Engine (G6BA)

GENERAL

TIMING SYSTEM

CYLINDER HEAD ASSEMBLY

ENGINE AND TRANSAXLE ASSEMBLY

ENGINE BLOCK

COOLING SYSTEM

LUBRICATION SYSTEM

INTAKE AND EXHAUST SYSTEM



اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL

SPECIFICATIONS E97CEC21

Description	Specifications	Limit
General		
Туре	V-type, DOHC	
Number of cylinder	6	
Bore	86.7mm (3.4133in.)	
Stroke	75mm (2.9528in.)	
Total displacement	2,656cc	
Compression ratio	10 : 1	
Firing order	1-2-3-4-5-6	
Valve timing	120400	
Intake valve		
Opens (BTDC)	6°	
Closes (ABDC)	46°	
Exhaust valve	40	
Opens (BBDC)	44 °	
	8	
Closes (ATDC)	0	
Camshaft Drive mechanism	Coggod type helt	
	Cogged type belt	
Cam height	40.05 44.45 mm (4.7000 4.7000 in)	10.15
Intake	43.95 ~ 44.15mm (1.7303 ~ 1.7382in.)	43.45mm (1.7106in.)
Exhaust	43.95 ~ 44.15mm (1.7303 ~ 1.7382in.)	43.45mm (1.7106in.)
Journal diameter	25.964 ~ 25.980mm (1.0222 ~ 1.0228in.)	25.914mm (1.0202in.)
Bearing oil clearance	0.02 ~ 0.061mm (0.0007 ~ 0.0024in.)	0.1mm (0.0039in.)
End play	0.1 ~ 0.15mm (0.0039 ~ 0.0059in.)	
Cylinder head	امايين سامانه دير ميتاليز	
Flatness of cylinder head surface	Max. 0.03mm (0.0012in.)	0.05mm (0.002 <mark>0in.)</mark>
Flatness of manifold mounting surface		
Intake	Max. 0.15mm (0.0059in.)	0.15mm (0.0059in.)
Exhaust	Max. 0.15mm (0.0059in.)	0.15mm (0.0059in.)
Valve guides hole diameter		
0.05 (0.002) O.S.	11.05 ~ 11.068mm (0.435 ~ 0.436in.)	
0.25 (0.010) O.S.	11.25 ~ 11.268mm (0.443 ~ 0.444in.)	
0.50 (0.020) O.S.	11.50 ~ 11.518mm (0.453 ~ 0.453in.)	
Intake valve seat ring hole diameter		
0.3 (0.012) O.S.	33.300 ~ 33.325mm (1.311 ~ 1.312in.)	
Exhaust valve seat ring hole diameter	, , , , , , , , , , , , , , , , , , ,	
0.3 (0.012) O.S.	28.600 ~ 28.621mm (1.126 ~ 1.127in.)	
Valve		
Overall length		
Intake	96.1mm (3.783in.)	
Exhaust	97.15mm (3.825in.)	
Stem diameter		
Intake	5.965 ~ 5.98mm (0.235 ~ 0.2354in.)	
Exhaust	5.95 ~ 5.965mm (0.234 ~ 0.235in.)	
Face angle	45° ~ 45.5°	
Margin		
Intake	1.0mm (0.0394in.)	0.5mm (0.0197in.)
Exhaust	1.3mm (0.0512in.)	0.8mm (0.0315in.)
Clearance (Stem-to-guide)		0.01111 (0.031011.)
Intake	0.02 ~ 0.05mm (0.008 ~ 0.0020in.)	0.10 mm (0.0020 m)
Exhaust	$0.02 \sim 0.05$ mm (0.008 ~ 0.0020 m.) $0.030 \sim 0.065$ mm (0.0012 ~ 0.0026 m.)	0.10mm (0.0039in.) 0.13mm (0.0051in.)
	0.000 ~ 0.0001111 (0.0012 ~ 0.002011.)	0.13000 (0.003 00.)

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ENGINE (G6BA)

GENERAL

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Description	Specifications	Limit
Valve spring Free length Load	42.5mm (1.6732in.) 21kg/35mm (48.4lb/1.3780in.) Max. 1.5°	41.5mm (1.6339in.) 21.9kg/34mm (48.4lb/1.3386in.) Max. 3°
Out of squareness	IVIAX. 1.5	IVIAX. 3
Piston Diameter (Standard) Clearance (Piston-to-cylinder) Ring groove width No.1 No.2 Oil	86.68 ~ 86.71mm (3.413 ~ 3.414in.) 0.01 ~ 0.03mm (0.0004 ~ 0.0012in.) 1.230 ~ 1.250mm (0.0484 ~ 0.0492in.) 1.220 ~ 1.250mm (0.0480 ~ 0.0488in.) 2.515 ~ 2.535mm (0.0990 ~ 0.0998in.)	
Piston for service	0.25mm (0.010in.), 0.50mm (0.020in.)	
Piston ring Number of rings per piston Compression ring Oil ring	3 2 1	
Compression ring type No.1 No.2 Oil ring type Ring end gap	Inner bevel type Under cut type 3-piece type	0
No.1 No.2 Oil ring side rail Ring side clearance	0.20 ~ 0.35mm (0.0079 ~ 0.0138in.) 0.37 ~ 0.52mm (0.0146 ~ 0.0205in.) 0.2 ~ 0.7mm (0.0079 ~ 0.0276in.)	0.8mm (0.031in.) 0.8mm (0.031in.) 1.0mm (0.039in.)
No.1 No.2 Rings for service	0.04 ~ 0.08mm (0.0016 ~ 0.0031in.) 0.03 ~ 0.07mm (0.0012 ~ 0.0028in.) 0.25mm (0.010in.), 0.50mm (0.020in.)	0.1mm (0.004in.) 0.1mm (0.004in.)
Connecting rod Piston pin installation force Side clearance (big end) Bend	2,450 ~ 12,225N (250 ~ 1,250kg, 551 ~ 2,755lb) 0.10 ~ 0.25mm (0.0039 ~ 0.0098in.) 0.05mm or less/100mm (0.0020in. or less/3.937in.)	0.4mm (0.016in.)
Bearing oil clearance Crankshaft Journal O.D. Pin O.D. Out-of-round, taper of journal and pin Taper of journal and pin End play Main bearing clearance	0.018 ~ 0.036mm (0.0007 ~ 0.0014in.) 61.982 ~ 62.000mm (2.4402 ~ 2.4409in.) 47.982 ~ 48.000mm (1.8891 ~ 1.8898in.) Max. 0.003mm (0.0012in.) Max. 0.005mm (0.0020in.) 0.070 ~ 0.250mm (0.0028 ~ 0.0098in.) 0.004 ~ 0.022mm (0.0002 ~ 0.0009in.)	0.1mm (0.004in.) 0.4mm (0.016in.) 0.1mm (0.004in.)
Cylinder block Cylinder bore Flatness of gasket surface Out-of-round of cylinder bore	86.7mm (3.4134in.) Max. 0.03mm (0.0012in.) Max. 0.02mm (0.0008in.)	0.05mm (0.002in.)
Oil pump Body clearance Side clearance	0.100 ~ 0.181mm (0.0039 ~ 0.0071in.) 0.040 ~ 0.095mm (0.0016 ~ 0.0037in.)	
Relief spring Free height Load	43.8mm (1.724in.) 4.6kg/39.3mm (10lb/1.548in.)	

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ENGINE (G6BA)

Description	Specifications	Limit
Oil filter		
Туре	Cartridge, full flow	
Engine oil pressure	50kPa (7.3psi) or more	
	[Conditions : Oil temperature is 75 to	
	90°C (167 to 194°F)]	
Cooling method	Engine coolant cooling, forced circulation	
	with electric fan	
Cooling system quantity	7.0lit (7.4U.S.qts., 6.1lmp.qts)	
Theromstat		
Туре	Wax pellet type with jiggle valve	
Normal opening temperature	82 ± 2.0°C (179.6 ± 3.6°F)	
Opening temperature range	80 ~ 84°C (176 ~ 183.2°F)	
Wide open temperature	95°C (203°F)	
Radiator cap		
Main valve opening pressure	107.9 ± 14.7kPa (1.1 ± 0.15kg/cm ² ,	
	15.65 ± 2.13psi)	
Main valve closing pressure	83.4kPa (0.85kg/cm², 12.1psi)	
Vacuum valve opening pressure	-6.86kPa (-0.07kg/cm², -1.00psi)	
Air cleaner		
Туре	Dry	
Element	Paper type	0
Exhaust pipe		0
Muffler	Expansion reaonance type	
Suspend system	Rubber hangers	

SERVICE STANDRDS

نه در جیتال تعمیر کاران خود ز Standard value	اولين ساما	0		
Coolant concentration			U	
Tropical areas	40%			
Other areas	50%			

COOLANT

Engine coolant	Ethlylen glycol base for aluminum radiator
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SEALANT

Engine coolant temperature sensor	LOCTITE 262 or equivalent, Three bond No.1324 or equivalent.
Oil pressure switch	3M ATD No.8660 or Three bond No.1141E
PCV valve	LOCTITE 242 or equivalent

GENERAL

TIGHTENING TORQUE

ltem	Nm	kgf.cm	lbf.ft
Camshaft sprocket bolt	90 ~ 110	900 ~ 1,100	65 ~ 85
Cylinder head cover bolt	8 ~ 10	80 ~ 100	5.8 ~ 7.2
Main bearing cap bolt M10 M8	27~33 + (90°~94°) 13~19 + (90°~94°)	270~300 + (90°~94°) 130~190 + (90°~94°)	19.5~24 + (90°~94°) 10~14 + (90°~94°)
Connecting rod bolt	16~20 + (90°~94°)	160~200 + (90°~94°)	12~15 + (90°~94°)
Cylinder head bolt(Cold engine)	25 + (58°~62°) + (43°~47°)	250 + (58°~62°) + (43°~47°)	18 + (58°~62°) + (43°~47°)
Oil pan drain plug	35 ~ 45	350 ~ 450	25 ~ 33
Lower oil pan bolt	10 ~ 12	100 ~ 120	7~9
Upper oil pan bolt [10 × 38mm (0.937 × 1.4961in.)] [8 × 22mm (0.3150 × 0.8661in.)] [161.5mm (6.3582in.)] [152.5mm (6.0039in.)]	30 ~ 42 19 ~ 28 5 ~ 7 5 ~ 7	300 ~ 420 190 ~ 280 50 ~ 70 50 ~ 70	22 ~ 30 14 ~ 20 4 ~ 5 4 ~ 5
Oil screen bolt	15 ~ 22	150 ~ 220	11 ~ 16
Oil pump case bolt	12 ~ 15	120 ~ 150	9 ~ 11
Oil relief valve plug	40 ~ 50	400 ~ 500	29 ~ 36
Oil pressure switch	15 ~ 22	150 ~ 220	11 ~ 16
Oil pressure cover screw	رکت 12 ~ 8 – ل <	80 ~ 120	6~9
Oil filter	12 ~ 16	120 ~ 160	9 ~ 12
Drive plate and adapte	ولين 71 - 73 ديد	730 ~ 770	53 ~ <mark>56</mark>
Air cleaner body installation bolt	8 ~ 12	80 ~ 120	6 ~ 9
Surge tank stay	15 ~ 20	150 ~ 200	11 ~ 14
Air intake surge tank to intake manifold(bolt)	15 ~ 20	150 ~ 200	11 ~ 14
Air intake surge tank to intake manifold(nut)	15 ~ 20	150 ~ 200	11 ~ 14
Intake manifold to cylinder head	19 ~ 21	190 ~ 210	14 ~ 15
Heat protector exhaust manifold	12 ~ 15	120 ~ 150	9 ~ 11
Exhaust manifold to cylinder head (Self-locking nut)	30 ~ 35	300 ~ 350	22 ~ 26
Oil level gauge guide to engine	12 ~ 15	120 ~ 150	9 ~ 11
Water outlet fitting bolt	17 ~ 20	170 ~ 200	12 ~ 14
Power steering oil pump bracket to cylinder head	17 ~ 26	170 ~ 260	12 ~ 19
Crank position sensor wheel screw	5 ~ 6	50 ~ 60	3.6 ~ 4.3
Engine mounting insulator bolt	50 ~ 65	500 ~ 650	36 ~ 47
Engine mounting bracket nut	60 ~ 80	600 ~ 800	43 ~ 58
Engine mounting bracket bolt	60 ~ 80	600 ~ 800	43 ~ 58
Engine support bracket bolt	60 ~ 70	600 ~ 700	43 ~ 51
Front roll stopper bracket sub frame bolt	50 ~ 65	500 ~ 650	36 ~ 47

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ENGINE (G6BA)

Item	Nm	kgf.cm	lbf.ft
Front roll stopper insulator bolt and nut	50 ~ 65	500 ~ 650	36 ~ 47
Rear roll stopper bracket to sub frame	50 ~ 65	500 ~ 650	36 ~ 47
Rear roll stopper insulator bolt and nut	50 ~ 65	500 ~ 650	36 ~ 47
Transaxle mounting bracket bolt	50 ~ 65	500 ~ 650	36 ~ 47
Transaxle mounting insulator bolt	90 ~ 110	900 ~ 1,100	65 ~ 80
Fuel hose clamp to rear cylinder head assembly	12 ~ 15	120 ~ 150	9 ~ 11
Transaxle mounting plate	10 ~ 12	100 ~ 120	7 ~ 9
Rear plate	10 ~ 12	100 ~ 120	7 ~ 9
Oil seal case	10 ~ 12	100 ~ 120	7 ~ 9
Crankshaft pulley bolt	180 ~ 190	1,800 ~ 1,900	130 ~ 138
Timing belt cover bolt	10 ~ 12	100 ~ 12	7 ~ 9
Engine hanger bracket to engine	20 ~ 27	200 ~ 270	14 ~ 20
Alternator mounting bracket to engine	20 ~ 30	200 ~ 300	14 ~ 22
Alternator mounting nut (Engine front case side)	20 ~ 30	200 ~ 300	14 ~ 22
Alternator mounting bolt (Alternator mounting bracket side)	20 ~ 30	200 ~ 300	14 ~ 22
Starter to transmission(nut)	20 ~ 30	200 ~ 300	14 ~ 22
Starter to transmission(bolt)	27 ~ 34	270 ~ 340	20 ~ 25
Drive belt pulley bolt	35 ~ 55	350 ~ 550	25 ~ 40
Drive belt tensioner bolt	20 ~ 27	200 ~ 270	14 ~ 20
Engine coolant pump to cylinder block bolt (Head mark "7" mark)	15 ~ 22	150 ~ 200	11 ~ 16
Engine coolant temperature sensor	20 ~ 40	200 ~ 400	14 ~ 29
Engine coolant inlet fitting attaching bolt	17 ~ 20	170 ~ 200	12 ~ 14
Throttle body to surge tank bolt	15 ~ 20	150 ~ 200	11 ~ 14
Oxygen sensor to exhaust manifold	40 ~ 50	400 ~ 500	29 ~ 36
Front exhaust pipe to exhaust manifold nut	30 ~ 40	300 ~ 400	22 ~ 29
Front exhaust pipe to catalytic converter bolt	40 ~ 60	400 ~ 600	29 ~ 43
Catalytic converter to center exhaust pipe nut	40 ~ 60	400 ~ 600	29 ~ 43
Center exhaust pipe to main muffler nut	40 ~ 60	400 ~ 600	29 ~ 43
Main muffler hanger support bracket bolt	10 ~ 15	100 ~ 150	7 ~ 11
Delivery pipe installation bolt	10 ~ 15	100 ~ 150	7 ~ 11
Timing belt tensioner pulley bolt	43 ~ 55	430 ~ 550	31 ~ 40
Timing belt idler puley bolt	50 ~ 60	500 ~ 600	36 ~ 43
Timing blelt tensioner arm fixed bolt	35 ~ 55	350 ~ 550	25 ~ 40
Auto tensioner fixed bolt	20 ~ 27	200 ~ 270	14 ~ 20
Accelerator cable bracket	4 ~ 6	40 ~ 60	3 ~ 4
Spark plug	20 ~ 30	200 ~ 300	14 ~ 22

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GENERAL

COMPRESSION

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If the there is lack of power, excessive oil consumption or poor fuel economy, measure the compression pressure.

- 1. Warm up and stop engine Allow the engine to warm up to normal operating temperature.
- 2. Remove ignition coils. (See EE group ignition)
- Remove spark plugs. Using a 16mm plug wrench, remove the 6 spark plugs.
- 4. Check cylinder compression pressure
 - a. Insert a compression gauge into the spark plug hole.

c. Repeat steps (a) through (b) for each cylinder.

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This measurement must be done in as short a time as possible.

Compression pressure : 1,420kPa (14.5kgf/cm², 206psi) Minimum pressure : 1,270kPa (13kgf/cm², 184psi) Difference between each cylinder : 100kPa (1.0kgf/cm², 15psi) or less

- d. If the cylinder compression in 1 or more cylinders is low, pour a small amount of engine oil into the cylinder through the spark plug hole and repeat steps (a) through (b) for cylinders with low compression.
 - If adding oil helps the compression, it is likely that the piston rings and/or cylinder bore are worn or damaged.
 - If pressure stays low, a valve may be sticking or seating is improper, or there may be leakage past the gasket.

5. Reinstall spark plugs. (See EE group - ignition)

6. Install ignition coils. (See EE group - ignition)

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b. While cranking the engine, measure the compression pressure.

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Always use a fully charged battery to obtain engine speed of 250 rpm or more.

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TROUBLESHOOTING EAE1F8CD

ENGINE (G6BA)

Symption	Suspect area	Remedy (See page)
Engine misfire with	Loose or improperly installed engine flywheel.	Repair or replace the flywheel as required.
abnormal internal lower engine noises.	Worn piston rings (Oil cousumption may or may not cause the engine to misfire.)	Inspect the cylinder for a loss of compression. Repair or replace as required.
	Worn crankshaft thrust bearings	Replace the crankshaft and bearings as required
Engine misfire with abnormal valve	Stuck valves. (Carbon buidup on the valve stem)	Repair or replace as required
train noise.	Excessive worn or mis-aligned timing chain	Replace the timing chain and sprocket as required.
	Worn camshaft lobes.	Replace the camshaft and valve lifters.
Engine misfire with coolant consumption	 Faulty cylinder head gasket and/or cranking or other damage to the cylinder head and engine block cooling system. Coolant consumption may or may not cause the engine to overheat. 	 Inspect the cylinder head and engine block for damage to the coolant passages and/or a faulty head gasket. Repair or replace as required.
Engine misfire with excessive oil consumption	Worn valves, guides and/or valve stem oil seals.	Repair or replace as required.
	Worn piston rings. (Oil consumption may or may not cause the engine to misfire)	 Inspect the cylinder for a loss of compression. Repair or replace as required.
Engine noise on start-up, but only lasting a few seconds.	Incorrect oil viscosity	Drain the oil.Install the correct viscosity oil.
	Worn crankshaft thrust bearing.	 Inspect the thrust bearing and crankshaft. Repair or replace as required.
Upper engine noise,	Low oil pressure	Repair or replace as required.
regardless of engine speed.	Broken valve spring.	Replace the valve spring.
speca.	Worn or dirty valve lifters.	Replace the valve lifters.
	Stetched or broken timing chain and/or damaged sprocket teeth.	Replace the timing chain and sprockets.
	Worn timing chain tensioner, if applicable.	Replace the timing chain tensioner as required.
	Worn camshaft lobes.	 Inspect the camshaft lobes. Replace the timing camshaft and valve lifters as required.
	Worn valve guides or valve stems.	Inspect the valves and valve guides, then repair as required.
	Stuck valves. (Carbon on the valve stem or valve seat may cause the valve to stay open.	Inspect the valves and valve guides, then repair as required.

GENERAL

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Symption	Suspect area	Remedy (See page)
Lower engine noise,	Low oil pressure.	Repair or required.
regardless of engine speed	Loose or damaged flywheel.	Repair or replace the flywheel.
speed	Damaged oil pan, contacting the oil pump screen.	Inspect the oil pan.Inspect the oil pump screen.Repair or replace as required.
	Oil pump screen loose, damaged or restircted.	Inspect the oil pump screen.Repair or replace as required.
	Excessive piston-to-cylinder bore clearance.	Inspect the piston, piston pin and cylinder bore.Repair as required.
	Excessive piston pin-to-clearance	 Inspect the piston, piston pin and the connecting rod. Repair or replace as required.
	Excessive connecting rod bearing rod clearance	 Inspect the following components and repair as required. The connecting rod bearings. The connecting rods. The crankshaft. The crankshaft journal.
PCIP	Excessive crankshaft bearing clearance	Inspect the following components, and repair as required. • The crankshaft bearing. • The crankshaft journals.
فولیت محدود)	Incorrect piston, piston pin and connecting rod installation	 Verify the piston pins and connecting rods are installed correctly. Repair as required.
Engine noise under	Low oil pressure	Repair or replace as required.
load	Excessive connecting rod bearing clearance	 Inspect the following components and repair as required : The connecting rod bearings. The connecting rods. The crankshaft
	Excessive crankshaft bearing clearance	 Inspect the following components, and repair as required. The crankshaft bearings. The crankshaft journals. The cylinder block crankshaft

EM -10

ENGINE (G6BA)

Symption	Suspect area	Remedy (See page)
Engine will not crank-crankshaft will not rotate	 Hydraulically cylinder Coolant/antifreeze in cylinder. Oil in cylinder. Fuel in cylinder 	 Remove spark plugs and check for fluid. Inspect for broken head gasket. Inspect for cracked engine block or cylinder head. Inspect for a sticking fuel injector and/or leaking fuel regulator.
	Broken timing chain and/or timing chain gears.	 Inspect timing chain and gears. Repair as required.
	Material cylinder • Broken valve • Piston material • Foreign material	 Inspect cylinder for damaged components and/or foreign materials. Repair or replace as required.
	Seized crankshaft or connecting rod bearings.	 Inspect crankshaft and connecting rod bearing. Repair as required.
	Bend or broken connecting rod.	 Inspect connecing rods. Repair as required.
	Broken crankshaft	 Inspect crankshaft. Repair as required.

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

GENERAL

SPECIAL TOOLS E4E4BACD

EM -11

Tool (Number and name)	Illustration	Use
Crankshaft front oil seal installer (09214-33000)	EDKA010A	Installation of the front oil seal
Camshaft oil seal installer (09214-21000)	EDKA010A	Installation of the camshaft oil seal
	EDDA005B	
Valve guide installer (09221-3F100 A/B)		Remove and installation of the valve guide
Valve stem oil seal installer	ECKA010B	Installation of the valve stem oil seal
(09222-22001)		
	ECKA010A	
Valve spring compressor & adaptor (09222-28000, 09222-28100)	EDDA005C	Removal and installation of the intake or exhaust valve
Crankshaft rear oil seal installer (09231-33000)		 Installation of the engine rear oil seal Installation of the crankshaft rear oil seal
	EDDA005F	

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ENGINE (G6BA)

TIMING SYSTEM

COMPONENT EB323873



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EM -13

TIMING SYSTEM

REMOVAL EF2F0D8C

Engine removal is not required for this procedure.

- 1. Remove the engine cover.
- 2. Remove RH front wheel.
- 3. Remove 2bolts(B) and RH side cover(A).

- (a holt(A) and holt tanging (D)
- 5. Remove drive belt(A) and belt tensioner(B).



EDQF100A

- 6. Remove the engine mount bracket.
 - 1) Set the jack to the engine oil pan.



4. Turn the crankshaft pulley, and align its groove with timing mark "T" of the timing belt cover.





ECKD102A

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Place wooden block between the jack and engine oil pan.

EDQF102A

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EM -14

ENGINE (G6BA)

- 2) Remove the 2bolts, 2nuts and engine mount bracket(A).
- 9. Remove the crankshaft pulley bolt and crankshaft pulley(A).





EDQF104A

- 7. Remove the power steering pump. (See ST group power steering pump)
- 8. Remove the 7bolts(B) and timing belt upper cover(A).



10. Remove the drive belt idler pulley(A).



EDQF105A

EDQF103A

EDQF017A

021-62999292

TIMING SYSTEM

11. Remove the 4bolts(B) and timing belt lower cover(A).

- EM -15
- 14. Remove timing belt tensioner. Alternately loosen the 2bolts, and remove the tensioner(A).



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If the timing belt is reused, make an arrow indicating the turning direction to make sure that the belt is reinstalled in the same direction as before.

If not, turn the crankshaft 1revolution(360°).

EM -16

021-62999292

ENGINE (G6BA)

16. Remove the tensioner pulley(A) and timing belt idler pulley(B).



INSPECTION EDAFCA96

SPOCKETS, TENSIONER, IDLER

- Check the camshaft sproket, crankshaft sprocket, 1. tensioner pulley, and idler pulley for abnormal wear, cracks, or damage. Replace as necessary.
- Inspect the tensioner pulley and the idler pulley for 2. easy and smooth rotation and check for play or noise. Replace as necessary.



- 17. Remove the crankshaft sprocket.
- 18. Remove camshaft sprockets. Hold the hexagonal head wrench portion of the camshaft with a wrench and remove the bolt and camshaft sprocket.

CAUTION

Be careful not to damage the cylinder head and valve lifter with the wrench.

Replace the pulley if there is a grease leak from its 3. bearing.

TIMING BELT

- Check the belt for oil or dust deposits. 1. Replace, if necessary. Small deposits should be wiped away with a dry cloth or paper. Do not clean with solvent.
- When the engine is overhauled or belt tension ad-2. justed, check the belt carefully. If any of the following flaws are evident, replace the belt.

NOTE

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

TIMING SYSTEM

INSTALLATION E1ED1397

- Install the crankshaft sprocket. Align the pulley set key with the key groove the crankshaft sprocket and slide on the crankshaft sprocket.
- 2. Install the camshaft sprockets and tighten the bolts to the specified torque.
 - 1) Temporarily install the camshaft sprocket bolts.
 - 2) Hold the hexagonal head wrench portion of the camshaft with a wrench, and tighten the camshaft sprocket bolts.

Tightening torque Camshaft sprocket bolt 90 ~ 110Nm (900 ~ 1100kgf.cm, 65 ~ 80lbf.ft)

3. Install the idler pulley(B) and the tensioner pulley(A).

Tightening torqueIdler pulley bolt50 ~ 60Nm (500 ~ 600kgf.cm, 36 ~ 43lbf.ft)Tensioner arm fixed bolt35 ~ 55Nm (350 ~ 550kgf.cm, 25 ~ 40lbf.ft)

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Insert and install the idler pulley to the roll pin that is pressed in the water pump boss.



4. Align the timing marks of the camshaft sprocket and crankshaft sprocket with the No.1 piston placed at top dead center and its compression stroke.



- 5. Set timing belt tensioner.
 - 1) Using a press, slowly press in the push rod.
 - 2) Align the holes of the push rod and housing pass a set pin through the holes to keep the setting position of the push rod.
 - 3) Release the press.
- 6. Install the timin belt tensioner.
 - 1) Temporarily install the tensioner with the 2bolts.

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021-62999292

ENGINE (G6BA)

EM -18

2) Alternately tighten the 2bolts.

Tightening torque

20 ~ 27Nm (200 ~ 270kgf.cm, 14 ~ 20lbf.ft)



- 7. Install the timing belt.
 - 1) Remove any oil or water on the sprockets, and keep them clean.
 - Install the tming belt in this order. Crankshaft sprocket(A) Idler pulley(B)
 Camshaft sprocket LH side(C) Water pump pulley(D) Camshaft sprocket RH side(E)
 Tensioner pulley(F).



8.



Remove the set pin(A) from the tensioner.

EDQF162A

- 9. Timing belt tensioner checking.
 - Rotate the crankshaft 2turns clockwise and measure the projected length of the auto tensioner at TDC(#1 compression stroke) after 5 minutes.
 - The projected length should be 7 ~ 9mm (0.27 ~ 0.31in.)



EDQF163A



EDQF108B

EDQF161A

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EM -19

TIMING SYSTEM

10. Install the engine support bracket(A).

Tightening torque

B : 60 ~ 70Nm (600 ~ 700kgf.cm, 43 ~ 51lbf.ft) C : 15 ~ 22Nm (150 ~ 220kgf.cm, 11 ~ 16lbf.ft)



11. Install the timing belt lower cover(A) with 4bolts(B).

Tightening torque Timing belt cover bolt 10 ~ 12Nm (100 ~120kgf.cm, 7 ~ 9lbf.ft)

12. Install the drive belt idler pulley(A).

Tightening torque Idler pulley bolt

35 ~ 55Nm (350 ~ 550kgf.cm, 25 ~ 40lgf.ft)



13. Install the crankshaft pulley(A). Make sure that crankshaft sprocket pin fits the small hole in the pulley.

Tightening torqueCrankshaft pulley bolt180 ~ 190Nm (1800 ~ 1900kgf.cm, 130 ~ 138lbf.ft)



EDQF105B

EDQF104A

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EM -20

ENGINE (G6BA)

14. Install the timing belt upper cover(A) with 7bolts(B).



17. Install the engine mount bracket. Install engine mount bracket with 2nuts and 2bolt.

Tightening torque

60 ~ 80Nm (600 ~ 800kgf.cm, 44 ~ 59lbf.ft)



EDQF103A

15. Install the power steering pump. (See ST group - power steering pump)

16. Install the drive belt tensioner(B) and drive belt(A).

18. Install RH side cover(A) with 2bolts(B).



EDQF100A

KXDSE16A

EDQF017A

- 19. Install RH front wheel.
- 20. Install engine cover.

CYLINDER HEAD ASSEMBLY

CYLINDER HEAD ASSEMBLY

COMPONENTS EAAAFFA1



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CYLINDER HEAD ASSEMBLY

REMOVAL EDA7EDAA

Engine removal is not required for this procedure.

🗥 CAUTION

- Use fender covers to avoid damaging painted surfaces.
- To avoid damaging the cylinder head, wait until the engine coolant temperature drops below normal temperature before removing it.
- When handling a metal gasket, take care not to fold the gasket or damage the contact surface of the gasket.
- To avoid damage, unplug the wiring connectors carefully while holding the connector portion.

🔟 ΝΟΤΕ

- Mark all wiring and hoses to avoid misconnection.
- Inspect the timing belt before removing the cylinder head.
- Turn the crankshaft pulley so that the No. 1 piston is at top dead center. (See page EM - 13).

EDQF041A

1. Remove the air duct(A).

2. Disconnect the negative terminal from the battery.



EDQF040A

- Drain the engine coolant. (See page EM 77) Remove the radiator cap to speed draining.
- 4. Remove the engine cover.
- 5. Remove the intake air hose and air cleaner assembly.
 - Disconnect the AFS connector(A).
 - Disconnect the breather hose(B) from air cleaner hose.
 - Remove the intake air hose and air cleaner assembly(C).



EDQF039A

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EM -23

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EM -24

ENGINE (G6BA)

- 6. Remove the upper radiator hose(A) and lower radiator hose(B).
- 5) Injector connector(E).
- 6) Knock sensor connectors(F).
- 7) CMP(Camshaft Position Sensor) connector(G).



EDQF019A

- 8. Remove the engine wire harness connectors and wire harness clamps from the cylinder head and the intake manifold.
 - 1) TPS(Throttle Position Sensor) connector(A).
 - 2) ISA(Idle Speed Actuator) connector(B).
 - PCSV(Purge Control Solenoid Valve) connector(C).
 - 4) VIS actuator connector(D).



EDQF033A

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CYLINDER HEAD ASSEMBLY

12) Three fuel injector connectors(A).

15) VIS actuator connector(B).





EDQF026A



EDQF027A

EDQF028A

14) IAT(Intake Air Temperature) sensor connector(A).

EDQF025A

10. Remove the PCSV hose.

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EM -26

- 11. Remove the brake booster vacuum hose(A).
- 13. Remove the PCV hose(A).



EDQF014A

- 14. Remove the intake manifold. (See page EM 93)
- 15. Remove the power steering pump. (See ST group power steering pump).
- 16. Remove the exhaust manifold. (See page EM 95)
- 17. Remove the timing belt. (See page EM 13)
- Remove the spark plug cable. (See EE group ignition)
- 19. Remove the cylinder head covers(A).



EDQF050A

20. Remove the camshaft sprocket.

12. Remove the accelerator cable by loosening the lock-

nut, then slip the cable end out of the throttle linkage.

EDQF029A

EDQF020A

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ENGINE (G6BA)

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EM -27

CYLINDER HEAD ASSEMBLY

- 21. Remove the camshaft bearing caps(A).
- 22. Remove the camshafts(A).



EDQF055A

EDQF056A

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ENGINE (G6BA)

EM -28

23. Remove the timing belt rear cover(A).



EDQF057A

24. Remove the water temperature control assembly(A) and water pipe.



EDQF058A

- 25. Remove the cylinder head bolts, then remove the cylinder heads.
 - Uniformly loosen and remove the 8 cylinder head bolts on each cylinder head in several passes and in the sequence shown, then repeat for the other side, as shown. Remove the 16 cylinder head bolts and plate washer.



M CAUTION

Head warpage or cracking could result from removing bolts in an incorrect order.

2) Lift the cylinder head from the dowels on the cylinder block and place the cylinder head on wooden blocks on a bench.

\Lambda CAUTION

Be careful not to damage the contact surfaces of the cylinder head and cylinder block.

CYLINDER HEAD ASSEMBLY

DISASSEMBLY E60D4118

🔟 ΝΟΤΕ

Identify HLA(Hydraulic Lash Adjuster), valves, valve springs as they are removed so that each item can be reinstalled in its original position.

1. Remove HLAs(A).

2.

Remove valves.

- 4) Remove the valve.
- 5) Using needle-nose pliers, remove the oil seal.
- 6) Using a magnetic finger, remove the spring seat.





1) Using SST(09222-28000, 09222-28100), compress the valve spring and remove retainer lock.



EDQF169A

- 2) Remove the spring retainer.
- 3) Remove the valve spring.

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ENGINE (G6BA)

EM -30

INSPECTION E29C1FBF

CLENING

- 1. Clean top surfaces of pistons and cylinder block.
 - Turn the crankshaft, and bring each piston to top dead center(TDC).
 Using a gasket scraper, remove all the carbon from the piston top surface.
 - 2) Using a gasket scraper, remove all the gasket material from the cylinder block surface.
 - 3) Using compressed air, blow carbon and oil from the bolt holes.
- 2. Remove gasket material. Using a gsket scraper, remove all the gasket material from the cylinder block contact surface.

\Lambda CAUTION

Be careful not to scratch the cylinder block contact surface.

3. Clean combustion cambers. Using a wire brush, remove all the carbon from the combustion cambers.

Be careful not to scratch the cylinder block contact surface.

- 4. Clean cylinder heads. Using a soft brush and solvent. throughly clean the cylinder head.
- 5. Clean valves.
 - 1) Using a gasket scraper, chip off any carbon from the valve head.
 - 2) Using a wire brush throroghly clean the valve.

CYLINDER HEAD

 Inspect for flatness. Using a precision straight edge and feeler gauge, measure the surface the contacting the cylinder block for warpage.

Flatness of cylinder head gasket surface Standard : Less than 0.03mm(0.0012 in.) Limit : 0.06 mm (0.0024 in.)



2. Inspect for cracks.

Check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks. If cracked, replace the cylinder head.

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CYLINDER HEAD ASSEMBLY

VALVE AND VALVE SPRING

- 1. Inspect valve stems and valve guides.
 - Using a caliper gauge, measure the inside diameter or the valve guide. Valve guide inside.



2) Using a micrometer, measure the diameter of the valve stem.

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[Standard]

Intake : 0.02 ~ 0.05mm (0.0008 ~ 0.0020in.) Exhaust : 0.030 ~ 0.065mm (0.0012 ~ 0.0026in.) [Limit] Intake : 0.1mm (0.0040in.) Exhaust : 0.13mm (0.0051in.)

> If the clearance is greater than maximum, replace the valve and valve guide.

- 2. Inspect valves.
 - 1) Check the valve is ground to the correct valve face angle.
 - 2) Check that the surface of the valve for wear. If the valve face is worn, replace the valve.
 - Check the valve head margin thickness. If the margin thickness is less than minimum, replace the valve.

Margin

[Standard] Intake : 1.0mm (0.0394in.) Exhaust : 1.3mm (0.0512in.) [Limit]] Intake : 0.5mm (0.0197in.) Exhaust : 0.8mm (0.0315in.)



ECKD220A

ECKD221A

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EM -31

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EM -32

ENGINE (G6BA)

- 4) Check the surface of the valve stem tip for wear. If the valve stem tip is worn, replace the valve.
- 3. Inspect valve seats

Check the valve seat for evidence of overheating and improper contact with the valve face. Replace the seat if necessary.

Before reconditioning the seat, check the valve guide for wear. If the valve guide is worn, replace it, then recondition the seat. Recondition the valve seat with a valve seat grinder or cutter. The valve seat contact width should be within specifications and centered on the valve face.

4. Inspect valve springs.

Free height : 42.5mm (1.6732in.) Load : 21kg/35mm (48.4kg/1.378mm)

Free height : -1.0mm (-0.0394 in.)

Valve spring [Standard]

[Limit]

- 1) Using a steel square, measure the out-of-square of the valve spring.
- 2) Using a vernier calipers, measure the free length of the valve spring.

Using a micrometer, measure the cam lobe height.

Intake : 43.95 ~44.15mm (1.7303 ~ 1.7382in.)

Exhaust: 43.95 ~ 44.15mm (1.7303 ~ 1.7382in.)

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Out-of-square : 3°

ECKD222A

If the free length is not as specified, replace the valve spring.

If the cam lobe height is less than minimum, replace the camshaft.

2. Inspect cam journals. Using a micrometer, measure the journal diameter.

Journal diameter

CAMSHAFT

Cam height

[Standard value]

Inspect cam lobes.

1.

Standard value 25.964 ~ 25.980mm (1.0222 ~ 1.0228in.)

If the journal diameter is not as specified, check the oil clearance.

- 3. Inspect camshaft bearings. Check that bearing for flaking and scoring. If the bearings are damaged, replace the bearing caps and cylinder head as a set.
- 4. Inspect camshaft journal oil clearance.
 - 1) Clean the bearing caps and camshaft journals.
 - 2) Place the camshafts on the cylinder head.

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CYLINDER HEAD ASSEMBLY

3) Lay a strip of plastigage across each of the camshaft journal.



If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

- 7) Completely remove the plastigage.
- 8) Remove the camshafts.
- 5. Inspect camshaft end play.
 - 1) Install the camshafts. (See page EM 38)
 - 2) Using a dial indicator, measure the end play while moving the camshaft back and forth.

Camshaft end play

Standard value : 0.1 ~ 0.15mm (0.004 ~ 0.0059in.)



Bearing oil clearance

Standard value : 0.02 ~ 0.061mm (0.0008 ~ 0.0024in.) Limit : 0.1mm (0.0039in.)

EDQF053B

If the end play is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

3) Remove the camshafts.

ECKD225A

021-62999292

EM -34

REPLACEMENT EED266F4

VALVE GUIDE

- Using the SST(09221-3F100A), withdraw the old 1. valve guide toward the bottom of cylinder head.
- 09221-3F100A Valve guide length Intake : 39mm (1.535in.) Exhaust : 43mm (1.693in.) 09221-3F100A EDKD900A Recondition the valve guide hole so that it can match 2. the newly press-fitted oversize valve guide.

ENGINE (G6BA)

Using the SST(09221-3F100A/B), press-fit the valve 3. guide. The valve guide must be press-fitted from the upper side of the cylinder head. Keep in mind that the intake and exhaust valve guides are different in length.

Over size mm(in.)	Size mark	Oversize valve guide hole size mm(in.)
0.05 (0.002)	5	11.05 ~ 11.068 (0.4350 ~ 0.4357)
0.25 (0.010)	25	11.25 ~ 11.268 (0.4429 ~ 0.4436)
0.50 (0.020)	50	11.50 ~ 11.518 (0.4528 ~ 0.4535)



EDKD900B

- 4. After the valve guide is press-fitted, insert a new valve and check for proper stem -to-guide clearance.
- 5. After the valve guide is replaced, check that the valve is seated properly. Recondition the valve seats as necessary.

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CYLINDER HEAD ASSEMBLY

REASSEMBLY EDCA3D22

🔟 ΝΟΤΕ

Thoroughly clean all parts to be assembled. Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces. Replace oil seals with new ones.

- 1. Install valves.
 - 1) Install the spring seats.
 - 2) Using SST(09222-22001), push in a new oil seal.

🔟 ΝΟΤΕ

Do not reuse old valve stem seals. Incorrect installation of the seal could result in oil leakage past the valve guides.

09222-22001

4) Using the SST(09222-28000, 09222-28100), compress the spring and install the retainer locks. After installing the valves, ensure that the retainer locks are correctly in place before releasing the valve spring compressor.



EDQF169A

Lightly tap the end of each valve stem two or three times with the wooden handle of a hammer to ensure proper seating of the valve and retainer lock.



5)

3) Install the valve, valve spring and spring retainer.

🔟 ΝΟΤΕ

Place valve springs so that the side coated with enamel faces toward the valve spring retainer and then installs the retainer.

EDQF168A

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EM -36

ENGINE (G6BA)

2. Install HLAs. Check that the HLA rotates smoothly by hand.



INSTALLATION E1F59CAC

NOTE

- Thoroughly clean all parts to be assembled.
- Always use a new head and manifold gasket.
- The cylinder head gasket is a metal gasket. Take care not to bend it.
- Rotate the crankshaft, set the No.1 piston at TDC. (See page EM - 13).
- Install the cylinder head gaskets on the cylinder block. 1.



NOTE

Be careful of the installation direction.

- 2. Place the cylinder head quietly in order not to damage the gasket with the bottom part of the end.
- 3. Install cylinder head bolts.

Tightening torque

25Nm (250kgf.cm, 18lbf.ft) + 60° + 45°

- Apply a light coat if engine oil on the threads and 1) under the heads of the cylinder head bolts.
- 2) Install the plate washer to the cylinder head bolt.

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CYLINDER HEAD ASSEMBLY

 Install the uniformly tighten the cylinder head bolts on each cylinder head in servral passes and in the sequence shown, then repeat for the other side, as shown.



If only of the cylinder head bolts dose not meet the torque specification, repeat the cylinder head bolt.

Torque : 25Nm (250kgf.cm, 18lbf.ft)

5. Install the timing belt rear cover(A).

Tightening torque Timing belt rear cover 10 ~ 12Nm (100 ~ 120kgf.cm, 7 ~ 9lbf.ft)



EDQF156A

4) Retighten the cylinder head bolts by 60° in the numerical order shown.



EDQF057A

EDQF058A

assembly(A). Tightening torque

Water temperature control

5)

4.

15 ~ 20Nm (150 ~ 200kgf.cm, 11 ~ 14lbf.ft)

numerical order shown.

Retighten the cylinder head bolts by 45° in the

Install the water pipe and water temperature control

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EM -37

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ENGINE (G6BA)

EM -38

- 6. Install the camshafts.
 - 1) Align the camshaft timing chain with the intake timing chain sprocket and exhaust timing chain sprocket as shown.
- 3) Install the camshaft bearing caps(A).

Tightening torque

10 ~ 12Nm (100 ~ 120kgf.cm, 7 ~ 9lbf.ft) 14 ~ 16Nm (140 ~ 160kgf.cm, 10 ~ 12lbf.ft)



EDQF052A

8. Install the camshaft sprocket.

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EM -39

CYLINDER HEAD ASSEMBLY

- Temporarily install the camshaft sprocket bolts. 1)
- Hold the hexagonal head wrench portion of 2) the camshaft with a wrench, and tighten the camshaft sprocket bolts.

Tightening torque

Camshaft sprocket bolt 90 ~ 110Nm (900 ~ 1100kgf.cm, 65 ~ 80lbf.ft)

- 9.
- 10. Install the cylinder head cover.

Install the cylinder head covers(A) with the 3) 16bolts. Uniformly tighten the bolts in several passes.

Tightening torque

8 ~ 10Nm (80 ~ 100kgf.cm, 6 ~ 7.4lbf.ft)



EDQF172A

- Use liquid gasket, loctite No.5699.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- After assembly, wait at least 30 minutes before filling the engine with oil.
- 11. Install the spark plug cable. (See EE group ignition)
- 12. Install the timing belt. (See page EM 17).
- 13. Install the exhaust manifold. (See page EM 98)

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ENGINE (G6BA)

EM -40

- 14. Install the power steering pump. (See ST group power steering pump)
- 15. Install the intake manifold. (See page EM 97)
- 16. Install the PCV hose(A).



18. Install the brake booster vacuum hose(A).



EDQF020A

- 19. Install the PCSV hose.
- 20. Install the fuel inlet hose(A).



EDQF025A

EDQF029A

021-62999292

CYLINDER HEAD ASSEMBLY

- 21. Install the engine wire harness connectors and wire harness clamps to the cylinder head and the intake manifold.
 - 1) VIS actuator connector(B).
 - 2) IAT(Intake Air Temperature) sensor connector(A).

20220 CLUQ CLUQ CLUQ CLUQ CLUQ EDQF026A

3) Connect the ground cable(A) to the cowl panel.

4) Three fuel injector connectors(A).



EDQF028A

- 5) Oxygen sensor connector(D).
- 6) Crankshaft position sensor connector(C).
- 7) Ignition coil connector(B).
- 8) ECT sensor connector(A).





EDQF027A

EDQF033A

- 9) CMP(Camshaft position sensor) connector(G).
- 10) Knock sensor connector(F).
- 11) Injector connector(E).
- 12) VIS actuator connector(D).

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EM -41

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ENGINE (G6BA)

EM -42

- PCSV(Purge Control Solenoid Valve) connector(C).
- 14) ISA connector(B).
- 15) TPS connector(A).



22. Install the heater hoses(A).

23. Install the upper radiator hose(A) and lower radiator hose(B).



EDQF037A

- 24. Install the intake air hose and air cleaner assembly.
 - 1) Install the intake air hose and air cleaner assembly(C).
 - 2) Connect the breather hose(B) from air cleaner hose.



3) Connect the AFS connector(A).



EDQF019A

EDQF039A

25. Install the engine cover.

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CYLINDER HEAD ASSEMBLY

26. Connect the negative terminal to the battery.

EDQF040A 27. Install the air duct(A).

0







EDQF041A

- 28. Fill with engine coolant.
- 29. Start the engine and check for leaks.
- 30. Recheck engine coolant level and oil level.

EM -44

ENGINE AND TRANSAXLE ASSEMBLY

REMOVAL E4AD264D

- Use fender covers to avoid damaging painted surfaces.
- To avoid damage, unplug the wiring connectors carefully while holding the connector portion.

🔟 ΝΟΤΕ

- Mark all wiring and hoses to avoid misconnection.
- Inspection the timing belt before removing the cylinder head.
- Turn the crankshaft pulley so that the No. 1 piston is at top dead center. (See page EM 13)
- 1. Remove the air duct(A).



EDQF040A

 Drain the engine coolant. Remove the radiator cap to speed draining.



EDQF041A

EDQF002A

- 4. Remove the engine cover.
- 5. Remove the intake air hose and air cleaner assembly.
 - 1) Disconnect the AFS connector(A).

Α

2) Disconnect the breather hose(B) from air cleaner hose.

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ENGINE (G6BA)

2. Disconnect the neagative terminal from the battery.

ENGINE AND TRANSAXLE ASSEMBLY

- Remove the intake air hose and air cleaner assembly(C).
- 7. Remove the heater hoses(A).



Remove the upper radiator hose(A) and lower radiator hose(B).



EDQF019A

- 8. Remove the engine wire harness connectors and wire harness clamps from the cylinder head and the intake manifold.
 - 1) TPS(Throttle Position Sensor) connector(A).
 - 2) ISA(Idle Speed Actuator) connector(B).
 - 3) PCSV(Purge Control Solenoid Valve) connector(C).
 - 4) VIS actuator connector(D).
 - 5) Injector connector(E).
 - 6) Knock sensor connector(F).

EDQF037A

EDQF039A

021-62999292

ENGINE (G6BA)

EM -46

8)

connector.

9) Ignition coil connector(B).

- 7) CMP(Camshaft Position Sensor) connector(G).
- 12) Three fuel injector connectors(A).



ECT(Engine Coolant Temperature) sensor(A)



EDQF028A

13) Disconnect ground cable(A) from the cowl panel.

10) Crankshaft position sensor connector(C).

11) Rear oxygen sensor connector(D).

EDQF027A

14) Intake air temperature sensor connector(A).

EDQF033A

EDQF032A

EM -47

ENGINE AND TRANSAXLE ASSEMBLY

- 15) VIS actuator connector(B).
- 11. Remove the fuel inlet from delivery pipe(A).



EDQF026A

Disconnect front heated oxygen sensor(LH) connector(A), air compressure switch connector(B) and oil pressure sensor connector(C).

EDQF025A

- 12. Remove the PCSV hose.
- 13. Remove the brake booster vacuum hose(A).



EDQF009A

EDQF020A

10. Disconnect rear heated oxygen sensor(RH) connector.

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EM -48

ENGINE (G6BA)

14. Remove the accelerator cable by loosening the locknut, then slip the cable end out of the throttle linkage.





EDQF021A



EDQF024A

EM -49

ENGINE AND TRANSAXLE ASSEMBLY

16. Remove the battery body bracket.

c. Disconnect the input shaft speed $\operatorname{connector}(C)$.



- 17. Disconnect the transaxle wire harness connector.
 - a. Disconnect the inhibitor switch connector(A).
 - b. Disconnect the transaxle range connector(B).

EDQF031A

021-62999292

ENGINE (G6BA)

EM -50

- 18. Remove the control cable(A) transaxle range switch.
- 20. Remove the under cover(A).





EDQF173A

- 19. Remove the transaxle oil cooler hoses(A/T)(A).
- 21. Remove the front exhaust pipe(A).



EDQF034A

EDQF018A

EDQF001A

ENGINE AND TRANSAXLE ASSEMBLY

- 22. Disconnect the ABS wheel speed sensor(A) from both front knuckles. (See DS group front axle).
- 24. Remove the caliper and hang the caliper assembly(A).





ECKD612A

- 23. Remove the front strut lower mounting bolts and nuts. 25 (See SS group front strut).
 - ts. 25. Remove the steering u-joint mounting bolt(A). (See ST group steering)



EDQF015A

EDQF023A

ECKD616A

26. Install the jack for supporting engine and transaxle assembly.

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EM -51

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EM -52

ENGINE (G6BA)

- 27. Remove the engine mounting bracket(A).
- 29. Remove the sub frame mounting bolts and nuts.

Tightening torque

- A : 160 ~ 180Nm (1600 ~ 1800kgf.cm, 118 ~ 133lbf.ft)
- B : 70 ~ 90Nm (700 ~ 900kgf.cm, 52 ~ 66lbf.ft)



EDQF016A

ECQF118A

ENGINE AND TRANSAXLE ASSEMBLY





ECKD618A

30. Jack up the vehicle.

يجيتال خودر

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INSTALLATION EFBF5C5C

Installation is in the reverse order of removal.

Perform the following :

- Adjust the shift cable.
- Adjust the throttle cable.
- Refill the engine with engine oil.
- Refill the transaxle with fluid.
- Refill the radiator with engine coolant.
- Bleed air from the cooling system with the heater valve open.
- Clean the battery posts and cable terminals with sandpaper assemble them, then apply grease to prevent corrosion.
- Inspect for fuel leakage.

After assembling the fuel line, turn on the ignition switch (do not operate the starter) so that the fuel pump runs for approximately two seconds and fuel line pressureizes.

Repeat this operation two or three times, then check for fuel leakage at any point in the fuel line.



ENGINE (G6BA)

EM -54

ENGINE BLOCK

COMPONENT E75D75CB



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ENGINE BLOCK

EM -55



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ENGINE (G6BA)

EM -56

DISASSEMBLY EB8FA3DB

- 1. A/T : remove drive plate.
- 2. Install engine to engine stand for disassembly(A).
- 3. Remove timing belt. (See page EM 13)
- 4. Remove cylinder head. (See page EM 23)
- 5. Remove oil level gauge assembly.
- 6. Remove the alternator. (See EE group alternator).
- 7. Remove the air compressor. (See HA group air compressor)
- 8. Remove the power steering pump bracket(A).

10. Remove knock sensors(A).





EDQF065A

021-62999292

021-62999292

Push the piston, connecting rod assembly and

upper bearing through the top of the cylinder

EM -57

ENGINE BLOCK

12. Remove oil screen. Remove the 2bolts(B), oil screen(A) and gasket.



2)

block.

EDQF067A

- Check the connecting rod end play. (See page EM -59)
- 15. Remove the connecting rod caps and check oil clearance. (See page EM - 59)
- 16. Remove piston and connecting rod assemblies.
 - 1) Using a ridge reamer, remove all the carbon from the top of the cylinder.

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ENGINE (G6BA)

EM -58

20. Remove crankshaft bearing cap and check oil clearance. (See page EM - 61)



- 23. Remove piston rings.
 - Using a piston ring expender, remove the 2 compression rings.
 - 2) Remove the 2side rails and oil ring by hand.

🔟 NOTE

Arrange the piston rings in the correct order only.

24. Disconnect connecting rod from piston.

EDQF072A

21. Lift the crankshaft(A) out of the engine, being careful not to damage journals.

NOTE

Arrange the main bearings and trust washers in the correct order.

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EDQF074A

22. Check fit between piston and piston pin. Try to move the piston back and forth on the piston pin. If any movement is felt, replace the piston and pin as a set.

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EM -59

ENGINE BLOCK

INSPECTION EE99516D

CONNECTING ROD AND CRANKSHAFT

 Check the connecting rod end play. Using a dial indicator, measure the end play while moving the connecting rod back and forth.

Standard end play : 0.1~ 0.25mm(0.004 ~ 0.010in.) Maximum end play : 0.4mm(0.016in.)

- 7) Remove the 2bolts, connecting rod cap and bearing half.
- 8) Measure the plastigage at its widest point.

Standard oil clearance 0.018 ~ 0.036mm(0.0007 ~ 0.0014in.)





If out-of-tolerance, replace the connecting rod as-

EDQE159A

- sembly.
- If still out-of-tolerance, replace the crankshaft.
- 2. Check the connecting road bearing oil clearance.
 - Check the matchmarks on the connecting rod and cap are aligned to ensure correct reassembly.
 - 2) Remove the 2 connecting rod cap bolts.
 - 3) Remove the connecting rod cap and bearing half.
 - 4) Clean the crank pin and bearing.
 - 5) Place plastigage across the crank pin.
 - 6) Reinstall the bearing half and cap, and torque the bolts.

Tightening torque

 $16 \sim 20$ Nm (160 ~ 200 kgf.cm, 12 ~ 15 lbf.ft) + 90°

🔟 NOTE

Do not turn the crankshaft.

If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color mark (select the color as shown in the next column), and recheck the clearance.

A CAUTION

9)

Do not file, shim, or scrape the bearings or the caps to adjust clearance.

10) If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again.

🔟 ΝΟΤΕ

If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

$\underline{}^{}$ CAUTION

If the marks are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

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ENGINE (G6BA)

(1.8893 ~ 1.8895in.) 47.982 ~ 47.988mm

(1.8890 ~ 1.8893in.)

Connecting rod mark location

CLSASS	MARK	OUTSIDE DIAMETER OF PIN
Ι	А	47.994 ~ 48.000mm (1.8895 ~ 1.8898in.)
II	В	47.988 ~ 47.994mm

Discrimination of crankshaft

С

Place of identification mark (Connecting rod bearing)



Ш

Crankshaft pin mark location

ECKD313A

Discrimination of connecting rod bearing

CLASS	MARK	THICKNESS OF BEARING
A	BLUE	1.500 ~ 1.503mm (0.0590 ~ 0.0591in.)
В	BLACK	1.497 ~ 1.500mm (0.0589 ~ 0.0590in.)
С	NONE	1.494 ~ 1.497mm (0.0588 ~ 0.0589in.)
D	GREEN	1.491 ~ 1.494mm (0.0587 ~ 0.0588in.)
E	YELLOW	1.488 ~ 1.491mm (0.0586 ~ 0.0587in.)



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EM -60

ENGINE BLOCK

11) Selection

CRANKSHAFT INDENTIFICATION MARK	CONNECT- ING ROD IDENTIFICA- TION MARK	ASSEMBING CLASSIFI- CATION OF BEARING
	0 (A)	E (YELLOW)
I (A)	1 (B)	D (GREEN)
	2 (C)	C (NONE)
	0 (A)	D (GREEN)
II (B)	1 (B)	C (NONE)
	2 (C)	B (BLACK)
	0 (A)	C (NONE)
III (C)	1 (B)	B (BLACK)
	2 (C)	A (BLUE)

3. Check the crankshaft bearing oil clearance.

- 1) To check main bearing-to-journal oil clearance, remove the main caps and bearing halves.
- Clean each main journal and bearing half with a clean shop tower.
- Place one strip of plastigage across each main journal.
 - 4) Reinstall the bearings and caps, then torque the bolts.

Tightening torque

M8 13 ~ 19Nm (130 ~ 190kgf.cm, 10 ~ 14lbf.ft) + 90° M10 27 ~ 33Nm (270 ~ 330kgf.cm, 19.5 ~ 24lbf.ft) + 90°

🚺 ΝΟΤΕ

Do not turn the crankshaft.

5) Remove the cap and bearing again, and measure the widest part of the plastigage.

Standard oil clearance 0.004 ~ 0.022mm (0.00016 ~ 0.00087in.)





6) If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color mark (select the color as shown in the next column), and recheck the clearance.

Do not file, shim, or scrape the bearings or the caps to adjust clearance.

7) If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again.

🔟 ΝΟΤΕ

If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

If the marks are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

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EM -61

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ENGINE (G6BA)

EM -62

CONNECTING RODS

- 1. When reinstalling, make sure that cylinder numbers put on the connecting rod and cap at disassembly match. When a new connecting rod is installed, make sure that the notches for holding the bearing in place are on the same side.
- 2. Replace the connecting rod if it is damaged on the thrust faces at either end. Also if step wear or a severely rough surface of the inside diameter of the small end is apparent, the rod must be replaced as well.
- 3. Using a connecting rod aligning tool, check the rod for bend and twist. If the measured value is close to the repair limit, correct the rod by a press. Any connecting rod that has been severely bent or distorted should be replaced.

Allowable bend of connecting rod 0.05mm / 100mm (0.0020 in./3.94 in.) or less Allowable twist of connecting rod 0.1mm / 100mm (0.0039 in./3.94 in.) or less

Crankshaft bore mark location

Letters have been stamped on the end of the block as a mark for the size of each of the 4 main journal bores.

Use them, and the numbers or bar stamped on the crank (marks for main journal size), to choose the correct bearings.



Discrimination of cylinder block

CALSS	MARK	INSIDE DIAMETER
а	A	66.000 ~ 66.006mm (2.5984 ~ 2.5986in.)
b	В	66.006 ~ 66.012mm (2.5986 ~ 2.5989in.)
С	С	66.012 ~ 66.018mm (2.5989 ~ 2.5991in.)

Crankshaft journal mark location



EDQF176B



Discrimination of crankshaft

EDQF078A

ENGINE BLOCK

Place of identification mark (Crankshaft bearing)

Mark Color

ECKD316A

Discrimination of crankshaft bearing

CLASS	MARK	THICKNESS OF BEARING
بت مددود)	انه (BLUE ئول	2.007 ~ 2.010mm (0.0790 ~ 0.0791in.)
و در ایران	BLACK	2.004 ~ 2.007mm (0.0789 ~ 0.0790in.)
С	NONE	2.001 ~ 2.004mm (0.0788 ~ 0.0789in.)
D	GREEN	1.998 ~ 2.001mm (0.0787 ~ 0.788in.)
E	YELLOW	1.995 ~ 1.998mm (0.0785 ~ 0.0787in.)

Selection

CRANKSHAFT IDENTIFICATION MARK	CRANK- SHAFT BORE IDENTIFICA- TION MARK	ASSEM- BLING CLAS- SIFICATION OF BEARING
	a (A)	E (YELLOW)
I (A)	b (B)	D (GREEN)
	c (C)	C (NONE)
	a (A)	D (GREEN)
II (B)	b (B)	C (NONE)
	c (C)	B (BLACK)
	a (A)	C (NONE)
III (C)	b (B)	B (BLACK)
	c (C)	A (BLUE)

4. Check crankshaft end play. Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard end play	
0.07 ~ 0.25mm (0.0027 ~ 0.0098in.)	
Limit : 0.30mm (0.0118in.)	



ECKD001B

If the end play is greater than maximum, replace the thrust bearings as a set.

Thrust bearing thickness 2.05 ~ 2.09mm (0.081 ~ 0.082in.)

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EM -63

EM -64

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ENGINE (G6BA)

5. Inspect main journals and crank pins Using a micrometer, measure the diameter of each main journal and crank pin.

Main journal diameter 61.982 ~ 62.000mm (2.4402 ~ 2.4409in.) Crank pin diameter 47.982 ~ 48.000mm (1.8890 ~ 1.8898in.) Inspect top surface of cylinder block for flatness. Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head gasket for warpage.

Flatness of cylinder block gasket surface Standard : Less than 0.03mm(0.0012 in.) Limit : 0.05 mm (0.0020 in.)



ECKD001E

CYLINDER BLOCK

- 1. Remove gasket material. Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.
- 2. Clean cylinder block Using a soft brush and solvent, thoroughly clean the cylinder block.

021-62999292

ENGINE BLOCK

EM -65

Inspect cylinder bore diameter 5. Using a cylinder bore gauge, measure the cylinder bore diameter at position A, B and C in the thrust and axial directions.

Standard diameter

86.70 ~ 86.73mm (3.4134 ~ 3.4145in.)



- 6. Check the cylinder bore size code(A) on the cylinder
- block bottom face.



Α Ο

Check the piston size code(A) on the piston top face.

EDQF177A

NOTE

7.

Stamp the grade mark of basic diameter with rubber stamp.

Class	Piston diameter	Size code
u A.J	86.68 ~ 86.69mm (3.4126 ~ 3.4130in.)	А
В	86.69 ~ 86.70mm (3.4130 ~ 3.4133in.)	None
С	86.70 ~ 86.71mm (3.4133 ~ 3.4137in.)	С

8. Select the piston related to cylinder bore class.

Clearance : 0.01 ~ 0.03mm (0.0004 ~ 0.0012in.)

BORING CYLINDER

Oversize pistons should be selected according to the 1. largest bore cylinder.

Identification Mark	Size
0.25	0.25mm (0.010in.)
0.50	0.50mm (0.0250in.)

🔟 NOTE

The size of piston is stamped on top of the piston.

2. Measure the outside diameter of the piston to be used.



EDQF078B

Class	Cylinder bore inner diameter	Size code
А	86.70 ~ 86.71mm (3.4133 ~ 3.4137in.)	А
В	86.71 ~ 86.72mm (3.4137 ~ 3.4141in.)	В
С	86.72 ~ 86.73mm (3.4141 ~ 3.4145in.)	С

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ENGINE (G6BA)

EM -66

3. According to the measured O.D., calculate the new bore size.

New bore size = Piston O.D + 0.01 to 0.03mm (0.0004 to 0.0012 in.) (clearance between piston and cylinder) - 0.01 mm (0.0004 in.) (honing margin.)

4. Bore each of the cylinders to the calculated size.

To prevent distortion that may result from temperature rise during honing, bore the cylinder holes in the firing order.

- 5. Hone the cylinders, finishing them to the proper dimension (piston outside diameter + gap with cylinder).
- 6. Check the clearance between the piston and cylinder.

Standard : 0.01 ~ 0.03mm (0.0004 ~ 0.0012 in.)

🔟 ΝΟΤΕ

When boring the cylinders, finish all of the cylinders to the same oversize. Do not bore only one cylinder to the oversize.

- PISTON AND RINGS and a local g
- 1. Clean piston
 - 1) Using a gasket scraper, remove the carbon from the piston top.
 - 2) Using a groove cleaning tool or broken ring, clean the piston ring grooves.
 - 3) Using solvent and a brush, thoroughly clean the piston.
 - 🚺 ΝΟΤΕ

Do not use a wire brush.

2. The standard measurement of the piston outside diameter is taken 38.5mm (1.516in.) from the top land of the piston.

Standard diameter 86.68 ~ 86.71mm (3.4126 ~ 3.4138in.)



 Calculate the difference between the cylinder bore diameter and the piston diameter.

Piston-to-cylinder clearance 0.01 ~ 0.03mm(0.0004 ~ 0.0012in.)

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ENGINE BLOCK

4. Inspect the piston ring side clearance. Using a feeler gauge, measure the clearance between new piston ring and the wall of the ring groove.

Piston ring side clearance

No. 1 : 0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in.) No. 2 : 0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in.) Limit No. 1 : 0.1mm (0.004in.) No. 2 : 0.1mm (0.004in.)

- 5. Inspect piston ring end gap.
 - To measure the piston ring end gap, insert a piston ring into the cylinder bore. Position the ring at right angles to the cylinder wall by gently pressing it down with a piston. Measure the gap with a feeler gauge. If the gap exceeds the service limit, replace the piston ring. If the gap is too large, recheck the cylinder bore diameter against the wear limits on page EM - 65, If the bore is over the service limit, the cylinder block must be rebored.(see page EM - 65).

Piston ring end gap

Standard No.1 : 0.20 ~ 0.35mm (0.0079 ~ 0.0138in.) No.2 : 0.37 ~ 0.52mm (0.0146 ~ 0.0205in.) Limit Oil ring : 0.2 ~ 0.7mm (0.0079 ~ 0.0276in.)

-11----

If the clearance is greater than maximum, replace the piston.

ECKD001G

ECKD001K

021-62999292

ENGINE (G6BA)

EM -68

PISTON PINS

1. Measure the diameter of the piston pin.

Piston pin diameter

21.001 ~ 21.007mm (0.8268 ~ 0.8270in.)



2. Measure the piston pin-to-piston clearance.

Piston pin-to-piston clearance

- 0.007 ~ 0.022mm (0.00027 ~ 0.00086in.)
- 3. Check the difference between the piston pin diameter and the connecting rod small end diameter.

Piston pin-to-connecting rod interference 0.016 ~ 0.033mm (0.00063 ~ 0.00130in.)

OIP PRESSURE SWITCH

2.

 Check the continuity between the terminal and the body with an ohmmeter.
 If there is no continuity replace the oil pressure

If there is no continuity, replace the oil pressure switch.



Check the continuity between the terminal and the body when the fine wire is pushed. If there is continuity even when the fine wire is pushed, replace the switch.

3. If there is no continuity when a 50kpa (7psi) vacuum is applied through the oil hole, the switch is operaing properly.

Check for air leakage. If air leaks, the diahragm is broken. Replace it.



ECKD001Y

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EM -69

ENGINE BLOCK

REASSEMBLY EF5F5963

🔟 ΝΟΤΕ

- Thoroughly clean all parts to assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O-rings and oil seals with new parts.
- 1. Assemble piston and connecting rod.
 - 1) Use a hydraulic press for installation.
 - The piston front mark(A) and the connecting rod front mark(B) must face the timing belt side of the engine.

3) Position the piston rings so that the ring ends are as shown.



EDQF178A

- 3. Install connecting rod bearings.
 - 1) Align the bearing claw with the groove of the connecting rod or connecting rod cap.
 - 2) Install the bearings in the connecting rod and connecting rod cap.

EDQF077A

- 2. Install piston rings.
 - 1) Install the oil ring expander and 2 side rails by hand.
 - 2) Using a piston ring expander, install the 2 compression rings with the code mark facing upward.



ECKD322A

021-62999292

EM -70

4. Install main bearings.

🔟 ΝΟΤΕ

Upper 1, 2, 3, 4 bearings have an oil groove of oil holes; Lower bearings do not.

1) Align the bearing claw with the claw groove of the cylinder block, push in the 4upper bearings(A).

ENGINE (G6BA)

 Install thrust bearings. Install the 2 thrust bearings (A) under the No.3 journal position of the cylinder block with the oil grooves facing outward.



7. Place main bearing caps on cylinder block.

EDQF079A

021-62999292

EM -71

ENGINE BLOCK

8. Install main bearing cap bolts.



- The main bearing cap bolts are tightened in 2 progressive steps.
- If any of the bearing cap bolts in broken or deformed, replace it.

Tightening torque

Main bearing cap bolt M8 13 ~ 19Nm (130 ~ 190kgf.cm, 10 ~ 14lbf.ft) + 90° ~ 94° M10 27 ~ 33Nm (270 ~ 330kgf.cm, 19.5 ~ 24lbf.ft) + 90° ~ 94°

- 1) Apply a light coat of engine oil on the threads and under the bearing cap bolts.
- 2) Install and uniformly tighten the 16bearing cap bolts, in several passes, in the sequence shown.

Tightening torque

M8(A) : 13 ~ 19Nm (130 ~ 190kgf.cm, 10 ~ 14lbf.ft) M10(B) : 27 ~ 33Nm (270 ~ 330kgf.cm, 19.5 ~ 24lbf.ft)



EDQF072A

3) Retighten the bearing cap bolts by $90^{\circ} \sim 94^{\circ}$ in the numerical order shown.



EDQF198A

- 4) Check that the crankshaft turns smoothly.
- 9. Check crankshaft end play. (See page EM 63)
- 10. Install piston and connecting rod assemblies.

Before installing the pistons, apply a coat of engine oil to the ring grooves and cylinder bores.

- Remove the connecting rod caps, and slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
- 2) Install the ring compressor, check that the bearing is securely in place, then position the piston in the cylinder, and tap it in using the wooden handle of a hammer.
- Stop after the ring compressor pops free, and check the connecting rod-to-check journal alignment before pushing the piston into place.

ENGINE (G6BA)

EM -72

4) Apply engine oil to the bolt threads. Install the rod caps with bearings, and torque the bolts.

Tightening torque

 $16 \sim 20$ Nm (160 ~ 200kgf.cm, 12 ~ 15lbf.ft) + $90^{\circ} \sim 94^{\circ}$

🔟 ΝΟΤΕ

Maintain downward force on the ring compressor to prevent the rings from expanding before entering the cylinder bore.

11. Apply liquid gasket to the oil seal case and install the oil seal case(A).

Tightening torque

10 ~ 12Nm (100 ~ 120kgf.cm, 7.3 ~ 8.8lbf.ft)



1) Apply engine oil to a new oil seal lip.
ENGINE BLOCK

- 2) Using SST(09231-33000) and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.
- Install the oil pan(A) with the 17bolts.
 Uniformly tighten the bolts in several passes.

Tightening torque

19 ~ 28Nm (190 ~ 280kgf.cm, 14 ~ 20lbf.ft) : (1 ~ 15)
5 ~ 7Nm (50 ~ 70kgf.cm, 4 ~ 5lbf.ft) : (16,17)





- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the residue.

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ENGINE (G6BA)

EM -74

- After assembly, wait at least 30 minutes before filling the engine with oil.
- Install oil screen. Install a new gasket and oil screen(A) with 2bolts(B).

Tightening torque

15 ~ 22Nm (150 ~ 220kgf.cm, 11 ~ 16lbf.ft)

Install the lower oil pan 10bolts.
 Uniformly tighten the bolts serveral passes

Tightening torque

10 ~12Nm (100 ~ 120kgf.cm, 7.3 ~ 8.8lbf.ft)



16. Install the lower oil pan.

 Apply liquid gasket as an even bead, centered between the edges of the mating surface. Use liquid gasket MS 721-40A or equivalent.

🚺 NOTE

- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

- Apply adhesive to 2 or 3 threads.
 Adhesive : THREE BOND TB2403 or equivalent.
- 2) Install the oil pressure sensor(A).

Tightening torque

15 ~ 22Nm (150 ~ 220kgf.cm, 11 ~ 16lbf.ft)



EDQF180A

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EM -75

ENGINE BLOCK

18. Install knock sensor(A).

Tightening torque

17 ~ 26Nm (170 ~ 260kgf.cm, 12.5 ~ 19lbf.ft)



- 23. Install oil level gauge assembly.
 - 1) Install a new O-ring on the oil level gauge.
 - 2) Apply engine oil on the O-ring.
 - 3) Install the oil level gauge assembly (A) with the bolt.

Tightening torque

12 ~ 15Nm (120 ~ 150kgf.cm, 9 ~ 11lbf.ft)

- 24. Install cylinder head. (See page EM 36)
- 25. Install timing belt. (See page EM 17)
- 26. Remove engine stand.
- 27. Install drive plate.

Tightening torque

73 ~ 77Nm (730 ~ 770kgf.cm, 53 ~ 56lbf.ft)

19. Install water pump. (See page EM - 80)

20. Install the power steering pump bracket(A).

Tightening torque

35 ~ 55Nm (350 ~ 550kgf.cm, 25.8 ~ 40.6lbf.ft)



EDQF061A

EDQF181A

- 21. Install the air compressor. (See HA group air compressor)
- 22. Install the alternator. (See EE group alternator)

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ENGINE (G6BA)

EM -76

COOLING SYSTEM

COMPONENT E9CB691B



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COOLING SYSTEM

ENGINE COOLANT REFILLING AND

BLEEDING EB5F0F42

😵 WARNING

Never remove the radiator cap when the engine is hot. Serious scalding could be caused by hot fluid under high pressure escaping from the radiator.

M caution

When pouring engine coolant, be sure to shut the relay box lid and not to let coolant spill on the electrical parts or the paint. If any coolant spills, rinse it off immediately.

- 1. Slide the heater temperature control lever to maximum heat. Make sure the engine and radiator are cool to the touch.
- 2. Remove radiator cap.
- 3. Loosen the drain plug, and drain the coolant.



EDQF002A

4. Tighten the radiator drain plug(A) securely.

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- 5. Remove, drain and reinstall the reservoir. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with antifreeze.
- 6. Fill fluid mixture with coolant and water(4 : 6) slowly through the radiator cap. Push the upper/lower hoses of the radiator so as bleed air easily.

🚺 ΝΟΤΕ

- Use only genuine antifreeze/coolant.
- For best corrosion protection, the coolant concentration must be maintained year-round at 50% minimum. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.
- Coolant concentrations greater then 60% will impair cooling efficiency and are not recommended.

$\mathbf{\hat{1}}$ caution

- Do not mix different brands of antifreeze/coolants.
- Do not use additional rust inhibitors or antirust products; they may not be compatible with the coolant.
- Start the engine and run coolant circulates. When the cooling fan operates and coolant circulates, refill coolant through the radiator cap.
- Repeat 7 until the cooling fan 3 ~ 5times and bleed air sufficiently out of the cooling system.
- 9. Install the radiator cap and fill the reservoir tank to the "MAX" line with coolant.
- 10. Run the vehicle under idle until the cooling fan operates 2 ~ 3 times.
- Stop the engine and wait coolant gets cool.
- 12. Repeat 6 to 11 until the coolant level doesn't fall any more, bleed air out of the cooling system.

🔟 ΝΟΤΕ

As it is to bleed air out to the cooling system and refill coolant when coolant gets cool completely, recheck the coolant level in the reservoir tank for 2 ~ 3 days after replacing coolant.

EM -77

021-62999292

ENGINE (G6BA)

EM -78

CAP TESTING

1. Remove the radiator cap, wet its seal with engine coolant, then install it no pressure tester.

TESTING

- 1. Wait until engine is cool, then carefully remove the radiator cap and fill the radiator with engine coolant, then install it on the pressure tester.
- Apply a pressure tester to the radiator and apply a pressure of 93 ~ 123kPa (0.95 ~ 1.25kgf/cm² 14 ~ 19psi).





Check for engine oil in the coolant and/or coolant in the engine oil.

COOLING SYSTEM

REMOVAL E6B7D6BE

WATER PUMP

1. Drain the engine coolant.

😵 WARNING

System is under high pressure when the engine is hot. To avoid danger of releasing scalding engine coolant, remove the cap only when the engine is cool.

- 2. Remove drive belts. (See page EM 13)
- 3. Remove the timing belt. (See page EM 13)
- 4. Remove the timing belt idler. (See page EM 16)
- Remove the water pump. Remove the water pump(A) and gasket(B).

THERMOSTAT

🚺 ΝΟΤΕ

Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

- 1. Remove the engine cover.
- 2. Drain engine coolant so its level is below thermostat.
- 3. Remove the lower hose.
- 4. Remove water inlet(A) and thermostat(B).



EDQF062A

EM -79

021-62999292

EM -80

INSPECTION ED61C13B

WATER PUMP

- Check each part for cracks, damage or wear, and re-1. place the coolant pump assembly if necessary.
- Check the bearing for damage, abnormal noise and 2. sluggish rotation, and replace the coolant pump assembly if necessary.
- Check for coolant leakage. If coolant leaks from hole, 3. the seal is defective. Replace the coolant pump assembly

NOTE

A small amount of "weeping" from the bleed hole is normal.

THERMOSTAT

2.

3.

1. Immerse the thermostat in water and gradually heat the water.

INSTALLATION EAD083BE

WATER PUMP

1. Install the water pump(A) and a new gasket(B) with the 8bolts.

Tightening torque 15 ~ 22Nm (150 ~ 220kgf.cm, 11 ~ 16lbf.ft)



If the valve lift is not as specified, replace the thermostat.

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ENGINE (G6BA)

COOLING SYSTEM

Bolt	Size	Number
A	8 × 25	4
В	8 × 30	2
С	8 × 32	1
D	8 × 40	1

- 2. Install the timing belt idler. (See page EM 17)
- 3. Install the timing belt. (See page EM 17)
- 4. Install drive belt.
- 5. Fill with engine coolant. (See page EM 77)
- 6. Start engine and check for leaks.
- 7. Recheck engine coolant level.

THERMOSTAT

- 1. Place thermostat in thermostat housing.
 - 1) Install the thermostat with the jiggle valve upward.

Install a new to the thermostat(B).





EDQF183A

2. Install water inlet(A).

Tightening torque 17 ~ 20Nm (170 ~ 200kgf.cm, 12.5 ~ 14lbf.ft)

- 3. Install the lower hose.
- 4. Fill with engine coolant.
- 5. Start engine and check for leaks.

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EM -81



ENGINE (G6BA)

LUBRICATION SYSTEM

COMPONENT E6B3C6EA



LUBRICATION SYSTEM

OIL AND FILTER E7FBE1A4

🗥 CAUTION

- Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.
- Exercise caution in order to minimize the length and frequency of contact of your skin to used oil. Wear protective clothing and gloves. Wash your skin thoroughly with soap and water, or use water-less hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.
- In order to preserve the environment, used oil and used oil filter must be disposed of only at designated disposal sites.

1. Drain engine oil.

- a. Remove the oil filter cap.
- b. Remove the oil drain plug(A), and drain the oil into a container.



EDQF022A

- 2. Replace oil filter.
 - a. Remove the oil filter(B).
 - b. Check and clean the oil filter installation surface.
 - c. Check the part number of the new oil filter is as same as old one.
 - d. Apply clean engine oil to the gasket of a new oil filter.
 - e. Lightly screw the oil filter into place, and tighten it until the gasket contacts the seat.
 - f. Tighten it an additional 3/4 turn.

- 3. Refill with engine oil filter.
 - Clean and install the oil drain plug with a new gasket.

Tightening torque

- 35 ~ 45Nm (350 ~ 450kgf.cm, 26 ~ 33lbf.ft)
 - Fill with fresh engine oil

Capacity

Drain and refill W/Oil filter change : 4.5l (4.74U.S.qts, 3.95lmp qts) W/O Oil filter change : 4.2l (4.30U.S.qts, 3.65lmp qts)

- Install the oil filter cap.
- 4. Start engine and check for oil leaks.
- 5. Recheck engine oil level.

INSPECTION

- Check engine oil quality Check the oil for deterioration, entry of water, discoloring or thinning. If the quality is visibly poor, replace the oil.
- 2. Check engine oil level.

After warming up the engine and then 5 minutes after the engine stop, oil level should be between the "L" and "F" marks on the dipstick. If low, check for leakage and add oil up to the "F"

ΝΟΤΕ

mark.

Do not fill with engine oil above the "F" mark.

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EM -83

ENGINE (G6BA)

SELECTION OF ENGINE OIL

Recommended API classification : SH OR ABOVE

RECOMMENDED SAE VISCOSITY GRADES :



*1 Restricted by driving condition and environment.

*2 Not recommended for sustained high speed vehicle operation

ECKD010A

🔟 ΝΟΤΕ

For best performance and maximum protection of all types of operation, select only those lubricants whitch

- 1. Satisfy the requirement of the API classification.
- 2. Have proper SAE grade number for expected ambient temperature range.

Lubricants that do not have both an SAE grade number and API service classification on the container should not be used.

LUBRICATION SYSTEM

REMOVAL EOD7EC7F

- 1. Drain engine oil.
- 2. Remove RH front wheel.
- 3. Remove RH side cover.
- 4. Remove the front exhaust pipe. (See page EM 50)
- 5. Remove the alternator from engine. (See EE group alternator)
- 6. Remove the drive belt. (See page EM 13)
- Turn the crankshaft and align the white groove on the crankshaft pulley with the pointer on the lower cover. (See page EM - 13)
- 8. Remove the timing belt. (See page EM 13)
- 9. Remove the oil pan and oil screen.(See page EM 56, 57)
- 10. Remove the oil pump case(A).

 Remove the screws(B) from the pump housing, then separate the housing and cover(A).



EDQF070A

2) Remove the inner and outer rotors.

EDQF068A

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ENGINE (G6BA)

DISASSEMBLY E1E5FFFC

 Remove the relief plunger. Remove the plug(A), spring(B) and relief plunger(C).





INSPECTION EC1BAD97

- Inspect relief plunger. Coat the valve with engine oil and check that it falls smoothly into the plunger hole by its own weight. If it does not, replace the relief plunger. If necessary, replace the front case.
- Inspect relief valve spring.
 Inspect for distorted or broken relief valve spring.

Standard value

Free height : 43.8mm (91.724in.) Load : 4.6kg/39.1mm (10lb/1.547in.)

 Inspect rotor side clearance. Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Side clerance

0.040 ~ 0.095mm (0.0016 ~ 0.0037in.)

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EDQF184A

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the front case.

LUBRICATION SYSTEM

4. Inspect rotor body clearance. Using a feeler gauge, measure the clearance between the outer rotor and body.

Body clearance

0.100 ~ 0.181mm (0.0039 ~ 0.0071in.)

REASSEMBLY E27BB309

 Install relief plunger. Install relief plunger(C) and spring(B) into the front case hole, and install the plug(A).

Tightening torque

40 ~ 50Nm (400 ~ 500kgf.cm, 30 ~ 37lb.ft)



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ENGINE (G6BA)

EM -88

INSTALLATION ED7EB1F3

- 1. Install oil pump.
 - 1) Place the inner and outer rotors into front case with the marks facing the oil pump cover side.
 - 2) Install the oil pump cover(A) to front case with the 8screws(B).

В

EDQF070A

Tightening torque

2.

3.

8 ~ 12Nm (80 ~ 120kgf.cm, 6 ~ 8.8lbf.ft)

 Apply liquid gasket to the oil pump as shown in the illustration. Use liquid gasket MS 721-40A.



EDQF187A

- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.
- 3) Place a new O-ring on the cylinder block.
- 4) Engage the spline teeth of the oil pump drive gear with large teeth of the crankshaft, and slide the oil pump on the crankshaft.
- Remove any old liquid gasket and be careful not to drop any oil on the contact surfaces of the oil

Check that the oil pump turns freely.

Install the oil pump on the cylinder block.

- pump and cylinder block.
 Using a razor blade and gasket scraper, remove all the old liquid gasket from the gasket surfaces and sealing grooves.
 - Using a non-residue solvent, clean both sealing surfaces.

LUBRICATION SYSTEM

 Install the oil pump with 5bolts. Uniformly tighten the bolts in several passes.

Tightening torque

12 ~ 15Nm (120 ~ 150kgf.cm, 8.8 ~ 11lbf.ft)



- 6. Install the oil pan and oil screen. (See page EM 73)
- 7. Install the timing belt. (See page EM 17)
- 8. Install the drive belt.
- 9. Install the alternator. (See EE group alternator)
- 10. Install the front exhaust pipe. (See page EM 98)
- 11. Install the RH front wheel.
- 12. Fill engine with oil.
- 13. Start engine and check for leaks.
- 14. Recheck engine oil level.



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- 4. Apply a light coat of oil to the seal lip.
- 5. Using the special tool(09214-33000), install the oil seal.



EDQF189A

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ENGINE (G6BA)

INTAKE AND EXHAUST SYSTEM

COMPONENT EC4F01D9

INTAKE MANIFOLD



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EXHAUST MANIFOLD



EM -91

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EM -92

MUFFLER

ENGINE (G6BA)



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INTAKE AND EXHAUST SYSTEM

REMOVAL EOC67FDF

INTAKE MANIFOLD

- 1. Remove the engine cover.
- 2. Remove air cleaner hose.
- 3. Remove surge tank assembly.
 - 1) Disconnect the accelerator cable.

- EM -93
- 6) Disconnect the PCSV connector(E).



EDQF032B

- 7) Disconnect the PCSV hose.
- 8) Disconnect the brake booster vacuum hose(A).



Disconnect the TPS connector(A).

EDQF029A

3) Disconnect the ISA connector(B).

2)

- 4) Disconnect the VIS actuator connector(C).
- 5) Disconnect the injector connector(D).

EDQF020A

- 9) Disconnect the PCV hose.
- 10) Disconnect the IAT sensor connector(A).

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ENGINE (G6BA)

EM -94

- 11) Disconnect the VIS actuator connector(B).
- 13) Remove the surge tank stay.



EDQF027B

INTAKE AND EXHAUST SYSTEM

- 14) Remove the surge tank assembly(A).
- 5. Remove the intake manifold(A) and gasket.



EDQF007A

EDQF173A

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EM -96

2. Remove the front exhaust pipe(A).

ENGINE (G6BA)

5. Remove the exhaust manifold(A) and gasket(B).





EDQF001A

- 3. Disconnect the oxygen sensor connector.
- 4. Remove the heat protector(A).



EDQF064A

EDQF003A

INTAKE AND EXHAUST SYSTEM

EM -97

INSTALLATION EE1ADD75

INTAKE MANIFOLD

1. Install the intake manifold and gasket.

Tightening torque

19 ~ 21Nm (190 ~ 210kgf.cm, 14 ~ 15lbf.ft)



- 2. Install the injector assembly. (See FL group injector)
- 3. Install the surge tank assembly(A).
 - 1) Install the surge tank assembly.

Tightening torque 15 ~ 20Nm (150 ~ 200kgf.cm, 11 ~ 15lbf.ft)



EDQF006A

2) Install the surge tank stay.

Tightening torque

15 ~ 20Nm (150 ~ 200kgf.cm, 11 ~ 15lbf.ft)

- 3) Install the ground cable.
- 4) Connect the VIS actuator connector.
- 5) Connect the IAT sensor connector.
- 6) Connect the PCV hose.
- 7) Connect the brake booster vacuum hose.
- 8) Connect the PCSV hose.
- 9) Connect the PCSV connector.
- 10) Connect the injector connector.
- 11) Connector the VIS actuator connector.
- 12) Connector the ISA connector.
- 13) Connector the TPS connector.
- 14) Connector the actuator cable.
- 4. Install the air cleaner hose.
- 5. Install the engine cover.

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ENGINE (G6BA)

EM -98

EXHAUST MANIFOLD

1. Install the exhaust manifold(A) and gasket(B).

Tightening torque

- 30 ~ 35Nm (300 ~ 350kgf.cm, 22 ~ 26lbf.ft)
- 4. Install the front exhaust pipe(A).

Tightening torque

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30 ~ 40Nm (300 ~ 400kgf.cm, 22 ~ 30lbf.ft)
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EDQF003A

3. Connect the oxygen sensor connector.

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