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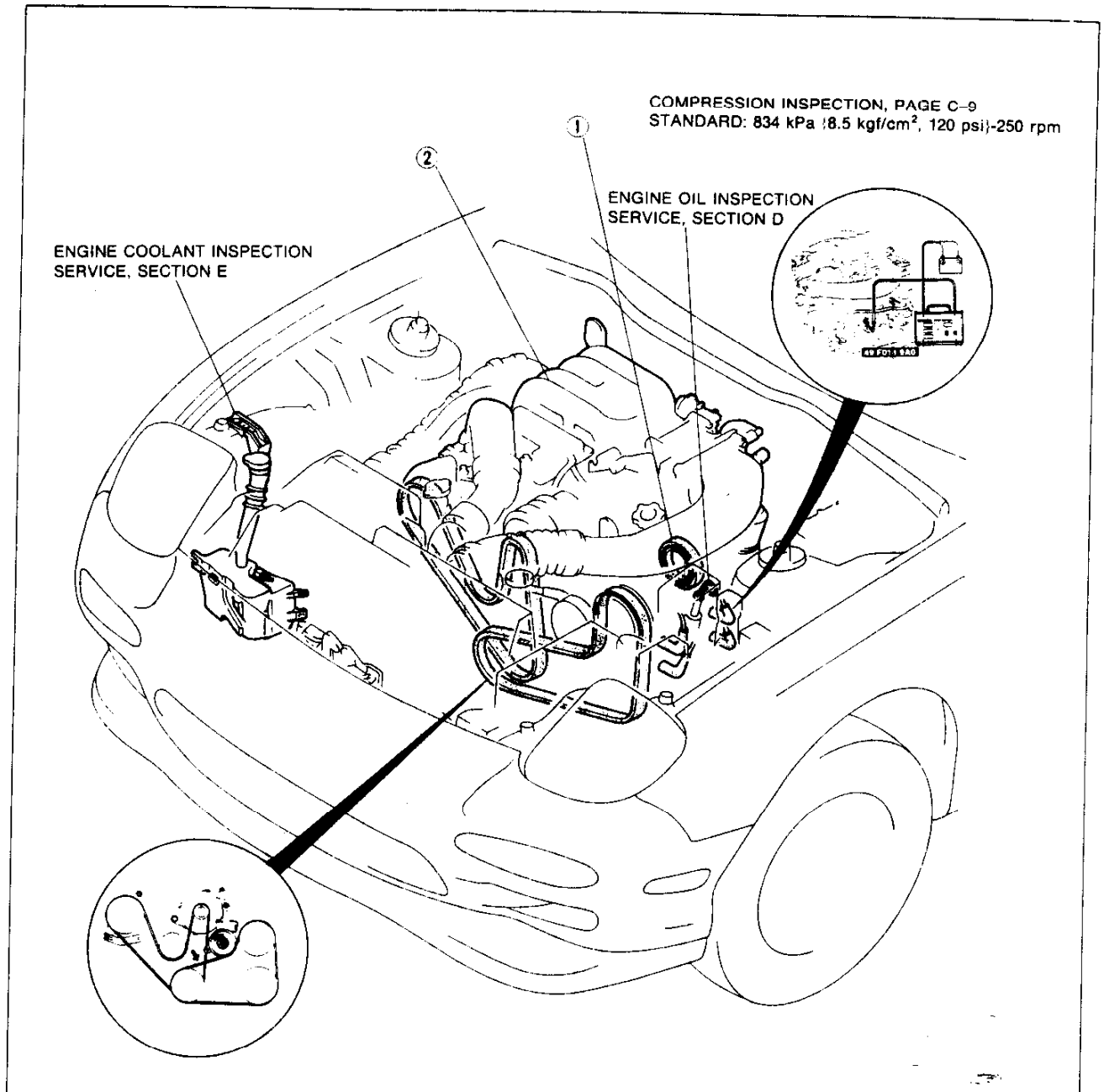
This file was not scanned to deprive Mazda of any money – it was scanned due to the rareness of the original manuals and the overwhelming need of the RX-7 owner to have this information so that they can accurately troubleshoot problems. Perhaps if Mazda's dealerships could support the Rotary Engine it wouldn't be so necessary for the owners to do so.

Many thanks to Anh Diep for scanning this file.

ENGINE

37U0CX-001

INDEX



DEFLECTION

mm {in}

DRIVE BELT	NEW	USED	LIMIT
ALTERNATOR	6.0–7.0 {0.24–0.27}	7.0–7.5 {0.28–0.29}	9.0 {0.35}
P/S · A/C	3.5–4.0 {0.14–0.15}	4.5–5.0 {0.18–0.19}	6.0 {0.24}

37U0CX-001

OUTLINE

SPECIFICATIONS

Item \ Engine				13B Turbo
Engine type				Rotary
Displacement			cm³ {cu in}	654 × 2 {40.0 × 2}
Number of cylinders and arrangement				2 rotors, longitudinal
Combustion chamber type				Bathtub
Compression ratio				9.0 : 1
Air induction				4-port induction
Port timing	Intake	Open	Primary	45° BTDC
			Secondary	32° BTDC
		Close	Primary	50° ABDC
			Secondary	50° ABDC
	Exhaust	Open		75° BBDC
		Close		48° ATDC
Fuel supply system				EGI
Ignition timing*			Trailing	20°ATDC (–20°BTDC)
			Leading	5°ATDC (–5°BTDC)
Idle speed*			rpm	700 – 750

* TEN terminal of diagnosis connector is grounded.

37U0CX-003

TROUBLESHOOTING GUIDE

Problem	Possible cause	Action	Page
Difficult starting	**Insufficient compression**		
	Deformation or abnormal wear of side housing	Replace	C–51
	Deformation or abnormal wear of rotor housing	Replace	C–54
	Wear of rotor grooves	Replace	C–57, 58
	Deformation of or loose rotor seals	Replace	C–57, 58
	Worn or weak rotor seal springs	Replace	–
	Malfunction of metering oil pump		Section D
	Malfunction of electrical system		Section F
	Malfunction of electrical system		Section G
Poor idling	**Insufficient compression**		
	Deformation or abnormal wear of side housing	Replace	C–51
	Deformation or abnormal wear of rotor housing	Replace	C–54
	Wear of rotor grooves	Replace	C–57, 58
	Deformation or loose rotor seals	Replace	C–57, 58
	Worn or weak rotor seal springs	Replace	–
	Malfunction of fuel system		Section F
	Malfunction of ignition system		Section G

37U0CX-004

TROUBLESHOOTING GUIDE

Problem	Possible cause	Action	Page
Insufficient power	**Insufficient compression**		
	Deformation or abnormal wear of side housing	Replace	C–51
	Deformation or abnormal wear of rotor housing	Replace	C–54
	Wear of rotor grooves	Replace	C–57, 58
	Deformation or loose rotor seals	Replace	C–57, 58
	Worn or weak rotor seal springs		
	Malfunction of fuel system		Section F
	Malfunction of ignition system		Section G
Abnormal combustion	**Malfunction in combustion chamber**		
	Carbon accumulation	Remove and clean	C–49
	Malfunction of fuel system		Section F
	Malfunction of ignition system		Section G
Excessive oil consumption	**Leakage into combustion chamber**		
	Deformation or abnormal wear of side housing	Replace	C–51
	Malfunction of rotor (blow holes)	Replace	C–54
	Scratched or burred rotor land	Replace	C–54
	Malfunction of oil seal (incorrect angle)	Replace	C–56
	Leakage into coolant passages		
	Deformed rotor housing	Replace	C–54
	Malfunction of sealing rubber	Replace	–
	Leakage to outside of engine		Section D
	Malfunction of lubrication system		Section D
Engine noise	**Rotor seal noise**		
	Malfunction of rotor seals	Replace	C–56, 57
	Malfunction of housing	Replace	C–51, 54
	Malfunction of seal spring	Replace	C–56, 57
	Malfunction of metering oil pump		Section D
	Knocking noise		
	Accumulation of carbon	Remove and clean	C–49
	Hitting noise		
	Malfunction of main bearing or rotor bearing	Replace	C–53, 56
	Excessive end play	Adjust	C–73
	Foreign matter in internal gear or stationary gear or malfunction of gear	Replace	C–53
	Other		
	Malfunction of water pump bearing		Section E
	Loose drive belt	Adjust	C–5
	Malfunction of alternator bearing		Section G
	Exhaust gas leakage		Section F
	Malfunction of fuel system		Section F

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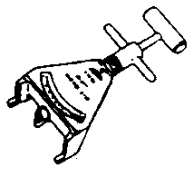
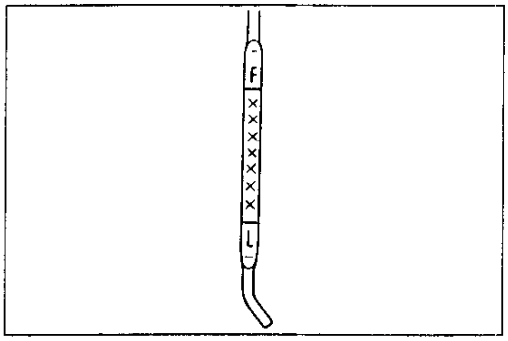
ENGINE TUNE-UP PROCEDURE

PREPARATION
SST

49 9200 020 Tension gauge, V-ribbed belt		For inspection of drive belt tension

16E0B1-006



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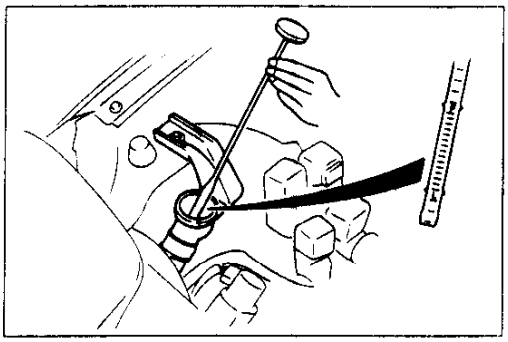

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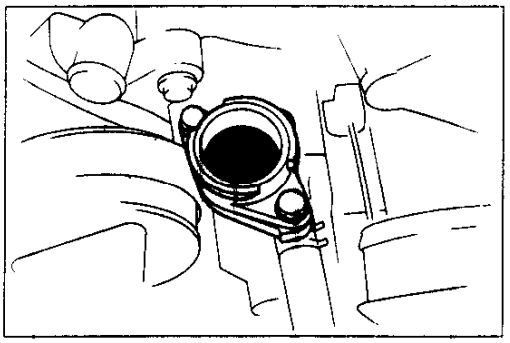

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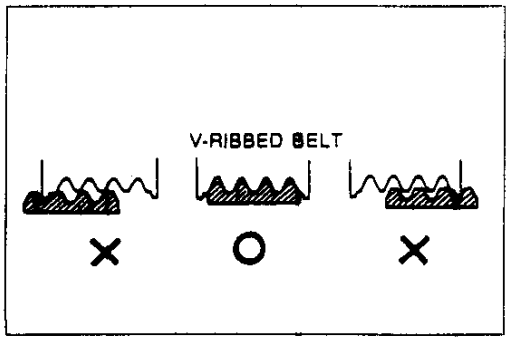


16E0B1-010

ENGINE OIL
Inspection
1. Be sure the vehicle is on level ground.
2. Warm up the engine to normal operating temperature and stop it.
3. Wait for five minutes.
4. Remove the oil level dipstick and check the oil level and condition.
5. Add or replace oil if necessary.

Note
- **The distance between the L and F marks on the dipstick represents 1.7L {1.8 US qt, 1.5 Imp qt}.**

ENGINE COOLANT
Inspection
Coolant level (Engine cold)

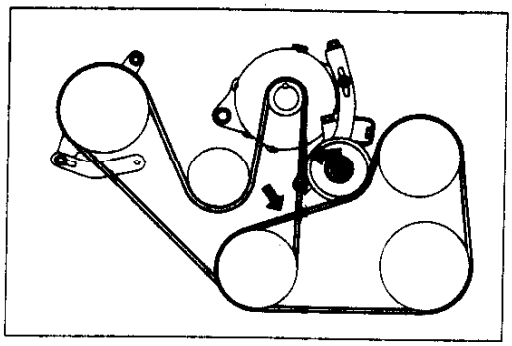
Warning
- **Never remove the radiator cap while the engine is hot.**
- **Wrap a thick cloth around the cap when removing it.**

1. Verify that the coolant level is near the filler port neck.
2. Remove the coolant level dipstick from the coolant reservoir and verify that the coolant level is between the F and L marks. Add coolant if necessary.

Coolant quality

1. Verify that there is no buildup of rust or scale around the radiator cap and radiator filler neck.
2. Verify that the coolant is free of oil.
3. Replace the coolant if necessary.

DRIVE BELT
Inspection
1. Check the drive belts for wear, cracks, and fraying. Replace if necessary.
2. Verify that the drive belts are correctly mounted on the pulleys.


37U0CX-007

3. Check the drive belt deflection by applying moderate pressure **98 N {10 kgf, 22 lbf}** midway between the pulleys.

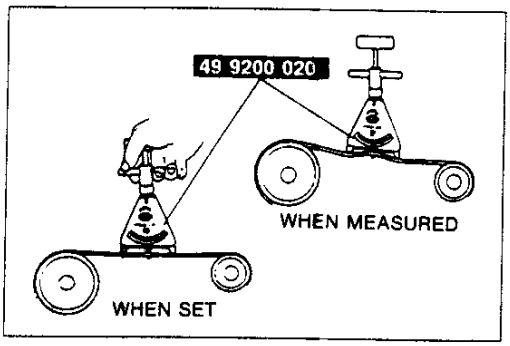
Note
- **Measure the belt deflection between the specified pulleys.**
- **A belt is considered "New" if it has been used on a running engine for less than 5 minutes. Set the deflection specified below accordingly.**
- **Check the belt deflection when the engine is cold, or at least 30 minutes after the engine has stopped.**

Deflection

mm { in }

Drive belt	New	Used	Limit
Alternator	6.0–7.0 {0.24–0.27}	7.0–7.5 {0.28–0.29}	9.0 {0.35}
P/S·A/C	3.5–4.0 {0.14–0.15}	4.5–5.0 {0.18–0.19}	6.0 {0.24}

4. If the deflection is not with in specification, adjust it.



37U0CX-008

Drive belt tension check

Note
- **Belt tension can be checked in place of belt deflection.**
- **Belt tension can be measured between any two pulleys.**

1. Using the **SST**, check the belt tension.

Tension

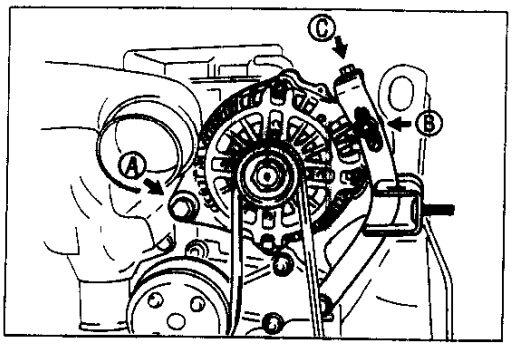
N {kgf·lbf}

Drive belt	New	Used	Limit
Alternator	690–780 {70–80, 160–170}	590–680 {60–70, 140–150}	320 {33, 73}
P/S·A/C	740–880 {75–90, 170–190}	540–630 {55–65, 130–140}	320 {33, 73}

2. If the tension is not with in specification, adjust it.

Adjustment

Caution
- **A belt is considered "New" if it has been used on a running engine for less than 5 minutes.**



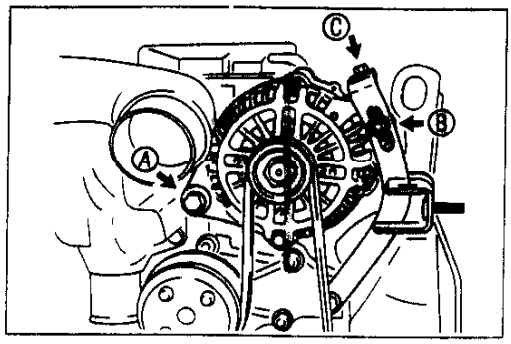
37U0CX-009

Alternator

1. Loosen bolt A and nut B.
2. Adjust the belt deflection by turning adjusting bolt C.

Deflection

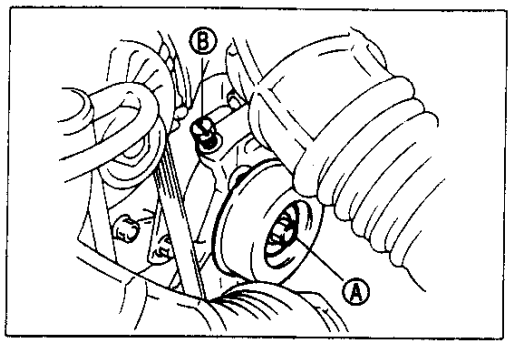
New : 6.0–7.0 mm {0.24–0.27 in}
Used : 7.0–7.5 mm {0.28–0.29 in}
Limit : 9.0 mm {0.35 in}



37U0CX-010

3. Tighten bolt A, and nut B.

Tightening torque:
Bolt A 38–51 N·m {3.8–5.3 kgf·m, 28–38 ft·lbf}
Nut B 19–25 N·m {1.9–2.6 kgf·m, 14–18 ft·lbf}



37U0CX-011

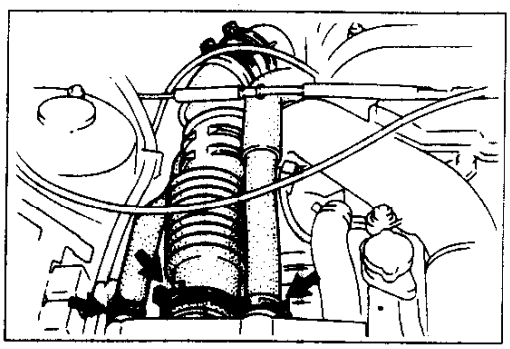
P/S, A/C

1. Loosen nut A.
2. Adjust the belt deflection by turning adjusting bolt B.

Deflection
New : 3.5–4.0 mm {0.14–0.15 in}
Used: 4.5–5.0 mm {0.18–0.19 in}
Limit: 6.0 mm {0.24 in}

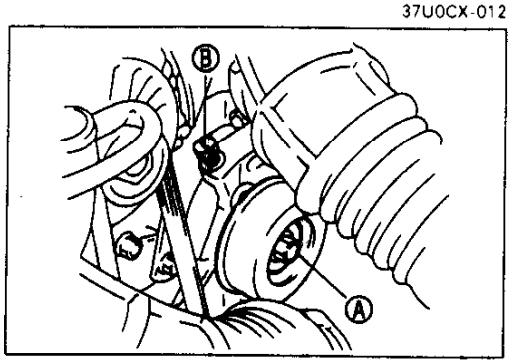
3. Tighten nut A.

Tightening torque:
37–53 N·m {3.7–5.5 kgf·m, 27–39 ft·lbf}


37U0CX-012

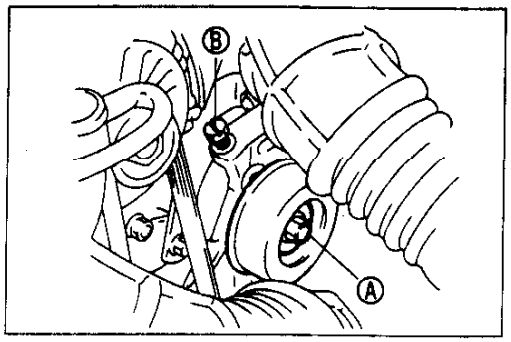
Replacement
P/S, A/C

1. Disconnect the air hoses shown in the figure.



37U0CX-013

2. Loosen idler pulley locknut A.
3. Loosen adjusting bolt B.
4. Remove the belt.



37U0CX-014

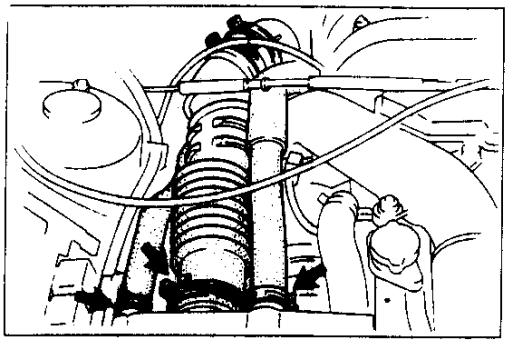
5. Install the new belt on the pulleys.
6. Adjust the belt deflection by turning adjusting bolt B.

Deflection
3.5–4.0mm {0.14–0.15 in}

7. Tighten pully locknut A.

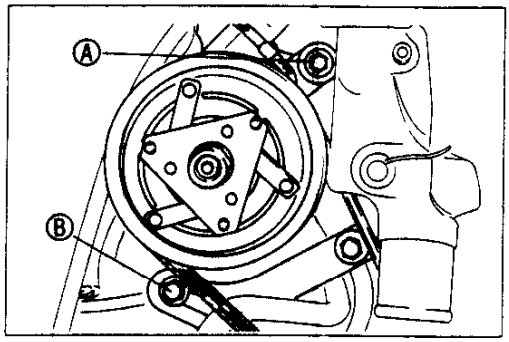
Tightening torque:
37–53 N·m {3.7–5.5 kgf·m, 27–39 ft·lbf}

8. Connect the air hoses.


37U0CX-015

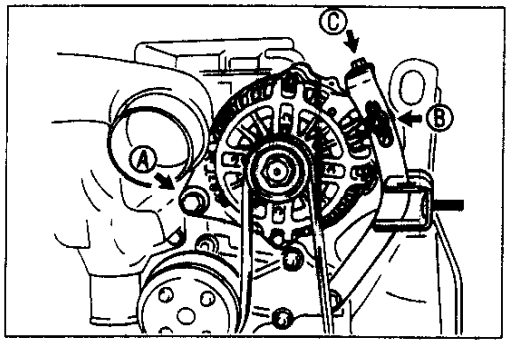
Alternator

1. Disconnect the air hoses shown in the figure.



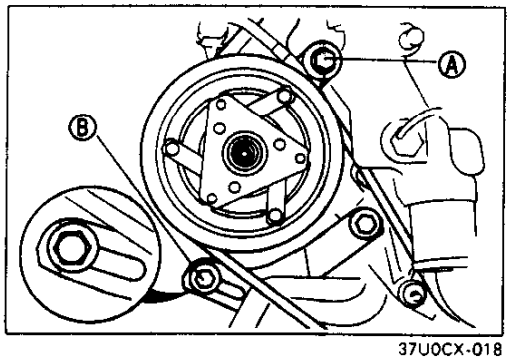
37U0CX-016

2. Loosen air pump mount bolts A and B.



37U0CX-017

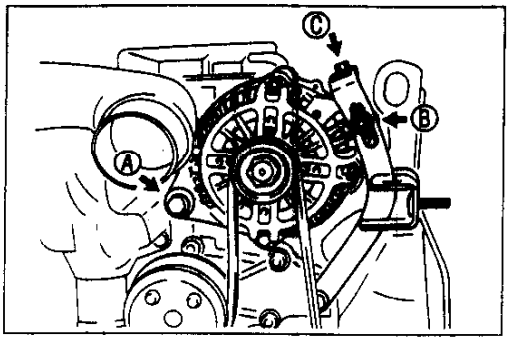
3. Loosen alternator mount bolt A and locknut B.
4. Loosen adjusting bolt C.
5. Remove the drive belt.



37U0CX-018

6. Install the new drive belt on the pulleys.
7. Install the air pump while applying the pressure the drive belt.

Tightening torque:
19–25 N·m {1.9–2.6 kgf·m, 14–18 ft·lbf}



37U0CX-019

8. Adjust the belt deflection by turning adjusting bolt C.

Deflection
6.0–7.0 mm {0.24–0.27 in}

9. Tighten alternator mount bolt A and locknut B.

Tightening torque:
Bolt A 37–51 N·m {3.8–5.3 kgf·m, 28–38 ft·lbf}
Nut B 19–25 N·m {1.9–2.6 kgf·m, 14–18 ft·lbf}

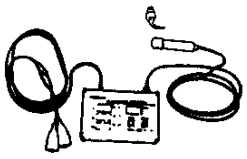
10. Connect the air hoses.

COMPRESSION

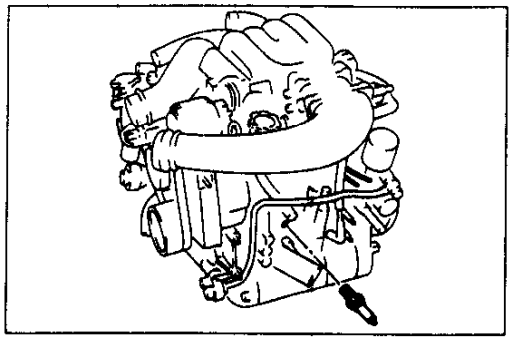
If the engine exhibits low power, poor fuel economy, or poor idle, check the following:
1. Ignition system (Refer to Section G.)
2. Compression
3. Fuel system (Refer to Section F.)

37U0CX-020

PREPARATION
SST

49 F018 9A0 Tester, compression		For Inspection of compression

37U0CX-013


37U0CX-022

1. Check that the battery is fully charged. Recharge it if necessary.
2. Warm up the engine to the normal operating temperature, then stop it.
3. Allow about 10 minutes for the exhaust manifold to cool.
4. Remove the front and rear trailing-side spark plugs.
5. Disconnect the circuit-opening relay and the igniter connector.