

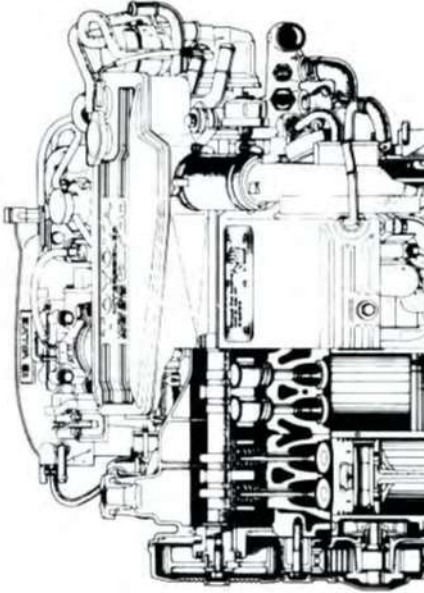
ENGINE MECHANICAL

REFER TO 1988 CELICA REPAIR MANUAL (Pub. No. RM071U)

NOTE: The following pages contain only the points which differ from the above listed manual.

DESCRIPTION	Page
.....	EM-2
TROUBLESHOOTING	EM-4
ENGINE TUNE-UP	EM-8
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CYLINDER HEAD	EM-26
CYLINDER BLOCK	EM-42



EM-2	ENGINE MECHANICAL — Description
DESCRIPTION	
The 3S-GTE engine is an in-line 4-cylinder 2.0 liter DOHC 16 valve engine.	
	

ENGINE MECHANICAL — Description EM-3

The 3S-GTE engine is an in-line 4-cylinder engine with the cylinders numbered 1 — 2 — 3 — 4 from the front. The crankshaft is supported by 5 bearings specified by the inside of the crankcase. These bearings are made of aluminum alloy.

The crankshaft is integrated with 8 weights which are cast along with it for balancing. Oil holes are built into the center of the crankshaft for supplying oil to the connecting rods, pistons and other components.

This engine's ignition order is 1 — 3 — 4 — 2. The cylinder head is made of aluminum alloy, with a cross flow type intake and exhaust layout and with pent roof type combustion chambers. The spark plugs are located in the center of the combustion chambers.

The intake manifold has 8 independent long ports and utilizes the inertial super-charging effect to improve engine torque at low and medium speeds.

The cylinder block is made of cast iron. It has 4 cylinders which are approximately 2 times the length of the piston stroke. The top of the cylinders is closed off by the cylinder head and the lower end of the cylinders becomes the crankcase, in which the crankshaft is installed. In addition, the cylinder block contains a water jacket, through which coolant is pumped to cool the cylinders.

The oil pan is bolted onto the bottom of the cylinder block. The oil pan is an oil reservoir made of pressed steel sheet. A dividing plate is included inside the oil pan to keep sufficient oil in the bottom of the pan even when the vehicle is tilted. This dividing plate also prevents the oil from making waves when the vehicle is stopped suddenly and thus shifting the oil away from the oil pump suction pipe.

TROUBLESHOOTING
ENGINE OVERHEATING

Problem	Possible cause	Remedy	Page
Engine overheats	Cooling system faulty Incorrect ignition timing	Troubleshoot cooling system Reset timing	*CO-4 IG-9

HARD STARTING

Problem	Possible cause	Remedy	Page
Engine will not crank or cranks slowly	Starting system faulty	Troubleshoot starting system	*ST-2
Engine will not start/hard to start (cranks OK)	No fuel supply to injector - No fuel in tank - Fuel pump no working	Troubleshoot EFI system	FI-4

ROUGH IDLING (Cont'd)

Problem	Possible cause	Remedy	Page
Rough idle, stalls or misses (Cont'd)	Vacuum leaks (Cont'd) • Intake air control valve • Throttle body • ISC valve • Brake booster line		
	Pulling in air between air flow meter and throttle body Incorrect idle speed Incorrect valve clearance EFI system problems Engine overheats Low compression	Check ISC system Adjust valve clearance Repair as necessary Check cooling system Check compression	FI-44 EM-15 CO-4 EM-10

ENGINE HESITATES/POOR ACCELERATION

EM-6

ENGINE MECHANICAL — Troubleshooting

ENGINE DIESELING

Problem	Possible cause	Remedy	Page
Engine diesels (runs after ignition switch is turned off)	EFI system problems Incorrect ignition timing EGR system faulty	Repair as necessary Reset timing Check EGR system	IG-9 EC-8

AFTER FIRE, BACKFIRE

Problem	Possible cause	Remedy	Page
Muffler explosion (after fire) on deceleration only	Deceleration fuel cut system always off	Check EFI (fuel cut) system	
Muffler explosion (after fire) all the time	Air cleaner clogged EFI system problem Incorrect ignition timing	Check air cleaner Repair as necessary Reset timing	MA-4 IG-9

EXCESSIVE FUEL CONSUMPTION

Problem	Possible cause	Remedy	Page
Poor gasoline mileage	Fuel leak Air cleaner clogged Incorrect ignition timing EFI system problems • Injector faulty • Deceleration fuel cut system faulty Idle speed too high Spark plug faulty EGR system always on Low compression Tires improperly inflated Clutch slips Brakes drag	Repair as necessary Check air cleaner Reset timing Repair as necessary Check ISC system Inspect plugs Check EGR system Check compression Inflate tires to proper pressure Troubleshoot clutch Troubleshoot brakes	MA-4 IG-9 FI-44 IG-5 EC-8 EM-10

EM-8**ENGINE MECHANICAL — Engine Tune-up**

ENGINE TUNE-UP**INSPECTION OF ENGINE COOLANT**

(See steps 1 and 2 on page CO-4)

INSPECTION OF INTERCOOLER COOLANT

(See steps 1 and 2 on page TC-7)

INSPECTION OF ENGINE OIL

(See steps 1 and 2 on page LU-4)

INSPECTION OF BATTERY

(See Pub. No. RM071U, steps 1 and 2 on page CH-3)

Standard specific gravity:

1.25 — 1.27 when fully charged at 20°C (68°F)

INSPECTION OF AIR FILTER

(See step 3 on page MA-4)

INSPECTION OF HIGH-TENSION CORDS

**INSPECTION OF TOYOTA-VARIABLE
INDUCTION SYSTEM (T-VIS)****1. WARM UP AND STOP ENGINE**

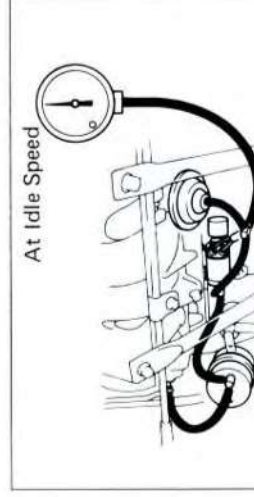
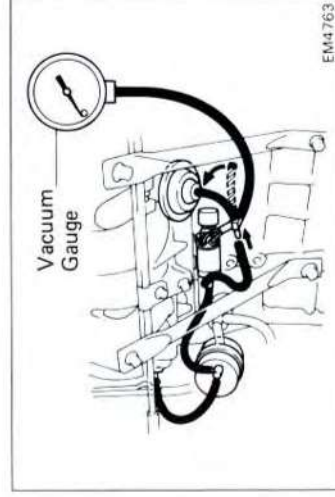
Allow the engine to reach normal operating temperature.

2. CONNECT TACHOMETER (See page IG-9)**3. CONNECT VACUUM GAUGE**

Using a 3-way connector, connect the vacuum gauge to the hose between the VSV and actuator.

4. INSPECT T-VIS OPERATION

- (a) Check that the vacuum gauge indicates vacuum at idle speed.



COMPRESSION CHECK

NOTE: If 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 reach normal operating temperature.

2. REMOVE INTERCOOLER

(See steps 3 and 7 on pages TC-9 and 10)

3. DISCONNECT SOLENOID RESISTOR CONNECTOR

4. DISCONNECT COLD START INJECTOR CONNECTOR

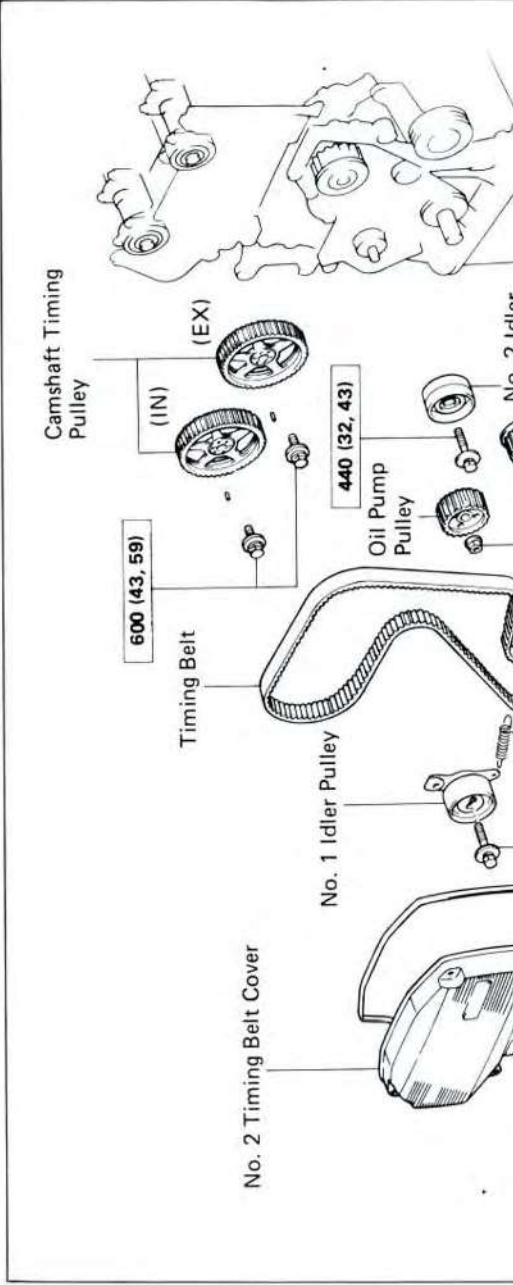
5. DISCONNECT DISTRIBUTOR CONNECTOR

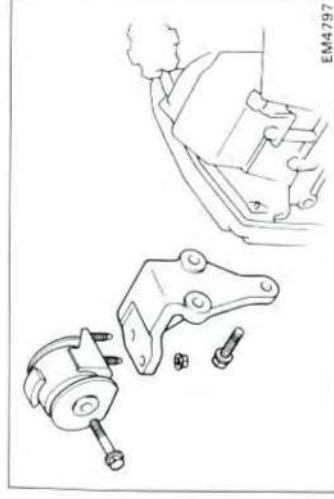
6. REMOVE SPARK PLUGS (See page IG-6)

7. CHECK CYLINDER COMPRESSION PRESSURE



TIMING BELT
COMPONENTS



EM-12**ENGINE MECHANICAL — Timing Belt****9. JACK UP ENGINE SLIGHTLY**

Raise the engine enough to remove the weight from the engine mounting on the right side.

10. REMOVE ENGINE RH MOUNTING INSULATOR AND BRACKET

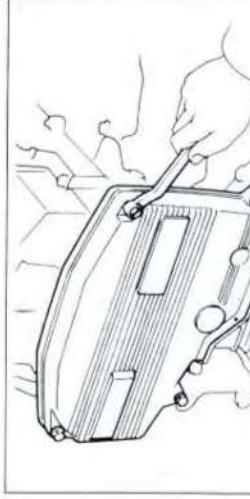
- (a) Remove the through bolt, two nuts and mounting insulator.
- (b) Remove the three bolts and bracket.

11. REMOVE THROTTLE BODY

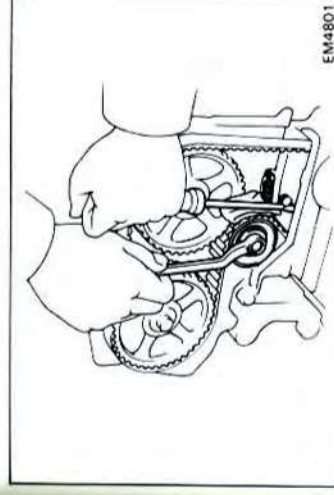
(See steps 1 to 10 on page FI-41)

12. REMOVE NO.2 TIMING BELT COVER

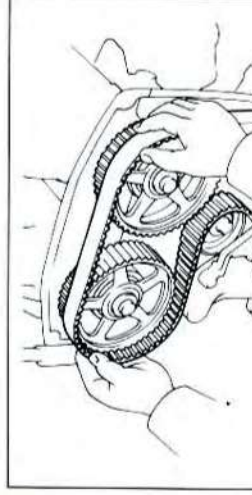
Remove the five screws, belt cover and gasket.

13. REMOVE SPARK PLUGS (See page IG-6)

ENGINE MECHANICAL — Timing Belt

EM-13

- (a) Loosen the No.1 idler pulley bolt and shift it left as far as it will go.
- (b) Temporarily tighten the pulley bolt and then relieve the timing belt tension.



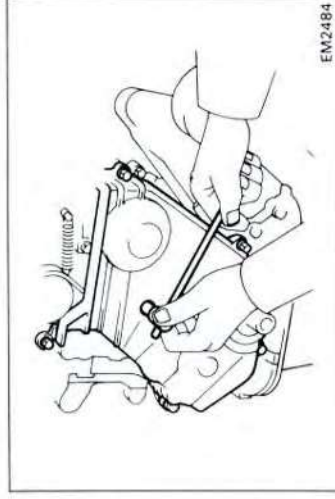
- (c) Remove the timing belt from the camshaft timing pulley.

NOTE:

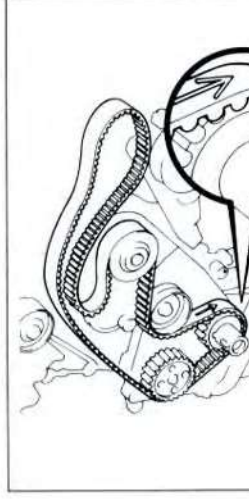
- Support the belt so the meshing of the crankshaft timing pulley and timing belt does not shift.
- Be careful not to drop anything inside the timing belt cover.

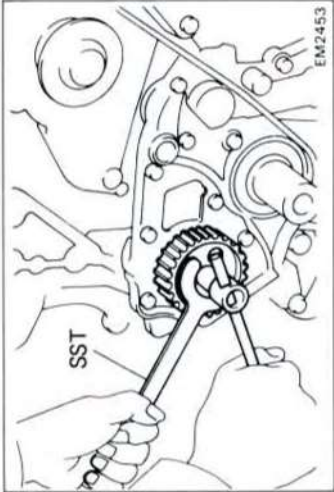
EM-14**ENGINE MECHANICAL — Timing Belt****19. REMOVE NO.1 TIMING BELT COVERS**

Remove the six bolts, belt cover and gaskets.

20. REMOVE TIMING BELT GUIDE**21. REMOVE TIMING BELT**

NOTE: If reusing the timing belt, draw a direction arrow on the timing belt (in direction of engine revolution), and place matchmarks on the timing belt and crankshaft timing pulley.



ENGINE MECHANICAL – Timing Belt		EM-15
	25. REMOVE OIL PUMP PULLEY Using SST, remove the nut and pulley. SST 09616-30011	
	INSPECTION OF COMPONENTS (See Pub. No. RM071U on pages EM-40 and 41) REMOVE THE BOLT AND PULLEY.	

EM-16

ENGINE MECHANICAL — Timing Belt

INSTALLATION OF TIMING BELT

(See page EM-11)

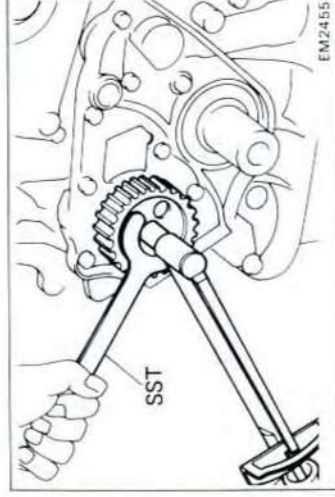
1. INSTALL OIL PUMP PULLEY

(a) Align the cutouts of the pulley and shaft, and slide the pulley.

(b) Using SST, install and torque the nut.

SST 09616-30011

Torque: 290 kg-cm (21 ft-lb, 28 N·m)

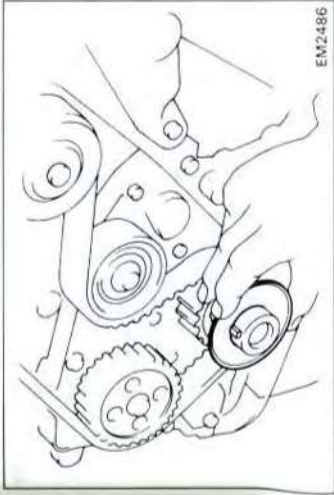
**2. INSTALL CRANKSHAFT TIMING PULLEY**

Align the pulley set key with the key groove of the pulley, slide the pulley.



6. INSTALL TIMING BELT GUIDE

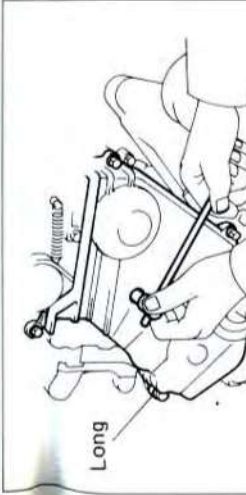
Install the guide, facing the cup side outward.



7. INSTALL NO.1 TIMING BELT COVER

- (a) Install the gasket to the belt cover.
- (b) Install the belt cover with the six bolts.

Torque: 90 kg-cm (78 in.-lb, 8.8 N·m)

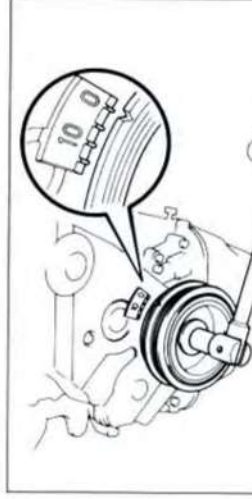


EM-18**ENGINE MECHANICAL — Timing Belt**

- (d) Hold the hexagonal wrench head portion of the camshaft with a wrench, and tighten the bolts.

Torque: 600 kg-cm (43 ft-lb, 59 N·m)

10. INSTALL CYLINDER HEAD COVER
(See step 7 on page EM-36)



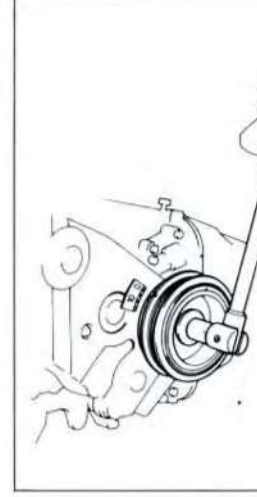
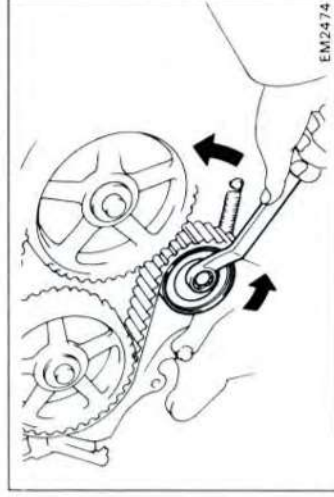
11. SET NO.1 CYLINDER TO TDC/COMPRESSION

- (a) Turn the crankshaft pulley, and align the its groove with mark "O" of the No.1 timing belt cover.

ENGINE MECHANICAL — Timing Belt **EM-19****13. CHECK VALVE TIMING**

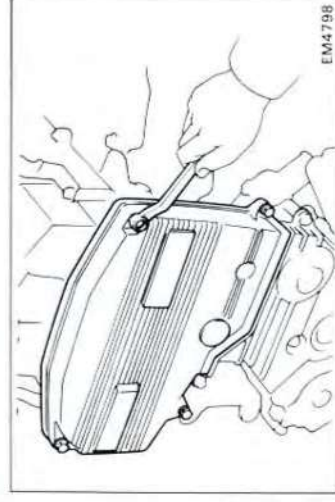
- (a) Loosen the No. 1 idler pulley bolt and stretch the timing belt.

NOTE: Do not loosen the pulley bolt further than the point where the idler returns.



- (b) Slowly turn the crankshaft pulley two revolutions from TDC to TDC.

NOTE: Always turn the crankshaft clockwise.

EM-20**ENGINE MECHANICAL — Timing Belt**

EM4798

14. INSTALL NO.2 TIMING BELT COVER

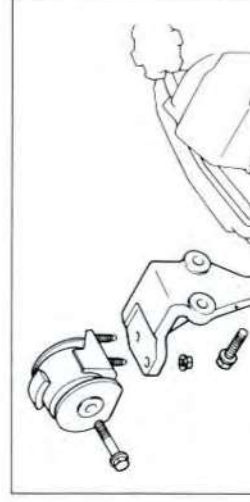
- (a) Install the gasket to the belt cover.
- (b) Install the belt cover with the five bolts.

15. INSTALL SPARK PLUGS (See page IG-6)

Torque: 180 kg-cm (13 ft-lb, 18 N·m)

16. INSTALL THROTTLE BODY

(See steps 2 to 12 on page FI-43)

**17. INSTALL ENGINE RH MOUNTING INSULATOR AND BRACKET**

- (a) Install the bracket with the three bolts.
Torque the bolts.

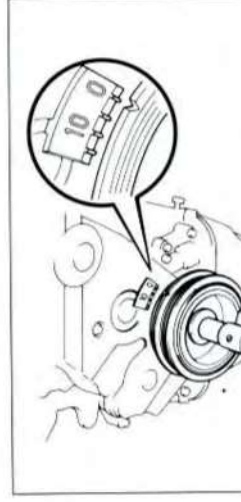
Torque: 530 kg-cm (38 ft-lb, 52 N·m)

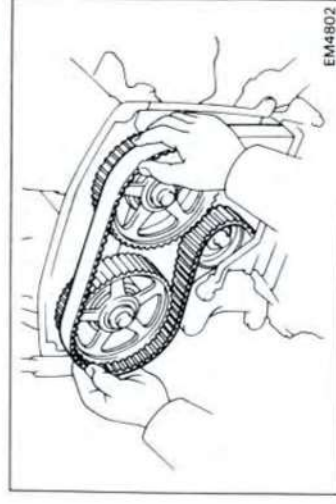
- (b) Install the mounting insulator with the two nuts and through bolt.

ENGINE MECHANICAL — Timing Belt EM-21

ADJUSTMENT OF VALVE TIMING

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY
2. REMOVE RH FRONT WHEEL
3. REMOVE ENGINE RH UNDER COVER
4. REMOVE SPARK PLUGS (See page IG-6)
5. REMOVE INTERCOOLER
(See steps 3 and 7 on pages TC-9 and 10)
6. REMOVE NO.2 TIMING BELT COVER
(See step 12 on page EM-12)
7. CHECK CAMSHAFT TIMING PULLEY MARKS
 - (a) Turn the crankshaft pulley and align its groove with mark "O" of the No.1 timing belt cover.



EM-22**ENGINE MECHANICAL — Timing Belt**

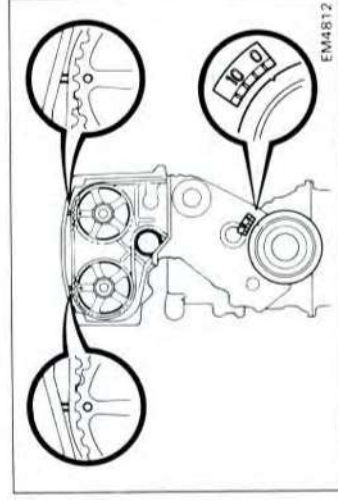
- (b) Remove the timing belt from the camshaft timing pulleys.



- (c) Rotate the camshaft with a wrench and align the alignment marks of the camshaft and cylinder head cover.

ENGINE MECHANICAL — Timing Belt EM-23

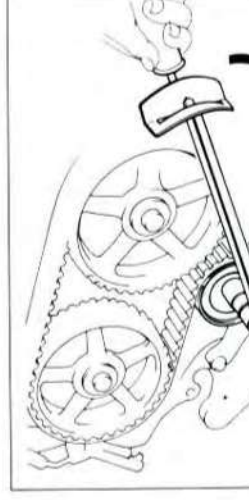
- (g) Check that each pulleys with the timing marks as shown in the figure.

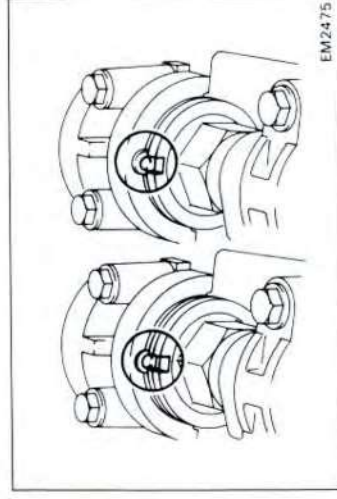


- (h) Tighten the No.1 idler pulley bolt.

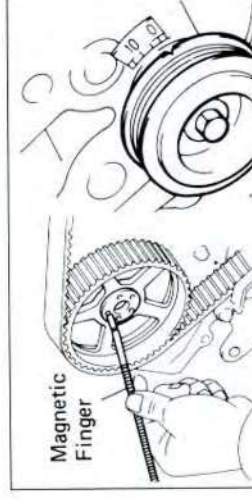
Torque: 440 kg-cm (32 ft-lb, 43 N·m)

9. REMOVE THROTTLE BODY
(See steps 1 to 10 on page FI-41)
10. REMOVE CYLINDER HEAD COVER
(See step 39 on page EM-31)

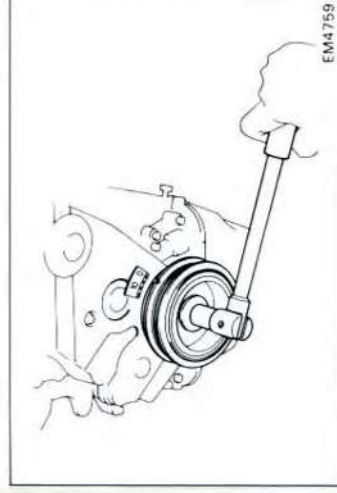


EM-24**ENGINE MECHANICAL — Timing Belt**

- (b) Check that the camshaft grooves are aligned with the drilled mark of the No.1 camshaft bearing cap.



- (c) Using a magnetic finger, remove the knock pin from the pin hole of camshaft timing pulley.

ENGINE MECHANICAL — Timing Belt **EM-25**

- (g) Turn the crankshaft clockwise two revolutions from TDC to TDC.
- (h) Recheck the valve timing.
(See step 10 on page EM-23)

13. REINSTALL NO.2 TIMING BELT COVER
(See step 20 page EM-20)**14. REINSTALL SPARK PLUGS** (See page IG-6)

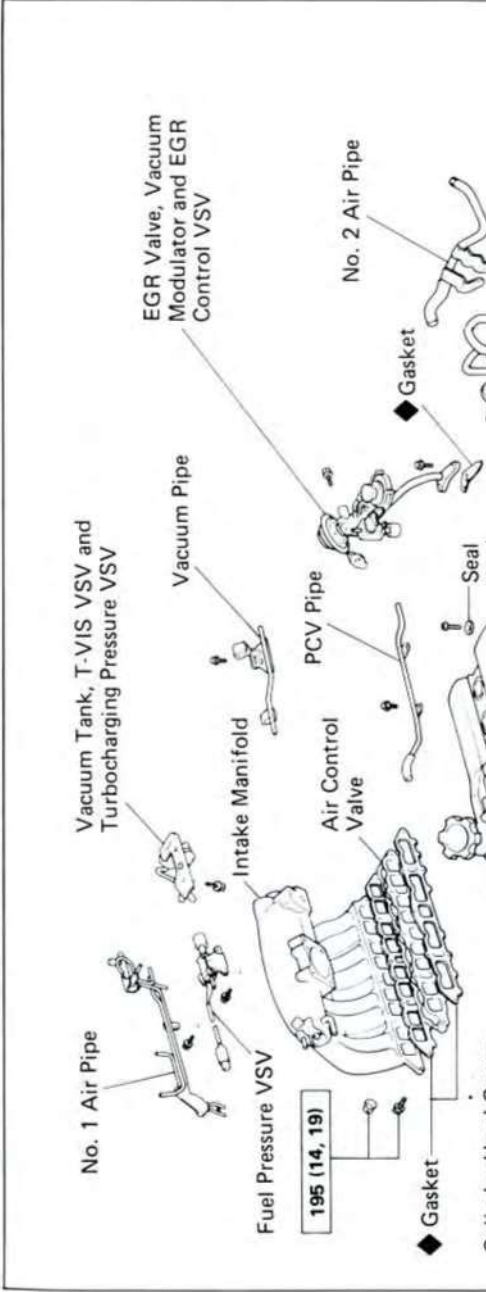
Torque: 180 kg-cm (13 ft-lb, 18 N·m)

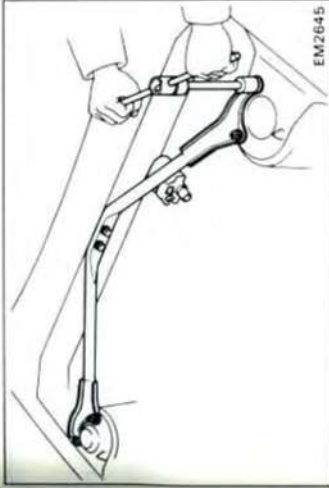
15. REINSTALL CYLINDER HEAD COVER
(See step 7 on page EM-36)

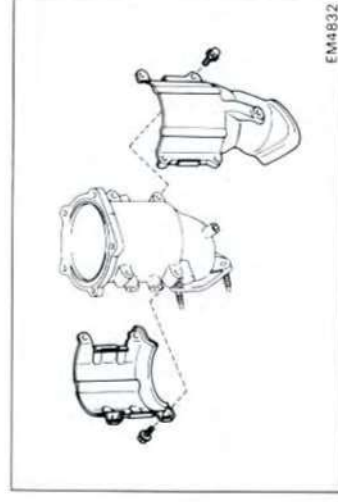
EM-26

ENGINE MECHANICAL — Cylinder Head

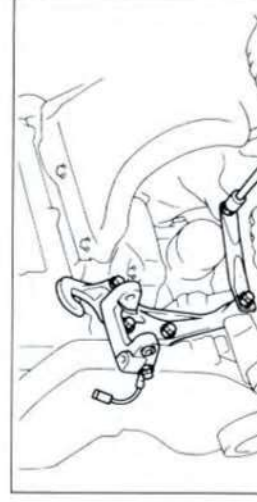
CYLINDER HEAD COMPONENTS



ENGINE MECHANICAL — Cylinder Head	EM-27
	
REMOVE OF CYLINDER HEAD (See page EM-26)	
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY	
2. DRAIN ENGINE COOLANT (See page CO-4)	
3. DRAIN INTERCOOLER COOLANT (See page TC-7)	
4. REMOVE SUSPENSION UPPER BRACE	
(a) Disconnect the ignition coil connector and high-tension cord from the ignition coil.	
(b) Remove the four nuts, two bolts and upper brace.	
5. DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY	
6. REMOVE RADIATOR RESERVOIR TANK	
7. REMOVE AIR CLEANER ASSEMBLY	

EM-28**ENGINE MECHANICAL — Cylinder Head**

- (c) Remove the nine bolts and two heat insulators.

**15. REMOVE ALTERNATOR BRACKETS**

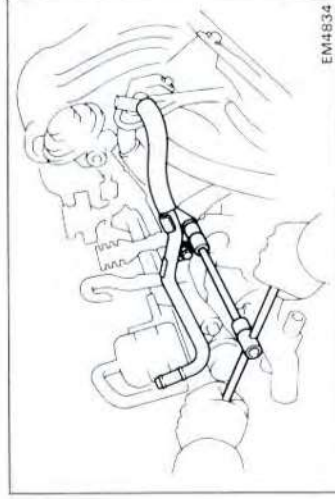
Remove the five bolts, No.1 and No.2 brackets.

16. REMOVE TURBOCHARGER

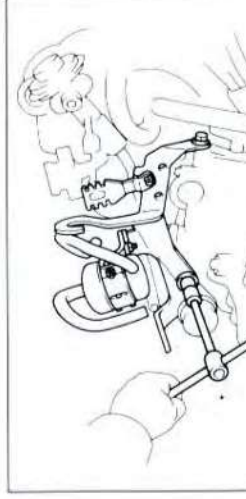
(See steps 6, 7 to 14 on pages TC-9 to 11)

ENGINE MECHANICAL – Cylinder Head **EM-29****19. REMOVE NO.2 AIR PIPE**

- (a) Disconnect the air hose.
- (b) Remove the two bolts and air pipe.

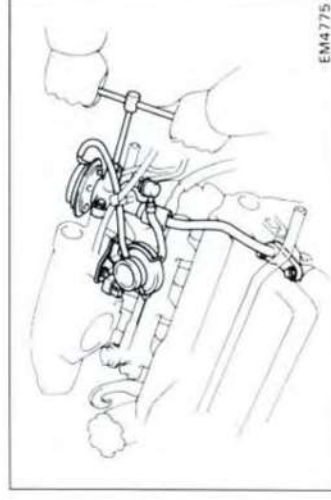
**20. REMOVE LH ENGINE HANGER**

Remove the two bolts and engine hanger together with the reservoir tank.

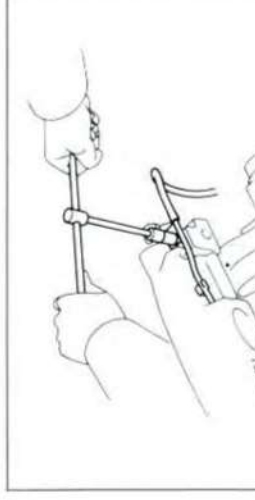
**21. REMOVE OIL PRESSURE SWITCH**

EM-30**ENGINE MECHANICAL — Cylinder Head****26. REMOVE EGR VALVE, VACUUM MODULATOR AND EGR CONTROL VSV**

Remove the five bolts, the EGR valve, pipe, vacuum modulator and control VSV assembly.

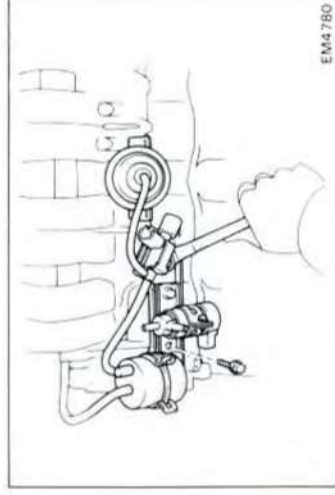
**27. REMOVE DELIVERY PIPE AND INJECTORS**
(See steps 4 to 6 on page FI-35)**28. REMOVE VACUUM PIPE**

- (a) Disconnect the vacuum hose from the EGR vacuum modulator.
- (b) Remove the bolt and vacuum pipe.

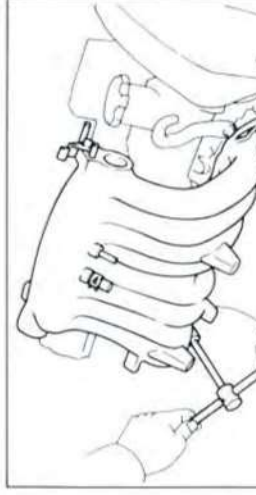


ENGINE MECHANICAL — Cylinder Head **EM-31****32. REMOVE T-VIS VSV, VACUUM TANK AND TURBOCHARGING PRESSURE VSV**

- (a) Disconnect the following hoses:
- (1) Intake manifold vacuum hose
 - (2) T-VIS actuator vacuum hose
- (b) Remove the two bolts, the T-VIS VSV, vacuum tank and turbocharging pressure VSV assembly.

**33. REMOVE INTAKE MANIFOLD AND AIR CONTROL VALVE**

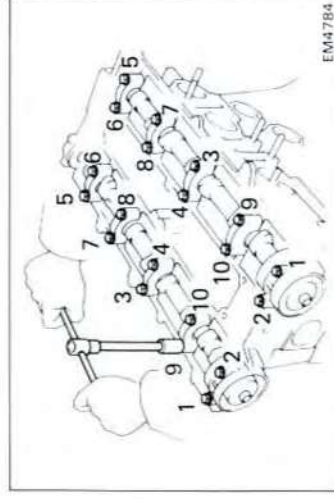
Remove the four bolts and three nuts, intake manifold, gasket, air control valve and gasket.

34. REMOVE POWER STEERING OIL RESERVOIR TANK WITHOUT DISCONNECTING HOSES**35. REMOVE SPARK PLUGS (See page IG-6)**

EM-32**ENGINE MECHANICAL — Cylinder Head****43. REMOVE INTAKE AND EXHAUST CAMSHAFTS**

- (a) Uniformly loosen and remove the twenty bearing cap bolts in several passes, in the sequence shown.
- (b) Remove the ten bearing caps, two oil seal and two camshafts.

NOTE: Arrange the intake and exhaust camshafts.

44. REMOVE RH REAR ENGINE HANGER

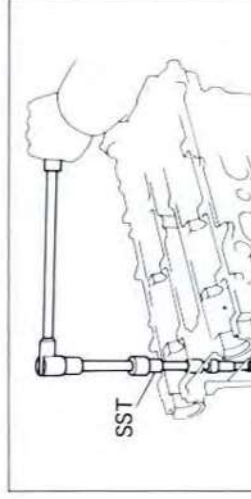
EM4784

45. REMOVE CYLINDER HEAD

- (a) Using SST, uniformly loosen and remove the ten cylinder head bolts in several passes, in the sequence shown.

SST 09043-38100

CAUTION: Head warpage or cracking could result from removing the bolts in incorrect order.



ENGINE MECHANICAL — Cylinder Head

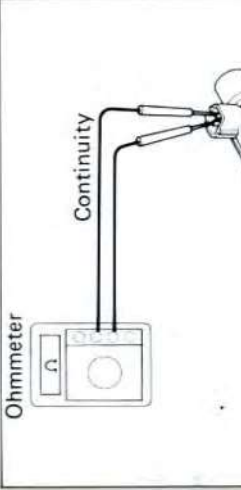
EM-33

INSPECTION, CLEANING AND REPAIR OF CYLINDER HEAD COMPONENTS

(See Pub. No. RM071U on pages EM-85 to 93)

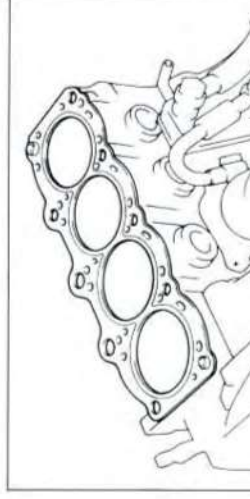
INSPECTION OF TOYOTA — VARIABLE INDUCTION SYSTEM (T-VIS)

1. INSPECT AIR CONTROL VALVE
(See Pub. No. RM071U, step 1 on page EM-93)
2. INSPECT VACUUM TANK
(See Pub. No. RM071U, step 2 on page EM-93)
3. INSPECT VACUUM SWITCHING VALVE (VSV)
 - A. Inspect VSV for open circuit
Using an ohmmeter, check that there is continuity between the terminals.
Resistance (Cold): 33 — 39 Ω



EM-34**ENGINE MECHANICAL — Cylinder Head****ASSEMBLY OF CYLINDER HEAD**

(See Pub. No. RM071U on pages EM-85 and 96)

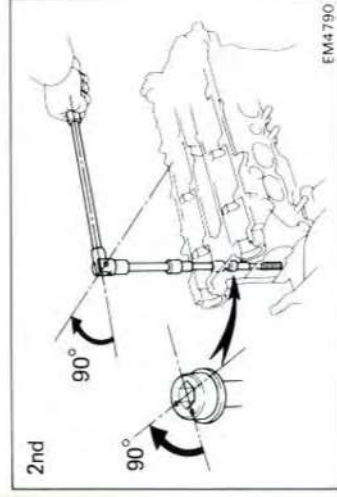
**INSTALLATION OF CYLINDER HEAD**

(See page EM-26)

1. **INSTALL CYLINDER HEAD**
 - A. Place cylinder head on cylinder block
 - (a) Place a new cylinder head gasket on the cylinder block.

ENGINE MECHANICAL — Cylinder Head **EM-35**

- (d) Second, retighten the ten cylinder head bolts 90° in the numerical order shown.
- (e) Check that the painted mark is now at a 90° angle to the front.

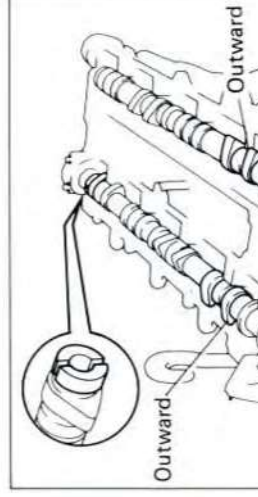


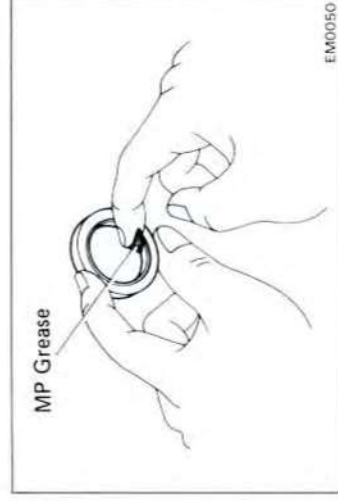
2. INSTALL RH REAR ENGINE HANGER

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

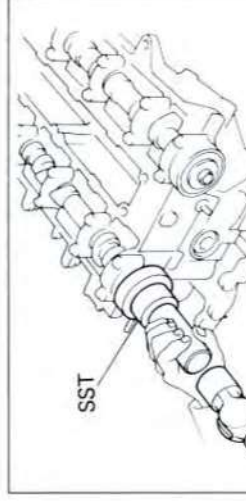
3. INSTALL INTAKE AND EXHAUST CAMSHAFTS

- (a) Place the camshaft on the cylinder head with the No. 1 cam lobe facing outward as shown.



EM-36**ENGINE MECHANICAL – Cylinder Head**

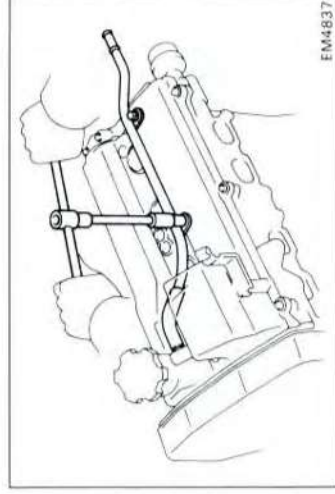
(f) Apply MP grease to a new oil seal lip.



(g) Using SST, tap in the two camshaft oil seals.
SST 09223-50010

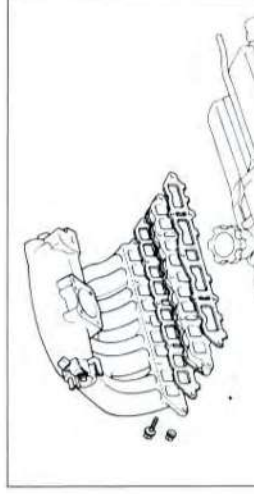
ENGINE MECHANICAL — Cylinder Head **EM-37****12. INSTALL PCV PIPE**

- (a) Connect the hose to the cylinder head cover.
- (b) Install the PCV pipe with the two bolts.

**13. INSTALL AIR CONTROL VALVE AND INTAKE MANIFOLD**

Install a new gasket, the air control valve, a new gasket and the intake manifold with the four bolts and three nuts.

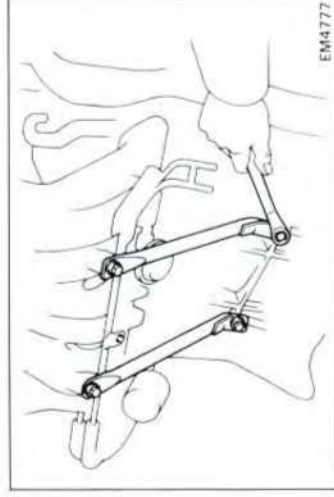
Torque: 195 kg-cm (14 ft-lb, 19 N·m)



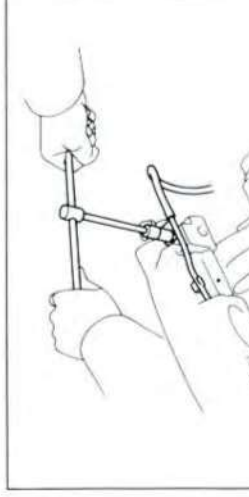
EM-38**ENGINE MECHANICAL — Cylinder Head****17. INSTALL INTAKE MANIFOLD STAYS**

Install the two manifold stays with the four bolts.

Torque: 260 kg-cm (19 ft-lb, 25 N·m)

**18. INSTALL VACUUM PIPE**

- (a) Install the vacuum pipe with the bolt.
- (b) Connect the vacuum hose to the EGR vacuum modulator.

**19. INSTALL DELIVERY PIPE AND INJECTORS**

(See steps 2 to 4 on page FI-37 and 38)

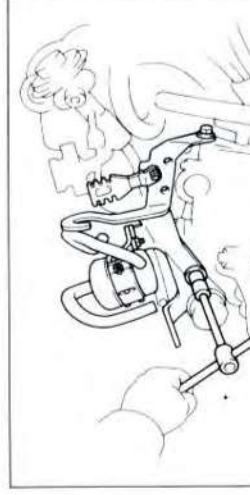
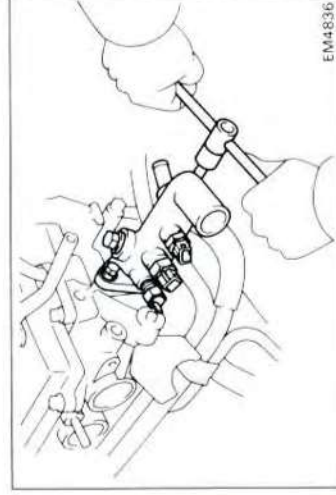
ENGINE MECHANICAL — Cylinder Head EM-39

24. INSTALL WATER OUTLET

- (a) Install a new gasket and water outlet with the two bolts.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

- (b) Connect the following connectors and hoses:
 - (1) Water temperature sender gauge connector
 - (2) Water temperature sensor connector
 - (3) Cold start injector time switch connector
 - (4) No.1 air pipe water by-pass hose
 - (5) Radiator upper hose
 - (6) Water by-pass pipe hose
 - (7) Heater water by-pass hose
 - (8) Emission control vacuum hoses



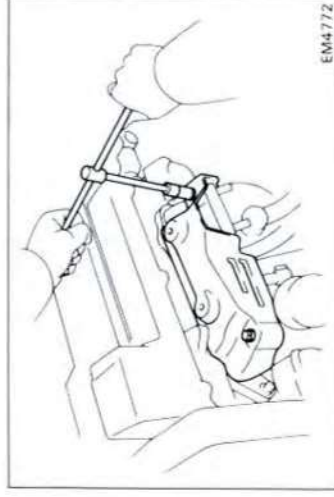
25. INSTALL OIL PRESSURE SWITCH

26. INSTALL LH ENGINE HANGER

EM-40**ENGINE MECHANICAL — Cylinder Head**

- (c) Install the upper heat insulator with the two bolts.

30. INSTALL TURBOCHARGER
(See steps 4 to 11 on pages TC-13 and 14)



31. INSTALL ALTERNATOR BRACKETS

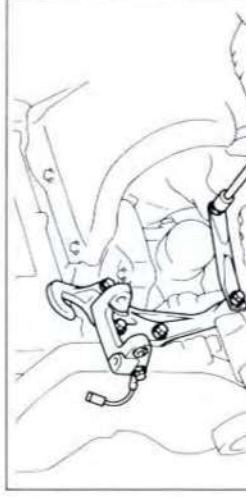
Install the No.1 and No.2 brackets with the five bolts.

Torque:

To turbine outlet elbow

440 kg-cm (32 ft-lb, 43 N·m)

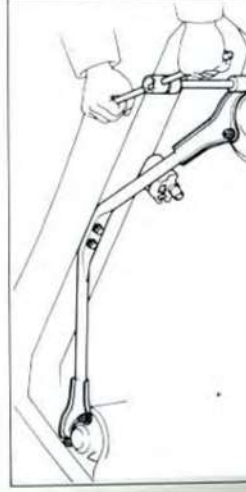
Others 400 kg-cm (29 ft-lb, 39 N·m)



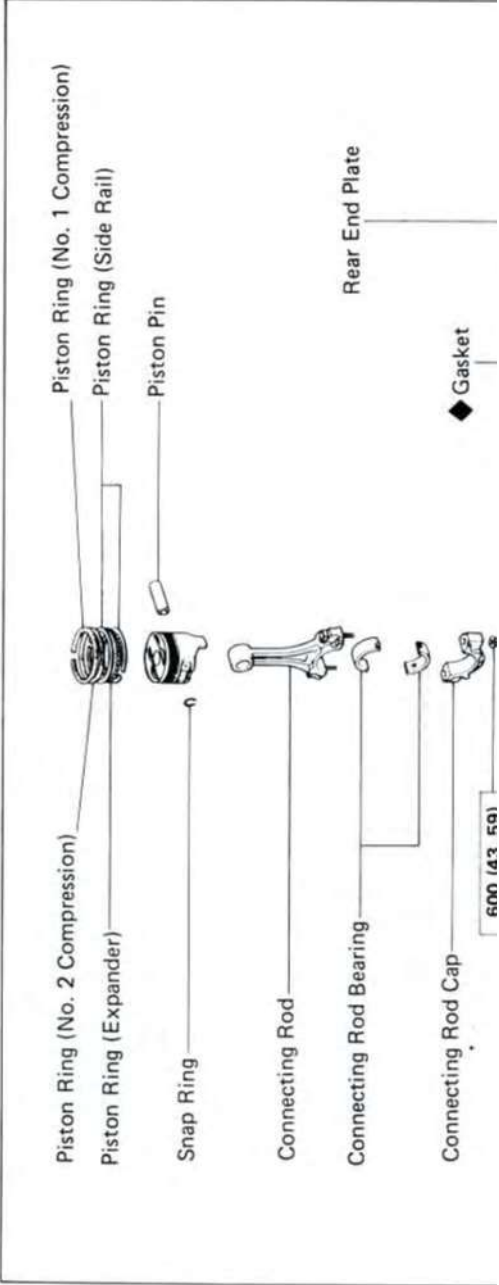
ENGINE MECHANICAL – Cylinder Head

EM-41

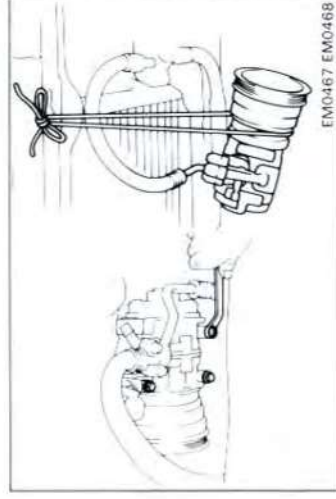
- 33. **INSTALL EXHAUST FRONT PIPE**
(See step 7 on page EM-50)
- 34. **INSTALL SUSPENSION LOWER CROSSMEMBER**
(See step 6 page EM-50)
- 35. **INSTALL ENGINE UNDER COVER**
- 36. **INSTALL RH FRONT WHEEL**
- 37. **LOWER VEHICLE**
- 38. **INSTALL ALTERNATOR**
- 39. **INSTALL AIR CLEANER ASSEMBLY**
(See step 21 on page EM-51)
- 40. **INSTALL CRUISE CONTROL ACTUATOR**
(See step 51 on page EM-22)
- 41. **INSTALL RADIATOR RESERVOIR TANK**
- 42. **INSTALL ACCELERATOR CABLE AND ADJUST IT**



**CYLINDER BLOCK
COMPONENTS**



ENGINE MECHANICAL — Cylinder Block	EM-43
REMOVAL OF ENGINE	
1. REMOVE BATTERY	
2. DRAIN ENGINE COOLANT (See page CO-4)	
3. DRAIN INTERCOOLER COOLANT (See page TC-7)	
4. REMOVE HOOD	
5. DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY	
6. REMOVE ENGINE RADIATOR (See Pub. No. RM071U on page CO-11)	
7. DISCONNECT INTERCOOLER WATER HOSES	
8. DISCONNECT HEATER HOSES	
9. DISCONNECT FUEL HOSES	(a) Disconnect the inlet hose from the fuel filter

**16. REMOVE A/C COMPRESSOR WITHOUT DISCONNECTING HOSES**

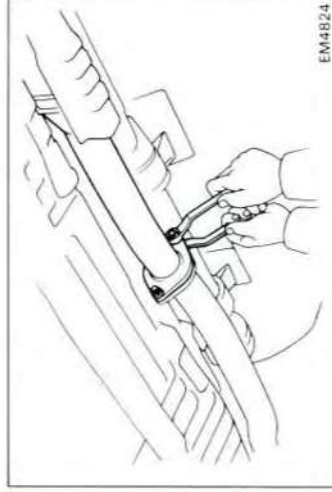
- (a) Disconnect the two connectors.
- (b) Loosen the adjusting bolt for alternator drive belt, and remove the drive belt.
- (c) Remove the three compressor mounting bolts.
- (d) Put aside the compressor, and suspend it to the radiator support with string.

17. DISCONNECT WIRE, CONNECTORS AND VACUUM HOSES:

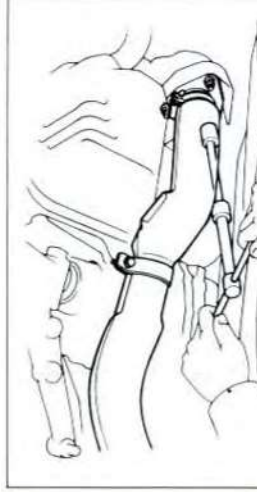
- (a) Check connector
- (b) Ground straps from LH fender apron
- (c) Connectors from No.2 junction block
- (d) Ignition coil connector and high-tension cord
- (e) Solenoid resistor connector

ENGINE MECHANICAL — Cylinder Block **EM-45****25. REMOVE FRONT EXHAUST PIPE**

- (a) Remove the two bolts, and disconnect the front exhaust pipe from the rear exhaust pipe.

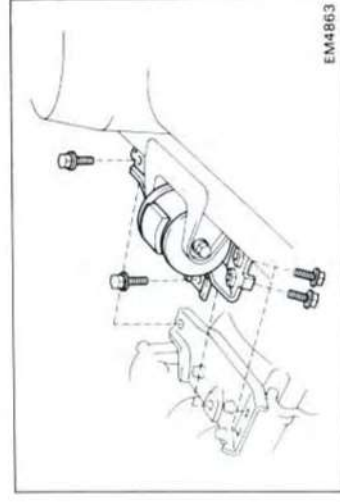


- (b) Loosen the bolt and nut, and disconnect the clamp from the bracket.
- (c) Remove the three nuts and the front exhaust pipe.

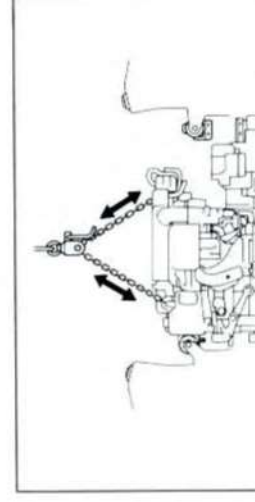


EM-46

ENGINE MECHANICAL – Cylinder Block



- (d) Remove the four bolt holding the LH mounting insulator to the mounting bracket.



- (e) Lower the engine out of the vehicle slowly and carefully.

CAUTION: Be careful not to hit the power steering gear housing.

- (f) Make sure the engine is clear of all wiring, hoses and cables.

- (g) Place the engine and transaxle assembly onto the

PREPARATION FOR DISASSEMBLY

1. REMOVE CLUTCH COVER AND DISC
2. REMOVE FLYWHEEL
3. REMOVE REAR END PLATE
4. INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY
5. REMOVE ALTERNATOR
6. REMOVE TURBOCHARGER (See page TC-9)
7. REMOVE DISTRIBUTOR (See page IG-8)
8. REMOVE TIMING BELT AND PULLEYS
(See page EM-17)
9. REMOVE CYLINDER HEAD
(See page EM-34)

ASSEMBLY OF PISTON AND CONNECTING ROD ASSEMBLIES

(See Pub. No. RM071U, for 3S-GE on pages EM-125 and 126)

ASSEMBLY OF CYLINDER BLOCK

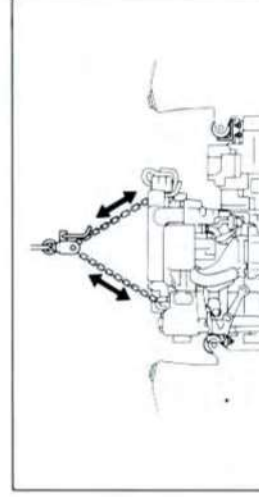
(See Pub. No. RM071U on pages EM-127 to 129)

POST ASSEMBLY

1. INSTALL OIL PUMP AND OIL PAN
(See Pub. No. RM071U on page LU-12)
2. INSTALL WATER PUMP
(See Pub. No. RM071U on page CO-8)
3. INSTALL CYLINDER HEAD
(See page EM-34)
4. INSTALL PULLEYS AND TIMING BELT
(See page EM-16)

INSTALLATION OF ENGINE

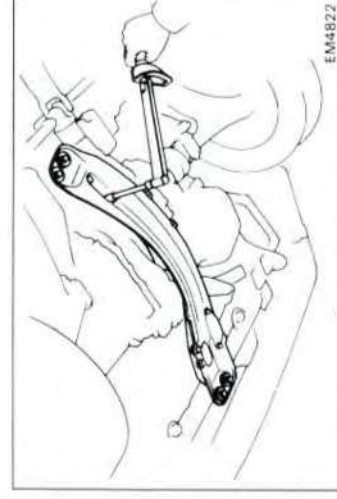
1. INSTALL TRANSAXLE TO ENGINE
(See page MT-7)



2. INSTALL ENGINE AND TRANSAXLE ASSEMBLY IN VEHICLE

- (a) Attach the engine hoist chain to the lifting brackets on the engine.
- (b) Raise the engine into the engine compartment.

CAUTION: Be careful not to hit the power steering gear housing.

EM-50**ENGINE MECHANICAL — Cylinder Block****3. INSTALL POWER STEERING PUMP RESERVOIR TANK MOUNTING BOLTS****4. CONNECT TCCS ECU CONNECTORS****5. RAISE VEHICLE**

CAUTION: Be sure the vehicle is securely supported.

6. INSTALL ENGINE MOUNTING CENTER MEMBER

Torque:

To body 400 kg-cm (29 ft-lb, 39 N·m)

Others 530 kg-cm (38 ft-lb, 52 N·m)

**7. INSTALL FRONT EXHAUST PIPE**

(a) Place new gaskets on the exhaust pipe.

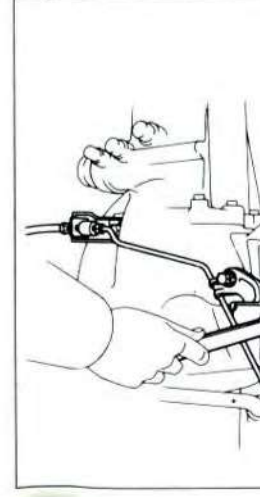
(b) Connect the exhaust pipe with new three nuts.

Torque: 630 kg-cm (46 ft-lb, 62 N·m)

ENGINE MECHANICAL – Cylinder Block

EM-51**15. INSTALL A/C COMPRESSOR**

- (a) Install the compressor with the three bolts.
- (b) Install the drive belt.

16. INSTALL ALTERNATOR**17. CONNECT TRANSAXLE CONTROL CABLE****18. CONNECT SPEEDOMETER CABLE****19. INSTALL CLUTCH RELEASE CYLINDER AND HOSE BRACKET**

EM-52	ENGINE MECHANICAL — Cylinder Block
28.	FILL ENGINE WITH COOLANT (See page CO-4) Capacity (w/ Heater): 8.0 liters (8.5 US qts, 7.0 Imp. qts)
29.	FILL INTERCOOLER WITH COOLANT (See page TC-7) Capacity: 1.7 liters (1.8 US qts, 1.5 Imp. qts)
30.	FILL WITH ENGINE OIL (See page LU-5) Capacity: Drain and refill w/ Oil filter change 3.6 liters (3.8 US qts, 3.2 Imp. qts) w/o Oil filter change 3.3 liters (3.6 US qts, 2.9 Imp. qts) Dry fill 4.6 liters (4.9 US qts, 4.0 Imp. qts)
31.	START ENGINE AND CHECK FOR LEAKS
32.	PERFORM ENGINE ADJUSTMENT

- (a) Adjust the drive belt.
(See Pub. No. RM071U on page CH-3 and AC-19)

Drive belt tension:

Alternator	w/ Air con.	New belt	175 ± 5 lb
		Used belt	115 ± 20 lb
	w/o Air con.	New belt	150 ± 25 lb
		Used belt	130 ± 25 lb
PS pump		New belt	125 ± 25 lb
		Used belt	80 ± 20 lb

- (b) Adjust valve clearance.
(See Pub. No. RM071U on page EM-15)

Valve clearance:

Intake	0.15 – 0.25 mm (0.006 – 0.010 in.)
Exhaust	0.20 – 0.30 mm (0.008 – 0.012 in.)

- (c) Adjust ignition timing.
(See steps 7 to 10 on pages IG-9 and 10)

Ignition timing:

10° BTDC @ idle
(w/ Terminals T and E1 short-circuited)

33. INSTALL HOOD**34. CHECK TOE-IN****35. PERFORM ROAD TEST**

Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

36. RECHECK ENGINE, INTERCOOLER COOLANT AND ENGINE OIL LEVELS