

The Nissan logo, consisting of the word "NISSAN" in a bold, sans-serif font, enclosed within a rounded rectangular border.

NISSAN

GT-R Model R32 Series

Foreword

This service manual has been prepared primarily for the purpose of assisting service personnel in providing effective service and maintenance of the GT-R.

This manual includes procedures for maintenance, adjustments, removal and installation, disassembly and assembly of components, and trouble-shooting.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. If your car differs from the specifications contained in this manual, consult your NISSAN dealer for information.

The right is reserved to make changes to specifications and methods at any time without incurring any obligation to make or install similar changes on vehicles and/or parts previously purchased.

IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the mechanic and the efficient functioning of the vehicle.

The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.

Service varies with the procedures used, the skills of the mechanic and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first completely satisfy themselves that neither their safety nor the vehicle's safety will be jeopardized by the service method selected.

GENERAL INFORMATION

ENGINE

CHASSIS

BODY

HEATER & AIR CONDITIONER

ELECTRICAL SYSTEM

SERVICE DATA

(Australian Design Changes – See Rear)

GENERAL INFORMATION

SECTION **GI**

CONTENTS

A1	HOW TO USE THIS MANUAL	GI- 2
A2	GENERAL PRECAUTIONS	GI- 5
A3	MODEL VARIATION	GI- 7
A4	VEHICLE AND UNIT IDENTIFICATION PLATE LOCATION	GI- 8
A5	TOW TRUCK TOWING	GI-10
A6	4WD INSPECTION AND REPAIR PRECAUTIONS	GI-11
A7	4WD VEHICLE TOWING PRECAUTIONS	GI-14

A1 HOW TO USE THIS MANUAL

1. Preparation Operation Explanation

This manual describes important items for installation, removal, assembly, disassembly, inspection and repair.

CAUTION:

A general description of a visual inspection and cleaning of disassembled parts has generally been omitted. However, when the parts will be used again, make sure to perform visual inspection and cleaning as necessary.

2. Configuration Components, Operation Contents and Procedures

The configuration components and operation contents and procedures are shown after the title of the operation. The preparation standards and important operation points such as parts which cannot be used again, tightening torque and lubrication locations are also indicated.

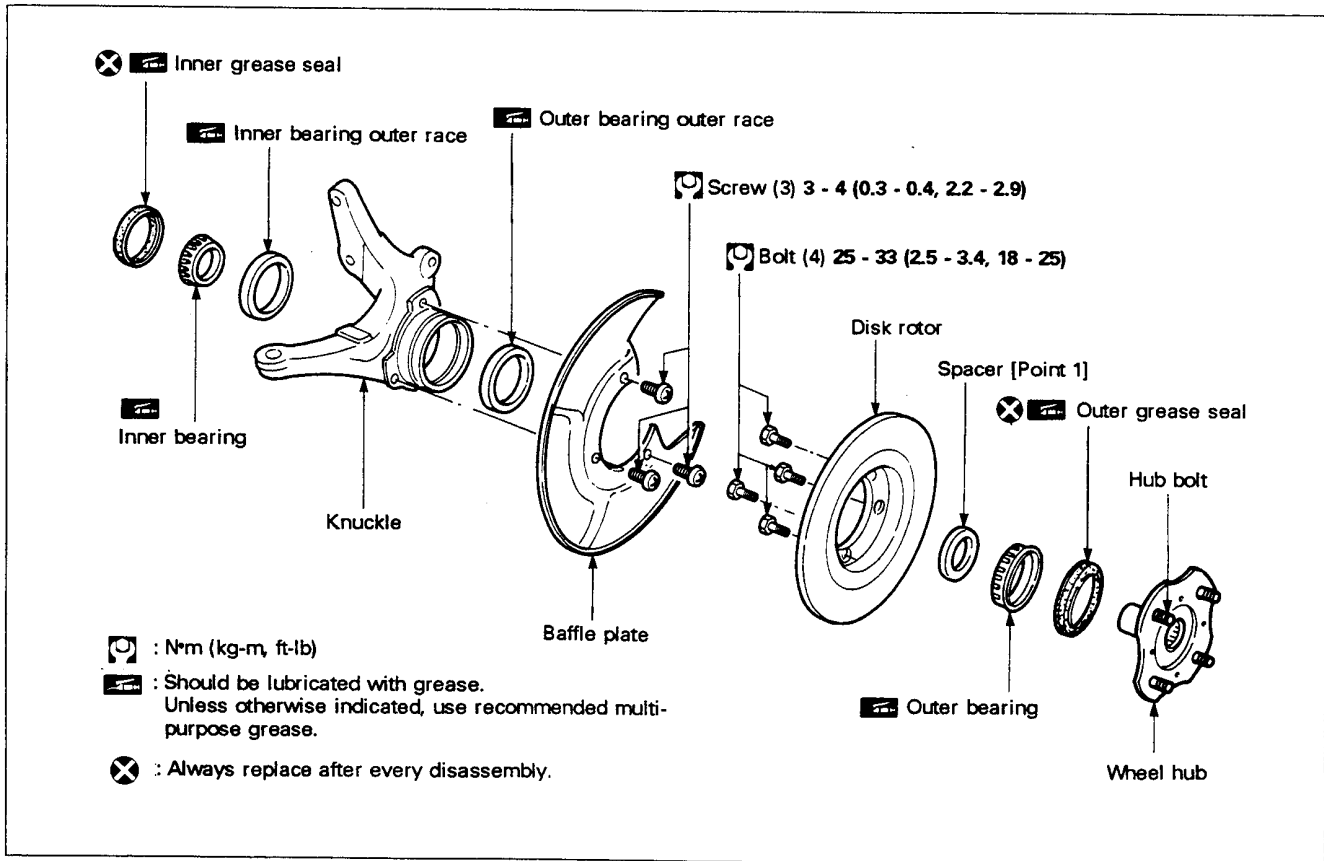
2-1 CONFIGURATION COMPONENTS AND OPERATION CONTENTS

The necessary operations for installation, removal, assembly and disassembly are indicated by the part (part name).

This description is used if the only ideal procedure cannot be determined or there are many types of components.

[Point] is used to indicate operation procedures which are necessary.

Example: Front accelerator assembly and disassembly



A1 HOW TO USE THIS MANUAL

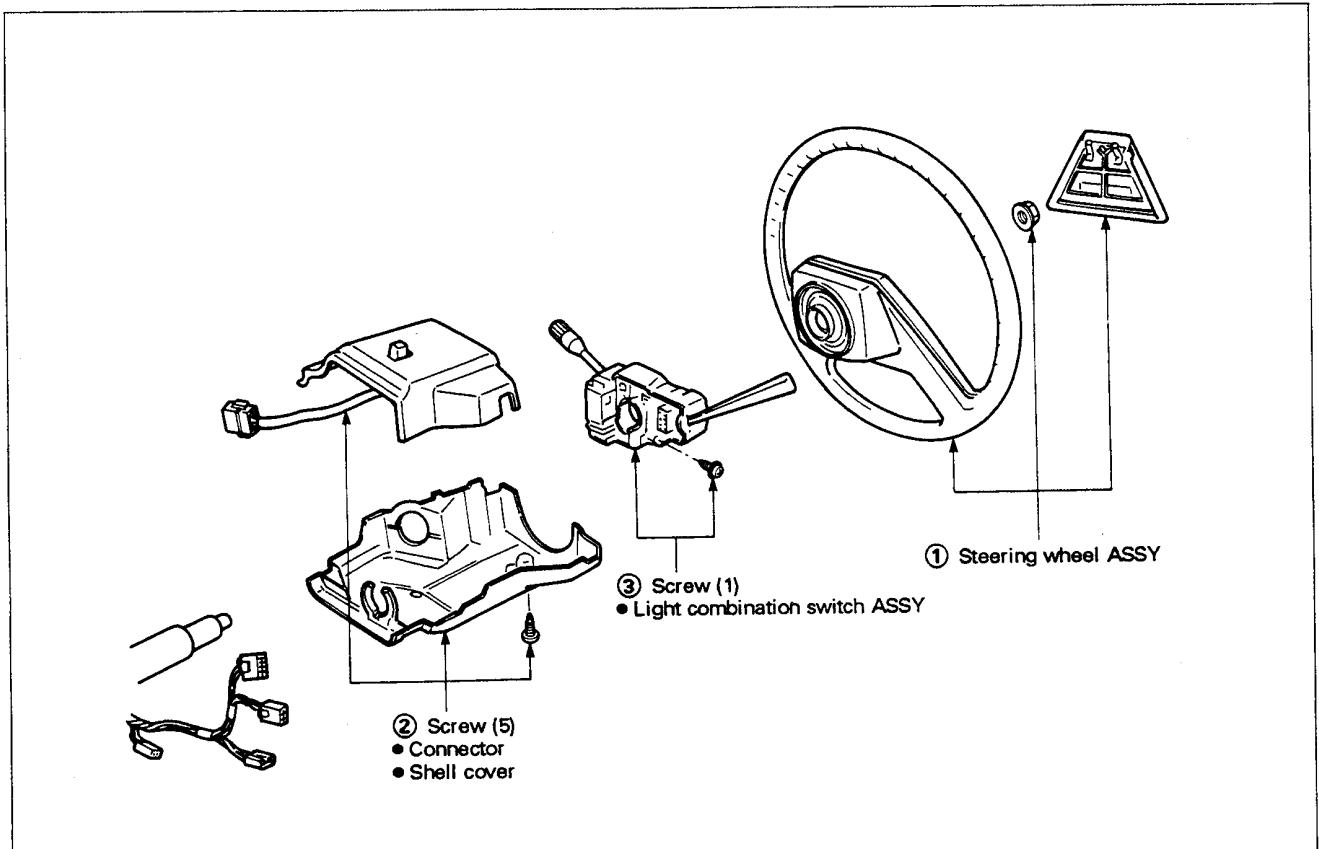
2.Configuration Components, Operation Contents and Procedures (Cont'd)

2-2 STRUCTURAL PARTS DIAGRAM AND OPERATIONAL SEQUENCE

The names of the parts required for removal and replacement and assembly and disassembly operations are shown. The operational sequence must be performed in the sequence of the indicated numbers.

Assembly is the reverse of disassembly except when otherwise indicated.

Example: Light combination switch ASSY installation and removal



2-3 OPERATION NAME SYMBOLS

(1) (Removal) (Installation) (Additional work required)

(Removal): Indicates an operation (preparation, inspection adjustment, etc.) that is only necessary for removal.

(Installation): Indicates an operation (preparation, inspection adjustment, etc.) that is only necessary for installation.


(Removal) (Installation): Indicates an operation (preparation, inspection adjustment, etc.) that is only necessary for both removal and installation.


(Additional work required): Indicates a supplementary operation (removal, installation, etc.) to be performed before the operation indicated in the section title.


(2) : Tightening torque


Indicates an operation where the torque should be checked and the standard torque value that should be used.

When X to Y N·m (kg-m, ft-lb) is indicated, the standard tightening torque is the mean value.

(3) : Should be lubricated with grease. Indicates a type of grease.


(4) : Always replace after every disassembly.

(5) : Should be lubricated with oil.

(6) : Sealing point

(7) ★: Select proper parts.

(8) : Indicates when the CONSULT electronic system diagnosis is used.

: Indicates when the CONSULT electronic system diagnosis is not used.

A1 HOW TO USE THIS MANUAL

2.Configuration Components, Operation Contents and Procedures (Cont'd)

(9) [Point No.] ([Point 1], [Point 2], [Point 3])

These sections describe the techniques, special tools, and repair reference values required to perform operations properly .

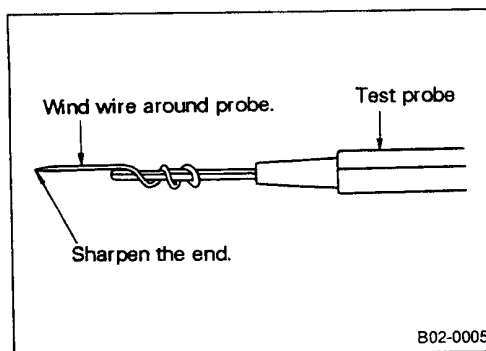
A2 GENERAL PRECAUTIONS

1. Safety Precautions

- The RB26DETT engine exhaust valves contain metallic sodium. Be careful when using or discarding the valves. (Refer to section B3, 80, Cylinder Head Removal and Installation.)
- Do not operate the engine for an extended period of time without proper exhaust ventilation. Keep the work area well ventilated and free of any inflammable materials. Special care should be taken when handling any inflammable or poisonous materials, such as gasoline, refrigerant gas, etc. When working in a pit or other enclosed space, be sure to properly ventilate the area before working with hazardous materials.
Do not smoke while working on any vehicle.
- Before jacking up the vehicle, use wheel chocks or tire blocks on the wheels to prevent the vehicle from moving. After jacking up the vehicle, support the vehicle weight with safety stands at the points designated for proper lifting and towing before working on the vehicle.
These operations should be done on a level surface.
- When the automobile is lifted on a rigid rack, it should be supported in fixed locations.
- Before starting removal and installation of the electrical system or other repairs which do not require battery power, always turn off the ignition switch, then disconnect the ground cable from the battery to prevent accidental short circuits.

2. Fast, Accurate Operations

- Check the vehicle damage carefully, make a careful diagnosis of the damage and perform the correct operation systematically.
- Check the correct part assembly condition before removal or disassembly. Make alignment marks when necessary in locations which will not interfere with the part functions.
- Replace oil seals, gaskets, packings, O-rings, locking washers, cotter pins, self-locking nuts, etc. with new ones. These items are indicated, "Always replace after every disassembly." and must be replaced with a new part.
- Before servicing the vehicle, protect fenders, upholstery and carpeting with appropriate covers. Be careful so that keys, buckles or buttons on your person do not scratch the paint.
- Refer to the lubrication section and only use the lubricants which are described.
- When replacing parts always use genuine Nissan replacement parts.
- Verify the inspection circuit in a wiring figure before performing any inspection with a circuit tester.
- An inspection may be difficult with a normal test probe when a connector pin is extremely small. If this occurs, wind a small pin or wire around the test probe, or sharpen the end of the probe to perform the inspection.



3. Electronic Trouble Diagnosis System

- Use measurement equipment such as the CONSULT electronic system diagnosis tester and an oscilloscope to perform diagnosis operations efficiently.
- The CONSULT unit is a hand-held compact type of tester. It transmits signals to the vehicle loading control units when the diagnosis connector is connected and can perform all types of diagnosis and testing.

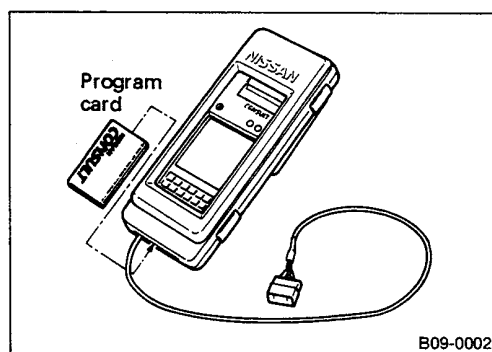
A2 GENERAL PRECAUTIONS

3. Electronic Trouble Diagnosis System (Cont'd)

Main functions and applications

Diagnosis mode	Function	System	Engine	HICAS
Work support	Transmits commands to the electrical control unit for setting the status suitable for required operation.		○	
Self-diagnosis results	Receives the self-diagnosis results from the electrical control unit and displays malfunctioning system names and the number of times a malfunction occurs.		○	○
Data monitor	Receives input and output signals from the control unit, displays and records data used to easily determine cause of malfunction.		○	○
Active test	Sends commands to the control unit and performs the operation inspection and verification of the output system according to output signal changes.		○	○
E.C.U. part number	Displays the part number of the electrical control unit.		○	○

Note: Refer to the CONSULT Operation Manual for further details.



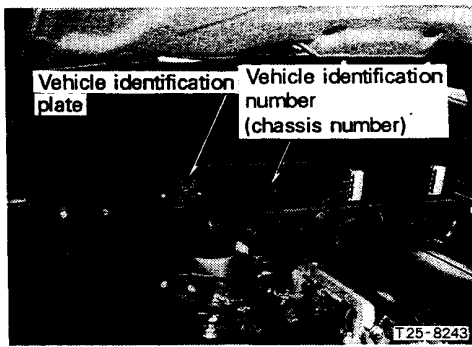
4. Environmental Protection

- Do not pour waste oil or cleaning fluids into a drain after an oil change. Use a disposal method that conforms to local laws.

A3 MODEL VARIATION

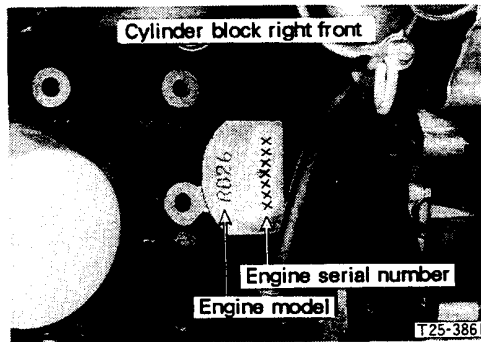
Drive system	Engine	Grade	Body type		Remarks
			4-door sedan	2-door coupe	Transmission
4WD	RB26DETT	GT-R	—	○	Manual 5-speed

A4 VEHICLE AND UNIT IDENTIFICATION PLATE LOCATION



1. Vehicle Identification Plate and Starting Number

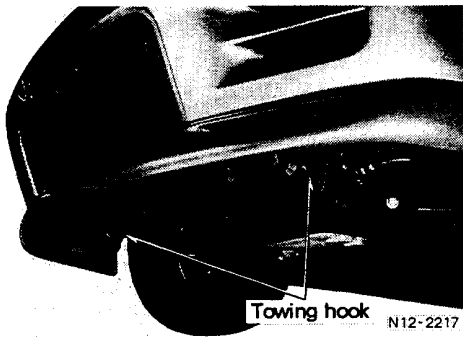
- E-BNR32 model BNR32-000001 - (equipped with RB26DETT engine)



2. Engine Serial Number Location

RB26DETT Engine

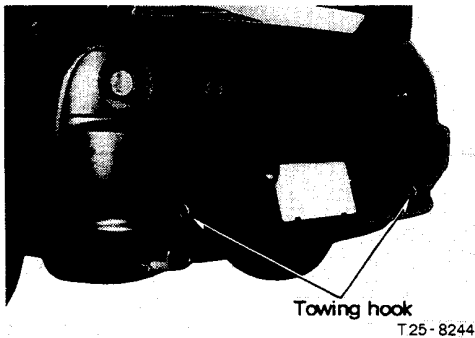
A5 TOW TRUCK TOWING



1. Towing

Front side

- After removing front spoiler, attach a cable to the hook in the front part of the front side member.



Rear

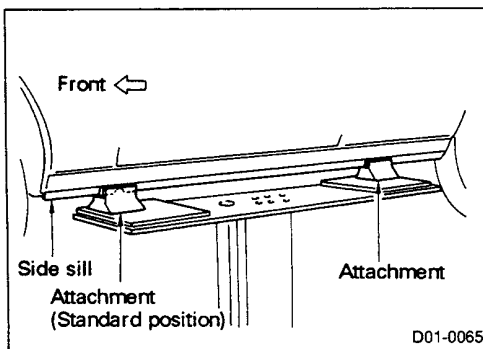
- Attach a cable to the hook mounted in the rear part of the rear side member.

2. 2-pole Lift

- The 2-pole lifting points are the same as for the rigid rack.

CAUTION:

- (1) Make sure vehicle is empty when lifting.
- (2) When lifting the vehicle, make sure the side sill and lift arm (rear part) do not contact each other.



3. Board-on Lift

- The board-on lift attachment (LM4086-0200) set at the front end of the vehicle should be set on the front of the sill under the front door opening.
- Position attachments at front and rear ends of board-on lift.

CAUTION:

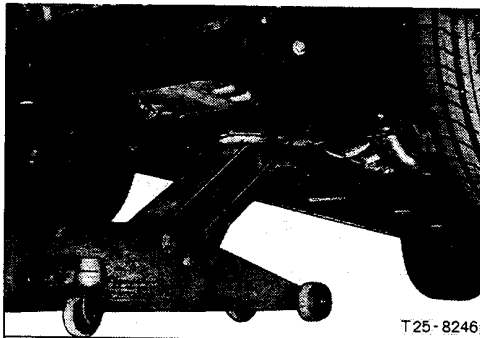
Make sure vehicle is empty when lifting.

A5 TOW TRUCK TOWING

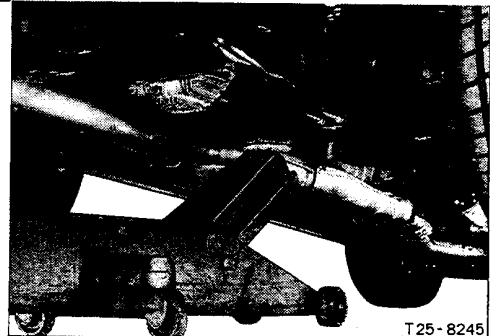
4. Hydraulic Jack Lifting and Jack Stand Support

CAUTION:

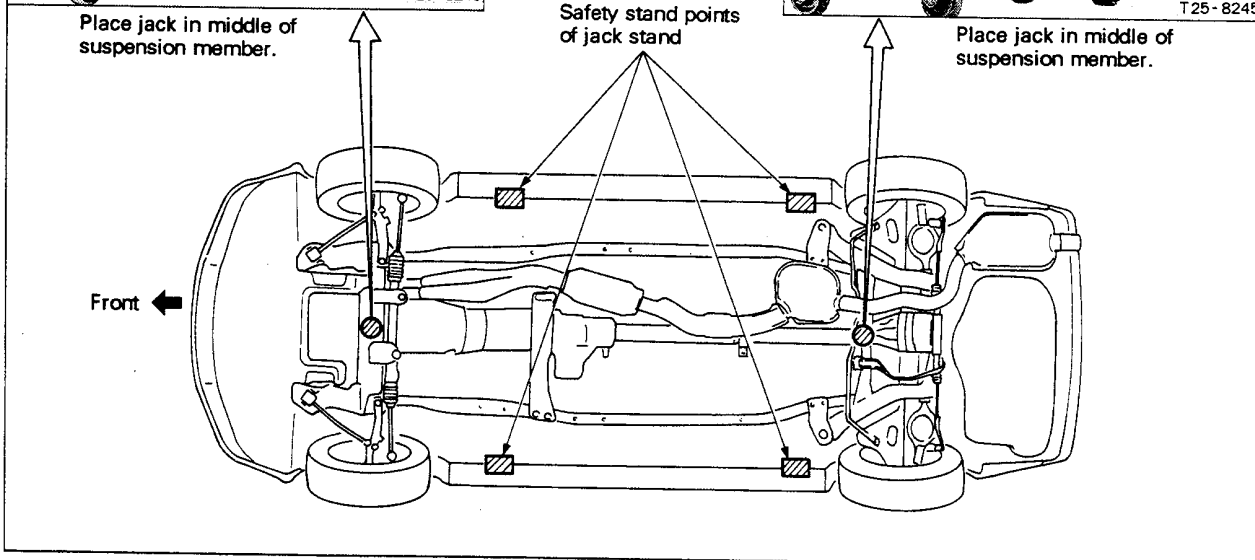
- (1) Make sure vehicle is empty when lifting.
- (2) When the front side is jacked up, raise the front sill edge slightly using the jack and then jack the vehicle up.
- (3) Use the attachment (LM4519-0000) whenever a vehicle is supported by jack stands.
- (4) When using jack stands, be careful not to allow the jack stand to crush brake tubes or fuel lines.



Place jack in middle of suspension member.



Place jack in middle of suspension member.

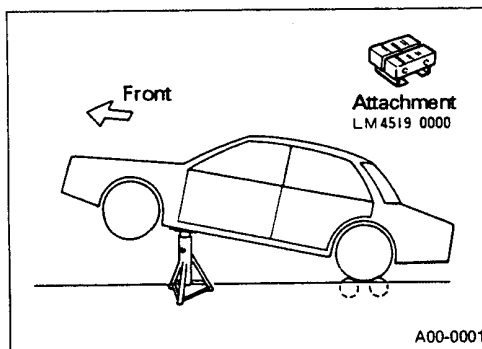


A6 4WD INSPECTION AND REPAIR PRECAUTIONS

Observe the following precautions to measure the speedometer reading and to check braking performance in the 4WD mode.

1. Speedometer Measurement

The two methods to measure the speedometer are described below.

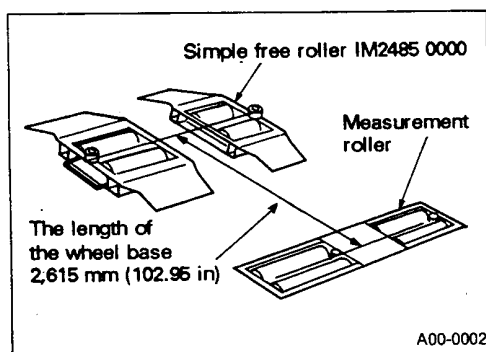


(1) Measurement with front wheels jacked up

- Place the rear wheels on the roller.
- Use the attachment to lift up the front wheels and support the car on jack stands as shown in the figure on the left.
- Place the transmission in 2nd gear and gradually release the clutch.
- When the test is completed, do not apply the brakes suddenly.

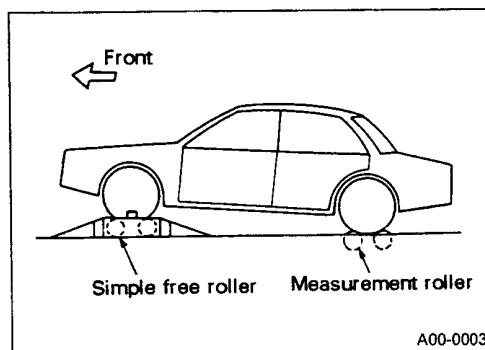
CAUTION:

- (1) Place the jacks securely, and perform the measurement after making sure the vehicle is stable.
- (2) Use the free rollers described below whenever possible.



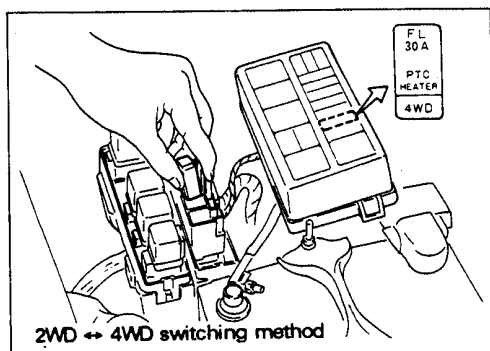
(2) Measurement with simple free roller

- Set the simple free roller the length of the wheel base [2,615 mm (102.95 in)] forward of the middle of the measurement roller as shown in the figure on the left.



- Place the front wheels on the simple free rollers and the rear wheels on the measurement rollers.
- Place the transmission in 2nd gear and gradually release the clutch.
- When the test is completed, do not apply the brakes suddenly.

A6 4WD INSPECTION AND REPAIR PRECAUTIONS



2. Braking Performance Check

2-1 PRE-INSPECTION PREPARATIONS

- The performance check must be performed in the 2WD mode. To set the 2WD mode, either use the front propellor shaft removal method or remove the fusible link from the engine compartment. Use the method most suitable for the test location.

A6 4WD INSPECTION AND REPAIR PRECAUTIONS

2. Braking Performance Check (Cont'd)

2-2 INSPECTION POINTS (when fusible link in engine compartment is removed)

Stop engine and remove the 4WD fusible link 30A from the engine compartment relay box.

Start the engine. Repeat the engine deceleration operation from full throttle to no throttle until the 4WD warning lamp on instrument panel lights.

NOTE: The vehicle may not enter 2WD mode when this operation is performed.

Make sure the 4WD warning lamp lights, then turn key switch off once.

Start engine again and make sure the 4WD warning lamp lights.

Position vehicle on rollers, set shift and range into neutral position.

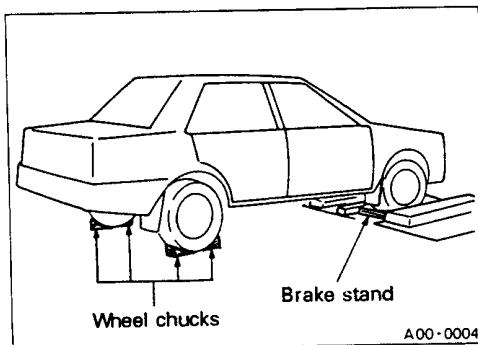
Press brake pedal. Release pedal when OK zone is reached or OK lamp lights.

NOTE: If the drag force exceeds 10% of the axle weight when the drag test is performed, the wheel rotation must be checked with the vehicle jacked up. If there is no abnormality at this time, it can be assumed that the drag is caused by the viscous torque and there is no brake abnormality.

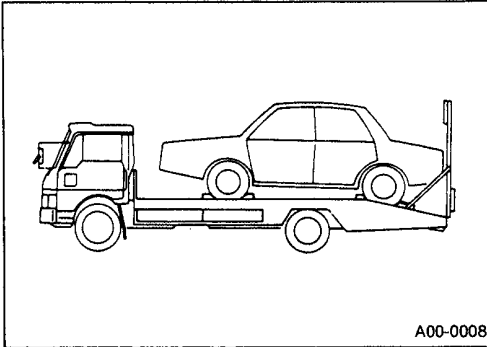
Stop the engine and install the fusible link in the normal location.

Restart engine and make sure the 4WD warning lamp goes off and 4WD mode is set.

End

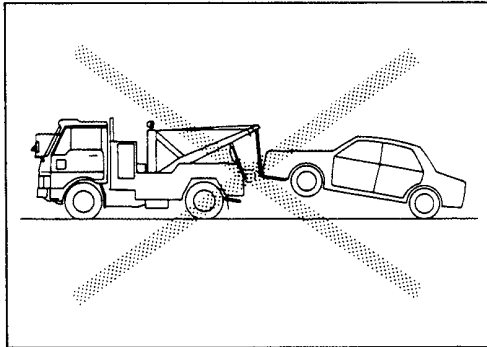


A7 4WD VEHICLE TOWING PRECAUTIONS



1. Towing Precautions

- Never tow a 4WD model with front or rear wheels raised and opposite rear or front wheels on the ground as this may cause serious and expensive damage to the transaxle.



CONTENTS

B ENGINE

B1 ENGINE SPECIFICATIONS	EN- 3
1.Main Engine Specifications	EN- 3
2.Emission Control Equipment Specification	EN- 4
3.System Diagram	EN- 5
4.Vacuum Diagram	EN- 6
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE	EN- 7
1.Idle Inspection and Adjustment	EN- 7
2.Compression Pressure Inspection	EN- 16
3.Belt Tension Inspection and Adjustment	EN- 17
4.Valve Clearance Inspection and Adjustment	EN- 19
5.Lubrication System Inspection	EN- 32
6.Exhaust System Inspection	EN- 23
7.Fuel System Inspection	EN- 25
8.Evaporative Gas Control System Inspection	EN- 26
9.Blowby Gas Reduction Equipment Inspection	EN- 26
10.Removal and Installation of On-vehicle Parts	EN- 27
11.Engine Removal and Installation	EN- 89
12.Oil Pan, Oil Pump and Oil Strainer Removal and Installation	EN- 92
13.Engine Overhaul	EN- 98
B3 ECCS (Electronically Concentrated Engine Control System)	EN-119
1.Trouble Diagnosis	EN-120
2.Diagnostic System	EN-150
3.Basic Inspection	EN-165
4.System Figure and Circuit Diagram	EN-169
5.Actuator System Inspection	EN-174
6.Sensor System Inspection	EN-203
7.ECCS Control Unit Input/Output Signals (RB26DETT)	EN-234
8.Deceleration Exhaust Gas Emission Control Equipment Inspection	EN-245
9.Air Conditioner Cut System Inspection	EN-245

B4 ENGINE ELECTRICAL EQUIPMENT	EN-246
1.Battery Inspection	EN-247
2.Alternator	EN-247
3.Starter Motor Removal and Installation	EN-248
4.Platinum Plug Inspection	EN-248
5.Ignition Coil Inspection	EN-248
B5 COOLING SYSTEM	EN-249
1.Radiator Inspection	EN-249
2.Radiator Cap Inspection	EN-250
3.Cooling Water Filling Procedures	EN-250
4.Radiator Removal and Installation	EN-251
5.Thermostat Inspection	EN-252
6.Sub Electrical Fan Inspection	EN-252
7.Sub Electrical Fan Removal and Installation	EN-253
B6 FUEL SYSTEM	EN-254
1.Fuel Tank Removal and Installation	EN-255
2.Fuel Gauge ASSY	EN-257
3.Fuel Pump Removal and Installation	EN-258
B7 EXHAUST SYSTEM	EN-260
1.Exhaust Pipe, Catalytic Converter and Heat Panel Tightening Torques	EN-261
2.Exhaust Temperature Warning Equipment Inspection	EN-261
B8 ENGINE CONTROL	EN-262
1.Accelerator Pedal Inspection and Adjustment	EN-262
B9 ENGINE MOUNTING (4WD)	EN-263
1.Front Engine Mounting (RB26DETT)	EN-263
2.Rear Engine Mounting (RB26DETT)	EN-263

B1 ENGINE SPECIFICATIONS

1. Main Engine Specifications

		Model	E-BNR32
Item		Engine	RB26DETT
Displacement		cm ³ (cu in)	2,568 (156.70)
Combustion chamber			Pent-roof type
Valve arrangement			DOHC belt drive
Bore × stroke		mm (in)	86.0 × 73.7 (3.386 × 2.902)
Compression ratio			8.5
Compression pressure		kPa (kg/cm ² , psi)/rpm	1,177 (12.0, 171)/300
Dimensions (L × W × H)		mm (in) M/T	870 × 665 × 675 (34.25 × 26.18 × 26.57)
Valve opening and closing cycle	Intake valve opening angle (BTDC)	(degrees)	7
	Intake valve closing angle (BBDC)	(degrees)	53
	Exhaust valve opening angle (BBDC)	(degrees)	63
	Exhaust valve closing angle (BTDC)	(degrees)	7 (BTDC)
Valve clearance	Intake (warm)	mm (in)	0.51 (0.020)
	Exhaust (warm)	mm (in)	0.44 (0.017)
Idle speed		(rpm) M/T	950
Ignition timing		(BTDC°/rpm) M/T	20/950
Preparation target value	Idle CO density	(%)	0.1 max.
	Idle HC density	(ppm)	50 max.
Engine oil (factory)	Standard		7.5W-30 (SG grade for turbo)
	Cold climate version		
Oil pan capacity (H level)		ℓ (Imp qt)	4.5 (4)
Oil filter capacity		ℓ (Imp qt)	Approx. 0.4 (3/8)
Total engine coolant capacity		ℓ (Imp qt)	Approx. 9.0 (7-7/8)

Use recommended genuine Nissan SG grade engine oil [Turbo X (7.5W-30)] or equivalent.

B1 ENGINE SPECIFICATIONS

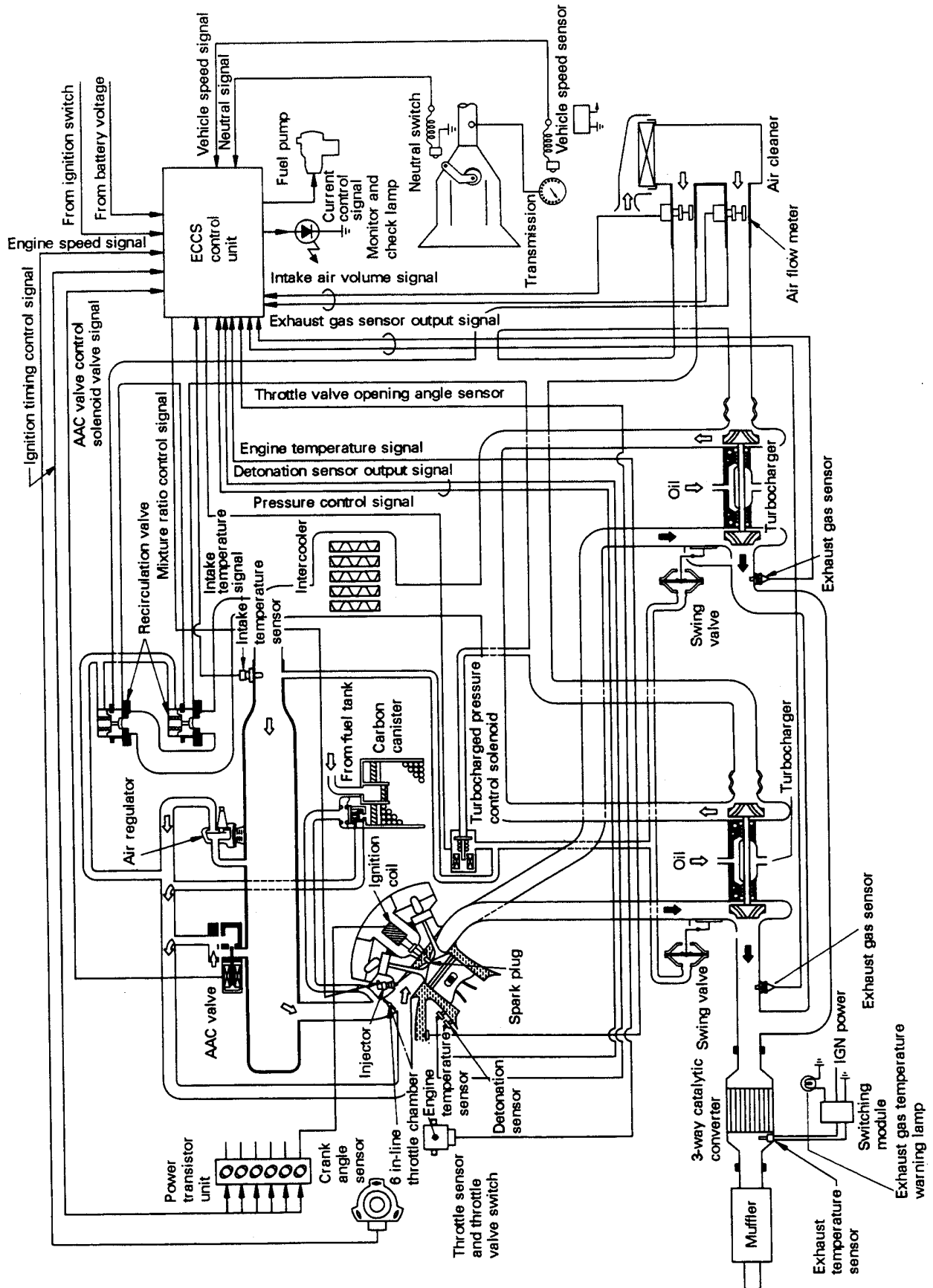
2. Emission Control Equipment Specification

		Model	E-BNR32
Item		Engine	RB26DETT
Engine fuel system			ECCS (MPi)
Air/fuel ratio control system			Air/fuel ratio feedback
Temperature control air cleaner			—
Supplemental start equipment			Bi-metal type air regulator
Intake heat system			Hot water heating
Ignition system			Breakerless type (ECCS electrical distributor)
NOx reduction equipment	EGR control system		—
	TV valve operation temperature °C (°F)		—
CO, HC (NOx) reduction equipment	Catalyzer type		Three-way catalyst
	Catalytic converter size [capacity in liters (Imp qt)]		X3 [1.7 (1-1/2)]
Deceleration exhaust gas reduction equipment	Fuel cutoff equipment		○
Exhaust gas temperature warning equipment [setting temperature °C (°F)]			Thermocouple [850 (1,562)]
Evaporative gas control system			Canister system
Blowby gas reduction system			Closed system

B1 ENGINE SPECIFICATIONS

3. System Diagram

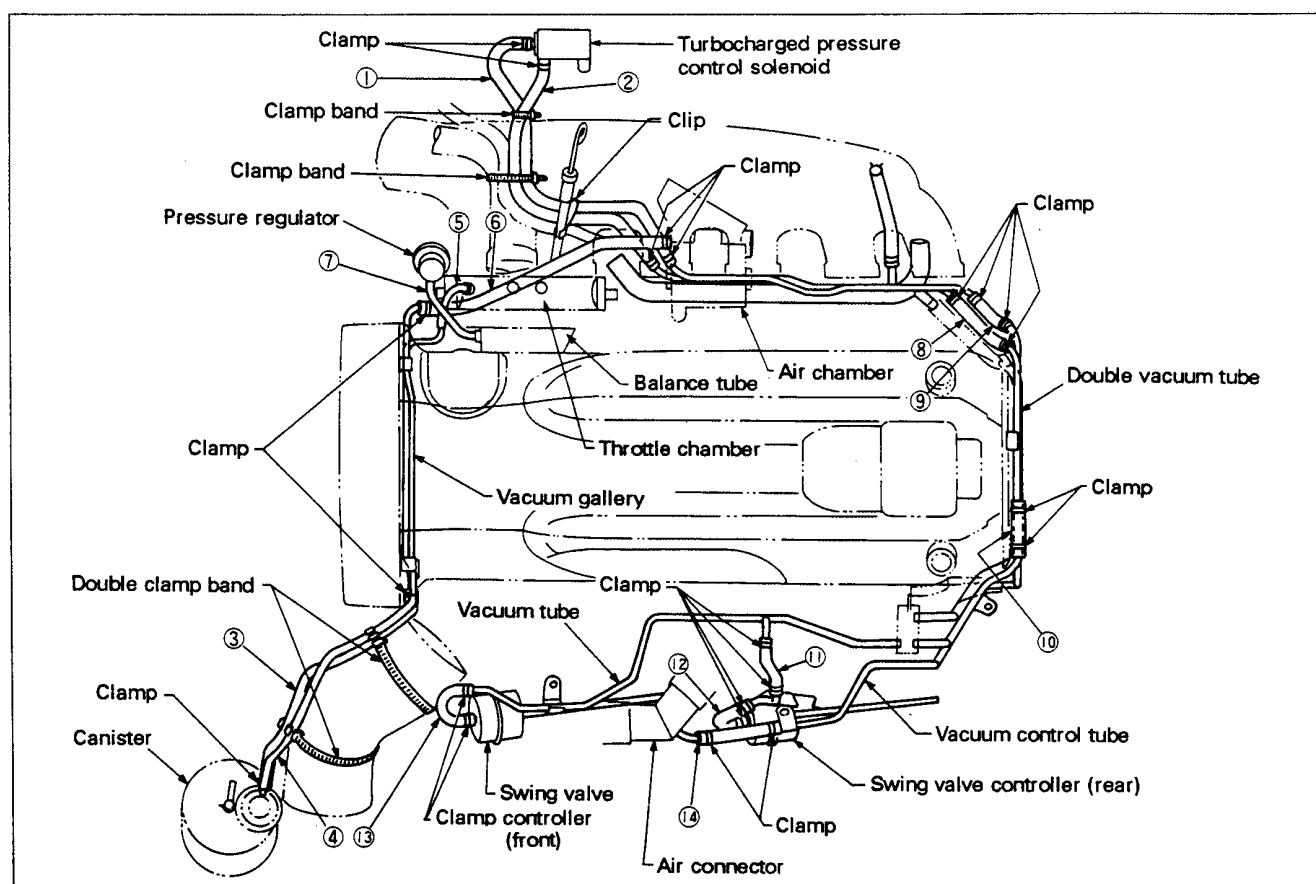
3-1 RB26 DOHC — EGI (ECCS) TWIN-TURBOCHARGER ENGINE



B1 ENGINE SPECIFICATIONS

4. Vacuum Diagram

4-1 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

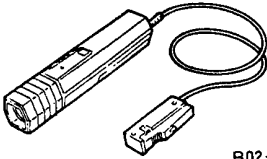
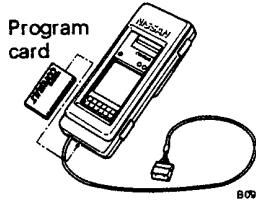


Number	Length mm (in)	Part
①	580 (22.83)	Turbocharged pressure control solenoid - vacuum gallery
②	560 (22.05)	Turbocharged pressure control solenoid - vacuum gallery
③	425 (16.73)	Canister - vacuum gallery
④	425 (16.73)	Canister - vacuum gallery
⑤	80 (3.15)	Throttle chamber - vacuum gallery
⑥	290 (11.42)	Air chamber - vacuum gallery
⑦	Molded	Pressure regulator - balance tube
⑧	120 (4.72)	Vacuum gallery - vacuum gallery
⑨	90 (3.54)	Vacuum gallery - vacuum gallery
⑩	60 (2.36)	Vacuum gallery - vacuum gallery
⑪	90 (3.54)	Vacuum gallery - vacuum gallery
⑫	Molded	Vacuum gallery - swing valve controller (rear)
⑬	Molded	Vacuum gallery - swing valve controller (front)
⑭	90 (3.54)	Vacuum gallery - vacuum control tube

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

1. Idle Inspection and Adjustment

Tools required

	Name		Use
Measurement tool	Super tuner After number EG1151-9000, EG1152-9000, EG1153-9000 and EG1154-9000	Otherwise, tachometer tester (after number EG1334-9000)	Engine speed inspection
	Timing light (internal battery) EG1444 0000	 B02-1498	Measures ignition timing.
	CO and HC meter		Measures CO and HC levels.
	Electronic system diagnosis tester CONSULT EG1180 0000	 B09-0001	Idle test and adjustment

Idle standard values

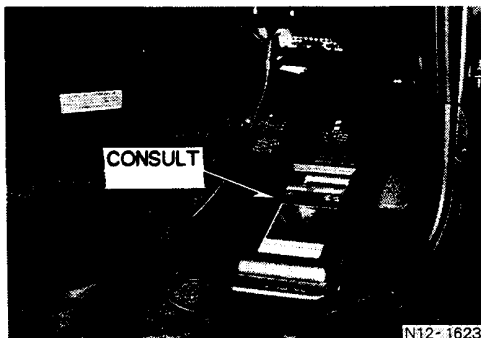
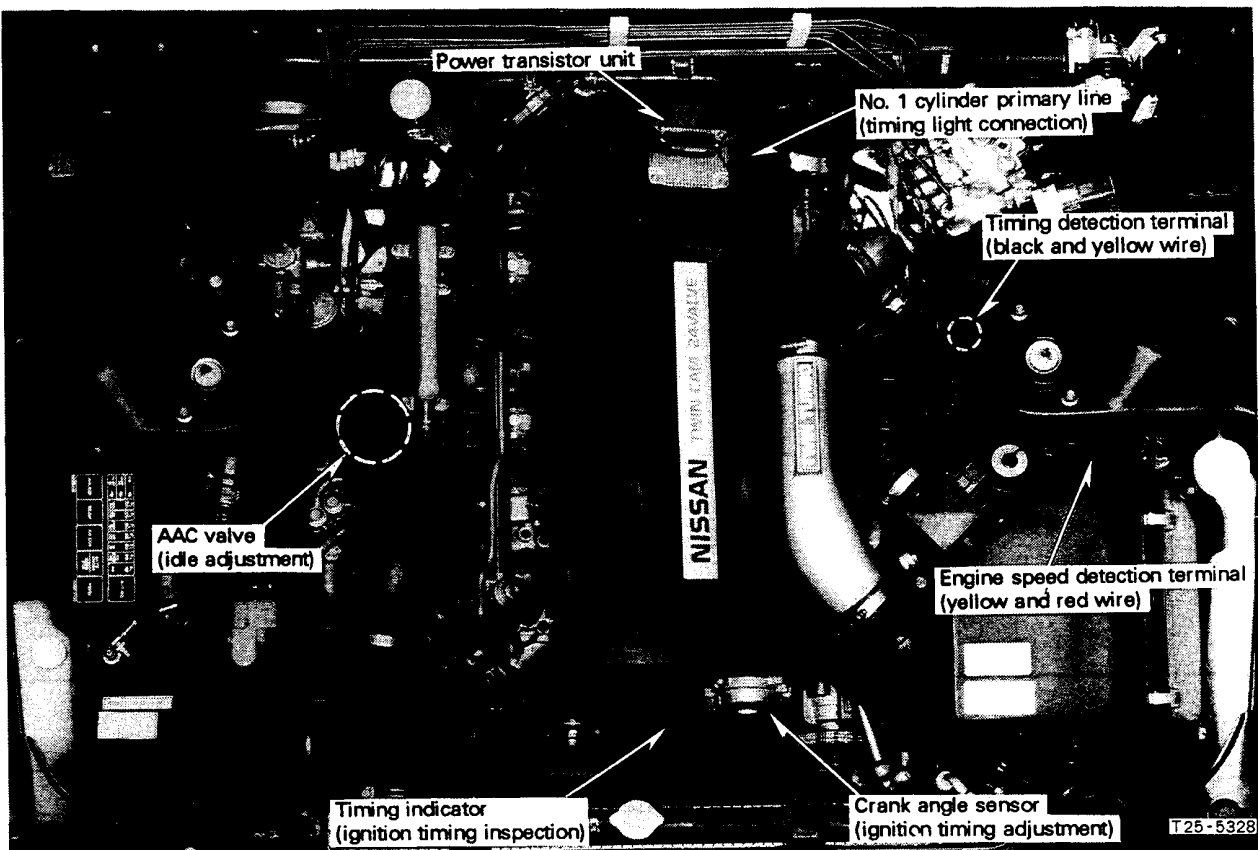
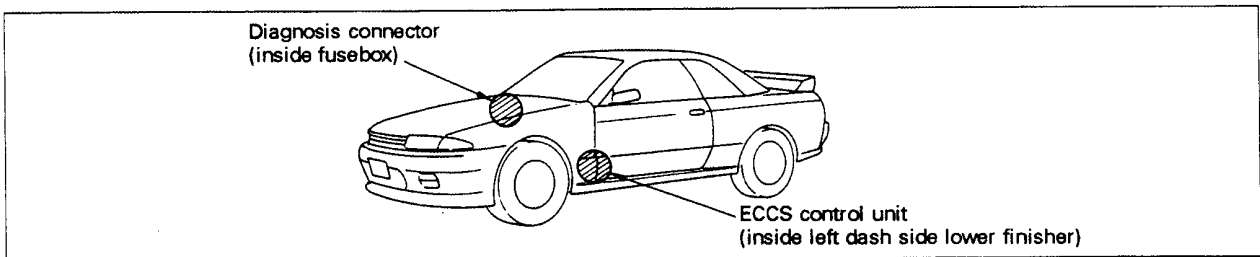
Engine		RB26DETT
Item		
Idle speed (when air conditioner is ON)	(rpm)	950 (950)
Ignition timing	(BTDC°/rpm)	20/950
CO/HC density	(%)	0.1 max,
	(ppm)	50 max.

CAUTION:

The idle speed, ignition timing, CO and HC density are inter-related. Any adjustment to one effects the others and requires an additional inspection.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

1. Idle Inspection and Adjustment (Cont'd)



1-1 IDLE SPEED INSPECTION AND ADJUSTMENT

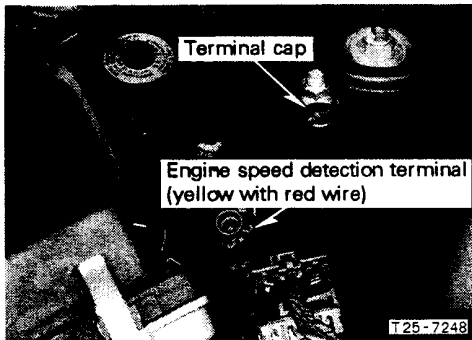
Engine speed measurement unit



- Warm engine adequately.
- Connect CONSULT to diagnosis connector on vehicle (attached to fuse block area). Turn ignition switch to ON.
- "DIAGNOSIS MODE SELECTION" is displayed.

Note: Refer to section B3, 2, 2-2 (2) for details.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



1. Idle Inspection and Adjustment (Cont'd)

- Connect the measurement unit to the speed detection terminal in the harness connected to the ignition coil from the power transistor.
- After the measurement is completed, always replace the terminal cap in the detection terminal.

CAUTION:

Be sure to check the tachometer specifications because a 6V voltage is generated.

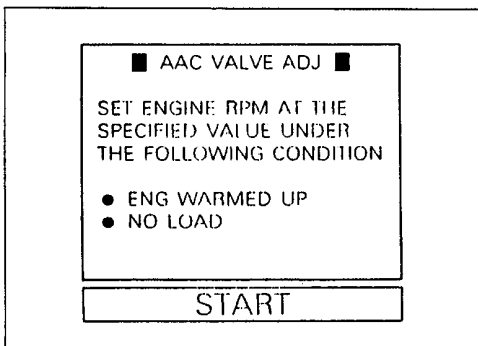
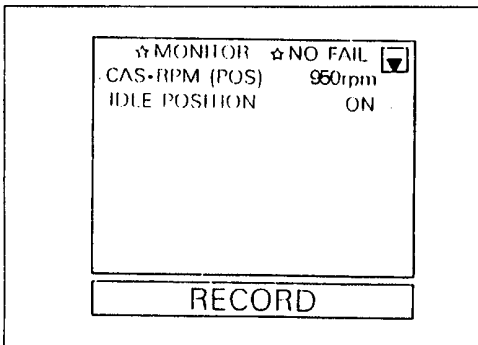
Inspection

- Warm engine adequately.
- Make sure air conditioning load, power steering oil pump load and electrical loads are not applied.
- Check "IDLE POS" and "CAS - RPM -(POS)" in "DATA MONITOR" mode in CONSULT unit.
- Perform inspection using engine speed measurement.

Note: The measurement unit is limited because the speed output voltage is low (approx. 6V Vp-p).

CAUTION:

Before inspection, make sure the throttle valve switch (idle connection point) is on when the accelerator pedal is not pressed.



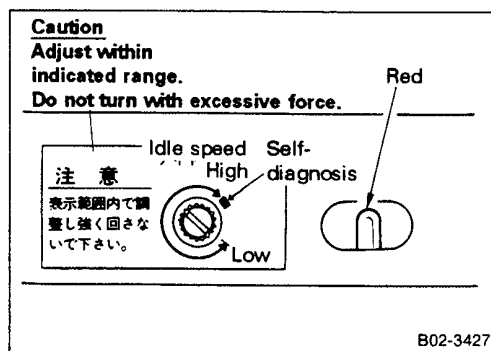
Adjustment

The idle speed adjustment is basically not necessary because the rated value (control target value) is returned to the control unit. If adjustment becomes necessary, perform the following procedures:

- ① Select "AAC valve adjustment" in the "WORK SUPPORT" mode. Turn AAC valve assembly idle adjustment screw with a screwdriver until idle speed is 900 rpm.
- ② Return the "AAC VALVE ADJUSTMENT" screen to "DATA MONITOR" and check idle speed shown on screen meets the specification.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

1. Idle Inspection and Adjustment (Cont'd)



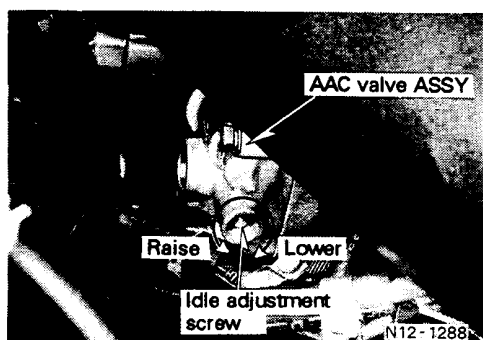
- ① Make sure ECCS control unit idle control adjustment volume is turned all the way to the left.

CAUTION:

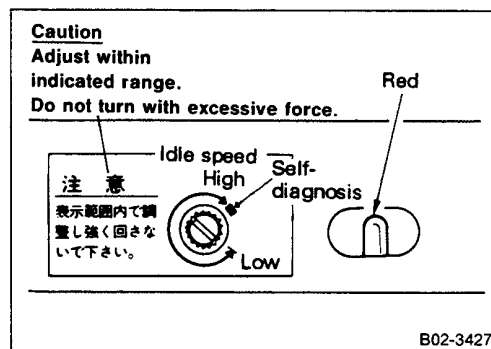
Never turn idle control speed adjustment volume with excessive force. The adjustment screw turning range is 3/4 of a turn.



- ② Remove the 2-pin harness connector from the AAC valve to stop the idle speed feedback control. The AAC valve is completely closed at this time and the idle speed should be 900 rpm maximum under normal conditions.



- ③ Turn the AAC valve assembly idle adjustment screw with a screwdriver to adjust engine speed to 900 rpm.
④ Connect AAC valve harness connector. Make sure idle speed is maintained at specified value. The engine speed increases when adjustment screw is turned to left (CCW) and decreases when turned to the right (CW).



- ⑤ If idle speed increases for any reason, turn idle control adjustment volume in ECCS control unit to adjust speed. Idle adjustment volume increases engine speed when turned to right by a maximum 250 rpm.

CAUTION:

The adjustment volume must be set 40° - 50° from the self-diagnosis position because idle speed is lowered (lowest rpm + 50 rpm) if it is turned all the way to the right (self-diagnosis position).

1-2 IGNITION TIMING CHECK AND ADJUSTMENT

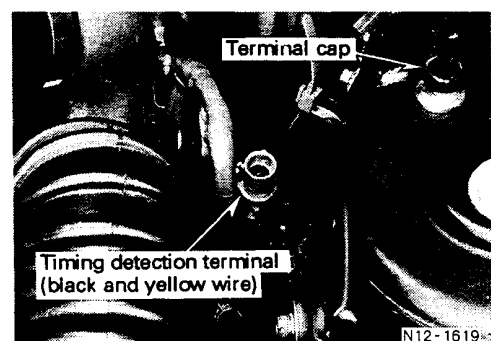
Timing light connection

(1) When using "super tuner"

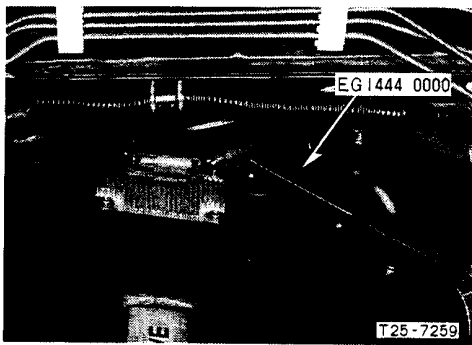
- Connect super tuner to timing detection terminal.

CAUTION:

After operation is completed, always attach terminal cap to timing detection terminal (check connector).



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



1. Idle Inspection and Adjustment (Cont'd)

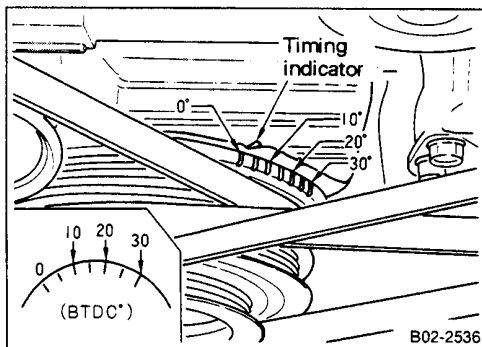
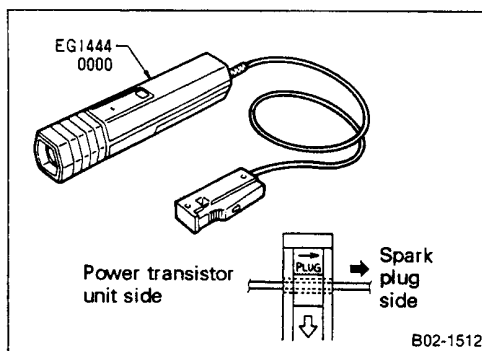
(2) Using primary current detector timing light

- When using EG1444 0000, attach sensor to No. 1 cylinder primary line.
(No. 1 cylinder primary line is looped because it is longer than other cylinder primary lines.)

CAUTION:

When using EG1444 0000 (internal battery model), make sure that the sensor direction (arrow direction) faces spark plug when sensor is clipped to primary line.

(If primary line direction is not clear, measure with sensor connected in both directions. The correct installation direction is indicated when lower advanced angle value is obtained.)



Inspection

- Make sure idle speed is standard value.
- Make sure ignition timing at engine idle is at standard specification.
- Make sure ignition advances to correct advance angle when engine is raced.

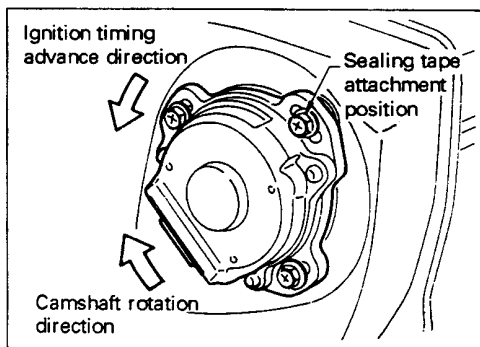
CAUTION:

The 0° timing mark on crank pulley is orange and other points are painted white.

Adjustment

Since there is no variation in ignition timing, over an extended time period, ignition timing adjustment is not necessary in principle. Adjust ignition timing when crank angle sensor is installed.

- Set ignition timing by adjusting crank angle sensor installation position.
- Make sure idle speed is standard.
- Loosen the three crank angle sensor mounting bolts and rotate crank angle sensor. Turn sensor to left to advance ignition timing.



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

1. Idle Inspection and Adjustment (Cont'd)

- After adjustment, attach sealing tape to one of the three bolts that secure crank angle sensor.

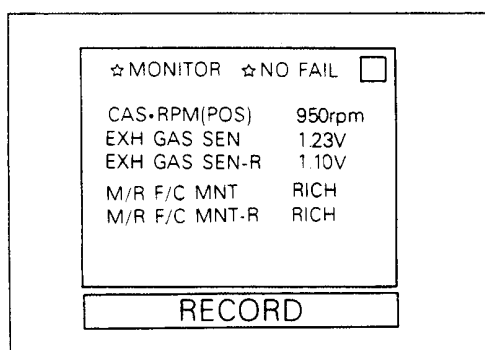
Sealing tape part number	B2235 U7410
--------------------------	-------------

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

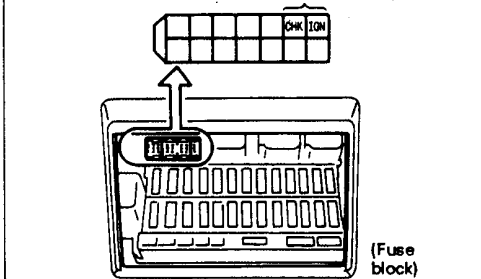
1. Idle Inspection and Adjustment (Cont'd)

1-3 CO, HC DENSITY INSPECTION

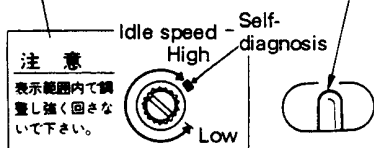
The air/fuel ratio feedback system which has a self-learning function is used and CO and HC density adjustment is not necessary because the correction range is wide.



Short these pins for approximately two seconds then open them, the diagnosis mode will then change. (The mode changes each time this operation is performed.)



Caution
Adjust within indicated range.
Do not turn with excessive force.



B02-3427

Inspection

- Warm up the engine adequately and make sure the idle speed and ignition timing are standard. Check CO, HC density with CO and HC meter.
- If values do not conform to standard perform the following procedures to inspect the air/fuel feedback condition:



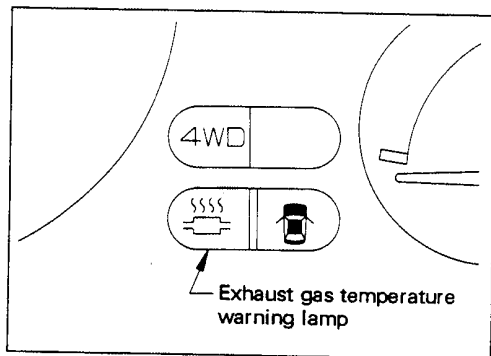
- ① In the data monitor mode, select "EXHAUST GAS SENSOR MONITOR" and "EXHAUST GAS SENSOR MONITOR (R)".
- ② Set the engine speed above 2,000 rpm and make sure "RICH" and "LEAN" are displayed alternately.



- Short-circuit the self-diagnosis connector on the vehicle side (near fuse box installation). Otherwise, remove ECCS control unit and operate adjustment volume on control unit side.

- ① Set the ignition switch "ON" and use a lead line to short-circuit the CHK pin and IGN pin of the diagnosis connector for more than two seconds to release the setting. (Otherwise turn the ignition switch to "ON" and turn the adjustment volume on the side of the ECCS control unit to the right (CW) until it stops in the self diagnosis mode switching position ⑧ for more than two seconds and then return it to the original position.)

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



1. Idle Inspection and Adjustment (Cont'd)

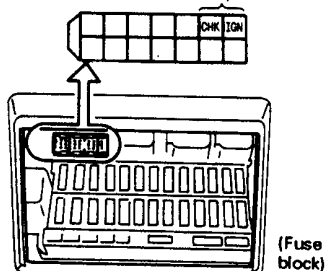
- ② After warming up the engine adequately, raise the engine speed until the exhaust temperature warning lamp (or the red lamp on side of control unit) flashes (the flashing will start above approximately 2,000 rpm). The exhaust gas sensor output monitor (R) mode will be set.

CAUTION:

The accelerator pedal must be pressed intentionally during idling to perform the inspection because the air/fuel ratio feedback control is stopped.

- ③ Make sure the exhaust gas temperature warning lamp or red lamp on the side of the control unit flashes in this condition.

Short these pins for approximately two seconds then open them, the diagnosis mode will change. (The mode changes each time this operation is performed.)

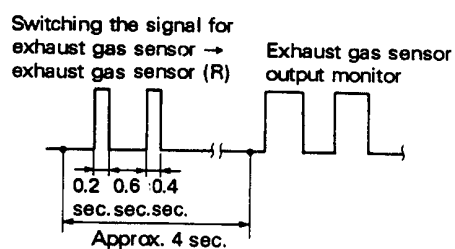


- ④ Use a lead to short the CHK pin and the IGN pin of the diagnosis connector for more than two seconds one more time to release the self-diagnosis mode. (Otherwise turn the adjustment volume of the ECCS control unit side to the right (CW) until it stops to select the self-diagnosis mode ⑧ for more than two seconds and then return it to the original position).

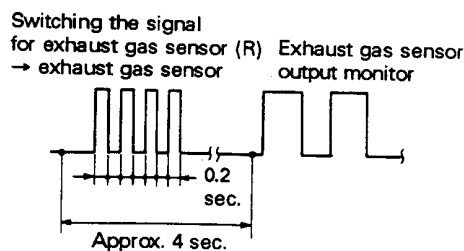
Note: Refer to section (B3, 2, Diagnosis System) for explanation of air fuel feedback monitor.

Exhaust gas sensor monitor mode switching display

- ① Set the ignition switch to "ON". Use a lead line to short CHK pin and IGN pin of diagnosis connector for more than two seconds to switch mode. (Otherwise turn ignition switch to "ON" and turn adjustment volume on side of the ECCS control unit to the right (CW) until it stops at self-diagnosis mode switching position ⑧ for more than two seconds and then return volume to original position.)



B09-0089



B09-0090

- ② After warming the engine adequately, raise the engine speed until the exhaust gas temperature warning lamp (or the red lamp on side of control unit) flashes (the flashing will start above approximately 2,000 rpm). The rear exhaust gas sensor output monitor mode will be set.

CAUTION:

The accelerator pedal must be pressed intentionally during idling to perform the inspection because the air-fuel ratio feedback control is stopped.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

1. Idle Inspection and Adjustment (Cont'd)

- ③ Make sure the exhaust gas temperature warning lamp or red lamp on the side of the control unit flashes in this condition.
- ④ Short CHK pin and IGN pin of the diagnosis connector for more than two seconds one more time to release the mode. (Otherwise, turn the adjustment volume on side ECCS control unit to the right (CW) until it stops at self-diagnosis mode switching position ⑧ for more than two seconds and then return volume to original position.) After the exhaust gas temperature warning lamp (or red lamp on control unit side) flashes two times, the mode switches to the front exhaust gas sensor output monitor mode.
- ⑤ Make sure that the exhaust gas temperature warning lamp (or red lamp on side of control unit) flashes at about 2,000 rpm.

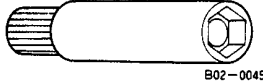
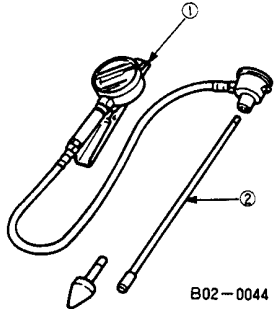
Note: Refer to section B3, 2, Self-diagnosis System for details about air/fuel ratio feedback monitor.

Note: When switching the exhaust gas sensor output monitor from the No. 1-3 cylinder bank to No. 4-6 cylinder bank, adjust the diagnosis connector (or control unit adjustment volume). The signal pattern is shown in the diagrams.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

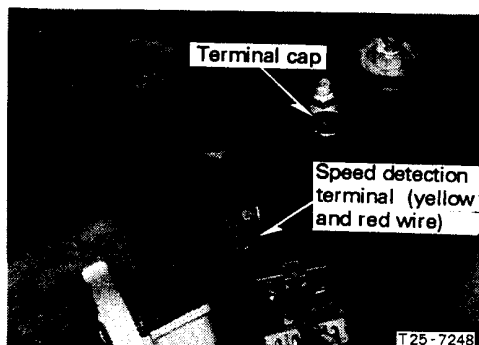
2. Compression Pressure Inspection

Tools required

	Name	Application
Tool	Spark plug wrench EG1740 1600 (or other regular spark plug wrench set)	 Removal and installation of small size hexagonal spark plug
Measurement tool	Engine speed measurement unit	To check engine speed.
	① Allen compression gauge EG1505 0000 ② Compression gauge adaptor EG1505 0101	 For engine compression pressure inspection.

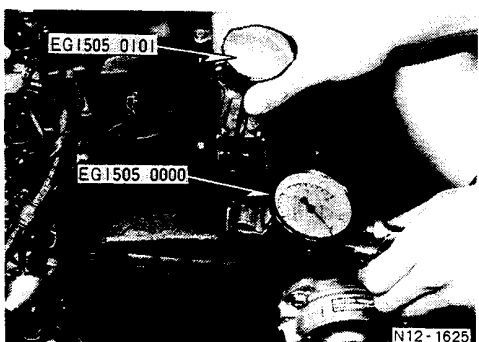
Compression pressure standard values

Item	Engine	RB26DETT
Standard value	kPa (kg/cm ² , psi)/rpm	1,177 (12.0, 171)/300
Limit value	kPa (kg/cm ² , psi)/rpm	883 (9.0, 128)/300
Compression variance limit between cylinders	kPa (kg/cm ² , psi)/rpm	98 (1.0, 14)/300



Engine speed measurement unit installation

- Connect the engine speed measurement unit to the speed detection pin on the harness connected to the ignition coil from the power transistor.
- Always attach the terminal cap with rubber seal after measurement is completed.



Compression gauge installation

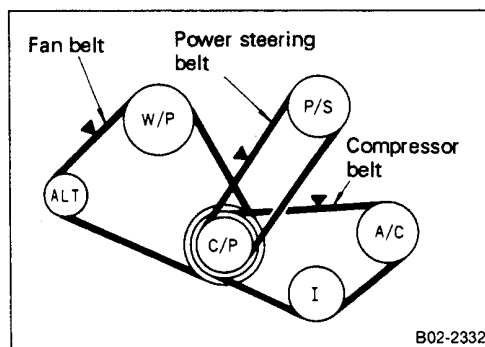
- Warm up engine.
- Release fuel pressure.
(Refer to "Releasing fuel pressure" section B2, 7-1.)
- Remove all spark plugs. (Refer to "SPARK PLUGS" section B2, 10-9.)
- Attach the adaptor to the Allen compression gauge and set it in a spark plug hole.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

2. Compression Pressure Inspection (Cont'd)

Inspection

- Press accelerator pedal all the way down. Turn ignition switch to "START" and crank the engine. When gauge needle stops moving read compression pressure and engine speed.
- When engine speed is out of specifications, check specific gravity of the battery and perform test again if battery is functioning properly.
- If the compression pressure is still not standard, inspect the components around the combustion chamber (valves, valves seat, hydraulic valve lifters, piston rings, cylinder bore, cylinder head, cylinder head gasket, etc.). Correct any malfunctions and repeat compression test.



3. Belt Tension Inspection and Adjustment

Inspection

- The inspection should be performed when the engine is cold or more than thirty minutes after the engine has stopped.

Part	Item	Belt specification	Belt deflection mm (in) [When 98 N (10 kg, 22 lb) of force is applied at the "▼" position.]		
			New	Adjustment	Tension limit
Power steering belt		Poly-V low-maintenance belt	8 - 10 (0.31 - 0.39)	10 - 12 (0.39 - 0.47)	16 (0.63)
Air conditioner compressor belt		Poly-V low-maintenance belt	6 - 8 (0.24 - 0.31)	7 - 9 (0.28 - 0.35)	12 (0.47)
Fan belt		Poly-V low-maintenance belt	3 - 5 (0.12 - 0.20)	4 - 6 (0.16 - 0.24)	7.5 (0.295)

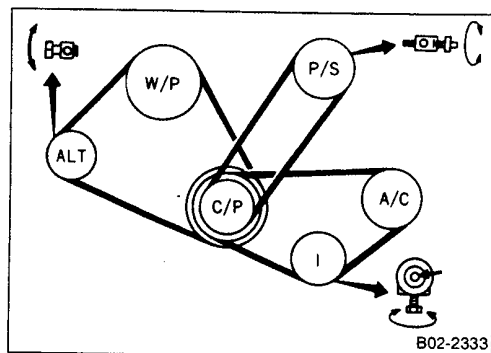
CAUTION:

- (1) When the belt is replaced with a new belt increase the tension slightly more than for the used belt to allow for wear-in of the new belt.
- (2) When the belt deflection exceeds the limit, adjust to the "Adjustment" value.
- (3) When the belt is installed, make sure pulley groove is aligned correctly.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

3. Belt Tension Inspection and Adjustment. (Cont'd)

Adjustment



Part	Item	Adjustment position
Power steering belt		Adjustment bolt in power steering pump
Air conditioner compressor belt		Adjustment bolt in idler pulley
Fan belt		Adjustment bolt in alternator

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

4. Valve Clearance Inspection and Adjustment

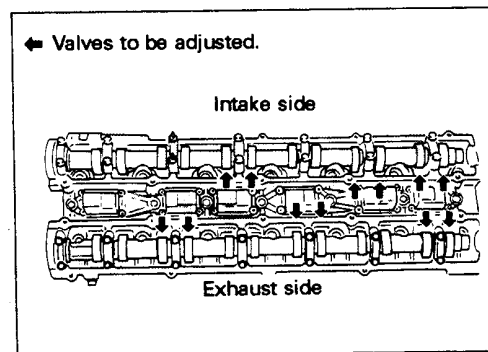
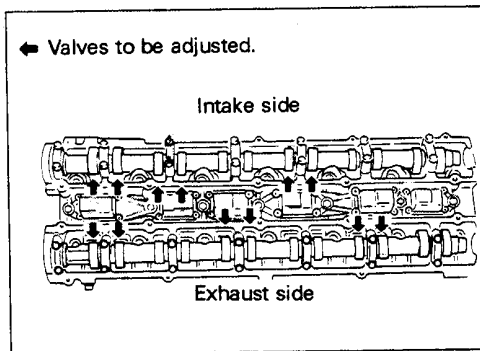
Additional work required:

Remove the following parts:

- Air duct
- Rocker cover (Refer to "SPARK PLUGS and ROCKER COVER REMOVAL AND INSTALLATION" section B2, 10-9, 10.)

Inspection

- Adjust valve clearance while engine is cold.
- Remove the air duct, ornaments and rocker cover.
- Turn crankshaft and align crankshaft pulley mark with belt cover indicator.
- No. 1 cylinder is at the compression stroke top dead center when both the intake and exhaust side cams do not move the valve lifters.



Item	Part	Valve clearance measurement
	Intake side	Cylinder No. 1, 2, 4
	Exhaust side	Cylinder No. 1, 3, 5

Firing order: 1-5-3-6-2-4

- Turn crankshaft one revolution (360°) and align mark on crankshaft pulley with belt cover indicator. (No. 1 cylinder piston exhaust T.D.C.)

Item	Part	Valve clearance measurement
	Intake side	Cylinder No. 3, 5, 6
	Exhaust side	Cylinder No. 2, 4, 6

Valve clearance standard values

[20 ± 5°C (68 ± 9°F)]

Item	Part	Intake	Exhaust
Valve clearance (cold)	mm (in)	0.45 ± 0.03 (0.018 ± 0.001)	0.38 ± 0.03 (0.015 ± 0.001)
(Reference value: warm)	mm (in)	0.51 ± 0.03 (0.020 ± 0.001)	0.44 ± 0.03 (0.017 ± 0.001)

CAUTION:

Always check valves when they are cold.

4. Valve Clearance Inspection and Adjustment (Cont'd)

Valve clearance measurement

- Insert a 0.15 - 0.20 mm (0.0059 - 0.0079 in) feeler gauge **Ⓐ** from spark plug side.
- Insert feeler gauges **Ⓑ** from opposite side. Select a gauge thickness that will reduce the clearance to 0 mm (0 in).

Note: ● Do not use more than two gauges for **Ⓑ**.
 ● The feeler gauge must conform to JIS (Japanese Industrial Standard) 150A25.

- Valve clearance = gauge **Ⓐ** + gauge **Ⓑ**

Reasons for measurement using gauges **Ⓐ** and **Ⓑ**:

- ① The valve clearance setting is larger compared to previous engines.
 - ② Larger gauges cannot be placed parallel to the measurement surface.
- Thick feeler gauge blades have a high rigidity and do not bend easily, so the measurement will be incorrect.
 - The error factor increases if a number of thin gauges are layered and the measurement will be incorrect.

Valve clearance adjustment

- The valve clearance adjustment is performed by selecting and inserting a shim of suitable thickness.
- When the measurement valve clearance (t) is out of specification, measure the shim thickness (T) and replace it with a shim that will produce the standard clearance.

① Shim thickness calculation method

Example: When the intake valve clearance (t) is 0.50 mm (0.020 in):

$$0.50 (t) - 0.45 (\text{specified value}) = 0.05 \text{ mm (0.0020 in)}$$

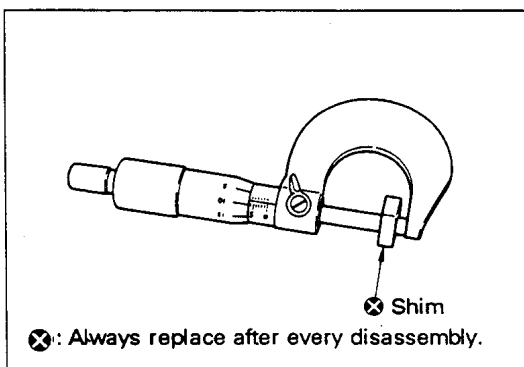
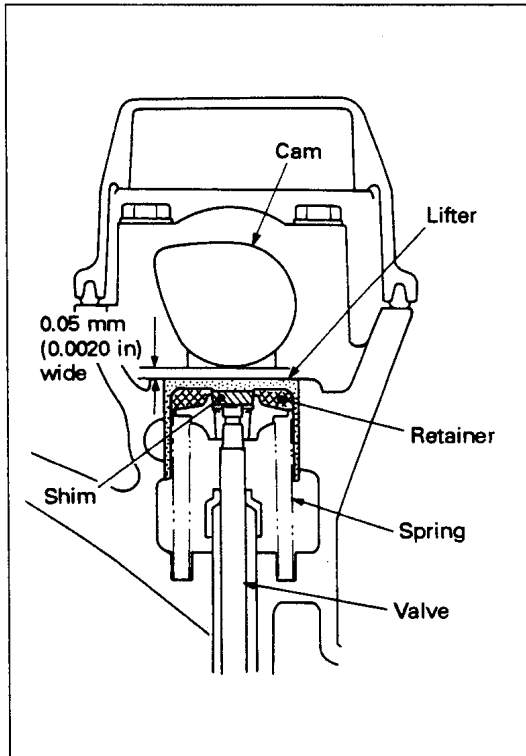
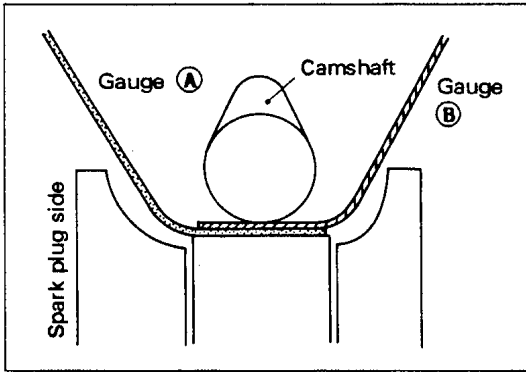
- The valve clearance is 0.05 mm (0.0020 in) greater than specified value.
- Use a shim which is 0.05 mm (0.0020 in) thicker than the current shim to reduce the valve clearance.

② Current shim thickness (T) calculation method

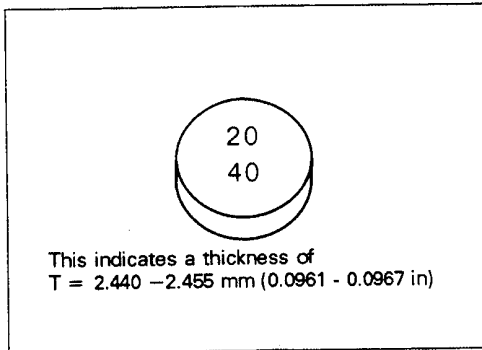
- Measure the center of removed shim to determine thickness.

CAUTION:

Do not use measured shims again.



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



4. Valve Clearance Inspection and Adjustment (Cont'd)

③ Shim selection

- Removed shim thickness (T) is 2.40 mm (0.0945 in).
2.40 (T) mm (0.0945 in) + 0.05 mm (0.0020 in) = 2.450 → selection shim thickness
- Select new shim with stamped mark $\begin{smallmatrix} 24 \\ 40 \end{smallmatrix}$ ($T = 2.440 - 2.455$).

CAUTION:

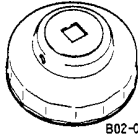
Select a shim which is within standard value range ± 0.03 mm (± 0.0012 in).

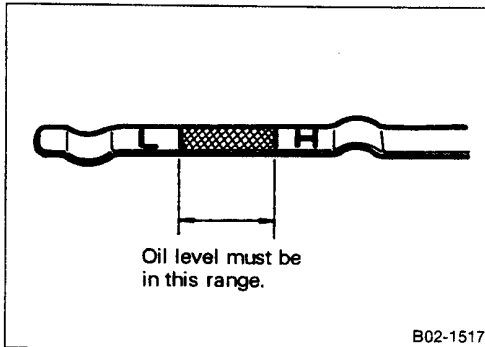
④ Shim types and classification

- There are 70 types of shims
The shim sizes range from 2.275 mm (0.0896 in) to 3.325 mm (0.1309 in) in 0.015 mm (0.0006 in) increments.
- After the camshaft is installed, measure valve clearance again and make sure clearance conforms to standard value.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

5. Lubrication System Inspection

	Name		Application
Special tool	Oil filter wrench KV101 062S0	 B02-0038	Oil filter removal and installation
Measurement tool	Oil pressure gauge		Used for oil pressure measurement



5-1 LUBRICATION OIL LEVEL INSPECTION

Inspection

- The engine oil level should be checked before starting the engine. If the engine has been started, perform the measurement ten minutes after the engine has cooled.
- The oil level should be between the H and L lines on the dipstick.
- The oil must not have any white turbidity or dirt.

Replacement interval	RB26DETT	Use SD, SE, SF or SG class oil. Change oil every 5,000 km (3,000 miles) or 6 months.
----------------------	----------	---

Note: Use genuine Nissan [Turbo X (7.5W-30)] for service.

Item	Engine	RB26DETT	
		H	4.5 (4)
Oil level	ℓ (Imp qt)	L	3.5 (3-1/8)
Oil supplement volume when replaced	ℓ (Imp qt)	Only oil replacement	Approx. 4.2 (3-3/4)
		Oil and oil filter replacement	Approx. 4.6 (4)

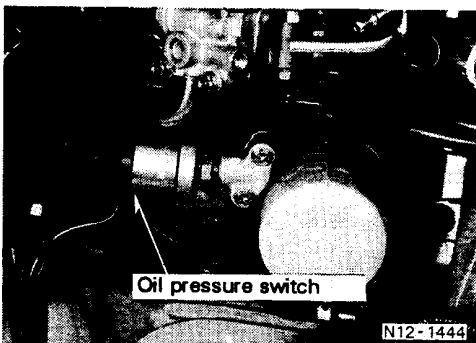
5-2 OIL PRESSURE INSPECTION

Inspection

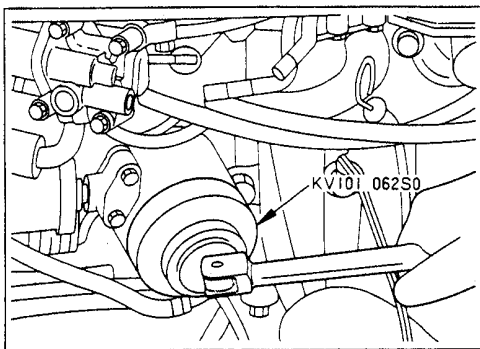
- Remove the oil pressure switch and connect oil pressure gauge.
- After warming engine, make sure the pressure is appropriate for engine speed.

Engine speed	(rpm)	800	2,000	6,000
Outlet pressure	kPa (kg/cm ² , psi)	Approx. 147 (1.5, 21)	Approx. 294 (3, 43)	Approx. 451 (4.6, 65)

[Oil temperature: 80°C (176°F)]



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



5. Lubrication System Inspection (Cont'd)

5-3 OIL FILTER REPLACEMENT

Refer to "OIL COOLER, OIL FILTER REMOVAL AND INSTALLATION" section B2, 10-15.)

Removal

- Use oil filter wrench (special service tool) to remove filter.

CAUTION:

Catch any dripping oil in a rag when removing the filter.

Installation

- Before installing new oil filter, clean the oil filter bracket mounting surface on cylinder block and coat the oil filter seal lips lightly with engine oil.
- Screw in the oil filter by hand until a slight resistance is felt and then tighten an additional 2/3 turn.

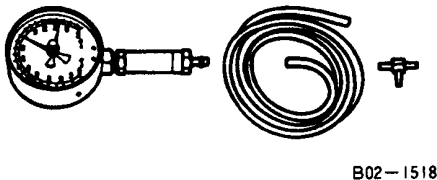
CAUTION:

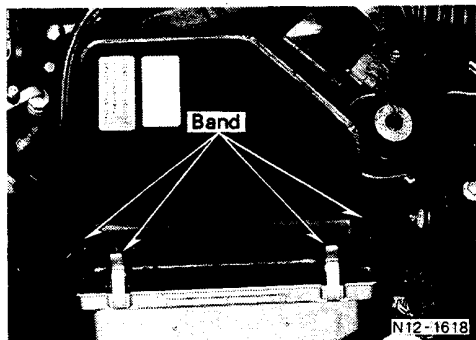
Start engine and check area around drain plug and oil filter for oil leakage.

Periodic exchange interval	RB26DETT	Use SD, SE, SF or SG class oil. Change oil every 10,000 km (6,000 miles) or 1 year.
----------------------------	----------	---

6. Exhaust System Inspection

Tools required

	Name		Application
Measurement tool	Compound gauge EG1508 0001	 B02-1518	Used to check turbo-charger for excess pressure.



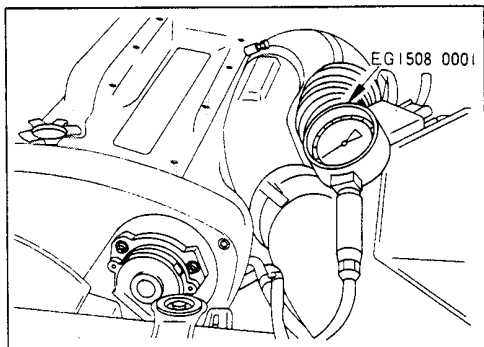
6-1 AIR CLEANER ELEMENT INSPECTION

Inspection

Remove parts from vehicle.

- Refer to Section 10-2, AIR CLEANER ELEMENT INSTALLATION.
- There should be no excessive dirt or damage in the air cleaner element.

RB26DETT	Periodic exchange interval	every 60,000 km (36,000 miles)
----------	----------------------------	--------------------------------



6-2 TURBOCHARGER INSPECTION

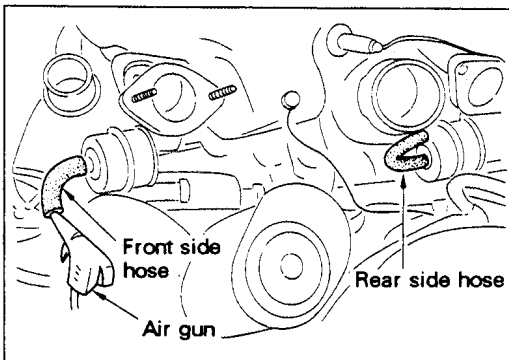
Function inspection

- Remove the intake manifold canister hose, and place a cap on the hose. Connect test hose to intake manifold and attach pressure gauge (compound gauge).
- When engine operation test is performed, check that pressure does not rise above approximately 78 to 88 kPa (0.8 to 0.9 kg/cm², 11 to 13 psi).

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

6. Exhaust System Inspection (Cont'd)

- a. When the pressure does not reach specified level:
 - Check for vacuum leak in intake or exhaust system or exhaust gas leak.
- b. When the pressure exceeds the maximum pressure level (approx. 78 to 88 kPa (0.8 to 0.9 kg/cm², 11 to 13 psi)):
 - Check if swing valve controller rubber hose is disconnected or cut.
 - Check if swing valve controller motion malfunctions (stays closed).

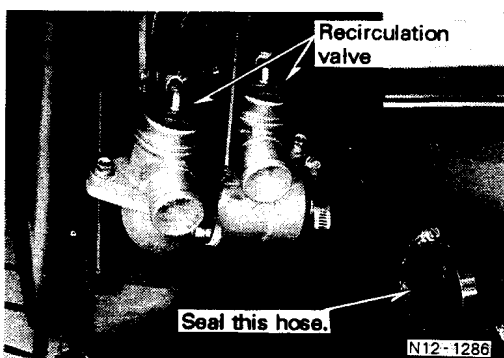


Swing valve controller inspection

- Remove the swing valve controller rubber hose from the vacuum tube side.
- When compressed air [approx. 69 to 78 kPa (0.7 to 0.8 kg/cm², 10 to 11 psi)] is forced into the hose by an air gun, the control rod must start operation. Stop blowing compressed air into the hose as soon as control rod operation is verified.

CAUTION:

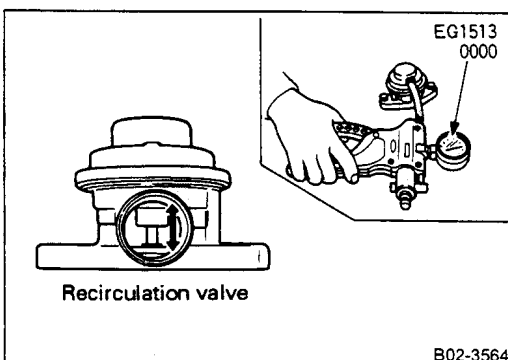
The diaphragm may be damaged if excessive air pressure is applied. Use the LPG pressure gauge (special service tool for [98 kPa (1 kg/cm², 14 psi)]) to verify that the air gun pressure is approx. 78 to 88 kPa (0.8 to 0.9 kg/cm², 11 to 13 psi) before testing the air hose.



6-3 RECIRCULATION VALVE INSPECTION

Function inspection

- Remove hose on upper flow side of recirculation valve compressor (cover end of hose with cap) and check if air blows back when throttle is closed quickly.



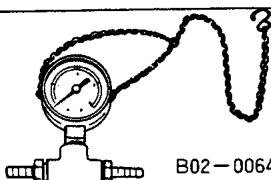
Unit inspection

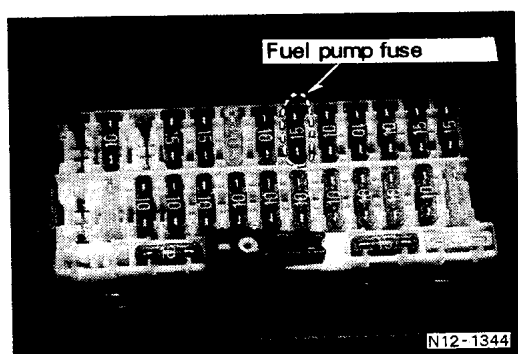
- Use a hand vacuum pump to create negative pressure [-20.0 ± 4.0 kPa (-150 ± 30 mmHg, -5.91 ± 1.18 inHg)]. The recirculation valve diaphragm must start to lift and the vacuum pressure must be maintained.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

7. Fuel System Inspection

Tools required

	Item	Application
Measurement tool	EGI fuel pressure meter ST1959 0000 	Fuel pressure measurement



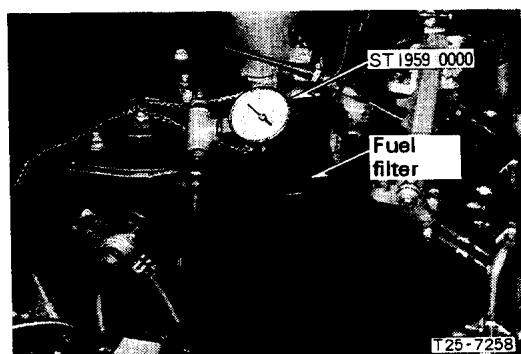
7-1 FUEL PRESSURE INSPECTION

Releasing fuel pressure

- After starting engine, remove fuel pump fuse. After the engine stops, crank the engine over two or three times and the fuel in the pipe will be consumed.
- If the engine does not start, remove the pump fuse and crank the engine three to four times to consume the fuel in fuel lines.

CAUTION:

The battery may become weak easily, so use booster cables to connect it to another vehicle or charged battery if necessary.



Fuel pressure meter installation

- Connect the fuel pressure meter between fuel filter and fuel line.
- Attach fuel pump fuse.

Fuel pressure inspection

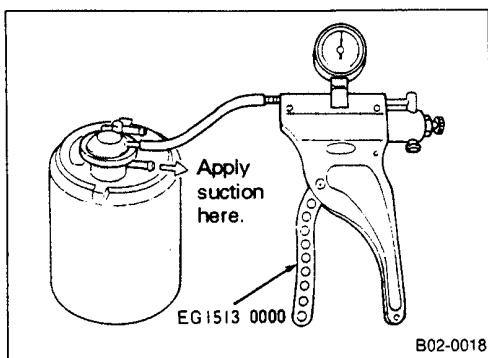
- Start engine and check if the fuel pressure is standard value.
- If the engine does not start, check fuel pressure after 5 seconds when the ignition switch has been turned ON.



Fuel pressure measurement

When ignition switch is ON	kPa (kg/cm ² , psi)	Approx. 294 (3.0, 43)
During idling	kPa (kg/cm ² , psi)	Approx. 245 (2.5, 36)
Idling when pressure regulator vacuum hose is removed.	kPa (kg/cm ² , psi)	Approx. 294 (3.0, 43)

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

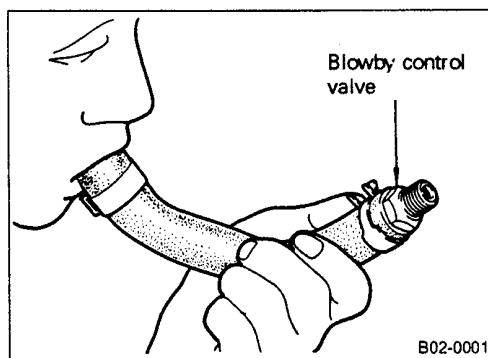


8. Evaporative Gas Control System Inspection

8-1 PURGE CONTROL VALVE INSPECTION

Inspection

- Use a hand vacuum pump to apply approximately -53.3 kPa (-400 mmHg , -15.75 inHg) and make sure vacuum pressure is maintained.
- In the preceding condition, check that a small amount of air can be sucked from the manifold vacuum path.



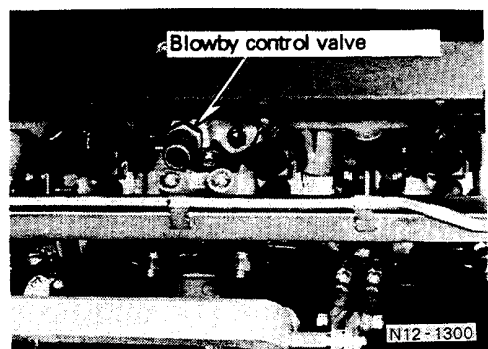
9. Blowby Gas Reduction Equipment Inspection

9-1 BLOWBY CONTROL VALVE INSPECTION

Inspection

- Check the blowby control valve flow path.

	Condition
Air is blown.	Air passes.
Air is drawn in.	No air passes.



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

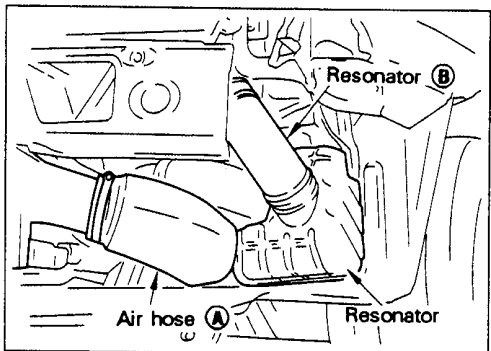
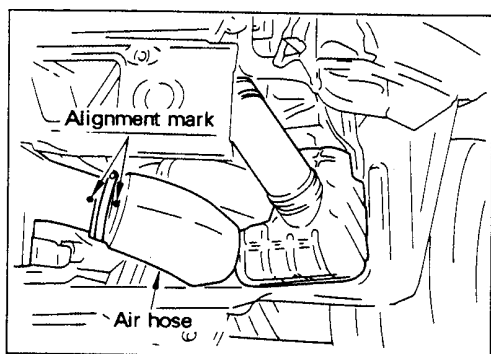
[Point 2] Remove and install each air hose and tube.

Removal

- Draw alignment marks before removing air hoses and tubes.

Installation

- Position air hoses and tubes so the alignment marks coincide. Insert [approximately 30 mm (1.18 in)] hose or tube and tighten clamps securely.



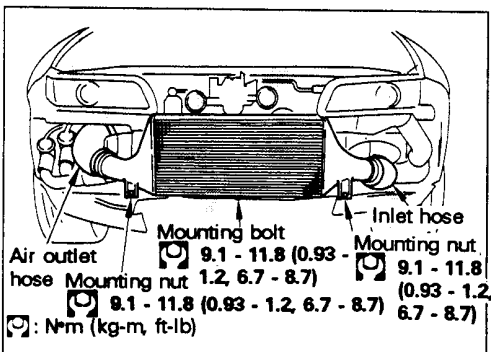
[Point 3] Remove and install the intercooler inlet hose.

Removal

- Remove the resonator and tube ② before removing hose ①.

Installation

- Attach hose ①, then combine resonator and tube ② as a single unit and install.



[Point 4] Remove and install intercooler.

Removal

- ① Remove the bumper finisher and bumper reinforcement. (Refer to Section D Body for details.)
- ② Separate the intercooler inlet and outlet hoses.
- ③ Remove the mounting bolt and two nuts. Detach intercooler without scratching the fins.

CAUTION:

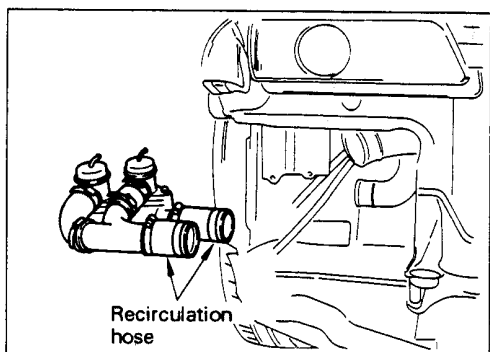
- (1) The fins are aluminum and can be damaged easily. Never place anything on the intercooler or allow tools or other hard objects to contact the fins.
- (2) The main unit (tank, fins, tube) cannot be disassembled.

Installation

- Assembly is the reverse of disassembly. Perform steps in the sequence ③, ②, ①.

Tightening torque

9.1 - 11.8 N·m (0.93 - 1.2 kg-m, 6.7 - 8.7 ft-lb)

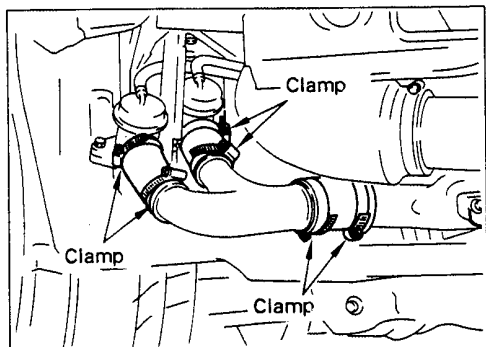


[Point 5] Recirculation hose removal and installation

- Remove and install the recirculation hose and tube as shown in the figure on the left.

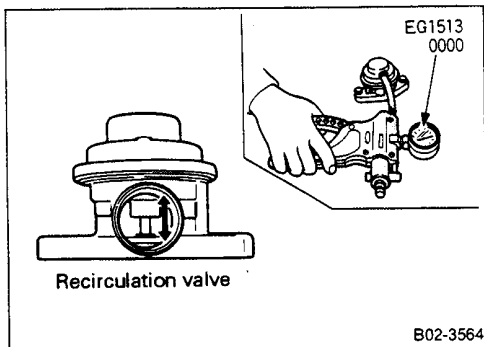
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)



[Point 6] Recirculation hose clamp installation

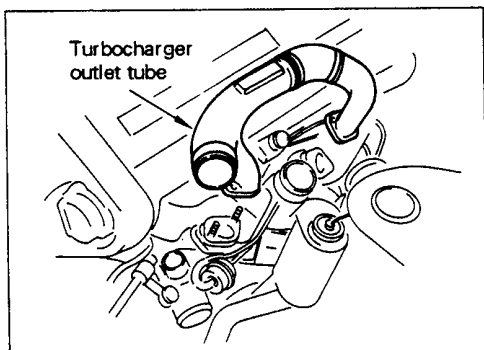
- When the recirculation hose clamp is installed, it must not contact the bumper finisher.



[Point 7] Recirculation valve inspection

Unit inspection

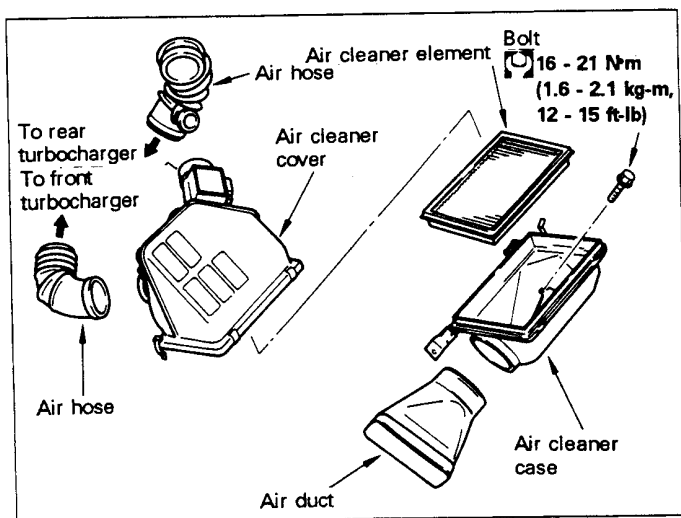
- Use a hand vacuum pump to apply a vacuum [-20.0 ± 2.7 kPa (-150 ± 20 mmHg, -5.91 ± 0.79 inHg)] and check that recirculation valve diaphragm lifts and vacuum pressure is maintained.



[Point 8] Turbocharger outlet tube removal and installation

- Remove and install turbocharger outlet tube as shown in figure on left.

10-2 AIR CLEANER ELEMENT



Additional work required:

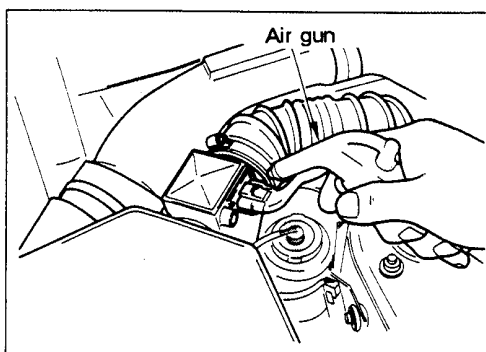
Remove turbocharger outlet hose. [Point 2]

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

[Point 1] Air hose and air duct cleaning

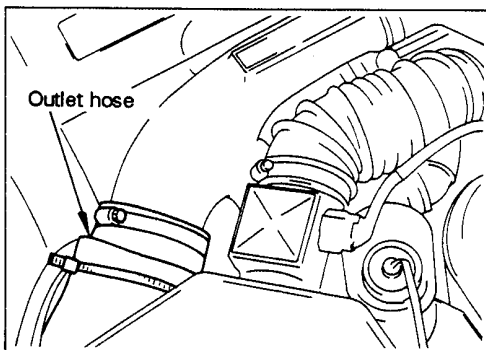
- Use an air gun to blow off any dirt or dust before removing the air cleaner element.



[Point 2] Air cleaner element removal and installation

Removal

- ① Remove turbocharger outlet hose.



- ② Remove the four band clips from air cleaner. Lift air cleaner cover and remove air cleaner element.

Installation

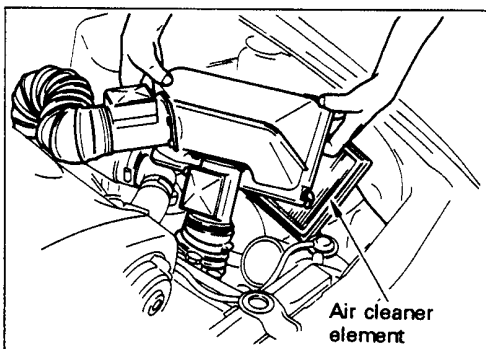
- Install in reverse order of removal.

[Point 3] Air cleaner element inspection

- Air cleaner element must not be dirty or damaged.

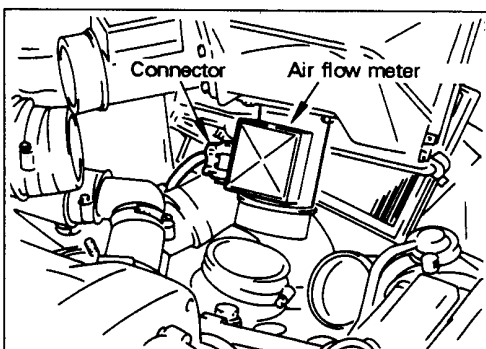
Periodic replacement interval:

Every 60,000 km (36,000 miles)



[Point 4] Air cleaner cover installation

- First connect air flow meter connector for front turbocharger and then install air cleaner cover.

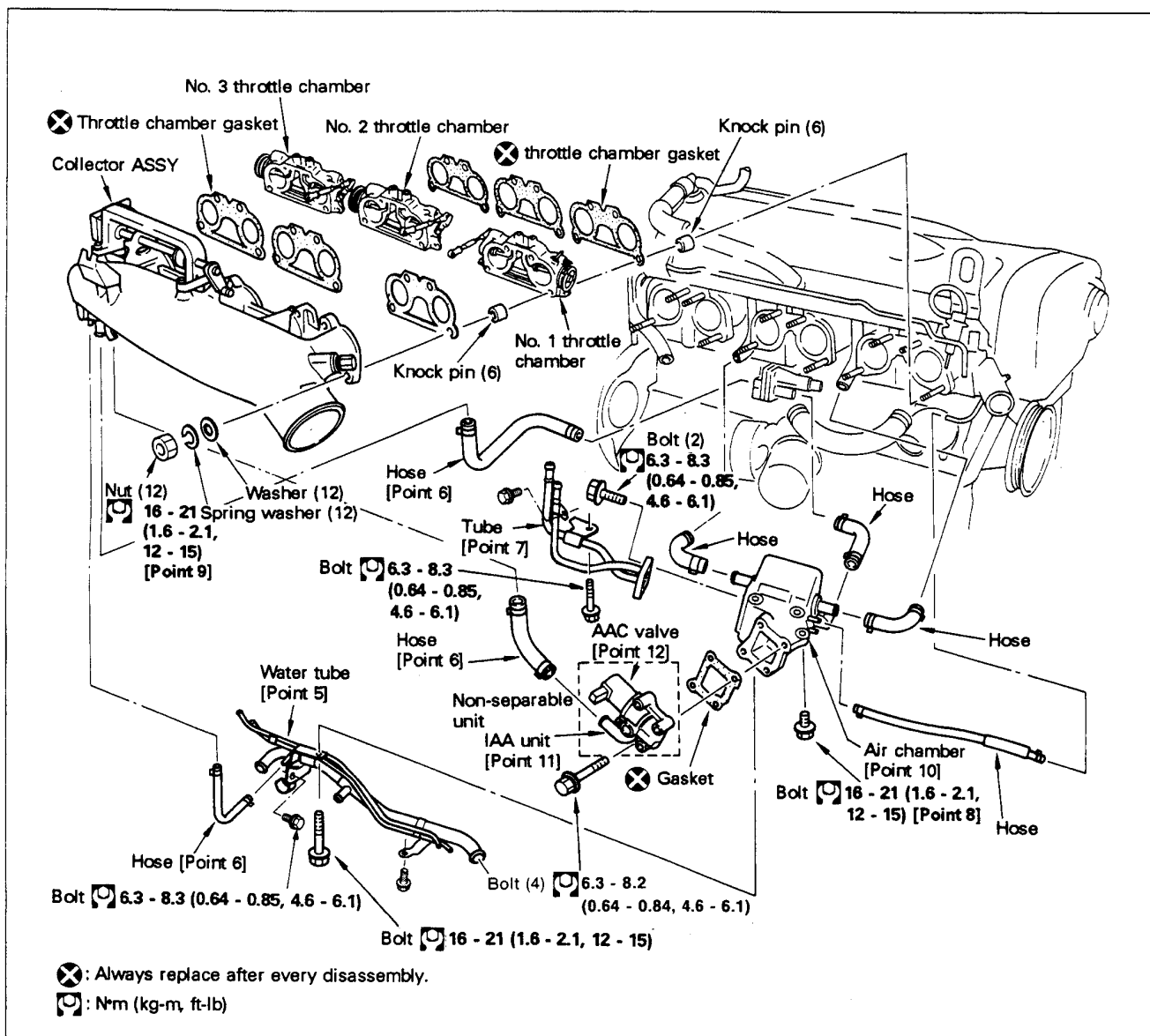


B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

10-3 COLLECTOR ASSY

(1) Collector ASSY removal and installation

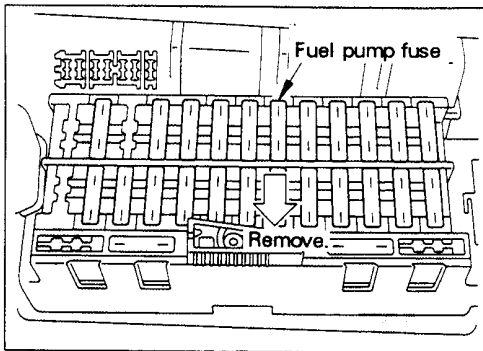


Additional work required

- Drain and refill cooling water. [Point 2]
- Release fuel pressure in the fuel lines. [Point 1]
- Acceleration control wire [Point 3]
- Air inlet hose
- EGI harness connector, harness clamp
- All hoses

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

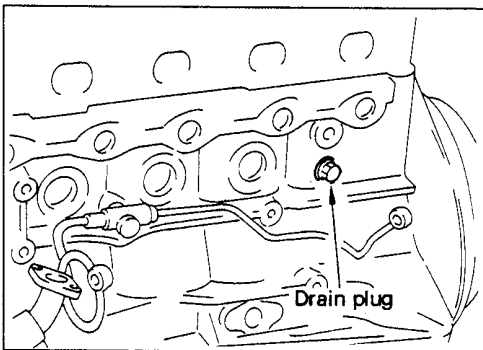


[Point 1] Release fuel pressure

- Start the engine.
- After engine starts, remove fuel pump fuse and wait until engine stops. Crank engine two or three times to use up fuel remaining in fuel lines.
- If the vehicle will not start, remove the fuel pump fuse, crank the engine 4 to 5 times to use up fuel in fuel lines.

CAUTION:

Connect the battery with booster cables to a battery in another vehicle or charged battery since the battery may drain easily.

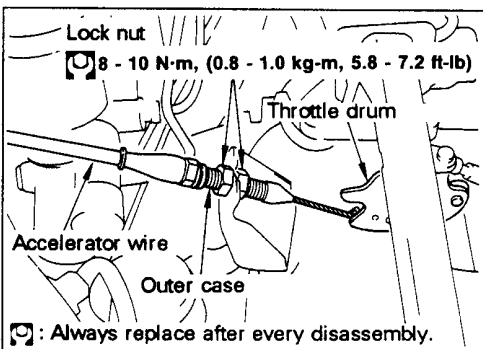


[Point 2] Drain the cooling water.

- Remove drain plug from cylinder block to drain all coolant from block.

CAUTION:

Make sure coolant does not fall on front exhaust pipe.

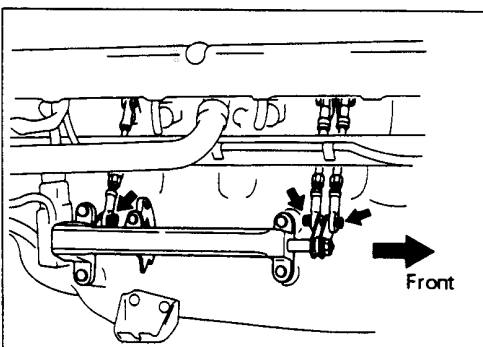


[Point 3] Accelerator wire adjustment

- Loosen lock nut to provide adequate slack for the accelerator wire and pull outer case in the direction of the accelerator. Return lock nut 1.0 to 1.5 turns from the position the throttle drum starts moving (when there is no play in cable) and tighten.

Tightening torque:

8 - 10 N·m (0.8 - 1.0 kg-m, 5.8 - 7.2 ft-lb)

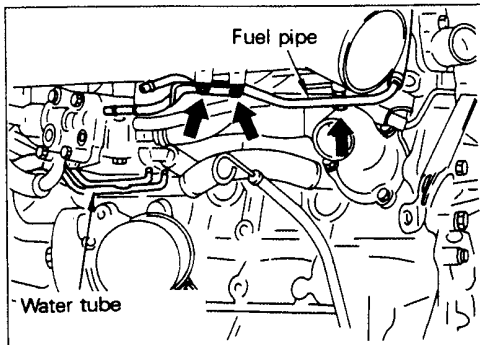


[Point 4] Remove throttle chamber linkage.

- Remove mounting nuts indicated by arrow marks. Separate the three throttle chamber links from collector side.
- Remove harness from throttle sensor and throttle valve switch.

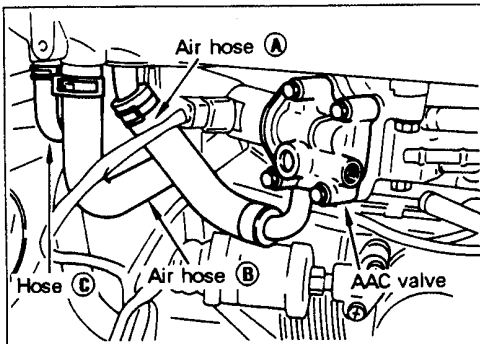
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)



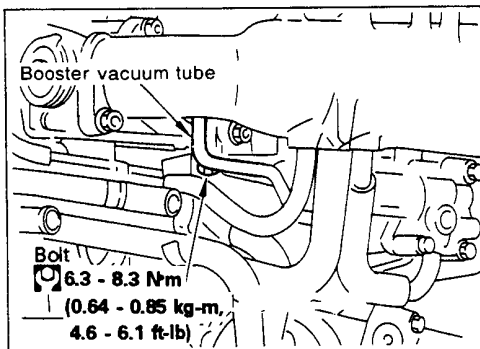
[Point 5] Fuel pipe removal

- Remove the three bolts indicated by the arrows and separate the fuel pipe.



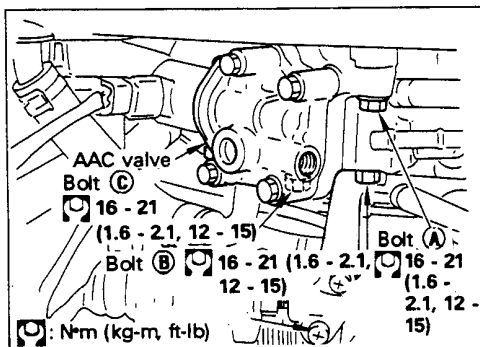
[Point 6] Air hose removal

- Separate air hoses A, B and C from the collector side.



[Point 7] Booster vacuum tube removal

- Remove the clamp bolts, separate booster vacuum tube from collector and air chamber and remove tube.



[Point 8] Air chamber bolts removal and installation

Removal

- Remove the three bolts and separate air chamber.

Installation

- Insert bolt B in air chamber bolt hole, before performing final assembly.

Tightening torque:

16 - 21 N·m (1.6 - 2.1 kg-m, 12 - 15 ft-lb)

[Point 9] Collector nut removal and installation

Removal

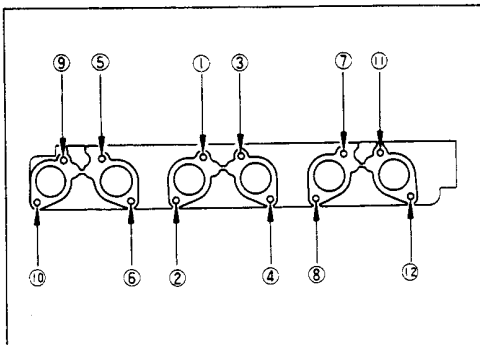
- Remove the nuts in the reverse order of the figure on the left.

Installation

- Tighten nuts in order shown in figure on left uniformly in two to three stages.

Tightening torque:

16 - 21 N·m (1.6 - 2.1 kg-m, 12 - 15 ft-lb)



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

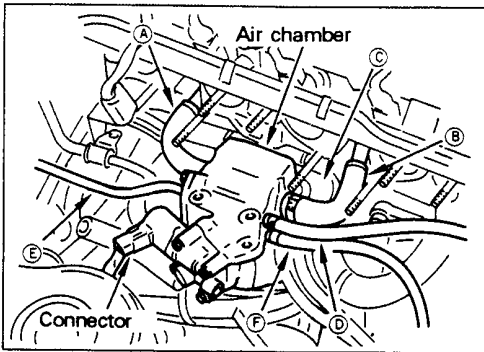
[Point 10] Air chamber removal and installation

Removal

- Separate air hoses ①, ②, ③, vacuum hoses ④, ⑤ and AAC valve connector and remove air chamber.

Installation

- Position air chamber in place, connect air hoses ③, ②, ①, vacuum hoses ⑤, ④, then connect AAC valve connector.



[Point 11] AAC valve removal and installation

Removal

- Remove the four bolts and detach AAC valve.

CAUTION:

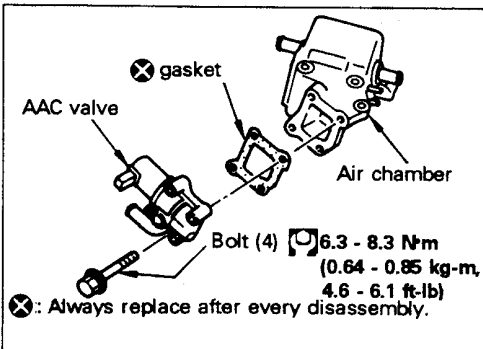
- (1) The AAC valve cannot be disassembled.
- (2) Replace gasket with a new one.

Installation

- Install gasket and AAC valve.

Tightening torque:

6.3 - 8.3 N·m (0.64 - 0.85 kg-m, 4.6 - 6.1 ft-lb)

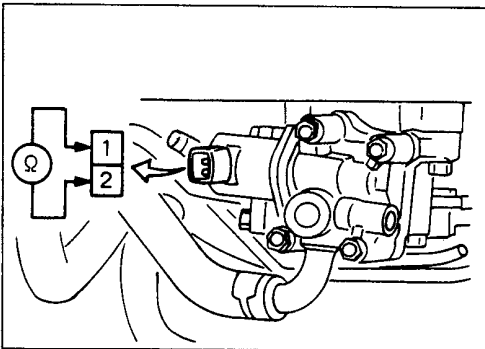


[Point 12] AAC valve inspection

- Measure the AAC valve resistance.

Resistance [20°C (68°F)]:

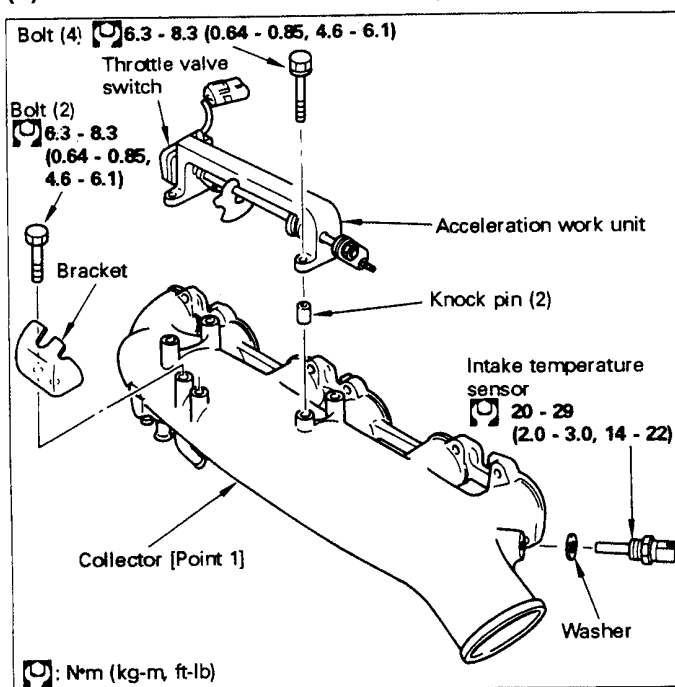
Approx. 9 - 10 (Ω)



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

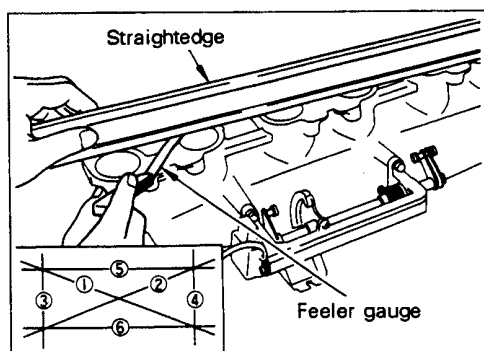
10. Removal and Installation of On-vehicle Parts (Cont'd)

(2) Collector ASSY disassembly and assembly



Additional work required:

- **Collector ASSY installation**
Refer to Section B3, 6-3, THROTTLE VALVE SWITCH SYSTEM INSPECTION for the throttle valve switch adjustment procedures. Refer to section B2, 10-5, 6 IN-LINE THROTTLE CHAMBER LINKAGE ADJUSTMENT for the related adjustment procedures.



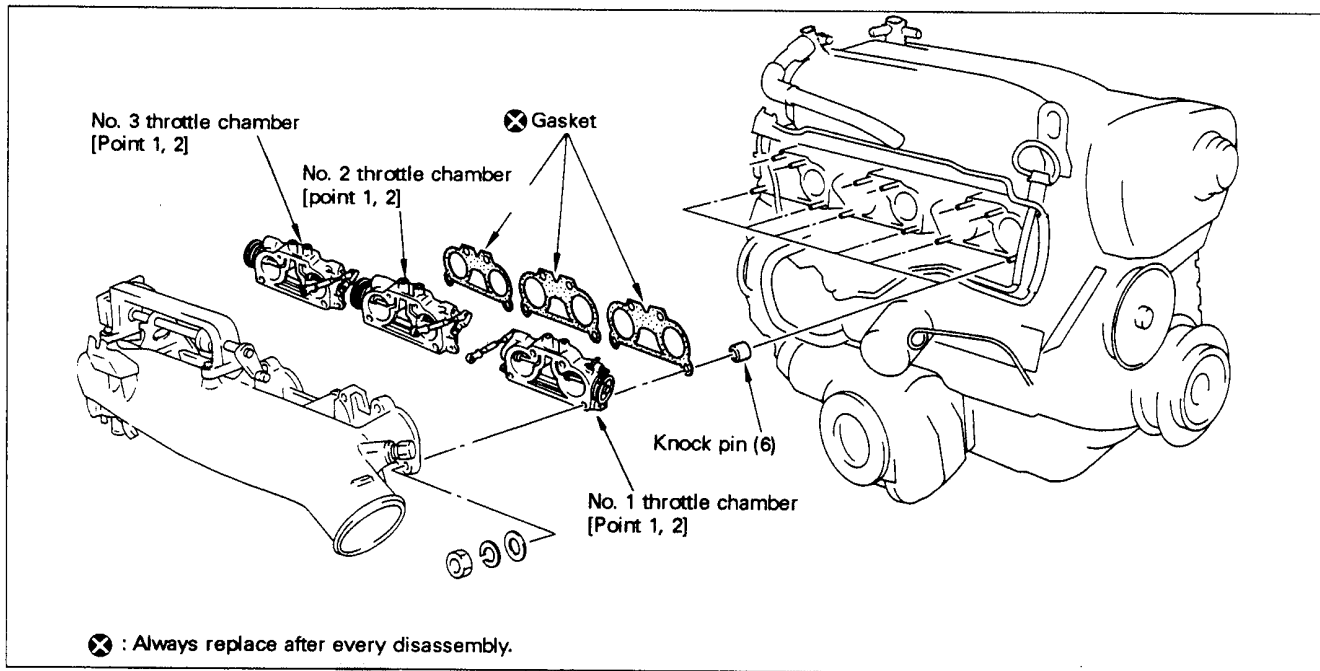
[Point 1] Collector installation

- Measure the collector installation surface for distortion in six directions (opposing directions, up, down, left, right, horizontally and vertically).
Limit: 0.15 mm (0.0059 in)

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

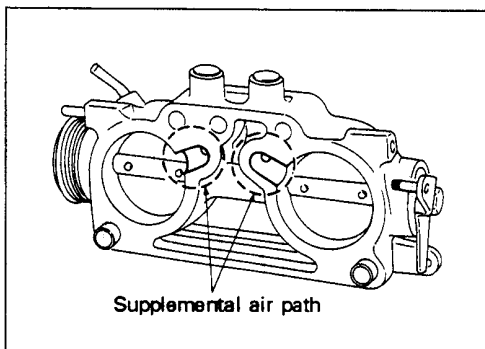
10. Removal and Installation of On-vehicle Parts (Cont'd)

10-4 6 IN-LINE THROTTLE CHAMBER REMOVAL AND INSTALLATION



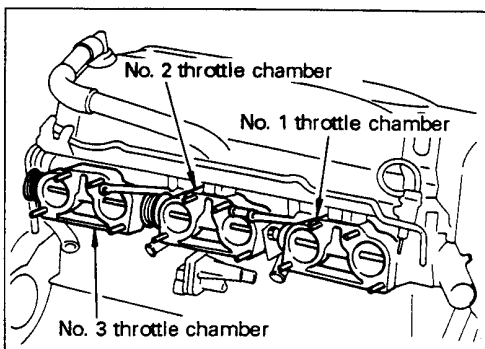
Additional work required:

- Collector ASSY removal and installation
- Canister hose



[Point 1] Throttle chamber inspection

- Check that there are no cracks and that supplemental air paths are not obstructed.



[Point 2] Throttle chamber installation

- Install the No. 1 to No. 3 throttle chambers.

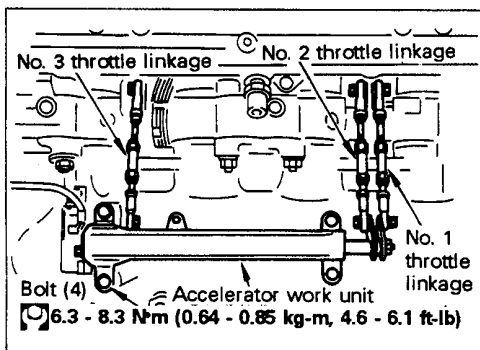
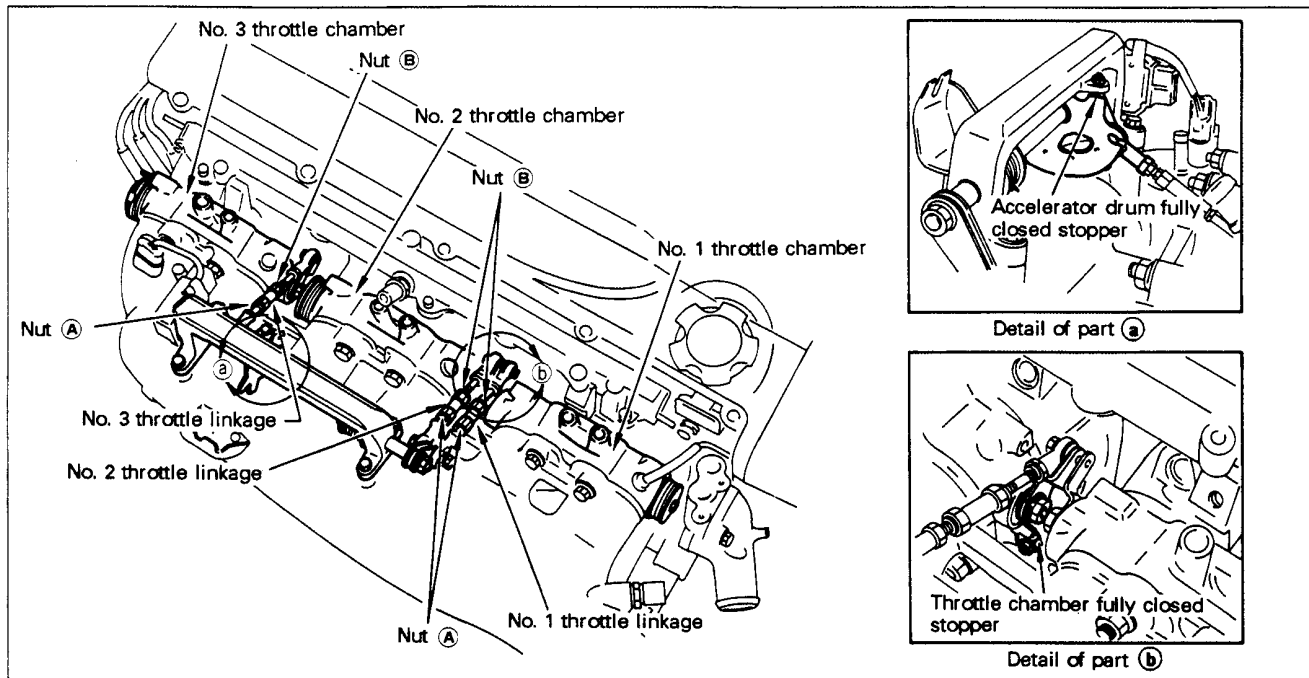
CAUTION:

Do not make any mistake when installing the chamber.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

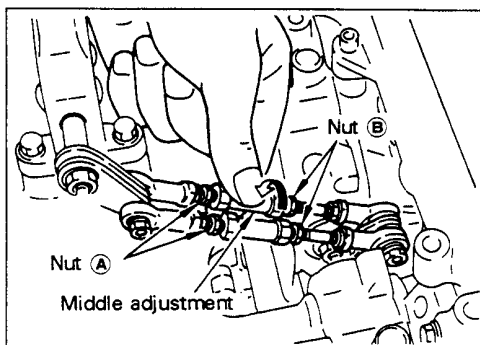
10. Removal and Installation of On-vehicle Parts (Cont'd)

10-5 6 IN-LINE THROTTLE CHAMBER LINKAGE ADJUSTMENT



[Point 1] Accelerator work unit installation

- Install the 6 in-line throttle chamber and accelerator work unit and connect the No. 1, 2 and 3 throttle linkages.

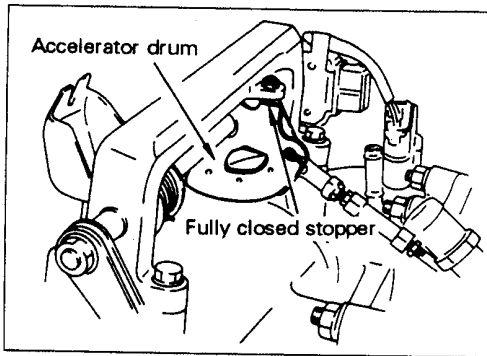


[Point 2] 6 in-line throttle chamber linkage adjustment

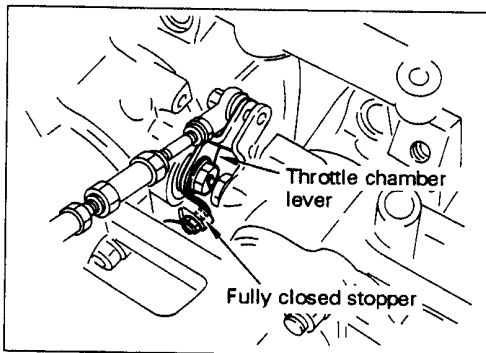
- ① Loosen nuts A and B for each throttle linkage. Turn the middle adjustment of each throttle linkage counterclockwise to shorten the linkage.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)



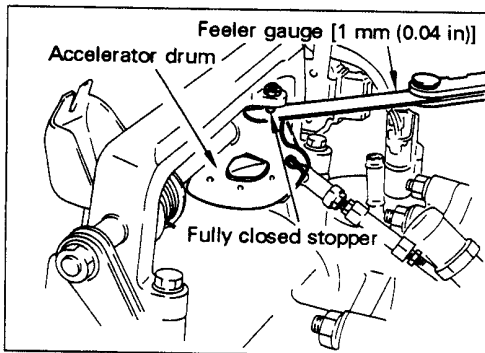
- ② Shorten each throttle linkage until acceleration drum contacts fully closed stopper on the accelerator work unit side.



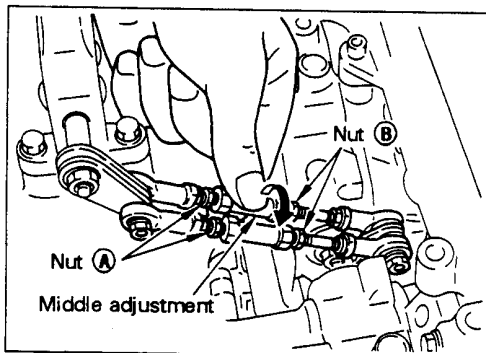
- ③ Shorten each throttle linkage, so the throttle chamber lever opens wider than fully closed stopper on the throttle chamber side.

CAUTION:

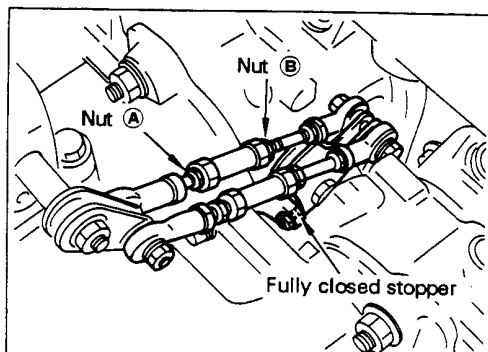
1. Do not lock nuts **A** and **B**.
2. The throttle chamber lever opening angle should be adequate.



- ④ Insert a 1 mm (0.04 in) feeler gauge between the accelerator drum and fully closed stopper on the accelerator work unit side.
Secure accelerator drum so it does not move.



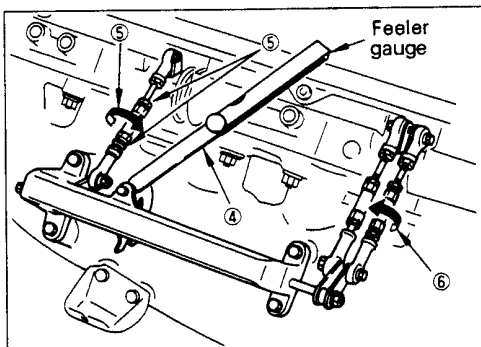
- ⑤ With feeler gauge inserted, turn the middle adjustment in No. 2 throttle linkage clockwise to lengthen throttle linkage until the throttle chamber lever contacts the fully closed stopper on the throttle chamber side.



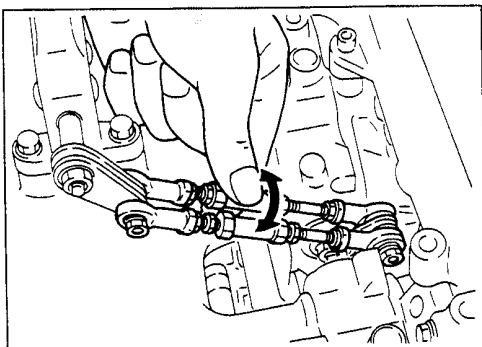
- ⑥ When the fully closed stopper contacts, the throttle chamber lever, you should feel resistance when turning the throttle linkage with your fingers. Shorten the throttle linkage to the point just before this resistance is felt.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)



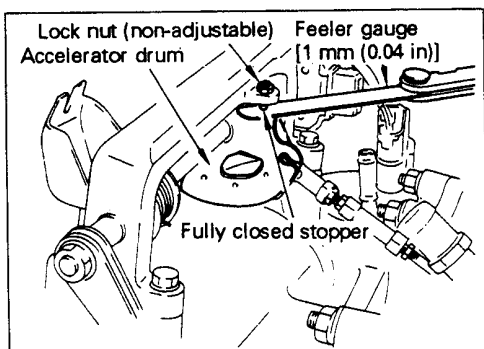
- ⑦ Perform steps ④, ⑤ and ⑥ to adjust the No. 3 and 1 throttle linkages.



- ⑧ After the adjustment is completed for the three throttle linkages, tighten lock nuts ① and ②. After the nuts are tightened, No. 1 - 3 throttle linkages must turn with same degree of smoothness.

CAUTION:

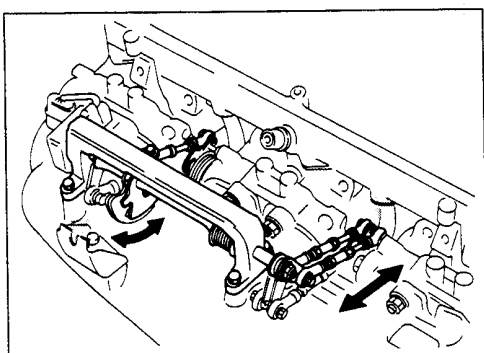
The middle adjustment linkage must not turn when the lock nut is tightened.



- ⑨ Remove feeler gauge from fully closed stopper on accelerator work unit side.

CAUTION:

Do not adjust fully closed stopper nut.



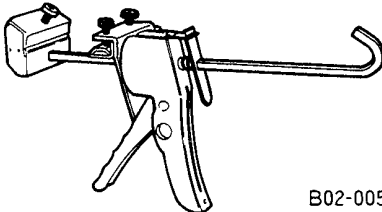
- ⑩ Completely open and close the 6 in-line throttle chambers repeatedly and check that each throttle chamber moves smoothly.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

10-6 INTAKE MANIFOLD ASSY

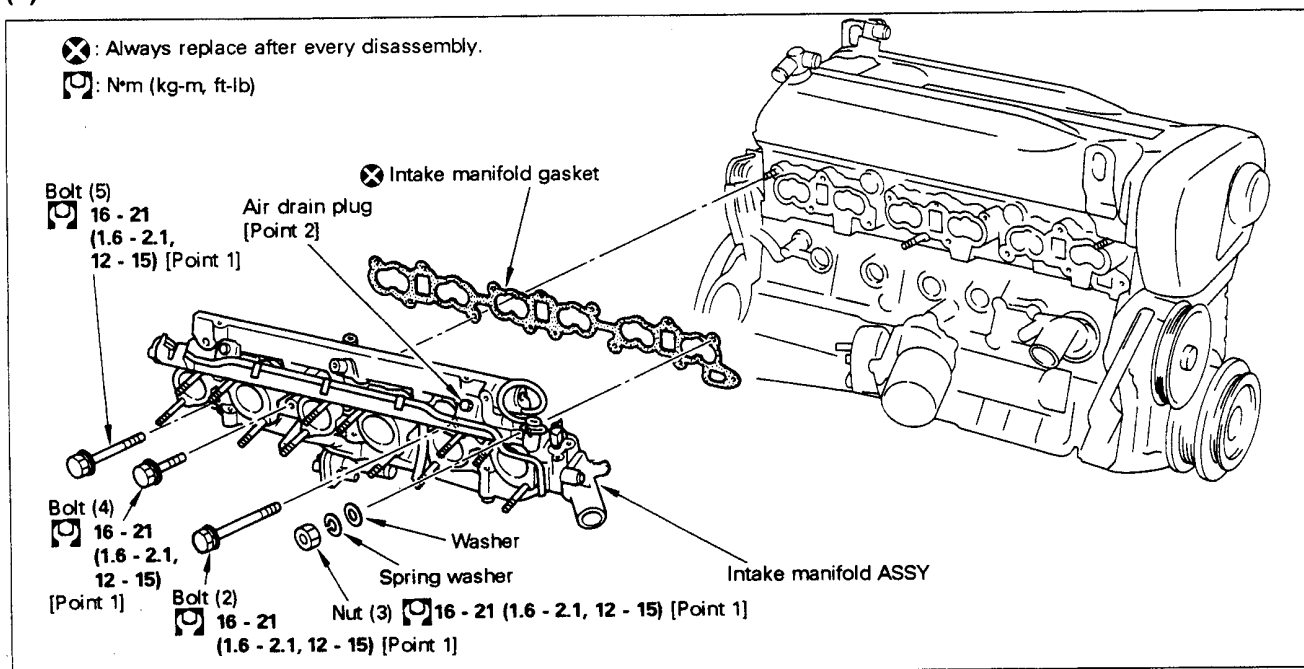
Tools required

	Name	Application
Tool	Tube presser WS3993	Liquid gasket lubrication
	 B02-0051	

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

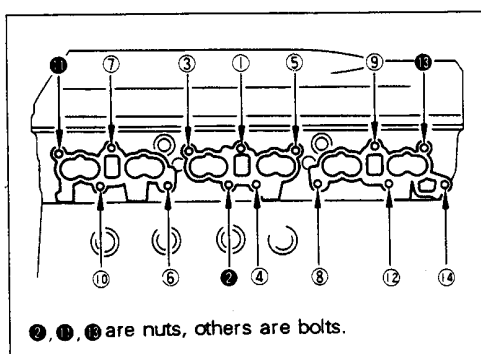
(1) Intake Manifold ASSY Removal and Installation



Additional work required:

Removal and Installation

- Collector ASSY
- Throttle chamber
- ECCS harness connector and all hoses
- Water outlet hose
- Blowby hose



[Point 1] Intake manifold ASSY bolt and nut removal and installation

Removal

- Removal is the reverse of order shown in the figure on left.

Installation

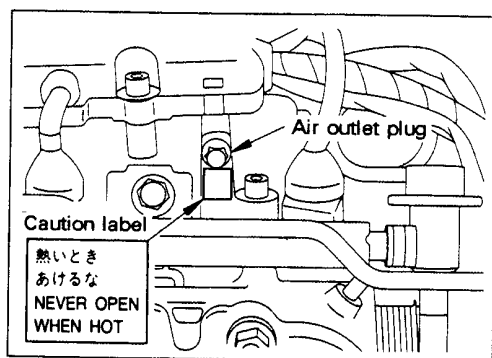
- Installation is performed in order shown in figure. Tighten in gradual steps to uniform tightness.

	Length: Number of bolts	Installation location
Bolt length below head mm (in)	30 (1.18): (4)	③, ⑤, ⑥, ⑧
	60 (2.36): (5)	①, ④, ⑩, ⑫, ⑭
	65 (2.56): (6)	⑦, ⑨

Tightening torque:

16 - 21 N·m (1.6 - 2.1 kg-m, 12 - 15 ft-lb)

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



10. Removal and Installation of On-vehicle Part (Cont'd)

[Point 2] Air drain plug

Refer to section B6, 3, for details.

- Perform when engine is cool.

WARNING:

Never remove the air drain plug when engine is warm, because hot water may escape and cause injury.

- When pouring coolant into engine, always remove air drain plug to allow air within engine to escape. (This prevents overheating.)

CAUTION:

Be careful not to strip screw threads by over-torquing the air drain plug.

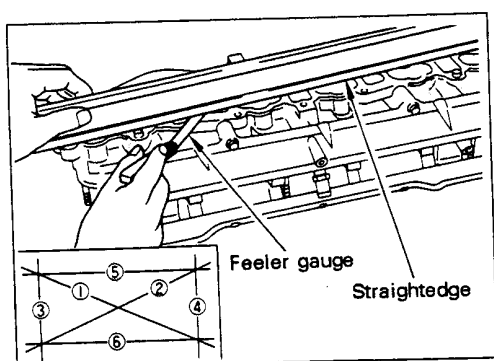
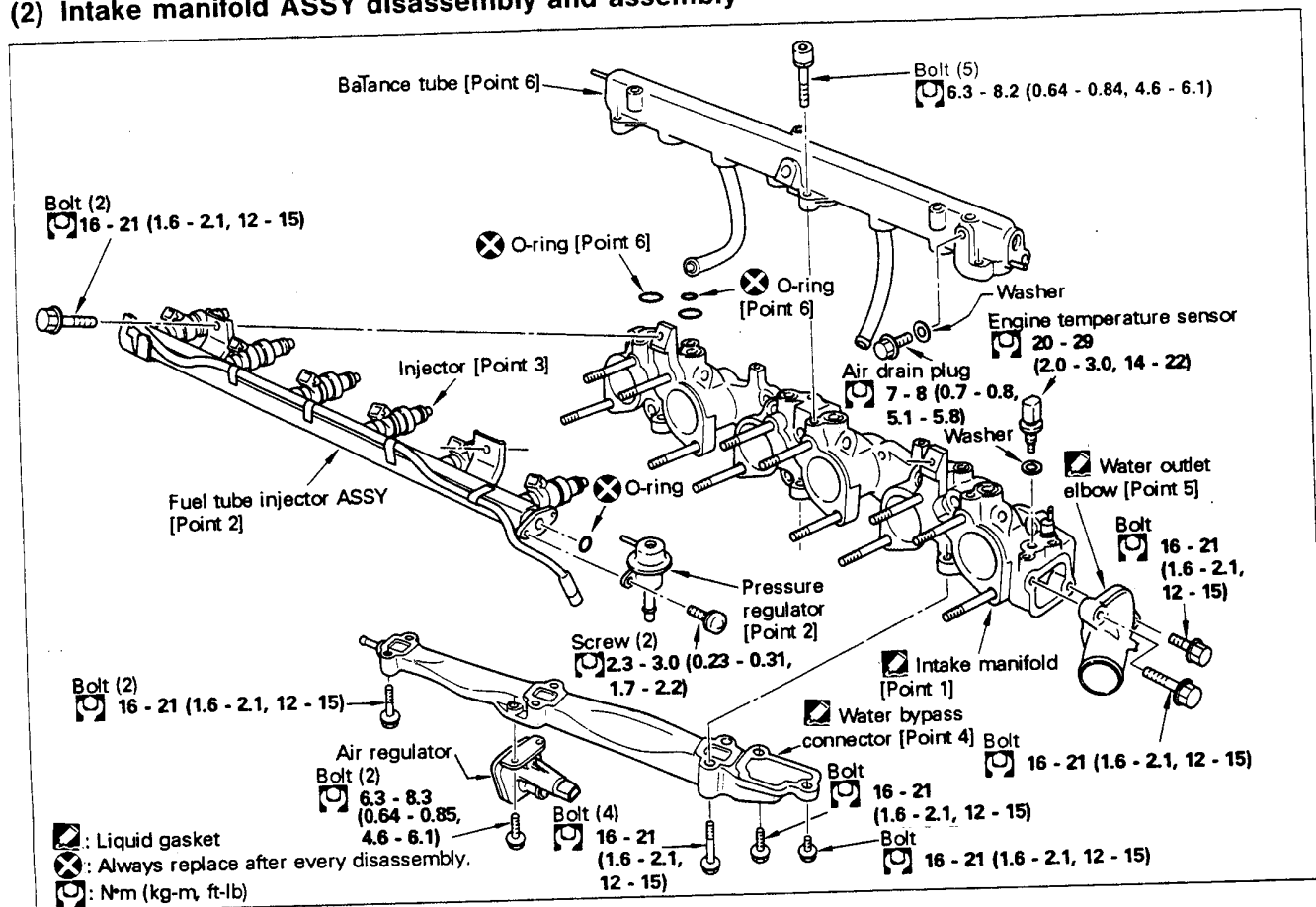
Tightening torque:

7 - 8 N·m (0.7 - 0.8 kg-m, 5.1 - 5.8 ft-lb)

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

(2) Intake manifold ASSY disassembly and assembly

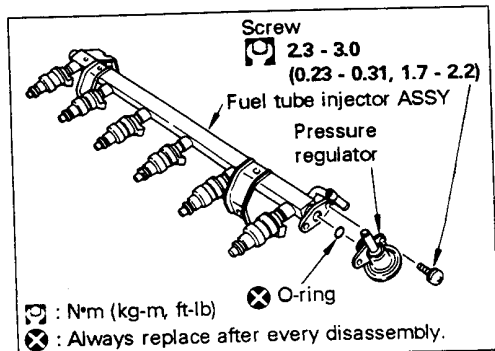


[Point 1] Intake manifold inspection

- Measure the intake manifold surface for distortions in six separate directions (at opposite directions; up, down, right, left, horizontally and vertically) in a number of locations.

Limit:

0.15 mm (0.0059 in)



[Point 2] Fuel tube ASSY

- O-rings must be replaced with new ones when pressure regulator is removed and installed.

CAUTION:

When pressure regulator is installed, be careful not to scratch the surfaces which contact O-rings.

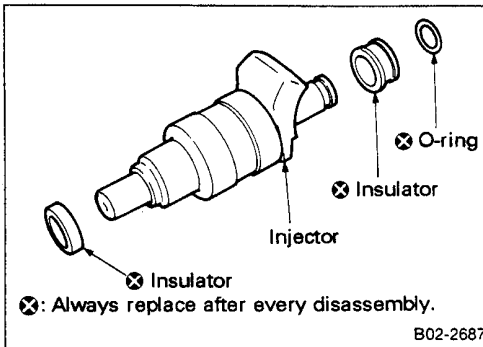
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

[Point 3] O-rings (for fuel injector pressure regulator)

Installation precautions

- Never re-use O-rings.
- Coat O-rings with engine oil (10W-30 or equivalent) or silicon oil (NUC silicon L45 or equivalent) but do not apply solvent to them as this may remove the oil coating.
- Do not allow dirt, dust or foreign matter to adhere to O-rings or other equipment surfaces. Do not use dirty O-rings.
- Be careful when installing O-rings so tools or operator's fingernails do not make scratches, twist or stretch them. In particular, do not insert them in the fuel tube by making them stretch slightly.
- When inserting the fuel injectors and pressure regulator in the fuel tubes, be careful not to install them off-center or rotate them.
- Do not store O-rings in locations subject to ozone, high temperatures or direct sunlight.



[Point 4] Water bypass connector removal and installation

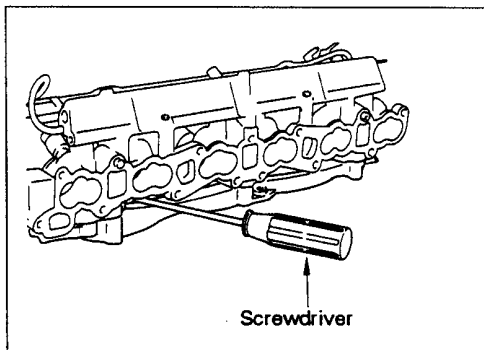
Removal and cleaning

- Remove the eight water bypass connector bolts. Insert screwdriver in clearance between the intake manifold and water bypass connector and move it lightly to remove connector.
- Use a scraper and remove liquid gasket.

CAUTION:

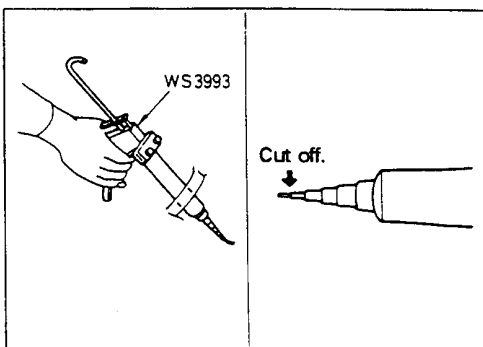
Liquid gasket in grooves must also be removed.

- Wipe off the surface with white gasoline, etc.



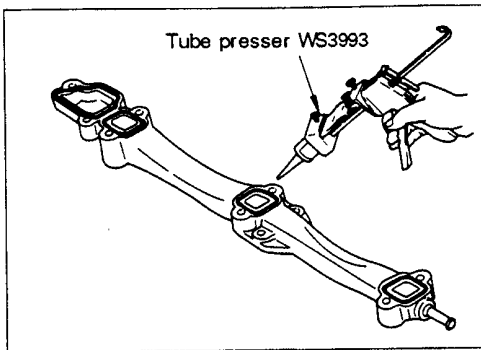
Installation

- Cut nozzle end of liquid gasket (KP510 00150) in position shown in left figure. Use a tube presser to apply gasket.



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)



Installation

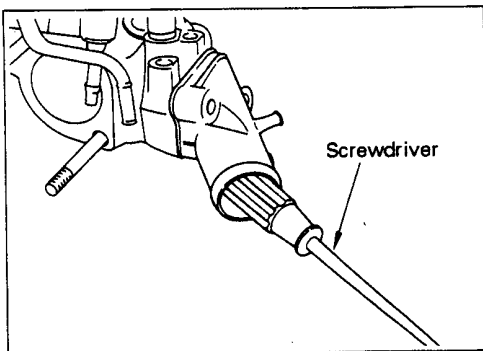
- Apply the liquid gasket (KP510 00510) to water bypass connector surfaces in four locations at one time without stopping, then install water bypass connector within 20 minutes.

CAUTION:

- (1) Apply liquid gasket coating 3.0 mm (0.118 in) wide (target width).
- (2) Coat on the inside of installation holes as shown.

Tightening torque:

16 - 21 N·m (1.6 - 2.1 kg-m, 12 - 15 ft-lb)



[Point 5] Water outlet elbow

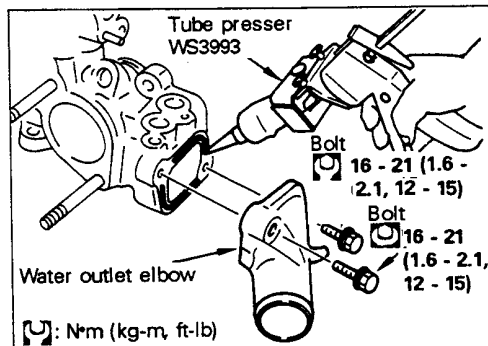
Removal and cleaning

- Remove the two water outlet elbow mounting bolts. Insert screwdriver handle as shown, and move it up and down to remove elbow.
- Use a scraper to remove liquid gasket from intake manifold and water outlet elbow.

CAUTION:

Liquid gasket in grooves must also be removed.

- Wipe off the installation surface with white gasoline, etc.



Installation

- Cut nozzle end of liquid gasket (KP510 00150). Use a tube presser to apply gasket.
- Apply the liquid gasket (KP510 00510) to intake manifold at one time without stopping as shown in figure on left.
- Complete installation within 20 minutes after liquid gasket application.

CAUTION:

Apply liquid gasket coating 3.0 mm (0.118 in) wide.

Tightening torque:

16 - 21 N·m (1.6 - 2.1 kg-m, 12 - 15 ft-lb)

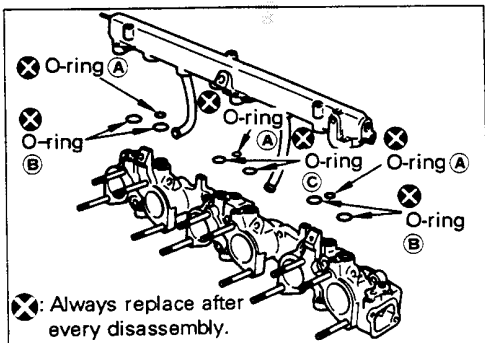
[Point 6] Balance tube removal and installation

Removal

- When removing balance tube, check O-ring size.

Installation

- When installing balance tube, replace O-rings with new ones.
- There are three different O-ring sizes. Be careful to install the correct size.



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

	Number of unit	Installation location
O-ring ① (small)	3 locations	Cylinders 1, 2, 3, 4, 5, 6
O-ring ② (large)	4 locations	Cylinders 1, 2, 5, 6
O-ring ③ (medium)	2 locations	Cylinders 3, 4

- Be careful not to pinch the O-rings during installation.

10. Removal and Installation of On-vehicle Parts (Cont'd)

Tools required

	Name	Application
Measurement tool	Compound gauge EG1508 0001	Turbocharged pressure control inspection
	Dial gauge	Turbocharger rotor shaft inspection

Front side

Water tube
Eyebolt 20 - 31 (2.0 - 3.2, 14 - 23)
Copper washer
Bolt 31 - 44 (3.2 - 4.5, 23 - 33)
Vacuum tube
Bolt 6.3 - 8.3 (0.64 - 0.85, 4.6 - 6.1)
Hose
Bracket 6.3 - 8.3 (0.64 - 0.85, 4.6 - 6.1)
Hose
Bolt (2) 6.3 - 8.3 (0.64 - 0.85, 4.6 - 6.1)
Air inlet tube
Front turbocharger ASSY
Gasket
Water tube
To cylinder block
Oil tube 25 - 34 (2.5 - 3.5, 18 - 25)
Oil hose
Oil pipe
Bolt (2) 13 - 19 (1.3 - 1.9, 9 - 14)
Cover
Bolt 4 - 5 (0.4 - 0.5, 2.9 - 3.6)
Copper washer
Eyebolt 18 - 20 (1.8 - 2.0, 13 - 14)
Bracket
Yoke
Washer
Copper washer
Oil and water tubes

Rear side

Tube
Bolt 16 - 21 (1.6 - 2.1, 12 - 15)
Water tube
Copper washer
Oil tube
Rear turbocharger ASSY
Cover
Bolt 15 - 20 (1.5 - 2.0, 11 - 14)
Bolt 6.3 - 8.3 (0.64 - 0.85, 4.6 - 6.1)
Bracket 4 - 5 (0.4 - 0.5, 2.9 - 3.6)
Yoke
Oil pipe
Oil hose
Gasket
Bolt 4 - 5 (0.4 - 0.5, 2.9 - 3.6)
To cylinder block
Bolt 13 - 19 (1.3 - 1.9, 9 - 14)
Gasket
Bolt (2) 10 - 21 (1.0 - 2.1, 7 - 15)
Eyebolt 20 - 29 (2.0 - 3.0, 14 - 22)
Copper washer
Oil and water tube

Legend:

- N·m (kg-m, ft-lb)
- Always replace after every disassembly.

Drain and refill cooling water
Separate exhaust front tube
Remove and install:
Undercover
Exhaust gas sensor connector
Intercooler air inlet tube, hose
Air inlet hose

(If water is only drained from radiator drain cock, the water inside cylinder block is not drained completely.)

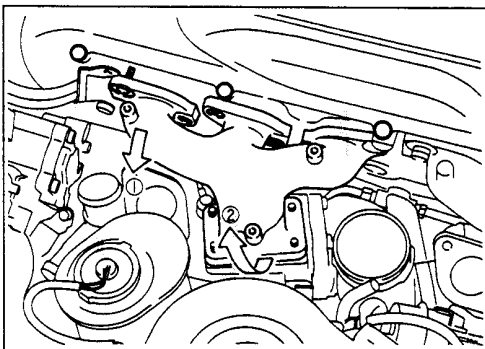
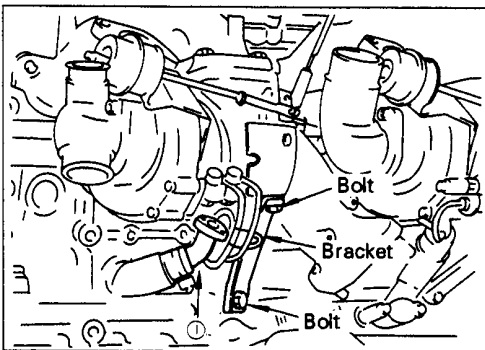
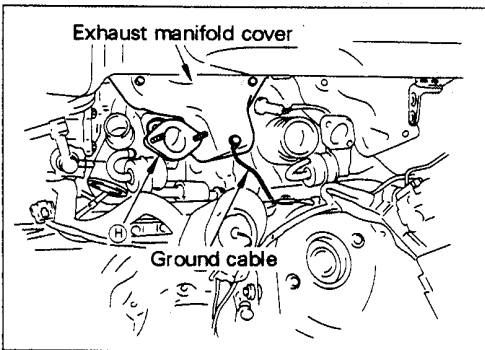
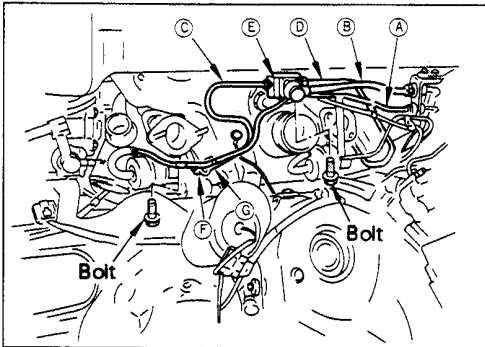
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

(2) Front turbocharger ASSY installation

Removal sequence

- ① Loosen the flare nuts of tubes **A** and **B**.
- ② Remove bolts, and detach tube **A**.
- ③ Loosen flare nuts of tubes **C** and **D** on the turbo side.
- ④ Remove hose **B** and bolts.
- ⑤ Remove bolts and detach tube **E**.
- ⑥ Remove eyebolts **F** and **G**.
- ⑦ Remove the two bolts and detach tube **H**. Make sure that bolt mounted on upper side is shorter than lower side.
- ⑧ Remove the three bolts, cover and ground cable.
- ⑨ Remove oil return hose.
- ⑩ Remove the three bolts and detach bracket.
- ⑪ Remove the four turbocharger bolts.
- ⑫ Lower turbocharger carefully.
- ⑬ Remove the six exhaust manifold nuts.
- ⑭ Pull the exhaust manifold in direction ① and then raise it in direction ② to avoid turbocharger stud.
- ⑮ Remove exhaust manifold.
- ⑯ Pull out turbocharger.



Installation sequence

- Installation is the reverse of the removal sequence.
- Place turbocharger in bottom of engine compartment before installing exhaust manifold.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

(3) Rear turbocharger ASSY removal and installation

Additional work required: remove and install front turbocharger ASSY

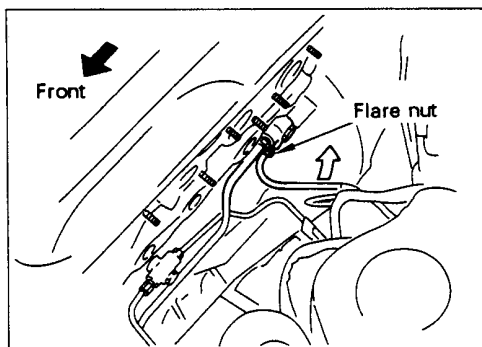
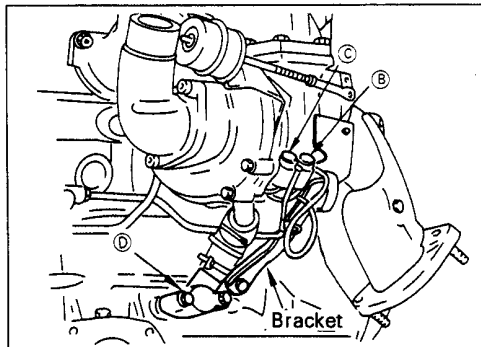
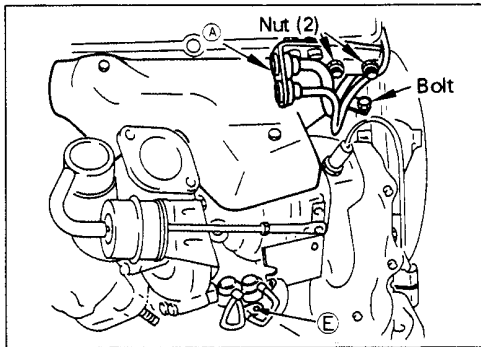
Removal sequence

- ① Remove front turbocharger and exhaust manifold ASSY.
- ② Remove the two nuts and clip securing bolt, and separate tube ①.
- ③ Remove the three bolts and detach exhaust manifold cover.
- ④ Remove eyebolts ⑧ and ⑨ and detach bolt ⑤.
- ⑤ Remove the two bolts and separate tube ⑩ from cylinder block side.
- ⑥ Remove the three bolts and detach bracket.

The sequence after this step is the same as numbers ⑪ to ⑯ of front turbocharger removal and installation.

Installation sequence

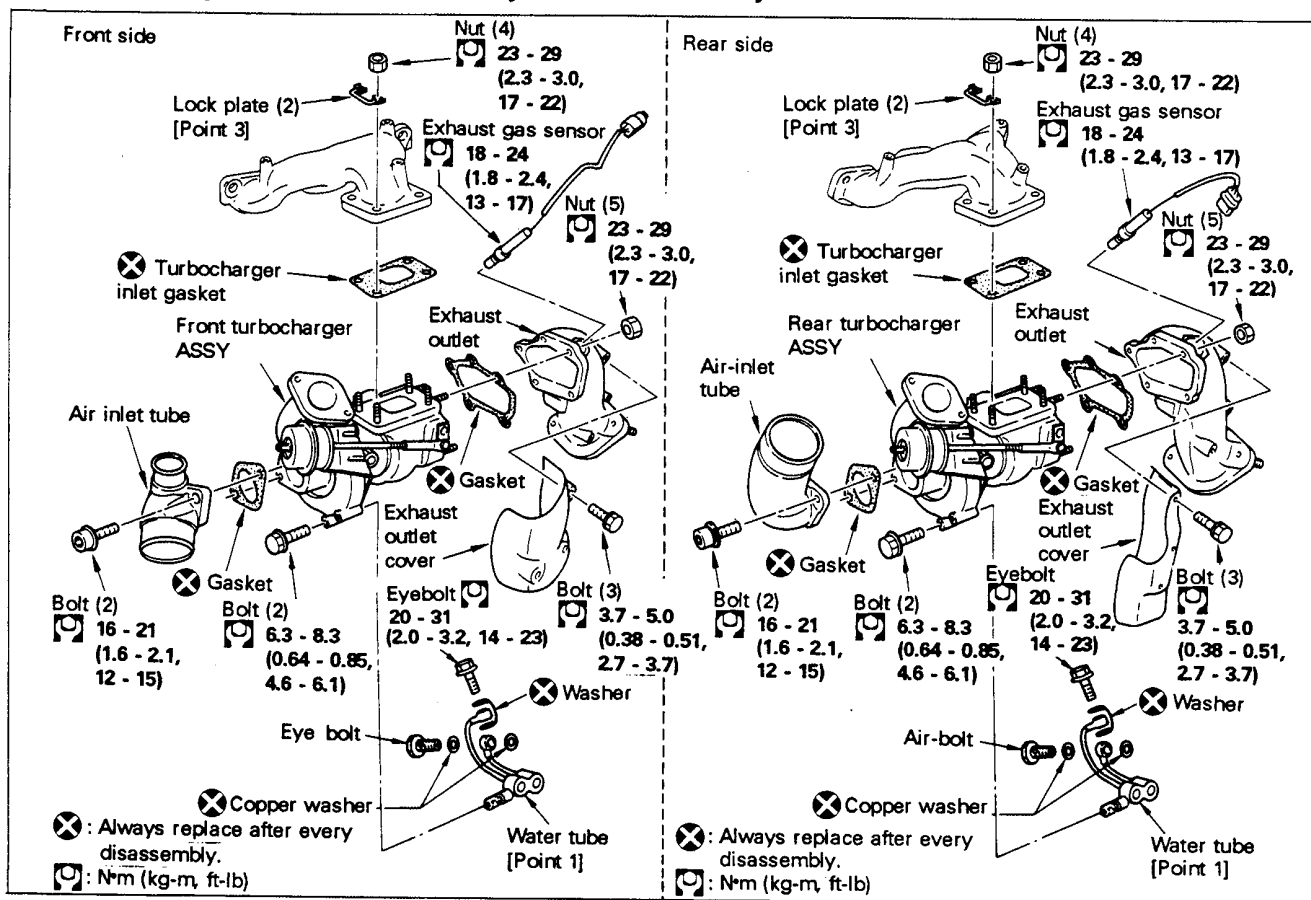
- Installation is the reverse of the removal sequence.
- Before installing eyebolt ⑧, loosen water tube flare nut as shown in figure on the left.



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

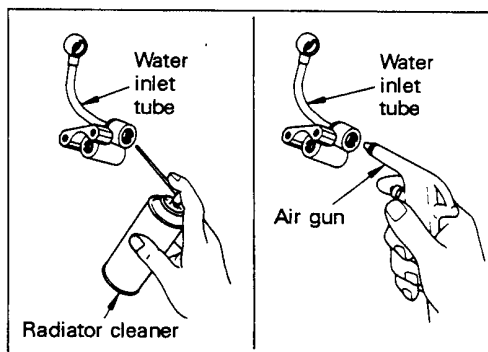
10. Removal and Installation of On-vehicle Parts (Cont'd)

(4) Turbocharger ASSY — Assembly and disassembly



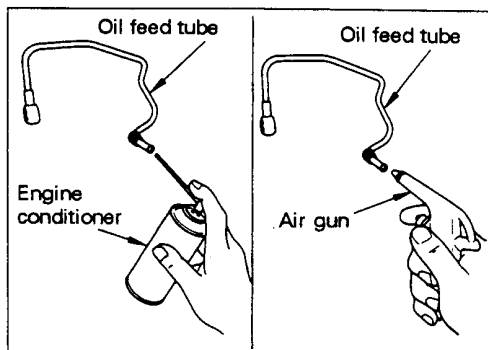
Additional work required:

Turbocharger ASSY removal and installation



[Point 1] Water tube inspection

- After cleaning water inlet and outlet tubes with radiator cleaner, blow with compressed air and check for rust or clogging.



[Point 2] Oil feed tube inspection

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

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

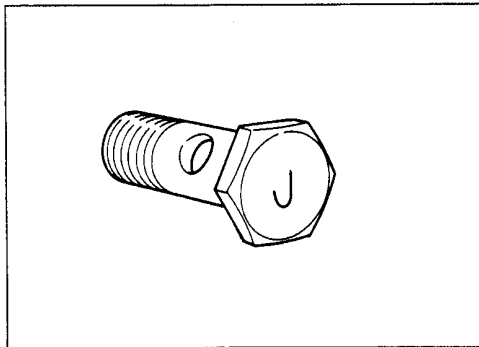
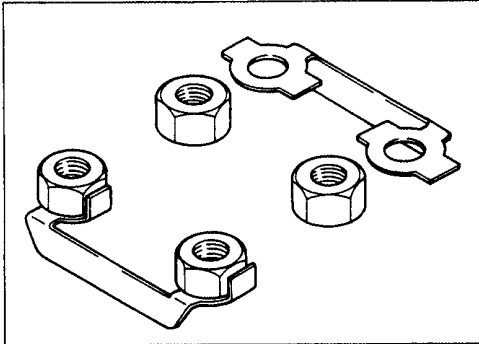
[Point 3] Lock plate removal and installation

Removal

- Spread the lock plate pawls with a screwdriver and loosen the nuts.

Installation

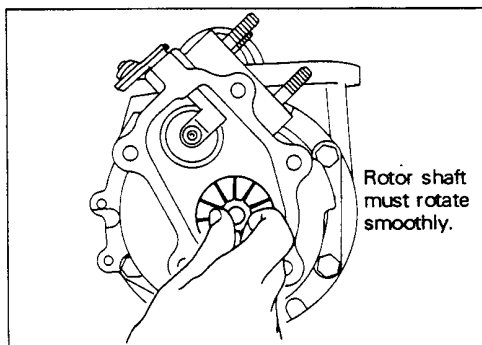
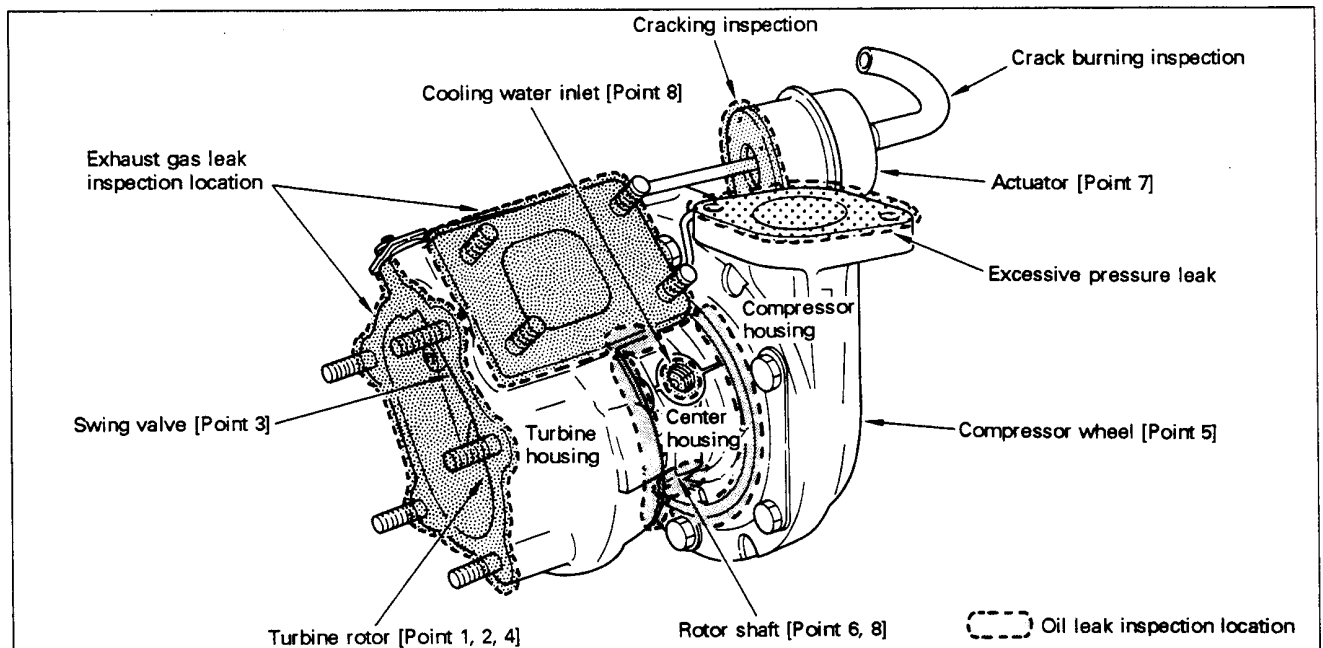
- Position lock plates and turbocharger mounting nuts. After tightening the nuts, bend lock plate pawls onto the nuts.



[Point 4] Eye-bolt determination

- Oil feed (turbocharger side) eye bolts are stamped "J".

(5) Turbocharger unit inspection



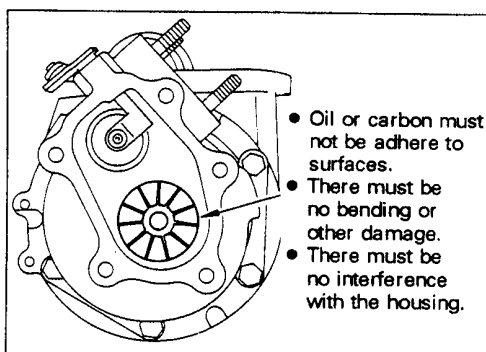
[Point 1] Rotor shaft inspection

- When rotor shaft is turned by finger, there must be no heaviness or dragging and shaft must turn smoothly.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

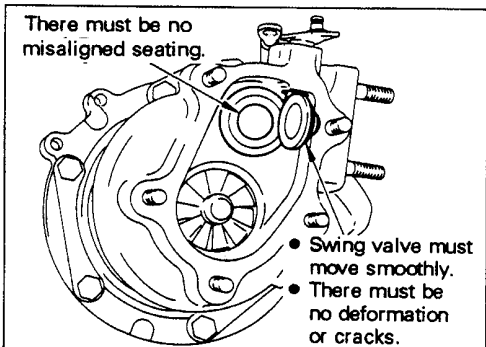
10. Removal and Installation of On-vehicle Parts (Cont'd)

[Point 2] Turbine rotor inspection



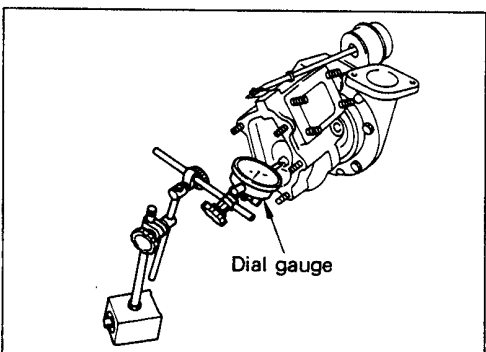
- Oil must not adhere to surfaces.
- There must be no carbon accumulation.
- The vanes of the turbine rotor must not be bent.
- There must be no interference with turbine housing.

[Point 3] Swing valve inspection



- Remove actuator rod pin and make sure switch valve moves smoothly, without deformation or cracks.
- Make sure there are no misaligned seating surfaces in turbine housing.

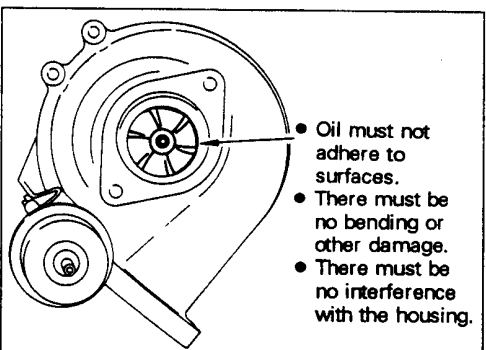
[Point 4] Rotor shaft play inspection



- Position a dial gauge and measure play and thrust clearance.
- Insert dial gauge in oil return hole and measure rotor shaft play.

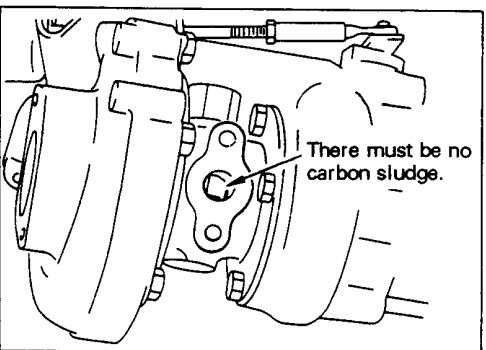
Rotor shaft play	0.056 - 0.127 mm (0.0022 - 0.0050 in)
Thrust clearance	0.013 - 0.096 mm (0.0005 - 0.0038 in)

[Point 5] Compressor wheel inspection



- Oil must not adhere to suction inlet.
- There must be no interference with compressor housing.
- Wheel must not be bent, folded or otherwise damaged.

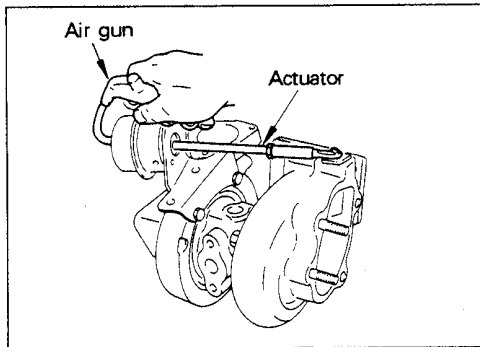
[Point 6] Rotor shaft damage



- There must be no carbon sludge accumulation.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10. Removal and Installation of On-vehicle Parts (Cont'd)

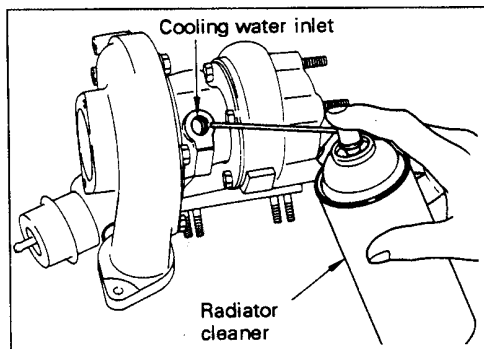


[Point 7] Swing valve controller inspection

- Connect the swing valve controller rubber hose to actuator side.
- Check swing valve controller whenever actuator rod is installed or removed.
- Use air gun to blow compressed air [approx. 69 to 78 kPa (0.7 to 0.8 kg/cm², 10 to 11 psi)] into hose and make sure swing valve controller rod operates. Stop blowing air as soon as rod operates.

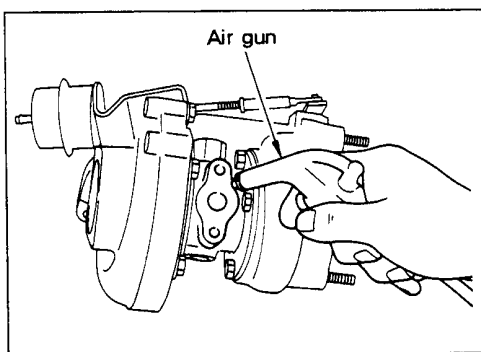
CAUTION:

If air pressure is applied excessively the diaphragm may be damaged. Use the LPG pressure gauge [special tool for approx. 98 kPa (1 kg/cm², 14 psi)] to verify that the air gun pressure is approx. 78 to 88 kPa (0.8 to 0.9 kg/cm², 11 to 13 psi) before testing the air hose.



[Point 8] Oil and cooling water inlet and outlet cleaning

- Use engine conditioner to clean oil feed and return passages.
- Use radiator cleaner to clean cooling water feed and return passages.



- Clean with air gun

Clean compressor wheel, turbine wheel, compressor housing and turbine housing with same methods.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

(6) Turbocharger trouble diagnosis (oil leaks, smoke (white or blue smoke), lack of power, poor acceleration, abnormal noise)

Items to be verified before diagnosis

- ① The engine oil level must be between the MIN and MAX marks on the oil level gauge.
(When higher than MAX, engine oil flows into the intake duct through the blowby gas recirculation pass and turbocharger may be determined to be malfunctioning.)
- ② Check with customer to determine if oil is cooled when idling after driving.
If even one malfunction in the following chart is detected in a unit inspection, replace the turbocharger ASSY.

If none of these conditions are found during inspection, assume there are no turbocharger problems and search for a malfunction in another location.

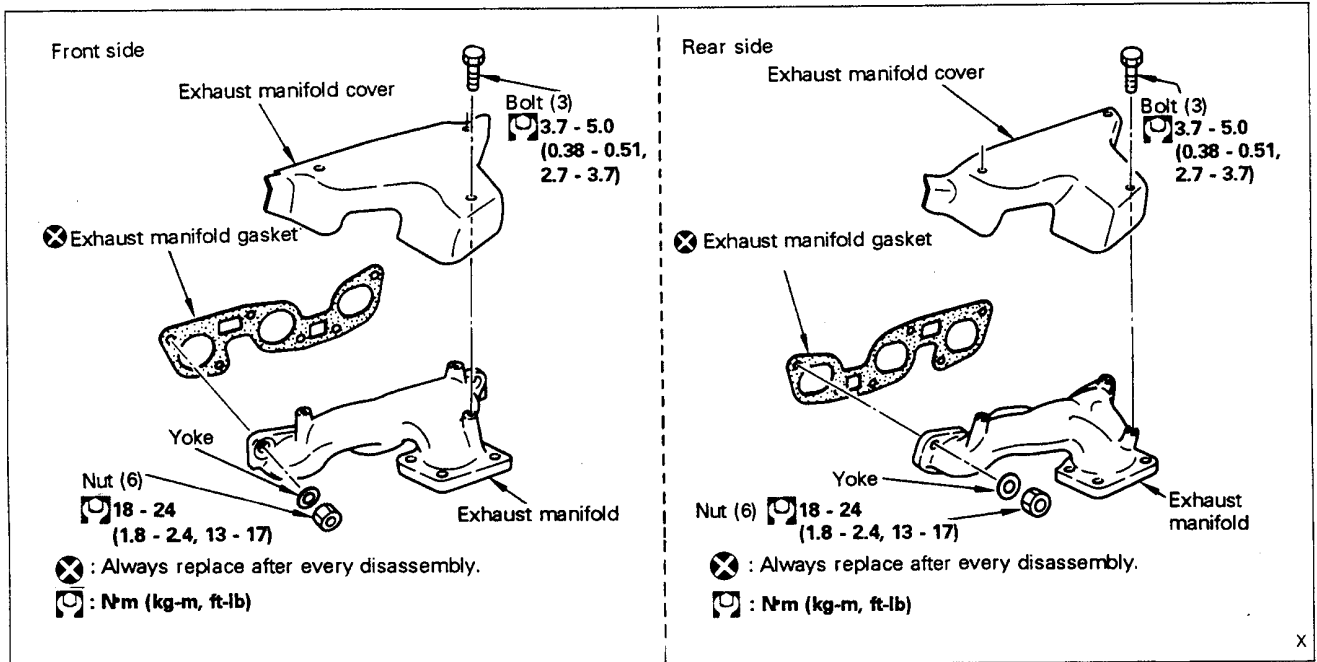
Item *Reference	Inspection location	Symptom	Possible associated phenomenon			
			Oil leak	Smoke	Abnormal noise	Lack of power or poor acceleration
2.8	Turbine rotor	Turbine has oil on rotors.	△	●	△	△
		Carbon has accumulated.	△	●	○	○
		Rotor scrapes against the housing.	△	○	●	○
		The turbine vanes are bent or folded.			●	●
5.8	Compressor wheel	Suction inlet is dirty with oil.	○	○		
		Rotor scrapes against the housing.	△	○	●	○
		The turbine vanes are bent or folded.			●	●
1.4.8	<ul style="list-style-type: none"> ● Both turbine and compressor ● Rotor shaft play inspection 	There is strong resistance or scraping when rotated by finger.		△	△	○
		Rotation by finger is not possible.				●
		There is considerable shaking between rotor shaft and turbo ASSY.	△	△	○	△
6.8	Look through oil hole. (Inspect interior with penlight.)	Carbon sludge has accumulated in waste oil hole.	△	●	△	△
3.7	Swing valve motion. (Use air gun or air pump.)	The valve does not move smoothly when pressure is applied gradually. (The valve normally opens at pressure greater than [59 to 69 kPa (0.6 to 0.7 kg/cm ² , 9 to 10 psi)].				●

*: Refer to previous section (5).

[●: Highly possible ○: Possible △: Slightly possible]

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10-8 EXHAUST MANIFOLD ASSY REMOVAL AND INSTALLATION

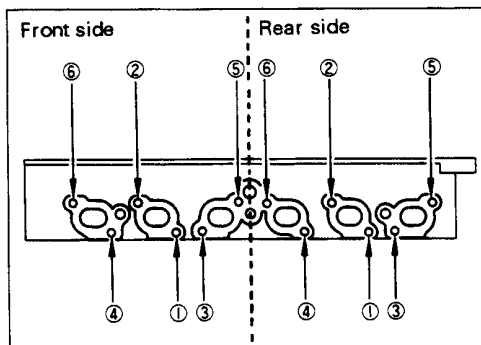


Additional work required:

- Turbocharger removal and installation (Refer to section 10-7)
- Gas leak inspection [Point 1]

[Point 1] Gas leak inspection

- After removing exhaust manifold, make sure there are no traces of gas leaks from any part of installation.
- After installation, crank engine and check for gas leaks.



[Point 2] EXHAUST MANIFOLD NUTS REMOVAL AND INSTALLATION

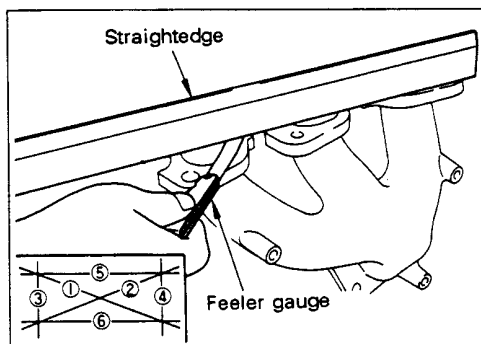
Removal

- Removal is the reverse of installation sequence shown in figure.

Installation

- The installation sequence is shown in the figure.

Tightening torque	18 - 24 N·m (1.8 - 2.4 kg-m, 13 - 17 ft-lb)
-------------------	---



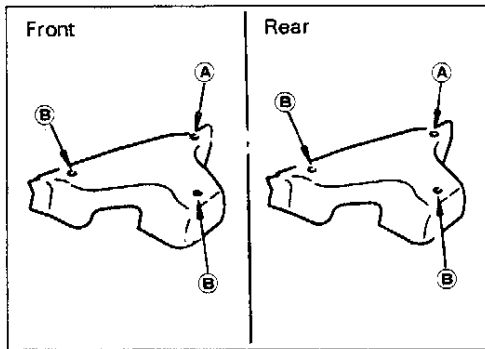
[Point 3] Exhaust manifold inspection

- Measure the intake manifold surface for distortions in six separate directions (opposite directions; up, down, right, left, horizontally and vertically) in a number of locations.

Limit	0.3 mm (0.012 in)
-------	-------------------

- Check that no oil, dirt or foreign matter adheres to cylinder head, exhaust manifold installation surface and gasket.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 4] Exhaust manifold cover installation

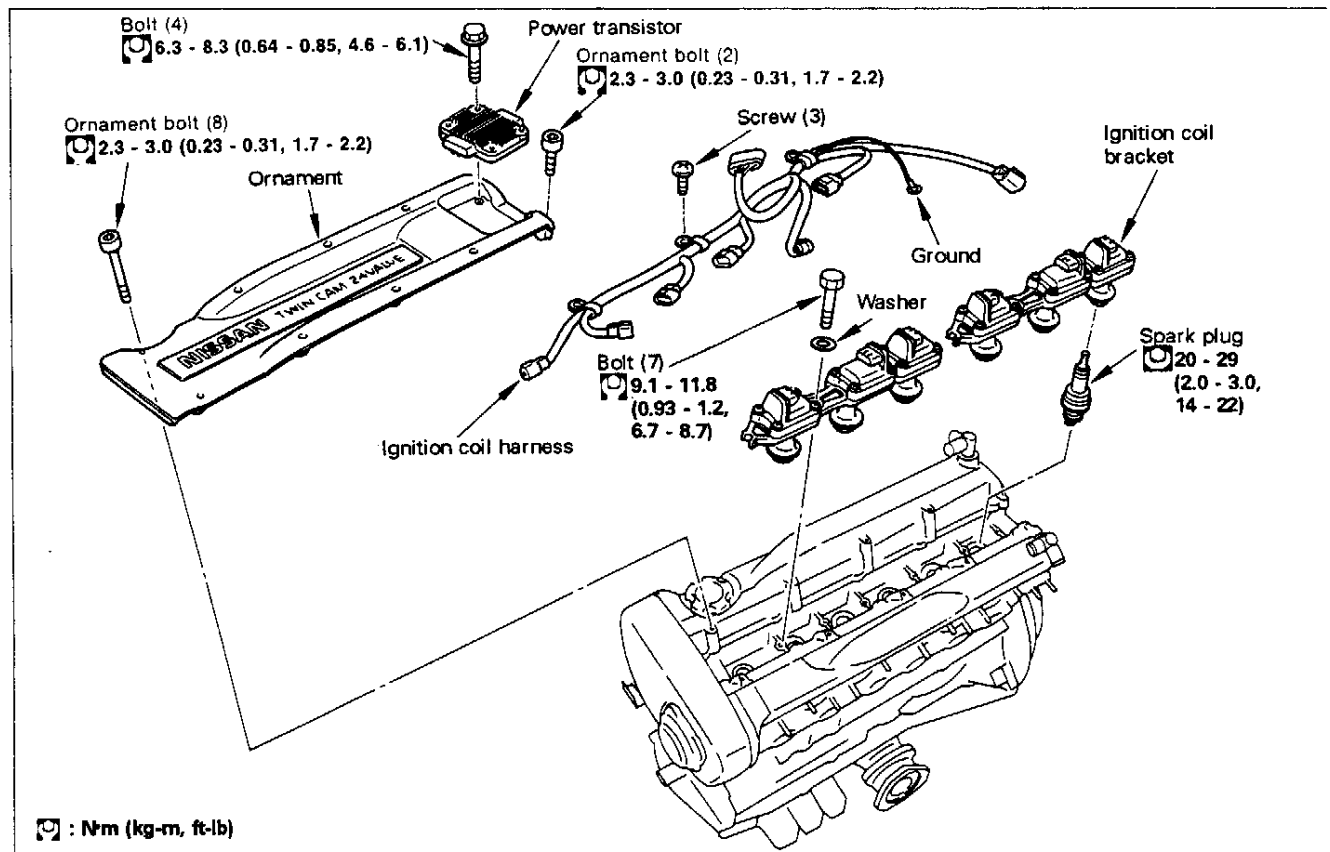
- Attach the exhaust manifold cover bolts in the following sequence (in both front and rear).
 - ① Temporarily tighten bolts for positioning hole indicated by **(A)**.
 - ② Tighten bolts in the other two locations **(B)**.
 - ③ Tighten bolts in holes **(A)** to specified tightening torque.

Tightening torque	3.7 - 5.0 N·m (0.38 - 0.51 kg-m, 2.7 - 3.7 ft-lb)
-------------------	---

10-9 SPARK PLUGS

Tools required

	Name	Application
Special tool	Spark plug wrench EG1740 1600	Small hexagonal spark plug removal and installation

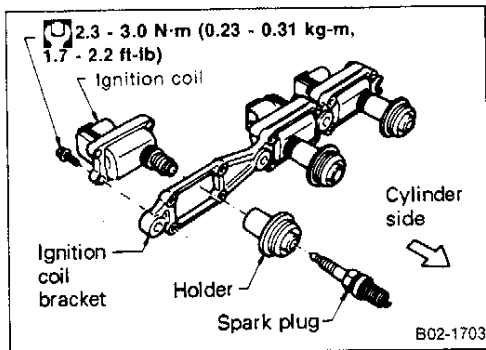


Additional work required:

Remove and install:

- Air inlet pipe
- Blowby hose

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 1] Ignition coil bracket removal and installation

Removal

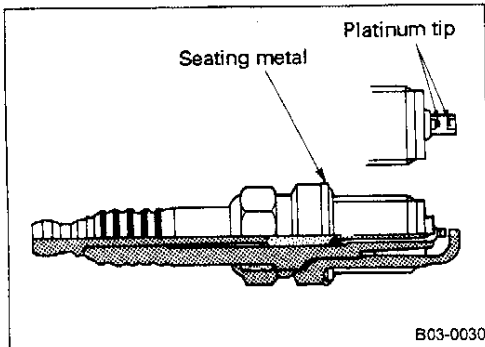
- When removing ignition coil bracket, hold coil to provide additional support while detaching it.

CAUTION:

Do not hold the coil by the connector when removing it.

Installation

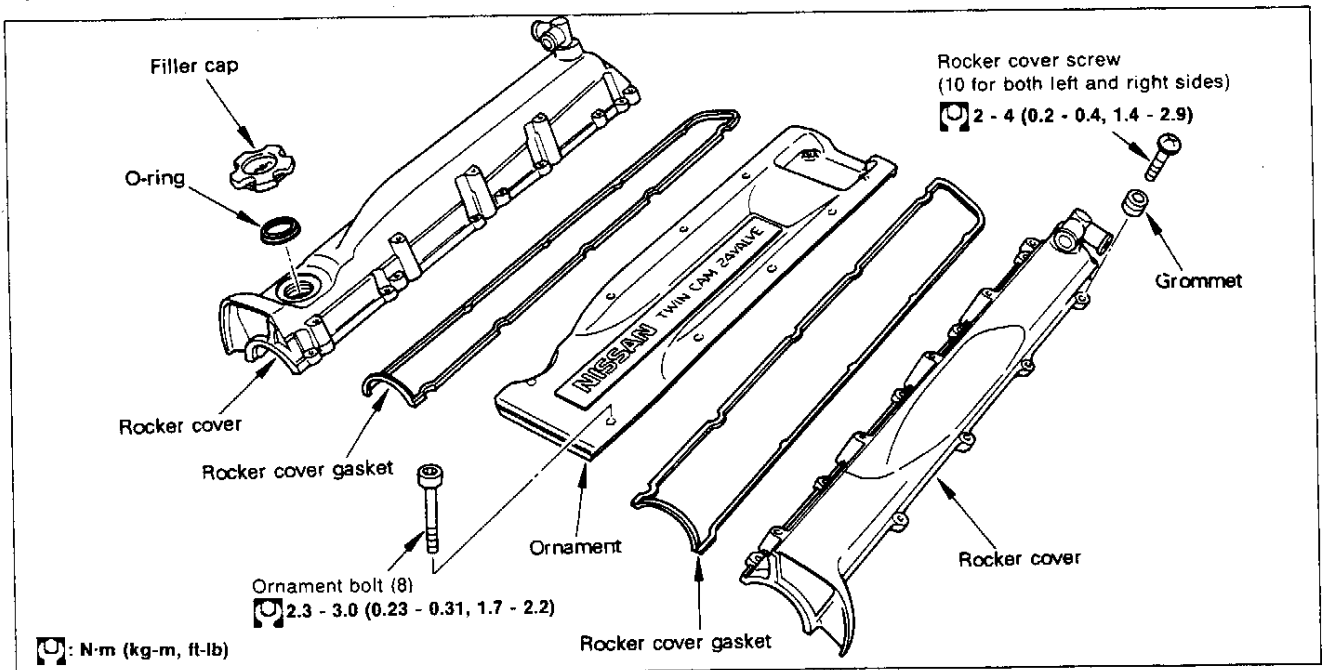
- When installing ignition coil bracket to cylinder head, check that ground line is connected securely.



[Point 2] Spark plug maintenance

- Gap inspection and adjustment is not necessary because a platinum tip is used.
- Change spark plugs every 100,000 km (60,000 miles).
- When using a compressed air spark plug cleaner, clean the plugs at maximum pressure of 588 kPa (6 kg/cm², 85 psi) for no more than 20 seconds.
- Do not use a wire brush to clean plugs.

10-10 ROCKER COVER REMOVAL AND INSTALLATION

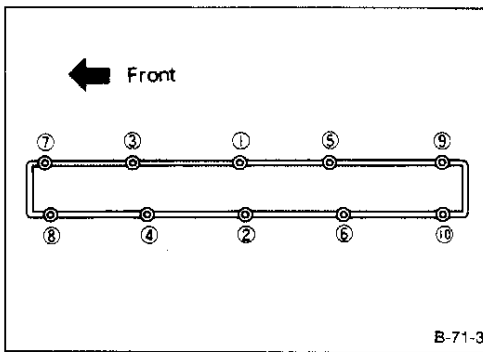


Additional work required:

Remove and install:

- Air inlet pipe
- Blowby hose

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 1] Rocker cover screw removal and installation

Removal

- Perform removal in reverse of sequence shown in the figure on the left.

Installation

- Perform installation in sequence shown in the figure on the left.

CAUTION:

Perform removal and installation for intake and exhaust sides by same method.

Tightening torque	2 - 4 N·m (0.2 - 0.4 kg-m, 1.4 - 2.9 ft-lb)
-------------------	---

[Point 2] Rocker cover installation surface inspection

- Check that no oil, dirt or foreign matter adheres to the cylinder head installation surface.

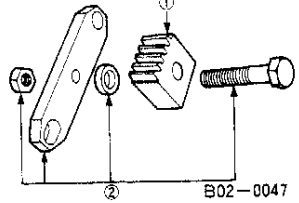
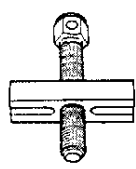
[Point 3] Rocker cover gasket installation

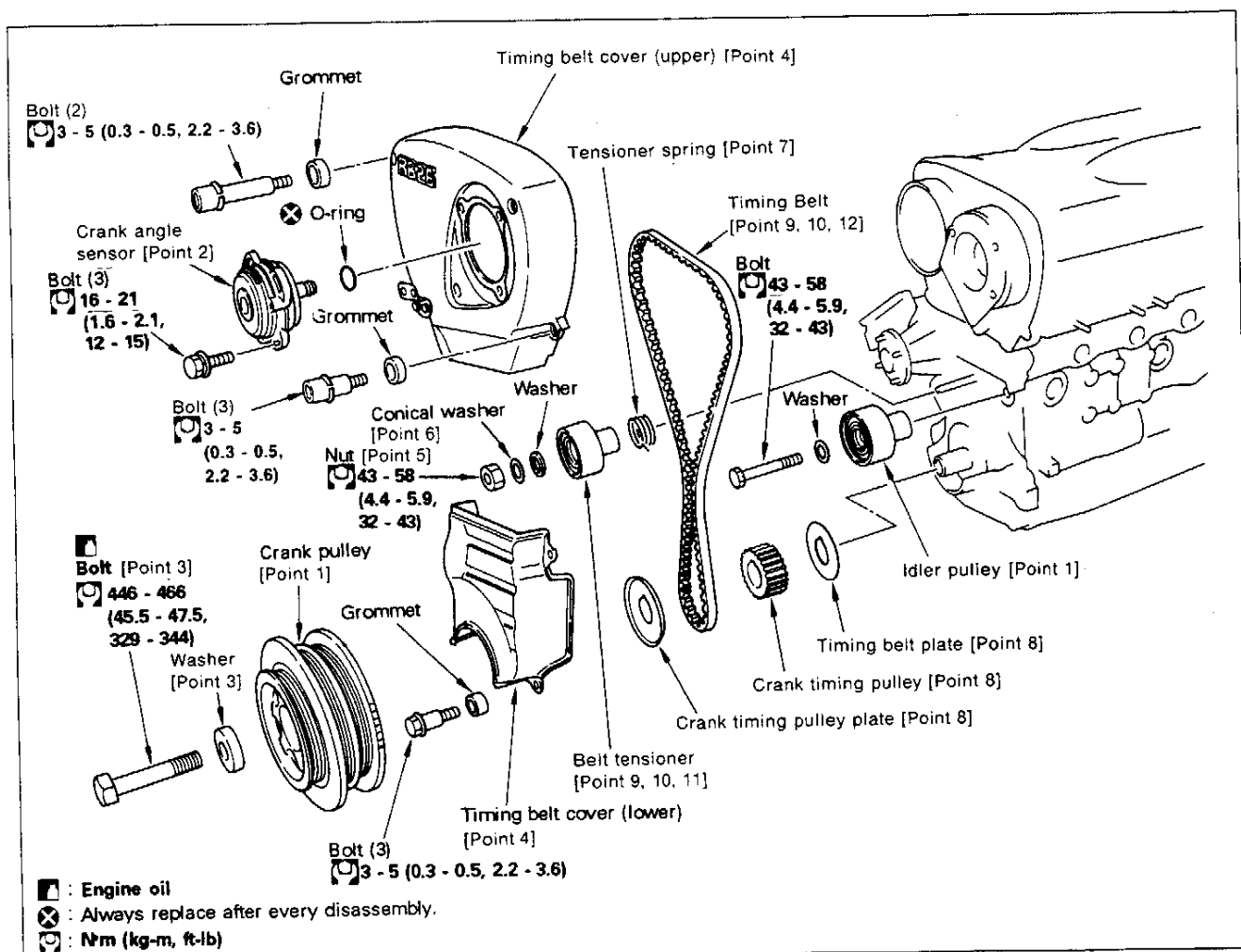
- Make sure the rocker cover gasket is positioned securely in groove without twisting, pinching or protrusion.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10-11 TIMING BELT REMOVAL AND INSTALLATION

Tools required

	Name	Application
Special tool	Ring gear stopper KV101 104S0 ① Adapter KV101 10410 ② Stopper plate KV101 05610	 Crank pulley bolt removal and installation
	Pulley puller ST2718 0001	 Crank pulley removal and installation



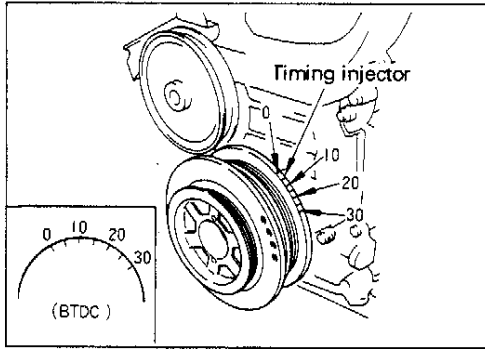
Additional work required:

- Drain and refill: Cooling water
- Remove and install:
 - Under cover
 - Radiator, fan shroud
 - Cooling fan

Supplemental belts

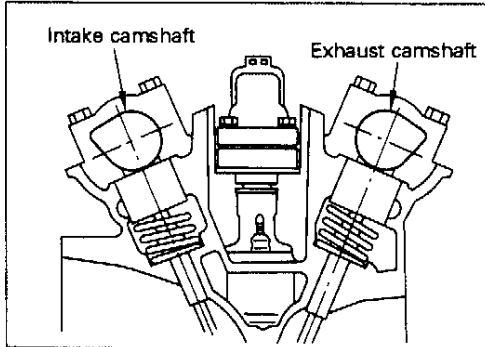
Water pump pulley
Spark plugs

- Check No. 1 cylinder compression T.D.C. position [Point 1]
- Install ring gear stopper [Point 3]

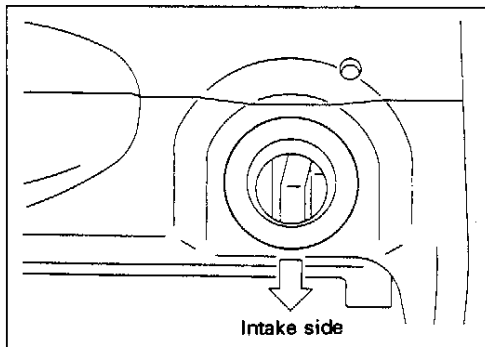


[Point 1] No. 1 cylinder pressure T.D.C. (top dead center) inspection

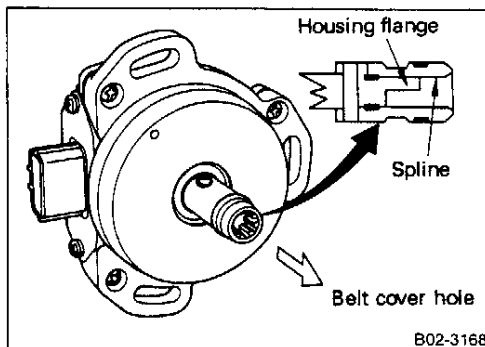
- Align the crank pulley timing mark and belt cover timing indicator (0° position).
At this time, the No. 1 cylinder is in the compression T.D.C. position when the camshaft is located as described below.



- No. 1 cylinder is at the compression stroke top dead center when both the intake and exhaust side cams do not move the valve lifters.

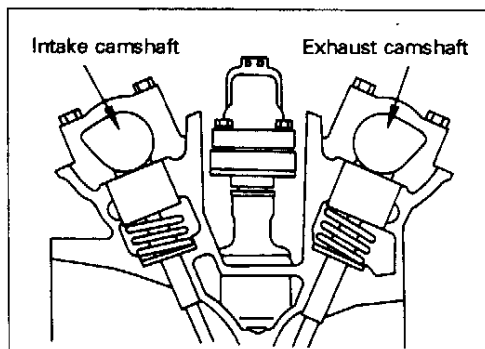


- Remove oil filler cap from intake side rocker cover and check that the front end of camshaft faces the intake side.

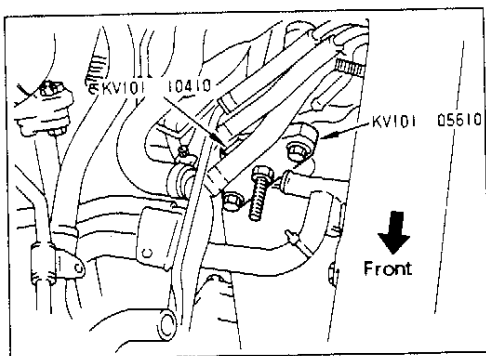


[Point 2] Crank angle sensor installation

- Apply chassis grease to drive unit spline during installation.
- There is a flange inside drive unit spline so spline only has one insertion position. Check the alignment visually before assembly.
- Check that crank angle sensor can be easily inserted in belt cover holes and sensor moves lightly to right and left, then tighten bolts.
- When sensor does not move lightly, loosen belt cover bolts to position when crank angle sensor was inserted. Move belt cover lightly horizontally and vertically to align it so belt cover holes and camshaft center are aligned and then tighten bolts so crank angle sensor moves lightly.



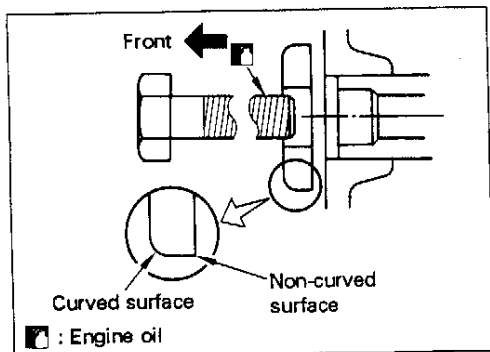
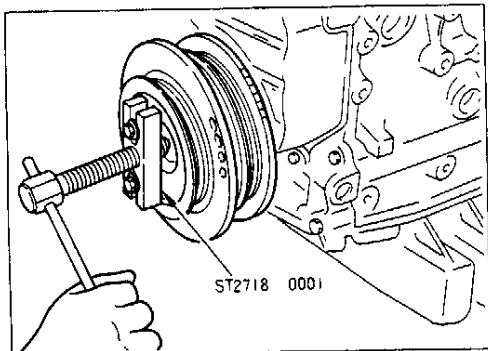
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 3] Removal and installation of crank pulley and bolt

Removal

- Remove starter motor, and attach ring gear stopper. (Refer to B5 starter motor removal and installation.)
- Use a pulley puller (steering wheel puller) to remove crank pulley. [Bolt size: M6 x 1.0, length below head approx. 50 mm (1.97 in).]



Installation

- Position the washers for the crank pulley bolts so the flat surface contacts the crank pulley side and then assemble.
- Apply a coat of engine oil to the threads of crank pulley bolts.

Tightening torque	446 - 466 N·m (45.5 - 47.5 kg-m, 329 - 344 ft-lb)
-------------------	---

[Point 4] Timing belt cover removal and installation

Removal

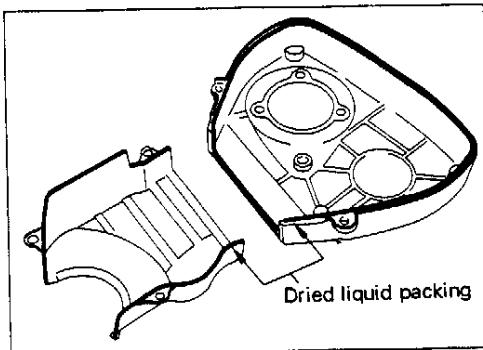
- Timing belt cover is separated into upper and lower sections. After crank angle sensor is removed, first remove the upper section and then remove lower section in this sequence.

Installation

- Installation is performed in reverse sequence of removal.

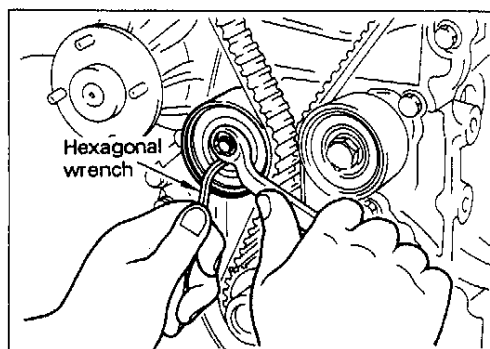
CAUTION:

Do not scratch dried liquid packing when removing and installing timing belt cover.



Tightening torque	3 - 5 N·m (0.3 - 0.5 kg-m, 2.2 - 3.6 ft-lb)
-------------------	---

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 5] Belt tensioner nut removal and installation

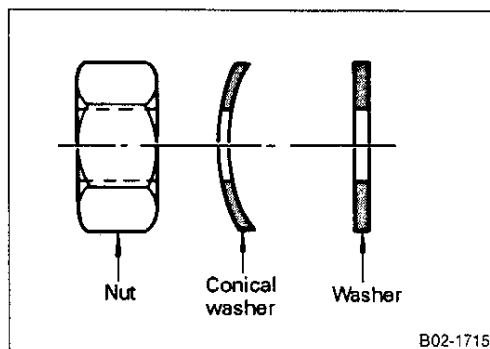
- When removing and installing belt tensioner nuts, secure the tensioner firmly with a hexagonal wrench.

CAUTION:

Do not loosen inserted stud at disassembly.

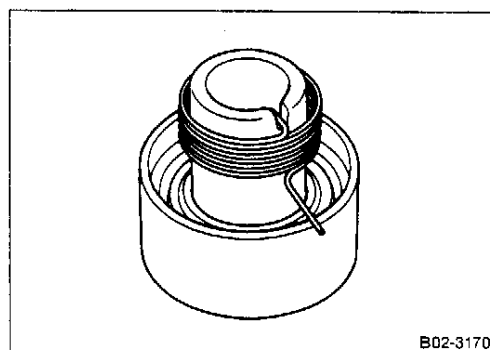
Tightening torque

43 - 58 N·m (4.4 - 5.9 kg-m, 32 - 43 ft-lb)



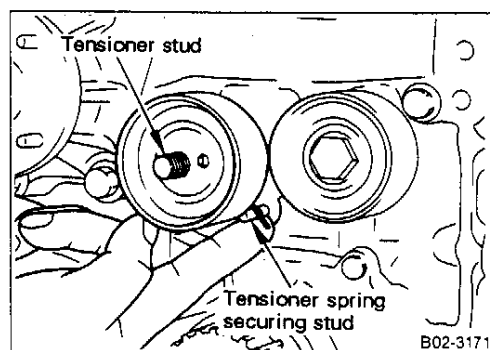
[Point 6] Conical washer installation

- Pay close attention to the installation direction of conical washers. The washer should be set with face the chamfered side facing the tensioner pulley side.

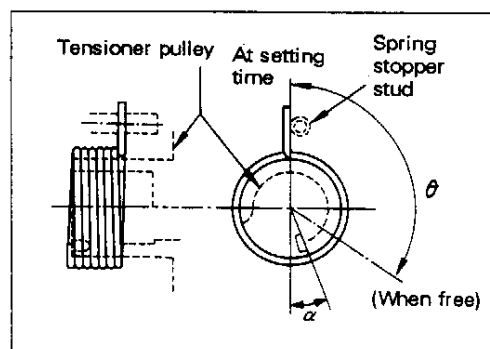


[Point 7] Tensioner spring installation

- Assemble the tensioner spring so it engages the belt tensioner pulley as shown in the figure.
- The tensioner spring must be assembled together with the belt tensioner pulley in the cylinder block.



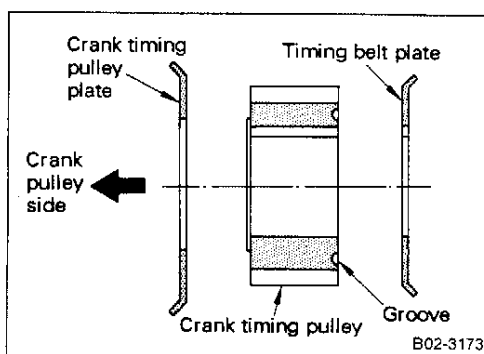
- When tensioner pulley is free, hook the tensioner spring on the upper side of tensioner spring stud.



Tensioner spring specifications

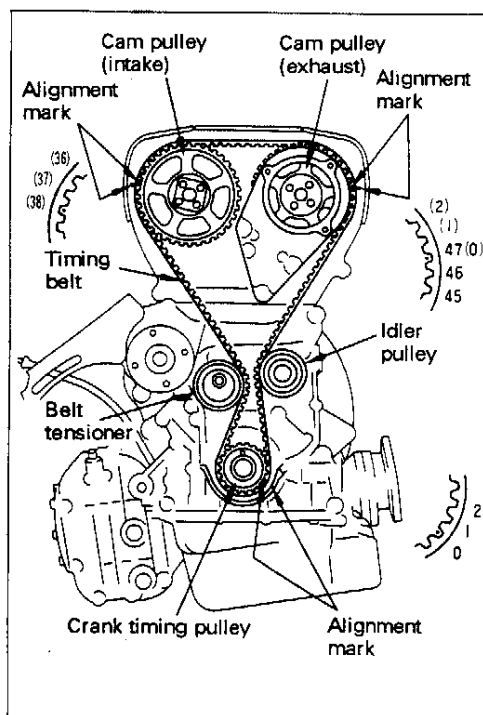
Spring wire diameter	Set angle: α	Free angle: θ	Classification paint
1.8 mm (0.071 in)	Approx. 20°	Approx. 163°	Yellow-green

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 8] Crank timing pulley and plate installation

- Be careful to observe front and rear positioning of timing belt plate, crank timing pulley and crank timing pulley plate when installation is performed.



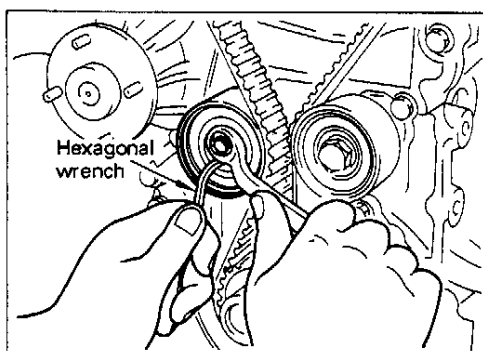
[Point 9] Timing belt alignment mark verification and installation

If paint on upper belt is unclear when disassembly is performed, paint a mark on belt that indicates rotation direction.

- Position the alignment marks of the intake and exhaust cam pulleys with the respective belt cover alignment marks. (No. 1 cylinder is at T.D.C.)
- Align the crank timing pulley alignment mark with the mark on oil pump housing. The groove must be straight up at this time. (No.1 cylinder compression T.D.C.)
- Move the belt tensioner clockwise at a 70 - 80° angle, and secure it temporarily with belt tensioner nut. (This will minimize the offset between the tensioner shaft and timing belt.)
- Align timing belt pulley marks and install belt. Align the number of ridges of exhaust cam pulley alignment mark and crank pulley (inner) alignment mark as shown in the figure on left.
- After loosening nuts and adjusting belt tension, secure tensioner with hexagonal wrench so it does not rotate together and tighten nut.

CAUTION:

- At timing belt assembly, check that it engages correctly with pulley and does not float.
- When disassembly is performed, replace belts whenever possible.



[Point 10] Timing belt tension adjustment

- Remove spark plugs, and align timing belt alignment marks with pulley marks and install timing belt onto each pulley.
- Loosen tensioner securing nut so belt tension is applied by tensioner spring.
- In this condition, turn crank pulley more than two turns clockwise to check belt movement and stop slowly at No. 1 cylinder compression T.D.C. point.
- Insert the hexagonal wrench in hexagonal hole. While holding it by hand so the tensioner does not move, tighten the tensioner securing nut to specified tightening torque.

Tightening torque	43 - 58 N·m (4.4 - 5.9 kg-m, 32 - 43 ft-lb)
-------------------	---

- The initial tension on the belt should be approximately 196 N (20 kg, 44 lb) in this condition.

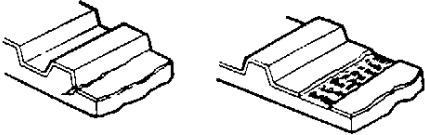

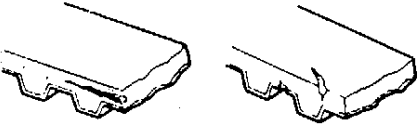
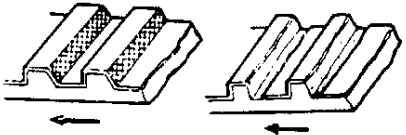
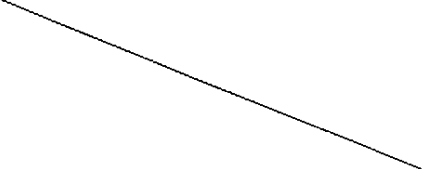
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

[Point 11] Idler and tensioner pulley installation

- Do not loosen inserted studs at disassembly. If studs are loosened, coat inserted stud with Locktite solution (Japan Locktite KK) or equivalent.

[Point 12] Timing belt inspection

- Replace timing belt if inspection indicates any problem.

Item	Condition	Cause
Missing tooth Cracked tooth		Camshaft lock Crank angle sensor lock
Cracks in rear side		Tensioner lock Engine overheating Interference with belt cover, etc.
Wear and cracks on side surface		Belt misalignment Belt plate malfunction
Worn teeth		Large sliding motion resistance in crank angle sensor and crankshaft
Oil or water adhesion		Oil seal malfunction Water leaks in water pump

CAUTION:


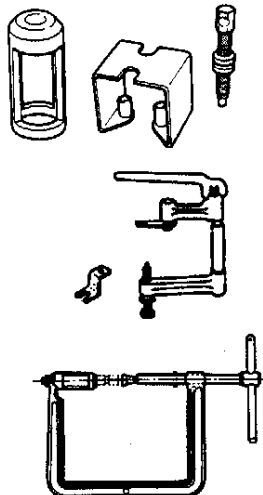
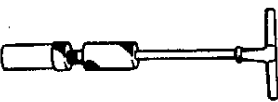
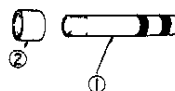
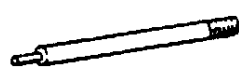
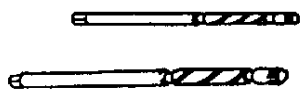
Make sure timing belt is not twisted or bent sharply. Also make sure there is no oil film or water on belt.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

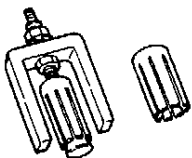
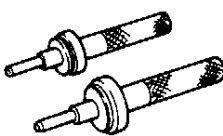

10-12 CYLINDER HEAD ASSY

Be careful when handling exhaust valves because metallic sodium is sealed inside. Refer to Page EN-67.

Tools required

	Name		Application
Special tool	Pulley holder KV101 09900 or KV101 09300, ST3152 0000, ST3153 0000		Cam pulley bolt removal and installation
	Valve spring compressor KV101 11300 ST1207 0000 KV101 089S0		Valve spring installation and removal
	Valve oil seal puller KV101 07900		Valve oil seal removal
	Valve oil seal drift and drift attachment ① KV101 07501 ② KV101 14800		Valve oil seal insertion
	Valve guide drift		Valve guide installation and removal
	Valve guide reamer for guide insertion hole correction Exhaust side Guide inner diameter correction Intake side KV101 11600 6.0 mm (0.236 in) dia. Exhaust side KV101 07700 7.0 mm (0.276 in) dia.		Valve guide insertion hole and guide internal diameter correction

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

	Name		Application
Special tool	Valve seat remover, intake side, exhaust side		Valve seat removal
	Valve seat drift intake side, exhaust side		Valve seat insertion
	Valve seat cutter set		Valve seat form correction
Tool	Valve surface grinder		
Measurement tool	Inside micrometer		Lifter guide, etc., inspection
	Micrometer		Camshaft, etc., inspection
	Dial gauge		Camshaft, etc., inspection
	V-block		Camshaft, etc., inspection
	Valve spring tester		Valve spring, etc., inspection
	Square edge		Valve spring, etc., inspection
	Square edge		Cylinder head, etc., inspection

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

SPECIAL PRECAUTIONS TO ENSURE SAFE DISPOSAL OF SODIUM-FILLED EXHAUST VALVES

The handling and disposal of sodium-filled exhaust valves requires special care and consideration. Under conditions such as breakage with subsequent exposure to water, the sodium metal which lines the inner portion of the exhaust valve will react violently, forming sodium hydroxide and releasing hydrogen gas which may result in an explosion or fire.

- **Damage to eyes may result in loss of vision**
- **Contact with skin will result in burns**
- **Fire may occur.**

① Basic precautions

- Never attempt to break valve and remove sodium metal.
- In principle, dispose of used valves by returning them to the Nissan service office.
- If valve(s) is/are damaged, remove valve(s), and perform sodium-filled valve disposal operations (neutralization and waste water disposal).

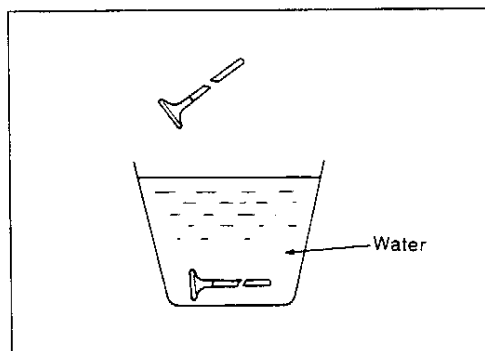
② Processing method

In principle, dispose of used valves by returning them to the Nissan service office.

If local industrial waste treatment companies do not perform the required press processing and it is clearly established that a solvent method can be used instead, this type of disposal method is also acceptable.

If valve(s) is/are damaged, remove valve(s), neutralize by water reaction and dispose of them with the same method used for ordinary scrap metal.

Processing must be performed as follows.



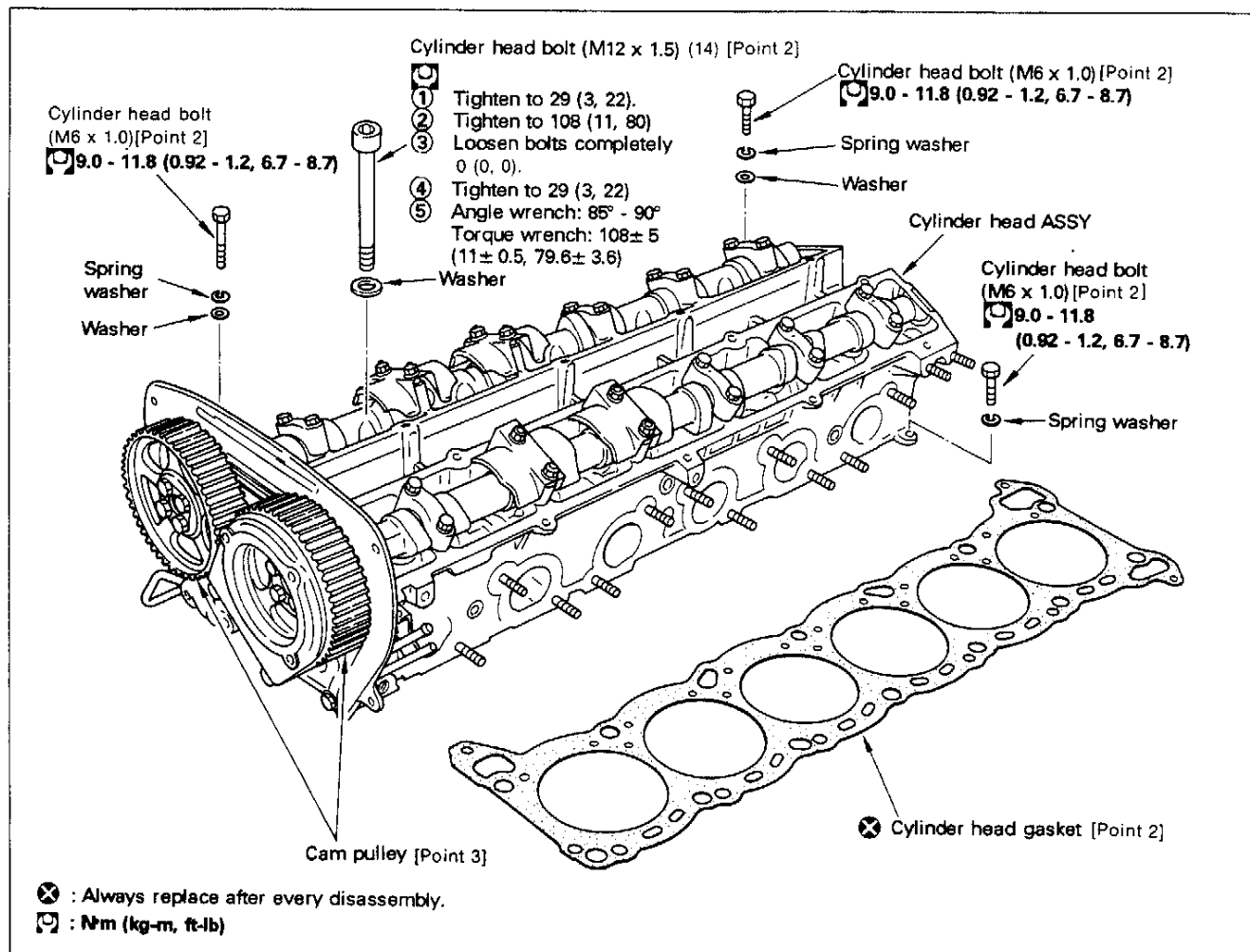
- Wear rubber gloves to remove valves from cylinder head.
- Pour more than 10 liters (2-1/4 Imp gal) of water into a bucket in a well-ventilated area.
- Submerge the damaged valves in the bucket.
- The reaction is violent so stand 2 to 3 meters (7 to 10 ft) from bucket.
- Hydrogen gas is produced so do not bring any naked flame near bucket.
- After the reaction is finished (4 - 5 hrs.), use large tweezers to pick the valves out. The valves can be disposed of by the same method used for other waste products at this time.
- Dealers should check their respective state and local regulations concerning any chemical treatment or waste water discharge permits which may be required to dispose of the resultant (high alkalinity) waste water.

CAUTION:

Make sure the resultant (high alkalinity) waste water does not contact your skin. If the waste water does contact the skin, wash the affected area immediately with large quantities of water.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

(1) Cylinder head ASSY removal and installation

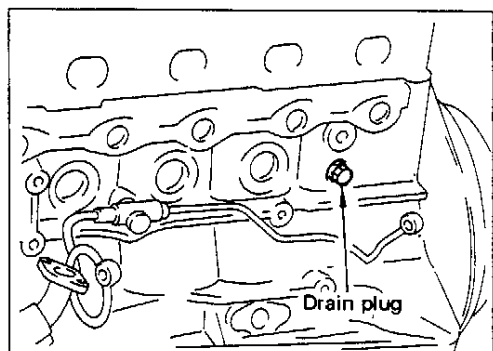


Additional work required:

- Drain and refill: Cooling water [Point 1]
- Remove and install:
Collector
Throttle chamber
Intake manifold

Turbocharger, exhaust manifold
Timing belt
Rocker cover
Spark plugs

- Installation: Check No. 1 cylinder compression T.D.C. position [Point 3]



[Point 1] Cooling water drain and refill

Removal

- Remove water completely from cylinder block drain plug.

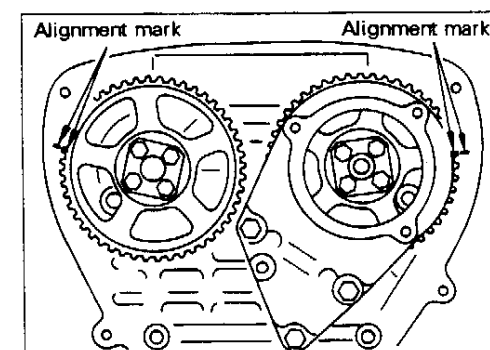
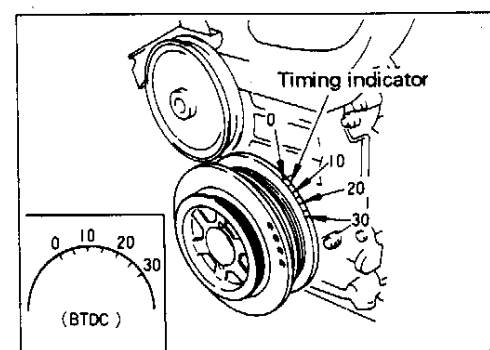
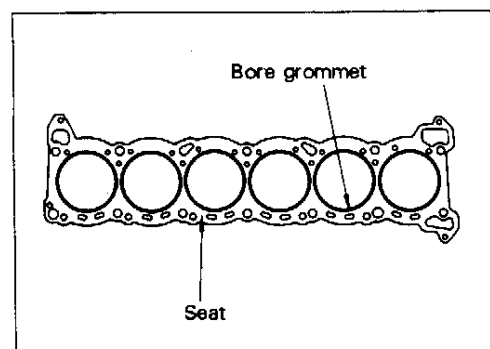
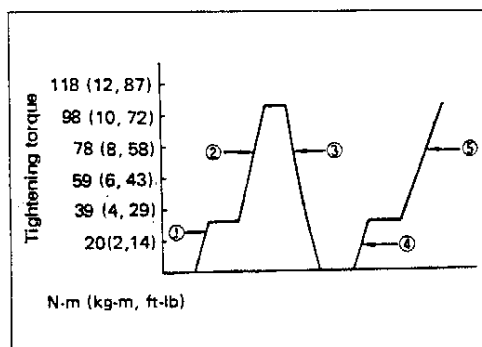
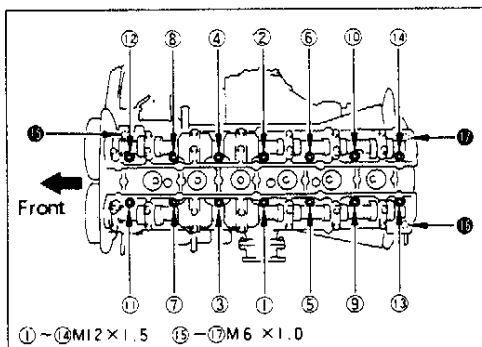
CAUTION:

Do not allow water to enter exhaust front tube.

Refilling water:

- Refer to (B6) "Cooling Water Filling Procedures" for details.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 2] Cylinder head bolts removal and installation

Removal

- Remove bolts in reverse sequence of figure on left.

Installation

- Remove bolts in sequence shown in figure on left.
- The cylinder head bolts (M12 x 1.5) are torqued by a two-step method in which bolts are tightened two times.
 - Tighten to 29 N·m (3 kg-m, 22 ft-lb).
 - Tighten to 108 N·m (11 kg-m, 80 ft-lb).
 - Loosen bolts completely 0 N·m (0 kg-m, 0 ft-lb).
 - Tighten to 29 N·m (3 kg-m, 22 ft-lb).
 - Turn bolts 85 to 90 degrees clockwise when angle wrench is used. Tighten bolts to 103 to 113 N·m (10.5 to 11.5 kg-m, 76 to 83 ft-lb) when torque wrench is used.

CAUTION:

When angle wrench is not used, never attempt to approximate the tightening angle visually.

- When gasket is installed, be careful not to hit or scratch gasket seat and bore grommet.
- When gasket is installed, clean cylinder head lower surface and cylinder block upper surface and remove all water, oil and foreign matter. Use compressed air to blow out the bore holes.

[Point 3] No. 1 cylinder compression T.D.C. verification

Before installing cylinder head ASSY on cylinder block, the crank pulley and cam pulley must be positioned at the No. 1 cylinder compression T.D.C. point.

- The crank pulley timing mark and timing belt cover timing indicator (0°) must be aligned.

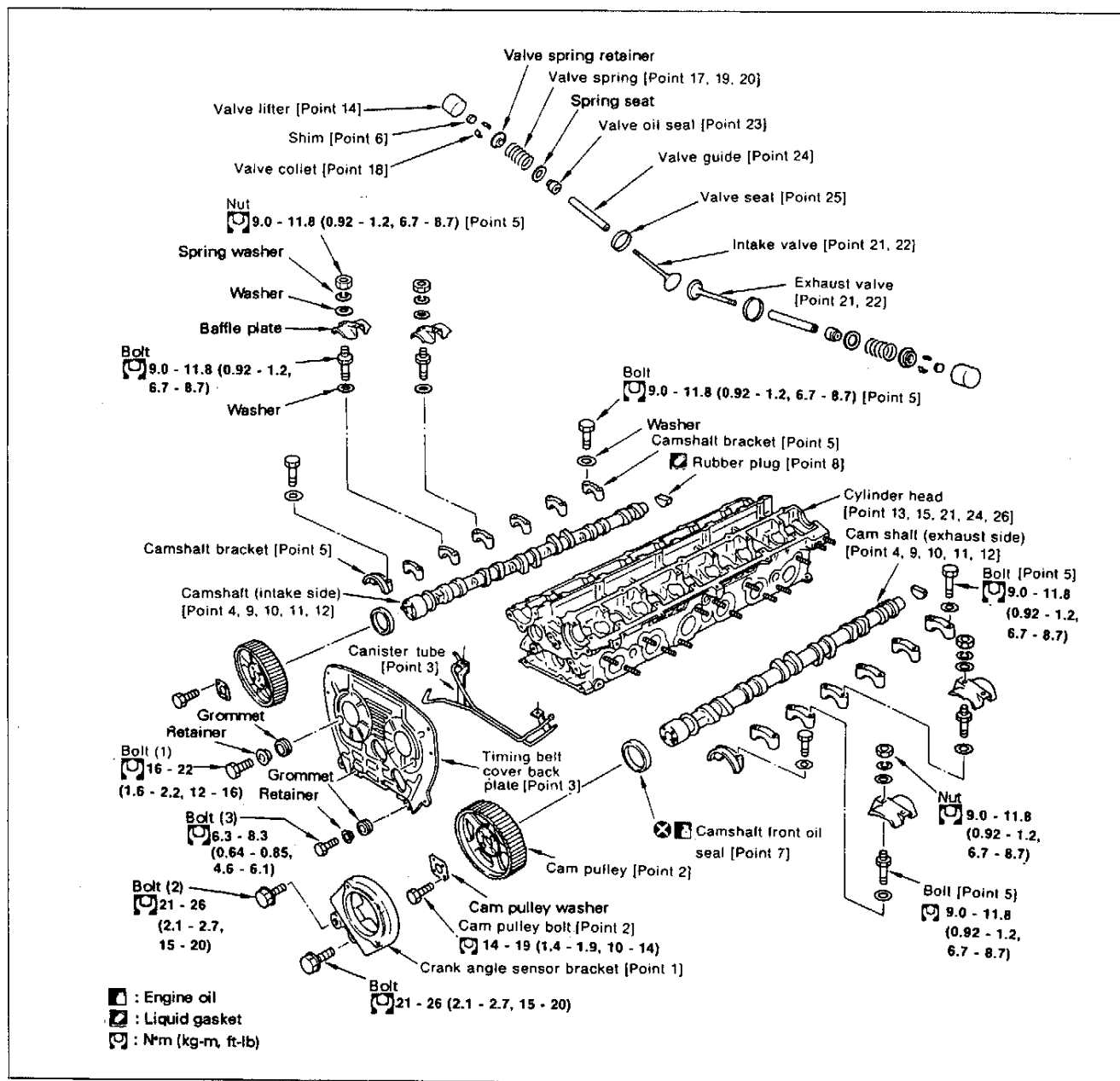
- Intake and exhaust cam pulley alignment marks must be positioned with their respective belt cover alignment marks.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

(2) Cylinder head ASSY disassembly and assembly

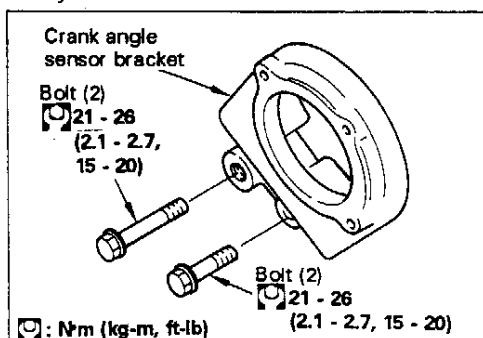
Special Precautions to Ensure Safe Disposal of Sodium-filled Exhaust Valves

Refer to page EN-66 for details.



Additional work required:

● Cylinder head ASSY removal and installation

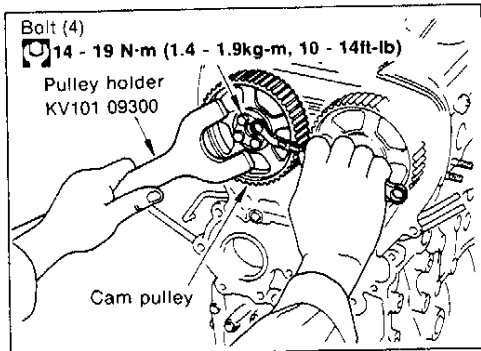


[Point 1] Crank angle sensor bracket installation

- The crank angle sensor bracket is positioned onto the cylinder head by using knock pins (2 locations). Align the positions correctly when installing the crank angle sensor.

Crank angle sensor bracket bolt tightening torque	21 - 26 N·m (2.1 - 2.7 kg-m, 15 - 20 ft-lb)
---	---

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

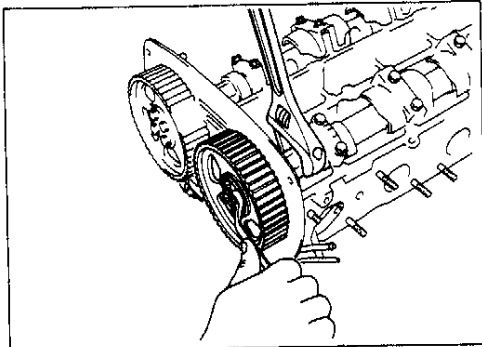


[Point 2] Cam pulley removal and installation

Removal

- Secure the pulley with a pulley holder or sprocket wrench and remove cam pulley bolts.

Pulley holder	KV101 09900
	or [KV101 09300, ST3152 0000, or ST3153 0000]

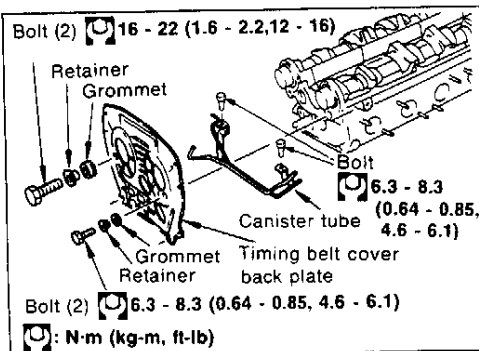


Installation

- Align camshaft knock pin and cam pulley knock pin holes to install camshaft pulley.
- Use a pulley holder or sprocket wrench to tighten the cam pulley bolt.

Cam pulley bolt tightening torque	14 - 19 N·m (1.4 - 1.9 kg-m, 10 - 14 ft-lb)
-----------------------------------	---

- To remove and install cam pulley bolts, use the proper tool to secure the hexagonal part in front of camshaft.



[Point 3] Timing belt cover back plate removal and installation

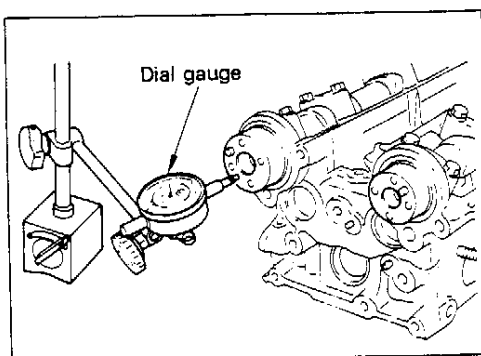
Removal

- Remove back plate bolts and detach back plate.

Installation

- Assemble back plate with canister tube and then install back plate.

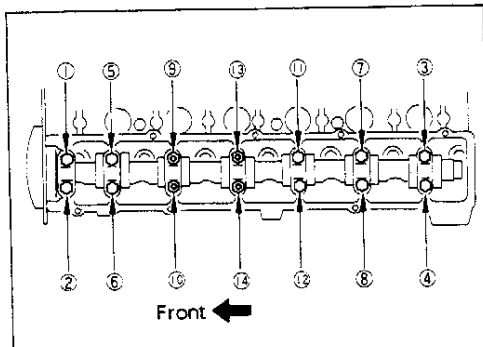
Back plate bolt tightening torque N·m (kg-m, ft-lb)	M6	6.3 - 8.3 (0.64 - 0.85, 4.6 - 6.1)
	M8	16 - 21 (1.6 - 2.1, 12 - 15)



[Point 4] Camshaft end play inspection

- Set a dial gauge at front end of camshaft in thrust direction. When camshaft moves in front and rear direction, read the dial gauge runout width.

Standard value	0.030 - 0.080 mm (0.0012 - 0.0031 in)
----------------	---------------------------------------

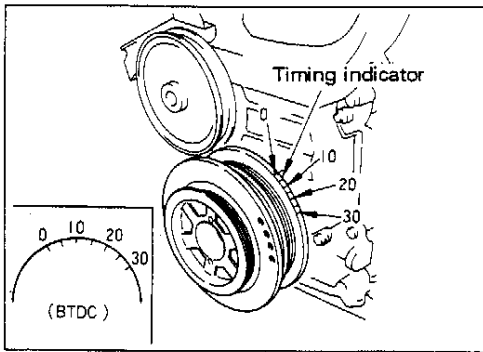


[Point 5] Camshaft bracket removal and installation

Removal (intake and exhaust camshafts)

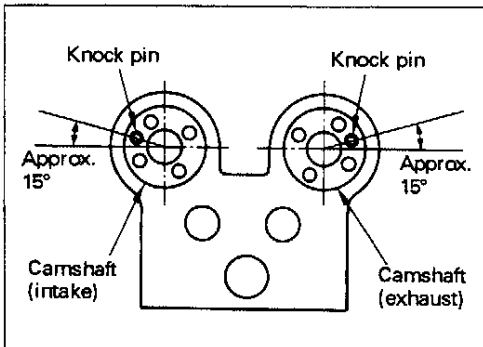
- Before removing camshaft bracket, paint marks to indicate bracket position and direction.
- Remove cam bracket bolts by loosening them gradually in several stages, in reverse sequence shown in left figure.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

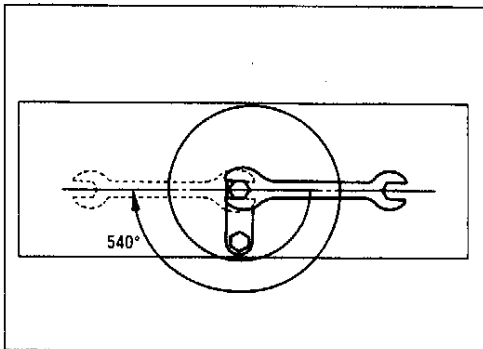


Installation

- Align crank pulley timing mark and timing belt cover timing indicator (0°) so No. 1 cylinder is at compression T.D.C. position. (This operation is not necessary when cylinder head is removed as single unit.)



- Turn camshaft so No. 1 cylinder is at compression T.D.C. position. (Operation is easier if the camshaft is turned 60° before or after No. 1 cylinder T.D.C. point when cylinder head is installed as single unit.) Verify position of No. 1 cylinder is at compression T.D.C. by knock pin in front end of camshaft.
- To install camshaft, temporarily tighten No. 1 cam bracket and check that camshaft thrust section is positioned securely.
- Tighten cam shaft bolt 540° (1.5 turns) in the numeric order shown in upper left figure.

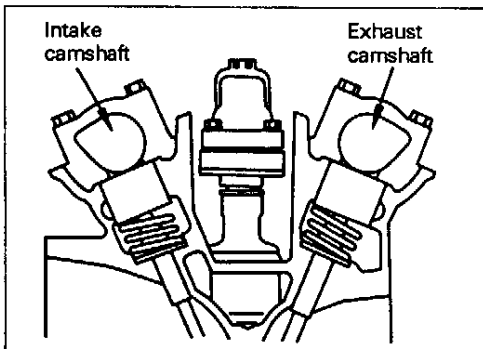


Cam bracket tightening torque

9.0 - 11.8 N·m (0.92 - 1.2 kg-m, 6.7 - 8.7 ft-lb)

CAUTION:

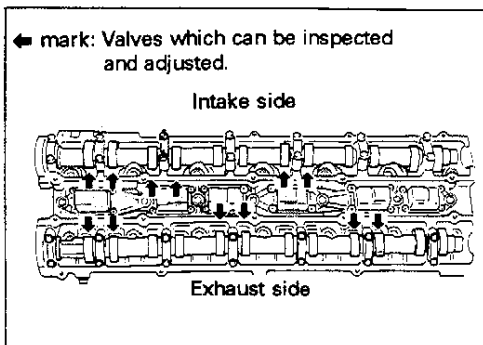
- Before installation, coat the cam journals and end of camshaft with engine oil.
- Do not rotate camshaft. (The valves and pistons may interfere.)



[Point 6] Valve clearance adjustment

No. 1 cylinder compression T.D.C. point

- Turn camshafts (intake and exhaust) so No. 1 cylinder is at the compression T.D.C. position.
- Check knock pin position of camshaft front end to verify No. 1 cylinder compression T.D.C. position.

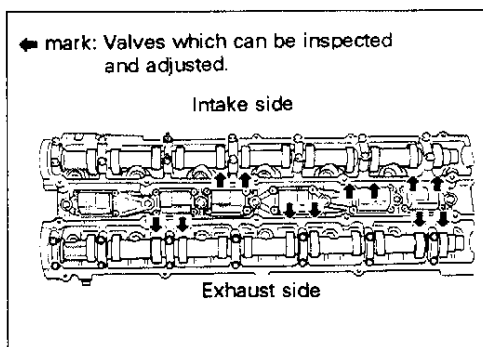


- No. 1 cylinder is at compression stroke top dead center when both the intake and exhaust side cams do not move the valve lifters.

Item	Part	Valve clearance measurement
Intake side		Cylinder No. 1, 2, 4
Exhaust side		Cylinder No. 1, 3, 5

Firing order: 1-5-3-6-2-4

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



- Rotate intake and exhaust camshafts 180°.
- No. 6 cylinder is at compression stroke top dead center when both the intake and exhaust side cams do not move the valve lifters.

Item	Part	Valve clearance measurement
Intake side		Cylinder No. 3, 5, 6
Exhaust side		Cylinder No. 2, 4, 6

Valve clearance specifications

[20 ± 5°C (68 ± 9°F)]

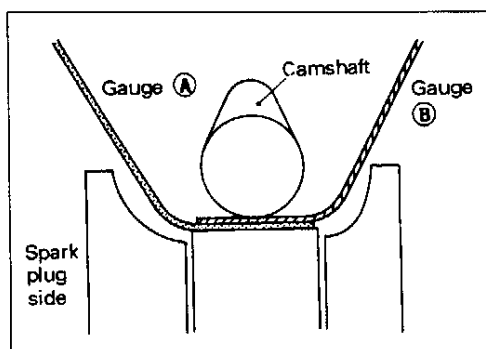
Item	Part	Intake	Exhaust
Valve clearance (cold)		0.45 ± 0.03	0.38 ± 0.03
mm (in)		(0.018 ± 0.001)	(0.015 ± 0.001)
(Reference value: hot)		0.51 ± 0.03	0.44 ± 0.03
mm (in)		(0.020 ± 0.001)	(0.017 ± 0.001)

CAUTION:

Always inspect when engine is cold.

Reference: Compensation by room temperature

Room temperature	0 ± 5 (32 ± 9)	10 ± 5 (50 ± 9)	20 ± 5 (68 ± 9)	30 ± 5 (86 ± 9)
°C (°F)				
Compensation value	+0.02	+0.01	0 (0)	-0.01
mm (in)	(+0.0008)	(+0.0004)		(-0.0004)



Valve clearance measurement method

- Insert a 0.15 to 0.20 mm (0.0059 to 0.0079 in) feeler gauge ① from spark plug side.
- Insert feeler gauge(s) ② from opposite side. Select a gauge thickness that will reduce the clearance to 0 mm (0 in).

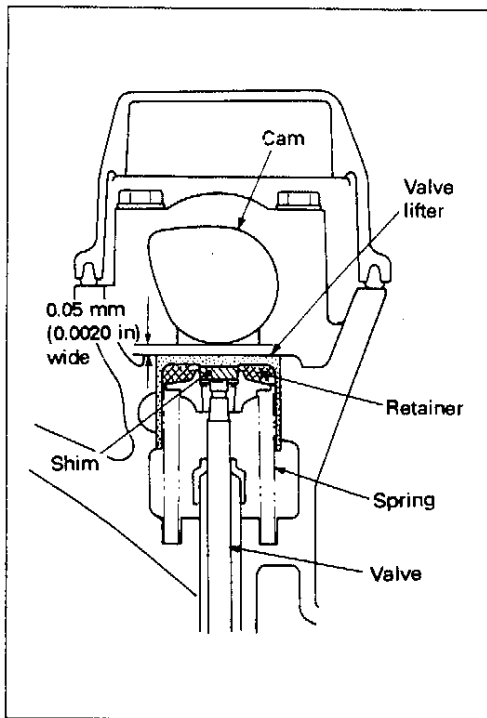
Note:

- Do not use more than two gauges for ②.
- The feeler gauge must conform to JIS (Japanese Industrial Standard) 150A25.

- Valve clearance = gauge ① + gauge ②
- Reasons for measurement using gauges ① and ②

- ① The valve clearance setting is larger compared to previous engines.
 - ② The gauges cannot be placed parallel to the measurement surface due to the structure.
- The blade of thick gauges has a high rigidity and does not bend easily, resulting in a large measurement error.
 - The error increases if a number of thin gauges are layered and the measurement will be incorrect.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



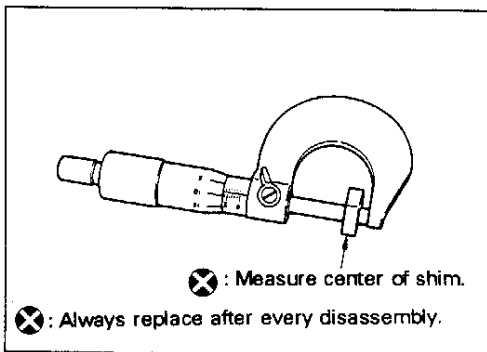
Valve clearance adjustment

- Select the shim for the valve clearance.
- When measured valve clearance (t) does not conform to specified value, measure shim thickness (T) and replace it with a shim that will produce the standard clearance.

① Shim thickness calculation method

Example: When intake valve clearance (t) is 0.50 mm (0.020 in):
 $0.50 (t) - 0.45 (\text{specified value}) = 0.05 \text{ mm (0.0020 in)}$.

- The valve clearance is 0.05 mm (0.0020 in) greater than specified value.
- Use shim 0.05 mm (0.0020 in) thicker than current thickness to narrow valve clearance.



② Current shim thickness (T) measurement method

- Use micrometer and measure center of shim.

CAUTION:

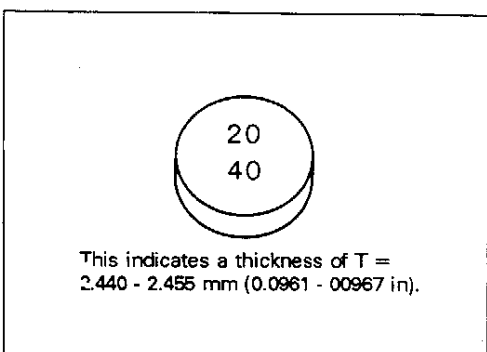
Dispose of shims which have been measured and do not use them again.

③ Shim selection

- When current shim thickness (T) is 2.40 mm (0.0945 in): $2.40 (T) \text{ mm (0.0945 in)} + 0.05 \text{ mm (0.0020 in)} = 2.450 \rightarrow$ selected shim thickness
- Read the identification mark $[\frac{24}{40}]$ (T: 2.440 to 2.455) to select shim closest to required thickness.

CAUTION:

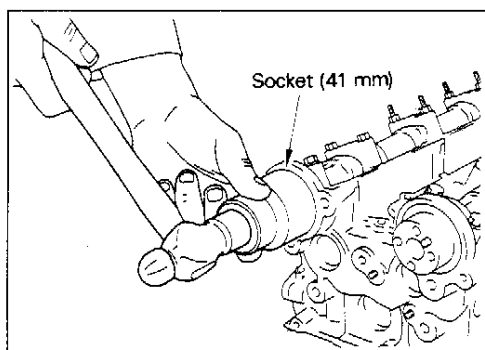
The shim thickness tolerance is $\pm 0.03 \text{ mm (0.0012 in)}$.



④ Identify the shim type

- There are 70 different types of shims. Sizes range from 2.275 mm (0.0896 in) to 3.325 mm (0.1309 in) in 0.015 mm (0.0006 in) increments.
- After installing camshaft, measure valve clearance again to check that clearance is within specifications.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

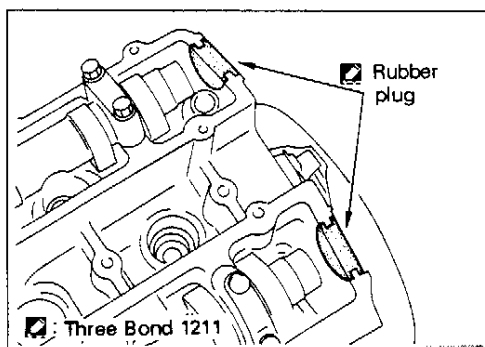


[Point 7] Camshaft front oil seal installation

- Be careful not to scratch or make a burr in the oil seal. Use a socket smaller than the seal (41 mm) and drive it into same level as front surface of oil seal retainer.
- Apply a coat of engine oil to the entire perimeter of oil seal lip.

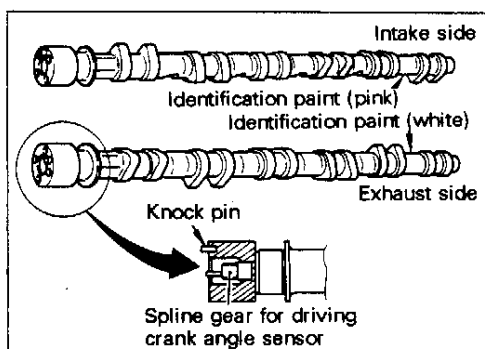
CAUTION:

Do not scratch the oil seal and lip.



[Point 8] Camshaft rear rubber plug installation

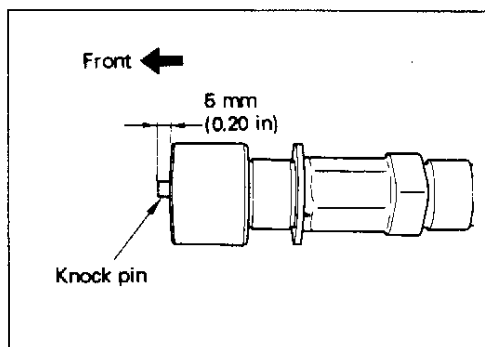
- Before installing rubber plug, remove oil, water, etc., on surface and clean thoroughly.
- When assembling rubber plug, coat it with adhesive (Three Bond 1211).



[Point 9] Intake and exhaust camshaft classification

- Intake and exhaust camshafts can be identified by identification paint color and presence of a spline gear for driving the crank angle sensor.

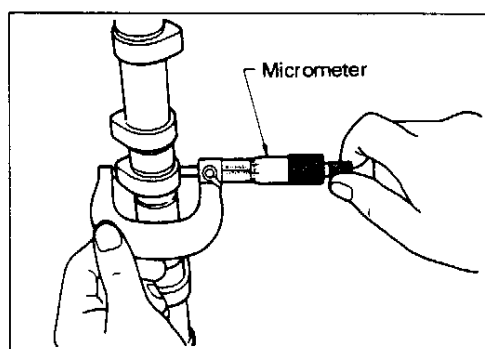
Camshaft	Identification paint	Spline gear
Intake camshaft	Pink	No
Exhaust camshaft	White	Yes



[Point 10] Camshaft knock pin insertion

- The protrusion distance is 5 mm (0.20 in) for camshaft knock pin insertion.

Knock pin protrusion distance	5 mm (0.20 in)
-------------------------------	----------------



[Point 11] Camshaft inspection

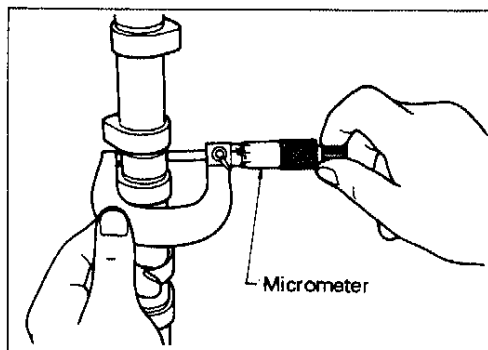
Cam height inspection

- Use a micrometer to measure cam height.

Unit: mm (in)

	Intake side	Exhaust side
Cam height standard value	40.58 (1.5976)	40.28 (1.5858)
Cam lift (reference)	8.58 (0.3378)	8.28 (0.3260)

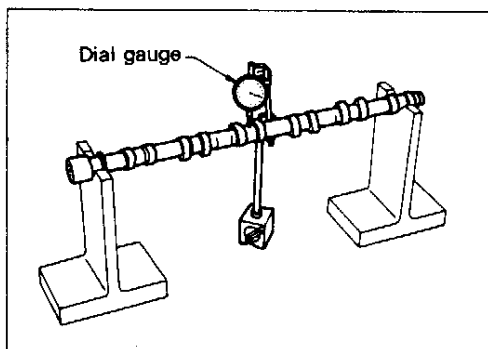
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



Camshaft journal outside diameter inspection

- Use micrometer to measure outside diameter of camshaft journal.

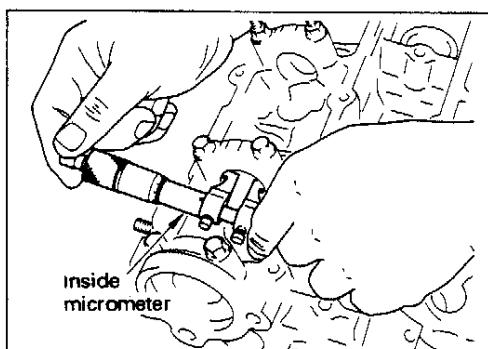
	No. 1 - No. 7
Standard value	27.935 - 27.955 mm (1.0998 - 1.1006 in)



[Point 12] Camshaft runout inspection

- Use V-blocks on fixed surface to support both camshaft end journals (No. 1 and No. 7).
- Avoid the oil groove in the center of the No. 4 journal and position the dial gauge vertically.
- Turn the camshaft by hand one rotation and read the movement width on dial gauge.
- The runout is equal to one-half of the movement width indicated on dial gauge.

Standard value	0.05 mm (0.0020 in)
----------------	---------------------



[Point 13] Cylinder head cam bracket inside diameter inspection

- Tighten the cam bracket to specified torque.

Cam bracket bolt tightening torque	9.0 - 11.8 N·m (0.92 - 1.2 kg-m, 6.7 - 8.7 ft-lb)
------------------------------------	---

- Use bore gauge or inside micrometer to measure inside diameter.

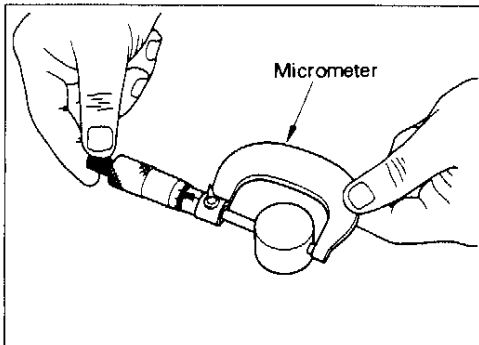
	No. 1 - No. 7
Standard value	28.000 - 28.021 mm (1.1024 - 1.1032 in)

[Point 14] Camshaft oil clearance inspection

- The oil clearance can be calculated from the camshaft journal outside diameter and bracket inside diameter measured in [Point 11] and [Point 13].
 $(\text{Clearance}) = (\text{cam bracket inside diameter}) - \text{Camshaft journal (outside diameter)}$

	No. 1 - No. 7
Standard value	0.045 - 0.086 mm (0.0018 - 0.0034 in)

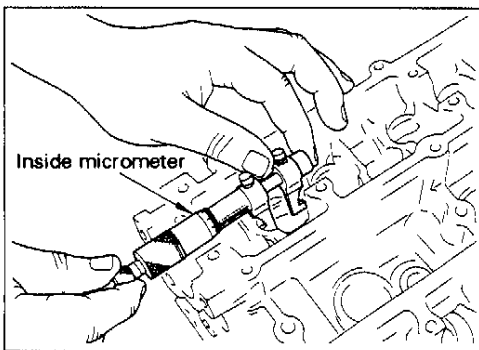
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 15] Valve lifter inspection

- Check contact and sliding surfaces for wear or scratches. Replace if damaged.
- Use a micrometer to check the valve lifter outside diameter.

Standard value	30.955 - 30.965 mm (1.2187 - 1.2191 in)
----------------	---



[Point 16] Cylinder head lifter bore inspection

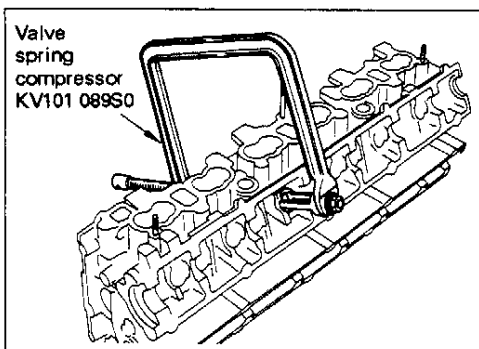
- Check bore surface for wear or scratches.
- Use inside micrometer to measure valve lifter hole diameter.

Standard value	31.0 - 31.020 mm (1.2205 - 1.2213 in)
----------------	---------------------------------------

[Point 17] Valve lifter-to-lifter hole clearance inspection

- Check the clearance using values for the valve lifter outside diameter and valve lifter hole diameter measured in [Point 15] and [Point 16].
(Clearance) = (valve lifter hole diameter) - (valve lifter outside diameter)

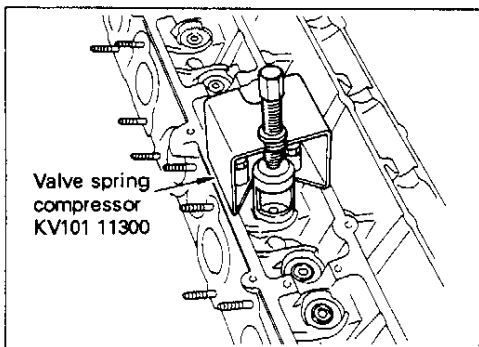
Standard value	0.025 - 0.065 mm (0.0010 - 0.0026 in)
----------------	---------------------------------------



[Point 18] Valve spring removal and installation

When cylinder head is removed from vehicle:

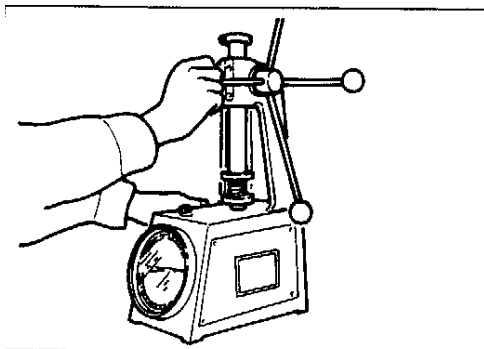
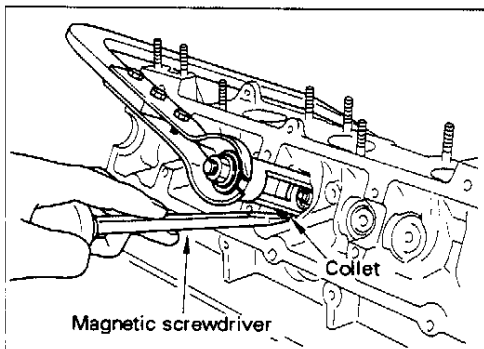
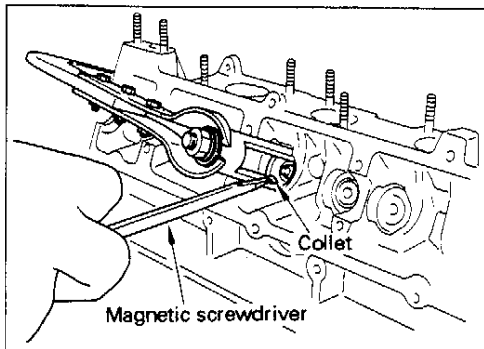
- Use valve spring compressor (KV101 089S0) to remove and install valves.



When cylinder head is installed in vehicle.

- Use valve spring compressor (KV101 11300) to remove and install valve springs.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 19] Valve collet removal and installation

Removal

- Use tweezers for removal and installation of collet.

Installation

- Apply a small coating of petroleum jelly to the internal surface of collet.
- Use a magnetic screwdriver.
 - ① Upper collet installation
Attach collet to lower side of magnetic screwdriver blade and install in the valve stem.
 - ② Lower collet installation
Attach collet to upper side of magnetic screwdriver blade and install in the valve stem.

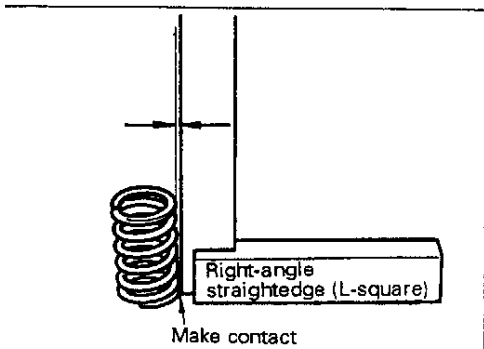
[Point 20] Valve spring inspection

Free length and pressure load inspection

- Use a valve spring tester to check spring pressure.

	Standard value	Limit value
Free length mm (in)	46.54 (1.8323)	—
Installation load N (kg, lb)	235.4 (24.0, 52.9)	220.7 (22.5, 49.6)
Identification color	White	—

Note: Installation load is the force required to compress the spring to a 35 mm (1.38 in) length.

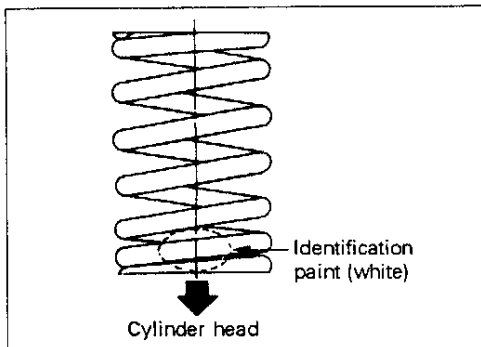


Valve spring squareness inspection

- Place a right-angle straightedge (L-square, etc.) so it contacts spring. Turn spring and measure the maximum clearance between upper spring surface and right angle surface to determine out-of-square distance.

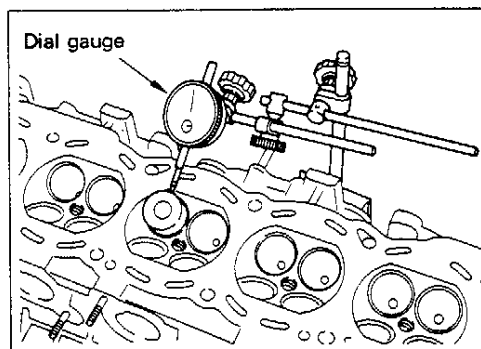
Limit	1.8 mm (0.071 in)
-------	-------------------

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 21] Valve spring installation

- Install uneven pitch type spring with narrow pitch end toward cylinder head (identification color side down).

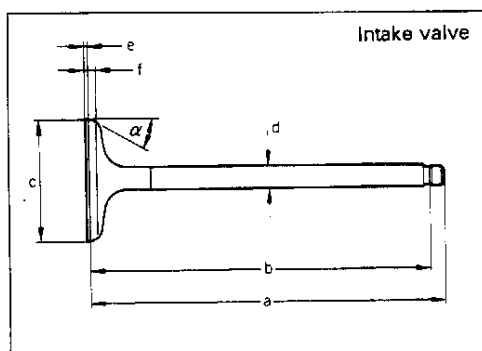


[Point 22] Valve guide clearance inspection

- Protrude valve approximately 15 mm (0.59 in) from valve guide hole into combustion chamber. Measure valve deflection by swinging it in direction parallel to dial gauge.
- The clearance is equal to one-half of the dial gauge reading (deflection width).

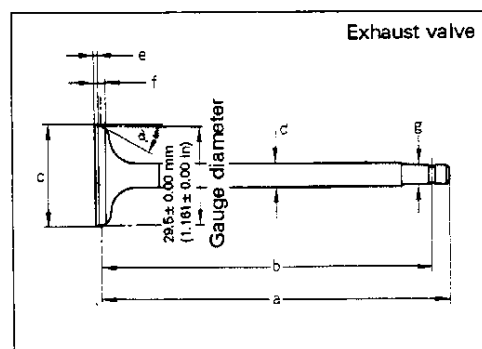
		Intake	Exhaust
Limit	mm (in)	0.1 (0.004)	0.1 (0.004)

- If clearance exceeds limit, verify valve stem diameter and replace valve or valve guide.



[Point 23] Valve inspection

Outside diameter measurement

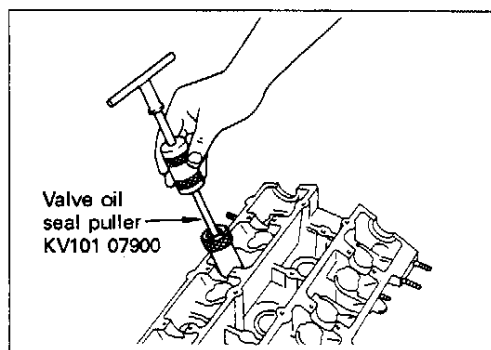


B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

Unit : mm (in)

Valve	a	b	c	d	e	f	g	α
Intake	100.98 ± 0.1 (3.9756 \pm 0.0039)	97.45 ± 0.15 (3.8366 \pm 0.0059)	$34.5^{+0.2}_{-0}$ (1.358 $^{+0.008}_{-0}$)	$6.0^{+0.020}_{-0.035}$ (0.2362 $^{+0.0008}_{-0.0014}$)	1.3 (0.051)	$2.6^{+0.3}_{-0}$ (0.102 $^{+0.012}_{-0}$)	—	45°30'
Exhaust	99.98 ± 0.1 (3.9362 \pm 0.0039)	95.48 ± 0.15 (3.7590 \pm 0.0059)	$30.0^{+0.2}_{-0}$ (1.181 $^{+0.008}_{-0}$)	$7.0^{+0.080}_{-0.095}$ (0.2756 $^{+0.0031}_{-0.0037}$)	1.2 (0.047)	$2.9^{+0.3}_{-0}$ (0.114 $^{+0.012}_{-0}$)	$6.0^{+0.020}_{-0.055}$ (0.236 $^{+0.0008}_{-0.0022}$)	45°30' \pm 15'

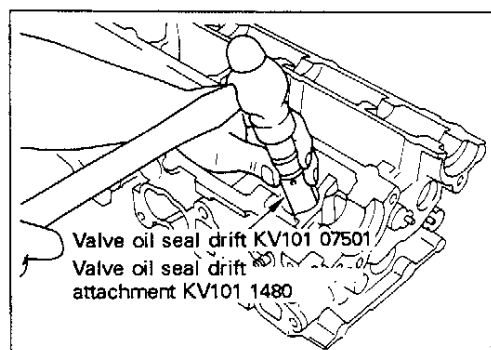
Be especially careful in handling and disposal of valves because exhaust valves are filled with metallic sodium. Refer to Page EN-67.



[Point 24] Valve oil seal removal and installation

Removal

- Use valve oil seal puller to remove valve seal.



Installation

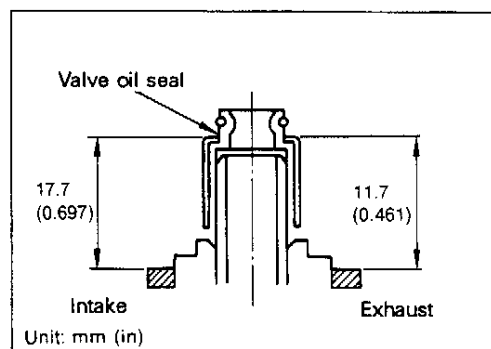
- Use valve oil seal drift to install valve seals.

Part	Intake	Exhaust
Tools		
Drift	KV101 07501	
Drift attachment	KV101 14800	

CAUTION:

Coat inside of valve oil seal with engine oil before installation.

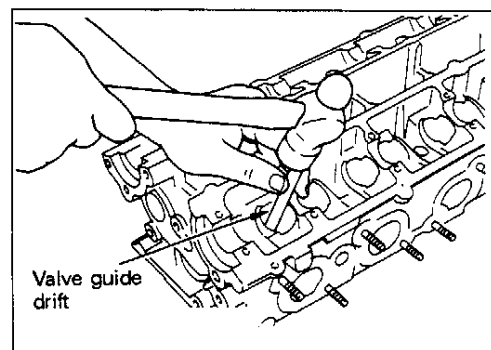
- Install valve oil seal as shown in figure.



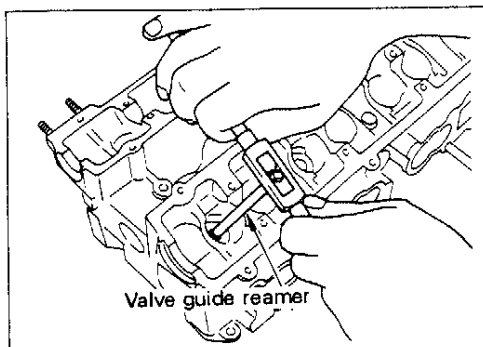
[Point 25] Valve guide removal and installation

Removal

- Use valve guide drift and tap it from combustion chamber side to remove seal.



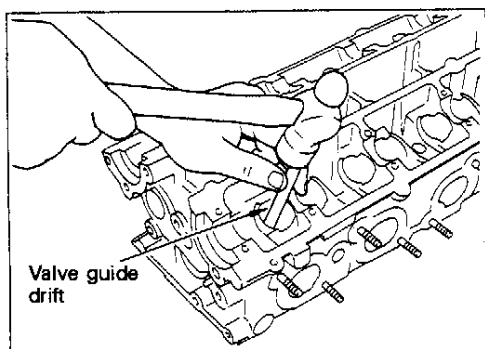
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



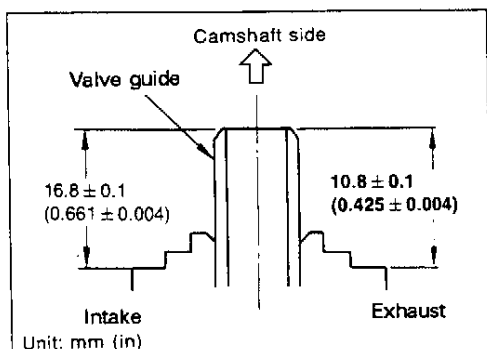
Installation

- Ream cylinder head valve guide holes with valve guide reamer at normal temperature to rectify the hole diameter [when using 0.5 mm (0.020 in) oversize service part)].

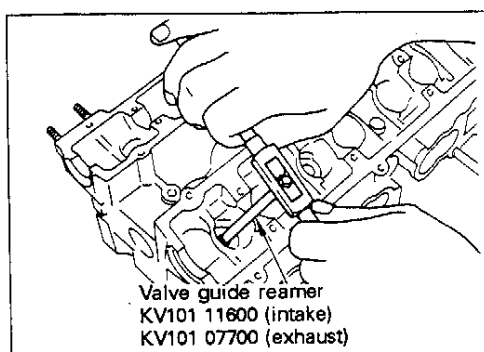
Rectified value mm (in)	Intake side	10.46 - 10.478 (0.4118 - 0.4125)
	Exhaust side	11.46 - 11.478 (0.4512 - 0.4519)



- Heat cylinder head in an oil bath to approximately 150 to 160°C (302 to 320°F). Use a valve guide drift or press-fit tool and press valve guide from camshaft side.

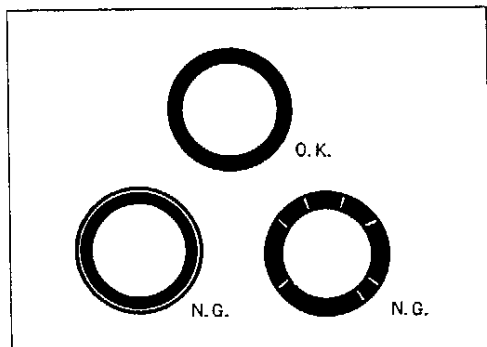


- The press-fit dimensions are shown in figure at left.



- Ream the inside of the inserted valve guide with valve guide reamer.

Finished internal diameter standard value mm (in)	Intake side	6.000 - 6.018 (0.2362 - 0.2369)
	Exhaust side	7.000 - 7.018 (0.2756 - 0.2763)

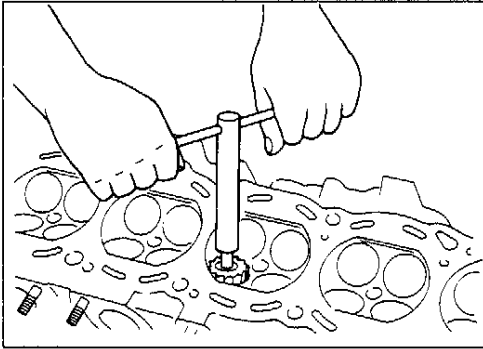


[Point 26] Valve seat

Inspection

- Check contacting surfaces of valve seat and valve.
- Replace valve or valve seat if contacting surface is too large or improper, or grind both surfaces and lap with abrasive compound.

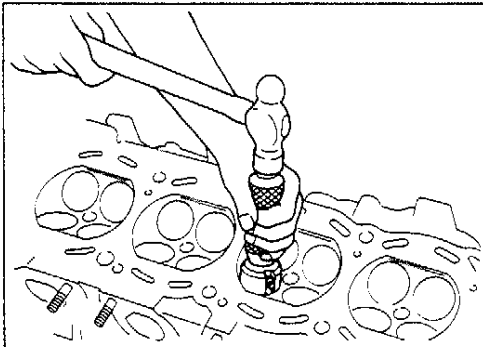
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



- When surfacing valve seat due to poor contact, inspect valve guide clearance and valve stem hole clearance.
- Use valve seat cutter or valve seat grinder and finish to standard value.

CAUTION:

When using valve seat cutter, press firmly and cut evenly with both hands to produce uniform cutting surface.

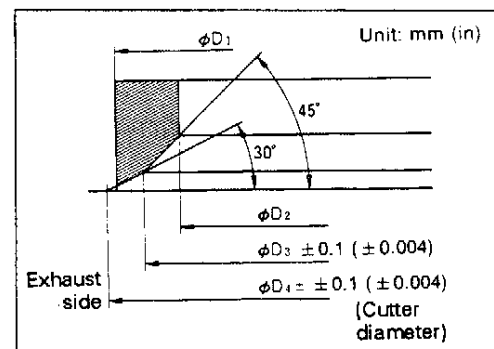
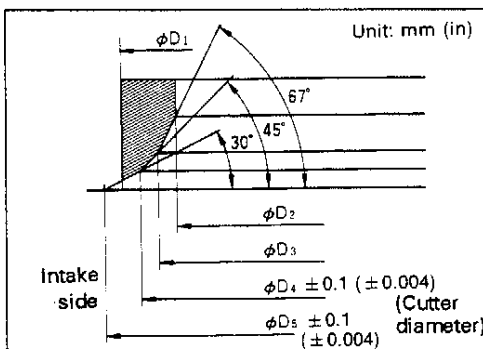


Removal

- Minimize valve seat thickness by cutting it, then remove.

Installation

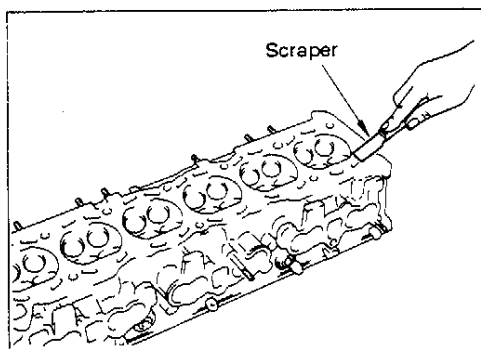
- ① Drive valve seat into cylinder head using valve seat as shown in figure.
- Exhaust valve seats are available in 0.5 mm (0.020 in) over size. When using oversize valve seats, cut and grind seating recess in cylinder head to fix valve seats.



Unit: mm (in)

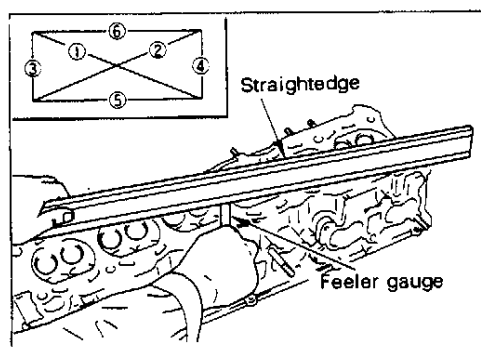
Valve oversize		Item	Cylinder head finishing	Valve seat				
			φd	φD ₁	φD ₂	φD ₃	φD ₄	φD ₅
Intake	Standard		36 ^{+0.016} ₀ (1.4173 ^{+0.0006} ₀)	36 ^{+0.113} ₀ (1.4173 ^{+0.0044} ₀)	30 ± 0.15 (1.1811 ± 0.0059)	32 (1.26)	34.3 (1.358)	37.5 (1.476)
	0.5 (0.020)		36.5 ^{+0.016} ₀ (1.4370 ^{+0.0006} ₀)	36.5 ^{+0.113} ₀ (1.4370 ^{+0.0044} ₀)	30 ± 0.15 (1.1811 ± 0.0059)	32 (1.26)	34.3 (1.358)	—
Exhaust	Standard		32 ^{+0.016} ₀ (1.2598 ^{+0.0006} ₀)	32 ^{+0.096} ₀ (1.2598 ^{+0.0038} ₀)	25 ± 0.15 (0.9843 ± 0.0059)	29.6 (1.165)	32.5 (1.280)	—
	0.5 (0.020)		32.5 ^{+0.016} ₀ (1.2795 ^{+0.0006} ₀)	32.5 ^{+0.096} ₀ (1.2795 ^{+0.0038} ₀)	25 ± 0.15 (0.9843 ± 0.0059)	29.6 (1.165)	—	—

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 27] Cylinder head inspection

- Remove all traces of oil, fur, gasket, sealing compound, carbon, and other foreign matter from cylinder head surface.



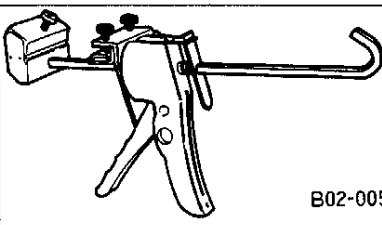
- Measure lower surface of cylinder head in six directions to check for distortion.

Limit	0.2 mm (0.008 in)
-------	-------------------

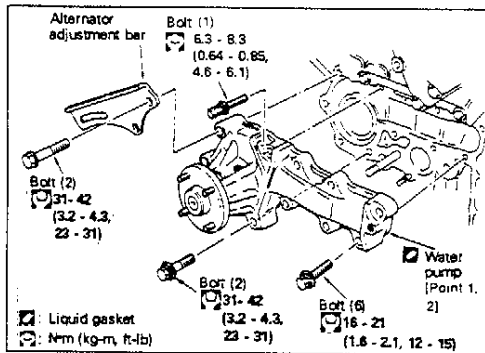
- When distortion is within the limit, resurface the cylinder head.
- If distortion exceeds the limit, replace cylinder head.

10-13 WATER PUMP REMOVAL AND INSTALLATION

Tools required

	Name	Application
Tool	Tube presser WS3993  B02-0051	Liquid gasket application

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



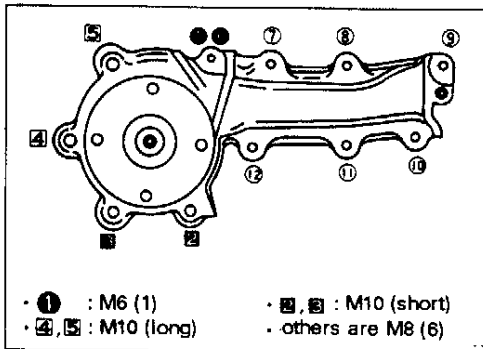
Additional work required:

- Drain and refill cooling water.
(Refer to section B6, 3.)
- Remove and install:
Cooling fan, water pump pulley
Alternator adjustment bolt
Timing belt cover, timing belt

CAUTION:

Loosen engine drain plug to remove cooling water from cylinder block.

(If water is only drained from the radiator drain cock, the cylinder block will not drain completely.)



[Point 1] Water pump removal and installation

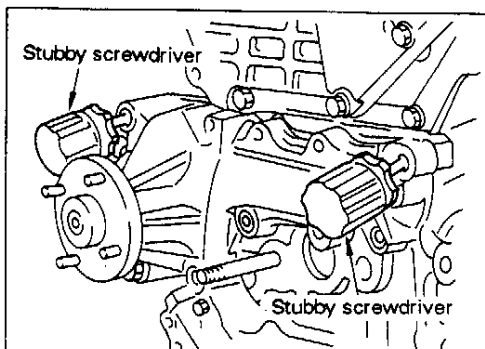
Removal

- When removing water pump assembly, be careful not to get coolant on timing chain. If any water does spill, wipe it off immediately.
- Remove water pump bolts in the reverse of sequence in figure on left.

Installation

- Install bolts in the numbered sequence in figure on left.

Installation location	Bolt size	Number of bolts	Tightening torque N-m (kg-m, ft-lb)
①	M6	1	6.3 - 8.3 (0.64 - 0.85, 4.6 - 6.1)
⑦, ⑧, ⑨, ⑩, ⑪, ⑫	M8	6	16 - 21 (1.6 - 2.1, 12 - 15)
②, ③, ④, ⑤	M10	4	31 - 42 (3.2 - 4.3, 23 - 31)



Removal and cleaning

- Insert stubby screwdrivers in bolt holes as shown, and move them up and down to remove water pump.

CAUTION:

Be careful not to damage screws in cylinder block side.

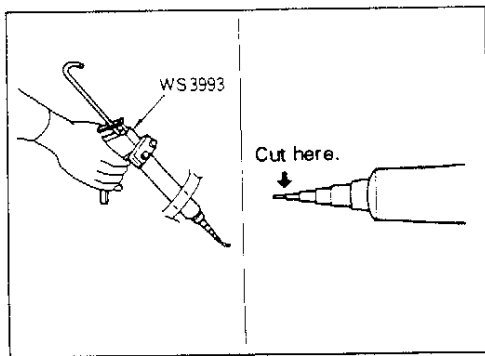
- Use a scraper to remove all traces of liquid gasket from mating surface.

CAUTION:

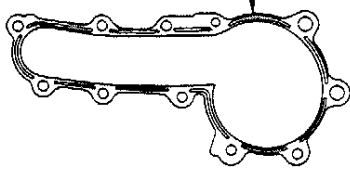
Also remove any liquid gasket remaining in grooves.

- Clean installation surface with white gasoline.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



Apply a continuous bead of liquid gasket 2.0 to 3.0 mm (0.079 to 0.118 in) wide along the groove of installation surface. In sections where there is no groove around bolt hole, coat middle of inside seal surface.



B02-3177

Installation

- Cut nozzle end of liquid gasket tube (KP510 00150) as shown in figure and use tube presser for application.

- Apply a continuous bead of liquid gasket (KP510 00150) to water pump sealing surface.

CAUTION:

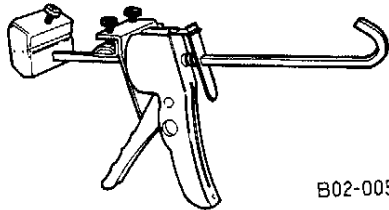
- (1) Be sure liquid gasket is 2.0 to 3.0 mm (0.079 to 0.118 in) wide.
- (2) Installation should be done within 5 minutes after liquid gasket application.

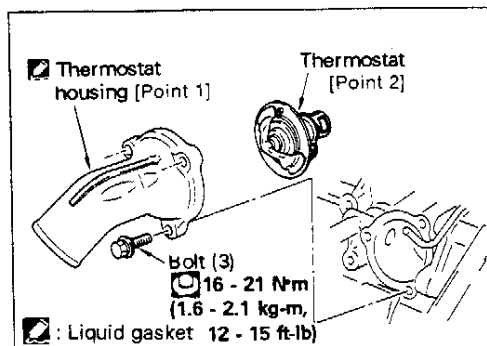
[Point 2] Water pump inspection

- Rotate water pump by hand and check for abnormal sound and smooth operation.
- There must be no traces of water leaks.

10-14 THERMOSTAT REMOVAL AND INSTALLATION

Tools required

	Name	Application
Tool	Tube presser WS3993  B02-0051	Liquid gasket application
Measurement tool	Thermometer	Water temperature measurement



Additional work required:

- Drain and refill cooling water.

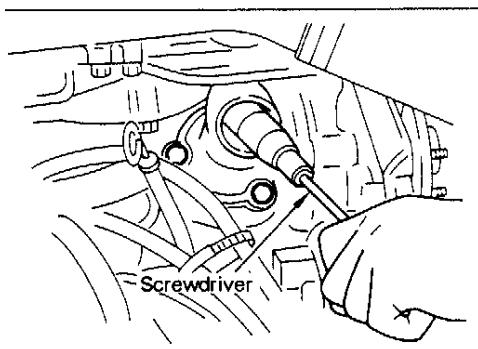
CAUTION:

Loosen engine drain plug to remove cooling water from cylinder block.

(If water is only drained from the radiator drain cock, the cylinder block will not drain completely.)

- Disconnect and connect water inlet hose.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



[Point 1] Thermostat housing removal and installation

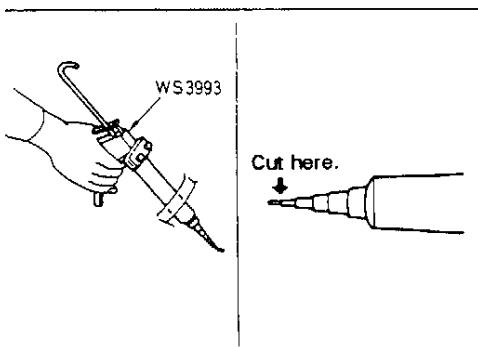
Removal and cleaning

- Insert screwdriver handle into thermostat housing. Pry lightly up and down and remove housing.
- Use a scraper to remove the liquid gasket.

CAUTION:

Be sure to also remove liquid gasket in grooves.

- Clean mating surface with white gasoline or equivalent.



Installation

- Cut nozzle end of liquid gasket (KP510 00150) tube as shown in figure.

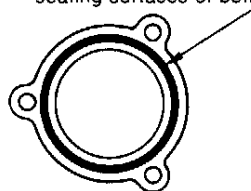
Apply a continuous coat of liquid gasket 2.0 to 3.0 mm (0.079 to 0.118 in) wide to center of flat mating surface and inner sealing surfaces of bolt holes (if provided).

- Apply a continuous bead of liquid gasket (KP510 00150) to sealing surface using tube presser, and install the housing within 5 minutes after coating.

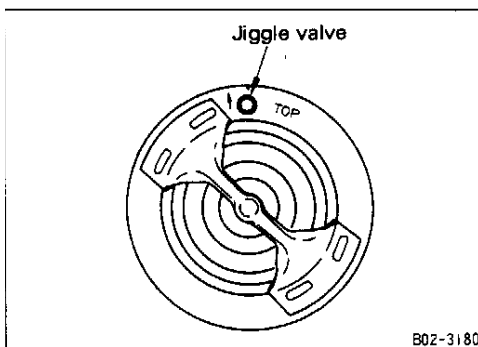
CAUTION:

Be sure liquid gasket is 2.0 to 3.0 mm (0.079 to 0.118 in) wide.

Tightening torque	16 - 21 N·m (1.6 - 2.1 kg-m, 12 - 15 ft-lb)
-------------------	---

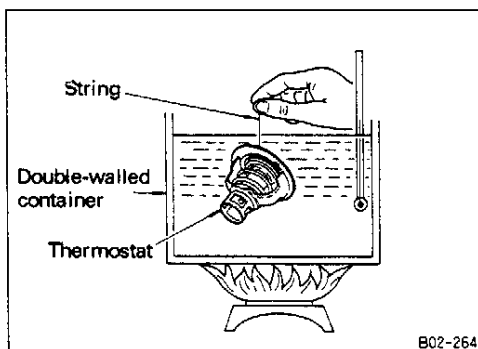


B02-3179



[Point 2] Thermostat installation

- "TOP" mark (jiggle valve) must face up when thermostat is inserted in housing.



[Point 3] Thermostat inspection

- Check valve opening temperature and maximum valve lift.
- Hang thermostat by string in valve and submerge in heated water in double walled container and stir water while heating it up.
- The opening temperature is the temperature when the valve opens and thermostat falls from string.

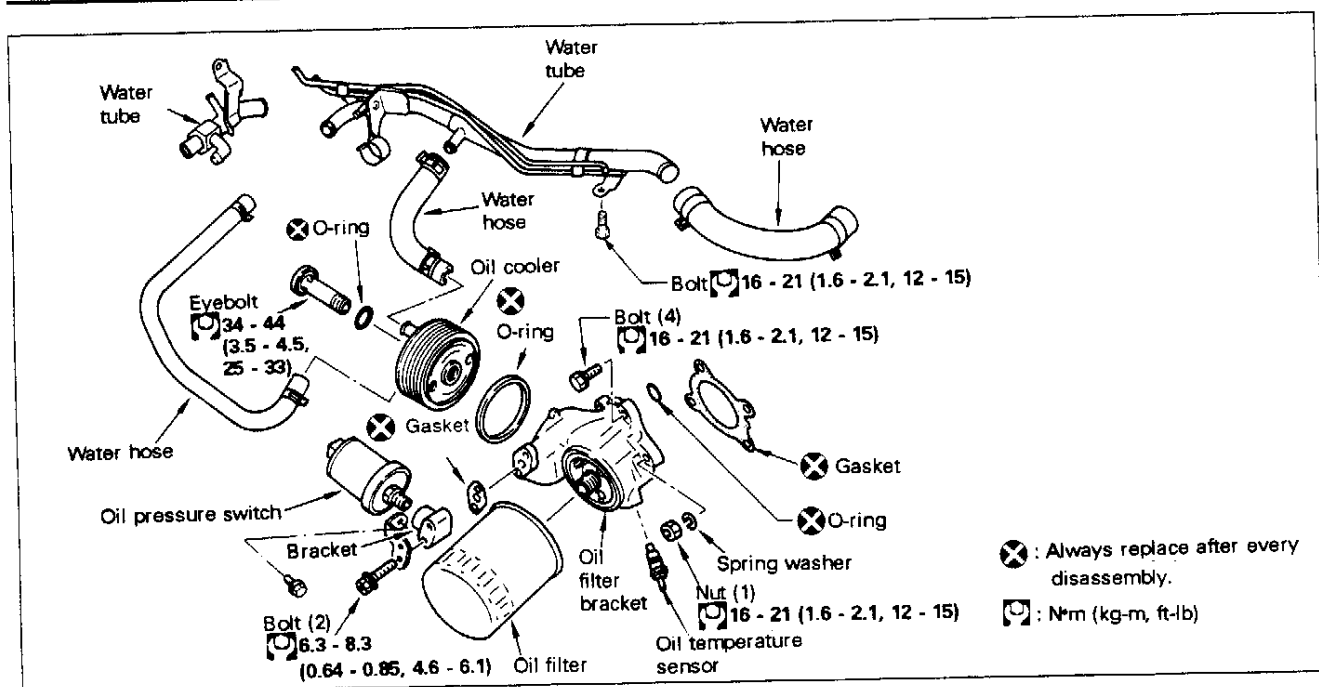
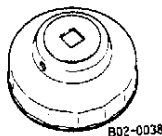
		Standard, cooled location
Valve opening temperature	°C (°F)	76.5 (170)
Max. valve lift	mm (in)/°C (°F)	10 (0.39) min./90 (194)

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

10-15 OIL COOLER, OIL FILTER REMOVAL AND INSTALLATION

Tools required

	Name	Application
Special tool	Oil filter wrench KV101 062S0	Oil filter removal and installation



Additional work required:

- Drain and refill cooling water.

CAUTION:

Loosen engine drain plug to remove cooling water from cylinder block.

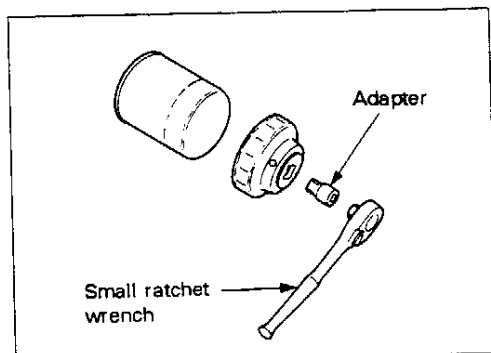
(If water is only drained from the radiator drain cock, the cylinder block will not drain completely.)

- Disconnect and connect switch harness connectors.

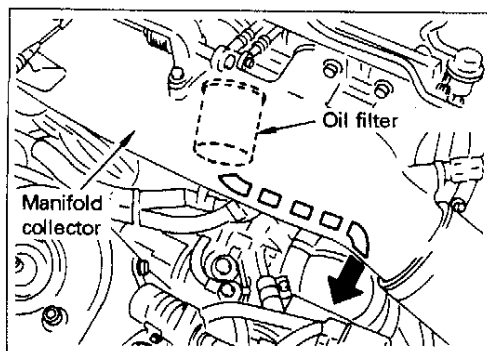
[Point 1] Oil filter removal and installation

Removal

1. Remove oil level gauge.
2. Remove turbocharged pressure control vacuum hose clamp and move vacuum hose out of the way.
3. Move main harness clamp out of the way.
4. Remove oil filter using oil filter wrench.



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



Installation

- Before installing new oil filter, wipe off dust, etc. from oil filter mounting bracket surface. Apply a thin coat of engine oil to oil filter O-ring.
- Screw oil filter on bracket by hand until a slight resistance is felt, then tighten an additional $2/3$ turn with oil filter wrench. After tightening, start engine and check for oil leaks.

Removal

- Face lower part of oil filter down and move out in direction of arrow in figure on left. Remove through aperture behind manifold collector.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

11. Engine Removal and Installation

Basic items

This section describes how to use an engine hoist and transmission jack to remove and install the RB26DETT engine.

Additional work required:

Inspection and adjustment after installation

Position vehicle on a flat and solid surface.

Remove and install:

- Battery
- Engine hood
- Cooling water
- Radiator
- Starter motor
- Front drive shaft
- Transmission ASSY

Engine compartment left side:

- Exhaust gas sensor harness disconnection
- Ground line connector separation
- Power steering oil pump [Point 4].
- Air conditioning compressor [Point 4].
- Air inlet pump, air cleaner upper case

Engine compartment front side:

- Cooling fan

Engine compartment upper side:

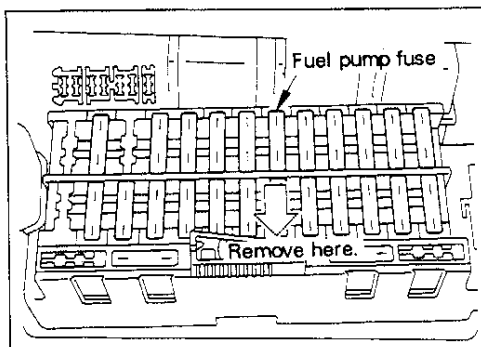
- ECCS harness connectors

Engine compartment right side:

- Fuel feed, return hoses separation [Point 1].
- Accelerator cable separation [Point 2].
- Engine main harness and ground line separation [Point 3].
- Heater hose separation
- Vacuum hoses separation

Vehicle body, lower side:

- Engine under cover
- Front section of exhaust pipe separation
- Right and left engine mount brackets [Point 6, 7]
- Power steering oil tube separation [Point 5]



[Point 1] Release fuel pressure

- After starting engine, remove fuel pump fuse and run engine until it stops. Crank the engine over two or three times to consume fuel in fuel lines.
- When unable to start vehicle, remove fuel pump fuse and crank engine four to five times to consume fuel in fuel lines.

CAUTION:

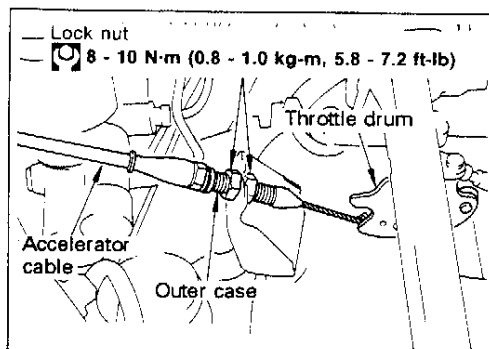
The battery can be run down easily, so connect booster cables to another vehicle or charged battery.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

11. Engine Removal and Installation (Cont'd)

[Point 2] Accelerator wire adjustment

- Loosen lock nut to provide adequate slack for the accelerator wire, and pull outer case in the direction of the accelerator pedal until throttle drum starts to move (when there is no play in cable). Return lock nut 1.0 to 1.5 turns then tighten.

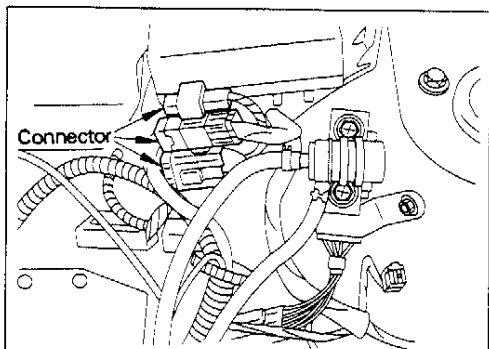


Tightening torque

8 - 10 N·m (0.8 - 1.0 kg-m, 5.8 - 7.2 ft-lb)

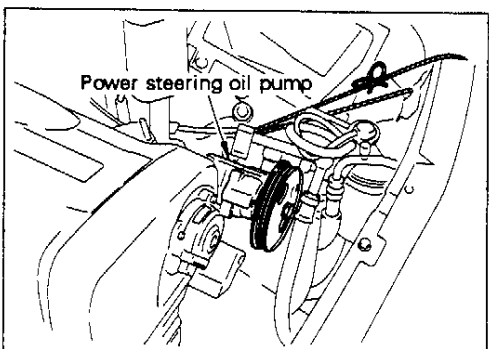
[Point 3] Engine main harness, ground line separation

- Disconnect connectors behind battery for harnesses of alternator, starter motor and transmission systems.



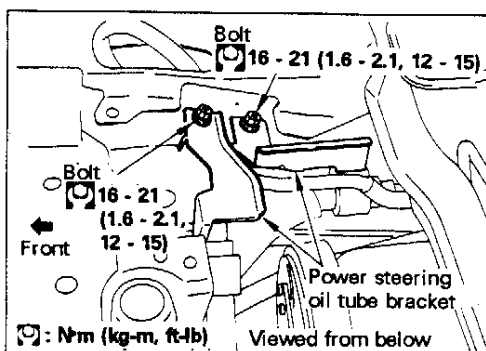
[Point 4] Air compressor, power steering oil pump movement

- Remove bolts securing each unit to brackets. Leave pipes connected and secure to side of body with string, being careful not to scratch body.



[Point 5] Power steering fluid tube bracket separation

- Remove bolts, and separate power steering fluid tube bracket, and move toward body side.

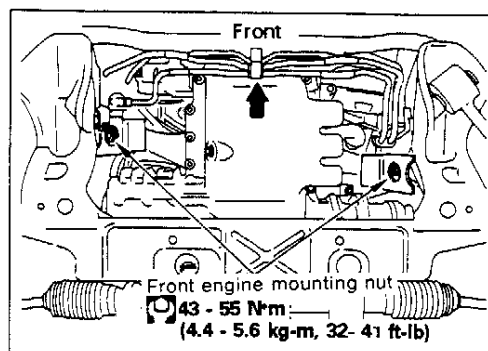


[Point 6] Front engine mounting nut removal

- Make sure engine slings are securely hooked by engine hoist chain and remove front engine mounting nuts.

Tightening torque

43 - 55 N·m (4.4 - 5.6 kg-m, 32 - 41 ft-lb)

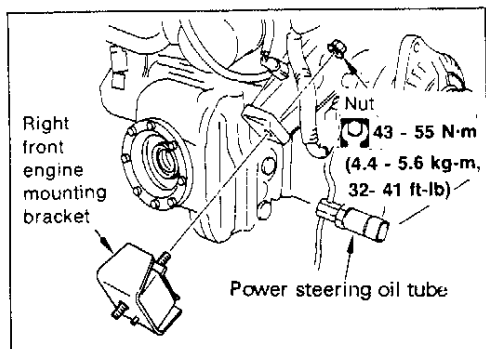


B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

11. Engine Removal and Installation (Cont'd)

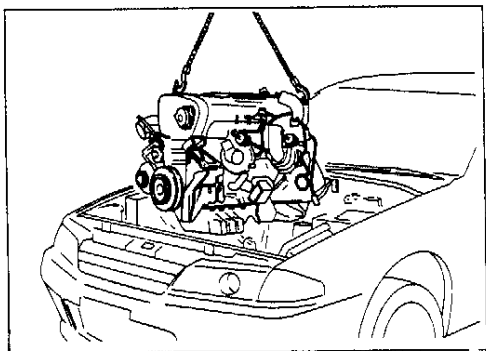
[Point 7] Right front engine mounting bracket removal

- Remove nut and remove right engine mounting bracket to move engine toward front of vehicle.



[Point 8] Engine ASSY removal and installation

- Operate hoist chain, and change engine angle gradually, being careful so it does not interfere with vehicle and remove engine.



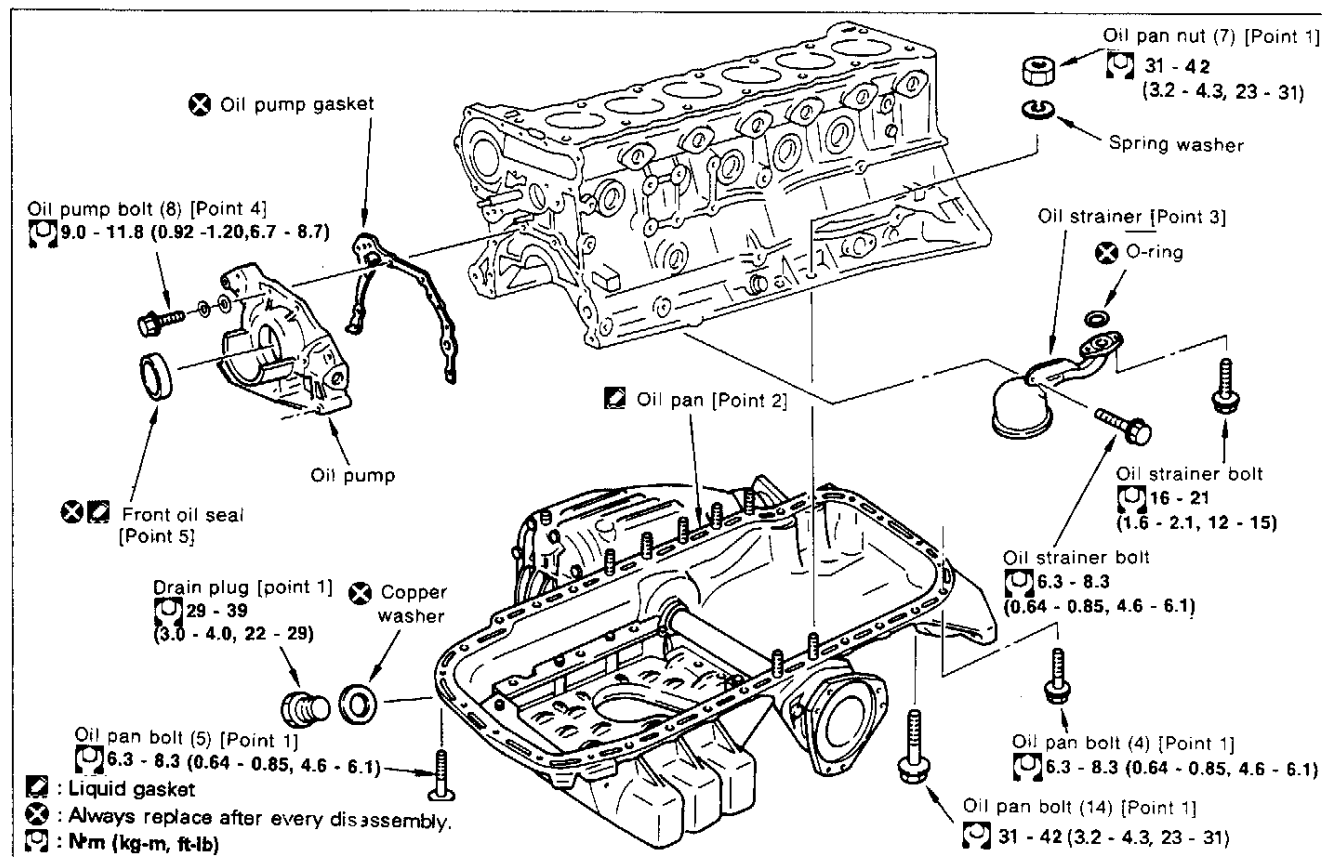
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

12. Oil Pan, Oil Pump and Oil Strainer Removal and Installation

Tools required

	Name	Application
Special tools	Seal cutter KV101 11100	Oil pan removal
	Oil seal drift KV401 00900	Oil seal insertion
Tool	Tube presser WS3993	Liquid gasket application

(1) OIL PAN, OIL PUMP AND OIL STRAINER REMOVAL AND INSTALLATION



Additional work required:

- Engine ASSY removal and installation
- Engine oil draining and refilling

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

12. Oil Pan, Oil Pump and Oil Strainer Removal and Installation (Cont'd)

[Point 1] Oil pan bolt, nut removal and installation

Removal

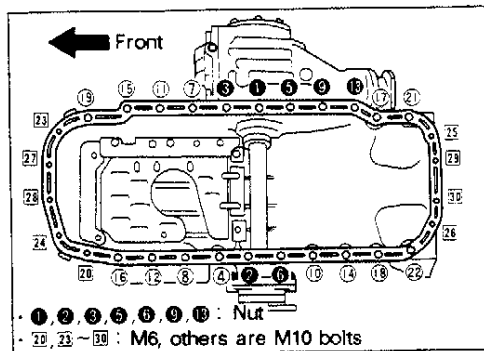
- Remove bolts and nuts in reverse order of installation shown in figure on left.

Installation

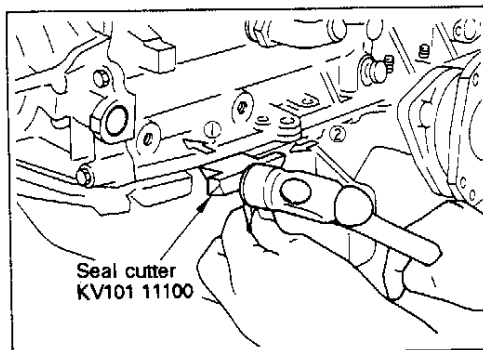
- Tighten nuts and bolts in numerical order shown in figure on left.

CAUTION:

Make sure there is no dirt, dust or debris on oil pan installation surface.



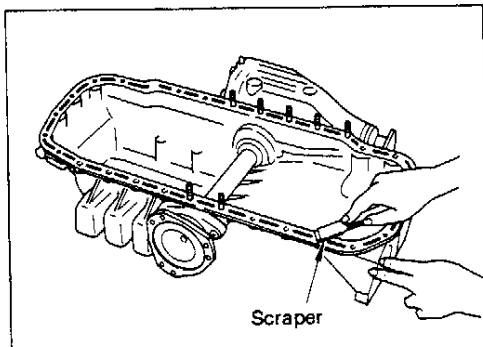
Installation position	Bolt size	Number of bolts	Tightening torque N·m (kg·m, ft·lb)
20 23 - 30	M6	9	6.3 - 8.3 (0.64 - 0.85, 4.6 - 6.1)
4 7 8 10 - 12, 14 - 19 21 22	M10	14	31 - 42 (3.2 - 4.3, 23 - 31)
1 2 3 5 6 9 13	M10 (nut)	7	31 - 42 (3.2 - 4.3, 23 - 31)



[Point 2] Oil pan removal and installation

Removal and cleaning

- Insert seal cutter between cylinder block and oil pan and remove oil pan by tapping seal cutter.



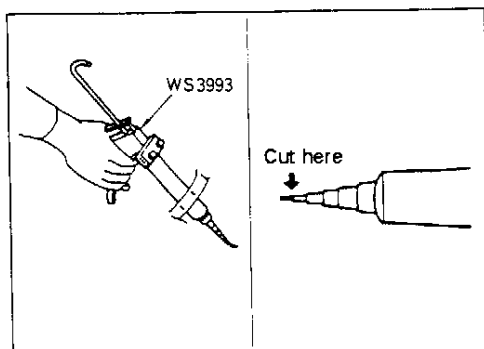
- Use a scraper to remove all traces of liquid gasket from mating surface.

CAUTION:

- Use a scraper to remove all liquid gasket and seal material attached to cylinder block and oil pan flange groove. Remove all gasket material and other debris that falls into the oil pan.
 - Be careful not to scratch oil pan.
- Clean all contact surfaces with white gasoline or equivalent.

Installation

- Cut off nozzle tip of liquid gasket (KP510 00510) at point shown in figure on left and insert in tube presser.



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

12. Oil Pan, Oil Pump and Oil Strainer Removal and Installation (Cont'd)

Installation

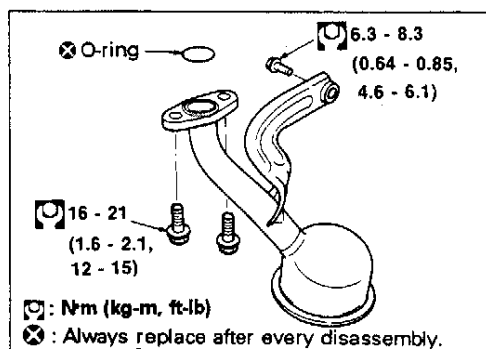
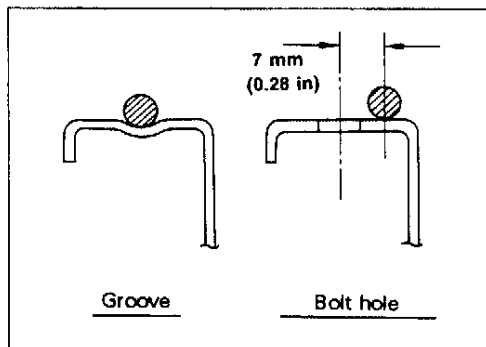
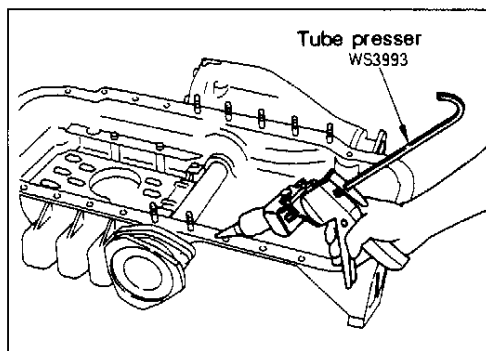
Apply liquid gasket to inner sealing surfaces as shown in figure. Installation should be performed within 5 minutes after coating.

- Apply a continuous bead of liquid gasket (KP510 00150) to mating surfaces of oil pan.

- Apply liquid gasket (KP510 00150) to areas 7 mm (0.28 in) inside from center of oil pan bolt holes.

CAUTION:

- (1) Be sure liquid gasket application is 4.0 mm (0.157 in) wide.
- (2) Wait at least 30 minutes before refilling engine oil and engine coolant.



[Point 3] Oil strainer installation

- When installing oil strainer, make sure O-ring is inserted securely in groove and then install.

Tightening torque N·m (kg-m, ft-lb)	M8	16 - 21 (1.6 - 2.1, 12 - 15)
	M6	6.3 - 8.3 (0.64 - 0.85, 4.6 - 6.1)

[Point 4] Oil pump installation bolts

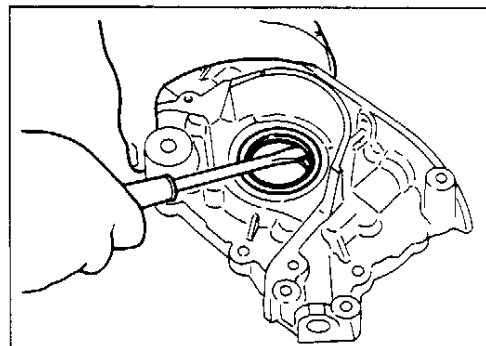
- There are 4 types of bolts so be careful not to mistake them when they are installed.

Installation position	Length below head mm (in)	Number of bolts	Tightening torque N·m (kg-m, ft-lb)
①	20 (0.79)	4	9.0 - 11.8 (0.92 - 1.2, 6.7 - 8.7)
②	35 (1.38)	2	9.0 - 11.8 (0.92 - 1.2, 6.7 - 8.7)
③	45 (1.77)	1	9.0 - 11.8 (0.92 - 1.2, 6.7 - 8.7)
④	55 (2.17)	1	9.0 - 11.8 (0.92 - 1.2, 6.7 - 8.7)

[Point 5] Front oil seal removal and installation

Removal

- Use a screwdriver to remove front oil seal from front cover.

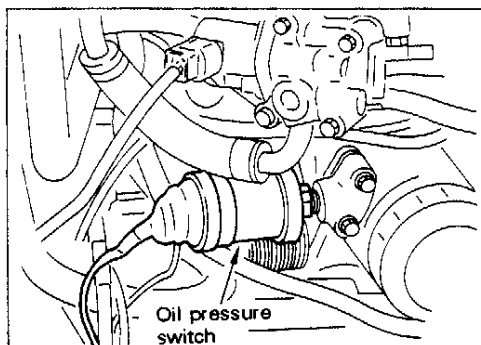
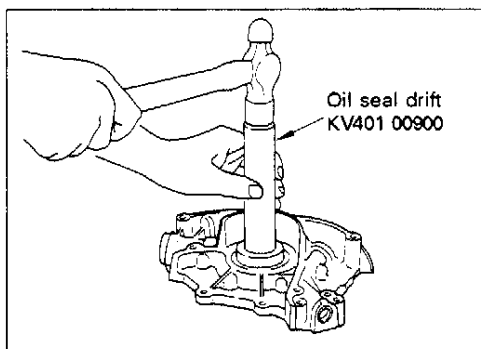


B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

12. Oil Pan, Oil Pump and Oil Strainer Removal and Installation (Cont'd)

Installation

- Be careful not to scratch or damage oil seal retainer. Use oil seal drift and insert it at same level as front surface of oil pump housing.
- Apply engine oil or chassis grease to area around oil seal lip.



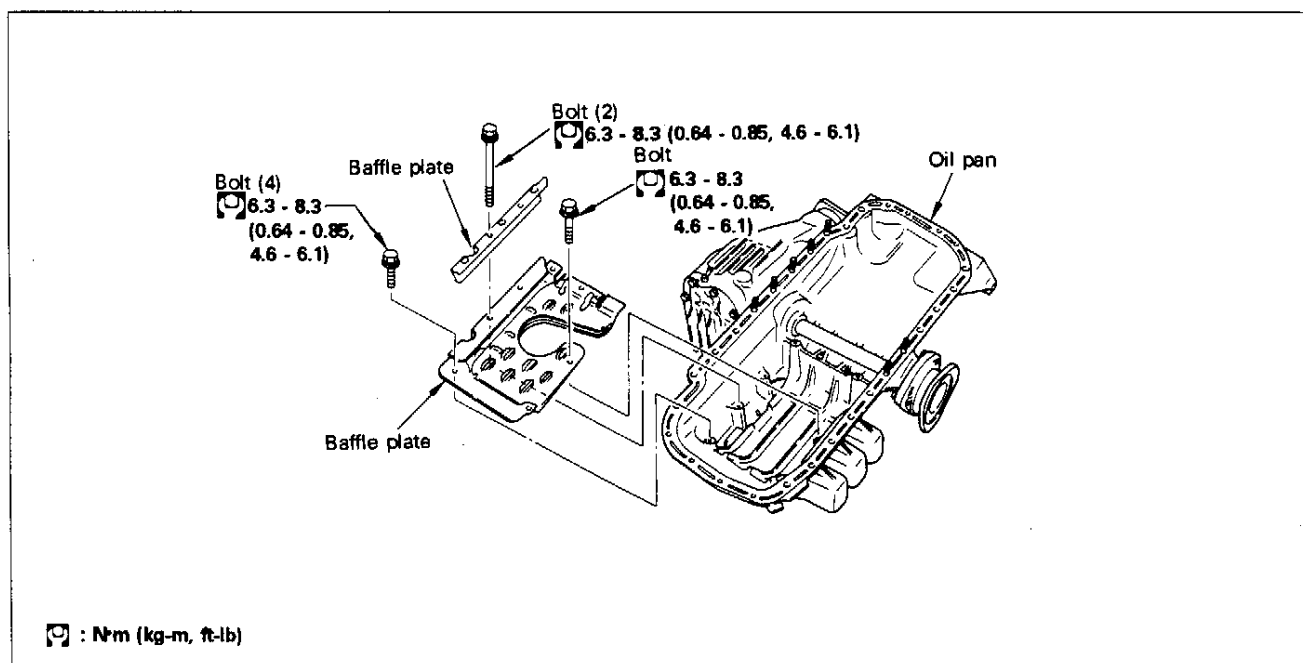
[Point 6] Oil leak and oil pressure check

- After installation, warm up engine and check for oil leaks and proper oil pressure.
- To perform oil pressure inspection, remove oil pressure switch and attach oil pressure gauge.

Engine speed	(rpm)	Idling	2,000	6,000
Delivery pressure kPa (kg/cm ² , psi)		Approx. 147 (1.5, 21)	Approx. 294 (3, 43)	Approx. 451 (4.6, 65)

Oil temperature at 80°C (176°F)

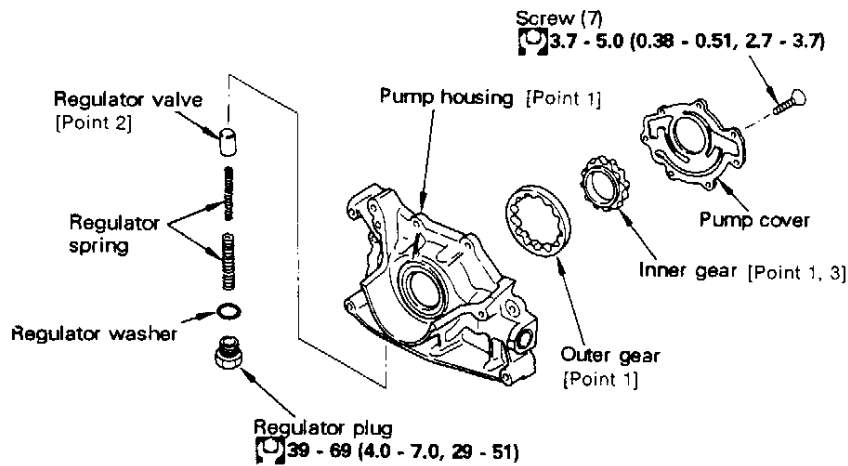
(2) OIL PAN DISASSEMBLY AND ASSEMBLY



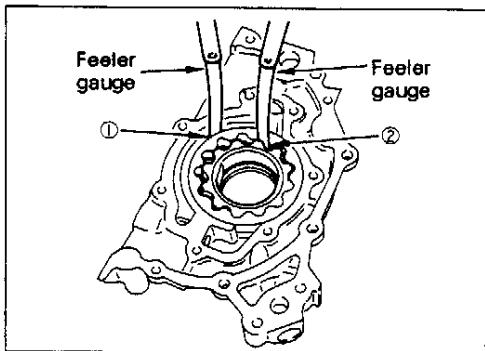
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

12. Oil Pan, Oil Pump and Oil Strainer Removal and Installation (Cont'd)

(3) OIL PUMP DISASSEMBLY AND ASSEMBLY



: Nm (kg-m, ft-lb)



[Point 1] Oil pump inspection

- Check inner gear, outer gear and housing for scratches and wear.
- Use a feeler gauge and measure the following clearances:

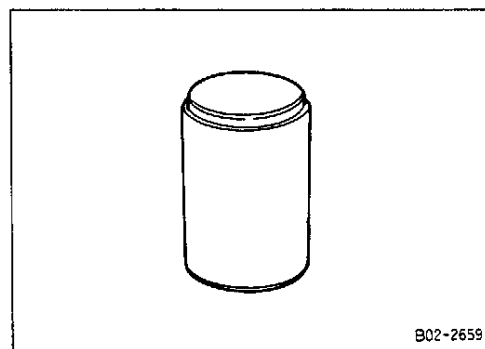
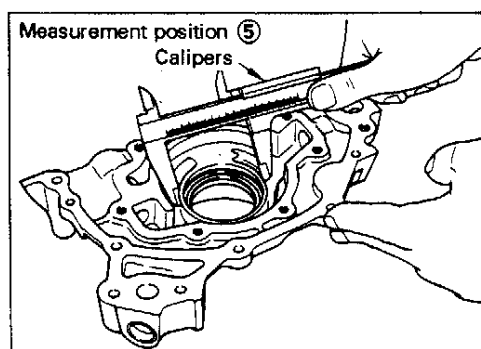
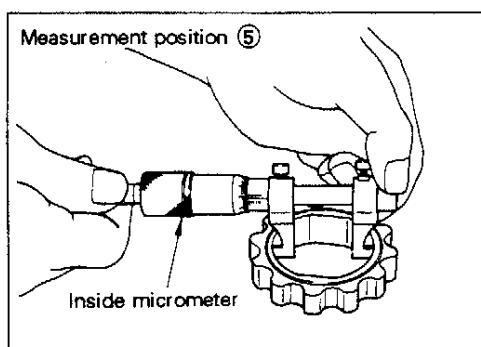
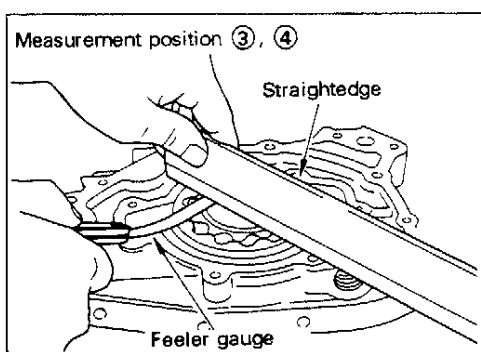
	Measurement position	Standard value	mm (in)
①	Outer gear and housing clearance	0.114 - 0.2	(0.0045 - 0.0079)
②	Outer gear and inner gear top clearance	0.180	(0.0071) max.
③	Inner gear and housing side clearance	0.05 - 0.07	(0.0020 - 0.0028)
④	Outer gear and housing side clearance	0.05 - 0.11	(0.0020 - 0.0043)
⑤	Inner gear and housing flange clearance	0.045 - 0.091	(0.0018 - 0.0036)

CAUTION:

Measurement position ⑤ is the figure obtained by subtracting the housing flange outside diameter from the inner gear inside diameter.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

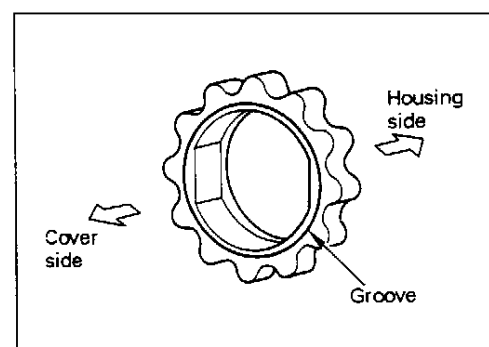
12. Oil Pan, Oil Pump and Oil Strainer Removal and Installation (Cont'd)



[Point 2] Regulator inspection

- Check oil pressure regulator valve sliding surface and spring for wear and damage.

Valve and valve hole clearance	0.04 - 0.097 mm (0.0016 - 0.0038 in)
--------------------------------	--------------------------------------



[Point 3] Inner gear installation

- Be careful because the inner gear has specific assembly direction.
- The side with the groove must face the cover side.

13. Engine Overhaul

This section describes the complete disassembly of the engine assembly removed from vehicle without transmission. It also explains the inspection, replacement of malfunctioning, damaged or worn parts, necessary adjustments and sequential assembly order to produce a standard engine condition.

13-1 OVERHAUL CAUTIONS

(1) Disassembly

- ① Use correct and suitable tools whenever possible, and do not try any unsafe or unreasonable procedures.
- ② Be careful with operations on mating surfaces and sliding surfaces to prevent loss of surface accuracy.
- ③ Make marks on disassembled parts for organized, thorough damage detection and precise assembly.
- ④ Loosen nuts and bolts in a diagonal direction from the outside, being careful to follow the numerical order when indicated.

(2) Inspection, repair and replacement

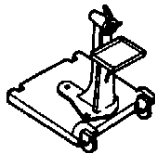
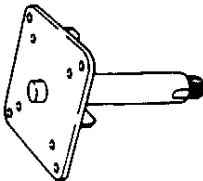
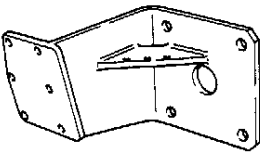
- ① Repair or replace after completing parts inspection following the inspection procedures. Perform the same inspection for the new parts and replace parts as necessary.

(3) Assembly

- ① Always use a torque wrench to tighten nuts and bolts to the specified torque.
- ② Tighten nuts and bolts from the center to the outside diagonal direction, gradually in two or three successive stages. Follow the numerical order when indicated.
- ③ Gaskets, packing, oil seals and O-rings should be replaced with new ones in principle.
- ④ Each part should be cleaned thoroughly and blown off with compressed air. In particular, check that oil and water passages are not clogged or obstructed.
- ⑤ Be careful not to scratch or damage sliding or mating surfaces. Clean off all dust, debris or foreign matter. Lubricate all sliding surfaces with an adequate coating of oil.

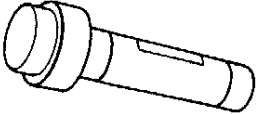
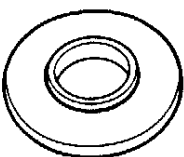



13-2 CYLINDER BLOCK ASSY ASSEMBLY AND DISASSEMBLY

Tools required

	Name		Application
Special tools	Engine stand ASSY ST0501 S000		Engine main unit overhaul
	Engine attachment KV101 06500		
	Engine sub-attachment KV101 14500		

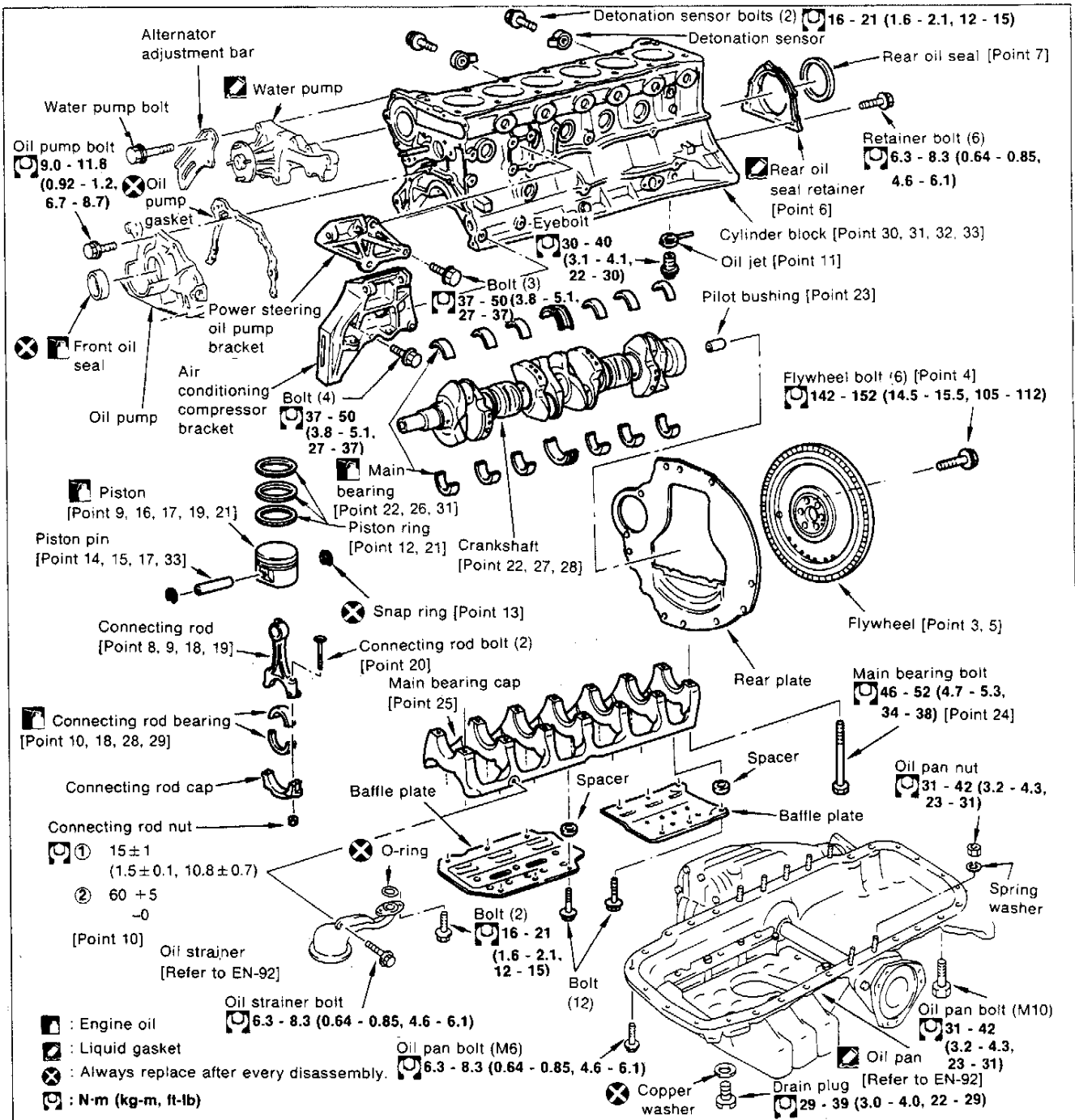
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

	Name		Application
Special tools	Rear axle bearing drift KV401 00900		Rear oil seal installation
	Rear oil seal drift ST3002 2000		
	Pilot bearing puller ST1661 0001		Pilot bushing removal
Tools	Piston ring compressor		Piston ASSY installation
	Piston ring expander		Piston ring removal and installation
Measurement tools	Dial gauge		Crankshaft, etc. inspection
	Magnetic stand		Crankshaft, etc. inspection
	Inside micrometer		Connecting rod, etc. inspection
	Plastigage		Oil clearance inspection
	Micrometer		Piston, etc. inspection
	Connecting rod aligner		Connecting rod inspection
	Bore gauge		Cylinder block, etc. inspection
	V-block		Crankshaft, etc. inspection
	Straightedge		Cylinder block, etc. inspection
Service settings	Engine slinger	  Front Rear	Engine removal and installation

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)



Additional work required:

- Drain and refill: cooling water [Point 1]
- Remove and install:
 - Engine
 - Collector
 - Throttle chamber
 - Intake manifold
 - Turbocharger, exhaust manifold
 - Timing belt
 - Cylinder head ASSY
 - Alternator
 - Starter motor
 - Clutch cover, clutch disc
 - Oil pan, oil strainer

- Water pump
- Oil pump
- Oil cooler, oil strainer
- All harnesses and connectors

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

Reference: Engine selection assembly

Part	Grade Indication	Selection Combination																																																																																										
Piston	<div></div>	<div>① Piston selection</div> <div>Unit: mm (in)</div> <table><tr><th>(Stamp)</th><th>1</th><th>2</th><th>3</th></tr><tr><td>Grade No.</td><td>86 010 (3.3862) Max. Greater than 86 000 (3.3858)</td><td>86 020 (3.3866) Max. Greater than 86 010 (3.3862)</td><td>86 030 (3.3870) Max. Greater than 86 020 (3.3866)</td></tr><tr><td>Cylinder block bore diameter</td><td>85.965 (3.3844) Max. Greater than 85.955 (3.3840)</td><td>85.975 (3.3848) Max. Greater than 85.965 (3.3844)</td><td>85.985 (3.3852) Max. Greater than 85.975 (3.3848)</td></tr><tr><td>Piston diameter</td><td></td><td></td><td></td></tr><tr><td>Piston clearance</td><td colspan="3">0.035 - 0.055 (0.0014 - 0.0022)</td></tr></table> <div>Service setting part Piston and piston pin STD 1, STD 2, STD 3, 0.50S, 1.00S</div>	(Stamp)	1	2	3	Grade No.	86 010 (3.3862) Max. Greater than 86 000 (3.3858)	86 020 (3.3866) Max. Greater than 86 010 (3.3862)	86 030 (3.3870) Max. Greater than 86 020 (3.3866)	Cylinder block bore diameter	85.965 (3.3844) Max. Greater than 85.955 (3.3840)	85.975 (3.3848) Max. Greater than 85.965 (3.3844)	85.985 (3.3852) Max. Greater than 85.975 (3.3848)	Piston diameter				Piston clearance	0.035 - 0.055 (0.0014 - 0.0022)																																																																								
(Stamp)	1	2	3																																																																																									
Grade No.	86 010 (3.3862) Max. Greater than 86 000 (3.3858)	86 020 (3.3866) Max. Greater than 86 010 (3.3862)	86 030 (3.3870) Max. Greater than 86 020 (3.3866)																																																																																									
Cylinder block bore diameter	85.965 (3.3844) Max. Greater than 85.955 (3.3840)	85.975 (3.3848) Max. Greater than 85.965 (3.3844)	85.985 (3.3852) Max. Greater than 85.975 (3.3848)																																																																																									
Piston diameter																																																																																												
Piston clearance	0.035 - 0.055 (0.0014 - 0.0022)																																																																																											
Main bearing	<div></div>	<div>② Main bearing selection</div> <div>Unit: mm (in)</div> <table><tr><th>Cylinder block bearing housing inner diameter</th><th>58.651 (2.3091) Max. Greater than 58.645 (2.3089)</th><th>58.657 (2.3093) Max. Greater than 58.651 (2.3091)</th><th>58.663 (2.3096) Max. Greater than 58.657 (2.3093)</th><th>58.670 (2.3098) Max. Greater than 58.663 (2.3096)</th></tr><tr><th>Crankshaft journal diameter</th><th>0</th><th>1</th><th>2</th><th>3</th></tr><tr><td>Bearing grade No.</td><td>STD 0</td><td>STD 1</td><td>STD 2</td><td>STD 3</td></tr><tr><td>Bearing thickness</td><td>1.818 - 1.821 (0.0716 - 0.0717)</td><td>1.821 - 1.824 (0.0717 - 0.0718)</td><td>1.824 - 1.827 (0.0718 - 0.0719)</td><td>1.827 - 1.830 (0.0719 - 0.0720)</td></tr><tr><td>Oil clearance</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.047 (0.0011/0.0019)</td></tr><tr><td>Identification color</td><td>Black</td><td>Brown</td><td>None</td><td>Yellow</td></tr><tr><td>Bearing grade No.</td><td>STD 1</td><td>STD 2</td><td>STD 3</td><td>STD 4</td></tr><tr><td>Bearing thickness</td><td>1.821 - 1.824 (0.0717 - 0.0718)</td><td>1.824 - 1.827 (0.0718 - 0.0719)</td><td>1.827 - 1.830 (0.0719 - 0.0720)</td><td>1.830 - 1.833 (0.0720 - 0.0722)</td></tr><tr><td>Oil clearance</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.047 (0.0011/0.0019)</td></tr><tr><td>Identification color</td><td>Brown</td><td>None</td><td>Yellow</td><td>Blue</td></tr><tr><td>Bearing grade No.</td><td>STD 2</td><td>STD 3</td><td>STD 4</td><td>STD 5</td></tr><tr><td>Bearing thickness</td><td>1.824 - 1.827 (0.0718 - 0.0719)</td><td>1.827 - 1.830 (0.0719 - 0.0720)</td><td>1.830 - 1.833 (0.0720 - 0.0722)</td><td>1.833 - 1.836 (0.0722 - 0.0723)</td></tr><tr><td>Oil clearance</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.047 (0.0011/0.0019)</td></tr><tr><td>Identification color</td><td>None</td><td>Yellow</td><td>Blue</td><td>Green</td></tr><tr><td>Bearing grade No.</td><td>STD 3</td><td>STD 4</td><td>STD 5</td><td>STD 6</td></tr><tr><td>Bearing thickness</td><td>1.827 - 1.830 (0.0719 - 0.0720)</td><td>1.830 - 1.833 (0.0720 - 0.0722)</td><td>1.833 - 1.836 (0.0722 - 0.0723)</td><td>1.836 - 1.839 (0.0723 - 0.0724)</td></tr><tr><td>Oil clearance</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.046 (0.0011/0.0018)</td><td>0.028/0.047 (0.0011/0.0019)</td></tr><tr><td>Identification color</td><td>Yellow</td><td>Blue</td><td>Green</td><td>Pink</td></tr></table> <div>Service setting parts: STD 0 - 6, US 0.25 mm (0.0098 in)</div>	Cylinder block bearing housing inner diameter	58.651 (2.3091) Max. Greater than 58.645 (2.3089)	58.657 (2.3093) Max. Greater than 58.651 (2.3091)	58.663 (2.3096) Max. Greater than 58.657 (2.3093)	58.670 (2.3098) Max. Greater than 58.663 (2.3096)	Crankshaft journal diameter	0	1	2	3	Bearing grade No.	STD 0	STD 1	STD 2	STD 3	Bearing thickness	1.818 - 1.821 (0.0716 - 0.0717)	1.821 - 1.824 (0.0717 - 0.0718)	1.824 - 1.827 (0.0718 - 0.0719)	1.827 - 1.830 (0.0719 - 0.0720)	Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)	Identification color	Black	Brown	None	Yellow	Bearing grade No.	STD 1	STD 2	STD 3	STD 4	Bearing thickness	1.821 - 1.824 (0.0717 - 0.0718)	1.824 - 1.827 (0.0718 - 0.0719)	1.827 - 1.830 (0.0719 - 0.0720)	1.830 - 1.833 (0.0720 - 0.0722)	Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)	Identification color	Brown	None	Yellow	Blue	Bearing grade No.	STD 2	STD 3	STD 4	STD 5	Bearing thickness	1.824 - 1.827 (0.0718 - 0.0719)	1.827 - 1.830 (0.0719 - 0.0720)	1.830 - 1.833 (0.0720 - 0.0722)	1.833 - 1.836 (0.0722 - 0.0723)	Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)	Identification color	None	Yellow	Blue	Green	Bearing grade No.	STD 3	STD 4	STD 5	STD 6	Bearing thickness	1.827 - 1.830 (0.0719 - 0.0720)	1.830 - 1.833 (0.0720 - 0.0722)	1.833 - 1.836 (0.0722 - 0.0723)	1.836 - 1.839 (0.0723 - 0.0724)	Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)	Identification color	Yellow	Blue	Green	Pink
Cylinder block bearing housing inner diameter	58.651 (2.3091) Max. Greater than 58.645 (2.3089)	58.657 (2.3093) Max. Greater than 58.651 (2.3091)	58.663 (2.3096) Max. Greater than 58.657 (2.3093)	58.670 (2.3098) Max. Greater than 58.663 (2.3096)																																																																																								
Crankshaft journal diameter	0	1	2	3																																																																																								
Bearing grade No.	STD 0	STD 1	STD 2	STD 3																																																																																								
Bearing thickness	1.818 - 1.821 (0.0716 - 0.0717)	1.821 - 1.824 (0.0717 - 0.0718)	1.824 - 1.827 (0.0718 - 0.0719)	1.827 - 1.830 (0.0719 - 0.0720)																																																																																								
Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)																																																																																								
Identification color	Black	Brown	None	Yellow																																																																																								
Bearing grade No.	STD 1	STD 2	STD 3	STD 4																																																																																								
Bearing thickness	1.821 - 1.824 (0.0717 - 0.0718)	1.824 - 1.827 (0.0718 - 0.0719)	1.827 - 1.830 (0.0719 - 0.0720)	1.830 - 1.833 (0.0720 - 0.0722)																																																																																								
Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)																																																																																								
Identification color	Brown	None	Yellow	Blue																																																																																								
Bearing grade No.	STD 2	STD 3	STD 4	STD 5																																																																																								
Bearing thickness	1.824 - 1.827 (0.0718 - 0.0719)	1.827 - 1.830 (0.0719 - 0.0720)	1.830 - 1.833 (0.0720 - 0.0722)	1.833 - 1.836 (0.0722 - 0.0723)																																																																																								
Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)																																																																																								
Identification color	None	Yellow	Blue	Green																																																																																								
Bearing grade No.	STD 3	STD 4	STD 5	STD 6																																																																																								
Bearing thickness	1.827 - 1.830 (0.0719 - 0.0720)	1.830 - 1.833 (0.0720 - 0.0722)	1.833 - 1.836 (0.0722 - 0.0723)	1.836 - 1.839 (0.0723 - 0.0724)																																																																																								
Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)																																																																																								
Identification color	Yellow	Blue	Green	Pink																																																																																								
Piston pin	<div></div>	<div>③ Piston pin selection</div> <div>Unit: mm (in)</div> <table><tr><th>(Stamp)</th><th>1</th><th>2</th></tr><tr><td>Grade No.</td><td>21.006 - 21.000 (0.8270 - 0.8268)</td><td>21.012 - 21.006 (0.8272 - 0.8270)</td></tr><tr><td>Piston pin hole diameter</td><td></td><td></td></tr><tr><td>Piston pin external diameter</td><td>20.995 - 20.999 (0.8266 - 0.8263)</td><td>21.001 - 20.995 (0.8268 - 0.8266)</td></tr><tr><td>Piston pin clearance</td><td colspan="2">0.005 - 0.017 (0.0002 - 0.0007)</td></tr></table> <div>Service setting Piston and piston pin STD 1, STD 2, STD 3, 0.50S, 1.00S</div>	(Stamp)	1	2	Grade No.	21.006 - 21.000 (0.8270 - 0.8268)	21.012 - 21.006 (0.8272 - 0.8270)	Piston pin hole diameter			Piston pin external diameter	20.995 - 20.999 (0.8266 - 0.8263)	21.001 - 20.995 (0.8268 - 0.8266)	Piston pin clearance	0.005 - 0.017 (0.0002 - 0.0007)																																																																												
(Stamp)	1	2																																																																																										
Grade No.	21.006 - 21.000 (0.8270 - 0.8268)	21.012 - 21.006 (0.8272 - 0.8270)																																																																																										
Piston pin hole diameter																																																																																												
Piston pin external diameter	20.995 - 20.999 (0.8266 - 0.8263)	21.001 - 20.995 (0.8268 - 0.8266)																																																																																										
Piston pin clearance	0.005 - 0.017 (0.0002 - 0.0007)																																																																																											
Connecting rod bearing	<div></div>	<div>④ Connecting rod bearing selection</div> <div>Unit: mm (in)</div> <table><tr><th>Connecting rod large end, inside diameter</th><th>Less than 51.007 (2.0081) 51.000 (2.0079) Min.</th><th>51.013 (2.0084) Max. 51.007 (2.0081) Max.</th></tr><tr><th>Crank pin diameter</th><th>0</th><th>1</th></tr><tr><td>Bearing grade No.: STD 0</td><td></td><td></td></tr><tr><td>Bearing thickness: 1.500 - 1.503 (0.0591 - 0.0592)</td><td></td><td>STD 1 1.503 - 1.506 (0.0592 - 0.0593)</td></tr><tr><td>Oil clearance: 0.020/0.039 (0.0008/0.0015)</td><td></td><td>0.021/0.039 (0.0008/0.0015)</td></tr><tr><td>Identification color: None</td><td></td><td>Brown</td></tr><tr><td>Bearing grade No.: STD 1</td><td></td><td></td></tr><tr><td>Bearing thickness: 1.503 - 1.506 (0.0592 - 0.0593)</td><td></td><td>STD 2 1.506 - 1.509 (0.0593 - 0.0594)</td></tr><tr><td>Oil clearance: 0.020/0.040 (0.0008/0.0016)</td><td></td><td>0.021/0.040 (0.0008/0.0016)</td></tr><tr><td>Identification color: Brown</td><td></td><td>Green</td></tr></table> <div>Service setting parts US 0.08 mm (0.0031 in), US 0.12 mm (0.0047 in), US 0.25 mm (0.0098 in)</div>	Connecting rod large end, inside diameter	Less than 51.007 (2.0081) 51.000 (2.0079) Min.	51.013 (2.0084) Max. 51.007 (2.0081) Max.	Crank pin diameter	0	1	Bearing grade No.: STD 0			Bearing thickness: 1.500 - 1.503 (0.0591 - 0.0592)		STD 1 1.503 - 1.506 (0.0592 - 0.0593)	Oil clearance: 0.020/0.039 (0.0008/0.0015)		0.021/0.039 (0.0008/0.0015)	Identification color: None		Brown	Bearing grade No.: STD 1			Bearing thickness: 1.503 - 1.506 (0.0592 - 0.0593)		STD 2 1.506 - 1.509 (0.0593 - 0.0594)	Oil clearance: 0.020/0.040 (0.0008/0.0016)		0.021/0.040 (0.0008/0.0016)	Identification color: Brown		Green																																																												
Connecting rod large end, inside diameter	Less than 51.007 (2.0081) 51.000 (2.0079) Min.	51.013 (2.0084) Max. 51.007 (2.0081) Max.																																																																																										
Crank pin diameter	0	1																																																																																										
Bearing grade No.: STD 0																																																																																												
Bearing thickness: 1.500 - 1.503 (0.0591 - 0.0592)		STD 1 1.503 - 1.506 (0.0592 - 0.0593)																																																																																										
Oil clearance: 0.020/0.039 (0.0008/0.0015)		0.021/0.039 (0.0008/0.0015)																																																																																										
Identification color: None		Brown																																																																																										
Bearing grade No.: STD 1																																																																																												
Bearing thickness: 1.503 - 1.506 (0.0592 - 0.0593)		STD 2 1.506 - 1.509 (0.0593 - 0.0594)																																																																																										
Oil clearance: 0.020/0.040 (0.0008/0.0016)		0.021/0.040 (0.0008/0.0016)																																																																																										
Identification color: Brown		Green																																																																																										

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

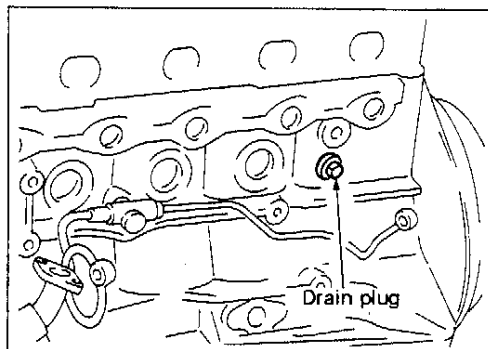
[Point 1] Cooling water, drain and refill

Draining

- Drain the water in the cylinder block completely from the drain plug.

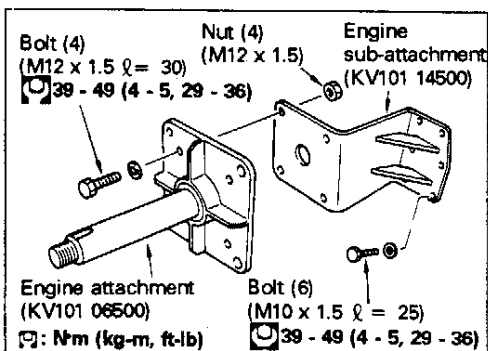
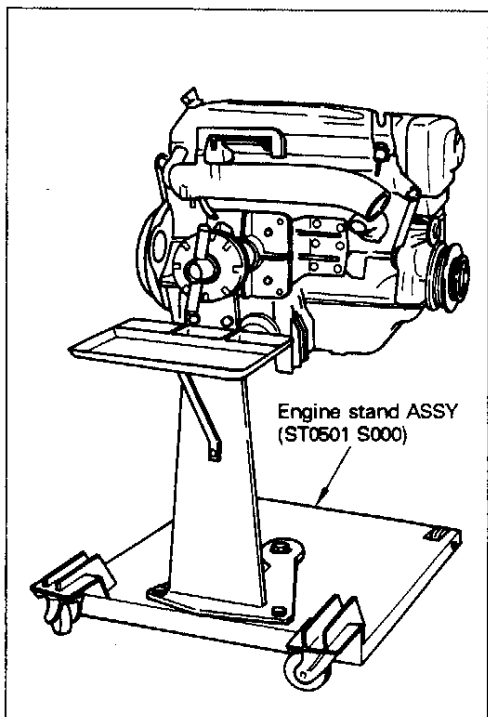
Refilling

- Refer to Cooling Water Filling Method (B6) for details.



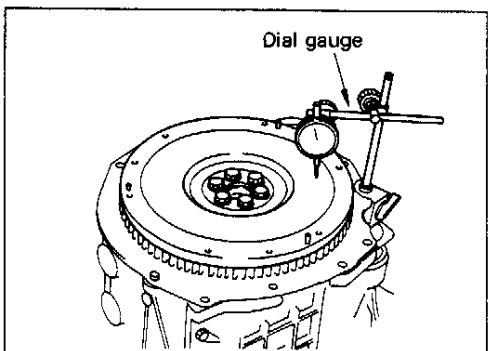
[Point 2] Engine stand installation and removal

- The engine sub-attachment is attached by 6 bolts to engine mounting bracket on right side of engine.



[Point 3] Flywheel runout

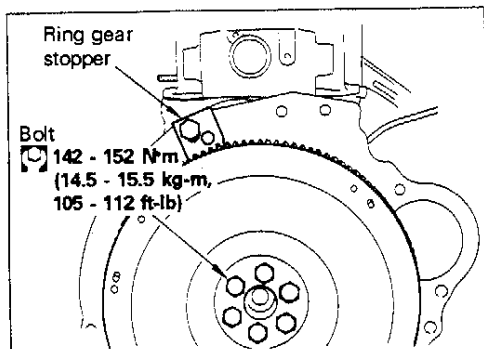
- Set dial gauge to flywheel where it contacts clutch.
- Turn the flywheel and measure the runout.



Runout (total indicator reading)	0.10 mm (0.0039 in)
----------------------------------	---------------------

13. Engine Overhaul (Cont'd)

[Point 4] Flywheel removal and installation



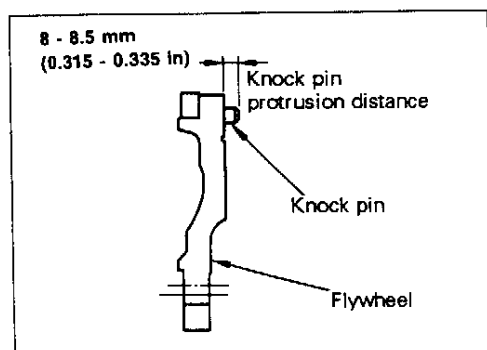
Removal

- Use ring gear stopper to secure flywheel and remove.

Installation

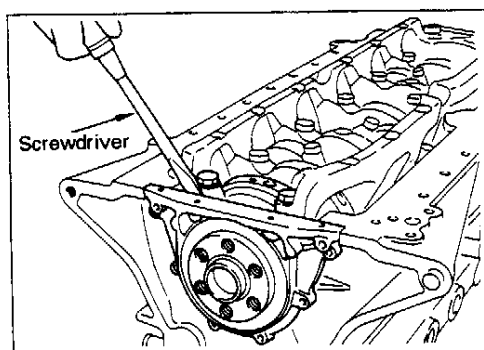
- Before installing bolts, coat the thread and flange of bolt with engine oil.
- After tightening the flywheel installation bolts halfway, use the ring gear stopper to secure flywheel and tighten bolts.

Flywheel bolt tightening torque	142 - 152 N·m (14.5 - 15.5 kg-m, 105 - 112 ft-lb)
---------------------------------	--



[Point 5] Flywheel knock pin insertion

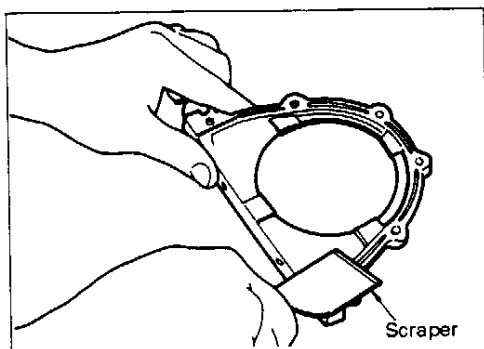
- Insert the flywheel knock pin so pin protrudes 8 to 8.5 mm (0.315 to 0.335 in).



[Point 6] Rear oil seal retainer removal and installation

Removal

- Insert a screwdriver in the gap between main bearing cap and rear oil seal retainer to remove seal.



Cleaning

- Use a scraper to remove liquid gasket.

CAUTION:

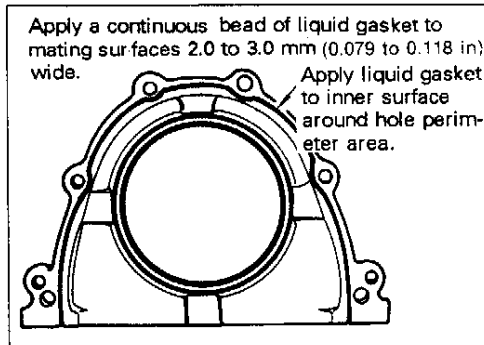
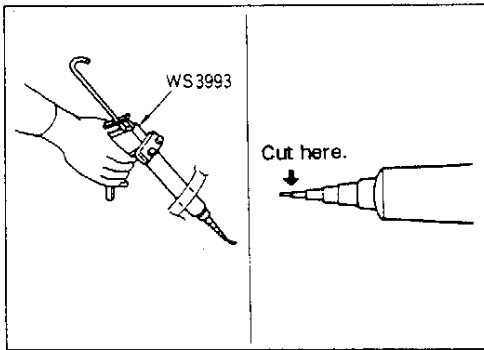
Also remove liquid gasket in grooves.

- Clean the cylinder block side in the same way.
- Clean mating surface with white gasoline or equivalent.

13. Engine Overhaul (Cont'd)

Installation

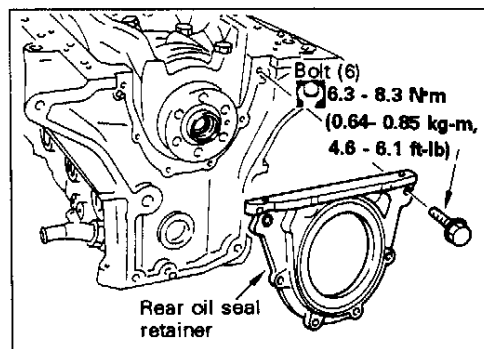
- Apply liquid gasket to mating surface and install unit within 5 minutes after coating.
- Cut nozzle end of liquid gasket (KP510 00150) tube as shown in figure and use tube presser for application.



- Apply liquid gasket continuously to rear oil seal retainer as shown in the figure on left.

CAUTION:

- (1) Be sure liquid gasket is 2.0 to 3.0 mm (0.079 to 0.118 in) wide.
- (2) Refill engine oil and start engine 30 minutes after assembly is completed.



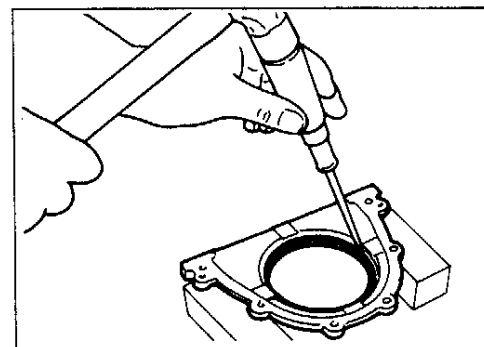
- Align rear oil seal retainer with dowel pins.
- Tighten the 6 bolts uniformly.

Rear oil seal retainer bolt tightening torque	6.3 - 8.3 N·m (0.64 - 0.85 kg-m, 4.6 - 6.1 ft-lb)
---	--

[Point 7] Rear oil seal removal and installation

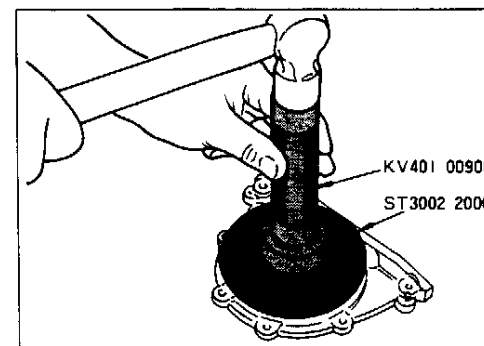
Removal

- Use a screwdriver or suitable tool to remove the seal.



Installation

- Be careful not to scratch or damage the oil seal perimeter area. Use an oil seal drift [outside diameter: 100 mm (3.94 in)] to install new oil seal.
- Apply a coat of engine oil or chassis grease to oil seal lip perimeter area.



B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

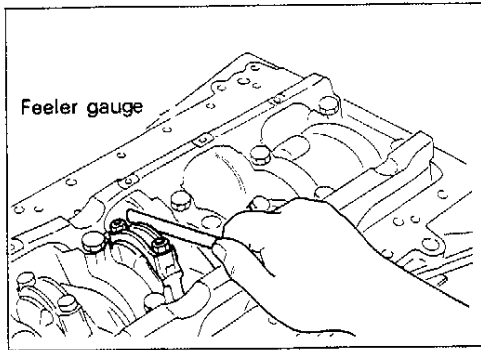
13. Engine Overhaul (Cont'd)

[Point 8] Connecting rod side clearance inspection

- Use a feeler gauge to measure the thrust clearance between the connecting rod and crank arm.

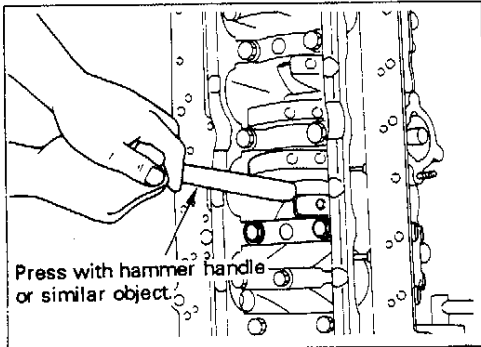
Unit: mm (in)

Standard	0.2 - 0.3 (0.008 - 0.012)
Limit	0.4 (0.016)



[Point 9] Piston and connecting rod ASSY removal and installation

- Use a hammer handle or similar tool to press unit to cylinder head side.

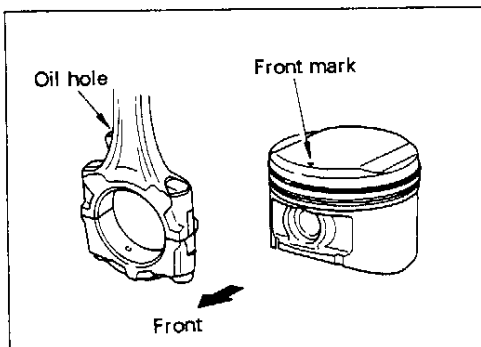
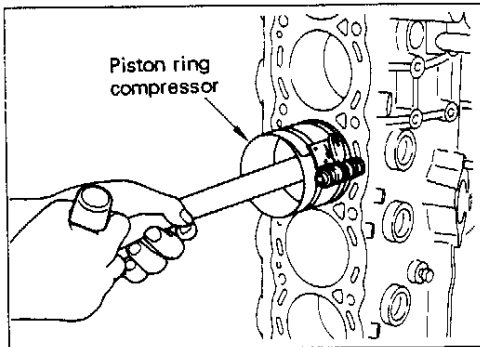


Installation

- Set crank pin at B.D.C. (bottom dead center) position.
- Coat cylinder bore, crank pin and piston with engine oil.
- Assemble piston with front mark on piston head facing the front of engine.
- Use a piston ring compressor to install piston and connecting rod assembly in cylinder block.

CAUTION:

Be careful not to strike or deform oil jet pipe with large end of connecting rod.



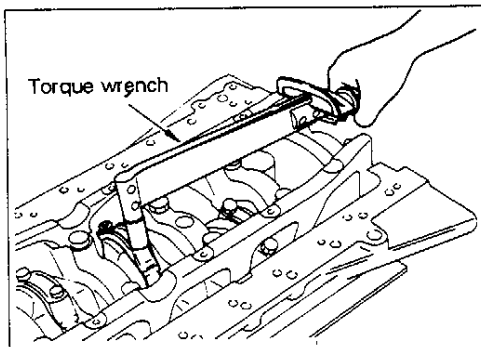
[Point 10] Connecting rod nut tightening

- Apply engine oil to connecting rods and nuts before assembly.
- Tighten nuts in two or three stages.

1st time	Torque wrench	14 - 16 N·m (1.4 - 1.6 kg-m, 10 - 12 ft-lb)
2nd time	Angle wrench (°)	60 - 65

CAUTION:

Do not use visual angle measurement for tightening torque if an angle wrench is not available.

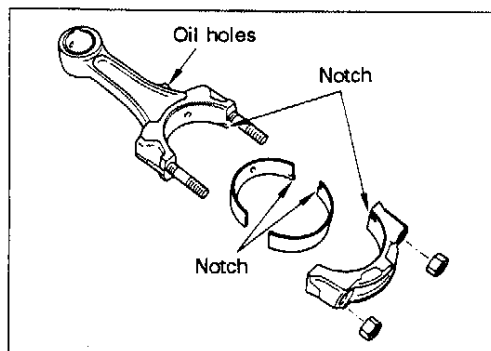


B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

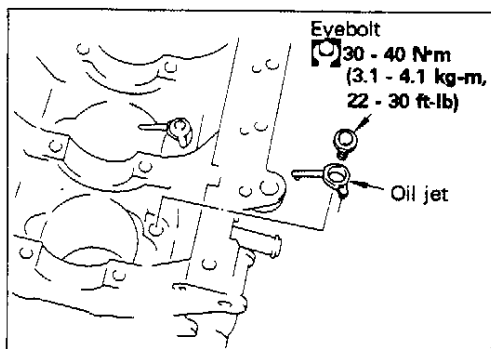
[Point 10] Connecting rod bearing installation

- Apply engine oil to bearing surfaces when assembling connecting rods and bearings. Do not apply engine oil to rear side of bearing, only clean this area.
- Align connecting rod bearing retainer notches and install.
- Align connecting rod oil holes and bearing oil holes.



[Point 11] Oil jet installation

- Set oil jet position securely and check that it does not interfere with piston.
- If oil jet pipe contacts piston or is bent, replace it with new part.



Oil jet tightening torque

30 - 40 N·m
(3.1 - 4.1 kg-m, 22 - 30 ft-lb)

[Point 12] Piston ring removal and installation

Removal

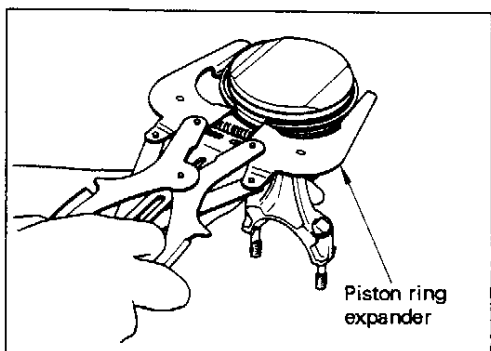
- Use piston ring expander to remove rings.

CAUTION:

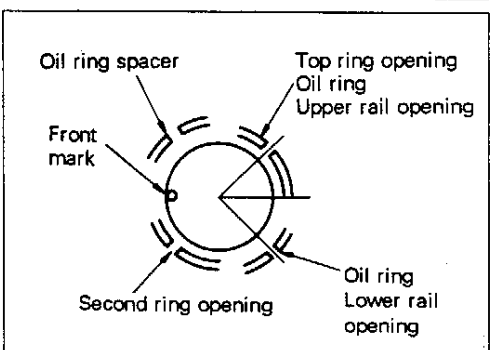
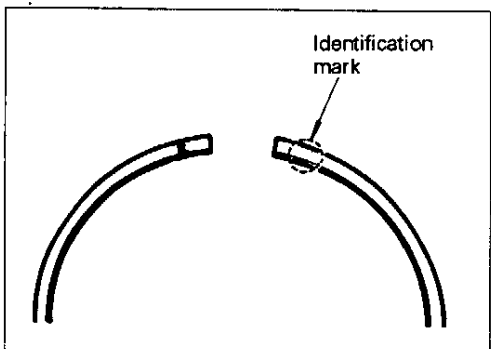
Be careful not to scratch piston.

Installation

- Use piston ring expander to install piston rings in correct position.



- The stamped marks on top and second piston ring openings must face up.



Position piston ring openings as shown in the figure on left and install.

CAUTION:

Be careful not to scratch piston.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

[Point 13] Snap ring removal and installation

Removal

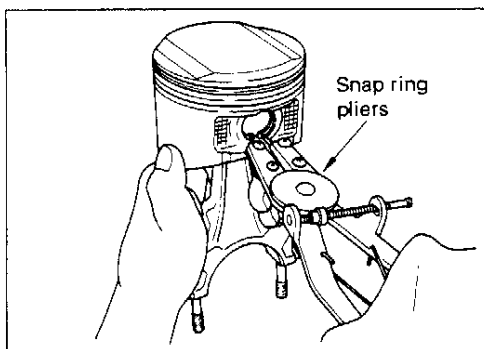
- Use snap ring pliers to remove rings.

Installation

- Use snap ring pliers and install ring securely in groove.

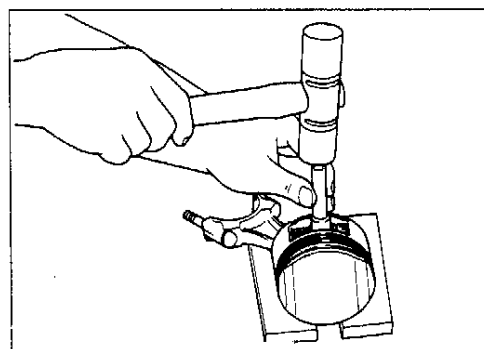
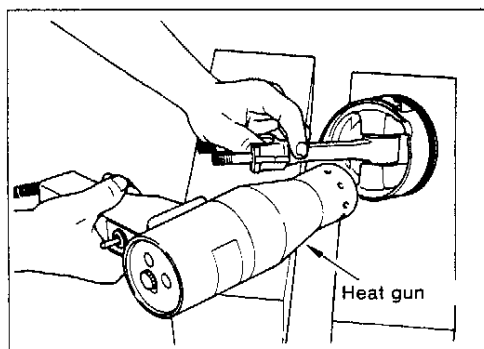
CAUTION:

Do not reuse snap rings.



[Point 14] Piston pin removal and installation

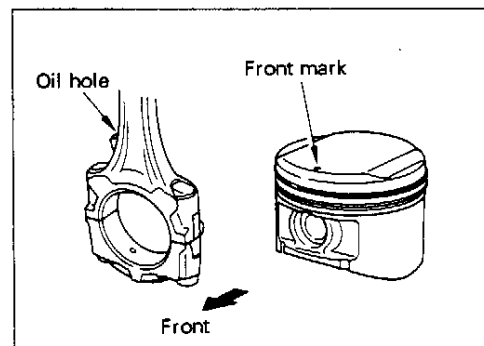
- When removing and installing piston pin, use a heat gun to heat piston to 60 to 70°C (140 to 158°F).



- Place suitable tool against piston pin and use press or plastic hammer.

Piston pin press-fit

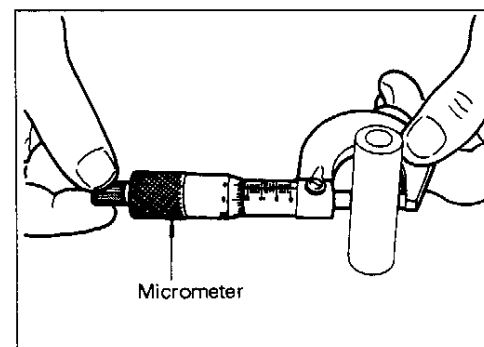
- Apply a liberal amount of oil to pin, pin hole, and connecting rod small hole.



- Position piston front mark so the connecting rod oil hole faces right side of engine (left side when viewed from front) and press-fit.

CAUTION:

Press-fit piston pin from the front of piston to the rear side of piston.



[Point 15] Piston pin inspection

- Measure outside diameter of piston pin with micrometer.

Standard	20.989 - 21.001 mm (0.8263 - 0.8268 in)
----------	--

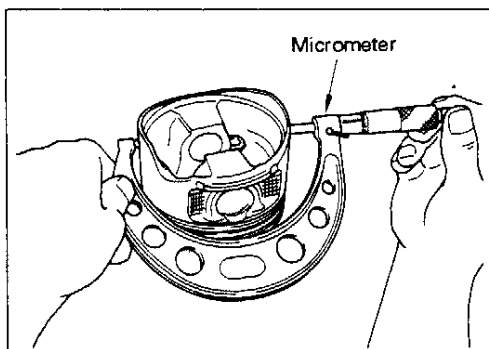
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

[Point 16] Piston inspection

- Measure outside piston skirt diameter with micrometer.

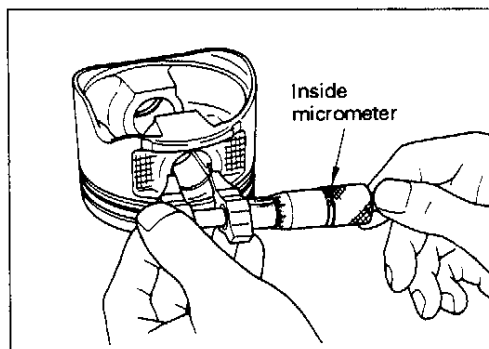
Measuring point	Distance from bottom: 13 mm (0.51 in)
Standard	85.955 - 85.985 mm (3.3840 - 3.3852 in)



- Measure inside diameter of piston pin hole with inside micrometer.

Standard	20.987 - 20.999 mm (0.8263 - 0.8267 in)
----------	---

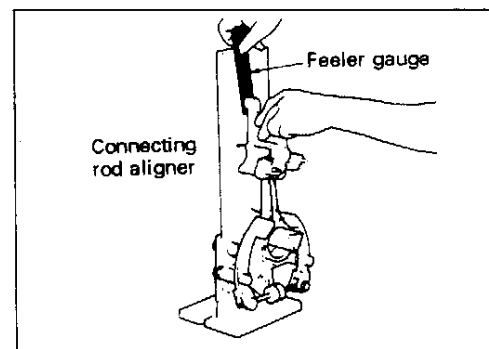
- Five types of pistons are available for service (STD1, STD2, STD3, 0.50S, 1.00S).



[Point 17] Piston pin clearance inspection

- Piston pin clearance is the figure obtained by subtracting the piston pin outside diameter [Point 15] from the piston pin hole inside diameter [Point 16].

Piston pin clearance at normal temperature [20°C (68°F)]	0 to -0.004 (0 to -0.0002 in)
--	-------------------------------

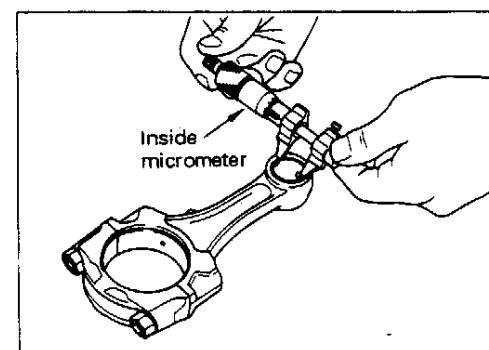


[Point 18] Connecting rod inspection

Bend and torsion inspection

- Measure the bend and torsion with connecting rod aligner.

Bend limit	0.15 mm (0.0059 in)
Torsion limit	0.3 mm (0.012 in)



Small end inside diameter inspection

- Using an inside micrometer, measure inside diameter of connecting rod small end.

Standard	21.000 - 21.012 mm (0.8268 - 0.8272 in)
----------	---

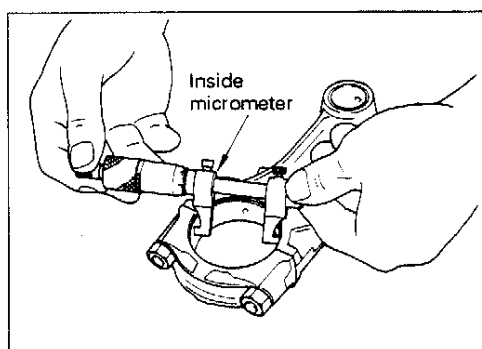
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

Connecting rod bearing inside diameter inspection

- Install connecting rod bearing in connecting rod and cap. Tighten connecting rod nuts to specified torque and measure connecting rod bearing inside diameter.

Connecting rod nut tightening torque	1st time	Torque wrench	14 - 16 N·m (1.4 - 1.6 kg-m, 10 - 12 ft-lb)
	2nd time	Angle wrench	60° - 65°
Standard value	47.989 - 48.007 mm (1.8893 - 1.8900 in)		

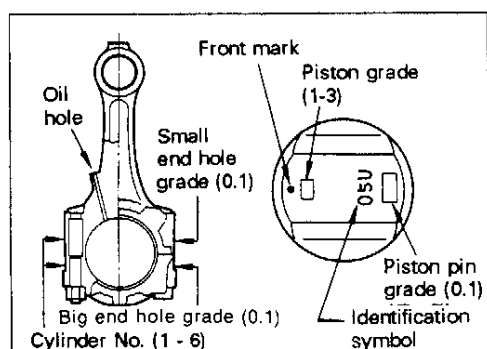


[Point 19] Connecting rod small end bushing clearance

- The measurement difference of the small end inside diameter [Point 18] and outside diameter of piston pin [Point 15] is the bushing clearance. (Full float type)

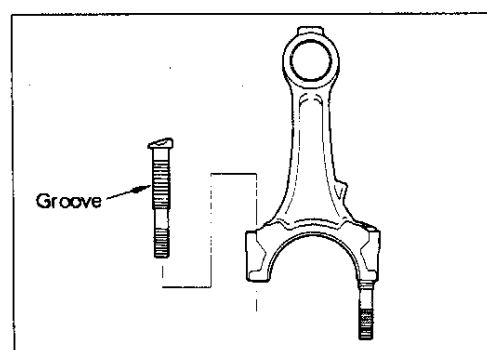
Bushing clearance standard	0.005 - 0.017 mm (0.0002 - 0.0007 in)
----------------------------	---------------------------------------

- The connecting rod small end and piston pin outside diameter are separated into two grades at the factory. Check that the grades (0.1) conform for both parts because the rod and pin are selected and fitted according to bushing clearance.



[Point 20] Connecting rod cap bolts

- Connecting rod cap bolts have grooves to prevent them from disengaging.
- For this reason, do not tap the ends to remove bolts.

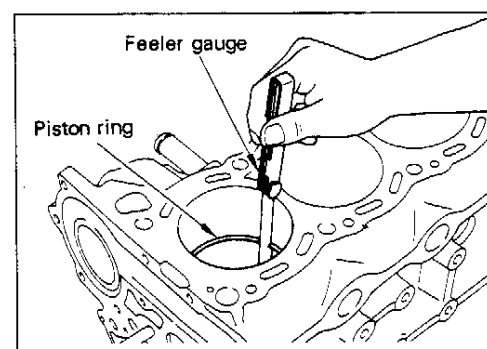


[Point 21] Piston ring end gap and side clearance

Ring end gap inspection

- Using a piston, press the piston ring into the middle of the cylinder, and measure the gap.

Part	Top ring	2nd ring	Oil ring
Item			
Standard mm (in)	Bore grade 1, 2, 3: 0.24 - 0.34 (0.0094 - 0.0134)	0.42 - 0.57 (0.0165 - 0.0224)	0.20 - 0.60 (0.0079 - 0.0236)

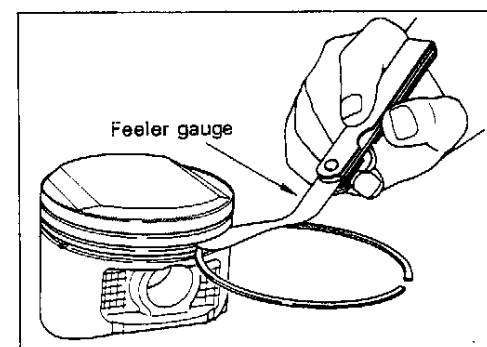


Side clearance inspection

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

Part	Top ring	2nd ring	Oil ring
Item			
Standard mm (in)	0.040 - 0.075 (0.0016 - 0.0030)	0.030 - 0.065 (0.0012 - 0.0026)	0.065 - 0.135 (0.0026 - 0.0053)

- Three types of piston rings (STD, 0.50S, 1.00S) are available for service.



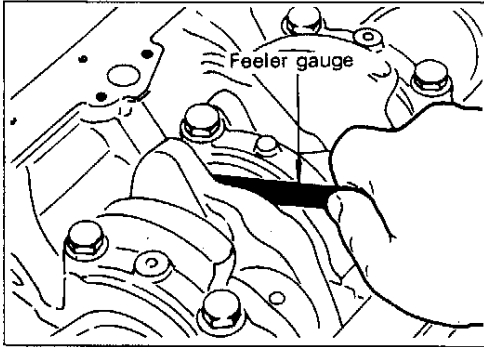
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

[Point 22] Crankshaft thrust clearance inspection

- Use a feeler gauge to measure the clearance between the thrust bearing (No. 4 bearing) and the crank arm when moving the crankshaft toward front and rear of engine.

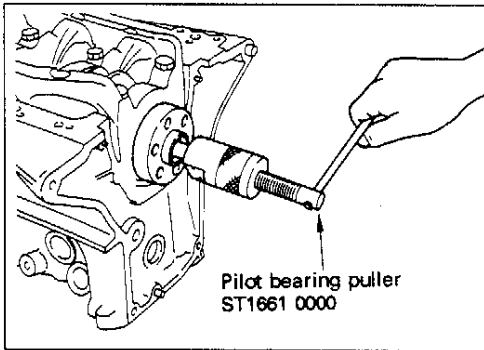
Standard	0.05 - 0.18 mm (0.0020 - 0.0071 in)
Limit	0.3 mm (0.012 in)



[Point 23] Pilot bushing removal and installation

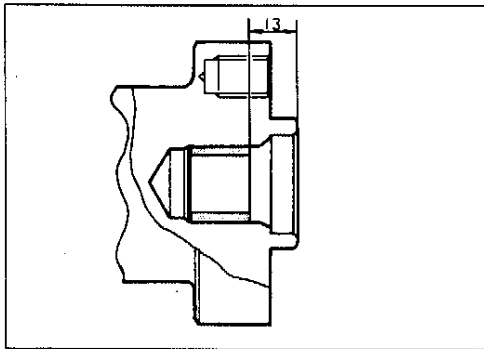
Removal

- Use a pilot bearing puller to remove pilot bushing.



Installation

- The pilot bushing installation position is shown in figure on left.



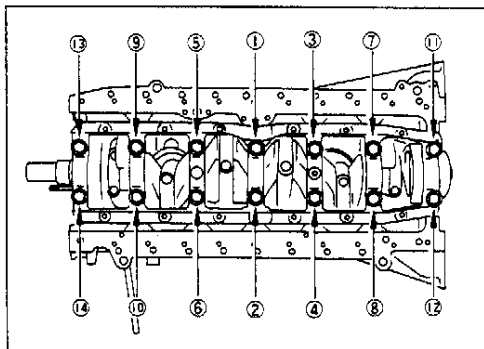
[Point 24] Main bearing bolt removal and installation

Removal

- Remove bearing bolts in reverse order of numbered sequence shown in the figure.

Installation

- Tighten the bearing bolts to the specified torque in two or three steps in the sequence shown in the figure. After tightening to the specified torque, check that crankshaft turns smoothly.



Main bearing bolt tightening torque

46 - 52 N·m (4.7 - 5.3 kg-m, 34 - 38 ft-lb)

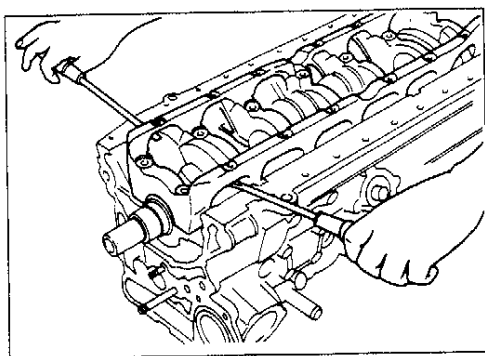
CAUTION:

Apply a coating of engine oil to the bolt threads and bolt seats.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

[Point 25] Main bearing cap removal and installation



Removal

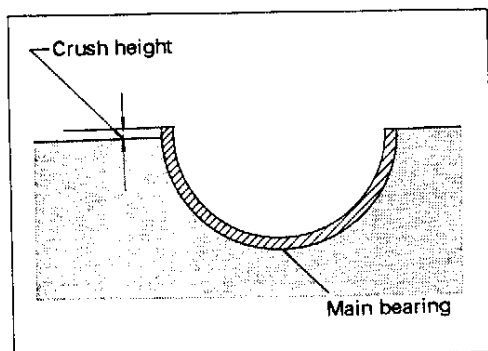
- Use screwdrivers to pry the bearing caps open.

CAUTION:

Be careful not to scratch the oil pan rail surface.

Installation

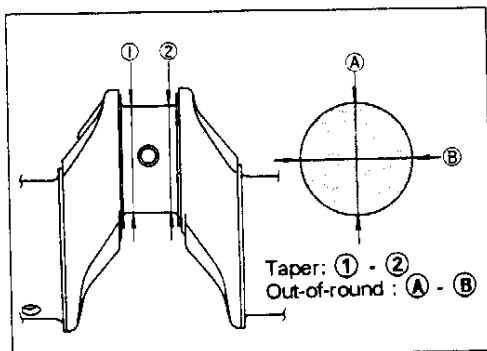
- Position main bearing cap ensuring the installation direction, then fit onto cylinder block by lightly tapping it in a number of locations with a copper hammer or suitable tool.



[Point 26] Main bearing inspection

- The bearing end should protrude when installed in main bearing cap or cylinder block.

This protrusion is called the crush height.



[Point 27] Crankshaft inspection

Out-of-round and taper inspection

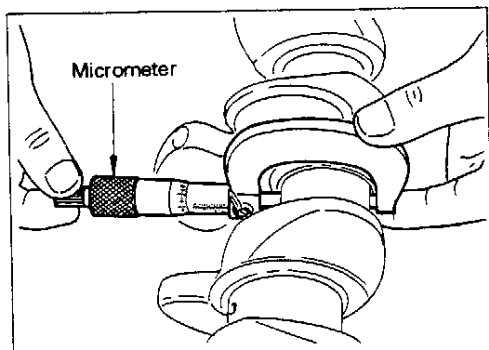
- Use a micrometer to check each journal (No. 1 to No. 7) and each pin (No. 1 to No. 6) in four locations shown in the figure.
- The out-of-round value is the difference of the dimensions in directions **A** and **B**.
- The taper value is the difference of the dimensions measured at points **1** and **2**.

Out-of-round and taper limit

0.005 mm (0.0002 in)

Pin and journal inspection

- Use a micrometer to measure pin and journal diameters.



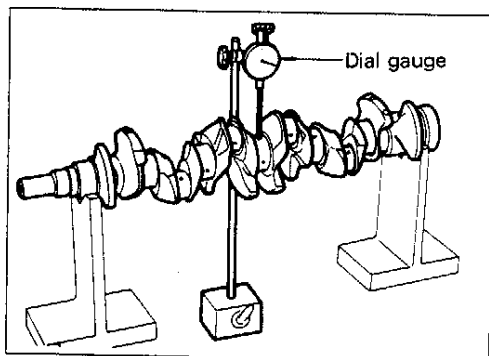
Pin diameter standard	47.961 - 47.974 mm (1.8882 - 1.8887 in)
Journal diameter standard	54.951 - 54.975 mm (2.1634 - 2.1644 in)

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

Curve inspection

- Use V-blocks on a fixed surface and support journals at both ends of crankshaft (No. 1 and No. 7).
- Position the dial gauge vertically on middle of No. 4 journal as shown.
- Turn crankshaft by hand in one direction and read dial gauge movement.
- The runout is equal to one-half of dial gauge movement.



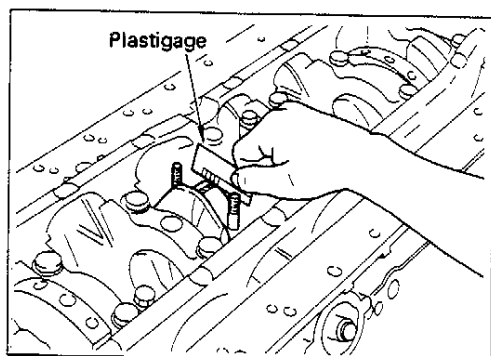
Limit	0.05 mm (0.0020 in)
-------	---------------------

[Point 28] Connecting rod bearing oil clearance inspection

Method A (using inside micrometer and micrometer)

- The oil clearance can be calculated from the connecting rod bearing inside diameter and the crankshaft pin diameter measured in [Point 18] and [Point 27].

$$(\text{oil clearance}) = (\text{bearing inside diameter}) - (\text{crankshaft pin diameter})$$



Method B (using plastigage)

- Remove all dust from crankshaft pins and bearing surfaces
- Cut off a piece of plastigage slightly shorter than the bearing width. Place the plastigage on crankshaft in direction of axis, being careful not to place on oil hole.
- Assemble connecting rod bearing in connecting rod cap and tighten connecting rod nuts to specified torque.

Connecting rod nut tightening torque	1st time	Torque wrench	14 - 16 N·m (1.4 - 1.6 kg-m, 10 - 12 ft-lb)
	2nd time	Angle wrench (°)	60 - 65

CAUTION:

Do not turn crankshaft or connecting rod while plastigage is being inserted.

- Remove connecting rod cap and bearing. Measure plastigage width with plastigage scale.

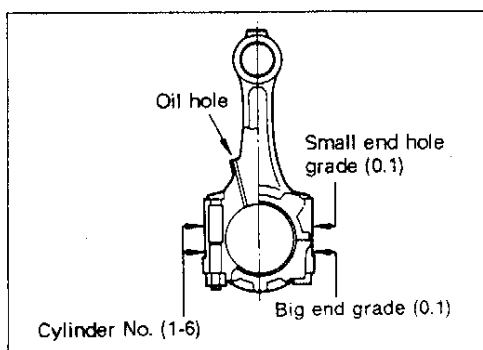
Standard	0.020 - 0.040 mm (0.0008 - 0.0016 in)
Limit	0.090 mm (0.0035 in)

- If the oil clearance exceeds the limit, refer to [Point 29] and select the appropriate bearing.

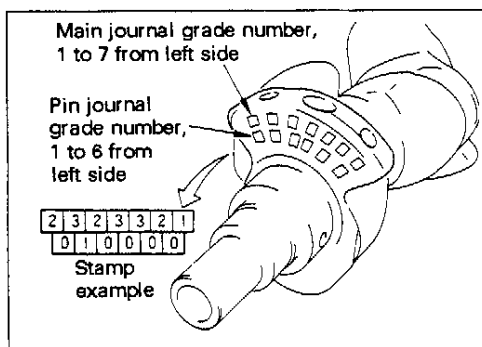
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

[Point 29] Connecting rod bearing selection and engaging



- Select the proper sized bearing because connecting rod bearing prevents fluctuation in the oil clearance. Three bearing thicknesses are available to fit the inside diameter of the big end of connecting rod and the crank pin diameter grade.
- When replacing connecting rod bearing, check big end inside diameter grade (indicated on the opposite side of connecting rod oil hole) and the pin diameter grade (indicated on crankshaft No. 1 counterweight front surface). Select connecting rod bearing with proper thickness according to the following table.

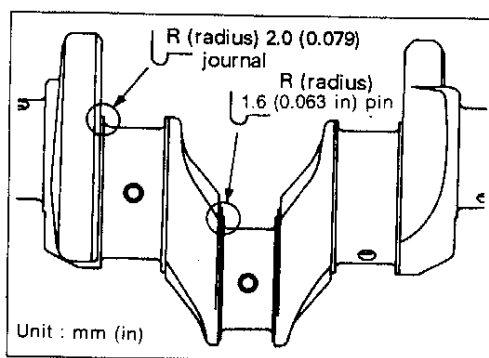


Connecting rod bearing selection chart

Unit: mm (in)

Connecting rod large end inside diameter		Less than 51.007 (2.0081)	51.013 (2.0084) max.
		51.000 (2.0079) max.	51.007 (2.0081) min.
Crank pin diameter	Grade number stamp	0	1
47.974 (1.8887) max. Greater than 47.968 (1.8885)	0	Bearing grade No.: STD 0 Bearing thickness: 1.500 - 1.503 (0.0591 - 0.0592) Oil clearance: 0.020/0.039 (0.0008/0.0015) Identification color: None	STD 1 1.503 - 1.506 (0.0592 - 0.0593) 0.021/0.039 (0.0008/0.0015) Brown
47.968 (1.8885) max. 47.961 (1.8882) min.	1	STD 1 1.503 - 1.506 (0.0592 - 0.0593) 0.020/0.040 (0.0008/0.0016) Brown	STD 2 1.506 - 1.509 (0.0593 - 0.0594) 0.021/0.040 (0.0008/0.0016) Green

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE



13. Engine Overhaul (Cont'd)

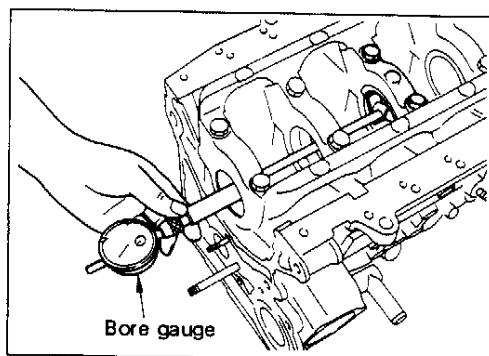
- When using undersize bearings, measure bearing inside diameter when bearing is installed. Grind pin so oil clearance conforms to specified value.

Unit: mm (in)

Size	Thickness	Grade No.
US0.08 (0.0031)	1.541/1.549 (0.0607/0.0610)	8
US0.12 (0.0047)	1.561/1.569 (0.0615/0.0618)	12
US0.25 (0.0098)	1.626/1.634 (0.0640/0.0643)	25

CAUTION:

Be careful not to scratch fillet roll when the crank pin is being ground for use with undersize bearing.



[Point 30] Main bearing oil clearance

Method A (using bore gauge and micrometer)

- Install main bearing in cylinder block and attach bearing cap. Tighten bearing cap bolts to specified torque and measure bearing inside diameter.

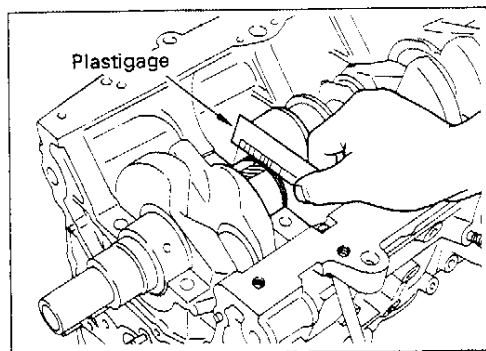
Bearing cap bolt tightening torque	46 - 52 N·m (4.7 - 5.3 kg-m, 34 - 38 ft-lb)
------------------------------------	---

- The oil clearance distance can be calculated from the values for the outside diameter of crank journal measured in [Point 27].

$$(\text{Oil clearance}) = (\text{bearing inside diameter} - (\text{crankshaft outside diameter}))$$

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)



Standard	0.028 - 0.047 mm (0.0011 - 0.0019 in)
Limit	0.090 mm (0.0035 in)

- If oil clearance exceeds limit value, refer to [Point 31] and select suitable bearing.

Method B (using plastigage)

- Remove all dust and oil from each crankshaft journal and bearing surface.
- Cut off a piece of plastigage slightly shorter than the bearing width. Place the plastigage on crankshaft in direction of axis, being careful not to place on oil hole.
- Assemble main bearing and bearing cap. Install bearing cap onto cylinder block and tighten cap bolts to the specified torque.

Bearing cap bolt tightening torque	46 - 52 N·m (4.7 - 5.3 kg-m, 34 - 38 ft-lb)
------------------------------------	---

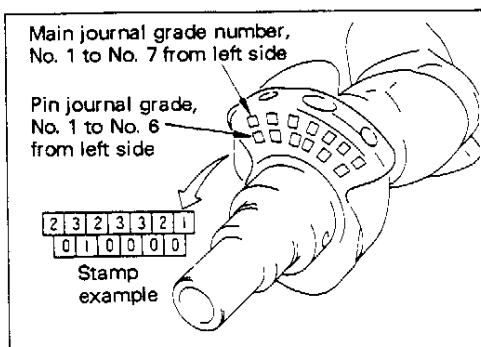
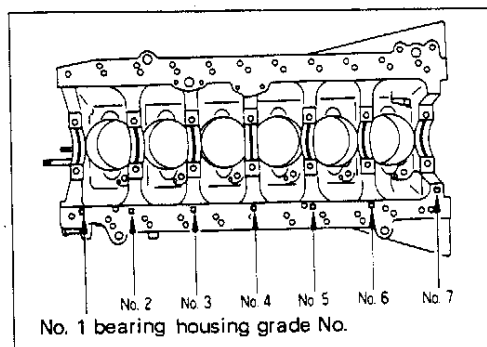
CAUTION:

Do not turn crankshaft while plastigage is being inserted.

- Remove bearing cap and bearing. Measure plastigage width on plastigage scale.

CAUTION:

If excessive bearing clearance still exists, use a thicker main bearing or undersized bearing so that the specified bearing clearance is obtained when measured by Method A as well.



[Point 31] Main bearing selection and engagement

- Select the proper sized bearing because main bearing prevents fluctuation in the oil clearance. Seven bearing thicknesses are available to fit the cylinder block bearing housing and crank journal diameter grade.

Note: Selection engagement is performed only for standard size.

- When replacing main bearing, check the bearing grade (indicated on bottom face of cylinder block) and journal diameter grade (indicated on crankshaft No. 1 counterweight front surface). Select main bearing with proper thickness according to the following table.

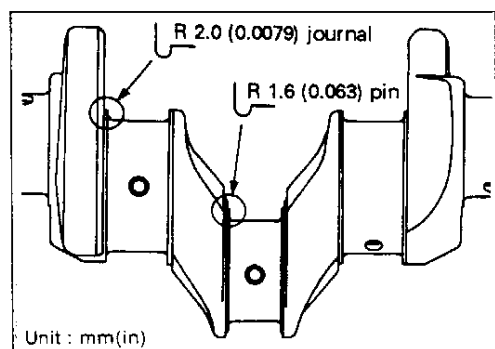
B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

Main bearing selection table

Unit: mm (in)

Cylinder block bearing housing inner diameter			58.651 (2.3091) Max. Greater than 58.645 (2.3089)	58.657 (2.3093) Max. Greater than 58.651 (2.3091)	58.663 (2.3096) Max. Greater than 58.657 (2.3093)	58.670 (2.3098) Max. Greater than 58.663 (2.3096)
Crankshaft journal diameter	Grade No. stamp		0	1	2	3
54.975 (2.1644) Max. Greater than 54.969 (2.1641)	0	Bearing grade No.	STD 0	STD 1	STD 2	STD 3
		Bearing thickness	1.818 - 1.821 (0.0716 - 0.0717)	1.821 - 1.824 (0.0717 - 0.0718)	1.824 - 1.827 (0.0718 - 0.0719)	1.827 - 1.830 (0.0719 - 0.0720)
		Oil clearance	0.028/0.046 st.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)
		Identification color	Black	Brown	None	Yellow
54.969 (2.1641) Max. Greater than 54.963 (2.1639)	1	Bearing grade No.	STD 1	STD 2	STD 3	STD 4
		Bearing thickness	1.821 - 1.824 (0.0717 - 0.0718)	1.824 - 1.827 (0.0718 - 0.0719)	1.827 - 1.830 (0.0719 - 0.0720)	1.830 - 1.833 (0.0720 - 0.0722)
		Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)
		Identification color	Brown	None	Yellow	Blue
54.963 (2.1639) Max. Greater than 54.957 (2.1637)	2	Bearing grade No.	STD 2	STD 3	STD 4	STD 5
		Bearing thickness	1.824 - 1.827 (0.0718 - 0.0719)	1.827 - 1.830 (0.0719 - 0.0720)	1.830 - 1.833 (0.0720 - 0.0722)	1.833 - 1.836 (0.0722 - 0.0723)
		Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)
		Identification color	None	Yellow	Blue	Green
54.957 (2.1637) Max. Greater than 54.951 (2.1634)	3	Bearing grade No.	STD 3	STD 4	STD 5	STD 6
		Bearing thickness	1.827 - 1.830 (0.0719 - 0.0720)	1.830 - 1.833 (0.0720 - 0.0722)	1.833 - 1.836 (0.0722 - 0.0723)	1.836 - 1.839 (0.0723 - 0.0724)
		Oil clearance	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.046 (0.0011/0.0018)	0.028/0.047 (0.0011/0.0019)
		Identification color	Yellow	Blue	Green	Pink



- When using undersize bearings, measure bearing inside diameter when bearing is installed and grind journal so oil clearance conforms to specified clearance.

Unit: mm (in)

Size	Thickness	Grade No.
US0.25 (0.0098)	1.950/1.958 (0.0768/0.0771)	25

CAUTION:

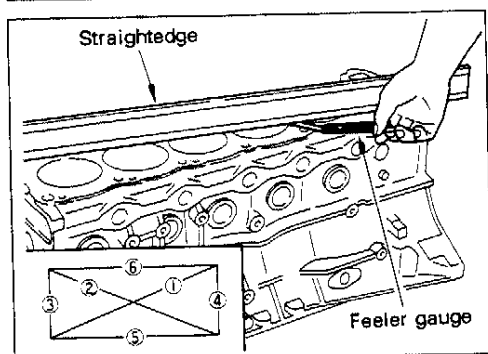
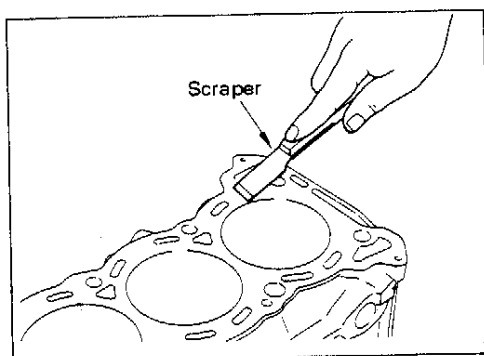
When crankshaft journal is being ground for use with undersize bearings, do not scratch the fillet roll.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

[Point 32] Cylinder block inspection and correction

- Remove all oil and water deposits, gasket, seal material and carbon from cylinder block.

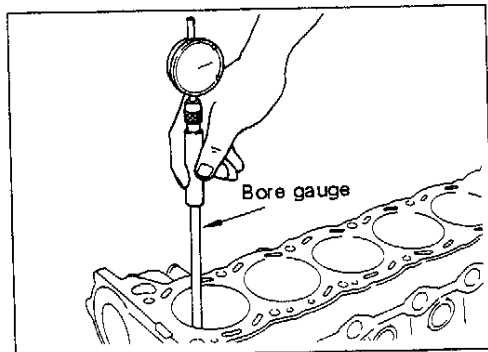


Upper surface distortion and wear inspection

- Clean upper face of cylinder block and measure the distortion in six directions.

Limit	0.1 mm (0.004 in)
-------	-------------------

- If the distortion exceeds the specified limit, resurface face with surface grinder or replace block if necessary.



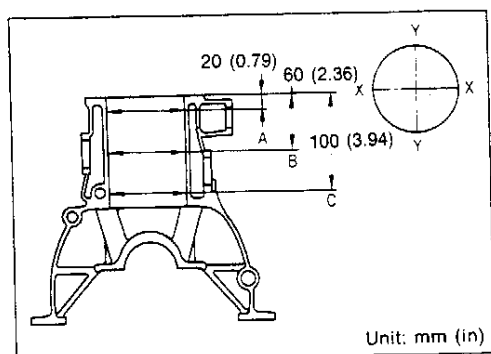
Cylinder inside diameter inspection

- Use bore gauge and measure cylinder bore for wear, out-of-round and taper. Measure in three vertical locations (A, B, C) and two directions (X, Y) for a total of six locations.

Unit: mm (in)

Cylinder inside diameter standard	86.000 - 86.050 (3.3858 - 3.3878)
Wear limit	0.2 (0.008)
Out-of-round limit	0.015 (0.0006)
Taper limit	0.010 (0.0004)

- Out-of-round measurement is difference of measurement in two directions (X, Y).
- Taper is difference of measurement at top and bottom (A, C).



Unit: mm (in)

- Perform honing or boring when abnormality is inspected.

B2 RB26 DOHC EGI (ECCS) TWIN-TURBOCHARGER ENGINE

13. Engine Overhaul (Cont'd)

Cylinder honing

- There are three types of oversize pistons, STD (standard - 0.02), OS (0.5) and OS (1.0). When oversize pistons are used, hone the cylinder so the clearance between piston and cylinder conforms to the specified value described in [Point 33]. Oversize piston rings must be used that fit the oversize piston.

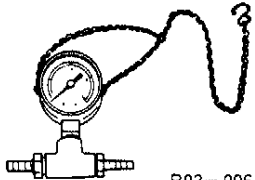
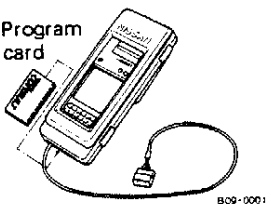
[Point 33] Piston-to-cylinder bore clearance

- The clearance can be calculated from the measured value for the piston skirt outside diameter [Point 16] and cylinder inside diameter [Point 32] (X direction B location).
(Clearance) = (cylinder inside diameter) — (piston skirt outside diameter)

Standard at normal temperature	0.035 - 0.055 mm (0.0014 - 0.0022 in)
--------------------------------	---------------------------------------

B3 ECCS (Electronically Concentrated Engine Control System)

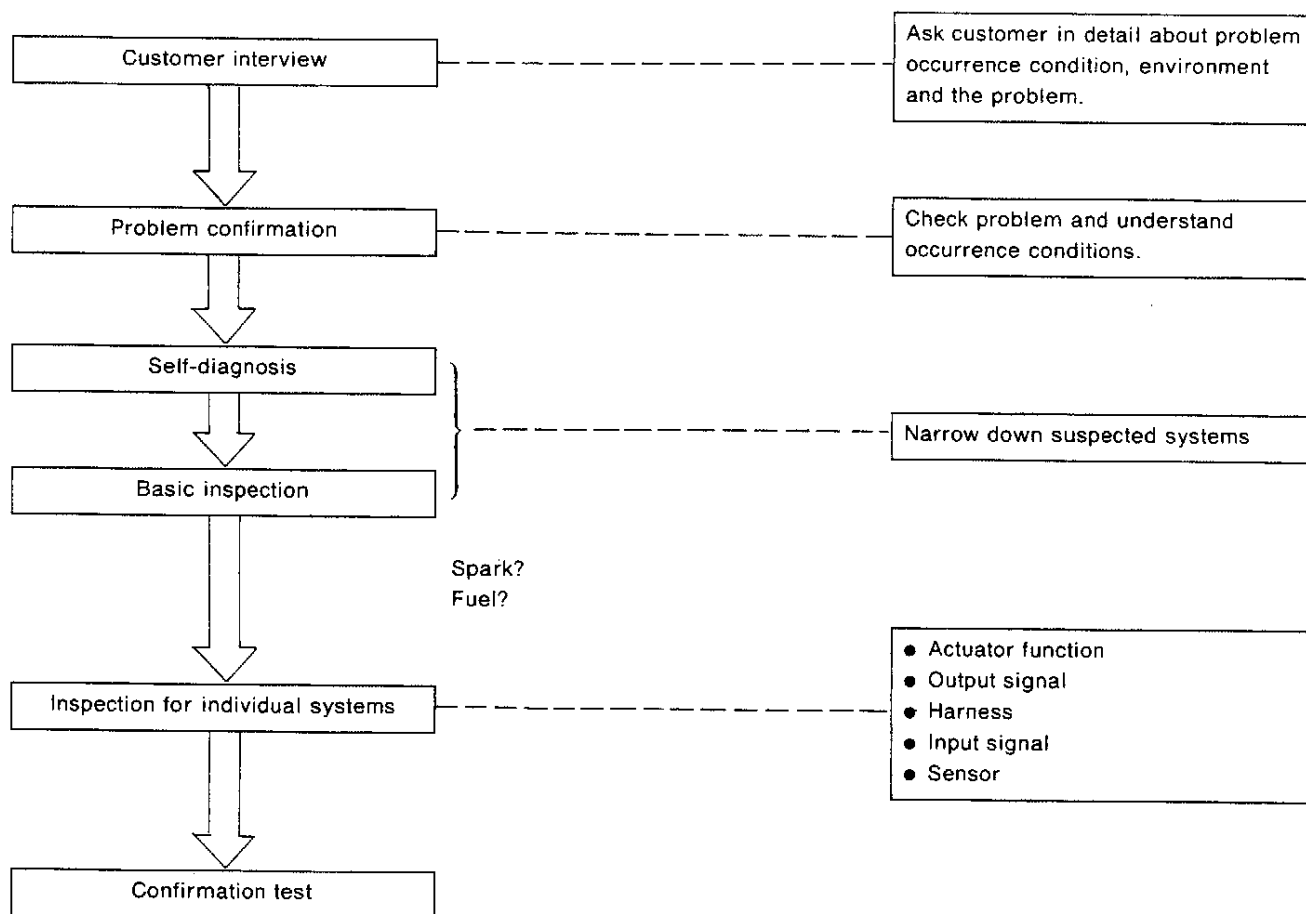
Tools required

	Name		Application
Measurement tool	EGI fuel pressure gauge ST1959 0000		Fuel pressure measurement
	Circuit tester		Resistance, voltage measurement
	Handy vacuum pump EG1513 000		Part inspection
	Engine tachometer		Engine speed inspection
	Electronic system diagnosis tester CONSULT EG1180 0000		System inspection, diagnosis
	Check adapter II EG1771 0000		Control unit input and output signal inspection
	Oscilloscope		

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis

1-1 TROUBLE DIAGNOSTIC PROCEDURE



CAUTION:

Engine problems are roughly divided into two types: problems relating to engine main body and those related to control system. This section explains the trouble diagnostic method for the control system under the assumption that the engine main body is normal. Consequently, attention should also be paid to the condition of the engine main body and gasoline quality.

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

(1) Diagnostic worksheet

There are many kinds of operating conditions that lead to malfunctions on engine components.

A good grasp of such conditions can make trouble-shooting faster and more accurate.

In general, feelings for a problem depend on each customer. It is important to fully understand the symptoms and conditions when a customer complains.

Make good use of a diagnostic worksheet such as the one shown below in order to utilize all the complaints for troubleshooting.

KEY POINTS

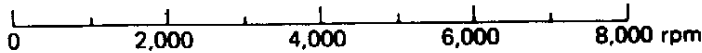
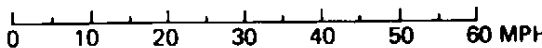
WHAT Vehicle & engine model

WHEN Date, Frequencies

WHERE Road conditions

HOW Operating conditions,
Weather conditions,
Symptoms

Worksheet sample

Customer name MR/MS		Model & Year		VIN
Engine #		Trans.		Mileage
Incident Date		Manuf. Date		In Service Date
Symptoms	<input type="checkbox"/> Startability	<input type="checkbox"/> Impossible to start <input type="checkbox"/> No combustion <input type="checkbox"/> Partial combustion <input type="checkbox"/> Partial combustion affected by throttle position <input type="checkbox"/> Partial combustion NOT affected by throttle position <input type="checkbox"/> Possible but hard to start <input type="checkbox"/> Others []		
	<input type="checkbox"/> Idling	<input type="checkbox"/> No fast idle <input type="checkbox"/> Unstable <input type="checkbox"/> High idle <input type="checkbox"/> Low idle <input type="checkbox"/> Others []		
	<input type="checkbox"/> Driveability	<input type="checkbox"/> Stumble <input type="checkbox"/> Surge <input type="checkbox"/> Detonation <input type="checkbox"/> Lack of power <input type="checkbox"/> Intake backfire <input type="checkbox"/> Exhaust backfire <input type="checkbox"/> Others []		
	<input type="checkbox"/> Engine stall	<input type="checkbox"/> At the time of start <input type="checkbox"/> While idling <input type="checkbox"/> While accelerating <input type="checkbox"/> While decelerating <input type="checkbox"/> Just after stopping <input type="checkbox"/> While loading		
Incident occurrence		<input type="checkbox"/> Just after delivery <input type="checkbox"/> Recently <input type="checkbox"/> In the morning <input type="checkbox"/> At night <input type="checkbox"/> In the daytime		
Frequency		<input type="checkbox"/> All the time <input type="checkbox"/> Under certain conditions <input type="checkbox"/> Sometimes		
Weather conditions		<input type="checkbox"/> Not affected		
	Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Raining <input type="checkbox"/> Snowing <input type="checkbox"/> Others []		
	Temperature	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold <input type="checkbox"/> Humid °F		
Engine conditions		<input type="checkbox"/> Cold <input type="checkbox"/> During warm-up <input type="checkbox"/> After warm-up Engine speed 		
Road conditions		<input type="checkbox"/> In town <input type="checkbox"/> In suburbs <input type="checkbox"/> Highway <input type="checkbox"/> Off road (up/down)		
Driving conditions		<input type="checkbox"/> Not affected <input type="checkbox"/> At starting <input type="checkbox"/> While idling <input type="checkbox"/> At racing <input type="checkbox"/> While accelerating <input type="checkbox"/> While cruising <input type="checkbox"/> While decelerating <input type="checkbox"/> While turning (RH/LH) Vehicle speed 		
Check engine light		<input type="checkbox"/> Turned on <input type="checkbox"/> Not turned on		

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

(2) Problem confirmation

- Customer's explanation is often insufficient in clarifying the status of the problem. Reproduction of the problem on the actual car and its confirmation and analysis are therefore essential. If unable to reproduce the problem, ask the customer in detail about its occurrence conditions and try to reproduce it under the indicated conditions. If unable to reproduce, manually shake the concerned harness to check for poor contact or other problems.
- It is also recommended to collect and analyze the data using CONSULT while driving.
- When checking the actual vehicle, record data on normal portions to assist in diagnosing a problem.

(3) Self-diagnosis

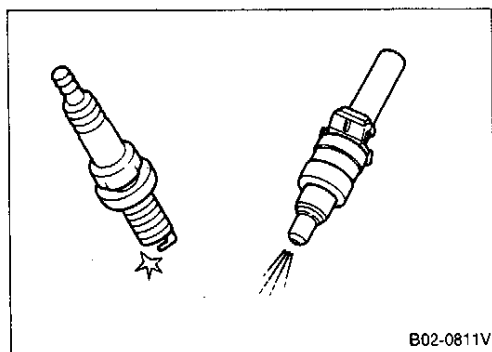
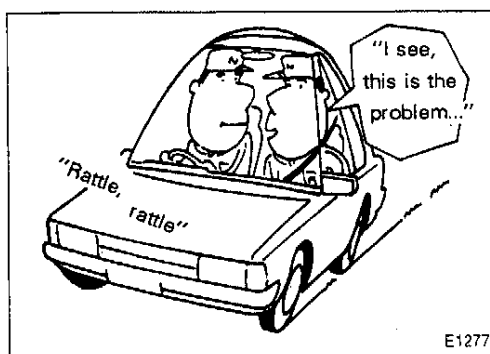
- If problems are attributable to the ECCS signal system, problem diagnosis should be narrowed down using the self-diagnostic function.

• What happened up to present?	Self-diagnosis
• How about the signal system at present?	Real-time diagnosis or switch ON/OFF diagnosis using the CONSULT "Data Monitor" function.

(4) Basic inspection

- Check if the three elements of combustion are functioning normally. Find out which system is faulty; fuel system, ignition system or idling control system.

• Fuel?	Are injector and fuel pump operating?
• Ignition?	Are sparks present?
• Idling control?	Is AAC valve operating?
• Air-fuel ratio?	Is air-fuel ratio feedback function normal?



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

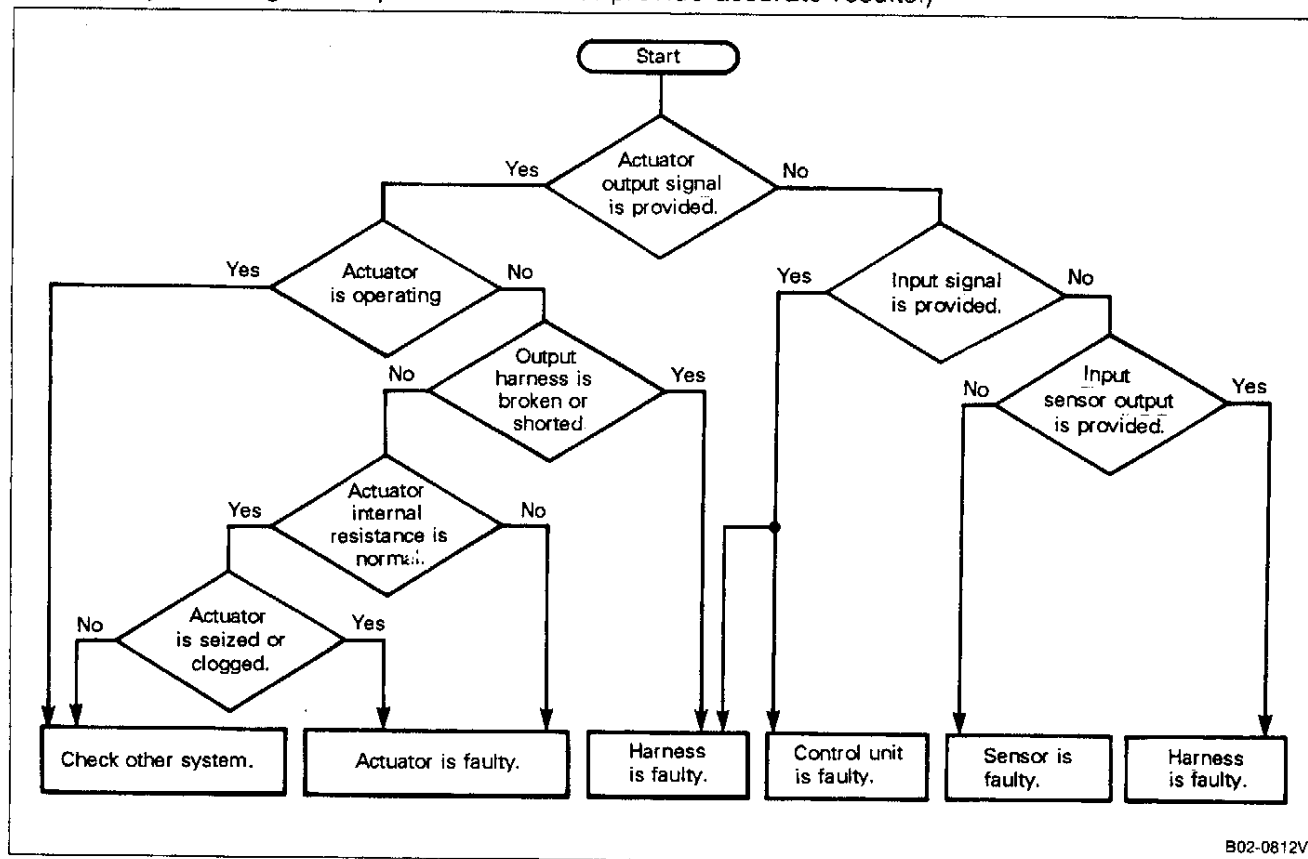
(5) Individual system inspection

An efficient method for ECCS diagnosis is to check the control unit output signals first. Continue by checking individual parts such as actuators and sensors as well as input signals according to the results of the output signal check.

[Procedure]

Note: The input data must be monitored first when using CONSULT.

(Only checking the output data does not provide accurate results.)

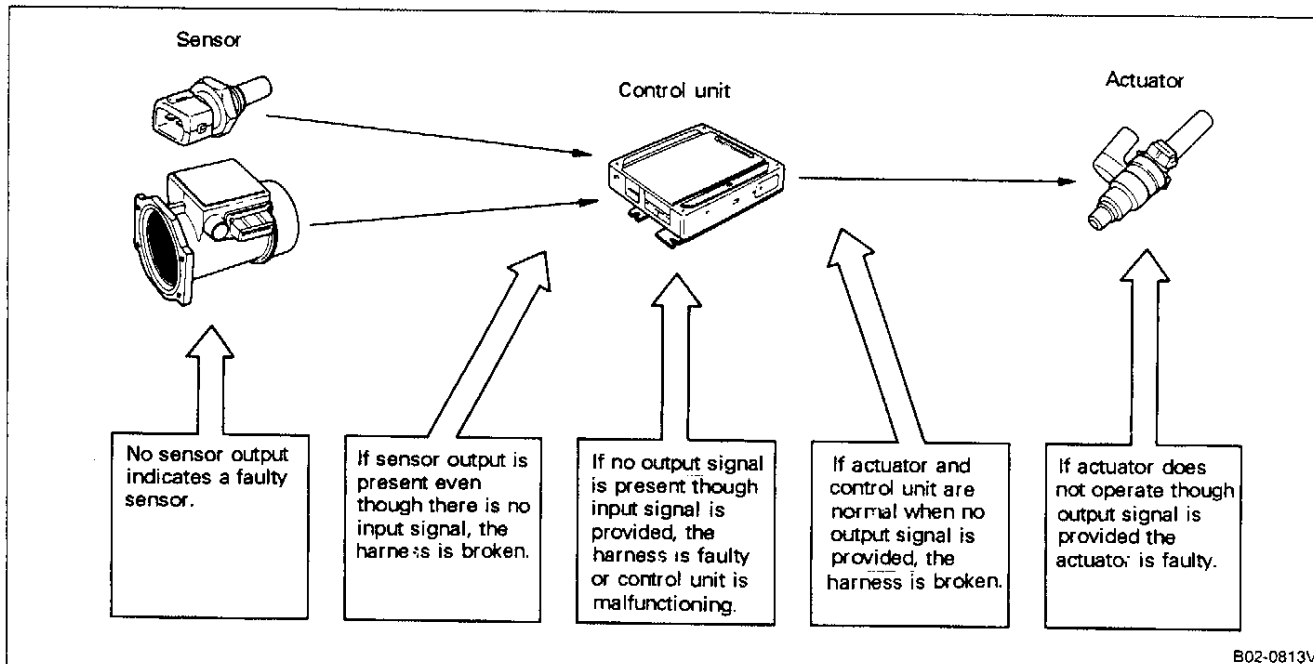


B02-0812V

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

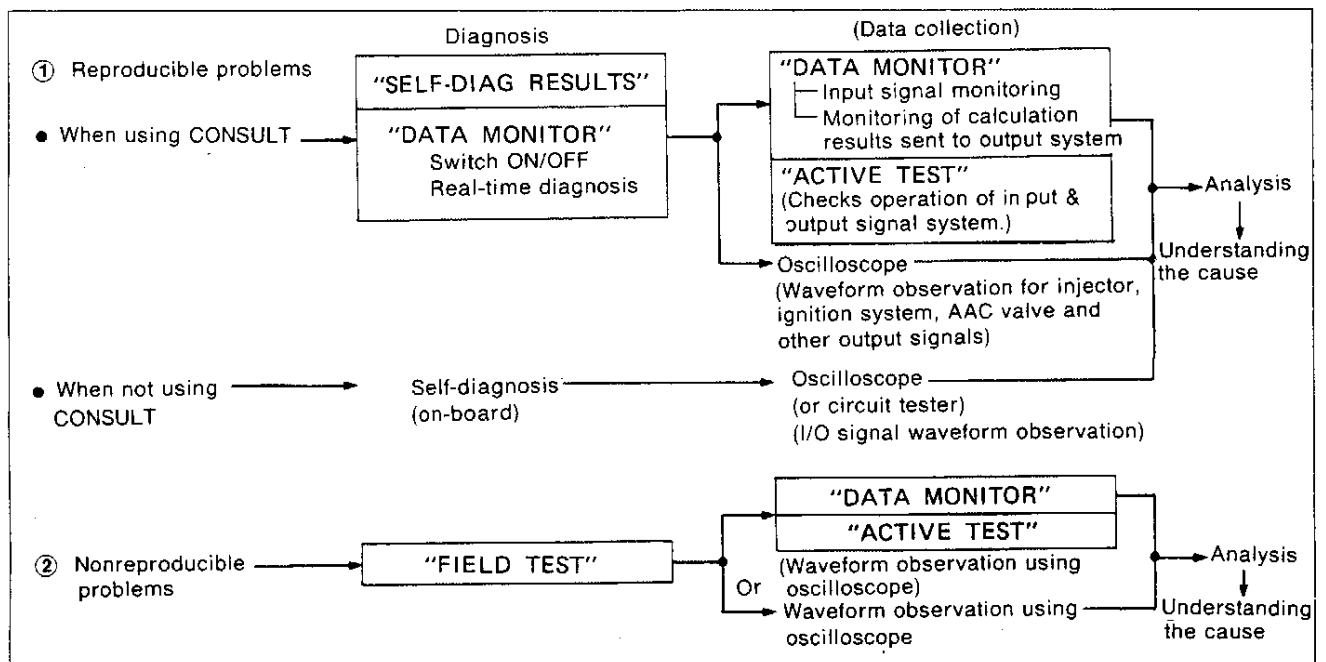
[Analysis]



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

(6) Trouble diagnosis using measuring instruments (Operations in square frames ☐ to be performed with CONSULT.)



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

1-2 MAJOR ECCS INPUT SIGNALS AND CONTROL ITEMS

Understanding the relationship between the input signals and control items (output) of ECCS is essential to efficiently determine the cause of problems.

Input	Output	Fuel injection control (injector)	Ignition control (power transistor, IGN coil)	Idle control (ACC valve)
Crank angle sensor 120° signal		<ul style="list-style-type: none"> ● Determination of injector injection timing ● Engine rpm input signal 	<ul style="list-style-type: none"> ● Ignition timing start point 	<ul style="list-style-type: none"> ● Engine rpm input signal
Crank angle sensor 1° signal		<ul style="list-style-type: none"> ● Engine speed input signal 	<ul style="list-style-type: none"> ● Ignition timing count 	<ul style="list-style-type: none"> ● Engine speed input signal
Air flow meter		<ul style="list-style-type: none"> ● Intake air volume measurement and control of injector injection pulse width 	<ul style="list-style-type: none"> ● Ignition timing control 	
Engine temperature sensor		<ul style="list-style-type: none"> ● Engine temperature enrichment correction ● Fuel cut range change 	<ul style="list-style-type: none"> ● Ignition timing alteration due to water temperature 	<ul style="list-style-type: none"> ● Target speed change according to water temperature
Start signal		<ul style="list-style-type: none"> ● Start time enrichment 	<ul style="list-style-type: none"> ● Ignition timing control during cranking 	
Throttle sensor		<ul style="list-style-type: none"> ● Fuel injection interrupt ● Enrichment correction during acceleration and deceleration ● Fuel cut judgment during speed change control ● Intake air volume measurement 		
Soft idle switch (idle judgment by throttle opening angle)		<ul style="list-style-type: none"> ● Fuel cut due to ON signal ● ON* → OFF time enrichment 	<ul style="list-style-type: none"> ● Ignition timing change 	<ul style="list-style-type: none"> ● Idle control start by ON signal

Note *: Throttle sensor judges ON-OFF time instead of idle contact. During the ON time, fully closed throttle or "fully closed throttle + α (partially open)" throttle is detected. (The idle contact is used as backup system if throttle sensor problem occurs.)

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

Input \ Output	Fuel injection control (injector)	Ignition control (power transistor, IGN coil)	Idle control (ACC valve)
Vehicle speed sensor	<ul style="list-style-type: none"> Fuel cut changeover vehicle speed Fuel cut at 0 km/h (0 MPH) vehicle speed Transmission shift position judgment 		<ul style="list-style-type: none"> Idle control start at vehicle speed below 8 km/h (5 MPH)
Exhaust gas sensor	<ul style="list-style-type: none"> Pulse width control by air-fuel ratio feedback 		
Detonation sensor		<ul style="list-style-type: none"> Ignition timing change 	
Battery voltage	<ul style="list-style-type: none"> Pulse width correction 	<ul style="list-style-type: none"> Excitation angle change 	<ul style="list-style-type: none"> Target rpm change
Air conditioner switch			<ul style="list-style-type: none"> Target rpm change after engine warms up
Neutral switch		<ul style="list-style-type: none"> Ignition timing change (at idle) 	<ul style="list-style-type: none"> Idle control start in neutral position
Power steering switch			<ul style="list-style-type: none"> Prevention of engine speed reduction when power steering is turned.

1-3 DIAGNOSIS CHART ITEM BY PROBLEM

- (1) Unable to start ... No initial combustion
- (2) Unable to start ... Initial combustion occurs but is incomplete.
- (3) Hard to start ... Hard to start when engine is cold.
- (4) Hard to start ... Hard to start after warm-up.
- (5) Hard to start ... Hard to start when engine is hot or cold.
- (6) Poor idling ... Fast idling inoperative
- (7) Poor idling ... Low idle rpm (after warm-up)
- (8) Poor idling ... High idle rpm (after warm-up)
- (9) Unstable idling ... Cold engine only
- (10) Unstable idling ... During warm-up
- (11) Poor driveability ... Engine breathing
- (12) Poor driveability ... Knocking
- (13) Poor driveability ... Lack of output, poor acceleration, poor response
- (14) Engine stalls when starting off
- (15) Engine stall during idling
- (16) Engine stall during driving
- (17) Engine stall when decelerating or immediately after stopping
- (18) Engine stall when electrical load or power steering load is applied

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

Diagnostic chart by problem

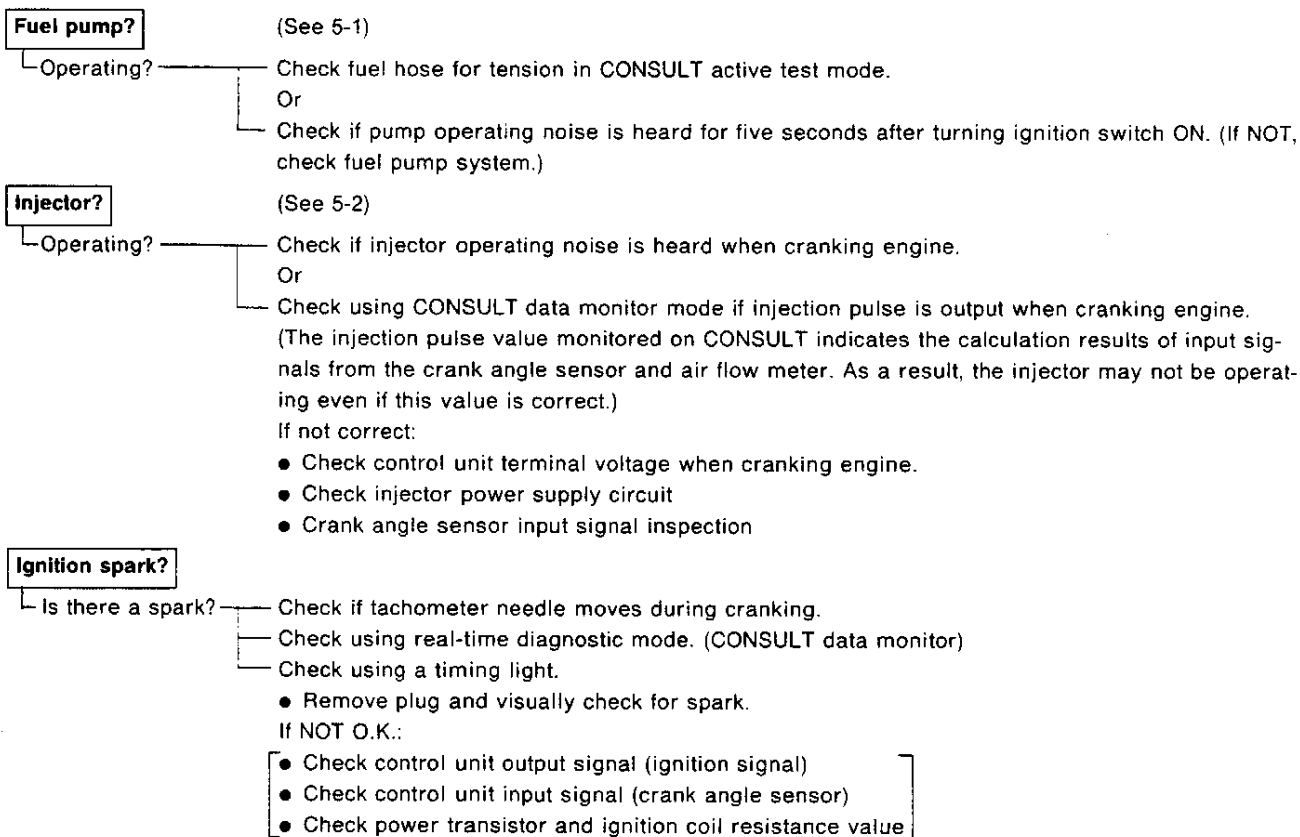
(1) Unable to start ... No initial combustion

[Analysis]

Ignition spark is not generated or no fuel is injected.

- Check if fuel pump is rotating.
- If no ignition spark is generated and no injector operating noise is heard, check the control unit input (crank angle sensor signal) or control unit power supply.
- If injector is operating but no spark is generated, the control unit and crank angle sensor can be judged as normal. In this case, check the ignition output system (power transistor, ignition coil, etc.)
- If ignition spark is generated but injector is not operating, check the ignition output system (injector power supply, harness, etc.).

[Chart]



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

(2) Unable to start ... Initial combustion occurs but is incomplete

[Analysis]

Occurrence of initial combustion means that sparks are created. The following three cases are possible.

- ① Initial combustion only
 - Is fuel system (fuel pump, fuel injector) operating?
- ② Engine fires incompletely
 - Check if fuel injection quantity is too small or large.
 - Check if fuel pressure is normal.
 - Check if water temperature enrichment is provided.
 - Check if start-time enrichment is provided.
 - Check if ignition timing is normal.
- ③ Engine fires completely if accelerator pedal is moved up and down.
 - Check if AAC valve operation is normal.

[Chart]

Fuel pressure?

(See 3-3)

Is pump operating? —————

Check fuel hose for tension in CONSULT active test mode.

Or

Check if fuel pump operating noise is heard for five seconds after ignition switch is turned ON.

Is fuel pump operating during cranking?

(If NOT O.K., check the fuel pump system.)

Injection quantity?

Engine temperature enrichment provided? —————

Check water temperature of CONSULT data monitor mode.

Or

Disconnect engine temperature sensor connector and check for any change.

- Check water temperature resistance value.

- Check engine temperature sensor output voltage.

Start-time enrichment provided? —————

Check "START" signal [ON/OFF] (CONSULT data monitor mode)

Idling control?

(See 5-4)

Is idling rpm increased? —————

Check AAC valve operation (CONSULT active test).

Check if AAC valve is fully closed (CONSULT data monitor).

Check AAC valve circuit for disconnection or loose connectors.

Ignition system?

Is ignition timing normal? —————

Try to advance or retard timing angle.

Is ignition correct? —————

Check spark plugs for fouling.

Check for ignition misfiring

(Check using a timing light or CONSULT real-time diagnostic mode.)

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

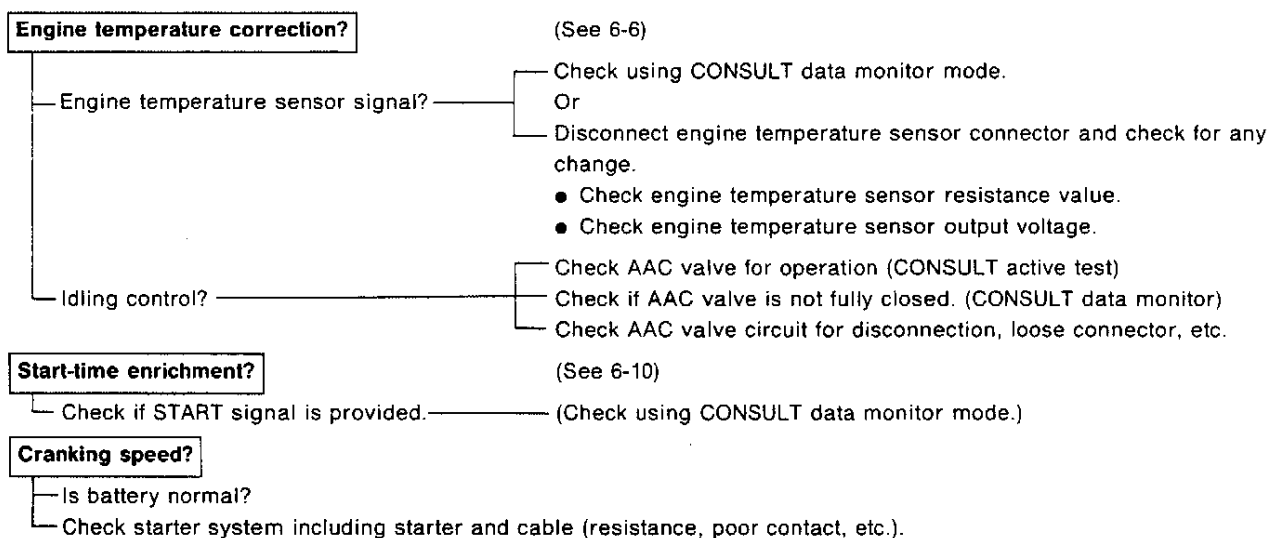
(3) Hard start ... Hard to start when engine is cold.

[Analysis]

The systems relating to water temperature must be checked because this problem only occurs when the engine is cold.

- Fuel injection enrichment from engine temperature sensor signal is not functioning when temperature is low.
- Idling speed control is not functioning normally.
- Start-time enrichment is not functioning.
- Cranking speed is too low.

[Chart]



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

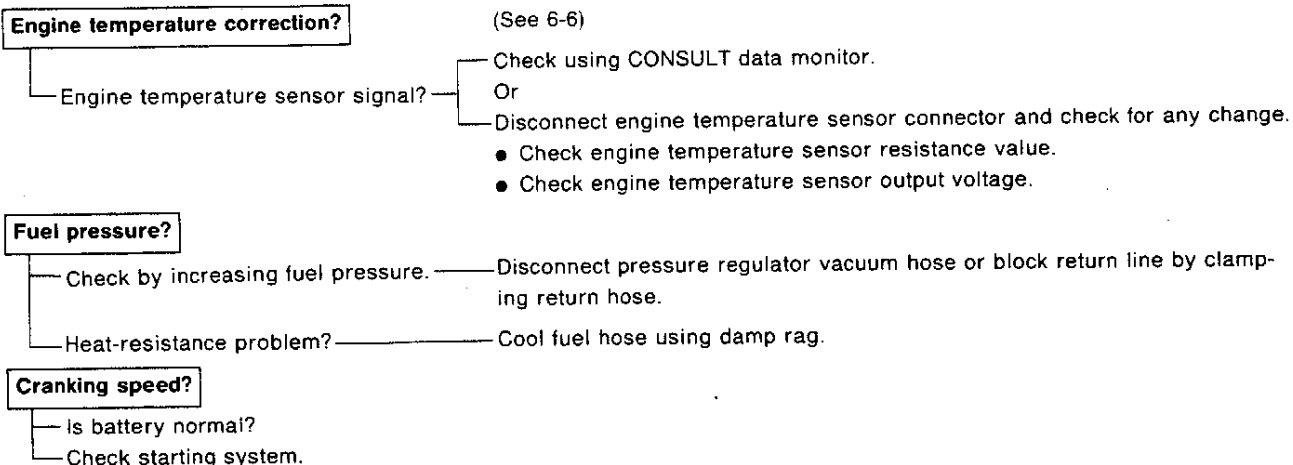
(4) Hard start ... Hard to start after warm-up

[Analysis]

This problem may be related to the water temperature control.

- Check if engine temperature correction is inaccurate.
- Check if fuel pressure is correct or if air bubbles are generated in the fuel when the engine is hard to start, especially when water temperature is high.
- Check if engine cranking speed is low.

[Chart]



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

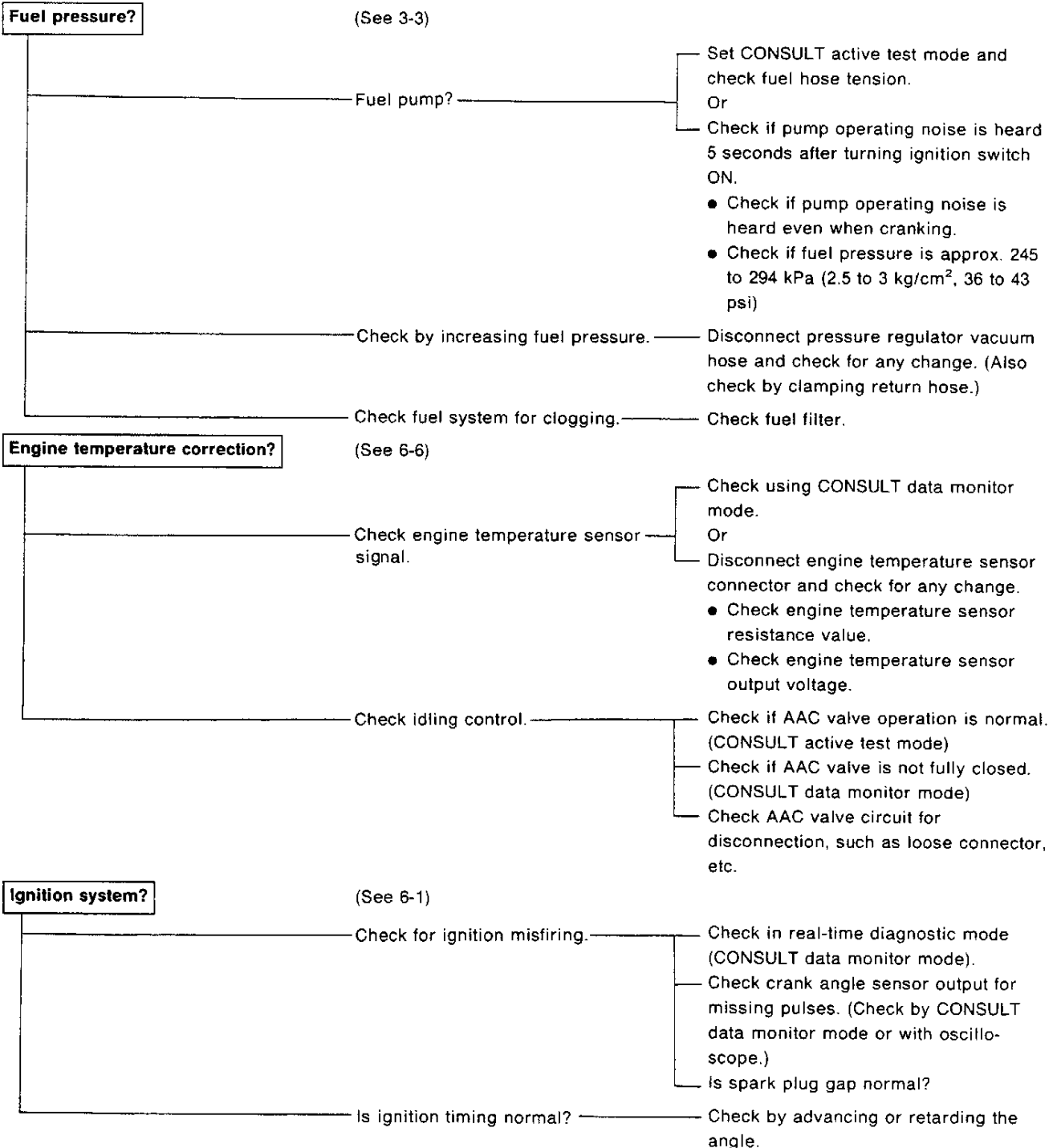
(5) Hard start ... Hard to start regardless of engine temperature

[Analysis]

Spark arc is created but air-fuel ratio seems to be incorrect.

- Check fuel pressure.
- Check fuel injection quantity. (Is engine temperature correction accurate?)
- Check if idling speed is controlled.
- Check for misfiring and incorrect ignition timing.
- Check if cranking speed is too low.

[Chart]



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

Cranking Speed?

Is battery normal?

Check charged state.

Check starting system.

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

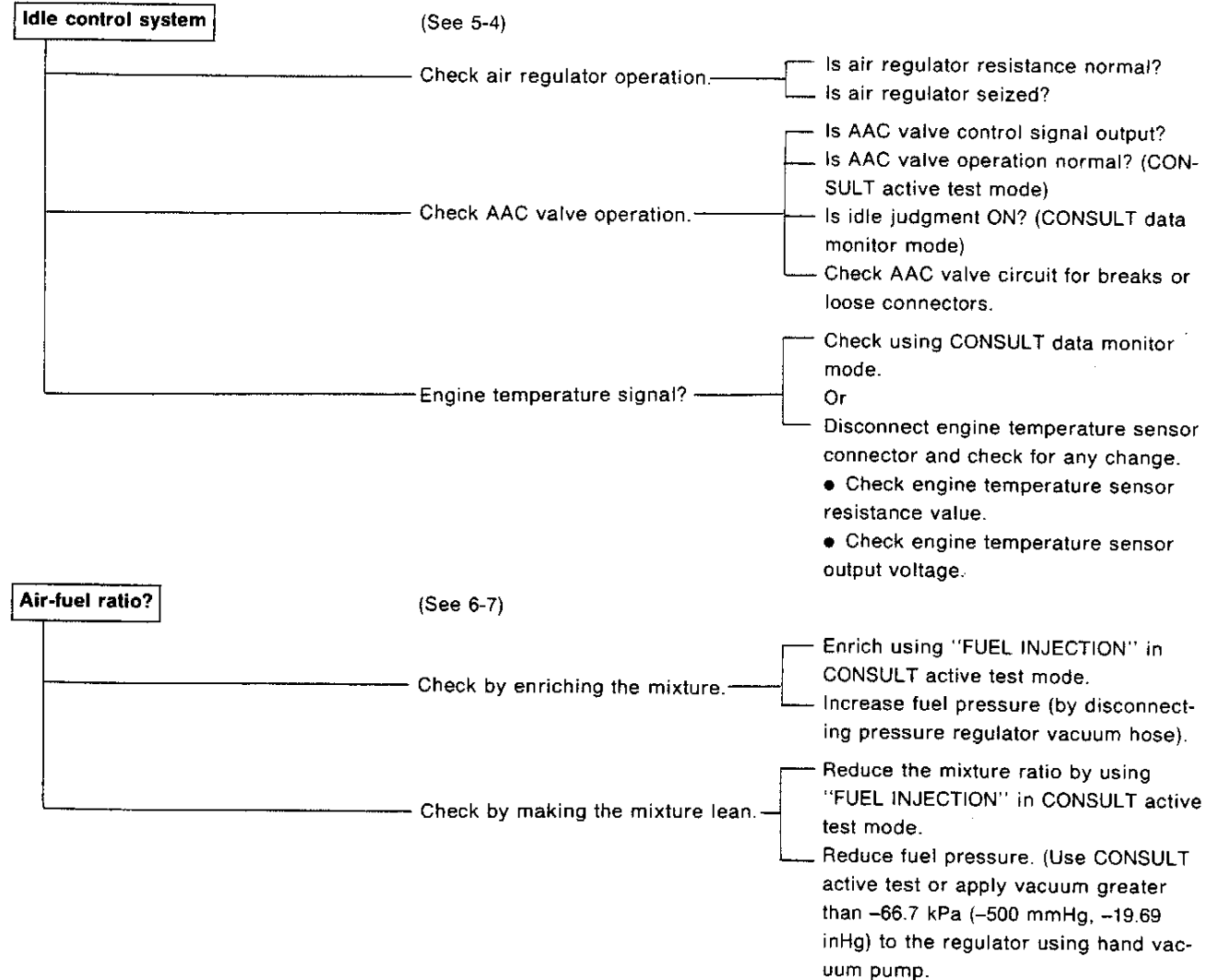
(6) Poor idling ... Fast idle inoperative

[Analysis]

This problem may be due to abnormal control of AAC valve and air regulator because idling speed is controlled by these devices.

The air-fuel ratio and ignition timing also relate to this problem.

[Chart]



B3 ECCS (Electronically Concentrated Engine Control System)

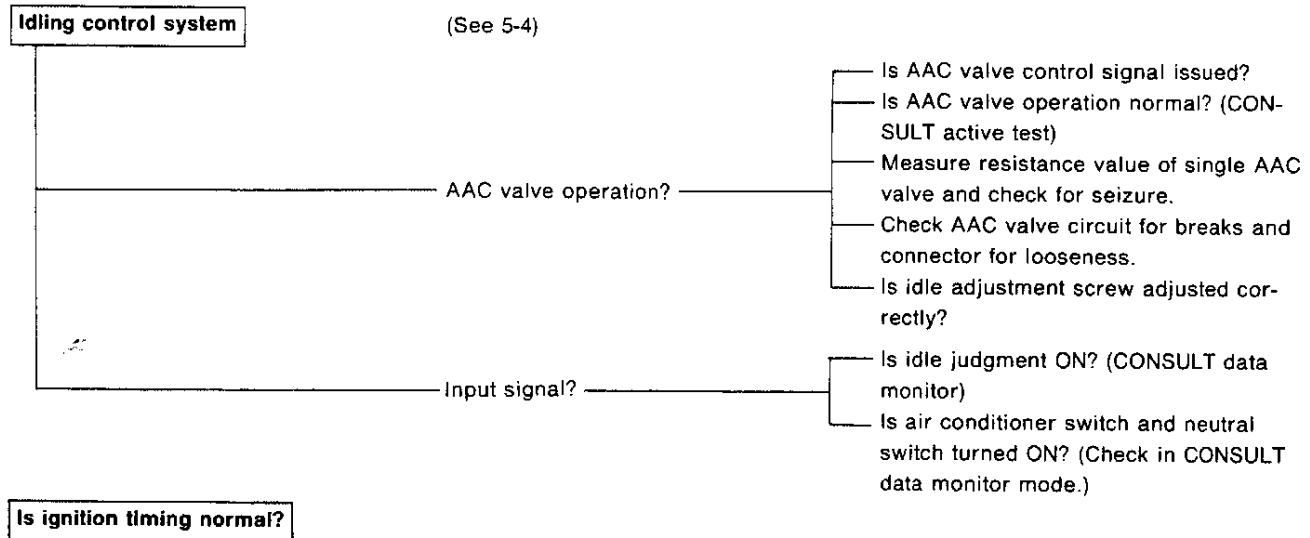
1. Trouble Diagnosis (Cont'd)

(7) Poor idling ... Low idling rpm (after warm-up)

[Analysis]

Idling speed is controlled by the AAC valve. A low idling rpm means insufficient auxiliary air volume through AAC valve.

[Chart]



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

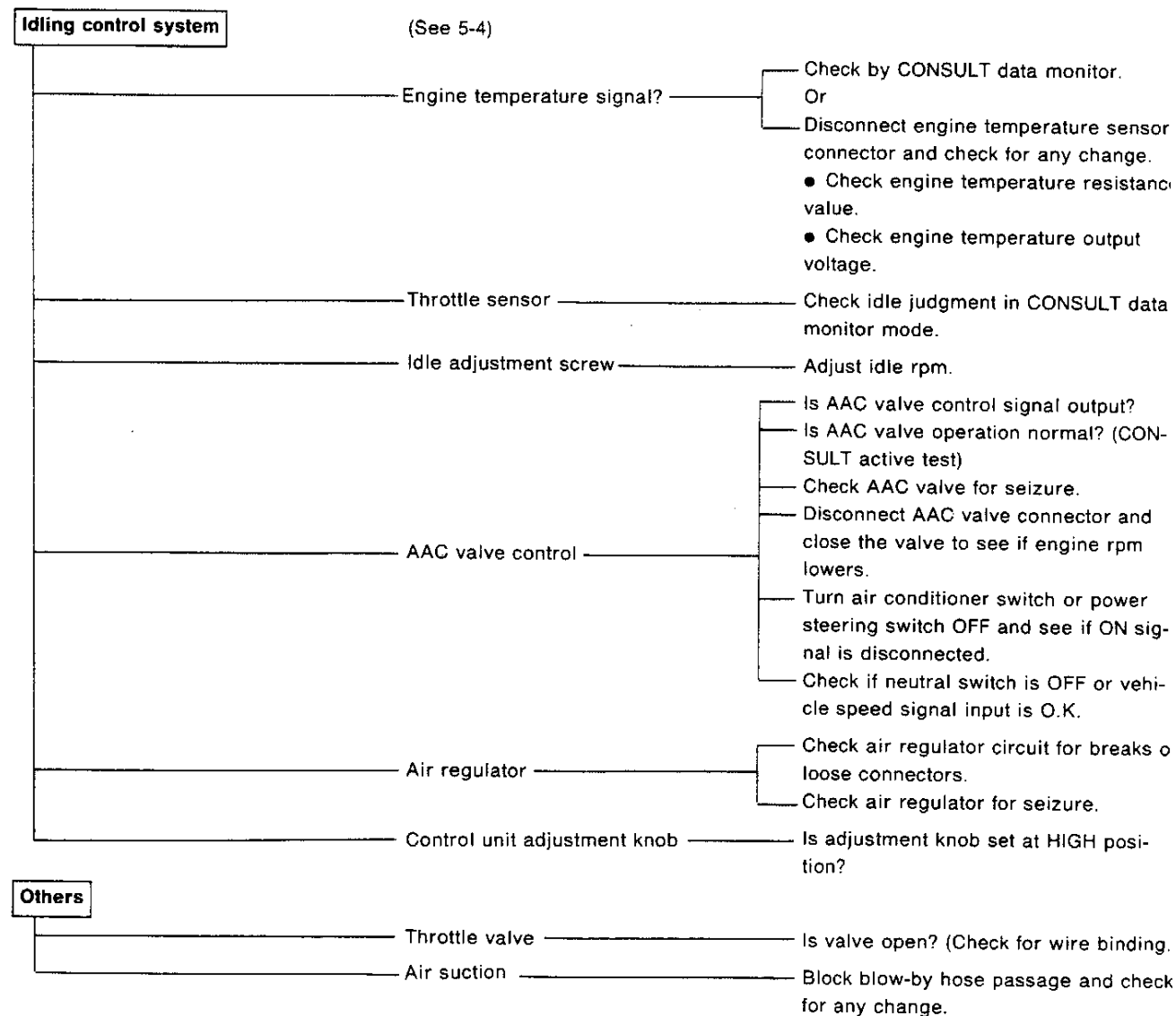
(8) Poor idling ... High idle rpm (after warm-up)

[Analysis]

High idling can be caused by the following factors.

- Low engine temperature signal. (Actual engine temperature differs from monitored temperature.)
- Idle judgment (throttle sensor) is OFF.
- Air conditioner switch and power steering switch are ON continuously.
- AAC valve is seized.
- Idle adjustment screw is not adjusted correctly. (Excessive throttle open position does not reduce engine rpm even if AAC valve is fully closed.)
- Air regulator is not energized.
- Air regulator is seized.
- Control unit adjustment knob is set at HIGH position.
- Throttle valve is open.
- Air is being sucked in.

[Chart]



B3 ECCS (Electronically Concentrated Engine Control System)

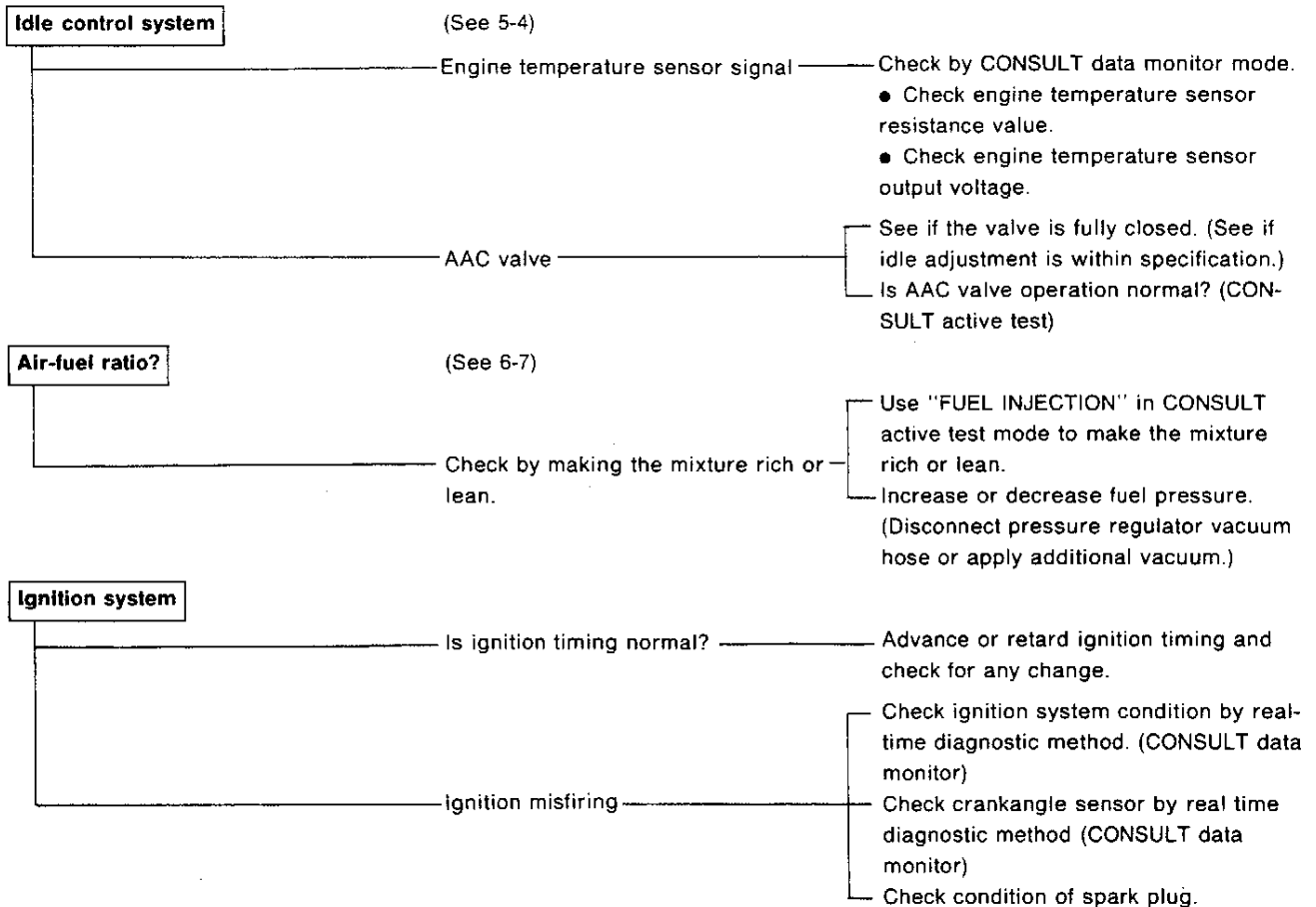
1. Trouble Diagnosis (Cont'd)

(9) Unstable idling ... Cold engine only

[Analysis]

Since idling is unstable only when the engine is cold, cause of this problem can be narrowed down to the relationship between the engine temperature and idle control system. This problem also relates to the air-fuel ratio, ignition timing, misfiring, etc.

[Chart]



(10) Unstable idling ... After warm-up

[Analysis]

This problem relates to various factors including air-fuel ratio, ignition system and compression. It is necessary to determine factors beginning with items that are easy to check.

- Idle rpm control system ... AAC valve operation?
- Air-fuel ratio ... Fuel pressure?
 - Injection quantity? (Enriched?)
 - Air suction?
- Ignition system ... Ignition timing
 - Ignition misfiring (missing signal pulse)
- Engine main unit ... Poor compression

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

[Chart]

Idle control system

(See 5-4)

Check by disabling control function.

Disconnect AAC valve connector and check for any change.

Control circuit

Check if control signal is output and check signal condition. (Use CONSULT data monitor or oscilloscope.)

Is AAC valve operation normal? (CONSULT active test)

Disconnect AAC valve connector and check by adjusting with IAS.

Check AAC valve for seizure.

Check if idle judgment is ON. (CONSULT data monitor)

Check circuit for breaks and connectors for looseness.

Air-fuel ratio

(See 6-7)

Check by enriching the mixture.

Enrich using "FUEL INJECTION" item of CONSULT active test mode, or by disconnecting regulator vacuum hose and clamping off the return hose.

Check by making the mixture lean.

Reduce the mixture ratio by using "FUEL INJECTION" item of CONSULT active test mode, or applying vacuum greater than -66.7 kPa (-500 mmHg, -19.69 inHg) with hand vacuum pump to pressure regulator.

Check by stopping feedback.

Perform CONSULT active test mode (clear with "SELF-LEARNING CONT" item)

Or

Disconnect exhaust gas sensor connector. (Set the circuit from racing mode to idling mode.)

Engine temperature signal?

Check using CONSULT data monitor mode.

Or

Disconnect engine temperature sensor connector and check for any change.

● Check engine temperature sensor resistance value.

● Check engine temperature sensor output voltage.

Check for air suction.

Check vacuum line and blow-by hose.

Ignition system

Is ignition timing normal?

Advanced or retarded ignition timing angle and check for any change.

Ignition misfiring

Check ignition system by real-time diagnosis (CONSULT data monitor mode).

Check condition of crank angle sensor by real-time diagnosis (CONSULT data monitor).

Check condition of spark plug.

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

Engine main body

Compression pressure?

Measure compression pressure. (Check valve timing, valve seats, piston rings, etc.)

(11) Poor driveability ... Engine breathing

[Analysis]

Items to be checked vary if this problem occurs during acceleration or during cruising.

① During acceleration

- Engine breathing while depressing the accelerator may be caused by momentary misfiring, or momentary occurrence of lean mixture (no interrupt injection).
- Increased tension of harnesses or air duct due to inclination of engine during acceleration can also be a cause of poor contact.
- Clogging in fuel system is a cause for engine breathing because sufficient fuel pressure cannot be maintained during acceleration.

② During cruising

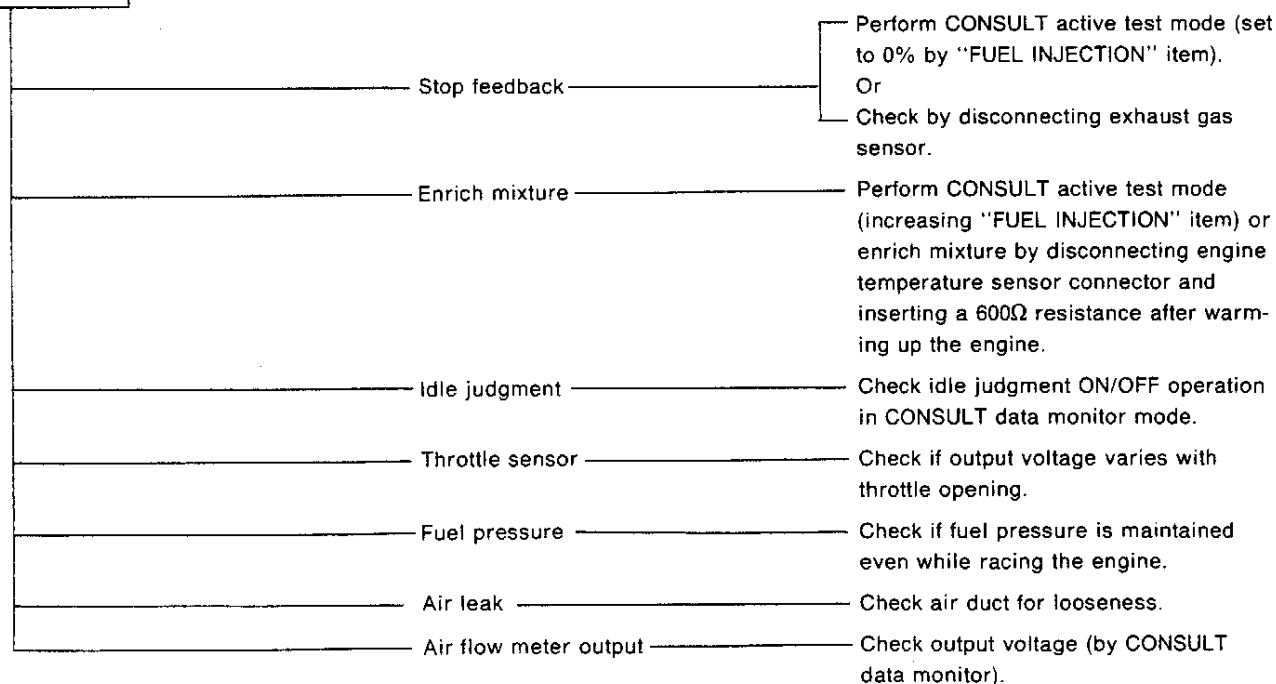
- Lean mixture and engine breathing caused by poor feedback of air-fuel ratio data.
- Misfiring of ignition system caused by leaks.
- Poor contact or malfunction of signal system, use of low quality gasoline.

[Chart]

① When accelerating

Air-fuel ratio

(See 6-7)



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

Ignition system

Ignition misfiring

Check signal system (ignition signal, crank angle sensor signal, air flow meter signal) for instantaneous break by using real-time diagnosis (CONSULT data monitor) or oscilloscope.
Check spark plug gap.
Check if ignition coil power supply voltage is lowered.

Ignition timing

Check if fail-safe mode is not set due to a detonation sensor error. (Check by self-diagnosis.)

② When cruising

Air-fuel ratio

(See 6-7)

Feedback function

Check by CONSULT active test mode. (Set mixture ratio by fuel injection quantity correction to 0%.)

Or

Check by disconnecting exhaust gas sensor connector.

Set self-diagnosis mode 2 and see if exhaust gas temperature warning lamp (or control unit red lamp) is flashing (exhaust gas sensor monitor diagnosis) or check in CONSULT data monitor mode.

Set self-diagnosis mode 2 and check if exhaust gas temperature warning lamp (or control unit red lamp) is flashing more than 5 times in 10 seconds when engine is running at 2,000 rpm, or check by CONSULT data monitor.

Idle judgment

Check if throttle sensor is OFF when accelerator pedal is depressed. (CONSULT data monitor)

Ignition system

Ignition misfiring

Check for instantaneous break in signal system using real-time diagnosis. (Ignition signal, crank angle sensor signal, air flow meter signal) (Use CONSULT data monitor or oscilloscope.)

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

(13) Poor driveability ... Lack of output, poor acceleration, poor response

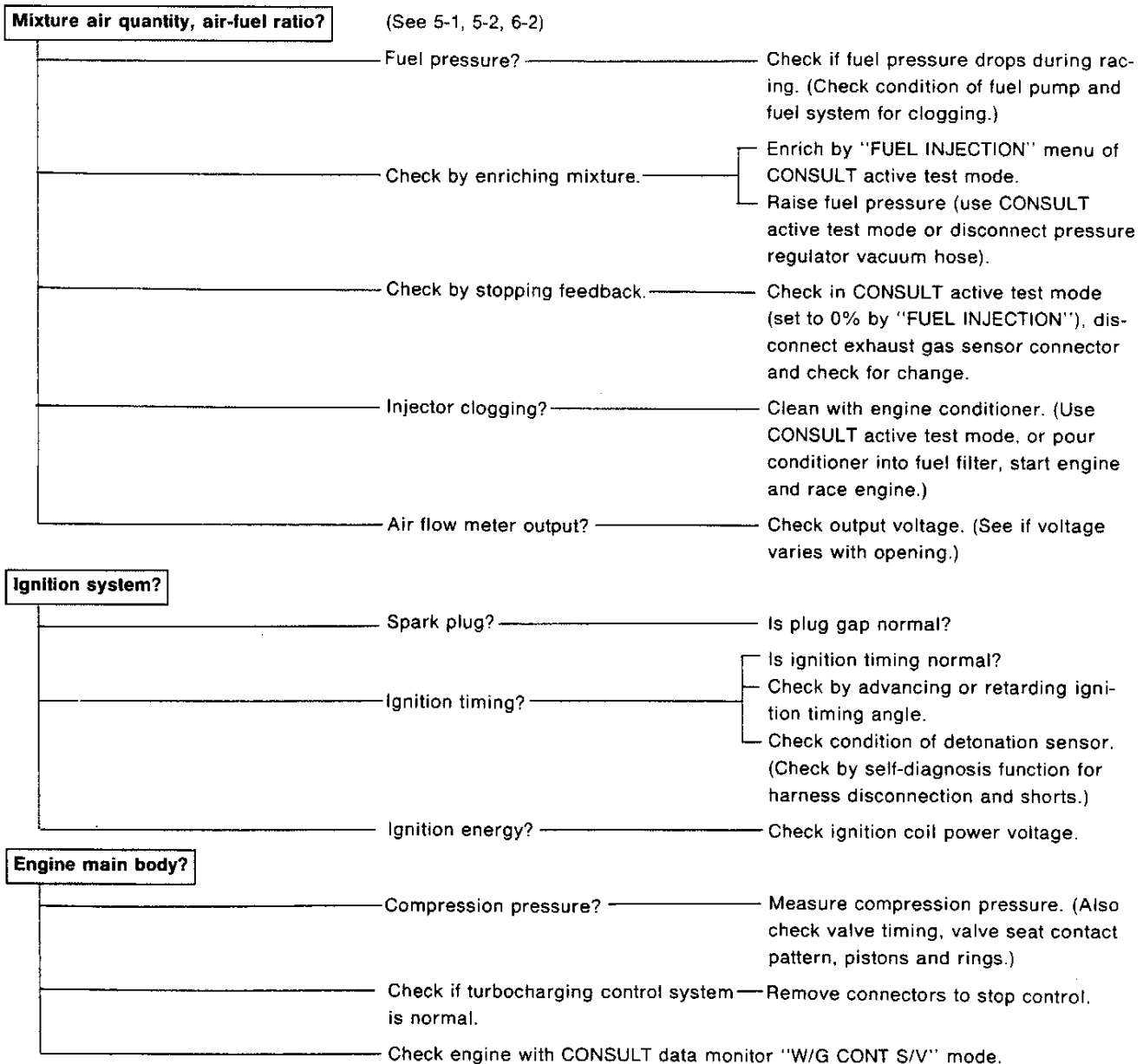
[Analysis]

Lack of power, poor acceleration and poor response are generally caused by insufficient mixture quantity (lack of fuel, lack of air) or incorrect air-fuel mixture ratio.

In the injection system, these problems are caused by lack of ignition energy or incorrect ignition timing.

Lack of compression pressure and excessive friction due to seizure in engine main body are also causes of these conditions.

[Chart]



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

(14) Engine stalls when starting

[Analysis]

Misfiring while depressing accelerator pedal or insufficient torque causes engine to stall when starting off.

- Misfiring
 - Too lean or too rich air-fuel mixture ratio
 - Large error in ignition timing
 - Weak spark
- Insufficient torque
 - Lean or rich mixture
 - Insufficient intake air quantity
 - Insufficient compression pressure

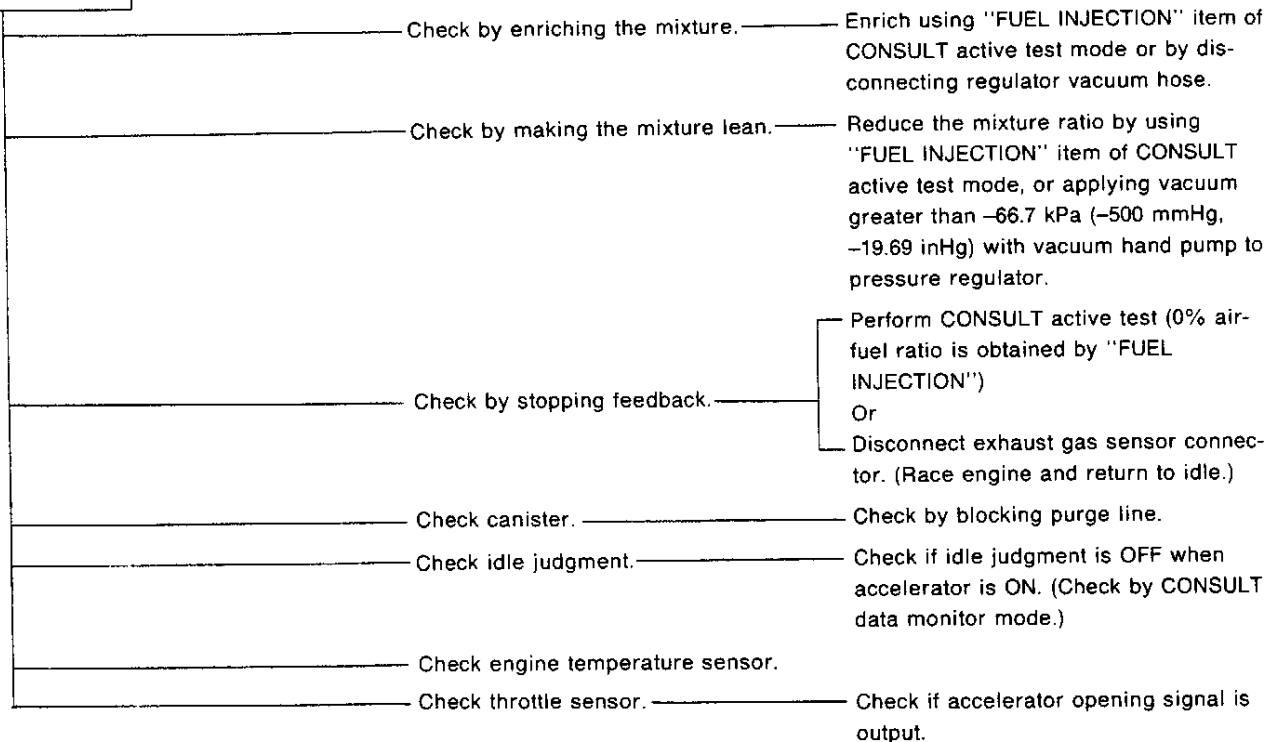
[Chart]

Self-diagnosis

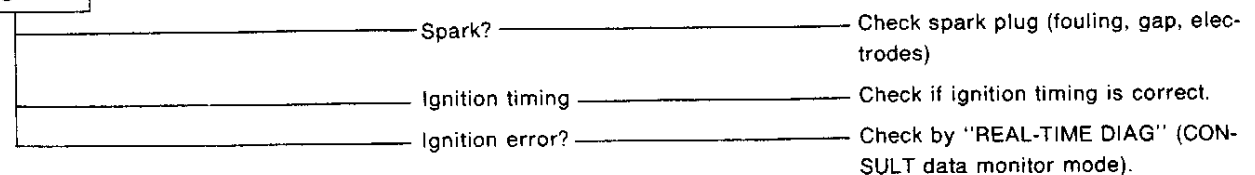
Check if occurrence of error is stored by self-diagnosis function.

Air-fuel ratio?

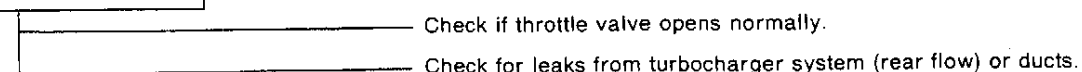
(See 6-4, 6-6, 6-7)



Ignition?



Intake air quantity?



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

Compression pressure?

Measure compression

Check valve timing for error, valves for incorrect contact pattern, pistons and rings for damage.

(15) Engine stall during idling

[Analysis]

Engine stall during idling may be caused by one of the following conditions. (Check idling speed, and then check for misfiring.)

- Improper idling speed
- Improper AAC valve control (Check for delayed response.)
- Excessively lean or rich mixture ratio
- Ignition error
- Poor contact of connector, etc.
- Relation to electrical load ON-OFF

[Chart]

Self-diagnosis

Check if any abnormal data is stored in self-diagnosis.

Idling control? (See 5-4)

Check for proper control.

- Is idling speed normal or adjusted?
- Is AAC valve fully closed? (Check for loose connector.)
- Close AAC valve and check for any change.
- Is AAC valve control signal issued? (Race engine and check voltage.)
- Is AAC valve operation normal? (CONSULT active test)
- Disconnect AAC valve connector, and check by adjusting with IAS.
- See if idle judgment is ON.

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

Air-fuel ratio? (See 6-7)

- | | |
|-----------------------------------|---|
| Is air-fuel ratio normal? | Select self-diagnosis mode 2 and check if exhaust gas temperature warning lamp (or red lamp on control unit) is flashing more than 5 times in 10 seconds when engine is running at 2,000 rpm, or check by CONSULT data monitor. |
| Check by enriching the mixture. | Enrich using "FUEL INJECTION" item of CONSULT active test mode, by disconnecting pressure regulator vacuum hose or closing off the return hose. |
| Check by making the mixture lean. | Reduce the mixture ratio by using "FUEL INJECTION" item of CONSULT active test mode, or applying vacuum greater than -66.7 kPa (-500 mmHg, -19.69 inHg) with hand pump to pressure regulator. |
| Check by stopping feedback. | Perform CONSULT active test (0% air-fuel ratio is obtained by "FUEL INJECTION")
Or
Disconnect exhaust gas sensor connector. (Set circuit from racing mode one time and return to idling mode.) |
| Check fuel pump operation. | Check for pump stop. |
| Check fuel system for clogging. | Race engine and check fuel pressure for drop. |

Others

- | | |
|-------------------------|---|
| Check for poor contact. | Using real-time diagnosis mode, check ignition signal, crank angle sensor signal and air flow meter signal for instantaneous break and missing pulses. (Use CONSULT data mode or oscilloscope.) |
| Check spark plugs. | Check for fouling and plug gap. |

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

(16) Engine stalls during driving

[Analysis]

Engine stall during cruising may be caused by misfiring. If engine stalls during acceleration, it may be caused by misfiring or insufficient torque.

- Too rich or lean air fuel mixture
- Ignition error
- Incorrect ignition timing
- Insufficient intake air quantity
- Insufficient compression pressure
- Misfiring, fuel pump stop, etc. caused by poor electrical contact

[Chart]

Self-diagnosis

Check the stored data by self-diagnosis for any abnormality.

① When cruising

Air-fuel ratio? (See 6-7)

- Idle judgment? ————— Check if idle judgment goes OFF when accelerator pedal is pressed. (Check in CONSULT data monitor mode.)
- Check for normal feedback. ————— Race engine at 2,000 rpm in self-diagnosis mode and check if exhaust gas temperature warning lamp (or red lamp on control unit) is flashing more than 5 times in 10 seconds or check by CONSULT data monitor.
- Stop feedback and check for any change. —————
 - Perform CONSULT active test.
 - Or
 - Check by disconnecting exhaust gas sensor connector.
- Intake air quantity signal ————— Check for poor contact using CONSULT data monitor ("REAL-TIME DIAG") mode.

Ignition?

- Ignition timing? ————— Is ignition timing normal?
- Ignition misfiring ————— Check ignition signal and crank angle sensor signal for missing pulses in CONSULT data monitor ("REAL-TIME DIAG") mode.

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

② During acceleration

Air-fuel ratio?

- Idle judgment? ————— Check if idle judgment goes OFF-ON when accelerator pedal is pressed and released. (Check in CONSULT data monitor mode.)
- Throttle sensor? ————— Check if voltage output varies with throttle opening. (Check in CONSULT data monitor mode.)
- Check for normal feedback. ————— Race engine at 2,000 rpm in self-diagnosis mode and check if exhaust gas temperature warning lamp (or red lamp on control unit) is flashing more than 5 times in 10 seconds or check by CONSULT data monitor.
- Stop feedback and check for any change. —————
 - Perform CONSULT active test. ("FUEL INJECTION" set to 0%)
 - Or
 - Check by disconnecting exhaust gas sensor connector.
- Intake air quantity signal —————
 - Check for poor contact using CONSULT data monitor ("REAL-TIME DIAG") mode.
 - Check for air flow or leaking after turbocharger operation.

Misfiring?

- Ignition timing? ————— Is ignition timing normal?
- Ignition misfiring? ————— Check ignition signal and crank angle sensor signal for missing pulses in CONSULT data monitor ("REAL-TIME DIAG") mode.

Compression pressure?

- Measure compression pressure.

B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

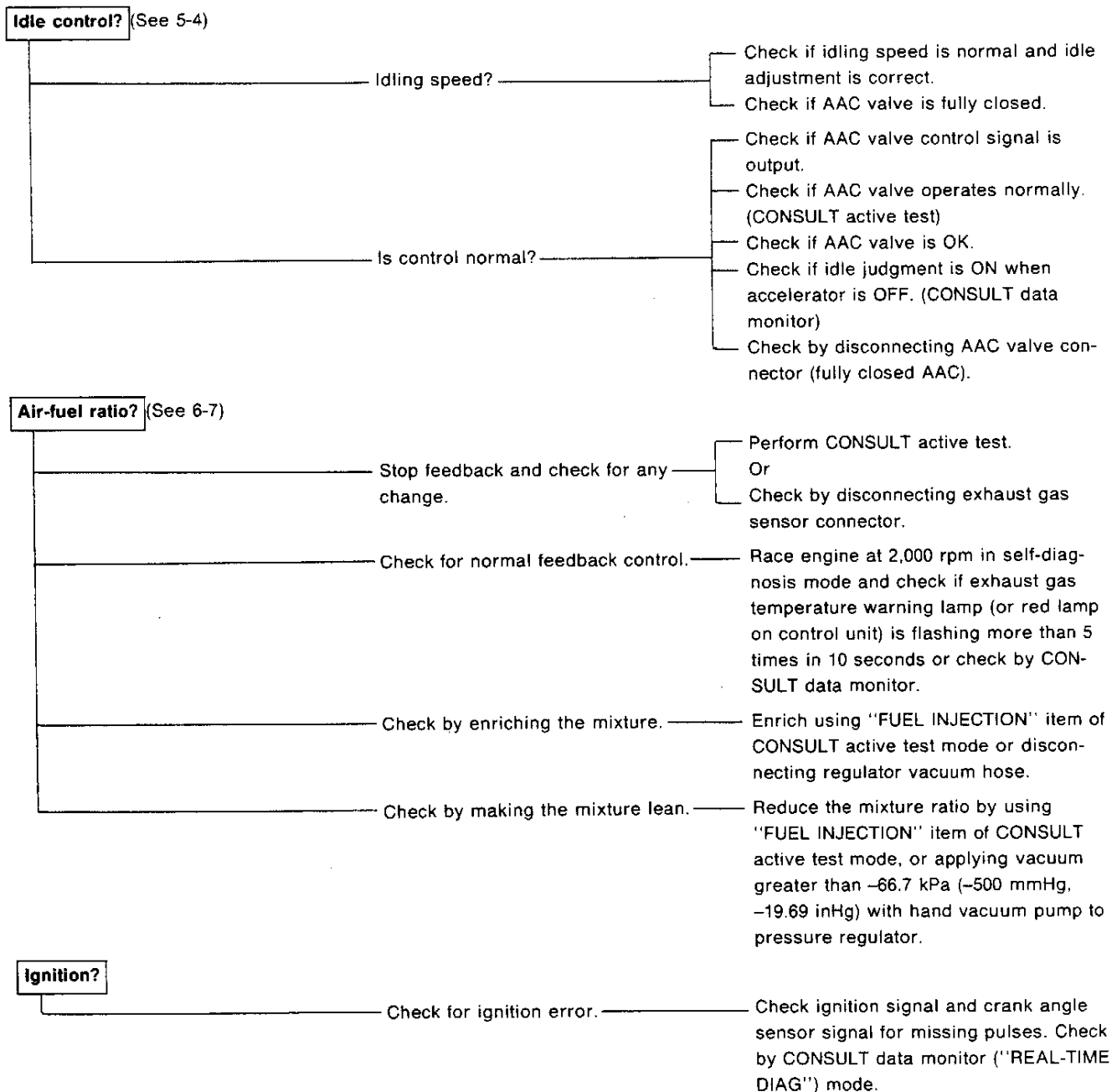
(17) Engine stalls when decelerating or immediately after stopping.

[Analysis]

Reduced engine rpm when releasing accelerator can lead to engine stall. Another cause is misfiring.

- Incorrect adjustment of idling control
- Incorrect air-fuel ratio
- Ignition error

[Chart]



B3 ECCS (Electronically Concentrated Engine Control System)

1. Trouble Diagnosis (Cont'd)

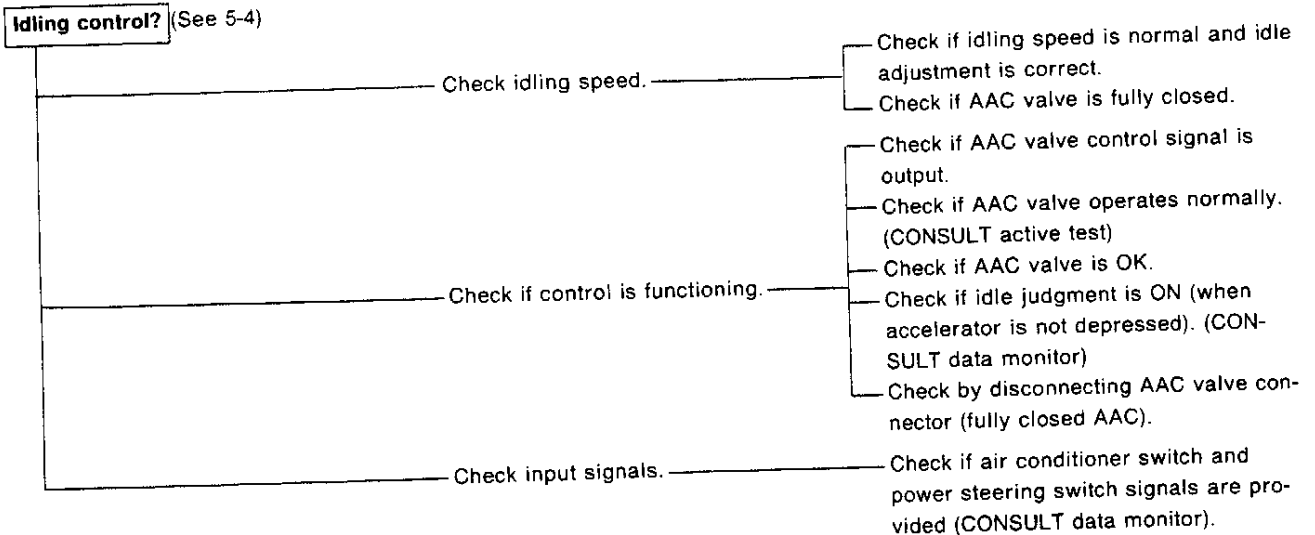
(18) Engine stalls when electrical load or power steering load is applied

[Analysis]

Check if idling is increased when load switch is turned ON (AAC valve correction quantity increases when load is applied).

- Check if ON signal is input from each switch.
- Check if AAC valve is operating.

[Chart]



2. Diagnostic System

2-1 GENERAL

The diagnostic system performance has been greatly improved concerning warning indication to drivers, operation of the self-diagnostic system, and application of the newly developed electrical system diagnostic tester CONSULT.

(1) Enhanced fault alarm items

If an error occurs in the ECCS system during driving, the exhaust gas temperature warning lamp flashes in the combination meter. At the same time, the backup function is activated to ensure the safety of the occupants and vehicle.

(2) Simplified troubleshooting

The following features have been incorporated for ease of inspection and problem diagnosis of ECCS system.

① Improvement of self-diagnostic function

The diagnostic modes have been rearranged and the mode shift and display systems have been simplified.

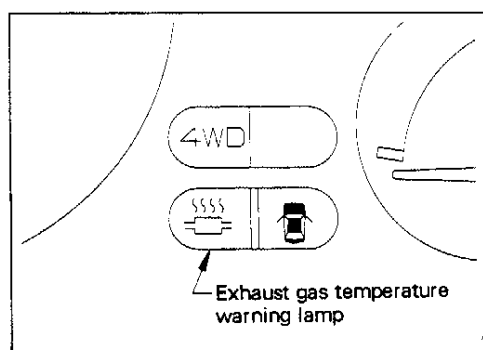
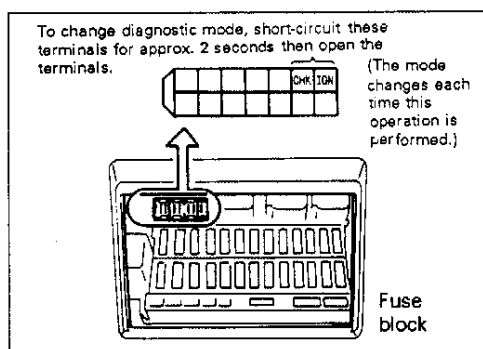
New system		
Diagnostic mode	Mode selection	Display
1 Fault alarm (Same as the former backup display mode)	By diagnostic connector installed on lower side of fuse block (Also adjustable by the knob installed on control unit)	Indicated by exhaust gas temperature warning lamp (also linked with the red lamp on control unit)
2 Exhaust gas sensor monitor (Same as the former air-fuel ratio feedback display)		
Self-diagnosis (The former ON/OFF switch diagnosis and real-time diagnosis are included in the operations performed by CONSULT as explained in item ② on the next page.)		



Current system		
Diagnostic mode	Mode selection	Display
1 Backup display	By adjustment knob on control unit.	Indicated by red or green lamps on control unit.
2 Air-fuel ratio feedback display		
3 Ordinary self-diagnosis		
4 ON/OFF switch diagnosis		
5 Real-time diagnosis		

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)



② Adoption of electronic system diagnostic tester for problem diagnosis.

The diagnostic functions have been modified to enable use of the newly developed electrical system diagnostic tester CONSULT to simplify complex diagnosis procedures.

CONSULT is a compact and lightweight hand-held type test device especially designed for automotive service operations, and can be used by simply connecting it to the diagnostic connector installed on the vehicle. This tester permits data display, recording and printing.

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

The CONSULT system has the following functions.

Mode		Description		Mode selection	Display
Diagnostic mode	SELF-DIAGNOSTIC RESULTS	Self-diagnosis	The same number of items are possible as previously described ①.	Diagnostic modes can be selected easily by the touch-sensitive keys of CONSULT.	Displayed data can be read easily on the CONSULT screen.
	DATA MONITOR	<ul style="list-style-type: none">● Used to identify major cause of fault, according to results of self-diagnosis.● Permits monitoring (observation and recording) and printing of input and output data of the control unit.● Permits data to be recorded in case of engine damage or engine stall.● The former diagnostic modes listed below are included in this monitor item.			
		<ul style="list-style-type: none">● Exhaust gas sensor monitor	Displays exhaust gas sensor output voltage and if mixture is lean or rich.		
		<ul style="list-style-type: none">● Switch ON/OFF	Same as former function.		
		<ul style="list-style-type: none">● Real-time diagnosis	Same as the former function		
	ACTIVE TEST	<ul style="list-style-type: none">● Used to examine major causes of problems according to self-diagnosis results and data monitor.● Used to check actuator operation by giving driving signal to the actuator.			
Supplemental	WORK SUPPORT	<ul style="list-style-type: none">● Used to reduce additional operation when checking idling, etc. (Example: When adjusting AAC valve, feedback control can be fixed by using this mode.)			

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

ECCS control unit input/output signals and applicable modes

Signal name \ Mode		Self-diagnosis	Data monitor	Active test	Work support
Input	Crank angle sensor	○	○		
	Air flow meter	○	○		
	Engine temperature sensor	○	○	○	
	Exhaust gas sensor		○		
	Vehicle speed sensor		○		
	Battery voltage		○		
	Throttle sensor	○	○		○
	Idle position (throttle sensor)		○		
	Intake temperature sensor	○	○		
	Detonation sensor	○			
	Ignition switch (Start signal)		○		
	Air conditioner, neutral, power steering oil pressure switch		○		
Output	Injectors		○	○	
	Power transistor (ignition signal)	○	○ (Ignition timing)	○ (Ignition timing)	
	A.A.C. valve		○	○	○
	Air conditioner relay		○		
	Fuel pump relay		○	○	
	Wastegate valve control solenoid valve		○		

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

2-2 SELF-DIAGNOSIS

Self-diagnosis can be performed by indications from the exhaust gas temperature warning lamp in the combination meter and the red lamp on the ECCS control unit, or by displaying data on the CONSULT screen.

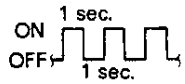
(1) Exhaust gas temperature warning lamp indication

Two diagnostic modes are available. In each mode, diagnosis is performed by operating the diagnostic connector terminal installed on the vehicle. (Diagnosis can also be performed using the adjustment knob on the control unit.) The diagnosis results are displayed by the exhaust gas temperature warning lamp in the combination meter and the red warning lamp on the control unit.

Basic operation and indication

Item		Operation	Indication (Flashing of exhaust gas temperature warning lamp and red warning lamp of control unit.)
Mode			
Mode 1	Fault alarm	Ignition switch ON Engine rotation	Alarm: Faulty system is indicated by warning lamp flashing pattern (backup function). Normal: Warning lamp remains OFF.
Mode 2	Self-diagnosis	Ignition switch ON ↓ Diagnosis mode shift ↓ Engine stop (with ignition switch remaining ON)	Fault: Faulty system is indicated by flashing code. Normal: Flashing code "55" is displayed.
	Exhaust gas sensor monitor	Self-diagnosis status described above ↓ Engine rotation	Lamp ON means "lean" mixture; OFF means "rich" mixture.

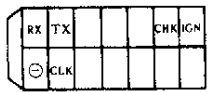
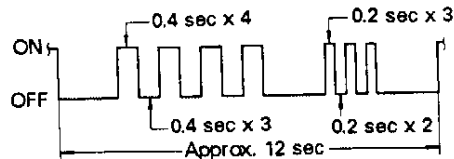
① Fault alarm mode (Mode 1)

Step	Operation	Indication			
1	Turn ignition switch ON. Mode 1 is normally set by this operation. [Pay attention to the following case that may occur: If the ignition switch is turned OFF in the self-diagnosis mode and then turned ON in a few seconds, the self-diagnosis mode will be executed. In this case, the self-diagnosis mode must be selected. (See item ② .)]	Indicated by flashing exhaust gas temperature warning lamp in combination meter and red lamp of control unit. (These lamps are linked together.)			
			Engine rotation	Indication	Condition
		Alarm	Stop	ON (lamp check)	—
			Rotating	ON OFF 	CPU backup (All models) (Lamp flashes when engine is OFF.)
		Normal	OFF	ON (lamp check)	—
			Rotating	OFF	
2	Run engine.				

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

② Self-diagnostic mode (Mode 2)

Step	Operation	Indication
1	<p>Turn ignition switch ON. Select the diagnostic mode by the method indicated below because the fault alarm mode is normally set after turning the ignition switch ON. Use a lead to short-circuit the CHK and IGN terminals connected on the diagnosis connector located on the vehicle (near the fuse block) for approx. 2 seconds, then separate the terminals. (Diagnosis connector)</p>  <p>(The fault alarm mode and self-diagnosis mode alternate each time the operation described above is performed.)</p>	<p>By flashing of the exhaust gas temperature warning lamp in combination meter and red lamp in control unit is used. (Operation of these two lamps is linked together.)</p> <p>Example: Indication of code number "43".</p> 
2	<p>Shut off engine (with the ignition switch remaining in ON position.) (If the engine is operated in this condition, the exhaust gas sensor monitor in the next mode is activated.)</p>	

(Reference) Names of diagnostic connector terminals
 CHK: Diagnosis start (check)
 IGN: Ignition power supply
 ⊖: GND
 RX: Control unit data reception
 TX: Control unit data transmission
 CLK: Transmission synchronization signal (clock)

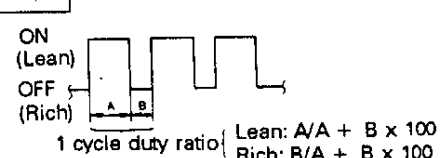
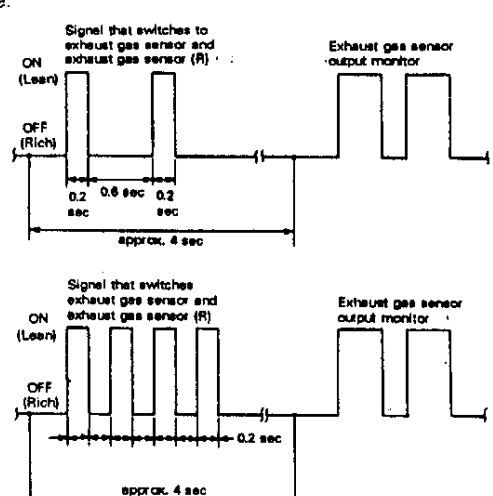
Code No.	Diagnosis item	Error (code number) state
11	Crank angle sensor signal system	<ul style="list-style-type: none"> 1° signal or 120° signal is not input for a certain period of time after starting engine. Incorrect signal waveform (abnormal correlation between 1° signal and 120° signal)
12	Air flow meter signal system	<ul style="list-style-type: none"> Hot wire disconnection Disconnection or short-circuit in air flow meter power supply line, ground line or signal system. Signal output is below 0.5 volts for a certain period during engine operation. Signal output is higher than 2 volts for a certain period of time with engine stalled, or when ignition switch is set to ON from OFF.
13	Engine temperature sensor signal system	<ul style="list-style-type: none"> Break or short-circuit in engine temperature sensor signal system
21	Ignition signal system	<ul style="list-style-type: none"> Ignition signal is not generated continuously even though crank angle sensor signal is entered. (Disconnection between power transistor and control unit)
34	Detonation sensor signal system	<ul style="list-style-type: none"> Disconnection or short-circuit in detonation sensor signal system
41	Intake temperature sensor signal system	<ul style="list-style-type: none"> Disconnection or short-circuit in intake temperature sensor signal system
43	Throttle sensor signal system	<ul style="list-style-type: none"> Disconnection or short-circuit in throttle sensor signal system (When engine is running, short-circuit occurs when voltage is 0.2V maximum except for N range. Disconnection occurs when voltage is 5V minimum.)
55	No error	<ul style="list-style-type: none"> No abnormality was detected in any of the above signal systems.

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

How to erase memory

- (a) Stop engine in mode 2 and short-circuit terminals "CHK" and "IGN" of the diagnostic connector for approx. 2 seconds, then disconnect. This will erase the memory on all diagnosis items. (The memory is also erased when the self-diagnosis mode is switched to the fault alarm mode.) Refer to the diagram indicated in table above.
- (b) When method (a) is not used: The memory is erased automatically if the ignition switch "START" operation is performed successfully 50 times.
(The memory is automatically erased every 50 "START" operations of the ignition switch.)
- ③ Exhaust gas sensor monitor mode (mode 2)

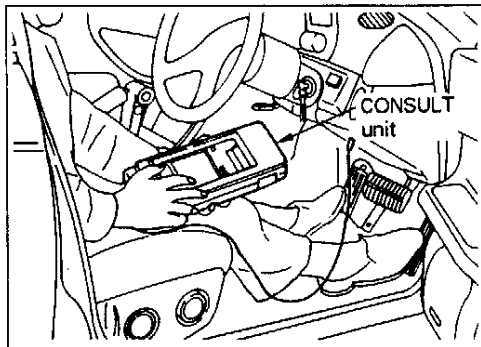
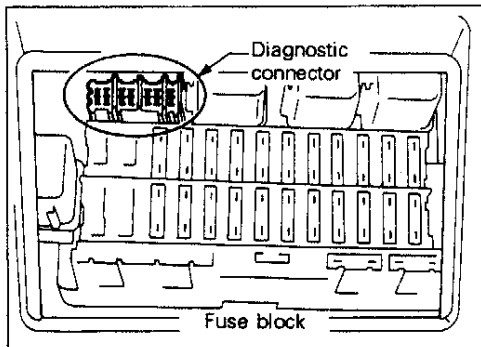
Step	Operation	Indication
1	<p>Set ignition switch to "ON".</p> <p>Make sure self-diagnosis mode is set. If problem alarm mode is set, connect diagnostic connector "CHK" and "IGN" terminals for approx. 2 seconds then disconnect the terminals. (See item ② above.)</p>	<p>Indication is made by the warning lamp (exhaust gas temperature warning lamp) on the instrument panel and the red lamp on the control unit. (These two lamps are linked together.)</p> <p>① During air-fuel ratio feedback control: When exhaust gas sensor output is "RICH": Lamps are OFF When exhaust gas sensor output is "LEAN": Lamps are ON (Reference) The lamp ON and OFF indication is the same as that of the air-fuel ratio feedback correction coefficient indicated by the red lamp in the former control unit.</p> <p>② When air-fuel ratio feedback control is clamped: The status immediately before clamping is maintained.</p> <p>③ When air-fuel ratio feedback control is faulty: OFF</p> <p>Display example</p> 
2	<p>Start engine.</p> <p>Note: Mode cannot be changed while engine is operating.</p> <p>After engine warms up adequately, increase engine speed until exhaust gas temperature warning lamp (approx. 2,000 rpm or until red lamp in control unit starts to flash) and exhaust gas sensor output monitor (R) mode is set.</p> <p>Caution: Check by pressing the accelerator pedal slightly because the air-fuel ratio feedback control is clamped during idling.</p> <p>Check that exhaust gas temperature warning lamp (or red lamp in control unit) flashes in this condition.</p> <p>Connect terminals "CHK" and "IGN" of the diagnostic connector for approx. 2 seconds, then disconnect. After the exhaust gas temperature warning lamp (or red lamp in control unit) flashes 2 times, the exhaust gas sensor output monitor mode is switched.</p>	<p>The status of the air-fuel ratio is indicated by the duty ratio in one cycle.</p> 

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

(2) CONSULT display screen

- Connect CONSULT to the diagnostic connector on the vehicle (lower side of fuse block) on the vehicle. Data is displayed on the CONSULT screen as the touch-sensitive keys of CONSULT are operated. The exhaust gas sensor monitoring, switch ON/OFF operation and real-time diagnosis are performed using the data monitor mode (see item 2-4).



① "SELF-DIAGNOSTIC RESULTS" mode

The diagnosis items are the same as those listed in item (1) ②. Faulty system name is indicated.

Step	Operation	Display
1	Connect CONSULT to diagnostic connector of vehicle.	<div>■ SELF-DIAG RESULTS ■</div> <div>FAILURE DETECTED TIME</div> <div>ENGINE TEMP SENSOR 0</div> <div>ERASE PRINT</div> <div>The number of times the vehicle has been driven after detecting the last problem is displayed here. If the same problem is still present, "O" is displayed.</div>
2	Set ignition switch to "ON". (Shut off engine.)	
3	Check with "SELF-DIAGNOSTIC RESULTS".	
4	To print, touch "PRINT" key. To erase stored data, touch "ERASE" key.	

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

2-3 FAIL-SAFE FUNCTION AND BACKUP FUNCTION

The fail-safe function ensures the safety of the driver and vehicle using the control unit control signals in case of an error in an important system device such as a sensor, etc.

The backup function ensures normal vehicle operation even when an error occurs in a vital sensor. For this purpose, the control unit ignores the signal sent from a failed sensor like this and outputs prearranged control signals.

When the backup function is operating, the fault alarm mode is set and the exhaust gas temperature warning lamp flashes in the combination meter.

Item	Description of problem	Fail-safe or backup	Alarm indication
CPU backup	When detecting error in internal circuit of control unit	<ul style="list-style-type: none">● Ignition timing is fixed at a specified value.● Fuel injection is fixed in 3 patterns: start-time injection, idling injection and driving injection.	<ul style="list-style-type: none">● Exhaust gas temperature warning lamp flashes in 1-sec intervals.● Reduce driving speed when CPU backup is performed.
Air flow meter	When intake air quantity signal is disconnected during engine operation.	<ul style="list-style-type: none">● There are two air flow meters to provide a backup meter if one is faulty (which enables almost normal operation). If both meters malfunction, the fail-safe function is set.● Fuel injection pulse width is fixed at a specified value.● Fuel is cut off at 2,400 rpm.	("12" is indicated in self-diagnosis mode.)
Engine temperature sensor	When short-circuited or disconnected.	Normal engine operation is enabled.	("13" is indicated in self-diagnosis mode.)
Detonation sensor	When short-circuited or disconnected.	A maximum 5° angle is delayed in knock control area.	("34" is indicated in self-diagnosis mode.)
Throttle sensor backup	When short-circuited (approx. 0.2V max.) or disconnected (approx. 5V min.) during engine operation.	Idle judgment is switched from a software switch (throttle sensor) to mechanical switch (throttle valve switch).	("43" is indicated in self-diagnosis mode.)

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

2-4 DATA MONITOR

The data monitor can be utilized when performing troubleshooting or trouble diagnosis according to the self-diagnosis results.

CONSULT performs monitoring (display and recording) and printing of the ECCS control unit input and output signal data. In case of engine malfunction or engine stall, the data before and after occurrence of the error can be recorded by manual or automatic operation.

(1) Monitoring items and description

Some monitor items are not applicable to all vehicles. (Inapplicable items are not displayed.)

Monitor item	Unit	Description	Remarks
CAS. RPM (POS)	rpm	Engine rpm computed from POS (1°) signal sent from crank angle sensor	Accuracy slightly lowered at less than idle speed.
AIR FLOW METER	V	Air flow meter output voltage	Voltage is fixed at approximately 0V when engine is stopped.
AIR FLOW METER-R			
ENG TEMP SEN	°C °F	Engine temperature value converted from engine temperature sensor voltage	If disconnection or short-circuit occurs in sensor circuit, fail-safe function is activated and engine temperature is fixed at a certain level. (The value increases until a certain value of the timer is reached right after the ignition switch is turned ON.)
EXH GAS SEN	V	Exhaust gas sensor output voltage	Sensor output is fixed at 0V when engine is stopped.
EXH GAS SEN-R			
M/R F/C MNT	(RICH/LEAN)	Air-fuel ratio of exhaust gas sensor signal during air-fuel ratio feedback control RICH: Sensor detects rich mixture and control is performed to reduce mixture ratio. LEAN: Sensor detects lean mixture and control is performed to increase mixture ratio.	<ul style="list-style-type: none"> After turning ignition switch "ON", "LEAN" status is displayed until air-fuel ratio feedback control starts. If clamp occurs, the status just before clamp occurrence is indicated.
M/R F/C MNT-R			
CAR SPEED SEN	km/h, mph	Value computed from vehicle speed sensor signal	—
BATTERY VOLT	V	ECCS control unit power supply voltage	—
THROTTLE SEN		Throttle sensor output voltage	—
INT/A TEMP SEN	°C °F	The value converted from intake temperature sensor output voltage to intake temperature.	Fail-safe is activated if disconnection or short-circuit occurs and this value is fixed. (The value right after ignition switch is turned ON is increased to a certain value by the timer.)
START SIGNAL	(ON/OFF)	ON/OFF setting is determined from each signal output.	"OFF" is indicated irrespective of starter signal after starting engine.
IDLE POSITION			Idle judgment determined from throttle sensor output. (When throttle sensor is faulty, a backup is performed using the throttle valve switch.)
AIR COND SIG			—
NEUTRAL SW			
PW/ST SIGNAL			
INJ PULSE	msec	Value computed by control unit	A value is indicated with engine stopped.
INJ PULSE-R			

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

Monitor item	Unit	Description		Remarks
IGN TIMING	BTDC (°)	Value computed by control unit		A fixed value is indicated with engine stopped.
AAC VALVE	%	Value computed by control unit "%%": Proportional solenoid system (Opening increases with numerical value.)		
A/F ALPHA		Mean value of air-fuel ratio feedback correction factor for each cycle		A fixed value is indicated with engine stopped.
A/F ALPHA-R				
AIR COND RLY	(ON/ OFF)	Control condition computed by control unit.		—
FUEL PUMP RLY				
W/G CONT S/V	(ON/ OFF)	Control condition computed by control unit	ON: Correction passage "open" OFF: Correction passage "closed"	
■ VOLTAGE		Voltage probe measurement value is indicated.		
■ PULSE		Pulse probe measurement value is indicated.		

Note: AIR FLOW METER, EXH GAS SEN, M/R F/C MNT, INJ PULSE, A/F ALPHA are monitored independently by cylinders groups 1-3 (-R) and 4-6.

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

(2) Operation and display

Step	Operation	Display (example)
1	Connect CONSULT to diagnostic connector on vehicle.	<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between;"> ☆MONITOR ☆NO FAIL <input checked="" type="checkbox"/> </div> <div> CAS•RPM (POS) 950rpm AIR FLOW MTR 0.92V AIR FLOW MTR-R 0.82V ENG TEMP SEN 57°C EXH GAS SEN 1.44V EXH GAS SEN-R 0.02V M/R F/C MNT RICH M/R F/C MNT-R RICH CAR SPEED SEN 0km/h BATTERY VOLT 14.0V </div> </div> <div style="border: 1px solid black; text-align: center; padding: 2px; margin-top: 5px;">RECORD</div>
2	Run engine or drive vehicle.	
3	Select a desired item on "DATA MONITOR" menu.	<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between;"> ★RECORD4/8 ☆NO FAIL <input checked="" type="checkbox"/> </div> <div> CAS•RPM (POS) 950rpm AIR FLOW MTR 0.92V AIR FLOW MTR-R 0.82V ENG TEMP SEN 62°C EXH GAS SEN 1.40V EXH GAS SEN-R 0.90V M/R F/C MNT RICH M/R F/C MNT-R RICH CAR SPEED SEN 0km/h BATTERY VOLT 14.0V </div> </div> <div style="border: 1px solid black; text-align: center; padding: 2px; margin-top: 5px;">RECORD</div>
4	Press "RECORD" key.	

① Exhaust gas sensor monitor

Exhaust gas sensor output voltage and RICH/LEAN status are displayed.

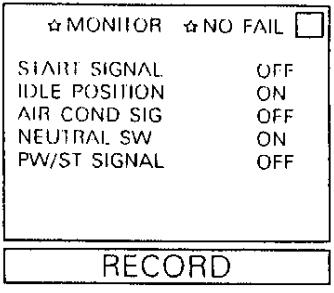
Step	Operation	Display (example)
1	Connect CONSULT to diagnostic connector on vehicle.	<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between;"> ☆MONITOR ☆NO FAIL <input type="checkbox"/> </div> <div> CAS•RPM (POS) 950rpm EXH GAS SEN 1.23V EXH GAS SEN-R 1.10V M/R F/C MNT RICH M/R F/C MNT-R RICH </div> </div> <div style="border: 1px solid black; text-align: center; padding: 2px; margin-top: 5px;">RECORD</div>
2	Run engine.	
3	Select EXH GAS SEN, EXH GAS SEN-R, M/R F/C MNT and M/R F/C MNT-R items on "DATA MONITOR" menu.	
4	To record data, press "RECORD" key.	

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

② Switch ON/OFF

The ON/OFF status of each switch is indicated.

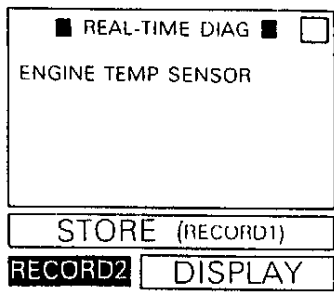
Step	Operation	Display (example)
1	Connect CONSULT to vehicle's diagnostic connector.	
2	Run engine or drive vehicle.	
3	Select each switch on "DATA MONITOR" menu.	
4	Set operating condition for applicable switch and check ON/OFF display.	

Diagnosis item

- (1) Ignition switch START signal system
- (2) Air conditioner switch signal system
- (3) Neutral switch signal system
- (4) Power steering switch signal system
- (5) Throttle position (throttle sensor system)

③ Real-time diagnosis

Although the diagnosis items are the same as those listed in item (2) Self-diagnosis, and Switch ON/OFF in section 2-2, this diagnostic mode provides higher detection capability than the self-diagnosis mode (2).

Step	Operation	Display (example)
1	Connect CONSULT to vehicle's diagnostic connector.	
2	Run engine or drive vehicle.	
3	Check using "DATA MONITOR" REAL-TIME DIAG mode. [If any abnormality is detected, data monitoring is stopped and data is recorded automatically.]	

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

2-5 ACTIVE TEST

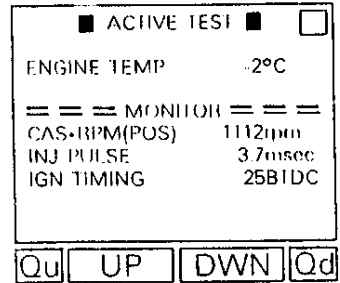
The active test mode is utilized to examine the problem diagnosis according to self-diagnosis results and data monitor results. CONSULT gives driving signals to the actuators while isolating the on-board ECCS control unit, to check if the actuator is functioning normally.

(1) Test items and description

Some test items do not apply to all vehicle models. (Inapplicable items are not displayed.)

Active test item	Description
FUEL INJECTION	Varies air-fuel ratio.
AAC VALVE OPENING	Sets control value (opening).
ENGINE TEMPERATURE	Sets engine temperature.
IGNITION TIMING	Sets delay angle correction value.
POWER BALANCE	Fixes AAC valve opening and can stop specified injector operation. Engine speed at this time can be displayed.
FUEL PUMP RELAY	Turns ON/OFF.
SELF-LEARNING CONT	Clears learned data on air-fuel ratio feedback correction factor.

(2) Operation and display

Step	Operation	Display (example)
1	Connect CONSULT to vehicle diagnostic connector.	 <p>The display shows a menu with 'ACTIVE TEST' selected. It lists 'ENGINE TEMP' at -2°C, 'CAS·RPM(POS)' at 1112rpm, 'INJ PULSE' at 3.7msec, and 'IGN TIMING' at 25B1DC. Below the menu are four buttons: 'Qu', 'UP', 'DWN', and 'Qd'. Arrows point from the text labels to the corresponding parts of the display.</p>
2	Run engine or drive vehicle.	
3	Select desired test item on "ACTIVE TEST" menu.	
4	Press "START" key and input a set value.	

Note: ● The set value will be canceled if test is terminated, canceled or power is turned OFF (CONSULT power OFF, ignition switch OFF, disconnection of battery terminal) during active test.
 ● If the diagnostic connector is disconnected during active test, the active test set status is maintained until the ignition switch is turned OFF.

B3 ECCS (Electronically Concentrated Engine Control System)

2. Diagnostic System (Cont'd)

2-6 WORK SUPPORT

CONSULT can be used as a powerful aid for idling checks and other engine tune-up operations. It issues instructions to the ECCS control unit to perform control and displays the input and output signal data being used. Actual tune-up operation (for example, turning adjustment screw, etc.) must be performed manually by the mechanic.

(1) Support items and description

Work support item	Description
AAC VALVE ADJ	Fully closes AAC valve and displays idling rpm.
THROTTLE SENSOR ADJ	Closes AAC valve completely and displays throttle sensor output voltage.

Note: Although it is possible to adjust the "IGNITION TIMING", this adjustment should not be performed because it may cause the timing to become unstabilized.

(2) Operation and display

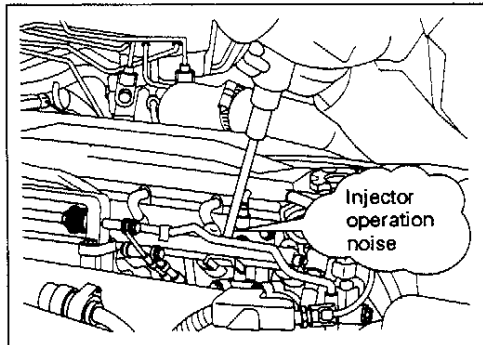
Step	Operation	Display (example)
1	Connect CONSULT to vehicle diagnostic connector.	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">■ AAC VALVE ADJ ■</p> <p>SET ENGINE RPM AT THE SPECIFIED VALUE UNDER THE FOLLOWING CONDITION</p> <ul style="list-style-type: none"> ● ENG WARMED UP ● NO LOAD <p style="text-align: center; border: 1px solid black; padding: 2px;">START</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">■ AAC VALVE ADJ ■ <input type="checkbox"/></p> <p>****ADJ MONITOR****</p> <p>CAS-RPM(POS) 612rpm</p> <p>— — CONDITION SETTING — —</p> <p>AAC VALVE FIXED</p> <p>== == MONITOR == ==</p> <p>ENG TEMP SEN 83°C</p> <p>IDLE POSITION ON</p> <p>AIR COND SIG OFF</p> </div>
2	Run engine.	
3	Select desired item on "WORK SUPPORT" menu.	
4	Press "START" key and execute operation.	

Note: The work support mode is maintained until ignition switch is turned OFF if the diagnostic connector is disconnected or while CONSULT is being used as a support.

B3 ECCS (Electronically Concentrated Engine Control System)

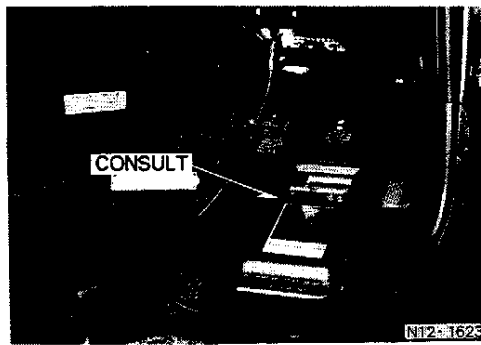
3. Basic Inspection

Inspect the three elements of combustion (1. Is fuel injected? 2. Does the spark arc? 3. Does the AAC valve work?) and determine if the faulty system is the fuel system, ignition system or idle control system.



3-1 INJECTOR OPERATION INSPECTION

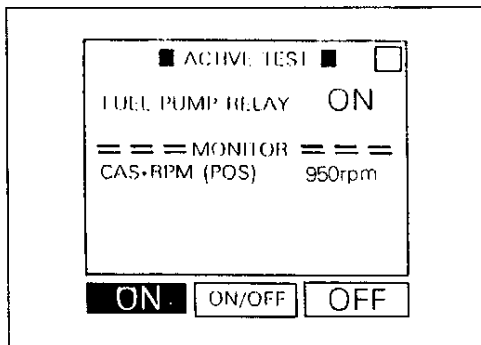
- Place a stethoscope or screwdriver on the injector and check for injector operation noise (click, click, click) while cranking engine.
If NG: Inspect the injector control circuit.



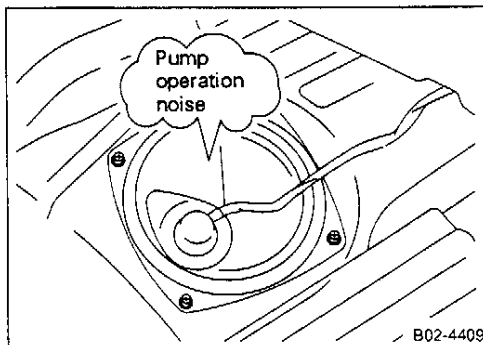
3-2 FUEL PUMP INSPECTION



- Connect CONSULT to the diagnosis terminal on the side of the vehicle (near fuse block).
Note: See B3, 2.2-2 (2)



- Turn the ignition switch "ON" and select the "ACTIVE TEST" mode. Press the operation key when "FUEL PUMP RELAY" is displayed and check for pump operation noise.



- After turning ignition switch "ON", check for fuel pump operation noise for 5-sec interval.
- There must be a fuel pump operation noise while cranking engine.
If NG: Inspect fuel pump control circuit.

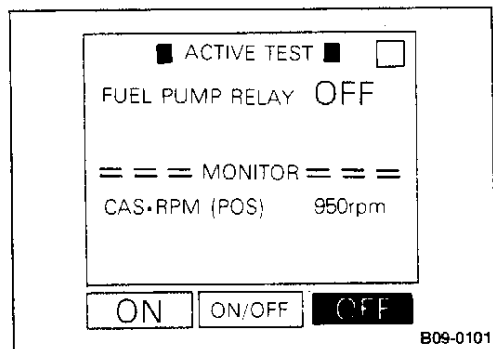
B3 ECCS (Electronically Concentrated Engine Control System)

3. Basic Inspection (Cont'd)

3-3 FUEL PRESSURE INSPECTION

(1) Simple inspection

- When the fuel pump is operating, press the hose between fuel filter and fuel gallery with a finger. There must be tension and pulsations in the hose.



- Run the engine.
- Select the "FUEL PUMP RELAY" item in the "ACTIVE TEST" mode.
- Press the OFF button to release fuel pressure.

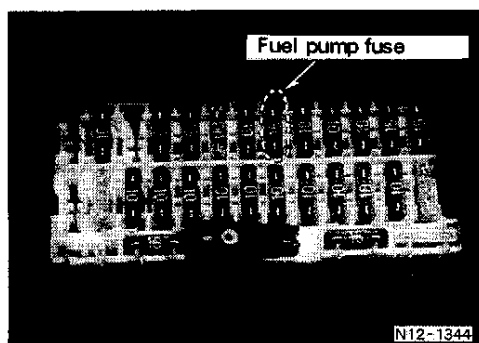
(2) Inspection using fuel pressure gauge

Fuel pressure release



- After starting engine, remove fuel pump fuse. Crank engine 2 or 3 times to remove fuel in lines.
- When engine will not start, remove pump fuse and crank engine 4 to 5 times to remove fuel in lines.

Note: The battery may become weak easily, so use booster cables to connect it to another vehicle or battery if necessary.



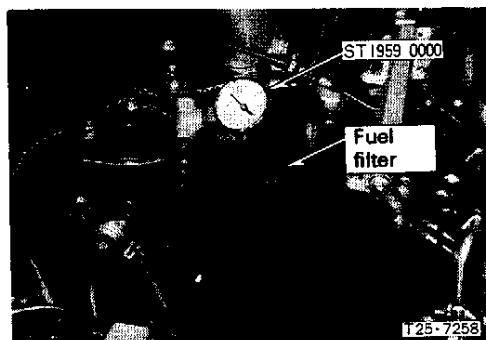
Fuel pressure gauge installation

- Connect the fuel pressure gauge between the fuel strainer and fuel gallery.
- Install the fuel pump fuse.
- Start engine and check if fuel pressure reaches standard value.

Fuel pressure inspection

Unit: kPa (kg/cm², psi)

Condition	Engine	RB26DETT
Idling		Approx. 245 (2.5, 36)
When pressure regulator vacuum hose is removed		Approx. 294 (3.0, 43)



B3 ECCS (Electronically Concentrated Engine Control System)



3. Basic Inspection (Cont'd)

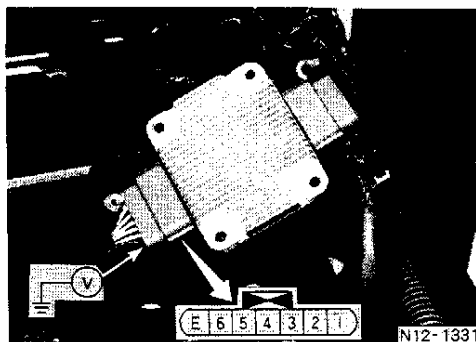
- In vehicles with starting problems, turn ignition switch ON and check fuel pressure for 5-sec interval when fuel pump is rotating.

Condition	Engine	RB26DETT
Ignition switch "ON" for 5-sec interval		Approx. 294 kPa (3.0 kg/cm ² , 43 psi)

If NG:

Fuel pressure is abnormally high.	<ul style="list-style-type: none"> Pressure regulator is faulty. Return system is clogged or hose is bent.
Fuel pressure is abnormally low.	<ul style="list-style-type: none"> Pressure regulator is faulty. Fuel pump output is faulty. Fuel supply system is clogged.

Note: The fuel pressure should be also checked when the engine speed is increased.

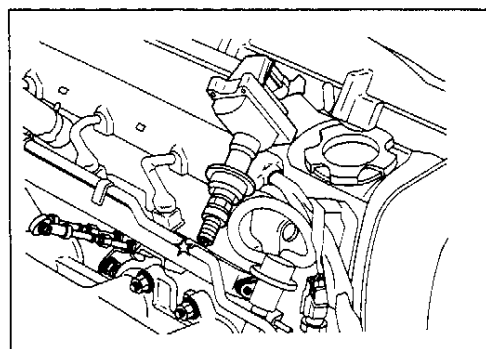


3-4 SPARK INSPECTION

- Measure the voltage with a test probe at power transistor coil side terminal for spark signal of the primary system.

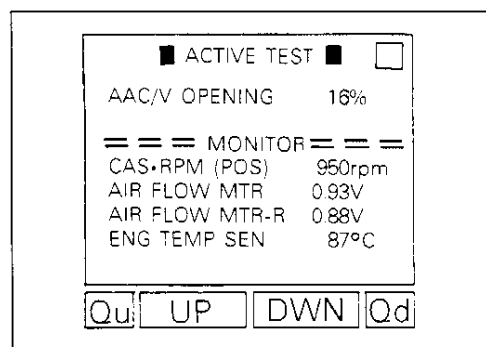
Terminals 1 - 6 when cranking engine Approx. 9.5V

- Primary system check can also be performed by timing light or tachometer needle deflection.



- To check if spark actually arcs or not, remove ignition coil (No. 1 cylinder is easiest), connect spark plug and place it against collector or other part for ground. Check if spark arcs when engine is cranked.

If NG: Inspect ignition control system.

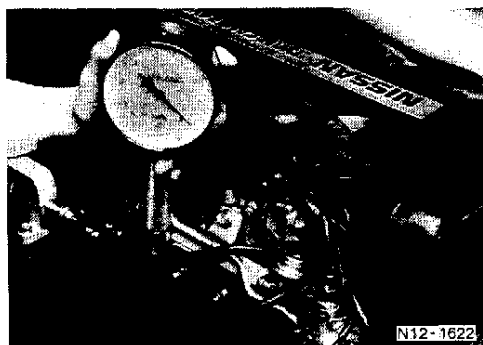
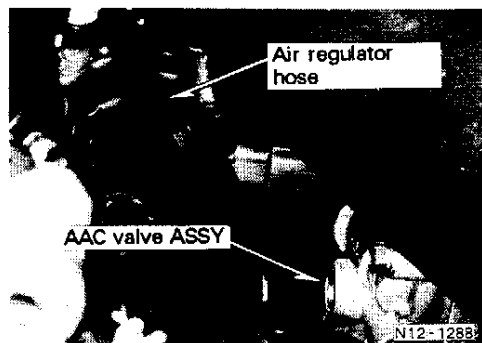
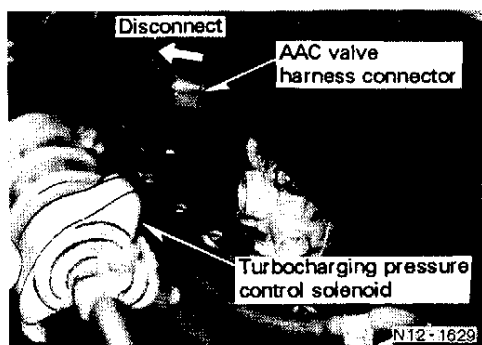


3-5 AAC VALVE OPERATION INSPECTION



- Start the engine.
- Set any angle in the "AAC VALVE OPENING" item of "ACTIVE TEST" mode.
- Check if idle speed at this time varies from set value.

B3 ECCS (Electronically Concentrated Engine Control System)



3. Basic Inspection (Cont'd)

- After warming engine, check if idle speed lowers for specified value when AAC valve connector is removed.

3-6 AIR REGULATOR OPERATION INSPECTION

- Start engine when cold, and check if idle speed lower when air regulator hose is closed or partially pressed.
- Start engine when cold and check if specified idle speed increases after AAC valve connector is removed and engine warms up.
- Connect AAC valve connector, and warm up engine adequately.
- After warming up, remove AAC valve connector again and check if idle speed gradually decreases below specified value.

3-7 INTAKE MANIFOLD VACUUM

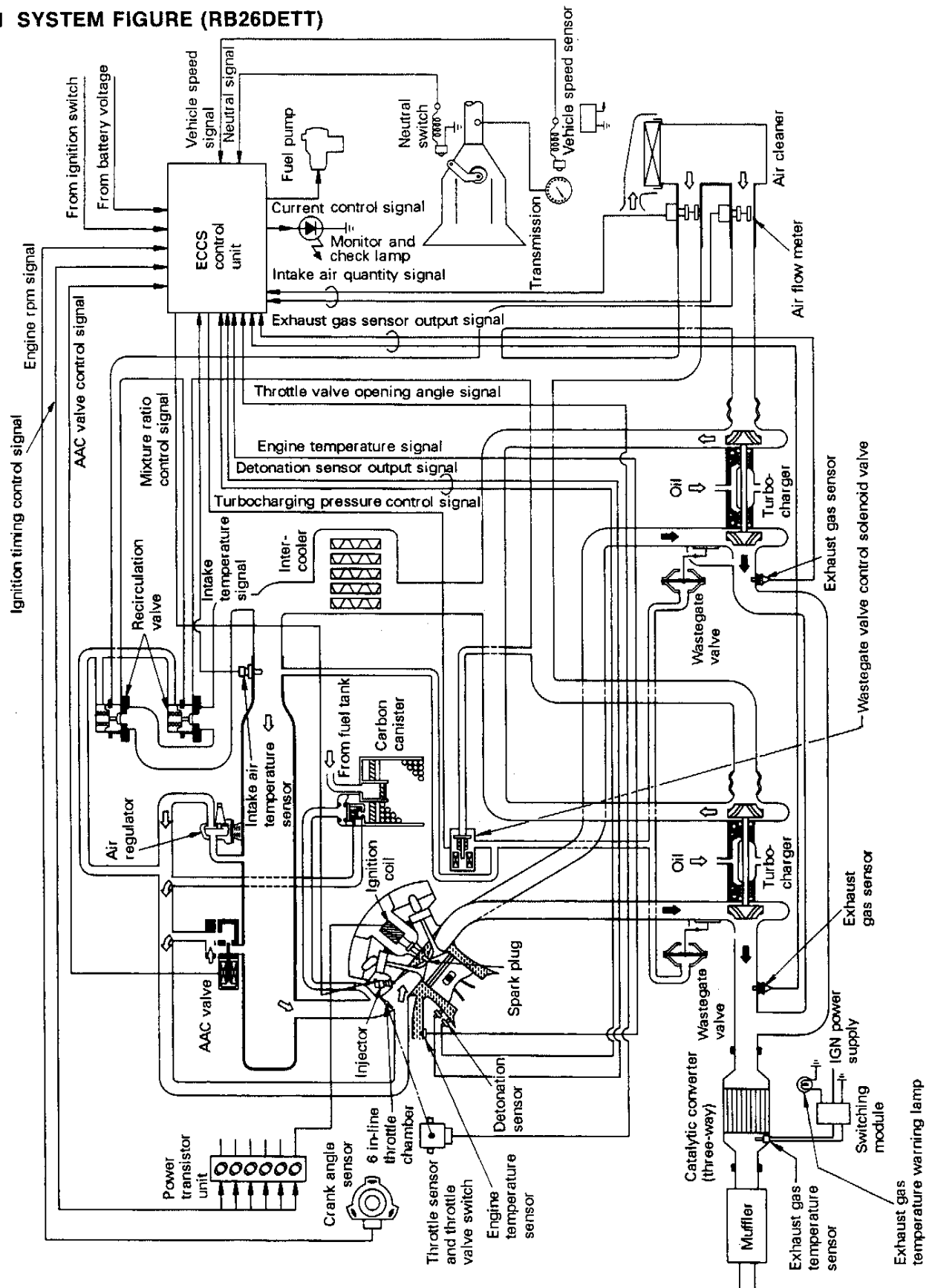
- After warming up engine, check vacuum when idling.

Reference	Approx. -64.0 kPa (-480 mmHg, -18.90 inHg)
-----------	--

- The vacuum value will be abnormal if there are air leak or other problems with combustion or main engine body. Locate and correct the cause of problem.

4. System Figure and Circuit Diagram

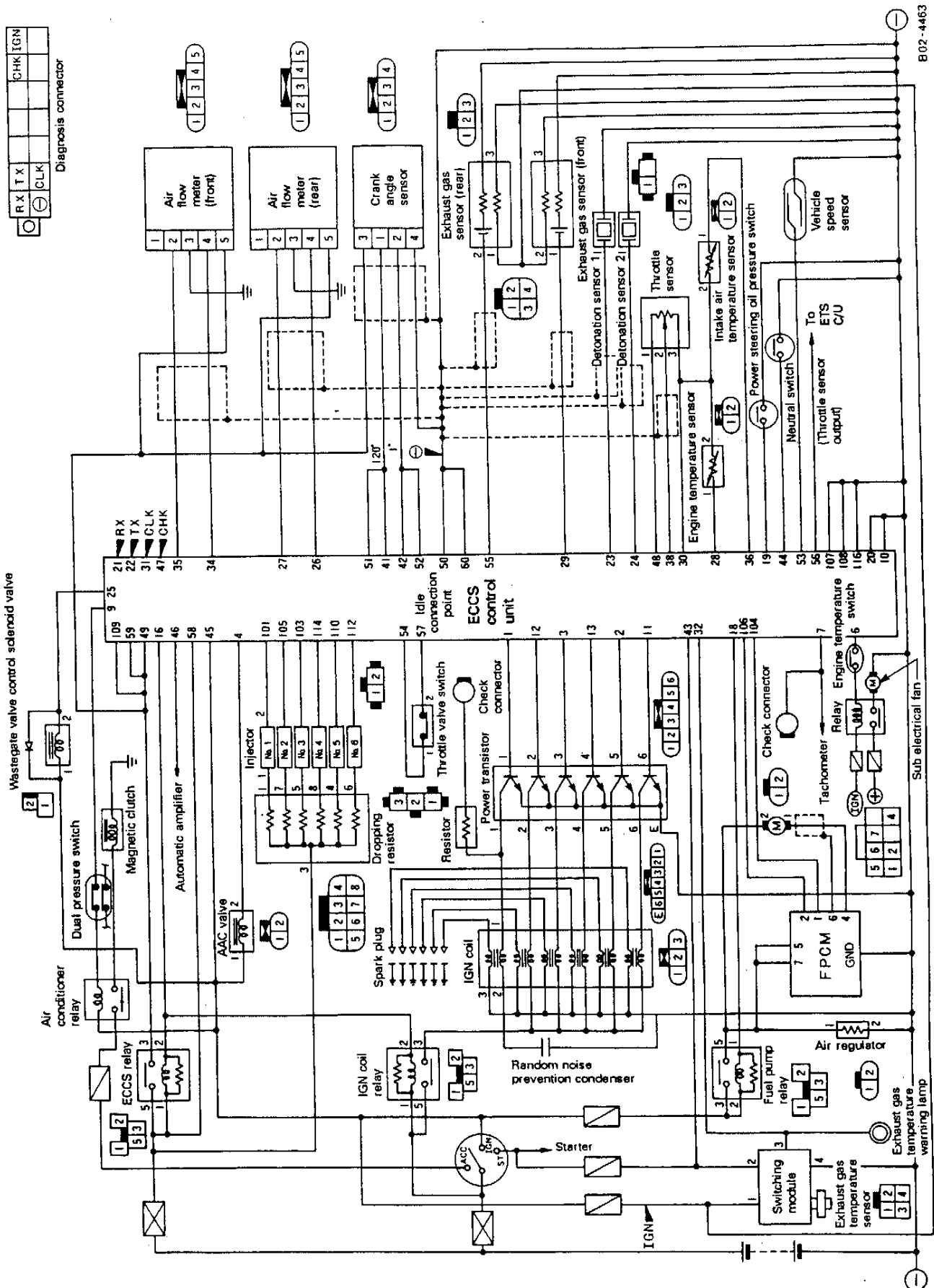
4-1 SYSTEM FIGURE (RB26DETT)



B3 ECCS (Electronically Concentrated Engine Control System)

4. System Figure and Circuit Diagram (Cont'd)

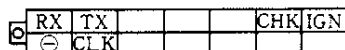
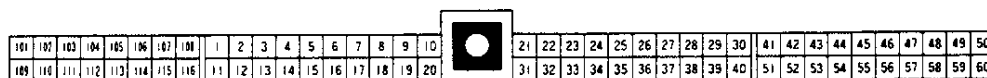
4-2 CIRCUIT DIAGRAM (RB26DETT)



B3 ECCS (Electronically Concentrated Engine Control System)

4. System Figure and Circuit Diagram (Cont'd)

ECCS control unit pin layout figure: RB26DETT



B02-3431

Terminal number	Description	Terminal number	Description
1	Ignition signal (power transistor) Cyl. No. 1	11	Ignition signal (power transistor) Cyl. No. 6
2	Ignition signal (power transistor) Cyl. No. 5	12	Ignition signal (power transistor) Cyl. No. 2
3	Ignition signal (power transistor) Cyl. No. 3	13	Ignition signal (power transistor) Cyl. No. 4
4	AAC valve	14	—
5	—	15	—
6	Sub electrical fan relay (engine temperature switch)	16	ECCS relay
7	Tachometer speed signal	17	—
8	—	18	Fuel pump relay
9	Air conditioner relay (air condi- tioner cut signal)	19	Power steering oil pressure switch
10	Ground (ignition signal system)	20	Ground (ignition signal system)
21 (RX)	Receive (control unit data recep- tion)	31 (CLK)	Clock (synchronization signal)
22 (TX)	Transmit (data sent from control unit)	32	Monitor and check lamp (red)
23	Detonation sensor 1 (cyl 1 to 3)	33	—
24	Detonation sensor 2 (cyl 4 to 6)	34	Air flow meter ground
25	Wastegate valve control solenoid valve	35	Air flow meter intake air quantity signal (front)
26	Air flow meter ground	36	Intake air temperature sensor
27	Air flow meter intake air quantity signal (rear)	37	—
28	Engine temperature sensor	38	Throttle opening output
29	Exhaust gas sensor (front)	39	—
30	Sensor ground (throttle sensor, engine temperature sensor)	40	—
41	Crank angle sensor (120° signal)	51	Crank angle sensor (120° signal)
42	Crank angle sensor (1° signal)	52	Crank angle sensor (1° signal)
43	Ignition switch START signal	53	Vehicle speed sensor
44	Neutral switch	54	Throttle valve switch (idle connec- tion point)
45 (IGN)	Ignition switch (IGN)	55	Exhaust gas sensor (Rear)
46	Air conditioner switch	56	Throttle sensor output signal

B3 ECCS (Electronically Concentrated Engine Control System)

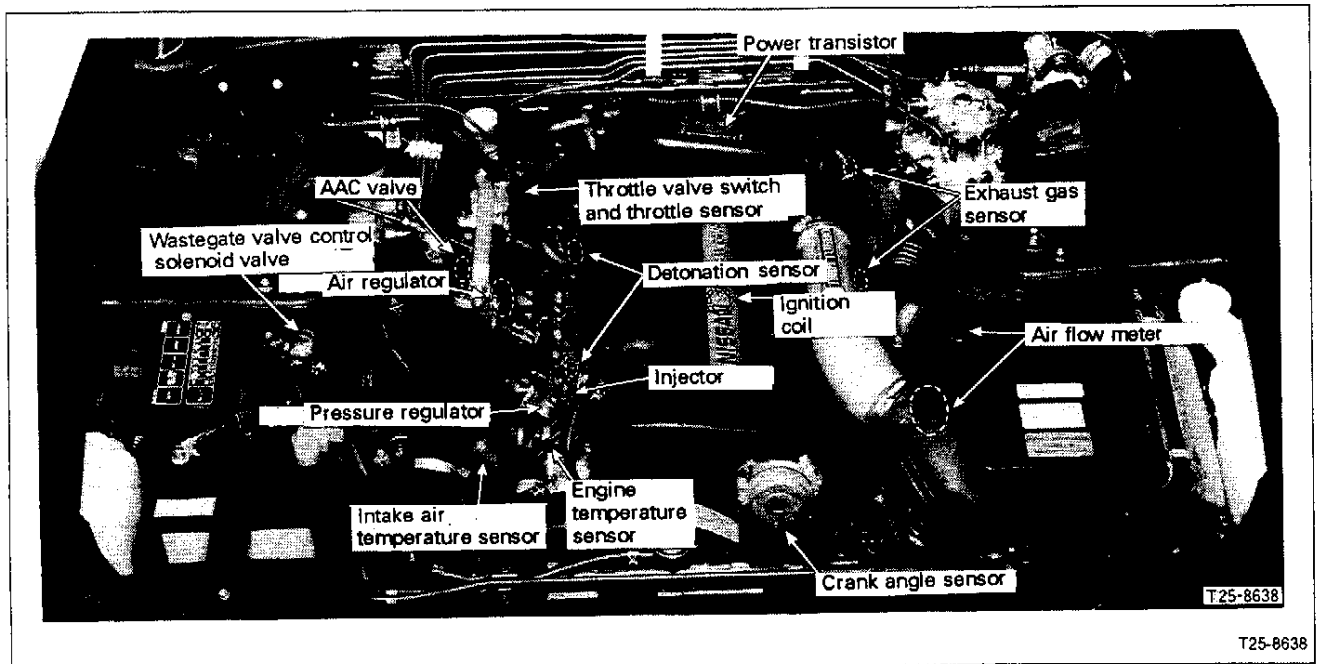
4. System Figure and Circuit Diagram (Cont'd)

47 (CHK)	Check (diagnosis activation)	57	Throttle valve switch power supply
48	Throttle sensor power supply supply	58	Battery power supply
49	Control unit power supply	59	Control unit power supply
50	Ground (control unit)	60 (⊖)	Ground (control unit)
101	Injector No. 1	109	Injector power supply (counter electromotive reflex circuit)
102	—	110	Injector No. 5
103	Injector No. 3	111	—
104	Fuel pump terminal voltage control output (FPCM) 1	112	Injector No. 6
105	Injector No. 2	113	—
106	Fuel pump terminal voltage control output (FPCM) 2	114	Injector No. 4
107	Injector ground	115	—
108	Injector ground	116	Injector ground

The terminal symbol enclosed in parentheses () is the self-diagnosis connector symbol.

B3 ECCS (Electronically Concentrated Engine Control System)

4. System Figure and Circuit Diagram (Cont'd) ECCS Component Parts



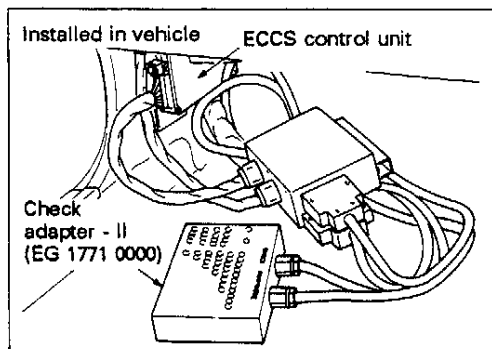
	Component part	Type	Installation position
Actuator system	Wastegate valve control solenoid valve	Solenoid system	Strut tower right
	Pressure regulator	Diaphragm system	Fuel pipe front end
	Injector	Top feed type	Intake manifold
	Fuel pump	Roller vane type	Fuel tank
	Air regulator	Bi-metal type	Intake manifold lower part
	AAC valve	Solenoid type	Intake manifold collector lower part
	Ignition coil	Mini mold type	Cylinder head (above each plug)
	Power transistor unit	For 6-channel low-voltage electronic distribution	Rocker cover ornament
Sensor system	Crank angle sensor	Photocell (camshaft drive)	Cylinder head left front
	Air flow meter (2)	Hot wire type	Front left
	Intake air temperature sensor	Thermistor type	Intake manifold collector
	Throttle sensor	Variable resistor type	Accelerator work unit
	Throttle valve switch	ON/OFF switch	Accelerator work unit
	Engine temperature sensor	Thermistor type	Water outlet
	Exhaust gas sensor	Heater attached (titanium)	Front and rear exhaust outlets
	Detonation sensor	Pressure-electrical type	Cylinder block
	Fuel pump modulator	Operation amplifier	Rear pillar inner

B3 ECCS (Electronically Concentrated Engine Control System)

5. Actuator System Inspection

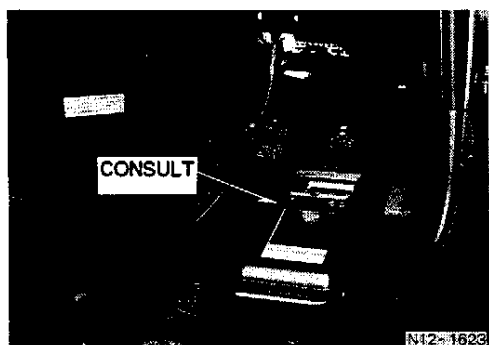
Use measurement equipment such as a circuit tester, CONSULT electrical system diagnosis tester and oscilloscope to perform the inspection. Refer to item 1., 1-1 (6) for the measurement equipment operation procedures.

The following preparation must be performed when using this equipment.



(1) Using circuit tester and oscilloscope

- Use check adapter to perform the measurement.



(2) Using CONSULT

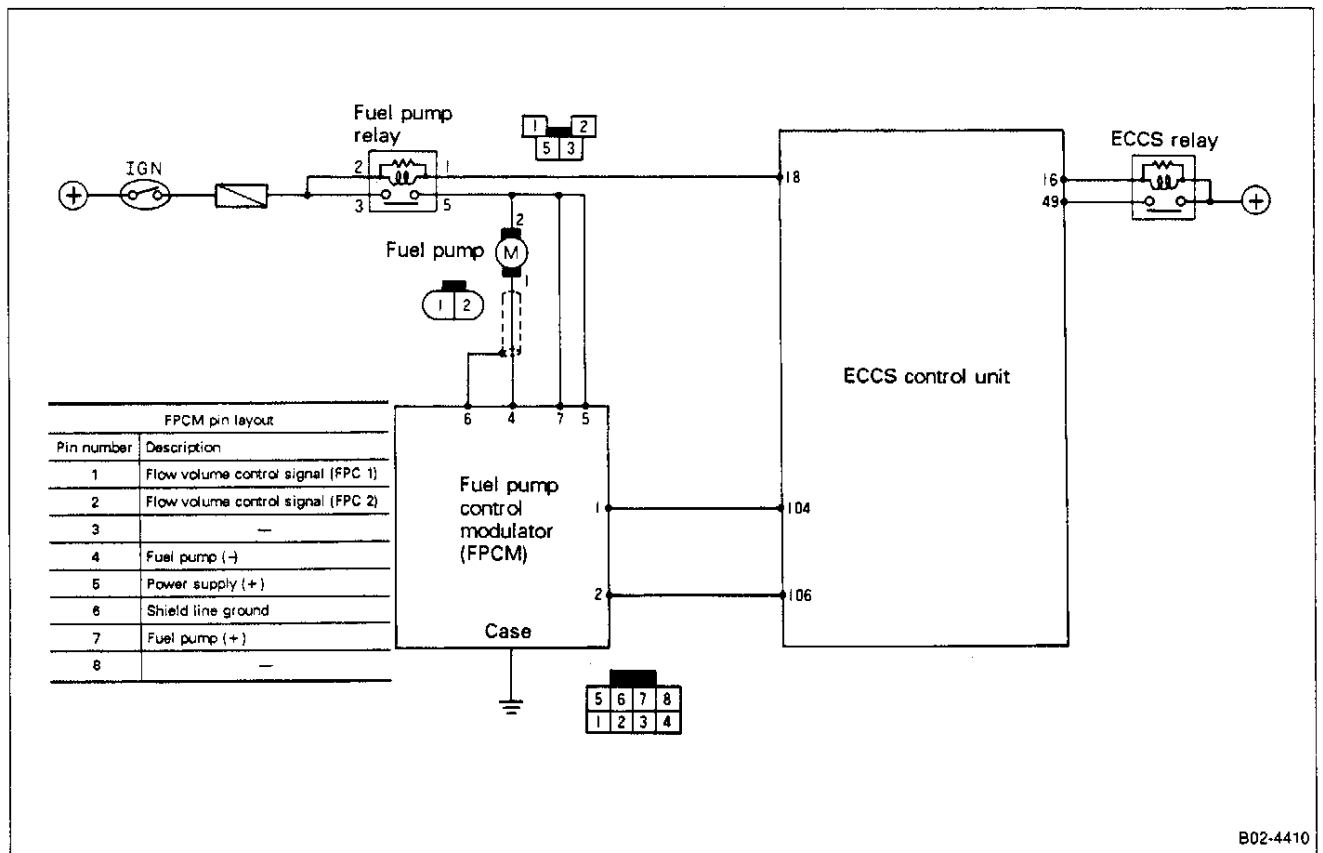
- Connect CONSULT to the diagnostic connector on vehicle (near the fuse block).

Note: See section 2, 2-2 (2) for details.

B3 ECCS (Electronically Concentrated Engine Control System)

5. Actuator System Inspection (Cont'd)

5-1 FUEL PUMP SYSTEM INSPECTION

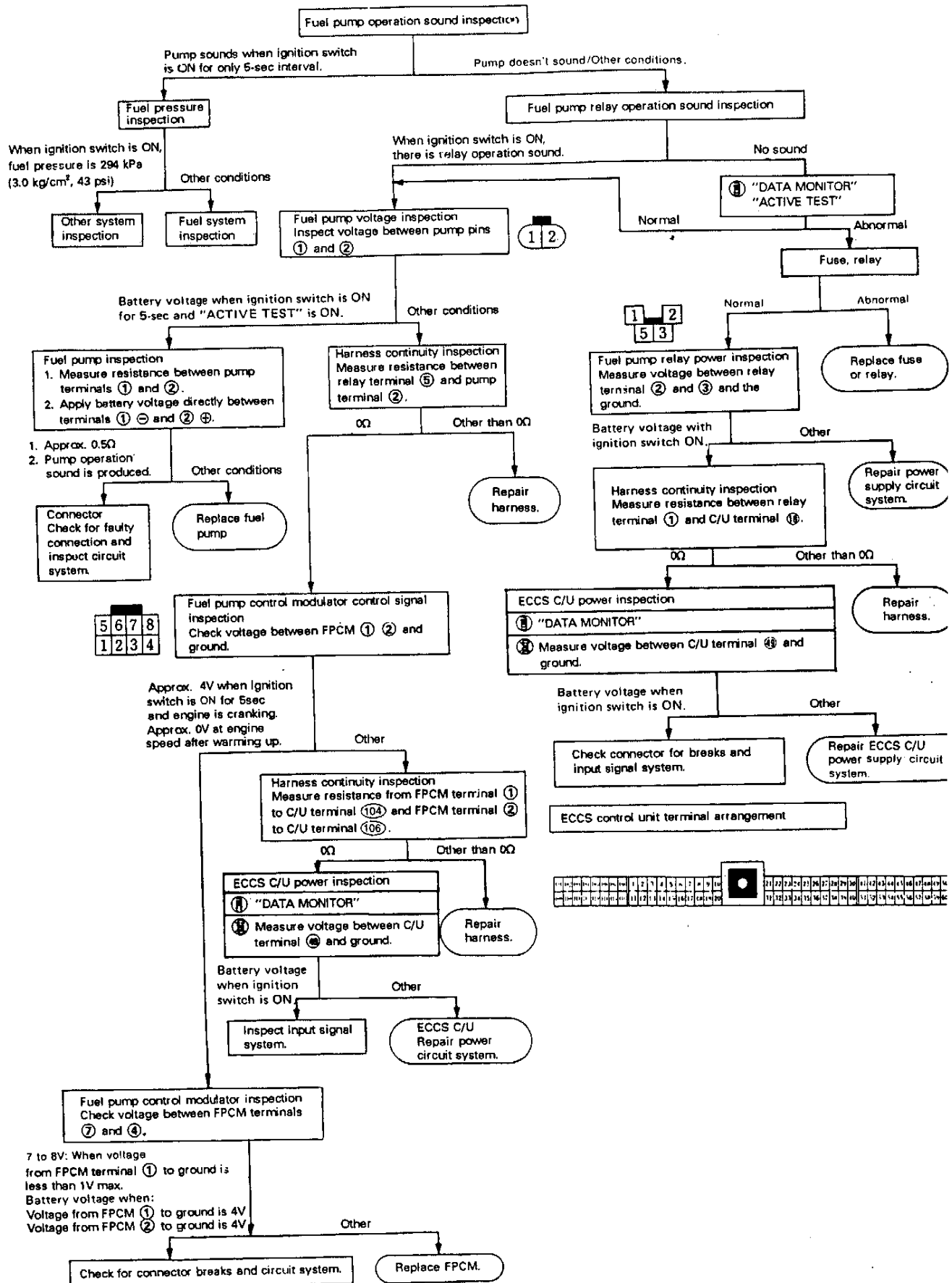


B02-4410

B3 ECCS (Electronically Concentrated Engine Control System)

5. Actuator System Inspection (Cont'd)

Fuel pump system trouble diagnosis flowchart



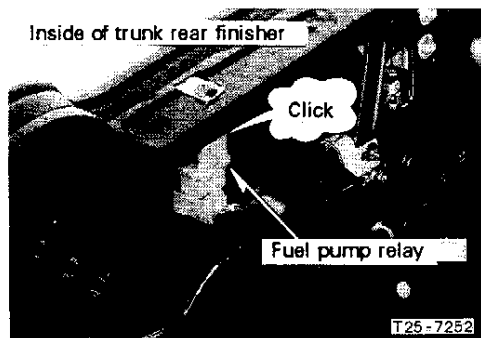
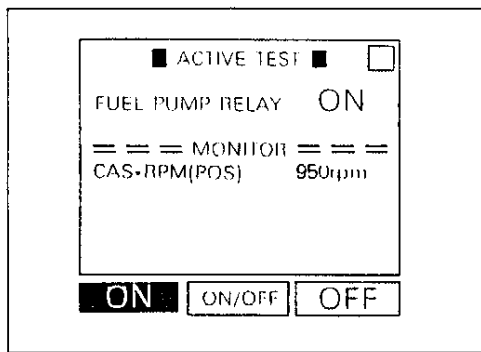
B3 ECCS (Electronically Concentrated Engine Control System)

5. Actuator System Inspection (Cont'd)

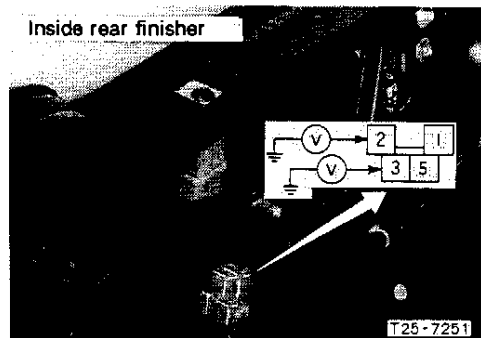
(1) Fuel pump relay operation inspection



- Turn ignition switch "ON", select "FUEL PUMP RELAY" of "ACTIVE TEST" mode. Press the ON key and check if pump operation makes an operation sound.



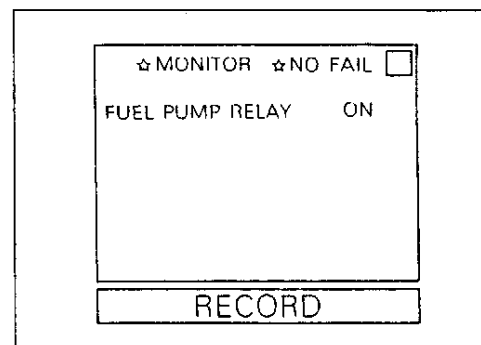
- When the ignition switch is "ON", the relay operation sound must be audible. The pump must sound in 5 sec after relay is turned on.
- After the engine has stopped, turn ignition key to OFF in 1.5 sec.



(2) Fuel pump relay power inspection

- Disconnect fuel pump relay and measure the voltage between following terminals and ground when the ignition switch is ON.

Engine	RB26DETT	
Measurement location	Between ground and terminal (2) on fuel pump relay harness side.	Between ground and terminal (3) on fuel pump relay harness side.
Condition	When ignition switch is ON.	Battery voltage



(3) Fuel pump control signal inspection

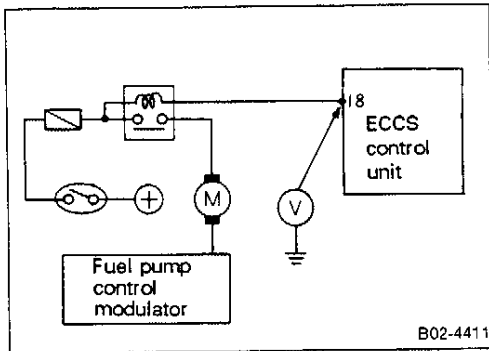


- Select "FUEL PUMP RLY" item of "DATA MONITOR" mode and check following items.

Condition	Item	Fuel pump relay
When ignition switch is ON (engine is not running)		OFF
When cranking engine		ON
When idling		ON

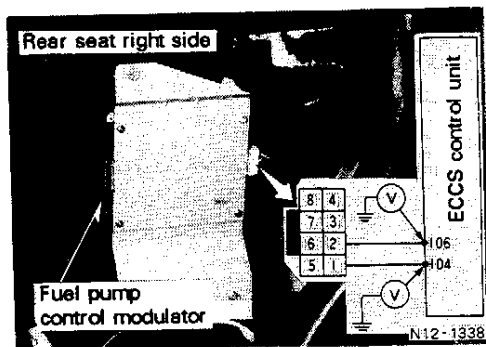
B3 ECCS (Electronically Concentrated Engine Control System)

5. Actuator System Inspection (Cont'd)



- Measure the voltage between the following terminals and the ground when the ECCS control unit connectors are connected.

Engine		RB26DETT
Measurement location		Between ECCS C/U terminal (18) and ground
Condition	Within 5 seconds right after turning switch ON.	Approx. 1V
	After 5 seconds right after turning switch ON.	Battery voltage
Cranking engine		Approx. 1V
Idling		Approx. 1V



(4) Fuel pump control modulator control signal inspection

- Measure the voltage between the following terminals and the ground when the ECCS control unit connectors are connected.

Engine		RB26DETT	
Measurement location		Between ECCS C/U terminal (104) and ground (FPCM1)	Between ECCS C/U terminal (106) and ground (FPCM2)
Condition			
Ignition switch ON (with engine stopped)		Approx. 4V 0V after 5 sec.	←
Starting or with high load		Approx. 4V	←
Idling		Approx. 0V	—
Medium load		Approx. 4V	Approx. 0V

- Check voltage at FPCM terminals 4 and 7.

Measurement location		Between FPCM terminal 4 and ground	Between FPCM terminal 7 and ground
Condition			
Idling		Battery voltage – Approx. 6V	Battery voltage
Medium load		Battery voltage – Approx. 8V	
Starting or with high load		Approx. 0V	

B3 ECCS (Electronically Concentrated Engine Control System)

5. Actuator System Inspection (Cont'd)

(5) ECCS control unit power inspection

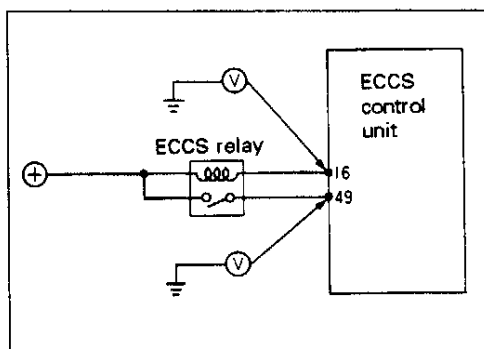


- Select "BATTERY VOLTAGE" item in "DATA MONITOR" mode and perform the following inspection.

Condition	Item	Battery voltage
Ignition switch ON		11 - 14V

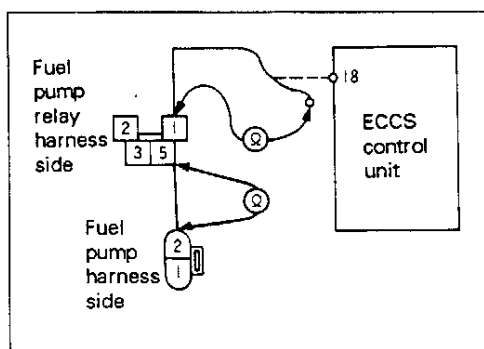
CAUTION:

The same setting as ON state is maintained for a few seconds right after the ignition switch is turned ON → OFF and then ON again.



- Measure the voltage between the following terminals and the ground when the ECCS control unit connectors are connected.

Engine	RB26DETT	
Measurement location	Between ECCS C/U terminal (16) and ground	Between ECCS C/U terminal (49) and ground
Condition		
Ignition switch OFF	Battery voltage	Approx. 0V
Ignition switch ON	Approx. 0V	Battery voltage
Cranking	Approx. 0V	Battery voltage
Idling	Approx. 0V	Battery voltage



(6) Harness continuity inspection

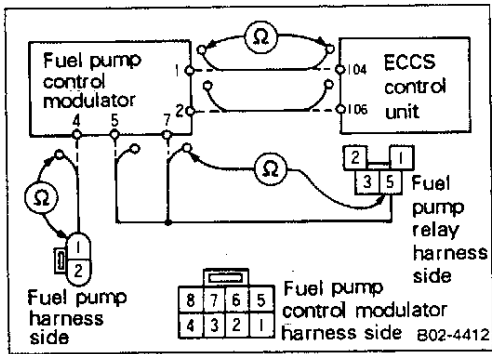
- Disconnect harness connectors of ECCS control unit, fuel pump relay and fuel pump and measure resistance between the following terminals.

Engine	RB26DETT
Measurement location	
Between ECCS C/U harness terminal (18) and fuel pump relay harness terminal (1)	0Ω
Between fuel pump harness terminal (2) and fuel pump relay harness terminal (5)	0Ω

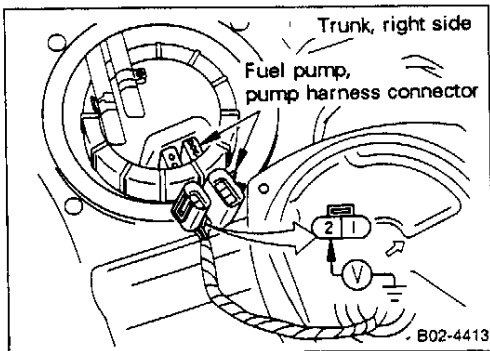
B3 ECCS (Electronically Concentrated Engine Control System)

5. Actuator System Inspection (Cont'd)

- Remove each connector and measure the resistance between the following terminals.



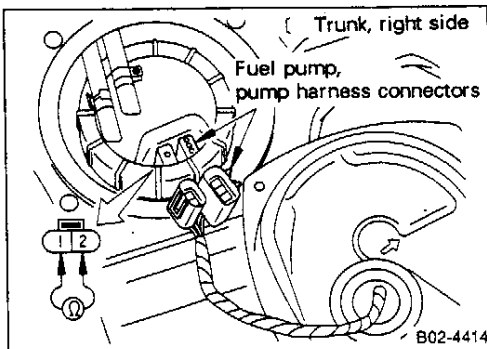
Engine	RB26DETT
Measurement location	
Between ECCS C/U terminal (104) and FPCM harness terminal (1)	0Ω
Between ECCS C/U terminal (106) and FPCM harness terminal (2)	
Between fuel pump relay harness terminal (5) and FPCM harness terminal (5)	
Between fuel pump relay harness terminal (5) and FPCM harness terminal (7)	
Between fuel pump harness terminal (1) and FPCM harness terminal (4)	



(7) Fuel pump voltage inspection

- Disconnect the fuel pump connector and measure the voltage between the following terminals and ground.

Engine	RB26DETT
Measurement location	Between fuel pump harness terminal (2) and ground
Condition	
5 sec after ignition switch is turned ON	Battery voltage
Cranking	Battery voltage



(8) Fuel pump inspection

- Disconnect the fuel pump connector and measure the resistance between the following fuel pump terminals.

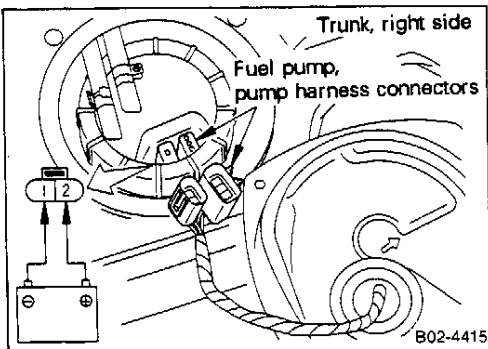
Engine	RB26DETT
Measurement location	
Between fuel pump terminal (1) and (2)	Approx. 0.4 - 0.7Ω

- Disconnect the fuel pump connectors, apply the battery voltage directly to the following fuel pump terminals and check fuel pump operation.

- Pump terminal (2) to battery positive terminal (+)
- Pump terminal (1) to battery negative terminal (-)

CAUTION:

Be careful because damage will occur if connection is made with the incorrect battery polarity. Do not generate any sparks because fuel tank is nearby.

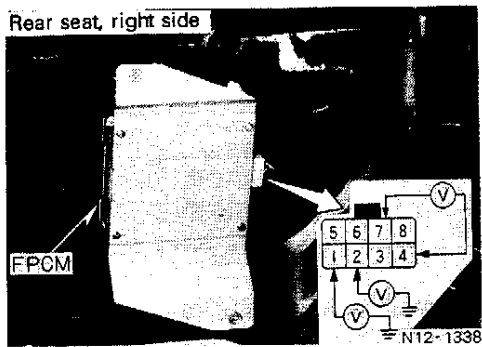


B3 ECCS (Electronically Concentrated Engine Control System)

5. Actuator System Inspection (Cont'd)

(9) Fuel pump control modulator inspection

- When fuel pump control modulator connector is connected, measure the voltage between the following terminals.



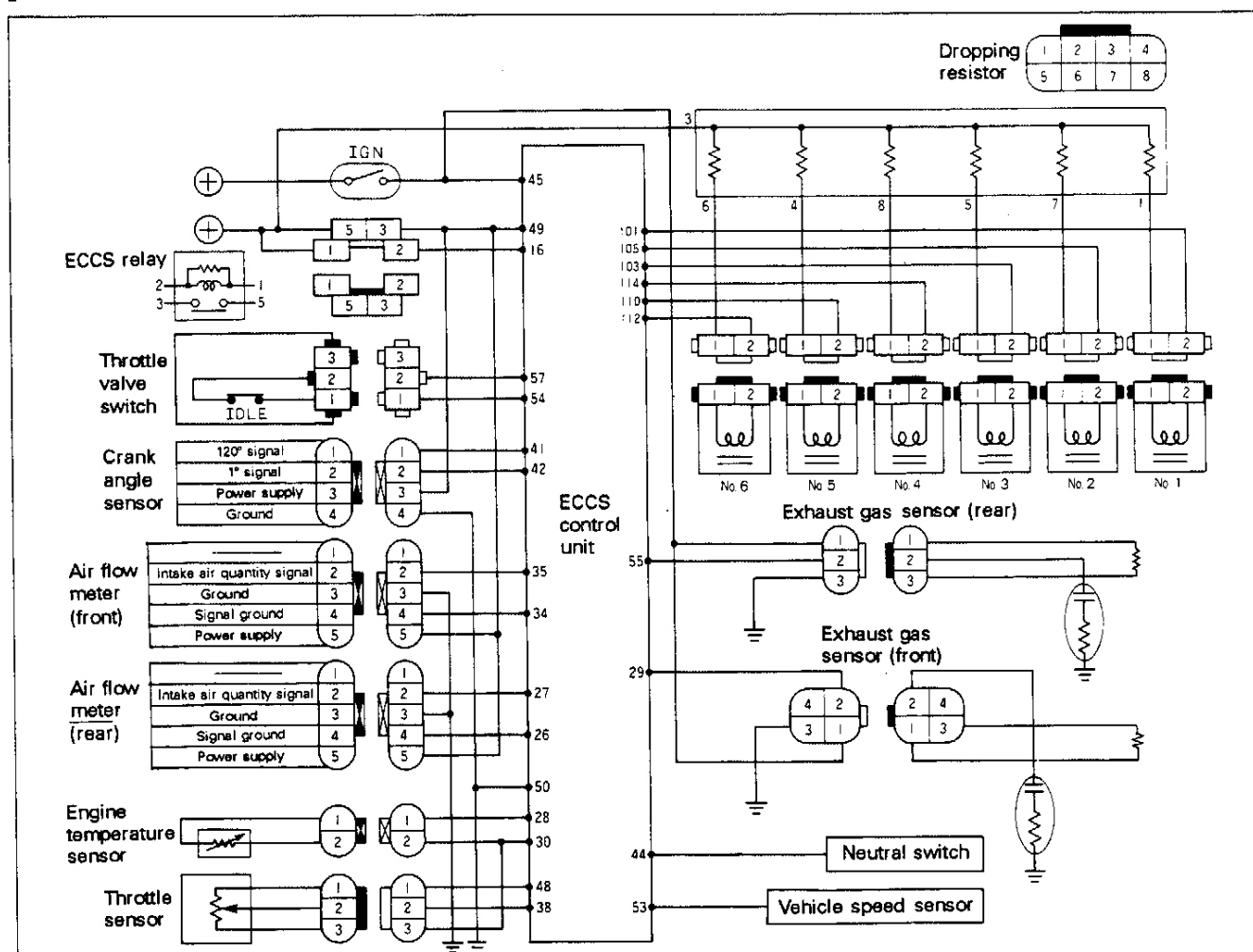
Condition		Voltage between FPCM terminal (1) and ground	Voltage between FPCM terminal (2) and ground
Measurement location			
Voltage between FPCM terminals (7) and (4)	6.6 - 7.0V	0 - 1V	—
	8.8 - 9.2V	Approx. 4V	0 - 1V
	Battery voltage	Approx. 4V	←

B3 ECCS (Electronically Concentrated Engine Control System)

5. Actuator System Inspection (Cont'd)

5-2 INJECTOR SYSTEM INSPECTION

[Control circuit diagram]



[Control description]

Input signal	Terminal number	Control description	Remarks
Crank angle sensor 120° signal Crank angle sensor 1° signal	41, 51 42, 52	<ul style="list-style-type: none"> ● Determines injector injection timing. ● Reads engine speed. 	—
Air flow meter intake air quantity signal	27, 35	<ul style="list-style-type: none"> ● Detects intake air quantity, and determines basic injection quantity (injection pulse width) based on engine load. 	<ul style="list-style-type: none"> ● Fail-safe function activated when disconnected.
START signal	43	<ul style="list-style-type: none"> ● Increases fuel quantity when starting. ● Determines injection quantity when starter SW is ON. 	—
Engine temperature sensor signal	28	<ul style="list-style-type: none"> ● Performs injection increase according to engine temperature. ● Fuel cut range changes according to engine temperature. 	<ul style="list-style-type: none"> ● Fail-safe activated when short-circuit or disconnection occurs.
Exhaust gas sensor signal	29, 55	<ul style="list-style-type: none"> ● Injection pulse width control according to air-fuel ratio feedback. 	<ul style="list-style-type: none"> ● According to control block condition.
Throttle valve SW (idle connection point)	54	—	<ul style="list-style-type: none"> ● Activated when throttle sensor damage occurs. ● Idle judgment backup.

B3 ECCS (Electronically Concentrated Engine Control System)**5. Actuator System Inspection (Cont'd)**

Input signal	Terminal number	Control description	Remarks
Throttle sensor	38	<ul style="list-style-type: none">● Fuel cut during deceleration● Flow correction during acceleration or deceleration● Interruption injection● Idle judgment● Deceleration fuel cut according to ON signal.● Acceleration increase when ON goes to OFF.	—
Vehicle speed sensor	53	<ul style="list-style-type: none">● Fuel cut interrupts speed and fuel cut at 0 km/h (0 MPH) vehicle speed	—
Battery voltage	49	<ul style="list-style-type: none">● Injection pulse width correction	—
Intake air temperature sensor	36	<ul style="list-style-type: none">● Detects intake air quantity temperature and corrects injection pulse width.	—

B3 ECCS (Electronically Concentrated Engine Control System)

5. Actuator System Inspection (Cont'd)

Injector system trouble diagnosis flowchart

