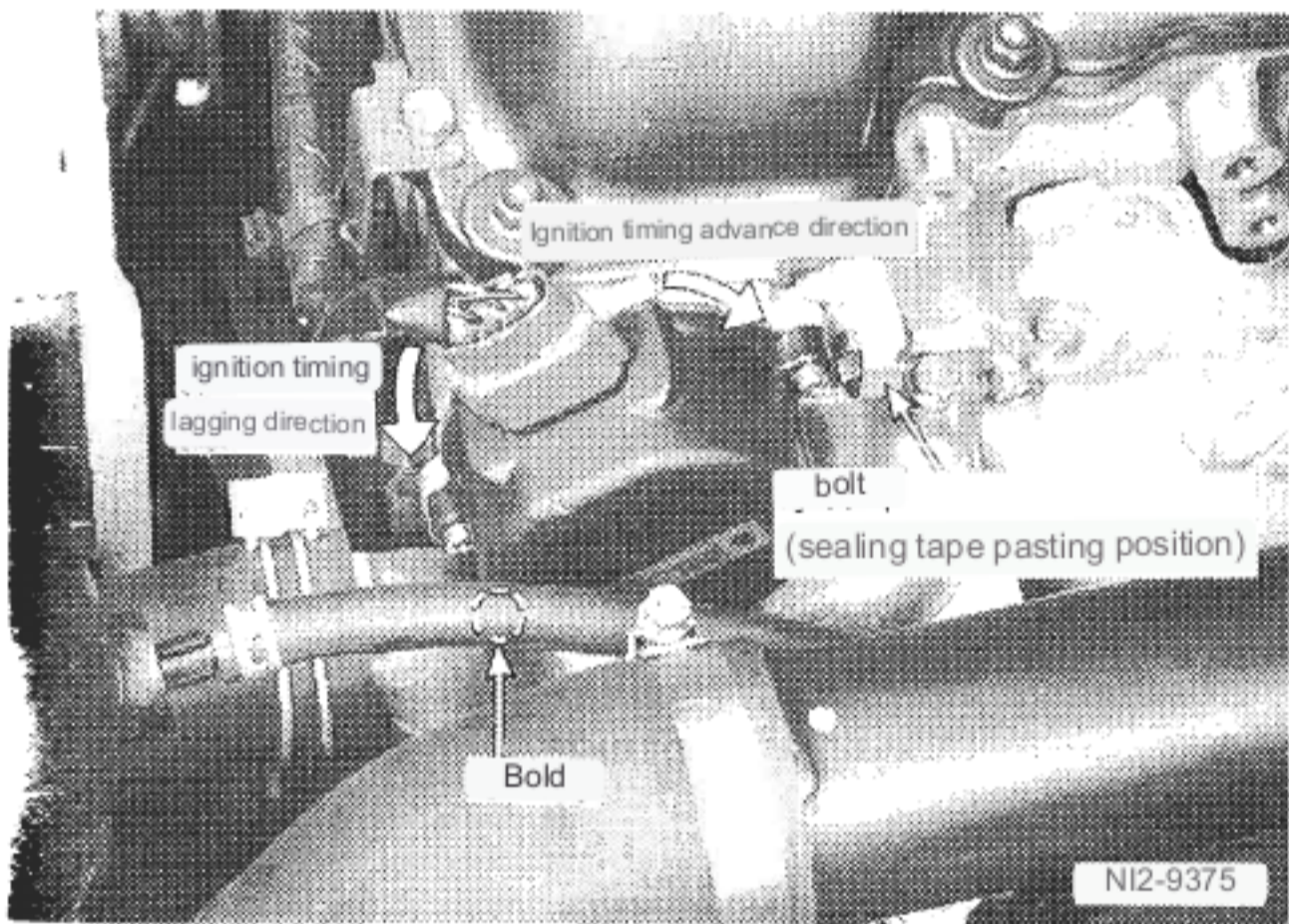
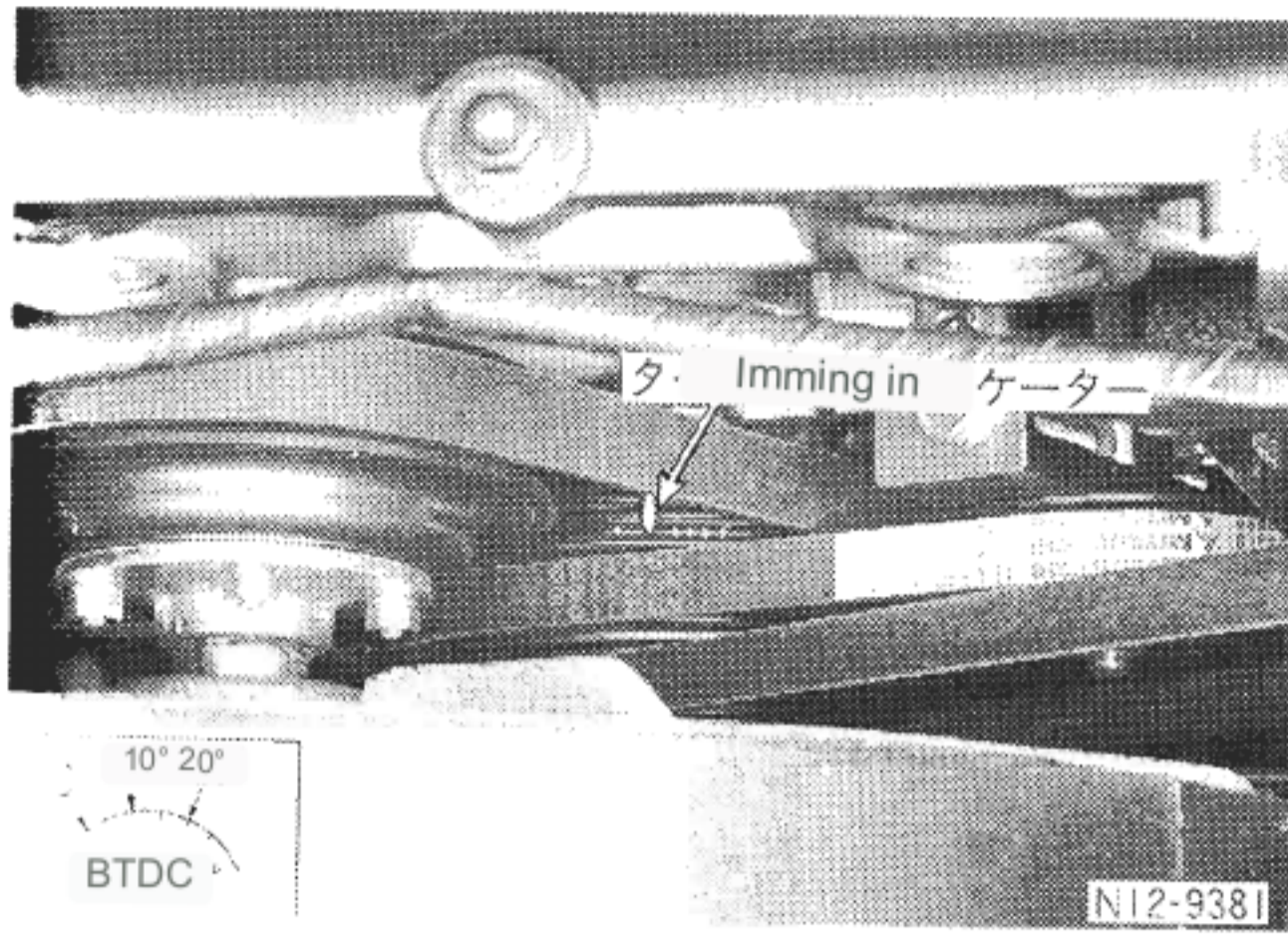
1. Relevant main specifications

item		car	seed	E-RPS13 E-KRPS13	
		engine specs		SR20DET	
総	気量	(cc)		1998	
Combustion chamber	状			ペントルーフ形	
弁				DOHC (Senichi Drive)	
×	行程	(mm)		86.0×86.0	
圧				8.5	
圧	圧	(kg/cm ²)/(rpm)		11.0/300	
High	output (lower than 6y)	(PS/rpm)		205/6000	
ク (ネット)		(kg-m/rpm)		28.0/4000	
Natural	rate	(g/PS·h)/(rpm)		200/2000	
[length a x width x height a]		(mm)		640×670×685	
season	Intake open [Before top dead center]	(Every time)		4	
	Intake closed [after bottom dead center]	(Every --)		56	
	Exhaust open [before bottom dead center]	(Every time)		63	
	Exhaust closed	[Before top dead center]	(Every --)		3
		[After top dead center]	(Every time)		—
valve clearance	qi [temperature]	(mm)		0 (automatic adjustment)	
	Exhaust temperature [warm]	(mm)		0 (while movement adjustment)	
idle speed	(rpm)	M/T		800	
		A/T		800 (Nレンジ)	
時期	(BTDC° /rpm)	M/T		15/800	
		A/T		15/800	
target	7F JLCO concentration	(%)		(0.1 or less)	
	Below 7% JLHC concentration	(ppm)		less than 50	
Engineer JL (factory default)	standard			7.5W-30 (for SG class evening quest)	
	Cold district specifications				
talent	ル パ > capacity[H]	(l)		3.7	
	oil filter capacity	(l)		about 0.2	
	Cooling water total capacity	(l)		about 6.5	

*Lead-free premium (high-octane) gasoline specification vehicle.

Note: 2011/2018, Nitto genuine SG class "Yuichishi X (7.5W-30) Reference: -SR20DET* recommended dimensions.

Maintenance weight, SR20DET (approx. 166kg) flying stone.



- Confirm that the idle speed is within the specified value.
- Disconnect the throttle sensor connector.
- The timing light confirms that the ignition timing in the idle state is at the specified value.
check using
- When racing the engine, the ignition timing should be advanced quickly.
and
- Connect the connector of the throttle sensor and set the idling speed
value.

Note: Timing marks on the crank pulley are yellow for the 0° position, other positions are colored white.

整

- Ignition timing is adjusted by adjusting the mounting position of the crank angle sensor. • Confirm that the idle speed is within the specified value.
- Disconnect the throttle sensor connector.
- Warm up the crank angle sensor mounting bolt and rotate the crank angle sensor.
turn over. Turning the crank angle sensor to the right advances the ignition timing.
- Connect the throttle sensor connector.
- After confirming that the idle speed is within the specified value, turn on the crank angle sensor.

Seal the servo mounting bolt with sealing tape.

sealing tape part number	B2235 U7410
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1-3 Check CO and HC concentration

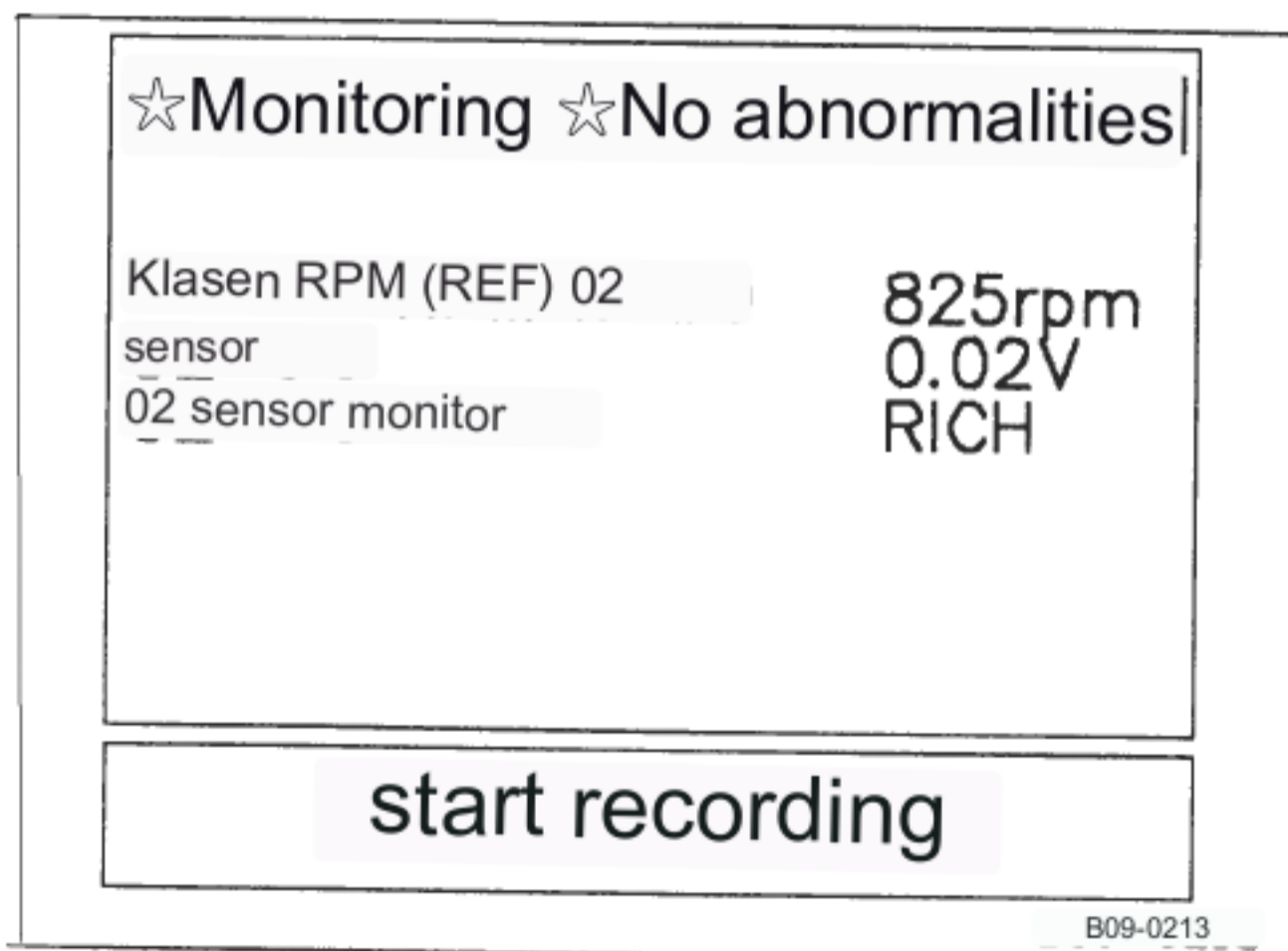
An air-fuel ratio feedback system with learning correction is adopted, and the correction range is wide, so adjustment of CO and HC concentrations is unnecessary.

point 検

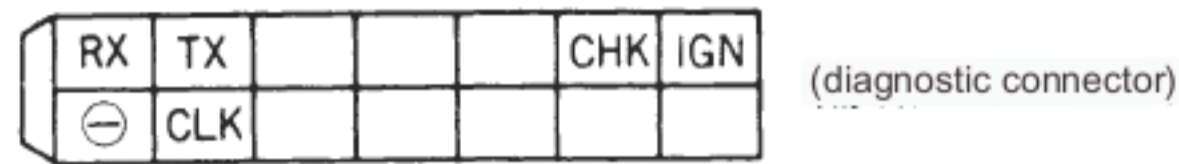
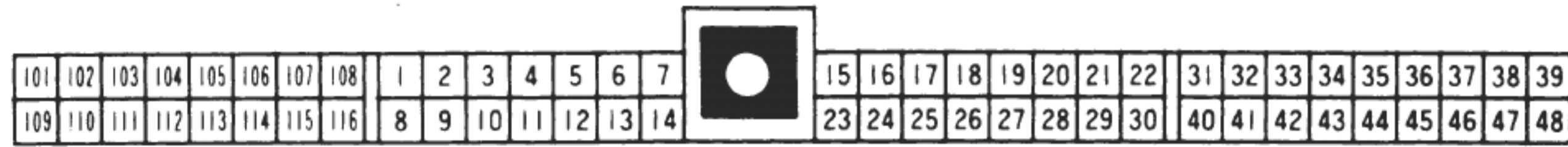
- After sufficiently warming up the engine and confirming that the idling speed and ignition timing are at the idling specified values, check with the CO HC meter.
- If it does not fall within the specified value, adjust the air-fuel ratio feedback in the following manner.
Check condition.



- ① Select "O2 sensor monitor" in "Data monitor".
- ② Raise the carrot rotation speed to about 1000 rpm or more, and confirm that "RICH" and "LEAN" are displayed alternately.

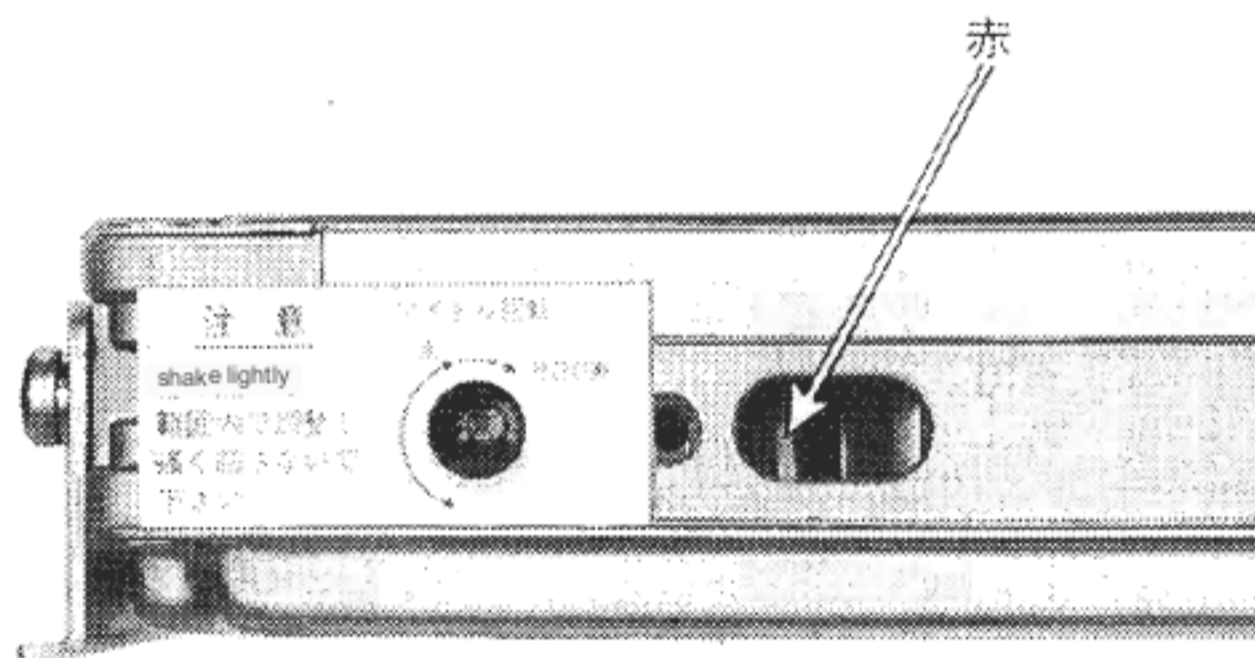
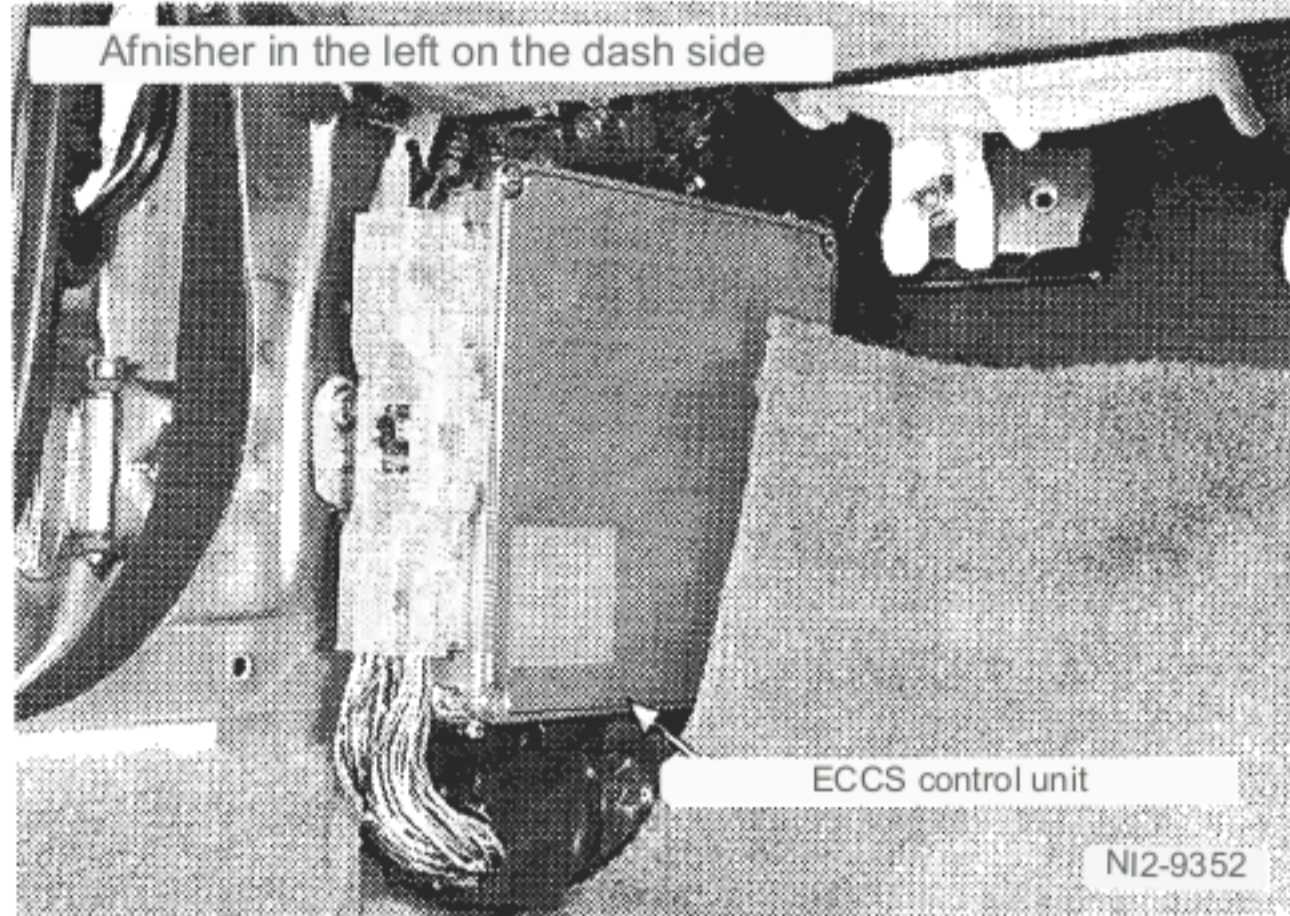
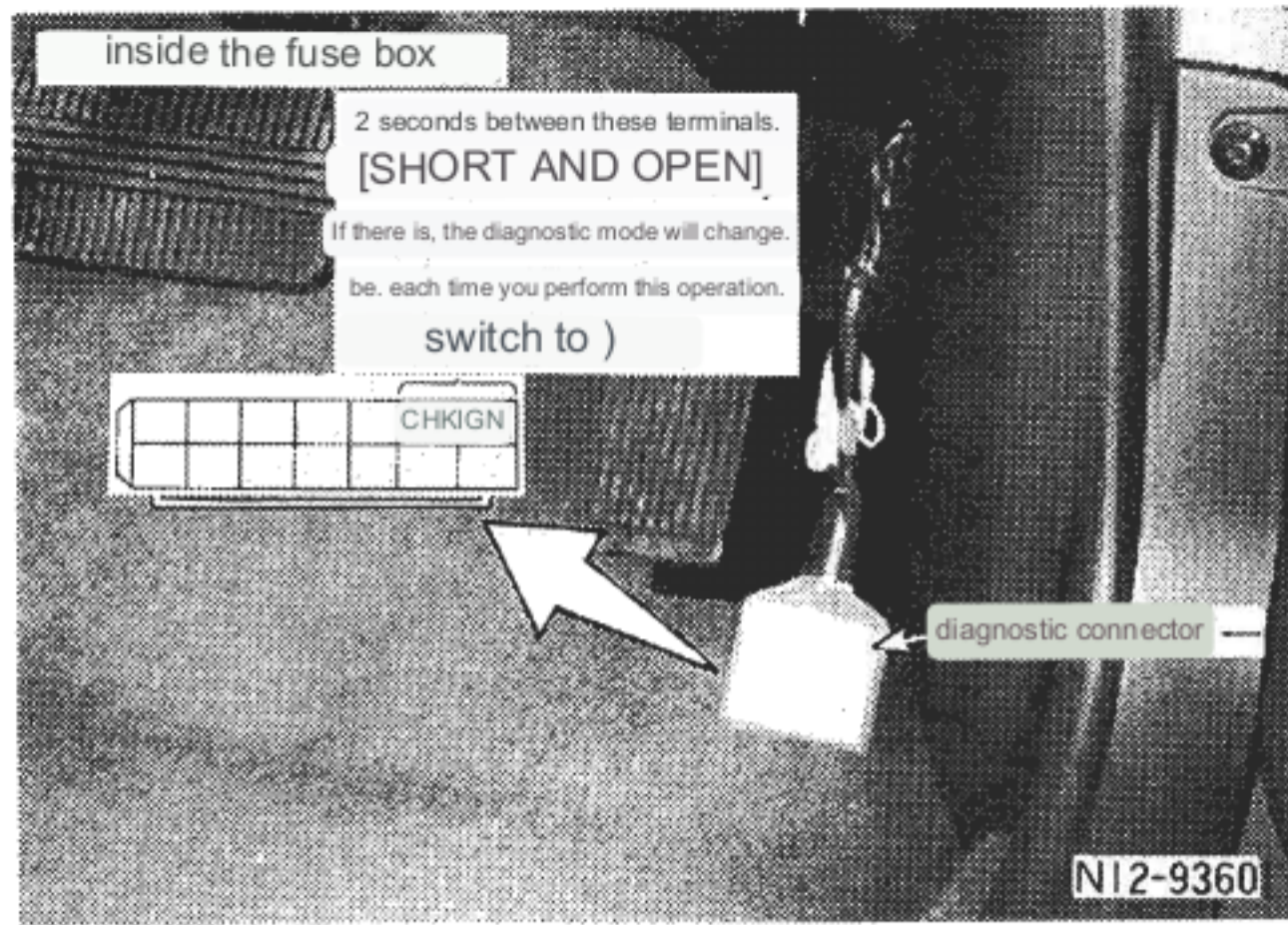


ECCS control unit terminal arrangement



B02-5513

Pin number	内 容	ID	within
1	Ignition Signal (Power Transmission) Cyl. No.1	8	Ignition signal (power truck) Cyl.3
2	Ignition Signal (Power Transmission) Cyl. No.2	9	Ignition signal (power truck) Cyl.4
3	RPM signal for tachometer	10	—
4	ECCS relay	11	—
5	Injection pulse monitor (Ti monitor)	12	Engine/A/T total control output signal (DT3)
6	Ground (ignition signal system)	13	Ground (ignition signal system)
7 RX)	Receive (control unit data reception)	14 (CLK)	clock (synchronization signal)
15 TX)	from (Transmit data control) unit	23 (CHK)	Check (start diagnostics)
16	Air flow meter intake air volume signal	24	Monitor & check lamp (red)
17	air flow meter ground	25	Exhaust temperature warning light
18	water temperature sensor	26	exhaust temperature sensor
19	O ₂ sensor	27	knock sensor
20	Throttle sensor opening signal	28	Throttle sensor output signal
21	sensor Booth (Throttle sensor, Water temperature Hanser, Exhaust temperature sensor)	29	sensor ground (Throttle sensor, water temperature ンサー、排気温度センサー)
22	Crank angle sensor 180° signal	30	Crank angle sensor 180° signal
41	Crank angle sensor 1° signal	40	Crank angle sensor 1° signal
42	Vehicle Speed Sensor-	41	air conditioner switch
43	—	42	Yunjin A/T integrated control input signal (DT1)
44	Key switch (START signal)	43	power steering switch
45	Neutral, parking (A/T car) switch	44	Engine/A/T general control input signal (DT2)
46 IGN)	Key switch (IGN)	45	outside temperature switch
47	throttle sensor power	46	backup power
48	control unit power	47	control unit power
109	control unit ground	48	control unit ground
101	Injector No.1 (No.1 Cyl)	109	Control unit power supply (back electromotive current feedback circuit)
102	EAI control solenoid control signal	110	Injector No.2 (No.2 Cyl)
103	Injector No.3 (No.3 Cyl)	111	Boost pressure control solenoid control signal
104	fuel pump relay	112	Injector No.4 (No.4 Cyl)
105	Fuel pump terminal voltage control output (FPCM)	113	AAC valve
106	Air conditioner relay (air conditioner cut signal)	114	—
107	injector ground	115	lockup release solenoid
108	injector ground	116	injector ground



- Short-circuit the diagnostic connector on the vehicle side (inside the fuse box). (Or remove the ECCS control unit and operate the adjustment volume on the control unit side.)

(1) Turn the key switch to "ON" and connect the CHK terminal of the diagnostic connector. Short-circuit the IGN terminal with a lead wire for at least 2 seconds and open it.

(Alternatively, turn the key switch to "ON", turn the adjustment volume on the side of the ECCS control unit clockwise until it stops, set it to the self-diagnostic mode switching position, hold it for 2 seconds or more, and return it to its original position.)

- ② After the engine is sufficiently warmed up, the engine speed is controlled. Raise until the unit red lamp flashes. Start blinking at about 1000 rpm or more.


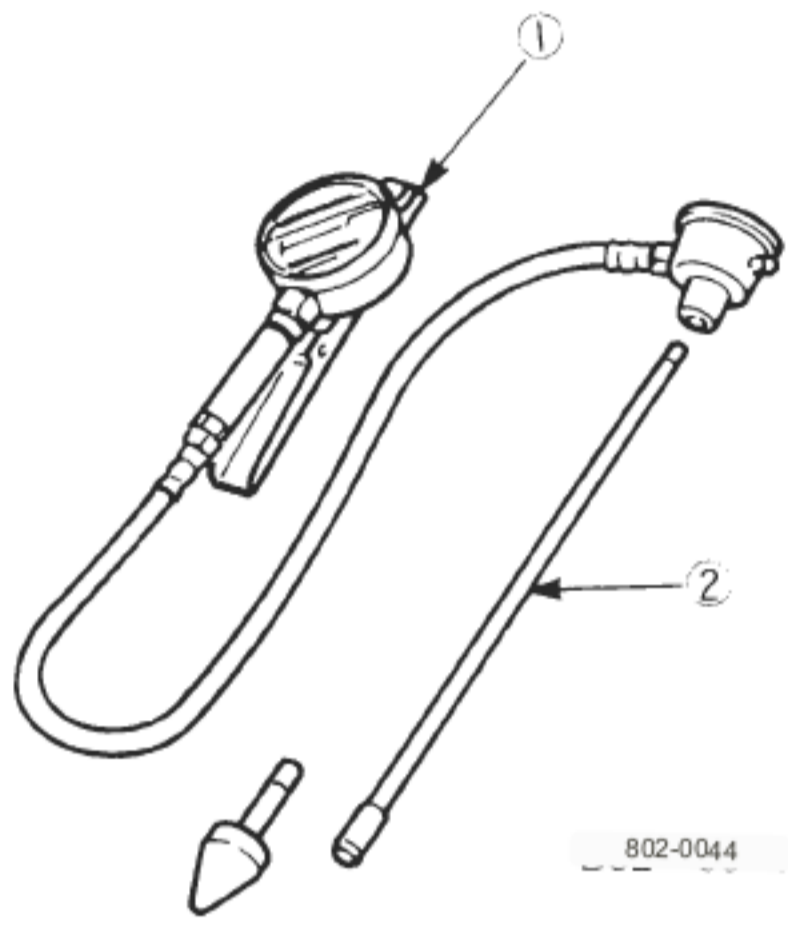
Note: Since the air-fuel ratio feedback control is clamped during idling, Check by depressing the accelerator pedal slightly.

- ③ In this state, the red lamp of the ECCS control unit lights up periodically. confirm that it is extinguished.

Note: See page B3 2. Diagnostic system for air/fuel ratio feedback monitor.

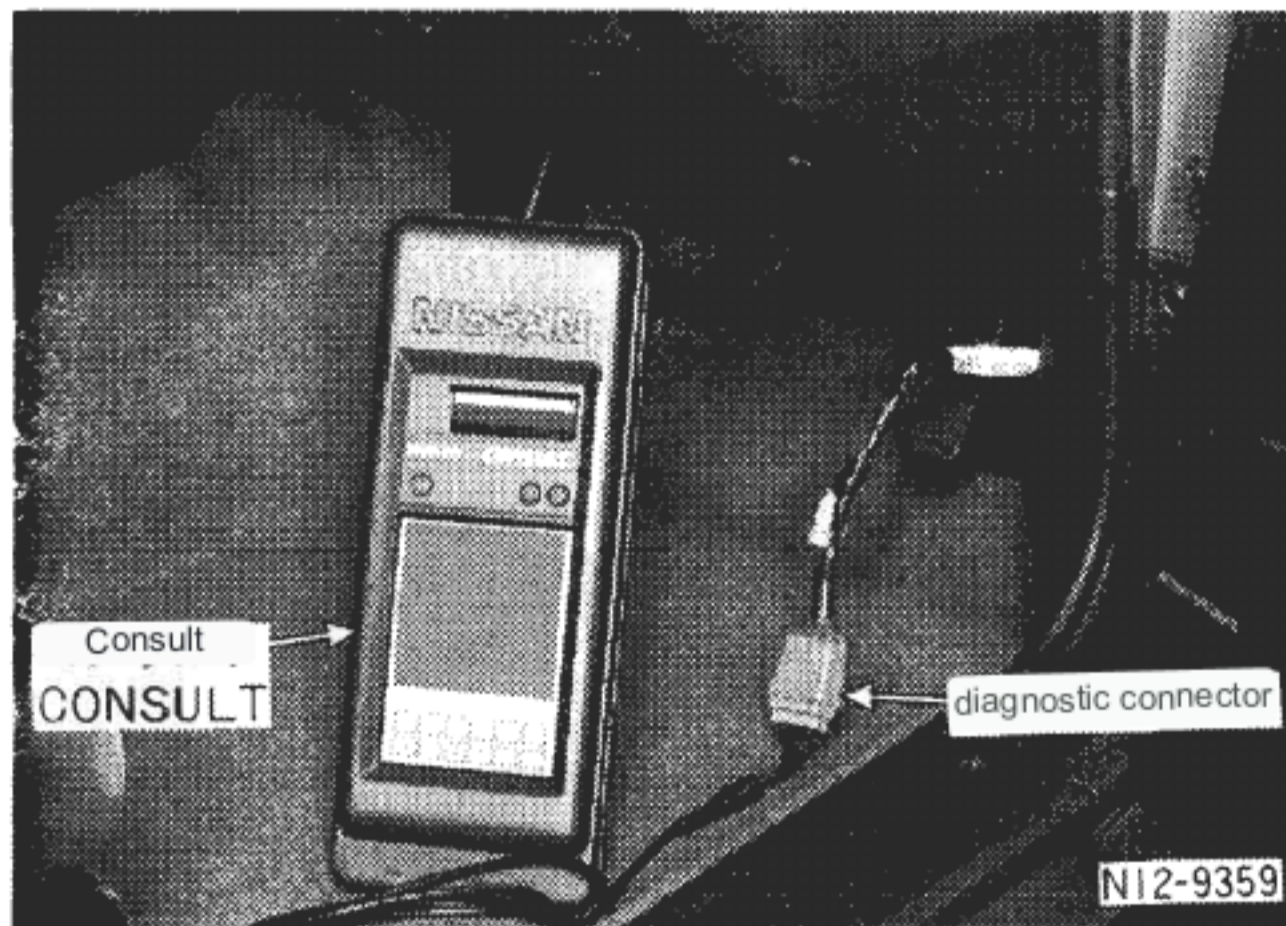
2. Check compression pressure

supplies

term	name	for way	remarks
tool	spark plug wrench EG1740 1600 or general purpose spark plug wrench set	 B02-0045	For removing spark plugs
計器	① Allen type compression Gauge EG1505 0000 ② Compression gauge adapter EG1505 0101	 B02-0044	Existing For compression pressure inspection

Compressive pressure regulation

term	eye	engine specs	SR20DET
mark	value	(kg/cm ²) / (rpm)	1 1.0/300
eye	value	(kg/cm ²) / (rpm)	9.0/300
Difference limit between cylinders		(kg/cm ²) / (rpm)	1.0/300

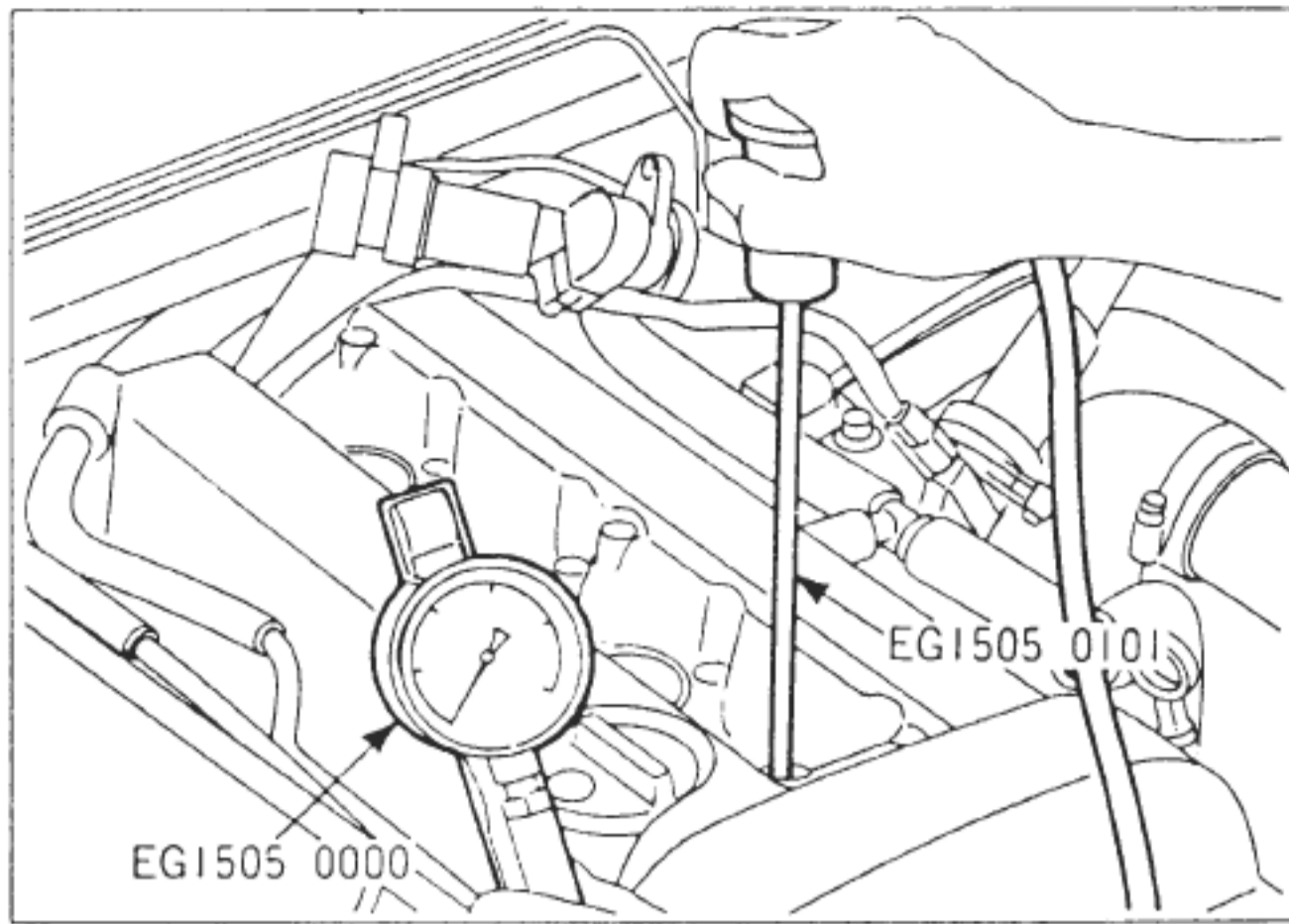


- Warm up the engine sufficiently.
- Connect CONSULT to the diagnostic connector (inside the fuse box) on the vehicle side and turn the key switch to "ON".
- Display the diagnostic mode "Select" screen.

Note: See B3 2 2 2 for details.



- Check with the tachometer in the combination meter.



Compression gauge installation

- Remove the ornament.
- Warm up the engine sufficiently and remove all 4 spark plugs.

CAUTION: Blow air around the spark plug when removing it. An adapter

is attached to the Allen type compression gauge and the engine is

set to

inspection

- Fully open the accelerator pedal, turn the key switch to "START" and start cranking.
- read the engine speed.
- If the engine speed does not reach the specified value, check the specific gravity of the battery.

Inspect and measure again under normal conditions.

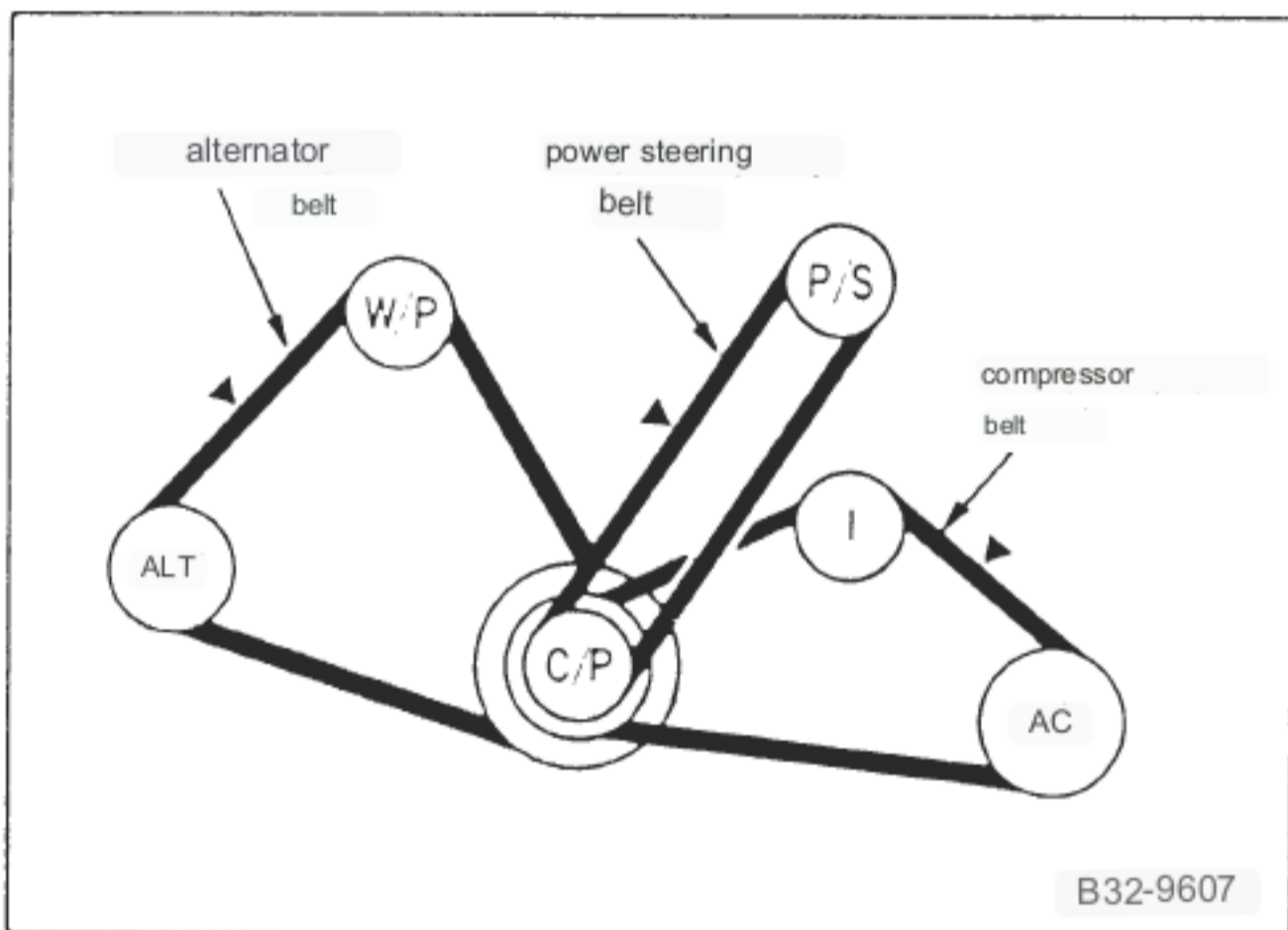
- If the compression pressure still does not reach the specified value, check the structure around the combustion chamber.

components (valves, valve seats, piston rings, cylinder

bores, cylinder heads, cylinder head gaskets, etc.)

Check, correct and measure again.

3. Tension check and adjustment of accessory belts

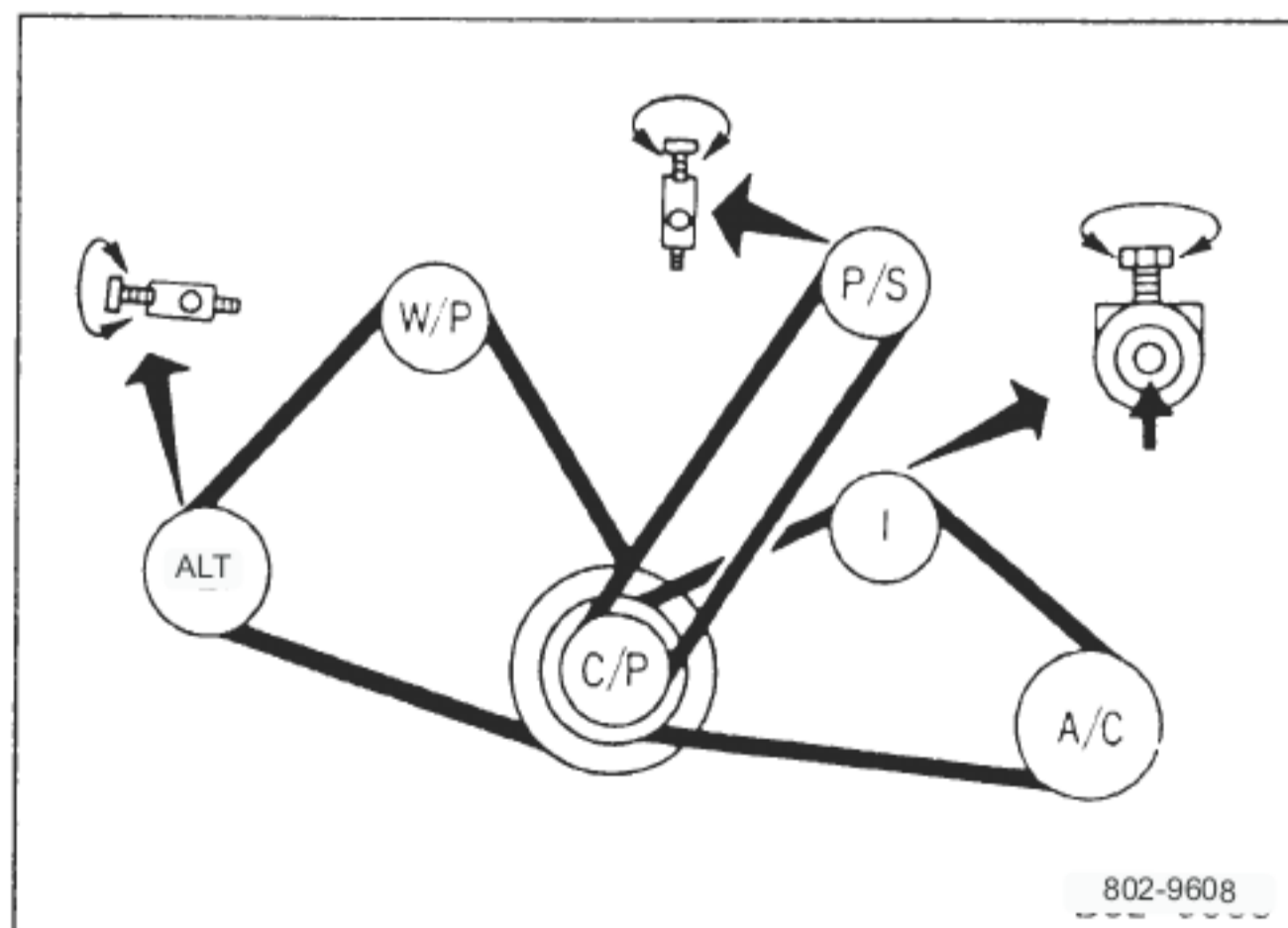


point 検

- As a general rule, the inspection should be carried out when the engine is cold or at least 30 minutes after the engine has stopped.

Leave it alone and then do it.

site	item	belt specifications	Deflection amount of bolt (mm) ▼When a force of 10 kg is applied to the position		
			When new	When adjusted	re-tension limit
power steering pump belt		Poly V Low Maintenance belt (4 threads)	8-9	9~10	12~14
alternator belt		Poly V Low Maintenance belt (5 threads)	6~7	7~8	11~13
air conditioner compressor belt		Poly V Low Maintenance belt (4 threads)	4-5	5-6	7-8



整

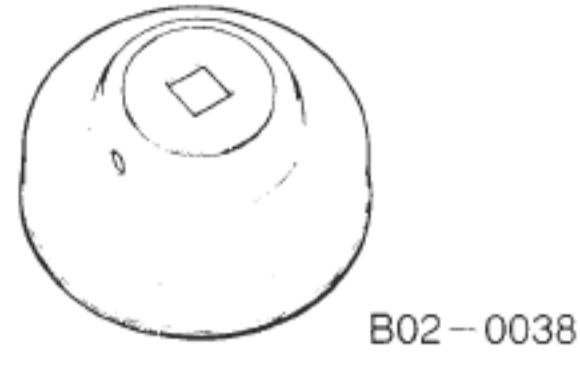
Part	Item	Adjustment part
power steering pump belt		Adjustment bolt provided on the power steering pump
alternator belt		Adjustment bolt provided on the alternator
air conditioner compressor belt		Adjustment provided on the idler pulley porto

- Caution: (1) When replacing the belt with a new one, it will not fit in the pulley grooves sufficiently. (2) Belts in use that exceed the re-tensioning limit shall be re-adjusted to the value at the time of adjustment. (3) When installing the belt, check that it fits properly in the pulley groove so that the belt is not misplaced.

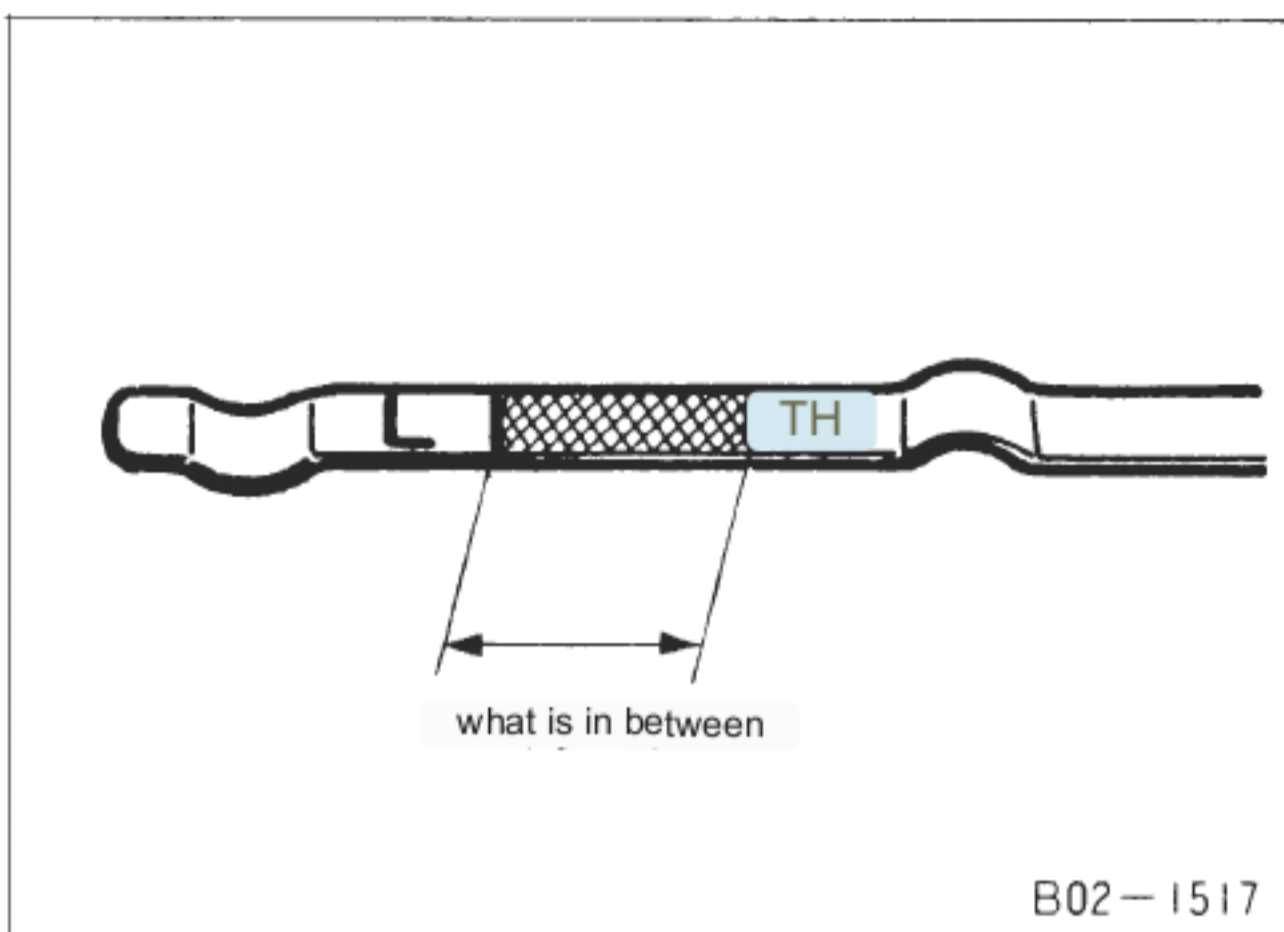
4. Lubrication system inspection

supplies

	name	for way	remarks
Special tool	Oil filter wrench KV101 15800	For oil filter removal	Existing
	oil king	For oil king measurement	



4-1 Checking the amount of lubricating oil



inspection

- In principle, check the oil level before starting the engine. If the engine is started, wait at least 10 minutes after stopping the engine.
- The oil level should be between the H and L lines on the level gauge.
- The oil must be free of cloudiness and significant dirt.

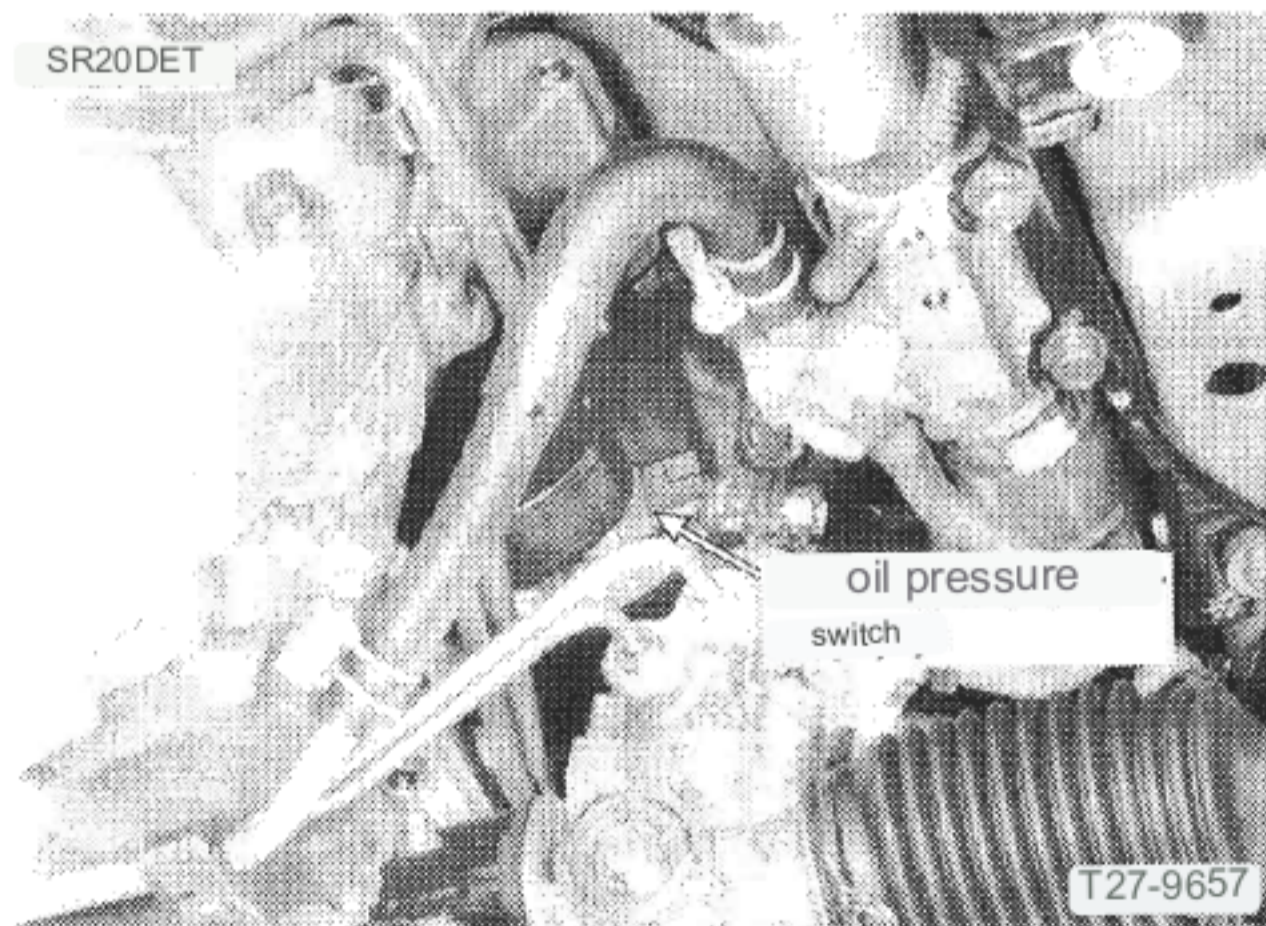
Change	Use SD, SE, SF class oil, every 5,000km or 6 months time 10,000km
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or 1 year when using SG grade oil

... SR20DET™ is recommended.

oil level (l)	H.	3.7
	L	2.7
3.5 Replenishment amount when changing	When changing oil only	Approx.
	oil (0) When changing oil and oil filter	about 3.7

4-2 Hydraulic pressure check

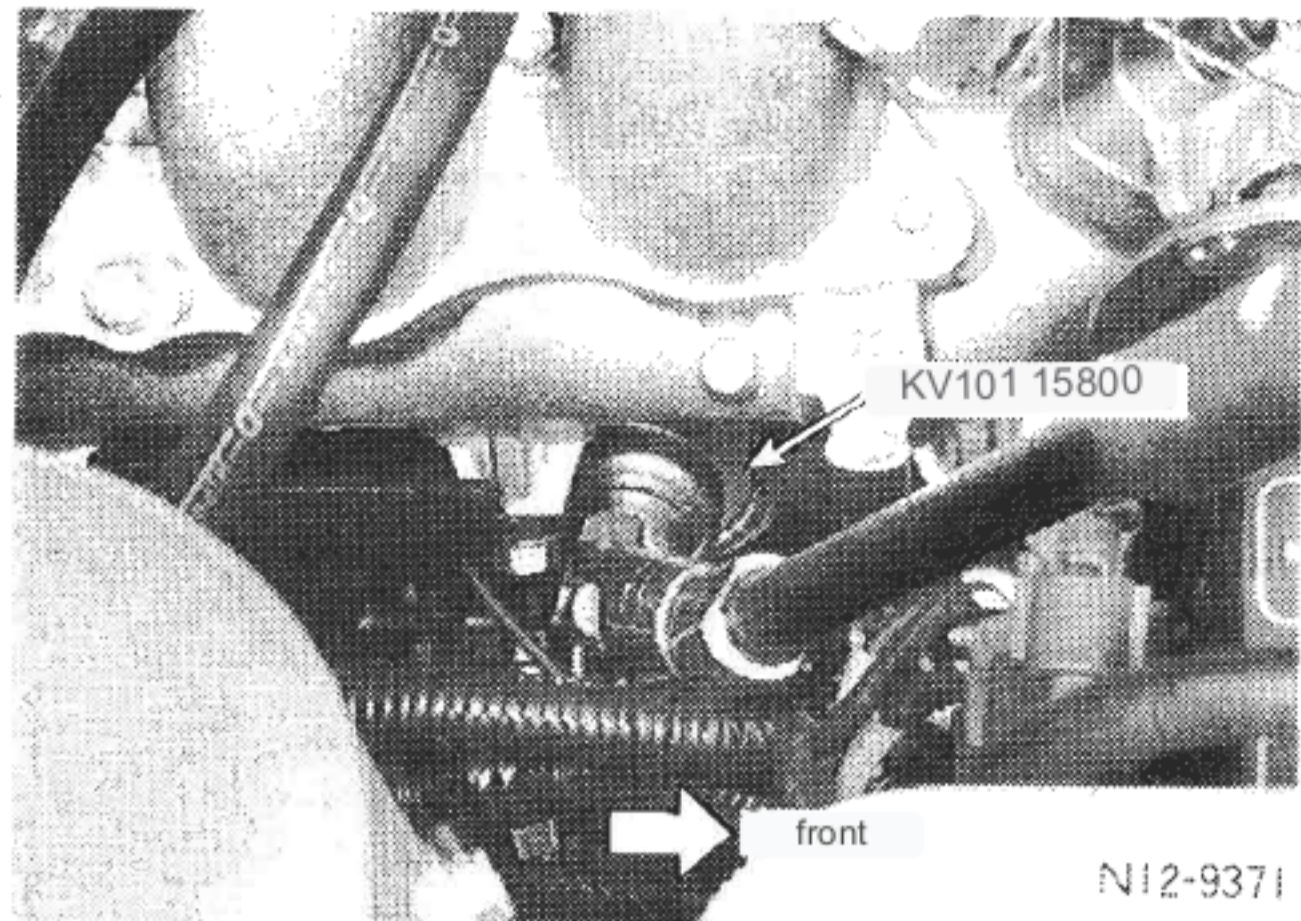


point inspection

- Remove the oil pressure switch and connect the oil pressure gauge.
- After the engine warms up, there should be oil pressure corresponding to the engine speed.

Engine RPM	(rpm)	600	2000	6000
leaf pressure	(kg/cm ²)	about 1	about 3	about 4

4-3 Oil filter replacement



removal

- Remove using an oil filter wrench (special tool).

CAUTION: When removed, oil will spill out, so place it under the oil filter.
Place and receive rags, etc.

attachment

- Wipe off dust from the mounting surface of the oil filter bracket, and apply engine oil all around the oil seal of the new filter.

- Screw in the oil filter by hand and attach the oil filter bracket.

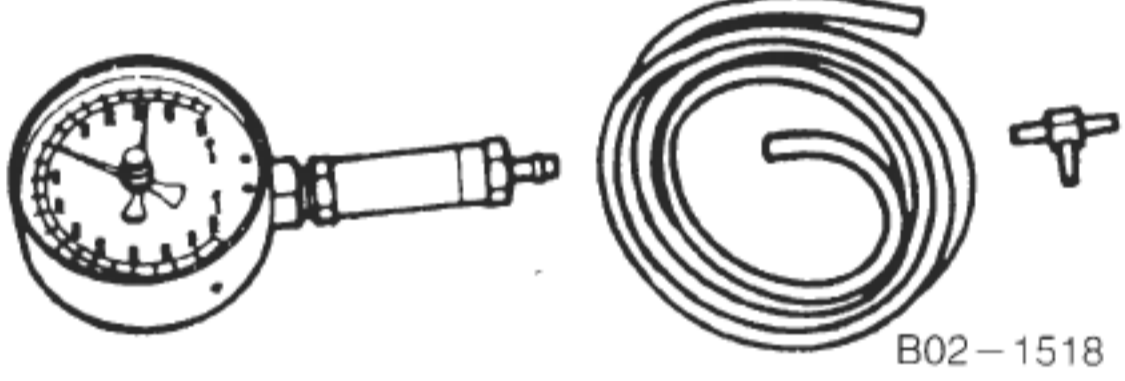
After touching, tighten 2/3 turn.

CAUTION: After starting the engine, check that there are no oil leaks.

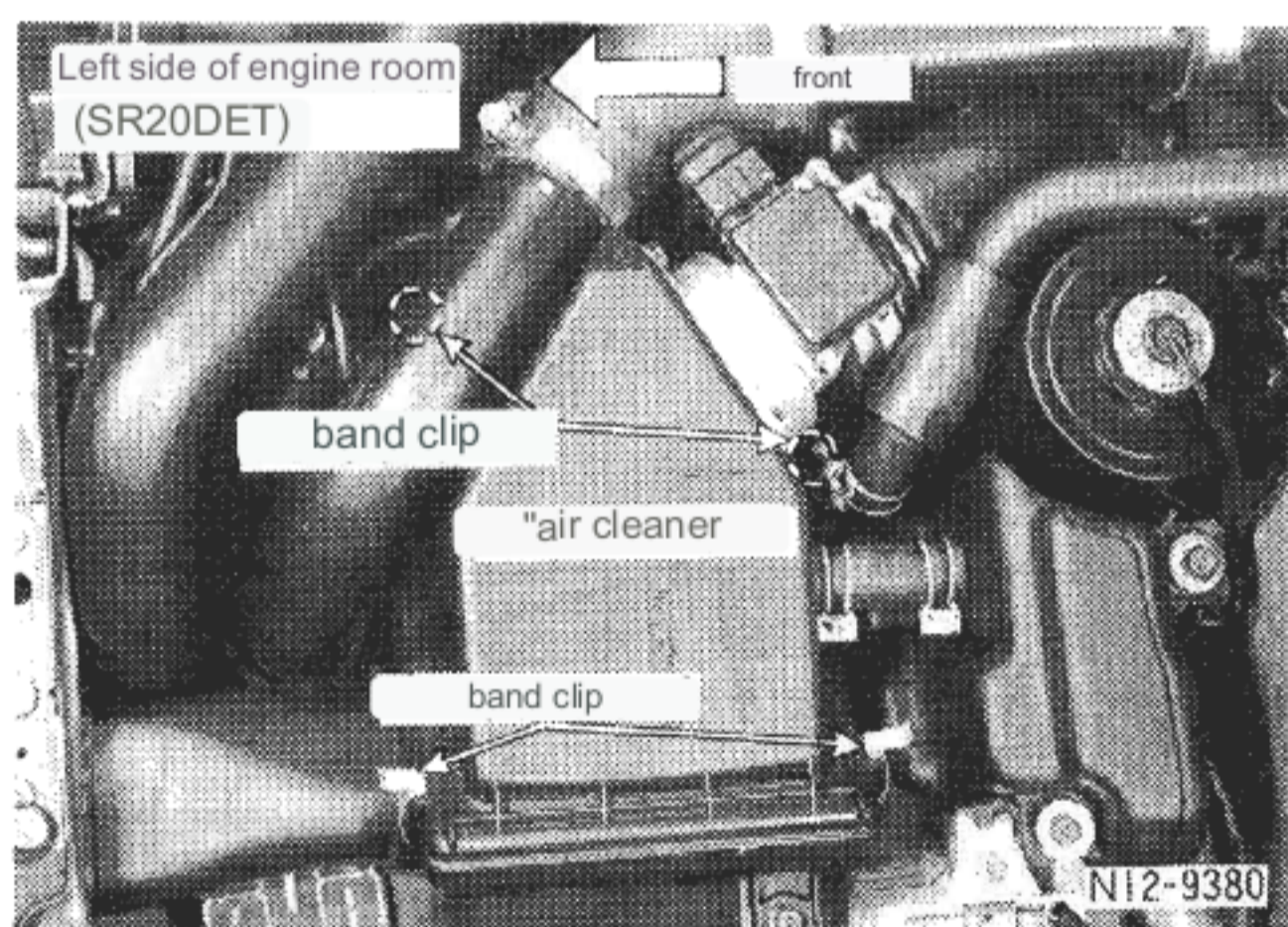
Regular replacement	period When using SD, SE SF, SG grade oil, 10,000Km or every year
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5. Inspection of intake and exhaust system

supplies

	name	for way	remarks
Total	Compound gauge EG1508 0001  B02-1518	Turbocharger boost pressure for inspection	Existing

5-1 Inspection of air cleaner element

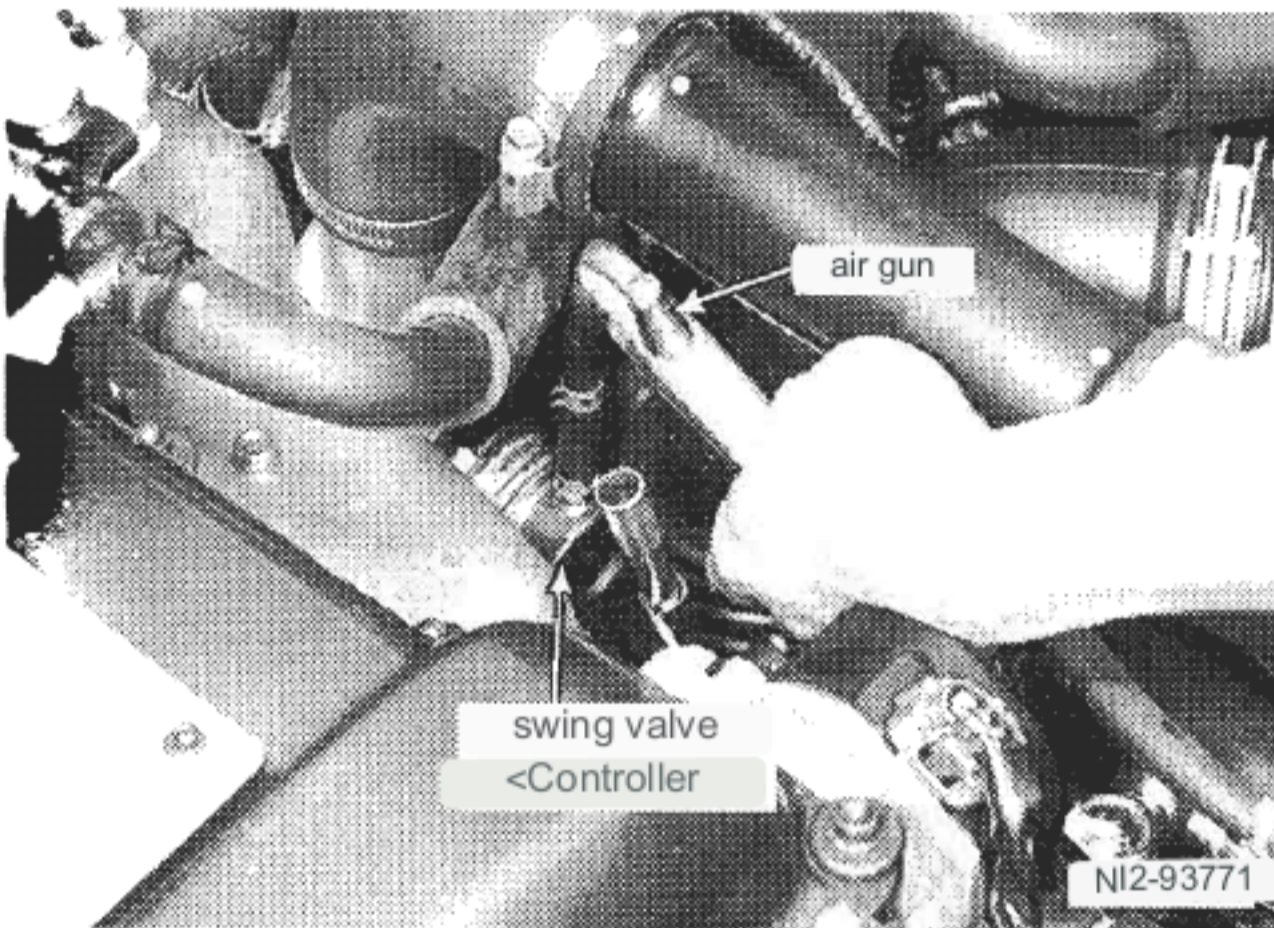
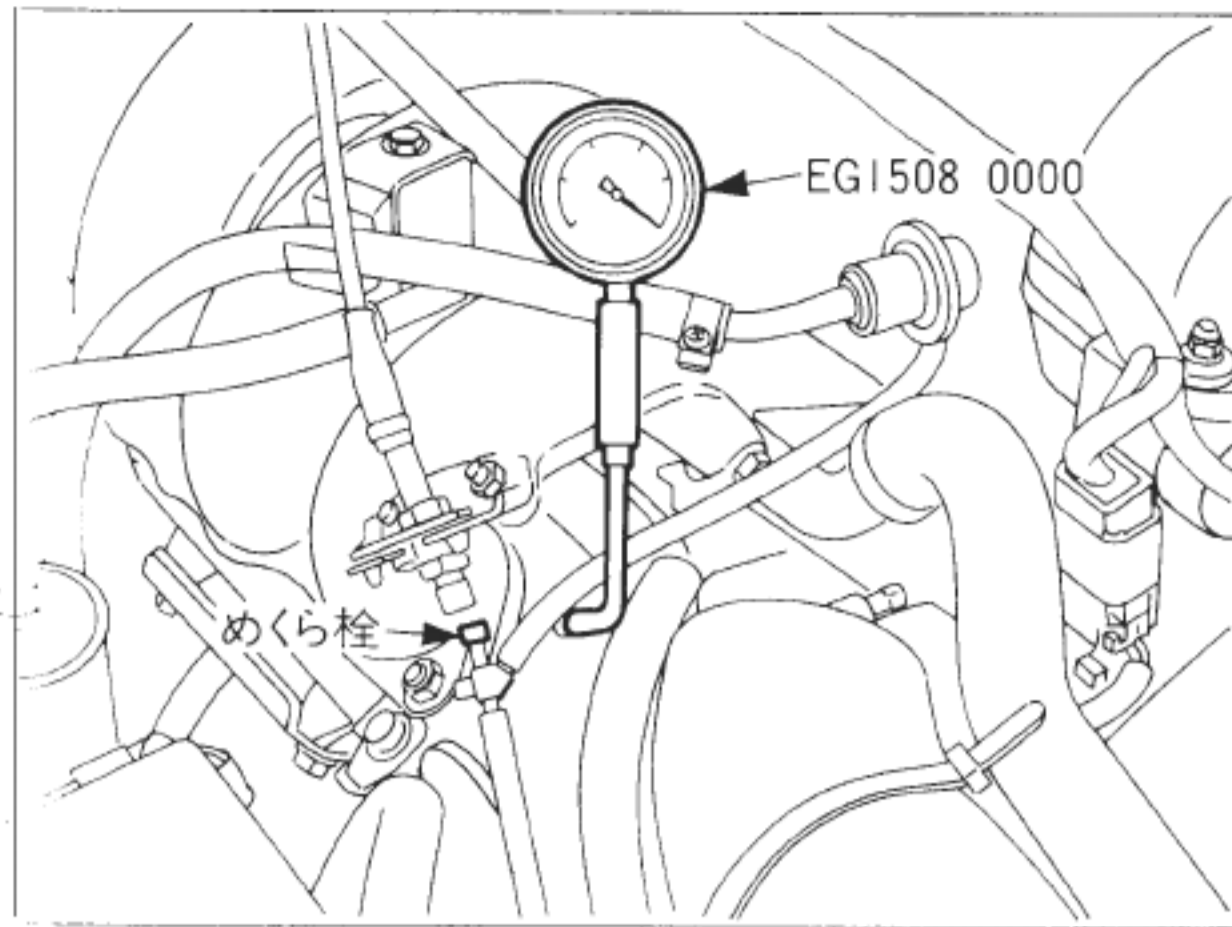


point 検

- Remove the band clip shown on the left, and remove the air cleaner element.
- The air cleaner element must be free from significant dirt and damage.

Periodic replacement period	Every 60,000km
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5-2 Inspection of turbocharger



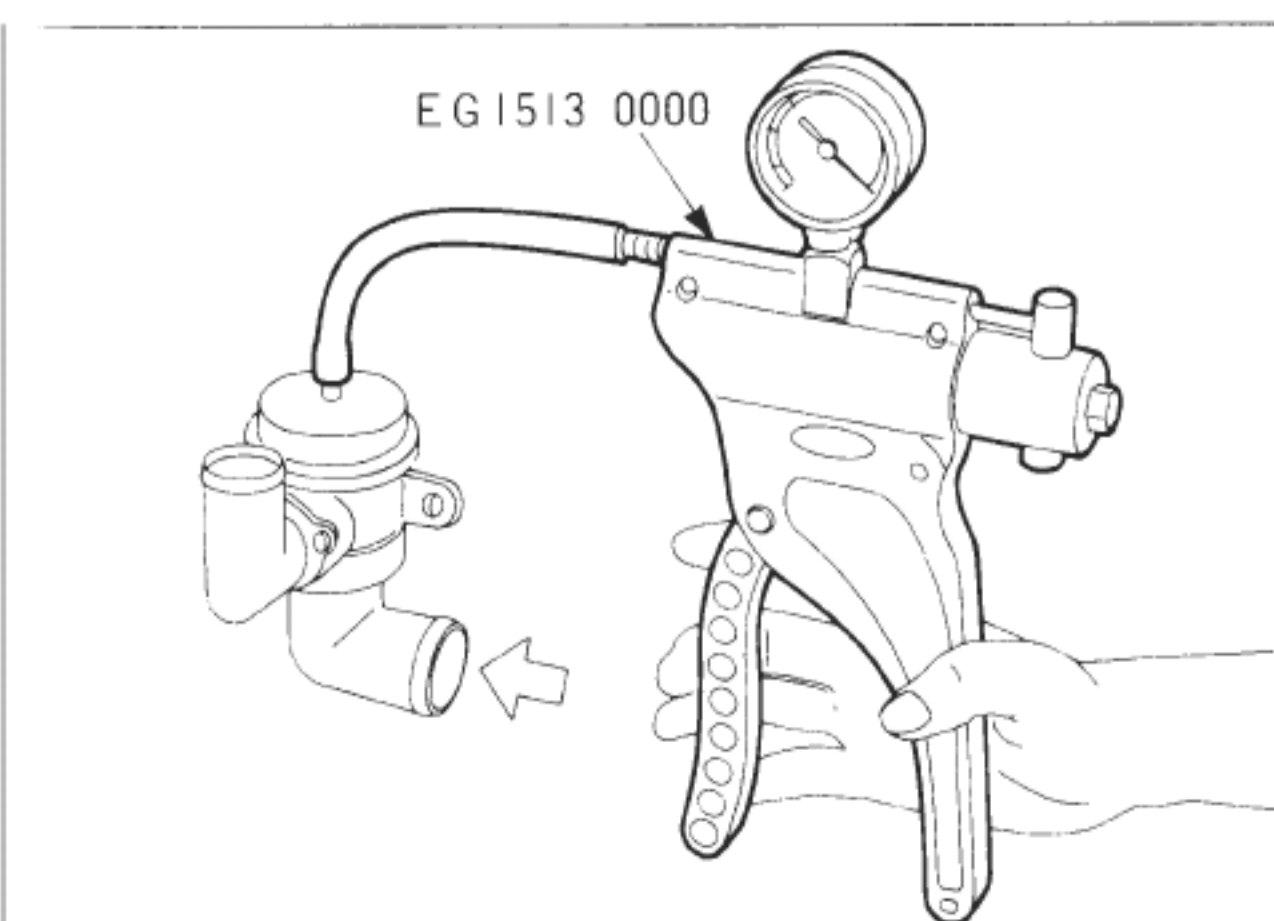
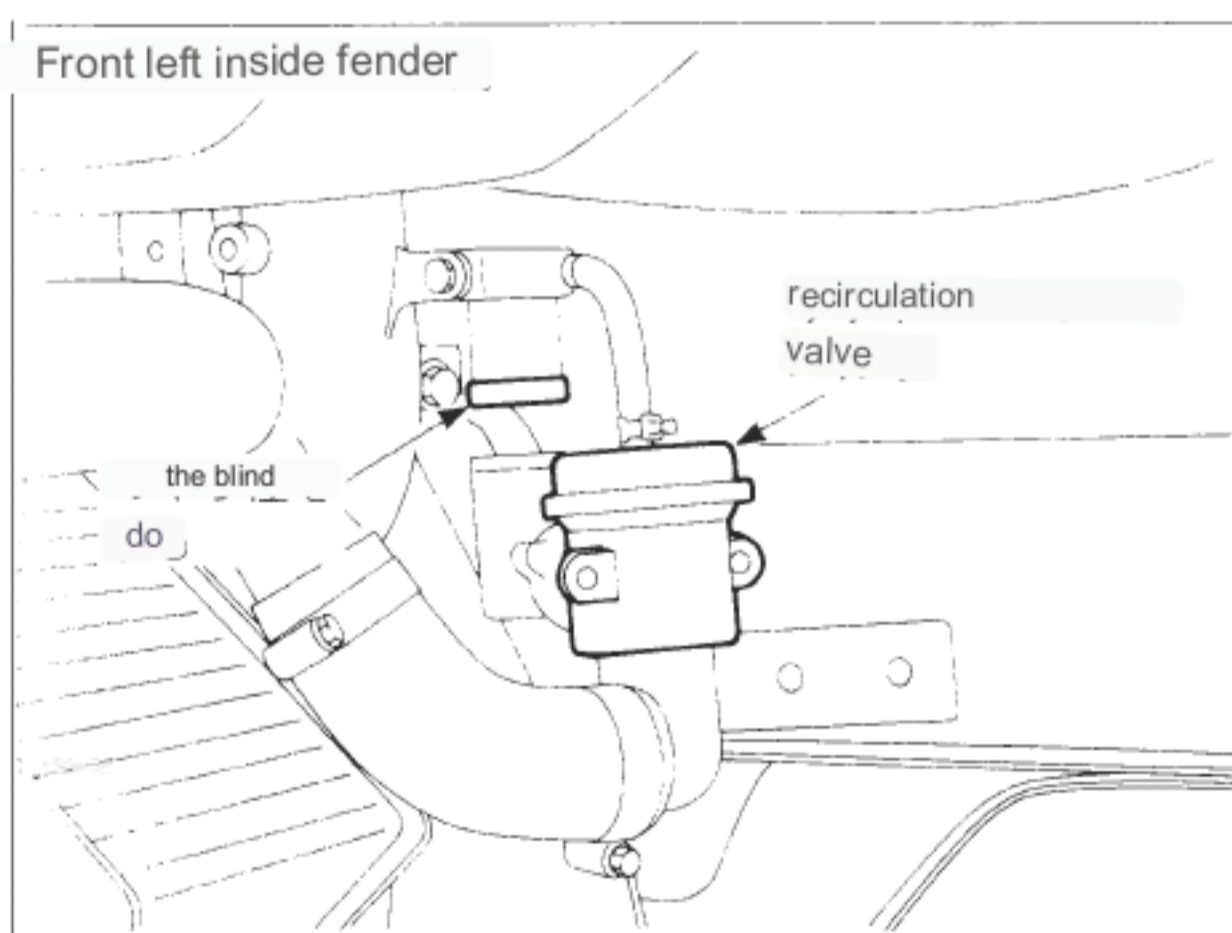
Functional check

- Remove the canister hose from the intake manifold and connect the test hose to the intake manifold, and attach a pressure gauge (compound gauge).
- After a running test, the pressure does not rise above approximately 0.8 to 0.9 kg/cm. check that
 - a. When pressure does not become positive pressure
 - Intake system, exhaust system air leak, exhaust gas leak
 - b. When the pressure is higher than the set supercharging pressure (about 0.8–0.9kg/cm²)
 - The rubber hose of the swing valve controller has come off or cracked.
 - Malfunction of the swing valve controller (remains fully closed)

Inspection of swing valve controller

- Connect the rubber hose of the swing valve controller to the compressor. Remove on the Ujing side.
 - When the hose is blown with an air gun (approximately 0.6 to 0.7 kg/cm²), the rod of the swing valve controller should start operating. Confirm operation stop blowing immediately.
- Caution: Applying too much pressure may damage the diaphragm, so first check that the air gun pressure is about 0.7~0.8kg/cm² with an LPG pressure gauge (special tool for 1kg/cm²). to do from

5-3 Inspection of recirculation valve



Functional check

- Remove the fender protector. • Remove the hose on the upstream side of the compressor of the recirculation valve (blind the hose) so that the air blows back when the throttle is suddenly closed. Check that there is

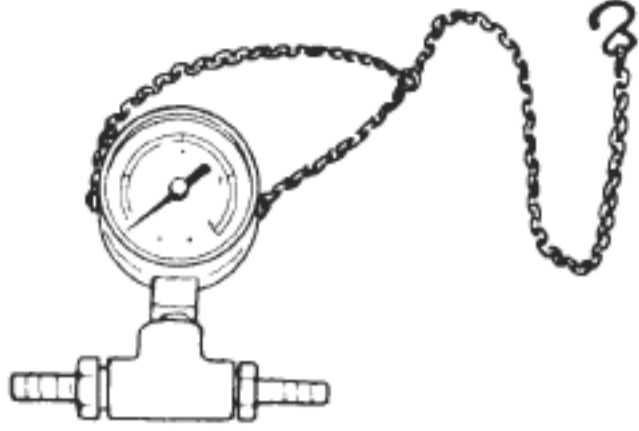
Unit inspection

- Apply negative pressure (-200±30mmHg) with a vacuum handy pump, There should be continuity when blowing air from the direction of the arrow.
- There should be no continuity when no negative pressure is applied.

CAUTION: Do not attempt to disassemble or adjust the recirculation valve.

6. Fuel system inspection

supplies

	name	for way	remarks
Total 器	EGI fuel pressure gauge ST1959 0000 	For fuel pressure measurement	Existing

6-1 Checking fuel pressure

◆Fuel pressure removal◆

At idle press START to stop the fuel pump.
stop.
Crank the engine 2-3 times after stalling.

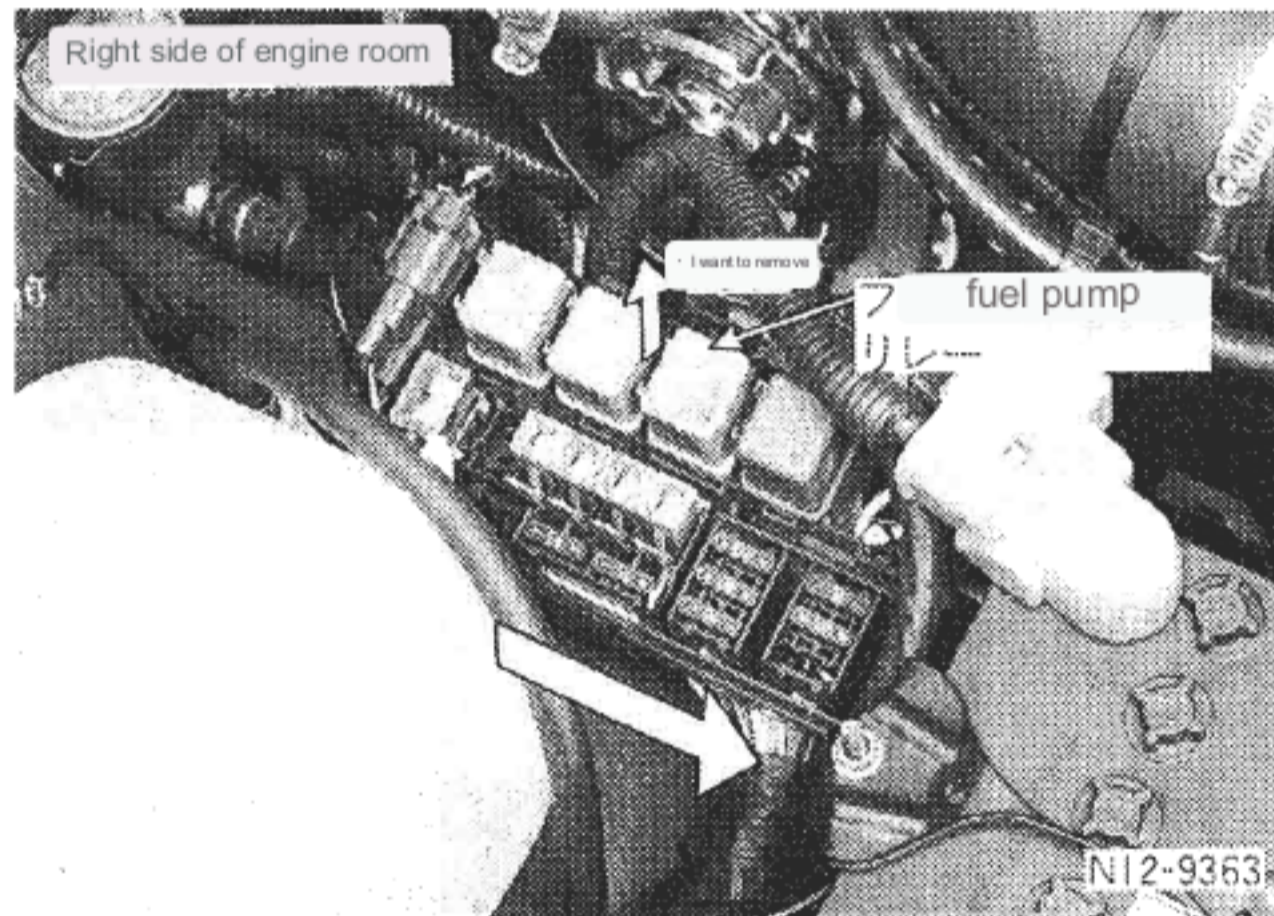
Start

B09-0214

fuel pressure removal

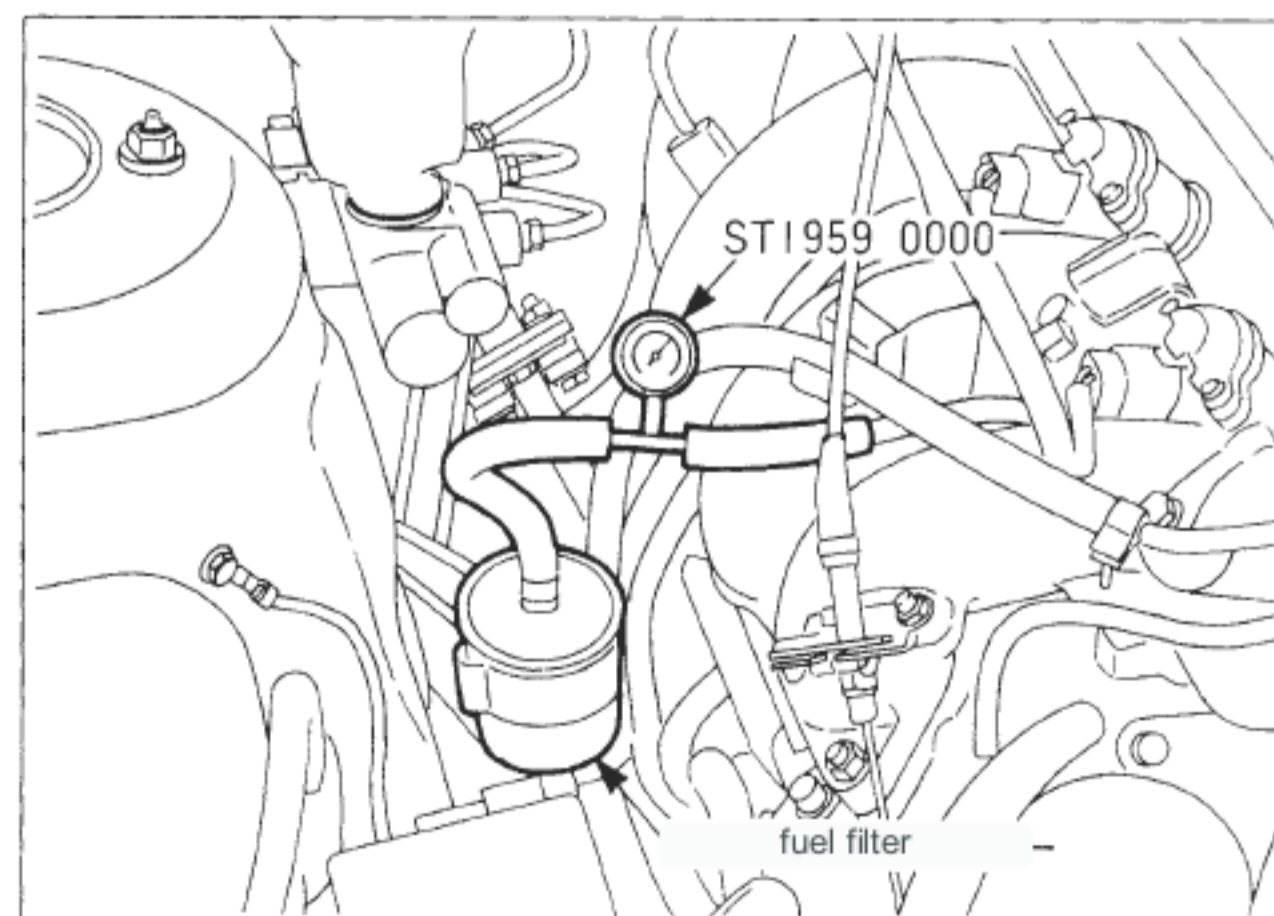


- Rotate the engine.
- Select "Work Support" "Relieve Fuel Pressure".
- Touch the start button to remove the fuel pressure.



- After starting the engine, disconnect the fuel pump relay. after engine stall Crank 2-3 times and consume the fuel in the pipe. • In the case of a car with poor starting, crank 3 to 4 times to remove the fuel in the pipes. Consume.

Note: It's better to connect the booster cable to a normal car because the battery runs out easily.

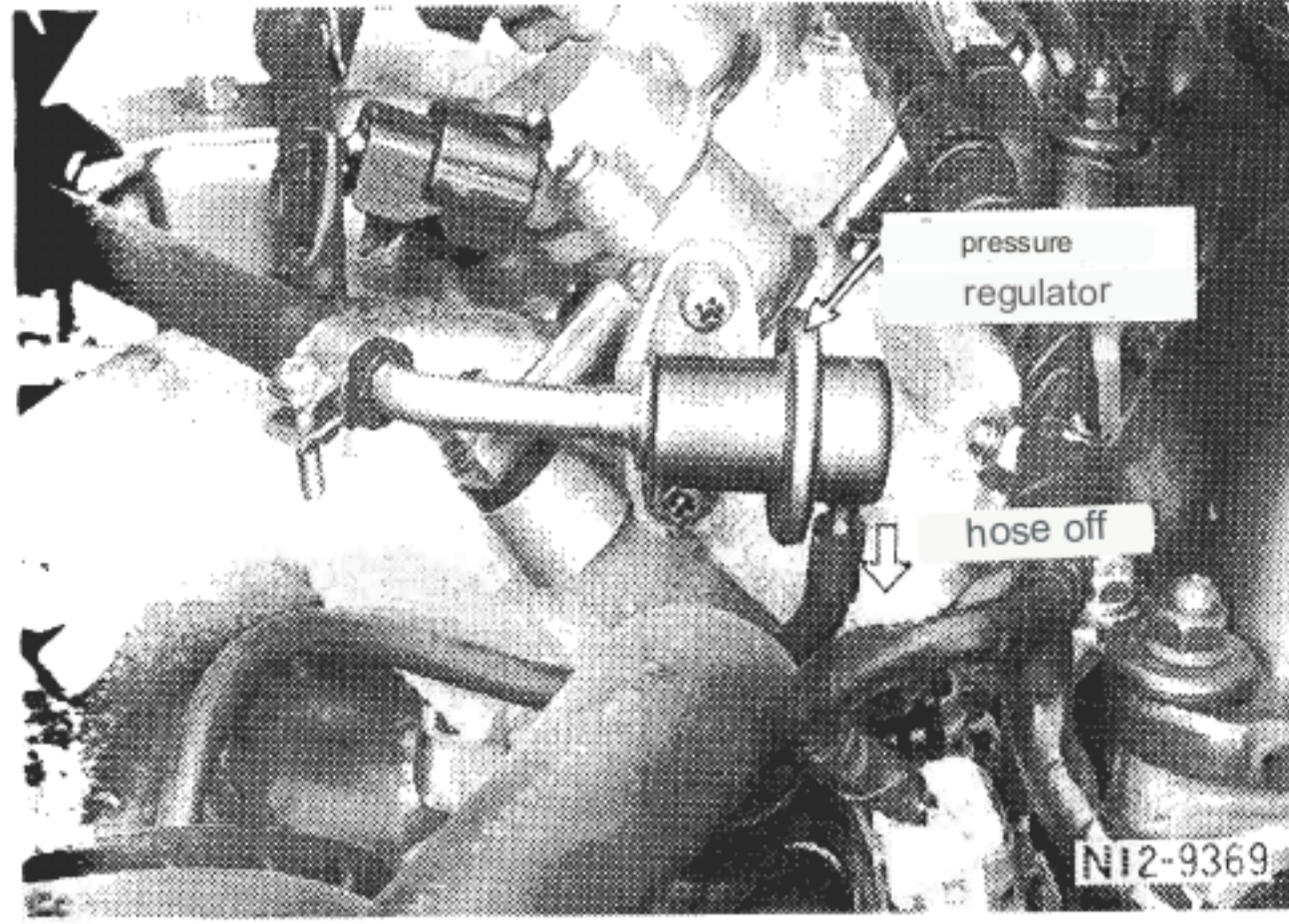


Fuel pressure gauge installation

- Connect the fuel pressure gauge between the fuel filter and the fuel gallery do.
- Install the fuel pump fuse.

Fuel pressure check

- Start the engine and check if the fuel pressure is at the specified value. • In case of starting failure, turn off the fuel for 1 second when the key switch is "ON". Check fuel pressure at pump rotation.

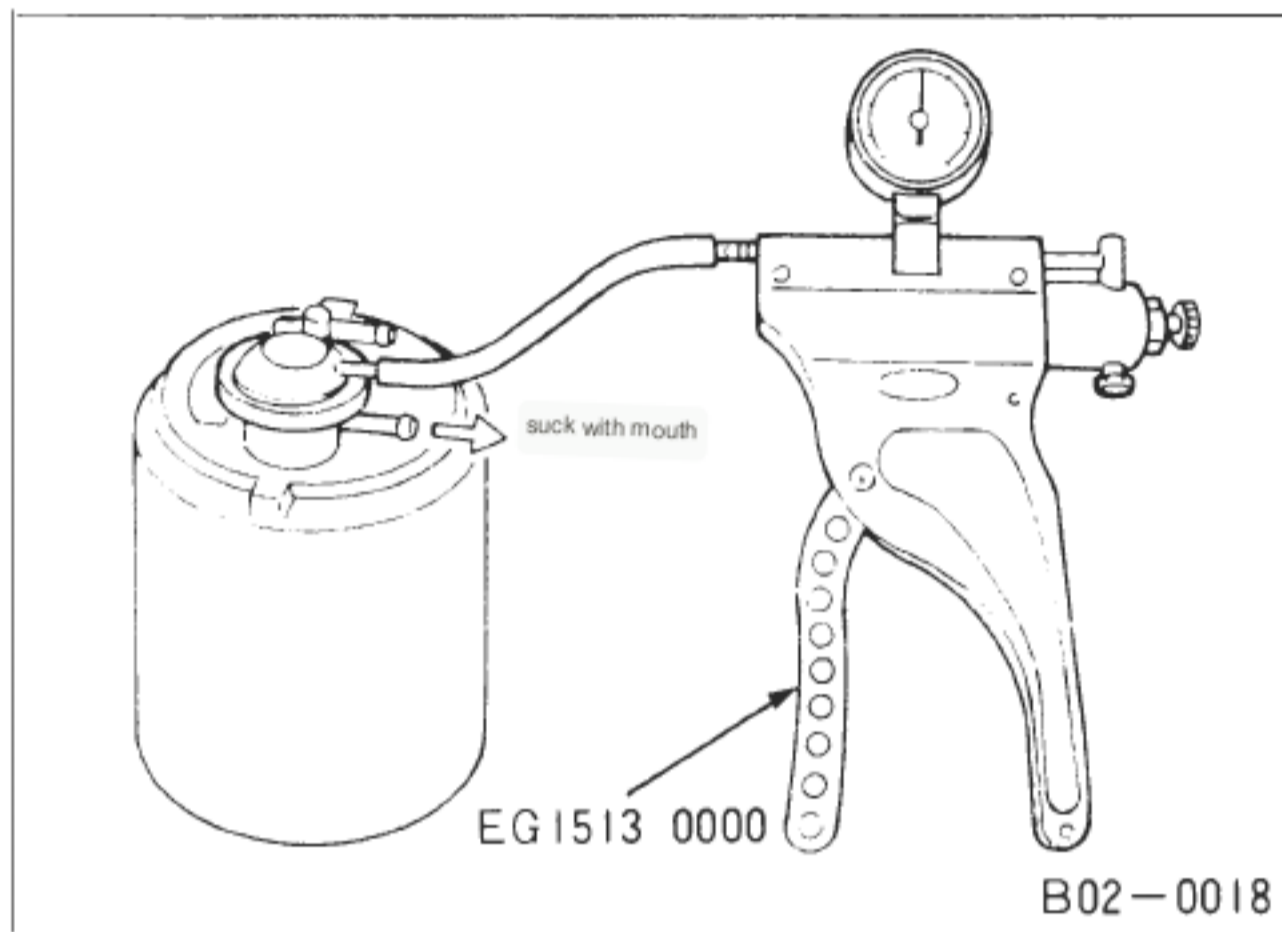


Fuel pressure specified value

1 second after key switch "ON"	(kg/cm ²)	about 3.0
when idle	(kg/cm ²)	about 2.5
pressure regulator vacuum hose Idle time removed	(kg/cm ²)	about 3.0)

7. Inspection of fuel evaporation (evaporation) gas suppression device

7-1 Inspection of purge control valve



inspection

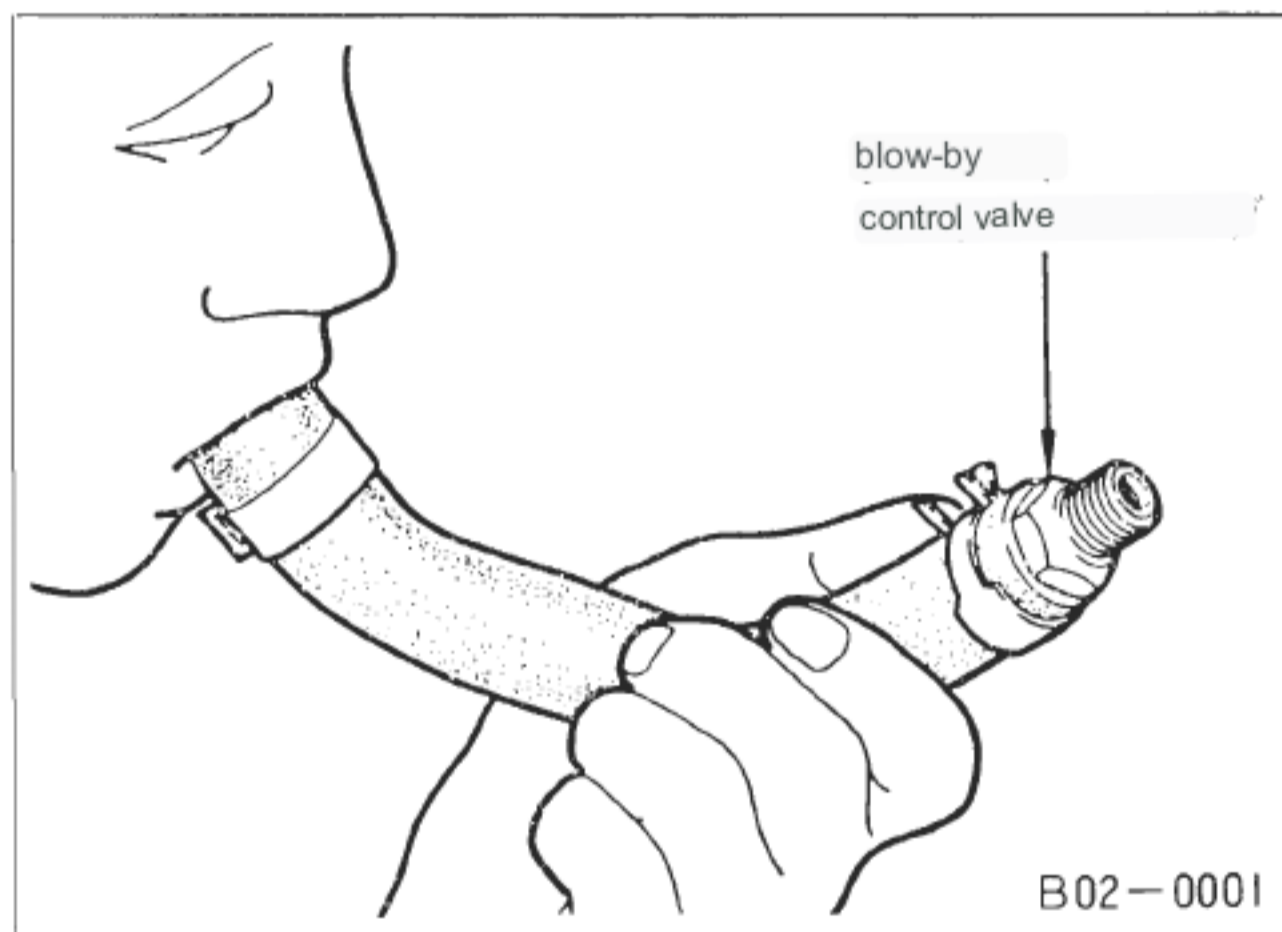
- When a vacuum handy pump is used to apply a negative pressure of approximately 400mmHg, the negative pressure must be maintained.

When the manifold negative pressure passage is inhaled in the above state, it can be slightly inhaled.

matter.

8. Inspection of blow-by gas reduction device

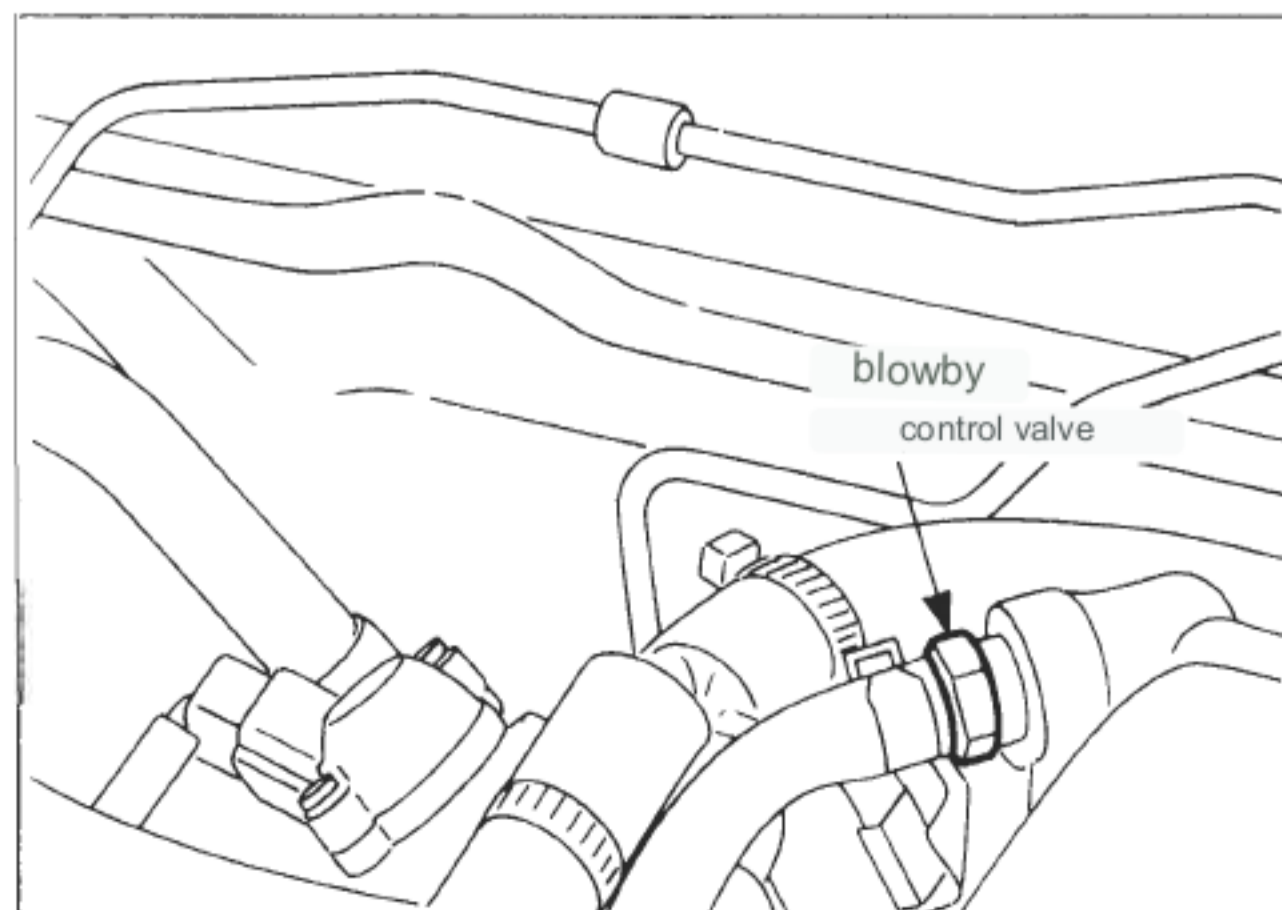
8-1 Inspection of blow-by control valve



point 検

- Check the continuity of the blow-by control valve.

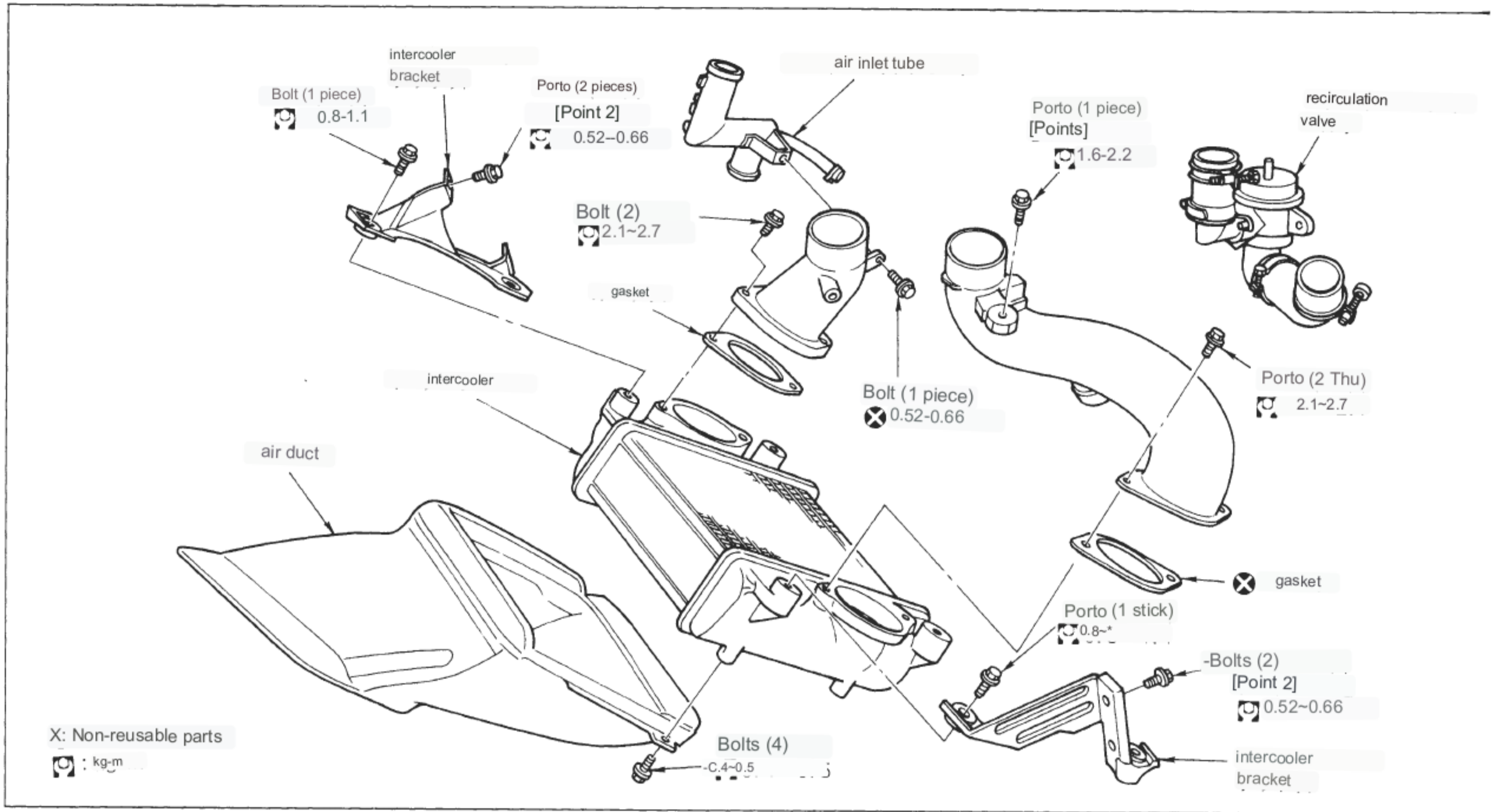
conditions	item	letter	bear
blew and	tree	through	ina な through
and	tree	through	Ru



9. Detachment of parts on board

9-1 Intercooler

(1) Description 着



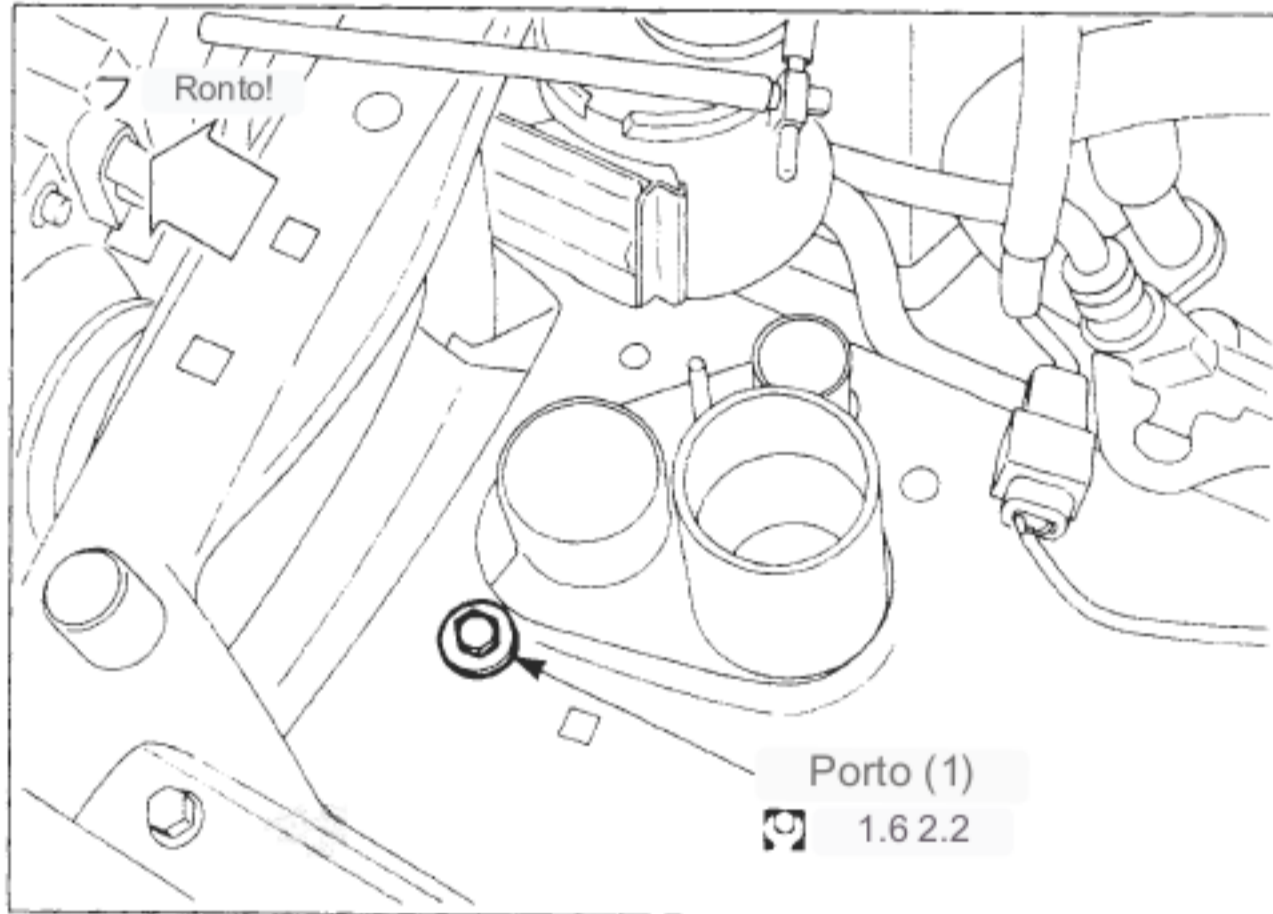
Left front tire

with) left front fender protector

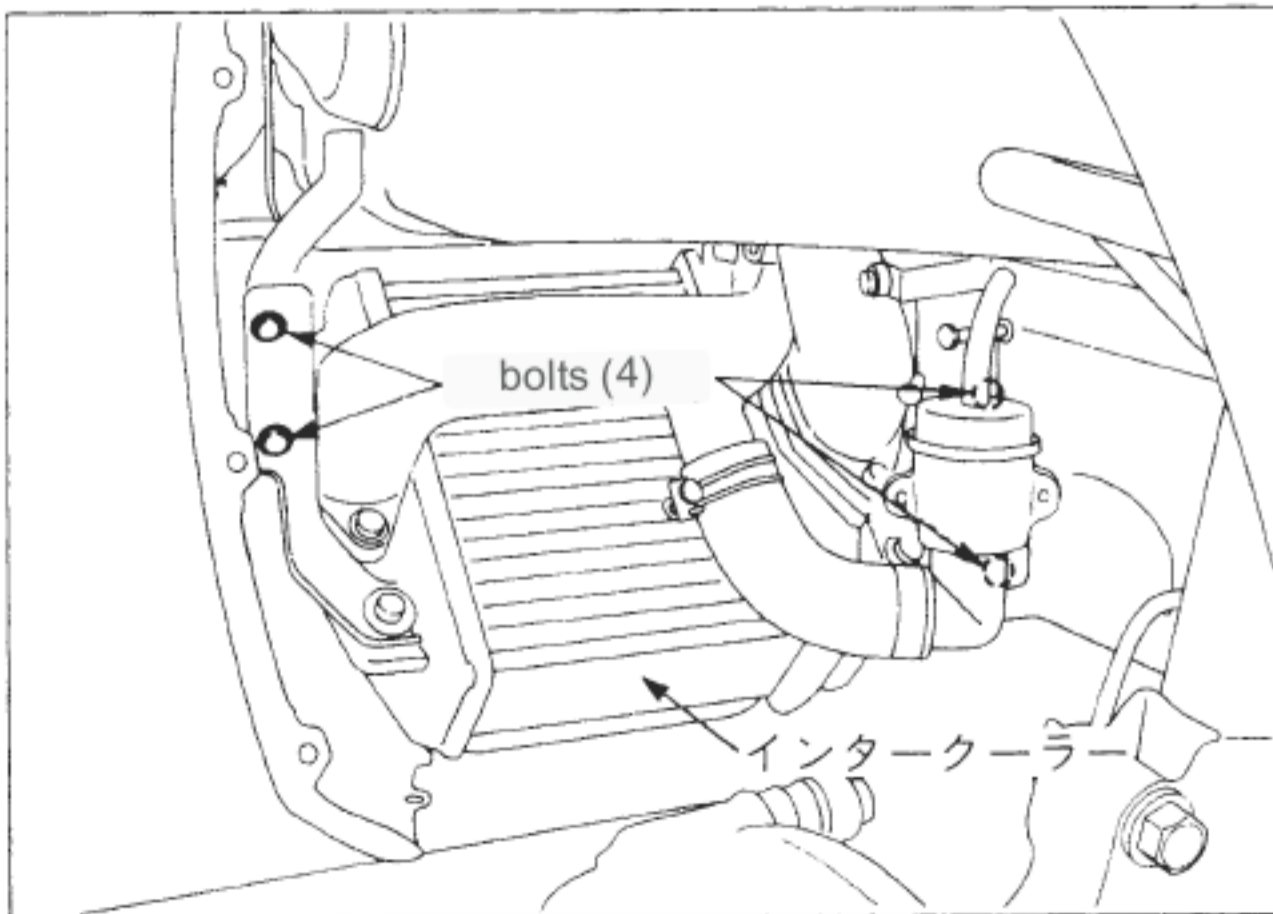
With air duct

(with) air cleaner

(with) intercooler inlet hose



[Point 1] Intercooler mounting nut · Remove the air duct and remove the nut (1 piece).



[Point 2] Intercooler removal and installation

removal

- Remove the fender protector.
- Remove the linaculation valve.
- Remove the four intercooler mounting bolts.
- Remove the intercooler without damaging the fins.

Caution (1) Since aluminum fins are used, the Do not place objects on the fins or hit the fins with tools. (2) The main body (tank, fin tube) cannot be disassembled.

attachment

- Securely attach the vacuum hose.

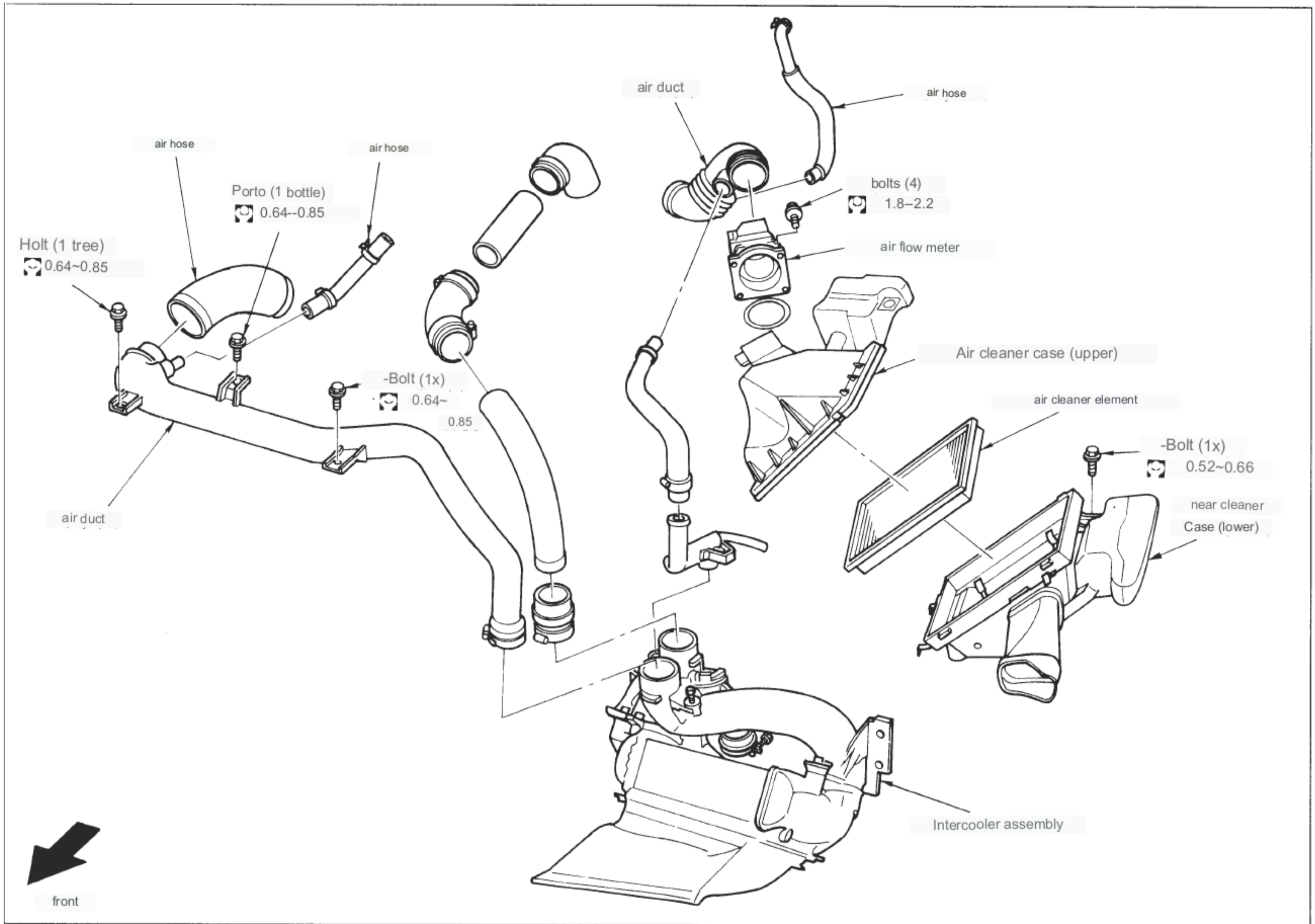
2. Exhaust gas cleaning equipment list

		car	seed	E-RPS13 E-KRPS13
item	engine specs			SR20DET
Fuel supply system		Electronically controlled fuel injection (ECCS)		
Air-fuel ratio control method		O2 sensor + ECCS control unit 卜		
Start assist method		Wax type air regulator (AAC valve)		
Intake heating method		hot water heating		
ignition	method	Contactless (ECCS electronic power distribution)		
CO, HC NOx reduction equipment	Catalyst type 種類	Ternary (Monolith)		
	Catalytic converter size (Capacity())		Underfloor (1.3)	
	E A I outfit place	With		
Deceleration exhaust gas reduction device	fuel cut device		With	
	AB valve		none	
Exhaust temperature alarm device		(Set temperature °C)		Thermistor type (approx. 850)
Fuel evaporation gas suppression device		canister type		
Blow-by gas reduction device		closed type		

B engine

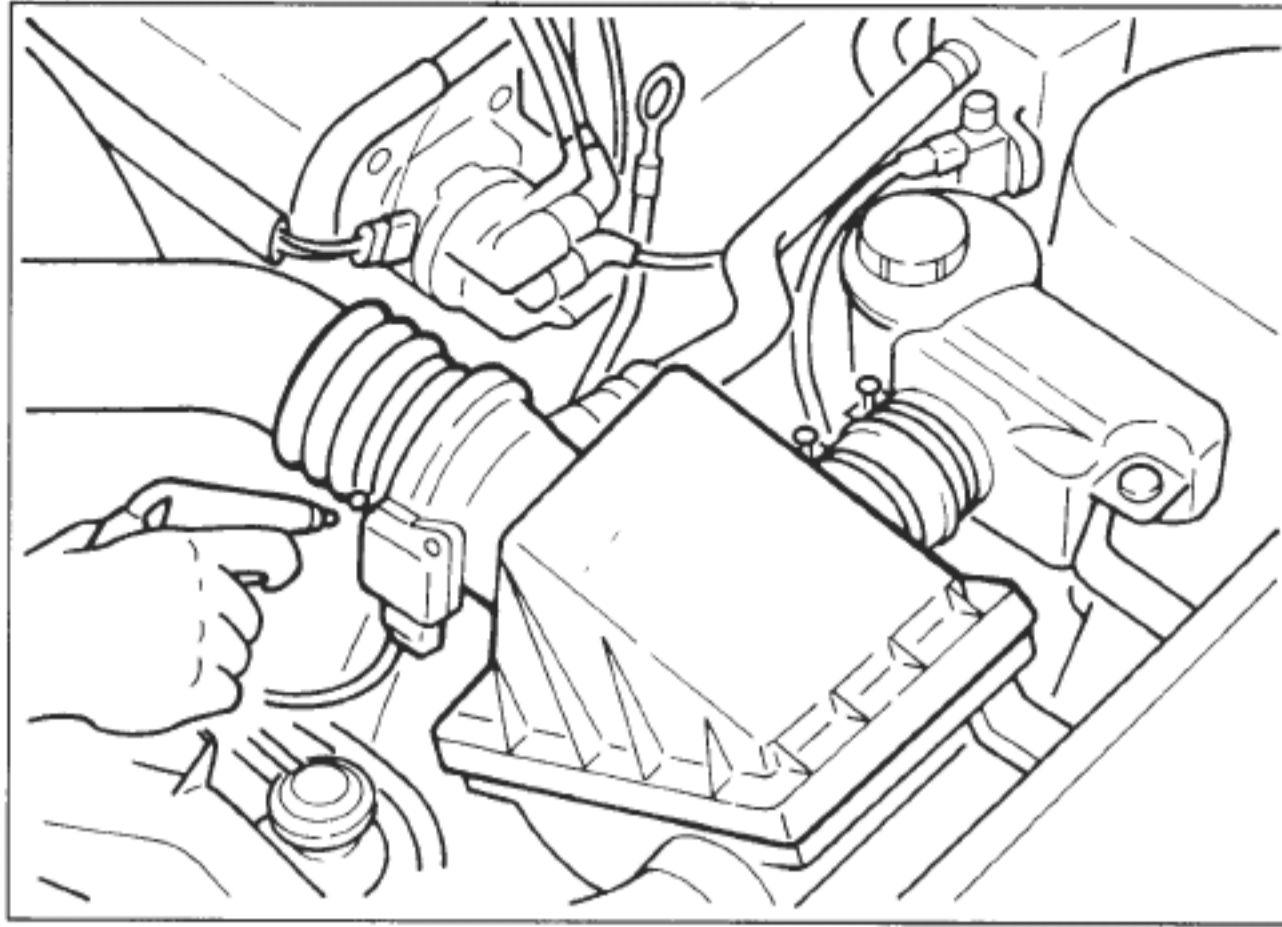
9-2 Air duct

(1) Description 着



⊖ air flow meter connector separation

⊖ hose air duct cleaning [Point 1]



[Point 1] Cleaning each air hose and air duct ·

Before removing each air hose and air duct, thoroughly remove dirt and dust with an air gun.

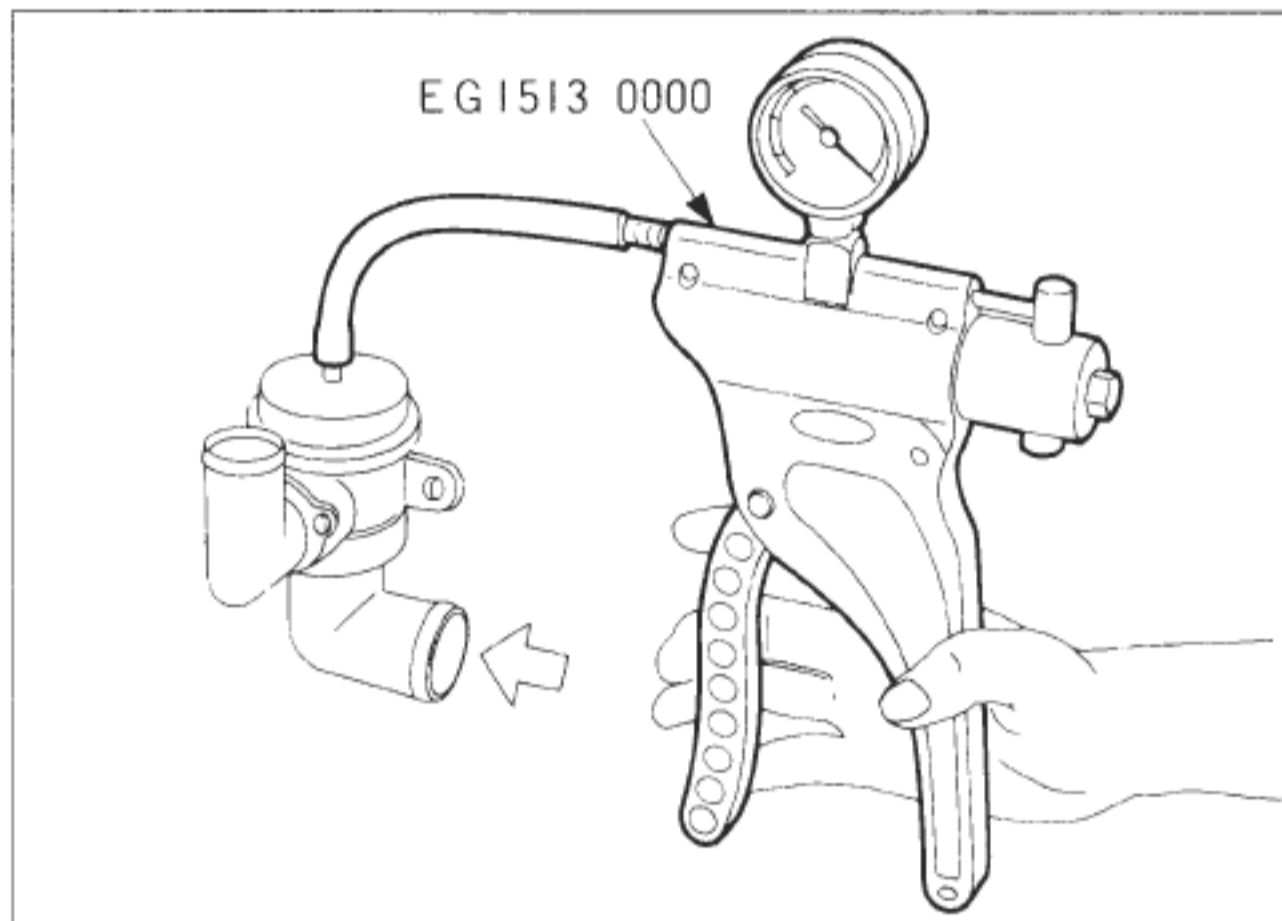
[Point 2] Remove and install each air hose and tube

removal

- Make matching marks on each air hose and tube before removing them.

attachment

- Insert each air hose and tube by aligning the matching marks (approximately 30 mm) and tighten securely with a clamp.



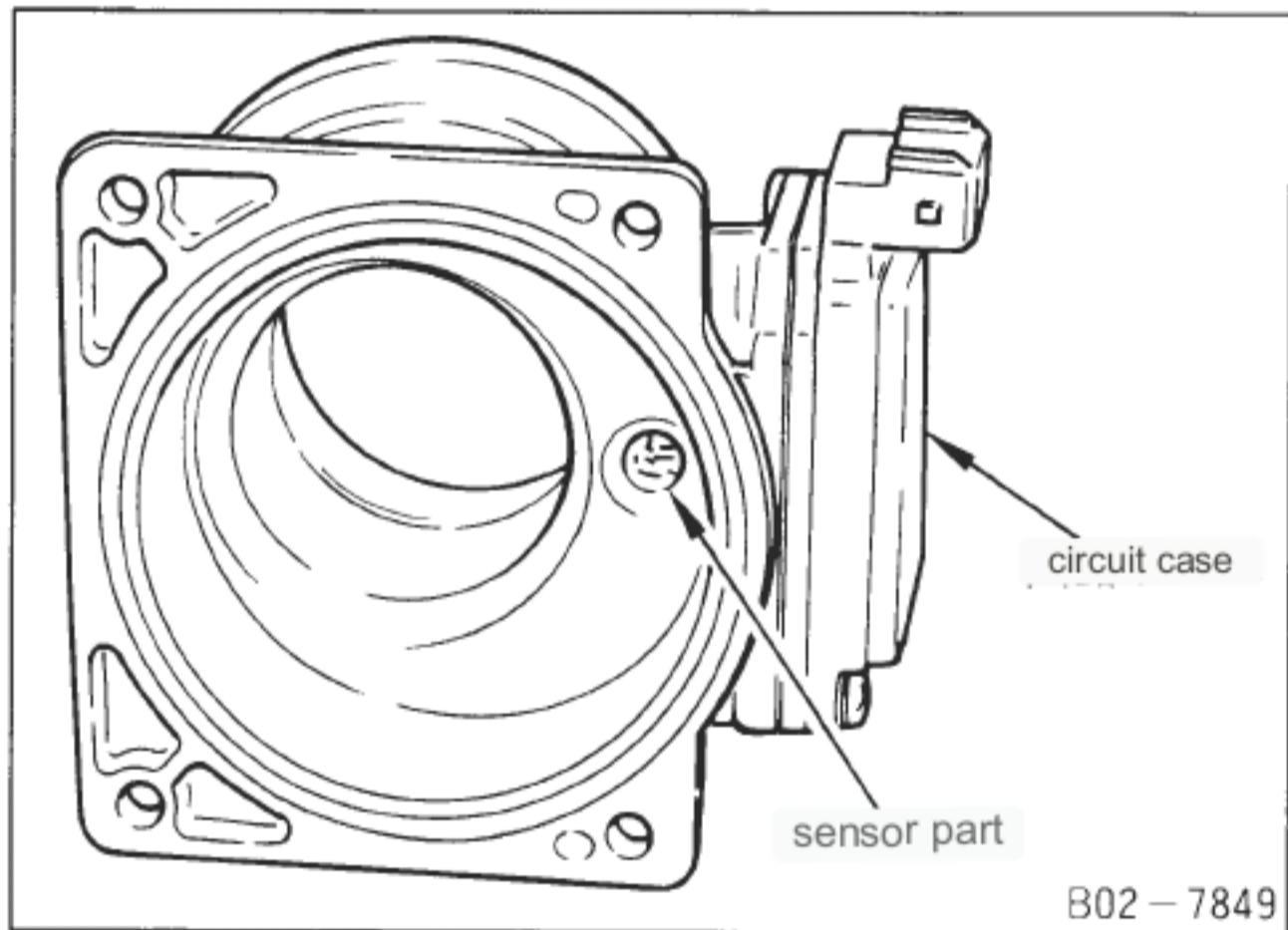
[Point 3] Inspection of the recirculation valve

- Apply negative pressure (-200mmHg±30) with a vacuum handy pump,

There should be continuity when blowing air from the direction of the arrow.

There should be no continuity when no negative pressure is applied.

CAUTION: Do not attempt to disassemble or adjust the recirculation valve.



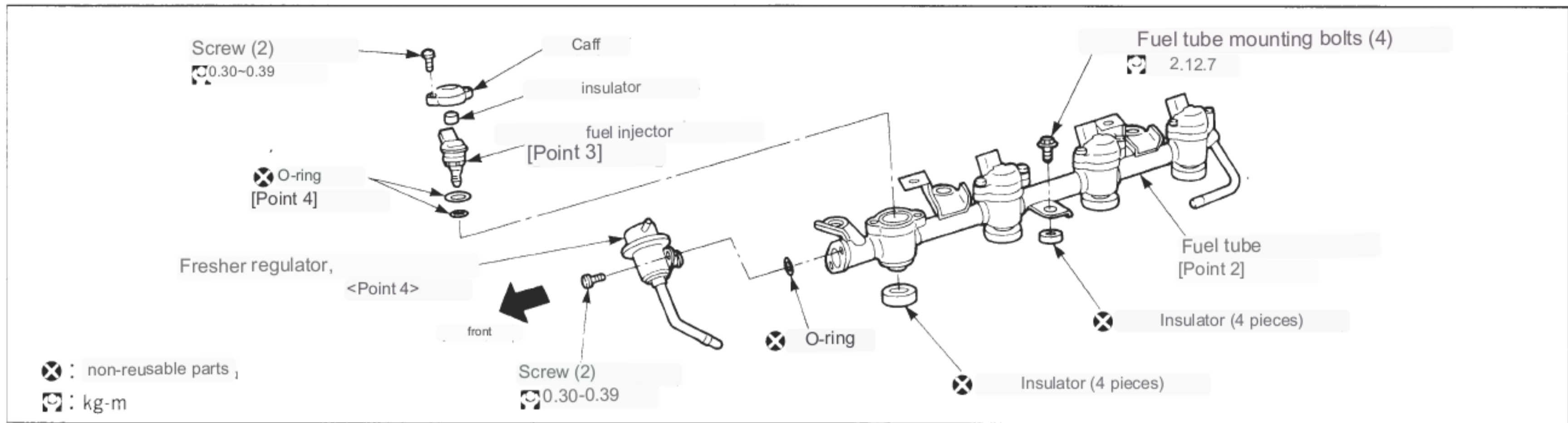
[Point 4] Removing and installing the air flow meter ·

Do not scratch or stain the sensor part of the air flow meter. The circuit case of the air flow meter is not detachable, so the air flow

When replacing the meter, do it with ASSY.

9-3 Fuel injector/pressure regulator

(1) Elimination 着



付 Removal of fuel pressure [Point 1]

with fuel injector wiring connector

disconnected fuel feed, return hose

◆ Removal of fuel pressure ◆

When idling, make "start".
Press to stop fuel pump
Crank
the engine 2-3
times after stalling.

Start

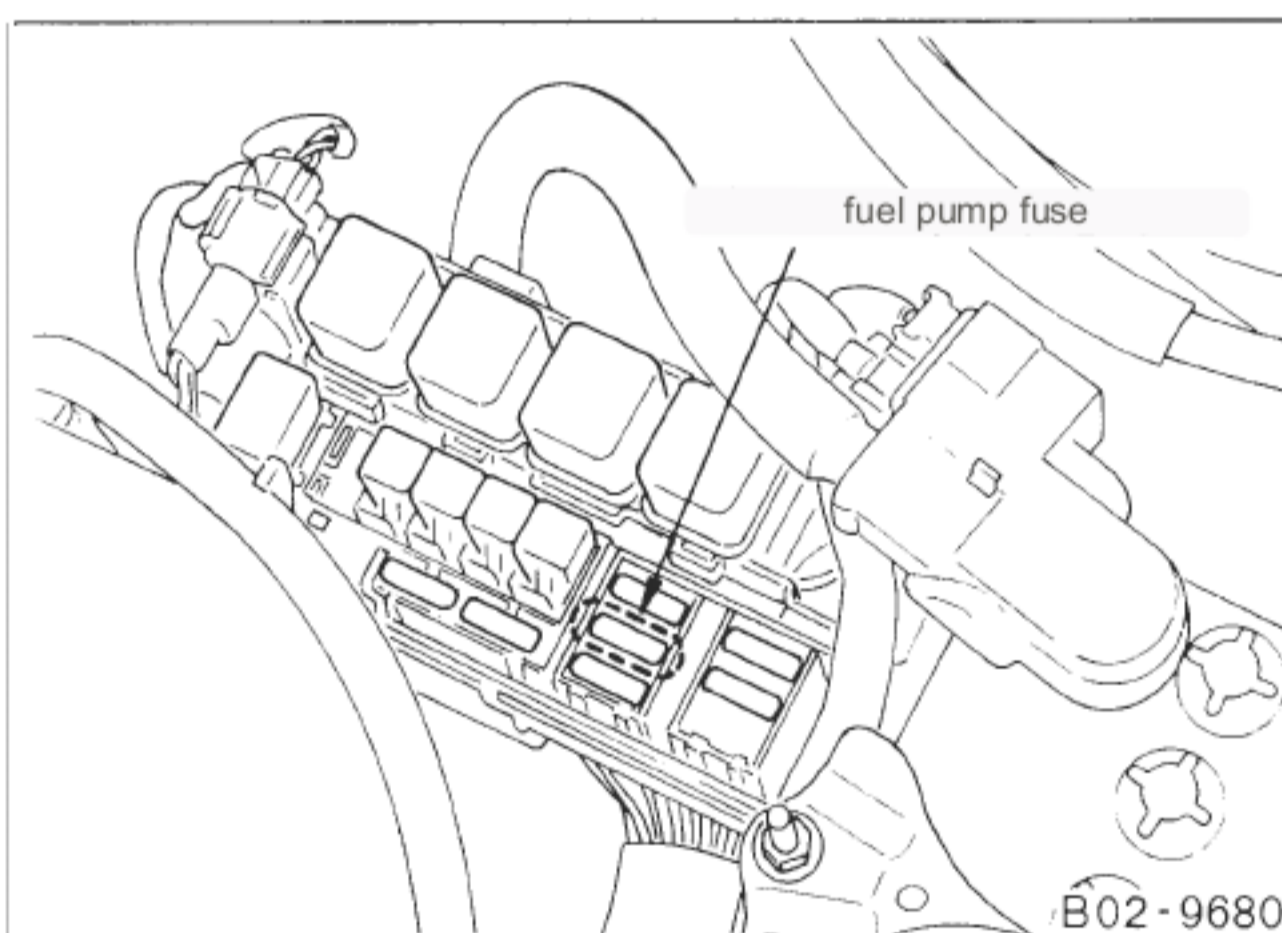
B09-0140

[Point 1] Removal of fuel pressure



- rev the engine.
- Select "Release Fuel Pressure" in "Work Support".

Touch the start button to remove the fuel pressure.

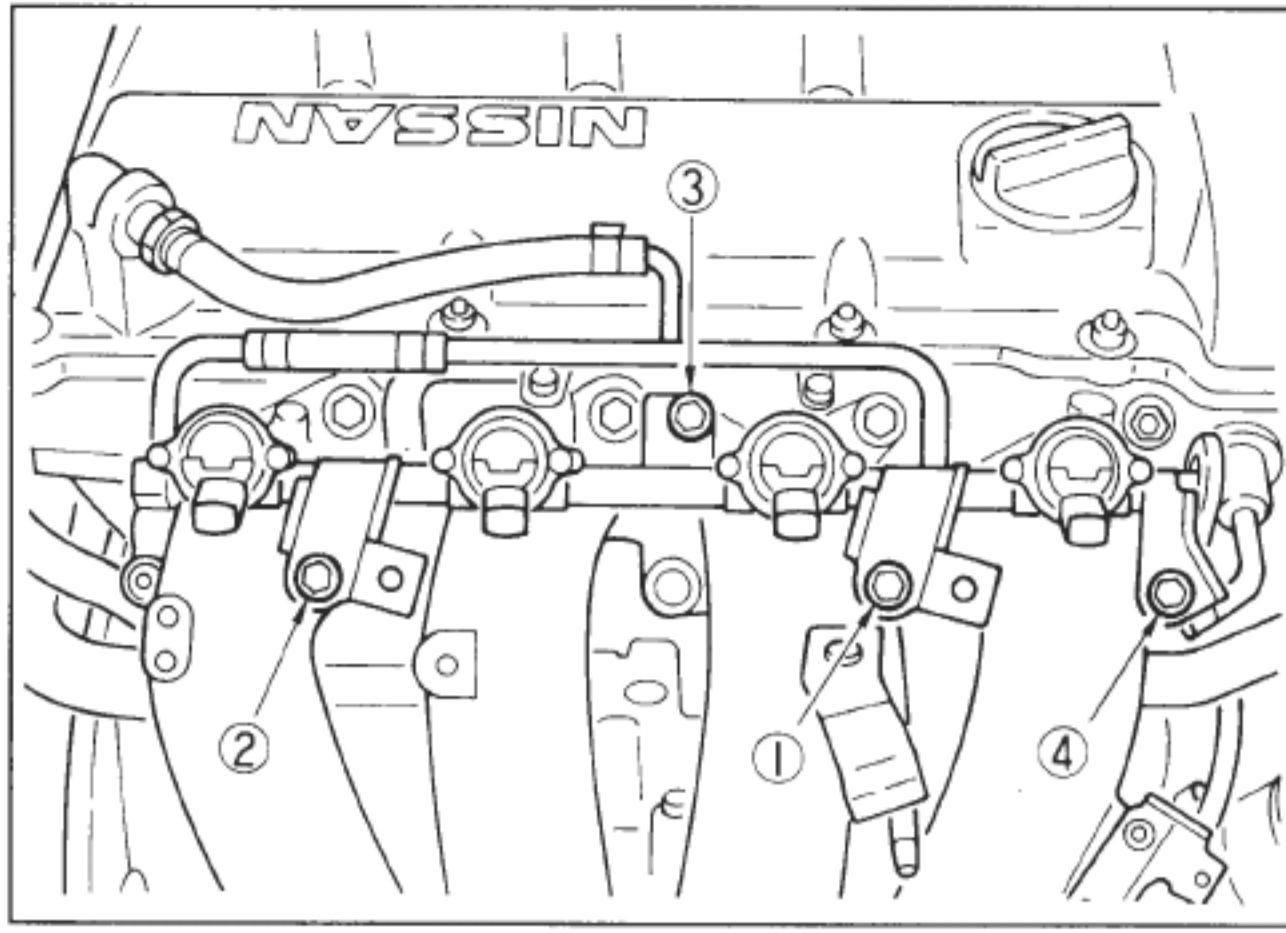


- After starting the engine, remove the fuel pump fuse. After the engine stalls, crank the engine 2-3 times to consume the fuel in the pipes.

- In the case of a car with poor starting, remove the pump fuse and crank 3 to 4 times.

King and consumes the fuel in the pipe.

Note: It is recommended to connect the booster cable to a normal car because the battery is easily discharged.

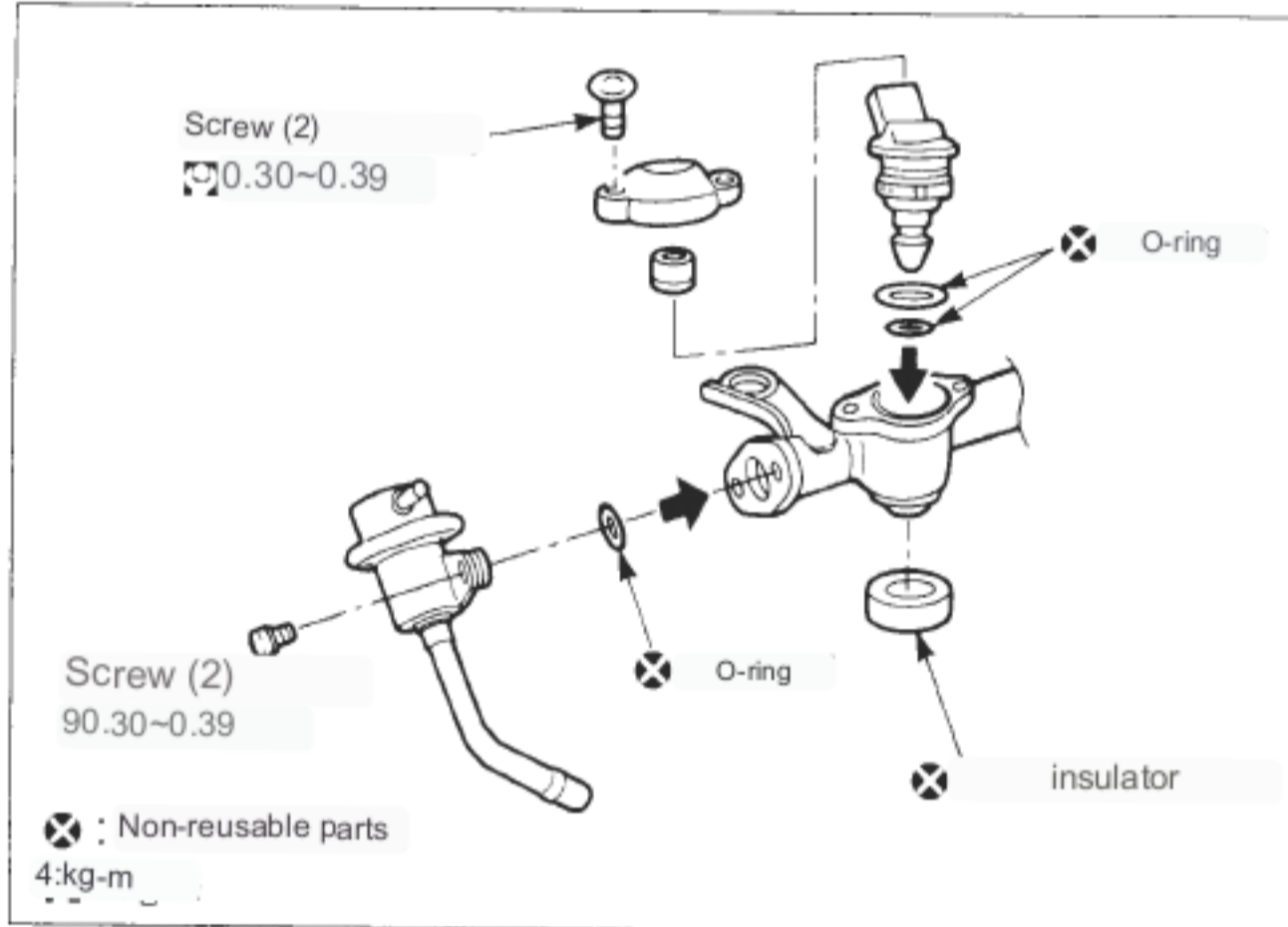


[Point 2] Remove and install the fuel tube

Installation is done in two steps in the order shown in the left figure.

	Fuel tube tightening torque (kg-m)
First time	0.95 1.1
Second time	2.1 2.7

- Remove in the order of ④ and ①.
- When removing and installing the fuel tube, do not hit the fuel tube with a tool or drop it.
- When inserting the fuel hose into the fuel tube, apply silicon oil (NUC Silicon L45) etc. and insert it straight in the axial direction.
enter.



[Point 3] Fuel injector, pressure regulator

remove and install

- When removing the fuel injector, from the intake manifold and push the tip of the injector. Pull out by holding the injector head (connector, etc.)
Never.

When handling the fuel injector, do not hit it with a tool or drop it.

I will not let you. Also, no external force is applied to the flow control rod. • Fuel injectors and pressure regulators

inserting into the fuel tube, apply silicon oil (NUC silicon L45) etc. to the O-ring and insert it straight into the shaft (fuel

Injector: 40kg or less, pressure regulator: 20kg

force below) to insert.

- The O-ring contact part should not be damaged or damaged by dust. • Be sure to replace O-rings and insulators with new ones. • Evenly tighten the two fuel injector cap mounting screws and pressure regulator cap mounting screws two or three times.

[Point 4] O-ring (fuel injector pressure regulator)

Precautions for handling

- Do not reuse O-rings.
- Do not use engine oil (10W-30, etc.) or silicon oil on the O-ring.

Do not wipe or immerse with solvent, etc.

- Keep the O-ring, fuel injector, and fuel tube free of dust, lint, and other foreign matter.

Avoid using worn O-rings.

- When installing the O-ring, be careful not to damage it with a tool or a worker's fingernail.

Be careful not to twist and stretch as you work. Do not insert it into the fuel tube immediately, especially if it is stretched and installed.

- When inserting the fuel injector, pressure and regulator into the fuel tube, do not eccentrically or rotate them.

and.

- Do not store in ozone, high temperature or direct sunlight.

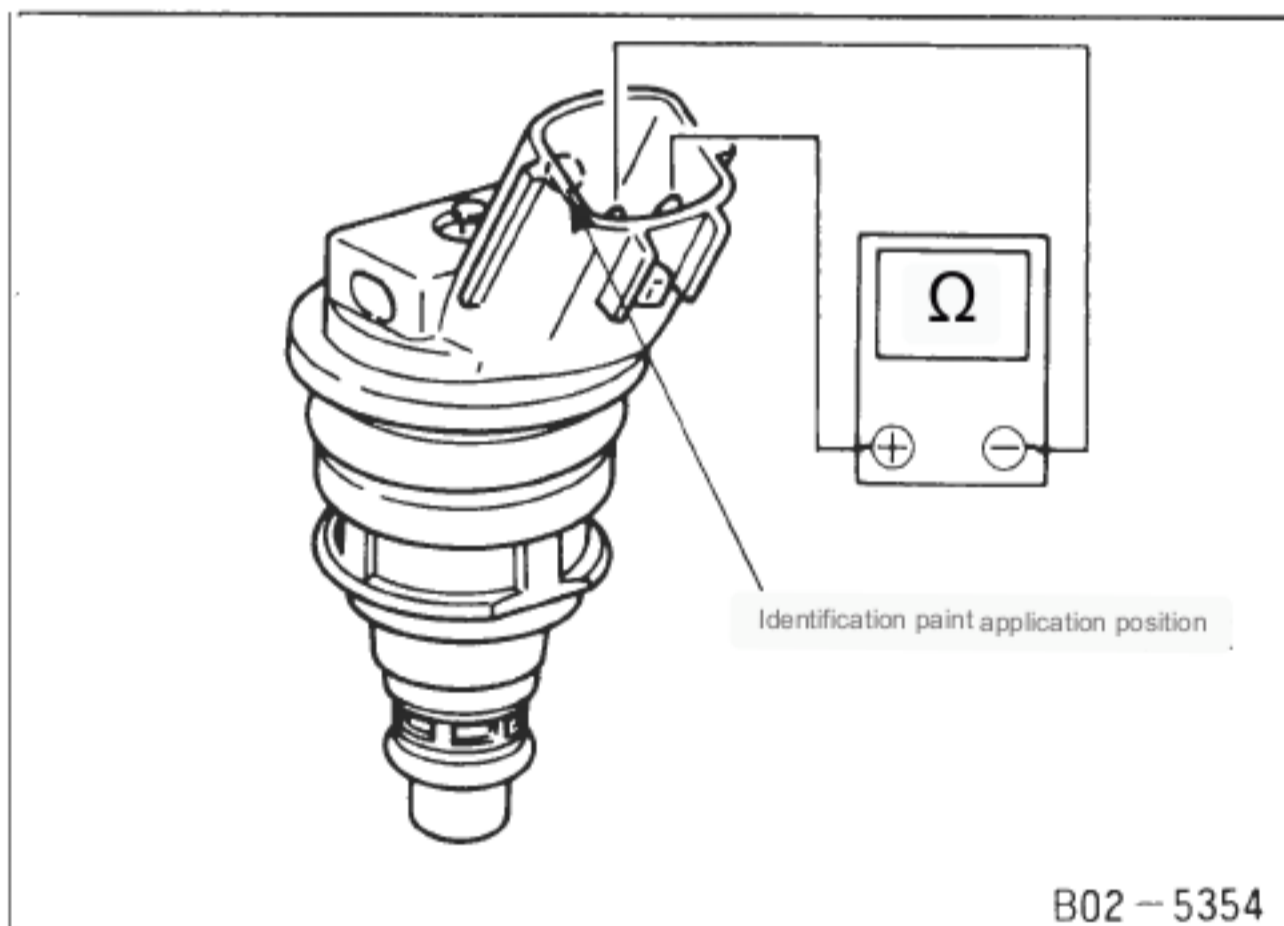
Avoid.

[Point 5] Fuel injector inspection

- Check the resistance of the injector.

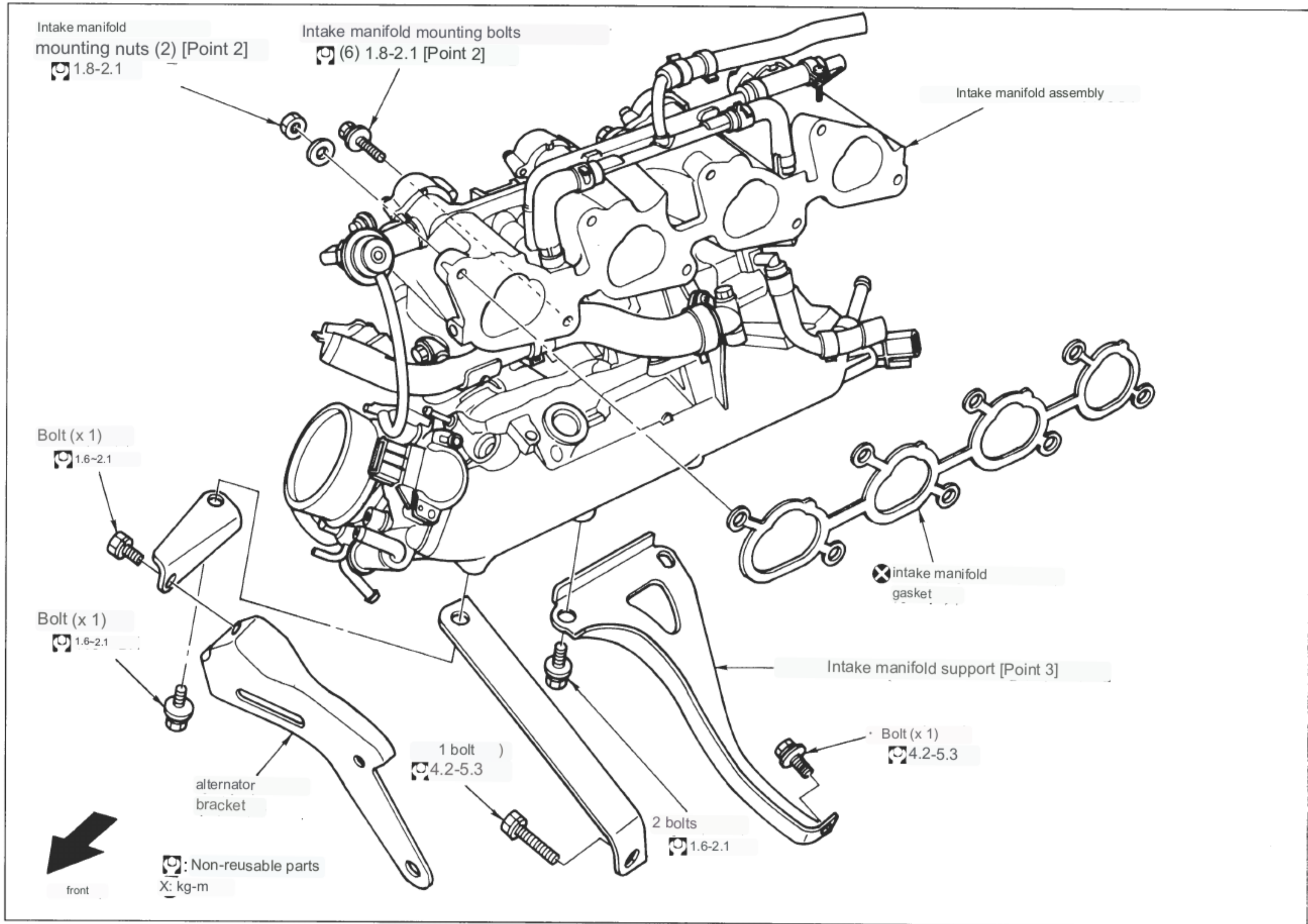
Resistance value (Ω)	about 10)
: 1 nectar color	紫
identification paint	yellow
	green

Note: Replace with the same identification paint for discharge volume control.

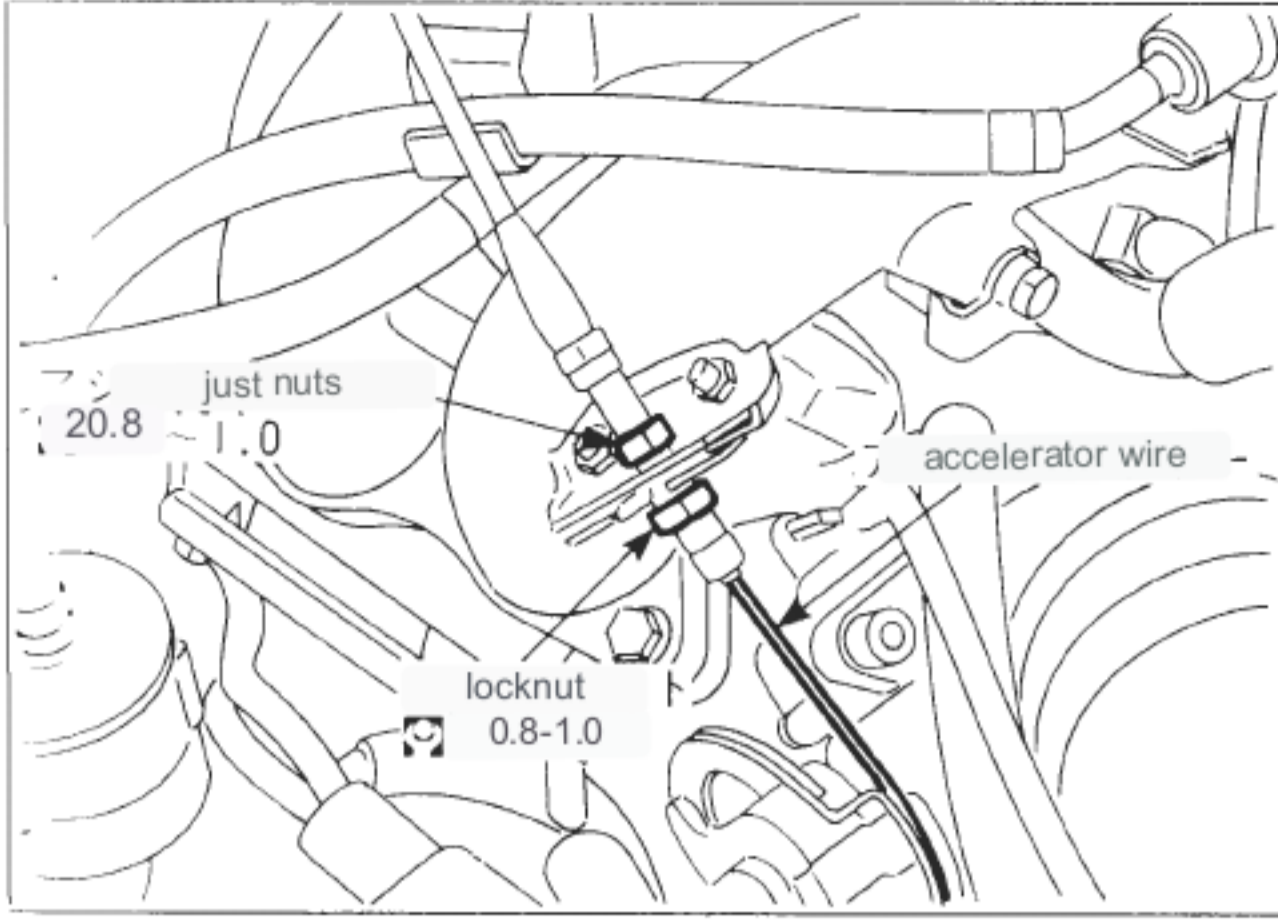


9-4 Intake manifold/collector/throttle chamber

(1) Detachment



- ⓧ Removal of fuel pressure (Refer to the section on removal and installation of fuel injectors)
- ⓧ Fuel injector wiring connector
- ⓧ Accel wire [Point 1] With main harness wiring clamp
- ⓧ Blow-by hose (between rocker covers)
- ⓧ Attached IAA unit wiring connector
- ⓧ With hose between intake manifold and brake booster Fuel feed, return hose
- (Attached) Vacuum hose
- (Attached) Hose between throttle chamber and
- (Attached) Hose between canister and collector
- ⓧ collector Knock sensor sub-harness



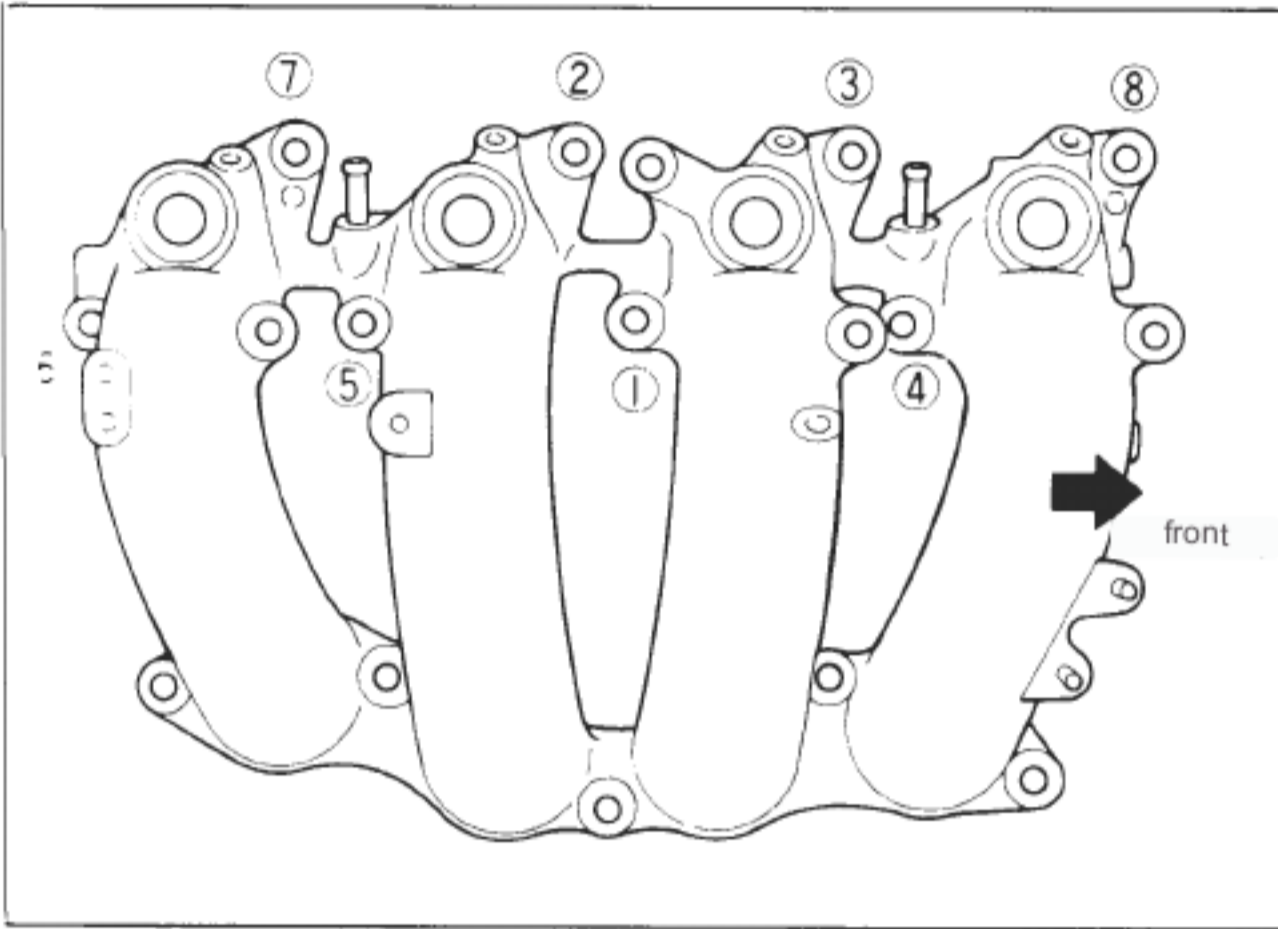
[Point 1] Accelerator wire

Adjustment of accelerator wire

- When the accelerator wire is sufficiently slack, adjust the nut.

pull the outer case toward the accelerator pedal, turn the adjusting nut back 1.5 to 2.0 turns from the position where the throttle drum starts to move (the play is 0 at this time), and tighten it with the lock nut.

Lock nut tightening torque	(kg-m)	0.8 1.0
----------------------------	--------	---------

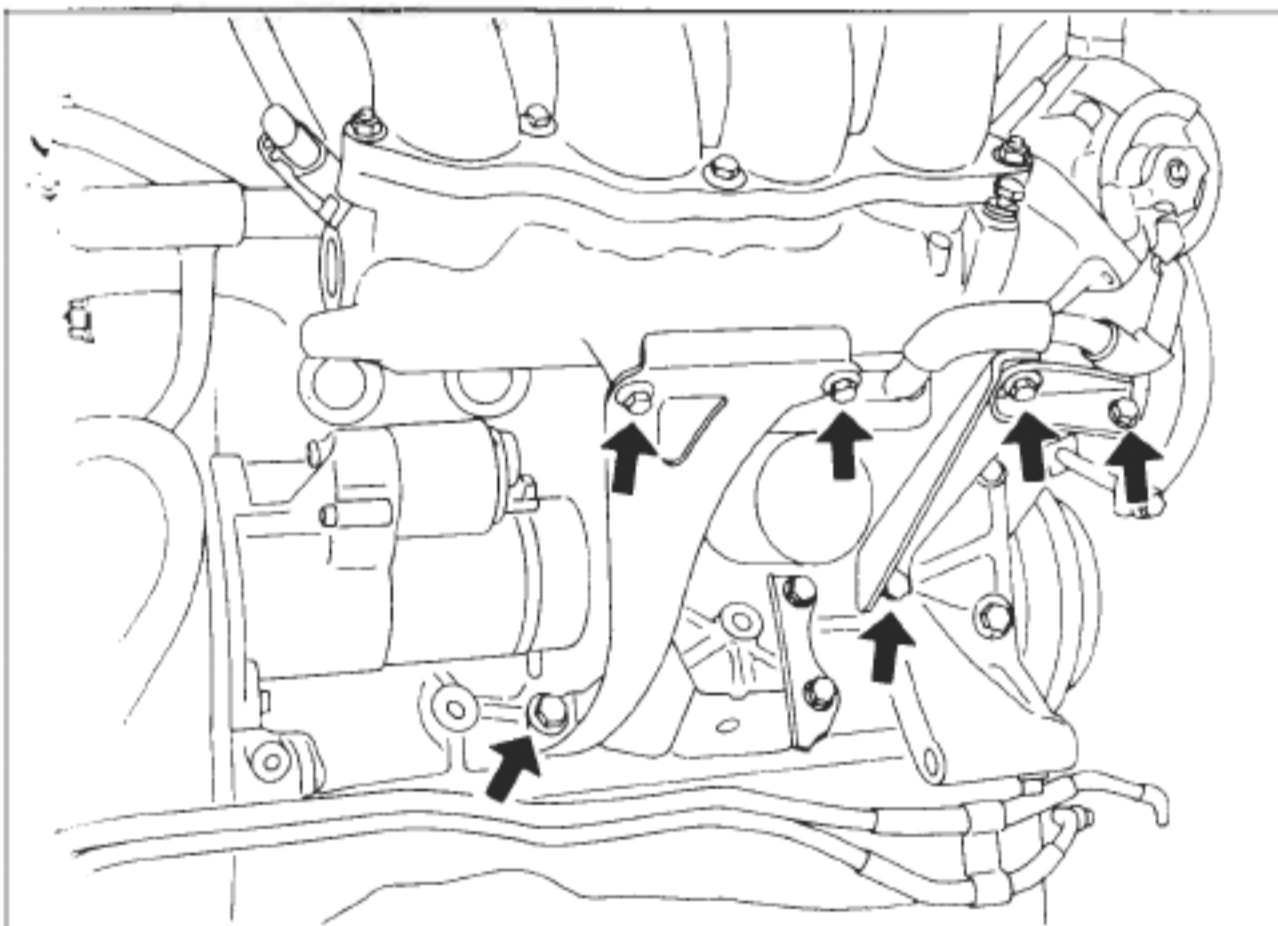


[Point 2] Remove and install intake manifold

- Install in the order of the numbers in the figure on the left.
- Remove in the reverse order.

Intake manifold tightening torque	(kg-m)	1.8 2.1
-----------------------------------	--------	---------

- After tightening all bolts, check again with the specified torque. Note: Remove the intake manifold after separating it from the collector.



[Point 3] Remove and install intake manifold support

removal

- Remove each mounting bolt of the intake manifold support shown on the left.

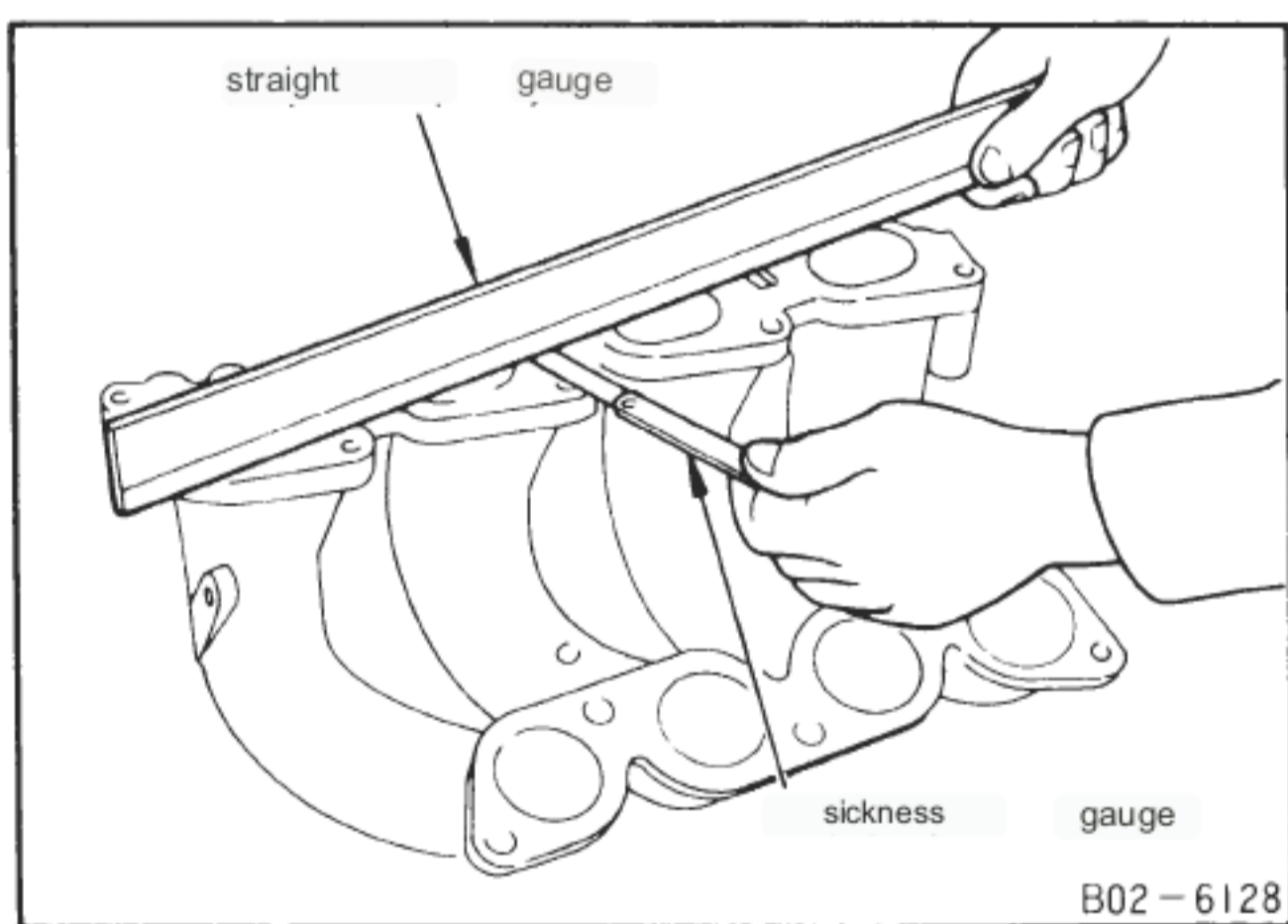
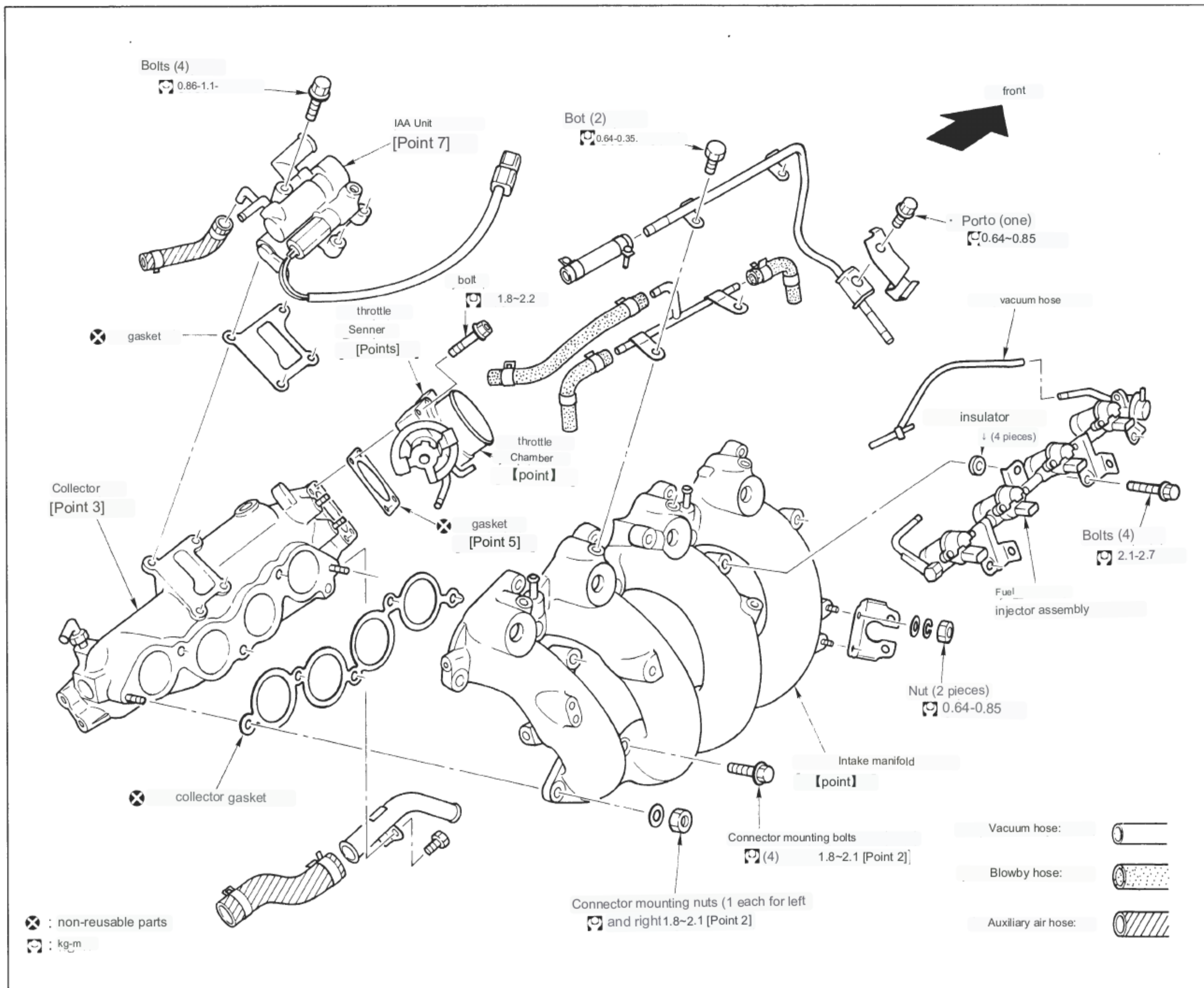
attachment

- After installing the intake manifold, tighten the support mounting bolts to the specified torque.

tighten with a

(2) Disassembly

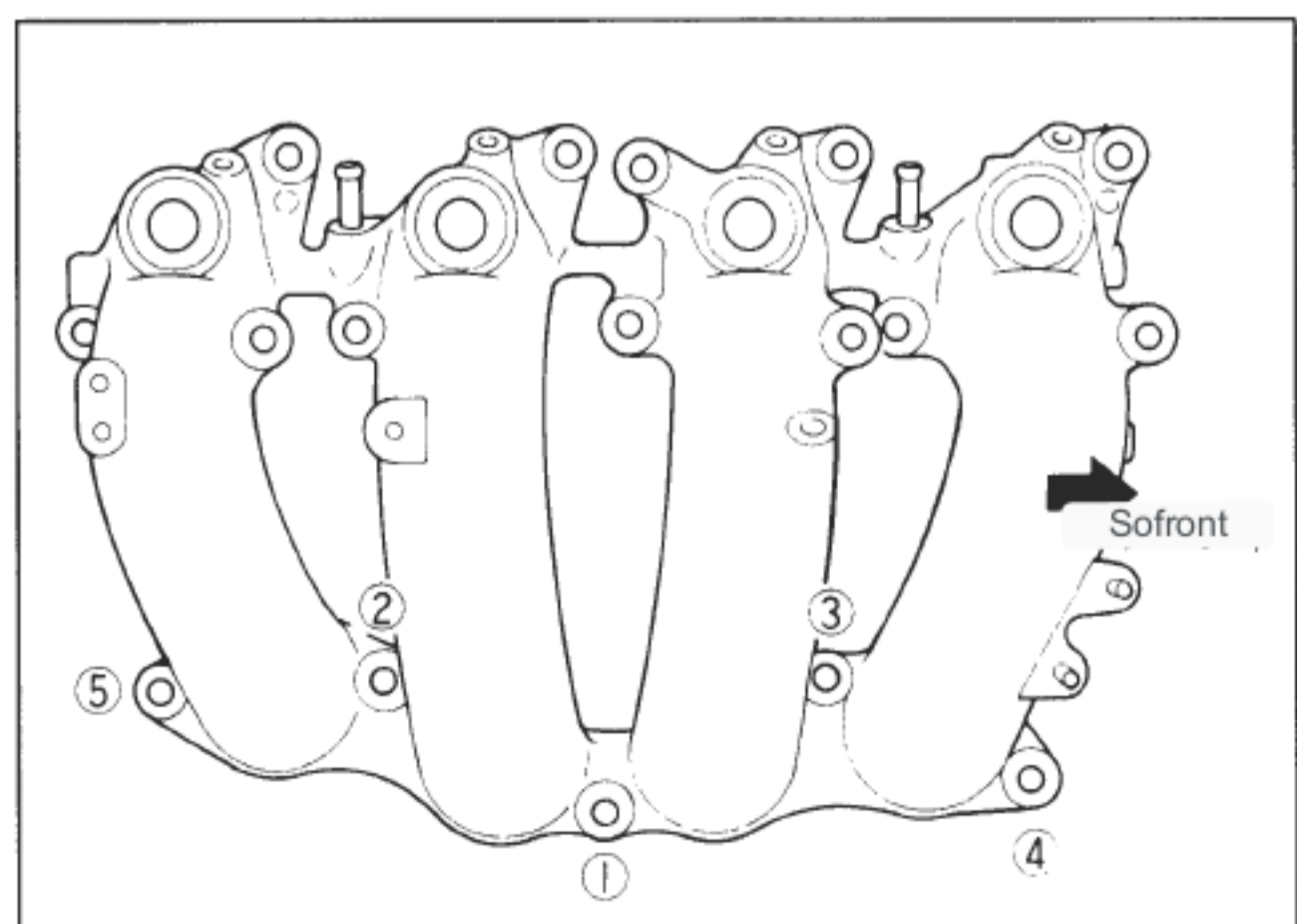
解



[Point 1] Intake manifold inspection

- Distortion of intake manifold and collector mounting surface in four directions (vs. horizontal direction and vertical direction) are measured at several points.

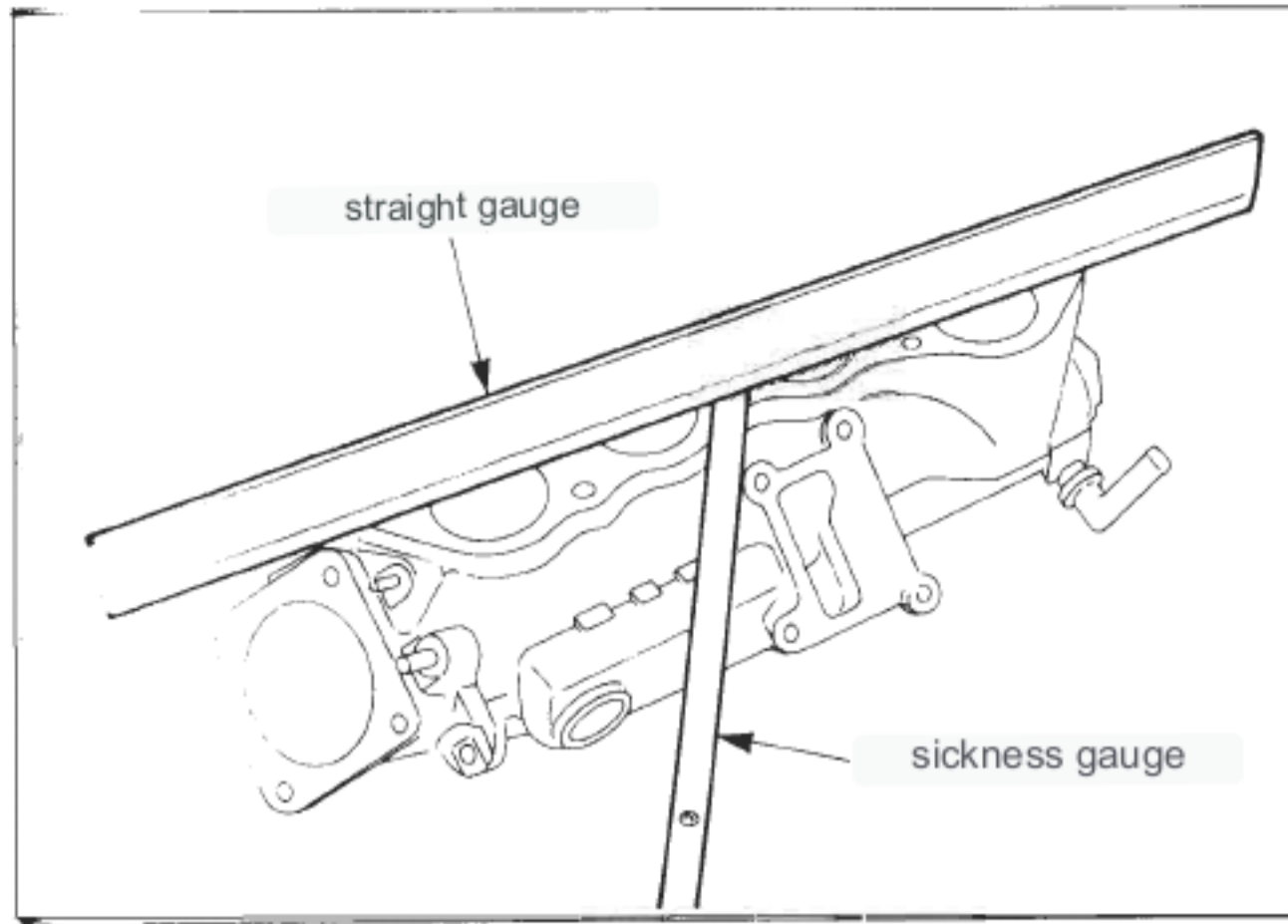
Limit	(mm)	0.1
-------	------	-----



[Point 2] Removing and installing the collector

- Install in the order of the numbers in the figure on the left.
- Remove in the reverse order.

Collector tightening torque	(kg-m)	1.8 2.1
-----------------------------	--------	---------

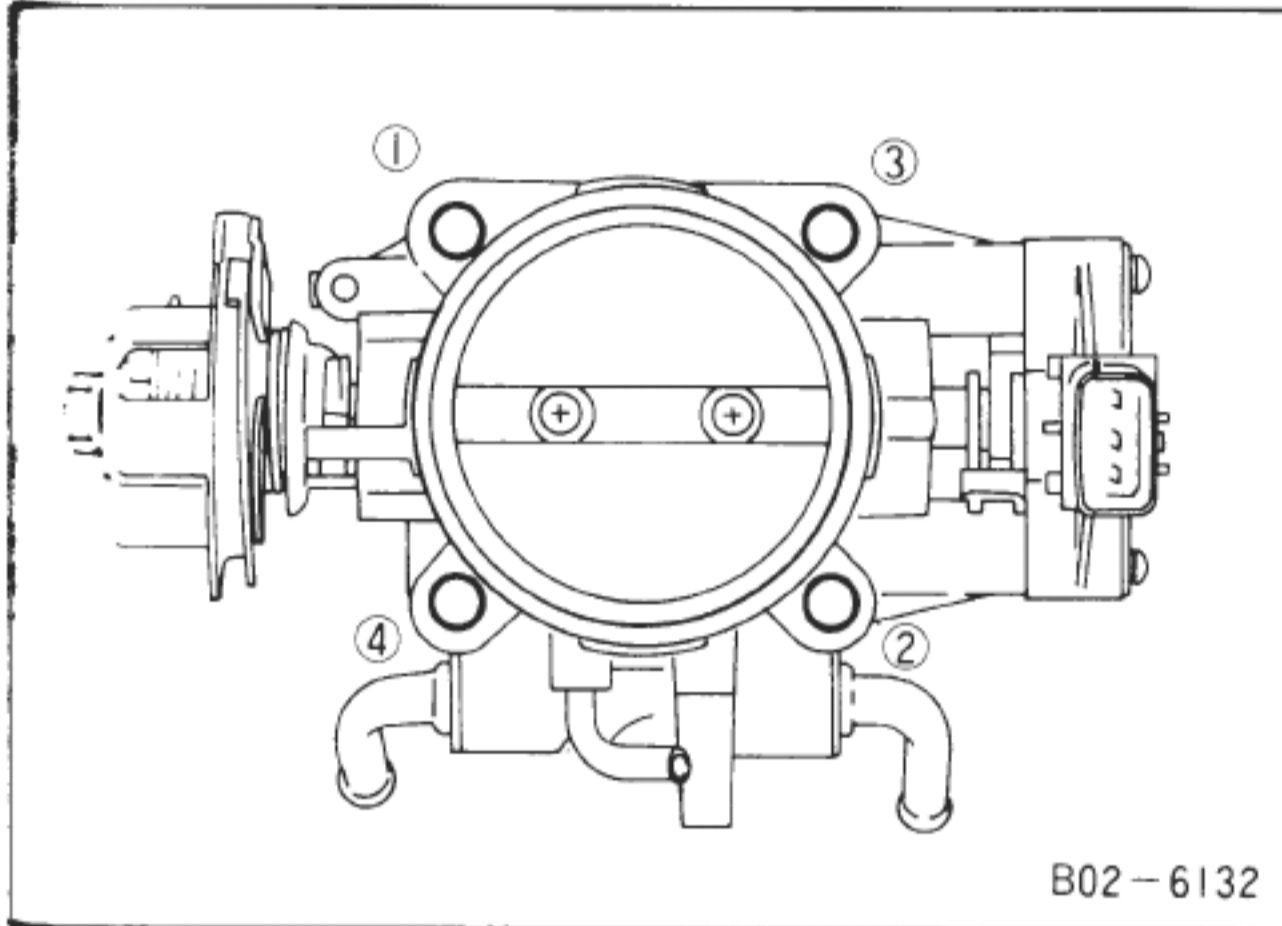


[Point 3] Collector inspection

- Distortion of collector mounting surface in 4 directions (diagonal direction and vertical and horizontal direction)

Measure several points at a time.

Limit	(mm)	0.1
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[Point 4] Throttle chamber removal and installation

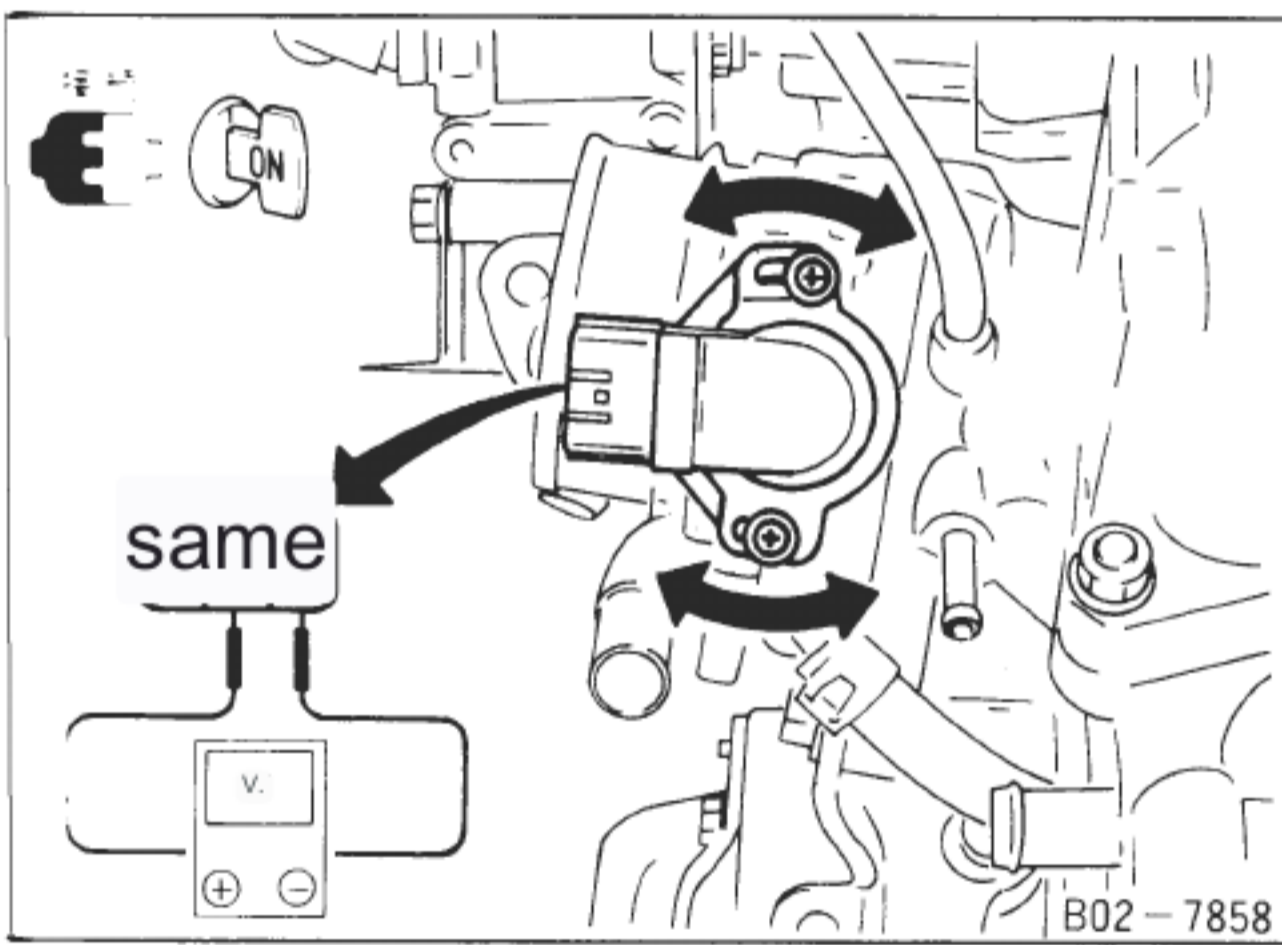
- Installation is done in two steps in the order shown in the figure on the left.

	Throttle chamber tightening torque	(kg-m)
First time	0.9	1.1
Second time	1.8	2.2

- Remove in the reverse order.

[Point 5] Throttle chamber gasket assembly

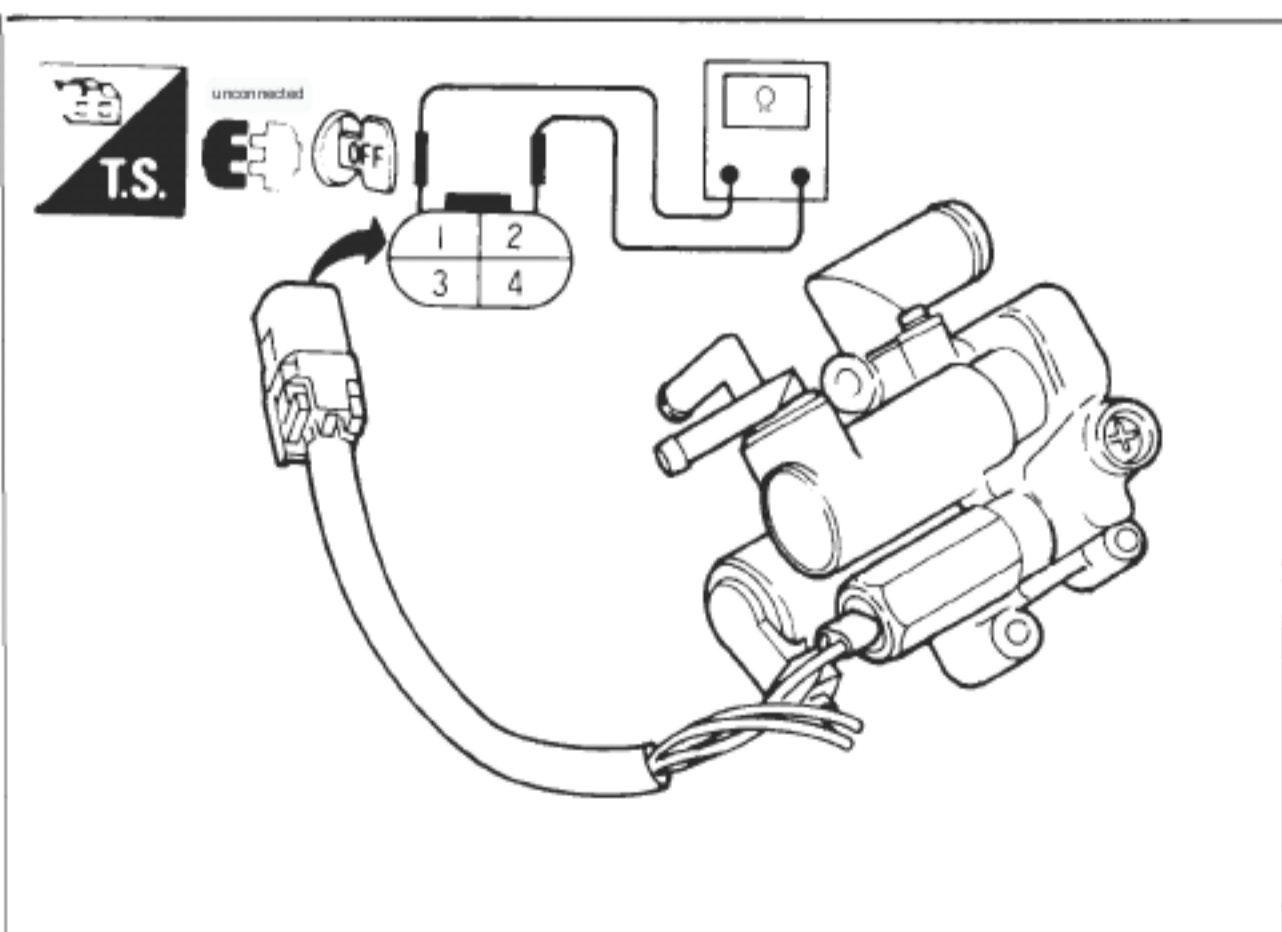
There is no mounting direction for the throttle chamber gasket.



[Point 6] Throttle sensor installation

- Set the key switch to "ON".
- Fix the throttle sensor at the position where the voltage between terminals 1 and 2 becomes the following value when the throttle valve is fully closed (idle state).

Idle output voltage	(V)	0.35	0.65
Throttle sensor tightening torque	(kg-m)	0.15	0.25



[Point 7] Inspection of the IAA unit

- Measure the resistance of the AAC valve, FICD solenoid.

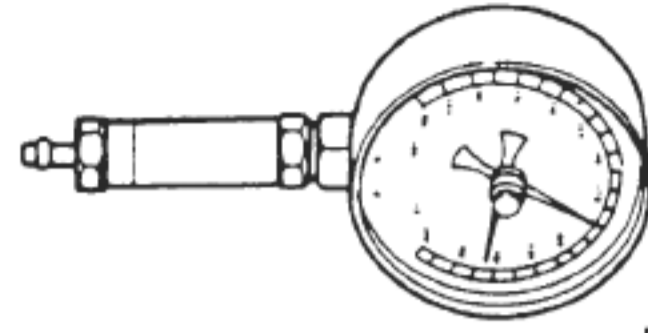
Part	AAC valve	FICD solenoid	
	manufacturer	Tokyo Survey	Atsugi Unisia
Reference value	(Ω) 9.6	22.5	20
measurement terminal	Between terminals ①-②	Between terminals ① and ②	

(20°C)

9-5 Turbocharger assembly

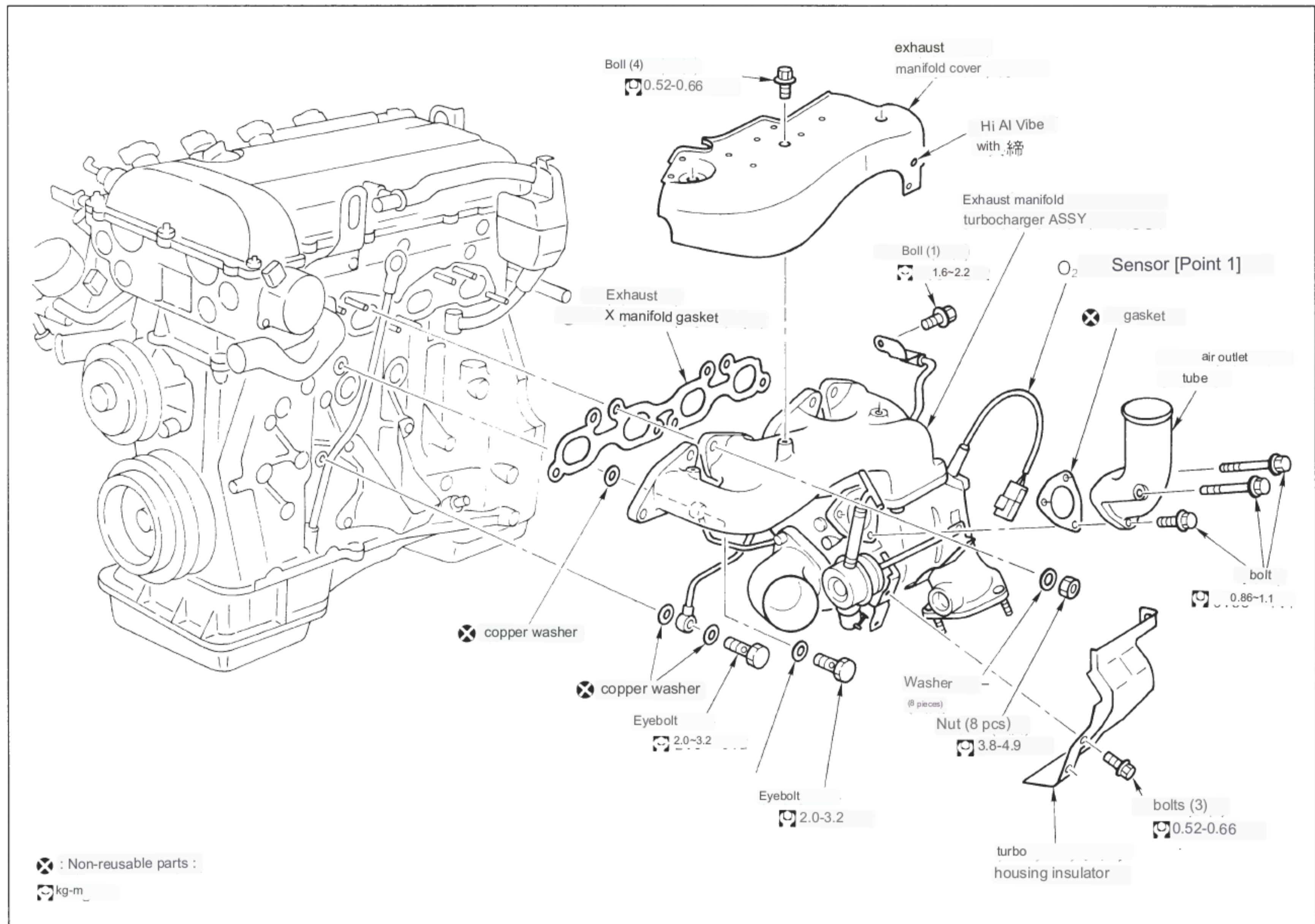
supplies

	name	for way	remarks
器	Compound gauge EG1508 0001	Turbocharger boost pressure for inspection	Existing
	Dial gauge	For inspecting the rotor shaft of a turbocharger	



B02-1948

(1) Elimination



(Attached) Air cleaner

With air duct, air cleaner

With intercooler duct (turbocharger outlet)

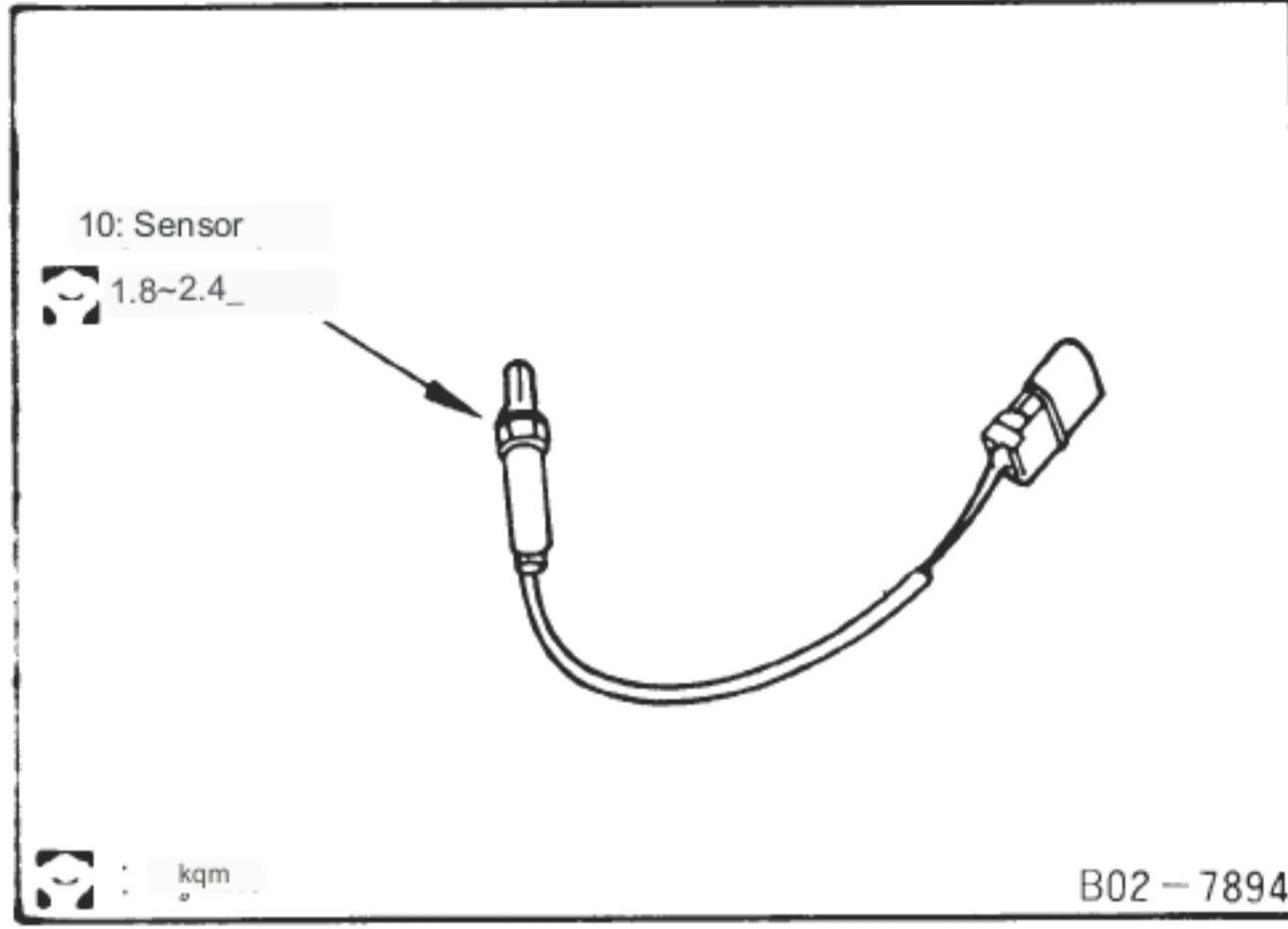
inlet duct with cooling water drain (Turbocharger inlet)

With EAI control valve, bracket, hose, pipe, resonator, blow-by separator

Attached O2 sensor wiring connector [Point 1]

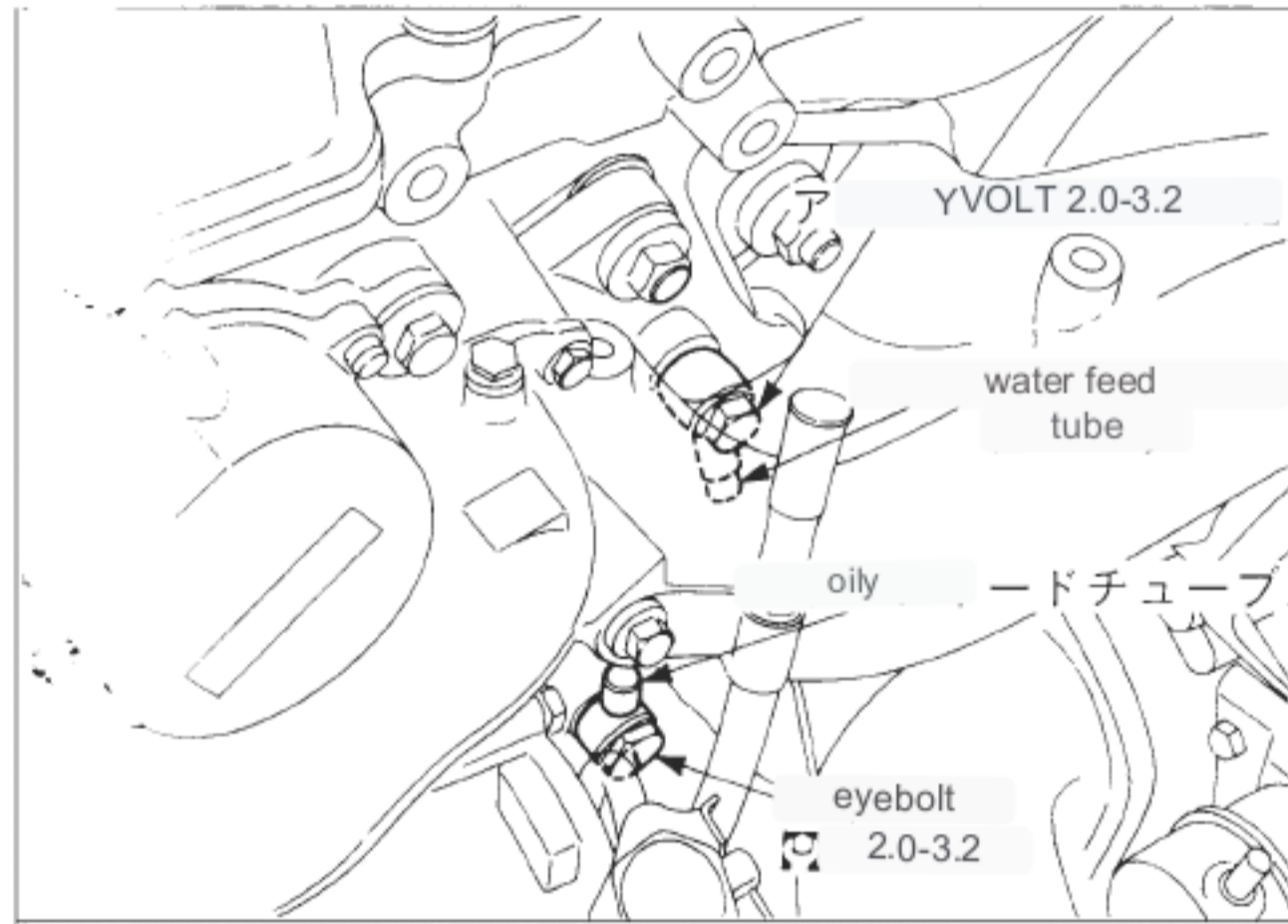
exhaust front tube

turbo cooling water return hose



[Point 1] O2 sensor wiring connector separation

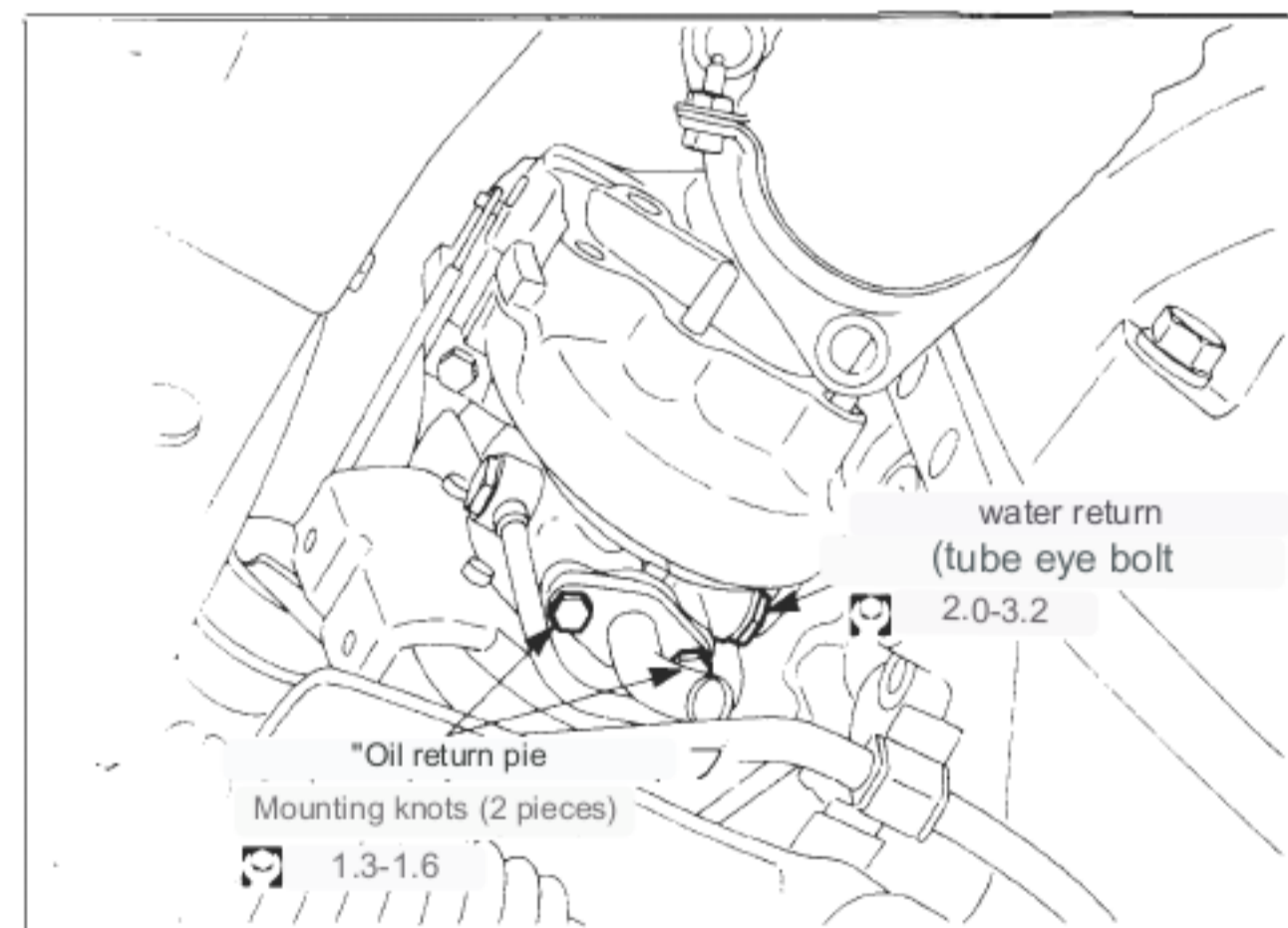
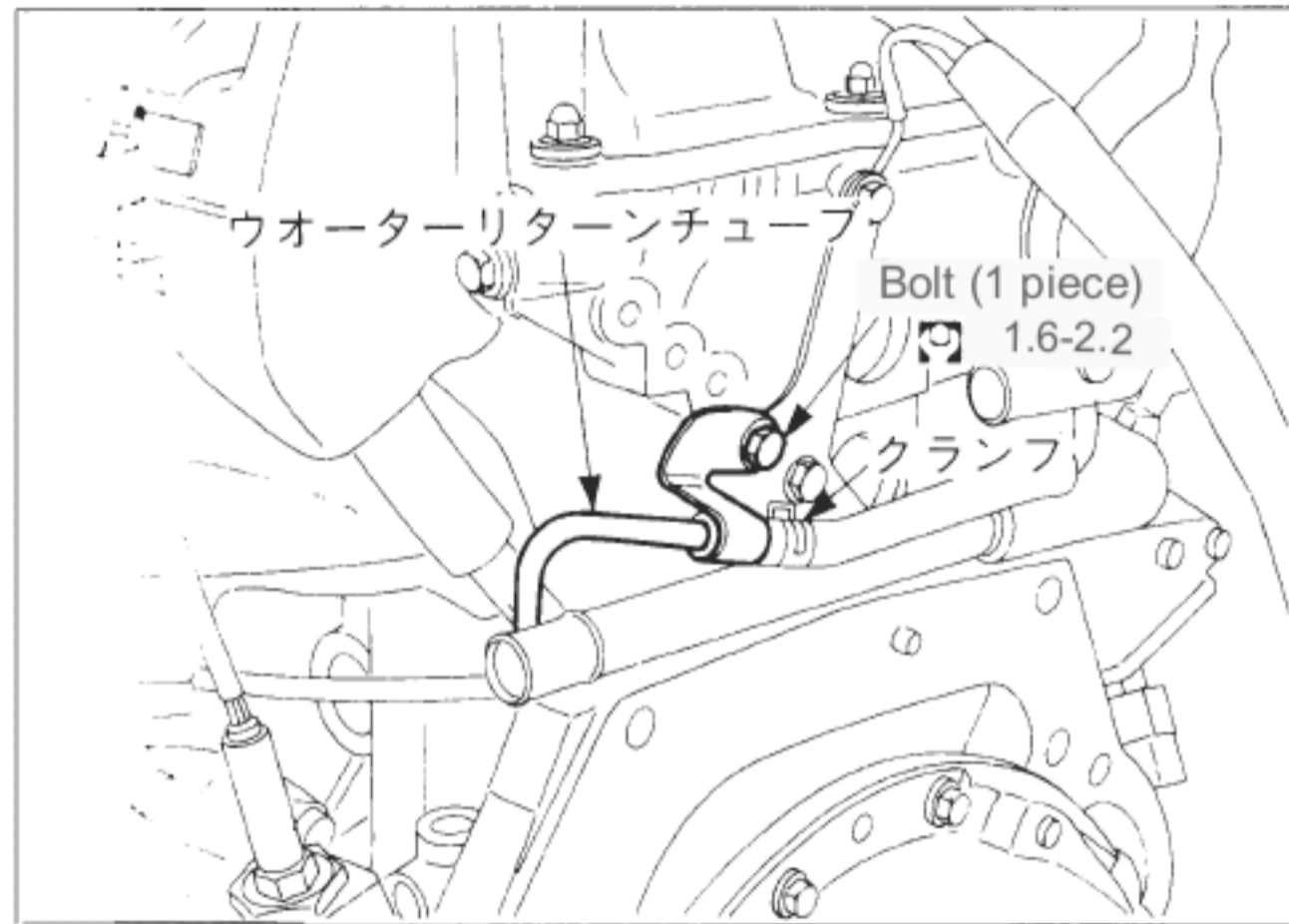
- Disconnect the O2 sensor harness so that excessive force is not applied. · Make sure that the seal rubber inside the connector does not come off when the connector is separated.
- and.
- Do not give a shock to the O2 sensor body.



Turbocharger, exhaust manifold assembly removal procedure

removal

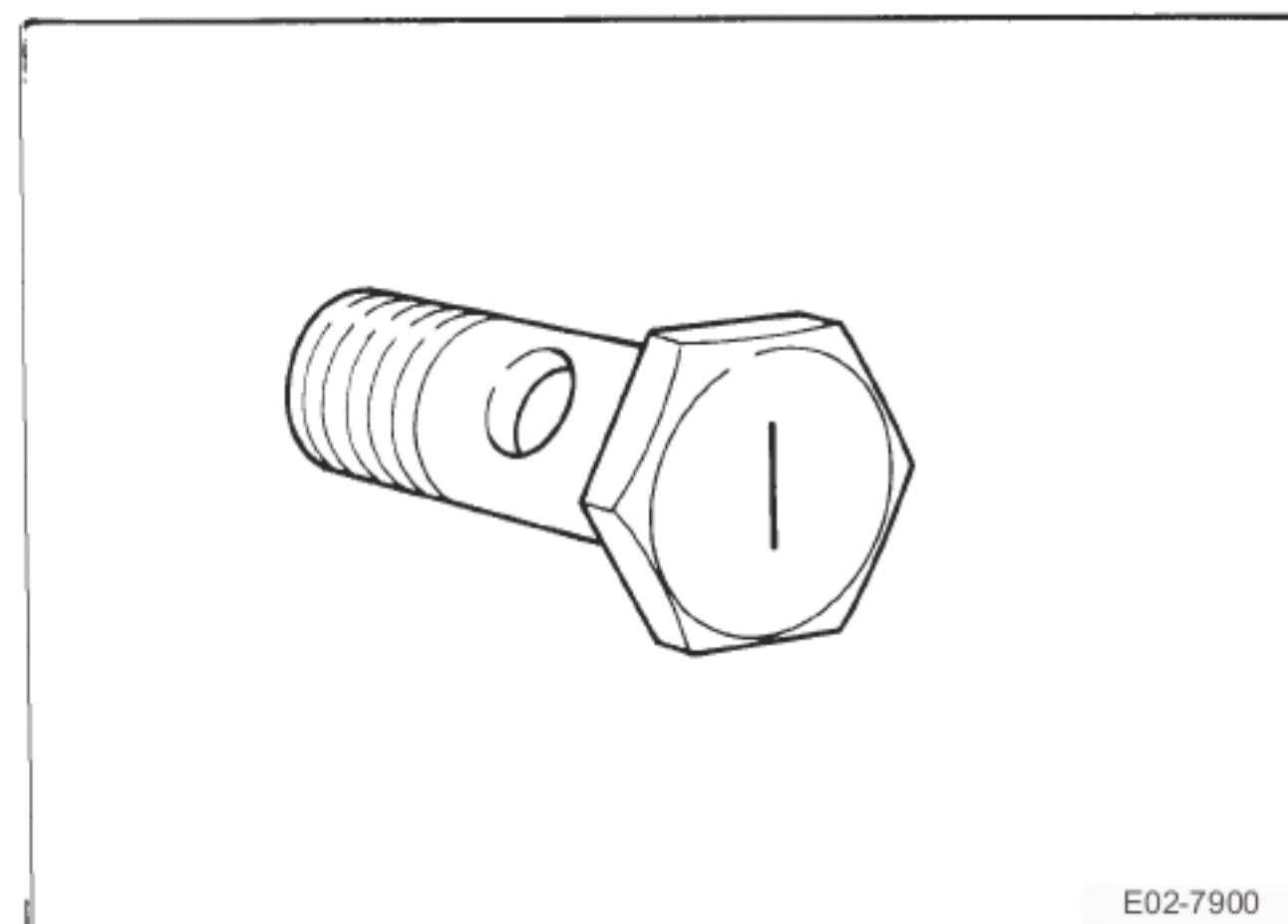
- ① Remove the exhaust manifold cover.
- ② Remove the air inlet tube.
- ③ Eyes of oil feed tube and water feed tube
Remove bolt.
- ④ Remove the heater hose and attach the water return tube bracket.
Remove the tightening bolt (1 piece).
- ⑤ Remove the front tube mounting nuts (x3).
- ⑥ Remove the EAI pipe and remove the turbo housing insulator.
- ⑦ Remove the exhaust outlet.
- ⑧ Remove the mounting nuts (2 pieces) of the oil return pipe.
- ⑨ Remove the exhaust manifold mounting nut.
- ⑩ Temporarily tighten 2 to 3 exhaust manifold mounting nuts, remove the eye bolts of the water return tube while lifting the exhaust manifold, and remove the water return tube.
To separate.



- ① Move the exhaust manifold and turbocharger ASSY upwards.

Take out more.

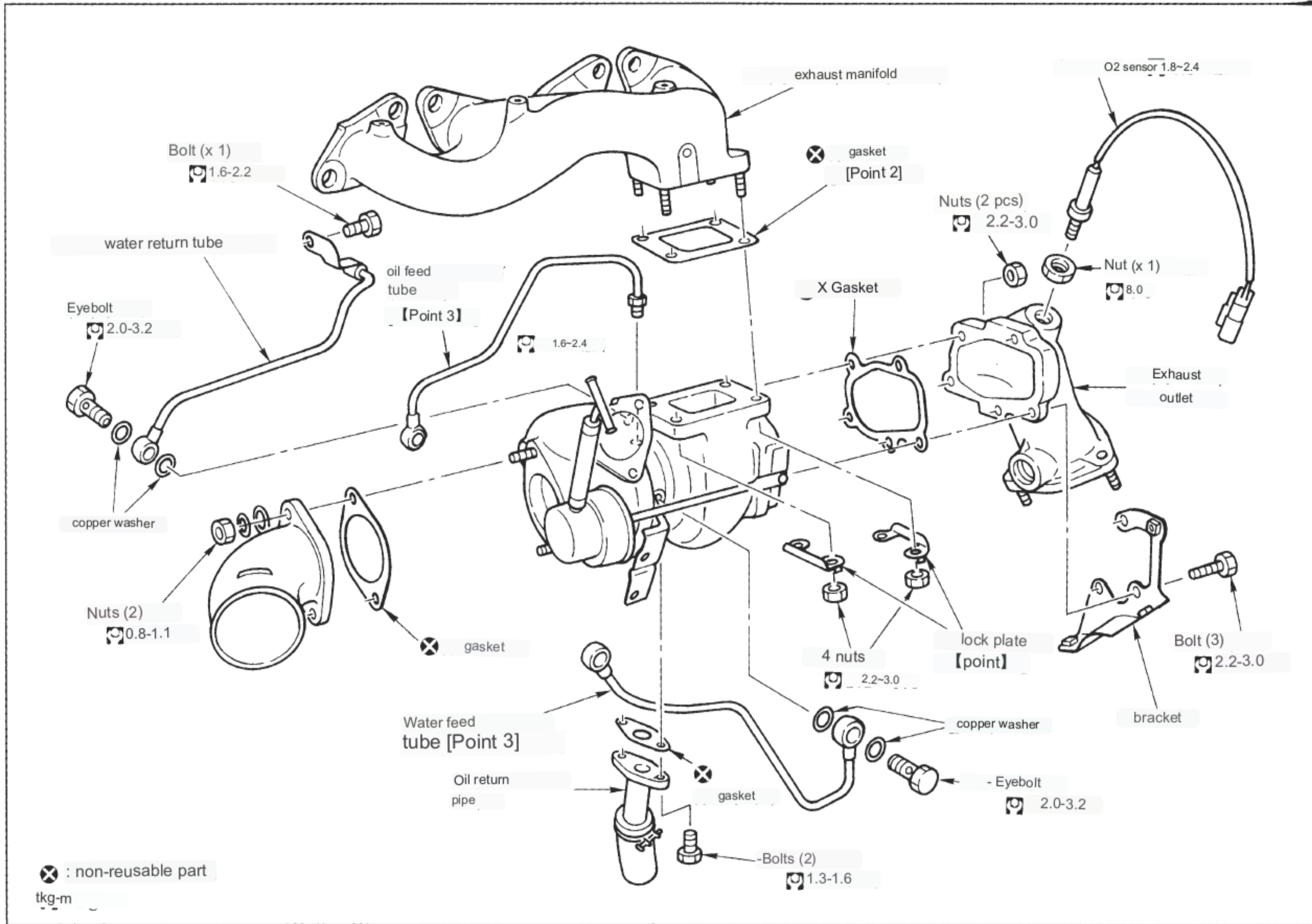
Note: When removing and installing, do not deform the oil tube or water tube.



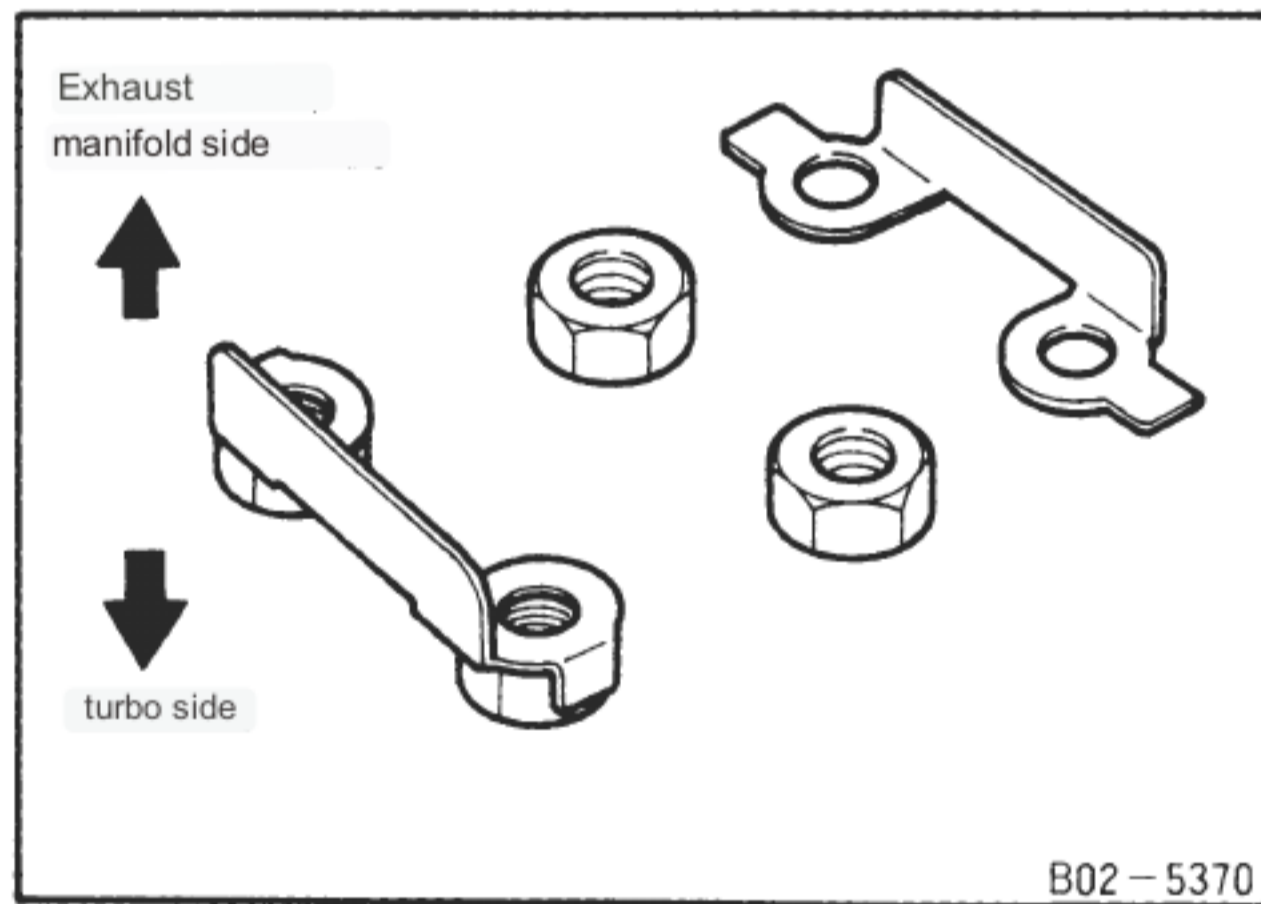
attachment

- Oil feed (cylinder block side) The head stamp of the eyebolt is "I".

(2) Disassembly 解



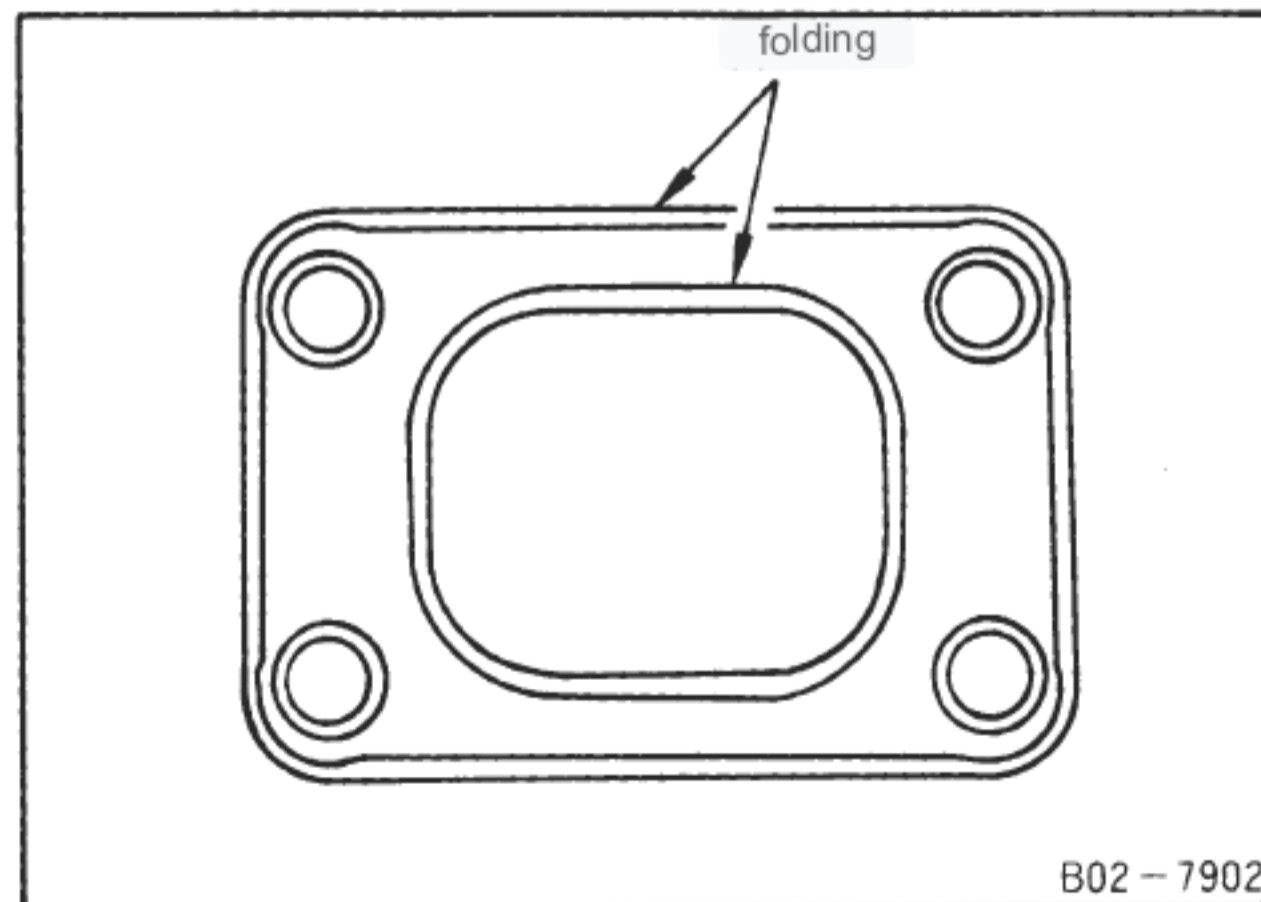
CAUTION: Do not disassemble or adjust the turbocharger body.



[Point 1] Removing and installing the lock plate

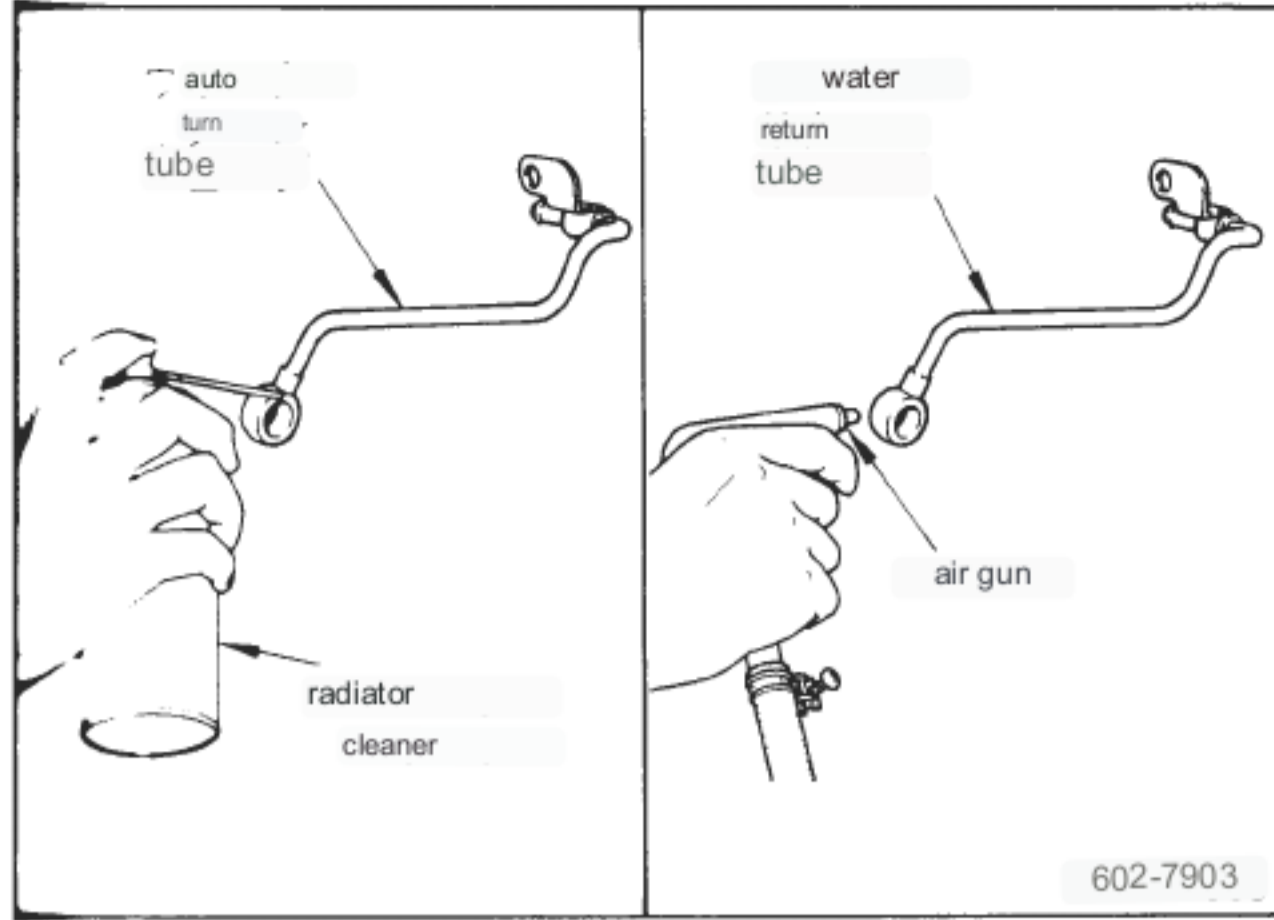
- Unfold the bent part with a screwdriver or the like before removing.
- After tightening the turbocharger mounting nut to the specified torque, fold the lock plate securely to match the shape of the nut head.

Turbocharger mounting nut tightening torque (kg-m)	2.2 3.0
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[Point 2] Gasket installation

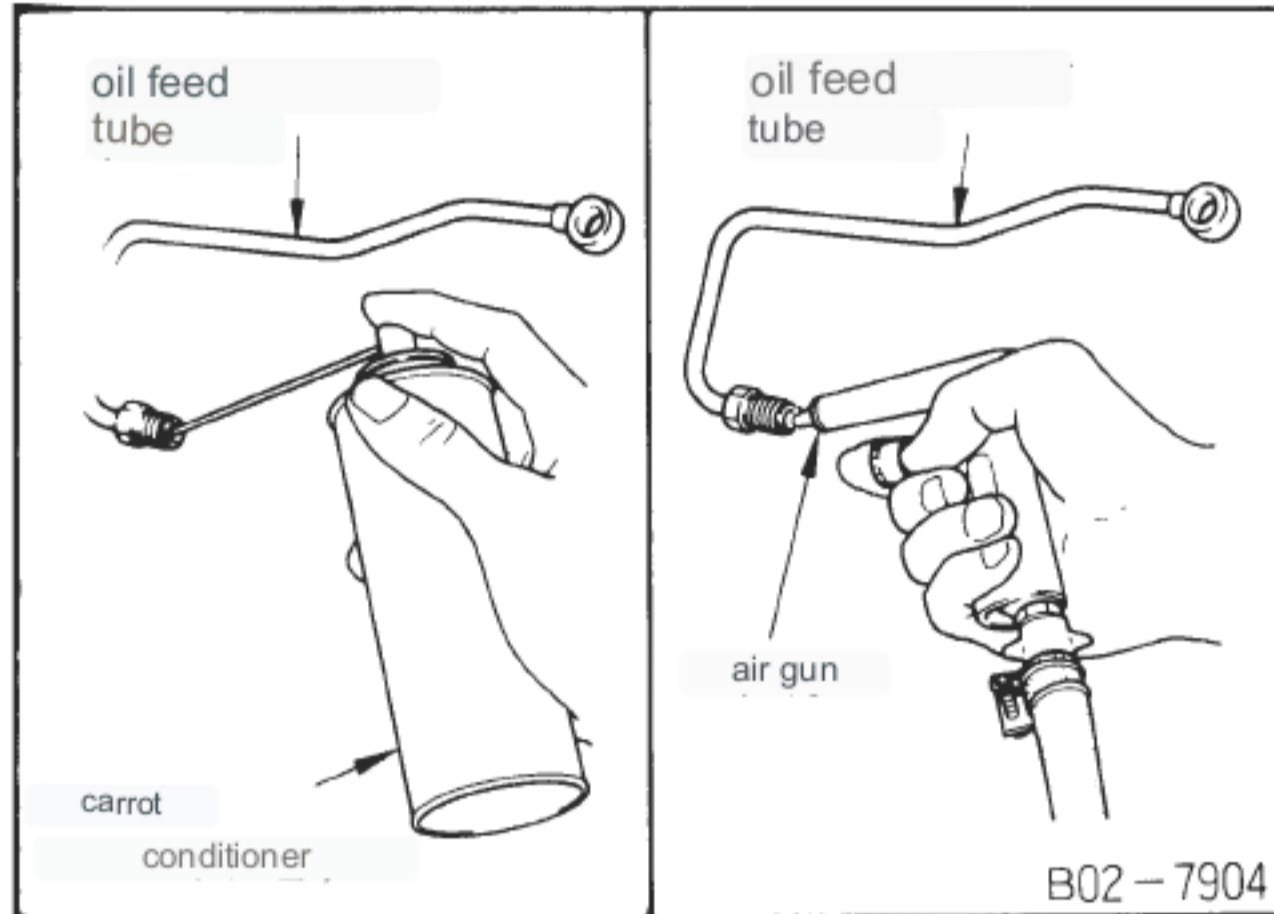
- Install with the folded side facing the turbocharger.
- Replace with a new product instead of reusing.



[Point 3] Cleaning and inspection

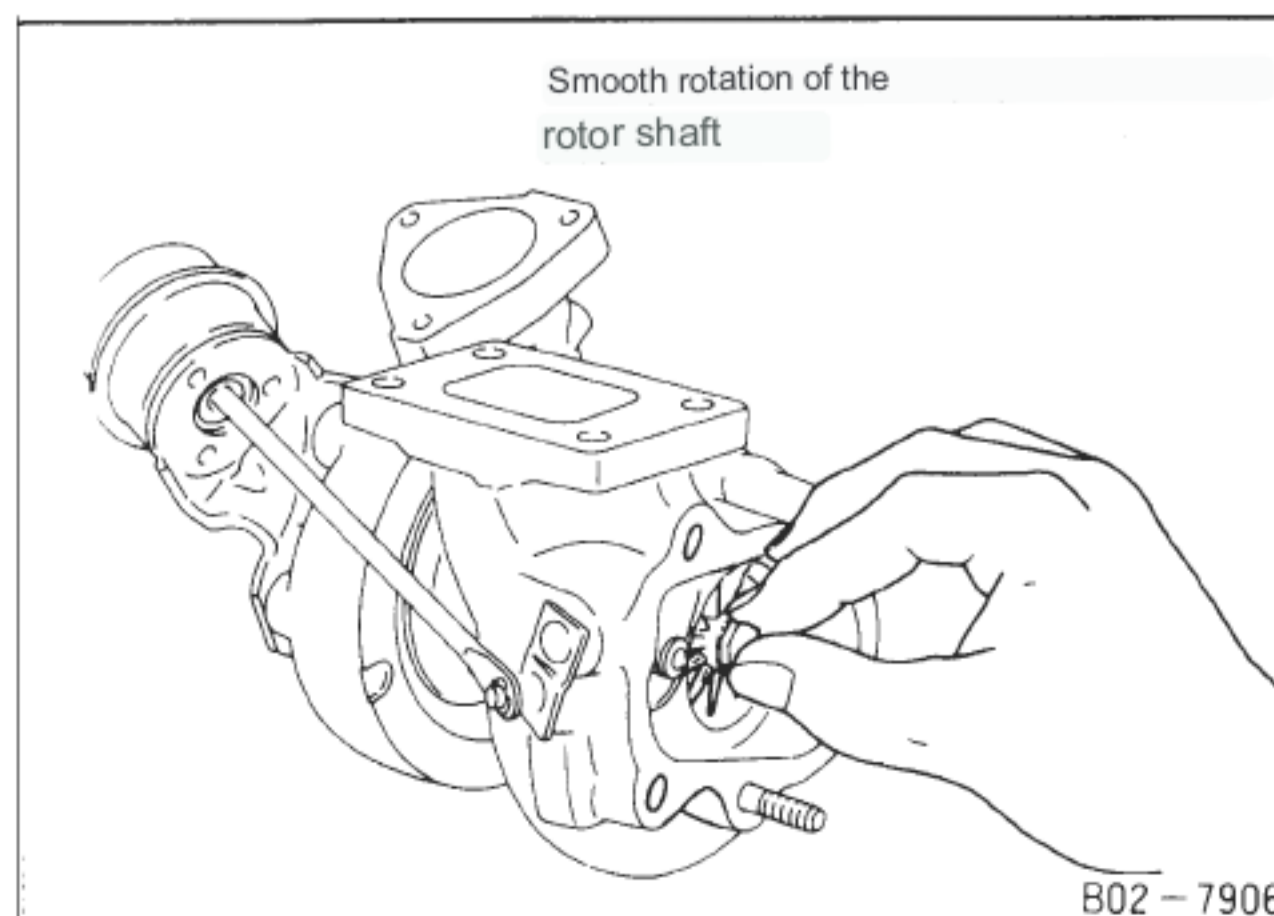
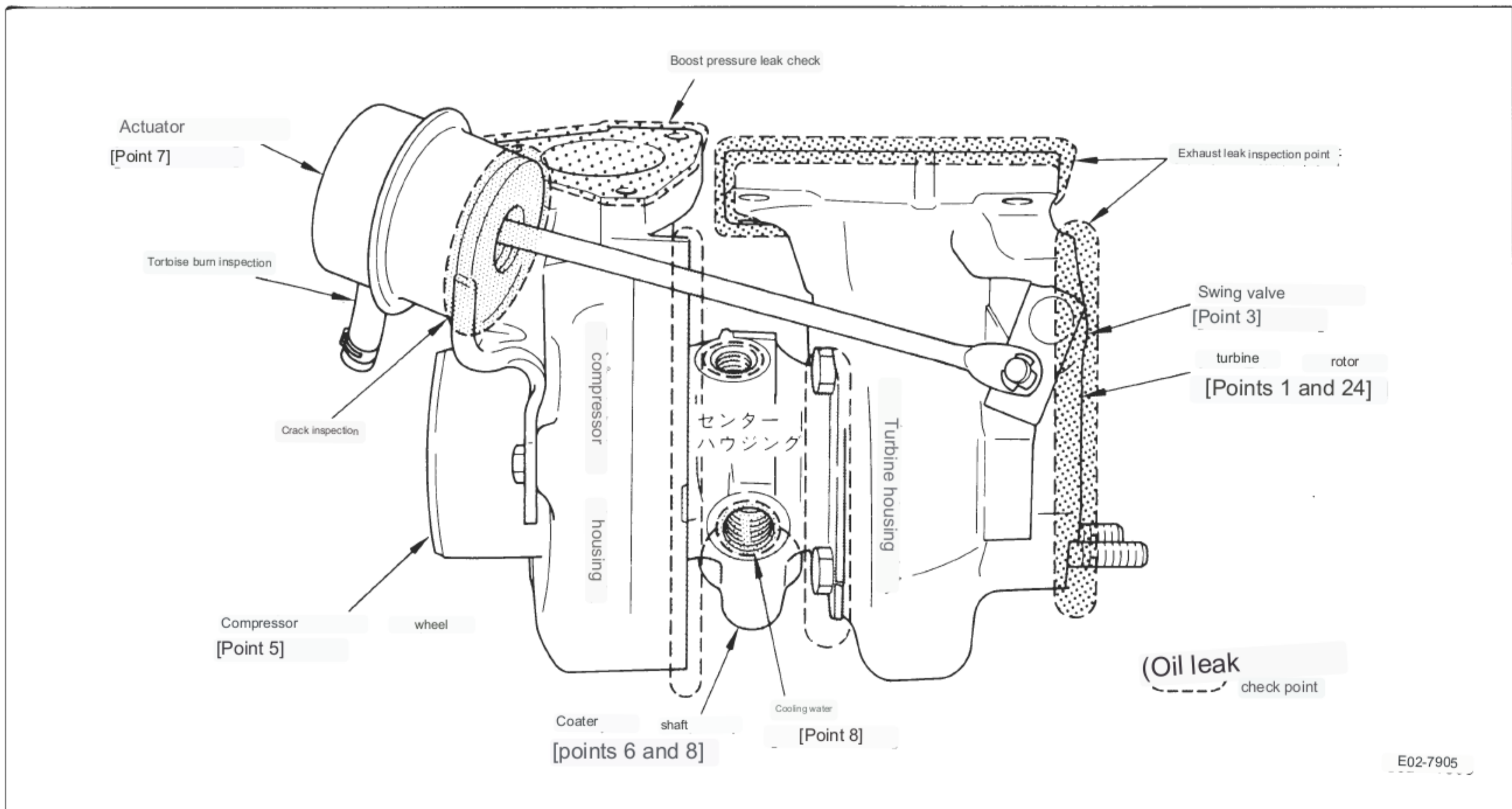
of water tubes and oil tubes

After cleaning with a cleaner, air blow and check for clogging.



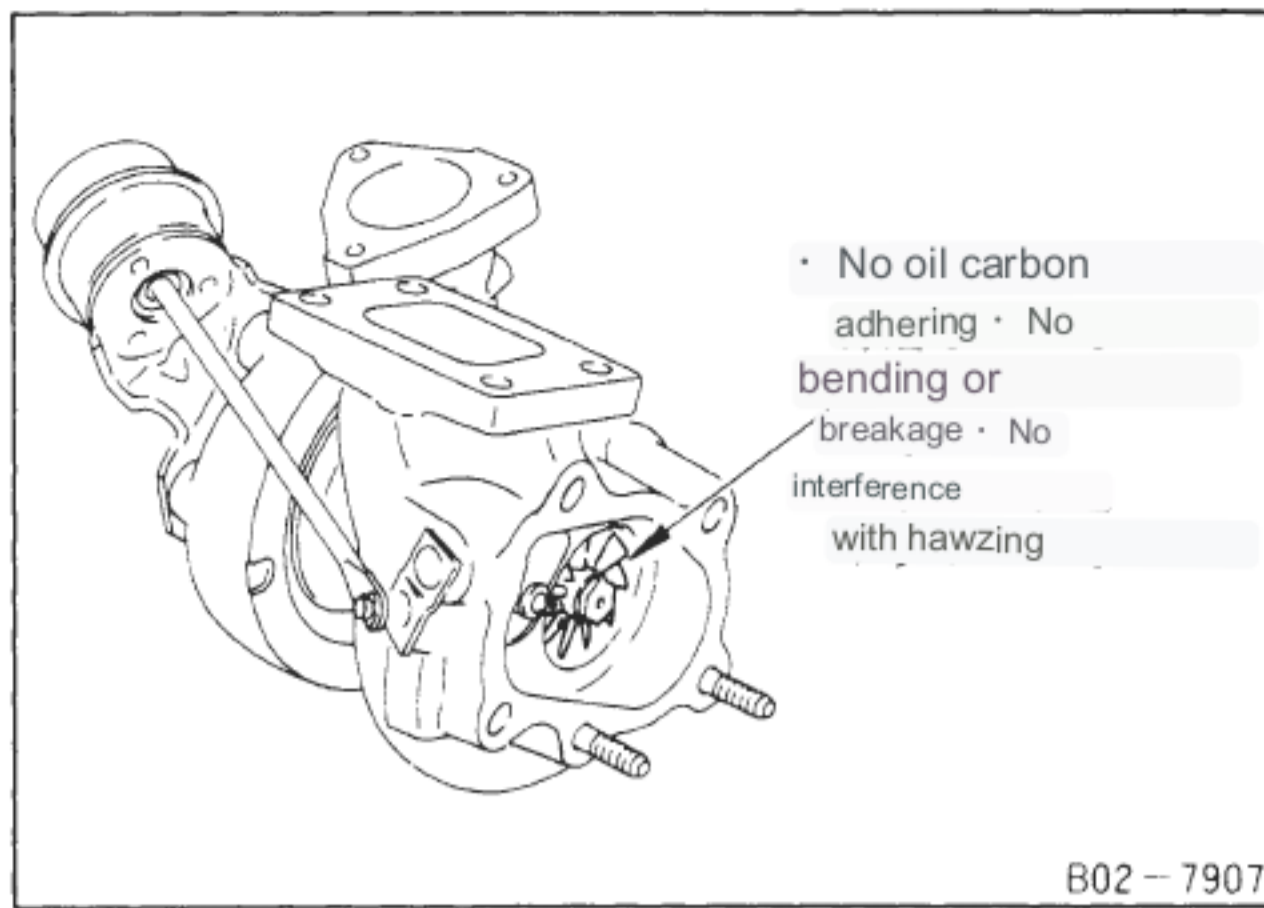
- After cleaning the oil feed tube with the engine conditioner, blow it with air and check for clogging.

(3) Inspection of single turbocharger



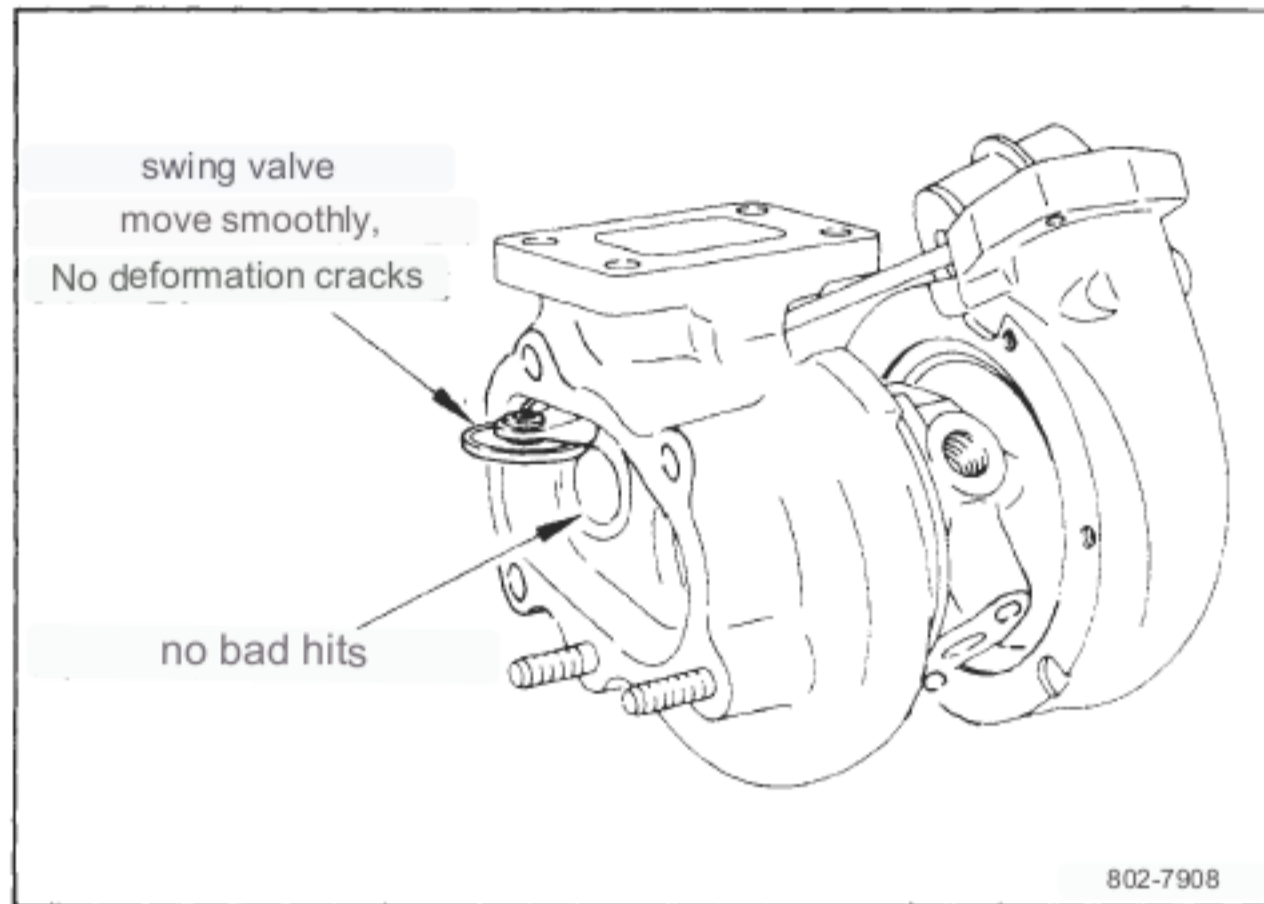
[Point 1] Inspect the rotor shaft

- When rotating the rotor shaft with your fingertips, it may feel heavy or get caught. Rotate smoothly without sticking.



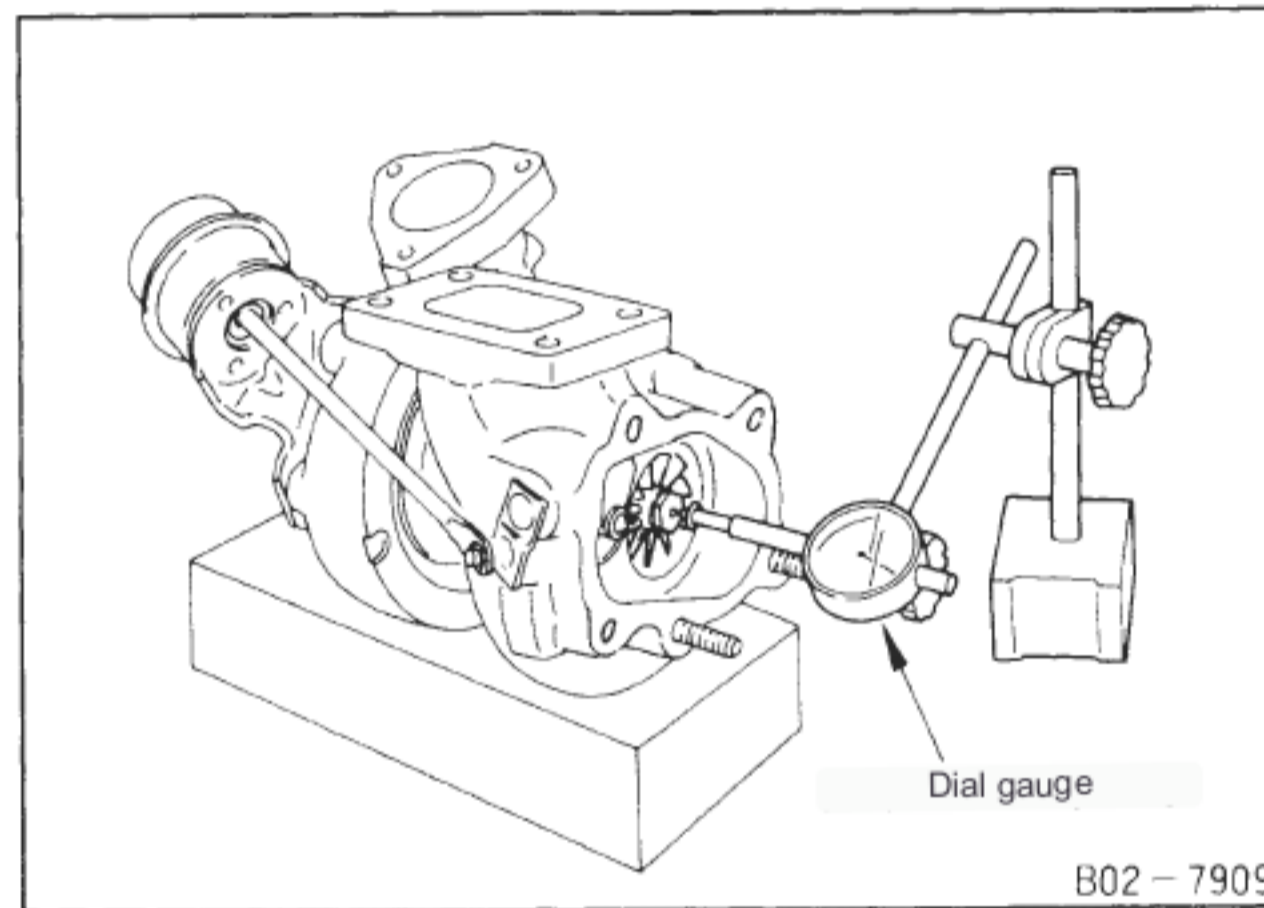
[Point 2] Inspection of turbine rotor

- Is oil adhered?
- Is there any carbon deposits?
- Is the blade of the turbine rotor bent or broken?
- Check for interference with the turbine housing.



[Point 3] Swing valve inspection

- Remove the pin of the actuator rod and check that the swing valve moves smoothly and that there are no deformations or cracks.
- Check for poor contact with the seat surface of the turbine housing.

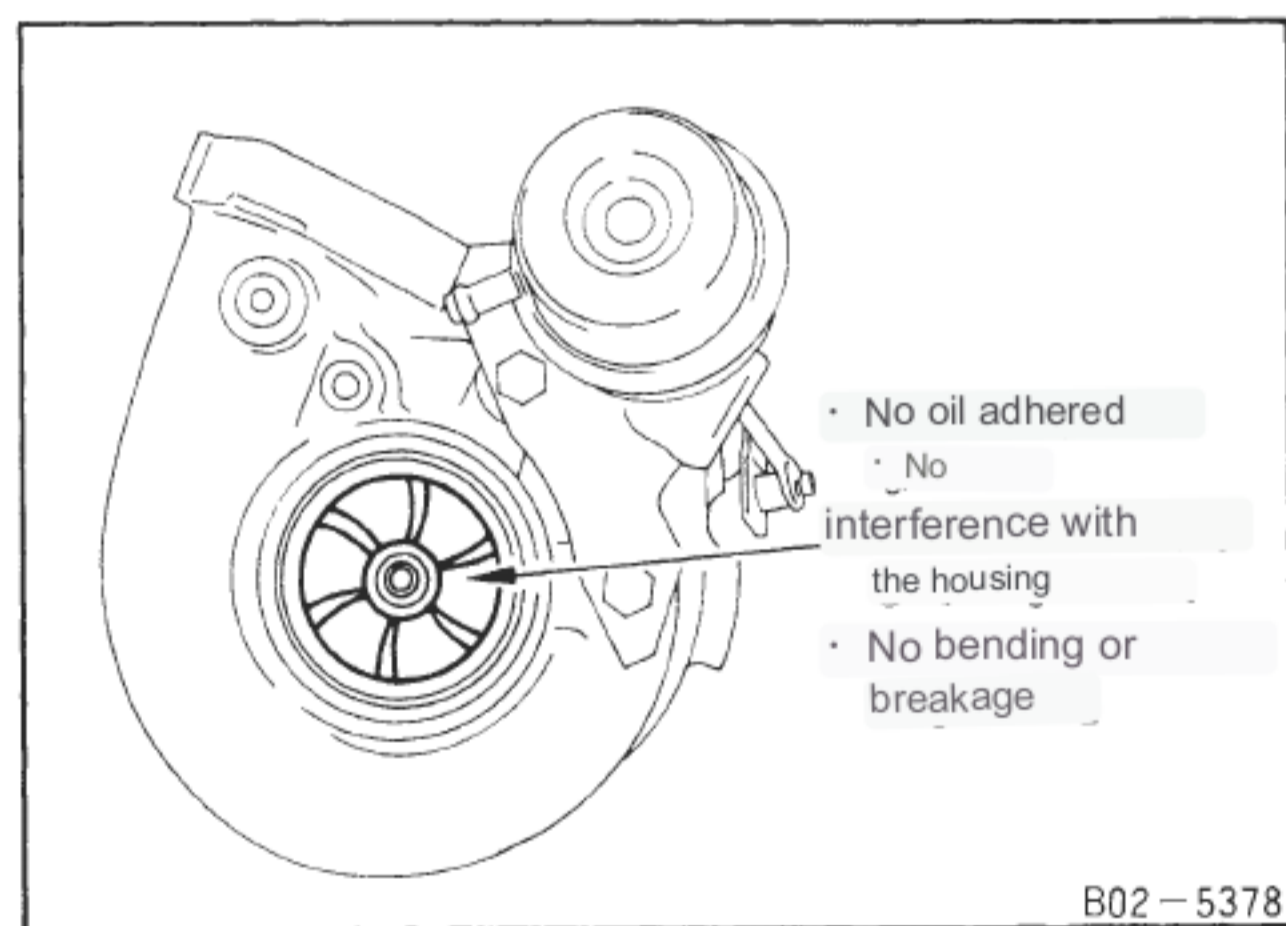


[Point 4] Rotor shaft play check

- Set and play with a dial gauge to measure thrust clearance.
- For rotor shaft play, insert a dial gauge into the oil return hole.

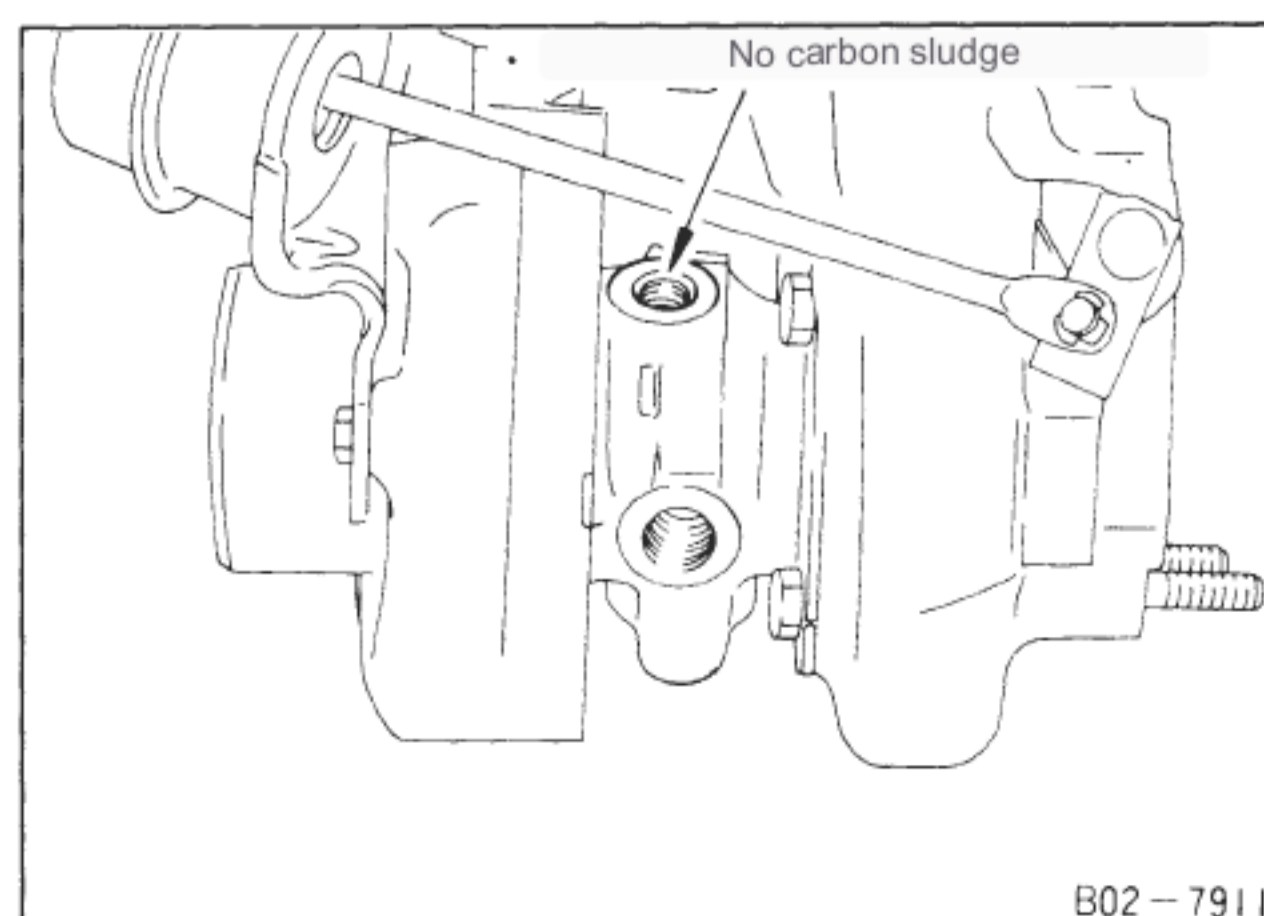
Insert and measure.

Rotor shaft free play	(mm)	0.056 0.127
Thrust clearance	(mm)	0.013 0.097



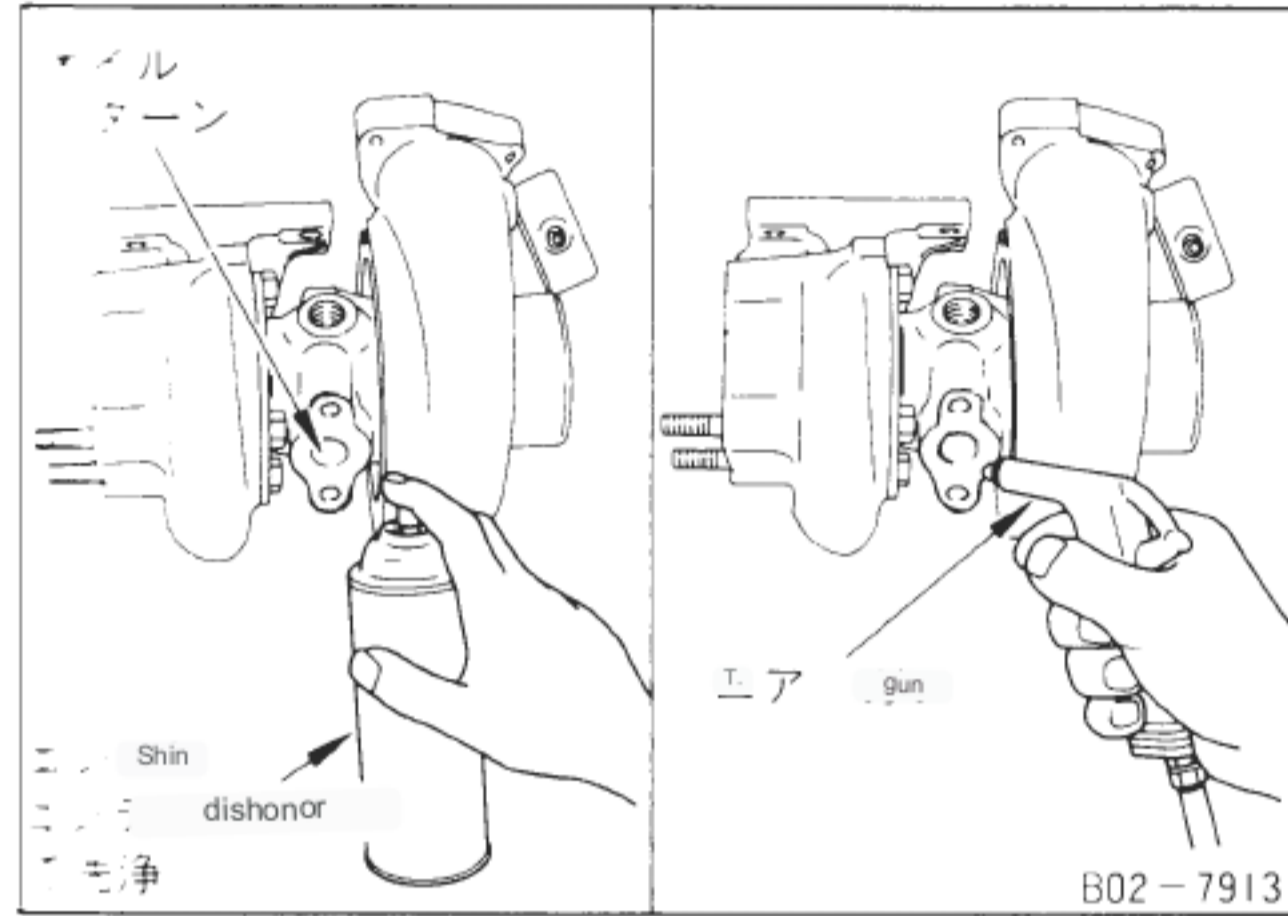
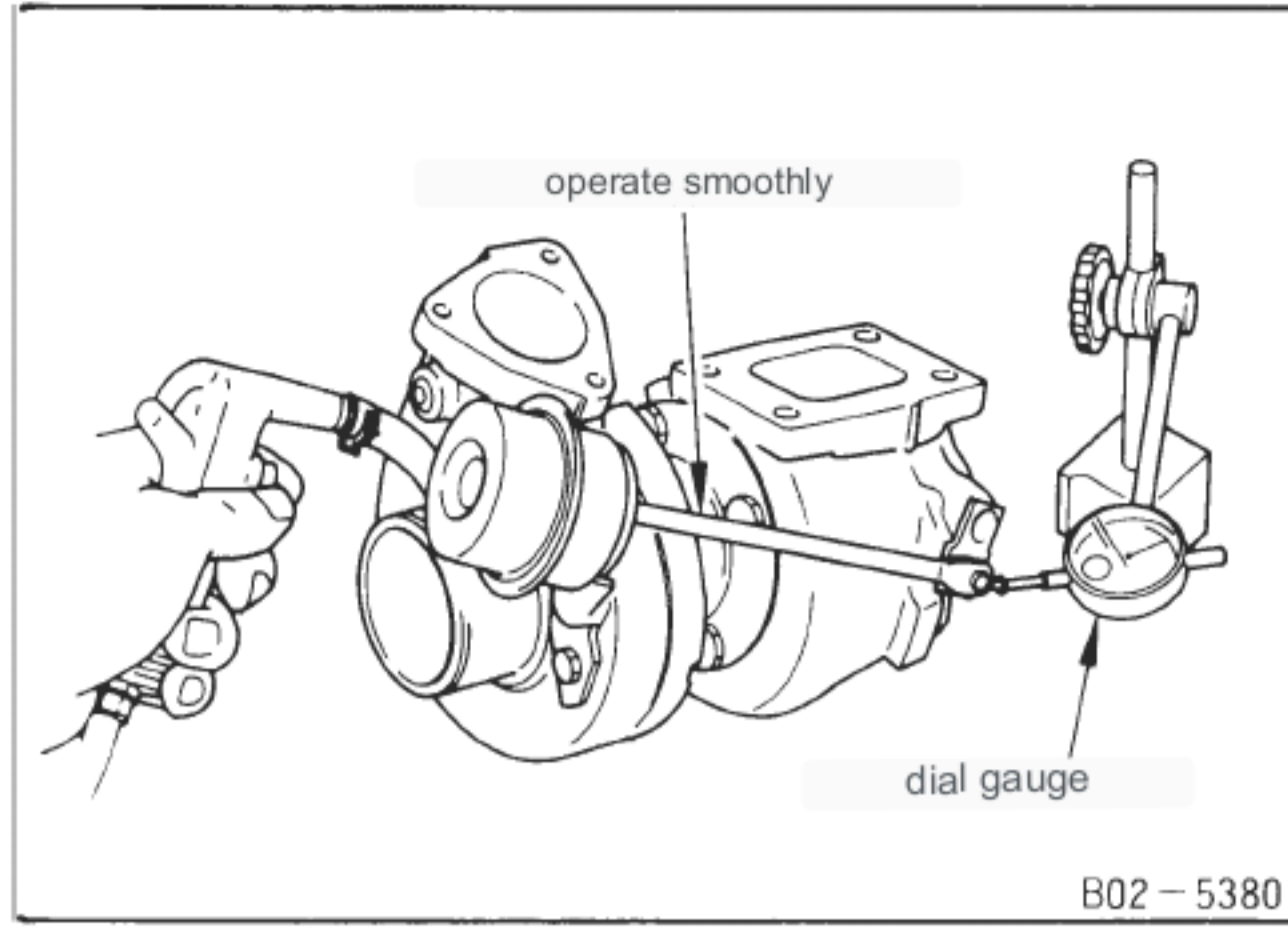
[Point 5] Compressor wheel inspection · Is

- there any oil adhered to the inside of the
- Is there any interference with the compressor housing?
- suction port? · Is the wheel bent or broken?



[Point 6] Inspect the rotor shaft

- Is there any accumulation of carbon sludge?



[Point 7] Swing valve controller inspection

- Use the rubber hose of the swing valve controller as the actuator side.
- Both when the actuator rod is attached and when it is removed

Inspection to.

- When blowing the hose with an air gun (approx. and. Stop blowing immediately after confirming operation.

CAUTION: Applying too much pressure can damage the diaphragm, so first LPG pressure gauge (for 1Kg/cm²... special tool) Confirm that the pressure is within 0.61~0.67Kg/cm² before doing this.

[Point 8] Washing and cleaning oil, cooling water, and intake/exhaust ports

- Clean oil feed and return with engine conditioner, cooling water feed and return with radiator cleaner, then clean with air gun. Others, compressor wheels, turbine rotors, compressor housings, turbine housings wash in the same manner.

(4) Diagnosis of turbocharger failure (oil leak, smoke (white smoke, blue smoke), insufficient power/acceleration failure, abnormal noise) Items to check before diagnosis

① The amount of engine oil must be above MIN and below MAX on the level gauge.

(If it is more than MAX, the engine oil flows into the intake duct from the blow-by gas return passage and is mistaken for a turbocharger failure. admit.) ②

After running, confirm with the customer whether the oil is being cooled while the vehicle is idling.

Refer to "Service Circular No. 1651" for detailed fault diagnosis by phenomenon.

As a result of the unit inspection in the table below, if even one of the problems can be confirmed, replace the turbo assembly.

If you can't confirm it at all, think that there is nothing wrong with the turbo itself, and pursue other parts again.

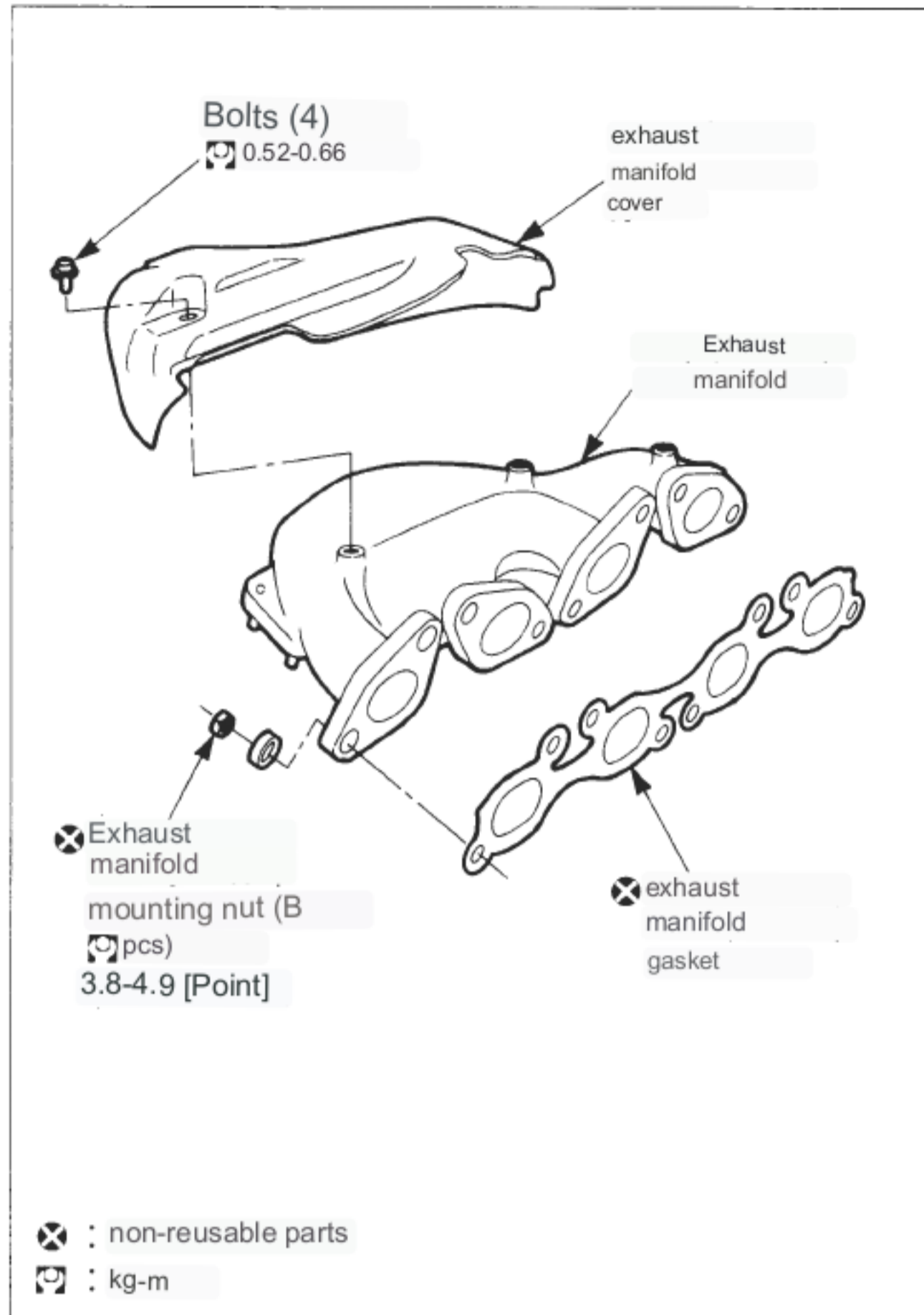
*point	item	Inspection part	Inspection result	Phenomenon when the left term is confirmed			
				oil leak	smoke	abnormal noise	Insufficient Power Poor acceleration
2, 8		turbine rotor	wet with oil	△	◎	△	△
			there is carbon deposits	A.	◎	○	○
			There is "rubbing" with the housing	△	○	◎	○
			Bent or broken wings			◎	◎
5, 8		compressor wheel	The inside of the suction port is heavily contaminated with oil.	○	○		
			There is "rubbing" with the housing	△	○	◎	○
			The blade is bent or broken. It feels			◎	◎
1, 4, 8		Turbines, compressors look at both Play point of the rotor shaft study	heavy or scratched when rotated with your fingertips. feels light		△	A.	○
			Fingertips may not rotate				◎
			Large play in the bearing	△	△	○	△
6, 8		Look into the oil hole (observe the inside with a penlight)	Carbon sludge has accumulated in the oil drain hole. Ru	△	○	△	△
3, 7		Operation of swing valve (no air gun or bicycle air pump (valve starts to open at 0.6~0.7kg/cm use)	Operates smoothly when positive pressure is applied gradually is normal).				◎

*: Refer to (3) above.

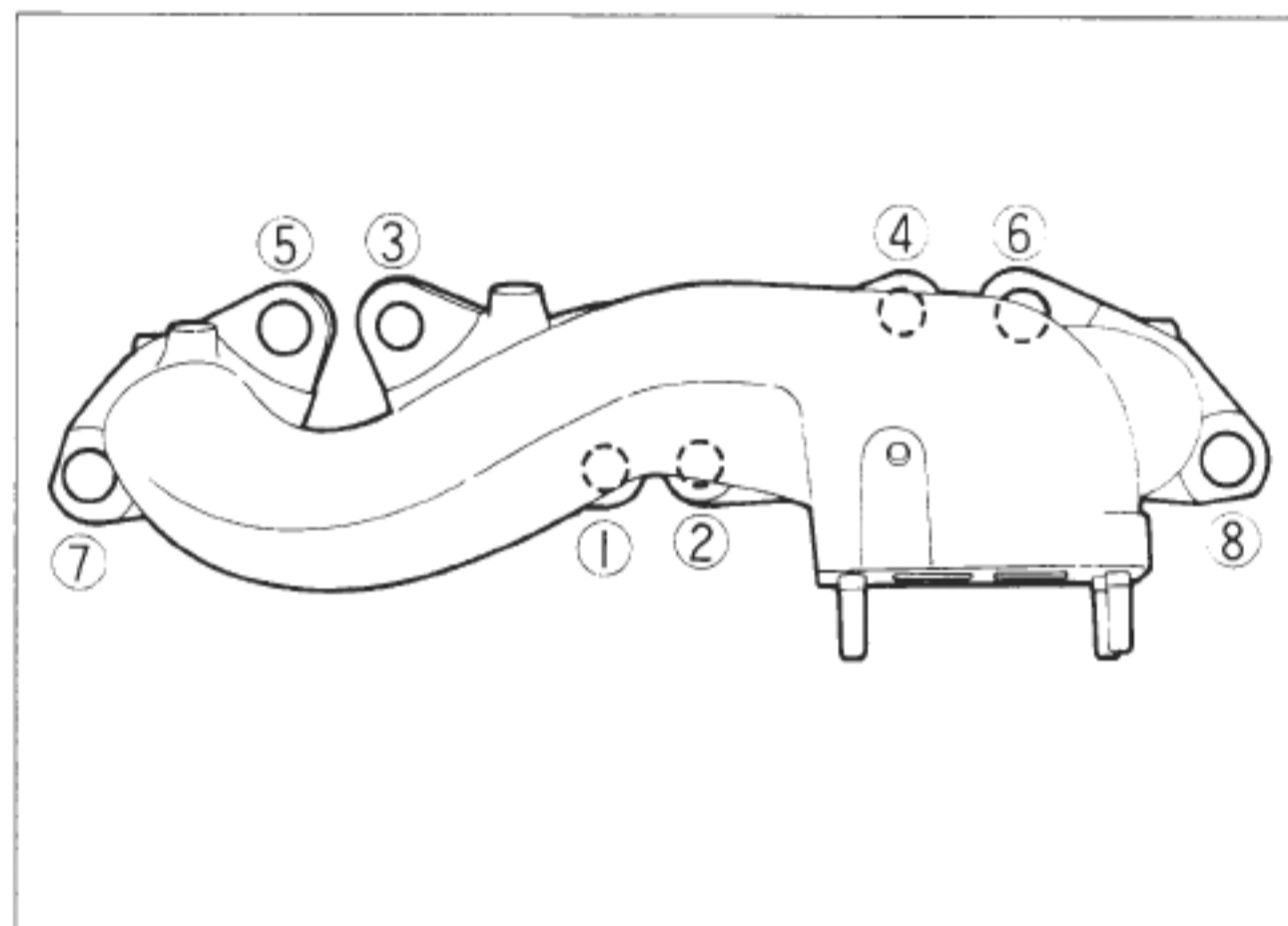
◎: High possibility ○: Medium possibility △: Possibility small

9-6 exhaust manifold

(1) Description 着



- Detachment is performed with the turbocharger ASSY installed. "9-5 Turbo Charger ASSY (SR20DET) (1) Refer to "Detachment" section.



[Point 1] Remove and install the exhaust manifold

- Install in the order shown in the figure on the left.
- Remove in the reverse order.

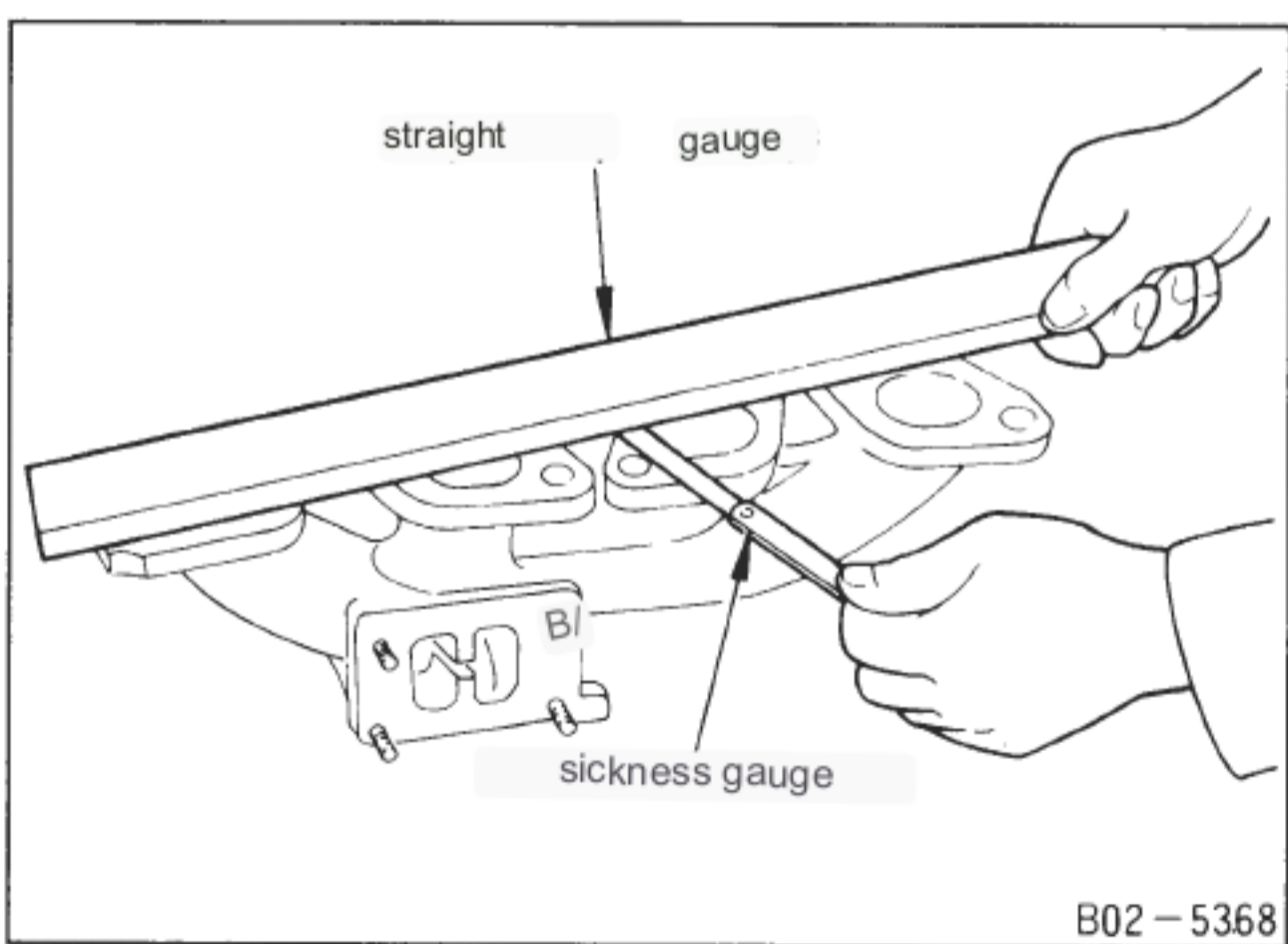
Exhaust manifold tightening torque (kg-m)	3.8 4.9
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- After tightening all bolts, check again with the specified torque.
- The gasket attached to the exhaust manifold mounting surface
Sufficiently remove with a scraper or the like.
- Replace the exhaust manifold mounting nut with a new one.

[Point 2] Exhaust manifold inspection

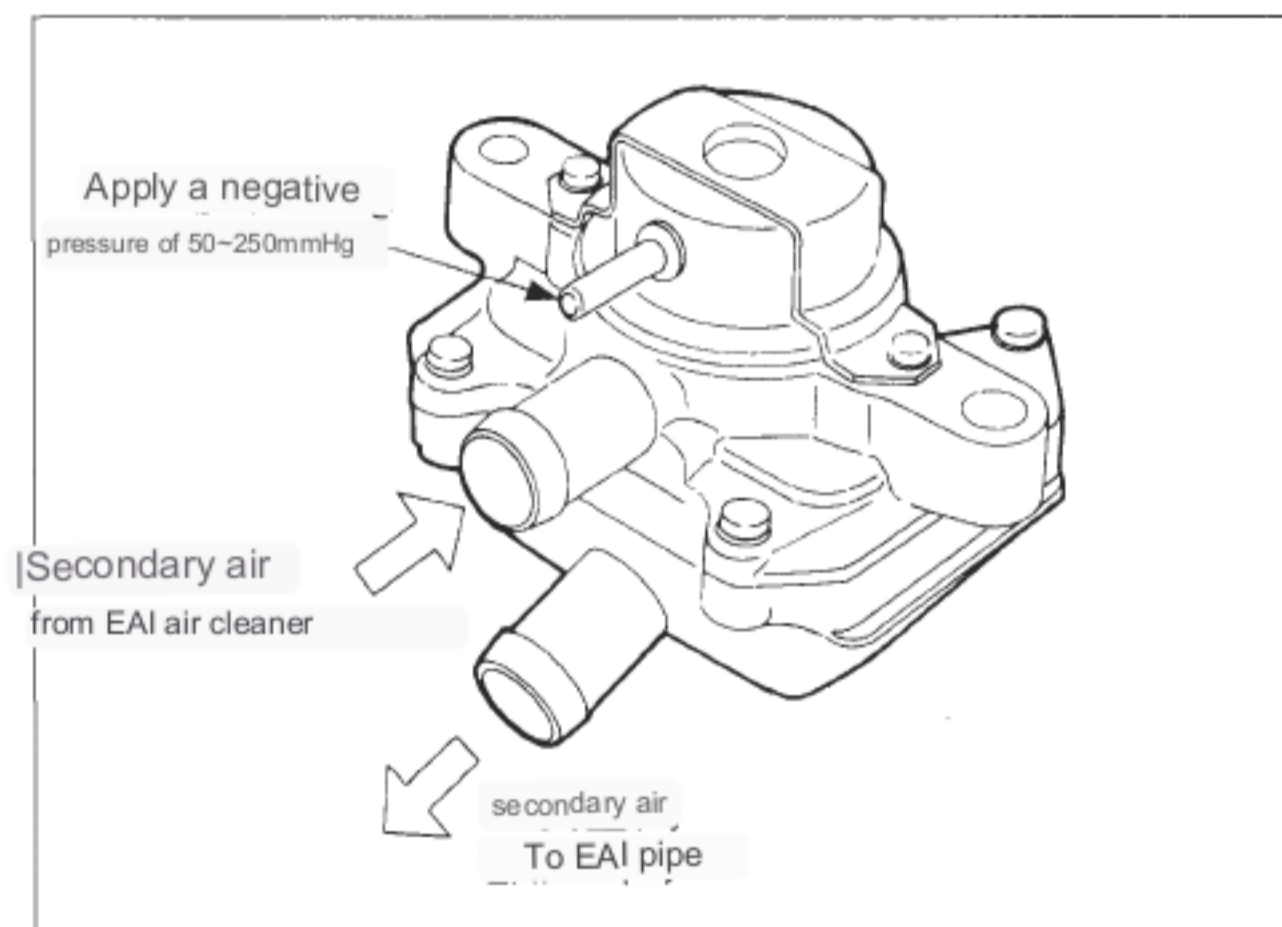
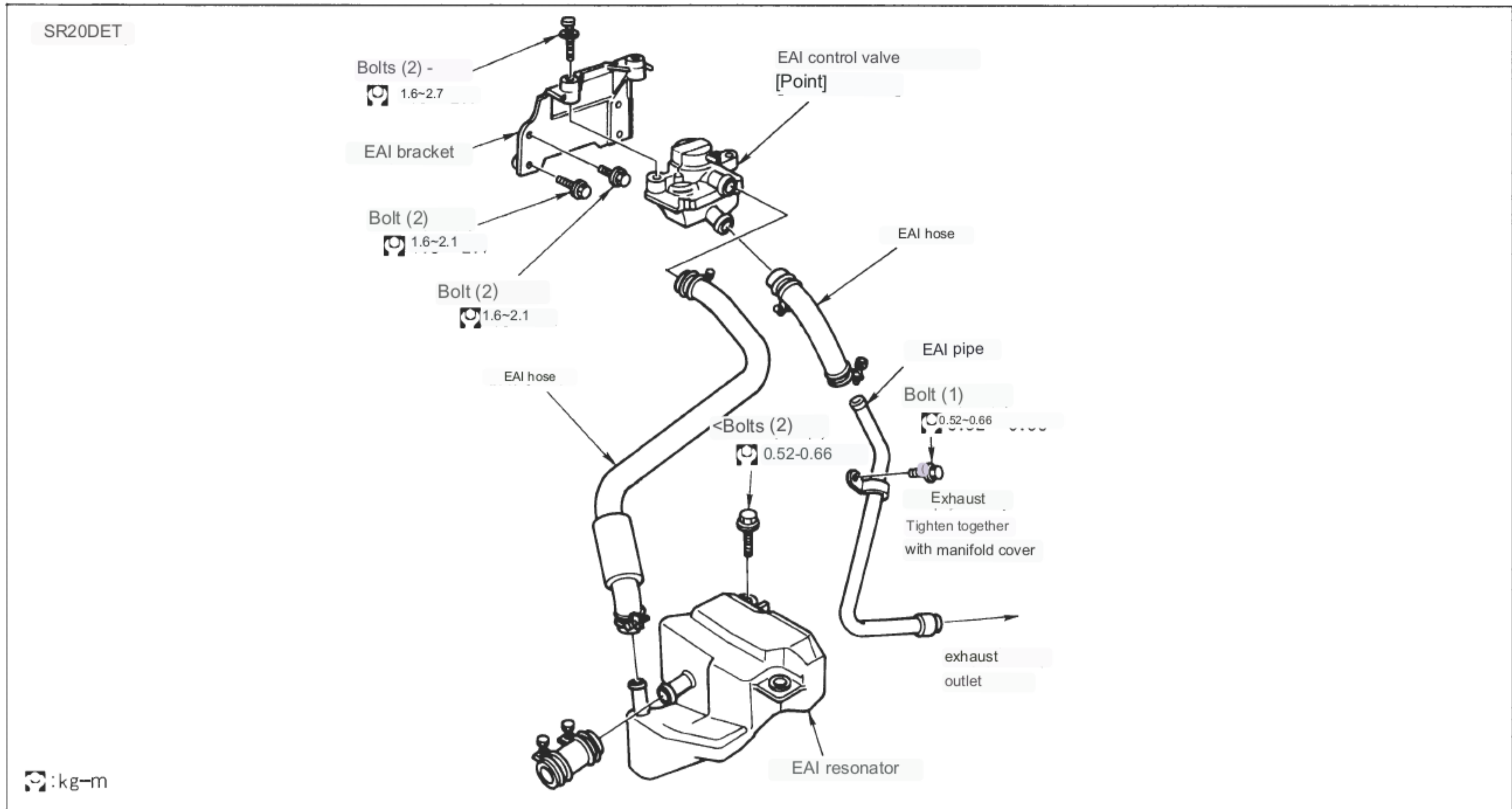
- The strain on the mounting surface of the exhaust manifold is reduced in four directions (diagonal and up, down, horizontal) at several points.

Limit (mm)	0.3
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B02-5368

9-7 EAI system related parts

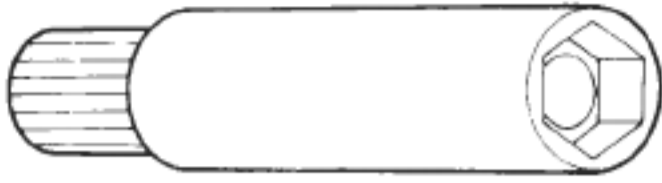


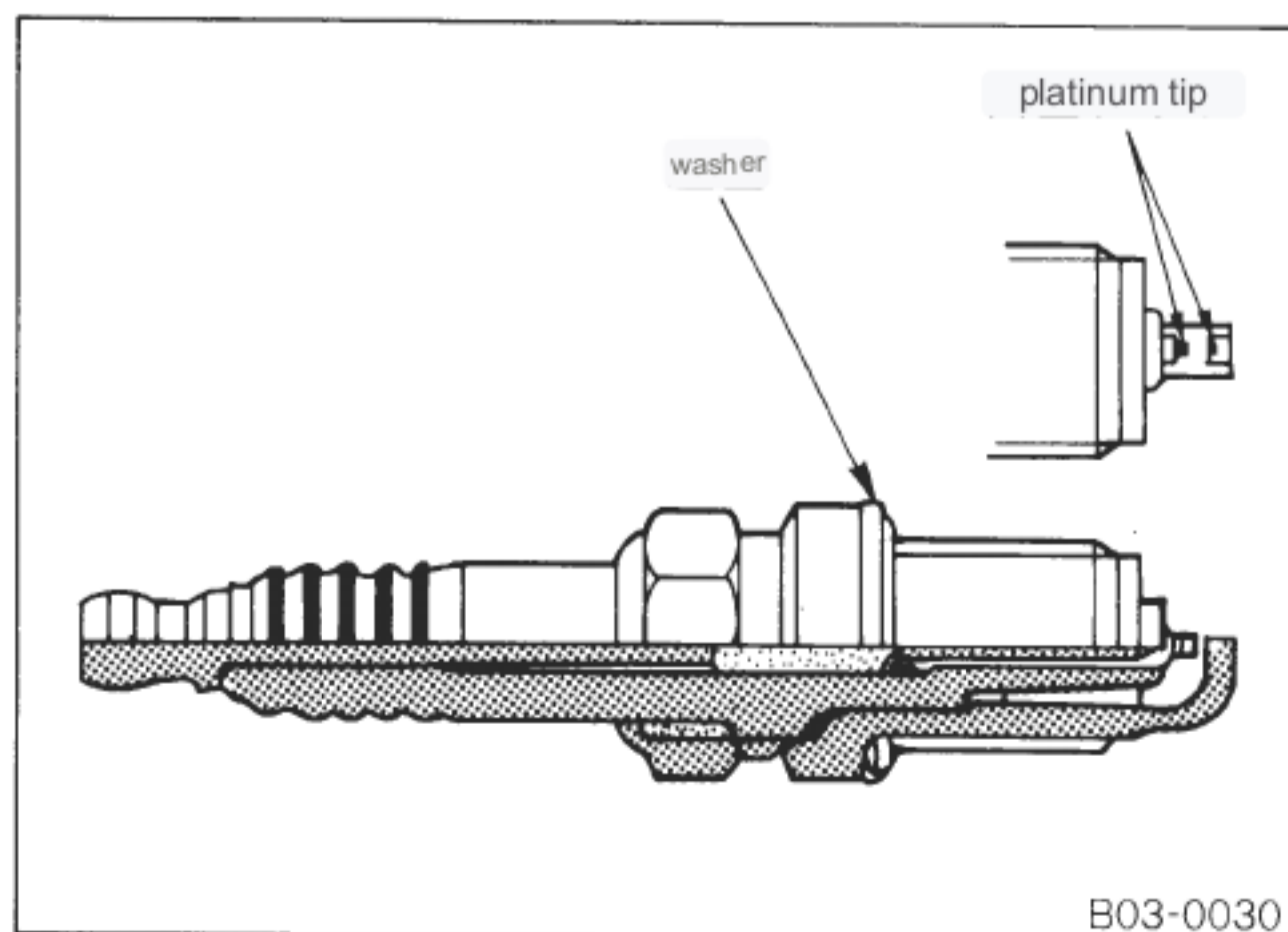
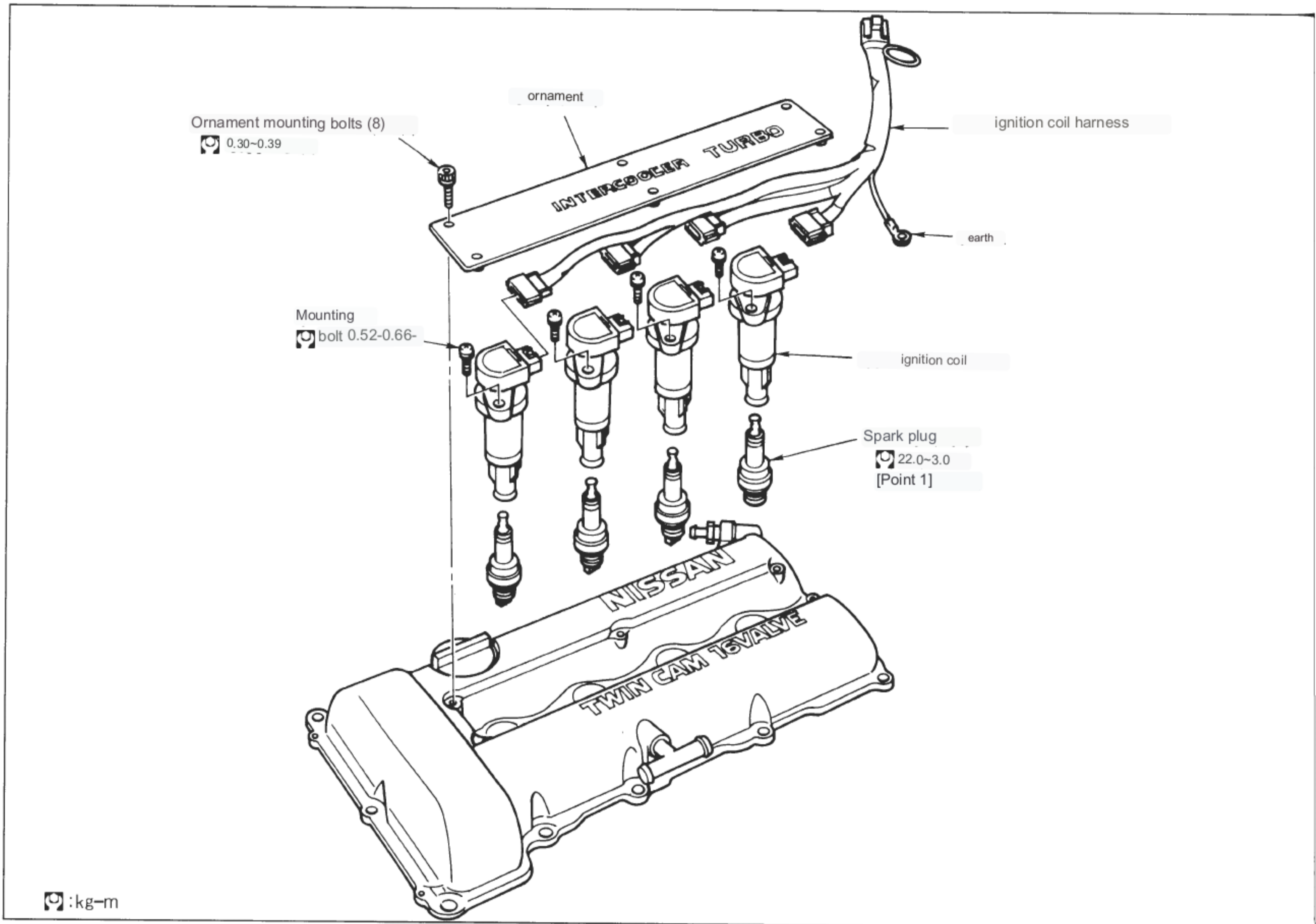
[Point 1] EAI control valve inspection

- A negative pressure of about 150 ~ 250mmHg was applied with a vacuum handy pump. when the negative pressure is maintained.
- In the above state, the valve should be connected to the EAI air cleaner and the front tube. make it conductive.

9-8 Removal and installation of spark plug

supplies

	name	for way	remarks
Special tool	Spark plug wrench EG1740 1600  B02-0045	Small hexagon For removing spark plugs	Existing

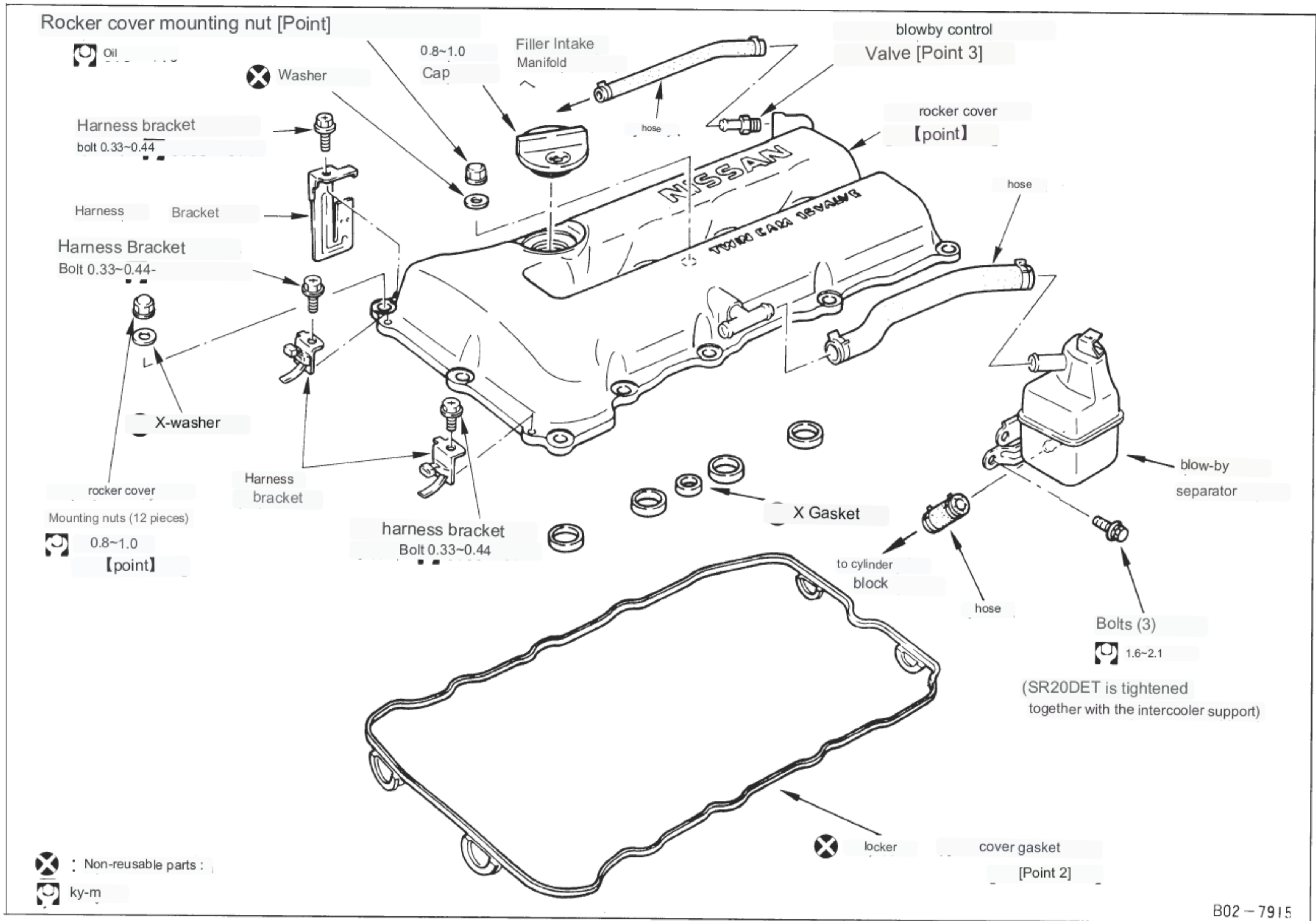


[Point 1] Spark plug maintenance

- Since a platinum tip is used, there is no need to check or adjust the gap.
 - Change the plug every 100,000 km.
 - When using a plug cleaner, apply air pressure within 6kg/cm² for 20 seconds.
- Do it quickly within·
- Do not use a wire brush.

9-9 rocker cover

(1) Description 着



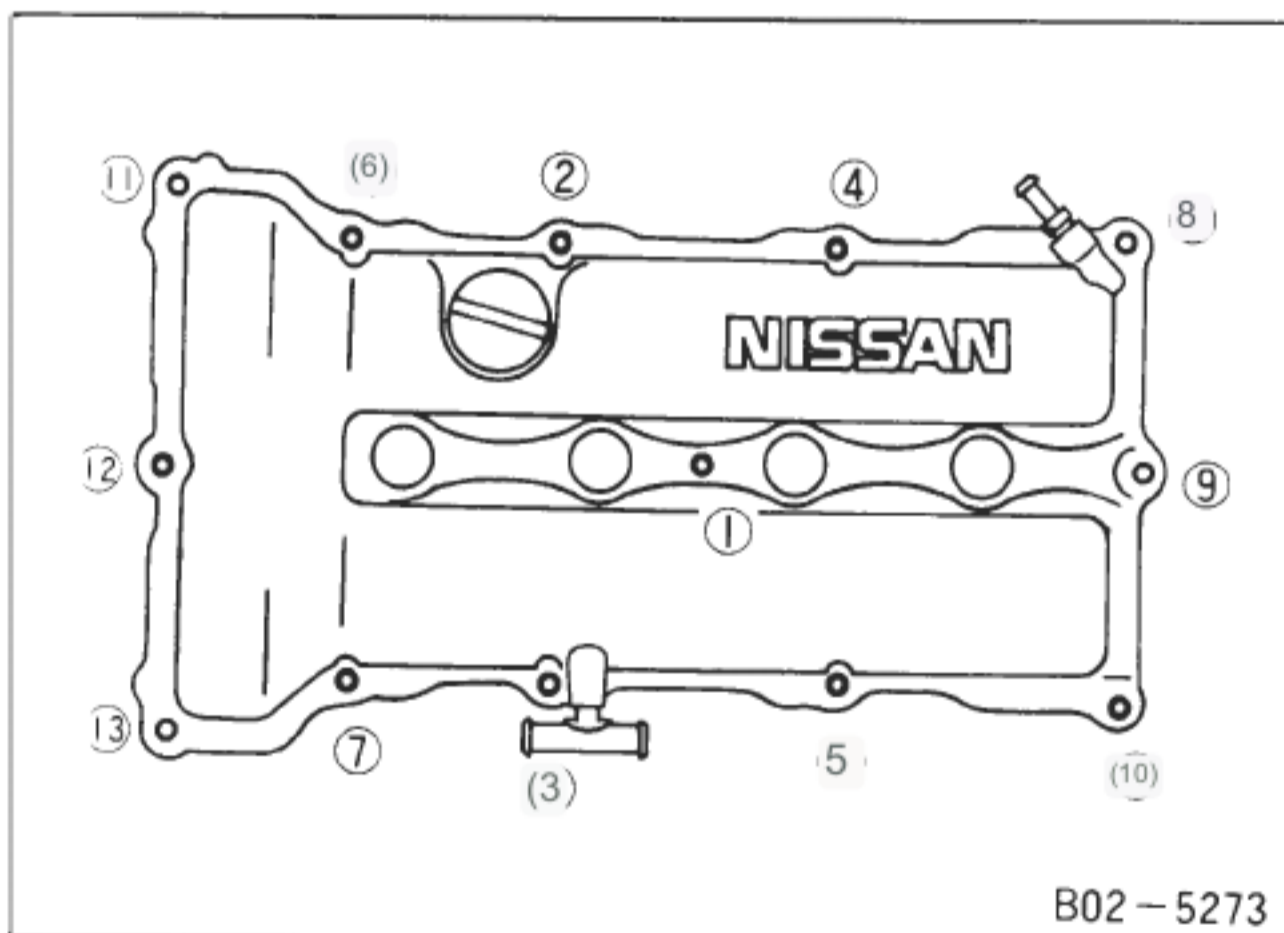
B02-7915

Harness clamp with

blow-by hose

ornament

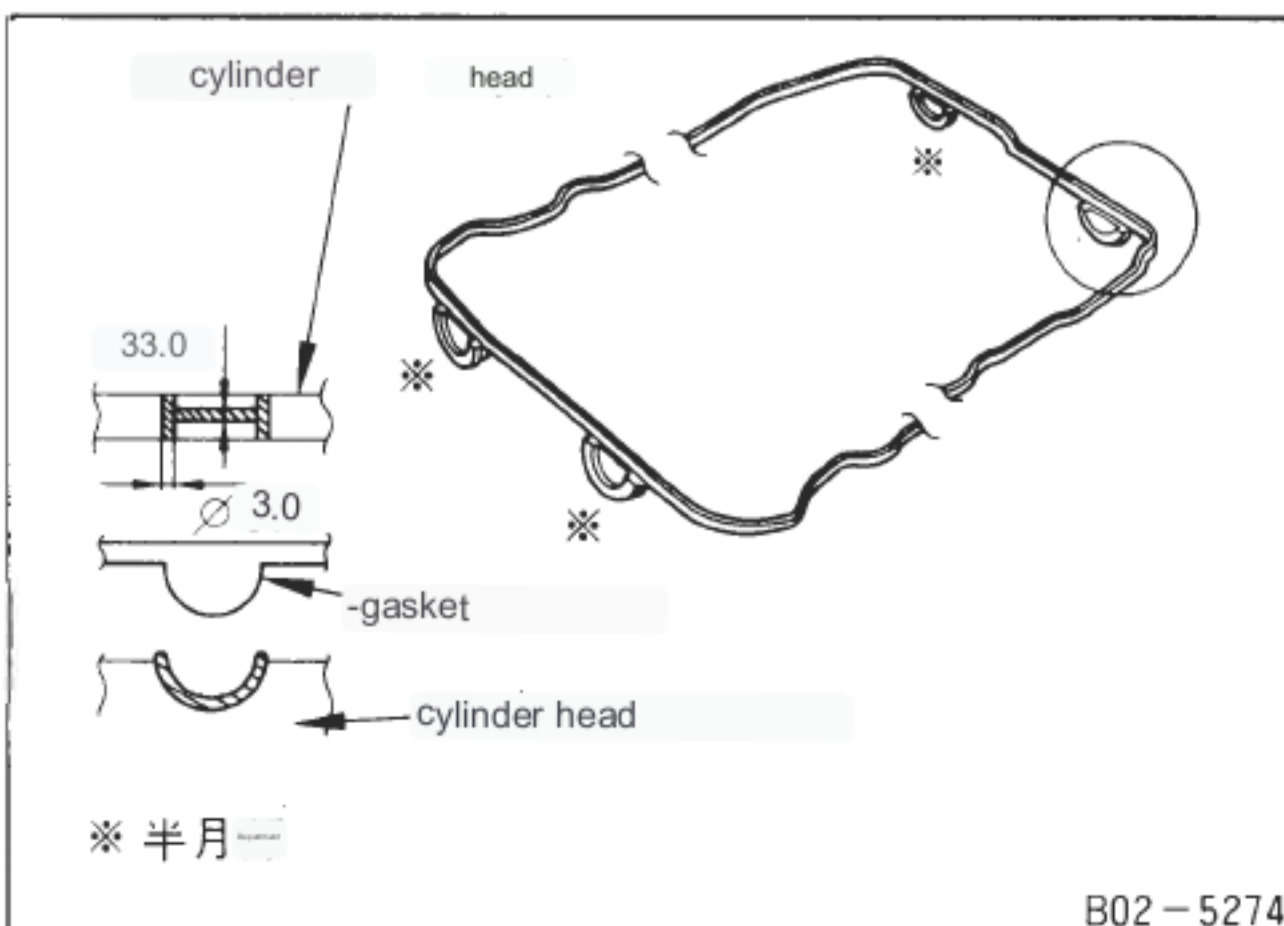
ignition coil and harness



B02-5273

[Point 1] Remove and install the rocker cover

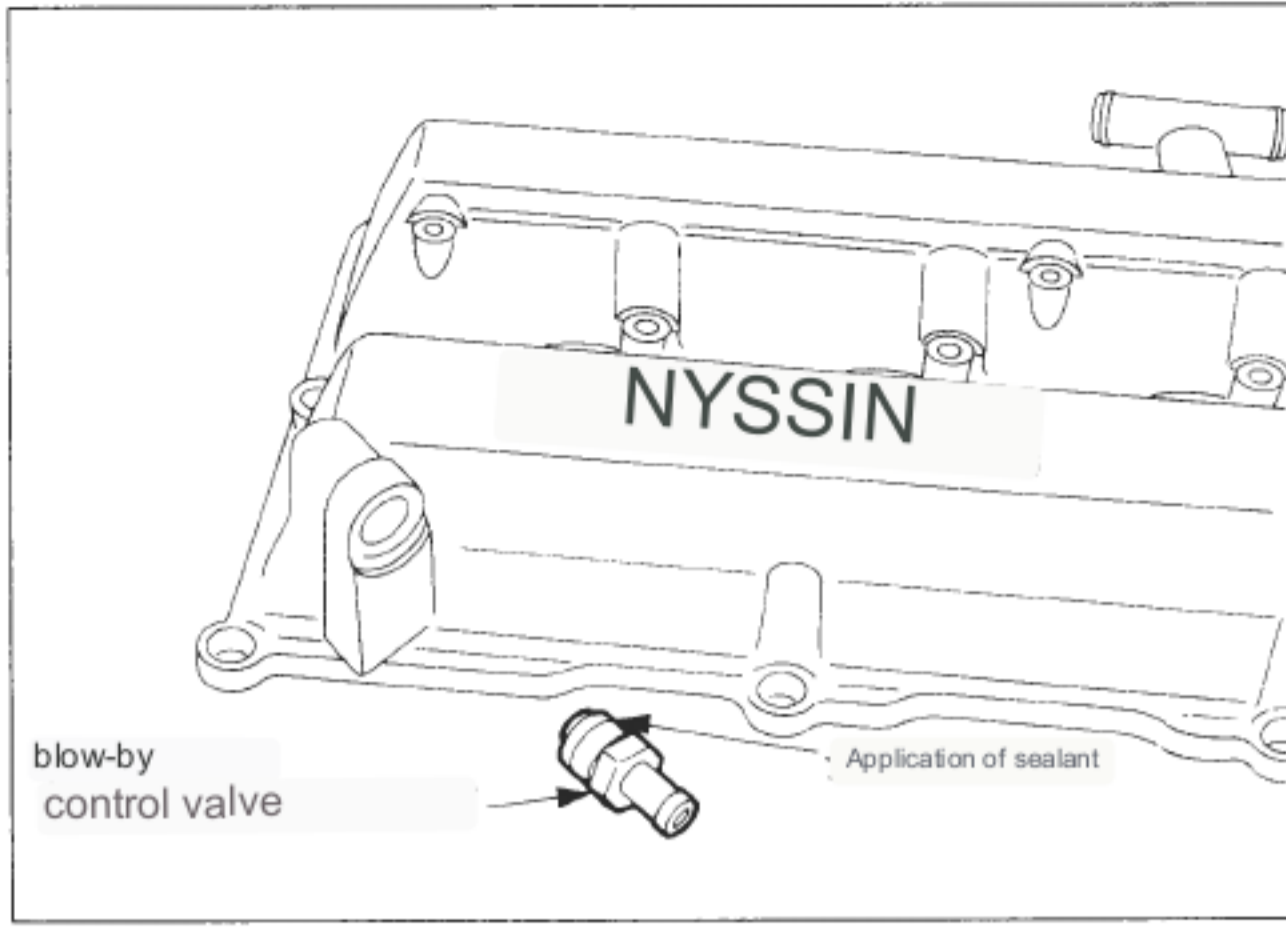
- Follow the following procedure for installation. (1) Tighten with 0.5kg-m in the order ①→1→D→B→⑧.
- (2) Tighten with 1.2~1.5kg-m in the order of ①~13. Remove in the order of 13~①.



B02-5274

[Point 2] Rocker cover gasket

- Firmly fit the gasket into the groove of the rocker cover. (Pay particular attention to the spark plug gasket)
- Make sure there is no oil or dust on the cylinder head flange surface.
- Apply sealant (ThreeBond 1207C) to the half moon and arch in the left figure.
- Replace all gaskets and washers with new ones.

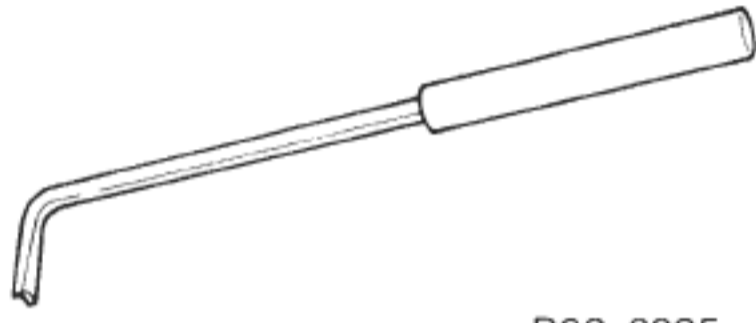



[Point 3] Installation of blow-by control valve

- Apply locking agent (equivalent to ThreeBond 1386) to the threads of the blow-by control valve, and attach it to the rocker cover.
- Refer to B2 8. Blow-by gas reduction device for inspection.

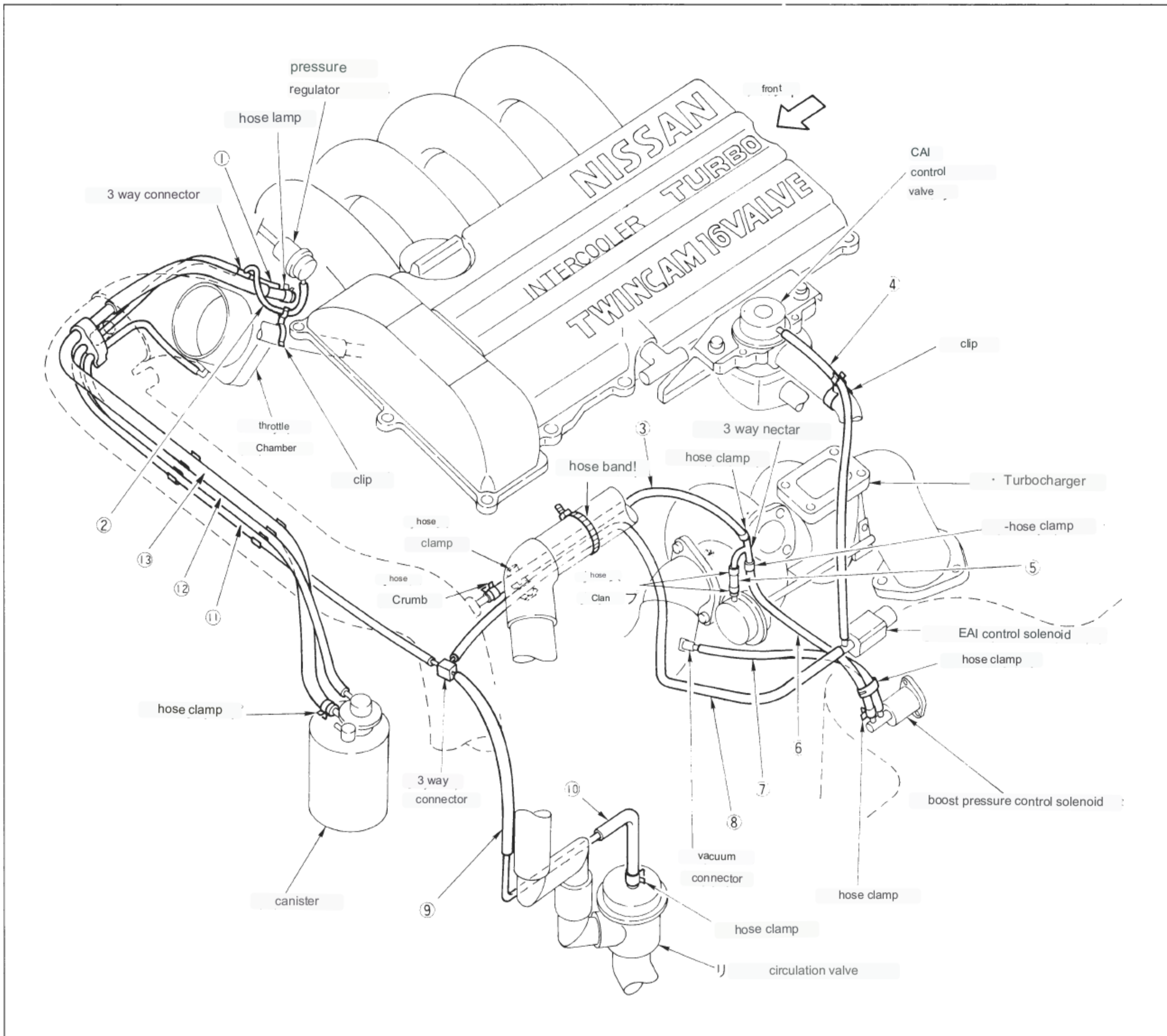
9-10 Camshaft

supplies

	name	for way	remarks
Special tool	valve spring compressor KV101 15400  B02-6095	rocker arm shim adjustment	Existing
	Dial gauge stand KV101 15700  B02-6096		
Total vessel	V-block	Supporting the measurement site	
	Dial gauge	Camshaft bending, end play inspection	
	Micrometer	Measure the outer diameter of each part of the camshaft and the hydraulic lash adjuster Measure	
	inside micrometer	the inner diameter of the cam bracket and the inside diameter of the hydraulic lash adjuster hole	
others	magnet band	Remove valve guide	

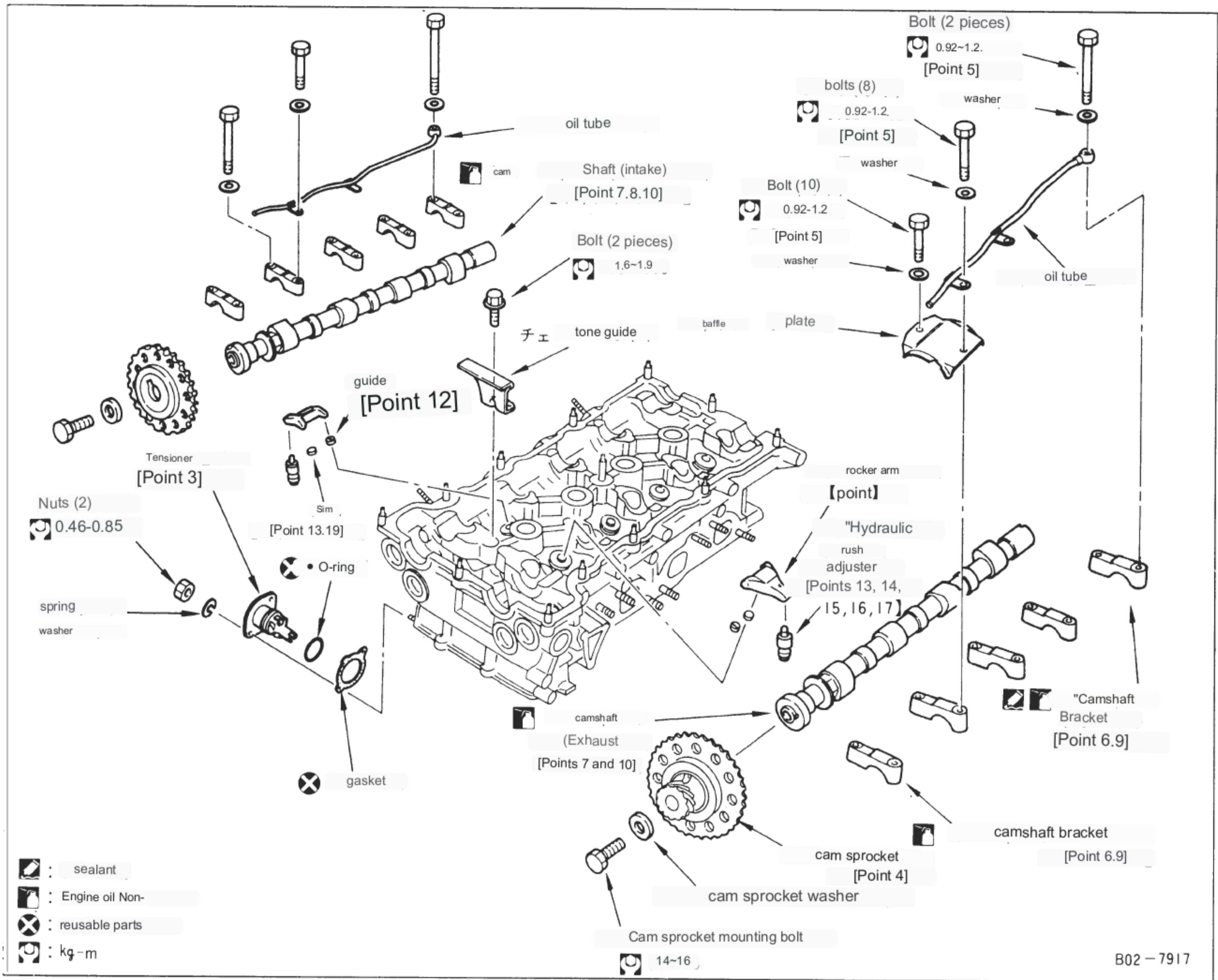
4. Vacuum piping diagram

4-1 S20 type DOHC/EGI (ECCS) engine with turbocharger



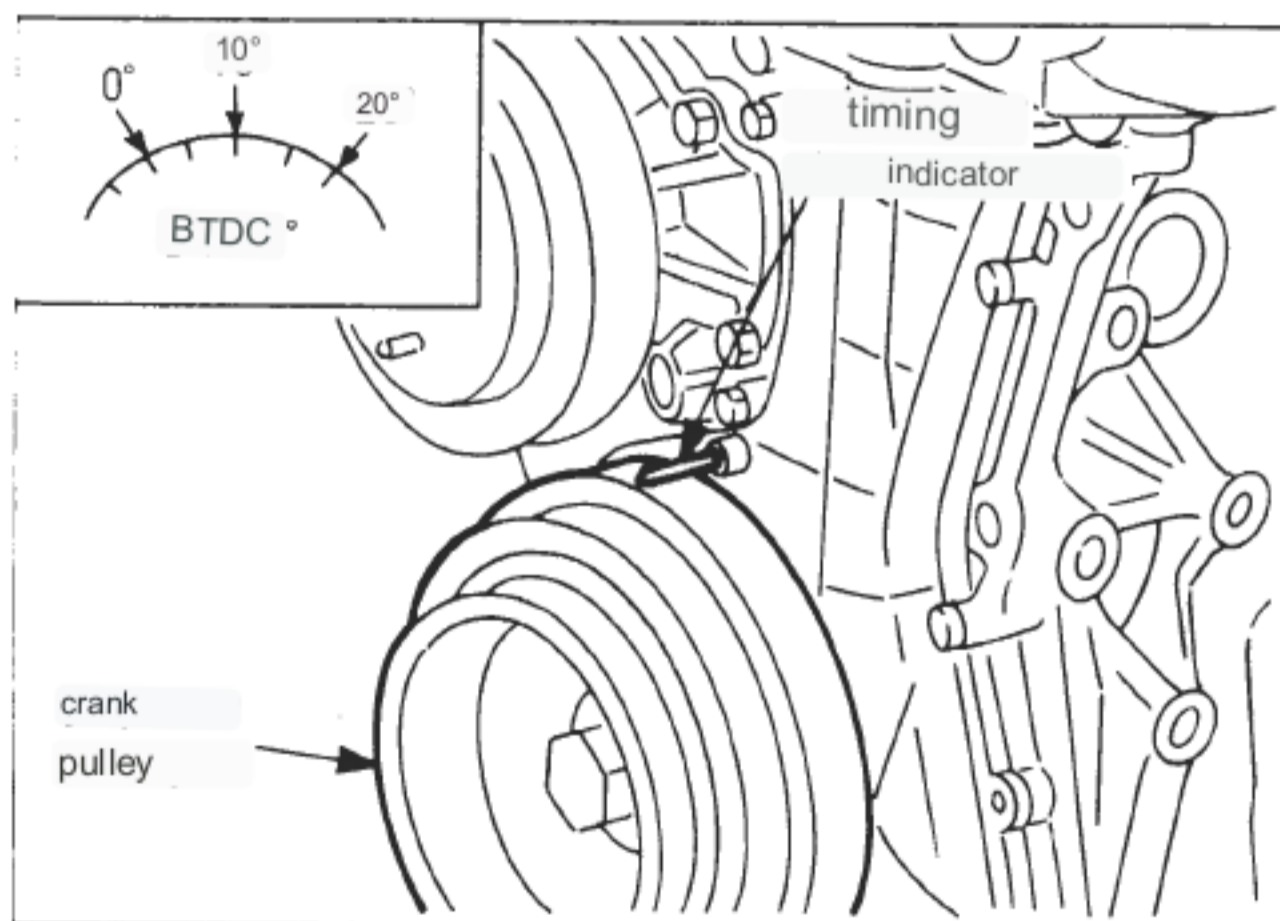
number	Length (mm)	位
①	120	Collector ~ 3-way connector
②	molding	3-way connector ~ pressure regulator
③	molding	3 way connector ~ air duct
④	290	EAI control solenoid EAI control valve
⑤	80	3-way connector ~ boost pressure control actuator
⑥	molding	Boost pressure control solenoid to 3 way connector
⑦	210	Boost pressure control solenoid ~ Vacuum connector
⑧	490	3-way connector ~ EAI control solenoid
⑨	270	3 way connector to vacuum pipe
⑩	molding	Vacuum pipe recirculation valve
⑪	molding	3 way connector ~ 3 way connector
⑫	molding	Throttle chamber ~ canister
⑬	molding	collector canister

(1) Elimination wearing



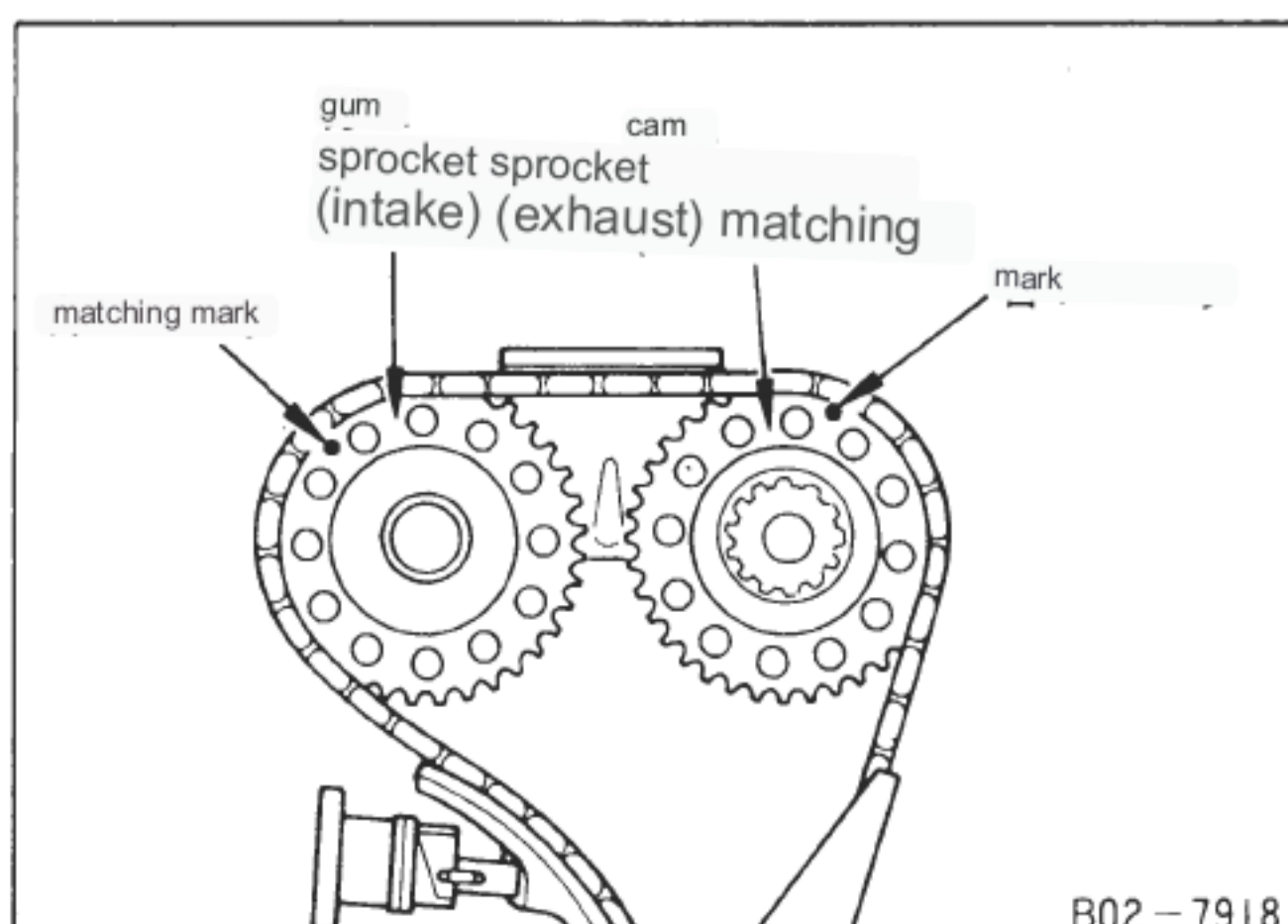
Ⓜ Harness clamp
blow-by hose

With ornament
With ignition coil and harness



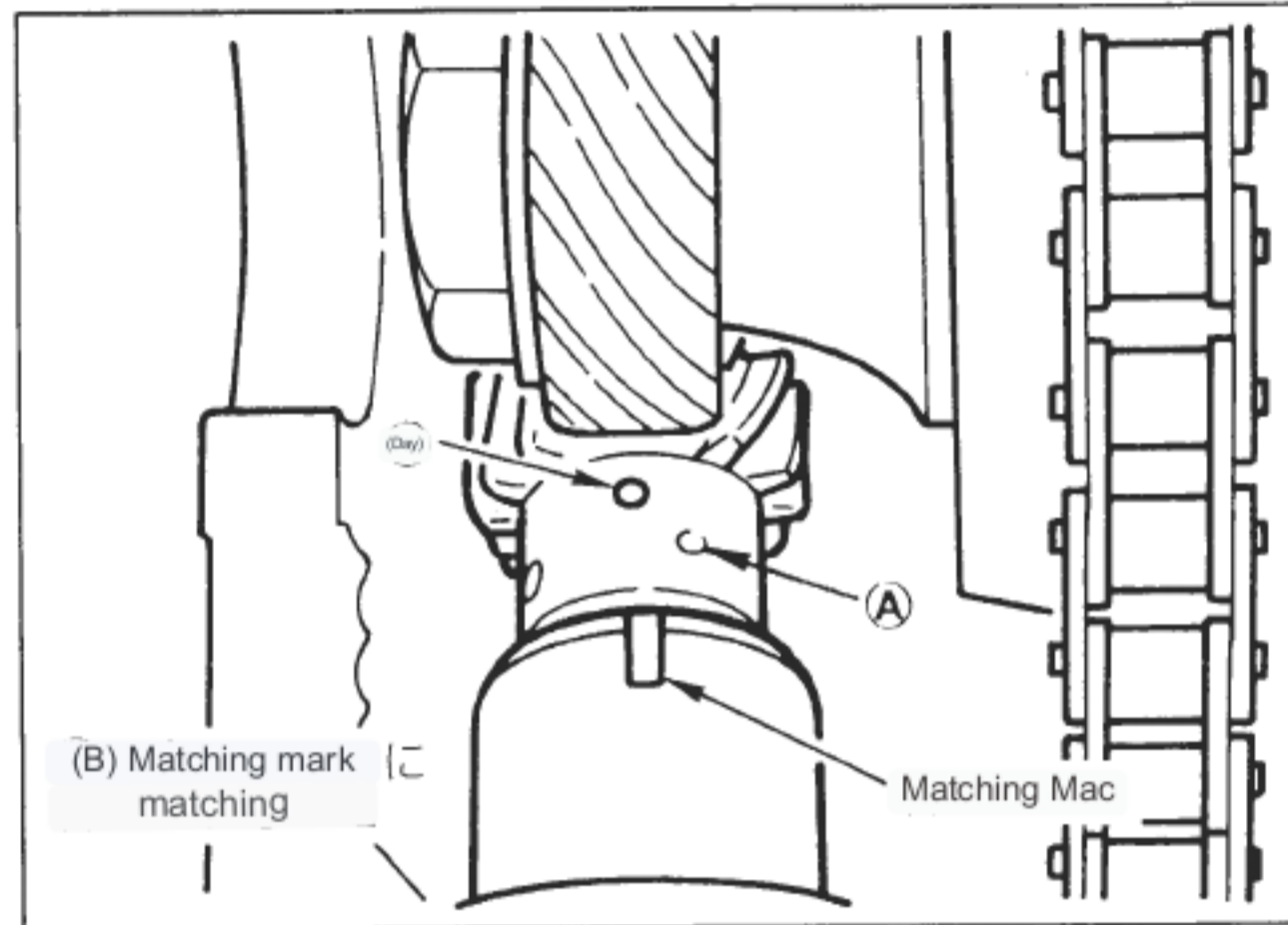
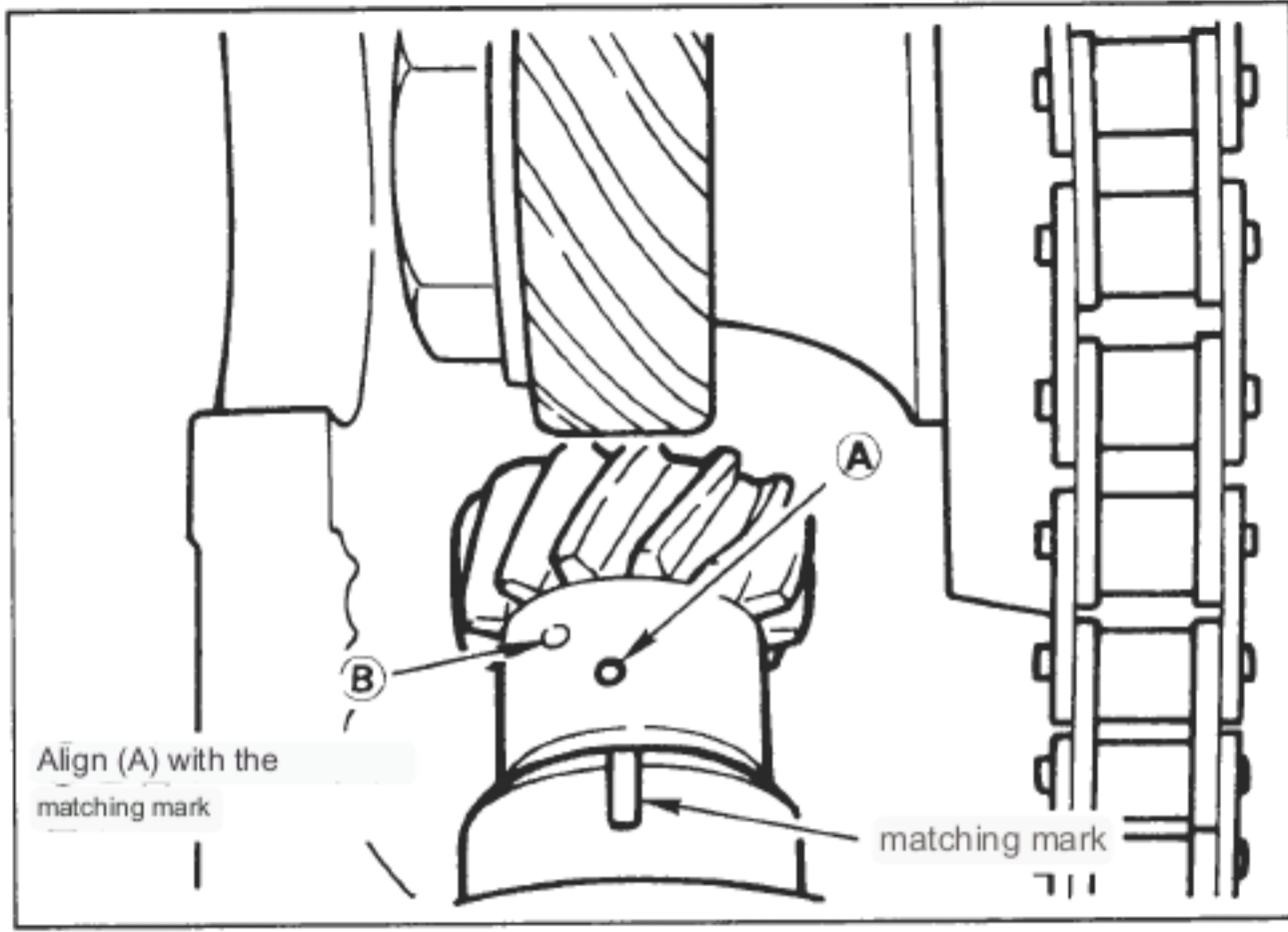
[Point 1] No. 1 cylinder compression top dead center confirmation

- Before removing the cam sprocket, align the mark (painted in yellow) on the crank pulley with the indicator on the front cover.



B02 - 7918

- At that time, the matching mark on each sprocket of the intake exhaust Make sure it is in the position shown on the left.
- If there is no matching mark at the position shown on the left, turn the crank pulley Rotate 1 in the direction.



[Point 2] Crank angle sensor removal and installation

removal

- Refer to [Point 1] and set No.1 cylinder compression top dead center.
- Remove two mounting bolts.

attachment

- No.1 Cylinder compression top dead center.
- Align the match mark (water) on the crank angle sensor.
- When the crank angle sensor is installed, align it with the alignment mark (B).

to be

- Tighten the mounting bolts at 1.3 to 1.6 kg-m.

[Point 3] Remove and install the tensioner

removal

- Gradually loosen the mounting nut and remove it while pressing with a waste cloth. CAUTION: The tensioner is under tension, so be careful not to pop it out or spill oil inside.

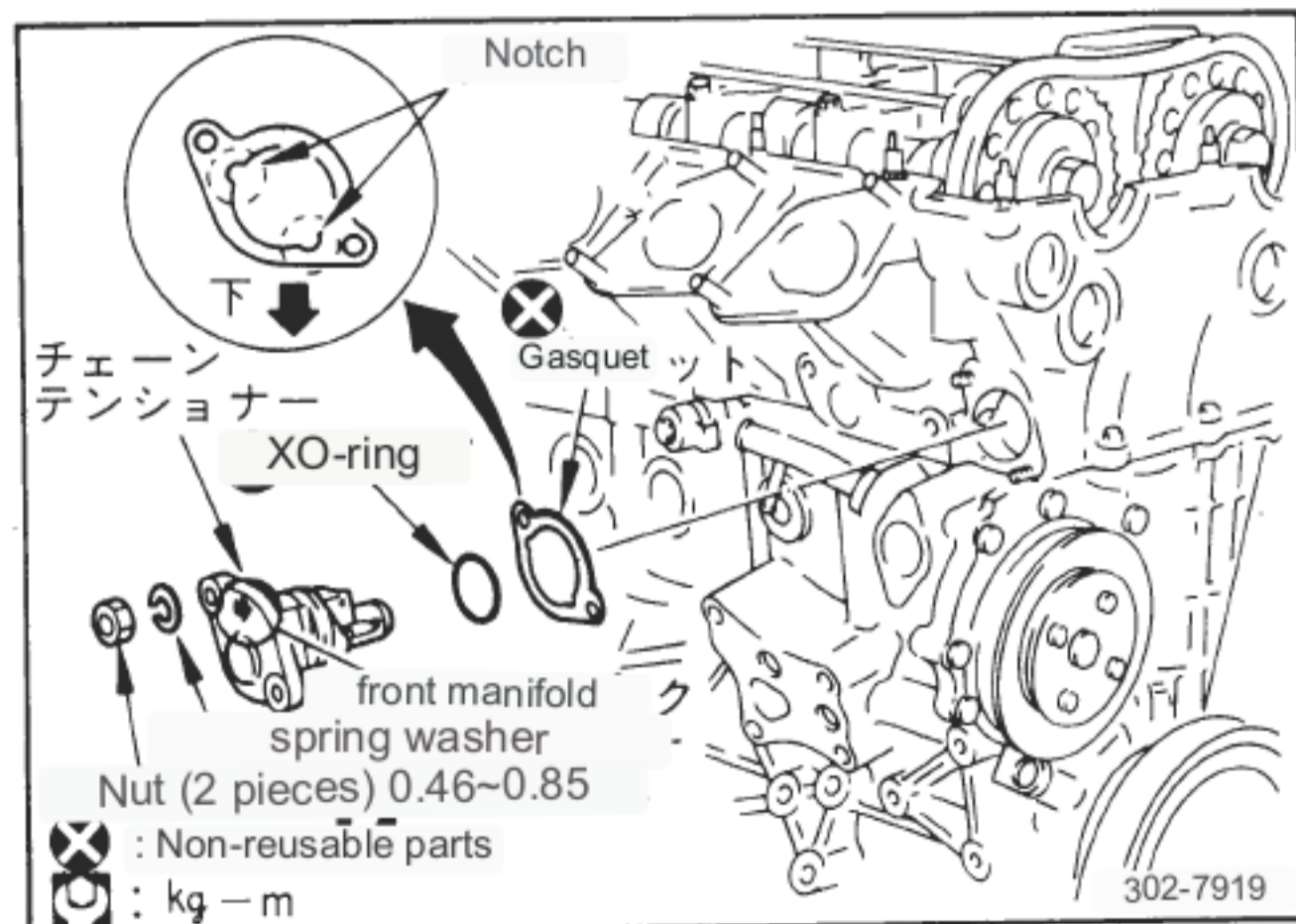
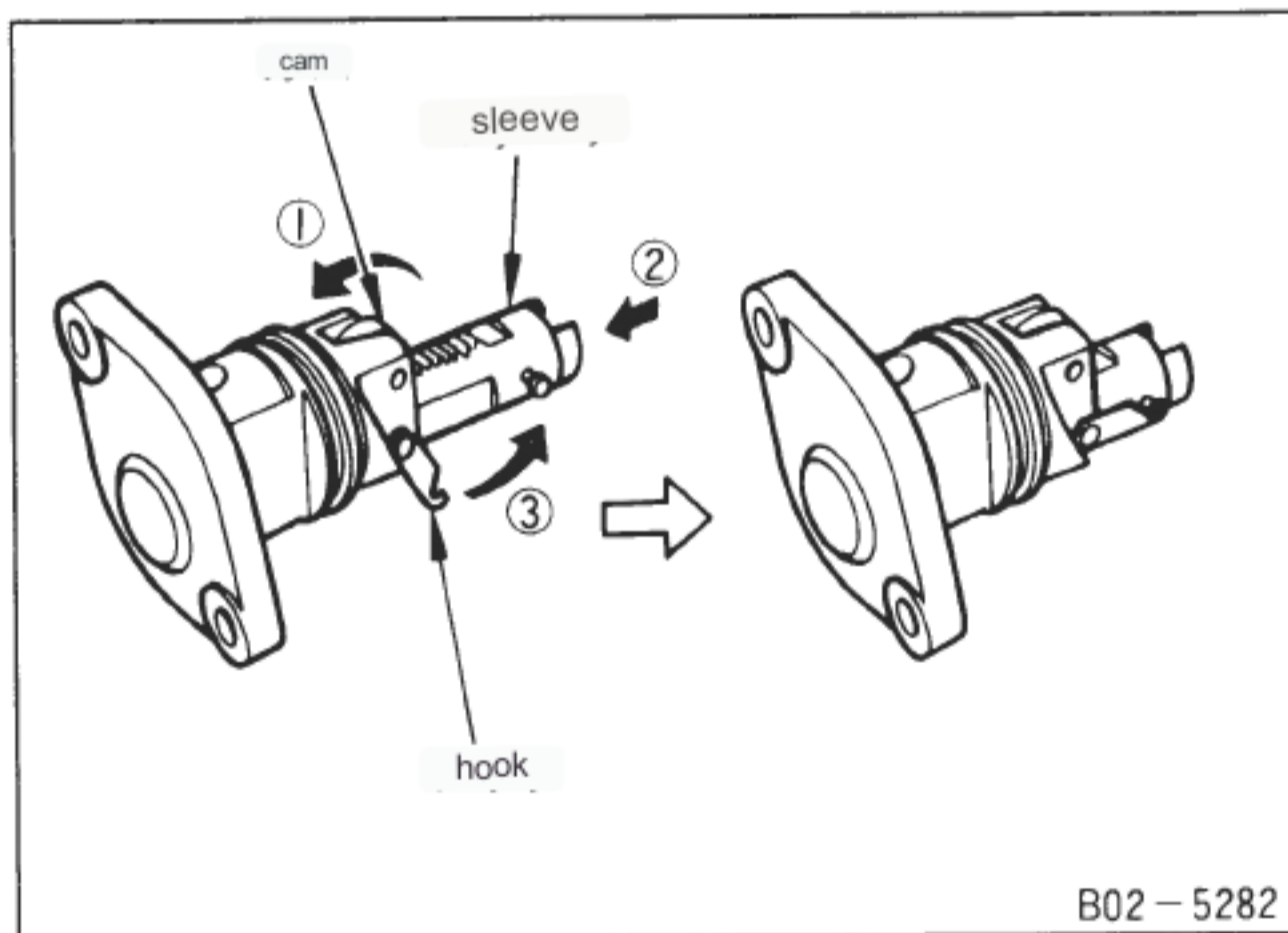
attachment

- Assemble after tightening the tensioner and hooking it as follows.

(After assembling and turning the crankshaft 1/4 turn, automatic

To be released)

- ① Push the cam (stopper).
- ② While maintaining the condition of ①, compress the sleeve.
- ③ put a hook on.



- Replace the gasket with a new one.

- Install the gasket with the notch facing down.

- Apply a small amount of engine oil to the tensioner and cylinder head mounting holes.

apply.

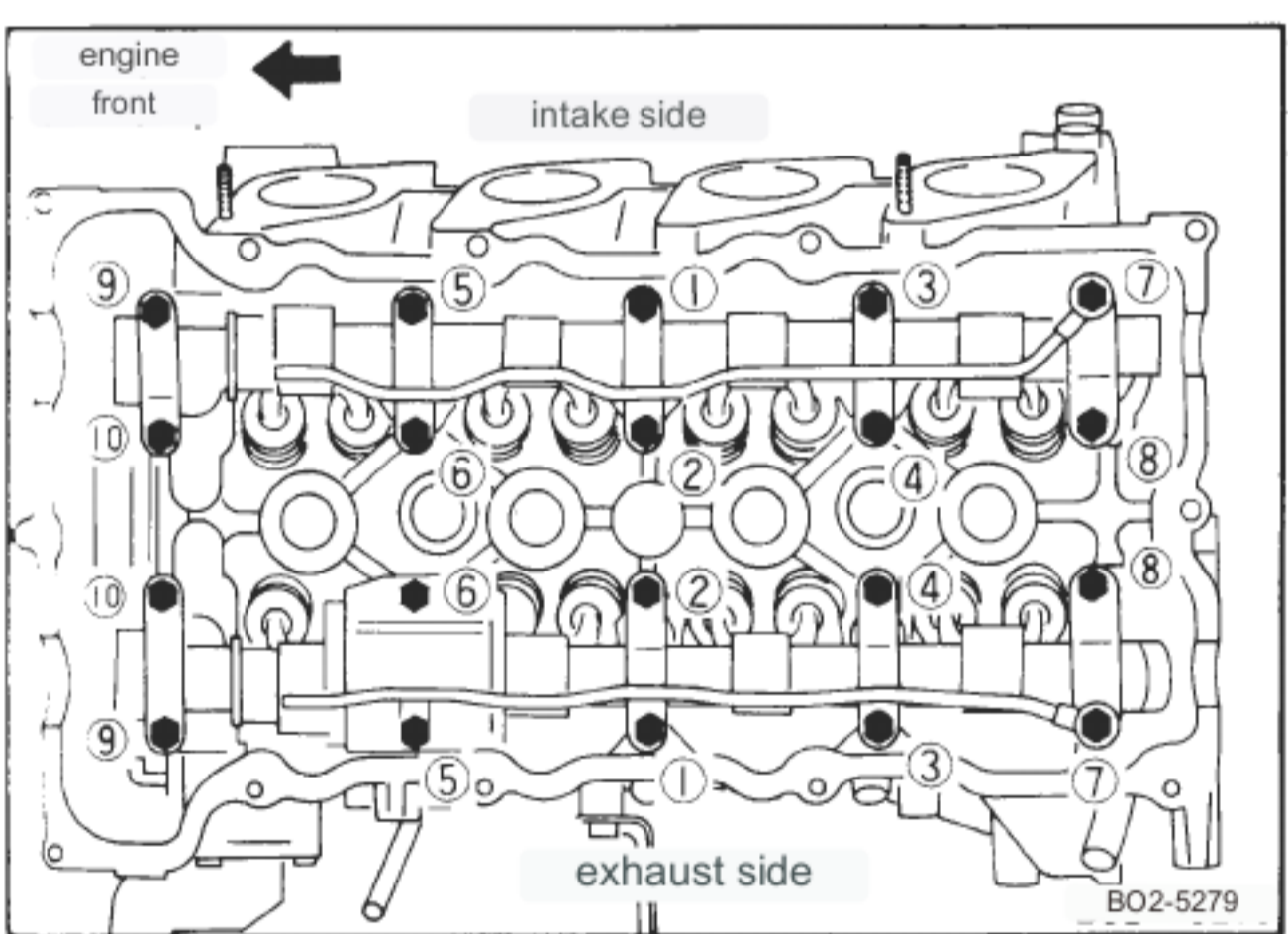
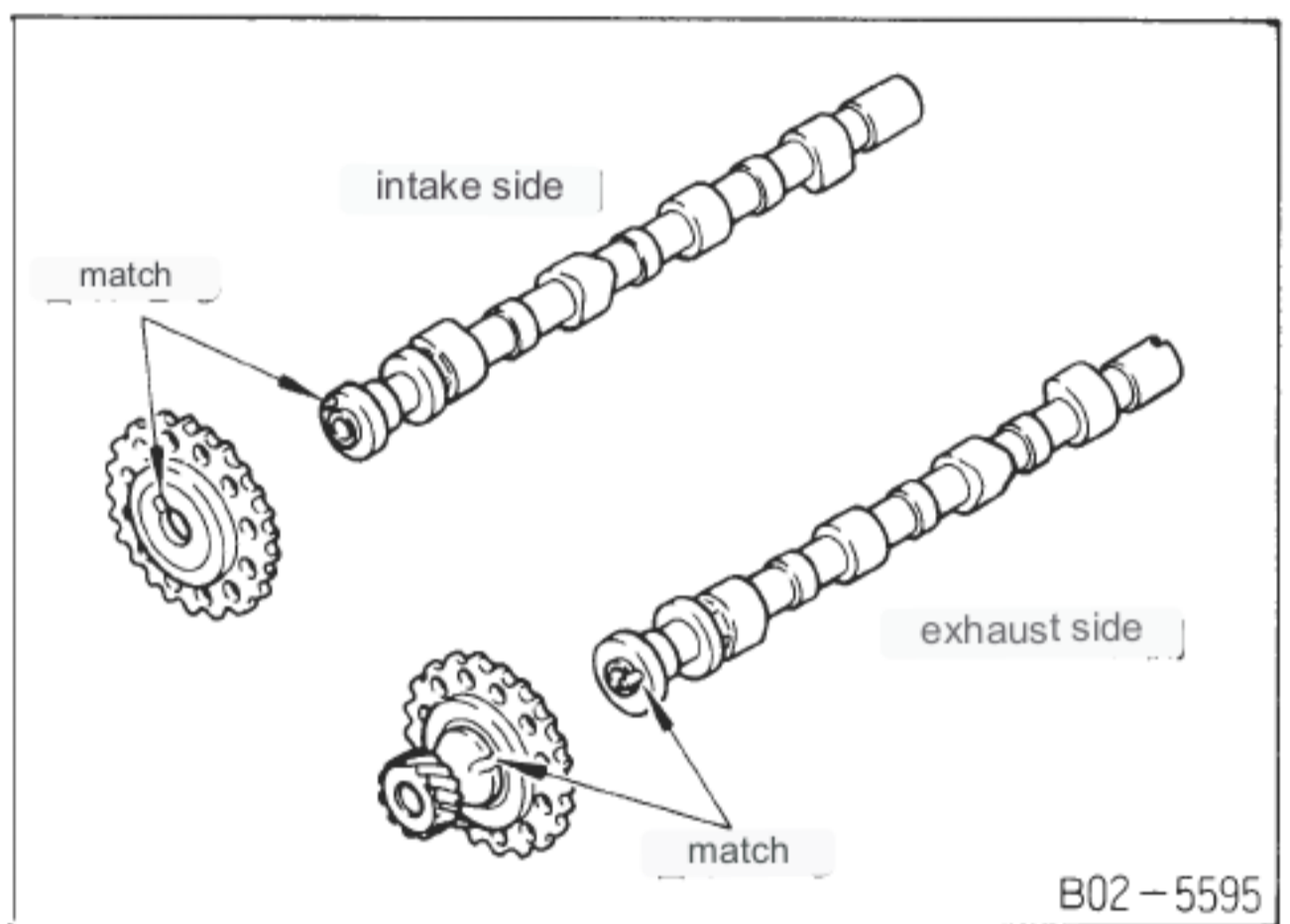
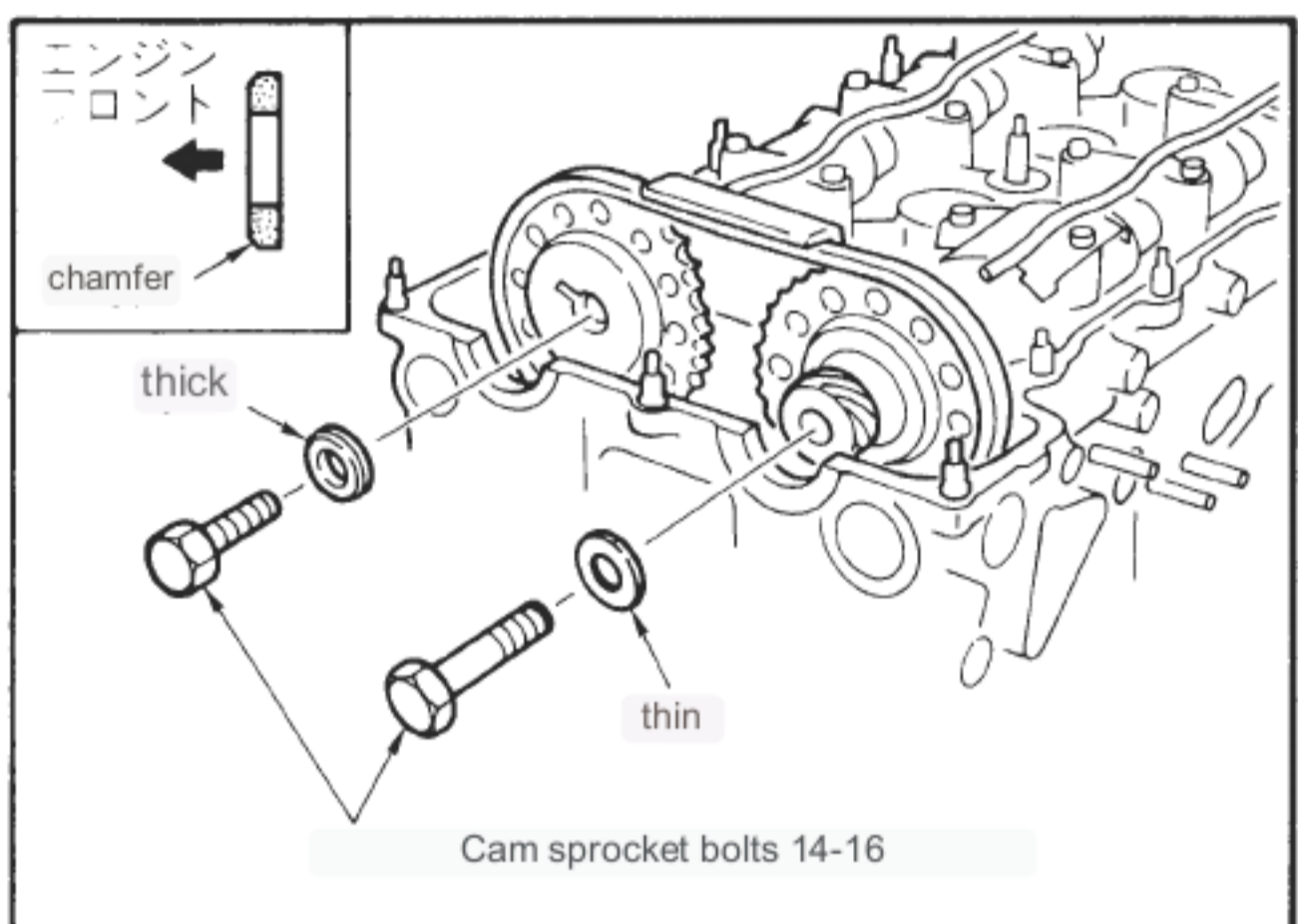
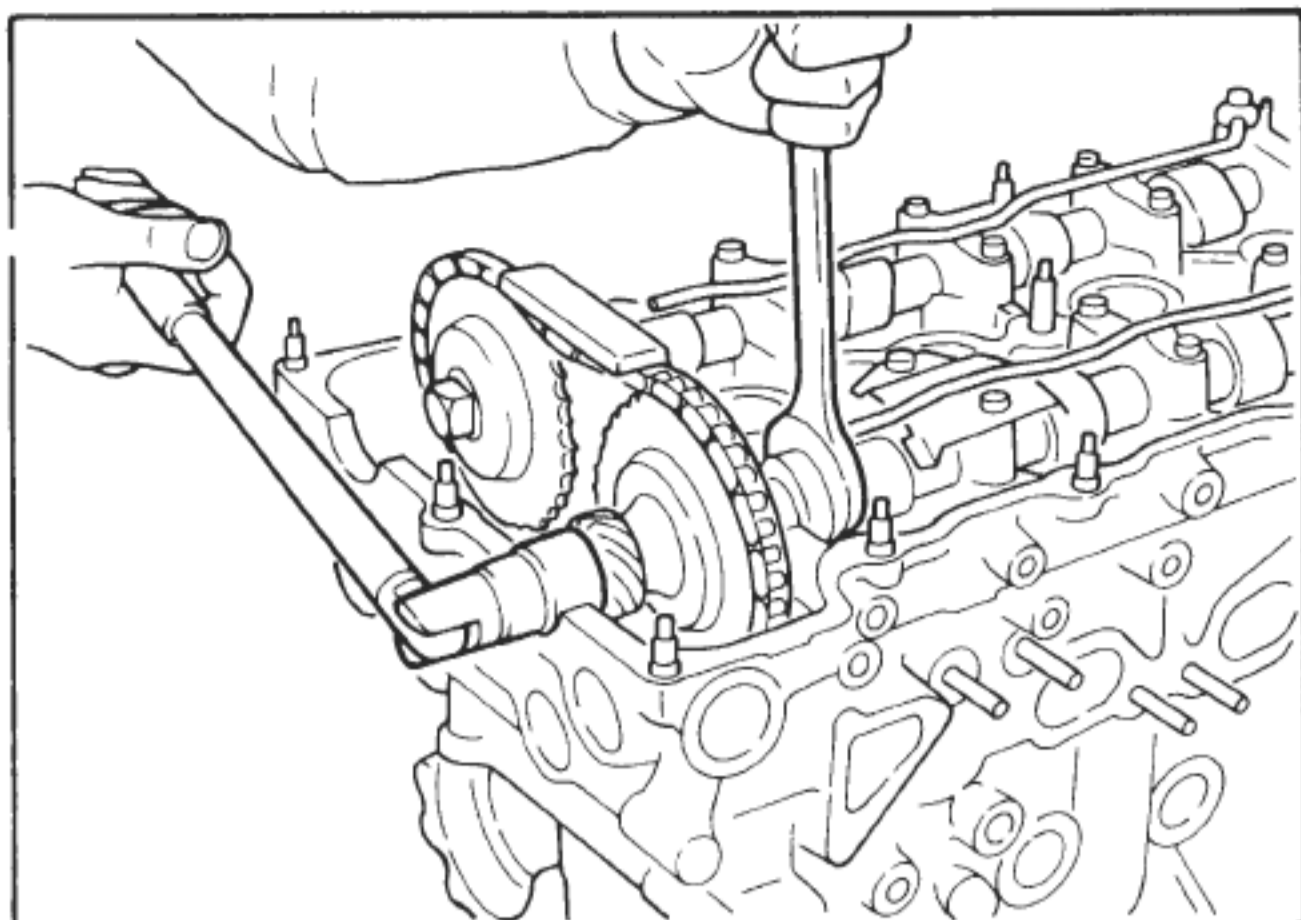
- Attach the O-ring without damaging it.

- Take the tensioner with the front mark facing the front of the engine.

wear.

- After installation, manually turn the crankshaft 1/2 turn (180 degrees) counterclockwise.

After that, turn it 1/2 turn (180 degrees) clockwise and check that the hook is released.



[Point 4] Remove and install the cam sprocket

removal

- To remove the cam sprocket, remove the hexagonal part of the cam shaft with a spatula and fix it with a nut.

attachment

- Attach the timing chain by aligning the timing marks on the cam sprocket and the timing chain.

Cam sprocket bolt tightening torque	(kg-m)	14-16
-------------------------------------	--------	-------

- Because the cam sprocket washer has an installation direction, install it with the chamfered surface facing the front of the engine as shown in the left figure.
- Align the dowel pin on the camshaft with the groove on the cam sprocket and install.

[Point 5] Installation and removal of camshaft mounting bolts

Installation is performed in the following procedure.

(1) Intake and exhaust side at 0.2kg-m

: ⑨, ⑩ After tightening, ①~⑧

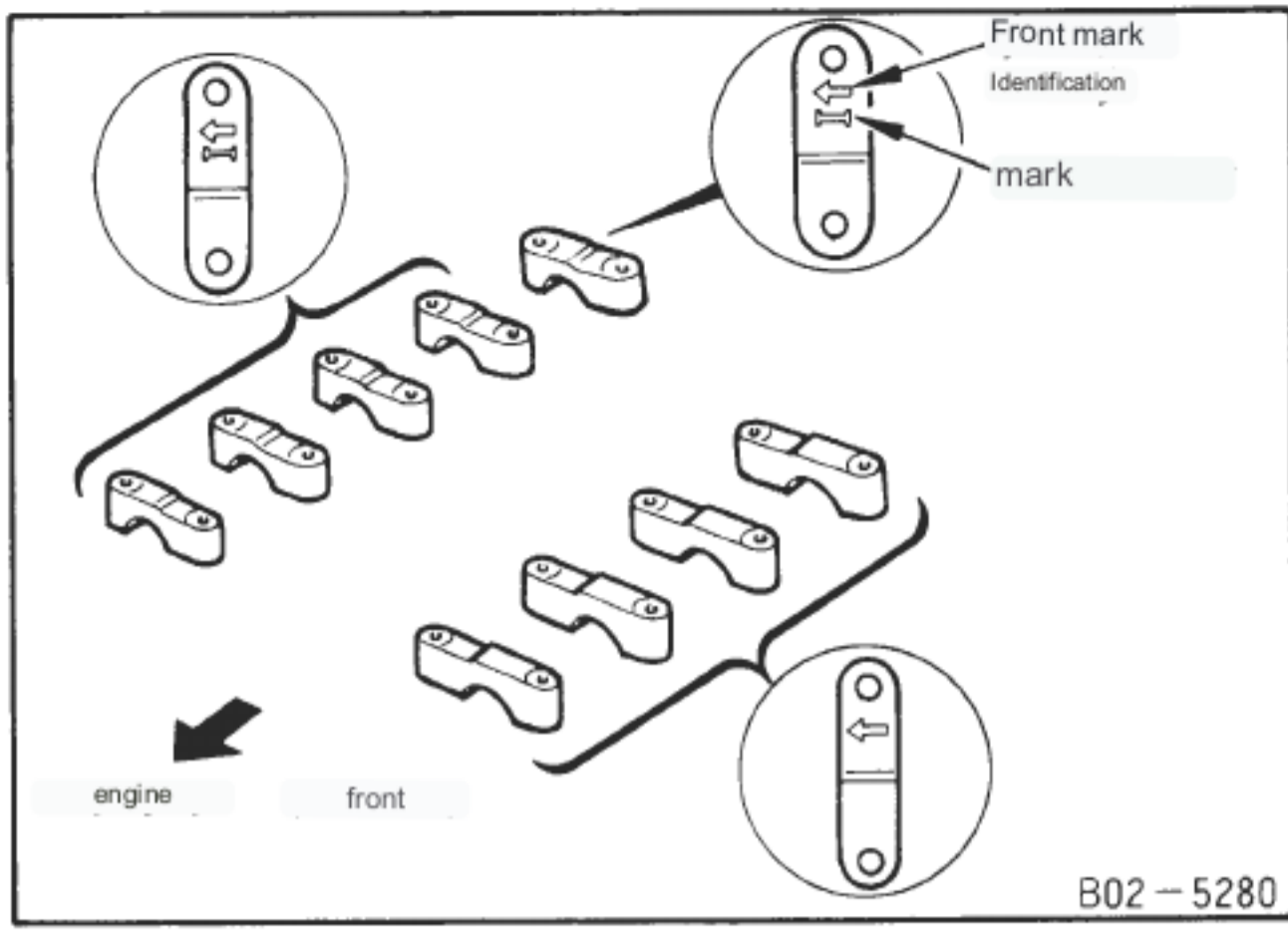
(2) 0.6kg-m on both intake and exhaust sides: Tighten in numerical order.

(3) 0.92~1.2 (Intake, Exhaust: ①~⑩) Intake

Exhaust side: Tighten in numerical order.

- Remove in the order of 10~).

位	under neck length (mm)
⑦	65
①③⑤⑨	55
②④⑥⑧⑩	40



B02-5280

[Point 6] Remove and install the camshaft bracket

removal

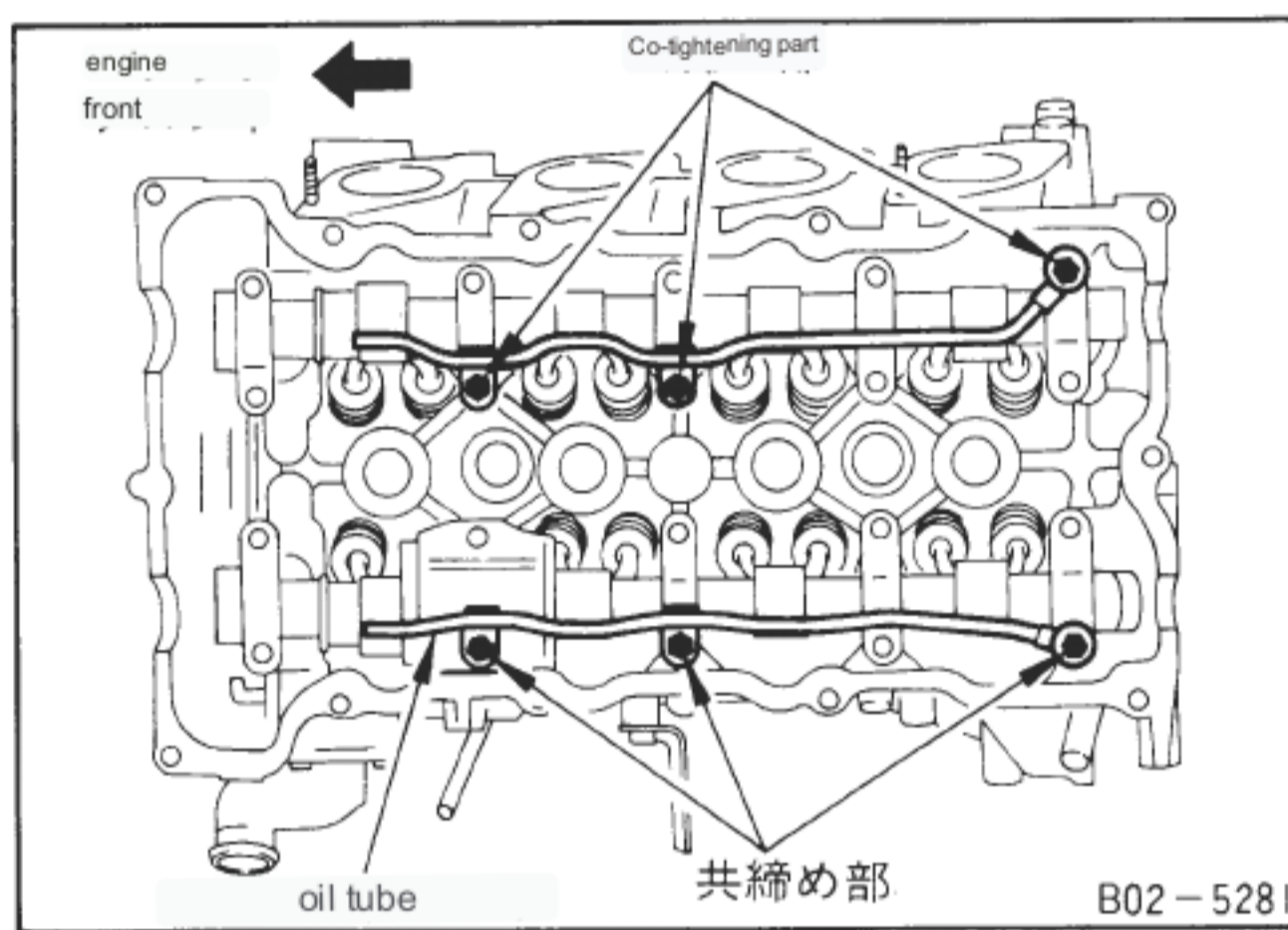
- Before removing, mark the mounting position with paint or the like.

attachment

- Attach to the position before removal.
- The identification of the camshaft bracket is as follows.

identification \ site	intake	Exhaust
Identifying mark	Yes	none
front mark	Yes	Yes
oil groove	none	Yes

- When installing the cam bracket, fasten the oil tube together with the part shown on the left.



B02-5281

[Point 7] Camshaft installation

- Install so that the position of the knock pin on the camshaft is as shown in the left figure.

Kick. (No. 1 compression top dead center)

- The engine is attached to the journal surface, thrust surface, and cam portion of the camshaft.

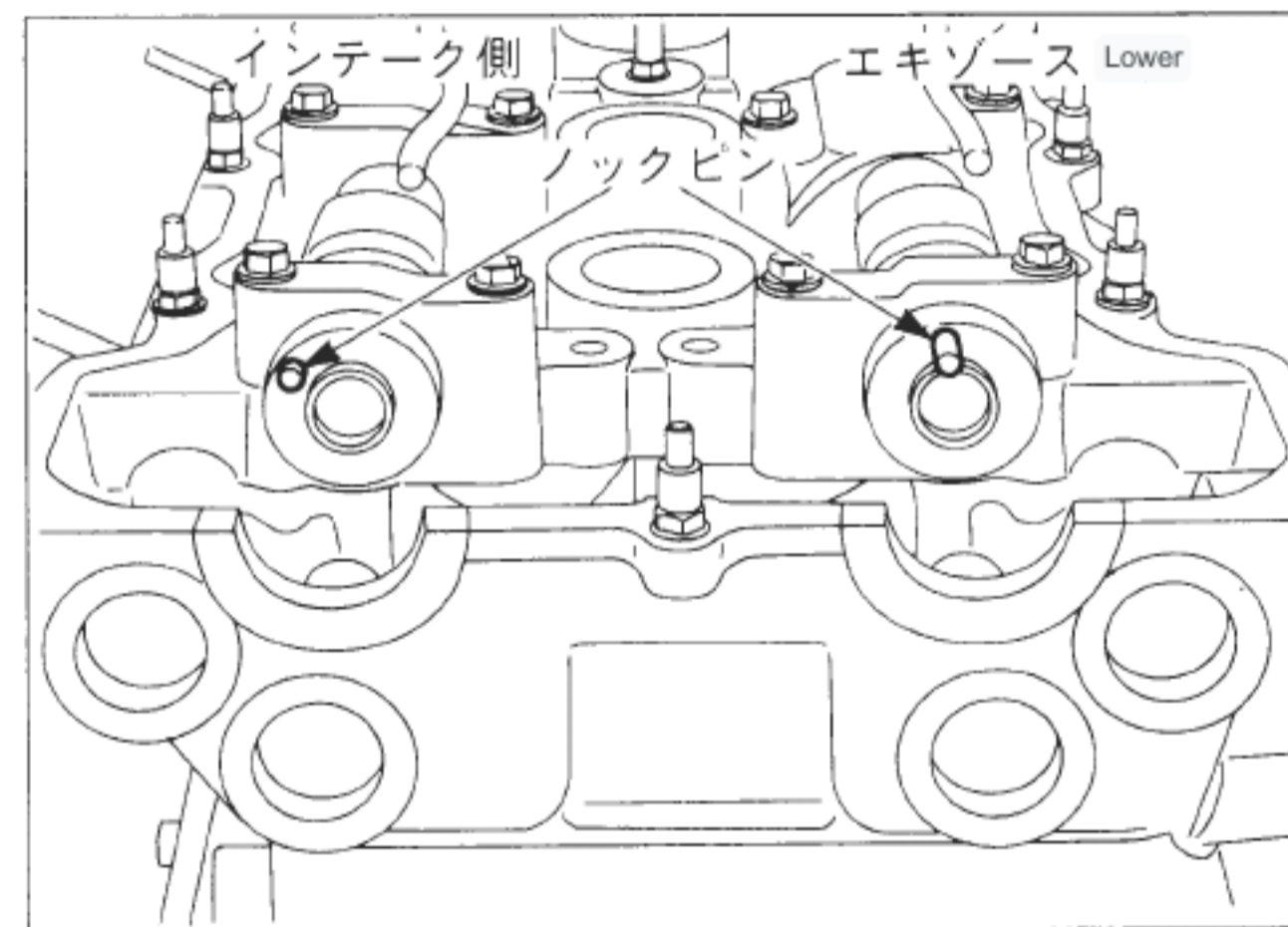
Apply oil and install.

- The identification of the camshaft is as follows.

識別 \ Part	Intake Identification	exhaust,
Camshaft rear end groove	none	Yes

- Identify the camshaft with identification paint.

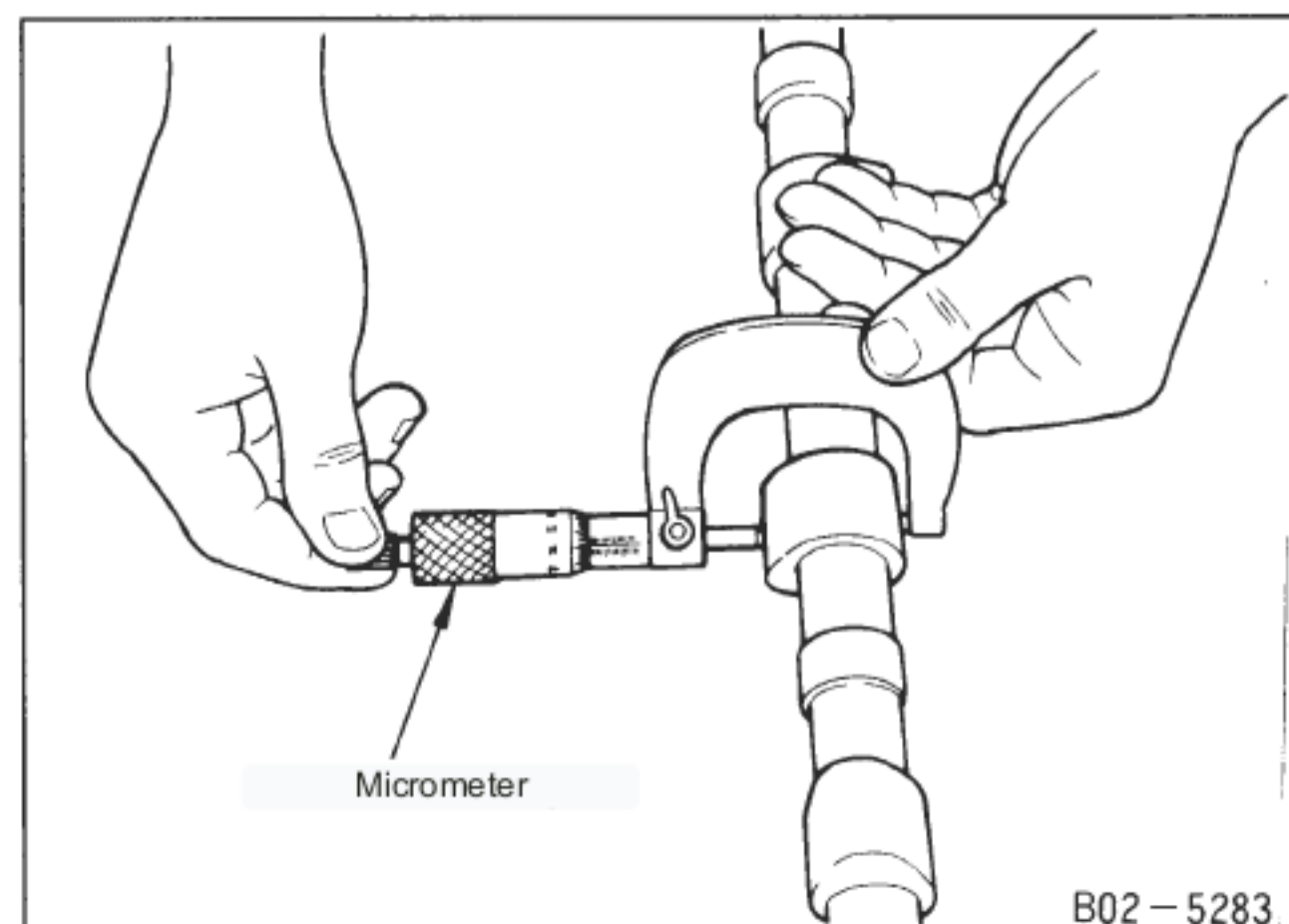
identification paint	intake	2 light blue
	Exhaust	



[Point 8] Camshaft inspection

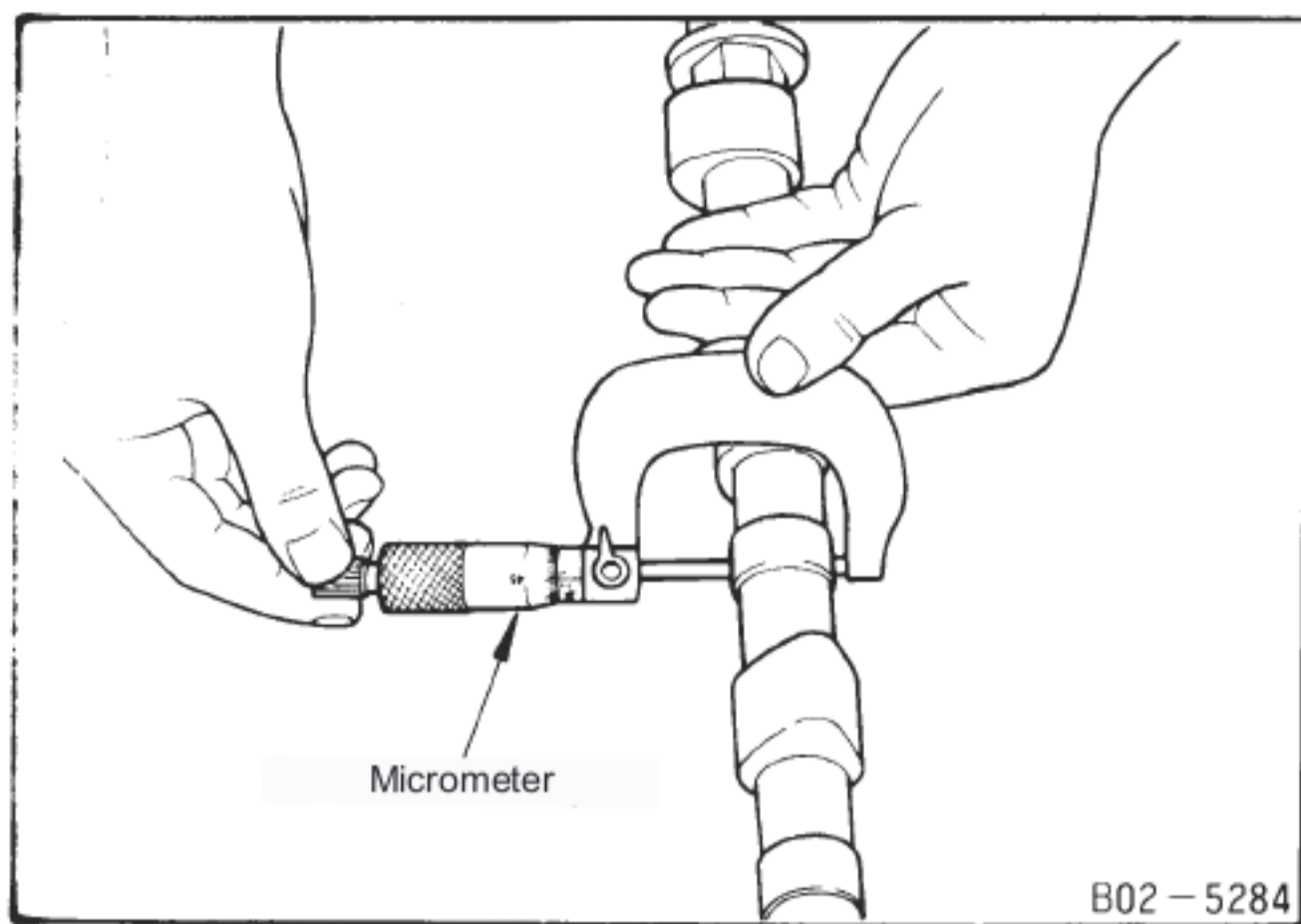
Cam nose height check

- Measure with a micrometer.



B02-5283

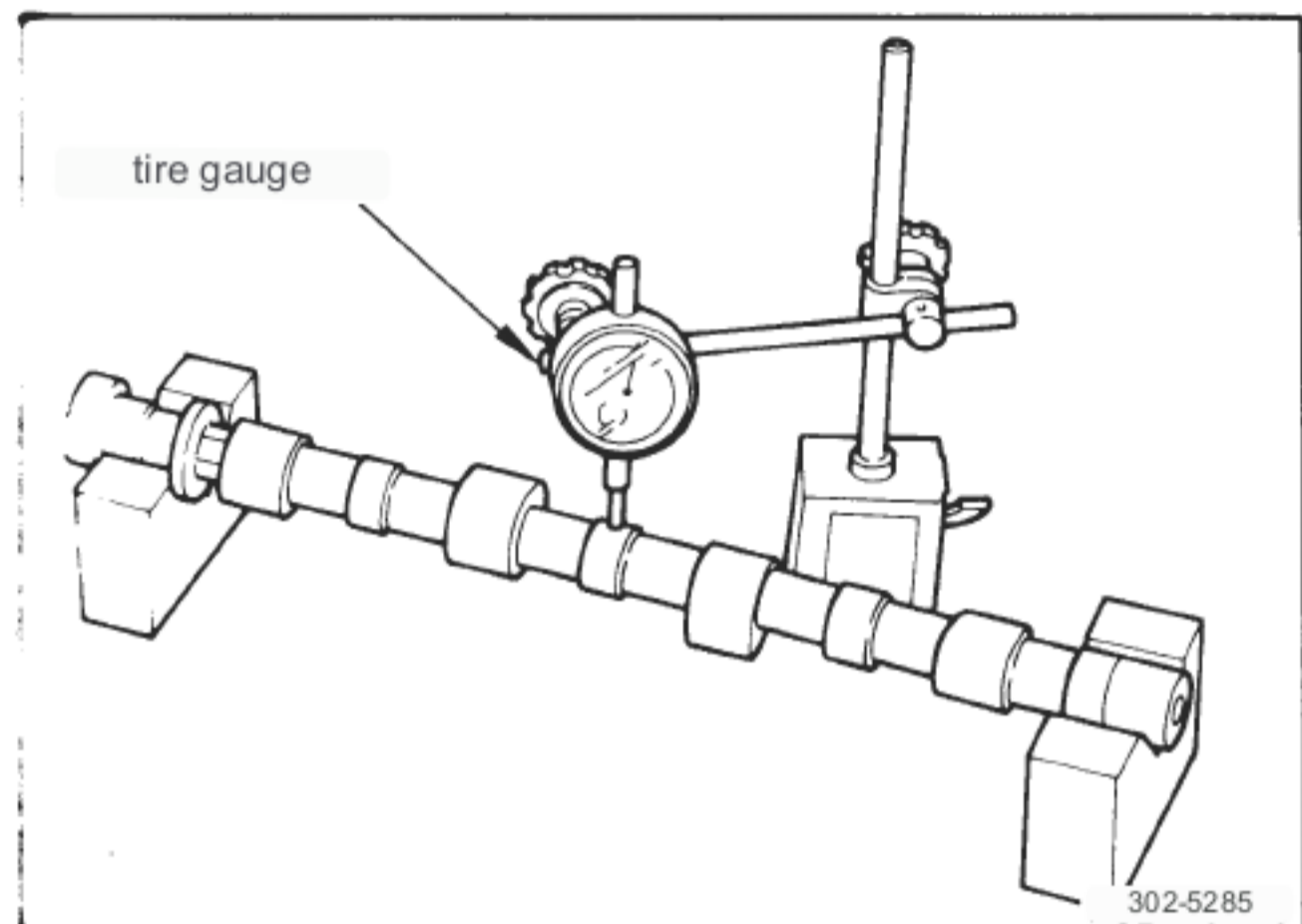
Intake side standard value	(mm)	38.103-38.293
Exhaust side reference value		(mm) 37.920 38.110



Cam journal outer diameter inspection

- Measure with a micrometer.

standard	value	(mm)	\$27.935-27.955
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Camshaft bend inspection

• Prepare a V-block on the surface plate and attach journals to both ends of the camshaft.

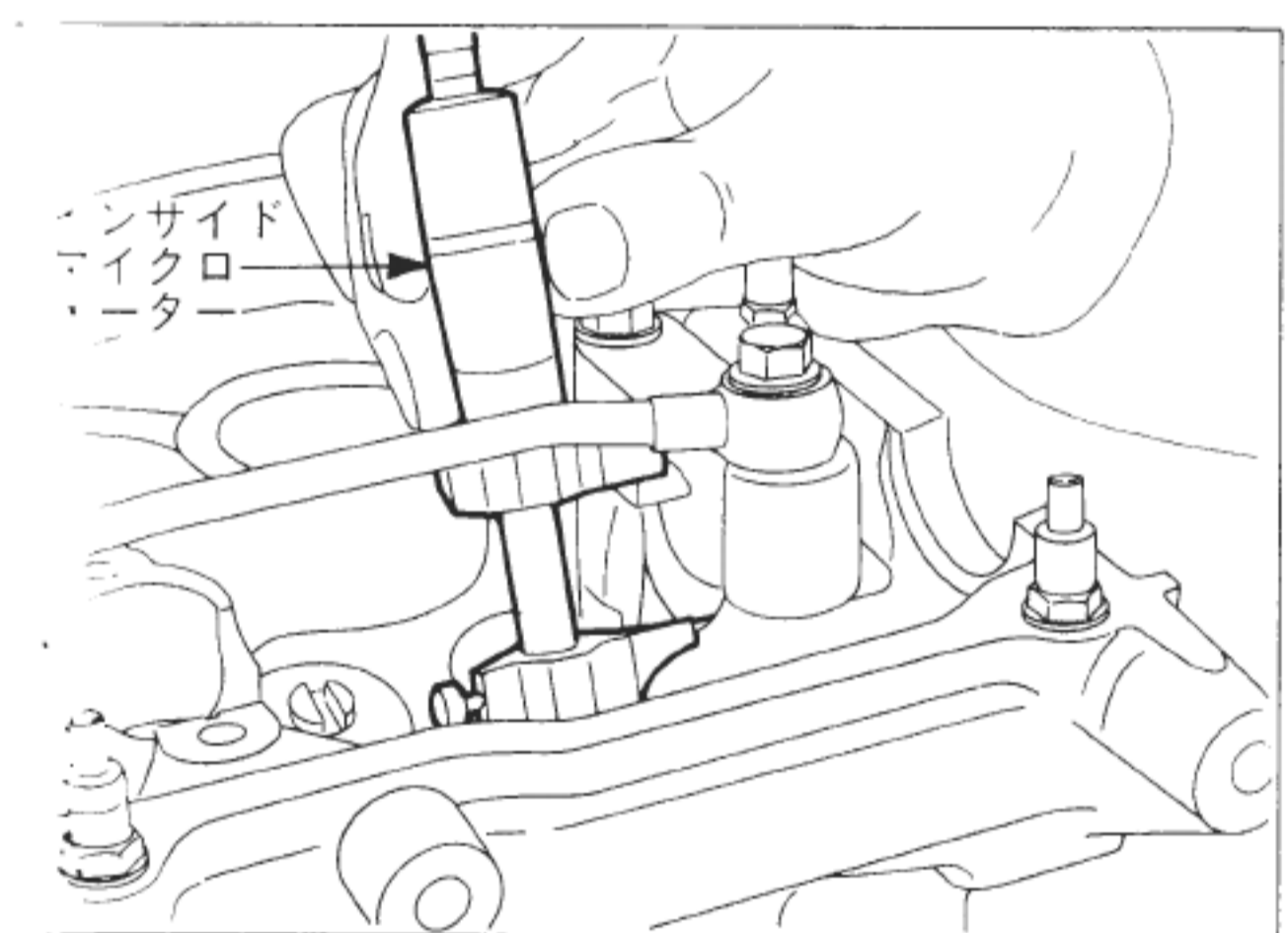
(No.1 and No.5).

• Place a dial gauge in the center of No. 3 journal, avoiding the oil groove. set vertically.

• Turn the camshaft in one direction by hand and read the deflection on the dial gauge.

• 1/2 of the amplitude is bending.

Limit	value	(mm)	(mm)	0.05
-------	-------	------	------	------



[Point 9] Camshaft bracket inner diameter inspection

• Tighten the camshaft bracket to the specified torque. • Measure using an inside micrometer.

No.1~No.5 Reference	value	(mm)	\$28.000~28.021
---------------------	-------	------	-----------------

[Point 10] Camshaft oil clearance check

① Method by measurement

• Calculate from the outer diameter of the cam journal and the inner diameter of the camshaft bracket measured in [Point 8] and [Point 9]. (Oil Clearance = Camshaft Cam clearance! Bracket inner diameter Journal outer diameter)

No.1~No.5 Reference	value	(mm)	0.045 0.086
---------------------	-------	------	-------------

② Method using plastigage

• Journal part of camshaft and inner diameter part of camshaft bracket Wipe off surface oil and dust.

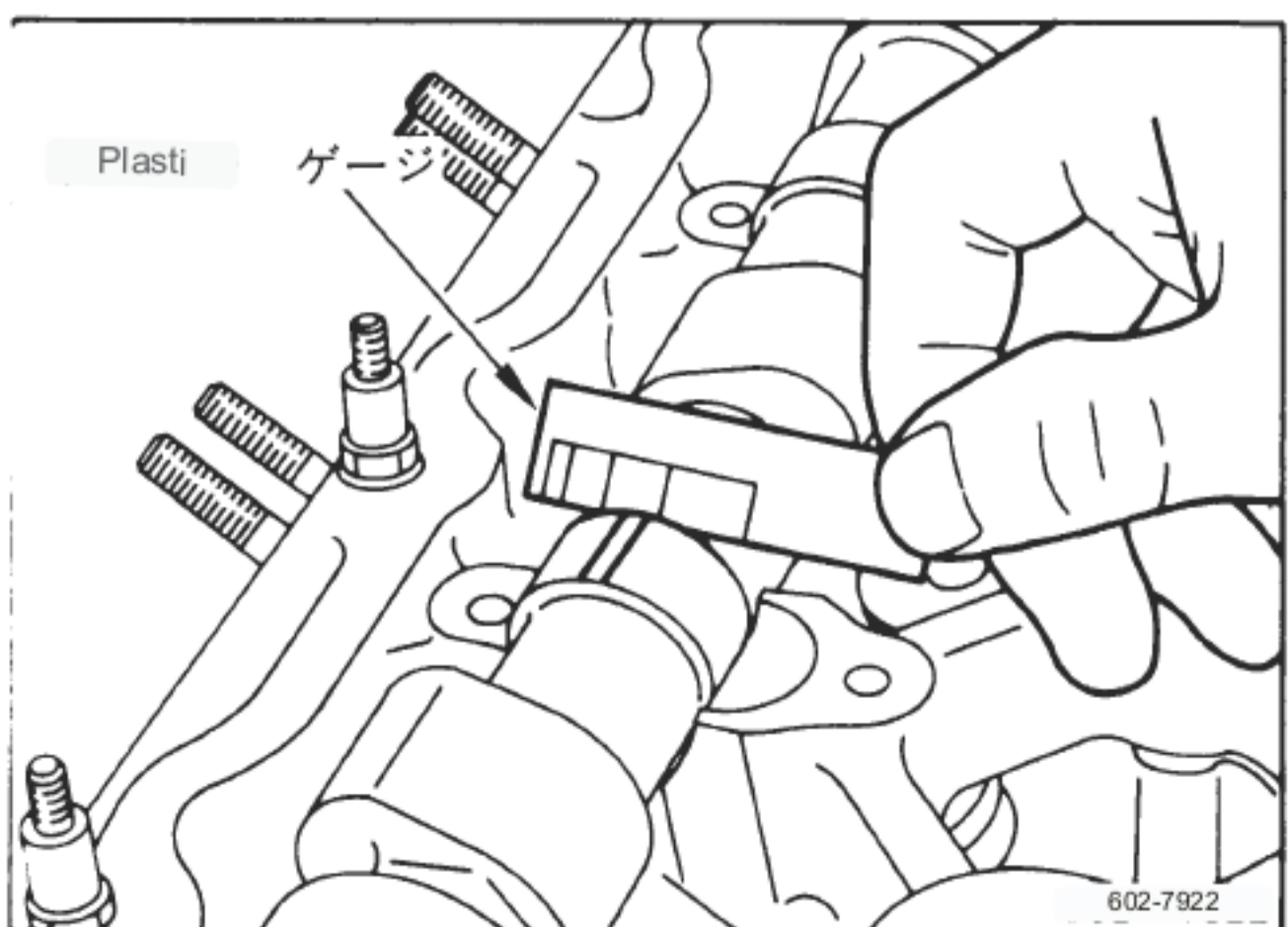
• Cut the plastigauge slightly shorter than the width of the camshaft bracket. and place it in the axial direction of the camshaft.

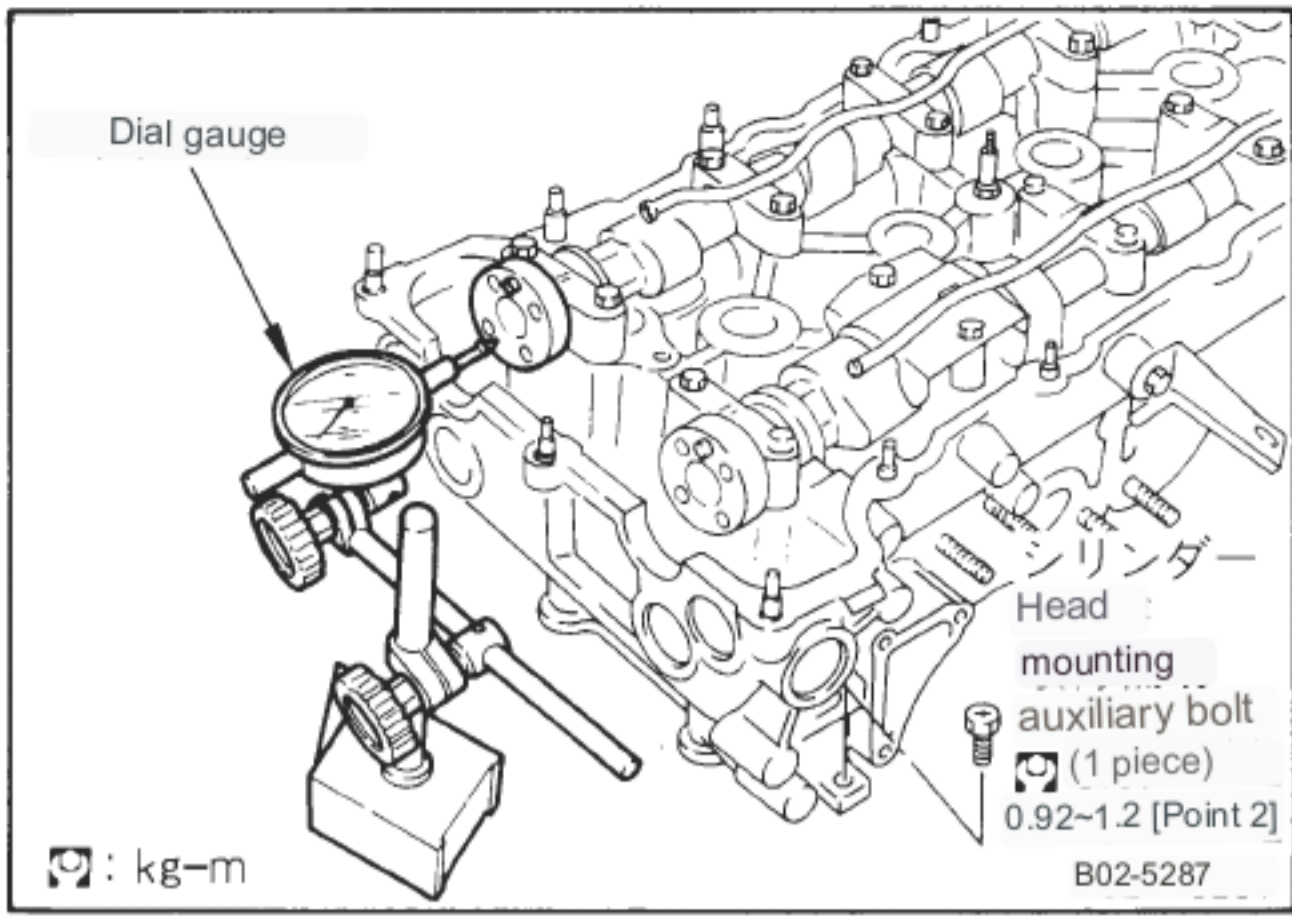
• Tighten the camshaft bracket to the specified torque.

CAUTION: Never turn the camshaft. • Remove the camshaft bracket and remove the scale from the plastigage bag.

Measure the width of the plastigauge with a ruler. •

• The standard value is the same as in "(1) Method by measurement".

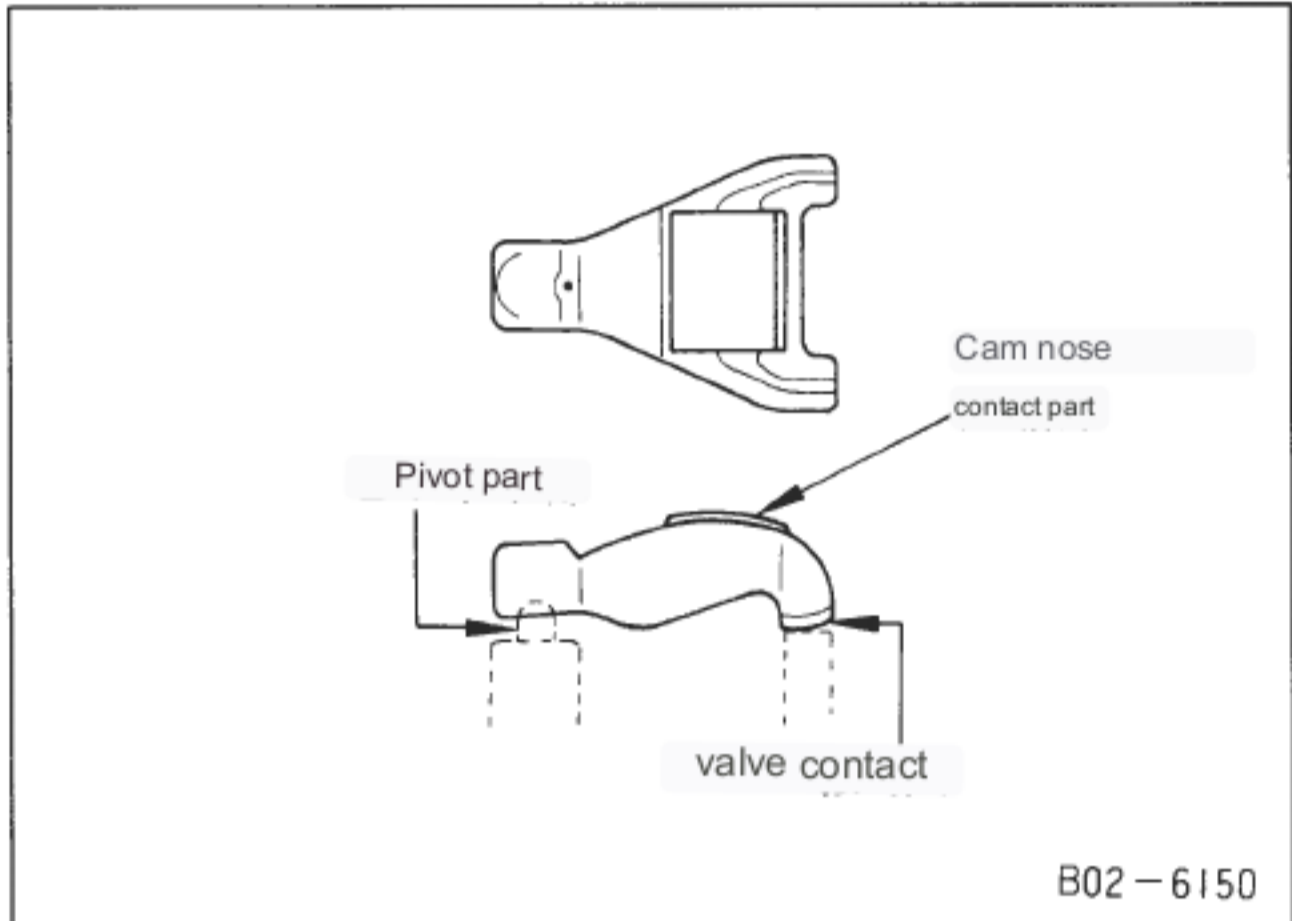




[Point 11] Camshaft end play check · Set a dial gauge

on the front end of the camshaft in the thrust direction, and measure the deflection of the dial gauge when moving the camshaft back and forth. read.

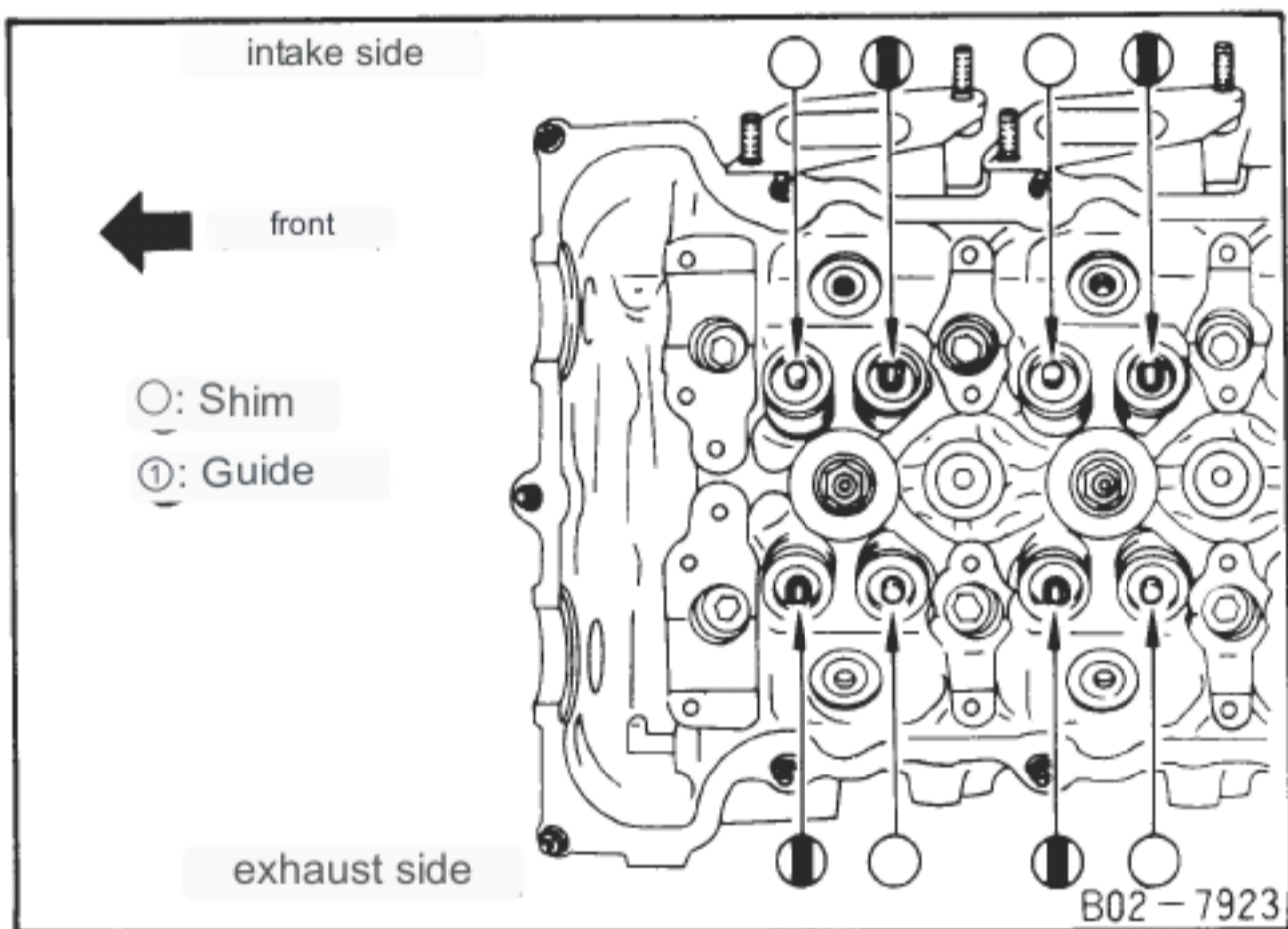
group	value (mm)
	0.055 0.139



[Point 12] Rocker arm inspection

- No scratches or uneven wear on the pivot part, cam nose contact part, or valve contact part.

Good things.



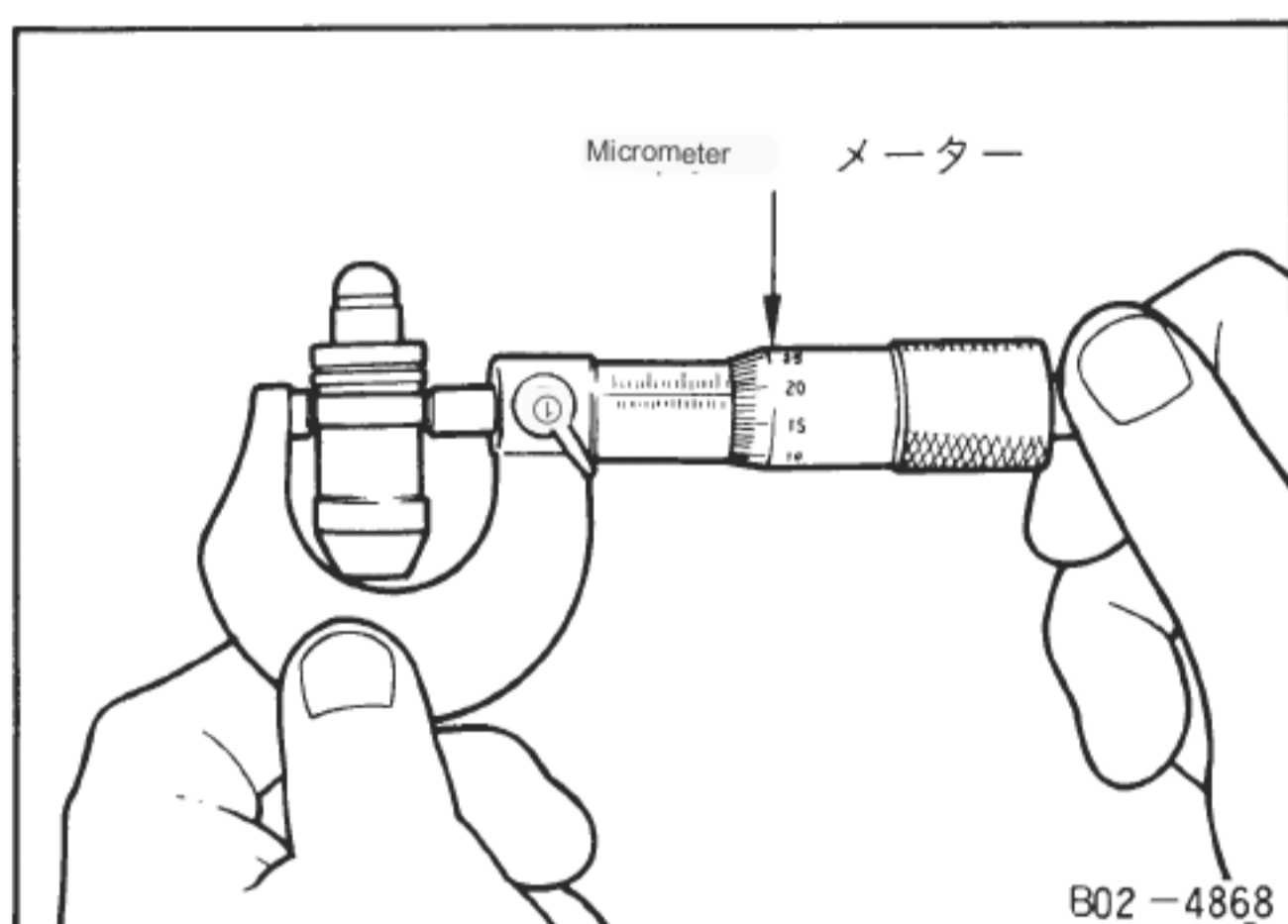
[Point 13] Remove and install shims and valve guides

Removal ·

Separate the shims and guides so that they do not attach incorrectly when removing.

attachment

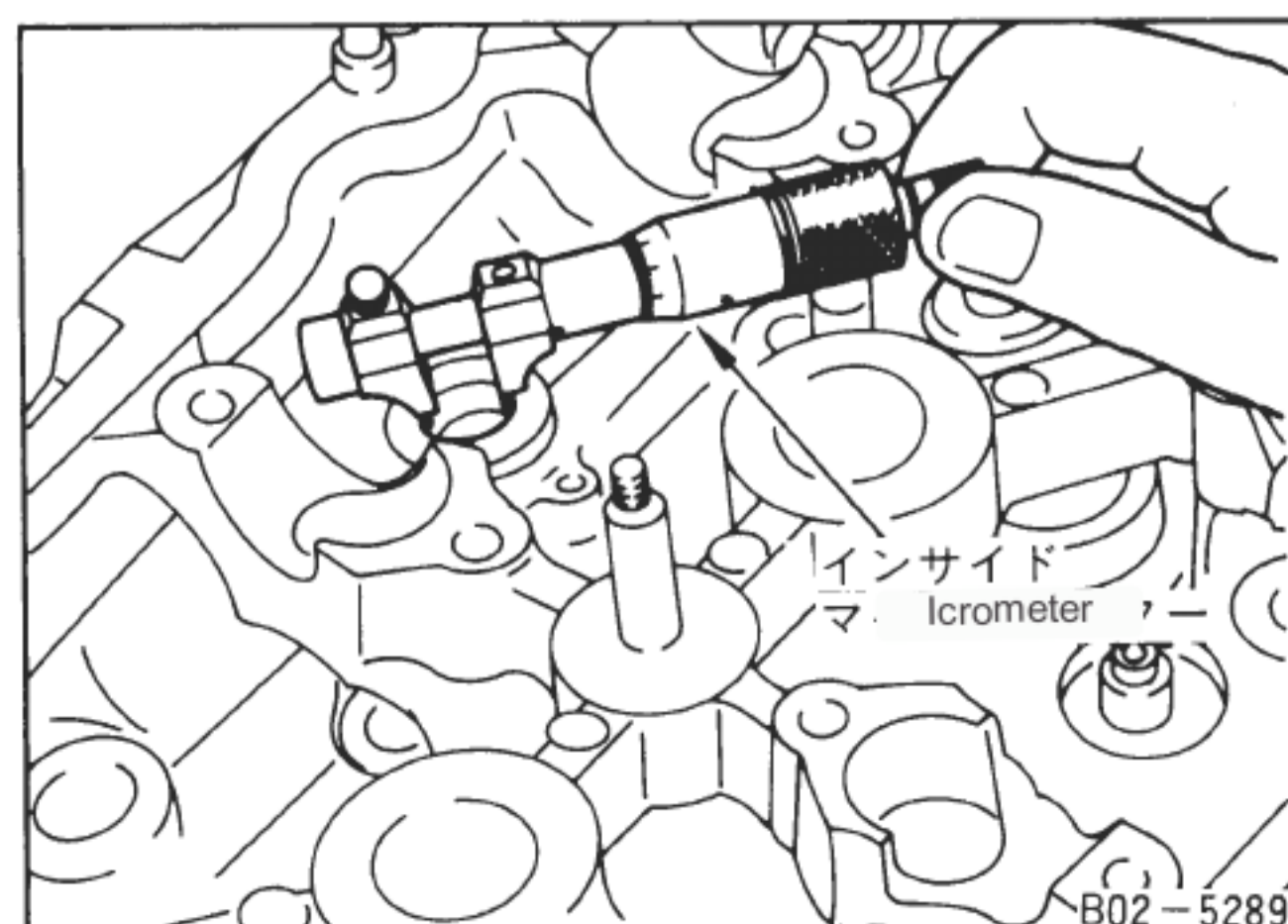
- Attach in the same position as when removed.
- Refer to the diagram on the left for the positional relationship between the shim and the valve guide.



[Point 14] Hydraulic lash adjuster outer diameter inspection

- Measure using a micrometer.

Standard	value (mm)
	ϕ 16.980 16.993



[Point 15] Checking the inner diameter of the hydraulic lash adjuster

hole · Measure the inner diameter of the hydraulic lash adjuster hole on the cylinder head using an inside micrometer.

Standard	value (mm)
	ϕ 17.000 17.020

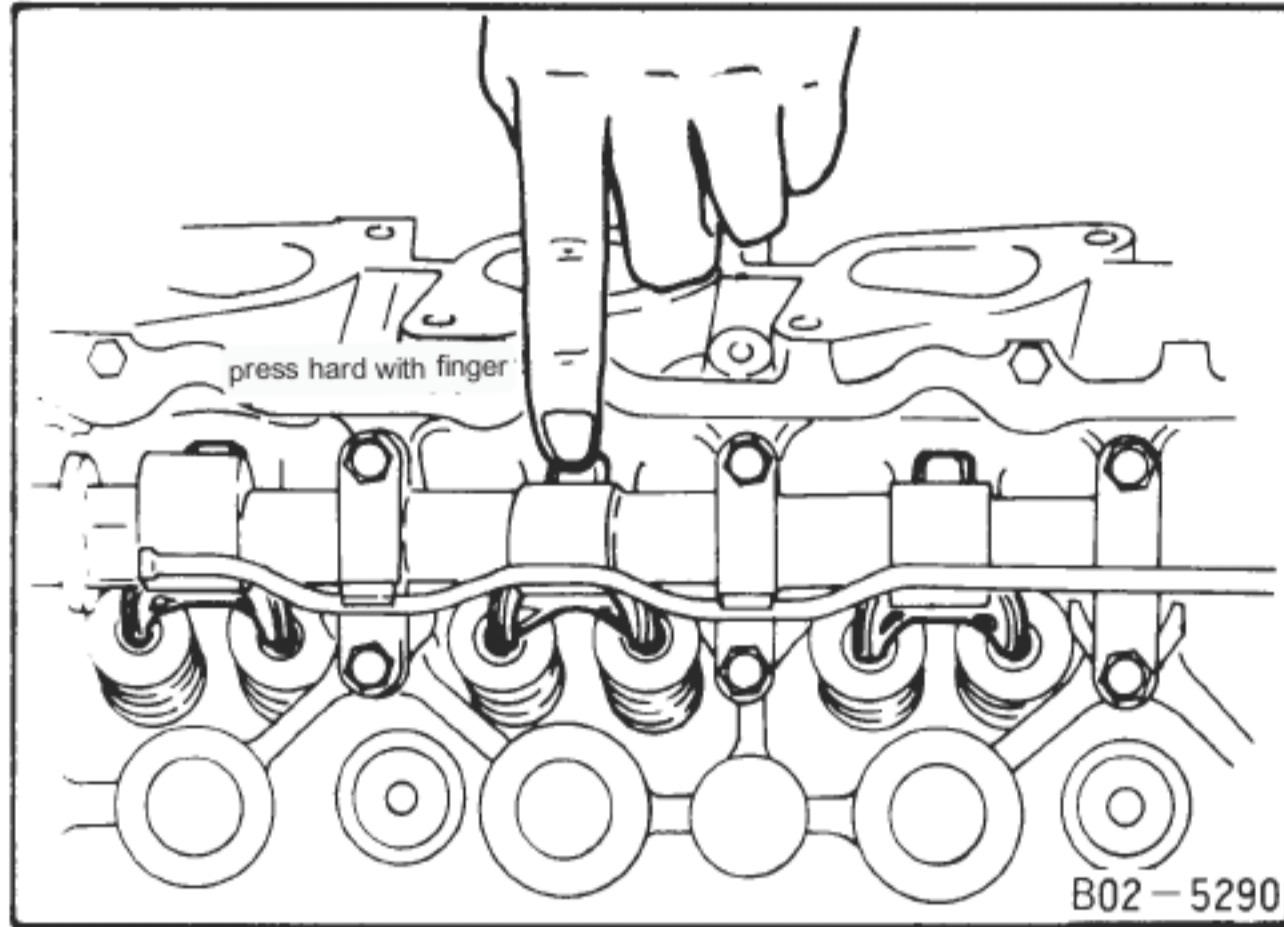
[Point 16] Hydraulic lash adjuster clearance check

- Hydraulic lash adjuster outer diameter and hydraulic lash adjuster measured in [Point 14] and [Point 15]

Calculated from the inner diameter of

$$(\text{Hydraulic (clearance)} = \frac{\text{the tar hole.}}{\text{Lash adjuster hole inner}}) - \left(\frac{\text{diameter (Hydraulic)}}{\text{Lash adjuster Star outer}} \right)$$

Standard value (mm)	diameter 0.007~0.040
---------------------	----------------------



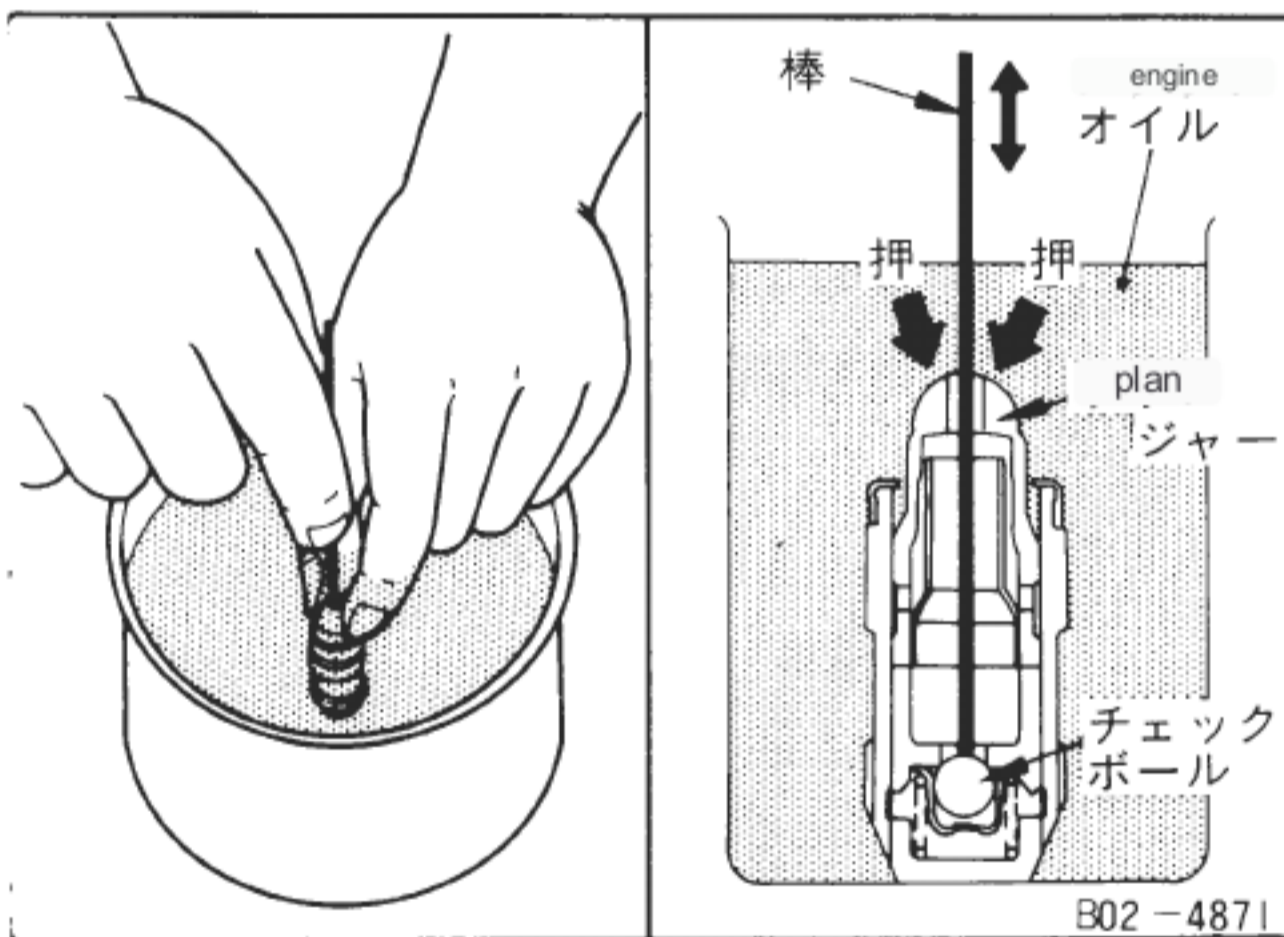
[Point 17] Check for air intrusion into the hydraulic lash adjuster

- When installing the hydraulic lash adjuster, or on the engine
If abnormal noise occurs during operation, check for air intrusion into the hydraulic lash adjuster.
- In the base circle section of the cam, turn the pivot of the rocker arm to the left.
Press hard with your finger as shown.

sinking limit (mm)	1.0
--------------------	-----

- If the amount of sinking is 1.0 or more, there is a possibility that air is mixed in the hydraulic lash adjuster high pressure chamber [Point 17]

Bleed air by



[Point 18] How to Bleed Air from the Hydraulic Lash Adjuster

- Take out the hydraulic lash adjuster, soak it in engine oil, and push the plunger as shown on the left with a thin stick.
- Lightly press the check ball.

CAUTION: Be careful not to damage the check ball. If the plunger

does not move even when pushed, the air bleeding operation is complete.

Caution: (1) If the air does not come out even after bleeding the air, replace the hydraulic lash adjuster.

(2) Since the hydraulic lash adjuster cannot be disassembled, Do not disassemble.

(3) When removing or storing the hydraulic lash adjuster, do not turn it over or turn it upside down.

[Point 19] Shim adjustment and assembly of rocker arm

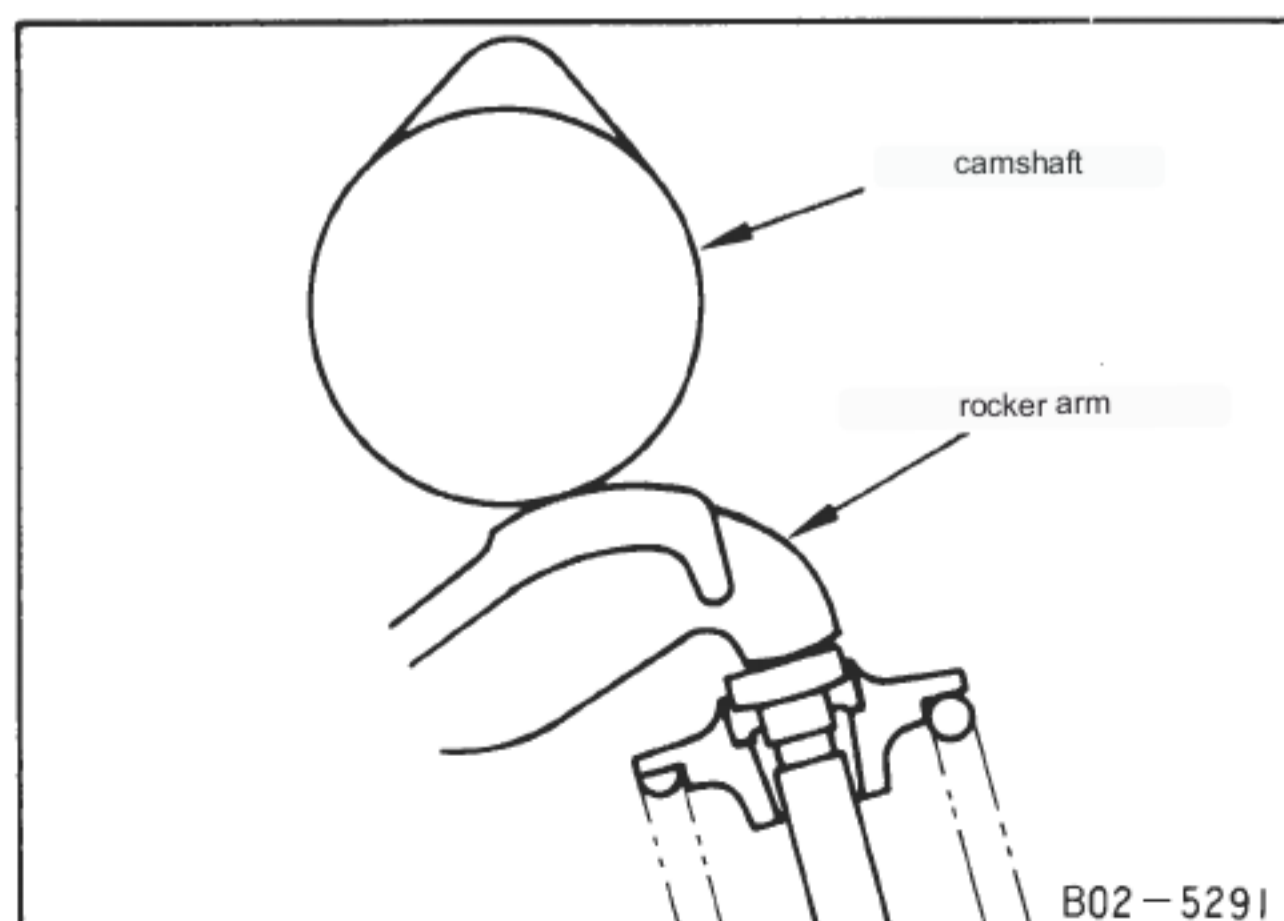
- When replacing camshafts, rocker arms, valves, etc., adjust the step at the end of the valve shaft as described below and select shims.

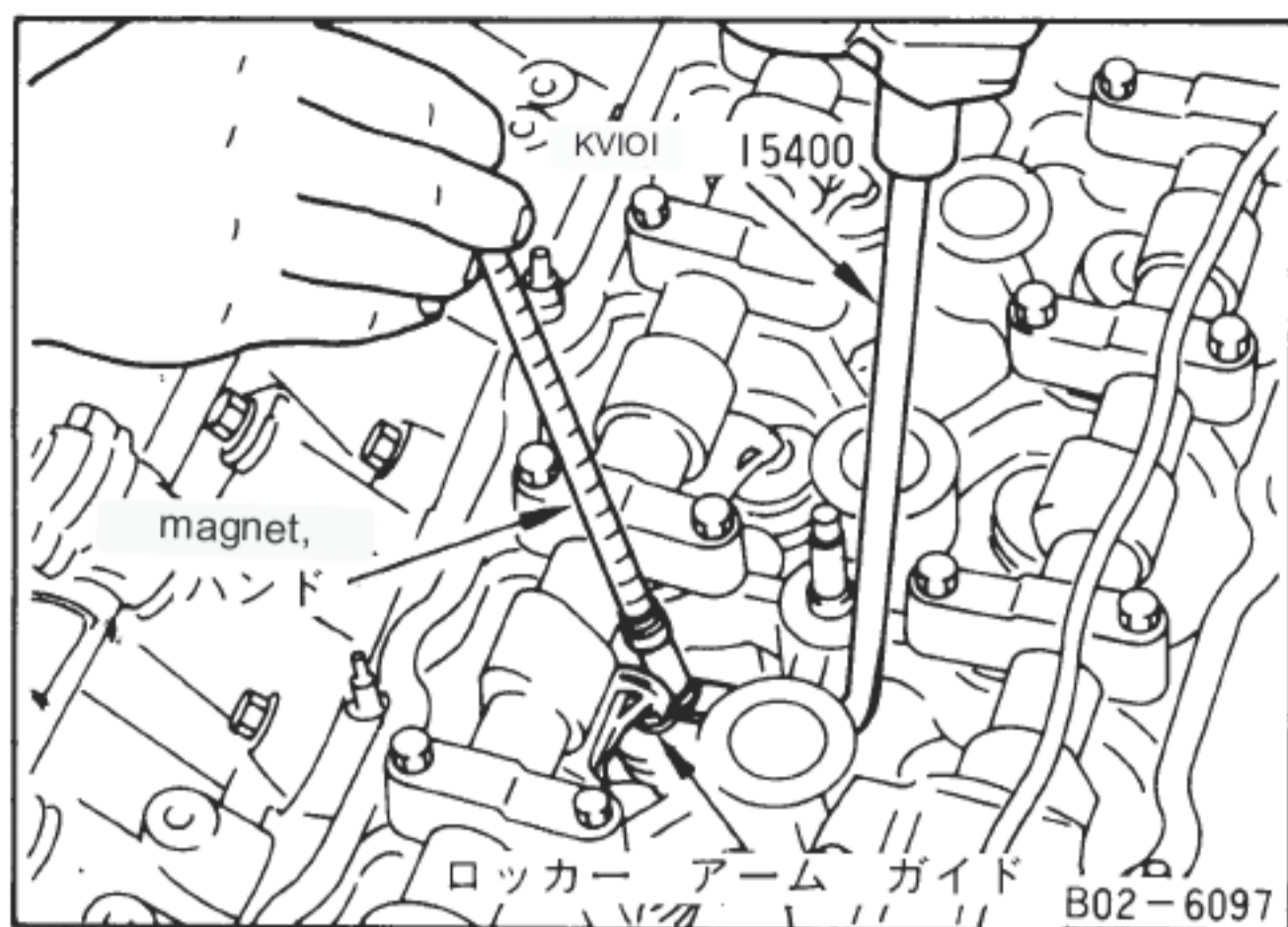
Adjustment procedure

1) Bring the camshaft of the cylinder to be adjusted in perfect circle as shown in the left figure.

Rotate as shown.

2) Remove the oil tube.



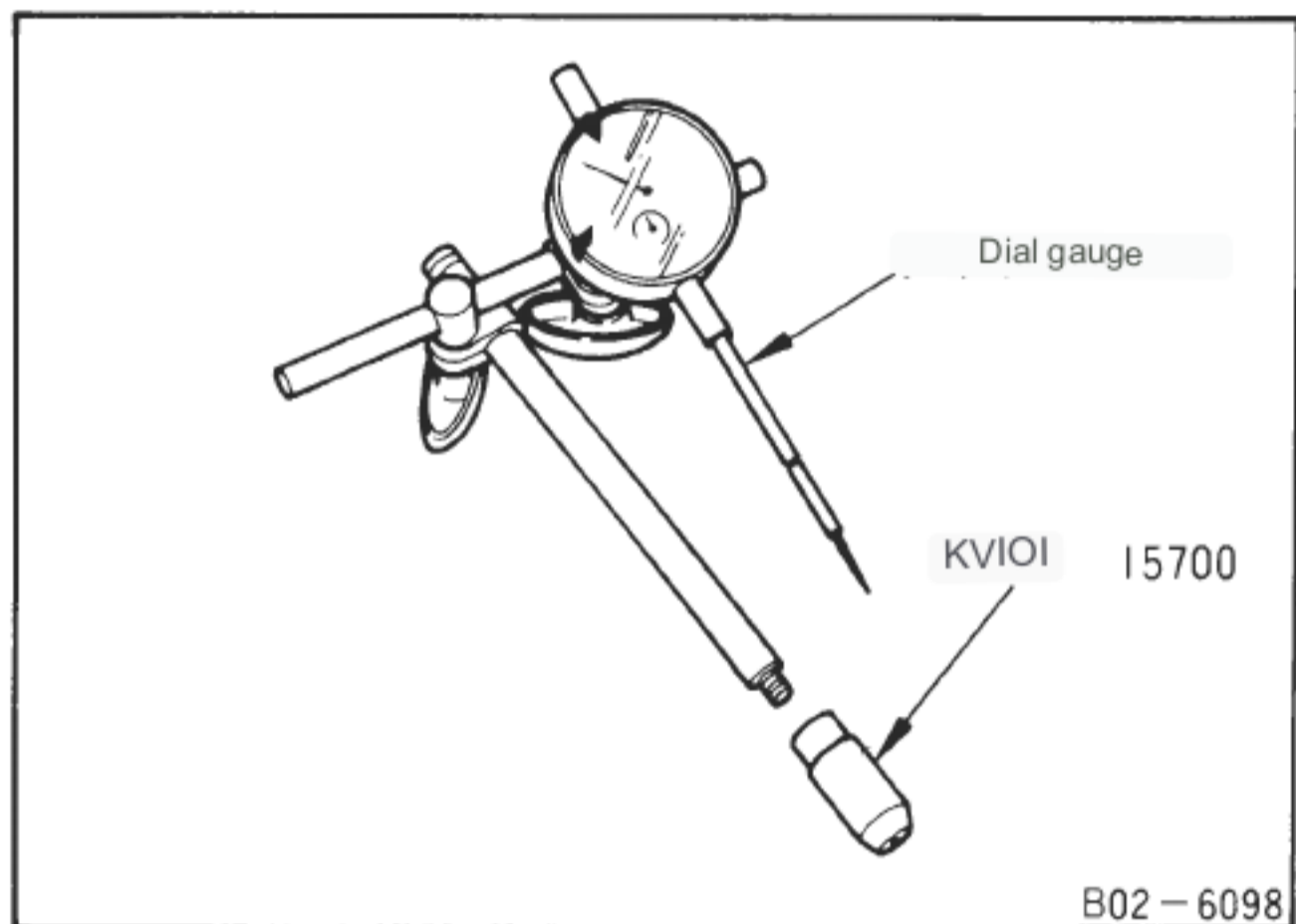


- 3) Install the valve retainer on the valve guide side as shown on the left. Apply a pulling compressor (special tool) and pull forward, lower the valve retainer and use a magnetic hand to remove the valve guide.

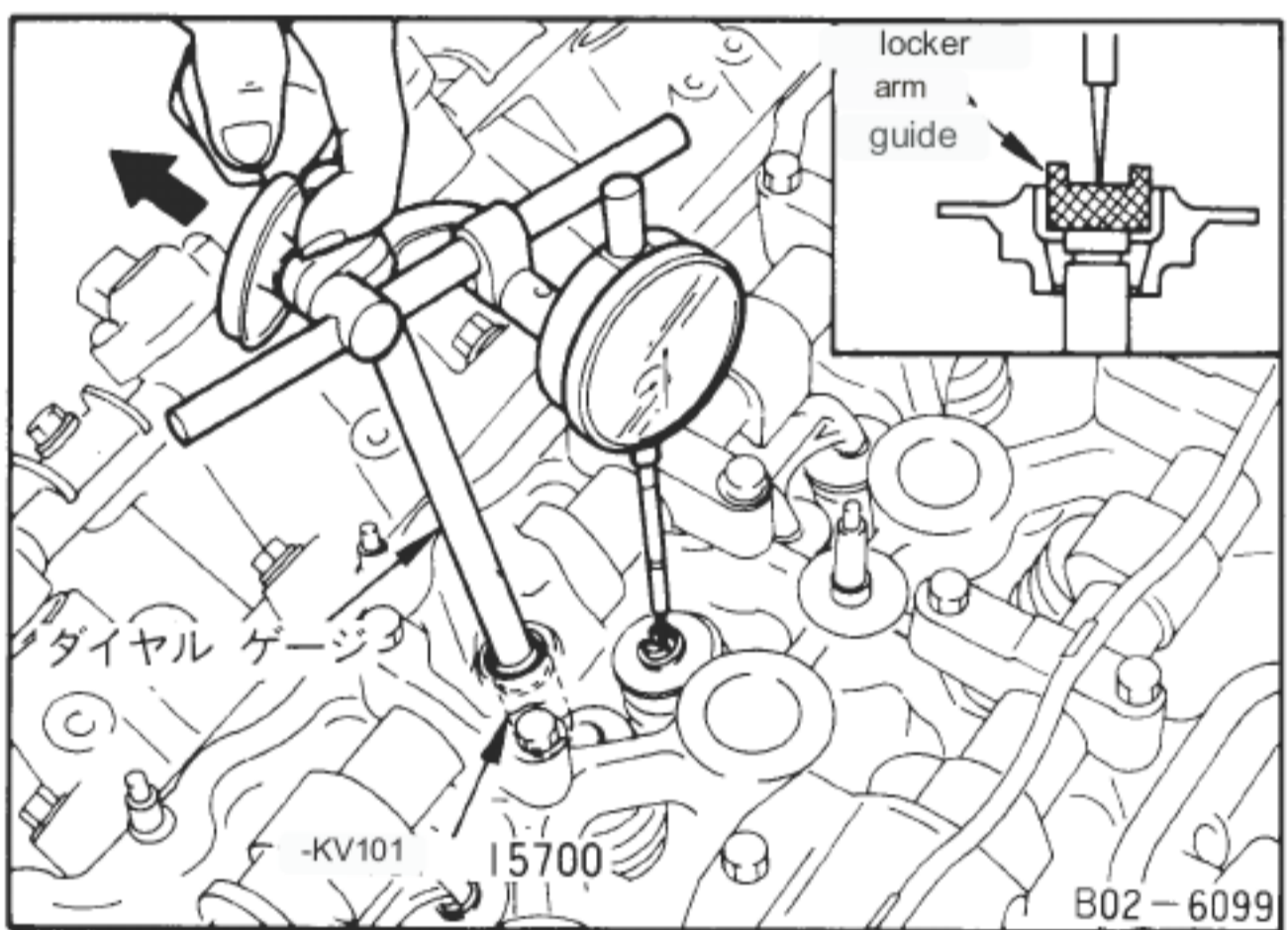
- 4) Slide the rocker arm and remove it.

Note: If the rocker arm does not move easily, lower the valve retainer on the shim side and slide the rocker arm out.

- 5) Remove the hydraulic lash adjuster.



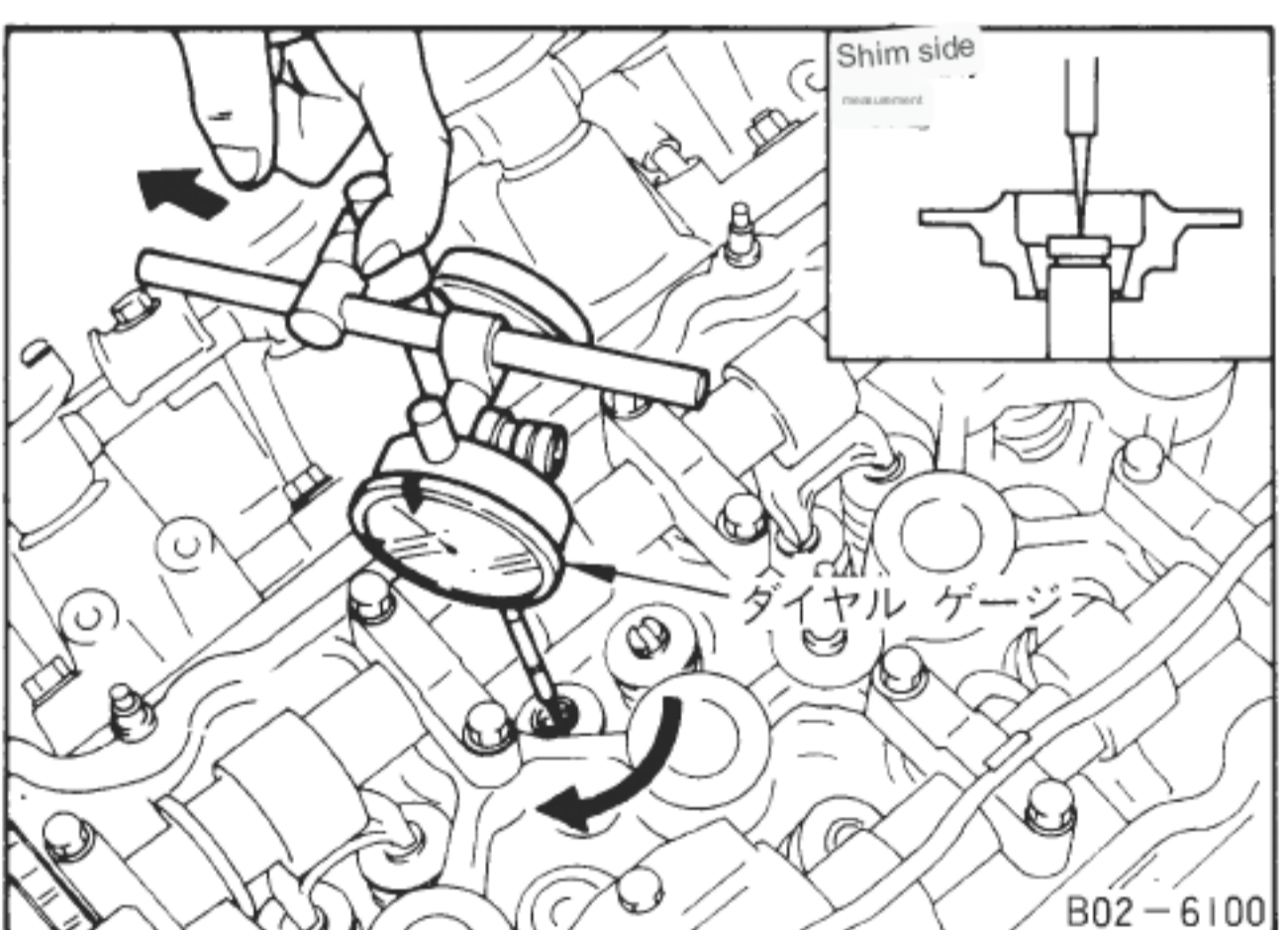
- 6) Attach a commercially available diamond to the dial gauge stand (KV101 15700). Screw in the lugage.



- 7) Insert the bolt into the hole of the hydraulic lash adjuster as shown in the left figure. Insert the ear gauge stand (special tool). 8)

Install a new valve guide, set the Danoyal gauge as shown in the left figure, and set the gauge to 0.

Note: When setting the gauge to 0, pull the rod of the dial gauge forward a little so that there is no backlash in the dial gauge stand.

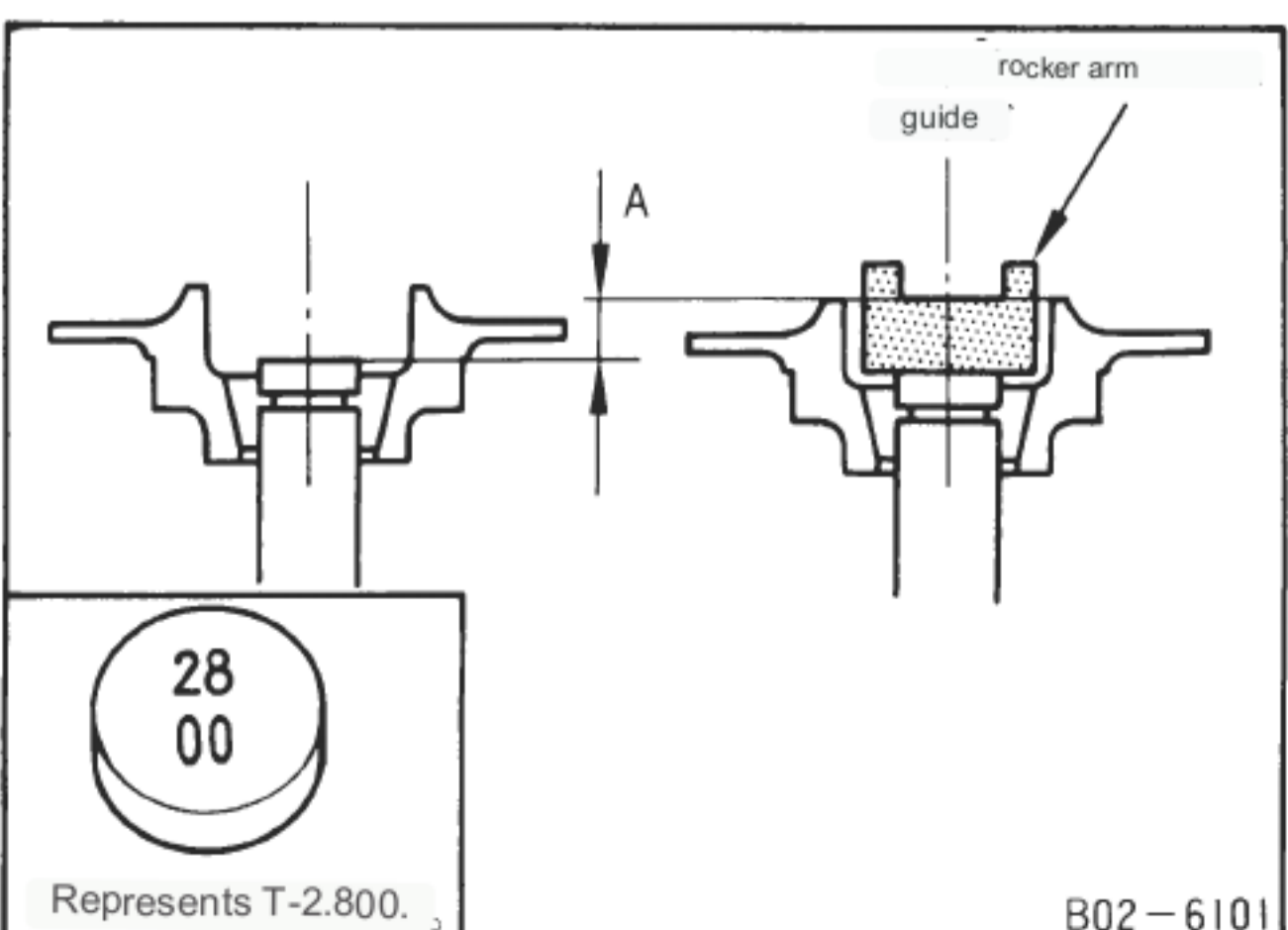


- 9) To prevent the dial gauge from rattling, move the shaft toward the shim while holding it toward you, and press it against the end of the valve shaft. Read the gauge value (A).

- 10) Select shim T so that it is within the following range.

$$-0.025\text{mm} \leq A - T \leq 0.025\text{mm}$$

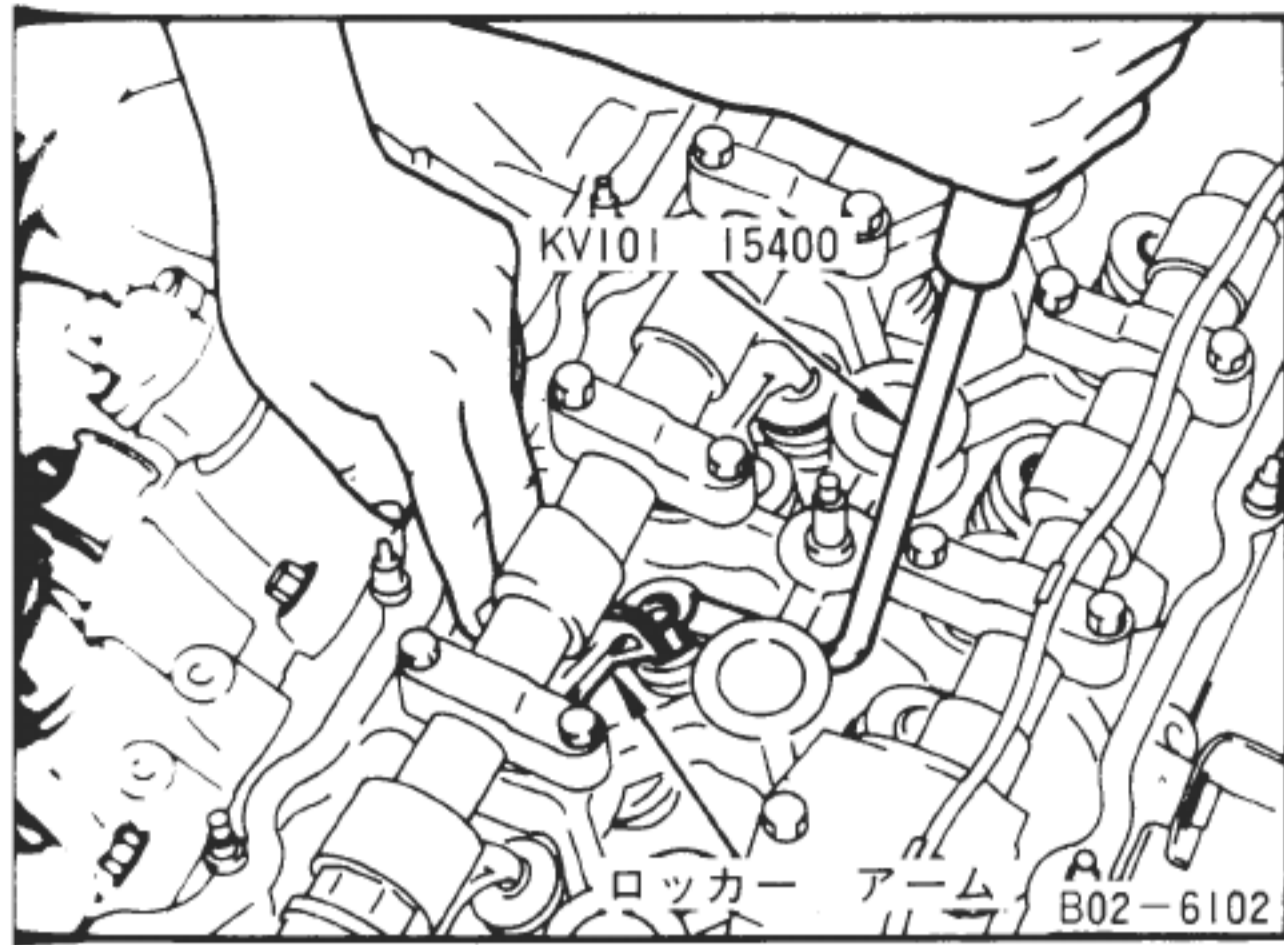
- 11) After inserting the shim, check that it is within the range of 10) above with a dial gauge.



Shim type and identification

- 17 types of shims

0.025mm steps from 2.800mm to 3.200mm



Assembling the rocker arm

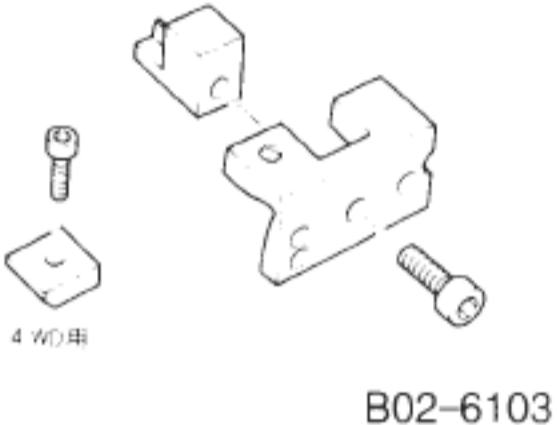
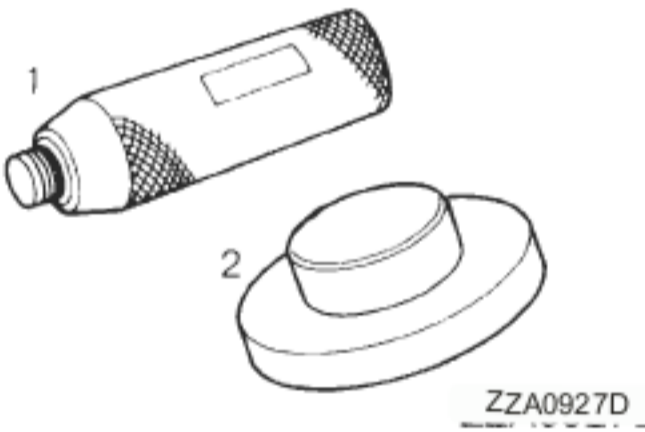
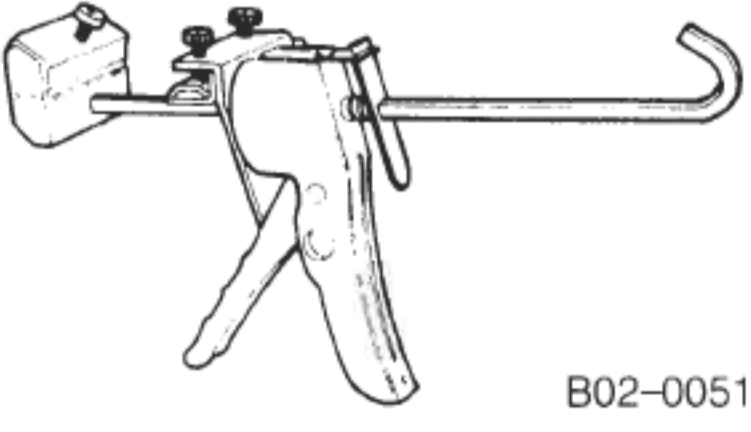
- 1) Install the shims of your choice.
- 2) Install a hydraulic lash adjuster.
- 3) Lower the valve retainer on the valve guide side using a valve spring compressor (special tool).
- 4) Install the rocker arm.

Note: If it is difficult to assemble the rocker arm, install the valve guide side and shim side. Lower the valve retainer and install it.

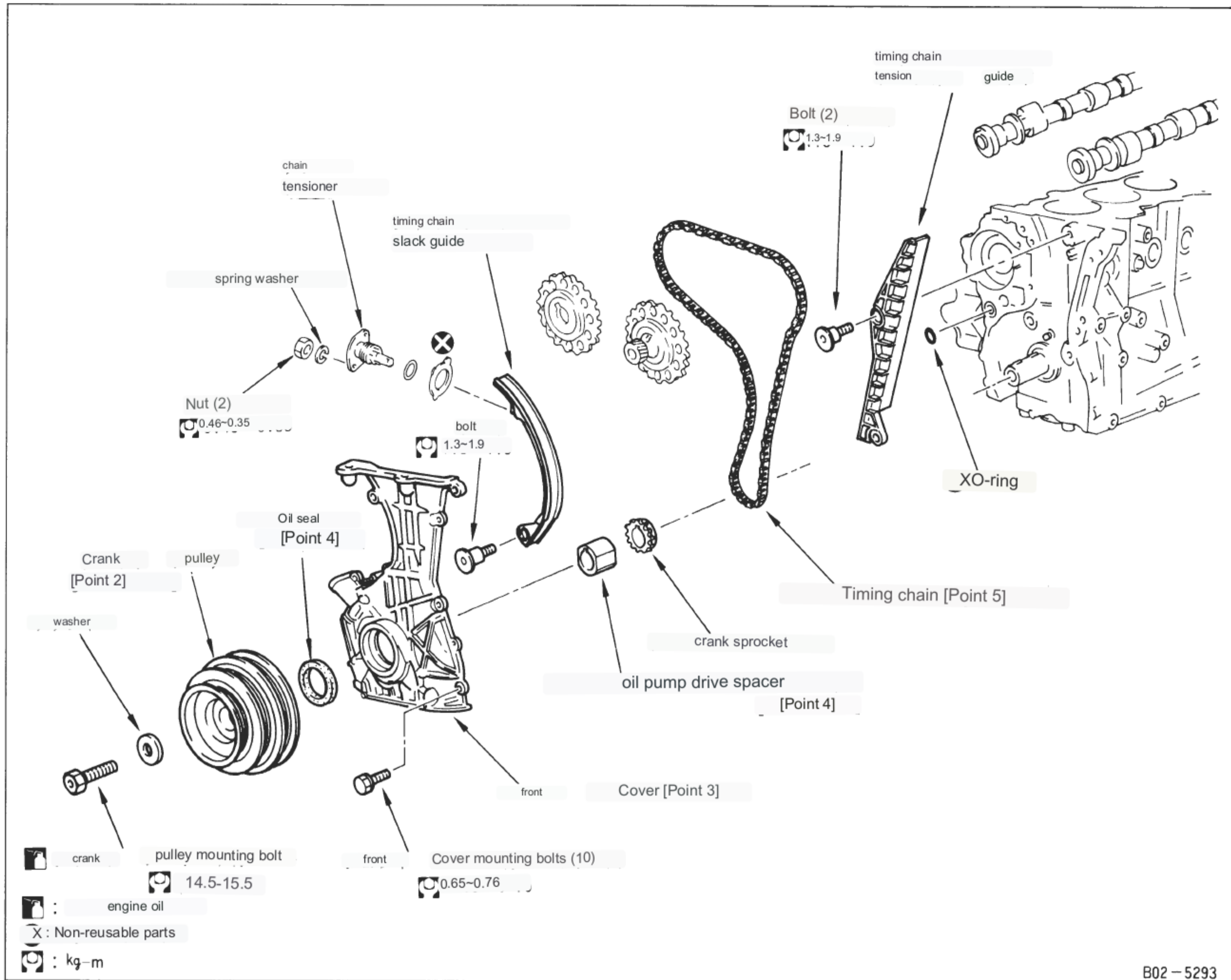
- 5) Install the valve guide.

11 Timing chain

supplies

	name	for way	remarks
Special tool	ring gear stopper KV101 15500 	Removal and installation of crank pulley bolt	Existing
	crank pulley puller (general purpose)	For removing the crank pulley	
	front oil shield lift ①ST1524 3000 ②ST1523 1000 	For driving oil seals	
tool	tube presser WS3993 	For liquid gasket application	
gasket	ThreeBond 1207D		

(1) Elimination



B02 - 5293

attached) Cylinder head (see 9-12)

With oil pan (see 9-16)

Attachment No. 1 Cylinder compression top dead center check (see 9-10)

With cooling fan (see B5)

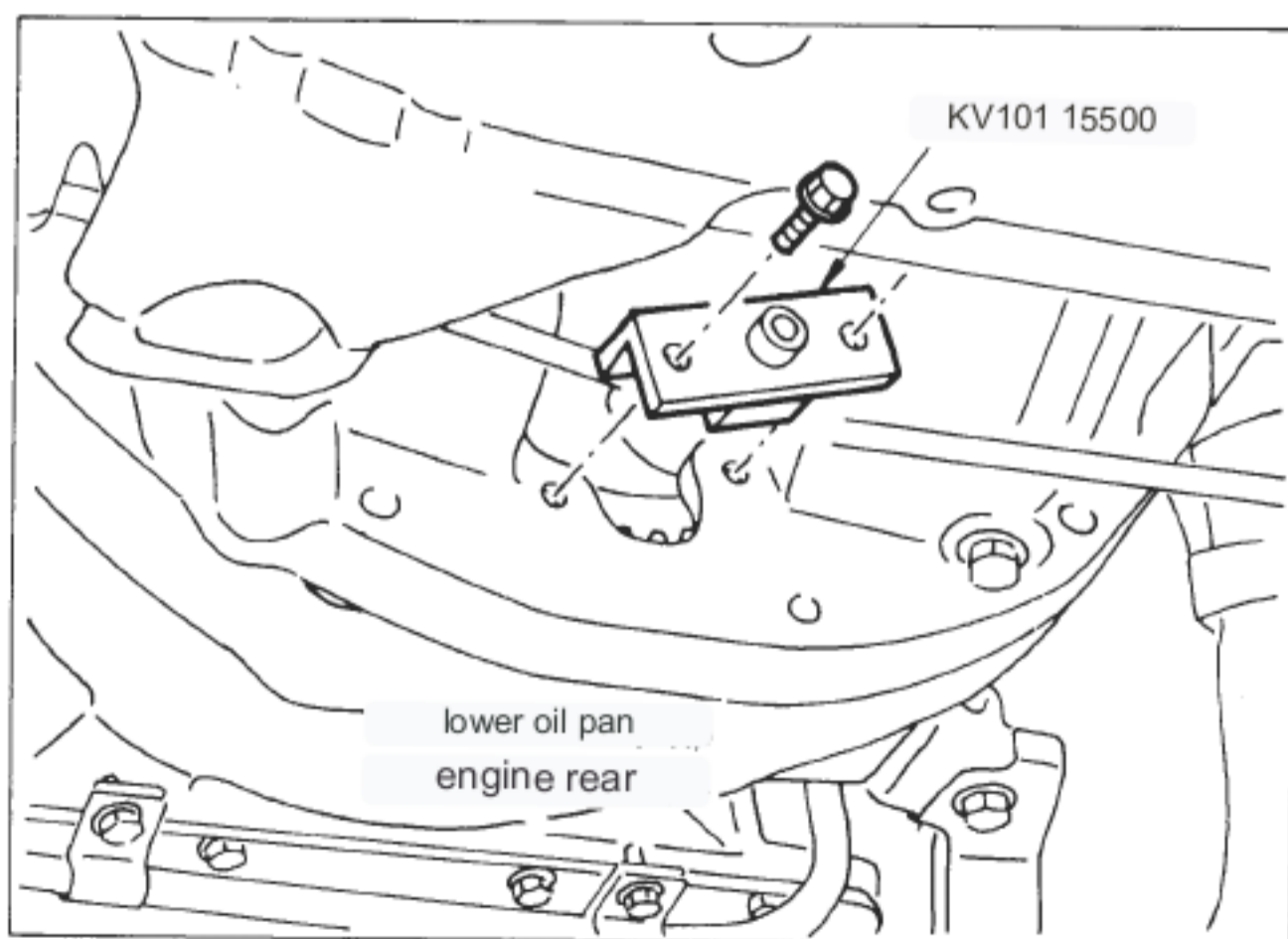
Attached Air Conditioner Midler Pulley

With fan shroud (see B5)

Auxiliary machine belts

付 blowby hose

Distributor with crank angle sensor (see 9-10)



[Point 1] Crank pulley removal and installation

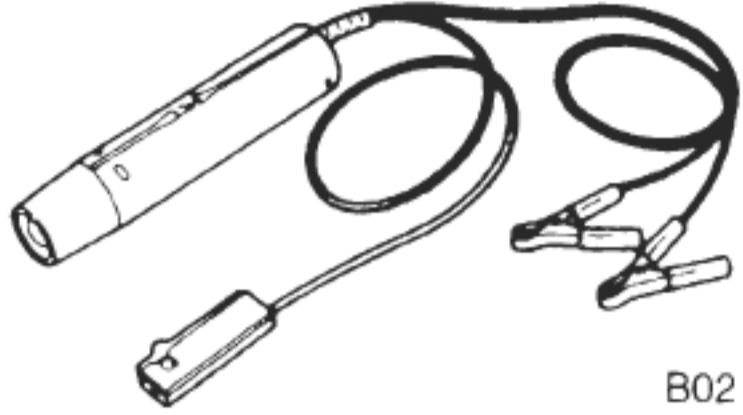
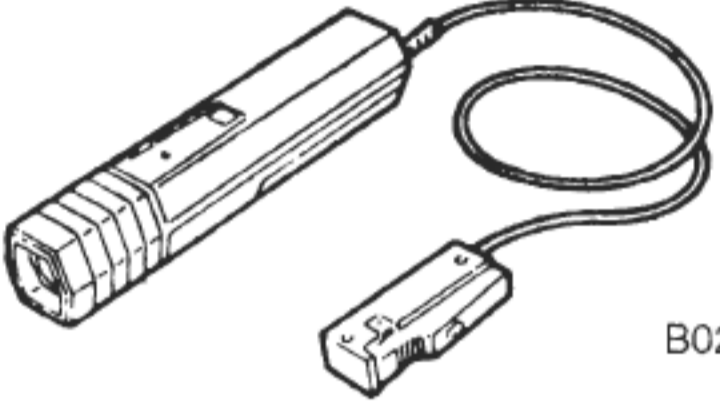
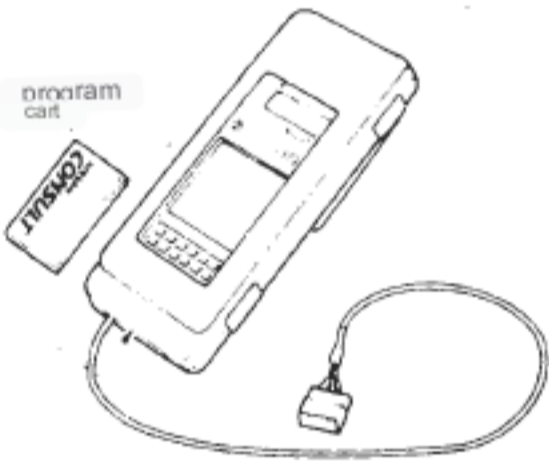
removal

- Remove the rear cover plate of the transmission connection part of the oil pan. and stop the drive gear with a ring gear stopper (special tool), etc. to fix the crankshaft, then loosen the crank pulley bolt.

B2 SR20 type DOHC/EGI (ECCS) specification turbocharged engine

1. Idle check and adjustment

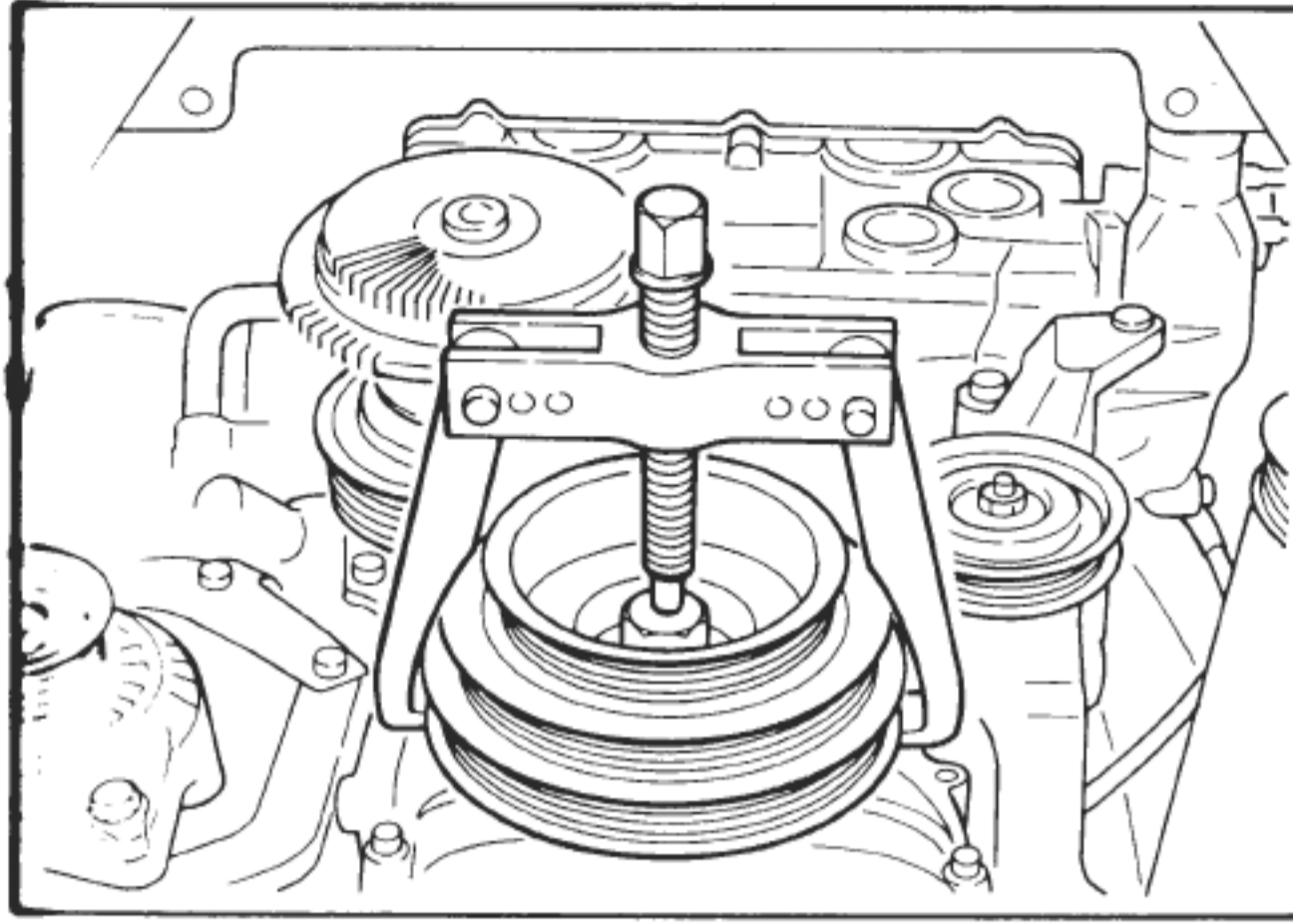
supplies

	name	for way	remarks
Total	Timing light (primary line, secondary line combined type) EG1443 0001  B02-1537	For ignition timing measurement (use either)	
	Timing light (with built-in battery) EG1444 0000  B02-1498		
	CO, HC meter	For measuring CO HC concentration	
	electronic system diagnostic tester CONSULT EG1180 0000  309-0001	For idle check and adjustment	

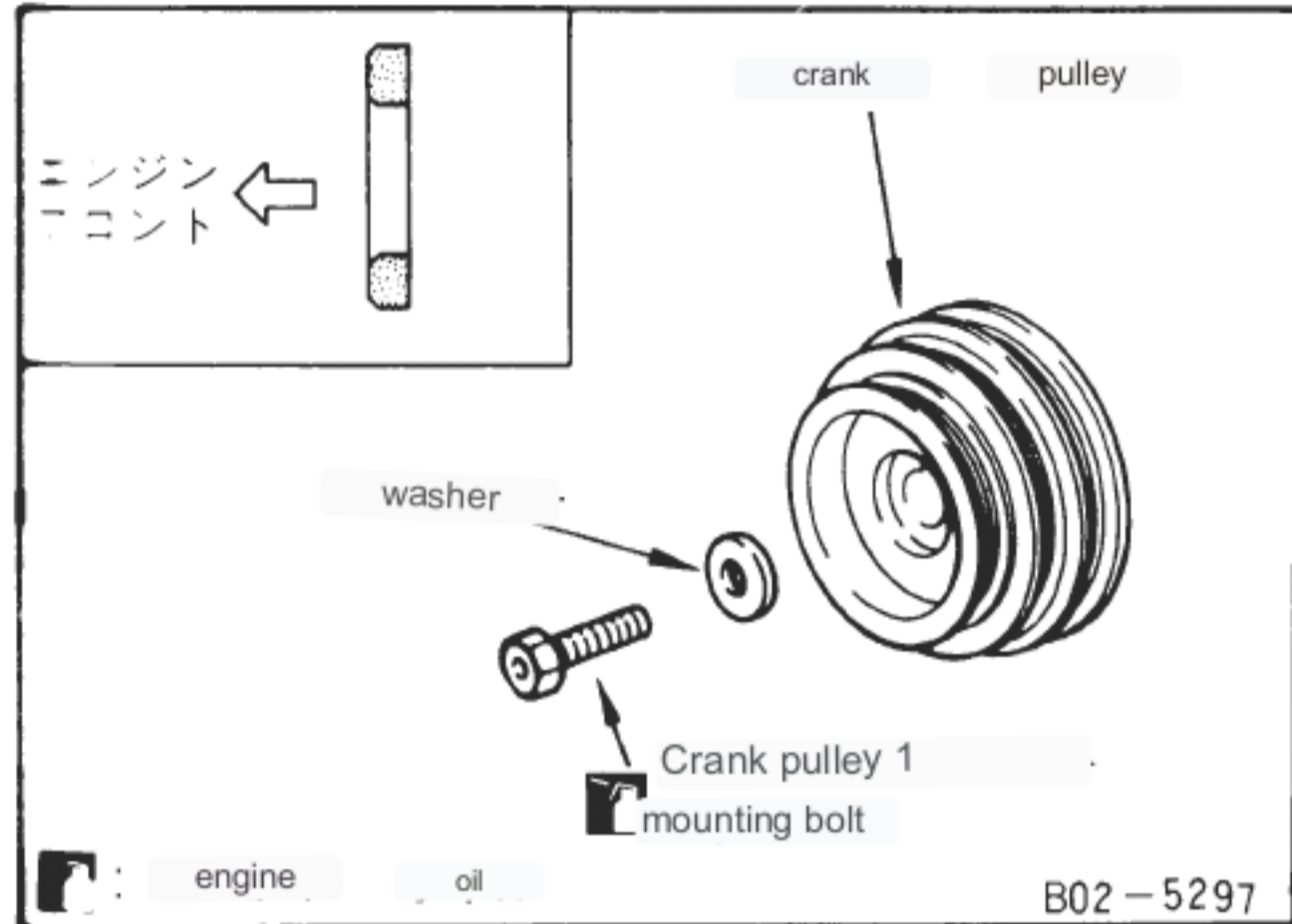
Idle check specified value

item	Transmission specification		M/T	A/T
	Idle speed (when air conditioner is on)	(rpm)	800(+/-)	< (<)
point	fire	Time term	(BTDC° /rpm)	←
C.	O		(%)	0.1 or less
H.	C.	dark	(ppm)	less than 50

Note: Idle speed, ignition timing, and CO and HC concentrations affect each other, so be sure to reconfirm other items when adjusting any of them.

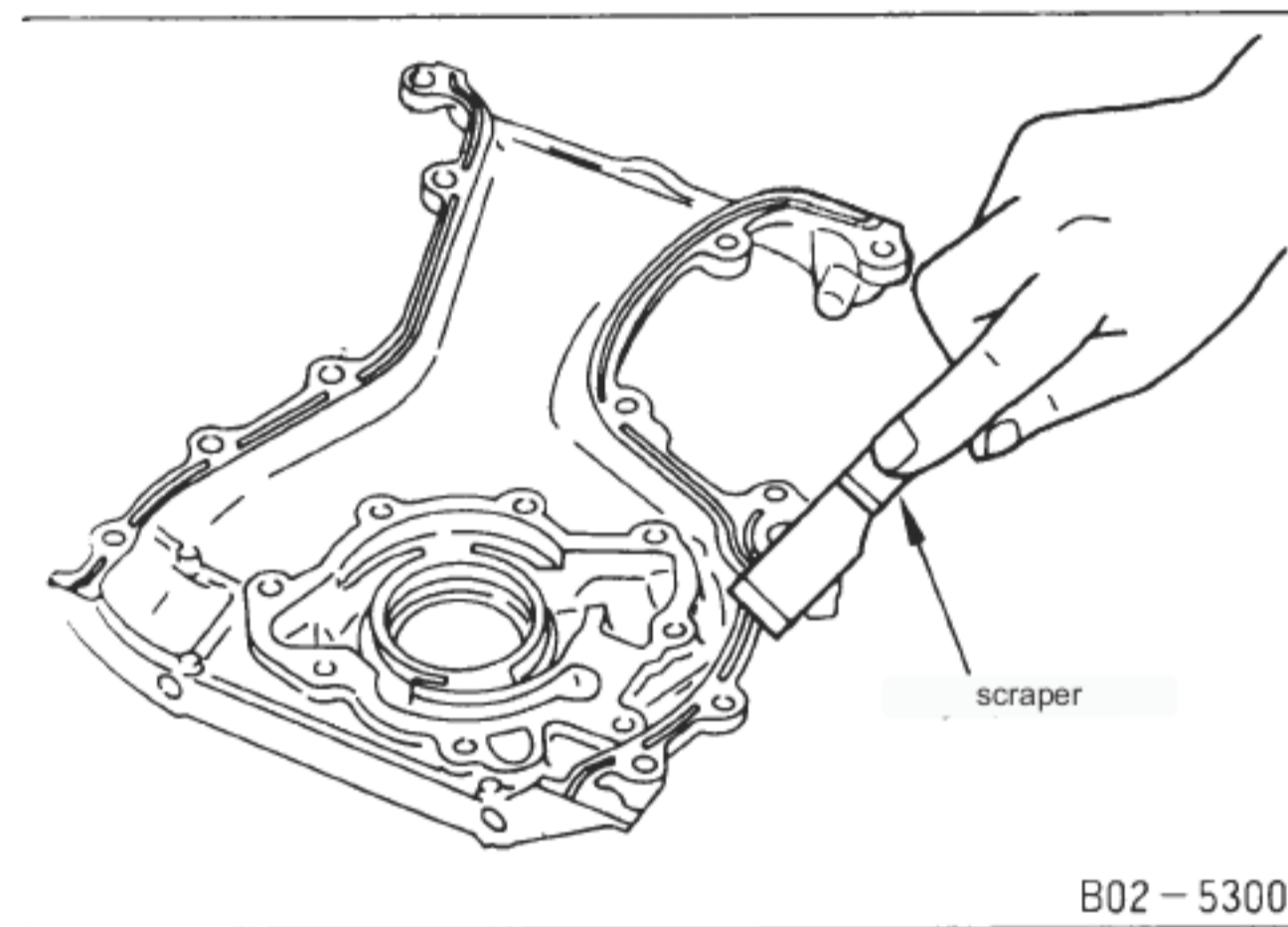


- Attach the pulley puller to the bolt hole of the crank pulley and remove it.
- start out.



attachment

- When installing the washer, place the chamfered side on the engine front side.
 - Apply oil to the bearing surface and threads of the crank pulley mounting bolt.
- tighten.



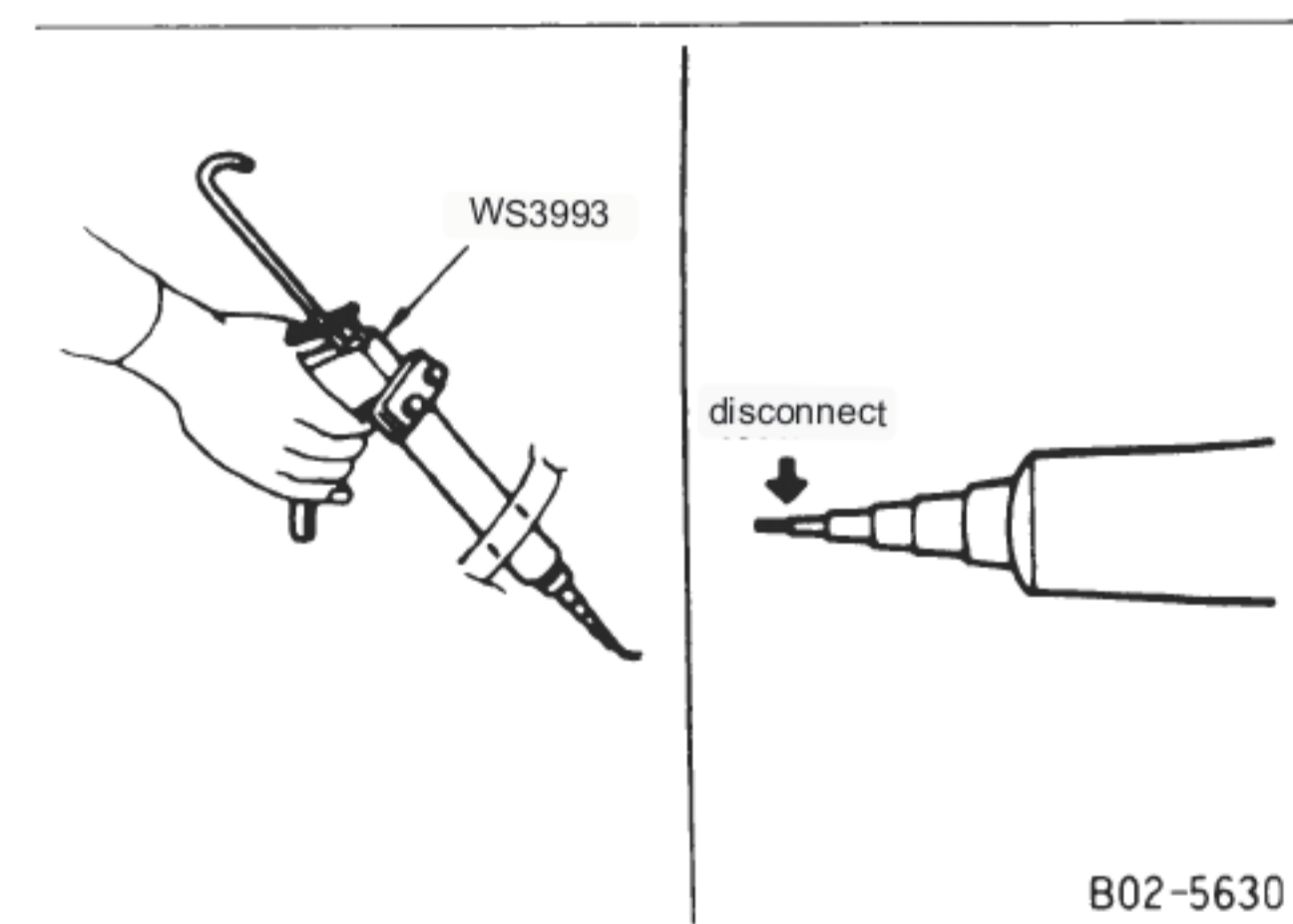
[Point 2] Remove and install the front cover

Remove and clean

Use a scraper to remove the liquid gasket. Wipe the

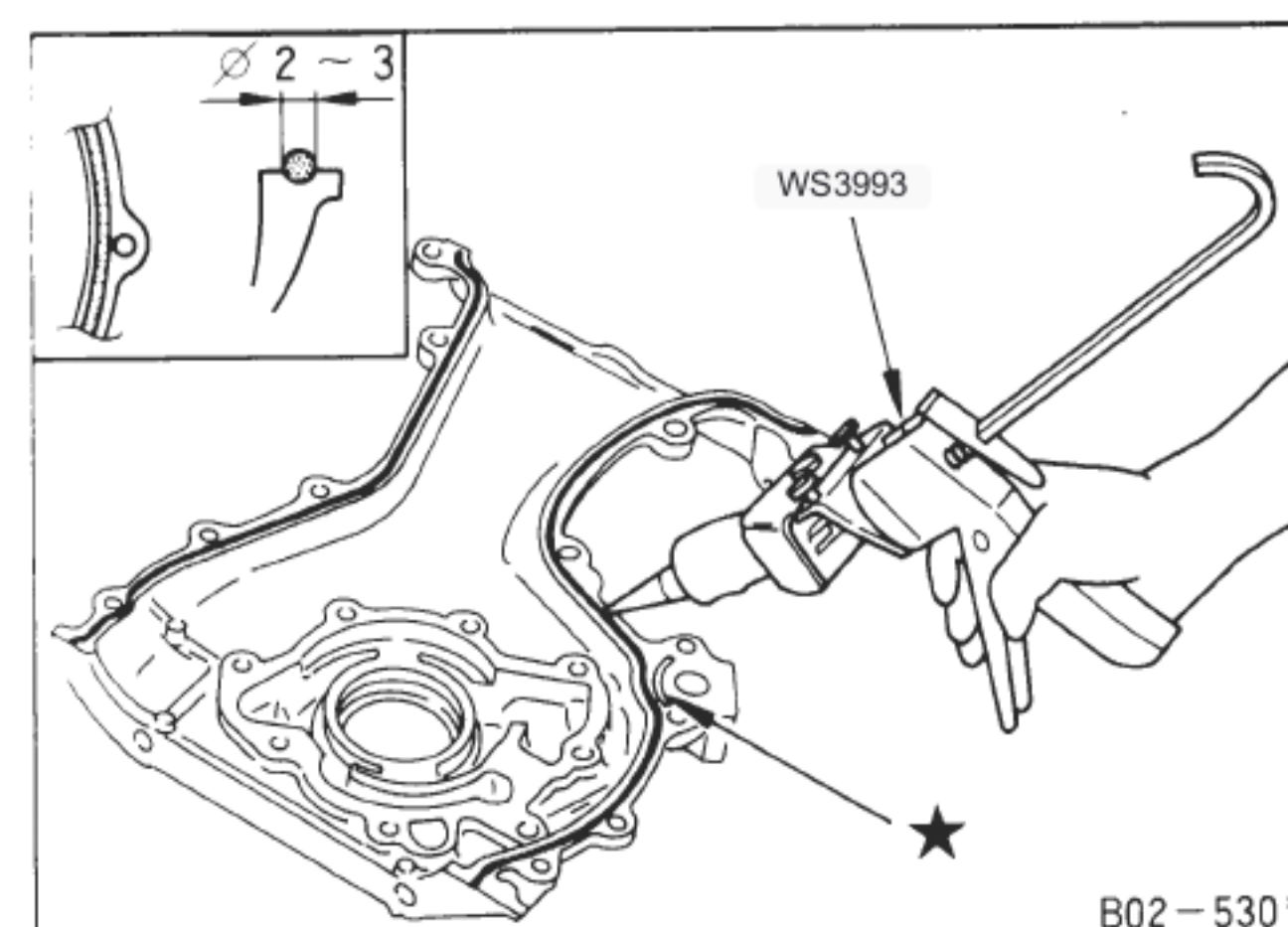
Note: Also remove the liquid gasket in the groove.

mounting surface with white gasoline.



attachment

- Cut the nozzle tip of the liquid gasket (equivalent to ThreeBond 1207D) at the position shown in the left figure, and use a tube presser.



- Apply the liquid gasket to the front cover by approximately 2.5 mm (thickness) as shown on the left.

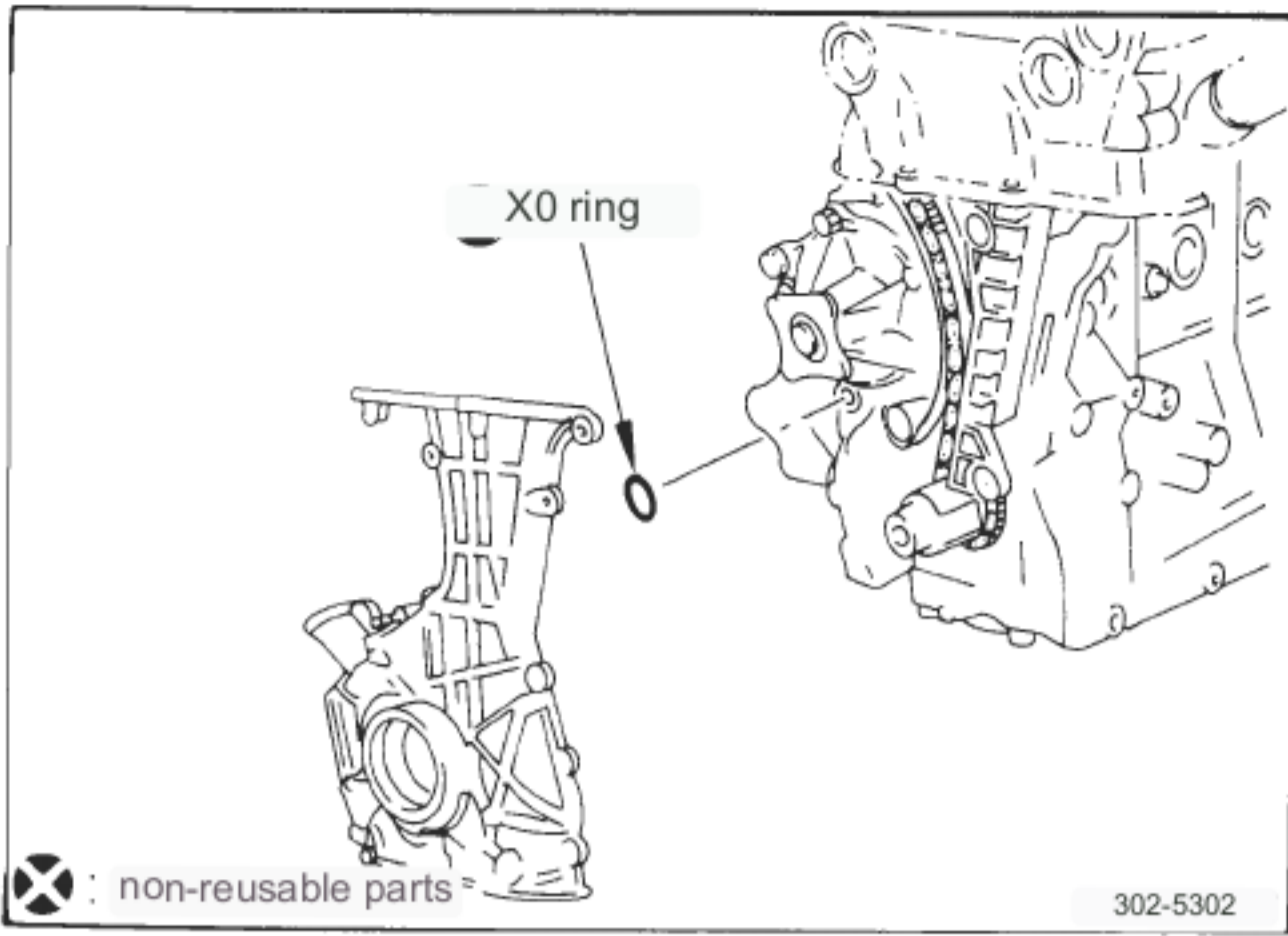
Visual) to apply without breaks.

Note: Do not apply to grooves marked with ★ in the left figure.

- After applying the liquid gasket, install it within 5 minutes after application.

After installation, leave it for 30 minutes or more before operating.

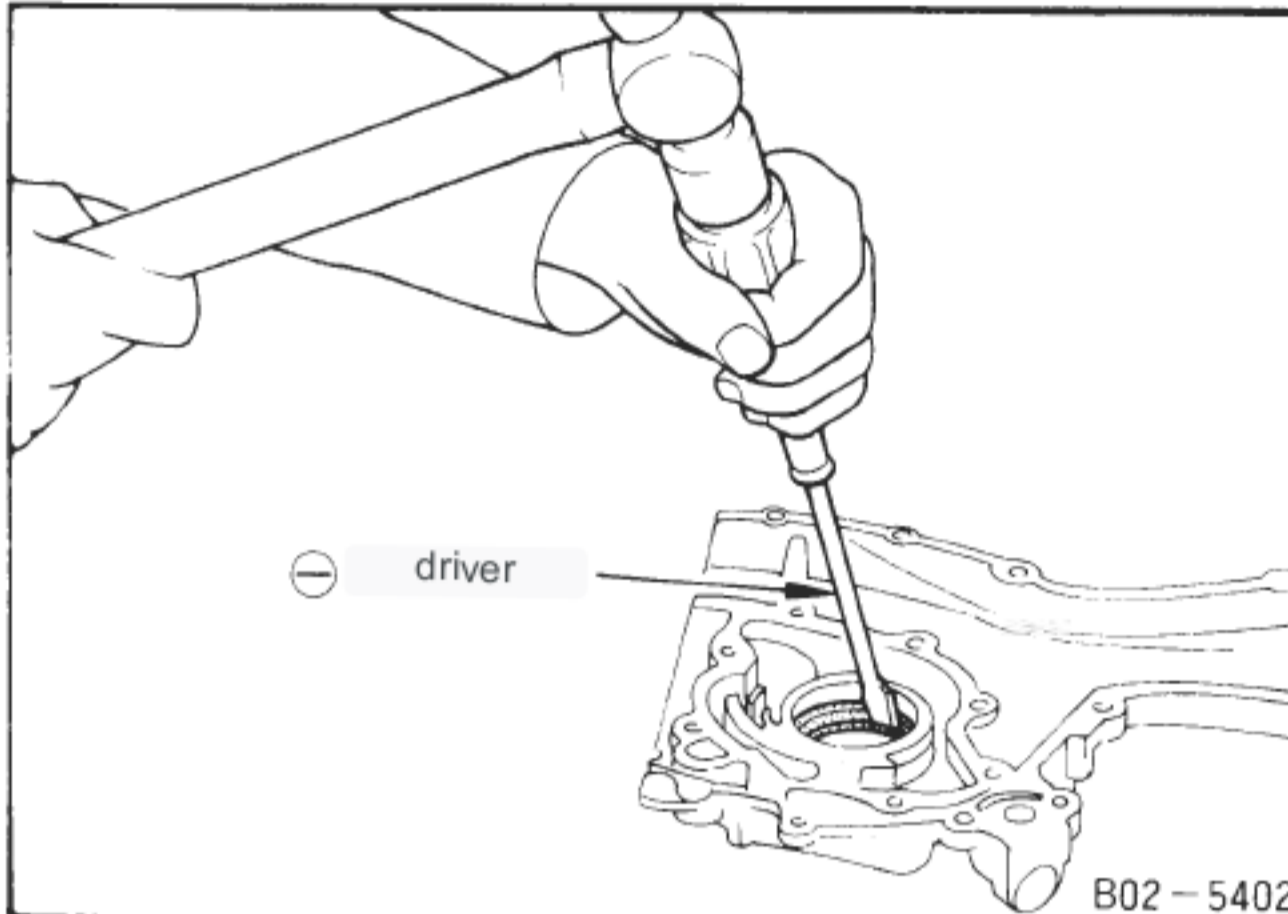
Front cover mounting bolt tightening torque (kg-m)	0.65 0.76
--	-----------



- Since the O-ring is attached to the cylinder block side, the front cover
Do not forget it when installing.

Caution: (1) If you have removed the front cover, follow
Replace the cylinder head gasket with a new one with or without
to do.

- (2) Do not damage the chain case part of the cylinder head gasket
when installing the front cover.



[Point 3] Remove and install front oil seal

removal

- Punch out with a screwdriver, etc., and remove.

Caution: (1) Do not scratch the front cover.

- (2) Be careful when removing the ring seal between
the front cover and the front oil seal.

attachment

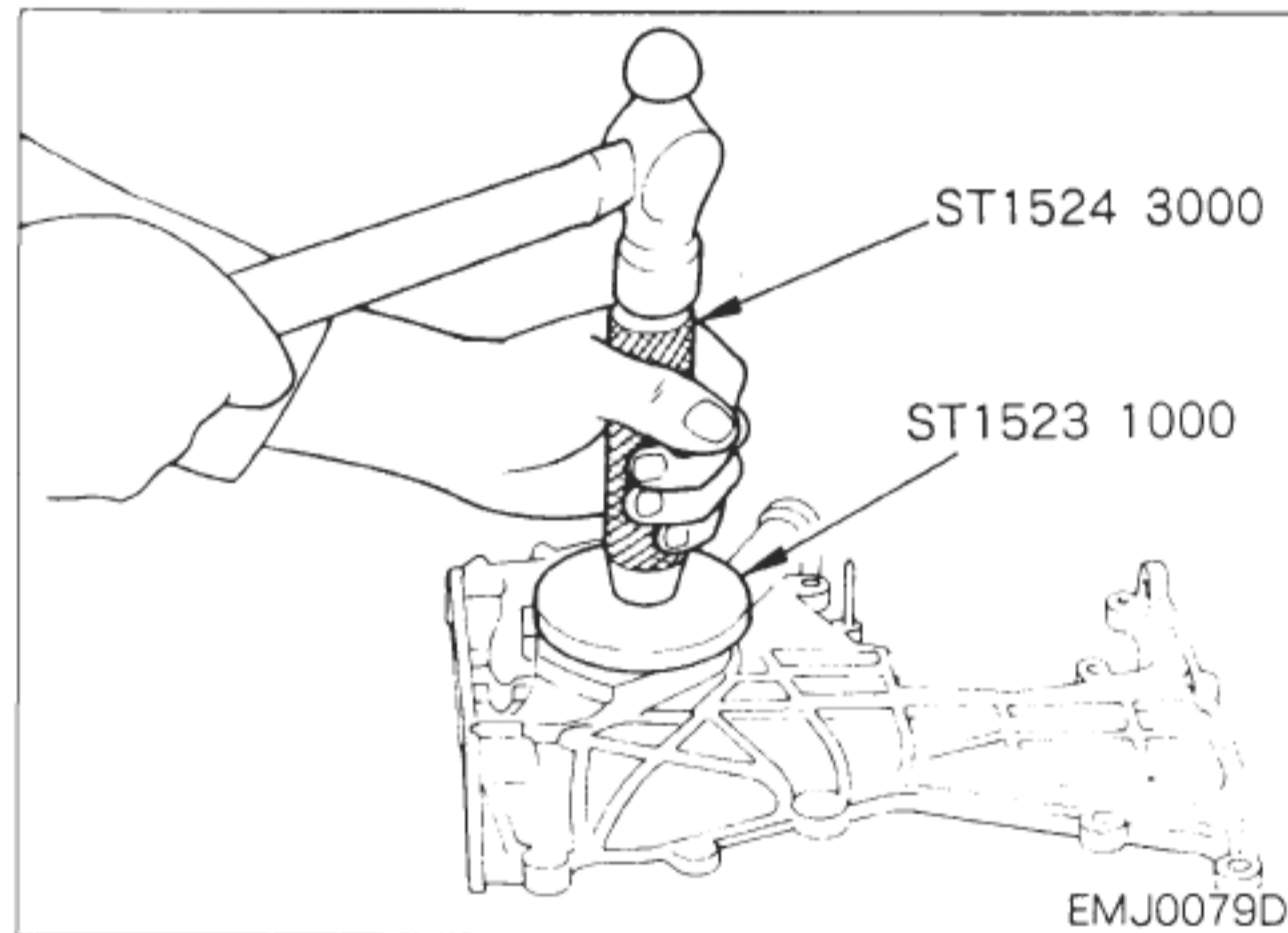
- Be careful not to damage or deform the outer circumference of the oil seal.

Using an oil shield lift (special tool), drive it into the front end
face of the oil pump housing until it is uniform.

Caution: (1) Do not scratch the front cover.

- (2) Grease is applied to the entire circumference of the oil seal lip.
Do not touch with fingers.

- (3) Install so that the garter spring does not come off and the lip does
not turn over.



[Point 4] Timing chain removal and installation

removal

- Remove the chain tensioner. (See 9-10 Camshaft) • Remove
the timing chain together with the cam sprocket. (")

照)

- Remove the front cover and remove the timing chain.

attachment

Install the timing chain as follows.

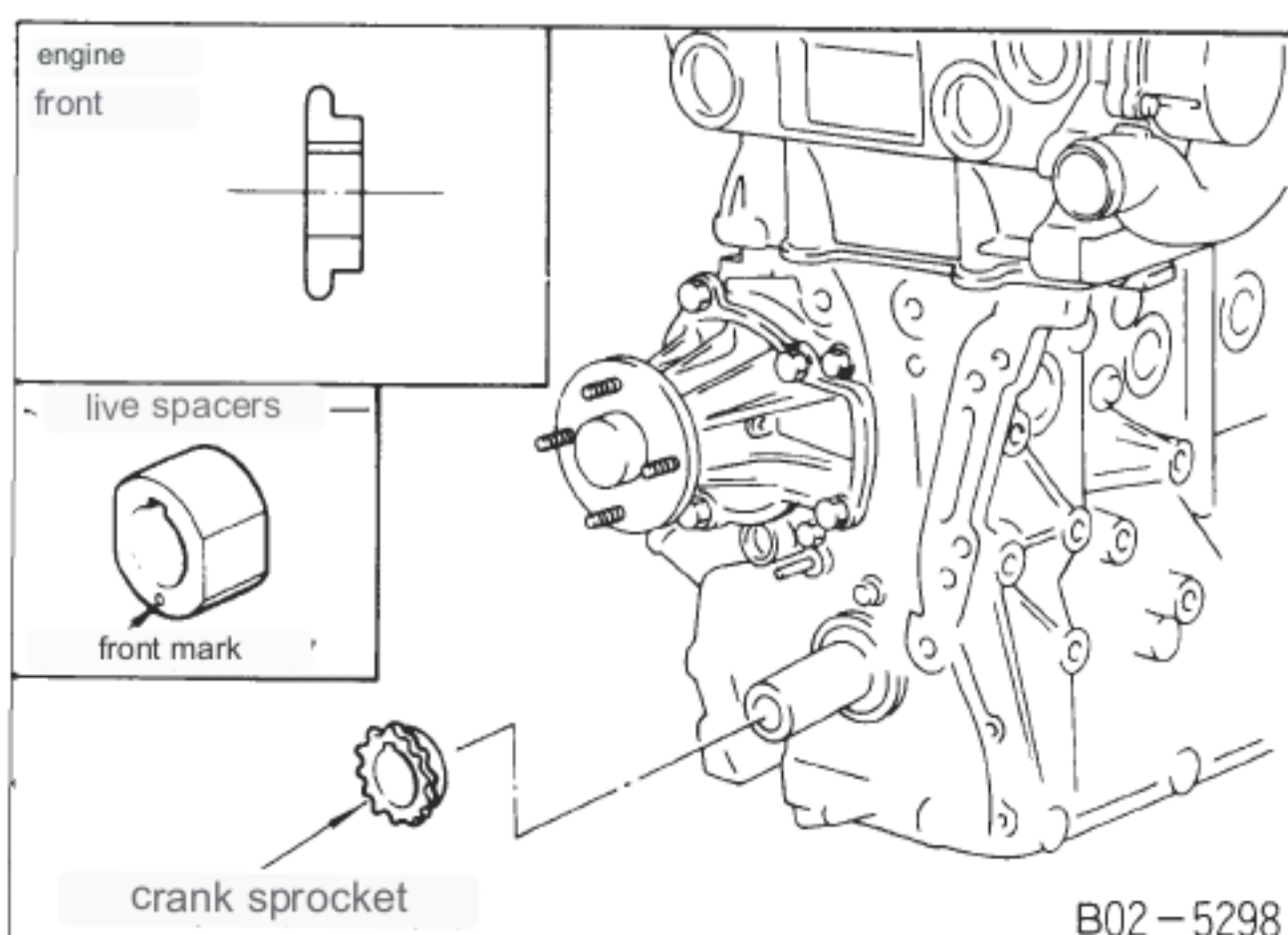
- Replace the cylinder head gasket and temporarily install the cylinder head.

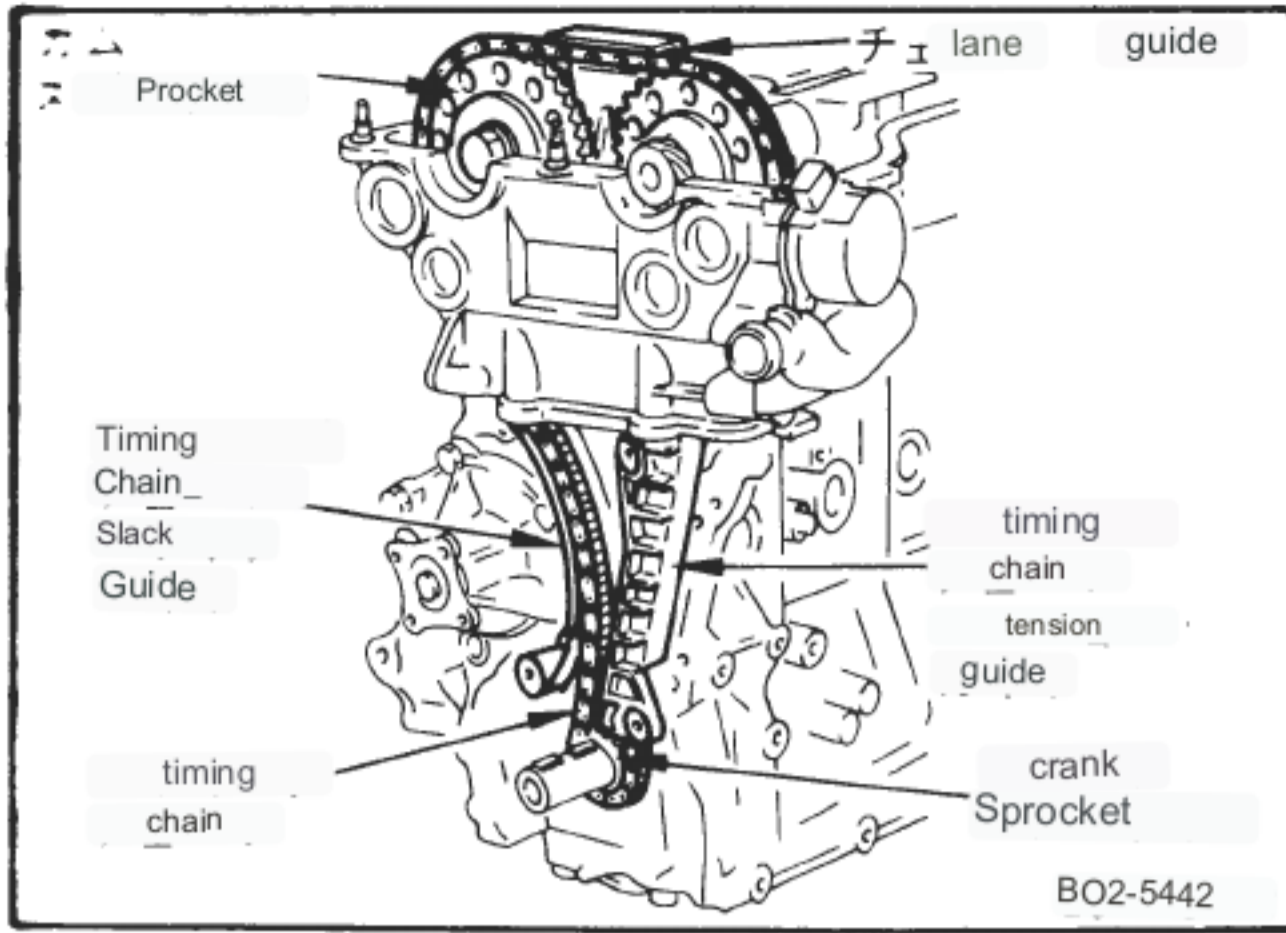
Kick it.

- Attach the crank sprocket to the crankshaft.

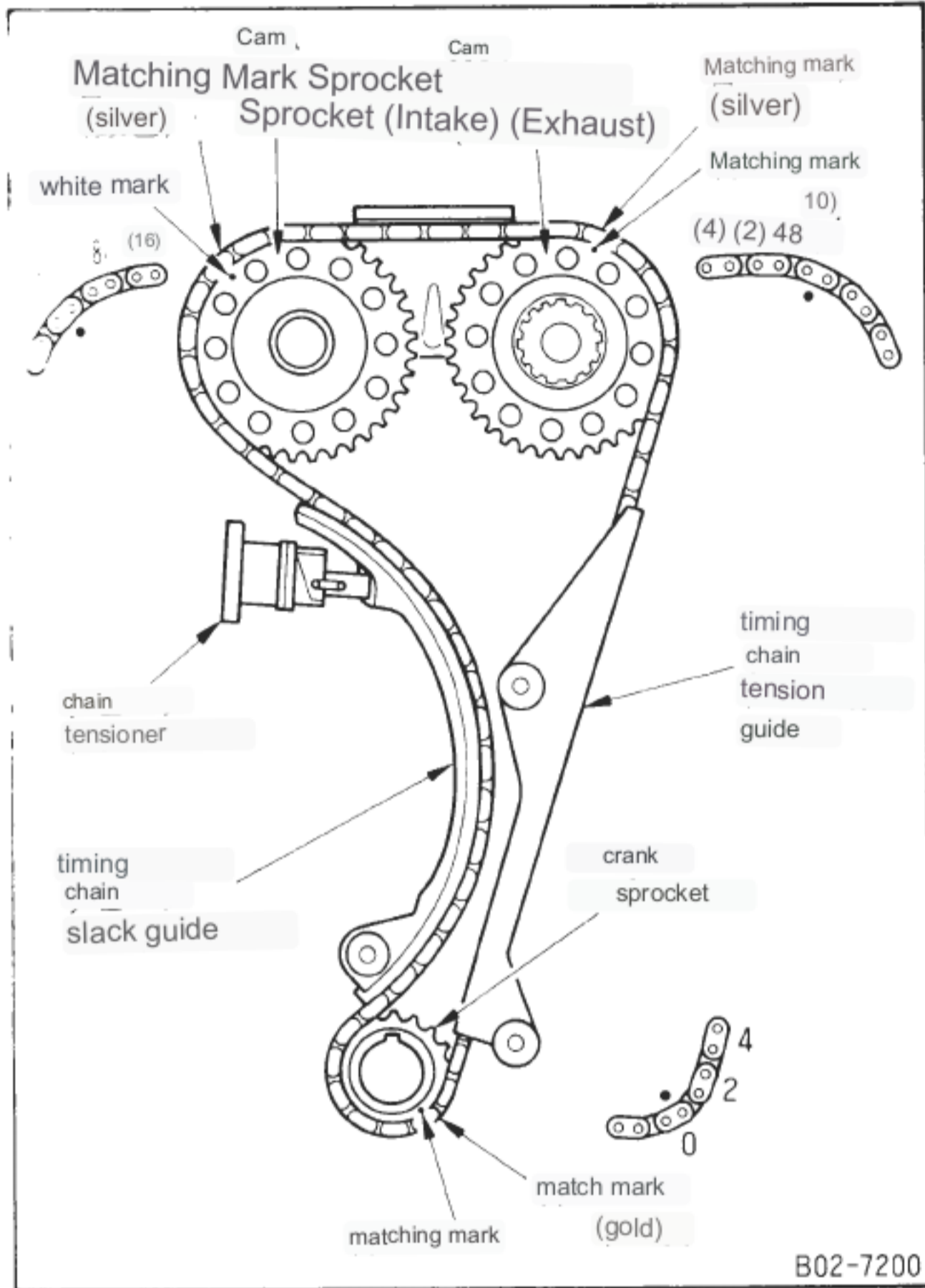
CAUTION Refer to the figure on the left for the assembly direction.

- Temporarily assemble the cam sprocket to the camshaft.





- Install the timing chain slack guide.



- Cam sprocket match mark and timing chain match mark (silver) and attach the timing chain to the cam sprocket.

Install.

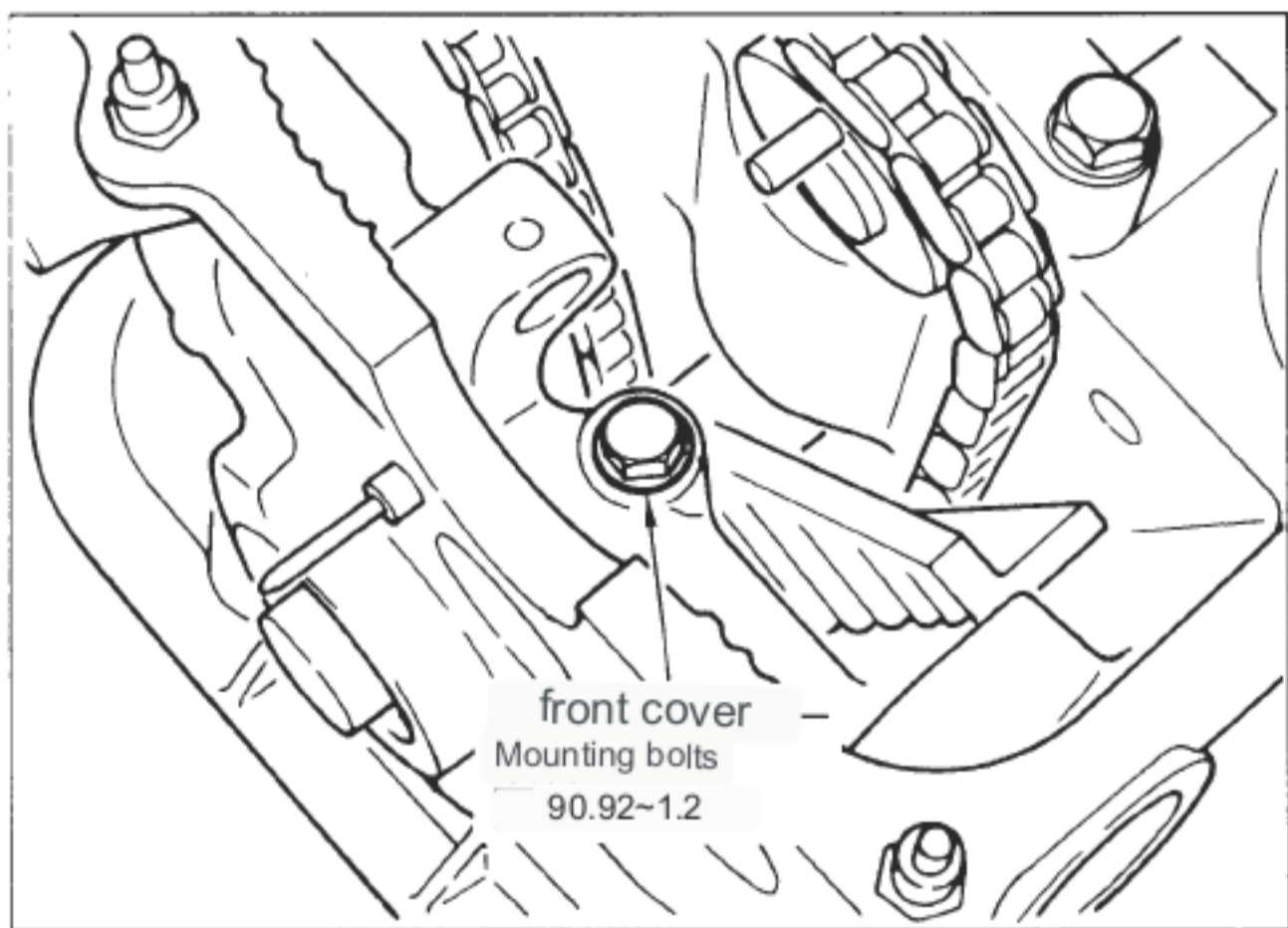
- Align the match mark on the crank sprocket with the match mark (gold) on the timing chain, and attach the timing chain to the crank sprocket.

attached to the ket.

- Firmly push the cam sprocket onto the cam shaft with all the timing marks aligned, and temporarily attach the cam sprocket.

Install the timing chain tension guide and slack guide.

Kick.

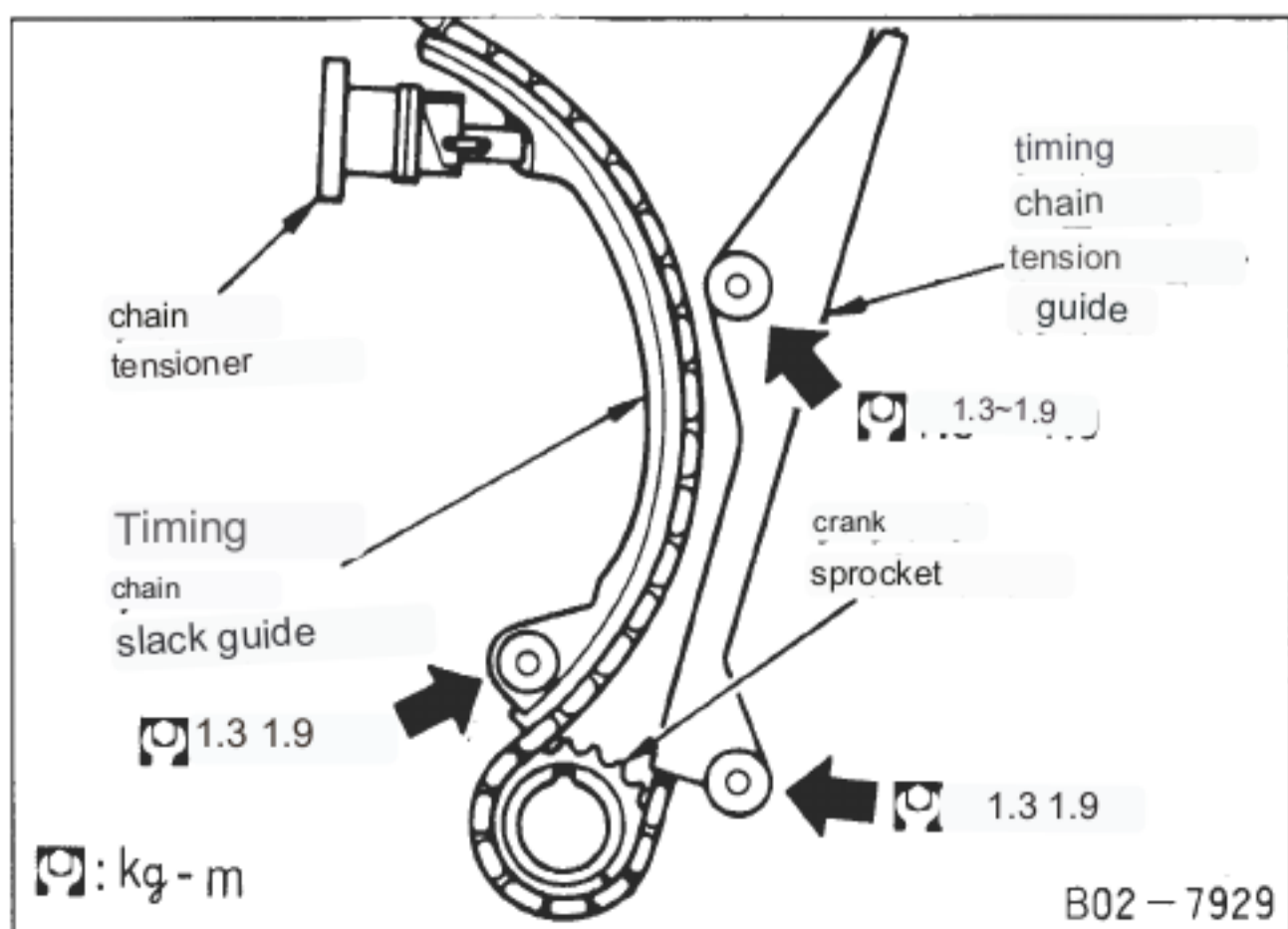


- Remove the exhaust cam sprocket and tighten the front cover mounting bolt.

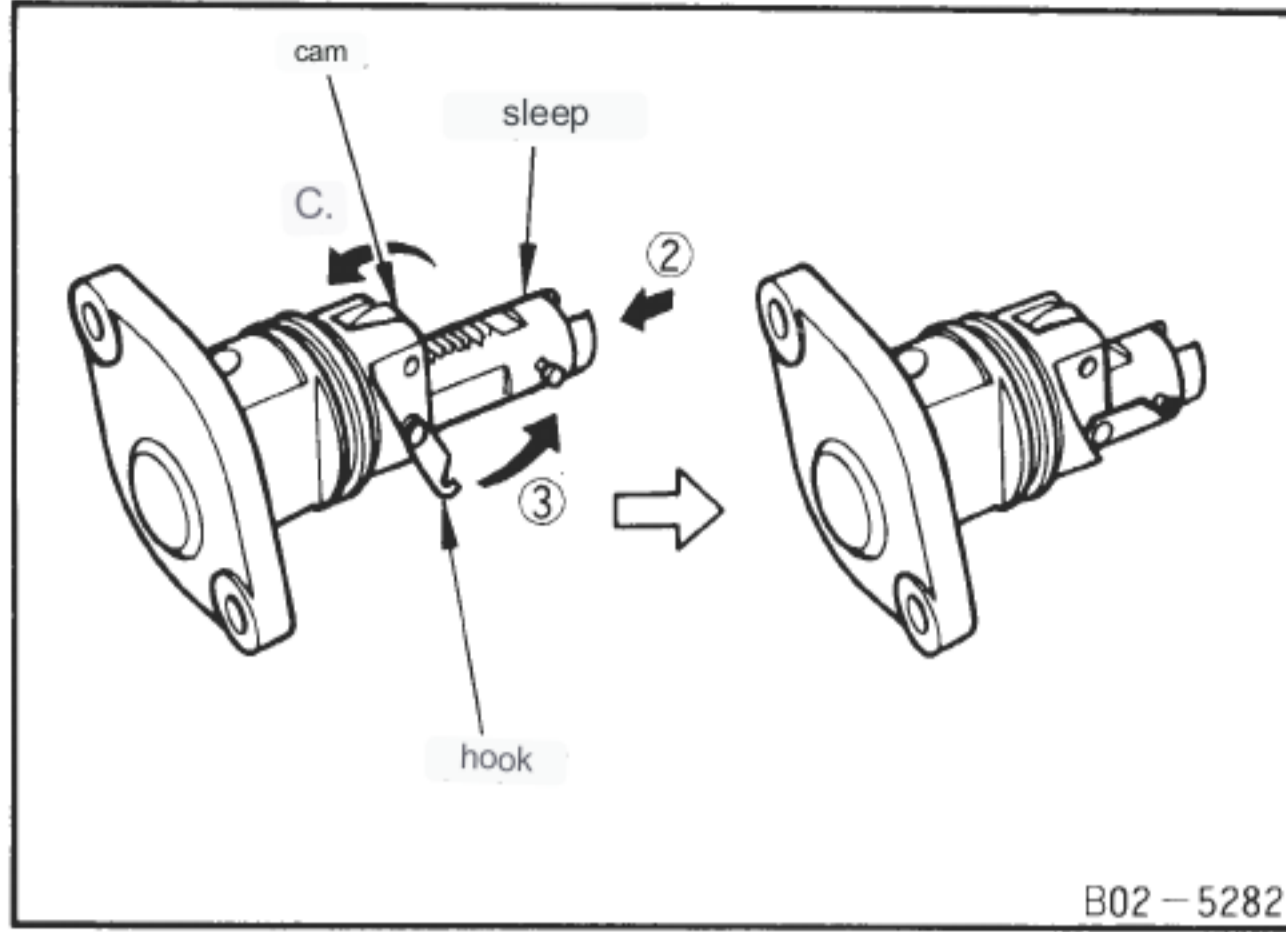
- With all the markings aligned, turn the cam sprocket into the cam.

Push firmly onto the shaft and rotate the cam sprocket at 14~16kg-m.

tighten.



- Be careful not to over-tighten the bolts (3 places) indicated by the arrows in the diagram on the left, as they are stepped bolts and there will be a clearance between them and the mounting part when they are completely



attachment

- Shrink the tensioner according to the following procedure, hook it, and then assemble it. (After assembling and turning the crankshaft 1/4 turn, automatic To be released)

(1) Press the cam (stopper).

② Press the sleeve while maintaining the state of (TI)。

③ put a hook on.

- Replace the gasket with a new one.

• Install the gasket with the notch facing down.

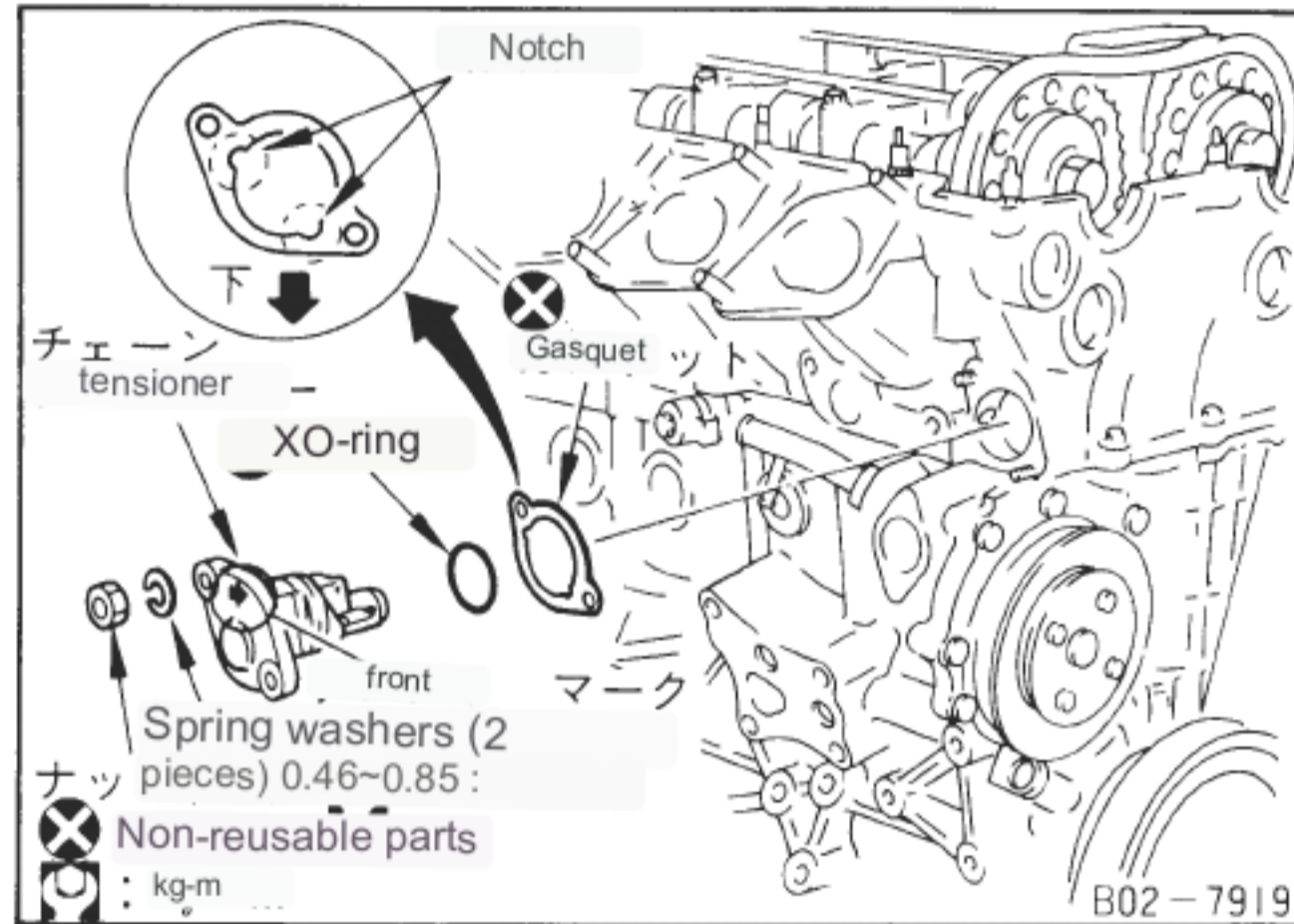
- Apply a small amount of engine oil to the tensioner and cylinder head mounting holes. apply.

• Attach the O-ring without damaging it.

- Install the tensioner with the front mark facing the front of the engine.

- After installation, turn the crankshaft 1/4 turn clockwise so that the hook

Confirm to release.

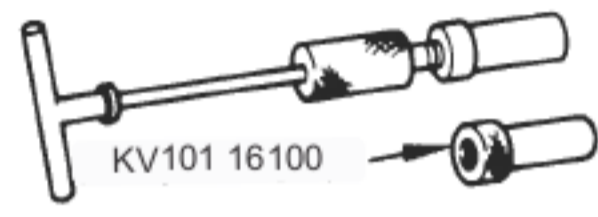





9-12 cylinder head

The exhaust valve contains metallic sodium, so be careful when handling it.

..... See the next page for details.

supplies

	name	for way	remarks
	Valve spring compressor (general purpose)	Valve cotter desorption	
	Valve Onor Seal Puller KV101 07902 (Set No.)  KV101 16100 B02-5997	Removal of valve oil seal	
	Valve oil shield lift KV101 15600  B02-5998	Installing the valve oil seal	
Special tool	Valve Guide Remover Dorint KV101 11800  B02-6167	Removing/Installing the Valve Guide	Existing
	valve guide reamer	Installing the valve guide	
	valve guide seat cutter		
	Valve seat drint ST1524 3000  B02-5615	Installing the valve seat	
Total	valve spring tester	Measurement of compressive load of valve springs, etc.	
vessel	Micrometer	Measuring valve dimensions	
	Dial gauge	Valve guide gap measurement	
fee	Daikator PL-1 (manufactured by Daido Chemical Industry Co., Ltd.)	Inspection per valve:	—

Precautions when handling metallic sodium-filled exhaust valves

Metallic sodium is strongly alkaline and can cause a violent chemical reaction.

Therefore, please be careful about handling and disposal as follows.

to do

Metallic sodium enclosed in the exhaust valve is exposed to the air.

It is safe unless

- If it gets in your eyes, it will cause
- blindness. If it touches your skin, it will burn you.
- Cause of fire

① Basic matters

- Do not break the valve intentionally and take out metallic sodium.
- When disposing of the valve, in principle, return it to Nissan Motor Co., Ltd. Service Department (Zama).

In the unlikely event that the valve is damaged, remove the valve and treat the metallic sodium (neutralization and waste liquid treatment).

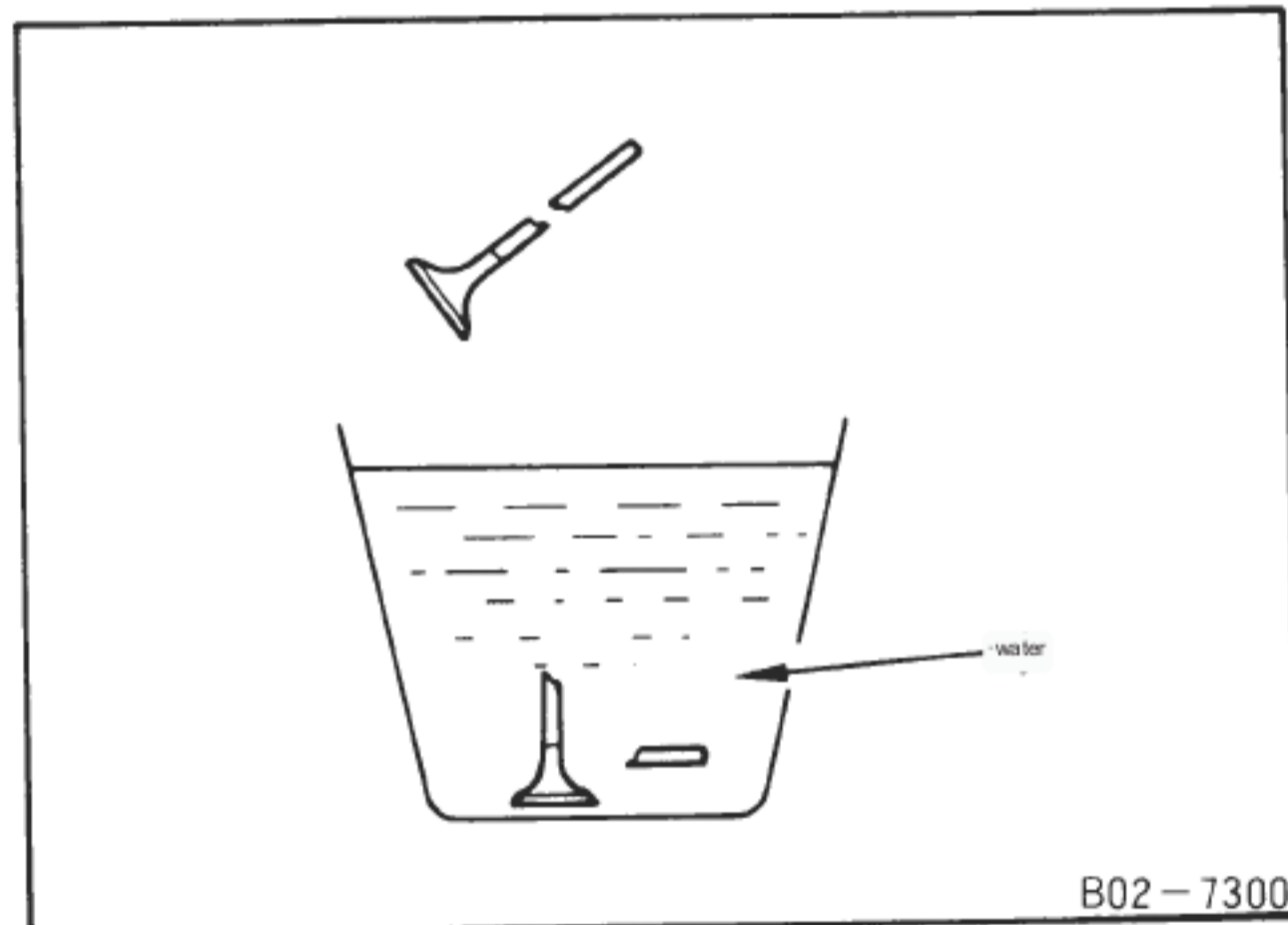
② Processing method

In principle, return the valve to Nissan Motor Co., Ltd. Service Department (Zama). However, if

it is clearly known that the disposal method of the industrial waste disposal company dissolves without using a process such as pressing, it may be disposed of.

If the valve is damaged, remove it, neutralize it by reacting with water, and treat it in the same way as ordinary steel. place

The procedure should be as follows.



- Put on rubber gloves and remove the damaged valve from the cylinder head.

vinegar.

- Prepare a bucket in a well-ventilated area and fill it with water (approximately 10 liters or more).
- Use large tweezers to prop up a damaged valve and submerge it in water.

Note: (1) Be sure to immerse the damaged valve in water.

(2) The number of valves reacting with about 10 liters of water should be 8 or less at a time.

- The reaction is intense, so keep a distance of 2-3m or more from the bucket.

- Because it generates hydrogen gas, keep away from fire.

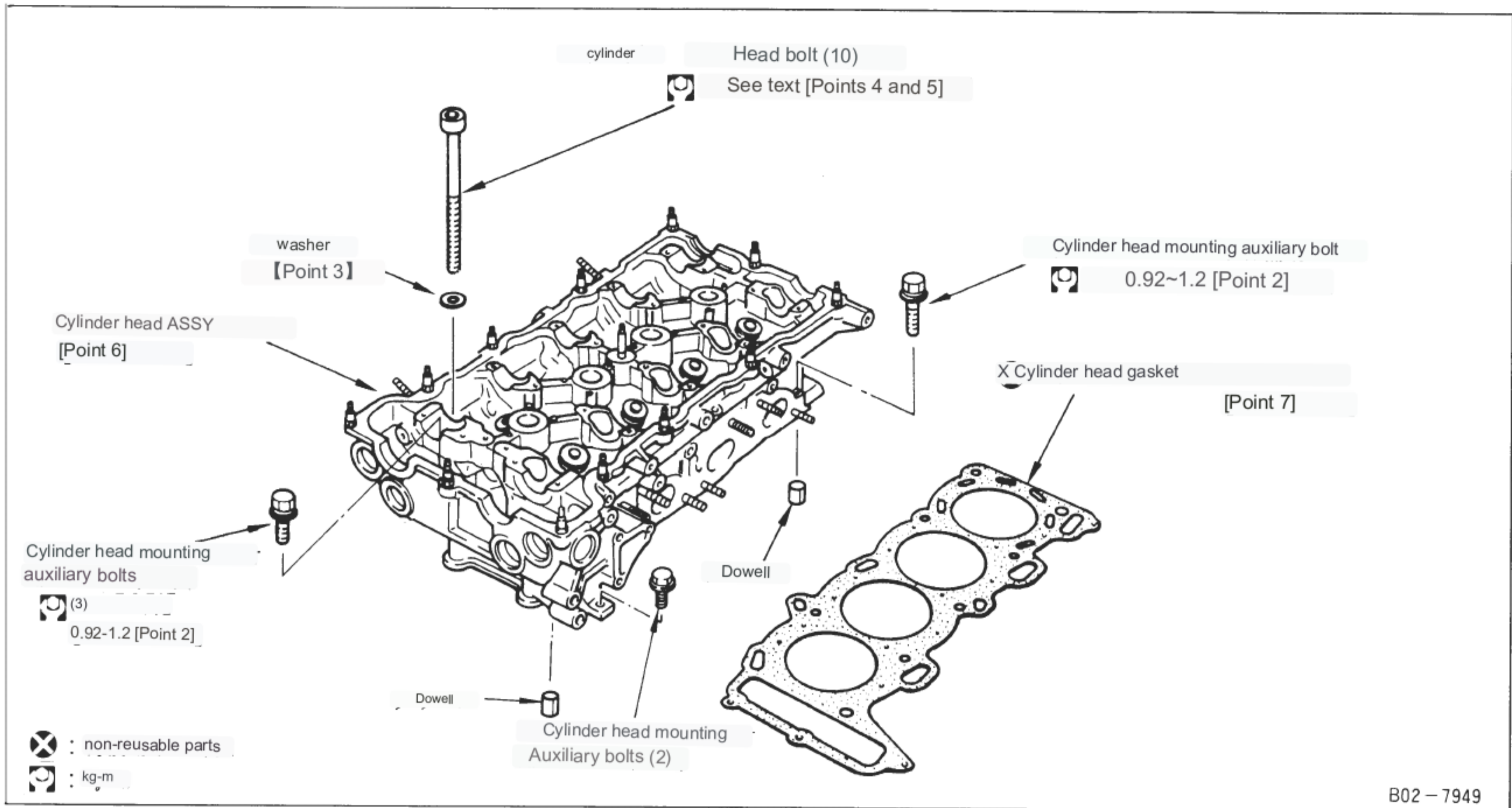
- When the reaction is complete (4 to 5 hours), remove the valve with large tweezers and dispose of it like any other part.

- Because the reaction solution is a strong alkaline solution, waste liquid treatment should be performed in accordance with local regulations.

matter.

Note: Do not allow the reaction solution to come into contact with the skin. If it gets on your skin, wash it off immediately with plenty of water.

(1) Elimination 着



B02 - 7949

Cooling water drain [Point 1]

with intake manifold (see 9-4)

Exhaust manifold (see 9-6)

With thermostat and water piping (see 9-16)

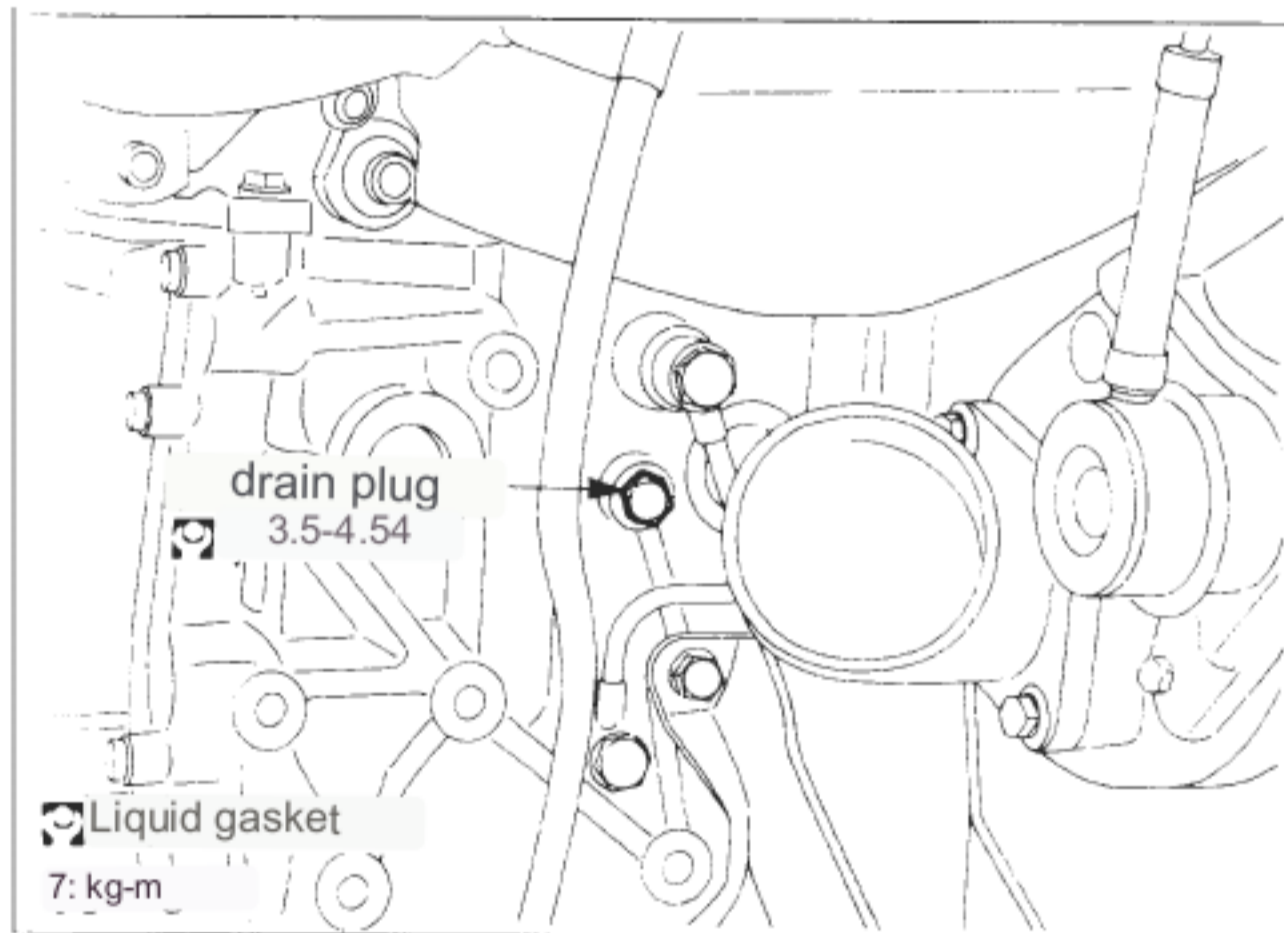
With radiator upper hose

付 rocker cover (see 9-9)

with camshaft (see 9-10)

(Attached turbocharger (see 9-5)

(Attached) Crank angle sensor (see 9-10)

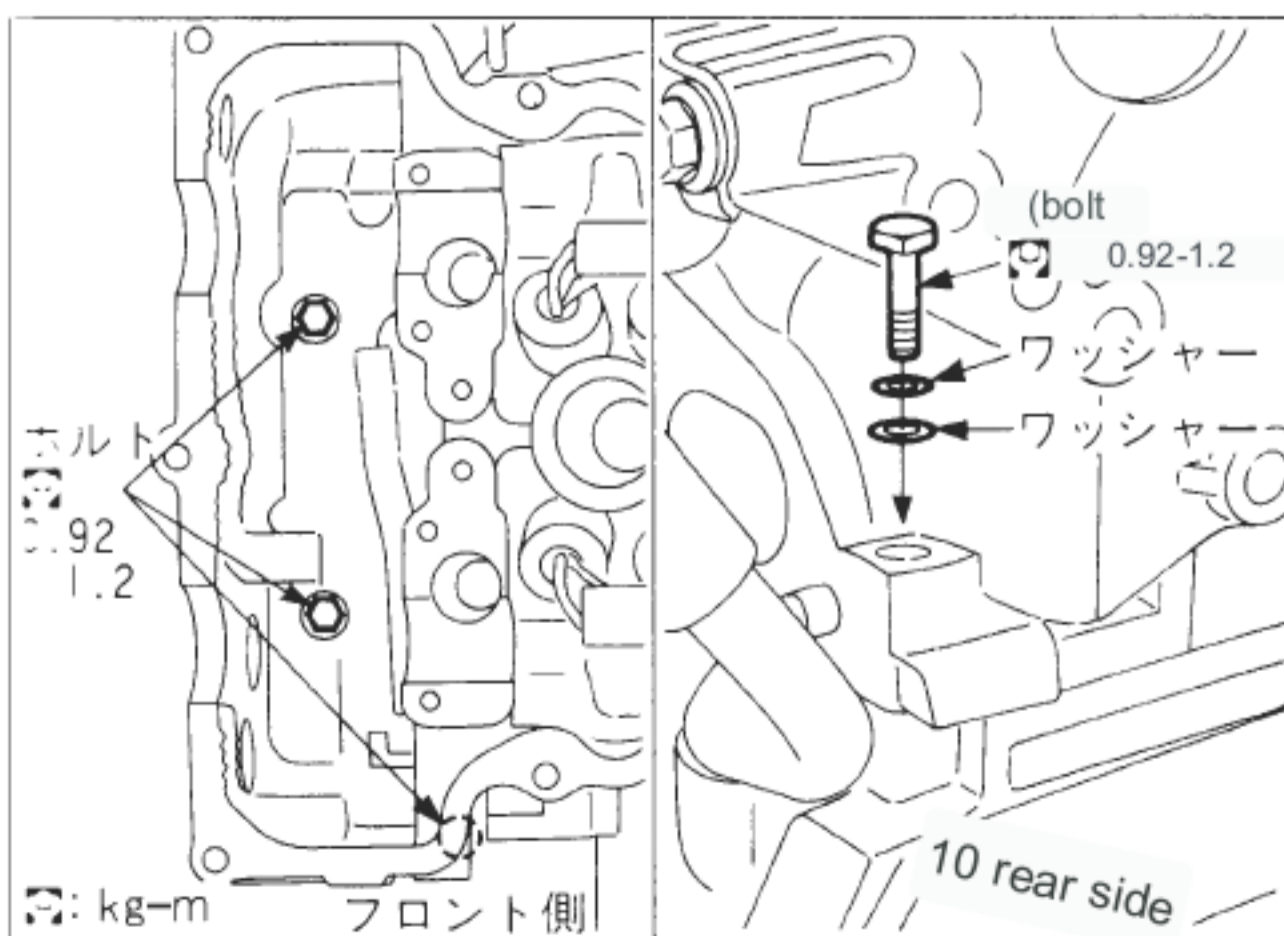


[Point 1] Cooling water drain

- Completely drain the cooling water from the drain plug of the cylinder block. take.

When installing the drain plug, apply a sealant (equivalent to ThreeBond 1386).

to clothe.



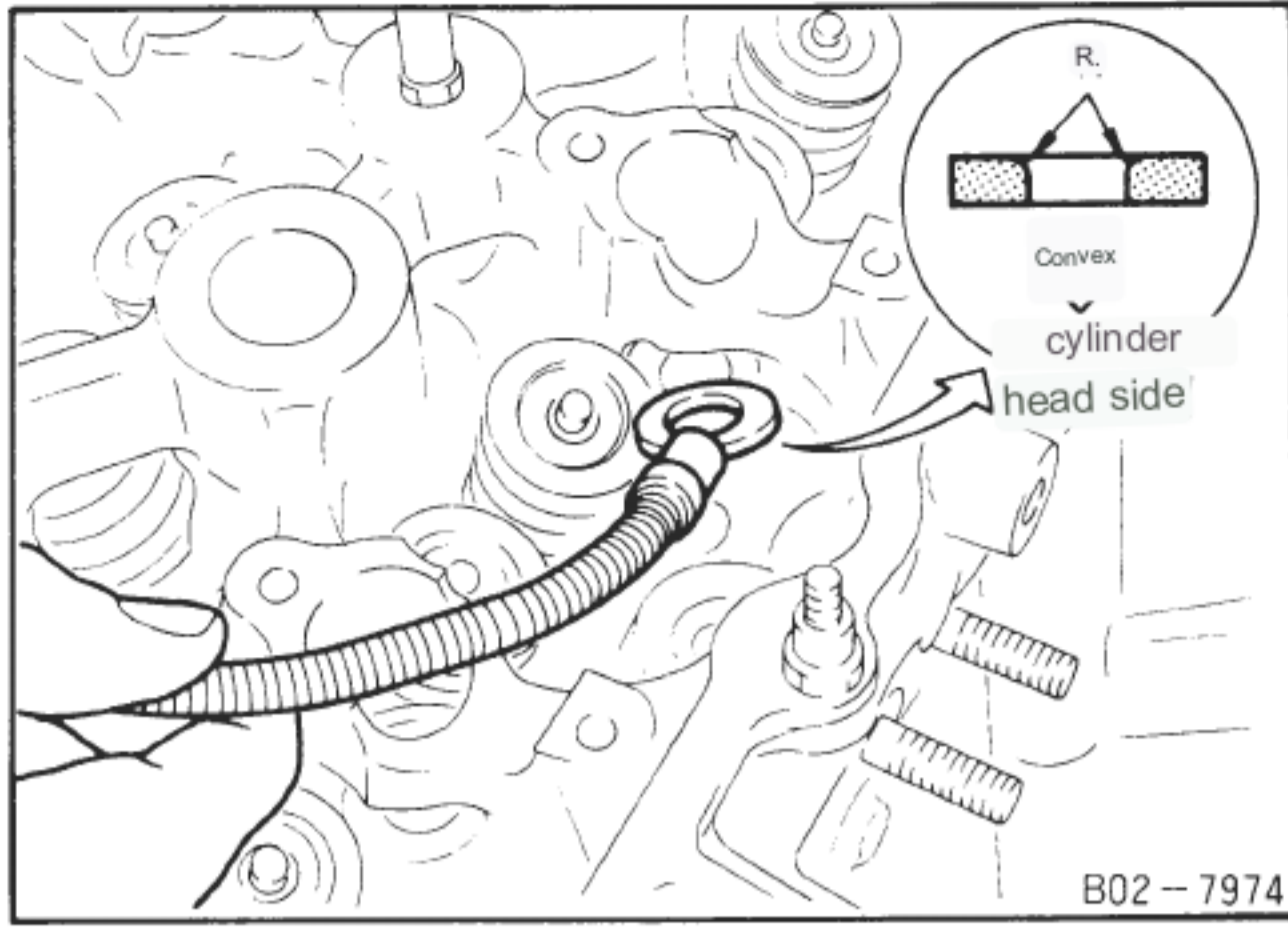
[Point 2] Remove and install cylinder head mounting auxiliary bolts

Removal

- Remove before loosening the cylinder head bolt.

attachment

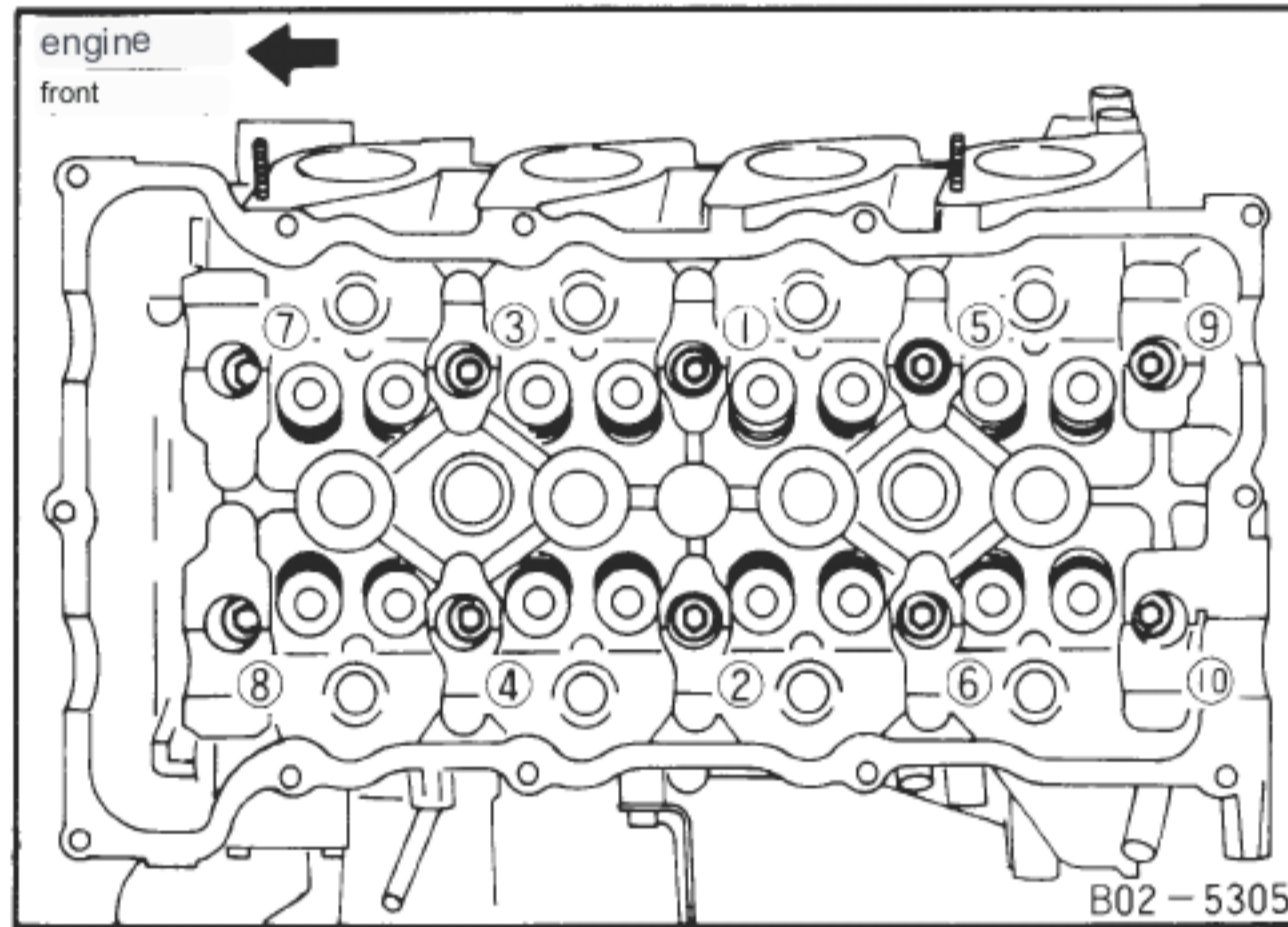
- Install after tightening the cylinder head bolts.



[Point 3] Remove and install cylinder

head bolt washer · Remove and install
from the side using a magnetic hand.

る。



[Point 4] Cylinder head bolt installation

· Tighten the cylinder head bolts at an angle as shown

below.

Cylinder head bolt tightening instructions

(1) Apply engine oil to the threads of each bolt.

(2) Tighten in the following stages in the following order.

① 4 kg-m

② 8 kg-m

③ to 30 kg-m.

④ 4 ± 0.5 kg-m

⑤ Put matching marks (paint, etc.) on the head and head surface of each bolt.

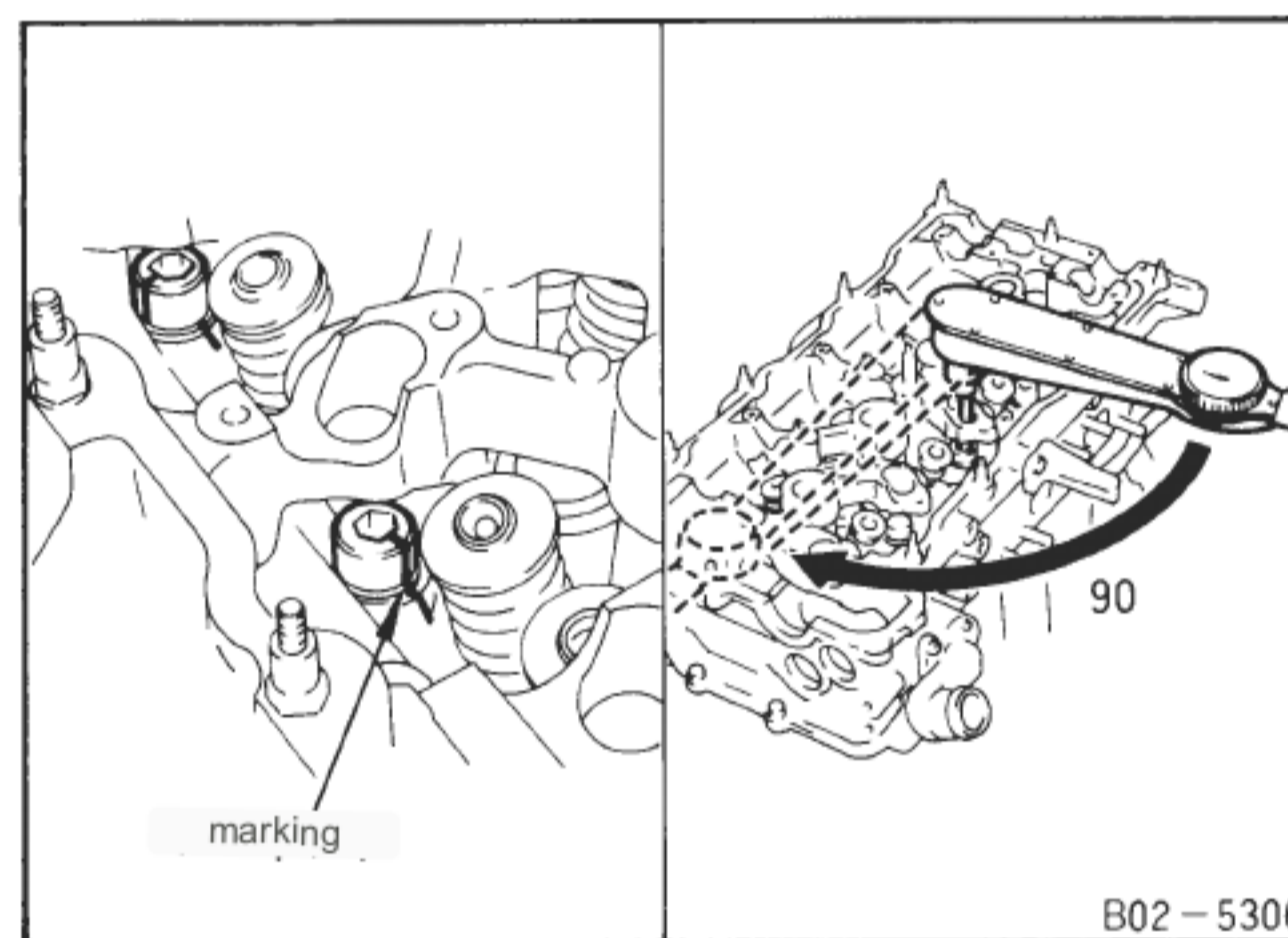
Attach in the same direction.

(6) Tighten each bolt $90^\circ +$.

(7) Attach the matching mark and tighten it again at $90^\circ + 5^\circ$ in the order shown in the upper left figure.

be. (Possible by visual judgment)

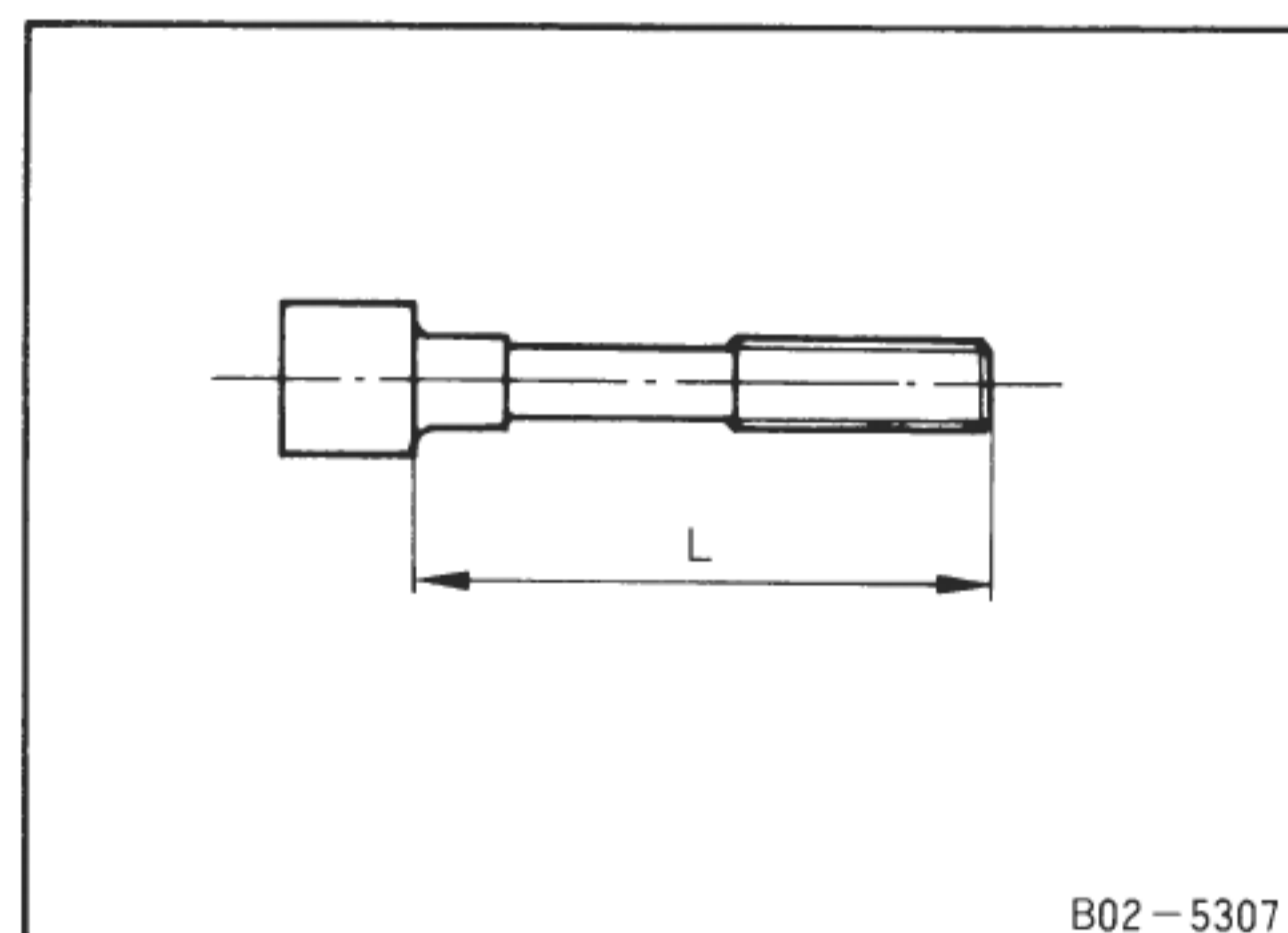
Remove the cylinder head bolts in reverse order.



[Point 5] Cylinder head bolt · The cylinder head

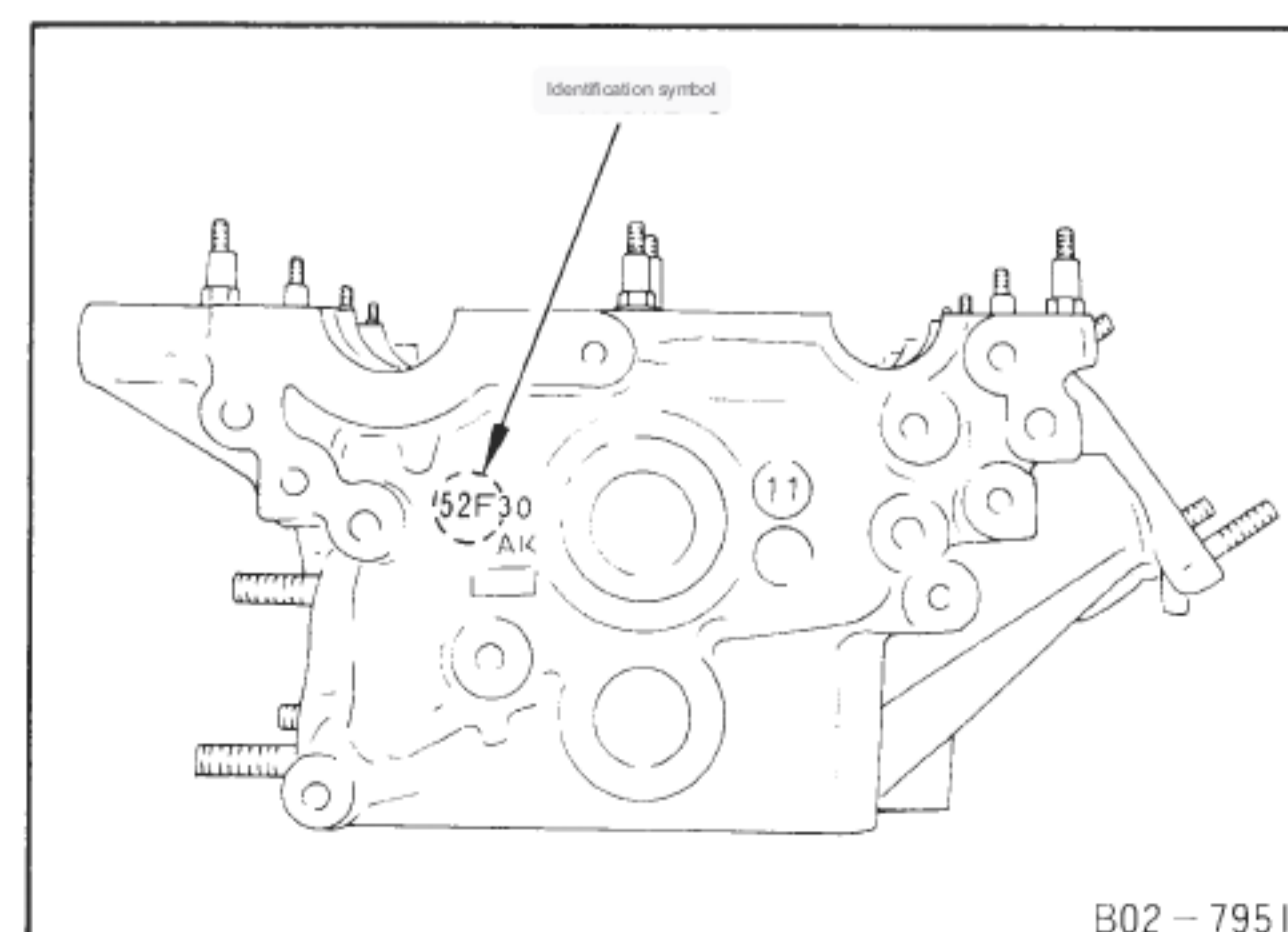
bolt is tightened in the plastic region, so the L dimension in the left figure is 158.2.

mm or more, replace it with a new one.

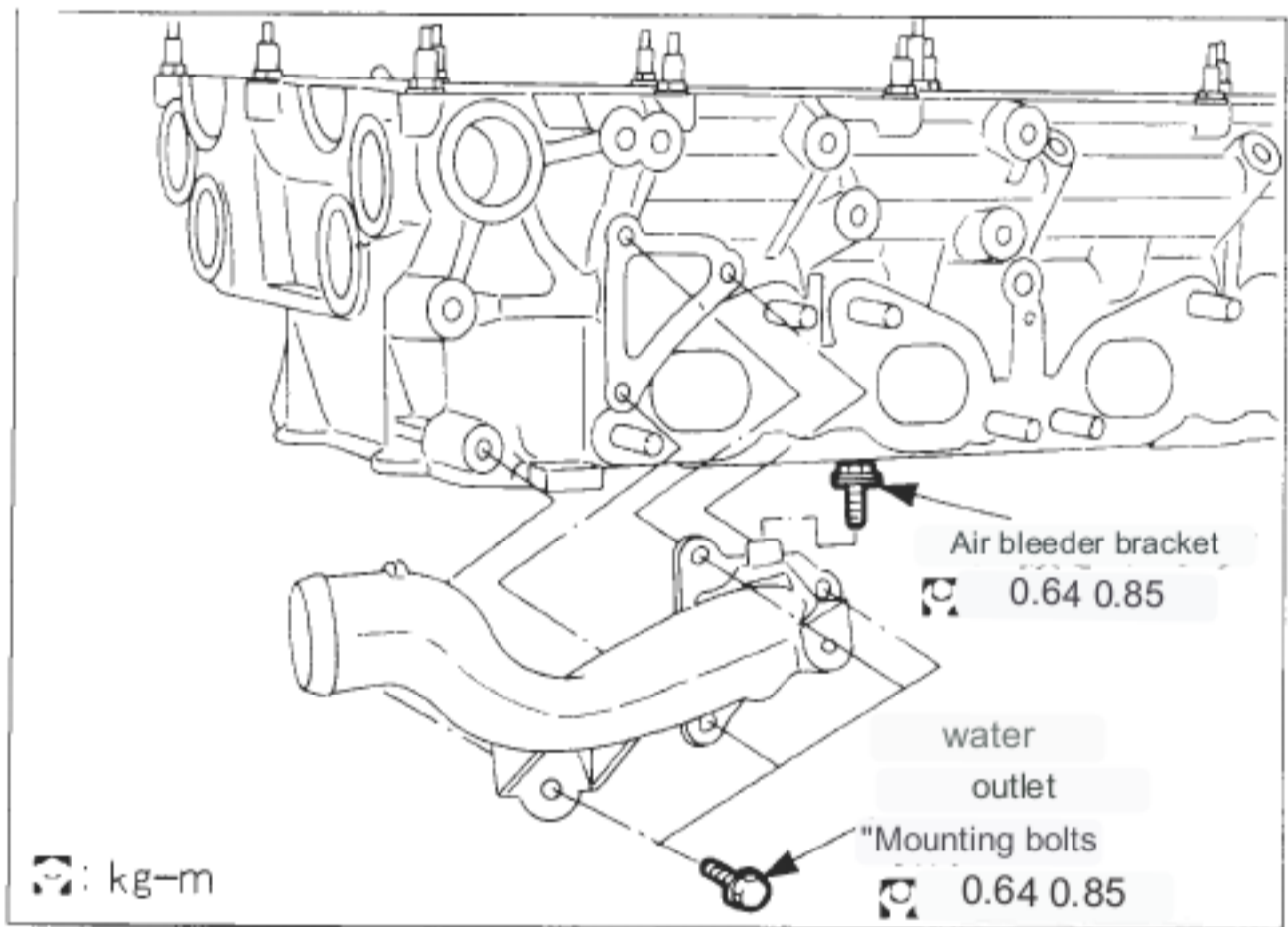
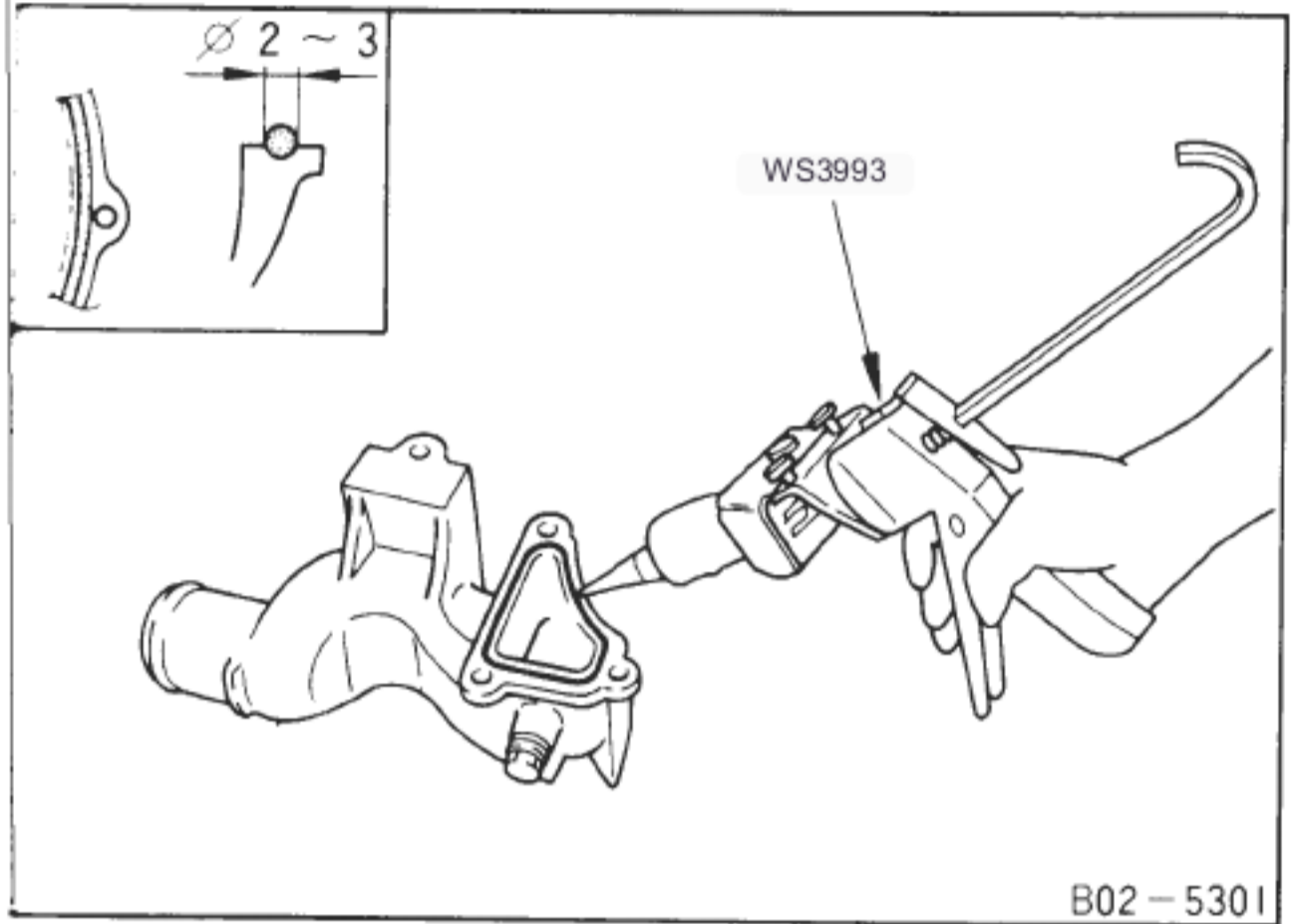
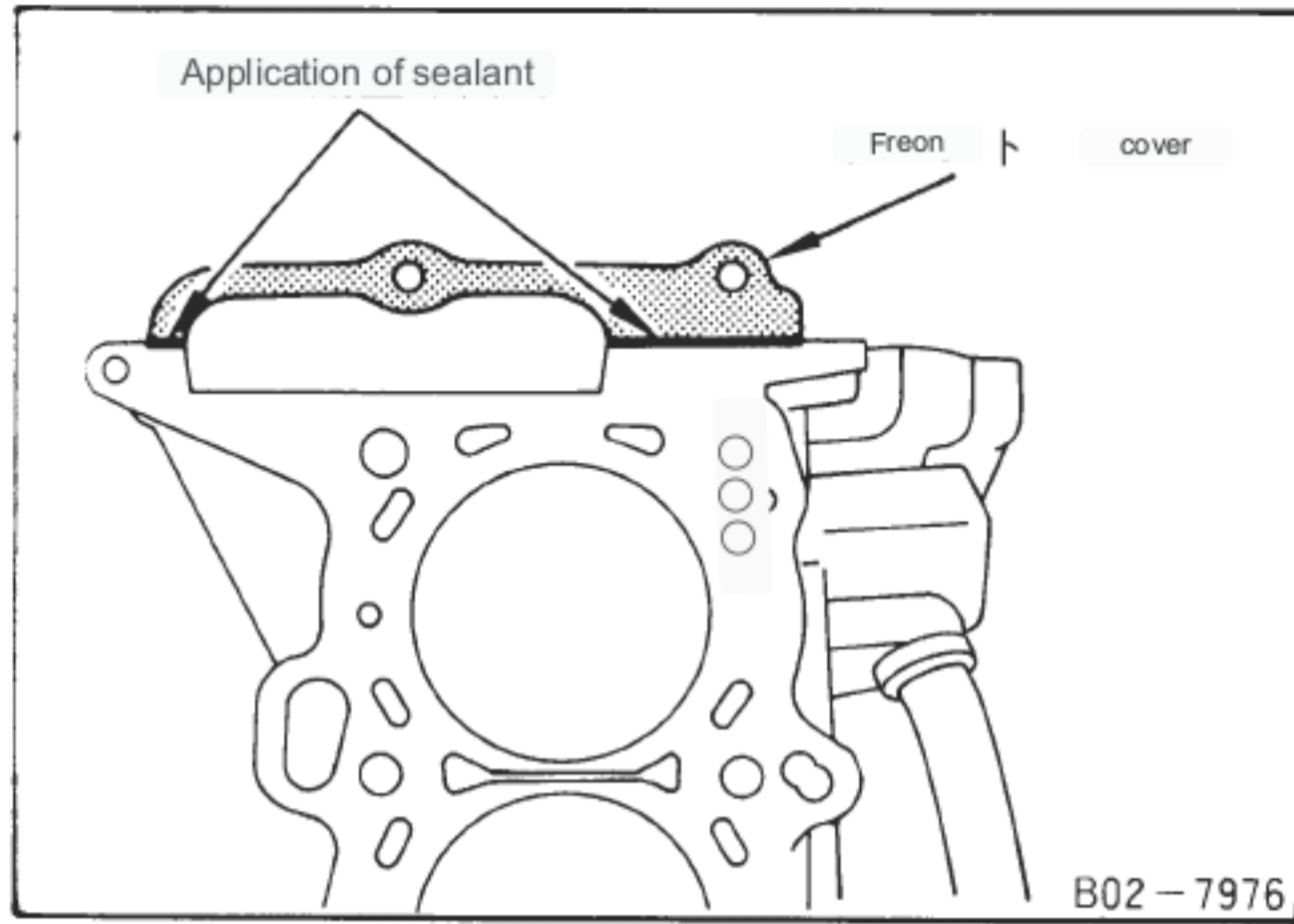


[Point 6] Cylinder head

· Cylinder heads are identified by the casting symbol shown on the left.



casting symbol	52F
----------------	-----



[Point 7] Cylinder head gasket installation

- A seal is installed where the top surface of the cylinder block and the front cover come into contact.

Apply a lubricant (equivalent to ThreeBond 1207C).

- Install the dowel to the cylinder block.
- Distinguish by grommet diameter.

Note: (1) Do not reuse, replace with a new one.

(2) At the time of installation, on the bottom surface of the cylinder head and the top surface of the cylinder block

No adhesion of water, oil, etc.

(3) Be careful not to damage the gasket during installation.

[Point] Water outlet removal and installation

remove and clean

- Insert a screwdriver into the arrow on the left and pry it up and down to remove it.
- Remove the liquid gasket using a scraper. CAUTION:
Also remove the liquid gasket in the grooves.
- Wipe the mounting surface with white gasoline.

attachment

- Using a tube presser, a liquid gasket (ThreeBond 12

X-001 equivalent) to the water outlet with a gap as shown on the left.

Apply at $\Phi 2.0 \sim 3.0 \text{mm}$.

- Install the liquid gasket within 5 minutes after application. • After installation,

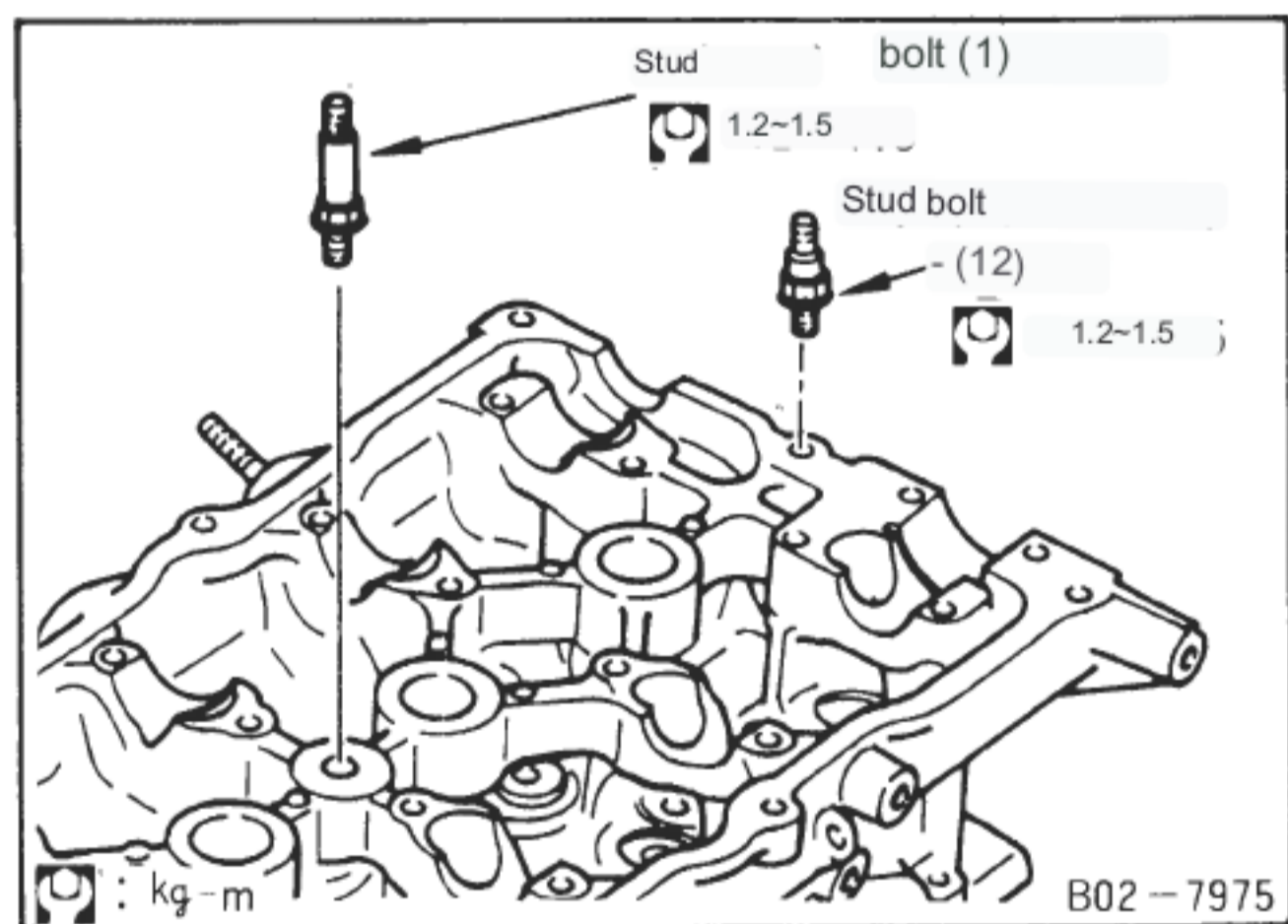
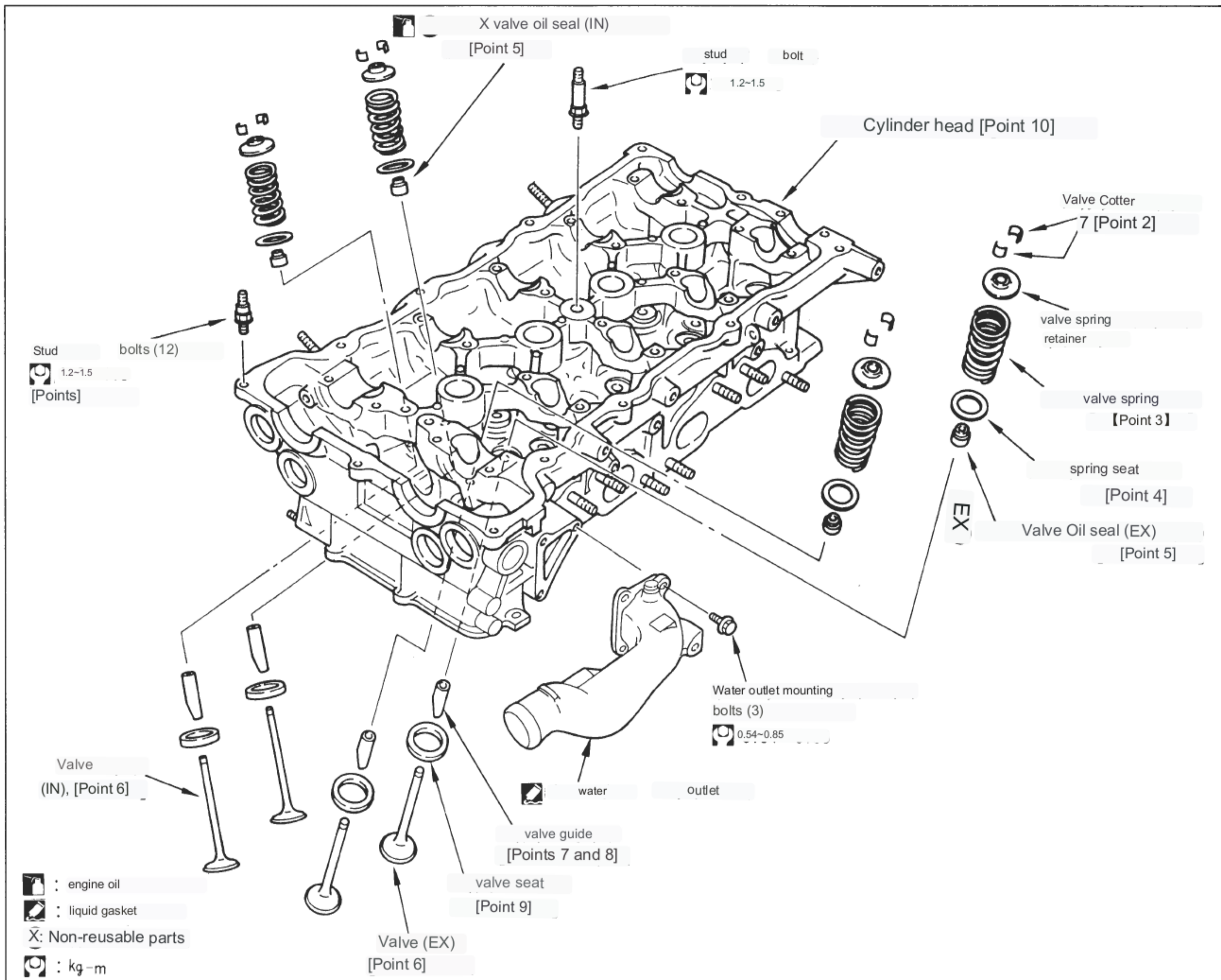
leave it for 30 minutes or more before operating.

Note: After warming up, make sure there are no water leaks.

Water outlet tightening torque (kgm)	0.64 0.85
--------------------------------------	-----------

(2) Disassembly

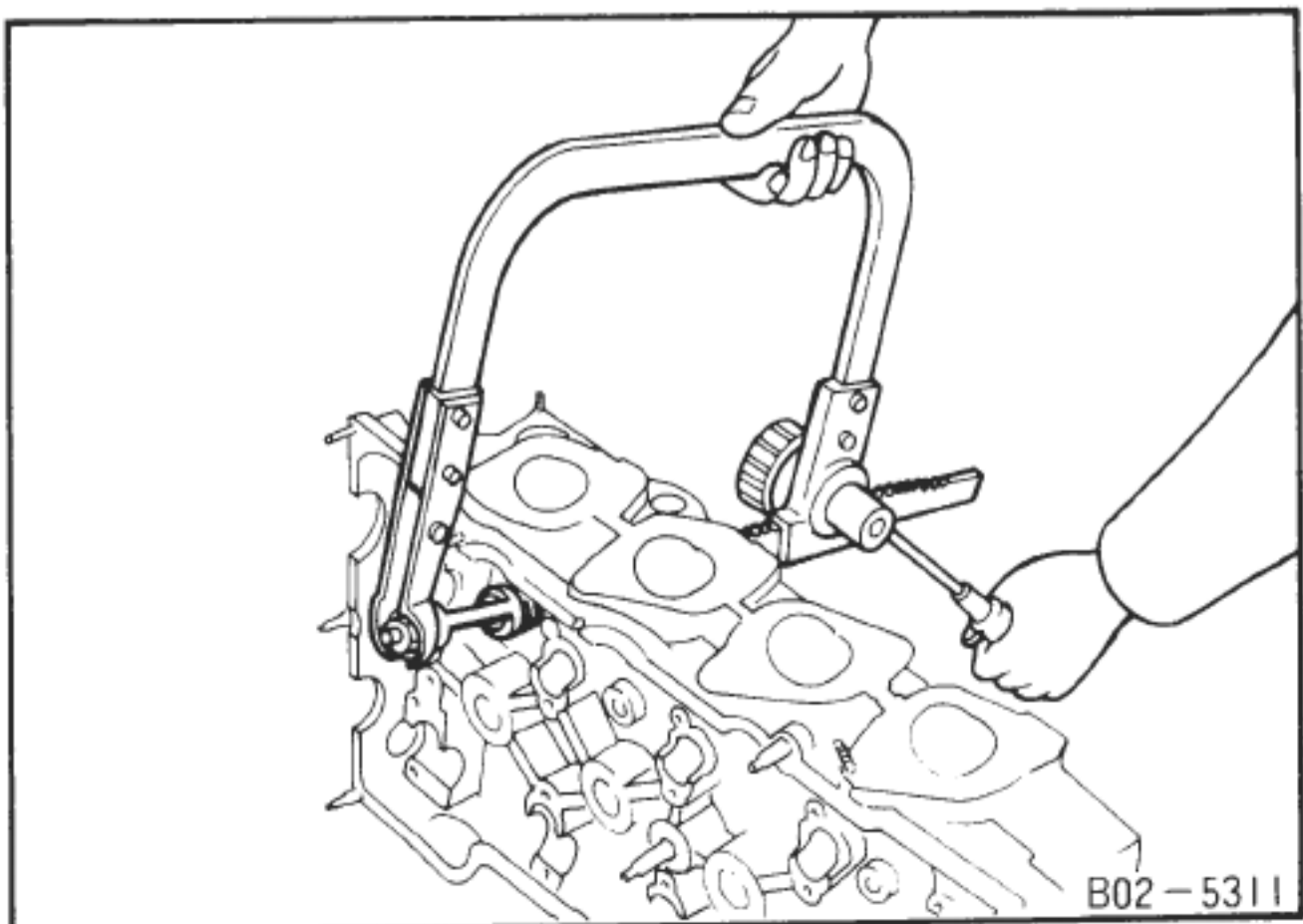
解



[Point 1] Stud bolt installation

- When the stud bolt is removed, replace it with a new one.
- A locking agent (three bond screw lock) is applied to the threaded portion of the stud bolt.

Super 101K) and install it on the cylinder head.



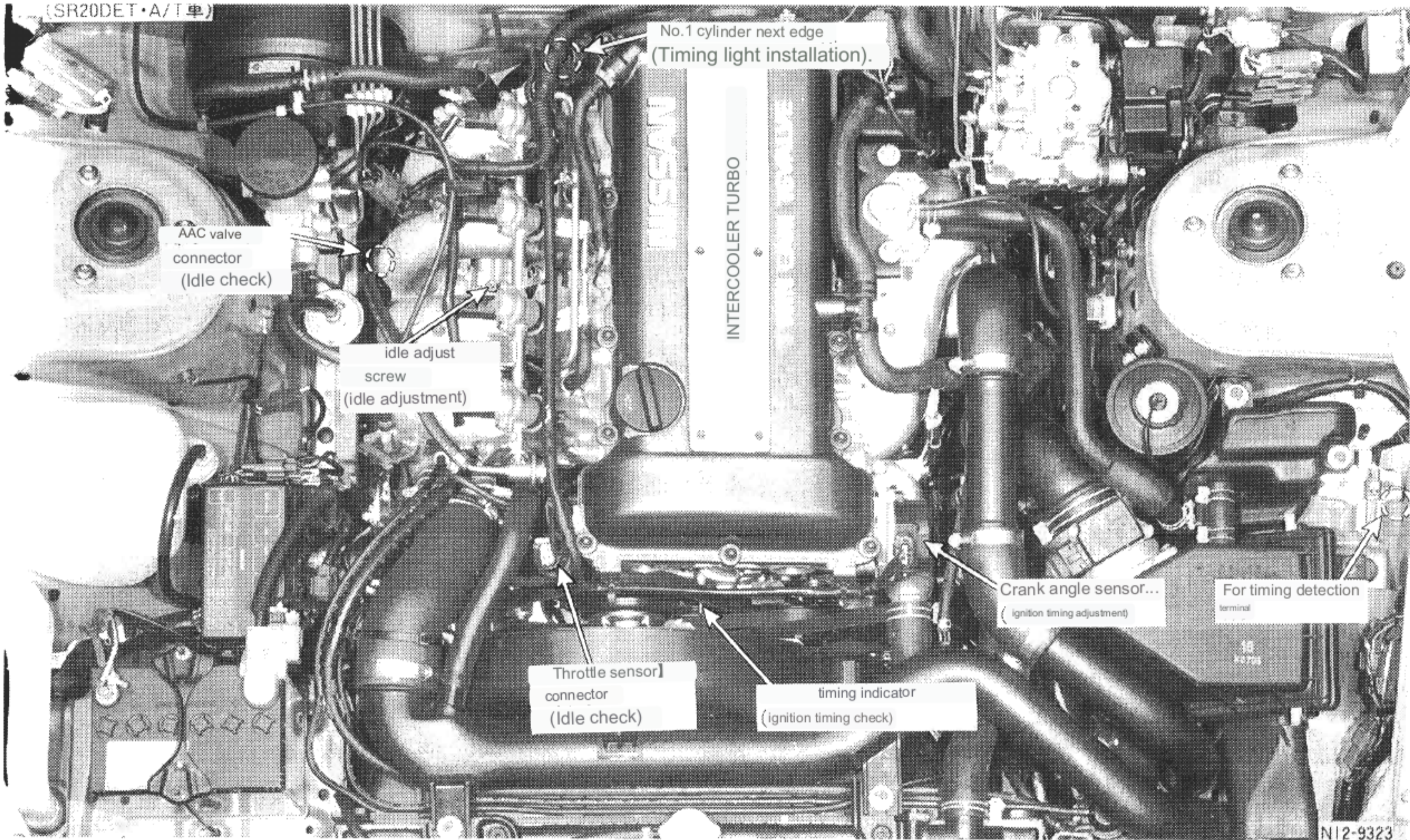
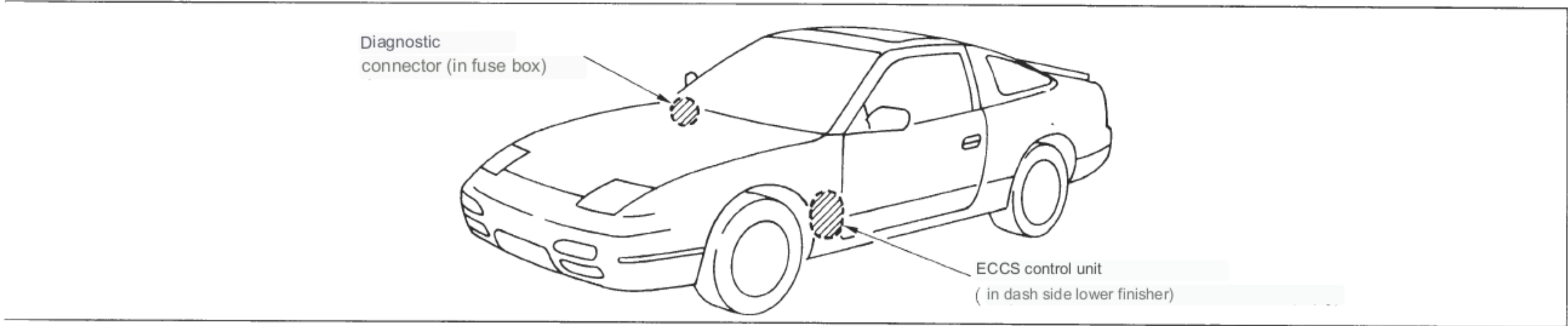
[Point 2] Remove and install the valve cotter

removal

- Use a valve spring compressor.

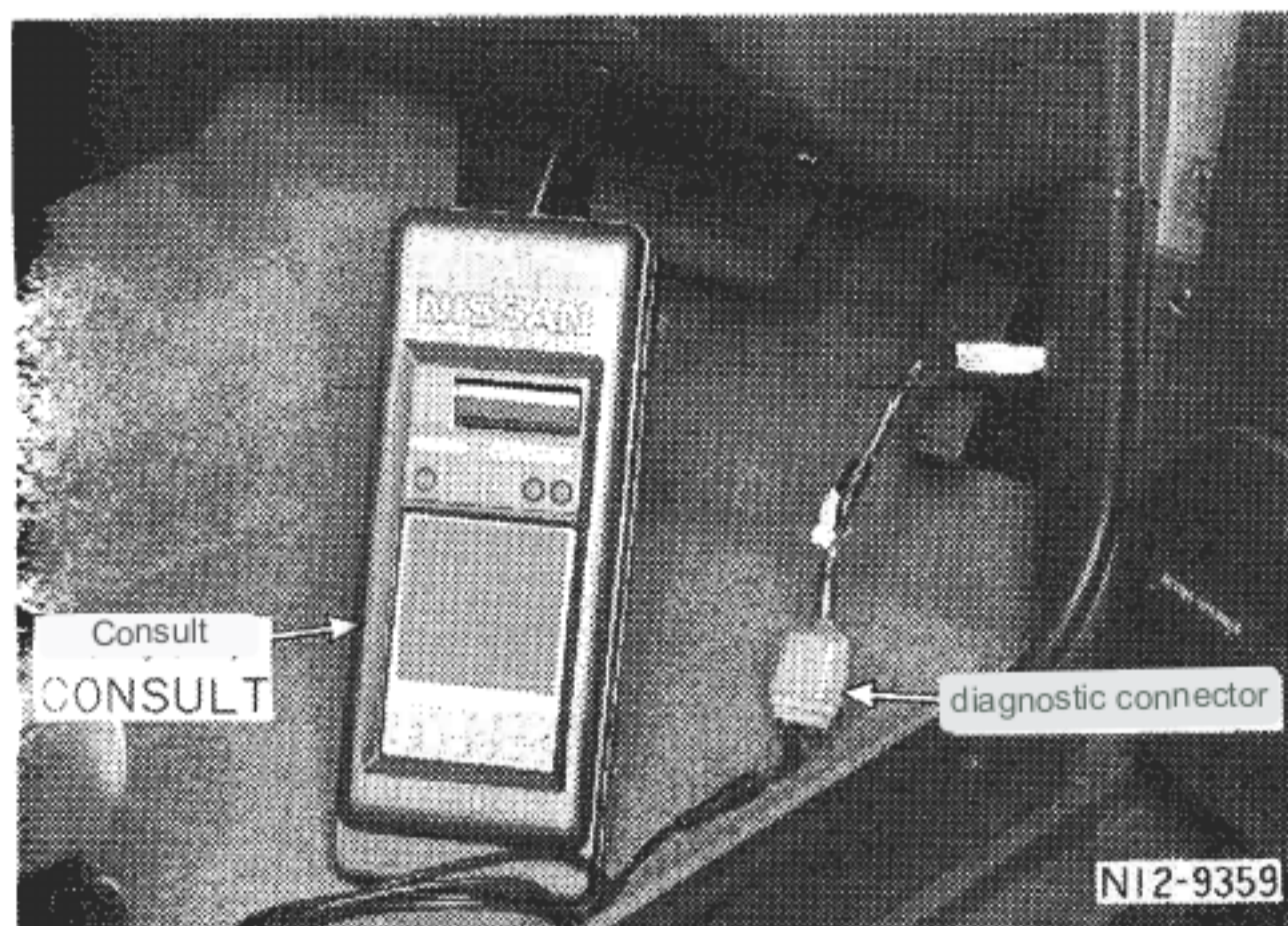
Installation

- After assembling the valve cotter, tap the end of the stem with a plastic hammer to check the installation condition.



B2

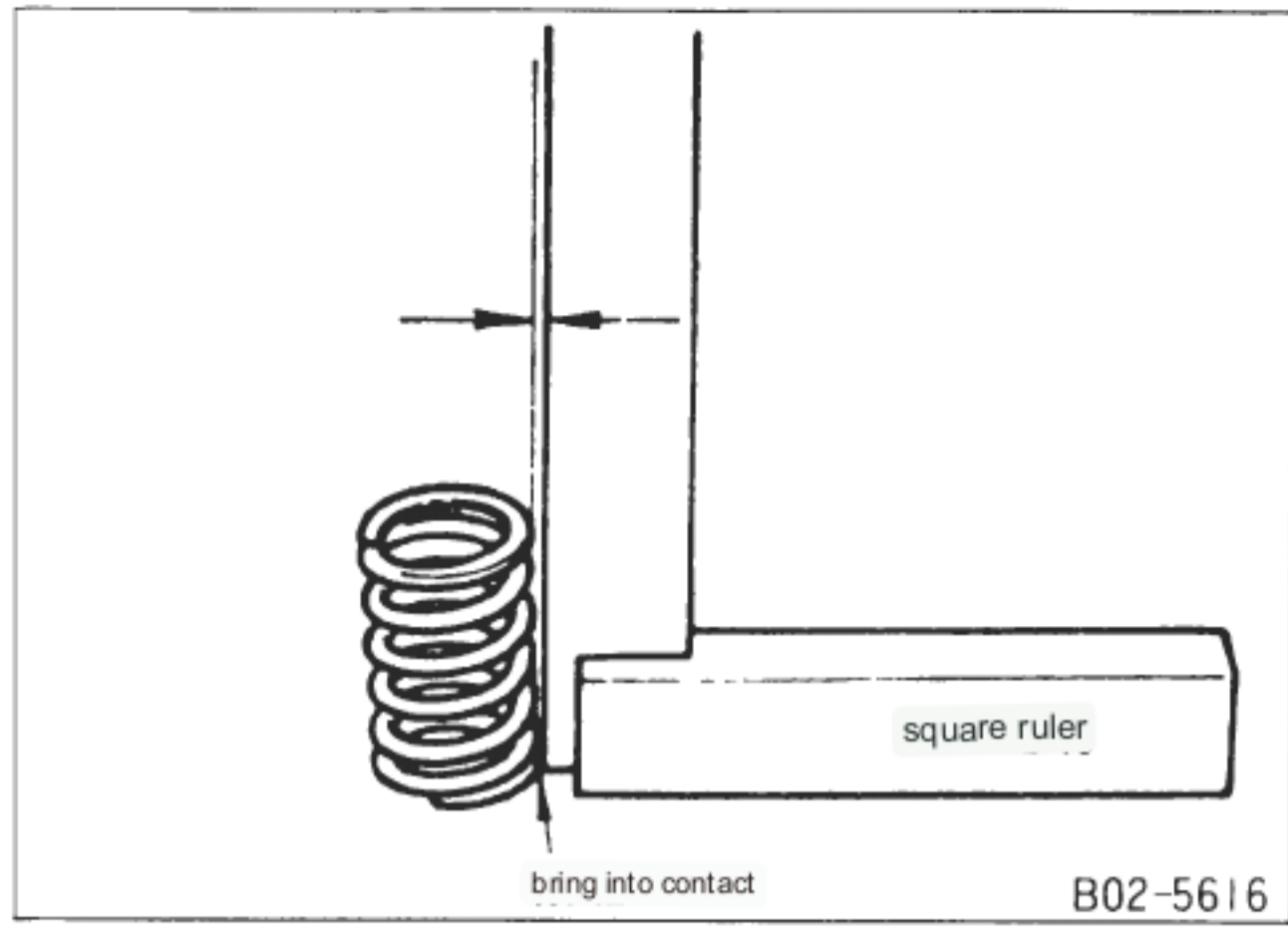
1-1 Inspection and adjustment of idle speed



- Warm up the engine sufficiently.
- Connect CONSULT to the diagnostic connector on the vehicle side (inside the fuse box). Display the diagnostic mode "Select" screen.
Note See B2, 2, 2-2 (2) for details.



- Check with the tachometer in the combination meter.



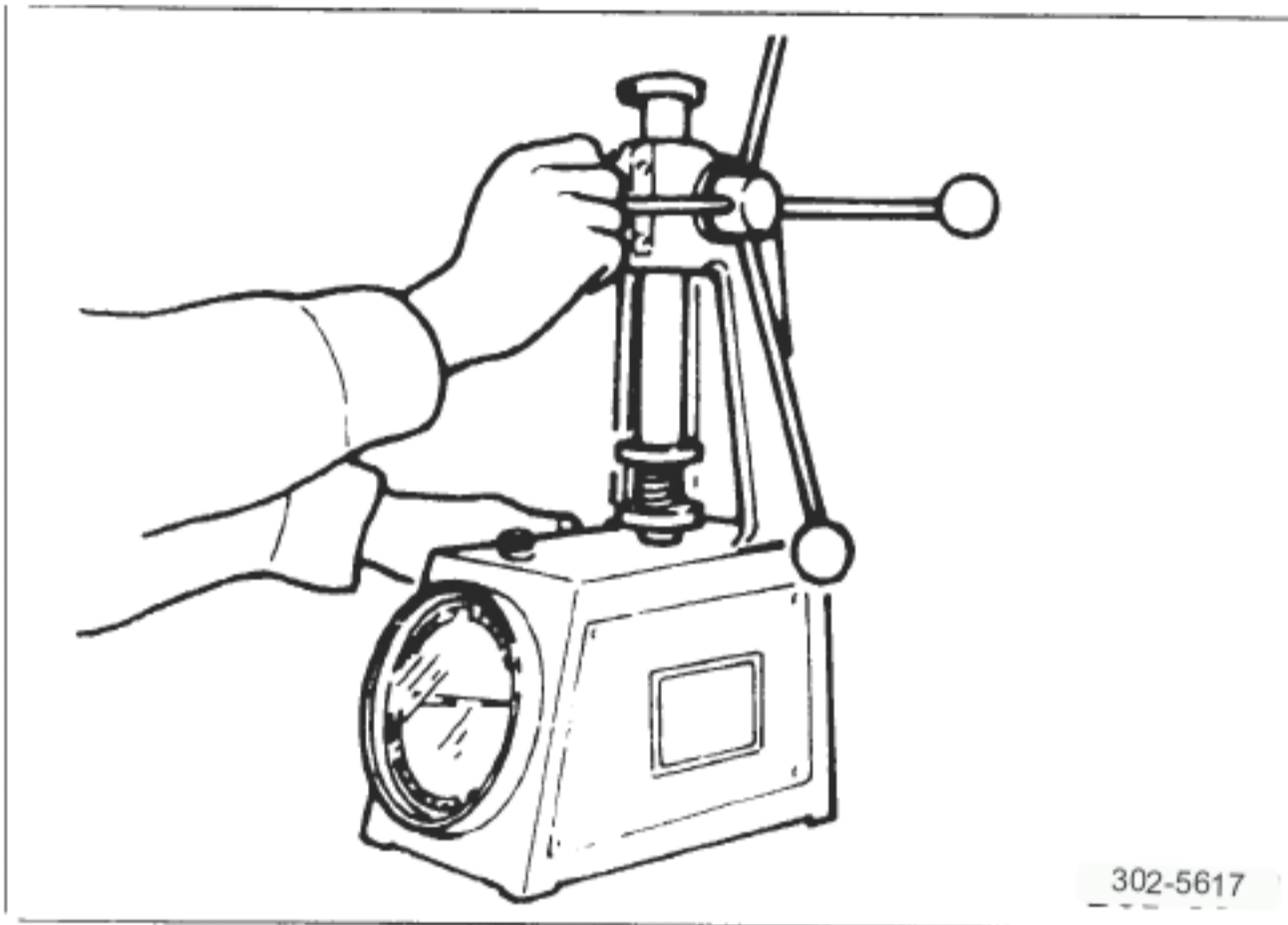
[Point 3] Valve spring

squareness check

- Apply a square ruler to the valve spring and turn the spring to

Measure the maximum value of the gap between the top surface of the jig and the square ruler.

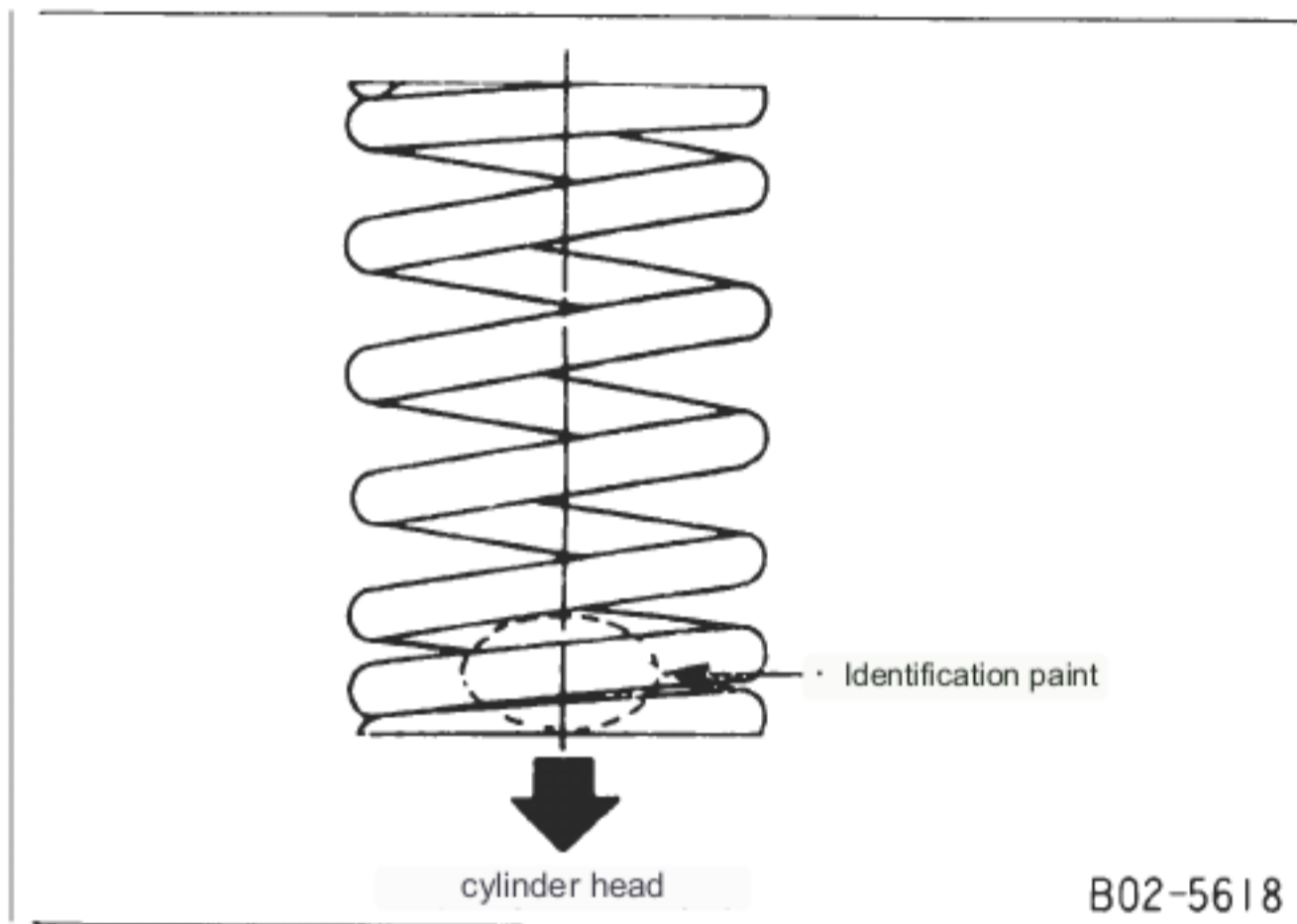
Limit	(mm)	2.2
-------	------	-----



Free length, compressive load measurement

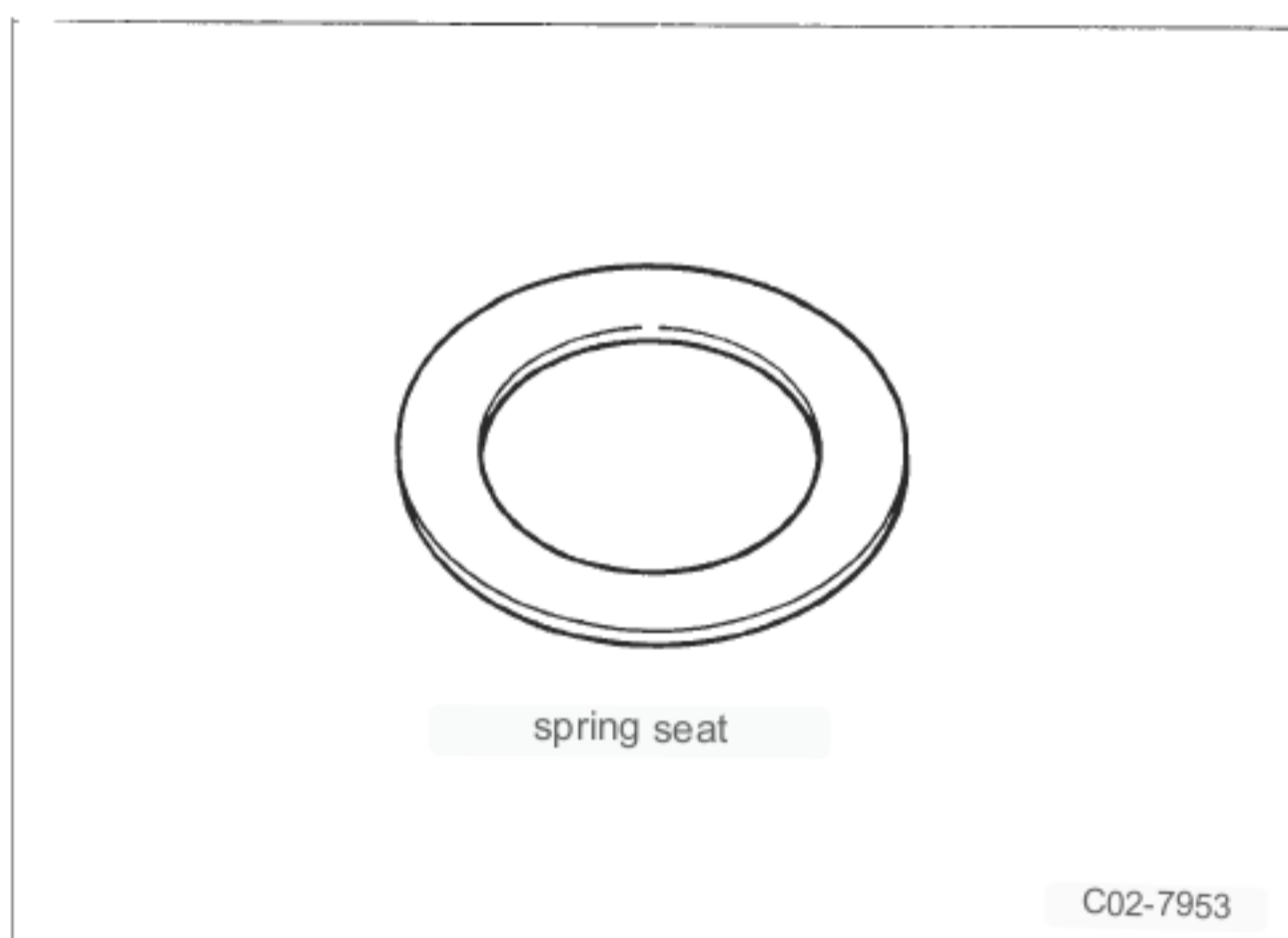
- Use a valve spring tester.

Free length	(mm)	49.36	
Mounting Time	compressive load	(kg)	25.6
	Compressed length	(mm)	40.0
identification paint		green	



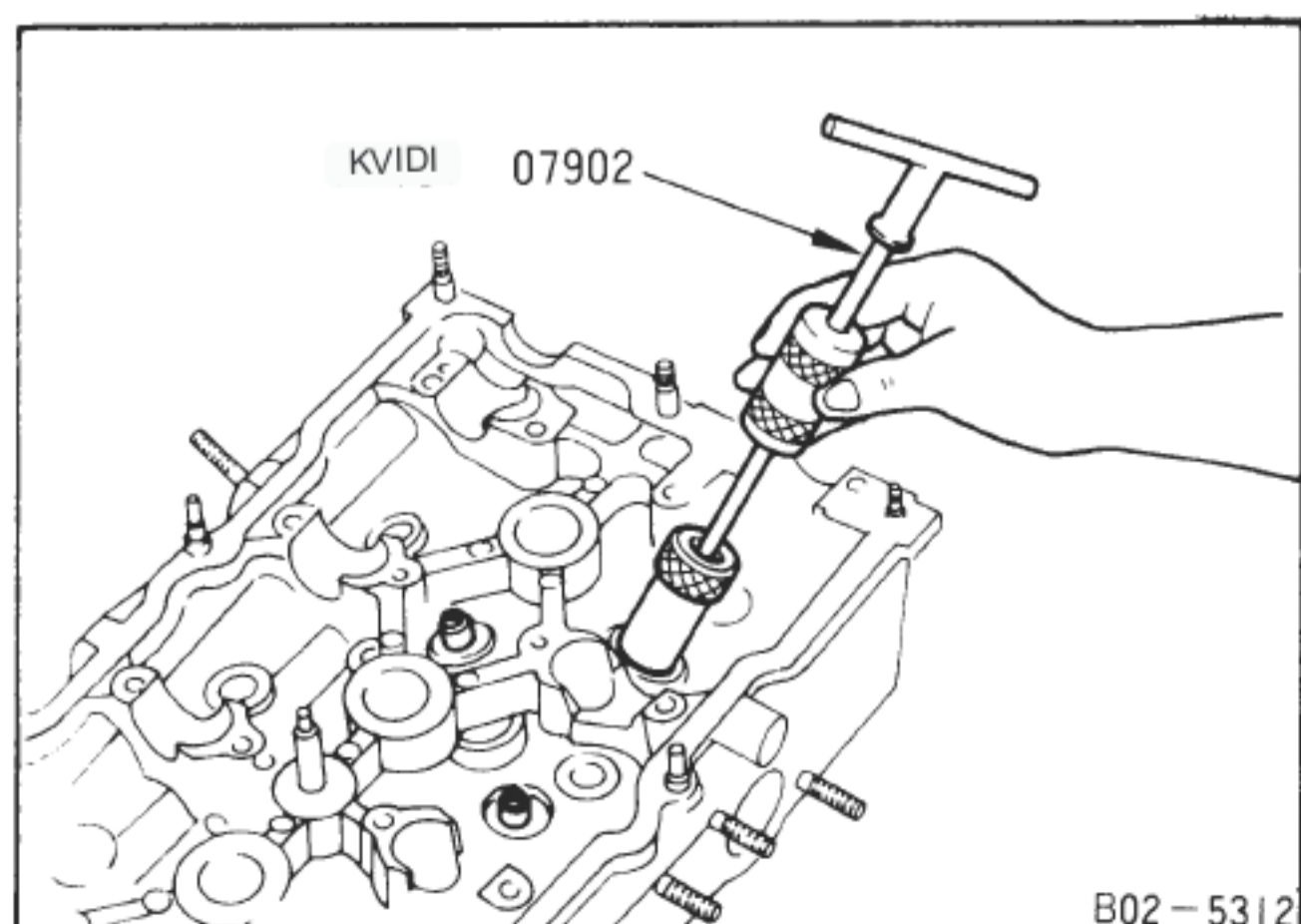
attachment

- Install the valve spring with the smaller pitch side (with identification paint) facing the cylinder head (lower side). CAUTION: Be careful not to damage the spring.



[Point 4] Valve spring seat installation

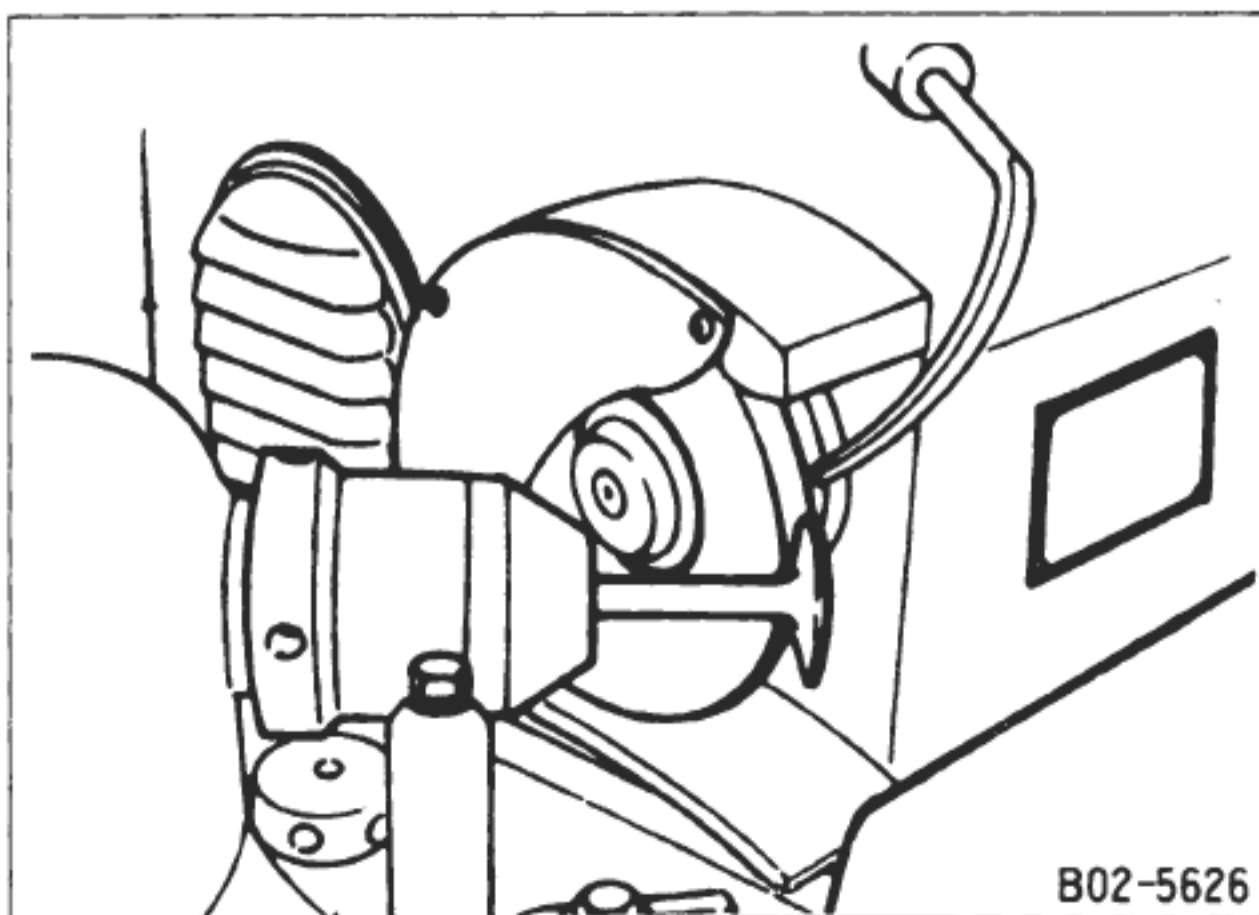
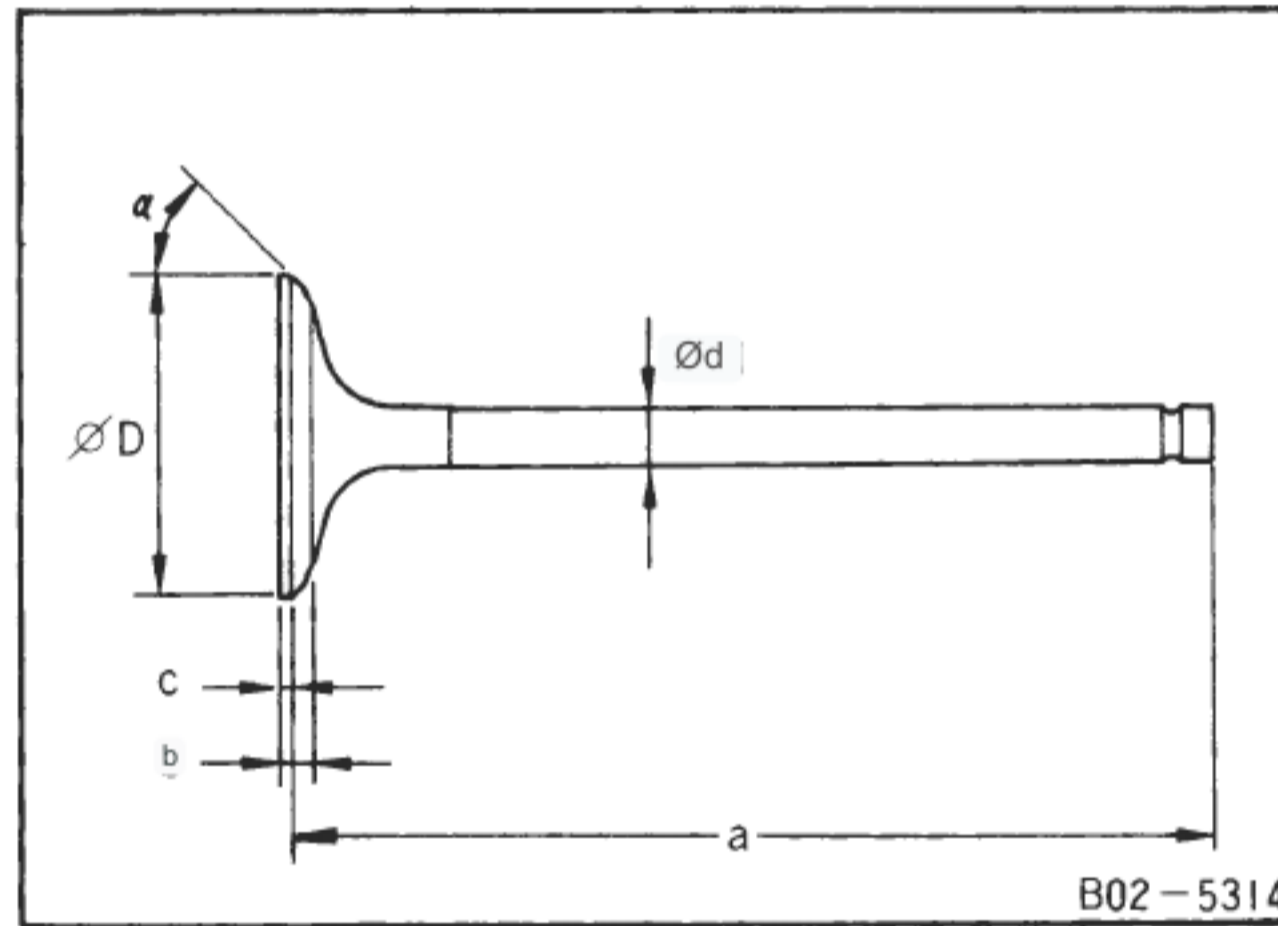
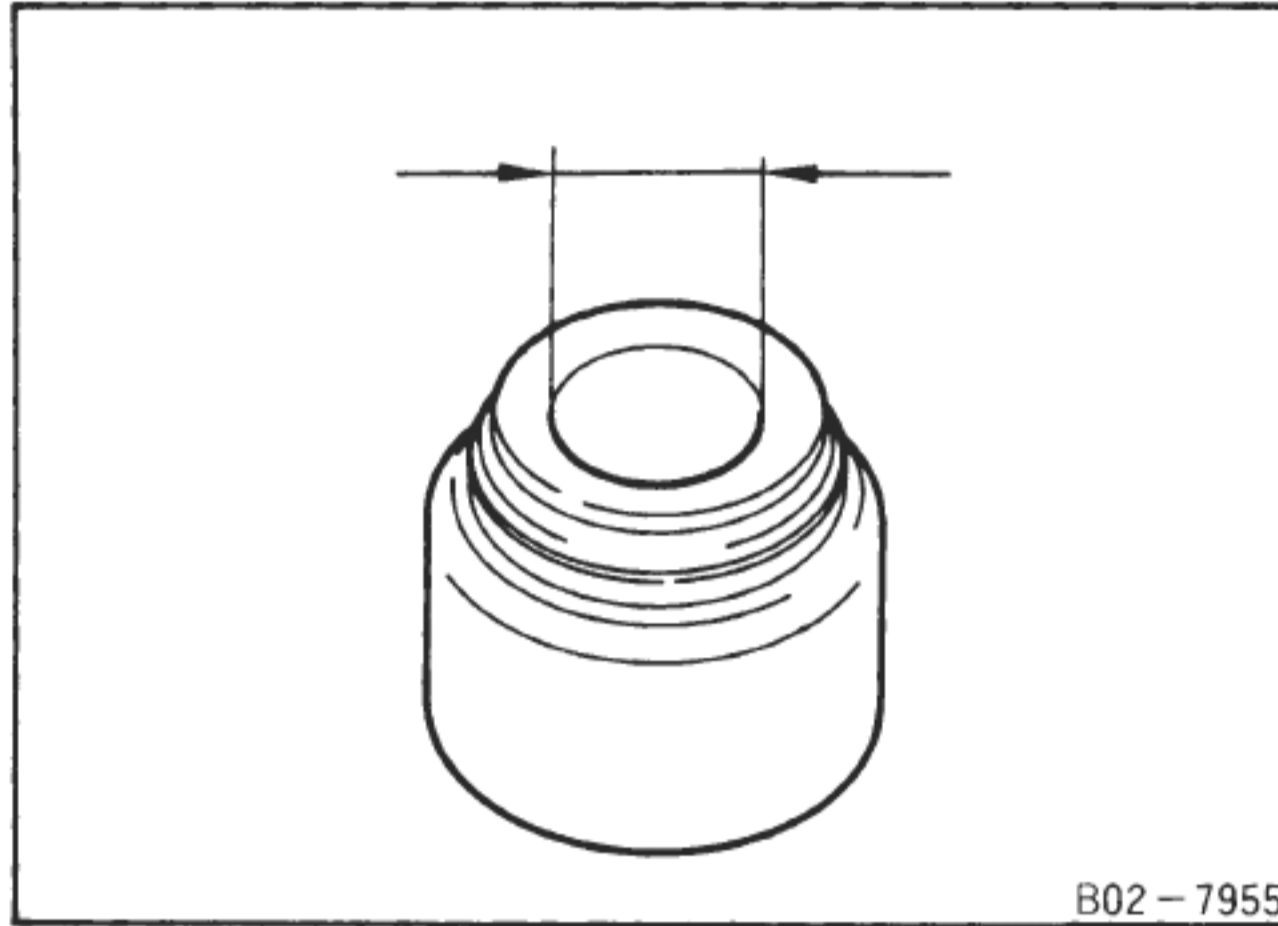
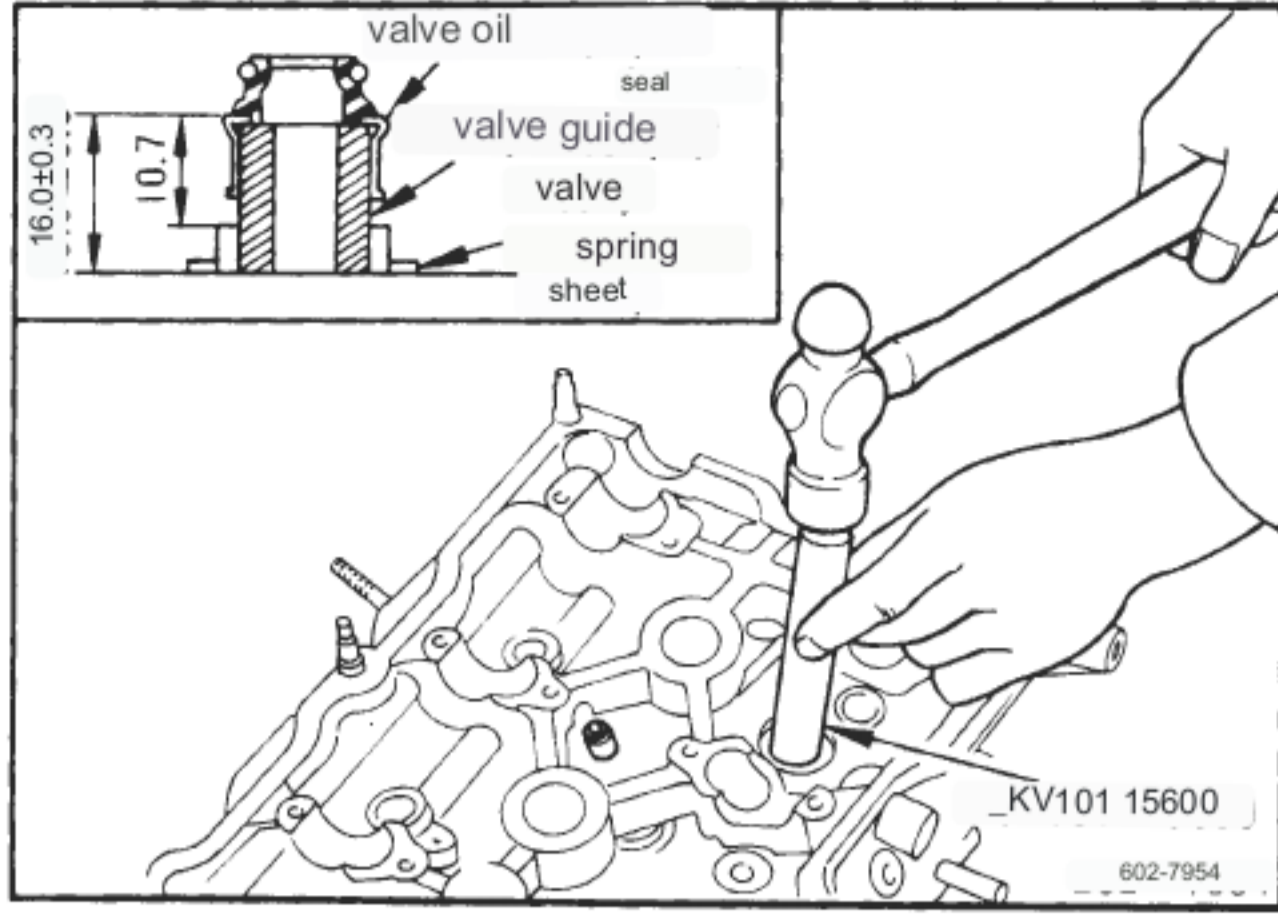
inner diameter	(mm)	outer diameter	(mm)
21.2		29.5	



[Point 5] Remove and install the valve oil seal

removal

- Use a valve oil seal puller (special tool).



attachment

- Use a valve oil shield lift (special tool).

- Note that the inner diameter of the valve oil seal is different only on the exhaust side.

do.

Valve oil seal inner diameter	Exhaust	Intake \$6	(mm)
		\$7	φ 7

[Point 6] Valve

Dimension measurement

- Measure the dimensions of each part using a micrometer or the like.

Valve reference value

item	intake	Exhaust
a (mm)	101.4	102.32
b (mm)	3.2	←
c (mm)	1.1	1.3
∅ D (mm)	34.0~34.2	30.0~30.2
∅ d (mm)	5.965~5.980	6.945 6.960
α (degree)	45° 15' 45° 45'	←

Be careful when handling the exhaust valve as it contains metallic sodium. For details,please refer to 9-11 Prepared Items.

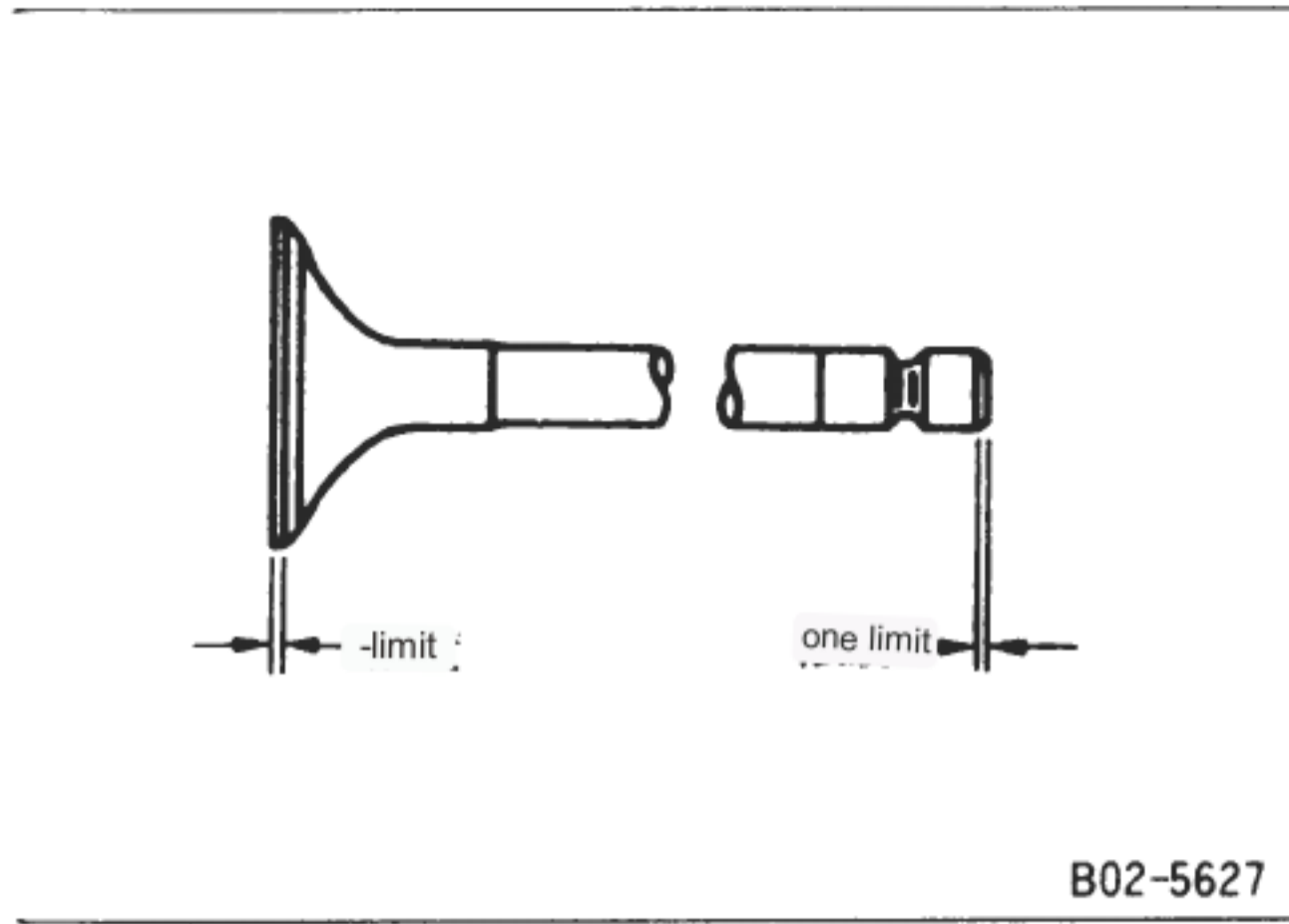
fix

- The valve face is made with a valve surface grinder.

- Stem end faces are polished with an oil grindstone.

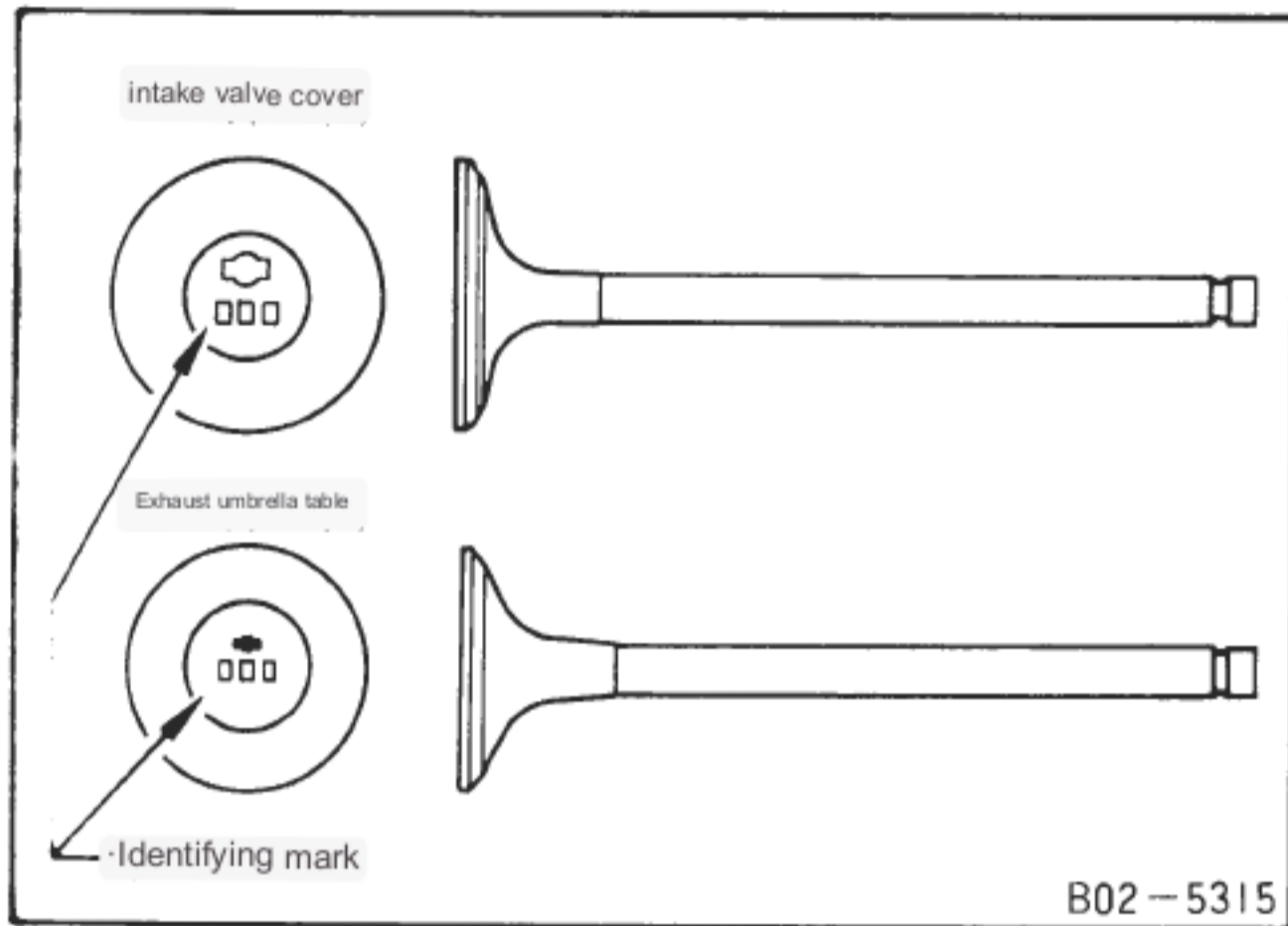
- Minimize corrections, and replace those exceeding the limit value.

CAUTION: Exhaust valves contain metallic sodium, so do not use a grinder to modify them.



limit

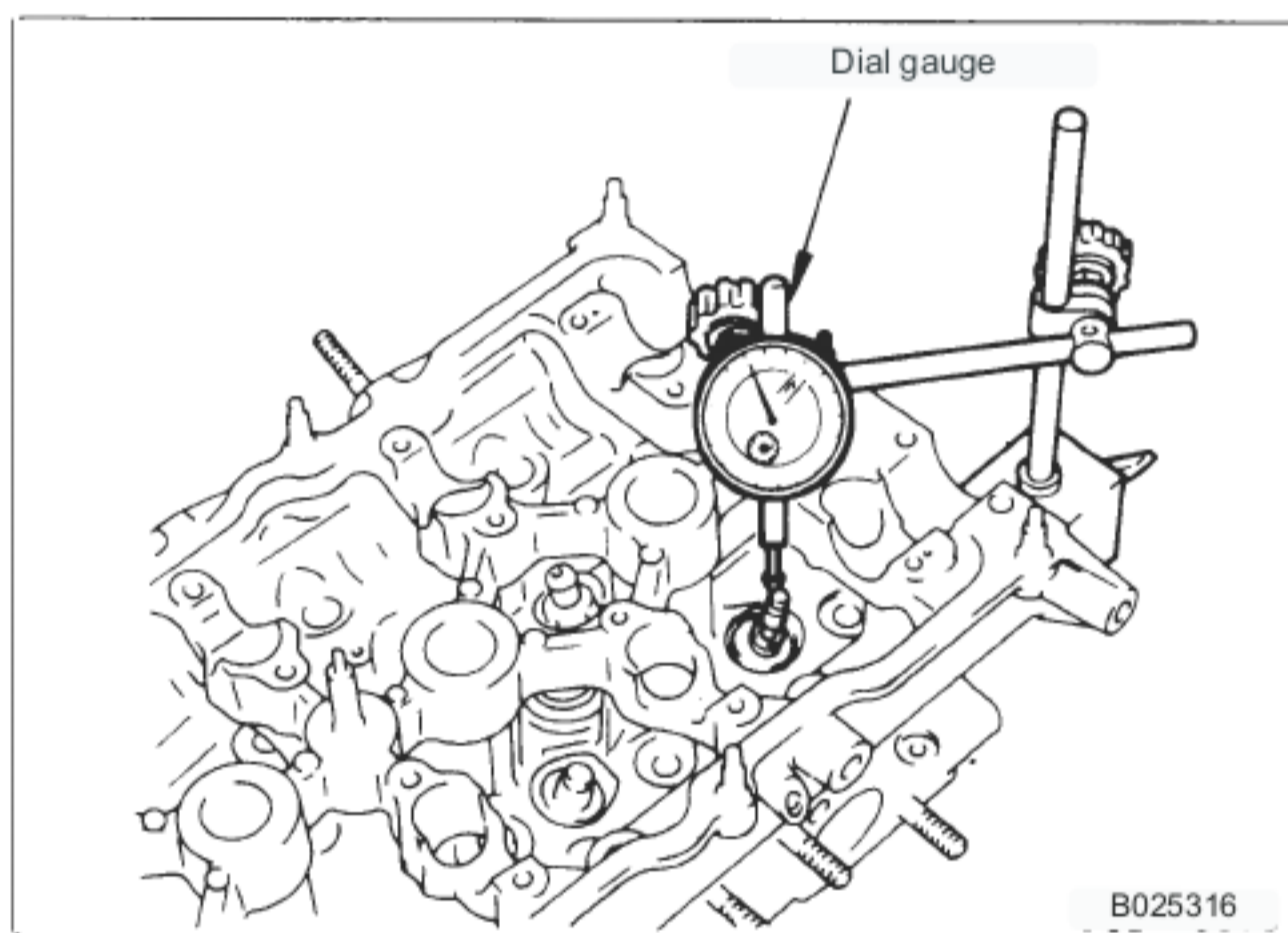
Site	Site	intake valve	exhaust valve
face thickness	(mm)	0.5	←
Stem end face correction allowance	(mm)	0.2	←



attachment

- Apply engine oil to the stem and install. Install valves by paying attention to their identification.

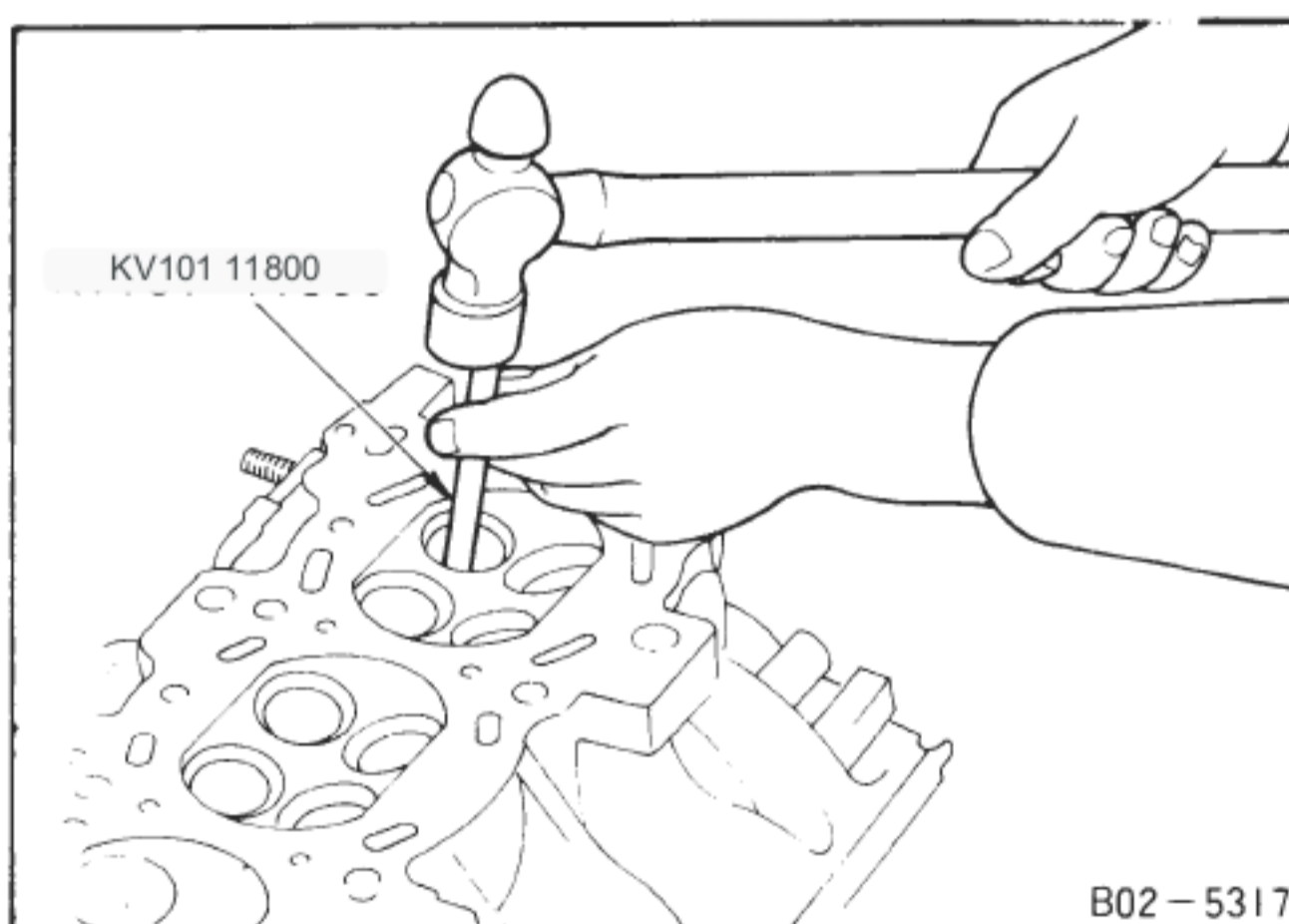
Part 位	Identifying mark
intake	53J
Exhaust	5J



[Point 7] Guide clearance inspection

- As shown in the illustration, swing the valve in the direction of the dial gauge and Read the range of lugage.
- The gap is 1/2 of the deflection width of the dial gauge.

Item	Part	intake	Exhaust
Standard value	(mm)	0.020-0.053	0.040-0.073

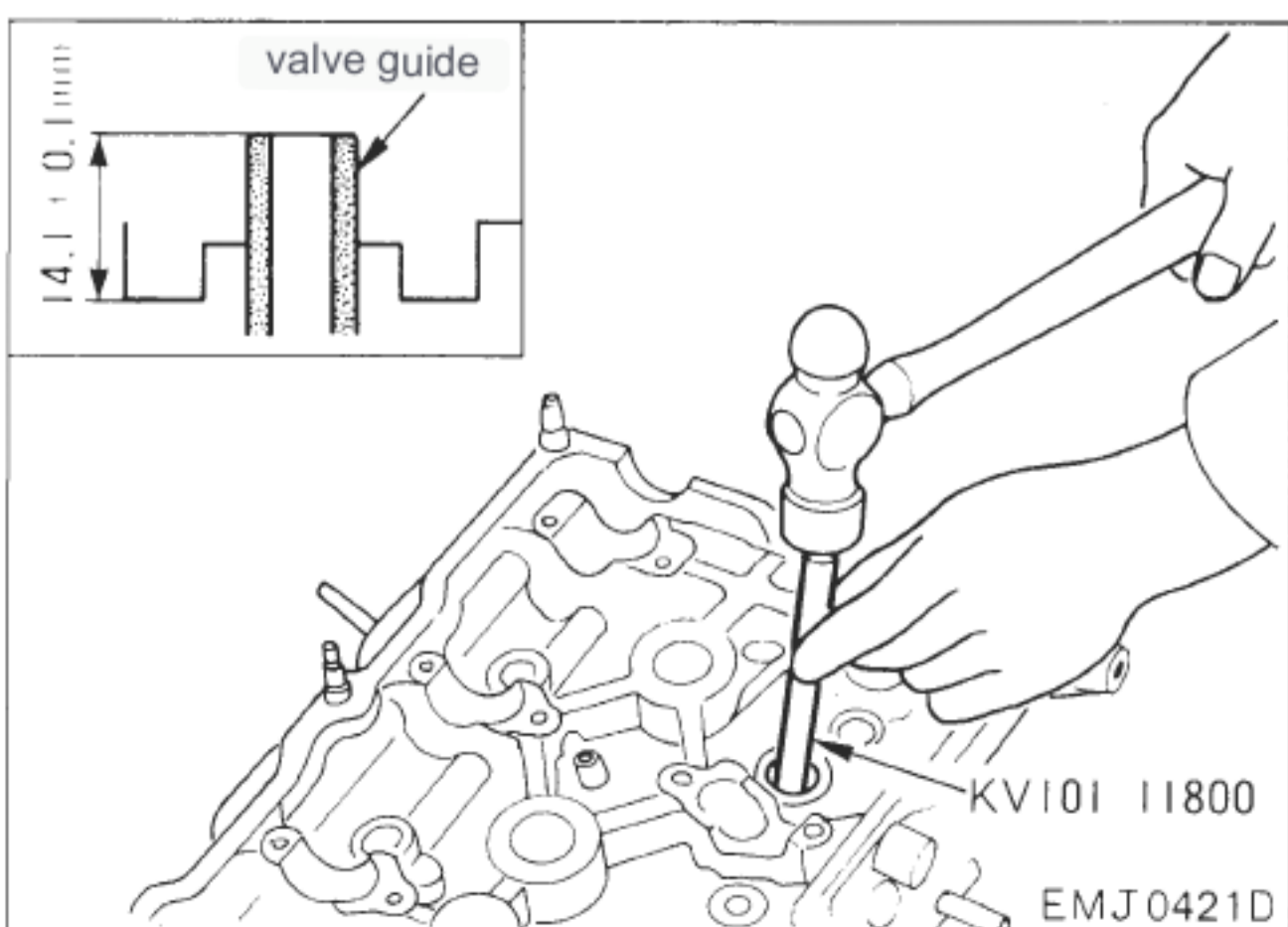


[Point] Remove and install the valve guide

removal

- Using a valve guide remover (special tool), lightly remove the valve from the combustion chamber side.

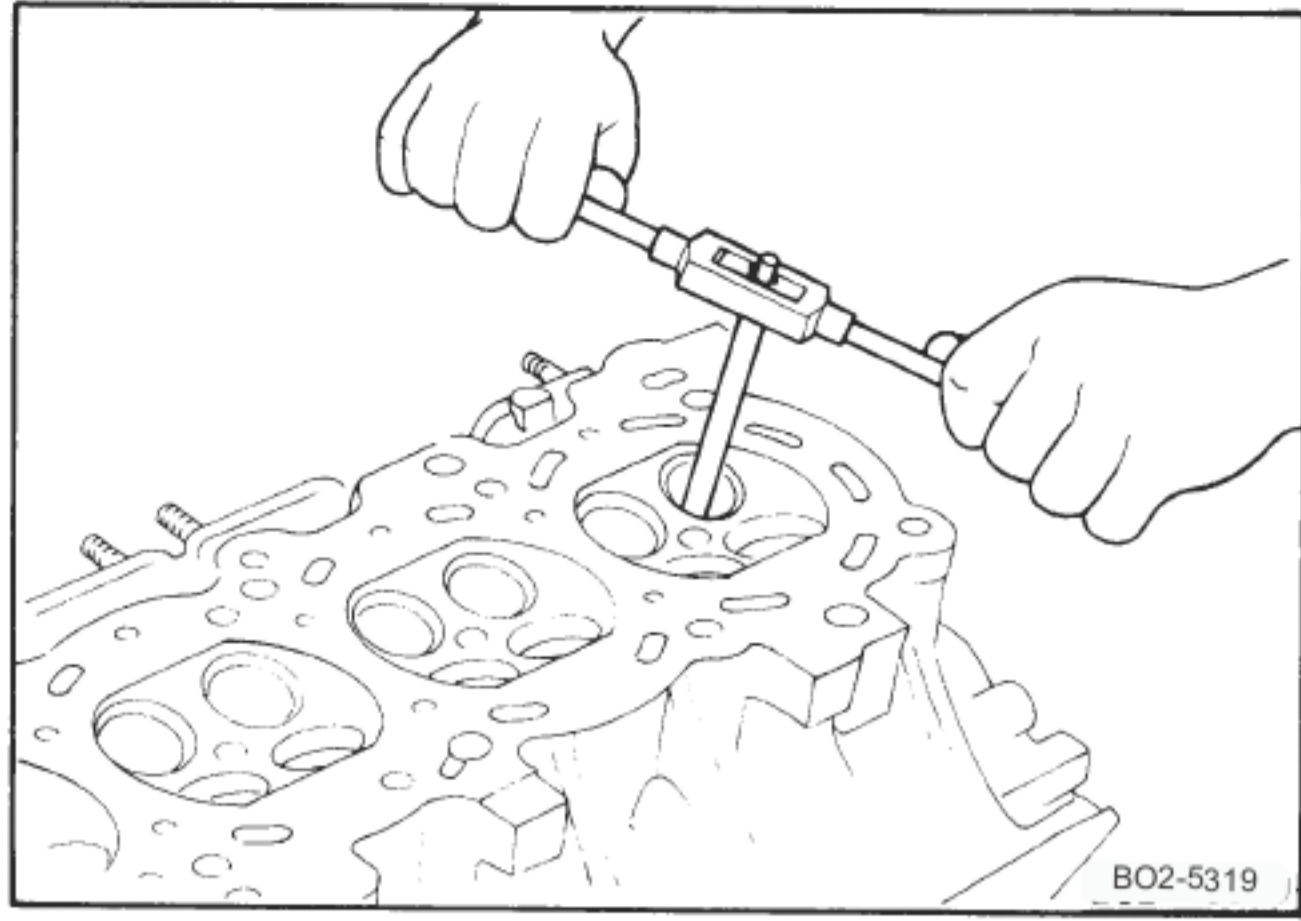
Remove while hitting.



attachment

- Use the valve guide drift to press fit from the rocker arm side.
- Pay attention to identification as the dimensions are different.

valve guide inner diameter	(mm)	intake	\$5.4
		Exhaust	\$6.3



- Ream the press-fitted valve guide with a reamer.

Reaming inner diameter reference value (mm)	intake	6.000 6.018
	Exhaust	7.000 7.018

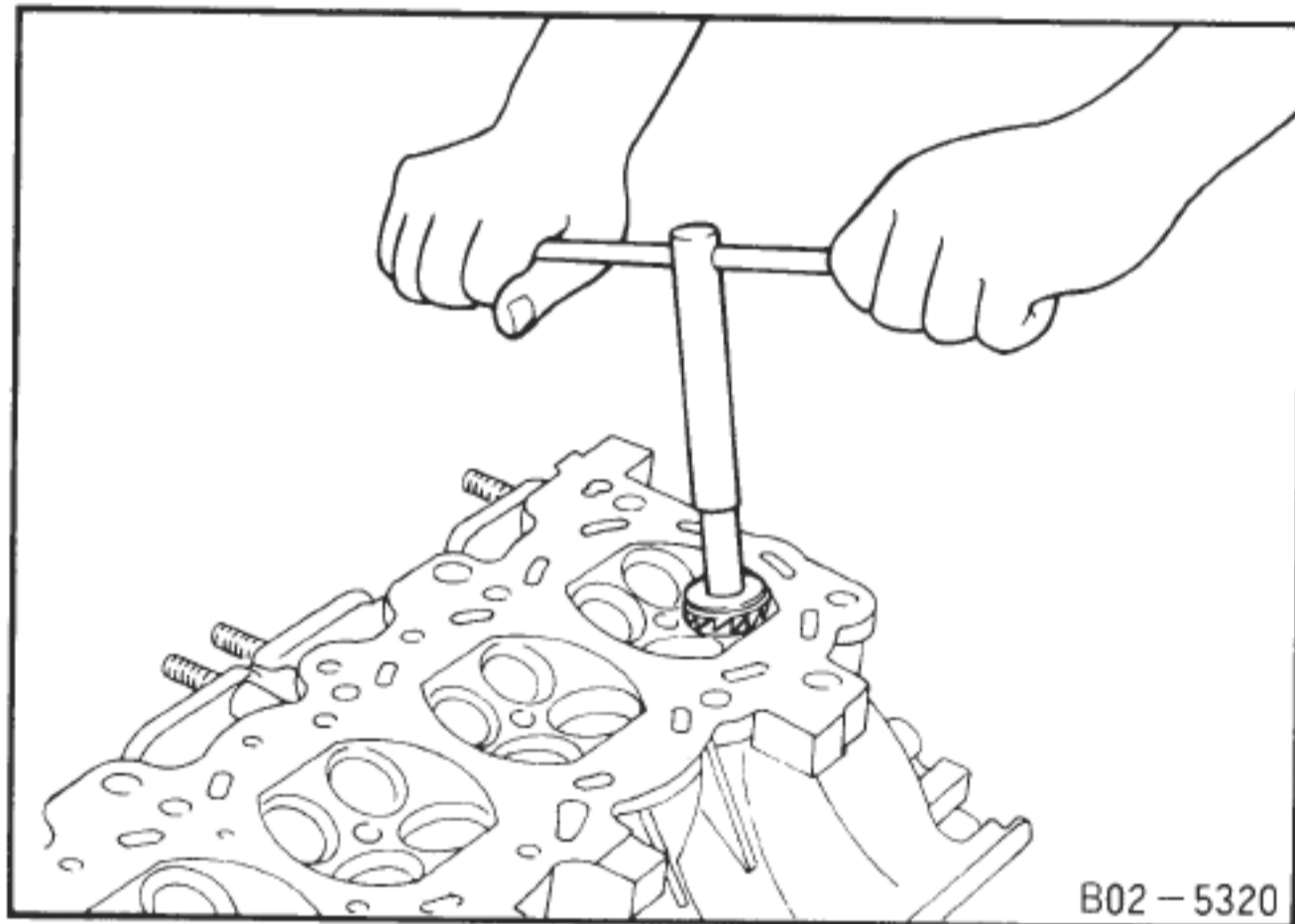
Note: After grinding the valve seat with a valve seat cutter centering on the new guide, grind the valve seat.



[Point 9] Valve seat

point 検

- Conditions of contact surface of valve seat and contact surface
Inspect by applying Daikator PL-1.
- of valve face If the contact width is large or the contact is poor, replace either the valve seat or the valve, or polish both and apply a compound. Perform valve alignment with .



Correction 正

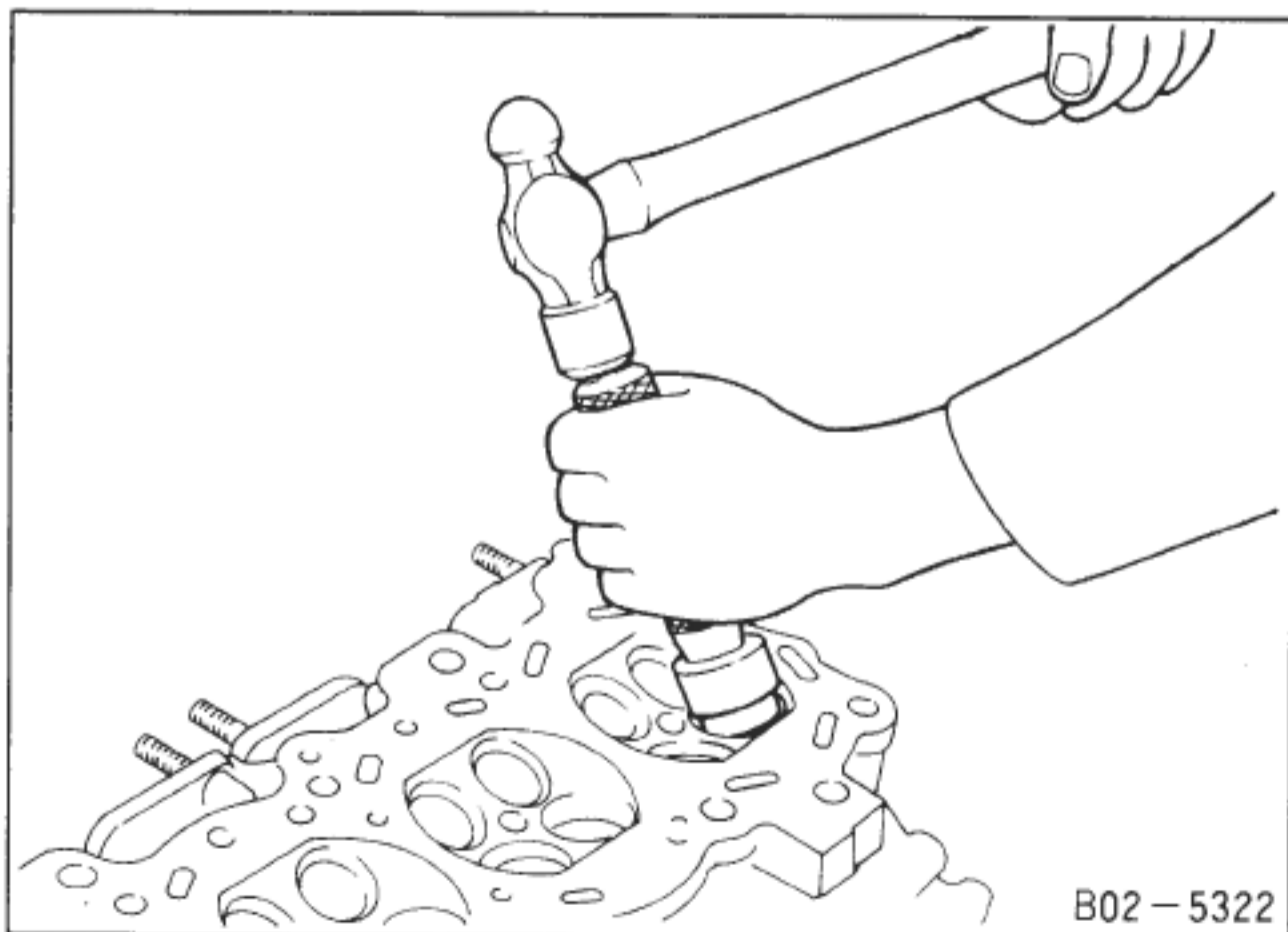
- When correcting the seat due to a defective contact surface, check the valve guide clearance or valve stem hole clearance before doing so. • Using a valve seat cutter or valve seat grinder Finish to the standard value.

Note: When using a valve seat cutter, firmly press it against the entire circumference of the grip contact surface and cut it all at once.

removal

- Cut the valve seat to make it thinner and pull it out.

CAUTION Be sure to place a copper plate on the bracket of the valve seat remover and the cylinder head surface.



attachment

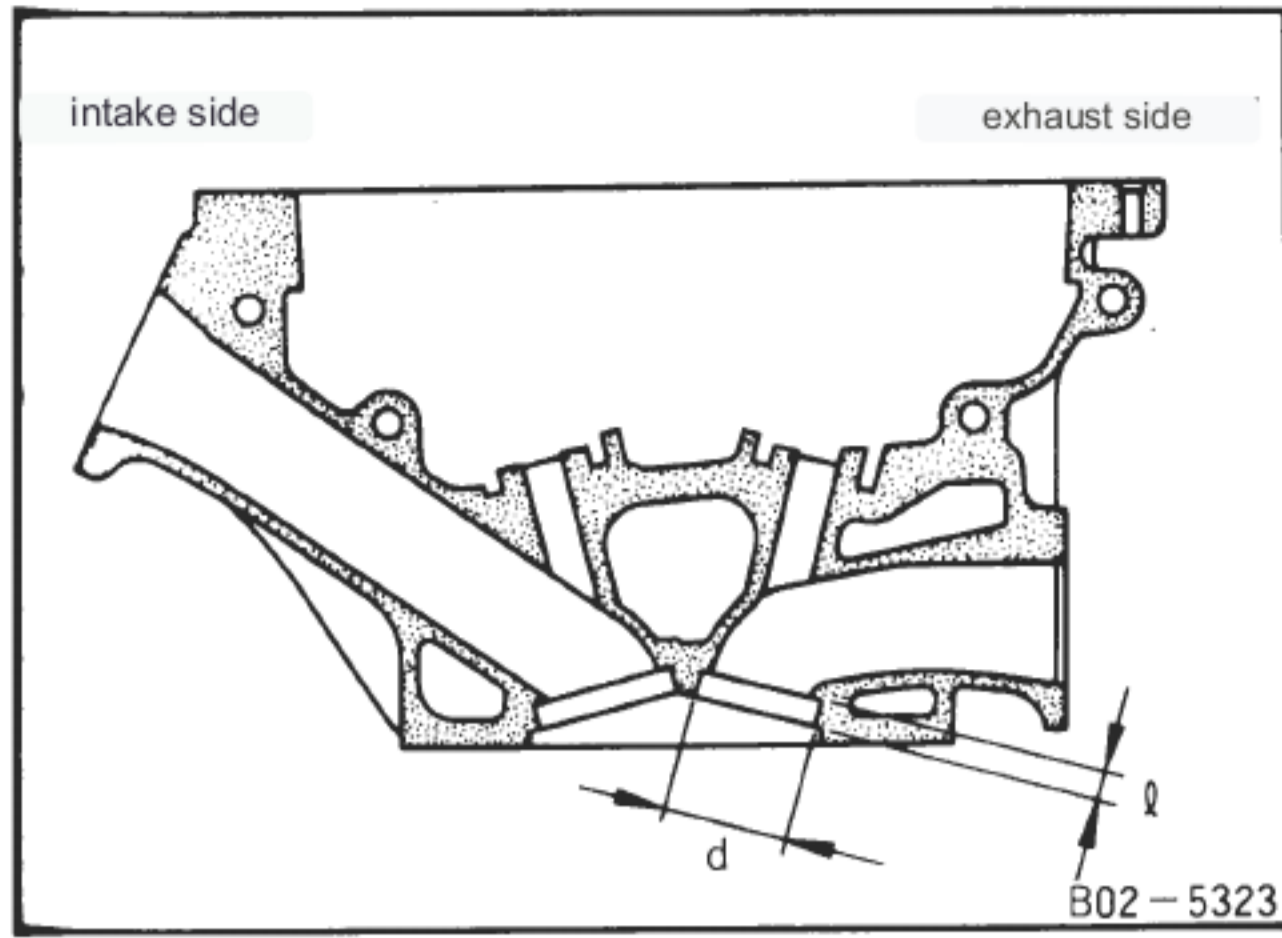
- ① Using the valve seat drift (special tool: ST1524 3000)

type like

- ② If the valve seat drift is not used, proceed as follows.

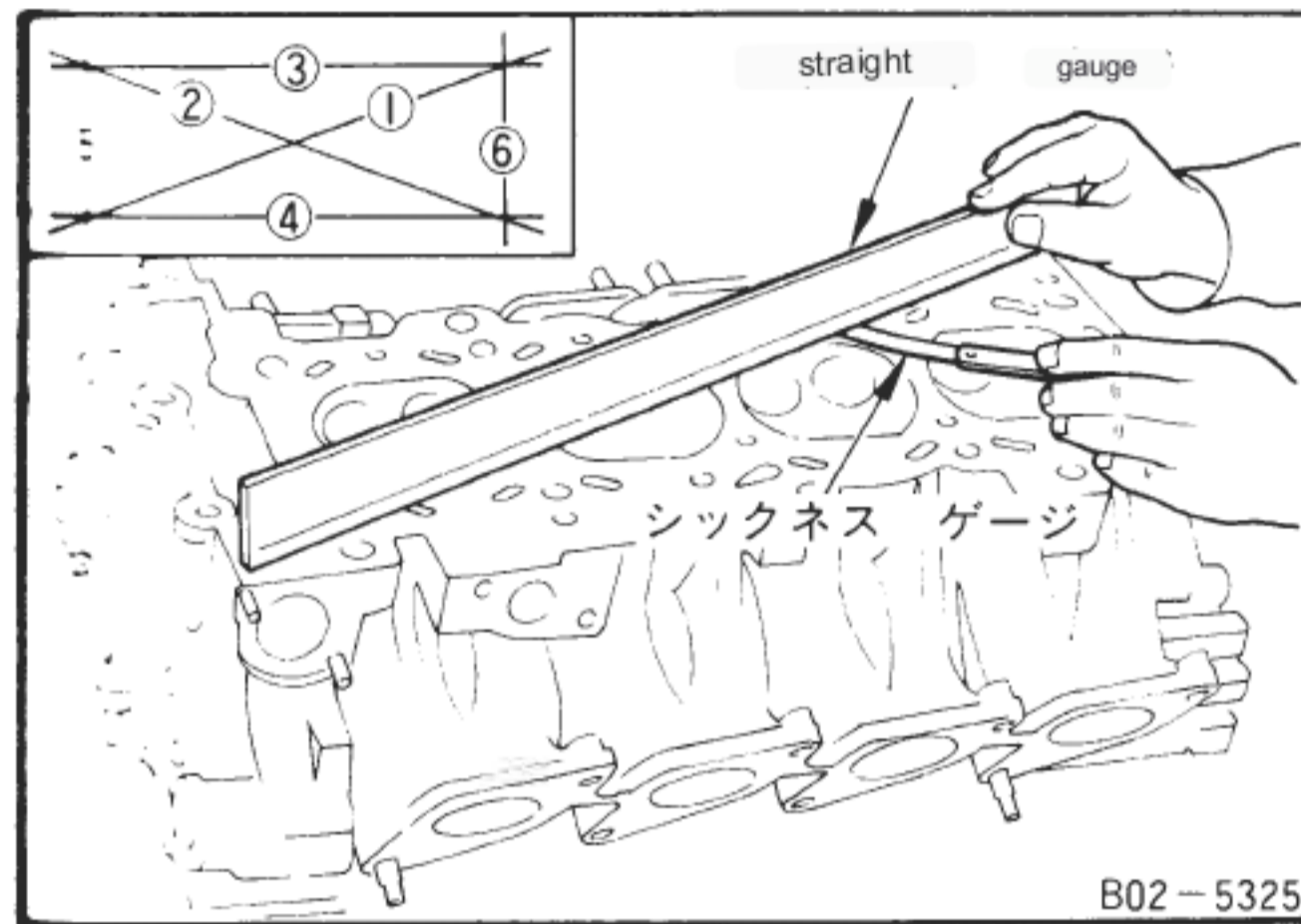
- Cool the valve seat sufficiently with dry ice.
- Warm up the cylinder head to about 110°C~130°C.
- Quickly remove cold valve seats using valve seat drift press into the holder head.

CAUTION: Do not touch cold valve seats directly with your hands.



- The intake and exhaust valve seats are set to an oversize of 0.5mm. When using the oversize, process the valve seat mounting part on the cylinder head side as follows.

rank	d	l
intake	ϕ 35.500-35.516	6.25-6.35
Exhaust	ϕ 31.500 31.516	†



[Point 10] Cylinder head inspection and correction

inspection

- Remove oil, scale, gaskets, sealing agents, carbon, etc. Measure the strain on the underside of the cylinder head at several points in six directions.

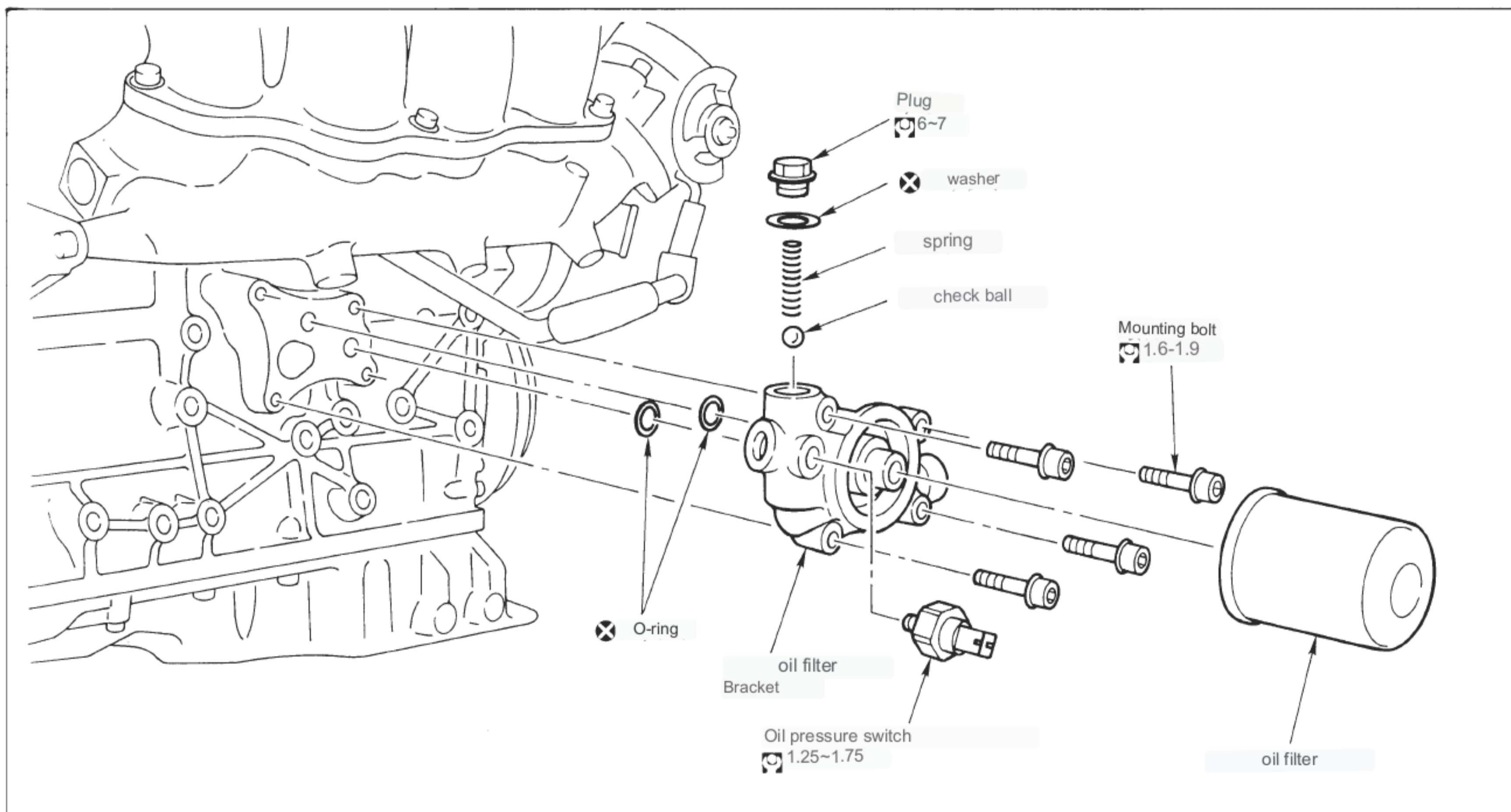
Limit (mm)	0.1
------------	-----

Correction

- If the strain exceeds the limit, correct it with a surface grinder.
- If the distortion is extremely large, replace the cylinder head.

9-13 Oil filter bracket

(1) Description 着

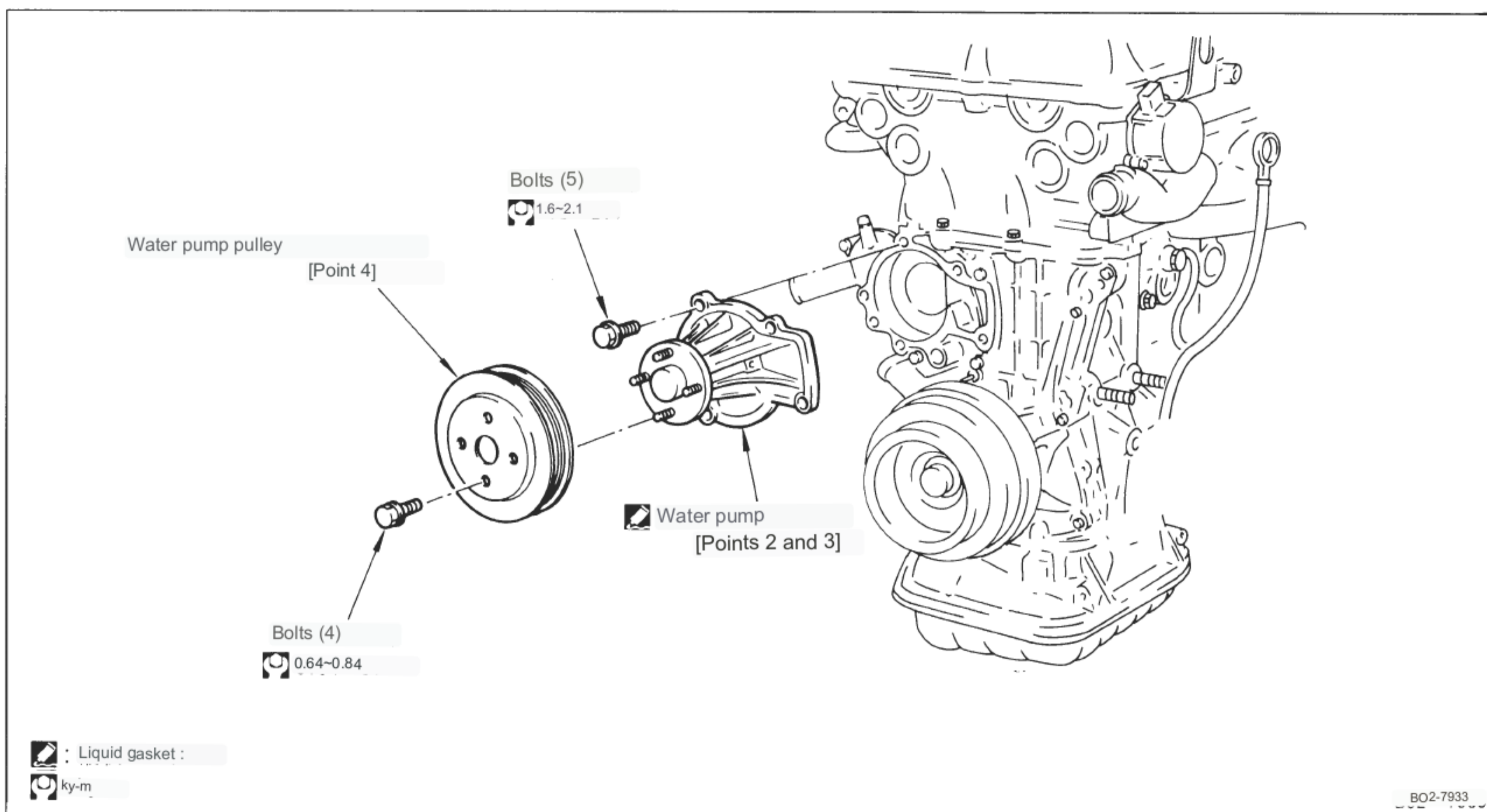


9-14 water pump

supplies

	name	for way	remarks
Special tool	crank pulley puller	Remove crank pulley 用	Existing
Tools	tube presser WS3993	For liquid gasket application	
Liquid gasket	ThreeBond 12X-001 equivalent		

(1) Elimination wearing



Cooling water drain (Refer to 9-12 Cylinder head removal and installation)

(ft) Radiator shroud (see B5)

(m) Power steering pump movement

With cooling fan (see B5)

(ft) Crank pulley [Point 1]

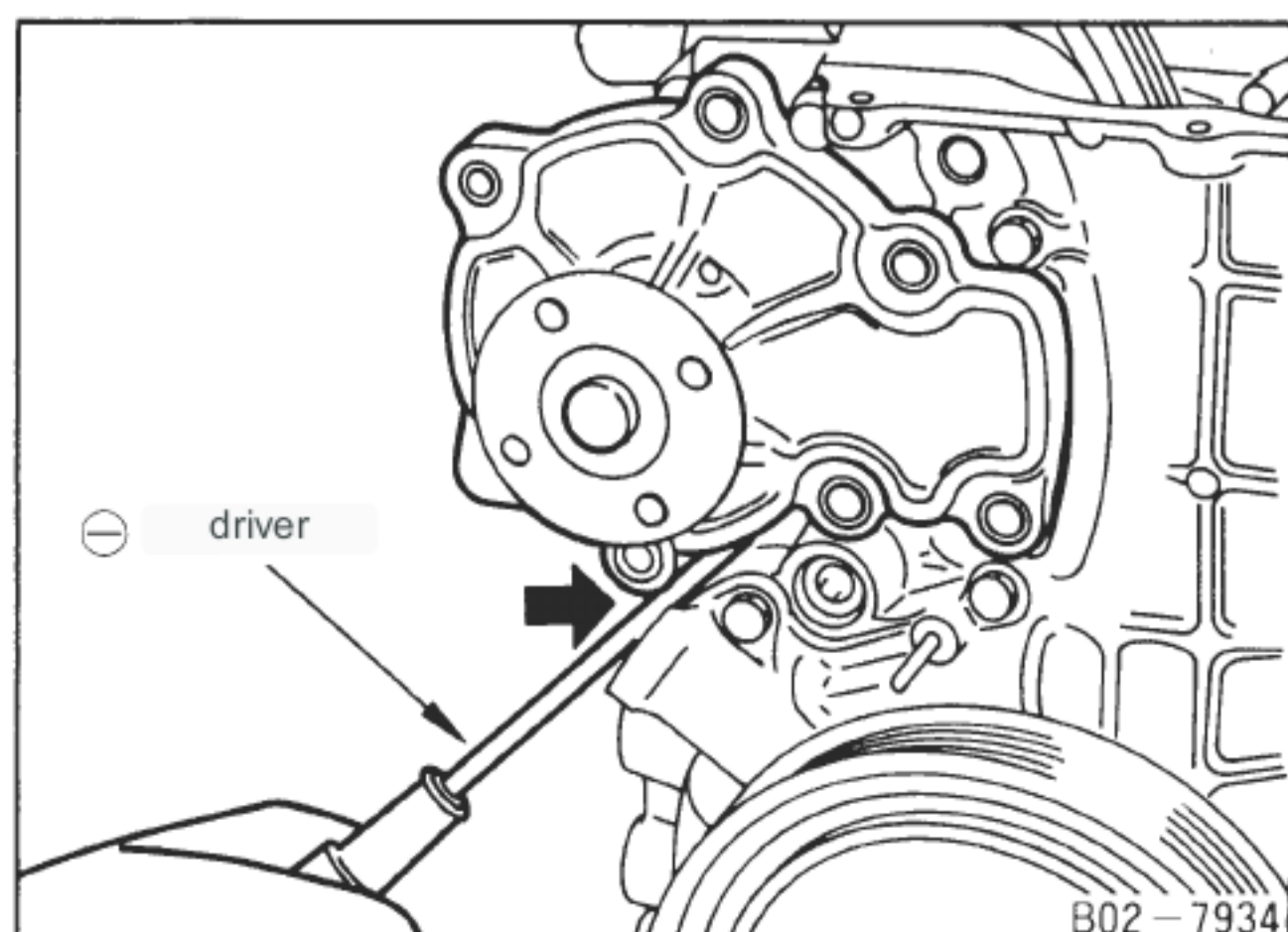
[Point 1] Remove the crank pulley

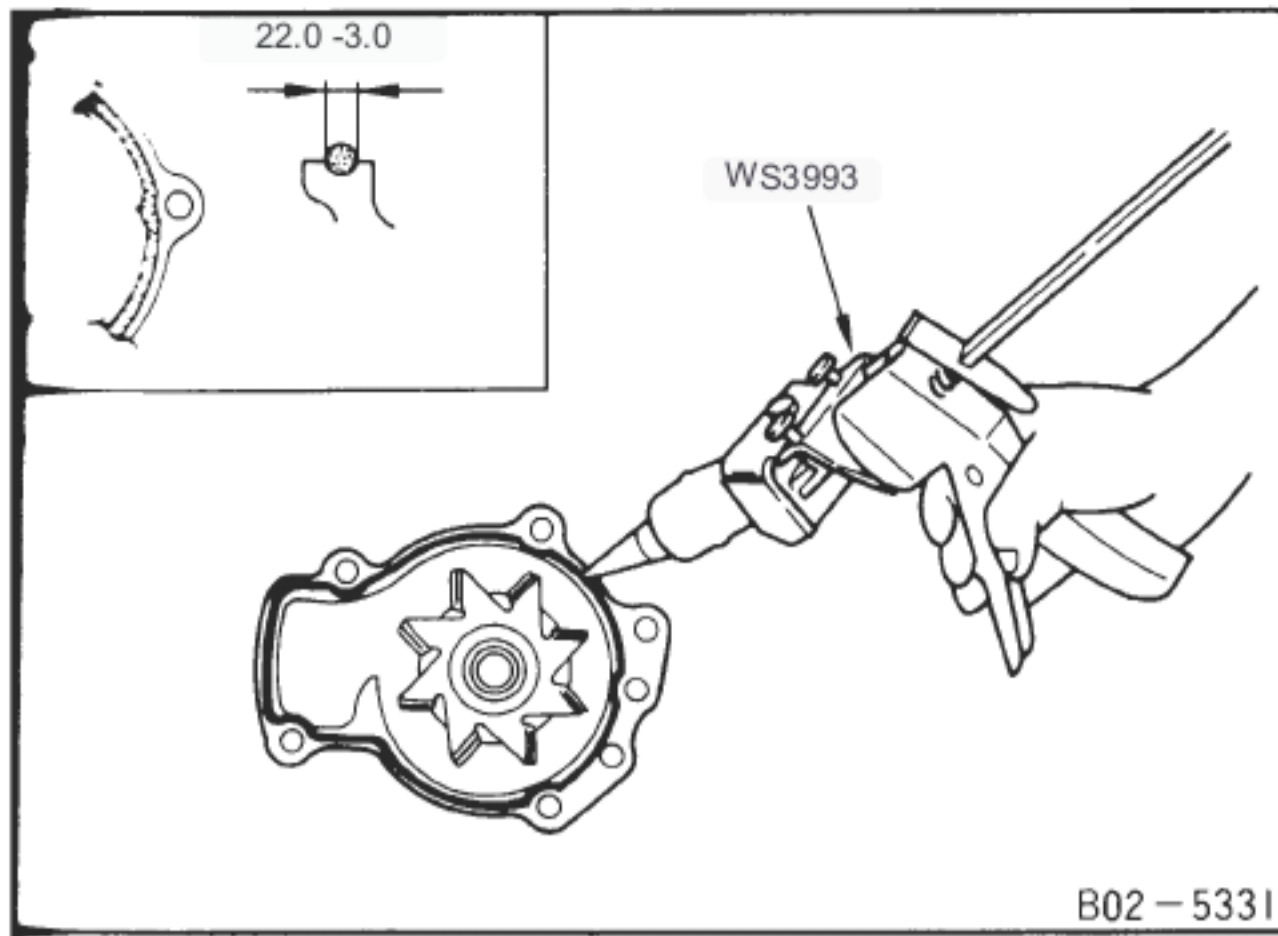
- Remove the crank pulley to secure clearance for installing and removing the water pump. (See timing chain section)

[Point 2] Water pump removal and installation

removal, cleaning

- Insert the () screwdriver into the arrow part on the left and pry it up and down to remove it.
- Remove the liquid gasket using a scraper. **CAUTION:**
Also remove the liquid gasket in the grooves.
- Wipe the mounting surface with white gasoline.





attachment

- Using a tube presser, apply a liquid gasket (equivalent to ThreeBond 12 X-001) to the water pump without a break as shown on the left.

Apply ~3.0mm.

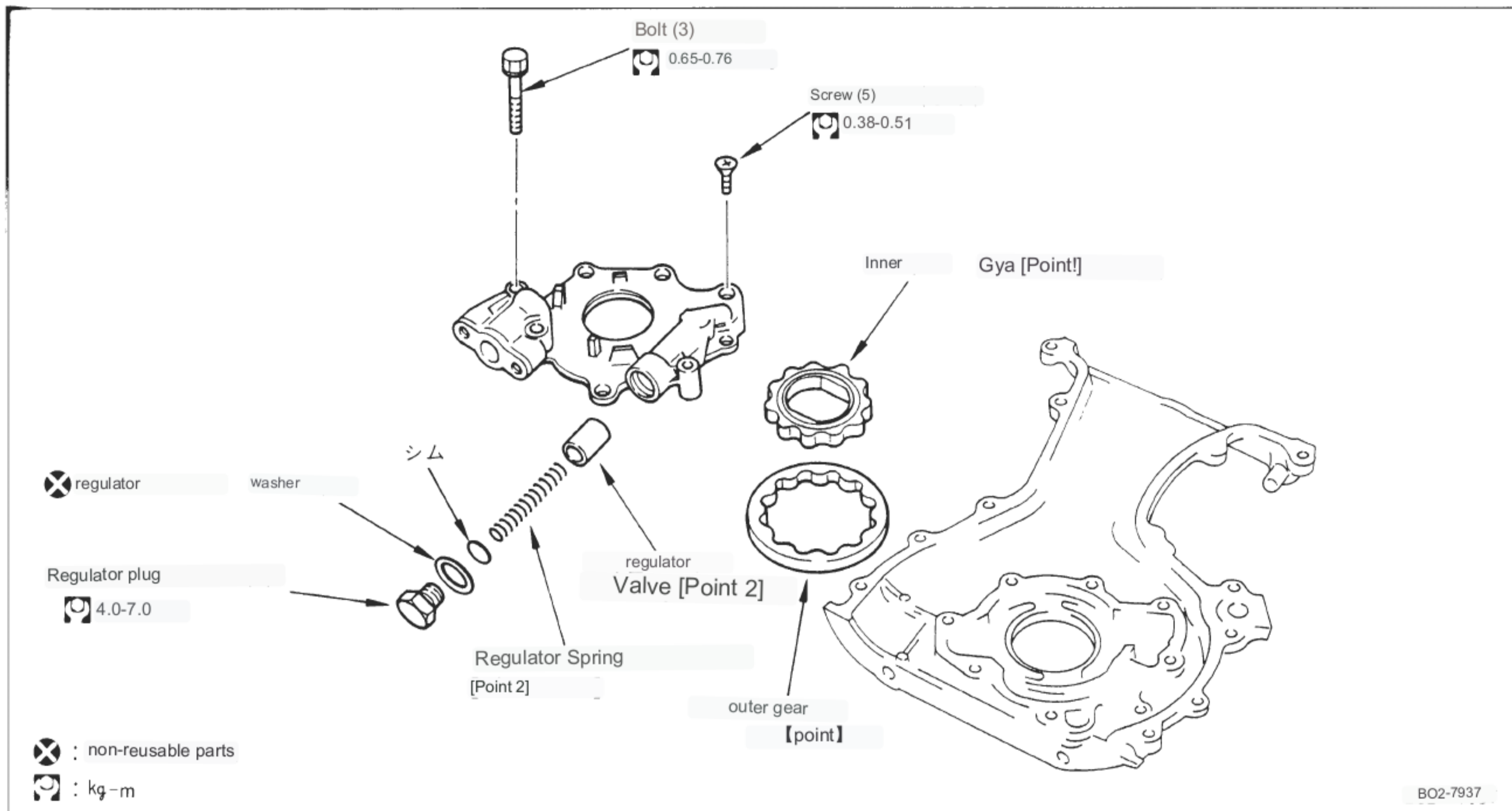
- Install the liquid gasket within 5 minutes after application.
- After installation, leave it for 30 minutes or more before operating.

Note: After warming up, make sure there are no water leaks.

Water pump tightening torque	(kg-m)	1.6 2.1
------------------------------	--------	---------

9-15 oil pump

(1) Desorption/disassembly



with cylinder head (see 9-12)

(Attachment) Oil pan (see 9-17)

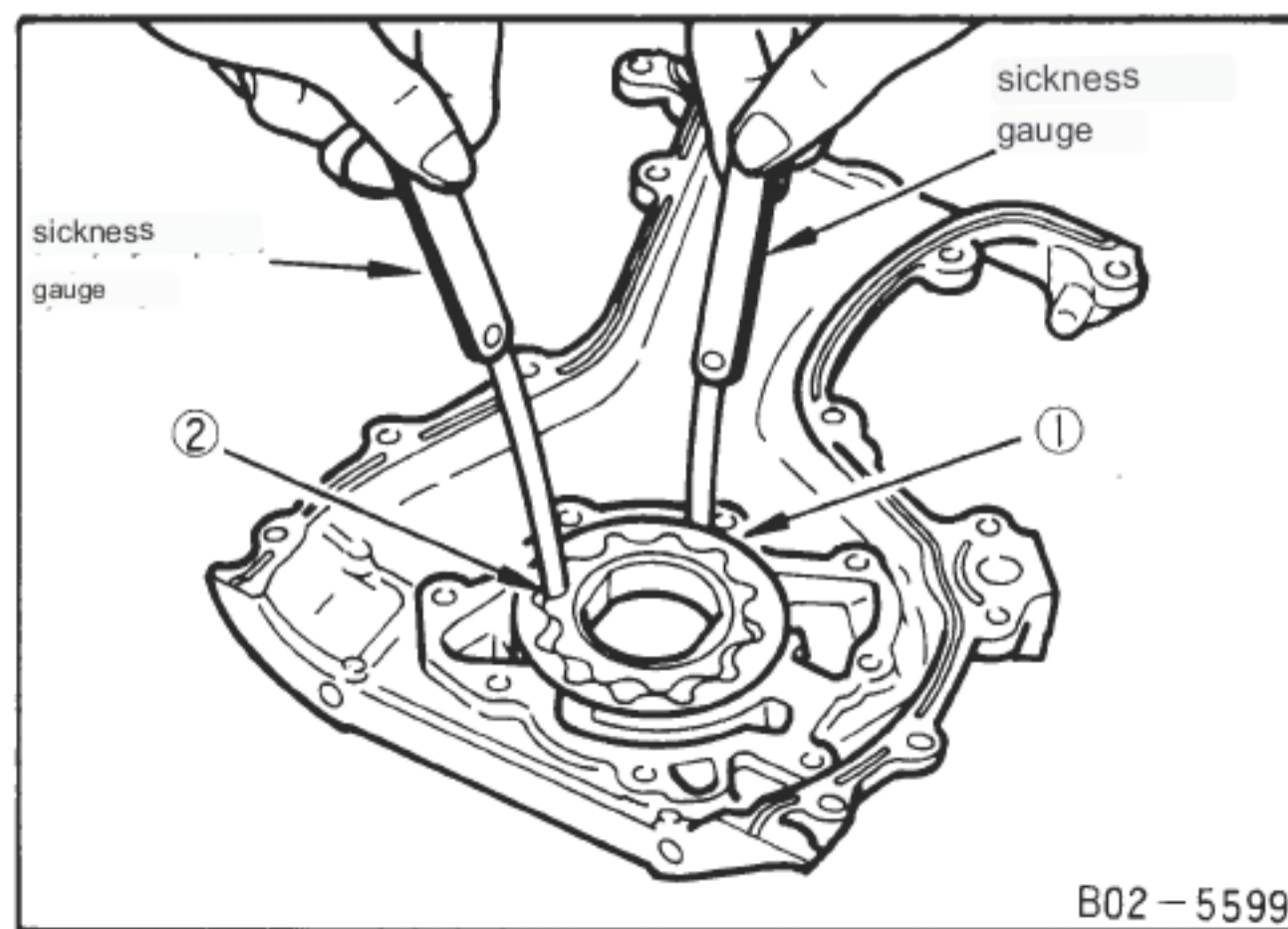
With front cover (see 9-11)

With fan shroud (see B5)

cooling fan (see B5)

Auxiliary machine belts

Air conditioner idler pulley

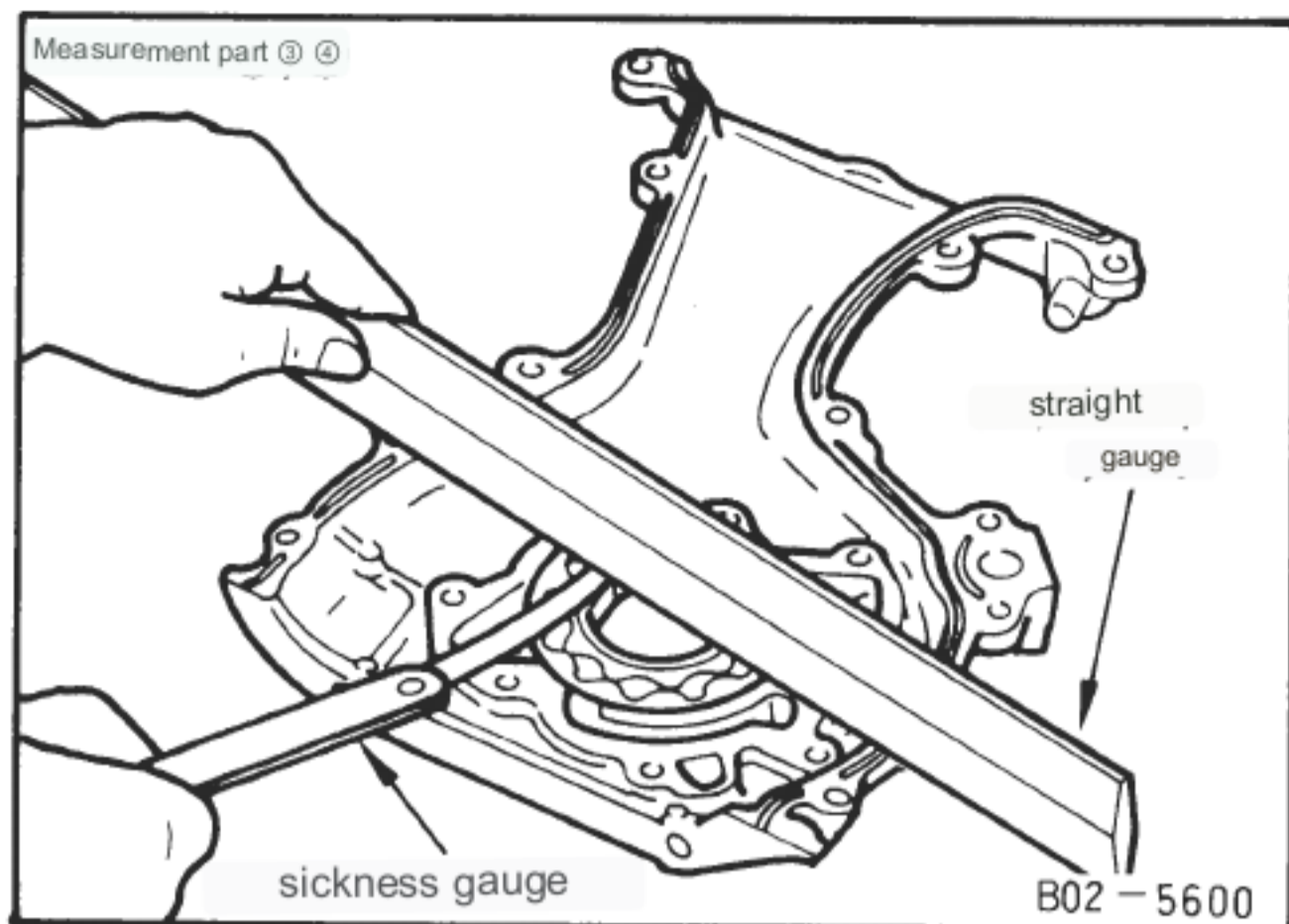


[Point 1] Oil pump inspection

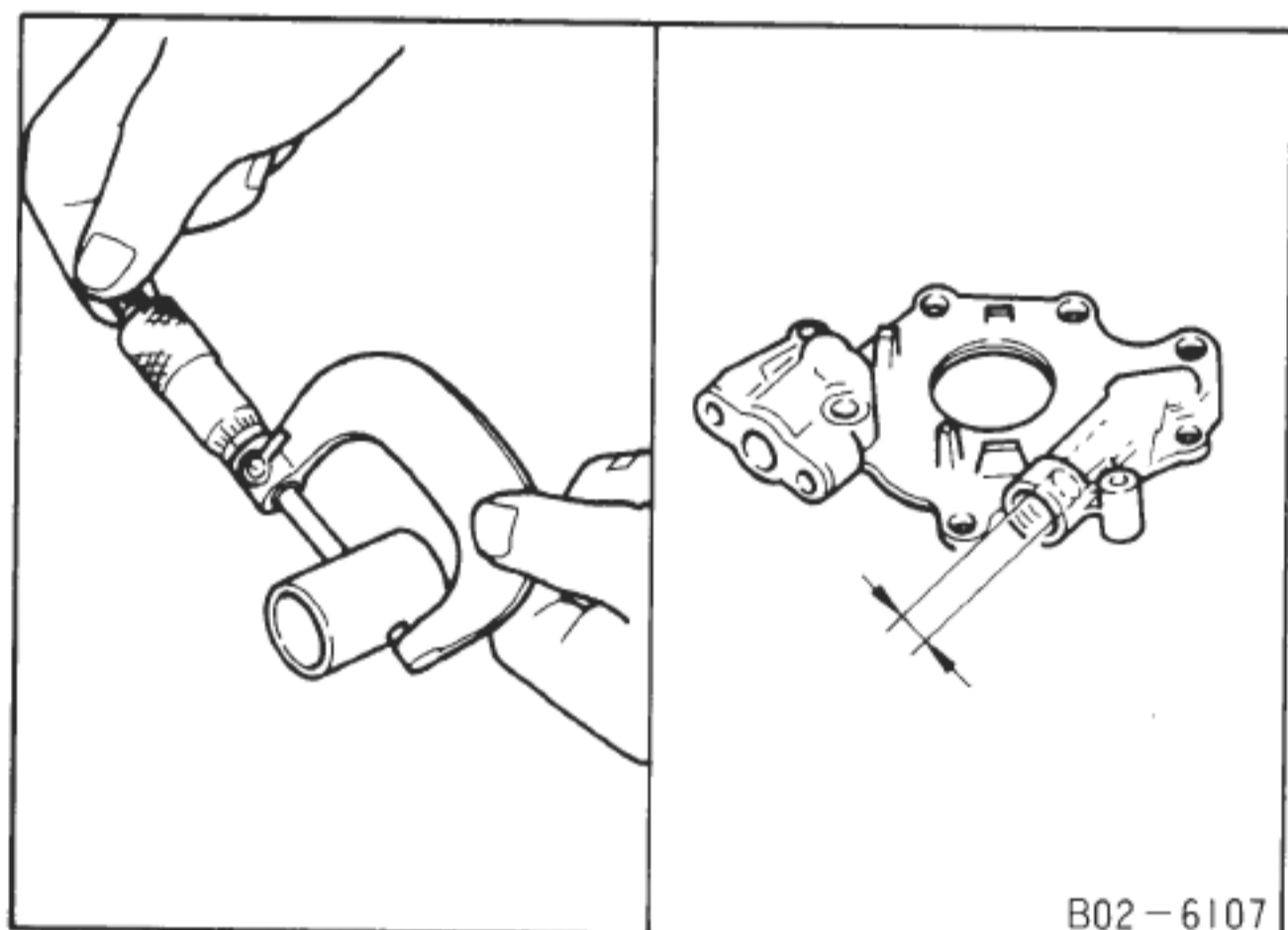
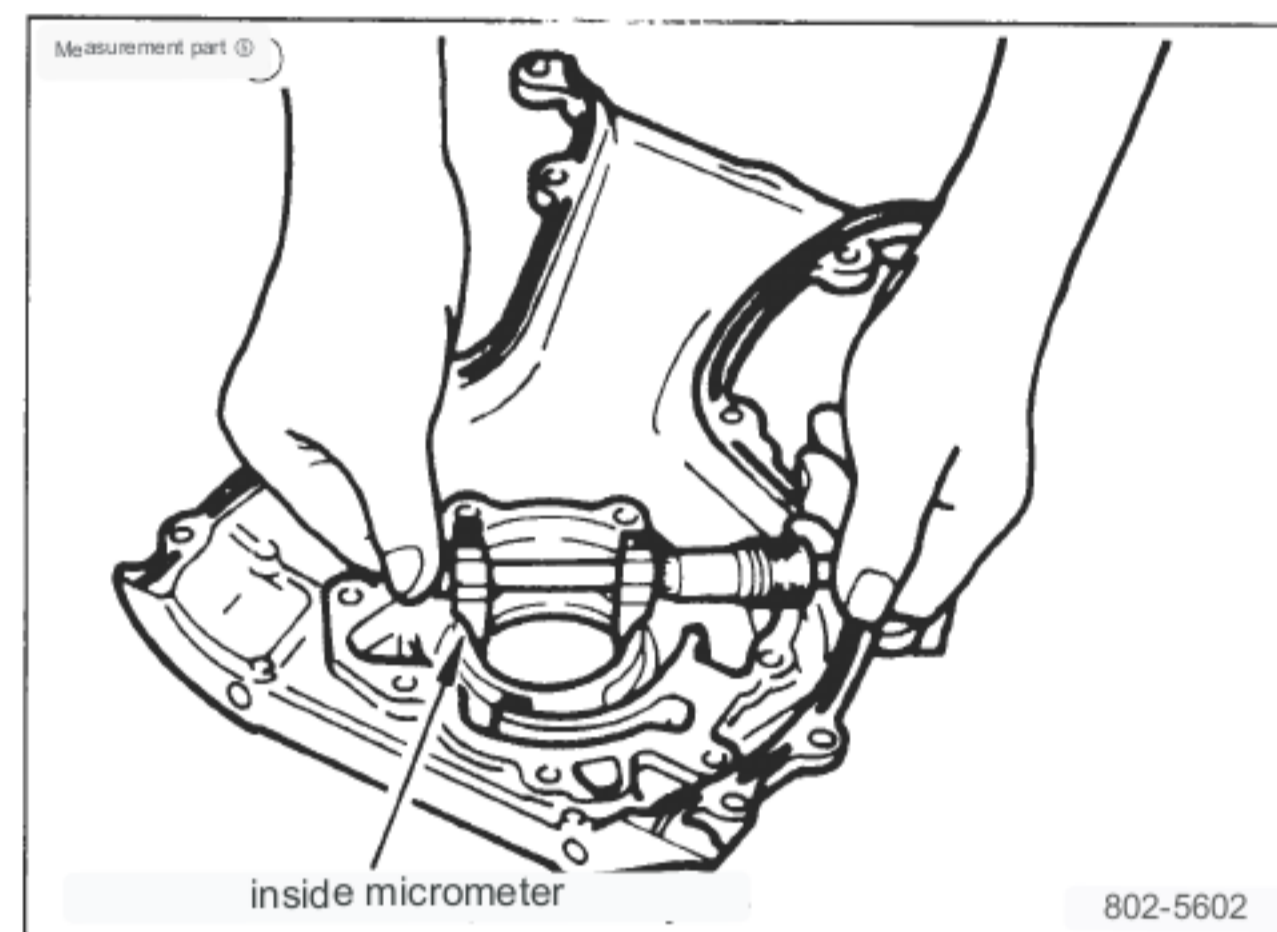
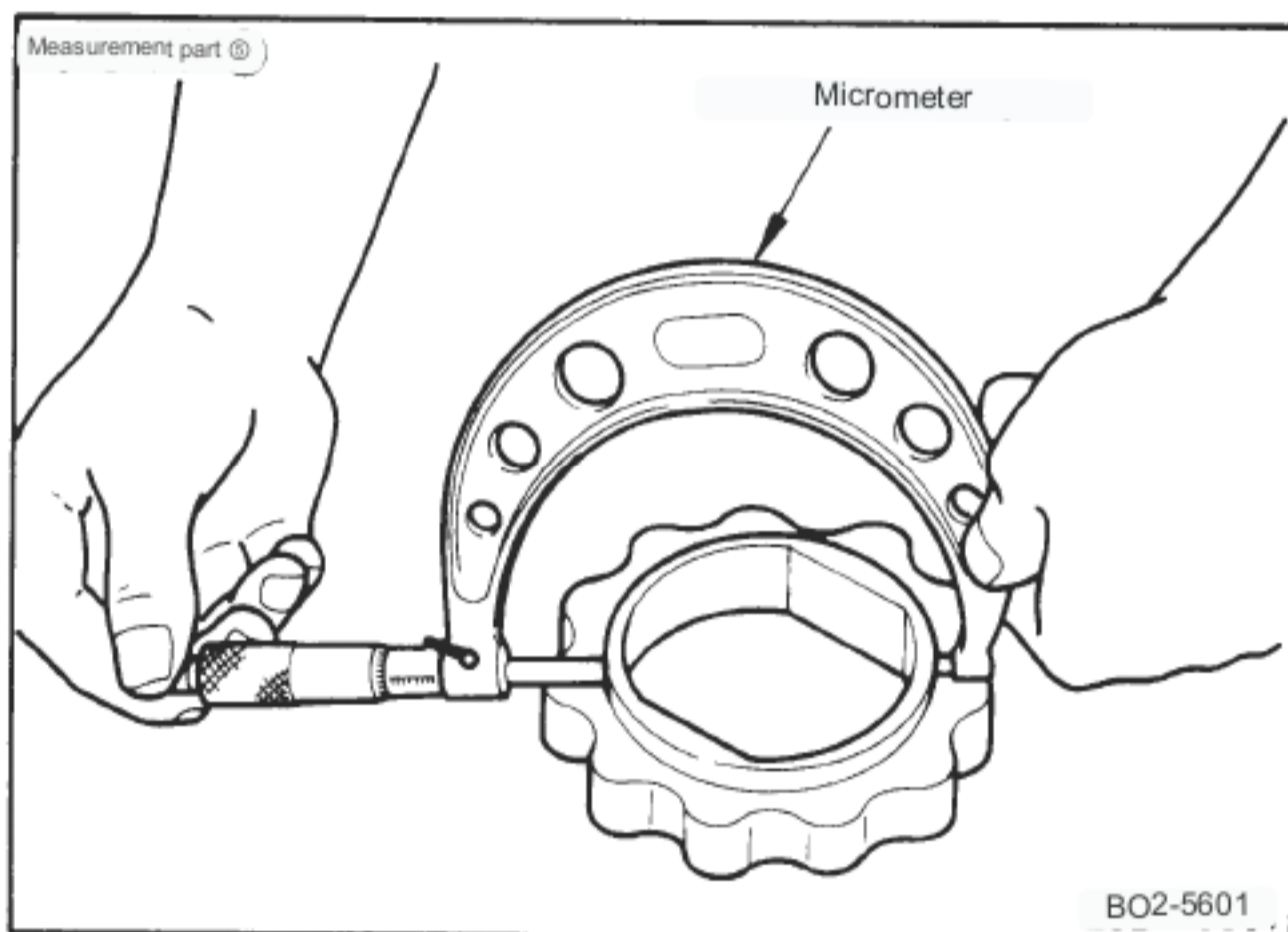
- Check the inner gear, outer gear and housing for damage and wear.

- Measure the following clearance using a thickness gauge.

Measurement site	Standard value (mm)
① Clearance between outer gear and housing	0.114~0.2
② Tip clearance between outer gear and inner gear	0.180 or less
③ Side clearance between inner gear and housing	0.05~0.09
④ clearance between outer gear and housing lance	0.045
⑤ Clearance between inner gear and housing spigot 4	0.091



Note: The measurement point ③ is the number obtained by subtracting the measured value of the inner diameter of the housing spigot from the measured value of the outer diameter of the inner gear.



[Point 2] Regulator inspection

- Check if the sliding surface and spring of the regulator valve are normal.

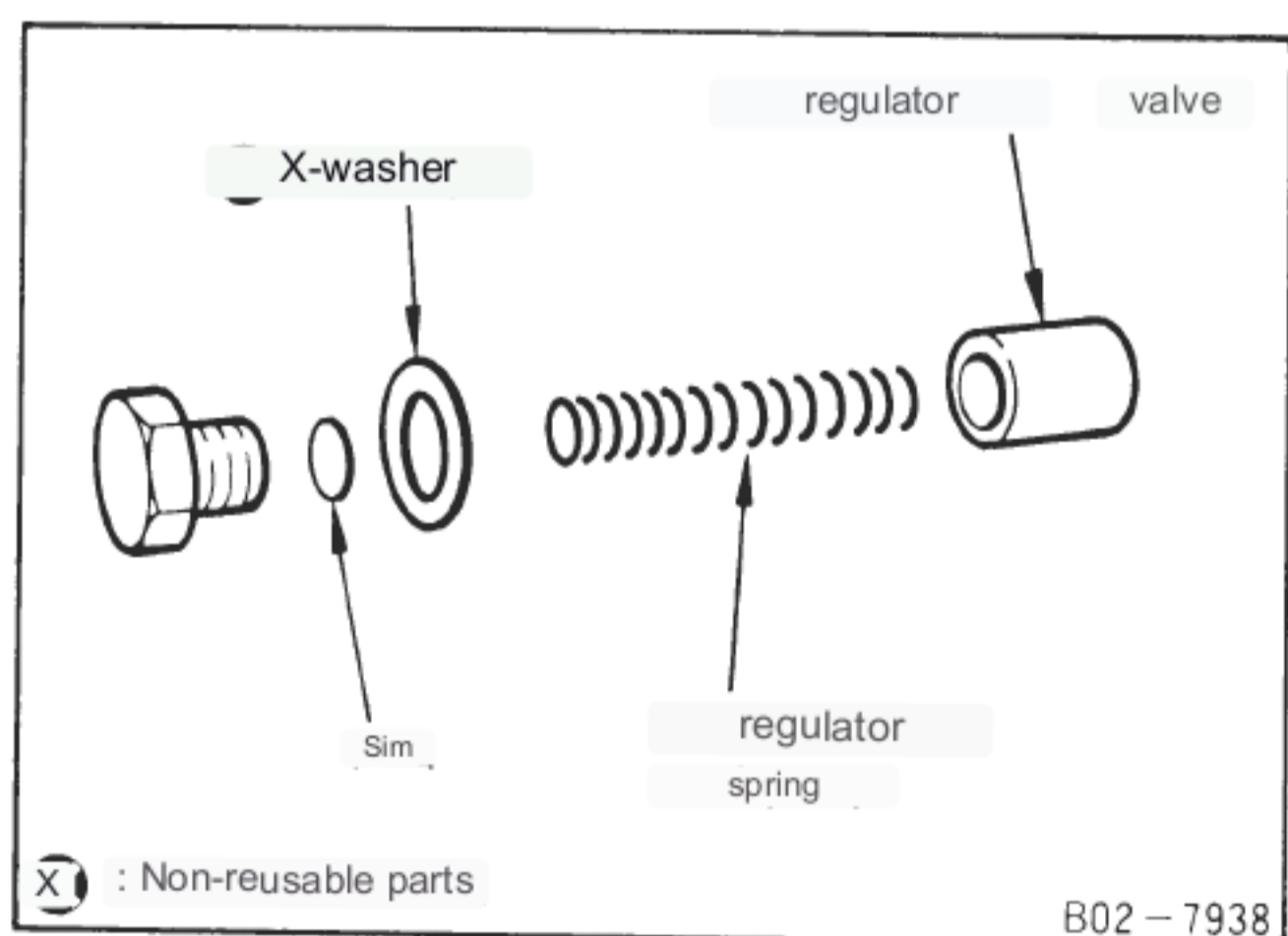
Measure

the clearance between the valve and the valve hole.

Clearance between valve and valve hole (mm)	0.040-0.097
---	-------------

- If there is an abnormality in the valve opening pressure, adjust the hydraulic pressure by increasing or decreasing the shim.

Valve opening pressure (kg/cm ²)	[At 2000rpm]	5.2-5.8
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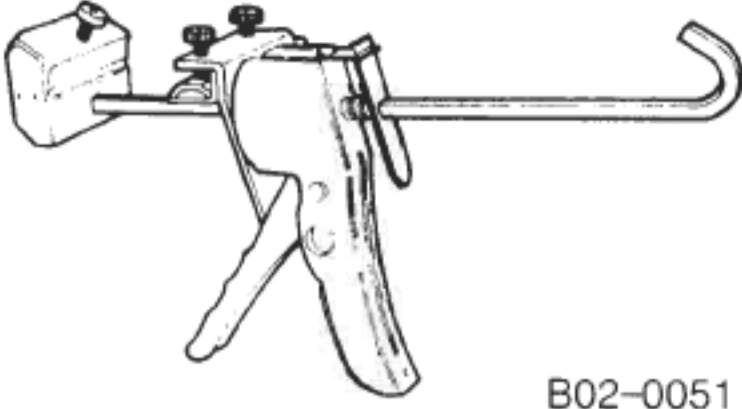


[Point 3] Oil pump installation

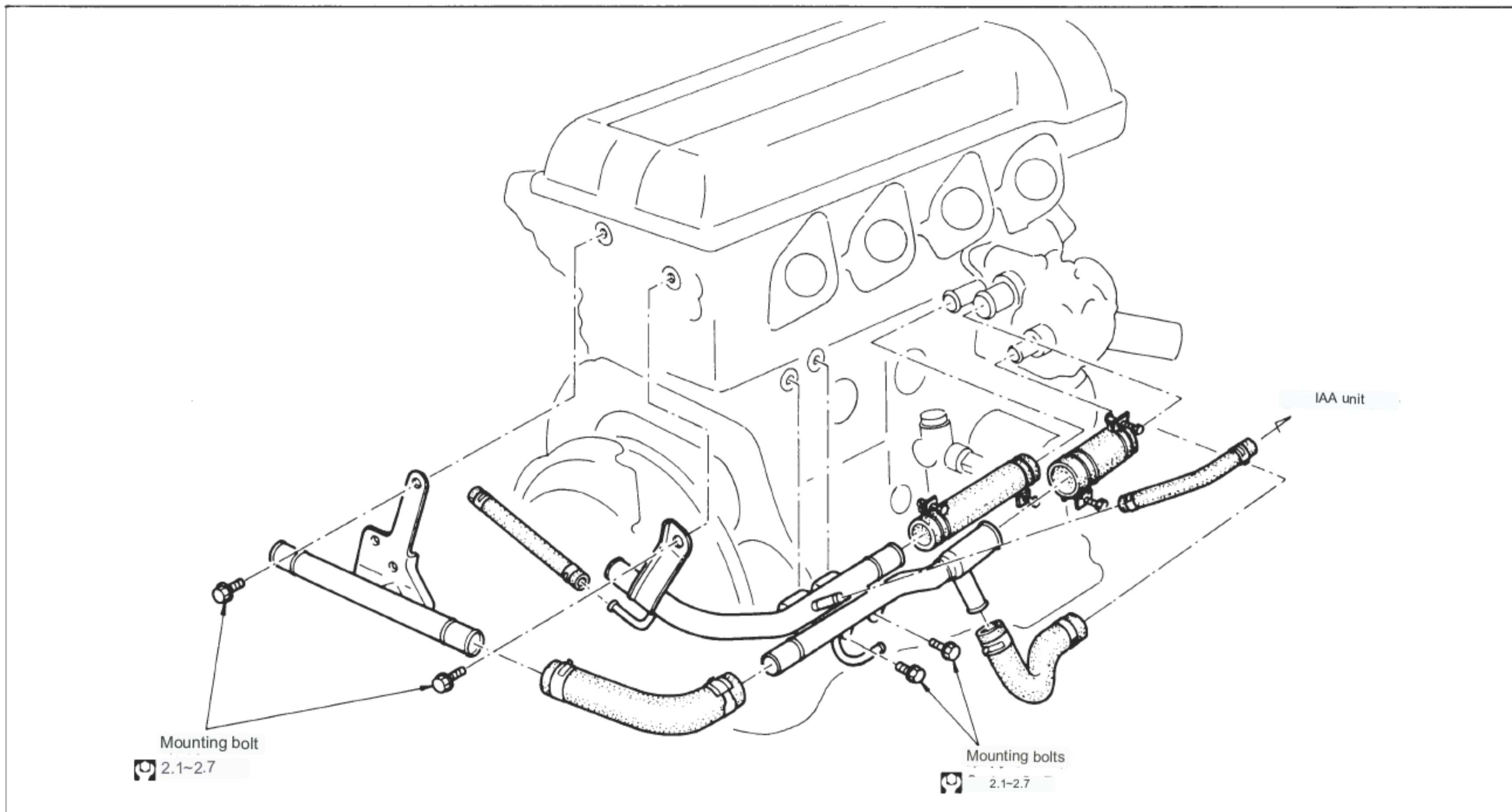
- When installing the oil pump, pour 2~3cc of engine oil and rotate the inner gear 4~5 times before installing.

9-16 thermostat water piping

supplies

	name	for way	remarks
I tool	Tube presser WS3993  B02-0051	For liquid gasket application	Existing
annular gasket	Equivalent to ThreeBond 12X-001		
Total vessel	temperature gauge	Water temperature measurement	— general goods

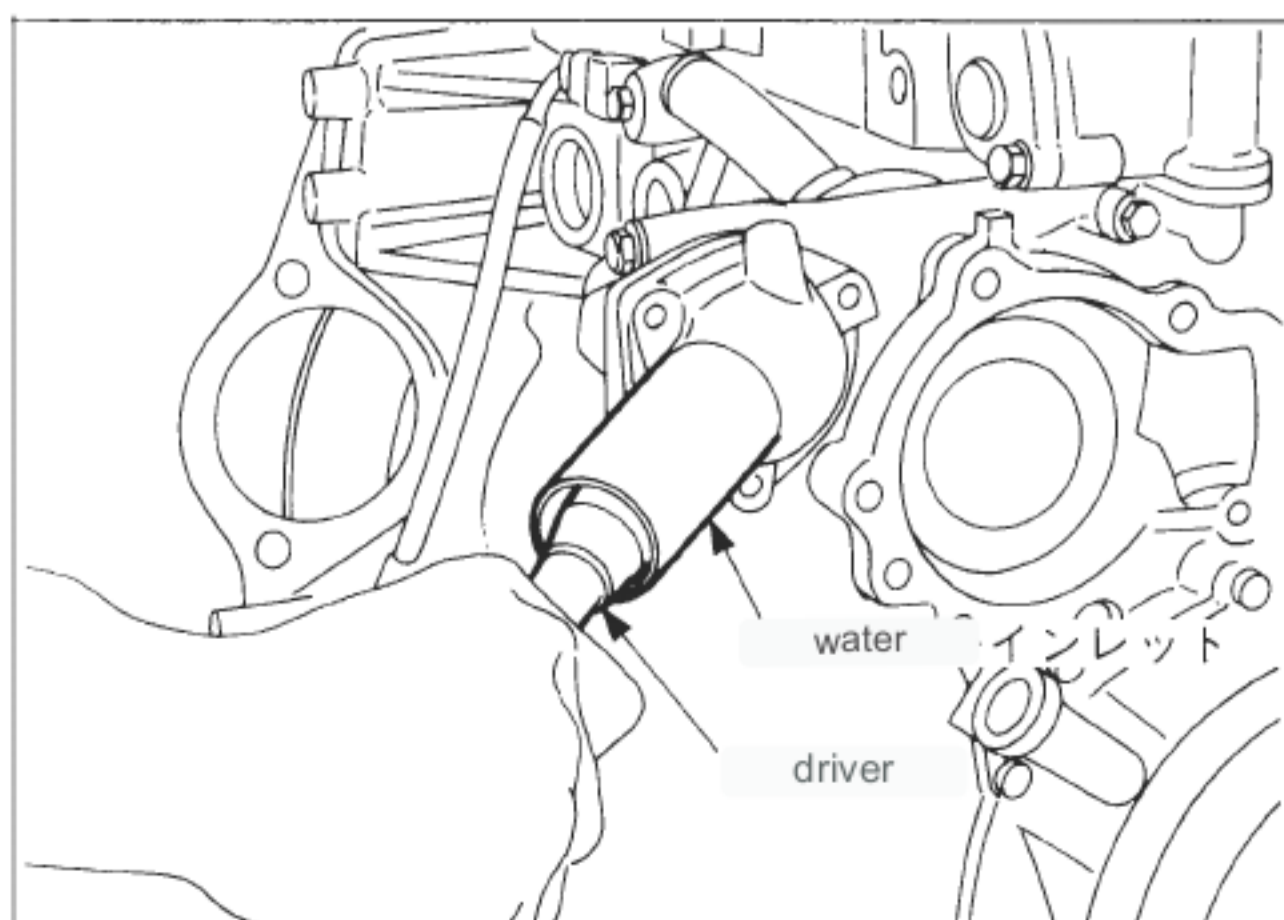
(1) Elimination warning



With cooling water drain

With intake manifold (when water pipe is removed)

Ⓣ Intake manifold (when water pipe is removed)



[Point 1] Water inlet removal and installation

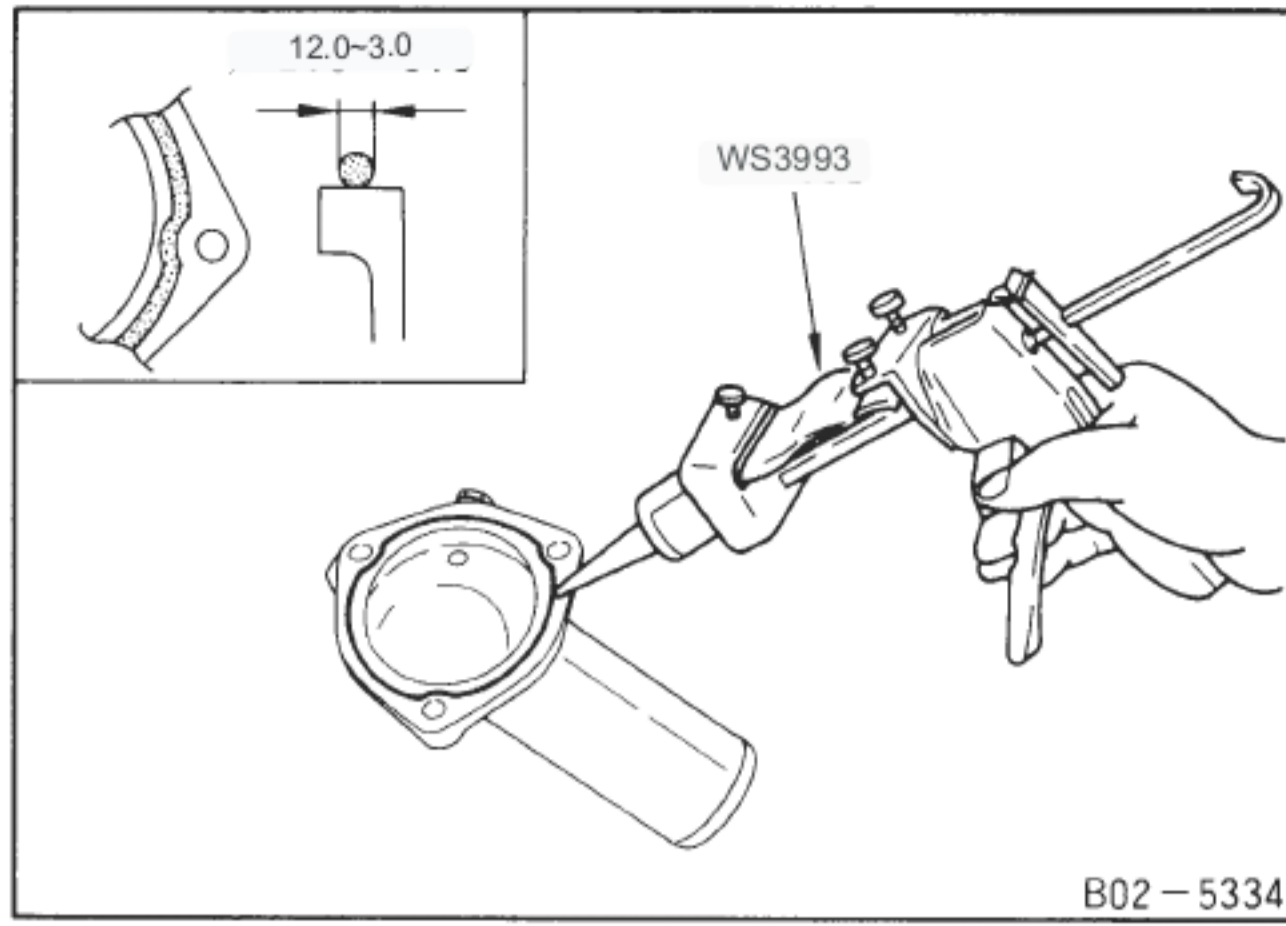
removal, cleaning

- Insert the handle of the screwdriver into the water inlet and lightly move it up and down.

Shake and remove.

Sufficiently remove the gasket attached to the water inlet

mounting surface with a scraper.

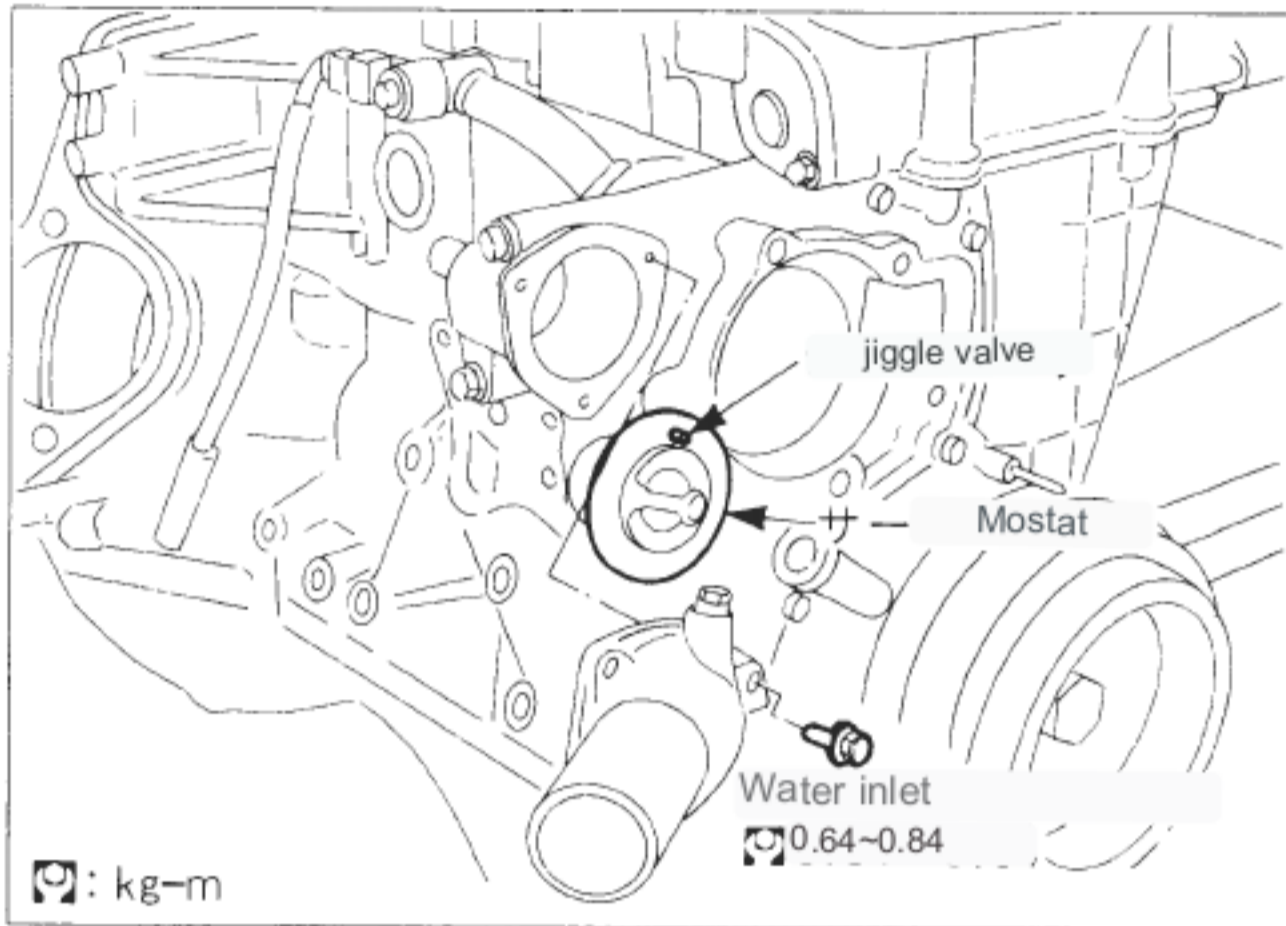


attachment

- Using a tube presser, apply a liquid gasket (ThreeBond 12X 001) with a thickness of 2.0 to 3.0mm without a break as shown in the figure on the left.
- After applying the liquid gasket, install it within 5 minutes after application.
- After installation, leave it for 30 minutes or more before operating.

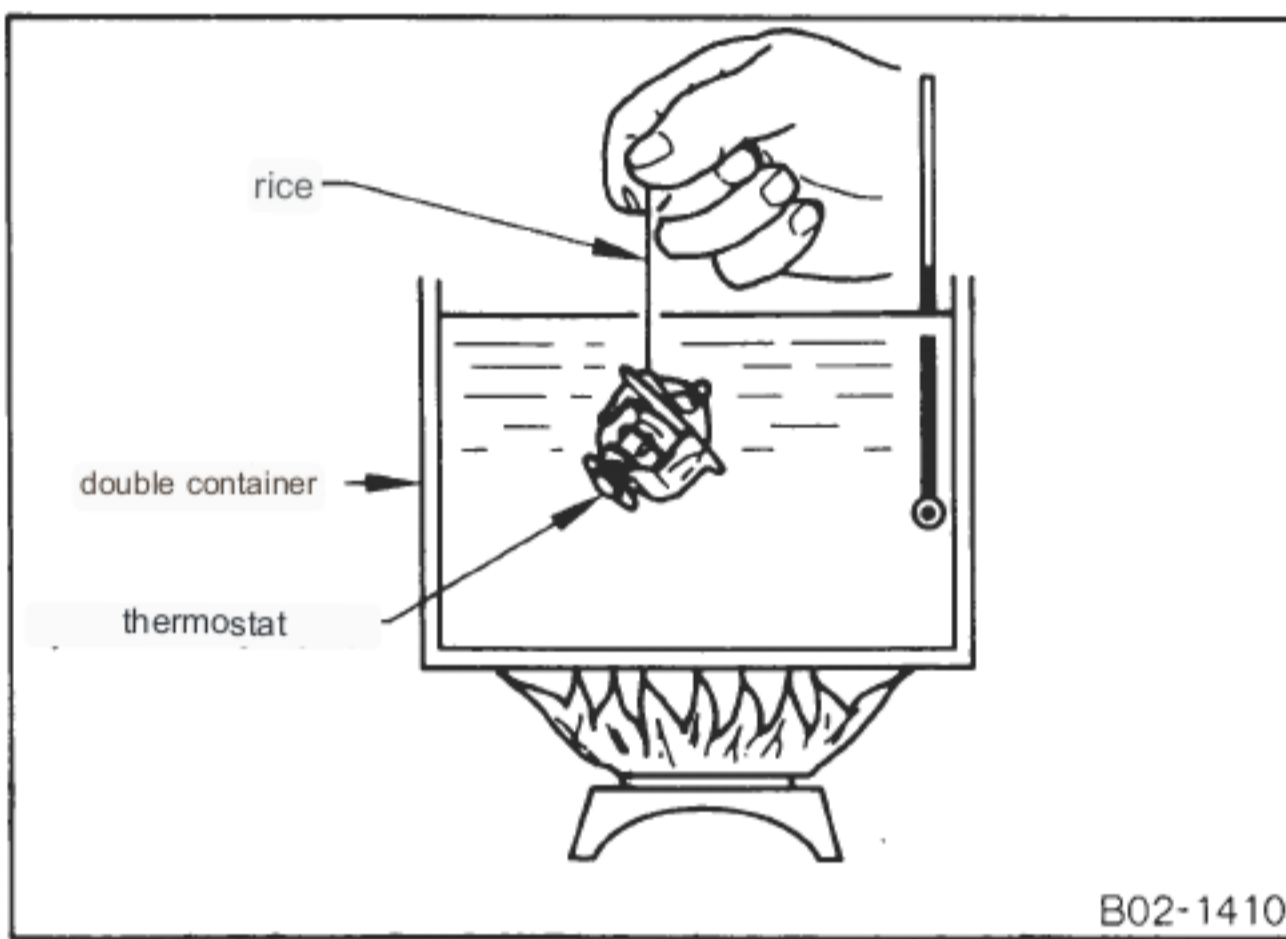
Note: Confirm that there is no water leakage after warming up.

Water inlet tightening torque	(kg-m)	0.64-0.84
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[Point 2] Thermostat installation

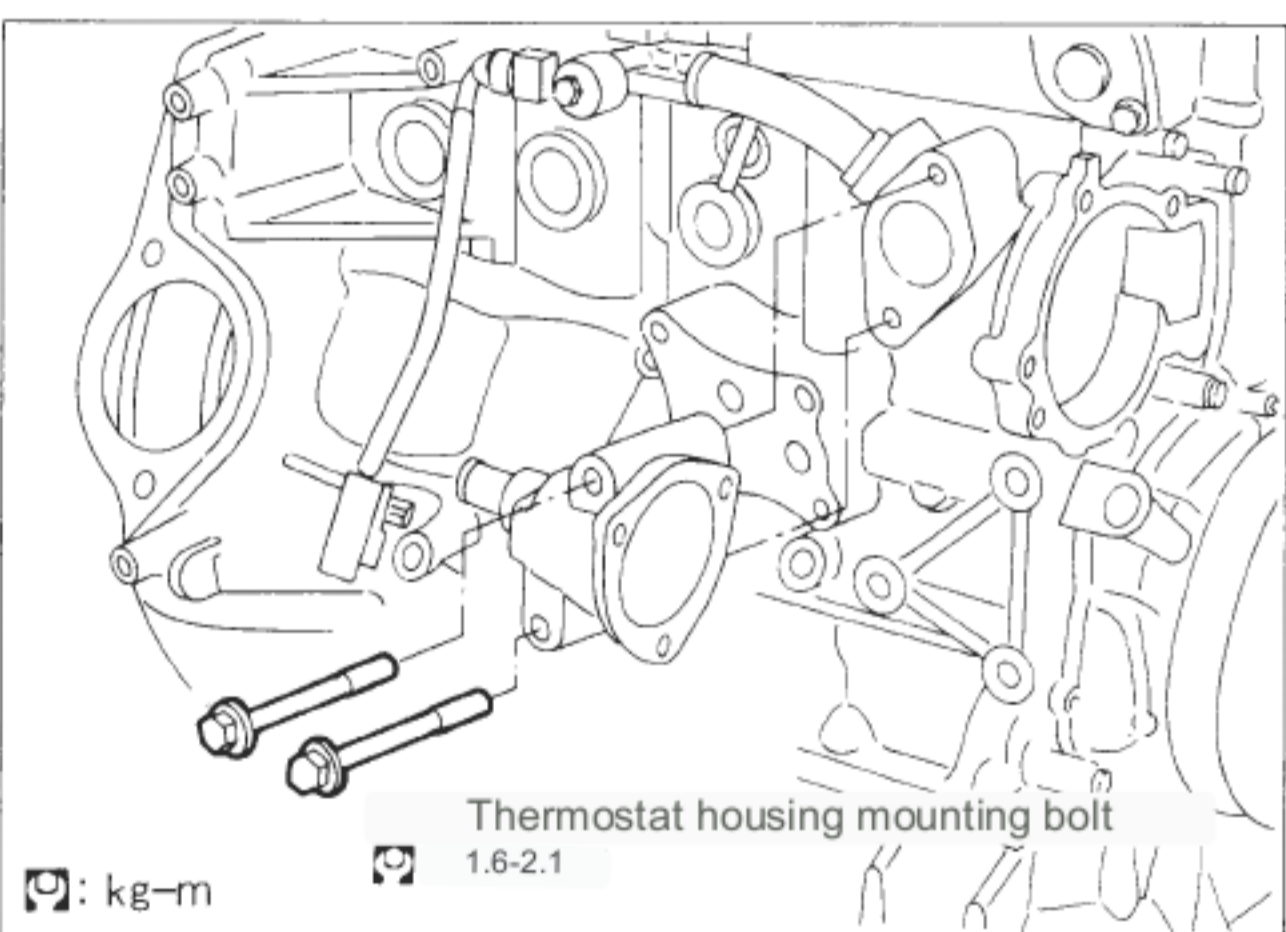
- Install with the "TOP" mark (jiggle valve) facing upward.



[Point 3] Thermostat inspection

- Put a thread in the valve part of the thermostat and place it in a double container filled with water.
- Add and heat while stirring.
- The water temperature when the thermostat falls off the thread is the valve opening temperature.

	standard	cold climate
Opening temperature (°C)	76.5	←

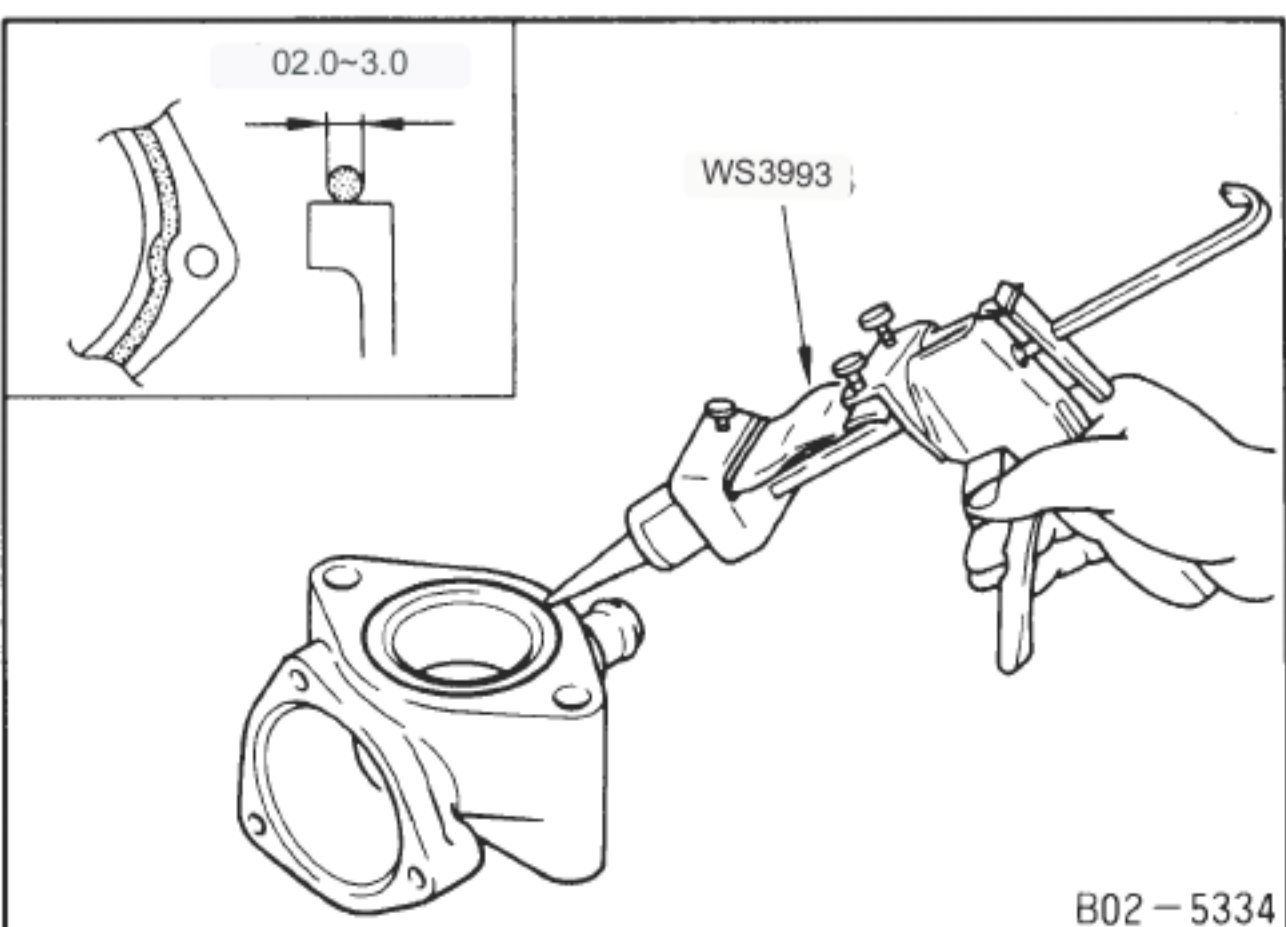


[Point 4] Water pipe installation

- Attach the water hose to the water inlet.
- Install the water pipe.

Attach the rear water pipe and the water

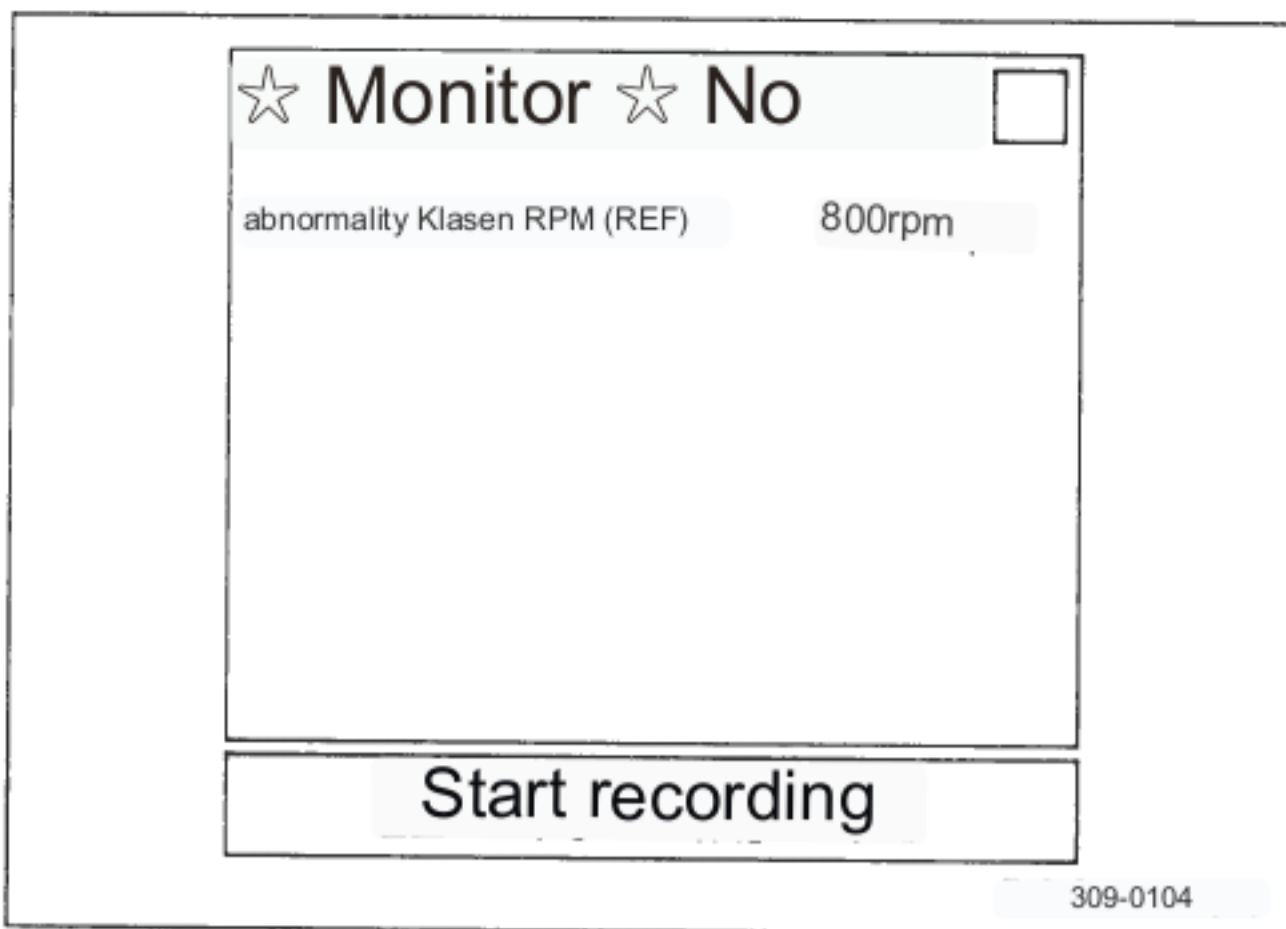
hose.



attachment

- Using a tube presser, apply liquid gasket (ThreeBond 12X 001) 2.0 to 3.0mm continuously as shown on the left.
- After applying the liquid gasket, install it within 5 minutes after application.
- After installation, leave it for 30 minutes or more before operating.

Note: Make sure there are no water leaks after warming up.



point 検

- Check that the air conditioner load, power steering oil pump load, and various electrical loads are not applied to the engine.

Also, for A/T vehicles, check the position of the select lever in the "N" range.

make adjustments.



- Check "Klasen RPM (REF)" in "Data Monitor".



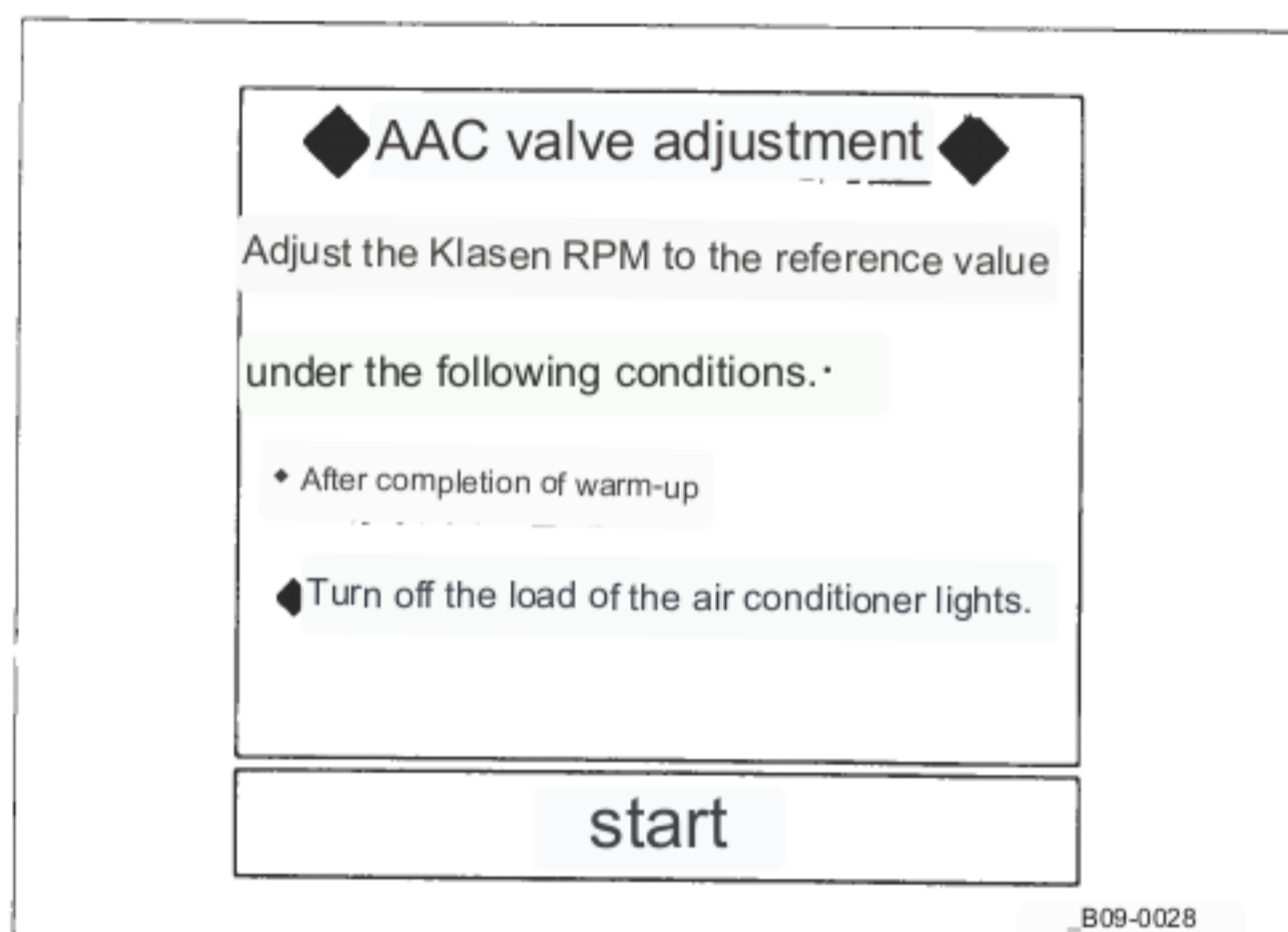
- Check with the tachometer in the combination meter.

tone

- Since the idling speed is feedback-controlled to the specified value (control target value), adjustment is basically unnecessary, but adjustment work is required.

If so, remove the ECCS control unit and follow the steps below.

do the work.



- ① In "Work Support", "AAC valve adjustment", AAC valve

Turn the ASSY idle adjustment screw with a screwdriver and

Adjust the idle speed to 750rpm.

- ② Back the execution screen of "AAC valve adjustment", idle speed

is the specified value.

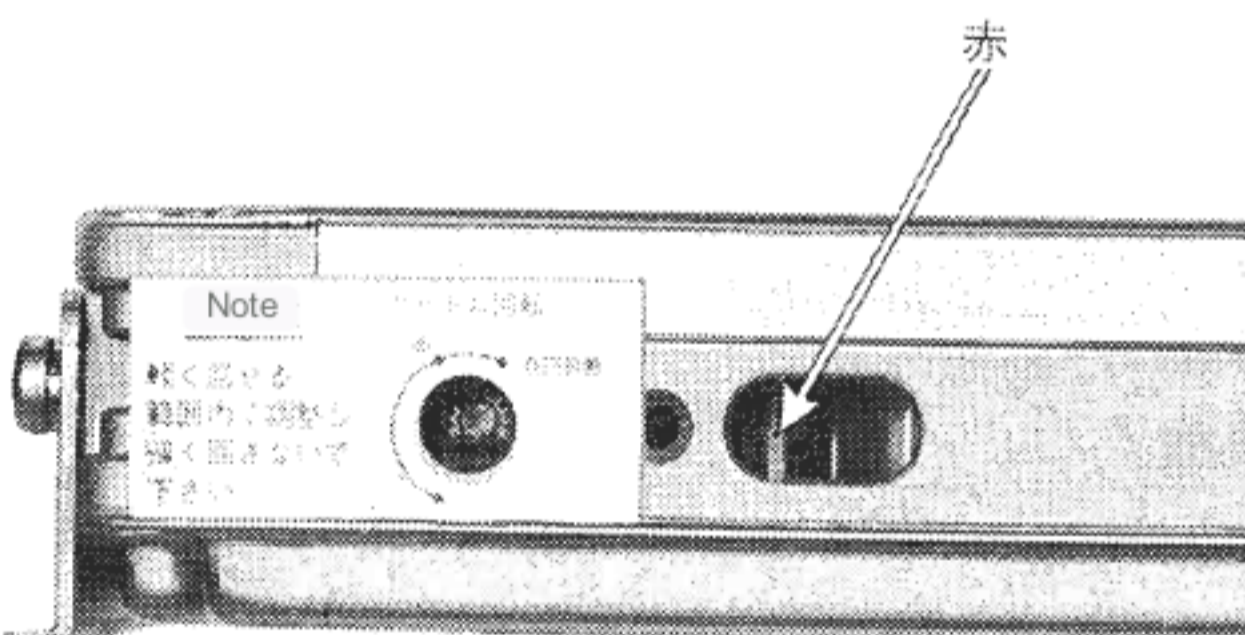


- ① Idle control speed adjustment volume of the ECCS control unit

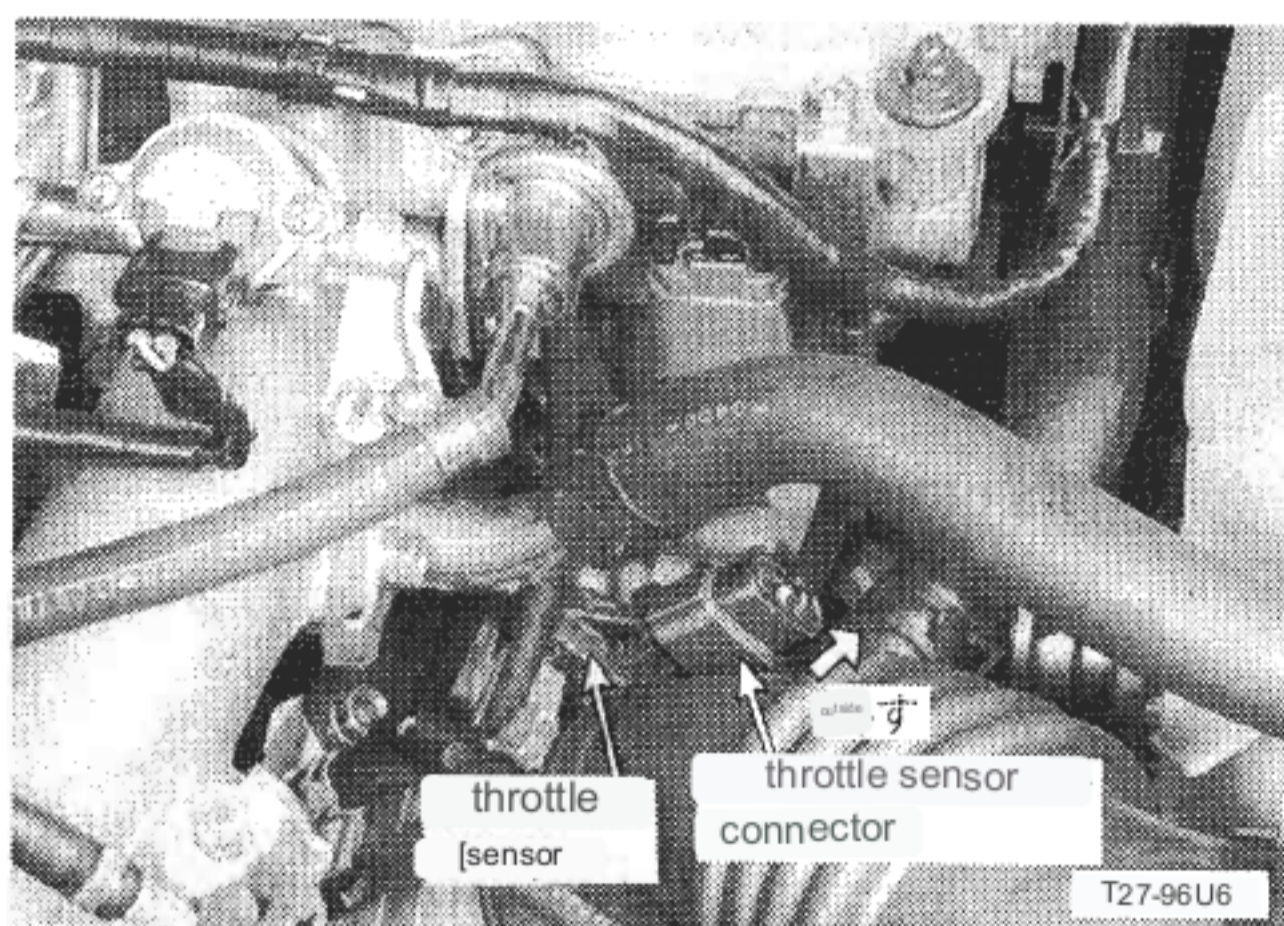
is in the full left position. CAUTION: Do not turn

the idle control rev adjustment volume too strongly. adjustment

The rotation range of the screw is about 3/4 turns.



N12-9357



(M/T car)

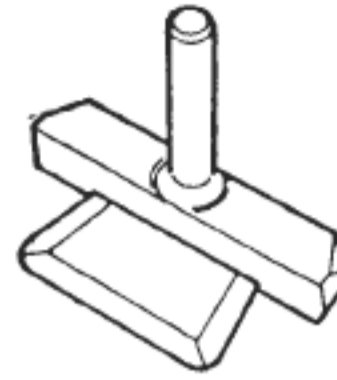
- 2) Disconnect the harness connector of the throttle sensor and

stop feedback control of idle speed. At this time, the AAC valve

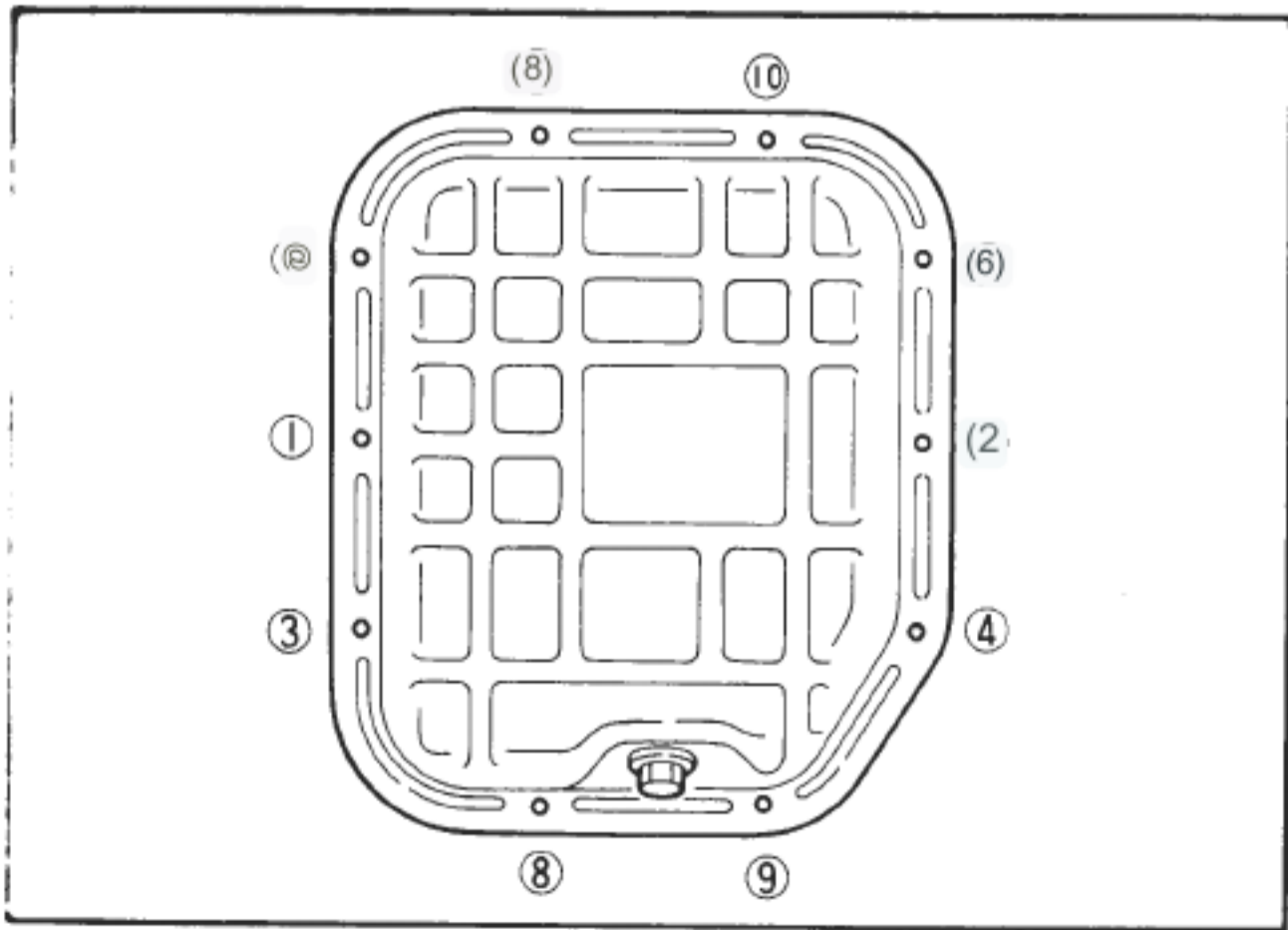
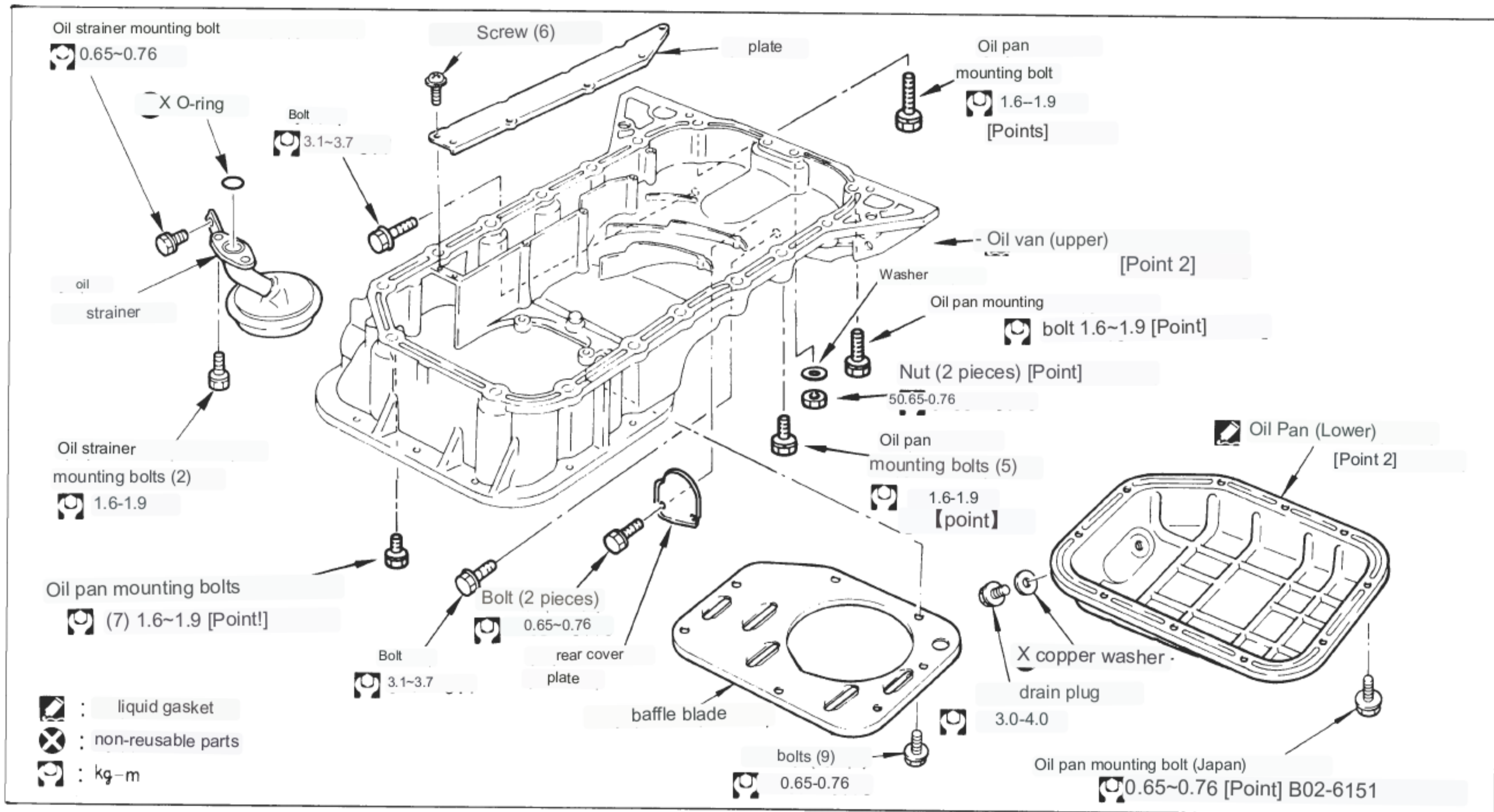
is fully closed and the idle speed drops to 750rpm.

9-17 Oil Pan, Oil Strainer

supplies

	name	for way	remarks
Special tool	seal cutter KV101 11100  B02-1212	oil pan removal	Existing
tool	tube presser WS3993	Liquid gasket application	
next gasket	ThreeBond 2107D		

(1) removal

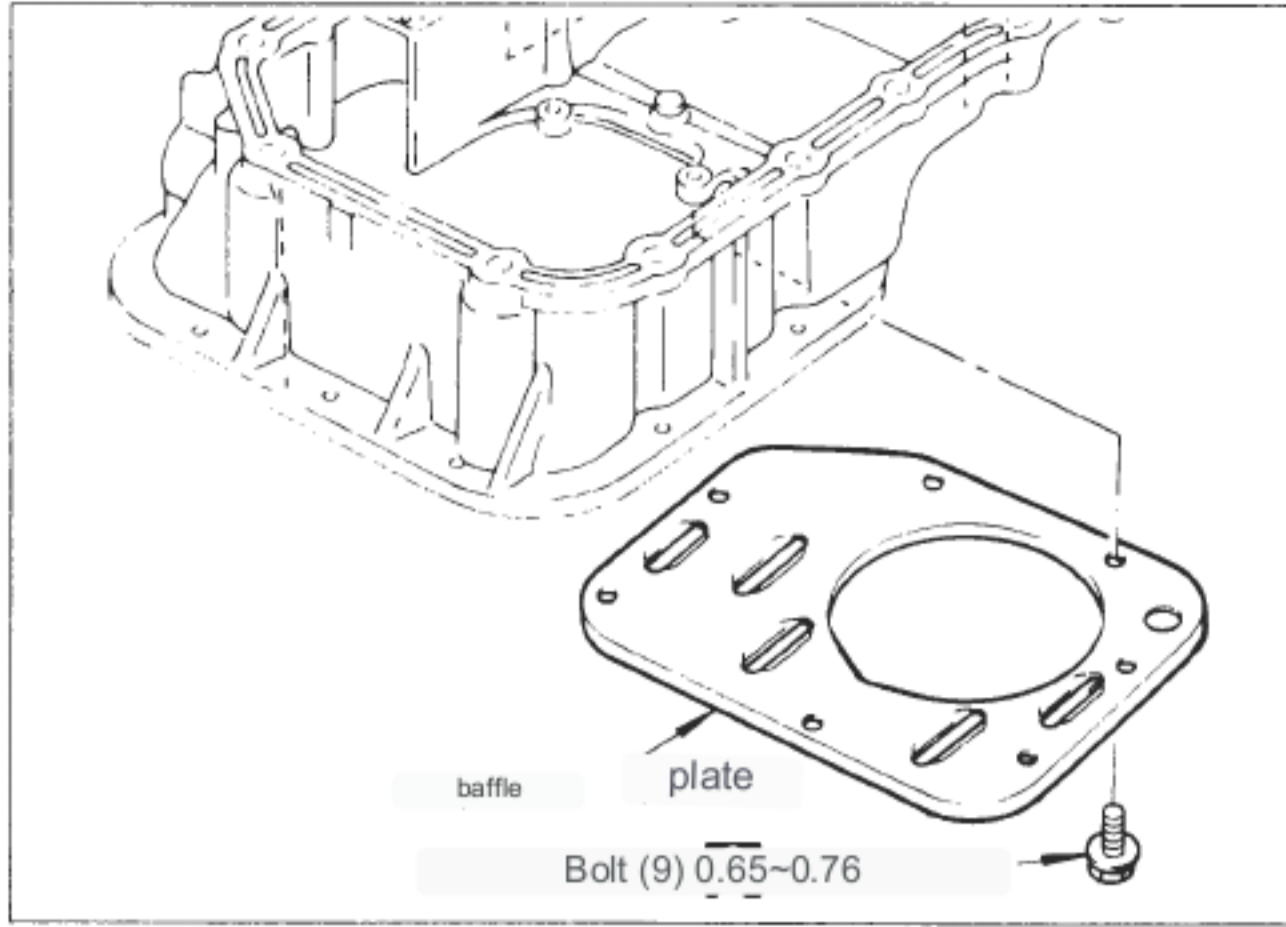


[Point 2] Remove and install oil pan mounting bolts

sheet metal oil pan

- Install in the order of the numbers on the left figure.
- Remove in the reverse order of the numbers in the figure on the left.

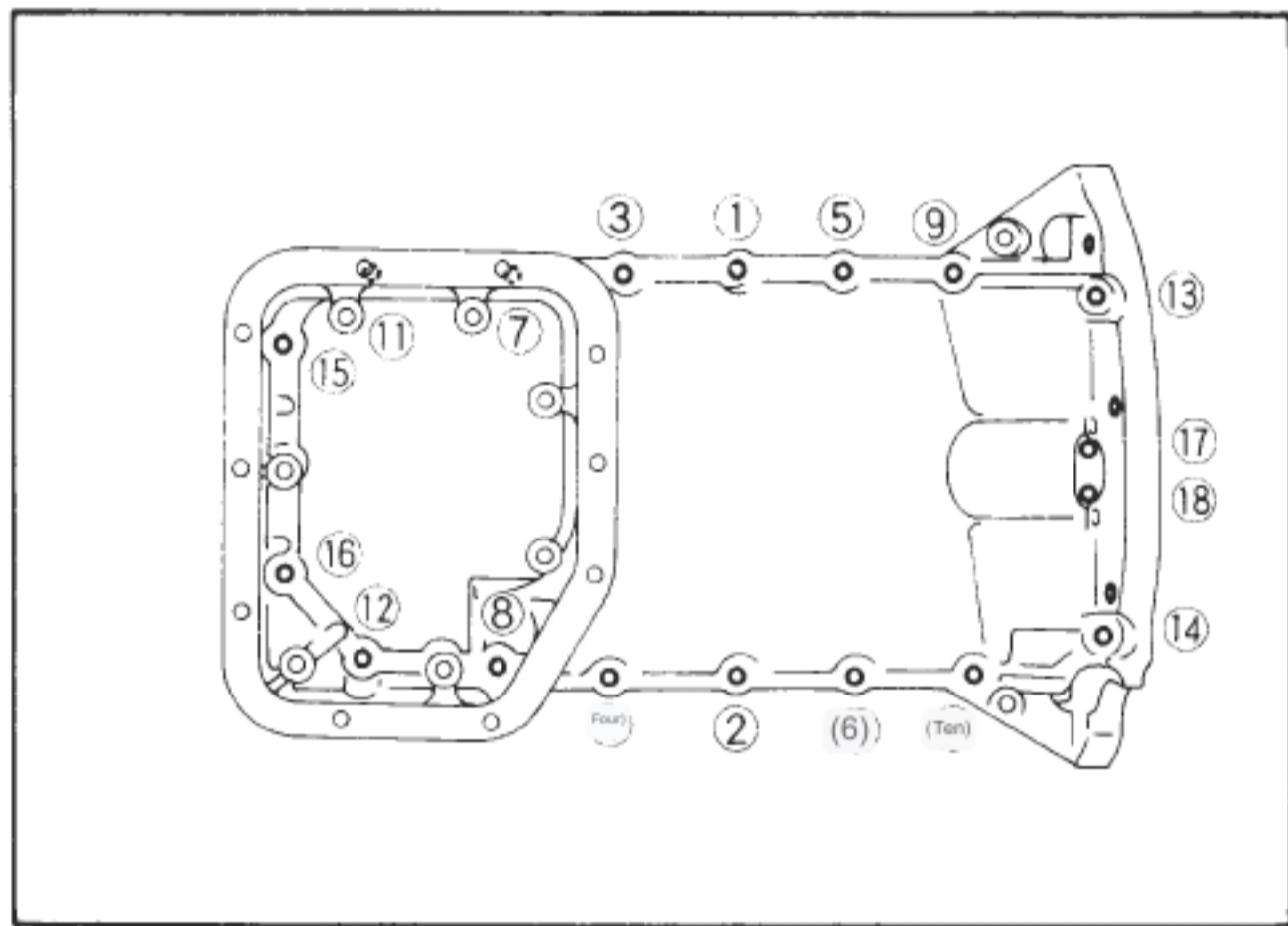
Oil pan mounting bolt tightening torque (kg-m)	0.65 0.76
--	-----------



baffle plate

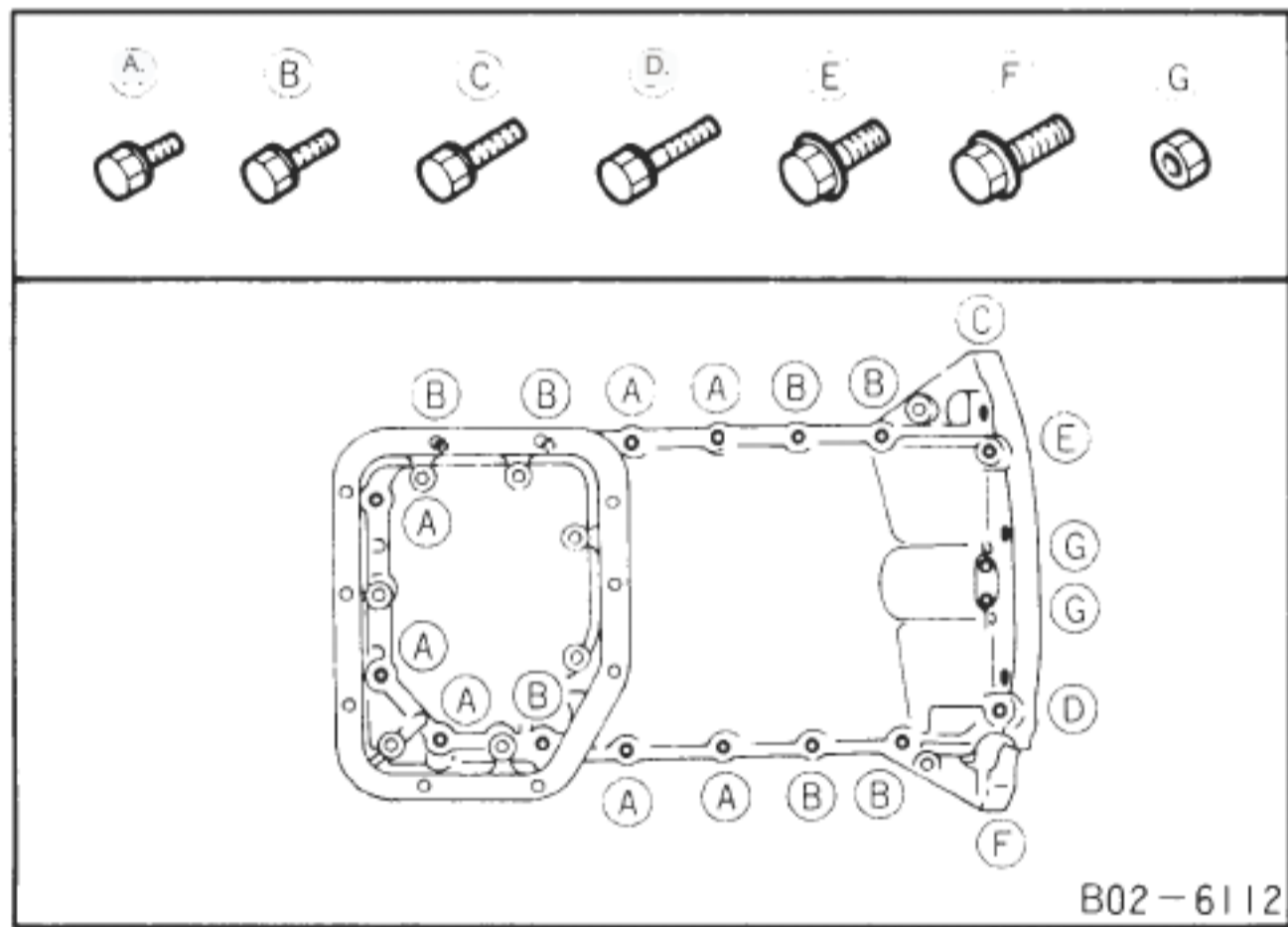
- Apply locking agent (equivalent to Three Bon 1386) to the baffle plate mounting bolt threads and tighten the bolts.

The aluminum alloy oil pan must be installed after the engine is removed. See Section 10



Aluminum alloy oil pan

- Install in the order of the numbers on the left figure.
- Remove in the reverse order of the numbers in the figure on the left.



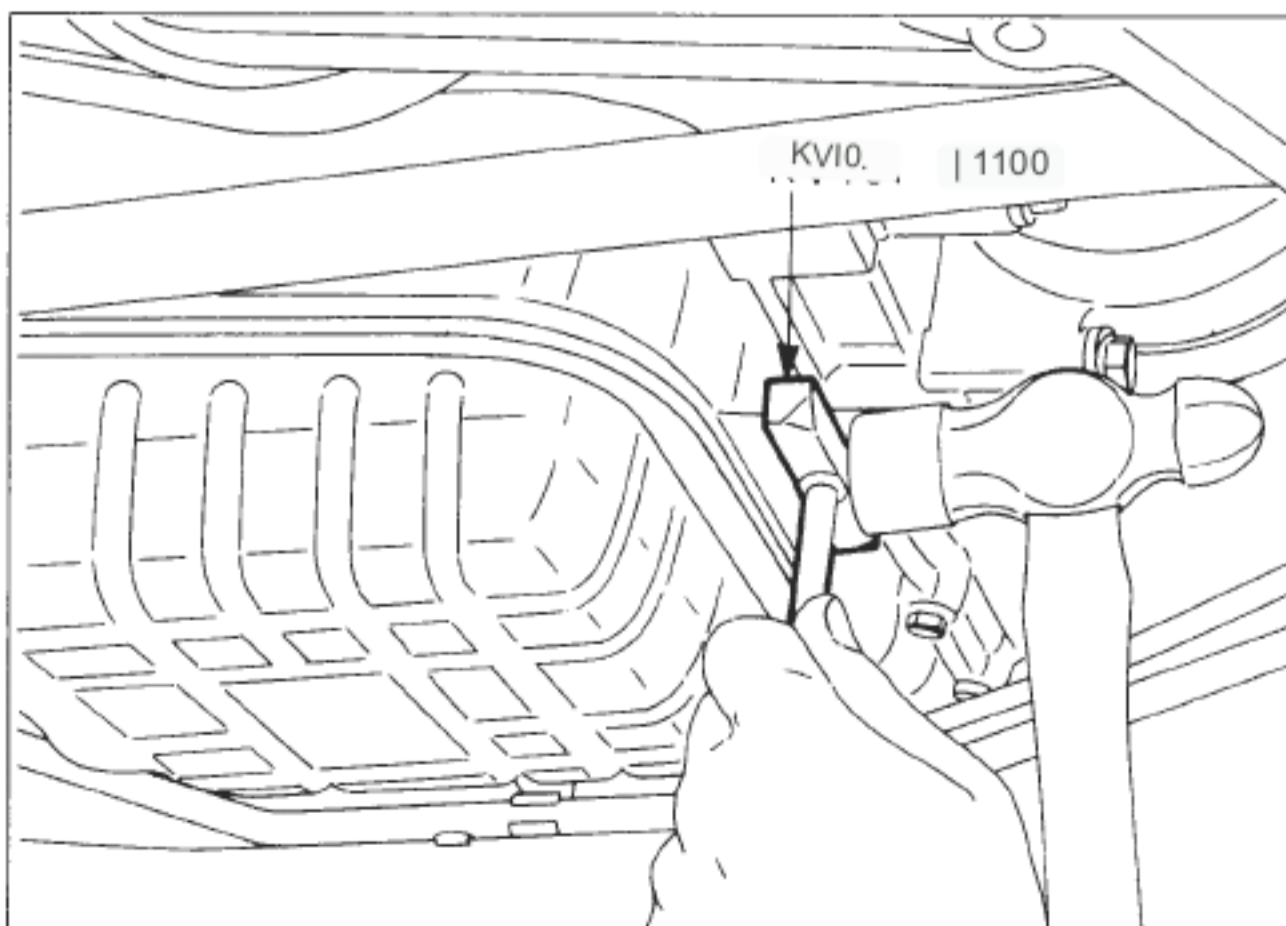
- Note that the size and tightening torque of the aluminum alloy oil pan mounting bolts and nuts differ depending on the mounting location.

site	screw size	under neck length (mm)	Tightening torque (kg-m)
A.	M8×1.25	25	1.6~1.9
B.		35	
C.		60	
D.	M10×1.5	85	3.1~3.7
E.		35	
F.	M6×1.0	47	0.65-0.76
G.		—	

[Point 3] Oil pan removal and installation

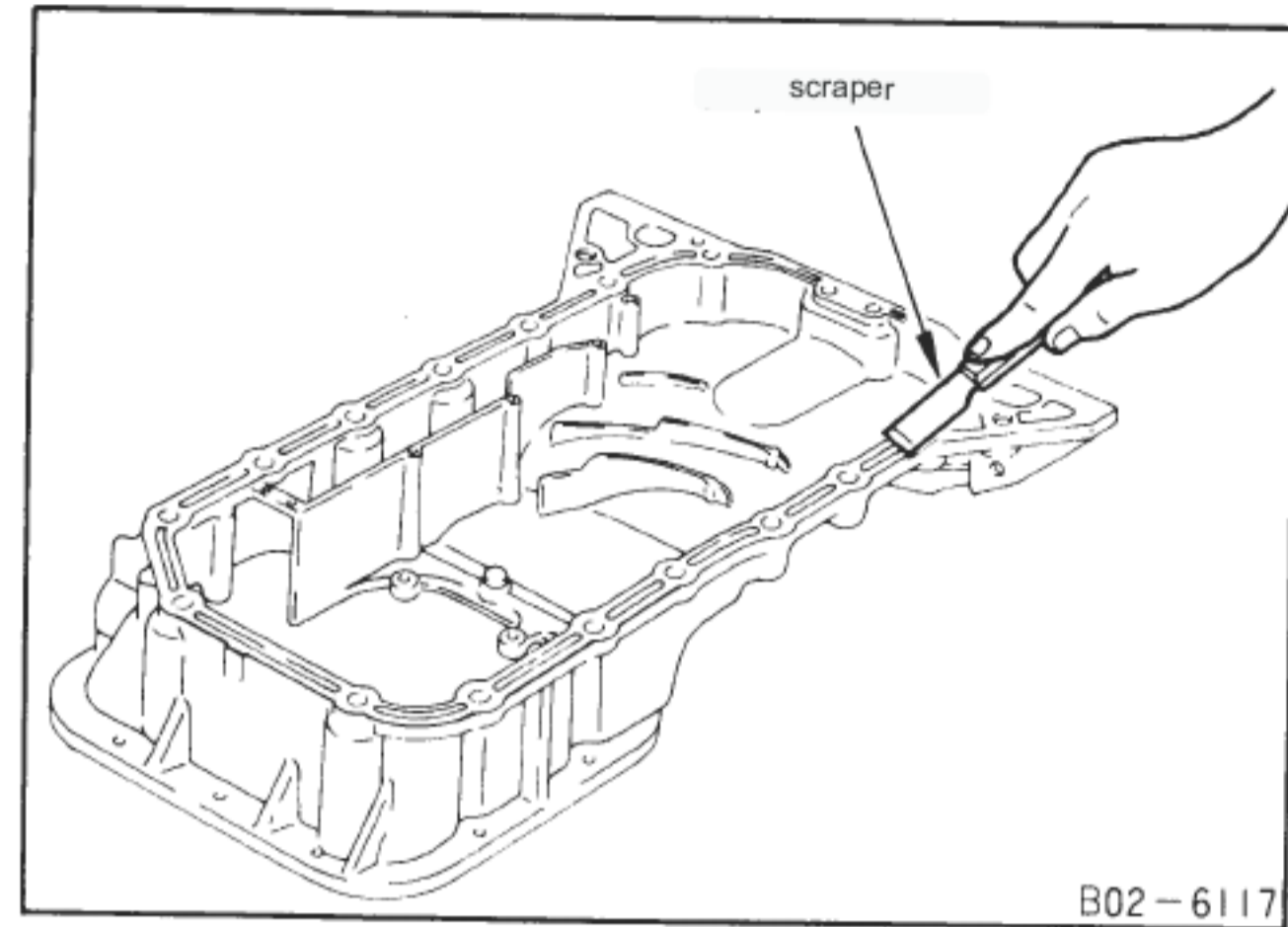
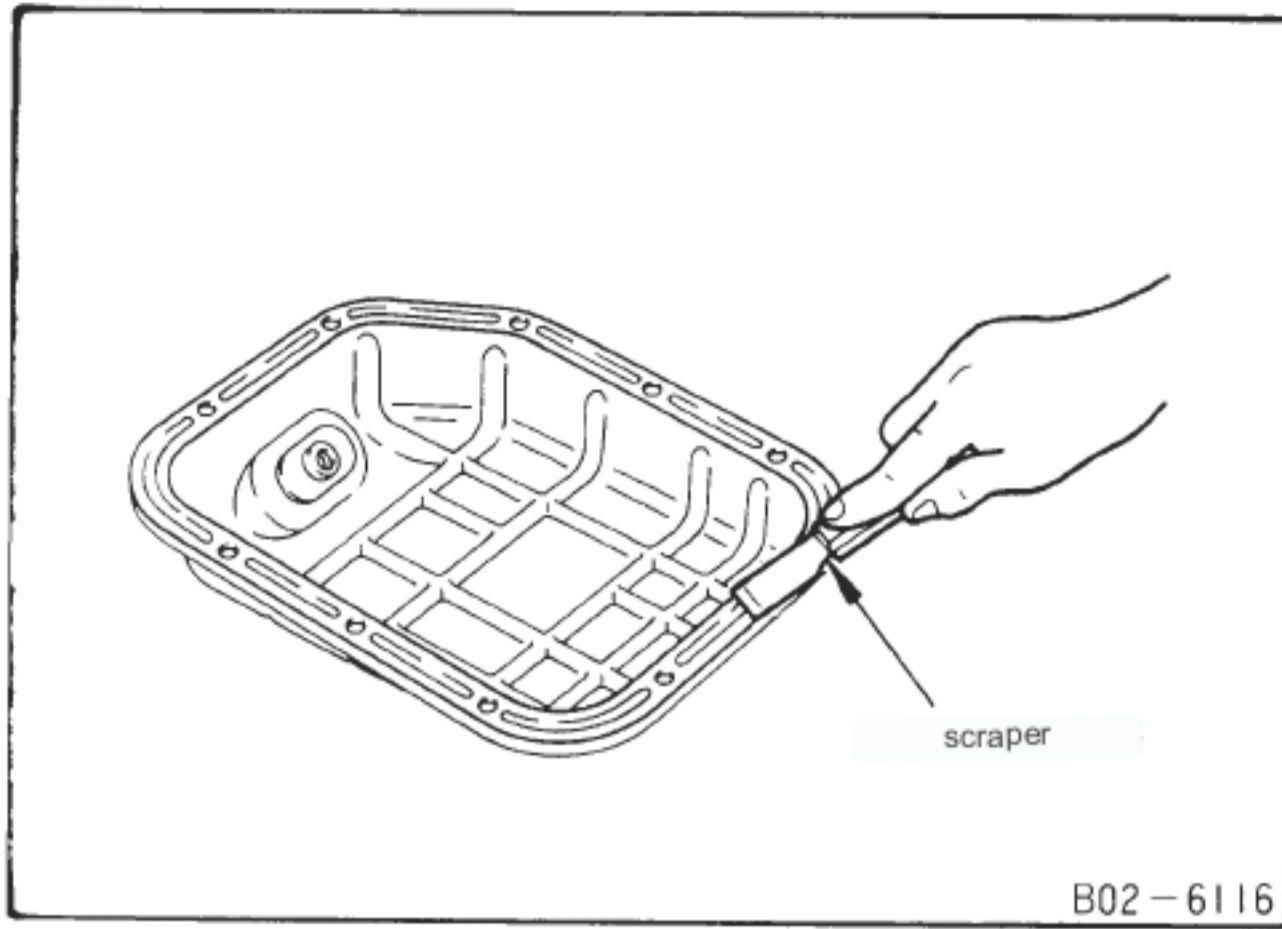
removal

- Remove the sheet metal oil pan using a seal cutter.



cleaning

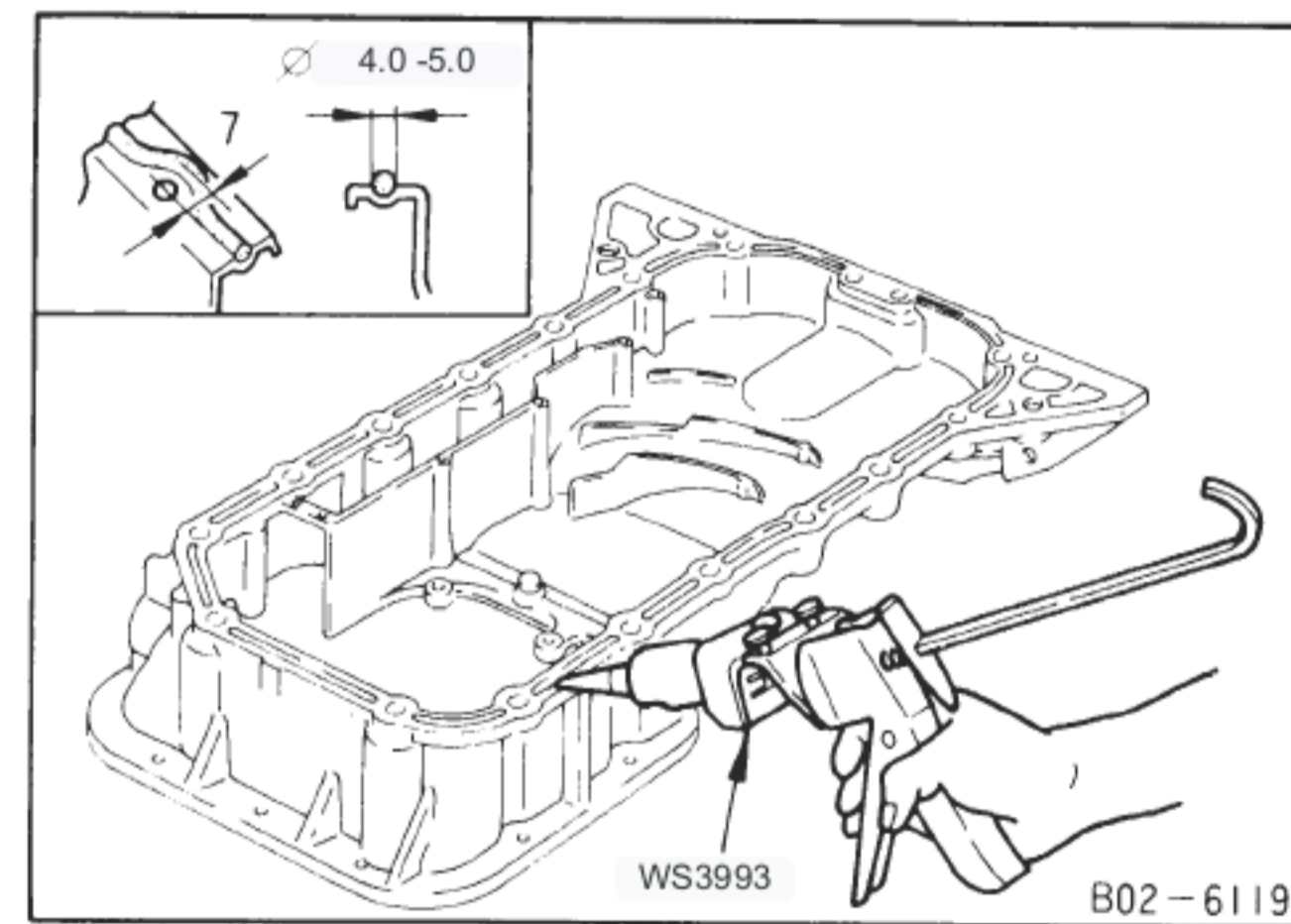
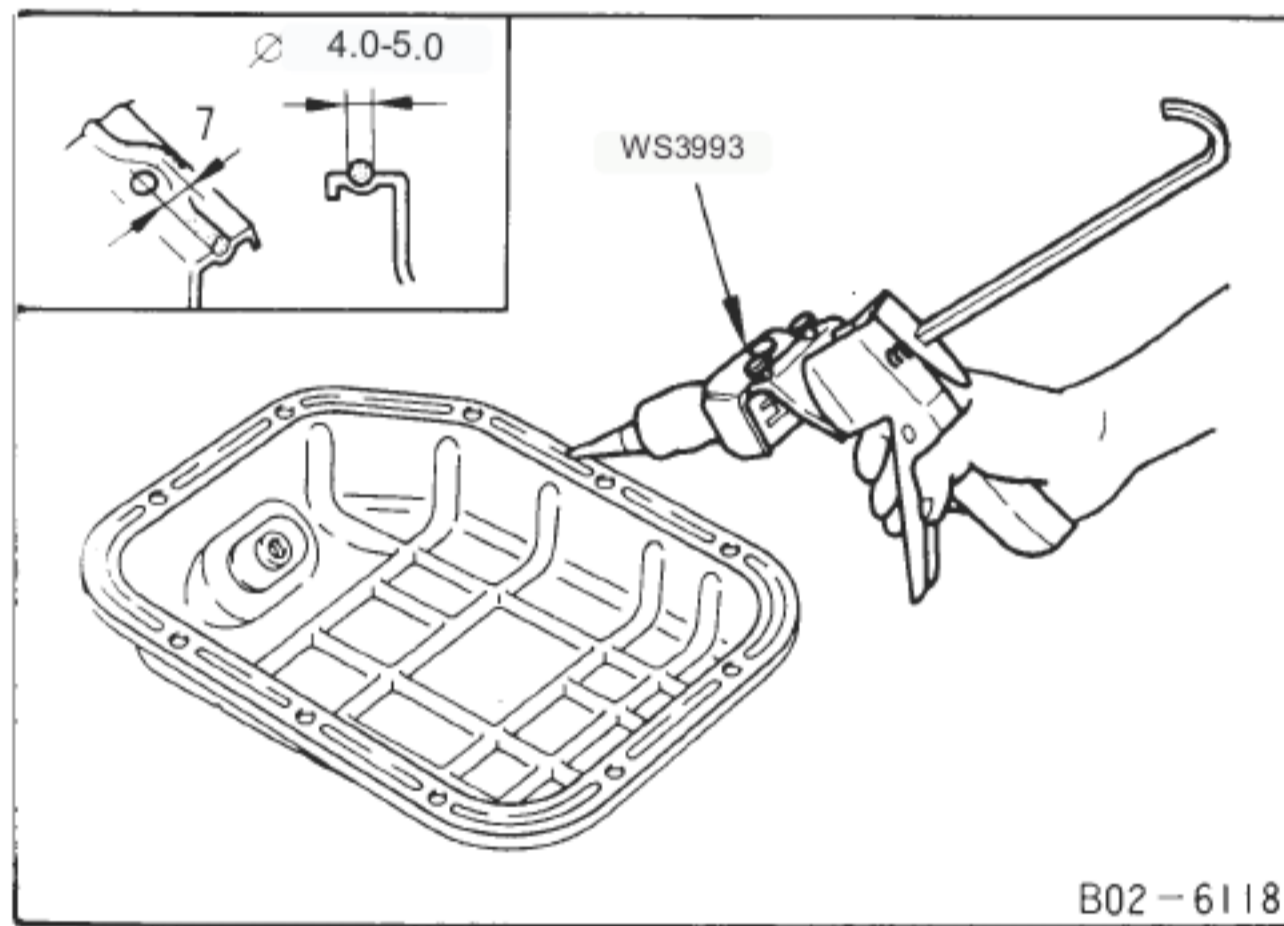
- Sufficiently remove gaskets attached to the cylinder block and oil pan mounting surface with a scraper.



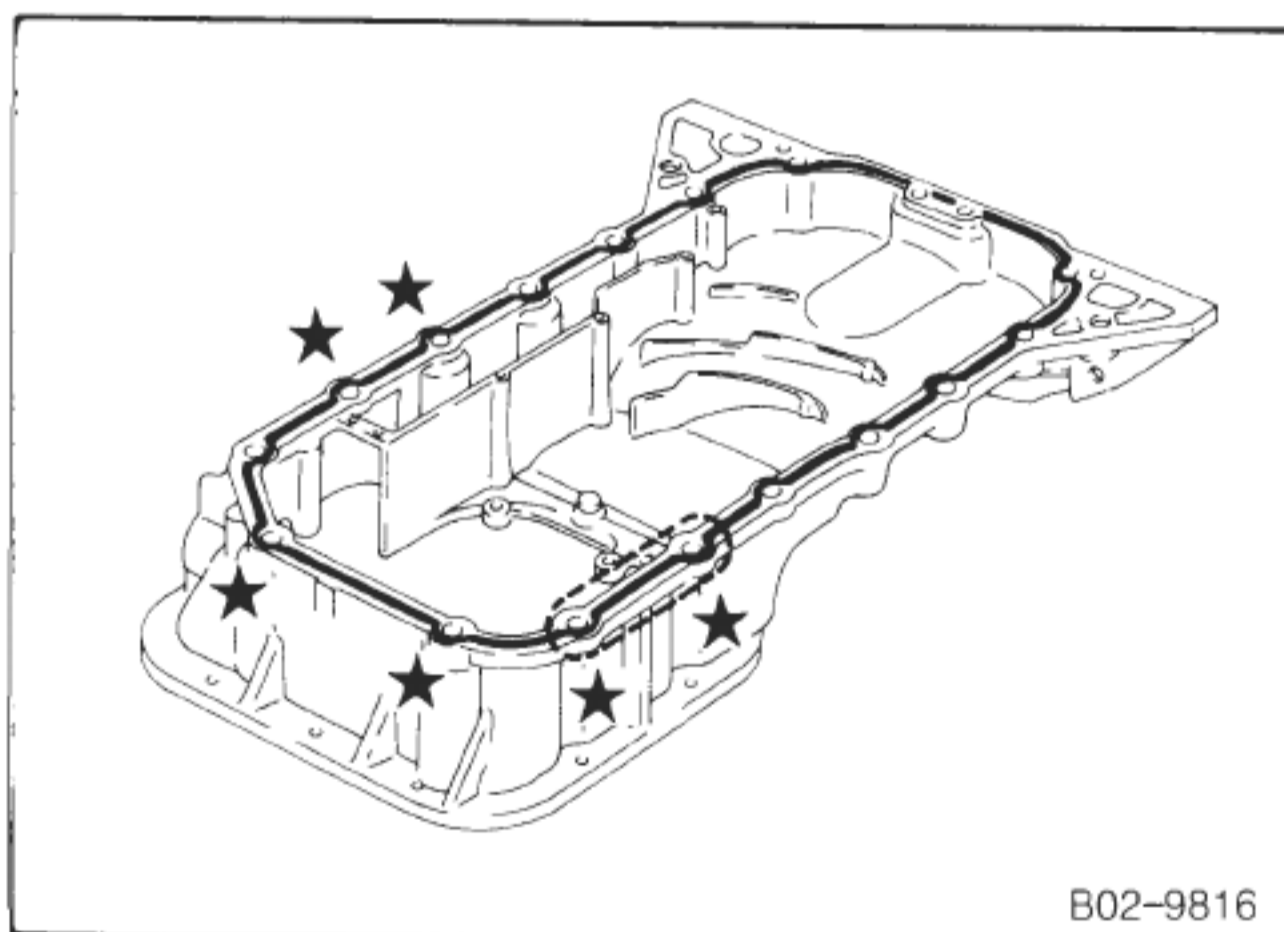
attachment

- As shown in the figure below, apply a liquid gasket (equivalent to ThreeBond 1207D) to the aluminum alloy oil pan and sheet metal oil pan with a 4 to 5 mm continuous coating using a Tuzo presser.

Install the liquid gasket within 5 minutes after application. • Leave it for 30 minutes or more after installation before operating.



- For the stamped part of the aluminum alloy oil pan shown on the left, Apply on the side.
- Completely remove the protruding liquid gasket from the dashed line.



[Point 4] Lubricant inspection

Refer to B25 Lubrication System Inspection

[Point 5] Oil leak, hydraulic pressure check

- After installing the oil pan, warm up the engine and check for oil leakage.
- Check the hydraulic pressure.
- To check the hydraulic pressure, remove the pressure switch and attach a hydraulic pressure gauge.
- conduct.

10. Engine removal and installation

Basic procedure

This section describes how to install and remove the SR20DET engine from above using a hoist crane and mission jack.

do.

Check and adjust after installation

Attached vehicle set

with battery

With engine hood

Cooling water

with radiator

Left side of engine room

- O2 sensor harness
- Ground wire connector separation
- Air duct, air cleaner, air inlet hole
- air outlet hose, EAI control bar
- lube, blow-by separator
- Moving the power steering oil pump [Point 4]
- Move the air conditioner compressor [Point 4]

front of engine room

- Cooling fan

upper engine room

- Various ECCS harness connectors

indoor room — △

- Refer to control lever C2 (M/T car)

Right side of engine room

- Separation of fuel feed and return hose [Point 1] • Separation
- Accelerator wire separation [Point 2]
- of engine main harness and ground wire
- 【Point 3】
- Heater hose separation
- Various vacuum hose separation

Under of vehicle 側

- Engine under cover
- Propeller shaft [Point 5]
- Transmission control lever (M/T car), operating cylinder
- Transmission control linkage (A/T car)
- Oil cooler tube separation (A/T car)
- Exhaust front tube separation
- Rear engine mount bracket [Point 6]
- Left and right engine mount insulator nuts
- [Point 7]

◆ fuel pressure relief ◆

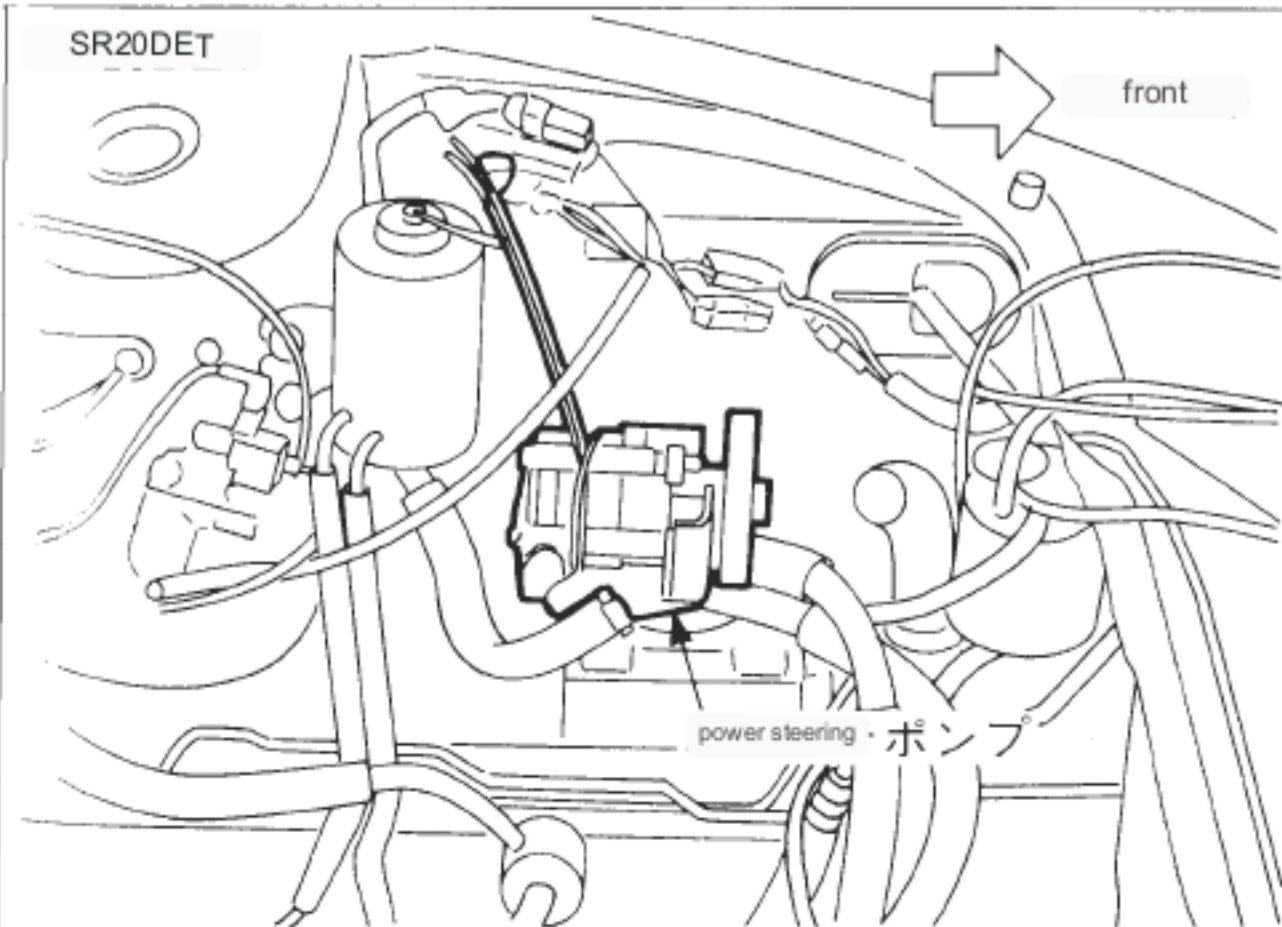
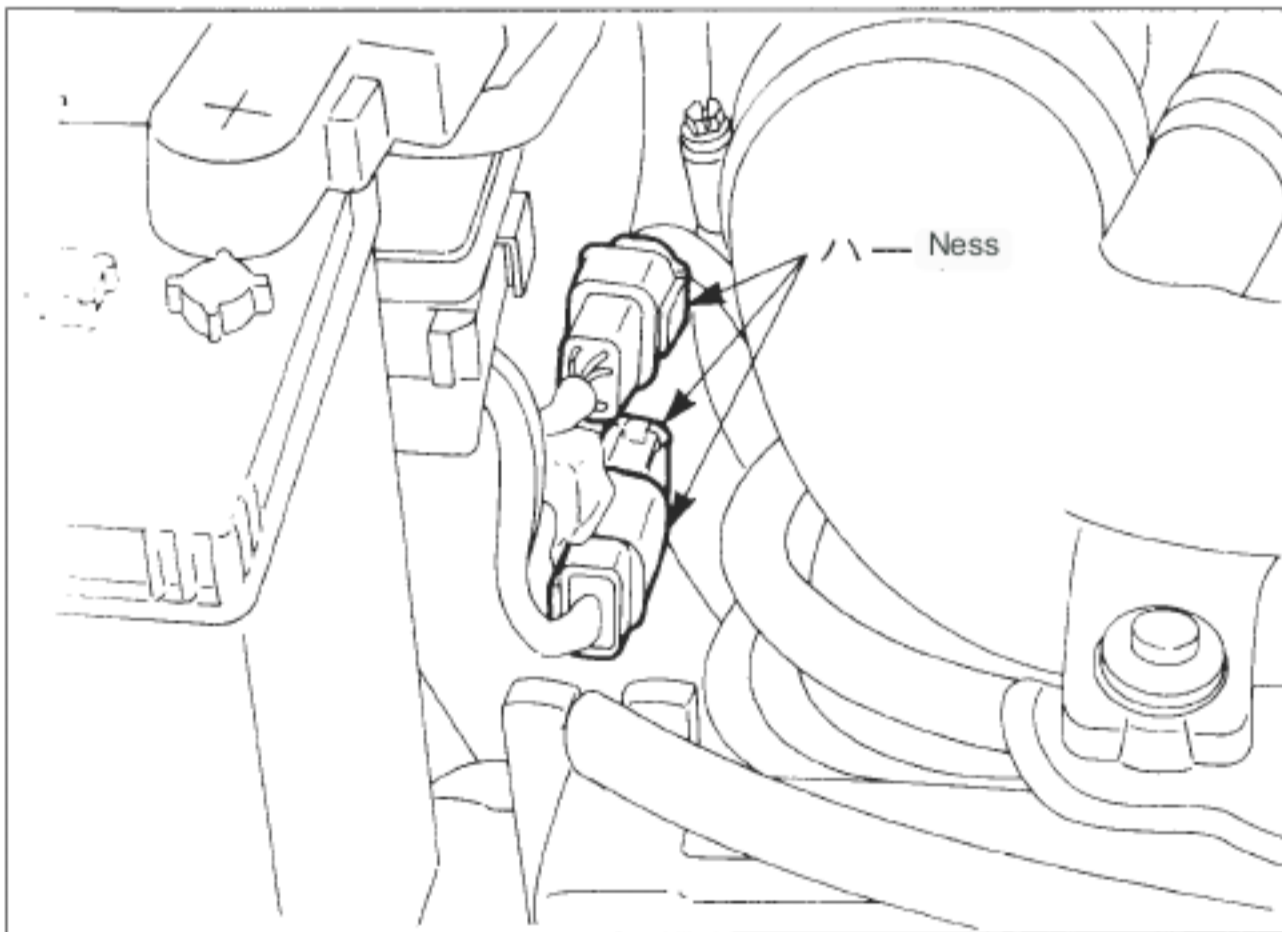
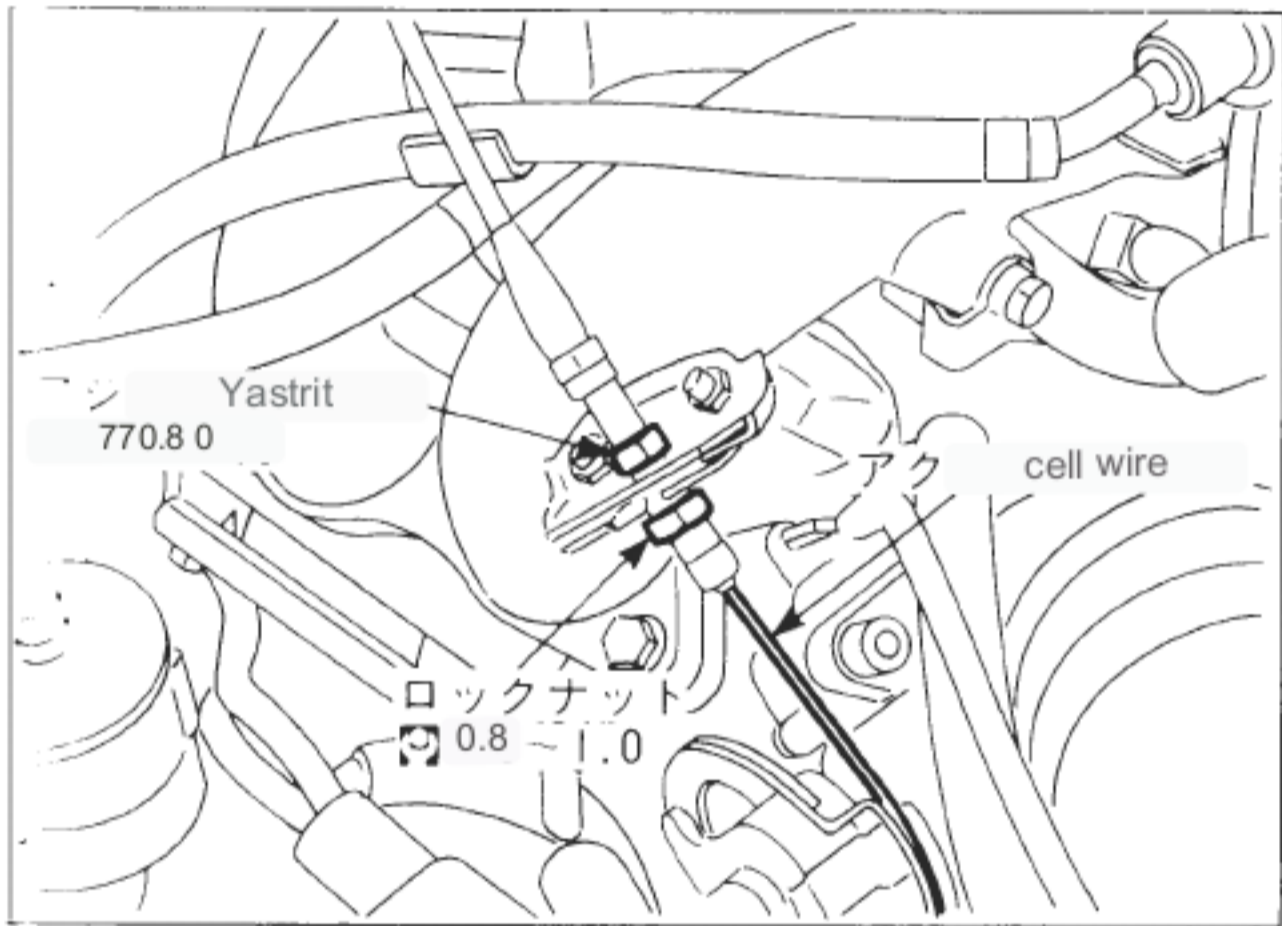
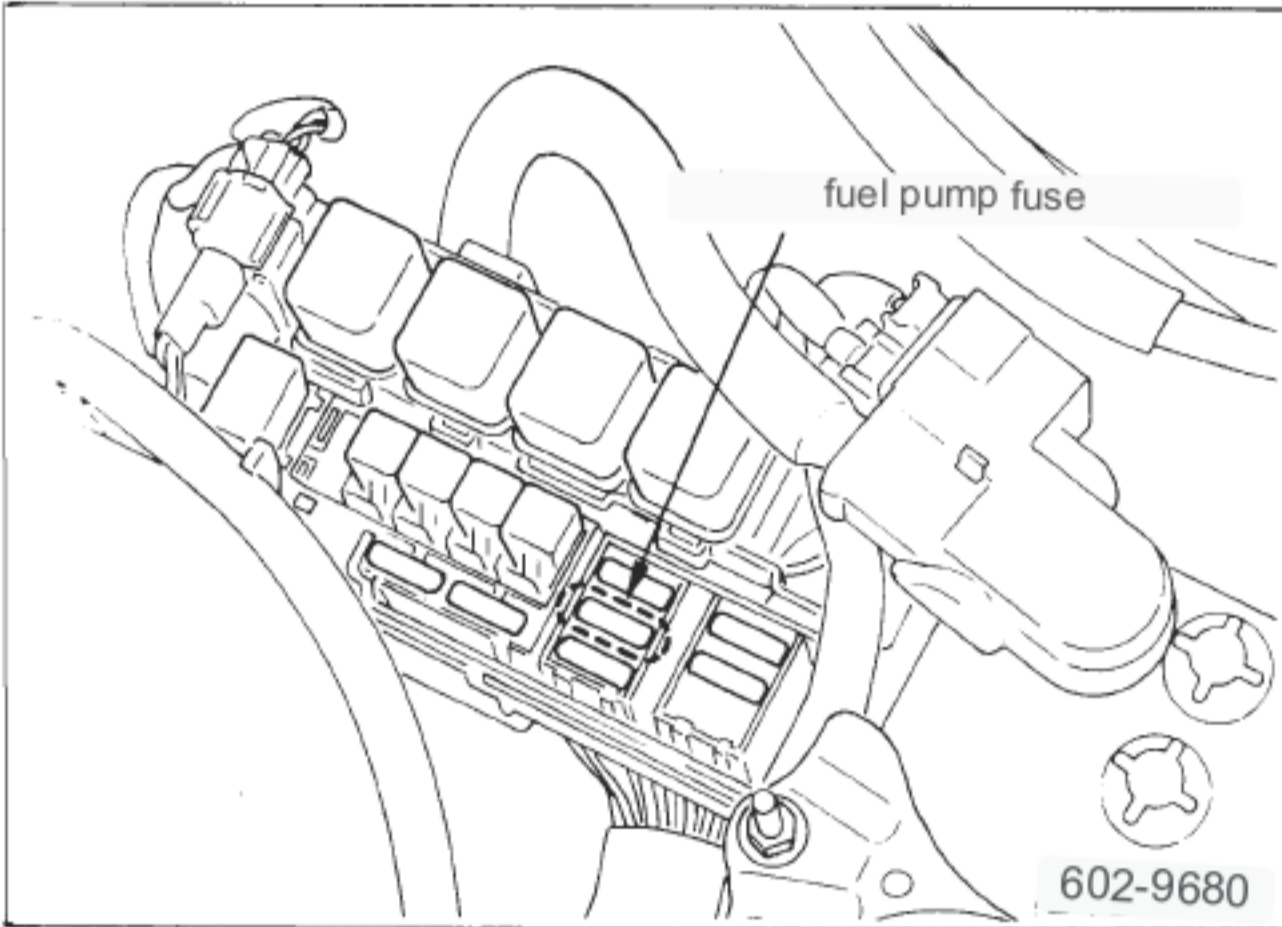
|When idling, press START
to stop the fuel pump |

Let

|After the engine stalls, click 2~3 times.
be ranked.

Start

B09-0140



[Point 1] Removal of fuel pressure



- Rotate the engine.
- Select "Release Fuel Pressure" in "Work Support".
- Touch the start button to remove the fuel pressure.



- After starting the engine, remove the fuel pump fuse. after engine stall
Crank 2-3 times and consume the fuel in the pipe.
- If the car has trouble
Crank 4 times and consume the fuel in the pipe.
starting, remove the fuel pump
fuse.

[Point 2] Accelerator wire adjustment

- With enough slack in the accelerator wire, pull the outer case in the direction of the accelerator pedal with the lock nut, and pull it 1.0 to 1.5 times from the position where the throttle drum starts to move (at this time, play is 0).
Replace the rotation lock nut and tighten.

Lock nut tightening torque (kg-m)	0.8~1.0
-----------------------------------	---------

[Point 3] Separation of engine main harness and

- ground wire · Alternator, starter motor and transmission
- Separate the harnesses at the connector behind the battery.

[Point 4] Air conditioner compressor

- Because the air conditioner compressor interferes, separate it from the piping.
- Remove the mounting bolts of the power steering pump and fix it with a string while connecting the pipes of each unit so as not to damage the vehicle body.

[Point 5] Detach the propeller shaft

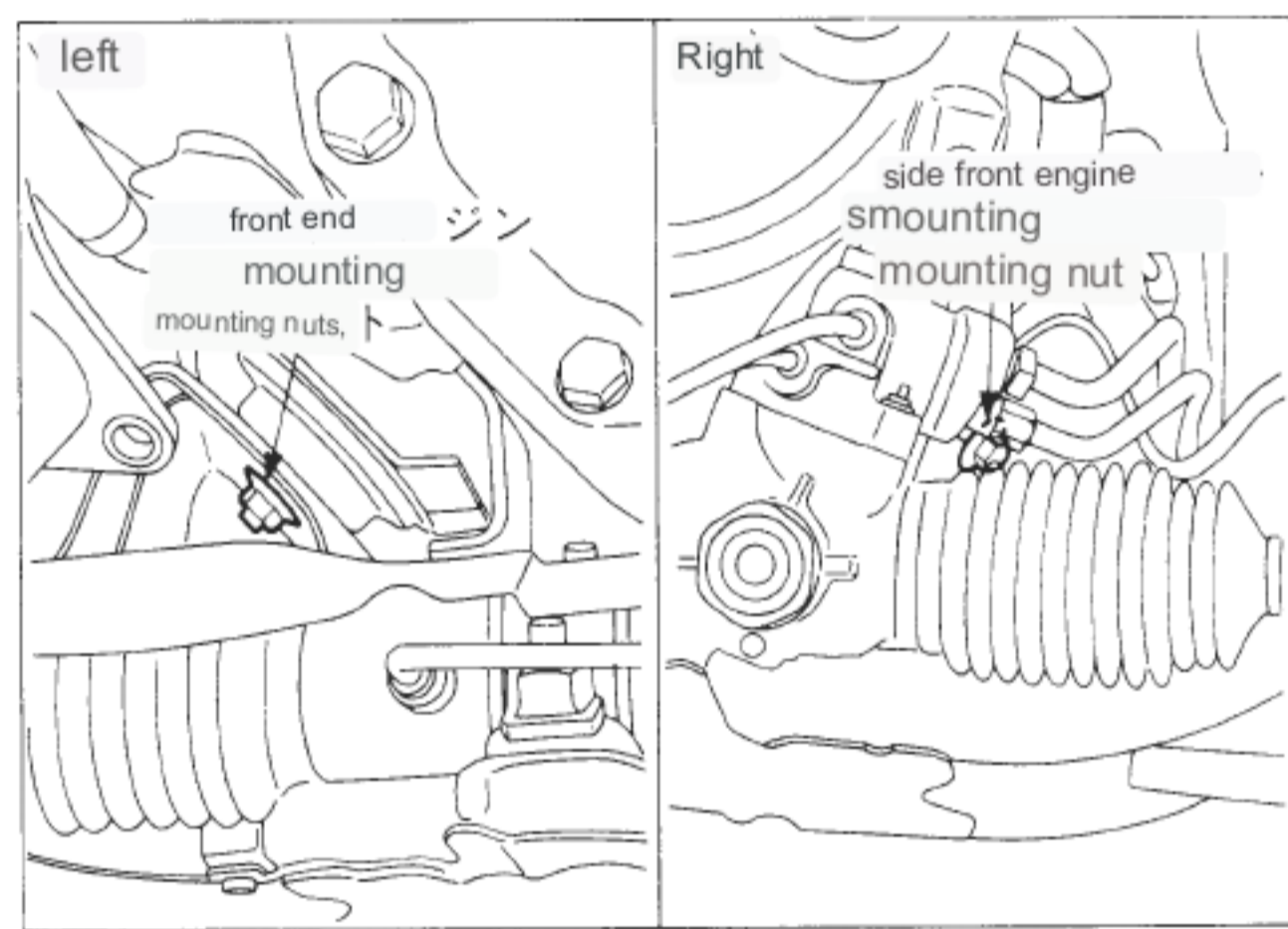
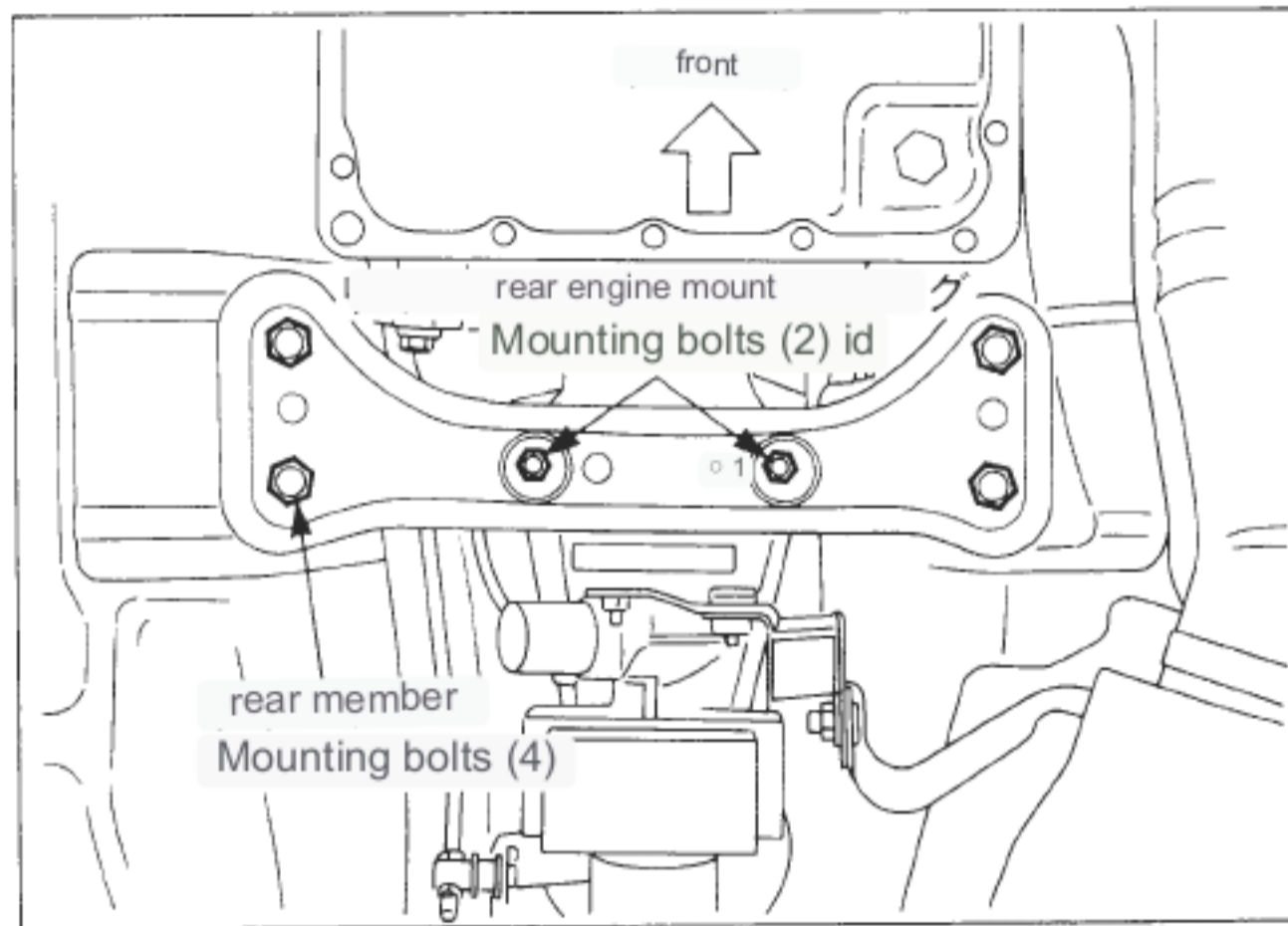
- After removing the propeller shaft, cap the rear seal of the transmission to prevent oil leakage.

- Before separating the propeller shaft and the final drive, Place matchmarks on the on-flanges.

Note: Install in the same place because the weight of the mounting bolt is balanced matter.

[Point 6] Detachment of rear engine mounting

- Support the transmission with a transmission jack, and remove the rear member mounting bolts and the rear engine mounting mounting bolts and nuts.



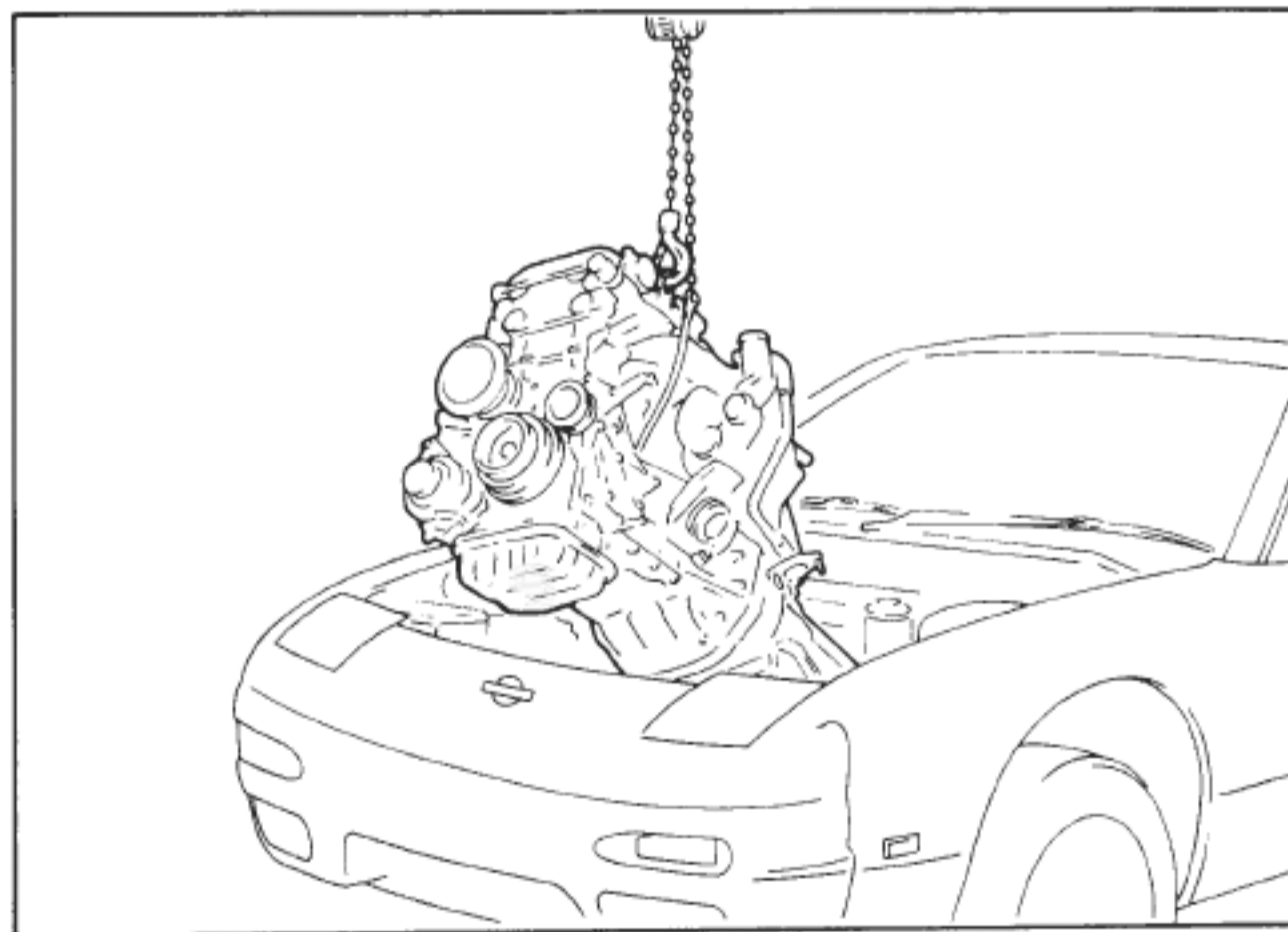
[Point 7] Removing and installing the front engine

- Check that the engine slinger is securely hooked to the mounting sling, and remove the front engine mounting mounting nut.

[Point] Removal and installation of engine assembly

- Operating the suspension chain and gradually changing the engine tilt

Be careful not to interfere with the side of your body when you put it on and take it off.



11. Engine body overhaul

In this section, the engine assembly (transmission removed) is completely disassembled from the vehicle, the functions of the parts that make up the main body are inspected, defective, damaged, worn and weakened parts are replaced, and necessary adjustments are made. , order the work to assemble to the normal state
 Write down the key points.

11-1 Precautions for overhaul

(1) When disassembled

- 1 Use the correct and well-matched tools as necessary, pay attention to safety and do not overdo the work.
- 2 Be careful not to impair the precision of mating surfaces and sliding surfaces.
- 3 The disassembled parts should be organized by marking them so that failure investigation and assembly can be performed reliably.
- 4 As a general rule, bolts and nuts should be loosened in a diagonal direction from the outside.

(2) When inspecting, correcting, or replacing

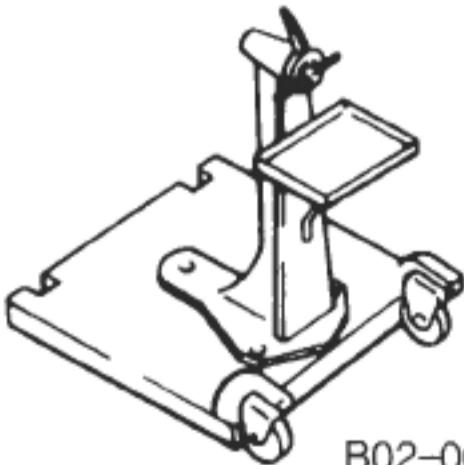
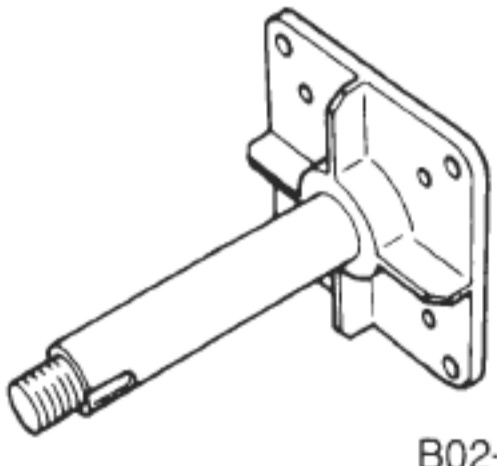
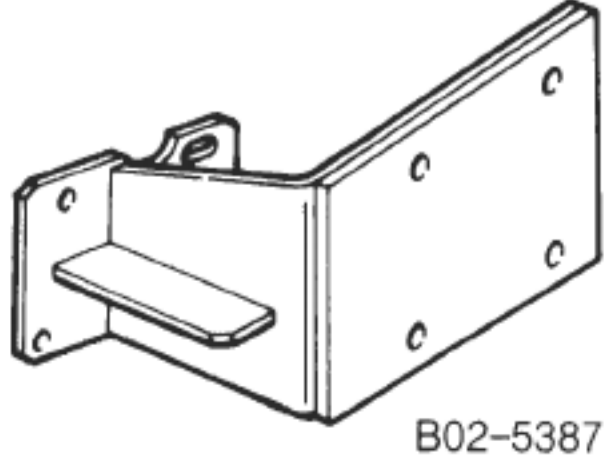
- 1 Correct or replace after thoroughly inspecting parts according to the inspection procedure. New parts should be inspected in the same way and replaced if necessary.

(3) When assembling

- 1 Always use a torque wrench to tighten bolts and nuts. 2 As a rule, bolts and nuts should be tightened diagonally outward from the center gradually in 2 to 3 steps, especially in order. Where the order is specified, follow the instructions.
 - 3 Gaskets, packings, oil seals, and O-rings should, in principle, be replaced with new ones.
 - 4 Thoroughly wash and clean each part and blow it with air. In particular, make sure that the oil passage and cooling water passage are not clogged.
 - 5 Be careful not to scratch the sliding surfaces and mating surfaces, thoroughly clean any dust or scraps of waste cloth, etc., and apply oil to the sliding surfaces.
- Apply a sufficient amount of lubricating oil and assemble.

11-2 Cylinder block assembly disassembly and assembly

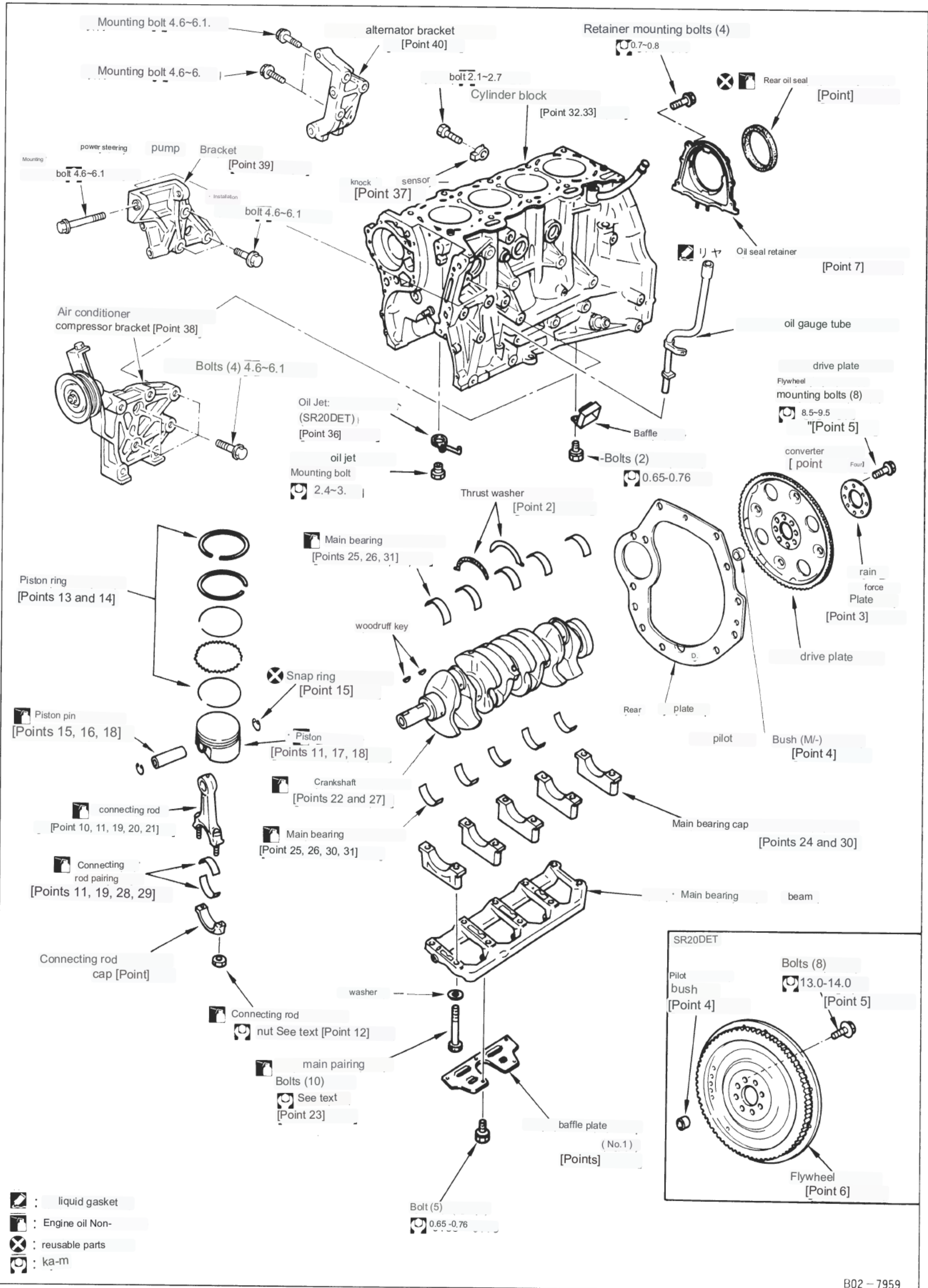
supplies

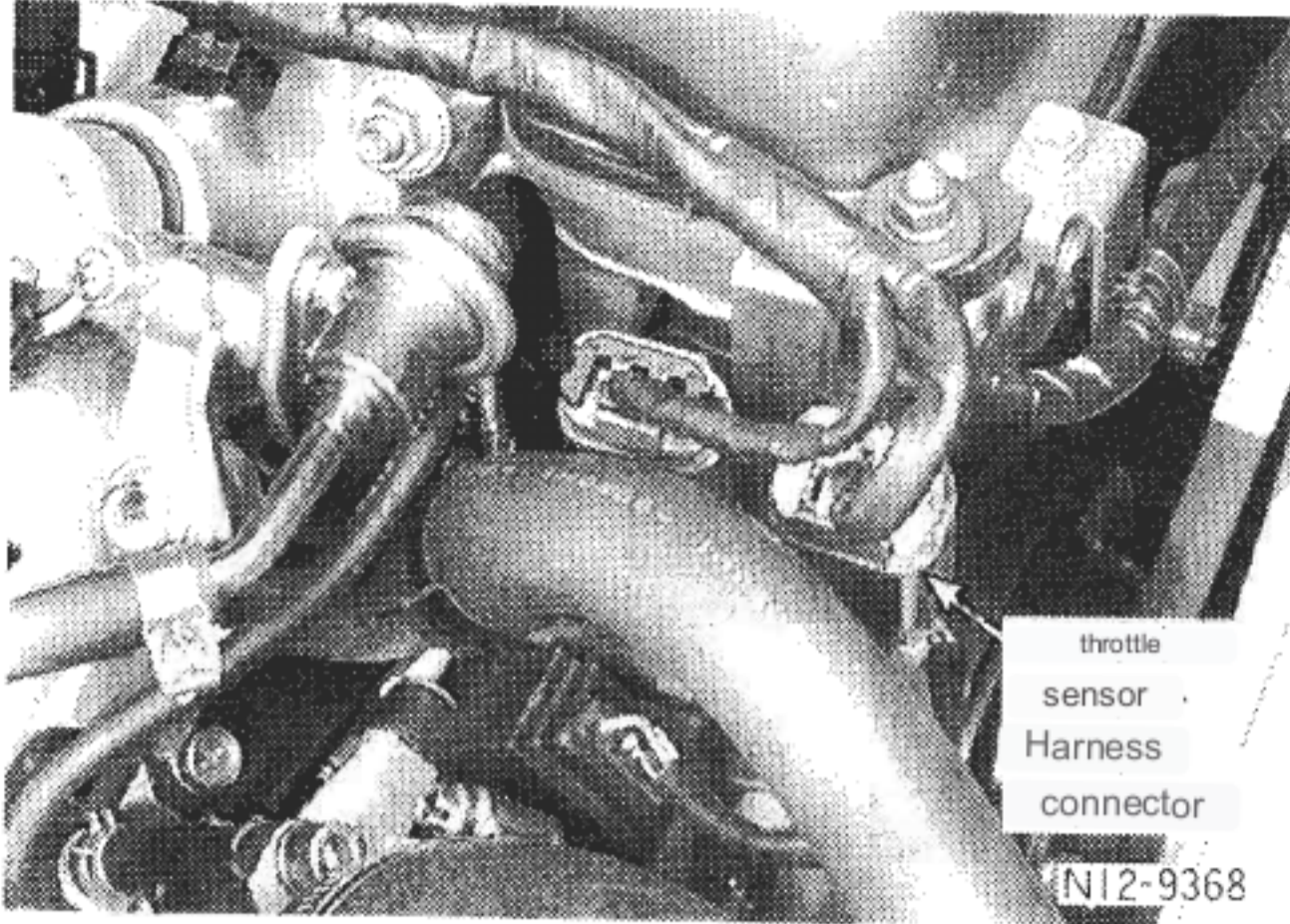
	name	for way	remarks
Special tool	Engine stand assembly ST0501 S000  B02-0037		
	engine attachment KV101 06500  B02-3216	Engine body for overhaul	Existing
	engine sub attachment KV101 15300  B02-5387		

	name	for 途	remarks
Special tool	crank pulley puller KV111 03000	For removing the crank pulley	Existing
	Rear oil shield lift ①KV401 00900 ②ST3002 2000	For driving oil seals	
	pilot bearing puller ST1661 0001	For removal of pilot bush	
	Stopper plate KV101 05610	For fixing flywheel and drive plate	
I tool	piston ring compressor	For mounting piston ASSY	
	piston ring expander -	For piston ring removal	
	tube presser WS3993	For liquid gasket application	
liquid gasket	ThreeBond 1207		
lock agent	ThreeBond 1386 ;	for baffle plate	
Total vessel	Micrometer	For inspection of pistons, etc.	
	V-block	For inspection of crankshaft, etc.	
	Dial gauge	For inspection of crankshaft, etc.	
	bore gauge	For inspection of cylinder bore, etc.	
	inside micrometer	For checking connecting rods, etc.	
	connecting rod aligner	For connecting rod inspection	
Service parts setting	engine slinger	For engine removal	

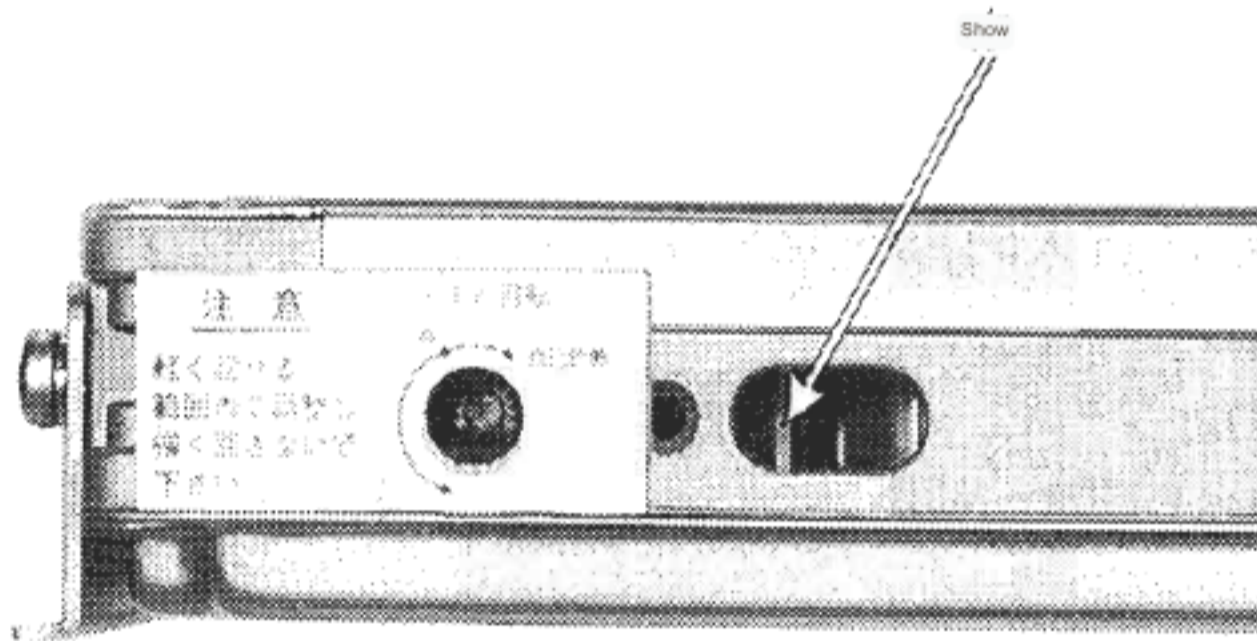
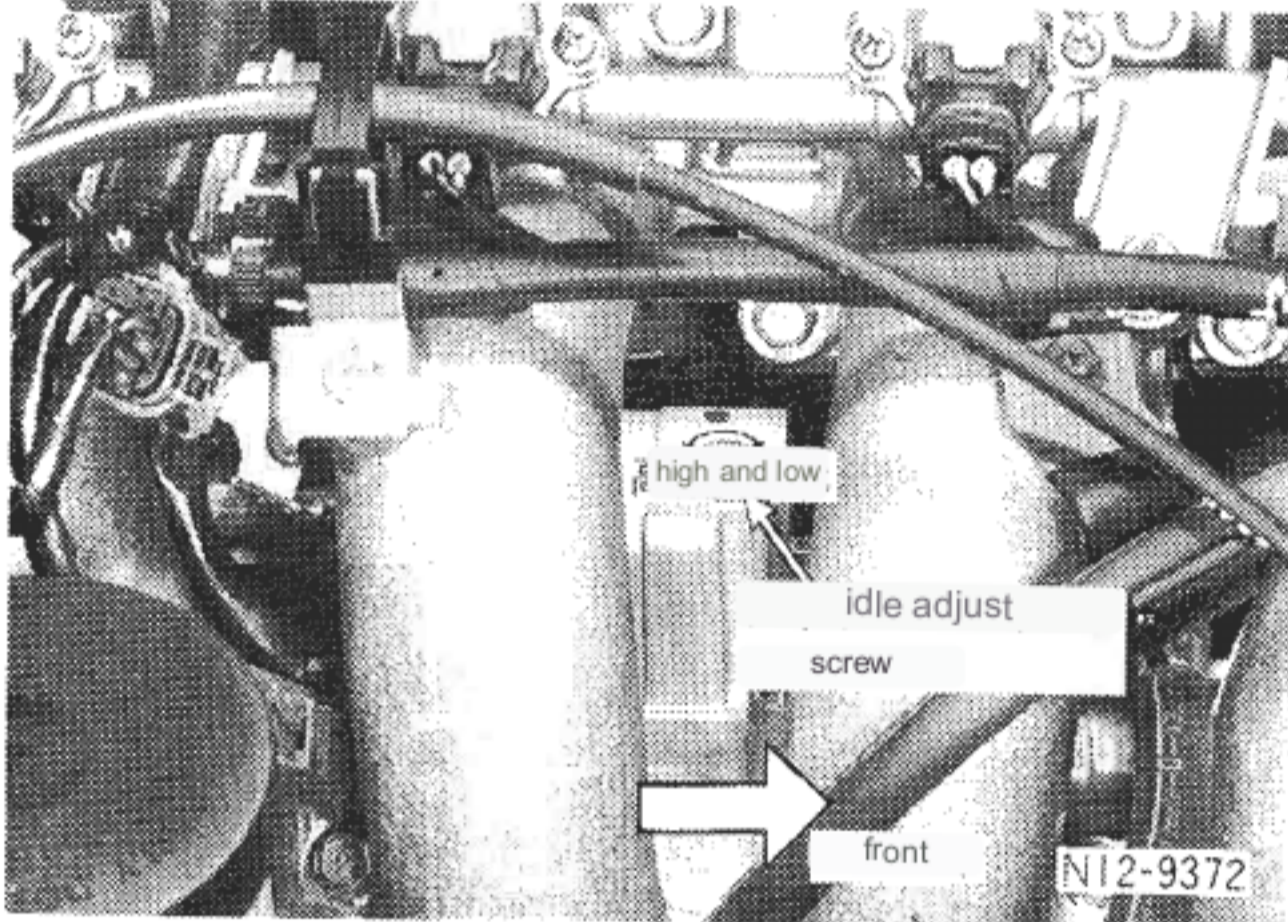
(Reference) Engine selection and assembly (at factory shipment and after service)

Grade display	Selection combination																																										
<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Grade display</p> <p style="text-align: center;">Cylinder Bore Grade (1,2,3) (for each cylinder)</p> </div>	<p>① Piston selection</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:40%;">cylinder bore grade</td> <td style="width:10%;">(engraved)</td> <td style="width:10%;">1</td> <td style="width:10%;">2</td> <td style="width:10%;">3</td> </tr> <tr> <td>piston grade</td> <td>(engraved)</td> <td>1</td> <td>2</td> <td>3</td> </tr> </table> <p>Service setting parts</p> <p>piston</p> <p>STD 1, STD 2, STD 3, 0.20S</p>	cylinder bore grade	(engraved)	1	2	3	piston grade	(engraved)	1	2	3																																
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piston grade	(engraved)	1	2	3																																							
<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">main bearing</p> <p style="text-align: center;">Grade No. (0~3) No.1~No.5 from the left</p> <p style="text-align: right;">B02-5436</p> </div>	<p>(2) Main bearing selection</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Cylinder block pairing housing inner diameter</th> <th>58.950</th> <th>58.956</th> <th>58.962</th> <th>58.968</th> </tr> <tr> <td colspan="2"></td> <td>58.944</td> <td>58.950</td> <td>58.956</td> <td>58.962</td> </tr> <tr> <th>crank journal diameter</th> <th>Grade No. (engraved)</th> <th>0</th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>54.980 54.974</td> <td>0</td> <td> Bearing grade No. STD 0 • Bearing thickness 1.977~1.980 • oil clearance 0.004~0.022 • color Same Color brown green yellow </td> <td> STD 1 1.980~1.983 0.004~0.022 </td> <td> STD 2 1.983~1.986 0.004~0.022 </td> <td> STD 3 1.986~1.989 0.004~0.022 </td> </tr> <tr> <td>54.974 54.968</td> <td>1</td> <td> • Bearing grade No. STD 1 • Bearing thickness 1.980~1.983 • Oil clearance 0.004~0.022 • identification color tea five </td> <td> STD 2 1.983~1.986 0.004~0.022 緑 </td> <td> STD 3 1.986~1.989 0.004~0.022 color yellow </td> <td> STD 4 1.989~1.992 0.004~0.022 blue </td> </tr> <tr> <td>54.968 54.962</td> <td>2</td> <td> • Bearing grade No. Bearing thickness Oil clearance Identification color STD 2 1.983~1.986 0.004~0.022 Green </td> <td> STD 3 1.986~1.989 0.004~0.022 黄 </td> <td> STD 4 1.989~1.992 0.004~0.022 Color Blue </td> <td> STD 5 1.992~1.995 0.004~0.022 Pink </td> </tr> <tr> <td>54.962 51.95€</td> <td>3</td> <td> • Bearing grade No. • Bearing thickness Oil clearance Identification color STD 3 1.986~1.989 0.004~0.022 0.004~0.022 0.004~0.022 0.004~0.022 Blue Pink Colorless </td> <td> STD 4 1.989~1.992 0.004~0.022 0.004~0.022 0.004~0.022 </td> <td> STD 5 1.992~1.995 0.004~0.022 0.004~0.022 0.004~0.022 </td> <td> STD 6 1.995~1.998 0.004~0.022 0.004~0.022 0.004~0.022 Yellow </td> </tr> </tbody> </table> <p>Service setting parts</p> <p>STD 0 ~ 6、US 0.25</p>	Cylinder block pairing housing inner diameter		58.950	58.956	58.962	58.968			58.944	58.950	58.956	58.962	crank journal diameter	Grade No. (engraved)	0	1	2	3	54.980 54.974	0	Bearing grade No. STD 0 • Bearing thickness 1.977~1.980 • oil clearance 0.004~0.022 • color Same Color brown green yellow	STD 1 1.980~1.983 0.004~0.022	STD 2 1.983~1.986 0.004~0.022	STD 3 1.986~1.989 0.004~0.022	54.974 54.968	1	• Bearing grade No. STD 1 • Bearing thickness 1.980~1.983 • Oil clearance 0.004~0.022 • identification color tea five	STD 2 1.983~1.986 0.004~0.022 緑	STD 3 1.986~1.989 0.004~0.022 color yellow	STD 4 1.989~1.992 0.004~0.022 blue	54.968 54.962	2	• Bearing grade No. Bearing thickness Oil clearance Identification color STD 2 1.983~1.986 0.004~0.022 Green	STD 3 1.986~1.989 0.004~0.022 黄	STD 4 1.989~1.992 0.004~0.022 Color Blue	STD 5 1.992~1.995 0.004~0.022 Pink	54.962 51.95€	3	• Bearing grade No. • Bearing thickness Oil clearance Identification color STD 3 1.986~1.989 0.004~0.022 0.004~0.022 0.004~0.022 0.004~0.022 Blue Pink Colorless	STD 4 1.989~1.992 0.004~0.022 0.004~0.022 0.004~0.022	STD 5 1.992~1.995 0.004~0.022 0.004~0.022 0.004~0.022	STD 6 1.995~1.998 0.004~0.022 0.004~0.022 0.004~0.022 Yellow
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<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">journal grade</p> <p style="text-align: center;">(There are two display methods)</p> <p style="text-align: center;">No.1 counter Unit (No.1 Counter Weight)</p> <p style="text-align: center;">Journal part Grade No. (D-3) No.1~No.5 from the left</p> <p style="text-align: right;">B02-6954</p> </div>	<p>③ Piston pin selection</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:40%;">piston pin grade</td> <td style="width:10%;">(engraved)</td> <td style="width:10%;">0</td> <td style="width:10%;">1</td> </tr> <tr> <td>Connecting rod small end diameter grade</td> <td>(engraved)</td> <td>0</td> <td>1</td> </tr> </table>	piston pin grade	(engraved)	0	1	Connecting rod small end diameter grade	(engraved)	0	1																																		
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<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Piston identification symbol</p> <p style="text-align: right;">B02-6157</p> </div>	<p>4) Connecting rod bearing selection</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Connecting rod big end inner diameter</th> <th>51.013</th> <th>51.000</th> </tr> <tr> <th colspan="2">Crank grade pin outer diameter No. (engraved)</th> <th colspan="2">0 (no engraving)</th> </tr> </thead> <tbody> <tr> <td>47.974 47.968</td> <td>0</td> <td> • Bearing grade No. STD 0 • Pairing thickness 1.500~1.503 • Oil clearance 0.020~0.045 • identification color colorless </td> <td> STD 0 1.495~1.498 0.030~0.055 colorless </td> </tr> <tr> <td>47.963 47.962</td> <td>1</td> <td> STD 1 1.503~1.506 0.020~0.045 Black </td> <td> STD 1 1.408~1.501 0.030~0.055 Black </td> </tr> <tr> <td>47.962 47.955</td> <td>2</td> <td> STD 2 1.596~1.509 0.020~0.045 brown </td> <td> STD 2 1.501~1.504 0.030~0.055 Brown </td> </tr> </tbody> </table> <p>Service setting parts</p> <p>US 0.08, US 0.12, US 0.25</p>	Connecting rod big end inner diameter		51.013	51.000	Crank grade pin outer diameter No. (engraved)		0 (no engraving)		47.974 47.968	0	• Bearing grade No. STD 0 • Pairing thickness 1.500~1.503 • Oil clearance 0.020~0.045 • identification color colorless	STD 0 1.495~1.498 0.030~0.055 colorless	47.963 47.962	1	STD 1 1.503~1.506 0.020~0.045 Black	STD 1 1.408~1.501 0.030~0.055 Black	47.962 47.955	2	STD 2 1.596~1.509 0.020~0.045 brown	STD 2 1.501~1.504 0.030~0.055 Brown																						
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<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Pin Grade (There are two ways to display)</p> <p style="text-align: center;">(No.1 counter weight) (No.8 counter weight)</p> <p style="text-align: center;">Pin part Grade No. No.1~No.4 from the left</p> <p style="text-align: right;">B02-6955</p> </div>																																											



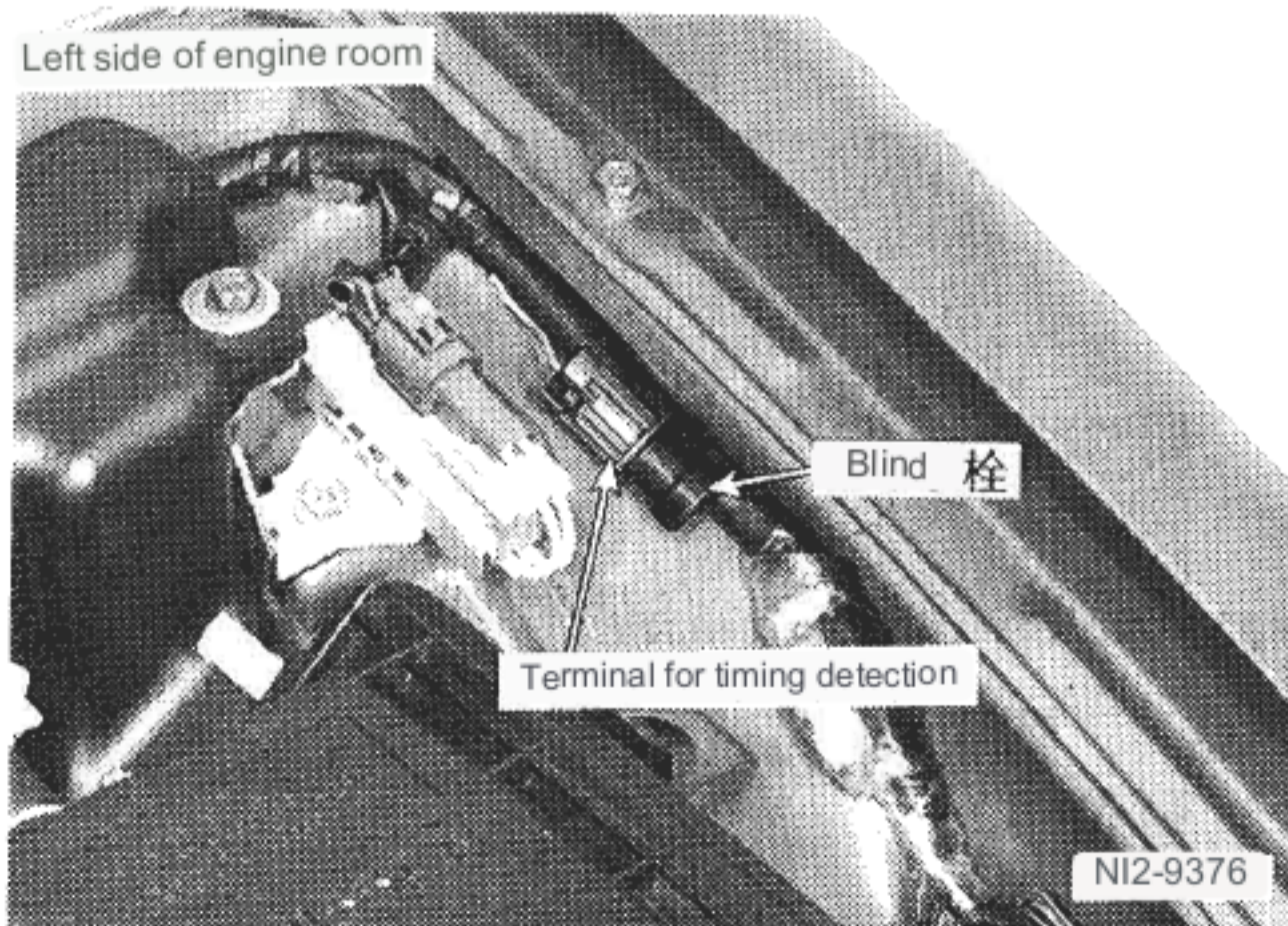


(A/T car)



NI2-9357

1-2 Inspection and adjustment of ignition timing



(3) Turn the AAC valve idle adjustment screw with a screwdriver.

At the same time, adjust the carot rotation speed to 750 rpm.

(4) Connect the throttle sensor harness connector and check that the idle speed is maintained at the specified value. The engine speed increases when turned to the left (counterclockwise) and decreases when turned to the right (clockwise).

⑤ If you want to increase the idling speed for some reason, turn the adjustment volume of the ECCS control unit to adjust it.

Turning the adjustment volume to the right increases the engine speed, and the maximum adjustment allowance is about 150 rpm.

Note: However, if you turn it all the way to the right (self-diagnostic position), the rotation will decrease (low position +25 rpm).

timing light installation

(1) When using a super tuner

•Connect a super tuner to the terminal for timing detection.

Note: Be sure to plug the timing detection terminal (check connector) after work.

Engine installation and removal [Point 1]

Intake manifold assembly

Exhaust manifold assembly

crank angle sensor

rocker cover

camshaft

with timing chain

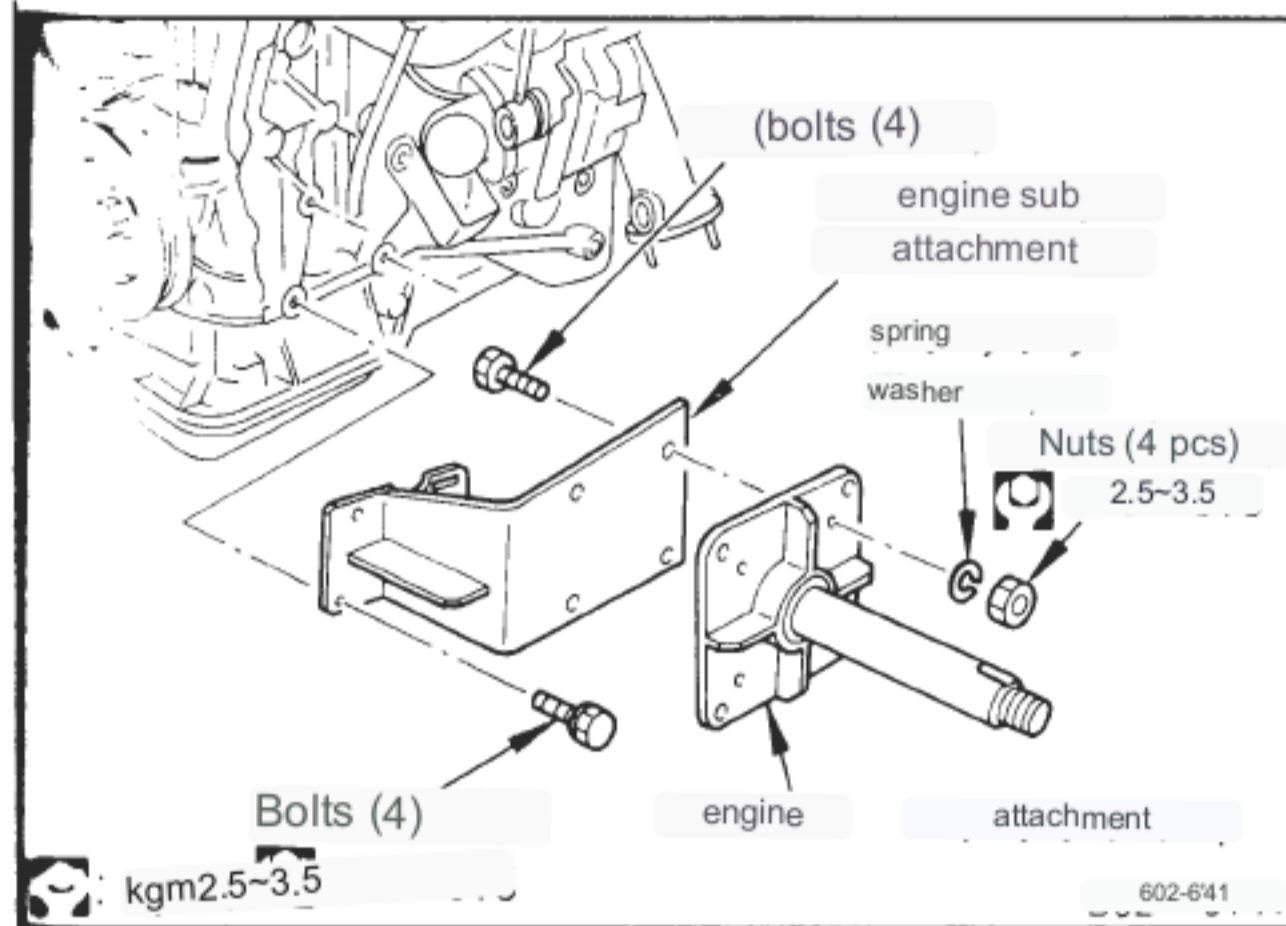
cylinder head

water pump

With thermostat and water piping

with oil filter, bracket

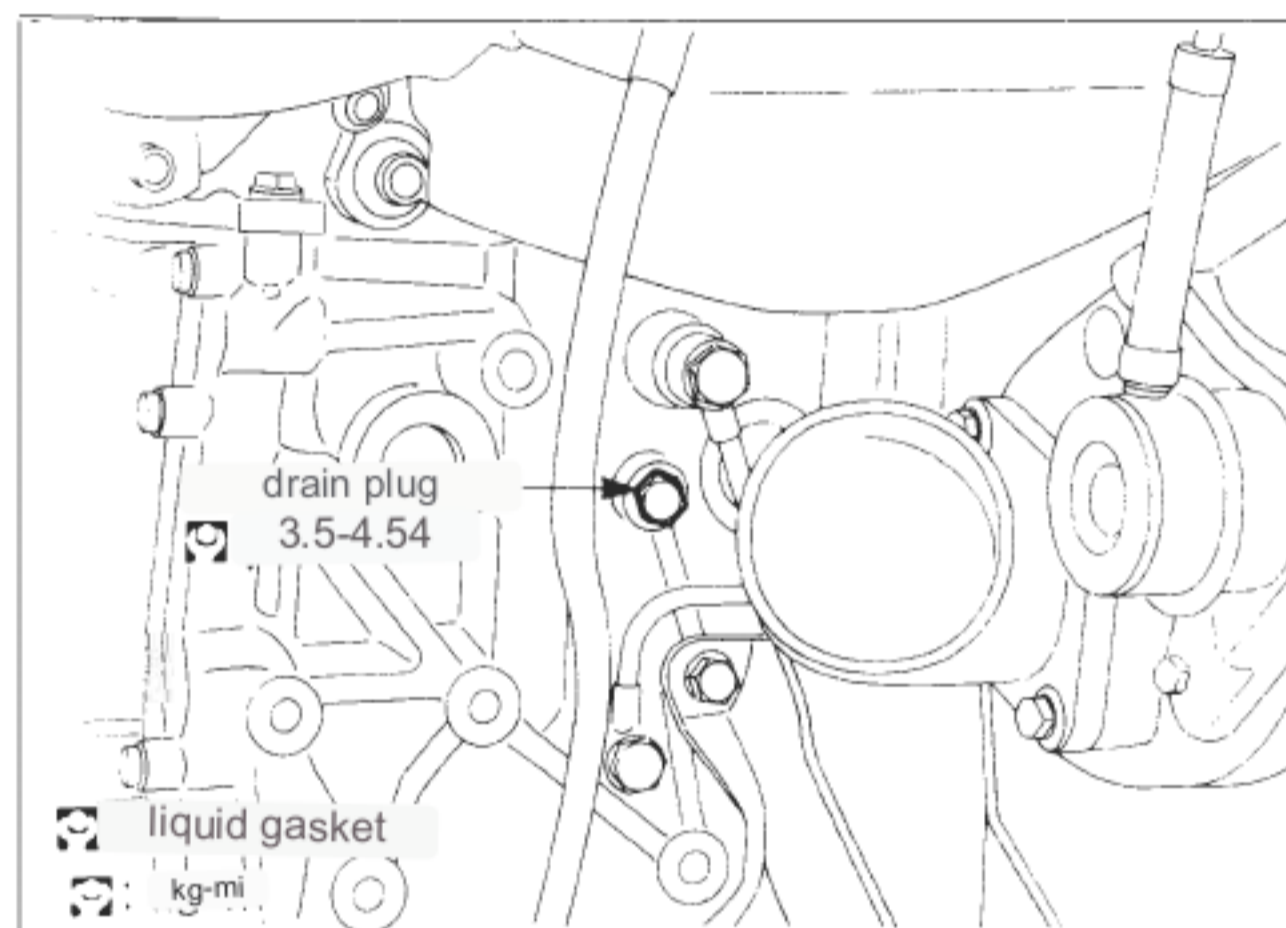
Oil Pan/Oil Strainer



[Point 1] Installing and removing the engine stand

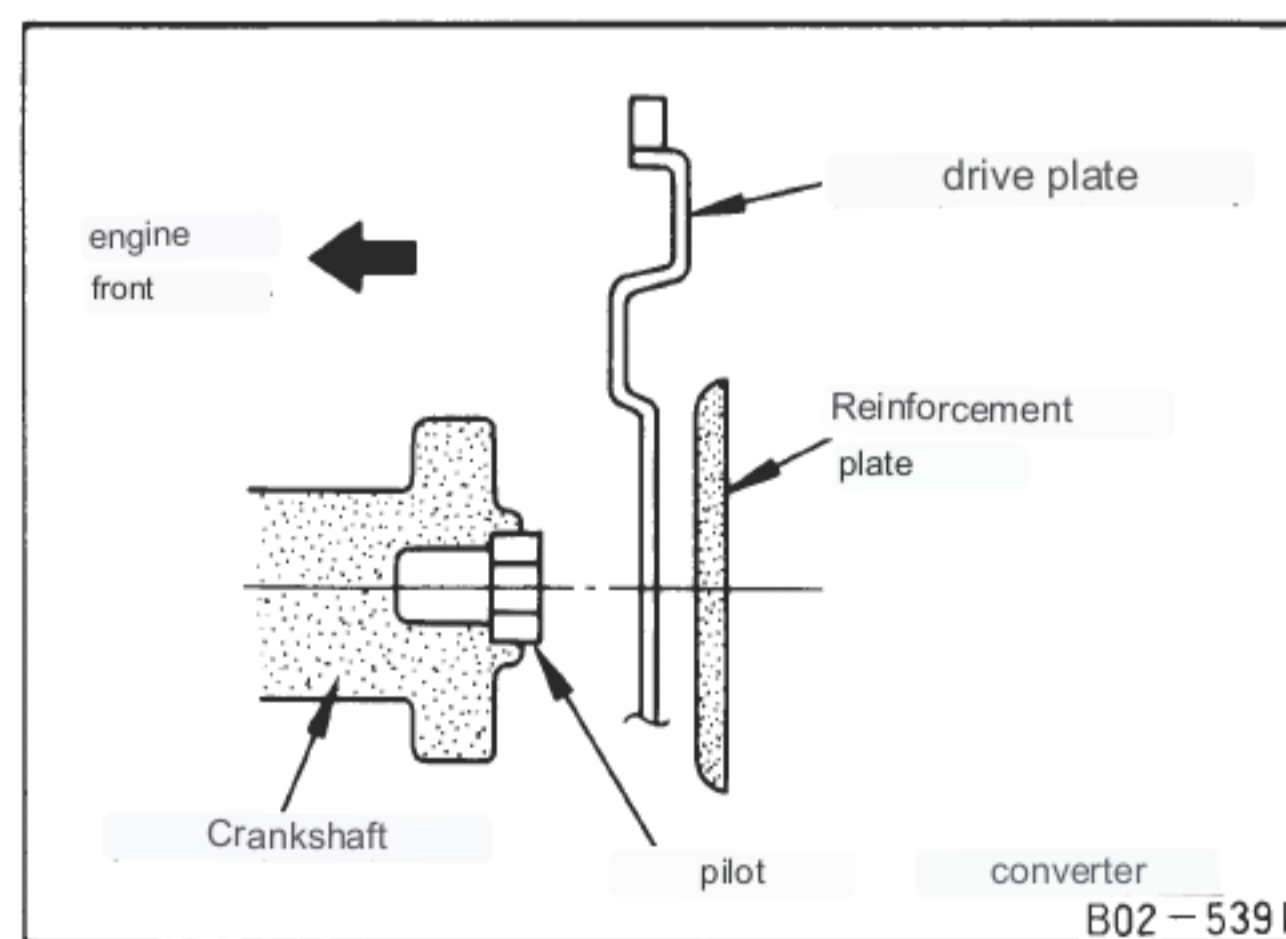
engine stand installation

- Remove the engine mount bracket.
 - Using the bolt holes for the air conditioner compressor mounting bracket Install the engine sub attachment (special tool). Use a spacer with a thickness of about 5 mm to prevent interference.
 - Install the engine attachment (special tool).
- Hang the engine ASSY and attach it to the engine stand.



[Point 2] Cooling water drain

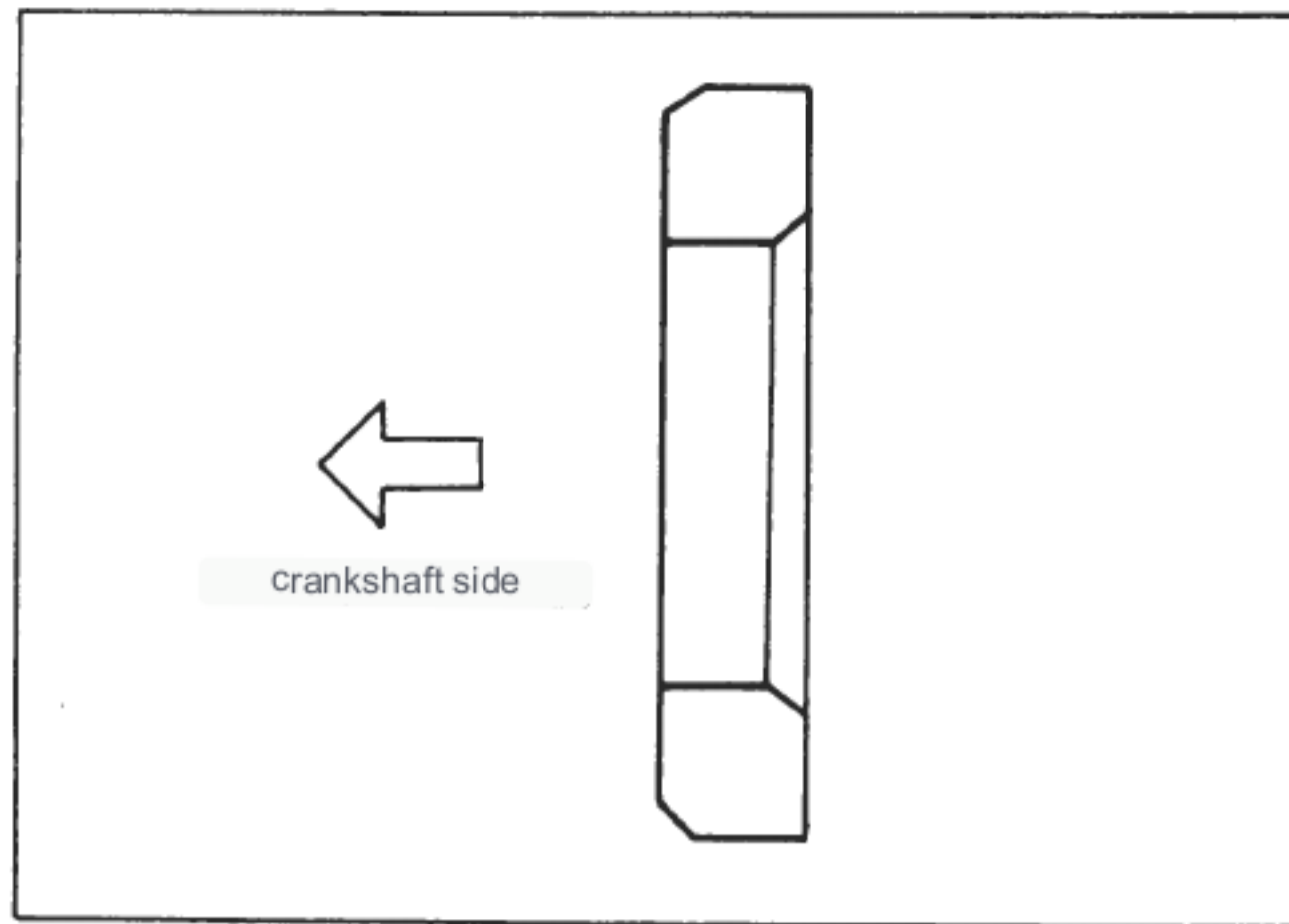
- Drain the cooling water completely from the drain plug.
- When installing the drain plug, use a sealant (equivalent to ThreeBond 1386B) to apply.



[Point 3] Reinforcement plate installation

(A/T car) Reinforcement plate for A/T car

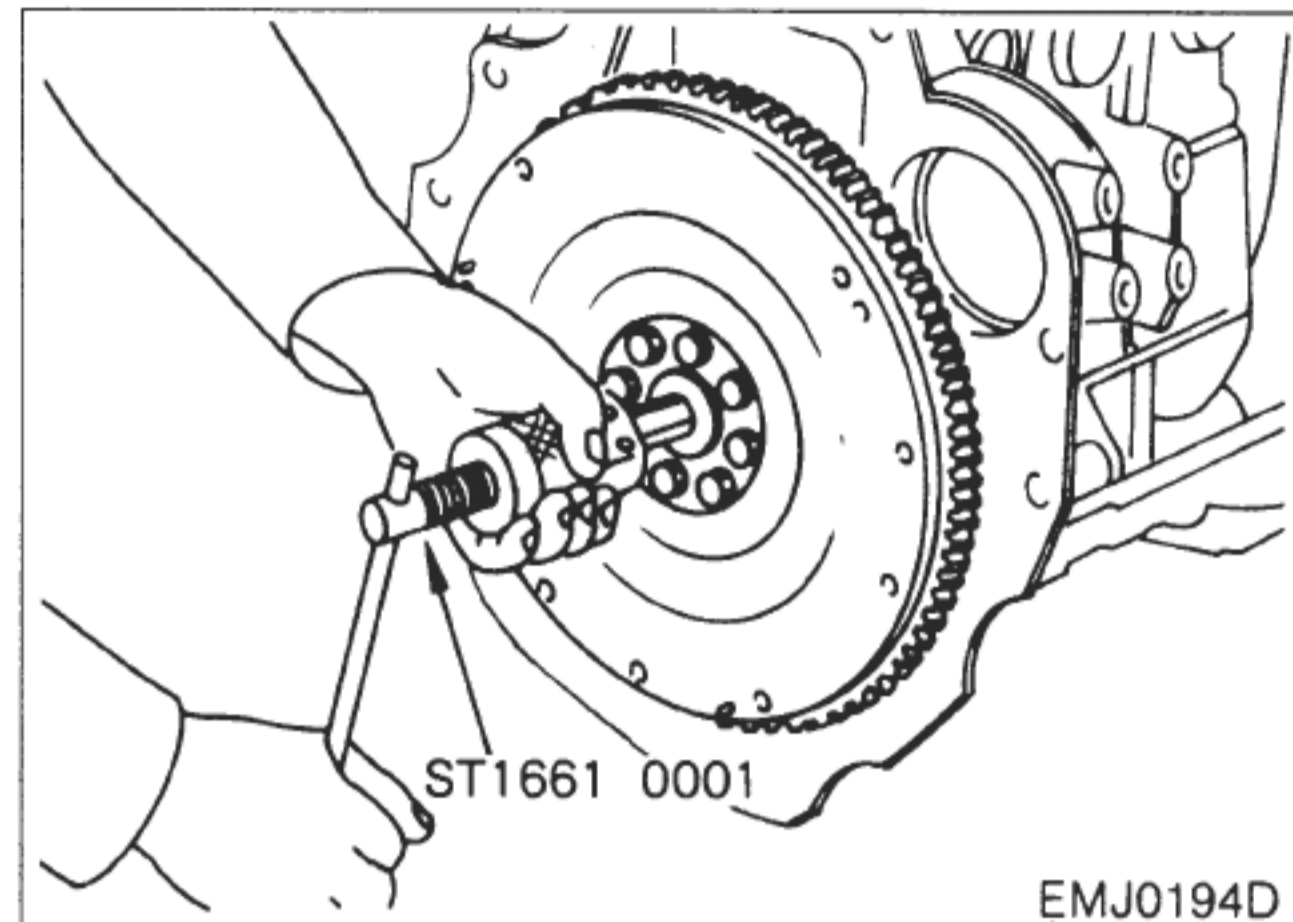
Install facing the rate side.



[Point 4] Remove and install pilot converter

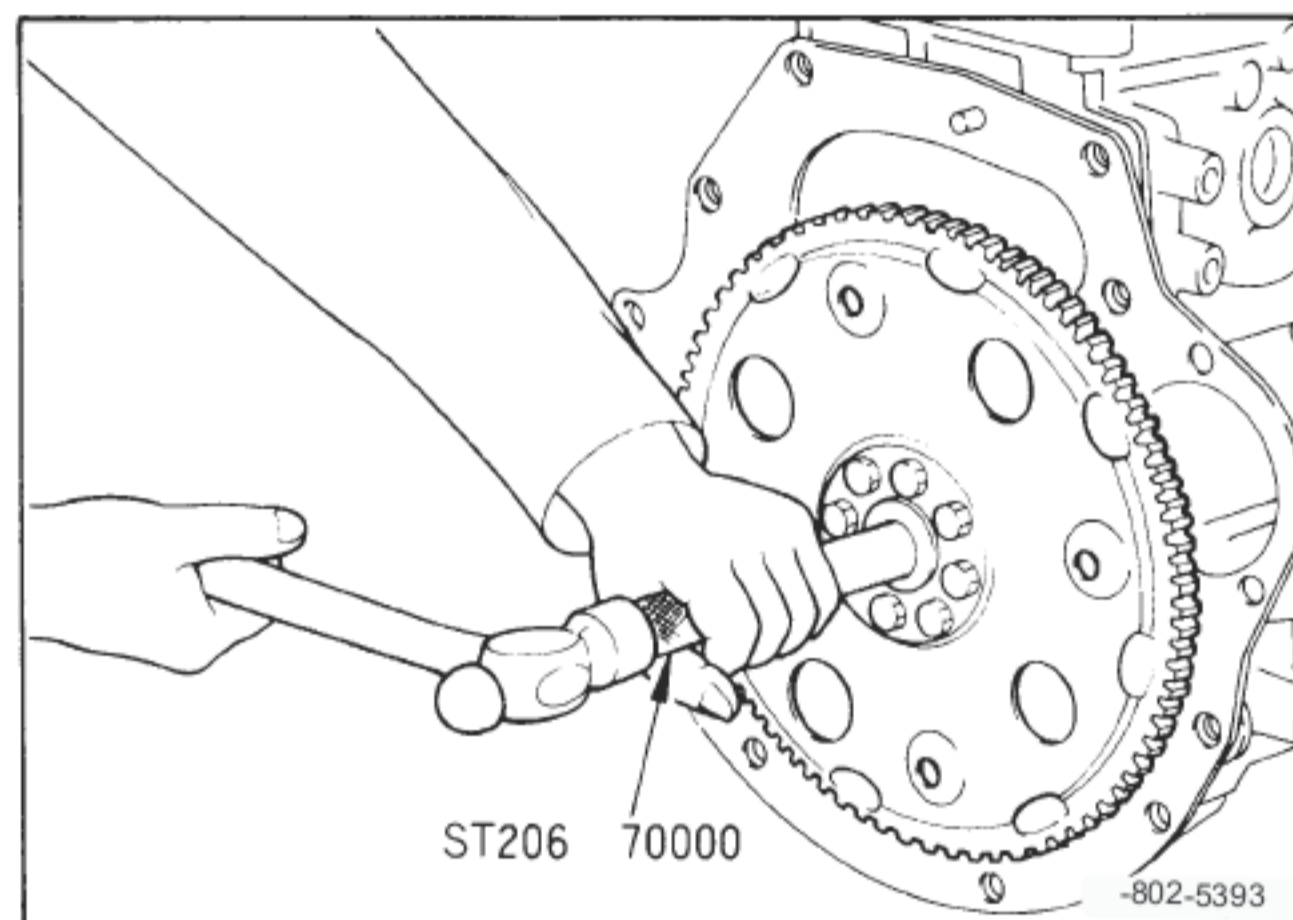
(A/T car) and bush (M/T car)

- Please note that the pilot converter has an installation direction.
- For installation, use a box wrench socket, etc., and drive it to the end.
- Use a pilot bearing puller to remove the pilot Remove with bush.



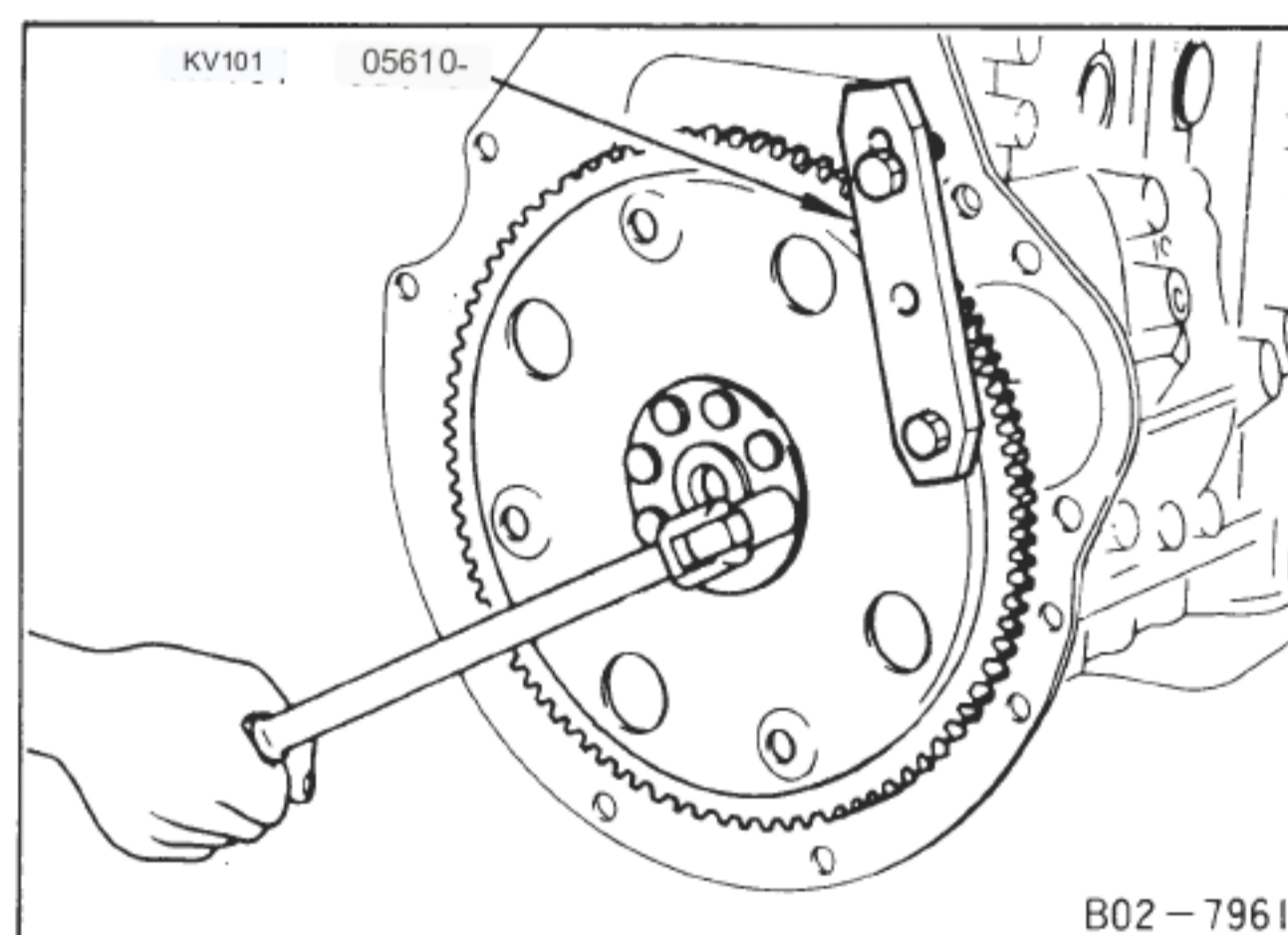
Remove pilot bush

- Using a pilot bearing puller (special tool) to remove.



Install pilot bush

- Use the appropriate drift (20) to set the pilot bearing as shown in the left figure. type in.



[Point 5] Remove and install flywheel and drive plate

bolts

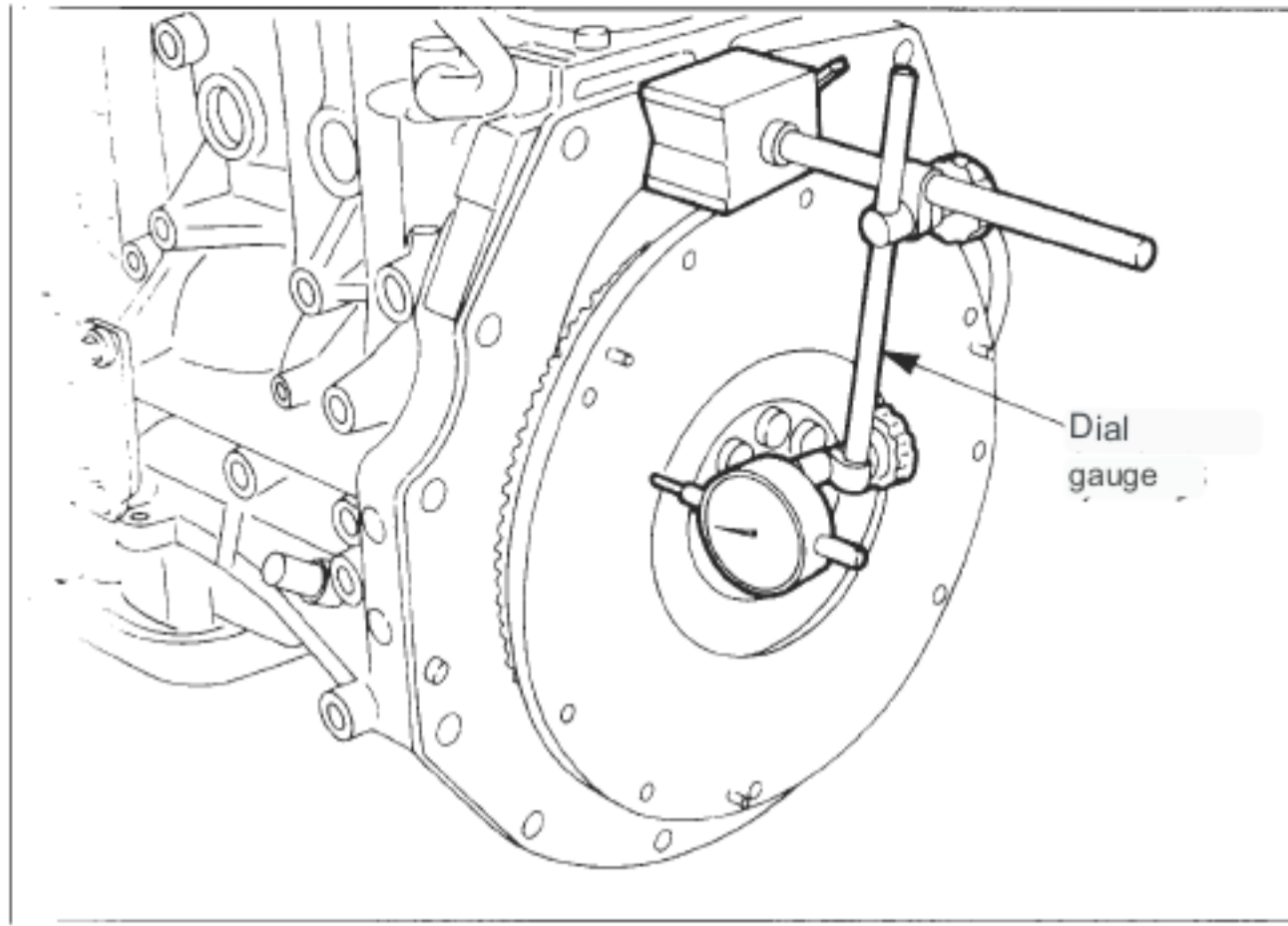
removal

- Fix the flywheel and drive plate with a stopper plate (special tool) to prevent the crankshaft from turning, and remove the bolts.

attachment

- When installing the bolt, apply engine oil to the screw part and flange part of the bolt. apply oil.
- Tighten bolts diagonally.

Flywheel and drive plate bolt tightening torque	(kg-m)	8.59.5
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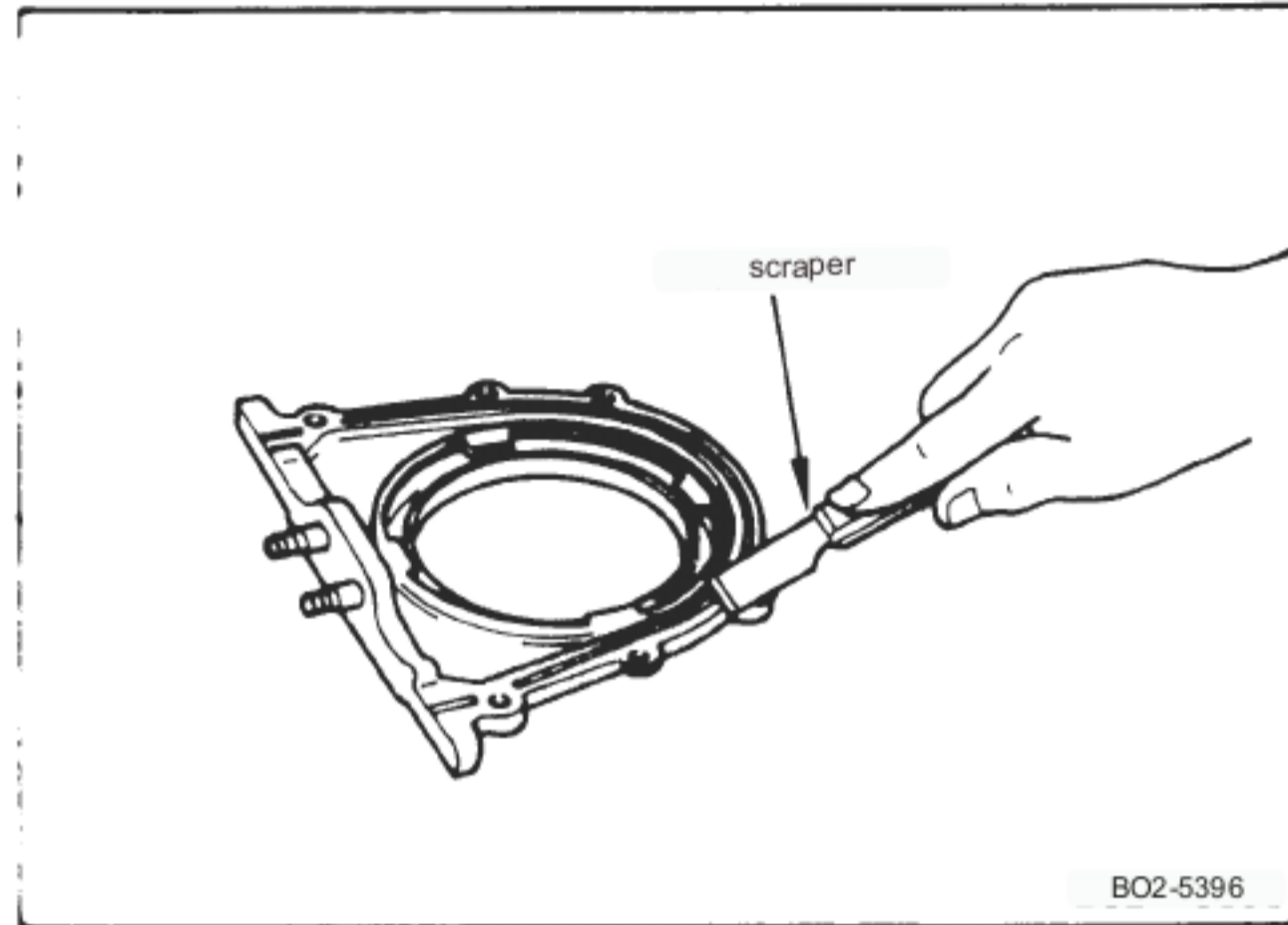


[Point 6] Flywheel run-out check

- Measure the deflection of the flywheel contact surface with a dial gauge.

set.

Deflection limit (mm)	0.15
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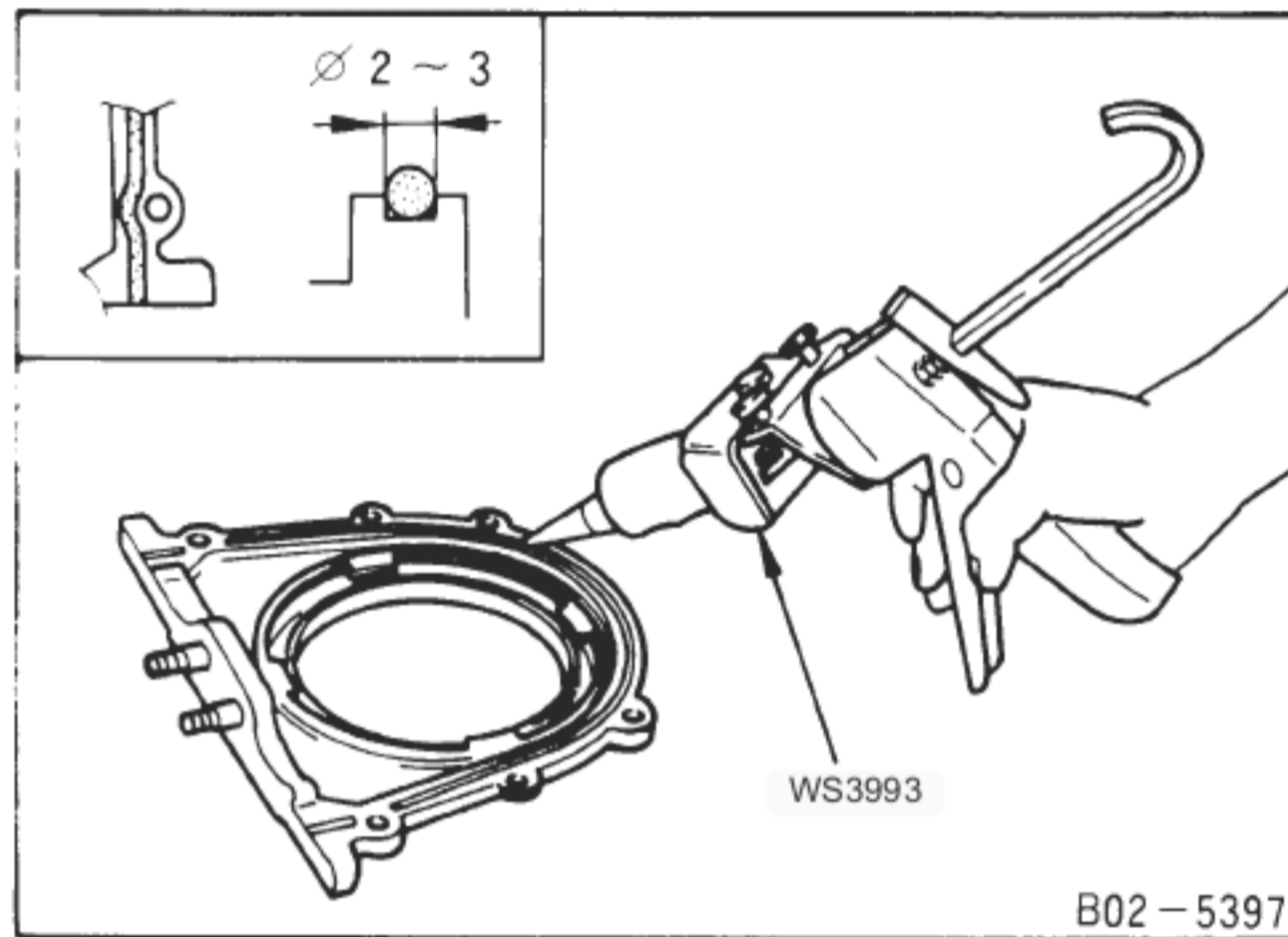
[Point 7] Remove and install rear oil seal retainer

remove and clean

- Remove the liquid gasket using a scraper.

Note: Also remove the liquid gasket in the groove.

- Wipe the mounting surface with white gasoline.



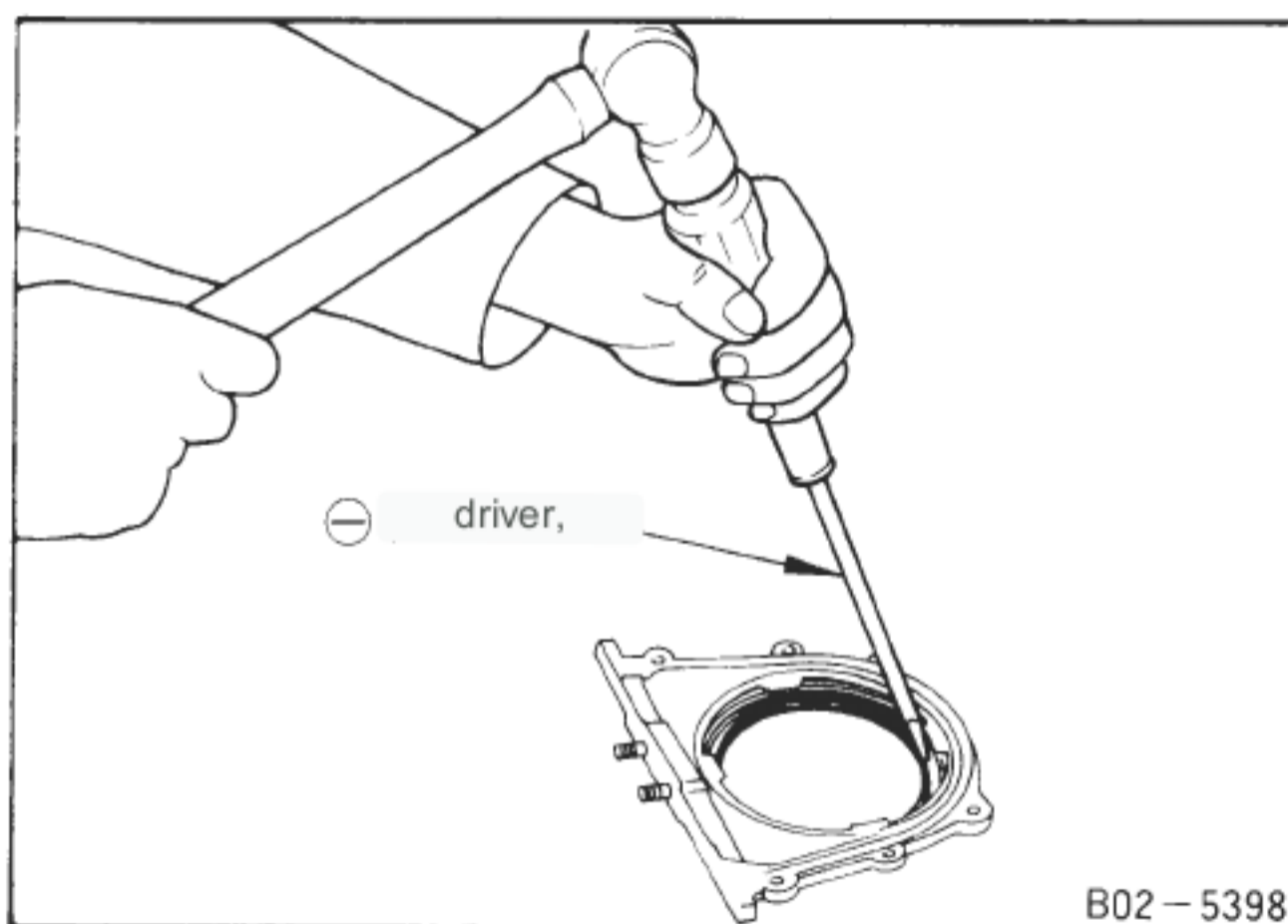
attachment

- Using a tube presser, apply a liquid gasket (equivalent to ThreeBond 1207C) to the rear oil seal retainer with a thickness of 2-3mm without a break as shown in the left figure.

- After applying liquid gasket, install within 5 minutes after application.

- After installation, leave it for 30 minutes or more before operating.

Rear oil seal retainer mounting bolt tightening torque (kg-m)	0.7-0.8
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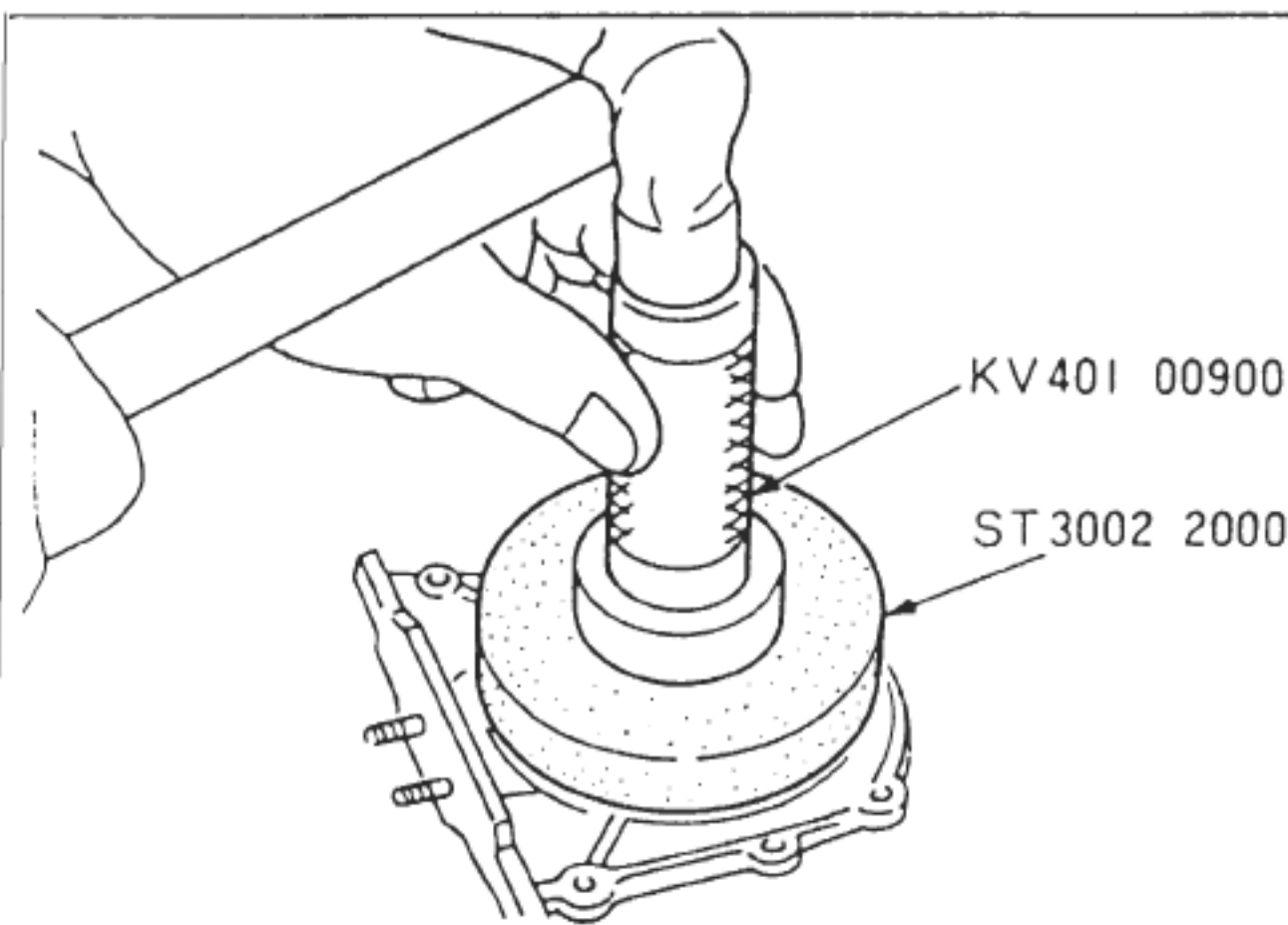


[Point 8] Remove and install rear oil seal

Removal

- Punch out with a screwdriver, etc., and remove.

Caution: Do not damage the rear oil seal retainer.



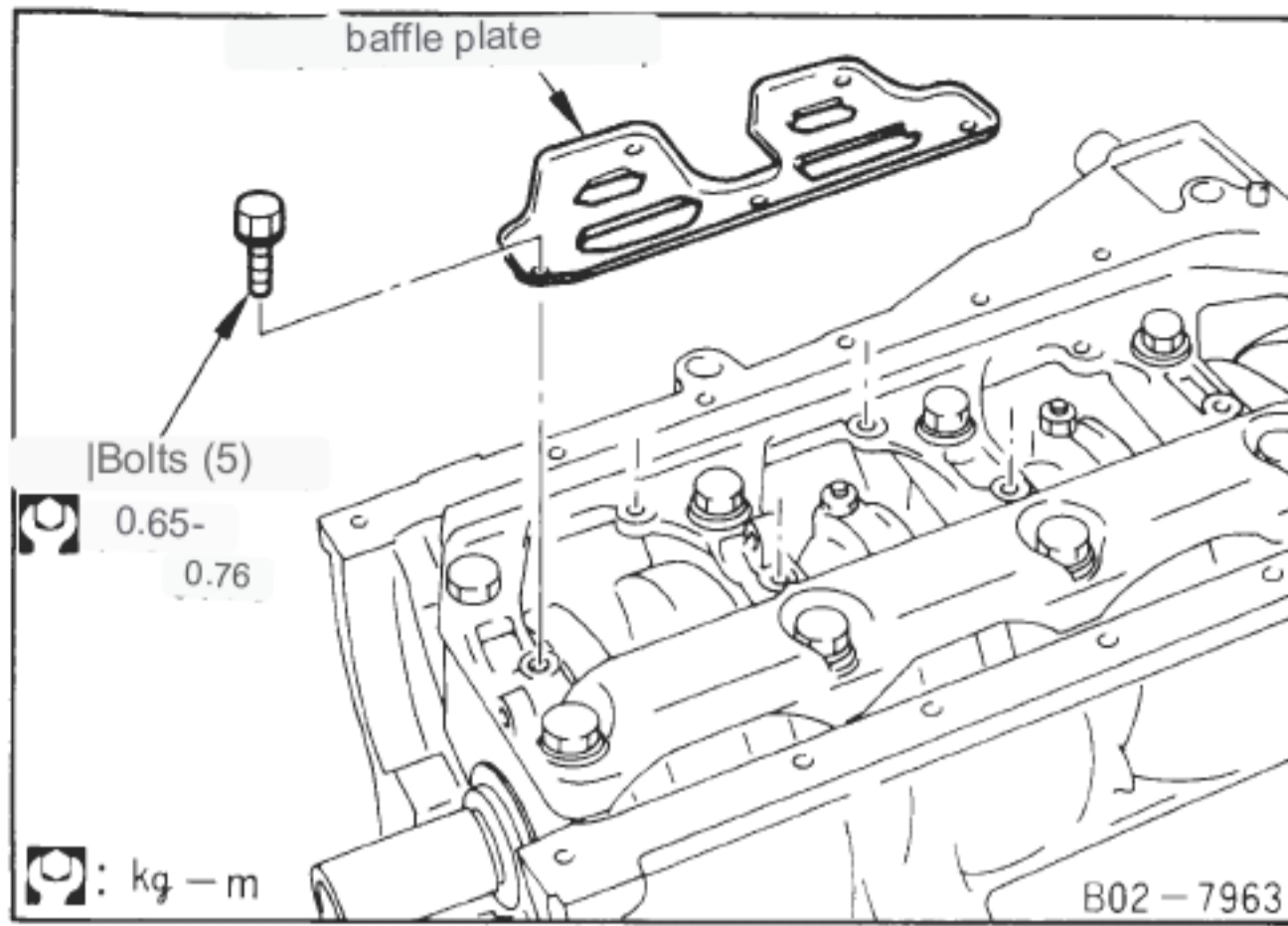
attachment

- Install the rear oil seal in two steps.

(1) Stack two oil shield lifts (special tool) and hammer them in with a hammer. (To prevent scratches, burrs, etc. on the oil seal)

(2) Using only one oil shield lift, firmly drive it into the front end face of the retainer until it is uniform.

Caution: (1) Grease is applied around the oil seal lip, so do not touch it with your fingers. (2) Make sure that the garter spring does not come off and the lip does not turn over when inserting.



[Point 9] Remove and install the baffle plate

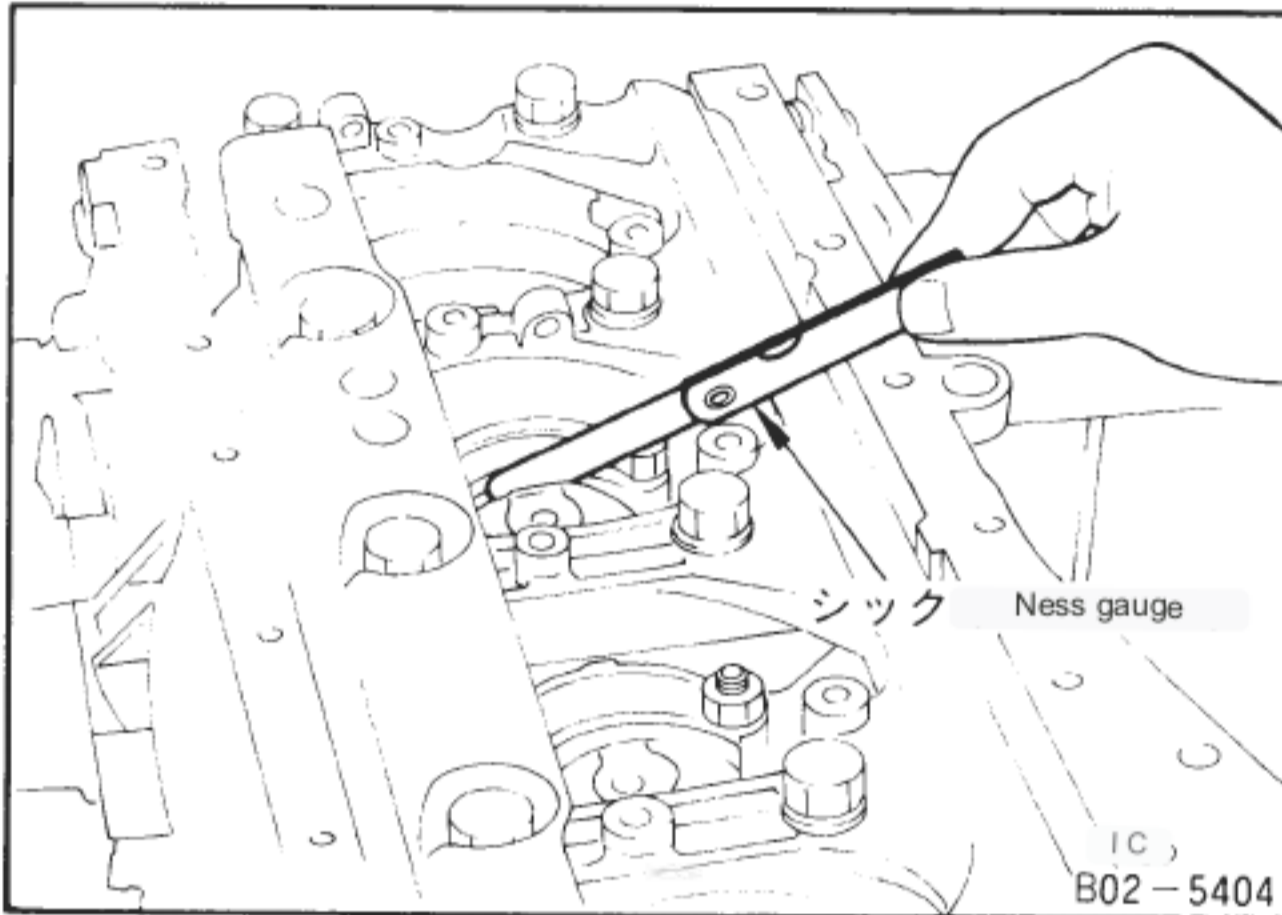
removal

- Remove 5 mounting bolts and remove the baffle plate.

attachment

- Attach to the front side of the beam.
- Apply a locking agent (equivalent to ThreeBond 1386) to the threads of the mounting bolts.

Tighten.

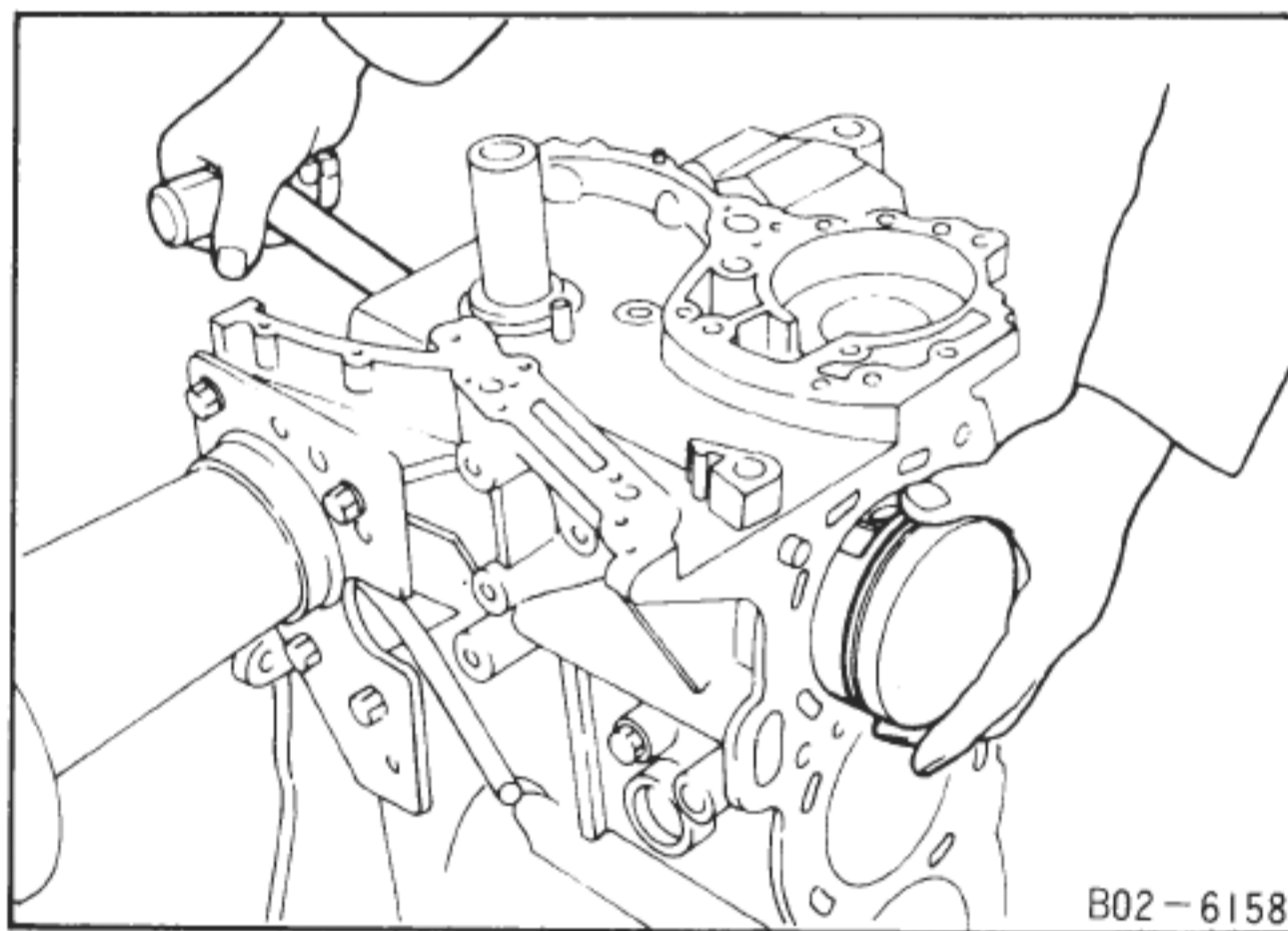


[Point 10] Checking the connecting rod thrust clearance

- Thickness clearance between connecting rod and crank arm

Measure with a gauge.

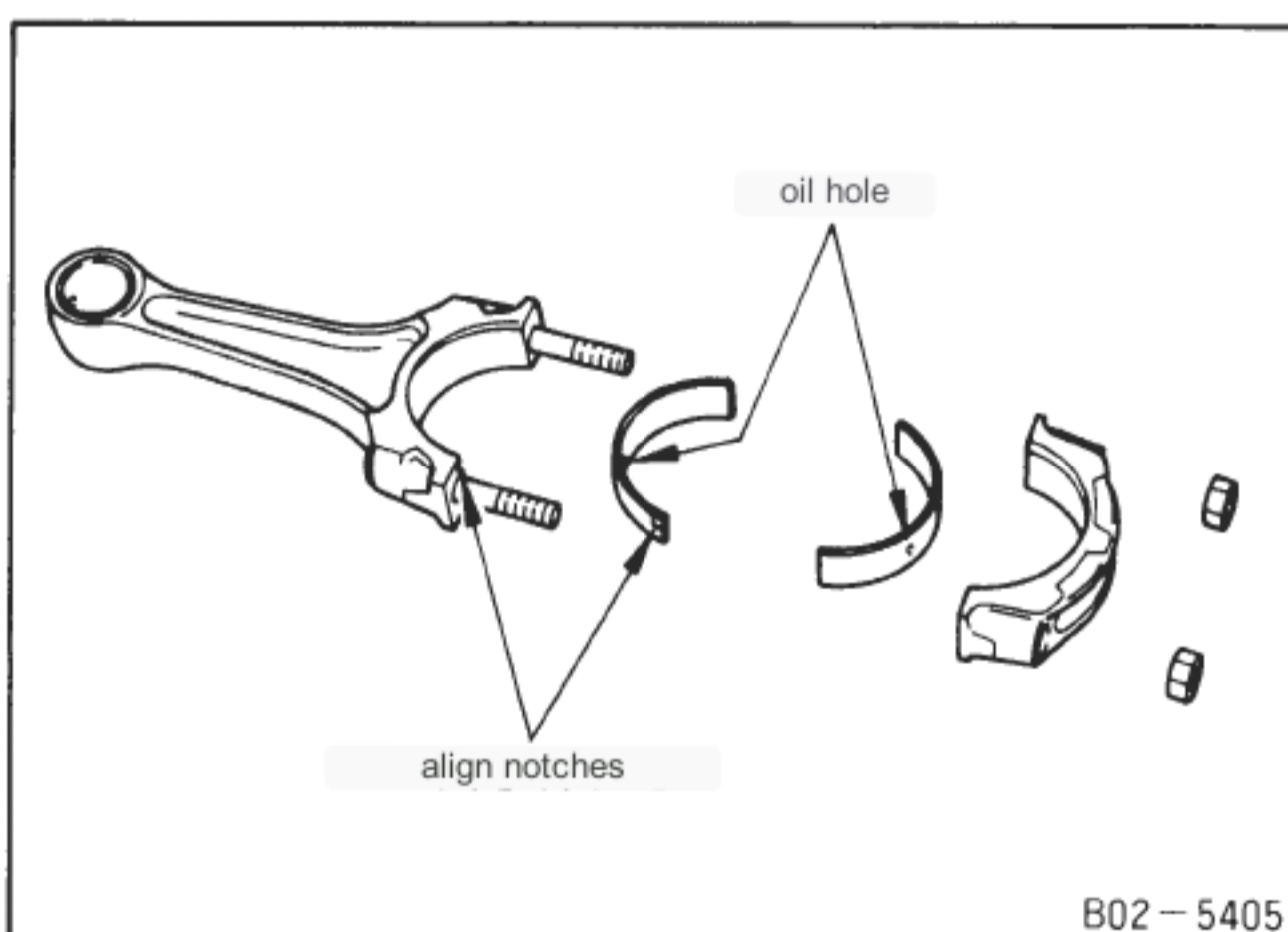
standard	value	(mm)
		0.20-0.35



[Point 11] Remove and install piston connecting rod assembly

removal

- Push out to the cylinder head side with the handle of a hammer.



attachment

- When connecting rod bearings are installed, the bearing surface (inner side) should be free of oil. Apply carot oil. Do not apply to the back side and clean thoroughly.

Assemble by aligning the rotation stop notch of the connecting rod bearing.

Connecting rod bearings are selectively fitted. (Refer to [Point 29])

- Set the crank pin to the bottom dead center position.

- Apply a small amount of engine oil to the cylinder bore, crank pin, piston ring and piston.

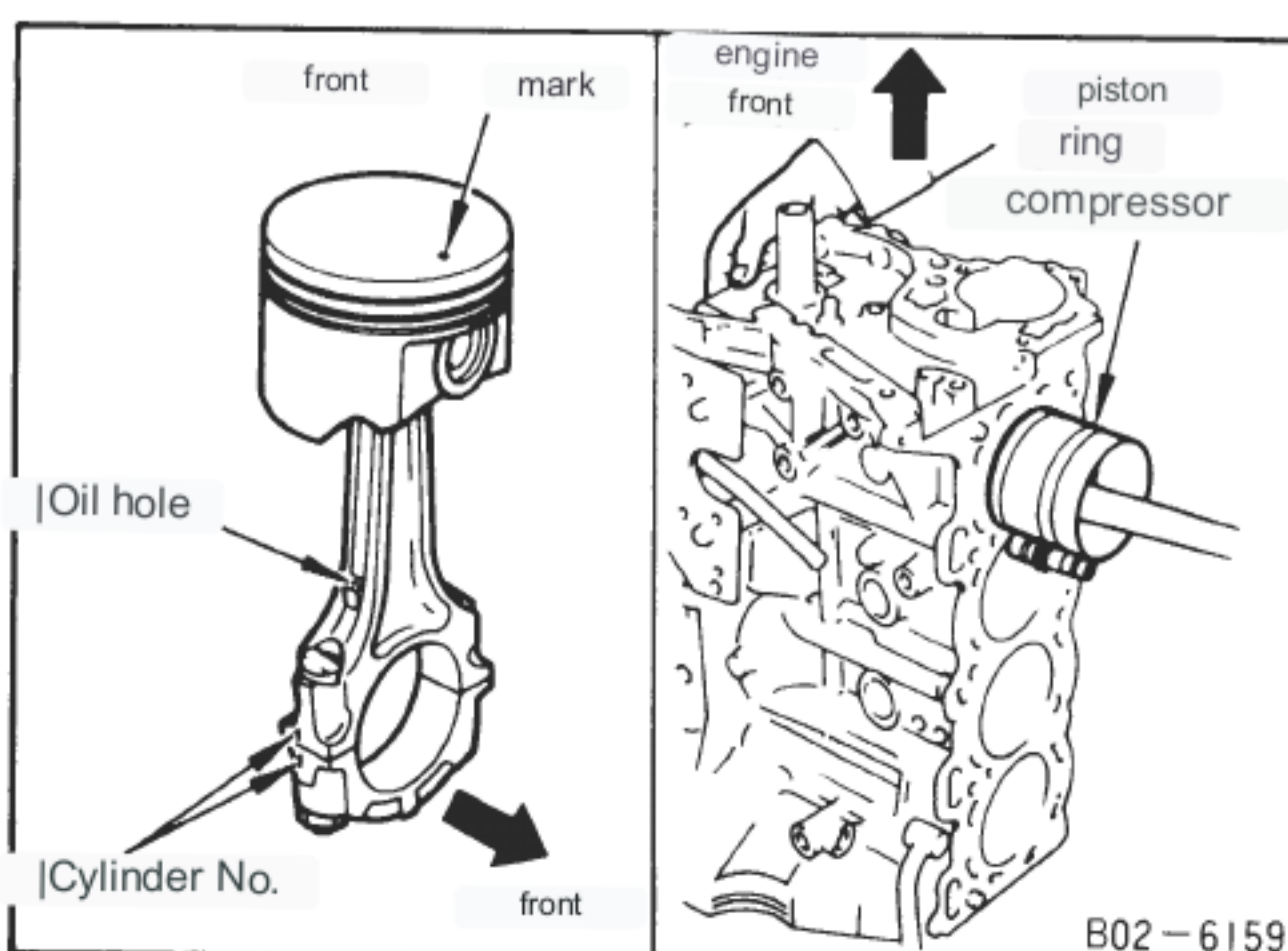
- Assemble the piston so that the front mark on the piston head faces the front.

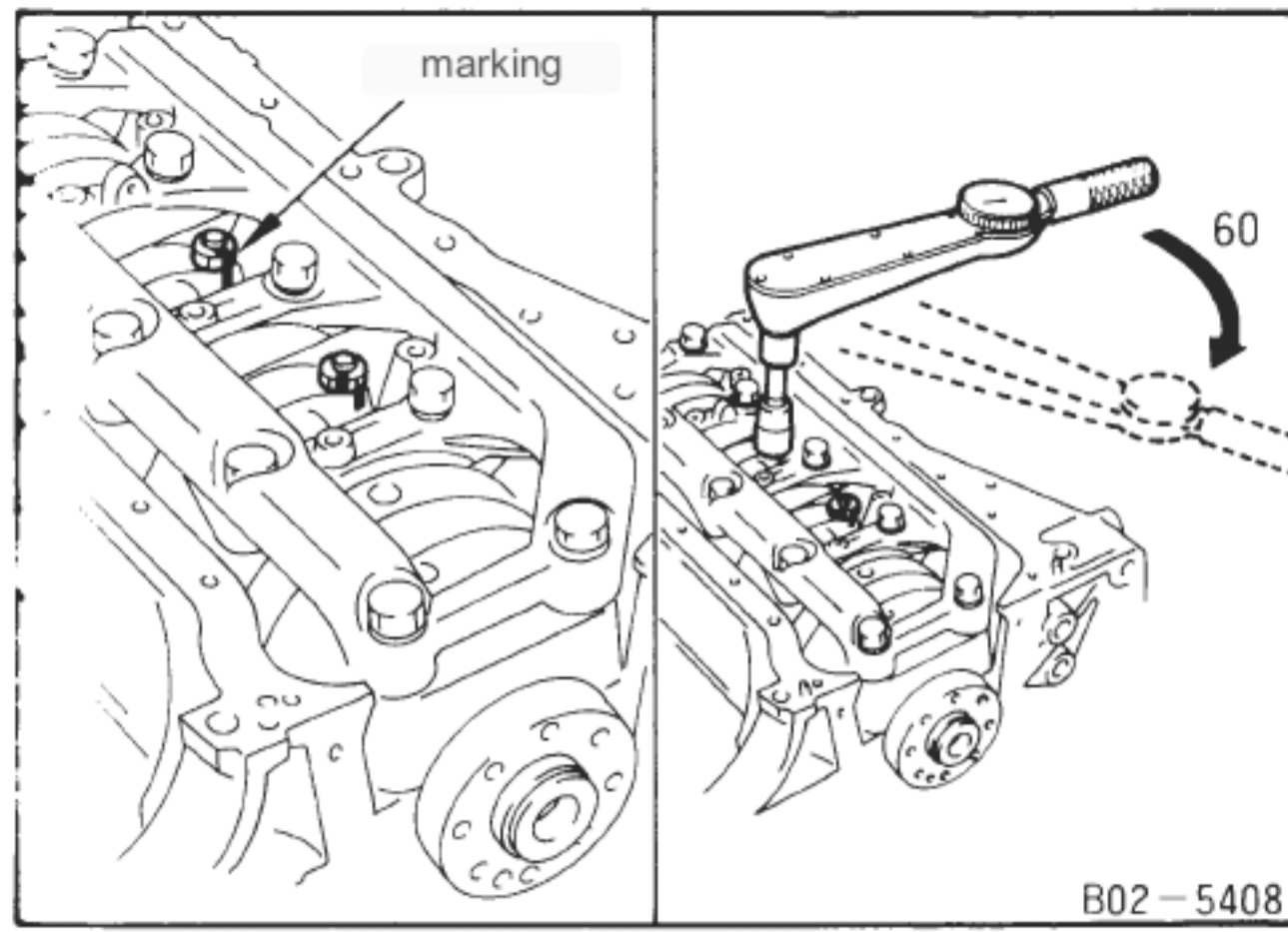
- Using a piston ring compressor, the piston and conrod

Assemble the door assembly to the cylinder block.

Note: (1) When installing, check the connecting rod cylinder No. to eat.

(2) Install so that the connecting rod big end does not hit the oil jet.



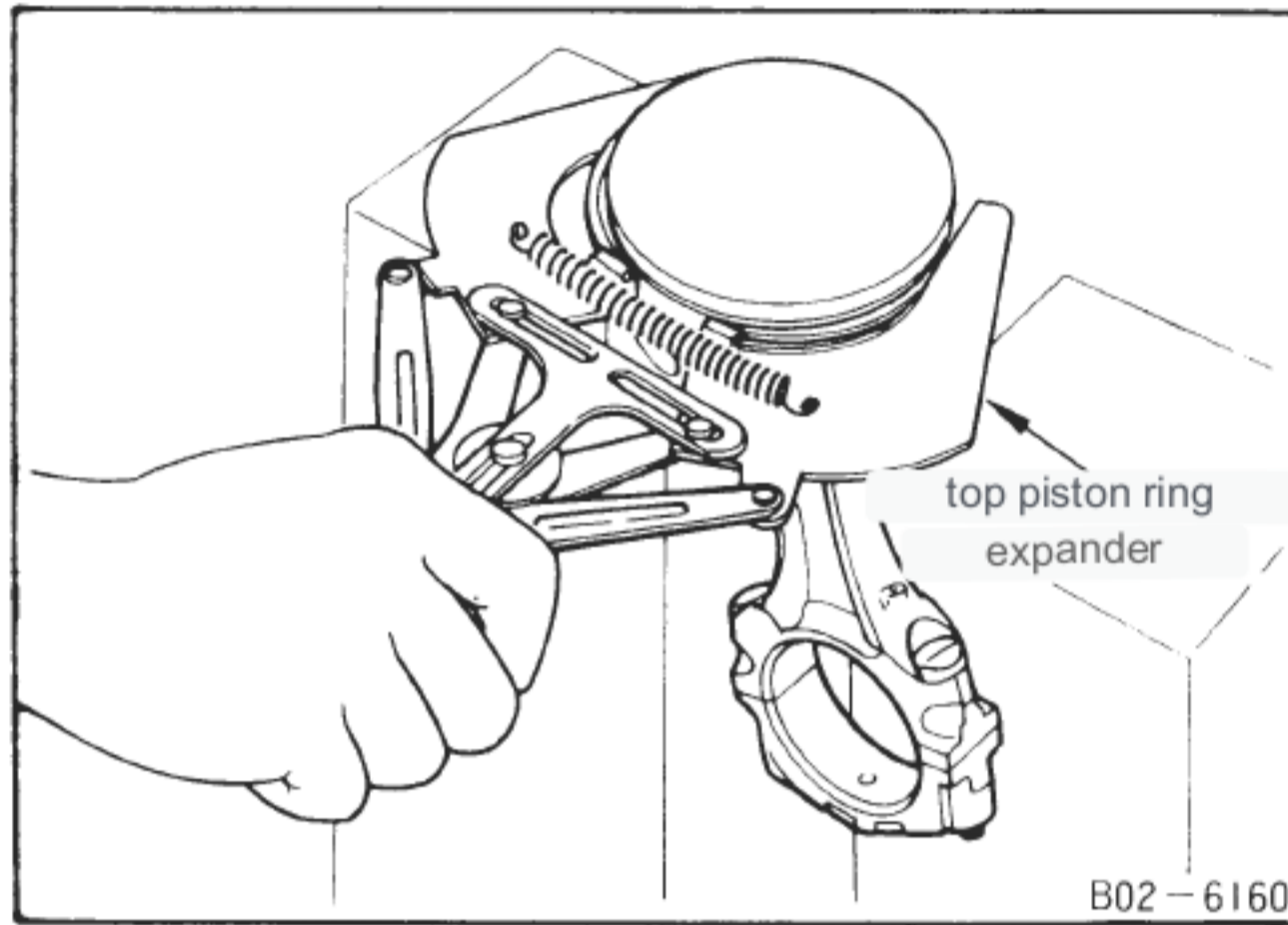


[Point 12] Tightening the connecting rod nut

- Apply engine oil when tightening the connecting rod and nut. The connecting rod nut should be tightened at an angle as shown below.

order	Tightening procedure
①	Tighten to 1.5±0.1kg-m.
②	Attach mating marks (white paint) to the nut and connecting rod cap in the same direction.
③	Tighten at 60°. *

Reference value approx. 3.9-4.5kg-m equivalent

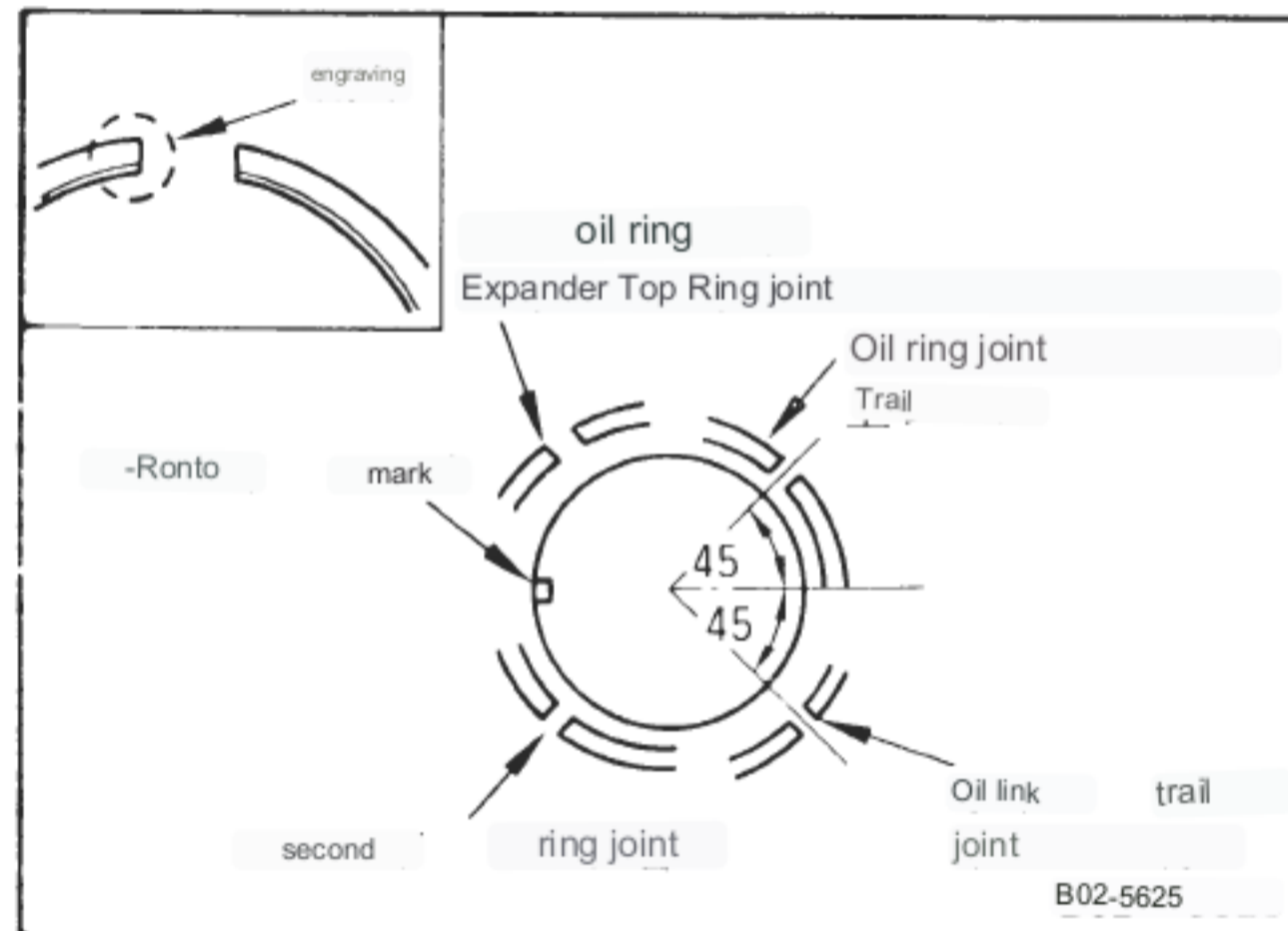


[Point 13] Remove and install piston rings

removal

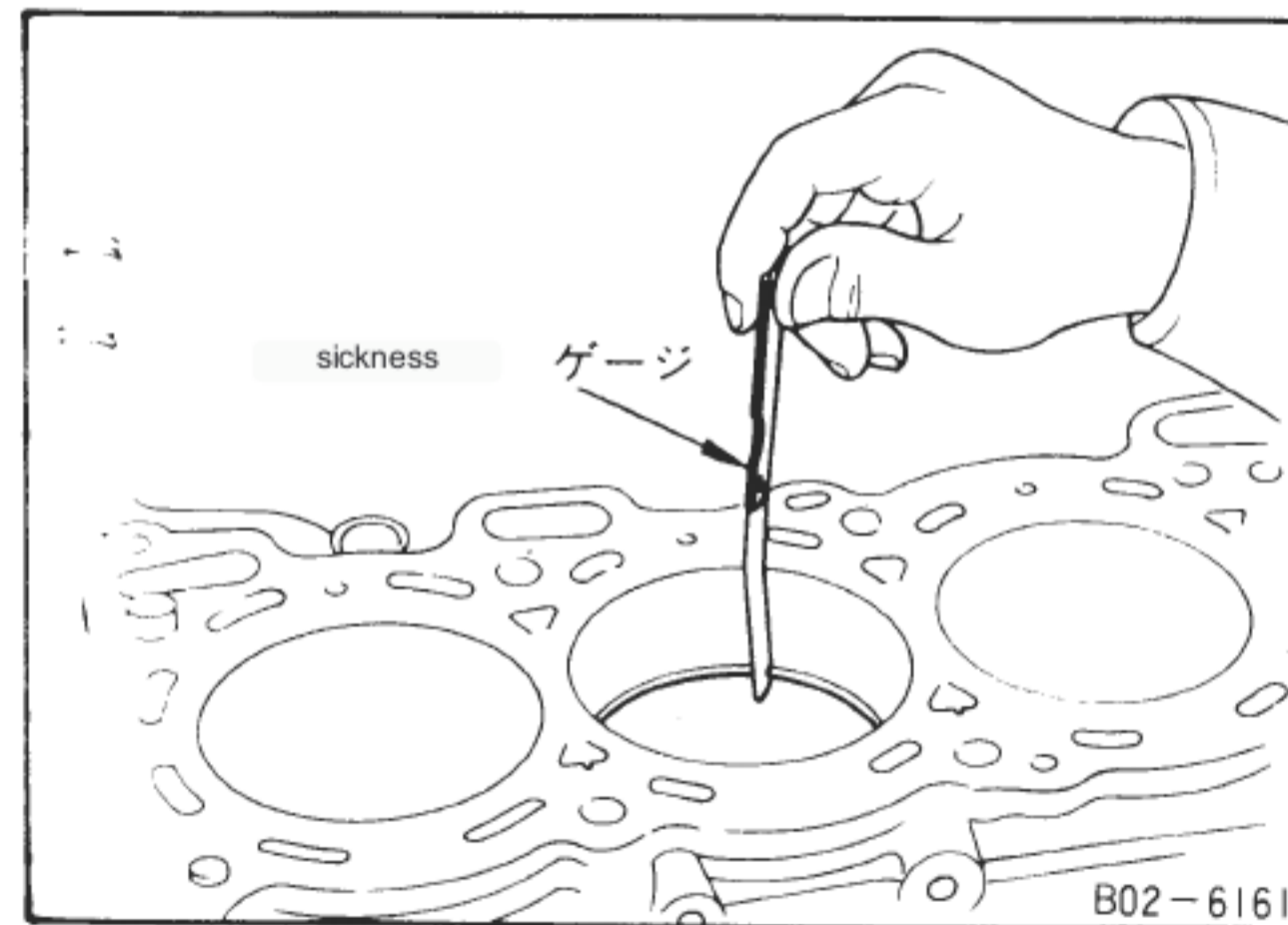
- Use a piston ring expander.

CAUTION: Be careful not to damage the piston.



attachment

- Install so that the stamp on the Kick joint of the piston ring faces up.



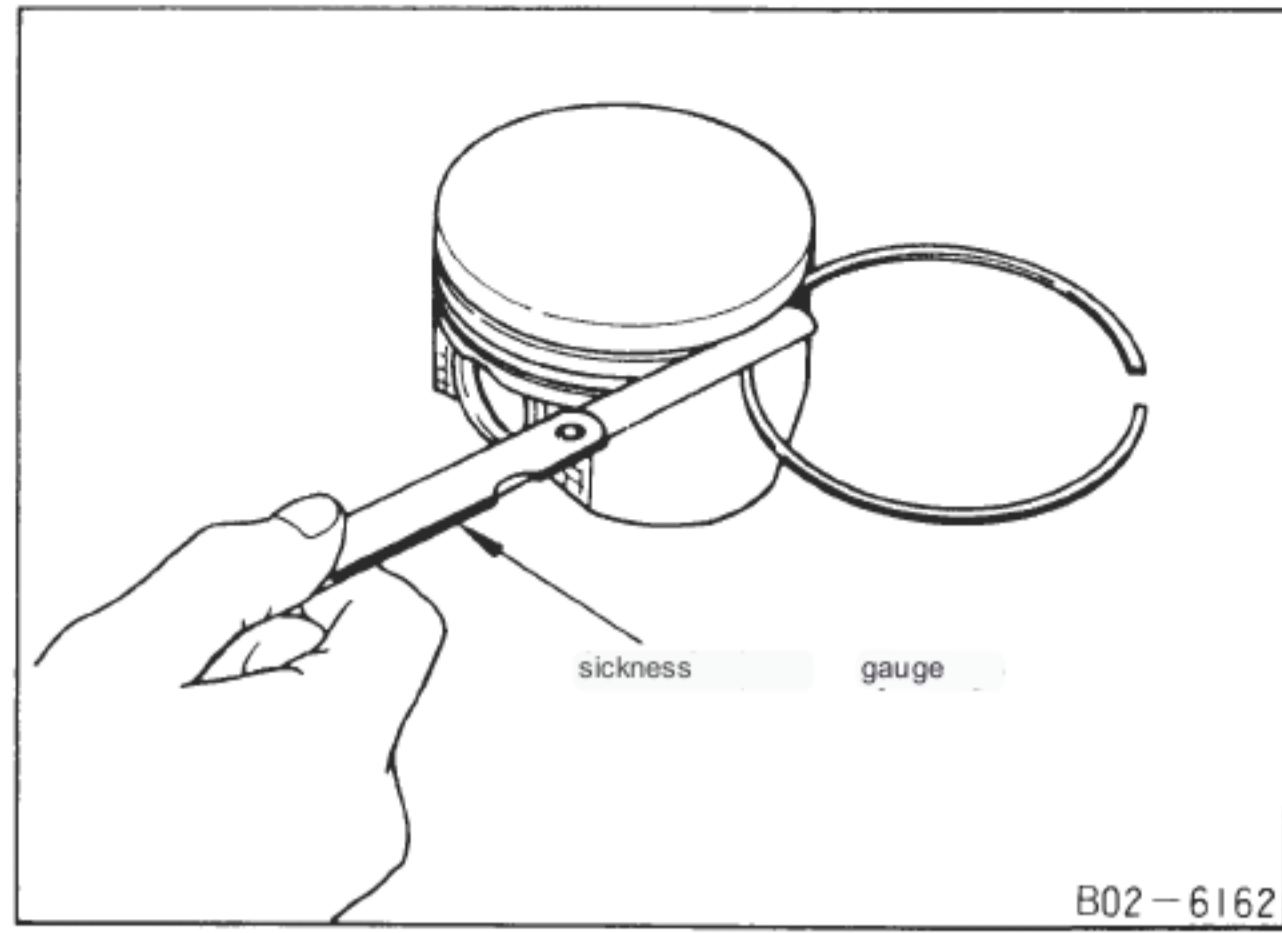
[Point 14] Piston ring gap and side clearance check

Mating clearance inspection

- Push the piston ring to the middle position of the cylinder with the piston.

Measure the contact gap.

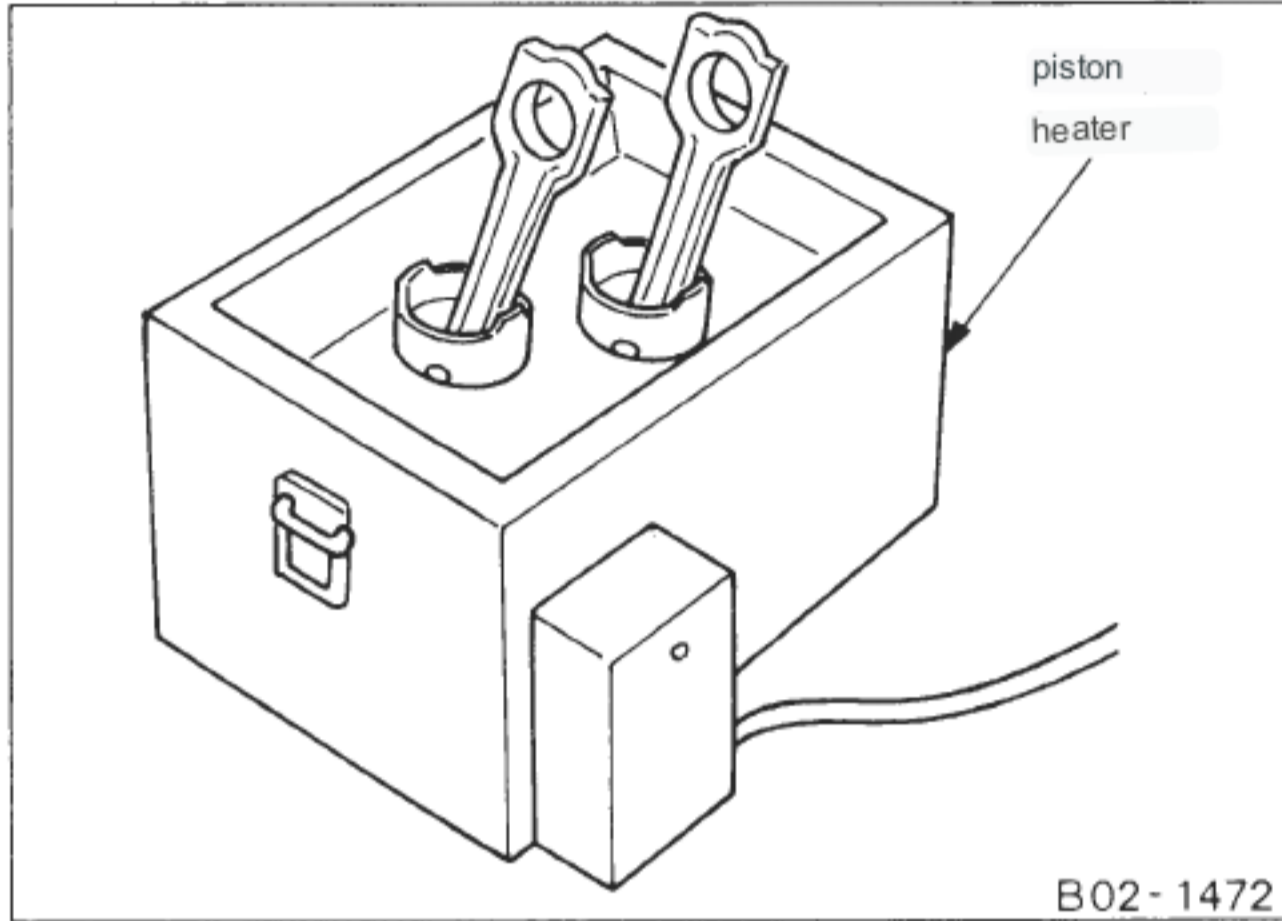
Item	site	top ring	second ring	oil ring
Reference value	(mm)	0.20-0.30	0.35 0.50	0.20-0.60
limit	(mm)	0.39	0.59	0.69



side clearance check

- Measure the clearance between the piston ring and the piston ring groove.

Part	top ring	Second ring	oil ring
Standard value (mm)	0.045 0.080	0.030 0.065	0.065 0.135



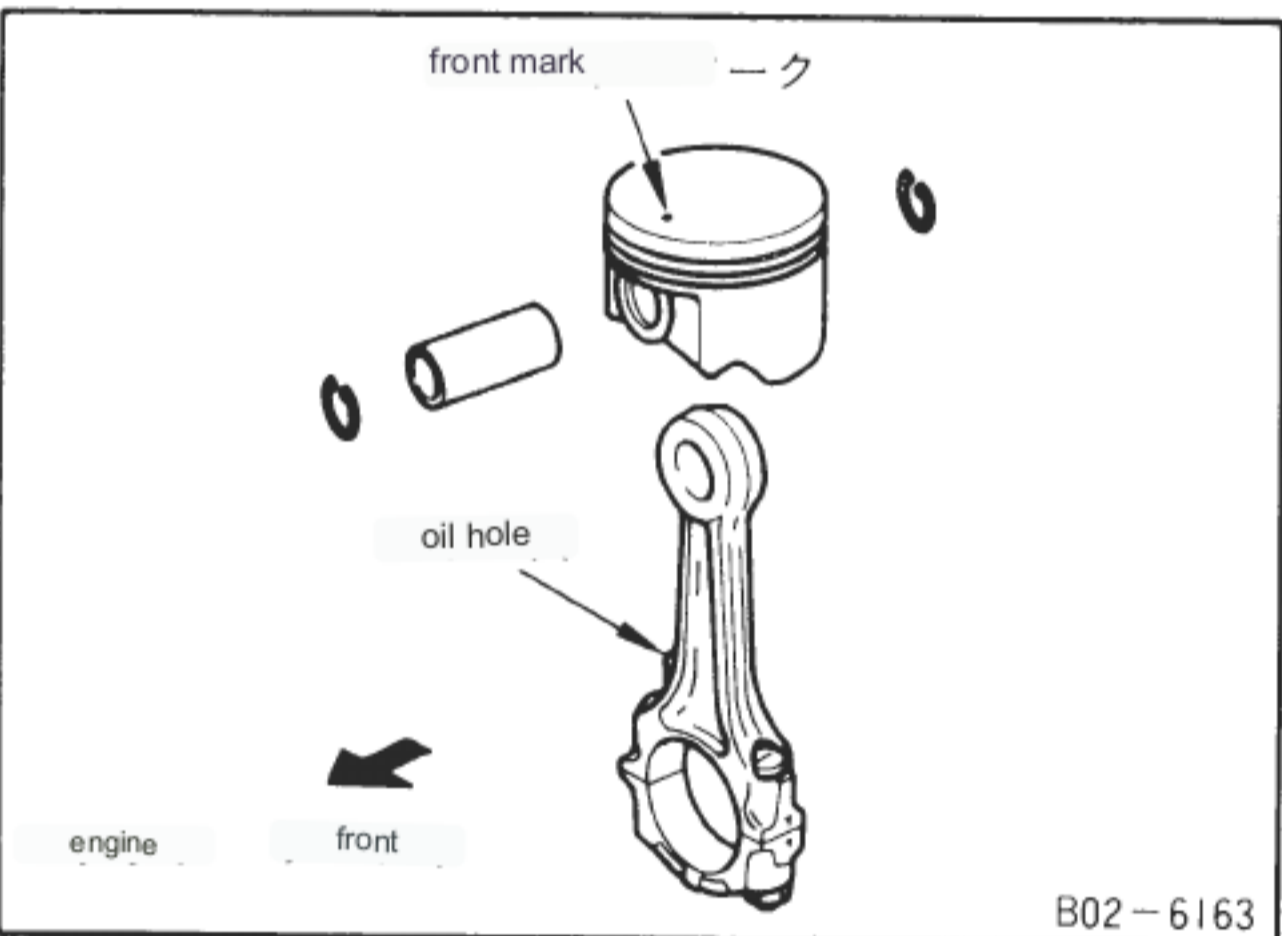
[Point 15] Remove and install the piston pin

removal

- Remove the snap ring using snap ring pliers.

Note: Do not reuse snap rings.

- The fitting method of the piston and connecting rod is a full float method. To remove the piston pin, warm the piston to 60 to 70°C and apply an appropriate tool to the piston pin and push it out.

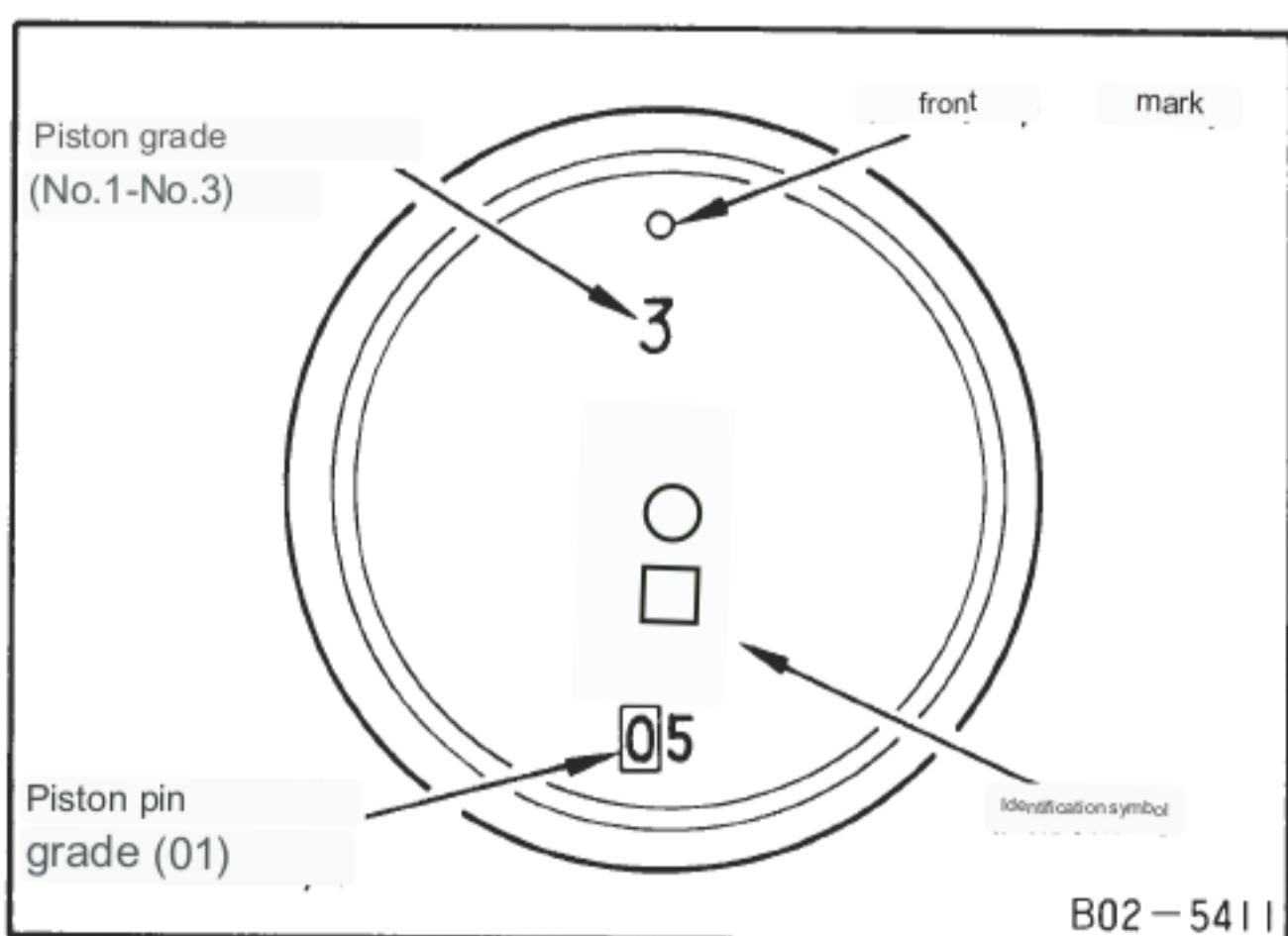


attachment

- The connecting rod boss is on the right side of the engine (on the left side when viewed from the front).

Assemble with the front mark of the piston facing.

Note: Be sure to insert the snap ring into the groove.



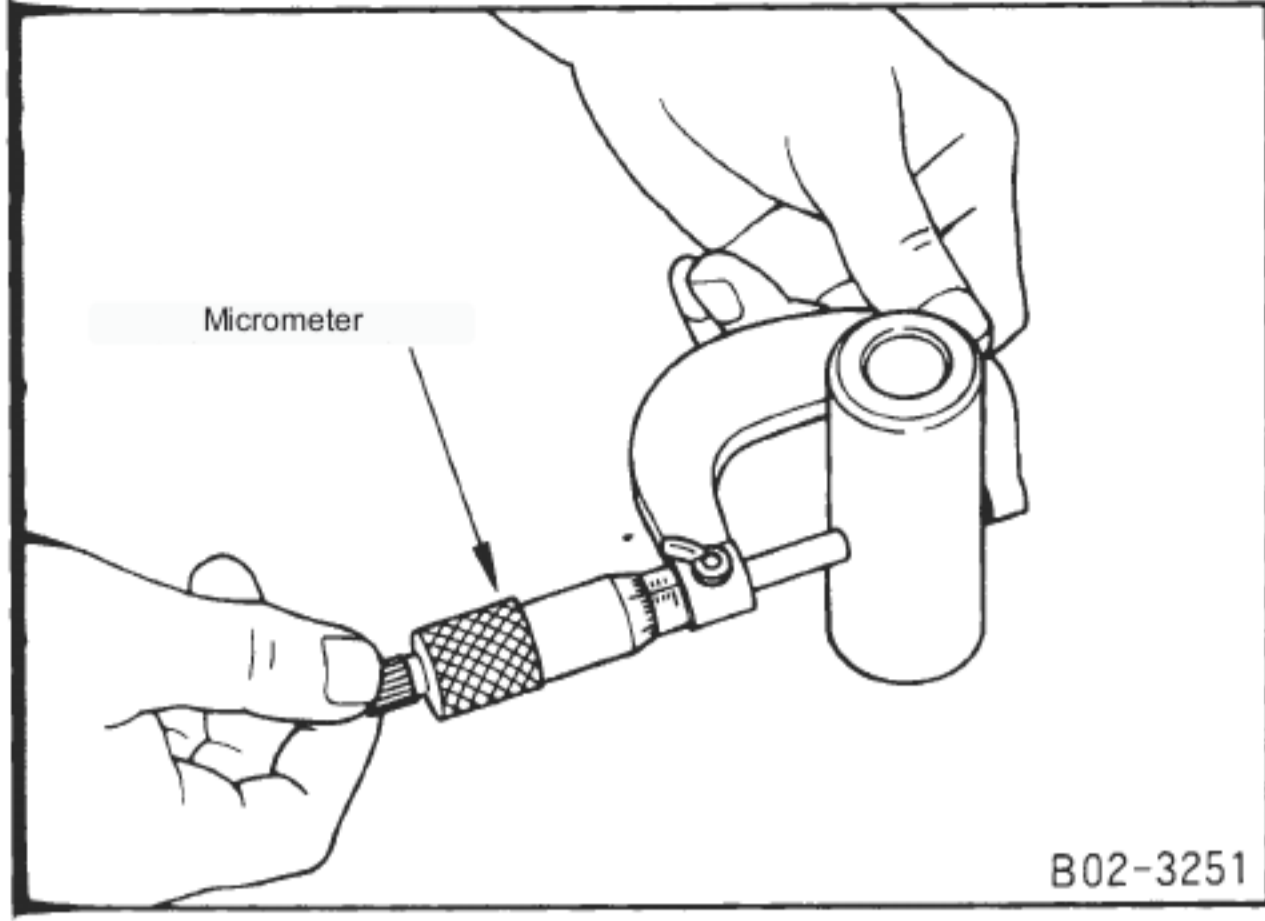
- Press fitting of the piston pin is performed by selective fitting with the connecting rod.

- Heat the piston until the piston pin can be lightly pushed in with a finger (approximately 60 to 70°C), insert the piston and connecting rod from the front side of the piston to the rear side.

- When inserting, apply sufficient oil to the pin and the small end of the pin hole connecting rod.

Grade identification stamp	Outer diameter of piston pin	Concord bush inner diameter	bush pin clearance	(Reference) Piston pin hole diameter	piston pin clearance
0	$\phi_{(D)}^{(+)}$ -0.005 -0.011	$\phi_{(D)}^{(+)}$ +0.006 0	0.005 0.017	$\phi_{(D)}^{(-)}$ -0.007 -0.013	0-0.004
1	$\phi_{(D)}^{(+)}$ +0.001 -0.005	$\phi_{(D)}^{(+)}$ +0.012 +0.006		$\phi_{(D)}^{(-)}$ -0.001 -0.007	
Identification stamp position	piston crown	Connecting rod big end Opposite side of face oil hole	—	—	—

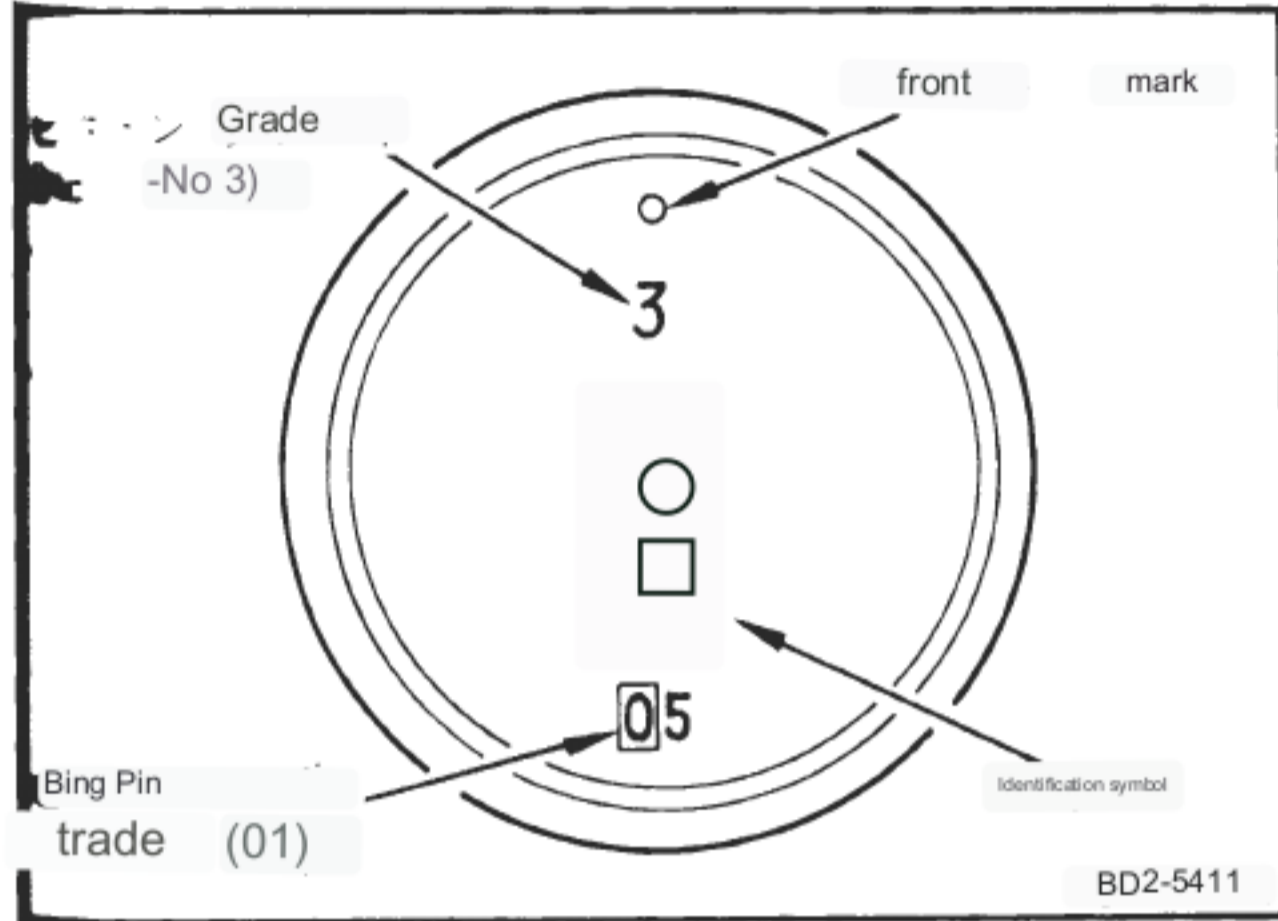
D dimension Pin: 22,000mm, Bush: 22,000mm



[Point 16] Piston pin inspection

- Measure the outer diameter of the piston pin using a micrometer.

item	Grade No.	0	1
standard value (mm)		21.989 21.995	21.995 22.001

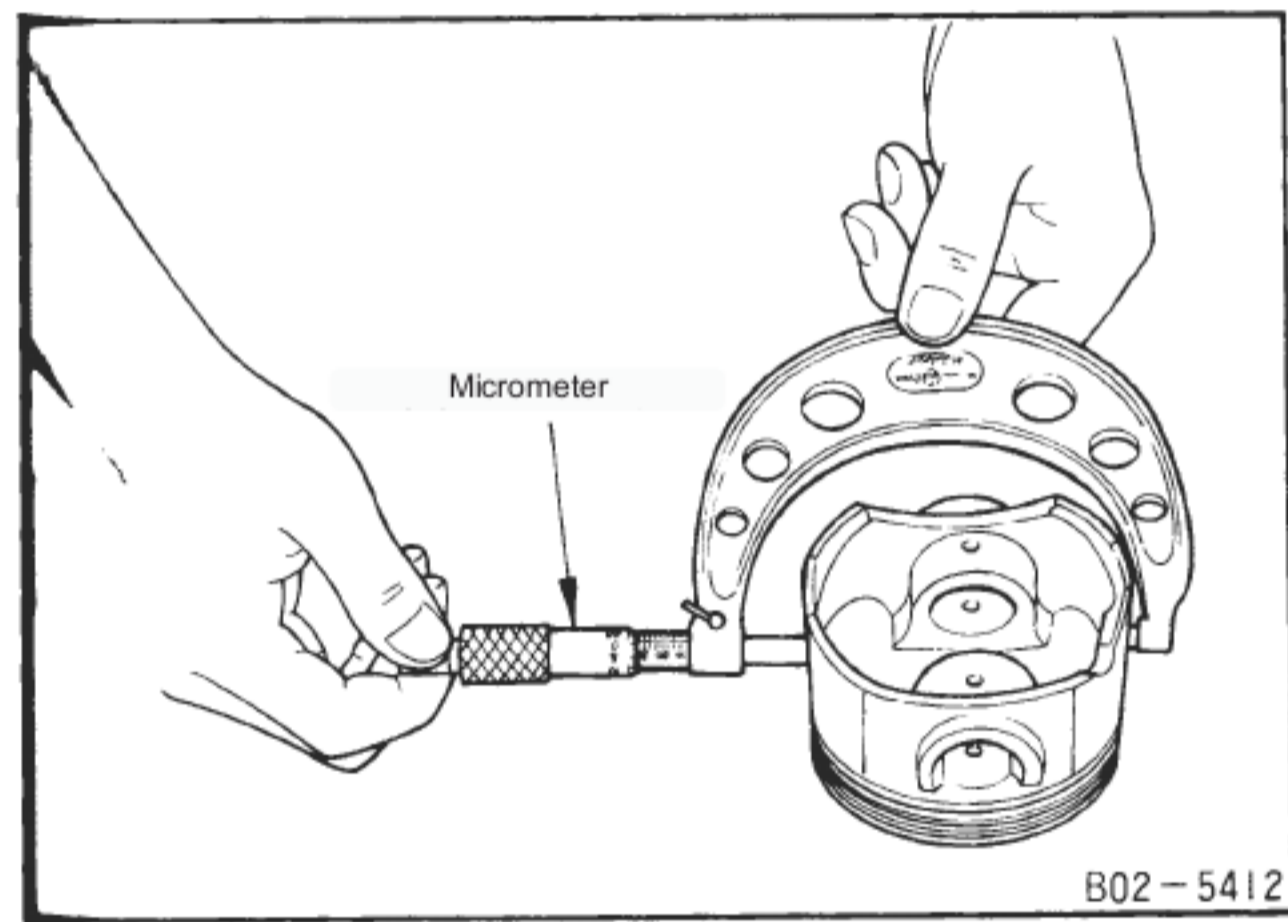


[Point 17] Piston inspection

piston identification

- Pistons are identified by the identification symbol on the crown of the piston.

Piston identification symbol	79E
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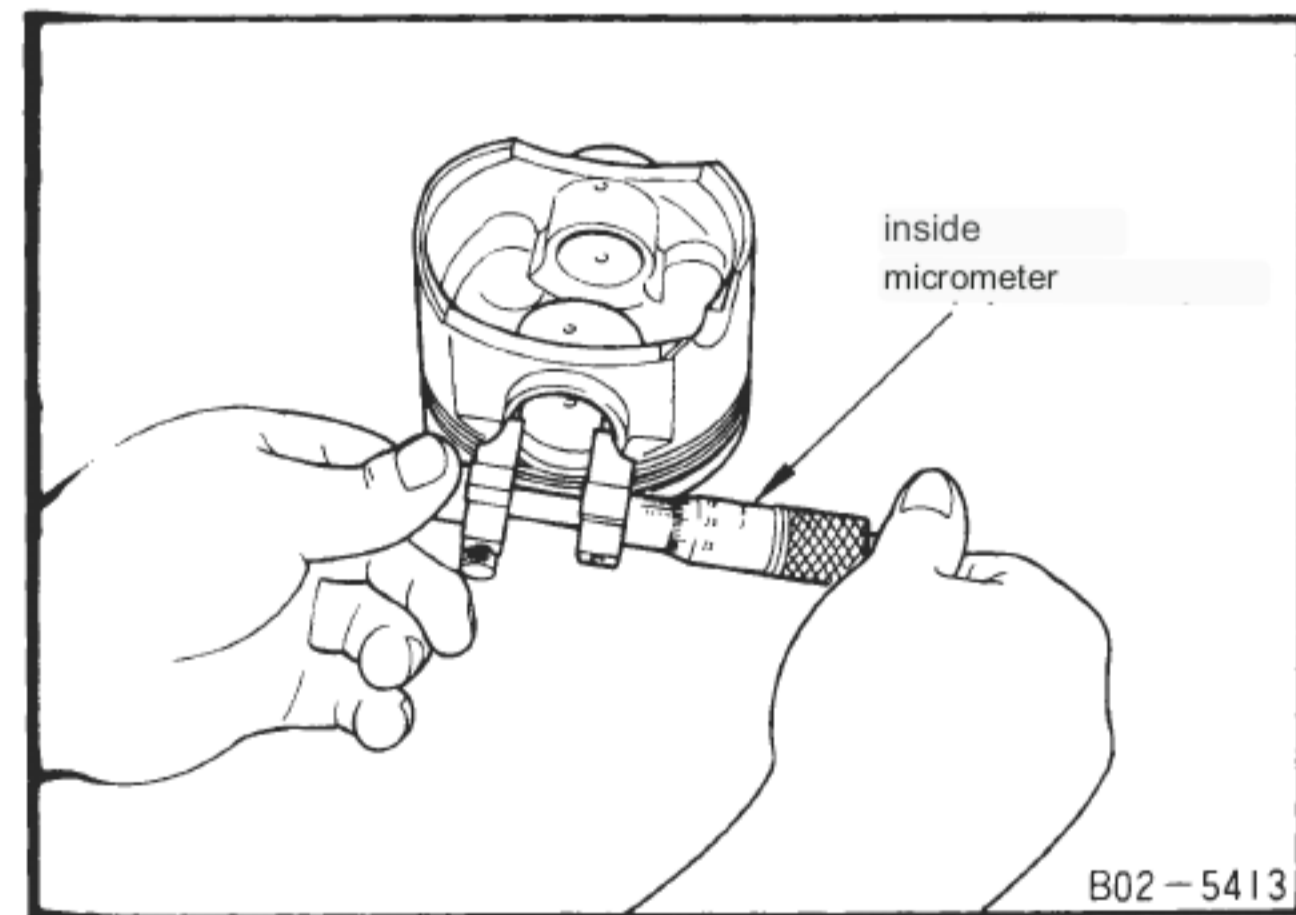
Piston outer diameter inspection

- Measure the outer diameter of the piston skirt using a micrometer.

be.

Measurement position	49 mm below the crown
----------------------	-----------------------

Item site	1	2	3
Standard value (mm)	85.980-85.990	85.990 86.000	86.000 86.010



Piston pin hole diameter inspection

- Measure the piston pin hole diameter using an inside micrometer.

be.

Grade No.	0	1
standard value (mm)	21.987-21.993	21.993 21.999

Note: When replacing the piston, replace the piston and piston pin as a set.

things to do c

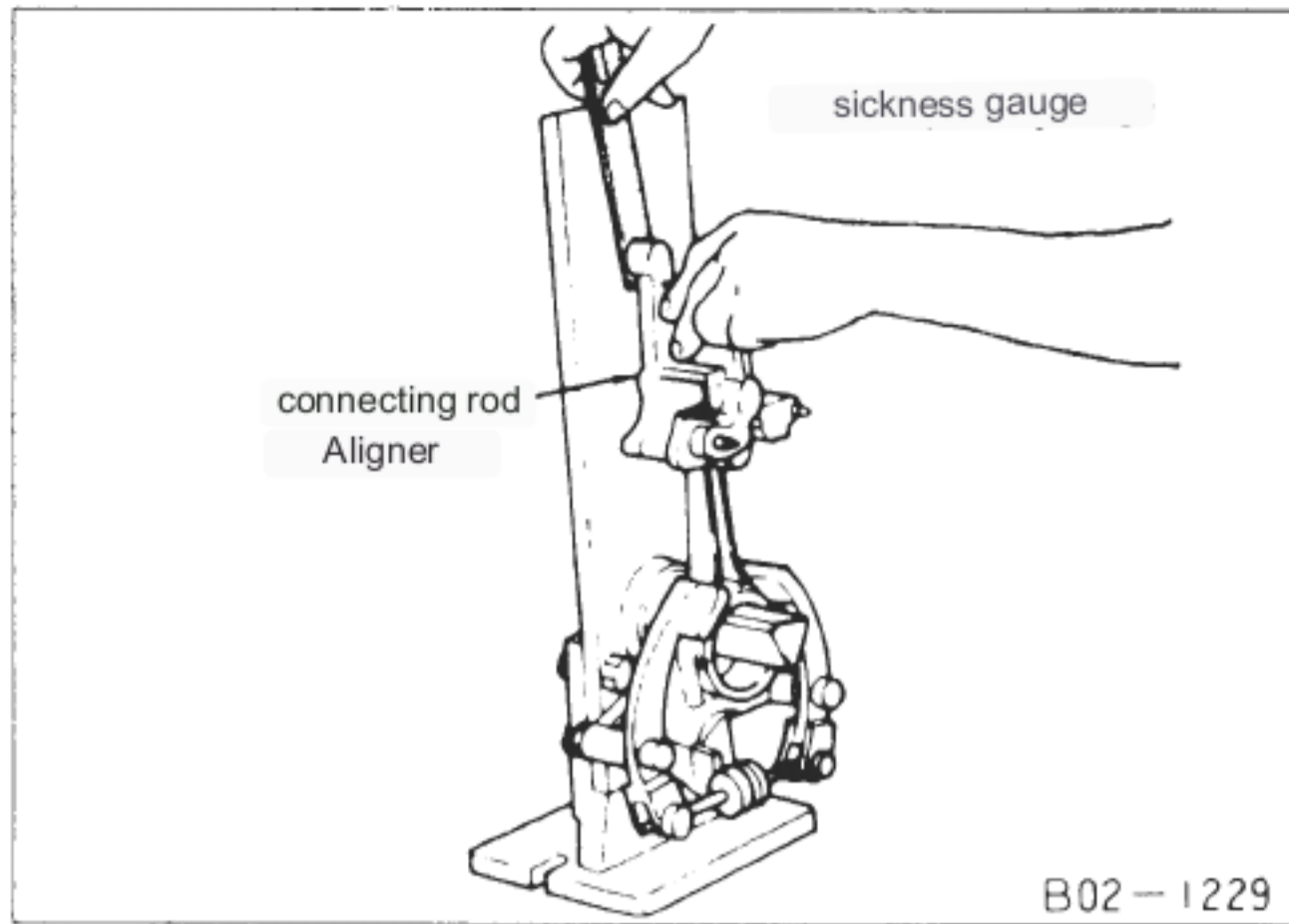
[Point 18] Piston pin clearance check

- Piston pin hole diameter measured in [Point 16] and [Point 17]

The difference between the measured piston pin outer diameters is the piston pin clearance.

be.

Piston pin clear at room temperature (20°C)	0-0.004 (tightening margin)
Lance reference value (mm)	

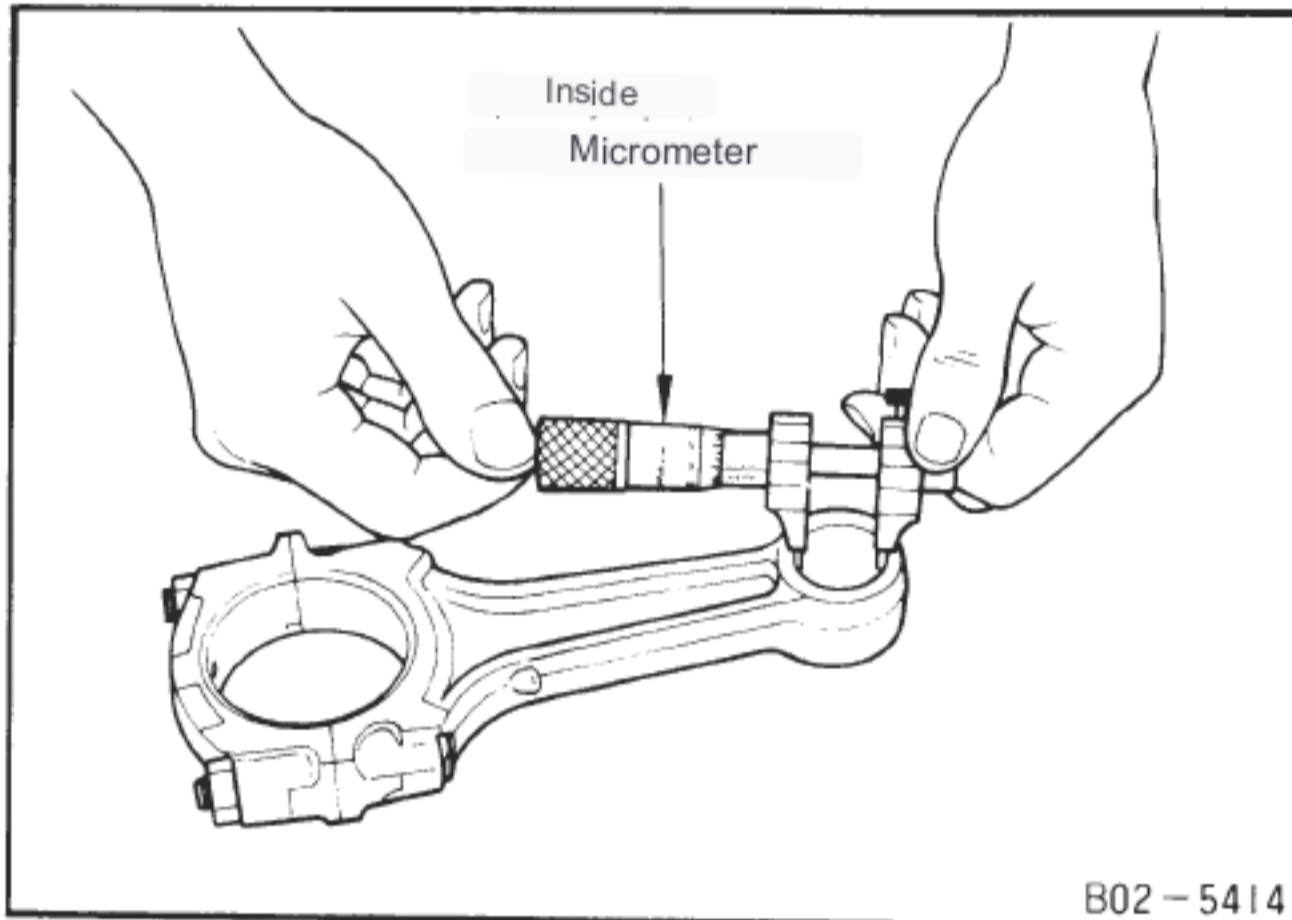


[Point 19] Bend and twist inspection

- Bending and twisting of the connecting rod is checked by the connecting rod aligner.

inspect.

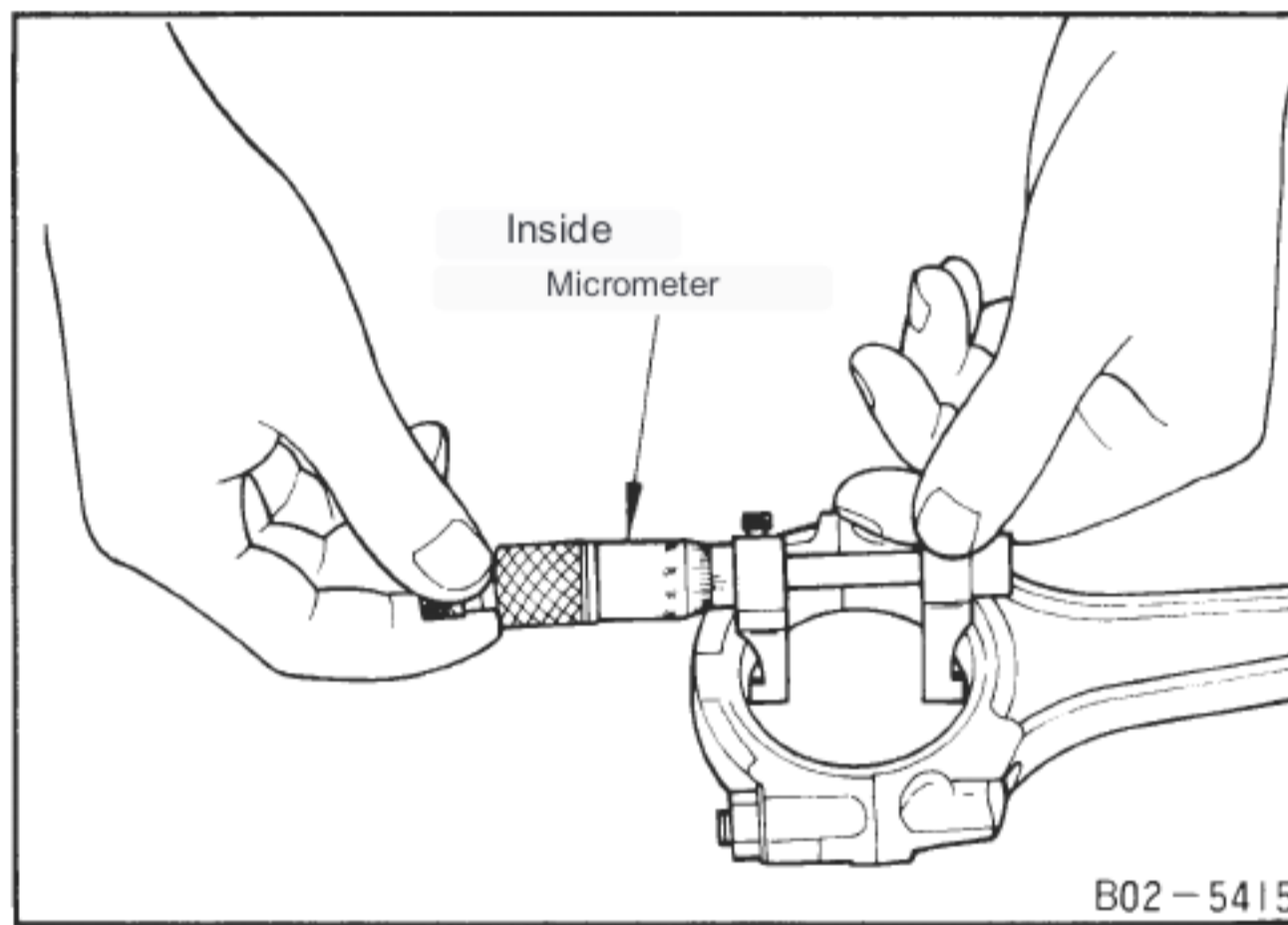
bending limit	(mm)	0.15 (per 100mm)
torsion limit	(mm)	0.3 (per 100mm)



Small end inner diameter inspection

- The inside diameter of the small end is measured using an inside micrometer.

Reference	value	(mm) 22.000 22.012
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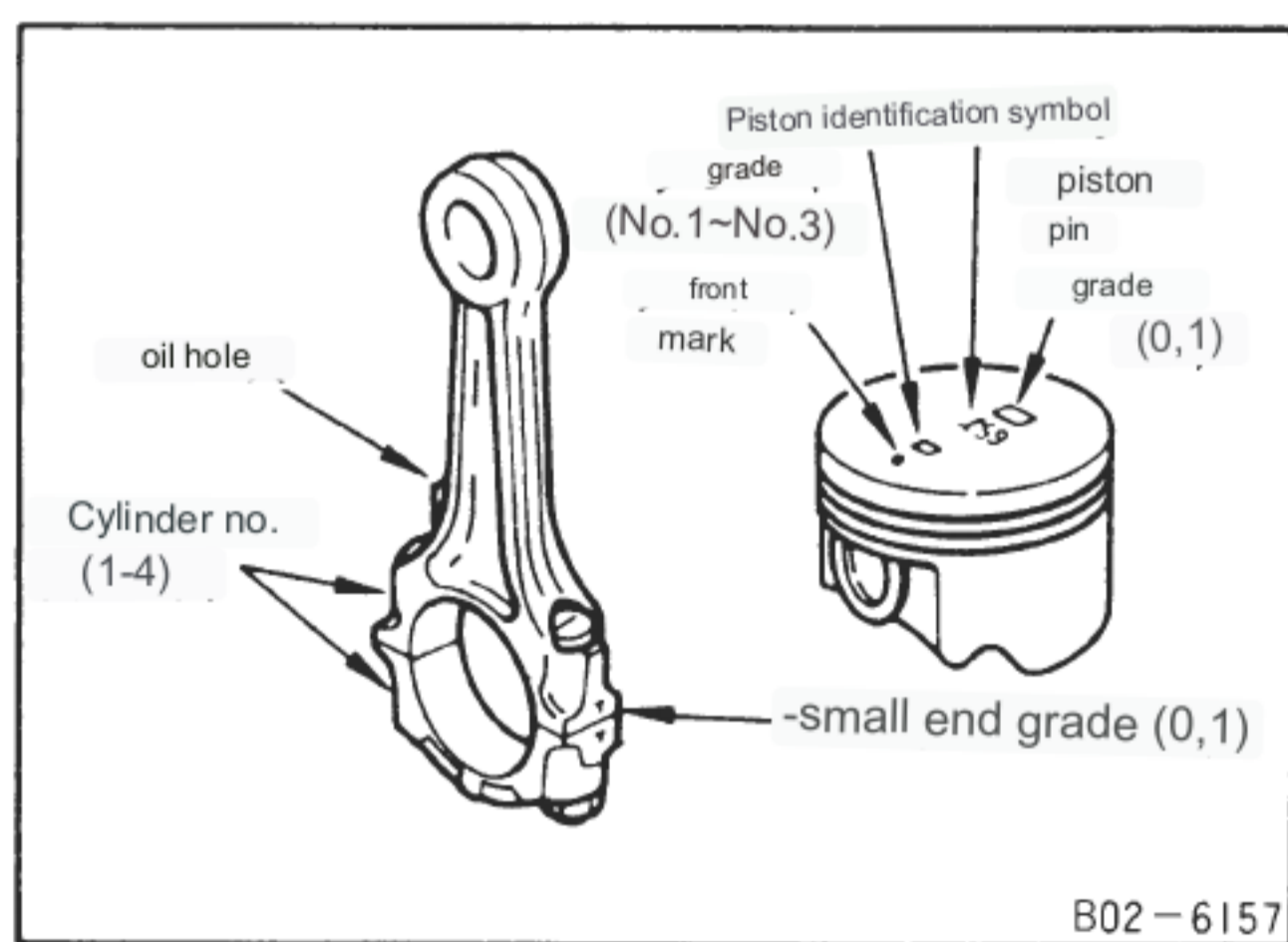
Checking the inner diameter of the connecting rod bearing

- Install the connecting rod bearing into the connecting rod cap and connect 11

After tightening the nut to the specified torque (see [Point 12]),

Measure the inner diameter of the connecting rod bearing.

standard value	(mm)	51.000 51.013
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[Point 20] Connecting rod small end bush clearance

- Small end inner diameter measured at [Point 19] and measured at [Point 16]

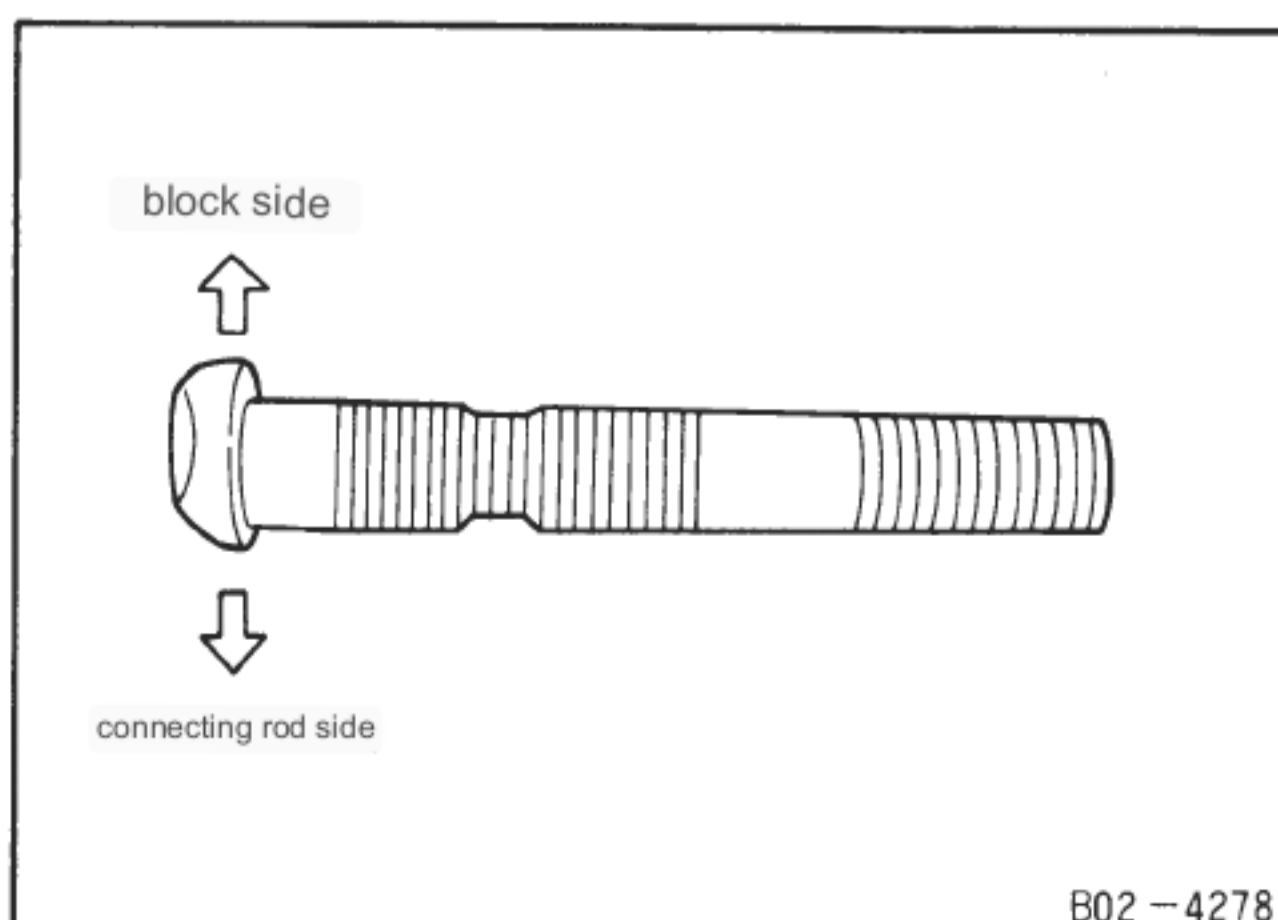
The difference in piston pin outer diameter is the bushing clearance. (centre float type)

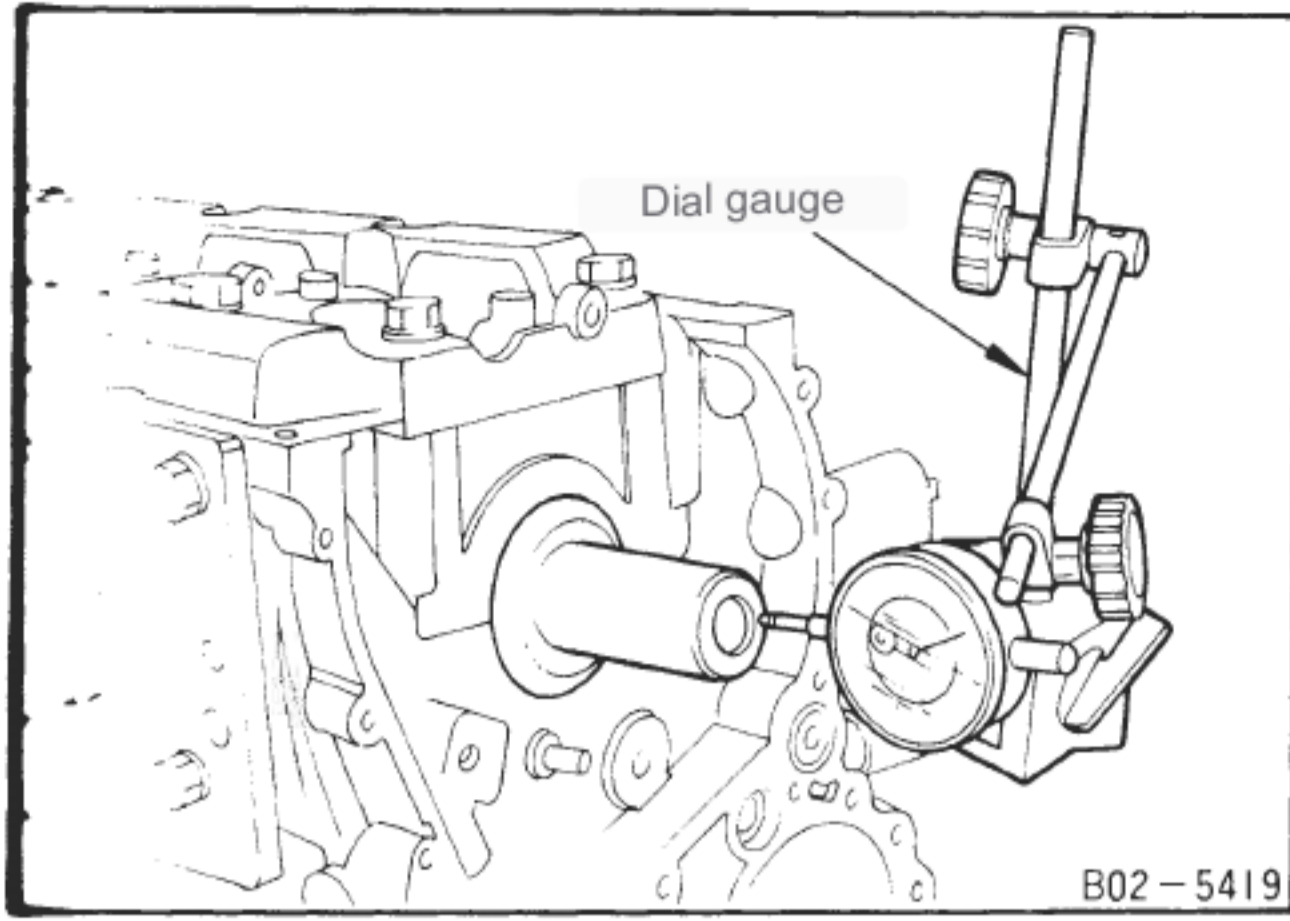
Standard	value	(mm)	0.005 0.017
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- At the factory, the small end hole of the connecting rod and the outer diameter of the piston pin are divided into two grades, and the bushing clearance is selectively fitted, so check that each grade (0.1) matches.

[Point 21] Connecting rod bolt

- The connecting rod bolt is press-fitted, so do not tap it out.



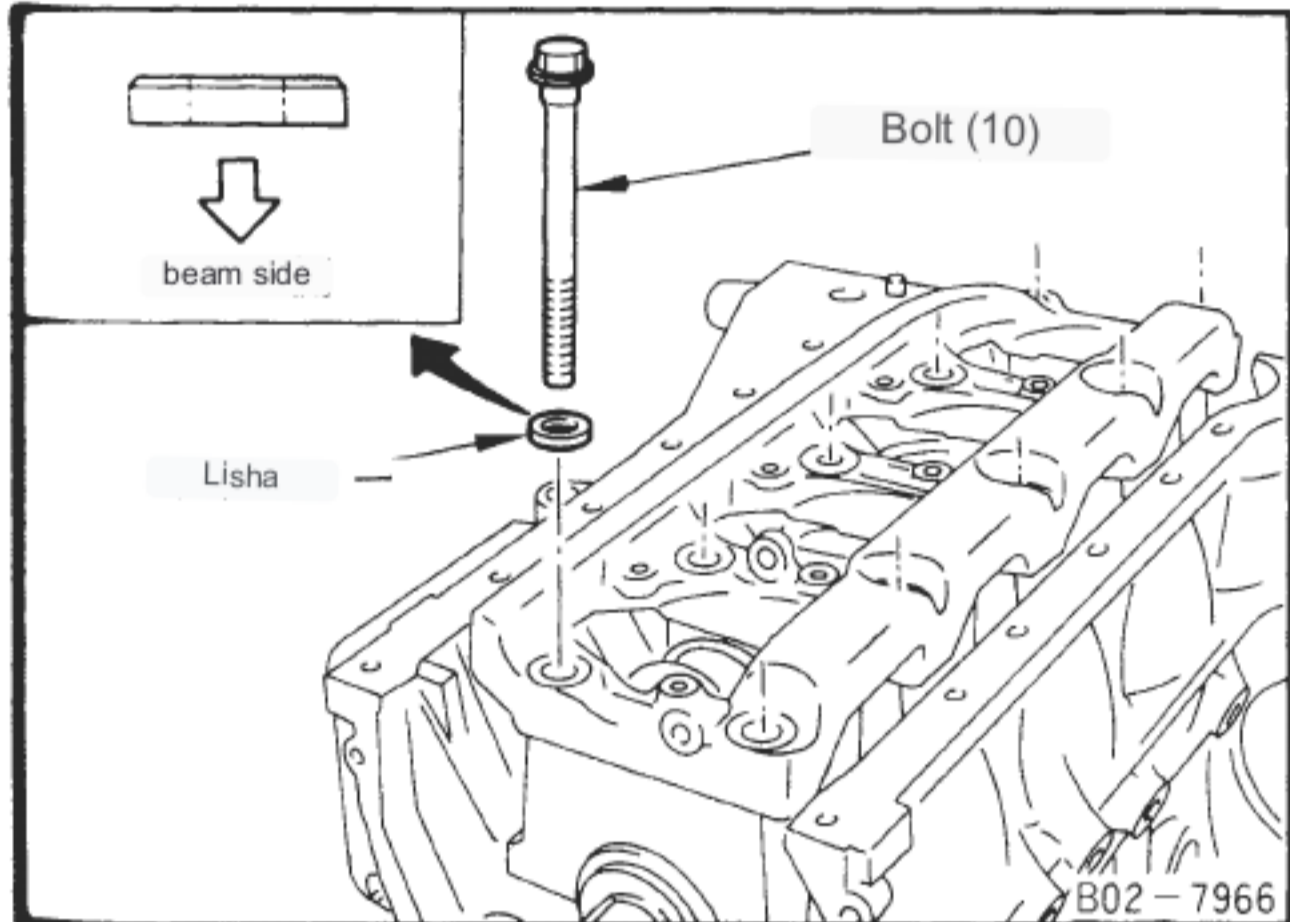


[Point 22] Crankshaft thrust clearance inspection

- Use a thickness gauge or a dial to check the clearance between the thrust bearing and the crank arm when the crankshaft is moved forward or backward.

Check with gauge.

Standard	value	(mm)	0.10-0.26
limit	value	(mm)	0.3



[Point 23] Remove and install the main bearing bolt

- Tighten the main bearing bolts at an angle as shown below.

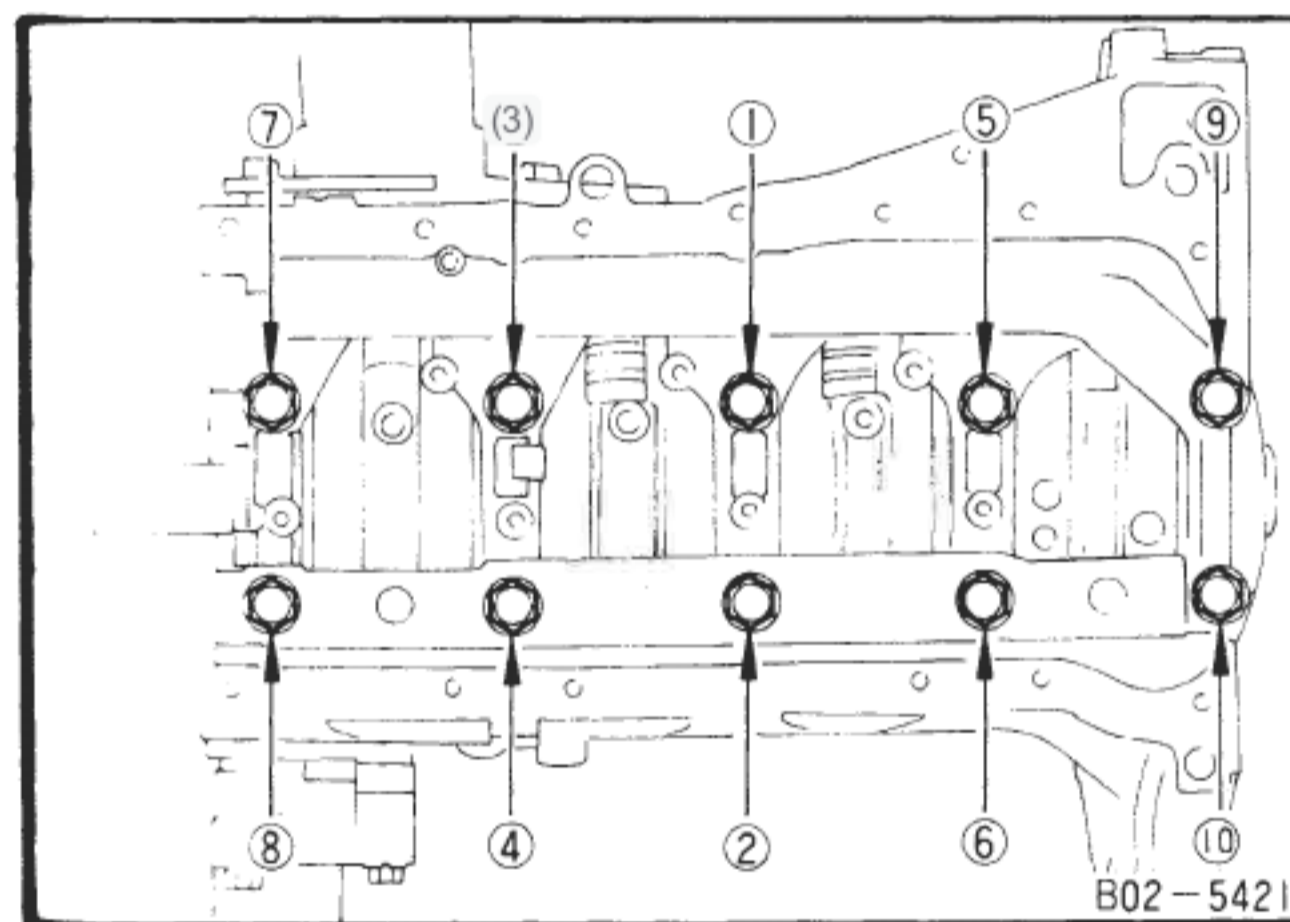
be.

- Install the washer with the non-chamfered side facing

the beam.

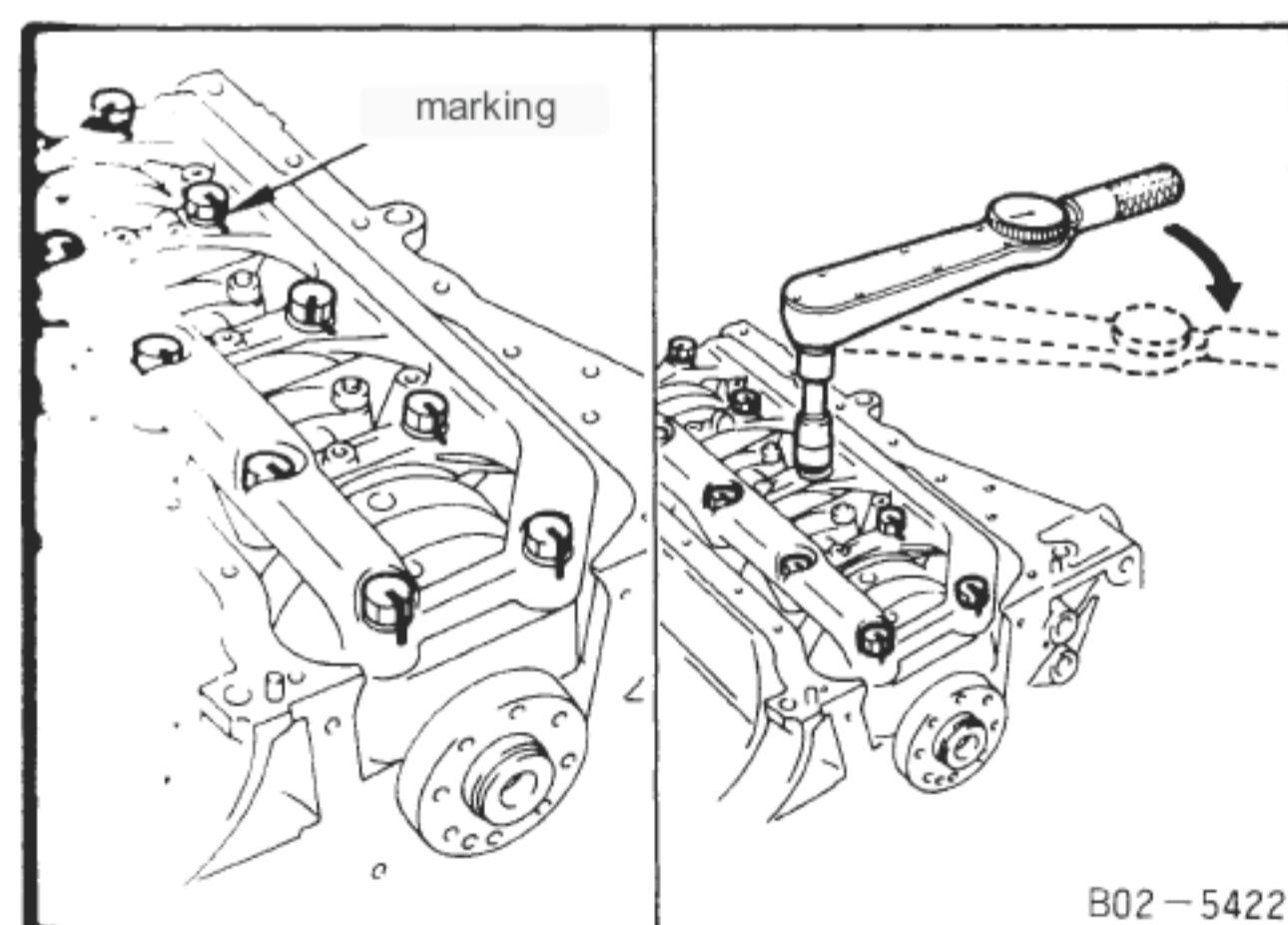
- Apply engine oil to the threaded part and bearing surface of each bolt.

- Tighten in the following stages in the order shown in the left figure.



- Remove in the reverse order of the numbers in the diagram on the left (from the outside to the inside alternately to the left and right).

to do).



<Main bearing bolt tightening procedure>

- Tighten to 3.0 ± 0.3 kg-m.

- Put matching marks (white paint, etc.) on the bolt head and beam.

be.

- Tighten at 75° .

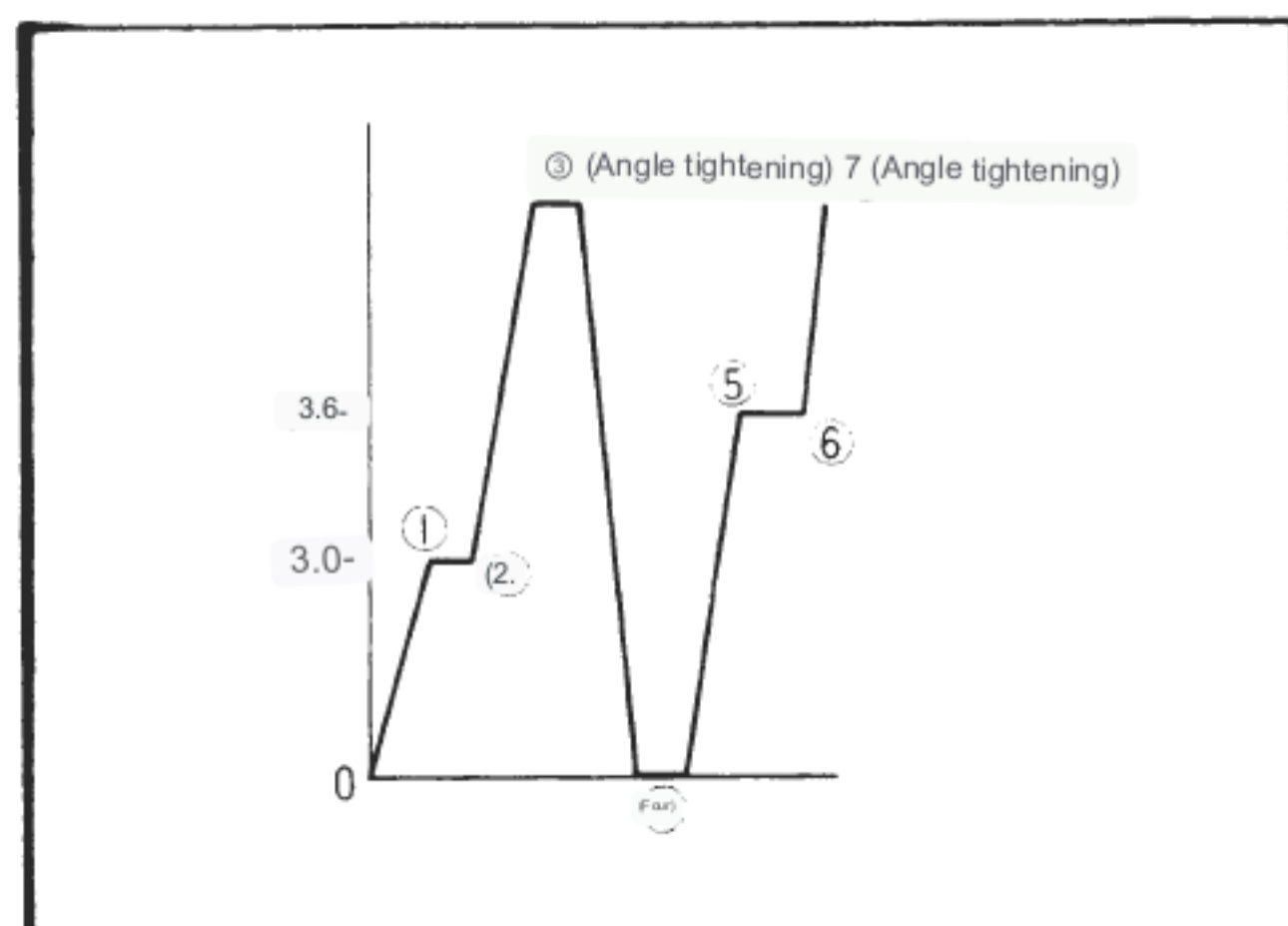
- Fully tighten to 0 kg m.

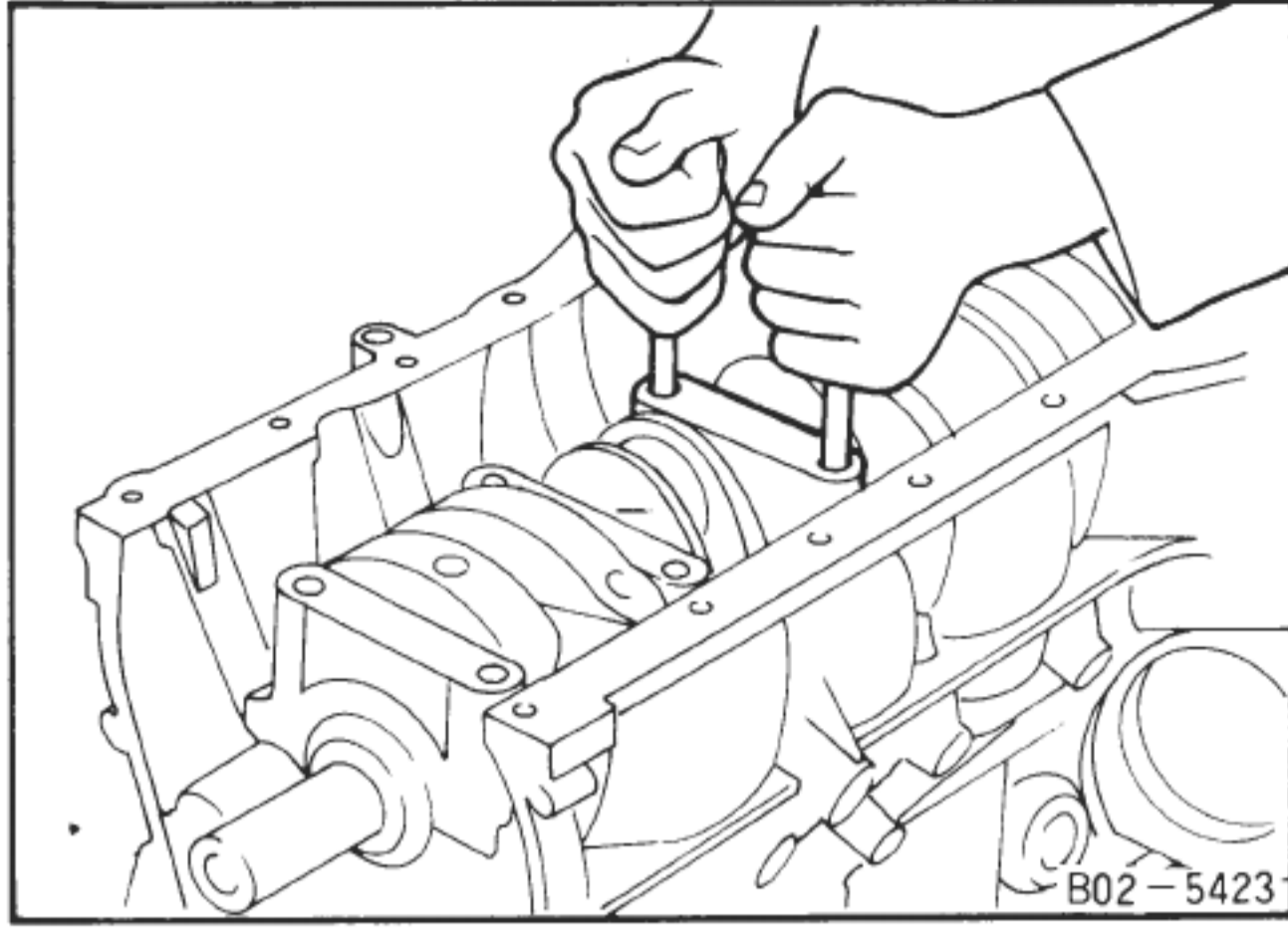
- Tighten to 3.6 ± 0.3 kg-m.

- Add a matching mark (paint in another color, etc.) to the bolt head and beam.

Kick.

- Tighten at 45° .





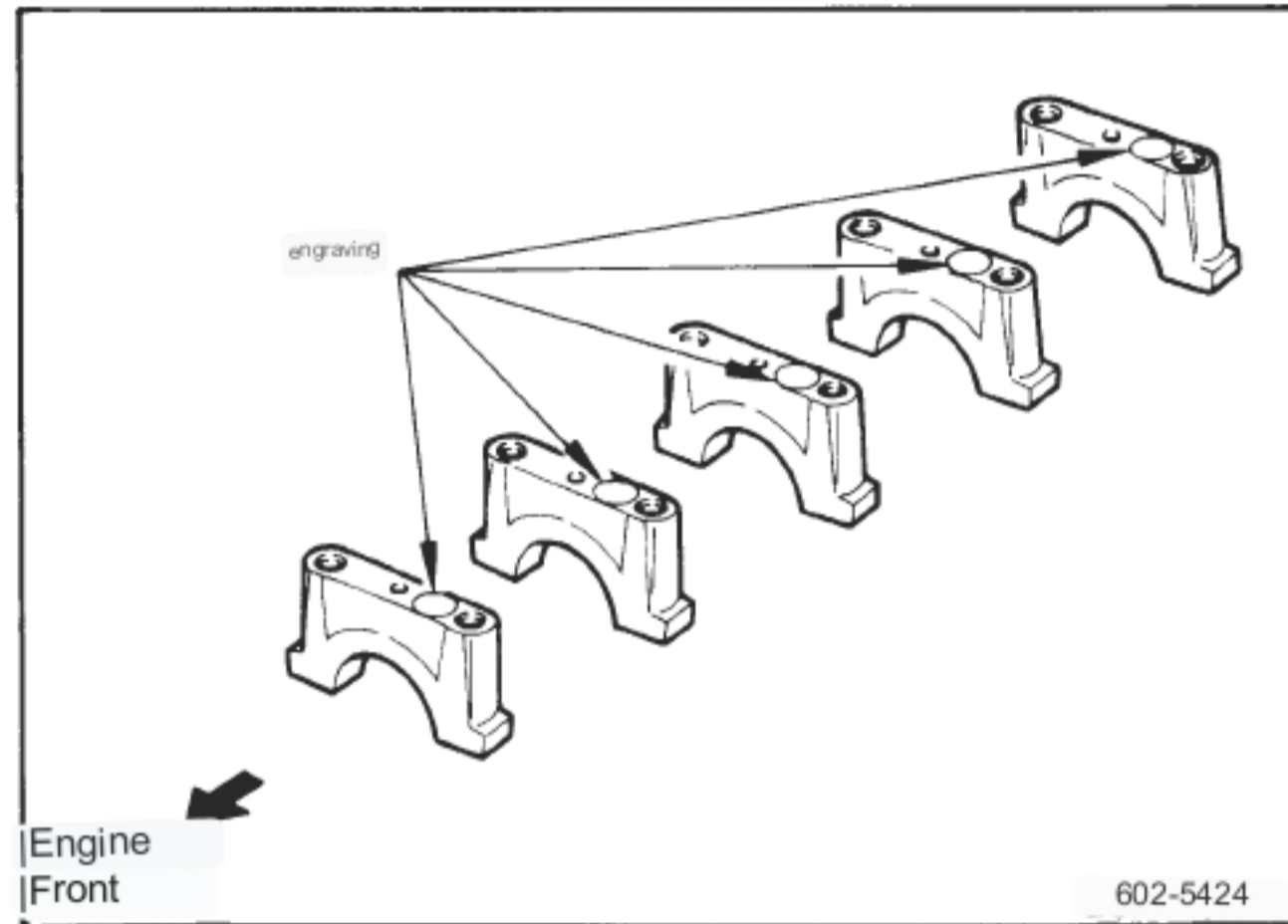
[Point 24] Remove and install the main bearing cap

removal

- Using the main bearing bolt, rotate the bearing cap to the left and right. Remove while shaking.
- If necessary, it may be loosened by tapping back and forth with a copper hammer.

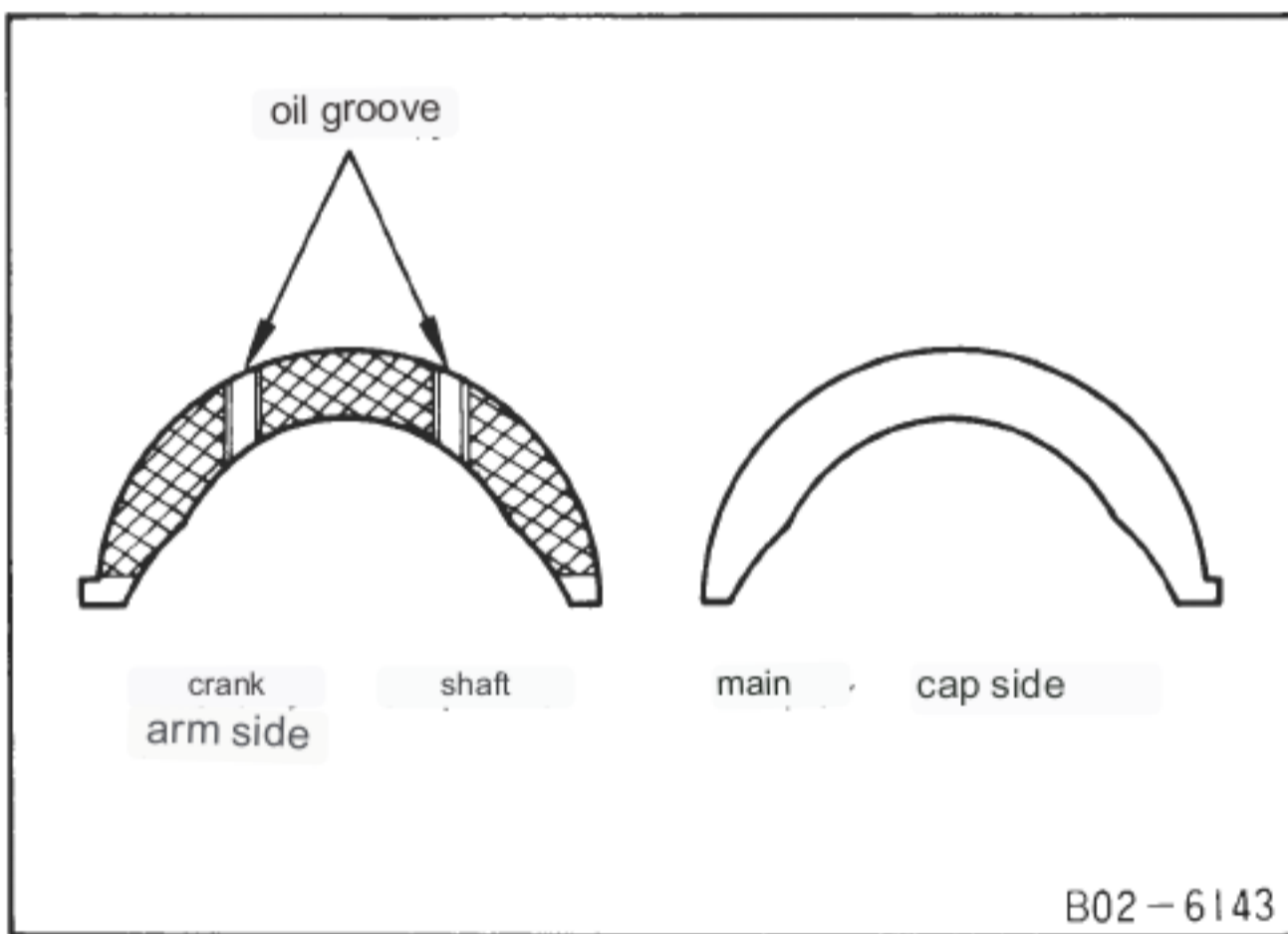
attachment

- The main bearing cap is identified by engraving.
- Install with the upper side of the stamped characters facing the front side. Note: The main bearing cap alone cannot be replaced.



[Point 25] Main bearing installation

- Place the oil groove side of the thrust bearing on the crankshaft arm side.
- turn to
- Select and fit the main bearing according to the cylinder block housing hole diameter and crankshaft journal diameter grade (Refer to [Point 31])



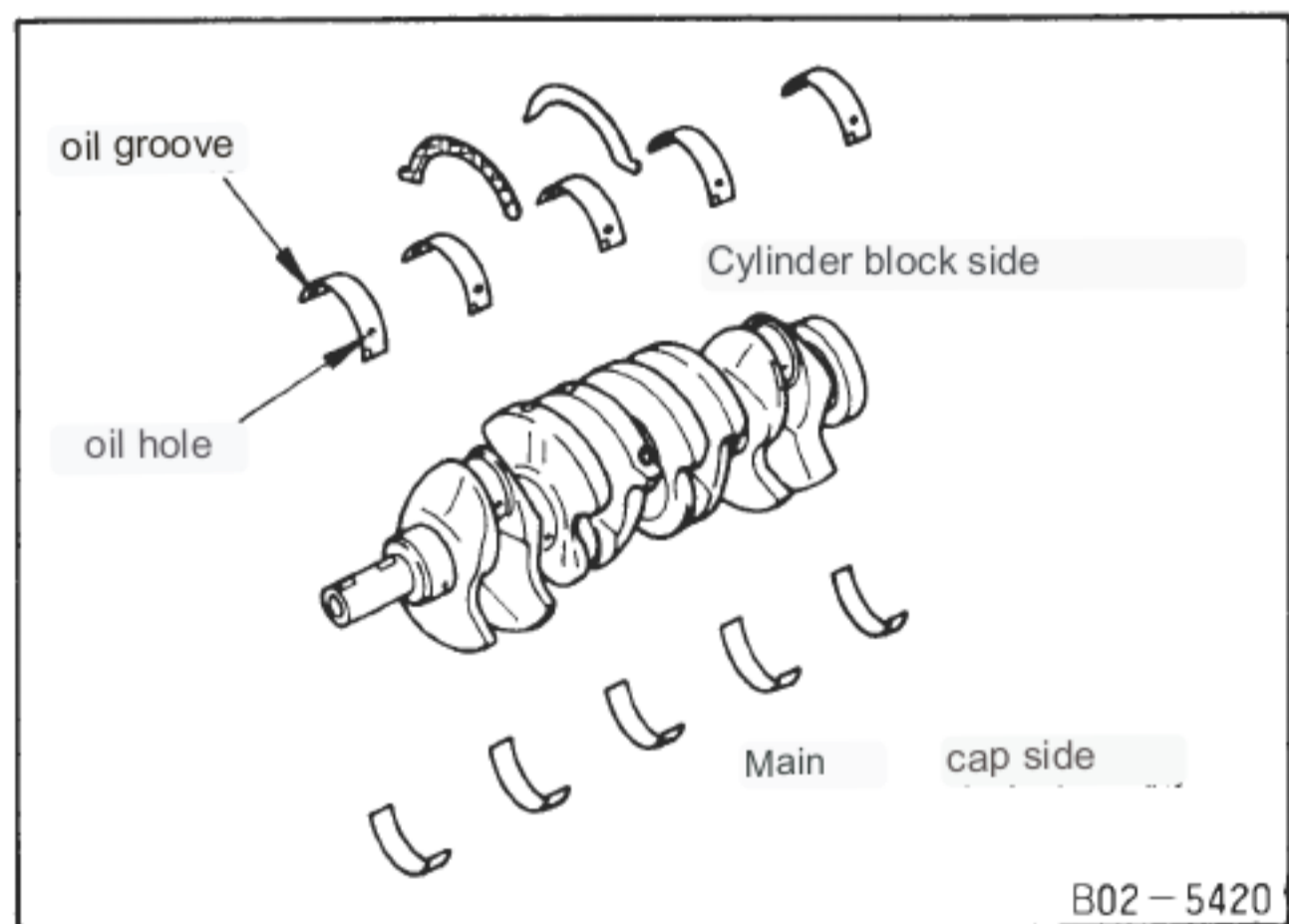
- When installing the main bearing, pay attention to the installation direction. Mainly no holes and no grooves on the cylinder block side for lubrication holes and grooves

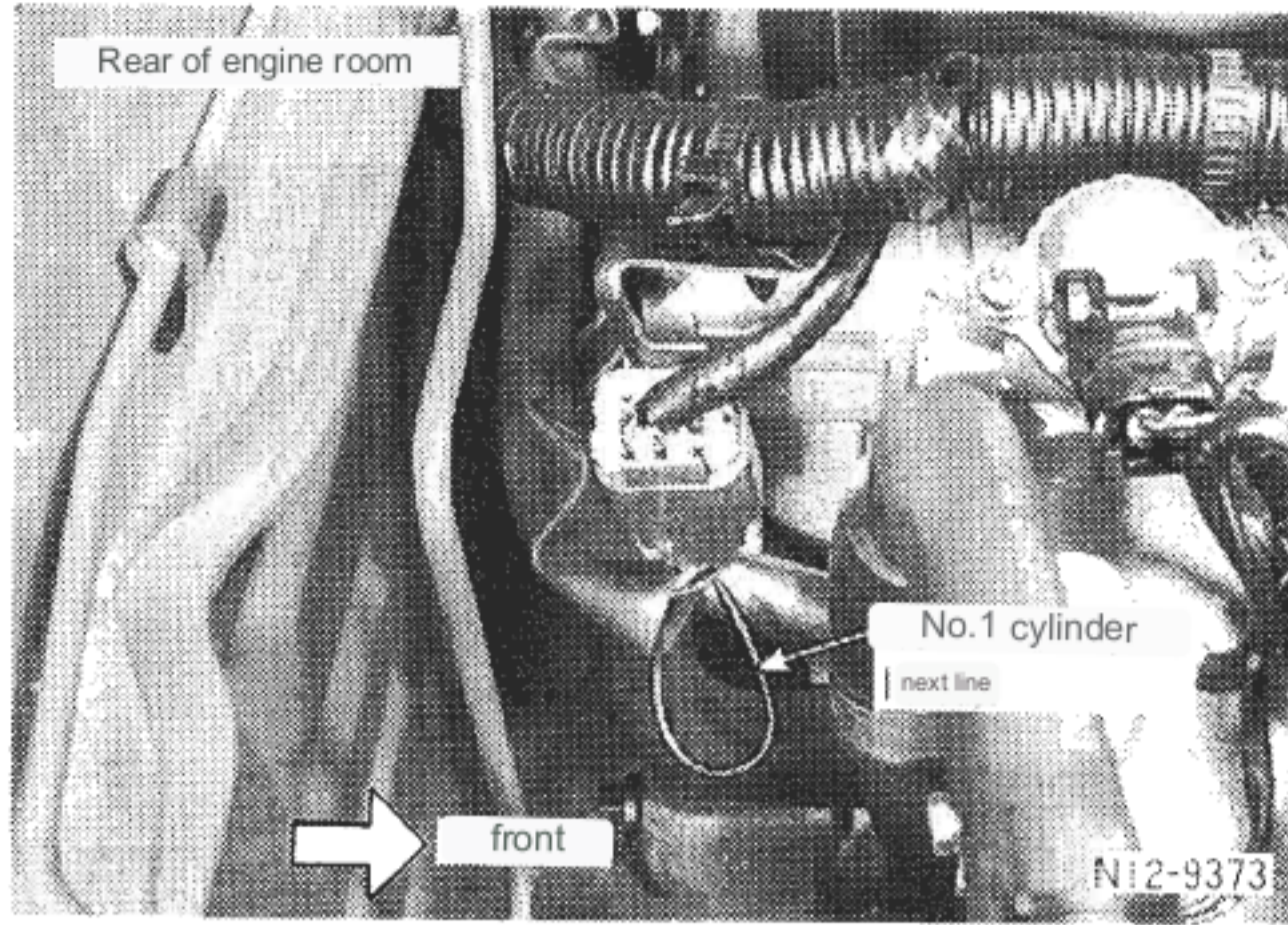
Install on the cap side.

- When installing the bearing, use engine oil on the bearing surface (inner side). apply. Do not apply to the back side and clean thoroughly.
- Assemble the bearing by aligning the whirl-stop notch. The position of the oil hole in the crankshaft body and the oil hole in the bearing are not aligned.

To verify that.

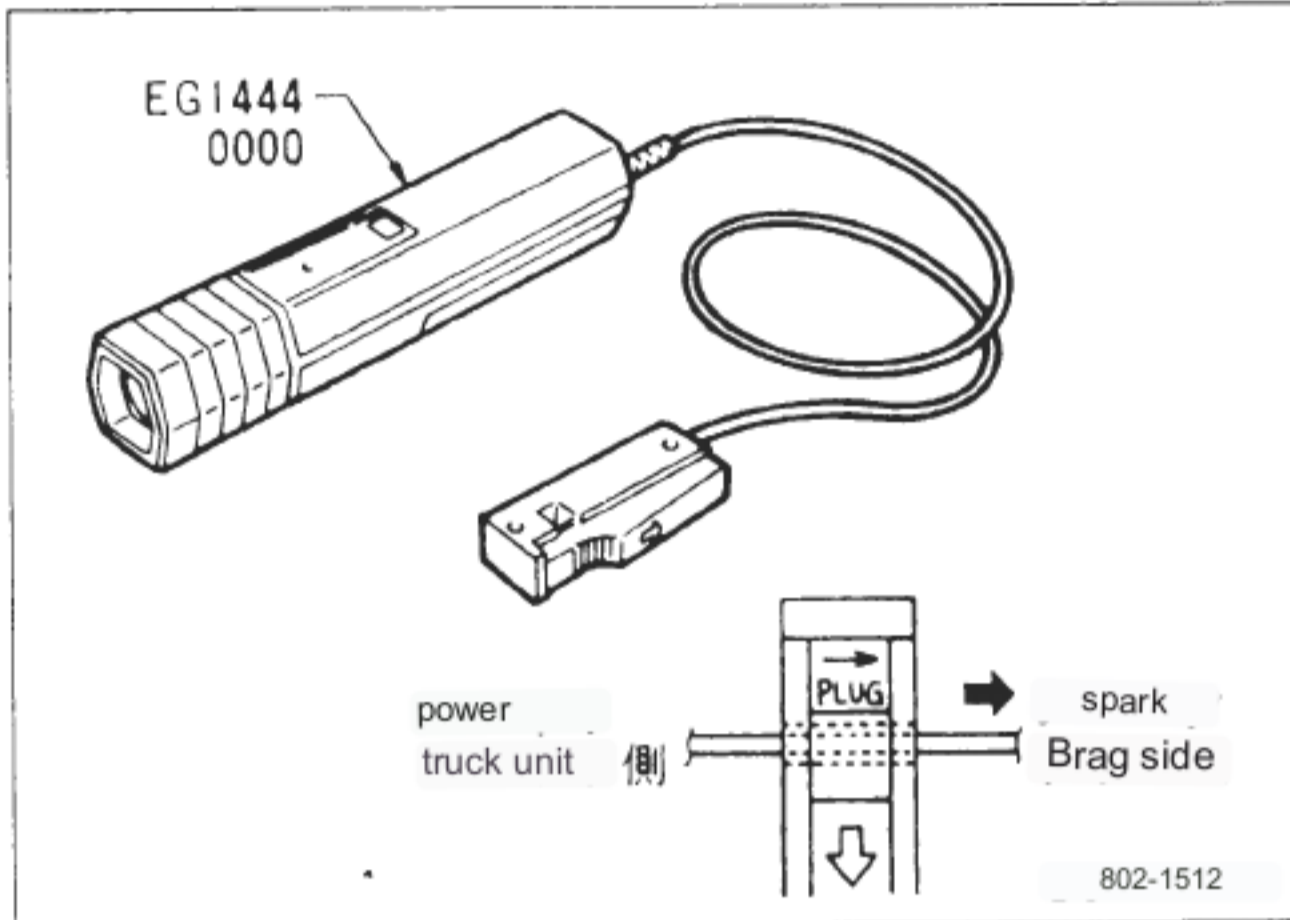
cylinder block side	12215 60J00~06
main cap side	12223 60J00~06



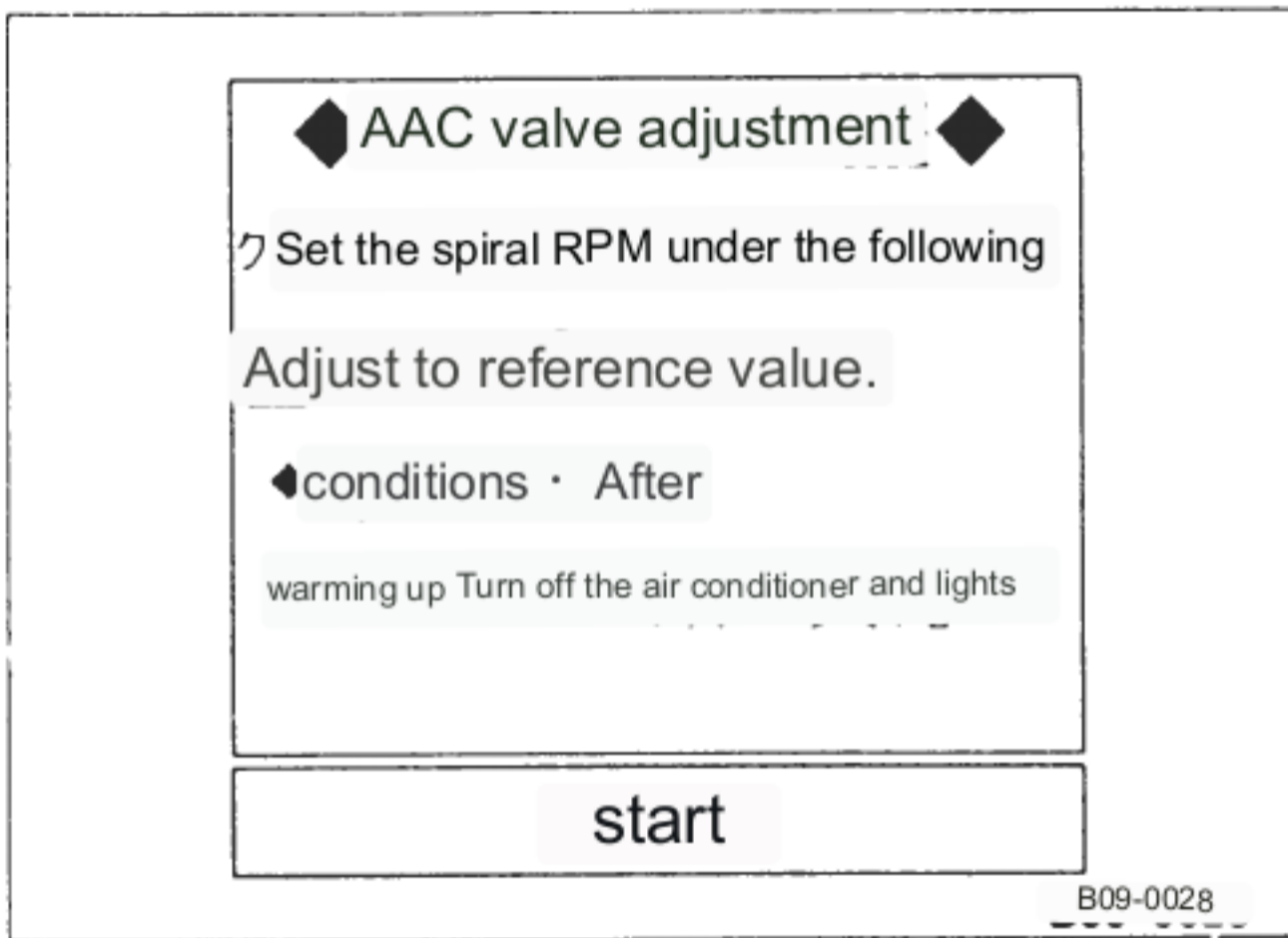


(2) When using a primary current detection type timing

light • Attach a sensor to the primary wire of No.1 cylinder.



Note: When using EG1444 0000 (battery built-in type), when clipping the sensor to the primary line, the direction of the sensor (direction of arrow) should be toward the spark plug. (When the direction of the primary wire is unknown, measure in both directions. The smaller lead angle value is the correct assembly direction.)



point

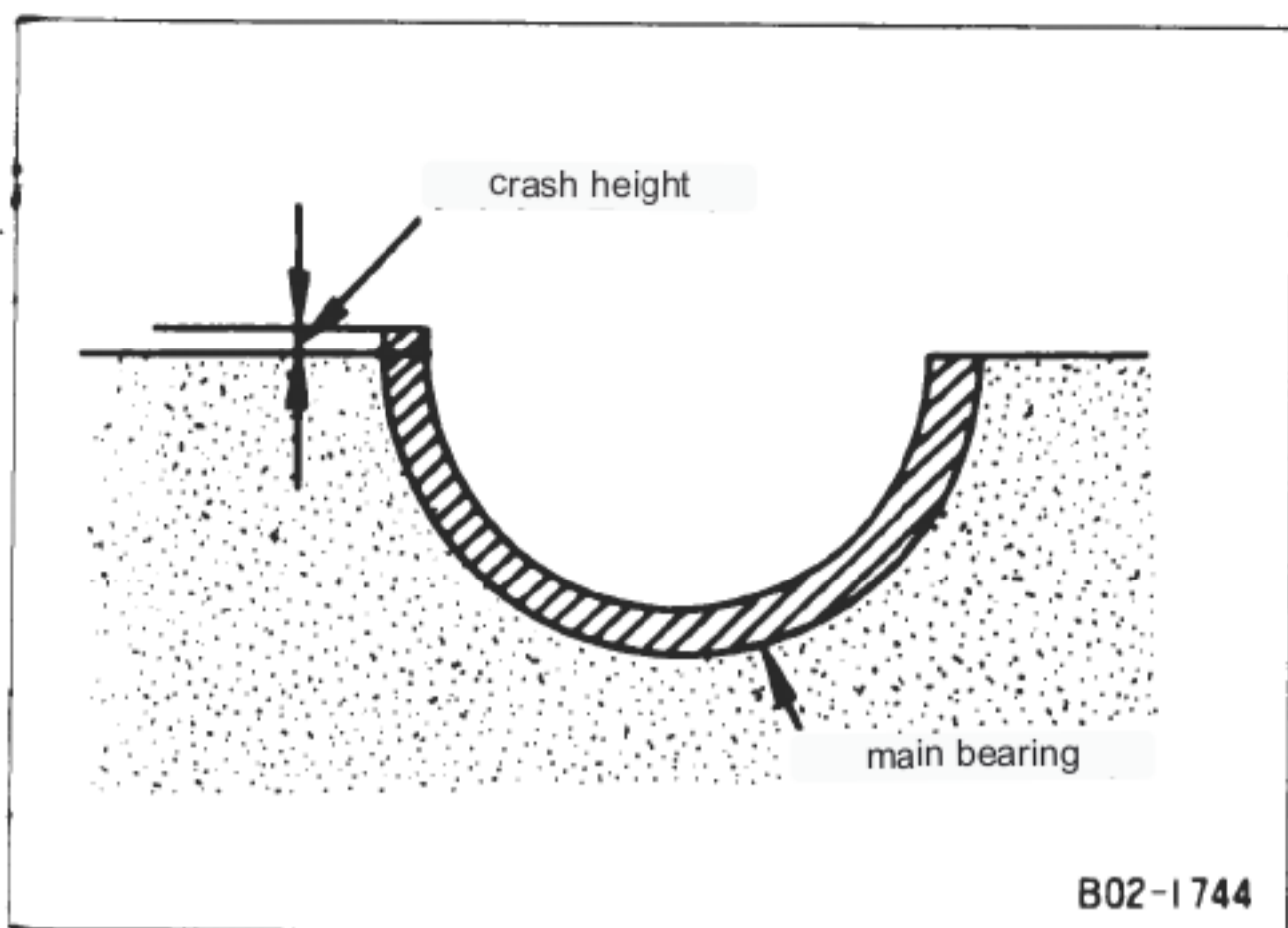
検



• Select "Ignition timing adjustment" in "Work support" and input the ignition timing feed.

Lock back control and check ignition timing.



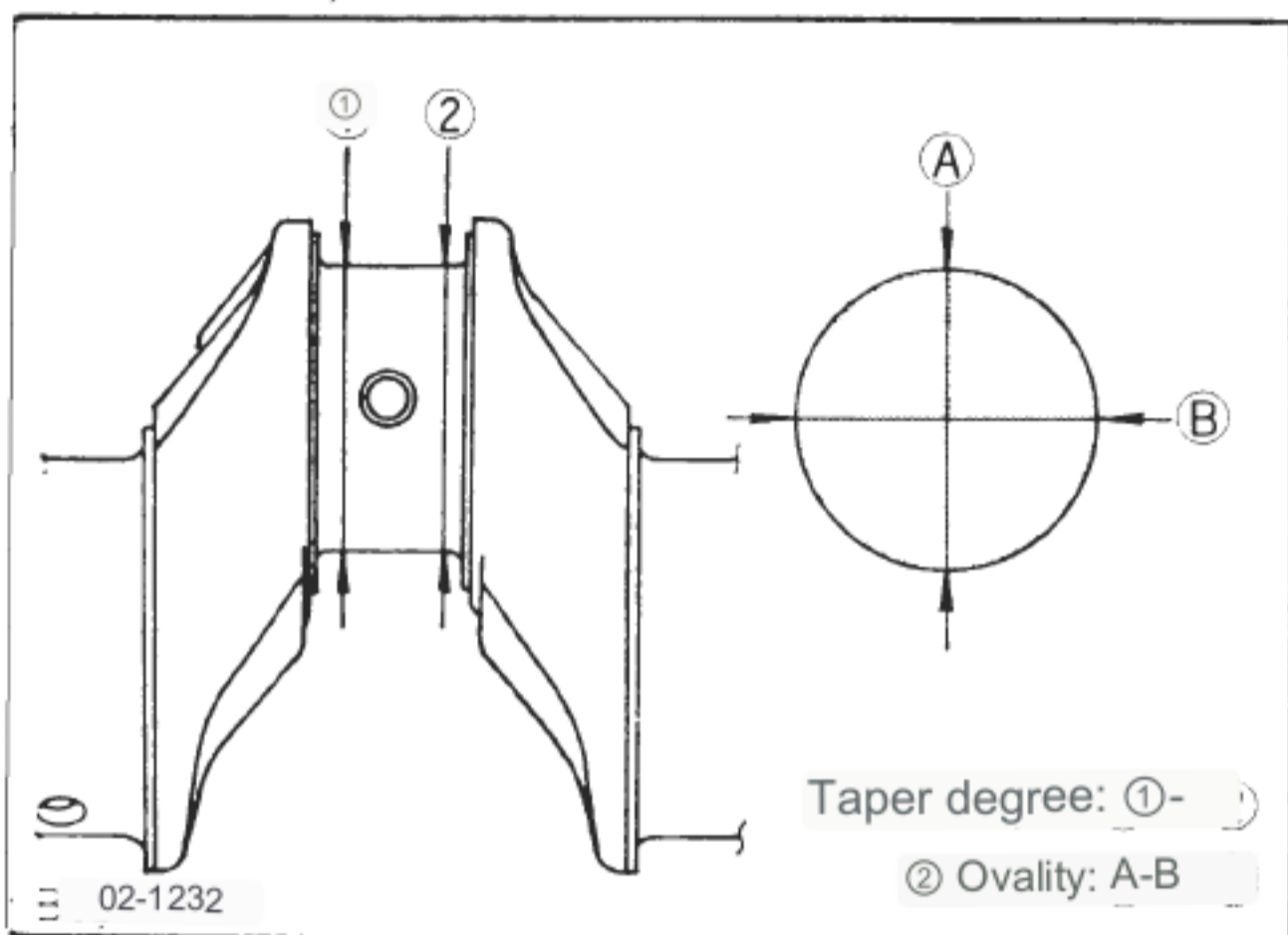


[Point 26] Main bearing inspection

- With the main bearing installed, tighten the bearing cap to the specified torque. When the cap is removed, the tip of the bearing should stick out.

There must be a crush height.

- Apply engine oil to the surface (inner side) of the bearing when installing the main bearing. Do not apply to the back side and clean thoroughly.



[Point 27] Crankshaft inspection

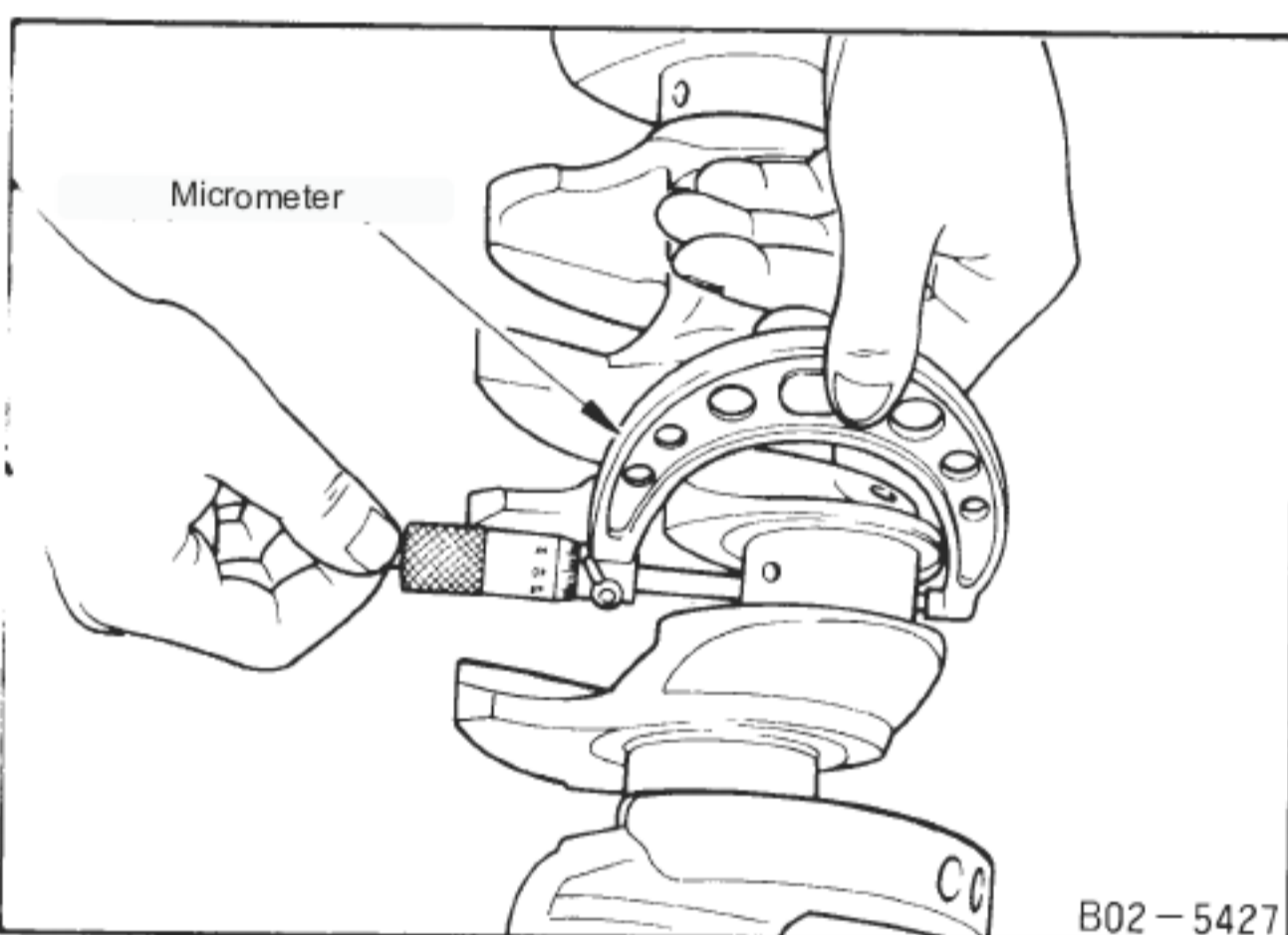
Ovality and taper inspection

- Use a micrometer to measure the 4 points shown in the left figure of each journal and pin.

Measure the spot.

- The ellipticity is indicated by the difference in dimension in the direction of ③ B between the positions ① and ②.
- The degree of taper is indicated by the dimensional difference between ① and ② in the A and B directions.

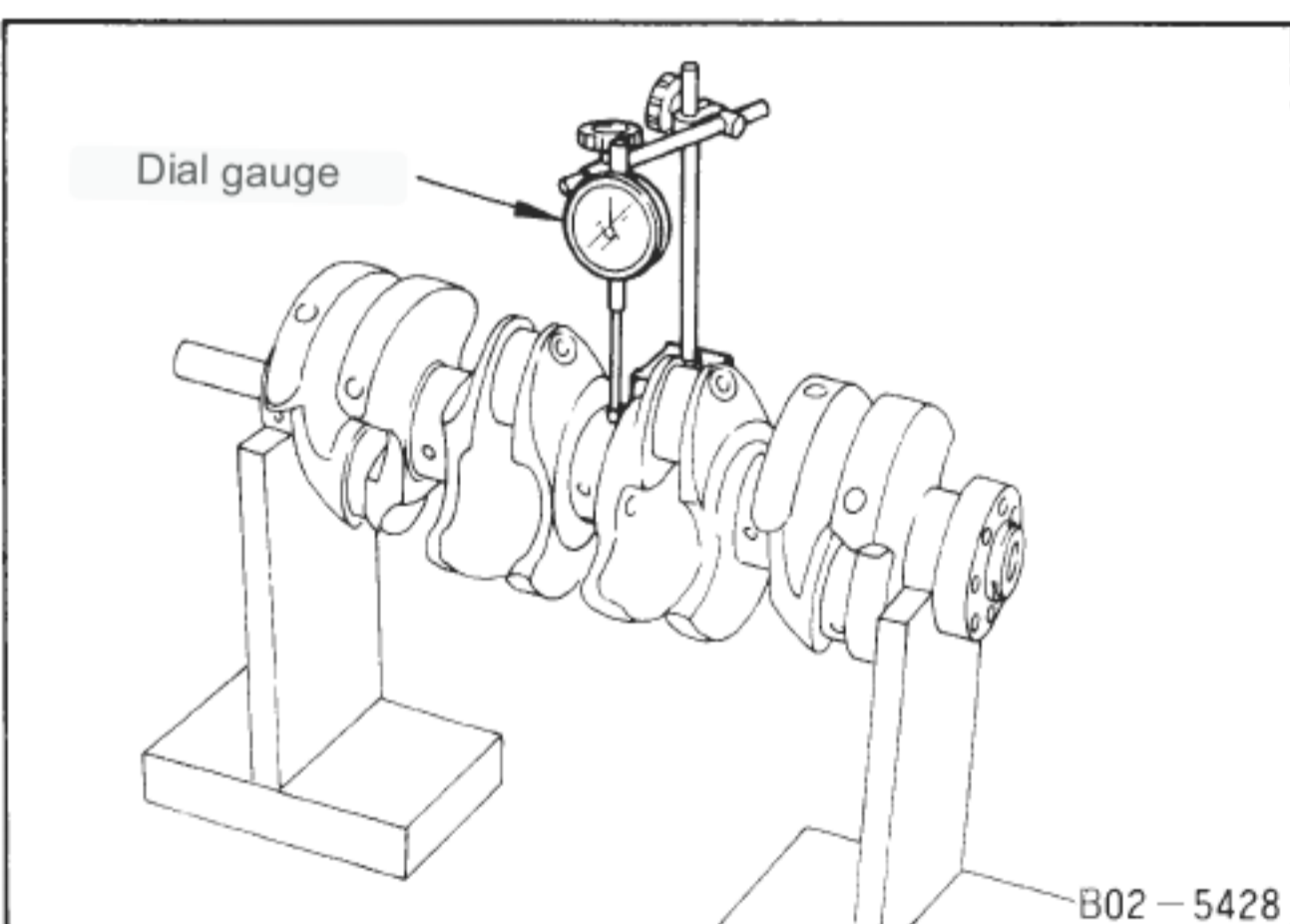
term	目	rank	
Ovality and taper limit	(mm)	pin	0.005
		journal	0.005



Pin and journal diameter inspection

- Measure the pin and journal diameters with a micrometer.

Pin diameter reference value	(mm)	47.956-47.974
Journal diameter reference value	(mm)	54.956-54.980



bend inspection

- Prepare a V-block on the surface plate and insert the journals on both ends of the crankshaft.

support the

- Set the dial gauge at a right angle to the No. 3 journal.

Turn the crankshaft and read the amplitude of the dial gauge.

- 1/2 of the amplitude is bending.

Standard value	(mm)	0.5
----------------	------	-----

[Point 28] Checking connecting rod bearing oil clearance

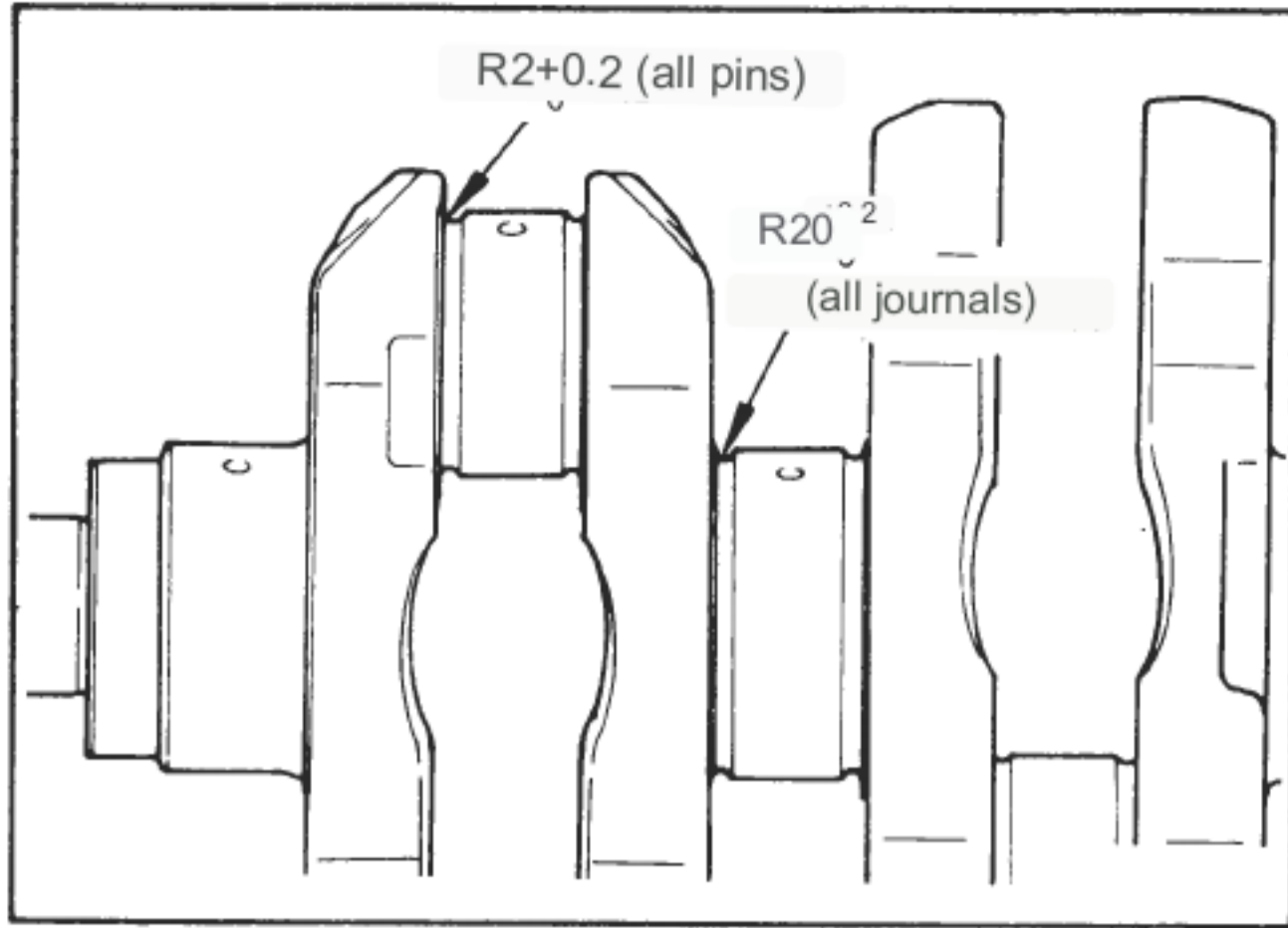
① Method by measurement

- The inner diameter of the connecting rod bearing measured in [Point 19] and [Point 19]

The difference between the crankshaft pin diameters measured in point

27 is the connecting rod bearing oil clearance.

基	value	(mm)	0.020-0.045
limit	value	(mm)	0.065



Instructions for using undersized bearings

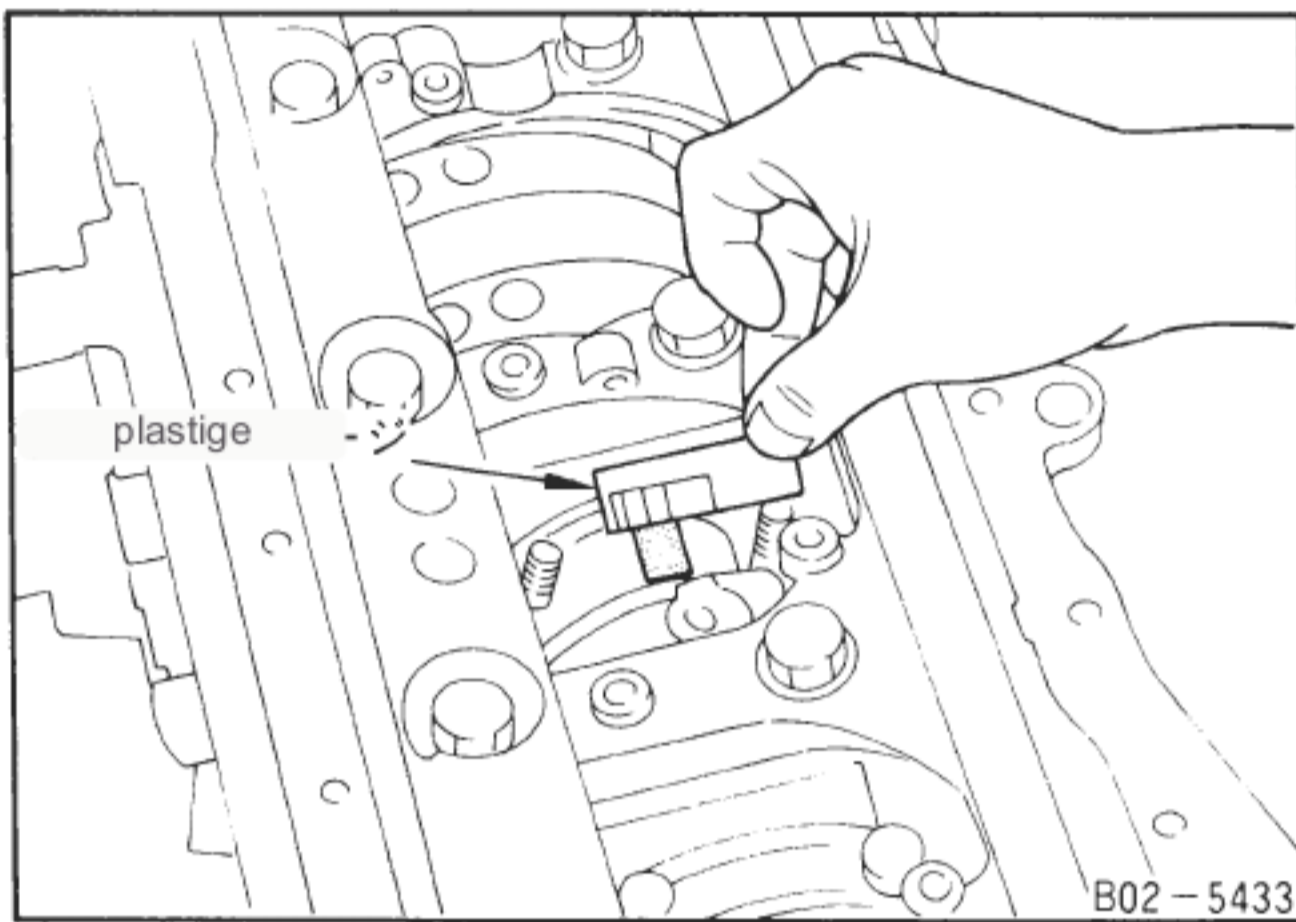
- When using an undersized bearing, measure the inner diameter of the bearing with the bearing installed, and check that the oil clearance reaches the specified value.

Grind the pin as shown.

Bearing undersize table

さ (mm)	US 0.08	1.549/1.541
	US 0.12	1.569/1.561
	US 0.25	1.634/1.626

CAUTION: When grinding the crankpin for use with undersized bearings, do not damage the fillet radius.

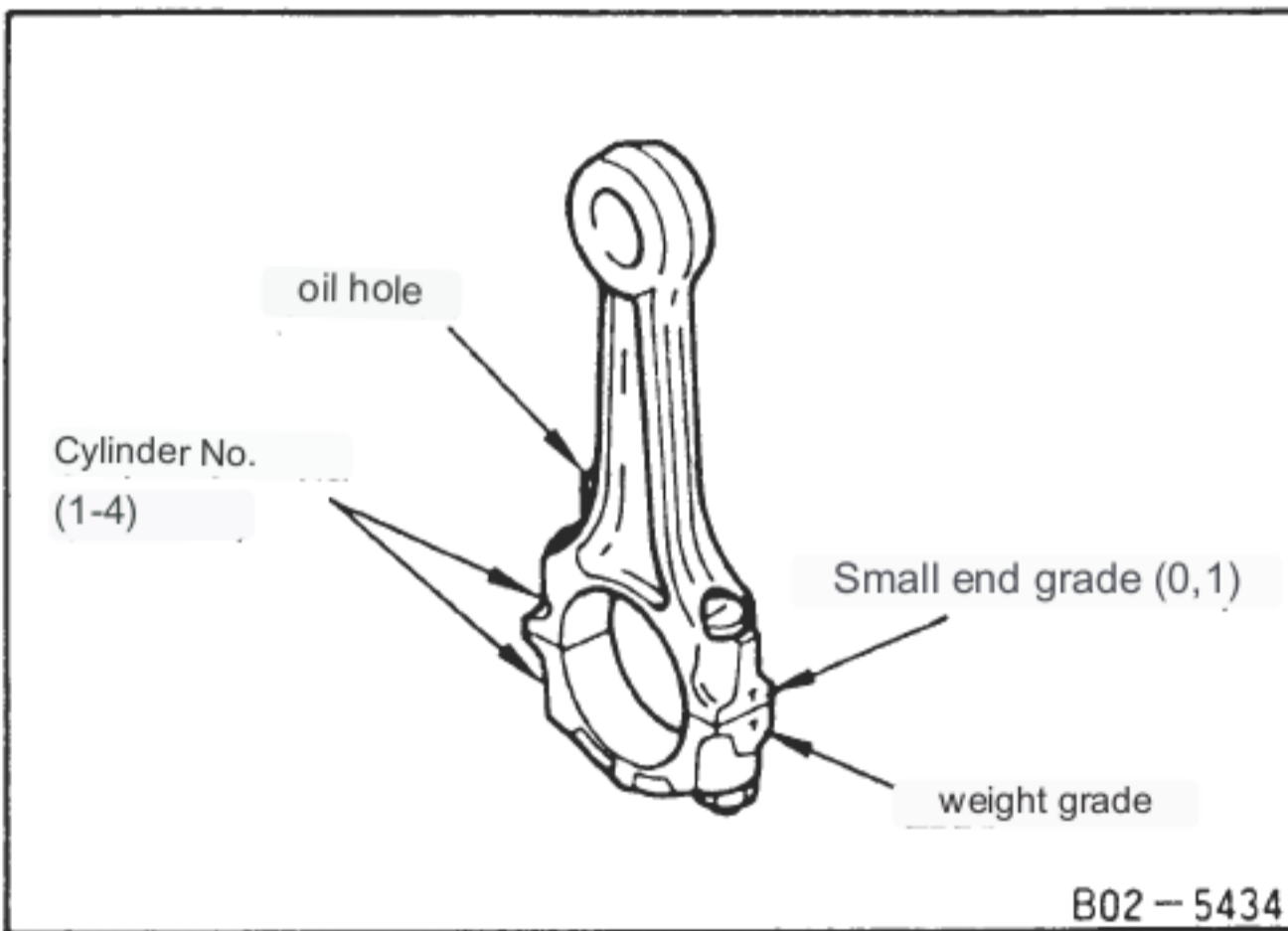


②) Method using plastigage

- Oil and dust on the surface of the crankshaft pin and each bearing ; wipe clean.
- Cut the plastigauge slightly shorter than the bearing width, and Avoid the oil hole in the axial direction of the shaft.
- Attach the connecting rod bearing to the connecting rod cap Tighten the nut to the specified torque. See [Point 12] Caution: Never turn the crankshaft.
- Remove the connecting rod cap and bearing, measure the width of the plastigage with the scale on the plastigage bag, and check the clearance.

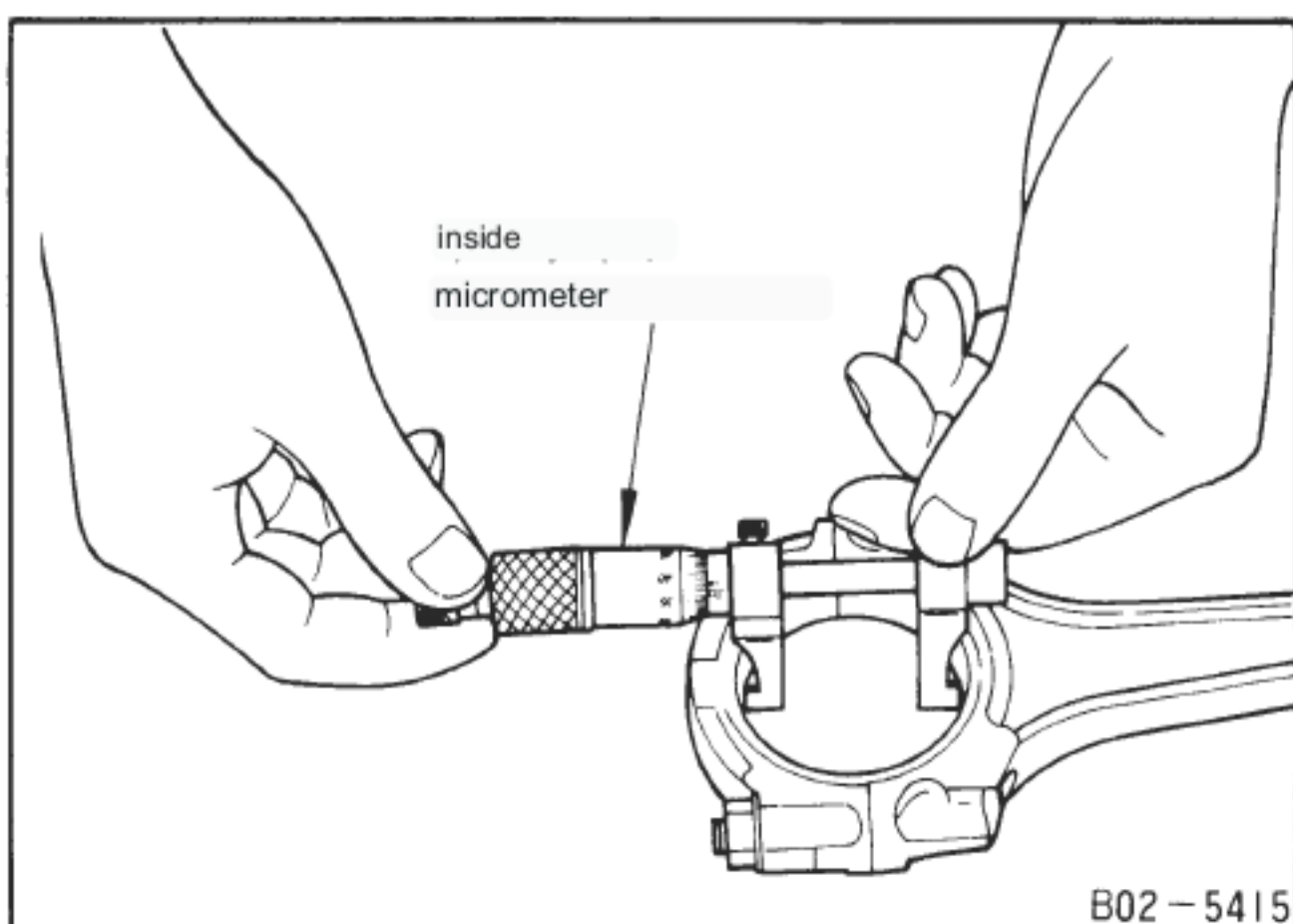
do. Note:

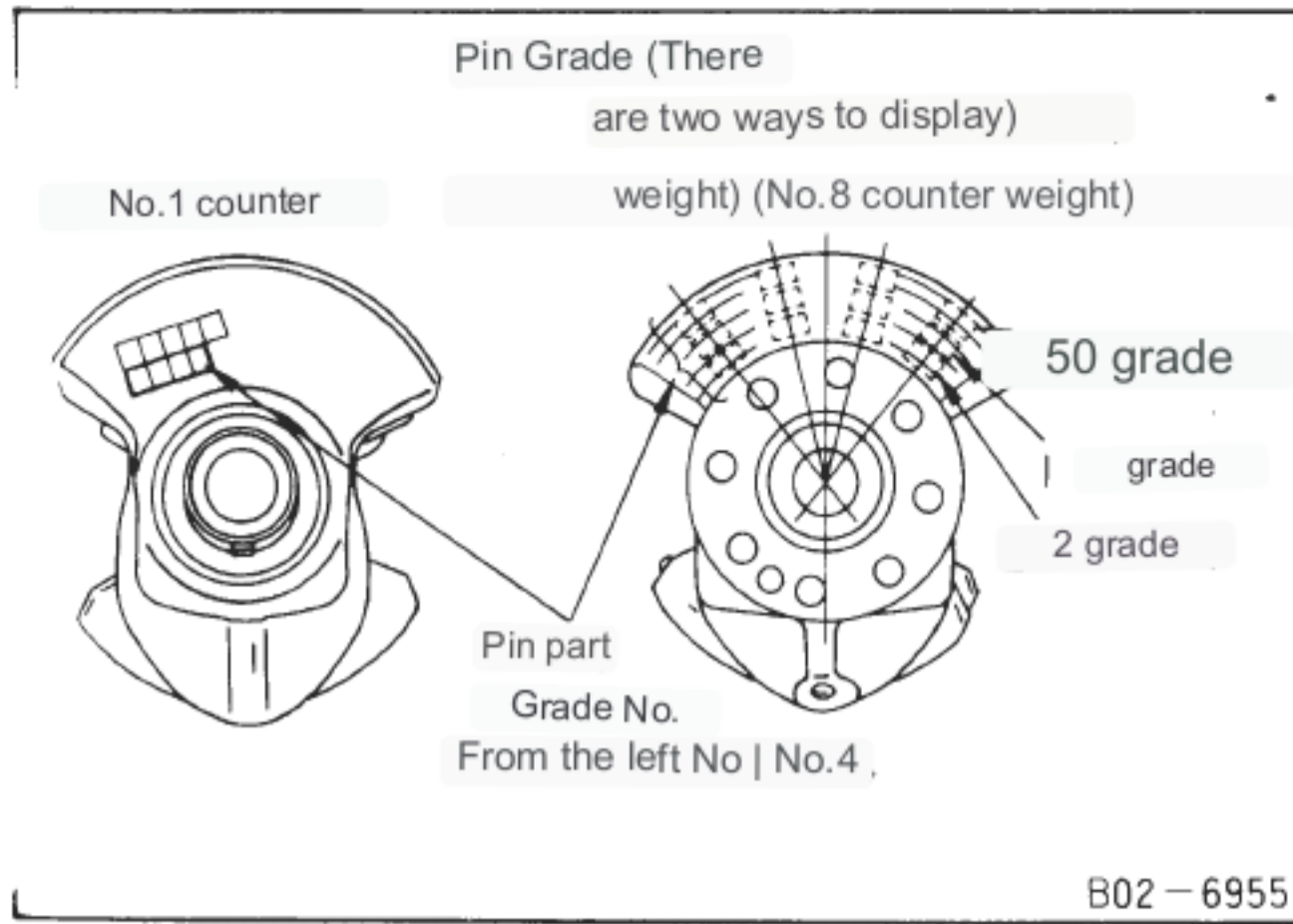
Regarding the standard value, the limit value, and the processing when the limit value is exceeded, refer to "(1) method".



[Point 29] Connecting rod bearing selection fitting

- The connecting rod pairing is selectively fitted to prevent variations in oil clearance. Bearings with 3 different thicknesses are set according to the crankpin diameter grade.
- When replacing the bearing, check the gray stamped on the front surface of the No. 1 counterweight (pin diameter grade display) of the crankshaft. check the model and select the bearing.
- When replacing the bearings, select the bearings according to the following procedure in order to use the oil clearance as a reference value.
 - Attach the cap to the connecting rod and tighten it to the specified torque. (Bearing not installed).
 - Measure the inside diameter of the big end of the connecting rod.





(3) Refer to the marking on the crankshaft and apply the inner diameter of the housing measured in ② and the outer diameter of the crankshaft pin measured in [Point 27] to the selection fitting table to select the bearing.

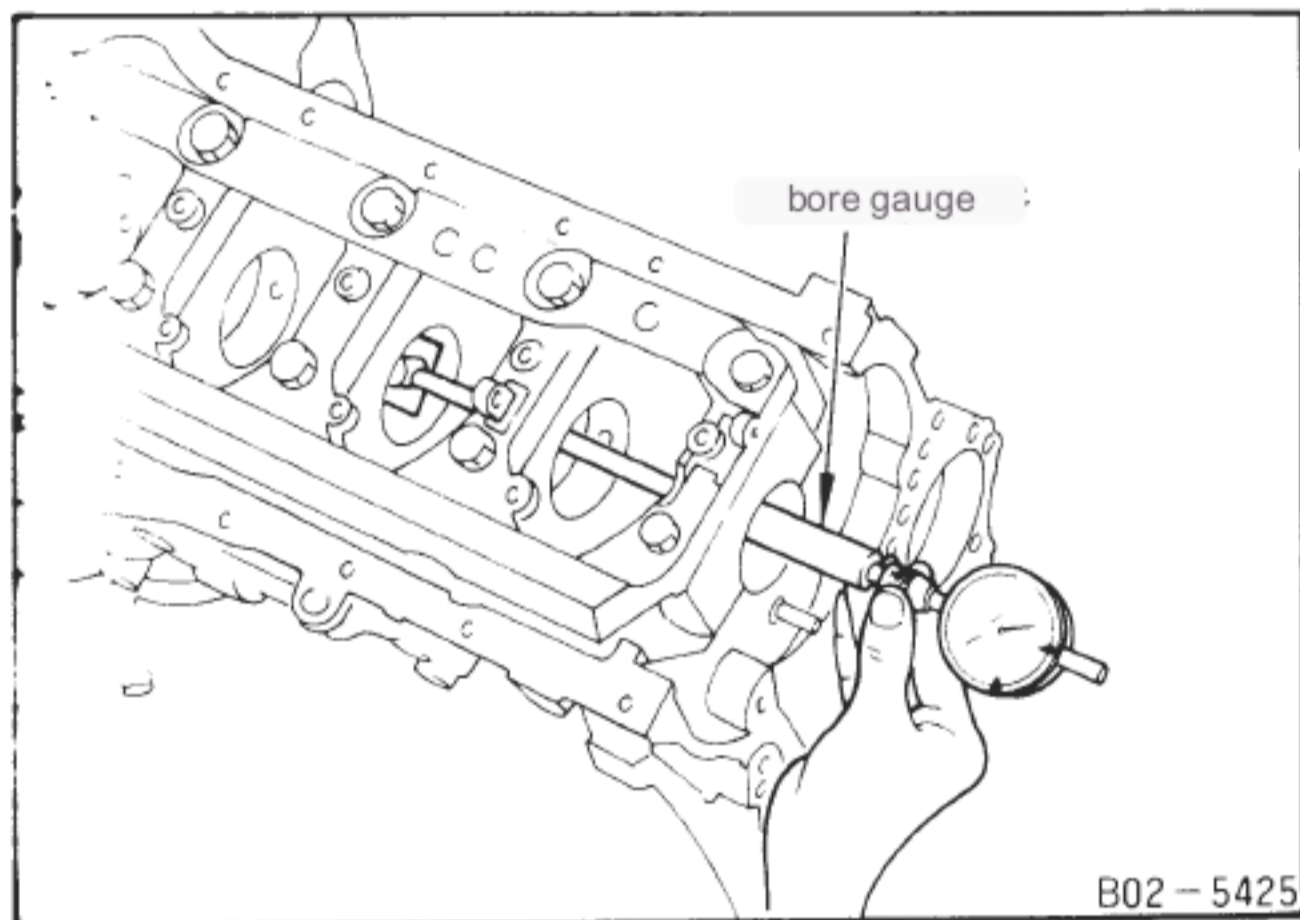
④ Install the selected pairing and check the oil level with a plastigage.

Make sure the clearance is at the reference value. ([Point 28] ②

reference)

Connecting rod bearing selection mating table

Connecting rod big end inner diameter		51.013 51.000
Crank pin outer diameter	Grade No. (engraved)	none
47.974 47.968	0	<ul style="list-style-type: none"> Bearing grade No. STD 0 Pairing thickness 1.500~1.503 Oil clearance 0.020~0.045 Identification color Colorless
47.968 47.962	1	<p>STD 1</p> <ul style="list-style-type: none"> 1.503~1.506 0.020-0.045 Black
47.962 47.956	2	<p>STD 2</p> <ul style="list-style-type: none"> 1.506~1.509 0.020~0.045 Brown



[Point 30] Main bearing oil clearance check

① Method by measurement

· Cylinder block and bearing cap for main bearing

and tighten the bearing cap bolt to the specified torque.

Measure the inner diameter of the bearing and check the clearance.

(Refer to [Point 23])

• [Point 27] Measured from the outer diameter of the crank journal

Calculate.

$$\text{(oil clearance)} = \text{(Bearing Diameter Inner)} - \text{(Crank Journal Outer Diameter)}$$

group	standard	value	(mm)	0.004 0.022
limit	excess	value	(mm)	0.05

Instructions for using undersized bearings

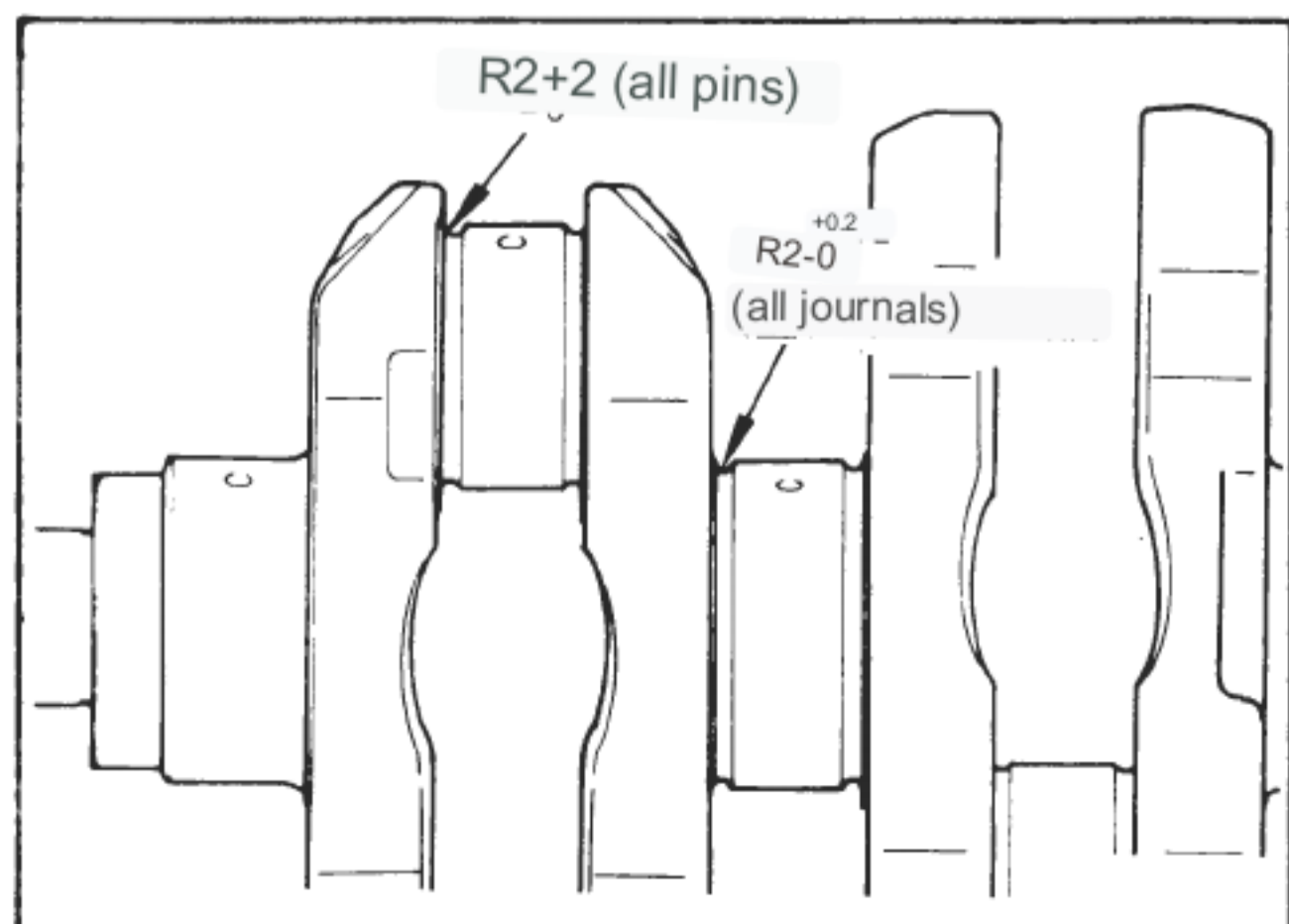
· When using an undersized bearing, measure the inner diameter of the bearing with the bearing installed, and check that the oil clearance reaches the specified value.

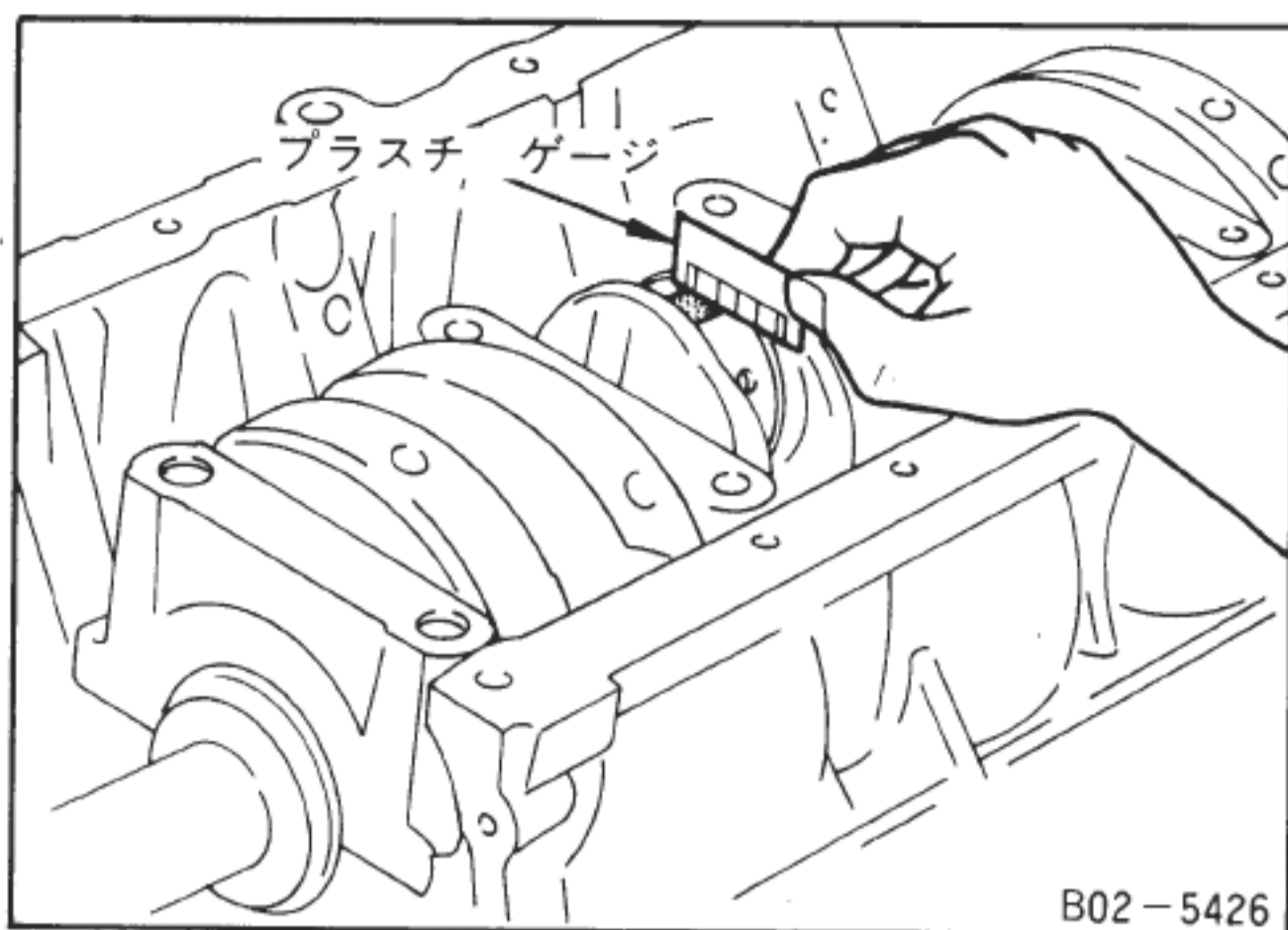
Grind the journal as shown.

Bearing undersize table

size	thickness (mm)
US 0.25	2.117/2.109

Note: When grinding the crank journal for use with undersized bearings, do not scratch the fillet radius.





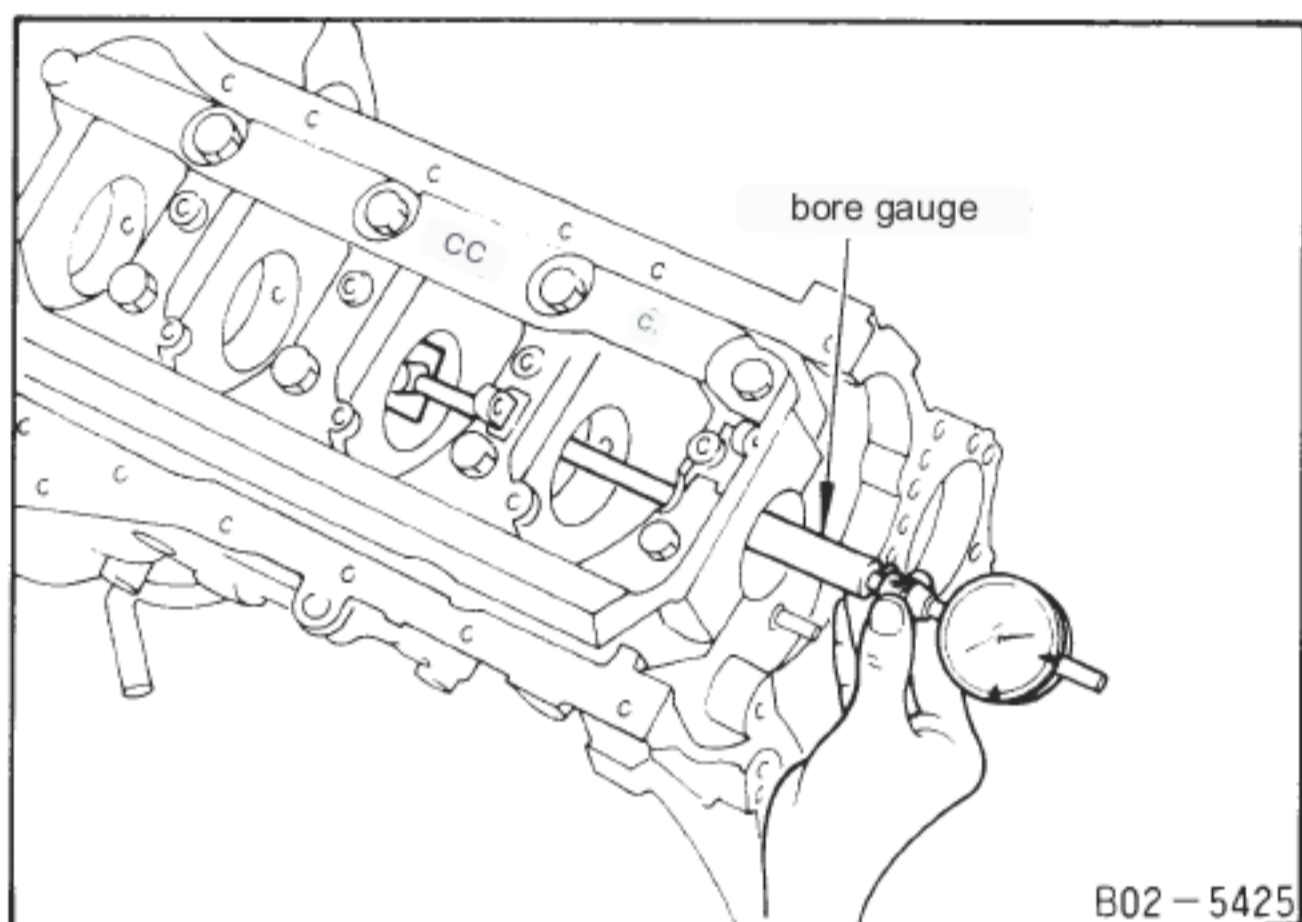
② Method using plastigage

- Oil on the surface of the crankshaft journal and each pairing,
Wipe off dust.
- Cut the plastigauge slightly shorter than the bearing width, and
Avoid the oil hole in the axial direction of the shaft.
- Tighten the main bearing bolt to the specified torque.

CAUTION: Never turn the crankshaft.

- Remove the bearing cap and bearing, and remove the plastigauge.
Measure the width of the plastigauge on the bag scale.

Note: The standard value, limit value, and processing when the limit value is exceeded are the same as in "(1) Method by measurement".



[Point 31] Main bearing selection fitting

- The main bearings are fitted selectively to prevent variations in oil clearance. Suitable for cylinder block bearing housing and crank journal diameter grade
In addition, 7 types of thickness bearings are set.
- In order to set the oil clearance to the standard value when replacing the bearing,
Select a bearing by following the steps in .

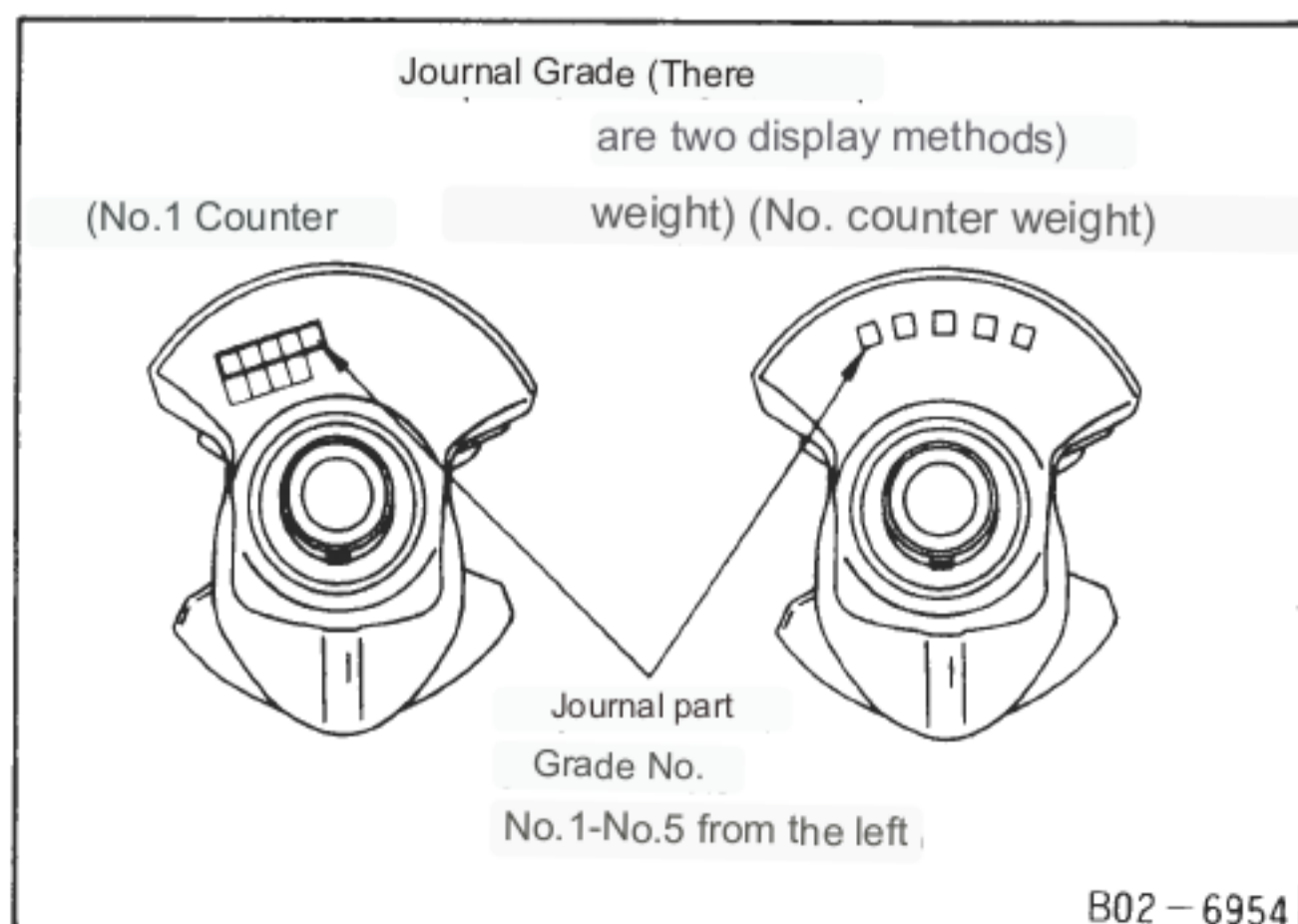
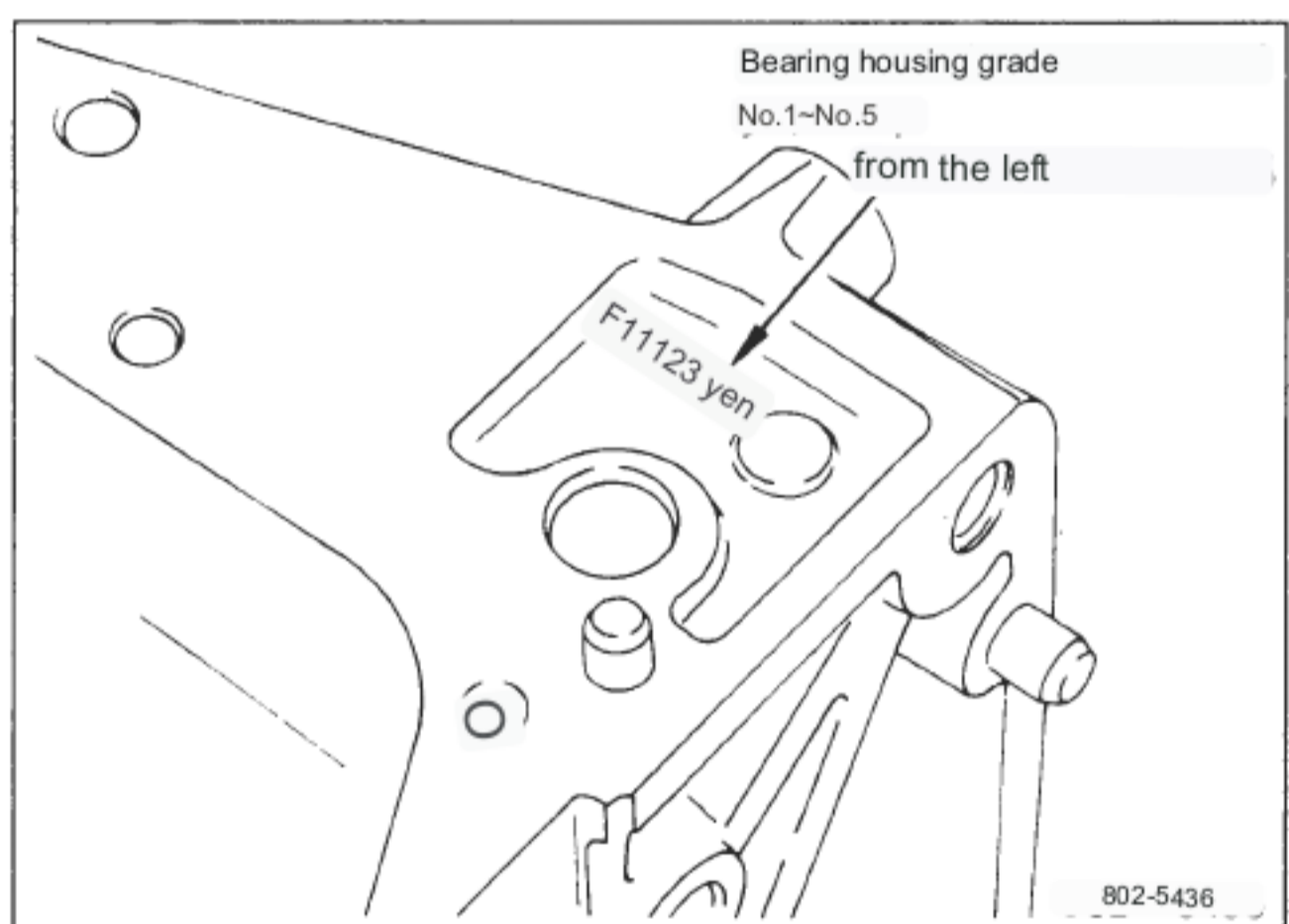
- 1 Install the bearing cap on the cylinder block and
Tighten with torque (no bearing installed).

- (2) Measure the inner diameter of each housing.

Note: Selective mating is performed only for standard sizes.

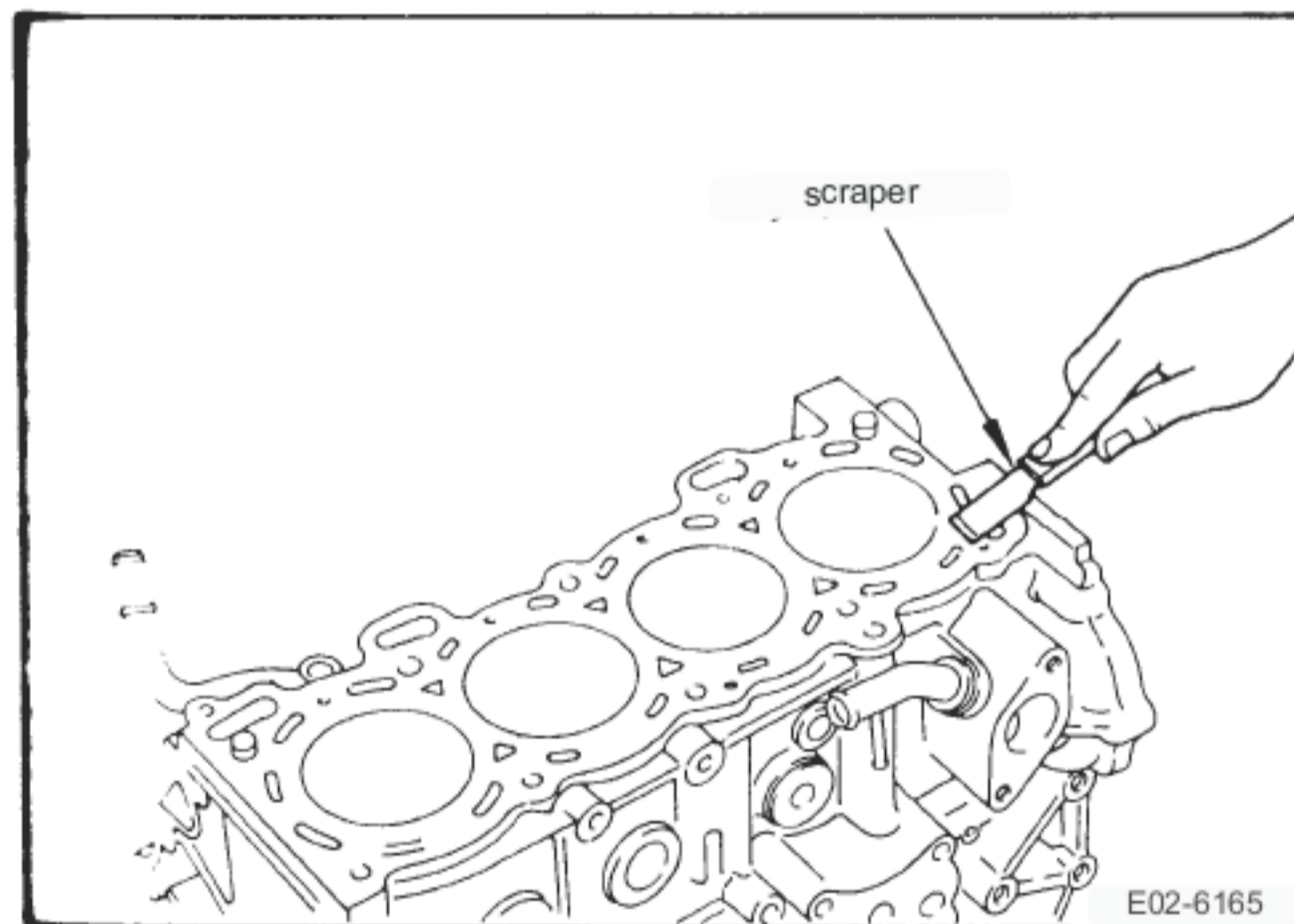
- ③ Refer to the markings on the cylinder block and crankshaft, and enter the inner diameter of the housing measured in ② and [Point 27] in the selection fitting table.
Applying the crankshaft journal outside diameter value measured in
select the ring.

- ④ Install the selected bearing and check with a plastigage that the oil clearance is within the standard value. (See [Point 30] ② see)



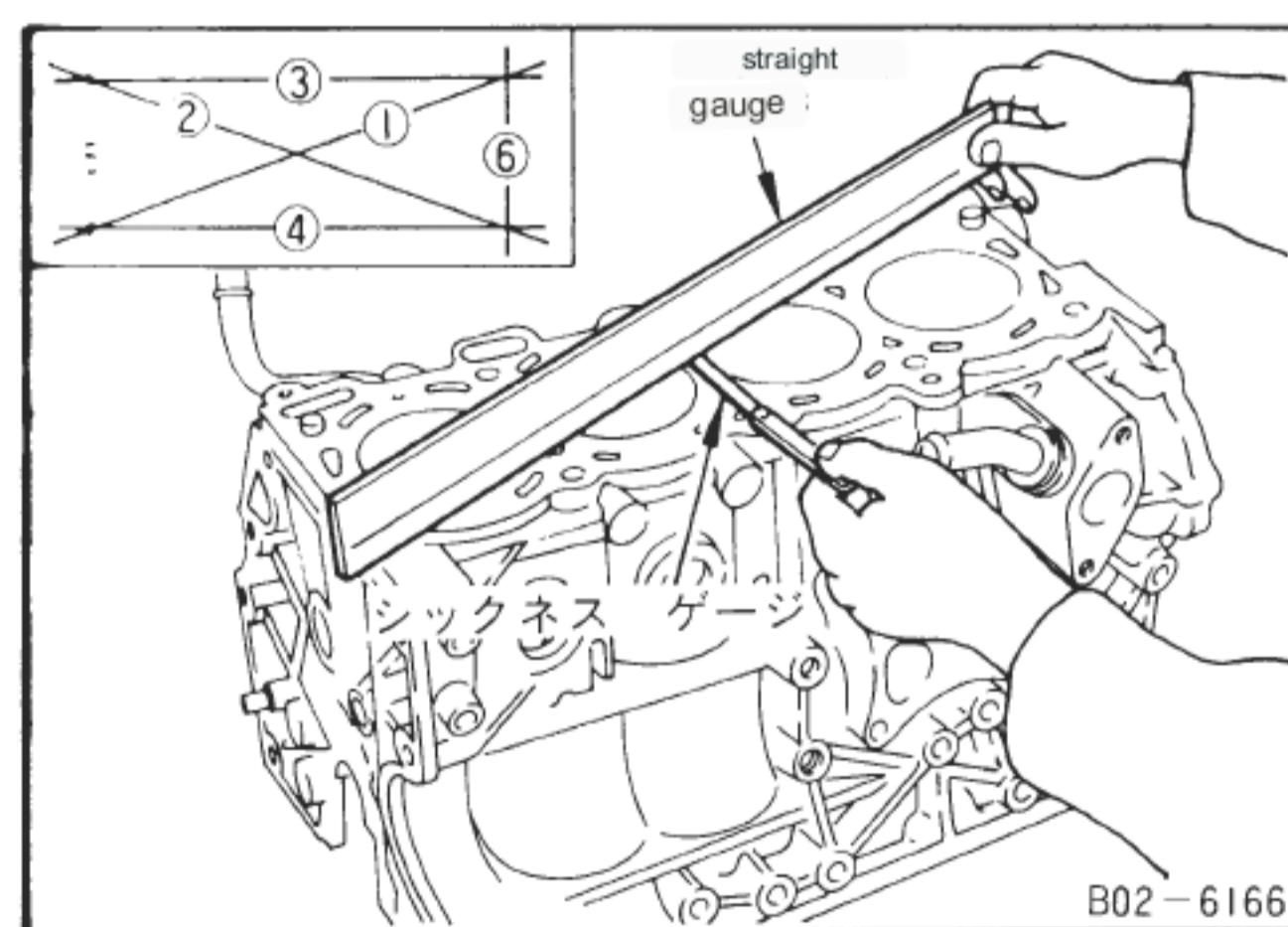
Main bearing selection mating table

Cylinder block ring housing inner diameter			58.950 58.944	58.956 58.950	58.962 58.956	58.968 58.962
Rank	Grade No. (engraved)		0	1	2	3
54.980 54.974	0	• Bearing grade No. STD 0 • Bearing thickness 1.977~1.980 • Oil clearance 0.004 0.022 • Identification color black color				
54.974 54.968	1	• Bearing grade No. STD 1 • Bearing thickness 1.980 1.983 • Oil clearance Identification 0.004~0.022 • color Brown				
54.968 54.962	2	• Bearing grade No. STD 2 • Bearing thickness 1.983~1.986 • Oil clearance 0.004~0.022 • Identification color green				
54.962 54.956	3	• Bearing grade No. STD 3 • Bearing thickness 1.986~1.989 • Oil clearance Identification 0.004 0.022 color Yellow				



[Point 32] Cylinder block inspection and correction

- Use a scraper to remove the gasket attached to the surface of the cylinder block.
- remove completely using



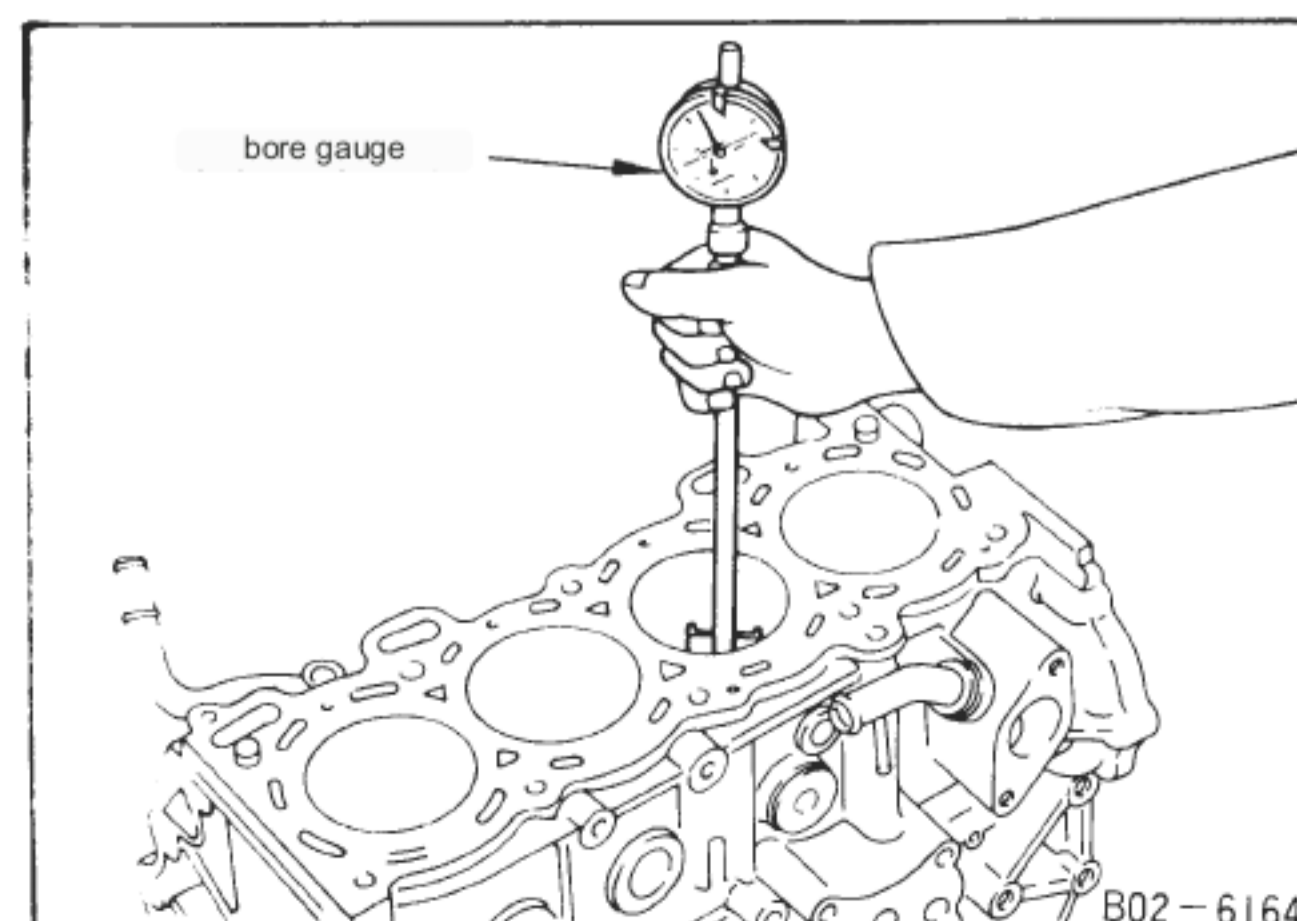
Cylinder block top surface inspection and correction

- Measure the strain of the cylinder block at several points in 6 directions.

Limit value (mm)	0.1

- If the strain exceeds the limit, repair it with a surface grinder.

Correct.

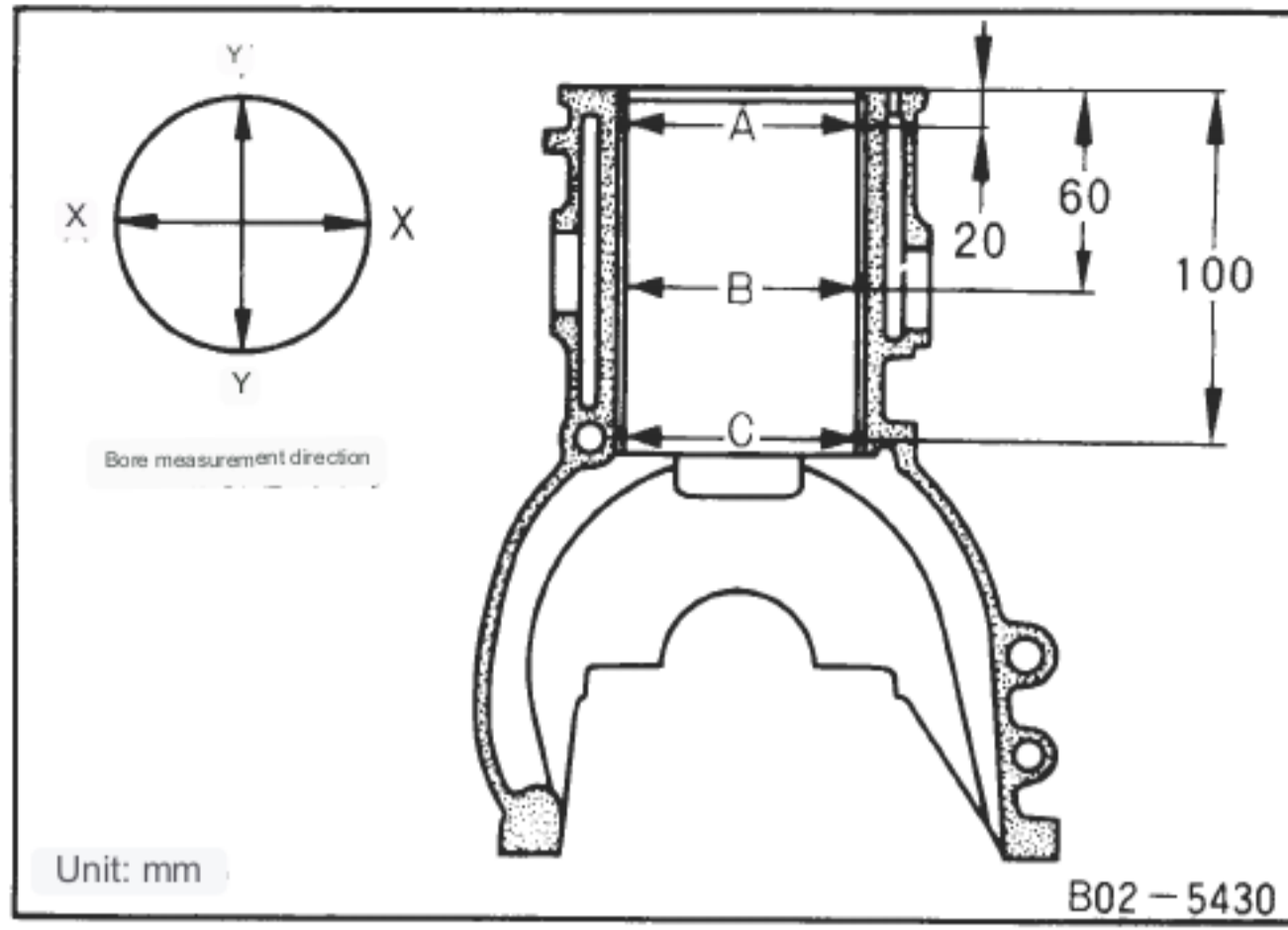


Cylinder inner diameter inspection

- Use a bore gauge to adjust the inner diameter of the cylinder at three points (A, B, C), measure 6 points in 2 directions (X, Y).

<reference value>

Inner diameter standard value grade (mm)	1	86.000 86.010
	2	86.010 86.020
	3	86.020 86.030



<limit value>

Wear limit	(mm)	0.2
Ovality limit <small>(difference between X and Y measurements)</small>	(mm)	0.015
Taper limit (mm) (difference <small>between A and C measurements)</small>		0.010

- If any abnormality is found during inspection, perform honing or boring.

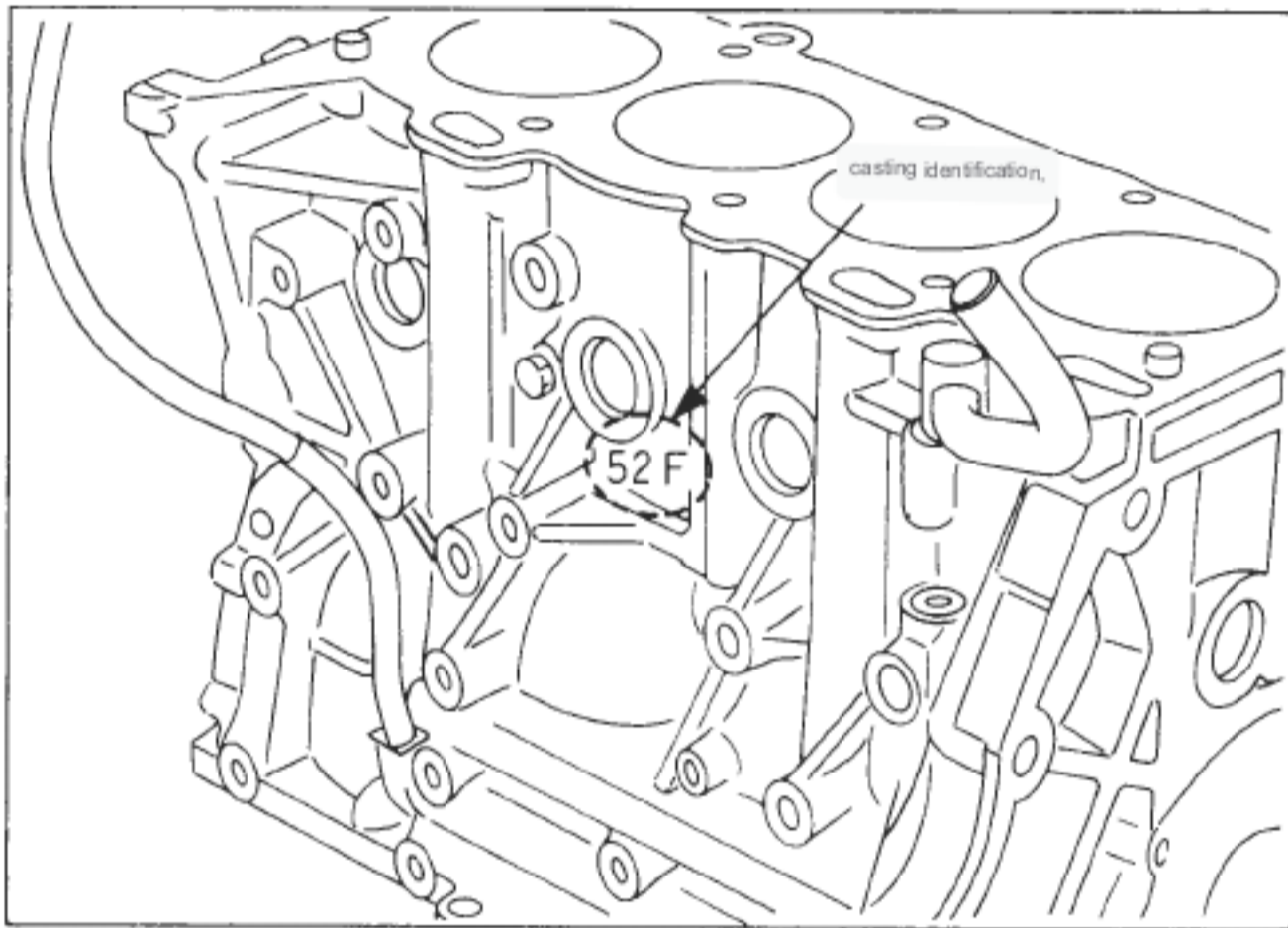
cylinder honing

- There is an OSO.2 setting for oversized pistons. When using an oversized cylinder, honing the cylinder so that the clearance between the piston and cylinder is the value indicated in [Point 33]. Also, oversized piston rings that match oversized pistons

use

cylinder block identification

The cylinder block is identified by the casting symbol at the left figure.



Cylinder block identification symbol	52F
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[Point 33] Check clearance between piston cylinders

- Calculated from the piston skirt outer diameter and cylinder inner diameter (X direction, B position) measured in [Point 16] and [Point 31]

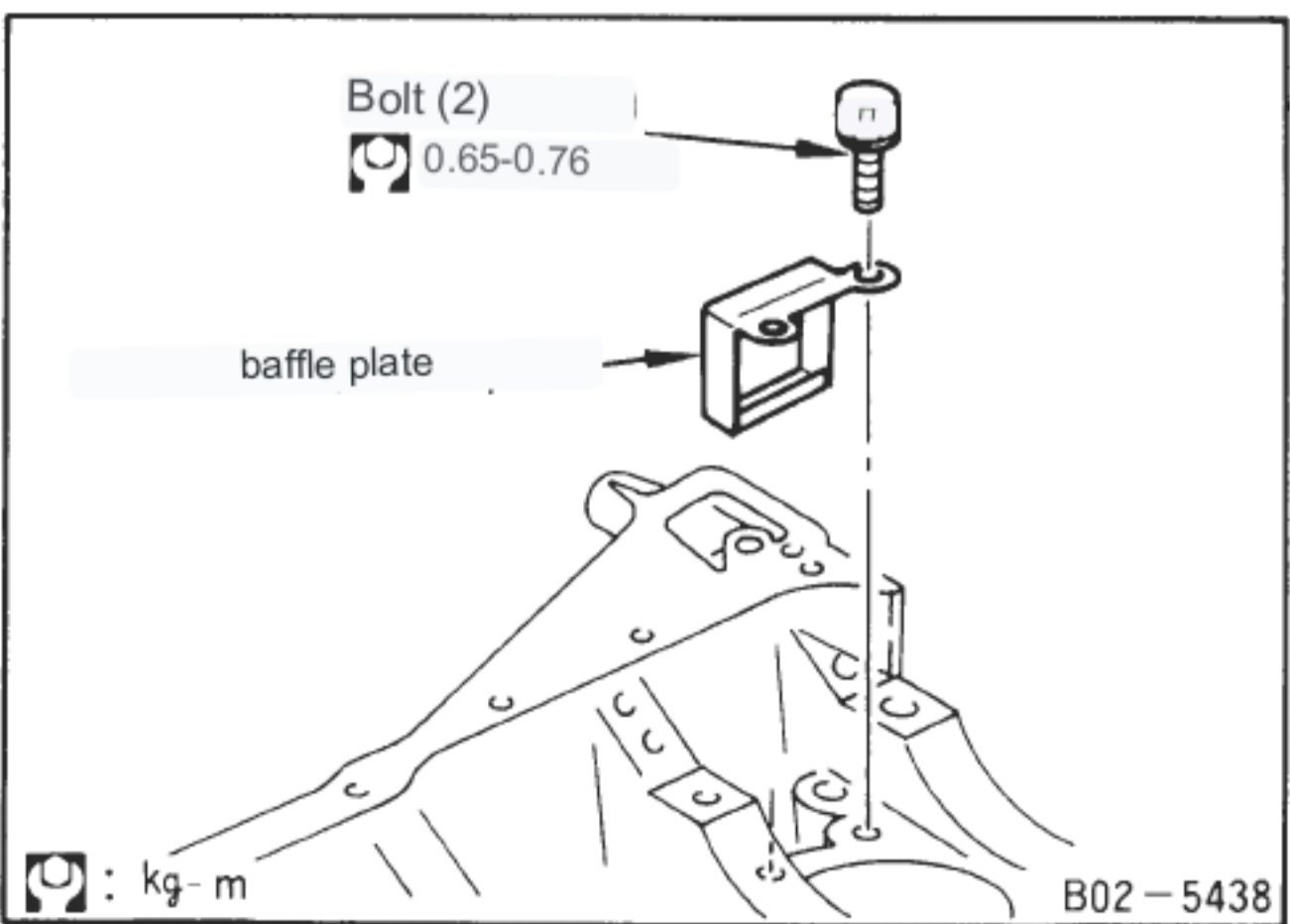
Ask for more.

$$(\text{clearance}) = (\text{cylinder inner diameter}) - (\text{outer diameter of piston skirt})$$

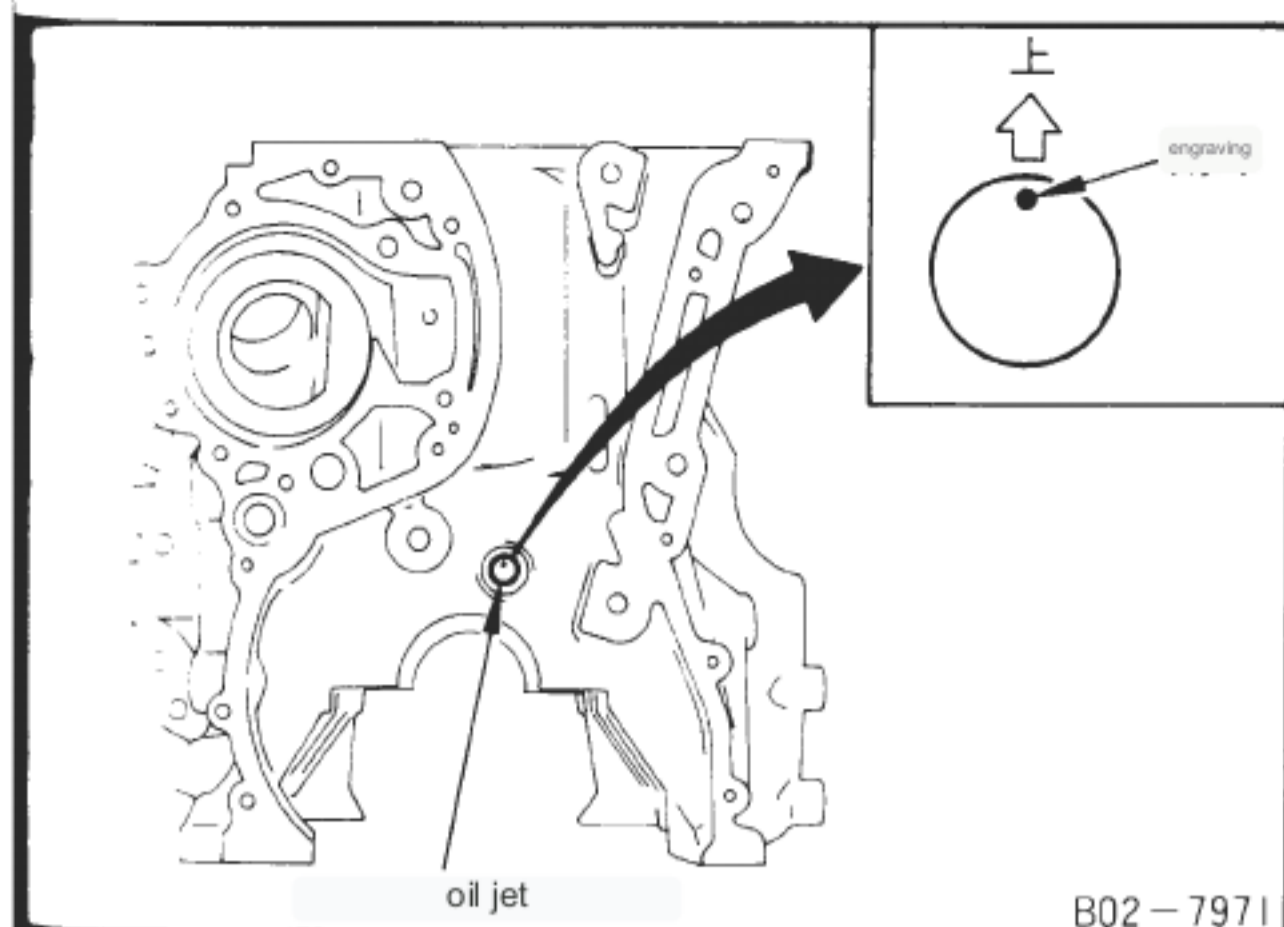
Standard value at room temperature	(mm)	0.010-0.030
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[Point 34] Baffle plate installation

- When tightening bolts, lock agent (ThreeBond Screw Lock Super 101) K).



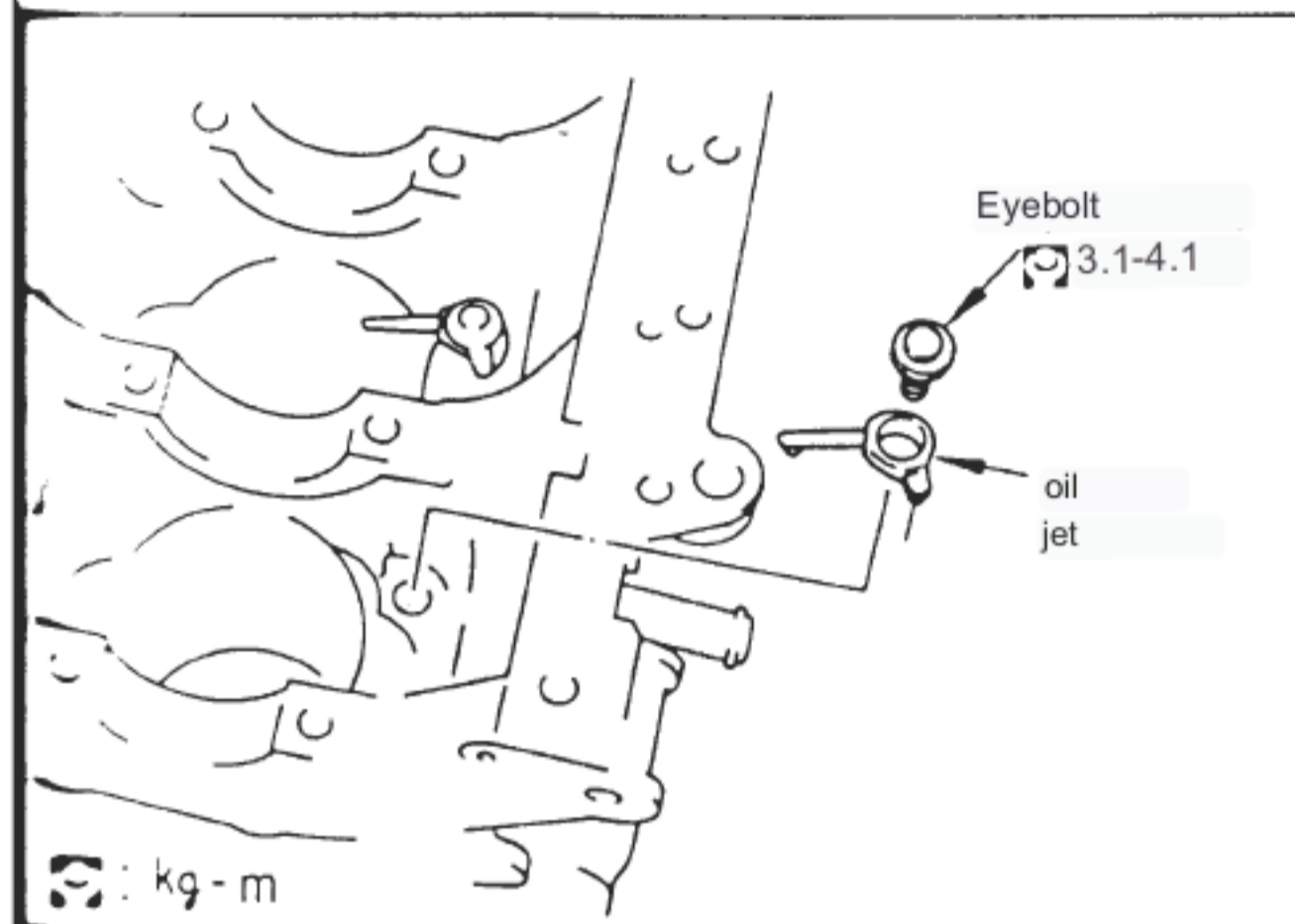
Baffle plate mounting bolt tightening torque (kg-m)	0.65-0.76
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[Point 35] Installing the oil jet for the timing chain

Drive the oil jet into the cylinder block with the mark facing

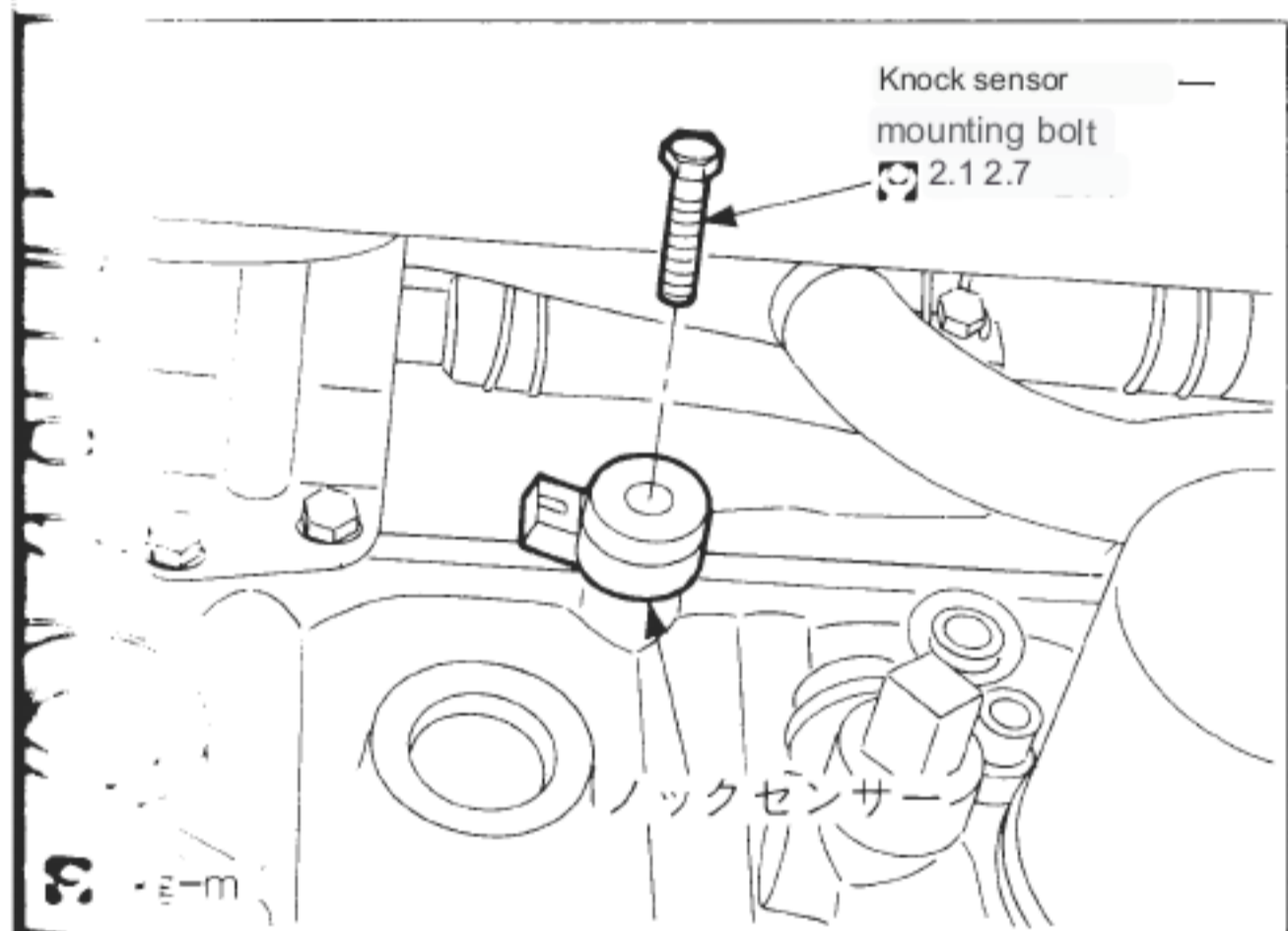
up.



[Point 36] Oil jet installation

- Match the projection of the oil jet with the positioning hole of the cylinder block. and tighten the eye bolts.
- Confirm that there is no interference with other parts.
- Replace damaged or deformed oil jets.

Oil jet tightening torque	(kg-m)	2.4~3.1
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[Point 37] Knock sensor removal and installation

removal

- Do not damage or drop the sensor.

CAUTION: Do not reuse if damaged or dropped.

attachment

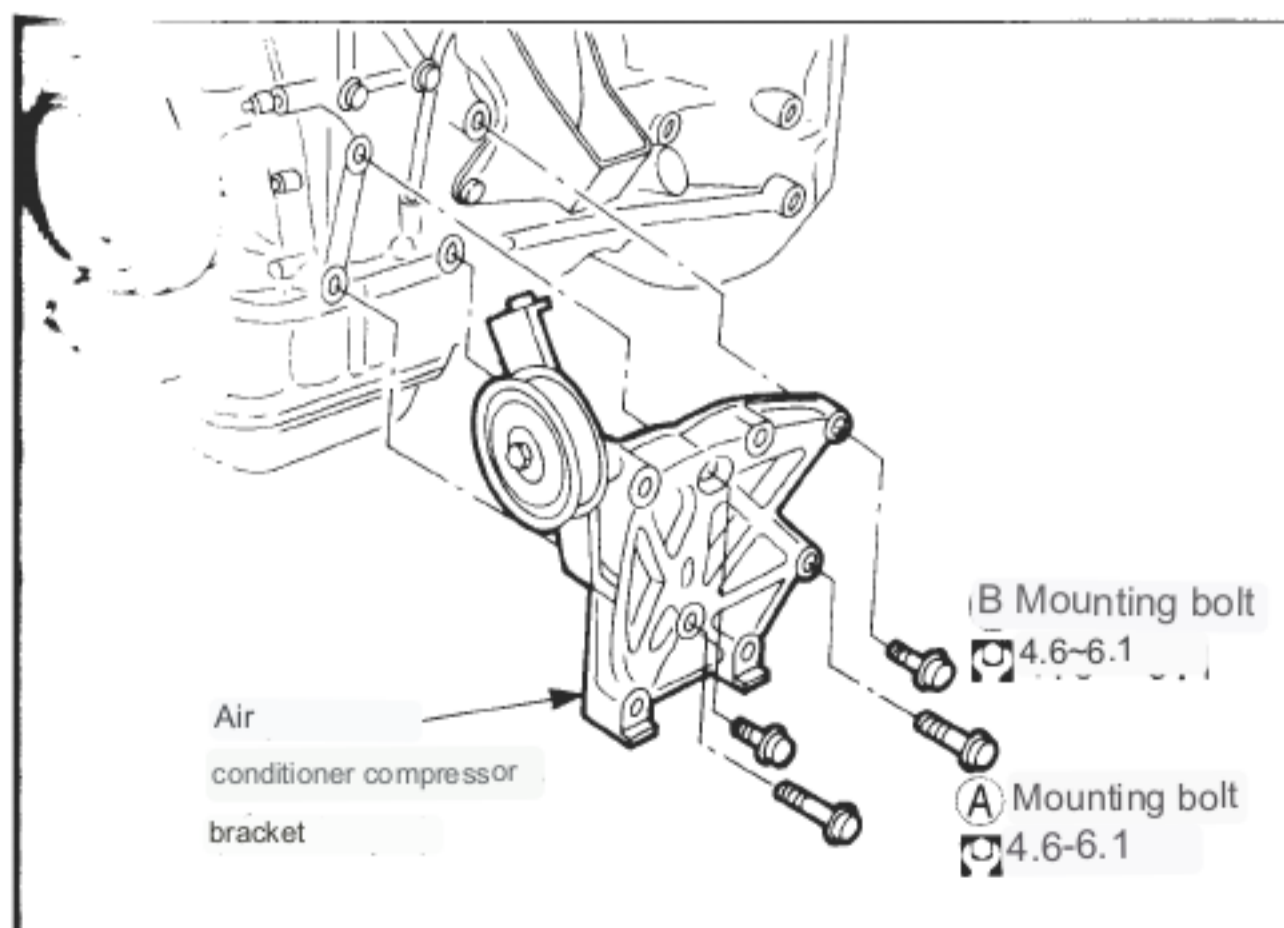
- Attach the connector facing the front side.
- Make sure there is no foreign matter on the top and bottom of the sensor and on the mounting surface of the cylinder block.

and.

- When tightening, do not apply force to the connector.

Knock sensor tightening torque	(kg-m)	2.1~2.7
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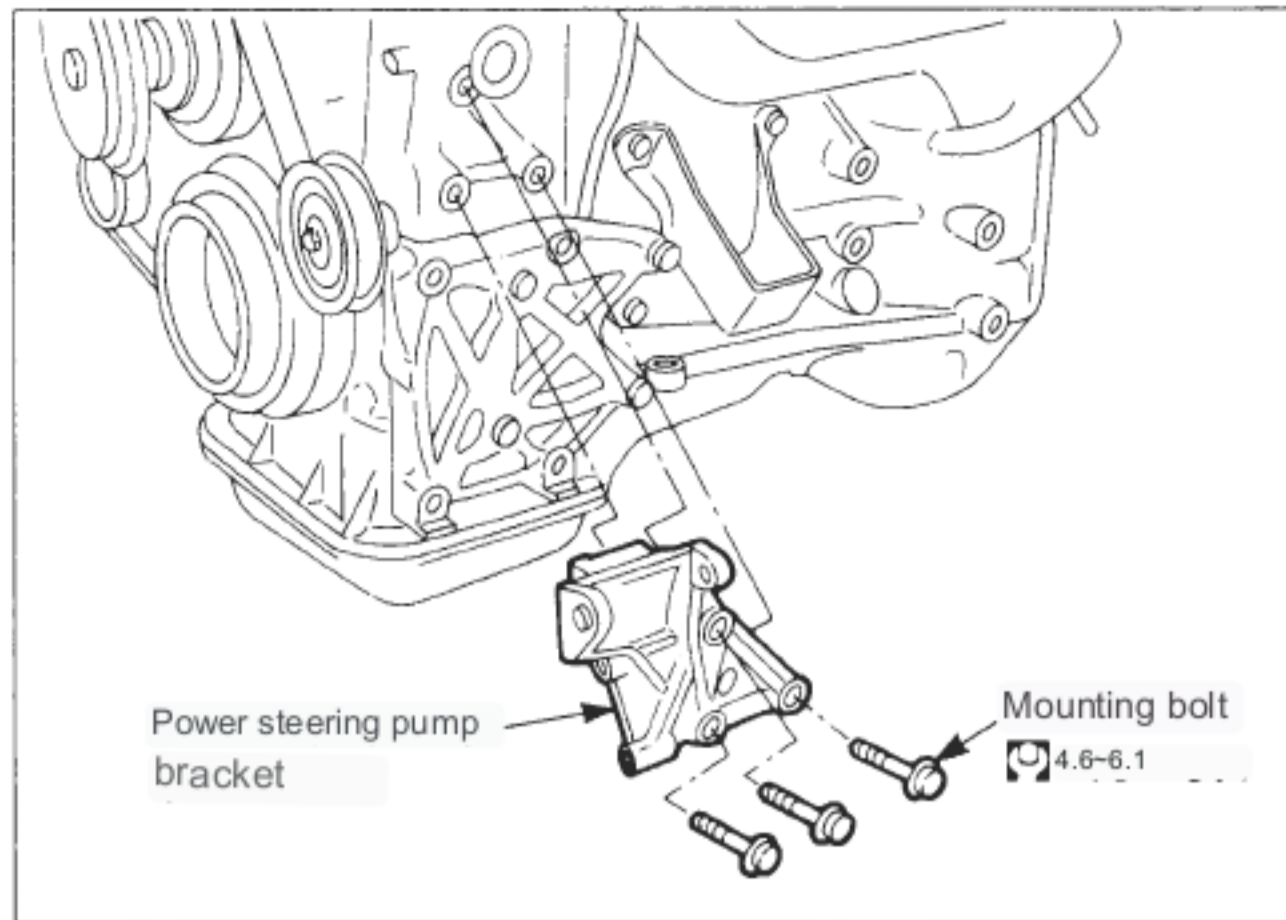
It must not come into contact with any other part when installed.



[Point 38] Air conditioner compressor bracket installation

Pay attention to the length of the installation bolt

bolt	under neck length (mm)
A	45
B	35



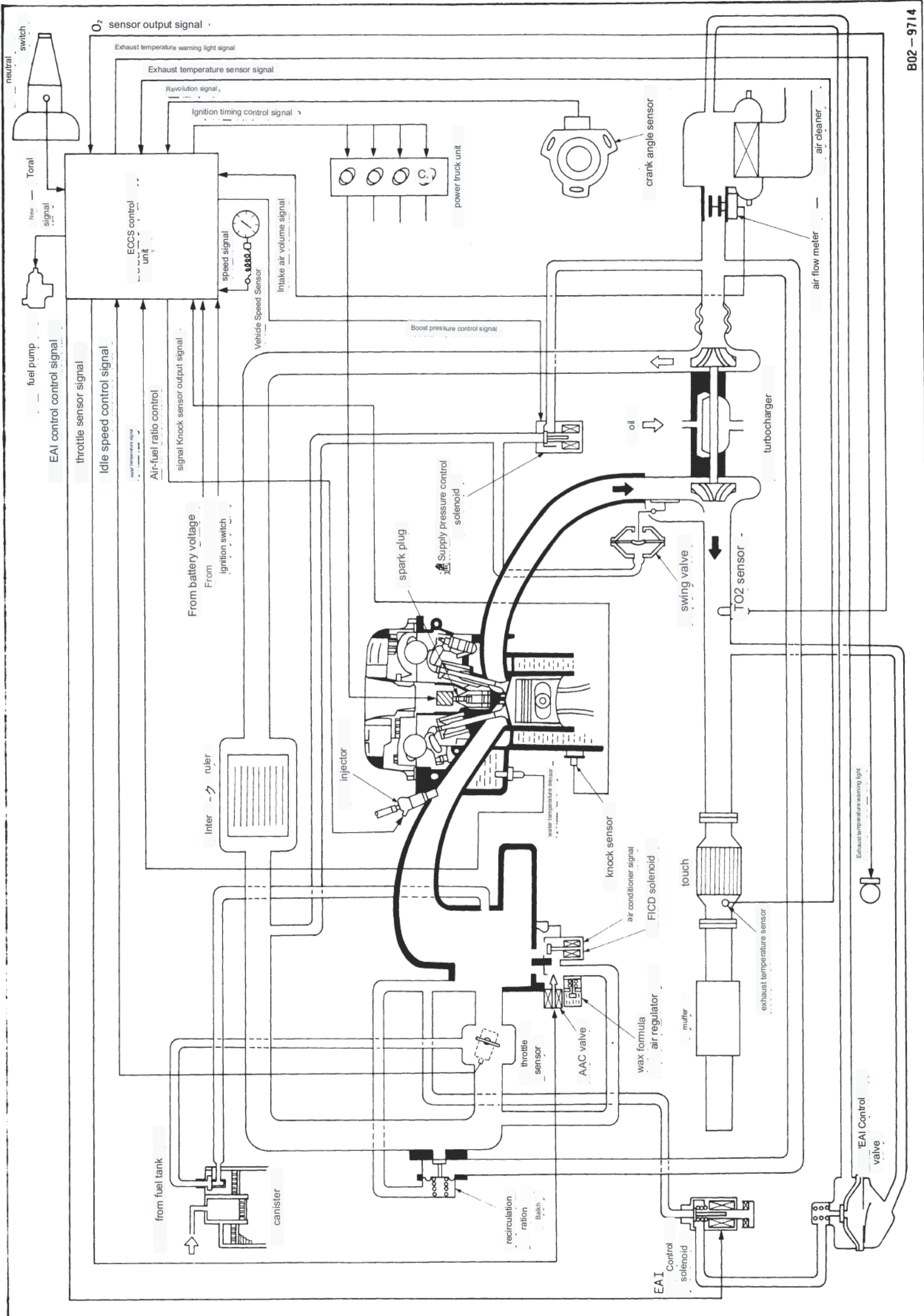
[Point 39] Bawaste pump bracket

attachment

- The length of the mounting bolt is the same.

4. System diagram and circuit diagram

4-1 System diagram



4-2 Circuit diagram

