

Chassis and Engine Numbers

Vehicle Identification Number

■ JHMAAS 5330S 0 00001 ■

Model Name

AS: 1600 Civic Coupe CR-X
AF: 1500 Civic Coupe CR-X
(KY only)

Transmission Type

5: 5-speed

Number of Doors

3: 2 Door

Grade

2: DX

3: Si

Plant

S: Suzuka Plant

Model Year

0: 1986 with AS Model → 3: 1987
2: 1986 with AF Model

Serial Number

Engine Serial Number

ZC1--10 00001

Engine Type

ZC1: 1600 DOHC (Fuel-Injected Engine)
EW2: 1500 SOHC (Carbureted Engine)

Model Year

10: 1986 with ZC1 Engine
14: 1986 with EW2 Engine

Serial Number

Transmission Number (Manual)

CG-11 00001

Transmission Type

CG: with ZC1 Engine
GW: with EW2 Engine

Model Year

11: 1986 with CG Transmission
20: 1986 with GW Transmission

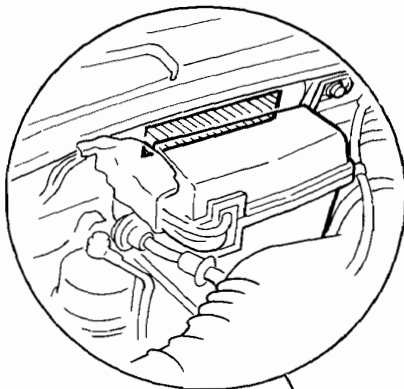
Serial Number

Identification Number Locations

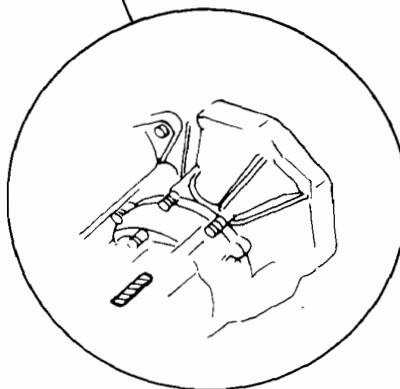
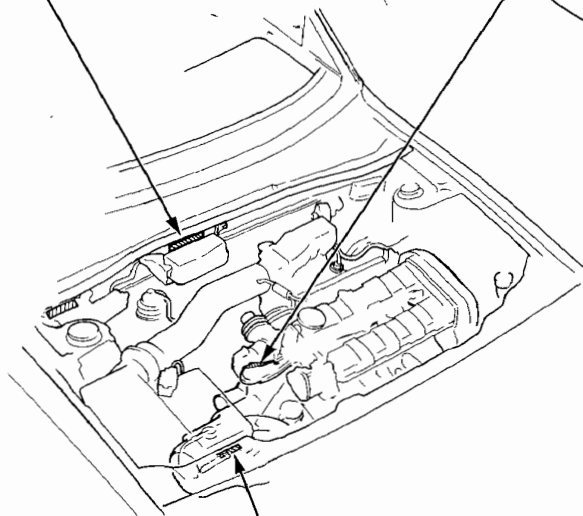
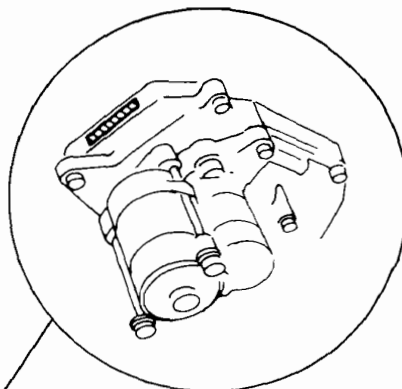


AS (1600) shown : AF (1500) similar

Chassis Number
(All Models)



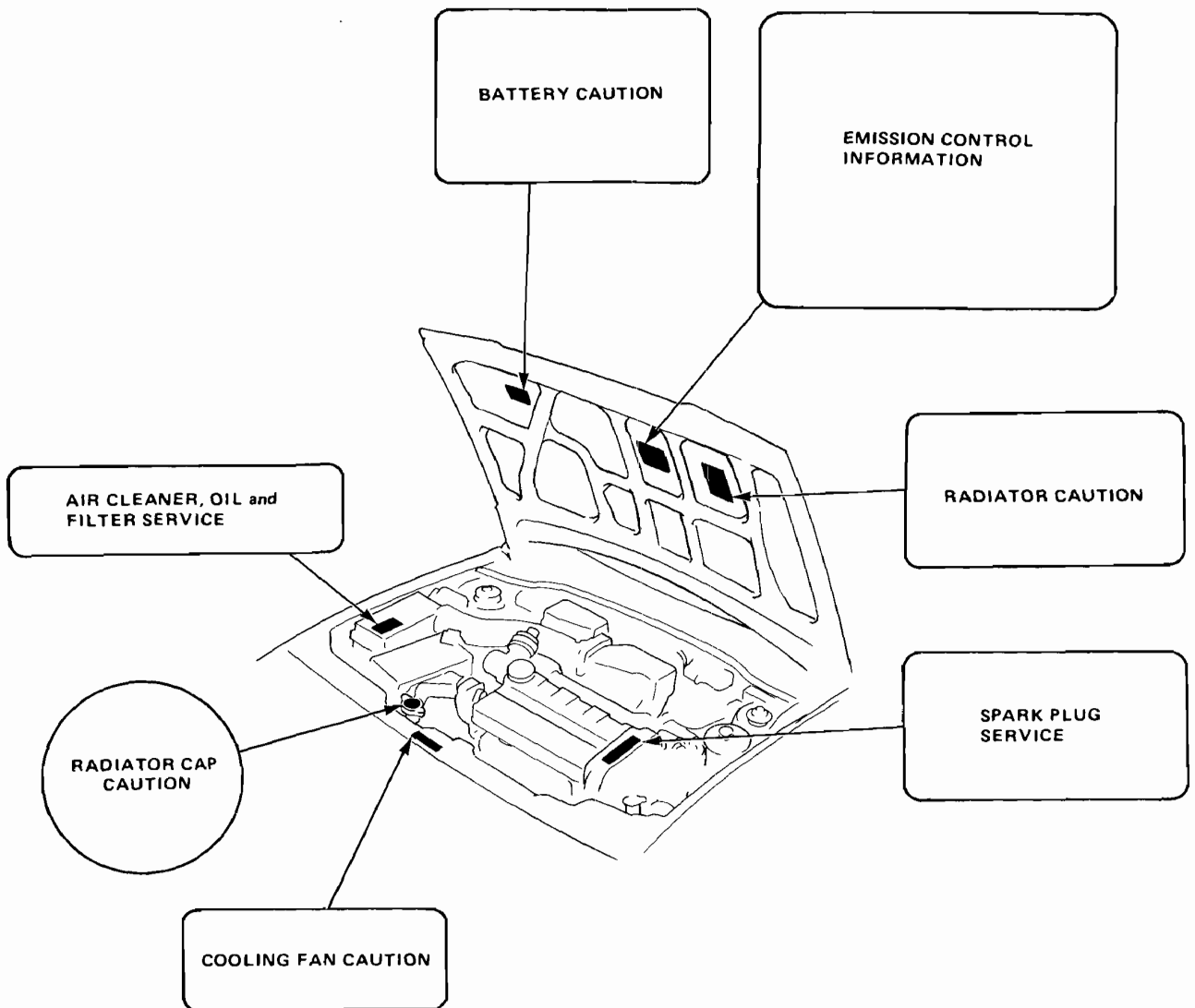
Engine Number



Transmission Number
(Manual)

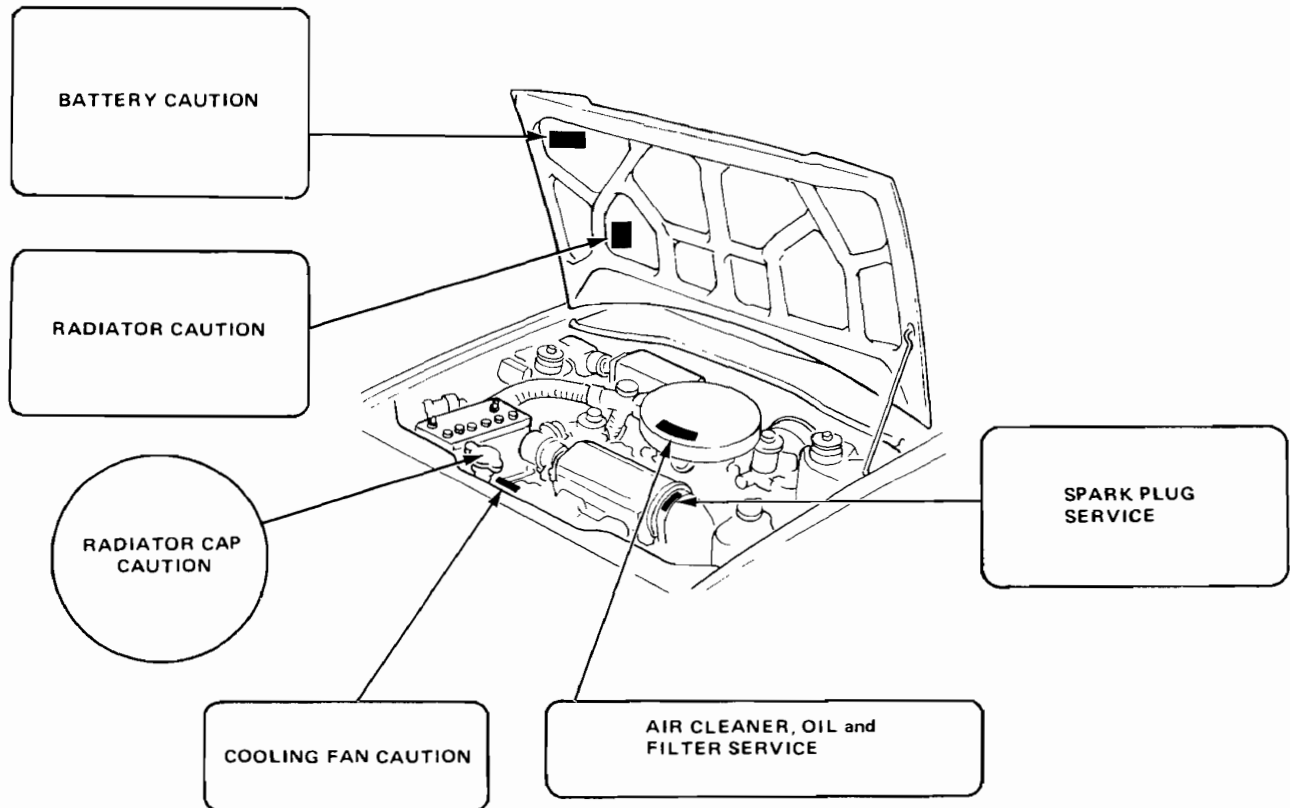
Label Locations

AS(1600)





AF (1500)



Special Tools

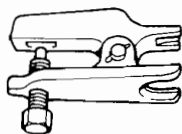
Special Tools (Common with Other Models)

5. Engine Removal/Installation

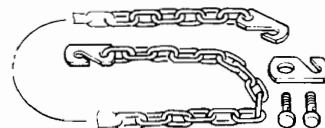
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07944-6110200	8 mm Pin Punch	1	
②	07941-6920002	Ball Joint Remover	1	
③	07966-6340011	Engine Block Hanger	1	



①



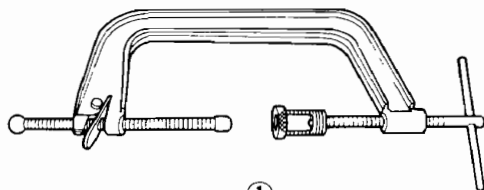
②



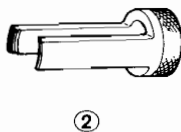
③

6. Cylinder Head/Valve Train

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07757-0010000	Valve Spring Compressor	1	ZC1 Engine Only
②	07757-PJ10100	Valve Spring Compressor Attachment	1	
③	07942-6570100	Valve Guide Driver/Remover	1	
④	07743-0020000	Valve Guide Driver	1	
⑤	07984-6110000	Valve Guide Reamer	1	Camshaft
⑥	07947-SB00100	Oil Seal Driver	1	



①



②



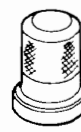
③



④



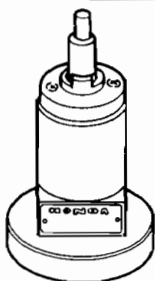
⑤



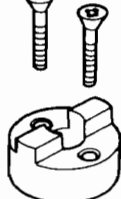
⑥

7. Engine Block

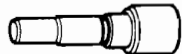
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07973-6570002	Piston Pin Insert Base Set	1	<div style="display: flex; align-items: center;"> <div style="width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div>Not included in base set.</div> </div>
②	07973-SB00100	Piston Pilot	1	
③	07973-PE00200	Piston Pin Insert Attachment , A	1	
④	07973-PE00301	Piston Pin Pilot Collar	1	
⑤	07973-PE00400	Piston Pin Insert Attachment , B	1	<div style="display: flex; align-items: center;"> <div style="width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div>Use each with the baset set.</div> </div>
⑥	07948-SB00101	Driver Attachment	1	
⑦	07749-0010000	Driver	1	



①



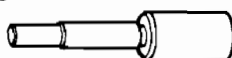
②



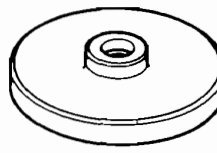
③



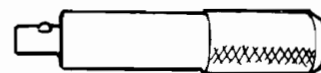
④



⑤



⑥

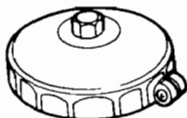


⑦



8. Engine Lubrication

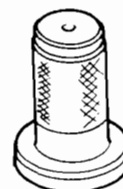
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07912—6340001	Oil Filter Socket Wrench	1	
②	07406—0030000	Oil Pressure Gauge Adaptor	1	
③	07947—6340000	Oil Seal Driver Attachment	1	



①



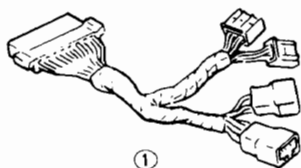
②



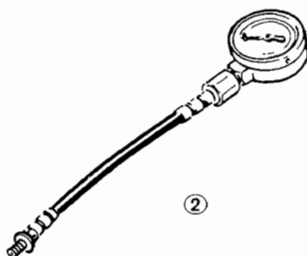
③

11. Fuel and Carburetor

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07999—PD6000A	System Checker Harness	1	ZC1 Engine Only
②	07406—0040000	Fuel Pressure Gauge Set	1	ZC1 Engine Only
②-1	07406—0040100	Pressure Gauge	(1)	Component Tool
②-2	07406—0040200	Hose Assy	(1)	Component Tool
③	07920—SB20000	Fuel Sender Wrench	1	
④	07GAZ—SE30300	R.P.M Connecting Adapter	1	EW2 Engine Only
⑤	07614—0050100	Fuel Line Clip	1	EW2 Engine Only
⑥	07411—0020000	Digital Circuit Tester	1	ZC1 Engine Only
⑦	07401—0010000	Float Level Gauge	1	EW2 Engine Only



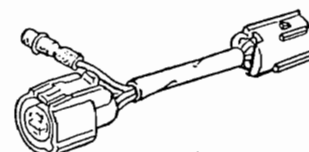
①



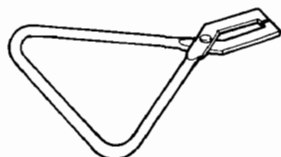
②



③



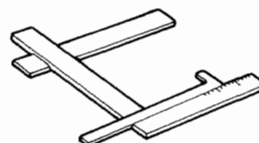
④



⑤



⑥



⑦

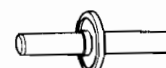
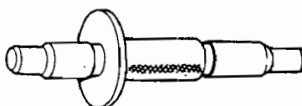
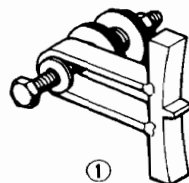
(cont'd)

Special Tools

Special Tools (Common with Other Models)

13. Clutch

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07924—PD20002	Ring Gear Holder	1	
②	07974—6890101	Clutch Disc Alignment Tool	1	With CG Transmission
③	07974—PE60000	Clutch Disc Alignment Tool	1	With GW Transmission



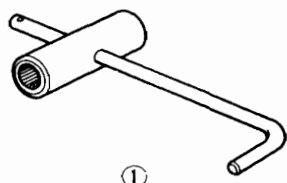
①

②

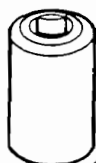
③

14. Manual Transmission (CG)

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07923—6890101	Mainshaft Holder	1	
②	07907—PD10000	Socket Wrench 30 mm	1	
③	07944—6110100	5 mm Pin Punch	1	
④	07933—6890100	Transmission Housing Puller	1	
⑤	07749—0010000	Driver	1	07949—6110000 may also be used.
⑥	07947—6340500	Driver Attachment E	1	
⑦	07936—6340000	Bearing Remover Set	1	
⑧	07936—6890101	Bearing Remover Attachment	1	Use changed to 07936—6340000 attachment
⑨	07947—6340000	Oil Seal Driver	1	
⑩	07746—0010400	Driver Attachment, 52×55 mm	1	
⑪	07744—0010200	3 mm Pin Punch	1	
⑫	07947—6110500	Driver Attachment, E	1	Differential Oil Seal



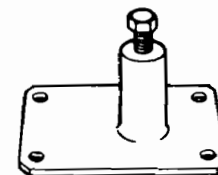
①



②



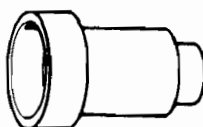
③



④



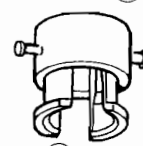
⑤



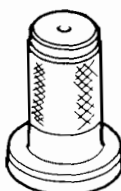
⑥



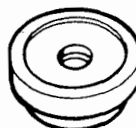
⑦



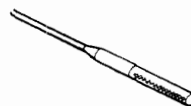
⑧



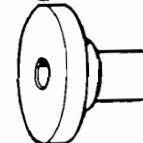
⑨



⑩



⑪

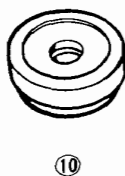
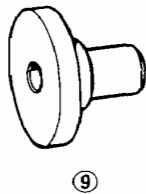
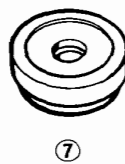
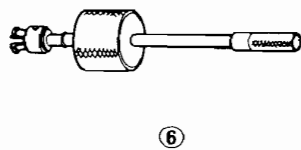
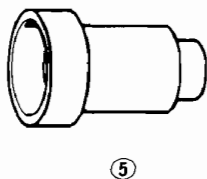
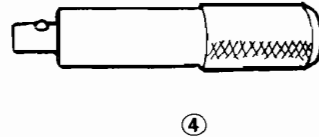
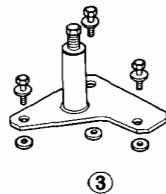
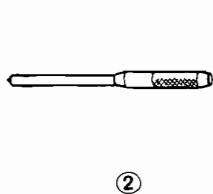
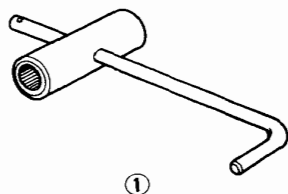


⑫



14. Manual Transmission (GW)

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07924-6340300	Mainshaft Holder	1	07949-6110000 may also be used.
②	07944-6110100	5 mm Pin Punch	1	
③	07933-PE60000	Transmission Housing Puller	1	
④	07749-0010000	Driver	1	
⑤	07947-6340500	Driver Attachment E	1	
⑥	07936-6340000	Bearing Remover Set	1	
⑦	07746-0010300	Driver Attachment, 42×47 mm	1	
⑧	07746-0010100	Driver Attachment, 32×35 mm	1	
⑨	07947-6110500	Driver Attachment, E	1	
⑩	07947-6710100	Driver Attachment, 45×50 mm	1	
				Differential Oil Seal



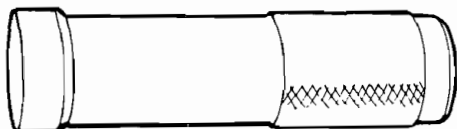
(cont'd)

Special Tools

Special Tools (Common with Other Models)

17. Differential

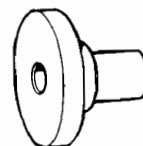
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07746-0030100	Driver, C	1	07949-6110000 may also be used
②	07944-SA00000	4 mm Pin Punch	1	
③	07947-6110500	Oil Seal Driver	1	
④	07749-0010000	Driver	1	
⑤	07947-6340500	Driver Attachment, E	1	
⑥	07746-0030400	Attachment, 35 mm	1	



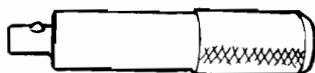
①



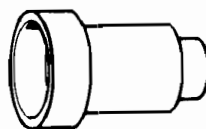
②



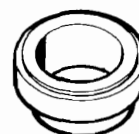
③



④



⑤

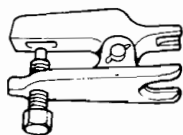


⑥

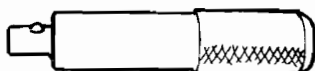
18. Driveshaft

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07941-6920002	Ball joint Remover	1	07949-6110000 may also be used
*②	07749-0010000	Driver	1	
*③	07946-0040900	Driver Pilot, 40 mm	1	
*④	07965-SD90100	Support Base	1	
*⑤	07746-0010400	Driver Attachment, 52x55 mm	1	
*⑥	07746-0010500	Driver Attachment, 62x68 mm	1	
*⑦	07GAD-SE00100	Oil Seal Driver Attachment	1	
*⑧	07965-SD90200	Support Collar	1	
*⑨	07947-SD90200	Oil Seal Driver Attachment	1	

*ZC1 Engine only



①



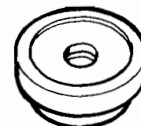
②



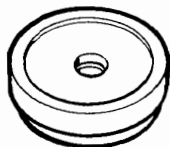
③



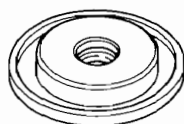
④



⑤



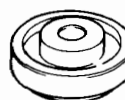
⑥



⑦



⑧



⑨

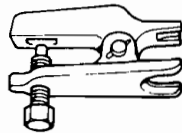


19. Steering

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07916—6920000 or 07916—6920100	Steering Gearbox Locknut Wrench, 40 mm	1	RHD
②	07941—6920002	Steering Gearbox Locknut Wrench, 40 mm	1	LHD
③	07941—6920002	Ball Joint Remover	1	
④	07974—SA50800	Ball Joint Boot Clip Installation Guide	1	
④	07944—6110200	8 mm Pin Punch	1	



①



②



③



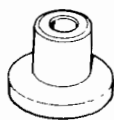
④

(cont'd)

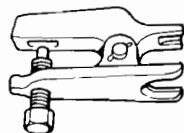
Special Tools

Special Tools (Common with Other Models)

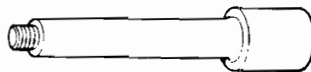
20. Suspension				
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07410-0010200	Wheel Alignment Gauge Attachment, B	1	07947-6340000 may also be used. 07949-6110000 may also be used.
②	07941-6920002	Ball Joint Remover	1	
③	07965-SA70100	Front Hub Dis/Assembly Tool Pin, A	1	
④	07965-6340301	Front Wheel Bearing Dis/Assembly Tool Base, A	2	
⑤	07965-SA70200	Front Hub Dis/Assembly Tool, B	1	
⑥	07749-0010000	Driver	1	
⑦	07746-0010600	Attachment, 72 x75 mm	1	
⑧	07946-SB20000	Bearing Driver Attachment	1	
⑨	07974-SA50700	Ball Joint Boot Clip Installation Guide	1	
⑩	07965-SB20000	Lower Arm Dis/Assembly Tool Set	1	
⑩-1	07965-SB20100	Shaft	(1)	Component Tools
⑩-2	07965-SB20200	Hook	(2)	
⑩-3	07965-SB20300	Disassembly Base	(1)	
⑩-4	07965-SB20400	Assembly Base	(1)	



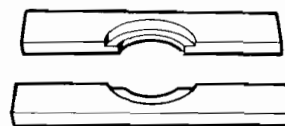
①



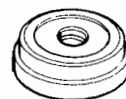
②



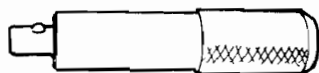
③



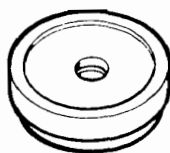
④



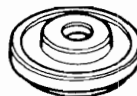
⑤



⑥



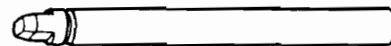
⑦



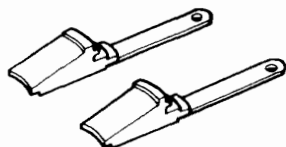
⑧



⑨



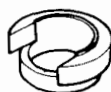
⑩-1



⑩-2



⑩-3

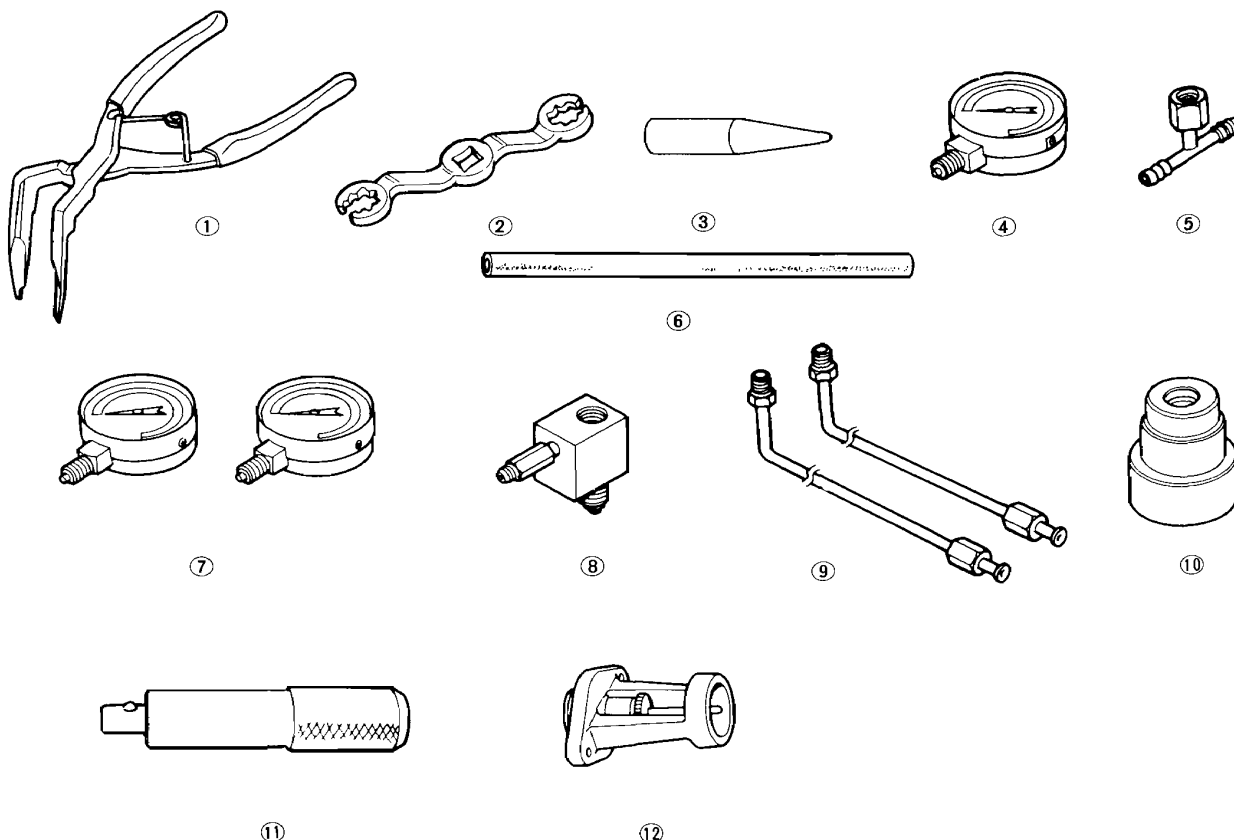


⑩-4



21. Brake

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07914—SA50000	Snap Ring Pliers	1	07914—323001 may also be used. Short parts of the brake power Kit 07504—6340100
②	07921—0010100	Flare Nut Wrench	1	
③	07965—5790400	Master Cylinder Cup Guide	1	
④	07404—5790300	Vacuum Gauge	1	
⑤	07410—5790500	Tube Joint Attachment, I	1	
⑥	07510—6340300	Vacuum Joint Tube, A	1	
⑦	07406—5790200	Oil Pressure Gauge	2	
⑧	07410—5790100	Pressure Gauge Attachment, C	1	
⑨	07510—6340100	Pressure Gauge Joint Pipe	2	
⑩	07947—6890300	Driver Attachment, C	1	
⑪	07749—0010000	Driver	1	
⑫	07GAG—SE00100	Brake Booster Rod Adjustment Gauge	1	

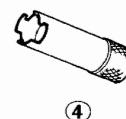
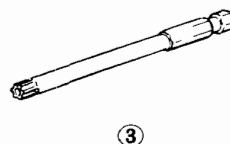
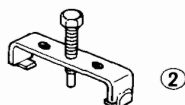
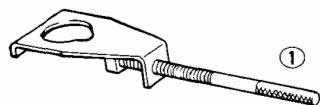


(cont'd)

Special Tools

24. Air Conditioner (EW2 Engine)

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07923—PB80001	Pulley Holder	1	
②	07934—PB80001	Clutch Remover	1	
③	07703—0010200	Torx Driver Bit (T30H)	1	
④	07934—SB20000	Shaft Seal Driver	1	



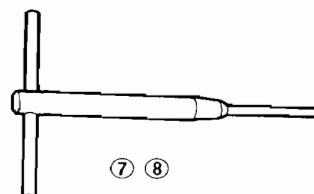
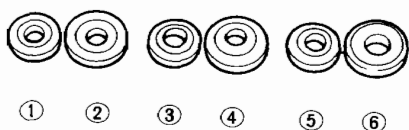
25. Ignition

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07744—0010300	3.5 mm Pin Punch	1	Distributor 07744—0010200 may also be used.



Optional Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07780—0012200	Valve Seat Cutter 32°	1	ZC1 Engine Intake and Exhaust
	07780—0012300	Valve Seat Cutter 32°	1	EW2 Engine Exhaust
②	07780—0012900	Valve Seat Cutter 32°	1	EW2 Engine Intake
③	07780—0014000	Valve Seat Cutter 60°	1	Intake and ZC1 Engine Exhaust
④	07780—0014100	Valve Seat Cutter 60°	1	EW2 Engine Exhaust
⑤	07780—0010300	Valve Seat Cutter 45°	1	ZC1 Engine Exhaust
	07780—0010400	Valve Seat Cutter 45°	1	EW2 Engine Exhaust and ZC1 Engine Intake
⑥	07780—0010800	Valve Seat Cutter 45°	1	EW2 Engine Intake
⑦	07781—0010201	Valve Seat Cutter Holder	1	
⑧	07781—0010301	Valve Seat Cutter Holder	1	



Standards and Service Limits

Cylinder Head/Valve Train (ZC1) — Section 6

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Compression	300 min ⁻¹ (rpm) and wide-open throttle	Nominal Minimum Maximum variation	1,323 kPa (13.5 kg/cm ² , 192 psi) 1,127 kPa (11.5 kg/cm ² , 164 psi) 196 kPa (2 kg/cm ² , 28 psi)
Cylinder head	Warpage Height	132.0(5.20)	0.05 (0.002) 131.8(5.19)
Camshaft	End play Oil clearance Runout Cam lobe height	0.05–0.15 (0.002–0.006) 0.050–0.089 (0.002–0.004) 0.03 (0.001) max. 32.982 (1.2985) 32.342(1.2733)	0.5 (0.02) 0.15 (0.006) 0.06 (0.002) —
Valve	Valve clearance Valve stem O.D. Stem-to-guide clearance Stem installed height	IN EX IN EX IN EX IN EX 45.78 (1.802) 44.97 (1.770)	— — 6.55 (0.258) 6.52 (0.257) 0.08 (0.003) 0.11 (0.004) 46.57 (1.833) 45.76 (1.802)
Valve seat	Width	IN and EX	1.25–1.55 (0.049–0.061) 2.0 (0.08)
Valve spring	Free length Squareness Inner and Outer	IN EX	45.8 (1.80) 47.1 (1.85) 44.8 (1.76) 46.1 (1.81) 1.6 (0.063)
Valve guide	I.D.	IN and EX	6.61–6.63 (0.260–0.261) 6.65 (0.262)

• Setting point between camshaft and rocker arm.

Cylinder Head/Valve Train (EW2) — Section 6

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Compression	300 min ⁻¹ (rpm) and wide-open throttle	Nominal Minimum Maximum variation	1,176 kPa (12.0 kg/cm ² , 171 psi) 980 kPa (10.0 kg/cm ² , 142 psi) 196 kPa (2 kg/cm ² , 28 psi)
Cylinder head	Warpage Height	90(3.54)	0.05 (0.002) 89.8(3.53)
Camshaft	End play Oil clearance Runout Cam lobe height	0.05–0.15 (0.002–0.006) 0.050–0.089 (0.002–0.004) 0.03 (0.001) max. 40.370(1.5894) 40.391(1.5902)	0.5 (0.02) 0.15 (0.006) 0.06 (0.002) —
Valve	Valve clearance Valve stem O.D. Stem-to-guide clearance Stem installed height	IN EX IN EX IN EX IN and EX 48.16(1.896)	— — 6.55 (0.258) 6.52 (0.257) 0.08 (0.003) 0.11 (0.004) 48.95(1.927)
Valve seat	Width	IN and EX	1.25–1.55 (0.049–0.061) 2.0 (0.08)
Valve spring	Free length Squareness Inner and Outer	IN and EX	47.6 (1.85) 46.6(1.83) 1.75 (0.068)
Valve guide	I.D.	IN and EX	6.61–6.63 (0.260–0.261) 6.65 (0.262)
Rocker arm	Arm-to-shaft clearance		0.018–0.054(0.0007–0.0021) 0.08(0.003)

Engine Block (ZC1) — Section 7

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface Bore diameter Bore taper Reboring limit	0.07 (0.003) max. 75.00–75.02 (2.9528–2.9535) 0.07–0.012 (0.0003–0.0005) —	0.10 (0.004) 75.07 (2.9555) 0.05 (0.002) 0.5 (0.02)
Piston	Skirt O.D. Clearance in cylinder Piston-to-ring clearance	At 16 mm (0.63 in) from bottom of skirt 0.01–0.05 (0.0004–0.0020) 0.03–0.06 (0.0012–0.0024) 0.030–0.055 (0.0012–0.0022)	74.98–74.99 (2.9520–2.9524) 0.07 (0.003) 0.13 (0.005) 0.13 (0.005)
Piston ring	Ring end gap (top and second) Ring end gap (oil)	0.15–0.35 (0.006–0.014) 0.20–0.70 (0.008–0.028)	0.6 (0.02) 0.8 (0.03)
Connecting rod	Pin-to-rod interference Large end bore diameter End play installed on crankshaft	0.014–0.040 (0.0006–0.0016) Nominal 48.0 (1.89) 0.15–0.30 (0.006–0.012)	— — 0.40 (0.016)
Crankshaft	Main Journal diameter Taper/out-of-round, main journal Rod Journal diameter Taper/out-of-round, rod Journal End play Runout	54.976–55.000 (2.1644–2.1654) 0.005 (0.0002) max. 44.976–45.000 (1.7707–1.7717) 0.005 (0.0002) max. 0.10–0.35 (0.004–0.014) 0.03 (0.0012) max.	— 0.010 (0.0004) — 0.010 (0.0004) 0.45 (0.018) 0.06 (0.0024)
Bearings	Main bearing-to-journal oil clearance No. 3 Journal Other Journals Rod bearing-to-journal oil clearance	0.030–0.048 (0.0012–0.0019) 0.024–0.042 (0.0009–0.0017) 0.020–0.038 (0.0008–0.0015)	0.05 (0.002) 0.05 (0.002) 0.05 (0.002)

Engine Block (EW2) — Section 7

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface Bore diameter Bore taper Reboring limit	0.07 (0.003) max. 74.00—74.02 (2.9133—2.9142) 0.07—0.012 (0.0003—0.0005) —	0.10 (0.004) 75.10 (2.9173) 0.05 (0.002) 0.5 (0.02)
Piston	Skirt O.D. Clearance in cylinder Piston-to-ring clearance At 16 mm (0.63 in) from bottom of skirt (Top) (Second)	73.97—73.99 (2.9122—2.9133) 0.01—0.05 (0.0004—0.0020) 0.03—0.06 (0.0012—0.0024) 0.030—0.055 (0.0012—0.0022)	73.97 (2.912) 0.07 (0.003) 0.13 (0.005) 0.13 (0.005)
Piston ring	Ring end gap (top and second) Ring end gap (oil)	0.15—0.35 (0.006—0.014) 0.30—0.90 (0.012—0.035)	0.6 (0.024) 1.1 (0.043)
Connecting rod	Pin-to-rod interference Large end bore diameter End play installed on crankshaft	0.02—0.045 (0.0006—0.0016) Nominal 45 (1.77) 0.15—0.30 (0.006—0.012)	— — 0.40 (0.016)
Crankshaft	Main Journal diameter Taper/out-of-round, main journal Rod Journal diameter Taper/out-of-round, rod Journal End play Runout	49.976—50.000 (1.9676—1.9685) 0.005 (0.0002) max. 41.976—42.000 (1.6526—1.6535) 0.005 (0.0002) max. 0.10—0.35 (0.004—0.014) 0.03 (0.0012) max.	— 0.010 (0.0004) — 0.010 (0.0004) 0.45 (0.018) 0.06 (0.0024)
Bearings	Main bearing-to-journal oil clearance Rod bearing-to-journal oil clearance	0.024—0.042 (0.0009—0.0017) 0.020—0.038 (0.0008—0.0015)	0.07 (0.003) 0.07 (0.003)

Engine Lubrication (ZC1) — Section 8

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US.qt., Imp.qt.)	4.0 (4.2, 3.5) After engine disassembly 3.5 (3.7, 3.1) After oil change, including oil filter 3.0 (3.2, 2.6) After oil change, without oil filter	
Oil pump	Displacement Inner-to-outer rotor radial clearance Pump body-to-rotor radial clearance Pump body-to-rotor side clearance	46 ℓ (12.4 US gal., 10.3 Imp gal.) 5,000 min ⁻¹ (rpm) 0.14 (0.006) max. 0.10—0.175 (0.004—0.007) 0.03—0.08 (0.001—0.003)	0.2 (0.008) 0.2 (0.008) 0.15 (0.006)
Relief valve	Pressure setting 80°C (176°F)	Idle 147 kPa (1.5 kg/cm ² , 21 psi) min 3,000 min ⁻¹ (rpm) 412—539 kPa (4.2—5.5 kg/cm ² , 60—78 psi)	

Engine Lubrication (EW2) — Section 8

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US.qt., Imp.qt.)	4.0 (4.2, 3.5) After engine disassembly 3.5 (3.7, 3.1) After oil change, including oil filter 3.0 (3.2, 2.6) After oil change, without oil filter	
Oil pump	Displacement Inner-to-outer rotor radial clearance Pump body-to-rotor radial clearance Pump body-to-rotor side clearance	35 ℓ (9.2 US gal., 7.7 Imp gal.) 3,000 min ⁻¹ (rpm) 0.14 (0.006) max. 0.10—0.175 (0.004—0.007) 0.03—0.08 (0.001—0.003)	0.2 (0.008) 0.2 (0.008) 0.15 (0.006)
Relief valve	Pressure setting 80°C (176°F)	Idle 147 kPa (1.5 kg/cm ² , 21 psi) min 3,000 min ⁻¹ (rpm) 333—412 kPa (3.4—4.2 kg/cm ² , 48—60 psi)	

Cooling (With ZC1 Engine) — Section 10

	MEASUREMENT	STANDARD (NEW)
Radiator	Capacity (incl. heater) ℓ (US.Gal., Imp.Gal.) Pressure cap opening pressure	5.6 (1.5, 1.2) Includes reservoir tank 0.4 (0.11, 0.09) 74—103 kPa (0.75—1.05 kg/cm ² , 11—15psi)
Thermostat	Starts to open Full open Valve lift at full open	76—78°C (169—173°F) 91°C (196°F) 8 (0.31) max.
Cooling fan	Fan-to-core clearance Thermoswitch "ON" temperature Thermoswitch "OFF" temperature	50 (1.97) 88.5—91.5°C (191—197°F) 85.5—86.5°C (186—188°F)

(cont'd)

Standards and Service Limits (cont'd)

Cooling (With EW2 Engine) — Section 10

	MEASUREMENT	STANDARD (NEW)
Radiator	Capacity (incl. heater) ℓ (US. Gal., Imp. Gal.)	5.6 (1.5, 1.2) Includes reservoir tank 0.4 (0.11, 0.09)
	Pressure cap opening pressure	74–103 kPa (0.75–1.05 kg/cm², 11–15 psi)
Thermostat	Starts to open	76–78°C (169–173°F)
	Full open	91°C (196°F)
	Valve lift at full open	8 (0.31) max.
Cooling fan	Fan-to-core clearance	ND 22 mm (0.87 in.) TOYO 17.5 mm (0.69 in)
	Thermoswitch "ON" temperature	88.5–91.5°C (191–197°F)
	Thermoswitch "OFF" temperature	85.5–86.5°C (186–188°F)

Fuel — Section 11

	MEASUREMENT	STANDARD (NEW)
Idle	Fast idle	1,000–1,800 min ⁻¹ (rpm)
	Idle speed with headlights and cooling fan off	850±50 min ⁻¹ (rpm)
	Idle CO	below 2.0%
Fuel pump	Delivery pressure	245 kPa (2.5 kg/cm², 36 psi)
	Displacement	230 cc in 10 seconds
	Relief valve opening pressure	441–588 kPa (4.5–6.0 kg/cm², 64–85 psi)
Pressure Regulator	Pressure	230–270 kPa (2.35–2.75 kg/cm², 33–39 psi)
Fuel tank	Capacity	41 ℓ (10.8 US. Gal., 9.0 Imp. Gal.)

Fuel and Carburetor — Section 12

	MEASUREMENT	STANDARD (NEW)
Idle	Choke fast idle	1,500–2,500 min ⁻¹ (rpm)
	Idle speed with headlights and cooling fan off	700–800 min ⁻¹ (rpm)
	Idle CO	below 1.0%
Carburetor	Float level	35.4–37.4 (13.9–14.7 in.)
Fuel pump	Delivery pressure	17.7–26.5 kPa (0.18–0.27 kg/cm², 2.6–3.8 psi)
	Displacement	170 cc/min at idle
Fuel tank	Capacity	41 ℓ (10.8 US. Gal., 9.0 Imp. Gal.)

Clutch (With ZC1 Engine) — Section 13

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height	144 (5.67) to floor	—
	Stroke	135–140 (5.3–5.5)	—
	Pedal play	16–21 (0.63–0.83)	—
	Disengagement height	56 (2.2) min. to floor	—
Clutch arm	Release arm adjustment	4.0–5.0 (0.16–0.20)	—
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch plate	Rivet head depth	1.3 (0.05) min.	0.2 (0.008)
	Surface runout	0.8 (0.03) max.	1.0 (0.04)
	Thickness	8.1–8.8 (0.32–0.35)	5.7 (0.22)
Clutch release bearing holder	I.D.	31.000–31.059 (1.220–1.223)	31.09 (1.224)
	Holder-to-guide sleeve clearance	0.050–0.15 (0.002–0.006)	0.22 (0.009)
Clutch cover	Unevenness of diaphragm spring	0.8 (0.03) max.	1.0 (0.04)

Clutch (With EW2 Engine) — Section 13

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height	175 (6.89) to floor	—
	Stroke	135–140 (5.3–5.5)	—
	Pedal play	10–30 (0.39–1.18)	—
	Disengagement height	61 (2.4) min. to floor	—
Clutch arm	Release arm adjustment	4.0–5.0 (0.16–0.20)	—
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch plate	Rivet head depth	1.3 (0.05) min.	0.2 (0.008)
	Surface runout	0.8 (0.03) max.	1.0 (0.04)
	Thickness	8.1–8.8 (0.32–0.35)	5.7 (0.22)
Clutch release bearing holder	I.D.	29.000–29.059 (1.142–1.144)	29.20 (1.150)
	Holder-to-guide sleeve clearance	0.040–0.132 (0.0016–0.0052)	0.2 (0.008)
Clutch cover	Unevenness of diaphragm spring	0.8 (0.03) max.	1.0 (0.04)

Manual Transmission (CG) — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US.qt., Imp.qt)	2.4 (2.5, 2.1) at assembly 2.3 (2.4, 2.0) at oil change	
Mainshaft	End play Diameter of needle bearing contact area Diameter of third gear contact area Diameter of ball bearing contact area Runout	0.10–0.35 (0.004–0.014) 27.920–27.980 (1.099–1.102) 31.984–32.000 (1.2592–1.2598) 24.980–24.993 (0.9835–0.9840) 0.04 (0.0016) max.	0.5 (0.02) 27.87 (1.097) 31.93 (1.2571) 24.93 (0.981) 0.10 (0.004)
Mainshaft third and fourth gears	I.D. End Play Thickness	37.009–37.025 (1.4570–1.4577) 0.03–0.18 (0.0012–0.0071) 31.42–31.47 (1.237–1.239)	37.07 (1.459) 0.3 (0.012) 31.3 (1.232)
Mainshaft fifth gear	I.D. End play Thickness	37.009–37.025 (1.4570–1.4577) 0.03–0.13 (0.0012–0.0051) 32.42–32.47 (1.276–1.278)	37.07 (1.459) 0.25 (0.01) 32.3 (1.272)
Countershaft	End play Diameter of needle bearing contact area Diameter of ball bearing contact area Diameter of low gear contact area Runout	0.10–0.35 (0.004–0.014) 33.000–33.015 (1.2992–1.2998) 24.980–24.993 (0.9835–0.9840) 33.984–34.000 (1.3380–1.3386) 0.04 (0.0016)	0.5 (0.02) 32.95 (1.297) 24.93 (0.981) 33.93 (1.336) 0.10 (0.004)
Countershaft low gear	I.D. End play	39.008–39.025 (1.5357–1.5364) 0.03–0.08 (0.0012–0.0031)	39.07 (1.538) 0.18 (0.007)
Countershaft second gear	I.D. End play Thickness	43.008–43.025 (1.6932–1.6939) 0.03–0.10 (0.0012–0.0039) 30.42–30.47 (1.1976–1.1996)	43.07 (1.696) 0.18 (0.007) 30.3 (1.193)
Spacer collar (Countershaft second gear)	I.D. O.D. Length	30.98–30.99 (1.2197–1.2201) 37.989–38.000 (1.4956–1.4961) 30.53–30.55 (1.2020–1.2028)	31.4 (1.236) 37.93 (1.493) 30.51 (1.201)
Spacer collar (Mainshaft fourth and fifth gears)	I.D. O.D. Length	25.002–25.012 (0.9843–0.9847) 31.989–32.000 (1.2594–1.2598) 27.03–27.08 (1.0642–1.0661)	25.06 (0.987) 31.93 (1.257) 27.01 (1.063)
Reverse idler gear	I.D. Gear-to-reverse gear shaft clearance	17.016–17.043 (0.6699–0.6710) 0.032–0.077 (0.0013–0.0030)	17.09 (0.673) 0.15 (0.006)
Synchronizer ring	Ring-to-gear clearance (ring pushed against gear)	0.73–1.18 (0.029–0.046)	0.4 (0.016)
Shift fork	Synchronizer sleeve gear Fork-to-synchronizer sleeve clearance	6.75–6.85 (0.266–0.270) 0.35–0.65 (0.014–0.026)	6.0 (0.24) 1.0 (0.04)
Reverse shift fork	End gap Fork-to-reverse idler gear clearance Groove width Fork-to-fifth/reverse shift shaft clearance	11.8–12.1 (0.46–0.48) 0.2–1.0 (0.008–0.039) 7.05–7.25 (0.278–0.285) 0.05–0.35 (0.002–0.014)	— 1.7 (0.07) — 0.5 (0.02)
Shift arm	Width of groove in shift rod guide Shift arm-to-shift rod guide Width in shift guide Shift arm-to-shift guide clearance	11.8–12.0 (0.46–0.47) 0.05–0.35 (0.002–0.014) 7.9–8.0 (0.311–0.315) 0.1–0.3 (0.004–0.012)	— 0.8 (0.03) — 0.6 (0.02)
Shift rod guide	I.D. Guide-to-shaft clearance O.D. Guide-to-fifth/reverse shift shaft clearance	14.000–14.068 (0.5512–0.5539) 0.011–0.092 (0.0004–0.0036) 11.9–12.0 (0.469–0.472) 0.2–0.5 (0.008–0.020)	— 0.15 (0.006) — 0.8 (0.03)
Selector arm	Width Arm-to-shift rod guide clearance End gap Arm-to-interlock clearance Arm-to-holder clearance	11.9–12.0 (0.469–0.472) 0.05–0.25 (0.002–0.010) 10.05–10.15 (0.396–0.400) 0.05–0.25 (0.002–0.010) 0.01–0.20 (0.004–0.0079)	— 0.5 (0.02) — 0.7 (0.03) Selection with 5 types of shims

Manual Transmission (GW) — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US.qt., Imp.qt)	2.5 (2.6, 2.2) at assembly 2.3 (2.4, 2.0) at oil change	
Mainshaft	End play Diameter of needle bearing contact area Diameter of fifth gear contact area Diameter of 62/22 ball bearing contact area Diameter of 6304 ball bearing contact area Runout	0.11–0.28 (0.004–0.007) 27.997–28.010 (1.1022–1.1028) 24.987–25.000 (0.9837–0.9840) 21.987–22.000 (0.8656–0.8661) 19.983–19.996 (0.7867–0.7872) 0.02 (0.0008) max.	— 27.94 (1.100) 24.93 (0.981) 21.93 (0.863) 19.93 (0.7846) 0.05 (0.019)
Mainshaft third gear	I.D. End Play	30.007–30.020 (1.1814–1.1819) 0.05–0.35 (0.0020–0.0138)	30.07 (1.184) —
Countershaft	End play Diameter of needle bearing contact area Diameter of ball bearing contact area Diameter of low gear contact area Runout	0.35 (0.0138) 30.004–30.017 (1.1813–1.1818) 24.9935–25.0065 (0.9840–0.9845) 31.984–32.000 (1.2592–1.2598) 0.04 (0.0016)	0.65 (0.026) 29.94 (1.179) 24.94 (0.982) 31.93 (1.257) 0.10 (0.004)
Countershaft low gear	I.D. End play	37.009–37.025 (1.4570–1.4577) 0.03–0.08 (0.0012–0.0031)	37.08 (1.460) 0.18 (0.007)
Countershaft second, third/fourth gear	I.D. End play	37.009–37.025 (1.4570–1.4577) 0.05–0.12 (0.0020–0.0047)	37.08 (1.460) 0.18 (0.007)

(cont'd)

Standards and Service Limits (cont'd)

Manual Transmission (GW—cont'd) — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Spacer collar	Second, Third I.D. O.D. Length	25.980—25.991 (1.0228—1.0233) 31.989—32.000 (1.2594—1.2598) 28.01—28.13 (1.1028—1.468)	26.04 (1.025) 31.93 (1.257) —
	Fourth I.D. O.D. Length	25.007—25.037 (0.9345—0.9857) 31.989—32.000 (1.2594—1.2598) 28.01—28.13 (1.1028—1.1074)	25.08 (0.987) 31.93 (1.257) —
Reverse idler gear	I.D. Gear-to-reverse gear shaft clearance	15.016—15.043 (0.5912—0.5922) 0.032—0.077 (0.0013—0.0030)	15.08 (0.594) 0.14 (0.006)
Synchronizer ring ring	Ring-to-gear clearance (ring pushed against gear)	0.85—1.10 (0.033—0.43)	0.4 (0.016)
Shift fork	Synchronizer sleeve gear Fork-to-synchronizer sleeve clearance	6.75—7.05 (0.2736—0.2776) 0.45—0.65 (0.018—0.026)	— 1.0 (0.039)
Reverse shift fork	End gap Fork-to-reverse idler gear clearance Groove width Fork-to-fifth/reverse shift shaft clearance	6.9—7.0 (0.27—0.28) 0.1—0.3 (0.004—0.012) 7.05—7.25 (0.278—0.285) 0.05—0.35 (0.002—0.014)	— 0.7 (0.028) — 0.5 (0.020)
Shift arm B	I.D. Shift arm-to-shift rod guide	11.8—12.0 (0.465—0.472) 0.05—0.35 (0.002—0.014)	— 0.8 (0.032)

Differential (With ZC1 Engine) — Section 17

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Ring gear	Backlash	0.14—0.20 (0.006—0.008)	0.25 (0.010)
Differential carrier	Pinion shaft bore diameter Carrier-to-pinion shaft clearance Driveshaft bore diameter Carrier-to-driveshaft clearance	18.000—18.018 (0.7087—0.7094) 0.016—0.052 (0.0006—0.0020) 28.00—28.021 (1.1024—1.1032) 0.020—0.062 (0.0010—0.0027)	18.1 (0.71) 0.1 (0.004) — 0.12 (0.005)
Differential pinion gear	Backlash Pinion gear bore diameter Pinion gear-to-pinion shaft clearance	0.05—0.15 (0.002—0.006) 18.041—18.061 (0.7103—0.7111) 0.057—0.095 (0.0022—0.0037)	0.2 (0.008) — 0.15 (0.006)

Differential (With EW2 Engine) — Section 17

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Ring gear	Backlash	0.14—0.20 (0.006—0.008)	0.25 (0.010)
Differential carrier	Pinion shaft bore diameter Carrier-to-pinion shaft clearance Driveshaft bore diameter Carrier-to-driveshaft clearance	18.000—18.018 (0.7087—0.7094) 0.016—0.052 (0.0006—0.0020) 26.005—26.025 (1.0238—1.0246) 0.020—0.066 (0.0010—0.0026)	18.1 (0.71) 0.1 (0.004) — 0.12 (0.005)
Differential pinion gear	Backlash Pinion gear bore diameter Pinion gear-to-pinion shaft clearance	0.05—0.15 (0.002—0.006) 18.041—18.061 (0.7103—0.7111) 0.057—0.095 (0.0022—0.0037)	— — 0.15 (0.006)

* KY Type

Driveshaft — Section 18

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Driveshaft	Right and Left boot as installed	469.2—474.2 (18.5—18.7)	—
	* Right boot As installed	471—476 (18.5—18.7)	—
	* Left boot As installed	771—776 (30.4—30.6)	—

* KY Type

Steering — Section 19

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Steering wheel	Play	10.0(0.39)Max	—
	Pinion-starting torque N-m(kg-m, lb-ft)	0.4—1.4 (0.04—0.14, 0.29—1.01) * 0.5—1.7 (0.03—0.19, 0.36—1.23)	— —

Suspension—Section 20

	MEASUREMENT			STANDARD(NEW)		SERVICE LIMIT	
Wheel alignment	Camber		EC	Front -10'10'±1'	Rear -0'45'±15'		
	Caster		KY	0'20'±1'			
	Toe-in		EC	2'50'±1'			
			KY	2'15'±1'			
				0±3 (0±0.118)	2±2 (0.079±0.79)		
	Steering angle	R/L	Inside Outside	41'30'±2' 34'30'±2'			
Wheel	Rim runout	Steel	Axial	0—1.0(0—0.039)		—	
			Radial	0—1.0(0—0.039)		—	
		Alumium	Axial	0—0.7(0—0.028)		—	
			Radial	0—0.7(0—0.028)		—	
Front spring	Clearance between wheel arch and ground		EC	639 (25.2)		624—654 (24.6—25.1)	
			KY	659 (25.9)		644—674(25.4—26.5)	

Brake—Section 21

	MEASUREMENT			STANDARD(NEW)		SERVICE LIMIT	
Parking brake lever	Play stroke 200N(20kg, 44 lbs)			To be locked when pulled 4—8notches			
Foot brake pedal	Pedal height			174(6.8)to floor		—	
	Free play			1—5(0.04—0.20)		5(0.20)	
Master cylinder	Piston-to-push rod clearance			0—0.4(0—0.016)			
Brake drum	I.D.			180 (7.09)		181 (7.13)	
Lining	Thickness			4.5 (0.18)		2.0 (0.08)	
Disc brake	Disc thickness		EC	19.0(0.75)		17.0(0.67)	
			KY	12.0(0.47)		10.0(0.39) (0.31)	
	Disc runout			0—0.1(0.004)		0—0.1(0.004)	
	Disc parallelism			0.007(0.0003)		0.15 (0.0006)	
	Pad thickness		EC	10.0 (0.39)		1.6 (0.06)	
			KY	9.5 (0.37)		1.6 (0.06)	
Brake Booster	Characteristic	Vacuum(mmHg)		Pedal Pressure kg(lbs)		Line Pressure kg/cm ² (psi)	
						EC	KY
		0		20(44)		15(213)min	16(228)min
		300		20(44)		47(668) min	46(654)min
		500		20(44)		67(953)min	66(939)min

Standards and Service Limits(cont'd)

Engine Electrical — Section 25, 26, 27 and 28

*EW2 Engine

Engine Electrical — Section 25, 26, 27 and 28

	MEASUREMENT	STANDARD (NEW)			
Ignition coil	Rated voltage	12 Volts			
	Performance winding resistance	1.24—1.46 ohms *1.215—1.485 ohms			
	Secondary winding resistance	8,000—12,000 ohms *9,040—13,560 ohms			
Ignition wire	Resistance	25,000 ohms max			
Spark plug	Type	Standard			
	Gap	NGK : BCPR6EY-11,BCPR6EY-N11, BCP6E-11, *BP6EY-11 ND : Q20PR-U11, *W20EX-U11 1.0—1.1(0.039—0.043)			
Ignition timing	At idling	20±2°BTDC, KS:10±2°BTDC KX:17±2° BTDC *16±2° BTDC			
Battery	Lighting capacity (20-hour ratio)	47.45 Ampere Hours			
	Starting capacity (5-specond ratio)	8.4 V minimum at 300 Ampere draw			
Alternator		ND			
	Output	14V/65A at 6,000 min ⁻¹ (rpm)			
	Coil resistance (rotor)	2.9 ohm	2.8—3.0 ohms		
	Slip ring O.D.	14.4 (0.57)	13.5 (0.53)		
Alternator belt	Brush length	10.5 (0.41)	5.5 (0.22)		
	Brush spring tension	330g (11.6 oz)	200g (7.05 oz)		
Alternator belt	Deflection midway between pulleys/load	6—9 (0.24—0.35)/98N (10kg.22 lb) for used belt 4—6 (0.16—0.24)/98N (10 kg. 22 lb) after replacement of belt			
Starting motor		ND 1.0 KW 1.4 KW		MITSUBA 1.0 KW 1.4 KW	
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT
	Mica depth	0.4—0.8 (0.016—0.031)	0.2 (0.008)	0.4—0.5 (0.016—0.020)	0.15 (0.006)
	Commutator	0—0.02 (0.0008)	0.05 (0.002)	0—0.02 (0.0008)	0.05 (0.002)
	Commutator O.D.	30.0 (1.18)	29.0 (1.14)	28.0 (1.10)	27.5 (1.08)
	Brush length	12.5—13.5 (0.49—0.53)	8.5 (0.33)	14.3—14.7 (0.56—0.58)	9.3 (0.37)
	Spring pressure (new)	1.75 kg (3.8 lb)	—	2.1 kg (4.6 lb)	—

Design Specifications

European Model

	ITEMS	METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length	3,755 mm	147.8 in.	with bumper guard
	Overall Width	3,780 mm	148.8 in.	
	Overall Height	1,630 mm	64.2 in.	
	Wheelbase	1,290 mm	50.8 in.	
	Tread Front/Rear	2,200 mm	86.6 in.	
	Ground Clearance	1,400/1,415 mm	55.1/55.7 in.	
	Seating Capacity	150 mm	5.9 in.	
		4		
		2 (KS and Norway)		
WEIGHTS	Engine Weight	105kg	232 lb.	Excludes transmission
	Curb Weight	895 kg	1,973 lb.	
		905 kg (KS)	1,996 lb.	
		900 kg (Finland, Norway)	1,985 lb.	
	Weight Distribution (F/R)	555/340 kg	1,224/750 lb.	
		565/340 kg (KS)	1,246/750 lb.	
		560/340 kg (Finland, Norway)	1,235/750 lb.	
	Max. Permissible Weight (EC)	1,270 kg	2,800 lb.	
		1,220 kg (KS)	2,690 lb.	
	Carrying (loading) Weight	45 kg	99 lb.	
GAPACITIES	Engine Oil:			
	drain and refill (with filter)	3.5 ℓ	3.7 US qt, 3.1 Imp qt	
	initial fill	4.0 ℓ	4.2 US qt, 3.4 Imp qt	
	Transmission Oil:			
	drain and refill	2.3 ℓ	2.4 US qt, 2.0 Imp qt	
	initial fill	2.4 ℓ	2.5 US qt, 2.1 Imp qt	
	Fuel Tank	41 ℓ	10.8 US gal, 9.0 Imp gal	
	Cooling System/Drain and Refill Radiator	5.6/4.5 ℓ	5.8/4.8 US qt, 4.8/4.0 Imp gal	
ENGINE	Type	Water cooled, 4-cycle D.O.H.C. 16 valves		OPEN measurement begins CLOSE measurement ends at point where valve reaches 1 mm lift.
	Cylinder Arrangement	4-cylinder in-line, transverse		
	Bore and Stroke	75 x 90 mm	2.95 x 3.54 in.	
	Compression Ratio	9.3 : 1		
	Displacement	1,590 cm³	97 cu in.	
	Valve Train	Timing belt driven, double overhead camshaft		
	Lubrication System	Trochoid pump		
	Fuel Required	Super or premium grade gasoline with 97 Research Octane Number or higher.		
	Valve Timing			
	Intake	OPEN	11° ATDC	
	CLOSE	36° ABDC		
	Exhaust	OPEN	35° BBDC	
	CLOSE	13° BTDC		
TRANS MISSION	Clutch	Single plate dry, diaphragm spring		
	Transmission	Synchronized 5 forward 1 reverse		
	Primary Reduction	Direct 1 : 1		
	Gear Ratio			
		1st	3.181	
		2nd	1.944	
		3rd	1.347	
		4th	1.033	
		5th	0.878	
		Reverse	2.916	
	Final Reduction	Single helical gear, 3.866		
	Clutch Lining Area	160 cm²	24.8 sq. in.	
STEERING	Gear Type	Rack and Pinion (Variable)		
	Overall Ratio	21.1 (19.2—21.7)		
		20.4 (18.3—21.7) (KE only)		
	Steering Wheel Diameter	370 x 360 mm	14.6 x 14.2 in.	
SUSPENSION	Front	Independent, Strut, Torsion bar spring		
	Rear	Rigid axle, Trailing arm, Coil spring		
WHEEL ALIGNMENT	Camber	Front/Rear		
		-0°10' / -0°45'		
	Caster	2°55'		
	Toe-in	Front	0 mm	
	Rear	2 mm	0.08 in.	
	Steering Axis Inclination	12°55'		
BRAKES	Type, Front	Power assisted ventilated disc		
	Type, Rear	Power assisted drum		
	Lining Surface Area Front/Rear	43.3/50.2 cm²	7.1/7.8 sq. in.	
	Effective Disc Diameter	194 mm	7.6 in.	
	Brake Drum I.D.	180 mm	7.1 in.	
	Parking Brake Type	Mechanical expanding, rear two wheel brakes		
TIRES	Size	185/60 R14 82H, 185/60VR14 (KG only)		

(cont'd)

Design Specifications

European Model

	ITEMS	METRIC	ENGLISH	NOTES
ELECTRICAL	Battery	12 V—45 AH		KE and KF
	Starter	12 V—47 AH		
	Alternator	12 V—1.4 kW		
	Fuses	12 V—60 amps		
	Main Fuses	12 A x 3, 15 A x 5, 10 A x 9		
	Headlights	55 A x 1, 45 A x 2	30 A x 1 (Sunroof)	
	Front Turn Signal Lights	12 V—60/55 W		
	Position Lights	12 V—21 W		
	Side Turn Signal Lights	12 V—5 W		
	Interior Light	12V—5W		
	Rear Turn Signal Lights	12 V—8 W		
	Stop/Tailights	12 V—21 W		
	Luggage area Light	12 V—21/5 W		
	Back-up Lights	12 V—3.4 W		
	License Lights	12 V—21 W		
	Rear Fog Lights	12 V—5 W		
		12 V—21 W		

KY Model

NOTE: Only the design specifications for models below different from those of the European model are listed. For the other items not given here, refer to the European Model design specification.

	ITEMS	METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length	3,675 mm	144.7 in.	
	Overall Width	1,625 mm	63.9 in.	
	Overall Height	1,315 mm	51.8 in.	
	Ground Clearance	185 mm	7.3 in.	
	Seating Capacity	2		
WEIGHTS	Engine Weight	90kg	198 lb.	Excludes transmission
	Curb Weight	825 kg	1,819 lb.	
	Weight Distribution (F/R)	505/320 kg	1,114/706 lb.	
GAPACITIES	Transmission Oil: initial fill	2.5 ℓ	2.6 US qt, 2.2 Imp qt	
ENGINE	Type	Water cooled, 4-cycle O.H.C.		OPEN measurement begins CLOSE measurement ends at point where valve reaches 1 mm lift.
	Cylinder Arrangement	4-cylinder in-line, transverse		
	Bore and Stroke	74 x 86.5 mm	2.91 x 34.1 in.	
	Compression Ratio	8.7 : 1		
	Displacement	1,488 cm³	91 cu in.	
	Valve Train	Timing belt driven, single overhead camshaft		
	Lubrication System	Trochoid pump		
	Fuel Required	Low-lead or regular gasoline with 91 Research Octane Number or higher.		
	Valve Timing			
	Intake	OPEN	10° ATDC	
TRANSMISSION		CLOSE	20° ABDC	
	Exhaust	OPEN	25° BBDC	
		CLOSE	10° BTDC	
	Gear Ratio	1st	2.916	
		2nd	1.764	
		3rd	1.192	
STEERING		4th	0.866	
		5th	0.718	
		Reverse	2.916	
	Final Reduction	Single helical gear, 4.250		
	Clutch Lining Area	147 cm²	22.9 sq. in.	
WHEEL ALIGNMENT	Gear Type	Rack and Pinion		
	Overall Ratio	19.5 : 1		
	Turns, lock-to-lock	4.1		
	Steering Wheel Diameter	370 x 360 mm	14.6 x 14.2 in.	
BRAKES	Camber	2°20' / -0°45'		
	Caster	2°15'		
TIRES	Type, Front	Power assisted solid disc		
	Lining Surface Area Front/Rear	36/50.2 cm²	5.6/7.8 sq. in.	
	Effective Disc Diameter	190 mm	7.5 in.	
ELECTRICAL	Size	165 SR13		
	Battery	12V—45AH		
	starter	12V—1.0 kW		
	Alternator	12V—55 amps		
	Fuses	10A, 15A, 20A		
	Main Fuse	45A, 65A		

Required Maintenance Schedule

SERVICE AT THE INTERVAL OF LISTED KM (MILES) OR MONTHS, WHICHEVER OCCURS FIRST.						
ITEMS	x 1,000 km	20	40	60	80	100
	x 1,000 miles	12	24	36	48	60
	months	12	24	36	48	60
IDLE SPEED AND IDLE CO	I	I	I	I	I	I
VALVE CLEARANCE	I	I	I	I	I	I
ALTERNATOR DRIVE BELT		I			I	
■ ENGINE OIL AND OIL FILTER	Replace every 10,000 km (6,000 miles) or 6 months					
■ TRANSMISSION OIL		R			R	
■ RADIATOR COOLANT					R ^{*1}	
COOLING SYSTEM HOSES AND CONNECTIONS		I			I	
SECONDARY AIR SUPPLY SYSTEM ^{*2}						I
AIR CLEANER ELEMENT	R ^{*2}	R	R ^{*2}	R	R	R ^{*2}
FUEL FILTER		R			R	
INTAKE AIR TEMP. CONTROL SYSTEM ^{*2}						I
TANK, FUEL LINE AND CONNECTIONS		I			I	
THROTTLE CONTROL SYSTEM ^{*2}		I			I	
CHOKE MECHANISM ^{*2}		I			I	
EVAPORATIVE EMISSION CONTROL SYSTEM						I
IGNITION TIMING AND CONTROL SYSTEM		I			I	
SPARK PLUGS (For cars using leaded gasoline)	R	R	R	R	R	R
SPARK PLUGS (For cars using unleaded gasoline)		R			R	
DISTRIBUTOR CAP AND ROTOR		I			I	
IGNITION WIRING		I			I	
CRANKCASE EMISSION CONTROL SYSTEM		I			I	
BRAKE HOSES, LINES	I	I	I	I	I	I
BRAKE FLUID		R			R	
FRONT BRAKE DISCS AND CALIPERS	I	I	I	I	I	I
FRONT BRAKE PADS	Inspect every 10,000 km (6,000 miles) or 6 months					
REAR BRAKES		I			I	
PARKING BRAKE	I	I			I	
CLUTCH RELEASE ARM TRAVEL	I	I	I	I	I	I
ENGINE EXHAUST SILENCER, SUSPENSION MOUNTING BOLTS	I	I	I	I	I	I
FRONT WHEEL ALIGNMENT	I	I	I	I	I	I
STEERING OPERATION, TIE ROD ENDS, STEERING GEAR BOX AND BOOTS	I	I			I	
CATALYTIC CONVERTER HEAT SHIELD						I

R—Replace I—Inspect. After inspection, clean, adjust, repair or replace if necessary

■ REMARK: Day to day care (such as oil, coolant check and replenishment) should be done practically according to the Owner's Manual.

*1 Thereafter, replace every 2 years or 48,000 km (30,000 miles), whichever comes first.

*2 KY type only.

CAUTION: The following items must be serviced more frequently on cars normally used under severe driving conditions. Refer to the chart below for the appropriate maintenance intervals.

"Severe driving conditions" include:

- A: Repeated short-distance driving
- B: Driving in dusty conditions
- C: Driving in severe, cold weather
- D: Driving in areas using road salt or other corrosive materials
- E: Driving on rough and/or muddy roads
- F: Towing a trailer

R—Replace

I—Inspect. After inspection, clean, adjust, repair or replace if necessary.

Condition	Maintenance item	Maintenance operation	Interval
A, B, F	Engine oil and oil filter	R	Every 5,000 km (3,000 miles) or 3 months
A, B, D, E, F	Front brake discs and calipers	I	Every 10,000 km (6,000 miles) or 6 months
A, B, C, E, F	Clutch release arm travel	I	Every 10,000 km (6,000 miles) or 6 months

Engine Removal/Installation

WARNING

- Make sure jacks and safety stands are placed properly and hoist brackets are attached to correct positions on the engine (pages 5-7 and 8).
- Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.

CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Disconnect the battery negative terminal first then the positive terminal.
2. Unbolt the hood brackets and remove the hood.
 - Disconnect the washer fluid tube.

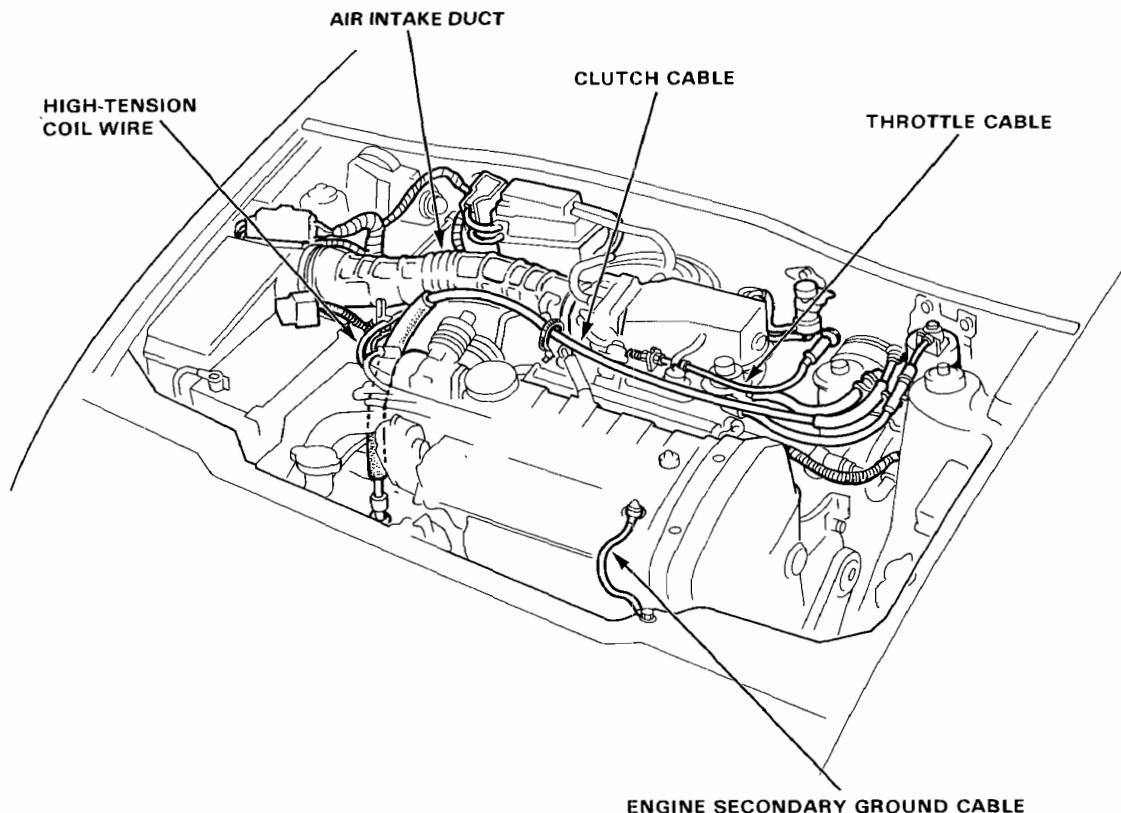
CAUTION: Use care when storing the hood to avoid damaging the paint.

3. Drain the engine oil. Remove the oil filler cap to speed draining. Reinstall the drain plug with a new washer.
4. Drain the coolant from the radiator into a clean pan so it may be re-used. Remove the radiator cap to speed draining.

WARNING

Use care when removing radiator cap to avoid scalding by hot coolant or steam.

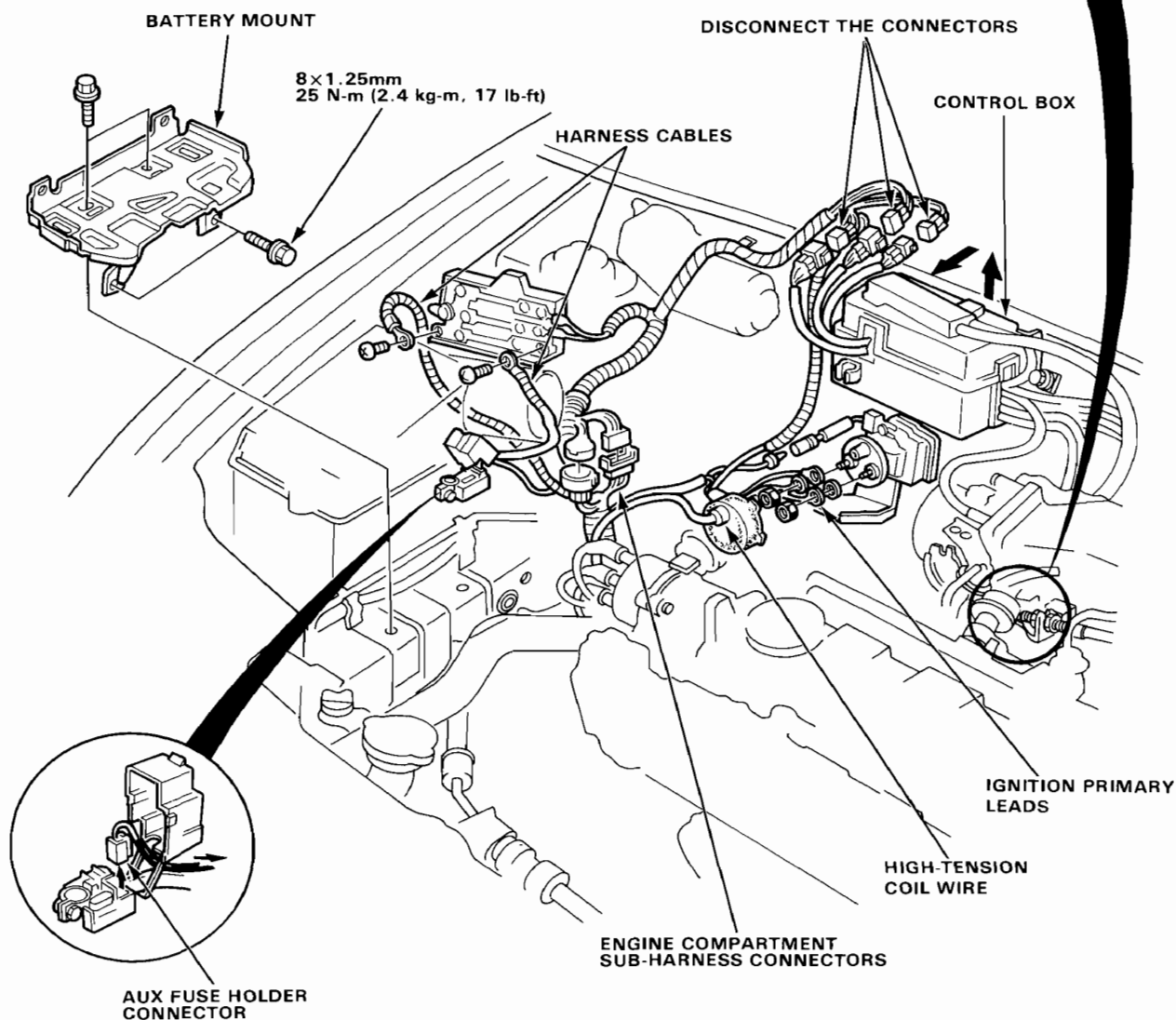
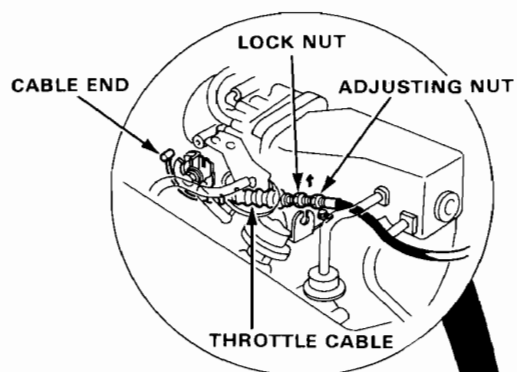
5. Drain transmission oil/fluid. Use a 3/8" drive socket wrench to remove the drain plug. Remove the oil filler plug to speed draining. Reinstall the drain plug with a new washer.
6. Remove the air intake duct.





7. Remove the throttle cable by loosening the lock nut and the throttle cable adjusting nut, then slip the cable end out of the throttle bracket and accelerator linkage.

NOTE: Take care not to bend the cable when removing it. Do not use pliers to remove the cable from the linkage. Always replace a kinked cable with a new one.



(cont'd)

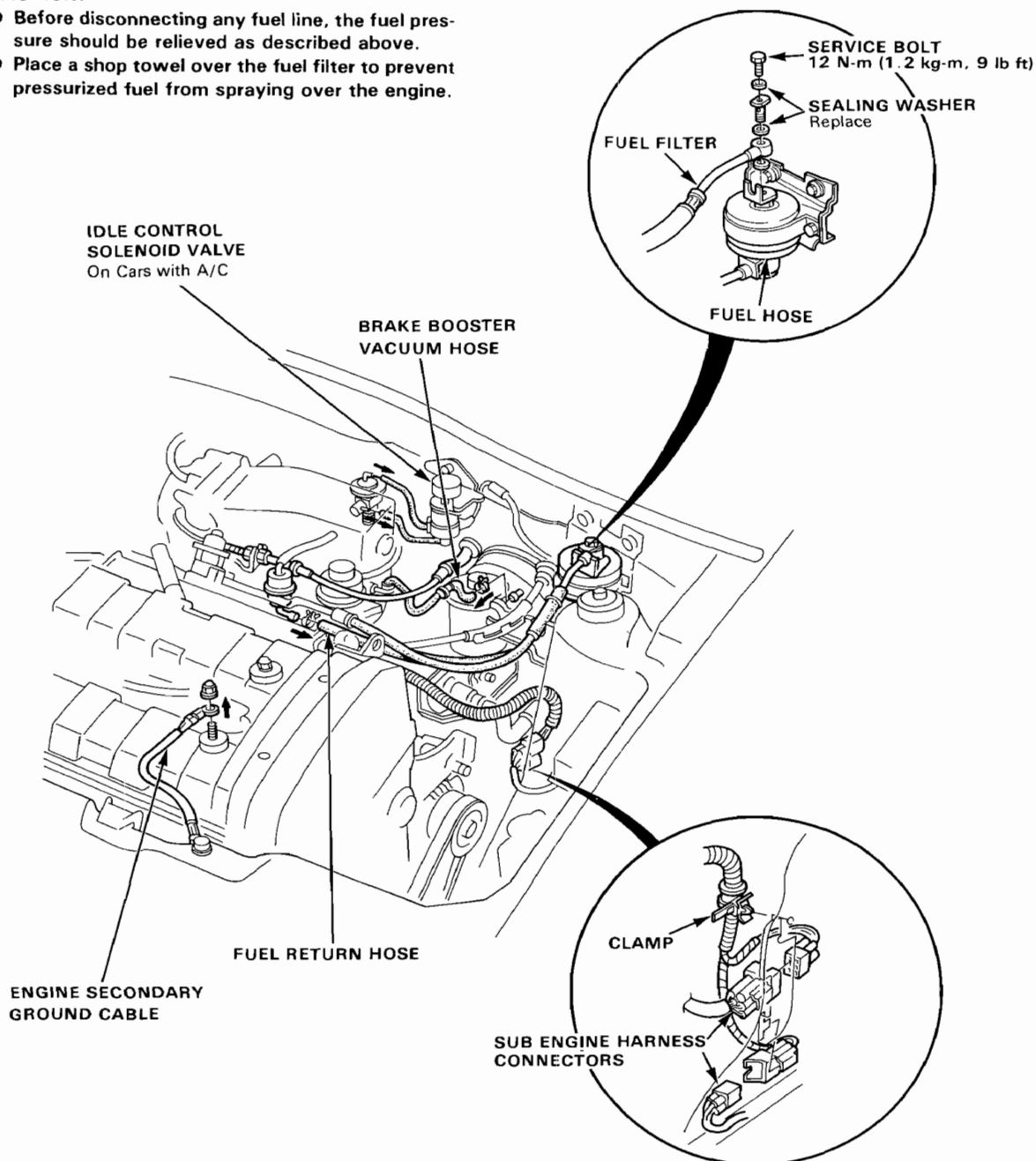
Engine Removal/Installation (cont' d)

8. Relieve fuel pressure by slowly, loosening the service bolt on the fuel filter about one turn.

WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

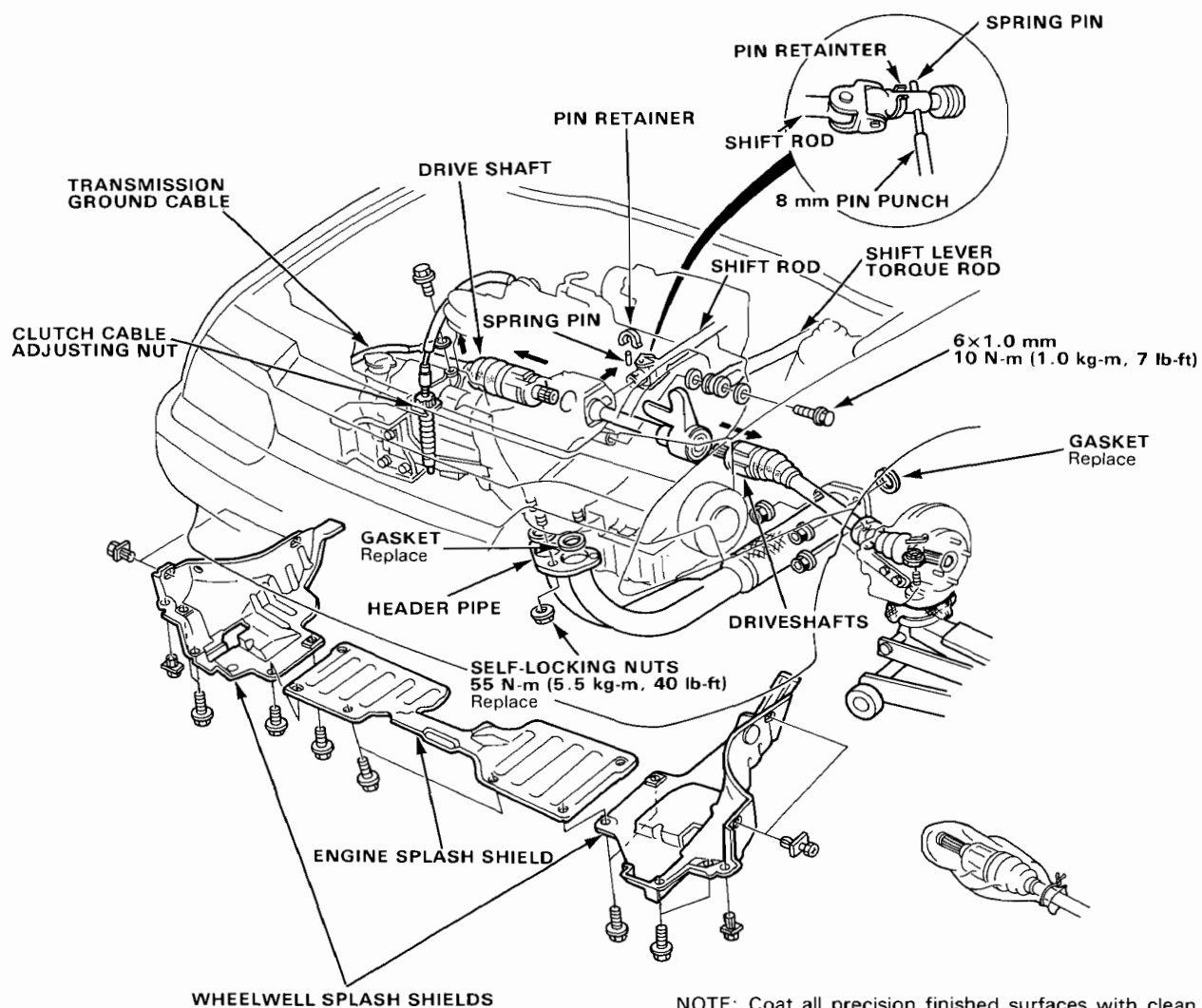
CAUTION:

- Before disconnecting any fuel line, the fuel pressure should be relieved as described above.
- Place a shop towel over the fuel filter to prevent pressurized fuel from spraying over the engine.





NOTE: On reassembly, slide the retainer back into place after driving in the spring pin.

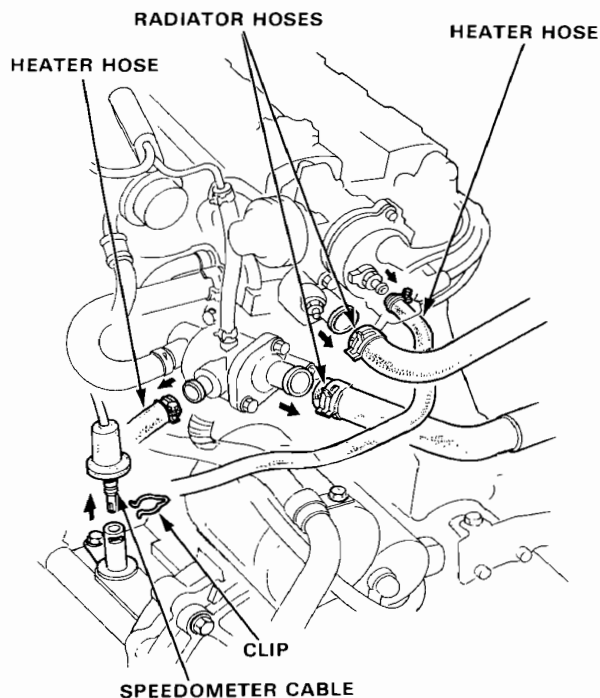


NOTE: Coat all precision finished surfaces with clean engine oil or grease. Tie plastic bags over the drive shaft ends.

(cont'd)

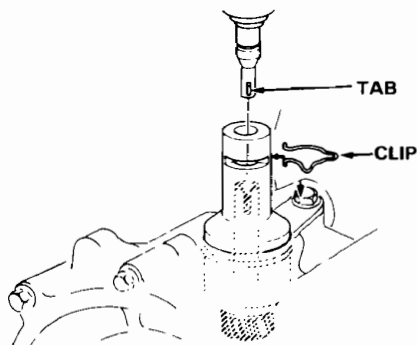
Engine Removal/Installation (cont'd)

9. Disconnect the radiator hoses and heater hoses.



10. Remove the speedometer cable.

CAUTION: Do not remove the holder because the speedometer gear may fall into the transmission housing.



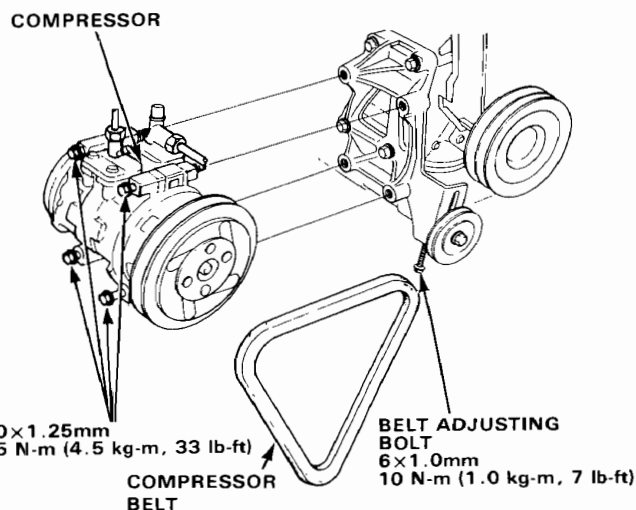
During Installation:

- Align tab on cable end with slot in holder.
 - Install clip so bent leg is on groove side.
- After installing, pull speedometer cable to make sure it is secure.

11. On Cars with A/C:

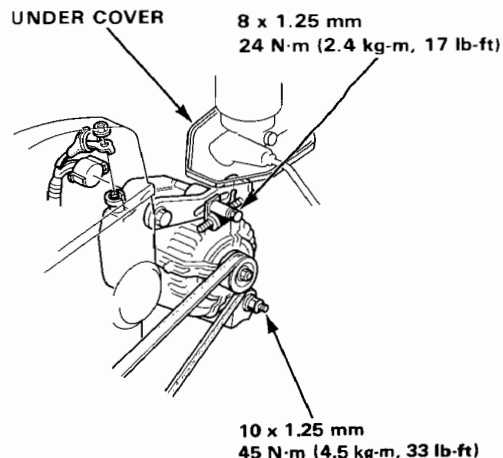
- Loosen the belt adjusting bolt and idler pulley nut.
- Remove the compressor mounting bolts, then lift the compressor out of the bracket with hoses attached, and wire it up to the front beam.

NOTE: The compressor can be moved without discharging the air conditioner system.



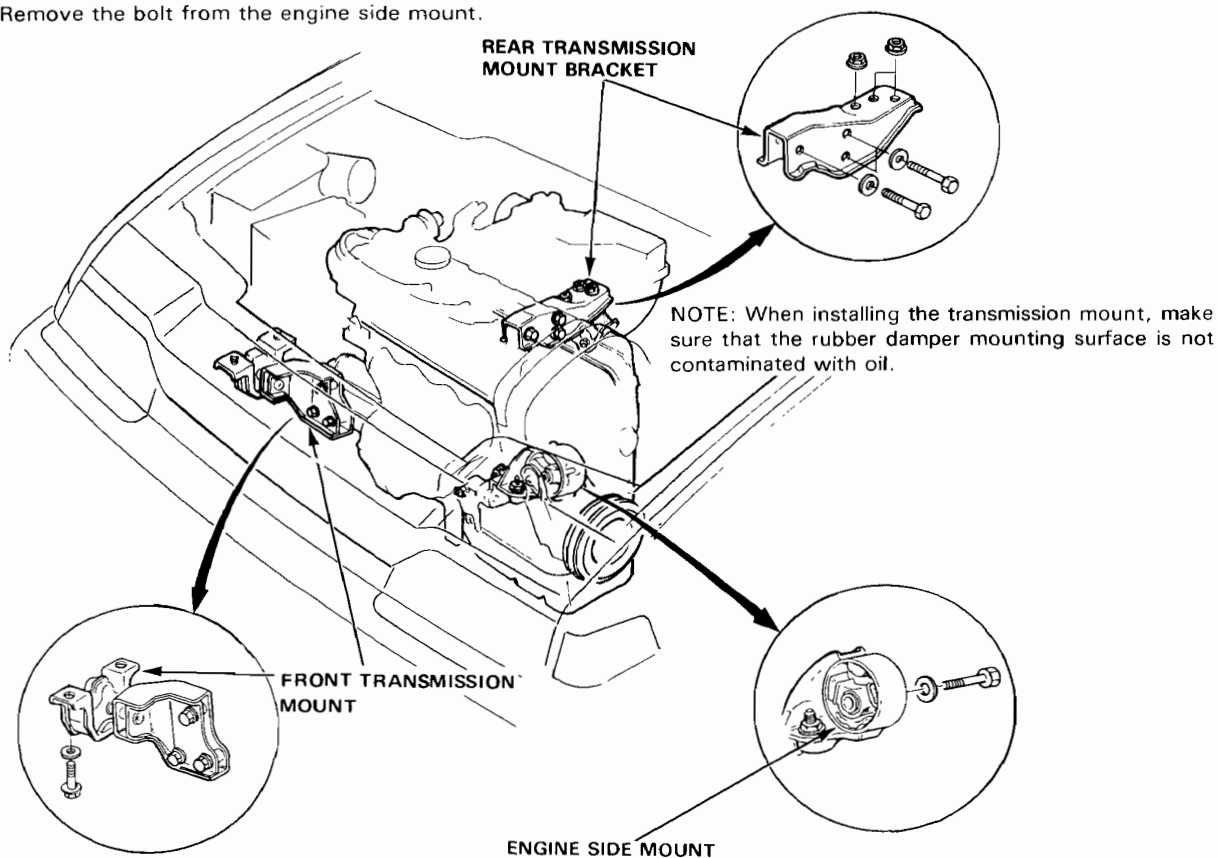
12. Remove the alternator:

- Disconnect the alternator wire harness connectors.
- Remove the belt adjusting bolt and remove the belt.
- Remove the alternator mount bolt and remove the alternator.





13. Attach a hoist chain to the engine block hoist brackets and raise the hoist just enough to remove slack from the chain with slight tension.
14. Remove the rear transmission mount bracket.
15. Remove the bolts from the front transmission mount.
16. Remove the bolt from the engine side mount.



17. Check that the engine/transaxle is completely free of vacuum, fuel, and coolant hoses, and electrical wires.
18. Slowly raise the engine approximately 6" and stop. Check once again that all wires and hoses have been disconnected from engine/transaxle.
19. Raise engine all the way and remove it from the car.

(cont'd)

Engine Removal/Installation (cont'd)

20. Install the engine in the reverse order of removal.
After the engine is in place:

- Torque engine mount bolts in sequence shown.

CAUTION: Failure to tighten the bolts in the proper sequence can cause excessive noise and vibration, and reduce bushing life: check that the bushings are not twisted or offset.

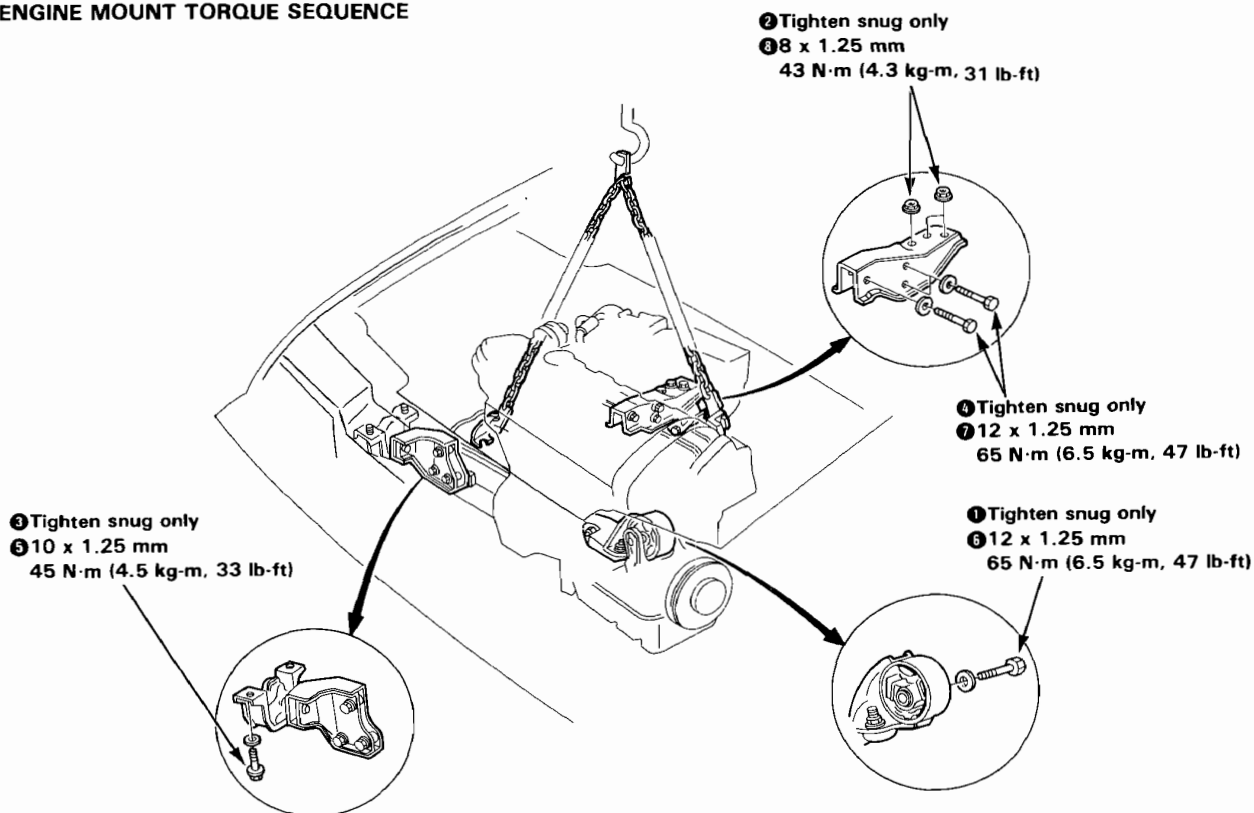
- Check that the spring clip on the end of each driveshaft clicks into place.

CAUTION: Use new spring clips on installation.

- Inspection for fuel leakage.
 - After assembling fuel line parts, turn on the ignition switch (do not operate the starter) so that the fuel pump is operated for approximately two seconds and the fuel is pressurized. Repeat this operation two or three times and check whether any fuel leakage has occurred at any point in the fuel line.

- Bleed air from the cooling system at the bleed bolt with the heater valve open.
- Adjust the throttle cable tension.
- Adjust the alternator belt tension.
- Check the clutch pedal free play.
- Check that the transmission shifts into gear smoothly.
- Reinstall the A/C compressor and A/C wiring.
- Clean battery posts and cable terminals with sandpaper, assemble, then apply grease to prevent corrosion.

ENGINE MOUNT TORQUE SEQUENCE

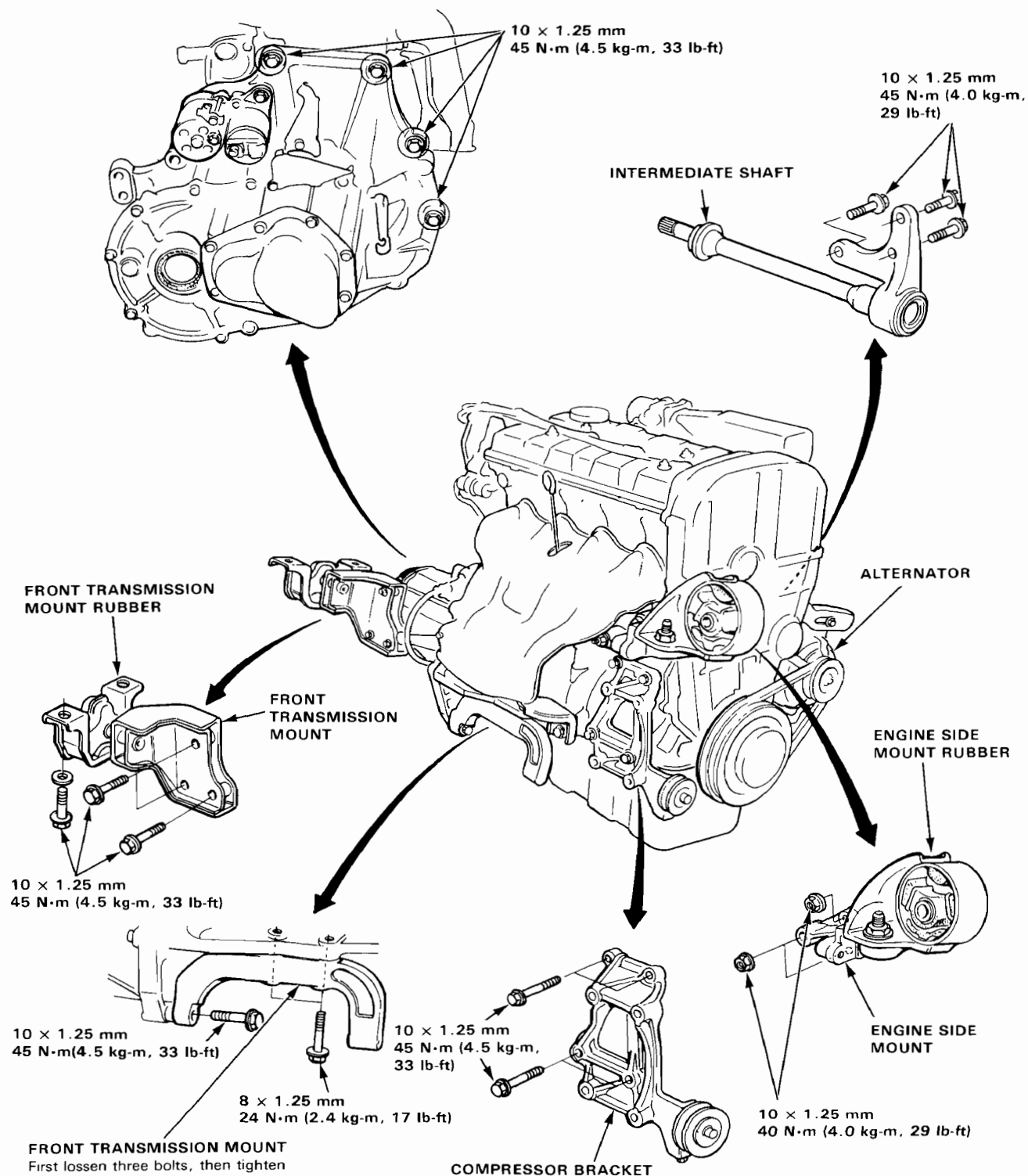


NOTE: Check the side mount and bracket for damage.



Index (Engine)

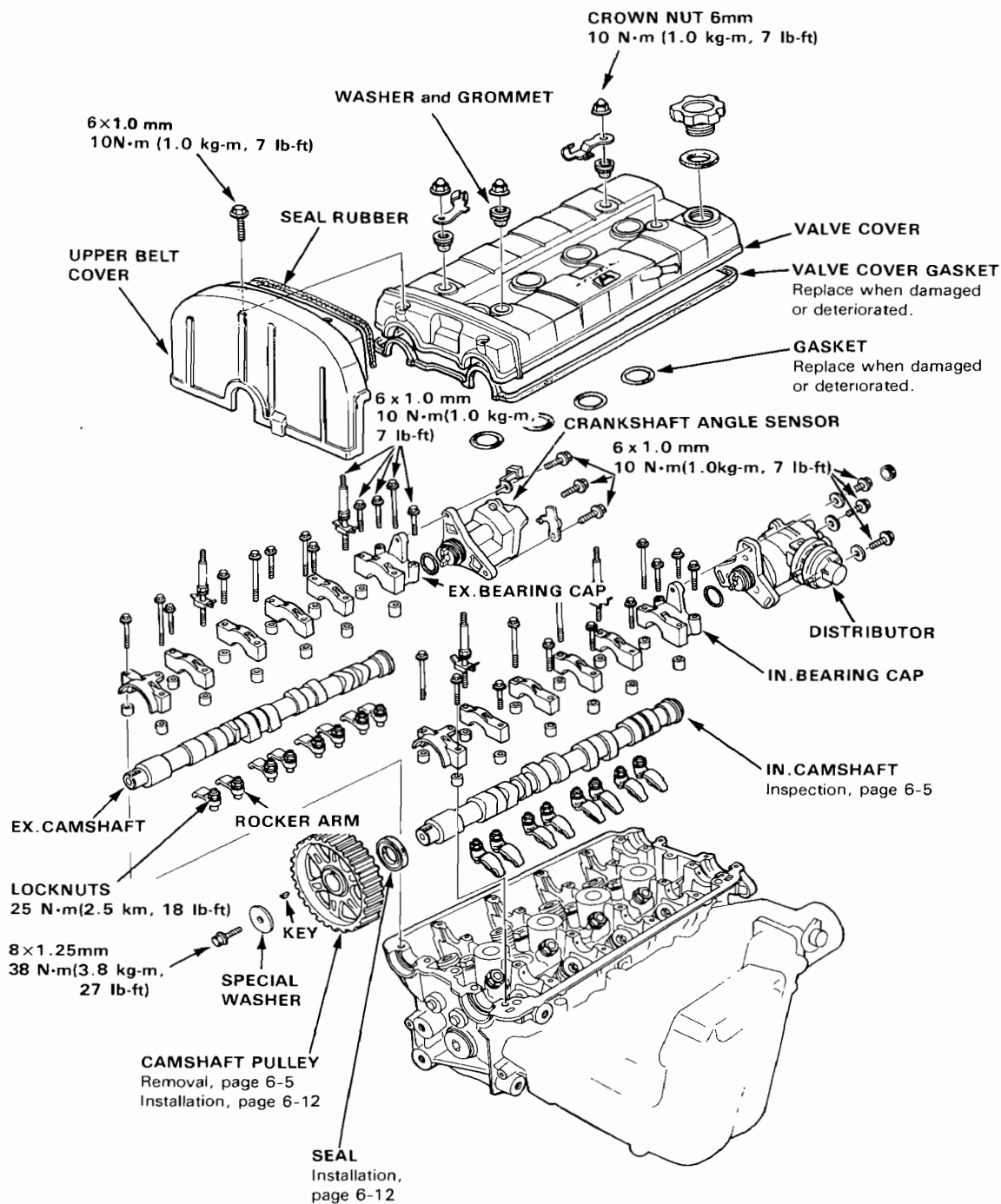
NOTE: For manifold replacement, refer to Section 9.



Cylinder Head/Valve Train

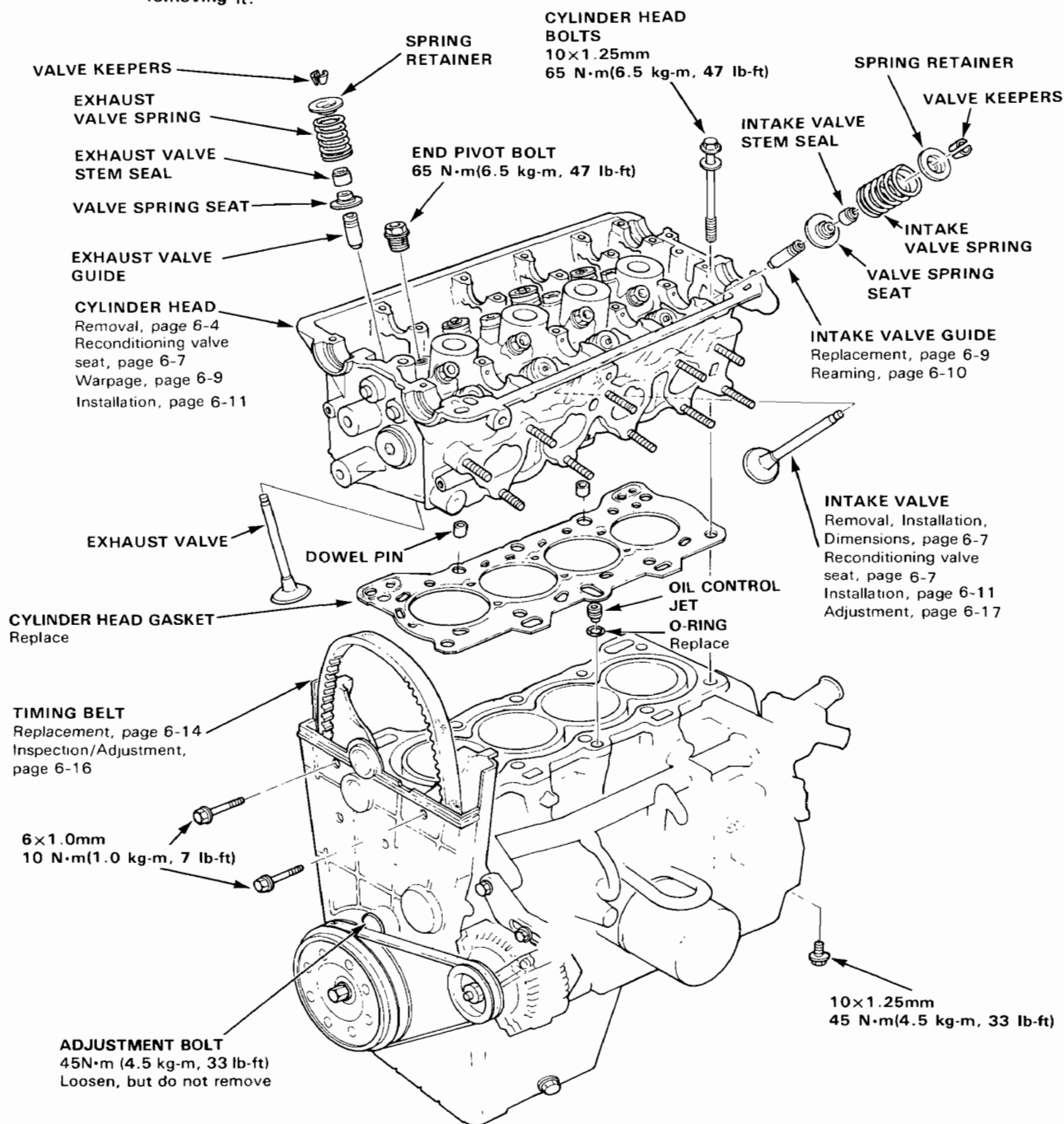
Illustrated Index

NOTE: Use new O-rings and gaskets whenever reassembling.





CAUTION: To avoid damaging the cylinder head, wait until the coolant temperature drops below 38°C (100°F) before removing it.



Cylinder Head

Removal (engine removal not required)

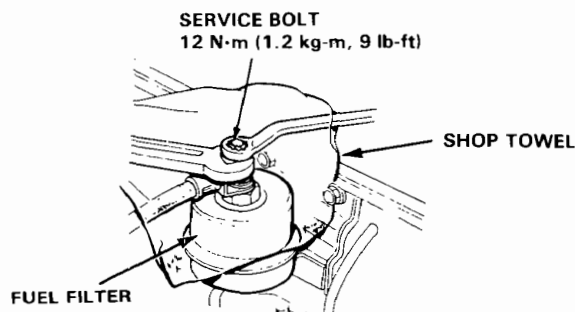
CAUTION: Do not remove the cylinder head until the coolant temperature drops below 38°C (100°F).

NOTE:

- Inspect the timing belt before removing the cylinder head.
- Before removal of the cylinder head, turn the flywheel so that the No.1 cylinder is at top-deadcenter (page 6-15).
- Mark all emissions hoses before disconnecting them.

1. Disconnect the negative terminal from the battery.
2. Drain the cooling system.
3. Disconnect the air intake duct and vacuum hose (page 5-2).
4. Relieve fuel pressure.

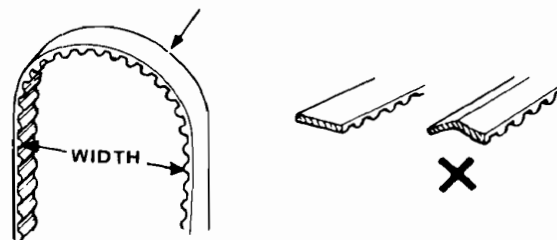
WARNING Do not smoke while working on fuel system, keep open flame or spark away from work area.



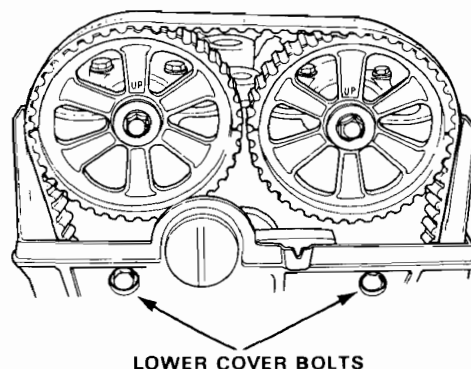
5. Disconnect the fuel hose and fuel return hose (page 5-3).
6. Remove the engine secondary ground cable from the valve cover.
7. Remove the brake booster vacuum tube from the intake manifold.
8. Disconnect the throttle cable at the throttle body (page 5-4).
9. Remove the spark plug caps from the spark plugs, then remove the distributor assembly.
10. Disconnect the hoses from the charcoal canister.
11. Disconnect the No. 1 control box emission hoses from the tubing manifold.
12. On cars equipped with air conditioning, disconnect the idle control solenoid hoses.
13. Disconnect the engine sub harness connectors and couplers from the cylinder head and intake manifold.
 - Four injector couplers
 - TA sensor connector
 - TW sensor connector
 - Ground terminals
 - Throttle sensor connector
 - Crankshaft angle sensor coupler.

14. Disconnect the oxygen sensor coupler.
15. Disconnect the upper radiator hose, heater inlet hose, and bypass inlet hose from the cylinder head (page 5-6).
16. Remove the hose between the thermostat housing and the intake manifold.
17. Remove the bolts attaching the exhaust manifold and bracket; then remove the manifold.
18. Remove the bolts attaching the intake manifold and bracket.
19. Disconnect the hose from the intake manifold to the breather chamber.
20. Remove the valve cover and the timing belt upper cover.
21. Loosen the tensioner adjustment bolt, then remove the timing belt.

CAUTION: Do not crimp or bend timing belt more than 90° or to less than 25 mm (1 in.) in diameter.



22. Remove the timing belt lower cover bolts, which are tightened to the cylinder head.



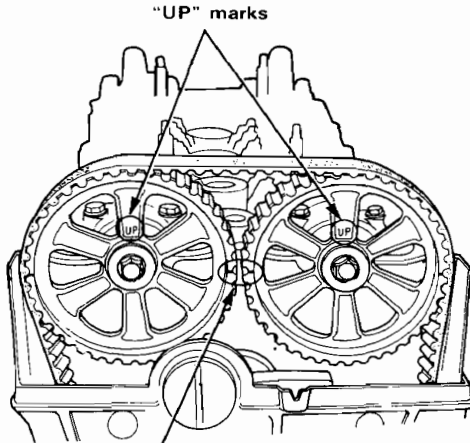
23. Remove the camshaft holder bolts, then remove the camshaft holders and the camshafts and rocker arms.
24. Remove the cylinder head bolts, then remove the cylinder head.

CAUTION: To prevent warpage, unscrew the bolts 1/3 turn each at a time; repeat the sequence until all bolts are loose.
25. Remove the exhaust manifold and intake manifold from the cylinder head.

Camshaft Pulley

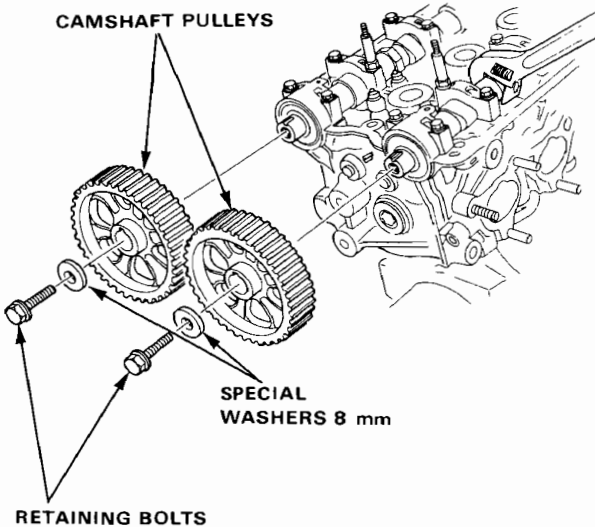
Removal

1. To ease reassembly, turn the pulley until the "UP" marks face up, and the front timing marks are aligned with the both marks on the pulley.



Align the marks on the pulleys

2. Remove the pulley retaining bolts and washers, then remove the pulleys.



NOTE: Before removing camshaft check camshaft end play.

Camshaft

Inspection

NOTE: Do not rotate camshaft during inspection.

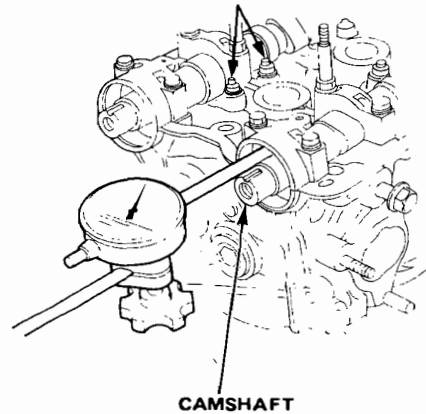
1. Loosen the adjusting screws.
2. Seat camshaft by prying it toward distributor end of head with screwdriver.
3. Zero dial indicator against the pulley end of the camshaft, then pry camshaft back toward it, and read end play.

Camshaft End Play:

Standard (New): 0.05—0.15 mm
(0.002—0.006 in.)

Service Limit: 0.5 mm (0.02 in.)

Unscrew the adjusting screws



4. Remove the bearing cap bolts from the cylinder head.

NOTE: Unscrew the bearing cap bolts, two turns at a time, in a criss-cross pattern, to prevent damaging valves or rocker arms.

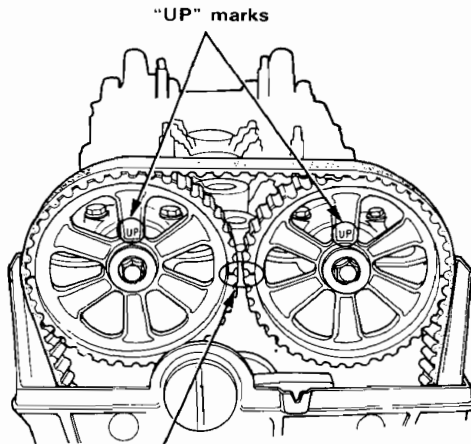
- Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.
- Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.
- Insert plastigage strip across each journal.
- Install the bearing caps and torque bolts to values and in sequence shown on page 6-13.

(cont'd)

Camshaft Pulley

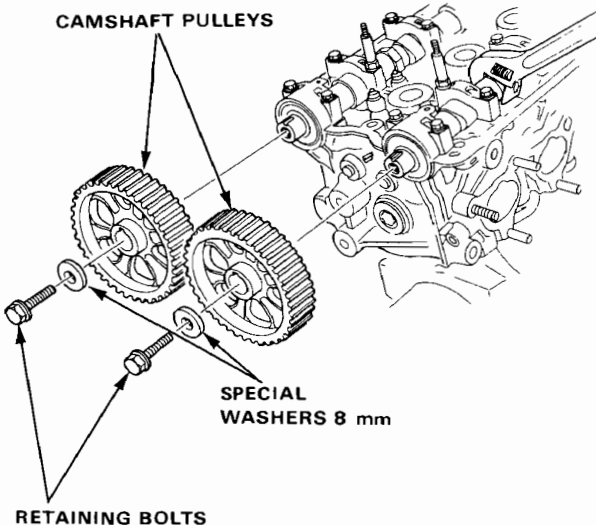
Removal

1. To ease reassembly, turn the pulley until the "UP" marks face up, and the front timing marks are aligned with the both marks on the pulley.



Align the marks on the pulleys

2. Remove the pulley retaining bolts and washers, then remove the pulleys.



NOTE: Before removing camshaft check camshaft end play.

Camshaft

Inspection

NOTE: Do not rotate camshaft during inspection.

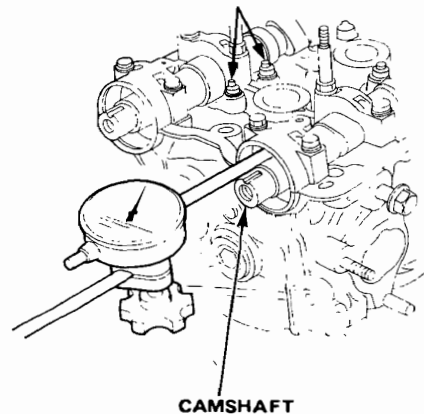
1. Loosen the adjusting screws.
2. Seat camshaft by prying it toward distributor end of head with screwdriver.
3. Zero dial indicator against the pulley end of the camshaft, then pry camshaft back toward it, and read end play.

Camshaft End Play:

Standard (New): 0.05—0.15 mm
(0.002—0.006 in.)

Service Limit: 0.5 mm (0.02 in.)

Unscrew the adjusting screws



4. Remove the bearing cap bolts from the cylinder head.

NOTE: Unscrew the bearing cap bolts, two turns at a time, in a criss-cross pattern, to prevent damaging valves or rocker arms.

- Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.
- Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.
- Insert plastigage strip across each journal.
- Install the bearing caps and torque bolts to values and in sequence shown on page 6-13.

(cont'd)

Camshaft

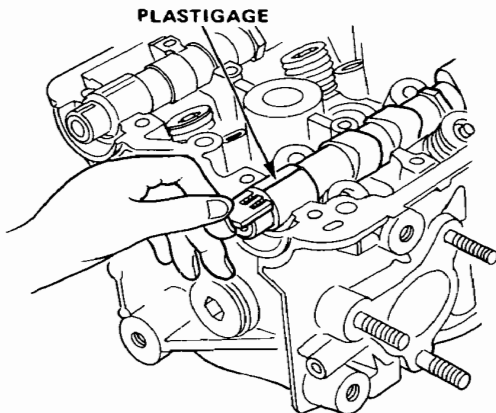
Inspection (cont'd)

5. Measure widest portion of plastigage on each journal.

Camshaft Bearing Radial Clearance:

Standard (New): 0.050–0.089 mm
(0.002–0.004 in.)

Service Limit: 0.15 mm (0.006 in.)



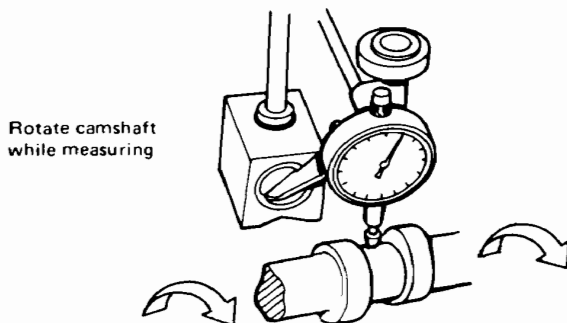
6. If camshaft bearing radial clearance is out of tolerance:

- And camshaft has already been replaced, you must replace the cylinder head.
- If camshaft has not been replaced, first check total runout with the camshaft supported on V-blocks.

Camshaft Total Runout:

Standard (New): 0.03 mm (0.001 in.)

Service Limit: 0.06 mm (0.002 in.)



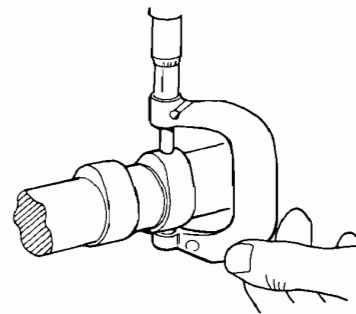
- If the total runout of the camshaft is within tolerance, replace the cylinder head.

- If the total runout is out of tolerance replace the camshaft and recheck. If the bearing clearance is still out of tolerance, replace the cylinder head.

7. Measure camshaft height.

Intake Standard: 32.982 mm (1.2985 in.)

Exhaust Standard: 32.342 mm (1.2733 in.)



Valves

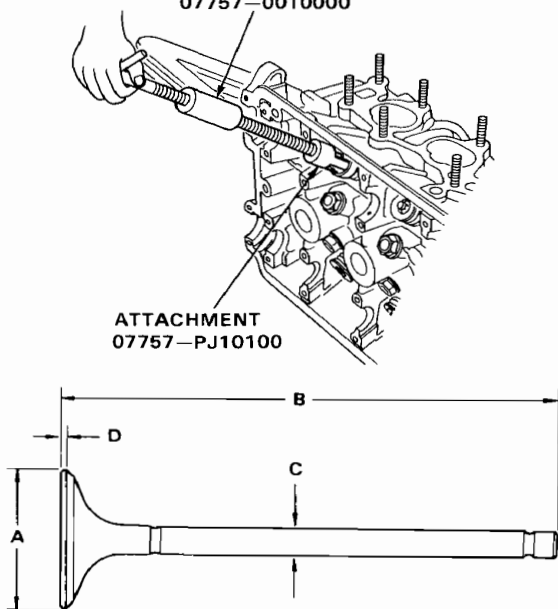
Replacement

NOTE: Identify valves and valve springs as they are removed so that each item can be reinstalled in its original position.

1. Tap each valve stem with a plastic mallet to loosen valve keepers before installing spring compressor.
2. Install spring compressor. Compress spring and remove valve keepers.

VALVE SPRING COMPRESSOR
07757-0010000

ATTACHMENT
07757-PJ10100



Intake Valve Dimensions

- A Standard(New): 29.9—30.1mm
(1.177—1.185 in.)
- B Standard(New): 105.18—105.48mm
(4.141—4.153 in.)
- C Standard(New): 6.58—6.59mm
(0.2591—0.2594 in.)
- C Service Limit: 6.55mm (0.258 in.)
- D Standard(New): 1.05—1.35mm
(0.041—0.053 in.)
- D Service Limit: 1.00mm (0.039 in.)

Exhaust Valve Dimensions

- A Standard(New): 26.9—27.1mm
(1.059—1.067 in.)
- B Standard(New): 104.47—104.77mm
(4.113—4.125 in.)
- C Standard(New): 6.55—6.56mm
(0.2579—0.2583 in.)
- C Service Limit: 6.52mm (0.257 in.)
- D Standard(New): 1.65—1.95mm
(0.065—0.077 in.)
- D Service Limit: 1.45mm (0.057 in.)

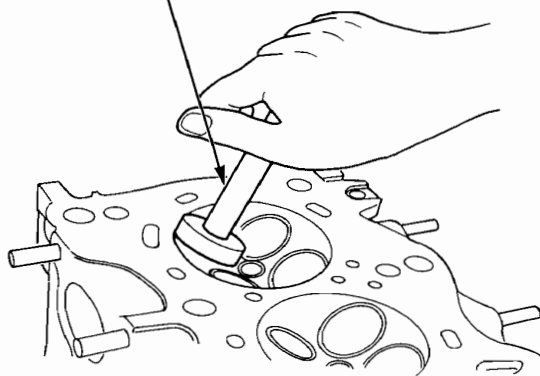
Valve Seat

Reconditioning

1. Renew the valve seats in cylinder head using a valve seat cutter.

NOTE: If guides are worn (page 6-8), replace them (page 6-9) before cutting valve seats.

VALVE SEAT CUTTER

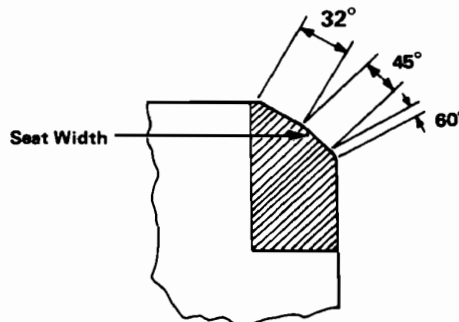


CUTTER	INTAKE	EXHAUST
32°	07780-0012200	07780-0012200
60°	07780-0014000	07780-0014000
45°	07780-0010800	07780-0010300
HOLDER	07781-0010201 and 07781-0010301	

2. Bevel the upper edge of seat with the 32° cutter until required seat width is obtained.
3. Bevel the inner edge of seat slightly with the 60° cutter.
4. Carefully center 45° cutter. Remove as little material as possible. (See measurement after reconditioning shown below.)

Valve Seat Width:

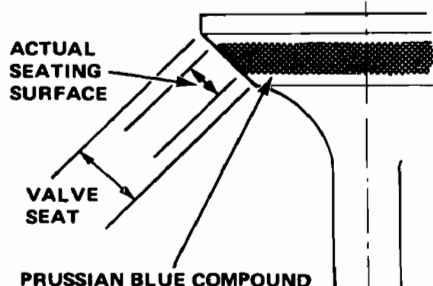
- Standard:** 1.25—1.55 mm (0.049—0.061 in.)
- Service Limit:** 2.0 mm (0.08 in.)



Valve Seat

Reconditioning (cont'd)

- After resurfacing seat, inspect for even valve seating: Apply Prussian blue compound to valve face, and insert valve in original location in head, then lift it and snap it closed against seat several times.



- The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
 - If it is too high (closer to the valve stem), you must make a second cut with the 60° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
 - If it is too low (closer to valve edge), you must make a second cut with the 32° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

NOTE: The final cut should always be made with the 45° cutter.

- Insert intake and exhaust valves in head and measure valve stem installed height.

Intake Valve Stem Installed Height:

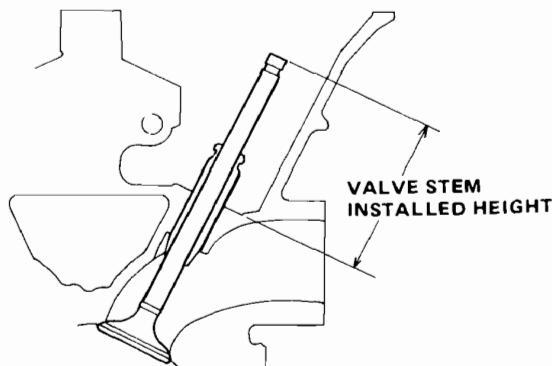
Standard(New): 45.78mm (1.802 in.)

Service Limit: 46.57mm (1.833 in.)

Exhaust Valve Stem Installed Height:

Standard(New): 44.97mm (1.770 in.)

Service Limit: 45.76mm (1.802 in.)



- If valve stem installed height is over service limit, replace valve and recheck. If still over service limit, replace cylinder head; the valve seat in the head is too deep.

Valve Guide-to-Valve Stem Clearance

- Measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).

Intake Valve Stem-to-Guide Clearance

Standard (New): 0.04–0.10 mm

(0.0015–0.004 in.)

Service Limit: 0.16 mm (0.006 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard (New): 0.10–0.16 mm

(0.004–0.006 in.)

Service Limit: 0.22 mm (0.008 in.)

Valve extended 10 mm out from seat.



- If measurement exceeds the service limit, re-check using new valve.
- If measurement is now within service limit, re-assemble using new valve.
- If measurement still exceeds limit, recheck using alternate method below, then replace valve and guide, if necessary.

NOTE: An alternate method of checking guide to stem clearance is to subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge.

Take the measurements in three places along the valve stem and three places inside the valve guide. The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit

Intake Valve Stem-to Guide Clearance

Standard(New): 0.02–0.05mm

(0.001–0.002 in.)

Service Limit: 0.08–(0.003 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard(New): 0.05–0.08mm

(0.002–0.003 in.)

Service Limit: 0.11mm (0.004 in.)

Cylinder Head

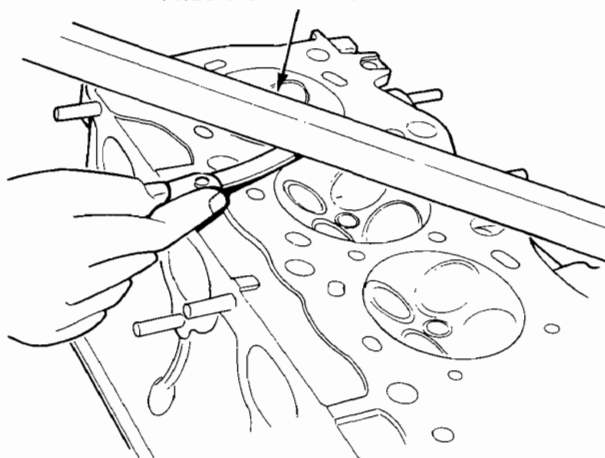
Warpage

NOTE: If camshaft bearing clearances (page 6-5) are not within specification, the head cannot be resurfaced.

If camshaft bearing radial clearances are within specifications, check head for warpage.

- If warpage is less than 0.05 mm (0.002 in.) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in.) and 0.2 mm (0.008 in.), resurface cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in.) based on height of 132.0 mm (5.20 in.)

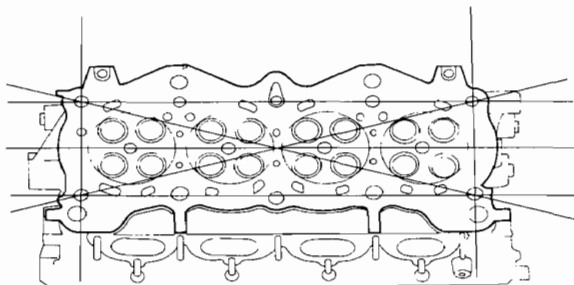
PRECISION STRAIGHT EDGE



Cylinder Head Height:

New: 132.0 mm (5.20 in.)
Service Limit: 131.8 mm (5.19 in.)

Measure along edges, and 3 ways across center.



Valve Guide

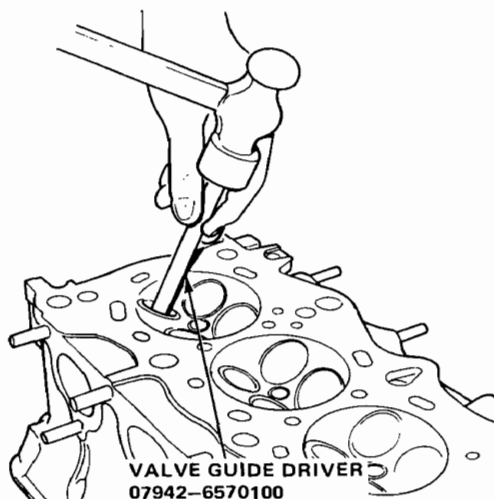
Replacement

NOTE:

- For best results, heat cylinder head to 150°C (300 °F) before removing or installing guides.
- It may be necessary to use an air hammer to remove some valve guides.

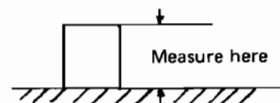
CAUTION: To avoid burns, use heavy gloves when handling heated cylinder head.

1. Drive the valve guide out from the bottom of the cylinder head.



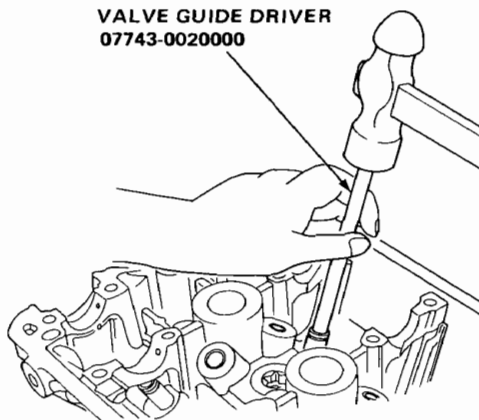
2. Drive in a new valve guide to the specified depth.

Intake: 20.0 mm (0.79 in.)
Exhaust: 19.0 mm (0.75 in.)



NOTE: If using adjustable valve guide driver 07743-0020000, adjust the collar depth to correspond with the measurements given above.

VALVE GUIDE DRIVER
07743-0020000



Cylinder Head

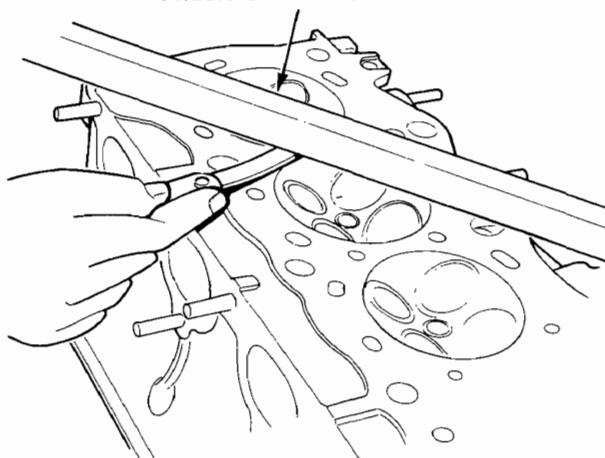
Warpage

NOTE: If camshaft bearing clearances (page 6-5) are not within specification, the head cannot be resurfaced.

If camshaft bearing radial clearances are within specifications, check head for warpage.

- If warpage is less than 0.05 mm (0.002 in.) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in.) and 0.2 mm (0.008 in.), resurface cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in.) based on height of 132.0 mm (5.20 in.)

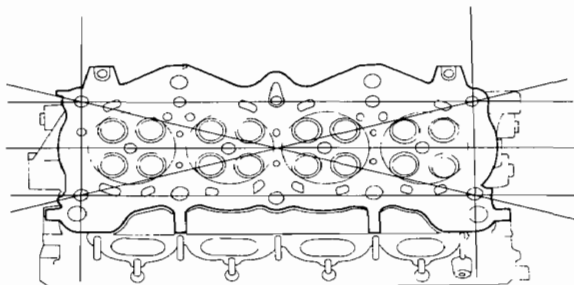
PRECISION STRAIGHT EDGE



Cylinder Head Height:

New: 132.0 mm (5.20 in.)
Service Limit: 131.8 mm (5.19 in.)

Measure along edges, and 3 ways across center.



Valve Guide

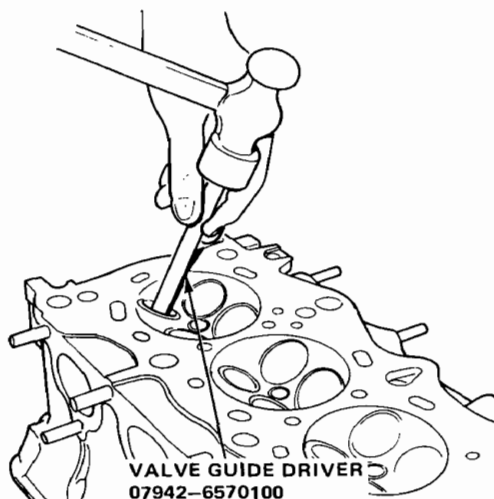
Replacement

NOTE:

- For best results, heat cylinder head to 150°C (300 °F) before removing or installing guides.
- It may be necessary to use an air hammer to remove some valve guides.

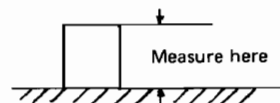
CAUTION: To avoid burns, use heavy gloves when handling heated cylinder head.

1. Drive the valve guide out from the bottom of the cylinder head.



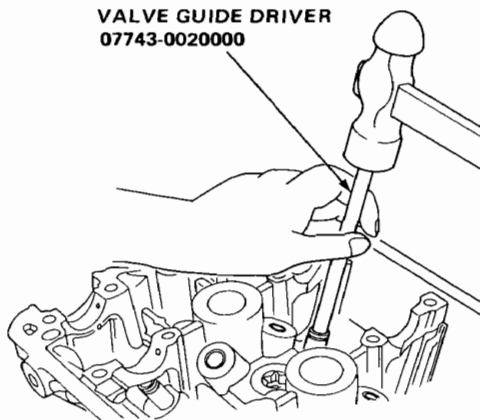
2. Drive in a new valve guide to the specified depth.

Intake: 20.0 mm (0.79 in.)
Exhaust: 19.0 mm (0.75 in.)



NOTE: If using adjustable valve guide driver 07743-0020000, adjust the collar depth to correspond with the measurements given above.

VALVE GUIDE DRIVER
07743-0020000

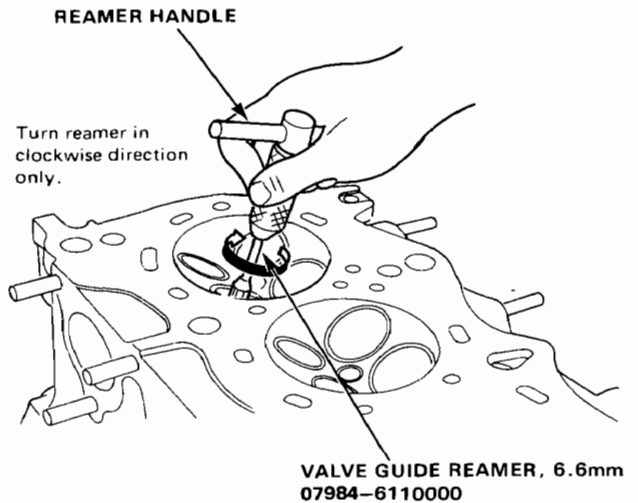


Valve Guide and Valve Spring

Valve Guide Reaming

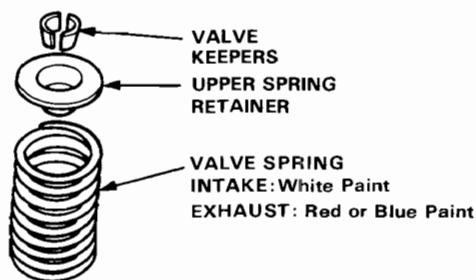
NOTE: For new valve guides only.

1. Coat reamer and valve guide with cutting oil.
2. Rotate reamer clockwise the full length of the valve guide bore.
3. Continue to rotate reamer clockwise while removing.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check clearance with valve (page 6-8).

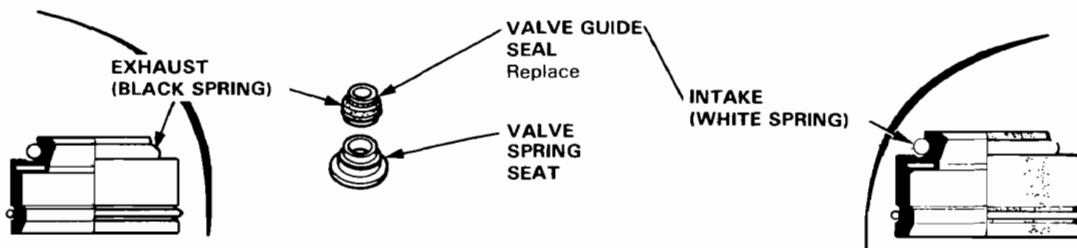


Valve Spring Installation Sequence

NOTE: Exhaust and intake valve guide seals are NOT interchangeable.



CAUTION: Place the valve springs so the closely wound coils are toward the cylinder head.

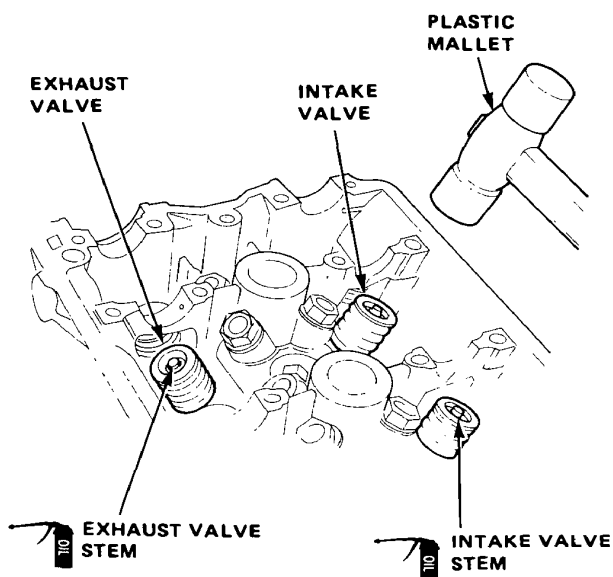


Valves

Installation

When installing valves in cylinder head, coat valve stems with oil before inserting into valve guides, and make sure valves move up and down smoothly.

When valves and springs are in place, lightly tap the end of each valve stem two or three times to ensure proper seating of valve and valve keepers (use plastic mallet).



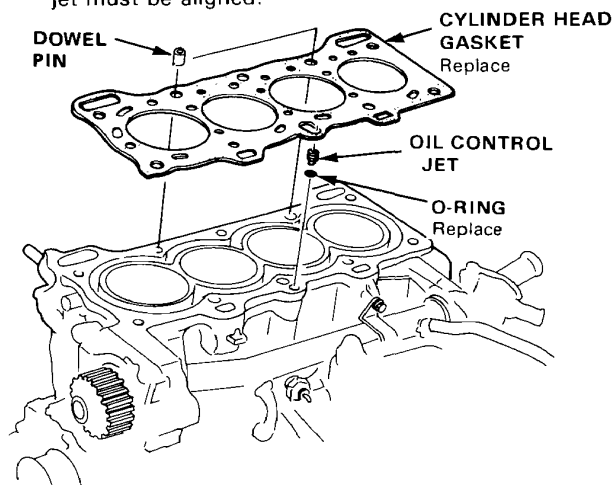
Cylinder Head

Installation

1. Install the cylinder head in reverse order of removal:

- Always use a new head gasket.
- Cylinder head and engine block surface must be clean.
- "UP" mark on timing belt pulley should be at the top.

NOTE: Cylinder head dowel pins and oil control jet must be aligned.

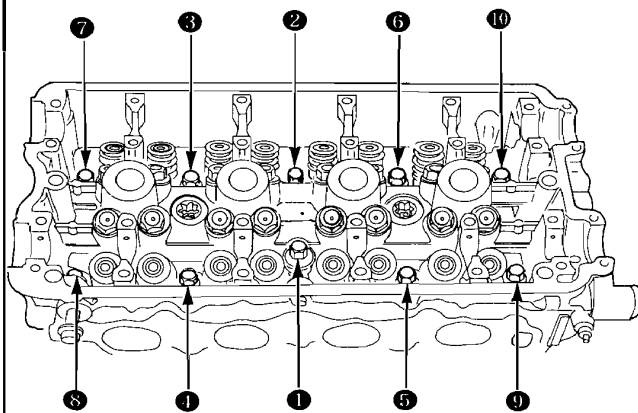


2. Tighten cylinder head bolts and nuts in two steps. In the first step tighten all bolts and nuts, in sequence, to about 30 N·m (3.0 kg-m, 22 lb-ft); in the final step tighten, in same sequence, to 65 N·m (6.5kg-m, 47 lb-ft)

NOTE:

- Apply engine oil to the cylinder head bolts and the washers.
- Use the longer bolt at the position No.8 as shown.

CYLINDER HEAD BOLTS TORQUE SEQUENCE



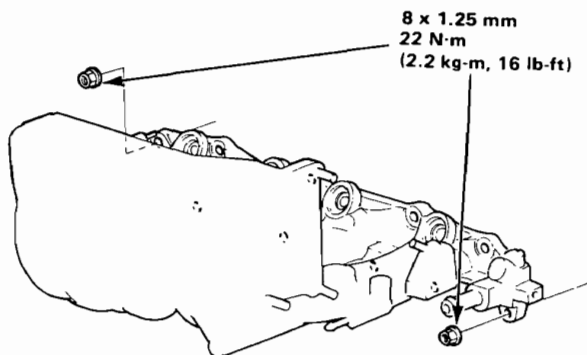
NOTE: Put longer bolt here.

(cont'd)

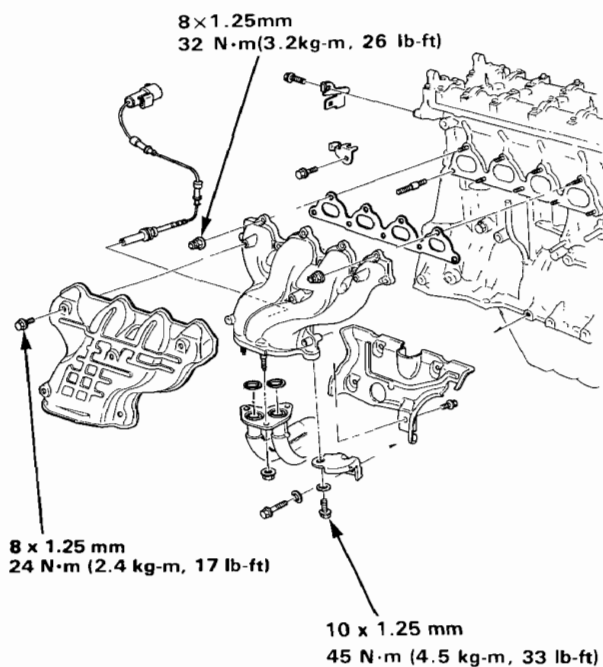
Cylinder Head

Installation (cont'd)

3. Install the intake manifold and tighten the nuts in a criss-cross pattern in 2 or 3 steps, beginning with the inner nuts.



4. Install the exhaust manifold and bracket.



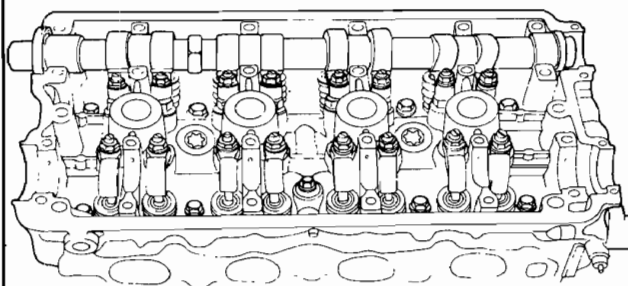
Cam/Rocker Arm and Camshaft Seal/Pulley

Installation

CAUTION:

- Make sure that the keyways on the camshafts are facing up (NO. 1 cylinder TDC).
- Valve locknuts should be loosened and adjusting screws backed off before installation.
- Replace the rocker arms in their original positions.

1. Place the rocker arms on the pivot bolts and the valve stems.

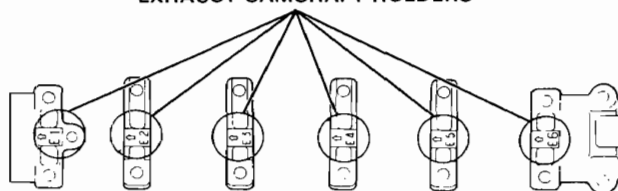


2. Install the camshafts and the camshaft seals with the open side (spring) facing in.

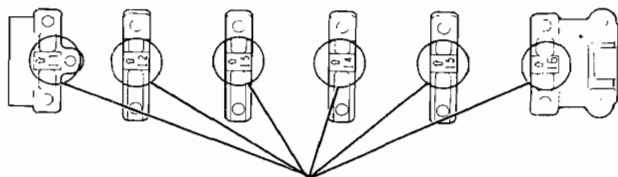
NOTE:

- "I" or "E" marks are stamped on the camshaft holders.
- Do not apply oil to the holder mating surface of camshaft seals.

EXHAUST CAMSHAFT HOLDERS

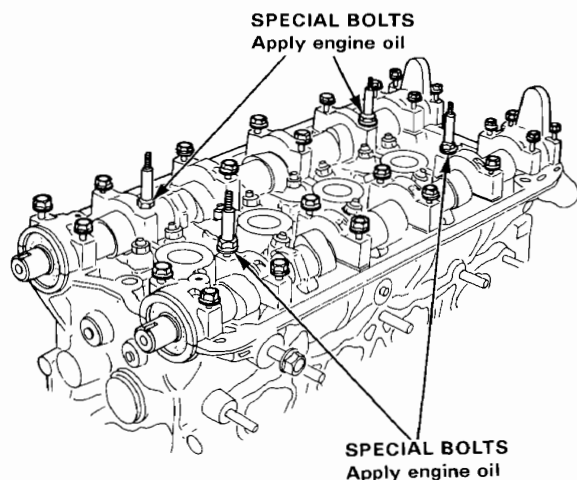


INTAKE CAMSHAFT HOLDERS

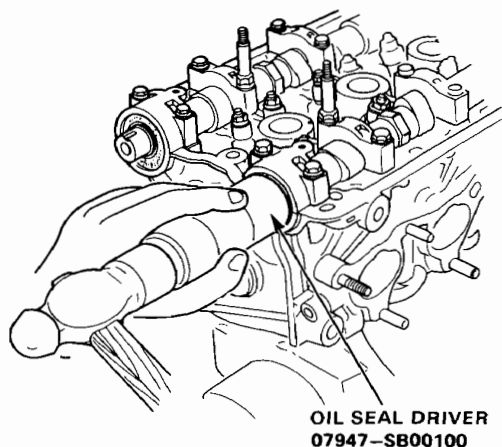




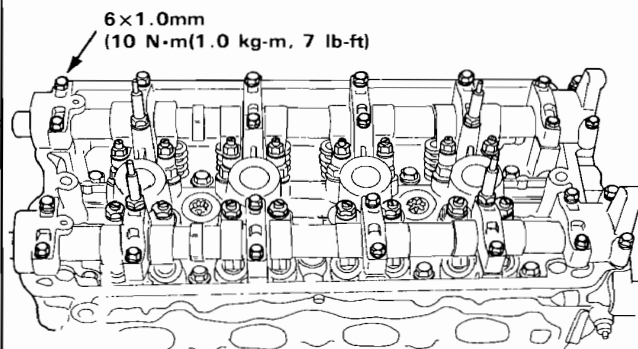
3. Apply liquid gasket to the head mating surfaces of the No.1 and No.6 camshaft holders then install them, along with the No.2, 3, 4 and 5.
4. Tighten the camshaft holders temporarily.
 - Make sure that the rocker arms are properly positioned on the valve stems.



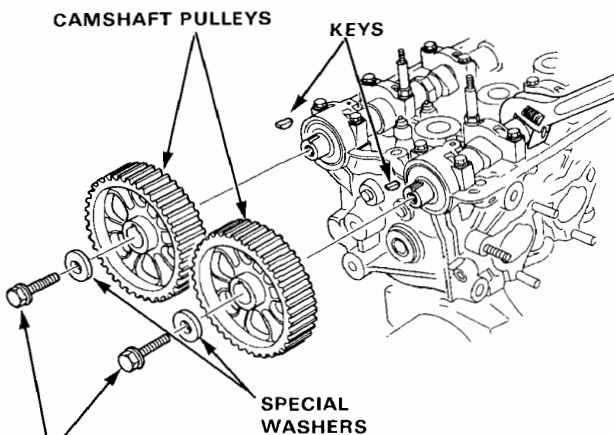
5. Press in the camshaft oil seal securely with the special tool.



6. Tighten each bolt two turns at a time in the sequence shown below to insure that the rockers do not bind on the valves.



7. Install keys into grooves in camshafts



RETAINING BOLTS
8×1.25 mm
38 N·m (3.8 kg-m, 27 lb-ft)

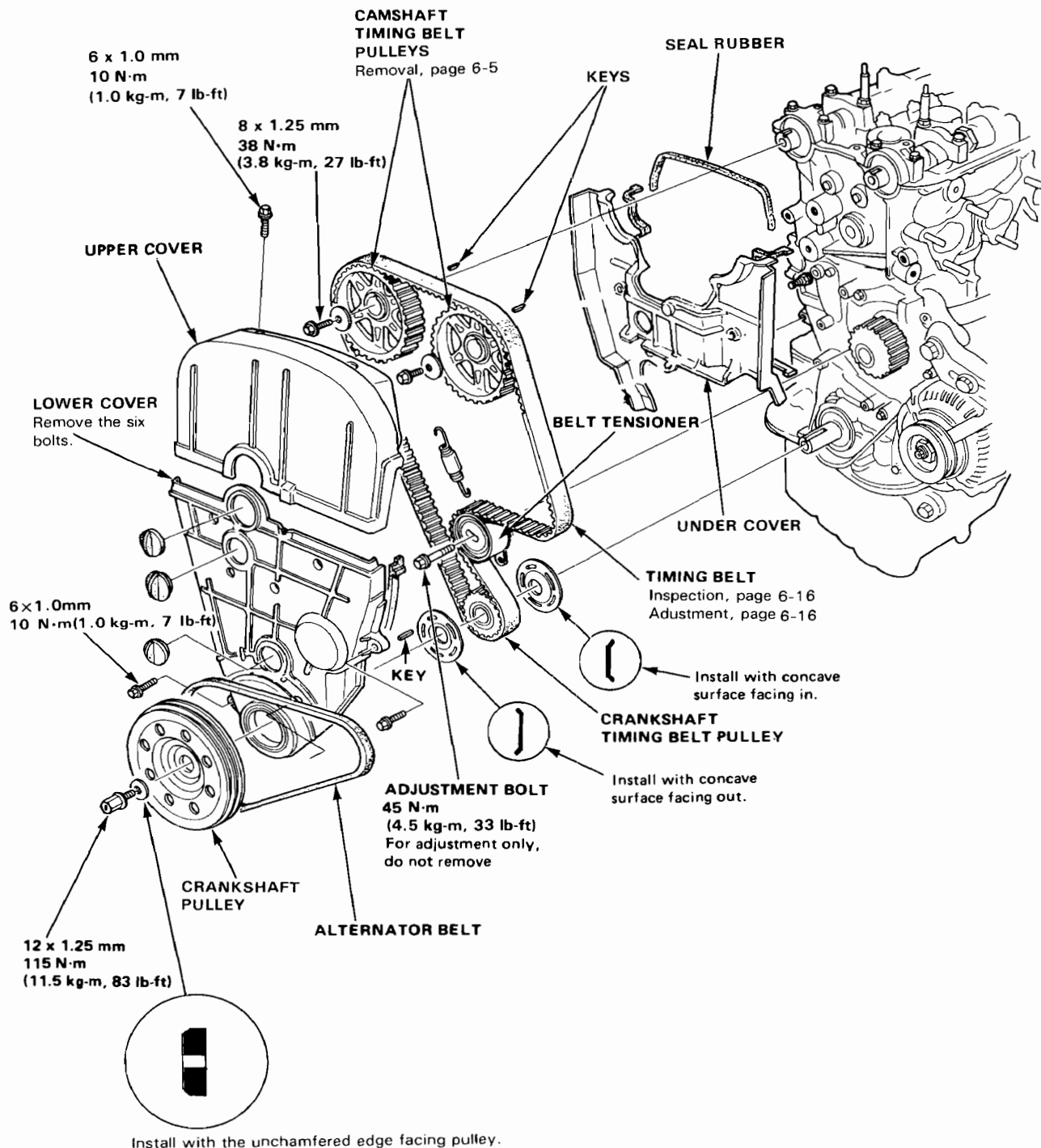
8. Push camshaft pulleys onto camshafts, then tighten retaining bolts to torque shown.
9. Adjust the valve timing (page 6-16).
10. After installation, check that all tubes, hoses and connectors are installed correctly.

Timing Belt

Replacement

NOTE:

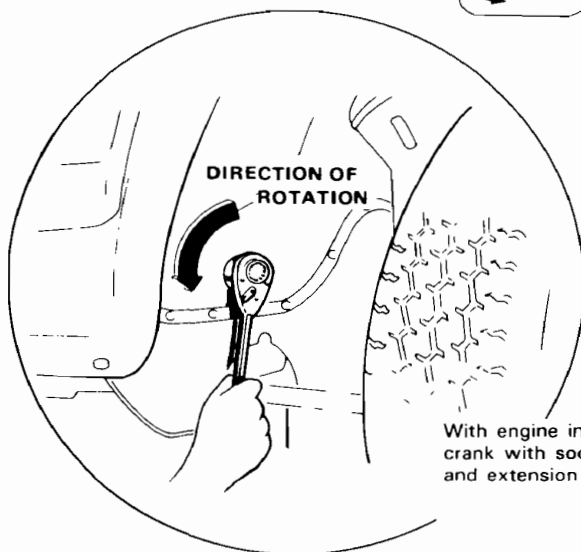
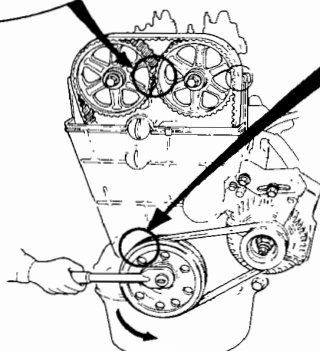
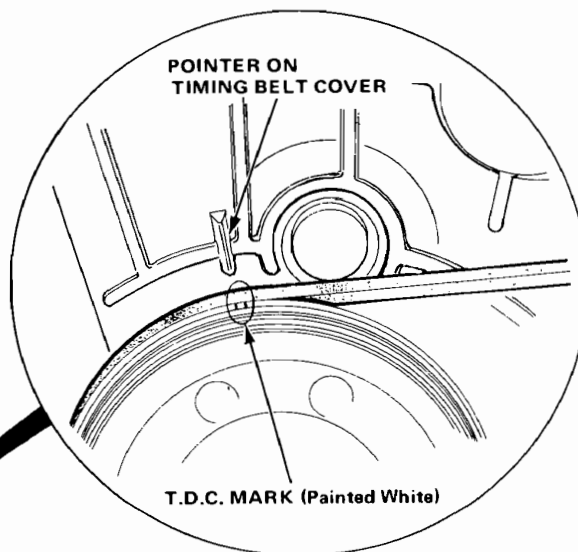
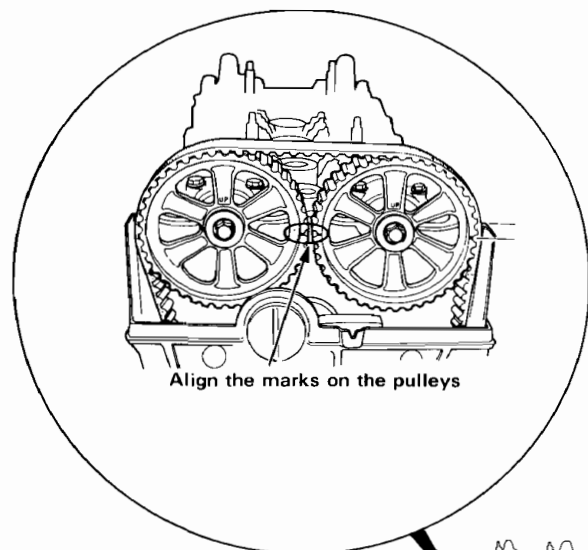
- Refer to next page for positioning crank and pulley before installing belt.
- Mark direction of rotation before removing.





Positioning Crankshaft Before Installing Timing Belt

NOTE: Install the timing belt with the No. 1 piston at TDC (Top Dead Center) on the compression stroke.



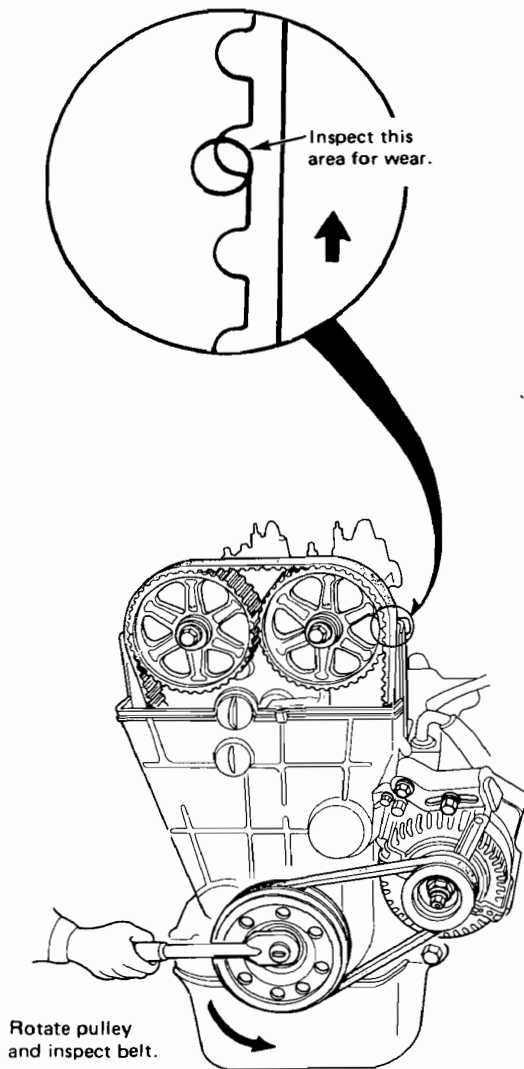
With engine installed, turn crank with socket wrench and extension as shown.

Timing Belt

Inspection

NOTE:

- Replace belt if oil soaked.
- Remove any oil or solvent that gets on the belt.

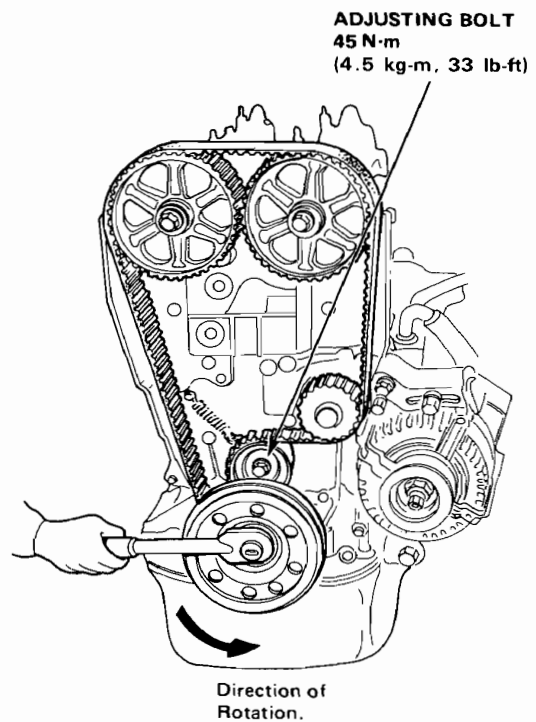


Tension Adjustment

CAUTION: Always adjust timing belt tension with the engine cold.

NOTE: Tensioner is spring-loaded to apply proper tension to the belt automatically after making the following adjustment:

1. Set the No. 1 piston at TDC.
2. Loosen adjusting bolt.



3. Rotate crankshaft counterclockwise 3-teeth on camshaft pulley to create tension on timing belt.
4. Tighten adjusting bolt.
5. If pulley bolt broke loose while turning crank, re-torque it to 115 N·m (11.5 kg-m, 83 lb-ft).

NOTE: Put transmission in gear and set parking brake before retorquing pulley bolt.

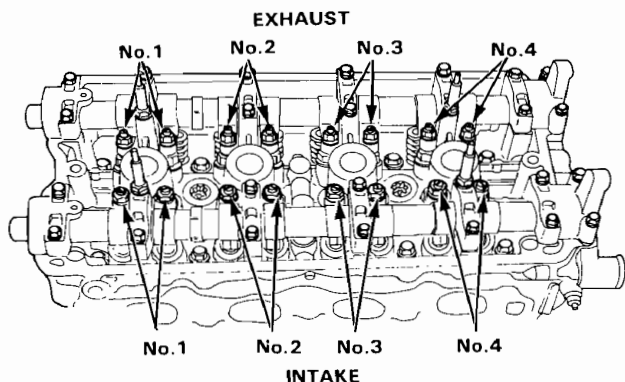


Valve

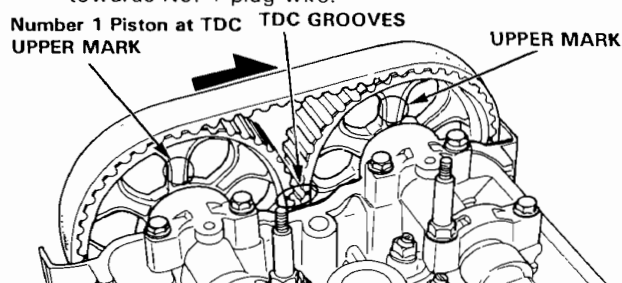
Adjustment

NOTE: Valves should be adjusted cold when the cylinder head temperature is less than 38°C (100°F). Adjustment is the same for intake and exhaust valves.

1. Remove the valve cover.



2. Set the No. 1 piston at TDC. "UP" marks in the pulleys should be at top, and the TDC grooves on back side of pulley should align with cylinder head surface. The distributor rotor must be pointing towards No. 1 plug wire.



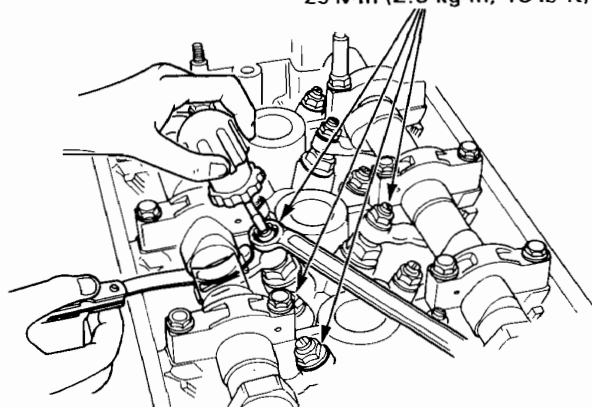
3. Adjust valves on No. 1 cylinder.

Intake: 0.13—0.17 mm (0.0051—0.0067 in.)

Exhaust: 0.15—0.19 mm (0.0059—0.0075 in.)

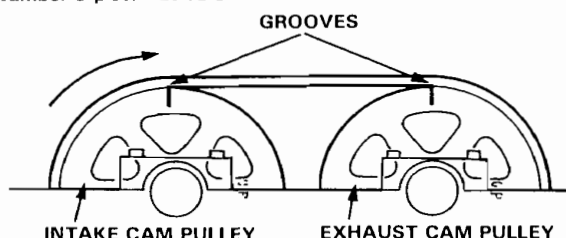
4. Loosen locknut and turn adjustment screw until feeler gauge slides back and forth with slight amount of drag.

LOCKNUTS 7 x 0.75 mm
25 N·m (2.5 kg-m, 13 lb-ft)



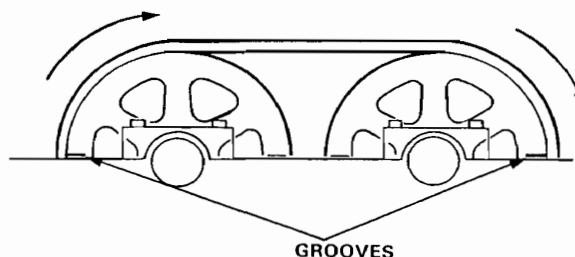
5. Tighten locknut and check clearance again. Repeat adjustment if necessary.
6. Rotate crankshaft 180° counterclockwise (cam pulley turns 90°). The "UP" marks should be at exhaust side. Distributor rotor should point to No. 3 plug wire. Adjust valves on No. 3 cylinder.

Number 3 piston at TDC



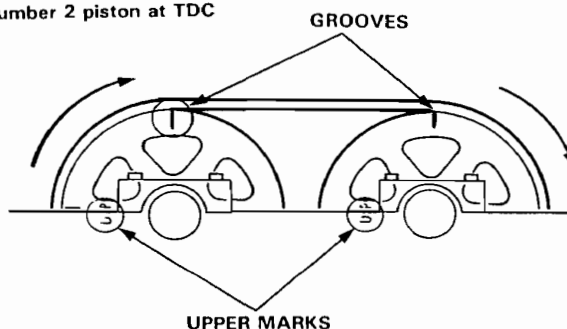
7. Rotate crankshaft 180° counterclockwise to bring No. 4 piston to TDC. Both "UP" marks should be at bottom and distributor rotor points to No. 4 plug wire. Adjust valves on No. 4 cylinder.

Number 4 piston at TDC




8. Rotate crankshaft 180° counterclockwise to bring No. 2 piston to TDC. "UP" marks should be at intake side. Distributor rotor should point to No. 2 plug wire. Adjust valves on No. 2 cylinder.

Number 2 piston at TDC

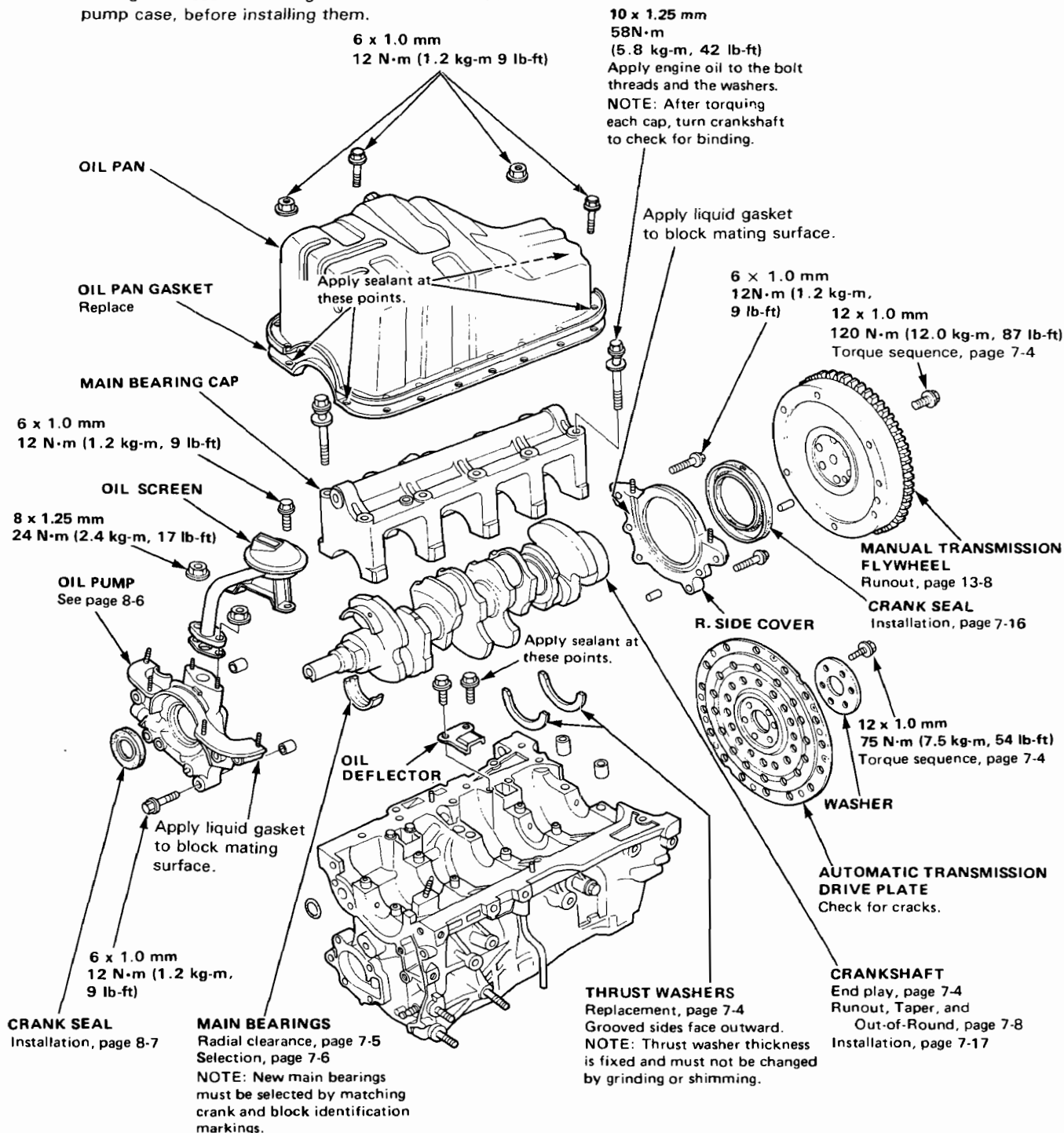


Engine Block

Illustrated Index

 Lubricate all internal parts with engine oil during reassembly.

NOTE: Apply non-hardening liquid gasket to the mating surfaces of the right side cover and oil pump case, before installing them.





NOTE: New rod bearings must be selected by matching connecting rod and crankshaft identification markings (page 7-6).

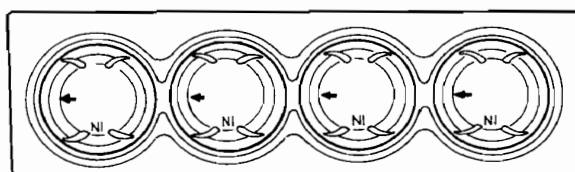


PISTON RINGS

Replacement, page 7-14
Measurement, pages 7-14 and 15
Alignment, page 7-15

PISTON INSTALLATION DIRECTION

EXHAUST



INTAKE

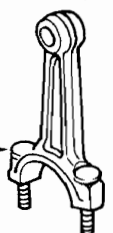
PISTON PIN

Removal, page 7-11
Installation, page 7-12
Inspection, page 7-13



PISTON

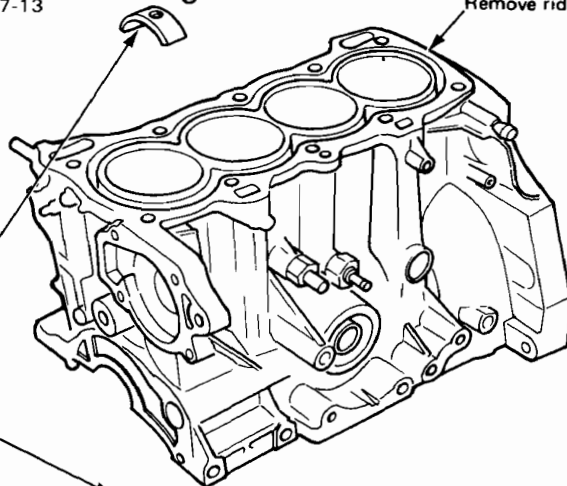
Removal, page 7-7
Measurement, pages 7-9



CONNECTING ROD

End play, page 7-4
Selection, page 7-12
Small end measurement, page 7-13

Inspect top of cylinder bore for carbon build up or ridge before removing piston.
Remove ridge if necessary, page 7-7



CONNECTING ROD BEARINGS

Clearance, page 7-5
Selection, page 7-6

ENGINE BLOCK

Cylinder bore inspection, page 7-10
Cylinder bore honing, page 7-11
Warpage inspection, page 7-10

CONNECTING ROD BEARING CAP

Installation, page 7-17
NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.



CONNECTING ROD NUT

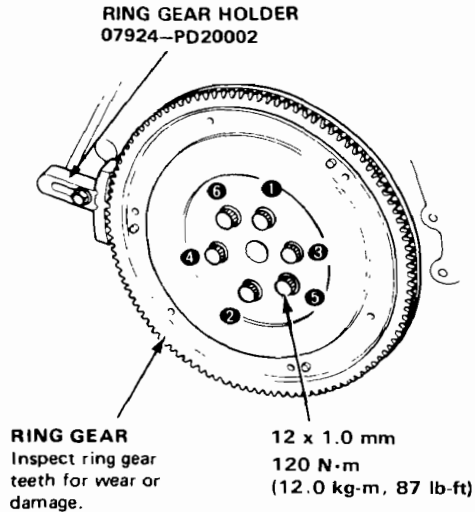
8 x 0.75mm
32 N·m (3.2 kg-m, 23 lb-ft)
After torquing each bearing cap, rotate crankshaft to check for binding.



Flywheel and Drive Plate

Flywheel Replacement (Manual Transmission)

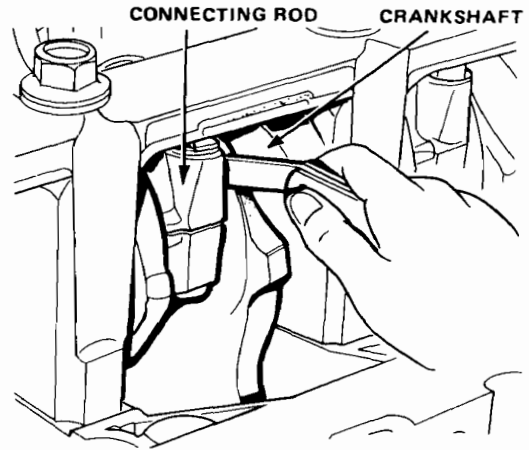
Remove the six flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



Connecting Rod and Crankshaft

Connecting Rod End Play

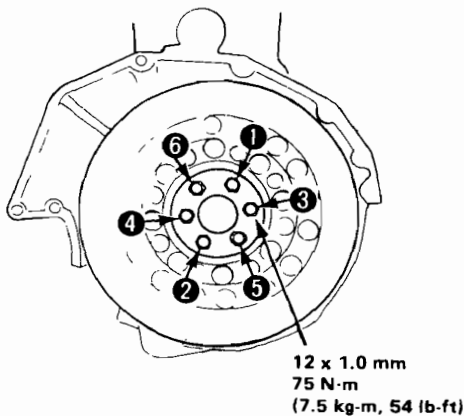
Standard (New): 0.15–0.30 mm
(0.006–0.012 in.)
Service Limit: 0.40 mm (0.016 in.)



- If out-of-tolerance, install new connecting rod.
- If still out-of-tolerance, replace crankshaft (pages 7-7 and 7-17).

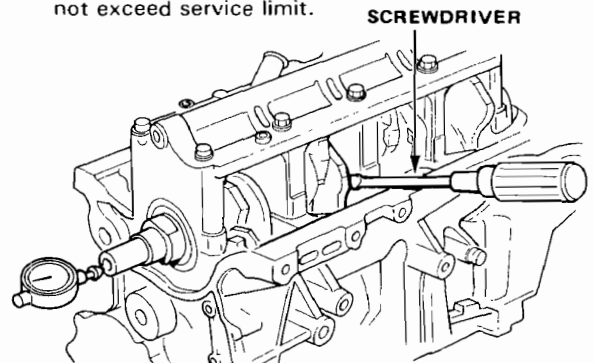
Drive Plate Replacement (Automatic Transmission)

Remove the six drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



Crankshaft End Play

Push crank firmly away from dial indicator, and zero dial against end of crank. Then pull crank firmly back toward indicator; dial reading should not exceed service limit.



Standard (New): 0.1–0.35 mm
(0.004–0.014 in.)
Service Limit: 0.45 mm (0.018 in.)

- If end play is excessive, inspect thrust washers and thrust surface on crankshaft. Replace parts as necessary.

NOTE: Thrust washer thickness is fixed and must not be changed either by grinding or shimming. Thrust washers are installed with grooved sides outward.

Main Bearing

Clearance

1. To check main bearing clearance, remove the main cap and bearing halves.
2. Clean each main journal and bearing half with a clean shop rag.
3. Place one strip of plastigage across each main journal.

NOTE: If the engine is still in the car when you bolt the main cap down to check clearance, the weight of the crank and flywheel will flatten the plastigage further than just the torque on the cap bolts, and give you an incorrect reading. For an accurate reading, support the crank with a jack under the counterweights and check only one bearing at a time.

4. Reinstall the bearings and cap, then torque the bolts to 58N·m (5.8 kg-m, 42 lb-ft).

NOTE: Do not rotate the crank during inspection.

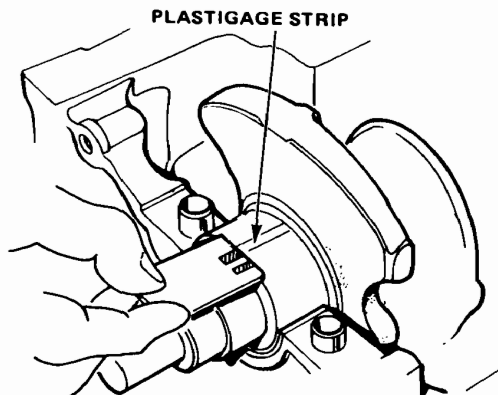
5. Remove the cap and bearings again, and measure the widest part of the plastigage.

Standard (New):

No. 1,2,4,5 Journal: 0.024–0.042 mm
(0.0009–0.0019 in.)

No. 3 Journal: 0.030–0.048 mm
(0.0012–0.0019 in.)

Service Limit: 0.05 mm (0.002 in.)



6. If the plastigage measures too wide or too narrow, (remove the engine if it's still in the car), remove the crank, remove the upper half of the bearing, then install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance.

CAUTION: 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 again.

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

Rod Bearing

Clearance

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop rag.
3. Place plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts to 32 N·m (3.2 kg-m, 23 lb-ft).

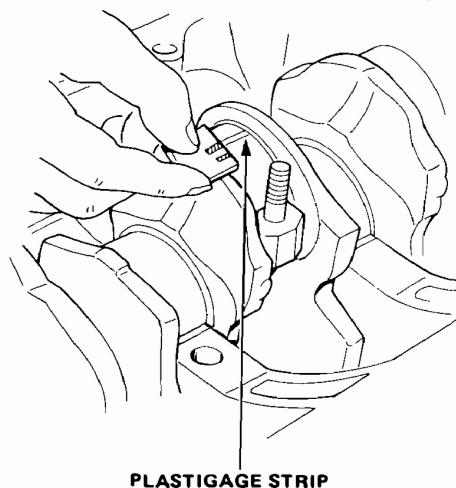
NOTE: Do not rotate the crank during inspection.

5. Remove the rod cap and bearing half and measure the widest part of the plastigage.

Connecting Rod Bearing Clearance:

Standard (New): 0.020–0.038 mm
(0.0008–0.0015 in.)

Service Limit: 0.05 mm (0.002 in.)



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 code (select color as shown on next page), and recheck the clearance.

CAUTION: Do not file, shim, or scrape the bearing 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.

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

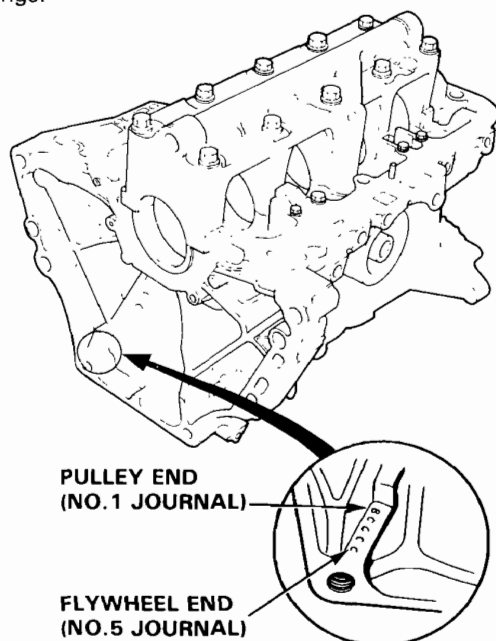


Main Bearing

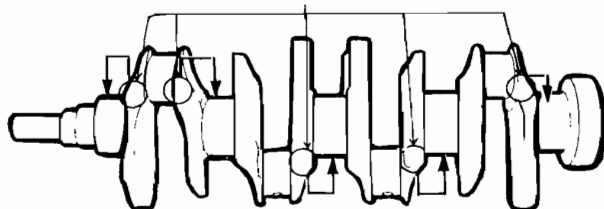
Selection

Crank Bore Code Location (Marks)

Marks have been stamped on the end of the block as a code for the size of each of the 5 main journal bores. Use them, and the numbers stamped on the crank (codes for main journal size), to choose the correct bearings.

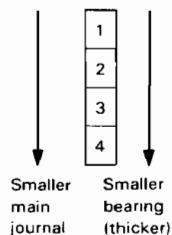


Main Journal Code Locations (Numbers)



Bearing Identification

Color code is on the edge of the bearing



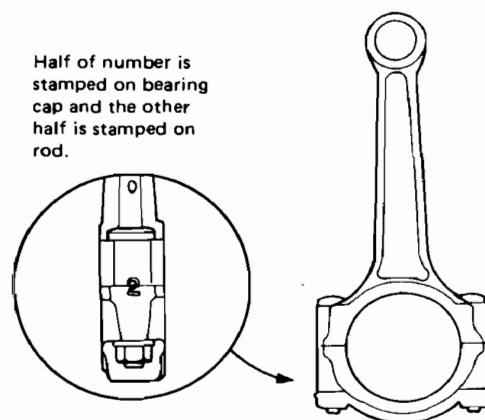
Larger crank bore			
A	B	C	D
Red	Pink	Yellow	Green
Pink	Yellow	Green	Brown
Yellow	Green	Brown	Black
Green	Brown	Black	Blue

Rod Bearing

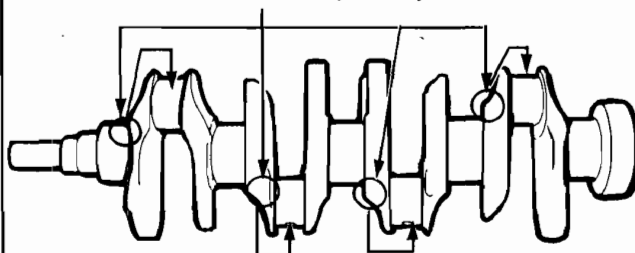
Selection

Rod Code Location (Numbers)

Numbers have been stamped on the side of each connecting rod as a code for the size of the big end. Use them, and the letters stamped on the crank (codes for rod journal size), to choose the correct bearings.

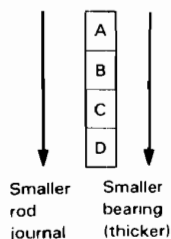


Rod Journal Code Locations (Letters)



Bearing Identification

Color code is on the edge of the bearing



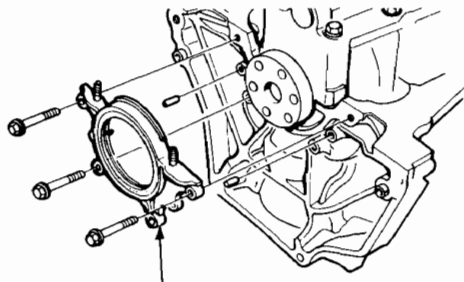
Larger big end bore			
1	2	3	4
Smaller bearing (thicker)			
Red	Pink	Yellow	Green
Pink	Yellow	Green	Brown
Yellow	Green	Brown	Black
Green	Brown	Black	Blue

Crankshaft/Piston



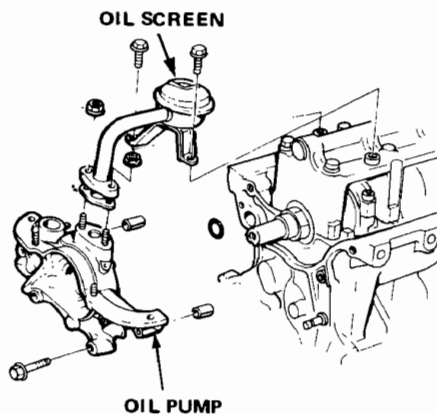
Removal

1. Remove the right side cover.



RIGHT SIDE COVER

2. Remove the oil screen.

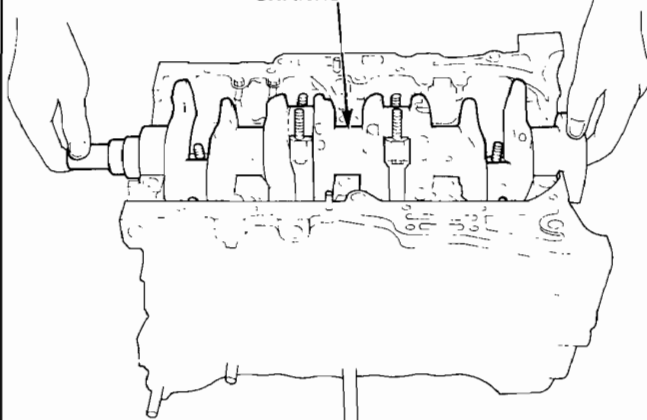


OIL SCREEN

OIL PUMP

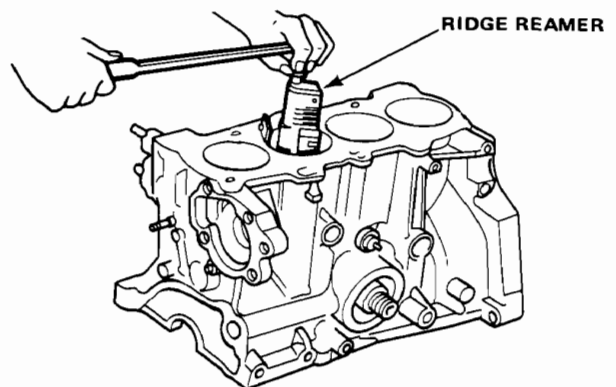
3. Remove the oil pump.
4. Turn the crankshaft so No. 2 and 3 crankpins are at the bottom.
5. Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.
6. Lift the crankshaft out of engine, being careful not to damage journals.

CRANKSHAFT



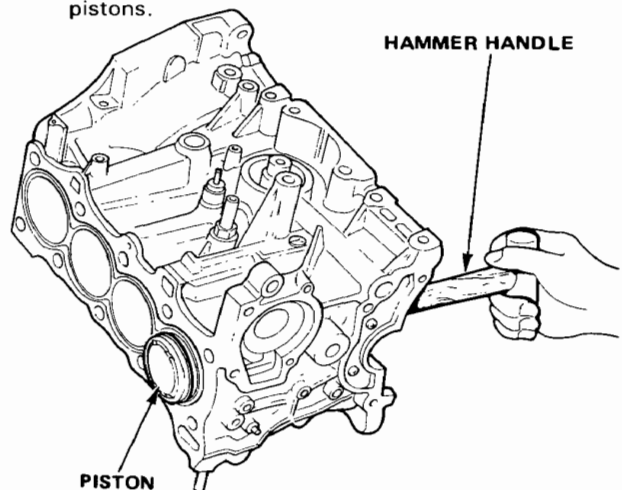
7. Remove upper bearing halves from connecting rods and set aside with their respective caps.
8. Reinstall main cap and bearings on engine in proper order.
9. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer. Follow reamer manufacturer's instructions.

CAUTION: If the ridge is not removed, it may damage the pistons as they are pushed out.



RIDGE REAMER

10. Use the wooden handle of a hammer to drive out pistons.



HAMMER HANDLE

PISTON

11. Reinstall the rod bearings and caps after removing each piston/connecting rod assembly.
12. Mark piston/connecting rod assemblies with cylinder numbers to avoid mixup on reassembly.

NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod bore size.

Crankshaft

Inspection

- Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
- Check the keyway and threads.

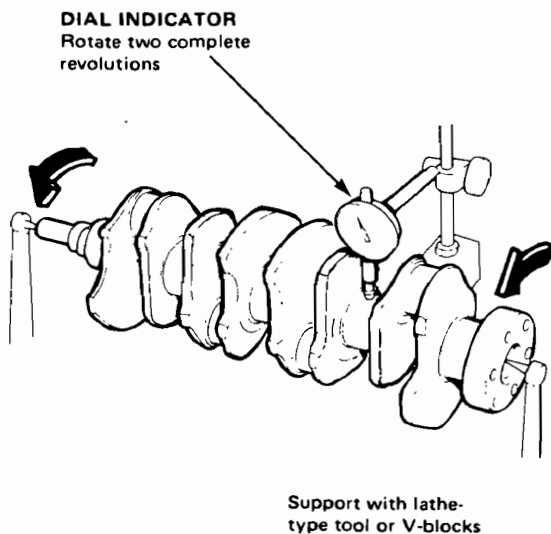
Alignment

- Measure runout on all main journals to make sure the crank is not bent.
- The difference between measurements on each journal must not be more than the service limit.

Crankshaft Total Indicated Runout:

Standard (New): 0.03 mm (0.0012 in.)

Service Limit: 0.06 mm (0.0024 in.)



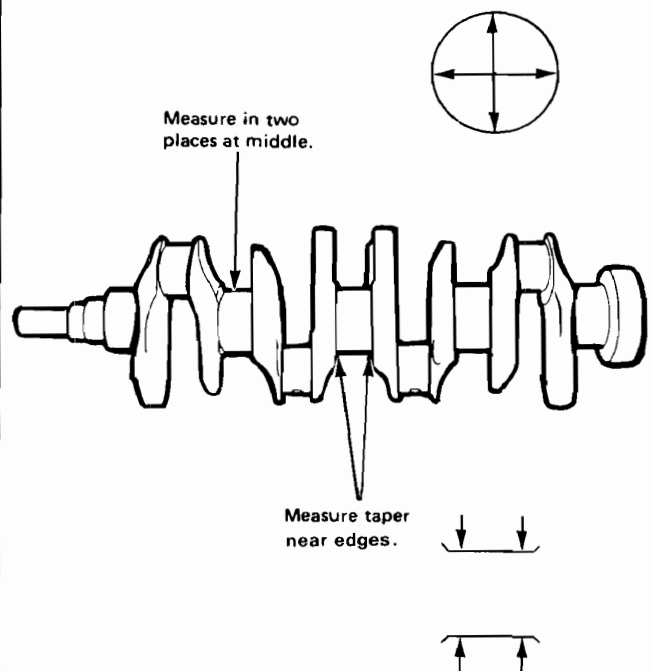
Out-of-Round and Taper

- Measure out-of-round at the middle of each rod and main journal in two places.
- The difference between measurements on each journal must not be more than the service limit.

Journal Out-of-Round:

Standard (New): 0.005 mm (0.0002 in.)

Service Limit: 0.010 mm (0.0004 in.)



- Measure taper near edges of each rod and main journal.
- The difference between measurements on each journal must not be more than the service limit.

Journal Taper:

Standard (New): 0.005 mm (0.0002 in.)

Service Limit: 0.010 mm (0.0004 in.)

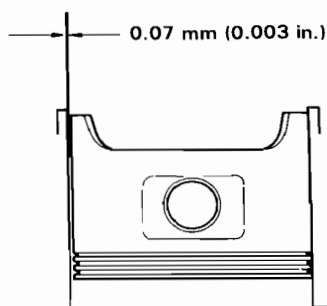
Piston



Piston-to-Block Clearance

1. Make a preliminary piston-to-block clearance check with a feeler gauge:

Service Limit: 0.07 mm (0.003 in.)



If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive wear.

To confirm the feeler gauge check, further measurement with a micrometer will be necessary.

2. Calculate difference between cylinder bore diameter on page 7-10 and piston diameter.

Piston-to-Cylinder Clearance:

**Standard (New): 0.01–0.05 mm
(0.0004–0.0020 in.)**

Service Limit: 0.07 mm (0.003 in.)

Inspection

1. Check the piston for distortion or cracks.

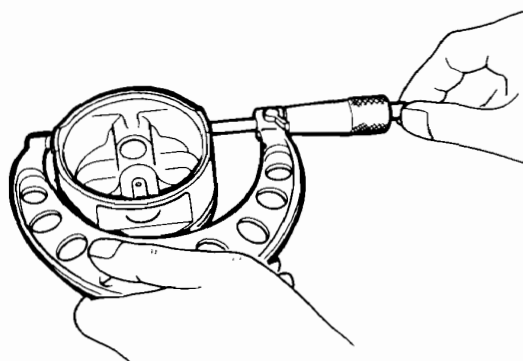
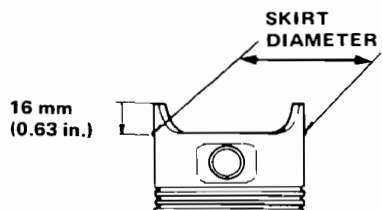
NOTE: If cylinder is bored, an oversized piston must be used.

2. Measure piston diameter at a point 16 mm (0.63 in.) from bottom of skirt.

Piston Diameter

**Standard (New): 74.98–74.99 mm
(2.9520–2.9524 in.)**

Service Limit: 74.97 mm (2.9516 in.)



Oversize Piston Diameter

**Standard 0.25: 75.23–75.24 mm
(2.9618–2.9622 in.)**

**Standard 0.5: 75.48–75.49 mm
(2.9716–2.9720 in.)**

3. Check the piston pin-to-piston clearance. Coat the piston pin with engine oil. It should then be possible to push the piston pin into the piston hole with thumb pressure.

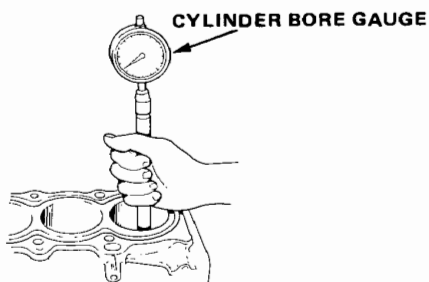
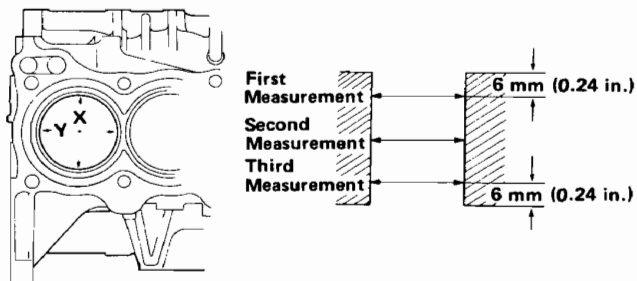
Piston Pin-to-Piston Clearance:

**Standard (New): 0.010–0.040 mm
(0.0004–0.0016 in.)**

Cylinder Block

Inspection

1. Measure wear and taper in directions X and Y at three levels in each cylinder as shown.



Cylinder Bore Size

Standard (New): 75.00–75.02 mm
(2.9528–2.9535 in.)

Service Limit: 75.07 mm (2.9555 in.)

Oversize

Standard 0.25 (New): 75.215–75.248 mm
(2.9612–2.9625 in.)

Standard 0.5 (New): 75.465–75.498 mm
(2.9711–2.9724 in.)

Bore Taper

Limit: (Difference between first and third measurement) 0.05 mm (0.002 in.)

- If measurements in any cylinder is beyond Oversize Bore Service Limit, replace the block.
- If block is to be rebored, refer to Piston Clearance Inspection (page 7-9) after reboring.

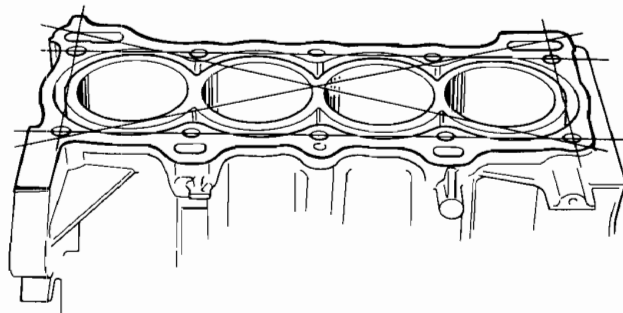
NOTE: Scored or scratched cylinder bores must be honed.

Out-of-Round

Service Limit: 0.05 mm (0.002 in.)

2. Check the top of the block for warpage. Measure along the edges and across the center as shown.

SURFACES TO BE MEASURED

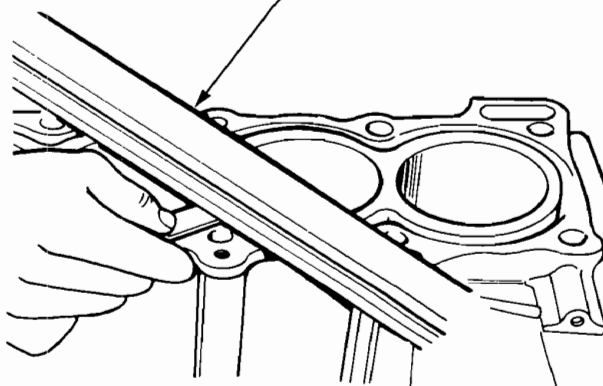


Engine Block Warpage:

Standard (New): 0.07 mm (0.003 in.)

Service Limit: 0.10 mm (0.004 in.)

PRECISION STRAIGHT EDGE

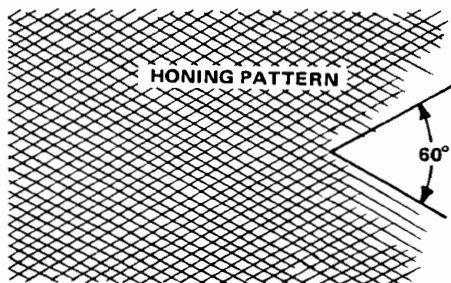




Piston Pin

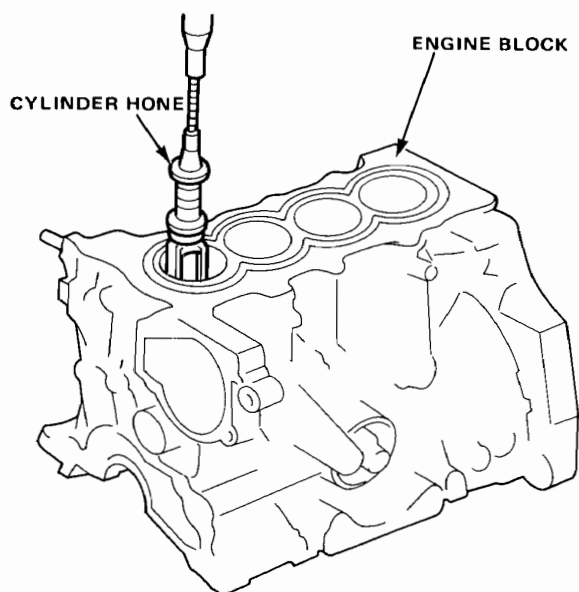
Cylinder Bore Honing

1. Measure cylinder bores as shown on page 7-10. If the block can be re-used, hone the cylinders, and remeasure the bores.
2. Hone cylinder bores with honing oil and medium (220 grit) stone in a 60 degree cross-hatch pattern.



3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.
4. If scoring or scratches are still present in cylinder bores after honing to service limit, rebore the engine block.

NOTE: Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail and does not run the full length of the bore.



Removal

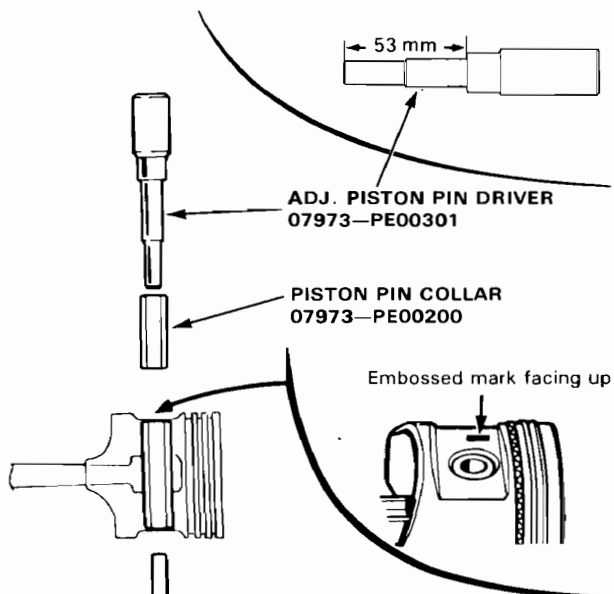
1. Install the attachment on the piston base.

PISTON BASE HEAD
07973-SB00100

PISTON PIN BASE INSERT
07973-PE00400

PISTON PIN DIS/ASSEMBLY TOOL SET BASE
07973-6570002

2. Adjust the length of piston pin driver to 53 mm (2.09 in) as shown.



NOTE: Use hydraulic press. When pressing pin in or out, make sure that the recessed portion of the piston aligns with the lips on the collar.

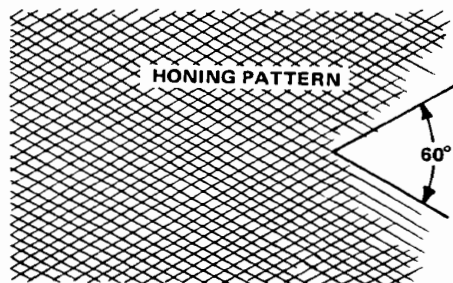
3. Place the piston on the piston base and press the pin out with a hydraulic press.



Piston Pin

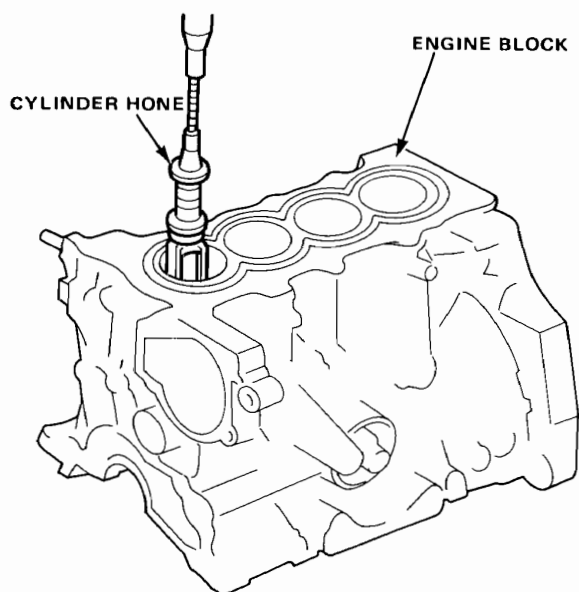
Cylinder Bore Honing

1. Measure cylinder bores as shown on page 7-10. If the block can be re-used, hone the cylinders, and remeasure the bores.
2. Hone cylinder bores with honing oil and medium (220 grit) stone in a 60 degree cross-hatch pattern.



3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.
4. If scoring or scratches are still present in cylinder bores after honing to service limit, rebore the engine block.

NOTE: Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail and does not run the full length of the bore.



Removal

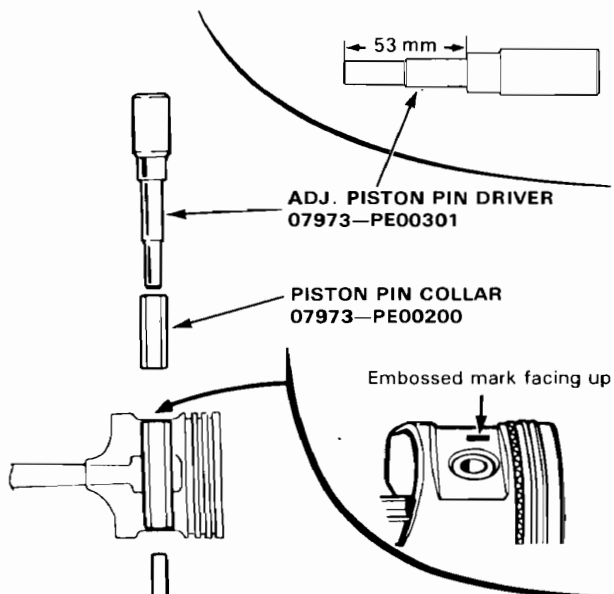
1. Install the attachment on the piston base.

PISTON BASE HEAD
07973-SB00100

PISTON PIN BASE INSERT
07973-PE00400

PISTON PIN DIS/ASSEMBLY TOOL SET BASE
07973-6570002

2. Adjust the length of piston pin driver to 53 mm (2.09 in) as shown.



NOTE: Use hydraulic press. When pressing pin in or out, make sure that the recessed portion of the piston aligns with the lips on the collar.

3. Place the piston on the piston base and press the pin out with a hydraulic press.

Connecting Rod

Selection

Each rod is sorted into one of four tolerance ranges (from +0.006 to +0.024 mm, in 0.006 mm increments) depending on the size of its big end bore. It's then stamped with a number (1, 2, 3, or 4) indicating that tolerance. You may find any combination of 1, 2, 3, or 4 in any engine.

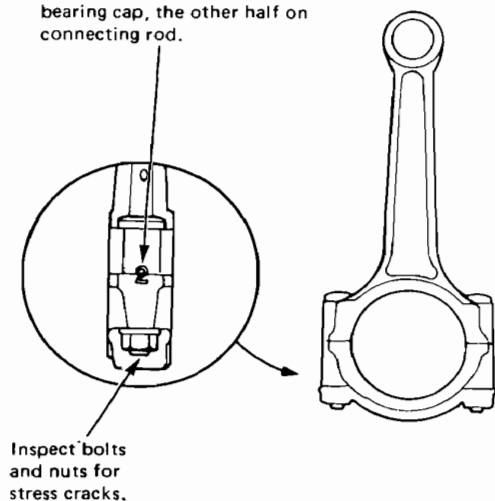
Normal Bore Size: 48 mm (1.89 in.)

NOTE:

- Reference numbers are for big end bore size and do NOT indicate the position of rod in engine.
- Inspect connecting rod for cracks and heat damage.

CONNECTING ROD BORE REFERENCE NUMBER

Half of number is stamped on bearing cap, the other half on connecting rod.



Piston Pin

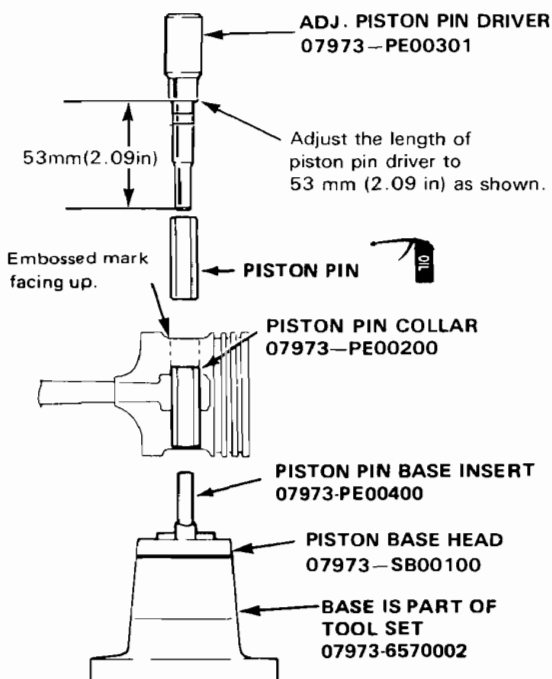
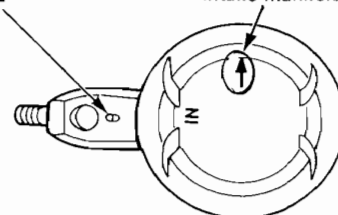
Installation

1. Use a hydraulic press for installation.

- When pressing pin in or out, be sure you position the recessed flat on the piston against the lugs on the base attachment.

CONNECTING ROD OIL HOLE

The arrow must face the timing belt side of the engine and the connecting rod oil hole must face the intake manifold.



NOTE: Install the assembled piston and rod with the oil hole facing the intake manifold.



Inspection

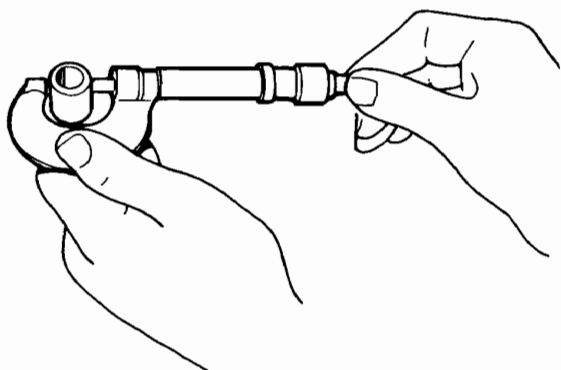
1. Measure the diameter of the piston pin.

Piston Pin Diameter:

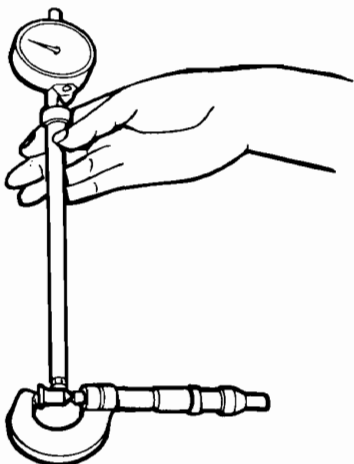
Standard (New): 18.994–19.0 mm
(0.7478–0.7480 in.)

Oversize: 18.997–19.003 mm
(0.7479–0.7481 in.)

NOTE: All replacement piston pins are oversize.



2. Zero the dial indicator to the piston pin diameter.



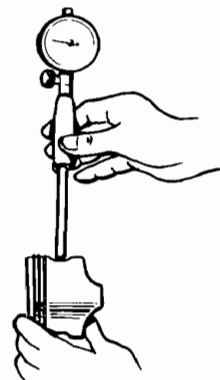
3. Measure the piston pin-to-piston clearance.

NOTE: Check the piston for distortion or cracks.

If the piston pin clearance is greater than 0.022 mm (0.0009 in.), re-measure using an oversize piston pin.

Piston Pin-to-Piston Clearance:

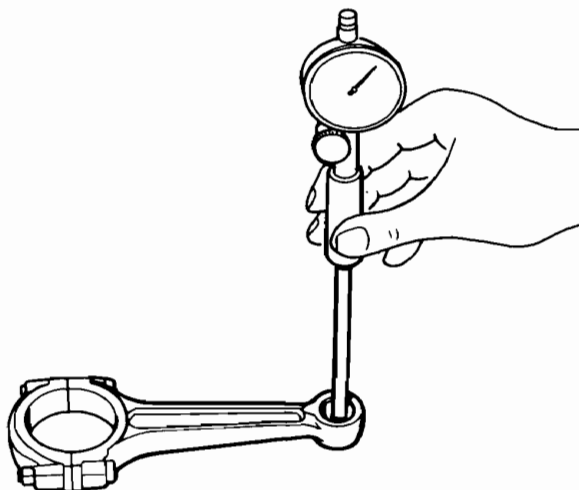
Service Limit: 0.010–0.022 mm
(0.0004–0.0009 in.)



4. Check the difference between piston pin diameter and connecting rod small end diameter.

Piston Pin-to-Connecting Rod Interference:

Standard (New): 0.014–0.04 mm
(0.0006–0.0016 in.)



Piston Rings

End Gap

1. Using a piston, push a new ring into the cylinder bore 15–20 mm (0.6–0.8 in.) from the bottom.
2. Measure the piston ring end-gap with a feeler gauge:
 - If the gap is too small, check to see if you have the proper rings for your engine.
 - If the gap is too large, re-check the cylinder bore diameter against the wear limits on page 7-9. If the bore is over limit, the engine block must be rebored.

Piston Ring End-Gap:

Top and Second Ring

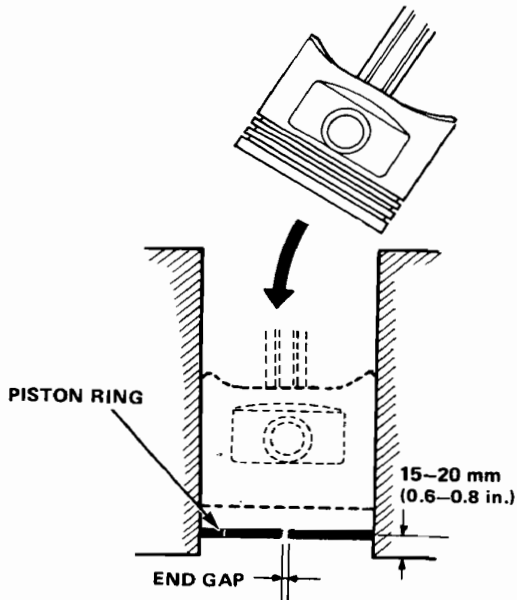
Standard (New): 0.15–0.35 mm
(0.006–0.014 in.)

Service Limit: 0.6mm (0.024 in.)

Oil Ring

Standard (New): 0.2–0.7 mm (0.008–0.028 in.)

Service Limit: 0.8 mm (0.032 in.)



Replacement

1. Using ring expander, remove old piston rings.
2. Clean all ring grooves thoroughly.

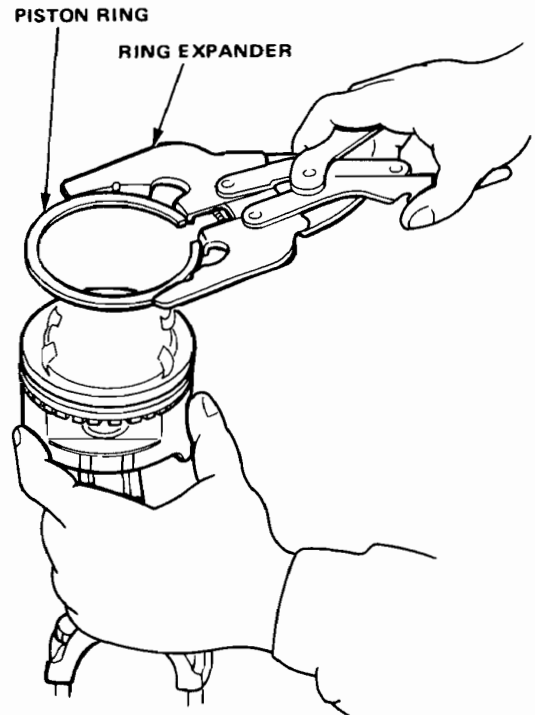
NOTE: Use squared-off broken ring, or file down blade on ring groove cleaner to fit (Top ring is 1.2 mm wide; 2nd ring is 1.5 mm wide; oil ring is 4.5 mm wide).

CAUTION: Do not use a wire brush to clean ring lands, or cut ring lands deeper with cleaning tool.

NOTE: If piston is to be separated from connecting rod, do not install new rings yet.

3. Install new rings in proper sequence and position (page 7-15).

NOTE: Do not re-use old piston rings.





Ring Land Clearances

After installing new set of rings, measure ring-to-land clearances:

Top Ring Clearance

Standard (New): 0.03–0.06 mm
(0.0012–0.0024 in.)

Service Limit: 0.13 mm (0.005 in.)

Second Ring Clearance

Standard (New): 0.030–0.055 mm
(0.0012–0.0022 in.)

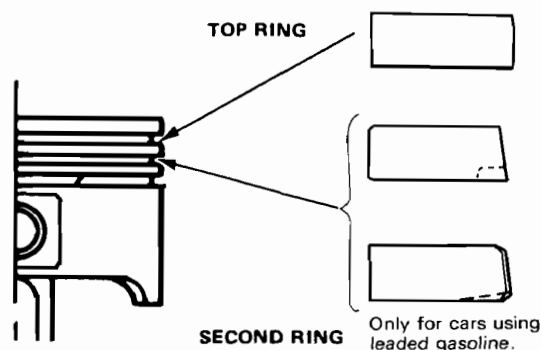
Service Limit: 0.13 mm (0.005 in.)



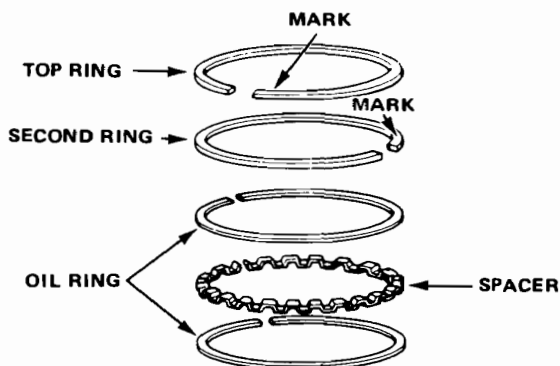
Alignment

1. Install the rings as shown on page 7-14.

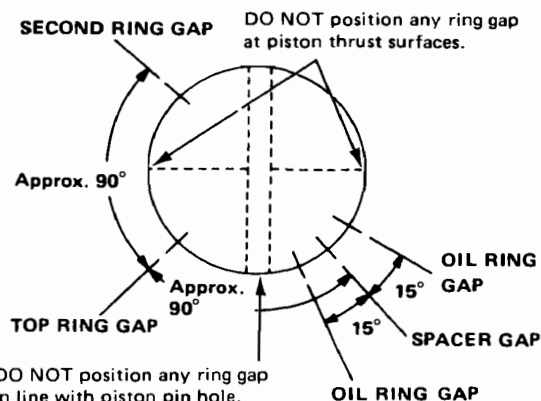
Identify top and second rings by the chamfer on the edge, and make sure they are in proper grooves on piston.



2. Rotate the rings in grooves to make sure they do not bind.
3. The manufacturing marks must be facing upward.




4. Position the ring end gaps as shown:

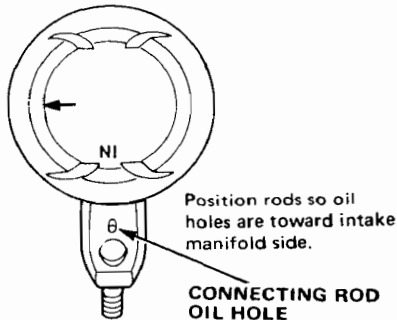


Piston

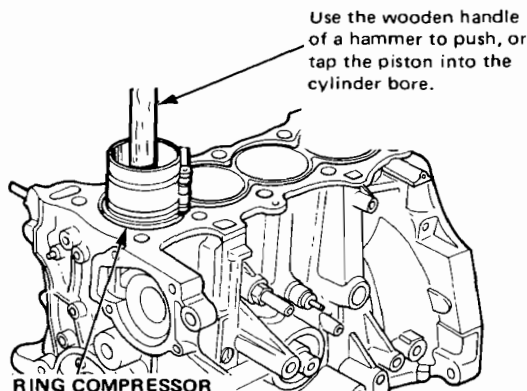
Installation

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

1. If the crankshaft is already installed:
 - Remove the connecting rod caps, then slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
 - Install the ring compressor, check that the bearing is securely in place, then position the piston in the cylinder and drive it in using the wooden handle of a hammer.
 - Stop after the ring compressor pops free and check the connecting rod-to-crank journal alignment before driving rod into place.
 - Install the rod caps with bearings, and torque the nuts to 32 N·m (3.2 kg-m, 23 lb-ft).
2. If the crankshaft is not installed:
 - Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder and drive it in using the wooden handle of a hammer.
 - Position all pistons at top dead center.




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

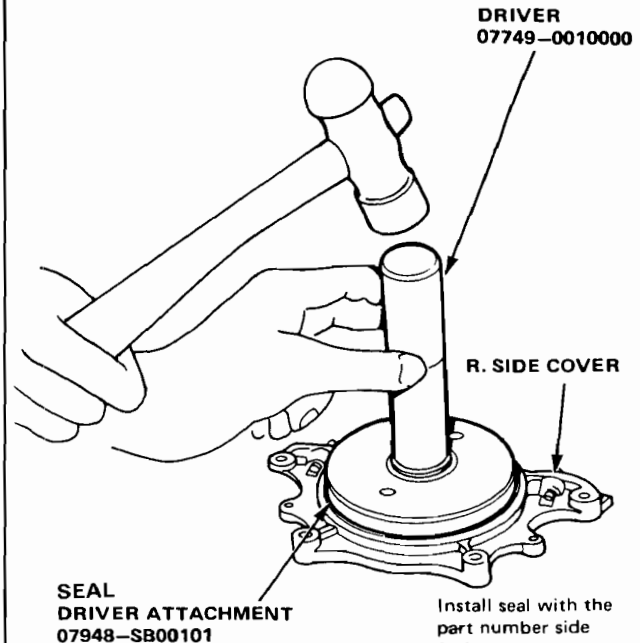


Oil Seal

Installation

 The seal surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of seal.


1. Drive in flywheel-end seal until to bottoms against R. side cover.



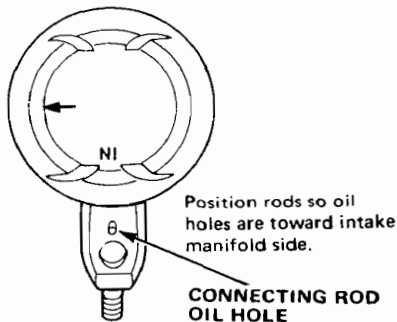
NOTE: Refer to page 8-7 for oil pump side oil seal installation.

Piston

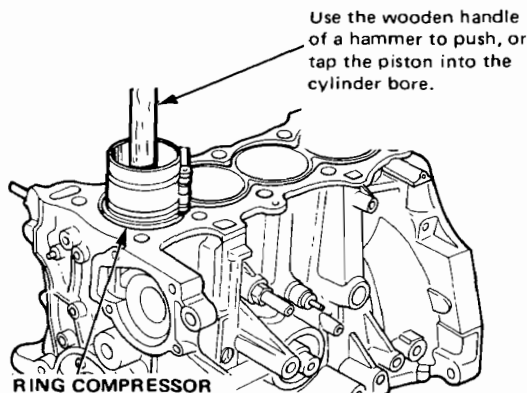
Installation

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

1. If the crankshaft is already installed:
 - Remove the connecting rod caps, then slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
 - Install the ring compressor, check that the bearing is securely in place, then position the piston in the cylinder and drive it in using the wooden handle of a hammer.
 - Stop after the ring compressor pops free and check the connecting rod-to-crank journal alignment before driving rod into place.
 - Install the rod caps with bearings, and torque the nuts to 32 N·m (3.2 kg-m, 23 lb-ft).
2. If the crankshaft is not installed:
 - Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder and drive it in using the wooden handle of a hammer.
 - Position all pistons at top dead center.




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

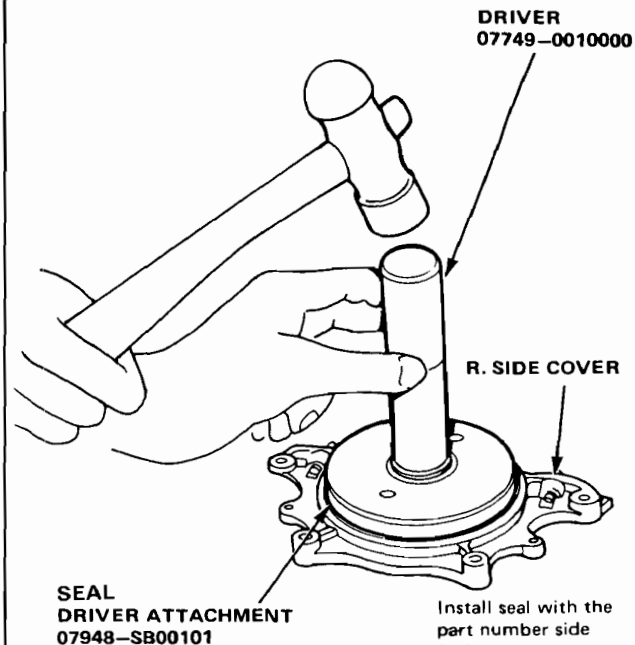


Oil Seal

Installation

 The seal surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of seal.

1. Drive in flywheel-end seal until to bottoms against R. side cover.



NOTE: Refer to page 8-7 for oil pump side oil seal installation.

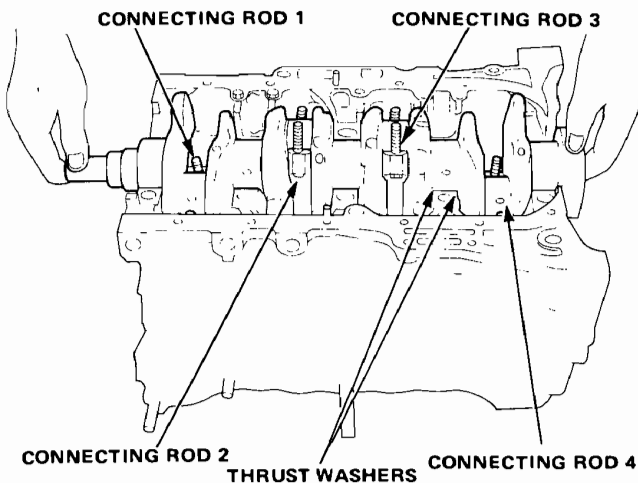
Crankshaft



Installation

10 Before installing the crankshaft, apply a coat of engine oil to the main bearings and rod bearings.

1. Insert bearing halves in the engine block and connecting rods.
2. Hold the crankshaft so rod journals for cylinder No. 2 and No. 3 are straight down.
3. Lower the crankshaft into the block, seating the rod journals into connecting rods No. 2 and No. 3 and install rod caps and nuts finger tight.



4. Rotate the crankshaft clockwise, seat journals into connecting rods No. 1 and No.4, and install the rod caps and nuts finger tight.

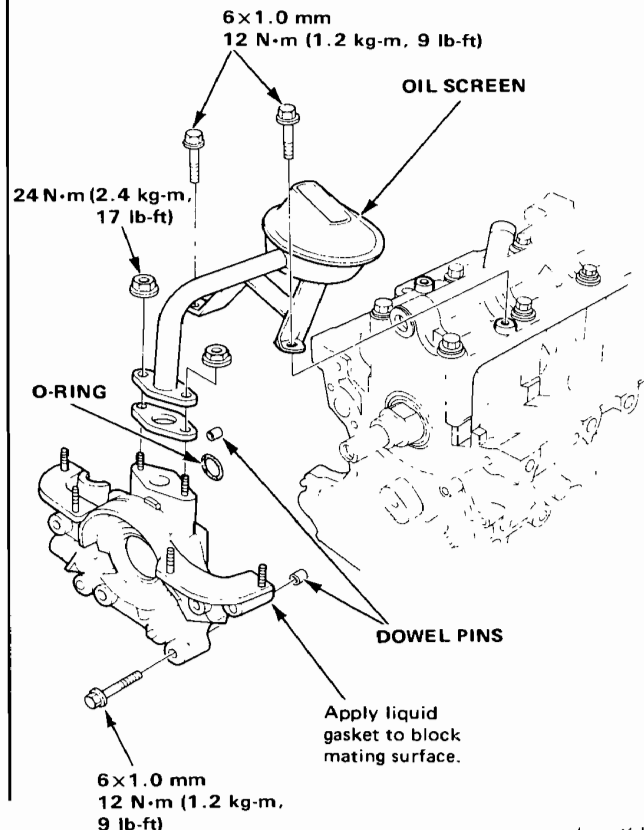
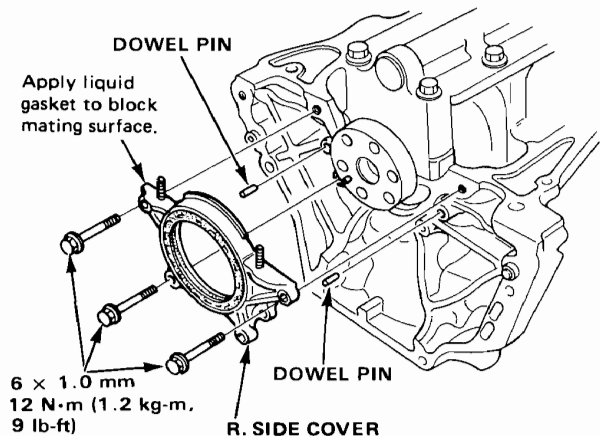
NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.

5. Install the thrust washers, main bearing halves and cap, check clearance with plastigage (page 7-5), then torque the nuts to 55 N·m (5.5kg-m, 40 lb-ft). Oil thrust washer surfaces.
6. Check the rod bearing clearance with plastigage (page 7-5), then torque nuts to 32 N·m (3.2 kg-m, 23 lb-ft).

NOTE: Reference numbers on connecting rod are for big-end bore tolerance and do NOT indicate the position of piston in engine.

CAUTION: Whenever any crankshaft or connecting rod bearing is replaced, after reassembly run the engine at idling speed until it reaches normal operating temperature, then continue to run for approximately 15 minutes.

7. Apply non-hardening liquid gasket to the block mating surface of the right side cover and oil pump case, and install them on the engine block.



(cont'd)

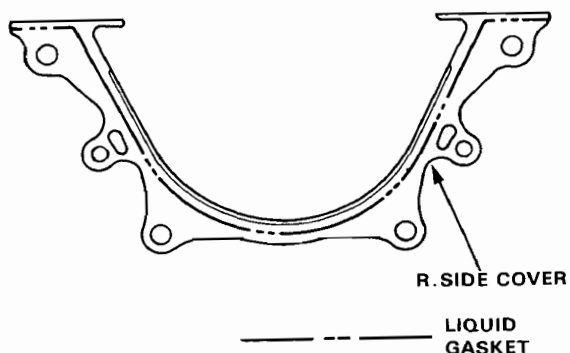
Craukshaft

Installation (cont'd)

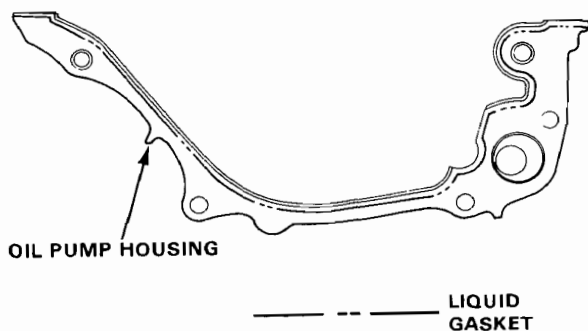
NOTE:

- Use HONDA PART NO 08740-99986 for the liquid gasket.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket by starting with an even bend, centered between edges of the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not allow the sealant to dry before assembly.
- Wait at least 30 minutes after assembly before filling the engine with oil.

R.side cover side:



Oil pump side

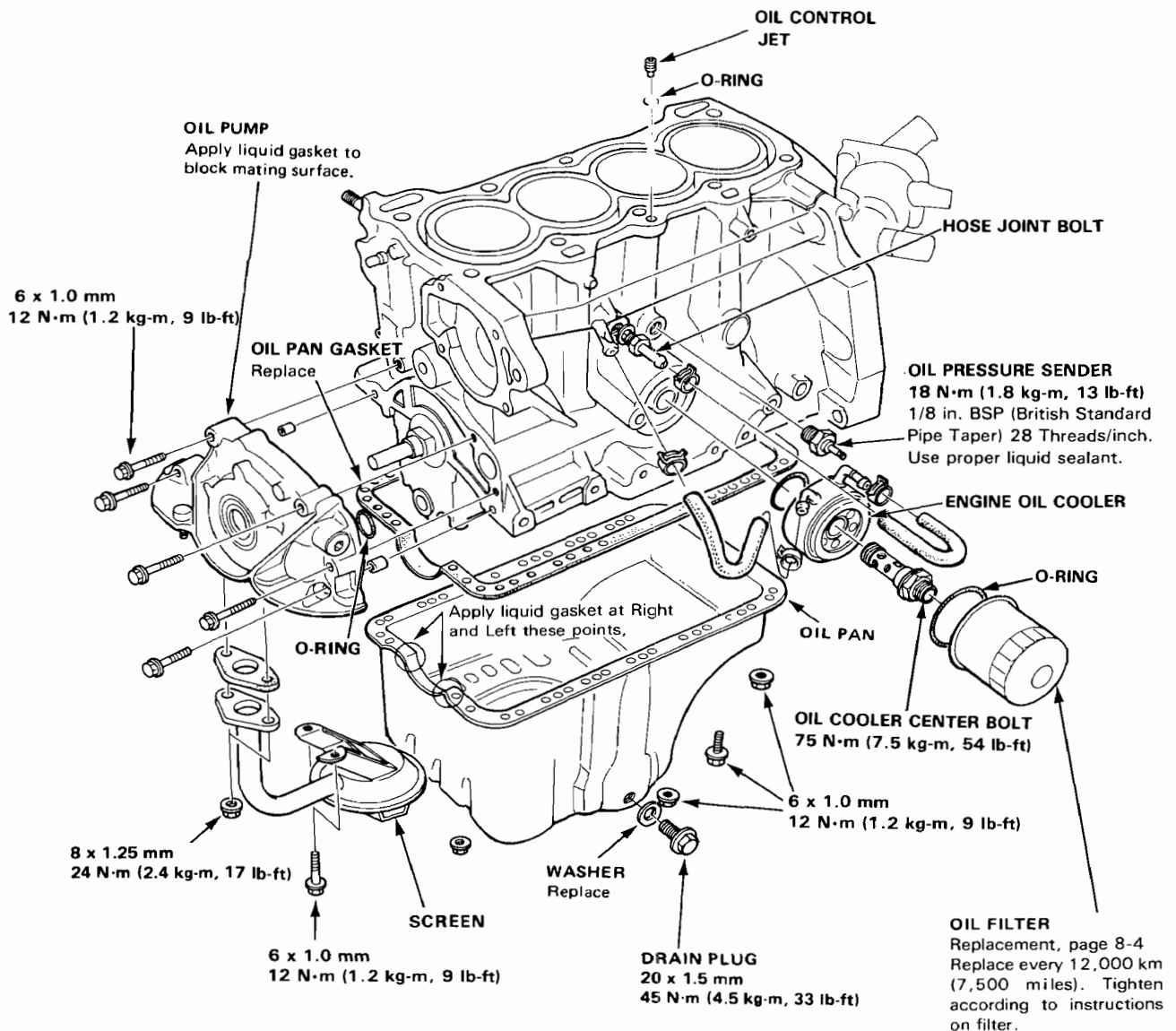


8. Install the oil strainer.
9. Install the oil pan.

Engine Lubrication

Illustrated Index

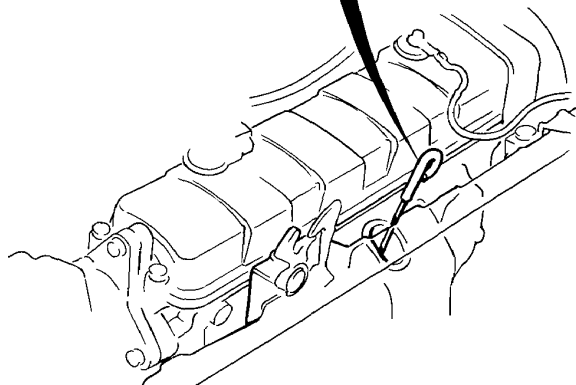
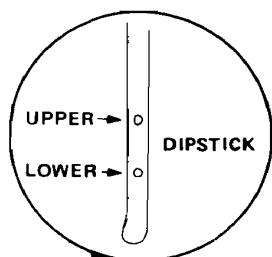
NOTE: Use new O-rings whenever reassembling.



Oil Level

Inspection

1. Check engine oil with the engine off and the car parked on level ground.
2. Make certain that the oil level indicated on the dipstick is between the upper and lower marks.
3. If the level has dropped close to the lower mark, add oil until it reaches the upper mark.



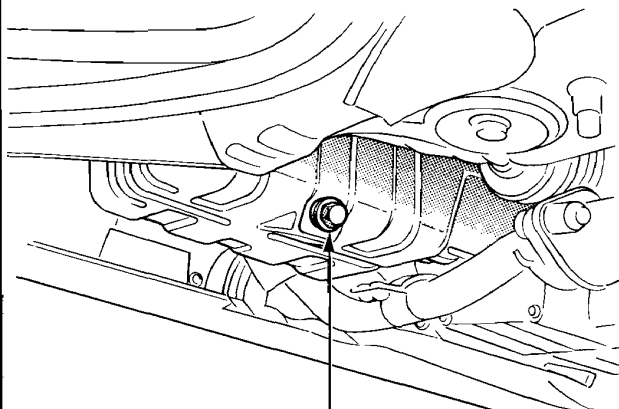
Engine Oil



Replacement

1. Warm up the engine.
2. Drain the engine oil.

NOTE: Remove the filler cap to speed draining.



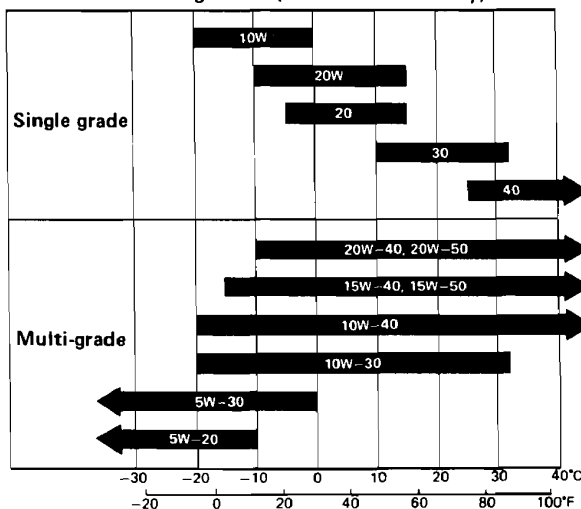
OIL PAN DRAIN PLUG
45 N·m (4.5 kg·m, 33 lb·ft)

3. Reinstall the drain plug with a new washer, and refill with the recommended oil.

Capacity	3.0 lit (3.2 US qt., 2.6 Imp. qt.)
	Exclude Oil filter
	3.5 lit (3.7 US qt., 3.1 Imp. qt.)
	Adding replace oil filter
	4.0 lit (4.2 US qt., 3.5 Imp. qt.)
	Means designed valve
Change	Every 12,000 km (7,500 mi.)

NOTE: Oil filter should be replaced at each oil change.

Recommended Engine Oil (SE or SF Grade only)



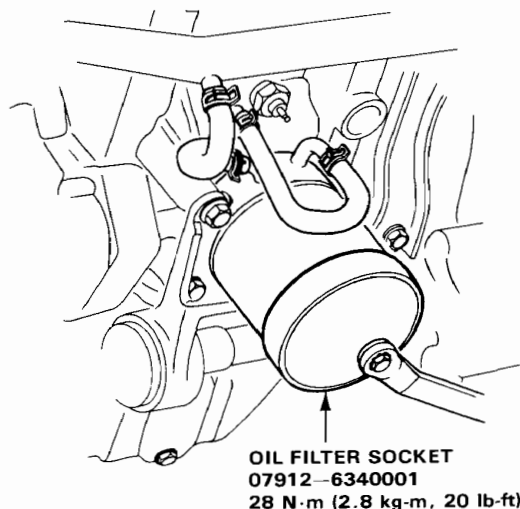
Expected Ambient Temperature before next oil change

Oil Filter

Replacement

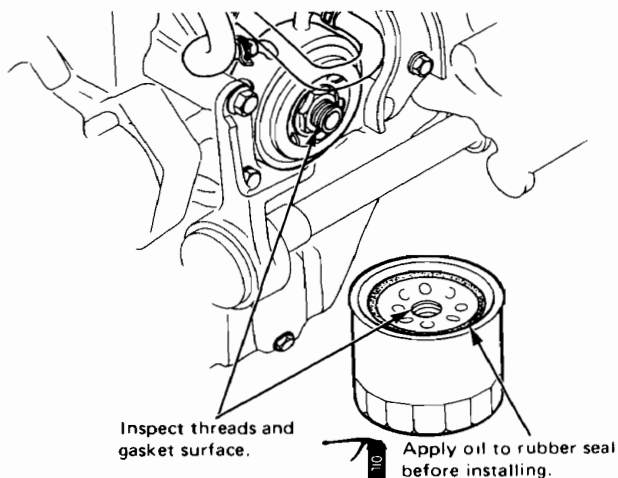
CAUTION: After the engine has been run, the exhaust pipes will be hot; be careful when working around the exhaust manifold.

1. Remove the oil filter with the special oil filter socket.



2. Inspect the threads and gasket on the new filter. Wipe off seat on engine block, then apply a light coat of oil to gasket, and install filter. Tighten according to instructions on, or with, the filter.

NOTE: Use only filters with a built-in bypass system.



Oil Pressure

Test

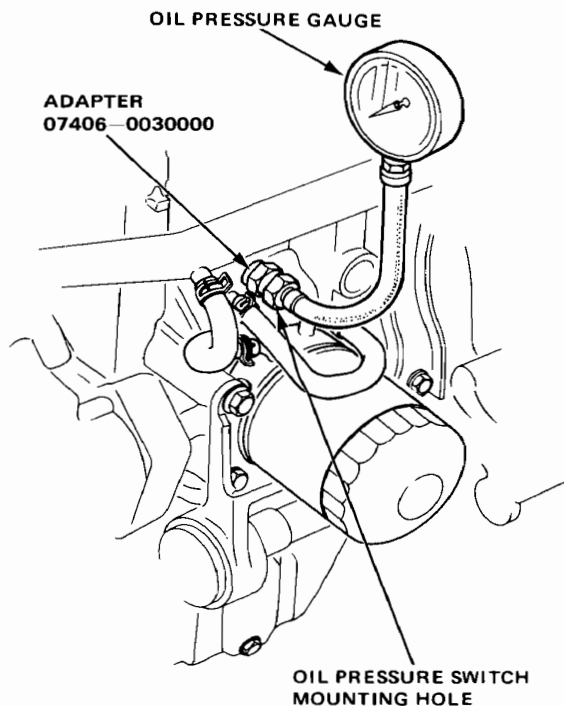
If the oil pressure warning light stays on with the engine running. Check the engine oil level. If the oil level is correct:

1. Remove the oil pressure sender and install an oil pressure gauge.
2. Start the engine and allow to reach operating temperature (fan comes on at least twice).
3. Pressure should be:

Engine Oil Pressure:

At Idle: 147 kPa (1.5 kg/cm², 21 psi) minimum
At 3,000 min⁻¹(rpm): 412–539 kPa (4.2–5.5 kg/cm² 60–78psi)

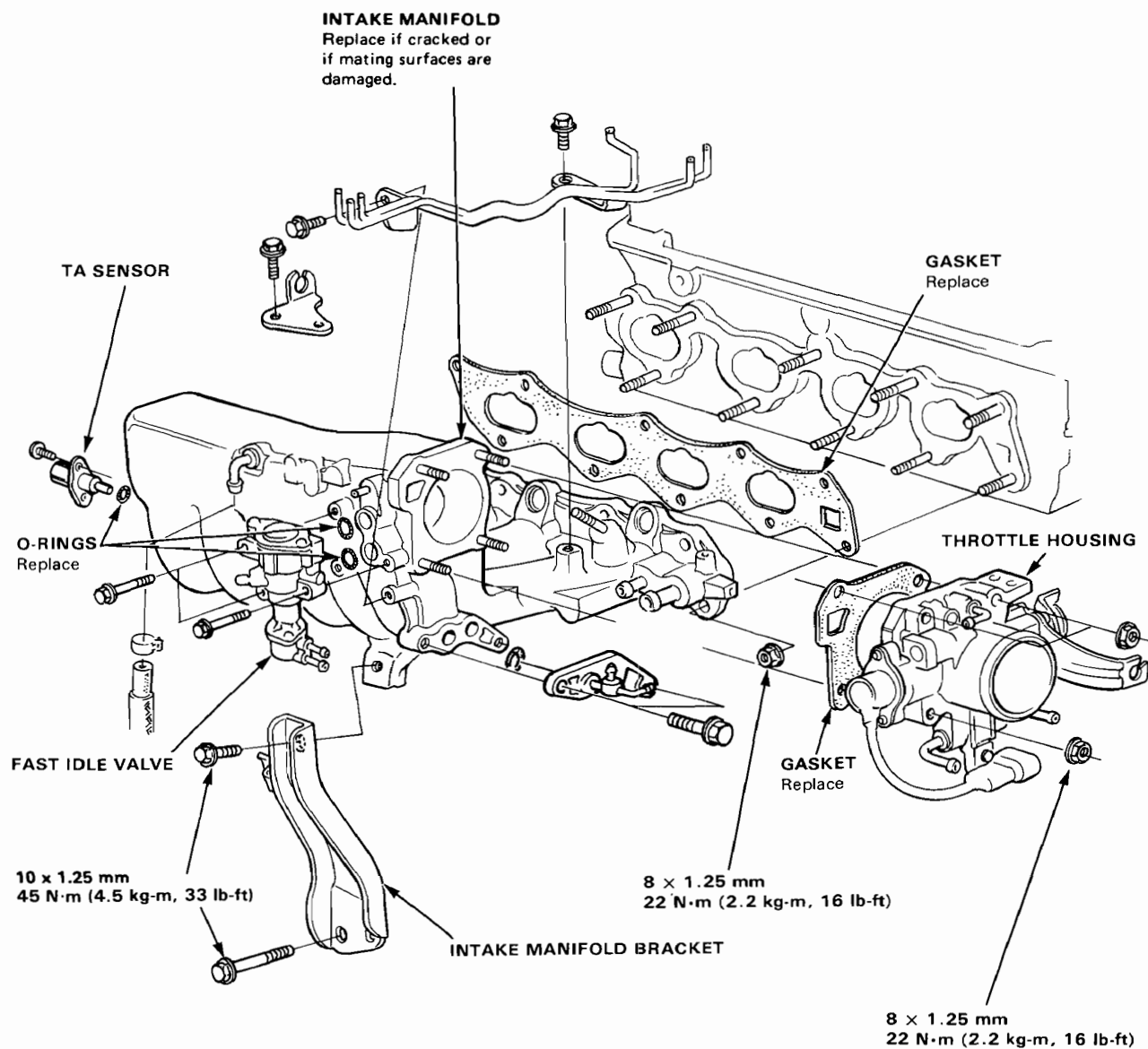
- If oil pressure is within specifications, replace oil pressure sender and recheck.
- If oil pressure is NOT within specifications, inspect oil pump.



Intake Manifold

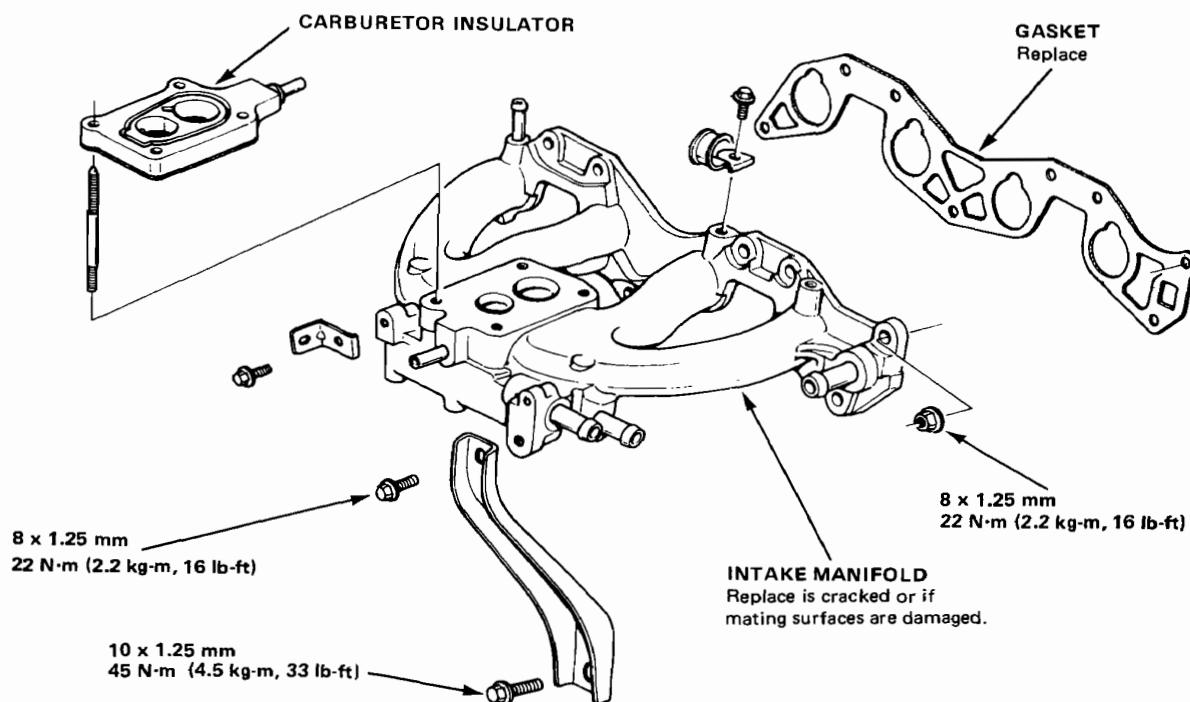
Illustrated Index

ZC1 Engine





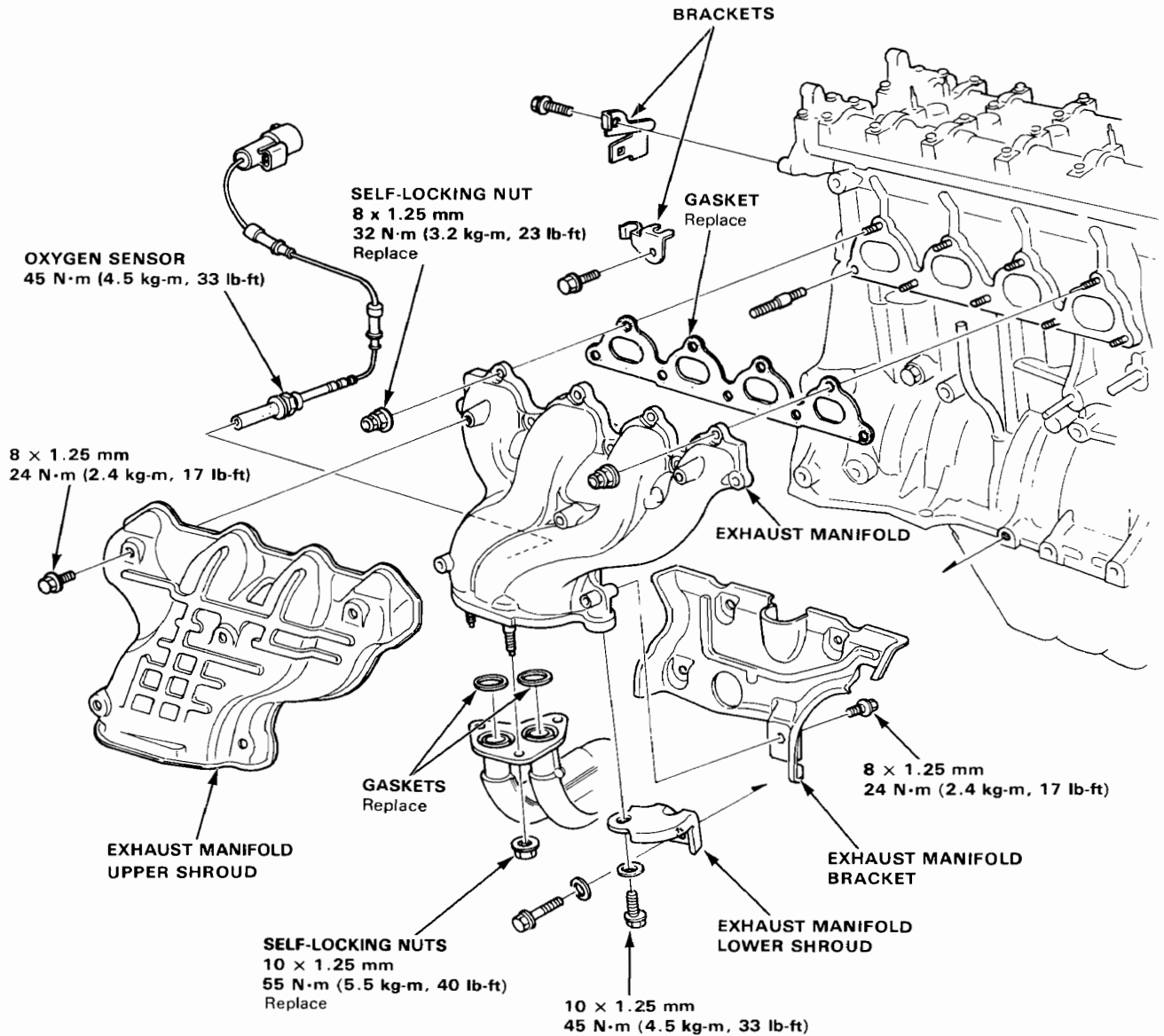
EW2 Engine (KY type)



Exhaust Manifold

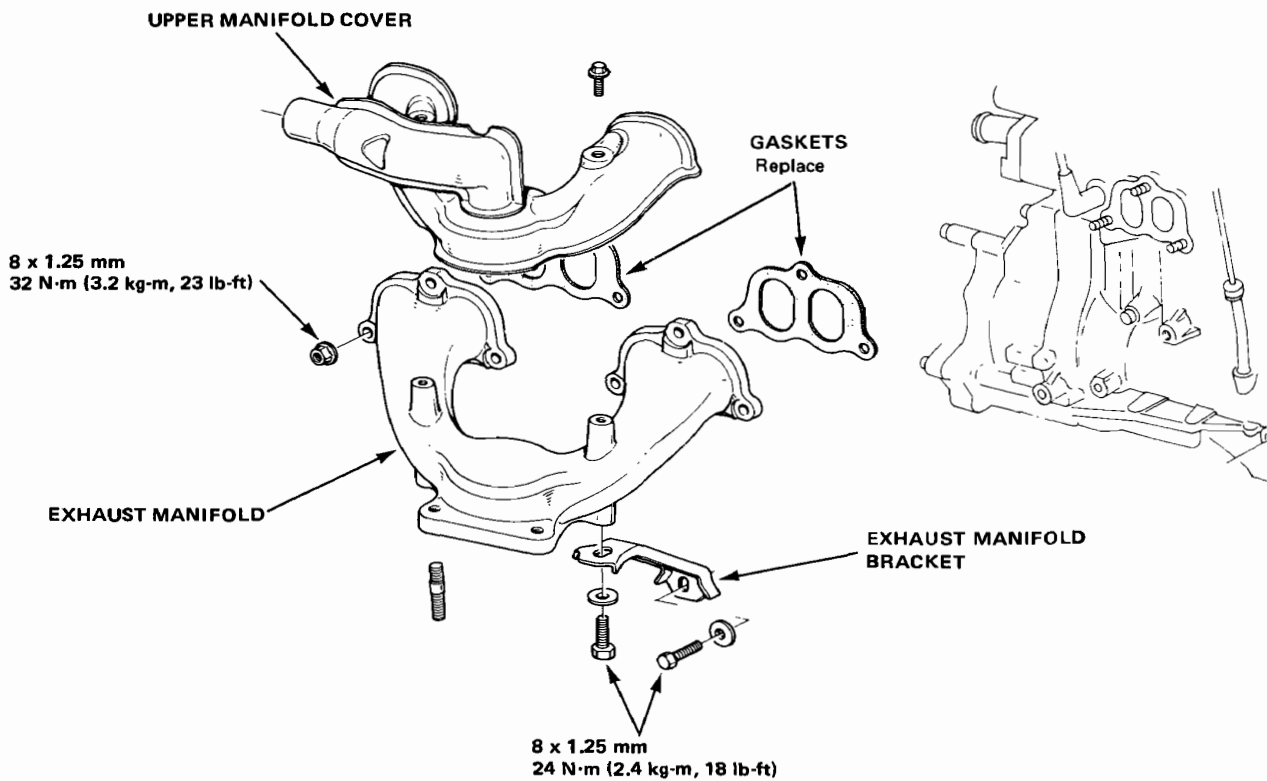
Illustrated Index

ZC1 Engine





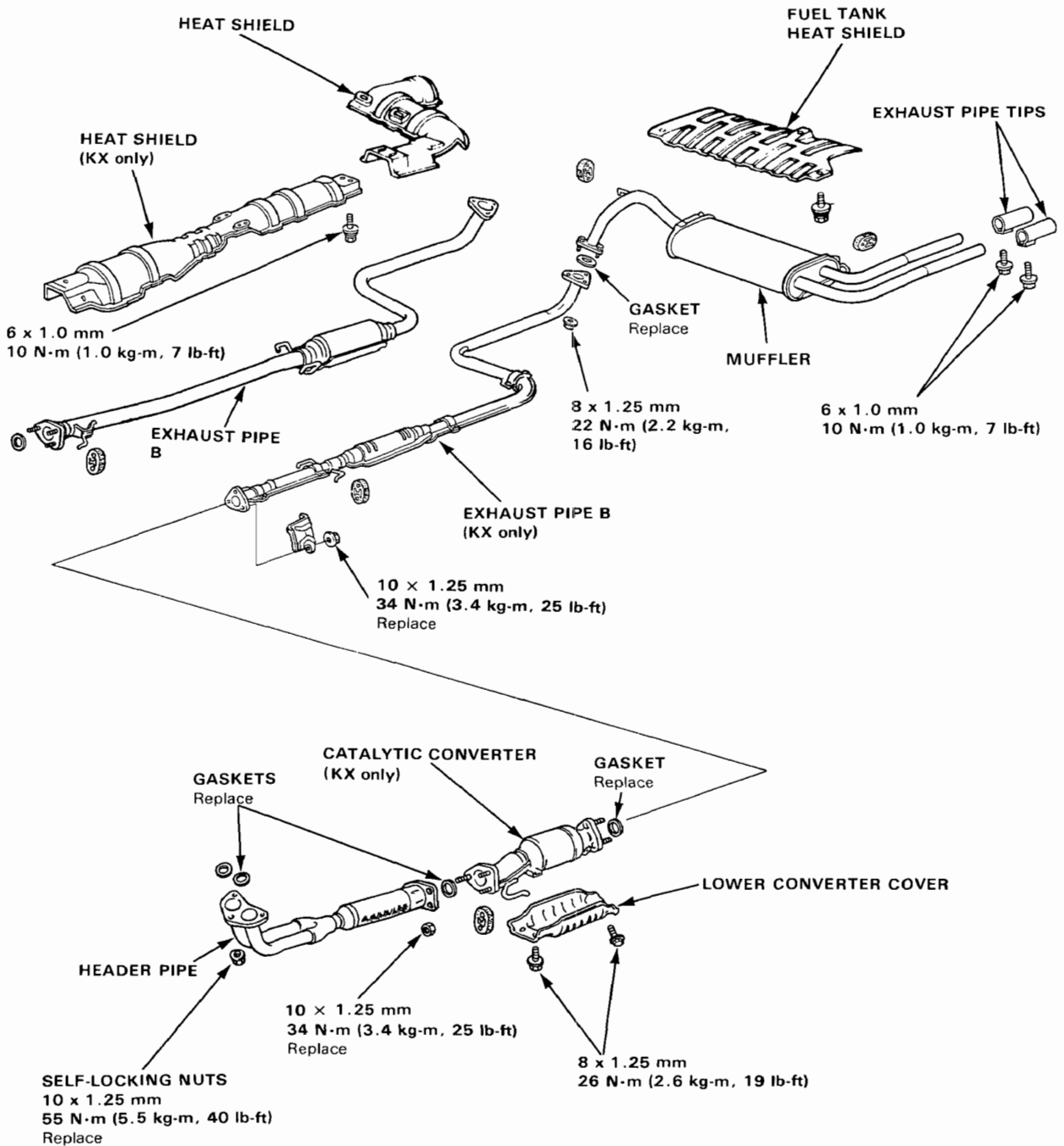
EW2 Engine (KY type)



Exhaust Pipe and Muffler

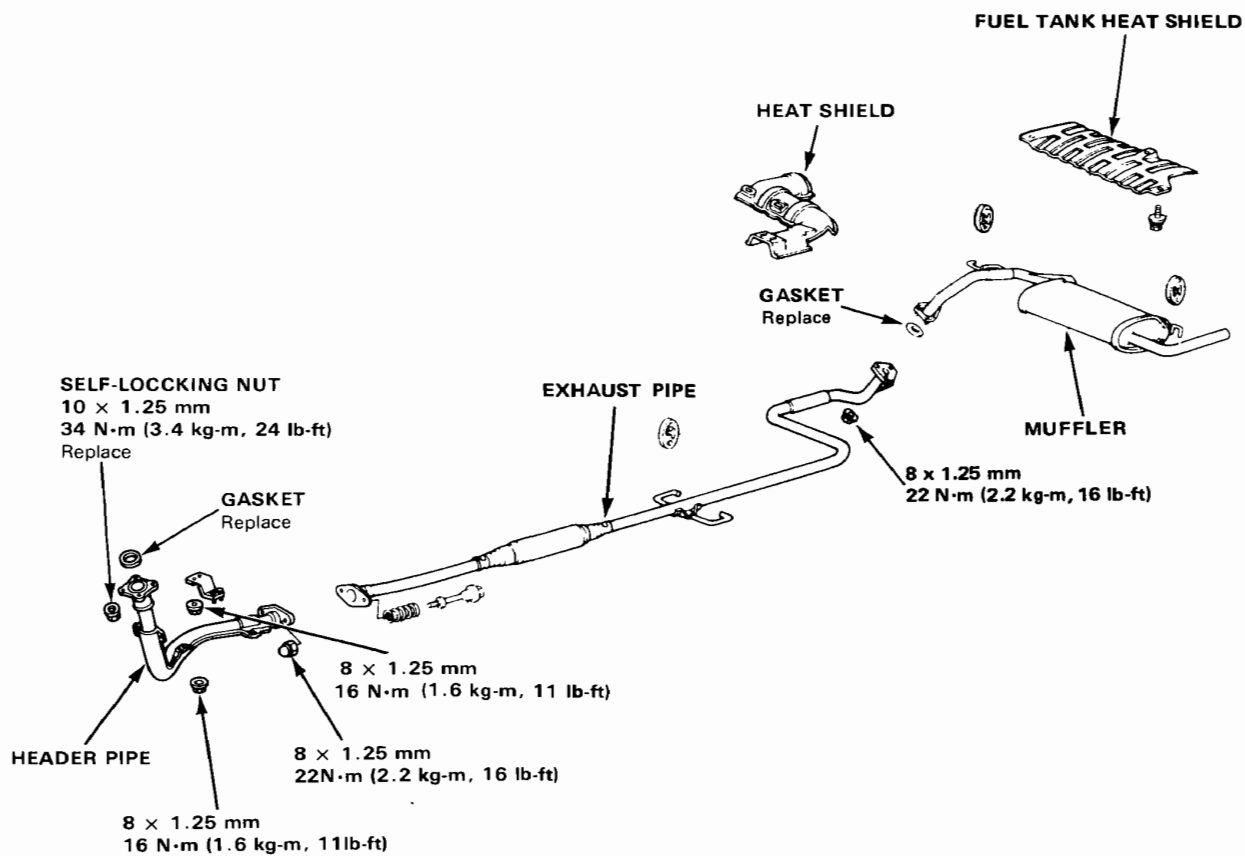
Replacement

ZC1 Engine





EW2 Engine (KY type)



Radiator

Replacement

WARNING System is under high pressure when engine is hot.

To avoid danger of releasing scalding coolant, remove cap only when engine is cool.

Total Cooling System Capacity (Incl. heater, incl. reserve tank)

5.6 liter (1.5 U.S. gal.)

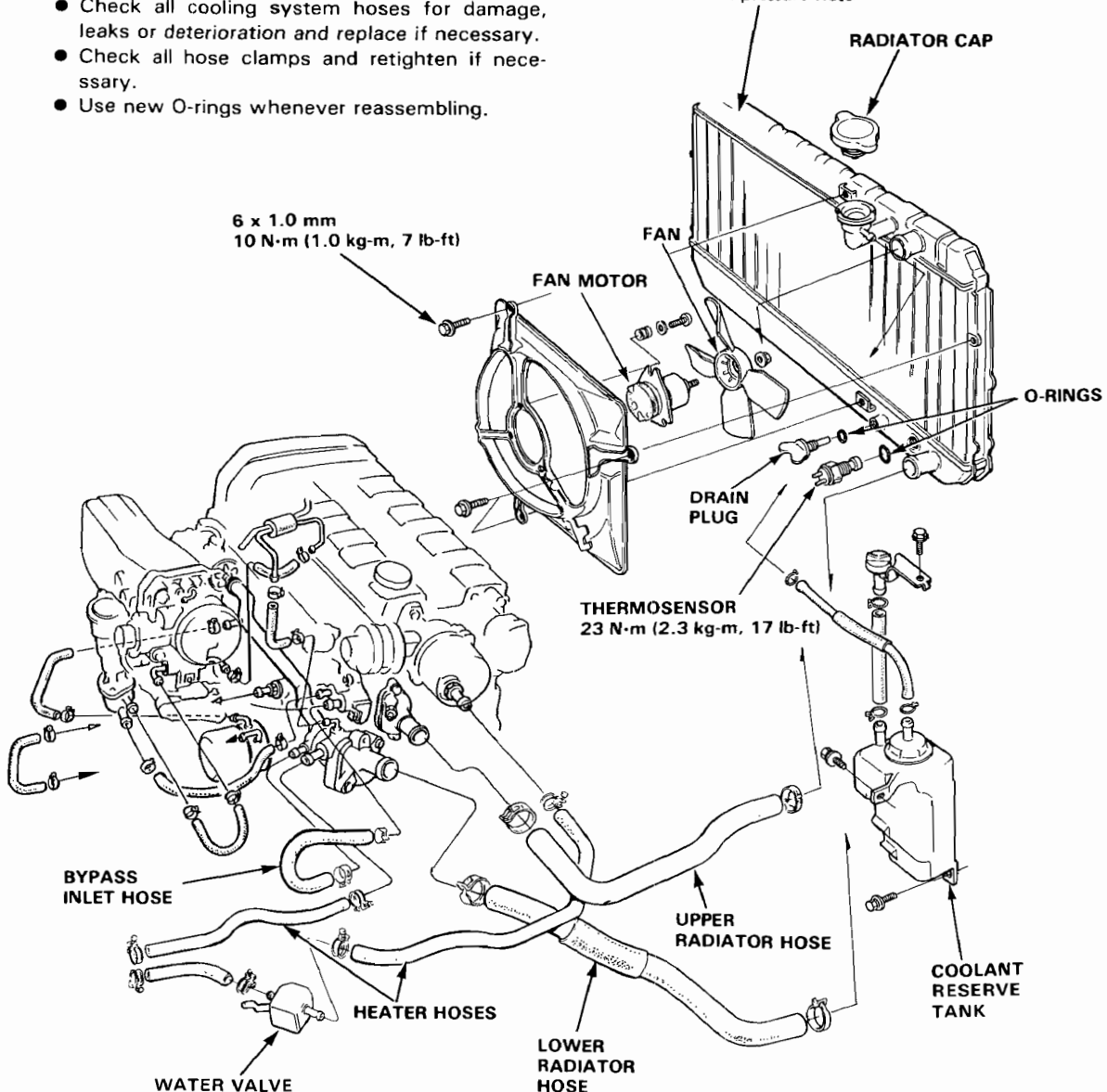
CAUTION: If any coolant spills on painted portions of the body, rinse it off immediately.

NOTE:

- Check all cooling system hoses for damage, leaks or deterioration and replace if necessary.
- Check all hose clamps and retighten if necessary.
- Use new O-rings whenever reassembling.

RADIATOR

Inspect soldered joints and seams for leaks.
Blow dirt out from between core fins with compressed air.
If insects, etc., are clogging radiator, wash them off with low pressure water





Refilling and Bleeding

1. Set the heater temperature lever to maximum heat.
2. When the radiator is cool, remove the radiator cap and drain plug, and drain the radiator.
3. Reinstall the radiator drain plug and tighten it securely.
4. Remove, drain and reinstall the reserve tank. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with coolant.
5. Mix the recommended anti-freeze with an equal amount of water, in a clean container.

NOTE:

- Use only HONDA-RECOMMENDED anti-freeze/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 than 60% will impair cooling efficiency and are not recommended.

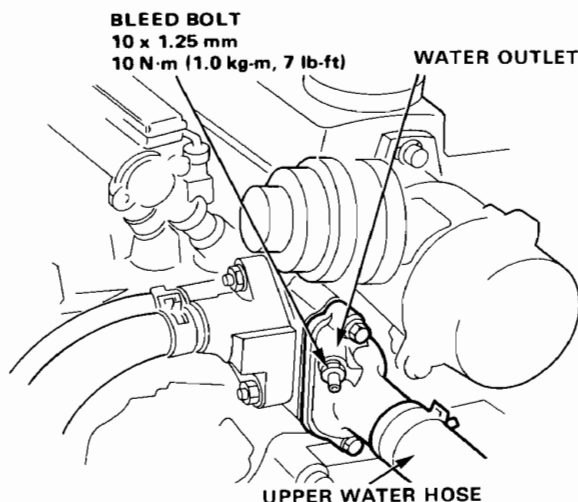
CAUTION:

- Do not mix different brand anti-freeze/coolants.
- Do not use additional rust inhibitors or anti-rust products; they may not be compatible with the recommended coolant.

Radiator Coolant Refill Capacity .

4.6 liter (1.2 U.S. gal.)

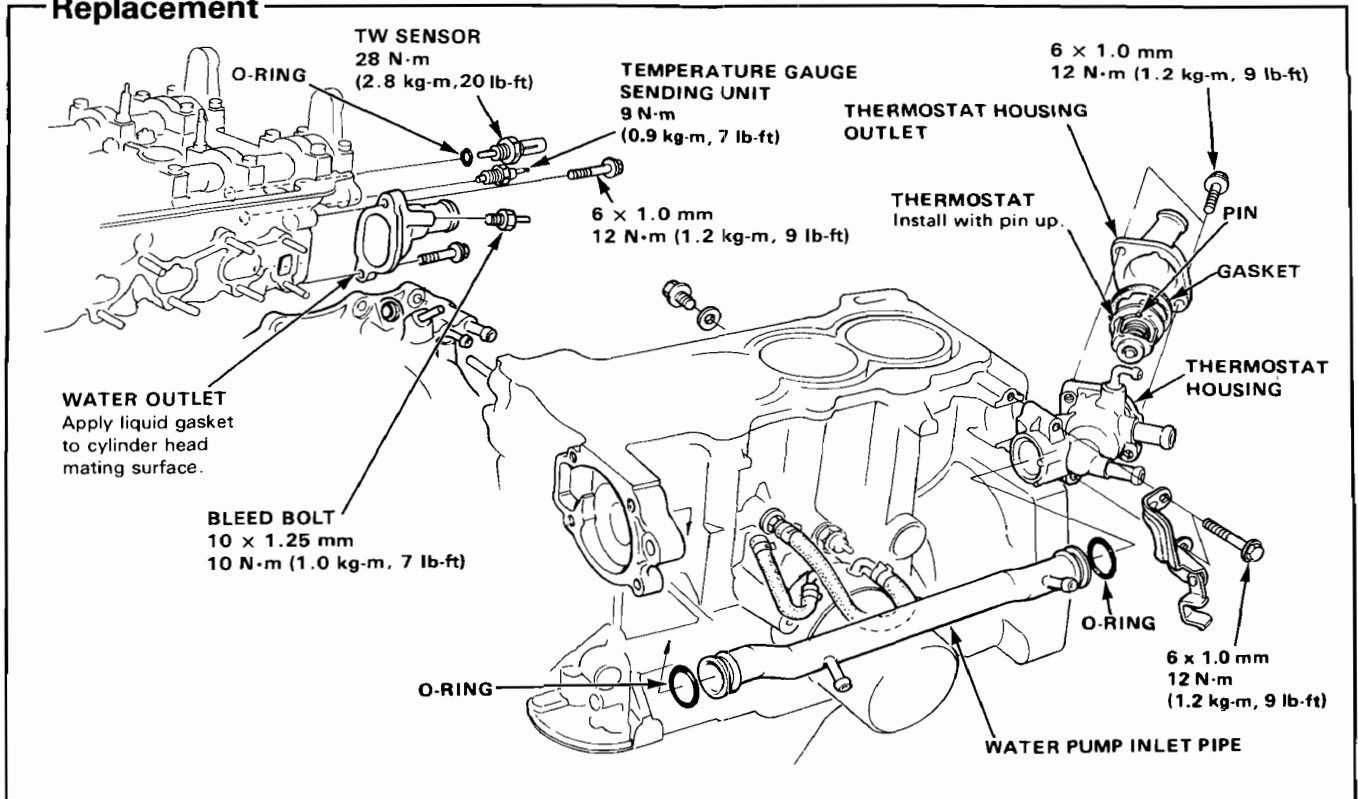
6. Loosen the air bleed bolt in the water outlet, then fill the radiator to the bottom of the filler neck with the coolant mixture. Tighten the bleed bolt as soon as coolant starts to run out in a steady stream without bubbles.



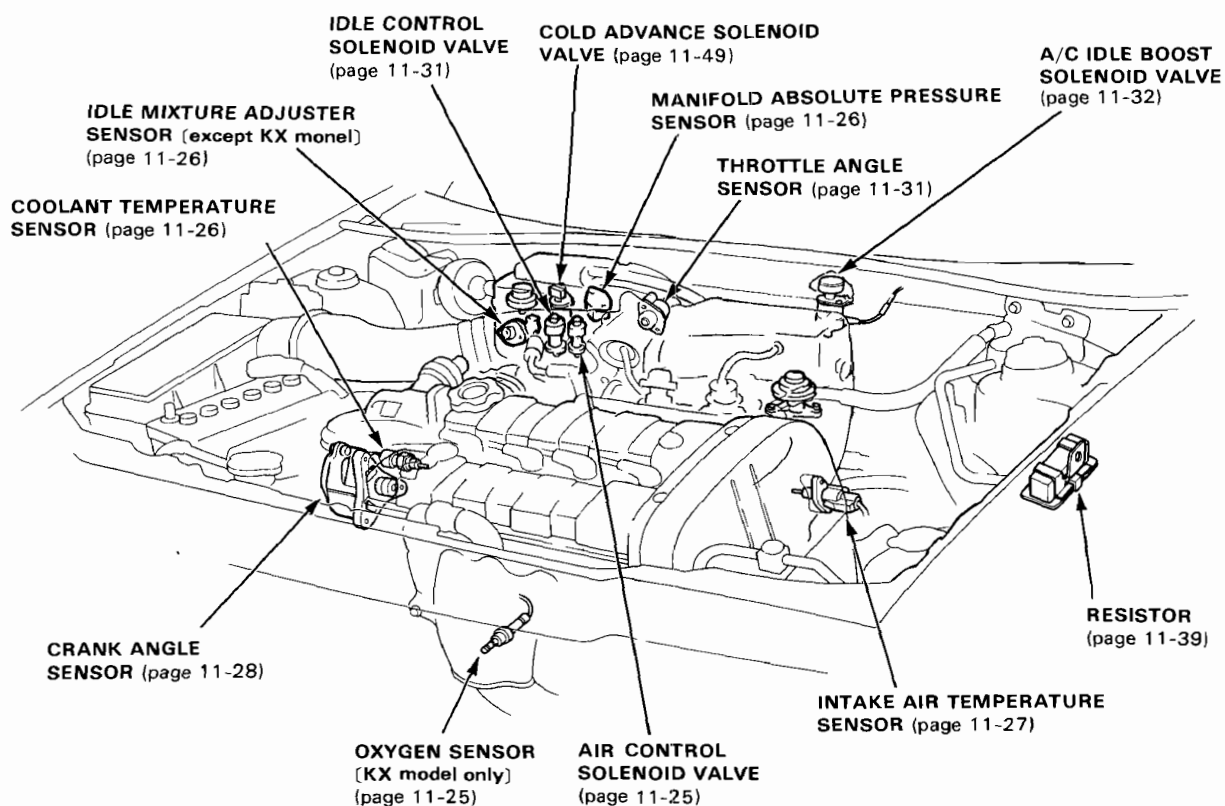
7. With the radiator cap off, start the engine and let it run until warmed up (fan goes on). Then, if necessary add more coolant mix to bring the level back up to the bottom of the filler neck.
8. Put the radiator cap on, then run the engine again and check for leaks.

Thermostat

Replacement

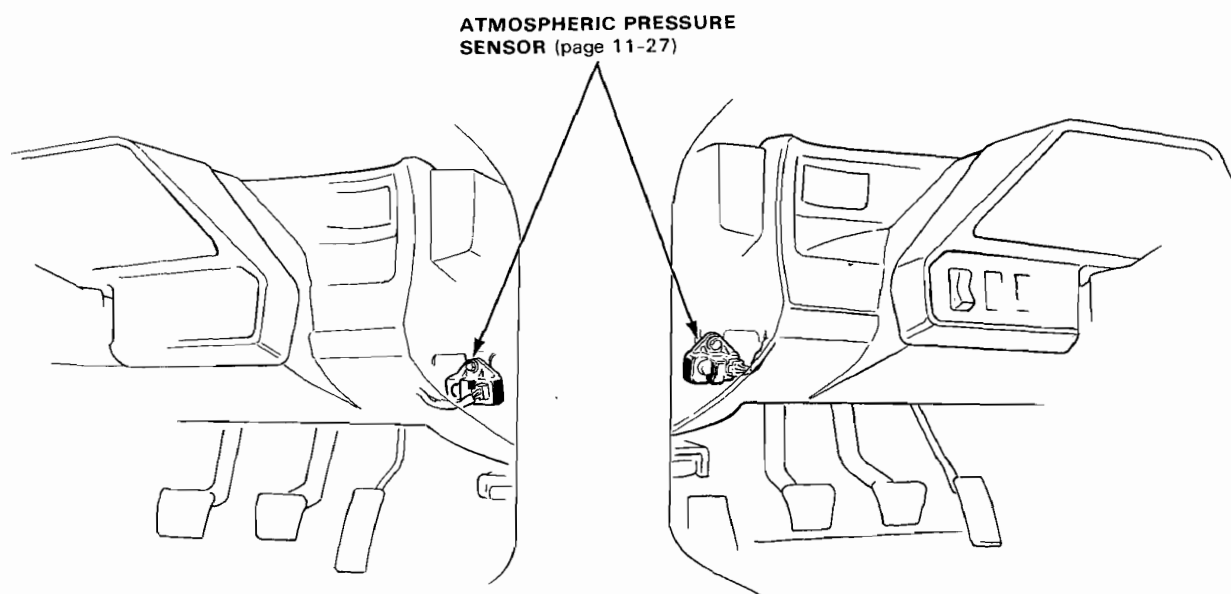


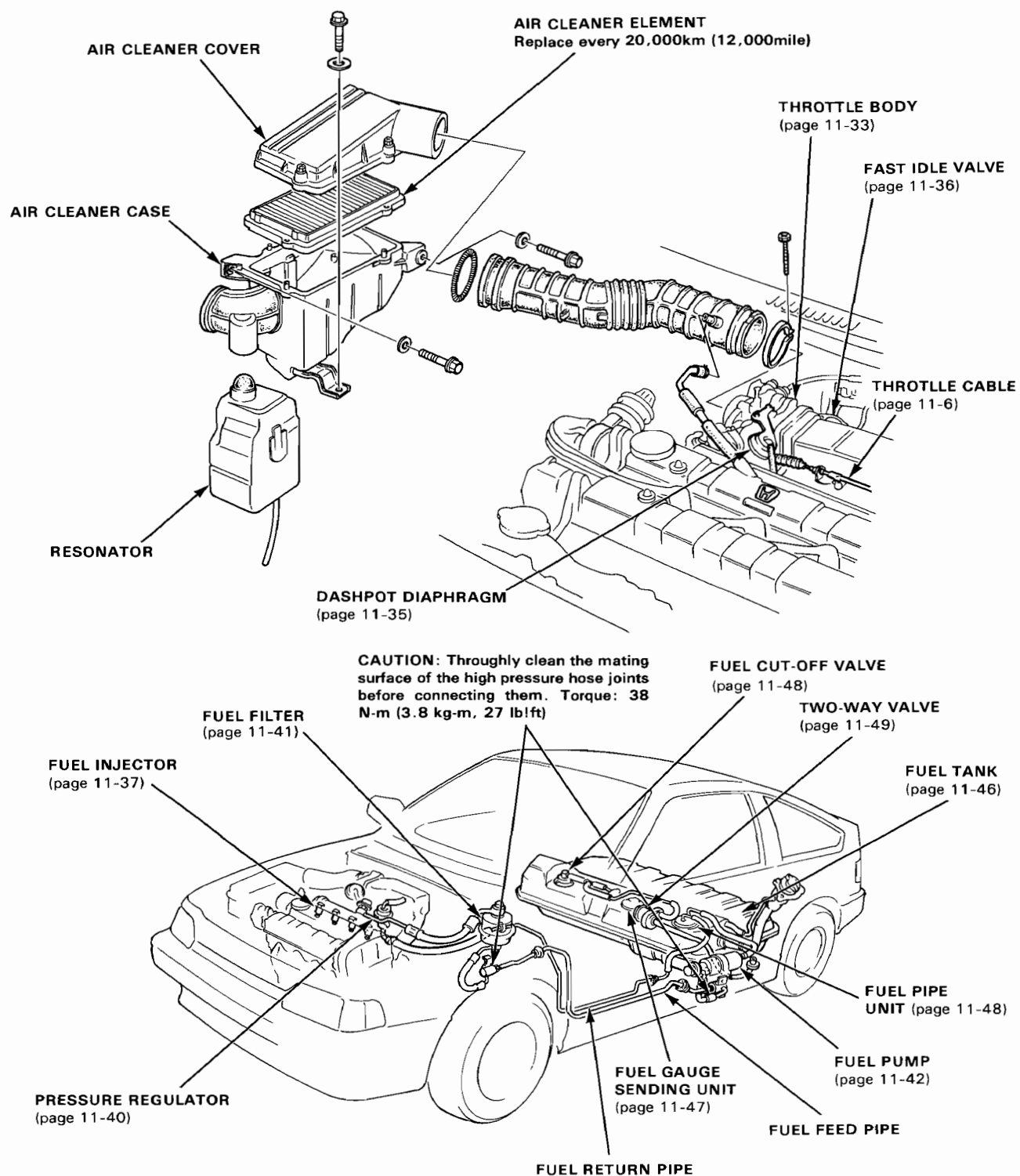
Index



[KE model]

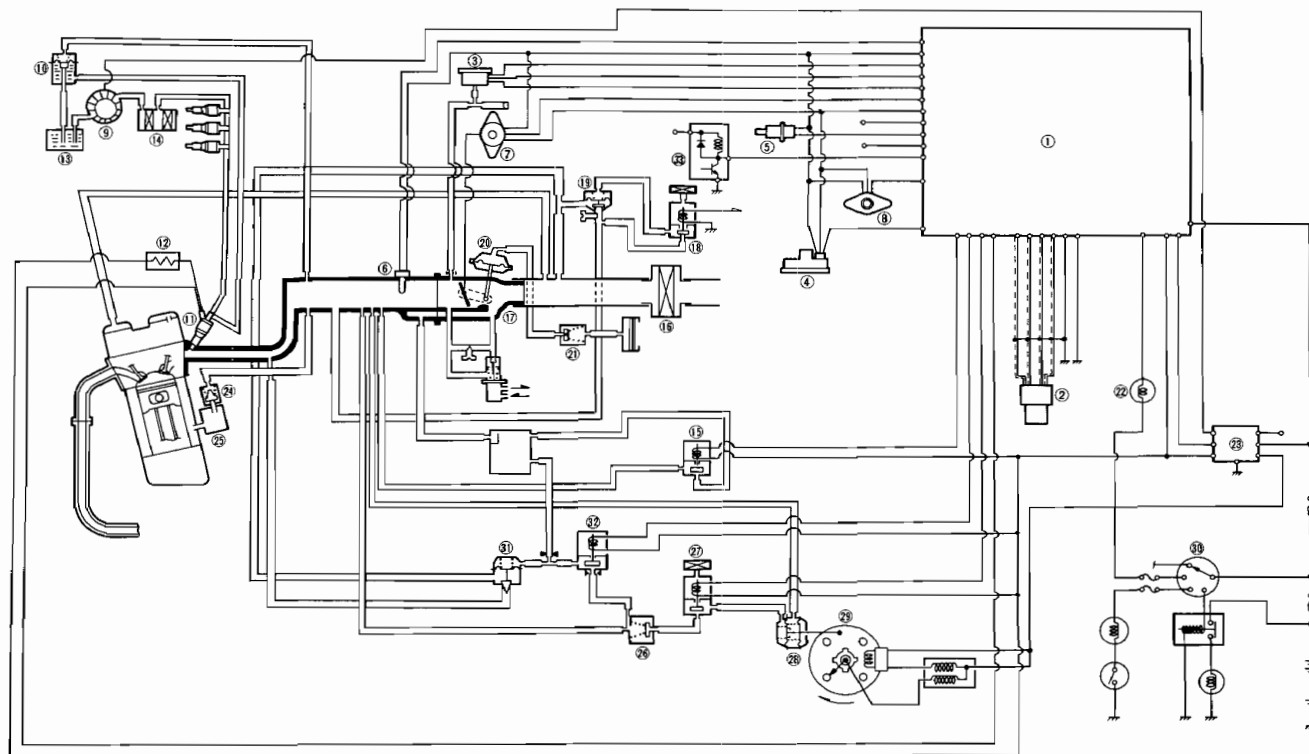
[Except KE model]





Vacuum and Electrical Connections

[Except KX model]

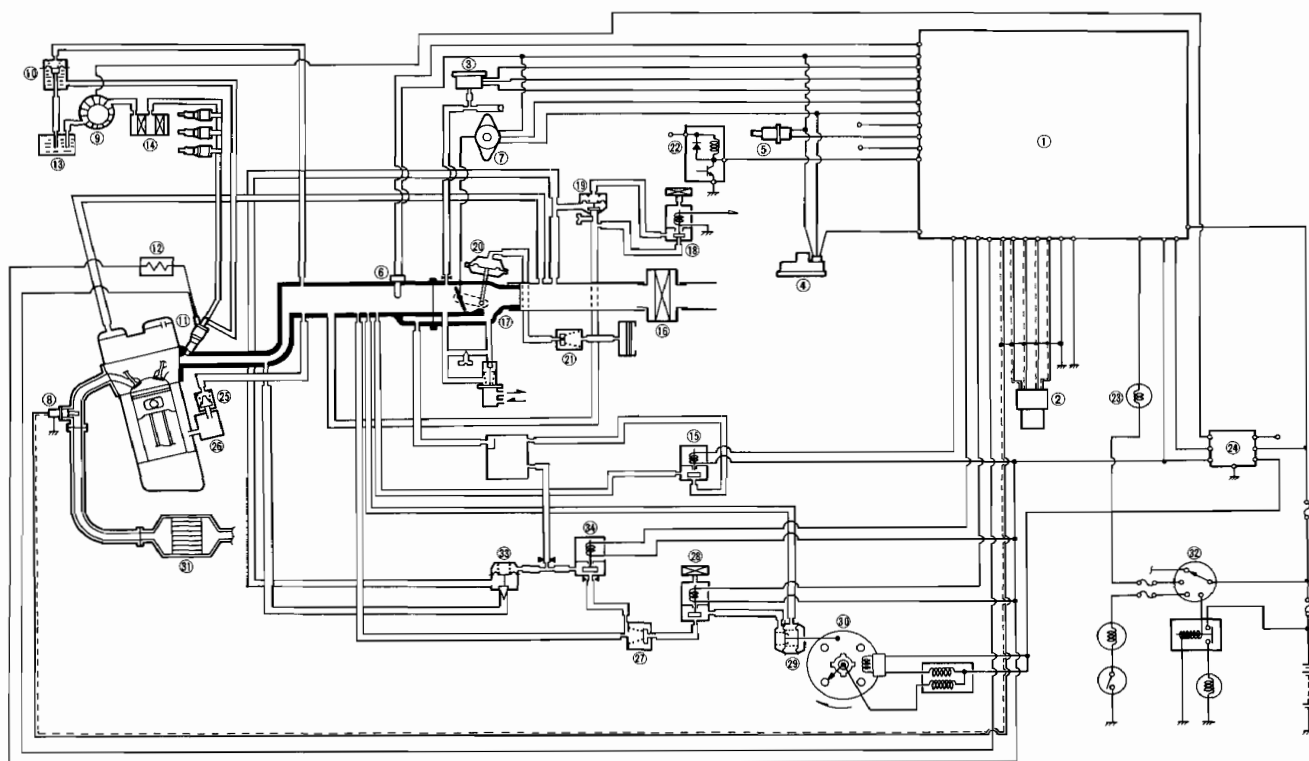


- ① ELECTRONIC CONTROL UNIT (ECU)
- ② CRANK ANGLE SENSOR
- ③ MANIFOLD ABSOLUTE PRESSURE SENSOR
- ④ ATMOSPHERIC PRESSURE SENSOR
- ⑤ COOLANT TEMPERATURE SENSOR
- ⑥ INTAKE AIR TEMPERATURE SENSOR
- ⑦ THROTTLE ANGLE SENSOR
- ⑧ IDLE MIXTURE ADJUSTER SENSOR
- ⑨ FUEL PUMP
- ⑩ PRESSURE REGULATOR
- ⑪ INJECTOR
- ⑫ RESISTOR
- ⑬ FUEL TANK
- ⑭ FUEL FILTER
- ⑮ IDLE CONTROL SOLENOID VALVE
- ⑯ AIR CLANER

- ⑰ THROTTLE BODY
- ⑱ A/C IDLE BOOST SOLENOID VALVE
- ⑲ A/C IDLE BOOST VALVE
- ⑳ DASHPOT DIAPHRAGM
- ㉑ DASHPOT CHECK VALVE
- ㉒ PGM-FI WARNING LIGHT
- ㉓ MAIN RELAY
- ㉔ PCV VALVE
- ㉕ BREATHER CHAMBER
- ㉖ CHECK VALVE
- ㉗ COLD ADVANCE SOLENOID VALVE
- ㉘ VACUUM ADVANCE DIAPHRAGM
- ㉙ DISTRIBUTOR
- ㉚ IGNITION SWITCH
- ㉛ AIR VALVE
- ㉜ AIR CONTROL SOLENOID VALVE
- ㉝ ALTERNATOR



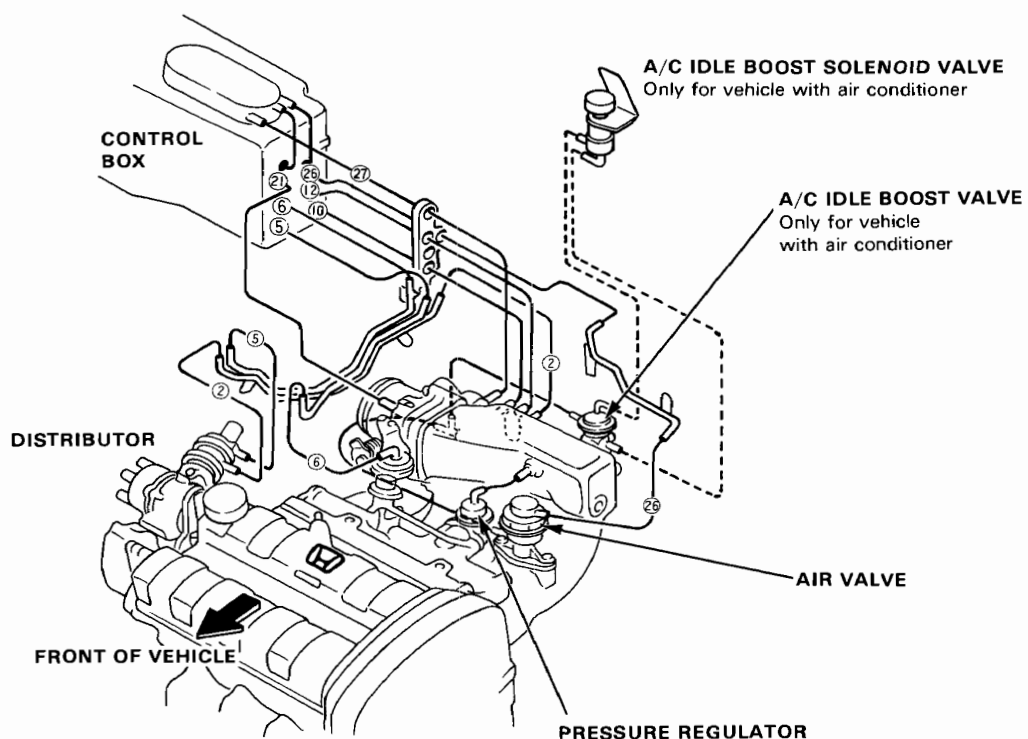
[KX model]



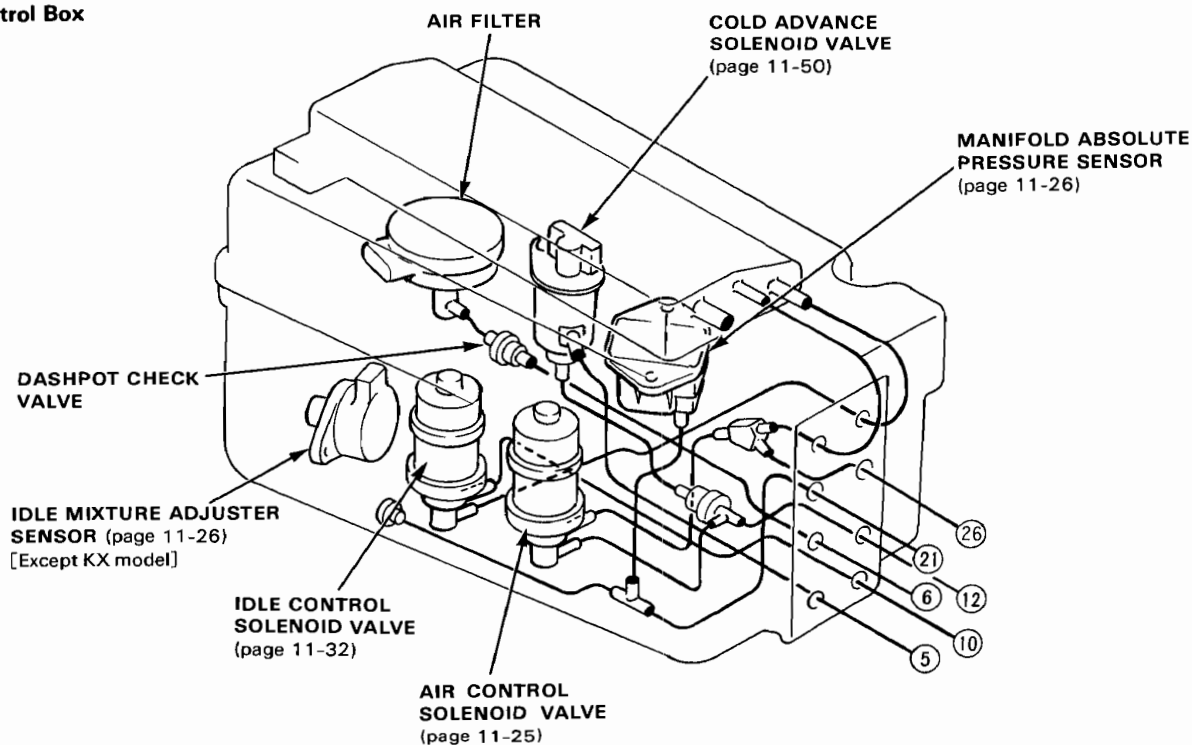
- ① ELECTRONIC CONTROL UNIT (ECU)
- ② CRANK ANGLE SENSOR
- ③ MANIFOLD ABSOLUTE PRESSURE SENSOR
- ④ ATMOSPHERIC PRESSURE SENSOR
- ⑤ COOLANT TEMPERATURE SENSOR
- ⑥ INTAKE AIR TEMPERATURE SENSOR
- ⑦ THROTTLE ANGLE SENSOR
- ⑧ OXYGEN SENSOR
- ⑨ FUEL PUMP
- ⑩ PRESSURE REGULATOR
- ⑪ INJECTOR
- ⑫ RESISTOR
- ⑬ FUEL TANK
- ⑭ FUEL FILTER
- ⑮ IDLE CONTROL SOLENOID VALVE
- ⑯ AIR CLEANER
- ⑰ THROTTLE BODY

- ⑱ A/C IDLE BOOST SOLENOID VALVE
- ⑲ A/C IDLE BOOST VALVE
- ⑳ DASHPOT DIAPHRAGM
- ㉑ DASHPOT CHECK VALVE
- ㉒ ALTERNATOR
- ㉓ PGM-FI WARNING LIGHT
- ㉔ MAIN RELAY
- ㉕ PCV VALVE
- ㉖ BREATHER CHAMBER
- ㉗ CHECK VALVE
- ㉘ COLD ADVANCE SOLENOID VALVE
- ㉙ VACUUM ADVANCE DIAPHRAGM
- ㉚ DISTRIBUTOR
- ㉛ CATALYTIC CONVERTER
- ㉜ IGNITION SWITCH
- ㉝ AIR VALVE
- ㉞ AIR CONTROL SOLENOID VALVE

Interconnect Diagram



Control Box

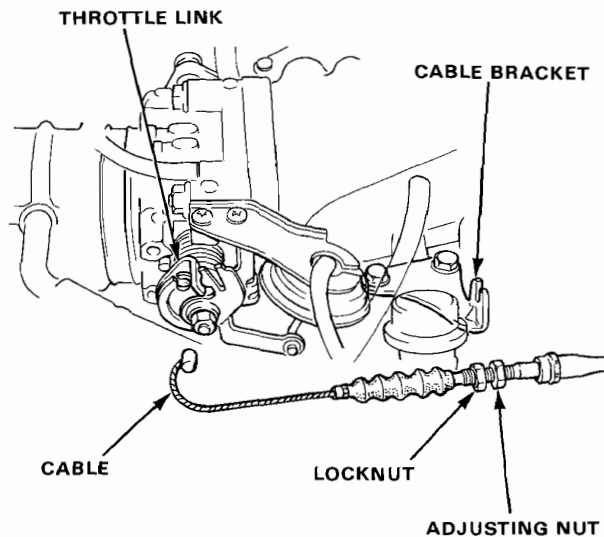


Throttle Cable



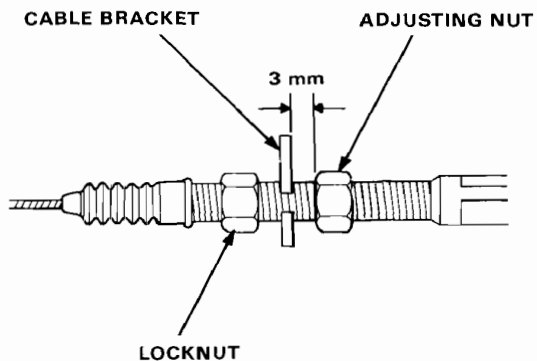
Replacement

1. Loosen the locknut and remove the throttle cable from the cable bracket.
2. Remove the cable from the throttle linkage.



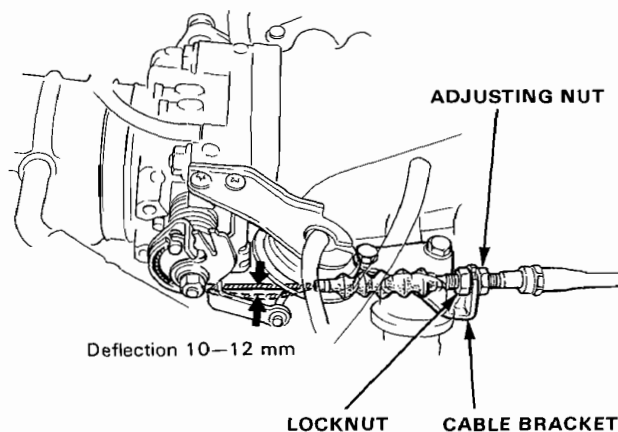
Installation

1. Hold the cable sheath, removing all slack from the cable.
2. Turn the adjusting nut until it is 3 mm away from the cable bracket.
3. Tighten the locknut. The cable deflection should now be 10–12 mm. If not, see Inspection/Adjustment.



Inspection/Adjustment

1. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
2. Check cable free play at the throttle linkage. Cable deflection should be 10–12 mm (0.39–0.47 in).



3. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
4. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator.

PGM-FI

Troubleshooting

Before starting troubleshooting on the PGM-FI system, check that other items that affect engine performance are within specification. Check the valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed on pages 11-8 and 11-9.

CAUSAL PART SYMPTOM		ELECTRONIC POWER SOURCE	ECU	INJECTOR	FUEL PUMP	FUEL LINE	FAST IDLE MECHANISM	THROTTLE BODY	CRANK ANGLE SENSOR	MANIFOLD ABSOLUTE PRES- SURE SENSOR
ENGINE WON'T START	WHEN COLD	• BLOWN FUSE • FAULTY MAIN RELAY	FAULTY ECU	• OPEN/SHORT CIRCUIT • DAMAGED INJECTORS	• FAULTY PUMP/MAIN RELAY • POOR GROUNDING	• FROZEN FUEL LINE • BLOCKED FILTER			• OPEN/SHORT CIRCUIT • FAULTY SENSOR	
	AT RESTART- ING WHEN HOT	↑	↑	↑	↑				↑	
DIFFICULT TO START ENGINE	WHEN COLD		↑	• OPEN/SHORT CIRCUIT • FAULTY INJECTOR	↑	• ICE IN FUEL LINE • CLOGGED FILTER	• STUCK AIR BYPASS VALVE		↑	
	AT RESTART- ING WHEN HOT		↑	↑ VAPOR LOCK	↑	VAPOR LOCK			↑	
IRREGULAR IDLING	WHEN COLD		↑	• OPEN/SHORT CIRCUIT • STUCK INJECTOR			STUCK AIR BYPASS VALVE		↑	• OPEN/SHORT CIRCUIT • BROKEN/DIS- CONNECTED HOSE • FAULTY SENSOR
	AFTER WARMING UP		↑	↑			↑		↑	↑
	AFTER RESTART- ING WHEN HOT		↑	↑ VAPOR LOCK		VAPOR LOCK	IDLE ADJUST- ING SCREW OUT OF AD- JUSTMENT		↑	↑
	RPM TOO HIGH						STUCK AIR BYPASS VALVE	THROTTLE VALVE STUCK OPEN		↑
	RPM TOO LOW						IDLE ADJUST- ING SCREW OUT OF AD- JUSTMENT			
FREQUENT STALLING	WHILE WARMING UP			• OPEN/SHORT CIRCUIT • STUCK INJECTOR	• FAULTY PUMP/MAIN RELAY • POOR GROUNDING	• IMPROPER LINE PRES- SURE • CLOGGED FILTER	STUCK AIR BYPASS VALVE			• OPEN/SHORT CIRCUIT • BROKEN/DIS- CONNECTED HOSE • FAULTY SENSOR
	AFTER WARMING UP		↑	↑	↑	↑	IDLE ADJUST- ING SCREW OUT OF AD- JUSTMENT		• OPEN/SHORT CIRCUIT • FAULTY SENSOR	↑
POOR PER- FORMANCE	POOR DRIVE- ABILITY HIGH FUEL CONSUMPTION		↑	↑	↑	↑	STUCK AIR BYPASS VALVE		↑	↑
	AFTER BURN		↑	↑						↑
	BACK FIRE		↑	↑	• FAULTY PUMP/MAIN RELAY • POOR GROUNDING	• IMPROPER LINE PRES- SURE • CLOGGED FILTER				↑
	KNOCKING		↑	↑	↑	↑				
	LACK OF POWER AT LOW RPM		↑	↑	↑	↑				
	LACK OF POWER AT MID RPM		↑	↑	↑	↑				• OPEN/SHORT CIRCUIT • BROKEN/DIS- CONNECTED HOSE • FAULTY SENSOR
	LACK OF POWER AT HIGH SPEED		↑		↑	↑		SECONDARY VALVE NOT OPENED FULLY		↑
WARNING/ INDICATOR LIGHT TURNS ON	PGM-FI WARNING LIGHT		↑							
	SELF DIAG- NOSIS INDICATORS		↑						• OPEN/SHORT CIRCUIT • FAULTY SENSOR	• OPEN/SHORT CIRCUIT • BROKEN/DIS- CONNECTED HOSE • FAULTY SENSOR

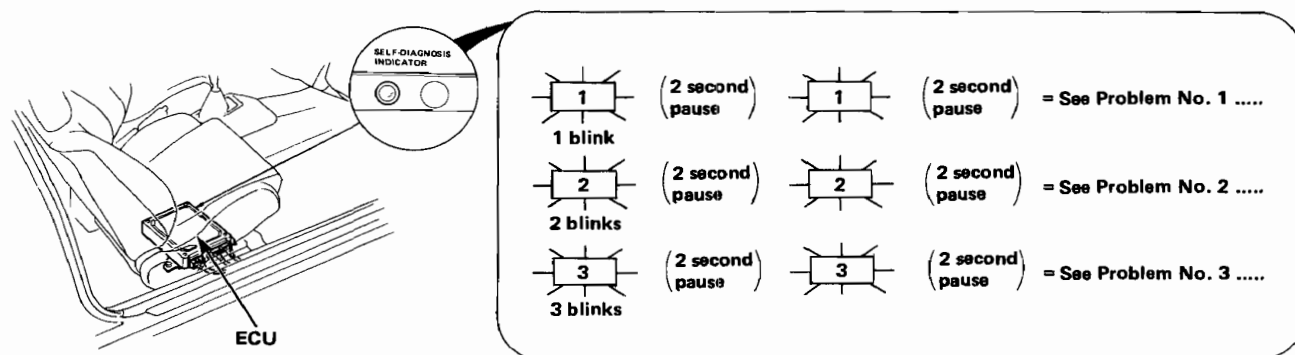


ATMOSPHERIC AIR PRES- SURE SENSOR	OXYGEN SENSOR [KX model only]	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR	SECONDARY AIR SUPPLY SYSTEM	IDLE MIXTURE ADJUSTER SENSOR [except KX model]	IDLE CON- TROL SYSTEM	IMPORTANT POINTS
								· CHECK FUEL PUMP/INJECTOR
								↑
· OPEN/SHORT CIRCUIT · FAULTY SENSOR		· OPEN/SHORT CIRCUIT · FAULTY SENSOR						· CHECK FUEL PUMP/INJECTOR · POSSIBLE TO START BY OPERATING THROTTLE? (STUCK AIR BYPASS VALVE)
								· CHECK FOR VAPOR LOCK IN INJECTOR · POSSIBLE TO START BY OPERATING THROTTLE? (VAPOR LOCK IN INJECTOR)
· OPEN/SHORT CIRCUIT · FAULTY SENSOR		· OPEN/SHORT CIRCUIT · FAULTY SENSOR						· CHECK IGNITION SYSTEM (SPARKS) AND EACH INJECTOR POSSIBLE TO START BY OPERATING THROTTLE (STUCK AIR BYPASS VALVE)
							FAULTY SOLE- NOID VALVE	↑
								· CHECK FOR VAPOR LOCK IN FUEL LINE · CHECK PCV VALVE FOR CLOGGING BY OPERATING THROTTLE
					FAULTY SOLENOID VALVE (STUCK OPEN)			· DISCONNECTED OR LEAKY VACUUM LINES · CHECK AIR BYPASS VALVE · CHECK SELF DIAGNOSIS INDICATORS
			SENSOR OUT OF ADJUST- MENT					
		· OPEN/SHORT CIRCUIT · FAULTY SENSOR		· OPEN/SHORT CIRCUIT · FAULTY SENSOR				· CHECK AIR BYPASS VALVE · CHECK COOLANT TEMPERATURE SENSOR
							FAULTY SOLE- NOID VALVE (RPM DOWN)	· CHECK IDLE SPEED · CHECK FOR FUEL CUT-OFF OPERATION
	· OPEN/SHORT CIRCUIT · FAULTY SENSOR	· OPEN/SHORT CIRCUIT · FAULTY SENSOR	· OPEN/SHORT CIRCUIT · FAULTY SENSOR	· OPEN/SHORT CIRCUIT · FAULTY SENSOR			FAULTY SOLE- NOID VALVE (STUCK OPEN)	· CHECK IGNITION TIMING · CHECK FOR FUEL CUT-OFF OPERATION
		↑	↑					↑
		↑	↑					· CHECK IGNITION TIMING · CHECK MANIFOLD AIR PRESSURE SENSOR/ INJECTORS
		↑	↑					· CHECK IGNITION TIMING
	· OPEN/SHORT CIRCUIT · FAULTY SENSOR	↑	↑					· CHECK IGNITION TIMING (DISCONNECTED OR BROKEN LINES) · CHECK INJECTORS
	↑	↑	↑					· CHECK IGNITION TIMING
								· IS SECONDARY THROTTLE VALVE OPEN FULLY? · CHECK MANIFOLD AIR PRESSURE SENSOR · CHECK IGNITION TIMING
· OPEN/SHORT CIRCUIT · FAULTY SENSOR	· OPEN/SHORT CIRCUIT · FAULTY SENSOR			· OPEN/SHORT CIRCUIT · FAULTY SENSOR		· OPEN/SHORT CIRCUIT · FAULTY SENSOR		· CONSULT TROUBLESHOOTING CHART ON PAGE 11
· OPEN/SHORT CIRCUIT · FAULTY SENSOR	↑	· OPEN/SHORT CIRCUIT · FAULTY SENSOR	· OPEN/SHORT CIRCUIT · FAULTY SENSOR	↑		↑		↑

Self-Diagnosis Indicator

Troubleshooting

The PGM-FI system's ECU is equipped with a self-diagnosis function. When an abnormality is detected, the PGM-FI dash warning light comes on, and the LED display on the ECU blinks. The location of the PGM-FI control system's trouble can be diagnosed from the frequency of the LED display blinks.



The quick reference chart on the next page covers the failure modes and possible causes for PGM-FI. If you run through all the possible causes listed and the problem is still unsolved, go on to the more detailed troubleshooting on the following pages.

Sometimes the PGM-FI dash warning light and/or ECU LED display will come on, indicating a system problem, when, in fact, there is a bad or intermittent electrical connection. To troubleshoot bad connections, note the ECU LED display blink frequency, refer to the diagnosis chart on page 11-11 and check the connectors associated with the items mentioned in the "Possible Cause" column. Clean or repair connections if necessary.

NOTE:

- The memory for the "PGM-FI" dash warning light will be erased when the ignition switch is turned off; however, the memory for the LED display will not be cancelled. Thus, the warning light will not come on when the ignition is again turned on unless the trouble is once more detected. Troubleshooting should be done according to the LED display even if the warning light is OFF.
If the LED display fails to come on when the ignition switch is turned on again, check for:
 - Blown No. 10 fuse.
 - Open circuit in White/Green wire between ECU A17 terminal and No. 10 fuse.Then, if there is no problem, substitute a known-good ECU and re-check.
- Turn the ignition switch ON. The PGM-FI dash warning light should come on for about 2 seconds. If the warning light won't come on, check for:
 - Blown No. 3 fuse (also the fuse for the back up lights.)
 - Open circuit in Yellow wire between No. 3 fuse and combination meter.
 - Open circuit in Green/Orange wire between combination meter and ECU B6 terminal.
 - Open circuit in Black wires between ECU A2, A4 and ground.
 - Blown warning light bulb.Then, if there is no problem, substitute a known-good ECU and re-check.
- After making repairs, disconnect the No. 10 fuse for at least 10 seconds to reset the ECU memory. After reconnecting the fuse, check that the LED display is turned off.



No. of LED Blinks between 2 second pauses	PGM-FI dash warning light	Symptom	Possible causes
0		<ul style="list-style-type: none"> Engine will not start 	<ul style="list-style-type: none"> Loose or poorly connected power line to ECU Disconnected control unit ground wire Faulty ECU
		<ul style="list-style-type: none"> Engine will not start No particular symptom shown 	<ul style="list-style-type: none"> Disconnected control unit ground wire Short circuit in combination meter or warning light wire Faulty ECU
1 (KX model only)		<ul style="list-style-type: none"> No particular symptom shown Erratic idling (Erratic injector, coupler and wiring/Insufficient fuel) 	<ul style="list-style-type: none"> Disconnected oxygen sensor coupler Spark plug mis-fire Short or open circuit in oxygen sensor circuit Faulty oxygen sensor Faulty fuel system
3		<ul style="list-style-type: none"> Fuel fouled plug Frequent engine stalling Hesitation 	<ul style="list-style-type: none"> Disconnected manifold absolute pressure sensor coupler Short or open circuit in manifold absolute pressure sensor wire Faulty manifold absolute pressure sensor
5		<ul style="list-style-type: none"> Hesitation Fuel fouled plug Frequent engine stalling 	<ul style="list-style-type: none"> Disconnected manifold absolute pressure sensor piping
6		<ul style="list-style-type: none"> High idle speed during warm-up High idle speed Hard starting at low temp 	<ul style="list-style-type: none"> Disconnected coolant temperature sensor coupler Open circuit in coolant temperature sensor wire Faulty coolant temperature sensor
7		<ul style="list-style-type: none"> Poor engine response to opening throttle rapidly High idle speed Engine does not rev up when cold 	<ul style="list-style-type: none"> Disconnected throttle angle sensor coupler Open circuit in throttle angle sensor wire Faulty throttle angle sensor
8		<ul style="list-style-type: none"> Engine does not rev up High idle speed Erratic idling 	<ul style="list-style-type: none"> Short or open circuit in crank angle sensor wire Crank angle sensor wire interfering with spark plug wires Crank angle sensor at fault
9		Same as above	Same as above
10		<ul style="list-style-type: none"> High idle speed Erratic idling when very cold 	<ul style="list-style-type: none"> Disconnected intake air temperature sensor Open circuit in intake air temperature sensor wire Faulty intake air temperature sensor
11 (Except KX model)		<ul style="list-style-type: none"> No particular symptom shown High idle speed 	<ul style="list-style-type: none"> Disconnected idle mixture adjuster sensor coupler Open or short circuit in idle mixture adjuster sensor wire Faulty idle mixture adjuster sensor
13		<ul style="list-style-type: none"> Poor acceleration at high altitude Hard starting at high altitude when cold 	<ul style="list-style-type: none"> Disconnected atmospheric pressure sensor coupler Open or short circuit in atmospheric pressure sensor wire Faulty atmospheric pressure sensor

NOTE:

- If the number of blinks between 2 second pauses is out of above numbers or if the LED indicator stays on, substitute a known-good ECU and re-check. If symptom/indication goes away, replace the ECU.
- Some failure indicators (such as, one blink) require the full test procedures on the following pages to confirm that the failure has or has not been eliminated.

(cont'd)

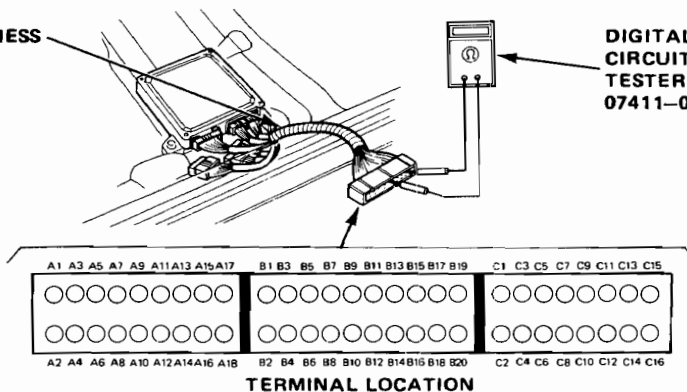
Self-Diagnosis Indicator

Troubleshooting (cont'd)

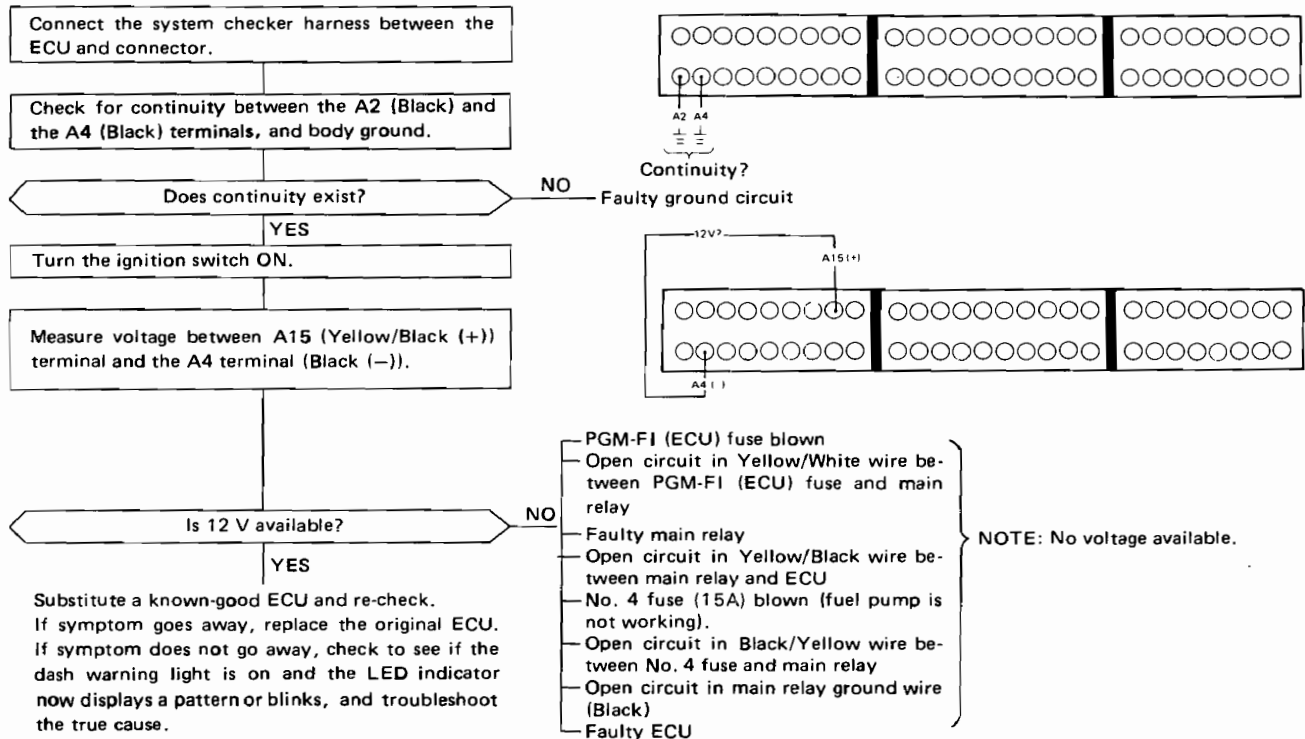
Use the system checker harness and digital circuit tester to check the system.

SYSTEM CHECKER HARNESS
07999-PD6000A

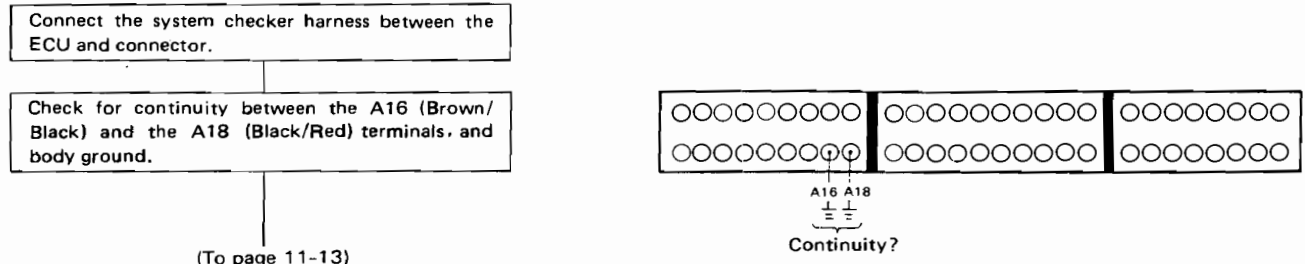
DIGITAL CIRCUIT TESTER
07411-0020000



Self-diagnosis indicator remains off— The dash warning light is not lit.



Self-diagnosis indicator remains off— The dash warning light is not lit.





(From page 11-12)

Does continuity exist? NO — Faulty ground circuit

YES

Check for short circuits in the Green/Orange wire between the combination meter and B6 terminal (Green/Orange), as well as in the combination meter printed circuit board.

Are wires normal? NO — Faulty circuit or combination meter.

YES

Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original circuit board.



Self-diagnosis indicator blinks once. (KX model only)

NOTE: First, check the spark plugs.

Plug mis-fire can be another source of this trouble.

Warm up engine to operating temperature.

Rev up and slow down engine between idle and 4,000 rpm quickly.

Stop engine.

Connect system checker harness between ECU and connector.

Attach positive probe of voltmeter to C16 terminal (White) of checker, and negative probe to A18 (Black/Red) terminal.

Restart the engine, then open the throttle wide open and close it.

Check that voltage rises over 0.6 V at wide open throttle, and falls below 0.4 V at full close.

Is voltage above 0.6 V ... below 0.4 V? NO

YES

Stop engine.

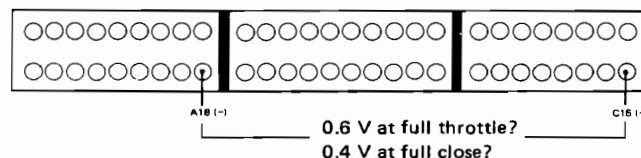
Disconnect engine wire harness from oxygen sensor.

Check oxygen sensor (page 11-25)

Is oxygen sensor normal? NO — Faulty oxygen sensor

YES

Check for open or short circuit in White wire between oxygen sensor and ECU.



(To page 11-14)

(To page 11-14)

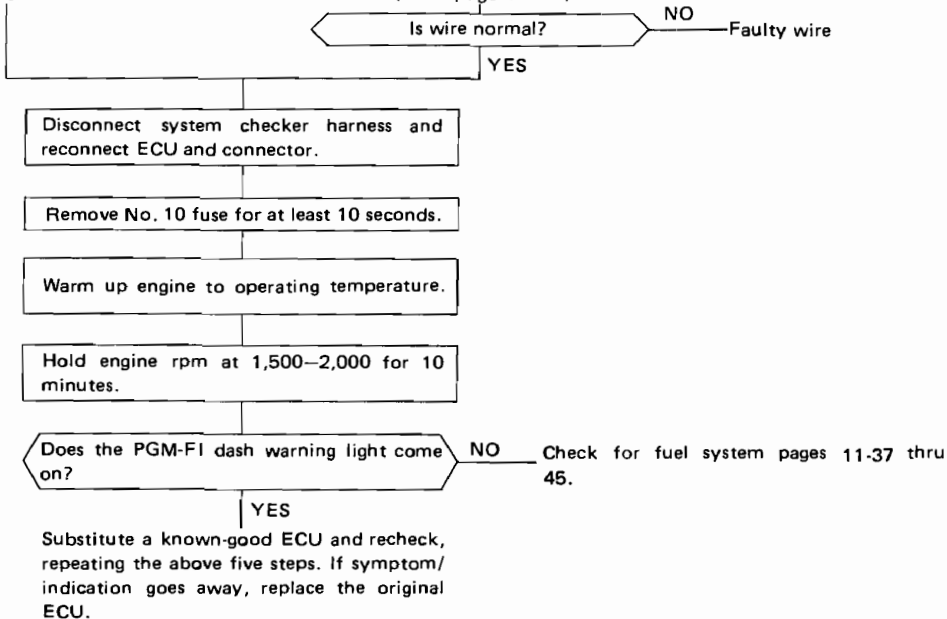
(cont'd)

Self-Diagnosis Indicator

Troubleshooting (cont'd)

(From page 11-13)

(From page 11-13)



3 Self-diagnosis indicator blinks three times.

Connect system checker harness between the ECU and coupler.

Turn ignition switch ON.

Measure voltage between C15 terminal (Red/White (+)) of system checker harness and C14 terminal (Blue/White (-)).

Is voltage between 4.75 and 5.25 V?

NO

Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

YES

Measure voltage between C11 terminal (White/Blue (+)) of system checker harness and C14 terminal (Blue/White (-)).

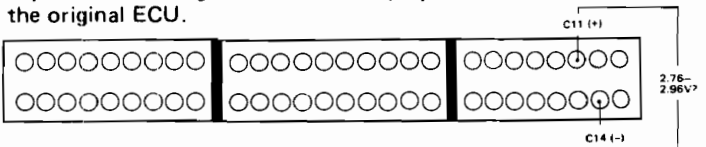
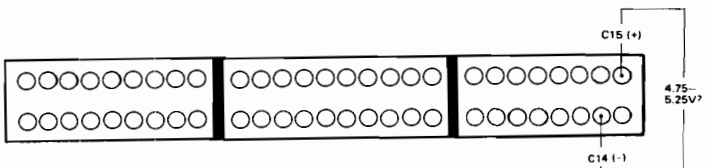
Is voltage between 2.76 and 2.96 V?

NO

Open or short circuit in White wire or Brown/White wire between manifold absolute pressure sensor and ECU.
Faulty manifold absolute pressure sensor.

YES

Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.



NOTE: If the voltage is below the specified range, there are open or poorly connected wires. If the wires are normal, the manifold absolute pressure sensor is at fault.



5 Self-diagnosis indicator blinks five times.

Check that the manifold absolute pressure sensor pipe is connected securely.

NOTE: Also check hose routing inside control box.

Is routing normal?

NO

Reconnect routing

YES

Disconnect pipe from manifold absolute pressure sensor and plug open end.

Disconnect vacuum hose (between the manifold absolute pressure sensor and throttle body) from throttle body.

Connect hand vacuum pump to vacuum hose (between the manifold absolute pressure sensor and throttle body) and check for leak.

Is vacuum maintained?

NO

Replace vacuum hose.

YES

Connect system checker harness between the ECU and coupler.

Turn ignition switch ON.

Measure voltage between C15 terminal (Red/White (+)) of system checker harness and C14 terminal (Blue/White (-)).

Is voltage between 4.75 and 5.25 V?

NO

Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

YES

Measure voltage between C11 terminal (White/Blue (+)) of system checker harness and C14 terminal (Blue/White (-)).

Is voltage between 2.76 and 2.96 V?

NO

Open or short circuit in White or Brown/White wire between manifold absolute pressure sensor and ECU.
Faulty manifold absolute pressure sensor.

YES

Connect hand vacuum pump to manifold absolute pressure sensor.

Check that voltage changes as vacuum is applied.

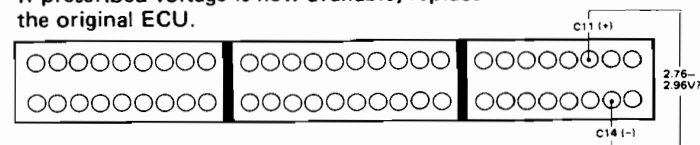
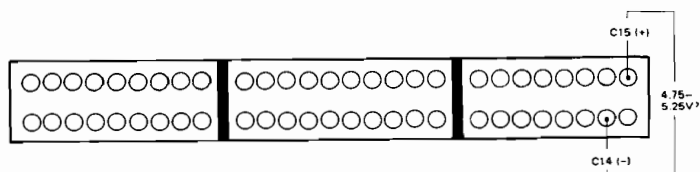
Has voltage changed?

NO

Faulty manifold absolute pressure sensor

YES

Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.



NOTE: If there is no voltage, or if voltage is low, the possibility is a shorted wire. If voltage is high, wire may be open or poorly connected. If wire is normal, manifold absolute pressure sensor is at fault.

(cont'd)

Self-Diagnosis Indicator

Troubleshooting (cont'd)

6 Self-diagnosis indicator blinks six times.

Connect system checker harness between the ECU and coupler.

Warm up engine until radiator fan comes on twice.

Measure voltage between C6 terminal (Yellow/Green (+)) of system checker and C12 terminal (Green/White (-)).

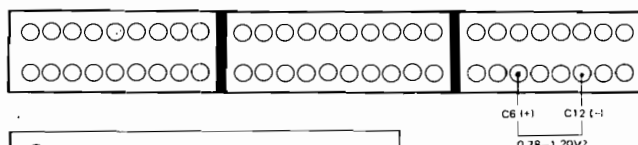
Is voltage between 0.50 and 0.90 V?

NO

Stop engine.

YES

Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.



NOTE: If there is no voltage or if voltage is low, check for shorted wire. If voltage is high, wire may be open or poorly contacted.

Are wires normal?

NO

Faulty wires

YES

Check coolant temperature sensor (page 11-27).

Is sensor normal?

NO

Faulty coolant temperature sensor

YES

Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

7 Self-diagnosis indicator blinks seven times.

Connect system checker harness between ECU and coupler.

Turn ignition switch ON.

Measure voltage between C13 terminal (Yellow/White (+)) of system checker harness and C12 terminal (Green/White (-)).

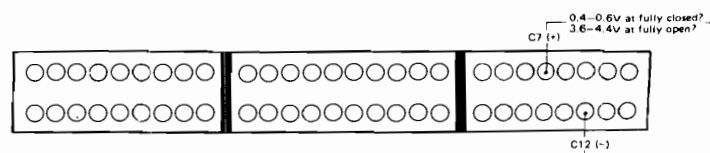
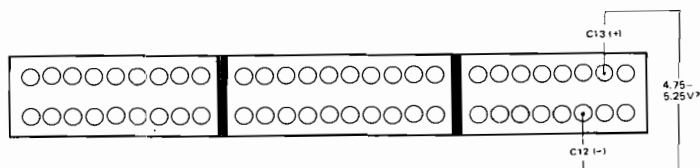
Is 4.75-5.25 V attained?

NO

Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

YES

Connect voltmeter positive probe to C7 terminal (Red/Yellow (+)), and negative probe to C12 terminal (Green/White (-)) of system checker harness.



(To page 11-17)



(From page 11-16)

Operate accelerator pedal from fully closed to fully open.

Check that 0.4–0.6 V is available at fully closed, and 3.6–4.4 V at fully open.

Are voltages within above ranges?

NO

Check for short or open circuit in Red/Blue and Brown/Black wires between the ECU and throttle angle sensor.

Are wires normal?

NO

Replace wires

YES

Adjust or replace throttle angle sensor (page 11-31).

YES

Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.

8

Self-diagnosis indicator blinks eight times.

Check for open or short circuit in Orange/Blue and White/Blue wires between the ECU and crank angle sensor.

Are wires normal?

NO

Replace wires

YES

Check crank angle sensor (page 11-28)

Does crank angle sensor operate properly?

NO

Faulty crank angle sensor

YES

Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.

9

Self-diagnosis indicator blinks nine times.

Check for open or short circuit in Orange and White wires between the ECU and crank angle sensor.

Are wires normal?

NO

Replace wires

YES

Check crank angle sensor (page 11-30).

Is sensor normal?

NO

Faulty crank angle sensor

YES

Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.

(cont'd)

Self-Diagnosis Indicator

Troubleshooting (cont'd)



Self-diagnosis indicator blinks ten times.

Connect system checker harness between the ECU and harness coupler.

Attach voltmeter positive probe to C5 terminal (White/Red (+)), and negative probe to C12 terminal (Green/White (-)) of system checker harness.

Turn ignition switch ON.

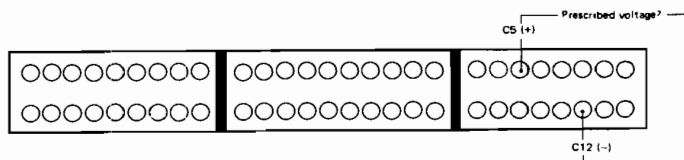
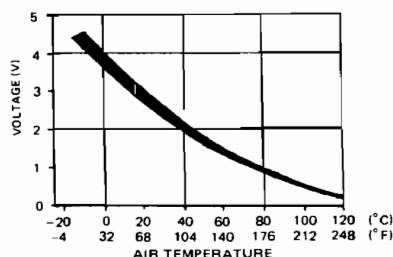
Check that voltage is correct for the intake air temperature.

Is voltage correct?

NO

YES

Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.



Turn ignition switch OFF.

Check for open or short circuit in Red/Yellow and Brown/Black wires between intake air temperature sensor and the ECU.

NOTE: If voltage is low, or there is no voltage, check wires for short circuit. If voltage is high, probability is open or poorly contacted wire.

Are wires normal?

NO

Faulty wires

YES

Check intake air temperature sensor (page 11-30).

Is sensor normal?

NO

Faulty intake air temperature sensor

YES

Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.



Self-diagnosis indicator blinks eleven times. (Except KX model)

Connect system checker harness between the ECU and harness coupler.

Turn ignition switch ON.

Measure voltage between C13 terminal (Yellow/White (+)) of system checker harness and C12 terminal (Green/White (-)).

Is 4.75–5.25V available?

NO

YES

Replace ECU

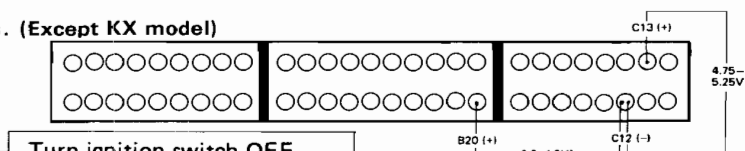
Measure voltage between B20 terminal (Brown (+)) of system checker harness and C12 terminal (Green/White (-)).

Is 0.3–4.9 V available?

NO

YES

Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.



Turn ignition switch OFF.

Check for open or short circuit in White/Yellow and Brown/Black wires between idle mixture adjuster sensor and the ECU.

NOTE: If there is no voltage, check for short circuit in the wires. If voltage is high, probability is open or poorly connected wire.

Are wires normal?

NO

Faulty wires

YES

Check idle mixture adjuster sensor (page 11-25)

Does sensor operate properly?

NO

Faulty idle mixture adjuster sensor.

YES

Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.



Self-diagnosis indicator blinks thirteen times.

Connect system checker harness between the ECU and harness coupler.

Turn ignition switch ON.

Measure voltage between C13 terminal (Yellow/White (+)) of system checker harness and C12 terminal (Green/White (-)).

Is 4.75–5.25 V available?

NO

YES

Measure voltage between C9 terminal (Red (+)) of system checker harness and C12 terminal (Green/White (-)).

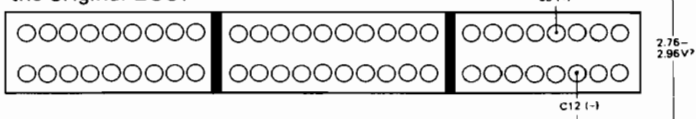
Is 2.76–2.96 V available?

NO

YES

Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.

Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.



Turn Ignition switch OFF.

Check for open or short circuit in Red/white and Brown/Black wires between atmospheric pressure sensor and the ECU.

NOTE: If there is no voltage, check for a short circuit. If voltage is high, wires may be open or poorly contacted.

Are wires normal?

NO

Faulty wires.

YES

Check atmospheric pressure sensor (page 11-27)

Does sensor operate properly?

NO

Faulty atmospheric pressure sensor.

YES

Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

Idle Control

Troubleshooting

NOTE:

- First, confirm that the idle speed is normal by pinching the No. 10 vacuum hose slightly. Then inspect the air cleaner element, ignition timing, spark plug and valve clearance.
- Before going through the Electrical Troubleshooting Charts, make sure that the vacuum hoses are not loose and securely tightened, and that the solenoid valves, throttle body and fast idle mechanism are in good order.

Part Symptom	Idle control solenoid valve	A/C idle boost solenoid valve	A/C idle boost valve	Throttle body	Fast idle mechanism	Starter switch signal	Alternator FR terminal signal	A/C switch signal	ECU	Remarks
Idle speed does not increase after initial start-up.	Valve failure/pinched hose				Adjust screw out of adjustment.	Open circuit			Failure in ECU	Is signal available at ECU?
Idle speed too high in neutral	Leaky solenoid valve			Valve stuck open	Adjust screw out of adjustment. Leaky fast idle valve.				Failure (signal not stopped)	Pinch idle control solenoid valve hose and re-adjust.
Idle speed changes under electrical load.	Valve failure/pinched vacuum hose			Throttle angle sensor out of adjustment. Valve stuck open.	Adjust screw out of adjustment.				Failure (signal not available)	<ul style="list-style-type: none"> Is idle control solenoid valve working? Is fast idle adjust screw adjustment correct?
Idle speed drops when blipping throttle with electrical load.							Open circuit		Failure in ECU	Is there big difference between no-load and loaded conditions?
Idle speed drops when A/C switch is turned ON.		Valve failure Pinched vacuum hose	Adjusting bolt out of adjustment		Operer opening out of adjustment			Open circuit	Failure in ECU	<ul style="list-style-type: none"> Is vacuum applied to opener? Is opener opening adjusted properly?
Idle speed fluctuates when idle control comes into operation.	Valve failure								Failure in ECU	Is condition improved when solenoid valve is replaced?



Starter Switch Signal Inspection

Connect system checker harness between ECU and wire harness coupler.

Turn ignition switch to START.

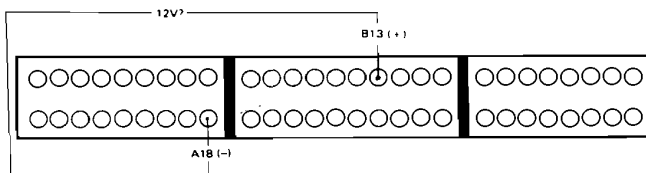
Measure voltage between B13 terminal (Blue/Red (+)) and A18 terminal (Black/Red (-)) of system checker harness.

Is battery voltage available?

NO

Blown starter signal fuse

Open circuit in Blue/White wire between starter signal fuse and ECU



Alternator FR Terminal Signal Inspection

Before inspection, check operation of alternator as follows:

With the engine running, and the vacuum hose #10 pinched (to cut off the idle control system), turn the headlight on and off.

Engine speed should be changed. If engine speed remains steady, re-charge battery and re-test.

Connect system checker harness between ECU and wire harness coupler.

Attach positive probe of voltmeter to B14 terminal (White/Red (+)), and negative probe to A18 terminal (Black/Red (-)) of system checker harness.

Start engine.

Turn headlights ON and OFF.

Check that voltage drops when headlights are ON, and rises when headlights are OFF, within 0 and 5 V.

Is voltage changed?

NO

Stop engine.

Check for continuity in White/Red wire between alternator and ECU.

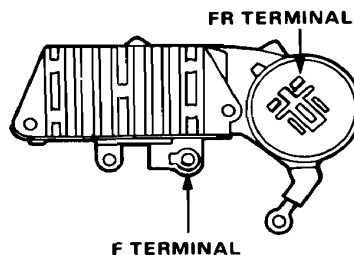
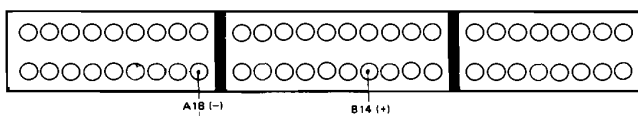
Is there continuity?

NO

Open circuit in harness

YES

Faulty voltage regulator or alternator



NOTE: FR terminal diode is faulty if continuity or no continuity exists in both directions between F and FR terminals of voltage regulator.

(cont'd)

Idle Control

Troubleshooting (cont'd)

Air Conditioner Switch Signal Inspection

Connect system checker harness between ECU and wire harness coupler.

Start engine.

Blower switch ON.

A/C switch ON.

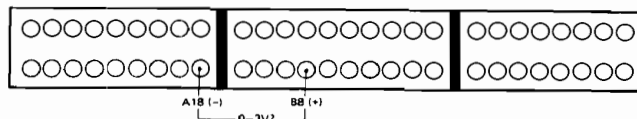
Check that compressor and condenser cooling fan work.

Measure voltage between B8 terminal (Blue/Red (+)) and A18 terminal (Black/Red (-)) of system checker harness.

Is 0–3 V available?

NO

Open circuit in Blue/Red wire between A/C, diode coupler and ECU.



NOTE: Voltage will be over 9 V if compressor or condenser cooling fan stops when power is cut off by pressure switch or thermostat.

Idle Control Solenoid Valve Inspection

Connect system checker harness between ECU and wire harness coupler.

Attach positive probe of voltmeter to A11 terminal (Green/Black (+)) and negative probe to A18 terminal (Black/Red (-)) of system checker harness.

Start engine.

NOTE: Measure within 10 seconds.

Is 0–1.5 V available?

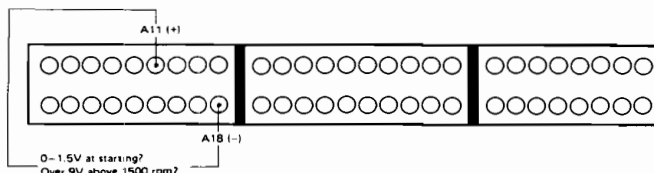
NO

Open circuit in Yellow/Black wire between Main Relay and idle control solenoid valve.

Open circuit in Red wire between idle control solenoid valve and ECU.

Open circuit in idle control solenoid valve.

Faulty ECU. NOTE: Voltage should be above 9 V.



NOTE: No voltage available.

Raise engine speed over 1,500 rpm.

Is more than 9 V available?

NO

Faulty ECU.



A/C Idle Boost Solenoid Valve Inspection

Connect system checker harness between ECU and wire harness connector.

Start engine.

Turn A/C switch ON.

Check that compressor and condenser cooling fan work

Measure voltage between B1 terminal (Blue/Yellow (+)) and A18 terminal (Black/Red (-)) of system checker harness.

Is 0—1.5 V available?

NO

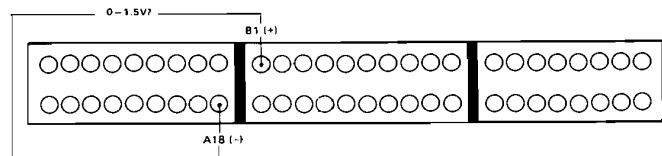
Open circuit in Black/Yellow wire between Regulator fuse and A/C idle boost solenoid valve

Open circuit in Red wire between A/C idle boost solenoid valve and ECU

Open circuit in A/C idle boost solenoid valve

Faulty ECU. NOTE: Voltage should be above 9 V.

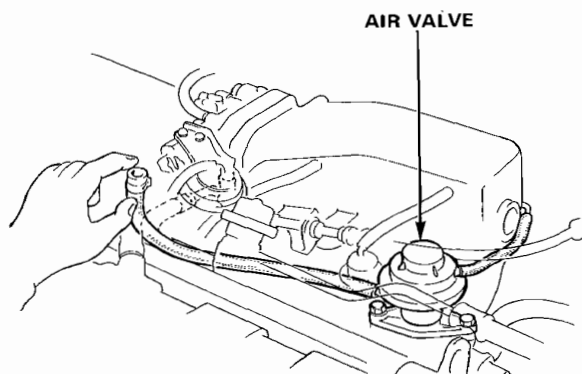
NOTE: No voltage available.



Secondary Air Supply System

System Inspection

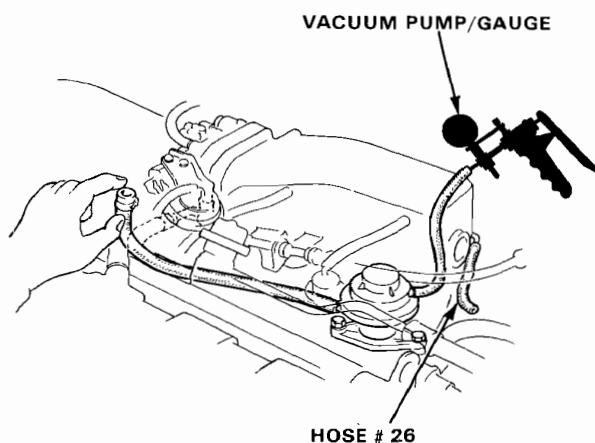
1. Warm up the engine and make sure that the idle speed is steady.
2. Raise the engine speed to around 4,000 min⁻¹(rpm) and release the accelerator pedal suddenly.
3. Make sure that the vacuum appears in the vacuum hose of the air valve after the accelerator pedal released.



- If no vacuum, check for:
 - each vacuum hose for clog, pinch, or disconnection.
 - air valve.
 - air valve control solenoid valve.

Air Valve Inspection

1. Disconnect the vacuum hose # 26 from the air valve and connect a vacuum pump to the valve.
2. Start the engine and make sure that the vacuum appears in the vacuum hose of the air valve while operating the vacuum pump.



3. Make sure that the vacuum disappears in the hose when the vacuum pump is removed.



Sensors

Oxygen Sensor

[KX Model Only]

1. Disconnect the connector of the oxygen sensor.
2. Start the engine and warm up for 2 minutes at 3,000 min⁻¹(rpm) under no load. Raise the engine speed to 4,000min⁻¹(rpm) and release the throttle suddenly at least 5 times.
3. Within one minute after the engine has been warmed up, measure the voltage between the connector terminal and body ground as described in steps 4 and 5.

NOTE: If it takes more than one minute to complete the checks, warm up the engine as in step 2 before continuing.

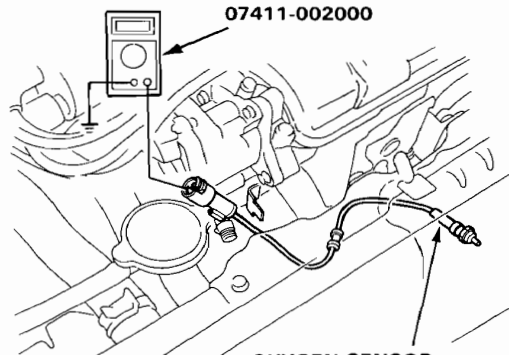
4. Raise the engine speed to 5,000 min⁻¹(rpm) then lower to 2,000min⁻¹(rpm) by operating the accelerator pedal.

Voltage should be below 0.4 V.

5. Disconnect the vacuum hose # 21 from the throttle body; plug the opening in the throttle body. Connect a vacuum pump to the open end of the vacuum hose and apply 300 mmHg, and raise the engine speed to 4,000min⁻¹(rpm).

Voltage should be above 0.6V.

DIGITAL CIRCUIT TESTER
07411-002000



OXYGEN SENSOR
45 N-m (4.5 kg-m, 33 lb-ft)

- Replace the oxygen sensor if the voltages are out of the above ranges.

6. Reconnect the connector.

NOTE:

- Avoid damaging the wire harness.
- To prevent cross-threading, first tighten the sensor finger tight, then tighten to the specified torque with a torque wrench.
- Oxygen sensor does not operate when its intake is clogged.
- Be extremely careful not to spray anything over the oxygen sensor.

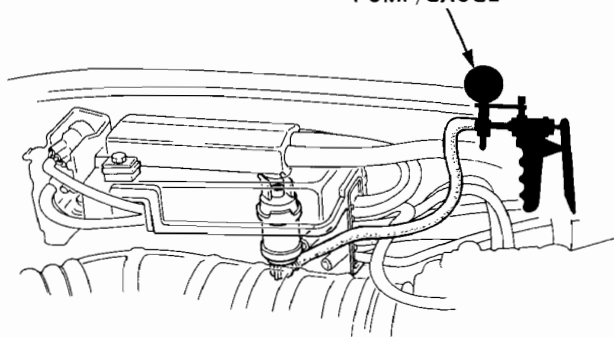
Air Control Solenoid Valve Inspection

1. Open the control box lid and disconnect the rectangular connector from the control box.
2. Disconnect the lower vacuum hose of the air valve control solenoid valve (between the solenoid valve and the three-way joint) from the joint.
3. Apply vacuum to the hose.

It should hold vacuum.

- If it does not hold vacuum, replace the valve.

VACUUM
PUMP/GAUGE

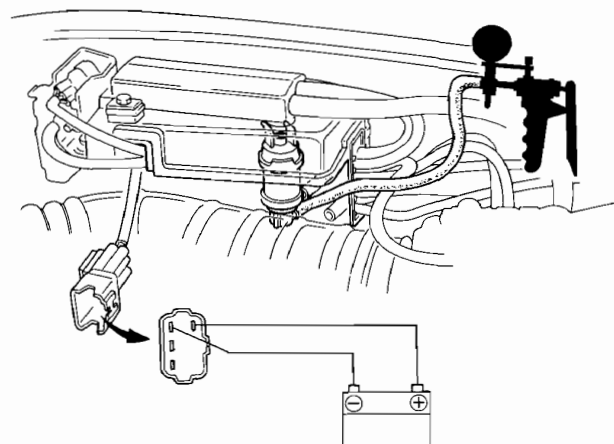


4. Connect the battery positive terminal to the Black/Yellow terminal of the control box coupler, and the negative terminal to the Orange terminal.

5. Apply vacuum to the hose.

It should not hold vacuum.

- If it holds vacuum, replace the valve.





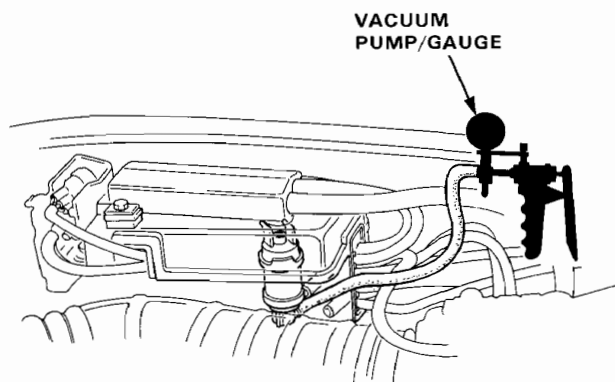
Sensors

Air Control Solenoid Valve Inspection

1. Open the control box lid and disconnect the rectangular connector from the control box.
2. Disconnect the lower vacuum hose of the air valve control solenoid valve (between the solenoid valve and the three-way joint) from the joint.
3. Apply vacuum to the hose.

It should hold vacuum.

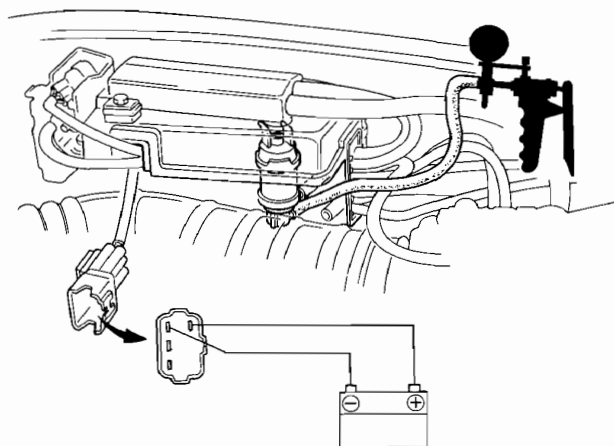
- If it does not hold vacuum, replace the valve.



4. Connect the battery positive terminal to the Black/Yellow terminal of the control box coupler, and the negative terminal to the Orange terminal.
5. Apply vacuum to the hose.

It should not hold vacuum.

- If it holds vacuum, replace the valve.



Oxygen Sensor

[KX Model Only]

1. Disconnect the connector of the oxygen sensor.
2. Start the engine and warm up for 2 minutes at 3,000 min⁻¹(rpm) under no load. Raise the engine speed to 4,000min⁻¹(rpm) and release the throttle suddenly at least 5 times.
3. Within one minute after the engine has been warmed up, measure the voltage between the connector terminal and body ground as described in steps 4 and 5.

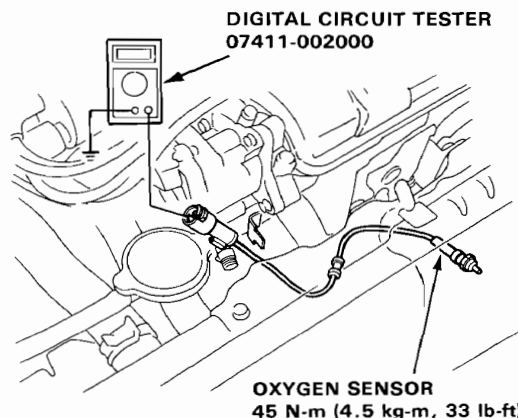
NOTE: If it takes more than one minute to complete the checks, warm up the engine as in step 2 before continuing.

4. Raise the engine speed to 5,000 min⁻¹(rpm) then lower to 2,000min⁻¹(rpm) by operating the accelerator pedal.

Voltage should be below 0.4 V.

5. Disconnect the vacuum hose # 21 from the throttle body; plug the opening in the throttle body. Connect a vacuum pump to the open end of the vacuum hose and apply 300 mmHg, and raise the engine speed to 4,000min⁻¹(rpm).

Voltage should be above 0.6V.



- Replace the oxygen sensor if the voltages are out of the above ranges.

6. Reconnect the connector.

NOTE:

- Avoid damaging the wire harness.
- To prevent cross-threading, first tighten the sensor finger tight, then tighten to the specified torque with a torque wrench.
- Oxygen sensor does not operate when its intake is clogged.
- Be extremely careful not to spray anything over the oxygen sensor.

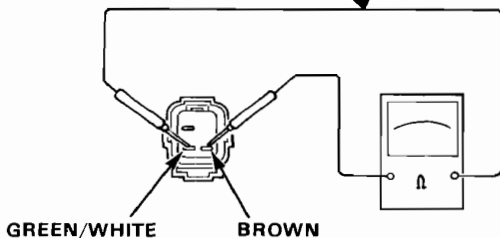
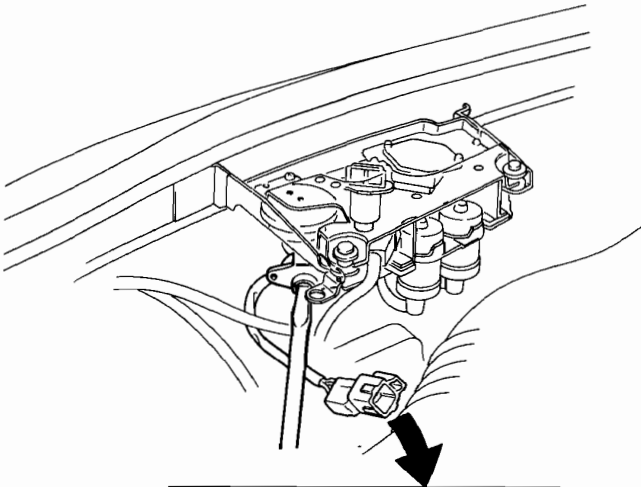
Sensors

Idle Mixture Adjuster (IMA) Sensor

[Except KX Model]

1. Open the control box lid and disconnect the connector of the IMA sensor at the control box.
2. Turning the adjusting screw on the sensor fully, measure resistance between the Brown terminal and the Green/White terminal at the sensor.

Resistance should be : 0.25—6.2 K Ω

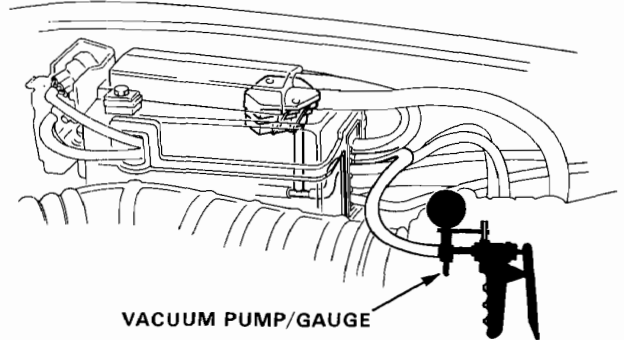


- If resistance is outside above ranges, replace IMA sensor.

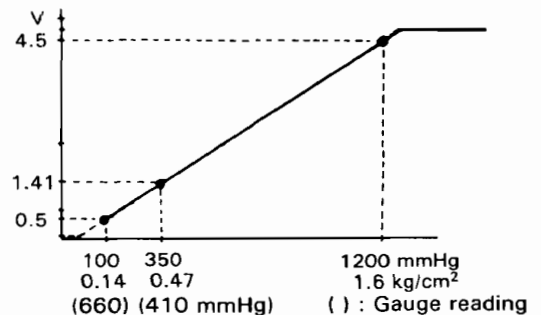
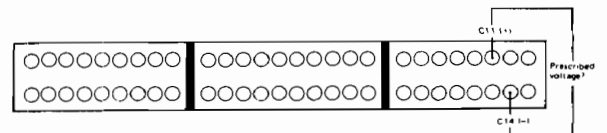
NOTE: Whenever the inspection or the replacement of IMA sensor is performed, check specification for CO. See page 11-35.

Manifold Absolute Pressure (MAP) Sensor

1. Disconnect the vacuum hose # 21 from the throttle body; plug the opening in the throttle body. Connect a vacuum pump to the open end of the vacuum hose.



2. Disconnect the connector from the control unit. Connect the system checker harness (No. 07999—PD6000A) between the control unit and wire harness connector.
3. Turn the ignition switch ON. Connect a digital voltmeter positive probe to the C11 terminal of the system checker harness and negative probe to the C14 terminal. Measure the voltage between the two terminals.



Voltmeter should indicate voltage along with the chart above.

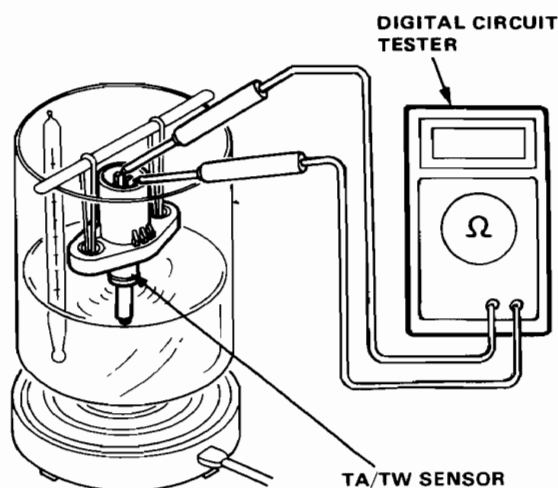
- If the voltage is incorrect, check the vacuum hose for leakage, and wires between the control unit and sensor for open or short circuit.
- Replace the sensor if the wires are normal.



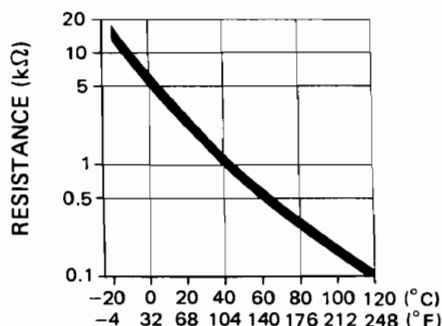
Intake Air Temperature (TA)/ Coolant Temperature (TW) Sensor

1. Disconnect the connector, then remove the TA/TW sensor from the intake manifold/cylinder head.
2. To test a sensor, suspend it in cold water and heat the water slowly. Make sure more than half of the connector is submerged. Measure the resistance between the terminals.

STANDARDS: 0.98–1.34 k Ω at 40°C (95°F)
0.22–0.35 k Ω at 80°C (176°F)



3. The chart below shows the change in resistance over a range of intake air/coolant temperature.



INTAKE AIR/COOLANT TEMPERATURE

- Replace the sensor if resistance is outside the range.
- When installing the TW sensor, torque to: 28 N·m (2.8 lg-m, 20 lb-ft)

NOTE:

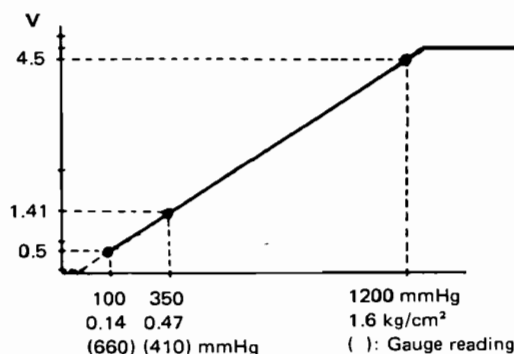
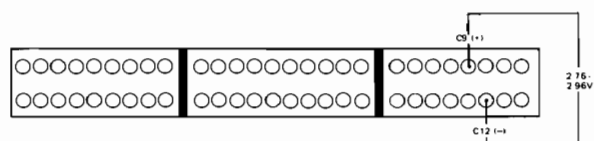
- Don't let the sensor touch the bottom of the container.
- During the test, stir the water in the container to ensure even temperature.

Atmospheric Pressure (PA) Sensor

NOTE: Check the sensor at the ECU connector.

1. Disconnect the wire harness connector from the control unit and connect the system checker harness (No. 07999–PD6000A) to the control unit and wire harness connector.
2. Turn the ignition switch ON. Connect a digital voltmeter positive probe to the C9 terminal of the system checker harness and negative probe to the C12 terminal.

There should be: 2.76–2.96 V



- If voltage is outside ranges, check for open or short circuit between the ECU and PA sensor. Replace the PA sensor with a new one if the wires are in good condition.

Sensors

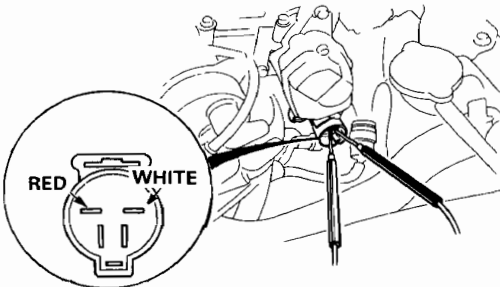
Crank Angle Sensor Inspection

NOTE: If either the CYL or TDC sensor tests bad, replace the crank angle sensor coil assembly.

CYL Sensor Inspection

1. Disconnect the connector of the crank angle sensor.
2. Measure the resistance between the White terminal and Red terminal at the sensor.

Resistance should be: 0.65—0.85 K Ω

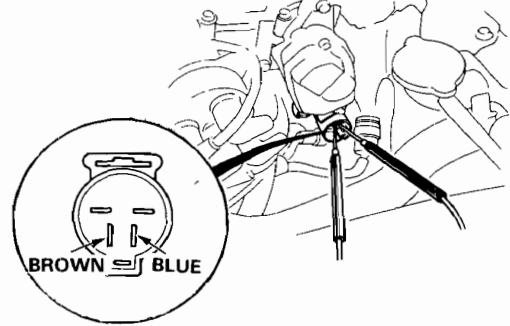


3. Measure the resistance between the White and Red terminals, and crank angle sensor housing.
Resistance should be: 100 k Ω or more

TDC Sensor Inspection

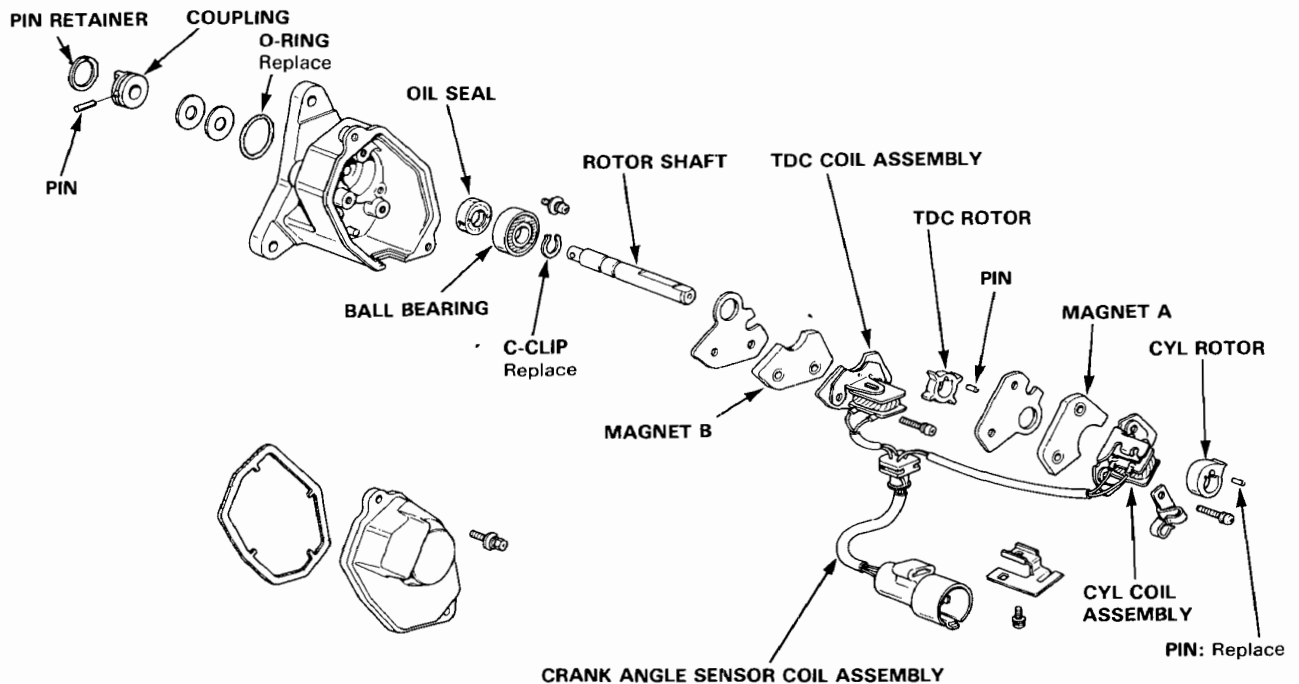
1. Disconnect the connector of the crank angle sensor.
2. Measure the resistance between the White terminal and Red terminal at the sensor.

Resistance should be: 0.65—0.85 K Ω



3. Measure the resistance between the Brown and Blue terminals, and crank angle sensor housing.
Resistance should be: 100 k Ω or more

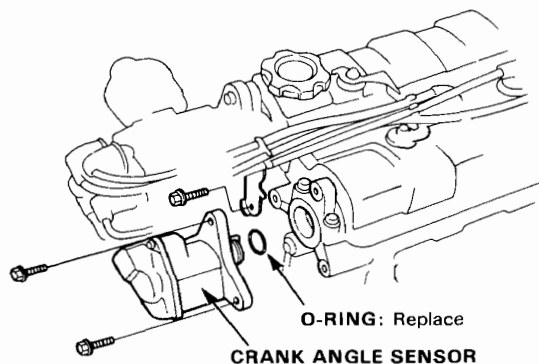
Crank Angle Sensor Disassembly



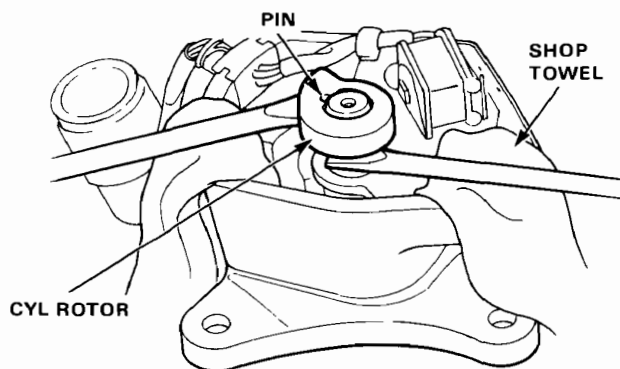


Crank Angle Sensor Disassembly

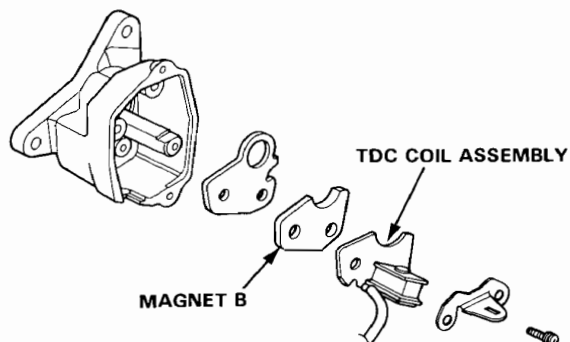
1. Remove the crank angle sensor from the engine.



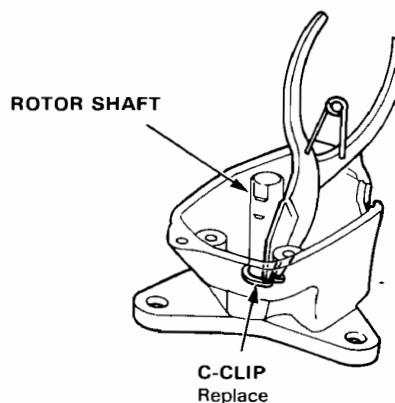
2. Carefully pry up the CYL rotor by using two screwdrivers as shown. Do not damage the CYL rotor.



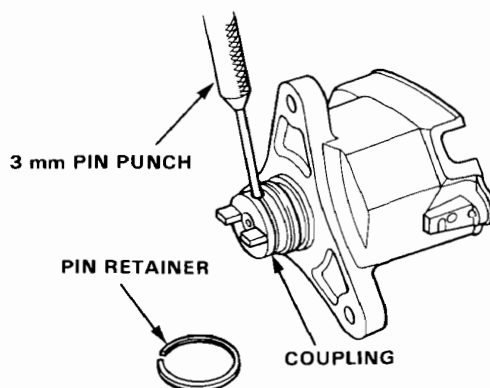
3. Pull the CYL coil assembly and magnet A out from the rotor shaft by removing the screws.
4. Pry up the TDC rotor in the same order of prying up the CYL rotor.
5. Pull the TDC coil assembly and magnet B out from the rotor shaft by removing the screws.



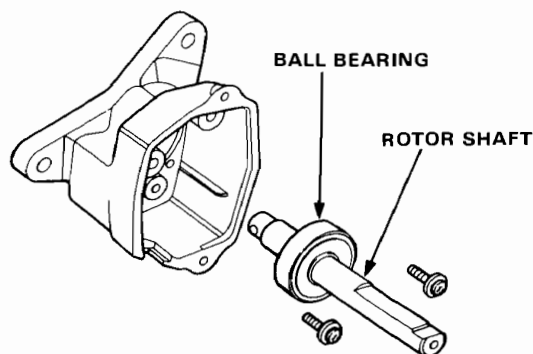
6. Remove the C-Clip.



7. Slide off the pin retainer being careful not to stretch it.
8. Separate the coupling from the shaft by removing the roll pin as shown.



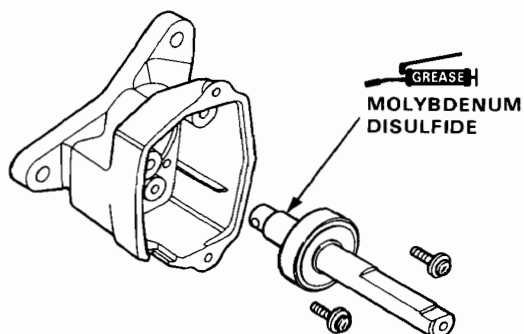
9. Remove the ball bearing and rotor shaft as an assembly by removing the screws.



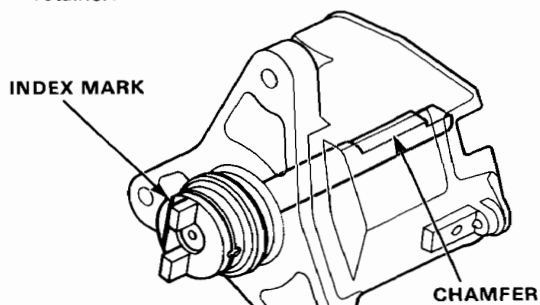
Sensors

Crank Angle Sensor Reassembly

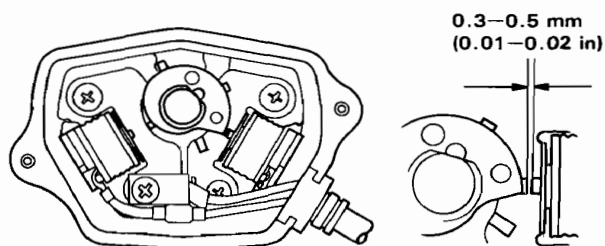
1. Apply a molybdenum disulfide grease to the tip of the rotor shaft, then install it on the sensor housing with 4 mm screws.



2. Install the coupling with its index mark facing in the direction shown, install the pin, and install the pin retainer.

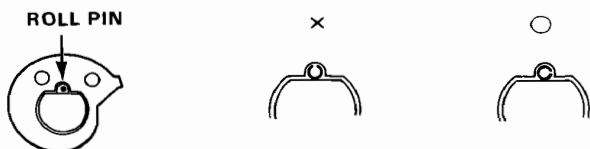


3. Install a new C-clip on the rotor shaft.
4. Install the TDC coil assembly and TDC rotor so that the air gap is 0.3–0.5 mm (0.01–0.02 in.), then install the CYL coil assembly and CYL rotor in the same way.



NOTE:

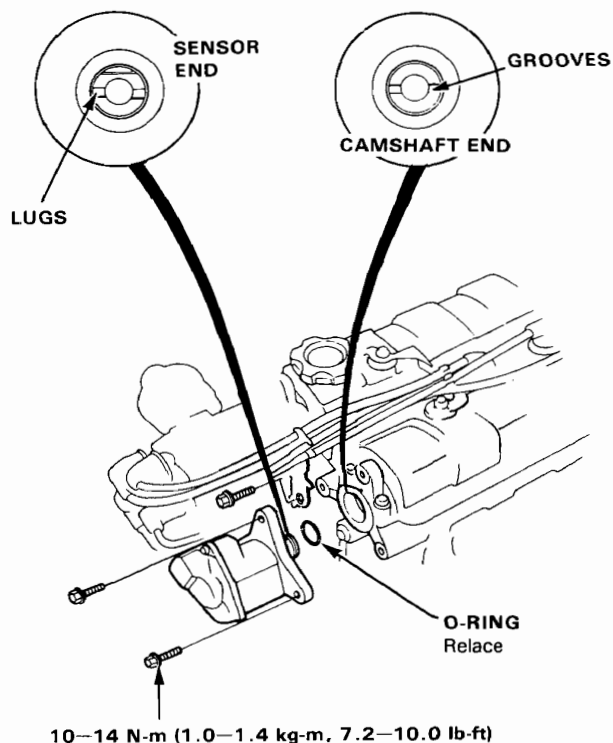
- Install the rotors with the part number facing up.
- Install the roll pin so that it faces as shown below.



Crank Angle Sensor Installation

1. Install a new O-ring on the sensor housing.
2. Slip the sensor into the position.

NOTE: The lugs on the end of the sensor and its mating grooves in the camshaft end are both offset to eliminate the possibility of installing the distributor 180° out of time.



10–14 N·m (1.0–1.4 kg·m, 7.2–10.0 lb·ft)



Throttle Angle Sensor

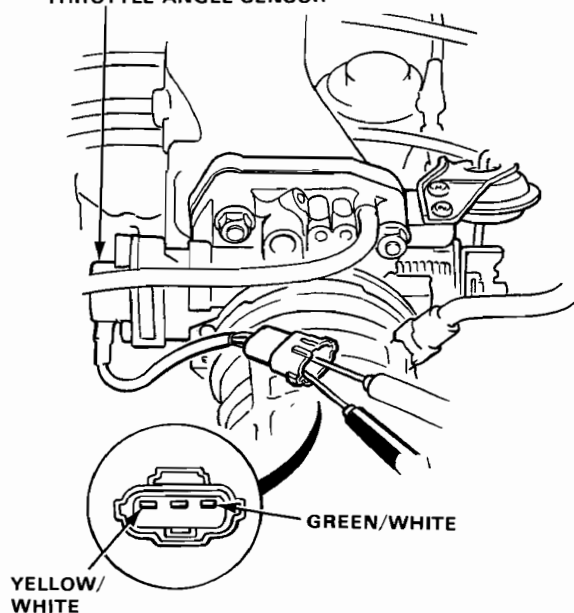
Testing/Removal:

CAUTION: The throttle stop screw is nonadjustable.

1. Disconnect the connector of the throttle angle sensor.
2. Measure full resistance between the Yellow/White terminal and Green/White terminal at the sensor.

Resistance should be: 4–6k Ω

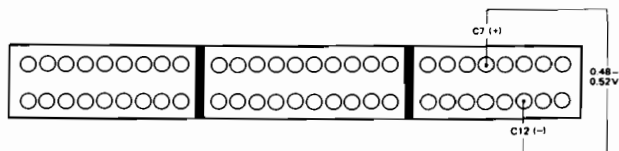
THROTTLE ANGLE SENSOR



- If the resistance is outside the above range, adjust the installation position of the sensor and re-test. Replace if necessary.

Installation:

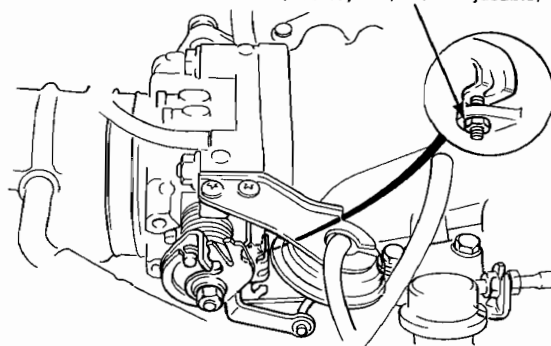
1. Align the pin of the sensor with the throttle valve shaft groove and tighten temporarily.
2. Disconnect the control unit connectors and connect the System Checker Harness (NO. 07999—PD6000A) between the control unit and wire harness connector.
3. Connect a digital voltmeter positive probe to C7 terminal of the system checker harness and negative probe to C12 terminal.



4. With the ignition switch turned ON, adjust the sensor to a position where the throttle stop lever just touches the stop screw. Then measure the voltage between the two terminals.

There should be: 0.48–0.52V

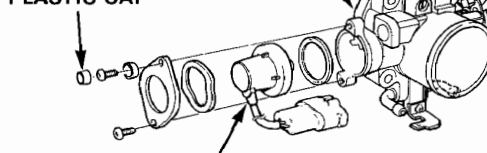
THROTTLE STOP SCREW (Factory set; Non Adjustable)



5. If the voltage is within specification, tighten the screws provisionally.

THROTTLE BODY

PLASTIC CAP



THROTTLE ANGLE SENSOR

6. After reassembling the sensor, test the deceleration fuel cut-off system (page 11-45).
 - If the deceleration fuel cut-off system is OK, tighten the screws.
 - If the deceleration fuel cut-off system does not work, repeat steps 1 through 5 and check the voltage.

Solenoid Valves

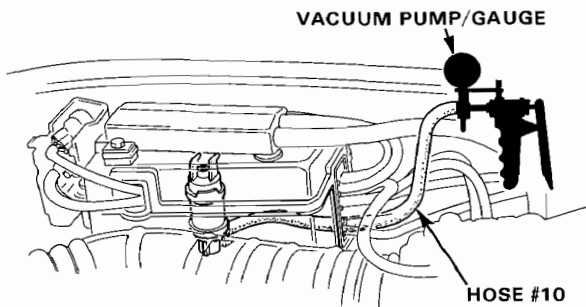
Idle Control Solenoid Valve

The idle control solenoid valve is activated by commands from the ECU. When the solenoid valve opens, this causes vacuum in the vacuum hose (between the air chamber and the solenoid valve) and increase idle speed approximately $150\text{min}^{-1}(\text{rpm})$ under the following conditions:

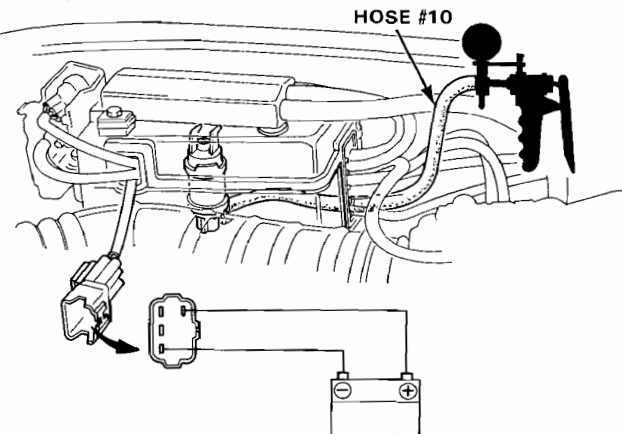
- For a short period after starting the engine.
- Altitude higher than 800 m.
- Coolant temperature lower than 70°C (158°F).
- For 0.5 seconds when quick deceleration is detected at $1,000\text{min}^{-1}(\text{rpm})$

While the solenoid valve is energized, 9V or higher should be available between the Black/Yellow terminal (+) and Yellow/Black terminal (-) of the main harness at the control box.

1. Disconnect the 6 cavity rectangular connector from the control box.
2. Disconnect the vacuum hose #10 from the throttle body.
3. Apply vacuum to the hose #10.
It should hold vacuum.



- If it does not hold vacuum, replace the valve.
4. Connect the battery positive terminal and negative terminal to the terminals of the control box connector.
 5. Apply vacuum to hose #10.
It should not hold vacuum.



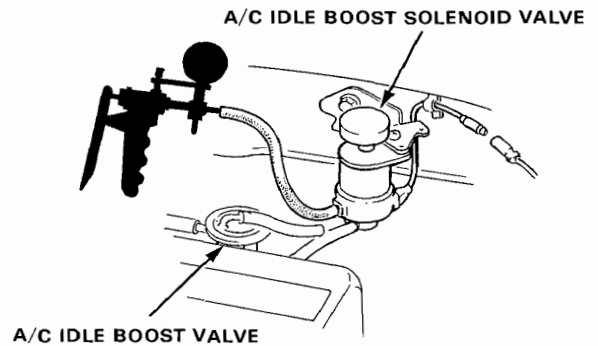
- If it holds vacuum, replace the valve.

A/C Idle Boost Solenoid Valve

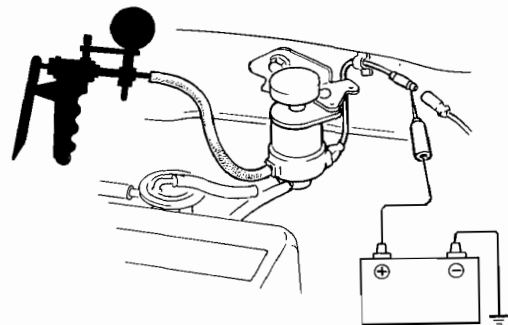
The A/C idle boost solenoid valve is activated when the A/C switch is turned ON. When the solenoid valve is activated vacuum is generated in the vacuum hose between the solenoid valve and A/C idle boost valve.

9V or higher should be detected between the Red terminal (+) and the ground (-) of the left side harness at the solenoid valve.

1. Disconnect the connector of the A/C idle boost solenoid valve.
2. Disconnect the lower vacuum hose of the valve (between the A/C idle boost valve and the solenoid valve) from the A/C idle boost valve.
3. Apply vacuum to the hose.
It should hold vacuum.
If it does not hold vacuum, replace the valve.



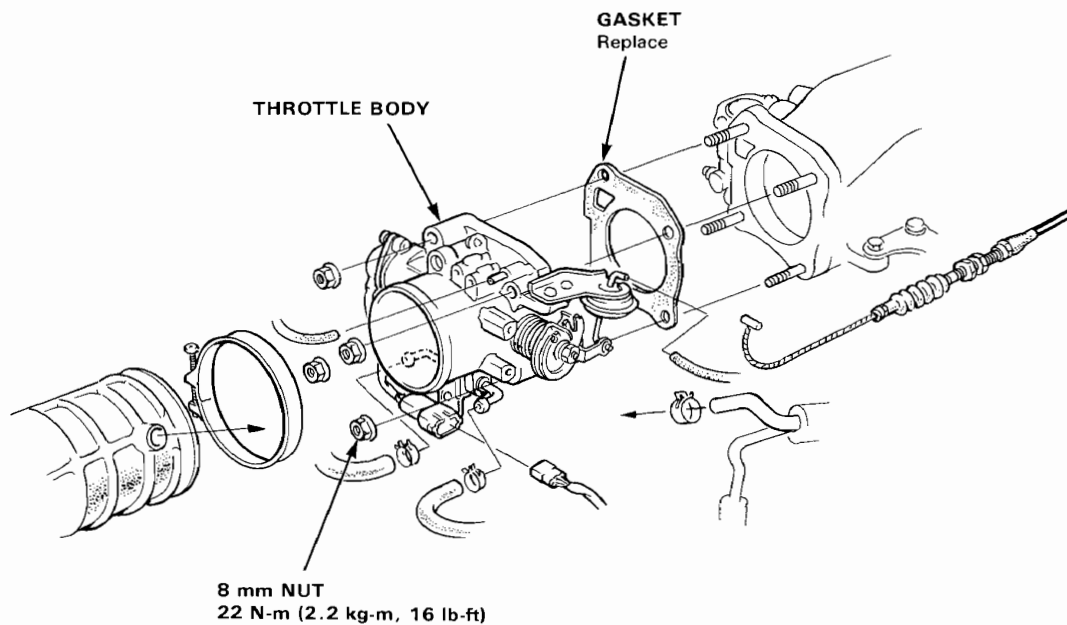
4. Connect the battery positive terminal to the terminal of the connector of the valve and the negative terminal to the ground.
5. Apply vacuum to the hose.
It should not hold vacuum.
If it holds vacuum, replace the valve.



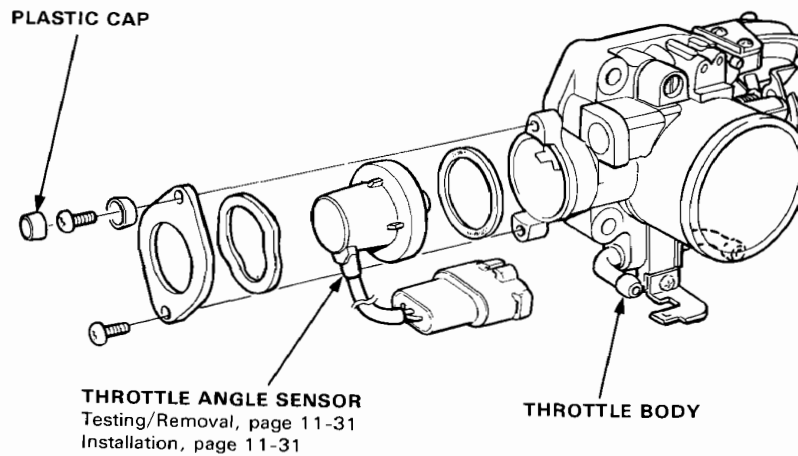
Air Intake System



Throttle Body Disassembly



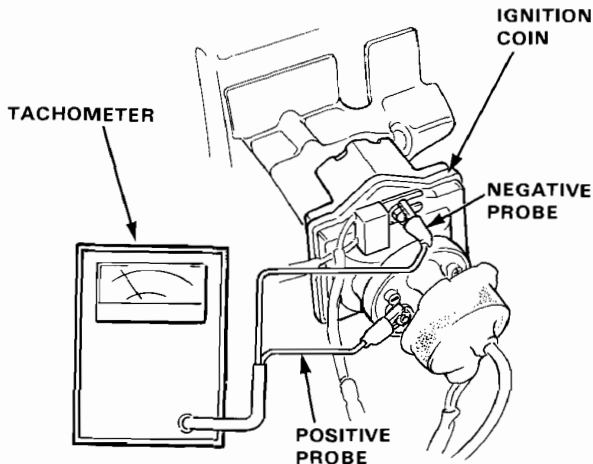
CAUTION: The throttle valve stop screw is nonadjustable.



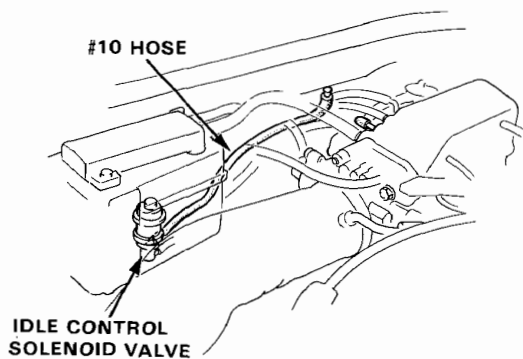
Air Intake System

Idle Speed Inspection

1. Start the engine and warm it up to normal operating temperature (the cooling fan goes on twice).
2. Connect a tachometer.



3. Disconnect the vacuum hose #10 of the idle control solenoid valve (between the valve and intake manifold) from the intake manifold.
4. Cap the end of the hose and intake manifold.

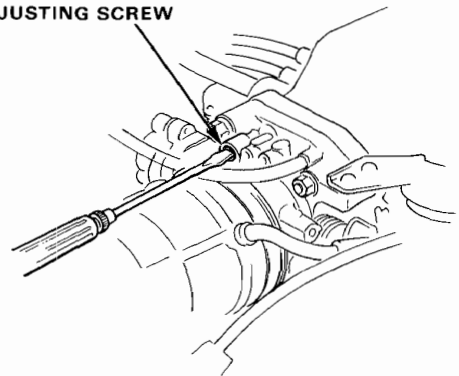


5. Adjust the idle speed with heater blower, rear window defroster, cooling fan and air conditioner off.

Idle Speed should be: $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$

Adjust the idle speed, if necessary, by turning the adjusting screw on the top of the throttle body.

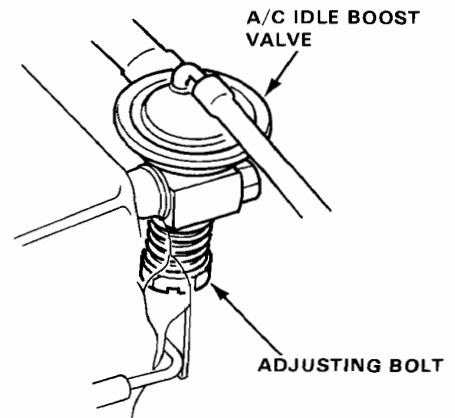
ADJUSTING SCREW



6. Check the idle speed with heater fan switch at HI (right end) and air conditioner on.

Idle Speed should be: $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$

Adjust idle speed, if necessary, by turning the adjusting bolt on the A/C idle boost valve.



7. After adjustment, connect the idle control solenoid valve vacuum hose.

8. Check the idle speed with headlights, heater blower, rear window defroster, and cooling fan on but air conditioner off.

It should be the same as normal idle speed.

NOTE: If the idle speed is not within specifications, see Troubleshooting on pages 11-20.



Idle Mixture Inspection

NOTE:

- Perform the measurement in a place with good ventilation and with no direct exposure to the wind and rain.
- Perform the measurement while the engine is idling (under no load).
- Use a precise tachometer to check engine rpm.
- Use the NDIR CO meter in accordance with the manufacturers' recommended procedures.
- The following inspections and adjustments should be completed before the measurement.

Air cleaner element

Ignition timing and control system

Spark plugs

Idling speed

Valve clearance

PCV valve

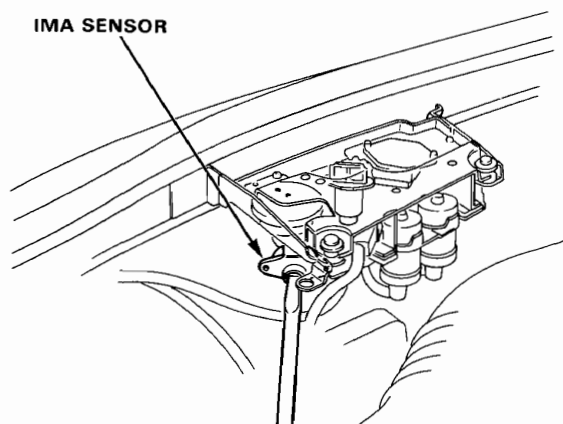
1. Start the engine, and, after the radiator cooling fan works two times, further warm up the engine at 3,000 min⁻¹(rpm) for two minutes or more.
2. Insert exhaust gas sampling probe into the tail pipe at least 40 cm (16 in.).
3. Check idle CO with the headlights, heater blower, rear window defroster, cooling fan, and air conditioner off.

CO meter should indicate:

KX Model: 0.1 % maximum

Other Models: 1.0 ± 1.0%

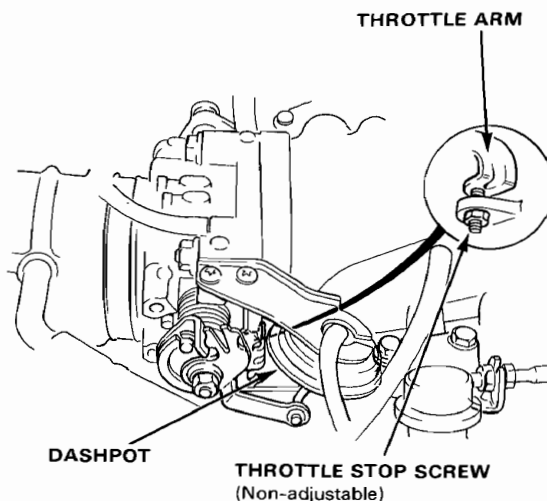
4. On except KX Model, if unable to obtain this reading, adjust by turning adjusting screw of the IMA sensor.



- If unable to obtain a CO reading of specified % by this procedure, check the engine tune-up condition.

Throttle Control System

1. With the engine shut off, slowly open the throttle arm until the dashpot rod is raised up as far as it will go.



2. Release the throttle arm and measure the time until the throttle arm contacts the stop screw.

Time should be: less than 2 seconds

- If the time is over 2.0 seconds, replace the dashpot check valve and re-test.
- If the rod does not operate, check for bound linkage, or for clogged check valve or vacuum line.
- If they are OK, replace the dashpot with a new one.

Air Intake System

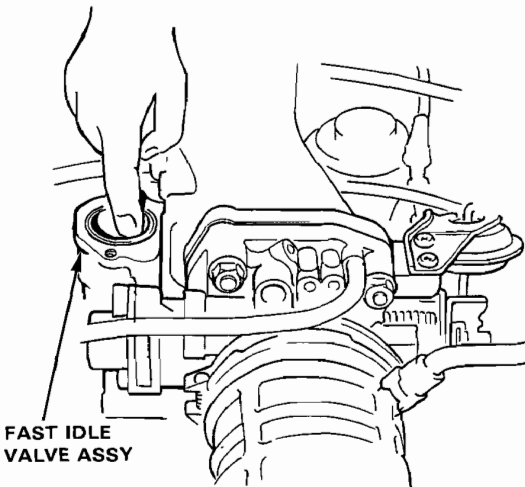
Fast Idle Valve

NOTE:

- The fast idle valve is factory adjusted, it should not be disassembled.
- Check the PCV (engine breather) circuit tubing for breakage, disconnection, clogging, etc.
- Check that the throttle valves are fully closed.

If idle speed is too high after engine is warmed up:

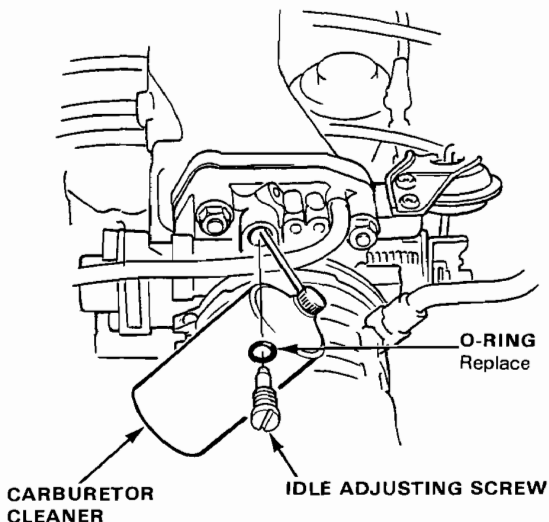
1. Remove the cover of the fast idle valve.
2. Check that the valve is completely closed. If not, an air suction sound can be heard in the valve seat area.



- If any suction is heard, the valve is leaking. Replace the fast idle valve and adjust idle speed (page 11-34).

If idle speed is too low after engine is warmed up:

1. Remove the idle adjusting screw.

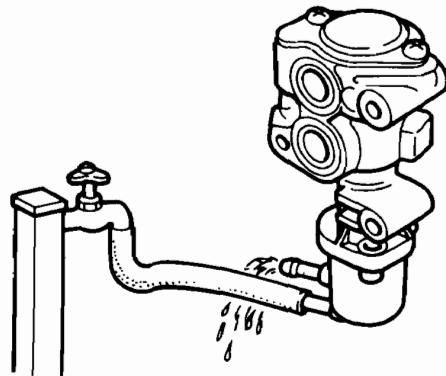


2. Wash the idle adjusting screw and the air bypass channel with carburetor cleaner.
3. Readjust idle speed after cleaning.

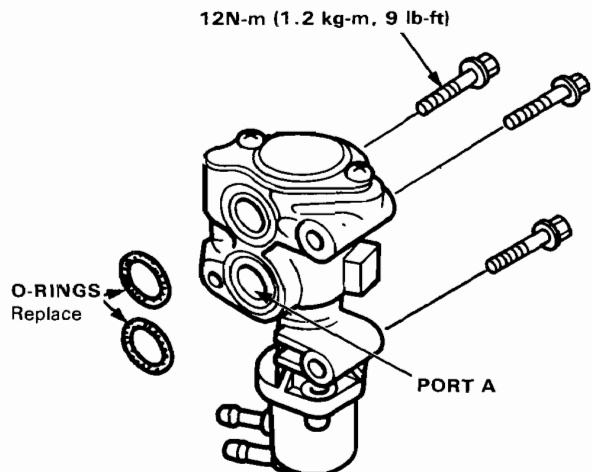
If fast idle speed is low when engine is cold (coolant temperature below 60°C (140°F). (Fast idle valve may be stuck closed):

Fast idle speed should be: 1,000—1,800 min⁻¹(rpm)

1. Remove the fast idle valve assy from the throttle body.
2. Apply cold water and cool down the wax part of the fast idle valve to 5—30°C (41—86°F).



3. Blow through port A or the fast idle valve, and check that a fairly large amount of air flows without resistance.



- If air does not flow or the resistance is large, replace the fast idle valve and adjust idle speed. (page 11-34)

Fuel System

Fuel Pressure Relieving



⚠ WARNING

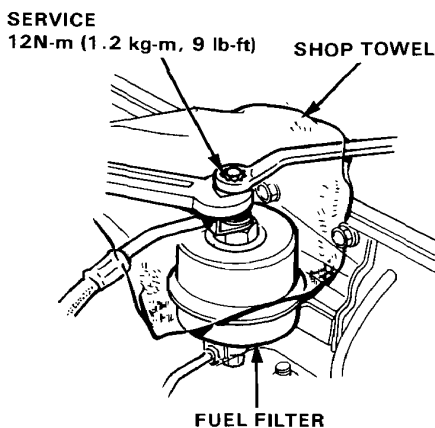
- Do not smoke while working on the fuel system. Keep open flames or sparks from the work area.
- Be sure to relieve fuel pressure while the engine is off.

NOTE: Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 6 mm service bolt at top of the fuel filter.

1. Disconnect the battery negative cable from the battery negative terminal.
2. Use a box end wrench on the 6 mm service bolt at top of the fuel filter, while holding the special banjo bolt with another wrench.
3. Place a rag or shop towel over the 6 mm service bolt.
4. Slowly loosen the 6 mm service bolt one complete turn.

NOTE:

- A fuel pressure gauge can be attached at the 6 mm service bolt hole.
- Always replace the washer between the service bolt and the Special Banjo Bolt, whenever the service bolt is loosened to relieve fuel pressure. Replace all washers whenever the bolts are removed to disassemble parts.

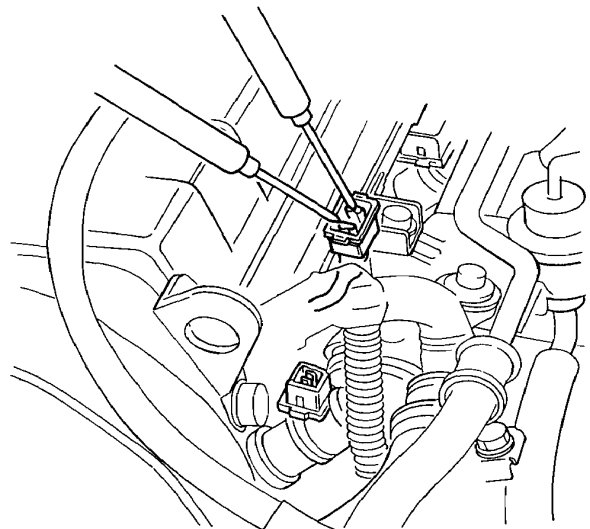


Injector Testing

NOTE: Check the following items before testing idle speed, ignition timing, valve clearance and idle CO %.

If the engine will run.

1. With the engine idling, disconnect injector couplers, and inspect the change in the idling speed.
- If the idle speed drop is almost the same for each cylinder, the injectors are normal.
 - If the idle speed or quality remains the same when you disconnect a particular injector, check for voltage at that coupler.



- If voltage fluctuates between 0 and 2 volts, replace the injector.
- If there is no voltage, check the following:
 - Whether there is any short-circuiting, wire breakage, or poor connection in the wiring between the resistor and the injector.
 - Whether the resistor is normal.
 - Whether there is any short-circuiting, wire breakage, or poor connection in the wire between the resistor and control unit.

(cont'd)

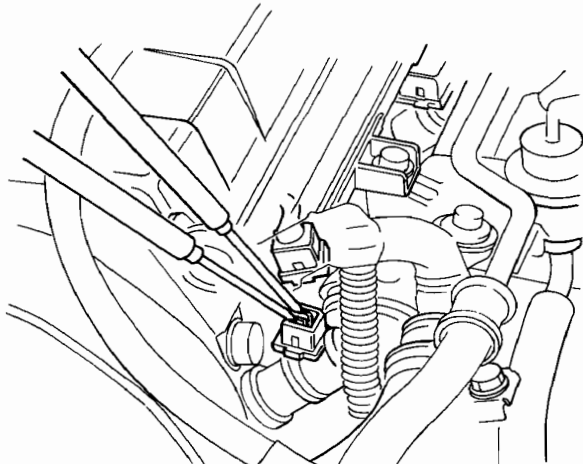
Fuel System

Injector Testing (cont'd)

If the engine cannot be started.

1. Remove the coupler of the injector, and measure the resistance between the terminals of the injector.

Resistance should be: 1.5–2.5 Ω

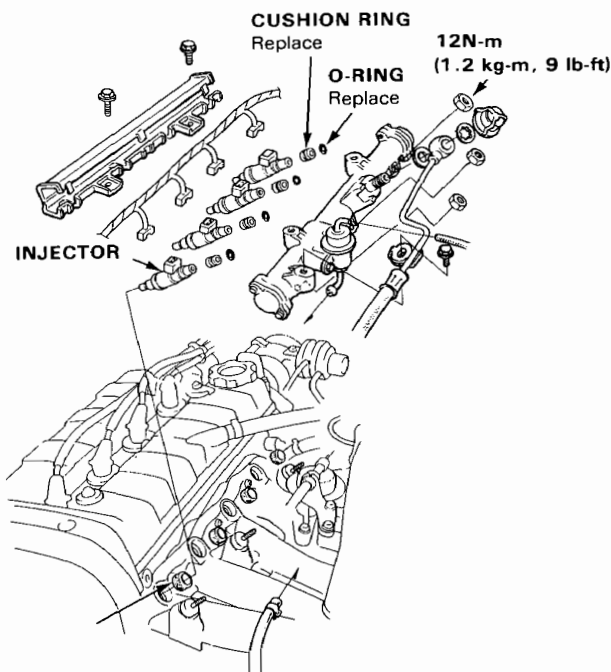


- If resistance is not as specified, replace the injector.
- If the resistance is normal, check the following:
 - Whether there is any short-circuiting, wire breakage, or poor connection in the wiring between the resistor and the injector.
 - Whether the resistor is normal.
 - Whether there is any short-circuiting, wire breakage, or poor connection in the wire between the resistor and control unit.

Injector Replacement

WARNING Do not smoke during the work. Keep open flames away from your work area.

1. Disconnect the battery negative cable from the battery negative terminal.
2. Relieve fuel pressure (page 11-37).
3. Disconnect the coupler of the injector.
4. Disconnect the vacuum hose and fuel return hose from the pressure regulator.
NOTE: Place a rag or shop towel over the hose and tube before disconnecting them.
5. Loosen the retainer nuts on the fuel pipe.
6. Disconnect the fuel pipe.
7. Remove the injector from the intake manifold.



8. Slide new cushion rings onto the injector.
9. Coat new O-rings with clean engine oil and put them on the injectors.

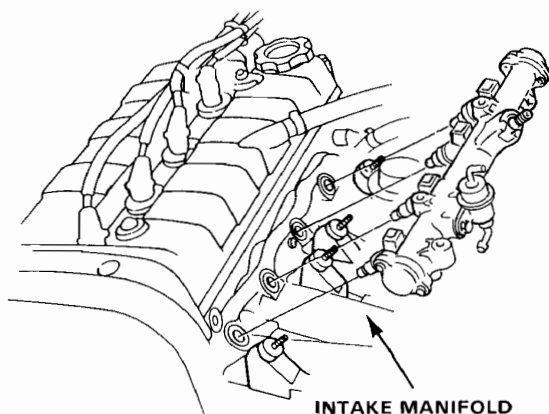


10. Insert the injectors into the fuel pipe first.

CAUTION: To prevent damage to the O-ring, insert the injector into the fuel pipe squarely and carefully.

11. Coat new seal rings with clean engine oil and press them into the intake manifold.
12. Install the injector and fuel pipe assembly in the manifold.

CAUTION: To prevent damage to the O-ring, install the injectors in the fuel pipe first, then install them in the intake manifold.

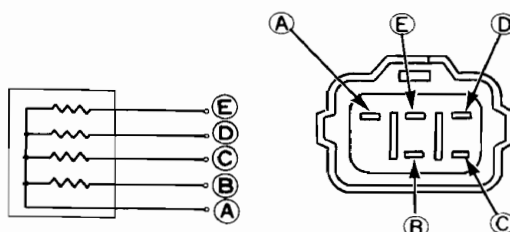
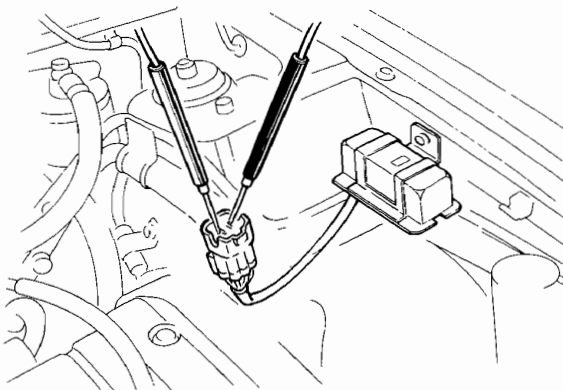


13. Tighten the retainer nuts.
14. Connect the vacuum hose and fuel return hose to the pressure regulator.
15. Install the couplers on the injectors.
16. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.

Fuel System Resistor

1. Disconnect the resistor connector.
2. Check for resistance between each of the resistor terminals (E, D, C and B) and the power terminal (A).

Resistance should be: 5–7 Ω



- Replace the resistor with a new one if any of the resistances are outside of the specification.

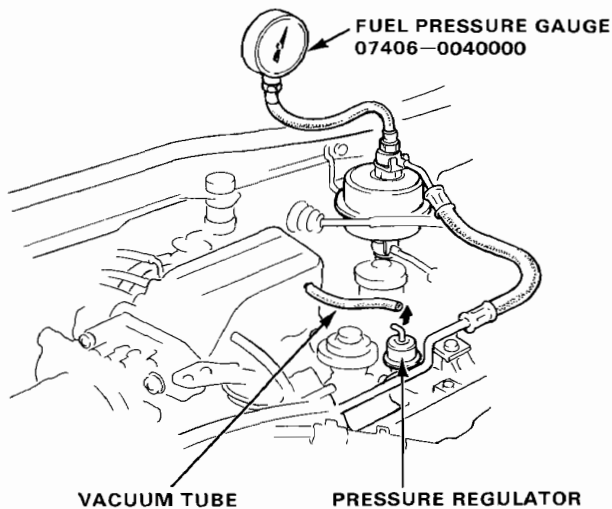
Fuel System

Fuel Pressure Testing

1. Relieve fuel pressure (page 11-37).
2. Remove the service bolt on the top of the fuel filter while holding the banjo bolt with another wrench and attach the fuel pressure gauge.
3. Start the engine. Measure the fuel pressure with the engine idling and the vacuum hose of the pressure regulator disconnected.

Pressure should be:

$255 \pm 20 \text{ kPa}$ ($2.55 \pm 0.2 \text{ kg/cm}^2$, $36 \pm 3 \text{ psi}$)



- If the fuel pressure is not as specified, first check the fuel pump (page 11-42). If the pump is OK, check the following:
 - If the pressure is higher than specified, inspect for:
 - Pinched or clogged fuel return hose or piping.
 - Faulty pressure regulator.
 - If the pressure is lower than specified, inspect for:
 - Clogged fuel filter
 - Pinched or clogged fuel hose from the fuel tank to the fuel pump
 - Pressure regulator failure
 - Leakage, in the fuel line
 - Pinched, broken or disconnected regulator vacuum hose

Pressure Regulator

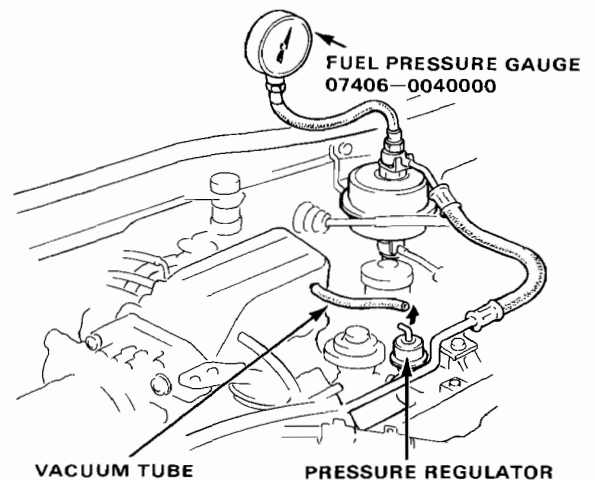
Testing:

WARNING Do not smoke during the test. Keep open flames away from your work area.

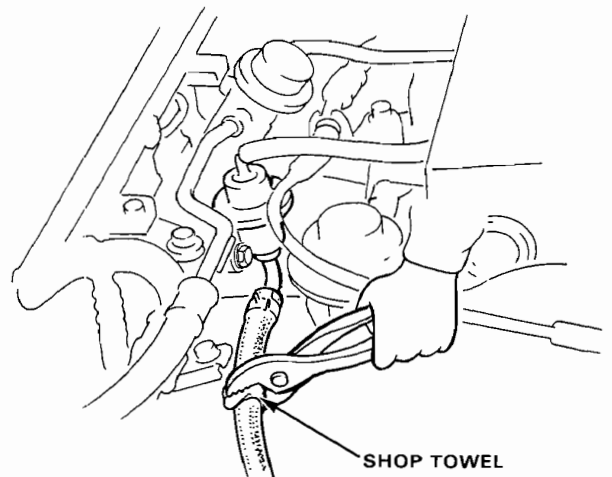
If the fuel pressure is not as specified, check the fuel pump first, then check the regulator.

1. Check for pinched or broken vacuum hoses.
2. Check that the fuel pressure rises by disconnecting the vacuum hose from the regulator.

Pressure should be: $255 \pm 20 \text{ kPa}$
($2.55 \pm 0.2 \text{ kg/cm}^2$, $36 \pm 3 \text{ psi}$)



- If the fuel pressure does not rise, pinch the return hose 2 or 3 times lightly.



- If the fuel pressure is not as specified, replace the pressure regulator.



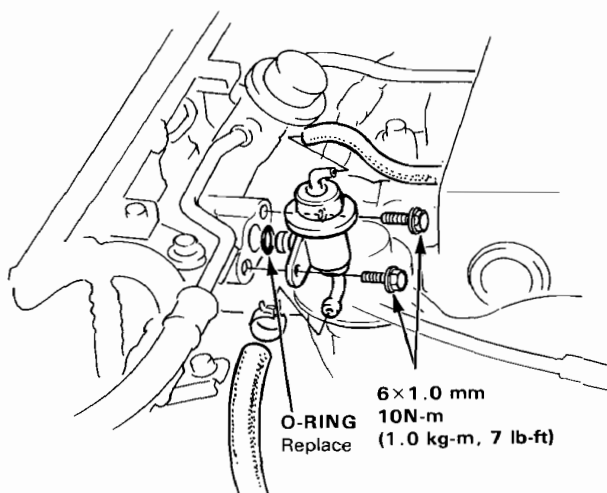
Replacement:

WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Disconnect the negative terminal of the battery.
2. Place a shop towel under the pressure regulator, then relieve fuel pressure (page 11-37).
3. Disconnect the vacuum tube and fuel return hose.
4. Remove the two 6 mm retainer bolts.

NOTE:

- Replace the O-rings.
- When assembling the regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.

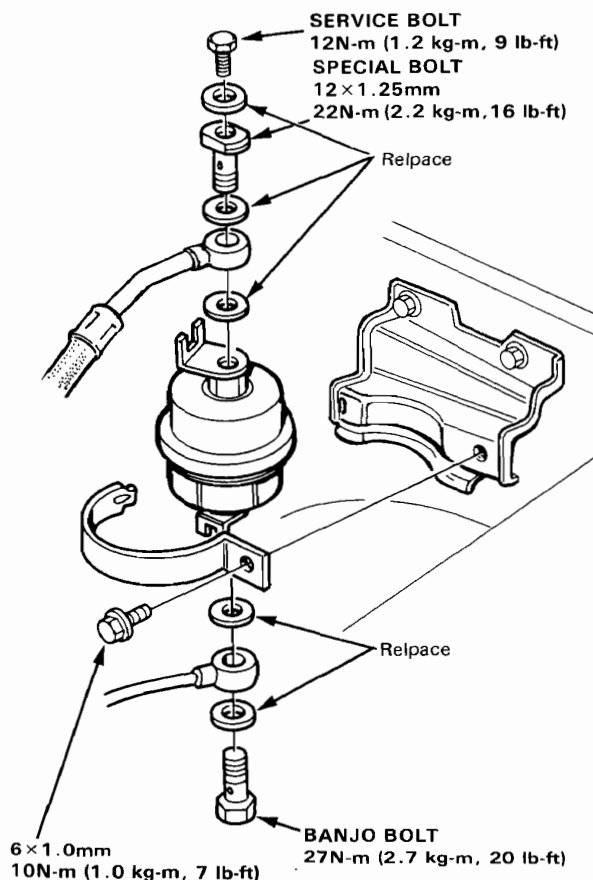


Fuel Filter Replacement

WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

The filter should be replaced: every 40,000 km (24,000 miles), or whenever the fuel pressure drops below the specified value (255 ± 20 kPa, 2.55 ± 0.2 kg/cm², 36 ± 3 psi with the vacuum pressure hose disconnected) after making sure that the fuel pump and the pressure regulator are OK.

1. Disconnect the battery cable from the negative terminal.
2. Place a shop towel under and around the fuel filter.
3. Relieve fuel pressure (page 11-37).
4. Remove the two 12 mm sealing bolts from the filter.
5. Remove the fuel filter clamp and fuel filter.
6. When assembling, use new washers, as shown.

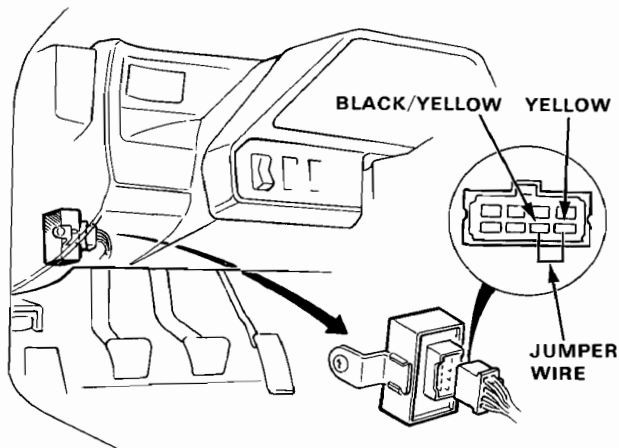


Fuel System

Fuel Pump Inspection

WARNING Do not smoke during the test. Keep open flame away from your work area.

1. With the ignition switch OFF, disconnect the coupler from the main relay behind the fuse box.
2. Connect the Yellow wire and Black/Yellow wire with a jumper wire.

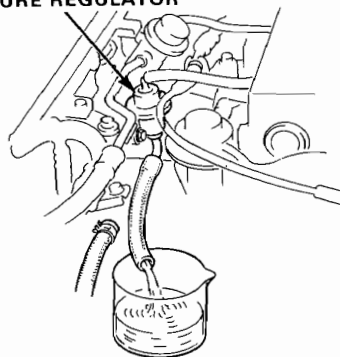


3. Relieve fuel pressure as described on page 11-37, then tighten the service bolt.
4. Disconnect the fuel return pipe from the regulator.
5. Turn the ignition switch ON, measure the amount of fuel flow for 10 seconds, then turn the ignition switch OFF.

Amount should be:

230 cc (7.8 oz) min. in 10 seconds at 12 V

PRESSURE REGULATOR



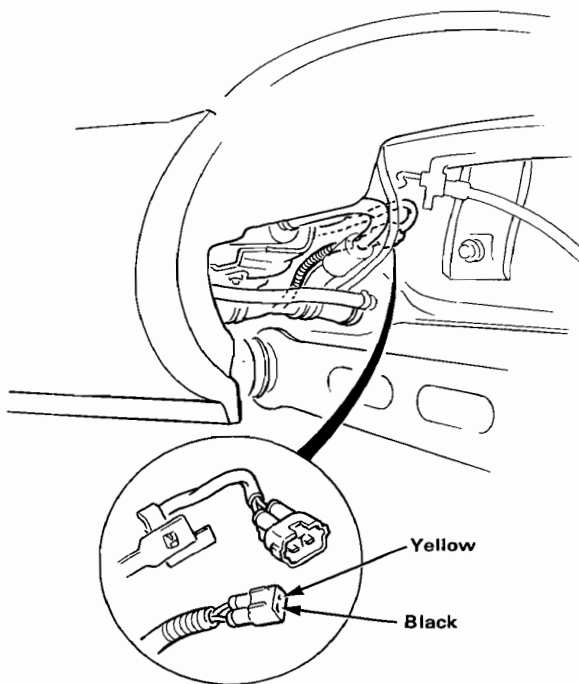
- If fuel flow is less than 230 cc (7.8 oz), or there is no fuel flow, check for:
 - Fuel pump failure
 - Clogged fuel filter
 - Clogged fuel line
 - Pressure regulator failure

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; it should make noise when it is ON. If the pump does not make noise, check as follows.

1. Jack up car and place jack stands in proper locations.
2. Remove left rear wheel.
3. Remove the fuel pump cover and disconnect Yellow and Black wires.

CAUTION: Be sure to turn the ignition switch OFF before disconnecting the wires.

4. Check that battery voltage is available at the fuel pump wire couplers when the ignition switch is turned ON. (Positive probe to the Yellow wire, negative probe to the Black wire)



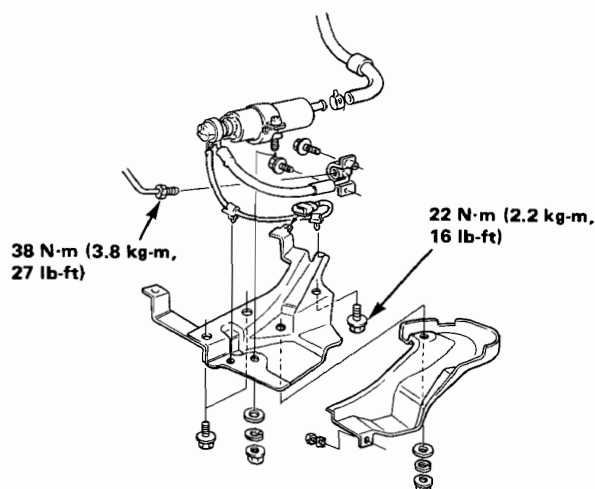
- If battery voltage is available, replace the fuel pump.
- If there is no voltage, check the main relay and wire harness.



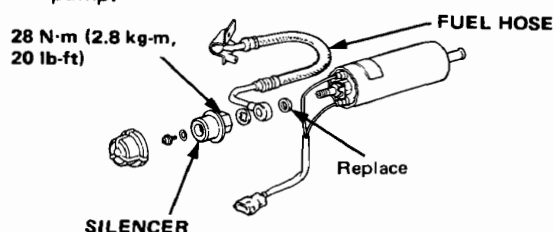
Fuel Pump Replacement

WARNING Do not smoke while working on fuel system. Keep open flames away from your work area.

1. Jack up car and place jack stands in proper locations.
2. Remove left rear wheel.
3. Remove the fuel pump cover.
4. Remove the three bolts, then remove the fuel pump with its mount.
5. Disconnect the fuel lines and electrical wires at the connectors.



6. Remove the clamp and then remove the fuel pump.
7. Remove the fuel line and the silencer from the pump.

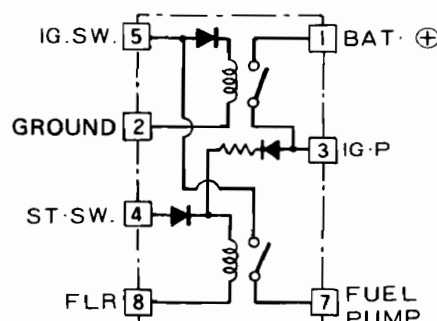
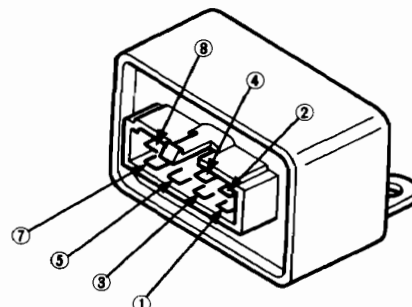


CAUTION: Do not disassemble the pump

8. Install the new fuel pump on its mount.
9. Carefully clean the sealing surface of the flared fuel line, then install it on the fuel pump and tighten the flare nut. Reinstall the fuel hose and silencer on the front of the fuel pump.
10. Reconnect the electrical wires and reinstall the fuel pump.
11. Have someone turn the ignition switch to ON while you watch the fuel pump connections for leaks. Repeat this check two or three times to be sure that there are no fuel leaks.

Main Relay Testing

1. Remove the main relay, near the under-dash fuse box.
 2. Connect the battery positive terminal to the No. 4 terminal and the battery negative terminal to the No. 8 terminal of the main relay. Then check for continuity between the No. 5 terminal and No. 7 terminal of the main relay.
- If there is continuity, go on to step 3.
 - If there is no continuity, replace the relay.



3. Connect the battery positive terminal to the No. 5 terminal and the battery negative terminal to the No. 2 terminal of the main relay. Then check that there is continuity between the No. 1 terminal and No. 3 terminal of the main relay.
- If there is continuity, go on to step 4.
 - If there is no continuity, replace the relay.
4. Connect the battery positive terminal to the No. 3 terminal and battery negative terminal to the No. 8 terminal of the main relay. Then check that there is continuity between the No. 5 terminal and No. 7 terminal of the main relay.
- If there is continuity, the relay is OK. If the fuel pump still does not work, go to Harness Testing in the next column.
 - If there is no continuity, replace the relay.

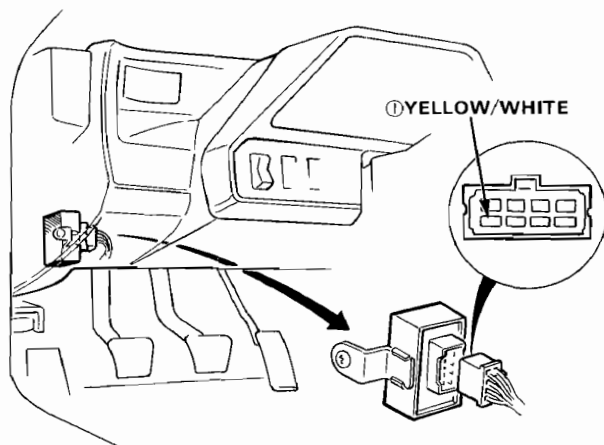
Fuel System

Harness Testing

1. Keep the ignition switch in the OFF position.
2. Disconnect the main relay coupler.
3. Connect the positive probe of the circuit tester to the Yellow/White wire ① in the coupler and ground the negative probe of the tester to body ground.

- Battery voltage should be available.

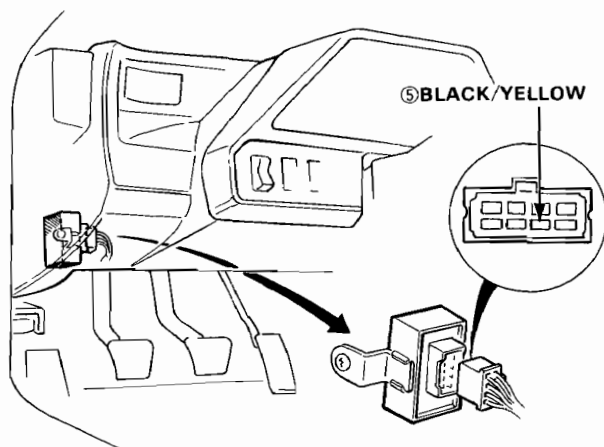
- If there is no voltage, check the wiring between the battery and the main relay as well as the ECU fuse in the engine compartment.



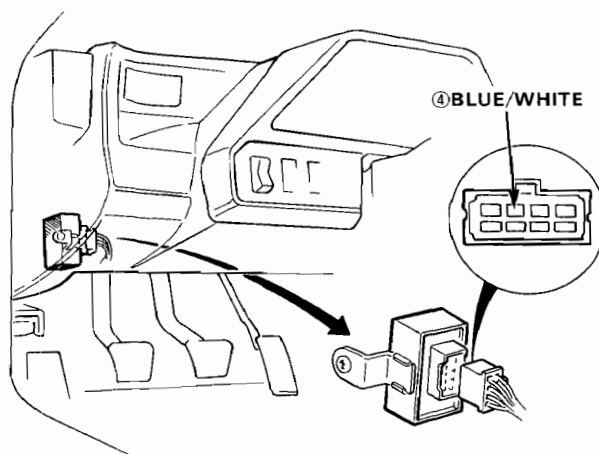
4. Connect the positive terminal of the tester to the Black/Yellow wire ⑤ of the coupler and ground the negative terminal of the tester to body ground.
5. Turn the ignition switch ON.

- The tester should indicate battery voltage.

- If there is no voltage, check the wiring from the ignition switch and the main relay as well as fuse No. 4.



6. Connect the positive terminal of the tester to the Blue/White wire ④ in the coupler and ground the negative terminal to the body.

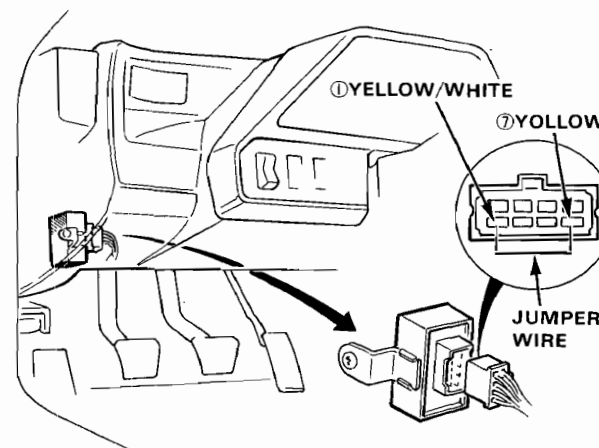


7. Turn the ignition switch to START position.
 - The tester should indicate battery voltage.
 - If there is no voltage, check the wiring between the ignition switch and main relay as well as the ECU fuse (10A)

8. Connect a jumper wire between the Yellow/White wire ① and Yellow wire ⑦ in the coupler.

- The fuel pump should work.

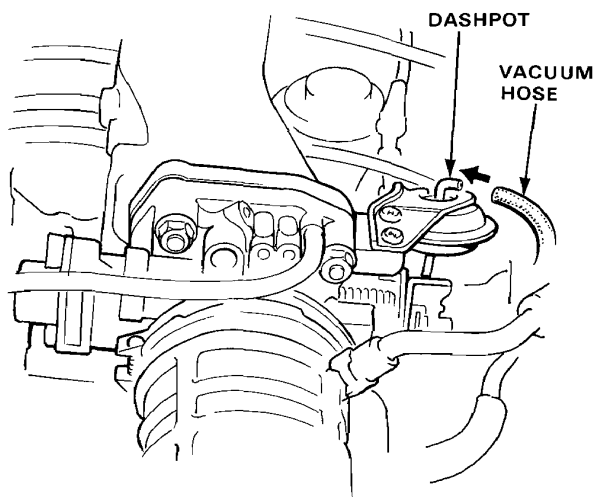
- If the fuel pump does not work, check the wiring between the battery and fuel pump and the wiring from the fuel pump to the ground (Black wire).



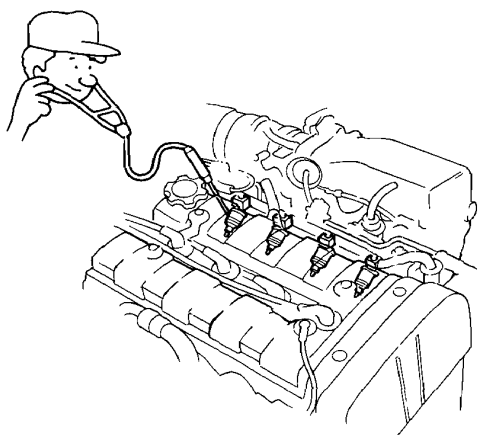


Fuel Cut-Off System

1. Start the engine and warm it up to operating temperature. Check that the engine idles smoothly.
2. On cars equipped with manual transmission: disconnect the vacuum hose from the dashpot of the throttle body.



3. Use a stethoscope to confirm that the injectors are working; they should make a clicking sound.



4. While listening to an injector, raise the engine speed to 3,000 rpm then release the throttle; the clicking of the injectors should cease momentarily when releasing the throttle.
 - If the clicking does not cease, check the ECU, throttle angle sensor, or wiring between the injector and ECU. Consult the Troubleshooting Chart according to the pattern of the self-diagnosis lamps on the ECU (page 11-11).

Fuel System

Fuel Tank Replacement

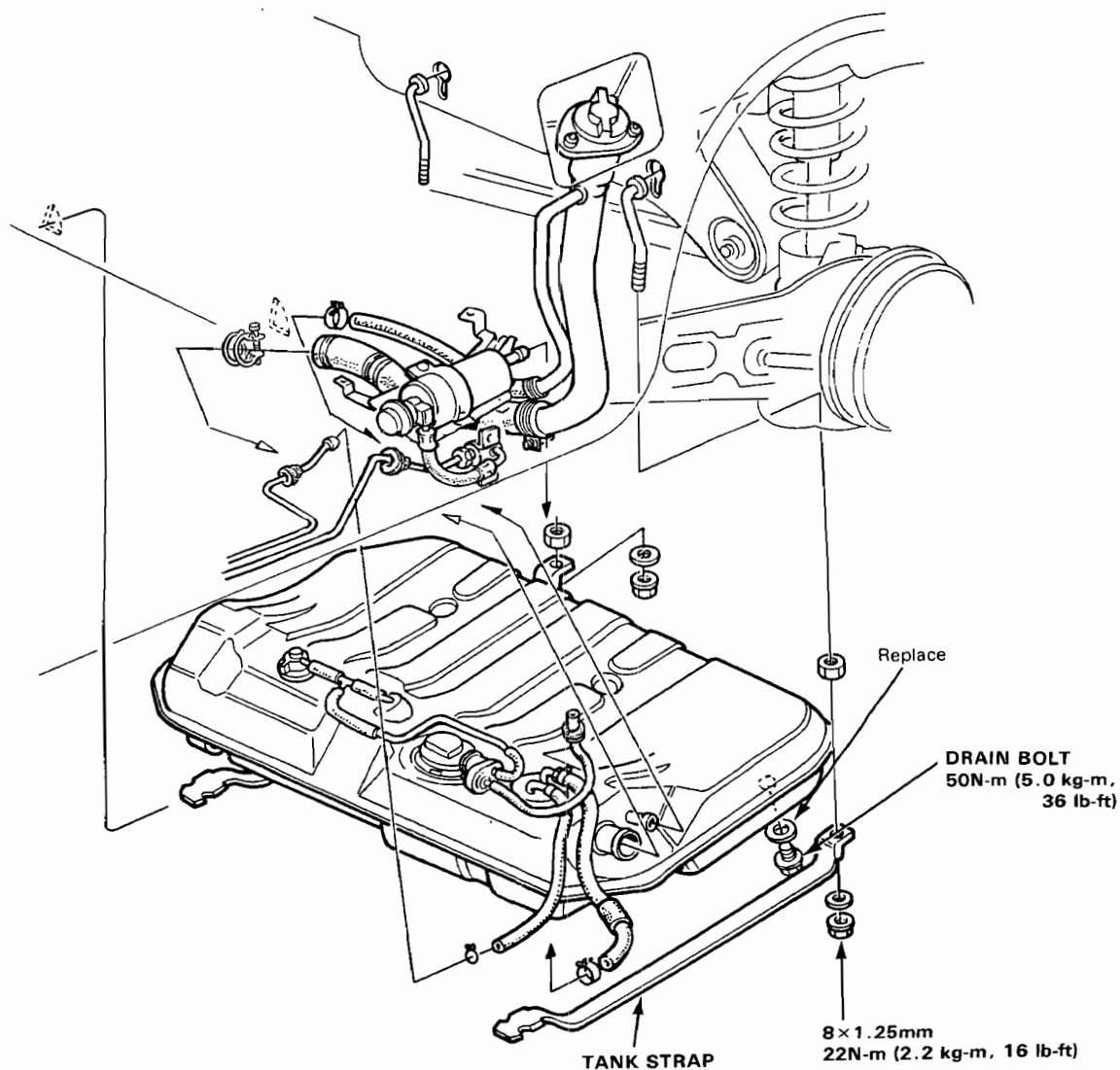
WARNING

- Do not smoke while working on fuel system. Keep open flame away from work area.
- Block front wheels before jacking up rear of car.

1. Raise rear of the car and place jack stands in the proper locations.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Disconnect the sending unit connectors.
4. Disconnect the hoses.

CAUTION: When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.

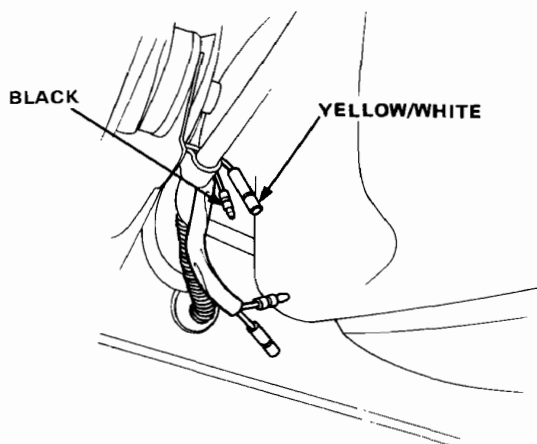
5. Place a jack, or other support, under the tank.
6. Remove the strap nuts and let the straps fall free.
7. Remove the fuel tank.
8. Install in the reverse order of removal.





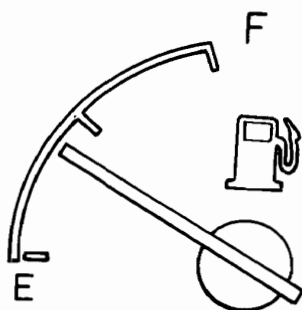
Fuel Gauge Testing

1. Disconnect the fuel tank wire harness connectors. Connect the Yellow/White wire to the Black wire.



2. Turn the ignition switch ON. Check that the pointer of the fuel gauge starts moving toward F.

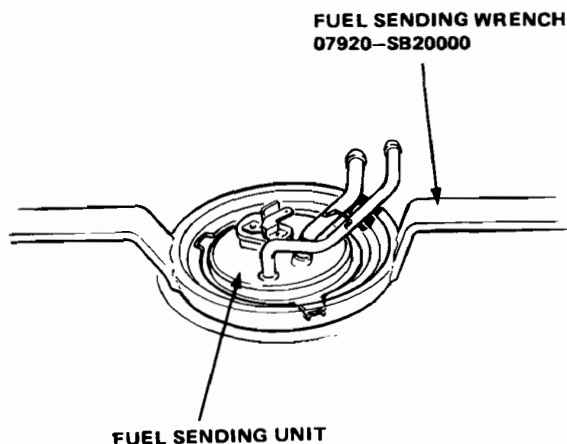
CAUTION: Turn the ignition switch OFF within 5 seconds, before the pointer reaches "F" mark on the gauge dial. Failure to turn the ignition switch OFF before the pointer reaches the "F" mark may cause damage to the fuel gauge.



- If the pointer of the fuel gauge does not swing at all, check the fuse, wire harness and coupler. Replace the fuel gauge if they are normal.
- Inspect the fuel gauge sending unit if the fuel gauge is OK.

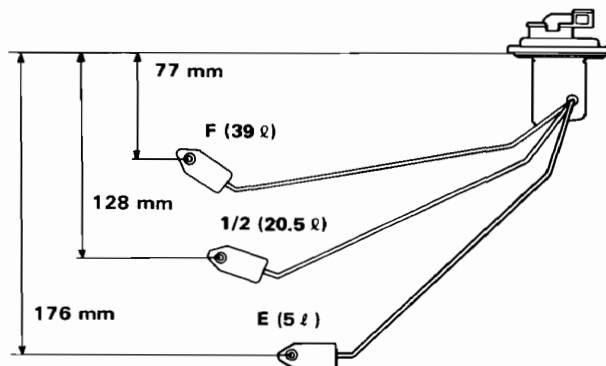
Fuel Sending Unit Testing

1. Remove the fuel tank (page 11-46)
2. Remove the fuel gauge sending unit.



3. Measure the resistance between the terminals at E (EMPTY), 1/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E (5 l)	1/2 (20.5 l)	F (39 l)
Resistance (Ω)	105-110	25.5-39.5	2-5



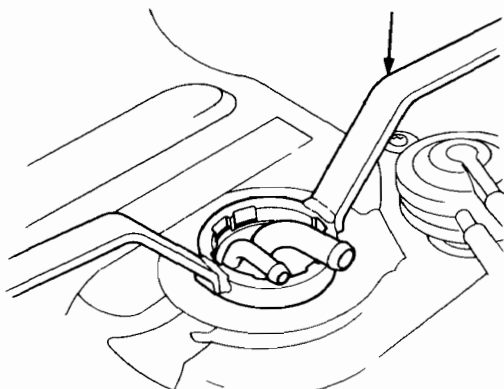
- If unable to obtain the above readings, replace the fuel unit with a new one.

Fuel System

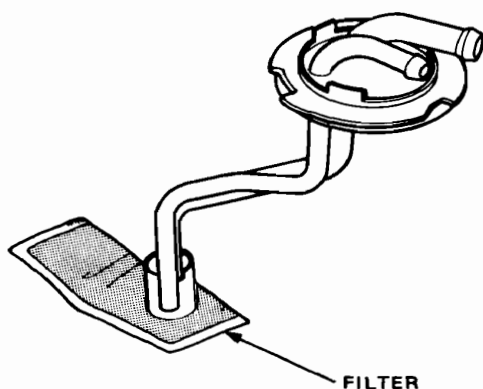
Fuel Pipe Unit Replacement

1. Remove the fuel tank (page 11-46).
2. Remove the fuel pipe unit.

FUEL SENDING WRENCH
07920-SB20000



3. Clean the filter at the end of the pipe unit.



Fuel Cut-off Valve Replacement

WARNING

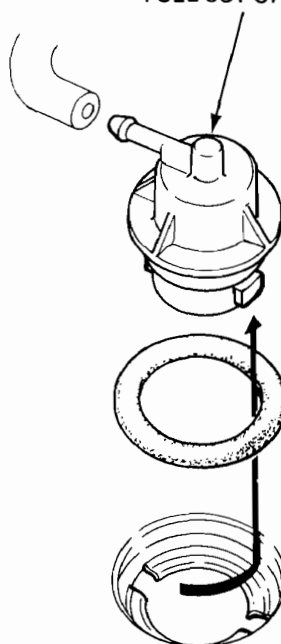
- Do not smoke while working on fuel system. Keep open flame away from work area.
- Block front wheels before jacking up rear of car.

1. Raise rear of car and place jackstands in the proper locations.
2. Place jack under fuel tank.

CAUTION: Place a flat piece of wood on the jack lifting pad to prevent damage to the fuel tank.

3. Remove the tank mounting nuts and bolts, then lower the tank just enough to gain access to the fuel cut-off valve.
4. Turn the valve ¼ turn (90°), so its lugs are aligned with the slots in the mount, then lift it out.

FUEL CUT-OFF VALVE

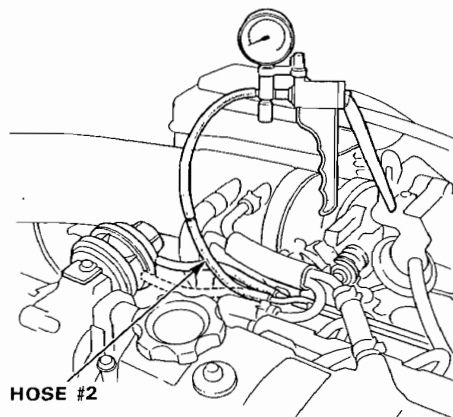




Emission Controls

Ignition Timing Control

1. Disconnect vacuum hose #2 from the vacuum advance diaphragm A on the distributor and connect a vacuum pump/gauge to the hose.



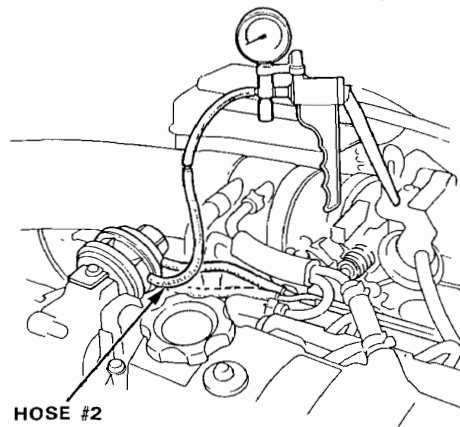
2. Start the engine, allow it to idle and check for vacuum.

There should be vacuum.

- If there is no vacuum, check the vacuum line for leaks, blockage or a disconnected hose and re-test.

3. Apply 500 mmHg (20 in.Hg) vacuum to the diaphragm A.

Timing should advance and remain steady.

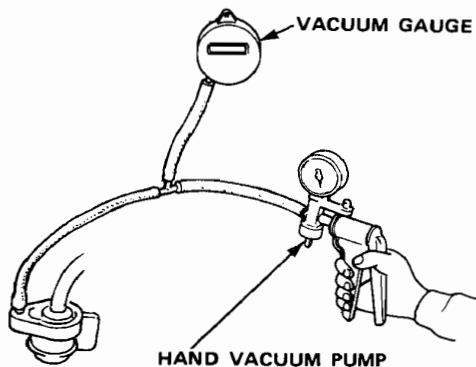


- If timing does not advance, stop the engine and remove distributor cap. Turn breaker plate right and left to check for freedom of movement. If there is no evidence of binding, replace advance diaphragm and re-test.

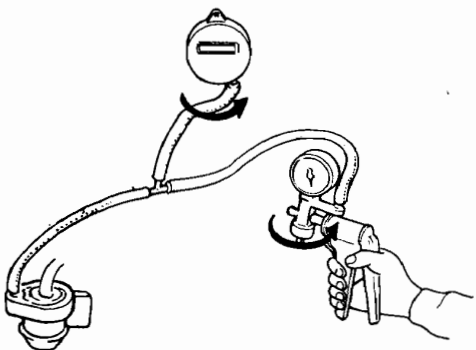
(cont'd)

Two-way Valve

1. Remove the fuel filler cap.
2. Remove the vapor line from the frame, and connect to a T-fitting from the vacuum gauge and the vacuum pump as shown.



3. Slowly draw a vacuum while watching the gauge. Vacuum should stabilize at 15 to 30 mmHg (0.6 to 1.2 in. Hg).
 - If vacuum stabilizes momentarily (Two-way Valve opens) between 15 and 30 mmHg (0.6 and 1.2 in. Hg), go on step 4.
 - If vacuum stabilizes (valve opens) below 15 mmHg or above 30 mmHg (1.2 in. Hg), install new valve and retest.
4. Move hand pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



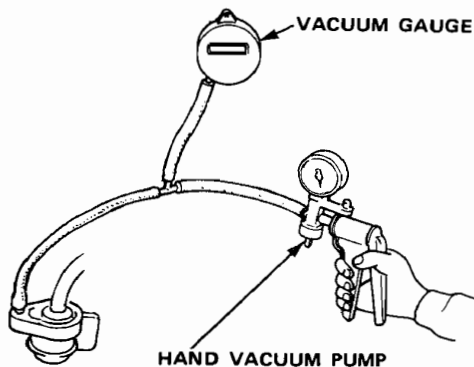
5. Slowly pressurize the vapor line while watching the gauge. Pressure should stabilize at 5 to 15 mmHg (0.2 to 0.6 in. Hg).
 - If pressure momentarily stabilizes (Valve opens) at 5 to 15 mmHg (0.2 to 0.6 in. Hg), the valve is OK.
 - If pressure stabilizes below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install a new valve and re-test.



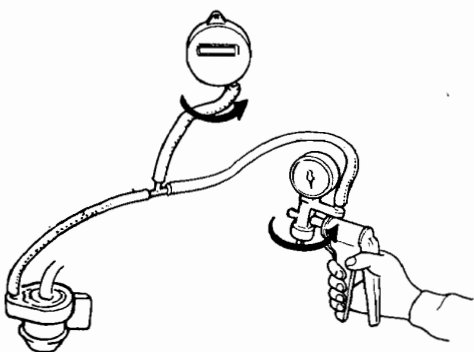
Emission Controls

Two-way Valve

1. Remove the fuel filler cap.
2. Remove the vapor line from the frame, and connect to a T-fitting from the vacuum gauge and the vacuum pump as shown.



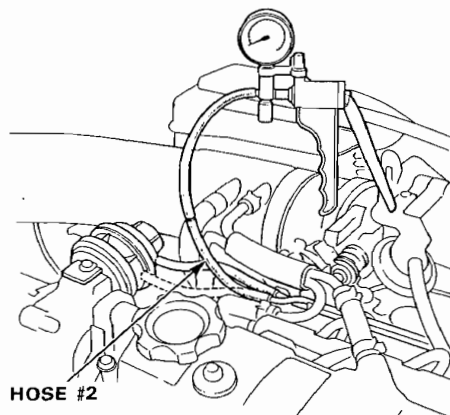
3. Slowly draw a vacuum while watching the gauge. Vacuum should stabilize at 15 to 30 mmHg (0.6 to 1.2 in. Hg).
 - If vacuum stabilizes momentarily (Two-way Valve opens) between 15 and 30 mmHg (0.6 and 1.2 in. Hg), go on step 4.
 - If vacuum stabilizes (valve opens) below 15 mmHg or above 30 mmHg (1.2 in. Hg), install new valve and retest.
4. Move hand pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge. Pressure should stabilize at 5 to 15 mmHg (0.2 to 0.6 in. Hg).
 - If pressure momentarily stabilizes (Valve opens) at 5 to 15 mmHg (0.2 to 0.6 in. Hg), the valve is OK.
 - If pressure stabilizes below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install a new valve and re-test.

Ignition Timing Control

1. Disconnect vacuum hose #2 from the vacuum advance diaphragm A on the distributor and connect a vacuum pump/gauge to the hose.



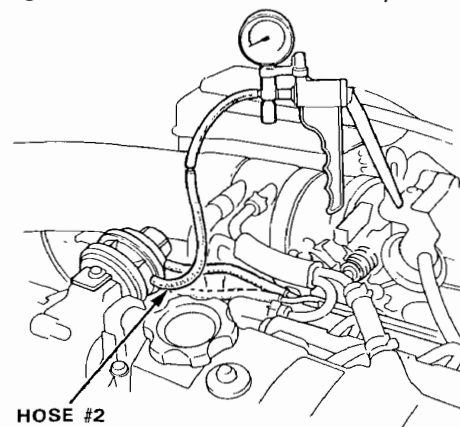
2. Start the engine, allow it to idle and check for vacuum.

There should be vacuum.

- If there is no vacuum, check the vacuum line for leaks, blockage or a disconnected hose and re-test.

3. Apply 500 mmHg (20 in.Hg) vacuum to the diaphragm A.

Timing should advance and remain steady.



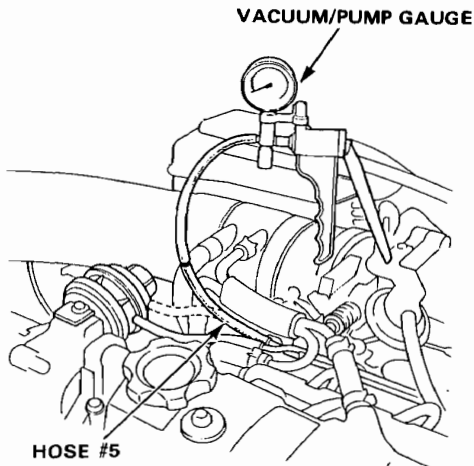
- If timing does not advance, stop the engine and remove distributor cap. Turn breaker plate right and left to check for freedom of movement. If there is no evidence of binding, replace advance diaphragm and re-test.

(cont'd)

Emission Controls

Ignition Timing Control (cont'd)

4. Warm-up the engine until the cooling fan comes on.
5. Disconnect vacuum hose #5 from the vacuum advance diaphragm B on the distributor and connect a vacuum pump/gauge to the hose.



6. Allow the engine to idle and check for vacuum.

There should be vacuum.

- If there is vacuum, check for voltage at the cold advance solenoid valve.
 - If there is voltage, replace the ECU and re-test.
 - If there is no voltage, replace the cold advance solenoid valve.

7. Rapidly open and release the throttle and check for vacuum.

There should be no vacuum.

- If there is no vacuum, check for voltage at the cold advance solenoid valve after checking the vacuum line for leaks, blockage or a disconnected hose.
 - If there is voltage, replace the cold advance solenoid valve and re-test.
 - If there is no voltage, replace the ECU and re-test.

Cold Advance Solenoid Valve

The cold advance solenoid valve is activated by commands from the ECU. When the solenoid valve opens, this causes vacuum in the #12 vacuum hose and sends vacuum to Diaphragm B to improve cold engine performance under the following conditions:

KS modem

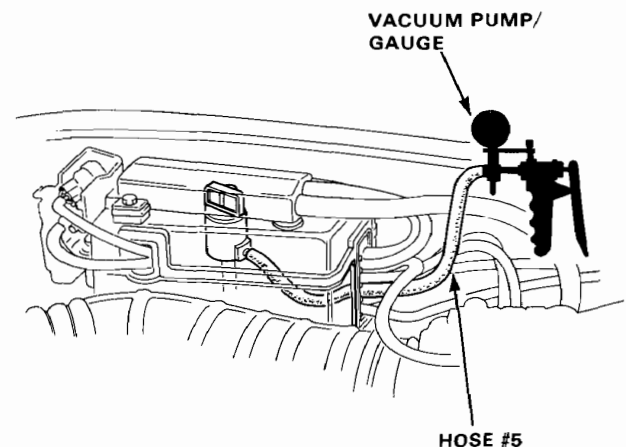
- At idle, the coolant temperature is below 60°C (160°F) and the intake air temperature is below 20°C (68°F).

Except KS model

- Whenever the coolant temperature is below 60°C (160°F).
- When the coolant temperature is 60–100°C (160–212°F), it is operated by the control unit which receives signals from the engine speed and manifold vacuum.

When the valve is open, 9V or more should be available between the Black/Yellow terminal (+) and White/Yellow terminal (–) of the main harness at the control box.

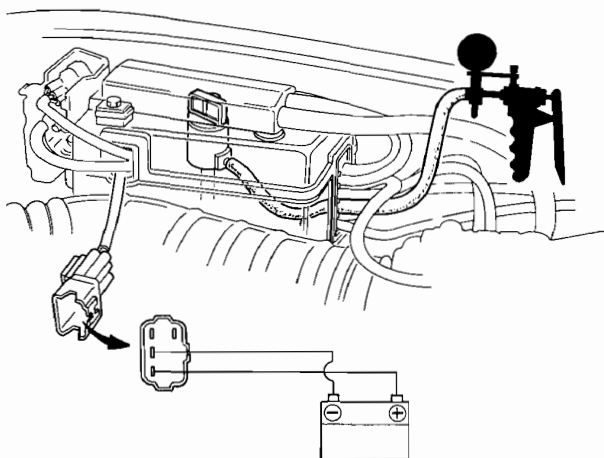
1. Disconnect the 6 cavity rectangular connector from the control box.
2. Disconnect the vacuum hose #5 from the vacuum tank.
3. Apply vacuum to the hose #5. It should hold vacuum.



- If it does not hold vacuum, replace the valve.



4. Connect the battery positive and negative terminals to the control box connector.
5. Apply vacuum to the hose #5 .
It should not hold vacuum.

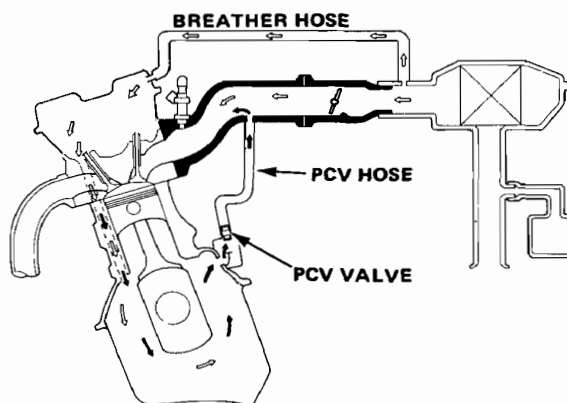


- If it holds vacuum, replace the valve.

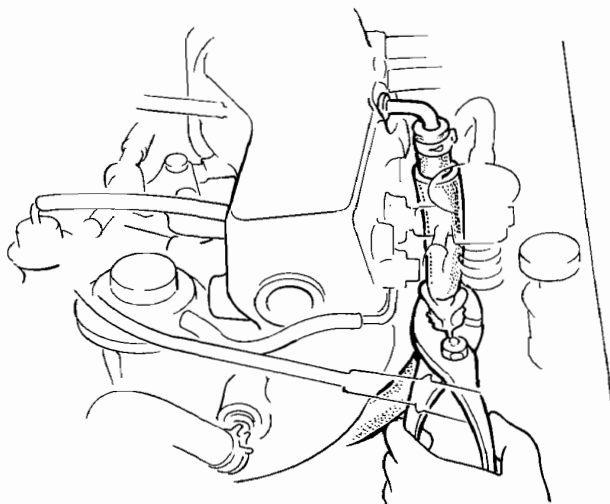
Crankcase Controls

PCV Valve

1. Check the crankcase ventilation hoses and connections for leaks and clogging.



2. At idling, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and intake manifold is lightly pinched with your fingers or pliers.

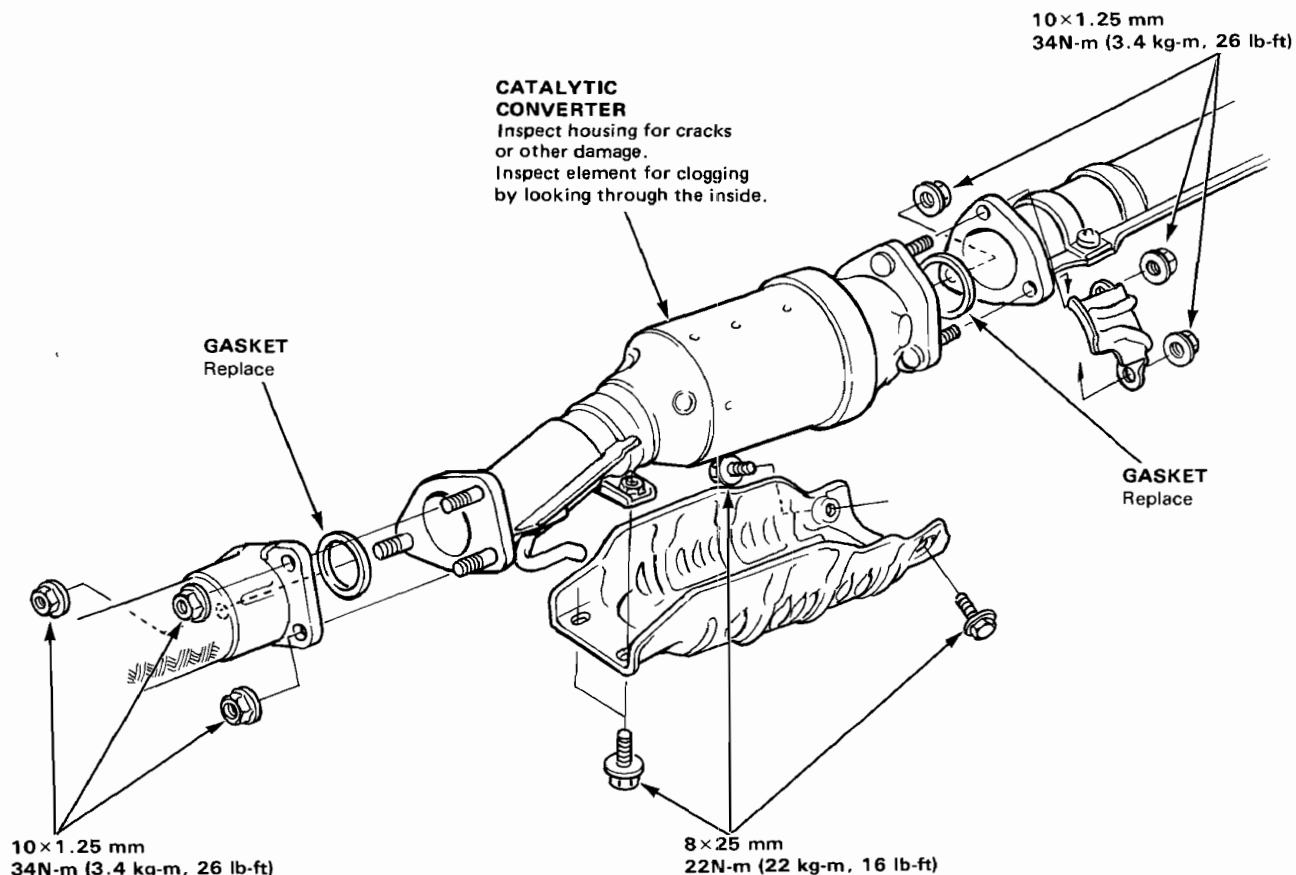


- If there is no clicking sound, check the PCV valve grommet for cracks or damage.
- If the grommet is OK, replace the PCV valve and recheck.

Emission Controls

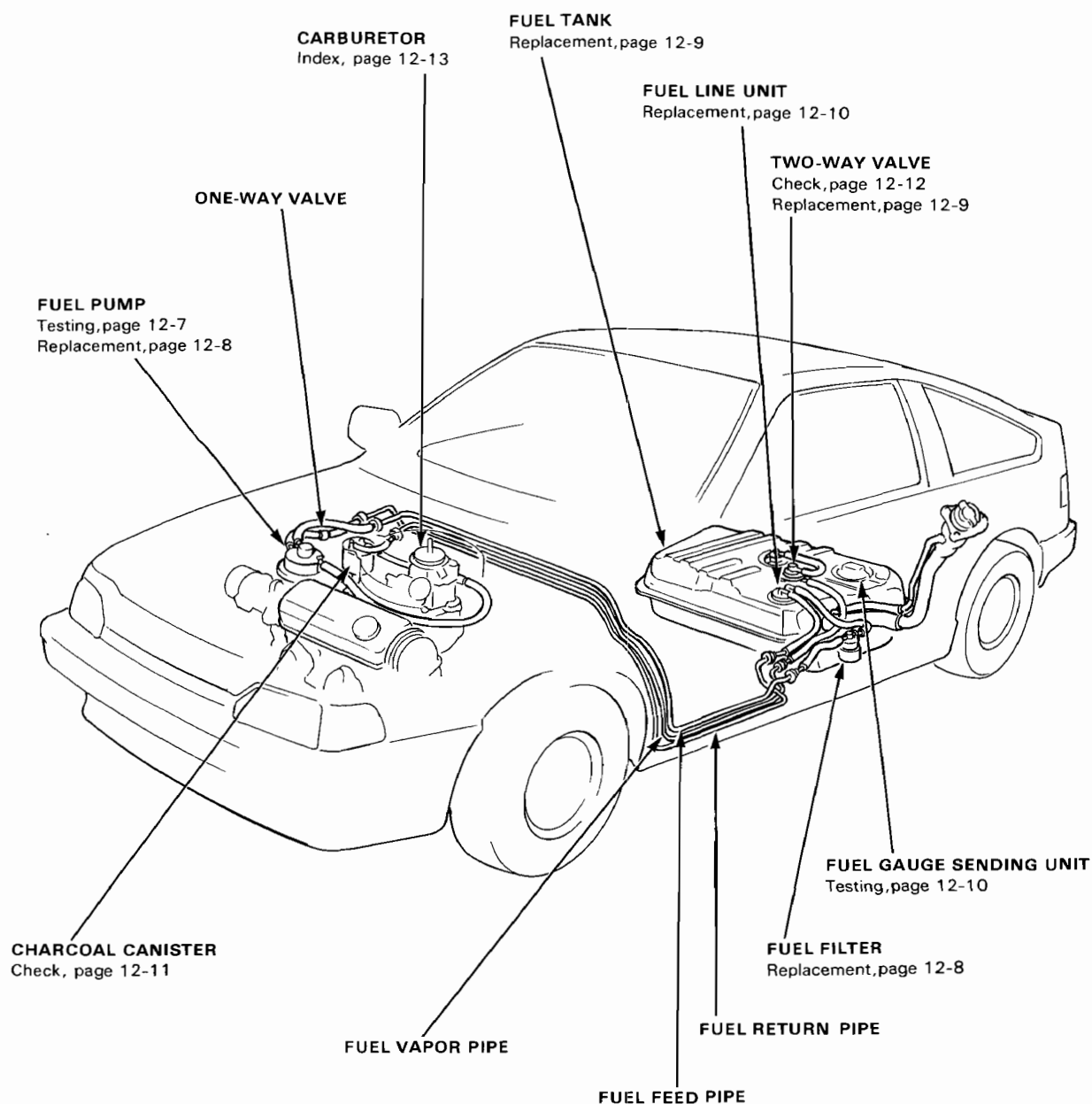
Catalytic Converter [KX model only]

If excessive exhaust system back-pressure is suspected, remove the catalytic converter from the car and make a visual check for plugging, melting or cracking of the catalyst. Replace the catalytic converter if more than 50% of the visible area is damaged or plugged.

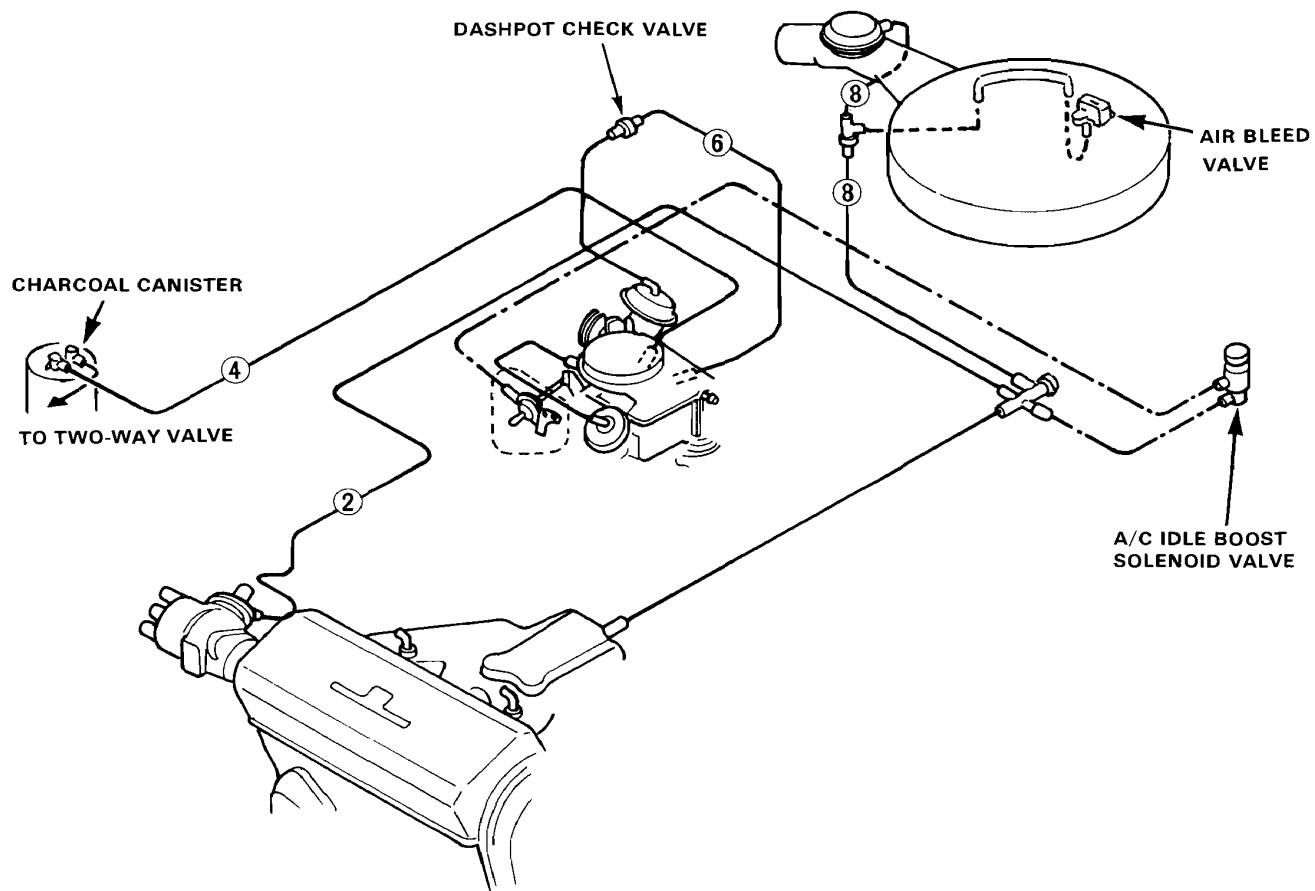


Fuel System

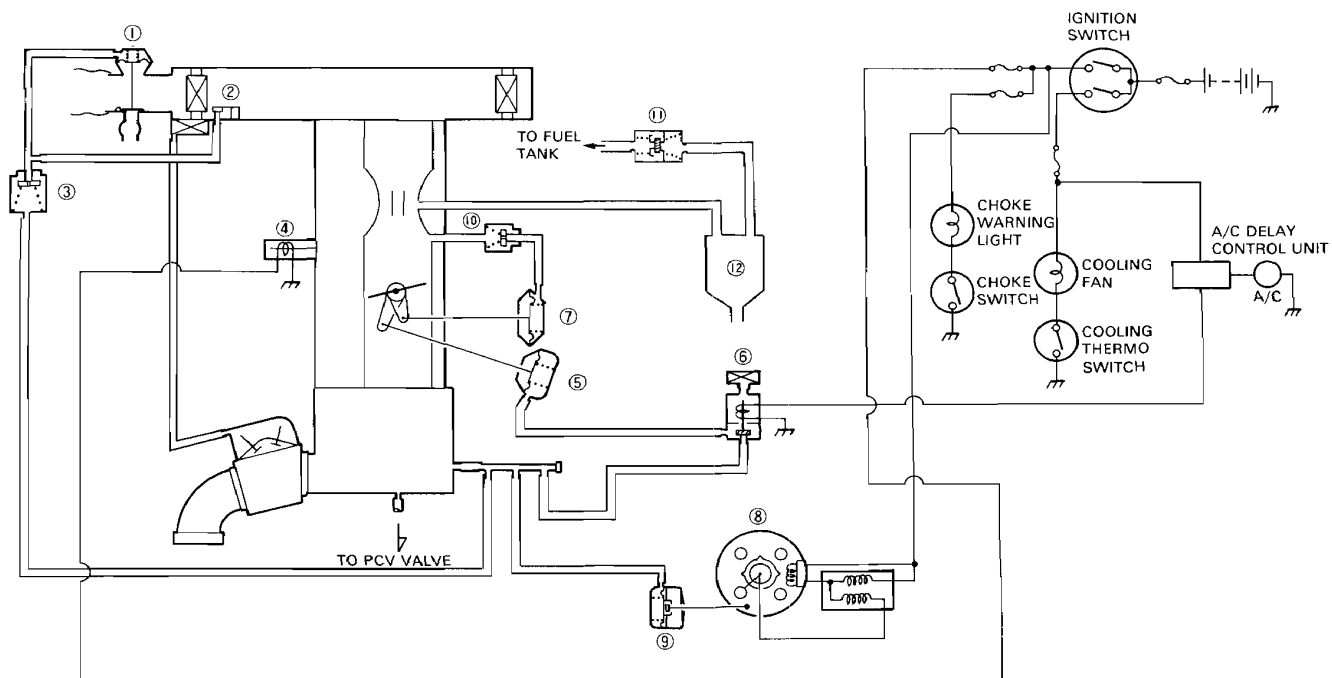
Index



Interconnect Diagram



Vacuum and Electrical Connections



- ① AIR CONTROL DIAPHRAGM
- ② AIR BLEED VALVE
- ③ CHECK VALVE A
- ④ FUEL CUT-OFF SOLENOID VALVE
- ⑤ A/C IDLE BOOST DIAPHRAGM
- ⑥ A/C IDLE BOOST SOLENOID VALVE

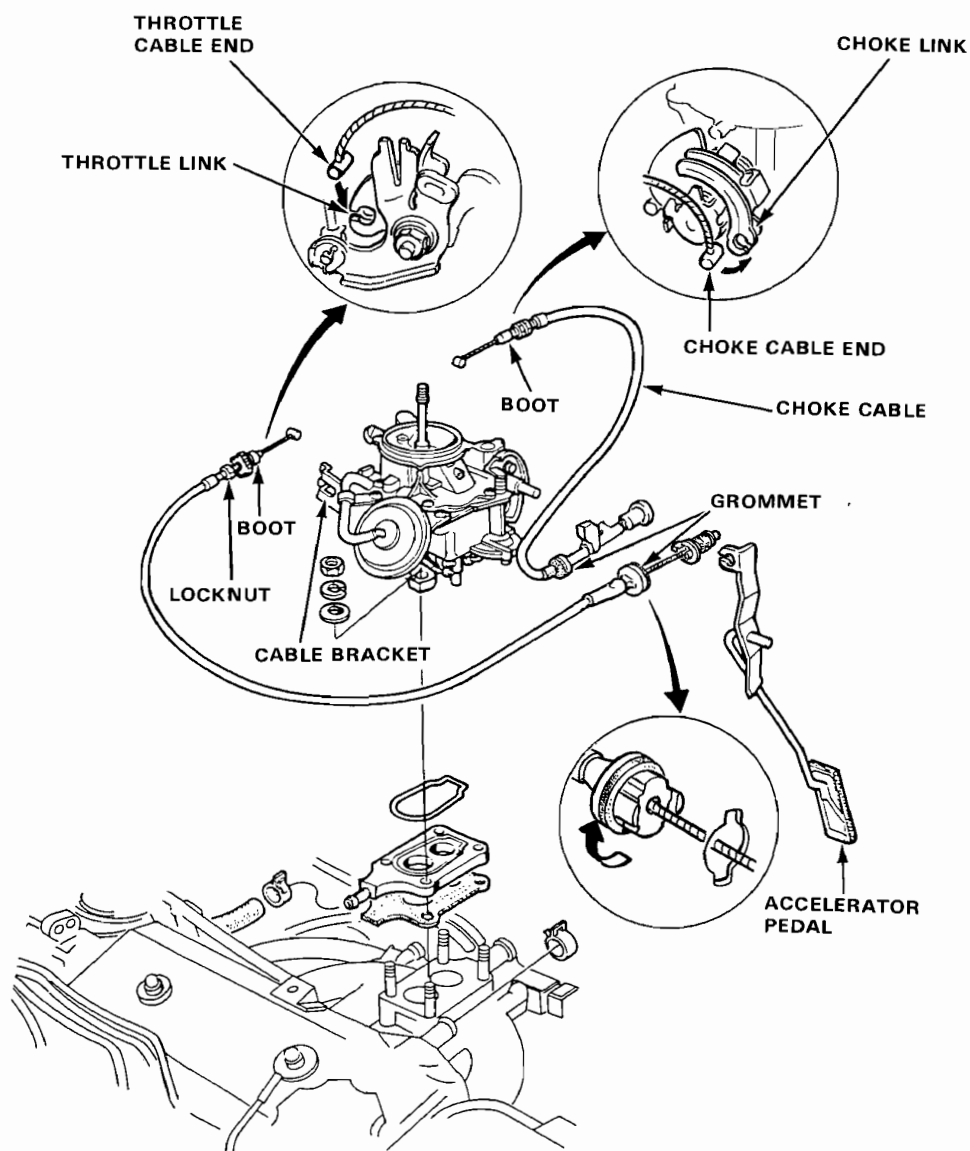
- ⑦ THROTTLE OPENER
- ⑧ DISTRIBUTOR
- ⑨ VACUUM ADVANCE DIAPHRAGM
- ⑩ DASHPOT CHECK VALVE
- ⑪ TWO WAY VALVE
- ⑫ CHARCOAL CANISTER

Throttle Cable/Choke Cable



Removal/Installation

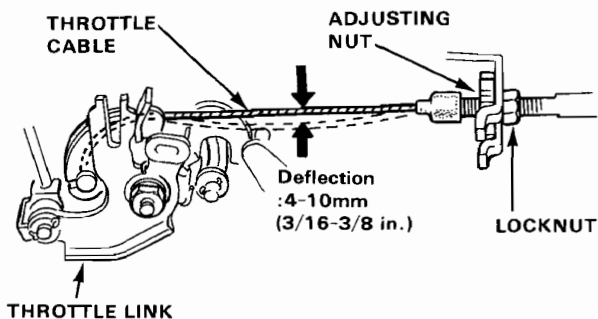
1. Push back boot and unscrew locknut.
2. Pull back throttle cable outer and slide cable out of throttle cable bracket.
3. Remove throttle cable end from throttle link.
4. Remove throttle cable end from accelerator pedal.
5. Turn grommet 90° and pull throttle cable through firewall from engine side.



Throttle Cable

Inspection/Adjustment

1. Check that throttle cable operates smoothly with no binding or sticking. Repair as necessary.
2. Check cable free-play at throttle linkage. Cable deflection should be 4–10 mm (3/16–3/8 in.)

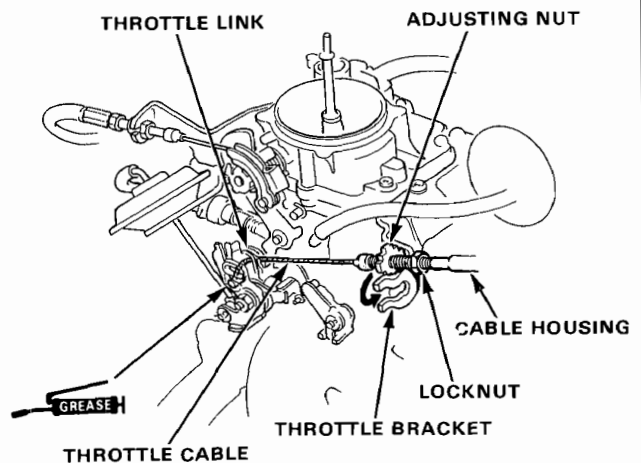


3. If deflection is not within specs, loosen locknut and turn adjusting nut until you can deflect cable as specified. Then tighten locknut.
4. With cable properly adjusted, check throttle valve to be sure it opens fully when you push accelerator pedal to the floor.

CAUTION: Check throttle valve to be sure it returns to idle position whenever you release accelerator.

Installation

1. Install the throttle cable in the throttle link.

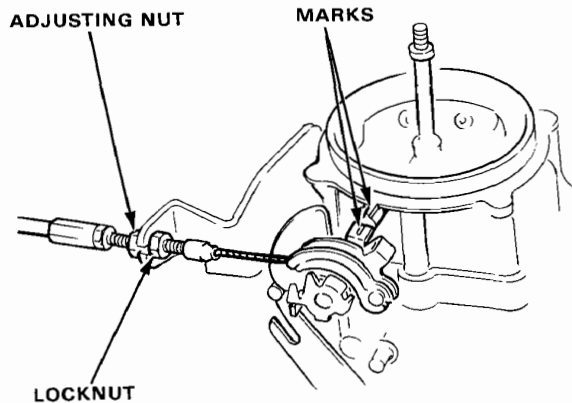


2. Slip the cable housing into the throttle bracket and adjust the cable deflection as described in the previous procedure.

Choke Cable

Adjustment

1. Check that choke control operates smoothly with no evidence of binding or sticking. Repair as necessary.
2. Set choke knob in the first detent position and check that the marks are aligned.



3. If not aligned, loosen the lock nut and adjust the adjusting nut, then retighten the lock nut.

Fuel Pump

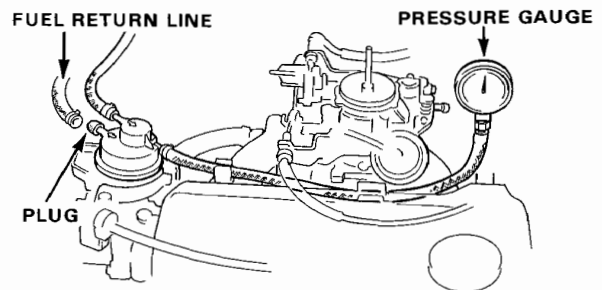


Output Test

WARNING Do not smoke during the test. Keep any open flame away from your work area.

NOTE: Check for a clogged fuel filter and/or fuel line before checking fuel pump pressure.

1. Disconnect the fuel line at the fuel filter in the engine compartment, and connect a pressure gauge to it as shown.
2. Disconnect the fuel return line at the fuel pump, and plug the return fitting with a cap.



3. Start the engine, and allow it to idle until pressure stabilizes, then stop engine.

Pressure should be:

17.7–26.5 kPa (0.18–0.27 kg/cm², 2.7–3.8 psi)

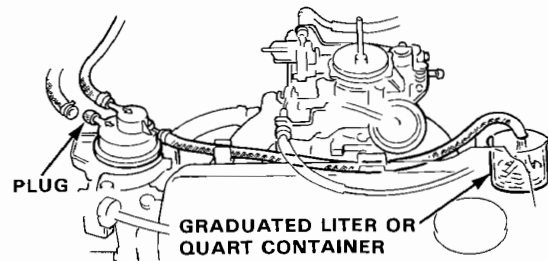
- If gauge shows at least 17.7 kPa (0.18 kg/cm², 2.7 psi), go on to step 4.
- If gauge shows less than 17.7 kPa (0.18 kg/cm², 2.7 psi), replace pump and re-test.

4. Remove pressure gauge and hold a graduated container under the hose.
5. Start the engine, and allow it to idle for 60 seconds, then stop the engine.

Fuel volume should be 170 cm³ (5.7 oz).

- If fuel volume is less than specified, replace the fuel pump and re-test.

NOTE: Check for a clogged fuel filter and/or fuel line before replacing pump.

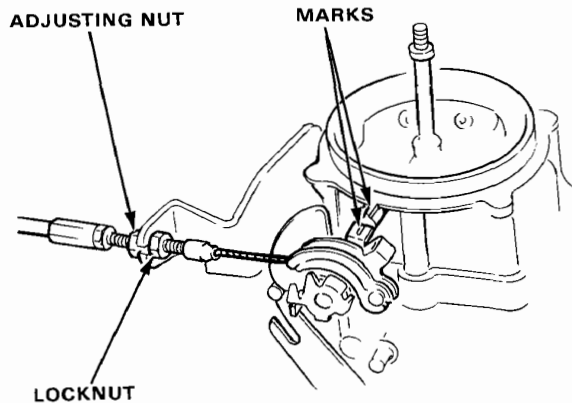


6. Remove plug from fuel pump return fitting and reconnect return line.

Choke Cable

Adjustment

1. Check that choke control operates smoothly with no evidence of binding or sticking. Repair as necessary.
2. Set choke knob in the first detent position and check that the marks are aligned.



3. If not aligned, loosen the lock nut and adjust the adjusting nut, then retighten the lock nut.

Fuel Pump

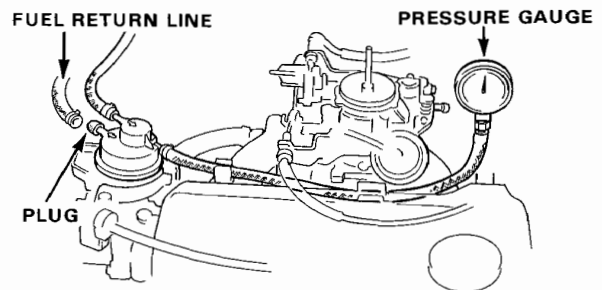


Output Test

WARNING Do not smoke during the test. Keep any open flame away from your work area.

NOTE: Check for a clogged fuel filter and/or fuel line before checking fuel pump pressure.

1. Disconnect the fuel line at the fuel filter in the engine compartment, and connect a pressure gauge to it as shown.
2. Disconnect the fuel return line at the fuel pump, and plug the return fitting with a cap.



3. Start the engine, and allow it to idle until pressure stabilizes, then stop engine.

Pressure should be:

17.7–26.5 kPa (0.18–0.27 kg/cm², 2.7–3.8 psi)

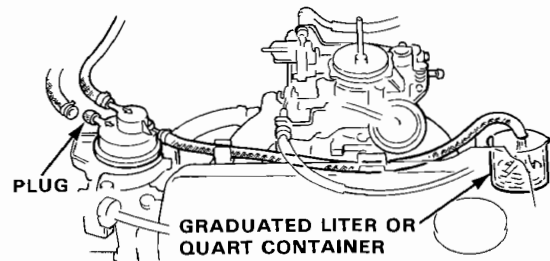
- If gauge shows at least 17.7 kPa (0.18 kg/cm², 2.7 psi), go on to step 4.
- If gauge shows less than 17.7 kPa (0.18 kg/cm², 2.7 psi), replace pump and re-test.

4. Remove pressure gauge and hold a graduated container under the hose.
5. Start the engine, and allow it to idle for 60 seconds, then stop the engine.

Fuel volume should be 170 cm³ (5.7 oz).

- If fuel volume is less than specified, replace the fuel pump and re-test.

NOTE: Check for a clogged fuel filter and/or fuel line before replacing pump.



6. Remove plug from fuel pump return fitting and reconnect return line.

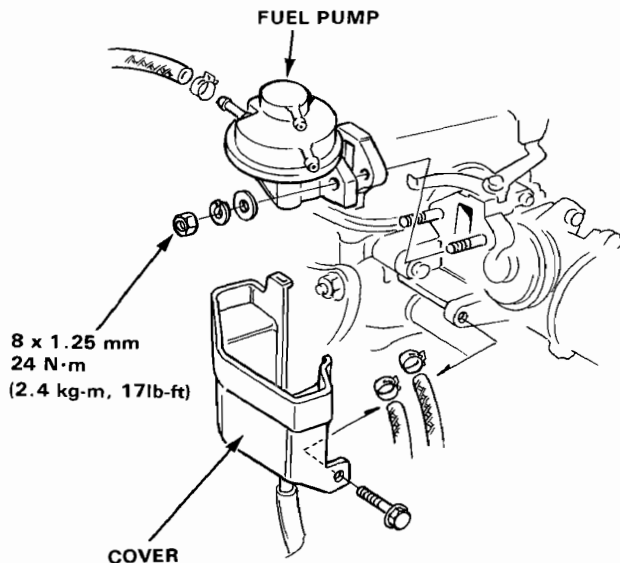
Fuel Pump

Replacement

WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Attach fuel line clamps to fuel pump lines.
2. Disconnect fuel lines at fuel pump.

CAUTION: When disconnecting fuel lines, slide back clamps then twist lines as you pull, to avoid damaging them.



3. Remove fuel pump.
4. Install in the reverse order of removal.

CAUTION: Make sure that the fuel lines are connected properly and securely.

Fuel Filter

Replacement

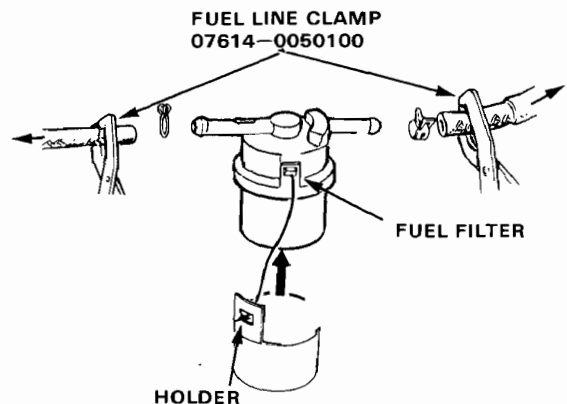
Replace filter every 40,000 km (24,000 miles)

WARNING

- Do not smoke while working on fuel system. Keep open flame away from work area.
- Block front wheels before jacking up rear of car.

1. Raise the rear of the car and place the jackstands in proper locations.
2. Push in the tab of the fuel filter to release the holder, then remove the filter from its bracket.
3. Attach fuel line clips to the fuel lines and disconnect the lines from the filter.

CAUTION: To avoid damaging the fuel lines when disconnecting, slide back the clamps then twist the lines as you pull.



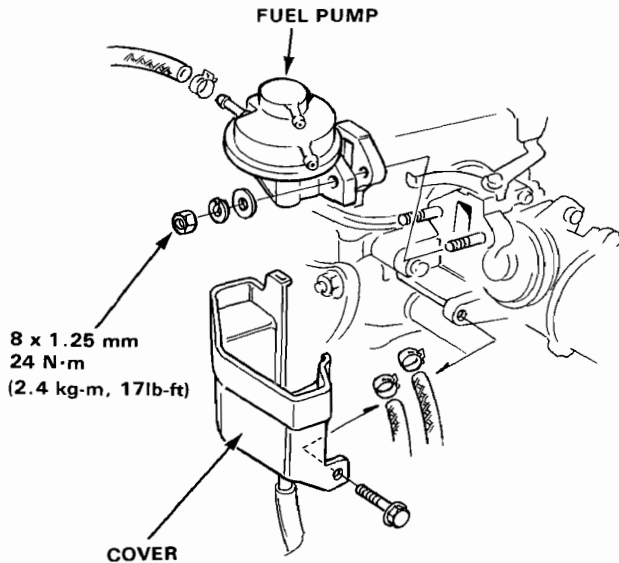
Fuel Pump

Replacement

WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Attach fuel line clamps to fuel pump lines.
2. Disconnect fuel lines at fuel pump.

CAUTION: When disconnecting fuel lines, slide back clamps then twist lines as you pull, to avoid damaging them.



3. Remove fuel pump.
4. Install in the reverse order of removal.

CAUTION: Make sure that the fuel lines are connected properly and securely.

Fuel Filter

Replacement

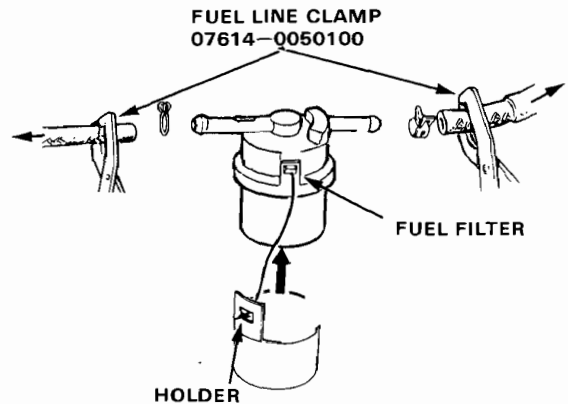
Replace filter every 40,000 km (24,000 miles)

WARNING

- Do not smoke while working on fuel system. Keep open flame away from work area.
- Block front wheels before jacking up rear of car.

1. Raise the rear of the car and place the jackstands in proper locations.
2. Push in the tab of the fuel filter to release the holder, then remove the filter from its bracket.
3. Attach fuel line clips to the fuel lines and disconnect the lines from the filter.

CAUTION: To avoid damaging the fuel lines when disconnecting, slide back the clamps then twist the lines as you pull.



Fuel Tank/Two-way Valve

Fuel Gauge



Replacement

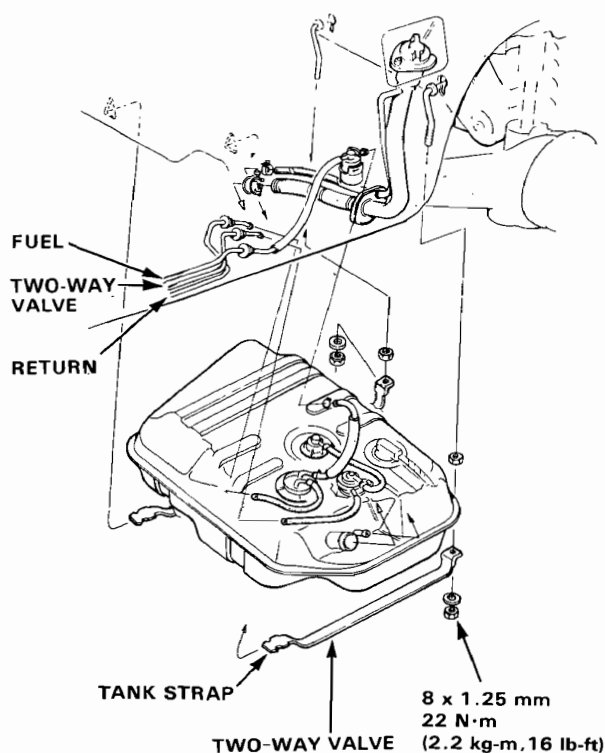
⚠ WARNING

- Do not smoke while working on fuel system. Keep open flame away from work area.
- Block front wheels before jacking up rear of car.

1. Raise the rear of the car and place jackstands in the proper locations.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Disconnect the sending unit connectors.
4. Disconnect the hoses.

CAUTION: When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.

5. Place a jack, or other support, under the tank.
6. Remove the strap nuts and let the straps fall free.
7. Remove the fuel tank.
8. Install a new washer on the drain bolt, then install parts in the reverse order of removal.

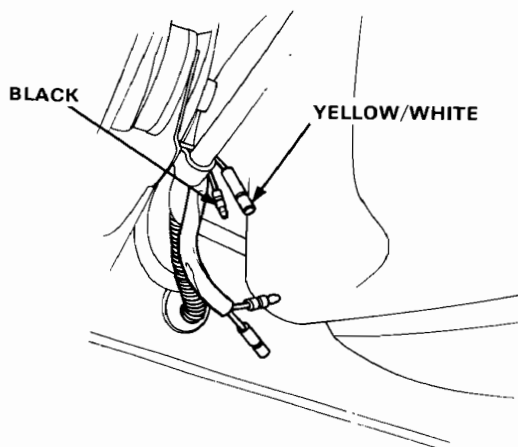


Testing

1. Raise the rear of the car and place jackstands in the proper locations.
2. Check that ignition switch is OFF.
3. Disconnect fuel sending unit connector to check fuel gauge continuity and movement.
4. Connect the yellow/white wire to the black wire using a jumper wire.
5. Turn ignition switch ON and watch the fuel gauge; turn the ignition OFF as soon as gauge needle stops moving. Needle should have moved to FULL mark.

CAUTION: Do not leave ignition ON for longer than 5 seconds or fuel gauge will be damaged.

- If gauge needle went to FULL, re-connect sending unit wires and go on to sending unit test on next page.
- If needle did not go to FULL, check fuse, wiring and connectors. If OK, replace gauge and re-test.



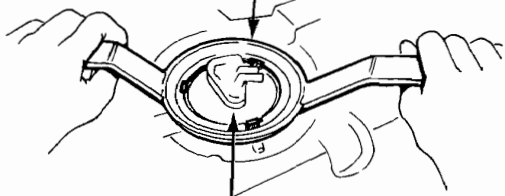
Fuel Gauge Sending Unit

Testing

WARNING Do not smoke while working on fuel system. Keep open flame away from work area. Drain fuel only into an approved container.

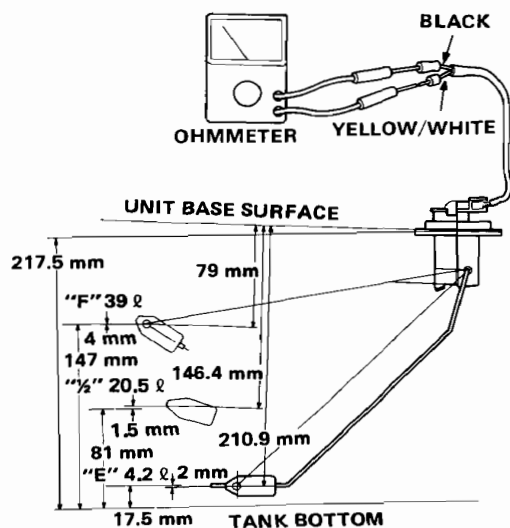
1. Check that ignition switch is OFF, then disconnect fuel sending unit connector at tank.
2. Drain and remove fuel tank as shown on page 12-9.
3. Remove fuel sending unit from tank.

FUEL SENDER WRENCH
07920-SB20000



FUEL SENDING UNIT

4. Measure resistance between the yellow/white wire and black wire at the 3 float positions shown below.



FLOAT POSITION	RESISTANCE (OHMS)	FUEL VOLUME (l)
EMPTY	105-110	5
1/2 FULL	25.5-39.5	20.5
FULL	2-5	39

Fuel Line Unit

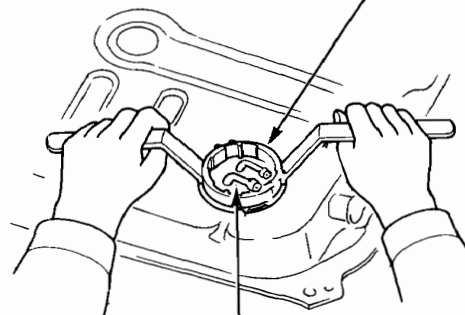
Replacement

WARNING

- Do not smoke while working on fuel system. Keep open flame away from work area.
- Block front wheels before jacking up rear of car.

1. Drain and remove fuel tank as shown on page 12-9.
2. Remove fuel line unit from tank.

FUEL SENDER WRENCH
07920-SB20000



FUEL LINE UNIT

Fuel Cut-off Valve

Replacement

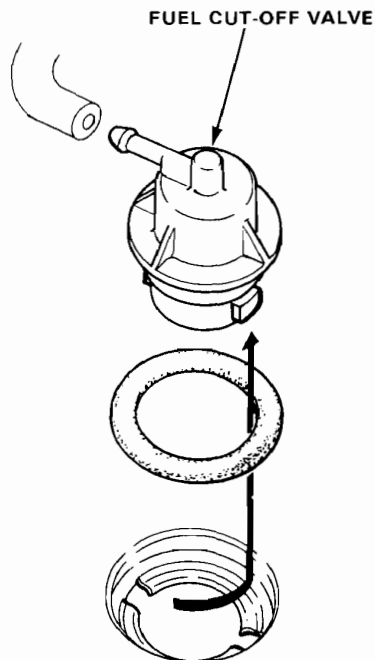
WARNING

- Do not smoke while working on fuel system. Keep open flame away from work area.
- Block front wheels before jacking up rear of car.

1. Raise rear of car and place jackstands in the proper locations.
2. Place jack under fuel tank.

CAUTION: Place a flat piece of wood on the jack lifting pad to prevent damage to the fuel tank.

3. Remove the tank mounting nuts and bolts, then lower the tank just enough to gain access to the fuel cut-off valve.
4. Turn the valve $\frac{1}{4}$ turn (90°), so its lugs are aligned with the slots in the mount, then lift it out.

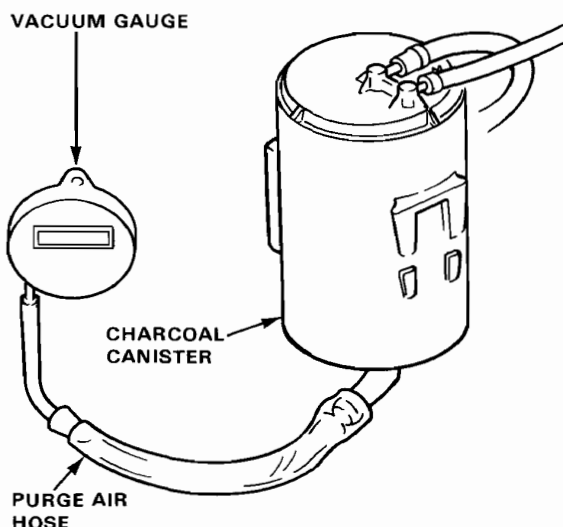


Evaporative Emission Control System



Charcoal Canister Check

1. Remove fuel filler cap.
2. Remove canister purge air hose from frame and connect hose to vacuum gauge as shown.



3. Start engine and raise speed to 3500 rpm. Vacuum should appear on gauge within 1 minute.
 - If no vacuum, disconnect vacuum gauge and reinstall fuel filler cap.
4. Remove charcoal canister and check for signs of damage or defects.
 - If defective, replace canister.

Fuel Cut-off Valve

Replacement

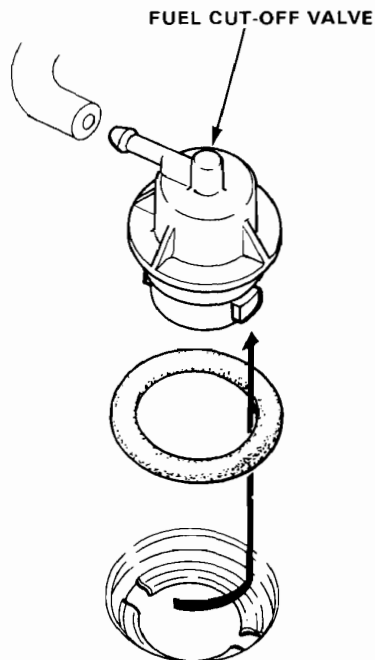
WARNING

- Do not smoke while working on fuel system. Keep open flame away from work area.
- Block front wheels before jacking up rear of car.

1. Raise rear of car and place jackstands in the proper locations.
2. Place jack under fuel tank.

CAUTION: Place a flat piece of wood on the jack lifting pad to prevent damage to the fuel tank.

3. Remove the tank mounting nuts and bolts, then lower the tank just enough to gain access to the fuel cut-off valve.
4. Turn the valve $\frac{1}{4}$ turn (90°), so its lugs are aligned with the slots in the mount, then lift it out.

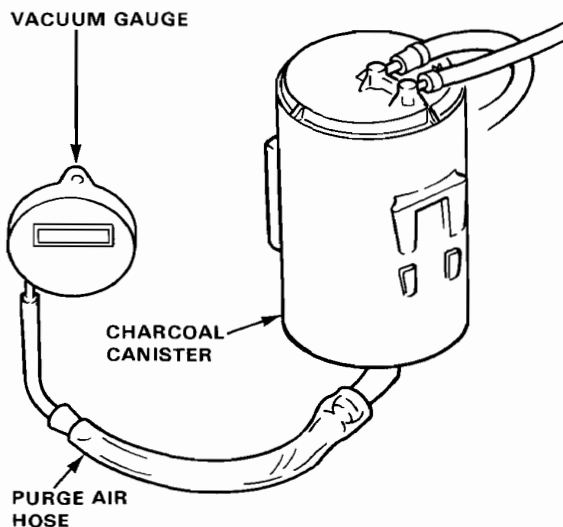


Evaporative Emission Control System



Charcoal Canister Check

1. Remove fuel filler cap.
2. Remove canister purge air hose from frame and connect hose to vacuum gauge as shown.

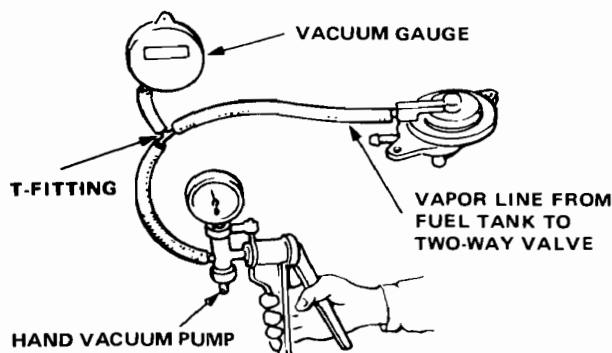


3. Start engine and raise speed to 3500 rpm. Vacuum should appear on gauge within 1 minute.
 - If no vacuum, disconnect vacuum gauge and reinstall fuel filler cap.
4. Remove charcoal canister and check for signs of damage or defects.
 - If defective, replace canister.

Evaporative Emission Control System

Two-way Valve Check

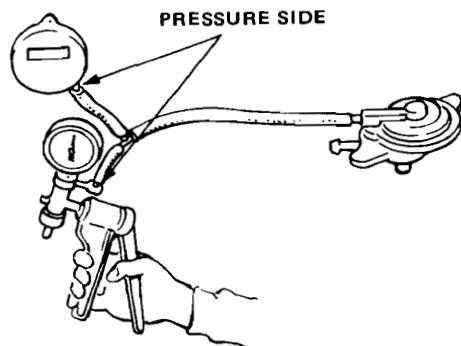
1. Remove the filler cap.
2. Remove vapor line from the fuel tank and connect to T-fitting from vacuum gauge and vacuum pump as shown.



3. Slowly draw a vacuum while watching the gauge. Vacuum should stabilize at 5 to 15 mmHg (0.2 to 0.6 in.Hg).

- If vacuum stabilizes momentarily (two-way valve opens) between 5 and 15 mmHg (0.2 and 0.6 in.Hg), go on to Step 4.
- If vacuum stabilizes (valve opens) below 5 mmHg (0.2 in.Hg) or above 15 mmHg (0.6 in.Hg), install new valve and re-test.

4. Move hand pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge.

Pressure should stabilize at 10 to 25 mmHg (0.4 to 1.0 in.Hg).

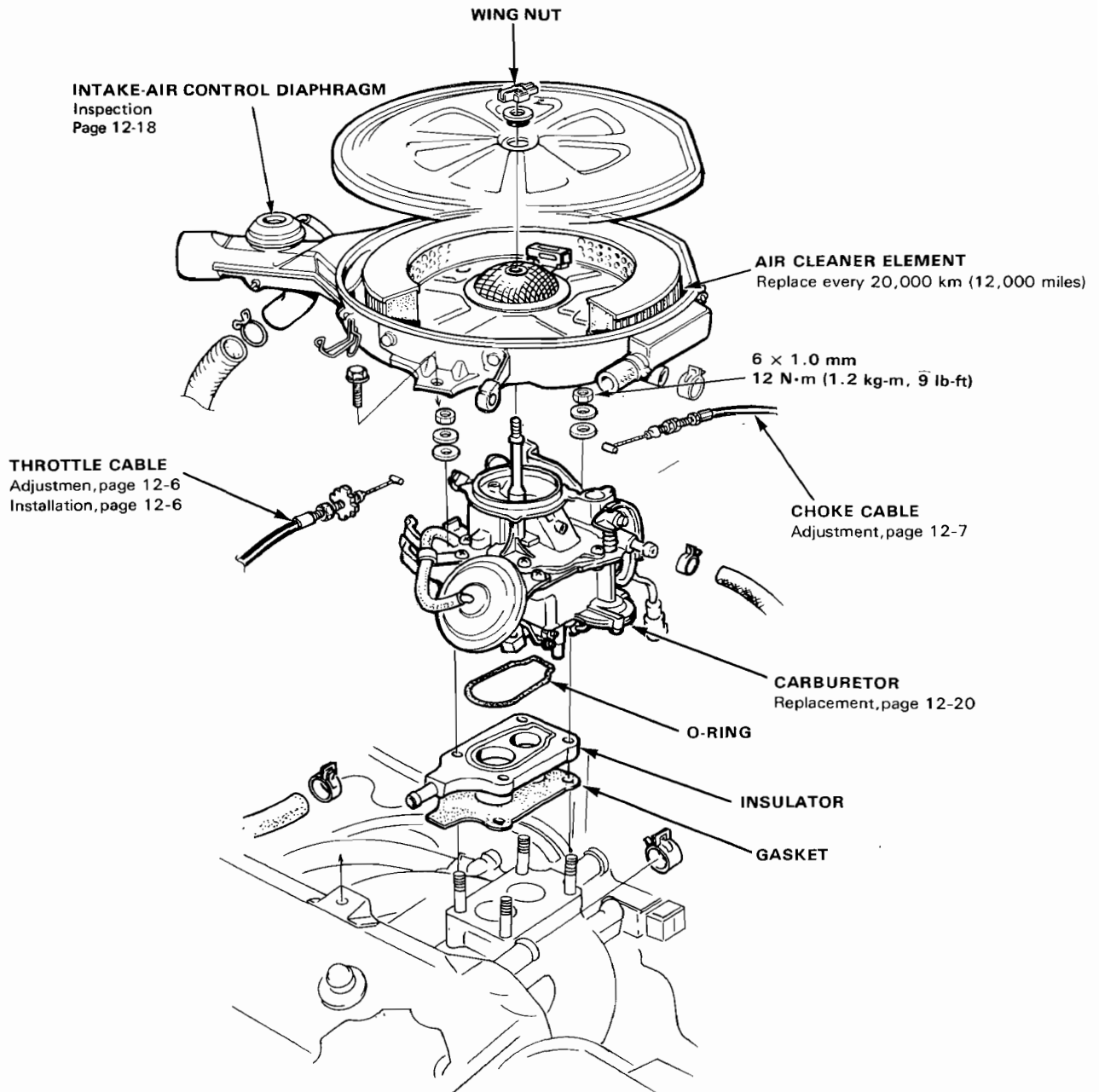
- If pressure momentarily stabilizes (valve opens) at 10 to 25 mmHg (0.4 to 1.0 in.Hg), the valve is OK.
- If pressure stabilizes below 10 mmHg (0.4 in.Hg) or above 25 mmHg (1.0 in.Hg), install a new valve and re-test.

Carburetor



Index

NOTE: Use new gaskets and O-rings whenever reassembling.



Idle Speed and Mixture

Adjustment

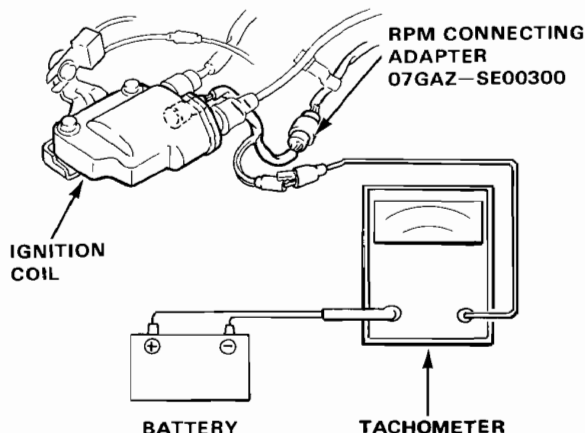
NOTE: The following inspections and adjustments should be completed before measurement.

- Air cleaner element
- Ignition timing and control system
- Spark plugs
- Idle speed
- Valve clearance
- Intake air control system
- PCV valve

WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

CO Meter Method

1. Warm-up and calibrate the NDIR CO Meter in accordance with the manufacturer's recommended procedures.
2. Insert exhaust gas sampling probe into the tail pipe at least 40 cm (16-inches), and connect a tachometer.



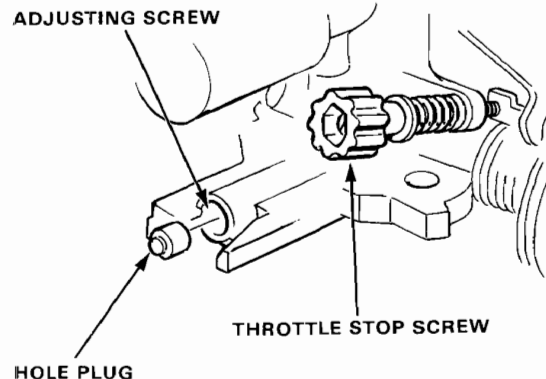
3. Check specification for idle speed and CO with the headlights and cooling fan OFF.

Idle Speed $750 \pm 50 \text{ min}^{-1} (\text{rpm})$

- If not within specification, adjust by turning throttle stop screw to obtain proper idle speed.
 - If idle speed cannot be adjusted properly, check for proper throttle cable adjustment.
4. Check specification for idle CO with cooling fan and headlights OFF.

Specified CO% : below 1.0%

- If not within specification, remove mixture adjusting screw hole plug and adjust by turning mixture adjusting screw to obtain proper CO reading.

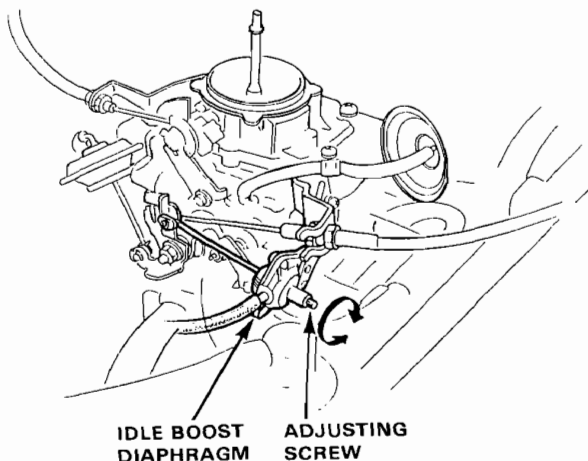


Turning mixture adjusting screw
clockwise: CO reading decreases
counterclockwise: CO reading increases
— Readjust idle speed if necessary, and recheck idle CO.

5. Install a new hole plug.

If unable to obtain a CO reading of specified % by this procedure, check the engine tune up condition.

6. If car is equipped with air conditioning, recheck idle speed with A/C on: Speed should still be within specification.
 - If the speed is outside the spec, remove the rubber cap on the idle boost diaphragm and adjust by turning adjusting screw.

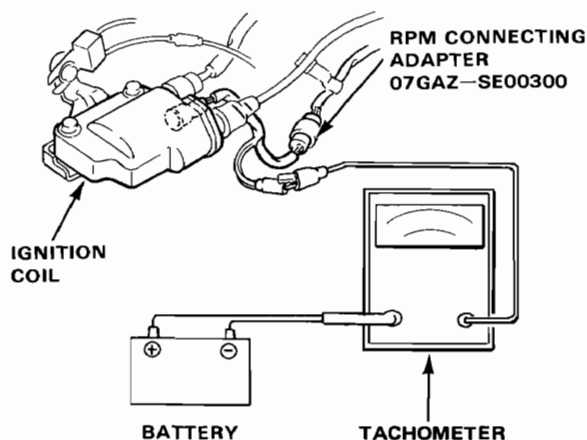




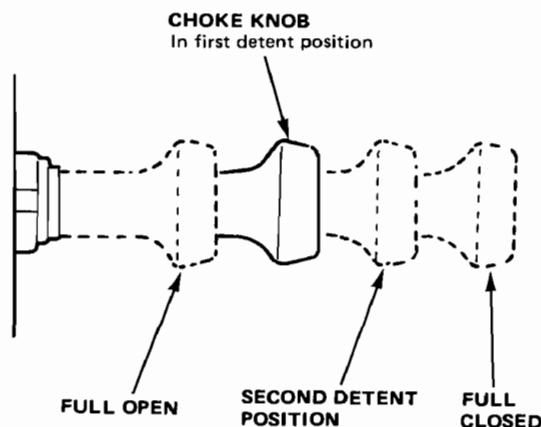
Choke Fast Idle

Adjustment

1. Connect a tachometer.



2. Start engine and allow to warm up.
3. Place choke control knob in first detent position.



Fast idle should be: 1,500–2,500 min⁻¹ (rpm)

7. If the idle boost diaphragm does not operate with the air conditioner on, disconnect the hose from the idle boost diaphragm and check for vacuum.
 - If there is vacuum, replace the idle boost diaphragm.
 - If there is no vacuum, check for voltage at the idle boost solenoid valve
 - If there is no voltage, check the wiring and fuse, and repair or replace as necessary.
 - If there is voltage, disconnect the hose routed to the intake manifold at the idle boost solenoid valve and check for vacuum.
 - If there is vacuum, replace the idle boost solenoid valve.
 - If there is no vacuum, check the vacuum line to the intake manifold.

Idle-Drop Method

1. Start the engine and warm up to the normal operating temperature (cooling fan comes on).
2. Remove the hole plug.
3. With the headlights OFF and the cooling fan OFF, adjust the engine speed and mixture to proper idle as below:

Idle Speed 820min⁻¹ (rpm)
4. Turn the mixture adjusting screw clockwise until engine speed drops as below:

Idle Speed 750min⁻¹ (rpm)
5. Replace the hole plug.

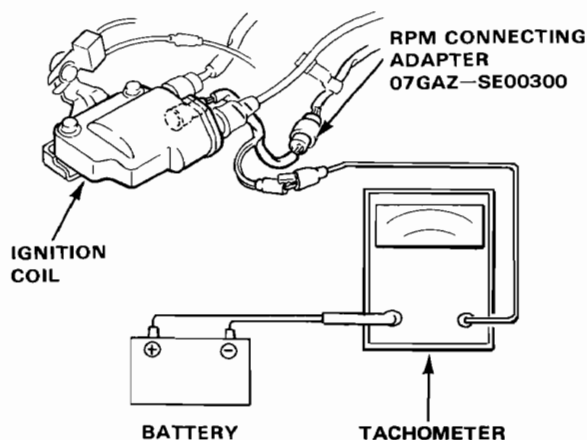
(cont'd)



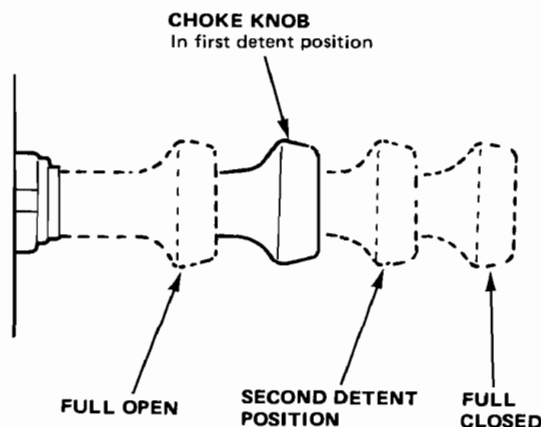
Choke Fast Idle

Adjustment

1. Connect a tachometer.



2. Start engine and allow to warm up.
3. Place choke control knob in first detent position.



Fast idle should be: 1,500–2,500 min^{-1} (rpm)

7. If the idle boost diaphragm does not operate with the air conditioner on, disconnect the hose from the idle boost diaphragm and check for vacuum.

- If there is vacuum, replace the idle boost diaphragm.
- If there is no vacuum, check for voltage at the idle boost solenoid valve
 - If there is no voltage, check the wiring and fuse, and repair or replace as necessary.
 - If there is voltage, disconnect the hose routed to the intake manifold at the idle boost solenoid valve and check for vacuum.
 - If there is vacuum, replace the idle boost solenoid valve.
 - If there is no vacuum, check the vacuum line to the intake manifold.

Idle-Drop Method

1. Start the engine and warm up to the normal operating temperature (cooling fan comes on).
2. Remove the hole plug.
3. With the headlights OFF and the cooling fan OFF, adjust the engine speed and mixture to proper idle as below:

Idle Speed 820 min^{-1} (rpm)

4. Turn the mixture adjusting screw clockwise until engine speed drops as below:

Idle Speed 750 min^{-1} (rpm)

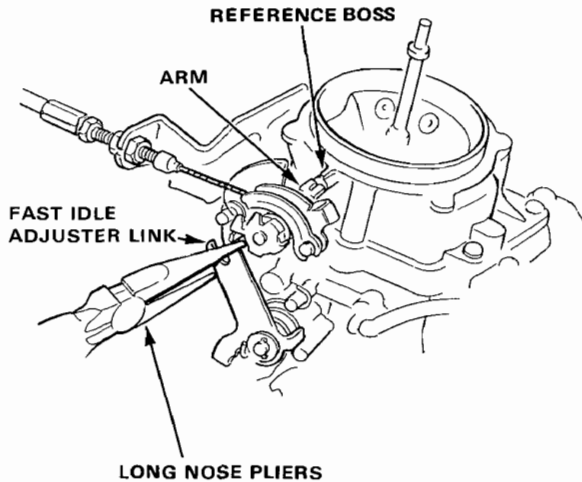
5. Replace the hole plug.

(cont'd)

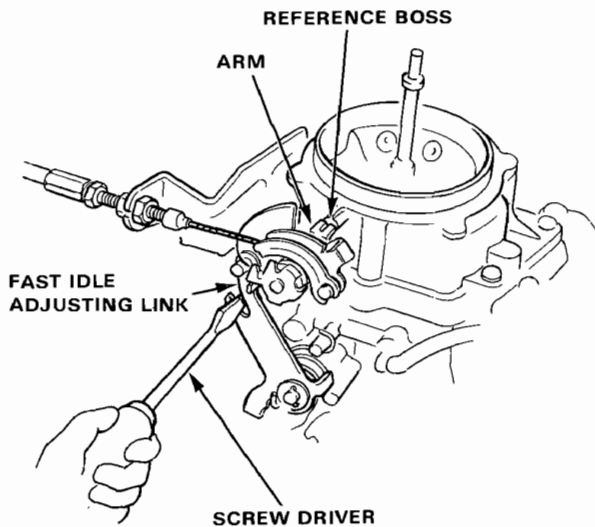
Choke Fast Idle

Adjustment (cont'd)

- If rpm is too high, use long nose pliers to narrow the slot in the fast idle adjusting link. Make the adjustment in small increments.



- If rpm is too low, insert a screwdriver in the fast idle adjusting link slot and widen the slot. Make adjustments in small increments.



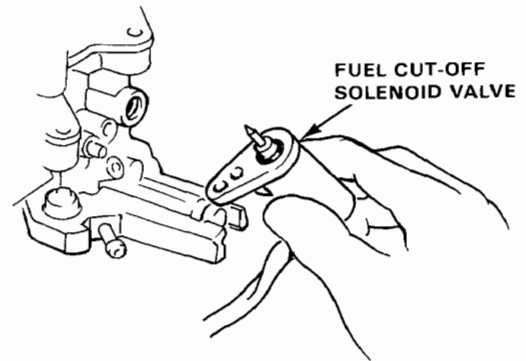
Fuel Cut-off Solenoid Valve

Inspection

1. Place a clean shop towel around the solenoid valve, to soak up any gasoline, then loosen the screws and remove the solenoid valve.

WARNING

- Wipe up any spilled gasoline before testing.
- If cut-off valve is removed for testing, be sure you ground it to prevent sparking or fire when the key is turned on.



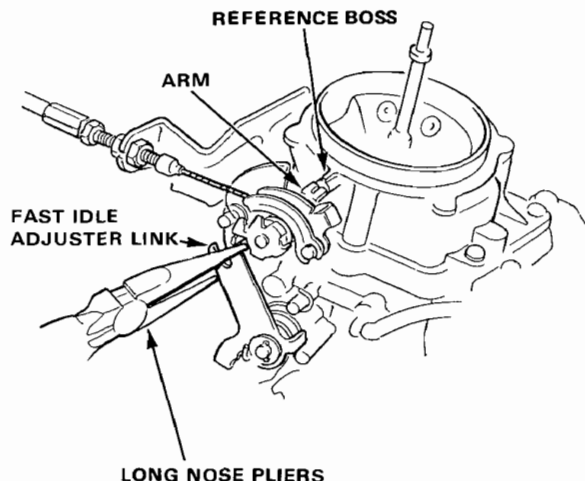
2. Ground the valve as far from the carburetor as possible and turn on the ignition while you watch the valve needle.

- If the needle retracts, the valve is OK.
- If the needle doesn't retract, check for voltage at the solenoid.
 - If voltage is present, check the fuse and wiring.

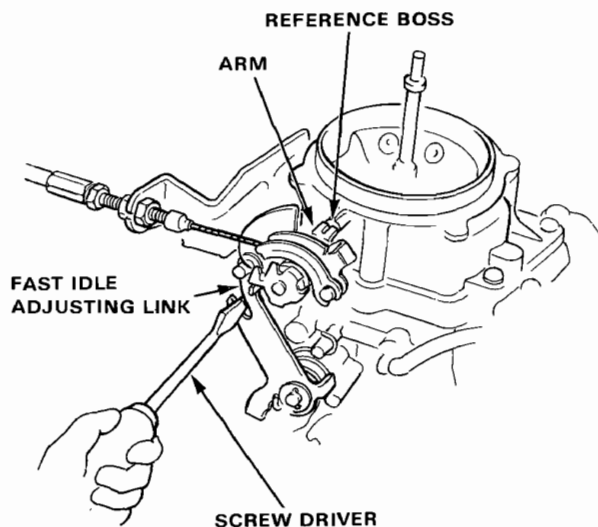
Choke Fast Idle

Adjustment (cont'd)

- If rpm is too high, use long nose pliers to narrow the slot in the fast idle adjusting link. Make the adjustment in small increments.



- If rpm is too low, insert a screwdriver in the fast idle adjusting link slot and widen the slot. Make adjustments in small increments.



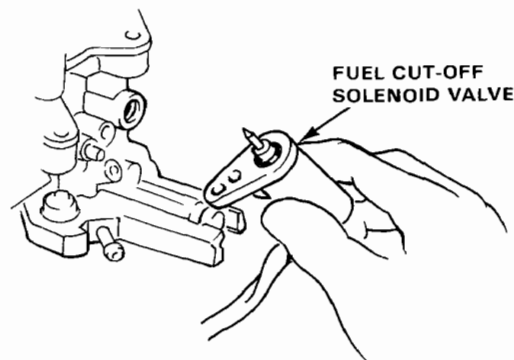
Fuel Cut-off Solenoid Valve

Inspection

1. Place a clean shop towel around the solenoid valve, to soak up any gasoline, then loosen the screws and remove the solenoid valve.

WARNING

- Wipe up any spilled gasoline before testing.
- If cut-off valve is removed for testing, be sure you ground it to prevent sparking or fire when the key is turned on.



2. Ground the valve as far from the carburetor as possible and turn on the ignition while you watch the valve needle.

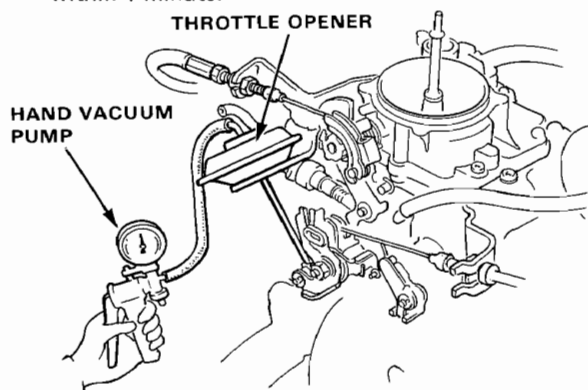
- If the needle retracts, the valve is OK.
- If the needle doesn't retract, check for voltage at the solenoid.
 - If voltage is present, check the fuse and wiring.



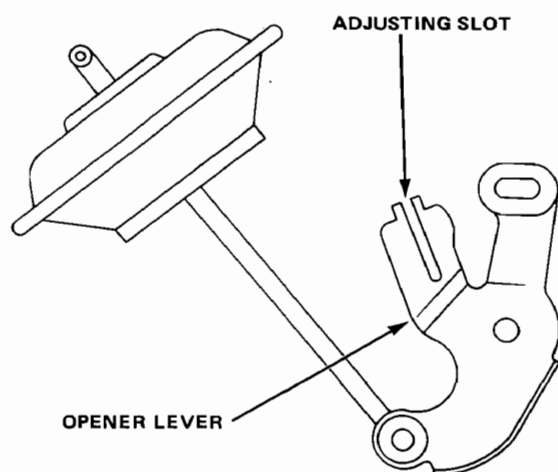
Inspection

1. Connect a tachometer, start the engine and allow it to reach normal operating temperature (cooling fan comes on).
2. Disconnect vacuum hose from the throttle opener, connect a hand vacuum pump to the opener and apply 400 mmHg (16 in.Hg) vacuum.

Engine speed should rise to 2,600–3,700 min^{-1} (rpm) within 1 minute.



- If the engine speed rises to 2,600–3,700 min^{-1} (rpm), go on to step 3.
- If rpm is too LOW: Widen the adjusting slot in the opener lever with a screwdriver.
- If the rpm is too HIGH: Narrow the adjusting slot in the lever with long nose pliers.



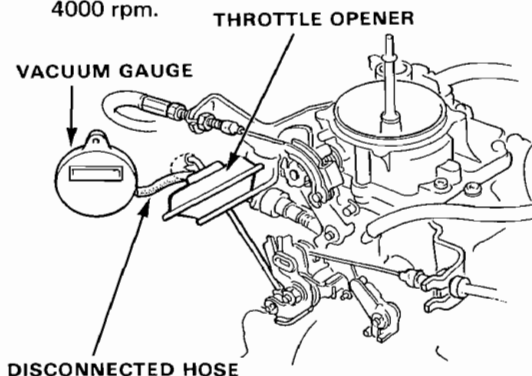
3. Disconnect the vacuum pump and reconnect the hose. Raise the engine speed to 3500 rpm and maintain for 2 to 3 seconds. Release the throttle suddenly, and watch how long the throttle opener arm takes to fully extend.

Return time should be 1 to 4 seconds.

- If return to idle takes less than 1 second, go on to step 4.
- If the throttle takes longer than 4 seconds to return, go on to step 5.

4. Disconnect the hose from the throttle opener and connect a vacuum gauge to the disconnected hose. Start and run the engine at 4000 rpm.

Vacuum should be at least 30 mmHg (1.2 in.Hg) at 4000 rpm.



- If vacuum is at least 30 mmHg (1.2 in.Hg) at 4000 rpm, replace the dashpot check valve and re-test.
- If vacuum is below 30 mmHg (1.2 in.Hg), check for vacuum at the carburetor port.
 - If there is no vacuum, clean the carburetor port and re-test.
 - If vacuum is present, check the vacuum line for leaks, blockage or disconnected hose and re-test.

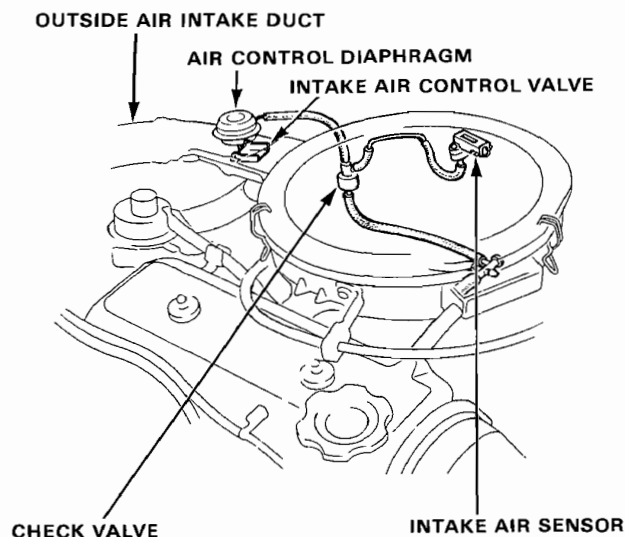
- If the rpm cannot be adjusted, or the diaphragm will not hold vacuum, replace the throttle opener and re-test.

Intake Air Control

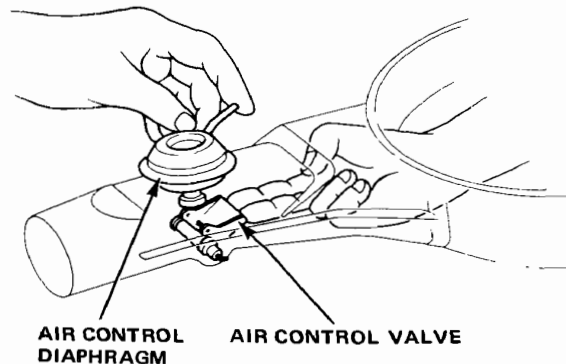
Inspection

Cold engine inspection

1. Remove air cleaner cover and filter element. Disconnect the air intake and hot air ducts.
2. With the engine cold, start the engine for about 5 seconds and stop. Air control valve should rise on start up and remain fully open for at least 3 seconds after stopping engine.



- If valve rises, intake air control is OK; reinstall filter element and air cleaner cover. Connect the air intake and hot air ducts. Go on to step 1 for hot engine inspection.
 - If valve does not rise, check to see if valve is binding. If valve still fails to rise, or fails to stay up for 3 seconds after cold engine cranking test, go on to step 3.
3. Disconnect and plug hose leading to intake air sensor.
 4. Crank starter for approximately 5 seconds.
 - If the air control valve does not rise or stay open for at least 3 seconds, proceed to Step 5.
 - If valve rises and stays up for at least 3 seconds replace the air bleed valve, and re-test (steps 2 thru 4).
 5. Disconnect vacuum hose from air control diaphragm.
 6. Raise air control valve manually and while blocking the inlet pipe, release the valve.



- If the valve stays up, replace check valve and re-test.
- If the valve drops to the closed position, replace the air control diaphragm and re-test.

7. Reinstall filter element and air cleaner cover.

Hot engine inspection

NOTE: As the outside air temperature drops, the bimetal spring in the intake air sensor closes, causing the air control valve to rise and allowing pre-heated air into the air cleaner; consistent intake air temperature (approximately 100°F) is maintained this way.

1. With engine running and cooling fan on, remove air cleaner cover and filter element and immediately check control valve position.

The air control valve should be down.

- If the control valve has dropped down to fully close the hot air intake duct: stop engine, reinstall filter element and air cleaner cover. Test is complete.
 - If control valve has not dropped to the fully closed position, go to step 2.
2. Disconnect the vacuum hose to the air control diaphragm.
 - If the control valve now closes, replace the intake air sensor and re-test.
 - If the control valve does not close, correct whatever is causing the valve to bind, and/or replace air control diaphragm. Re-test.
 3. Stop engine, reinstall filter element and air cleaner cover. Test is complete.

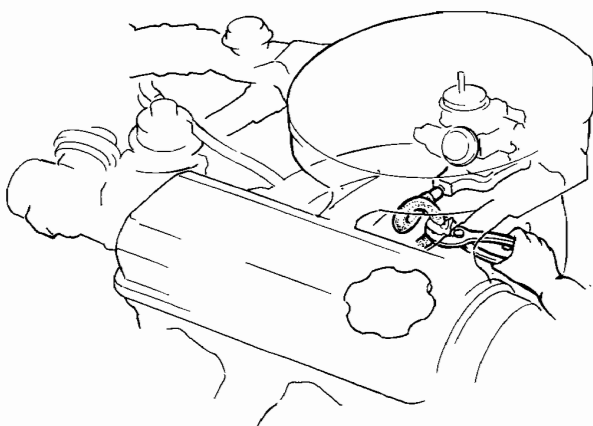
Crankcase Emission Control



Inspection

PCV Valve

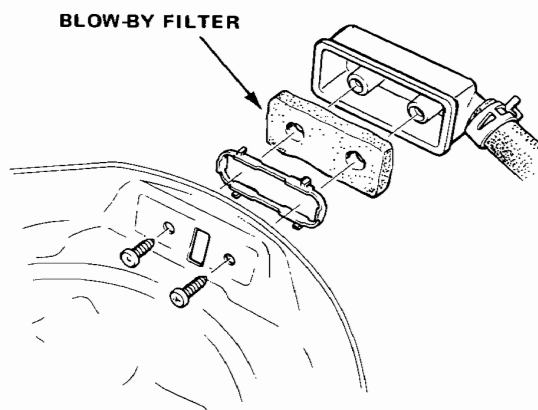
1. Check the crankcase ventilation hoses and connections for leaks and clogging.
2. At idling, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and insulator is lightly pinched with your fingers or pliers.



- If there is no clicking sound, check the PCV valve grommet for cracks or damage.
- If the grommet is OK, replace the PCV valve and recheck.

Blow-by Filter

1. Inspect the condition of the blow-by filter.
 - Replace the filter in the following instances:
 - When the filter is stuck fast and oil is dripping or seeping through.
 - When the filter is covered with dust and dirt so that clogging is evident.



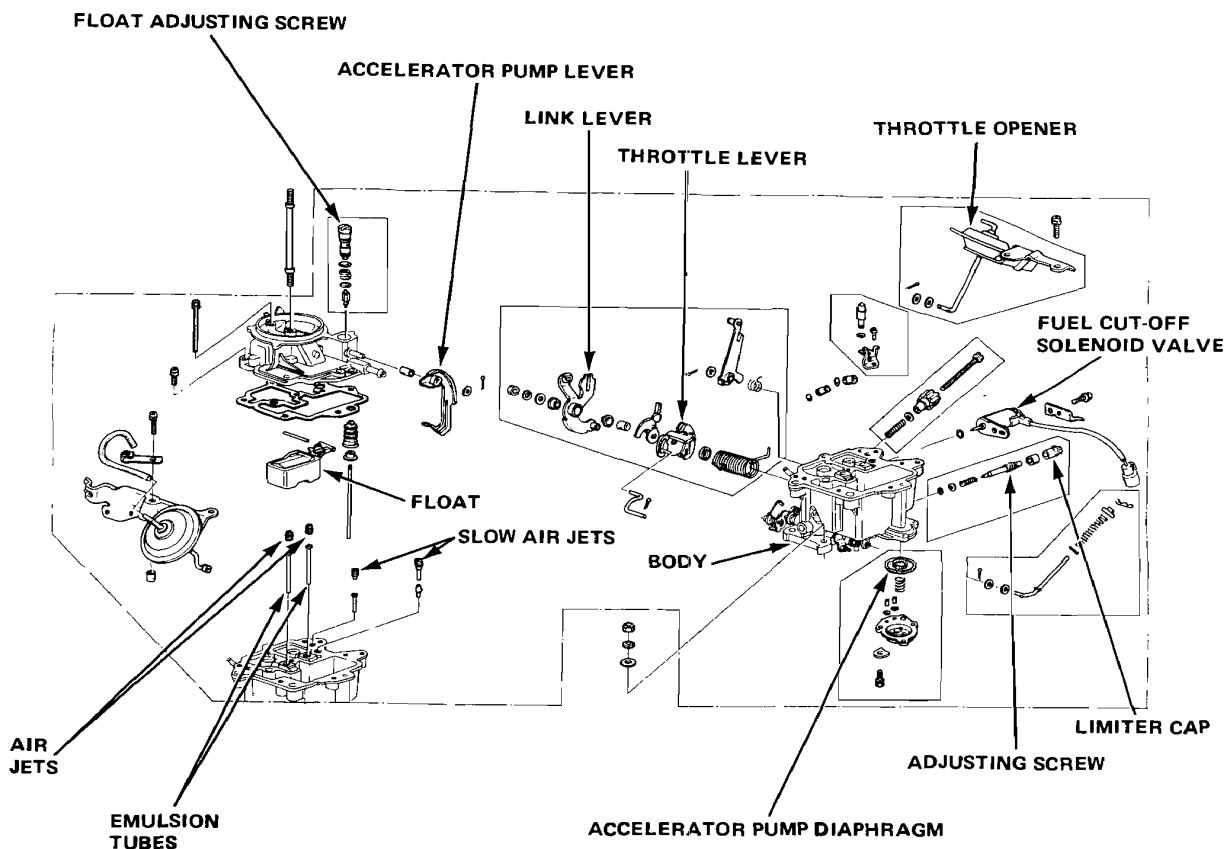
Carburetor

Replacement

CAUTION:

- As the carburetor parts are small always use hand tools that specifically correspond to the sizes of the fasteners to be removed.
- The primary and secondary parts must be set aside separately in groups. Take care not to lose them.
- The carburetor must be disassembled in a clean area and washed in gasoline.
- Use compressed air to clean jet orifices and fuel passages. Do not use a wire.
- Do not disassemble the throttle and choke valves and their shafts.
- Replace with new parts as a set if so required in the parts list.

NOTE: After cleaning the carburetor, apply a coat of silicon oil.

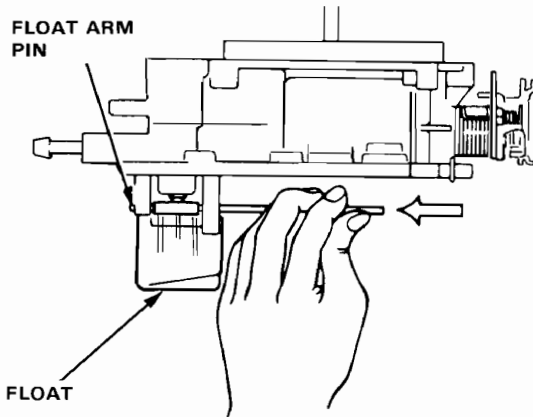


Float

Level Inspection/Adjustment

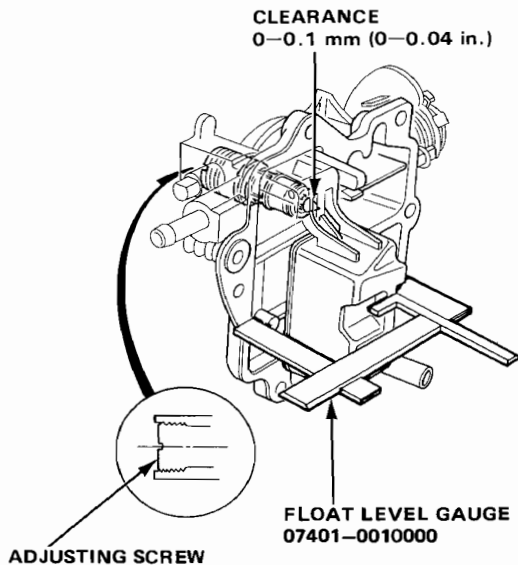
1. Remove float arm pin by lightly tapping it with a slender pin from long leg side as shown, then remove float.

NOTE: Never tap the float leg.



2. Reassemble float in reverse order.
3. Measure float level by attaching a float level gauge to the center of float.

Float Level (from Gasket):
35.4–37.4 mm (1.39–1.47 in.)



4. Adjust level by turning adjusting screw in or out if necessary.
5. Paint adjusting screw after adjustment.

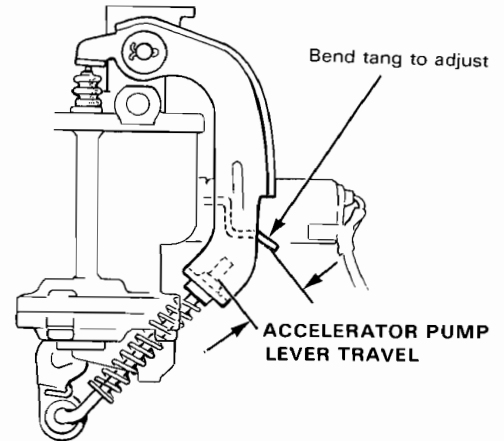
Accelerator Pump Linkage/Choke Relief Valve



Travel Inspection/Adjustment

1. Measure accelerator pump lever travel between tang on accelerator lever and stop on carburetor body.

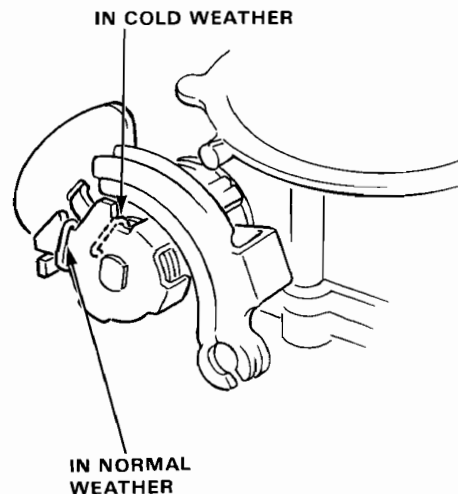
Lever Travel: 18.5–19.5 mm (0.73–0.77 in.)



2. If out of specification, adjust travel by bending tang on lever.

Choke Relief Valve Adjustment

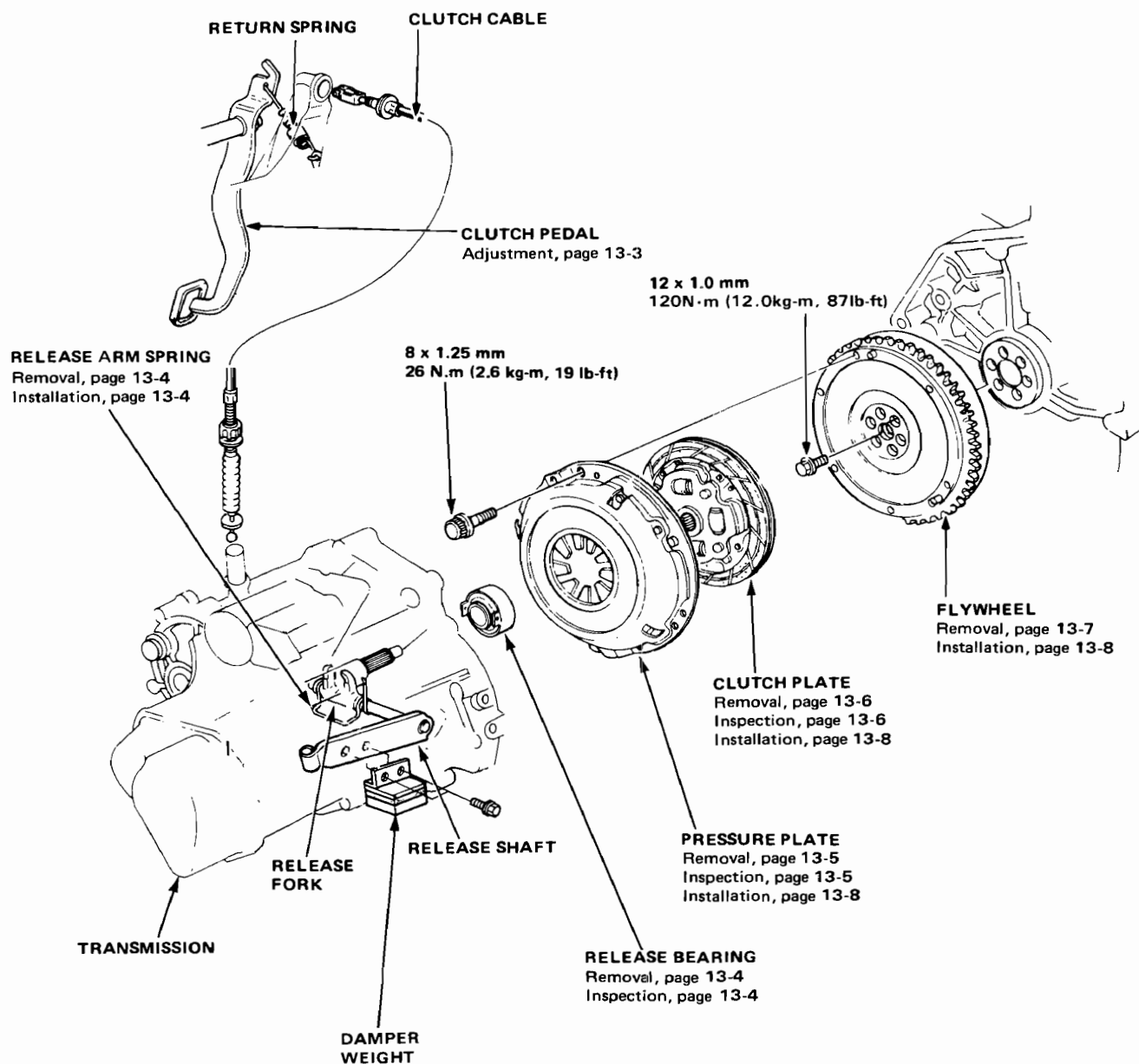
When engine is hard to start in cold weather, or when it is impossible to drive the car with choke operating, attach relief spring hook to the next strongest position.



Clutch

Illustrated Index

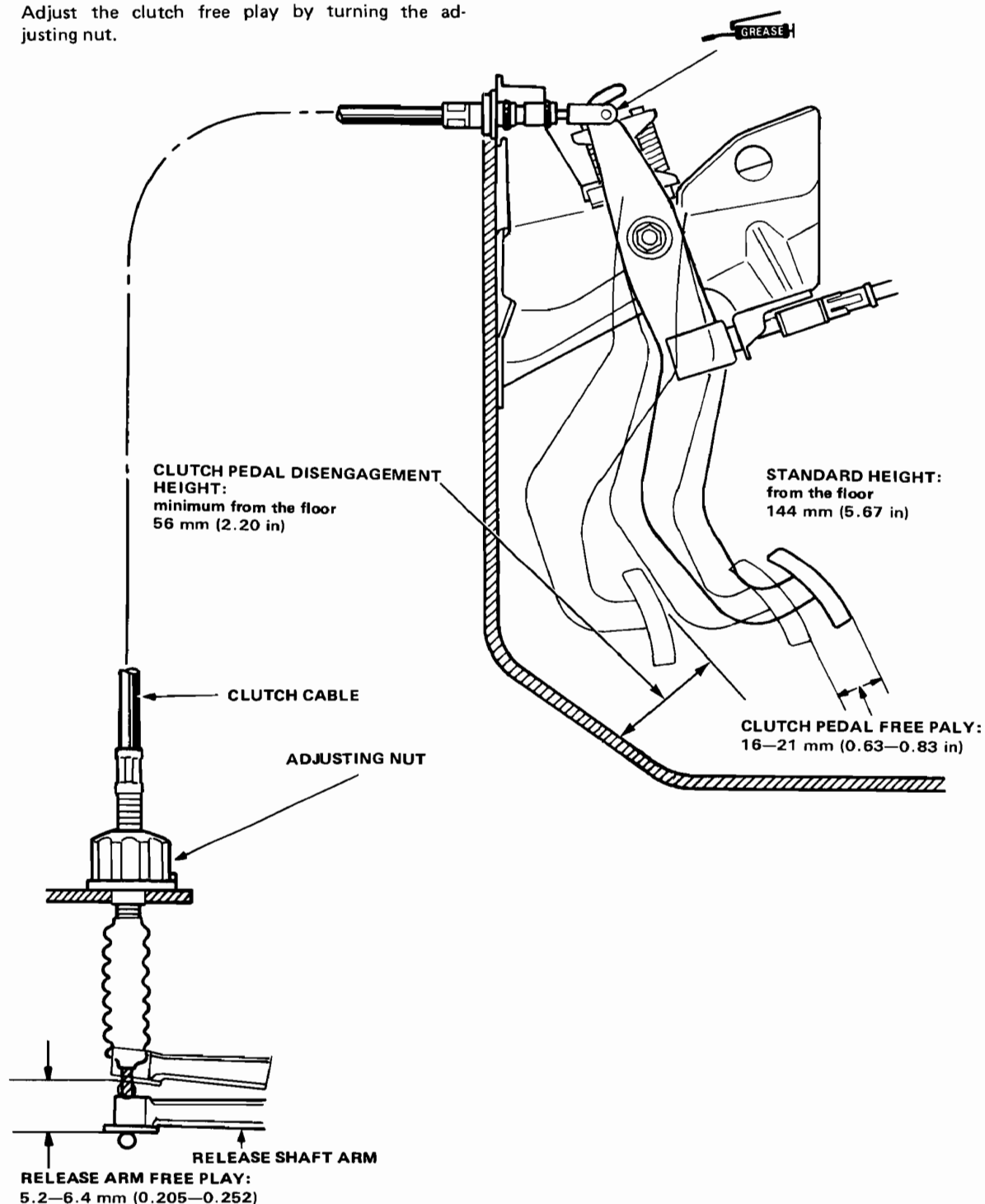
NOTE: Whenever the transmission is removed the release bearing sliding surface should be cleaned and greased.





Clutch Adjustment

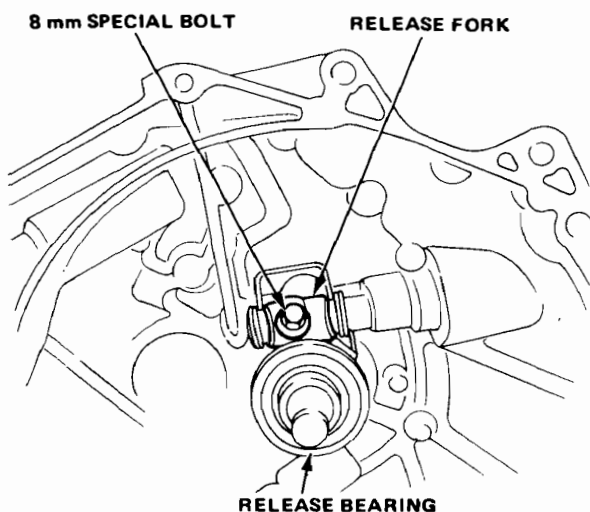
1. Measure the clutch pedal disengagement height.
2. Measure the clutch pedal free play.
3. Adjust the clutch free play by turning the adjusting nut.
4. Make sure that there is 5.2–6.4 mm (0.205–0.252 in) free play at the tip of release arm after the adjustment.



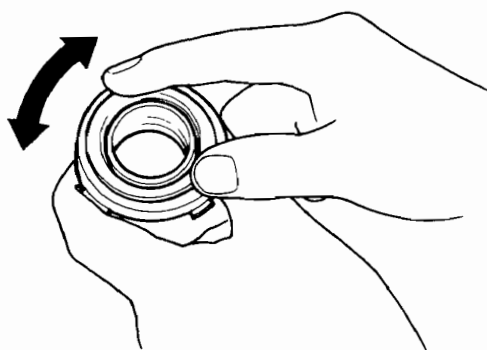
Release Bearing

Removal/Inspection

1. Remove 8 mm special bolt.



2. Remove the clutch release shaft and then remove the release bearing and release fork.
3. Separate the release bearing from the release fork.
4. Check release bearing for excessive play by spinning it by hand.



5. Replace bearing with new one if there is excessive play.

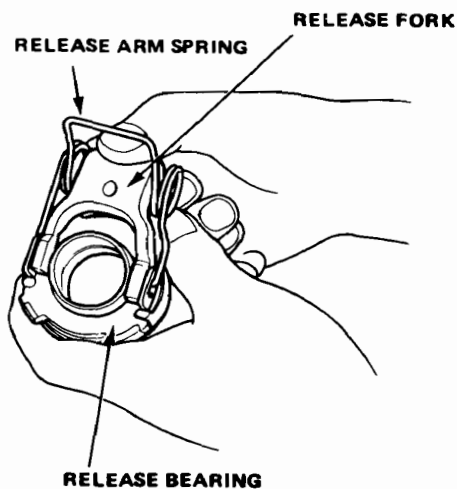
CAUTION: Bearing is packed with grease. Do not wash in solvent.

Installation

1. Apply grease to the grooves inside of the bearing and to the bearing contact surface with the release fork.



2. Install the release arm spring into the release fork tabs as shown.
3. Install the release fork onto the release bearing with its arms aligned with the tabs.

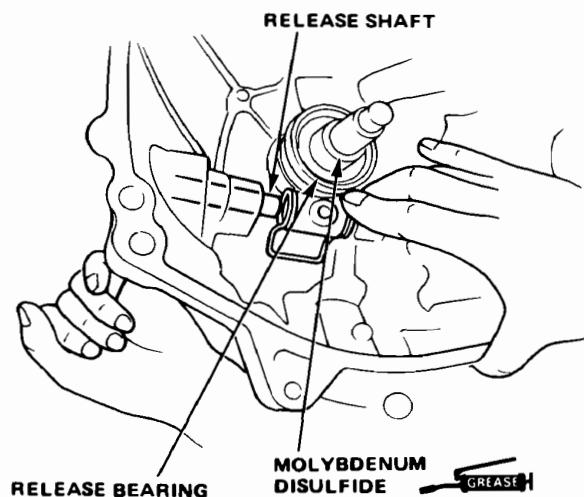




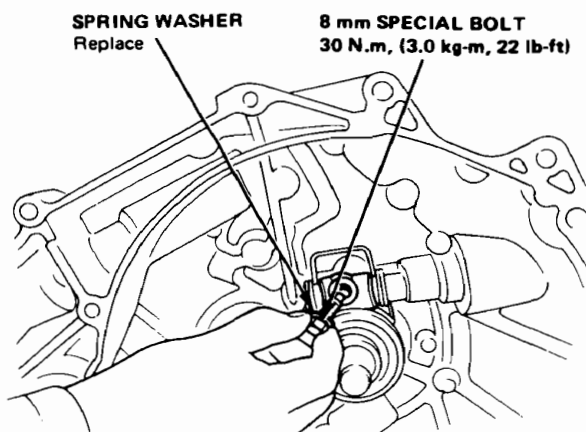
Pressure Plate

Removal/Inspection

- Slip the release bearing over the mainshaft, while holding the release arm spring as shown, then install the release shaft.



- Align the hole on the release shaft with the one on the release fork then install the 8 mm special bolt and new spring washer.



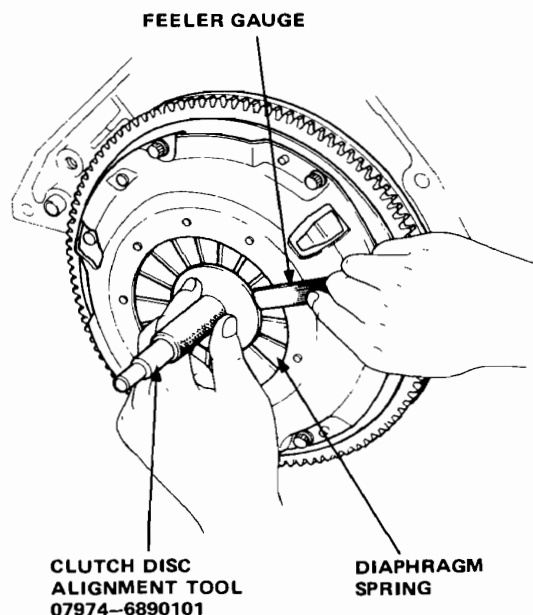
- After installation, pull release arm up, then let it down, to be sure fork fits against bearing holder properly, and holder slides freely on sleeve.

- Inspect the fingers of diaphragm spring for wear at release bearing contact area.
- Check diaphragm spring leaves for height using Clutch Disc Alignment Tool and feeler gauge.

Diaphragm spring height:

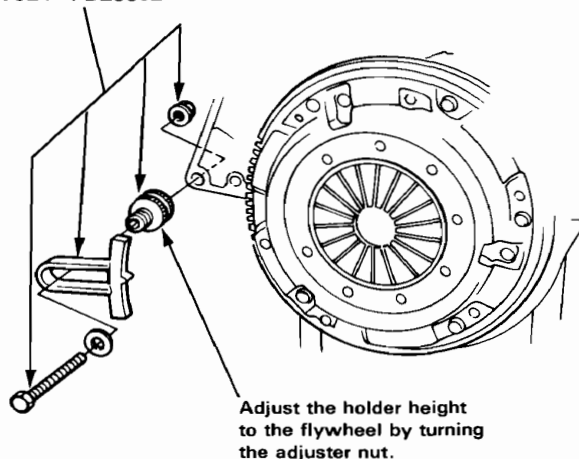
Standard: 0.6 mm (0.024 in) Max.

Service limit: 1.0 mm (0.039 in)



- Install Ring Gear Holder.

RING GEAR HOLDER
07924-PD20002



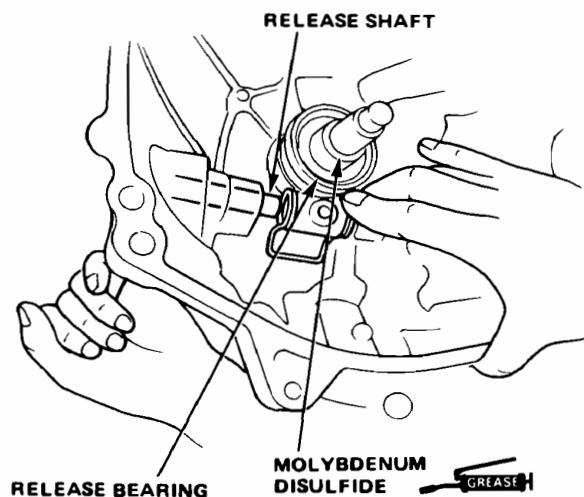
(cont'd)



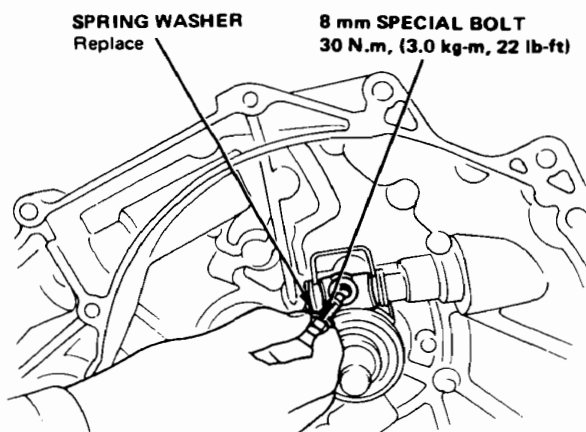
Pressure Plate

Removal/Inspection

4. Slip the release bearing over the mainshaft, while holding the release arm spring as shown, then install the release shaft.



5. Align the hole on the release shaft with the one on the release fork then install the 8 mm special bolt and new spring washer.



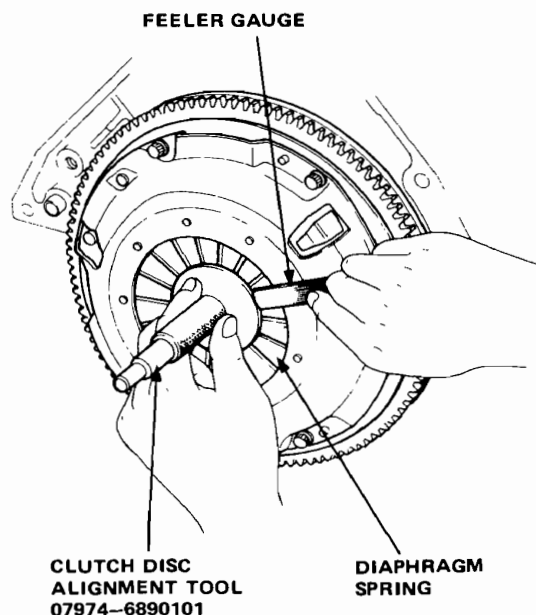
6. After installation, pull release arm up, then let it down, to be sure fork fits against bearing holder properly, and holder slides freely on sleeve.

1. Inspect the fingers of diaphragm spring for wear at release bearing contact area.
2. Check diaphragm spring leaves for height using Clutch Disc Alignment Tool and feeler gauge.

Diaphragm spring height:

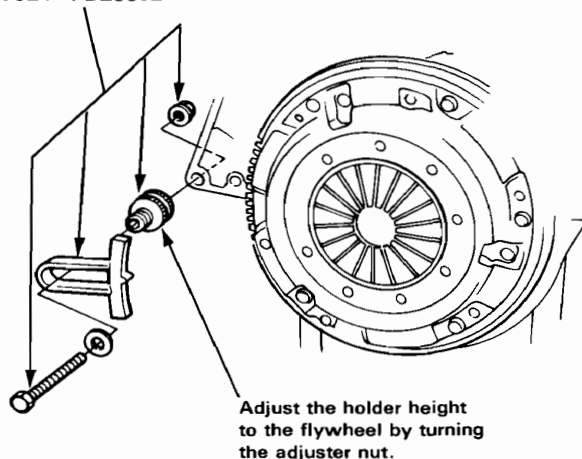
Standard: 0.6 mm (0.024 in) Max.

Service limit: 1.0 mm (0.039 in)



3. Install Ring Gear Holder.

RING GEAR HOLDER
07924-PD20002

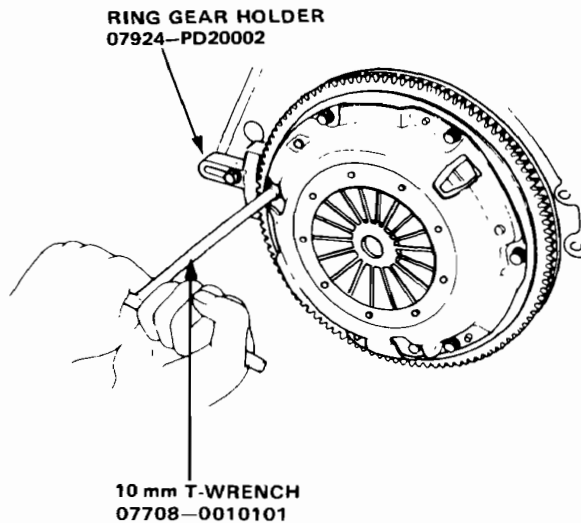


(cont'd)

Pressure Plate

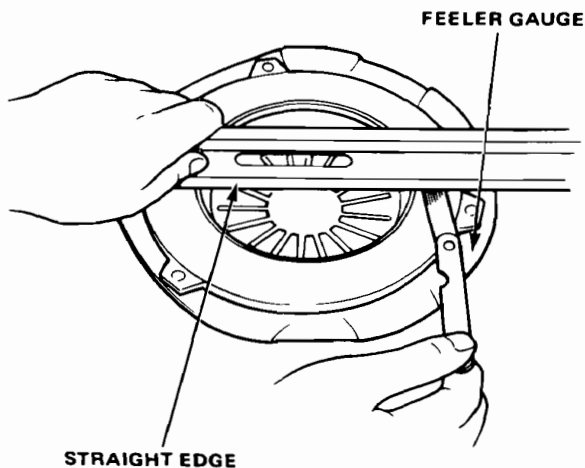
Removal/Inspection(cont'd)

4. To prevent warping, unscrew pressure plate mounting bolts two turns at a time in a criss-cross pattern using a 10 mm T-wrench, then remove pressure plate and clutch plate.



5. Inspect pressure plate surface for wear, cracks, or burning.
6. Inspect for warpage using a straight edge and feeler gauge.

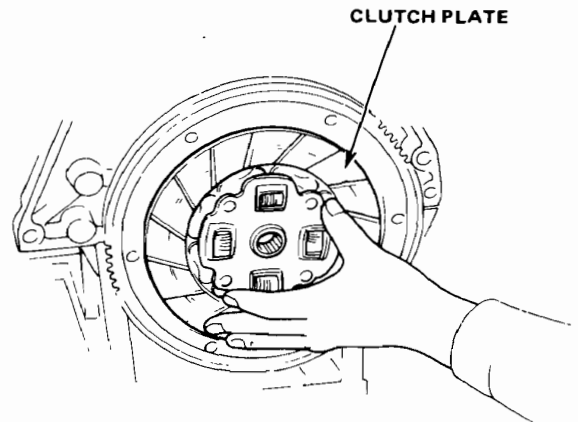
Standard: 0.03 mm (0.001 in.) max.
Service Limit: 0.15 mm (0.006 in.)



Clutch Plate

Removal/Inspection

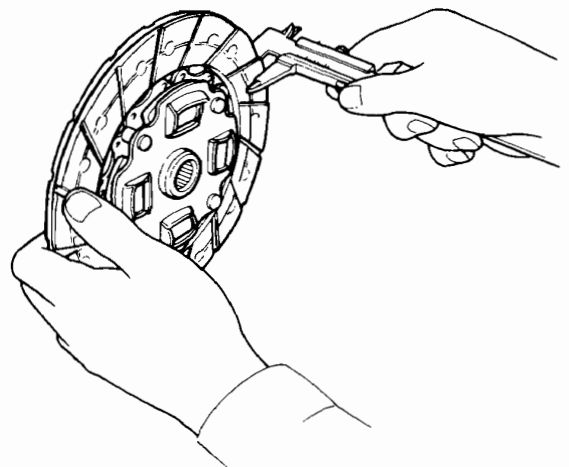
1. Remove clutch plate.



2. Inspect lining for signs of slipping or oil. Replace if burned black or oil soaked.
3. Measure clutch plate thickness.

Clutch Plate Thickness:

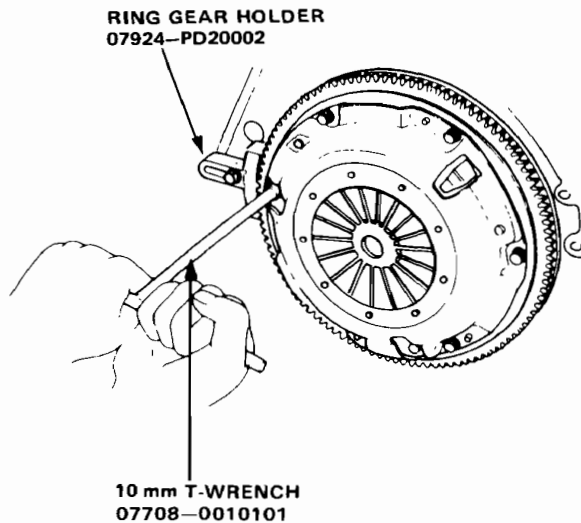
Standard: 8.1–8.8 mm (0.32–0.35 in.)
Service Limit: 5.7 mm (0.22 in.)



Pressure Plate

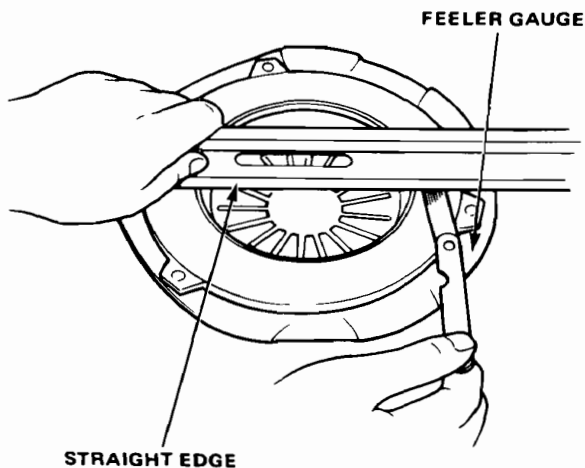
Removal/Inspection(cont'd)

4. To prevent warping, unscrew pressure plate mounting bolts two turns at a time in a criss-cross pattern using a 10 mm T-wrench, then remove pressure plate and clutch plate.



5. Inspect pressure plate surface for wear, cracks, or burning.
6. Inspect for warpage using a straight edge and feeler gauge.

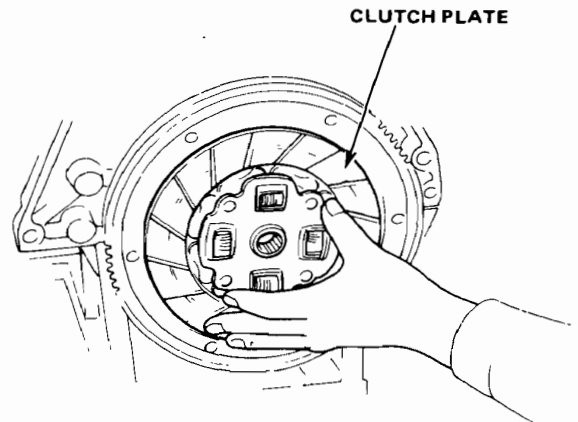
Standard: 0.03 mm (0.001 in.) max.
Service Limit: 0.15 mm (0.006 in.)



Clutch Plate

Removal/Inspection

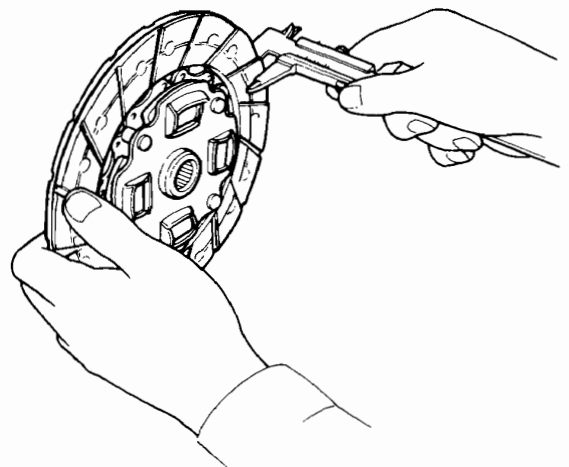
1. Remove clutch plate.



2. Inspect lining for signs of slipping or oil. Replace if burned black or oil soaked.
3. Measure clutch plate thickness.

Clutch Plate Thickness:

Standard: 8.1–8.8 mm (0.32–0.35 in.)
Service Limit: 5.7 mm (0.22 in.)





Flywheel

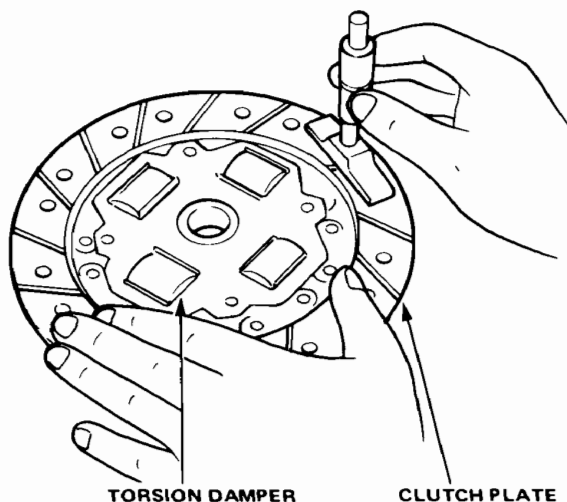
Inspection/Removal

4. Check for loose rubber torsion dampers. Replace clutch plate if any are loose.
5. Measure depth from lining surface to rivets, on both sides.

Rivet Depth:

Standard (New): 1.3 mm (0.051 in.) min.

Service Limit: 0.2 mm (0.008 in.)

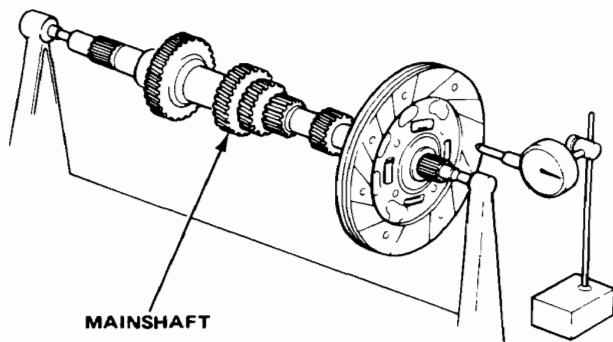


6. Measure the clutch plate runout with the mainshaft and a dial indicator.

Clutch plate runout:

Standard: 0.8 mm (0.031 in.) max.

Service Limit: 1.0 mm (0.039 in.)



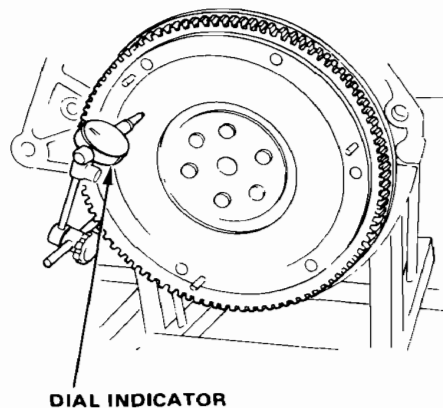
1. Inspect ring gear teeth for wear or damage.
2. Inspect clutch plate mating surface on flywheel for wear, cracks or burning.
3. Measure flywheel runout using dial indicator through at least two full turns. Push against flywheel each time you turn it to take up crankshaft thrust washer clearance.

NOTE: Runout can be measured with engine installed.

Flywheel Runout:

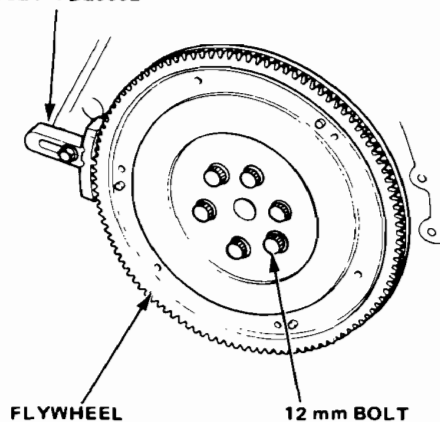
Standard (New): 0.05 mm (0.002 in.) max.

Service Limit: 0.15 mm (0.006 in.)



4. Remove six flywheel mounting bolts and flywheel.

RING GEAR HOLDER
07924-PD20002





Flywheel

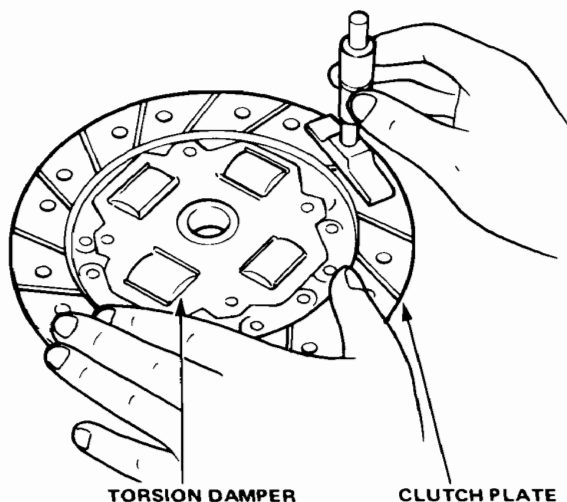
Inspection/Removal

4. Check for loose rubber torsion dampers. Replace clutch plate if any are loose.
5. Measure depth from lining surface to rivets, on both sides.

Rivet Depth:

Standard (New): 1.3 mm (0.051 in.) min.

Service Limit: 0.2 mm (0.008 in.)

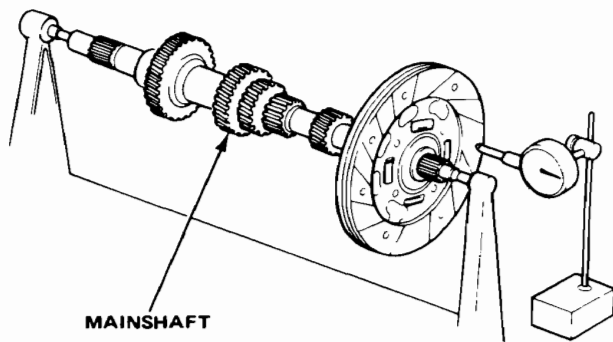


6. Measure the clutch plate runout with the mainshaft and a dial indicator.

Clutch plate runout:

Standard: 0.8 mm (0.031 in.) max.

Service Limit: 1.0 mm (0.039 in.)



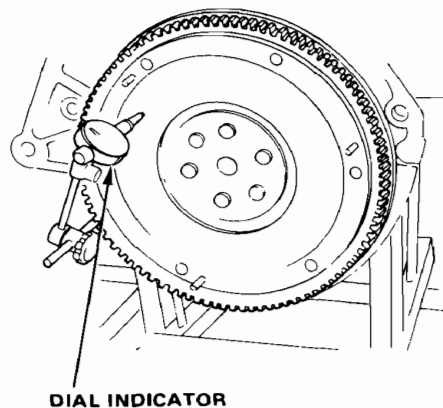
1. Inspect ring gear teeth for wear or damage.
2. Inspect clutch plate mating surface on flywheel for wear, cracks or burning.
3. Measure flywheel runout using dial indicator through at least two full turns. Push against flywheel each time you turn it to take up crankshaft thrust washer clearance.

NOTE: Runout can be measured with engine installed.

Flywheel Runout:

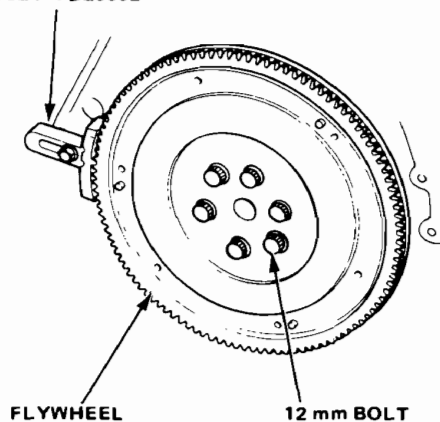
Standard (New): 0.05 mm (0.002 in.) max.

Service Limit: 0.15 mm (0.006 in.)



4. Remove six flywheel mounting bolts and flywheel.

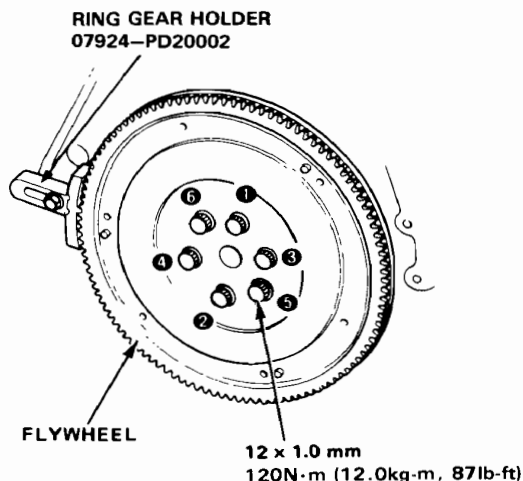
RING GEAR HOLDER
07924-PD20002



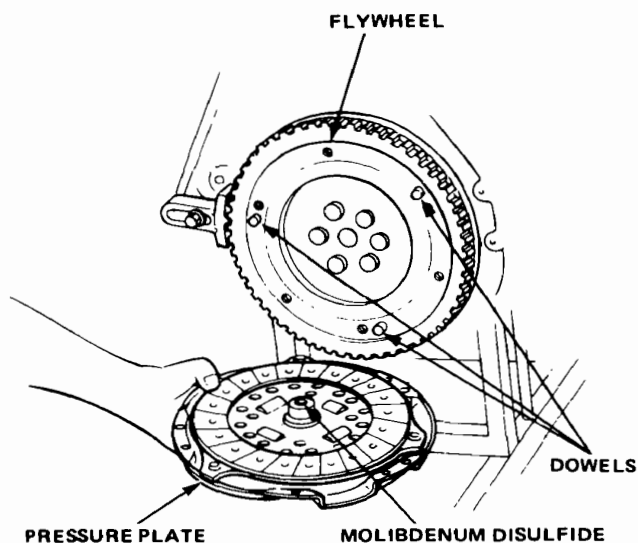
Pressure Plate/Flywheel

Installation

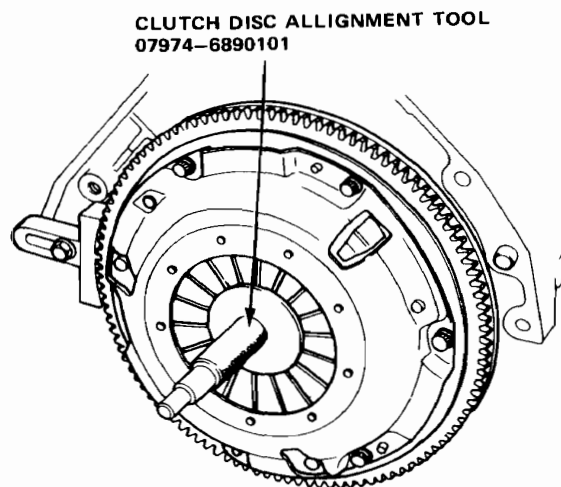
1. Align hole in flywheel with crankshaft dowel pin and assemble. Install bolts only finger tight.
2. Install Ring Gear Holder, then torque flywheel bolts in a criss-cross pattern.



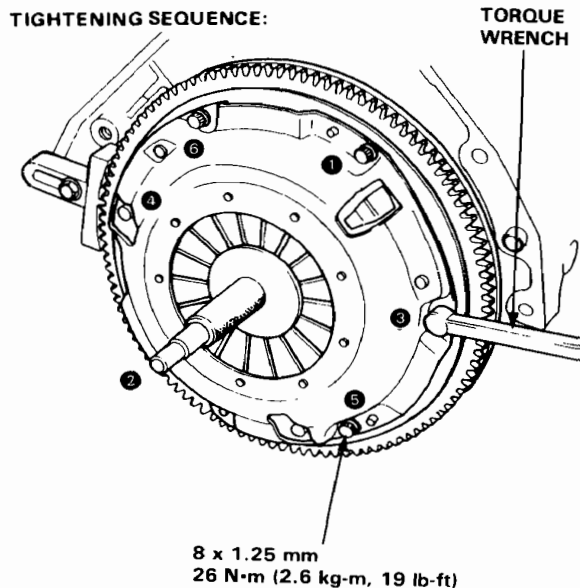
3. Install friction disc and pressure plate by aligning flywheel dowels with dowel holes in clutch cover.



4. Install attaching bolts but do not tighten the bolts at this time.
5. Insert Clutch Alignment Tool in spline hole in friction disc.



6. Torque the bolts in a criss-cross pattern. Tighten them two turns at a time to prevent warping the diaphragm spring.



7. Remove Alignment Tool and Ring Gear Holder.

5-Speed Transmission (GW)

Index

Clean all parts thoroughly in solvent and dry with compressed air.

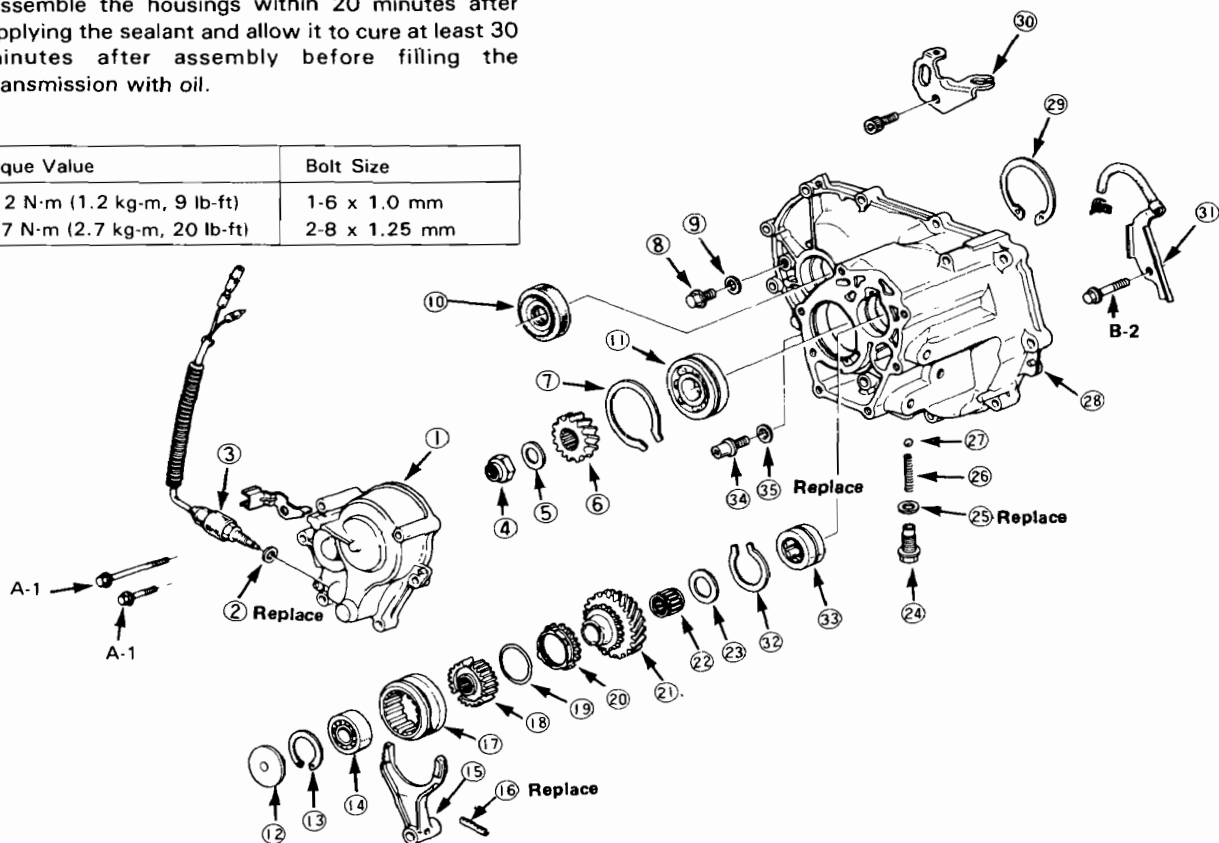


Lubricate all parts with oil before reassembly.

NOTE: This transmission uses no gaskets between the major housings; use Honda P/N 08740-99986 sealant.

Assemble the housings within 20 minutes after applying the sealant and allow it to cure at least 30 minutes after assembly before filling the transmission with oil.

Torque Value	Bolt Size
A-12 N·m (1.2 kg-m, 9 lb-ft)	1-6 x 1.0 mm
B-27 N·m (2.7 kg-m, 20 lb-ft)	2-8 x 1.25 mm



- ① 5th GEAR HOUSING
- ② 14 mm WASHER
- ③ BACK-UP LIGHT SWITCH
25 N·m (2.5 kg-m, 18 lb-ft)
- ④ COUNTERSHAFT LOCKNUT
110 N·m (11.0 kg-m, 80 lb-ft)
- ⑤ SPRING WASHER
- ⑥ COUNTERSHAFT 5th GEAR
- ⑦ 65 mm SNAP RING
- ⑧ OIL FILLER BOLT
45 N·m (4.5 kg-m, 33 lb-ft)
- ⑨ SEALING WASHER
- ⑩ SEAL
- ⑪ COUNTERSHAFT BALL BEARING
- ⑫ OIL GUIDE PLATE

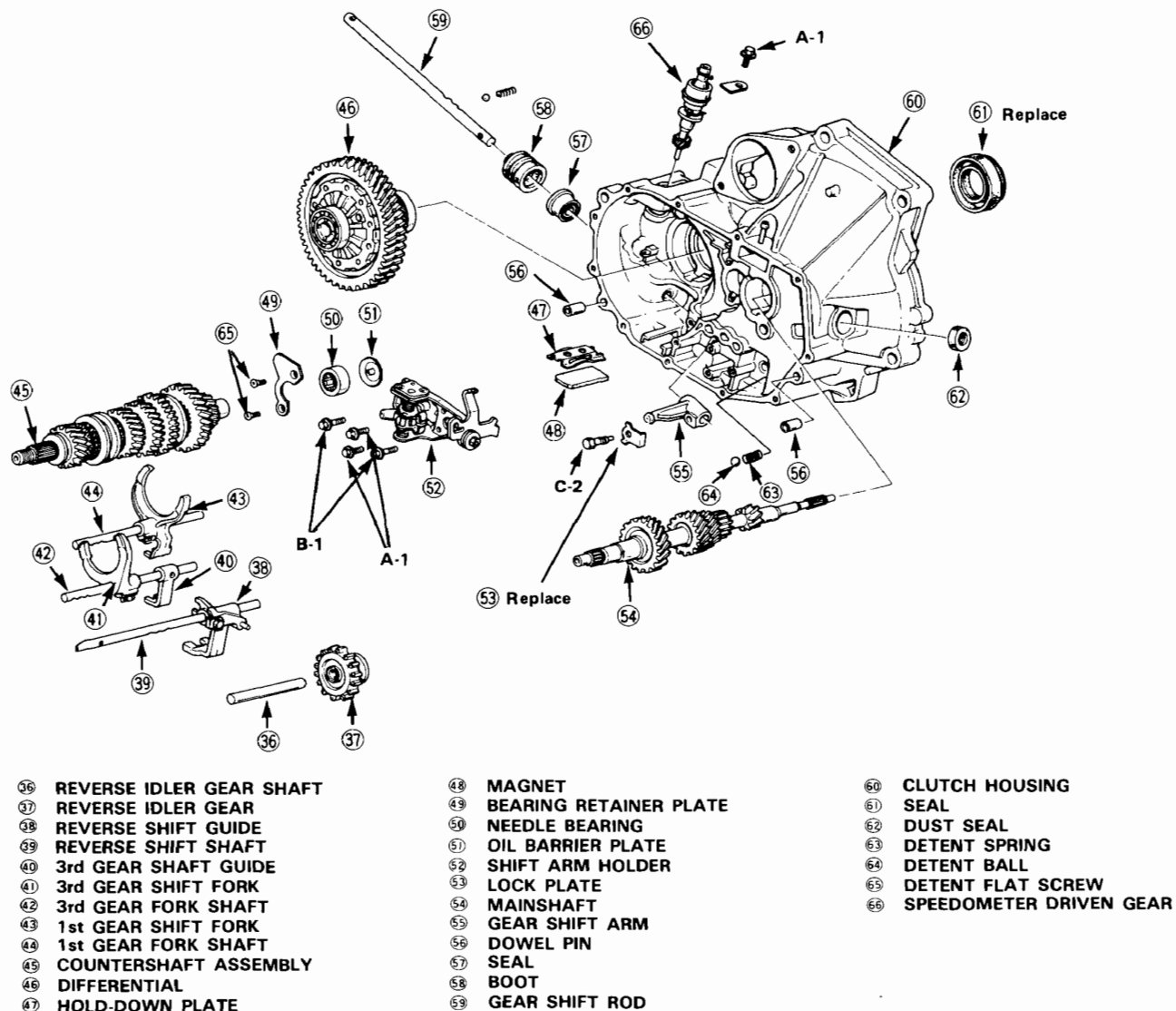
- ⑬ SNAP RING
- ⑭ MAINSHAFT BALL BEARING
- ⑮ 5th GEAR SHIFT FORK
- ⑯ SPRING PIN
- ⑰ 5th GEAR SYNCHRO SLEEVE
- ⑱ 5th GEAR SYNCHRO HUB
- ⑲ SYNCHRO SPRING
- ⑳ 5th GEAR SYNCHRO RING
- ㉑ 5th GEAR
- ㉒ NEEDLE BEARING
- ㉓ THRUST WASHER
- ㉔ DETENT BALL RETAINER SCREW
22 N·m (2.2 kg-m, 16 lb-ft)
- ㉕ SEALING WASHER
- ㉖ DETENT SPRING

- ㉗ DETENT BALL
- ㉘ TRANSMISSION HOUSING
- ㉙ 72 mm SNAP RING
- ㉚ CLUTCH CABLE BRACKET
- ㉛ BREATHER TUBE ASSEMBLY
- ㉜ 45 mm SNAP RING
- ㉝ NEEDLE BEARING
- ㉞ OIL DRAIN PLUG
40 N·m (4.0 kg-m, 29 lb-ft)
- ㉟ SEALING WASHER



NOTE: Always clean the magnet (48) whenever the transmission housing is disassembled.

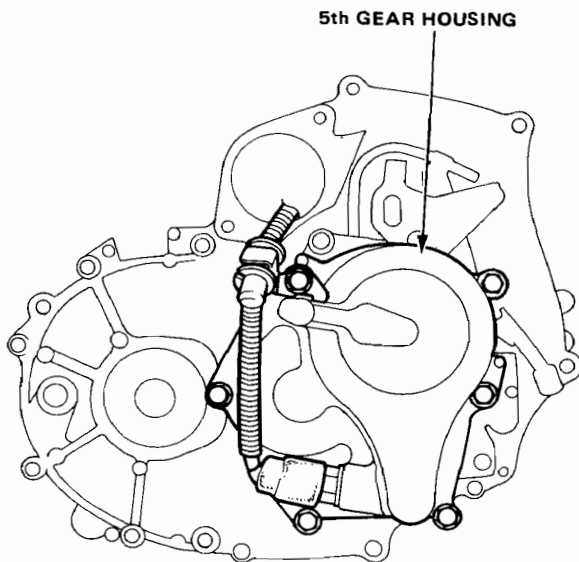
Torque Value	Bolt Size
A-12 N·m (1.2 kg-m, 9 lb-ft)	1-6 x 1.0 mm
B-14 N·m (1.4 kg-m, 10 lb-ft)	2-8 x 1.25 mm
C-24 N·m (2.4 kg-m, 17 lb-ft)	



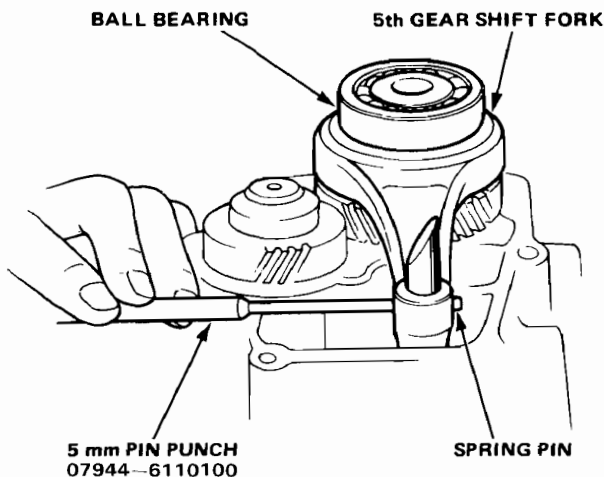
5th Gear Housing

Thrust Inspection

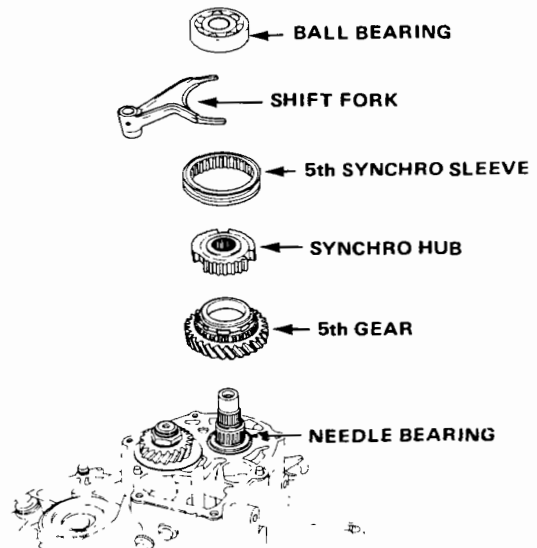
1. Remove the six 5th gear housing mounting bolts.



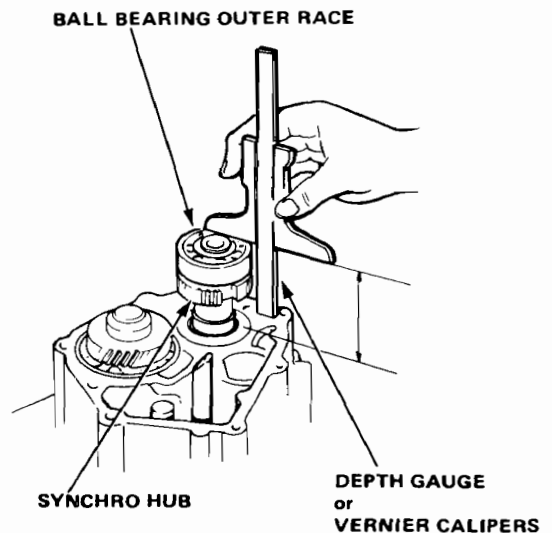
2. Remove the spring pin from the 5th gear shift fork.



3. Remove the outside parts from the mainshaft.

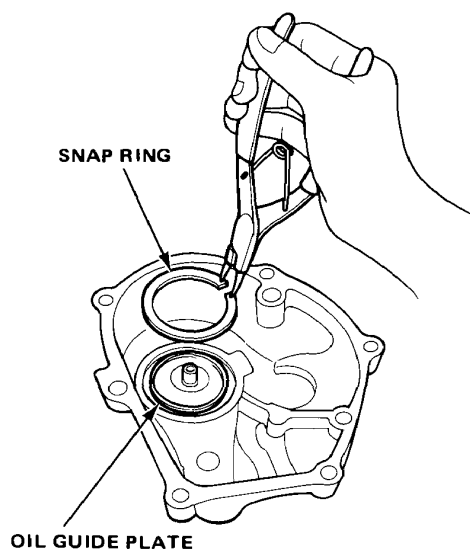


4. Reinstall the synchro hub and the ball bearing onto the mainshaft.
5. Clean all sealant residue from the transmission housing, then measure from the top of the ball bearing's outer race to the mounting flange for the 5th gear housing. Measure at two points and average the reading.

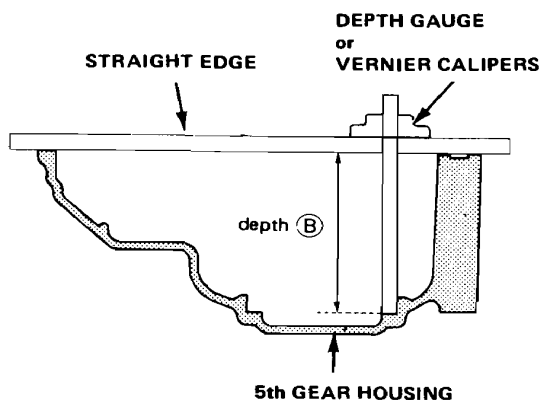




6. Remove the 52 mm snap ring and the oil guide plate from the 5th gear housing.



7. Place a straight edge on the 5th gear housing and measure the depth of the snap ring thrust shim installation hole. Measure at two points and average the readings. Subtract the thickness of the straight edge from the reading.



8. Select the correct thickness snap ring as follows:

- Subtract the bearing height (step 5) from the depth of the end cover (step 7).
- Subtract the Standard Clearance 0.11 mm – 0.18 mm (0.004 – 0.007 in.) from the dimension determined in step 8a,

EXAMPLE:

Housing depth: 57.00 mm (2.244 in.)

Bearing height: -54.50 mm (2.145 in.)

2.50 mm (0.099 in.)

2.50 mm (0.099 in.)

Snap ring height: -0.11 mm (0.004 in.)

(minimum) 2.39 mm (0.095 in.)

2.50 mm (0.099 in.)

Snap ring height: -0.18 mm (0.007 in.)

(maximum) 2.32 mm (0.092 in.)

Select the Snap ring in the range between 2.39 mm (0.095 in.) and 2.32 mm (0.092 in.) from the parts list.

Parts Number	Thickness
23931-PE6-000	0.500 mm (0.0196 in.)
23932-PE6-000	1.100 mm (0.0433 in.)
23942-PE6-000	1.125 mm (0.0442 in.)
23933-PE6-000	1.150 mm (0.0452 in.)
23943-PE6-000	1.175 mm (0.0462 in.)
23934-PE6-000	1.200 mm (0.0472 in.)
23944-PE6-000	1.225 mm (0.0482 in.)
23935-PE6-000	1.250 mm (0.0492 in.)
23945-PE6-000	1.275 mm (0.0501 in.)
23936-PE6-000	1.300 mm (0.0511 in.)
23946-PE6-000	1.325 mm (0.0521 in.)
23937-PE6-000	1.350 mm (0.0531 in.)
23947-PE6-000	1.375 mm (0.0541 in.)
23938-PE6-000	1.400 mm (0.0551 in.)
23948-PE6-000	1.425 mm (0.0561 in.)
23939-PE6-000	1.450 mm (0.0570 in.)
23949-PE6-000	1.475 mm (0.0580 in.)
23940-PE6-000	1.500 mm (0.0590 in.)
23950-PE6-000	1.525 mm (0.0600 in.)
23941-PE6-000	1.550 mm (0.0610 in.)
23951-PE6-000	1.575 mm (0.0620 in.)

NOTE: If the measurements determined in 8b are greater than the thickest snap ring, you may use two snap rings (For the example above, you could use the 1,250 mm and the 1,100 mm rings for a total of 2,350).

CAUTION: Do not use more than two rings together.

Mainshaft Assembly

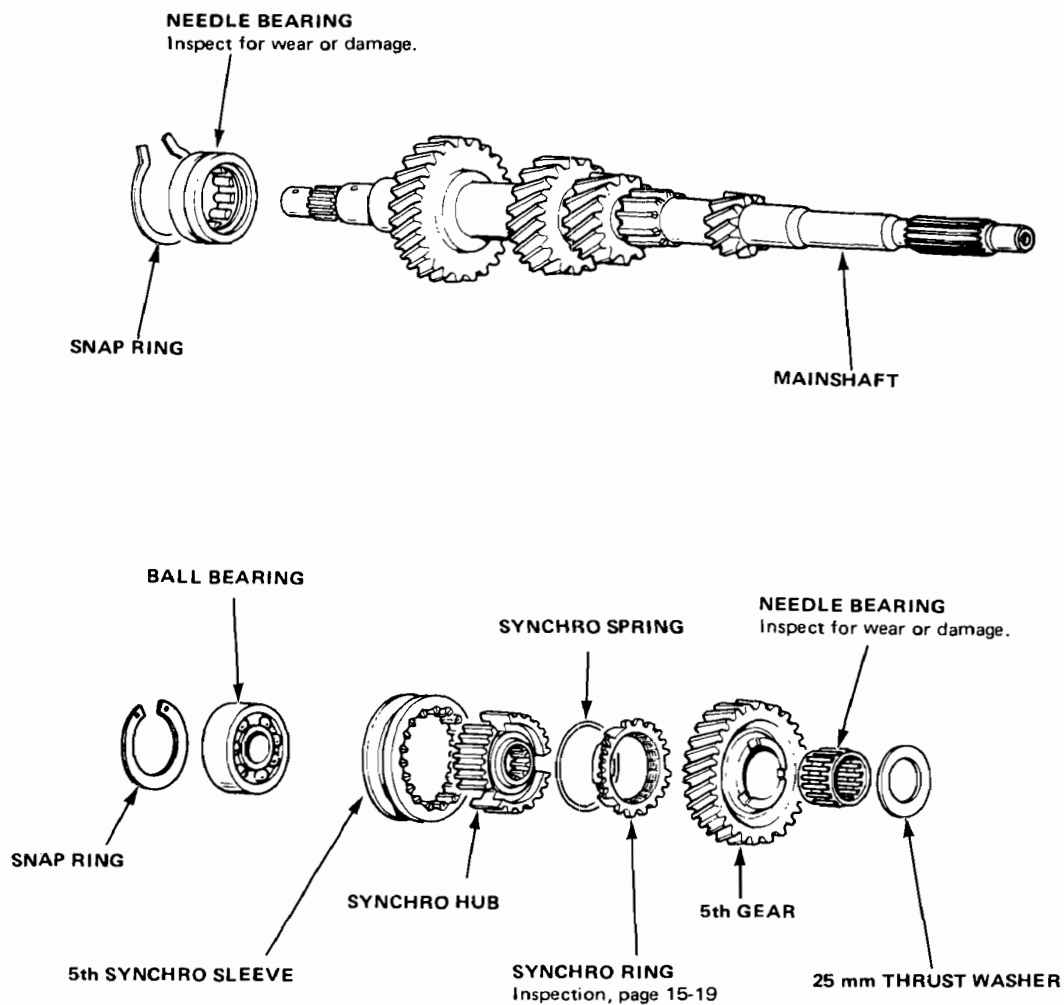
Index

NOTE:

- Clean all parts thoroughly in solvent and dry with compressed air.



Lubricate all parts with oil before reassembly.



Maintenance

Transmission Oil

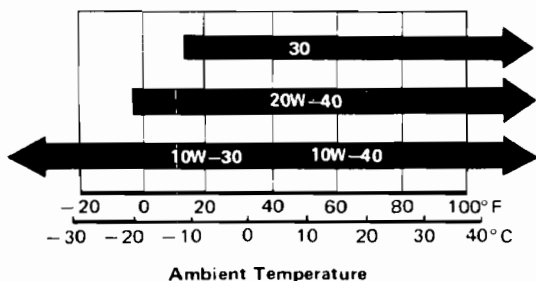
Oil Level Inspection

1. Check with oil at operating temperature, engine OFF, and car on level ground.
2. Remove oil filler plug and check level with finger.
3. Oil level must be up to fill hole. If it is below hole, add oil until it runs out, then reinstall plug.

Oil Change

Change oil every 48,000 km (30,000 miles).

Use only SAE30, 10W-30, 10W-40, or 20W-40 weight oil rated SE or SF grade.



1. With transmission oil at operating temperature, engine OFF, and car on level ground, remove drain plug and drain transmission.
2. Reinstall drain plug with new washer, and refill to proper level.

NOTE: Drain plug washer should be replaced at every oil change.

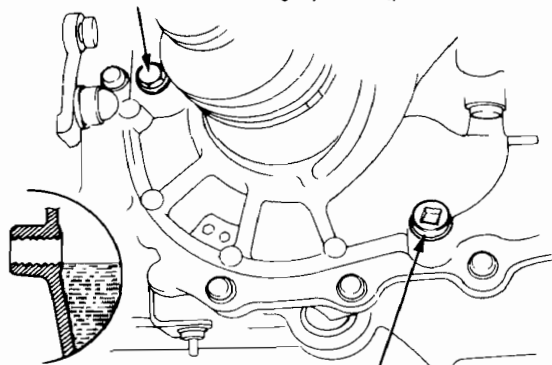
Oil Capacity

2.3 l (2.4 U.S. qt.) after drain.

2.4 l (2.5 U.S. qt.) after overhaul.

OIL FILLER PLUG

20 x 15 mm 45 N·m (4.5 kg·m, 33 lb-ft)

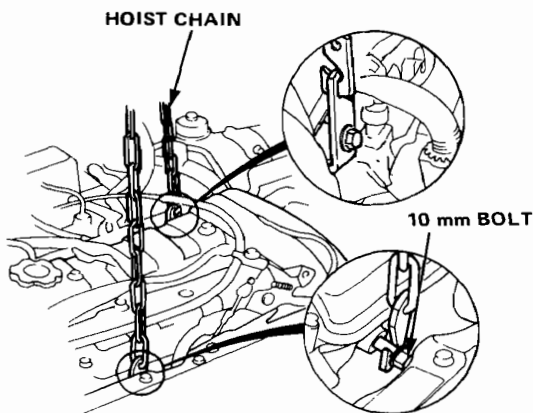


DRAIN PLUG 14 x 1.5 mm
40 N·m (4.0 kg·m, 29 lb-ft)

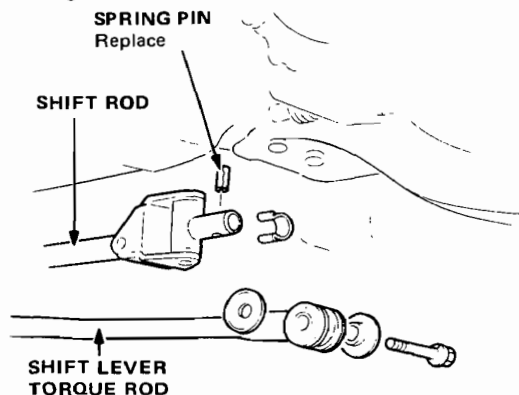
Transmission Assy

Removal

1. Disconnect the ground cable at battery and at transmission.
2. Release the steering lock and put gearshift lever in neutral.
3. Disconnect the engine compartment wiring:
 - Battery positive cable from starter.
 - Black/white wire from starter solenoid.
 - Green/black and yellow wires from back-up light switch.
4. Remove the speedometer cable by removing clip. Do not disassemble speedometer gear holder.
5. Disconnect the clutch cable at release arm.
6. Drain the transmission oil. Reinstall the drain plug and washer.
7. Remove the right and left driveshafts and intermediate shaft (see section 16).
8. Screw a 10 mm bolt at engine block and attach a hoist chain to the bolt; attach the other end of the chain on the opposite side, to the engine hanger plate, then lift the engine slightly to take the weight off the mounts.



9. Remove the engine under cover and splash shield (see section 5).
10. Disconnect the header pipe at exhaust manifold (see section 5).
11. Disconnect the shift lever torque rod from clutch housing.



Maintenance

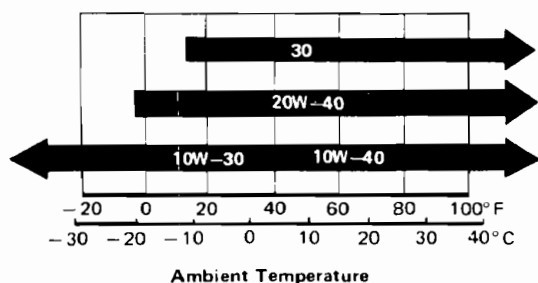
Transmission Oil

Oil Level Inspection

1. Check with oil at operating temperature, engine OFF, and car on level ground.
2. Remove oil filler plug and check level with finger.
3. Oil level must be up to fill hole. If it is below hole, add oil until it runs out, then reinstall plug.

Oil Change

Change oil every 48,000 km (30,000 miles).
Use only SAE30, 10W-30, 10W-40, or 20W-40 weight oil rated SE or SF grade.



1. With transmission oil at operating temperature, engine OFF, and car on level ground, remove drain plug and drain transmission.
2. Reinstall drain plug with new washer, and refill to proper level.

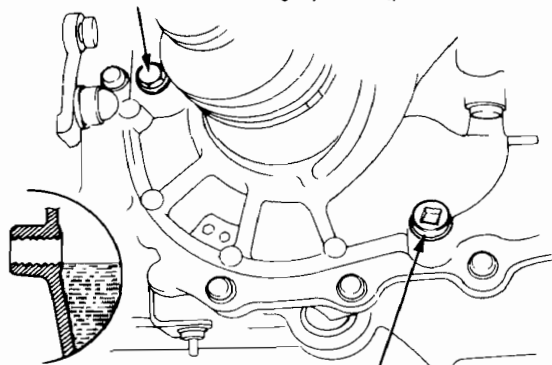
NOTE: Drain plug washer should be replaced at every oil change.

Oil Capacity

- 2.3 l (2.4 U.S. qt.) after drain.
- 2.4 l (2.5 U.S. qt.) after overhaul.

OIL FILLER PLUG

20 x 15 mm 45 N·m (4.5 kg·m, 33 lb·ft)

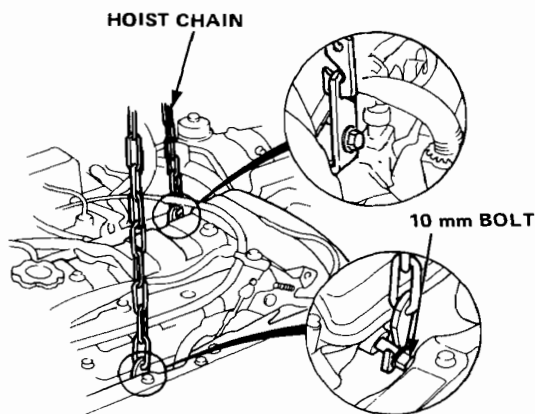


DRAIN PLUG 14 x 1.5 mm
40 N·m (4.0 kg·m, 29 lb·ft)

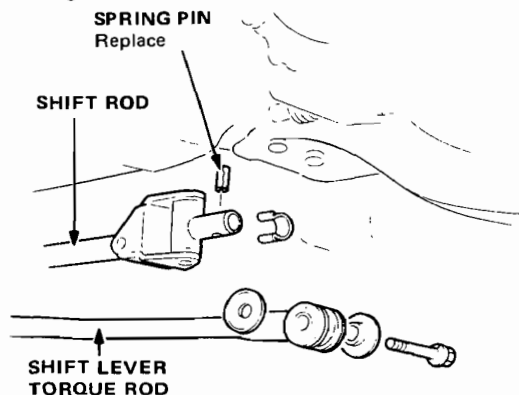
Transmission Assy

Removal

1. Disconnect the ground cable at battery and at transmission.
2. Release the steering lock and put gearshift lever in neutral.
3. Disconnect the engine compartment wiring:
 - Battery positive cable from starter.
 - Black/white wire from starter solenoid.
 - Green/black and yellow wires from back-up light switch.
4. Remove the speedometer cable by removing clip. Do not disassemble speedometer gear holder.
5. Disconnect the clutch cable at release arm.
6. Drain the transmission oil. Reinstall the drain plug and washer.
7. Remove the right and left driveshafts and intermediate shaft (see section 16).
8. Screw a 10 mm bolt at engine block and attach a hoist chain to the bolt; attach the other end of the chain on the opposite side, to the engine hanger plate, then lift the engine slightly to take the weight off the mounts.



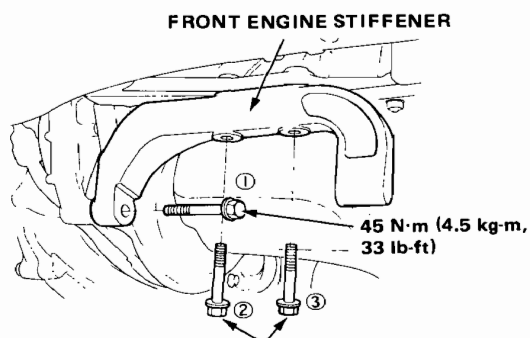
9. Remove the engine under cover and splash shield (see section 5).
10. Disconnect the header pipe at exhaust manifold (see section 5).
11. Disconnect the shift lever torque rod from clutch housing.



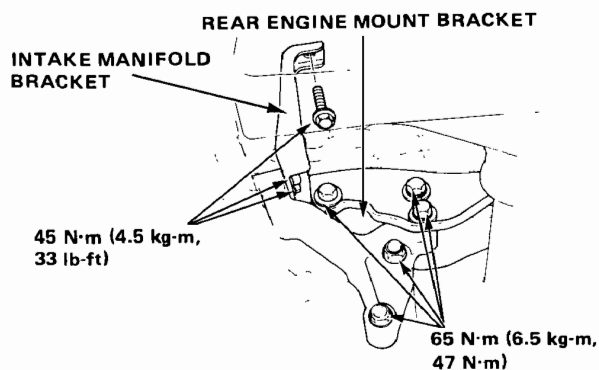


12. Slide pin retainer back, drive out the spring pin using a pin punch, then disconnect shift rod.
13. Place a jack under the transmission and raise transmission just enough to take weight off mounts.
14. Remove the bolts from the front transmission mount at the front engine stiffener.

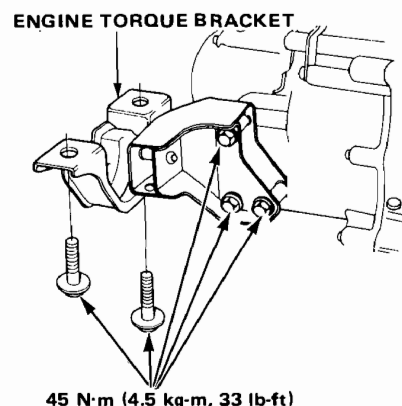
CAUTION: When installing, tighten the bolts in the sequence shown in steps 1-3.



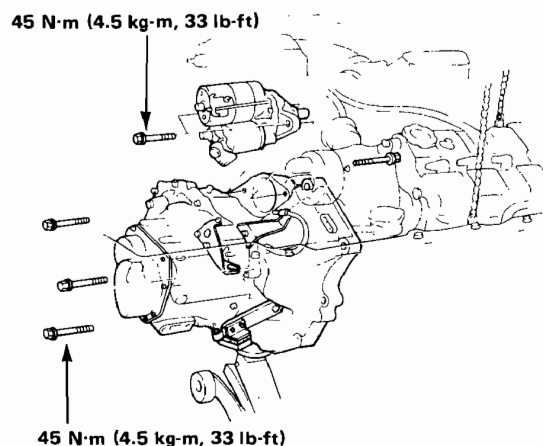
15. Remove the intake manifold bracket and rear engine mount bracket.



16. Remove the transmission housing bolts from engine torque bracket.



17. Remove the bolts attaching the starter motor, and remove the starter motor.
18. Remove the rest of the transmission mount bolts.

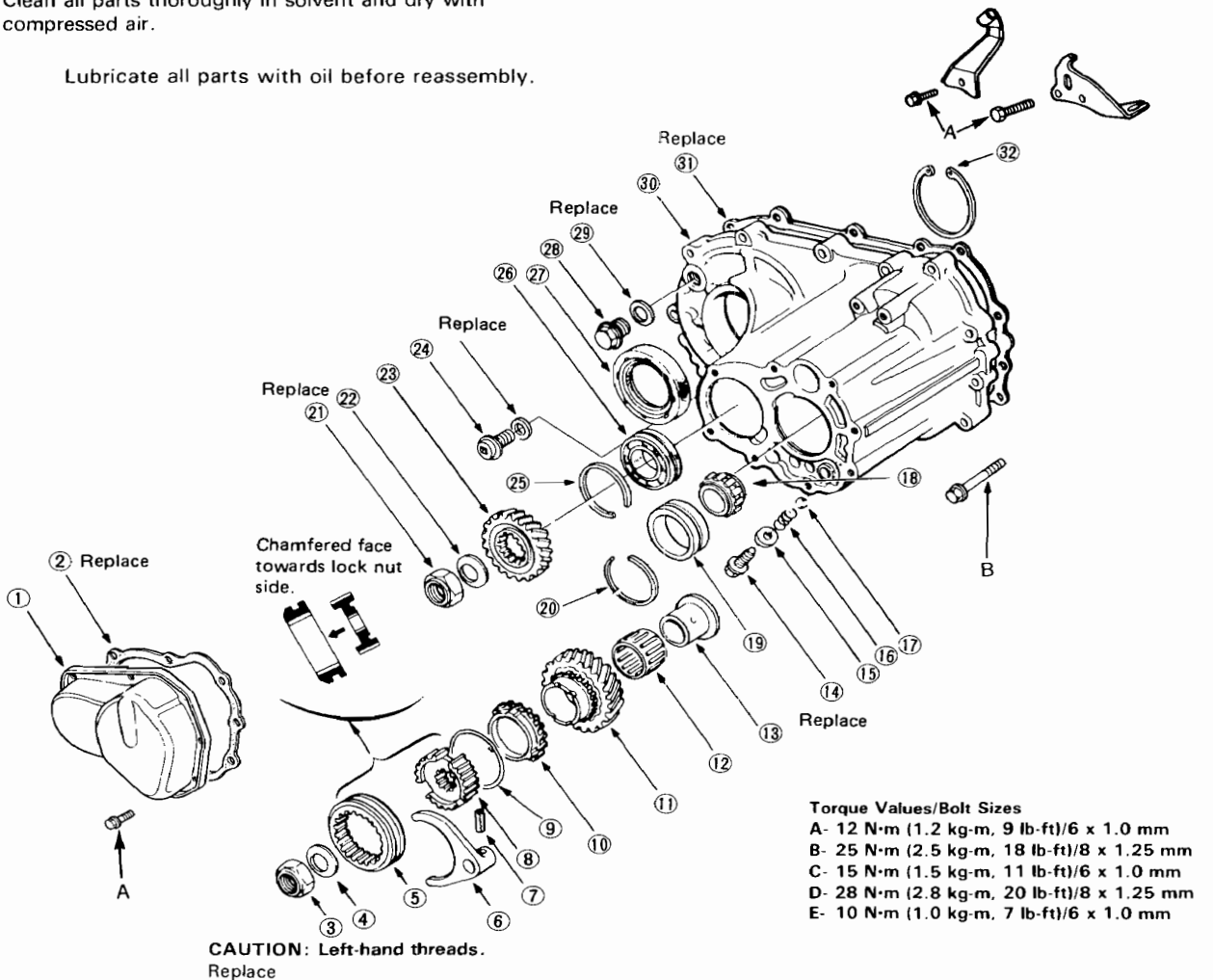


19. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower on the transmission jack.
20. Separate the mainshaft from the clutch pressure plate and remove the transmission by lowering the jack.

Illustrated Index

- Clean all parts thoroughly in solvent and dry with compressed air.

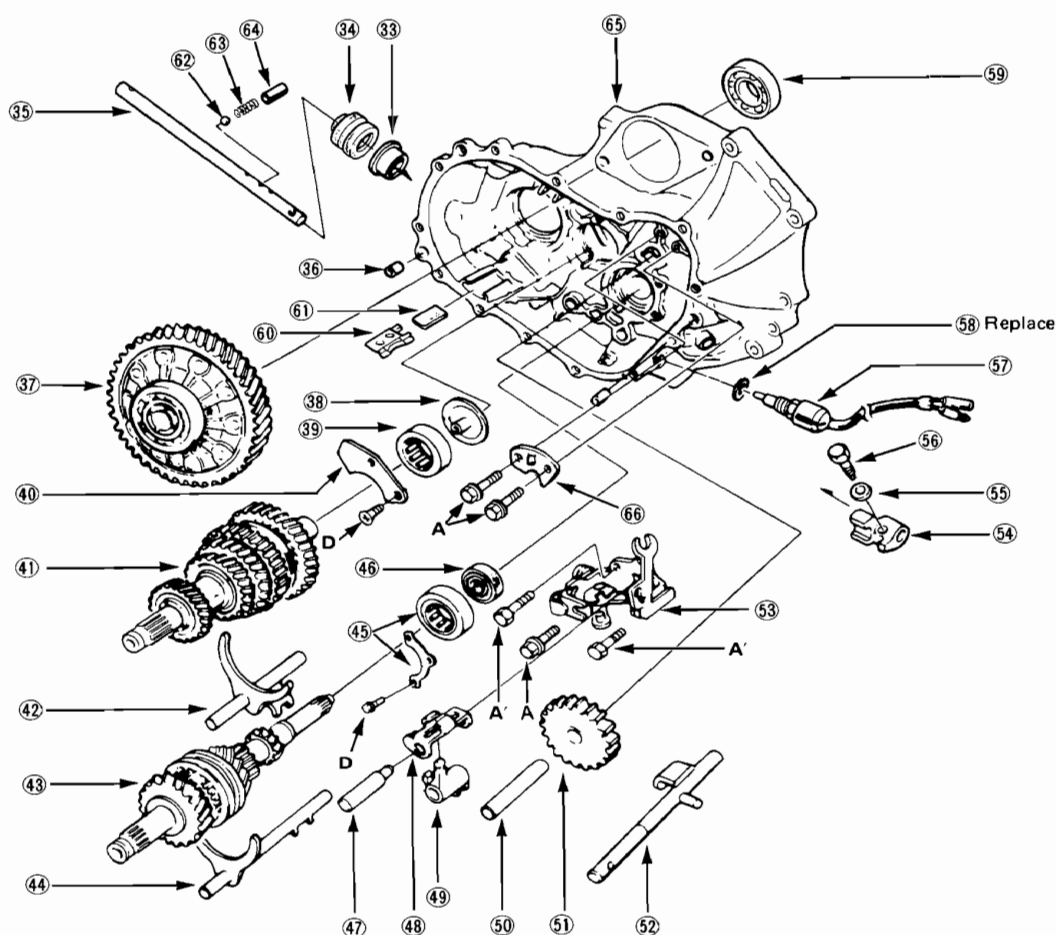
Lubricate all parts with oil before reassembly.



- ① **END COVER**
Removal, Page 14-12
Installation, Page 14-35
- ② **GASKET**
- ③ **LOCKNUT**
Removal, Page 14-12
Installation, Page 14-35
- ④ **SPRING WASHER**
- ⑤ **FIFTH GEAR SYNCHRO SLEEVE**
Removal, Page 14-13
Installation, Page 14-35
- ⑥ **FIFTH GEAR SHIFT FORK**
Removal, Page 14-13
Installation, Page 14-35
- ⑦ **SPRING PIN**
- ⑧ **FIFTH GEAR SYNCHRO HUB**
Removal, Page 14-13
Installation, Page 14-34
- ⑨ **SYNCHRO SPRING**

- ⑩ **FIFTH GEAR SYNCHRO RING**
Inspection, Page 14-21
- ⑪ **MAINSHAFT FIFTH GEAR**
Removal, Page 14-13
Installation, Page 14-34
- ⑫ **NEEDLE BEARING**
- ⑬ **SPACER COLLAR**
- ⑭ **RETAINING SCREW**
22 N·m (2.2 kg-m, 16 lb-ft)
- ⑮ **WASHER 12 mm**
- ⑯ **SPRING**
- ⑰ **DETENT BALL**
- ⑱ **ROLLER BEARING**
- ⑲ **BEARING OUTER RACE**
Replacement, Page 14-18
- ⑳ **SNAP RING 50 mm**
- ㉑ **LOCKNUT**
Removal, Page 14-12
Installation, Page 14-35

- ㉒ **SPRING WASHER**
- ㉓ **COUNTERSHAFT FIFTH GEAR**
- ㉔ **DRAIN PLUG**
40 N·m (4.0 kg-m, 29 lb-ft)
- ㉕ **SNAP RING 71 mm**
- ㉖ **BALL BEARING**
Replacement, Page 14-18
- ㉗ **OIL SEAL**
Removal, Page 14-16
Installation, Page 14-36
- ㉘ **OIL FILLER BOLT**
45 N·m (4.5 kg-m, 33 lb-ft)
- ㉙ **WASHER 20 mm**
- ㉚ **TRANSMISSION HOUSING**
Disassembly, Page 14-12
Installation, Page 14-33
- ㉛ **GASKET**
- ㉜ **SNAP RING 80 mm**



- 33 OIL SEAL
- 34 BOOT
- 35 SHIFT ROD
- 36 DOWEL PIN 14 x 20 mm
- 37 DIFFERENTIAL ASSY
Removal, Page 14-16
Overhaul, Sec. 17
Installation, Page 14-31
- 38 OIL BARRIER PLATE
- 39 COUNTERSHAFT BEARING
Replacement, Pages 14-16, 17
- 40 BEARING RETAINER PLATE
- 41 COUNTERSHAFT ASSY
Removal, Page 14-15
Inspection, Page 14-23
Installation, Page 14-31
Measurements, Page 14-27
- 42 FIRST & SECOND
GEAR SHIFT SHAFT

- 43 MAINSHAFT ASSY
Removal, Page 14-15
Inspection, Page 14-23
Installation, Page 14-31
Measurements, Page 14-26
- 44 THIRD & FOURTH
GEAR SHIFT SHAFT
- 45 MAINSHAFT BEARING AND
BEARING RETAINER PLATE
Replacement, Pages 14-16, 17
- 46 OIL SEAL
Replacement, Page 14-16
- 47 SHIFT GUIDE SHAFT
- 48 INTERLOCK
- 49 SHIFT GUIDE
- 50 REVERSE IDLER GEAR SHAFT
Removal, Page 14-14
Installation, Page 14-33
- 51 REVERSE IDLER GEAR
Removal, Page 14-14
Installation, Page 14-33
- 52 FIFTH & REVERSE
GEAR SHIFT SHAFT

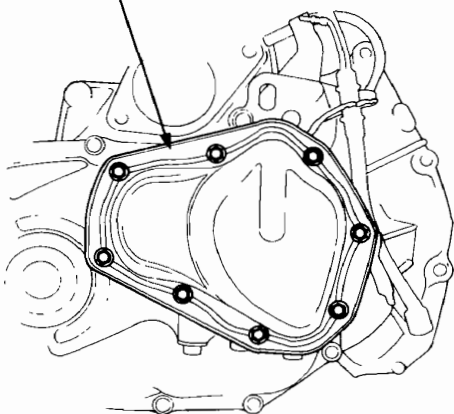
- 53 SHIFT ARM HOLDER
Measurements, Pages 14-28, 29
Removal, Page 14-29
Installation, Page 14-31
A 12 N·m (1.2 kg-m, 9 lb-ft)
A' 15 N·m (1.5 kg-m, 11 lb-ft)
- 54 SHIFT ROD GUIDE
Measurements, Page 14-30
Installation, Page 14-31
- 55 WASHER 8 mm
- 56 BOLT, 8 x 1.25 mm
30 N·m (3.0 kg-m, 22 lb-ft)
- 57 BACK-UP LIGHT SWITCH
- 58 WASHER 14 mm
- 59 OIL SEAL
Removal, Page 14-16
Installation, Page 14-36
- 60 SET PLATE
- 61 MAGNET
- 62 DETENT BALL
- 63 SPRING
- 64 SPRING COLLAR
- 65 CLUTCH HOUSING
- 66 BREATHER CHAMBER
PLATE

Transmission Housing

Disassembly

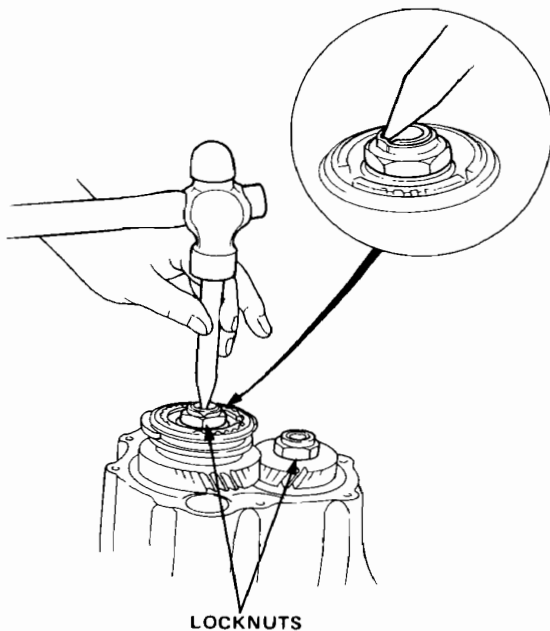
1. Remove transmission end cover.

END COVER
(8 bolts, 6 x 1.0 mm)

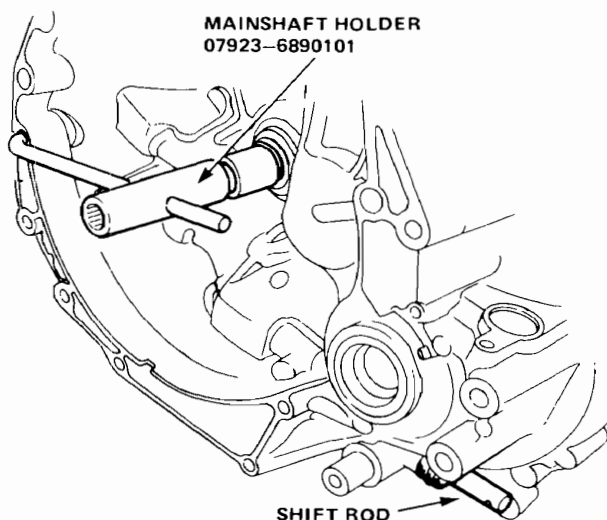


NOTE: Before removing mainshaft/countershaft locknuts, measure clearance between spacer collar and shoulder on fifth gear.

2. Bend locking tab on locknuts out of slots in mainshaft and countershaft.

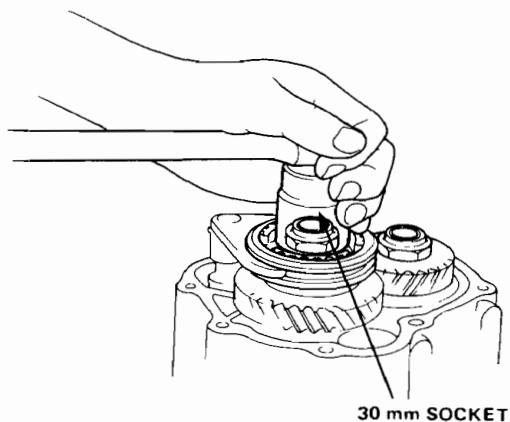


3. Install mainshaft holder.



4. Shift transmission into reverse gear.
5. Remove locknuts.

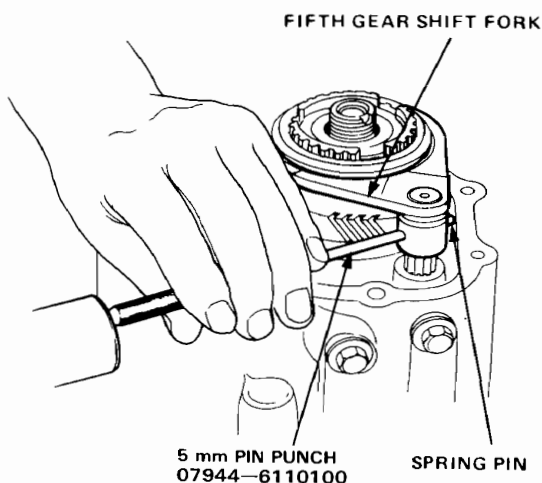
CAUTION: The mainshaft locknut has left-hand threads.



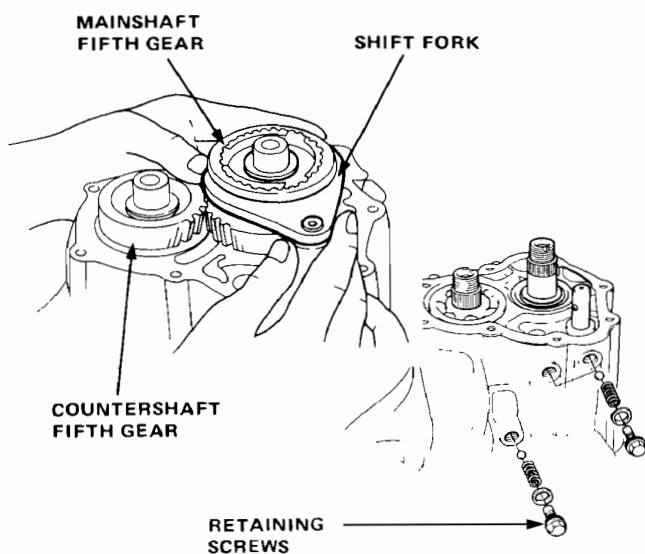
6. Remove mainshaft holder.



7. Drive out spring pin securing fifth gear shift fork to shaft.

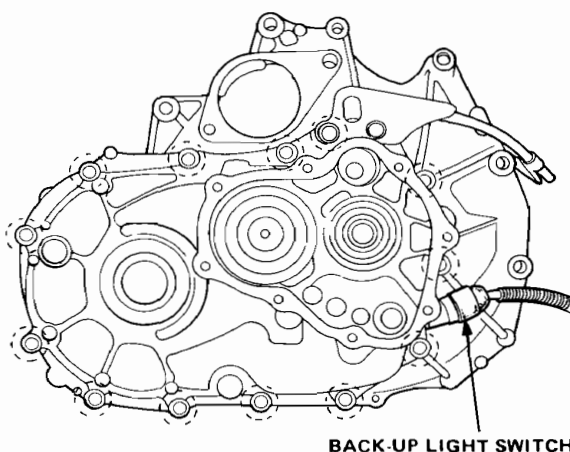


8. Remove mainshaft fifth gear, shift fork, synchronizer sleeve, hub, ring and spring as a unit.
9. Remove countershaft fifth gear.
10. Remove three retaining screws and detent balls.

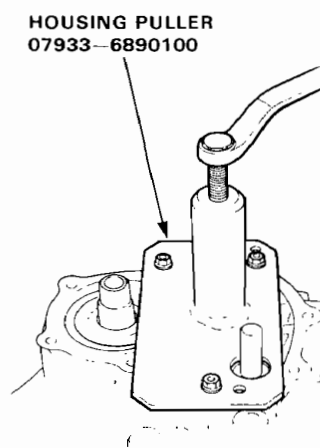


11. Remove back-up light switch.

12. Remove thirteen housing bolts.



13. Install transmission housing puller with four bolts and tighten securely. Screw the puller bolt against end of countershaft until transmission housing breaks loose.



Reverse Fork

Shift Shaft Clearance

1. Check clearance between fifth/reverse shift shaft pin and reverse shift fork.

PIN-TO-FORK CLEARANCE

Standard (New): 0.05–0.35 mm
(0.002–0.014 in.)

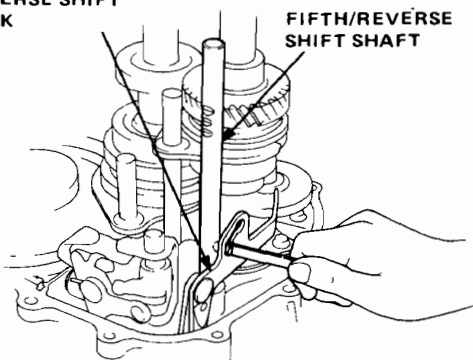
Service Limit: 0.5 mm (0.02 in.)

2. If clearance is beyond limit, measure width of slot in reverse shift fork.

Standard (New): 7.05–7.25 mm
(0.278–0.285 in.)

REVERSE SHIFT
FORK

FIFTH/REVERSE
SHIFT SHAFT



Gear Clearance

1. Check reverse idler gear-to-shift fork clearance.

GEAR-TO-FORK CLEARANCE

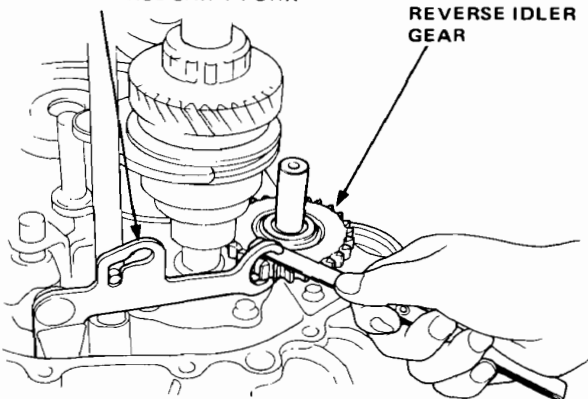
Standard (New): 0.2–1.0 mm (0.008–0.04 in.)
Service Limit: 1.7 mm (0.07 in.)

2. Pull out the reverse idler shaft and remove gear. If gear-to fork clearance is beyond limit, measure gap between ends of shift fork fingers.

Standard (New): 11.8–12.1 mm (0.46–0.48 in.)

REVERSE SHIFT FORK

REVERSE IDLER
GEAR

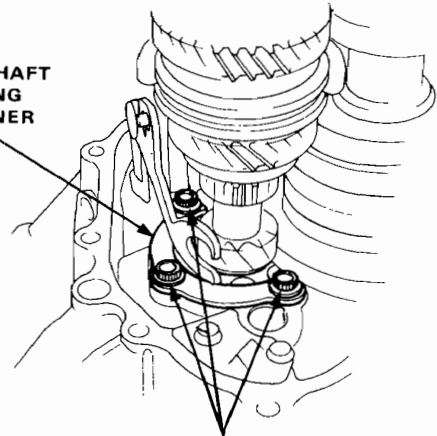


Countershaft/Mainshaft

Removal

1. Shift transmission into neutral.
2. Remove the mainshaft bearing retainer plate.

MAINSHAFT
BEARING
RETAINER

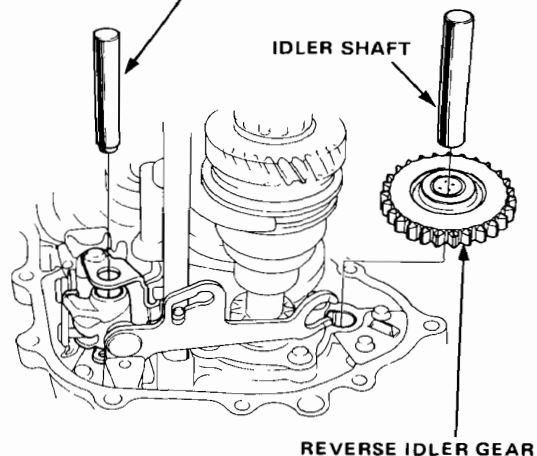


8 mm SPECIAL BOLTS

3. Pull out the shift guide shaft.
4. Pull out reverse idler shaft and remove gear.

SHIFT GUIDE SHAFT

IDLER SHAFT

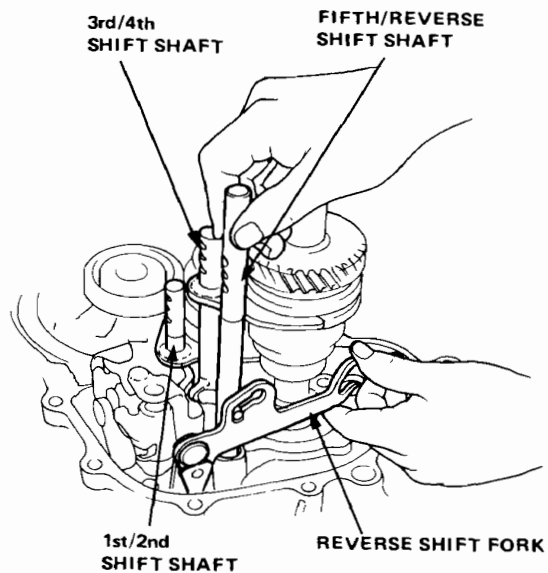


REVERSE IDLER GEAR

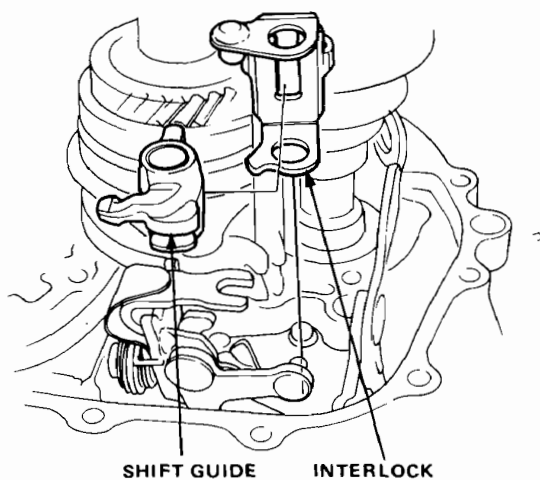


5. Pull the 3rd/4th and 1st/2nd shift shafts up, to shift into fourth and second.

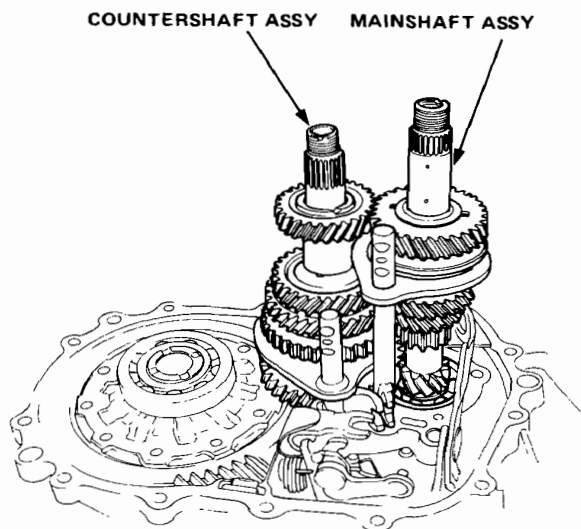
6. Remove the 5th/reverse shift shaft by pulling it up while lifting the reverse shift fork.



7. Tilt interlock and shift guide to the side, then lift them out.



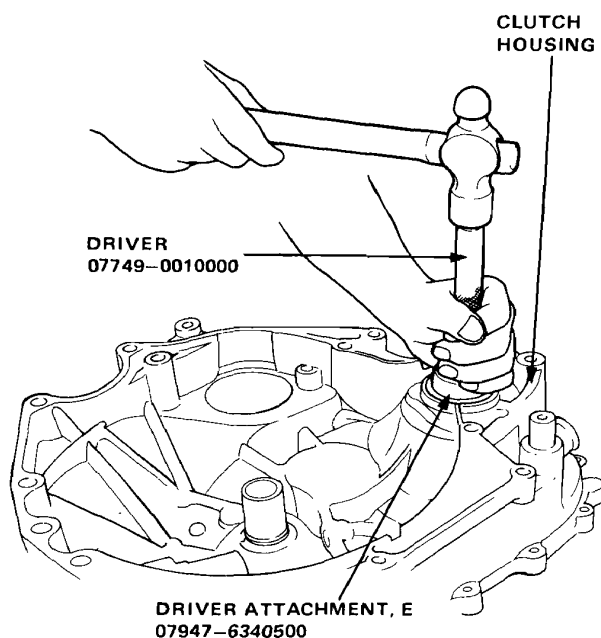
8. Remove countershaft and mainshaft as an assembly, with 1st/2nd & 3rd/4th shift shafts.



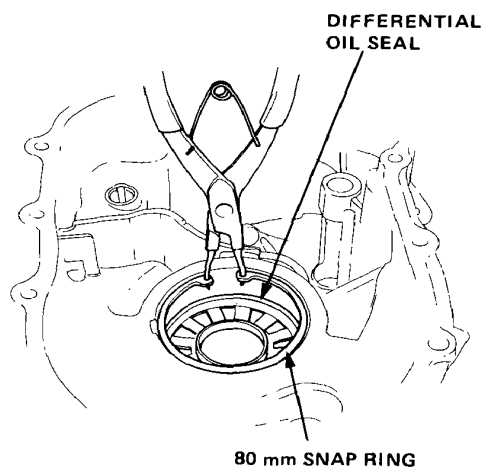
Differential Oil Seals

Removal

1. If seals are to be replaced, or if differential needs repair, remove differential assembly.



2. Drive the differential oil seal out of the clutch housing.
3. Remove 80 mm snap ring in transmission housing.



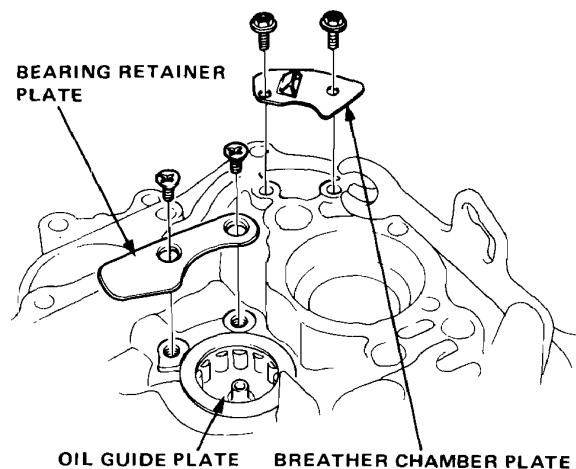
4. Drive the differential oil seal out of the transmission housing.

NOTE: Replace the differential oil seal in the transmission housing whenever disassembled.

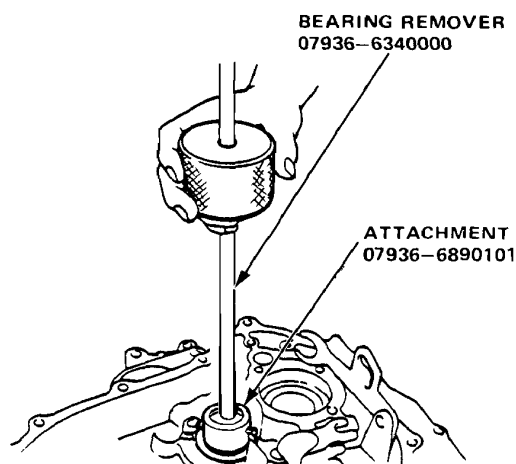
Bearings and Seals

Replacement (Clutch Housing)

1. Remove countershaft bearing retainer plate.
2. Remove the breather chamber plate.



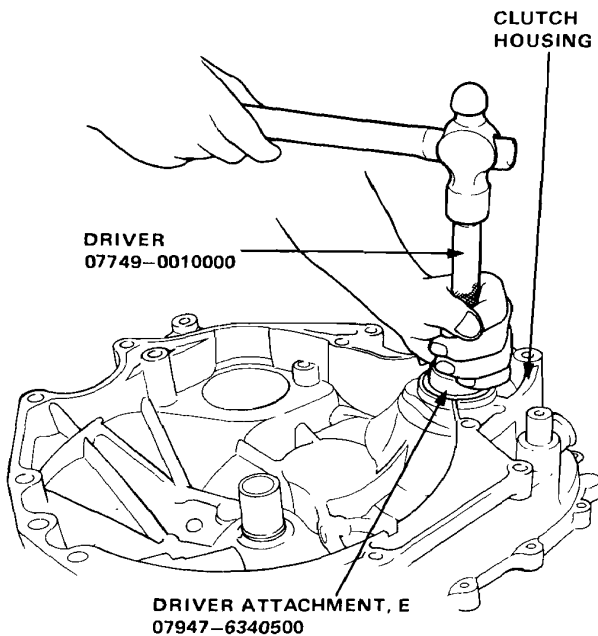
3. Insert Bearing Remover with attachment into countershaft bearing.
4. Raise slide hammer rapidly and strike against handle. Repeat several times to remove bearing.



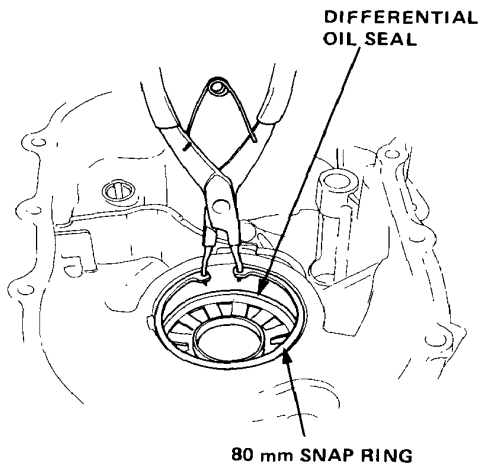
Differential Oil Seals

Removal

1. If seals are to be replaced, or if differential needs repair, remove differential assembly.



2. Drive the differential oil seal out of the clutch housing.
3. Remove 80 mm snap ring in transmission housing.



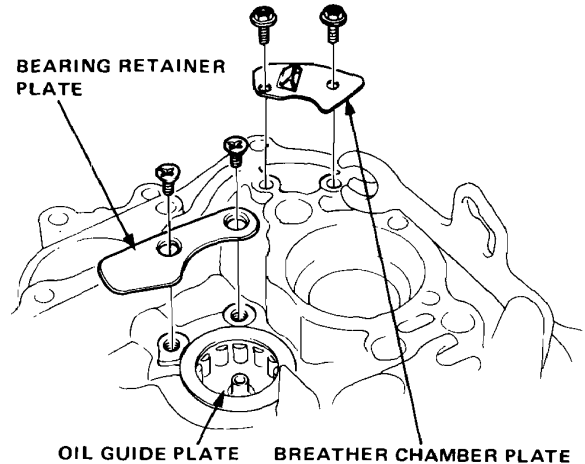
4. Drive the differential oil seal out of the transmission housing.

NOTE: Replace the differential oil seal in the transmission housing whenever disassembled.

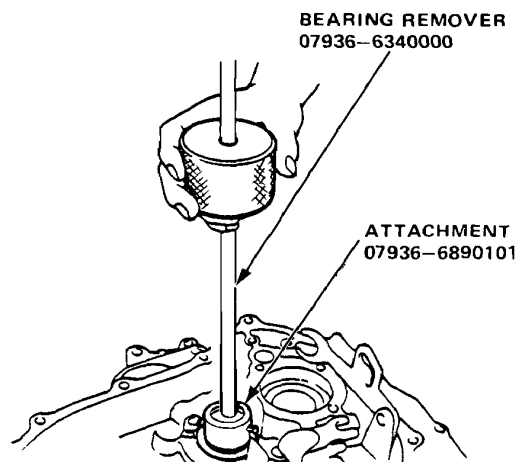
Bearings and Seals

Replacement (Clutch Housing)

1. Remove countershaft bearing retainer plate.
2. Remove the breather chamber plate.



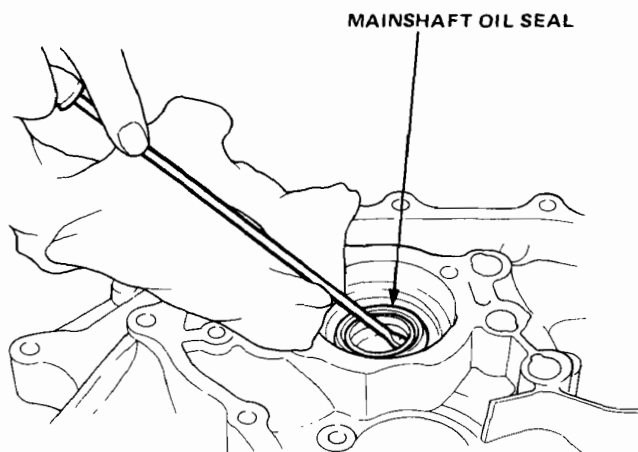
3. Insert Bearing Remover with attachment into countershaft bearing.
4. Raise slide hammer rapidly and strike against handle. Repeat several times to remove bearing.





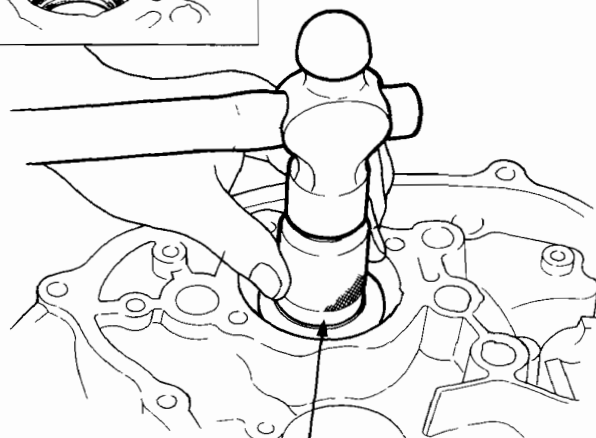
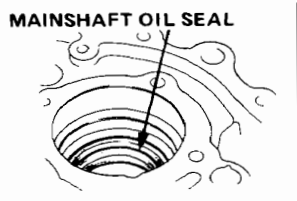
5. Remove mainshaft bearing and oil seal from clutch housing by prying out with a screwdriver.

NOTE: Always install new oil seal. Do not reinstall old one.



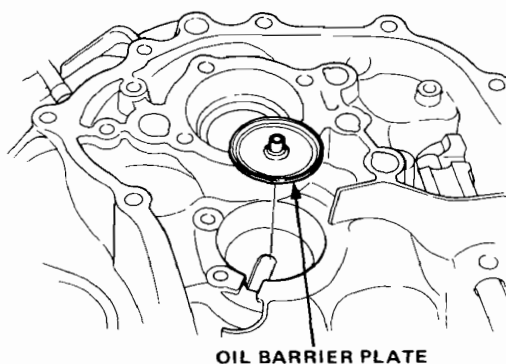
6. Install the mainshaft oil seal.

NOTE: Install the oil seal with the sealing lips facing the mainshaft bearing.

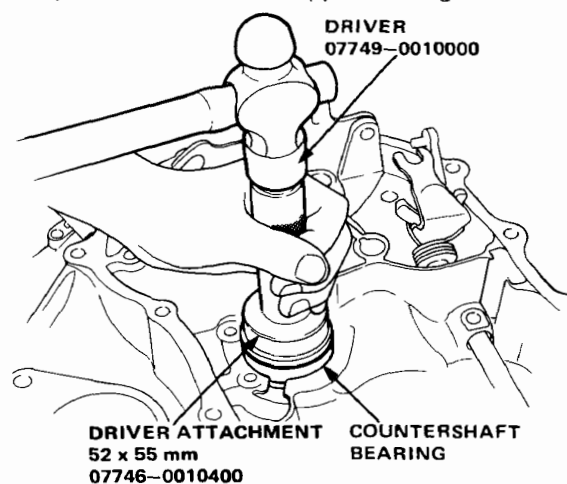


07947-6340000

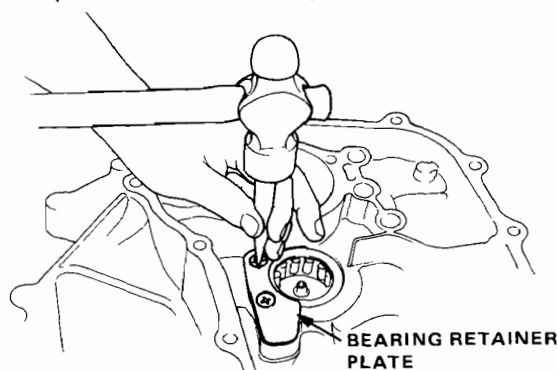
7. Install the countershaft oil barrier plate.



8. Drive in countershaft bearing with support block placed under case to support bearing boss.



9. Reinstall bearing retainer plate. Install screws using impact driver. Stake the screws.



10. Reinstall the breather chamber plate.

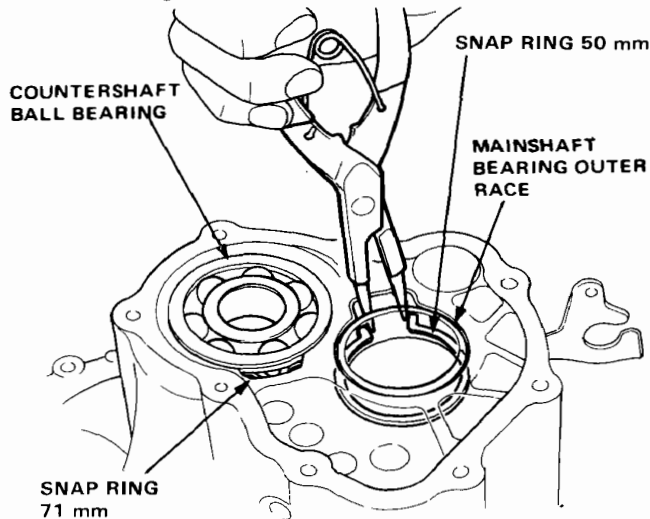
Bearings

Replacement (Transmission Housing)

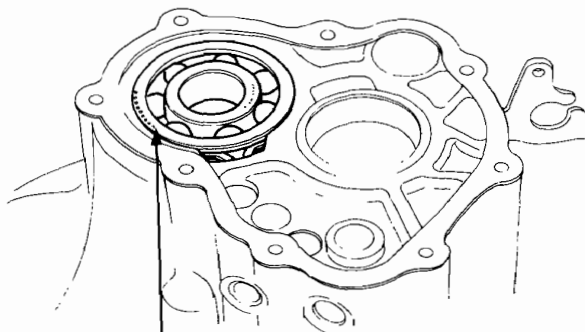
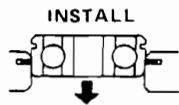
1. Using snap ring pliers, carefully expand the snap ring and press the bearing out into the case.

CAUTION: Do not expand the ring any wider than to clear the groove in the bearing. Over-expansion or off-angle use of the pliers can damage the snap ring and/or the groove in the trans housing.

NOTE: Inspect the snap rings for wear. Replace any snap rings that are worn excessively or damaged.

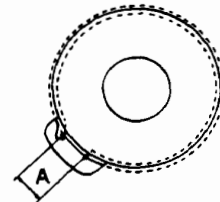


2. Install the new bearing with the part number facing out. Using snap ring pliers, carefully expand the snap ring, press the bearing into the case, and then seat the snap ring in the bearing groove.
3. After the bearing has entered the snap ring, remove the pliers, and press the bearing into place by hand.



INSTALL BEARING WITH THE PART NUMBER SIDE FACING OUT.

4. Check that the snap ring is securely seated in both the grooves of the bearing and the case.



NOTE: To confirm proper snap ring seating and condition, measure snap ring gap A as installed:

Bearing	Dimension A as installed
Mainshaft	3.0–8.0 mm (0.118–0.314 in)
Countershaft	7.0–7.1 mm (0.276–0.279 in)

Reseat or carefully replace the snap ring if the gap is outside the specification.

Mainshaft

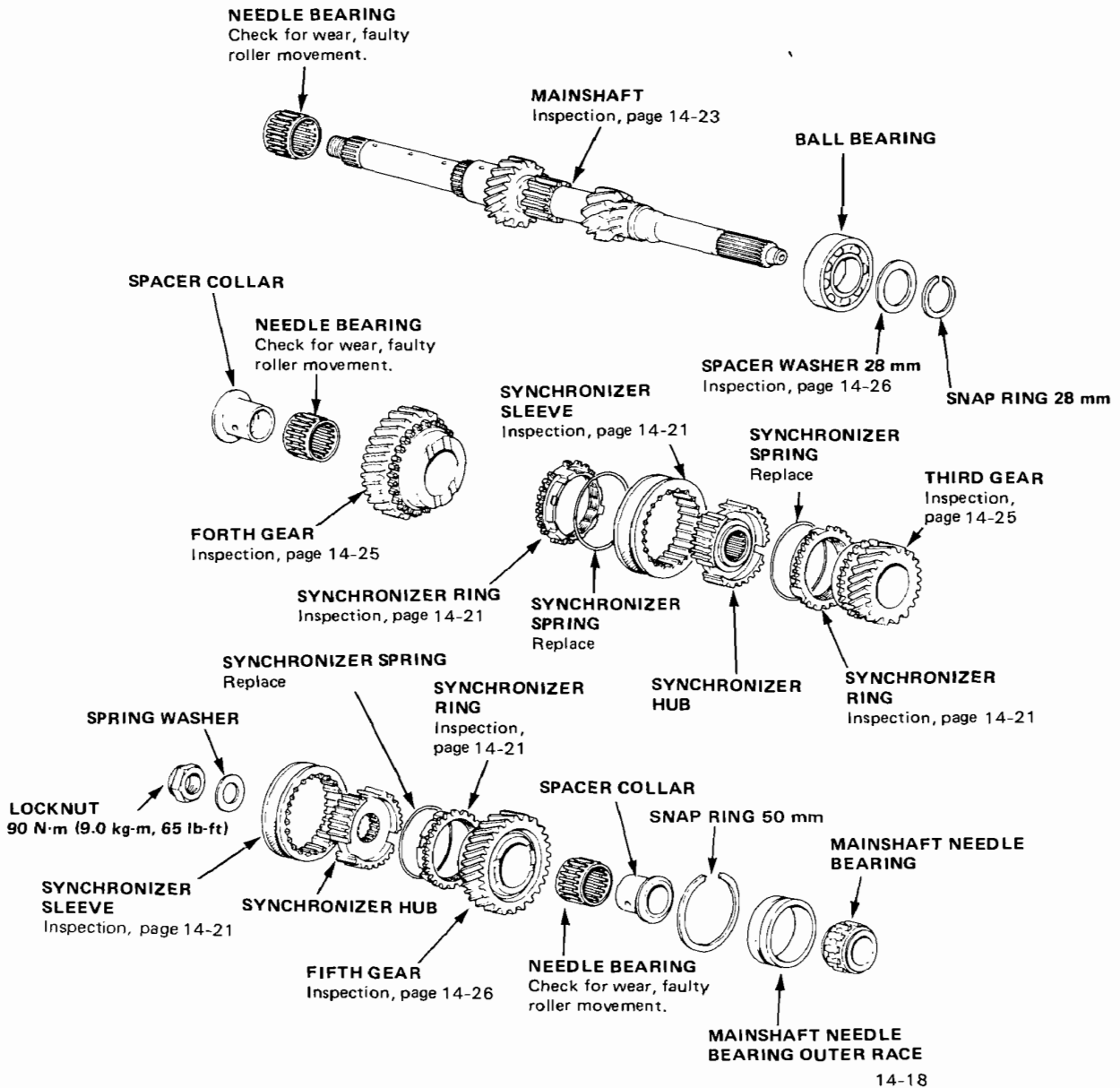


Index

NOTE:

- Clean all parts thoroughly in solvent and dry with compressed air.
- Third, fourth and fifth gear needle bearings are identical.

Lubricate all parts with oil before reassembly.



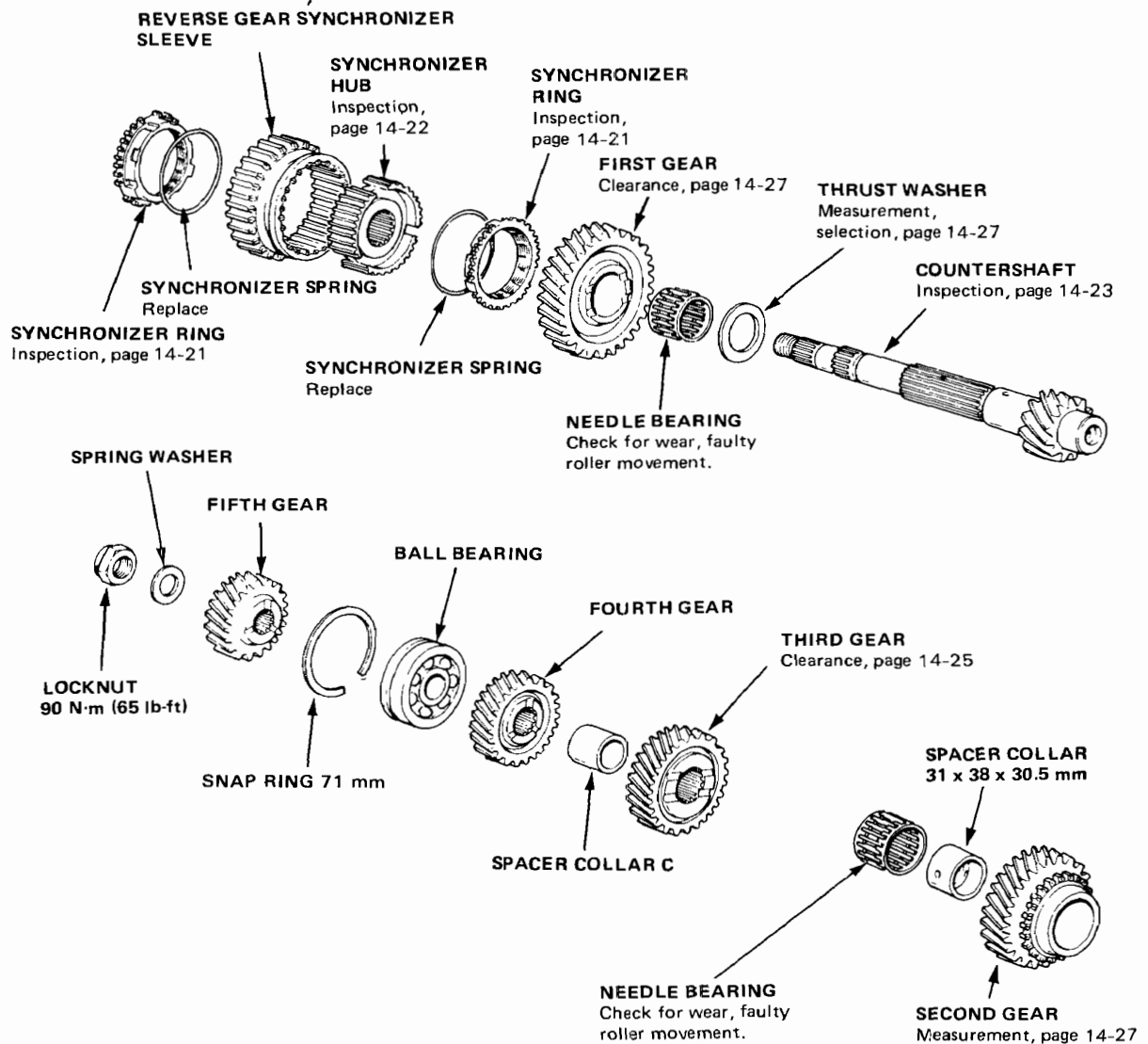
Countershaft

Index

NOTE:

- Clean all parts thoroughly in solvent and dry with compressed air.
- First and second gear needle bearings are not identical.

Lubricate all parts with oil before reassembly.



Gear and Synchronizer Ring



Inspections

1. Inspect the inside of synchronizer ring for wear.
2. Inspect the synchronizer ring teeth and matching teeth on gear for wear (rounded off).
3. Inspect the gear hub thrust surface for wear.
4. Inspect the cone surface for wear on 1st, and 2nd, countershaft gears; 3rd, 4th and 5th mainshaft gears.
5. Inspect the teeth on all gears for uneven wear, scoring, galling, cracks.
6. Place the synchronizer ring on matching gear cone and rotate until it stops (approx. 10 to 20 degrees), then measure the clearance between ring and gear.
- Ring-to-Gear Clearance:**
Standard (New): 0.73—1.18 mm
(0.029—0.047 in.)
Service Limit: 0.4 mm (0.016 in.)
7. Separate the synchronizer ring and gear, and coat them with oil.
8. Install the synchronizer spring on synchronizer ring.
9. Put the synchro ring on gear cone again, rotate until it stops, then set it aside for later reassembly.
- Diagram Labels:**
SYNCHRONIZER SPRING
SYNCHRONIZER RING
Wear
GEAR
SYNCHRONIZER RING
-

Synchronizer Sleeve, Shift Shaft

Shift Fork to Synchronizer Sleeve Clearance

1. Check clearance between each shift fork and its matching synchronizer sleeve.

FORK-TO-SLEEVE CLEARANCE (ALL THREE FORKS & SLEEVES)

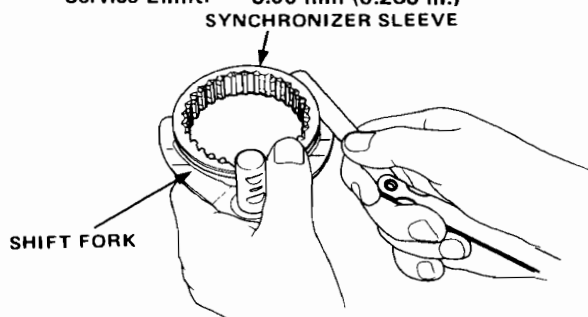
Standard (New): 0.35–0.65 mm
(0.014–0.026 in.)

Service Limit: 1.0 mm (0.039 in.)

2. If fork-to-sleeve clearance is too great, measure width of groove in synchronizer sleeve.

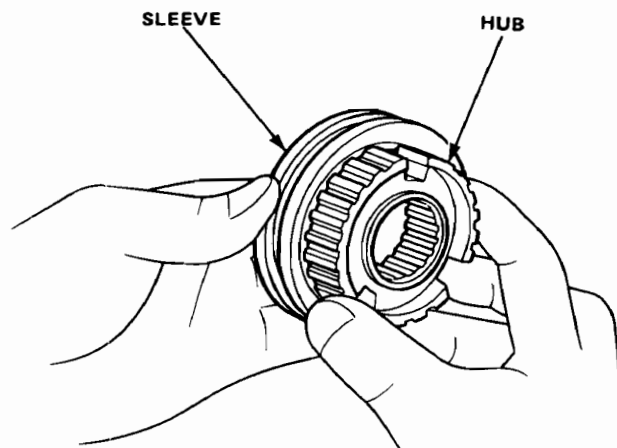
Standard (New): 6.75–6.85 mm
(0.266–0.270 in.)

Service Limit: 6.00 mm (0.236 in.)



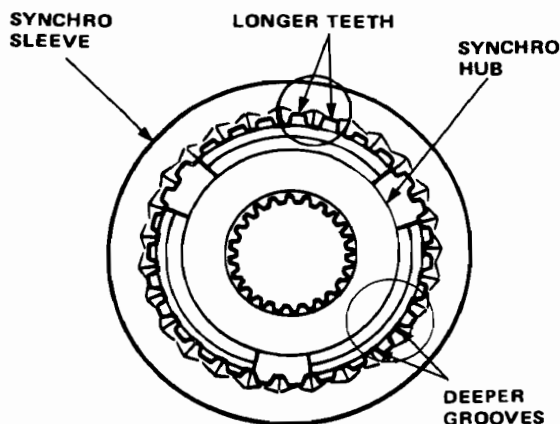
Synchronizer Sleeve and Hub Inspections

1. Inspect gear teeth on all synchro hubs and sleeves for rounded off corners, indicating wear.
2. Install each hub in its mating sleeve and check for freedom of movement.



Installing Synchronizer Hubs in Sleeves

Each synchronizer sleeve has three sets of longer teeth (120 degrees apart) that must be matched with the three sets of deeper grooves in the hub when assembled.



Third/Fourth Shift Shaft to Shift Guide Clearance

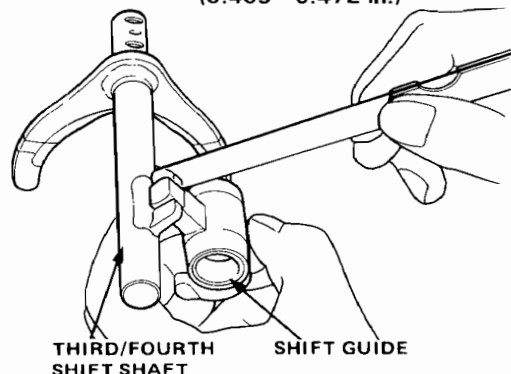
1. Check third/fourth shift shaft-to-shift guide clearance as shown.

SHAFT-TO-GUIDE CLEARANCE

Standard (New): 0.2–0.5 mm (0.008–0.02 in.)
Service Limit: 0.8 mm (0.03 in.)

2. If clearance is too great, measure width of shift guide tab.

Standard (New): 11.9–12.0 mm
(0.469–0.472 in.)



Mainshaft

Inspection

Wear

Outside Diameter:

Standard (New): A: 27.920–27.980 mm
(1.0992–1.1016 in.)

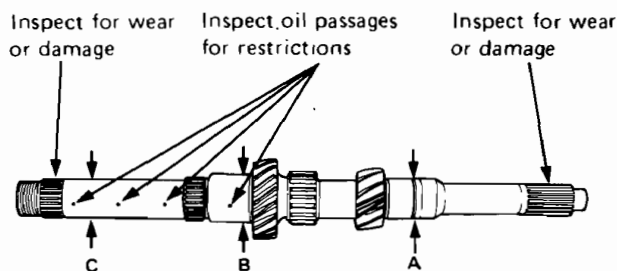
B: 31.984–32.000 mm
(1.2592–1.2598 in.)

C: 24.980–24.993 mm
(0.9835–0.9840 in.)

Service Limit: A: 27.87 mm (1.097 in.)

B: 31.93 mm (1.257 in.)

C: 24.93 mm (0.98 in.)



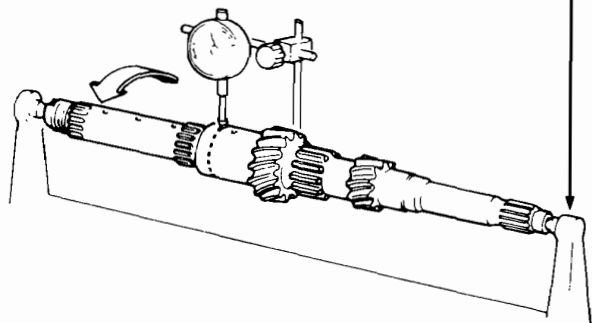
Runout

Standard (New): 0.04 mm (0.0016 in.)

Service Limit: 0.10 mm (0.004 in.)

Rotate two complete revolutions.

Support with lathe type tool or V-blocks



Countershaft

Inspection

Wear

Outside Diameter:

Standard (New): A: 33.000–33.015 mm
(1.2992–1.2998 in.)

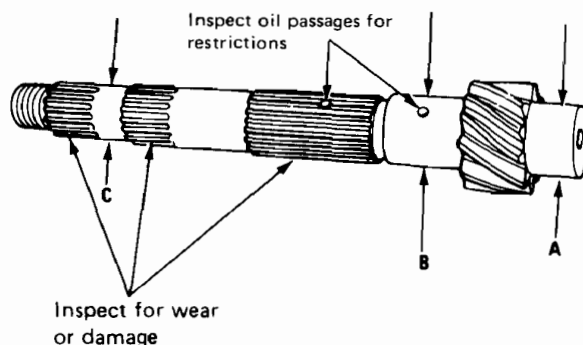
B: 33.984–34.000 mm
(1.3380–1.3386 in.)

C: 24.980–24.993 mm
(0.9835–0.9840 in.)

Service Limit: A: 32.95 mm (1.297 in.)

B: 33.93 mm (1.336 in.)

C: 24.93 mm (0.981 in.)



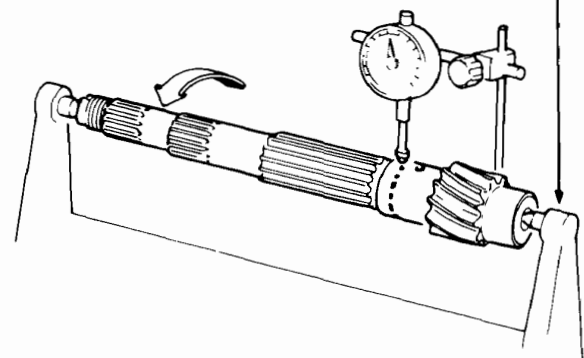
Runout

Standard (New): 0.04 mm (0.0016 in.)

Service Limit: 0.10 mm (0.004 in.)

Rotate two complete revolutions.

Support with lathe type tool or V-blocks



Mainshaft/Countershaft

Reassembly and Measurement

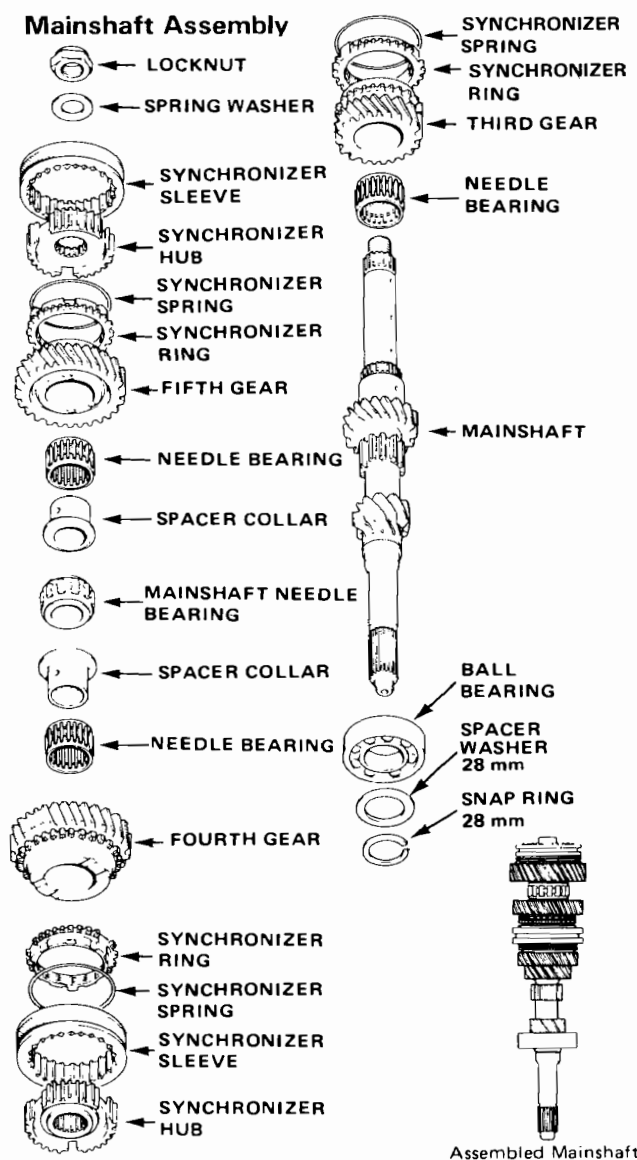
1. Remove both mainshaft and countershaft bearings from transmission housing.
2. Assemble mainshaft and countershaft including bearings and fifth gear components, as shown below. Lubricate all parts with oil before final re-assembly.
3. Install mainshaft/countershaft assembly into clutch housing.
4. Install the mainshaft holder to prevent shafts from turning, and shift transmission into gear.

5. Torque the countershaft and mainshaft locknuts to 90 N·m (9.0 kg·m, 65 lb·ft) before checking clearances.

CAUTION: Incorrect gear clearances can be caused by overtightening the countershaft or mainshaft locknuts. Whenever locknuts are installed, use an accurately calibrated torque wrench.

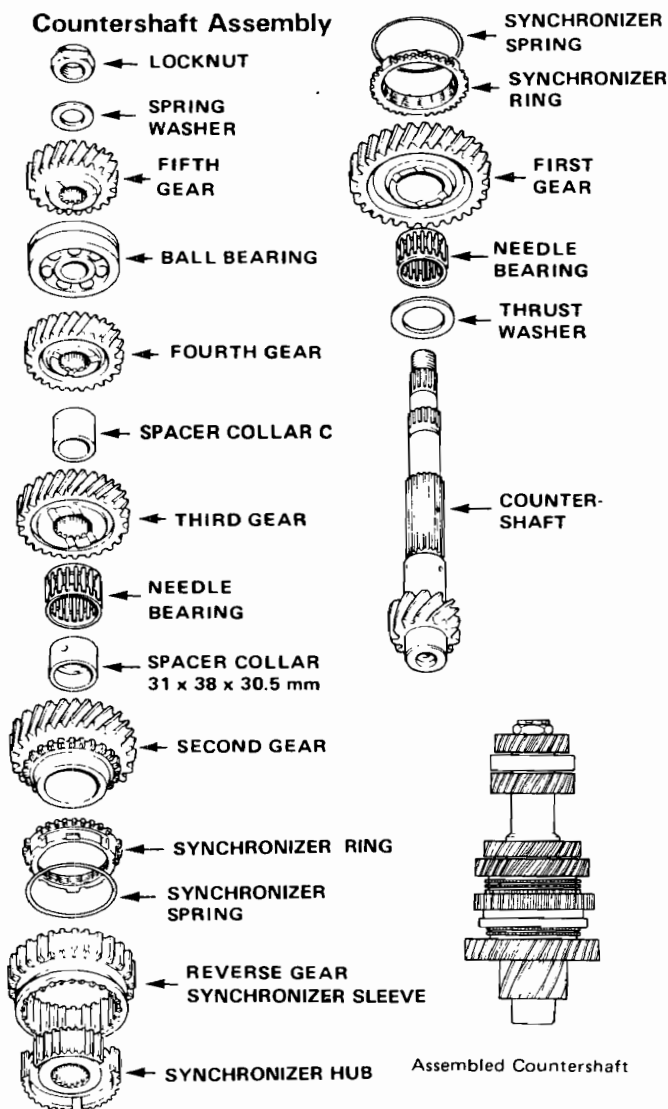
6. Remove transmission shafts from clutch housing and measure clearances as described on next two pages.

Mainshaft Assembly



Assembled Mainshaft

Countershaft Assembly



Assembled Countershaft



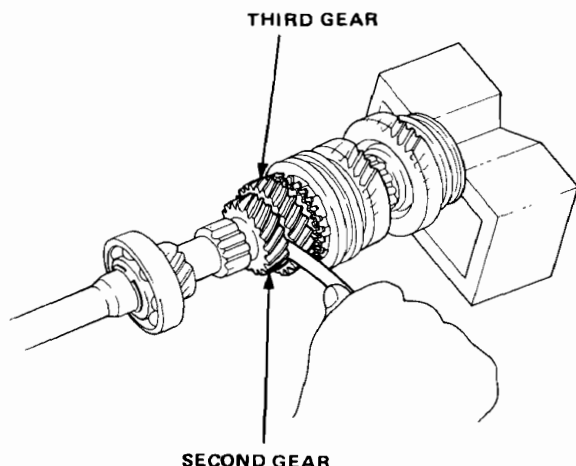
Mainshaft Measurements

7. Measure clearance between shoulder on third gear and shoulder on second gear.

THIRD GEAR CLEARANCE

Standard (New): 0.03–0.18 mm
(0.0012–0.0071 in.)

Service Limit: 0.3 mm (0.012 in.)

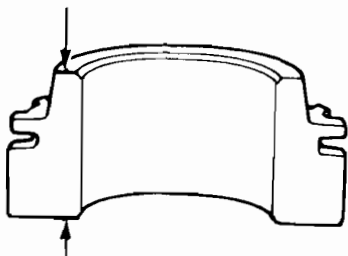


8. If out of tolerance, measure thickness of third gear.

THIRD GEAR THICKNESS

Standard (New): 31.42–31.47 mm
(1.237–1.239 in.)

Service Limit: 31.30 mm (1.232 in.)



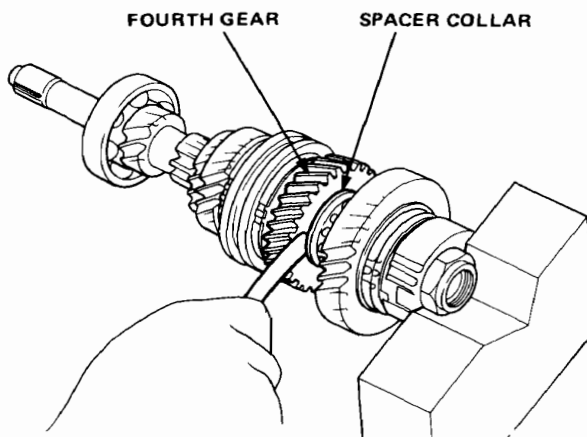
If third gear is OK, replace synchronizer hub if necessary after all other measurements are complete.

9. Measure clearance between spacer collar and shoulder on fourth gear.

FOURTH GEAR CLEARANCE

Standard (New): 0.03–0.18 mm
(0.0012–0.0071 in.)

Service Limit: 0.3 mm (0.012 in.)

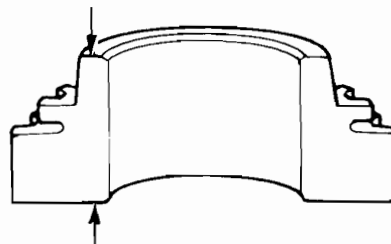


10. If out of tolerance, measure thickness of fourth gear.

FOURTH GEAR THICKNESS

Standard (New): 31.42–31.47 mm
(1.237–1.239 in.)

Service Limit: 31.30 mm (1.232 in.)



If fourth gear is OK, replace synchronizer hub if necessary after all other measurements are complete.

(cont'd)

Mainshaft/Countershaft

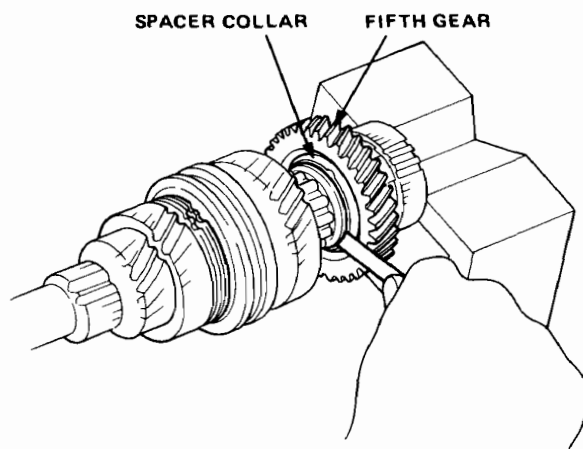
Reassembly and Measurement (cont'd)

Mainshaft Measurements

11. Measure clearance between spacer collar and shoulder on fifth gear.

FIFTH GEAR CLEARANCE

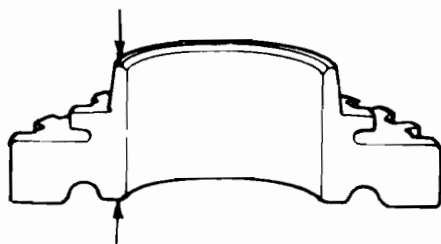
Standard (New): 0.03–0.13 mm
(0.001–0.005 in.)
Service Limit: 0.25 mm (0.01 in.)



12. If out of tolerance, measure thickness of fifth gear.

FIFTH GEAR THICKNESS

Standard (New): 32.42–32.47 mm
(1.276–1.278 in.)
Service Limit: 32.30 mm (1.272 in.)

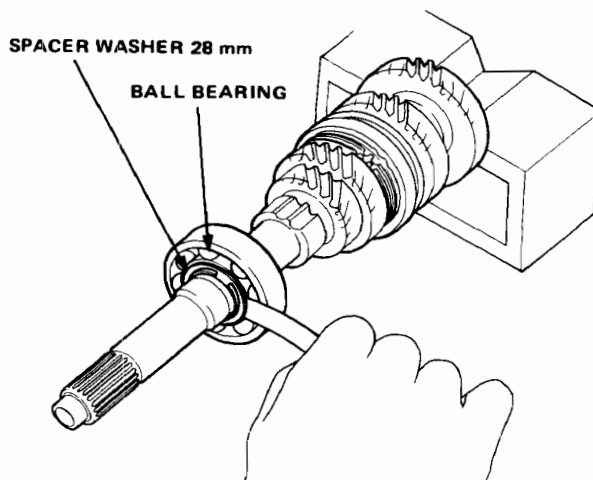


If out of limit, replace fifth gear.

13. Measure clearance between 28 mm spacer washer and ball bearing.

BALL BEARING CLEARANCE

Standard (New): 0–0.1 mm (0–0.004 in.)



If out of tolerance, change thickness of 28 mm spacer washer after measuring all other clearances.

Replacement Spacer Washers

IDENTIFI- CATION	THICKNESS
A	1.88–1.92 mm (0.074–0.075 in.)
B	1.94–1.98 mm (0.076–0.078 in.)
C	2.00–2.04 mm (0.079–0.080 in.)
D	2.06–2.10 mm (0.081–0.082 in.)
E	2.12–2.16 mm (0.083–0.085 in.)

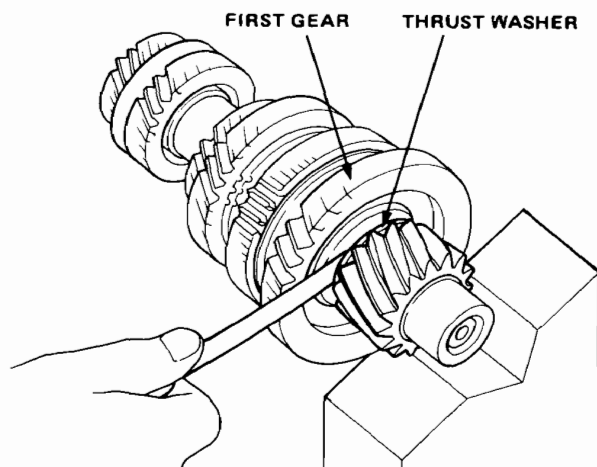


Countershaft Measurements

14. Measure clearance between first gear thrust washer and shoulder on first gear.

FIRST GEAR CLEARANCE

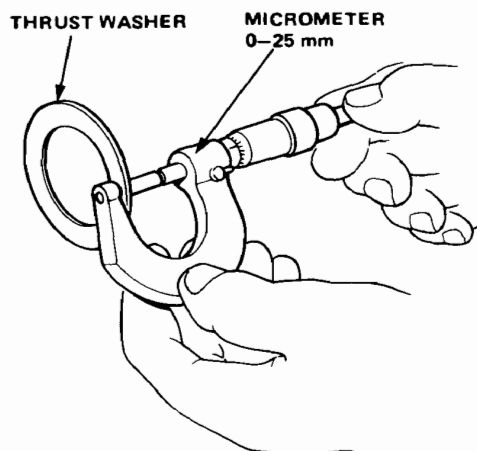
Standard (New): 0.03–0.08 mm
(0.001–0.003 in.)



If out of tolerance, change thickness of first gear thrust washer after measuring all other clearances.

Replacement Thrust Washers

IDENTIFICATION	THICKNESS
A	2.02–2.04 mm (0.080–0.081 in.)
B	2.00–2.02 mm (0.079–0.080 in.)
C	1.98–2.00 mm (0.078–0.079 in.)
D	1.96–1.98 mm (0.077–0.078 in.)

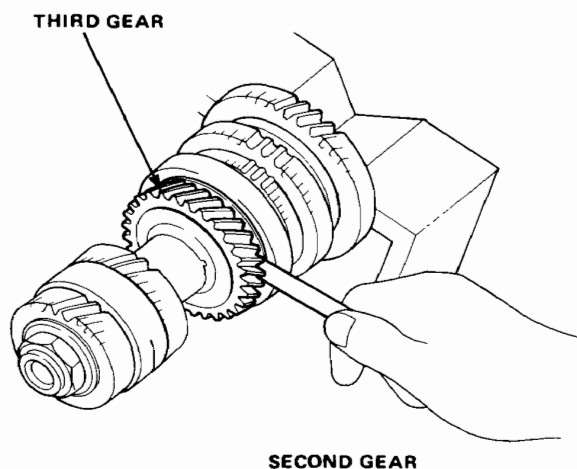


15. Measure clearance between shoulder on third gear and shoulder on second gear.

SECOND GEAR CLEARANCE

Standard (New): 0.03–0.1 mm
(0.0012–0.004 in.)

Service Limit: 0.18 mm (0.007 in.)

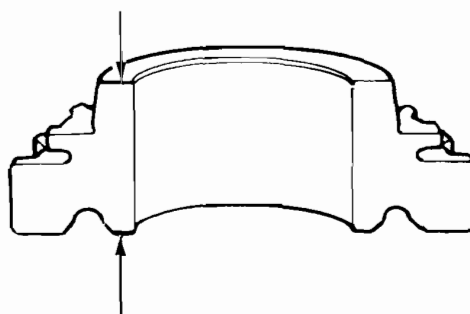


16. If out of tolerance, measure thickness of second gear.

SECOND GEAR THICKNESS

Standard (New): 30.42–30.47 mm
(1.198–1.200 in.)

Service Limit: 30.3 mm (1.192 in.)



If out of limit, replace second gear.

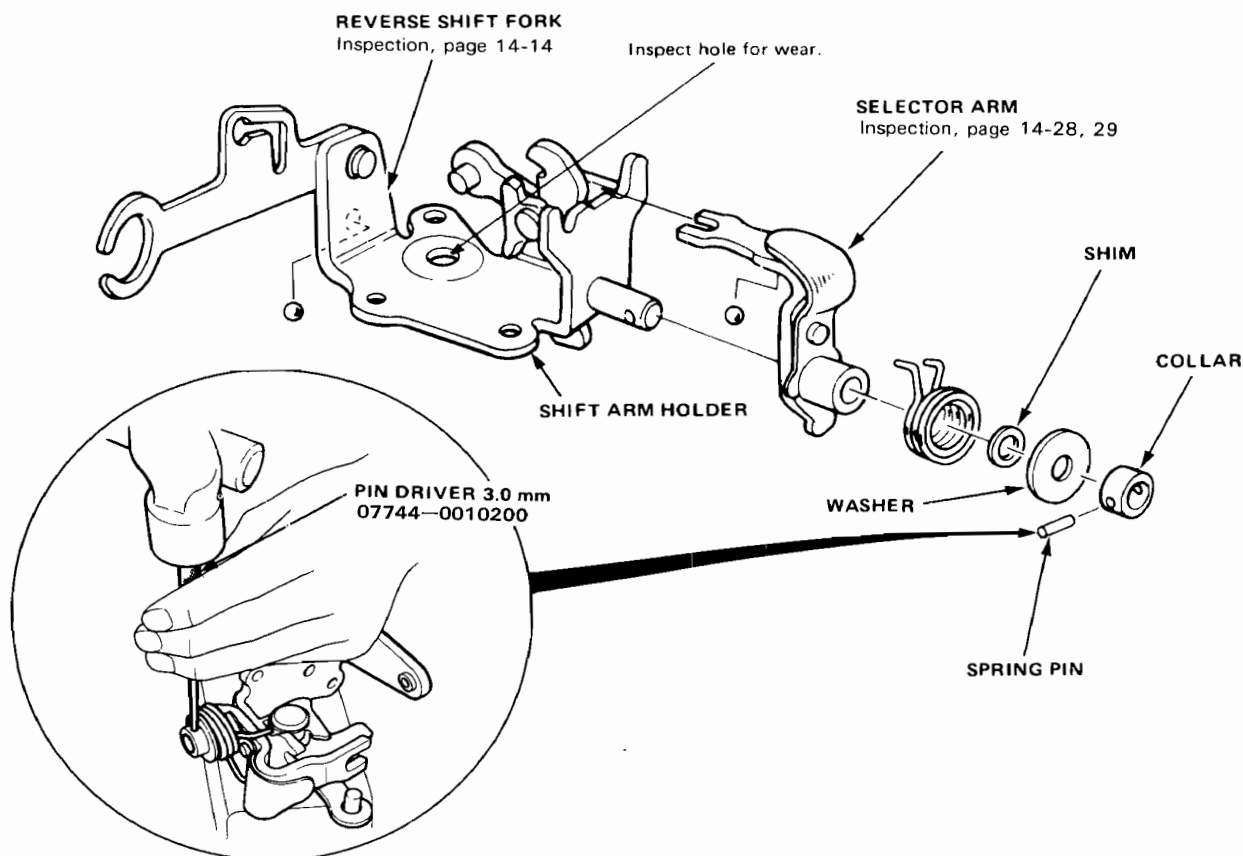
17. After all clearances have all been checked, and those out of limits corrected, reassemble transmission mainshaft and countershaft and recheck all clearances.

If they are correct, disassemble fifth gear components and reinstall bearings in transmission housing.

Shift Arm Holder

Index

To remove selector arm from holder for shimming or replacement, drive out spring pin with driver.



Clearances

1. Measure clearance between collar and shim on shaft of selector arm as shown.

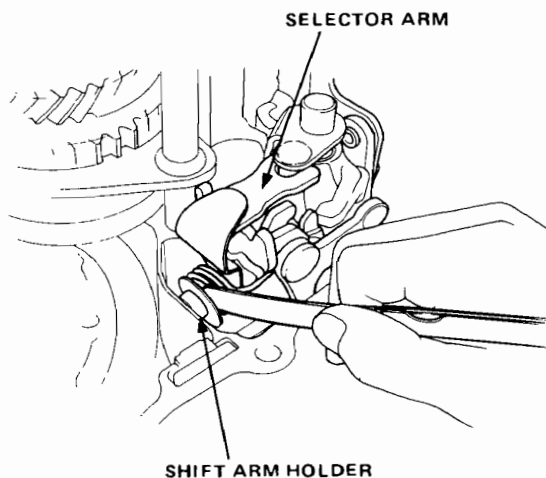
CLEARANCE

Standard (New): 0.01–0.2 mm
(0.0004–0.008 in.)

2. If out of tolerance, select a new shim from following table:

Collar-to-Selector Arm Shim Clearance:

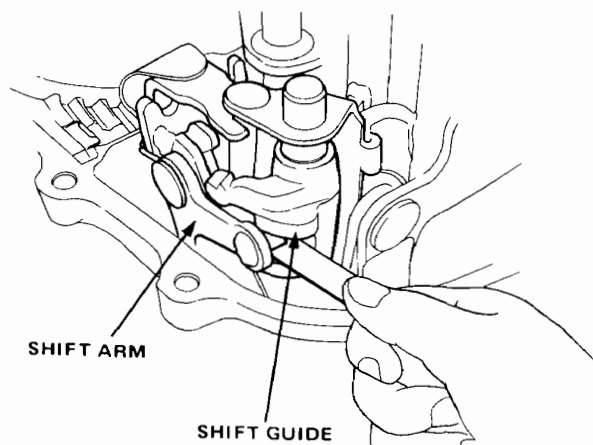
IDENTIFICATION	THICKNESS
A	0.8 mm (0.031 in.)
B	1.0 mm (0.039 in.)
C	1.2 mm (0.047 in.)
D	1.4 mm (0.055 in.)
E	1.6 mm (0.063 in.)



Shift Arm/Selector Arm

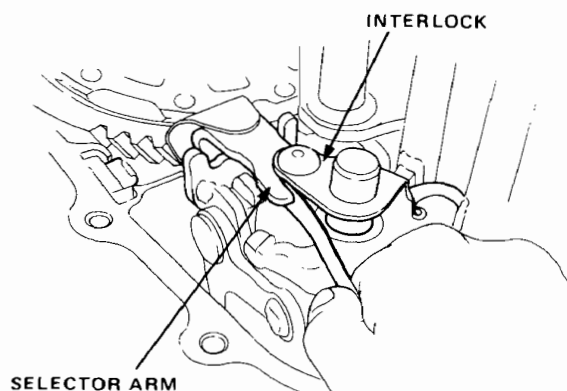
Shift Guide Clearance

1. Check shift arm-to-shift guide clearance.
Standard (New): 0.1–0.3 mm (0.004–0.012 in.)
Service Limit: 0.6 mm (0.024 in.)
2. If not within service limit, measure width of slot in shift guide.
Standard (New): 7.9–8.0 mm (0.311–0.315 in.)
3. If slot is wider than standard, replace shift guide.



Interlock Clearance

1. Check selector arm-to-interlock clearance.
Standard (New): 0.05–0.25 mm
(0.002–0.01 in.)
Service Limit: 0.7 mm (0.03 in.)
2. If not within service limit, measure gap between selector arm fingers.
Standard (New): 10.05–10.15 mm
(0.396–0.4 in.)
3. If gap is wider than standard, replace arm.

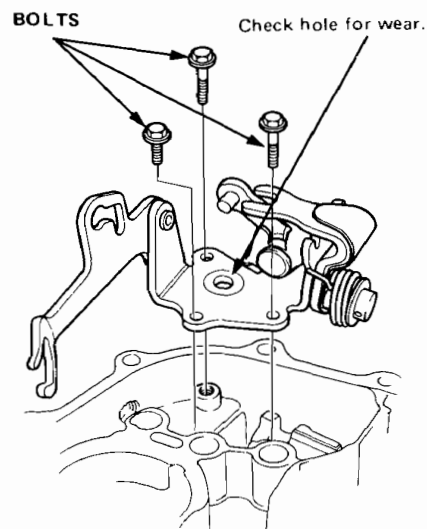


Shift Rod and Shift Arm Holder

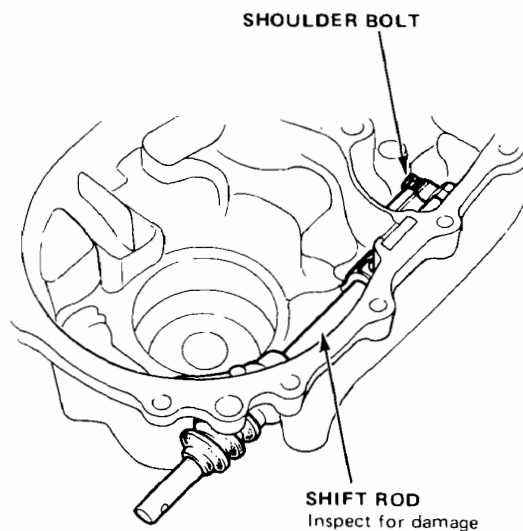


Removal

1. Remove shift arm holder (3 bolts).



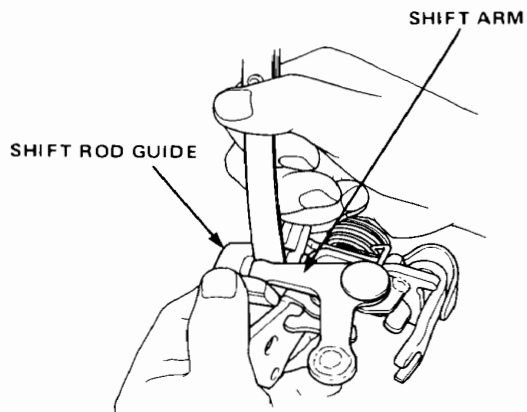
2. Remove shift rod by removing shoulder bolt.



Shift Arm/ Gear Selector Arm

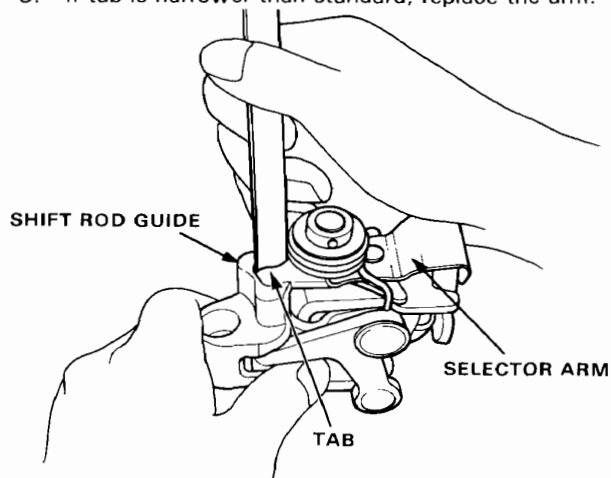
Shift Rod Guide Clearance

1. Check shift arm-to-shift rod guide clearance.
Standard (New): 0.05–0.35 mm
(0.002–0.01 in.)
Service Limit: 0.8 mm (0.03 in.)
2. If not within service limit, measure width of slot in shift rod guide.
Standard (New): 11.8–12.0 mm
(0.46–0.47 in.)
3. If slot is wider than standard, replace shift rod guide.



Shift Rod Guide Clearance

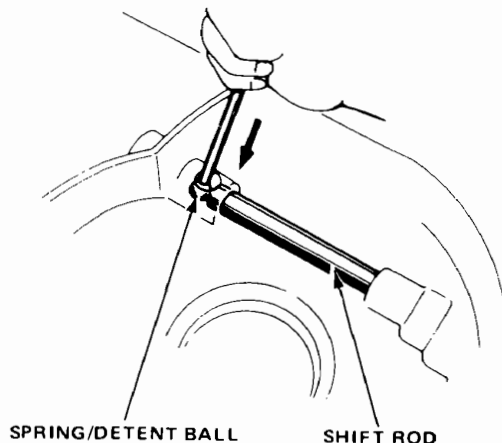
1. Check selector arm-to-shift rod guide clearance.
Standard (New): 0.05–0.25 mm
(0.002–0.01 in.)
Service Limit: 0.5 mm (0.02 in.)
2. If not within service limit, measure width of tab on selector arm.
Standard (New): 11.9–12.0 mm
(0.469–0.472 in.)
3. If tab is narrower than standard, replace the arm.



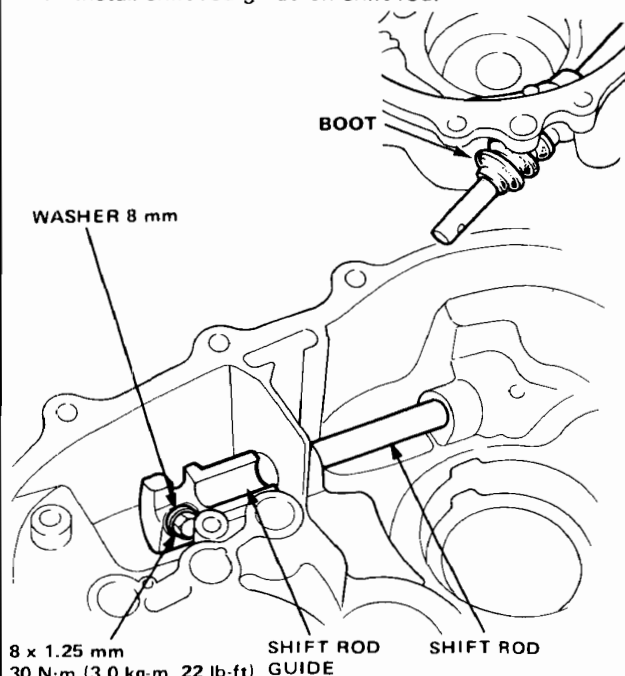
Shift Rod

Installation

1. Install shift rod with detent notches facing downward.
2. Install spring and detent ball. Lubricate spring with molybde.
3. Install shift rod while pushing detent ball in.



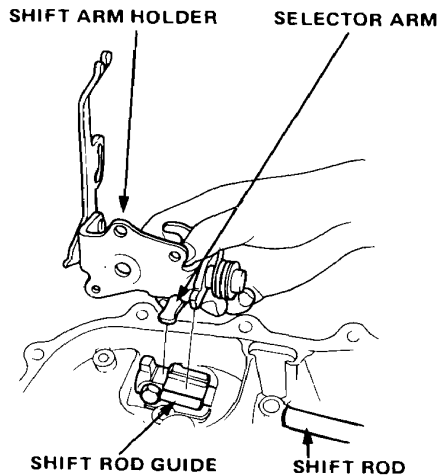
4. Install shift rod guide on shift rod.



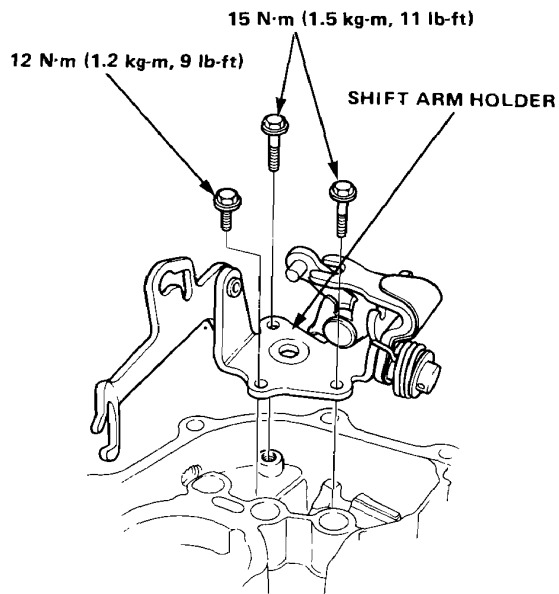
Shift Arm Holder Assy

Installation

1. Hook selector arm and shift arm into shift rod guide.



2. Install bolts in shift arm holder.

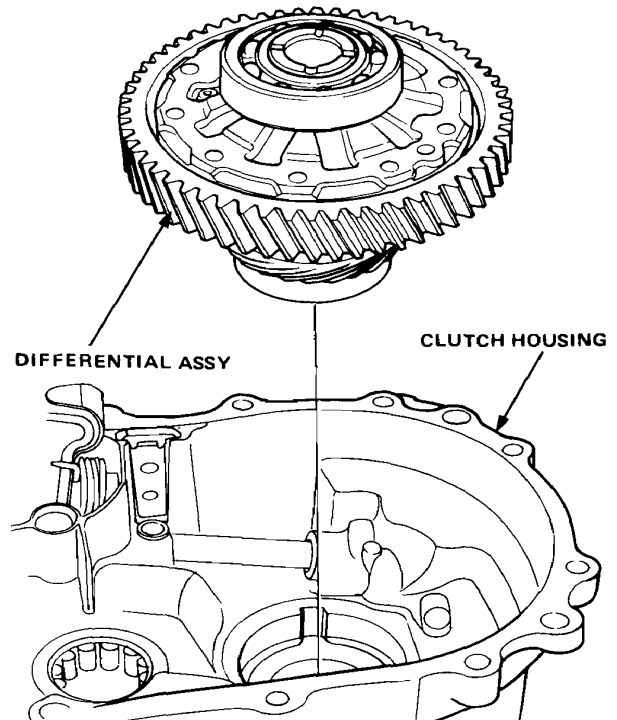


Transmission Assy

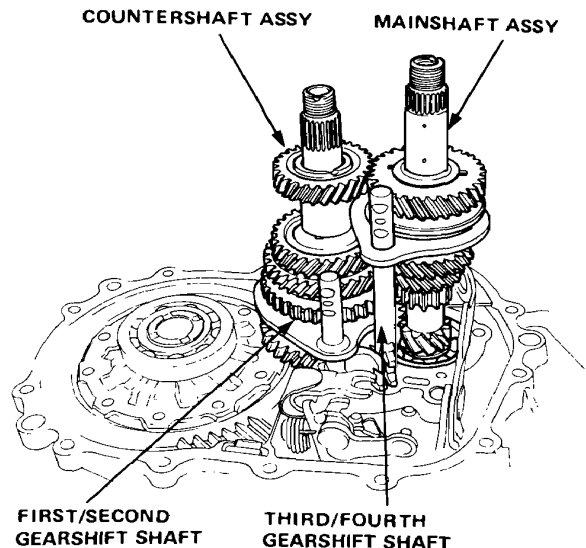


Reassembly

1. Install differential assembly in clutch housing.



2. Install mainshaft, countershaft, first/second gear shift shaft and third/fourth gear shift shaft together as an assembly. Make sure forks are in fourth and second gear positions to make installation easier.

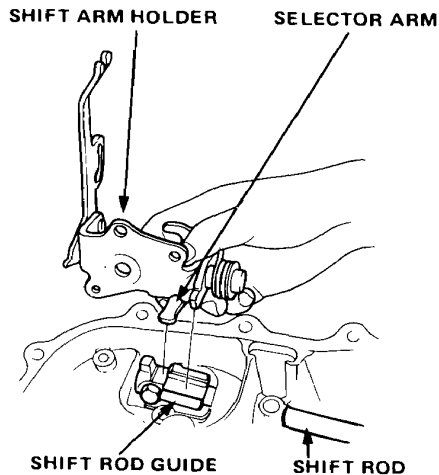


(cont'd)

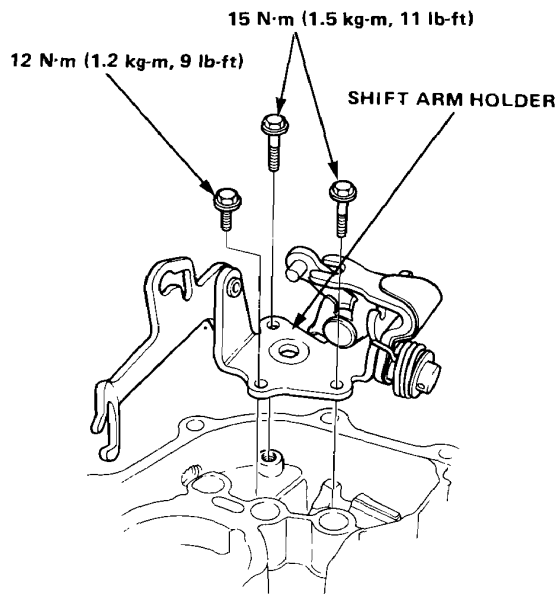
Shift Arm Holder Assy

Installation

1. Hook selector arm and shift arm into shift rod guide.



2. Install bolts in shift arm holder.

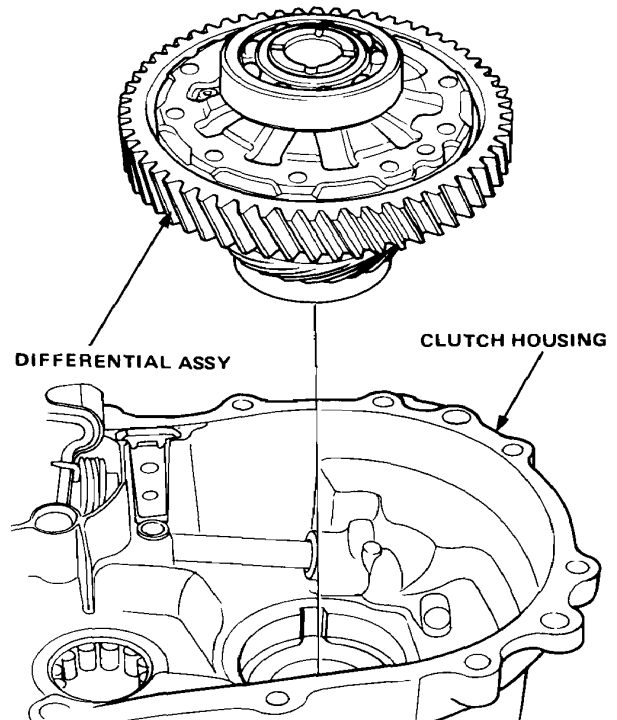


Transmission Assy

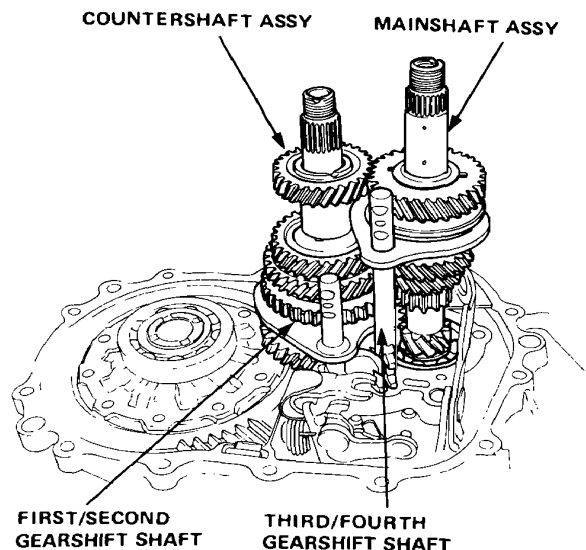


Reassembly

1. Install differential assembly in clutch housing.



2. Install mainshaft, countershaft, first/second gear shift shaft and third/fourth gear shift shaft together as an assembly. Make sure forks are in fourth and second gear positions to make installation easier.

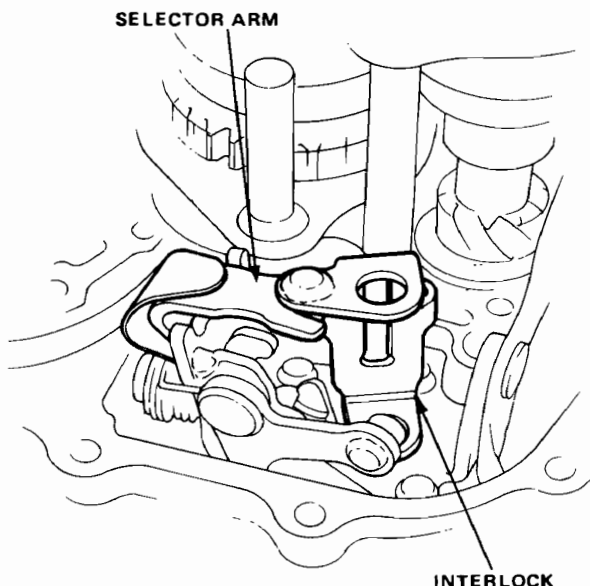


(cont'd)

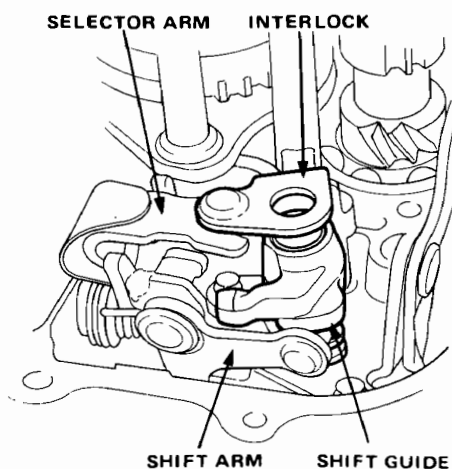
Transmission Assy

Reassembly (cont'd)

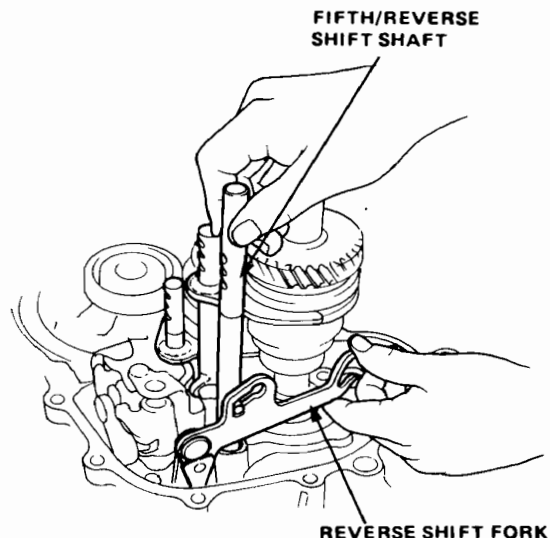
3. Lift mainshaft as shown and install interlock into the selector arm.



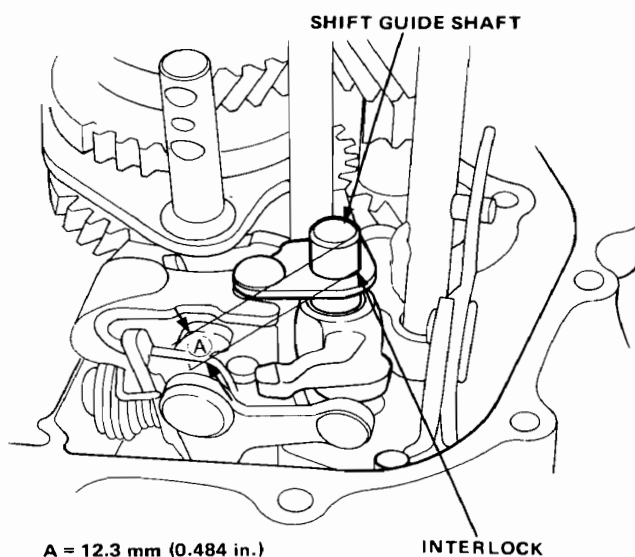
4. Place shift rod in neutral.
5. Hook interlock into selector arm, first/second gearshift shaft and third/fourth gearshift shaft. Hook shift guide into shift arm.



6. Install fifth/reverse shift shaft and hook its pin into reverse shift fork slot.

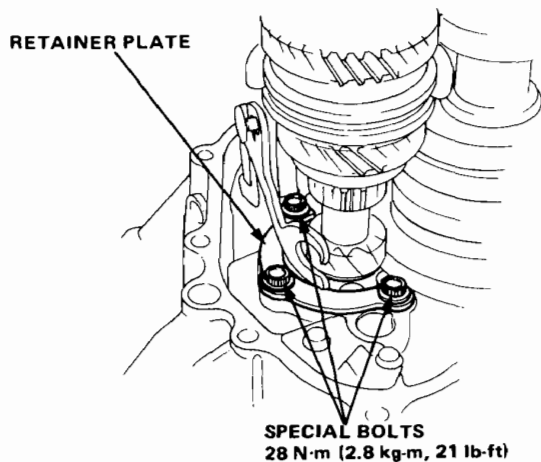


7. Install shift guide shaft so it bottoms securely in clutch housing hole. End of shaft should extend no more than 12.3 mm (0.484 in.) above interlock as shown. If not, check installation.

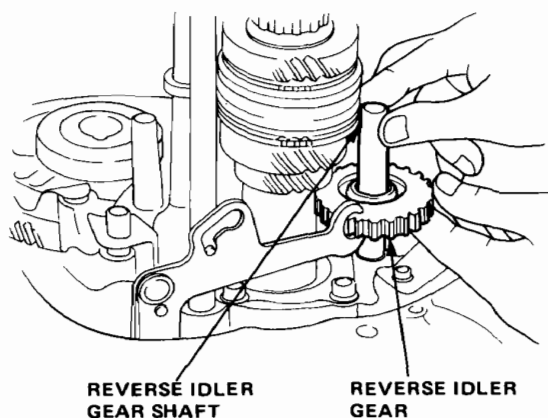




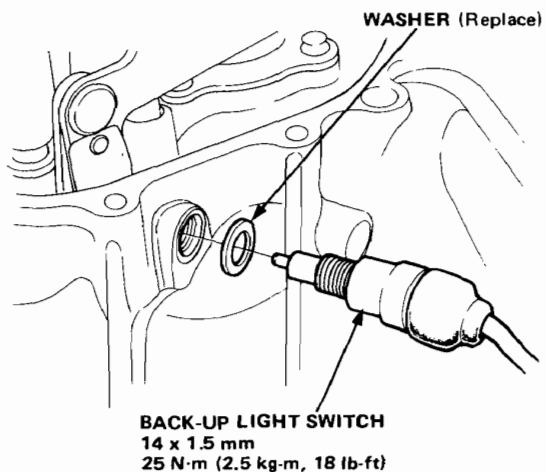
8. Install mainshaft bearing retainer plate.



9. Install reverse idler gear and shaft.



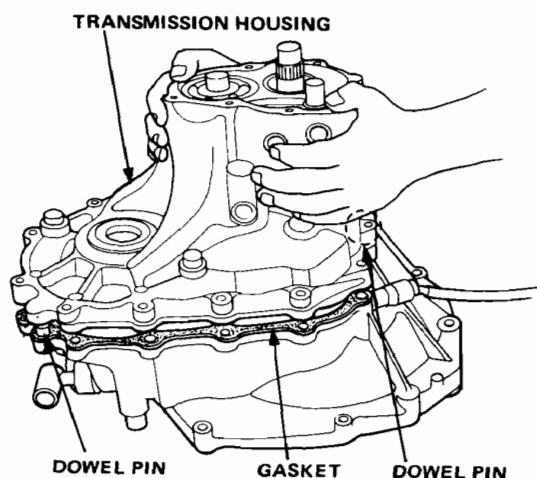
10. Install back-up light switch with new washer.



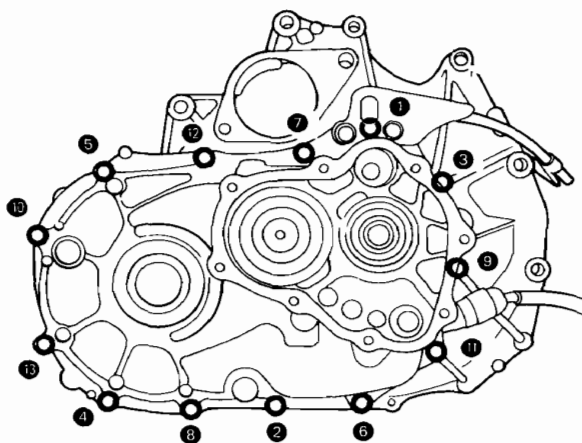
11. Place new gasket on clutch housing.

12. Install dowel pins.

13. Shift transmission into third gear to position shift guide shaft for reassembly. Install transmission housing being careful to line up shafts. Shift guide shaft must seat in blind hole in transmission housing. Do not force installation of housing.



14. Torque bolts (8 x 1.25 mm) in sequence shown, to 28 N·m (2.8 kg-m, 21 lb-ft).

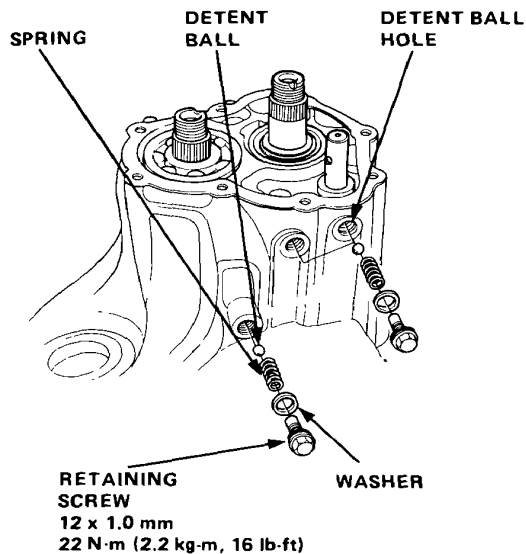


(cont'd)

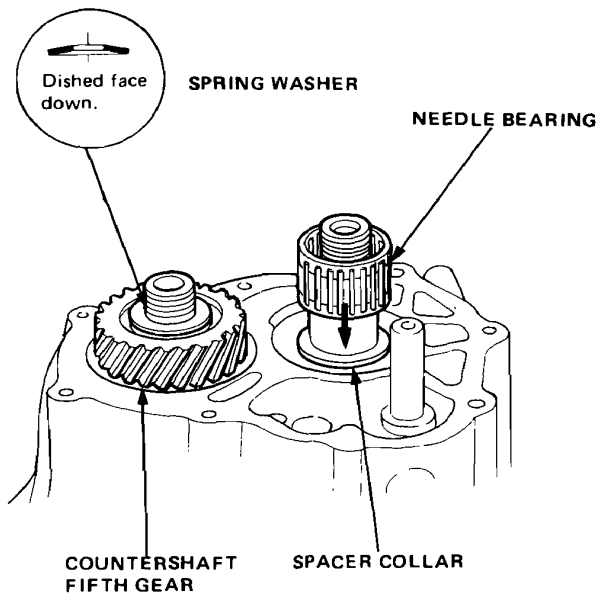
Transmission Assy

Reassembly (cont'd)

15. Install three detent balls, washers, and retaining screws.

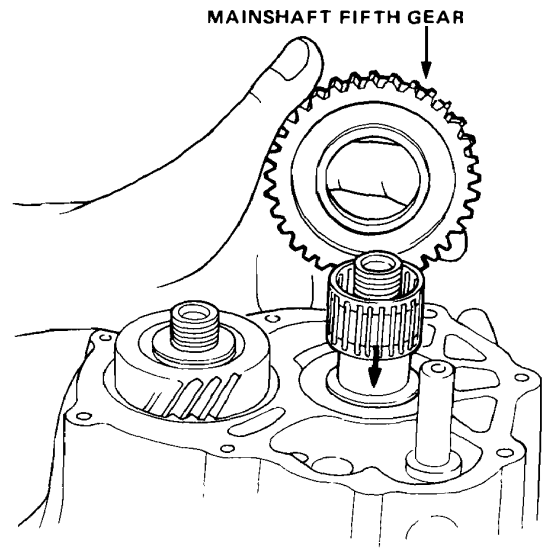


16. Install countershaft fifth gear with high side facing down. Then install spring washer with dished surface facing fifth gear.

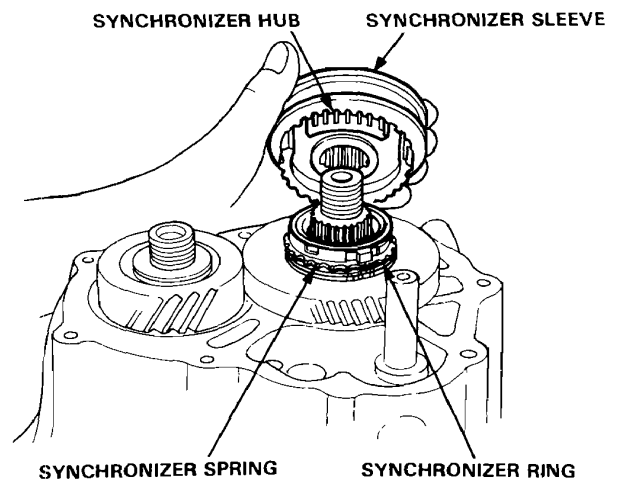


17. Install spacer collar and needle bearing on the mainshaft.

18. Install mainshaft fifth gear.

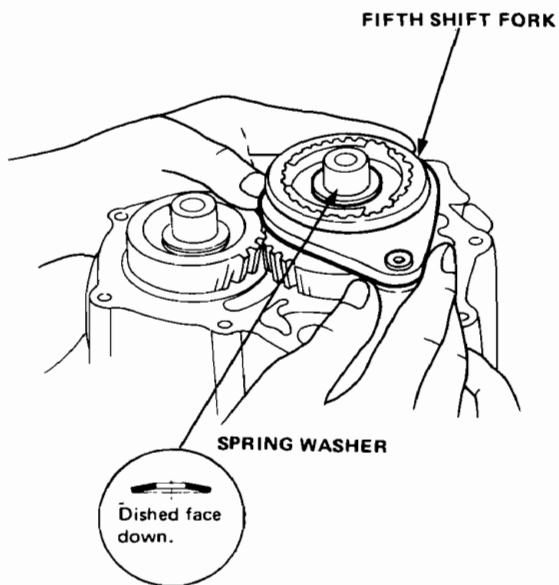


19. Install synchronizer ring, synchronizer spring, synchronizer hub and synchronizer sleeve on the mainshaft.



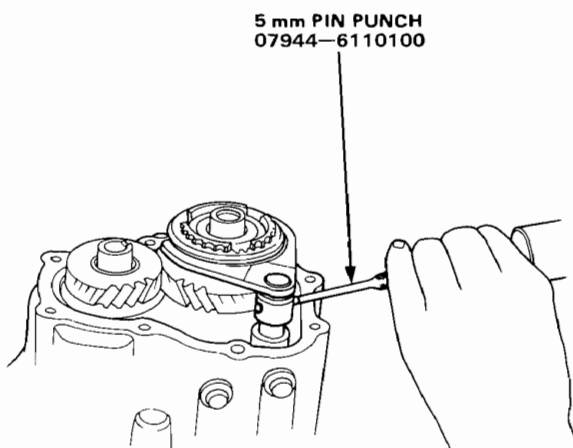


20. Install fifth shift fork into synchronizer sleeve.



21. Install spring washer with dished (concave) surface facing synchronizer hub.

22. Drive spring pin into fifth gear shift fork.

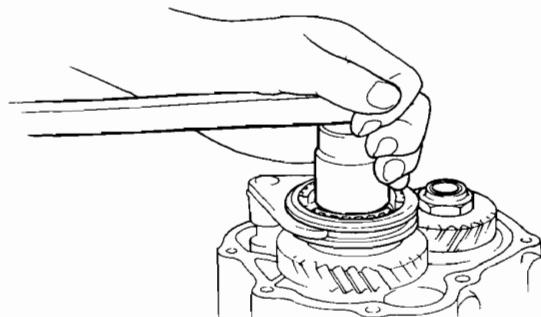


23. Install mainshaft holder 07923-6890101 to prevent shaft from rotating, then shift transmission into reverse gear.

24. Torque mainshaft and countershaft locknuts. Tighten to specified torque, then loosen and re-tighten to same torque.

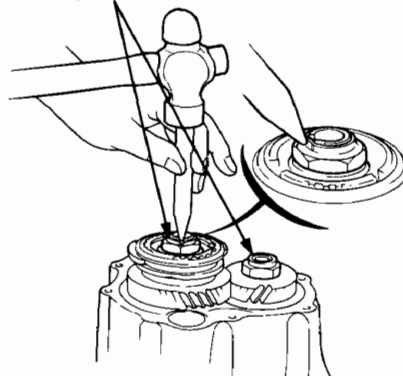
90 N·m (9.0 kg-m, 65 lb-ft) → 0 → 90 N·m (9.0 kg-m, 65 lb-ft)

CAUTION: The mainshaft locknut has left-hand threads.



25. Stake shoulders on locknuts into slots in mainshaft and countershaft.

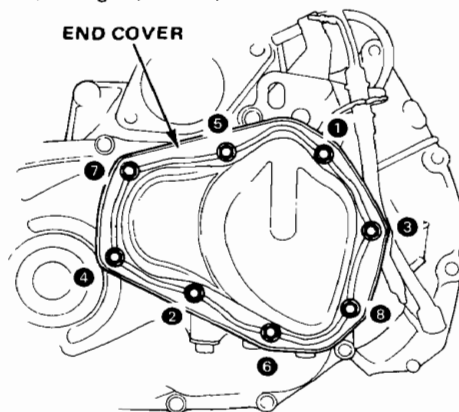
LOCKNUTS



26. Install end cover on transmission housing with new gasket.

27. Torque bolts (6 × 1.0 mm) in sequence shown to 12 N·m (1.2 kg-m, 9 lb-ft).

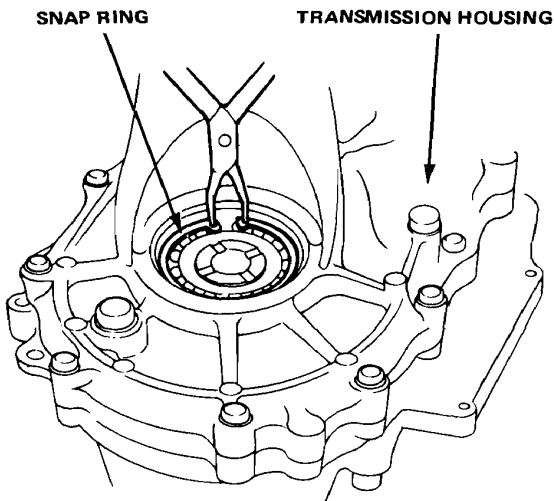
END COVER



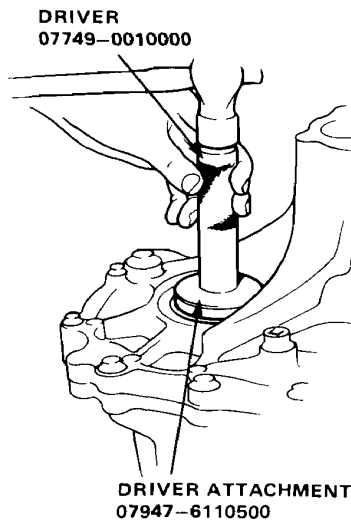
Differential Oil Seal

Installation

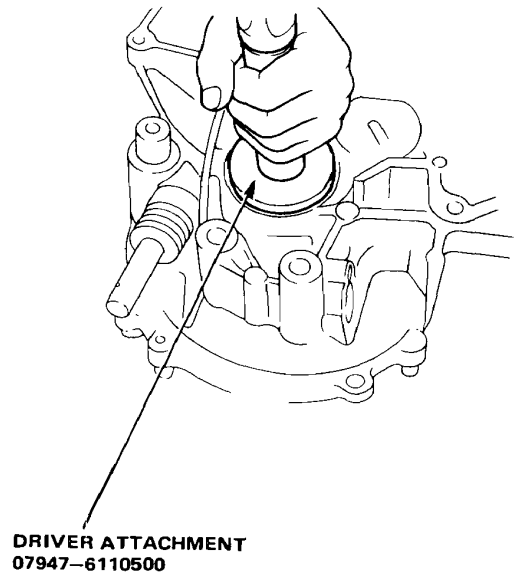
1. Install 80 mm snap ring in transmission housing. If differential bearings or carrier were replaced, select snap ring of correct thickness as shown on page 17-6.



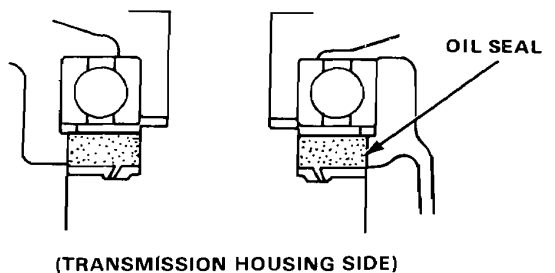
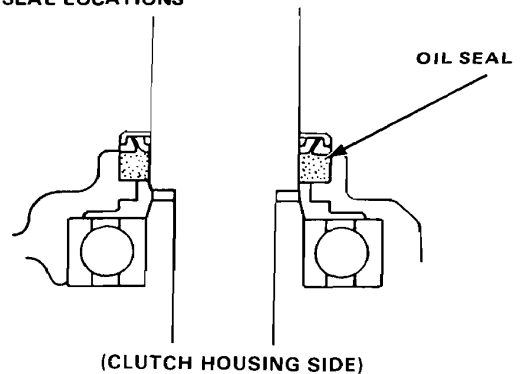
2. Drive oil seal into transmission housing with part number side facing away from snap ring.



3. Drive differential oil seal into clutch housing with part number side facing away from bearing.



OIL SEAL LOCATIONS



Transmission Assy



Installation

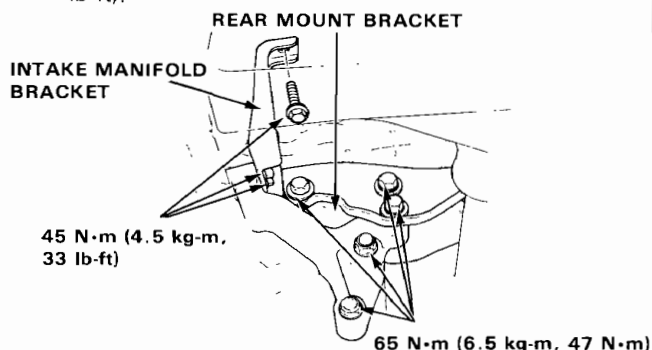
1. Place the transmission on transmission jack.
NOTE: Clean and grease release bearing sliding surfaces.
2. Check that two 14 mm dowel pins are installed in the clutch housing.
3. Raise the transmission far enough to align dowel pins with matching holes in block.

4. Roll the transmission toward engine and fit mainshaft into clutch disc splines. If driver's side suspension was left in place, install new spring clips on both axles, then carefully insert left axle into differential as you install transmission.

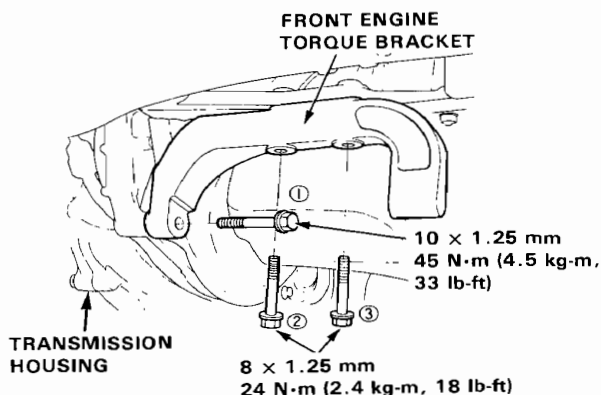
NOTE: New 26 mm spring clips must be used on both axles.

CAUTION: Make sure that axles fully bottom. Slide axle in until you feel spring clips engage differential.

5. Push and wiggle the transmission until it fits flush with engine flange.
6. Secure transmission to engine with mounting bolts from the engine side (12 x 1.25 x 70 mm). Torque to 68 N·m (6.8 kg-m, 50 lb-ft).
7. Install the rear mount bracket on the transmission housing. Torque its bolts to 65 N·m (6.5 kg-m, 47 lb-ft).



8. Install the engine torque bracket on the transmission housing. Torque its bolts to 45 N·m (4.5 kg-m, 33 lb-ft).
9. Loosely install the bolts for the front transmission mount, then torque them in the sequence shown.



10. Install the starter mounting bolts and torque to 45 N·m (4.5 kg-m, 33 lb-ft).

11. Install the intermediate shaft and, right and left drive-shafts (see section 18).

12. Turn right steering knuckle/axle assembly outward far enough to insert free end of axle into transmission. Repeat on opposite side.

CAUTION: Make sure that axles fully bottom. Slide axle in until you feel spring clips engage differential.

13. Reconnect the shift rod and shift lever torque rod.

14. Reconnect the lower arm ball joints and torque to 45 N·m (4.5 kg-m, 33 lb-ft).

15. Reconnect the tie-rod end ball joints and torque to 45 N·m (4.5 kg-m, 33 lb-ft).

16. Install the engine and wheelwell splash shields.

17. Reconnect the exhaust header pipe.

18. Install the front wheels, lower car to ground, and torque lug nuts to 110 N·m (11 kg-m, 80 lb-ft).

19. Remove the hoist chain from the 10 mm bolt on the cylinder head and engine hanger plate.

20. Install the speedometer cable.

21. Install the transmission housing bolts and torque to 45 N·m (4.5 kg-m, 33 lb-ft).

22. Connect the clutch cable to release arm, then attach cable housing end to transmission bracket.

23. Connect the engine compartment wiring:

- Battery positive cable to starter.
- Black/white wire to starter solenoid.
- Green/black and yellow wires to back-up light switch.
- Transmission ground cable.

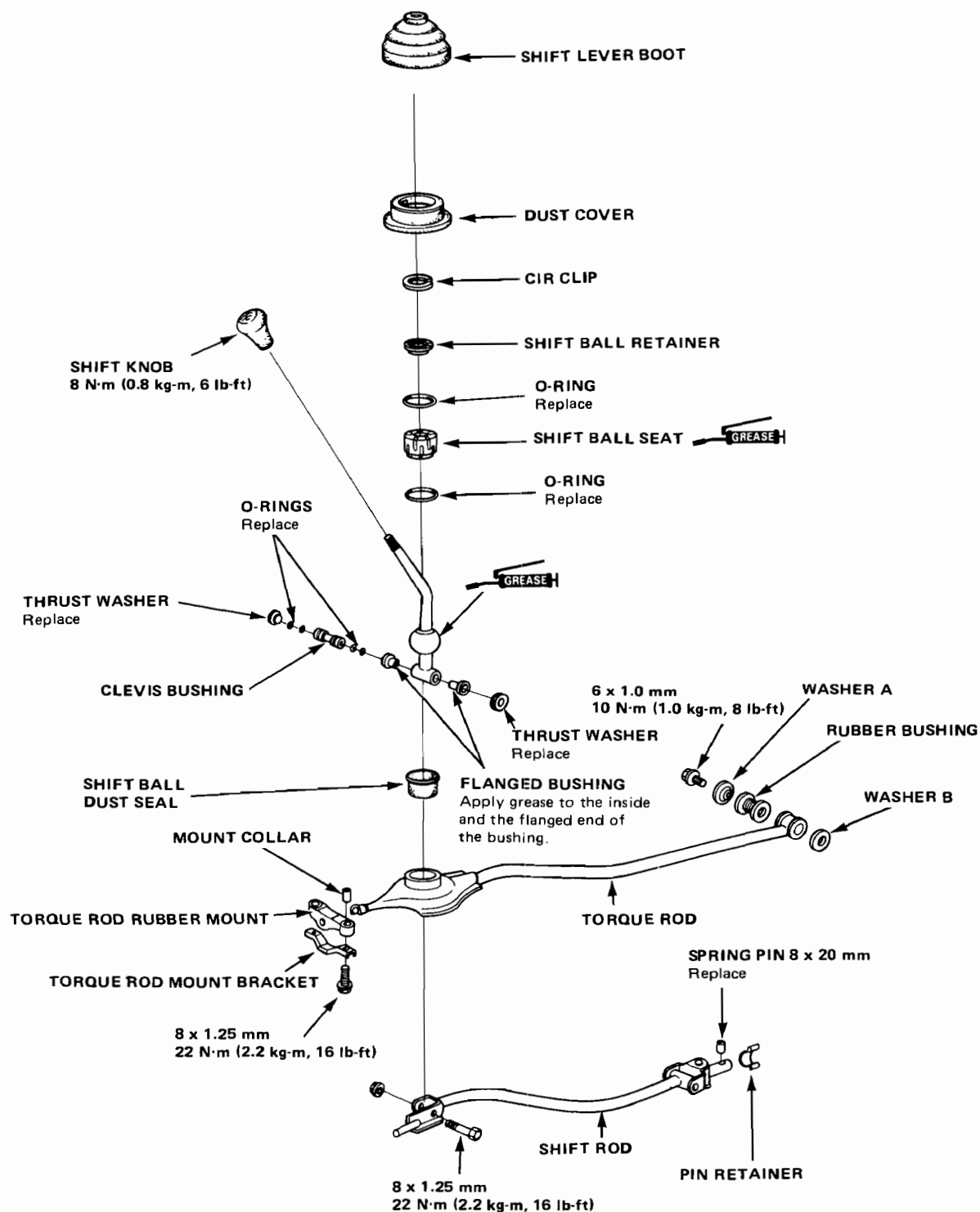
24. With ignition key OFF, connect ground cable to battery and transmission.

25. Refill the transmission and adjust clutch free play. (see section 13)

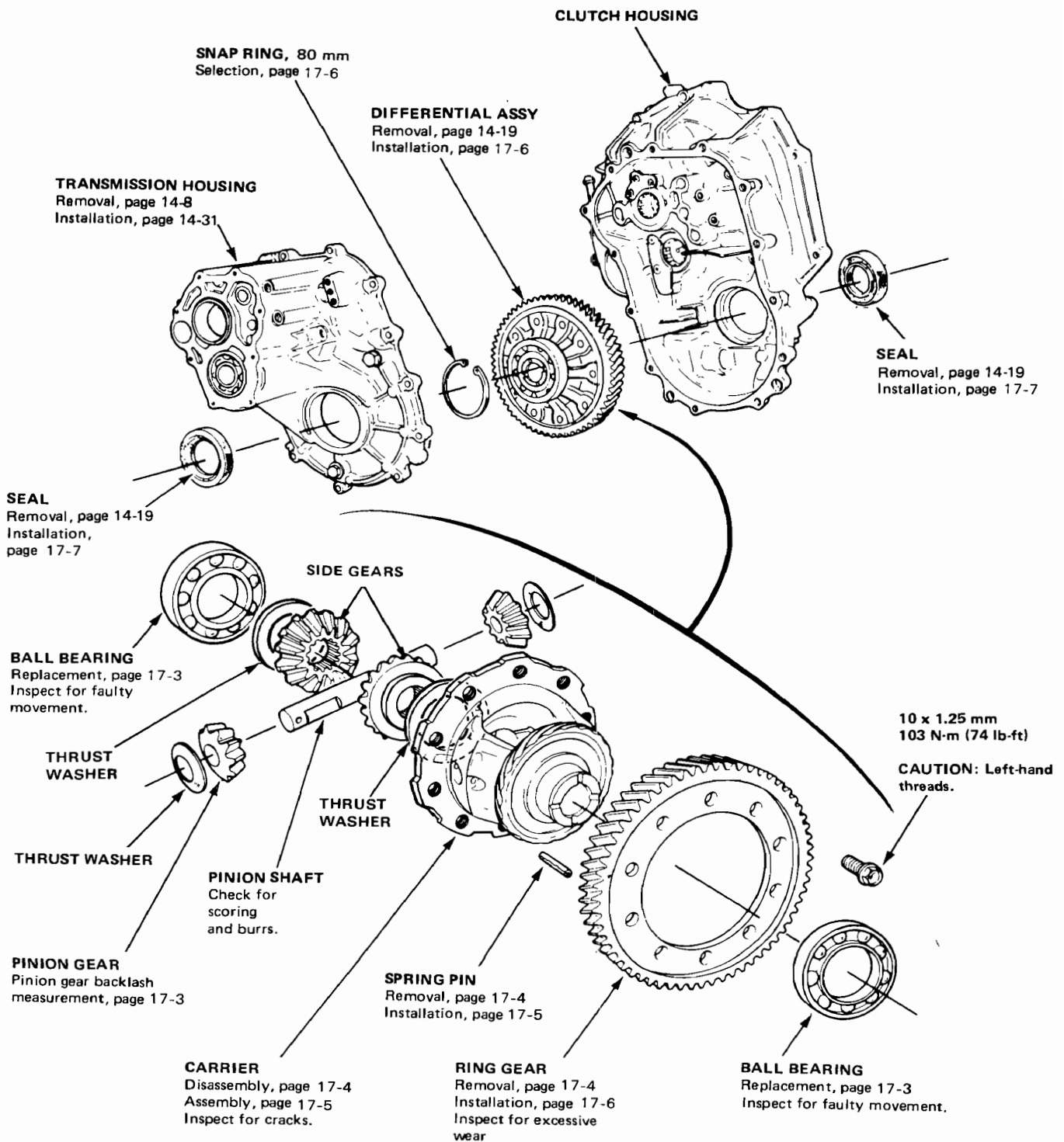
26. Check the transmission for smooth operation.

Gearshift Mechanism

Overhaul



Index

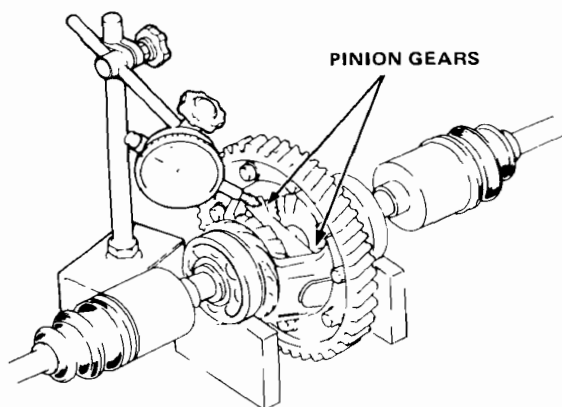




Backlash Inspection

1. Place differential assembly on V-blocks and install both axles.
2. Check backlash of both pinion gears.

Standard (New): 0.05–0.15 mm (0.002–0.006 in.)

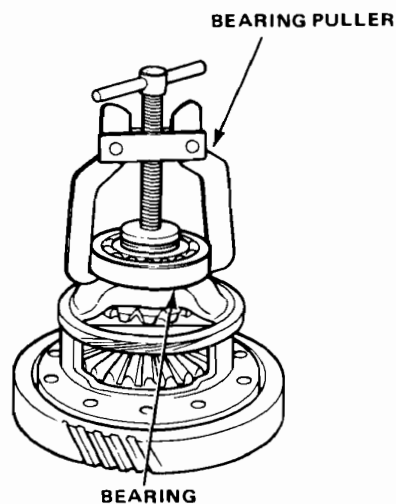


3. If out of tolerance, disassemble the differential and select new thrust washers according to the chart on page 17-5.

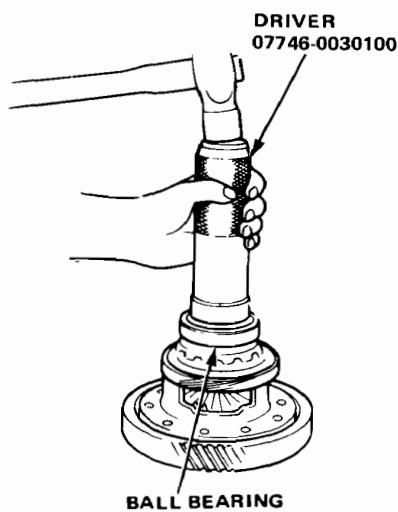
Bearing Replacement

NOTE: Check bearings for wear and rough rotation. If bearings are OK, removal is not necessary.

1. Remove bearings using a standard bearing puller.



2. Install new bearings.

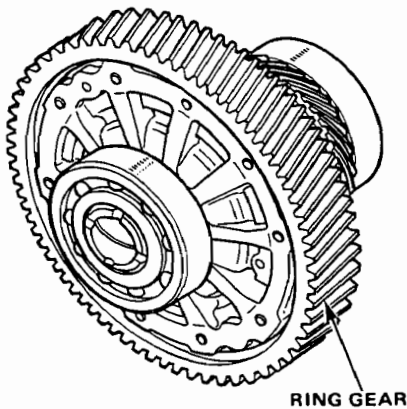


Differential

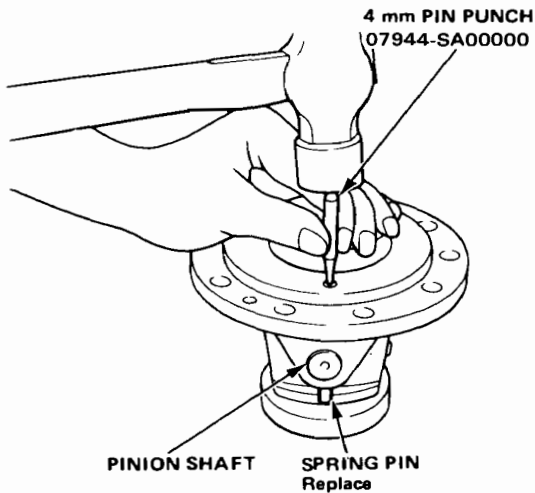
Inspection/Disassembly

1. Remove the ring gear and inspect teeth for excessive wear.

CAUTION: The ring gear bolts have left-hand threads.

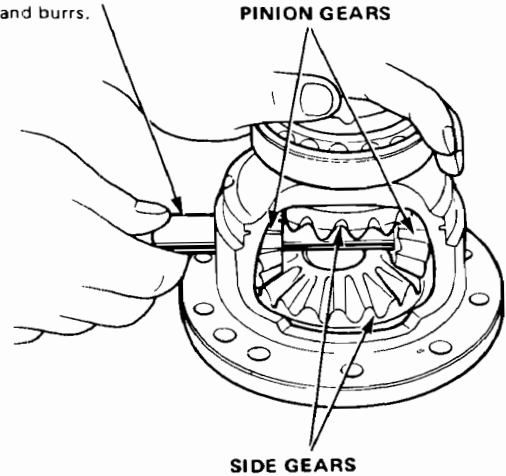


2. Drive out spring pin with pin punch.



3. Remove pinion shaft, pinion gears and thrust washers.

PINION SHAFT
Inspect for scoring and burrs.



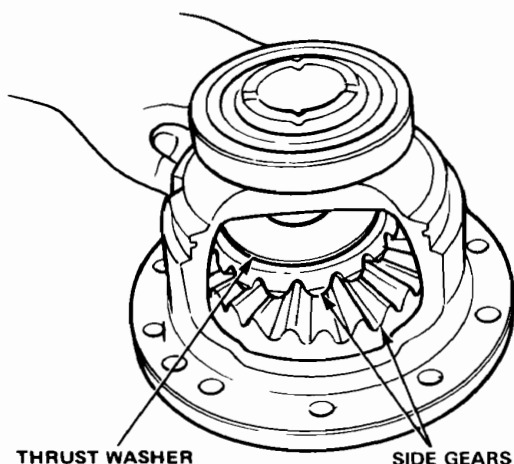
4. Wash parts thoroughly in solvent and dry with compressed air. Inspect all parts for wear or damage and replace any that are defective.



Reassembly

1. Install the side gears in differential carrier.
2. Install a thrust washer between each side gear and carrier.

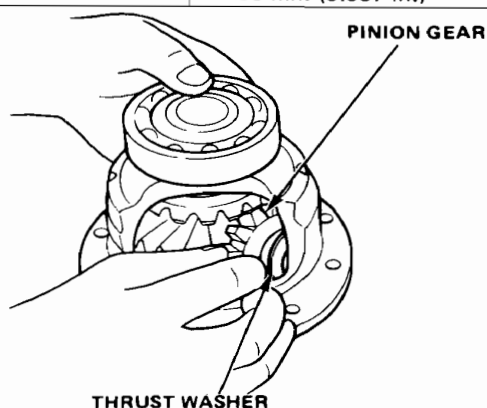
CAUTION: Coat all gears with molybdenum disulfide grease on all sides.



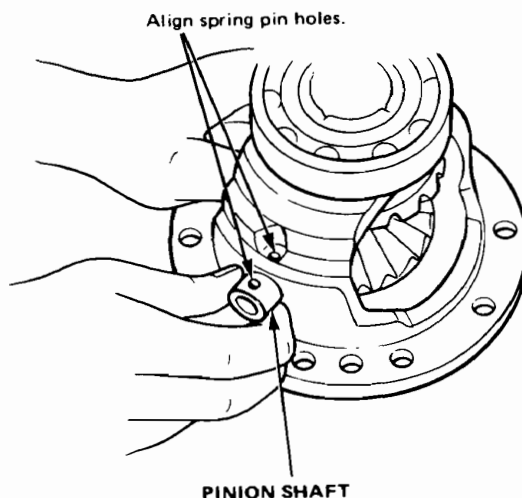
3. Set pinion gears in place exactly opposite each other in mesh with side gears, then install a thrust washer behind each one. Washers must be of equal thickness.

Thrust Washers

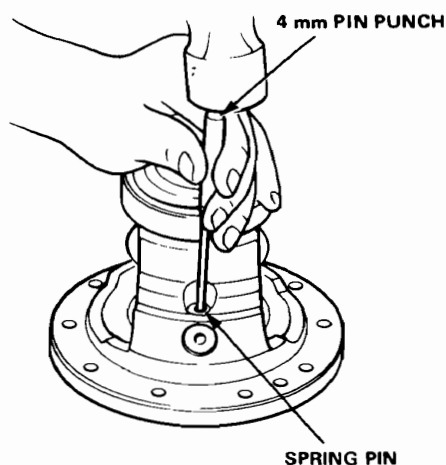
PART NUMBER	THICKNESS
41351-689-000	0.7 mm (0.028 in.)
41352-689-000	0.8 mm (0.031 in.)
41353-689-000	0.9 mm (0.035 in.)
41354-689-000	1.0 mm (0.039 in.)
41355-PC8-000	0.75 mm (0.030 in.)
41356-PC8-000	0.85 mm (0.033 in.)
41357-PC8-000	0.95 mm (0.037 in.)



4. Rotate gears as shown until shaft holes in pinion gears line up with shaft holes in carrier.
5. Insert pinion shaft and align spring pin holes in one end with matching hole in carrier.



6. Drive in a new spring pin with pin punch.



7. Check backlash of both pinion gears again.

Standard (New): 0.05–0.15 mm (0.002–0.006 in.)

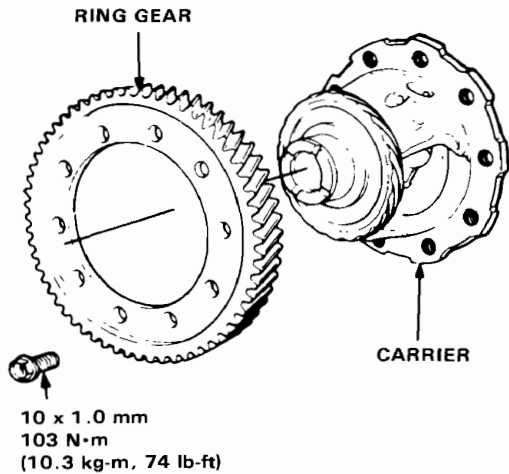
- If still out of tolerance, replace both pinion gears, then recheck backlash.
- If still out of tolerance, replace side gears, and re-check backlash.
- If still out of tolerance, replace carrier assembly.

(cont'd)

Differential

Reassembly (cont'd)

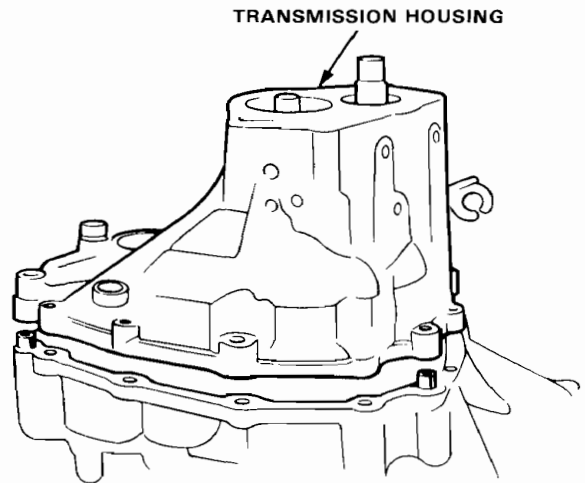
8. Install the ring gear with the chamfer on inside diameter facing the carrier.



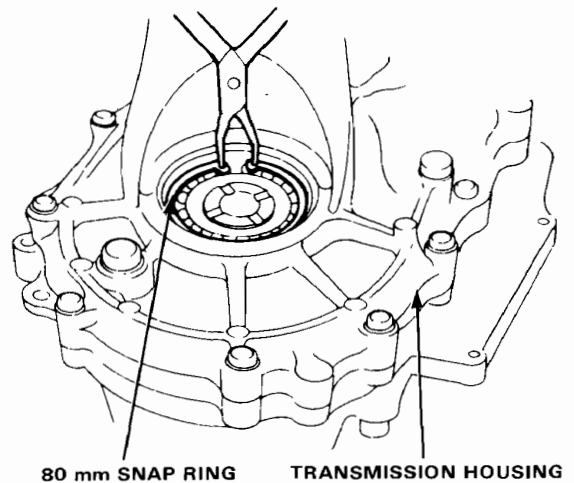
CAUTION: Ring gear bolts have left-hand threads.

Installation

1. Install differential assembly and all transmission gear assemblies in clutch housing. Refer to page 14-28.
2. Install dowel pins in clutch housing then carefully lower the transmission housing into place.



3. Install 80 mm snap ring in transmission housing.



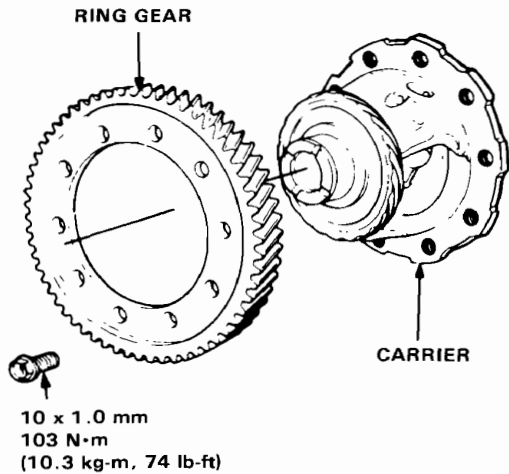
Side Clearance Measurement

NOTE: If clutch housing, transmission housing, differential carrier, or differential bearings were replaced, the differential side clearance must be measured.

Differential

Reassembly (cont'd)

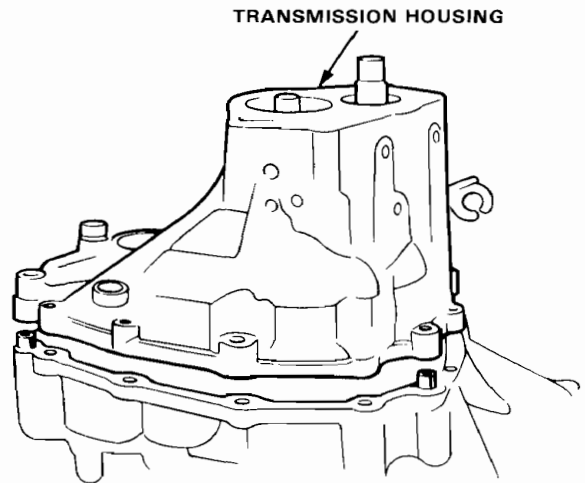
8. Install the ring gear with the chamfer on inside diameter facing the carrier.



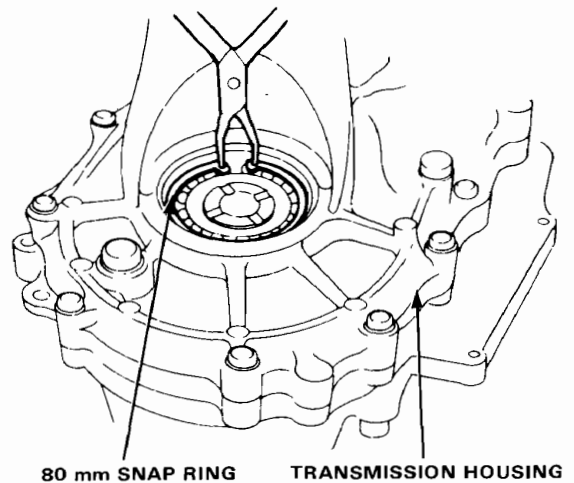
CAUTION: Ring gear bolts have left-hand threads.

Installation

1. Install differential assembly and all transmission gear assemblies in clutch housing. Refer to page 14-28.
2. Install dowel pins in clutch housing then carefully lower the transmission housing into place.



3. Install 80 mm snap ring in transmission housing.



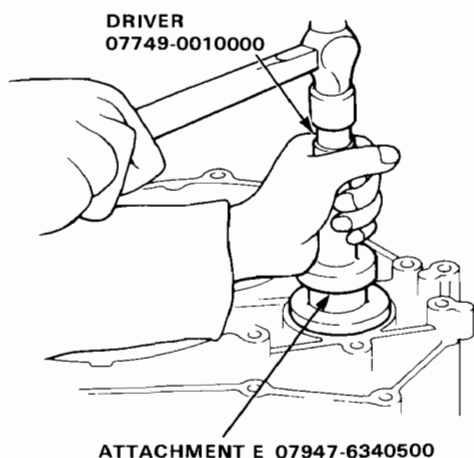
Side Clearance Measurement

NOTE: If clutch housing, transmission housing, differential carrier, or differential bearings were replaced, the differential side clearance must be measured.



4. Seat the snap ring.

Tap on clutch housing side of differential assembly with driver and attachment to seat 80 mm snap ring in transmission housing.

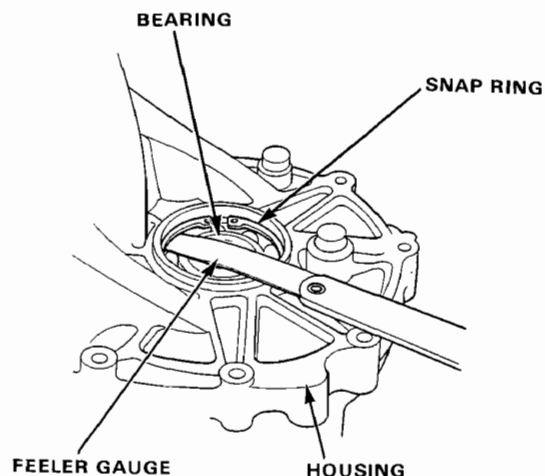


5. Turn the transmission over and seat the differential assembly.

Tap on transmission housing side of differential assembly with driver and attachment to seat the assembly in the clutch housing.

6. Measure clearance between snap ring and outer race of bearing in transmission housing.

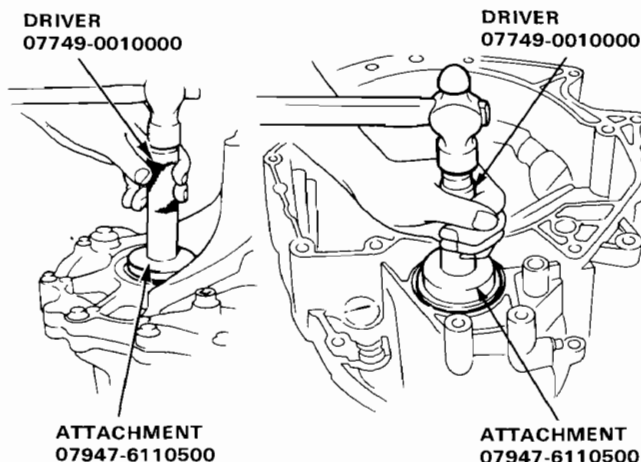
Side Clearance: 0.15 mm (0.006 in.) Max.



7. If out of limits, select new snap ring from following table and install. Repeat Steps 6-8.

Part Number	Thickness
90414-PC8-000	2.5 mm (0.098 in)
90415-PC8-000	2.6 mm (0.102 in)
90416-PC8-000	2.7 mm (0.106 in)
90417-PC8-000	2.8 mm (0.110 in)
90418-PC8-000	2.9 mm (0.114 in)

8. Apply oil to new differential seals and install them in clutch/torque converter housing and transmission housing with special tools as shown.



9. Refer to page 14-28 for assembly or remaining parts.

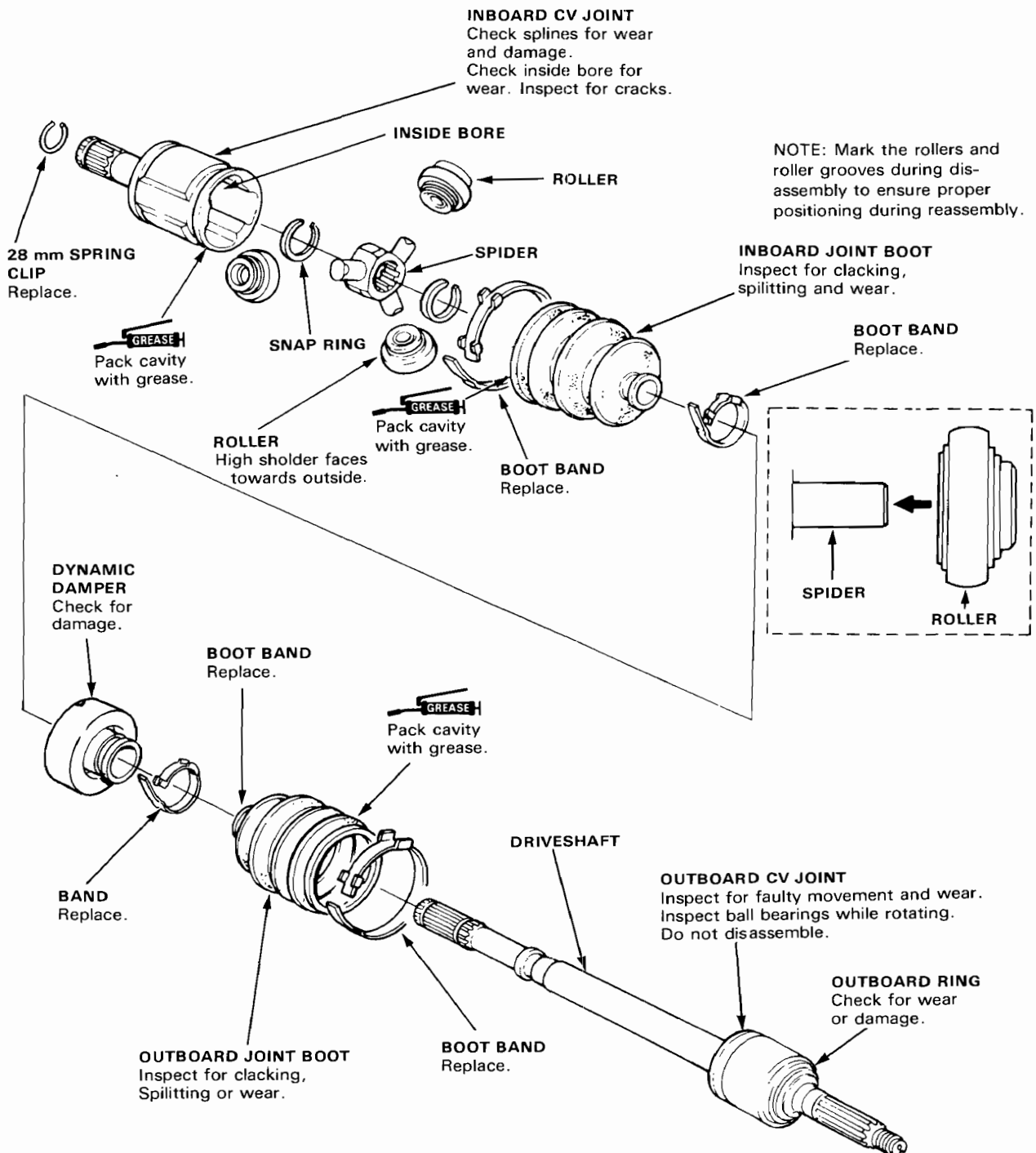
Driveshafts

Disassembly/Inspection

NOTE : Amount of grease

Inboard Joint : 100-110g

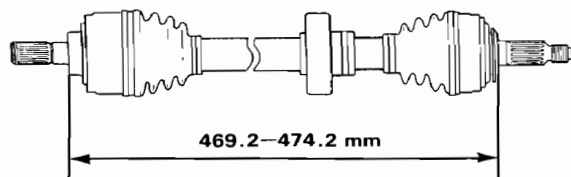
Outboard Joint : 90-100g



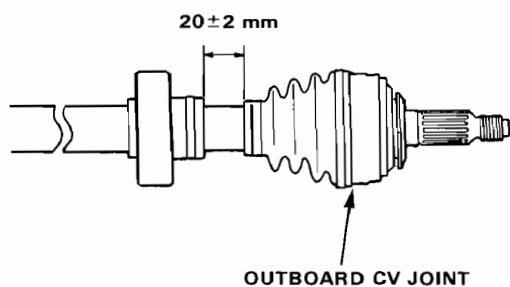


Key Points of Reassembly

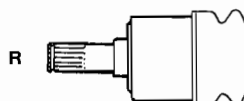
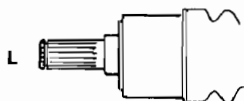
1. Adjust the length of the driveshafts figures given below.



2. Adjust the position of the dynamic damper as shown.



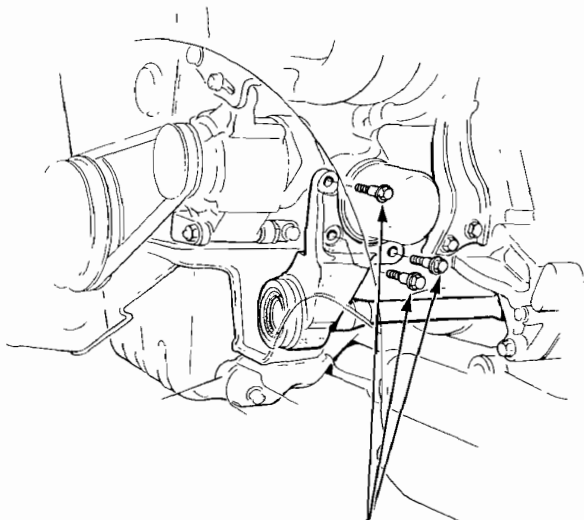
3. Discrimination of driveshafts



Intermediate Shaft

Replacement

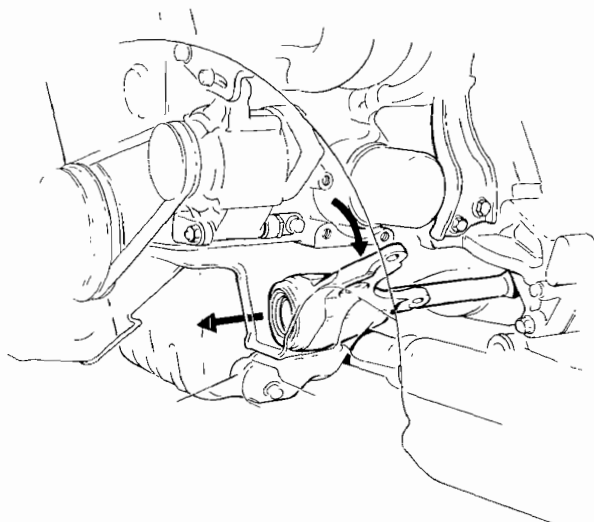
1. Drain oil from the transmission.
2. Remove the three 10 mm bolts.



10 x 1.25 mm
40 N·m (4.0 kg-m, 29 lb-ft)

3. Lower the bearing support close to the steering gearbox and remove the intermediate shaft from the differential.

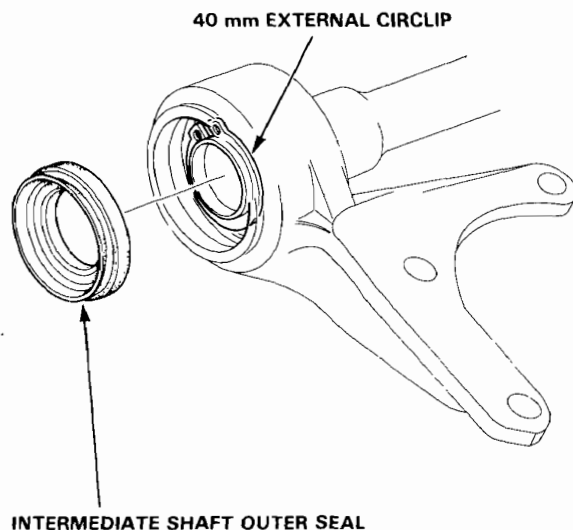
CAUTION: To prevent damage to the differential oil seal, hold the intermediate shaft horizontal until it is clear of the differential.



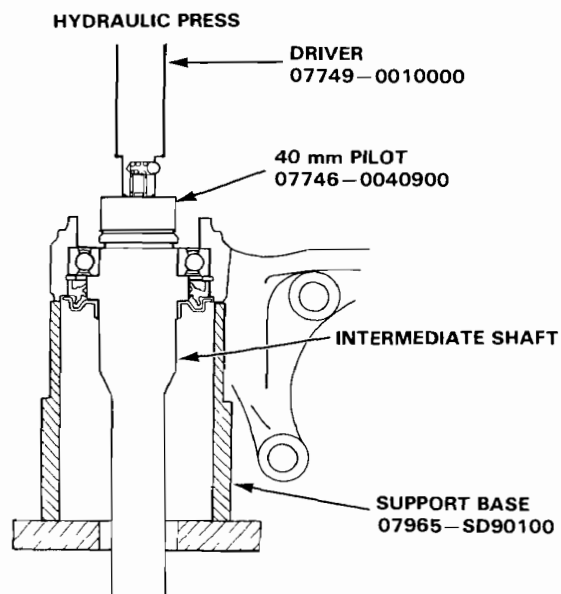
Installation is the reverse of removal.

Disassembly

1. Remove the intermediate shaft outer seal.
2. Remove the 40 mm external circlip.



3. Press the intermediate shaft out of the shaft bearing.

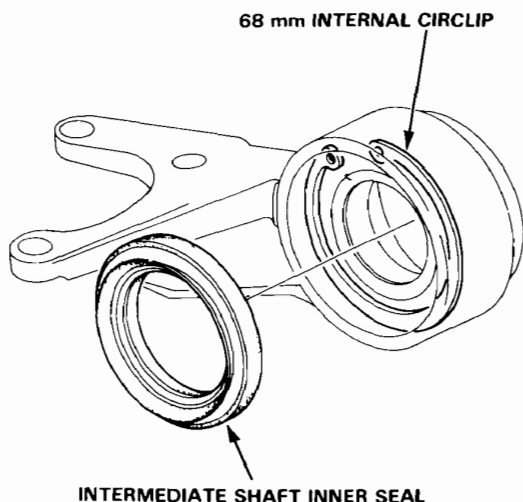


(cont'd)

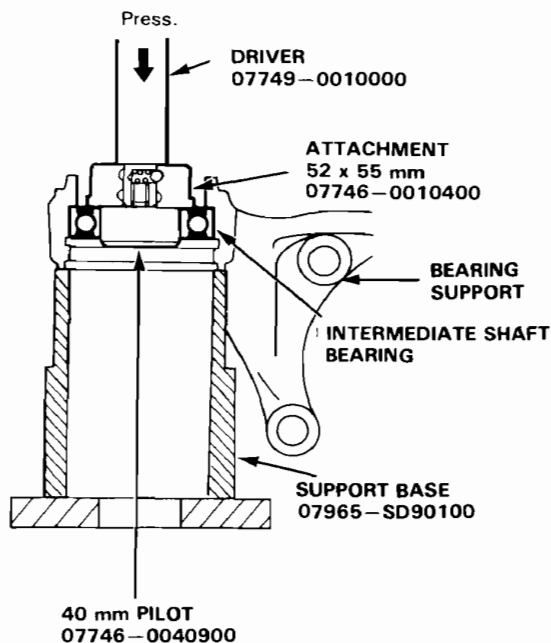


Disassembly (cont'd)

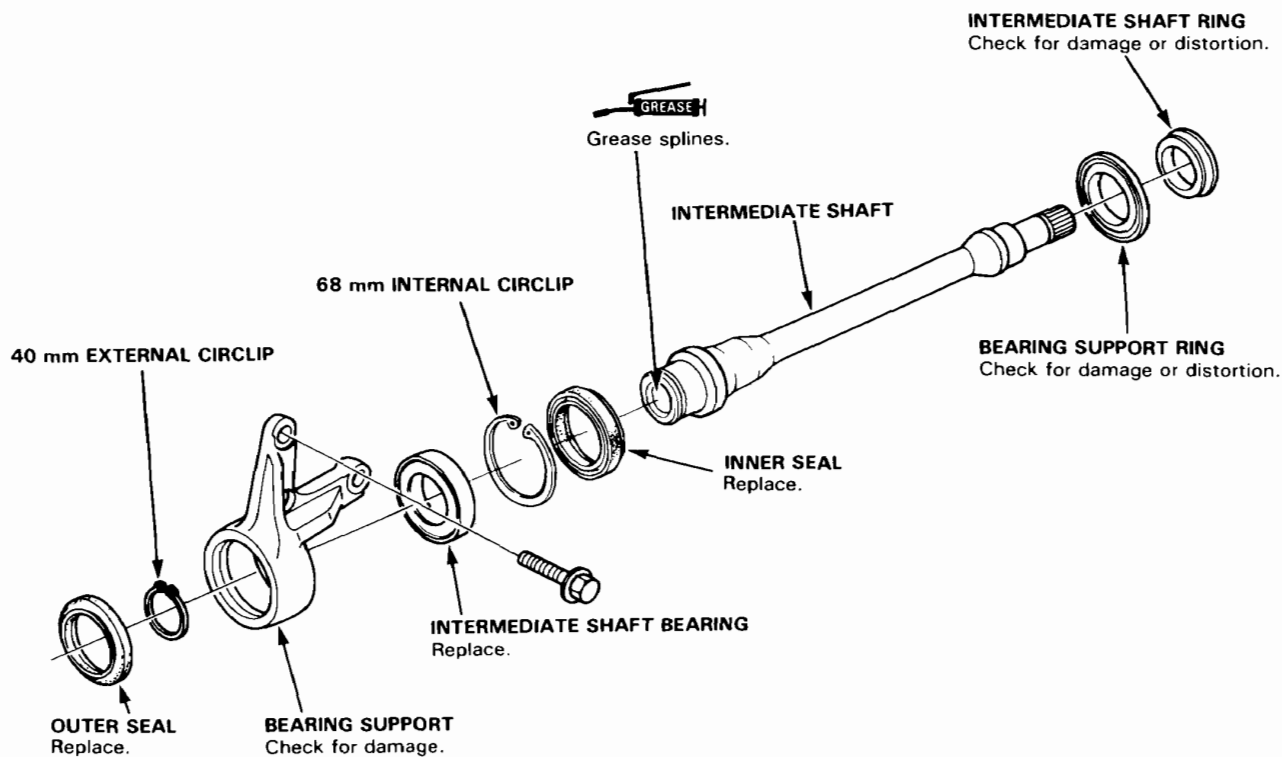
4. Remove the intermediate shaft inner seal.
5. Remove the 68 mm internal circlip.



6. Press the intermediate shaft bearing out of the bearing support.



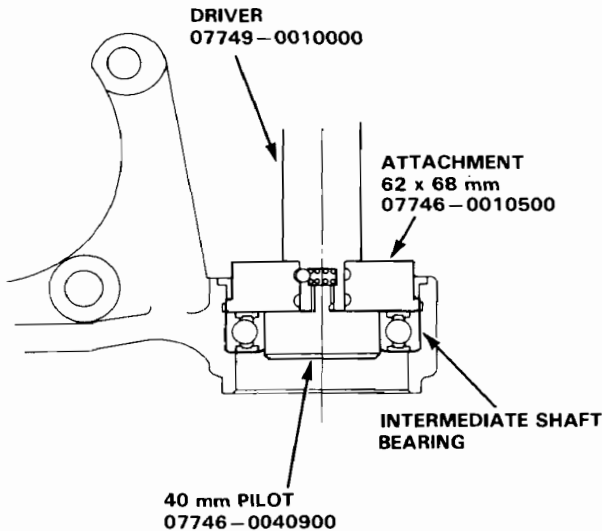
Index/Inspection



Intermediate Shaft

Reassembly

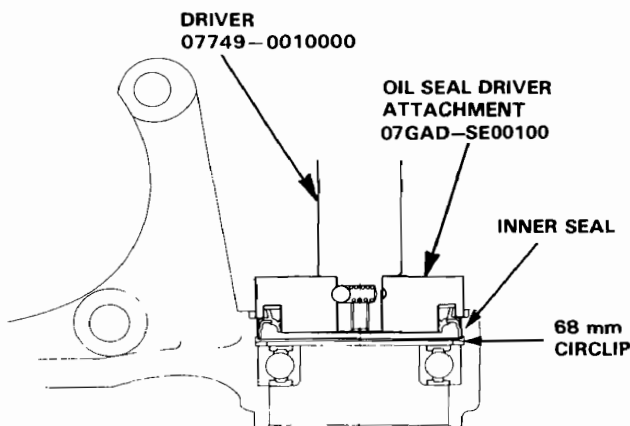
1. Press the intermediate shaft bearing into the bearing support.



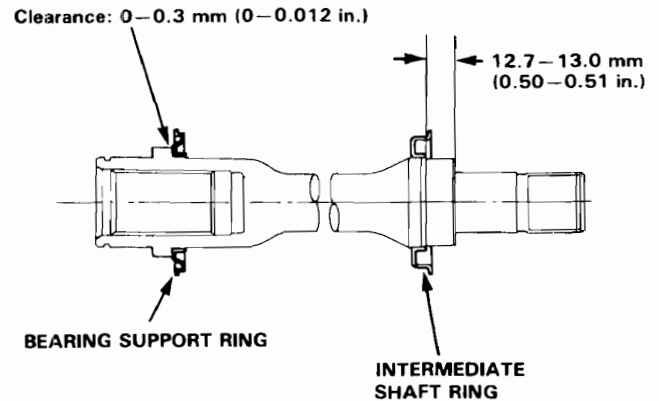
2. Seat the 68 mm circlip in the groove of the bearing support.

CAUTION: Install the circlip with the tapered end facing out.

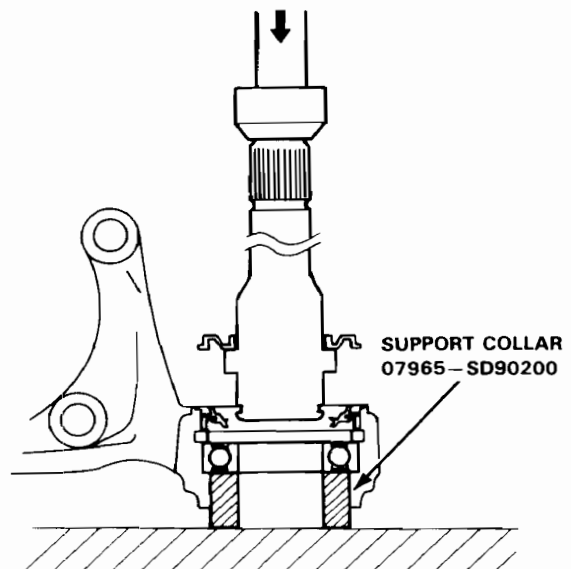
3. Press the intermediate shaft inner seal into the bearing support.



4. Install the intermediate shaft ring and bearing support ring on the intermediate shaft and position as shown using a soft hammer.



5. Press the intermediate shaft into the shaft bearing.

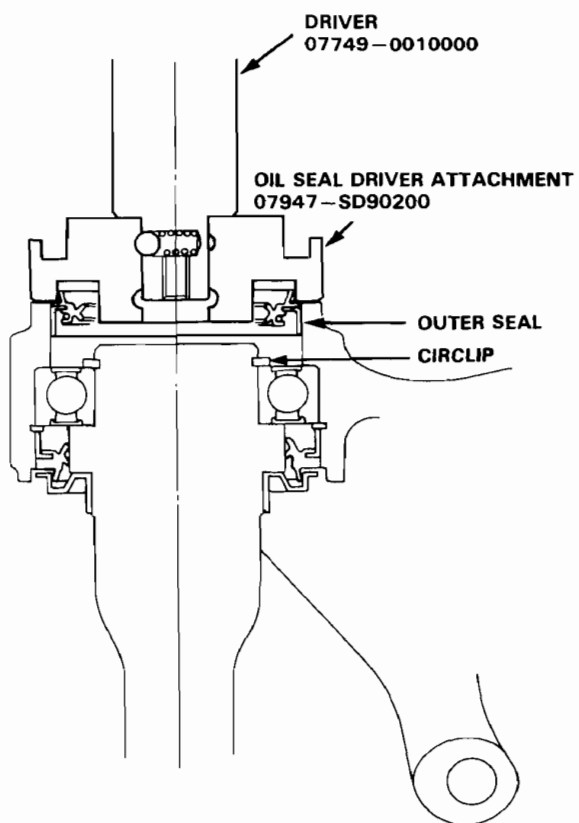




6. Seat the 40 mm external circlip in the groove of the intermediate shaft.

CAUTION: Install the circlip with the tapered end facing out.

7. Press the outer seal into the bearing support.

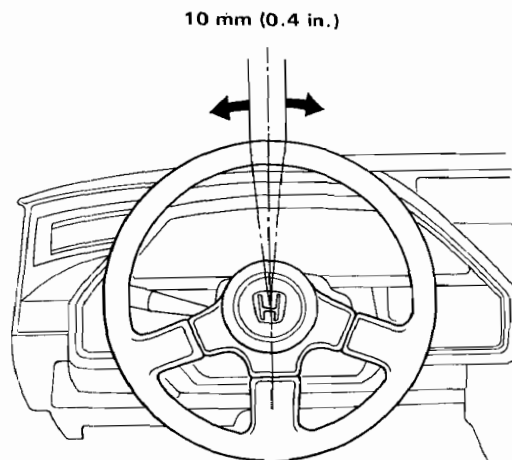


Inspection and Adjustment

Steering Wheel Rotational Play

1. Place the front wheels in a straight ahead position and measure the distance the steering wheel can be turned without moving the front wheels.
2. If the play exceeds the service limit, check all steering components.

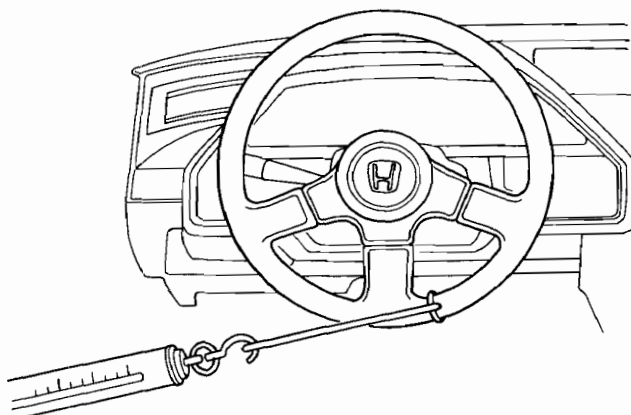
Service Limit: 10 mm (0.4 in.)



Steering Effort Check

1. Raise the front wheels off the ground.
2. Turn the steering wheel with a spring gauge and check its reading.
3. If the reading exceeds the service limit, adjust the steering gearbox as shown below.

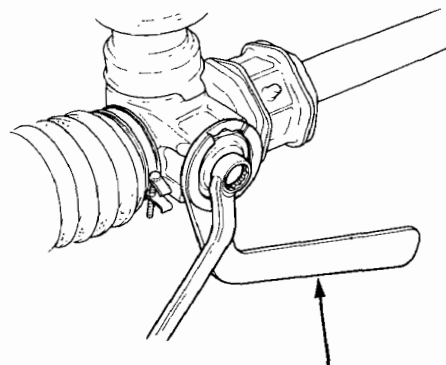
Service Limit: 15 N (1.5 kg, 3.3 lbs)



Steering Gearbox Adjustment

NOTE: This adjustment must be performed with the front wheel pointed straight ahead.

1. Loosen the rack screw locknut.
NOTE: Apply Three Bond No.2 thread locking sealant to the guide screw locknut threads.
2. Torque the rack guide screw to 5 N·m (0.5 kg-m, 4 lb-ft).
3. Back off the screw $15^{\circ} \pm 3$ from the bottomed (torqued) position and tighten the locknut to 68 N·m (6.8 kg-m, 49 lb-ft).
4. Check for tight or loose steering through the complete turning travel.
5. Recheck steering effort as shown above.



STEERING GEARBOX LOCKNUT WRENCH
07916-6920100 for LHD
07916-6920000 for RHD

Front Brakes

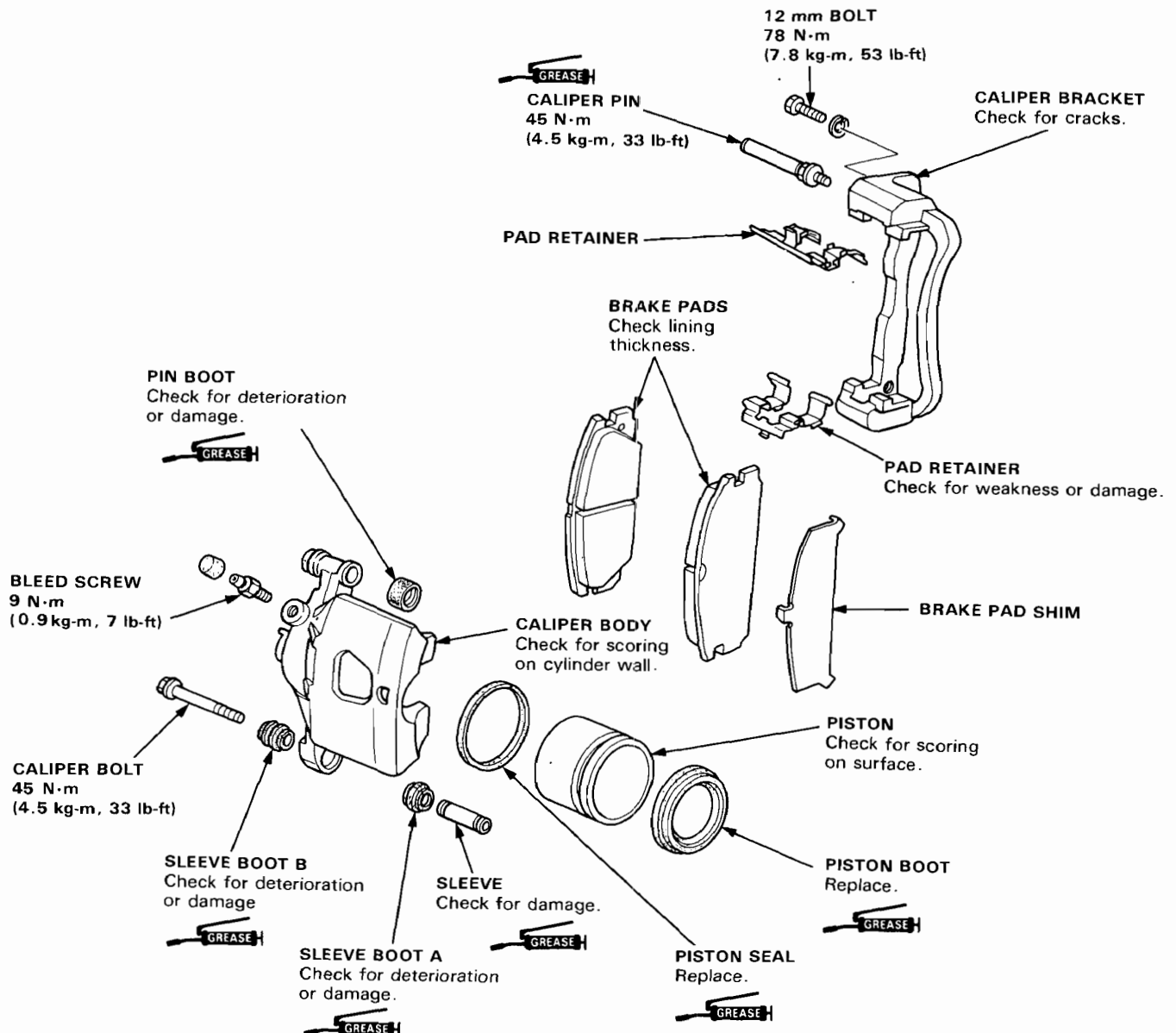
Inspection

WARNING Do not use an air hose to blow the brake assembly clean.

CAUTION

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.

- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid.
- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.



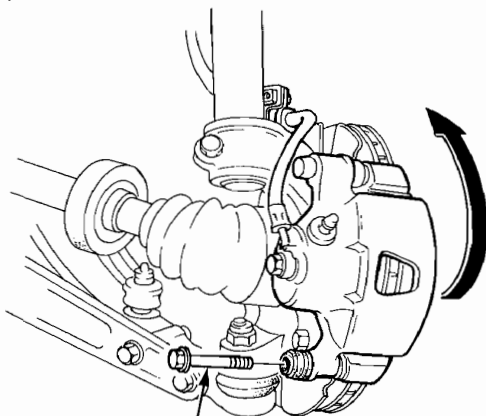
Brake Pad



Inspection/Replacement

WARNING Do not use an air hose to blow the brake assembly clean.

1. Remove the front wheels and support the front of car on safety stands.
2. Remove caliper pin bolt and pivot caliper up out of the way.

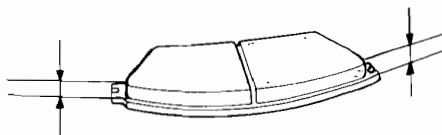


CALIPER PIN BOLT

3. Remove the pad shim, pad retainers and pads.
4. Using a vernier caliper, measure the thickness of each brake pad lining.

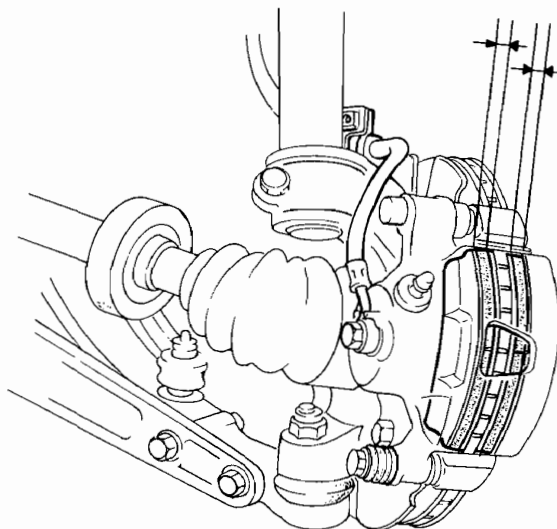
Break Pad Thickness:

Standard: 10 mm (0.39 in)
Service Limit: 1.6 mm (0.06 in)

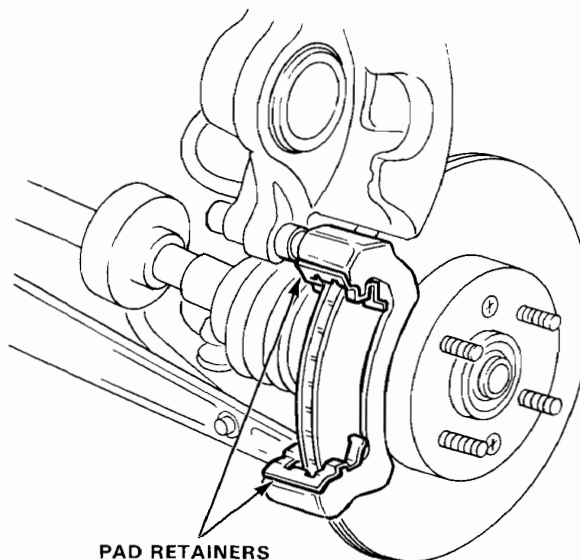


NOTE: Measurement does not include pad backing thickness.

5. If lining thickness is less than service limit, replace both pads as a set.



6. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
7. Install the pad retainers.



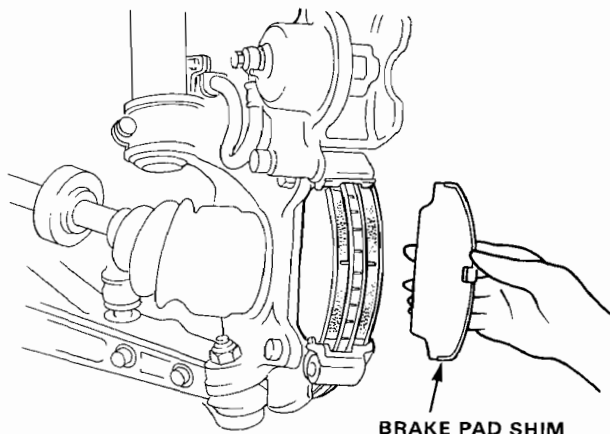
PAD RETAINERS

(cont'd)

Brake Pad

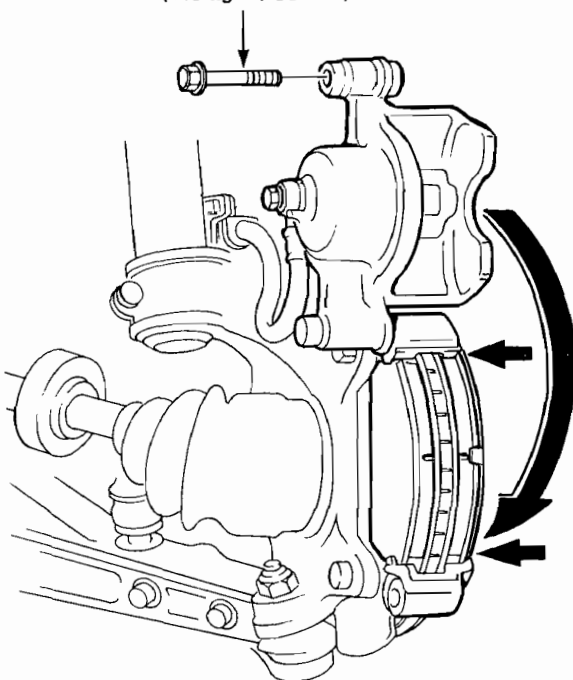
Inspection/Replacement (cont'd)

8. Install the brake pads and shim with the shim on the outside.



9. Push in the piston so that the caliper will fit over the pads.
10. Pivot the caliper down into position, then install the caliper pin bolt and tighten to 45 N·m (4.5 kg-m, 33 lb-ft).

CALIPER PIN BOLT
45 N·m
(4.5 kg-m, 33 lb-ft)



11. Depress the brake pedal several times to make sure the brakes work, then road-test.

Brake Caliper

Disassembly

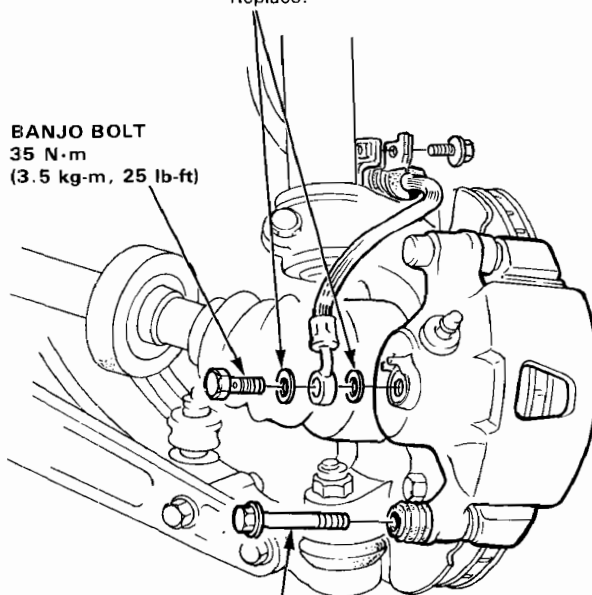
CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Use only new clean brake fluid.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.

1. Remove the banjo bolt and disconnect the brake hose from the caliper.
2. Remove the caliper pin bolt, then remove the caliper.

NOTE : Avoid damaging the splash guard.
Replace.

BANJO BOLT
35 N·m
(3.5 kg-m, 25 lb-ft)



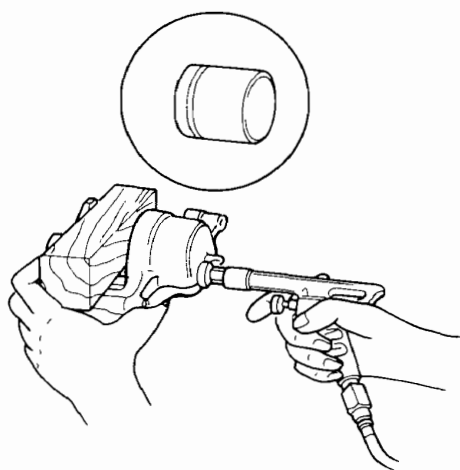
CALIPER PIN BOLT
45 N·m
(4.5 kg-m, 33 lb-ft)



3. Place a wooden block or shop rag in the caliper opposite the piston, then carefully remove the piston from the caliper by applying air pressure through the brake line hole.

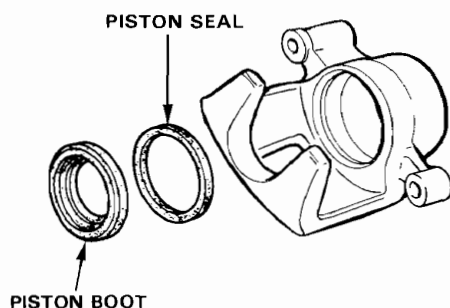
WARNING

- Do not place your fingers in front of the piston.
- Do not use high air pressure.



4. Remove the piston boot and piston seal.

CAUTION: Take care not to damage the cylinder.

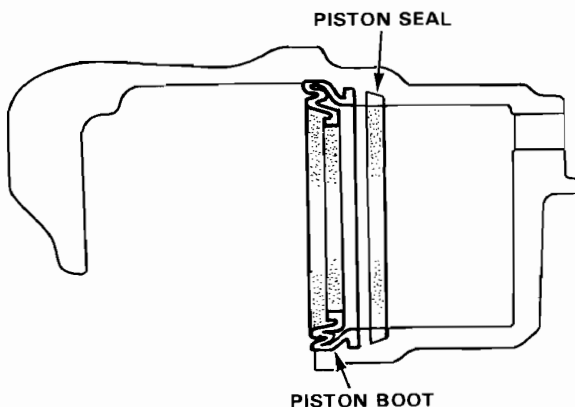


Reassembly

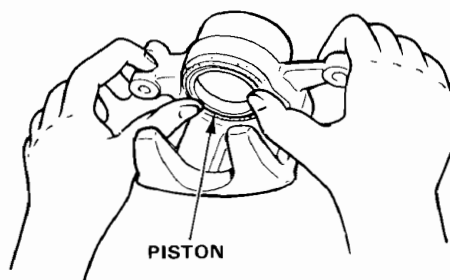
CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Use only new clean brake fluid.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.

1. Clean the piston and caliper bore with brake fluid and inspect for wear or damage.
2. Apply brake cylinder grease to the new piston seal, then install the piston seal in the cylinder groove.
3. Install the piston boot.



4. Lubricate the caliper cylinder and piston with brake fluid, then install the piston in the cylinder with the dished end facing in.



5. Reinstall the caliper in the reverse order of removal.
6. Fill the brake reservoir up and bleed the brake system.

Brake Disc

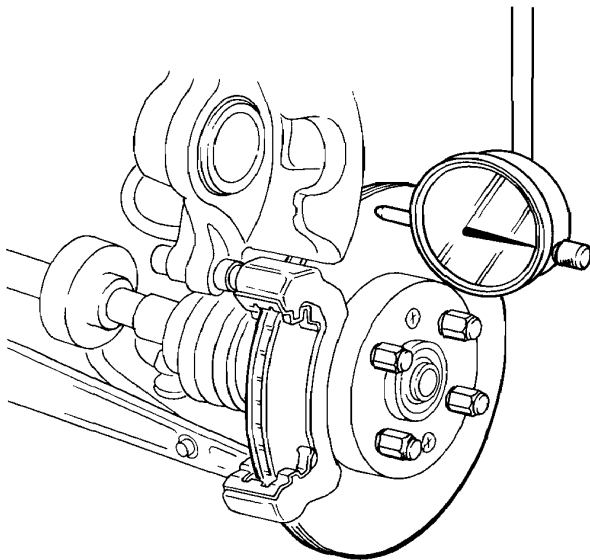
Run-Out

1. Remove the front wheels, and support the front of the car on safety stands.
2. Remove caliper pin bolt, then pivot the caliper up out of the way on the caliper pin, and remove the pads and pad retainers.
3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.
4. Use the lug nuts to hold the disc securely against the hub, then mount a dial indicator as shown.

Brake Disc Runout:

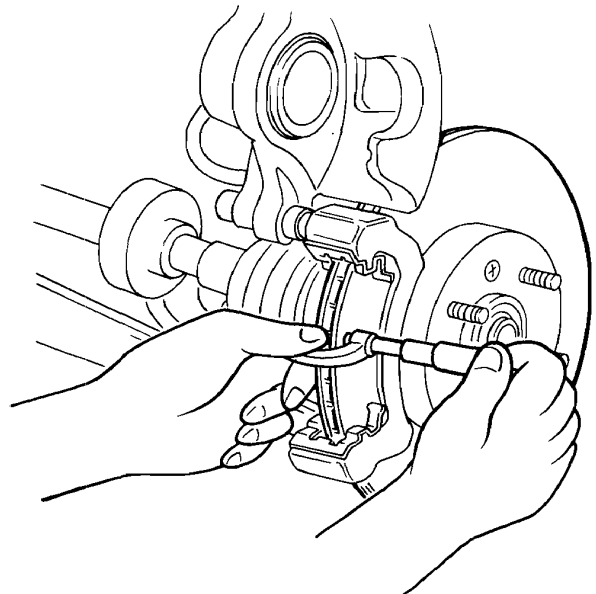
Service Limit: 0.1 mm (0.004 in.)

5. If the disc is beyond the service limit, remove it and install a new one.



Thickness and Parallelism

1. Remove the front wheels, and support the front of car on safety stands.
2. Move the caliper and pads out of the way as described in the preceding column.
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in.) in from the outer edge of the disc.



Brake Disc Thickness:

Standard: 19 mm (0.75 in.)

Max. Refinishing Limit: 17 mm (0.67 in.)

Brake Disc Parallelism:

The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in.).

4. If the disc beyond the limits for thickness or parallelism, remove it and install a new one.

Master Cylinder

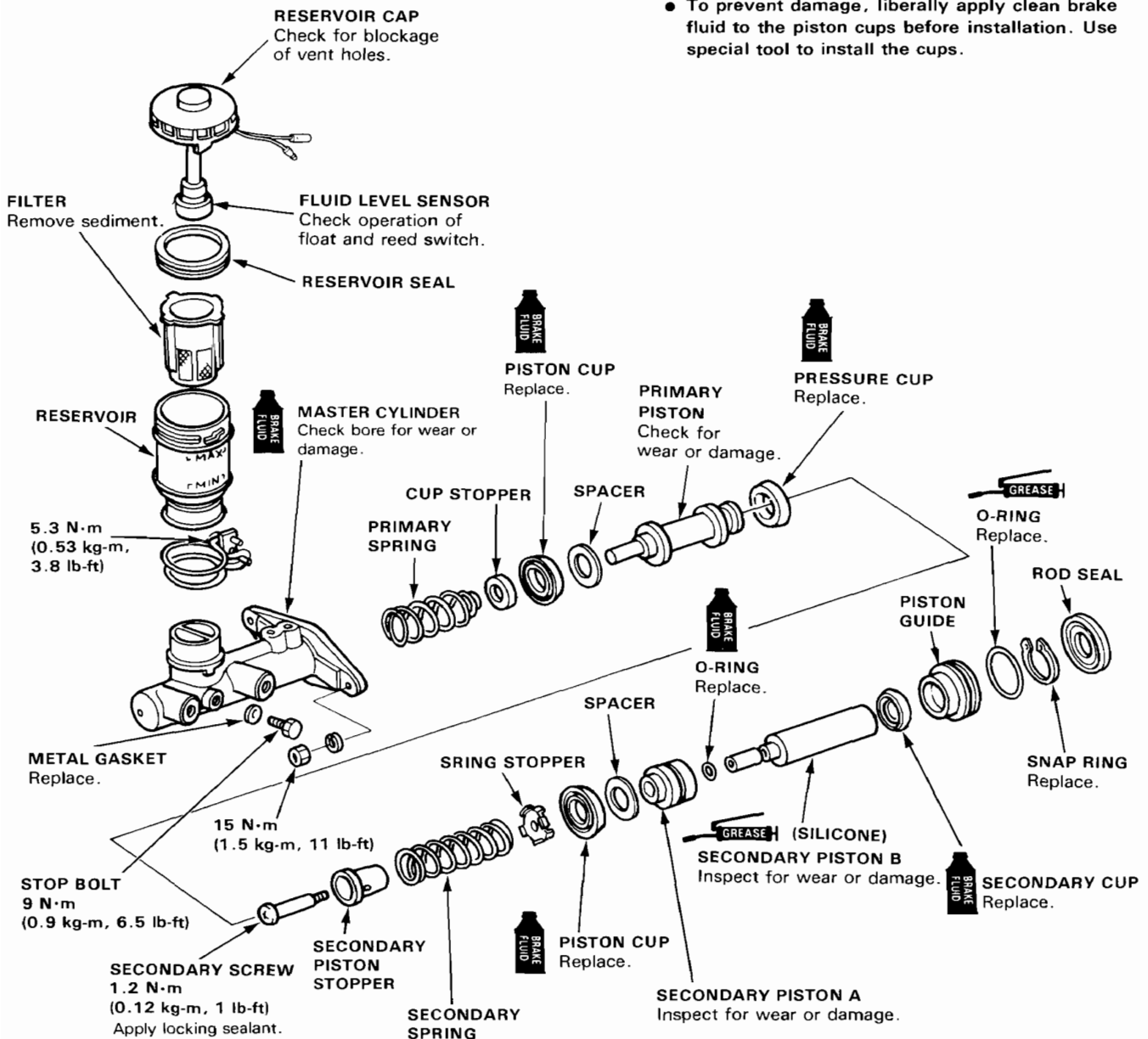
Overhaul/Inspection



CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.

- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid.
- Replace all rubber parts with new ones whenever the cylinder is disassembled.
- To prevent damage, liberally apply clean brake fluid to the piston cups before installation. Use special tool to install the cups.



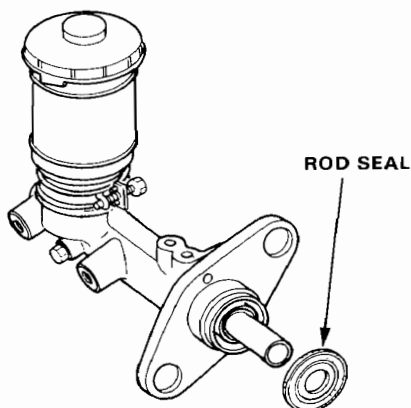
Master Cylinder

Disassembly

CAUTION:

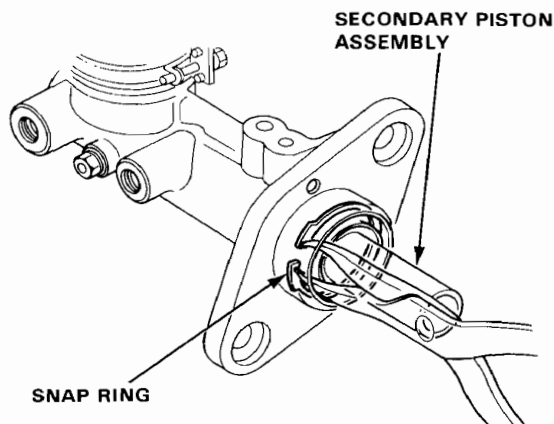
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Use only new clean brake fluid.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Be careful not to bend or damage the brake pipe when removing the master cylinder.

1. Remove the rod seal.

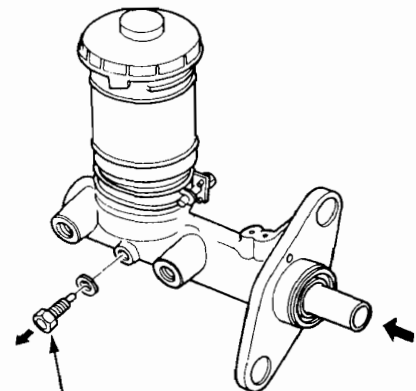


2. Push the secondary piston assembly, then remove the snap ring.

CAUTION: Avoid damaging the master cylinder wall.



3. Remove the stop bolt while pushing in the secondary piston assembly.

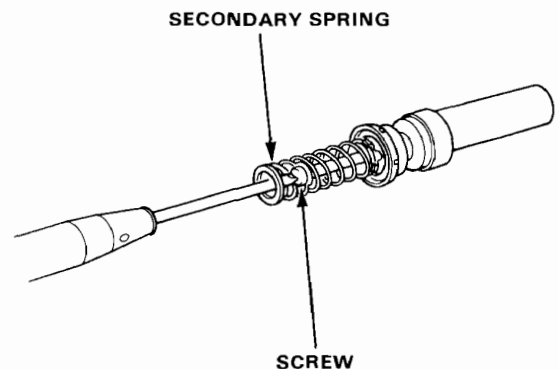


4. Remove the piston guide, secondary piston assembly and primary piston assembly.

NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side outlet.

CAUTION:

- Do not use high pressure air or bring the nozzle too close to the inlet.
 - Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.
5. Remove the screw from the secondary piston assembly, then remove the secondary spring.



6. Clean all parts with brake fluid.



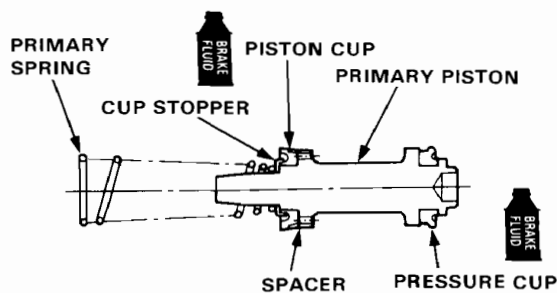
Reassembly

CAUTION:

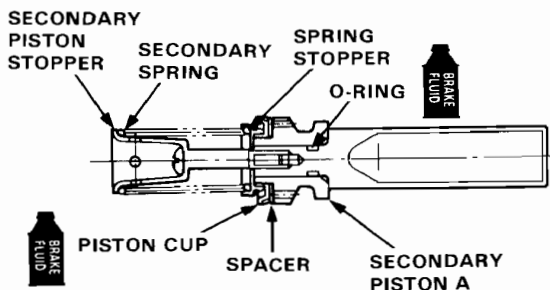
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Use only new clean brake fluid.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.

1. Lubricate new piston assemblies with brake fluid, then fit them together.

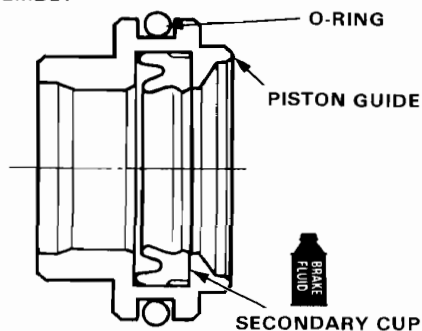
PRIMARY PISTON ASSEMBLY



SECONDARY PISTON ASSEMBLY



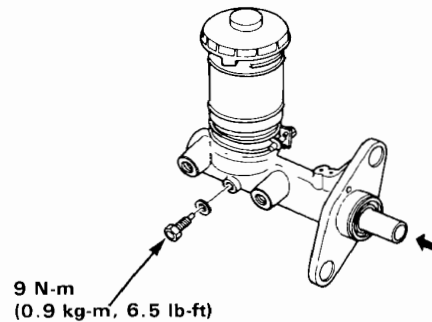
PISTON GUIDE ASSEMBLY



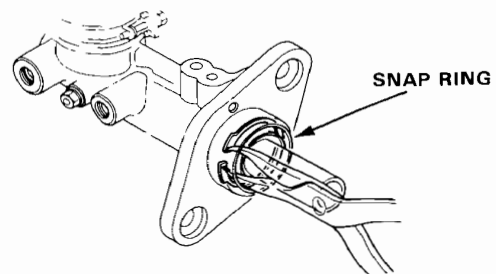
2. Install the piston assemblies in the master cylinder.

NOTE: To ease assembly, rotate the pistons while inserting.

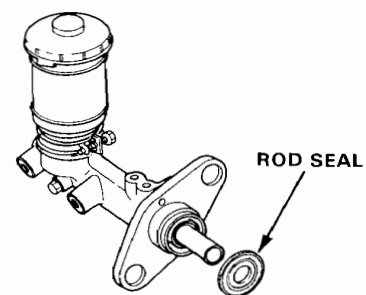
3. Install the stop bolt and new sealing washer while pushing in the secondary piston assembly, then tighten the stop bolt.



4. Install the snap ring after pushing in the secondary piston assembly.



5. Install a new rod seal.



CAUTION: When connecting the brake pipes, make sure that there is no interference between the brake pipes and other parts.

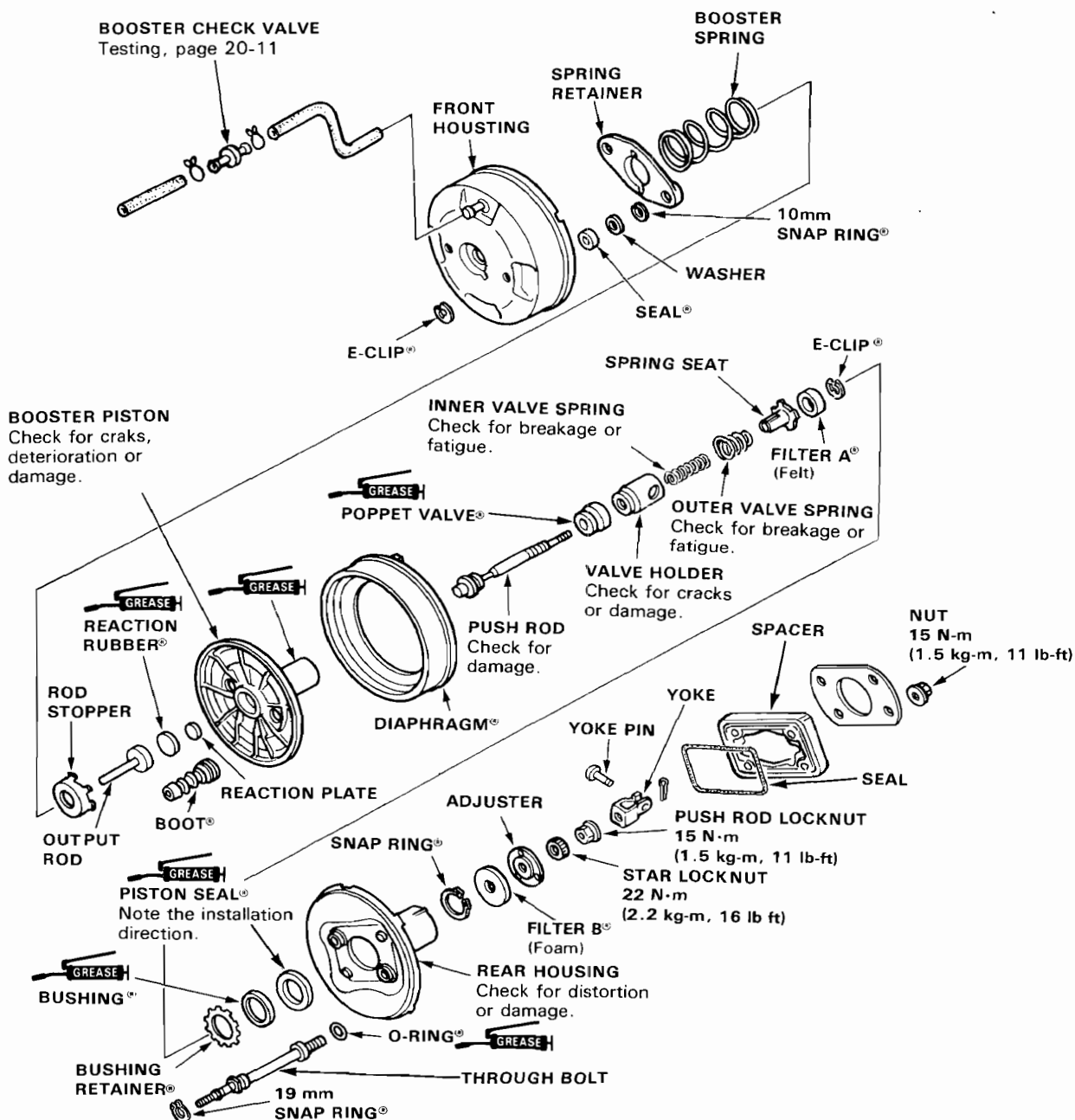
Brake Booster

Index and Inspection

Booster testing is on the page 21-11.

NOTE:

- On left hand drive car, to remove the brake booster, remove the master cylinder first. Remove the A.C.G. bracket, then remove the brake booster. After installing the brake booster, adjust the A.C.G. belt tension.
- Parts marked® are available with rebuild kit and must be replaced whenever disassembled.
- **GREASE** on this page refers to silicone grease.
- Scribe an aligning mark across the front and rear housings so you can reassemble in their original positions.





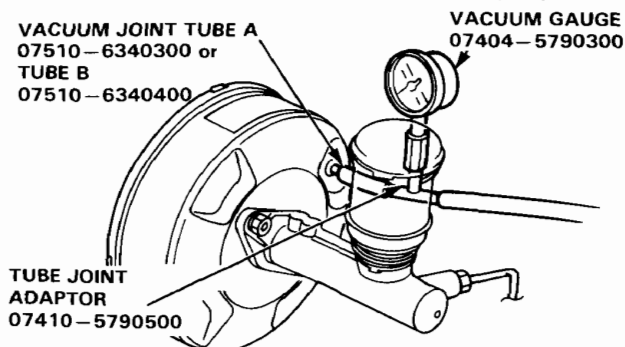
Booster Test

Leak Test

1. Install the Brake Power Kit (07504-6340100) as shown.
2. Start the engine, adjust the engine speed with the accelerator pedal so that the vacuum gauge readings show 300–500 mmHg, then stop the engine.
3. Read the vacuum gauge.

If the vacuum readings decreases 20 mmHg or more after 30 seconds, check following parts for leaks.

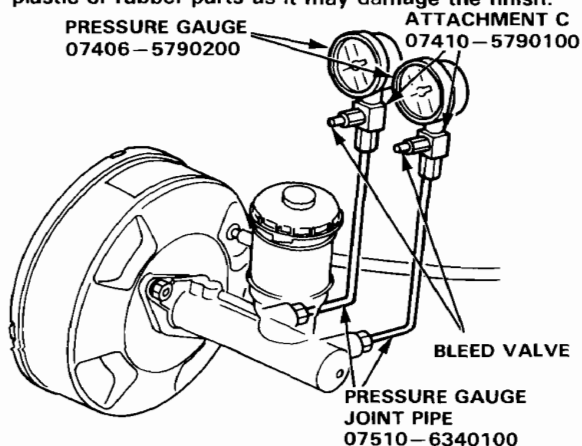
- Check valve
- Vacuum hose
- Seals
- Diaphragm
- Master cylinder rod seal and secondary cup



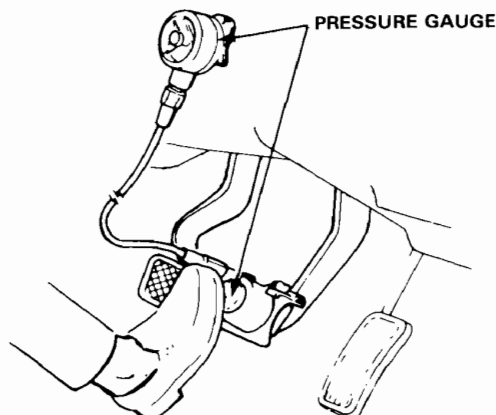
Function Test

1. Install the vacuum gauge as same the leak test.
2. Connect the oil pressure gauges to the master cylinder using the attachments as shown.
3. Bleed air through the valves.

CAUTION: Avoid spilling brake fluid on painted, plastic or rubber parts as it may damage the finish.



4. Start the engine.
5. Depress the brake pedal with a 200 N (20 kg, 44 lbs) of pressure. The following pressures should be observed at the pressure gauges in each vacuum.

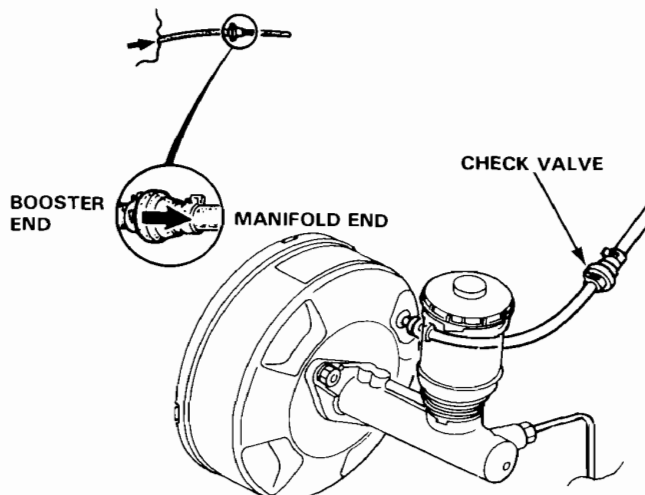


Vacuum mmHg	Line pressure kPa (kg/cm, psi)
0	1,470 (15, 213) Min.
300	4,606 (47, 668) Min.
500	6,566 (67, 953) Min.

6. Inspect the master cylinder pistons and cups in the readings do not fall within the limits shown above.

Check Valve Test

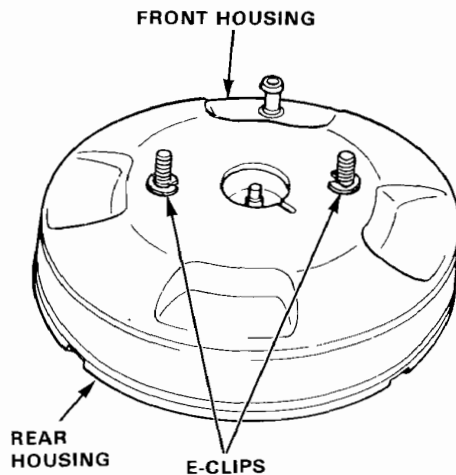
1. Remove the check valve, blow on one end of the hose and then the other; if you can blow through the booster end, but not through the manifold end, the check valve is OK.



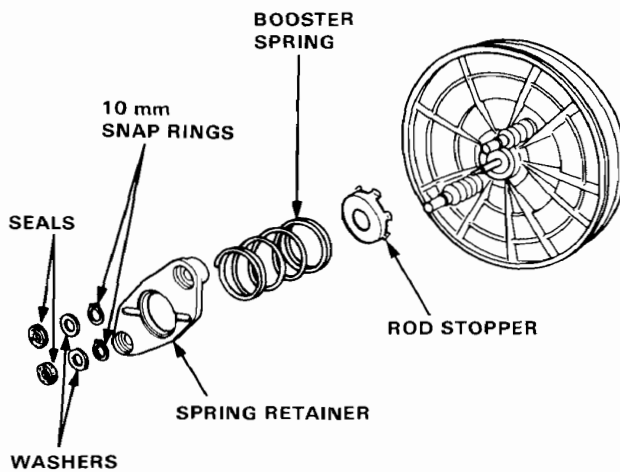
Brake Booster

Disassembly

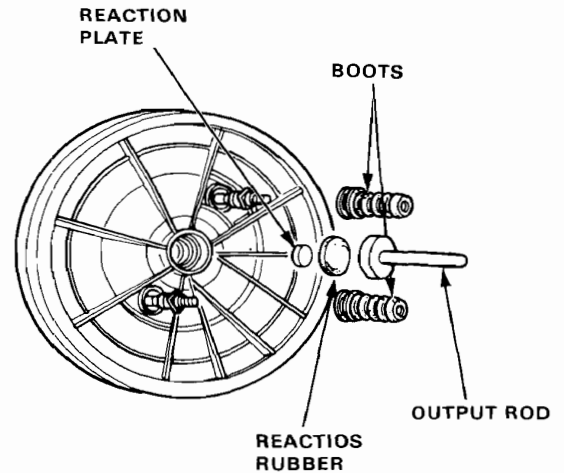
1. Scribe an aligning mark across the front and rear booster housings to ensure proper positioning of parts on reassembly.
2. Remove the E-clips, and separate the front booster housing and the rear booster housing.



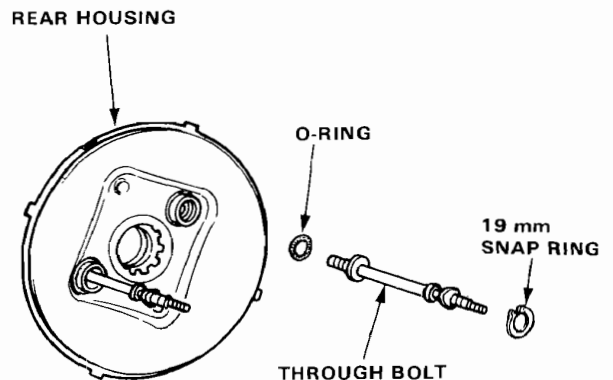
3. Remove the seals and washers from the spring retainer, then remove the spring retainer, booster spring and rod stopper by removing the 10 mm snap rings.



4. Remove the output rod, reaction rubber and reaction plate.
5. Remove the boots.

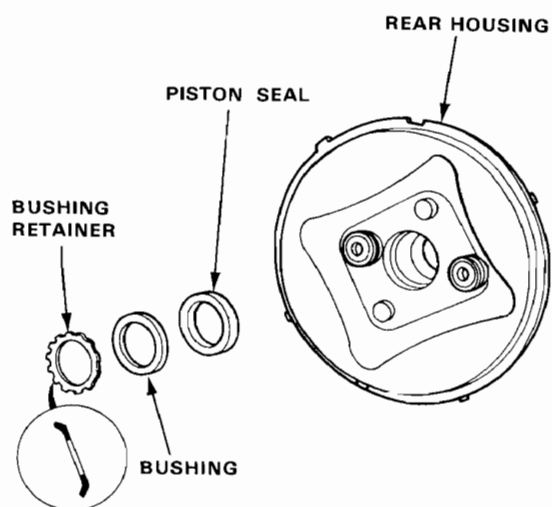


6. Separate the booster piston from the housing.
7. Remove the 19 mm snap ring and remove the through bolt with O-ring from the rear housing.

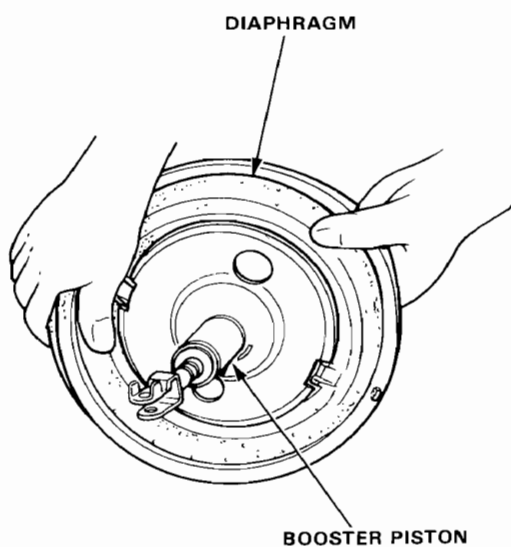




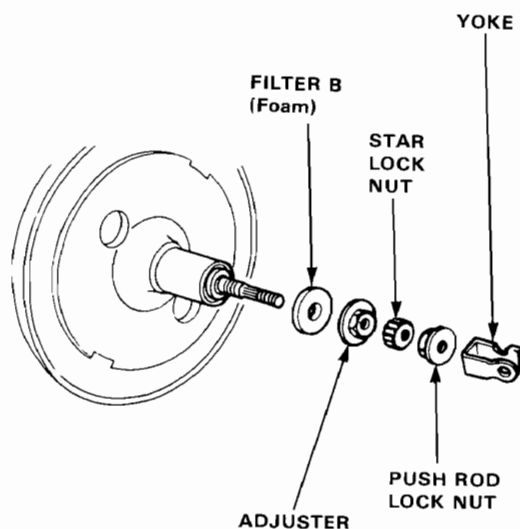
8. Remove the bushing retainer, bushing and piston seal from the rear housing.



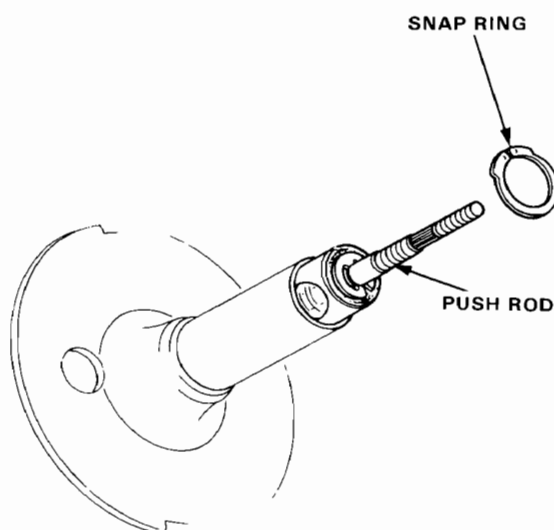
9. Remove the diaphragm from the booster piston.



10. Remove the push rod yoke, push rod lock nut, star lock nut, adjuster and filter B (foam) from the booster piston.



11. Remove the push rod by removing the snap ring.

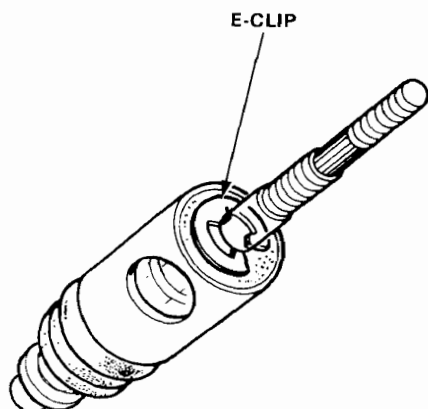


(cont'd)

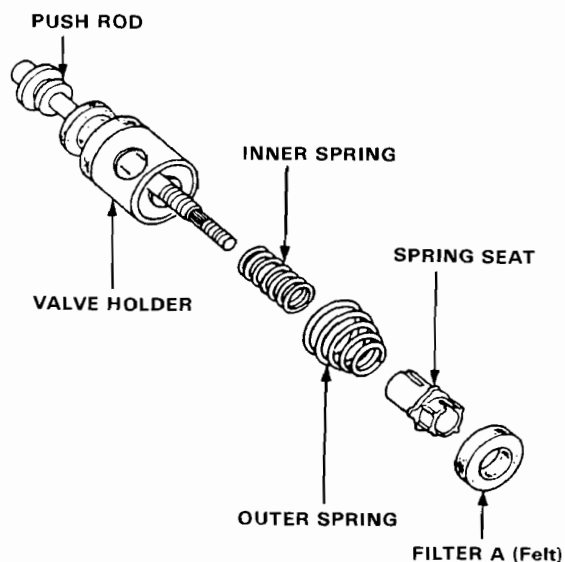
Brake Booster

Disassembly (cont'd)

12. Remove the E-clip from the push rod.



13. Remove filter A (Felt), spring seat, outer valve spring, inner valve spring, valve holder, poppet valve and push rod.



Rebuild Kit

E-CLIP SEAL 10 mm SNAP RING

REACTION RUBBER

BOOT

DIAPHRAGM

POPPET VALVE

FILTER A (Felt)

E-CLIP

FILTER B (Foam)

SNAP RING

BUSHING RETAINER

BUSHING

PISTON SEAL

19 mm SNAP RING

O-RING

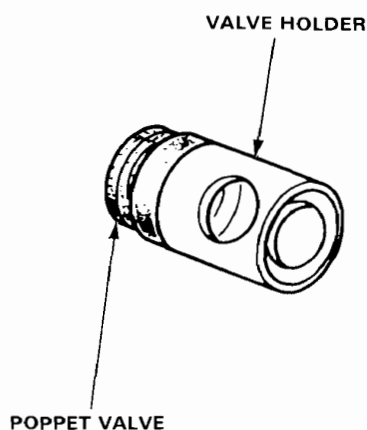
SILICONE GREASE



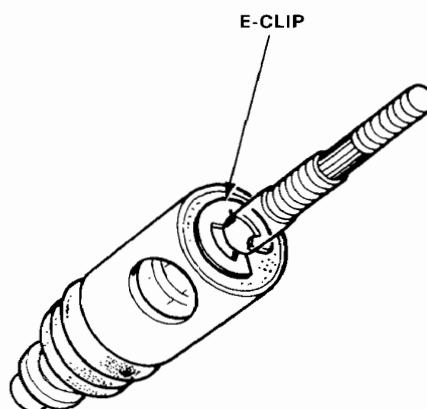
Reassembly

NOTE: Clean all parts before reassembly.

1. Install the poppet valve on the valve holder.

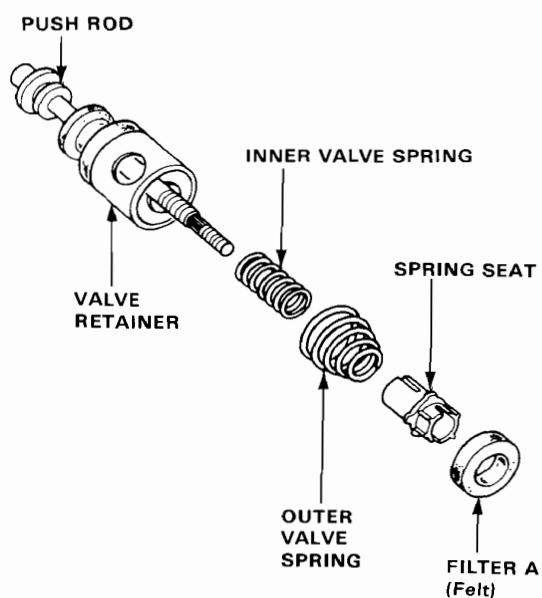


3. Install a new filter A (felt) on the push rod and secure with a new E-clip.

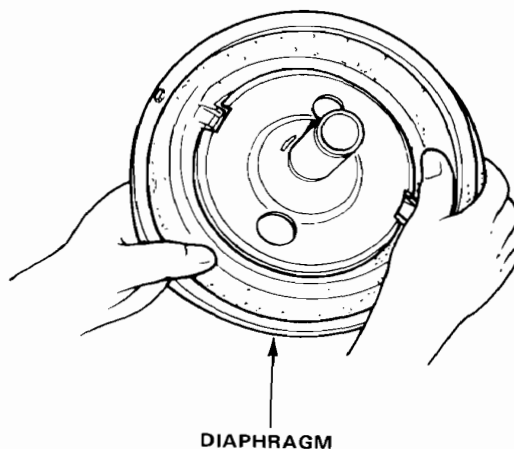


2. Install the valve holder, inner valve spring, outer valve spring and spring seat on the push rod.

NOTE: Install the spring seat with its short end facing the filter side.



4. Install the diaphragm on the booster piston.

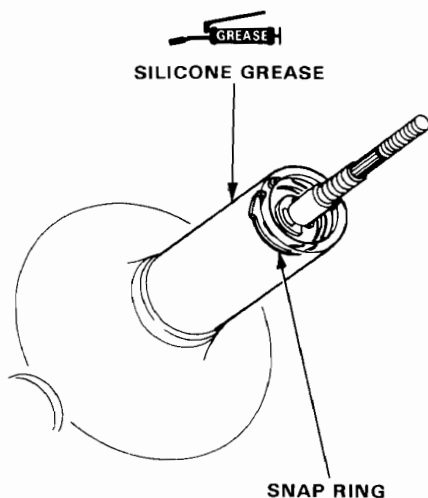


(cont'd)

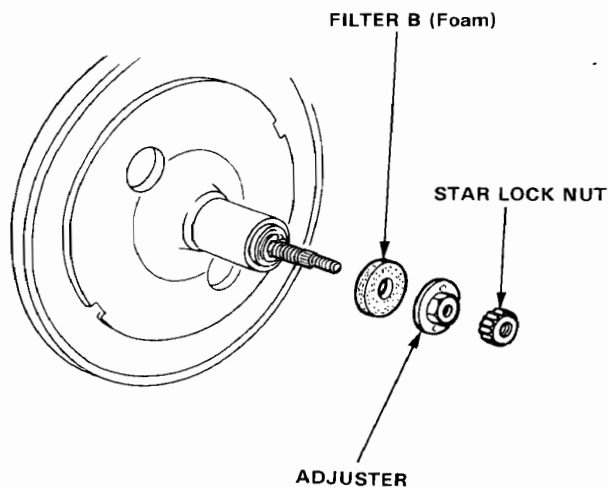
Brake Booster

Reassembly (cont'd)

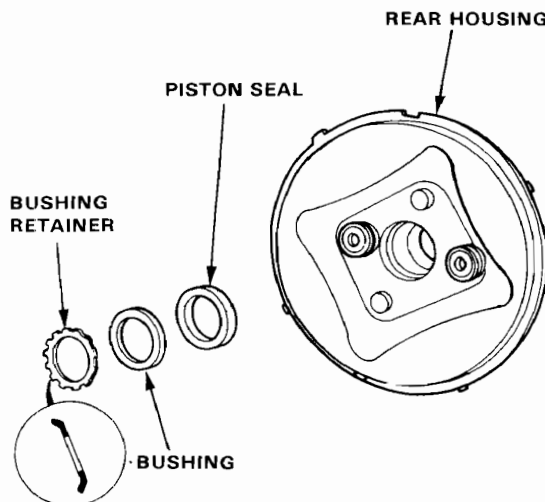
5. Apply silicone grease to the inner and outer surface of the booster piston tube.
6. Install the push rod assembly and secure with the snap ring.



7. Install filter B (foam) on the push rod, then loosely install the adjuster and start lock nut.



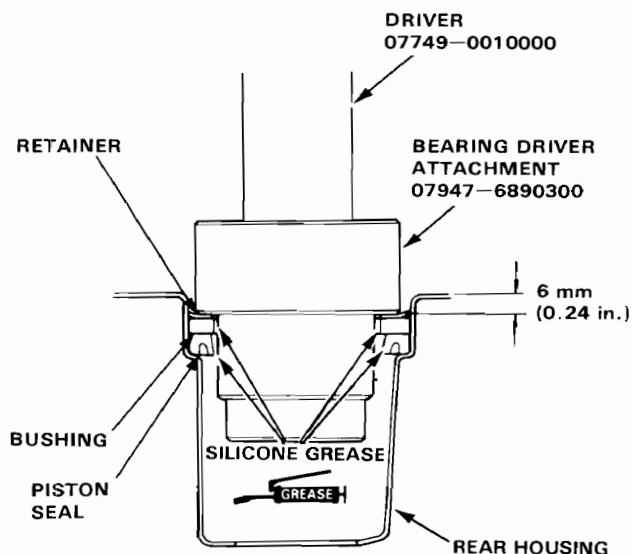
8. Apply silicone grease to the piston seal.
9. Position the piston seal, bushing and bushing retainer on the rear housing.



NOTE: Make sure the lip of the seal is facing in, as shown in drawing below.

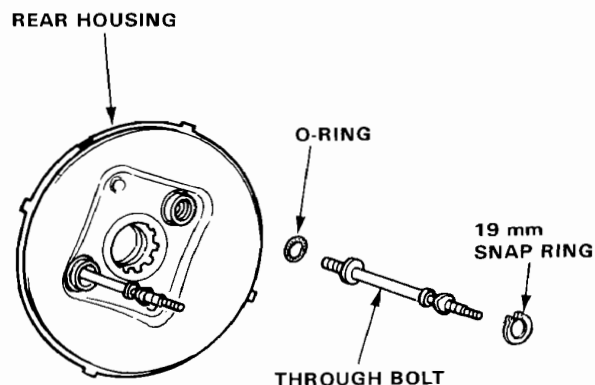
10. Drive the bushing retainer in until it is 6 mm below the edge of the rear housing.

CAUTION: If you drive the retainer more than 6 mm, the piston seal may distort.

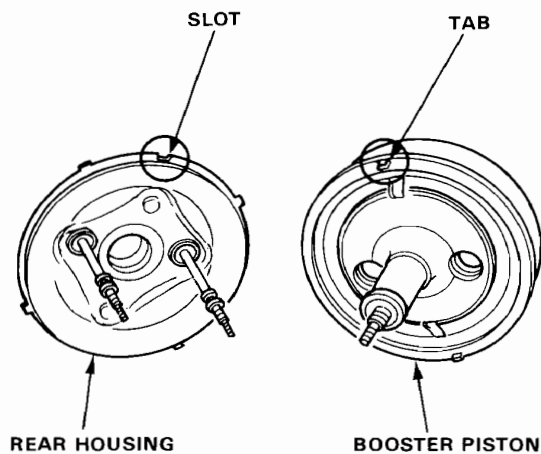




11. Install the O-rings and through bolts on the rear housing and secure with 19 mm snap ring.

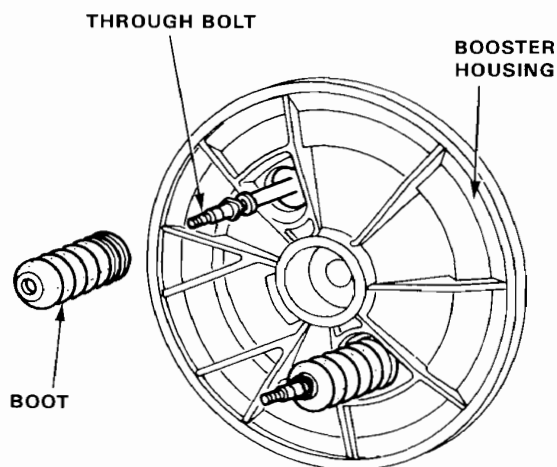


12. Install the booster piston on the rear housing aligning their tabs and slots.



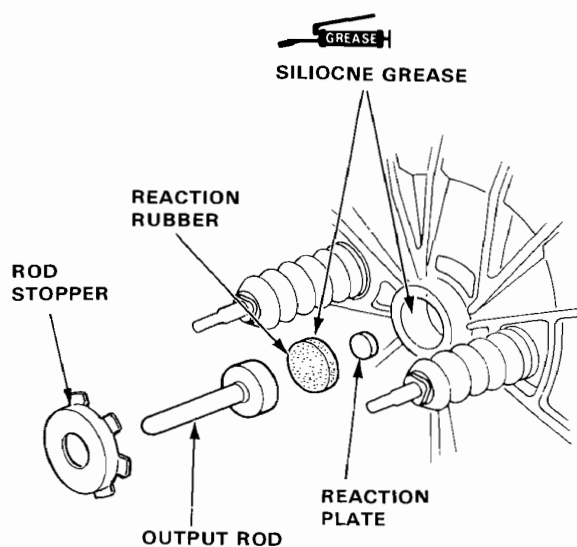
13. Install the boots on the through bolts.

NOTE: Make sure not to damage the boots when installing.



14. Apply silicone grease to the bore of the booster piston and reaction rubber.

15. Install the reaction plate, reaction rubber, output rod and rod stopper on the booster piston.

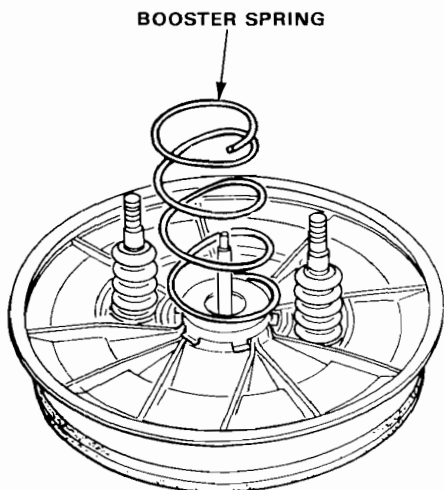


(cont'd)

Brake Booster

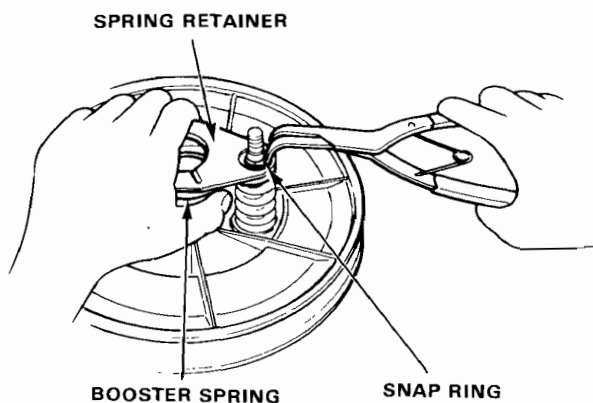
Reassembly (cont'd)

16. Install the booster spring.



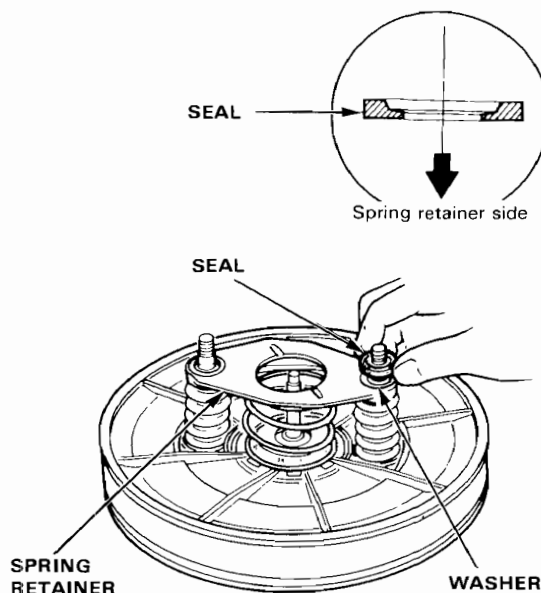
17. Install the spring retainer on the through bolts aligning the square portions of the bolts and retainer.

18. Compress the booster spring, then install the 10 mm snap ring on the through bolts.

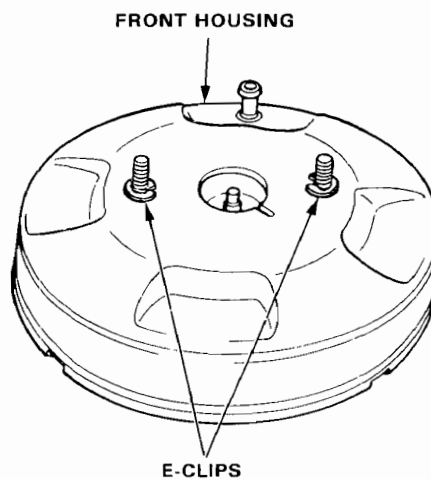


19. Install the washers and seals on the through bolts.

NOTE: Install the seals with the flat sides facing the spring retainer side as shown.



20. Install the front housing and secure with E-clips.

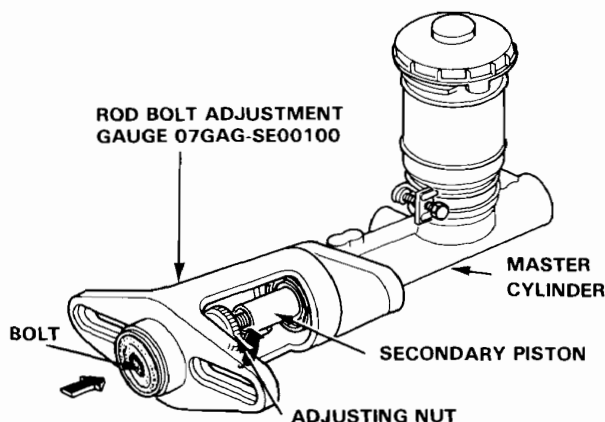




Pushrod Clearance Adjustment

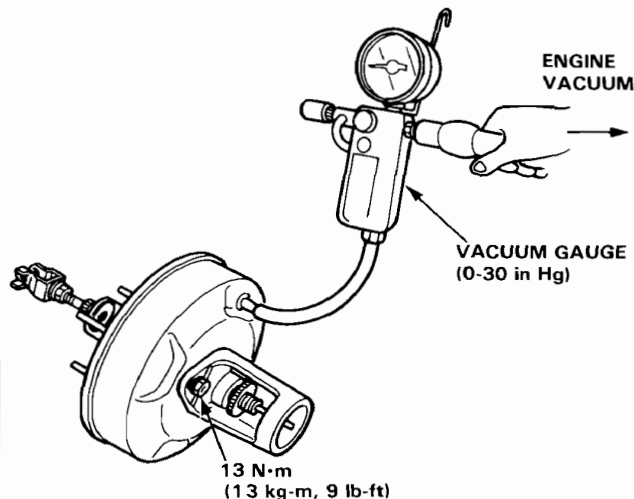
NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

1. Using the Rod Bolt Adjustment Gauge, adjust bolt so the top of it is flush with end of master cylinder piston.

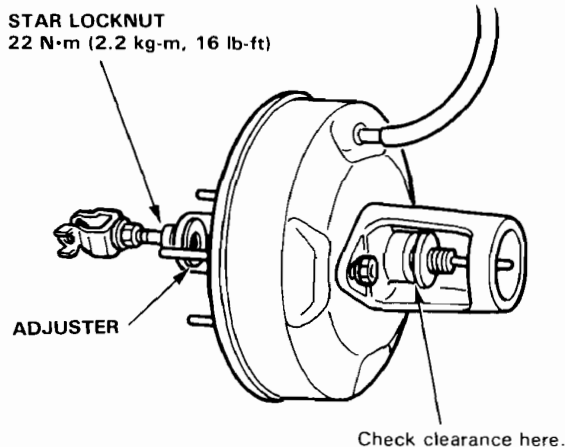


2. Without disturbing the adjusting bolt's position, install the master cylinder rod seal on the adjustment gauge and put the gauge upside down on the booster.
3. Install the master cylinder nuts and tighten to the specified torque.
4. Connect the booster in-line with a vacuum gauge (0–30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 500 mm Hg (20 in Hg) vacuum.
5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.

CLEARANCE: 0–0.4 mm (0–0.016 in.)



6. If clearance is incorrect, loosen star locknut and turn adjuster in or out to adjust.
7. Tighten locknut securely.

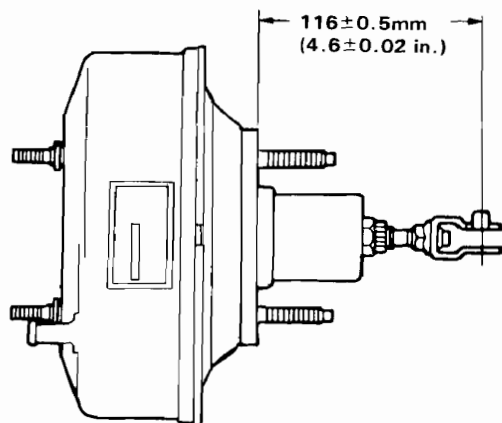


NOTE: If the clearance between the gauge body and the adjusting nut is 0 mm, the push rod-to-piston clearance is adjusted to 0.4 mm. If the clearance is 0.4 mm, the push rod-to-piston clearance is adjusted to 0 mm.

Brake Booster

Pushrod Adjustment

Install the locknut and pushrod yoke on the pushrod, adjust the pushrod length as shown.

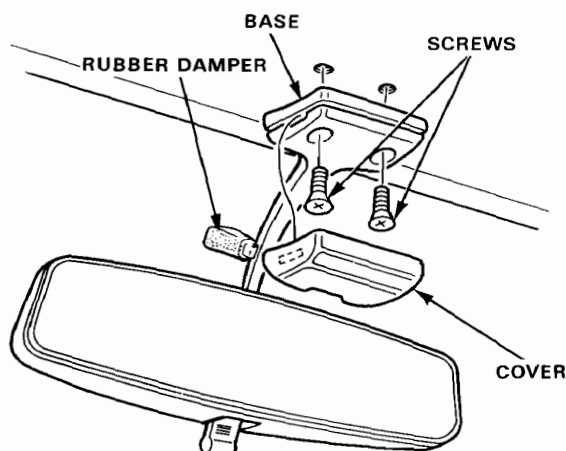


NOTE: Adjust the brake pedal height after installing the brake booster.

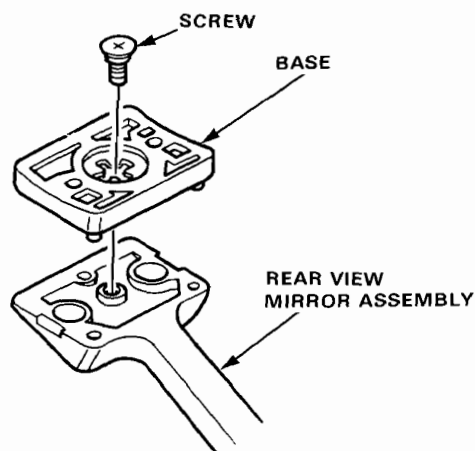
Rear View Mirror/Console

Rear View Mirror Replacement

1. Remove the rubber damper.
2. Pry the cover off using the end of a slot-head screw driver.

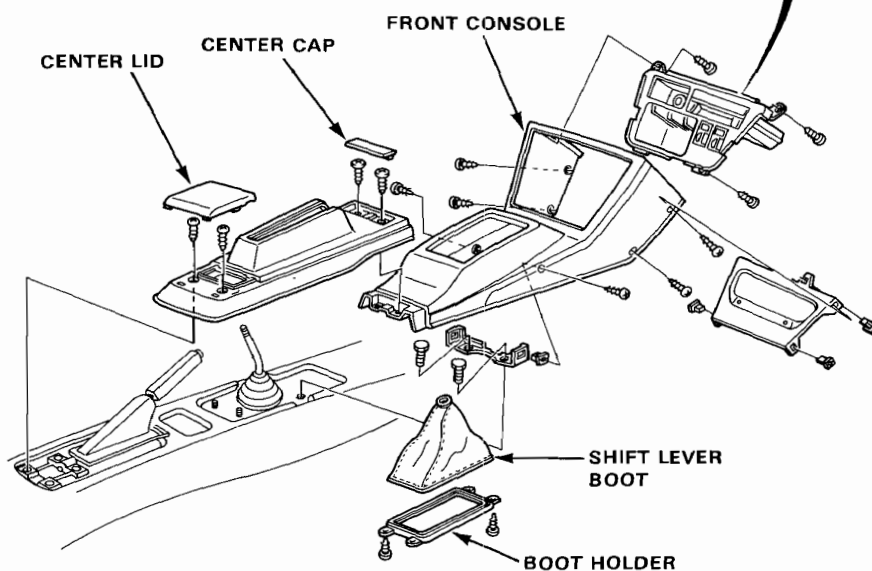
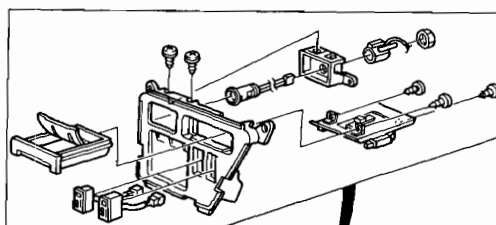


3. Remove both mounting screws from the mirror base, then remove the mirror assembly.
4. Remove the base from the rear view mirror.



Console Replacement

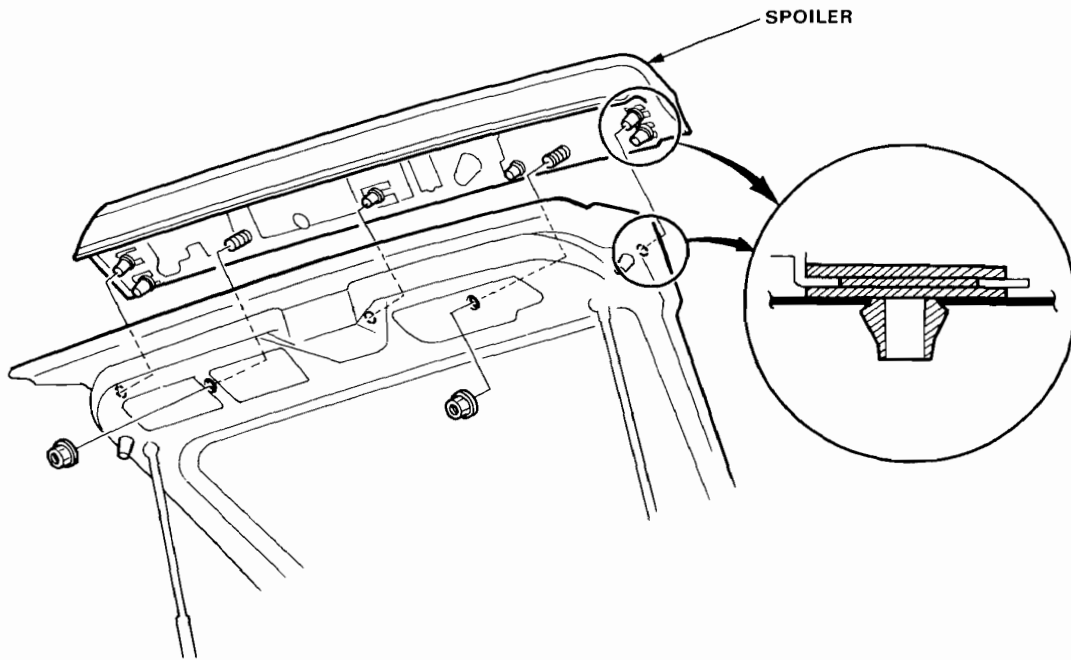
1. Remove the shift lever knob.
2. Lift up the parking brake lever.
3. Remove the center cap and center lid.
4. Remove the console by removing the attaching screws.
5. Install the console in the reverse order of removal.



Rear Spoiler/Side Panel

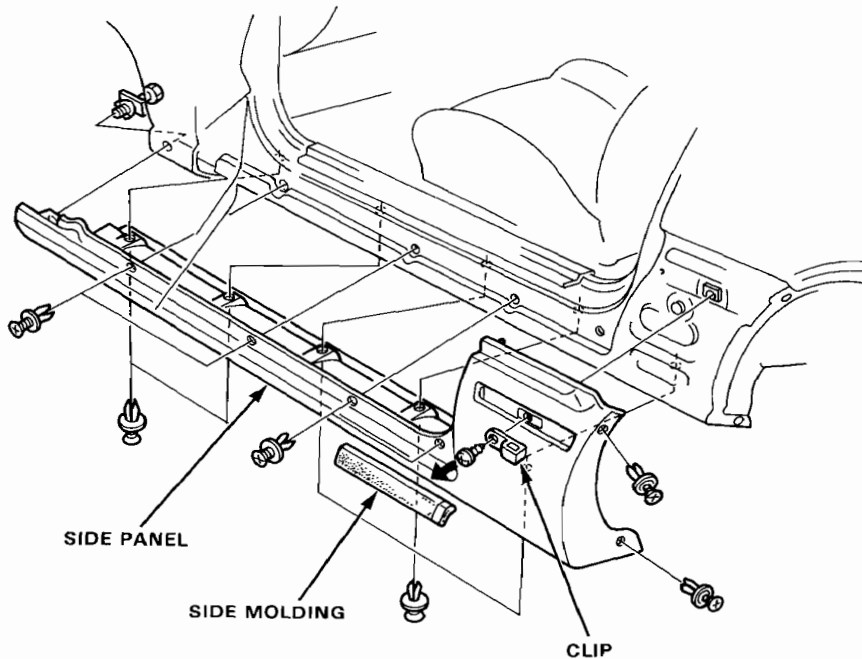


Rear Spoiler Replacement



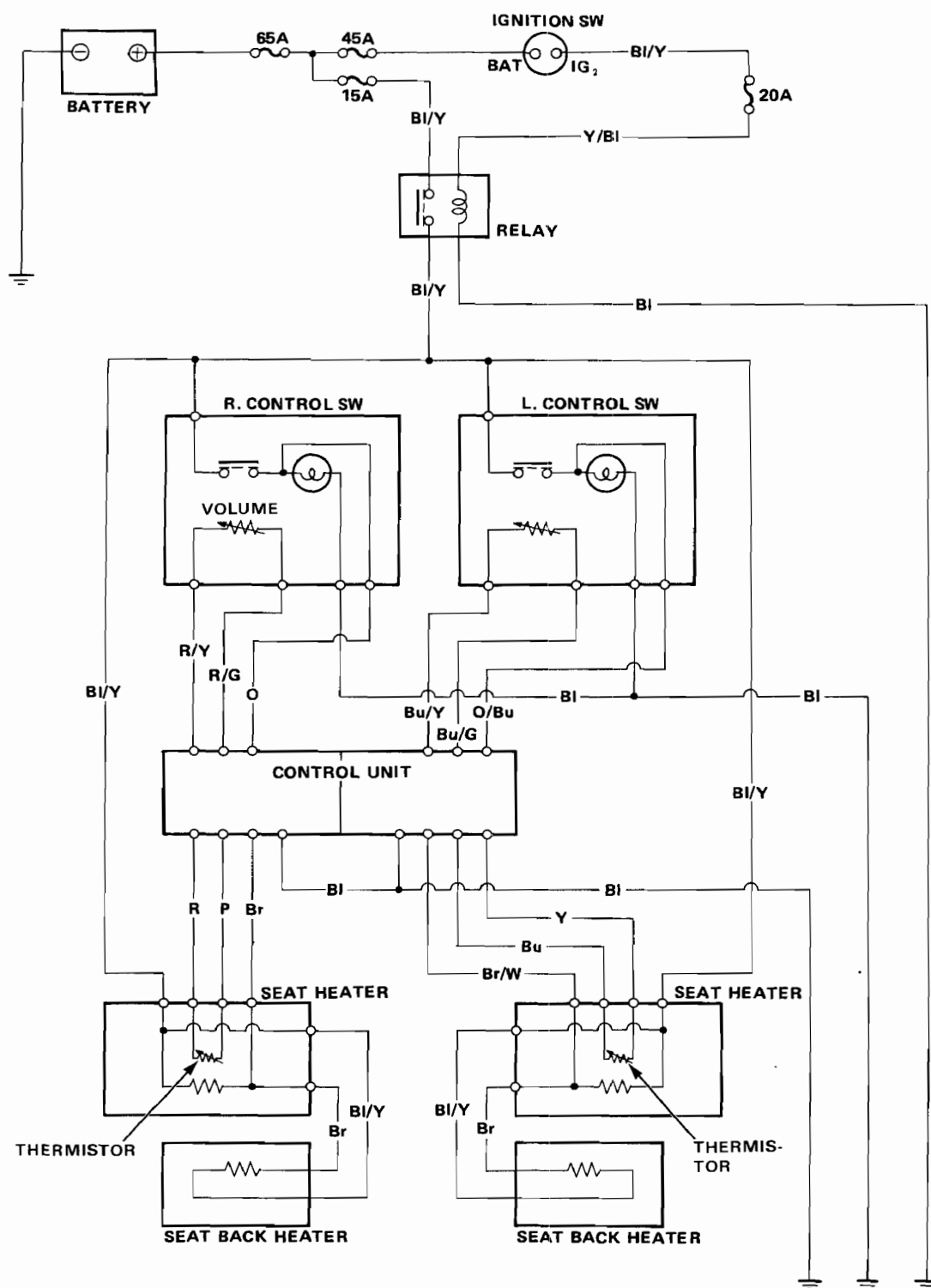
Side Panel Replacement

- Remove the side molding and 13 screws, then remove the side panel.



Heated Seats

Wiring Diagram





Troubleshooting

Description :

- Two heaters are provided in each seat; one in the seat cushion and one in the seat back.
- The heater in the seat cushion uses a temperature-dependent diode (thermistor) to measure differences in the seat temperatures. The use of the thermistor and transistors in the control unit combine to offer more accurate temperature control than thermostat type seat heaters.

● Heat temperature cannot be adjusted.

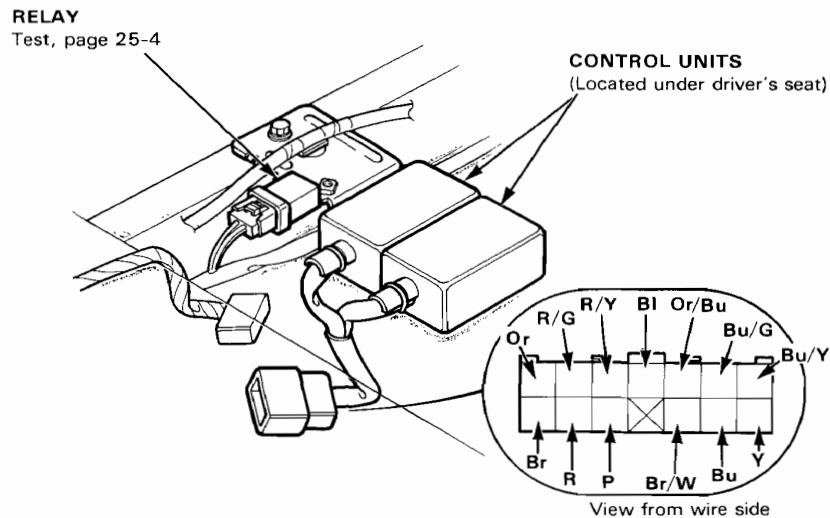
1. Check the control switch.
2. Check the heater unit.
3. Check the control unit.

● Seat heater is not warmed.

1. Check the fuse (15A, 20A) for blown.
2. Check the relay.
3. Check the control switch.
4. Check the heater unit.
5. Check the control unit.

Control Unit Terminal Arrangement

Under driver's seat:

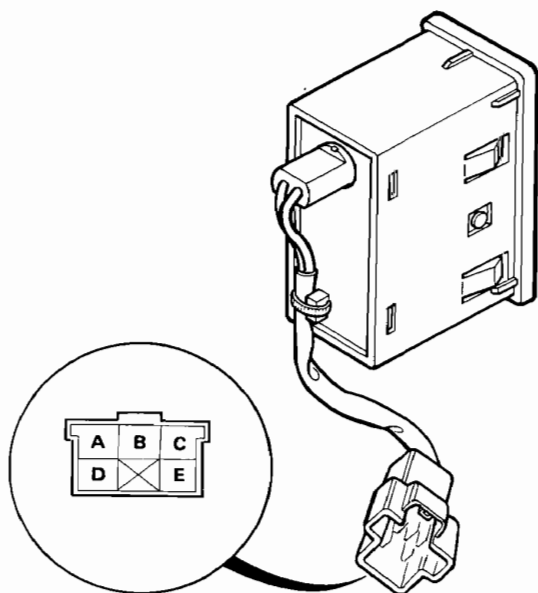


Br	Right heater ground
Br/W	Left heater ground
R and P	Right seat thermistor
Bu and Y	Left seat thermistor
Bl	Ground
Or	Right seat power
Or/Bu	Left seat power
R/Y and R/G	Right seat control switch
Bu/Y and Bu/G	Left seat control switch

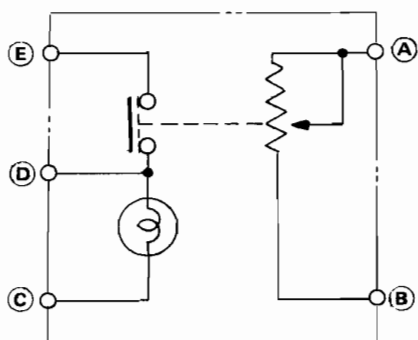
Heated Seats

Control Switch Test

1. Remove the switch.
2. Measure resistance between (A) and (B) terminals while rotating the adjusting dial. Resistance should vary from 0 to 10,000 ohms as dial is rotated.



View from terminal side.

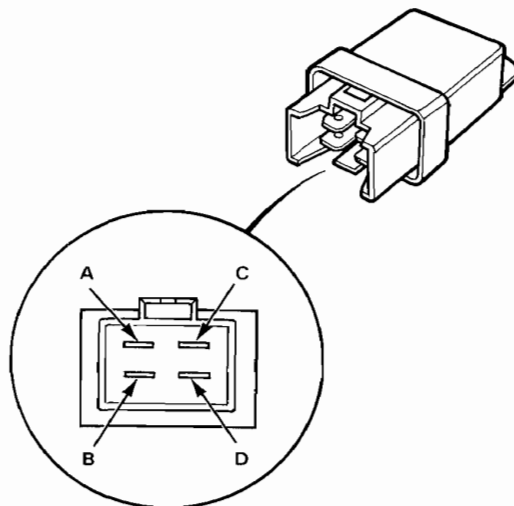


Relay Test

Remove the relay under the driver's seat.

There should be continuity between A and B terminals, when the battery is connected to C (positive) and D (negative) terminals.

There should be no continuity when the battery is disconnected.



Ignition

Ignition Coil Test (EW2 engine)

1. With the ignition switch OFF, disconnect the primary connectors and the coil wire.
2. Using an ohmmeter, check the resistance between the terminals. Replace the coil if the resistance is not within specifications.

NOTE: Resistance will vary with the coil temperature. Resistances are for 20°C (70°F).

Primary Winding Resistance (between the A and D terminals):

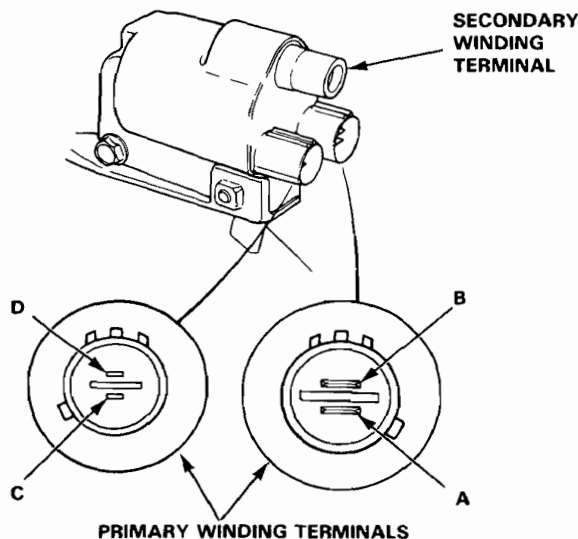
1.215–1.485 ohms

Secondary Winding Resistance (between the A and secondary winding terminals):

9,040–13,560 ohms

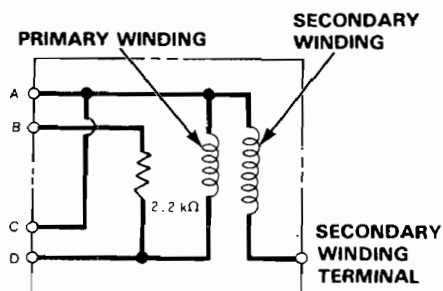
Resistance between the B and D terminals:

2,090–2,310 ohms



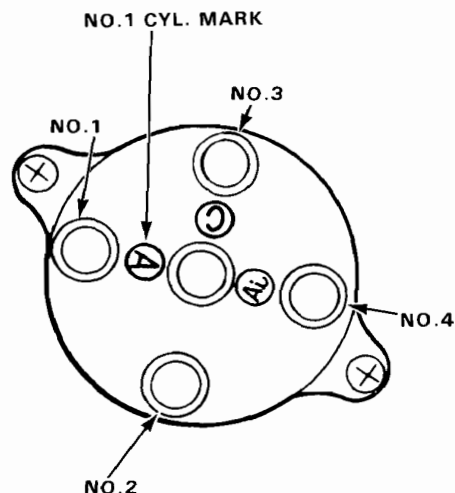
3. Check for continuity between the A and C terminals. Replace the coil if there is no continuity.

Circuit Diagram



Plug Wire Installation (ZC1 engine)

Connect the spark plug wires as shown.

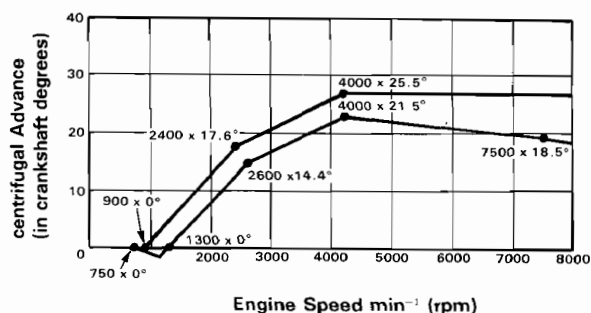




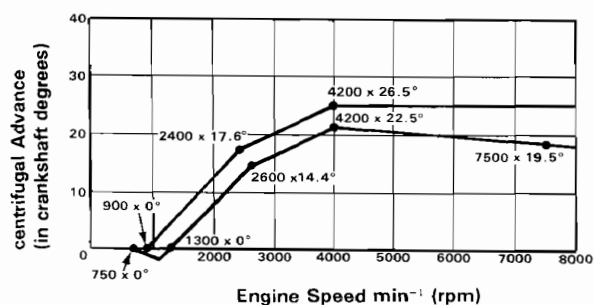
Advance Inspection (ZC1 engine)

Centrifugal Advance:

KS model:

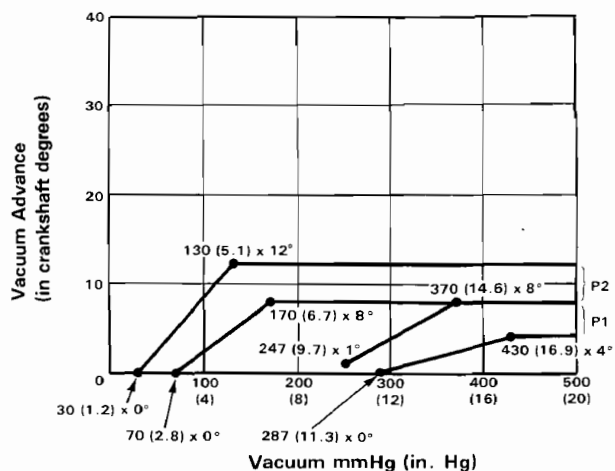


Others:

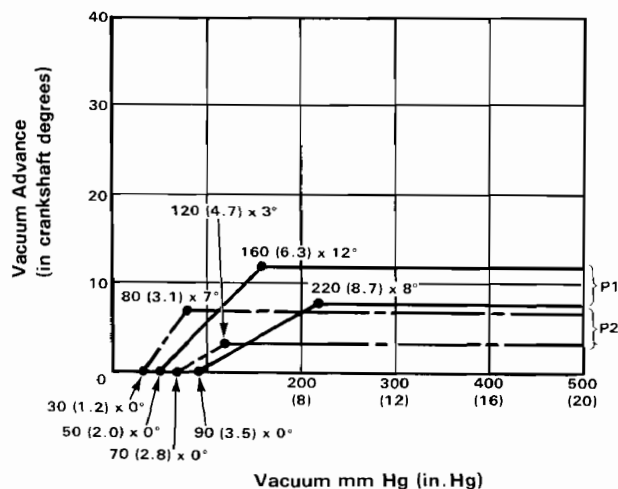


Vacuum Advance:

KS model:



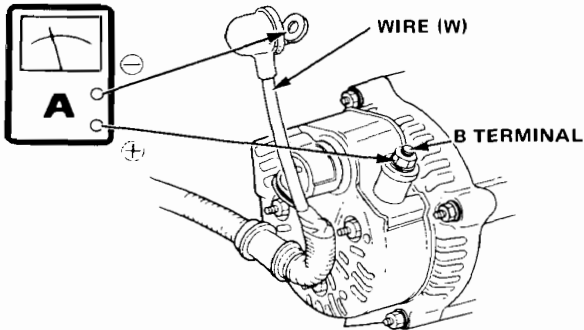
Others:



Charging

Alternator Output Test

1. With engine off, disconnect the alternator terminal (W).
2. Hook up an ammeter as shown.



3. Start the engine.
4. Turn on:
 - Headlight switch (high beam).
 - Rear window defroster switch.
 - Heater fan switch (MAX).
5. Check alternator output.

If within the output curve shown, the alternator is good.

If the alternator has no output or its output is not within specification, see the alternator checks starting.

