Chassis and Engine Number

Vehicle Identification Number

SAH HW H L L B A D 140001

Manufacturer Code
Rover Group Ltd.

Model Type
HW : Concerto

Grade
H : GL, 1.5i
W : 1.6i-16
Y : 1.6i
Z : 1.6i-16SE

Body Type
L : 4-door Saloon
W : 5-door Saloon

Engine Type
L : 1400 SOHC Twin Carb.
M : 1600 SOHC PGM-FI with Catalyst
N : 1600 DOHC PGM-FI with Catalyst
P : 1500 SOHC PGM-FI with Catalyst
U : 1600 DOHC PGM-FI

Transmission and Steering
B : RHD M/T 1500 SOHC
C : RHD M/T 1600 SOHC
D : RHD M/T 1600 DOHC
J : RHD A/T 1500 SOHC
J : RHD A/T 1600 SOHC
N : LHD M/T 1400 SOHC
P : LHD M/T 1600 SOHC
R : LHD M/T 1600 DOHC
T : LHD M/T 1500 SOHC
V : LHD A/T 1500 SOHC
X : LHD A/T 1600 SOHC
Y : LHD A/T 1600 DOHC
Z : LHD A/T 1400 SOHC

Model Year
A : 1990, 1991

Factory Code
D : Longbridge

Serial Number

Engine Number

D14A1-E100001

Engine Type
D14A1: 1.4 ℓ SOHC Cabureted Engine without catalytic converter
D15B2: 1.5 ℓ SOHC PGM-FI Engine with catalytic converter
D16A8: 1.6 ℓ DOHC PGM-FI Engine with catalytic converter
D16A9: 1.6 ℓ DOHC PGM-FI Engine without catalytic converter for manual transmission
D16Z2: 1.6 ℓ SOHC PGM-FI Engine with catalytic converter
D16Z4: 1.6 ℓ DOHC PGM-FI Engine without catalytic converter for automatic transmission

Serial Number

Transmission Number

P7-2000001

Transmission Type
P7 : Manual 5-speed
MPPA : Automatic 4-speed

Serial Number
P7 : 2000001~
MPPA : 2000001~

Chassis and Engine Numbers

MODEL YEAR	DOOR	ENGINE	GRADE	AREA	SHIFT TYPE	FRAME NUMBER	ENGINE NUMBER	TRANSMISSION NUMBER
1991	5D	1400 2 Carb	GL	KB	M/T	SAHHW HWLNAD140001~	D14A1-E100001~	P7-2000001~
					A/T	SAHHW HWLZAD140001~		MPPA-2000001~
		1500 PGM-FI	1.5i	KE	M/T	SAHHW HWPBAD140001~	D15B2-E100001~	P7-2000001~
					A/T	SAHHW HWPJAD140001~		MPPA-2000001~
				KF	M/T	SAHHW HWPTAD140001~		P7-2000001~
					A/T	SAHHW HWPVAD140001~		MPPA-2000001~
				KG	M/T	SAHHW HWPTAD140001~		P7-2000001~
					A/T	SAHHW HWPVAD140001~		MPPA-2000001~
		1600 SOHC PGM-FI	1.6i	KB	M/T	SAHHW YWMPAD140001~	D16Z2-E100001~	P7-2000001~
					A/T	SAHHW YWMXAD140001~		MPPA-2000001~
				KE	M/T	SAHHW YWMCAD140001~		P7-2000001~
					A/T	SAHHW YWMJAD140001~		MPPA-2000001~
				KF	M/T	SAHHW YWMPAD140001~		P7-2000001~
					A/T	SAHHW YWMXAD140001~		MPPA-2000001~
				KG	M/T	SAHHW YWMPAD140001~		P7-2000001~
					A/T	SAHHW YWMXAD140001~		MPPA-2000001~
				KX	M/T	SAHHW YWMPAD140001~		P7-2000001~
					A/T	SAHHW YWMXAD140001~		MPPA-2000001~
			1.6i (A.L.B.)	KE	M/T	SAHHW YWMCAD140001~	D16Z2-E100001~	P7-2000001~
					A/T	SAHHW YWMJAD140001~		MPPA-2000001~
				KG	M/T	SAHHW YWMPAD140001~		P7-2000001~
					A/T	SAHHW YWMXAD140001~		MPPA-2000001~
				KX	M/T	SAHHW YWMPAD140001~		P7-2000001~
					A/T	SAHHW YWMXAD140001~		MPPA-2000001~
		1600 DOHC PGM-FI	1.6i-16	KB	M/T	SAHHW WWURAD140001~	D16A9-E100001~	P7-2000001~
					A/T	SAHHW WWUYAD140001~	D16Z4-E100001~	MPPA-2000001~
				KE	M/T	SAHHW WWNDAD140001~	D16A8-E100001~	P7-2000001~
				KF	M/T	SAHHW WWNRAD140001~	D16A8-E100001~	P7-2000001~
				KG	M/T	SAHHW WWNRAD140001~	D16A8-E100001~	P7-2000001~
				KX	M/T	SAHHW WWNRAD140001~	D16A8-E100001~	P7-2000001~
			1.6i-16 (A.L.B.)	KB	M/T	SAHHW WWURAD140001~	D16A9-E100001~	P7-2000001~
					A/T	SAHHW WWUYAD140001~	D16Z4-E100001~	MPPA-2000001~
				KE	M/T	SAHHW WWNDAD140001~	D16A8-E100001~	P7-2000001~
				KF	M/T	SAHHW WWNRAD140001~	D16A8-E100001~	P7-2000001~
				KG	M/T	SAHHW WWNRAD140001~	D16A8-E100001~	P7-2000001~
				KX	M/T	SAHHW WWNRAD140001~	D16A8-E100001~	P7-2000001~
			1.6i-16SE	KE	M/T	SAHHW ZWNDAD140001~	D16A8-E100001~	P7-2000001~
			1.6i-16SE (A.L.B.)	KE	M/T	SAHHW ZWNDAD140001~	D16A8-E100001~	P7-2000001~

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Chassis and Engine Numbers (cont'd)

MODEL YEAR	DOOR	ENGINE	GRADE	AREA	SHIFT TYPE	FRAME NUMBER	ENGINE NUMBER	TRANSMISSION NUMBER
1991	4D	1400 2 Carb	GL	KB	M/T	SAHHW HLLNAD140001~	D14A1-E100001~	P7-2000001~
					A/T	SAHHW HLLZAD140001~		MPPA-2000001~
		1500 PGM-FI	1.5i	KF	M/T	SAHHW HLPTAD140001~	D15B2-E100001~	P7-2000001~
					A/T	SAHHW HLPVAD140001~		MPPA-2000001~
		1600 SOHC PGM-FI	1.6i	KB	M/T	SAHHW YLMPAD140001~	D16Z2-E100001~	P7-2000001~
					A/T	SAHHW YLMXAD140001~		MPPA-2000001~
				KE	M/T	SAHHW YLMCAD140001~		P7-2000001~
					A/T	SAHHW YLMJAD140001~		MPPA-2000001~
				KF	M/T	SAHHW YLMPAD140001~		P7-2000001~
					A/T	SAHHW YLMXAD140001~		MPPA-2000001~
			1.6i (A.L.B.)	KE	M/T	SAHHW YLMCAD140001~		P7-2000001~
					A/T	SAHHW YLMJAD140001~		MPPA-2000001~
		1600 DOHC PGM-FI	1.6i-16	KB	M/T	SAHHW WLURAD140001~	D16A9-E100001~	P7-2000001~
					A/T	SAHHW WLUYAD140001~	D16Z4-E100001~	MPPA-2000001~
				KE	M/T	SAHHW WLNDAD140001~	D16A8-E100001~	P7-2000001~
				KF	M/T	SAHHW WLNRAD140001~	D16A8-E100001~	P7-2000001~
			1.6i-16 (A.L.B.)	KB	M/T	SAHHW WLURAD140001~	D16A9-E100001~	P7-2000001~
					A/T	SAHHW WLUYAD140001~	D16Z4-E100001~	MPPA-2000001~
				KE	M/T	SAHHW WLNDAD140001~	D16A8-E100001~	P7-20000001~
				KF	M/T	SAHHW WLNRAD140001~	D16A8-E100001~	P7-2000001~
			1.6i-16SE	KE	M/T	SAHHW ZLNDAD140001~	D16A8-E100001~	P7-2000001~
			1.6i-16SE (A.L.B.)	KE	M/T	SAHHW ZLNDAD140001~	D16A8-E100001~	P7-2000001~

Standards and Service Limits

5. Engine/Cylinder Head, Valve Train (SOHC Engine)

Unit: mm (in.)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	250 min^{-1} (rpm) and wide-open throttle	Normal Minimum Maximum variation	—— —— ——	1,275 kPa (13.0 kg/cm^2, 185 psi) 932 kPa (9.5 kg/cm^2, 135 psi) 196 kpa (2 kg/cm^2, 28 psi)
Cylinder head	Warpage Height		—— 94.95-95.05 (3.7381-3.7421)	0.05 (0.002) ——
Camshaft	End play Oil clearance Runout Cam lobe height 1.4ℓ (2-Carb.) } 1.5ℓ (PGM-FI) } 1.6ℓ (2-Carb.) 1.6ℓ (PGM-FI)	 IN EX M/T A/T IN EX IN EX	0.05-0.15 (0.002-0.006) 0.050-0.089 (0.002-0.004) 0-0.03 (0-0.001) max. 36.603 (1.4411) 36.747 (1.4467) 36.750 (1.4468) 36.782 (1.4481) 36.947 (1.4546) 36.782 (1.4481) 36.947 (1.4546)	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	0.17-0.22 (0.007-0.009) 0.22-0.27 (0.009-0.011) 5.48-5.49 (0.2157-0.2161) 5.45-5.46 (0.2147-0.2150) 0.02-0.05 (0.001-0.002) 0.45-0.08 (0.002-0.003) 46.985-47.455 (1.8498-1.8683) 48.965-49.435 (1.9278-1.9562)	—— —— 5.45 (0.2146) 5.42 (0.2134) 0.08 (0.003) 0.11 (0.004) 47.705 (1.8781) 49.685 (1.9561)
Valve seat	Width	IN EX	0.85-1.15 (0.033-0.045) 1.25-1.55 (0.049-0.061)	1.6 (0.06) 2.0 (0.08)
Valve spring	Free length 1.4ℓ (2-Carb.) Others	 IN EX IN EX	 48.58 (1.9126) 48.49 (1.9091) 48.58 (1.9126) 49.19 (1.9366)	 47.64 (1.8756) 47.68 (1.8772) 47.64 (1.8756) 48.32 (1.9024)
Valve guide	I.D.	IN and EX	5.51-5.53 (0.2169-0.2177)	5.55 (0.2185)
Rocker arm	Arm-to-ahaft clearance	IN EX	0.017-0.050 (0.0007-0.0020) 0.018-0.054 (0.0007-0.0021)	0.08 (0.003) 0.08 (0.003)

Unit: mm (in.)

5. Engine/Cylinder Head, Valve Train (DOHC Engine)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	250 min⁻¹ (rpm) and wide-open throttle	Nominal	—	1,324 kPa (13.5 kg/cm², 192 psi)
		Minimum	—	932 kPa (9.5 kg/cm², 135 psi)
		Maximum variation	—	196 kPa (2 kg/cm², 28 psi)
Cylinder head	Warpage		—	0.05 (0.002)
	Height		131.95—132.05 (5.1949—5.1988)	—
Camshaft	End play		0.05—0.15 (0.002—0.006)	0.5 (0.02)
	Oil clearance		0.050—0.089 (0.002—0.004)	0.15 (0.006)
	Runout		0—0.03 (0—0.001) max.	0.06 (0.002)
	Cam lobe height	IN	33.021 (1.3000)	—
		EX	32.382 (1.2749)	—
Valve	Valve clearance	IN	0.12—0.17 (0.005—0.007)	—
		EX	0.14—0.19 (0.006—0.008)	—
	Valve stem O.D.	IN	6.58—6.59 (0.2591—0.2595)	6.55 (0.2579)
		EX	6.55—6.56 (0.2579—0.2583)	6.52 (0.2567)
	Stem-to-guide clearance	IN	0.02—0.05 (0.001—0.002)	0.08 (0.003)
		EX	0.05—0.08 (0.002—0.003)	0.11 (0.005)
	Stem installed height	IN	45.545—46.015 (1.7931—1.8116)	46.265 (1.8215)
		EX	44.735—45.205 (1.7612—1.7797)	45.455 (1.7896)
Valve seat	Width	IN and EX	1.25—1.55 (0.049—0.061)	2.0 (0.08)
Valve spring	Free length	IN	47.49 (1.8697)	46.46 (1.8291)
		EX	46.89 (1.8461)	45.93 (1.8083)
Valve guide	I.D.	IN and EX	6.61—6.63 (0.2602—0.2610)	6.55 (0.2579)

5. Engine/Engine Block

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface		—	0.10 (0.004)
	Bore diameter		75.00—75.02 (2.9528—2.9535)	75.07 (2.9555)
	Bore taper		—	0.05 (0.002)
	Reboring limit		—	0.5 (0.02)
Piston	Skirt O.D. At 16 mm (0.63 in) from bottom of skirt		74.98—74.99 (2.9520—2.9524)	74.97 (2.9516)
	Clearance in cylinder		0.01—0.04 (0.0004—0.0016)	0.05 (0.002)
	Piston-to-ring clearance	Top	0.03—0.06 (0.0012—0.0024)	0.13 (0.005)
		2nd	0.030—0.055 (0.0012—0.0022)	0.13 (0.005)
Piston ring	Ring end gap	Top	0.15—0.30 (0.006—0.012)	0.6 (0.02)
		2nd	0.30—0.45 (0.012—0.018)	0.6 (0.02)
		Oil	0.20—0.80 (0.008—0.031)	0.9 (0.04)
Connecting rod	Pin-to-rod interference		0.014—0.040 (0.0006—0.0016)	—
	Large end bore diameter	1.4 ℓ	Nominal 43.0 (1.69)	—
		1.5 ℓ	Nominal 45.0 (1.77)	—
		1.6 ℓ	Nominal 48.0 (1.89)	—
	End play installed on crankshaft		0.15—0.30 (0.006—0.012)	0.40 (0.016)
Crankshaft	Main journal diameter	except 1.6 ℓ	44.976—45.000 (1.7707—1.7718)	—
		1.6 ℓ	54.976—55.000 (2.1644—2.1654)	—
	Taper/out-of-round, main journal		0.0025 (0.0001) max.	0.010 (0.004)
	Rod journal diameter	1.4 ℓ	39.976—40.000 (1.5739—1.5748)	—
		1.5 ℓ	41.976—42.000 (1.6526—1.6535)	—
		1.6 ℓ	44.976—45.000 (1.7707—1.7765)	—
	Taper/out-of-round, rod journal		0.0025 (0.0001) max.	0.010 (0.004)
	End play		0.10—0.35 (0.004—0.014)	0.45 (0.018)
	Runout		0.03 (0.0012) max.	0.06 (0.0024)
Bearings	Main bearing-to-journal oil clearance			
	except 1.6ℓ	(No. 1, 5 journals)	0.018—0.036 (0.0007—0.0014)	0.05 (0.002)
		(No. 2, 3, 4 journals)	0.024—0.042 (0.0010—0.0017)	0.05 (0.002)
	1.6ℓ	(No. 1, 5 journals)	0.018—0.036 (0.0007—0.0014)	0.05 (0.002)
		(No. 2, 4 journals)	0.024—0.042 (0.0010—0.0017)	0.05 (0.002)
		(No. 3 journal)	0.030—0.048 (0.0012—0.0019)	0.05 (0.002)
	Rod bearing-to-journal oil clearance		0.020—0.038 (0.0008—0.0015)	0.05 (0.002)

Standards and Service Limits

5. Engine/Engine Lubrication

Unit: mm (in.)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (U S qt, Imp qt) (Includes oil filter 0.5 (0.53, 0.44))	SOHC DOHC	4.0 (4.2, 3.5) for engine disassembly 3.5 (3.7, 3.1) for oil change 4.3 (4.5, 3.8) for engine disassembly 3.8 (4.0, 3.3) for oil change	
Oil pump	Displacement ℓ (US qt, Imp qt) @min^{-1} (rpm)	SOHC DOHC	44 (11.6, 9.7) @ 6,250 62 (16.3, 13.6) @ 6,750	
	Inner-to-outer rotor radial clearance Pumb body-to-rotor radial clearance Pump body-to rotor side clearance		0.14 (0.006) 0.100-0.175 (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) kPa (Kg/cm^2, psi)	Idle	69 (0.7, 10) min.	
		3,000min-^{1}(rpm)	343 (3.5, 50) min.	

5. Engine/Cooling

	MEASUREMENT	STANDARD (NEW)	
Radiator	Capacity (incl. heater) ℓ (US qt, Imp qt) (Includes expantion tank 0.55 (0.58, 0.48)) 1.4ℓ (2-Carb.), 1.6 ℓ (PGM-FI) 1.5 ℓ (PGM-FI), 1.6 ℓ (2-Carb.), 1.6 ℓ DOHC	 M/T 5.4 (5.7, 4.8) M/T 5.5 (5.8, 4.8)	 A/T 5.3 (5.6, 4.7) A/T 5.4 (5.6, 4.8)
Expantion tank cap	Pressure cap opening pressure kPa (kg/cm^2, psi)	74-103 (0.75-1.05, 11-15)	
Thermostat	Starts to open Full open Valve lift at full open	76-80°C (169-176°F) 90°C (194°F) 8 (0.31) min.	
Water pump	Pulley ratio (crankshaft) Capacity ℓ (US gal, Imp gal) per min @ min^{-1} (rpm) SOHC DOHC	1 : 1 85 (22.4, 18.7) @ 4,000 76 (20.0, 16.7) @ 4,000	
Cooling fan	Thermoswith "ON" temperature Thermoswitch "OFF" temperature	91.5-94.5°C (197-202°F) Subtract 3.5 ± 1.5°C (6 ± 2.7°F) from actual "ON" temperature.	

6. Fuel and Emission (PGM-FI)

	MEASUREMENT	STANDARD (NEW)	
Fuel pump	Delivery pressure kPa (kg/cm^2, psi) Displacement cc/10 seconds Relief valve opening pressure kPa (kg/cm^2, psi)	250 (2.55, 36) 236 min. 441-588 (4.5-6.0, 64-85)	
Pressure regulator	Pressure kPa (kg/cm^2,psi)	245-255 (2.5-2.6, 36-37)	
Fuel Tank	Capacity ℓ (US gal, Imp gal)	55 (14.5, 12.1)	
Fast idle	min^{-1} (rpm)		M/T 1,000-2,000 A/T 1,000-2,000
Idle speed min^{-1} (rpm)	with headlights and cooling fan off 1.5 ℓ 1.6 ℓ 1.6 ℓ DOHC	 800 ± 50 780 ± 50 M/T: 800 ± 50	 A/T without CATA: 750 ± 50
Idle CO %	With CATA Without CATA	below 0.1 0.5 $^{+0.5}_{-0.3}$	

Unit: mm (in)

6. Fuel and Emissions (Carbureted Engine)

	MEASUREMENT	STANDARD (NEW)
Fuel pump	Delivery pressure kPa (kg/cm², psi) Displacement cc/minutes	6.8-22.6 (0.07-0.23, 1.0-3.2) 833.3 min.
Fuel Tank	Capacity ℓ (US gal, Imp gal)	55 (14.5, 12.1)
Fast idle		See section 6
Idle speed	With headlights and cooling fan off min^{-1} (rpm)	750 ± 50 700 ± 50
Idle CO	%	below 1.0

7. Clutch

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height from floor from carpet Stroke Disengagement height from floor Pedal play from carpet	208 (8.19) 194 (7.64) 135–145 (5.31–5.71) 52 (2.01) 25 (0.98) 15–20 (0.59–0.79)	— — — — — —
Clutch release arm	Free play at arm	3.5–4.5 (0.14–0.18)	—
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch disc	Rivet head depth Surface runout Radial play in spline at circumference (200ϕ) Thickness	1.3 (0.05) min. 0.8 (0.03) max. 0.1–0.5 (0.004–0.020) 8.4–8.9 (0.331–0.350)	0.2 (0.008) 1.0 (0.04) 3.4 (0.134) 6.2 (0.244)
Clutch release bearing holder	I.D. Holder-to-guide sleeve clearance	31.00–31.15 (1.220–1.226) 0.05–0.23 (0.002–0.009)	31.2 (1.228) 0.3 (0.012)
Clutch cover	Uneveness of diaphragm spring Pressure disc parallelism	0.8 (0.03) max. 0.03 (0.0012) max.	1.0 (0.04) 0.15 (0.006)

8. Manual Transmission

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)	1.8 (1.9, 1.6) at oil change 1.9 (2.0, 1.7) at assembly	
Mainshaft	End play Diameter of ball bearing contace area Diameter of third gear contact area Diameter of 4th, 5th gear contact area Diameter of ball bearing contact area Runout	0.11–0.18 (0.004–0.007) 25.977–25.990 (1.0227–1.0232) 33.984–34.000 (1.3380–1.3386) 26.980–26.993 (1.0622–1.0627) 21.987–22.000 (0.8656–0.8661) 0.02 (0.0008) max.	Adjust with a shim 25.92 (1.020) 33.93 (1.336) 26.93 (1.060) 21.93 (0.863) 0.05 (0.002)
Mainshaft third and fourth gears	I.D. End play 3rd 4th Thickness 3rd 4th	39.009–39.025 (1.5358–1.5364) 0.06–0.21 (0.0024–0.008) 0.06–0.19 (0.0024–0.0075) 30.22–30.27 (1.1898–1.1917) 30.12–30.17 (1.1858–1.1878)	39.07 (1.538) 0.33 (0.013) 0.31 (0.012) 30.15 (1.187) 30.05 (1.183)
Mainshaft fifth gears	I.D. End play Thickness	37.009–37.025 (1.4570–1.4577) 0.06–0.19 (0.0024–0.0075) 28.42–28.47 (1.1189–1.1209)	37.07(1.459) 0.31 (0.012) 28.35 (1.116)
Countershaft	End play Diameter of needle bearing contact area Diameter of ball bearing contact area Diameter of low gear contact area Runout	0.17–0.38 (0.0067–0.0150) 30.000–30.015 (1.1811–1.817) 24.980–24.993 (0.9835–0.9840) 35.984–36.000 (1.4167–1.4173) 0.02 (0.0008) max.	0.53 (0.021) 29.95 (1.179) 24.93 (0.981) 35.93 (1.415) 0.05 (0.002)
Countershaft low gear	I.D. End play, after tightening with specified torque Thickness	41.009–41.025 (1.6145–1.6152) 0.03–0.10 (0.0012–0.0039) 29.41–29.44 (1.1579–1.1591)	41.07 (1.617) 0.22 (0.009) 29.36 (1.156)

Standards and Service Limits

8. Manual Transmission (cont'd)

Unit: mm (in.)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Countershaft second gear	I.D. End play, after tightening with specified torque Thickness	44.009–44.025 (1.7326–1.7333) 0.03–0.11 (0.0012–0.0043) 29.92–29.97 (1.1780–1.1799)	44.07 (1.735) 0.23 (0.009) 29.85 (1.175)
Spacer collar (Countershaft second gear)	I.D. O.D. Length	32.975–32.985 (1.2982–1.2986) 38.989–39.000 (1.5350–1.5354) 30.03–30.06 (1.1823–1.1835)	33.03 (1.300) 38.93 (1.533) 30.01 (1.181)
Spacer collar (Mainshaft fourth and fifth gears)	I.D. O.D. 4th 5th Length 4th 5th	27.002–27.012 (1.0631–1.0635) 33.989–34.000 (1.3381–1.3386) 31.989–32.000 (1.2594–1.2598) 27.43–27.46 (1.0799–1.0811) 23.53–23.56 (0.9264–0.9276)	27.06 (1.065) 33.93 (1.336) 31.93 (1.257) 27.41 (1.079) 23.51 (0.926)
Reverse idler gear	I.D. Gear-to-reverse gear shaft clearance	15.016–15.043 (0.5911–0.5922) 0.032–0.077 (0.0013–0.0030)	15.08 (0.594) 0.14 (0.006)
Synchro ring	Ring-to-gear clearance (ring pushed against gear)	0.73–1.18 (0.029–0.046)	0.4 (0.016)
Shift fork	Shift fork finger thickness Fork-to-synchro sleeve clearance	6.4–6.5 (0.252–0.255) 0.25–0.45 (0.0098–0.0177)	— 0.8 (0.03)
Reverse shift fork	Shift fork paul groove width Fork-to-reverse idler gear clearance Groove width Fork-to-fifth/reverse shift piece pin clearance	12.7–13.0 (0.500–0.512) 0.5–1.1 (0.020–0.043) 7.05–7.25 (0.278–0.285) 0.05–0.35 (0.002–0.014)	— 1.8 (0.071) — 0.5 (0.02)
Shift arm A	Diameter of shift rod contact area Shift arm A-to-shift rod clearance	13.005–13.130 (0.5120–0.5169) 0.005–0.230 (0.0002–0.0091)	— 0.35 (0.0138)
Shift arm B	Diameter of shift arm shaft contact area Shift arm B-to-shift arm shaft clearance Shift arm B-to-shift piece clearance Shift piece diameter of shift fork shaft contact area	13.973–14.000 (0.5501–0.5512) 0.013–0.070 (0.0005–0.0028) 0.2–0.5 (0.0079–0.0197) 12.9–13.0 (0.5079–0.5118)	— 0.16 (0.0063) 0.62 (0.0244) 12.78 (0.5031)
Ring gear	Backlash	0.070–0.130 (0.0028–0.0051)	0.18 (0.007)
Differential carrier	Pinionshaft bore diamater Carrier-to-pinionshaft clearance Driveshaft bore diameter 1.4 ℓ (2-Carb.), 1.5 ℓ (PGM-FI), 1.6 ℓ (2-Carb.) 1.6 ℓ (PGM-FI), 1.6 ℓ DOHC Carrier-to-driveshaft clearance Carrier-to-intermediate shaft clearance 1.6 ℓ (PGM-FI), 1.6 ℓ DOHC only Side clearance	18.000–18.018 (0.7087–0.7094) 0.017–0.047 (0.0007–0.0019) 26.025–26.045 (1.0246–1.0254) 28.025–28.025 (1.1033–1.1041) 0.045–0.086 (0.0017–0.0034) 0.075–0.111 (0.0030–0.0044) 0.15 max.	— 0.095 (0.004) — — — 0.14 (0.006) 0.16 (0.006) —
Differential pinion gear	Backlash Pinion gear bore diameter Pinion gear-to-pinionshaft clearance	0.05–0.15 (0.002–0.006) 18.042–18.066 (0.7103–0.7113) 0.059–0.095 (0.0023–0.0037)	Adjust with a washer — 0.15 (0.006)

Unit: mm (in.)

9. Automatic Transmission

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)	2.4 (2.5, 2.1) at oil change 5.4 (5.7, 4.8) at assembly	
Hydraulic pressure	Line pressure at 2,000 min^{-1} (rpm)	785-834 kPa (8.0-8.5 kg/cm^2, 114-121 psi)	736 kPa (7.5 kg/cm^2, 107 psi)
	2nd, 3rd, 4th clutch pressure at 2,000 min^{-1} (rpm) in D$_3$ and D$_4$	412 kPa (4.2 kg/cm^2, 60 psi) Throttle control lever full closed	363 kPa (3.7 kg/cm^2, 53 psi) (closed)
		785-834 kPa (8.0-8.5 kg/cm^2, 114-121 psi) Throttle control lever open 2/8 or more	736 kPa (7.5 kg/cm^2, 107 psi) (2/8 open)
	2nd clutch pressure at 2,000 min^{-1} (rpm) in 2	785-834 kPa (8.0-8.5 kg/cm^2, 114-121 psi)	736 kPa (7.5 kg/cm^2, 107 psi)
	1st clutch pressure at 2,000 min^{-1} (rpm)		
	Governor pressure at 60 km/h (37.5 mph) 1.4 ℓ (2-Carb.)	151-161 kPa (1.54-1.64 kg/cm^2, 22-23 psi)	146 kPa (1.49 kg/cm^2, 21 psi)
	1.6 ℓ (2-Carb.)	148-158 kPa (1.51-1.61 kg/cm^2, 21-23 psi)	143 kPa (1.46 kg/cm^2, 21 psi)
	1.5 ℓ (PGM-FI), 1.6 ℓ (PGM-FI)	161-171 kPa (1.64-1.75 kg/cm^2, 23-25 psi)	156 kPa (1.59 kg/cm^2, 23 psi)
	1.6 ℓ DOHC	165-176 kPa (1.68-1.78 kg/cm^2, 24-25 psi)	160 kPa (1.63 kg/cm^2, 23 psi)
	Throttle pressure B — Full closed	0	—
	Throttle pressure B — Full open	785-834 kPa (8.0-8.5 kg/cm^2, 114-121 psi)	736 kPa (7.5 kg/cm^2, 107 psi)
	Throttle pressure A — Full closed	0-4.9 kPa (0-0.05 kg/cm^2, 0-0.7 psi)	—
	Full open 1.4 ℓ (2-Carb.) 1.6 ℓ (2-Carb.)	505-520 kPa (5.15-5.30 kg/cm^2, 73-75 psi)	500 kPa (5.1 kg/cm^2, 73 psi)
	1.5 ℓ (PGM-FI) 1.6 ℓ (PGM-FI)	456-471 kPa (4.65-4.80 kg/cm^2, 66-68 psi)	451 kPa (4.6 kg/cm^2, 65 psi)
	1.6 ℓ DOHC	477-490 kPa (4.85-5.00 kg/cm^2, 69-71 psi)	471 kPa (4.8 kg/cm^2, 68 psi)
Stall speed	min^{-1} (rpm)	2,300-2,900	—
Clutch	Clutch inital clearance — 1 st	0.65-0.85 (0.026-0.033)	—
	2 nd	0.65-0.85 (0.026-0.033)	—
	3 rd, 4 th	0.40-0.60 (0.016-0.024)	—
	Clutch return spring free length — 1 st	31.0 (1.22)	29.0 (1.14)
	except 1 st	30.5 (1.20)	28.5 (1.12)
	Clutch disc thickness	1.88-2.0 (0.074-0.079)	Until grooves worn out
	Clutch plate thickness — 1 st	1.55-1.65 (0.061-0.065)	Discoloration
	Clutch plate thickness — except 1 st	1.95-2.05 (0.077-0.081)	
	Clutch end plate thickness 1.4 ℓ (2-Carb.) — Mark 1	2.05-2.15 (0.081-0.085)	
	Mark 2	2.20-2.30 (0.087-0.091)	
	Mark 3	2.35-2.45 (0.093-0.096)	
	Mark 4	2.50-2.60 (0.098-0.102)	
	Mark 5	2.65-2.75 (0.104-0.108)	
	Mark 11	2.80-2.90 (0.110-0.114)	
	Mark 12	2.95-3.05 (0.116-0.120)	
	Mark 13	3.10-3.20 (0.122-0.126)	
	Mark 14	3.25-3.35 (0.128-0.132)	
	Mark 15	3.40-3.50 (0.134-0.138)	
	Mark 16	3.55-3.65 (0.140-0.144)	Discoloration

(cont'd)

Standards and Service Limits

9. Automatic Transmission (cont'd)

Unit: mm (in)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch (cont'd)	Clutch end plate thickness except 1.4 ℓ (2-Carb.)		
	Mark 1	2.3–2.4 (0.091–0.094)	Discoloration
	Mark 2	2.4–2.5 (0.094–0.098)	
	Mark 3	2.5–2.6 (0.098–0.102)	
	Mark 4	2.6–2.7 (0.102–0.106)	
	Mark 5	2.7–2.8 (0.106–0.110)	
	Mark 6	2.8–2.9 (0.110–0.114)	
	Mark 7	2.9–3.0 (0.114–0.118)	
	Mark 8	3.0–3.1 (0.118–0.122)	
	Mark 9	3.1–3.2 (0.122–0.126)	
	Mark 10	3.2–3.3 (0.126–0.130)	
	Mark 11	2.0–2.1 (0.079–0.083)	
	Mark 12	2.1–2.2 (0.083–0.087)	
	Mark 13	2.2–2.3 (0.087–0.091)	Discoloration
Transmission	Diameter of needle bearing contact area on main and stator shaft	19.980–19.993 (0.7866–0.7871)	Wear or damage
	Diameter of needle bearing contact area on mainshaft 2nd gear	35.975–35.991 (1.4163–1.4169)	
	Diameter of needle bearing contact area on mainshaft 4th gear collar	31.975–31.991 (1.2589–1.2595)	
	Diameter of needle bearing contact area on mainshaft 1st gear coller	27.975–27.995 (1.1014–1.1022)	
	Diameter of needle bearing contact area on countershaft (L side)	36.004–36.017 (1.4175–1.4180)	
	Diameter of needle bearing contact area on countershaft 3rd gear	31.975–31.991 (1.2589–1.2595)	
	Diameter of needle bearing contact area on countershaft 4th gear	27.980–27.993 (1.1016–1.1021)	
	Diameter of needle bearing contact area on countershaft reverse gear collar	29.980–29.993 (1.1803–1.1808)	
	Diameter of needle bearing contact area on countershaft 1st gear collar	29.980–29.993 (1.1803–1.1808)	
	Diameter of needle bearing contact area on reverse idle gear	13.990–14.000 (0.5508–0.5512)	
	Mainshaft 2nd gear I.D.	41.000–41.016 (1.6142–1.6148)	
	Mainshaft 1st gear I.D.	33.000–33.016 (1.2992–1.2998)	
	Mainshaft 4th gear I.D.	38.000–38.016 (1.4961–1.4967)	
	Countershaft 4th gear I.D.	33.000–33.016 (1.2992–1.2998)	
	Countershaft 3rd gear I.D.	38.000–38.016 (1.4961–1.4967)	
	Countershaft 1st gear I.D.	35.000–35.016 (1.3780–1.3786)	
	Countershaft reverse gear I.D.	36.000–36.016 (1.4173–1.4179)	
	Reverse idler gear I.D.	18.007–18.020 (0.7089–0.7094)	
	Stator shaft (R side) ID of needle bearing contact area	26.000–26.013 (1.0236–1.0241)	
	Stator shaft (Stator side) ID of needle bearing contact area	24.000–24.021 (0.9449–0.9457)	
	Reverse idler shaft holder I.D.	14.416–14.434 (0.5676–0.5683)	Wear or damage

Unit: mm (in)

9. Automatic Transmission

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Mainshaft 4th gear end play	0.10–0.22 (0.0039–0.0087)	—
	Mainshaft 2nd gear end play	0.07–0.15 (0.0028–0.0059)	—
	Mainshaft 1st gear end play	0.08–0.24 (0.0031–0.0094)	—
	Countershaft 4th gear end play	0.07–0.15 (0.0028–0.0059)	—
	Countershaft 3rd gear end play	0.07–0.15 (0.0028–0.0059)	—
	Countershaft 1st gear end play	0.10–0.45 (0.0039–0.0177)	—
	Reverse idler gear end play	0.05–0.18 (0.0020–0.0071)	—
	Countershaft reverse gear end play	0.10–0.45 (0.0039–0.0177)	—
	Selector hub O.D.	51.87–51.90 (2.0421–2.0433)	Wear or damage
	Thrust washer thickness		
	Mainshaft 2nd gear A	3.47–3.50 (0.1366–0.1378)	Wear or damage
	B	3.52–3.55 (0.1386–0.1398)	
	C	3.57–3.60 (0.1406–0.1417)	
	D	3.62–3.65 (0.1425–0.1437)	
	E	3.67–3.70 (0.1445–0.1457)	
	F	3.72–3.75 (0.1465–0.1476)	
	G	3.77–3.80 (0.1484–0.1496)	
	H	3.82–3.85 (0.1504–0.1516)	
	I	3.87–3.90 (0.1524–0.1535)	
	Mainshaft L side bearing	2.95–3.05 (0.1161–0.1201)	
	Mainshaft 4th gear	4.45–4.55 (0.1752–0.1791)	
	Mainshaft R side 1st gear	2.43–2.50 (0.0957–0.0984)	
	Mainshaft L side 1st gear	1.45–1.50 (0.0571–0.0591)	
	Countershaft 3rd gear A	2.97–3.00 (0.1169–0.1181)	
	B	3.02–3.05 (0.1189–0.1201)	
	C	3.07–3.10 (0.1209–0.1220)	
	D	3.12–3.15 (0.1228–0.1240)	
	E	3.17–3.20 (0.1248–0.1260)	
	F	3.22–3.25 (0.1268–0.1280)	
	G	3.27–3.30 (0.1287–0.1299)	
	H	3.32–3.35 (0.1307–0.1319)	
	I	3.37–3.40 (0.1327–0.1339)	Wear or damage
	Countershaft distance collar length	38.97–39.00 (1.5342–1.5354)	—
		39.02–39.05 (1.5362–1.5374)	—
		39.07–39.10 (1.5382–1.5394)	—
		39.12–39.15 (1.5402–1.5413)	—
		39.17–39.20 (1.5421–1.5433)	—
		39.22–39.25 (1.5441–1.5453)	—
		39.27–39.30 (1.5461–1.5472)	—
	Mainshaft 4th gear collar length	40.00–40.05 (1.5748–1.5768)	—
	Mainshaft 1st gear collar length	25.00–25.15 (0.9843–0.9902)	—
	Mainshaft 1st gear collar flange thickness	2.5–2.6 (0.098–0.102)	Wear or damage
	Countershaft reverse gear collar length	14.50–14.55 (0.5709–0.5728)	—
	Countershaft reverse gear collar flange thickness	2.45–2.55 (0.0965–0.1004)	Wear or damage
	Countershaft 1st gear collar length	14.50–14.55 (0.5709–0.5728)	—
	Countershaft 1st gear collar flange thickness	2.45–2.55 (0.0965–0.1004)	Wear or damage
	Diameter of countershaft one-way clutch contact area	74.414–74.440 (2.9297–2.9307)	Wear or damage
	Diameter of parking gear one-way clutch contact area	57.755–57.768 (2.2738–2.2743)	Wear or damage
	Mainshaft feed pipe A O.D. (at 15 mm from end)	8.97–8.98 (0.353–0.354)	8.95 (0.3524)
	Mainshaft feed pipe B O.D. (at 12 mm from end)	5.97–5.98 (0.2350–0.2354)	5.95 (0.2343)
	Countershaft feed pipe O.D. (at 20 mm from end)	7.97–7.98 (0.3138–0.3142)	7.95 (0.3130)
	Mainshaft sealing ring 32 mm thickness	1.980–1.995 (0.0780–0.0785)	1.800 (0.0709)
	Mainshaft bushing I.D.	6.018–6.030 (0.2369–0.2374)	6.045 (0.2380)
	Mainshaft bushing I.D.	9.000–9.015 (0.3543–0.3549)	9.030 (0.3555)
	Countershaft bushing I.D.	8.000–8.015 (0.3150–0.3156)	8.030 (0.3161)
	Mainshaft sealing ring groove width	2.025–2.060 (0.0797–0.0811)	2.080 (0.0819)
	Statorshaft distance collar 20 mm I.D.	26.000–26.013 (1.0236–1.0241)	26.030 (1.0248)
Regulator valve body	Sealing ring contact area diameter	32.000–32.025 (1.2598–1.2608)	32.050 (1.2618)
Shifting device and parking brake control	Reverse shift fork thickness	5.90–6.00 (0.2323–0.2362)	5.40 (0.2126)
	Parking brake ratchet pawl	—	Wear or other defect
	Parking gear	—	Wear or other defect
	Throttle cam stopper	18.5–18.6 (0.728–0.732)	—
Servo body	Shift fork shaft bore I.D. A	14.000–14.005 (0.5512–0.5514)	—
	B	14.006–14.010 (0.5514–0.5516)	—
	C	14.011–14.015 (0.5516–0.5518)	—
	Shift fork shaft valve bore I.D.	37.000–37.039 (1.4567–1.4582)	37.045 (1.4585)
Valve body	Oil pump gear side clearance	0.03–0.05 (0.0012–0.0020)	0.07 (0.0028)
	Oil pump gear-to-body clearance	Drive: 0.240–0.266 (0.0094–0.0105)	—
		Driven: 0.063–0.088 (0.0025–0.0035)	—
	Oil pump driven gear I.D.	14.016–14.034 (0.5518–0.5525)	Wear or damage
	Oil pump shaft O.D.	13.980–13.990 (0.5504–0.5508)	Wear or damage

(cont'd)

Standards and Service Limits

Automatic Transmission (cont'd)

Unit: mm (in)

	MEASUREMENT		STANDARD (NEW)			
Springs			Wire Diameter	O.D.	Free Length	No. of Coils
	Regulator valve spring A		1.58 x 2.00 (0.06 x 0.08)	14.7 (0.58)	86.5 (3.41)	20.9
	Regulator valve spring B		1.8 (0.07)	9.6 (0.38)	44 (1.73)	7.5
	Stator reaction spring		6 (0.24)	38.4 (1.51)	30.3 (1.20)	2
	Throttle modulator spring	Carbureted	1.2 (0.05)	9.4 (0.37)	{27.2 (1.07) / 26.3 (1.04)}	8
		Fuel-Injected	1.2 (0.05)	9.4 (0.37)	{26.3 (1.04) / 26.4 (1.04)}	8
	Torque converter check valve spring		1.1 (0.04)	8.4 (0.33)	36.4 (1.43)	12
	Cooler releaf valve spring		1.1 (0.04)	8.4 (0.33)	36.4 (1.43)	12
	Releaf valve spring		1.0 (0.04)	8.4 (0.33)	52 (2.05)	23
	Governer spring A	except 1.4 ℓ	1.0 (0.04)	18.8 (0.74)	38.1 (1.50)	4
		1.4 ℓ	1.0 (0.04)	18.8 (0.74)	20.4 (0.80)	4
	Governer spring B	except 1.4 ℓ	0.9 (0.04)	11.8 (0.46)	27.8 (1.09)	6
		1.4 ℓ	0.9 (0.04)	11.8 (0.46)	26.7 (1.05)	6
	2nd orifice control spring		0.8 (0.03)	6.6 (0.26)	43.8 (1.72)	27.6
	Servo orifice control spring		0.9 (0.04)	6.1 (0.24)	35.9 (1.41)	20
	Throttle spring A		1.0 (0.04)	8.5 (0.33)	{22.2 (0.87) / 22.1 (0.87)}	{6 / 5.5}
	Throttle adjust spring A (throttle B pressure)		0.8 (0.03)	6.2 (0.24)	30 (1.18)	8
	Throttle adjust spring A		0.8 (0.03)	6.2 (0.24)	27 (1.06)	8.5
	Throttle spring B	except 1.4 ℓ	1.6 (0.06)	8.5 (0.33)	41.3 (1.63)	13.9
		1.4 ℓ	1.4 (0.06)	8.5 (0.33)	41.4 (1.63)	8.4
	1—2 shift spring	DOHC	0.5 (0.02)	4.4 (0.17)	48.5 (1.91)	35.1
		1.5 ℓ, 1.6 ℓ (FI)	0.6 (0.02)	6.1 (0.24)	41.3 (1.63)	16.5
		Carbureted	0.5 (0.02)	4.5 (0.18)	46.8 (1.84)	35.1
	1—2 shift ball spring	1.4 ℓ, DOHC	0.45 (0.02)	4.5 (0.18)	12.7 (0.50)	11
		1.5 ℓ, 1.6 ℓ (FI)	0.4 (0.02)	4.5 (0.18)	14.4 (0.57)	8.2
		1.6 ℓ (Carb)	0.4 (0.02)	4.5 (0.18)	11.3 (0.44)	8
	2—3 shift spring	Fuel-Injected	0.9 (0.04)	7.6 (0.23)	46.5 (1.83)	20.7
		Carbureted	0.7 (0.03)	7.6 (0.23)	43 (1.69)	12.7
	2—3 shift ball spring	except DOHC	0.4 (0.02)	4.5 (0.18)	14.7 (0.58)	7.3
		DOHC	0.45 (0.02)	4.5 (0.18)	13.3 (0.52)	8
	3—4 shift spring	1.5 ℓ, 1.6 ℓ (FI)	0.9 (0.04)	9.6 (0.38)	38.1 (1.50)	10
		DOHC	0.9 (0.04)	9.6 (0.38)	33.9 (1.33)	11.3
		Carbureted	0.7 (0.03)	9.6 (0.38)	32.9 (1.30)	6.4
	3—4 shift ball spring	1.5 ℓ, 1.6 ℓ (FI)	0.5 (0.02)	4.5 (0.18)	11.2 (0.44)	7
		DOHC	0.5 (0.02)	4.5 (0.18)	10.8 (0.43)	7.4
		Carbureted	0.45 (0.02)	4.5 (0.18)	12.0 (0.47)	6.7
	Low accumulator spring A		2.34 x 2.9 (0.09 x 0.1)	21.5 (0.85)	66.7 (2.63)	10.2
	Low accumulator spring B		2.8 (0.11)	13.1 (0.52)	40 (1.57)	8.8
	Top accumulator spring		3.2 (0.13)	18.6 (0.73)	78.3 (3.08)	10
	2nd accumulator spring		3.5 (0.14)	20.2 (0.80)	76.7 (3.02)	9.6
	3rd accumulator spring		2.7 (0.10)	15.5 (0.61)	80.0 (3.15)	14.8
	L/C shift spring	Fuel-Injected	1.1 (0.04)	8.1 (0.32)	51.8 (2.04)	22.3
	L/C shift spring	1.4 ℓ	0.7 (0.03)	8.1 (0.32)	39.0 (1.54)	15.4
		1.6 ℓ (Carb.)	0.9 (0.04)	8.1 (0.32)	44.5 (1.75)	18.3
	L/C timing spring B	except 1.4 ℓ	1.0 (0.04)	6.6 (0.26)	55.6 (2.19)	30
		1.4 ℓ	1.0 (0.04)	6.6 (0.26)	52.3 (2.06)	30.1
	L/C control valve spring	DOHC	0.7 (0.03)	6.6 (0.26)	35.3 (1.39)	15.8
		Carbureted	0.7 (0.03)	6.6 (0.26)	32.5 (1.28)	14
		1.5 ℓ, 1.6 ℓ (FI)	0.7 (0.03)	6.6 (0.26)	33.8 (1.33)	15.8
	CPC valve spring		1.4 (0.06)	9.4 (0.37)	31.6 (1.24)	10.9

(FI): (Fuel-Injected)

Unit: mm (in.)

9. Automatic Transmission

	MEASUREMENT	STANDARD (NEW)			
Springs		Wire Diameter	O.D.	Free Length	No. of Coils
	Shift timing valve spring	0.9 (0.04)	8.6 (0.34)	42.9 (1.69)	21.4
	Kick down valve spring	0.9 (0.04)	10.1 (0.40)	40.8 (1.61)	14.5
	Reverse control spring	0.7 (0.03)	7.6 (0.30)	37.2 (1.46)	15.3
	L/C cut spring	0.7 (0.03)	7.6 (0.30)	29 (1.14)	18
	3-2 timing valve spring	1.2 (0.05)	7.7 (0.30)	45.1 (1.78)	19.8
	Low oneway ball spring	0.29 (0.01)	4.0 (0.16)	14 (0.55)	13
	4th exhaust spring	0.9 (0.04)	6.1 (0.24)	43.7 (1.72)	20.3
	Servo control valve spring	1.0 (0.04)	7.6 (0.30)	44 (1.73)	18.2
	Reverse timing spring	0.7 (0.03)	5.6 (0.22)	43.8 (1.72)	21.7

		STANDARD (NEW)	SERVICE LIMIT
Ring gear	Backlash	0.086-0.143 (0.0034-0.0056)	0.25 (0.01)
Differential carrier	Pinionshaft bore diameter	18.000-18.018 (0.7087-0.7094)	——
	Carrier-to-pinionshaft clearance	0.017-0.047 (0.0007-0.0019)	0.095 (0.004)
	Driveshaft bore diameter		
	1.4 ℓ, 1.5 ℓ, 1.6 ℓ (2-Carb.)	26.025-26.045 (1.0246-1.0254)	——
	1.6 ℓ (PGM-FI), 1.6 ℓ DOHC	28.025-26.045 (1.1033-1.1041)	——
	Carrier-to-driveshaft clearance	0.045-0.111 (0.0030-0.0044)	0.14 (0.006)
	Carrier-to-intermediate shaft clearance		
	1.6 ℓ (PGM-FI), 1.6 DOHC only	0.075-0.111 (0.0030-0.0044)	0.16 (0.006)
	Side clearance	0.15 max.	
Differential pinion gear	Backlash	0.05-0.15 (0.002-0.006)	Adjust with a washer
	Pinion gear bore diameter	18.042-18.066 (0.7103-0.7113)	——
	Pinion gear to pinionshaft clearance	0.059-0.095 (0.0023-0.0037)	0.15 (0.006)

11. Steering

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Steering wheel	Play	10 (0.39) max.	——
	Starting torque of power steering wheel N (kg, lb)	27-30 (2.7-3.0, 6.0-6.6)	——
Gear box	Pinion starting torque N·m (kg-m, lb-ft)	0.49-1.67 (0.05-0.17, 0.36-1.27)	——
	with P/S	0.98 (0.1, 0.72) max.	——
Pump	Pump pressure with valve closed (Oil temp./ speed: 40°C (104°F) min/idle. Do not run for more than 5 seconds) kPa (kg/cm², psi)	6,566–7,154 (67–73, 952–1,038)	
Power steering fluid	Fluid capacity ℓ (US qt, Imp qt)	Reservoir·····0.4 (0.42, 0.35) At change ·····approx. 1.2 (1.3, 1.1)	
Power steering belt	Deflection between pulleys with 98N (10kg, 22lb) force	9-12 (0.35-0.47) for used belt 7-10 (0.28-0.39) for new belt	
	Belt tension between pulleys N (kg, lb) (measured with belt tension gauge)	343-490 (35-50, 77-110) for used belt 441-686 (45-70, 99-154) for new belt	

Standards and Service Limits

12. Suspension

	MEASUREMENT		STANDARD (NEW)	
Wheel alignment	Total toe (°)		Front OUT 0°04′±8′ OUT 0.7±1.4 (0.028±0.055)	Rear IN 0°13.5′±8′ IN 2.3±1.4 (0.091±0.055)
	Camber		−0°20′±30′	−0°26′±30′
	Side slip		0±3 (0±0.12)	—
	Turning angle (max.) Inward wheel		41°30′±2°	
	Outward wheel		33°30′±2°	
			STANDARD (NEW)	SERVICE LIMIT
Wheel	Rim runout	Steel	0–1.0 (0–0.039)	2.0 (0.08)
		Aluminum	0–0.7 (0–0.028)	1.5 (0.06)
Wheel bearing	End play	Front	0	0.05
		Rear	0	0.05

13. Brake

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT	
Parking brake lever	Play in stroke 200N (20 kg, 44 lbs)		To be locked when pulled 6–10 notches		
Foot brake pedal	Pedal height		161 (6.3) from 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)	—	
Disc brake	Disc thickness	Front	21.0 (0.827)	19.0 (0.748)	
		Rear	10.0 (0.394)	8.0 (0.315)	
	Disc runout	Front	—	0.10 (0.004)	
		Rear	—	0.15 (0.006)	
	Disc parallelism		—	0.015 (0.0006)	
	Pad thickness	Front	11.0 (0.433)	1.6 (0.063)	
		Rear	8.0 (0.315)	1.6 (0.063)	
Brake Drum	I.D.		203 (7.99)	204 (8.03)	
	Lining thickness		5.0 (0.20)	2.0 (0.08)	
Brake booster	Characteristics	Vacuum (mm Hg)	Pedal Pressure kg (lbs)	Line Pressure kg/cm² (psi)	
				without ALB	with ALB
		0	20 (44)	13.0 (184) min.	10.0 (142) min.
		300	20 (44)	50.0 (711) min.	56.6 (805) min.
		500	20 (44)	74.0 (1,052) min.	87.7 (1,247) min.

15. Air Conditioner

	MEASUREMENT	STANDARD (NEW)
Compressor		MATSUSHITA
	Cooling capacity	3,850 kcal/h
	Refrigerant qwantity	0.9 ± 0.05 kg (1.98 ± 0.11 lb.)
	Lubricant capacity	130 cc
	Clutch resistance	3.33 ± 0.17 ohm at 20 °C (68 °F)
	Clutch clearance	0.4–0.6
Compressor belt	Deflection between pulleys with 98N (10kg, 22lb) force	9–11 (0.35–0.43) for used belt 7–9 (0.28–0.35) for new belt
	Belt tension between pulleys N (kg, lb) (measured with belt tension gauge)	343-441 (35–45, 77–99) for used belt 441–686 (45–70, 99–154) for new belt

Unit: mm (in.)

16. Electrical

	MEASUREMENT		STANDARD (NEW)		
Ignition coil	Rated voltage		12 Volts		
	Primary winding resistance		PGM-FI: 0.3—0.5 ohms	2-Carb: 0.6—0.7 ohms	
	Secondary wisding resistance		PGM-FI: 9,440—14,160 ohms	2-Carb: 14,400—21,600 ohms	
Ignition wire	Resistance		25,000 ohms max.		
Spark plug	Type		Engine type	Standard	Optional
		NGK	1.5 ℓ, 1.6 ℓ (PGM-FI) 1.6 ℓ DOHC*1	BCPR6E-11	BCPR7E-11, BCPR6EY-N11 BCPR7EY-N11
		NGK	1.4 ℓ, 1.6 ℓ (2-Carb)	BCPR6E-11	BCPR7E-11
		NGK	1.6 ℓ DOHC*2	BCPR6E-11	BCPR7E-11
		ND	1.5 ℓ, 1.6 ℓ (PGM-FI). 1.6 ℓ DOHC*1	Q20PR-U11	Q22PR-U11
		ND	1.4 ℓ, 1.6 ℓ (2-Carb)	Q20PR-U11	Q22PR-U11
	*1: with CATA *2: without CATA	ND	1.6 ℓ DOHC*2	Q20PR-UL11	Q20PR-U11, Q22PR-U11 Q22PR-UL11
	Gap		1.0—1.1 (0.039—0.043)		
Ignition timing	At idling PGM-FI engine		SOHC: 18° ± 2° (Red) BTDC DOHC: 16° ± 2° (Red) BTDC		
	At idling Carbureted engine		16° ± 2° (Red) BTDC		
Battery	Lighting capacity (20-hour rate) Starting capacity (Voltage after 5 sec.)		47 ampere hours 8.6 V min. at 300 ampere draw /—15°C		

Alternator		ND		MITSUBISHI	
	Output	13.5V/60A			
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT
	Coil resistance (rotor)	2.8—3.0 ohm	±0.1 ohm	3.4—3.8 ohm	±0.2 ohm
	Slip ring O.D.	32.5 (1.28)	32.1 (1.26)	22.7 (0.89)	22.2 (0.87)
	Brush length	13.5 (0.53)	4.5 (0.18)	22 (0.87)	8 (0.31)
	Brush Spring tension	300—500 g (10.6—17.6 oz)	—	300—450 g (10.6—15.9 oz)	—

Alternator belt	Deflection between pulleys with 98N (10kg, 22lb) force Belt tension between pulleys N (kg, lb) (measured with belt tension gauge)	9—11 (0.35—0.43) for used belt 7—9 (0.28—0.35) for new belt 294—392 (30—40, 66—88) with used belt 392—588 (40—60, 88—132) with new belt

Starting motor		ND 1.2 kw		MITSUBA 1.0 kw, 1.4 kw	
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT
	Mica depth	0.5—0.8 (0.020—0.031)	0.2 (0.008)	0.4—0.5 (0.016—0.020)	0.15 (0.006)
	Commutator	0—0.02 (0.008)	0.05 (0.002)	0—0.02 (0.0008)	0.05 (0.002)
	Commutator O.D.	29.9—30.0 (1.18)	29.0 (1.14)	28.0—28.1 (1.10—1.11)	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)	18.1—23.5 N (1.85—2.4 kg, 4.1—5.3 lb)	—	20.1—26.5 N (2.05—2.7 kg, 4.5—6.0 lb)	—

Design Specifications

	ITEM		METRIC	ENGLISH	NOTES
DEMENSIONS	Overall Length	5D	4,265 mm	167.9 in	
		4D	4,410 mm	173.6 mm	
	Overall Width		1,690 mm	66.5 in	
	Overall Height		1,395 mm	54.9 in	
	Wheelbase		2,550 mm	100.4 in	
	Track, Front/Rear		1,475/1,470 mm	58.1/57.9 in	
	Ground Clearance		160 mm	6.3 in	KE, KF, KB, KR
			150 mm	5.9 in	KX, KS, KG
	Turning Circle Diameter (at body end)		10,2 m	33.5 ft	
	Seating Capacity		Five		
Weight (5-door)	Curb Weight				
	DX 1.4ℓ 2-Carb.	M/T	1,030 kg	2,271 lb	KB,KE,KF
		A/T	1,050 kg	2,315 lb	KB,KE,KF
	DX 1.5ℓ PGM-FI	M/T	1,035 kg	2,282 lb	KG
		A/T	1,055 kg	2,326 lb	KG
	LX 1.6ℓ 2-Carb.	M/T	1,060 kg	2,337 lb	KR
		A/T	1,080 kg	2,381 lb	KB, KE, KF
	EX 1.6ℓ 2-Carb.	M/T	1,075 kg	2,370 lb	KE, KF
		A/T	1,095 kg	2,414 lb	KE, KF
	EX 1.6ℓ PGM-FI	M/T	1,085 kg	2,391 lb	KG, KX
		A/T	1,105 kg	2,436 lb	KS
	SX 1.6ℓ DOHC	M/T	1,100 kg	2,425 lb	KB,
		A/T	1,120 kg	2,469 lb	KR, KE, KF
	SX 1.6ℓ DOHC with CATA	M/T	1,100 kg	2,425 lb	KG, KX
		M/T	1,110 kg	2,447 lb	KS
	Weight Distribution (Front/Rear)				
	DX 1.4ℓ 2-Carb.	M/T	590/440 kg	1,301/ 970 lb	KB
		A/T	610/440 kg	1,345/ 970 lb	KE, KF
	DX 1.5ℓ PGM-FI	M/T	595/440 kg	1,312/ 970 lb	KG
		A/T	615/440 kg	1,356/ 970 lb	KG
	LX 1.6ℓ 2-Carb.	M/T	615/445 kg	1,356/ 981 lb	KR
		A/T	635/445 kg	1,400/ 981 lb	KB, KE, KF
	EX 1.6ℓ 2-Carb.	M/T	620/455 kg	1,367/ 981 lb	KE,KF
		A/T	640/455 kg	1,411/ 981 lb	KE,KF
	EX 1.6ℓ PGM-FI	M/T	625/460 kg	1,378/1,014 lb	KG, KX
		A/T	645/460 kg	1,422/1,014 lb	KS
	SX 1.6ℓ DOHC	M/T	635/465 kg	1,400/1,025 lb	KB,
		A/T	655/465 kg	1,444/1,025 lb	KR, KE, KF
	SX 1.6ℓ DOHC with CATA	M/T	635/465 kg	1,400/1,025 lb	KG, KX
		M/T	640/470 kg	1,411/1,036 lb	KS
	Max. Permissible Weight (European)				
	DX, LX		1,530 kg	3,373 lb	
	EX, SX		1,580 kg	3,483 lb	
	EX*1	M/T	1,520 kg	3,351 lb	*1 KS (Sweden)
		A/T	1,540 kg	3,395 lb	
	SX*1	M/T	1,540 kg	3,395 lb	
Weight (4-door)	Curb Weight				
	DX 1.4ℓ 2-Carb.	M/T	1,020 kg	2,249 lb	KB,KF
		A/T	1,040 kg	2,293 lb	KB,KF
	LX 1.6ℓ 2-Carb.	M/T	1,050 kg	2,315 lb	KB,KE
		A/T	1,070 kg	2,359 lb	KF,KR
	EX 1.6ℓ 2-Carb.	M/T	1,065 kg	2,348 lb	KB,KF
		A/T	1,085 kg	2,392 lb	KE,KF
	SX 1.6ℓ DOHC	M/T	1,090 kg	2,403 lb	KB,KE
		A/T	1,110 kg	2,447 lb	KF,KR
	Weight Distribution (Front/Rear)				
	DX 1.4ℓ 2-Carb.	M/T	590/430 kg	1,301/948 lb	KB,KF
		A/T	610/430 kg	1,345/948 lb	KB,KF
	LX 1.6ℓ 2-Carb.	M/T	615/435 kg	1,356/959 lb	KB,KE
		A/T	635/435 kg	1,400/959 lb	KF,KR
	EX 1.6ℓ 2-Carb.	M/T	620/445 kg	1,367/981 lb	KB,KF
		A/T	640/445 kg	1,411/981 lb	KE,KF
	SX 1.6ℓ DOHC	M/T	635/455 kg	1,400/1,003 lb	KB,KE
		A/T	655/455 kg	1,440/1,003 lb	KF,KR
	Max. Permissible Weight (European)				
	DX, LX		1,530 kg	3,373 lb	
	EX, SX		1,580 kg	3,483 lb	

	ITEM		METRIC	ENGLISH	NOTES
ENGINE	Type	SOHC	Water-cooled 4-stroke SOHC 16-valve		
		DOHC	Water-cooled 4-stroke DOHC 16-valve		
	Cylirder arrangement		4-cylinder in-line transversly mounted		
	Bore and Stroke	1.4ℓ	75x79 mm	2.95x3.11 in	
		1.5ℓ	75x84.5mm	2.95x3.33 in	
		1.6ℓ	75x90 mm	2.95x3.54 in	
	Displacement	1.4ℓ	1,396 cm^3	85.2 cu in	
		1.5ℓ	1,493 cm^3	91.1 cu in	
		1.6ℓ	1,590 cm^3	97.0 cu in	
	Conpression Ratio	1.4ℓ, 1.6ℓ 2-Carb.	9.3		
		1.5ℓ	9.2		
		1.6ℓ	9.1		
		DOHC	9.5		
	Valve Train	SOHC	4valves per cylinder, single overhead camshaft.		
		DOHC	4valves per cylinder, dual overhead camshafts.		
	Fuel Supply System	1.4ℓ, 1.6ℓ 2-Carb.	CV Dual carburetors		
		1.5	Dual-point PGM-FI		
		1.6ℓ PGM-FI, 1.6ℓ DOHC	Multi-point PGM-FI		
	Lubrication System		Forced and wet sump		
	Fuel Required				
	1.4ℓ 2-Carb, 1.6ℓ 2-Carb.		Leaded gasoline or unleaded gasoline with 91 R.O.N. or higher		KB, KE, KF
	1.5ℓ PGM-FI, 1.6ℓ PGM-FI		Unleaded gasoline with 91 R.O.N. or higher		KG, KX, KS
	1.6ℓ DOHC with CATA		Unleaded gasoline with 95 R.O.N. or higher		KG, KX, KS
	1.6ℓ DOHC with out CATA		Leaded gasoline with 97 R.O.N. or higher or unleaded gasoline with 95 R.O.N. or higher		KB, KE

Design Specifications

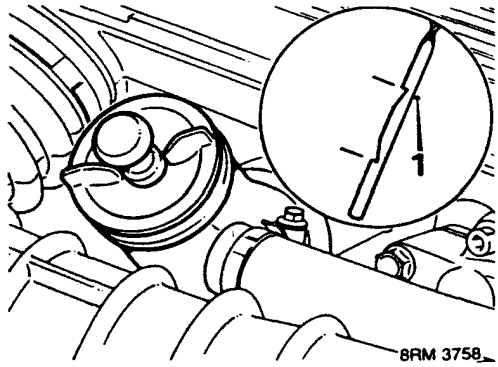
	ITEMS		METRIC	ENGLISH	NOTES
STARTER	Type	1.0kW,1.2kW,1.4kW	Gear reduction type		
	Normal Output		1.0kW, 1.2kW, 1.4kW		
	Normal Voltage		12V		
	Hour Rating		30 seconds		
	Direction of Rotation		Clockwise as viewed from gear end		
	Weight	1.0kW MITSUBA	3.4 kg	7.5 lb	
		1.0kW,1.2kW ND	3.85 kg	8.5 lb	
		1.4kW MITSUBA	3.7 kg	8.2 lb	
TRANSMISSION	Clutch	M/T	Single plate dry, diaphram spring		
		A/T	Torque converter		
	Clutch Facing Area	M/T	160 cm²	24.8 sp. in.	
	Transmission Type	M/T	5-speed forward, synchromesh, 1 reverse		
		A/T	4-speed forward, with lock-up clutch, 1 reverse		
	Primary Reduction		1.000		
	Type		5-speed manual except DOHC	5-speed manual DOHC	
	Gear Ratio	1st	3.250	3.250	
		2nd	1.894	1.944	
		3rd	1.259	1.346	
		4th	0.937	1.033	
		5th	0.771	0.848	
		Reverse	3.153	3.153	
		Final	4.437	4.250	
	Type		4-speed automatic except DOHC	4-speed automatic DOHC	
		1st	2.705	2.705	
		2nd	1.560	1.560	
		3rd	1.027	1.085	
		4th	0.780	0.825	
		Reverse	1.954	1.954	
		Final	3.933*1	4.124	*1 Carbureted
			4.214*2		*2 Fuel-Injected
	Final Reduction Gear Type		Single helical gear		
AIR CONDITIONER	Compressor		MATSUSHITA		
	Cooling Capacity		3,850 kcal/h		
	—Conditions:				
	Compression min⁻¹ (rpm)		1,800 min⁻¹ (rpm)		
	Outside Air Temperature		27.0°C	81°F	
	Outside Air Humidity		50%		
	Condenser Air Temperature		35°C	95°F	
	Condenser Air Velocity		4.5 m/sec.	14.8 ft/sec.	
	Blower Capacity		440 m³/h	15. 118 cu. ft/h	
	Compressor	Type	Vane rotary type		
		Number of Vane	3		
		Displacement	130cc/rev.	7.93 cu. in./rev	
		Max. min⁻¹ (rpm)	7,500 min⁻¹ (rpm)		
		Lubricant Capacity	130 cc	7.93 cu. in.	
	Receiver Dryer With Desiccant		Includes fusible safety plug		
	Condenser		Corrugated fin type		
	Evaporator		Corrugated fin type		
	Blower	Type	Sirocco fan		
		Motor input	170W (12V)		
		Speed control	4 speeds		
		Max. capacity	390 m³/h	13,773 cu ft/h	
	Temp. Control		Air-mix type		
	Comp. Clutch	Type	Dry, single plate, V-belt		
		Power consumption	32W max. 12V		
	Refrigerant	Type	R-12		
		Quantity	0.90±0.05 kg	1.98±0.11 lbs	
STEERING SYSTEM	Type		Rack and pinion		
	Overall Ratio		19.95: 1, 16.96 (with power assist)		
	Turn, lock-to-lock		4.0, 3.4 (with power assist)		
	Steering Wheel Dia		370 mm	14.6 in	
	Power Steering Fluid Capacity		1.2 lit.	13 US. qt., 1.1 Imp. qt.	
	Power Steering Fluid		Use only DEXRON®II Automatic Transmission Fluid(A.T.F.)		
SUSPENSION SYSTEM	Type, Front		Independent strut with coil spring and stabiliger		
	Rear		Independent double wishbone with coil spring (SX: with coil spring and stabiliger)		
	Shock Absarber	Front/Rear	Telescopic, Nitrogen gas filled.		

	ITEMS		METRIC	ENGLISH	NOTES
WHEEL ALIGNMENT	Wheel alignment				
	Total Toe	Front	OUT 0.7±1.4 mm	OUT 0.028±0.055	
		Rear	IN 2.3±1.4 mm	IN 0.091±0.055	
		(*) Front/Rear	OUT 0°04'±8'/IN 0°13.5'±8'		
	Camber	Front	−0°20'±30'		
		Rear	−0°26'±30'		
	Caster		1°38'±30'		
	Kingpin Inclination		12°07'		
BRAKE SYSTEM	Type	Front	Power assisted self-adjusting ventilated discs		
		Rear DX, LX	Power assisted leading/trailing shoe drums		
		EX, SX	Power assisted self-adjusting solid discs		
	Lining Surface Area	Front	49.2 cm² X4	7.63 sq.in.X4	
		Rear	65.6 (21.0) cm² X4	10.17 (3.25) sq.in.X4	( ): EX,SX
	Effeetive Diameter	Front	214 mm	8.43 in.	
		Rear (EX,SX)	208 mm	8.19 in.	
	Brake Drum (DX, LX)		203 mm	7.99 in.	
TIRES	Size	DX, LX	175/65R14 82T		
		EX	175/65R14 82H		
		SX	185/60R14 82H		
ELECTRICAL	Battery		12V-47AH		
	Starter		12V-1.0kW, 1.2kW, 1.4kW		
	Alternator		12V-60 amps		
	Fuses	In the dash fuse box	10A, 15A, 20A, 30A		
		In the main fuse box	10A, 15A, 30A, 40A, 60A		
	Headlights High/Low		12V-60/55W		
	Front Turn Signal Lights		12V-21W		
	Rear Turn Signal Lights		12V-21W		
	Side Turn Signal Lights		12V-5W		
	Stop/Taillights		12V-21/5W		
	Side Marker Lights		12V-5W		
	Back-up Lights		12V-21W		
	License Plate Lights		12V-5W		
	Gauge Lights		12V-3.0W, 1.4W		
	Indicator Lights		12V-1.4W		
	Warning Lights		12V-1.4W		
	Dome Light		12V-5W		
	Laggage Area Light		12V-3.4W		
	Illumination and Pilot Lights		12V-1.4W		
			0.91W, LED		
	Heater Illumination Lights		12V-1.4W		
	Coutesy Lights		12V-3.4W		
	Rear fog lights		12V-21W		

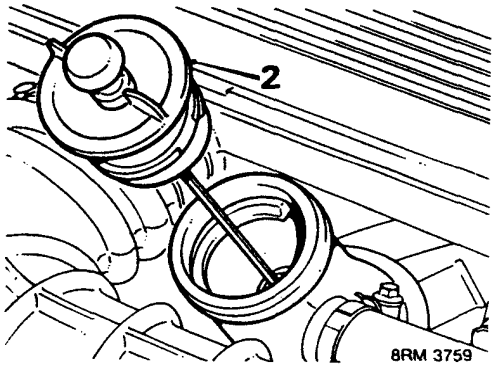
ENGINE OIL AND FILTER

Oil level check

Always check oil level and drain oil with vehicle standing on level ground and use oil of correct specification for topping up and refilling.



1. Withdraw dipstick and wipe blade. Re - insert dipstick fully, withdraw it and check oil level which must be maintained between minimum and maximum marks on dipstick.



2. If required, unscrew oil filler cap and top up oil to correct level.
3. Fit oil filler cap.

Oil drain and refill

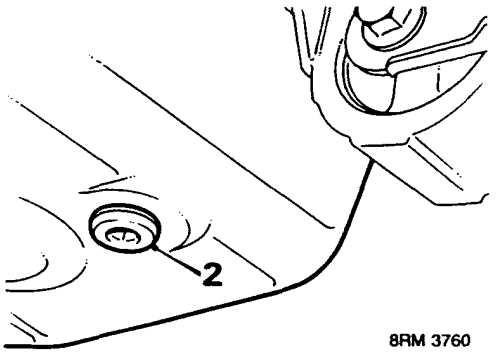
Oil should always be drained when engine is warm.

WARNING: After engine has been run, exhaust pipes will be hot; take care when working in this area. Observe due care when draining oil as oil can be very hot.

Prolonged and repeated contact with used engine oil may cause serious skin disorders, wash hands thoroughly after contact.

Keep engine oil out of reach of children.

1. Place a suitable container beneath sump.



2. Remove drain plug, allow oil to drain.
3. Fit drain plug and tighten to 30 Nm.
4. Unscrew oil filler cap, fill engine to correct level on dipstick with new engine oil of correct specification; fit oil filler cap.
5. Remove container.

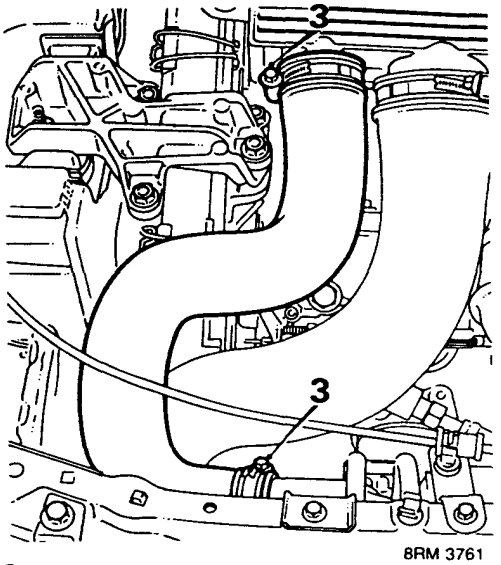
Oil filter - Turbo Models

Renew

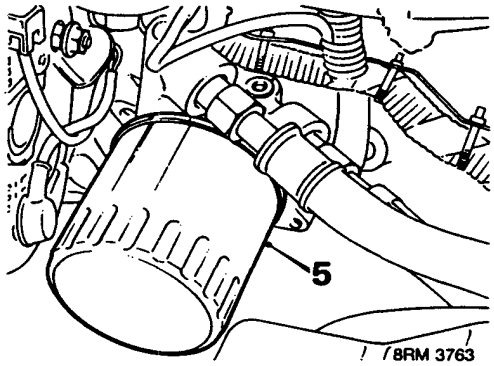
1. Raise front of vehicle.

WARNING: Support on safety stands.

2. Position suitable container beneath oil filter.



3. Slacken 2 clips, disconnect hose from air box and intercooler.
4. Thoroughly clean area in vicinity of filter head.



5. Remove and discard filter.

CAUTION: Filters with RED lettering on body are fitted in production and must be replaced at first service by a filter with WHITE lettering on body.

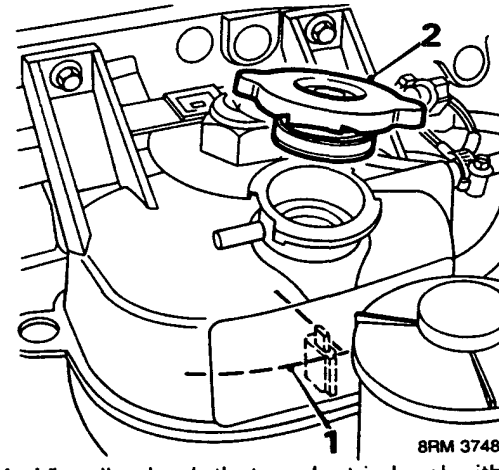
6. Smear sealing ring of new filter with new engine oil.
7. Fit filter; tighten by hand.
8. Remove stand(s) and lower vehicle.
9. Connect hose to air box and intercooler; tighten clips.
10. Refill/top – up engine with oil of correct specification.
11. Run engine and check for oil leaks.
12. Stop engine, wait one minute then check oil level and top – up if necessary with new engine oil.
13. Remove container from beneath oil filter.

COOLING SYSTEM

WARNING: Since injury such as scalding could be caused by escaping steam or coolant, do not remove pressure relief cap from expansion tank while system is hot. Wait until system has cooled, use a cloth or glove to protect hands from escaping steam.

Check level and top up.

Note: *The coolant level should only be checked when the system is cold.*



1. Visually check that coolant is level with 'MAX' mark on coolant expansion tank.

CAUTION: If coolant is not visible in expansion tank, refill system in accordance with refilling procedure.

2. If required, remove expansion tank cap and top – up system with anti – freeze mixture using Unipart Superplus Anti – freeze and Summer Coolant and water.

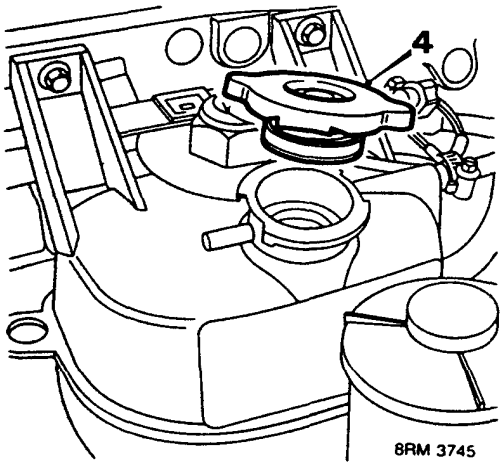
CAUTION: Coolant level must not be above 'MAX' mark on expansion tank.

3. Check specific gravity of coolant. Overall anti – freeze concentration must not fall below 50% by volume and must not exceed 60% by volume.
4. Fit expansion tank cap.

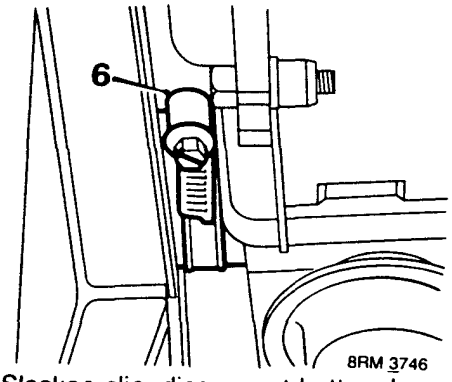
Solution	Amount of anti-freeze	Commences freezing		Frozen solid	
50%	Litres	°C	°F	°C	°F
All Models	4.0	-36	-33	-48	-53

Drain and refill

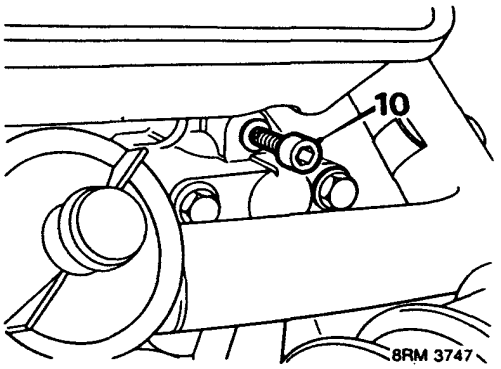
1. Visually check engine and cooling system for coolant leaks.
2. Examine hoses for signs of cracking, distortion and security of connections; rectify as necessary.
3. Position heater control to 'HOT' position.



4. Remove expansion tank cap.
5. Position suitable container beneath radiator bottom hose.



6. Slacken clip, disconnect bottom hose from radiator and drain coolant into container.
7. Connect bottom hose to radiator; tighten clip.
8. Prepare coolant to required concentration.
9. Ensure heater control is at 'HOT' position.

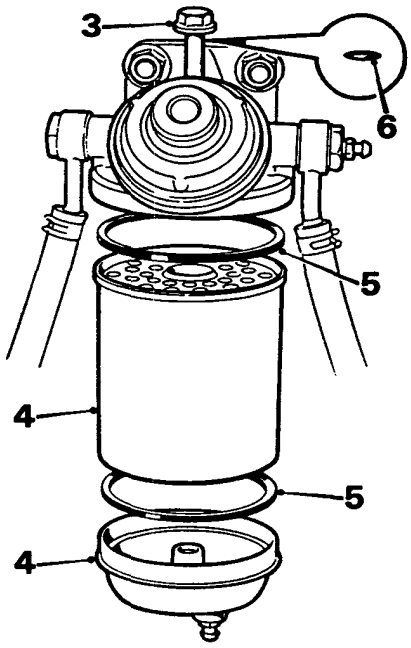


10. Slacken bleed screw on thermostat housing.
11. Fill system through expansion tank filler.
12. Tighten bleed screw when air-free coolant flows.
13. Continue filling system until coolant level is to bottom of expansion tank filler neck.
14. Fit expansion tank cap.
15. Start engine and run at 2000 rev/min until cooling fan operates.
16. Stop engine and allow it to cool.
17. Check cooling system for leaks.
18. Check coolant level and if necessary, top-up to 'MAX' mark on expansion tank.

FUEL FILTER ELEMENT

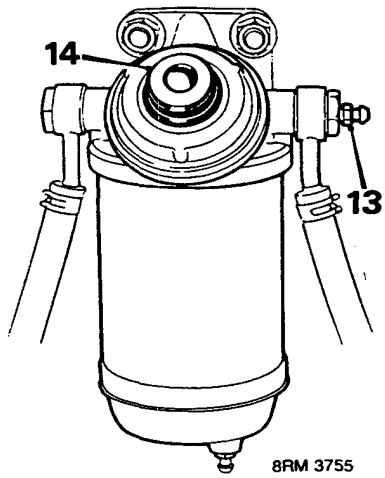
Renew

1. Position suitable container beneath fuel filter.
2. Thoroughly clean area in vicinity of filter head.



8RM 3754

3. Remove bolt securing filter element and filter base to filter head.
4. Remove filter element from filter base; discard element.
5. Discard 2 sealing rings.
6. Remove and discard 'O' ring from securing bolt.
7. Thoroughly clean filter and sealing ring recess in filter head.
8. Lubricate new 'O' ring with clean fuel and fit to securing bolt.
9. Lubricate 2 new sealing rings with clean fuel and fit to filter base and recess in filter head.
10. Fit new filter element to filter base.
11. Position filter element and base to filter head.
12. Fit securing bolt and tighten to 9 Nm.

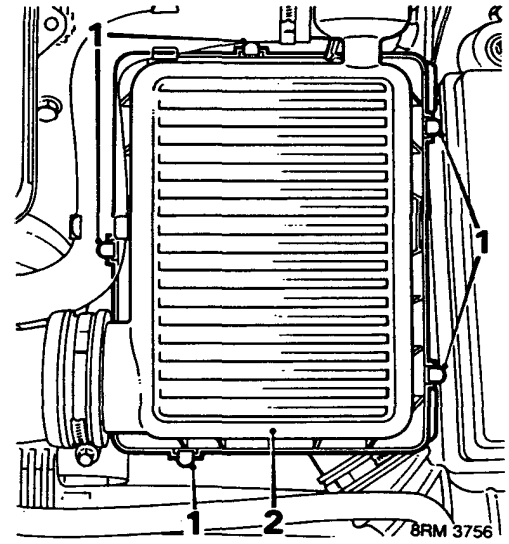


8RM 3755

13. Slacken bleed screw.
14. Depress priming button several times until fuel, issuing from bleed screw is free from air bubbles; tighten bleed screw.
15. Continue to operate priming button until resistance is felt.
16. Remove container.

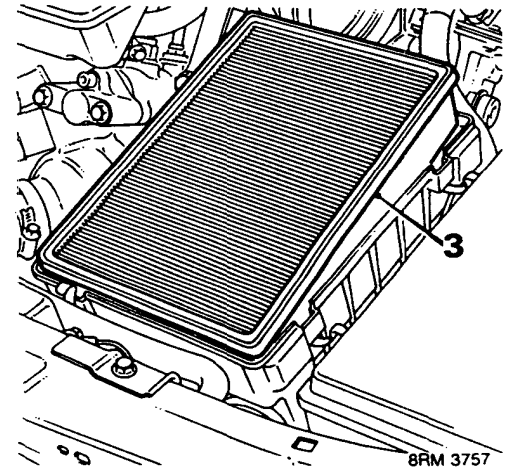
AIR CLEANER ELEMENT

Remove



8RM 3756

1. Release 5 clips securing air cleaner cover.
2. Release air cleaner cover from air cleaner.



8RM 3757

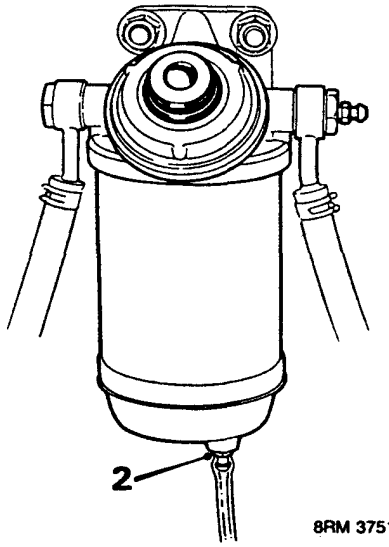
3. Remove air cleaner element.

Refit

1. Thoroughly clean air cleaner and cover.
2. Position element in air cleaner.
3. Fit air cleaner cover and secure clips.

FUEL FILTER - SEDIMENT DRAIN

1. Position suitable container beneath fuel filter.

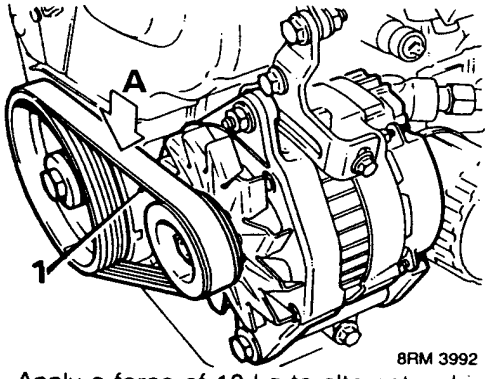


2. Slacken drain screw and allow filter to drain until fuel, free from water and sediment flows from filter; tighten screw.
3. Remove container.
4. Bleed fuel system - see **Fuel filter element.**

DRIVE BELTS

1. Check condition of alternator, brake servo vacuum pump and power steering drive belts; renew any belt showing signs of splitting, oil contamination or wear.

Check tension of alternator drive belt.



1. Apply a force of 10 kg to alternator drive belt at position 'A' and measure belt deflection.

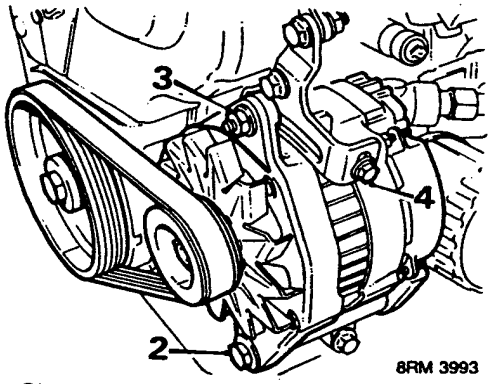
New belt deflection = 5.5 to 6.5 mm

Used belt deflection = 7.8 to 8.5 mm

Adjust tension of alternator drive belt.

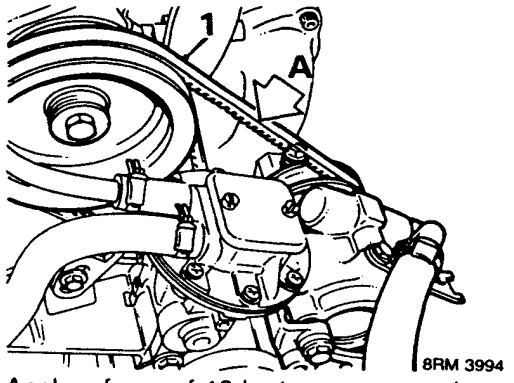
1. Raise front R.H. side of vehicle.

WARNING: Support on safety stands.



2. Slacken alternator pivot bolt.
3. Slacken adjusting link nut.
4. Adjust drive belt tension by means of adjusting bolt.
5. Tighten adjusting link nut and pivot bolt to 35 Nm.
6. Remove stand(s) and lower vehicle.

Check tension of power steering pump drive belt.

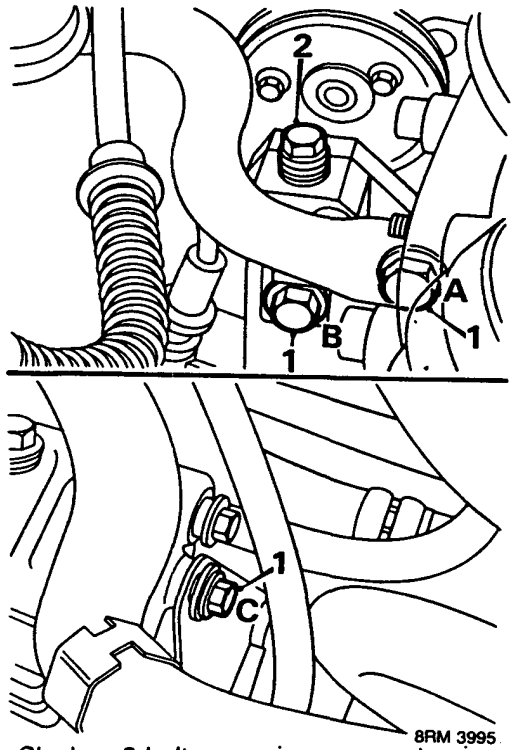


1. Apply a force of 10 kg to power steering pump drive belt at position 'A' and measure belt deflection.

New belt deflection = 7.0 to 8.0 mm

Used belt deflection = 9.0 to 10.0 mm

Adjust tension of power steering pump drive belt.



1. Slacken 3 bolts securing power steering pump.
2. Adjust drive belt tension by means of adjusting bolt.
3. Tighten power steering pump securing bolts to:

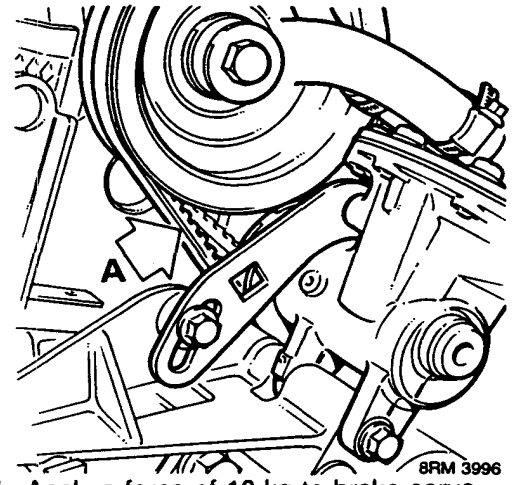
Bolt A – 55 Nm.

Bolt B – 45 Nm

Bolt C – 25 Nm

4. Using a socket and extension bar on crankshaft pulley bolt, turn engine 3 revolutions in a clockwise direction (viewed from crankshaft pulley).
5. Check drive belt tension; re – adjust if necessary.

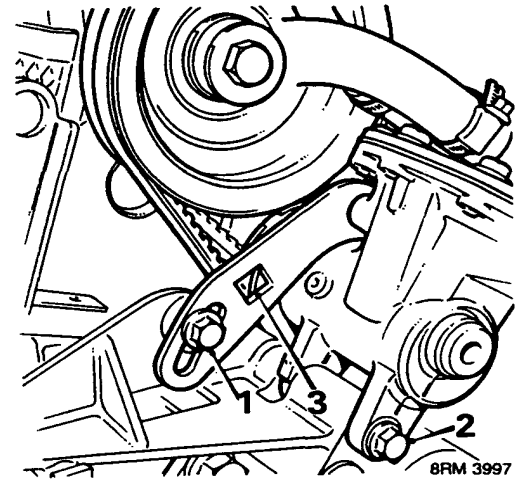
Check tension of brake servo vacuum pump drive belt.



1. Apply a force of 10 kg to brake servo vacuum pump drive belt at position 'A' and measure belt deflection.

New or used belt deflection 5.5 to 6.5 mm.

Adjust tension of brake servo vacuum pump drive belt.

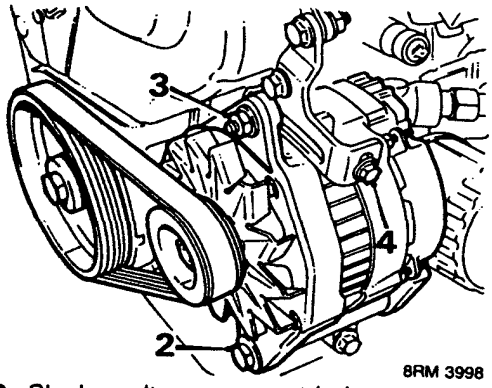


1. Slacken drive belt adjustment bolt.
2. Slacken vacuum pump pivot bolt.
3. Using a wrench and 1/2 in square drive socket extension located in hole in vacuum pump mounting bracket, move pump to adjust drive belt tension. Maintain loading and tighten pivot bolt to 25 Nm and adjustment bolt to 82 Nm.
4. Remove socket extension.

Renew alternator drive belt.

1. Raise front R.H. side of vehicle.

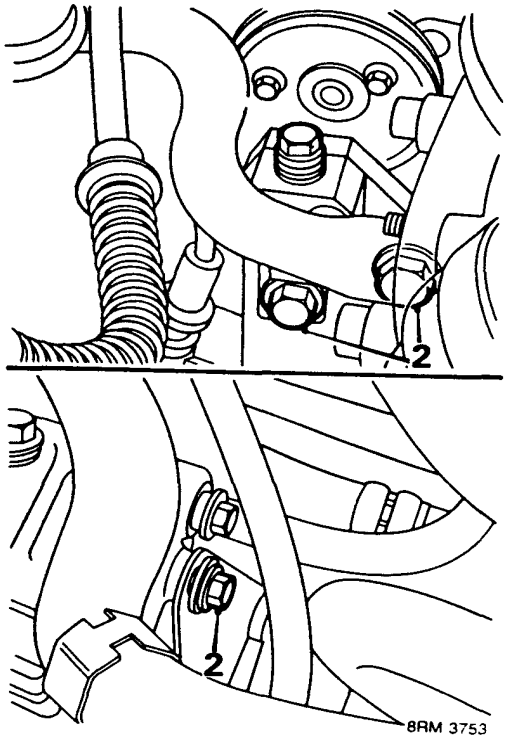
WARNING: Support on safety stands.



2. Slacken alternator pivot bolt.
3. Slacken adjusting link nut.
4. Release drive belt tension by means of adjusting bolt; remove drive belt.
5. Clean pulley 'V's.
6. Fit drive belt to pulleys.
7. Adjust drive belt tension.
8. Remove stand(s) and lower vehicle.

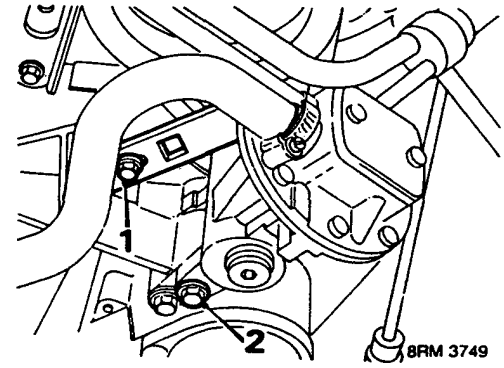
Renew power steering pump drive belt.

1. Remove brake servo vacuum pump drive belt.

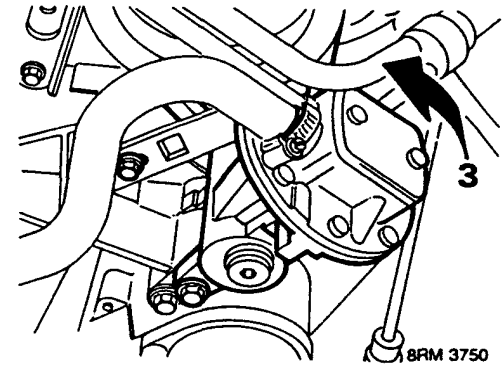


2. Slacken 3 bolts securing power steering pump; remove drive belt.
3. Clean pulley 'V's.
4. Fit drive belt to pulleys.
5. Adjust drive belt tension.
6. Fit brake servo vacuum pump drive belt.

Renew brake servo vacuum pump drive belt.



1. Slacken drive belt adjustment bolt.
2. Slacken vacuum pump pivot bolt.



3. Move vacuum pump towards mounting bracket; remove drive belt.
4. Clean pulley 'V's.
5. Fit drive belt to pulleys.
6. Adjust drive belt tension.

Maintenance Schedule

Service at the interval listed x 1,000 km (or miles) or after that number of months, whichever comes first.	R—Replace	I—Inspect. After inspection, clean, adjust, repair or replace if necessary.				
ITEM	x 1,000 km x 1,000 miles months	20 12 12	40 24 24	60 36 36	80 48 48	100 60 60
Idle speed and idle CO*3		I	I	I	I	I
Idle speed and idle CO*4						I
Valve clearance		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	
Timing belt						R
Water pump						I
■Radiator coolant					R*1	
Cooling system hoses and connections			I		I	
Air cleaner element (Viscous type)			R		R	
Fuel filter			R		R	
Tank, fuel line and connections			I		I	
Intake air temp. control system*5						I
Throttle control system*5			I		I	
Choke mechanism*5			I		I	
Evaporative emission control system						I
Ignition timing and control system*3			I		I	
Ignition timing and control system*4						I
Spark plugs (for cars using unleaded gasoline)			R		R	
Spark plugs (for cars using leaded gasoline)		R	R	R	R	R
Distributor cap and rotor*3			I		I	
Distributor cap and rotor*4						I
Ignition wiring*3			I		I	
Ignition wiring*4						I
Positive crankcase ventilation valve*3			I		I	
Positive crankcase ventilation valve*4						I
Blow-by filter*5			I		I	

■: These service intervals assume routine checking and replenishment has been done, as needed, by the customer.
*1 Thereafter, replace every 2 years or 40,000 km (24,000 miles), whichever comes first.
*3 Except KX model
*4 KX model
*5 Only for carbureted type

Service at the interval listed x 1,000 km (or miles) or after that number of months, whichever comes first.	R—Replace	I—Inspect. After inspection, clean, adjust, repair or replace if necessary.				
ITEM	x 1,000 km x 1,000 miles months	20 12 12	40 24 24	60 36 36	80 48 48	100 60 60
Brake hoses and lines (Including ALB hoses and pipes for ALB models)		I	I	I	I	I
Brake fluid (Including ALB fluid for ALB models)			R		R	
Front brake discs and calipers		I	I	I	I	I
Front brake pads		Inspect every 10,000 km (6,000 miles) or 6 months				
Rear brake discs, calipers and pads (for disc brake type)			I		I	
Rear brake drums, wheel cylinders and linings (for drum brake type)			I		I	
Parking brake		I	I		I	
Clutch release arm travel		I	I	I	I	I
Exhaust pipe and muffler		I	I	I	I	I
Suspension mounting bolts		I	I	I	I	I
Front wheel alignment		I	I	I	I	I
Steering operation, tie rod ends, steering gear box and boots		I	I		I	
ALB high pressure hose (for ALB models)					R	
ALB operation (for ALB models)		I	I		I	
Power steering system (Standard for some types)		I	I	I	I	I
Power steering pump belt (Standard for some types)			I		I	
Catalytic converter heat shield (Standard for some types)						I

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.

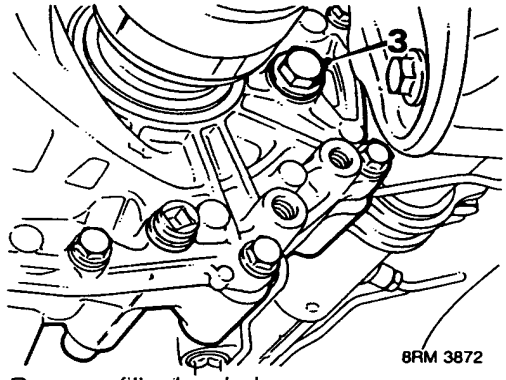
Condition	Maintenance item	Maintenance operation	Interval
A B • • • F	Engine oil and oil filter	R	Every 5,000 km (3,000 miles) or 3 months
• • • • • F	Transmission oil	R	Every 20,000 km (12,000 miles) or 12 months
A B • D E F	Front brake discs and calipers	I	Every 10,000 km (6,000 miles) or 6 months
A B • D E F	Rear brake discs, calipers and pads	I	Every 20,000 km (12,000 miles) or 12 months
A B C • E F	Clutch release arm travel	I	Every 10,000 km (6,000 miles) or 6 months
• B C • E •	Power steering system	I	Every 10,000 km (6,000 miles) or 6 months

CAUTION: Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

MANUAL GEARBOX OIL

Oil level check

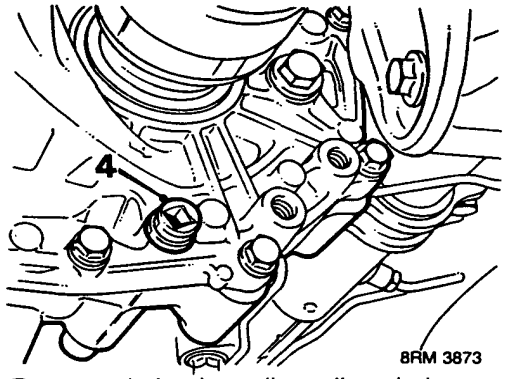
1. Raise vehicle on a ramp.
2. Clean area around filler/level plug.



3. Remove filler/level plug.
4. Check oil level and top – up if necessary to bottom of filler/level plug hole with oil of correct specification.
5. Fit filler/level plug and tighten to 45 Nm.
6. Lower ramp.

Drain and refill

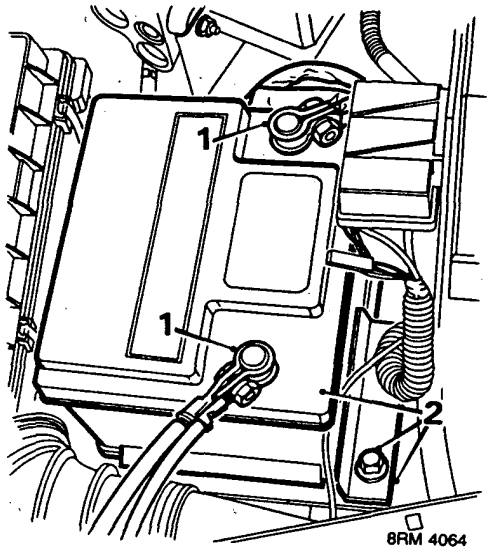
1. Raise vehicle on a ramp.
2. Clean area around drain plug.
3. Position container beneath gearbox.



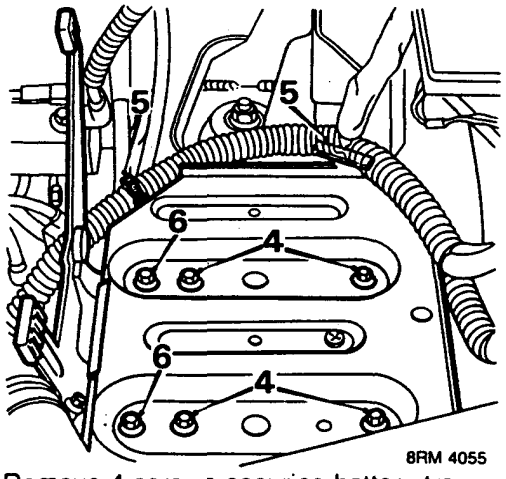
4. Remove drain plug, allow oil to drain; discard oil drained from gearbox.
5. Fit drain plug and tighten to 40 Nm.
6. Remove filler/level plug.
7. Fill gearbox with oil of correct specification until level reaches bottom of filler/level plug hole.
8. Fit filler/level plug and tighten to 45 Nm.
9. Lower ramp.

ENGINE L.H. MOUNTING

Remove



1. Disconnect both battery leads.
2. Remove bolt and battery clamp; lift out battery.
3. Remove air cleaner, see **FUEL SYSTEM - Repairs.**

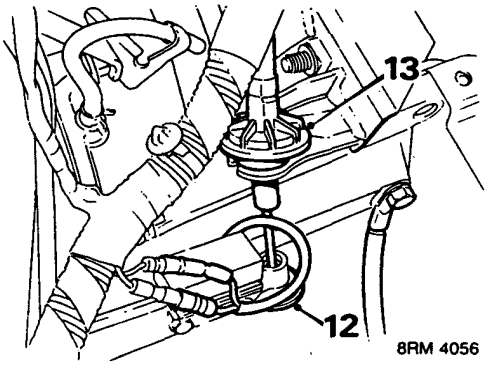


4. Remove 4 screws securing battery tray.
5. Release 2 clips securing harness to battery tray.
6. *Non - Turbo Models:* Remove 2 screws securing resonator bracket to battery tray.
7. Remove battery tray.
8. *Non - Turbo Models:* Move resonator aside.
9. Raise front of vehicle.

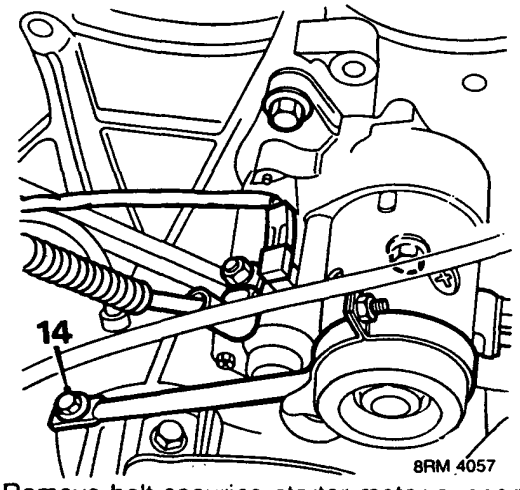
WARNING: Support on safety stands.

10. Remove L.H. front road wheel.
11. Position trolley jack to support gearbox.

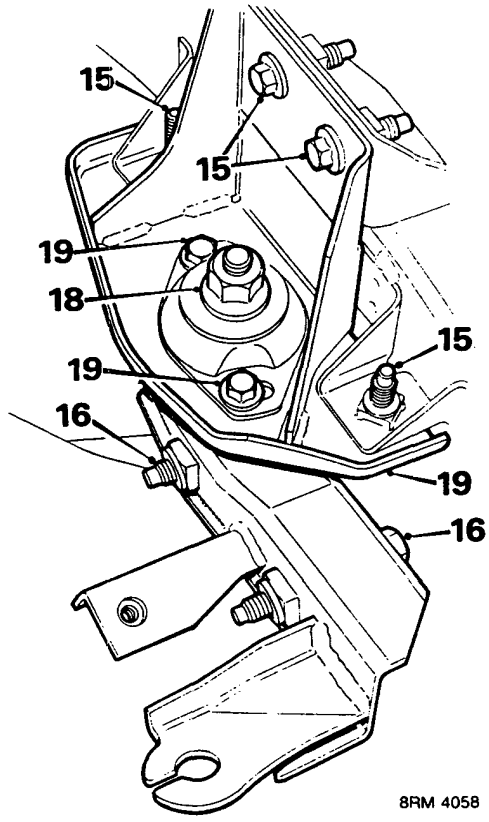
CAUTION: *Use a block of wood or hard rubber pad to protect gearbox casing.*



12. Release clutch cable from gearbox operating lever.
13. Release clutch cable from abutment bracket.



14. Remove bolt securing starter motor support rod to gearbox bracket.



15. Remove 4 bolts securing mounting bracket to body.
16. Remove 2 bolts securing mounting bracket to gearbox.

CAUTION: Note fitted positions of long and short bolts.

17. Lower trolley jack until mounting can be released from gearbox.
18. Remove nut securing gearbox mounting bracket to rubber mounting; recover special washer.
19. Remove 2 screws securing rubber mounting to body bracket; remove mounting.

Refit

1. Position rubber mounting to body bracket.
2. Fit and tighten screws.
3. Position gearbox bracket to body bracket.
4. Fit special washer and nut, tighten nut to 73 Nm.
5. Position mounting to gearbox.
6. Fit bolts securing mounting bracket to gearbox and tighten to 45 Nm.
7. Raise trolley jack to support gearbox and align mounting bracket to body.
8. Fit bolts and tighten to 45 Nm.
9. Fit and tighten bolt securing starter motor support rod to gearbox bracket.
10. Connect clutch cable to abutment bracket and gearbox operating lever.
11. Remove trolley jack.
12. *Non – Turbo Models:* Position resonator bracket to battery tray; fit and tighten screws.
13. Fit battery tray, fit and tighten screws.
14. Position harness to battery tray; secure clips.
15. Fit air cleaner, see **FUEL SYSTEM – Repairs.**

WARNING: Support on safety stands.

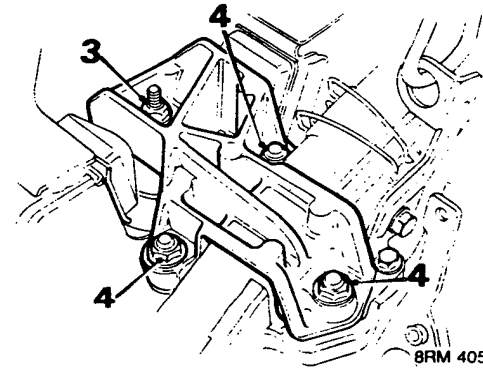
16. Remove stand(s) and lower vehicle.
17. Fit battery into tray, fit clamp and tighten bolt, connect both battery leads.

ENGINE R.H. MOUNTING

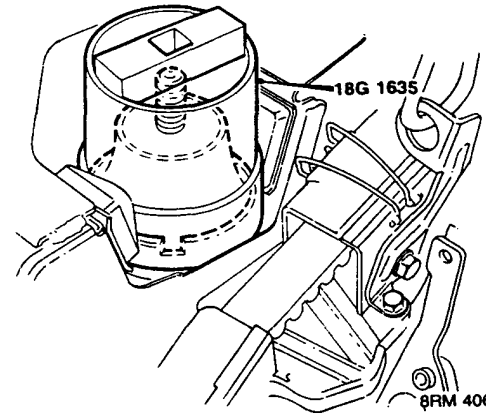
Remove

1. Position trolley jack beneath sump.
2. Support engine on trolley jack.

CAUTION: Use a block of wood or hard rubber pad to protect sump.



3. Remove nut securing mounting bracket to mounting rubber.
4. Remove 3 nuts securing mounting bracket to engine, remove bracket.



5. Using tool **18G 1635**, remove mounting rubber.

Refit

1. Position mounting rubber to body.
2. Tighten mounting rubber using **18G 1635**
3. Position mounting bracket to engine and mounting rubber.
4. Fit nuts and tighten to 50 Nm.

ENGINE REAR MOUNTING

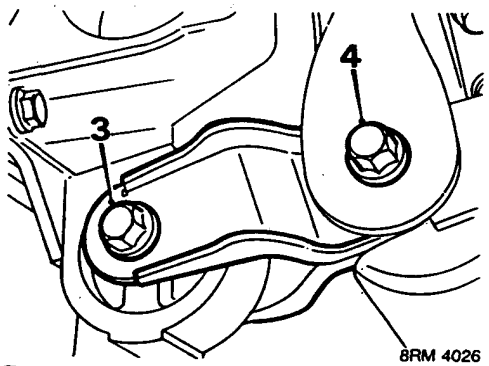
Remove

1. Raise front of vehicle.

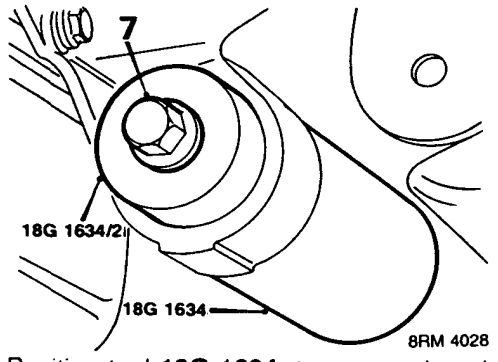
WARNING: Support on safety stands.

2. Position trolley jack beneath sump to support engine.

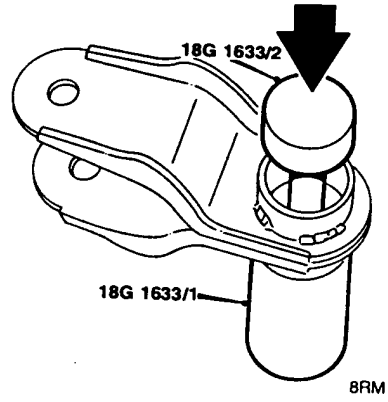
CAUTION: *Use a block of wood or hard rubber pad to protect sump.*



3. Remove bolt securing tie rod to support housing.
4. Remove bolt securing tie rod to mounting bracket; remove tie rod.



5. Position tool **18G 1634** to support housing bush.
6. Assemble tool **18G 1634/2** to tool **18G 1634.**
7. Tighten centre bolt of tool **18G 1634/2** and withdraw bush from support housing; discard bush.



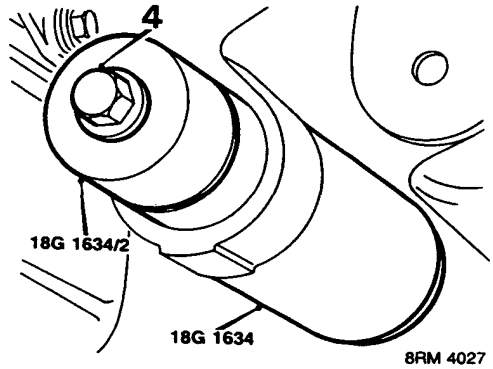
8. Position tool **18G 1633/1** on bed of press.

CAUTION: *Ensure chamfer on tool faces towards tie rod bush.*

9. Place tie rod and bush on tool **18G 1633/1.**
10. Position tool **18G 1633/2** to tie rod bush and press bush out of tie rod; discard bush.

Refit

1. Ensure bore of support housing is clean.



2. Position new bush and tool **18G 1634** to support housing.
3. Assemble tool **18G 1634/2** to tool **18G 1634.**
4. Tighten centre screw of tool **18G 1634/2** and pull bush into support housing.

Engine Tune-up

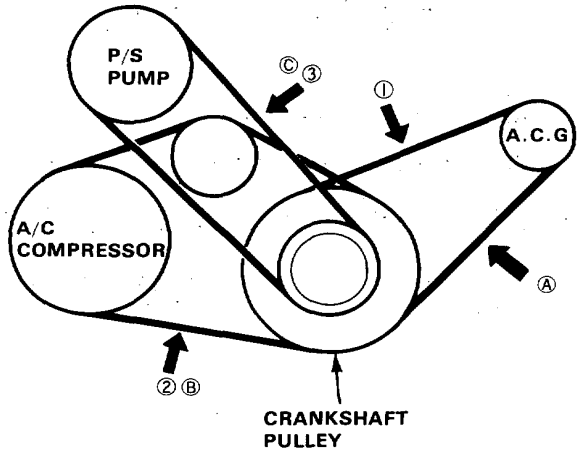
Drive Belts Inspection

Drive Belts Deflection :
(When applying a force of 9.8N (10 kg, 22 lb))

	Used Belt	New Belt
①Alternator Belt	9–11 mm (0.35–0.43 in.)	7–9 mm (0.28–0.35 in.)
②A/C Compressor Belt	9–11 mm (0.35–0.43 in.)	7–9 mm (0.28–0.35 in.)
③P/S Pump Belt	9–12 mm (0.35–0.47 in.)	7–10 mm (0.28–0.39 in.)

Measure with the belt tension gauge :

	Used Belt	New Belt
ⒶAlternator Belt	294–392N (30–40kg 66–88 lb)	392–588N (40–60 kg 66–132 lb)
ⒷA/C Compressor Belt	343–490N (35–50 kg 77–110 lb)	441–686N (45–70 kg 99–154 lb)
ⒸP/S Pump Belt	343–490N (35–50 kg 77–110 lb)	441–686N (45–70 kg 99–154 lb)



Alternator Belt Adjustment

NOTE: If there are cracks or any damage evident on the belt, replace it with a new one.

1. Apply a force of 98 N(10 kg, 22 lb) and measure the deflection between the alternator and the crankshaft pulley.

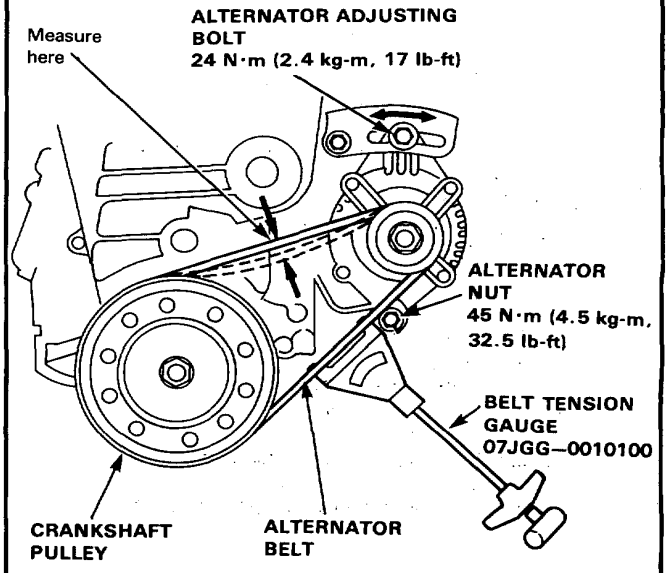
   Deflection: 9–11 mm (0.35–0.43 in)

   NOTE: On a brand-new belt, the deflection should be 7–9 mm (0.28–0.35 in) when first measured.

Measure with the belt tension gauge:
Attach the tension gauge to the alternator belt as shown. Measure the belt tension.

Tension: 294–392 N (30–40 kg, 66–88 lb)

NOTE: On a brand-new belt, the tension should be 392–588 N (40–60 kg, 66–132 lb) when first measured.



2. Loosen the alternator adjusting bolt and nut.
3. Move the alternator to obtain the proper belt tension, then retighten the adjusting bolt and nut.
4. Recheck the deflection of the belt.

Valve Clearance Adjustment

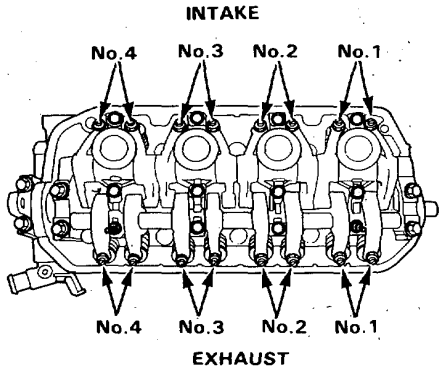
SOHC Engine :

CAUTION: Do not overtighten the locknuts, for the locker arms are made of aluminum.

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.**
- **If pulley bolt broke loose while turning the crank, retorque it to 165 N·m (16.5 kg-m, 119 lb-ft).**

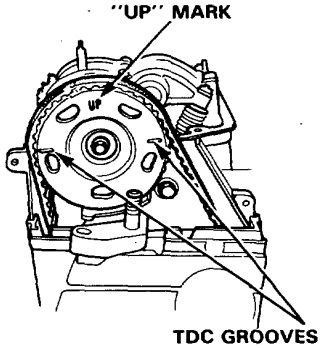
1. Remove the valve cover.



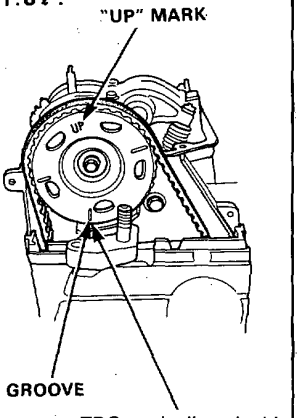
2. Set No. 1 piston at TDC "UP" mark on the pulley should be at top, and TDC groove on the pulley should align with cylinder head surface. The distributor rotor must be pointing towards No. 1 plug wire.

Number 1 piston at TDC

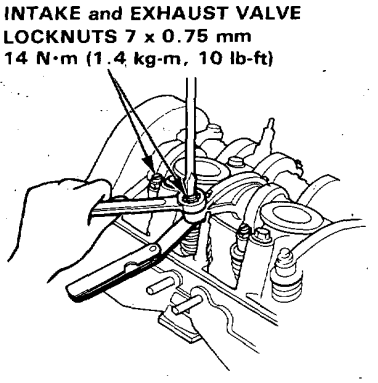
1.4ℓ :



1.6ℓ :



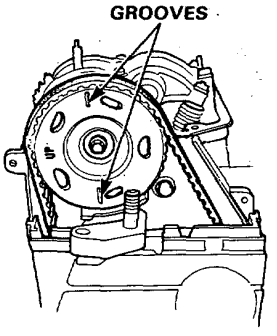
3. Adjust valves on No. 1 cylinder.
   Intake : 0.17—0.22 mm (0.007—0.009 in.)
   Exhaust : 0.22—0.27 mm (0.009—0.011 in.)
4. Loosen locknut and turn adjusting screw until feeler gauge slides back and forth with slight amount of drag.



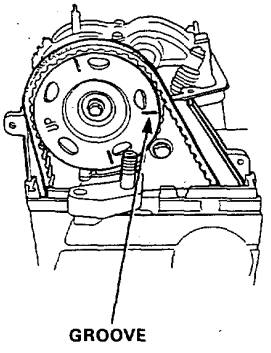
5. Tighten locknut and check clearance again. Repeat adjustment if necessary.
6. Rotate crankshaft 180° counterclockwise (cam pulley turns 90°). The "UP" mark should be at exhaust side. Distributor rotor should point to No. 3 plug wire. Adjust valves on No. 3 cylinder.

Number 3 piston at TDC

1.4ℓ :



1.6ℓ :



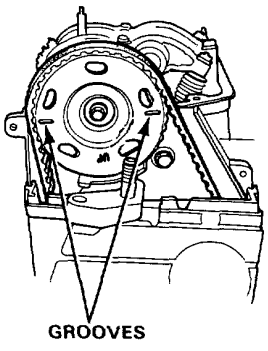
(cont'd)

Valve Clearance

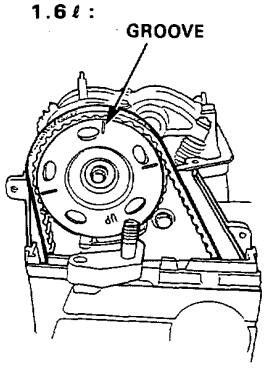
7. Rotate crankshaft 180° counterclockwise to bring No. 4 piston to TDC. Both TDC grooves are once again visible and distributor rotor points to No. 4 plug wire. Adjust valves on No. 4 cylinder.

Number 4 piston at TDC

1.4ℓ :



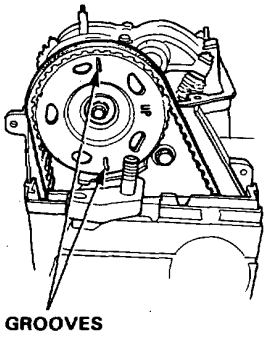
1.6ℓ :



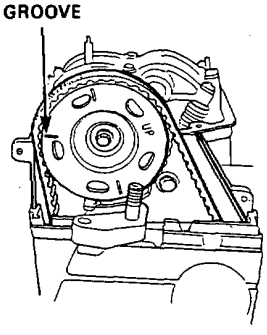
8. Rotate crankshaft 180° counterclockwise to bring No. 2 piston to TDC. The "UP" mark should be at intake side. Distributor rotor should point to No. 2 plug wire. Adjust valves on No.2 cylinder.

Number 2 piston at TDC

1.4ℓ :



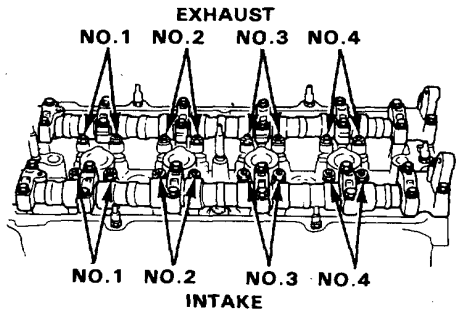
1.6ℓ :



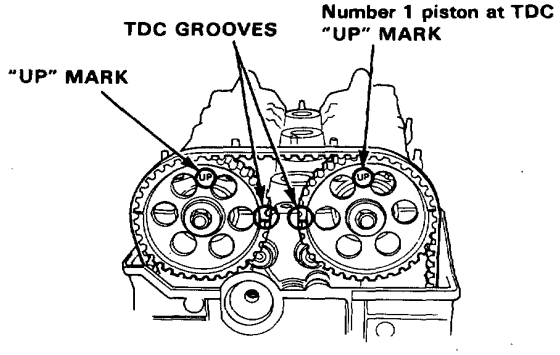
DOHC Engine:

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.
- If pulley bolt broke loose while turning the crank, retorque it to 165 N·m (16.5 kg-m, 119 lb-ft).

1. Remove the valve cover.



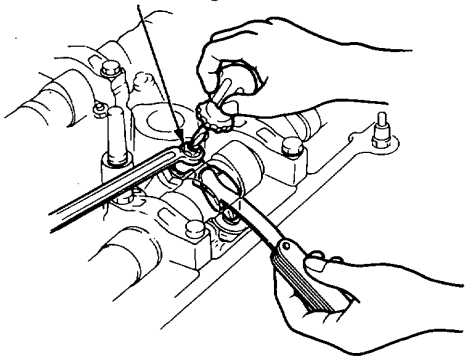
2. Set the No. 1 piston at TDC. "UP" marks in the pulleys should be at top, and the TDC grooves on back side of pulley should align with cylinder head surface. The distributor rotor must be pointing towards No. 1 plug wire.



3. Adjust valves on No.1 cylinder.
   Intake: 0.13—0.17 mm (0.005—0.007 in.)
   Exhaust: 0.15—0.19 mm (0.006—0.007 in.)

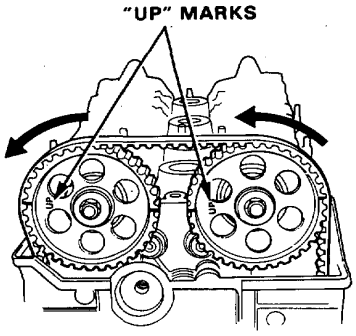
4. Loosen locknut and turn adjusting screw until feeler gauge slides back and forth with slight amount of drag.

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



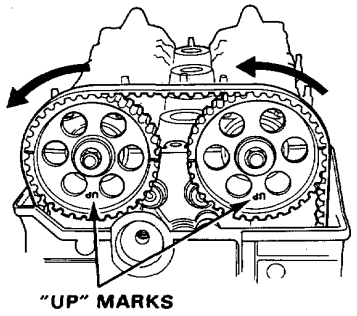
5. Tighten locknut and check clearance again. Repeat adjustment if necessary.
6. Rotate crankshaft 180° counterclockwise (cam pulley turns 90°). The "UP" marks should be at exhaust side. Distributor rotor should point to No.3 plug wire. Adjust valves on No. 3 cylinder.

Number 3 piston at TDC



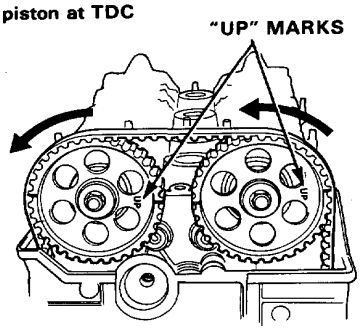
7. Rotate crankshaft 180° counterclockwise to bring No. 4 piston to TDC. Both "UP" marks should be at bottom and distributor rotor points to No.4 plug wire. Adjust valves on No.4 cylinder.

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 Tune-up

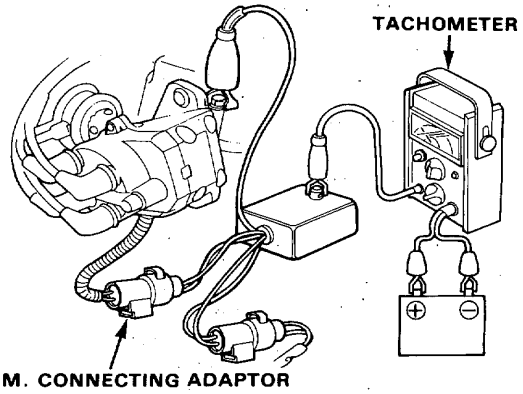
Idle Speed Inspection/Adjustment (Carbureted Engine)

NOTE:
- Ignition timing and valve clearance must be correct, and engine must be normal operating temperature; the cooling fan will come on.
- Snap the accelerator pedal serveral times and check the idle speed with the accelerator pedal fully returned.
- Check the clutch pedal (section 7) before making idle speed and mixture inspections.

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

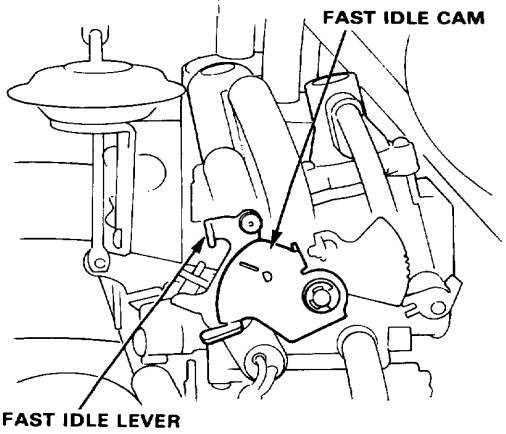
CO Meter Method

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 and connect a tachometer.



3. (1.6 ℓ Engine)
   Check the fast idle lever.

   Fast idle lever should not be seated against fast idle cam.



   - If the fast idle lever is against the fast idle cam, replace the fast idle cam (page 6-19).

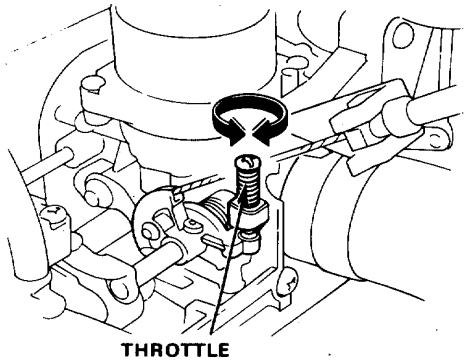
4. Check the idle speed with no load.

   Idle speed should be:

Manual	750±50 min⁻¹ (rpm)
Automatic	700±50 min⁻¹ (rpm) (N or P)

5. If not within specification, adjust by turning throttle stop screw to obtain proper idle speed.

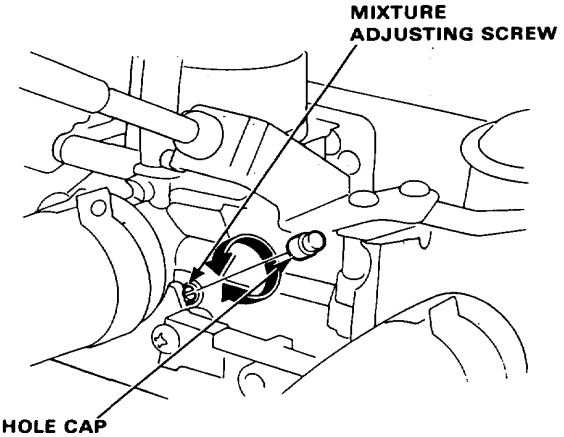
   If idle speed cannot be adjusted properly, check for proper throttle cable adjustment.



6. Check specification for idle CO with no load.

   Spcified CO %: below 1.0 %

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



   Turning both mixture adjusting screws.
   clockwise: CO reading decreases
   counterclockwise: CO reading increases

   - Readjust idle speed if necessary, and recheck idle CO.

8. Install the hole plugs.

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

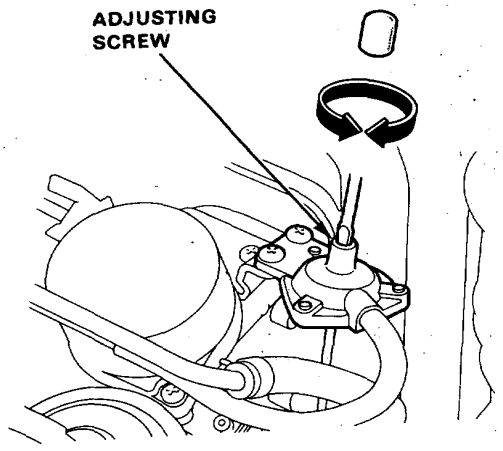
9. If equipped with air conditioner, check the idle speed with the A/C on.

   Idle speed should be:

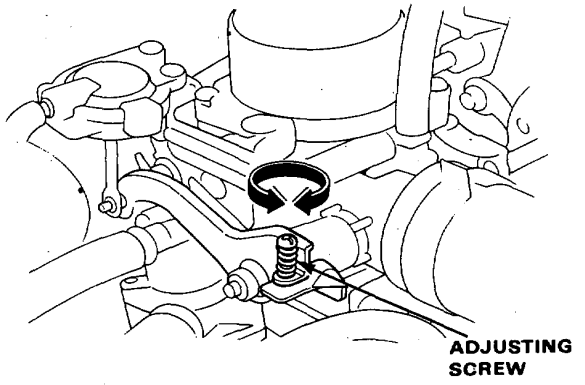
Manual	750±50 min^{-1} (rpm)
Automatic	750±50 min^{-1} (rpm) (N or P)

   Adjust the idle speed, if necessary, by turning the adjusting screw.

(1.4 ℓ Engine)



(1.6 ℓ Engine)



Tailpipe Emissions (Carbureted Engine)

Inspection

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

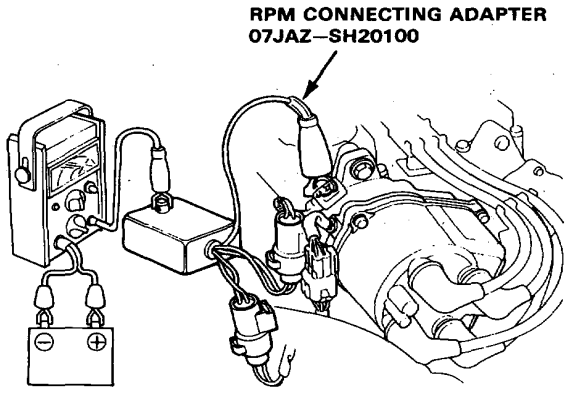
1. Follow steps the CO meter method. (page 6-15).
2. Warm up and calibrate the CO meter according to the meter manufacture's instructions.
3. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

   Specified CO% ; 1.0%

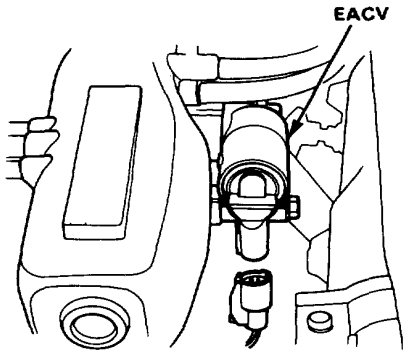
Idle Speed Inspection/Adjustment (Fuel-Injected Engine)

1.6 ℓ Fuel-Injected Engine:

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



3. Disconnect the 2P connector from the EACV.



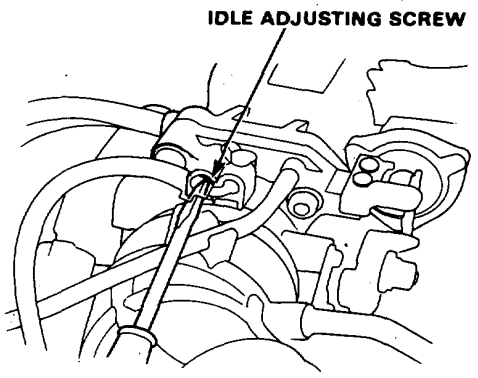
4. Check idling in no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

   Idle speed should be:

   (SOHC)
   680 ± 50 min^{-1} (rpm) (A/T: in [N] or [P])
   (DOHC with CATA)
   700 ± 50 min^{-1} (rpm)
   (DOHC without CATA)
   M/T: 700 ± 50 min^{-1} (rpm)
   A/T: 650 ± 50 min^{-1} (rpm) (in [N] or [P])

   Adjust the idle speed, if necessary, by turning the idle adjusting screw.

   NOTE: If the idle speed is excessively high, check the throttle control system (page 6-169).



5. Turn the ignition switch OFF.
6. Reconnect the 2P connector on the EACV, then remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.
7. Restart and idle the engine with no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating for one minute, then check the idle speed.

   Idle speed should be:
   (SOHC)
   780 ± 50 min^{-1} (rpm) (A/T: in [N] or [P])
   (DOHC with CATA)
   800 ± 50 min^{-1} (rpm)
   (DOHC without CATA)
   M/T: 800 ± 50 min^{-1} (rpm)
   A/T: 750 ± 50 min^{-1} (rpm) (in [N] or [P])
8. Idle the engine for one minute with headlights (Hi) and rear defogger ON and check the idle speed.

   Idle speed should be:
   (SOHC)
   780 ± 50 min^{-1} (rpm)
   (DOHC with CATA)
   800 ± 50 min^{-1} (rpm)
   (DOHC without CATA)
   M/T: 800 ± 50 min^{-1} (rpm)
   A/T: 750 ± 50 min^{-1} (rpm)
9. Idle the engine for one minute with heater fan switch at HI (right end) and air conditioner on, then check the idle speed.

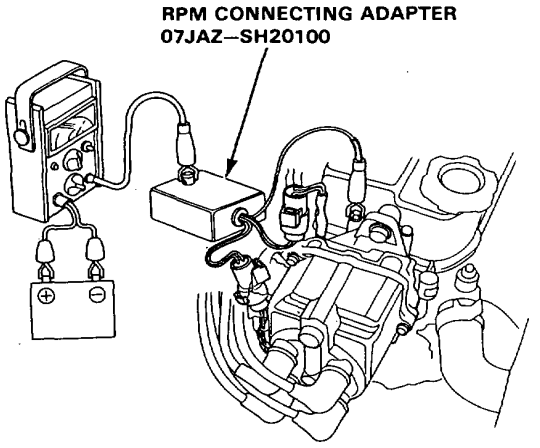
   Idle speed should be:
   (SOHC)
   810 ± 50 min^{-1} (rpm)
   (DOHC with CATA)
   800 ± 50 min^{-1} (rpm)
   (DOHC without CATA)
   M/T: 800 ± 50 min^{-1} (rpm)
   A/T: 750 ± 50 min^{-1} (rpm)

NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 6-120.

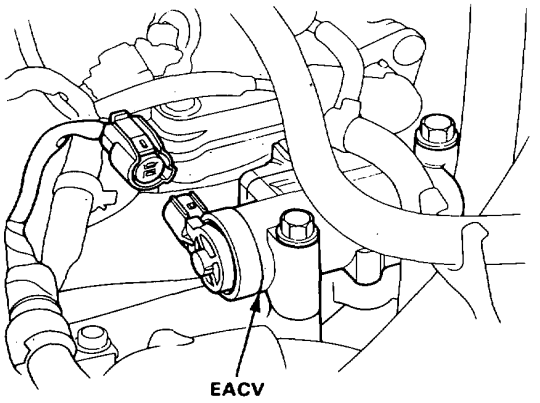
1.5 ℓ Fuel-Injected Engine:

1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).

2. Connect a tachometer.



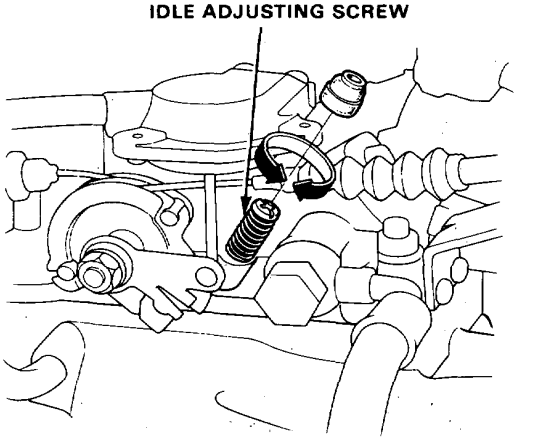
3. Disconnect the 2P connector from the EACV.



4. Check idling in no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

   Idle speed should be:
   700 ± 50 min^{-1} (rpm) (A/T: in [N] or [P])
   Adjust the idle speed, if necessary, by turning the idle adjusting screw.

   NOTE: If the idle speed is excessively high, check the throttle control system (page 6-126)



5. Turn the ignition switch OFF.
6. Reconnect the 2P connector on the EACV, then remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

7. Restart and idle the engine with no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating for one minute, then check the idle speed.

   Idle speed should be:
   800 ± 50 min^{-1} (rpm) (A/T: in [N] or [P])

8. Idle the engine for one minute with headlights (Hi) and rear defogger ON and check the idle speed.
   Idle speed should be: 800 ± 50 mim^{-1} (rpm)

9. Idle the engine for one minute with heater fan switch at HI (right end) and air conditioner on, then check the idle speed.

   Idle speed should be: 800 ± 50 mim^{-1} (rpm)

   NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 6-120.

Tailpipe Emission (Fuel-Injected Engine)

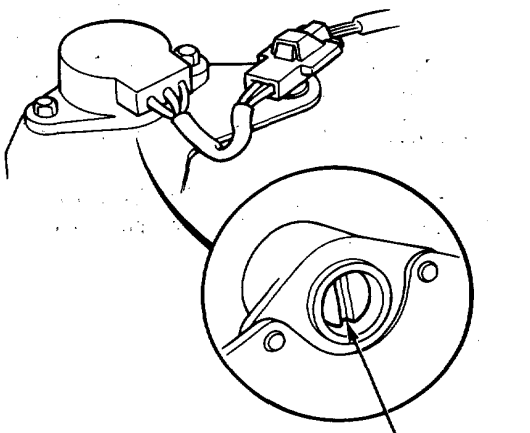
Inspection

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

1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 6-133, 134).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

Specified CO%:
With CATA: 0.1% maximum
Without CATA: 0.5 $^{+0.5\%}_{-0.3\%}$

- If unable to obtain this reading;
  On With CATA, see ECU troubleshooting (page 6-54).
  On other models, adjust by turning the adjusting screw of the IMA sensor.



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

89. Fit air cleaner and air box, see **FUEL SYSTEM - Repairs.**
90. Fit bonnet, see **BODY - REPAIR MANUAL - Repairs.**
91. Check/top - up engine oil, see **MAINTENANCE.**
92. *Power Steering:* Fill pump reservoir with Dexron IID fluid or equivalent.
93. Refill cooling system, see **MAINTENANCE.**
94. Bleed fuel filter, see **MAINTENANCE.**
95. Set fuel injection pump timing, see **FUEL SYSTEM - Adjustments.**
96. Fit starter motor, see **ELECTRICAL - Repairs.**
97. **Fit road wheel and tighten nuts to 100 Nm.**
98. Remove stand(s) and lower vehicle.
99. Bleed power steering hydraulic system, see **STEERING - Adjustments.**
100. Bleed and top - up cooling system, see **MAINTENANCE.**
101. Check/top - up engine oil, see **MAINTENANCE.**
102. Check/adjust engine idle speed, see **FUEL SYSTEM - Adjustments.**

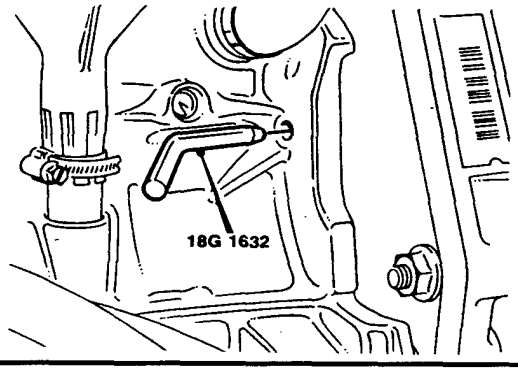
TIMING BELT

Remove

1. Raise front of vehicle.

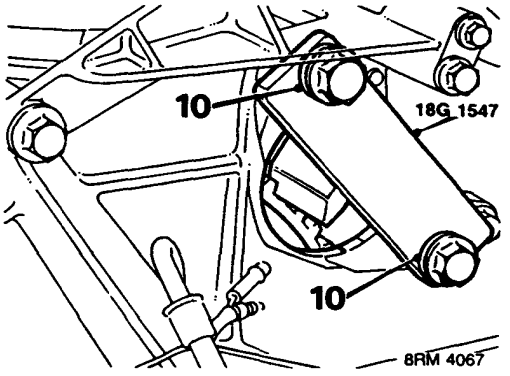
WARNING: Support on safety stands.

2. Remove R.H. front road wheel.
3. Remove timing belt top cover.
4. Remove engine R.H. mounting bracket.
5. Remove alternator drive belt, see **MAINTENANCE.**
6. Remove starter motor, see **ELECTRICAL - Repairs.**
7. Lower engine to gain access to crankshaft pulley bolt.
8. Using a spanner on crankshaft pulley bolt, rotate engine in a clockwise direction (viewed from crankshaft pulley) until timing pin hole in camshaft timing gear is aligned with tapped hole in cylinder head.

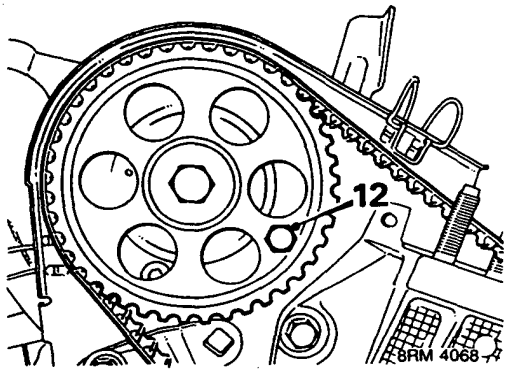


9. Fit timing pin **18G 1632** to hole in flywheel.

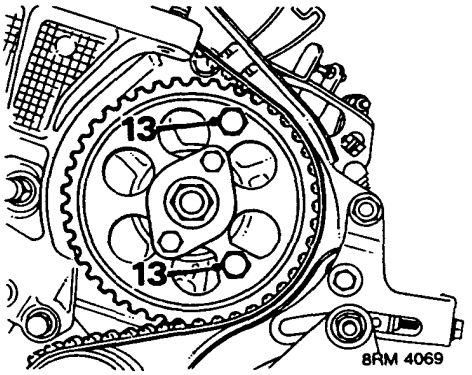
Note: *If timing pin hole in flywheel cannot be located rotate crankshaft through a further 180° to bring No. 4 piston to T.D.C. (compression); fit timing pin.*



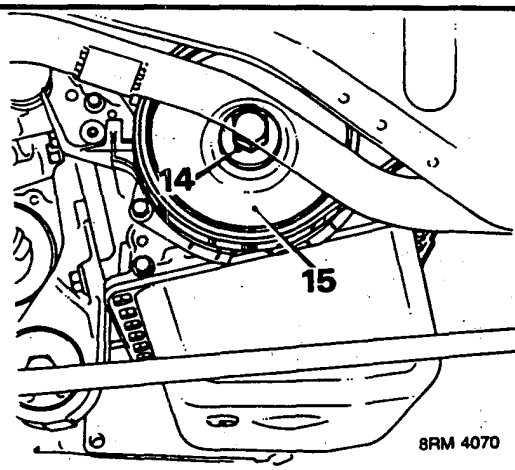
10. Fit a plain washer to 2 bolts of tool **18G 1547.**
11. Lock flywheel using tool **18G 1547.**



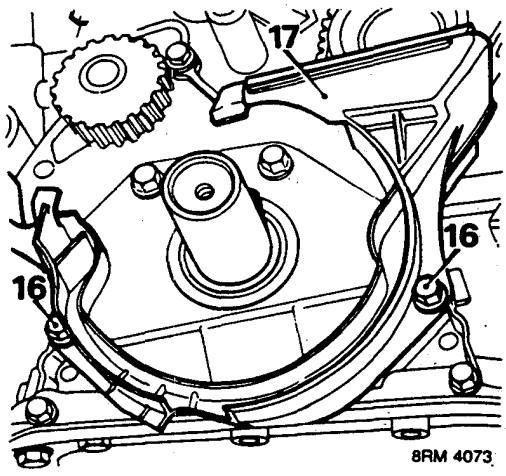
12. Insert an M8 bolt through timing pin hole in camshaft timing gear; hand tighten bolt to hole in cylinder head.



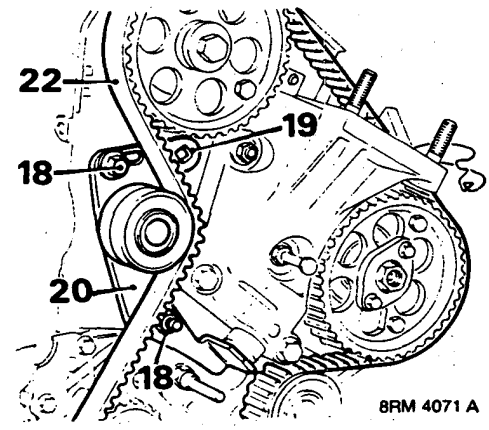
13. Insert 2 M8 bolts, through timing pin holes in fuel injection pump timing gear; hand tighten bolts to holes in fuel injection pump bracket.



14. Remove crankshaft pulley bolt.
15. Remove crankshaft pulley; recover Woodruff key.



16. Remove 2 bolts securing timing belt bottom cover.
17. Remove timing belt bottom cover; recover rubber spacer from dowel bolt.



18. Slacken but do not remove locking bolt and pivot nut securing timing belt tensioner bracket.
19. Using a 3/8 in socket extension inserted in hole in tensioner bracket, move tensioner bracket sideways until tension is released from timing belt.
20. Hold tensioner bracket in this position and tighten locking bolt and pivot nut to 15 Nm.
21. If timing belt is to be refitted, mark direction of rotation on belt.
22. Remove timing belt from timing gears and pulleys.

Refit

1. Check timing belt for wear, damage or oil contamination; replace as necessary.
2. Thoroughly clean timing gears and pulleys.

CAUTION: *Do not remove M8 bolts from timing gears during above operation.*

3. Remove all traces of Loctite from crankshaft pulley bolt and tapped hole in crankshaft, clean Woodruff key and keyway.
4. Clean timing belt bottom cover and mating faces of cylinder block; examine rubber spacer for damage, replace as necessary.
5. Position timing belt to crankshaft gear.

CAUTION: *If original timing belt is to be refitted, ensure direction of rotation mark is facing correct way.*

6. Fit timing belt to timing gears and pulleys in following sequence:
   Jockey pulley
   Fuel injection pump timing gear
   Camshaft timing gear
   Tensioner pulley
   Coolant pump gear
7. Slacken but do not remove timing belt tensioner locking bolt and pivot nut; allow tensioner to operate.
8. Tighten locking bolt and pivot nut to 15 Nm.
9. Remove M8 bolts from camshaft and fuel injection pump timing gears.

10. Remove timing pin **18G 1632.**

CAUTION: *Do not remove flywheel locking tool* **18G 1547** *at this stage.*

11. Fit rubber spacer to dowel bolt, position timing belt bottom cover to cylinder block.
12. Fit timing belt bottom cover securing bolts and tighten to 10 Nm.
13. Fit Woodruff key to crankshaft.
14. Fit crankshaft pulley.
15. Coat threads of crankshaft pulley bolt with Loctite 601.
16. Fit crankshaft pulley bolt and tighten to 40 Nm then a further 60°.
17. Remove flywheel locking tool **18G 1547.**
18. Rotate engine in a clockwise direction (viewed from crankshaft pulley) 2 complete turns.
19. Fit timing pin **18G 1632** to flywheel, lock camshaft and fuel injection pump timing gears using M8 bolts.
20. Slacken but do not remove timing belt tensioner locking bolt and pivot nut; allow tensioner to operate.
21. Tighten locking nut and pivot bolt to 15 Nm.
22. Check/adjust fuel injection pump timing – see **FUEL SYSTEM – Adjustments.**
23. Remove M8 bolts from camshaft and fuel injection pump timing gears.
24. Remove timing pin **18G 1632.**
25. Fit timing belt top cover.
26. Fit engine R.H. mounting bracket.
27. Fit starter motor, see **ELECTRICAL – Repairs.**
28. Fit alternator drive belt and adjust tension, see **MAINTENANCE.**
29. **Fit road wheel and tighten nuts to 100 Nm.**
30. Remove stand(s) and lower vehicle.

FOREWORD

This supplement covers the following engines:

XUD 9A - Non - Turbo
XUD 7TE - Turbo

As these operations have been performed on an XUD9A engine, some illustrations may differ in detail from the engine being worked on.

IMPORTANT: Unless shown otherwise, all dimensions are in millimetres.

Abbreviations used in this supplement:

IN : INLET

EX : EXHAUST

S : STANDARD

SL : SERVICE LIMIT

Ø : DIAMETER

Modifications can affect adjustments and overhaul operations on these engines.

IDENTIFICATION DATA

Cylinder Head

Cylinder head height **h** is measured with the camshaft in place fitted with two bearing caps.

h is measured in the oil seal lip contact diameter (the largest diameter).

h nominal: 157.40 to 157.75

Maximum permissible bow: **0.07** (the camshaft must turn freely)

Maximum permissible gasket face machining: **0.4** in relation to the measured **h** nominal.

Cylinder heads machined undersize are stamped **R** in the area **(a).**

After machining a gasket face, the following operations must be carried out:

- Valve seat machining to re-establish correct recess, (See page 6).
- Replacement of the swirl chambers by service replacement chambers and correction of their protrusion, (See page 7).
- Fitting of **0.4** thick compensation washers under the valve springs.

Cylinder heads with oversize camshaft bearings (+ 0.5) are stamped **1** in the area **(a).**

Cylinder head gasket

Thickness identification: **b**

Engine identification: **c**

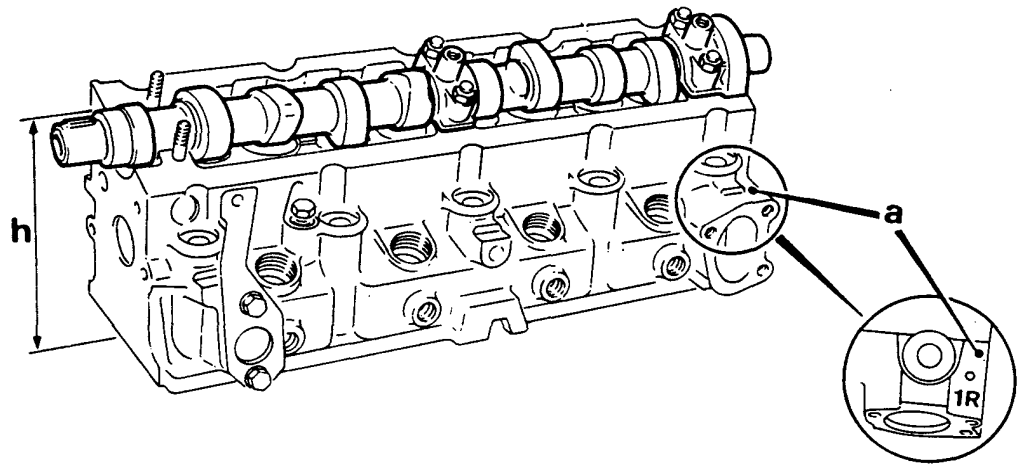
Engine	Identification(c)	Identification(b)	Thickness
XUD 9A	No notch	2 notches	1.61 mm
		3 notches	1.73 mm
XUD 7TE	2 notches	2 notches	1.65 mm
		3 notches	1.80 mm

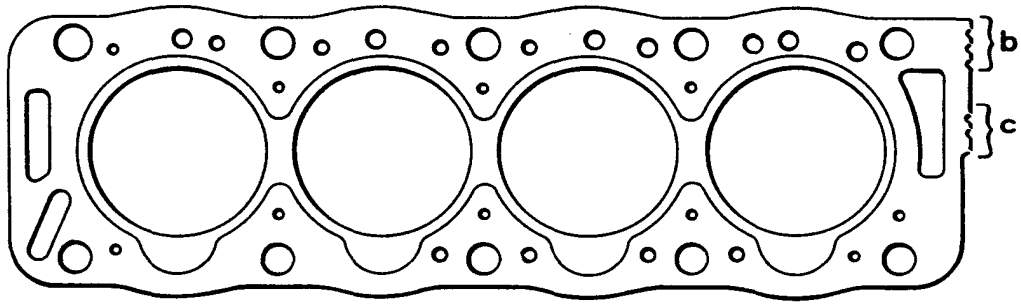
Camshaft

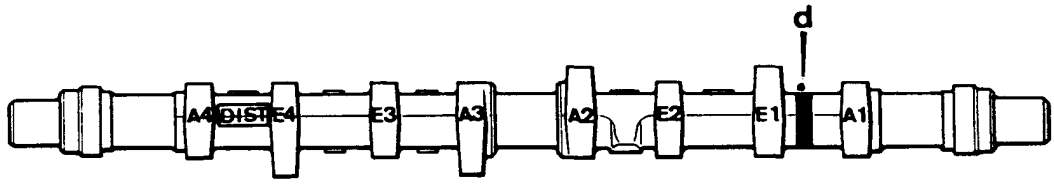
The camshaft for the XUD 7TE engine is identified by a boss between the cams of No.1 cylinder.

Camshafts with **0.5 mm** oversize bearings * are identified by a yellow paint ring **(d)** between the cams of No.1 cylinder.

* These camshafts are fitted only to exchange engines and can be obtained from Parts on special order.







12M 0312

IDENTIFICATION DATA

Valves

	IN	EX
Min. length 1	112.2	112.2
Ø a – 0.015	8.005	7.985
Ø ± 0.1	38.5	33
a	90°	90°

IN: faces **(x)** and **(y)** can be machined a maximum of 0.2 mm

EX: No machining is permissible

Valve recess

	IN	EX
C	0.5 to 1.05	0.9 to 1.45

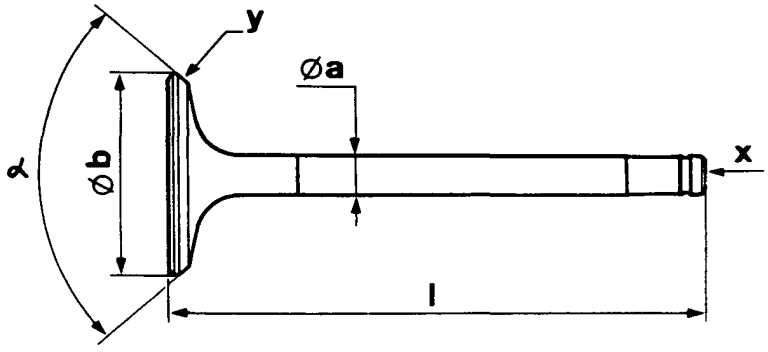
Valve springs

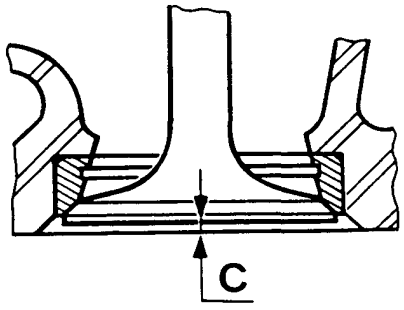
Ø d	29
Ø	57

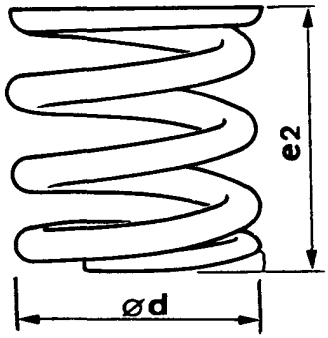
Valve guides

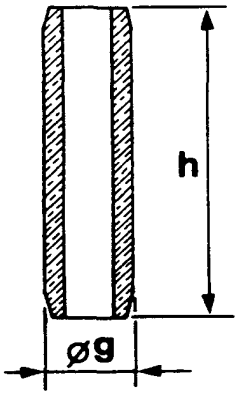
	Ø f	Ø g	h	j	Ø k
Tolerance	0 – 0.011	+ 0.032 0	± 0.25	± 0.50	0 + 0.2
S	14.02 14.13	13.981 14.051	52.00	36.50	8.02
SL – 1	14.29	14.211	52.00	36.50	8.02
SL – 2	14.59	14.511	52.00	36.50	8.02

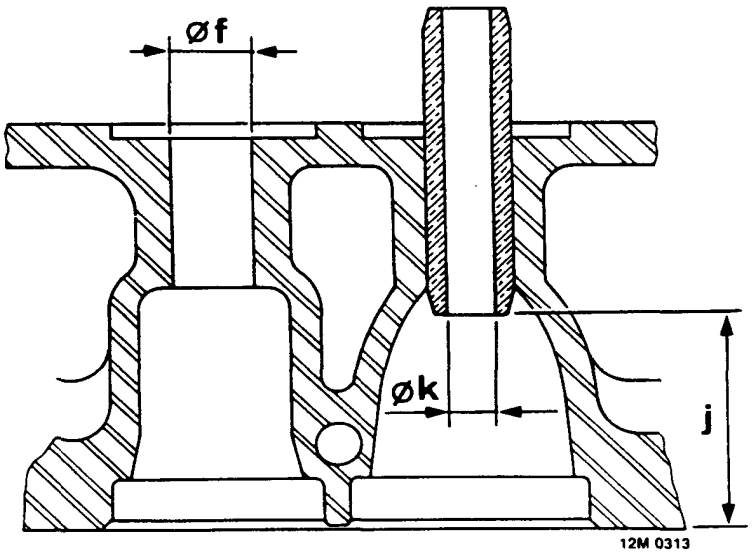
Ø k is obtained by machining after fitting in the cylinder head.


y
Øa
α
Øb
x
l


C


e2
Ød


h
Øg


Øf
Øk
j
12M 0313

IDENTIFICATION DATA

Valve seats

	IN			
	Ø a	Ø b	c	d
Tolerance	0 −0.025	±0.025	0 −0.1	±0.15
S	40.161 40.361	40 40.2	6.25 6.45	8.267 8.467
SL −1	40.461	40.3	6.45	8.467
SL −2	40.661	40.5	6.45	8.467

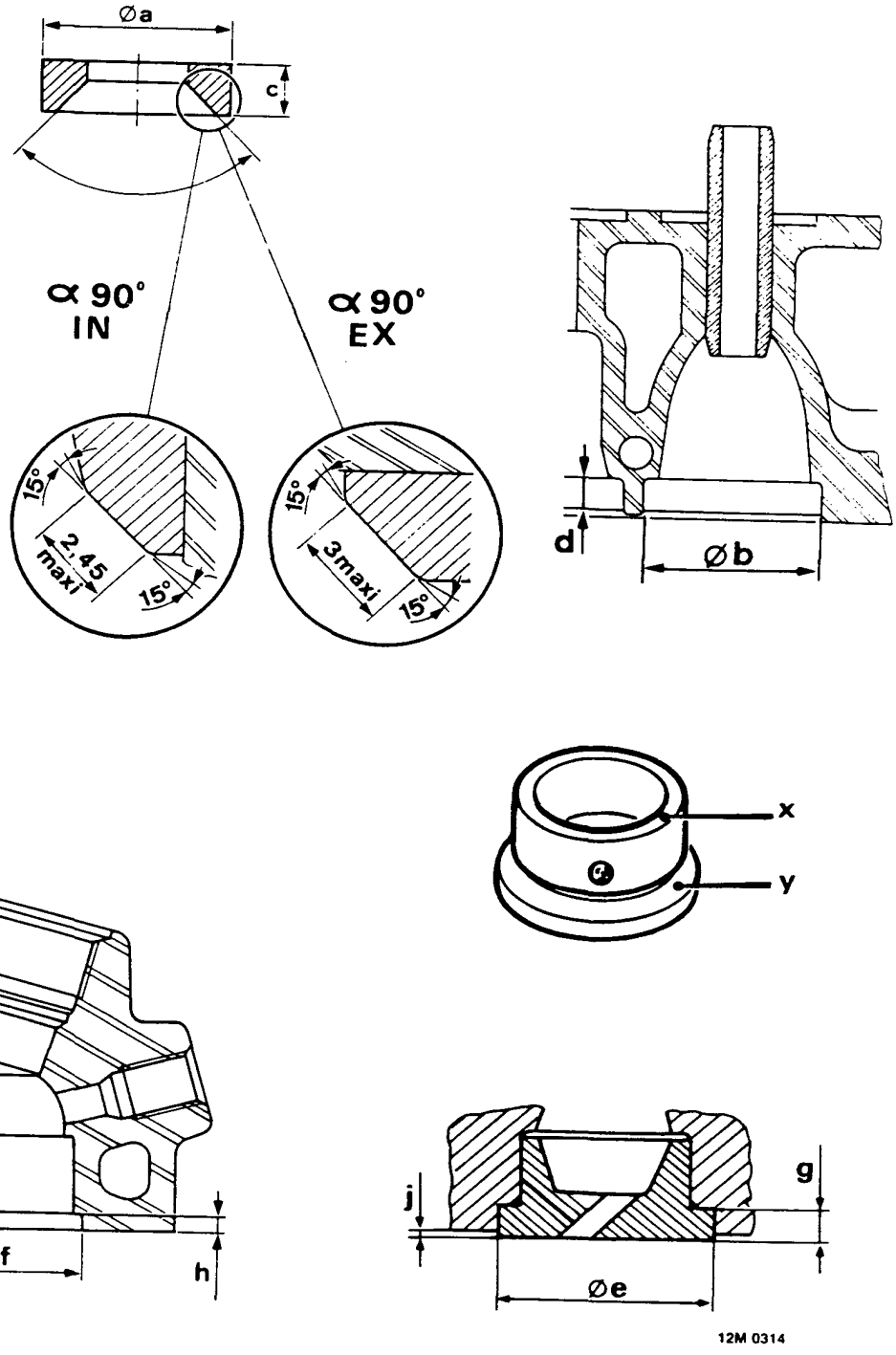
	EX			
	Ø a	Ø b	c	d
Tolerance	0 −0.025	±0.025	0 −0.1	±0.15
S	34.137 34.337	34 34.2	6.05 6.25	8.15 8.35
SL −1	34.437	34.3	6.25	8.35
SL −2	34.637	34.5	6.25	8.35

After fitting valve seats into the cylinder head, machine them according to the drawings opposite.

Swirl chambers

	Ø e	Ø f	g	h
Tolerance	+0.099 −0.060	+0.039 −0	+0.020 −0.025	+0.02 −0.04
S	32.05 32.25	32 32.2	4 4.1	3.9 4
SL −1	32.45	32.4	4.2	4.1
SL −2	32.65	32.6	4.3	4.2

The protrusion **j** must be between **0 and 0.03 mm.**
Dimension **j** is obtained by machining faces **(x)** and **y**


Øa
c
α 90°
IN
α 90°
EX
15°
2,45
maxi
15°
15°
3maxi
15°
d
Øb
x
y
Øf
h
j
g
Øe
12M 0314

IDENTIFICATION DATA

Cylinder/piston matching

Identification (x)		Cylinder Ø a Tolerance + 0.018 XUD 7TE	Cylinder Ø a Tolerance + 0.018 XUD 9A	Piston Ø b Tolerance ± 0.009 XUD 7TE	Piston Ø b Tolerance ±0.009 XUD 9A
S	None	80	83	79.93	82.93
S	A1	80.03	83.03	79.96	82.96
SL – 1	R1	80.20	83.20	80.13	83.13
SL – 2	R2	80.50	83.50	80.43	83.43
SL – 3	R3	80.80	83.80	80.73	83.73

Note: *The piston* **Ø b** must be measured at dimension c

	XUD 7TE	XUD 9A
c	22.50	25.00

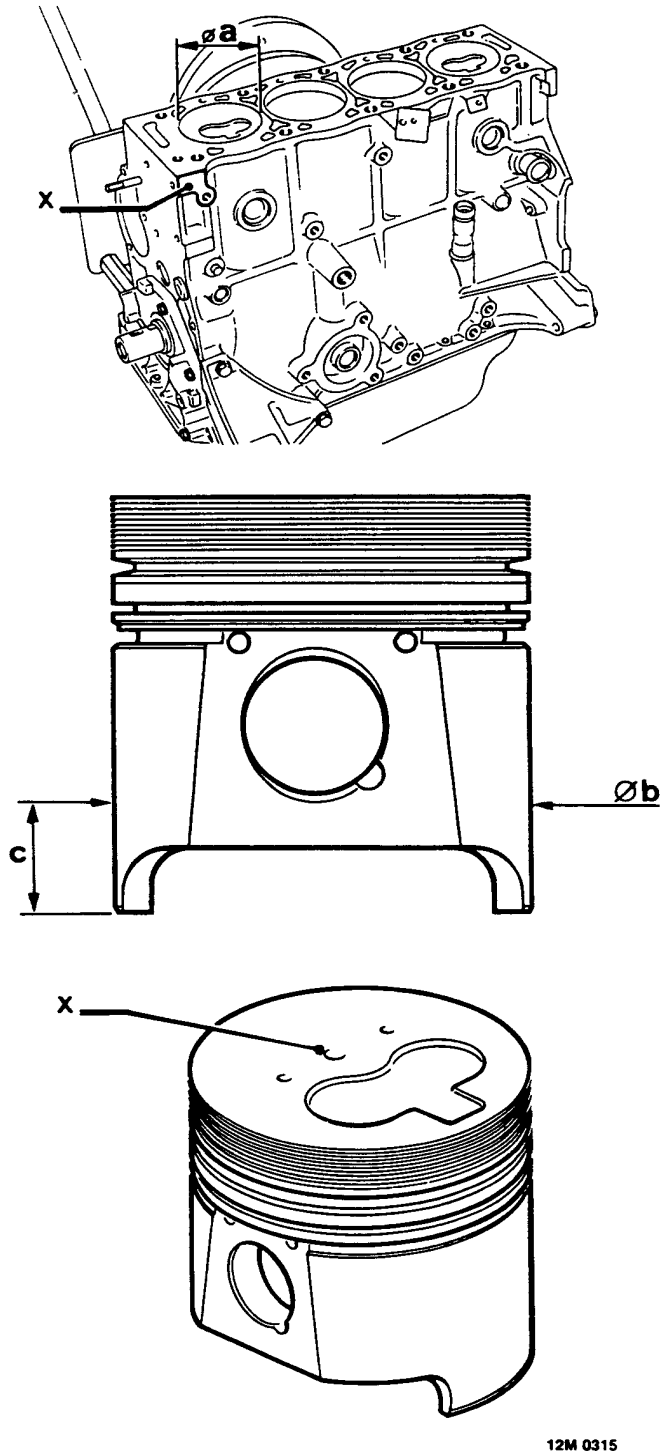
The repair dimension identification **(x)** is stamped on the cylinder block and pistons.

Gudgeon pin

	XUD 7TE	XUD 9A
Ø	28	25

Piston ring gaps

	XUD 7TE	XUD 9A
First ring	0.20 to 0.40	0.20 to 0.40
Second ring	0.20 to 0.35	0.15 to 0.35
Oil control ring	0.10 to 0.35	0.10 to 0.30


øa
X
Øb
c
X
12M 0315

IDENTIFICATION DATA

Crankshaft

Crankpins and journals

	Ø a	b	Ø c	d
Tolerance	−0 −0.016	±0.003	−0 −0.019	±0.003
S	50.00	1.827	60.00	1.842
SL − 1	49.70	1.977	59.70	1.992

Note: *Big end and main bearing shells* **SL − 1** can be identified by white paint **(1)** on the edge of the shell.

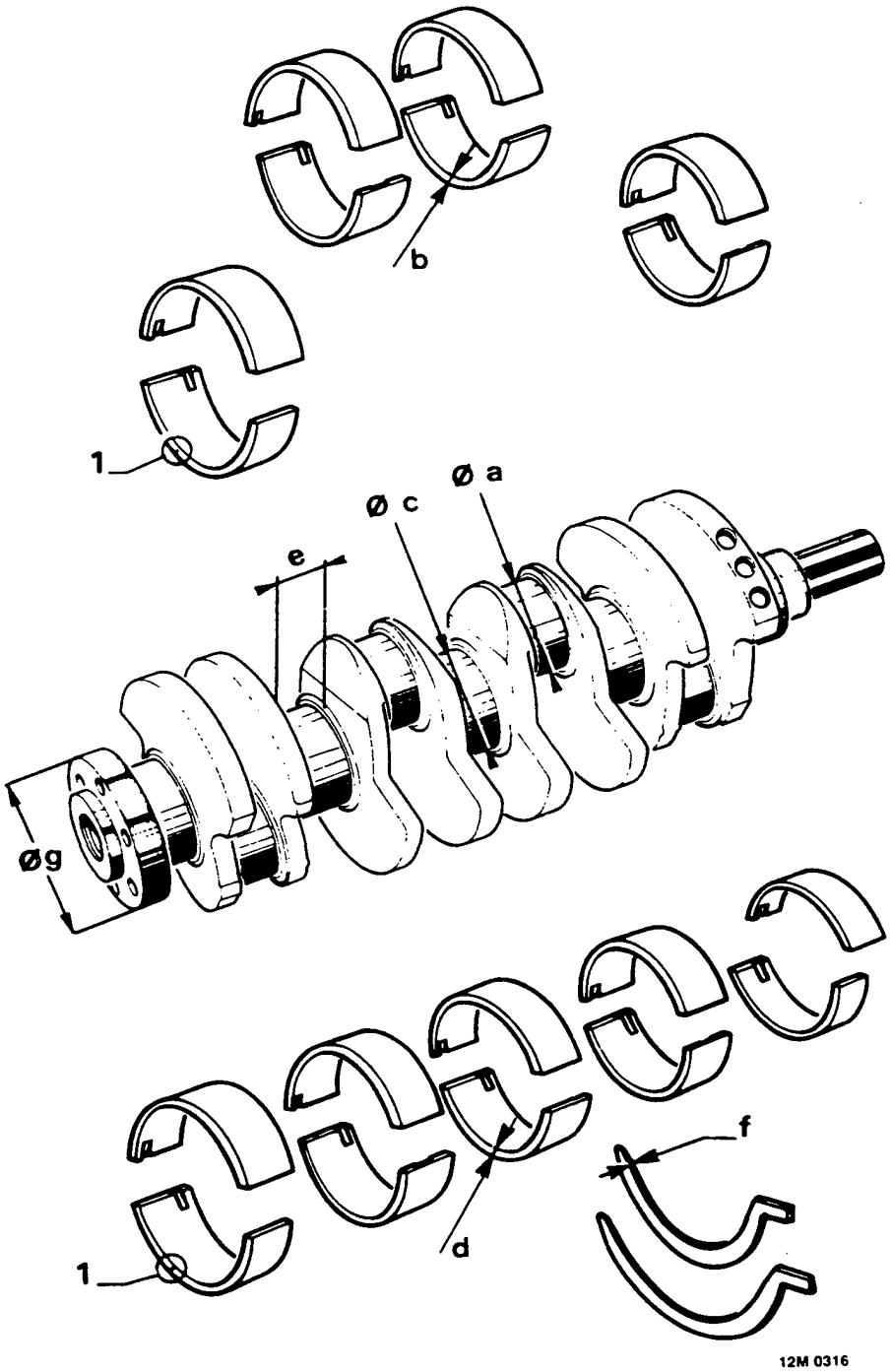
End float

End float must be between **0.7** and **0.32 mm.**

	e	e	f	f
	XUD 7TE	XUD 9A	XUD 7TE	XUD 9A
Tolerance	+0.05	+0.05	±0.025	±0.025
S	25.7	26.60	1.855	2.305
SL − 1	25.9	26.80	1.955	2.405
SL − 2	26.0	26.90	2.005	2.455
SL − 3	26.1	27.00	2.055	2.505

Oil seal contact surface

Dimension	Ø g Tolerance −0.087
S	90.0
SL − 1	89.80

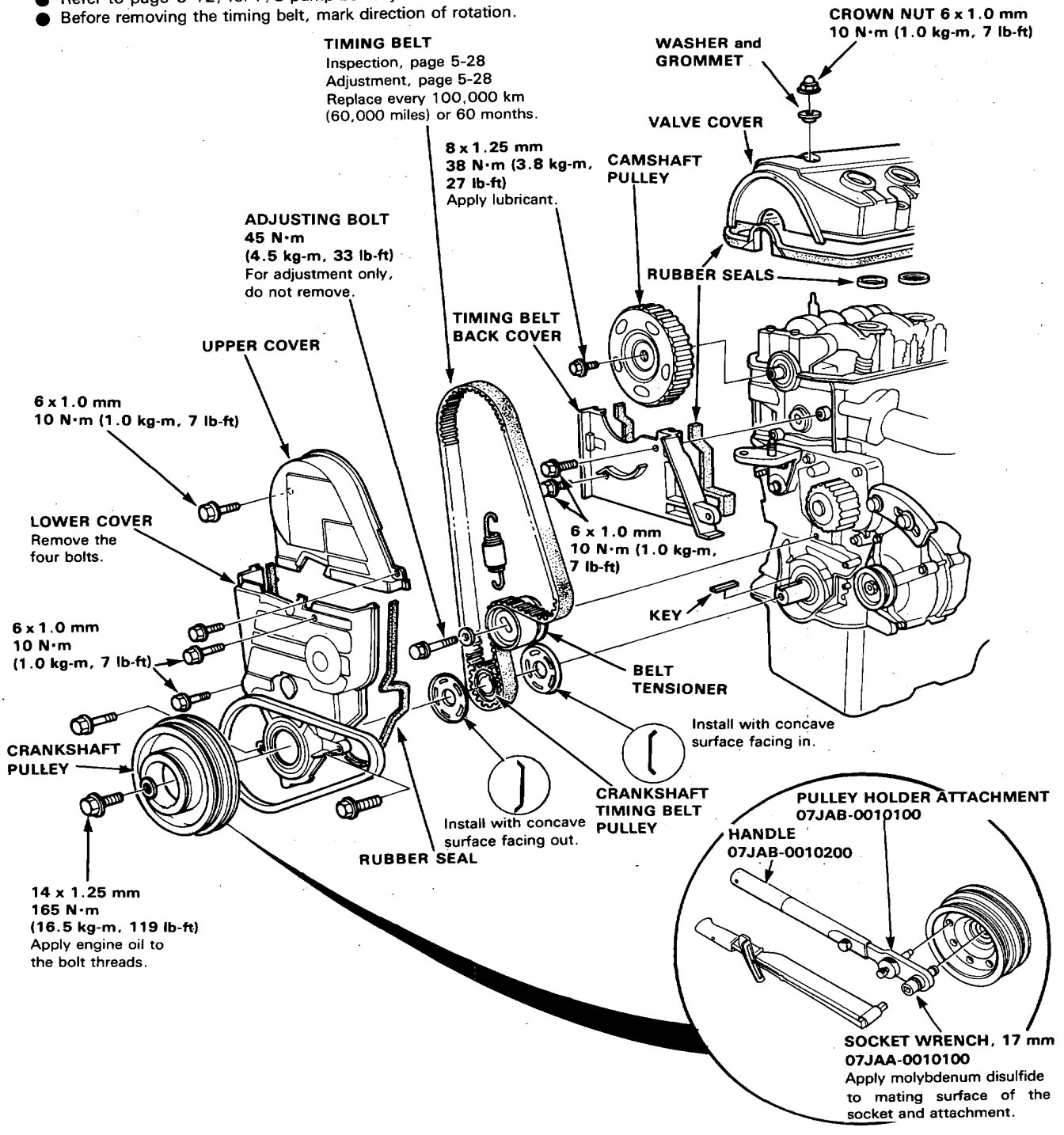

b
1
Ø a
Ø c
e
Øg
f
d
1
12M 0316

Timing Belt

Illustrated Index

NOTE :

- Refer to page 5-31 for positioning crank and pulley before installing belt.
- Refer to page 5-10, for alternator belt adjustment.
- Refer to page 5-11, for A/C compressor belt adjustment.
- Refer to page 5-12, for P/S pump belt adjustment.
- Before removing the timing belt, mark direction of rotation.

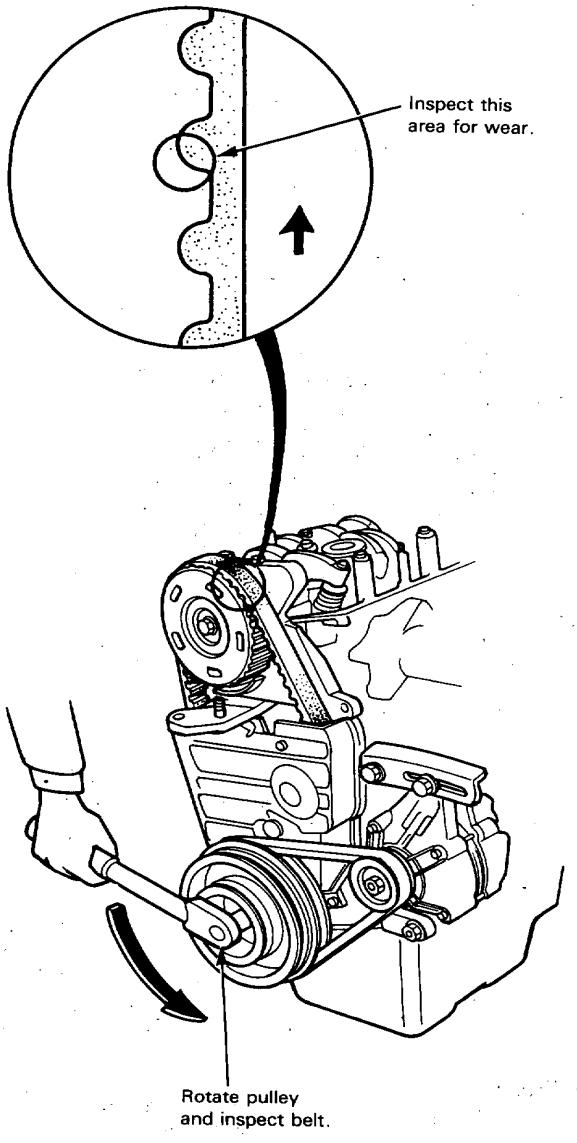


Timing Belt

Inspection

1. Remove the valve cover.
2. Remove the timing belt upper cover.
3. Inspect the timing belt for cracks and oil soaking.

NOTE :
- Replace belt if oil soaked.
- Remove any oil or solvent that gets on the belt.
- If pulley bolt broke loose while turning the crank, retorque it to 165 N·m (16.5 kg-m, 119 lb-ft).



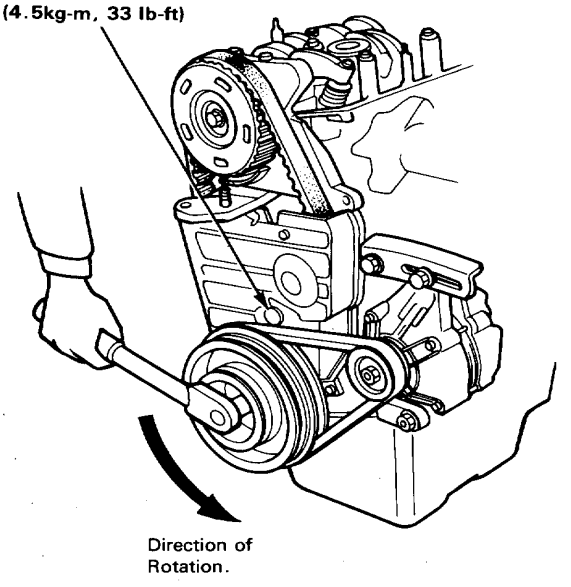
Tension Adjustment

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

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

1. Remove the valve cover.
2. Remove the timing belt upper cover.
3. Set the No. 1 piston at TDC.
4. Loosen, but do not remove, the ajusting bolt.

ADJUSTING BOLT
45 N·m
(4.5kg-m, 33 lb-ft)



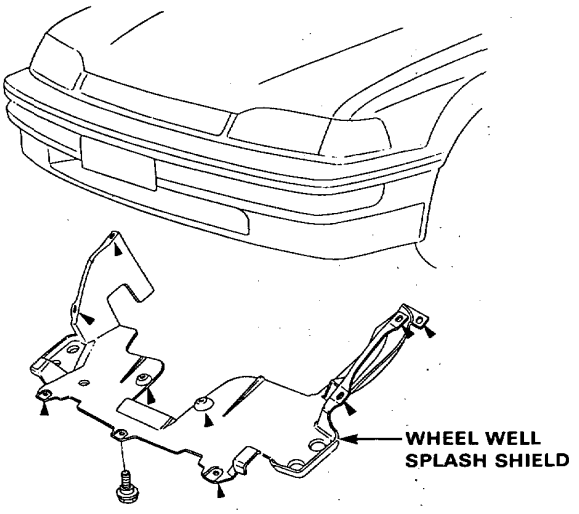
5. Rotate crankshaft counterclockwise 3-teeth on camshaft pulley to create tension on timing belt.
6. Tighten the adjust bolt.
7. If pulley bolt broke loose while turning crank, retorque it to 165 N·m (16.5kg-m, 119 lb-ft).

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

Replacement

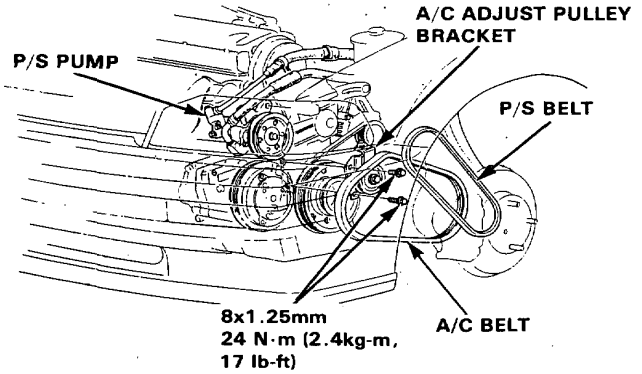
NOTE:
- Turn the crankshaft pulley so that the No. 1 cylinder is at TDC before removing the timing belt (5-31).
- Inspect the water pump after removing the timing belt.

1. Remove the wheel well splash shield.



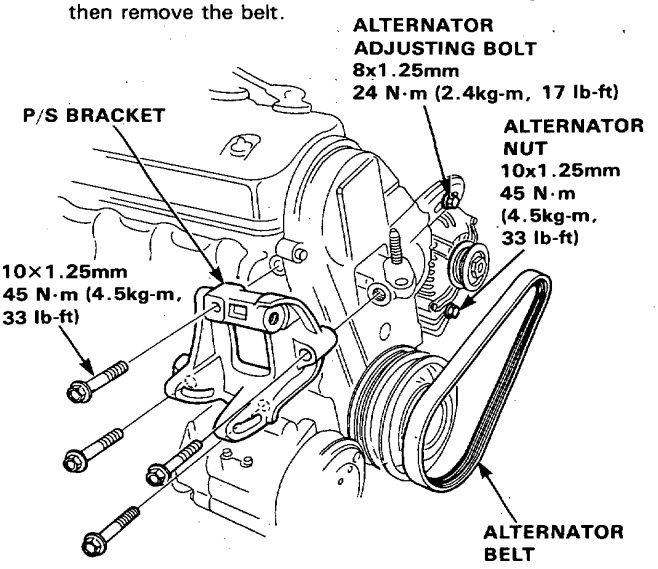
2. Remove the power steering pump (5-61 and 63).

3. Remove the A/C compressor adjust pulley with bracket and the belt (standard for some types).



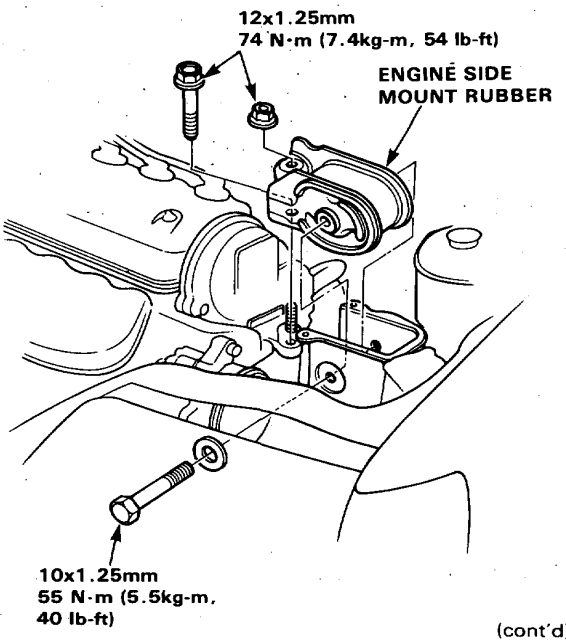
4. Remove the power steering bracket.

5. Loosen the alternator adjusting bolt and through bolt, then remove the belt.



6. After installation, adjust the tension of each belt.
   See page 5-10 for alternator belt tension adjustment.
   See page 5-11 for A/C compressor belt tension adjustment.
   See page 5-12 for power steering pump belt tension adjustment.

7. Remove the engine support bolts and nut, then remove the side mount rubber.

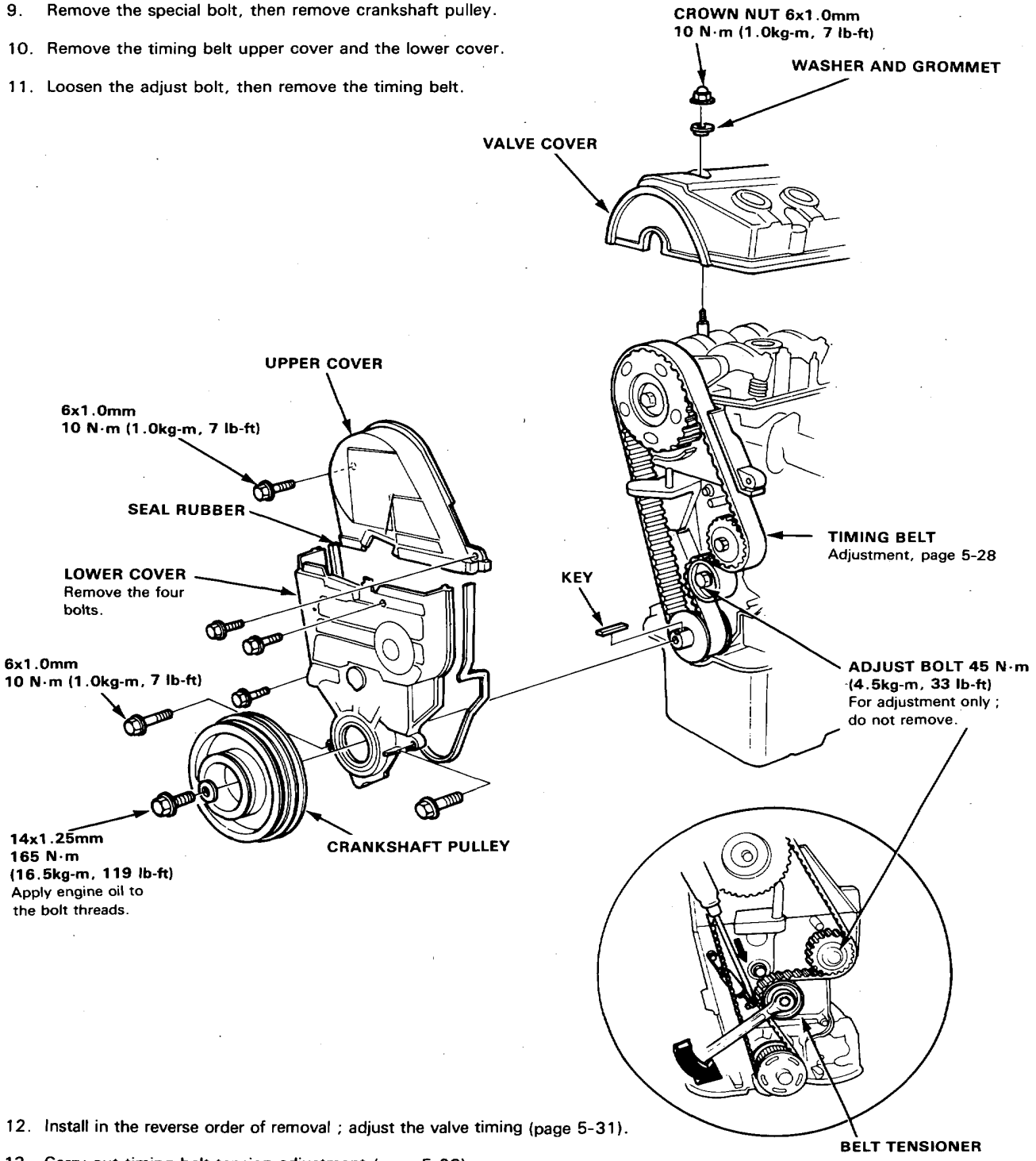


(cont'd)

Timing Belt

Replacement (cont'd)

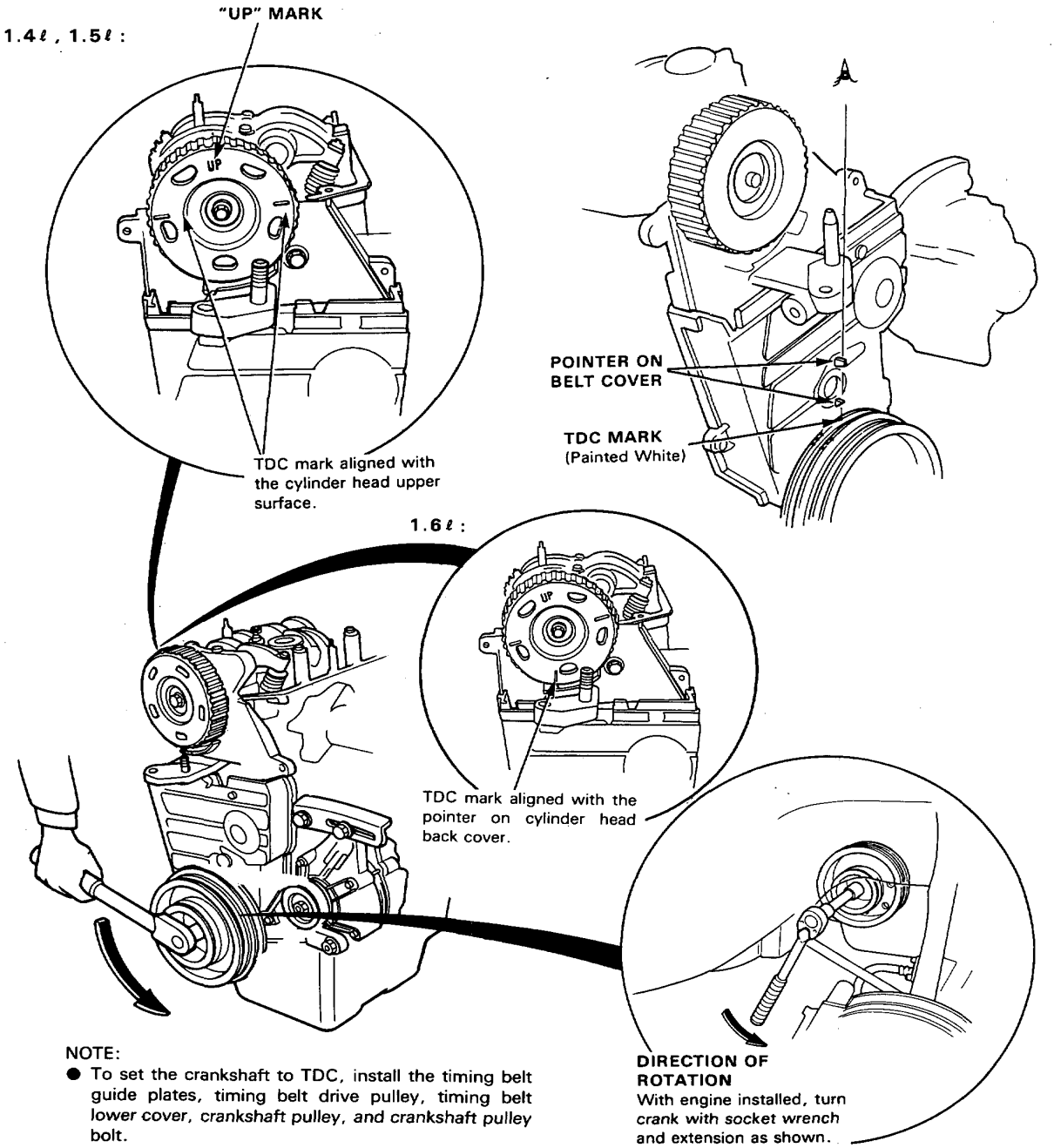
8. Remove the valve cover.
9. Remove the special bolt, then remove crankshaft pulley.
10. Remove the timing belt upper cover and the lower cover.
11. Loosen the adjust bolt, then remove the timing belt.



12. Install in the reverse order of removal ; adjust the valve timing (page 5-31).
13. Carry out timing belt tension adjustment (page 5-28).

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.*
- If pulley bolt broke loose while turnig the crank, retorque it to 16.5 N·m (16.5 kg-m, 119 lb-ft.).



NOTE:
- To set the crankshaft to TDC, install the timing belt guide plates, timing belt drive pulley, timing belt lower cover, crankshaft pulley, and crankshaft pulley bolt.

DISMANTLING

I

Removing the cylinder head

- Remove the cylinder head cover.
- Progressively slacken the cylinder head bolts working in a spiral from the outside.
- Release the cylinder head using levers.
- Remove the cylinder head and gasket.

II

Removing the oil pump

- Remove:
- The sump and its joint
- The bolts **(1)**, **(2)** and **(3)**
- The seal carrier plate **(4)**

CAUTION: The bolt **(1)** *is special as it serves to centralise the pump* **(5).**

III

- Lift the pump **(5)** to free it from its centralising dowel.
- Remove:
- The spacer **(6)** (according to engine type).
- The pump **(5)** /drive chain/crankshaft sprocket **(7)** assembly.
- Retrieve the key and the centralising dowel.

IV

Remove the crankshaft and piston

- Remove:
- The big end caps **(8)** marking them.
- The main bearing caps **(9)** (cast - in marks).
- With No.2 cap, retrieve the end float washers.

V

- Remove:
- The oil seal **(10).**
- The end float washers **(11).**
- The crankshaft.
- The main bearing shells.
- The piston/connecting rod assemblies.
- Remove the gudgeon pin circlips and separate the pistons from the connecting rods.

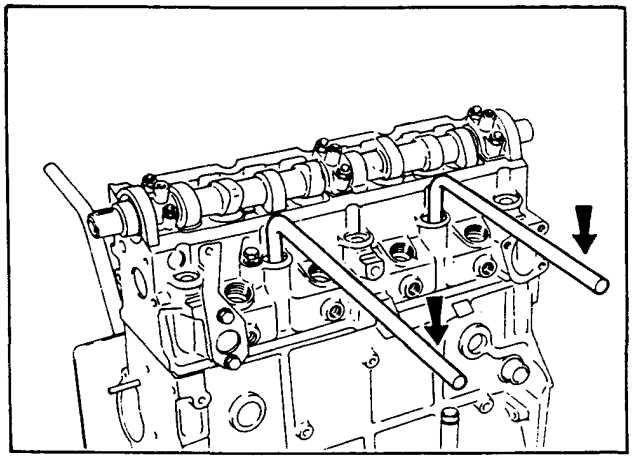
VI

- Remove:
- The plugs **(12)** from the oil galleries (illustrations V and VI).

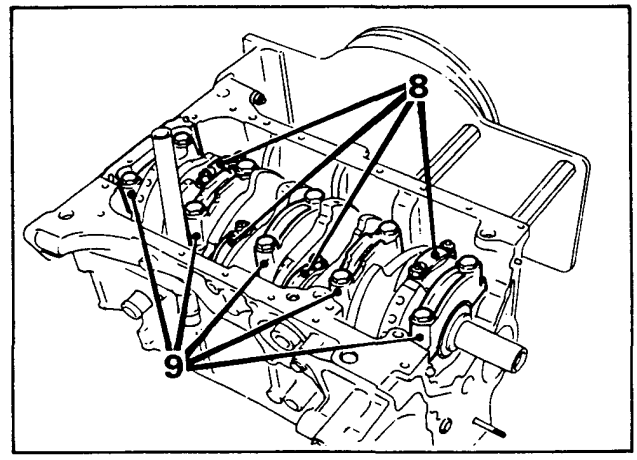
XUD 7TE

- The piston crown cooling jets.
- Thoroughly clean out the oilways.

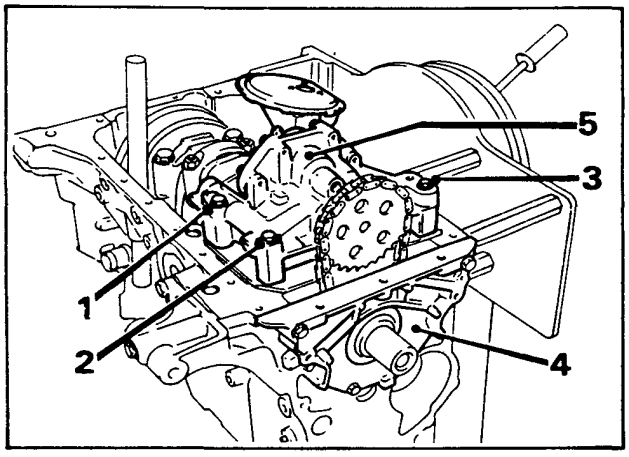
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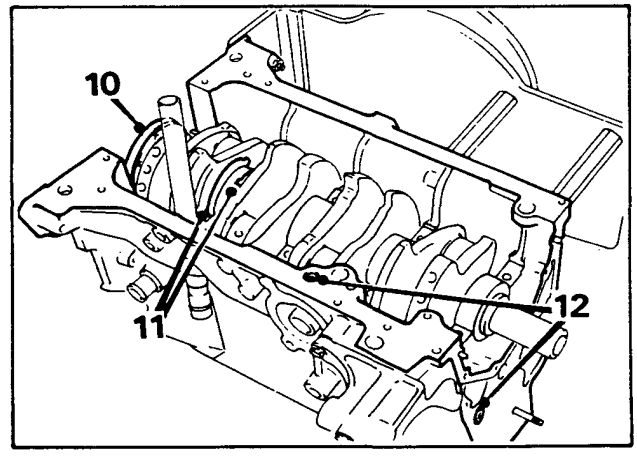
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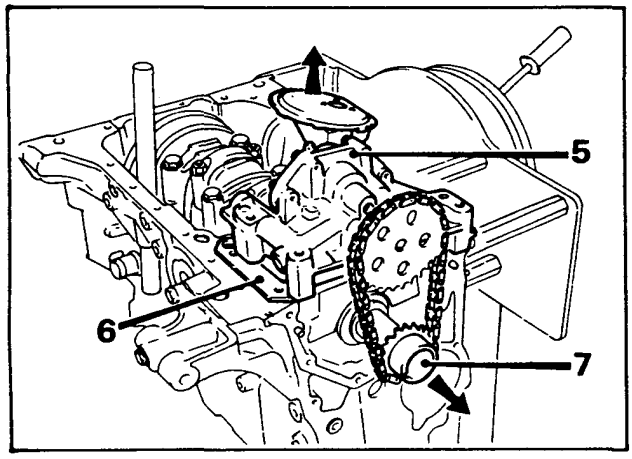
II



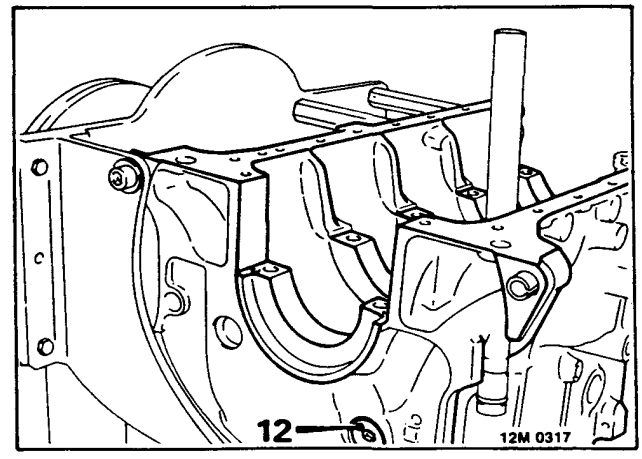
V



III



VI



CYLINDER HEAD OVERHAUL

I

- Progressively slacken the camshaft bearing caps **(1)**
- Remove:
- The bearing caps **(1)** (cast – in markings).
- The oil seals **(2)**.
- The camshaft **(3)**.
- The tappets **(4)**.
- The adjustment shims **(5)**.

II

- Remove:
- The eight valves using tool **18G 1519**.
- The swirl chambers by drifting them out from the injector orifices.
- Clean the cylinder head, use suitable gasket remover.

III

- Check the gasket face for bow. Maximum bow: **0.07 mm** .
- Check the condition of:
- The valve seats and guides.*
- The valves.*
- The valve springs.*
- The swirl chambers.
- The camshaft.
- The camshaft bearings.
- The various tapped holes.

* **Important:** For checking, rectification or replacement of these parts, (see pages 2 to 6).

IV

- Check the protrusion of the swirl chambers **(A)**:
- Protrusion: **0 to 0.03.**
- Achieve this dimension by machining faces **(a)** and **(b)**.
- Check the valve recess **(B)**:

EX = 0.9 to 1.45

IN = 0.5 to 1.05

- Achieve these dimensions by machining the valve seats.

V

- Lap in the valves.
- Refit the valves using tool **18G 1519.**

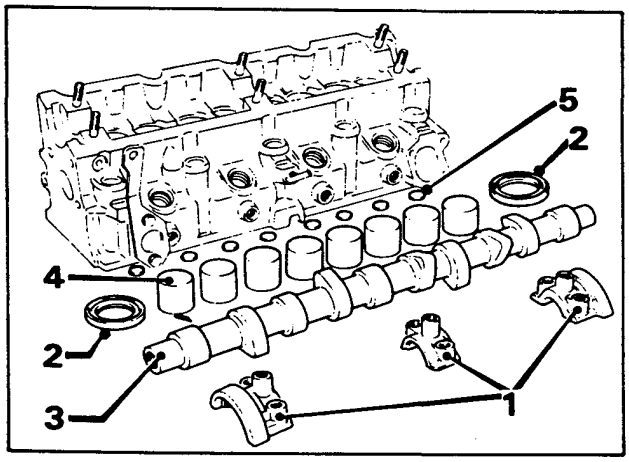
Important: If the cylinder head has been machined, fit compensating washers under the valve springs. (See page 2)

- Fit a basic shim **2.425** thick to each valve stem and check they are proud of the cup **(6)**.
- If they are not, grind the top face of the cup **(6)**.

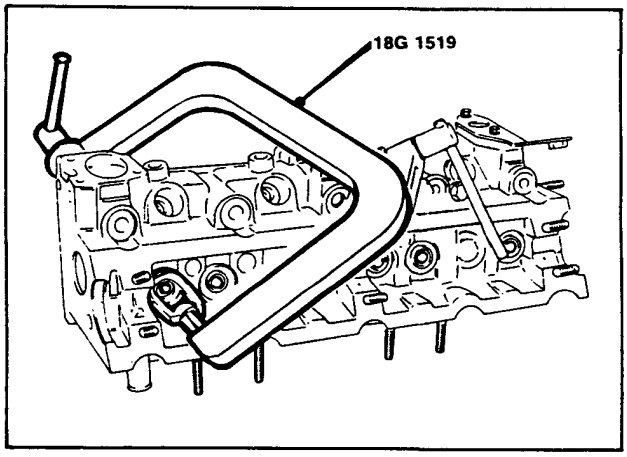
VI

- Refit the tappets.
- Oil the camshaft bearings.
- Fit the camshaft with the **DIST** marking at the timing gear end.
- Progressively tighten the bearing caps to 17.5 Nm (cast – in markings).
- Check and adjust tappet clearances **(j)** (illustration **V**).

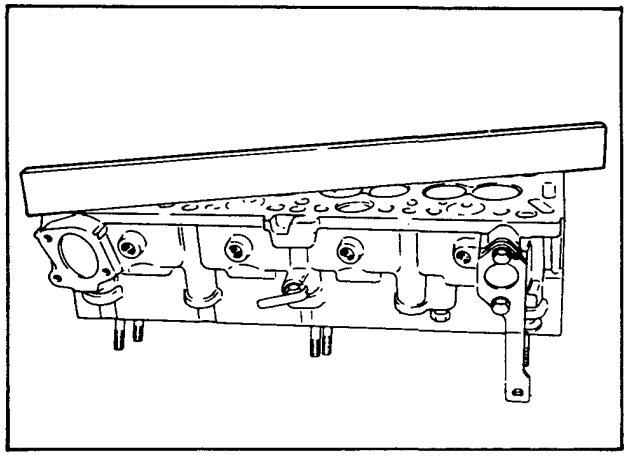
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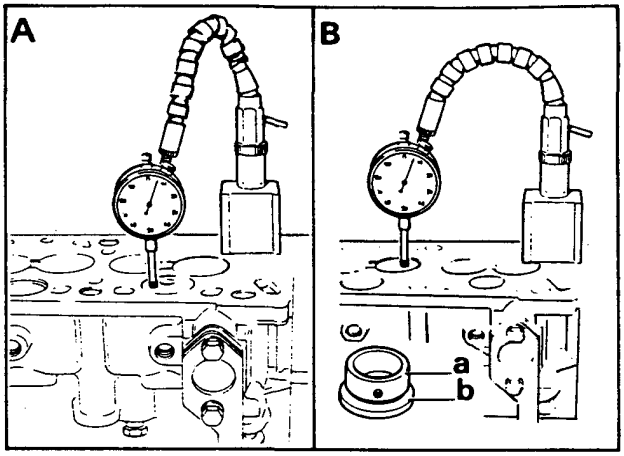
II



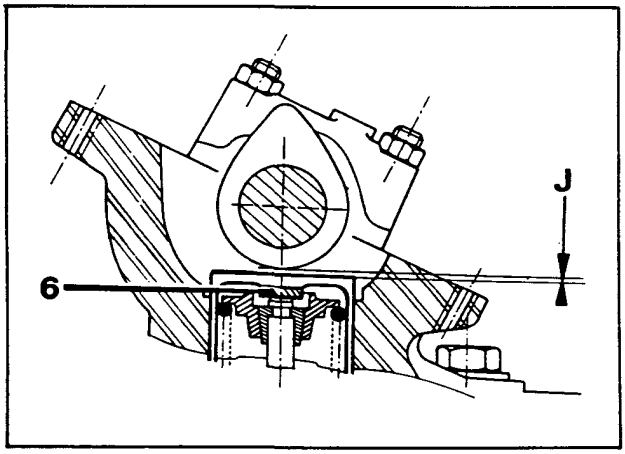
III



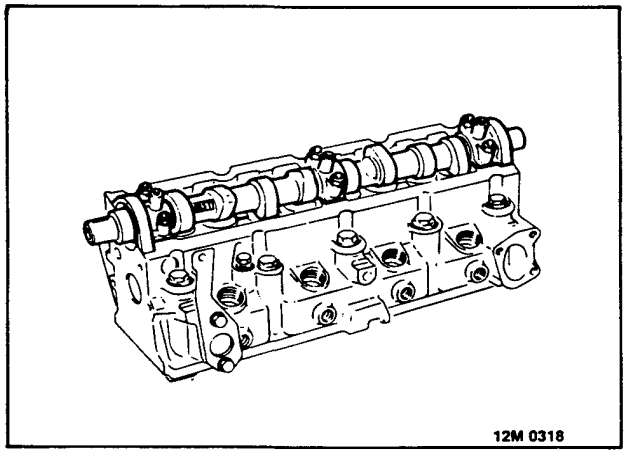
IV



V



VI

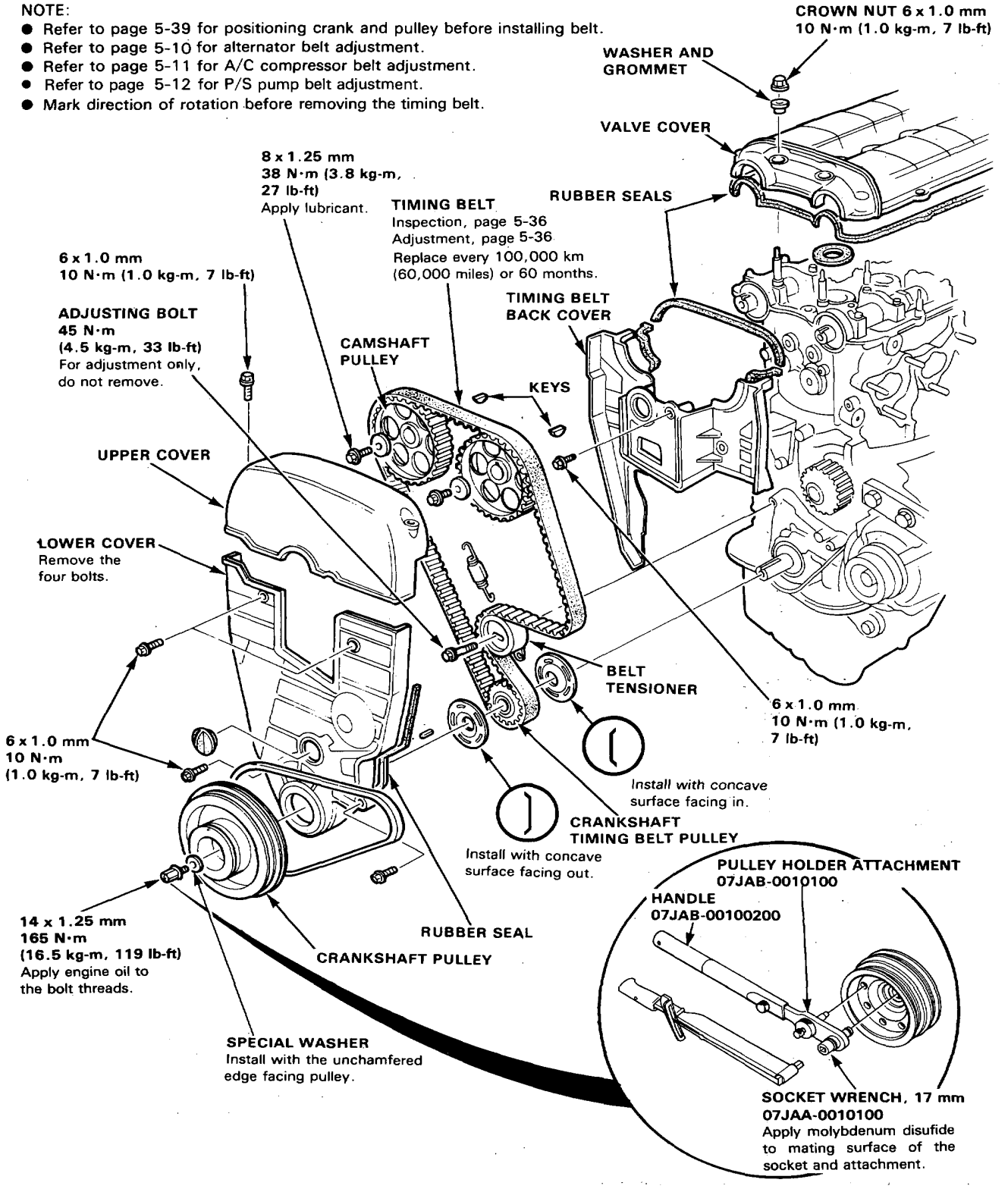


Timing Belt

Illustrated Index

NOTE:

- Refer to page 5-39 for positioning crank and pulley before installing belt.
- Refer to page 5-10 for alternator belt adjustment.
- Refer to page 5-11 for A/C compressor belt adjustment.
- Refer to page 5-12 for P/S pump belt adjustment.
- Mark direction of rotation before removing the timing belt.

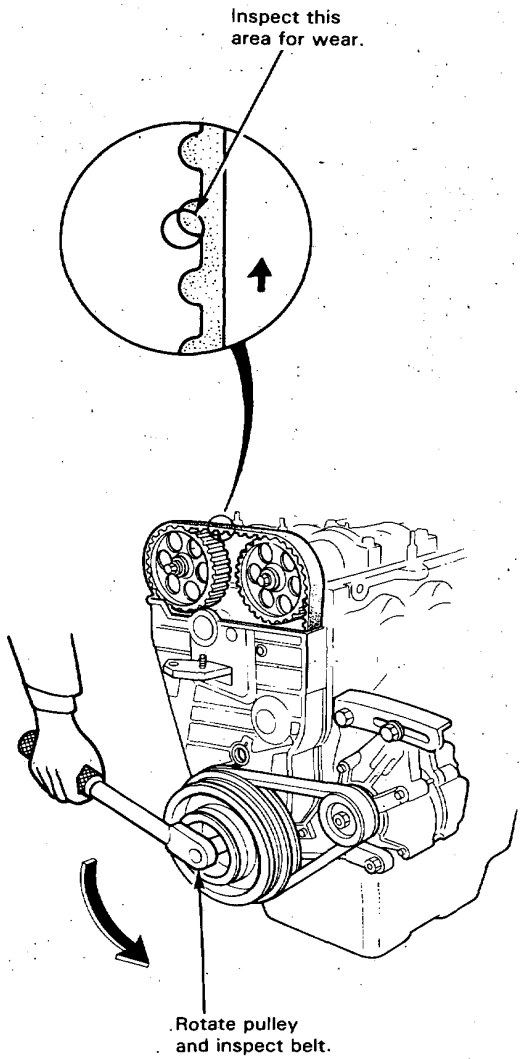


Timing Belt

Inspection

1. Remove the timing belt upper cover.
2. Remove the valve cover.
3. Inspect the timing belt for cracks and oil soaking.

NOTE:
- Replace belt if oil soaked.
- Remove any oil or solvent that gets on the belt.
- If pulley bolt broke loose while turnig the crank, retorque it to 165 N·m (16.5 kg-m, 119 lb-ft).

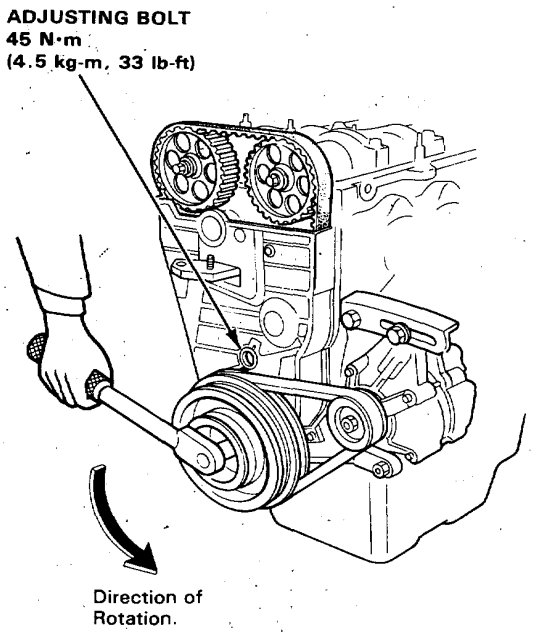


Tension Adjustment

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

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

1. Remove the timing belt upper cover.
2. Remove the valve cover.
3. Set the No. 1 piston at TDC.
4. Loosen, but do not remove, the adjusting bolt.



5. Rotate crankshaft counterclockwise 3-teeth on camshaft pulley to create tension on timing belt.
6. Tighten the adjust bolt.
7. If pulley bolt broke loose while turning the crank, retorque it to 165 N·m (16.5 kg-m, 119 lb-ft).

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

RE - ASSEMBLY

I

Fitting the crankshaft

- Fit in the cylinder block:
- The oil gallery plugs coated with Loctite Threadlock.
- The grooved main bearing shells.

XUD 7TE

- The piston crown cooling jets.

Note: *For bearing shell thickness (See page 10)*

II

- Fit:
- The crankshaft.
- Nos. 3, 4 and 5 main bearing caps.
- The two end float half - washers **(1)**, with the anti - friction faces towards the crankshaft.

III

- Fit the No.2 main bearing cap **(2)** with its two end float half - washers, their anti - friction faces towards the crankshaft.
- Apply a thin coat of Loctite 518 sealant to the ends **(a)** of the bearing.

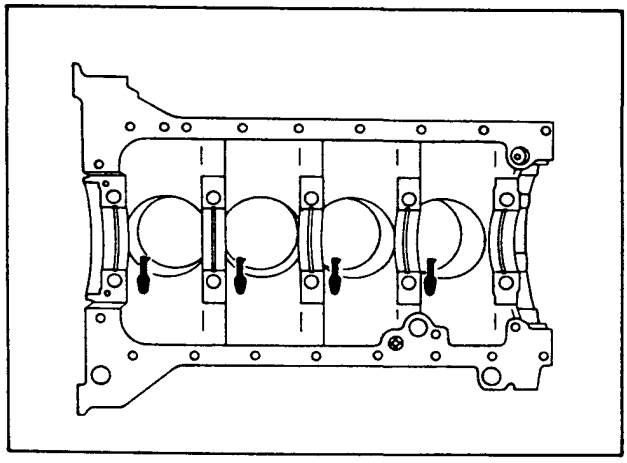
IV

- Fit:
- New sealing rubbers to the bearing cap ensuring each rubber is located on the dowel pins.
- Lubricate:
- Side plates of tool **18G 1627**
- Assemble:
- Tool **18G 1627** to main bearing cap, secure tool to bearing cap using the two shortest sump bolts.
- Main bearing cap to cylinder block.

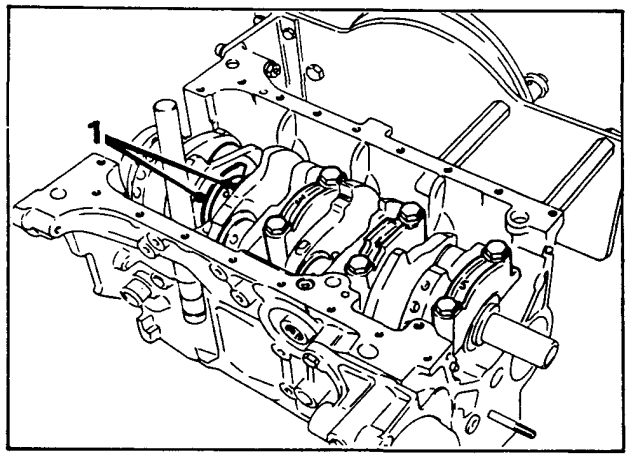
Note: *When fitting bearing cap, insert it at an angle of 45° then carefully bring it to the vertical position and press it on to the crankshaft journal.*

- Fit:
- The main bearing cap bolts and tighten them to 70 Nm.
- Remove:
- The bolts retaining tool **18G 1627** and remove the tool by rocking the tool backwards and forwards.
- Position:
- The hole (arrowed) in the centre of tool **18G 1627** over each sealing rubber and slice off each rubber level with the face of the tool; this will leave 2 mm of seal protruding from the main bearing cap.
- Tighten the bearing cap bolts to 70 Nm.
- Check that the crankshaft rotates without tight spots.

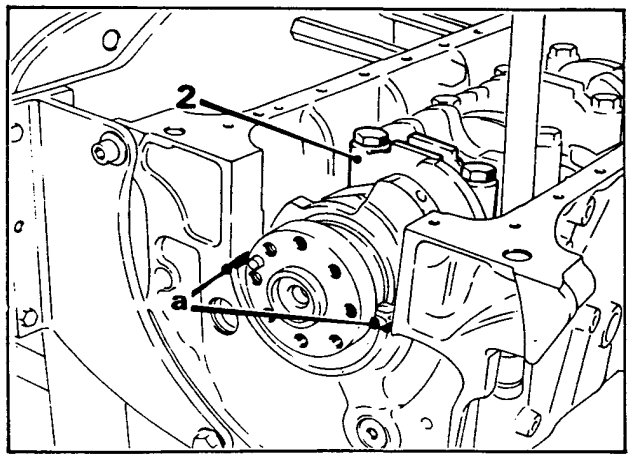
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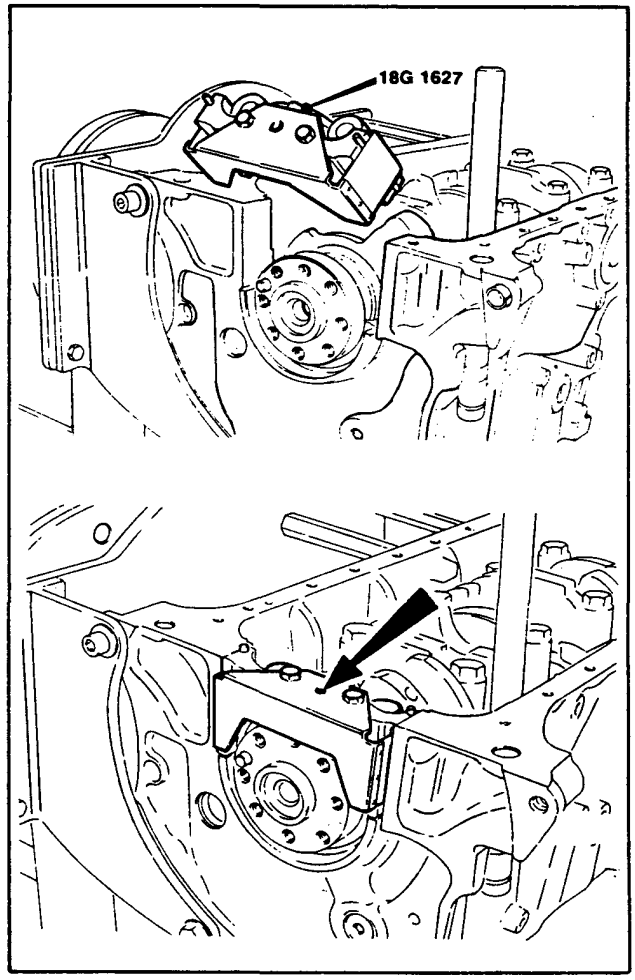
II



III



IV



12M 0319

I

Checking crankshaft end float

- Assemble D.T.I. gauge to cylinder block.
- End float must be between **0.07** and **0.32 mm.**

Note: *For choice of half washer thickness, (see page 10)*

II

Fitting pistons - connecting rods:

- Assemble the connecting rods and pistons with the bearing shell tab recesses **(a)** on the same side as the piston crown recess **(b)** .
- Fit the piston rings.

Note: *the marked face of the tapered ring must be towards the combustion chamber.*

- To assemble, use special pliers
- scraper ring (oil control) **(1)**
- tapered ring (second ring) **(2)**
- domed chrome ring (first ring) **(3)**
- Space the ring gaps at 120° in relation to the scraper ring gap **(c)** .
- Oil the piston and moderately tighten the piston ring clamp **(4)** (illustration **III**).

III

- Remove the big end caps.
- Fit the pistons in the bores, observing the markings made on removal and with the piston crown recess **(a)** on the oil filter side of the block.
- Fit the big end caps and tighten the nuts to 50 Nm.

Note: *For choice of bearing shell thickness, (see page 10)*

IV

- Position a new oil seal on tool **18G 1628.**
- Fit the new seal by tapping it fully home with a mallet.
- Withdraw the tool with a twisting movement.
- Check that the visible lip of the seal is towards the outside.

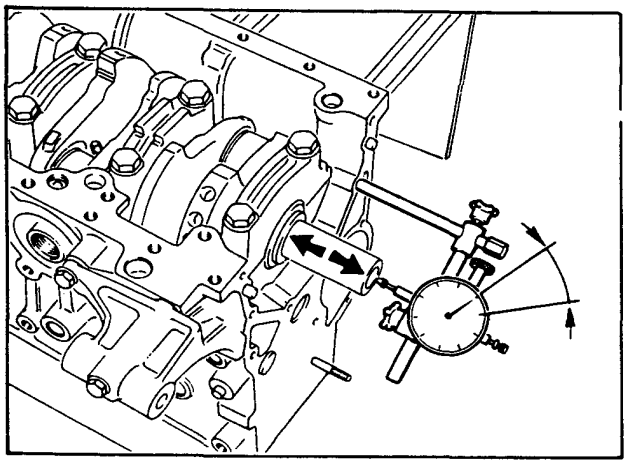
V

Fitting the oil pump.

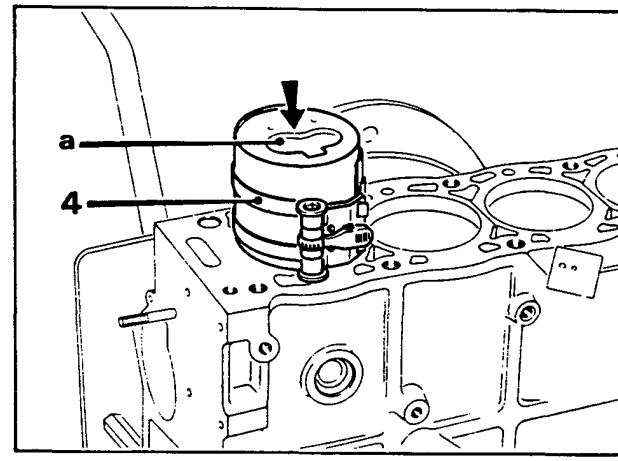
- Fit in the following order:
- The centralising dowel **(5)** to the cylinder block.
- The key **(6).**
- The pump **(7)** /drive chain/sprocket **(8)** assembly.
- The 'L' shaped spacer at **(9)*** .

* According to engine type.

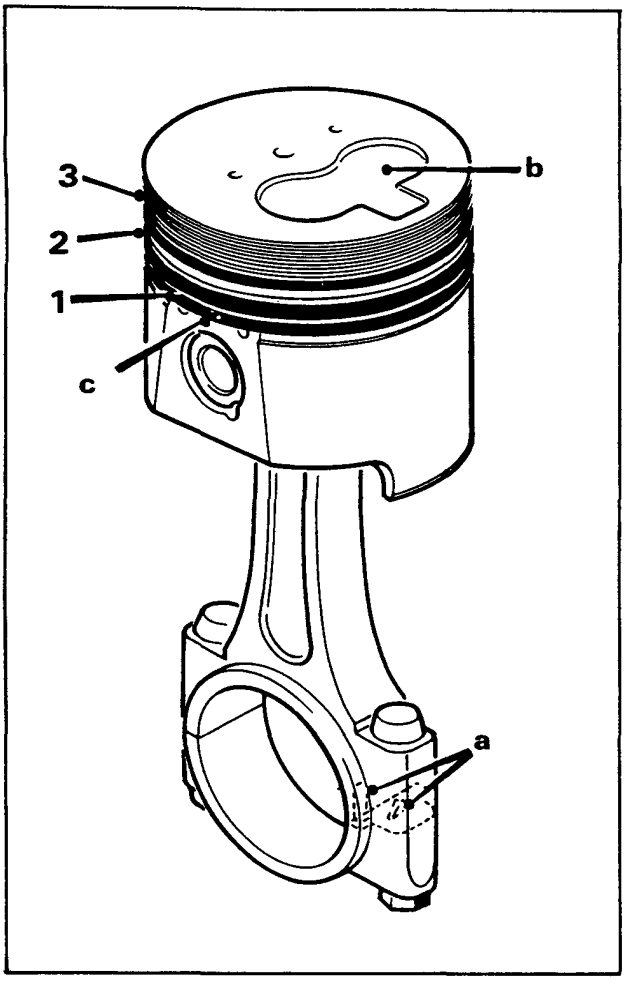
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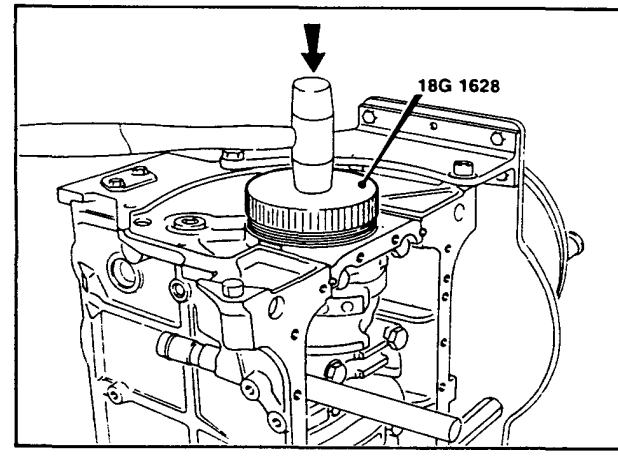
III



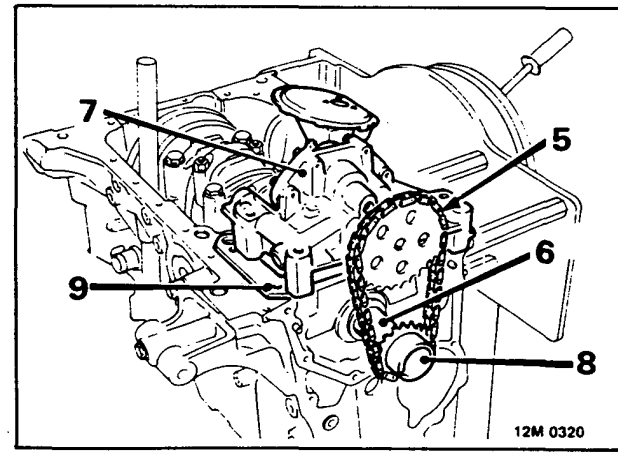
II



IV



V



I

WARNING: The bolt **(1)** is special; it serves to centralise the pump.

- Tighten the bolts **(1)**, **(2)** and **(3)** to 20 Nm.
- Fit the seal carrier plate with a new seal **(4)** and tighten the bolts to 15 Nm.
- Fit the seal using **18G 1507** and by tapping it fully home with a mallet.
- Apply silicone jointing paste at **(a)**.
- Fit the sump using a new gasket.
- Tighten the bolts to 20 Nm.

Note: *The Allen screws are fitted at front of sump.*

II

Cylinder head gasket selection

- Fit a D.T.I. gauge and zero it on a surface plate.
- Turn the crankshaft and measure the protrusion of each piston at T.D.C.
- Note the maximum protrusion **(d)**.
- Select a cylinder head gasket of suitable thickness. Protrusion **(d)** less than 0.77 mm, fit gasket with 2 notches.
- Protrusion **(d)** greater than 0.77 mm, fit gasket with 3 notches.

Note: *For gasket identification, (See page).*

III

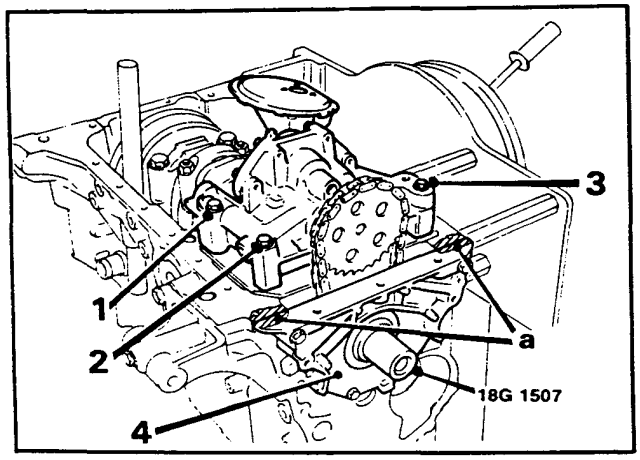
Fitting the cylinder head

- Turn the crankshaft to position the pistons at mid stroke with the damper pulley key **(6)** at 9 o'clock.
- Clean the tapped holes in the cylinder block (12 x 150 thread).
- Fit:
- The centralising dowel **(7)**.
- The head gasket (dry).
- The cylinder head.
- Carefully brush the threads of the cylinder head bolts.

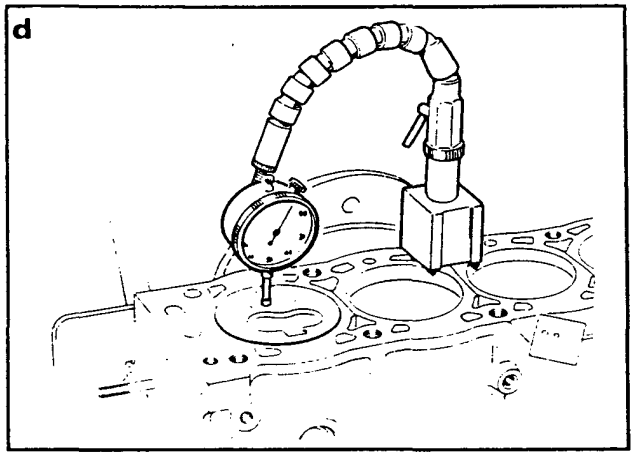
Important: If threads of any bolt are found to be "waisted", all ten bolts must be replaced.

- Coat the bolt threads and the washer contact faces with Molycote G Rapid.

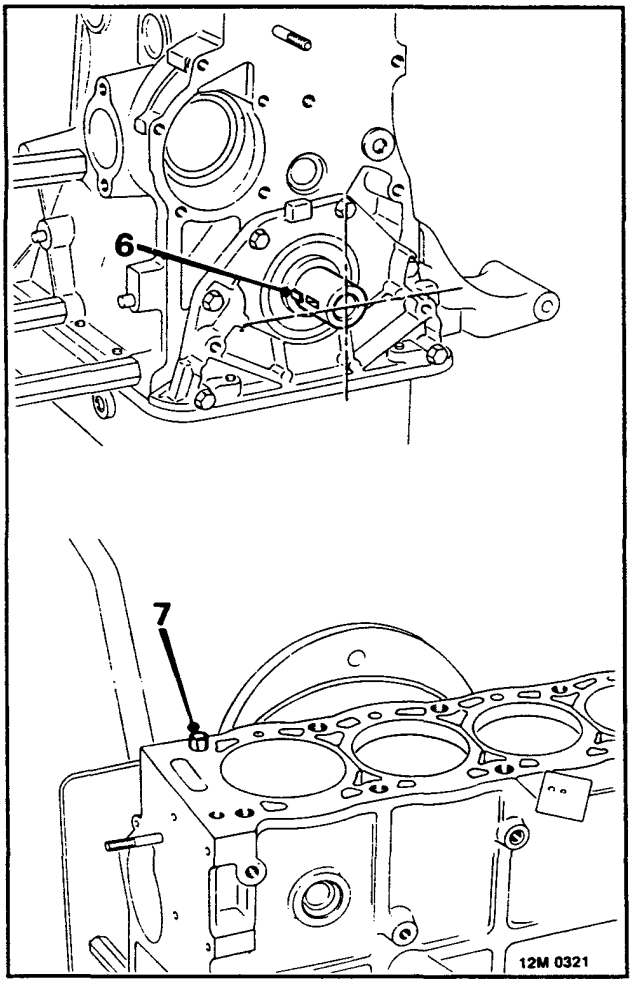
I



II



III



I

Cylinder head tightening

- Fit the bolts with new washers.

***Note:** Concave side of washers must face towards cylinder head.*

- In the order shown:
- Pre – tighten to 30 Nm.
- Tighten to 70 Nm.
- Tighten a further 120° using an angular gauge.

II

Valve clearance adjustment

- Fit the camshaft gear **(1).**
- Running clearance
  IN: **0.15 mm**
  EX: **0.30 mm**
  Tolerance: **±0.04 mm**
- Valves 1 and 2 rocking – check 7 and 8
- Valves 3 and 4 rocking – check 5 and 6
- Valves 5 and 6 rocking – check 3 and 4
- Valves 7 and 8 rocking – check 1 and 2
- Note the clearances

III

- Remove:
- The camshaft gear **(1)** (illustration **II**).
- The camshaft bearing caps **(2).**
- The camshaft **(3).**
- The tappets **(4).**
- The basic shims **(5).**
- Determine the shim thickness to be fitted for each valve.
- Example

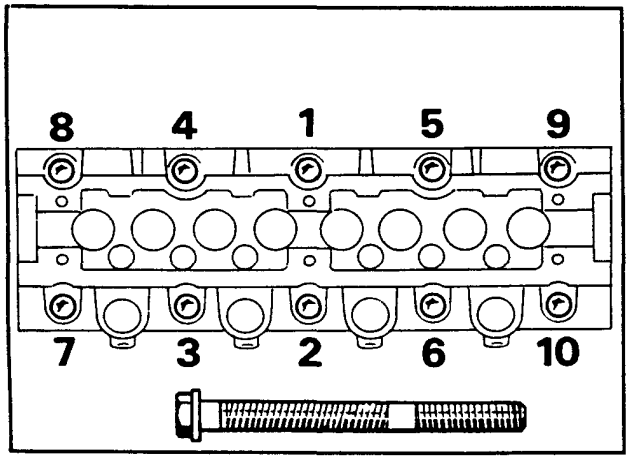
Specified clearance	0.15
Clearance measured	0.25
Difference	+ 0.10
Shim fitted	* 2.425
Shim to be fitted	2.50
Clearance obtained	0.175

* Basic shim

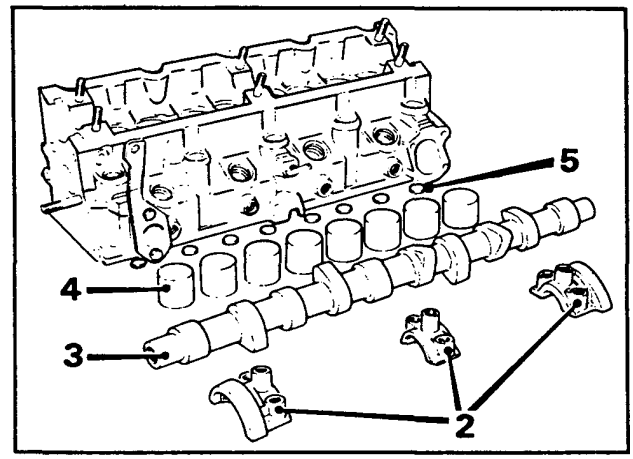
IV

- Fit:
- The shims thus determined.
- The tappets.
- Apply:
- A thin coat of RTV sealant to each end of the bearing housing at **(a).**
- Molycote G Rapid to the bearing surfaces on the camshaft.
- Fit:
- The camshaft **(3)** with the DIST marking at the timing gear end.
- The camshaft bearing caps **(2)** (cast – in markings).
- Progressively tighten the bearing caps to 17.5 Nm.

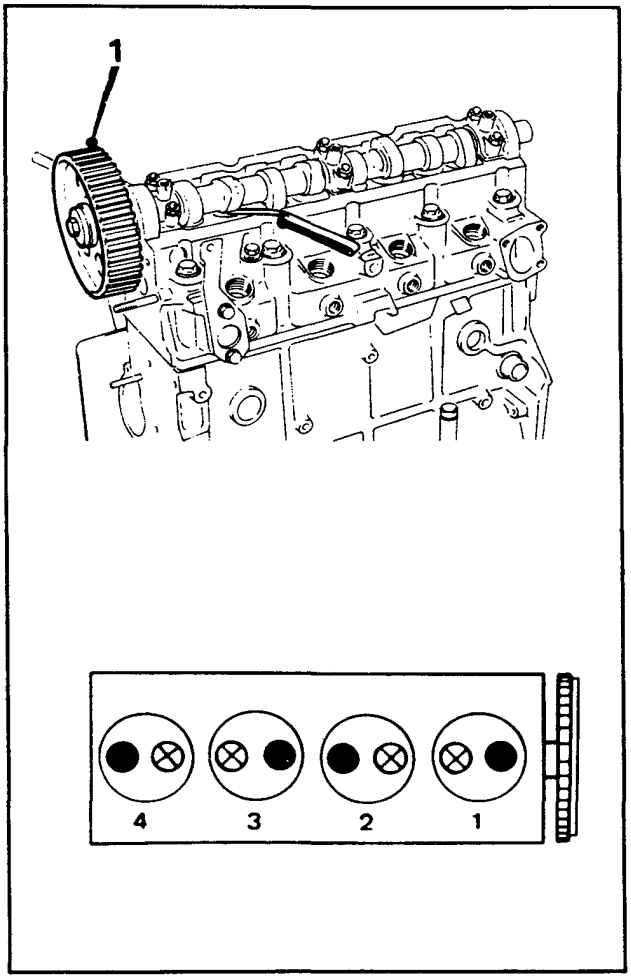
I



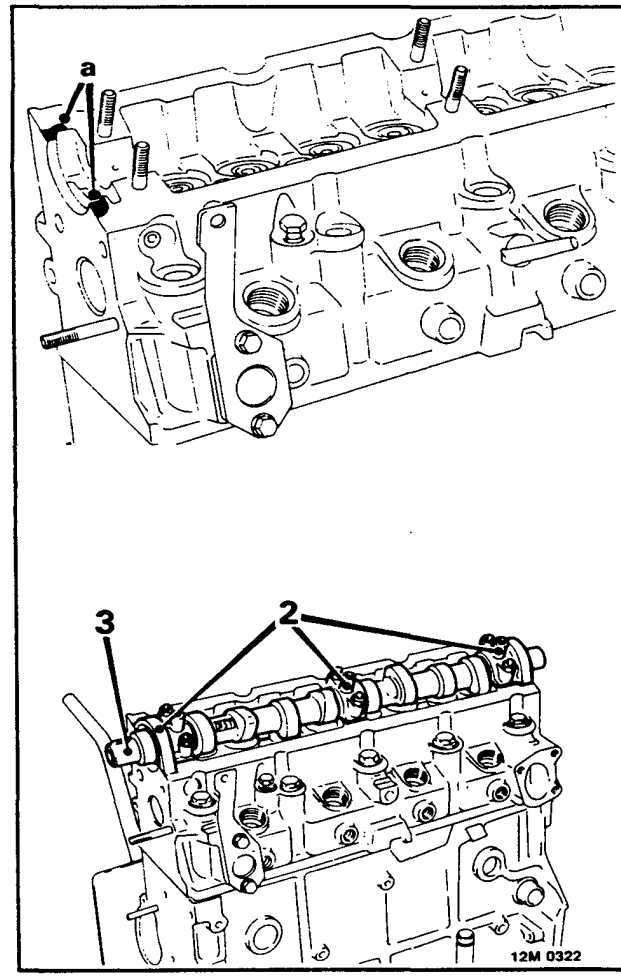
III



II



IV



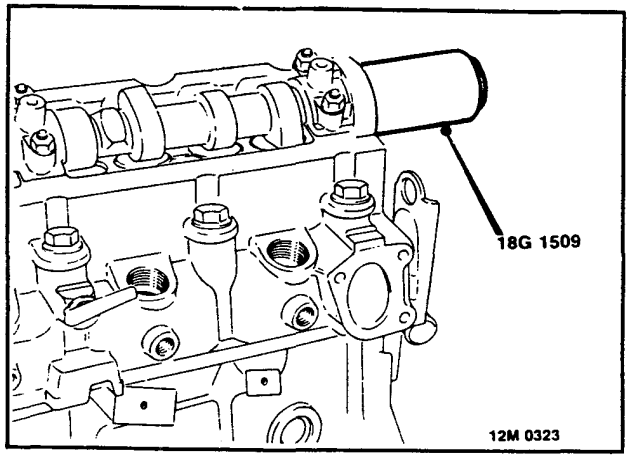
I

Camshaft oil seals

- Fit:
- New camshaft oil seals using tool **18G 1509.**
- Camshaft gear, restrain gear using tool **18G 1521** and tighten bolt to 40 Nm.
- Gearbox adapter plate, tighten bolts to 45 Nm.

All ancillary components as detailed in the appropriate section of the Repair Manual.

I

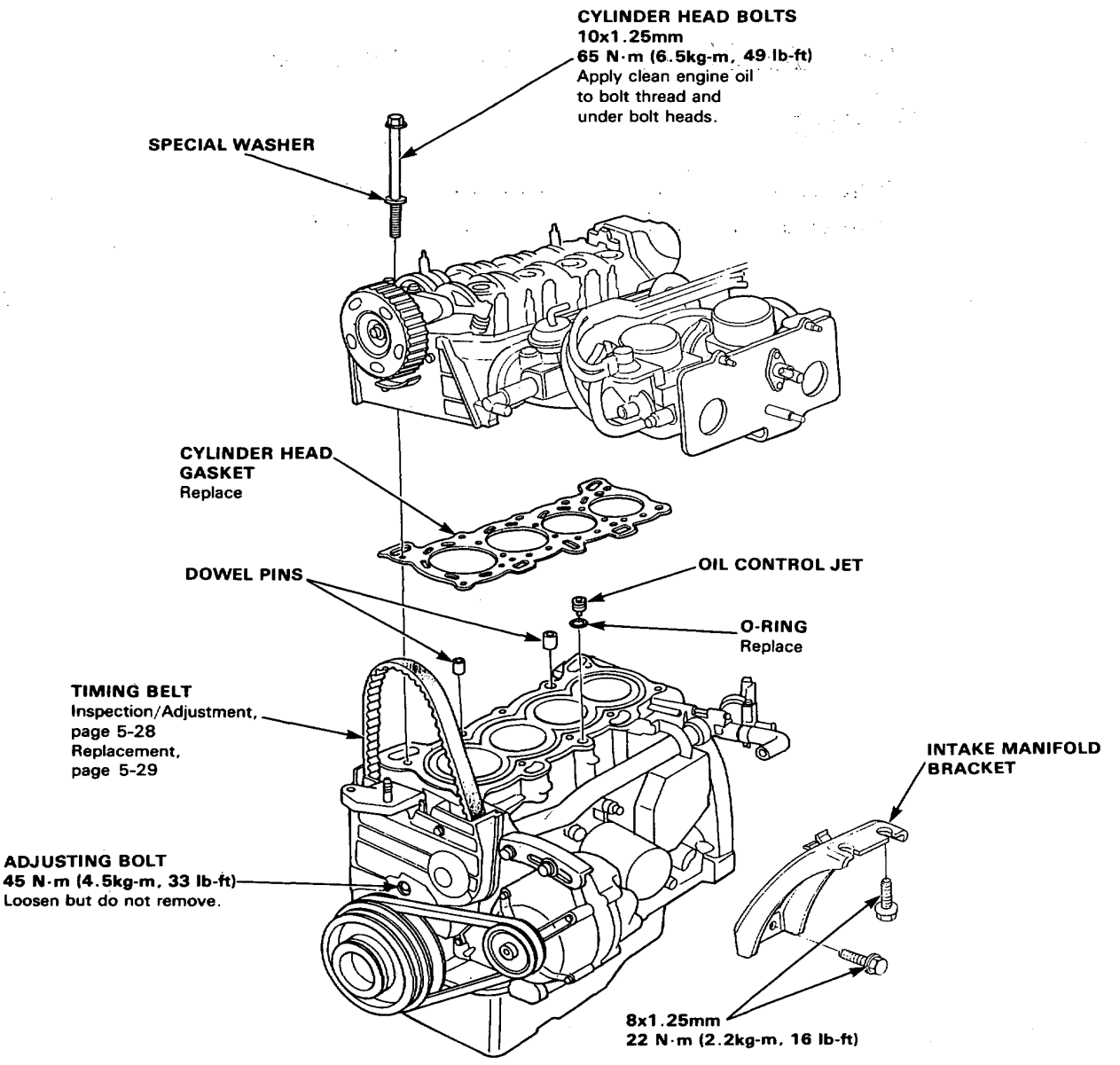


Cylinder Head

Removal (engine removal not required)

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

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



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

NOTE :
- Inspect the timing belt before removing the cylinder head.
- Turn the crankshaft pulley so that the No. 1 cylinder is at top-dead-center.
- Mark all emissions tubes before disconnecting them.
- Be careful not to damage the cylinder head and engine block mating surface, and keep them clean.

1. Disconnect the negative terminal from the battery.
2. Drain the cooling system (See page 5-84).
3. Remove the brake booster vacuum hose from the brake booster.
4. Remove the engine secondary ground cable from the valve cover.
5. Remove the air cleaner cover and air cleaner (carbureted engine).

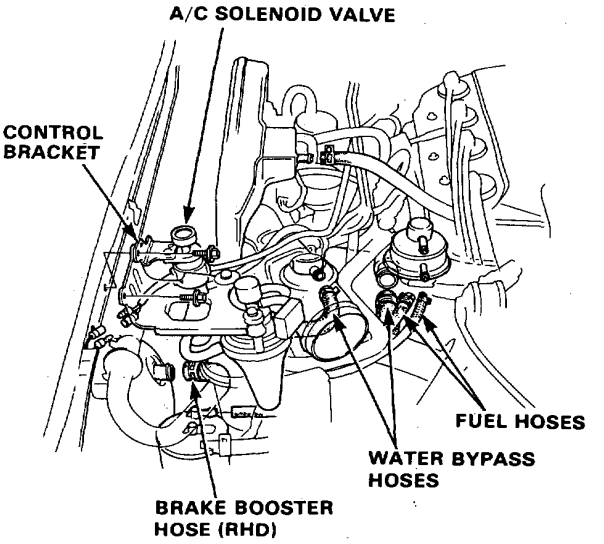
⚠ WARNING Do not smoke while working on fuel system, keep open flame or spark away from work area. Drain fuel only into an approved container.

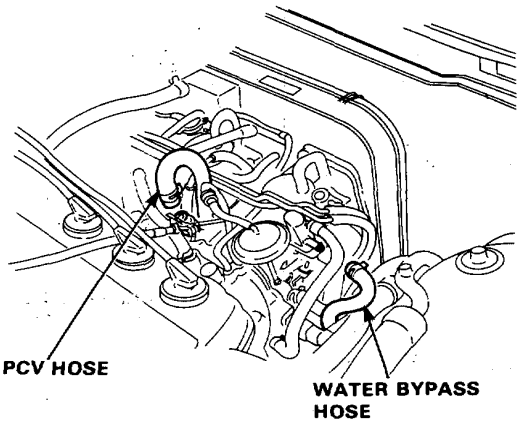
6. Disconnect the fuel hose and fuel return hose.
7. Remove the air intake pipe and air cleaner pipe joint.
8. Disconnect the throttle cable at the throttle body (5-63 and 65).
9. Discnnect the throttle control cable at the throttle body (A/T only).

CAUTION: Be careful not to damage the throttle cable during engine removal. On installation, check the cable is not kinked or binding.

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.

10. Disconnect the charcoal canister hose at the throttle valve.
11. Disconnect the vacuum hose and the water bypass hoses from intake manifold and the throttle body.
12. Remove the PCV hose, charcoal canister hose and vacuum hose from intake manifold, and remove the vacuum hose from the brake booster.

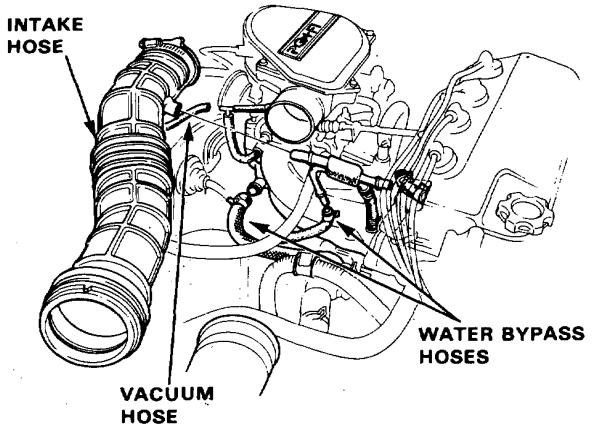




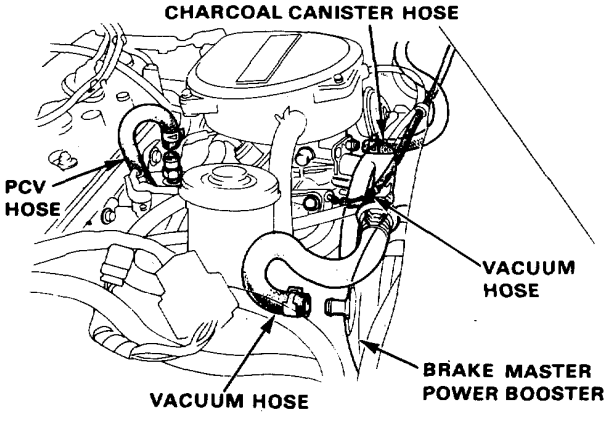
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Removal (engine removal not required) (cont'd)

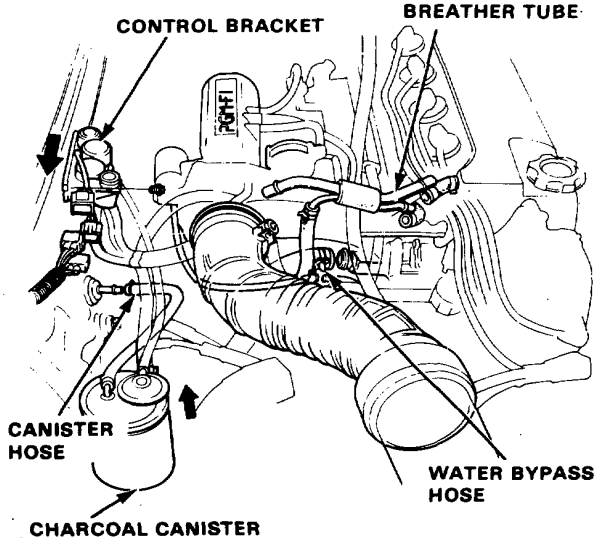
1.5 ℓ PGM-FI Engine:



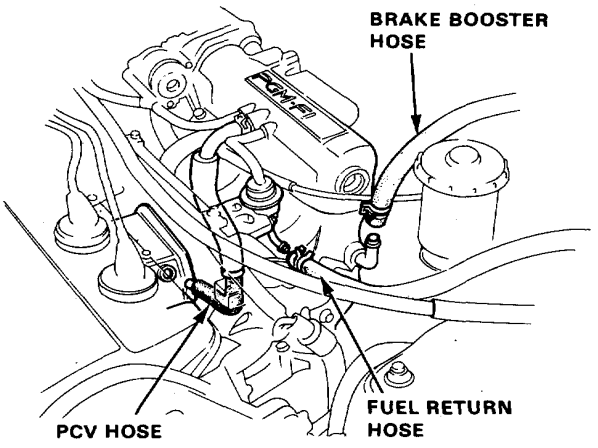
1.5 ℓ PGM-FI Engine:



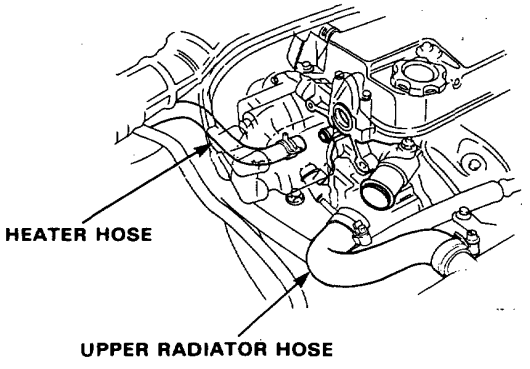
1.6 ℓ PGM-FI Engine:



1.6 ℓ PGM-FI Engine:



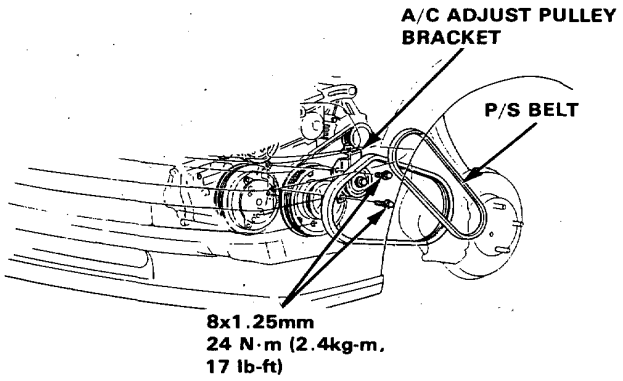
13. Remove the upper radiator hose and the heater hose from the cylinder head.

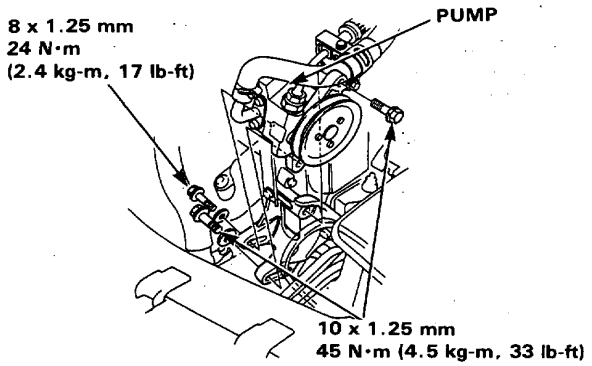


14. Disconnect the engine wire connectors and clamps from the cylinder head, throttle body, and IN/EX manifolds.
    - Ignition coil connector (from distributor)
    - EACV connector
    - Engine ground wire
    - Thermounit connector
    - Coolant temperature sensor connector
    - Carburetor solenoid valve, inner bent solenoid valve connector (Carbureted)
    - Air leak solenoid valve connector (Carbureted)
    - L.carburetor solenoid valve connector (Carbureted)
    - TDC/CRANK sensor connector (from distributor)

15. Remove the power steering belt.

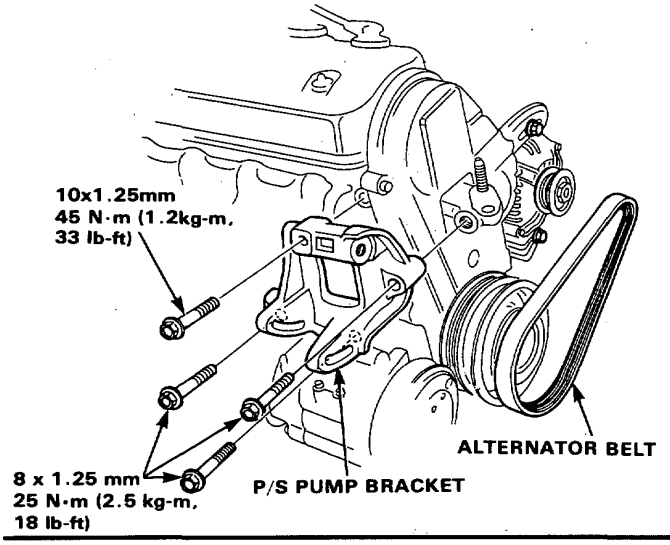
16. Remove the power steering pump.
    - Do not disconnect the power steering hoses.





17. Remove the power steering bracket.

18. Remove the alternator belt.



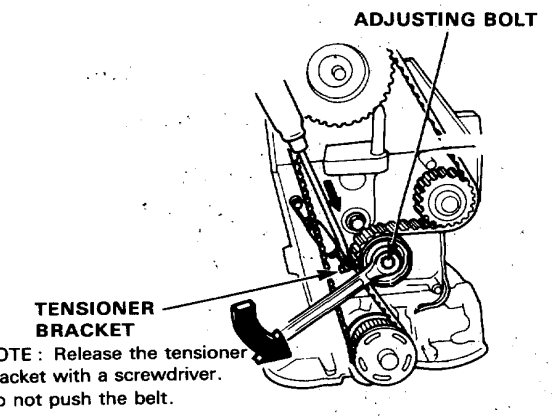
19. Jack-up and set the rigid rack.

20. Remove the L.tire and L.wheel.

21. Remove the L.wheel well splash shield.

22. Remove the intake manifold bracket.

23. Remove the exhaust manifold bracket, then remove the exhaust pipe A.



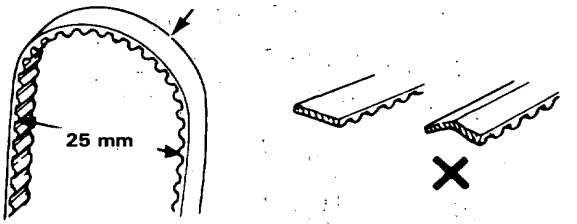
24. Remove the exhaust manifold shroud, then remove exhaust manifold.

25. Remove the distributor and valve cover.

26. Remove the timing belt upper cover.

27. Loosen the timing belt adjust bolt, then remove the timing belt from the camshaft pulley.

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



28. Remove the cylinder head.

    CAUTION: Do not loosen one head bolt completely but loosen the bolts gradually from the outside diagonally.

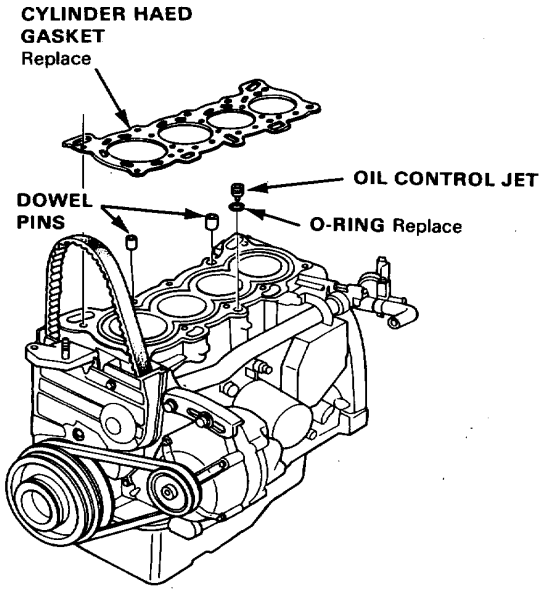
29. Remove the intake manifold from the cylinder head.

Cylinder Head

Installation

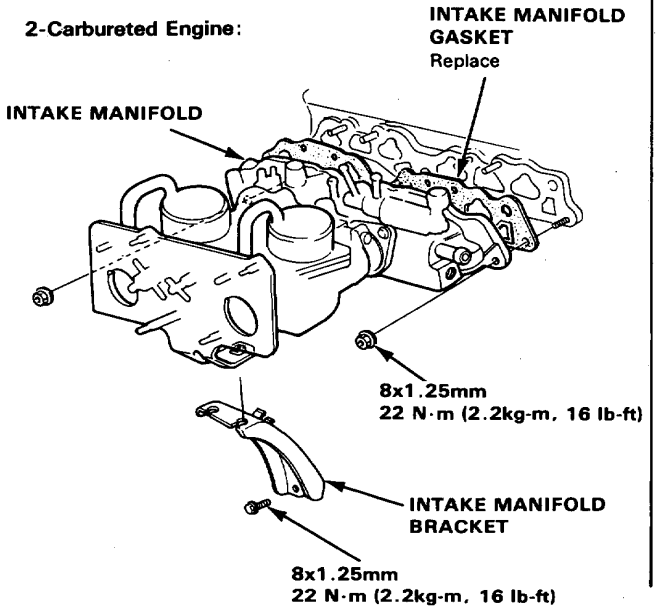
1. Install the cylinder head in the reverse order of removal:
   - Always use a new head gasket.
   - Cylinder head and engine block surface must be clean.
   - "UP" mark on timing belt pulley should be at the top.

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

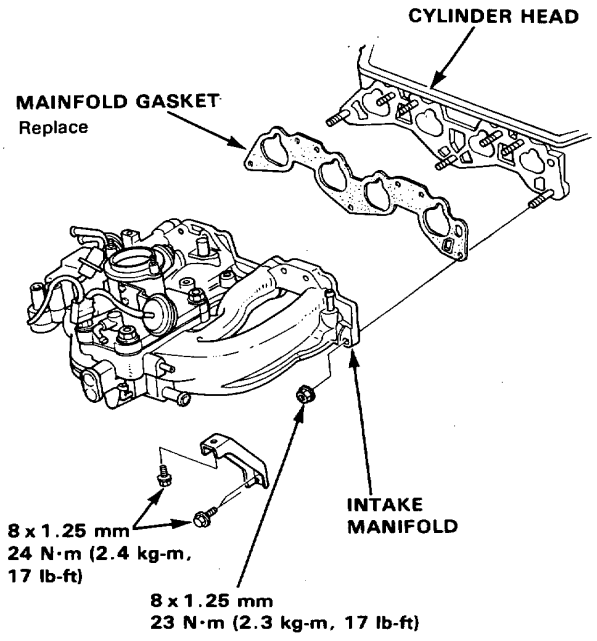


3. Install the intake manifold and tighten the nuts in a criss-cross pattern, beginning with the inner nuts.

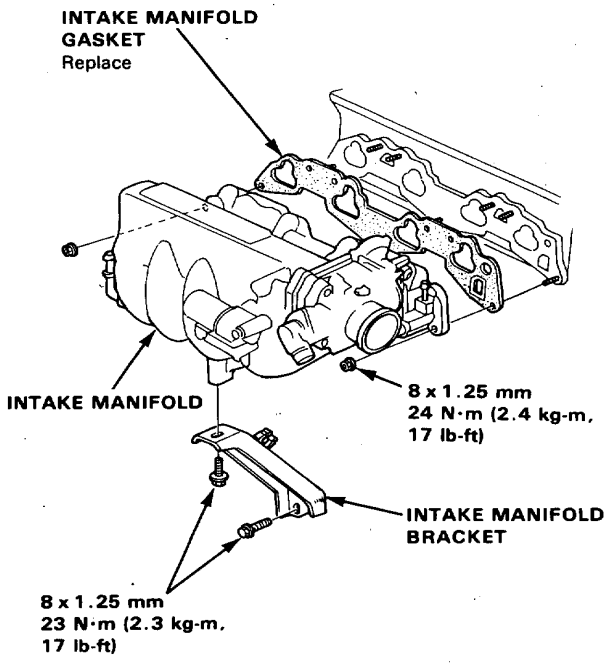
2-Carbureted Engine:



1.5 ℓ PGM-FI Engine:



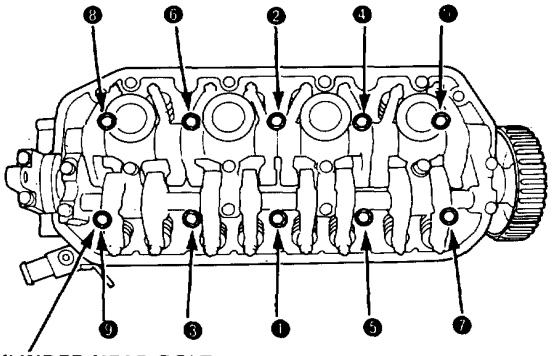
1.6 ℓ PGM-FI Engine:



4. Tighten cylinder head bolts in two steps.
In the first step tighten all bolts and nuts, in sequence, to about 30 N·m (3.0kg, 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.

CYLINDER HEAD TORQUE SEQUENCE

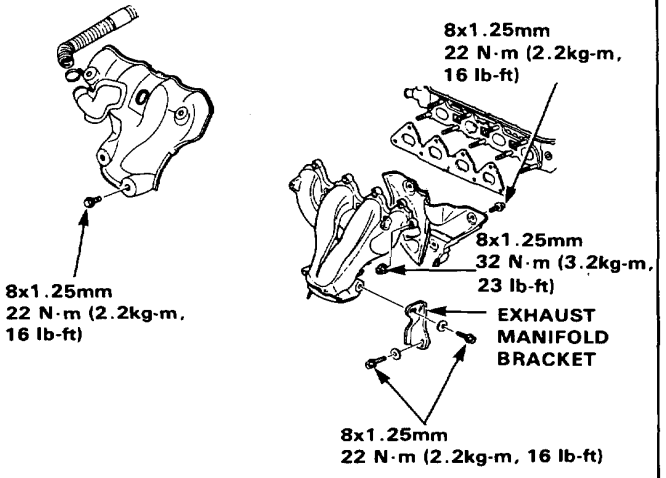


CYLINDER HEAD BOLT
10x1.25mm
65 N·m (6.5kg-m, 47 lb-ft)

5. Adjust the valve timing.

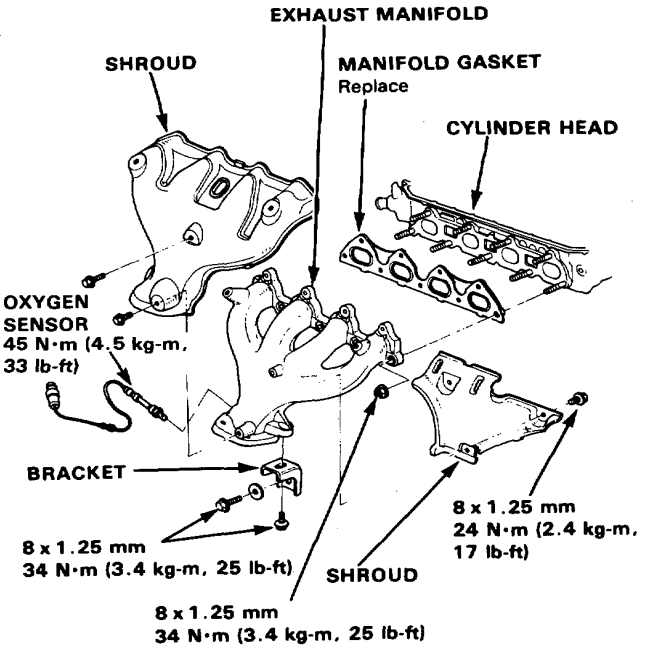
6. Install the exhaust manifold and bracket.

Carbureted Engine:

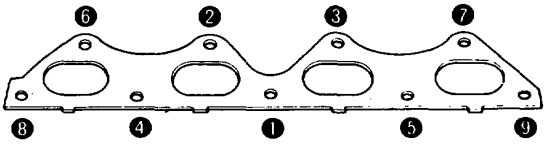


NOTE:
- Remove the oxygen sensor prior to disconnecting the exhaust pipe A and the exhaust manifold.
- Do not use the inpact wrench or hammer when the oxygen sensor is not to be removed.
- Reinstallation of oxygen sensor should be carried out after connecting the exhaust pipe A and the exhaust manifold.
- Do not tighten the connection with the inpact wrench if the oxygen sensor has not been removed.

1.5ℓ , 1.6ℓ PGM-FI with CATA:



EXHAUST MANIFOLD TORQUE SEQUENCE

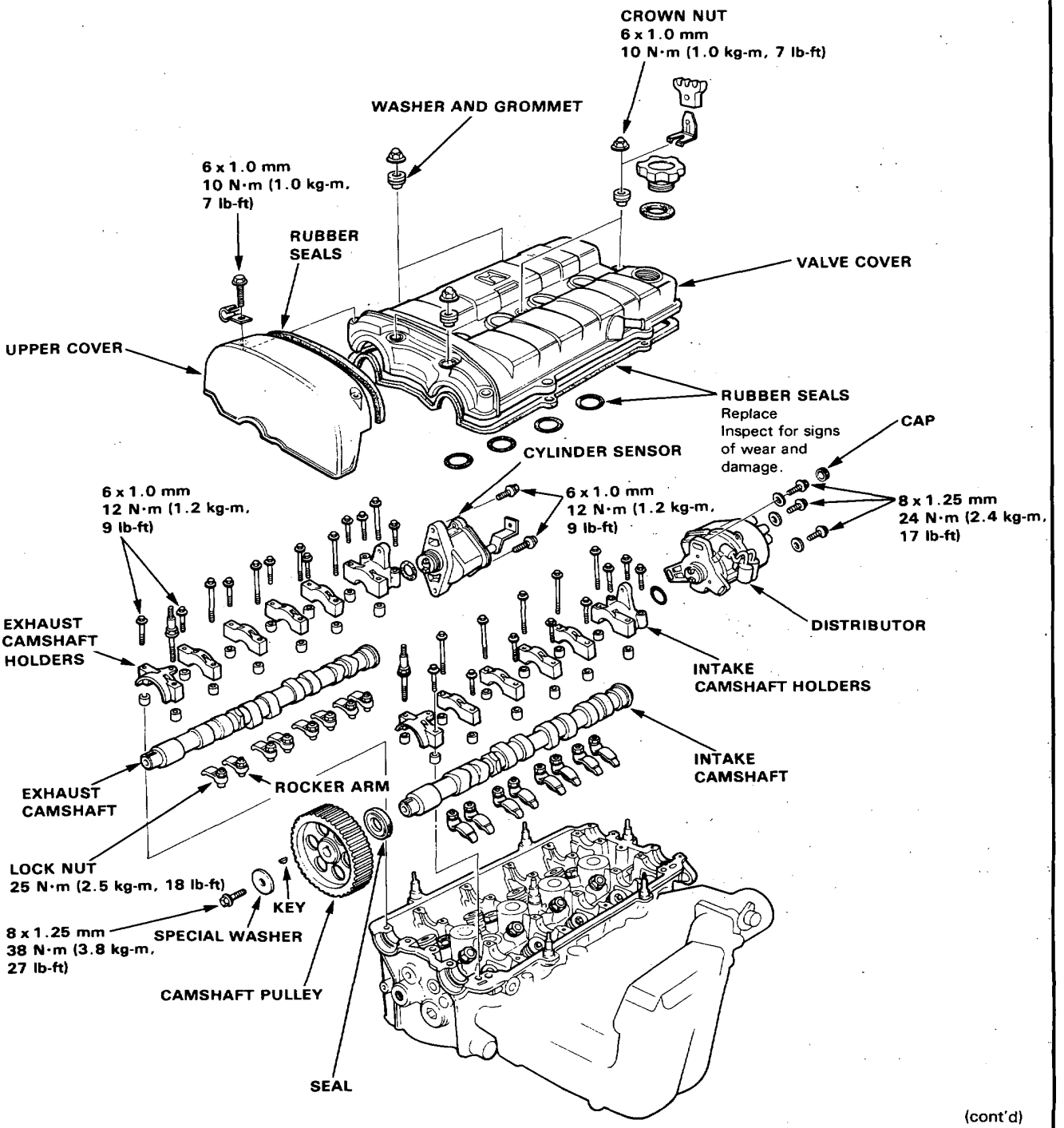


Cylinder Head

Removal (engine removal not required)

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

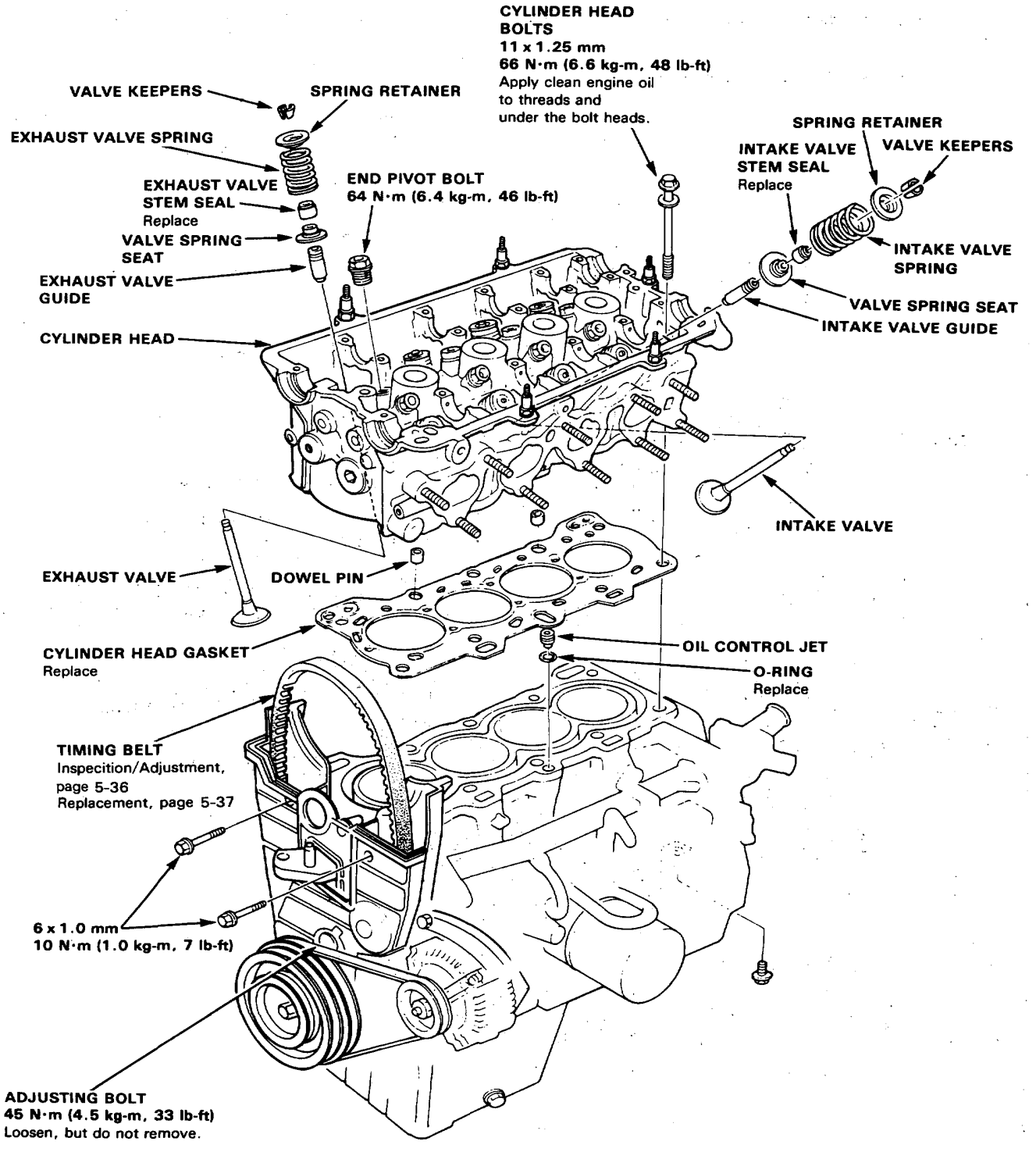
NOTE: Use new O-rings and gaskets whenever reassembling.



(cont'd)

Cylinder Head

Removal (engine removal not required) (cont'd)



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

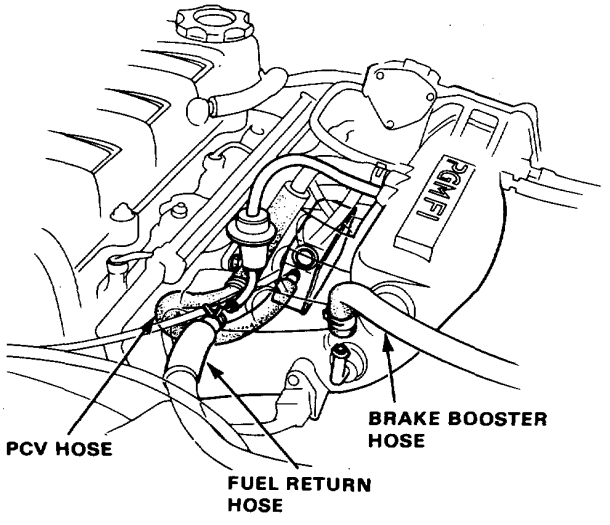
NOTE:
- Inspect the timing belt before removing the cylinder head.
- Turn the crankshaft pulley so that the No. 1 cylinder is at top-dead-center.
- Mark all emission hoses before disconnecting them.

1. Disconnect the negative terminal from the battery.
2. Drain the coolant system.
3. Relieve fuel pressure (See Section 6).
4. Disconnect the fuel feeder hose and fuel return hose.

⚠WARNING

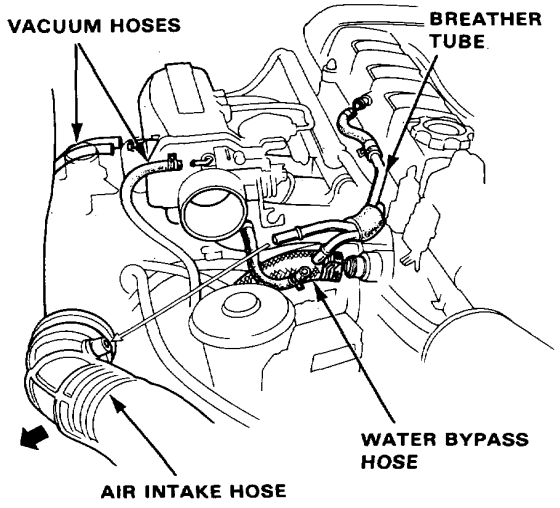
- **Do not smoke while working on fuel system, keep open flame or spark away from work area.**
- **Drain fuel only into an approved container.**

5. Remove the brake booster vacuum hose.
6. Disconnect the PCV hose.



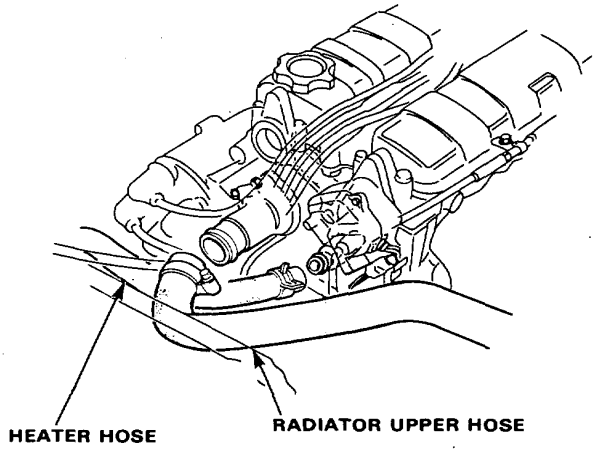
7. Disconnect the breather tube and air intake hose.
8. Disconnect the vacuum hose from the intake manifold.
9. Disconnect the charcoal canister hose.
10. Disconnect the water bypass hose.

11. Disconnect the engine wire connectors and clamps from the cylinder head, throttle body, and IN/EX manifolds.
    - Ignition coil connector (from distributor)
    - EACV connector
    - Engine ground wire
    - Thermounit connector
    - Coolant temperatuer sensor connector



    - Intake air pressure sensor connector
    - Throttle angle sensor connector
    - Injection connector
    - TDC/CRANK sensor connector

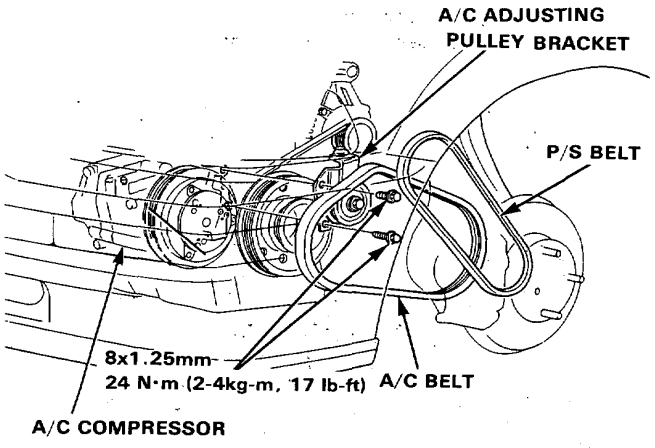
12. Disconnect the radiator upper hose and the heater hose at the engine.

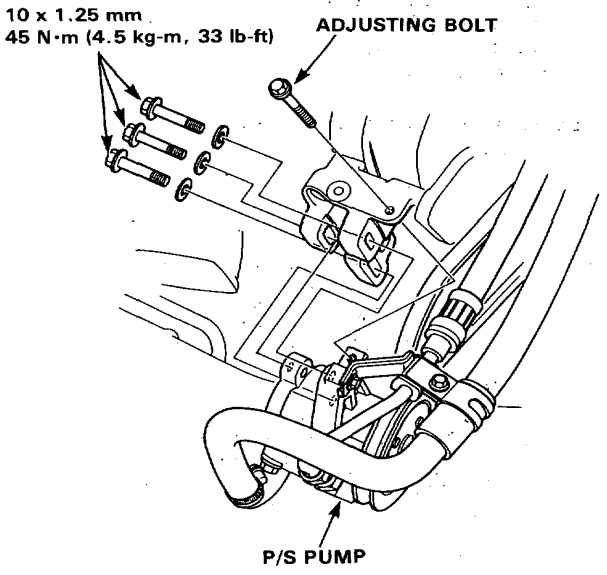


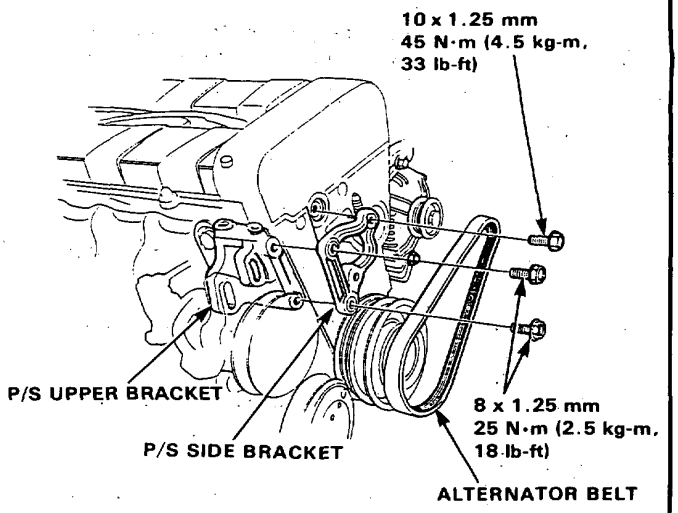
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Removal (engine removal not required) (cont'd)

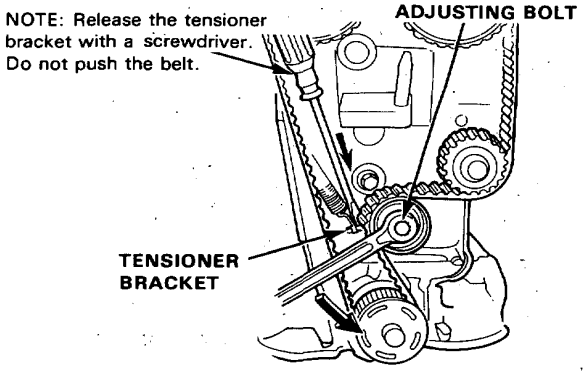
13. Loosen the air conditioning (A/C) adjusting pulley bracket and remove the A/C belt.
14. Remove the P/S pump.
    - Do not disconnect the P/S hoses.
15. Remove the P/S pump bracket and the alternator belt.



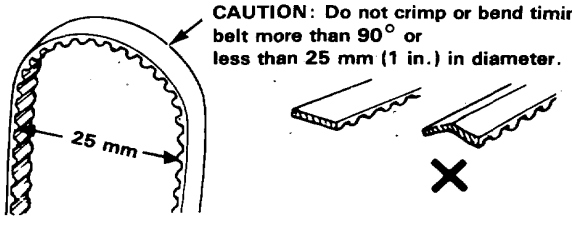




16. Remove the bolts from the intake manifold bracket.
17. Remove the exhaust manifold shroud.
18. Remove the bolts from the exhaust manifold bracket.
19. Remove the self-locking nut from the exhaust pipe A.
20. Remove the exhaust manifold assy.
21. Remove the timing belt upper cover.
22. Remove the valve cover.
23. Loosen the timing belt adjusting bolt, releasing the timing belt, and fix the bolt.



24. Remove the timing belt from the driven pulleys.



25. Remove the cylinder head.

CAUTION: Loosen the head bolts diagonally from the inside to outside.

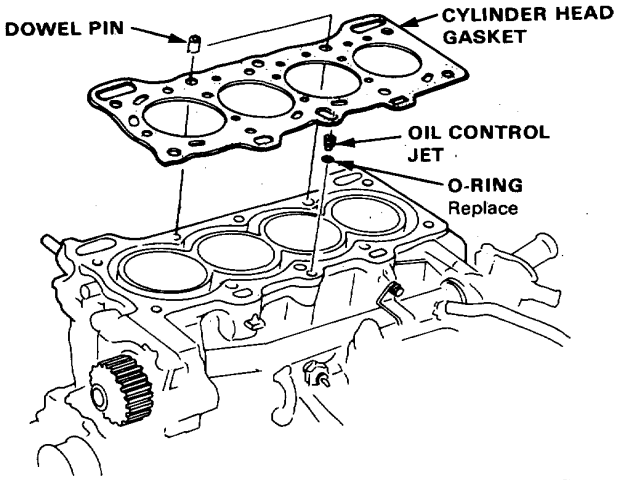
26. Remove the intake manifold from the cylinder head.

Installation

1. Install the cylinder head in the revese 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.

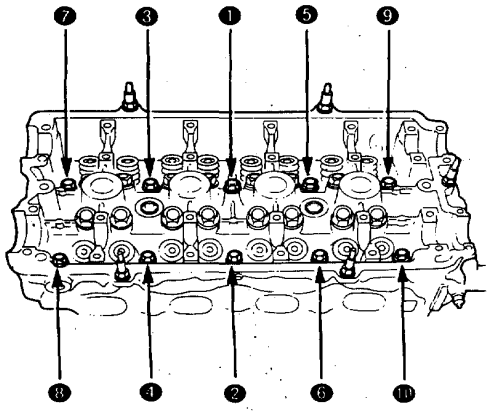


2. Tighten cylinder head bolts in two steps. In the first step tighten all bolts, in sequence, to about 30 N·m (3.0 kg-m, 22 lb-ft); in the final step tighten, in same sequence, to 68 N·m (6.8 kg-m, 49 lb-ft)

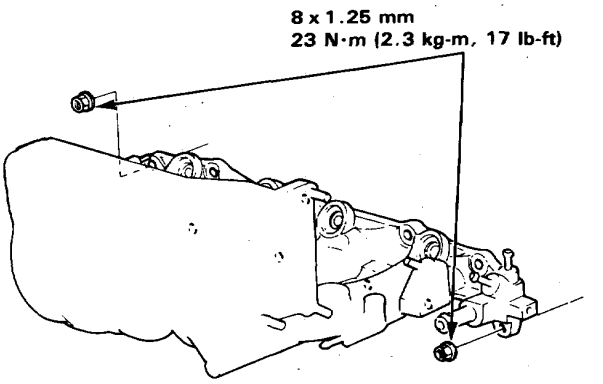
   NOTE:

   - Apply engine oil to the cylinder head bolts and the washers.
   - Use the longer bolts at the position ❶ and ❷ as shown.

CYLINDER HEAD BOLTS TORQUE SEQUENCE

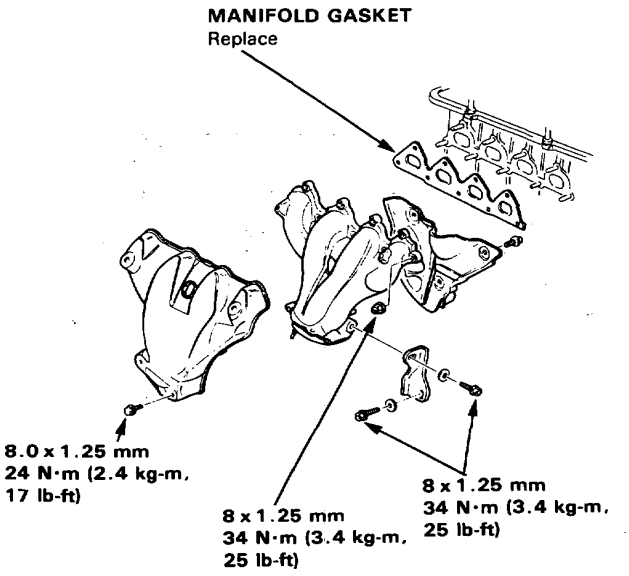


3. Install the intake manifold and tighten the nuts in a criss-cross pattern in 2 or 3 steps, beginning with the inner nuts.



4. Install the exhaust manifold and bracket.

Without CATA:

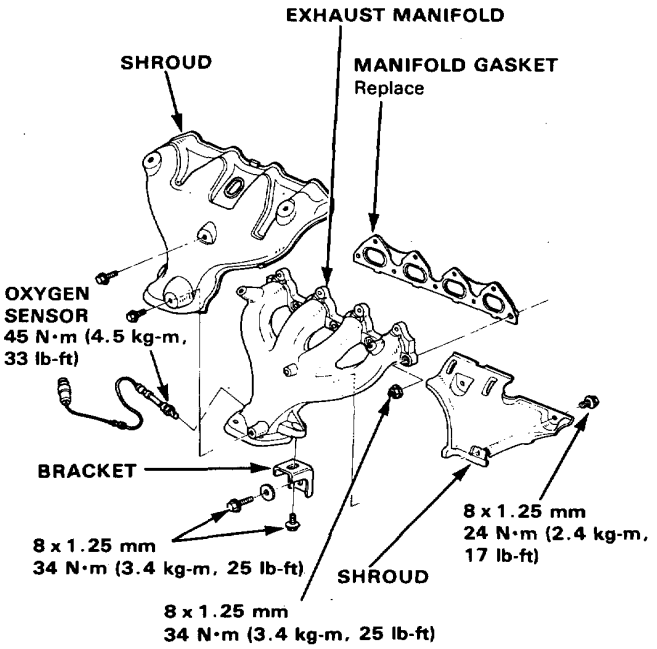


(cont'd)

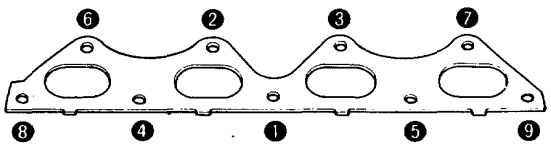
Installation (cont'd)

NOTE:
- Remove the oxygen sensor prior to disconnecting the exhaust pipe A and the exhaust manifold.
- Do not use the inpact wrench or hammer when the oxygen sensor is not to be removed.
- Reinstallation of oxygen sensor should be carried out after connecting the exhaust pipe A and the exhaust manifold.
- Do not tighten the connection with the inpact wrench if the oxygen sensor has not been removed.

With CATA:

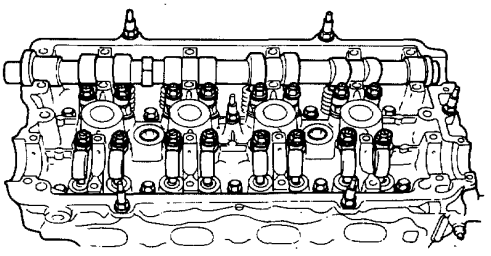


EXHAUST MANIFOLD TORQUE SEQUENCE



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

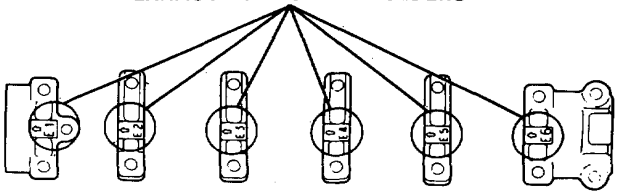
5. Place the rocker arms on the pivot bolts and the valve stems.

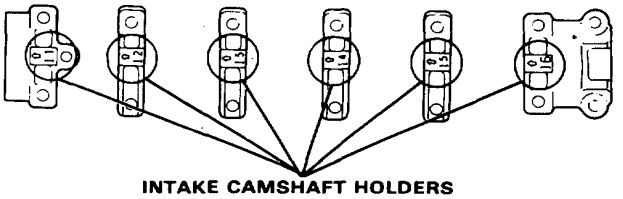


6. Install the camshafts and the camshaft seals with the open side (spring) facing in.

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



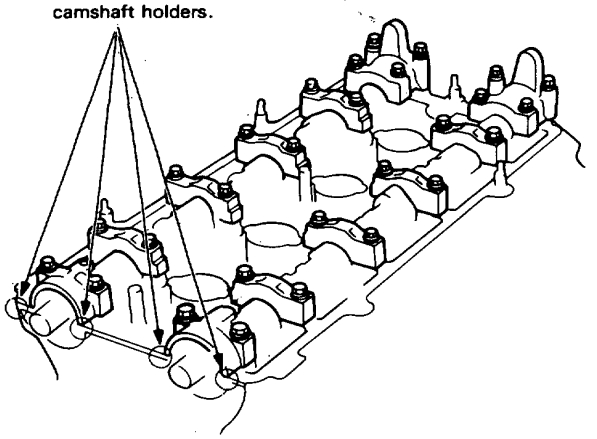


INTAKE CAMSHAFT HOLDERS

7. 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.

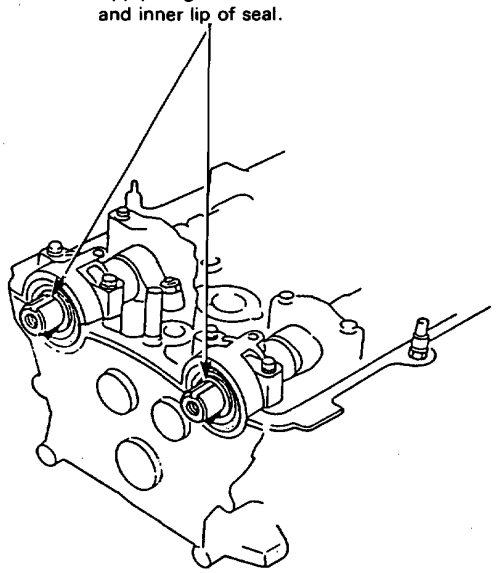
8. Tighten the camshaft holders temporarily.
   - Make sure that the rocker arms are properly positioned on the valve stems.

Apply non-hardening sealant to these areas (also opposite sides) before installing camshaft holders.

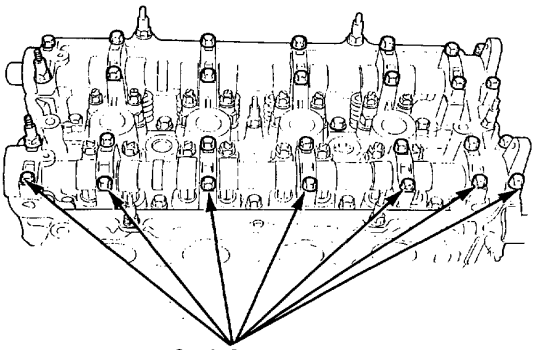


9. Press in the camshaft oil seal securely with the special tool.

Seal housing surface should be dry. Apply a light coat of oil to camshaft and inner lip of seal.



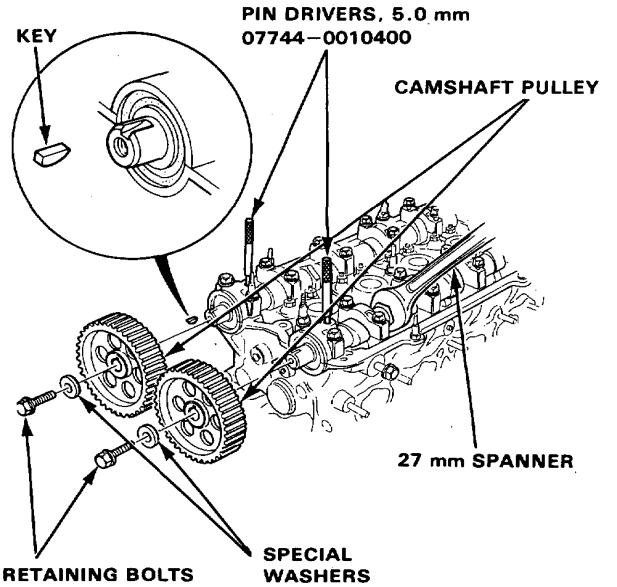
10. Tighten each bolt two turns at a time in the sequence shown below to insure that the rockers do not bind on the valves.



6 x 1.0 mm
12 N·m (1.2 kg-m, 9 lb-ft)

11. Install keys into grooves in camshafts.

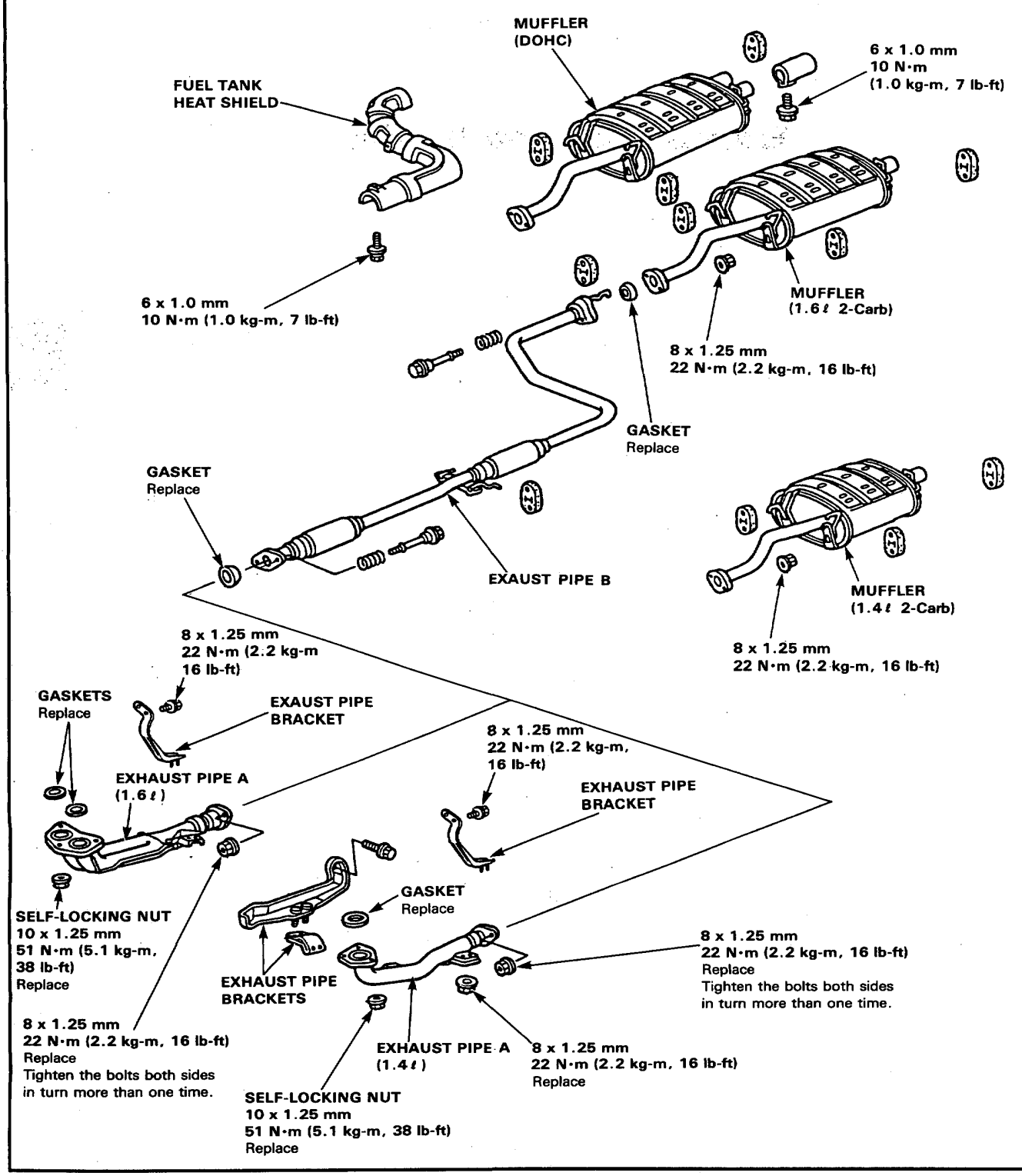
NOTE: To set the No. 1 piston at TDC, align the hole on the camshaft with the hole in the No.1 camshaft holders and drive 5.0 mm pin drivers into the holes.



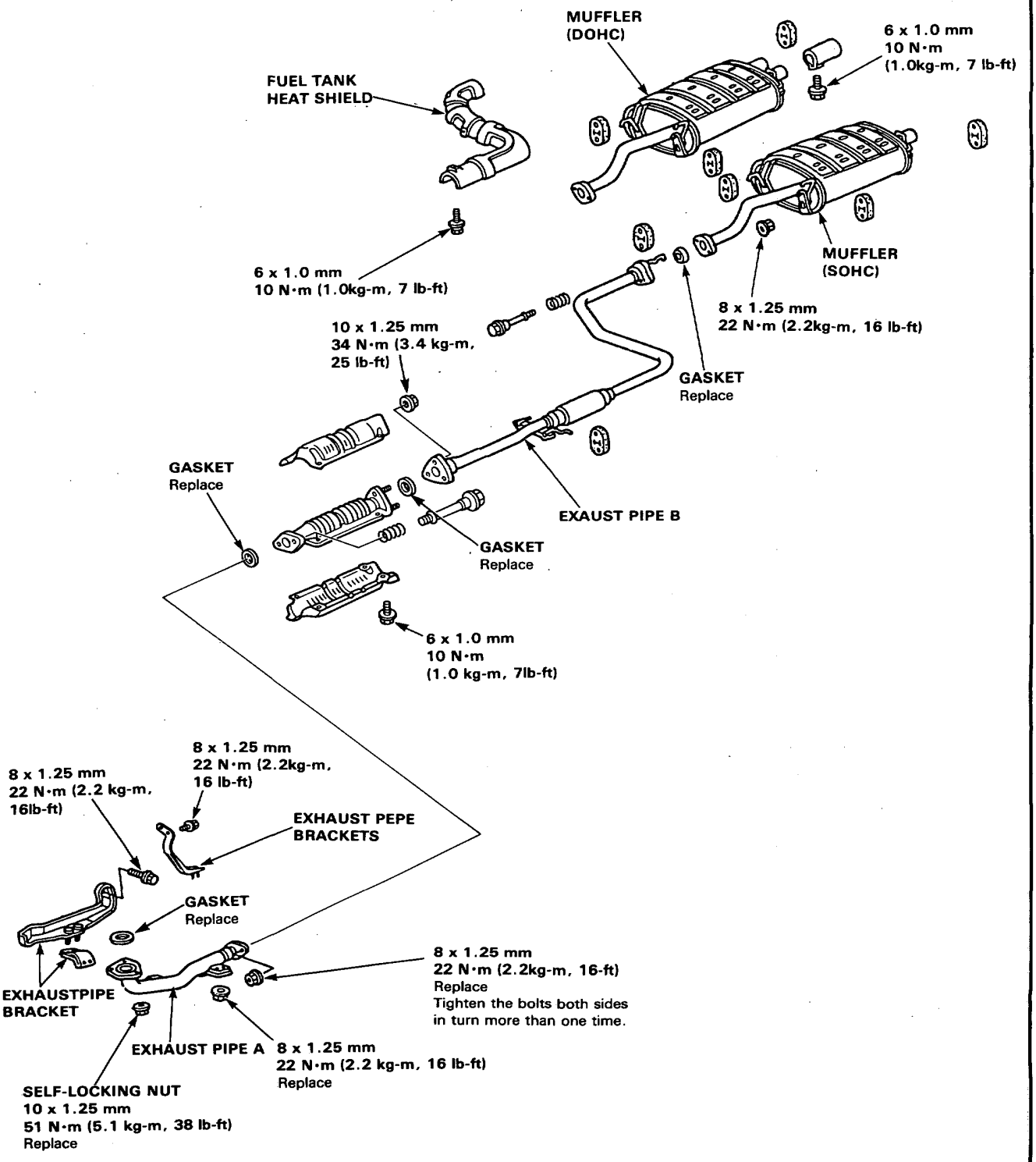
12. Push camshaft pulleys onto camshafts, then tighten retaining bolts to torque shown.
13. Adjust the valve timing (page 5-39).
14. After installation, check that all hoses and connectors are installed correctly.

Exhaust Pipe and Muffler

Replacement (without CATA)

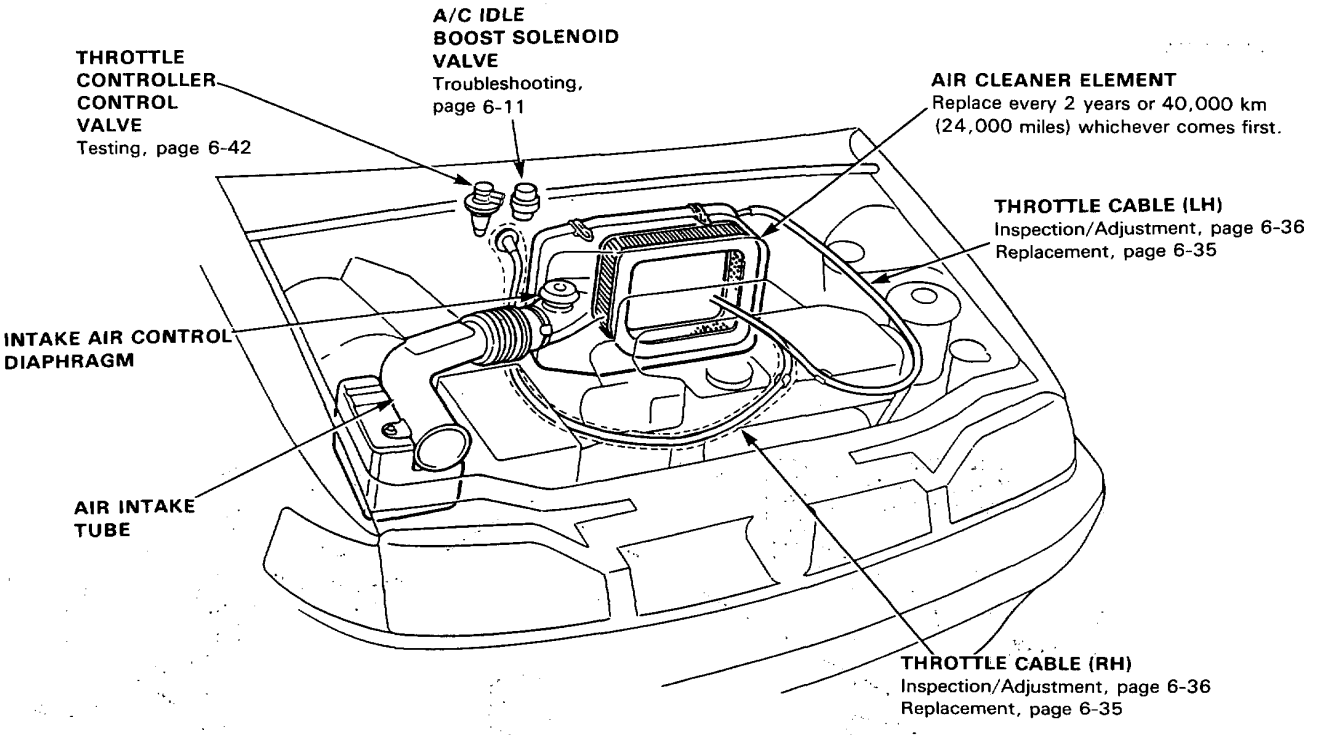


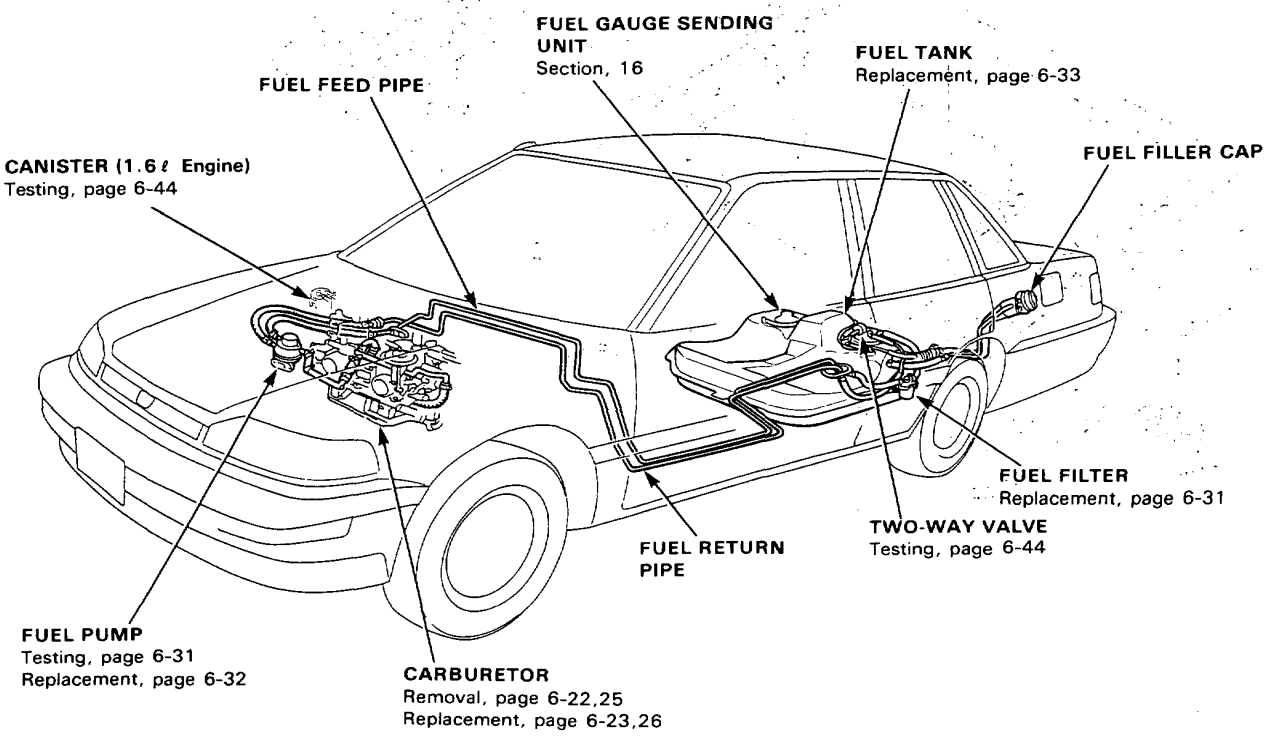
Replacement (with CATA)



Component Locations

Index

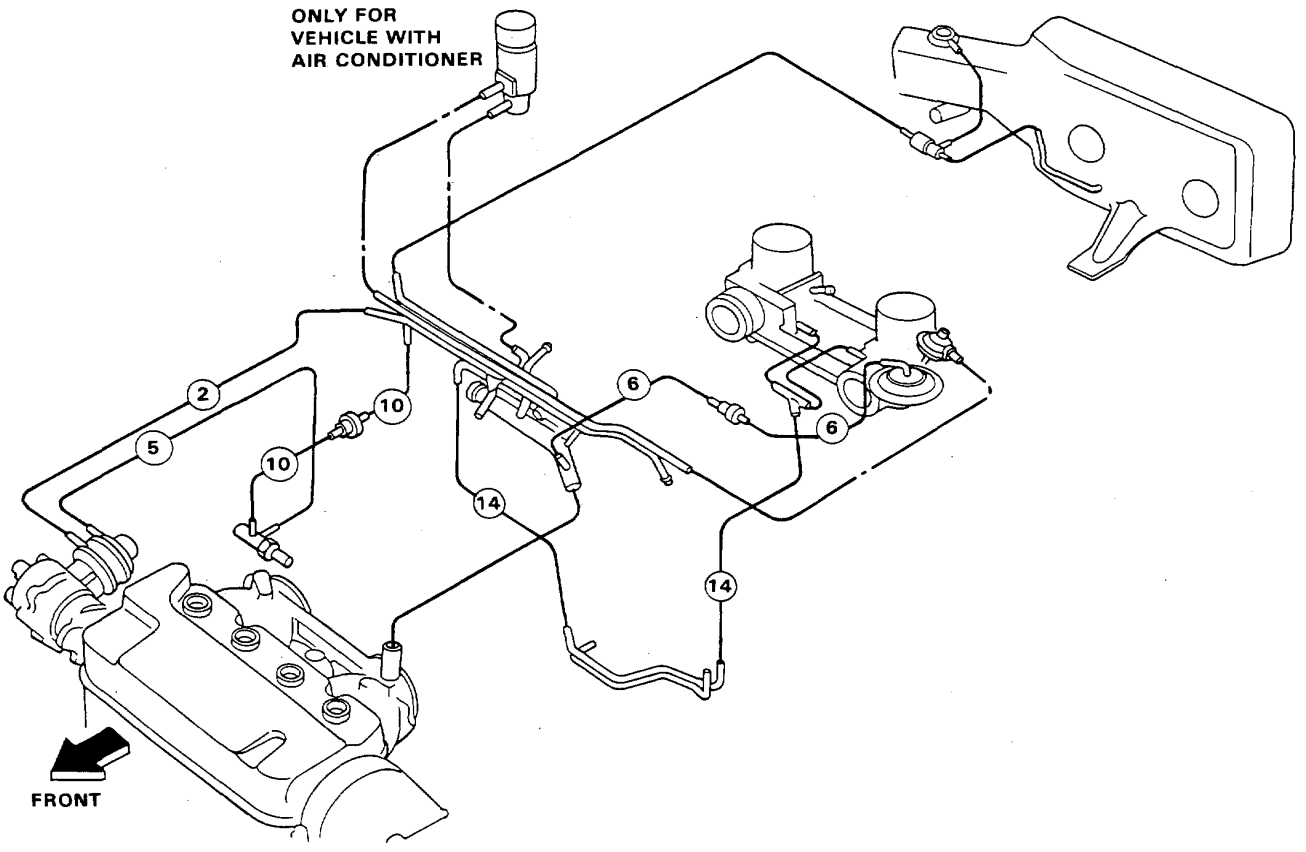




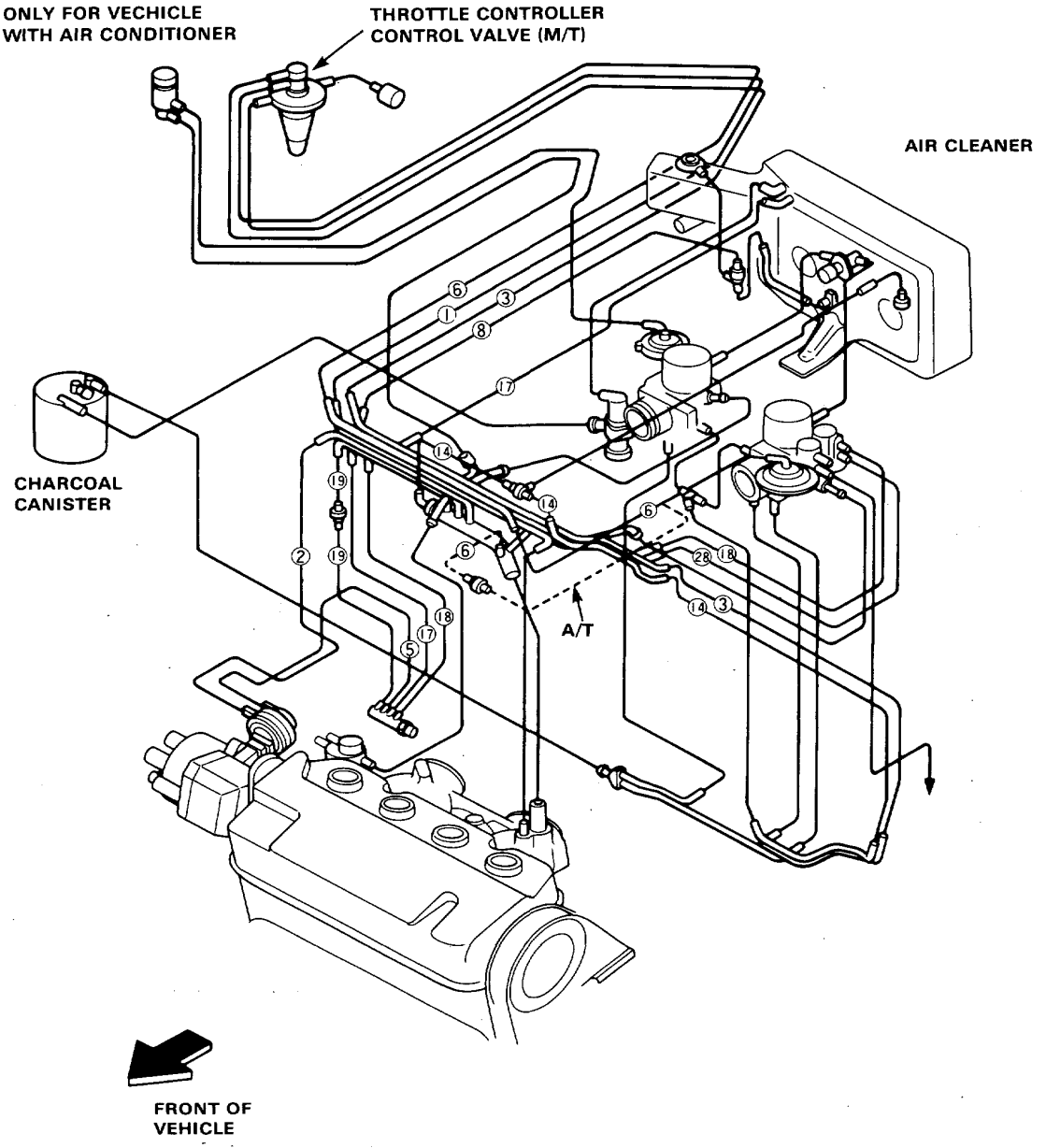
System Description

Vacuum Connections

(1.4 ℓ Engine)



(1.6 ℓ Engine)

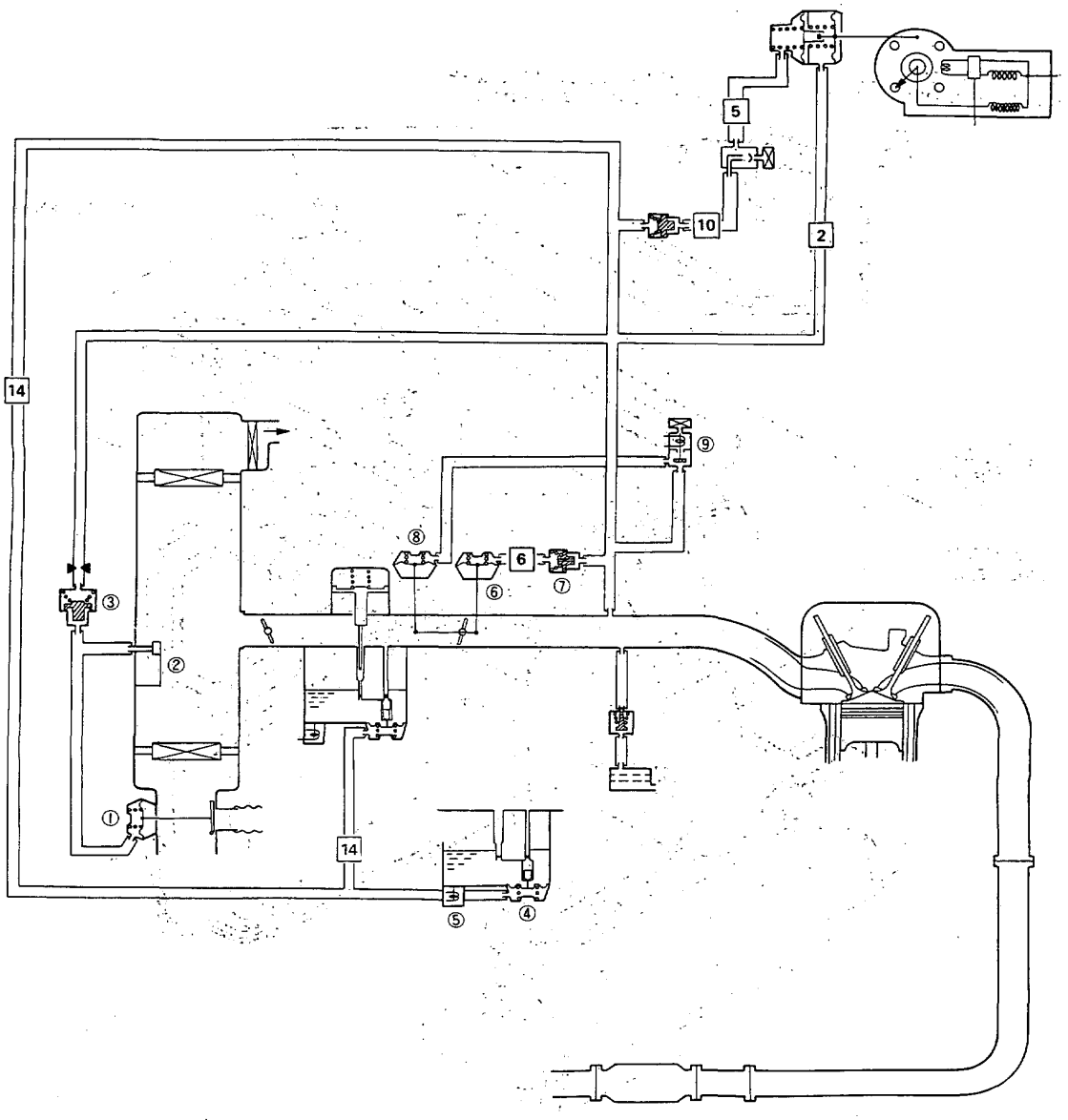


(cont'd)

System Description

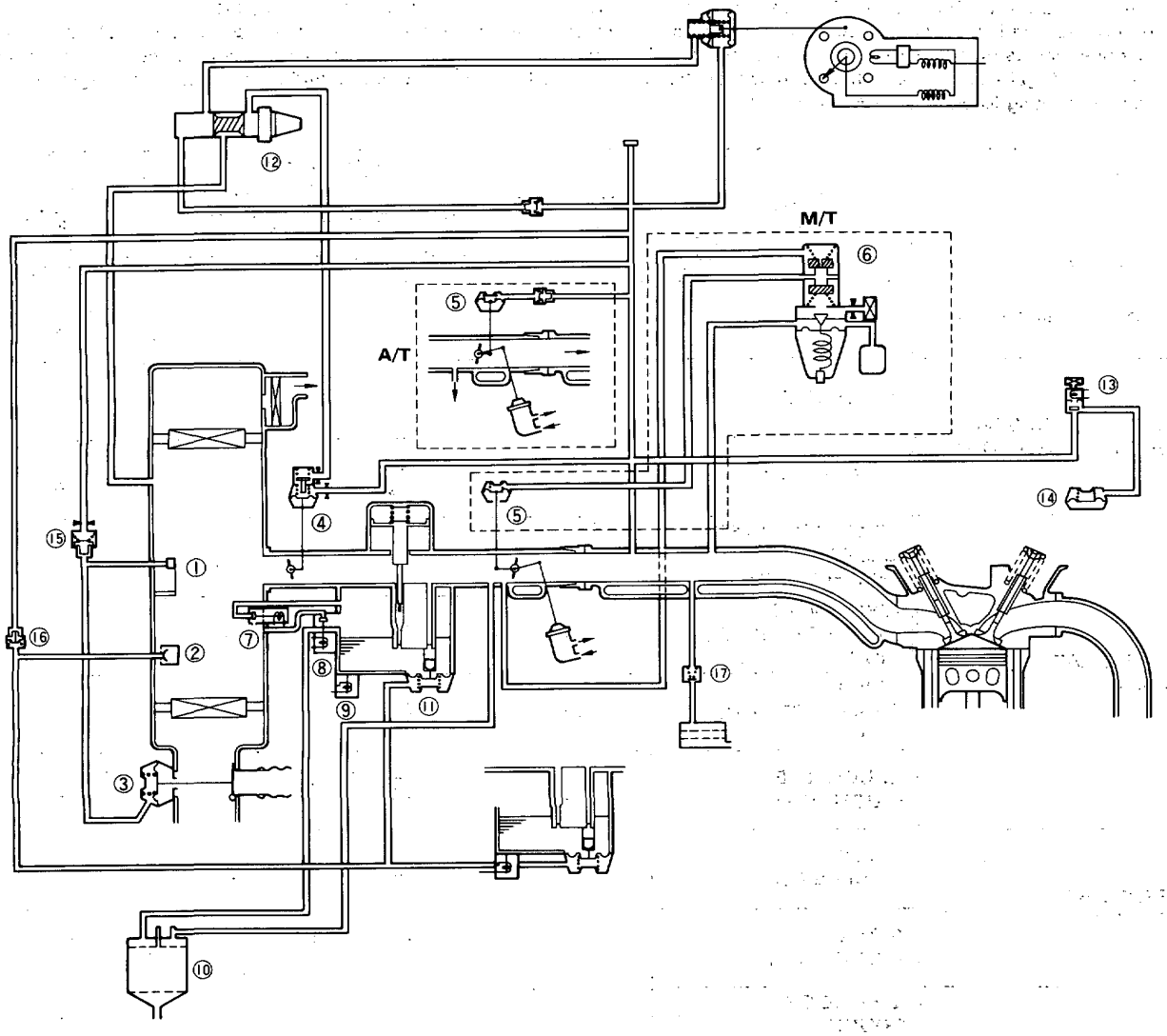
Vacuum Connections (cont'd)

(1.4 ℓ Engine)



① AIR CONTROL DIAPHRAGM
② AIR BLEED VALVE
③ CHECK VALVE
④ POWER VALVE
⑤ *PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE*
⑥ THROTTLE CONTROLLER
⑦ CHECK VALVE
⑧ IDLE BOOST THROTTLE CONTROLLER
⑨ A/C IDLE BOOST SOLENOID VALVE

(1.6 ℓ Engine)



① AIR BLEED VALVE A
② AIR BLEED VALVE B
③ AIR CONTROL DIAPHRAGM
④ CHOKE OPENER
⑤ THROTTLE CONTROLLER
⑥ THROTTLE CONTROLLER CONTROL VALVE
⑦ INNER VENT SOLENOID VALVE
⑧ AIR VENT CUT-OFF SOLENOID VALVE
⑨ PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE
⑩ CANISTER
⑪ POWER VALVE
⑫ THERMOVALVE
⑬ A/C IDLE BOOST SOLENOID VALVE
⑭ A/C IDLE BOOST THROTTLE CONTROLLER
⑮ CHECK VALVE A
⑯ CHECK VALVE B
⑰ PCV VALVE

Carburetor

Symptom-to-System Chart

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the self-diagnosis indicator, 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 in page 6-8 and 6-9

PAGE / SYSTEM / SYMPTOM		CARBURETOR			
		IDLE SPEED/ MIXTURE	IDLE CONTROL	CHOKE/ FAST IDLE SYSTEM	AIR VENT CUT-OFF (INNER VENT) SOLENOID VALVE (1.6 ℓ Engine)
		13	8	15	40, 42
ENGINE WON'T START					①
DIFFICULT TO START ENGINE WHEN COLD	WHEN COLD			①	②
	WHEN WARM		②		②
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION			①	
	WHEN WARM ENGINE SPEED TOO HIGH	①	②	③	
	WHEN WARM ENGINE SPEED TOO LOW	①	①		
	ROUGH IDLE/ FLUCTUATION	①	②		②
FREQUENT STALLING	WHILE WARMING UP		③	②	
	AFTER WARMING UP	①	②		②
POOR PERFORM-ANCE	MISFIRE OR ROUGH RUNNING			①	①
	LOSS OF POWER				②
	AFTERBURN		①		
	HESITATION/ SURGE	①			

CARBURETOR			FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL
POWER VALVE	PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE	ACCELE-RATOR PUMP			
11	12	—	24	28	32
	②		①		
	①	②			
	①				③
	②				③
					③
	①				
	①				
			③		
①		③	②	①	
				②	①
		②		②	

Idle Control System (A/C only)

Testing

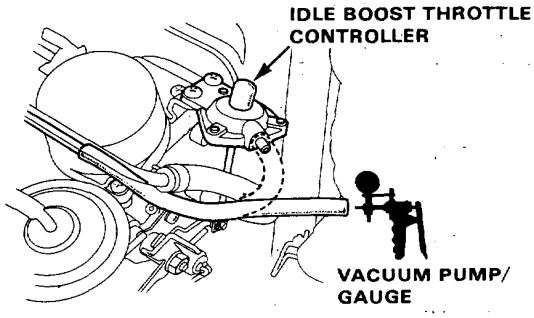
Idle speed too high in no-load conditions

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).

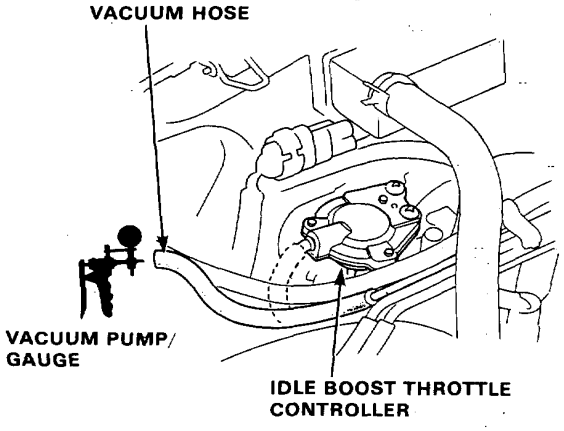
2. Disconnect the vacuum hose from the idle boost throttle controller and check for vacuum.

   There should be no vacuum.

(1.4 ℓ Engine)



(1.6 ℓ Engine)



- If there is no vacuum, check the throttle valve shaft for binding or sticking, and replace the idle boost throttle controller.
- If there is vacuum, go to troubleshooting (page 6-11).

Idle speed is low with A/C on

1. Disconnect the vacuum hose from the idle boost throttle controller and check for vacuum with the A/C on.

   There should be vacuum.

- If there is vacuum, check the throttle valve shaft for binding or sticking, and replace the idle boost throttle controller.
- If there is no vacuum, go to troubleshooting (page 6-11).

Troubleshooting Flow Chart

Inspection of A/C Idle Boost System

Disconnect the upper vacuum hose of the solenoid valve from the idle boost throttle controller and connect a vacuum gauge.

Start the engine and warm up to *normal operating temperature* (the cooling fan comes on).

Is there vacuum ?

YES → Disconnect the connector near the solenoid valve.

Is there vacuum ?

YES → **Replace the solenoid valve.**

NO → **Inspect the A/C Signal (section 15).**

NO

Turn the blower switch ON.

Turn the A/C switch ON.

Is there vacuum ?

NO → Disconnect the connector near the solenoid valve.

YES → **A/C Idle Boost Solenoid Valve and A/C signal are OK.**

Measure voltage between RED (+) terminal and body ground.

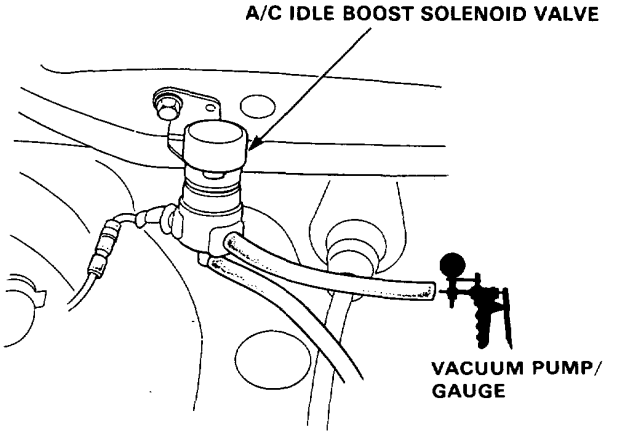
Is there battery voltage ?

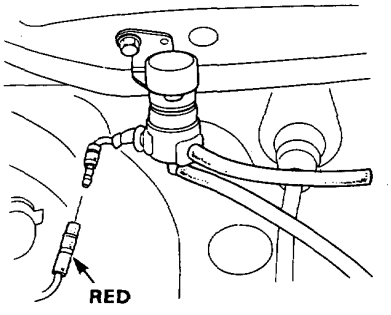
NO → **Repair open or short in RED wire between the solenoid valve and compressor control unit.**

YES

(To page 6-12)

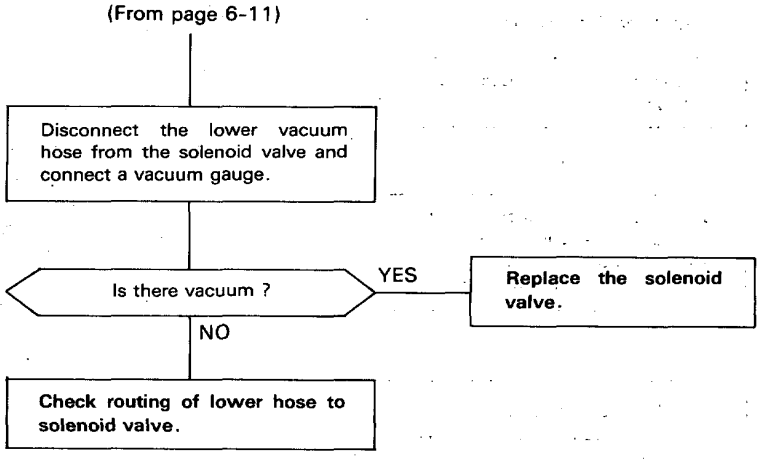
A/C Idle Boost Solenoid Valve





(cont'd)

Idle Control System (A/C only) (cont'd)

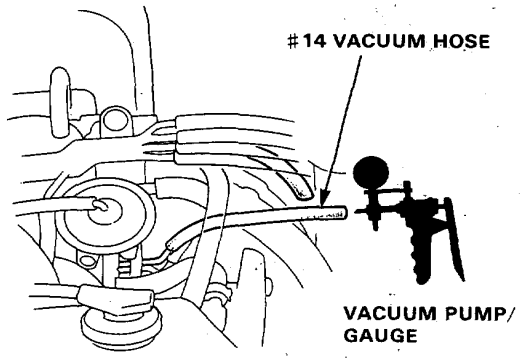


Power Valve

Testing (COLD ENGINE)

1. Disconnect the #14 vacuum hose from the vacuum hose manifold and connect a vacuum pump. Apply vacuum.

   It should hold vacuum.

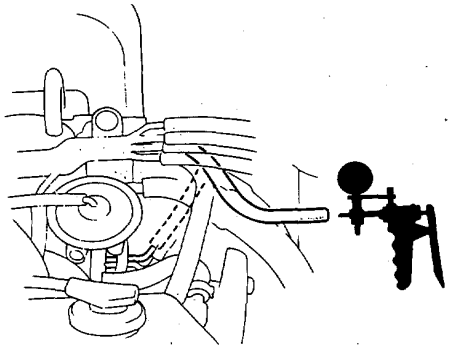


   - If it does not hold vacuum, replace the diaphragm and retest (page 6-24,27).

2. (1.6 ℓ Engine)
   Start the engine and disconnect the #14 vacuum hose from the vacuum hose manifold, and connect a vacuum pump/gauge to the manifold.

   NOTE: Intake air temperature must be below 21°C (69.8 °F).

   There should be no vacuum.



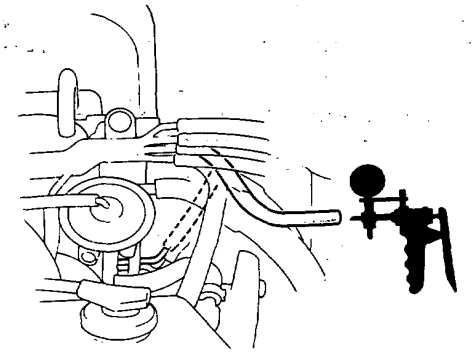
   - If there is vacuum, check the vacuum hose for proper connection, cracks, blockage or disconnected hose, then, if necessary, replace the air bleed valve B.

Testing (HOT ENGINE)

1. Start the engine and warm up to normal operating temperature (cooling fan comes on).

2. Disconnect the #14 vacuum hose from the vacuum hose manifold and connect a vacuum pump/gauge.

   There should be vacuum.



   - If there is no vacuum, check the vacuum hose for proper connection, cracks, blockage or disconnected hose.
     1.6 ℓ Engine: then, if necessaly, replace the air bleed valve B.

Primary Slow Mixture Cut-off Solenoid Valve

Troubleshooting Flow Chart Primary Slow Mixture Cut-off Solenoid Valve

Inspection of Primary Slow Mixture Cut-off Solenoid Valve

Turn the ignition switch ON.

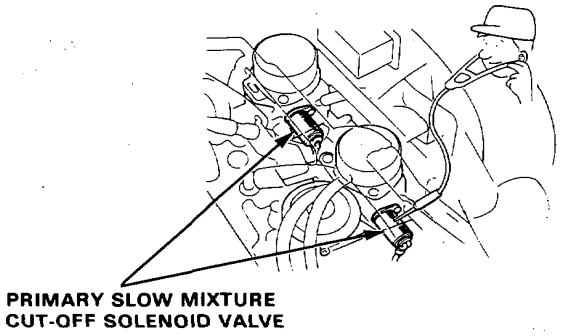
Check the clicking sound of each solenoid valve by means of a stethoscope.

Does the solenoid valve click?

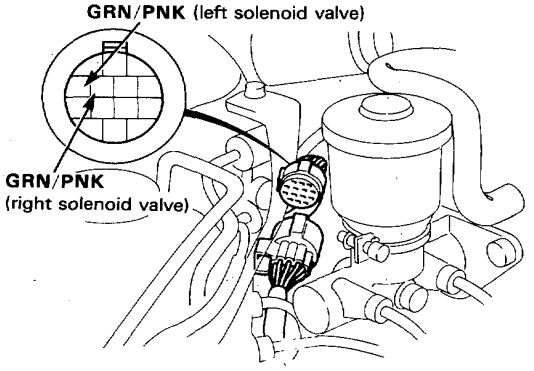
NO

Turn the ignition switch OFF.

YES



PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE



Disconnect the 14P connector.

Turn the ignition switch ON.

Measure voltage between GRN/PNK (+) terminal and body ground.

Is there battery voltage?

YES

Repair open or short in BLK/YEL wire between the solenoid valve and the 14P connector.
If OK;
right solenoid valve: replace the solenoid valve.
left solenoid valve: inspect open in BLK wire between the solenoid valve and G201, and replace the solenoid valve.

NO

Repair open or short in GRN/PNK wire between the 14P connector and the ignition switch as well as No. 14 fuse.

Solenoid valve is OK.

Idle Speed/Mixture (cont'd)

8. Install the hole plugs.

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

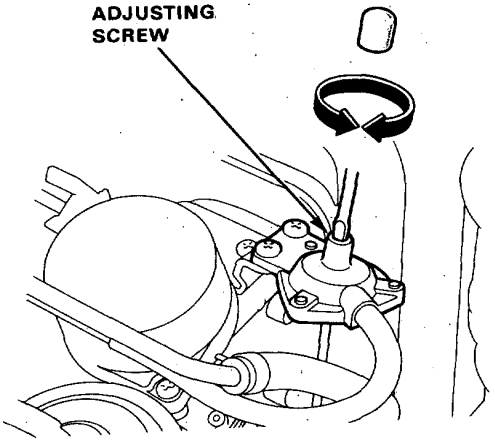
9. If equipped with air conditioner, check the idle speed with the A/C on.

   Idle speed should be:

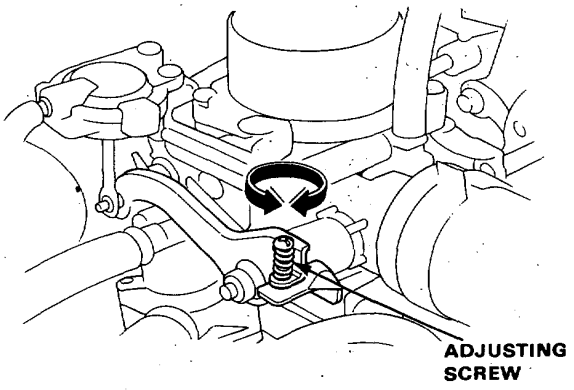
Manual	750±50 min^{-1} (rpm)
Automatic	750±50 min^{-1} (rpm) (N or P)

   Adjust the idle speed, if necessary, by turning the adjusting screw.

(1.4 ℓ Engine)



(1.6 ℓ Engine)



Float Level

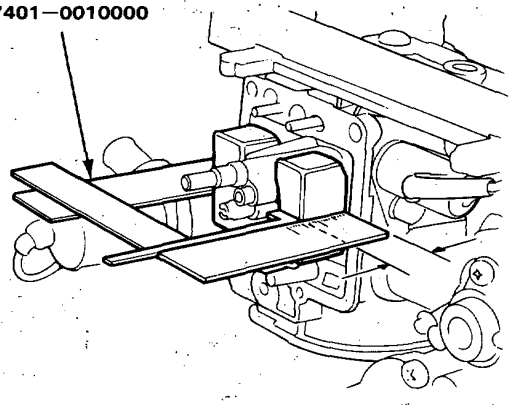
Inspection

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

1. Remove the carburetors (page 6-22,25).
2. Remove the float chambers.
3. Using the float level gauge, measure the float level with the float tip lightly contacting the float valve and the carburetor float chamber surface inclined about 30° from vertical.

   Float Level: 16±1 mm (0.6 ±0.04 in.)

FLOAT LEVEL GAUGE 07401—0010000

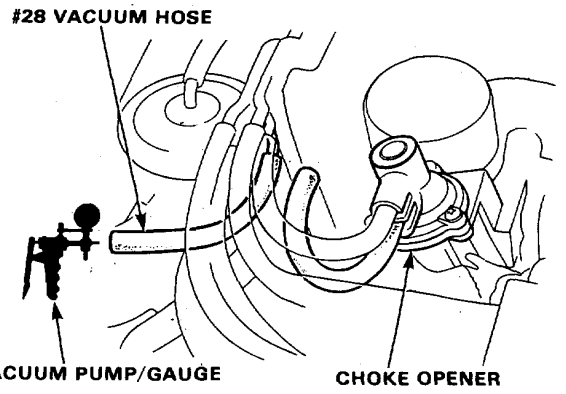


Choke Opener

Testing (COLD ENGINE)

NOTE: Engine coolant temperature must be below 18°C (64.4°F)

1. Disconnect the #28 vacuum hose from the choke opener and connect a vacuum pump.

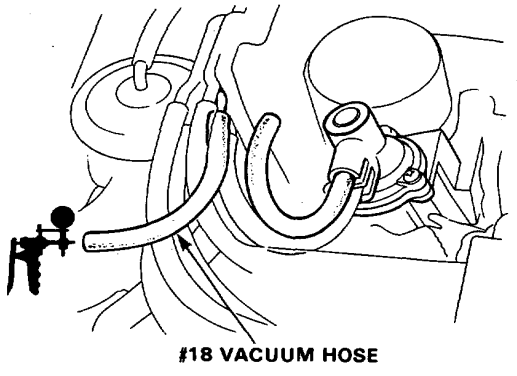


2. Start the engine and check the vacuum.

   There should be vacuum.

   - If there is no vacuum, check the #28 vacuum hose for proper connection, cracks, brockage or disconnected hose.

3. Disconnect the #18 vacuum hose from the choke opener, then connect a vacuum pump.



   It should not hold vacuum.

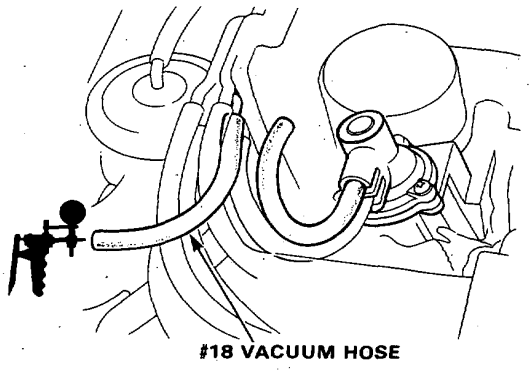
   - If it holds vacuum, check the #18 vacuum hose for proper connection, cracks, blockage or disconnected hose. If OK, replace the thermovalve and retest.

Testing (HOT ENGINE)

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).

2. Disconnect the #18 vacuum hose from the choke opener and connect a vacuum pump.

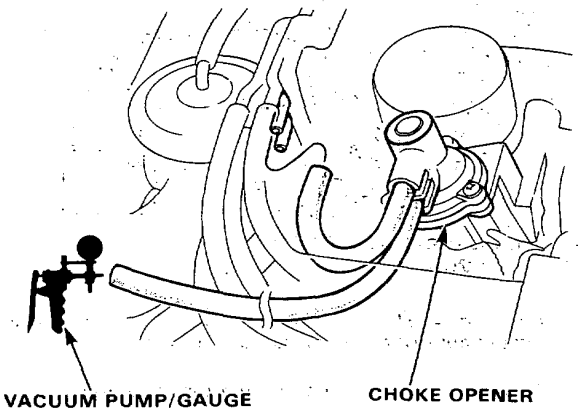
   It should hold vacuum.



   - If it does not hold vacuum, check the #18 vacuum hose for proper connection, cracks, blockage or disconnected hose. If OK, replace the thermovalve and retest.

Choke Opener Diaphragm Testing

1. Disconnect the #18 vacuum hose from the vacuum hose manifold.
2. Disconnect the #28 vacuum hose from the vacuum hose manifold and connect a vacuum pump.



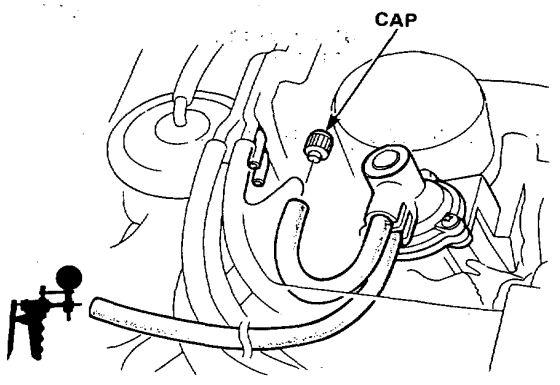
3. Apply vacuum.

   Vacuum should stabilize at 100 to 200 mm Hg (4 to 8 in. Hg) and it should pull the opener rod.

   - If not, check the linkage for signs of mechanical binding and replace the left carburetor (page 6-25).

4. Cap the end of the #18 vacuum hose and apply vacuum.

   It should pull the opener rod.

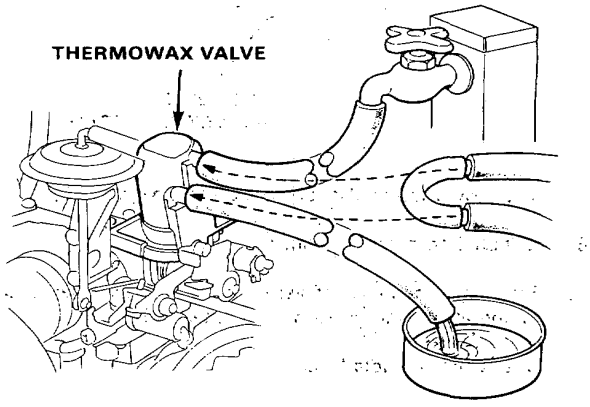


   - If not, replace the left carburetor (page 6-25).

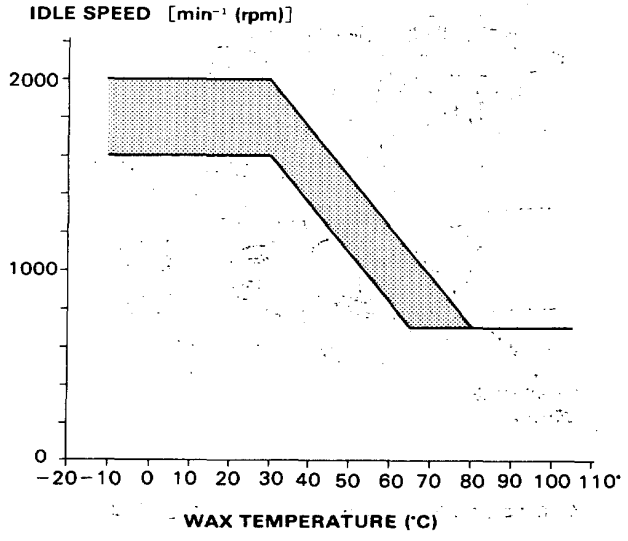
Fast Idle (1.6 ℓ Engine)

Inspection/Adjustment

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Stop the engine.
3. Disconnect both coolant hoses from the thermowax valve and cap the end of hoses.
4. Apply cold water and cool down the wax.



5. Connect a tachometer and check the idle speed.

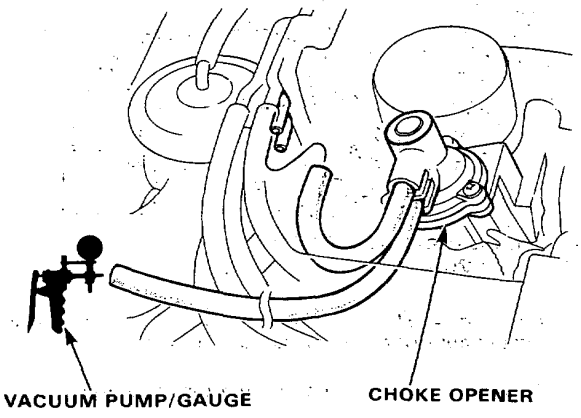


   Adjust the idle speed, if necessary, by turning the fast idle adjusting screw.

(cont'd)

Choke Opener Diaphragm Testing

1. Disconnect the #18 vacuum hose from the vacuum hose manifold.
2. Disconnect the #28 vacuum hose from the vacuum hose manifold and connect a vacuum pump.



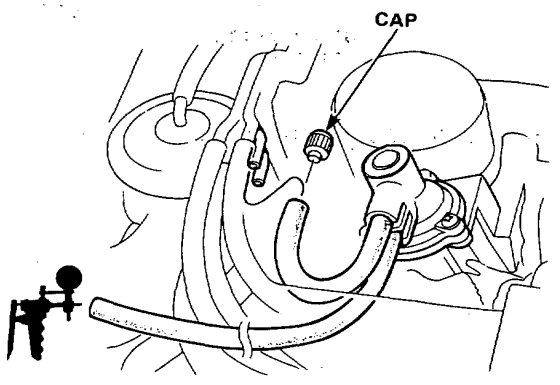
3. Apply vacuum.

   Vacuum should stabilize at 100 to 200 mm Hg (4 to 8 in. Hg) and it should pull the opener rod.

   - If not, check the linkage for signs of mechanical binding and replace the left carburetor (page 6-25).

4. Cap the end of the #18 vacuum hose and apply vacuum.

   It should pull the opener rod.

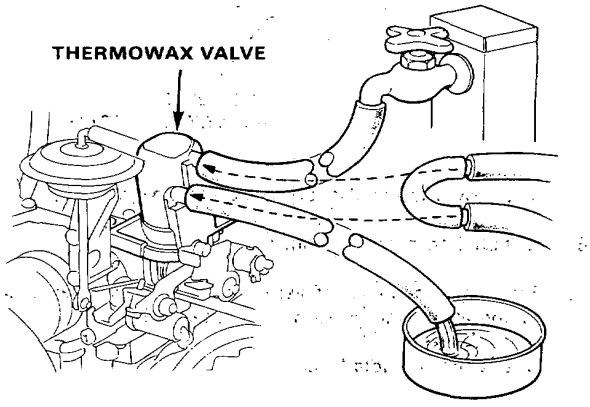


   - If not, replace the left carburetor (page 6-25).

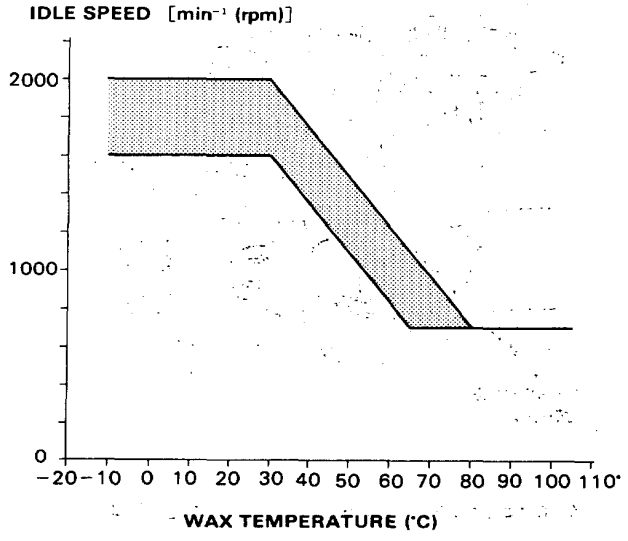
Fast Idle (1.6 ℓ Engine)

Inspection/Adjustment

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Stop the engine.
3. Disconnect both coolant hoses from the thermowax valve and cap the end of hoses.
4. Apply cold water and cool down the wax.



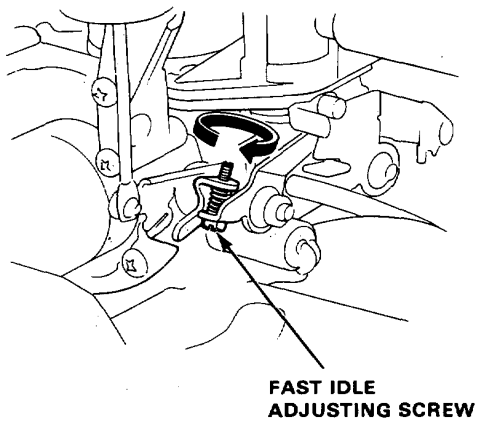
5. Connect a tachometer and check the idle speed.



   Adjust the idle speed, if necessary, by turning the fast idle adjusting screw.

(cont'd)

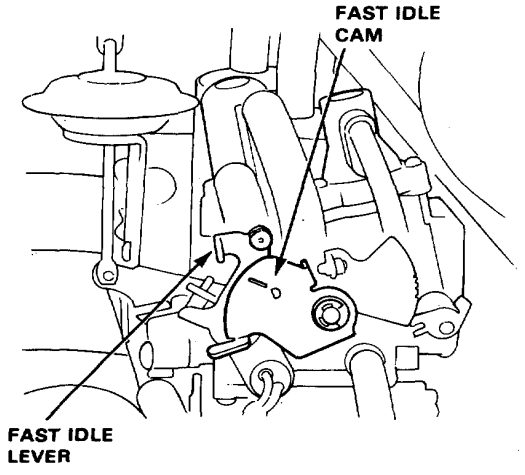
Fast Idle (1.6 ℓ Engine) (cont'd)



- If not, replace the left carburetor (page 6-25).

6. Reinstall both coolant hose.
7. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
8. Check the fast idle lever.

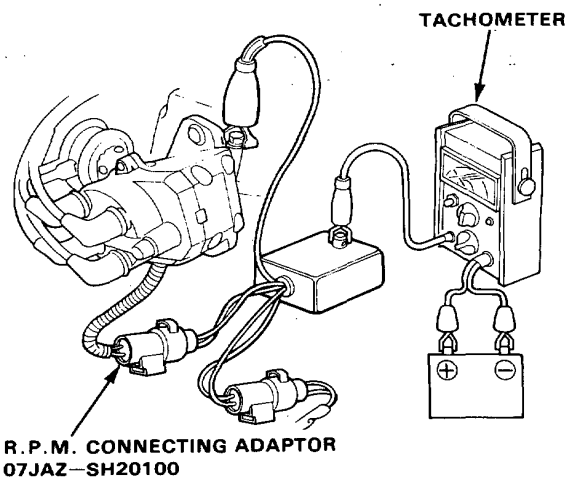
   Fast idle lever should not be seated against fast idle cam.



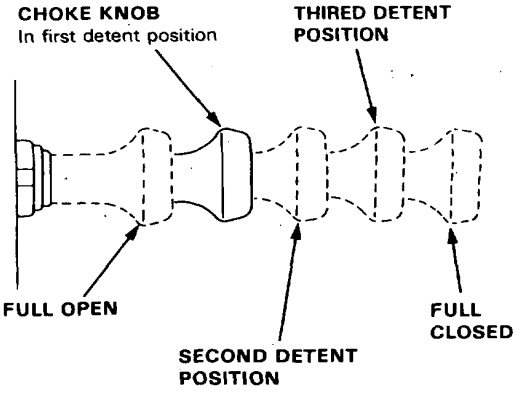
- If not, replace the left carburetor (page 6-25).

Manual Choke /Fast Idle (1.4 ℓ Engine)

1. Connect a tachometer.

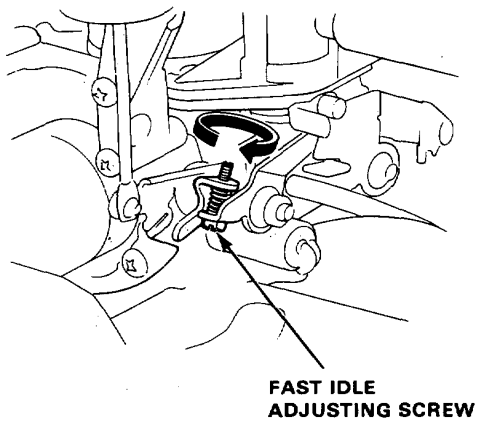


2. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
3. Place choke control knob in first detent position.



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

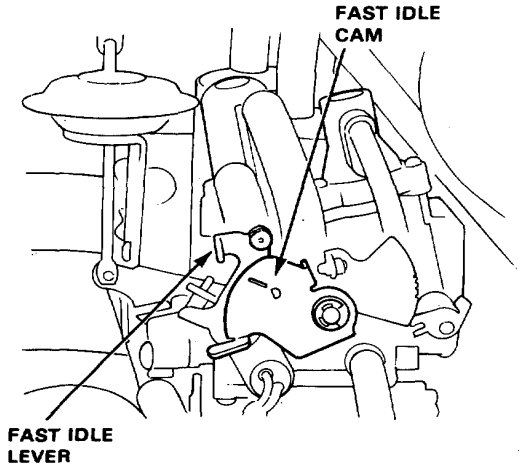
Fast Idle (1.6 ℓ Engine) (cont'd)



- If not, replace the left carburetor (page 6-25).

6. Reinstall both coolant hose.
7. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
8. Check the fast idle lever.

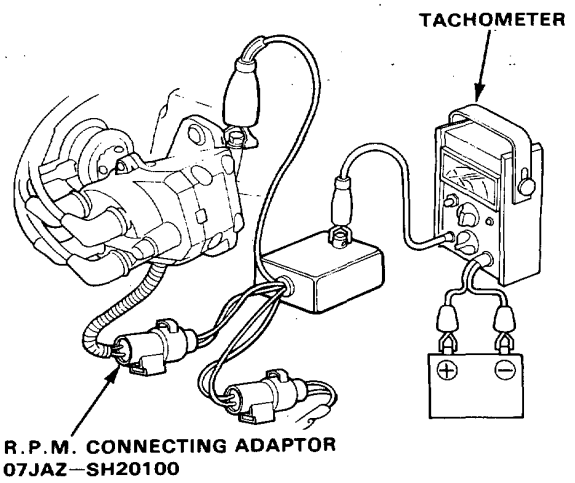
   Fast idle lever should not be seated against fast idle cam.



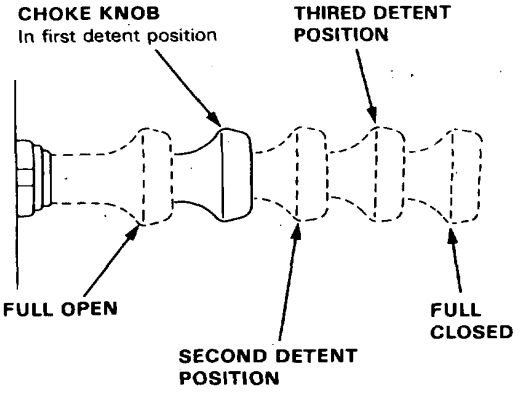
- If not, replace the left carburetor (page 6-25).

Manual Choke /Fast Idle (1.4 ℓ Engine)

1. Connect a tachometer.

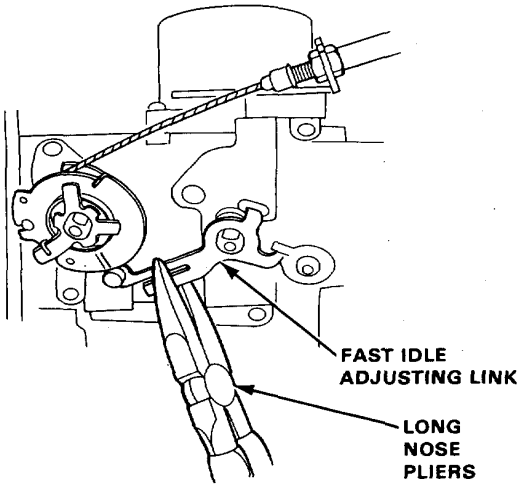


2. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
3. Place choke control knob in first detent position.

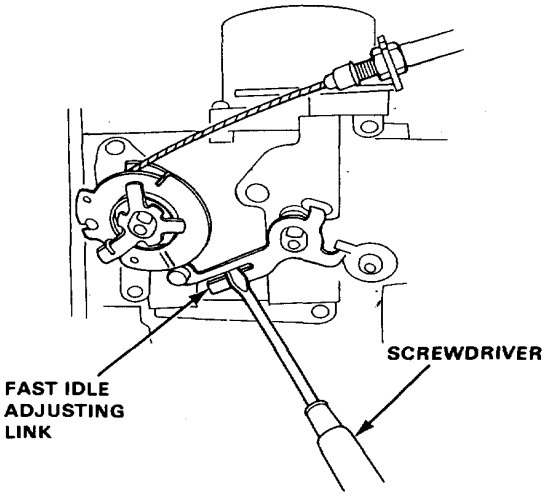


Fast idle should be: 1,500—2,500 min⁻¹ (rpm)

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

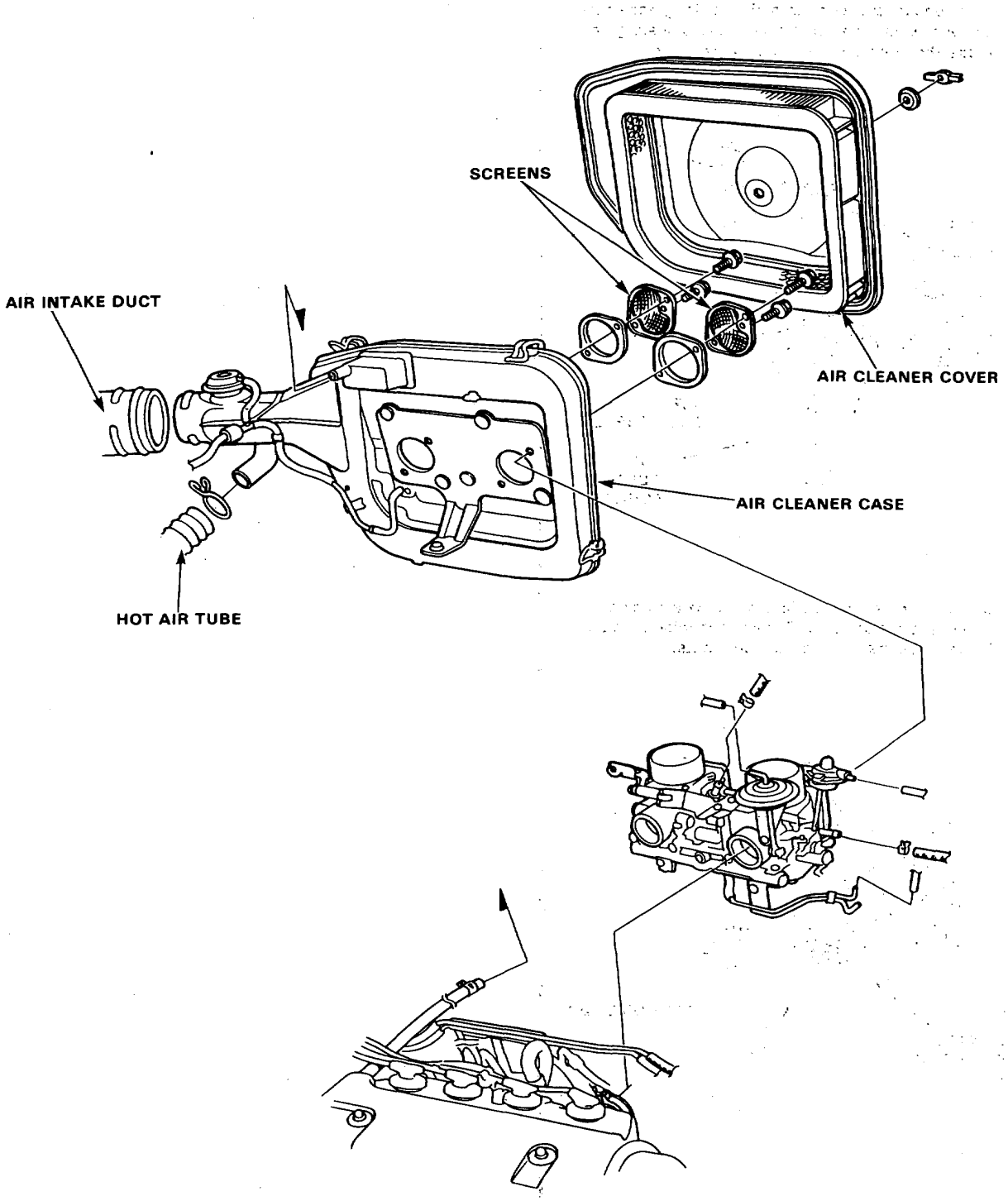


- If the engine speed is too low, insert a screwdriver in the fast idle adjusting link slot and widen the slot. Make adjustments in small increments.



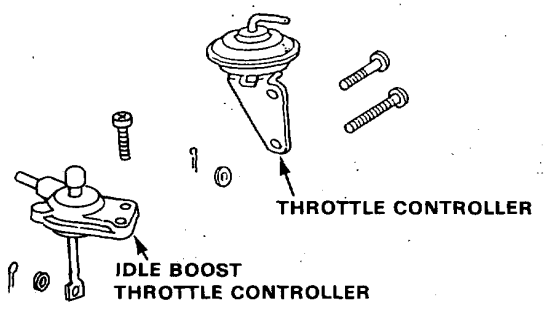
Carburetor

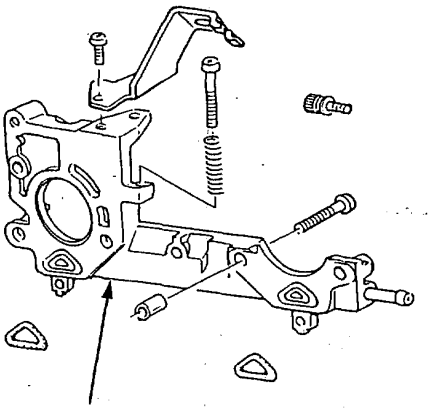
Removal
(1.4 ℓ Engine)

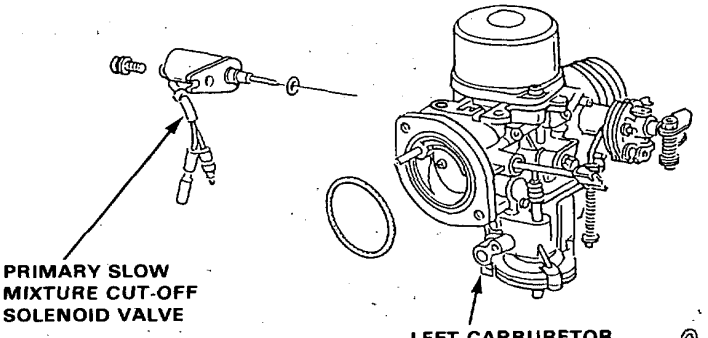


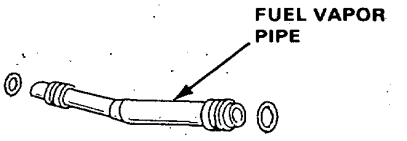
Replacement (1.4 ℓ Engine)

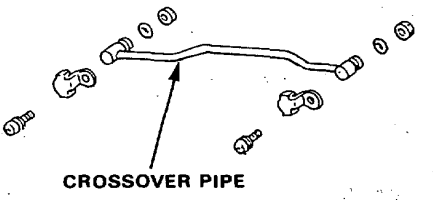
⚠WARNING Do not smoke while working on fuel system. Keep any open flame away from your work area. Drain fuel in to an approved container.

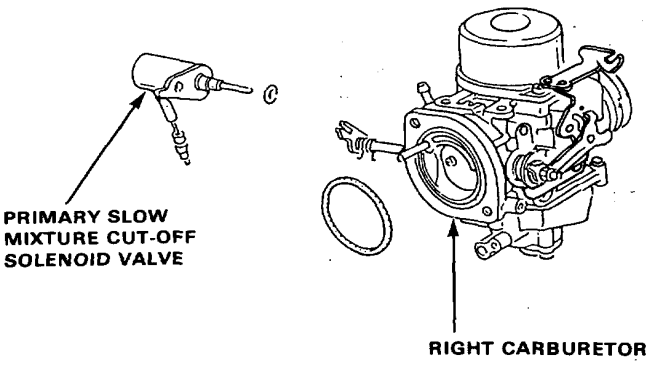








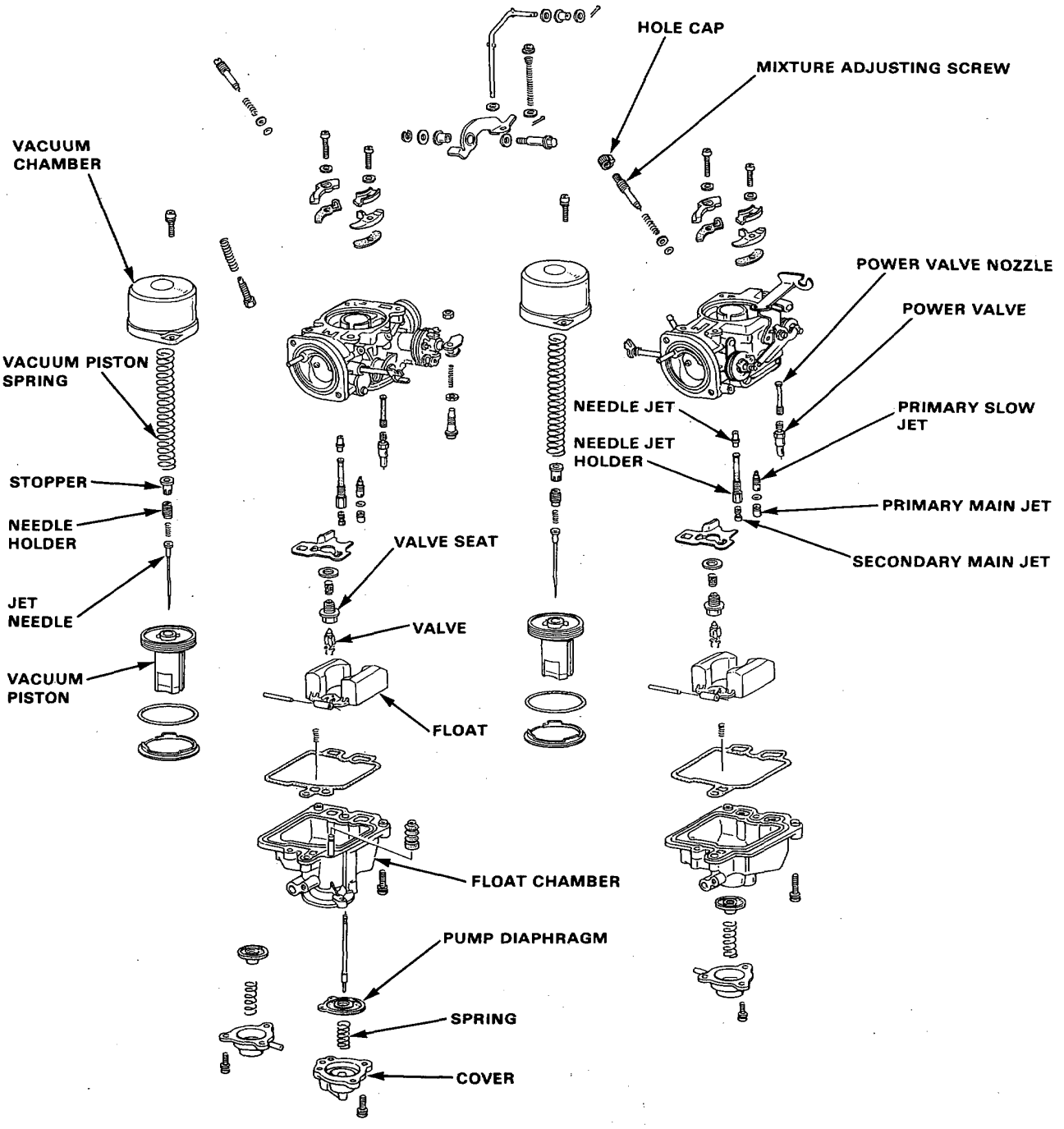




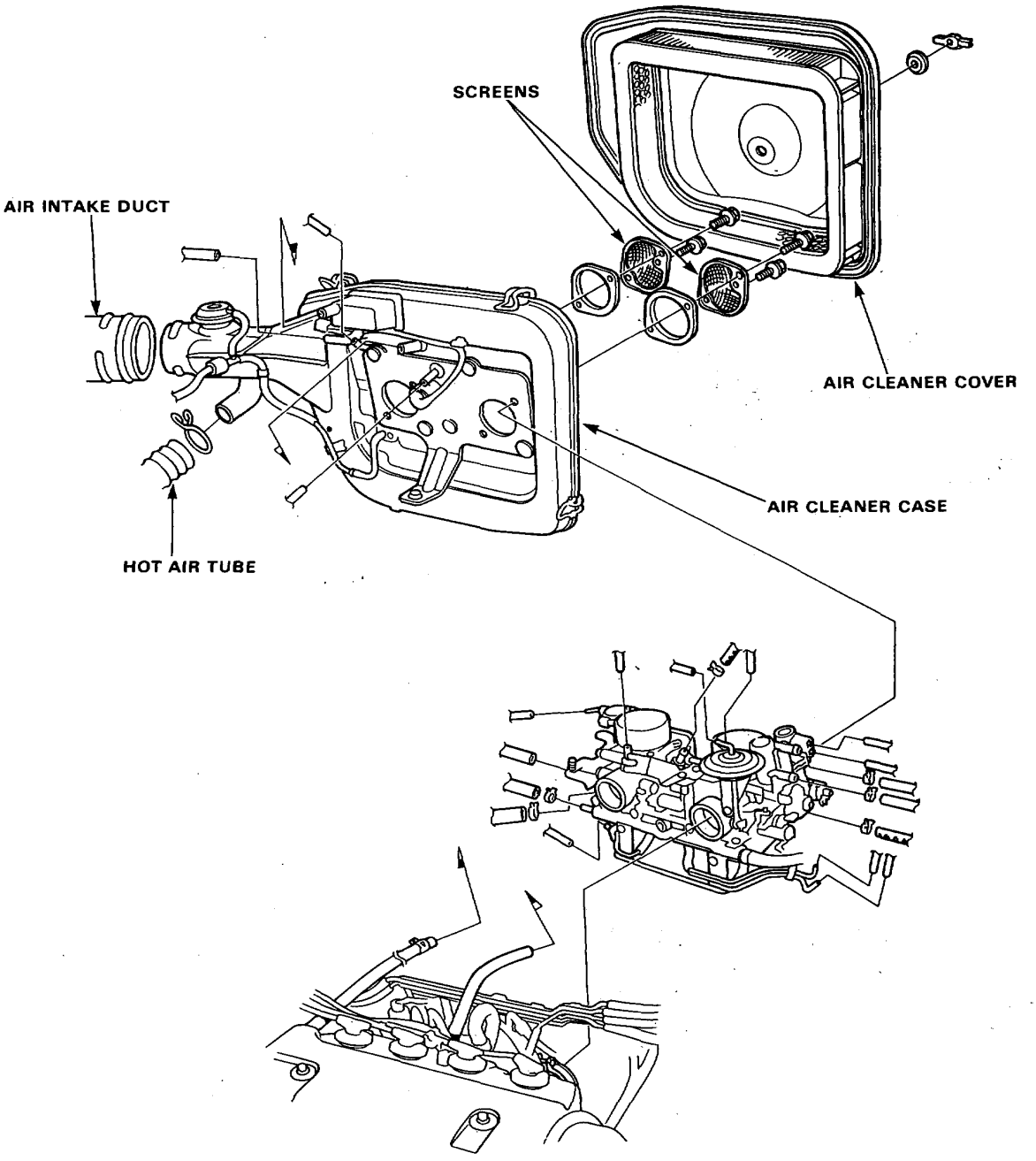
(cont'd)

Carburetor

Replaccment (cont'd) (1.4 ℓ Engine)



Removel
(1.6 ℓ Engine)

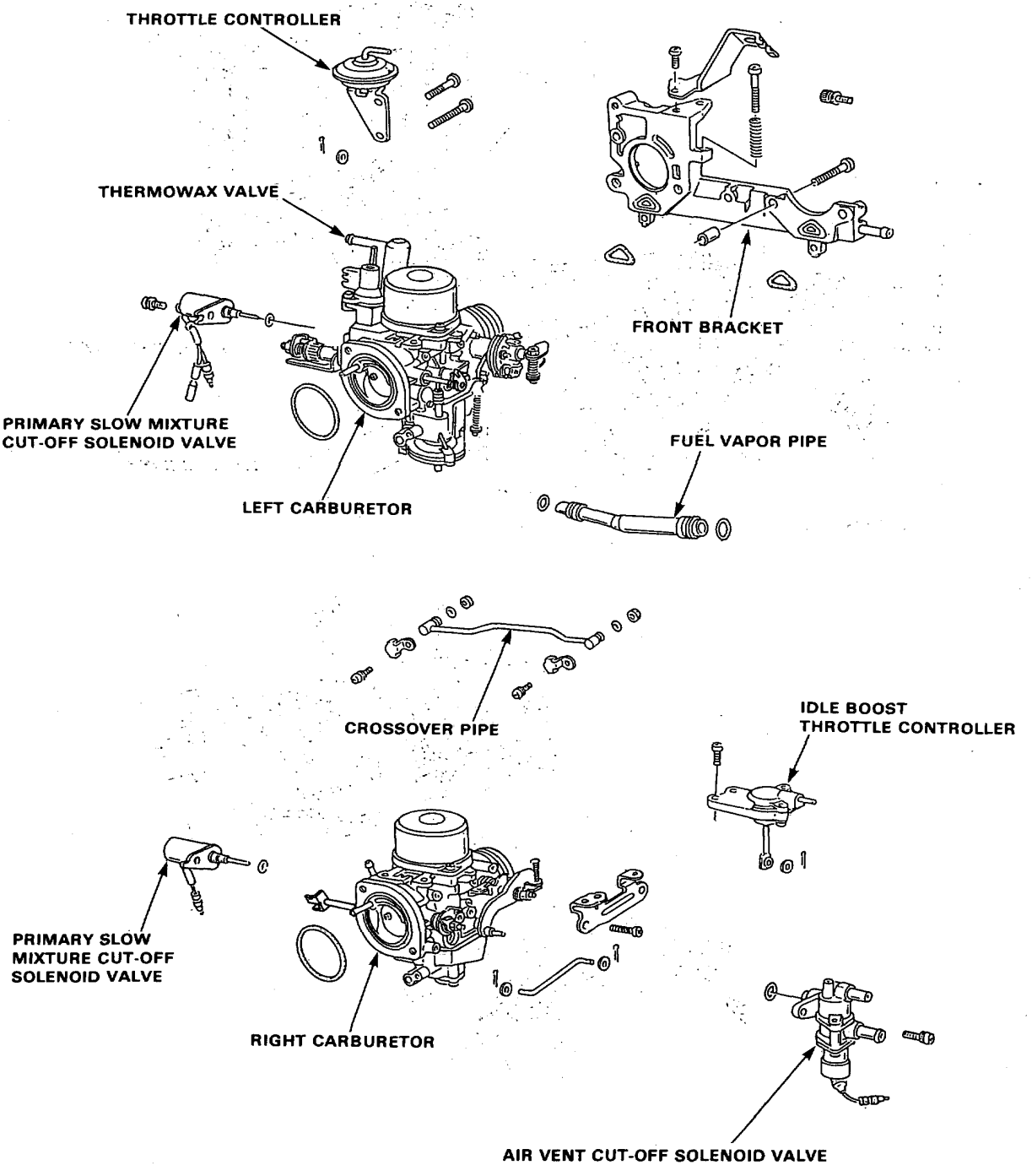


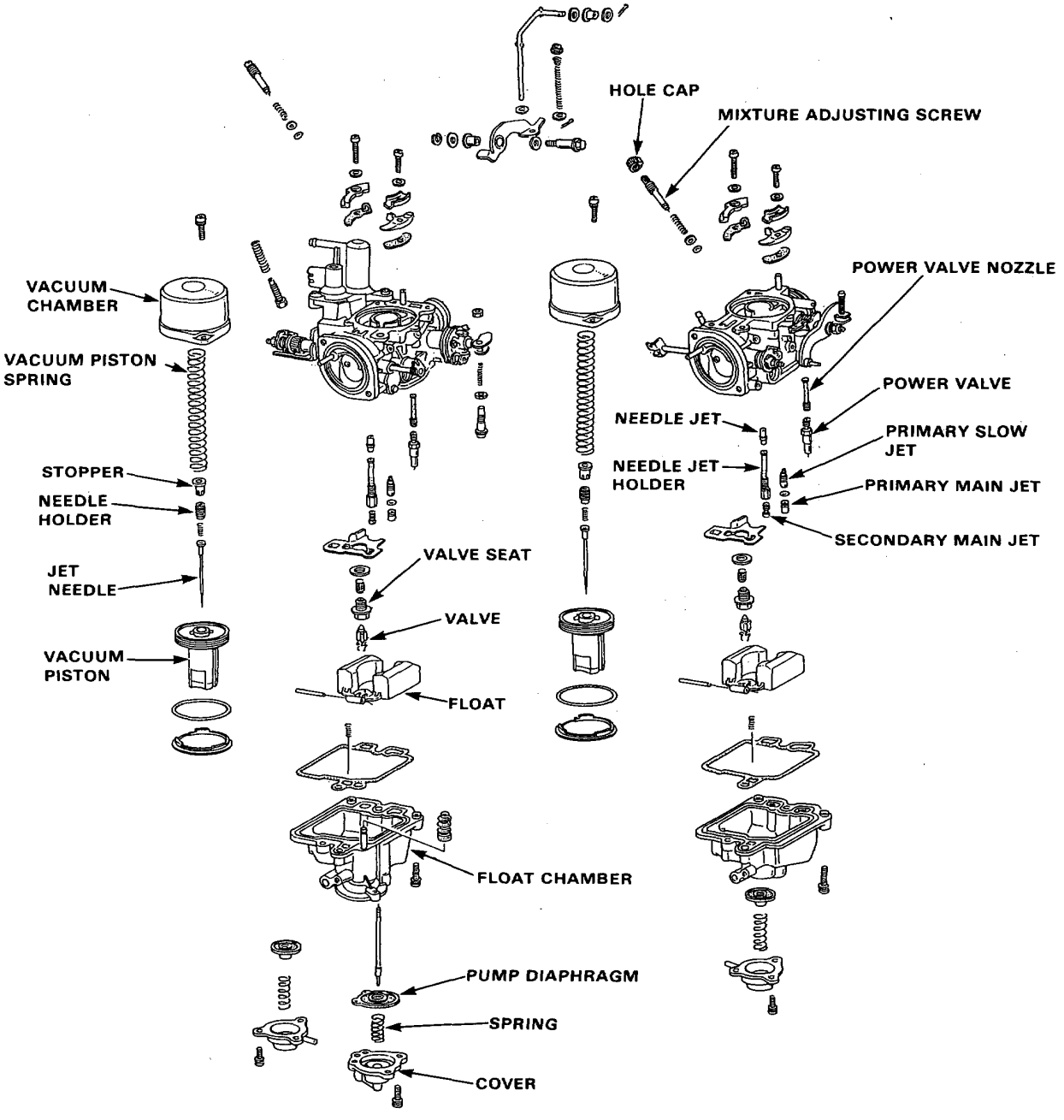
Carburetor

Replacement

(1.6 ℓ Engine)

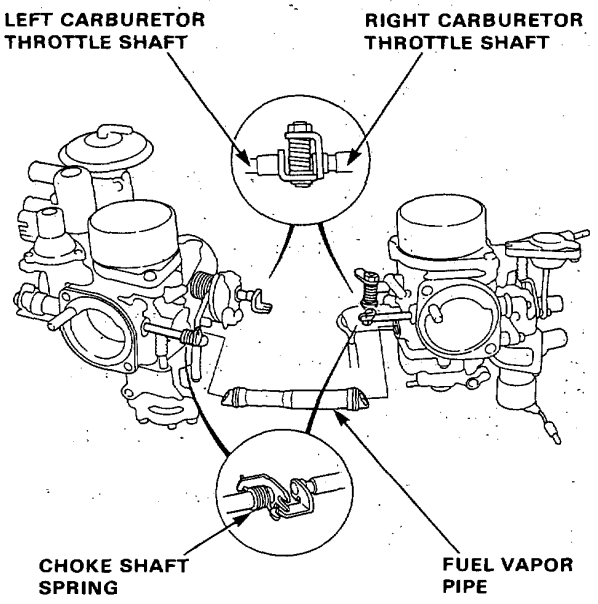
⚠ WARNING Do not smoke while working on fuel system. Keep any open flame away from your work area. Drain fuel in to an approved container.




HOLE CAP
MIXTURE ADJUSTING SCREW
VACUUM CHAMBER
VACUUM PISTON SPRING
STOPPER
NEEDLE HOLDER
JET NEEDLE
VACUUM PISTON
POWER VALVE NOZZLE
POWER VALVE
NEEDLE JET
PRIMARY SLOW JET
NEEDLE JET HOLDER
PRIMARY MAIN JET
SECONDARY MAIN JET
VALVE SEAT
VALVE
FLOAT
FLOAT CHAMBER
PUMP DIAPHRAGM
SPRING
COVER

Reassembly

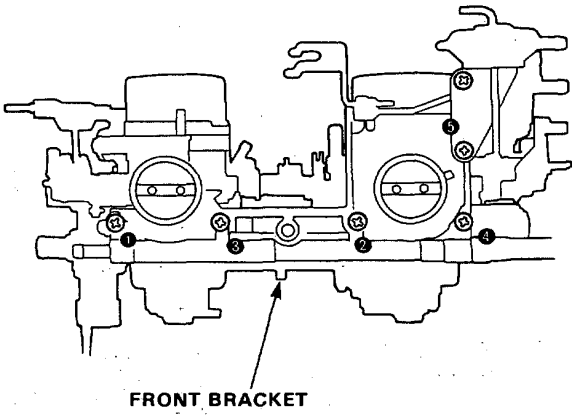
1. Insert the left carburetor's throttle shaft end (forked), between the washers on the right carburetor's throttle shaft end.
2. Install new O-rings on the fuel vapor pipe, then install it.
3. Set the left and right carburetors up.



4. Connect the choke shaft spring.
5. Install the front bracket, with new gaskets, but don't tighten its screws yet.

   CAUTION: Make sure the screw length is correct or you may damage the carburetors.

6. Check that the choke and throttle shafts move smoothly without binding.
7. Tighten the screws in the sequence shown.

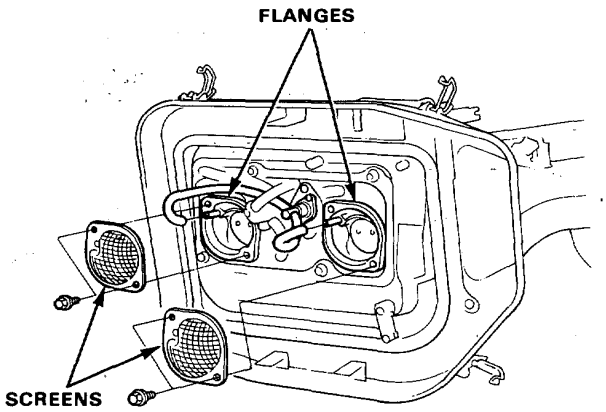


Synchronization

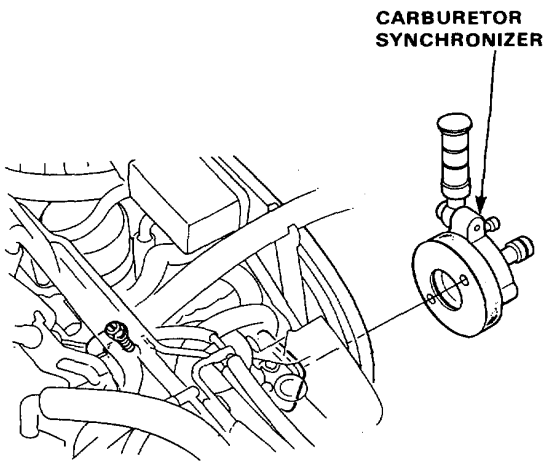
1. Remove the air cleaner cover and element.

   CAUTION: Care should be taken not to damage bi metal strip.

2. Remove the air intake screens and air intake flanges.



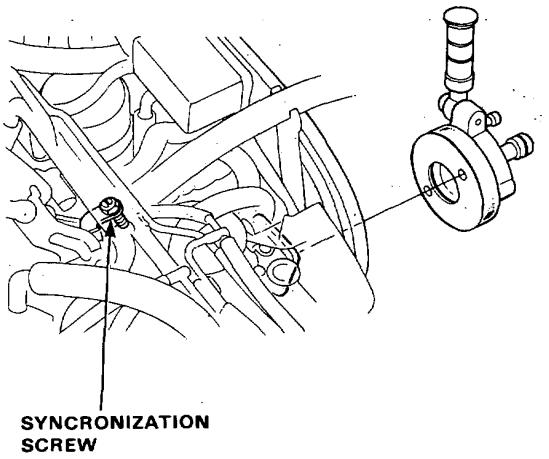
3. Install the carburetor synchronizer.



4. Connect a tachometer, start the engine and allow it to reach its normal operating temperature; the cooling fan will come on.

5. Measure the air flow using the carburetor synchronizer.

   - If the flow rates are identical, remove the synchronizer and reinstall the remaining parts in the reverse order of disassembly.
   - If the air flow rates are different, loosen the adjusting screw lock nut and adjust as necessary.
     The adjusting screw only affects the right carburetor; turning the screw clockwise decreases air flow and counterclockwise increases air flow.
     If the flow rates can't be balanced, check for air leaks or carbon build-up on a throttle valve.



6. Tighten the adjusting screw lock nut and recheck the flow rates. Adjust as necessary.

7. Remove the carburetor synchronizer and reinstall the remaining parts in the reverse order of disassembly.

Fuel Filter

Replacement

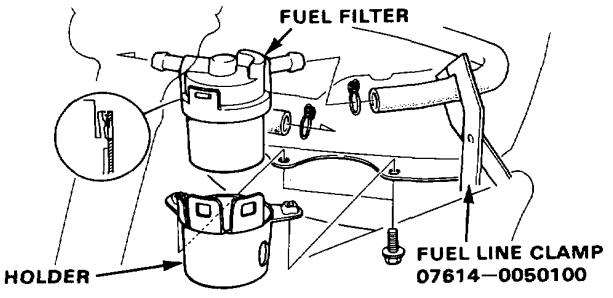
Replace rear filter at every 2 years or 40,000 km (24,000 miles) whichever comes first.

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

1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Push in the tab of the fuel filter to release the holder, then remove the filter from its bracket.
3. Attach fuel line clamps to the fuel lines and disconnect the lines from the fillter.

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

4. Install in the reverse order of removal.



Fuel Pump

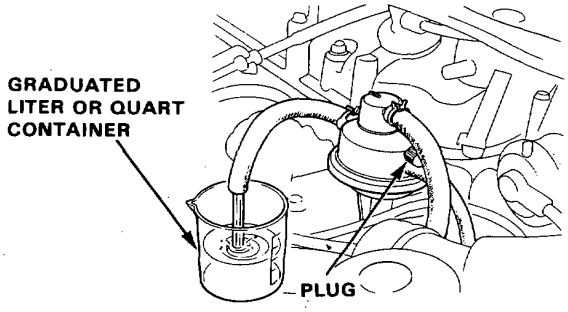
Testing

⚠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, and hold a graduated container under the hose 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 for 60 seconds, then stop the engine.
   Fuel flow should be more than 833.3 cm^3 (27.9 oz).
   - If fuel flow is less than specified, replace the fuel pump and retest.

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



4. Remove the plug from fuel pump return fitting and reconnect return line.

(cont'd)

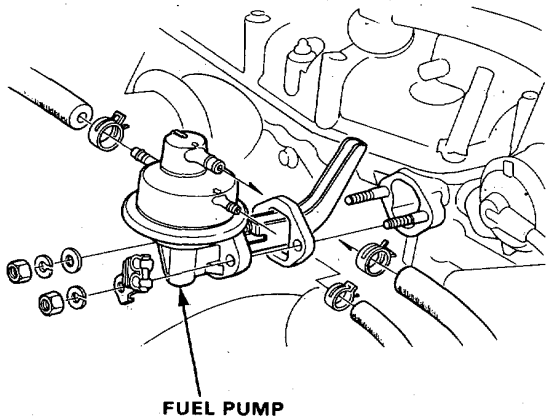
Fuel Pump (cont'd)

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.



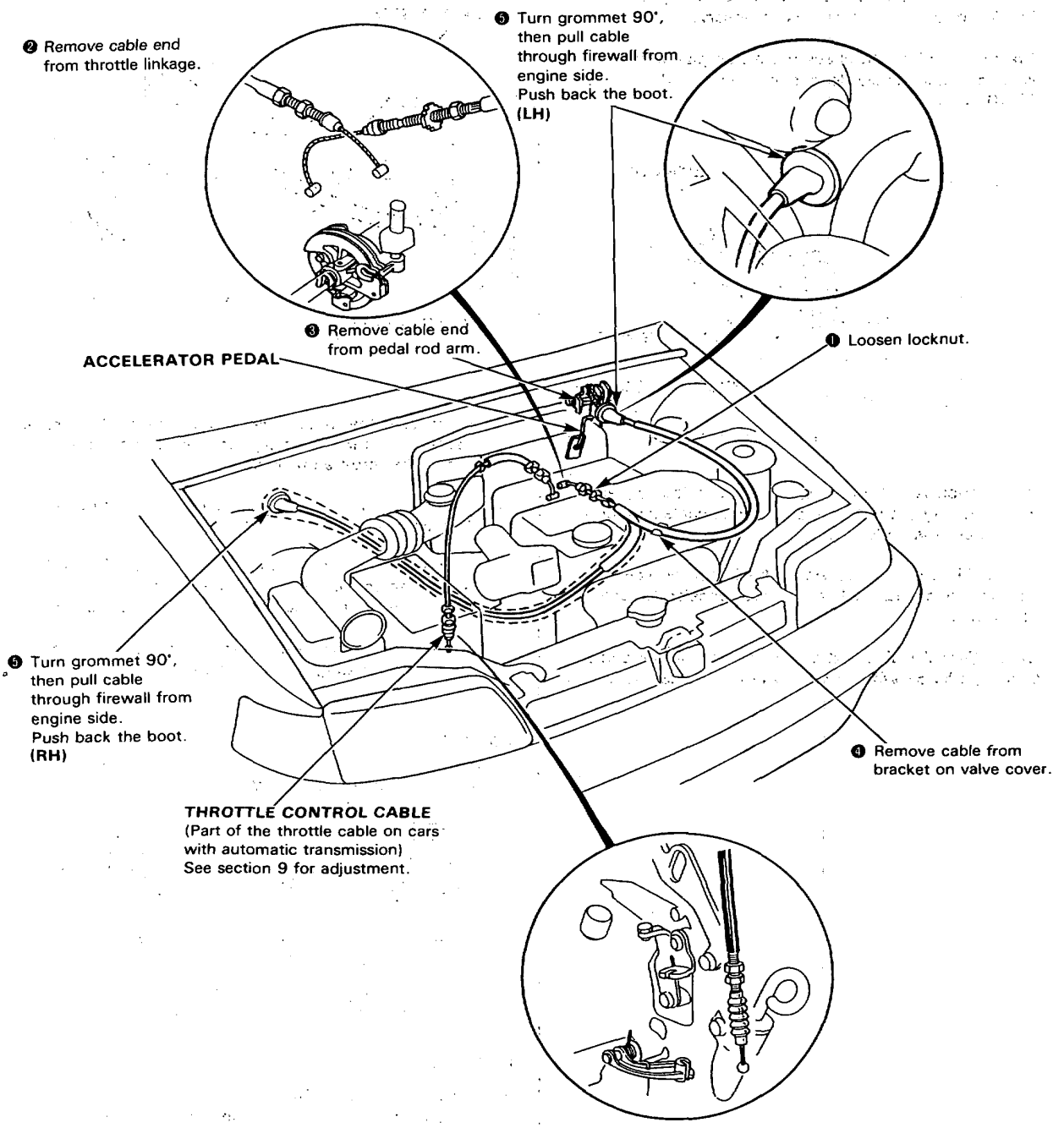
3. Remove fuel pump.
4. Install in the reverse order of removal.

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

Throttle Cable

Replacement

NOTE:
- Detach cable in the numbered sequence shown.
- Information on this page is for RH and LH models.



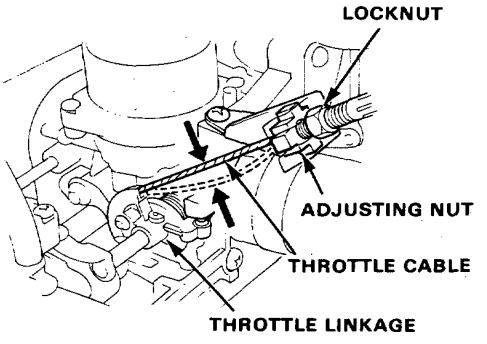
❻ Install the cable in reverse order of removal.
Apply sealant to grommet mating surface, when installing cable.

(cont'd)

Throttle Cable (cont'd)

Inspection/Adjustment

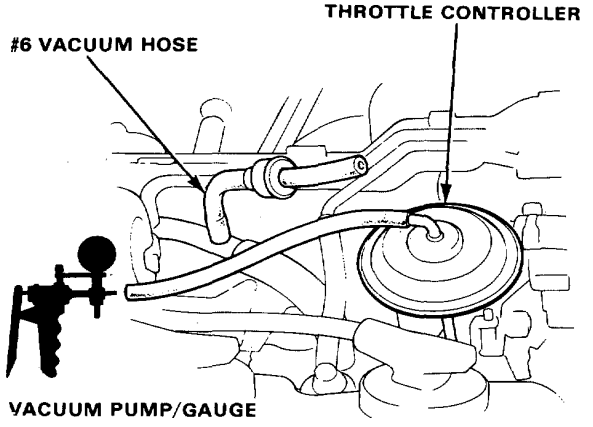
1. Warm up the engine to normal operating temperature (the cooling fan comes on).
2. Check that throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Start the engine and check cable free-play at throttle linkage at idle. Cable deflection should be 4—10 mm (3/16—3/8 in.).



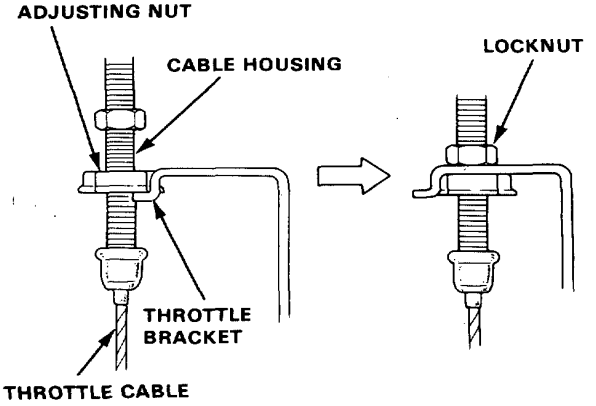
4. If deflection is not within specs, loosen locknut and turn adjusting nut until you can deflect cable as specified. Then tighten locknut.
5. With cable properly adjusted, check throttle valve to be sure it opens fully when you push accelerator pedal to the floor.

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

1. (Except 1.6 ℓ M/T Engine)
   Disconnect the #6 vacuum hose from the throttle controller and connect a vacuum pump to the controller, the apply vacuum.



2. Fully open the throttle valve, then install the throttle cable in the throttle linkage and install the cable housing in the throttle bracket.
3. Warm up the engine to normal operating temperature (the cooling fan comes on).
4. Remove the cable housing from the throttle bracket, set the adjusting nut on the throttle bracket.
   Adjust the adjuting nut so that its free play is 0 mm.
5. Remove the cable housing from the throttle bracket, reset the adjusting nut and tighten the locknut.



6. (Except 1.6 ℓ M/T Engine)
   Disconnect the vacuum pump and connect the #6 vacuum hose.

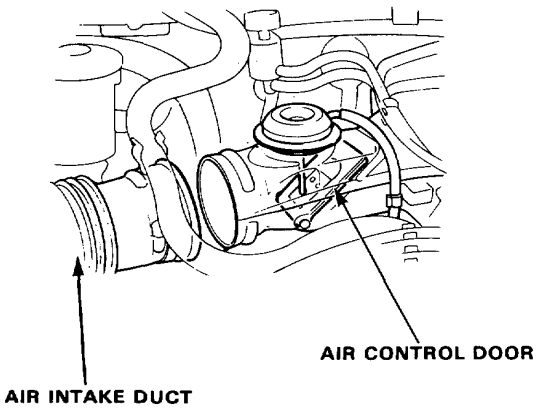
Intake Air Control System

Testing (COLD ENGINE)

NOTE: Intake air temperature must be below 25°C (77°F).

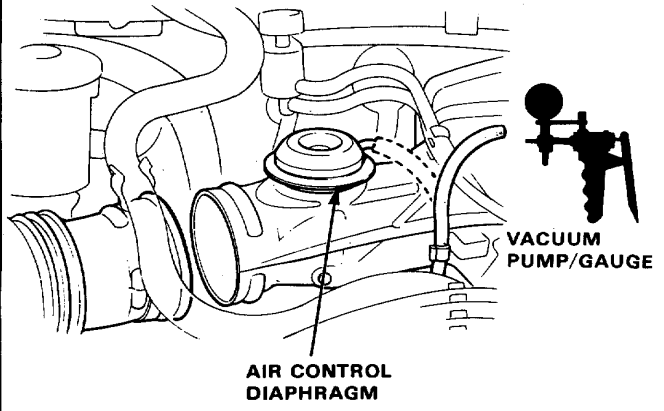
1. Disconnect the air intake duct and start the engine.

   The air control door should rise.



- If not, disconnect the vacuum hose from the air control diaphragm, and connect a vacuum pump.

  There should be vacuum.

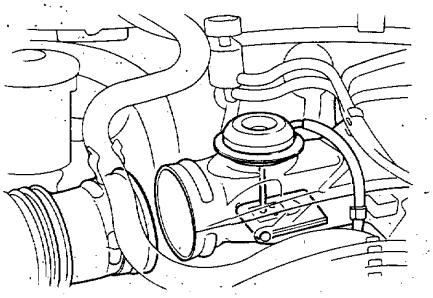


  — If there is vacuum, replace the air control diaphragm and retest.
  — If there is no vacuum, check the vacuum hose for proper connection, cracks, blockage or disconnected hose, and replace the air bleed valve A.

Testing (HOT ENGINE)

1. Start the engine and warm up to normal operatring temperature (the cooling fan comes on).

   The air control door should be down.



- If not, disconnect the vacuum hose from the air control diaphragm, and connect a vacuum pump.

  There should be no vacuum.

  — If there is no vacuum, replace the air control diaphragm and retest.
  — If there is vacuum, replace the air bleed valve A and retest.

Emission Control System

Sympton-to-sub System Chart

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- Before starting inspection, 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 in this page.

PAGE / SYSTEM / SYMPTOM		THROTTLE CONTROL	EVAPORATIVE CONTROL
		41	44
ENGINE WON'T START			
DIFFICULT TO START ENGINE	WHEN COLD		
	WHEN WARM	②	
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION	②	
	WHEN WARM ENGINE SPEED TOO HIGH	①	
	WHEN WARM ENGINE SPEED TOO LOW		
	ROUGH IDLE/ FLUCTUATION		
FREQUENT STALLING	WHILE WARMING UP		
	AFTER WARMING UP		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING		
	LOSS OFF POWER		
	AFTERBURN	②	
	HESITATION/SURGE		

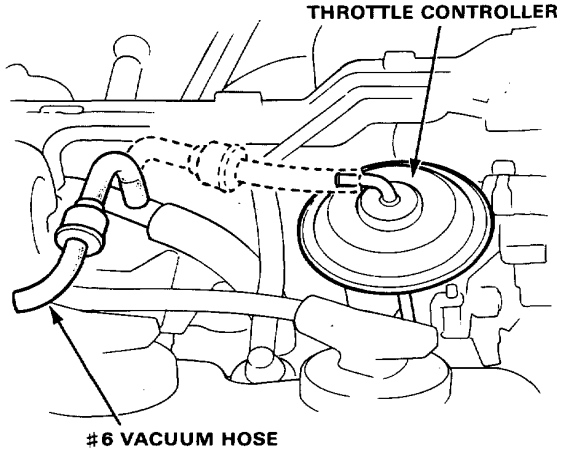
Testing (HOT ENGINE)

(1.4 ℓ Engine and 1.6 ℓ A/T Engine)

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Disconnect the #6 vacuum hose from the throttle controller and check the engine speed.

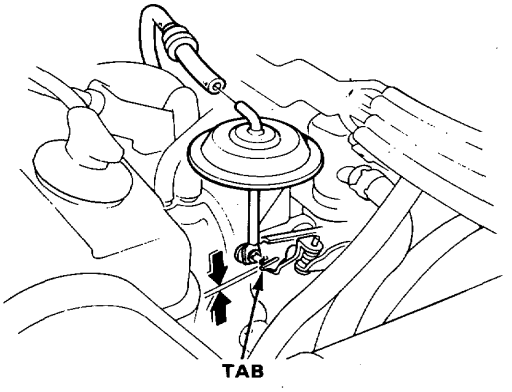
Engine speed should be:

Manual	2,200±500 min^{-1} (rpm)
Automatic	1,900±500 min^{-1} (rpm)

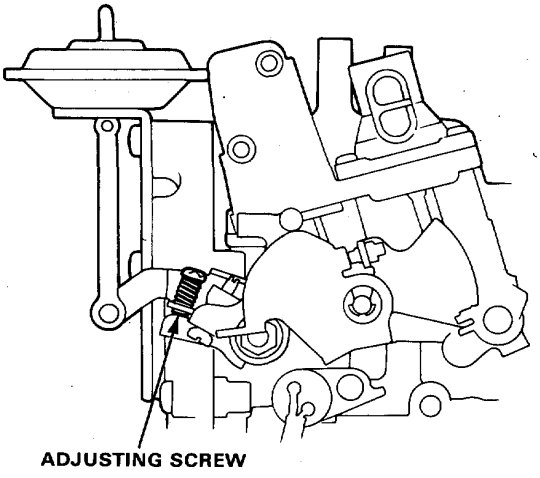


- If the engine speed is excessively high:
  1.4ℓ Engine; adiust by bending TAB.
  1.6ℓ Engine; adjust by turning the adjusting screw.

(1.4 ℓ Engine)

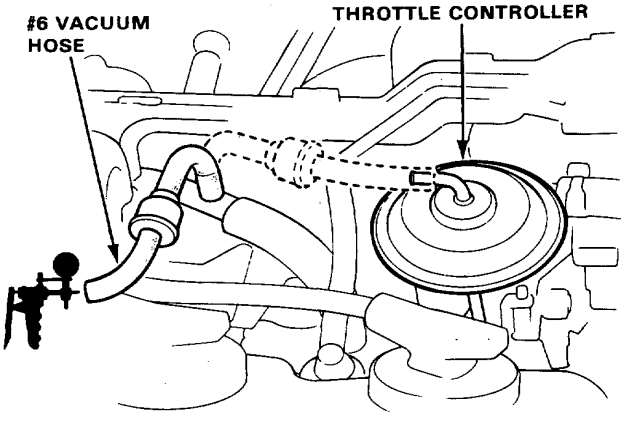


(1.6 ℓ A/T Engine)



- If the engine speed does not change, connect a vacuum pump to the #6 vacuum hose and check vacuum.

There should be vacuum.



- If there is no vacuum, check the #6 vacuum hose for proper connection cracks, brockage or disconnected hose and replace the check valve.
- If there is vacuum, replace the throttle controller and retest.

3. Reconnect the #6 vacuum hose and check the idle speed.

Idle speed should be within specification (page 6-15).

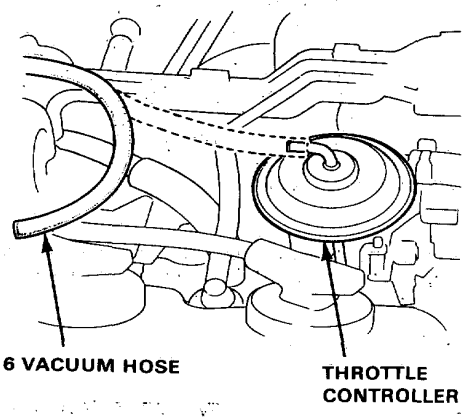
(cont'd)

Throttle Control System (cont'd)

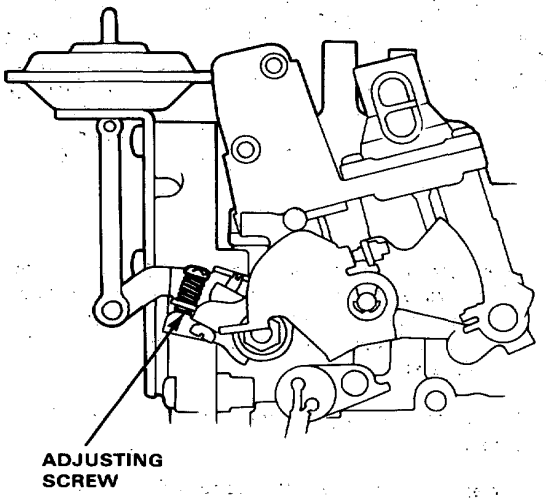
(1.6 ℓ M/T Engine)

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Disconnect #6 vacuum hose from the throttle controller, connect a vacuum pump to the controller and apply 400 mmHg (16 in. Hg) vacuum.

   Engine speed should rise to 1,500–2,500 min^{-1} (rpm) with in 1 minute.

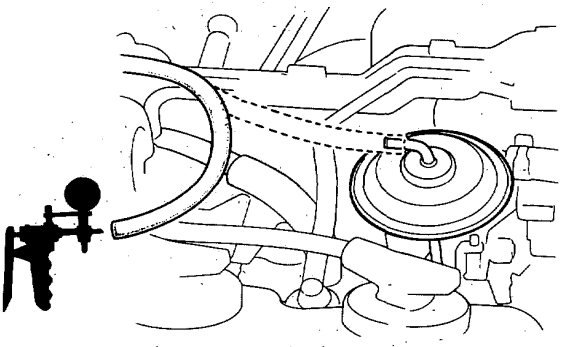


- If the engine speed is excessively high, adjust the engine speed by turning adjusting screw.



- If the engine speed does not change, connect a vacuum pump to the #6 vacuum hose.
  Raise the engine speed to 3,500 min^{-1} (rpm) and close the throttle suddenly, then check vacuum.

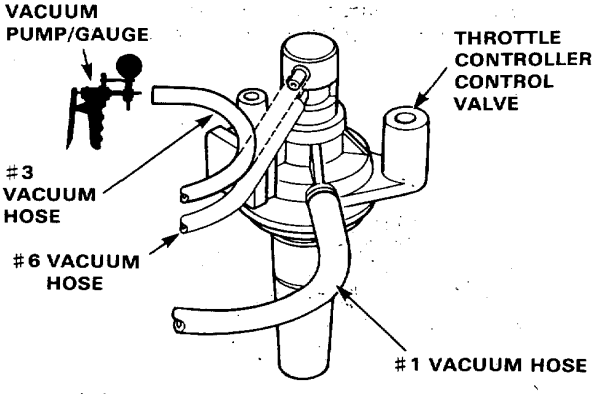
  There should be vacuum.



  — If there is vacuum, replace the throttle controller and retest.

  — If there is no vacuum, check the #6 vacuum hose for proper connection, cracks, blockage or disconnected hose, and disconnected the #3 vacuum hose from the throttle controller control valve. Raise the engine speed and close the throttle suddenly, then check vacuum.

  There should be vacuum.

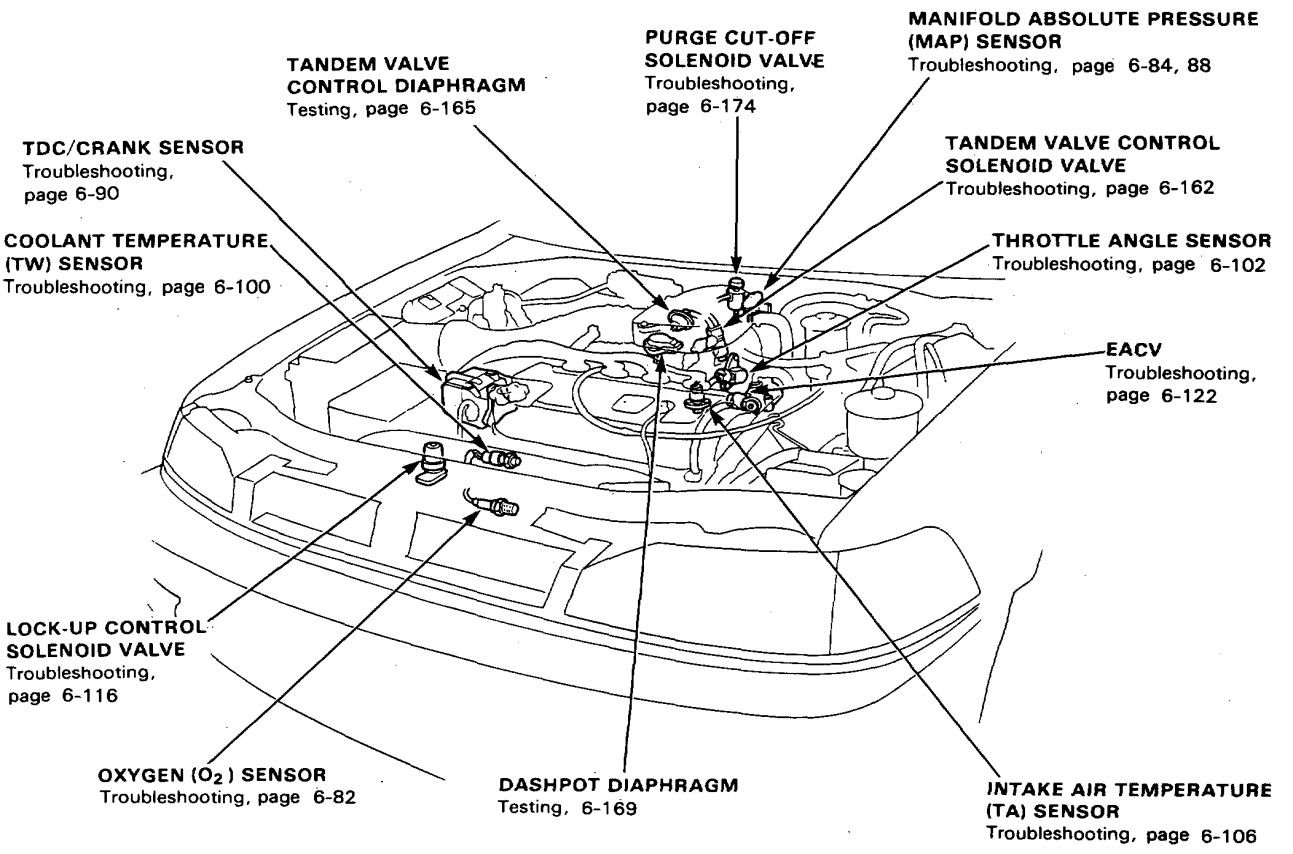


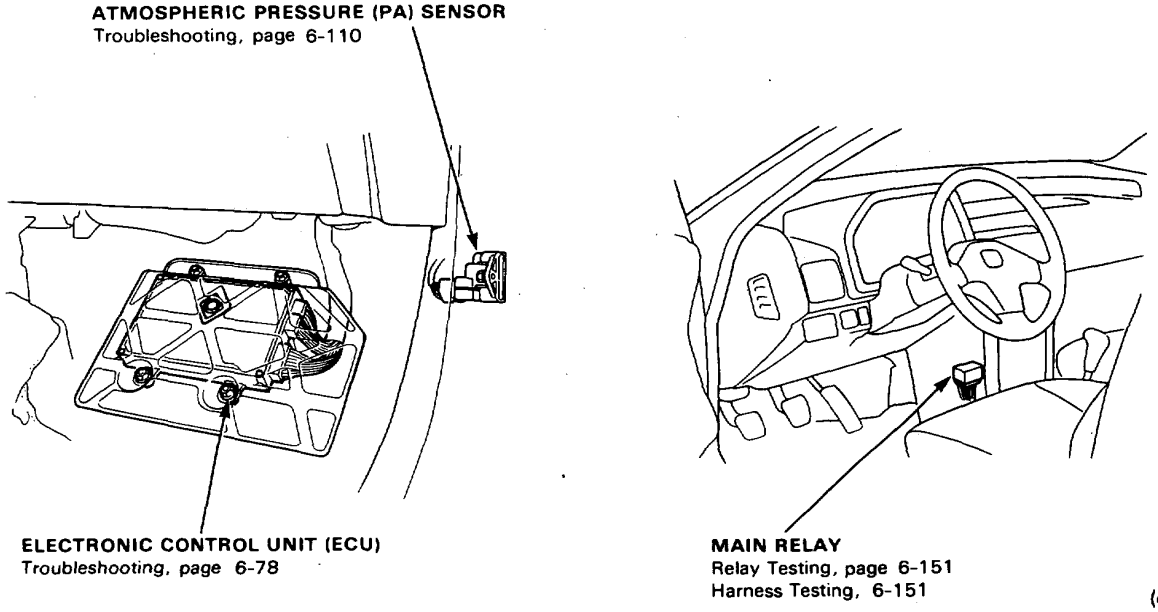
- If there is vacuum, chek the #1 vacuum hose for proper connection, cracks, blockage or disconnected hose, and replace the throttle controller control valve.
- If there is no vacuum, check the #3 vacuum hose for proper connection, cracks, blockage or disconnected hose.

3. Reconnect the #6 vacuum hose and check the idle speed.
   Idle speed should be within specification (page 6-15).

Component Locations

Index [1.5 ℓ]

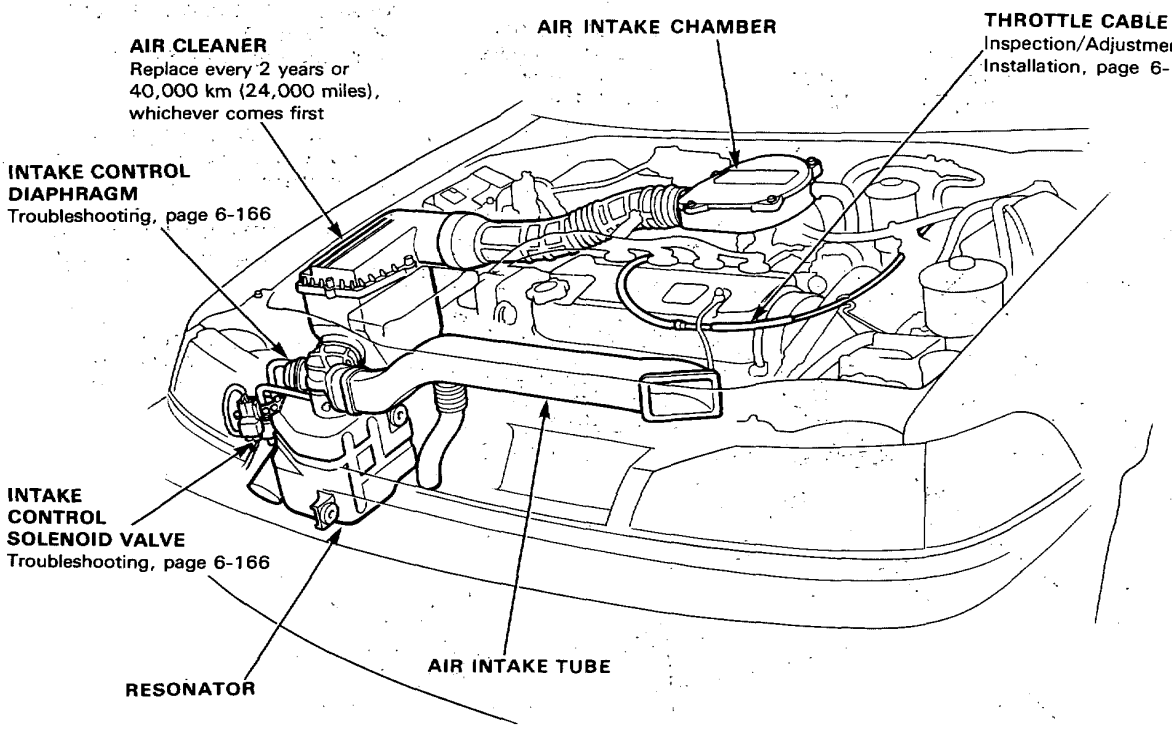


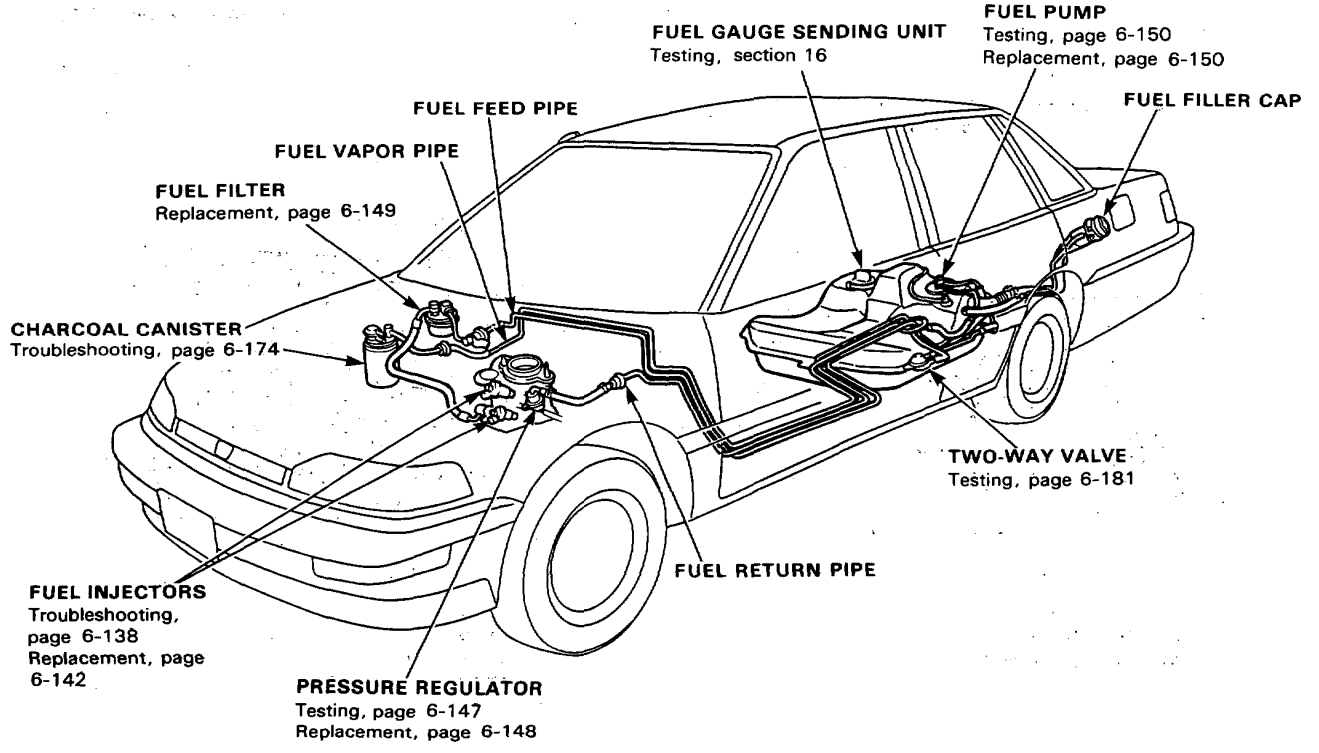


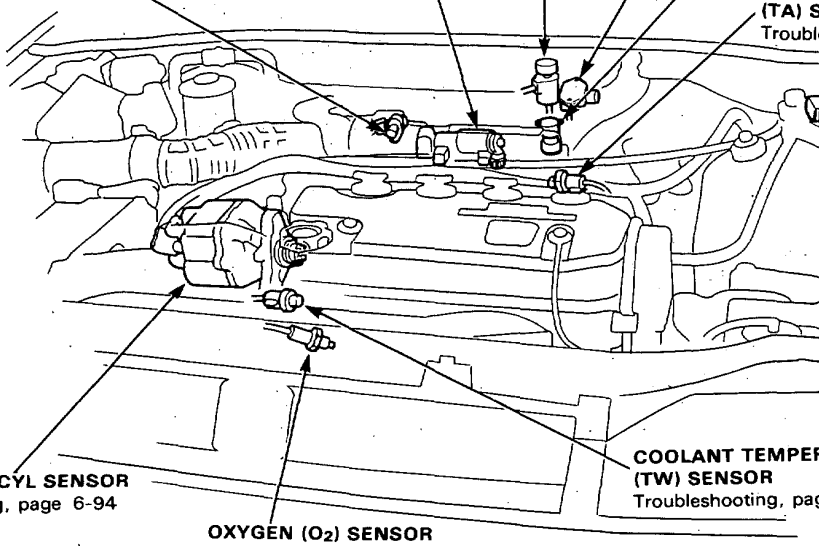
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Component Locations

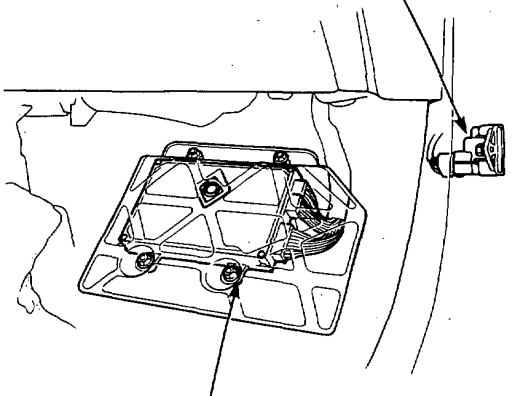
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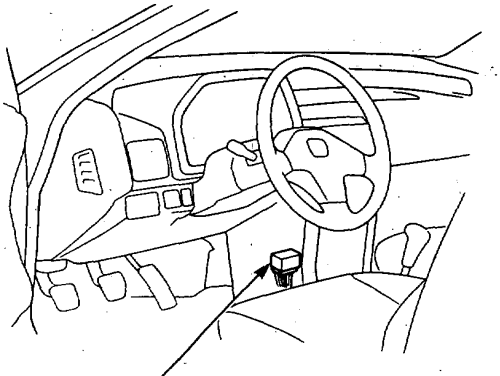






NOTE: The illustration is SOHC type. DOHC type is the same as of SOHC type, except for the cylinder head.

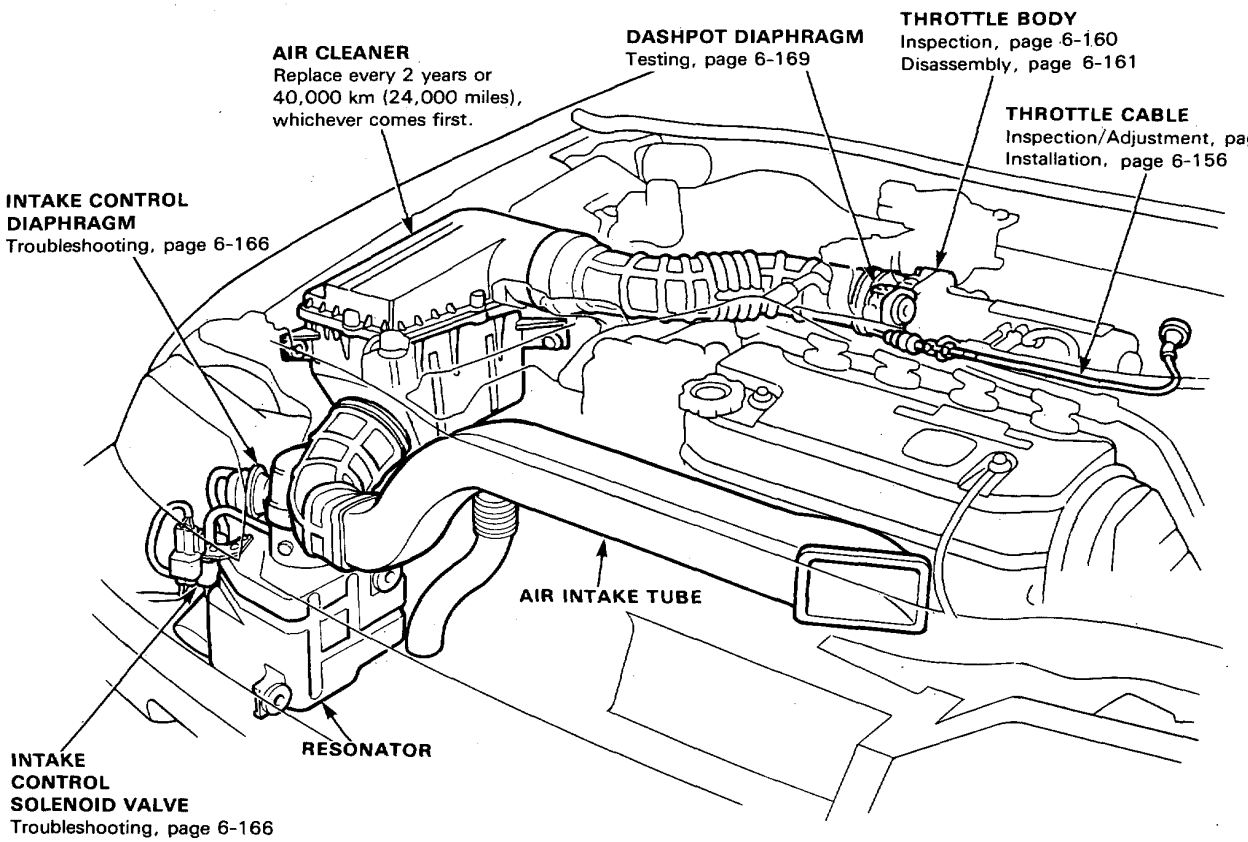


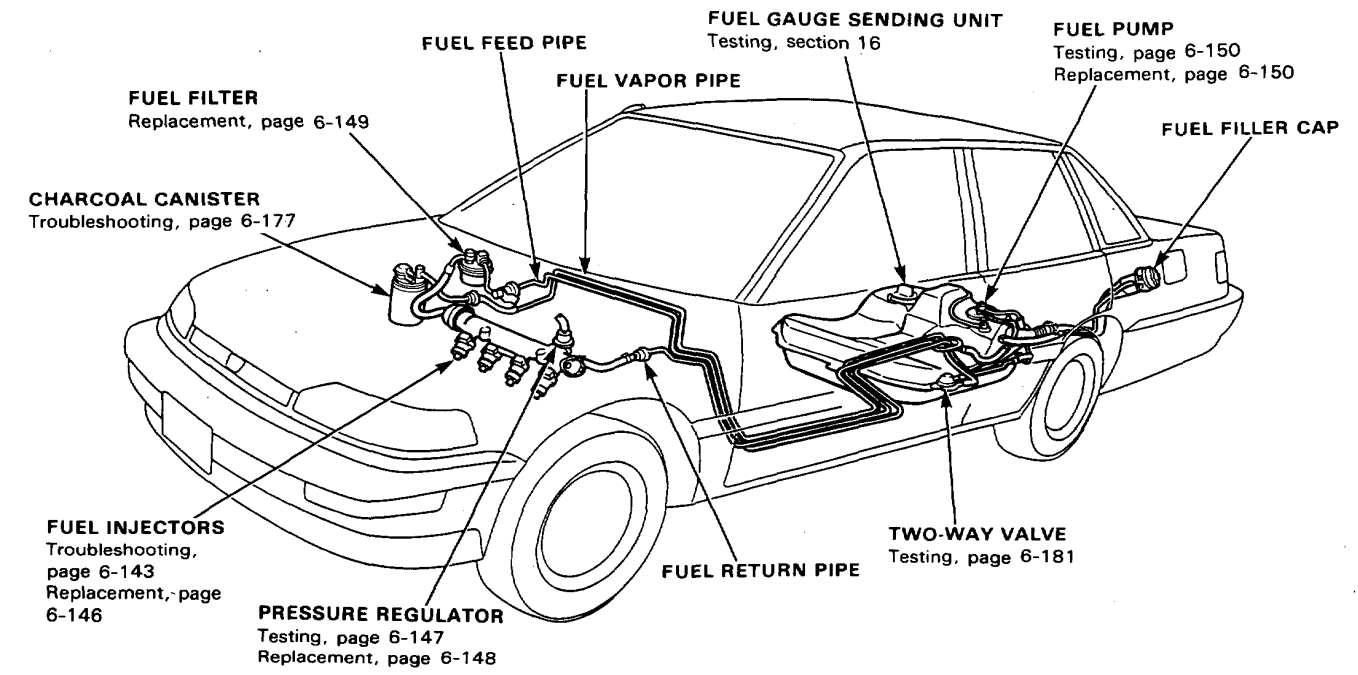


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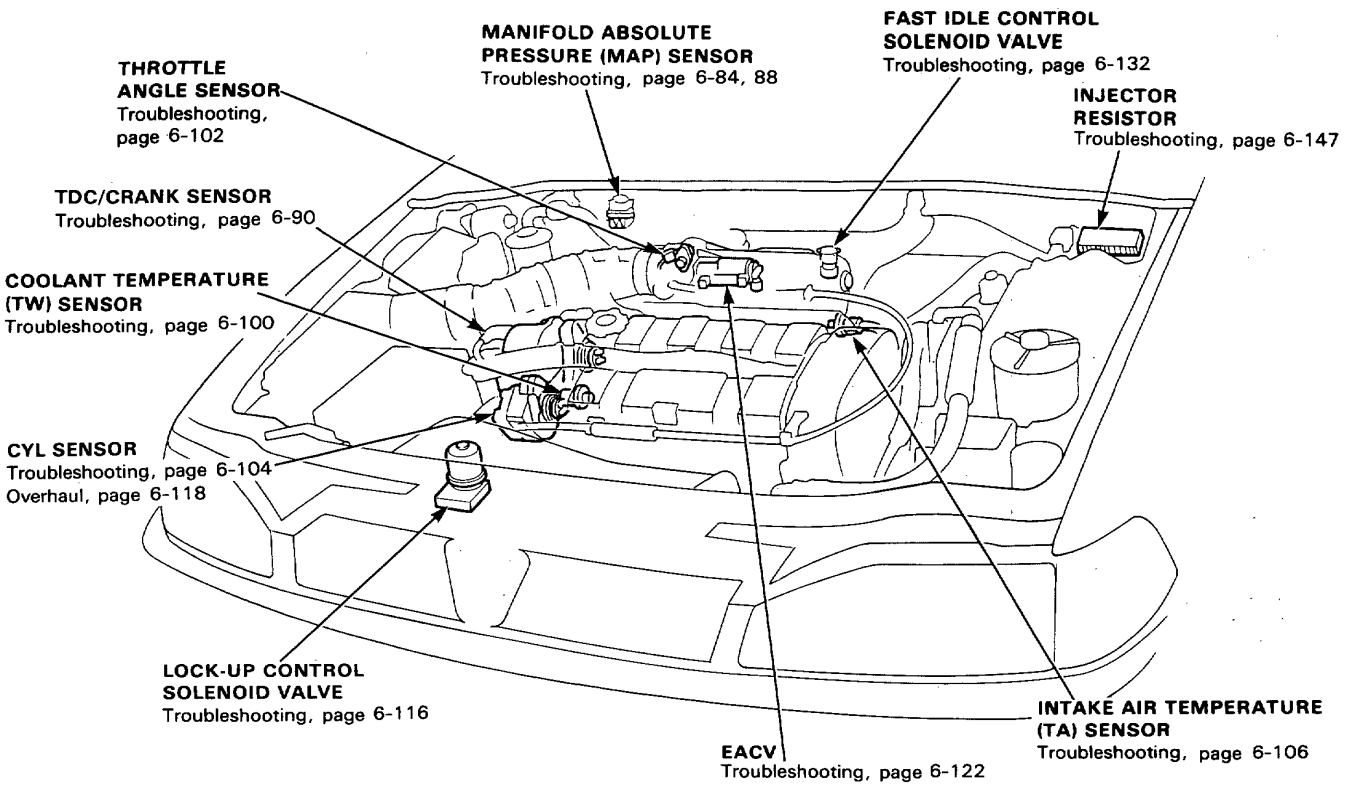
Component Locations

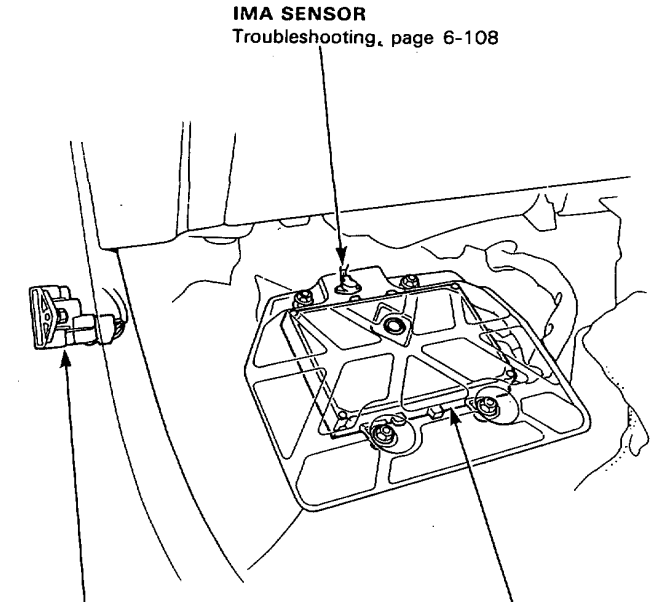
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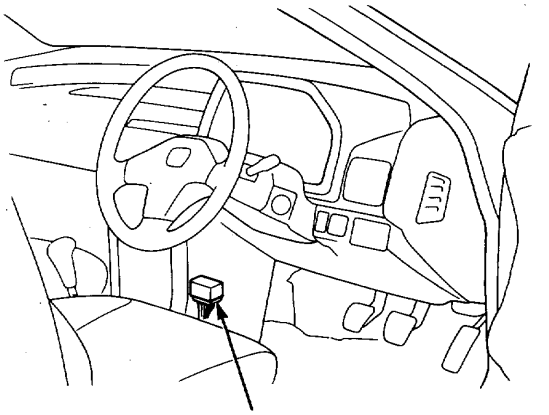




Index [1.6 ℓ with out CATA]



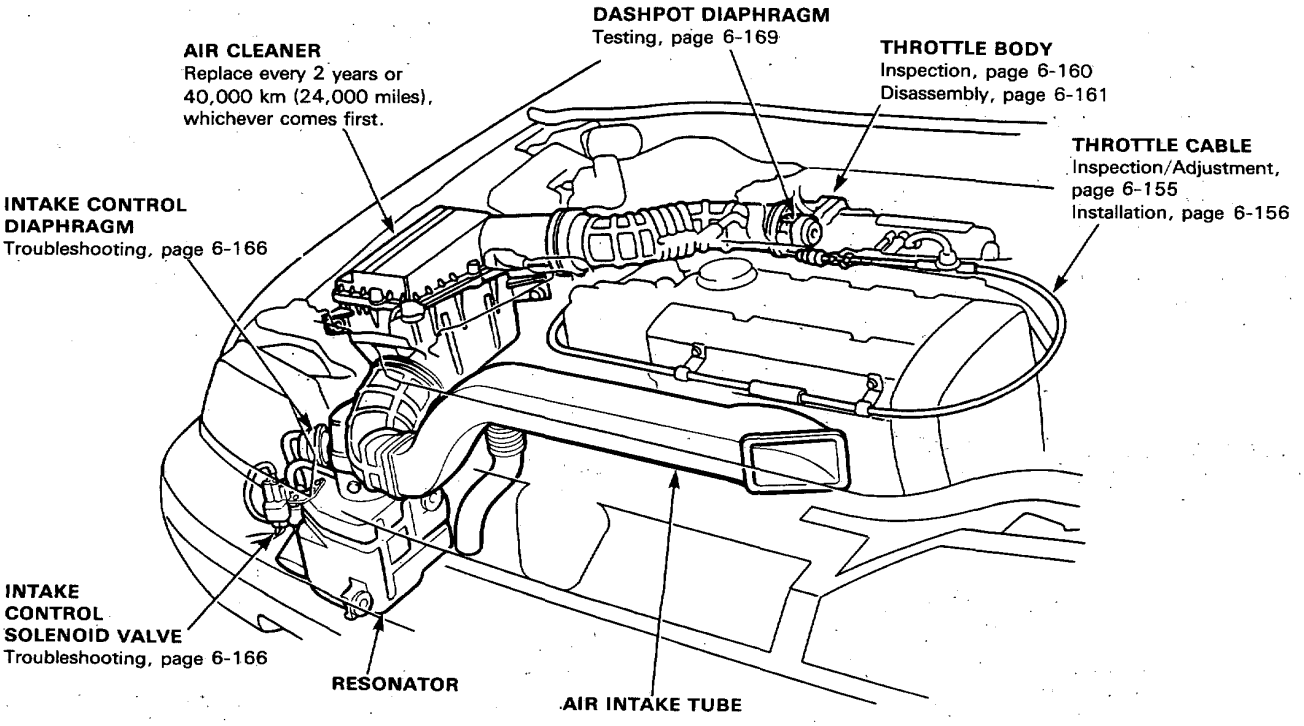


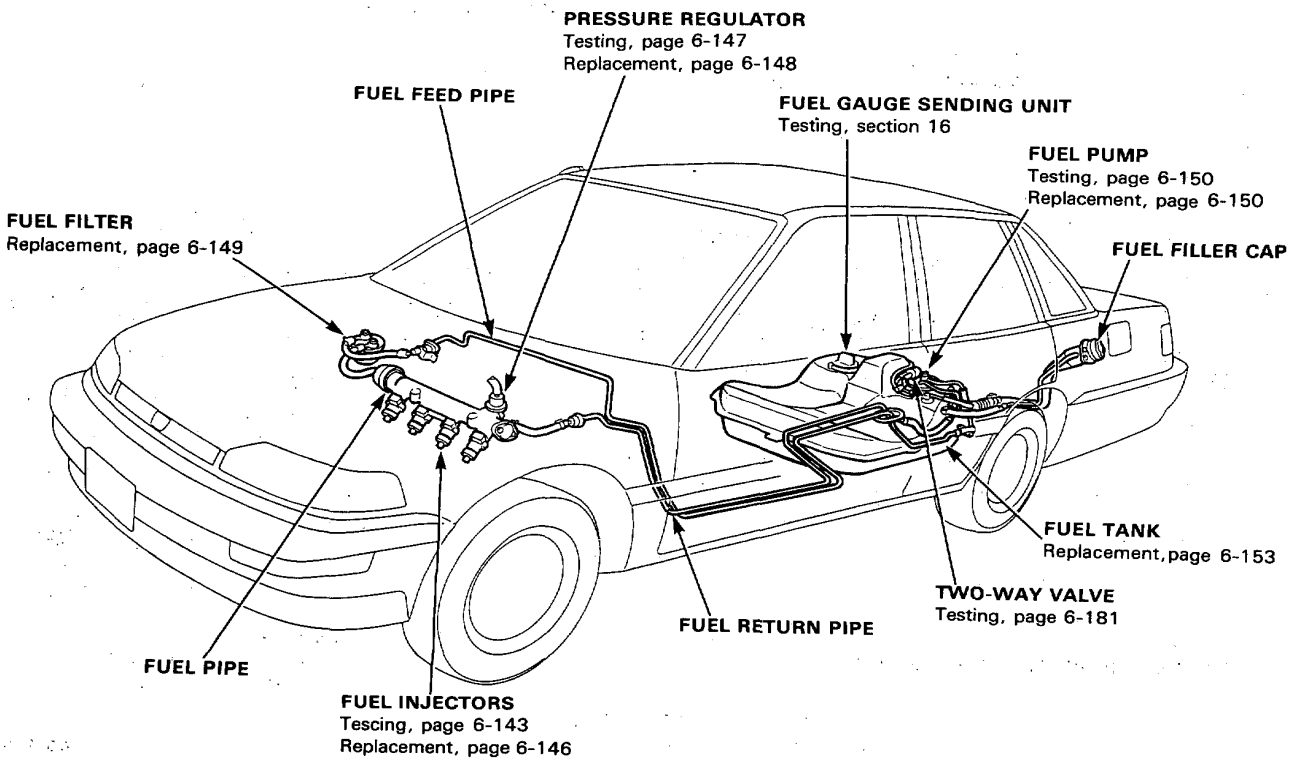


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Component Locations

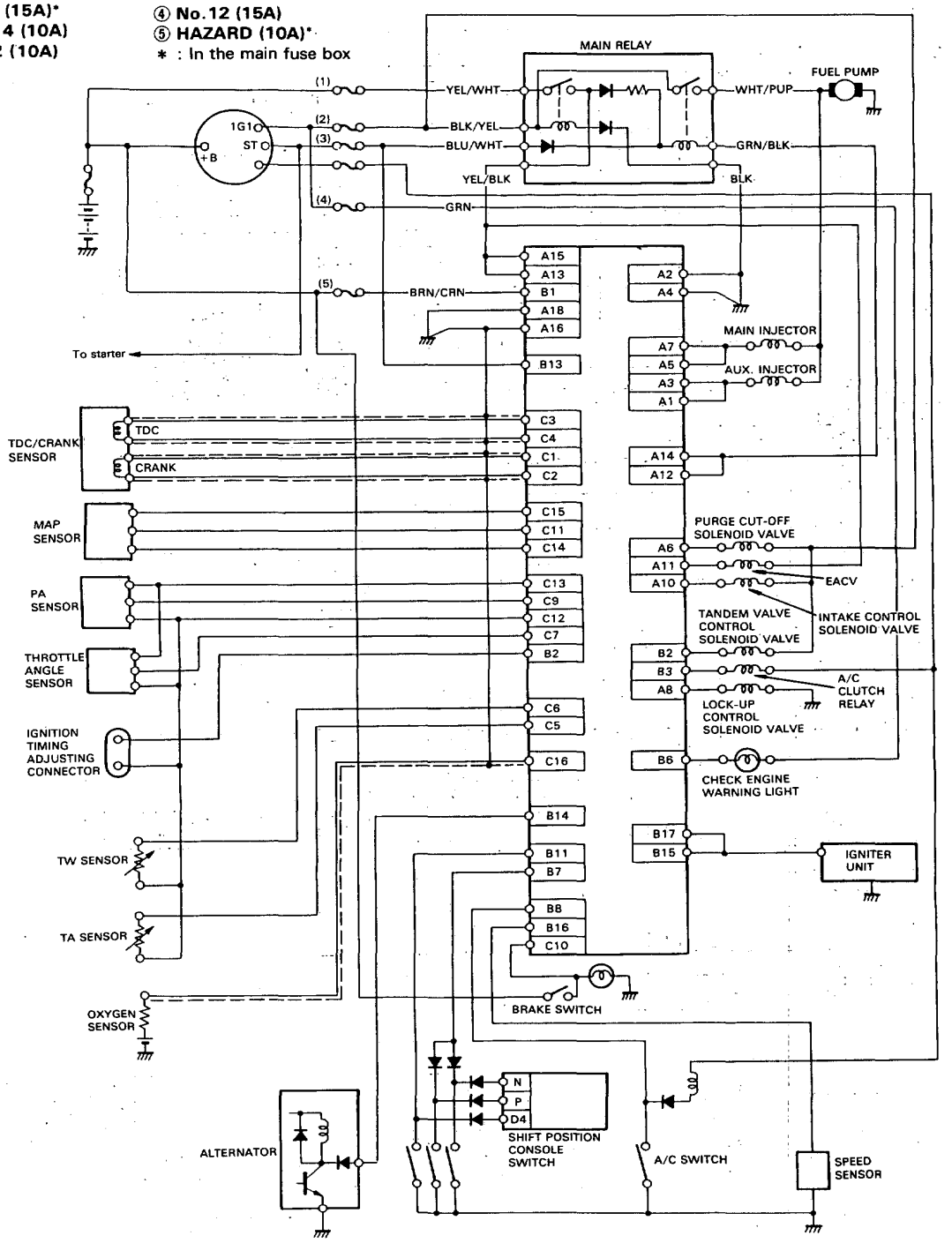
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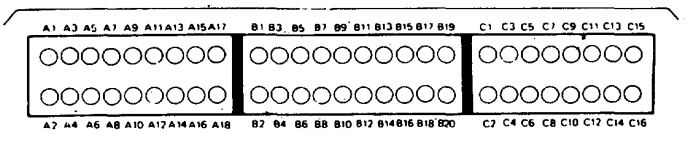




Electrical Connections [1.5 ℓ]

FUSES
① ECU (15A)*
② No.14 (10A)
③ No.2 (10A)
④ No.12 (15A)
⑤ HAZARD (10A)*
* : In the main fuse box



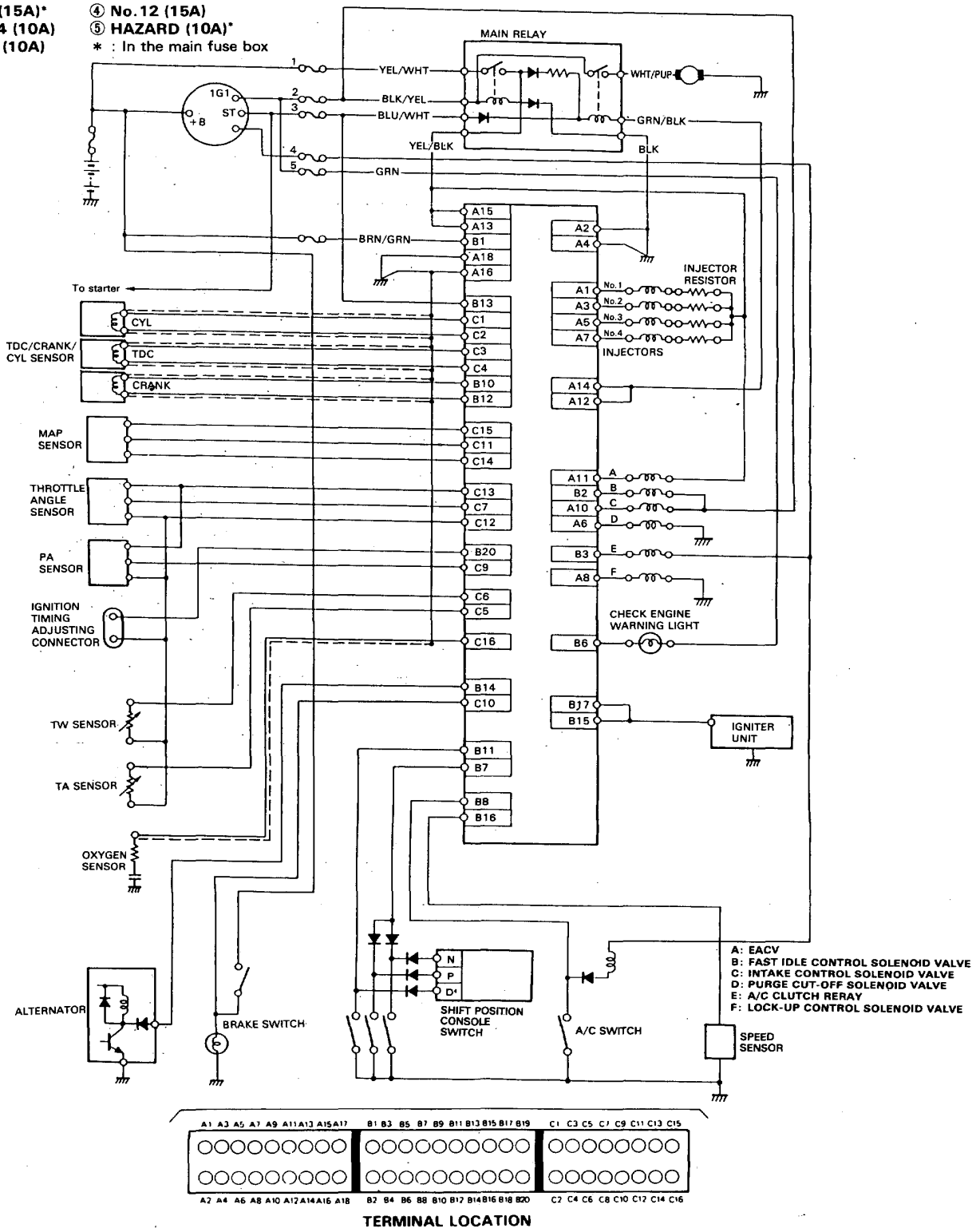


TERMINAL LOCATION

System Description

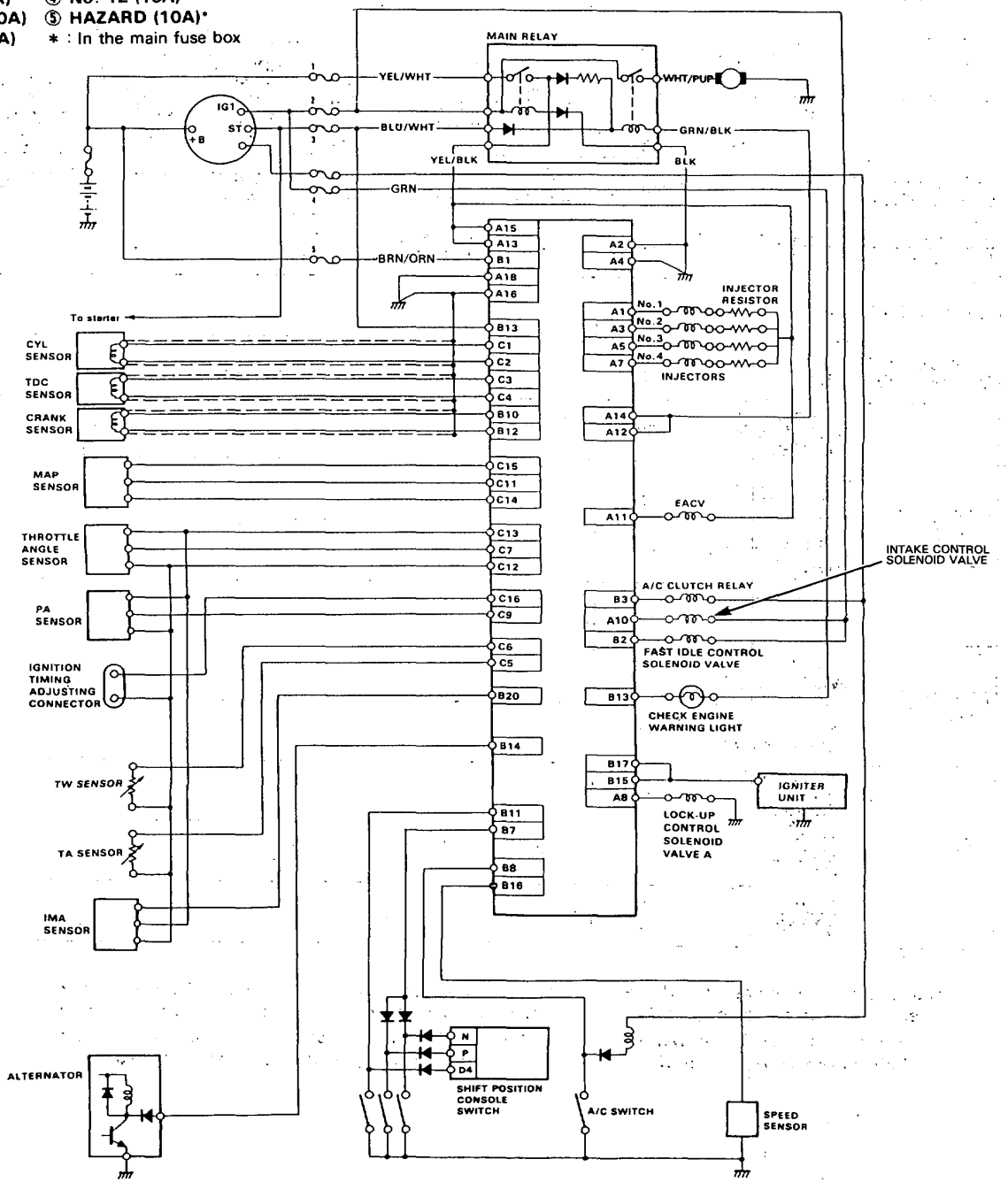
Electrical Connections [1.6 ℓ with CATA]

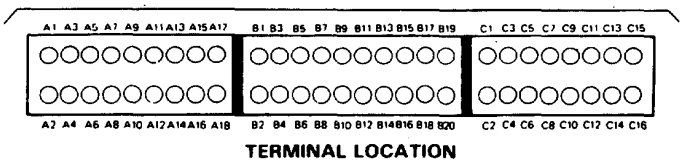
FUSES
① ECU (15A)*
② No.14 (10A)
③ No.2 (10A)
④ No.12 (15A)
⑤ HAZARD (10A)*
* : In the main fuse box



TERMINAL LOCATION

FUSES
① ECU (15A)* ④ No. 12 (15A)
② No.14 (10A) ⑤ HAZARD (10A)*
③ No.2 (10A) * : In the main fuse box





TERMINAL LOCATION

Troubleshooting

Troubleshooting Guide [1.5 ℓ]

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE / SYSTEM / SYMPTOM		PGM-FI							
		ECU	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	TDC/CRANK SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR	ATMOSPHERIC PRESSURE SENSOR
		78	82	84, 88	90	100	102	106	110
CHECK ENGINE WARNING LIGHT TURNS ON		□ or ☼							
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		⓪ or ✻	①	③ or ⑤	④ or ⑧	⑥	⑦	⑩	⑬
ENGINE WON'T START		③							
DIFFICULT TO START ENGINE WHEN COLD		(BU)		③		①			
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	(BU)				③			
	ROUGH IDLE	(BU)		③					
	WHEN WARM IDLE SPEED TOO HIGH	(BU)				③			
	WHEN WARM IDLE SPEED TOO LOW	(BU)							
FREQUENT STALLING	WHILE WARMING UP	(BU)		③					
	AFTER WARMING UP	(BU)							
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	(BU)							
	FAILS EMISSION TEST	(BU)	③	②					
	LOSS OF POWER	(BU)					②		

* If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

(BU): When the Check Engine warning light and the self-diagnosis indicator are on, the back-up system is in operation. Substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

PGM-FI			IDLE CONTROL		FUEL SUPPLY			
IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR	LOCK-UP CONTROL SOLENOID VALVE	ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	OTHER FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL
112	114	116	122	120	138	135	154	171
								
(15)	(17)	(19)	(14)		(16)			
					②	①		
			②					
			①	②				
			①		②			
			②	①				
			①		②			
②			①					
			①		②	③		
			③		①	②		
						①		
					③	①		

Troubleshooting

Troubleshooting Guide [1.6ℓ With CATA]

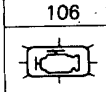
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PAGE / SYSTEM / SYMPTOM		PGM-FI							
		ECU	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	TDC/ CRANK SENSOR **	CYL SENSOR **	TDC/CRANK/CYL SENSOR *	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR
		78	82	84, 88	90	118	94	100	102
CHECK ENGINE WARNING LIGHT TURNS ON		□ or ☼	☼	☼	☼	☼	☼	☼	☼
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		⓪ or ✱	①	③ or ⑤	④ or ⑧	⑨	④ or ⑧ or ⑨	⑥	⑦
ENGINE WON'T START		②							
DIFFICULT TO START ENGINE WHEN COLD		(BU)						①	
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	(BU)						②	
	ROUGH IDLE	(BU)		②					
	WHEN WARM IDLE SPEED TOO HIGH	(BU)							
	WHEN WARM IDLE SPEED TOO LOW	(BU)							
FREQUENT STALLING	WHILE WARMING UP	(BU)		③					
	AFTER WARMING UP	(BU)		③					
POOR PERFORM-ANCE	MISFIRE OR ROUGH RUNNING	(BU)		③					
	FAILS EMISSION TEST	(BU)		②					
	LOSS OF POWER	(BU)		③					②

- If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

(BU): When the Check Engine warning light and the self-diagnosis indicator are on, the back-up system is in operation. Substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

* : SOHC, ** : DOHC

PGM-FI					IDLE CONTROL		FUEL SUPPLY			
INTAKE AIR TEMPERATURE SENSOR	ATMOSPHERIC PRESSURE SENSOR	IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR	LOCK-UP CONTROL SOLENOID VALVE	ELECTRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	OTHER FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL
106	110	112	114	116	122	120	143	135	154	171
										
⑩	⑬	⑮	⑰	⑲	⑭		⑯			
		③					②	①		
						②				
					①	②				
					③	①				
					②	①				
					①	②				
					①	②		③		
					①	②		③		
							②	①		
								①		
							③	①		

Troubleshooting

Troubleshooting Guide [1.6 ℓ Without CATA]

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE / SYSTEM / SYMPTOM		PGM-FI						
		ECU	MANIFOLD ABSOLUTE PRESSURE SENSOR	TDC/ CRANK SENSOR	CYL SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR
		78	84, 88	90	118	100	102	106
CHECK ENGINE WARNING LIGHT TURNS ON		□ or 						
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		⓪ or ✱	③ or ⑤	④ or ⑧	⑨	⑥	⑦	⑩
ENGINE WON'T START		②						
DIFFICULT TO START ENGINE WHEN COLD		(BU)	③			①		
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	(BU)				②		
	ROUGH IDLE	(BU)	③					
	WHEN WARM IDLE SPEED TOO HIGH	(BU)						
	WHEN WARM IDLE SPEED TOO LOW	(BU)						
FREQUENT STALLING	WHILE WARMING UP	(BU)	③					
	AFTER WARMING UP	(BU)	③					
POOR PERFORM-ANCE	MISFIRE OR ROUGH RUNNING	(BU)	②					
	FAILS EMISSION TEST	(BU)	②					
	LOSS OF POWER	(BU)	③				②	

* If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

(BU): When the Check Engine warning light and the self-diagnosis indicator are on, the back-up system is in operation. Substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

PGM-FI					IDLE CONTROL				
IMA SENSOR	ATMO-SPHERIC PRESSURE SENSOR	IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR	LOCK-UP CONTROL SOLENOID VALVE	ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL
108	110	112	114	116	122	120	135	154	171
									
⑪	⑬	⑮	⑰	⑲	⑭				
		②					①		
						②			
					①	②			
					③	①			
					②	①			
					①	②			
					①	②			
					①	②	③		
							①		
							①		
							①		

Check Engine warning light isn't on for two seconds after ignition is first turned on.

Is oil pressure warning light on ?

NO → Inspect No. 12 fuse.

Is No. 12 fuse OK ?

NO → **Replace fuse.**

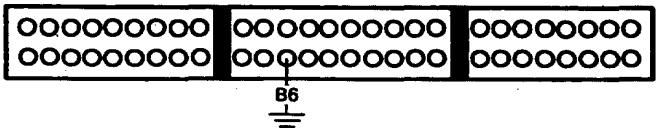
YES → **Repair open in GRN wire between No. 12 fuse and combination meter.**

YES

Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 6-75).

Connect B6 terminal to body ground.

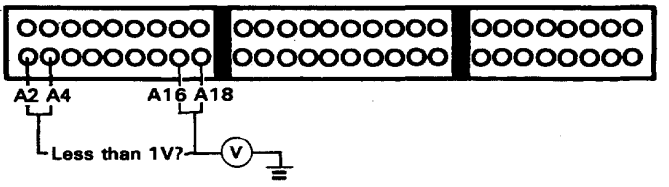


Turn the ignition switch ON.

Is Check Engine warning light on ?

NO →
- **Replace warning light bulb.**
- **Repair open in GRN/ORN wire between ECU (B6) and combination meter.**

YES



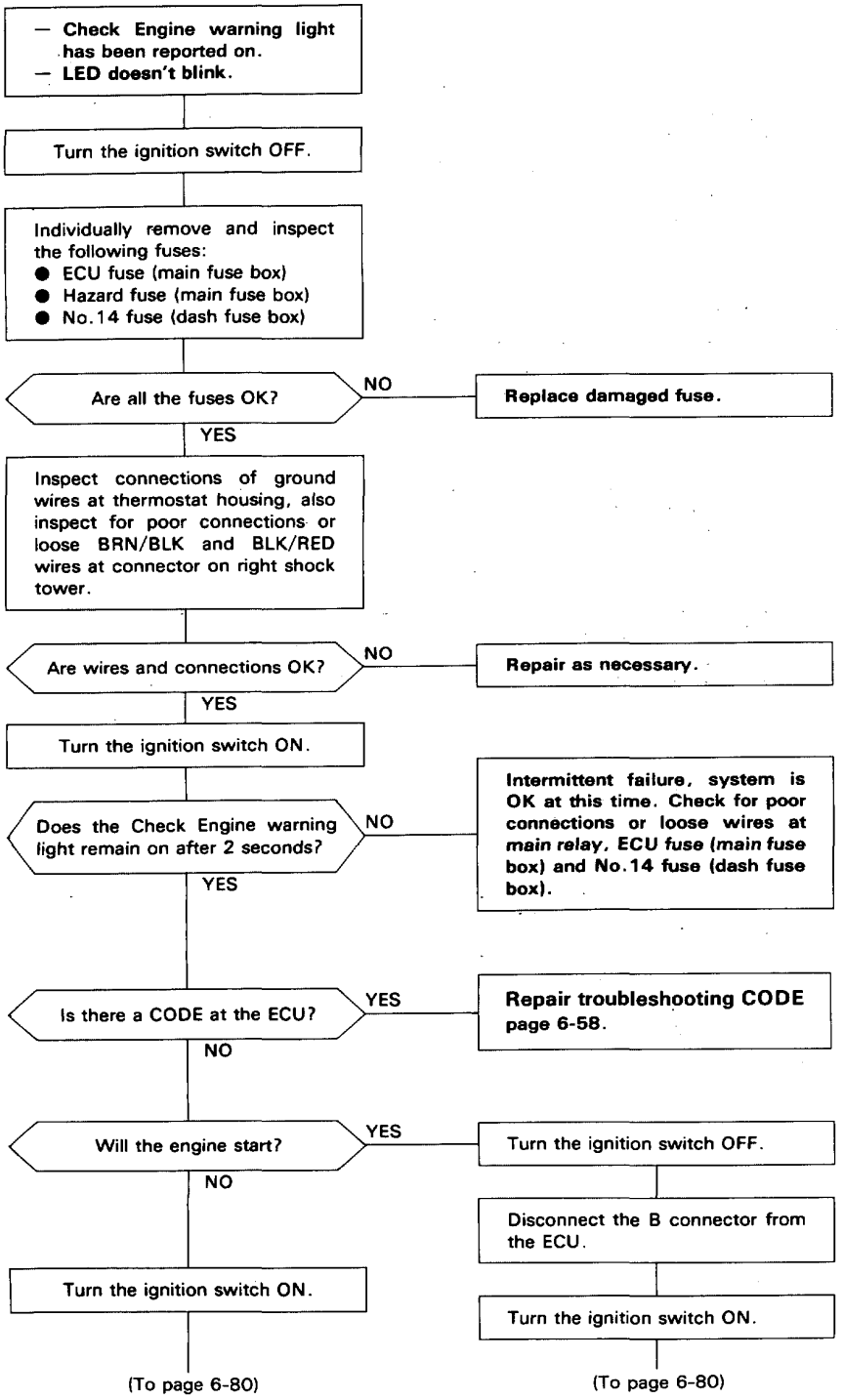
Measure voltage between body ground and the following terminals individually : ●A2, ●A4, ●A16 ●A18

Is there less than 1V?

NO → **Repair open in wire between ECU and thermostat housing (G101) that had more than 1V.**

YES

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


— Check Engine warning light has been reported on.
— LED doesn't blink.
Turn the ignition switch OFF.
Individually remove and inspect the following fuses:
● ECU fuse (main fuse box)
● Hazard fuse (main fuse box)
● No.14 fuse (dash fuse box)
Are all the fuses OK?
NO
Replace damaged fuse.
YES
Inspect connections of ground wires at thermostat housing, also inspect for poor connections or loose BRN/BLK and BLK/RED wires at connector on right shock tower.
Are wires and connections OK?
NO
Repair as necessary.
YES
Turn the ignition switch ON.
Does the Check Engine warning light remain on after 2 seconds?
NO
Intermittent failure, system is OK at this time. Check for poor connections or loose wires at main relay, ECU fuse (main fuse box) and No.14 fuse (dash fuse box).
YES
Is there a CODE at the ECU?
YES
Repair troubleshooting CODE page 6-58.
NO
Will the engine start?
YES
Turn the ignition switch OFF.
NO
Disconnect the B connector from the ECU.
Turn the ignition switch ON.
Turn the ignition switch ON.
(To page 6-80)
(To page 6-80)

(cont'd)

Troubleshooting Flowchart — ECU (cont'd)

(From page 6-79)

Disconnect the 3P connector of each sensor one at a time.
- MAP sensor
- Throttle angle sensor
- PA sensor
- IMA sensor (Without CATA)

Does Check Engine light remain on? — NO → **Replace the sensor that, when disconnected caused the light to go out.**

YES

Disconnect the PA sensor.

Does LED indicate CODE 13? — YES → **Replace PA sensor.**

NO

Turn the ignition switch OFF.

Connect the PGM-FI test harness to the main harness only, not to the ECU (page 6-75)

Check for continuity between the body ground and the following terminals individually.
●C13 ●C15

Does continuity exist? — YES →
- **Repair short to ground in YEL/RED wire between ECU (C15) and MAP sensor.**
- **Repair short to ground in YEL/WHT wire between ECU (C13) and PA sensor or throttle angle sensor.**
- **Repair short to ground in YEL/WHT wire between ECU (C13) and IMA sensor.**

NO

Reconnect the 3P connectors of all sensors.
Connector the A, B and C connectors of PGM-FI test harness to ECU.

Turn the ignition switch ON.

Measure voltage between the following terminals individually to body ground: ●A16 ●A18

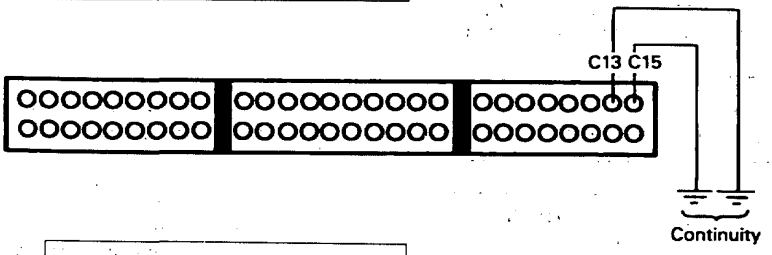
(To page 6-81)

(From page 6-79)

Is Check Engine warning light on? — YES → **Repair short to ground in GRN/ORN wire between ECU (B6) and combination meter.**

NO

Susbstitute a known-good ECU and recheck. If symptom/Indication goes away, replace the original ECU.

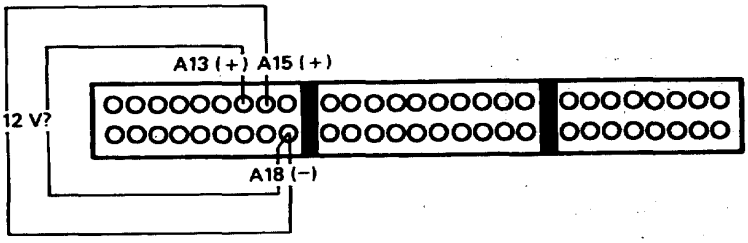


(From page 6-80)

Is there less than 1V? NO → **Repair open in wire that between ECU (A16, A18) and thermostat housing (G101) that had more than 1V.**

YES

Measure voltage between A13 (+), A15 (+) terminals and A18 (−) terminal.



Is there battery voltage? NO →
- **Repair open in YEL/BLK wire between ECU (A13, A15) and main relay**
- **Check main relay and wiring connectors at main relay.**

YES

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

Troubleshooting Flowchart —— Oxygen Sensor




Self-diagnosis LED indicates code 1: A problem in the Oxygen (O_2) Sensor circuit.




– Check Engine warning light has been reported on.
– LED indicates CODE 1.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Inspect pressure regulator (page 11-101).

Is it normal ? — NO → **Replace the pressure regulator (page 6-148).**

YES

Warm up engine to normal operating temperature (cooling fan comes on).

1.6 ℓ

Hold engine at 1500 min^{-1} (rpm) for 15 minutes.
NOTE: Do not close throttle completely during this time.

Is Check Engine warning light on and does LED indicate CODE 1? — NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at the thermostat housing, O_2 sensor.**

YES

Inspect for poor connection or loose ground wires at thermostat housing.

Are connections and wires OK? — NO → **Repair as necessary.**

YES

(To page 6-83)

1.5 ℓ

Block rear wheels and set the parking brake. Jack up the front of car and support with safety stands.

⚠ WARNING Block rear wheels before jacking up front of car.

Warm up engine to normal operating temperature again, then put the transmission into second gear and run the engine at 2,000 min^{-1} (rpm) for 15 minutes.
NOTE: Do not close throttle completely during this time.

(From page 6-82)

Disconnect engine wire harness from O_2 sensor.

Connect a voltmeter between the O_2 sensor (+) and body ground (−).

Warm up engine to normal operating temperature again, then hold engine speed at 4,000 for 10 seconds then release throttle completely while watching the voltmeter.

Was voltage above 0.6V at 4,000 min^{-1} (rpm)? Was voltage below 0.4V during closed throttle deceleration from 4,000 min^{-1} (rpm)?

NO → **Replace O_2 sensor.**

YES

Stop engine.

Reconnect O_2 sensor.

Connect the PGM-FI test harness between the ECU and connector (page 6-75).

Connect a voltmeter between C16 (+) and A18 (−) terminals.

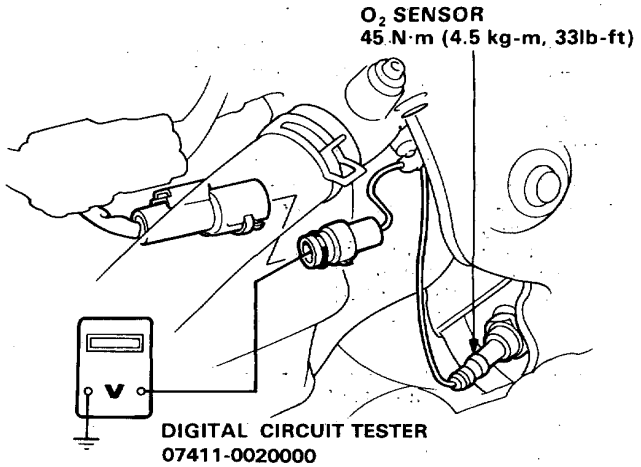
Restart and warm up engine to normal operating temperature, then hold engine rpm at 4,000 min^{-1} (rpm) for 10 seconds then release throttle completely while watching the voltmeter.

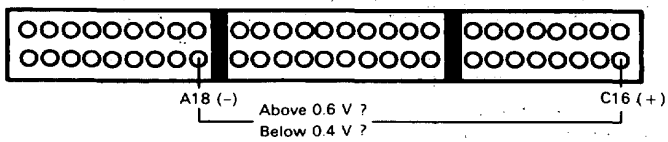
Was voltage above 0.6V at 4,000 min^{-1} (rpm)? Was voltage below 0.4V during closed throttle deceleration from 4,000 min^{-1} (rpm)?

NO → **Repair short or open in WHT wire between ECU (C16) and O_2 sensor.**

YES

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





Troubleshooting Flowchart — MAP Sensor

Self-diagnosis LED indicates code 3: Most likely an electrical problem in the Manifold Absolute Pressure (MAP) Sensor system.

Self-diagnosis LED indicates code 5: Most likely a mechanical problem (broken hose) in the Manifold Absolute Pressure (MAP) Sensor system.

- **Engine is warm and running.**
- **Check Engine warning light hos been reported on.**
- **LED indicates CODE 3.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Warm up engine to normal operating temperature (cooling fan comes on).

Is Check Engine warning light on and does LED indicate CODE 3?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connection or loose wires at MAP sensor connector and ECU.**

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the MAP sensor.

Turn the ignition switch ON.

Measure voltage between YEL/RED (+) terminal and body ground.

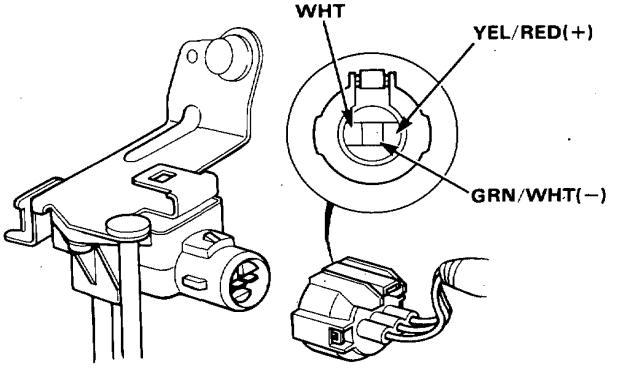
Is there approx. 5V?

YES → Measure voltage between YEL/RED (+) terminal and GRN/WHT (−) terminal.

NO

(To page 6-85)

(To page 6-85)



(From page 6-84)

Repair open in YEL/RED wire between ECU (C15) and MAP sensor. If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

(From page 6-84)

Is there approx. 5V?

NO

Repair open in GRN/WHT wire between ECU (C14) and MAP sensor. If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

Measure voltage between WHT (+) terminal and GRN/WHT (−) terminal.

Is there approx. 5V?

NO

Repair open or short in WHT wire between ECU (C11) and MAP sensor. If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

Turn the ignition switch OFF.

Reconnect the 3P connector to the MAP sensor.

Connect the PGM-FI test harness between the ECU and connector (page 6-75)

Turn the ignition switch ON.

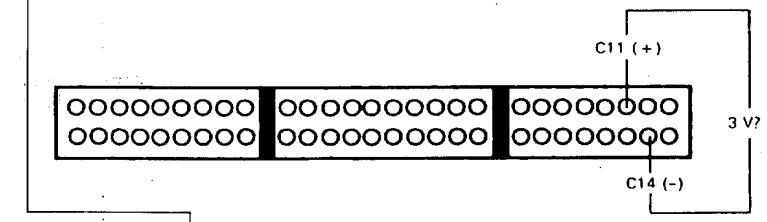
Measure voltage between C11 (+) terminal and C14 (−) terminal.

(To page 6-86)

(cont'd)

Troubleshooting Flowchart — MAP Sensor (cont'd)

(From page 6-85)



Is there approx. 3 V ?

NO

Replace MAP sensor.

YES

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

(cont'd)



Troubleshooting Flowchart — MAP Sensor (cont'd)

- Check Engine warning light has been reported on.
- LED indicates CODE 5.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start the engine.

Is Check Engine warning light on and does LED indicate CODE 5?

NO

- Intermittent failure, system is OK at this time (test drive may be necessary).
- Check vacuum hoses, pipes and connections.
- Make sure all connectors are secure.

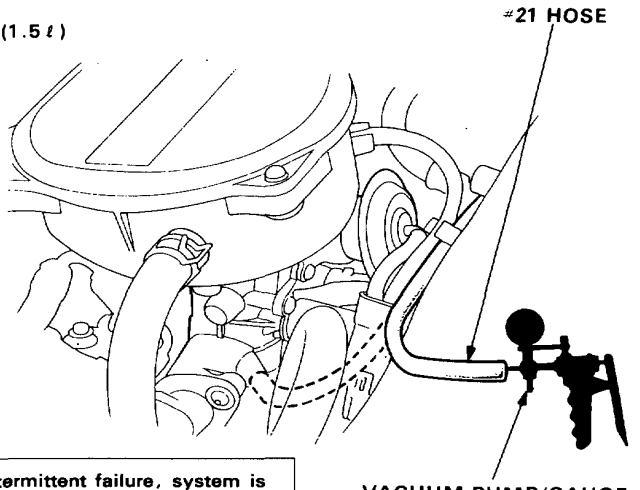
(1.6 ℓ)

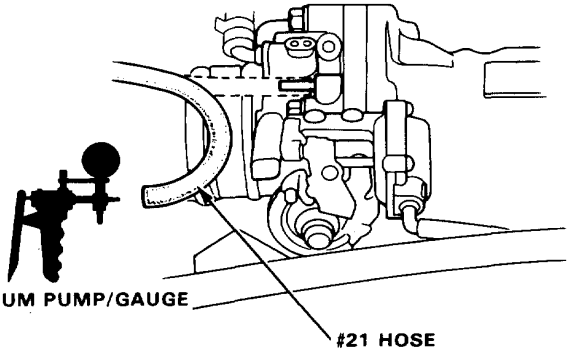
YES

Stop engine.

Connect vacuum pump to #21 hose and apply vacuum.

(1.5 ℓ)





Does it hold vacuum?

NO

Connect a vacuum pump to the MAP sensor and apply vacuum.

Does it hold vacuum?

NO

Replace MAP sensor.

YES

Replace #21 hose.

YES

Disconnect #21 hose from the throttle body and connect a T-fitting from a vacuum gauge between the throttle body and MAP sensor.

(To page 6-89)

(From page 6-88)

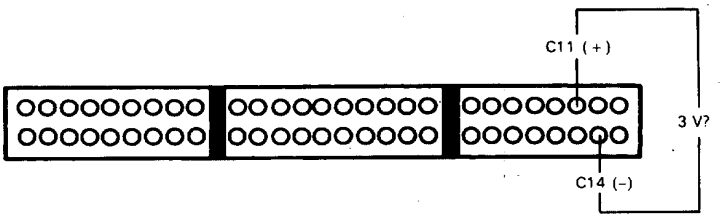
Start engine.

Is there manifold vacuum? NO → **-Remove restriction from throttle body. -Replace throttle body.**

YES

Stop engine.

Connect the PGM-FI test harness between the ECU and connector (page 6-75)



Turn the ignition switch ON.

Measure voltage between C11 (+) terminal and C14 (-) terminal.

Is there approx. 3 V ? NO → **Inspect for an open in WHT wire between the MAP sensor and ECU. If wire is OK, replace the MAP sensor.**

YES

Start the engine and allow it to idle..

Is there approx 1V? NO → **Replace MAP sensor.**

YES

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

Troubleshooting Flowchart– TDC/CRANK Sensor [1.5 ℓ and 1.6 ℓ DOHC]

Self-diagnosis LED indicates code 4: A problem in the CRANK circuit of the TDC/CRANK Sensor.

Self-diagnosis LED indicates code 8: A problem in the TDC circuit of the TDC/CRANK Sensor.

– Check Engine warning light has been reported on.
– LED indicates CODE 4.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light on and does LED indicate CODE 4?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at the distributor connector.

YES

Stop engine.

Disconnect 6P connector from the TDC/CRANK sensor.

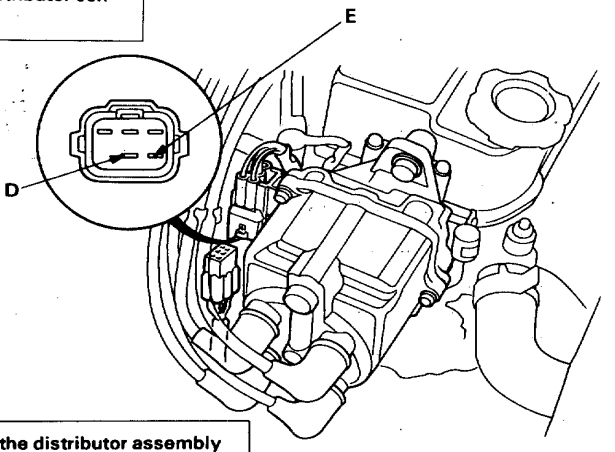
Measure resistance between D terminal and E terminal.

Is there 350–550 Ω ?

NO → **Replace the distributor assembly (section 16).**

YES

(To page 6-91)



(From page 6-90)

Check for continuity to body ground on D terminal and E terminal individually.

Does continuity exist ?

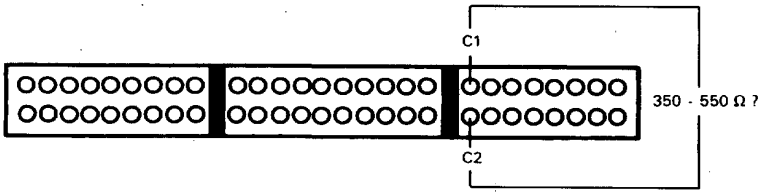
YES → **Replace the distributor assembly (section 16).**

NO

Reconnect the connector.

Connect the ECU test harness only to the main wire harness, not to the ECU (page 6-75).

Measure resistance between C1 terminal and C2 terminal.



Is there 350–550 Ω ?

NO → **Repair open in ORN and/or WHT wires.**

YES

Check for continuity to body ground on C1 terminal.

Does continuity exist?

YES → **Repair short in ORN wire between ECU (C1) and distributor connector.**

NO

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

Troubleshooting Flowchart — TDC/CRANK sensor [1.5 ℓ and 1.6 ℓ DOHC] — (cont'd)

- Check Engine warning light has been reported on.
- LED indicates CODE 8.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

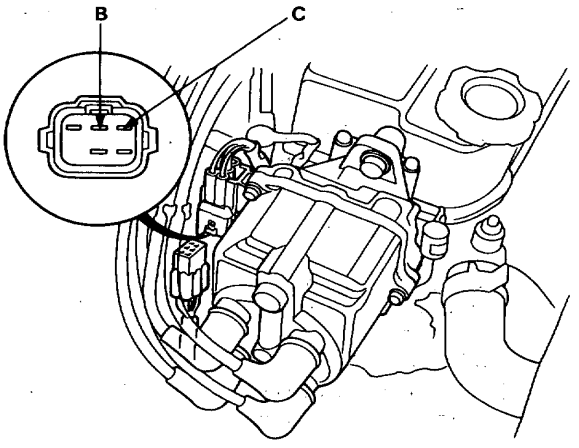
Is Check Engine warning light on and does LED indicate CODE 8?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at distributor connector.**

YES

Stop engine.

Disconnect the 6P connector from the TDC/CRANK sensor.



Measure resistance between B terminal and C terminal.

Is there 350—550 Ω ?

NO → **Replace the distributor assembly (section 16).**

YES

Check for continuity to body ground on B terminal and C terminal individually.

Does continuity exist ?

YES → **Replace the distributor assembly (section 16).**

NO

Reconnect the connector.

(To page 6-93)

(From page 6-92)

Connect the ECU test harness only to the main wire harness, not to the ECU (page 6-75).

Measure resistance between C3 terminal and C4 terminal.

Is there 350 — 550 Ω ?

NO → **Repair open in ORN/BLU and/or WHT/BLU wires.**

YES

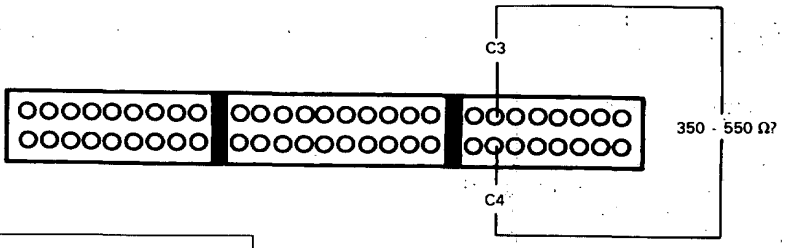
Check for continuity to body ground on C3 terminal.

Does continuity exist?

YES → **Repair short in ORN/BLU wire between ECU (C3) and distributor connector.**

NO

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



Troubleshooting Flowchart — TDC/CRANK/CYL Sensor [1.6 ℓ SOHC]

Self-diagnosis LED indicates code 4: A problem in the CRANK circuit of the TDC/CRANK/CYL Sensor.

Self-diagnosis LED indicates code 8: A problem in the TDC circuit of the TDC/CRANK/CYL Sensor.

Self-diagnosis LED indicates code 9; A problem in the CYL circuit of the TDC/CRANK/CYL Sensor.

– Check Engine warning light has been reported on.
– LED indicates CODE 4.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light and does LED indicate CODE 4?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at the distributor connector.

YES

Stop engine.

Disconnect the 8P connector from the TDC/CRANK/CYL sensor.

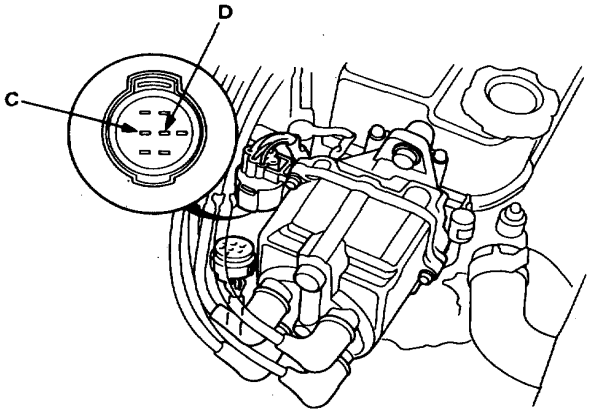
Measure resistance between C terminal and D terminal.

Is there 350–550 Ω ?

NO → **Replace the distributor assembly (section 16).**

YES

(To page 6-95)



(From page 6-94)

Check for continuity to body ground on C terminal and D terminal individually.

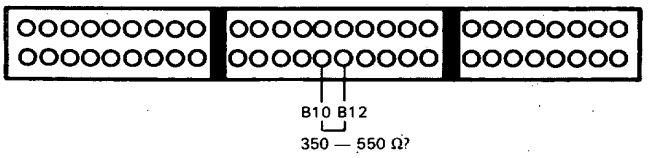
Does continuity exist ? — YES → **Replace the distributor assembly (section 16).**

NO

Reconnect the connector.

Connect the ECU test harness only to the main wire harness, not to the ECU (page 6-75).

Measure resistance between B10 terminal and B12 terminal.



Is there 350–550 Ω ? — NO → **Repair open in ORN and/or WHT wires.**

YES

Check for continuity to body ground on B10 terminal.

Does continuity exist? — YES → **Repair short in ORN wire between ECU (B10) and distributor connector.**

NO

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

(cont'd)

Troubleshooting Flowchart — TDC/CRANK/CYL sensor [1.6 ℓ SOHC] (cont'd)

- Check Engine warning light has been reported on.
- LED indicates CODE 8.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

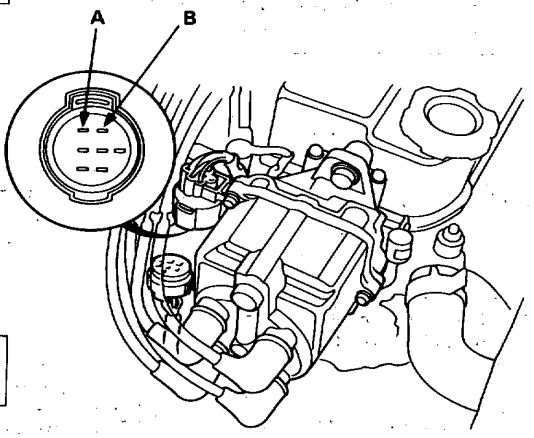
Is Check Engine warning light on and does LED indicate CODE 8?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at the distributor connector.**

YES

Stop engine.

Disconnect the 8P connector from the TDC/CRANK/CYL sensor.



Measure resistance between A terminal and B terminal.

Is there 350—550 Ω ?

NO → **Replace the distributor assembly (section 16).**

YES

Check for continuity to body ground on A terminal and B terminal individually.

Does continuity exist ?

YES → **Replace the distributor assembly (section 16).**

NO

Reconnect the connector.

(To page 6-97)

(From page 6-96)

Connect the ECU test harness only to the main wire harness, not to the ECU (page 6-75).

Measure resistance between C3 terminal and C4 terminal.

Is there 350 — 550 Ω ?

NO → **Repair open in ORN/BLU and/or WHT/BLU wires.**

YES

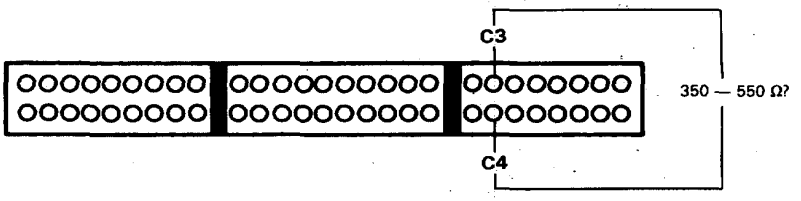
Check for continuity to body ground on C3 terminal.

Does continuity exist?

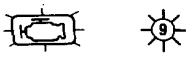
YES → **Repair short in ORN/BLU wire between ECU (C3) and distributor connector.**

NO

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



Troubleshooting Flowchart —— TDC/CRANK/CYL Sensor [1.6 ℓ SOHC] (cont'd)



- Check Engine warning light has been reported on.
- LED indicates CODE 9.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

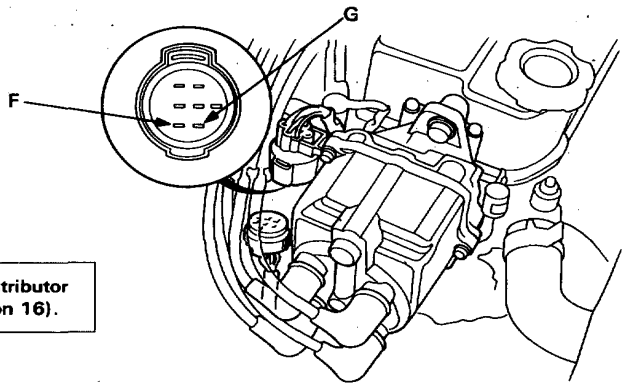
Is Check Engine warning light on and does LED indicate CODE 9?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at the distributor connector.**

YES

Stop engine.

Disconnect the 8P connector from the TDC/CRANK/CYL sensor.



Measure resistance between F terminal and G terminal.

Is there 350—550 Ω ?

NO → **Replace the distributor assembly (section 16).**

YES

Check for continuity to body ground on F terminal and G terminal individually.

Does continuity exist ?

YES → **Replace the distributor assembly (section 16).**

NO

Reconnect the connector.

(To page 6-99)

(From page 6-98)

Connect the ECU test harness only to the main wire harness, not to the ECU (page 6-75).

Measure resistance between C1 terminal and C2 terminal.

Is there 350 — 550 Ω ?

NO

Repair open in BLU/GRN and/or BLU/YEL wires.

YES

Check for continuity to body ground on C1 terminal.

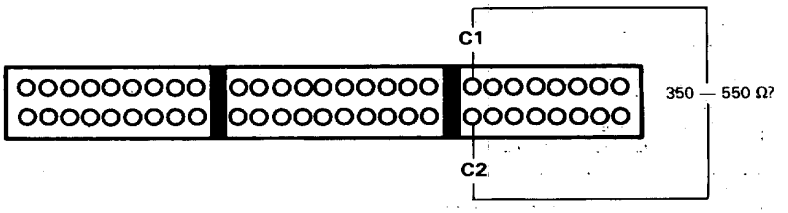
Does continuity exist?

YES

Repair short in BLU/GRN wire between ECU (C1) and distributor connector.

NO

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



Troubleshooting Flowchart — TW Sensor

Self-diagnosis LED indicates code 6: Most likely a problem in the Coolant Temperature (TW) Sensor circuit.

- Check Engine warning light has been reported on.
- LED indicates CODE 6.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is Check Engine warning light on and does LED indicate CODE 6?

NO — **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at TW sensor.**

(SOHC)

YES

Warm up engine to normal operating temperature (cooling fan comes on).

Turn the ignition switch OFF.

Disconnect the 2P connector from the TW sensor.

Measure resistance between the 2 terminals on the TW sensor.

Is there 200—400 Ω ?

NO — **Replace the TW sensor.**

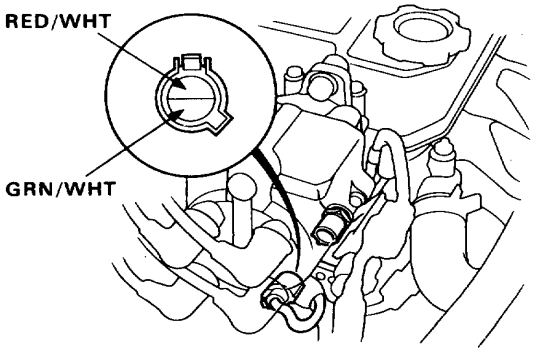
(DOHC)

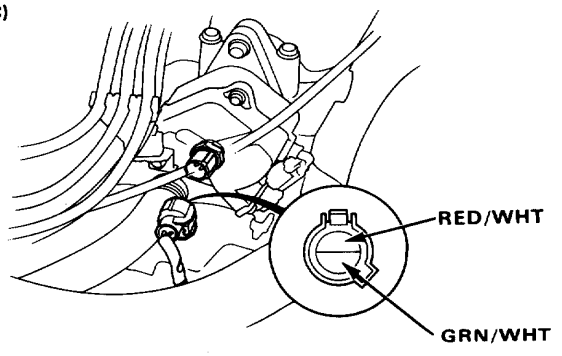
YES

Turn the ignition switch ON.

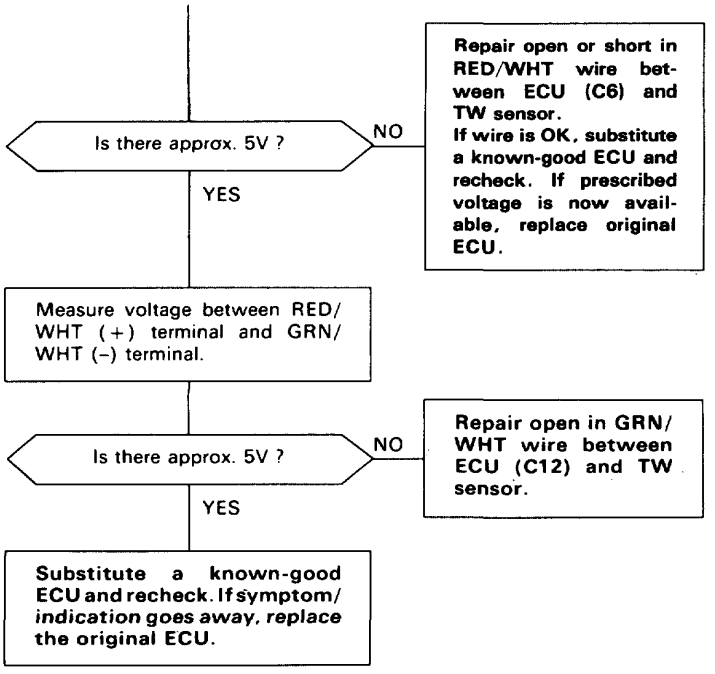
Measure voltage between RED/WHT (+) and body ground.

(To page 6-101)





(From page 6-100)



Troubleshooting Flowchart — Throttle Angle Sensor

Self-diagnosis LED indicates code 7: Most likely a problem in the Throttle Angle Sensor circuit.

– Engine is running
– Check Engine warning light has been reported on.
– LED indicates CODE 7

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light on and does LED indicate CODE 7?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at throttle angle sensor.

YES

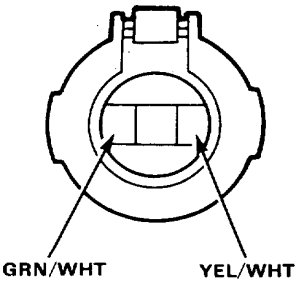
Turn the ignition switch OFF.

Disconnect the 3P connector from the throttle angle sensor.

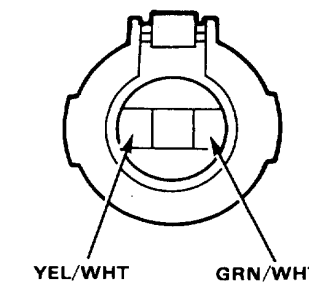
Turn the ignition switch ON.

Measure voltage between YEL/WHT (+) terminal and GRN/WHT (–) terminal.

(1.5ℓ)



(1.6ℓ)



Is there approx. 5V ?

NO → Measure voltage between YEL/WHT (+) terminal and body ground.

YES

Turn the ignition switch OFF.

Reconnect the 3P connector.

Connect the PGM-FI test harness between the ECU and connector (page 6-75).

(To page 6-103)

Is there approx. 5V ?

YES → **Repair open in GRN/WHT wire between ECU (C12) and throttle angle sensor.**

NO

Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 6-75).

(To page 6-103)

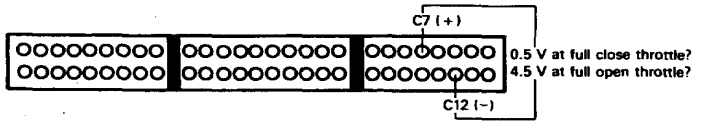
(From page 6-102)

Turn the ignition switch ON.

Disconnect #6 hose from the dashpot diaphragm and connect a vacuum pump to the diaphragm.

Apply 500 mm Hg to the diaphragm.

Measure voltage between C7(+) terminal and C12(–) terminal.



Is voltage approx. 0.5 V at full close throttle (applying vacuum to the dashpot diaphragm), and approx. 4.5 V at full open throttle?
NOTE: There should be a smooth transition from 0.5 V to 4.5 V as the throttle is depressed.

NO

- **Replace throttle angle sensor.**
- **Repair open or short in RED/BLU wire between ECU (C7) and throttle angle sensor.**

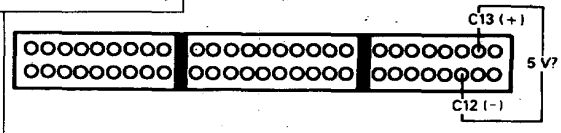
YES

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

(From page 6-102)

Turn the ignition switch ON.

Measure voltage between C13 (+) terminal and C12 (–) terminal.



Is there approx. 5V ?

YES

Repair open in YEL/WHT wire between ECU(C13) and throttle angle sensor.

NO

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

Troubleshooting Flowchart — CYL Sensor [1.6 ℓ DOHC only]

Self-diagnosis LED indicates code 9: A problem in the CYL Sensor.

- **Check Engine warning light has been reported on.**
- **LED indicates CODE 9.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light on and does LED indicate CODE 9?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connection or loose wires at the distributor connector.**

YES

Stop engine.

Disconnect the 2P connector from the CYL sensor.

Measure resistance between 2 terminals on the CYL sensor.

Is there 700–1,000 Ω ?

NO → **Replace CYL sensor (page 6-118).**

YES

Check for continuity to body ground on the 2 terminals individually.

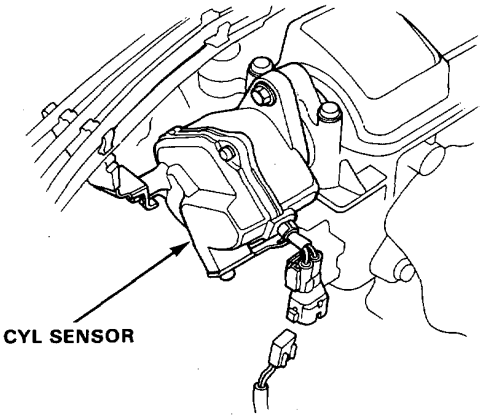
Does continuity exist ?

YES → **Replace CYL sensor (page 6-118).**

NO

Reconnect the connector.

(To page 6-105)



(From page 6-104)

Connect the PGM-FI test harness only to the main wire harness, not to the ECU (page 6-75).

Measure resistance between C1 terminal and C2 terminal.

Is there 700-1000 Ω ?

NO → **Repair open in BLU/GRN and/or BLU/YEL wires.**

YES

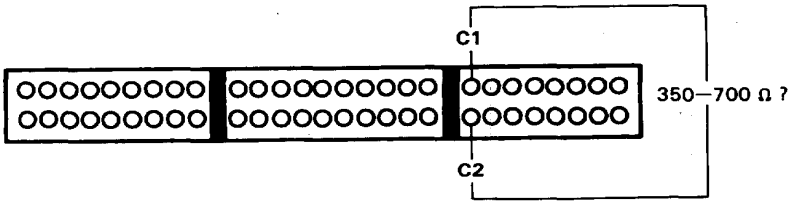
Check for continuity to body ground on C1 terminal.

Does continuity exist?

YES → **Repair short in BLU/GRN wire between ECU (C1) and distributor connector.**

NO

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



Troubleshooting Flowchart — TA Sensor

Self-diagnosis LED indicates code 10: Most likely a problem in the Intake Air Temperature (TA) Sensor circuit.

- **Check Engine warning light has been reported on.**
- **LED indicates CODE 10**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is Check Engine warning light on and does LED indicate CODE 10?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at TA sensor.

YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the TA sensor.

Measure resistance between the 2 terminals on the TA sensor.

Is there 1–4 kΩ ?

NO → **Replace TA sensor.**

YES

Turn the ignition switch ON.

Measure voltage between RED/YEL (+) terminal and body ground.

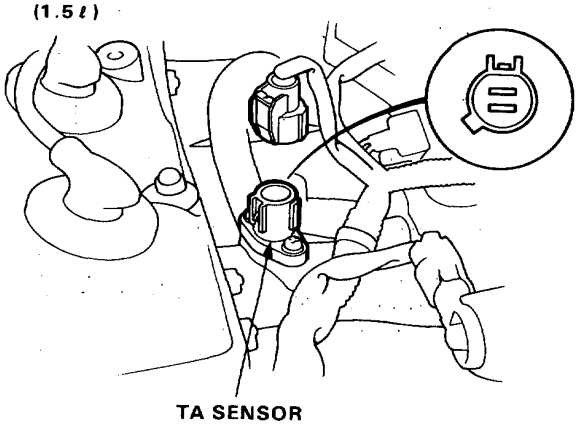
Is there approx. 5 V ?

NO → **Repair open or short in RED/YEL wire between ECU (C5) and TA sensor.**
If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

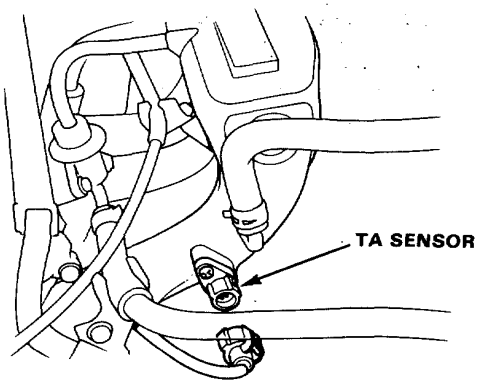
(To page 6-107)

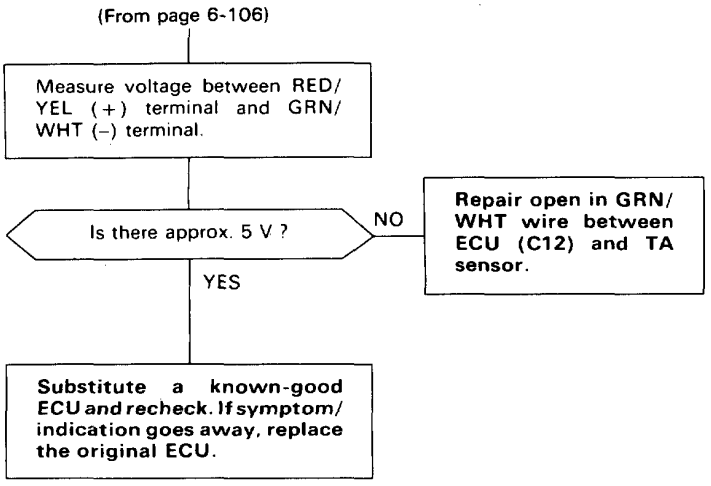
(1.5 ℓ)



TA SENSOR

(1.6 ℓ)




(From page 6-106)
Measure voltage between RED/ YEL (+) terminal and GRN/ WHT (–) terminal.
Is there approx. 5 V ?
NO
Repair open in GRN/ WHT wire between ECU (C12) and TA sensor.
YES
Substitute a known-good ECU and recheck. If symptom/ indication goes away, replace the original ECU.

Troubleshooting Flowchart — IMA Sensor

Self-diagnosis LED indicates code 11: Most likely a problem in the IMA Sensor circuit.

–Check Engine warning light is has been reported on.
–LED indicates CODE 11.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Turn the ignition switch ON.

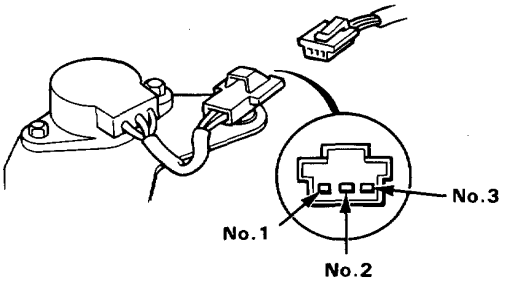
Is Check Engine warning light on and does LED indicate CODE 11?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at the IMA sensor.

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the IMA sensor.



Measure resistance between No.1 terminal and No.3 terminal on IMA sensor harness.

Is there 4—6 kΩ?

NO → **Replace IMA sensor.**

YES

Measure resistance between No.1 and No.2 terminals and between No.3 and No.2 terminals.

Does the sum of the two resistance checks equal 4—6 kΩ?

NO → **Replace IMA sensor.**

YES

(To page 6-109)

(From page 6-108)

Turn the ignition switch ON.

Measure voltage between YEL/WHT (+) terminal and GRN/WHT (−) terminal on the wire harness.

Is there approx. 5V?

NO → Measure voltage between YEL/WHT (+) terminal and body ground.

YES

Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 6-75).

Turn the ignition switch ON.

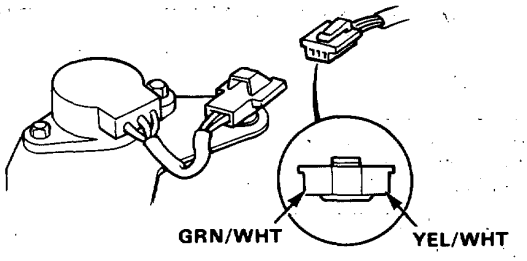
Measure voltage between B20 (+) terminal and C12 (−) terminal.

Is voltage 0.5—4.5V?

NO → **Repair open or short in GRN/YEL wire between ECU (B20) and IMA sensor.**

YES

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



Is there approx. 5V?

YES → **Repair open in GRN/WHT wire between ECU (C12) and IMA sensor.**

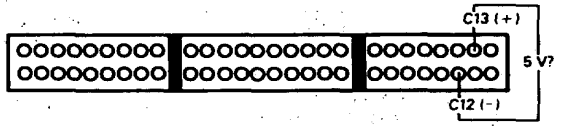
NO

Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 6-75).

Turn the ignition switch ON.

Measure voltage between C13 (+) terminal and C12 (−) terminal.



Is there approx. 5V?

YES → **Repair open in YEL/WHT wire between ECU (C13) and IMA sensor.**

NO

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

Troubleshooting Flowchart — PA Sensor

Self-diagnosis LED indicates code 13: A problem in the Atmospheric Pressure (PA) Sensor circuit.

- **Check Engine warning light has been reported on.**
- **LED indicates CODE 13.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is Check Engine warning light on and does LED indicate CODE 13?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at the PA sensor.**

YES

Turn the ignition switch OFF.

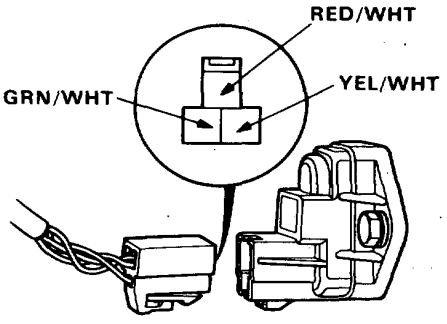
Disconnect the main wire harness from PA sensor.

Measure voltage between YEL/WHT (+) terminal and body ground.

Is there approx. 5V?

YES → Measure voltage between YEL/WHT (+) terminal and GRN/WHT (−) terminal.

NO → **Repair open in YEL/WHT wire between ECU (C13) and the sensor. If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available replace the original ECU.**



Is there approx. 5V?

NO → **Repair open or short in GRN/WHT wire between ECU (C12) and the sensor. If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.**

YES

Measure voltage between RED/WHT (+) terminal and GRN/WHT (−) terminal.

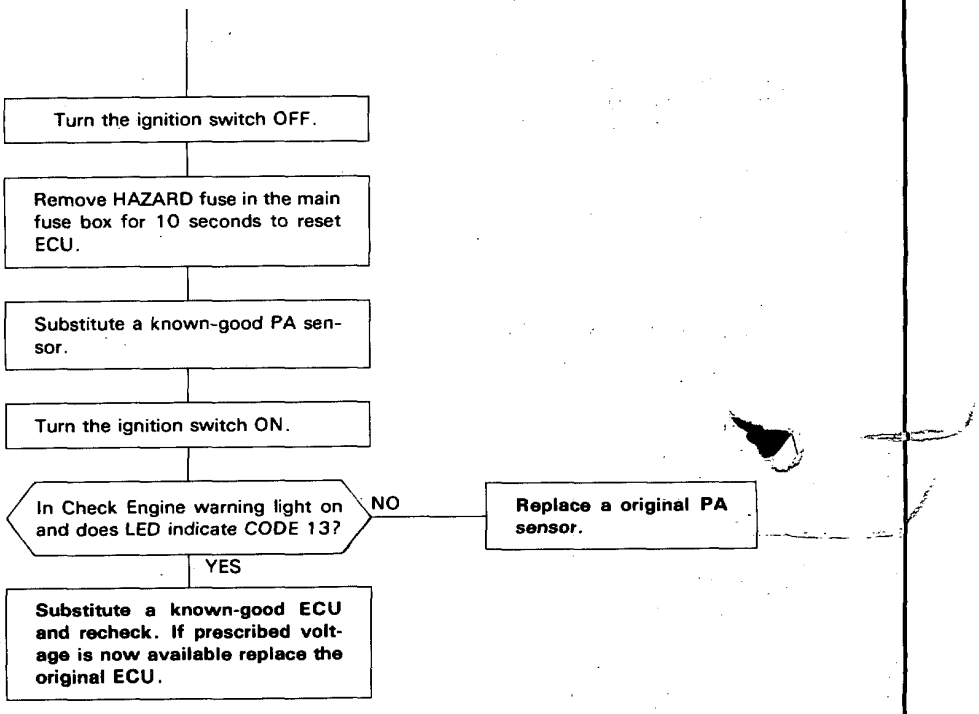
Is there approx. 5V?

NO → **Repair open or short in RED/WHT wire between ECU (C9) and PA sensor. If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.**

YES

(To page 6-111)

(From page 6-110)



Troubleshooting Flowchart — Ignition Output Signal

Self-diagnosis LED indicates code 15: A problem in the Ignition Output Signal circuit.

- Check Engine warning light has been reported on.
- LED indicates CODE 15.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light on and does LED indicate CODE 15?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at the distributor connector.

YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the distributor.

Turn the ignition switch ON.

Measure voltage between BLK / YEL (+) terminal and body ground.

Is there battery voltage ?

NO → **Repair open in BLK/YEL wire between the 2P connector and ignition switch.**

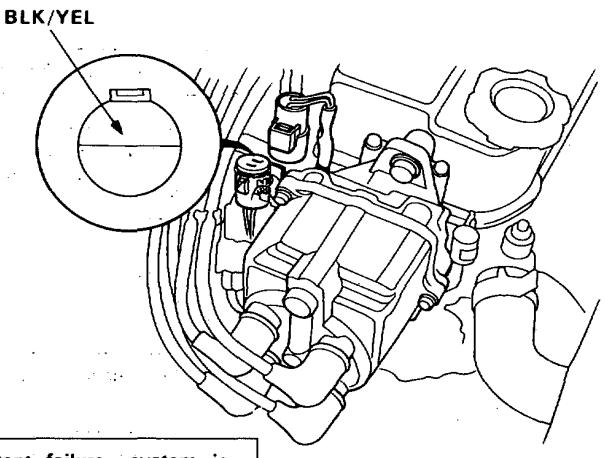
YES

Turn the ignition switch OFF.

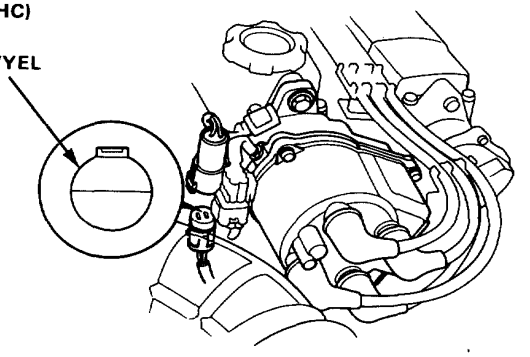
Reconnect the 2P connector.

(To page 6-113)

(SOHC)



(DOHC)



(From page 6-112)

Connect the PGM-FI test harness between the ECU and connector (page 6-75).

Turn the ignition switch ON.

Measure voltage individually between B15 (+), B17 (+) terminals and A18 (–) terminal.

Is there approx. 10 volts?

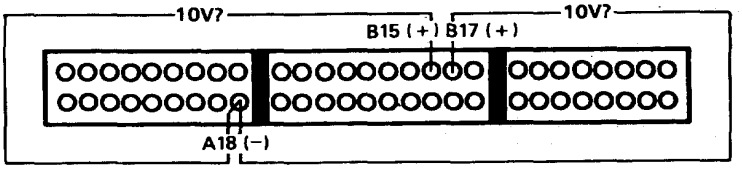
NO

- **Replace the igniter unit.**
- **Repair open or short in WHT wires between distributor and ECU (B15 or B17).**

NOTE: If the WHT wire was shorted, the ignitor may be damaged.

YES

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



Troubleshooting Flowchart — Vehicle Speed Sensor

Self-diagnosis LED indicates code 17: A problem in the Vehicls Speed Sensor circuit.

- Check Engine warning light has been reported on.
- LED indicates CODE 17.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Road test necessary:
In 2nd gear accelerate to 3, 500 min^{-1} (rpm) and decelerate to 1,500 min^{-1} (rpm) with throttle fully closed.

Is Check Engine warning light and does LED indicate CODE 17? — NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires.**

YES

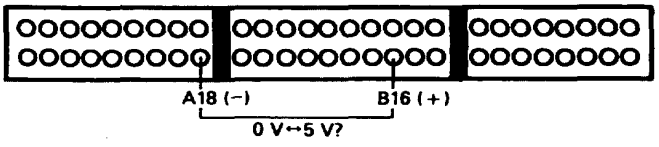
Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

⚠ WARNING Block rear wheels before jacking up front of car.

Connect the PGM-FI test harness between the ECU and connector (page 6-61).

Turn the ignition switch ON.

Slowly rotate left front wheel and measure voltage between B16 (+) terminal and A18 (–) terminal.



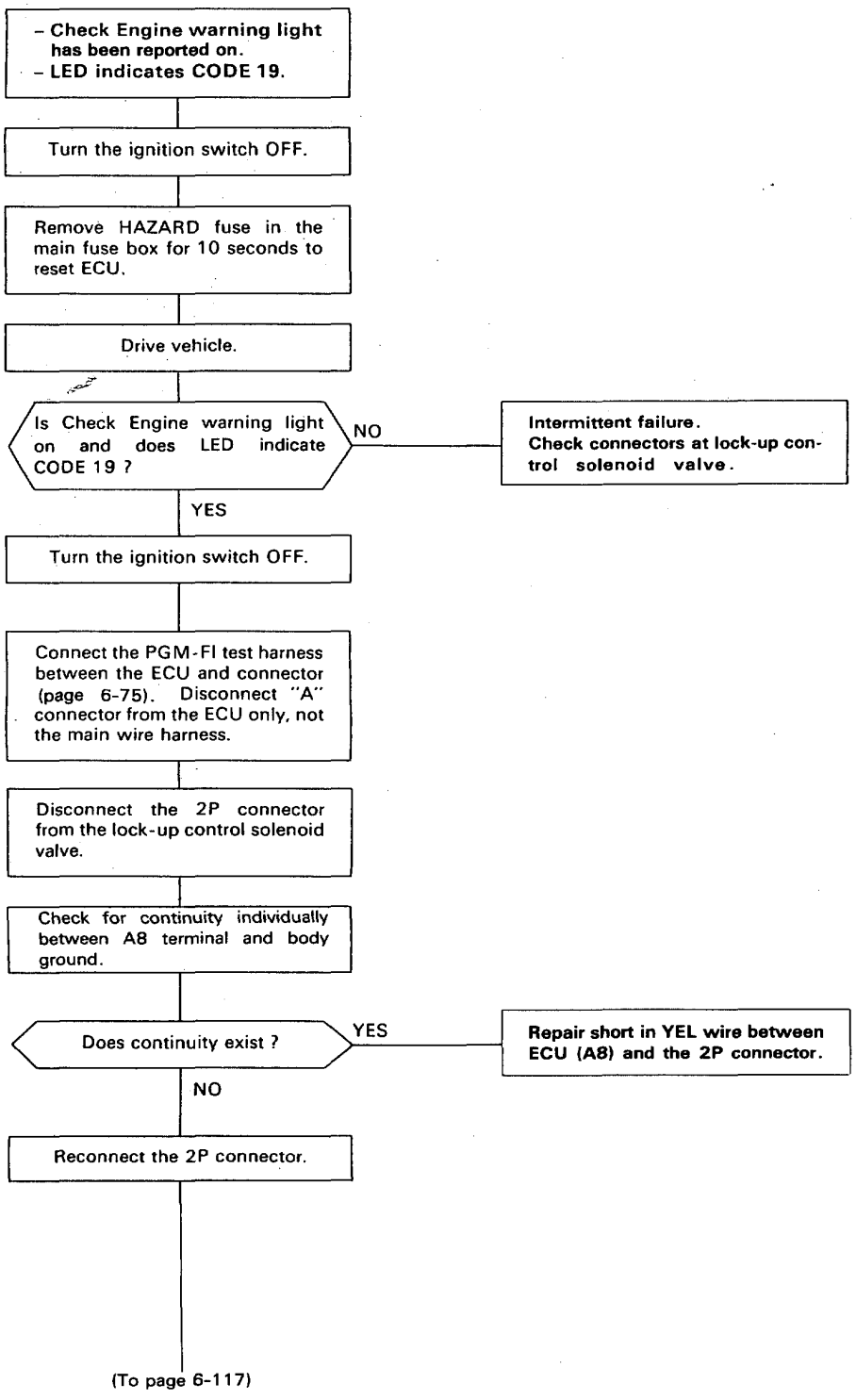
Does voltage pulse 0V and 5V ? — NO →
- **Repair open or short in YEL/RED wire between ECU (B16) and the speed sensor.**
- **Faulty speed sensor.**
- **Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.**

YES

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

Troubleshooting Flowchart — Lock-up Control Solenoid Valve (A/T only)

Self-diagnosis LED indicates code 19: A problem in the Lock-up Control Solenoid Valve circuit.



(To page 6-117)

(From page 6-116)

Measure resistance between A8 terminal and A18 terminal.

Is there 14 — 25 Ω ?

NO

Check for continuity in YEL wire between ECU (A8) and the 2P connector.

Does continuity exist ?

YES

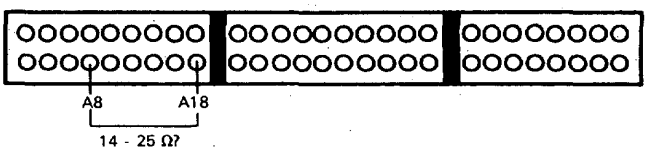
Faulty lock-up control solenoid valve.

NO

Repair open in YEL wire between ECU (A8) and the 2P connector.

YES

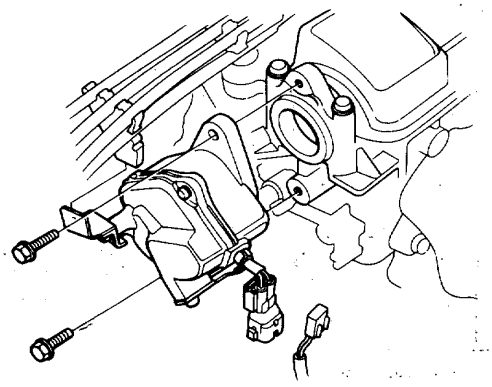
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.



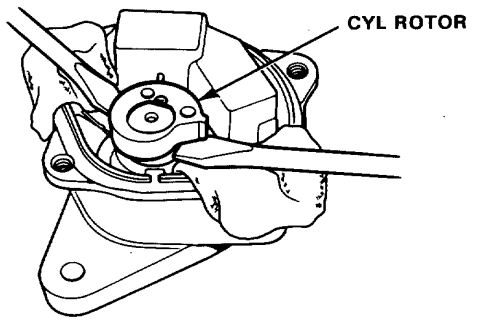
CYL Sensor Overhaul [1.6 ℓ DOHC only]

Disassembly

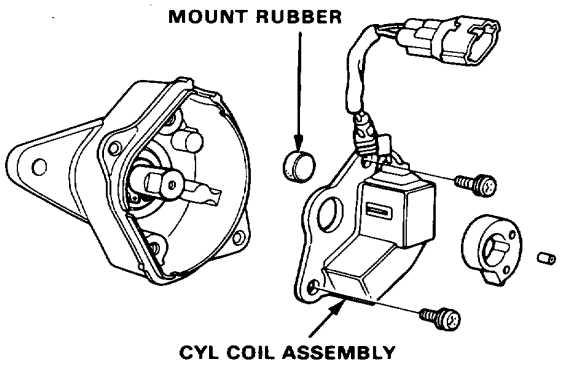
1. Remove the CYL sensor from the engine.



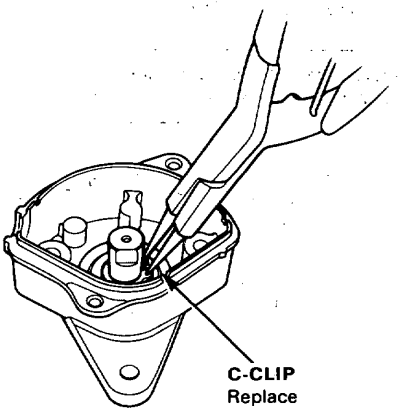
2. Carefully pry up the CYL rotor by using two screwdrivers as shown. Do not damage the CYL rotor.



3. Pull the CYL coil assembly and mount rubber out from the sensor housing by removing the screws.

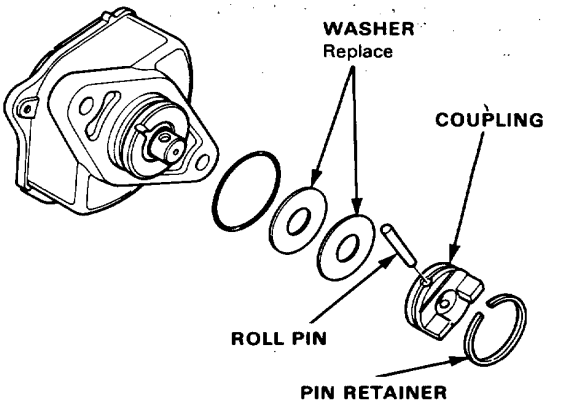


4. Remove the C-clip.

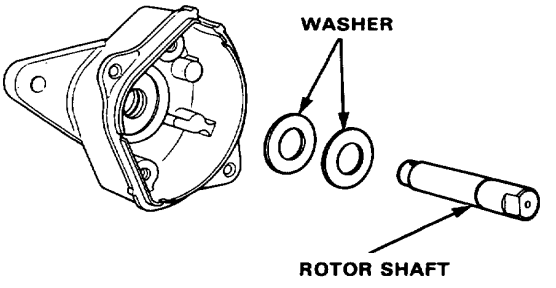


5. Slide off the pin ratainer being careful not to stretch it.

6. Separate the coupling from the shaft by removing the roll pin as shown.

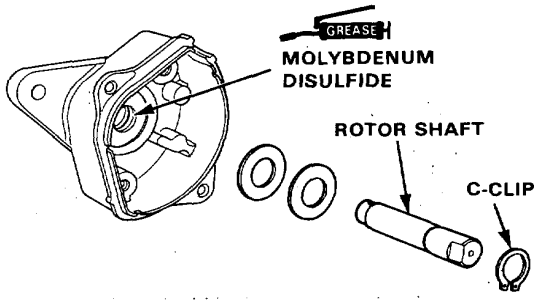


7. Remove the rotor shaft.

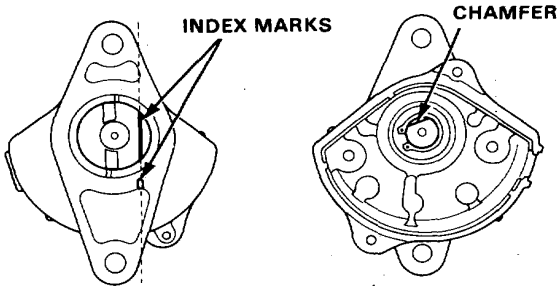


Reassembly

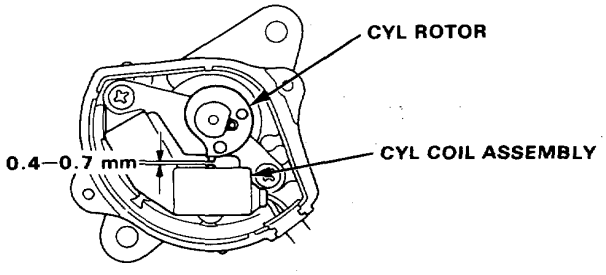
1. Apply molybdenum disulfide grease to the sensor housing, install the washers on the rotor shaft, then install it in the sensor housing. Install a new C-clip.



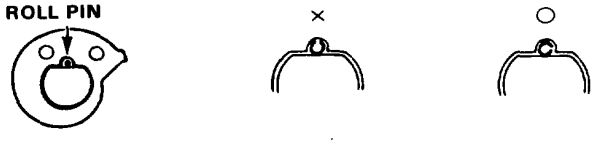
2. Install the coupling with its index mark facing in the direction shown, install the pin, and install the pin retainer.



3. Install the mount rubber, then install the CYL coil assembly and the CYL rotor. Adjust the air gap to 0.4—0.7 mm.



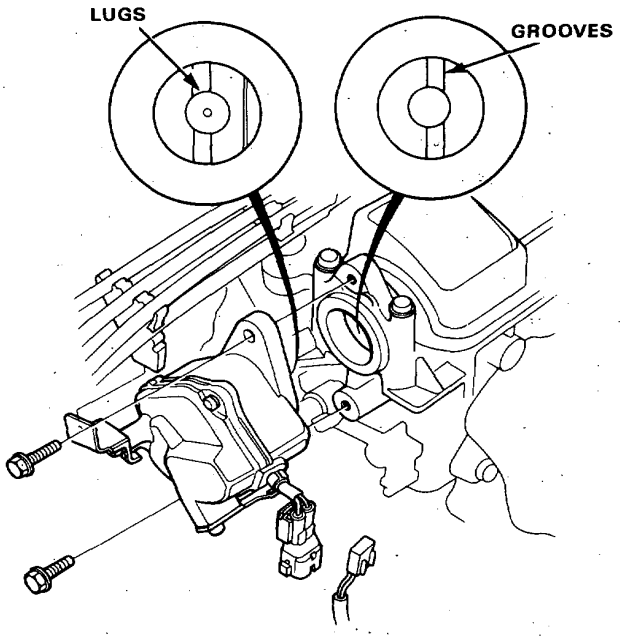
NOTE:
- Install the rotor with the part number facing up.
- Install the roll pin so that it faces as shown below.



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 sensor 180° out of time.



Idle Control System

System Troubleshooting Guide

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- If the idle speed is out of specification and LED does not blink CODE 14, go to inspection described on page 6-121.

PAGE / SUB SYSTEM / SYMPTOM		IDLE ADJUSTING SCREW	EACV	AIR CONDITIONING SIGNAL	ALTERNATOR FR SIGNAL	A/T SHIFT POSITION SIGNAL (Automatic)	STARTER SWITCH SIGNAL	FAST IDLE CONTROL (1.6 ℓ)	HOSES AND CONNECTIONS
		133, 134	122	125	127	129	131	132	*
ENGINE WON'T START			②						①
DIFFICULT TO START ENGINE WHEN COLD		②	①						
WHEN COLD FAST IDLE OUT OF SPEC [1,000-2,000 min^{-1} (rpm)]		②	①						③
ROUGH IDLE		③	②						①
WHEN WARM IDLE SPEED TOO HIGH		③	②						①
WHEN WARM IDLE SPEED TOO LOW	Idle speed is below specified (no load)	②	①		③				
	Idle speed does not increase after initial start up.		①				②		
	On models with automatic transmission, the idle speed drops in gear	③	②			①			
	Idle speeds drops when air conditioner in ON	③	②	①					
FREQUENT STALLING	WHILE WARMING UP	②	①						
	AFTER WARMING UP	②	①						
FAILS EMISSION TEST									①

1. When the idle speed is out of specification and LED does not blink CODE 14, check the following items:
   - Adjust the idle speed (page 6-133, 134)
   - Air conditioning signal (page 6-125)
   - Alternator FR signal (page 6-127)
   - A/T shift position signal (page 6-129)
   - Starter switch signal (page 6-131)
   - Fast idle control (page 6-132)
   - Hoses and connections
   - EACV and its mounting O-rings.

2. If the above items are normal, substitute a known-good EACV and readjust the idle speed (page 133, 134)

   ● If the idle speed still cannot be adjusted to specification (and LED does not blink CODE 14) after EACV replacement, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

Idle Control System

Troubleshooting Flowchart — EACV

Self-diagnosis LED indicates code 14: A problem in the Electronic Air Control Valve (EACV) circuit.

- **Engine is running.**
- **Check Engine warning light has been reported on.**
- **LED indicates CODE 14.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light on and does LED indicate CODE 14?

NO → **Intermittent failure, system is OK at this time (test driving may be necessary). Check for poor connections or loose wires at EACV.**

YES

Stop engine.

Disconnect the 2P connector from the EACV.

Measure resistance between the 2 terminals on the EACV.

Is there 8—15Ω ?

NO → **Replace EACV.**

YES

Check for continuity to body ground on each terminal on the EACV.

Does continuity exist ?

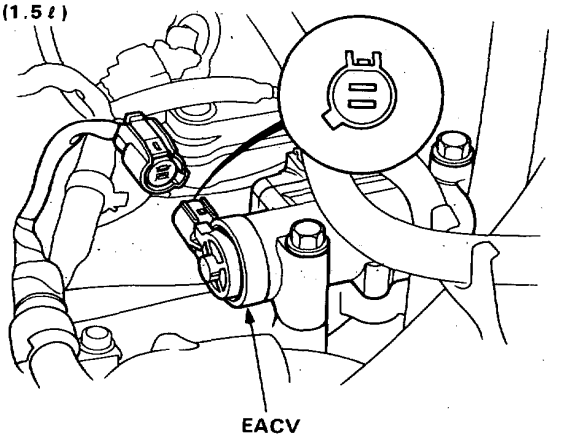
YES → **Replace EACV.**

NO

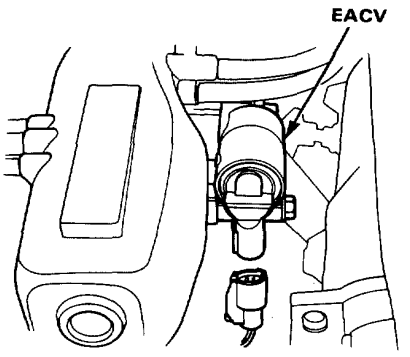
Turn the ignition switch ON.

(To page 6-123)

(1.5 ℓ)



(1.6 ℓ)



(From page 6-122)

Measure voltage between BLK/YEL (+) terminal and BLU/YEL (–) terminal.

Is there battery voltage ?

YES → Disconnect the "A" connector from the ECU.

Measure voltage between BLK/YEL (+) terminal and BLU/YEL (–) terminal.

Is there battery voltage ?

YES → **Repair short in BLU/YEL wire between ECU (A11) and EACV.**

NO

NO → Measure voltage between BLK/YEL (+) terminal and body ground.

Is there battery voltage ?

NO → **1.5ℓ : Repair open in BLK/YEL, YEL/BLK Wire between the EACV and Main Relay.**
1.6ℓ : Repair open in BLK/YEL, GRN/PNK wire between the EACV and No. 14 fuse.

YES

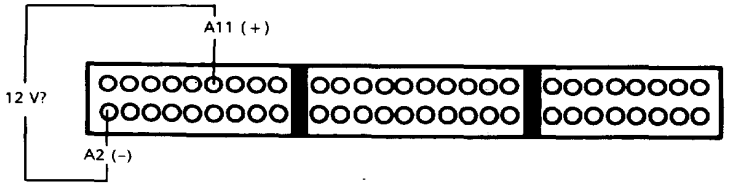
Turn the ignition switch OFF.

Reconnect the 2P connector to EACV.

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

Connect the PGM-FI test harness "A" connector to the main wire harness only, not the ECU (page 6-75).

Turn the ignition switch ON.



Measure voltage between A11 (+) terminal and A2 (–) terminal.

Is there battery voltage ?

NO → **Repair open in BLU/YEL wire between ECU (A11) and EACV.**

YES

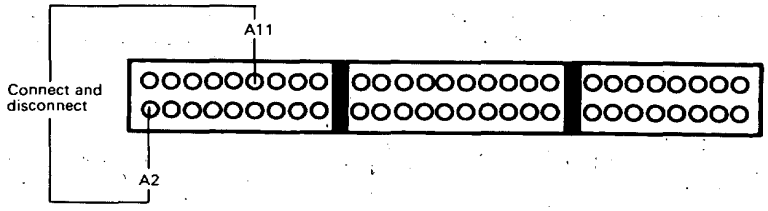
(To page 6-124)

(cont'd)

Troubleshooting Flowchart — EACV (cont'd)

(From page 6-123)

Connect and disconnect A11 terminal to A2 terminal.



Does EACV click when the connector is connected and disconnected ?

NO → **Replace EACV.**

YES

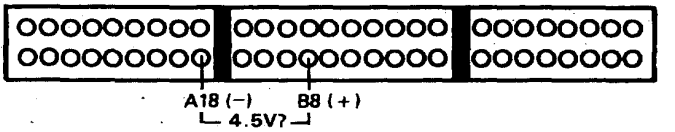
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Troubleshooting Flowchart——Air Conditioning Signal

Inspection of Air Conditioning Signal.

Connect the PGM-FI test harness between the ECU and connector (page 6-75). Disconnect "B" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.



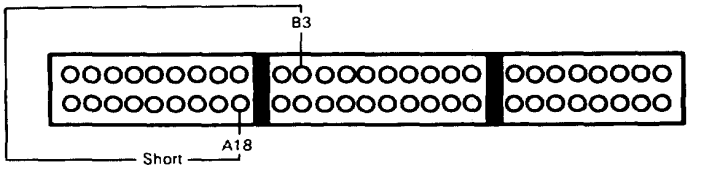
Measure voltage between B8 (+) terminal and A18 (–) terminal.

Is there approx. 4.5 V? NO → **Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.**

YES

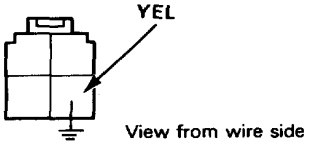
Reconnect "B" connector to the main wire harness.

Momentarily connect B3 terminal to A18 terminal several times.



Is there a clicking noise from the A/C compressor clutch? NO → Connect the YEL terminal of the 4P connector on the A/C clutch relay to body ground.

YES



Start engine.

Blower switch ON.

Is there a clicking noise from the A/C compressor clutch? NO → **See Air conditioner inspection (section 15).**

YES

Repair open in YEL wire between ECU (B3) and A/C clutch relay.

(To page 6-126)

(cont'd)

Troubleshooting Flowchart —— Air Conditioning Signal (cont'd)

(From page 6-125)

A/C switch ON.

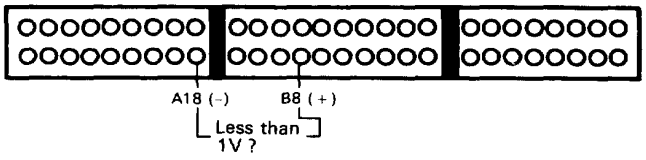
Does A/C operate ?

NO

Measure voltage between B8 (+) terminal and A18 (–) terminal.

YES

Air conditioning signal is OK.



Is voltage less than 1V ?

NO

Repair open in BLU/RED wire between ECU (B8) and A/C switch.

YES

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

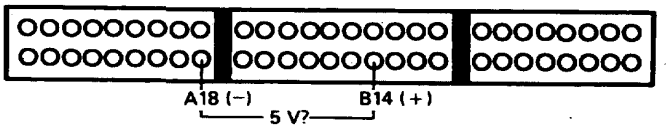
Troubleshooting Flowchart —— Alternator FR Signal

Inspection of Alternator FR signal.

Connect the PGM-FI test harness between the ECU and connector (page 6-75). Disconnect "B" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.

Measure voltage between B14 (+) terminal and A18 (–) terminal.



Is there approx. 5V ?

NO → **Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.**

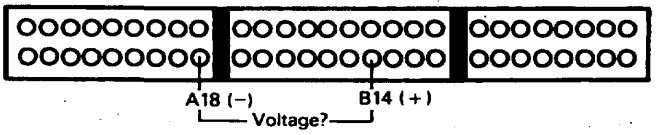
YES

Turn the ignition switch OFF.

Reconnect "B" connector to the main wire harness.

Warm up engine to normal operating temperature (cooling fan comes on).

Measure voltage between B14 (+) terminal and A18 (–) terminal.



Does the voltage decrease when headlight and rear defogger are turned on ?

NO → Stop engine.

YES

Alternator FR signal is OK.

(To page 6-128)

(cont'd)

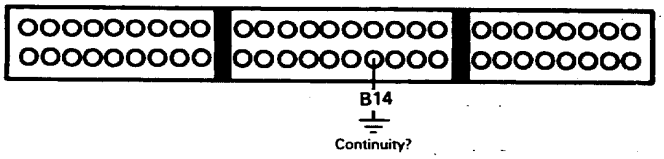
Troubleshooting Flowchart — Alternator FR Signal (cont'd)

(From page 6-127)

Disconnect "B" connector from ECU only, not the main wire harness.

Disconnect the negative battery cable from the battery.

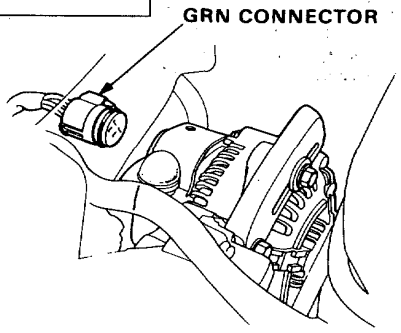
Check for continuity between B14 terminal and body ground.



Does continuity exist ?

YES → Disconnect GRN connector from the alternator.

NO → Disconnect GRN connector from the alternator.



Connect YEL wire to body ground.

Check for continuity between B14 terminal and body ground.

Does continuity exist ?

YES → **Repair short in YEL, BLU wire between ECU (B14) and alternator.**

NO → **See Alternator Inspection (section 16).**

Check for continuity between B14 terminal and body ground.

Does continuity exist ?

YES → **See Alternator Inspection (section 16).**

NO → **Repair open in YEL, BLU wire between ECU (B14) and alternator.**

Troubleshooting Flowchart — A/T Shift Position Signal

Inspection of A/T Shift Position Signal

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

Does the indicator light properly? NO → **See A/T shift position Indicator Inspection (section 16).**

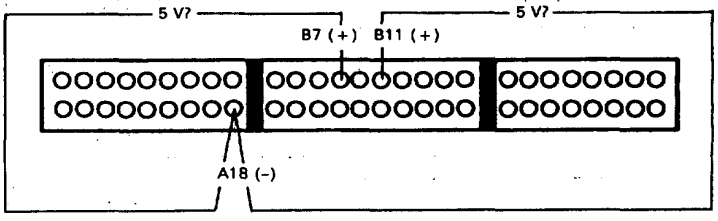
YES

Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 6-75). Disconnect "B" connector from the main wire harness only, not the ECU.

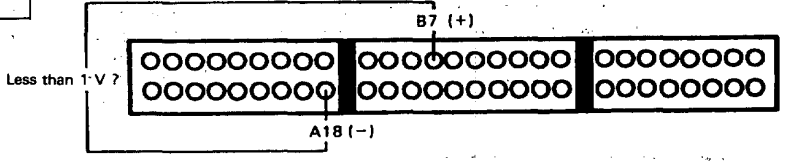
Turn the ignition switch ON.

Measure voltage individually between B7 (+), B11 (+) terminals and A18 (−) terminal.



Is there approx. 5 V ? NO → **Substitute a known-good ECU and recheck If prescribed voltage is now available, replace the original ECU.**

YES



Turn the ignition switch OFF.

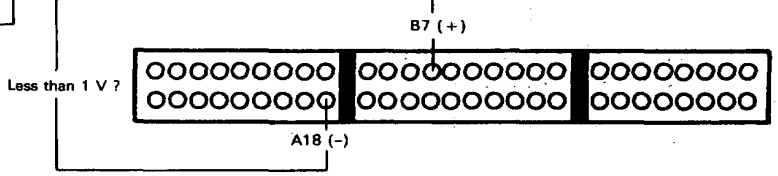
Reconnect "B" connector to the main wire harness.

Turn the ignition switch ON.

Measure voltage between B7 (+) terminal and A18 (−) terminal in Neutral position.

Is voltage less than 1 V ? NO →
- **Repair open in GRN wire between ECU (B7) and combination meter.**
- **Repair open in GRN wire between the combination meter and shift position console switch.**

YES



Measure voltage between B7 (+) terminal and A18 (−) terminal in Park position.

(To page 6-130)

(cont'd)

Idle Control System

Troubleshooting Flowchart — A/T Shift Position Signal (cont'd)

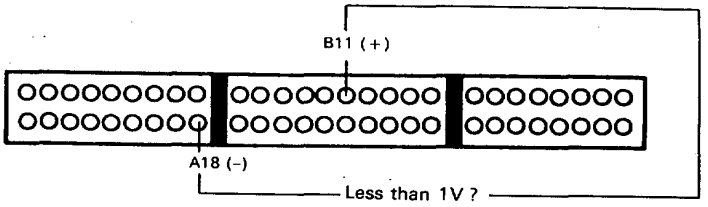
(From page 6-129)

Is voltage less than 1V ?

NO → **Repair open in GRN/WHT wire between combination meter and shift position console switch.**

YES

Measure voltage between B11 (+) terminal and A18 (–) terminal in D4 position.



Is voltage less than 1V ?

NO → **Repair open in GRN/BLK wire between ECU (B11) and shift position console switch.**

YES

Measure voltage between B7 (+) terminal and A18 (—) except in Park and Neutral.

Is there approx. 5V?

NO → **Repair short in GRN wire between ECU (B7) and combination meter.**

YES

Measure voltage between B11 (+) terminal and A18 (–) except in D4 position.

Is there approx. 5V?

NO → **Repair short in GRN/BLK wire between ECU (B11) and shift position console switch.**

YES

A/T shift position signal is OK.

Troubleshooting Flowchart — Starter Switch Signal

Inspection of Starter Switch Signal

Connect the PGM-FI test harness between the ECU and connector (page 6-75).

Measure voltage between B13 (+) terminal and A18 (–) terminal with ignition switch in the start position.

Is there battery voltage ?

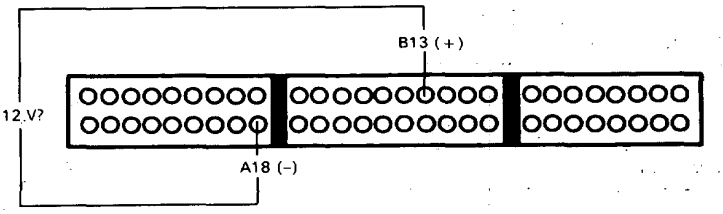
NO → Inspect No. 2 fuse.

Is No. 2 fuse OK ?

NO → **Replace fuse.**

YES → **Repair open in BLU/WHT wire between ECU (B13) and No. 2 fuse.**

YES → **Starter switch signal is OK.**



Idle Control System

Fast Idle Control [1.6 ℓ only]

Troubleshooting Flow Chart

Inspection of Fast Idle Control Solenoid Valve.

Warn up engine to normal operating temperature (cooling fan comes on).

Disconnect the upper vacuum hose from the fast idle control solenoid valve and connect a vacuum gauge to the valve.

Is there any vacuum?

YES → Disconnect the 2P connector from the solenoid valve

Is there any vacuum?

YES → **Replace the fast idle control solenoid valve.**

NO → **Repair short to ground at BLU wire between ECU (B2) and the 2P connector. If wire is OK, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.**

NO

Turn the ignition switch OFF.

Disconnect the 2P connector from the solenoid valve.

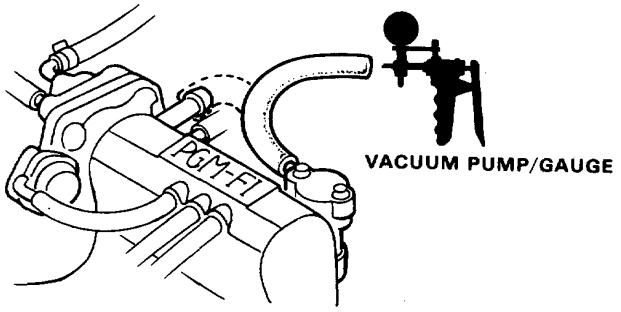
Connect battery positive to terminal B and battery negative to terminal A of the solenoid valve.

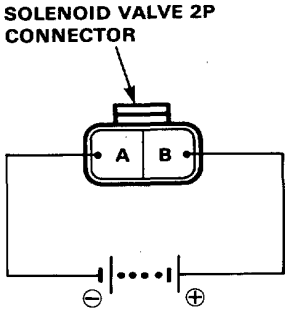
Is there mainfold vacuum?

NO → **Replace the fast idle control solenoid valve.**

YES

Fast Idle Control Solenoid valve is OK.



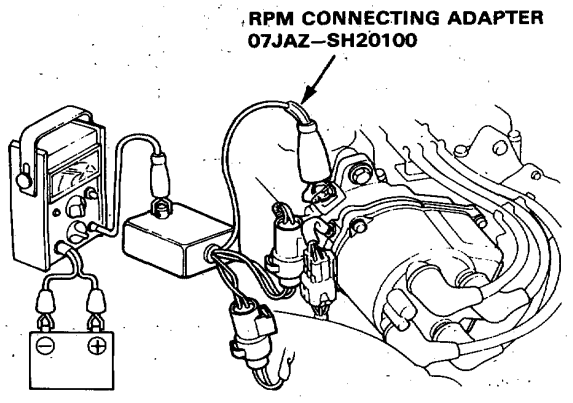


Idle Control System

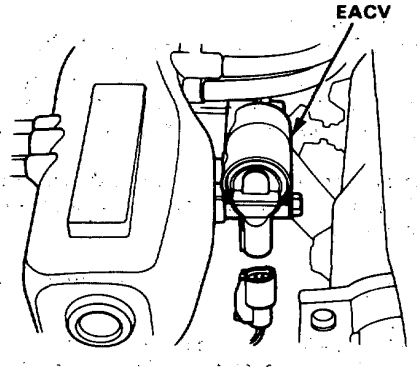
Idle Speed Setting [1.6 ℓ]

Inspection/Adjustment

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



3. Disconnect the 2P connector from the EACV.



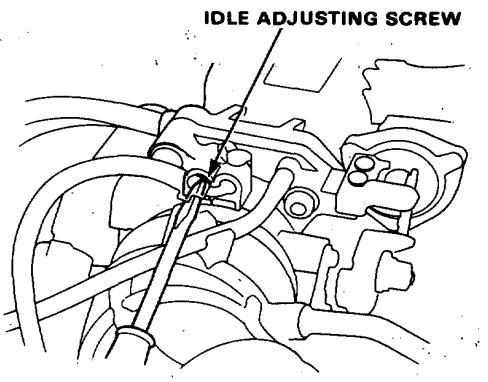
4. Check idling in no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

   Idle speed should be:

   (SOHC)
   680 ± 50 min^{-1} (rpm) (A/T: in [N] or [P])
   (DOHC with CATA)
   700 ± 50 min^{-1} (rpm)
   (DOHC without CATA)
   M/T: 700 ± 50 min^{-1} (rpm)
   A/T: 650 ± 50 min^{-1} (rpm) (in [N] or [P])

   Adjust the idle speed, if necessary, by turning the idle adjusting screw.

   NOTE: If the idle speed is excessively high, check the throttle control system (page 6-169).



5. Turn the ignition switch OFF.
6. Reconnect the 2P connector on the EACV, then remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.
7. Restart and idle the engine with no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating for one minute, then check the idle speed.

   Idle speed should be:
   (SOHC)
   780 ± 50 min^{-1} (rpm) (A/T: in [N] or [P])
   (DOHC with CATA)
   800 ± 50 min^{-1} (rpm)
   (DOHC without CATA)
   M/T: 800 ± 50 min^{-1} (rpm)
   A/T: 750 ± 50 min^{-1} (rpm) (in [N] or [P])
8. Idle the engine for one minute with headlights (Hi) and rear defogger ON and check the idle speed.

   Idle speed should be:
   (SOHC)
   780 ± 50 min^{-1} (rpm)
   (DOHC with CATA)
   800 ± 50 min^{-1} (rpm)
   (DOHC without CATA)
   M/T: 800 ± 50 min^{-1} (rpm)
   A/T: 750 ± 50 min^{-1} (rpm)
9. Idle the engine for one minute with heater fan switch at HI (right end) and air conditioner on, then check the idle speed.

   Idle speed should be:
   (SOHC)
   810 ± 50 min^{-1} (rpm)
   (DOHC with CATA)
   800 ± 50 min^{-1} (rpm)
   (DOHC without CATA)
   M/T: 800 ± 50 min^{-1} (rpm)
   A/T: 750 ± 50 min^{-1} (rpm)

   NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 6-120.

Fuel Supply System

System Troubleshooting Guide

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

1.5ℓ

PAGE / SUB SYSTEM / SYMPTOM		FUEL INJECTOR	PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	MAIN RELAY	CONTAMINATED FUEL
		138	147	149	150	151	*
ENGINE WON'T START		③		③	①	②	
DIFFICULT TO START ENGINE WHEN COLD		②	③	①			
ROUGH IDLE		①	②				
FREQUENT STALLING	WHILE WARMING UP	①		②	③		
	AFTER WARMING UP	①	③	③	②		③
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	①	②				③
	FAILS EMISSION TEST	①	②				
	LOSS OF POWER	③		①	③		②

1.6ℓ

PAGE / SUB SYSTEM / SYMPTOM		FUEL INJECTOR	INJECTOR RESISTOR	PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	MAIN RELAY	CONTAMINATED FUEL
		143	147	147	149	150	151	*
ENGINE WON'T START			③		③	①	②	
DIFFICULT TO START ENGINE WHEN COLD		③			②	①		
ROUGH IDLE		①		②				
FREQUENT STALLING	WHILE WARMING UP	①			②	③		
	AFTER WARMING UP	①		③	③	②		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	①		②				
	FAILS EMISSION TEST	①		②				
	LOSS OF POWER				①	③		

* Fuel with dirt, water or a high percentage of alcohol is considered contaminated.

Fuel Pressure

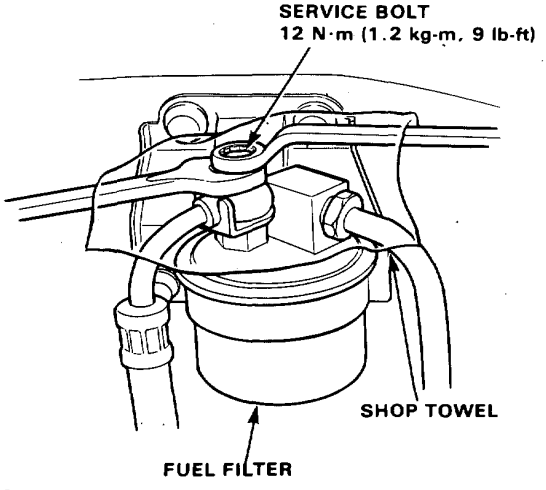
Relieving

⚠ WARNING

- **Do not smoke while working on the fuel system. Keep open flames or sparks away 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. Remove fuel filler cap.
2. Disconnect the battery negative cable from the battery negative terminal.
3. 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.
4. Place a rag or shop towel over the 6 mm service bolt.
5. Slowly loosen the 6 mm service bolt one complete turn.



NOTE:

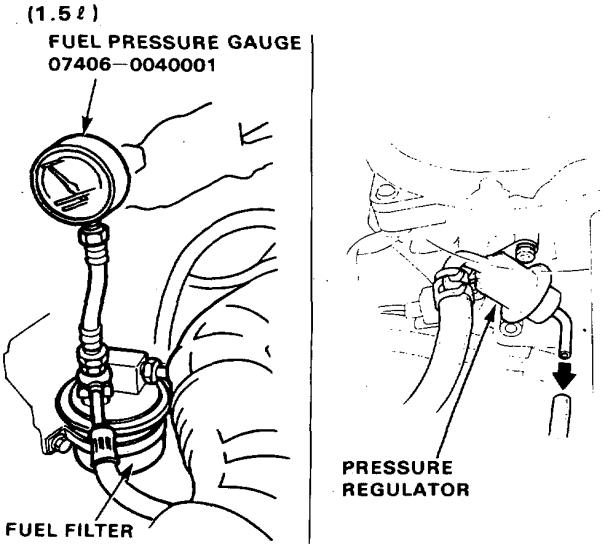
- A fuel pressure gauge can be attached at the 6 mm service bolt hole.
- Always replace the washer between the service bolt and the special banjo bolt, whenever the service bolt is loosened to relieve fuel pressure.
- Replace all washers whenever the bolts are removed to disassemble parts.

Inspection

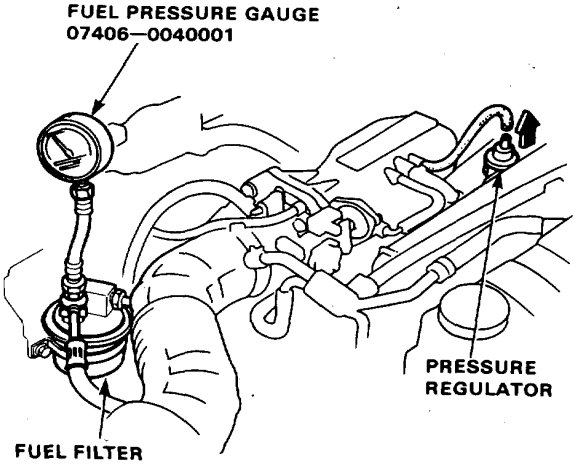
1. Relieve fuel pressure.
2. Remove the service bolt on the top of the fuel filter while holding the banjo bolt with another wrench and attach the fuel pressure gauge.
3. Start the engine. Measure the fuel pressure with the engine idling and vacuum hose of the pressure regulator disconnected.

Pressure should be:
240—279 kPa (2.45—2.85 kg/cm², 35-41 psi)

(1.5 ℓ)



(1.6 ℓ)



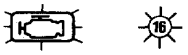
- If the fuel pressure is not as specified, first check the fuel pump (page 6-150). If the pump is OK. check the following:

— If the pressure is higher than specified, inspect for:
  - Pinched or clogged fuel return hose or piping.
  - Faulty pressure regulator (page 6-147).
— If the pressure is lower than specified, inspect for:
  - Clogged fuel filter.
  - Pressure regulator failure (page 6-147).
  - Leakage in the fuel line.

Fuel Injectors [1.5 ℓ]

Troubleshooting Flowchart

Self-diagnosis LED indicates code 16: A problem in the fuel injector circuit.



—Check Engine warning light has been reported on.
—LED indicates CODE 16.

Turn the ignition switch OFF.

Check for loose wires or connectors at injectors.

Are connections OK? — NO → **Repair as necessary.**

YES

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine and hold at 2000 min^{-1} (rpm) for 1 minute.

NOTE: If engine will not start, continue cranking for at least 15 seconds to reproduce CODE on ECU.

Does the engine start and run at 2000 min^{-1} (rpm) for 1 minute. — NO → Is Check Engine warning light on and does LED indicate CODE 16 ? — NO → **See Troubleshooting Guide (page 6-135).**

YES

Is Check Engine warning light on and does LED indicate CODE 16 ? — NO → **Intermittent failure (test drive may be necessary).**

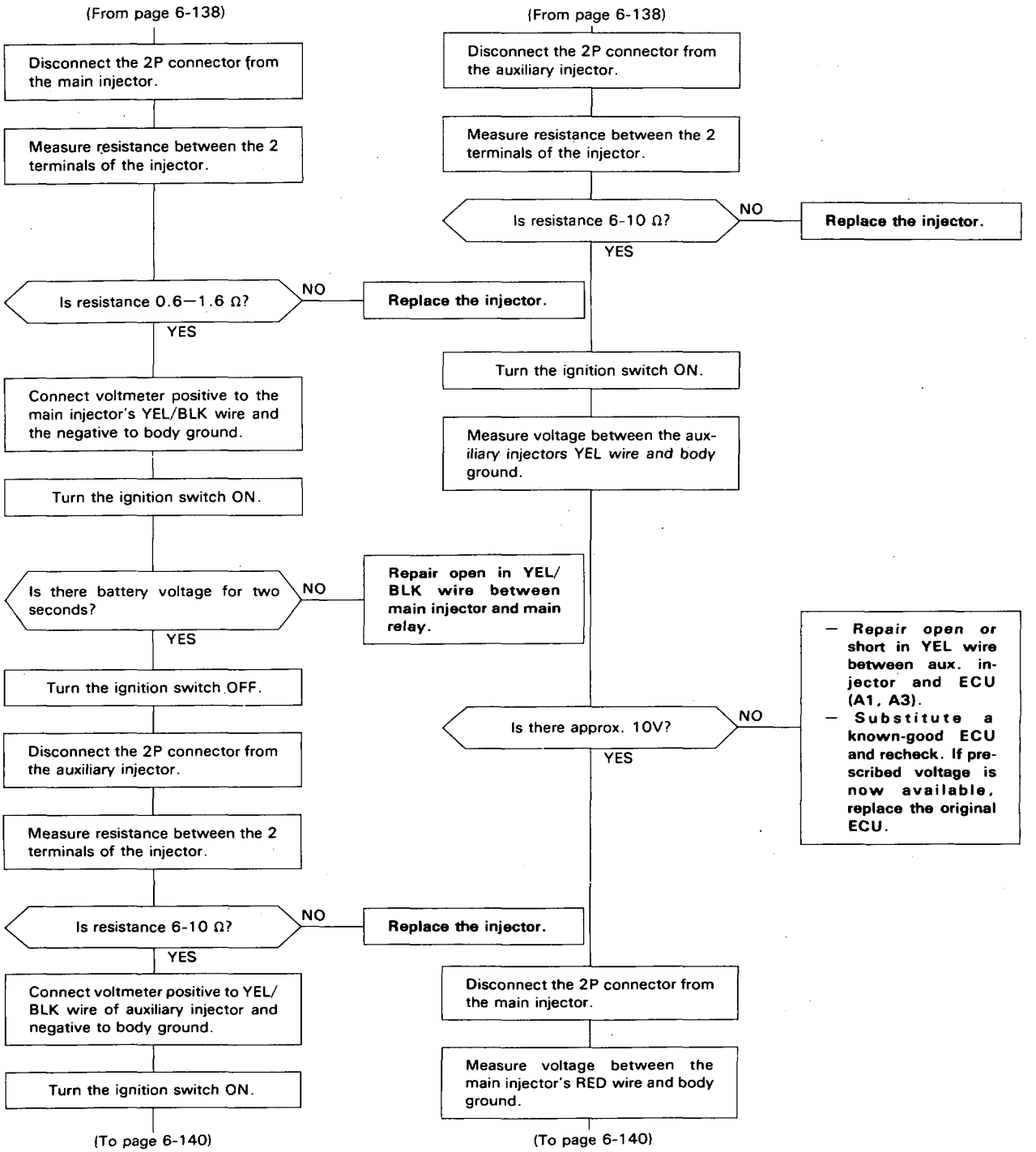
YES

Turn the ignition switch OFF.

Turn the ignition switch OFF.

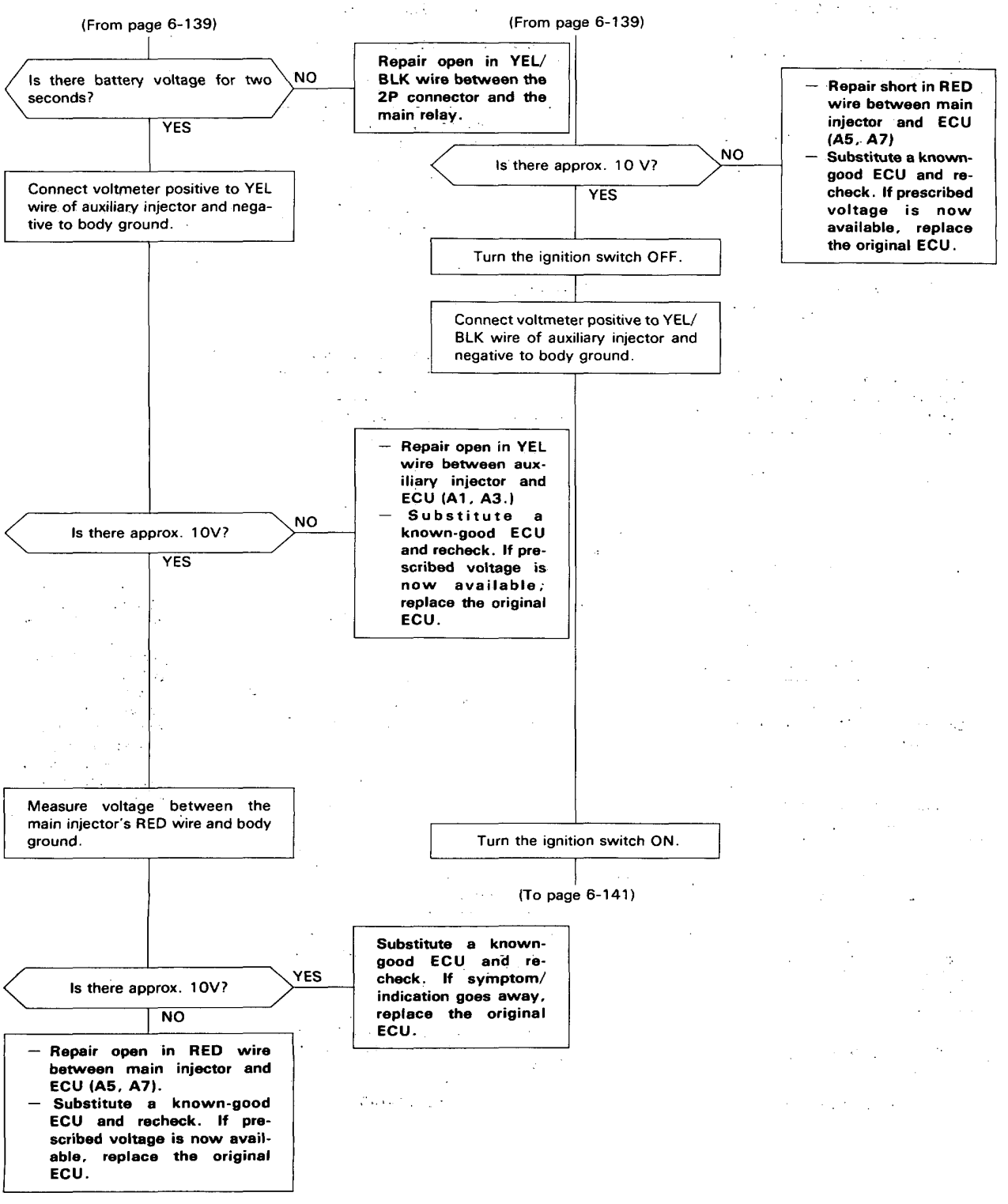
(To page 6-139)

(To page 6-139)


(From page 6-138)
Disconnect the 2P connector from the main injector.
Measure resistance between the 2 terminals of the injector.
Is resistance 0.6—1.6 Ω?
NO
Replace the injector.
YES
Connect voltmeter positive to the main injector's YEL/BLK wire and the negative to body ground.
Turn the ignition switch ON.
Is there battery voltage for two seconds?
NO
Repair open in YEL/BLK wire between main injector and main relay.
YES
Turn the ignition switch OFF.
Disconnect the 2P connector from the auxiliary injector.
Measure resistance between the 2 terminals of the injector.
Is resistance 6-10 Ω?
NO
Replace the injector.
YES
Connect voltmeter positive to YEL/BLK wire of auxiliary injector and negative to body ground.
Turn the ignition switch ON.
(To page 6-140)
(From page 6-138)
Disconnect the 2P connector from the auxiliary injector.
Measure resistance between the 2 terminals of the injector.
Is resistance 6-10 Ω?
NO
Replace the injector.
YES
Turn the ignition switch ON.
Measure voltage between the auxiliary injectors YEL wire and body ground.
Is there approx. 10V?
NO
— Repair open or short in YEL wire between aux. injector and ECU (A1, A3).
— Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.
YES
Disconnect the 2P connector from the main injector.
Measure voltage between the main injector's RED wire and body ground.
(To page 6-140)

(cont'd)

Fuel Injectors [1.5 ℓ] (cont'd)



(From page 6-140)

Is there battery voltage for two seconds?

YES

- **Substitute a known-good ECU and recheck. If prescribed voltage in now available, replace the original ECU.**

NO

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 6-75).

Connect following terminals individually to A18: ●A12 ●A14.

Turn the ignition switch ON.

Is there battery voltage at YEL/BLK wire of aux. injector?

NO

- **Repair open in YEL/BLK wire between aux. injector and main relay.**
- **Repair open in GRN/BLK wire between main relay and ECU (A12, A14).**
- **Replace main relay.**

YES

- **Repair open in BLK wire between G101 (thermostat housing) and ECU (A2, A4).**
- **Substitute a known-good ECU and recheck. If prescribed voltage in now available, replace the original ECU.**

(cont'd)

Fuel Injectors [1.5 ℓ] (cont'd)

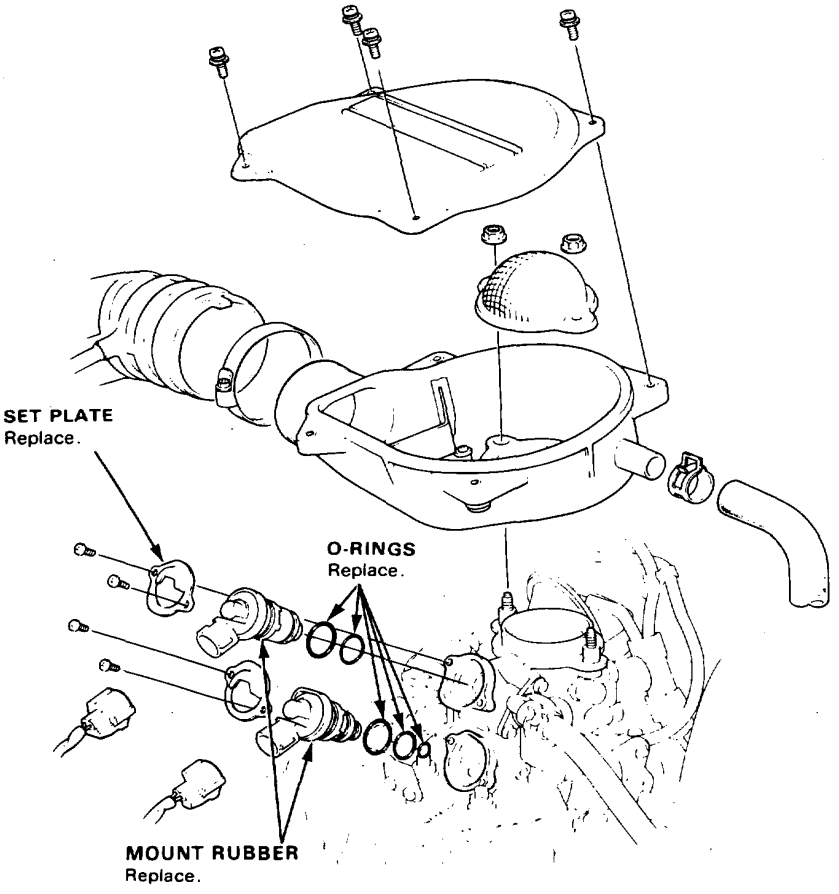
Replacement

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

1. Relieve fuel pressure (page 6-136).
2. Remove the air intake chamber.
3. Disconnect the 2P connector from the injector.
4. Loosen the screws, then remove the injector from the throttle body.

   NOTE: Place a rag or shop towel over the throttle body.
5. Coat new O-rings with clean engine oil and put them on the injector.
6. Insert the injector into the throttle body.

   NOTE: After the injector is inserted, be sure that it turns smoothly about 30°.
7. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approx. 2 seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.



Troubleshooting Flowchart

Self-diagnosis LED indicates code 16: A problem in the fuel injector circuit (with CATA).

(With CATA)

—Check Engine warning light has been reported on.
—LED indicates CODE 16.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Turn the ignition switch to START position.

Does the engine start ? NO

(With CATA)

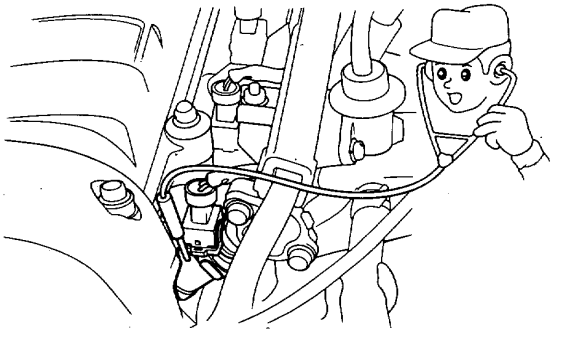
YES

Is Check Engine warning light on and does LED indicate CODE 16? NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires at injectors, injector resistor.

YES

Check the clicking sound of each injector by means of a stethoscope when the engine is idling.



Do the injectors click ? YES

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

NO

(To page 6-144)

(To page 6-144)

(cont'd)

Fuel Injectors [1.6 ℓ] (cont'd)

(From page 6-143)

Turn the ignition switch OFF.

Disconnect the 2P connector from the injector that does not click.

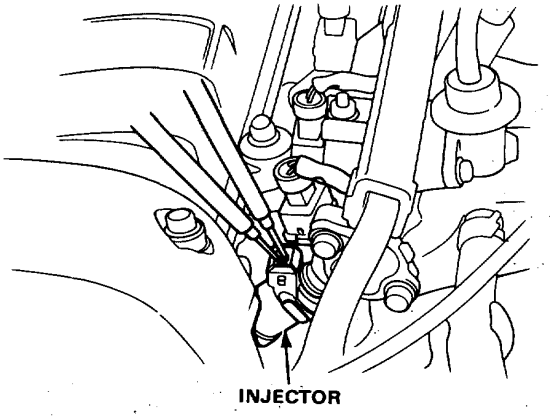
Measure resistance between the 2 terminals of the injector.

(From page 6-143)

Turn the ignition switch OFF.

Disconnect the 2P connector from each injector.

Measure resistance between the 2 terminals of the injector.



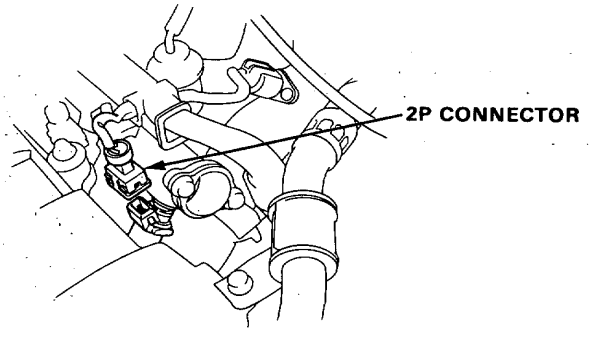
Is there 1.5—2.5Ω ?

NO → **Replace the injector.**

YES

Turn the ignition switch ON.

Measure voltage between RED/BLK (+) terminal on the 2P connector and body ground.



Is there battery voltage ?

NO → Turn the ignition switch OFF.

YES

(To page 6-145)

(To page 6-145)

(From page 6-144)

Measure voltage between the following terminals,
- No. 1 injector: RED/BLK (+) terminal and BRN (–) terminal.
- No. 2 injector: RED/BLK (+) terminal and RED (–) terminal.
- No. 3 injector: RED/BLK (+) terminal and LT BLU (–) terminal
- No. 4 injector: RED/BLK (+) terminal and YEL (–) terminal

Is there battery voltage ?

YES

Disconnect 6P connector on the injector resistor.

Turn the ignition switch ON.

Measure voltage between YEL/BLK (+) terminal and body ground.

Is there battery voltage ?

NO

Repair open in the YEL/BLK wire between the injector resistor and the main relay.

YES

- **Replace the injector resistor.**
- **Repair open in RED/BLK wire between 2P connector and resistor.**

NO

Reconnect the 2P connector to the injector.

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 6-75).

Turn the ignition switch ON.

Measure voltage between A2 (–) terminal and following terminals,
- No.1 injector: A1 (+) terminal.
- No.2 injector: A3 (+) terminal.
- No.3 injector: A5 (+) terminal.
- No.4 injector: A7 (+) terminal.

Disconnect (17P) connector from the ECU.

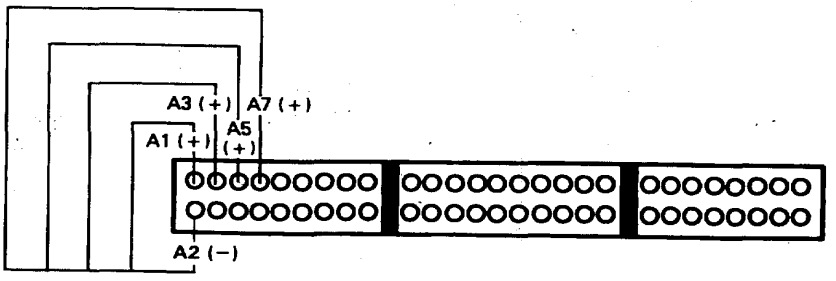
Is there battery voltage ?

YES

Repair short in the wire between the ECU (A1, A3, A5 or A7) and the injector.

NO

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



Is there battery voltage ?

NO

Repair open in the wire between the ECU (A1, A3, A5 or A7) and the injector.

YES

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

(cont'd)

Fuel Injectors [1.6 ℓ] (cont'd)

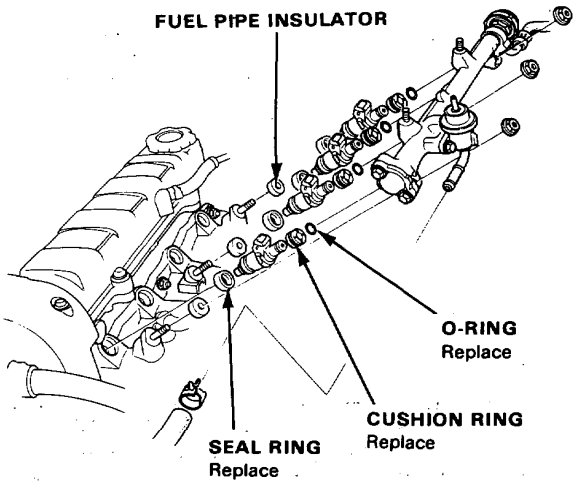
Replacement

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

1. Relieve fuel pressure (page 6-136).
2. Disconnect the connectors from the injectors.
3. Disconnect the vacuum hose and fuel return hose from the pressure regulator.

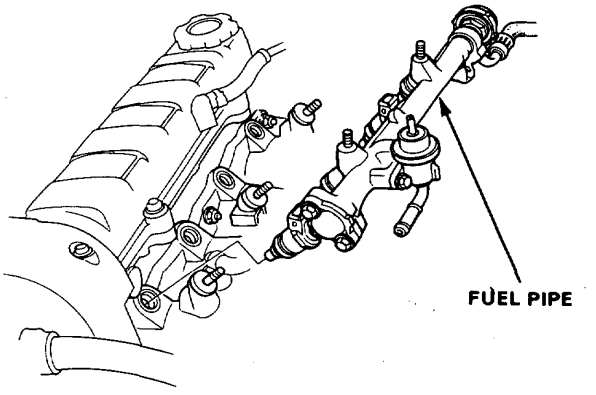
   NOTE: Place a rag or shop towel over the hoses before disconnecting them.

4. Loosen the retainer nuts on the fuel pipe and harness holder.
5. Disconnect the fuel pipe.
6. Remove the injectors from the intake manifold.

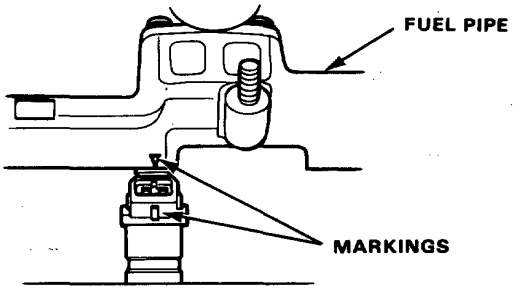


7. Slide new cushion rings onto the injectors.
8. Coat new O-rings with clean engine oil and put them on the injectors.
9. Insert the injectors into the fuel pipe first.
10. Coat new seal rings with clean engine oil and press them into the intake manifold.
11. Install the injectors and fuel pipe assembly 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.



12. Align the center line on the connector with the mark on the fuel pipe.



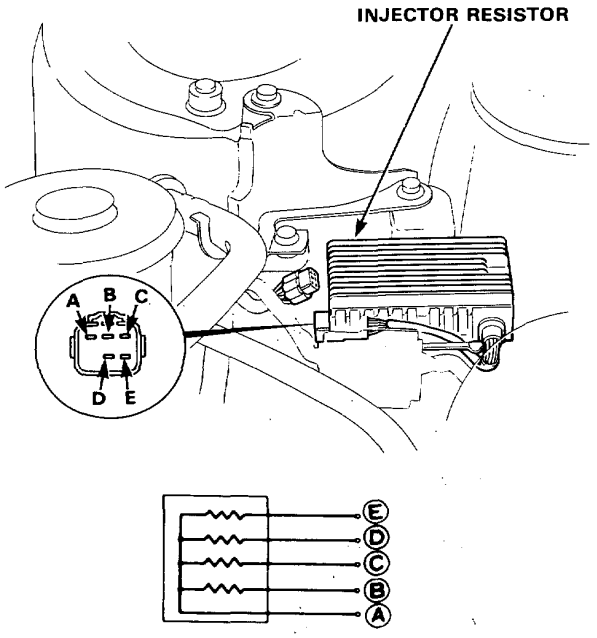
13. Install and tighten the retainer nuts.
14. Connect the vacuum hose and fuel return hose to the pressure regulator.
15. Install the connectors on the injectors.
16. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure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

Injector Resistor

Testing

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.

Pressure Regulator

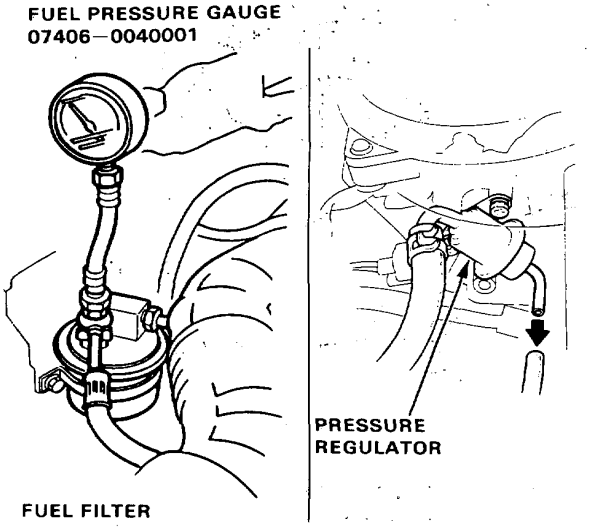
Testing

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

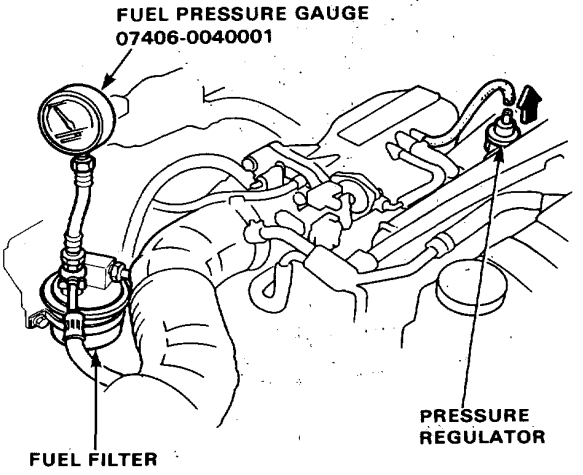
1. Attach a pressure gauge to the service port of the fuel filter (page 6-136).

   Pressure should be:
   240–279 kPa (2.45–2.85 kg/cm², 35–41 psi)
   (with the regulator vacuum hose disconnected)

(1.5 ℓ)



(1.6 ℓ)



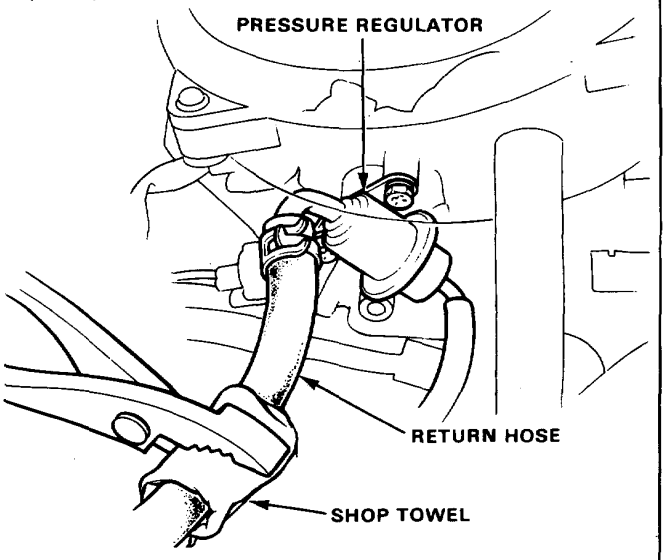
(cont'd)

Pressure Regulator (cont'd)

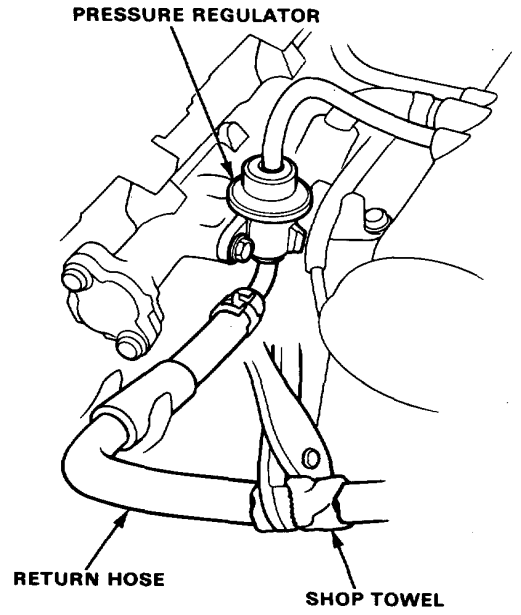
2. Check that the fuel pressure rises when the vacuum hose from the regulator is disconnected.

   - If the fuel pressure did not rise, check whether it rises when the return hose is lightly pinched.

(1.5 ℓ)



(1.6 ℓ)



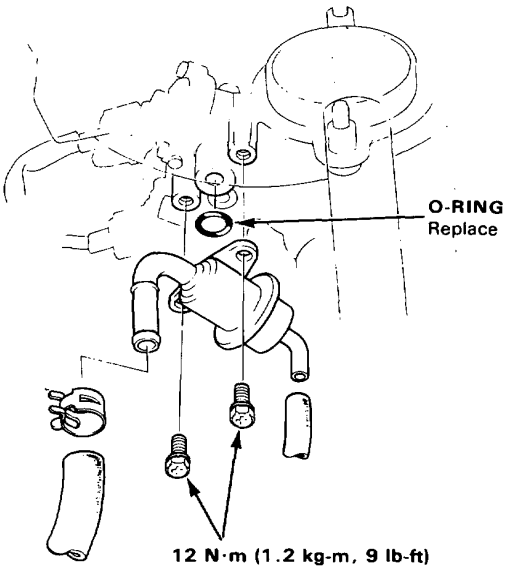
– If the pressure does not rise, replace the regulator and retest.

Replacement

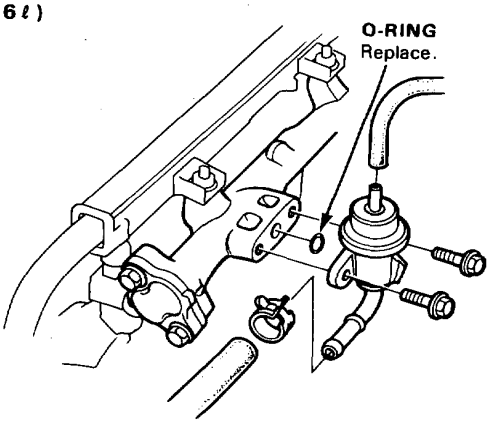
⚠WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Place a shop towel under pressure regulator, then relieve fuel pressure (page 6-136).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.

(1.5 ℓ)



(1.6 ℓ)



NOTE:
- Replace the O-ring.
- 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.

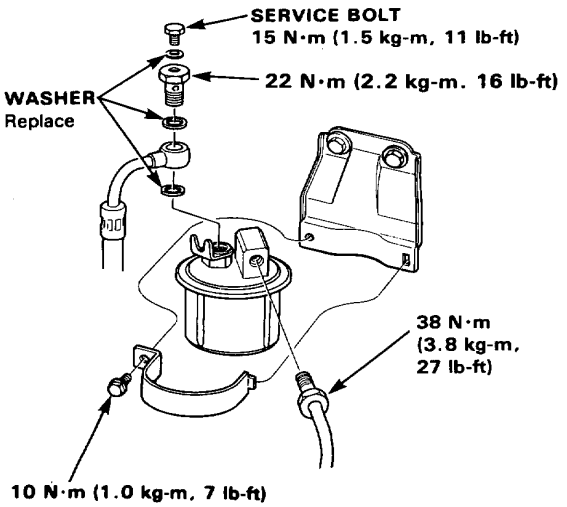
Fuel Filter

Replacement

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

The filter should be repiaced: every 2 years or 40,000 km (24,000 miles), whichever comes first or whenever the fuel pressure drops below the specified value (240-279 kpa, 2.45-2.85 kg/cm², 35-41 psi with the pressure requlator vacuum hose disconnected) after making sure that the fuel pump and the pressure requlator are OK.

1. Place a shop towel under and around the fuel filter.
2. Relieve fuel pressure (page 6-136).
3. Remove the 12 mm banjo bolt and the fuel feed pipe from the filter.
4. Remove the fuel filter clamp and fuel filter.
5. When assembling, use new washers, as shown.



CAUTION: Clean the flared joint of high pressure hoses throughly before reconnecting them.

Fuel Pump

Testing

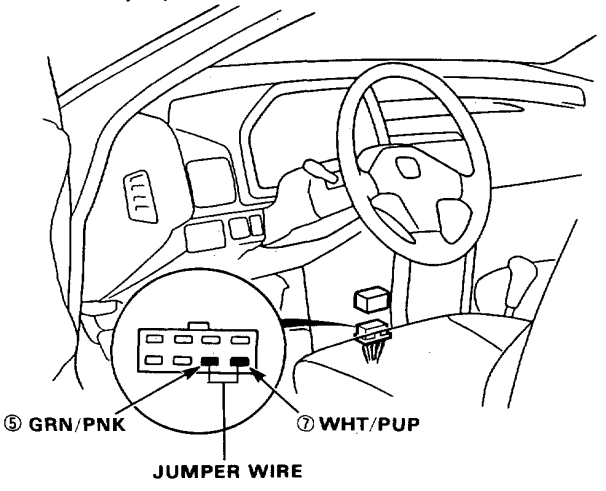
⚠WARNING Do not smoke during the test. Keep open flame away from your work area.

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; when it is ON, you will hear some noise if you hold your ear to the fuel filler port with the fuel filler cap removed. The fuel pump should run for two seconds when ignition switch is first turned on. If the pump does not make noise, check as follows:

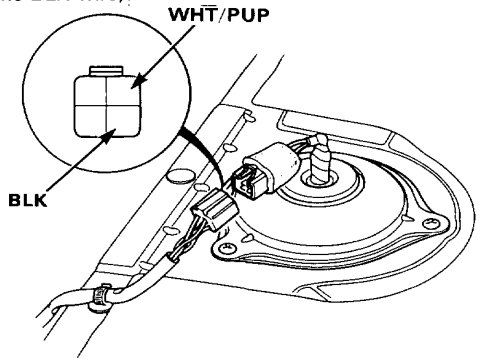
1. Remove the rear seat.
2. Disconnect the 4P connector.

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

3. Connect the GRN/PNK ⑤ wire and WHT/PUP ⑦ wire with a jumper wire.



4. Check that battery voltage is available at the fuel pump connector when the ignition switch is turned ON (positive probe to the WHT/PUP wire, negative probe to the BLK wire).

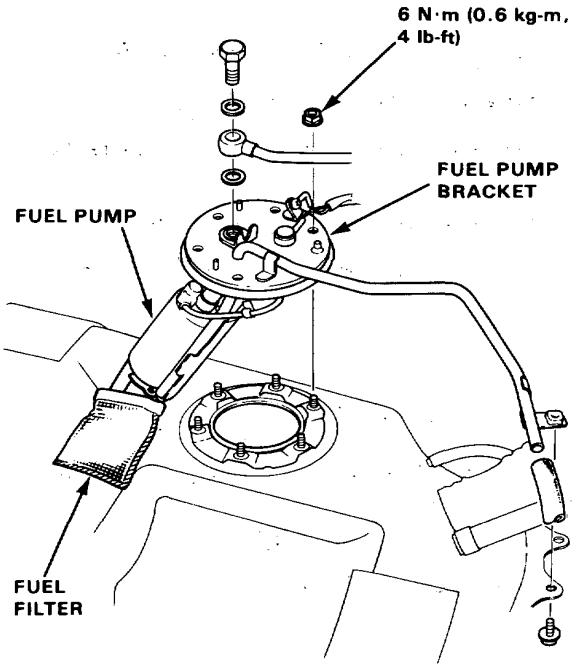


- If battery voltage is available, replace the fuel pump.
- If there is no voltage, check the main relay and wire harness (page 6-151).

Replacement

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

1. Remove the fuel tank (page 6-153).
2. Remove the fuel pump mounting nuts.
3. Remove the fuel pump from the fuel tank.



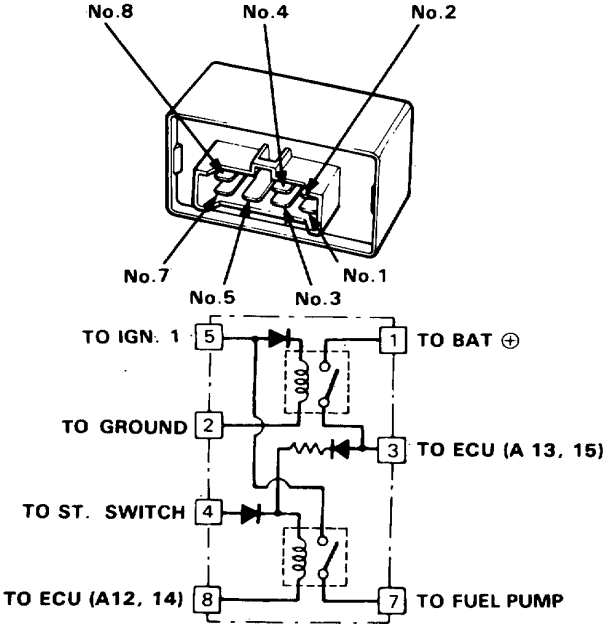
Main Relay

Relay Testing

1. Remove the main relay.

2. Attach 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 and retest.



3. Attach 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 and retest.

4. Attach 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 and retest.

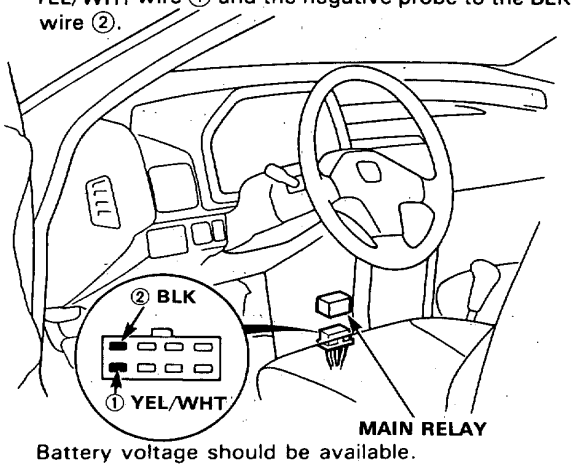
Harness Testing

1. Keep the ignition switch in the OFF position.

2. Disconnect the main relay connector.

3. Check for continuity between the BLK wire ② in the connector and body ground.

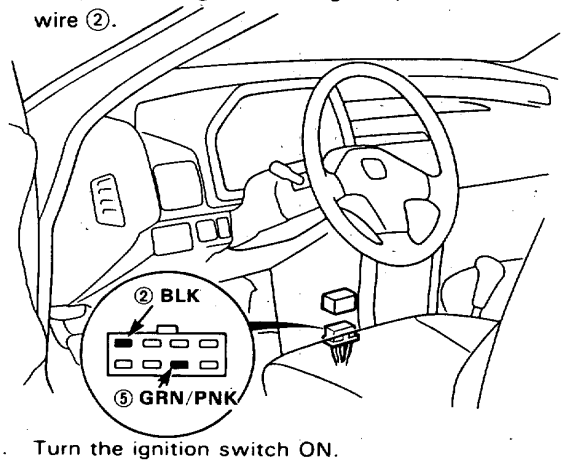
4. Attach the positive probe of voltmeter to the YEL/WHT wire ① and the negative probe to the BLK wire ②.



Battery voltage should be available.

   - If there is no voltage, check the wiring between the battery and the main relay as well as ECU fuse (15A) in the main fuse box.

5. Attach the positive probe of voltmeter to the GRN/PNK wire ⑤ and the negative probe to the BLK wire ②.



6. Turn the ignition switch ON.

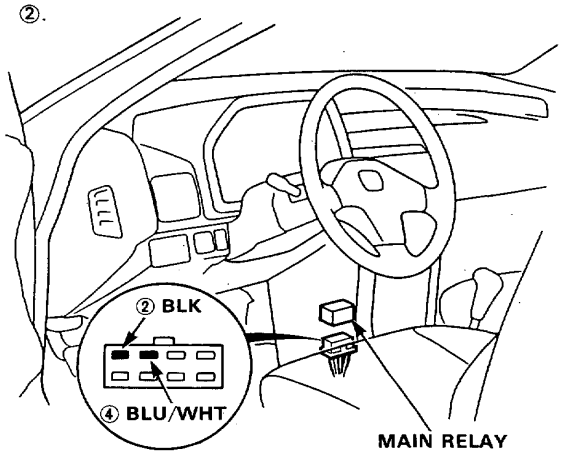
   Battery voltage should be available.

   - If there is no voltage, check No. 14 fuse and the wiring from the ignition switch to the fuse box and the wiring from the fuse box to the main relay.

(cont'd)

Main Relay (cont'd)

7. Attach the positive probe of voltmeter to the BLU/WHT wire ④ and the negative probe to the BLK wire ②.

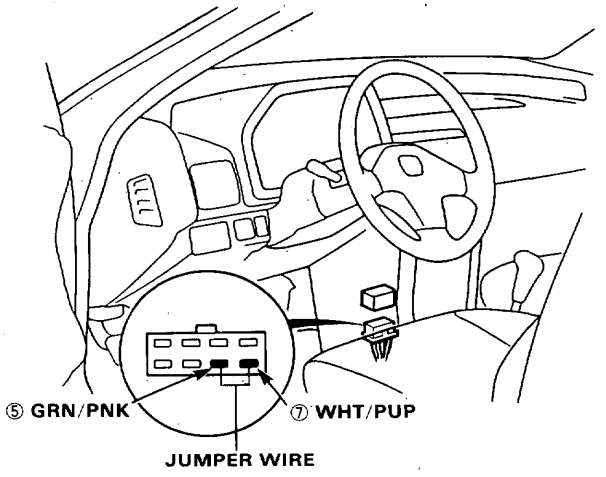


8. Turn the ignition switch to START position.

   Approximately 10 volts should be available.

   - If there is no voltage, check the No.2 (10A) fuse and the wiring between the ignition switch and fuse box and from the fuse box to the main relay.

9. Connect a jumper wire between the GRN/PNK wire ⑤ and WHT/PUP wire ⑦.



10. Turn the ignition switch ON.

    The fuel pump should work.

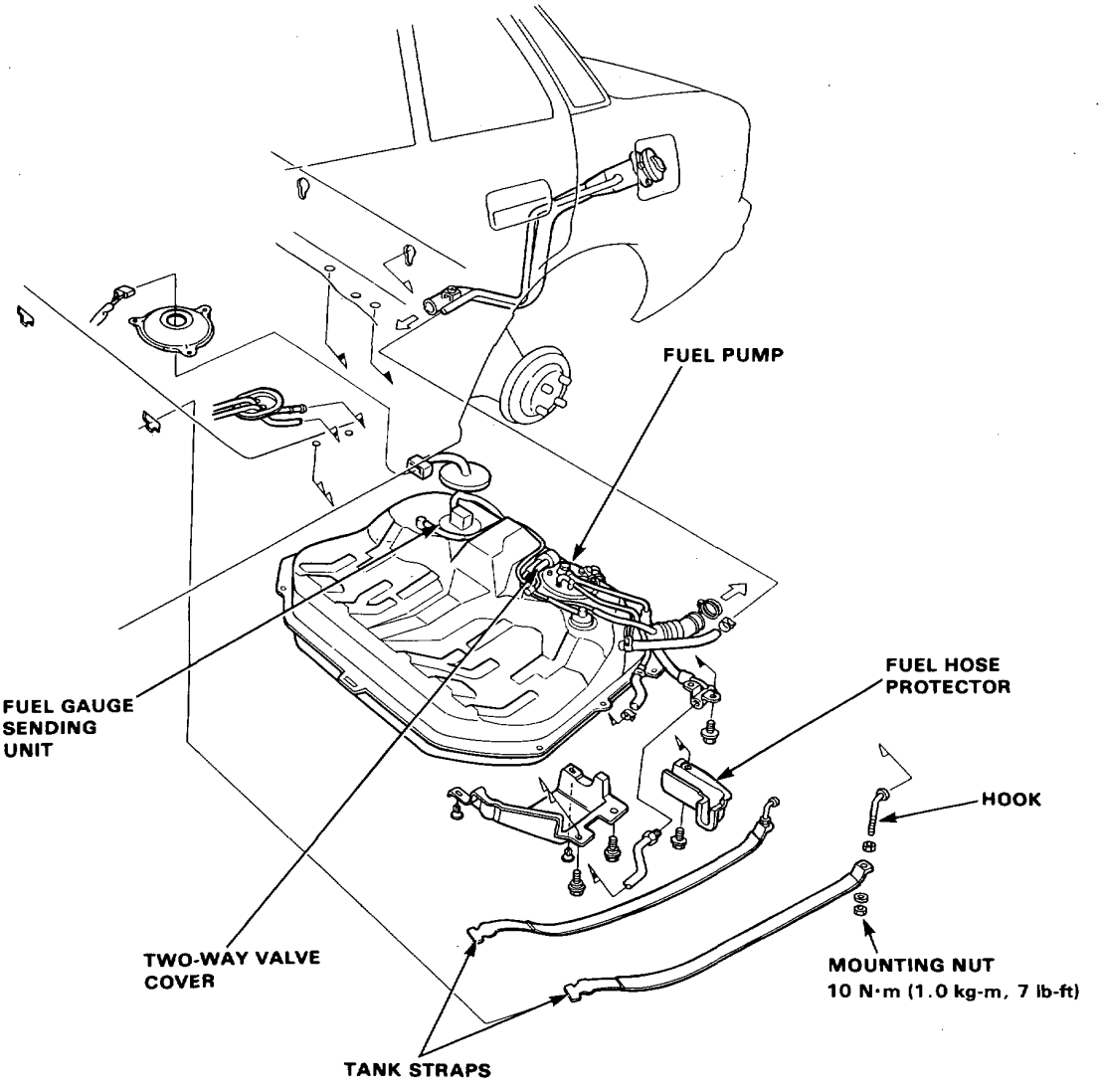
    - If the fuel pump does not work, check the wiring between the main relay and fuel pump, and the wiring from the fuel pump to the ground (BLK wire).

Fuel Tank

Replacement

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

1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the rear seat and disconnect the 4P connector.
3. Remove the two-way valve cover and fuel hose protector.
4. Disconnect the hoses.
   CAUTION:
   - **When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.**
   - **Clean the flared joint of high pressure hoses throughly before reconnecting 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.
   NOTE: The tank may stick on the undercoat applied to its mount. To remove, carefully pry it off the mount.
8. Install parts in the reverse order of removal.



Air Intake System

System Troubleshooting Guide

NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.

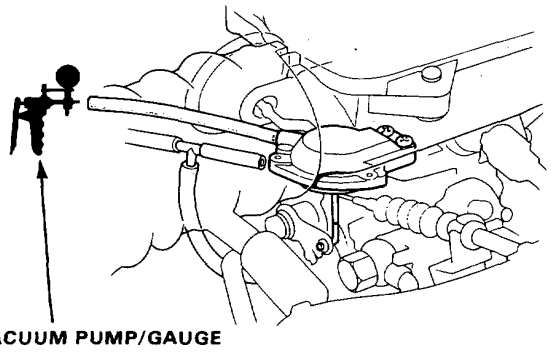
PAGE / SUB SYSTEM / SYMPTOM	THROTTLE CABLE	THROTTLE BODY	TANDEM CONTROL SYSTEM (1.5ℓ)	THROTTLE CONTROL SYSTEM
	155	157, 160	162	169
DIFFICULT TO START ENGINE WHEN COLD			①	
WHEN COLD FAST IDLE OUT OF SPEC	③	②		①
WHEN WARM RPM TOO HIGH	③	②		①
WHEN WARM RPM TOO LOW		①		
FREQUENT STALLING WHILE WARMING UP	③	②	①	
LOSS OF POWER	③	②	①	

Throttle Cable

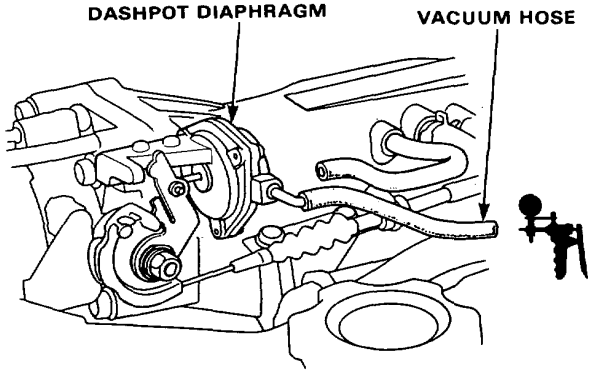
Inspection/Adjustment

1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Disconnect #6 hose from the dashpot diaphragm and connect a vacuum pump to the diaphragm. Apply vacuum.

(1.5 ℓ)

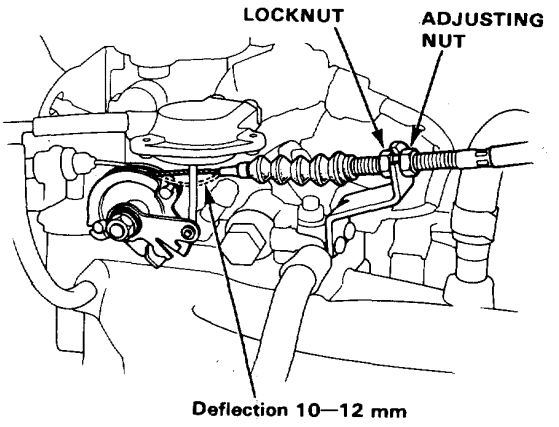


(1.6 ℓ)

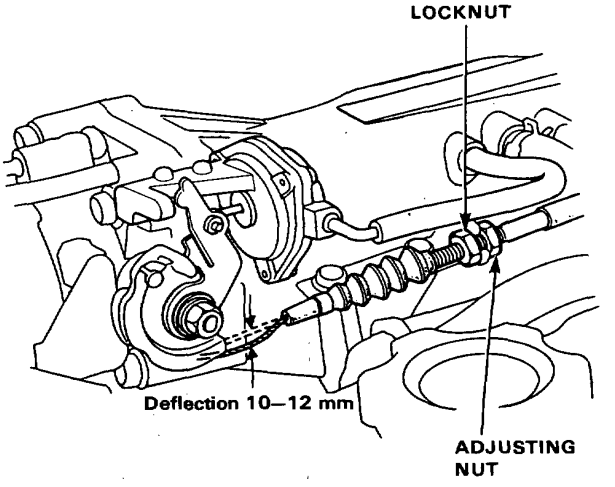


4. Check cable free play at the throttle linkage. Cable deflection should be 10—12 mm

(1.5 ℓ)



(1.6 ℓ)



5. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
6. 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.

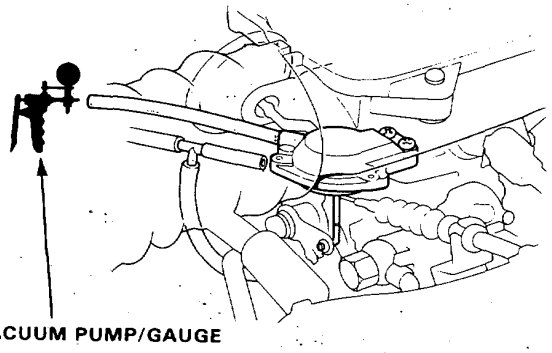
(cont'd)

Throttle Cable (cont'd)

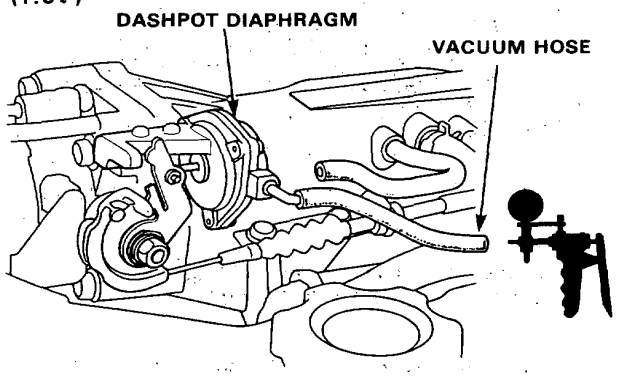
Installation

1. Fully open the throttle valve, then install the throttle cable in the throttle linkage and install the cable housing in the cable bracket.
2. Warm up the engine to normal operating temperature (the cooling fan comes on).
3. Disconnect #6 hose from the dashpot diaphragm and connect a vacuum pump to the diaphragm. Apply vacuum.

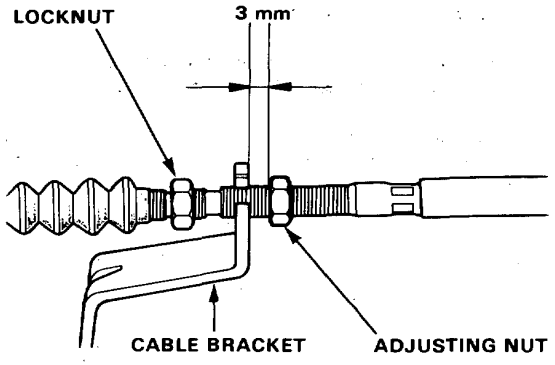
(1.5 ℓ)



(1.6 ℓ)



4. Hold the cable sheath, removing all slack from the cable.
5. Turn the adjusting nut until it is 3 mm away from the cable bracket.
6. Tighten the locknut.

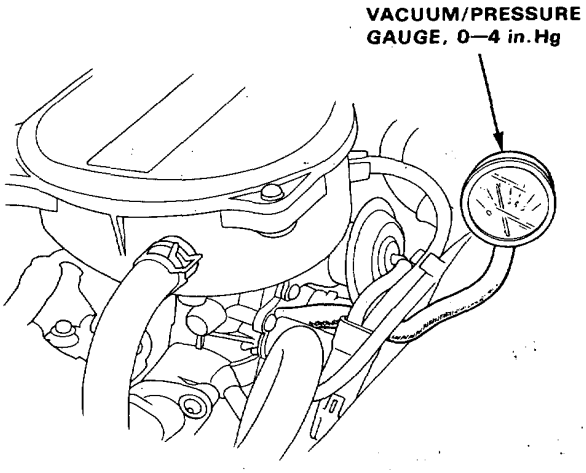


7. Disconnect the vacuum pump and connect the #6 vacuum hose.

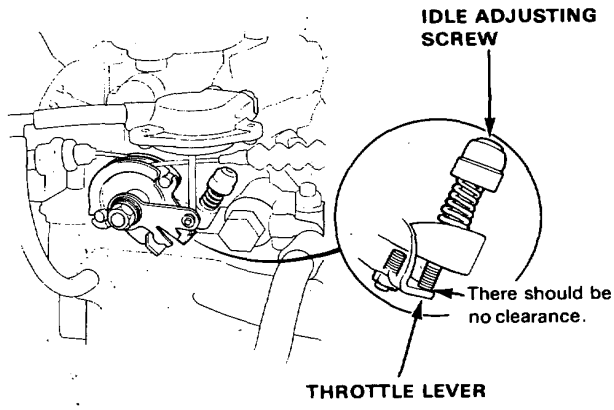
Inspection

CAUTION: Do not adjust the throttle stop screw since it cannot be reset except at the factory.

1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. Disconnect the vacuum hose (to the canister) from the throttle body and connect a vacuum gauge to the throttle body.



3. Allow the engine to idle and check that the gauge indicates little or no vacuum.
   - If there is measurable vacuum, check the throttle control system (page 6-169).
4. Check that vacuum increases when the throttle is opened slightly from idle.
   - If there is no increase in vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.
5. Stop the engine and check that the throttle cable operates smoothly without binding or sticking.
   - If there are any abnormalities in the above steps, check for:
   - — Excessive wear or play in the throttle valve shaft.
   - — Sticky or binding throttle lever at full close position.
   - — Clearance between idle adjusting screw and throttle lever at full close position.

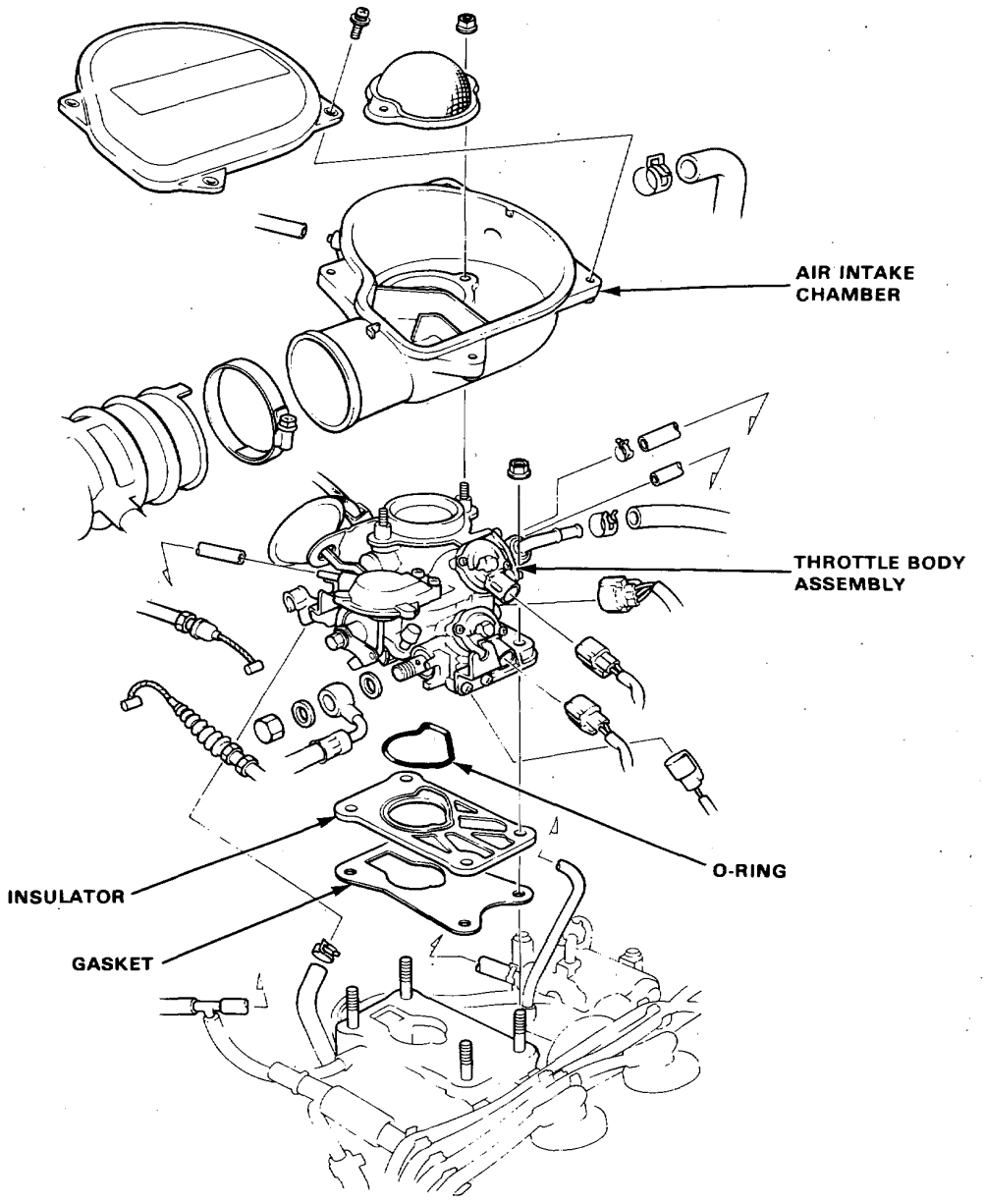


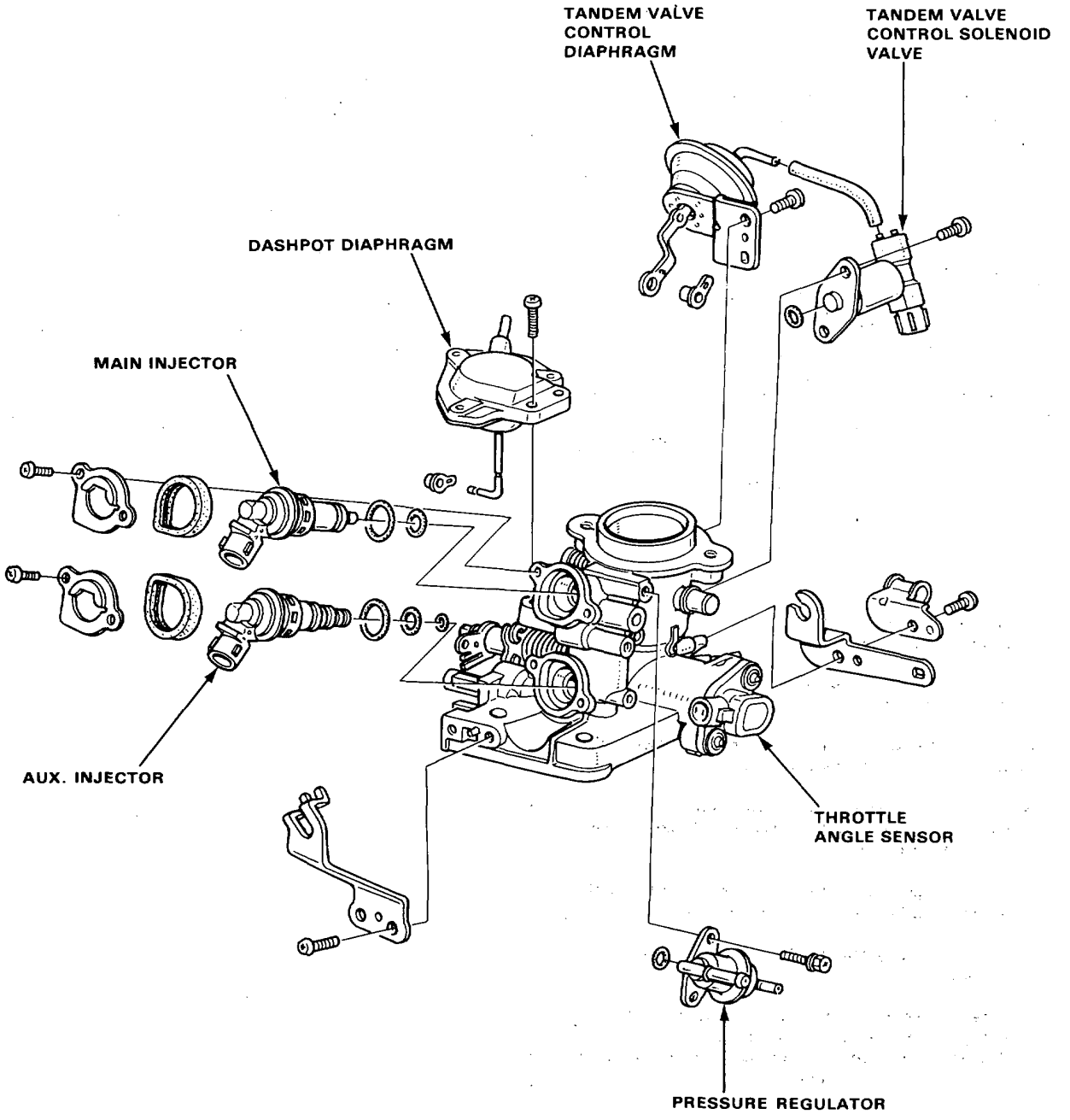
Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

(cont'd)

Throttle Body [1.5 ℓ] (cont'd)

Disassembly

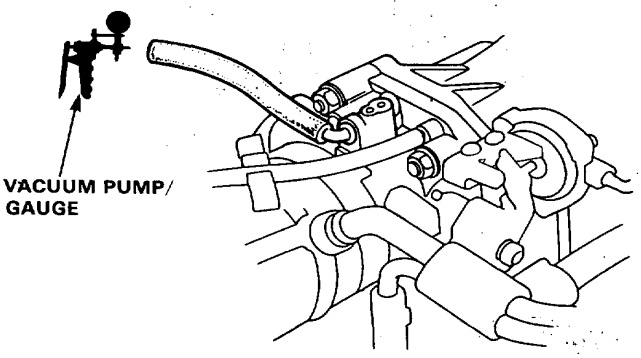



TANDEM VALVE CONTROL DIAPHRAGM
TANDEM VALVE CONTROL SOLENOID VALVE
DASHPOT DIAPHRAGM
MAIN INJECTOR
AUX. INJECTOR
THROTTLE ANGLE SENSOR
PRESSURE REGULATOR

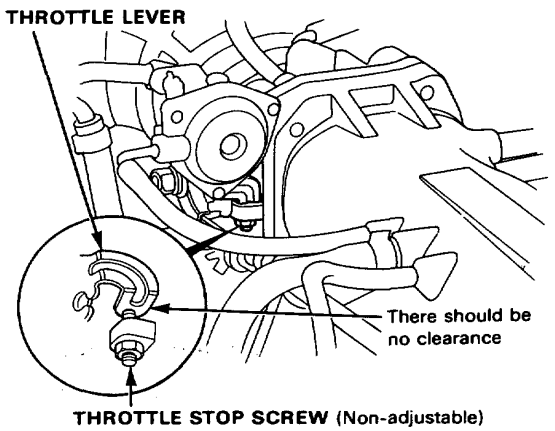
Inspection

CAUTION: Do not adjust the throttle stop screw since it can not be reset except at the factory.

1. Start the engine and allow to reach normal operating temperature (cooling fan comes on).
2. Disconnect the vacuum hose (to the canister) from the top of the throttle body; connect a vacuum gauge to the throttle body.



3. Allow the engine to idle and check that the gauge indicates no vacuum.
   - If there is vacuum, check the throttle control system (page 6-169).
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
   - If the gauge indicates no vacuum, check the canister port. If the canister port is clogged, clean it with carburetor cleaner.
5. Stop the engine and check that the throttle cable operates smoothly without binding or sticking.
   - If there are any abnormalities in the above steps, check for:
     - Excessive wear or play in the throttle valve shaft.
     - Sticky or binding throttle lever at full close position.
     - Clearance between throttle stop screw and throttle lever at full close position.

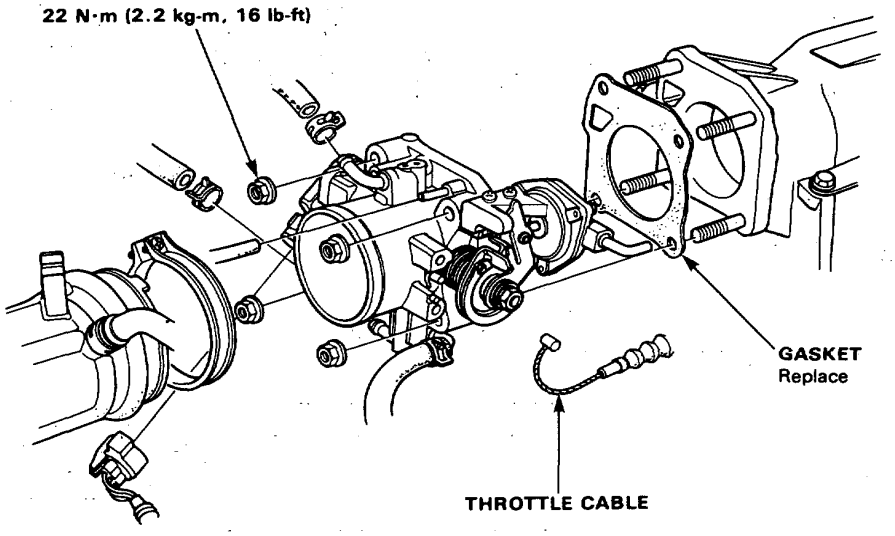


THROTTLE STOP SCREW (Non-adjustable)

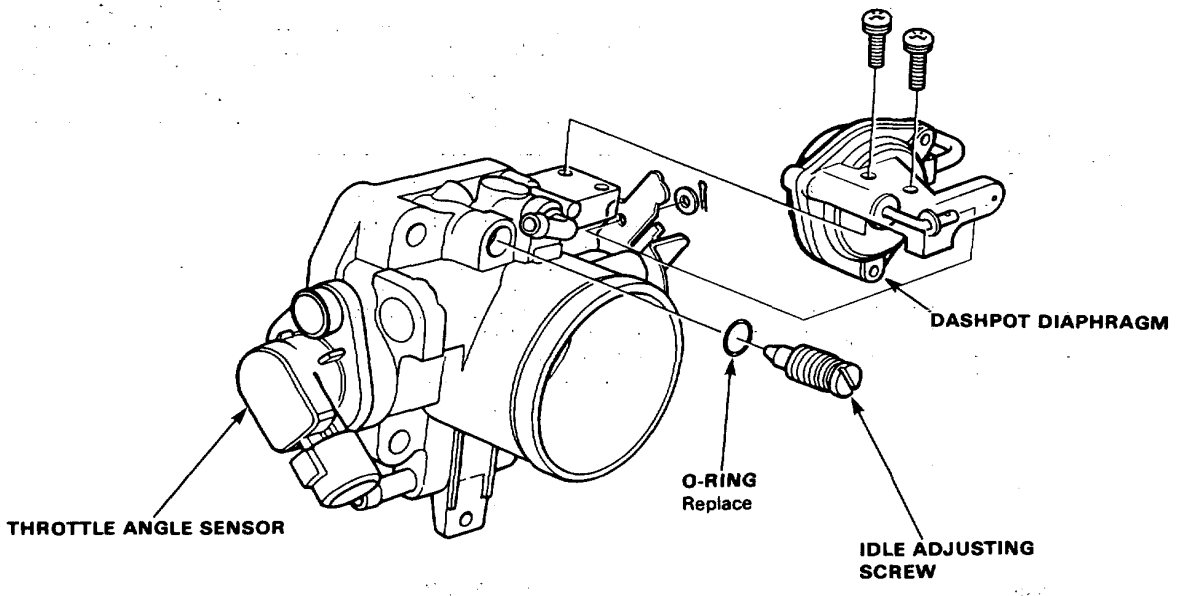
Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

— Throttle Body [1.6 ℓ]

Disassembly

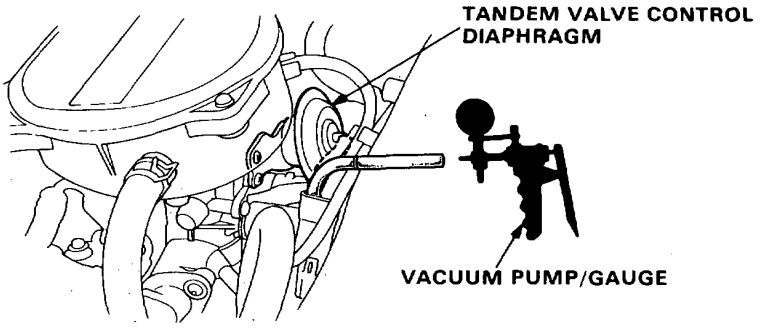


CAUTION:
- **The throttle stop screw in non-adjustable.**
- **After reassembly, adjust the throttle cable (page 6-155).**



Tandem Control System [1.5 ℓ]

Troubleshooting Flowchart



Inspection of Tandem Control System

Disconnect the vacuum hose from the tandem valve control diaphragm and connect a vacuum gauge to the hose.

Start engine and allow to idle.
NOTE: Coolant temperature must be below 70°C (160°F).

Is there vacuum ?
- YES → Disconnect the 2P connector from the tandem valve control solenoid valve.
  - Is there vacuum ?
    - YES → **Replace the solenoid valve.**
    - NO → Turn the ignition switch OFF.
      - Disconnect "B" connector from ECU.
      - Check for continuity to ground on the ORN wire.
      - Is there continuity to ground ?
        - YES → **Repair short to ground at ORN wire between ECU (B2) and the 2P connector.**
        - NO → **Substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.**
- NO → Raise engine speed to,
  - Manual: 3,000 min^{-1} (rpm)
  - Automatic: 2,000 min^{-1} (rpm)

  Is there vacuum ?
  - NO → Disconnect the 2P connector from the tandem valve control solenoid valve.
  - YES

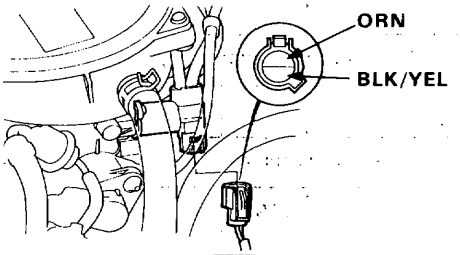
(To page 6-163)

(To page 6-163)

(From page 6-162)

(From page 6-162)

Measure voltage between BLK/YEL (+) terminal and ORN (–) terminal at 3,000 min^{-1} (rpm)



Is there battery voltage ?

YES

Remove the solenoid valve from the throttle body and check the port for blockage. If the port is OK, replace the solenoid valve.

NO

Measure voltage between BLK/YEL (+) terminal and body ground.

Is there battery voltage ?

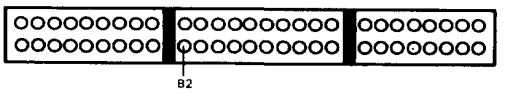
NO

Repair open in BLK/YEL wire between the 2P connector and No. 14 fuse.

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 6-75).



Check for continuity of ORN wire between ECU (B2) and the 2P connector.

Does continuity exist ?

NO

Repair open in ORN wire between ECU (B2) and the 2P connector.

YES

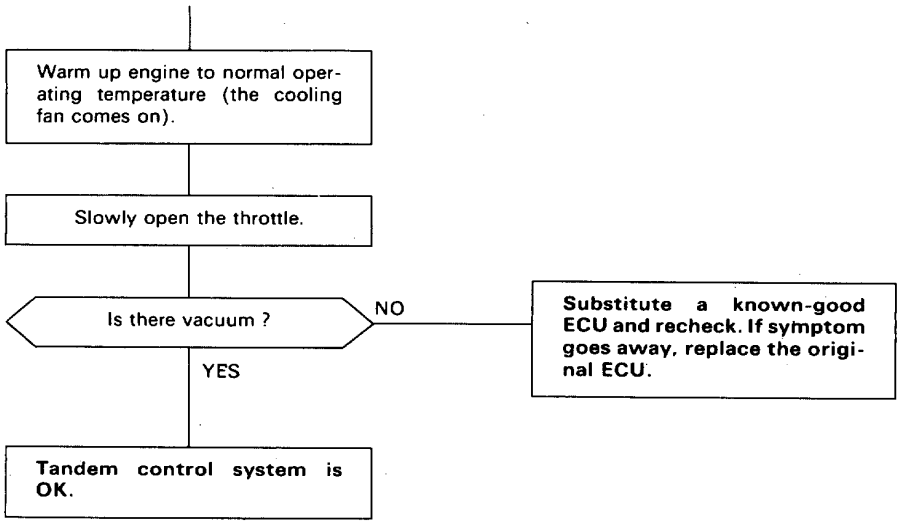
Substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

(To page 6-164)

(cont'd)

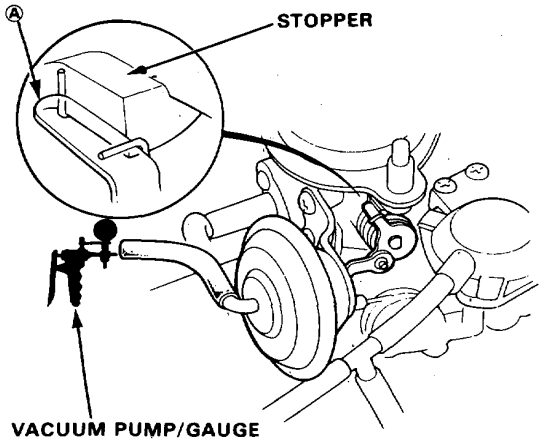
Tanden Control System [1.5 ℓ] (cont'd)

(From page 6-163)



Tandem Valve Control Diaphragm Testing

1. Check the tandem valve shaft for binding or sticking.
2. Check the bypass valve for smooth movement.
   - If any fault is found, clean the linkage and shafts with carburetor cleaner.
3. Disconnect the vacuum hose from the tandem valve control diaphragm and connect a vacuum pump to the diaphragm.
4. Apply vacuum and check that Ⓐ of the tandem valve is in close contact with the stopper when the tandem valve is fully open.



   - If any fault is found, replace the tandem valve control diaphragm.

Intake Control System

Troubleshooting Flow Chart

Inspect of Intake Control System.

Start engine and allow to idle.

Remove the vacuum hose from the intake control diaphragm and connect a vacuum gauge to the hose.

Is there vacuum?

NO

Disconnect the lower vacuum hose of the solenoid valve from the check valve and connect a vacuum pump.

YES

Is there vacuum?

NO

Check the vacuum line for proper connection, cracks, blockage or disconnected hose.

YES

Disconnect the connector from the resonator control solenoid valve.

Measure voltage between GRN/PNK (+) terminal and RED (−) terminal.

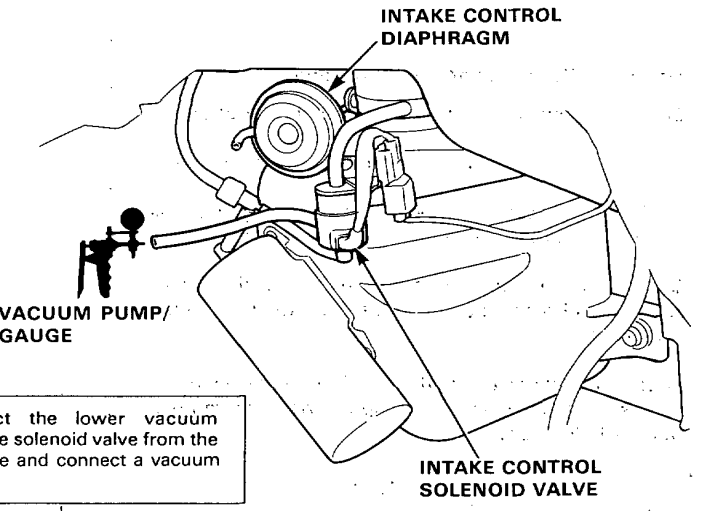
Is there battery voltage?

YES

Replace the intake control solenoid valve.

NO

Measure voltage between GRN/PNK (+) terminal and body ground.



(To page 6-167)

(To page 6-167)

(From page 6-166)

Raise engine speed to 3,000 min^{-1} (rpm).

Is there vacuum?

YES → Disconnect the connector

NO

Is there vacuum?

YES → **Replace intake control solenoid valve.**

NO

Turn the ignition switch OFF.

Disconnect "A" connector from ECU.

Check for continuity to ground on RED wire.

(To page 6-168)

(From page 6-166)

Is there battery voltage?

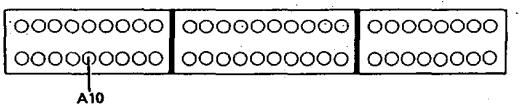
NO → **Repair open in wire between the 2P connector and No. 14 fuse.**

YES

Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 6-75).

Check for continuity of RED wire between ECU (A10) and the 6P connector.



Does continuity exist?

NO → ***Repair open in RED wire between ECU (A10) and the connector.***

YES

Substitute a known-good ECU and recheck. If prescribed voltage is now avilable, replace the original ECU.

(To page 6-168)

(cont'd)

Intake Control System (cont'd)

(From page 6-167)

Connect the vacuum hose to the vacuum hose manifold and connect a vacuum pump to the hose.

Apply vacuum.

Does it hold vacuum?

NO

Check the vacuum line for proper connection or disconnected hose.
If OK, replace the intake control diaphragm.

YES

Intake control system is OK.

(From page 6-167)

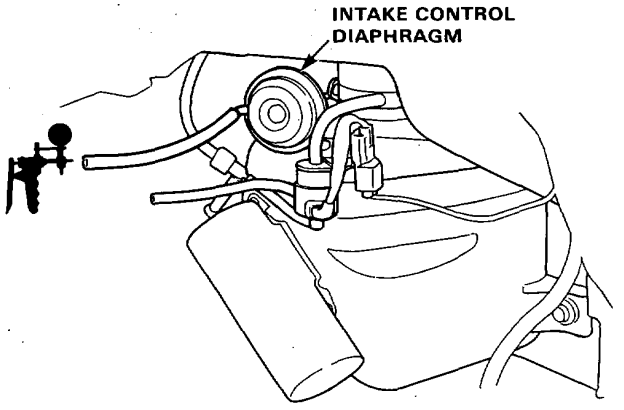
Is there continuity to ground?

YES

Repair short to ground in RED wire between ECU (A10) and the connector.

NO

Substitute a known good ECU and recheck. If symptom goes away, replace the original ECU.



System Troubleshooting Guide

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE / SUB SYSTEM / SYMPTOM		CATALYTIC CONVERTER	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
		172	173	174,177
ROUGH IDLE			①	
POOR PERFORMANCE	FAILS EMISSION TEST	①		②
	LOSS OF POWER	①		

Emission Control System

Tailpipe Emission

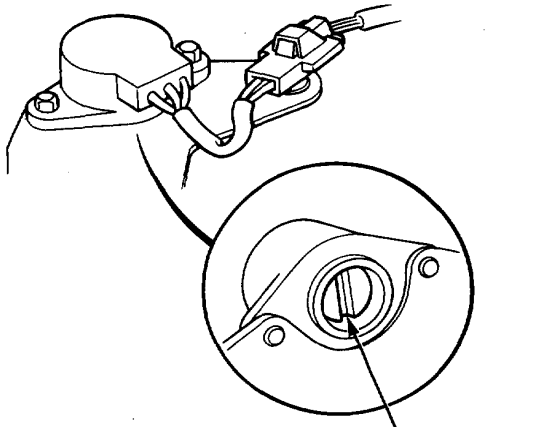
Inspection

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

1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 6-133, 134).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

Specified CO%:
With CATA: 0.1% maximum
Without CATA: 0.5 $^{+0.5\%}_{-0.3\%}$

- If unable to obtain this reading;
  On With CATA, see ECU troubleshooting (page 6-54).
  On other models, adjust by turning the adjusting screw of the IMA sensor.

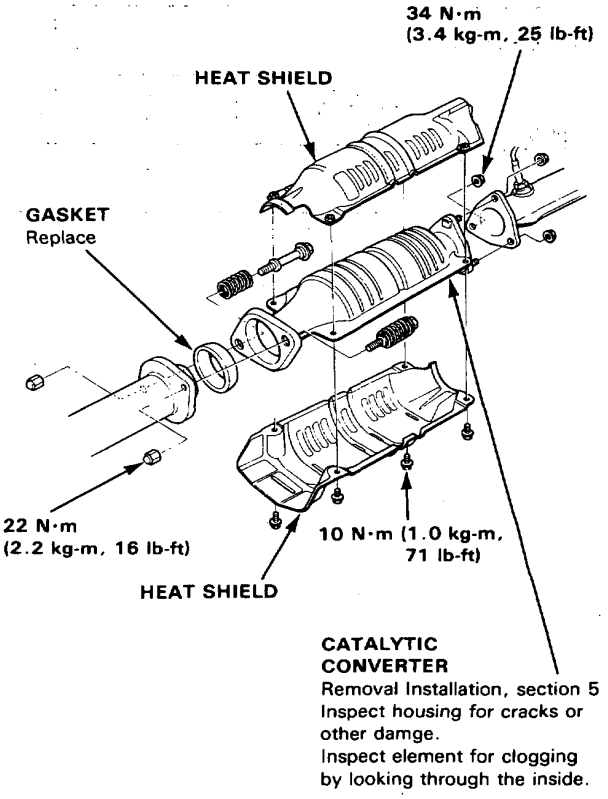


– If unable to obtain a CO reading of specified % by this procedure, check the engine tune-up condition.

Catalytic Converter

Inspection

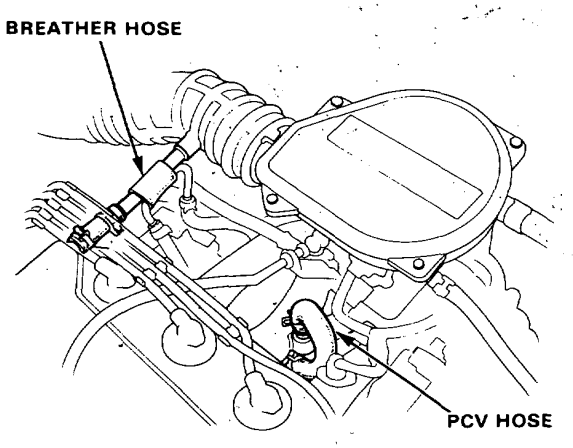
If excessive exhaust system back-pressure is suspected, remove the catalytic converter from the car and make a visual check for plugging, melting or cracking of the catalyst. Replace the catalytic converter if more than 50% of the visible area is damaged or plugged.



Positive Crankcase Ventilation System

Inspection (1.5 ℓ)

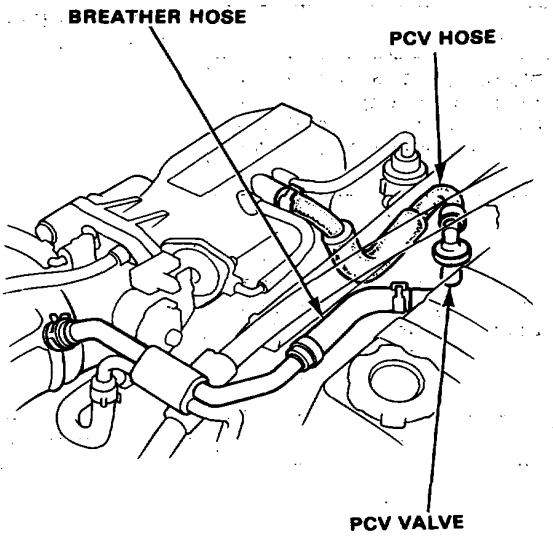
1. Check the crankcase ventilation hoses and connections for leaks and clogging.



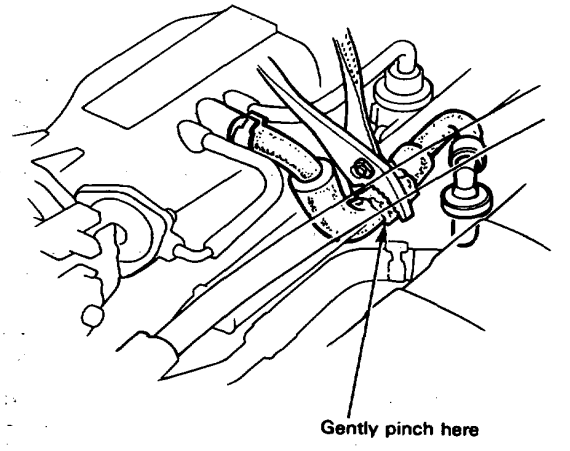
2. At idle, make sure there is a clicking sound from the PCV valve when you lightly pinch the PCV hose with your fingers or pliers.
   - If no clicking sound is heard, replace PCV valve and recheck.

Inspection (1.6 ℓ)

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



2. At idle, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and intake manifold in 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.

Evaporative Emission Controls [1.5 ℓ]

Troubleshooting Flowchart

Inspection of Evaporative Emission Controls

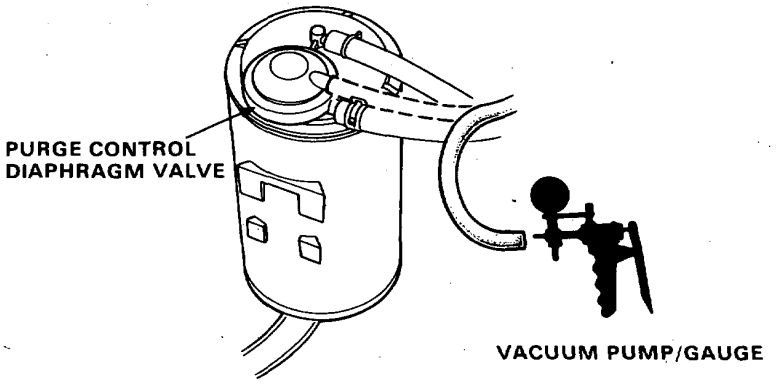
Disconnect #7 hose from the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.

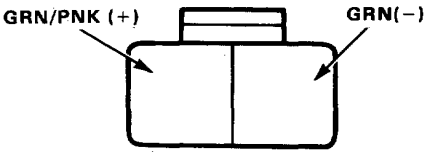
Start the engine and allow to idle.
NOTE: Engine coolant temperature must be below 80°C (176°F).

Is there vacuum ?

YES → Disconnect the 2P connector.

NO





Measure voltage between GRN/PNK (+) terminal and GRN (−) terminal.

Is there battery voltage ?

YES → **Inspect #7 hose routing. If OK, replace purge cut-off solenoid valve.**

NO

Measure voltage between GRN/PNK (+) terminal and body ground.

(To page 6-175)

(To page 6-175)

(From page 6-174)

Warm up the engine to normal operating temperature (cooling fan comes on).

Check for vacuum at #7 hose 10 seconds after starting the engine. NOTE: Check with the throttle valve slightly opened.

Is there manifold vacuum? NO

YES

Reconnect the hose.

Remove fuel filler cap.

(To page 6-176)

(From page 6-174)

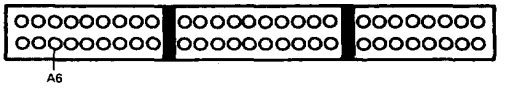
Is there battery voltage ? NO

Repair in GRN/PNK wire between No. 14 fuse and the 2P connector.

YES

Turn the ignition switch OFF.

Connect the ECU test harness to the main wire harness only, not the ECU (page 6-75).



Check for continuity of GRN wire between ECU (A6) and the 2P connector.

Does continuity exist ? NO

Repair open in GRN wire between ECU (A6) and the connector.

YES

Substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

Disconnect the 2P connector.

Is there manifold vacuum? NO

Inspect #7 hose routing. If OK, replace purge cutoff solenoid valve.

YES

Turn the ignition switch OFF.

Disconnect "A" connector from ECU.

Check for continuity to ground on GRN wire.

(To page 6-176)

(cont'd)

Evaporative Emission Control [1.5 ℓ] (cont'd)

(From page 6-175)

Connect a vacuum gauge to canister purge air hose.

Start the engine and raise speed to 3,500 min^{-1} (rpm).

Does vacuum appear on gauge within 1 minute ?

NO → **Replace the canister.**

YES

See two-way valve test (page 6-181) to complete. Evaporative emission conrtols are OK.

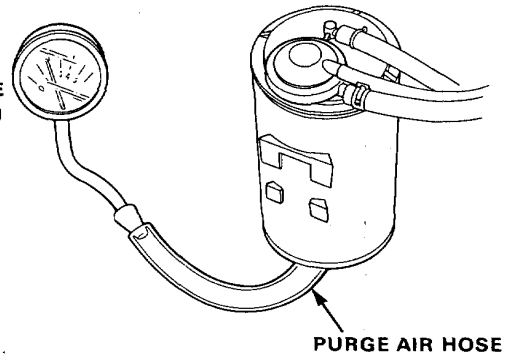
(From page 6-175)

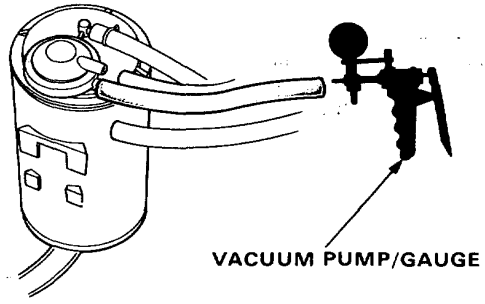
Is there continuity to ground ?

YES → **Repair short to ground in GRN wire between ECU (A6) and the connector.**

NO

Substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

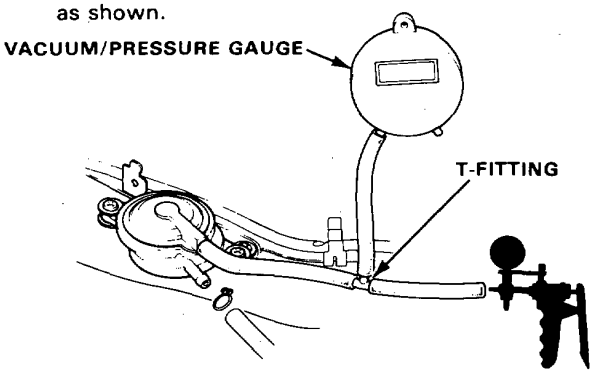




Evaporative Emission Controls [With CATA]

Two-Way Valve Test

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

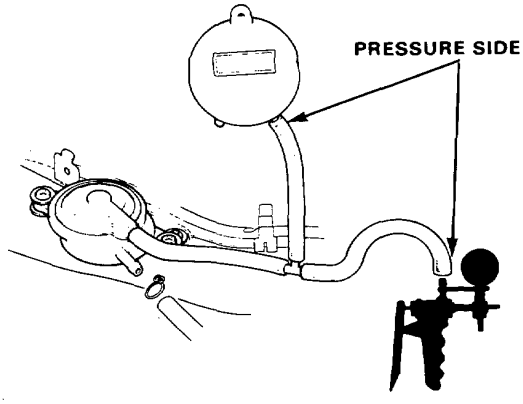


3. Slowly apply vacuum while watching the gauge.

   Vacuum should stabilize momentarily at 5 to 15 mmHg (0.2 to 0.6 in. Hg).

   - If vacuum stabilizes (valve opens) below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install new valve and retest.

4. Move vacuum 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.

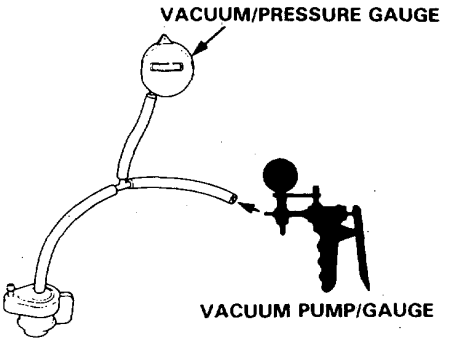
   Pressure should stabilize at 10 to 35 mmHg (0.4 to 1.4 in. Hg).

   - If pressure momentarily stabilizes (valve opens) at 10 to 35 mmHg (0.4 to 1.4 in. Hg), the valve is OK.
   - If pressure stabilizes below 10 mmHg (0.4 in. Hg) or above 35 mmHg (1.4 in. Hg), install a new valve and retest.

Two-Way Valve [Without CATA]

Test

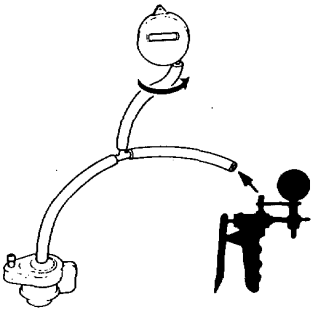
1. Remove the fuel filler cap.
2. Remove the vapor line from the canister or frame, and connect to a T-fitting from the vacuum gauge and the vacuum pump as shown.



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.

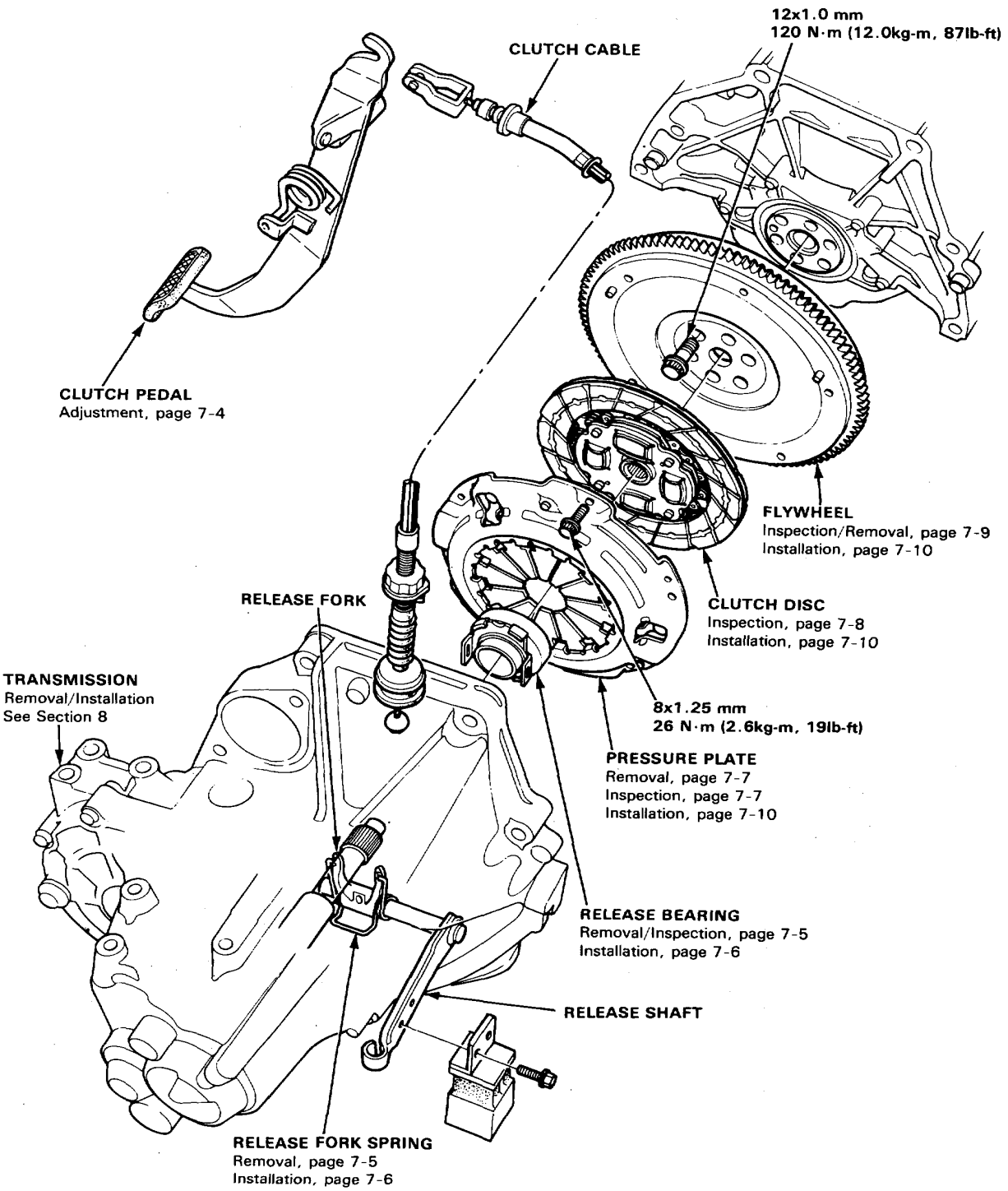
4. Move vacuum pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



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).

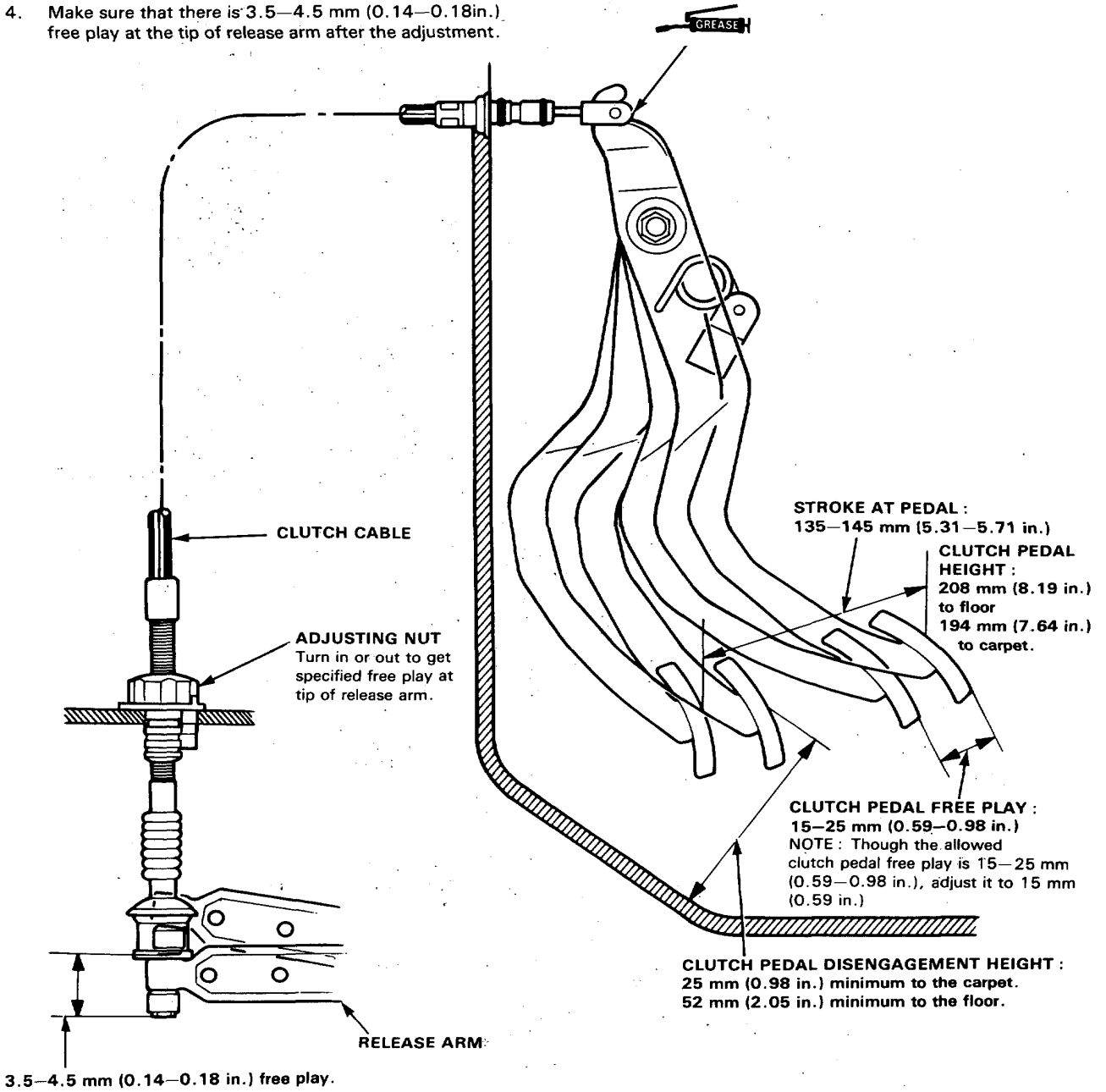
   - If pressure momentarily stabilizes (Valve opens) at 10 to 25 mmHg (0.4 to 1.0 in.Hg), the valve is OK.
   - If pressure stabilizes below 10 mmHg (0.4 in.Hg) or above 25 mmHg (1.0 in. Hg), install a new valve and re-test.

NOTE : Whenever the transmission is removed, the release bearing sliding surface should be cleaned and greased (Molybdenum Disulfide).



Clutch Adjustment

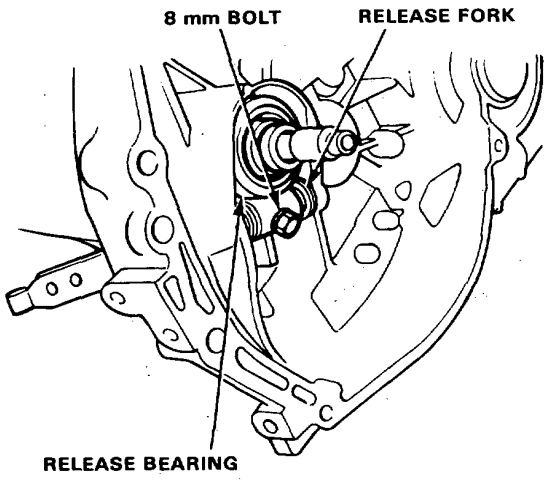
1. Measure the clutch pedal disengagement height.
2. Measure the clutch pedal free play.
3. Adjust the clutch free play by turning the adjusting nut.
4. Make sure that there is 3.5—4.5 mm (0.14—0.18in.) free play at the tip of release arm after the adjustment.



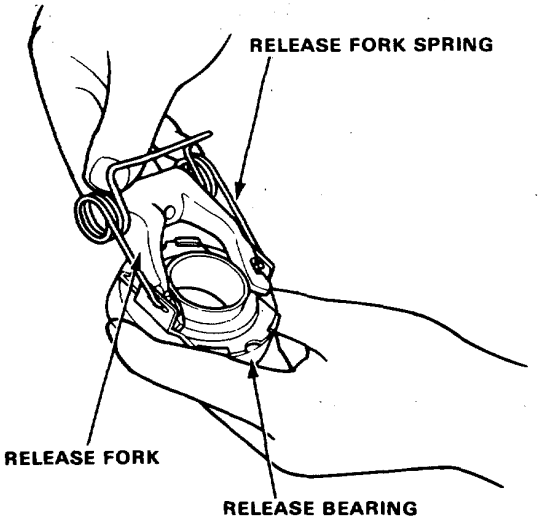
Release Bearing

Removal

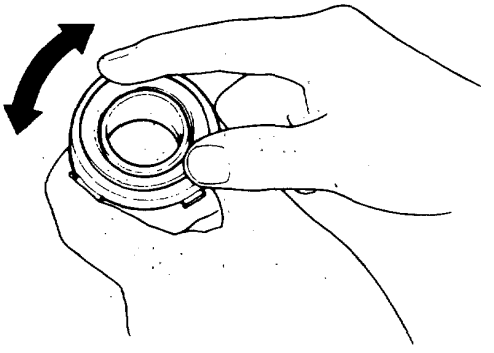
1. Remove the 8 mm special bolt.
2. Remove the release shaft and release bearing assembly.



3. Separate the release fork from the bearing by removing the release fork spring from the holes in the release bearing.



4. Check the release bearing for excessive play by spinning it by hand.



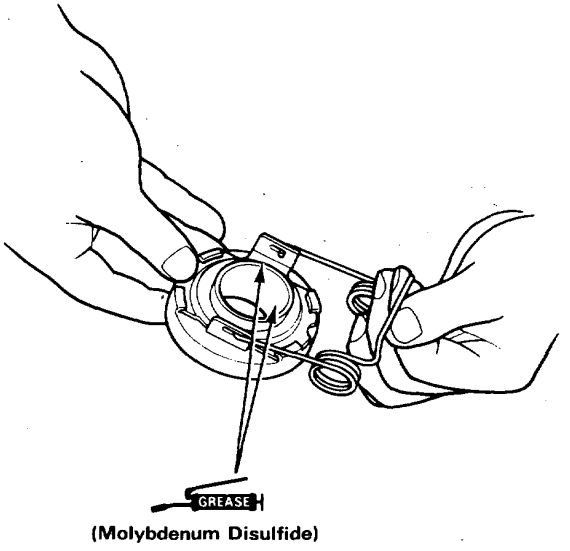
5. Replace the bearing with a new one if there is excessive play.

CAUTION : The bearing is packed with grease. Do not wash it in solvent.

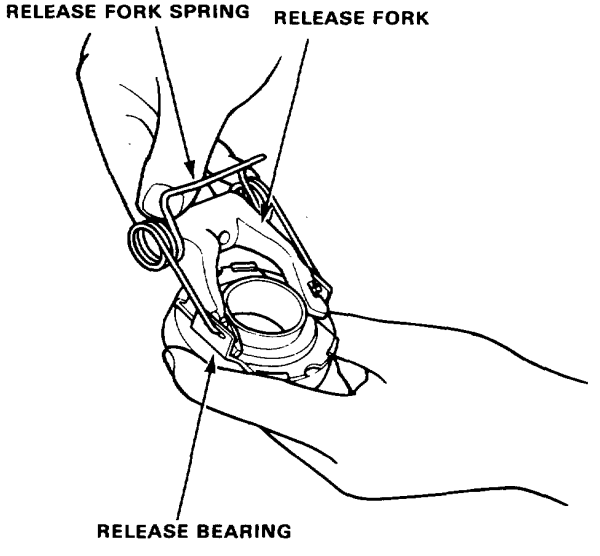
Release Bearing

Installation

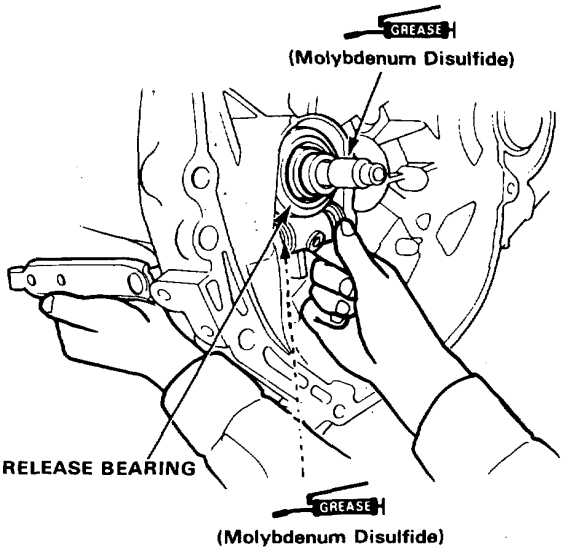
1. Install the release fork spring in the locating holes as shown.



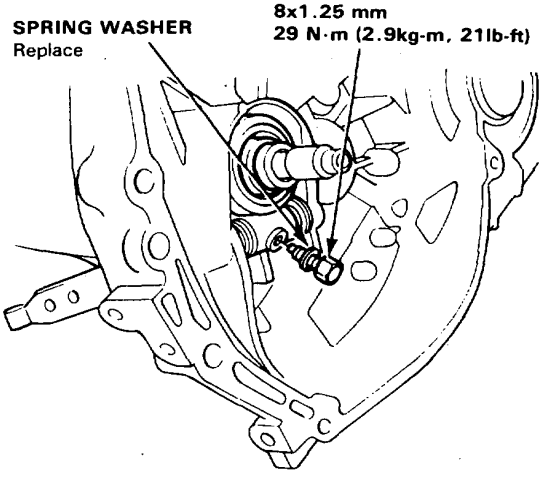
2. Align the release fork with the locating holes of the release bearing.



3. Install the release shaft and the release bearing.
NOTE : Apply molybdenum disulfide grease to the release shaft.



4. Align the release shaft and release fork, then install a new spring washer and bolt.

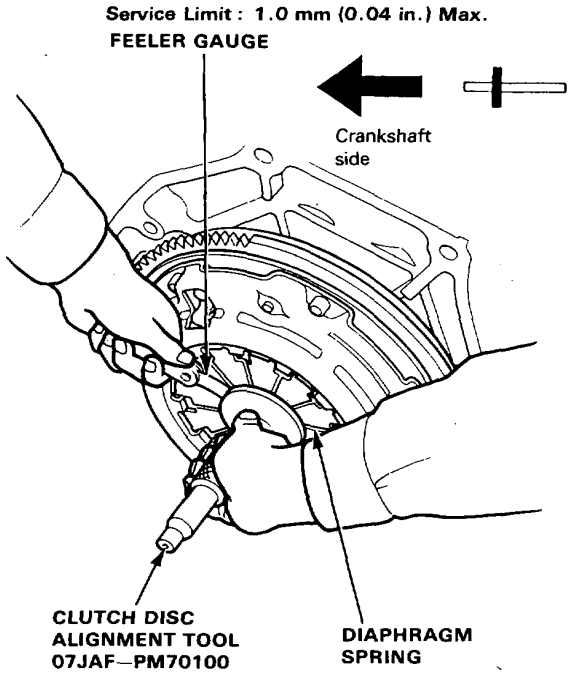


5. Move the release fork up and down to make sure the fork fits properly against the bearing, and that the bearing slides freely.

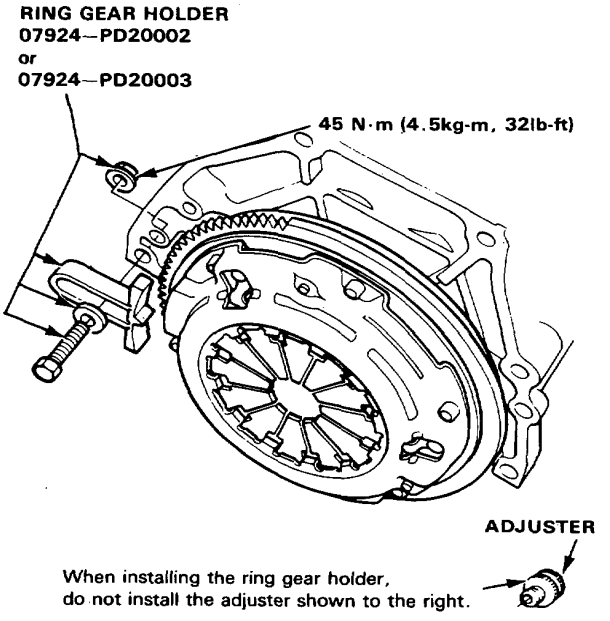
Pressure Plate

Removal/Inspection

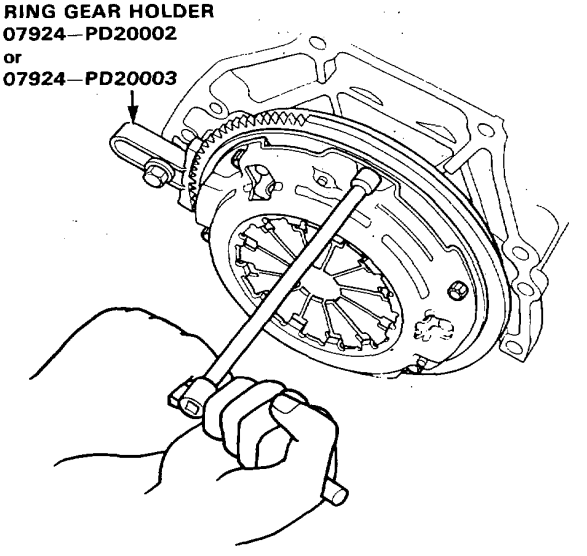
1. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.
2. Check the diaphragm spring fingers for height using the Clutch Disc Alignment Tool and feeler gauge.



3. Install the Ring Gear Holder.

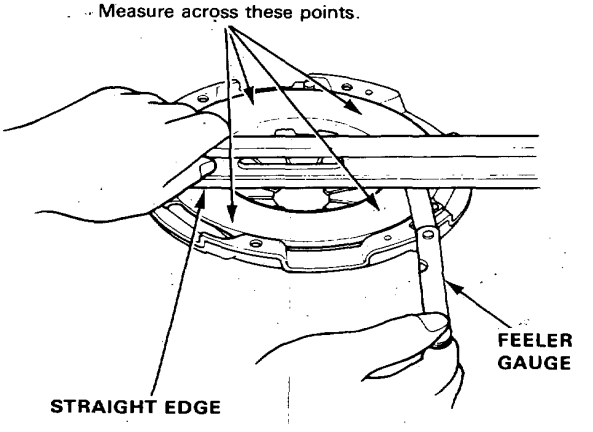


4. To prevent warping, loosen the pressure plate mounting bolts two turns at a time in a crisscross pattern using a 10 mm T-wrench, then remove the pressure plate and clutch disc.



5. Inspect the pressure plate surface for wear, cracks, or burning.
6. Inspect for warpage using a straight edge and feeler gauge.

Service Limit: 0.15 mm (0.006 in.) Max.



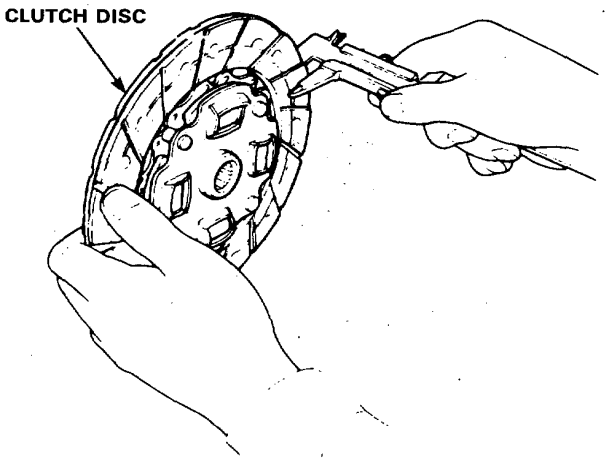
Clutch Disc

Inspection

1. Inspect lining of the clutch disc for signs of slipping or oil. Replace it if it is burned black or oil soaked.

2. Measure the clutch disc thickness.

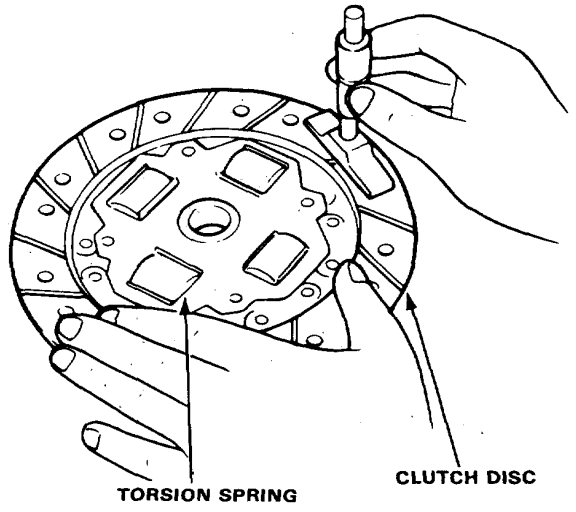
Clutch Disc Thickness :
Standard (New) : 8.4—8.9 mm (0.331—0.350 in.)
Service Limit : 5.9 mm (0.232 in.)



3. Check for loose torsion springs. Replace the clutch disc if any are loose.

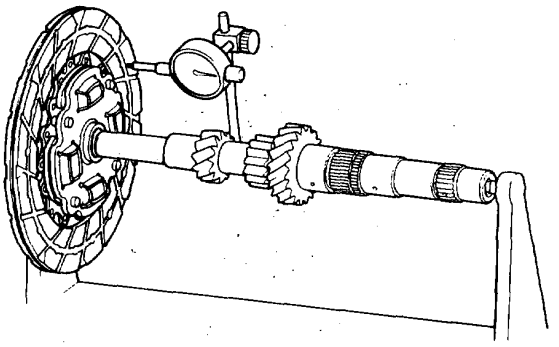
4. Measure the depth from the lining surface to the rivets, on both sides.

Rivet Depth :
Standard (New) : 1.3 mm (0.051 in.) min.
Service Limit : 0.2 mm (0.008 in.)



5. 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.)



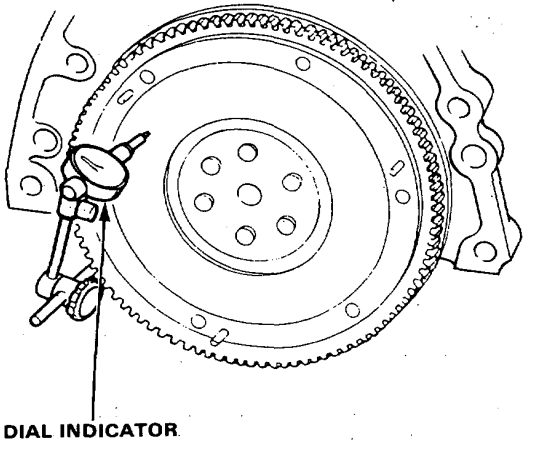
Flywheel

Inspection/Removal

1. Inspect the ring gear teeth for wear or damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks or burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push against the flywheel each time you turn it to take up the crankshaft thrust washer clearance.

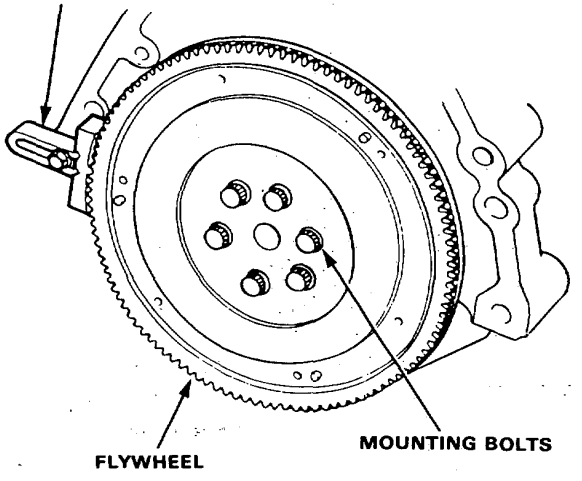
   NOTE : The runout can be measured with engine installed.

   Standard (New) : 0.05 mm (0.002 in.) max.
   Service Limit : 0.15 mm (0.006 in.)



4. Remove the six flywheel mounting bolts and flywheel.

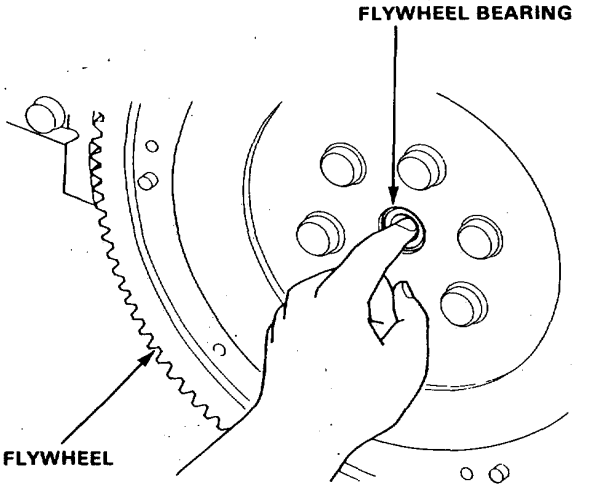
RING GEAR HOLDER
07924—PD20002
or
07924—PD20003



Flywheel Bearing

Inspection/Replacement

1. Turn the inner race of the bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the flywheel. Replace the bearing if the race does not turn smoothly, quietly, or fit tightly in the flywheel.

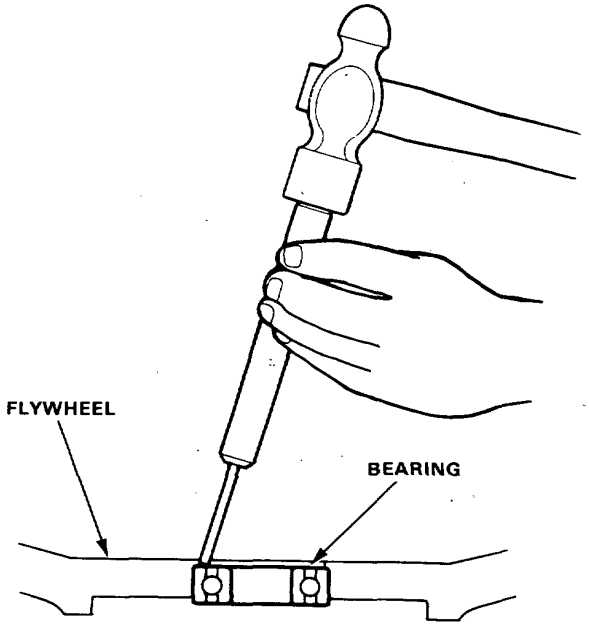


(cont'd)

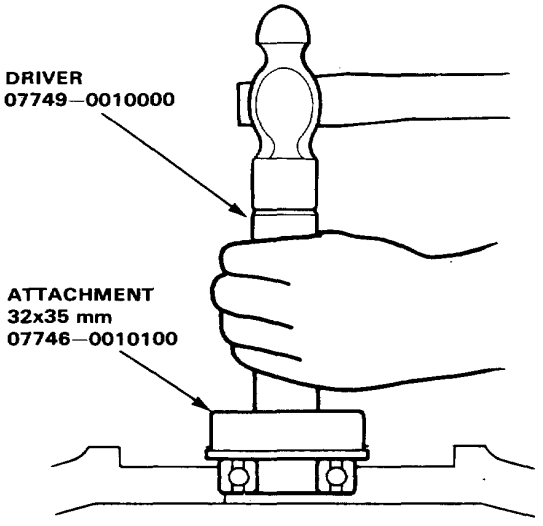
Flywheel Bearing

Inspection/Replacement (cont'd)

2. Remove the bearing from the flywheel.



3. Drive in the new bearing in the flywheel.

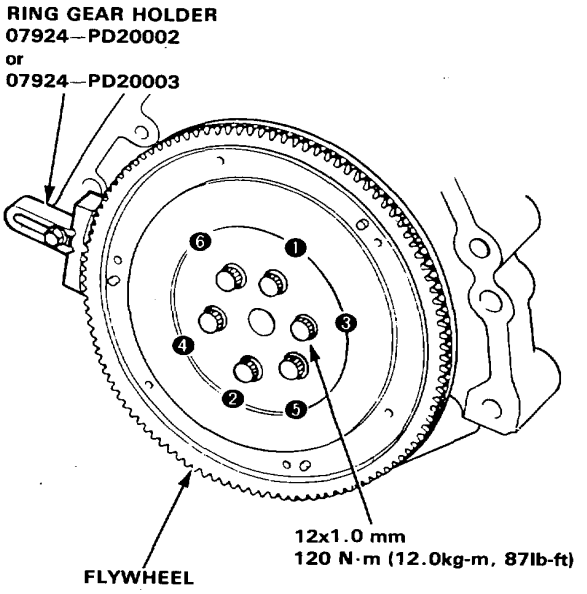


Flywheel and Clutch

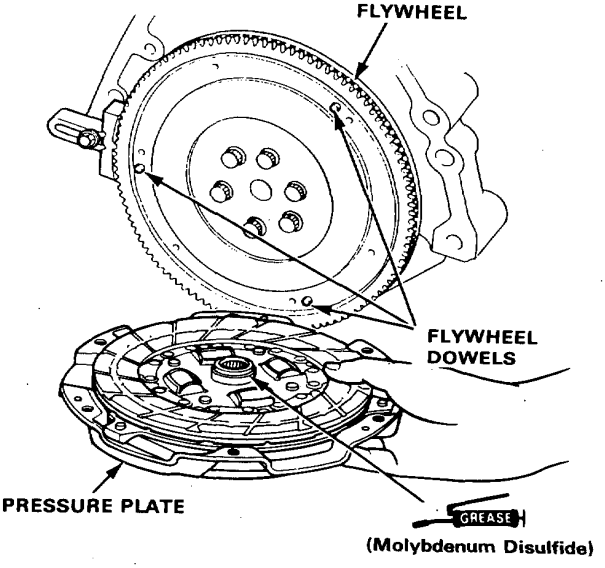
Installation

1. Align the hole in flywheel with the crankshaft dowel pin and assemble. Install the bolts only finger tight.

2. Install the Ring Gear Holder, then torque the flywheel bolts in a crisscross pattern, as shown.



3. Install the clutch disc and pressure plate by aligning the flywheel dowels with dowel holes in the pressure plate.

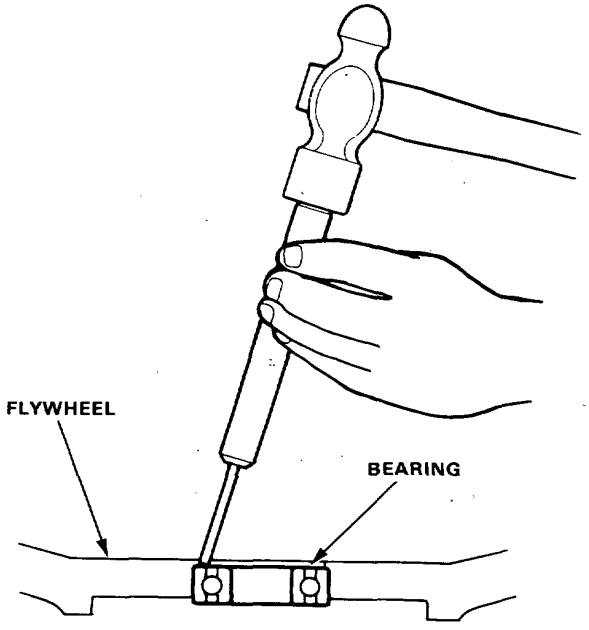


4. Install the attaching bolts finger tight.

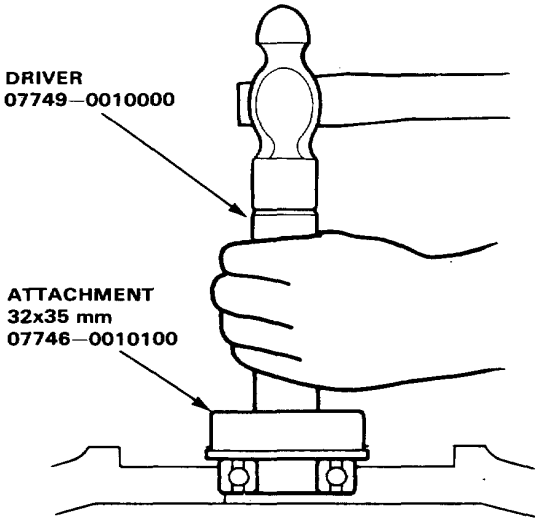
Flywheel Bearing

Inspection/Replacement (cont'd)

2. Remove the bearing from the flywheel.



3. Drive in the new bearing in the flywheel.

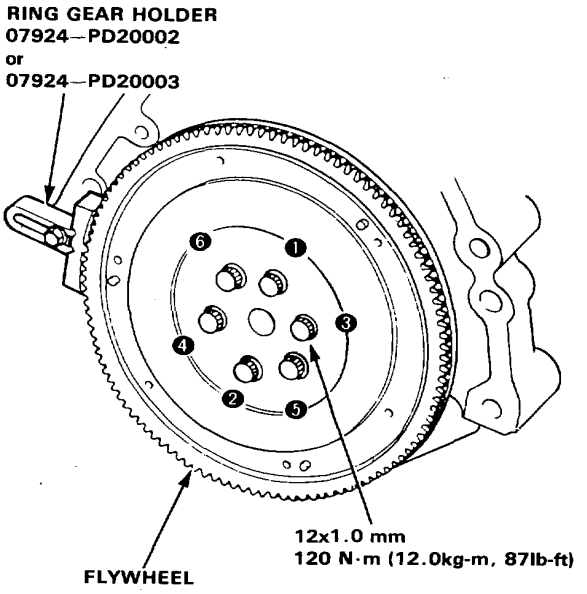


Flywheel and Clutch

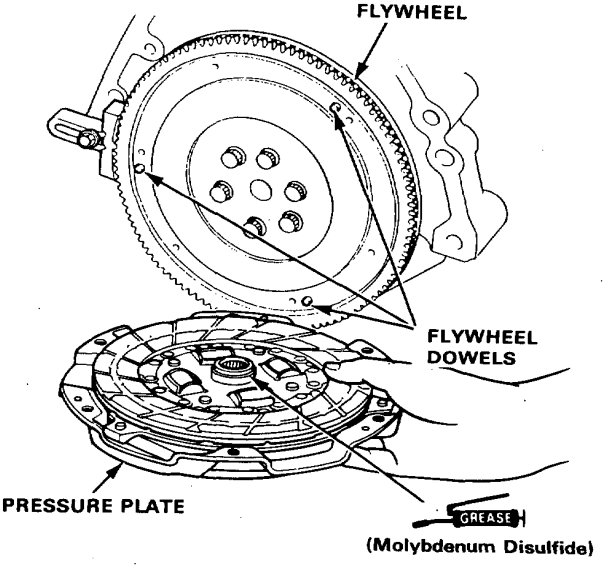
Installation

1. Align the hole in flywheel with the crankshaft dowel pin and assemble. Install the bolts only finger tight.

2. Install the Ring Gear Holder, then torque the flywheel bolts in a crisscross pattern, as shown.

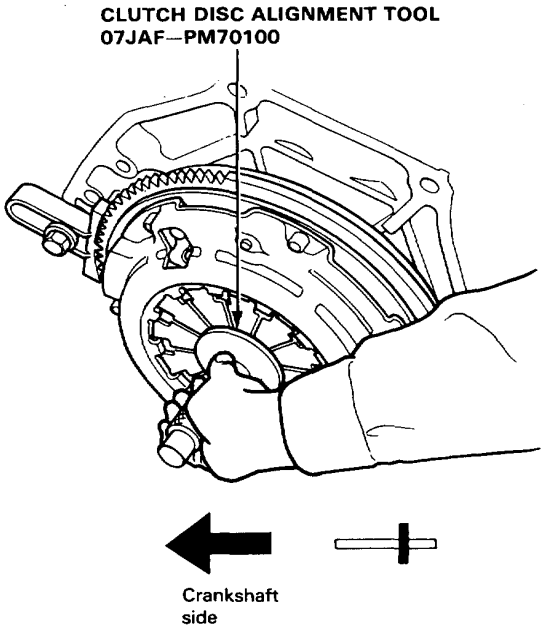


3. Install the clutch disc and pressure plate by aligning the flywheel dowels with dowel holes in the pressure plate.

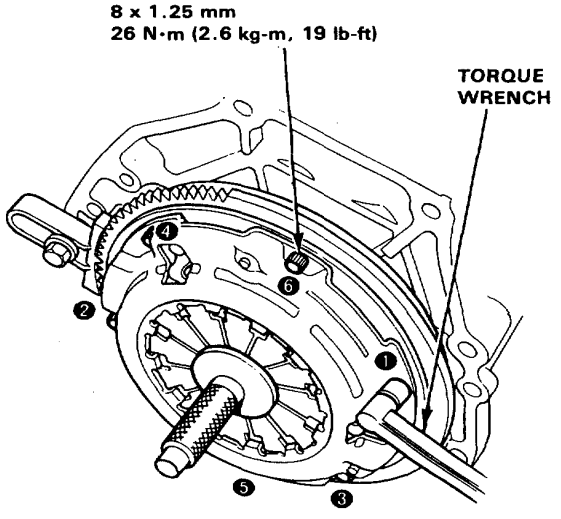


4. Install the attaching bolts finger tight.

5. Insert the Clutch Disc Alignment Tool in the splined hole in the clutch disc.



6. Torque the bolts in a crisscross pattern as shown. Tighten them two turns at a time to prevent warping the diaphragm spring.



7. Remove the Alignment Tool and Ring Gear Holder.

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

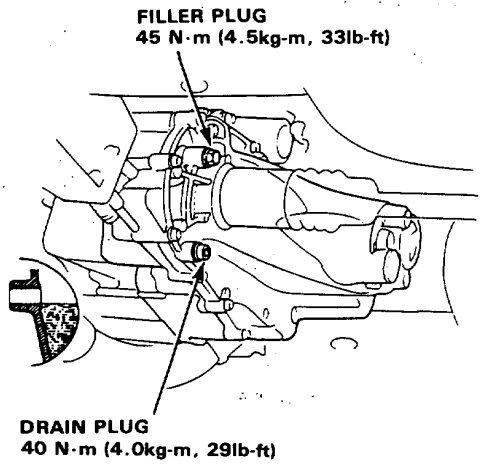
Use only SAE 10W-30 or 10W-40 oil rated SE or SF grade.

1. Drain with transmission oil at operating temperature, engine OFF, and car on level ground.
2. Remove the oil filler plug, then remove the drain plug and drain transmission.
3. Reinstall drain plug with new washer, and refill to proper level.

   NOTE : Drain plug washer should be replaced at every oil change.

Oil Capacity

1.8 ℓ (1.9 U.S.qt.) after drain.
1.9 ℓ (2.0 U.S.qt.) after overhaul.

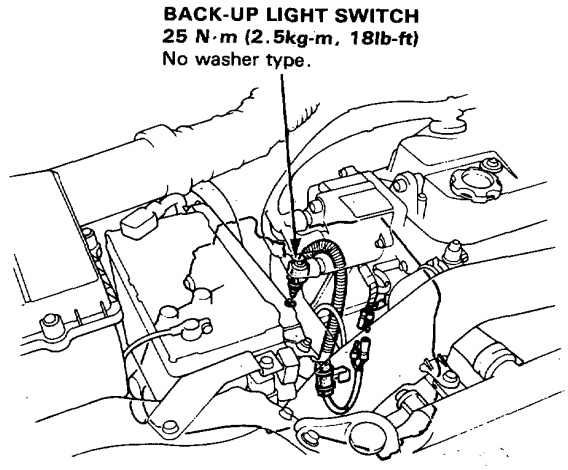


Back-up Light Switch

Replacement

NOTE : Check the switch see Section 16.

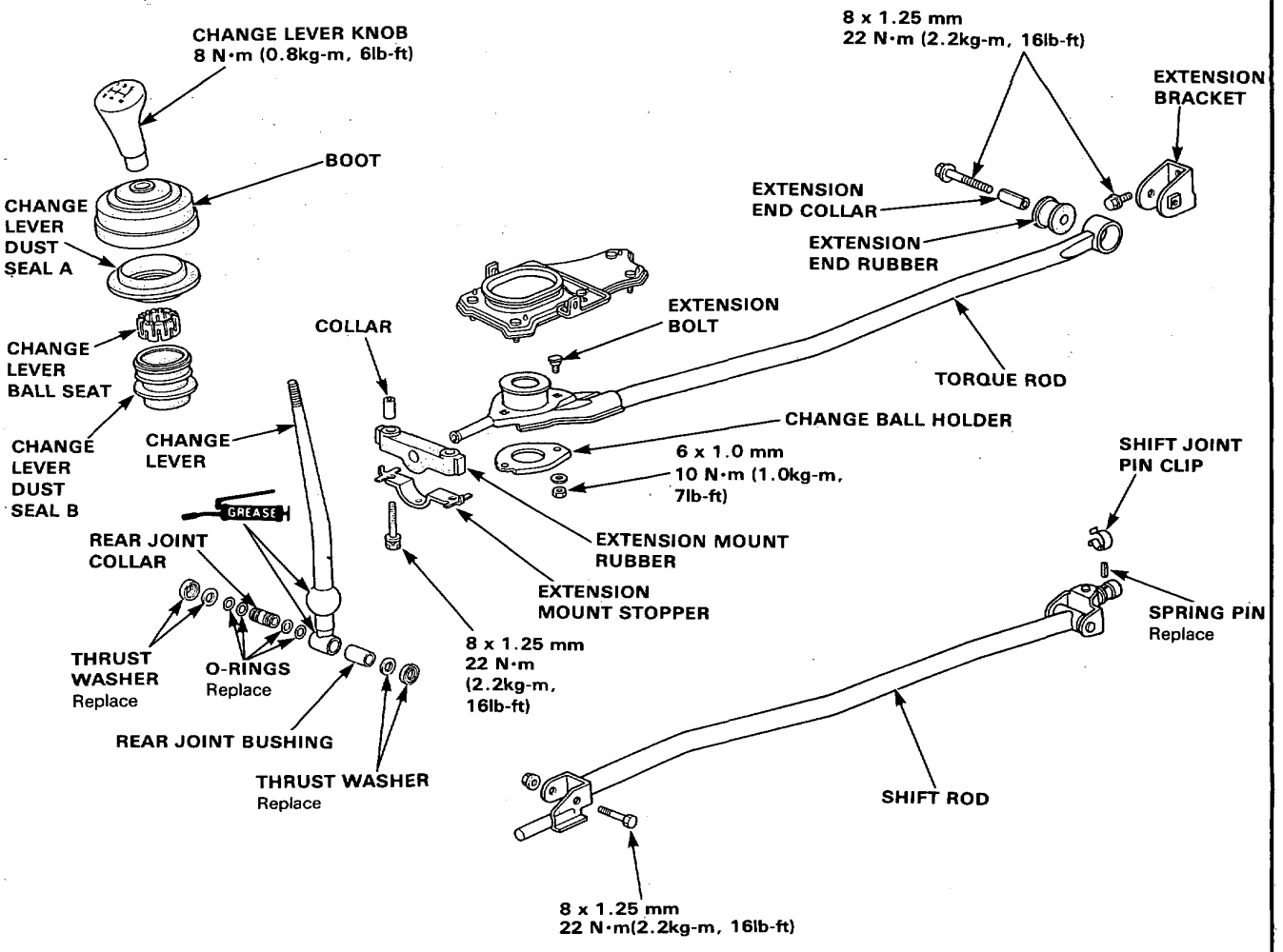
1. Disconnect the back-up light switch wire connectors.
2. Remove the back-up light switch.



3. Install the back-up light switch.

Gearshift Mechanism

Overhaul



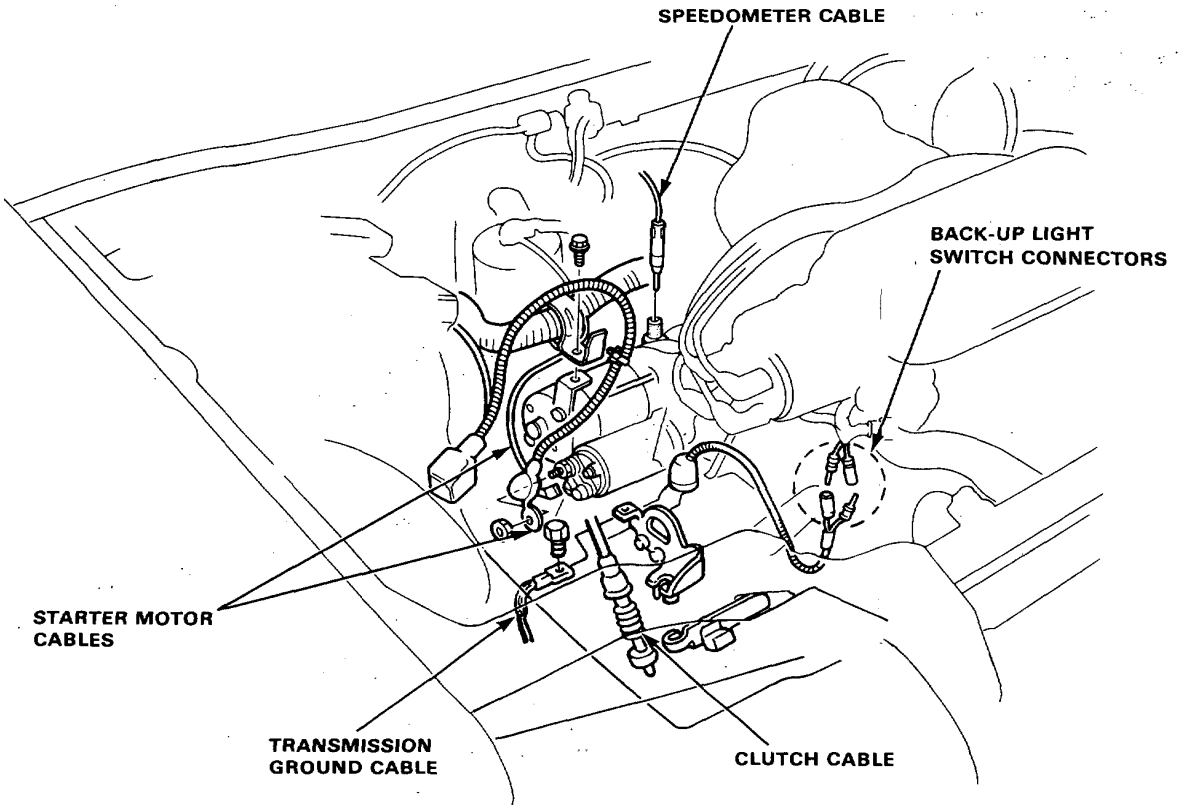
Removal

⚠ WARNING

- **Make sure jacks and safety stands are placed properly (See Section 1), and hoist brackets are attached to correct positions on the engine (See Section 5).**
- **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.

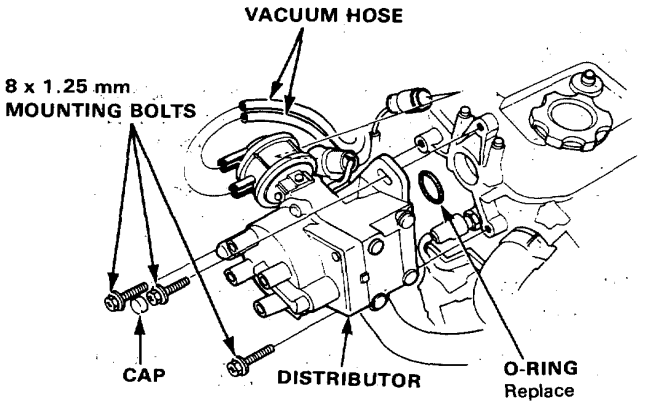
1. Disconnect the battery negative (−) and positive (+) cables from the battery, and remove the battery.
2. Remove the battery base. Remove the intake hose.
3. Remove the air cleaner case complete with the intake hose (See Section 6).
4. Disconnect the starter motor and transmission ground cables.
5. Disconnect the speedometer cable (See Section 5).
   NOTE : Do not disassemble speedometer gear holder.
6. Disconnect the back-up light switch connector.
7. Disconnect the clutch cable at release arm.
8. Drain transmission oil. Use a socket wrench to remove the drain plug. Remove the oil filler plug to speed draining. Reinstall the drain plug with a new washer.



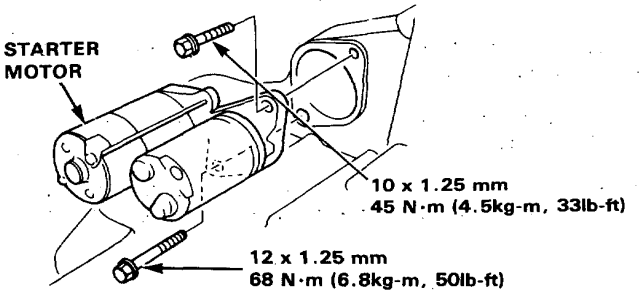
(cont'd)

Removal (cont'd)

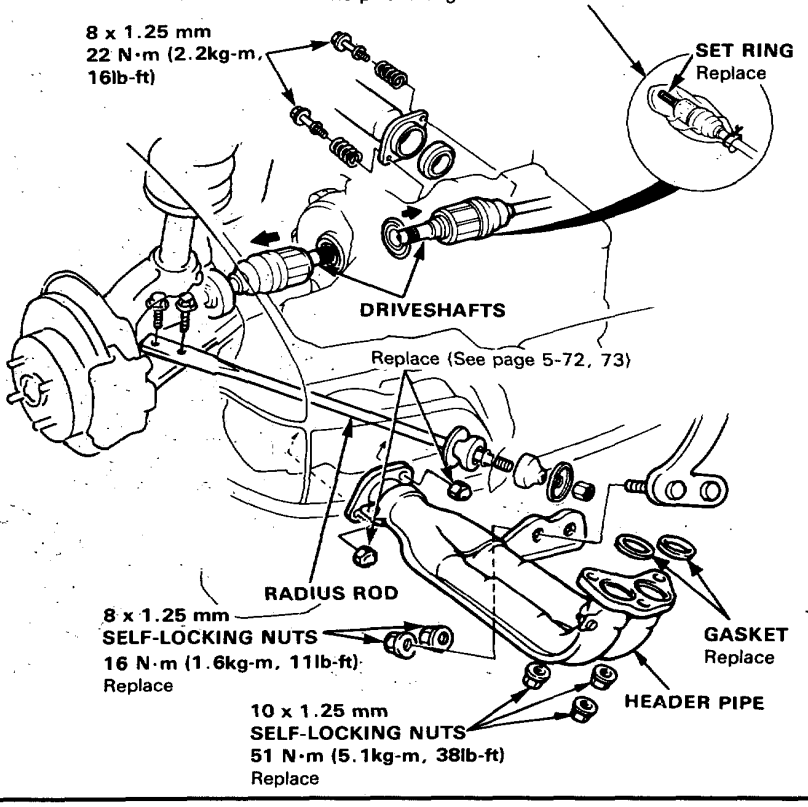
9. Disconnect the connectors and remove the mounting bolts, then remove the distributor from the cylinder head.



10. Remove the bolts attaching the starter motor, and remove the starter motor.
11. Remove the engine splash shield and the right wheelwell splash shield.
12. Remove the exhaust pipe A. (page 5-72, 73)
13. Remove the cotter pin and front lower arm ball joint nut, separate the ball joint and lower arm. (page 12-11)
14. Remove the self locknut, and remove the damper fork bolt. (page 12-12)
15. Remove the bolts and nut, then remove the right radius rod. (page 12-8, 9)
16. Remove the driveshaft (intermediate shaft). (See Section 10)



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



17. Remove the 2 clutch cover mounting bolts.

18. Remove the shift lever torque rod and shift rod from clutch housing.

19. Install the bolt at the cylinder head and attach a hoist chain to the bolt and the other end to the engine hanger plate, then lift the engine slightly to unload the mounts.

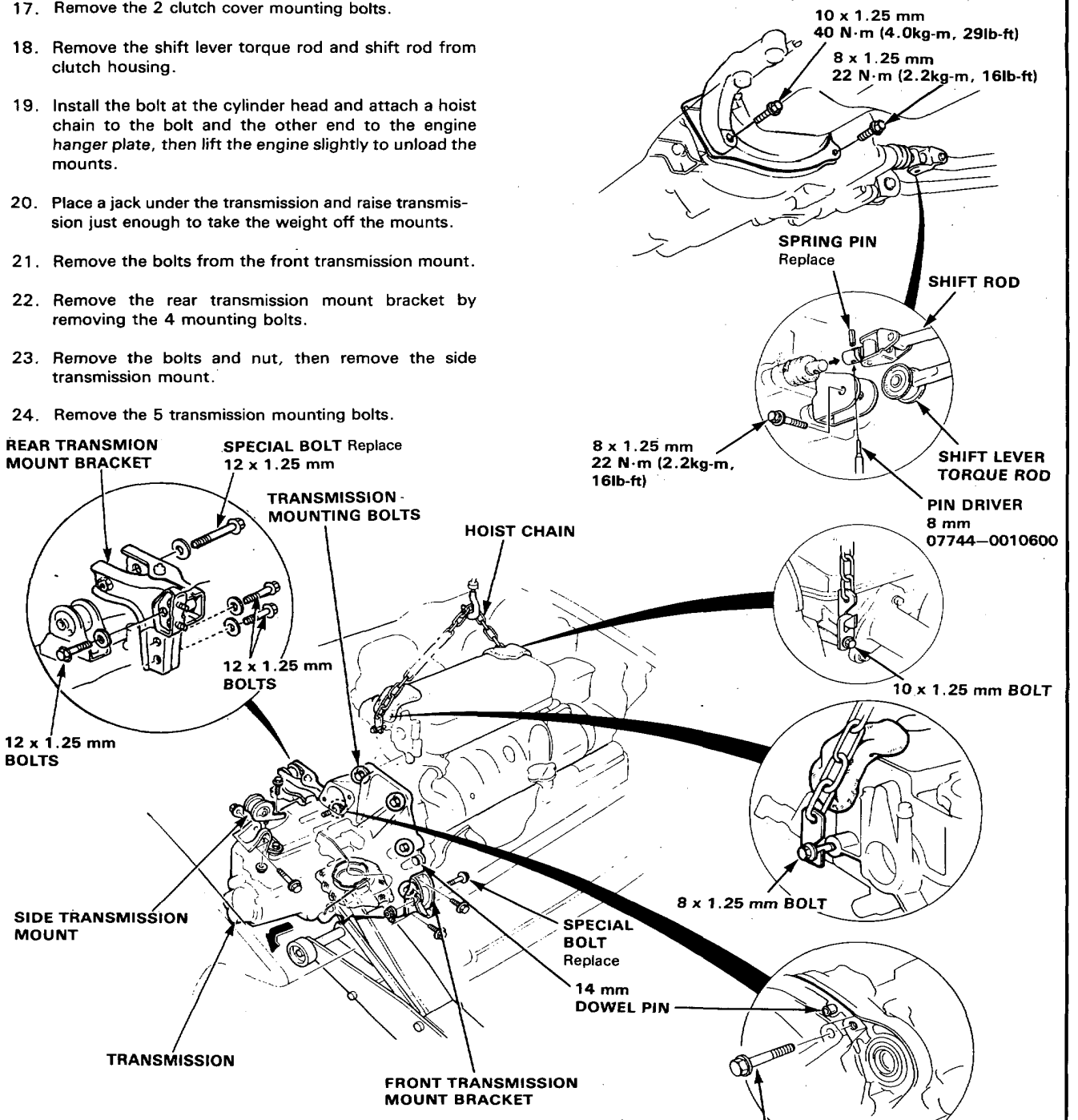
20. Place a jack under the transmission and raise transmission just enough to take the weight off the mounts.

21. Remove the bolts from the front transmission mount.

22. Remove the rear transmission mount bracket by removing the 4 mounting bolts.

23. Remove the bolts and nut, then remove the side transmission mount.

24. Remove the 5 transmission mounting bolts.

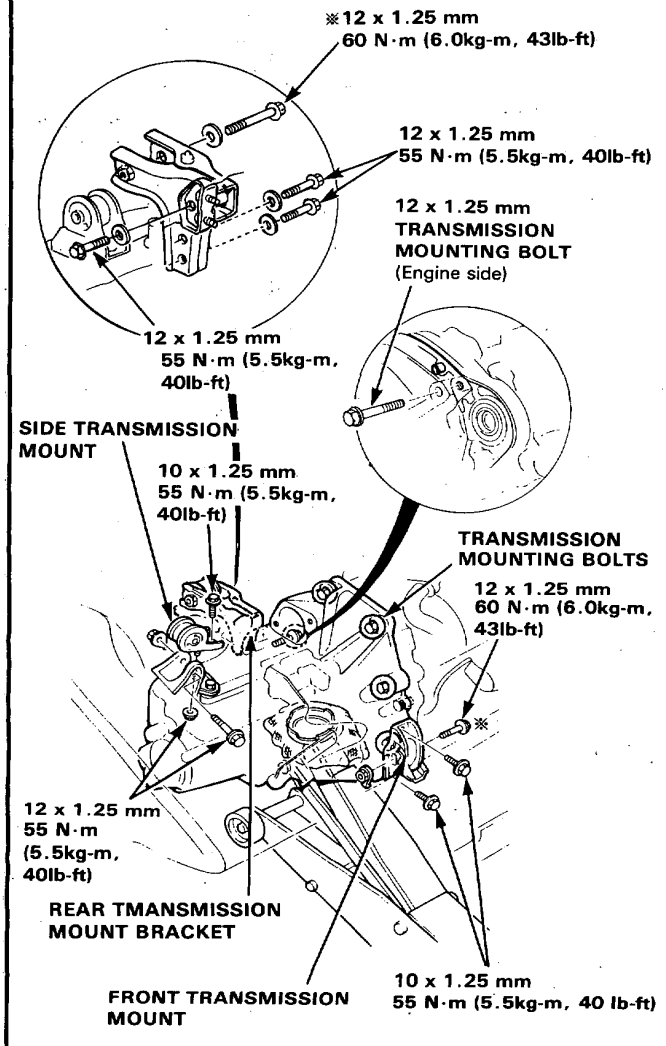


25. Pull the transmission away from the engine until it clears the 14 mm dowel pins.

26. Separate the mainshaft from the clutch pressure plate and remove the transmission by lowering the jack.

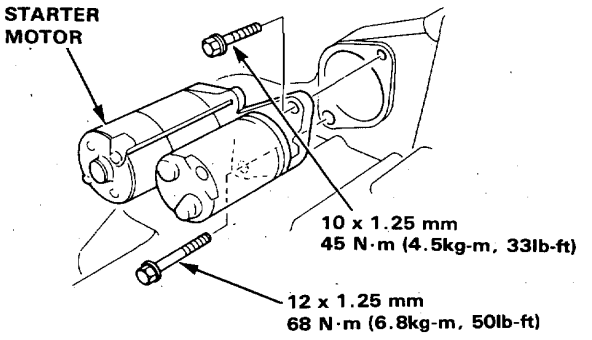
Installation

1. Place the transmission on the transmission jack, and raise to the engine level.
2. Check that the two 14 mm dowel pins are installed in the clutch housing.
3. Loosely install the transmission mounting bolts, then torque in the sequence shown.
4. Secure the transmission to engine with the engine side mounting bolt (12x1.25x70 mm) and torque to 68 N·m (6.8kg-m, 50lb-ft).
5. Install the transmission to rear transmission mount bracket.
6. Install the transmission to front and side transmission mounts.

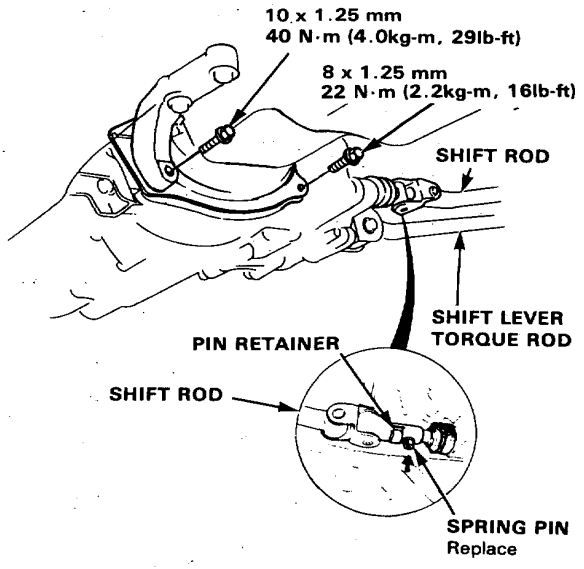


※Special bolt : Replace.

7. Install the starter motor.



8. Remove the transmission jack.
9. Remove the chain hoist by removing the hanger plate and 10 mm bolts.
10. Install the shift lever torque rod and shift rod.



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

11. Install the clutch cover mounting bolts.

12. Install a new set rings on the end of each driveshaft.

13. Install the driveshaft (intermediate shaft) (See Section 10).

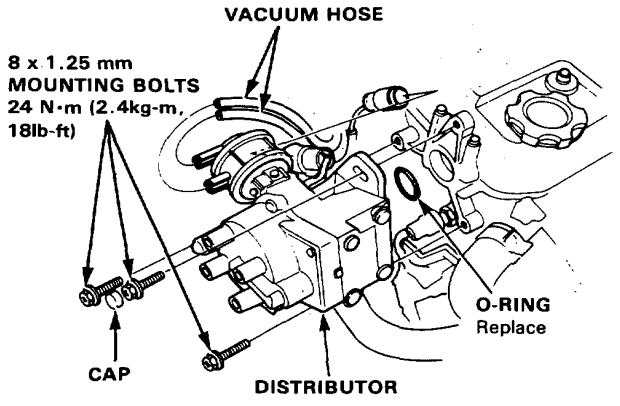
    NOTE : Turn the right steering knuckle fully outward, and slide axle into the differential untily you feel its spring clip engage side gear.

14. Install the damper swivel bolt and radius rod. (page 12-8, 9, 12)

15. Install the ball joints to the front lower arm. (page 12-12)

16. Install the splash shields and exhaust pipe A. (page 5-66)

17. Install the distributor and ignition timing inspection (See Section 16 Ignition Timing Control).

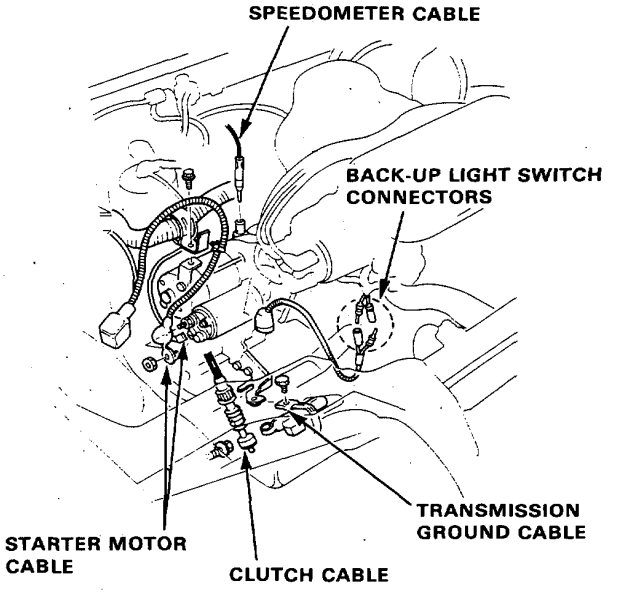


18. Connect the speedometer cable.

19. Connect the clutch cable to release arm.

20. Connect the back-up light switch connector.

21. Install the battery base. Install the intake hose.



22. Refill the transmission with oil.

23. Connect the starter motor and transmission ground cables.

24. Connect the battery positive (+) and negative (−) cables to the battery.

25. Install the air cleaner case and intake hose.

26. Check the ignition timing (See Section 16).

27. Check the transmission for smooth operation.

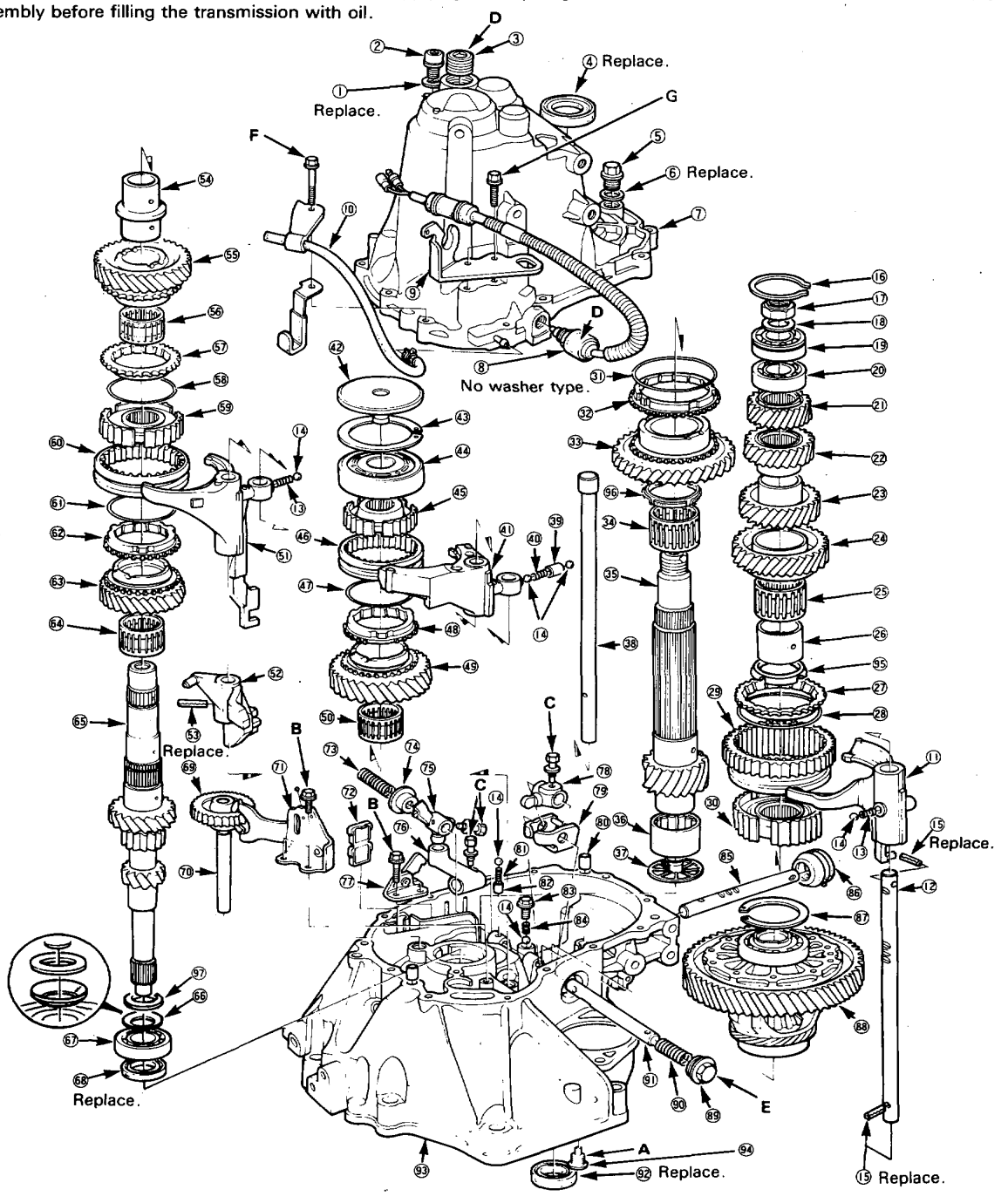
Transmission Maintenance and Repair

Illustrated Index

Refer to the drawing below for the transmission disassembly/reassembly.
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 PART NO. ÕY746-99986 for the liquid gasket. Assemble the housings within 20 minutes after applying the liquid gasket and allow it to cure at least 30 minutes after assembly before filling the transmission with oil.



Torque Value
A —40 N·m (4.0 kg-m, 29 lb-ft)
B —15 N·m (1.5 kg-m, 11 lb-ft)
C —29 N·m (2.9 kg-m, 21 lb-ft)
D —25 N·m (2.5 kg-m, 18 lb-ft)
E —55 N·m (5.5 kg-m, 40 lb-ft)
F —28 N·m (2.8 kg-m, 21 lb-ft)
G —26 N·m (2.6 kg-m, 19 lb-ft)

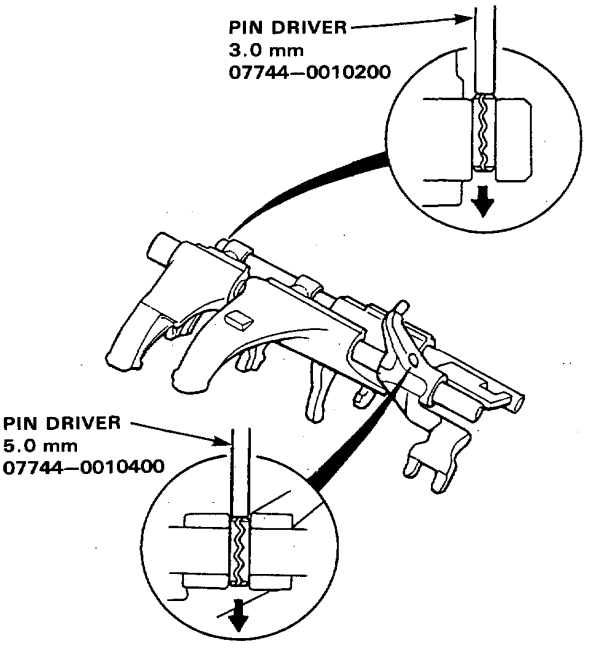
NOTE: Always clean the magnet ⑫ whenever the transmission housing is disassembled.

① SEALING WASHER
② OIL DRAIN PLUG
40 N·m (4.0 kg-m, 29 lb-ft)
③ 32 mm SEALING BOLT
④ OIL SEAL
⑤ OIL FILLER PLUG
45 N·m (4.5 kg-m, 33 lb-ft)
⑥ SEALING WASHER
⑦ TRANSMISSION HOUSING
⑧ BACK-UP LIGHT SWITCH
25 N·m (2.5 kg-m, 18 lb-ft)
⑨ CLUTCH CABLE BRACKET
⑩ BREATHER TUBE
⑪ 1st/2nd SHIFT FORK
⑫ 1st/2nd SHIFT FORK SHAFT
⑬ SHIFT FORK SPRING
⑭ STEEL BALL
⑮ SPRING PIN
⑯ SNAP RING
⑰ COUNTERSHAFT LOCKNUT
110→0→110 N·m (11.0→0→11.0 kg-m, 80→0→80 lb-ft)
⑱ WASHER
⑲ BALL BEARING
Disassembly, page 8-16
Reassembly, page 8-17
⑳ NEEDLE BEARING
㉑ COUNTERSHAFT 5th GEAR
㉒ COUNTERSHAFT 4th GEAR
㉓ COUNTERSHAFT 3rd GEAR
㉔ COUNTERSHAFT 2nd GEAR
㉕ NEEDLE BEARING
㉖ DISTANCE COLLAR
㉗ SYNCHRO RING
㉘ SYNCHRO SPRING
㉙ REVERSE GEAR
㉚ SYNCHRO HUB
㉛ SYNCHRO SPRING
㉜ SYNCHRO RING
㉝ COUNTERSHAFT 1st GEAR
㉞ NEEDLE BEARING
㉟ COUNTERSHAFT
㊱ NEEDLE BEARING
㊲ OIL GUIDE PLATE
㊳ 5th/REVERSE SHIFT FORK SHAFT
㊴ ROLLER
㊵ 5th DETENT SPRING
㊶ 5th SHIFT FORK
㊷ OIL GUIDE PLATE
㊸ THRUST SHIM
Selection, page 8-13
㊹ BALL BEARING
㊺ SYNCHRO HUB
㊻ SYNCHRO SLEEVE
㊼ SYNCHRO SPRING
㊽ SYNCHRO RING
㊾ 5th GEAR
㊿ NEEDLE BEARING
(51) 3rd/4th SHIFT FORK
(52) SHIFT PIECE
(53) SPRING PIN
(54) SPACER COLLAR
(55) 4th GEAR
(56) NEEDLE BEARING
(57) SYNCHRO RING
(58) SYNCHRO SPRING
(59) SYNCHRO HUB
(60) SYNCHRO SLEEVE
(61) SYNCHRO SPRING
(62) SYNCHRO RING
(63) 3rd GEAR
(64) NEEDLE BEARING
(65) MAINSHAFT
(66) SPRING WASHER
(67) BALL BEARING
(68) OIL SEAL
(69) REVERSE IDLER GEAR
(70) REVERSE IDLER SHAFT
(71) REVERSE SHIFT HOLDER
(72) MAGNET
(73) REVERSE SELECT SPRING
(74) REVERSE RETURN SELECT
(75) SHIFT ARM C
(76) SHIFT ARM A
(77) REVERSE LOCK CAM
(78) SHIFT ARM B
(79) INTERLOCK
(80) DOWEL PIN
(81) SPRING
(82) SPRING COLLAR
(83) SPRING BOLT
(84) SPRING
(85) SHIFT ROD
(86) BOOT
(87) SHIM
(88) DIFFERENTIAL ASSEMBLY
(89) 28 mm PLUG
(90) 1st/2nd SELECT SPRING
(91) SHIFT ARM SHAFT
(92) OIL SEAL
(93) CLUTCH HOUSING
(94) INTERLOCK GUIDE BOLT
(95) FRICTION DAMPER (2nd gear side)
Disassembly, page 8-16
Reassembly, page 8-17
(96) FRICTION DAMPER (1st gear side)
Disassembly, page 8-16
Reassembly, page 8-17
(97) THRUST WASHER

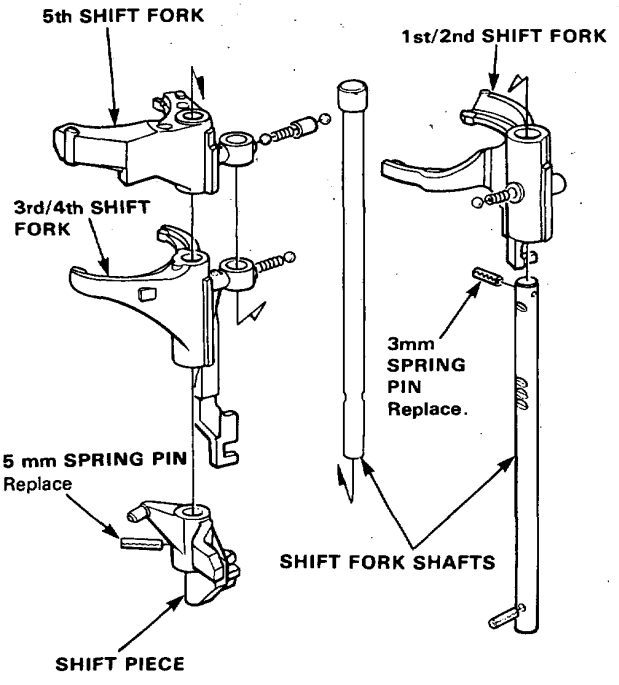
Transmission Maintenance and Repair

Shift Fork Disassembly

1. Remove the shift fork shaft by removing the spring pins from the shift forks.



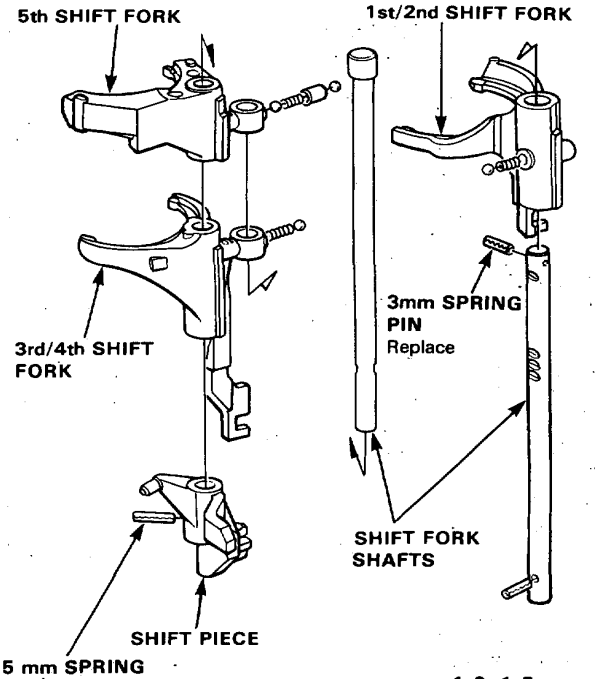
CAUTION: Do not lose the spring-loaded detent while disassembling the shift forks and shift fork shafts.

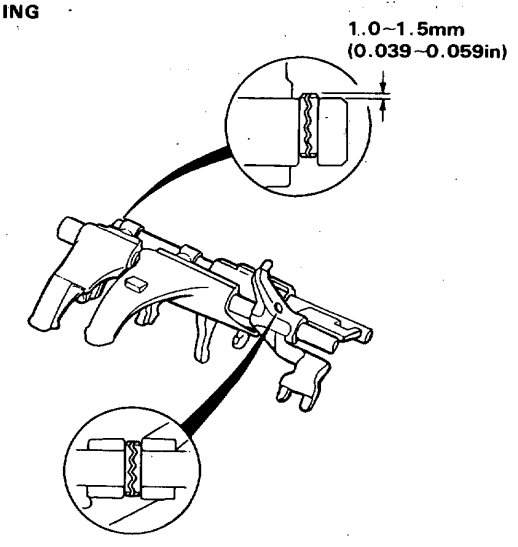


Shift Fork Reassembly

1. Insert the shift fork shaft into the shift forks and drive in the spring pins.

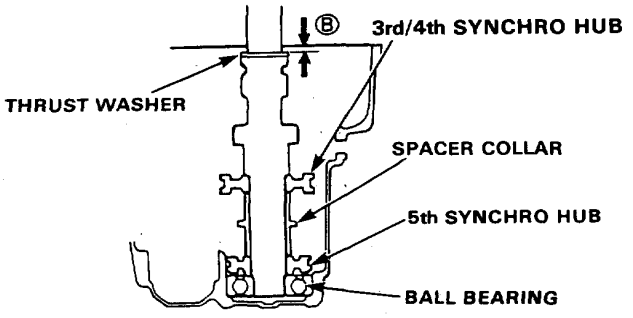
NOTE: Do not lose the steel balls and spring when rsassembling.





Mainshaft Thrust Shim Adjustment

1. Remove the thrust shim and oil guide plate from the transmission housing.
2. Install the 3rd/4th synchro hub, spacer collar, 5th synchro hub, ball bearing and thrust washer on the mainshaft. Install the assembly in the transmission housing.

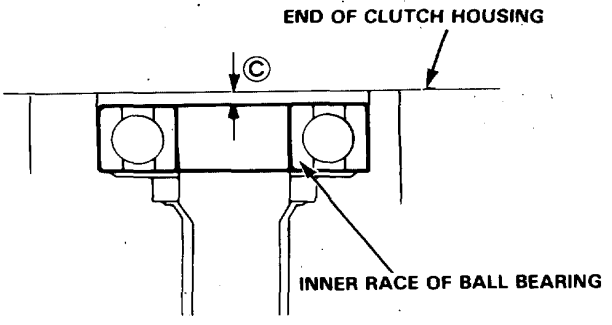


3 Measure the distance B between the end of the transmission housing and thrust washer.

NOTE:
- Use a straight edge and feeler gauge.
- Measure at three locations and average the readings.

4. Measure the distance C between the surfaces of the clutch housing and bearing inner race.

NOTE:
- Use a straight edge and feeler gauge.
- Measure at three locations and average the readings.



5. Select the proper shim (or shim pair) on the basis of the following calculations:

NOTE: Do not use more than two shims.

(Basic Formula)
(B) + (C) − 0.95 = shim thickness

Example of calculation:
Distance B (2.00mm) + Distance C (0.09mm) = 2.09mm subtract the spring washer height (0.95mm) = the required thrust shim (1.14mm)

D14A, D15B: 65 mm Thrust Shim

	PART NUMBER	THICKNESS
A	23931—PL3—A10	0.60 mm (0.0236 in.)
B	23932—PL3—A10	0.63 mm (0.0284 in.)
C	23933—PL3—A10	0.66 mm (0.0260 in.)
D	23934—PL3—A10	0.69 mm (0.0272 in.)
E	23935—PL3—A10	0.72 mm (0.0283 in.)
F	23936—PL3—A10	0.75 mm (0.0295 in.)
G	23937—PL3—A10	0.78 mm (0.0307 in.)
H	23938—PL3—A10	0.81 mm (0.0319 in.)
I	23939—PL3—A10	0.84 mm (0.0331 in.)
J	23940—PL3—A10	0.87 mm (0.0343 in.)
K	23941—PL3—A10	0.90 mm (0.0354 in.)
L	23942—PL3—A10	0.93 mm (0.0366 in.)
M	23943—PL3—A10	0.96 mm (0.0378 in.)
N	23944—PL3—A10	0.99 mm (0.0390 in.)
O	23945—PL3—A10	1.02 mm (0.0402 in.)
P	23946—PL3—A10	1.05 mm (0.0413 in.)
Q	23947—PL3—A10	1.08 mm (0.0425 in.)
R	23948—PL3—A10	1.11 mm (0.0437 in.)
S	23949—PL3—A10	1.14 mm (0.0449 in.)
T	23950—PL3—A10	1.17 mm (0.0461 in.)
U	23951—PL3—A10	1.20 mm (0.0472 in.)
V	23952—PL3—A10	1.23 mm (0.0484 in.)
W	23953—PL3—A10	1.26 mm (0.0496 in.)
X	23954—PL3—A10	1.29 mm (0.0508 in.)
Y	23955—PL3—A10	1.32 mm (0.0520 in.)
Z	23956—PL3—A10	1.35 mm (0.0531 in.)
AA	23957—PL3—A10	1.38 mm (0.0543 in.)
AB	23958—PL3—A10	1.41 mm (0.0555 in.)
AC	23959—PL3—A10	1.44 mm (0.0567 in.)
AD	23960—PL3—A10	1.47 mm (0.0579 in.)
AE	23961—PL3—A10	1.50 mm (0.0591 in.)
AF	23962—PL3—A10	1.53 mm (0.0602 in.)
AG	23963—PL3—A10	1.56 mm (0.0614 in.)
AH	23964—PL3—A10	1.59 mm (0.0626 in.)
AI	23965—PL3—A10	1.62 mm (0.0638 in.)
AJ	23966—PL3—A10	1.65 mm (0.0650 in.)
AK	23967—PL3—A10	1.68 mm (0.0661 in.)
AL	23968—PL3—A10	1.71 mm (0.0673 in.)
AM	23969—PL3—A10	1.74 mm (0.0685 in.)
AN	23970—PL3—A10	1.77 mm (0.0697 in.)
AO	23971—PL3—A10	1.80 mm (0.0709 in.)

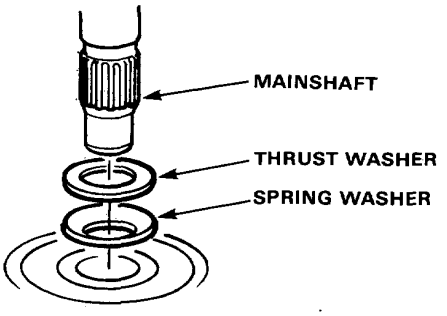
(cont'd)

Mainshaft Thrust Shim Adjustment (cont'd)

D16A: 70 mm Thrust Shim

	PART NUMBER	THICKNESS
A	23931—PL3—B00	0.60 mm (0.0236 in.)
B	23932—PL3—B00	0.63 mm (0.0284 in.)
C	23933—PL3—B00	0.66 mm (0.0260 in.)
D	23934—PL3—B00	0.69 mm (0.0272 in.)
E	23935—PL3—B00	0.72 mm (0.0283 in.)
F	23936—PL3—B00	0.75 mm (0.0295 in.)
G	23937—PL3—B00	0.78 mm (0.0307 in.)
H	23938—PL3—B00	0.81 mm (0.0319 in.)
I	23939—PL3—B00	0.84 mm (0.0331 in.)
J	23940—PL3—B00	0.87 mm (0.0343 in.)
K	23941—PL3—B00	0.90 mm (0.0354 in.)
L	23942—PL3—B00	0.93 mm (0.0366 in.)
M	23943—PL3—B00	0.96 mm (0.0378 in.)
N	23944—PL3—B00	0.99 mm (0.0390 in.)
O	23945—PL3—B00	1.02 mm (0.0402 in.)
P	23946—PL3—B00	1.05 mm (0.0413 in.)
Q	23947—PL3—B00	1.08 mm (0.0425 in.)
R	23948—PL3—B00	1.11 mm (0.0437 in.)
S	23949—PL3—B00	1.14 mm (0.0449 in.)
T	23950—PL3—B00	1.17 mm (0.0461 in.)
U	23951—PL3—B00	1.20 mm (0.0472 in.)
V	23952—PL3—B00	1.23 mm (0.0484 in.)
W	23953—PL3—B00	1.26 mm (0.0496 in.)
X	23954—PL3—B00	1.29 mm (0.0508 in.)
Y	23955—PL3—B00	1.32 mm (0.0520 in.)
Z	23956—PL3—B00	1.35 mm (0.0531 in.)
AA	23957—PL3—B00	1.38 mm (0.0543 in.)
AB	23958—PL3—B00	1.41 mm (0.0555 in.)
AC	23959—PL3—B00	1.44 mm (0.0567 in.)
AD	23960—PL3—B00	1.47 mm (0.0579 in.)
AE	23961—PL3—B00	1.50 mm (0.0591 in.)
AF	23962—PL3—B00	1.53 mm (0.0602 in.)
AG	23963—PL3—B00	1.56 mm (0.0614 in.)
AH	23964—PL3—B00	1.59 mm (0.0626 in.)
AI	23965—PL3—B00	1.62 mm (0.0638 in.)
AJ	23966—PL3—B00	1.65 mm (0.0650 in.)
AK	23967—PL3—B00	1.68 mm (0.0661 in.)
AL	23968—PL3—B00	1.71 mm (0.0673 in.)
AM	23969—PL3—B00	1.74 mm (0.0685 in.)
AN	23970—PL3—B00	1.77 mm (0.0697 in.)
AO	23971—PL3—B00	1.80 mm (0.0709 in.)

6. Check the thrust clearance in the manner described below.
   a. Install the shims selected in the transmission housing.
   b. Install the thrust washer and spring washer in the mainshaft.

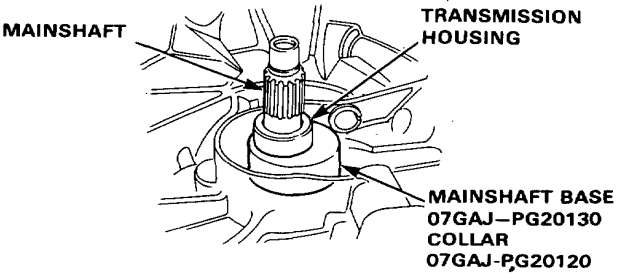


NOTE:
- Clean the thrust washer, spring washer and shim thoroughly before installation.
- Install the thrust washer, spring washer and shim properly.

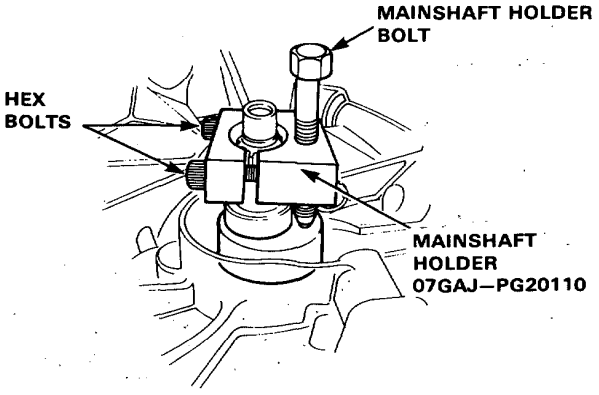
   c. Install the mainshaft in the clutch housing.
   d. Place the transmission housing over the mainshaft and onto the clutch housing.
   e. Tighten the clutch and transmission housings with several 10mm bolts.
   f. Tap the mainshaft with a plastic hammer.
7. Check the thrust clearance in the manner described below.

CAUTION: Mesurement should be made at room temperature.

   a. Slide the mainshaft base and the collar over the mainshaft.

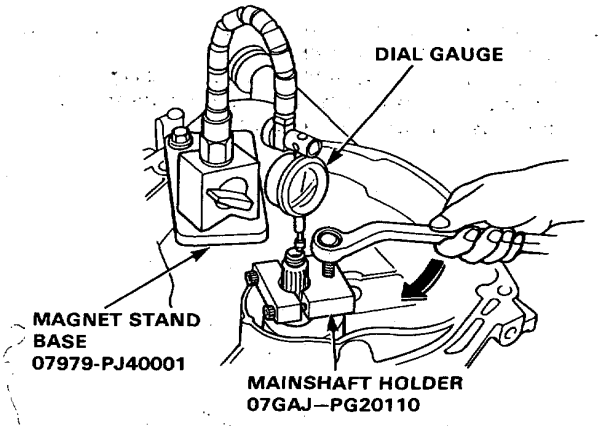


b. Attach the mainshaft holder to the mainshaft as follows:
   - Back-out the mainshaft holder bolt and loosen the two hex bolts.
   - Fit the holder over the mainshaft so its lip is towards the transmission.
   - Align the mainshaft holder's lip around the groove at the inside of the mainshaft splines, then tighten the hex bolts.



c. Seat the mainshaft fully by tapping its end with a plastic hammer.
d. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.

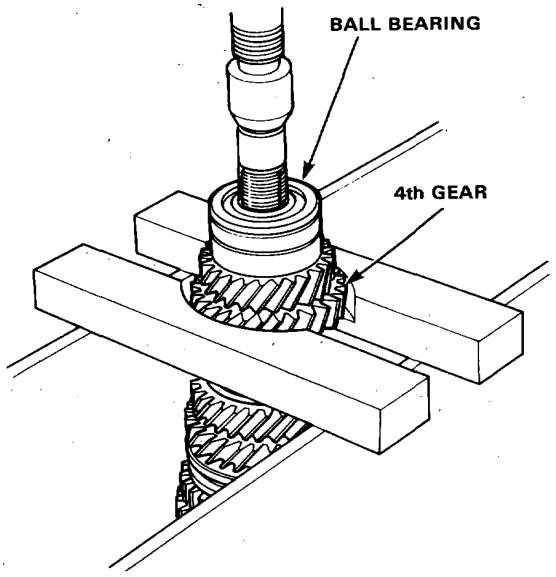
e. Zero a dial gauge on the end of the mainshaft.



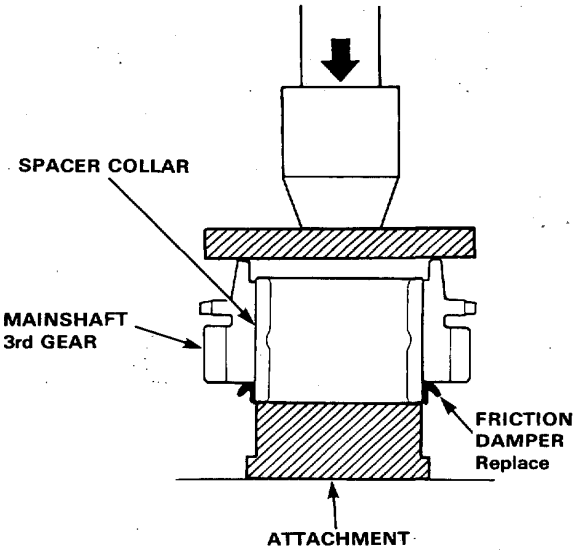
f. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft end play.
   CAUTION: Turning the shaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.
g. Clearance is correct if reading is between 0.13—0.20mm (0.0051—0.0079 in).
   If not, recheck necessary shim thickness.

Countershaft Disassembly

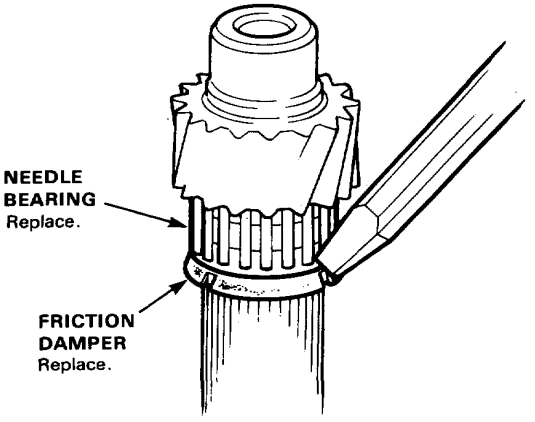
1. Raise the locknut tab from the groove of the shaft and remove the locknut and the spring washer.
2. Support 4th gear on steel blocks as shown and press the shaft out of ball bearing.
   CAUTION: Remove the ball bearing using a press and steel blocks as shown. Use of a jaw-type puller can cause damage to the gear teeth.



3. Using a press as shown, remove the friction damper (2nd gear side) from the spacer collar.

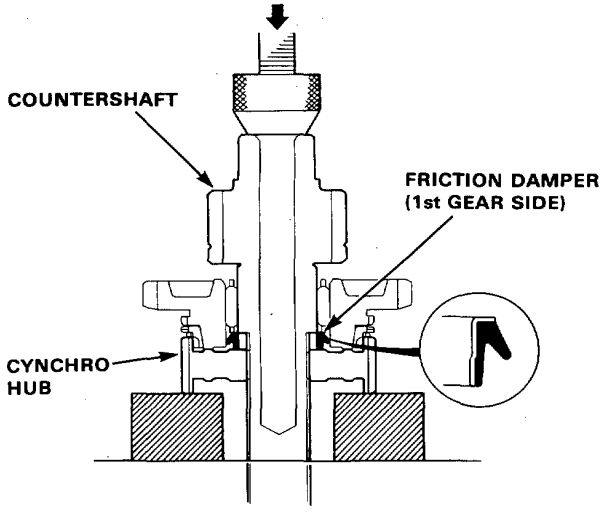


4. Remove the friction damper (1st gear side) and needle bearing from the countershaft.

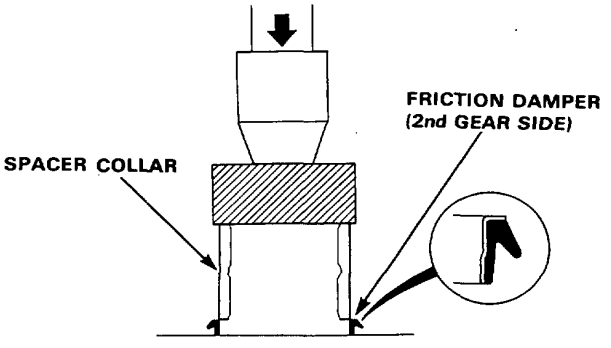


Countershaft Reassembly

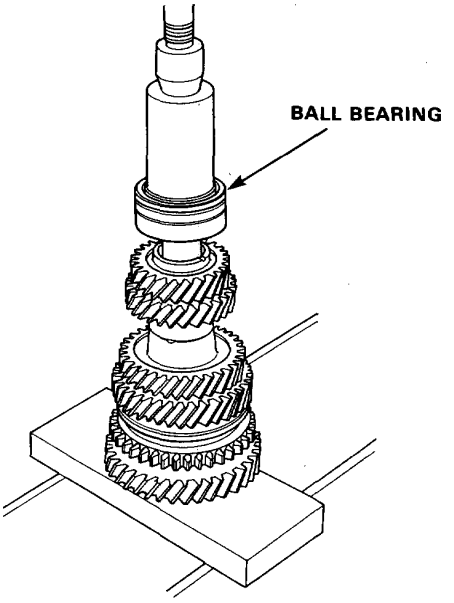
1. Using a press, install the friction damper (1st gear side) to the countershaft as shown.



2. Using a press, install the friction damper (2nd gear side) to the spacer collar.



3. Install the ball bearing using a press as shown.



4. Install the spring washer, tighten the locknut and then stake the locknut tab into the groove.

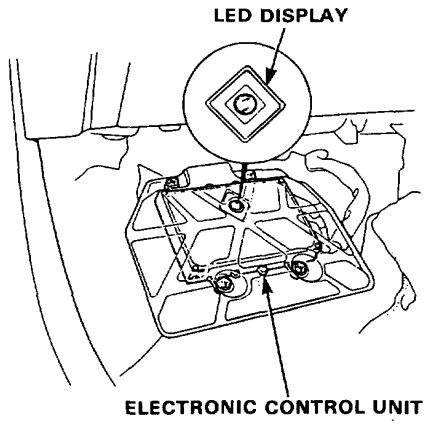
LOCKNUT
110 → 0 → 110 N·m (11.0 → 0 → 11.0kg-m, 80 → 0 → 80 lb-ft)

If the look-up control electrical system is suspected to be faulty according to the symptom charts on pages 9-4 and 9-5, check the following.

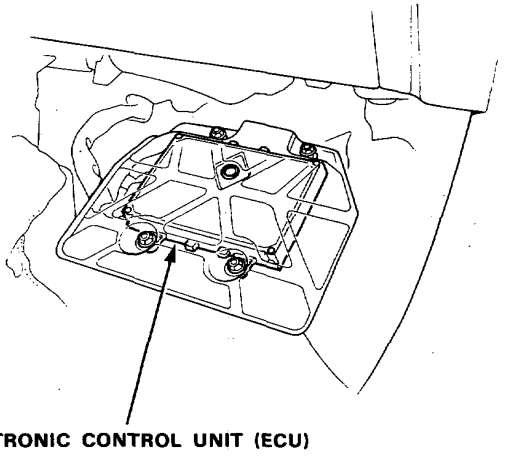
1. **PGM-FI engine type :**
   Check the LED of ECU under the instrument panel.
   If it blinks, count the number of blinks according to the troubleshooting chart.

   **The drawing below is for the PGM-FI engine type.*

RHD:



LHD:



2. Check and adjust the throttle control cable (page 9-43).
3. Check for power input signal of the lock-up control solenoid valve (See section 6).
4. Check the lock-up control solenoid valve (page 9-6).
5. Check the hydraulic system according to the troubleshooting in pages 9-4 and 9-5.

Troubleshooting

Symptom-to-System

SYMPTOM	Check these items on PROBABLE CAUSE LIST	Check these items on NOTES PAGE
Engine runs, but car does not move in any gear.	1, 6, 7, 16	K, L, R, S
Car moves in R and 2, but not in D3 or D4.	8, 29, 45, 49	C, M, O
Car moves in D3, D4 and R, but not in 2.	9, 30, 50	C, L
Car moves in D3, D4 and 2, but not in R.	1, 11, 12, 22, 39, 40, 41	C, L, Q
Car moves in N.	1, 8, 9, 10, 11 47, 48	C, D
Excessive idle vibration.	5, 17	B, K, L
Slips in all gears.	6, 7, 16	C, L, U
Slips in low gear.	8, 29, 45, 46, 49	C, N, O, U
Slips in 2nd gear.	9, 20, 23, 30, 46, 50	C, L, U
Slips in 3rd gear.	10, 21, 23, 31, 45, 46	C, L, U
Slips in 4th gear.	11, 23, 32, 46	C, L, U
Slips in reverse gear.	11, 32	C
Slips on 2 - 3 upshift.	3, 15, 24	E, L, V
Slips on 3 - 4 upshift.	3, 15, 25	E, L, V
No upshift; trans stays in low gear.	12, 13, 14, 19, 23	E, F, G, L
No downshift to low gear.	12, 19	G, L
Late upshift.	2, 12, 13, 14	E, F, L, V
Early upshift.	3, 13, 14	E, F, L, V
Erratic shifting.	2, 14, 26	E, F, V
Harsh shift (up & down shifts).	2, 4, 15, 23, 24, 25, 27, 48	A, E, H, I, L, V
Harsh shift (1 - 2).	2, 9	C, D, V
Harsh shift (2 - 3).	2, 10, 23, 24	C, D, H, L, V
Harsh shift (3 - 4).	2, 11, 23, 25	C, D, I, L, V
Harsh kickdown shifts.	2, 23, 27	L, V, Q
Harsh kickdown shift (2 - 1).	48	O
Harsh downshift (3 - 2) at closed throttle.	15	E, T
Axle(s) slips out of trans on turns.	44, 51	L, P, Q
Axle(s) stuck in trans.	44	L, Q
Ratcheting noise when shifting into R.	6, 7, 39, 40, 41	K, L, Q
Loud popping noise when taking off in R.	39, 40, 41	L, Q
Ratcheting noise when shifting from R to P, or from R to N.	39, 40, 41, 52	L, Q
Noise from trans in all selector lever positions.	6, 17	K, L, Q
Noise from trans only when wheels rolling.	40, 43	L, Q
Gear whine, rpm related (pitch changes with shifts).	6, 42	K, L, Q
Gear whine, speed related (pitch changes with speed).	40, 43	L, Q
Trans will not shift into 4th gear in D4.	1, 21, 28	L
Engine stalls on emergency stops (shift lever in D4 only).	2, 33	L, V
Lockup clutch does not lock up smoothly.	35, 37, 17	L
Lockup clutch does not operate properly.	2, 3, 12, 15, 18, 33, 34, 35, 36, 37, 38	E, L, V
Transmission has multitude of problems shifting, at disassembly large deposits of metal found on magnet.	44	L, Q
Hard to shift into 3rd and 4th in D4 range.	53	
Hard to shift into 3rd in D3 range.	53	
Slow to shift into R range from D3 and D4 ranges.	54	
Excessive shock when shifting into R range from P and N ranges.	54	

The following symptoms can be caused by improper repair or assembly.	Check these items on PROBABLE CAUSE DUE TO IMPROPER REPAIR	Check these ITEMS ON NOTES PAGE
Car creeps in N.	R1, R2	
Car does not move in D3 or D4.	R5	
Trans locks up in R.	R4	
Trans has no park.	R3	
Excessive drag in trans.	R8	R, K
Excessive vibration, rpm related.	R9	
Noise with wheels moving only.	R7	
Main seal pops out.	R10	S
Various shifting problems.	R11, R12	
Harsh upshifts.	R13	
In D3 or D4 trans starts in 2nd gear.	R6	

	PROBABLE CAUSE
1.	Shift cable broken/out of adjustment
2.	Throttle cable too short
3.	Throttle cable too long
4.	Wrong type ATF
5.	Idle rpm too low high
6.	Oil pump worn or seized
7.	Pressure regulator stuck
8.	Low clutch defective
9.	2nd clutch defective
10.	3rd clutch defective
11.	4th clutch defective
12.	Governor valve stuck
13.	Throttle A valve stuck
14.	Modulator valve stuck
15.	Throttle B valve stuck
16.	Oil screen clogged
17.	Torque convertor defective
18.	Torque governor check valve stuck
19.	1 - 2 shift valve stuck
20.	2 - 3 shift valve stuck
21.	3 - 4 shift valve stuck
22.	Reverse control valve stuck
23.	Clutch pressure control valve stuck
24.	2nd oriffice control valve stuck
25.	Orifice control valve stuck
26.	3 - 2 timing valve stuck
27.	kickdown valve stuck
28.	Shift timing valve accumulator stuck
29.	Low clutch accumulator defective
30.	2nd clutch accumulator defective
31.	3rd clutch accumulator defective
32.	4th/reverse accumulator defective
33.	Lockup clutch cut valve stuck
34.	Lockup clutch timing valve A stuck
35.	Lockup clutch timing valve B stuck
36.	Lockup clutch shift valve stuck
37.	Lockup clutch control valve stuck
38.	Lockup control solenoid valve broken
39.	Shift fork bent
40.	Reverse gears worn damaged (3 gears)
41.	Reverse selector worn
42.	3rd gears worn damaged (2 gears)
43.	Final gears worn damaged (2 gears)
44.	Differential pinion shaft worn
45.	Feedpipe O-ring broken

	PROBABLE CAUSE
46.	Servo valve check valve loose
47.	Gear clearance incorrect
48.	Clutch clearance incorrect
49.	Sprag clutch defective
50.	Sealing rings/guide worn
51.	Axle-inboard joint clip missing
52.	4th gears worn (damaged (2 gears)
53.	Servo control valve stuck
54.	Reverse timing valve stuck

	PROBABLE CAUSES DUE TO IMPROPER REPAIR
R1	Improper clutch clearance
R2	Improper gear clearance
R3	Parking pawl installed upside down
R4	Parking shift arm installed upside down
R5	Sprag clutch installed upside down
R6	Feed pipe missing in governor shaft
R7	Reverse hub installed upside down
R8	Oil pump binding
R9	Torque converter not fully seated in oil pump
R10	Main seal improperly installed
R11	Springs improperly installed
R12	Valves improperly installed
R13	Ball check valves not installed
R14	Shift fork bolt not installed

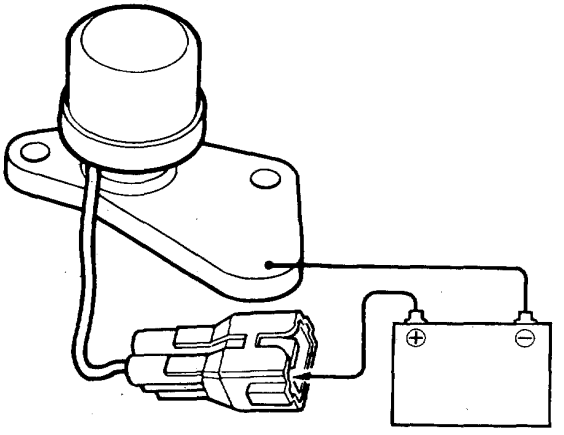
	NOTES
A	Flushing procedure (repeat 3 times): 1. Drain the trans. 2. Refill with 3 qts. of Dexron recommended type ATF. 3. Start the engine and shift trans to D4. 4. Let trans shift through gears at least 5 times. 5. Shift to reverse and neutral at least 5 times. 6. Drain and refill.
B	Set idle rpm in gear to specified idle speed. If still no good, adjust the motor mounts as outlined in engine section of service manual.
C	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D	If the clutch pack is seized, or is excessively worn, inspect the other clutches for wear, and check the orifice control valves and throttle valves for free movement.
E	If throttle valve B is stuck, inspect the clutches for wear.
F	If the modulator valve is stuck open (does not modulate line pressure), the trans will shift normally with less than 5 8 throttle but will shift up very late over 5 8 throttle. If the modulator valve is stuck closed, throttle valve A pressure will be zero and result in early upshifts and no forced downshift.
G	If the 1 – 2 valve is stuck closed, the transmission will not upshift. If stuck open, the transmission has no low gear.
H	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I	If the 3rd orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J	If the clutch pressure control valve is stuck closed, the transmission will not shift out of low gear.

	NOTES
K	Improper alignment of main valve body and torque converter case may cause oil pump seizure. The symptoms are mostly an rpm related ticking noise high pitched squeak. In severe instances, it may stall the engine. Follow instruction procedure
L	If the oil screen is clogged with particles of steel or aluminum, inspect the oil pump and differential pinion shaft. If both are OK, and no cause for the contamination is found, replace the torque converter.
M	If the low clutch feedpipe guide in the end cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the end cover as it is dented. The O-ring under the guide is probably broken.
N	Replace the mainshaft if the bushings for the low-and 4th feedpipe are loose or damaged. If the low feedpipe is damaged or out of round, replace it. If the 4th feedpipe is damaged or out of round, replace the end cover.
O	A worn or damaged sprag clutch is mostly a result of shifting the trans in D3 or D4 while the wheels rotate in reverse, such as rocking the car in snow.
P	Inspect the frame for collision damage.
Q	Inspect for damage or wear: 1. Governor shaft woodruff key 2. Reverse selector gear teeth chamfers 3. Engagement teeth chamfers of countershaft 4th & reverse gear 4. Shift fork, for scuff marks in center 5. Differential pinion shaft for wear under pinion gears 6. Bottom of 3rd clutch for swirl marks Replace items 1, 2, 3 and 4 if worn or damaged. If trans makes clicking, grinding or whiring noise, also replace mainshaft 4th gear and reverse idler gear and counter 4th gear in addition to 1, 2, 3, or 4. If differential pinion shaft is worn, overhaul differential assembly and replace oil screen and throughly clean trans, flush torque converter and cooler and lines. If bottom of 3rd clutch is swirled and trans makes gear noise, replace countershaft and ring gear.
R	Be very careful not to damage the torque converter case when replacing the main ball bearing. You may also damage the oil pump when you torque down the main valve body; this will result in oil pump seizure if not detected. Use proper tools.
S	Install the main seal flush with the torque converter ease. If you push it into the torque converter case until it bottoms out, it will block the oil return passage and result in damage.
T	Harsh downshifts when coasting to a stop with zero throttle may be caused by a bent-in throttle valve retainer/cam stopper. Throttle control cable adjustment may clear this problem. See page 9-43.
U	Check if servo valve check valve stopper cap is installed. If it was not installed, the check valve may have been pushed out by hydraulic pressure causing a leak (internal) affecting all forward gears.
V	Throttle cable adjustment is essential for proper operation of the transmission. Not only does it affect the shift points if misadjusted but also the shift quality and lockup clutch operation. A too long adjusted cable will result in throttle pressure being too low for the amount of engine torque input into the transmission, and may cause clutch slippage. A too short adjusted cable will result in too high throttle pressures which may cause harsh shifts, erratic shifts and torque converter hunting.

Lock-up Control Solenoid Valve (PGM-FI)

Inspection

1. Disconnect the lock-up control solenoid valve connector.
2. Connect the yellow terminal of the lock-up control solenoid valve to the battery positive (+) terminal and the battery negative (−) terminal to the body ground. A clicking sound should be heard.

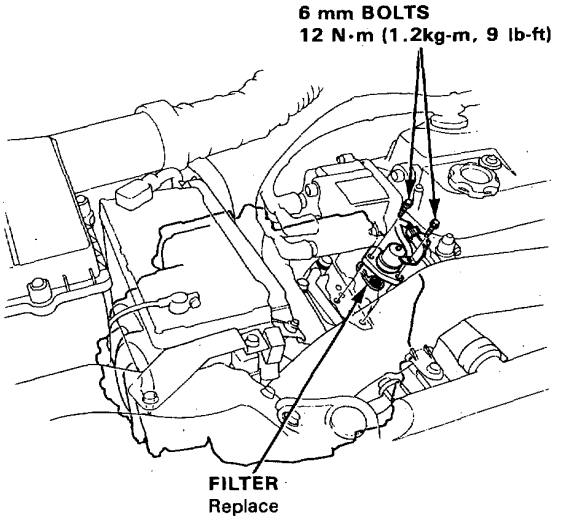


3. If not, check for continuity between the harness and body ground.
4. Replace the lock-up control solenoid valve if there is continuity between the harness and body ground.

Replacement

NOTE : Be sure to replace the lock-up control solenoid valve only when it is suspected to be faulty.

1. Remove the 6x1.0 mm bolts and lock-up control solenoid valve.
2. Check the oil passage in the lock-up control solenoid valve body and replace if is clogged with dirt.



3. Clean the lock-up control solenoid valve mounting suface and oil passage.
4. Install a new filter O-ring and the lock-up control solenoid valve.

   CAUTION : Do not use the glove while installing the filter.

5. Be sure that the connector is not rusted or contaminated with dirt or oil and connect it securely.

   NOTE : To ease installation of the bolt, the filter is provided with a cutout as shown in the drawing.

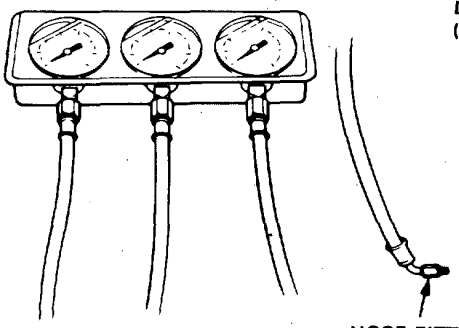
Pressure

Testing

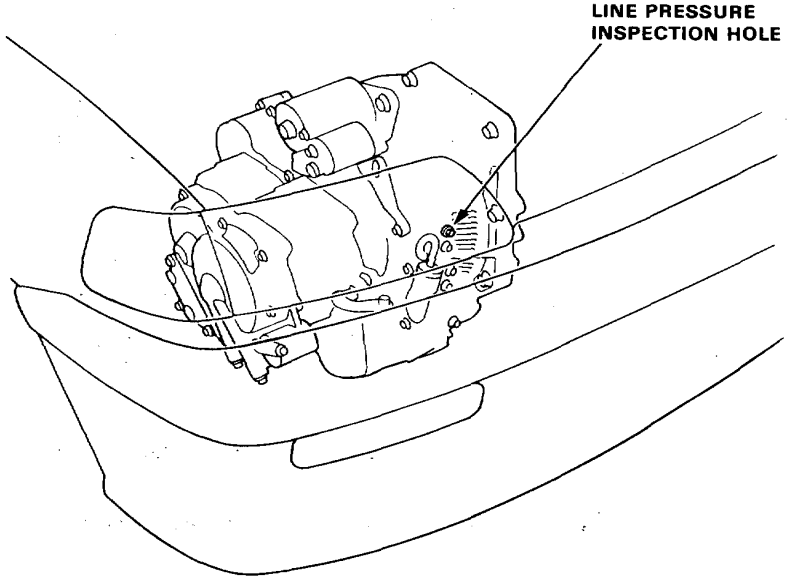
CAUTION: Before testing, be sure transmission is filled to proper level.

NOTE :
- Stop engine when attaching hoses for pressure tests.
  Torque hose fitting to 18 N·m (1.8kg-m, 12lb-ft).
- Do not reuse aluminum washers.

GAUGE SET 07406—0020003
(includes pressure hose set 07406—0020201)



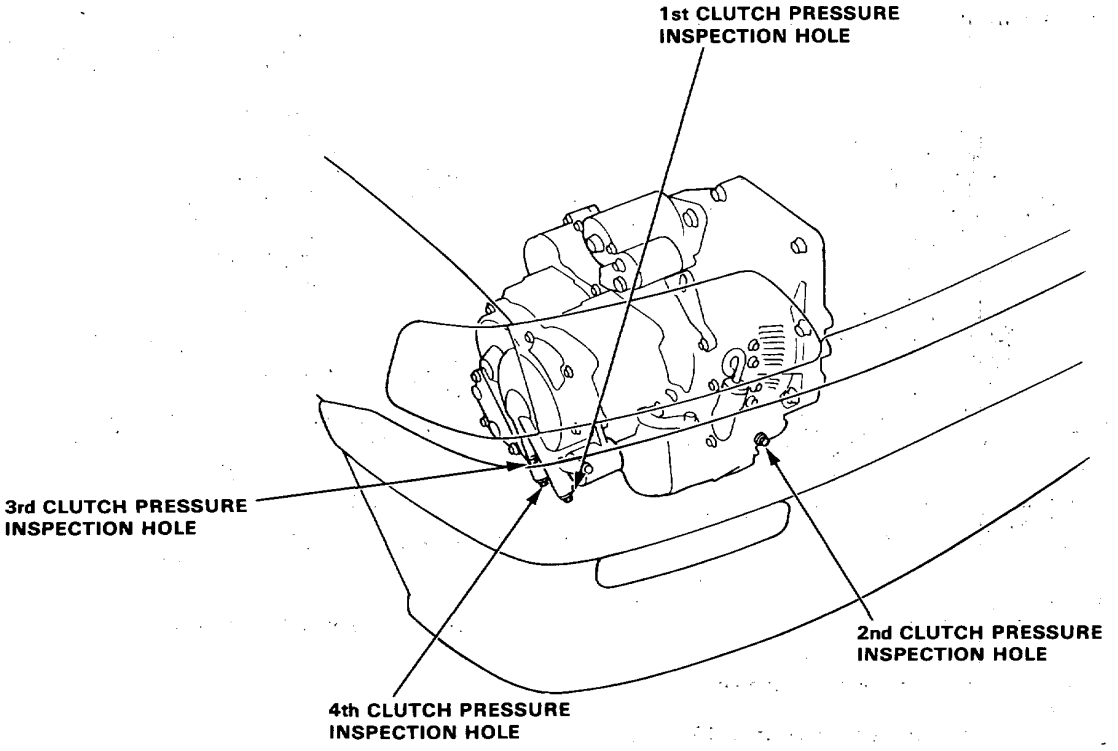
Line Pressure Measurement
1. Set the parking brake securely and block the rear wheels.
2. Run the engine at 2,000 min^{-1} (rpm).



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	N or P	No (or low) Line pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	736kPa (7.5 kg/cm², 107 psi)

Clutch Pressure Measurment

1. Set the parking brake securely and block the rear wheels.
2. Jack the up front of the car and support it with jack stands.
3. Run the engine at 2,000 min^{-1} (rpm).



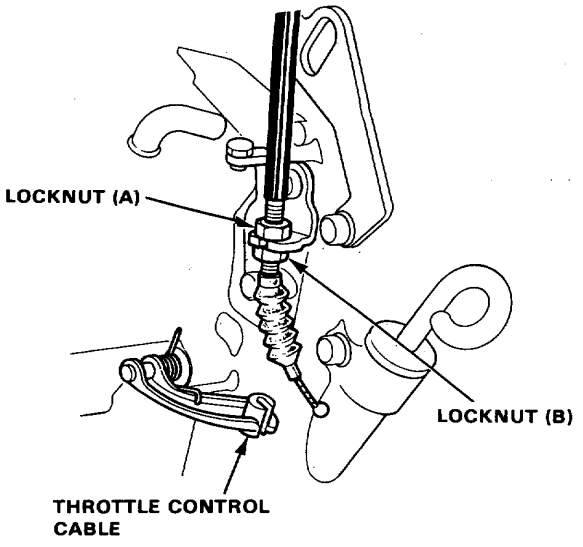
PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
1st Clutch	D3 or D4	No or low 1st pressure	1st Clutch	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	736 kPa (7.5 kg/cm², 107 psi)
2nd Clutch (2nd hold)	2	No or low 2nd pressure	2nd Clutch	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	736 kPa (7.5 kg/cm², 107 psi)
2nd Clutch 3rd Clutch 4th Clutch	D3 or D4	No or low 2nd, 3rd or 4th pressure	2nd, 3rd and 4th Clutch	412 kPa (4.2 kg/cm², 60psi) (throttle control lever fully closed) 785—834 kPa (8.0—8.5 kg/cm² 114—121 psi) (throttle open more than 1/4)	363 kPa (3.7 kg/cm², 53 psi) (throttle control lever fully closed) 736 kPa (7.5 kg/cm², 107 psi) (throttle open more than 1/4)
4th Clutch	R	No or low 4th pressure	Servo valve or4th Clutch	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	736 kPa (7.5 kg/cm², 107 psi)

(cont'd)

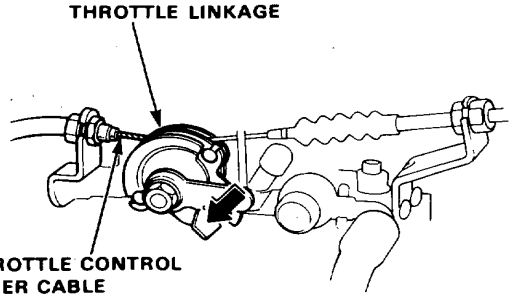
Testing (cont'd)

Low/High Pressure Test

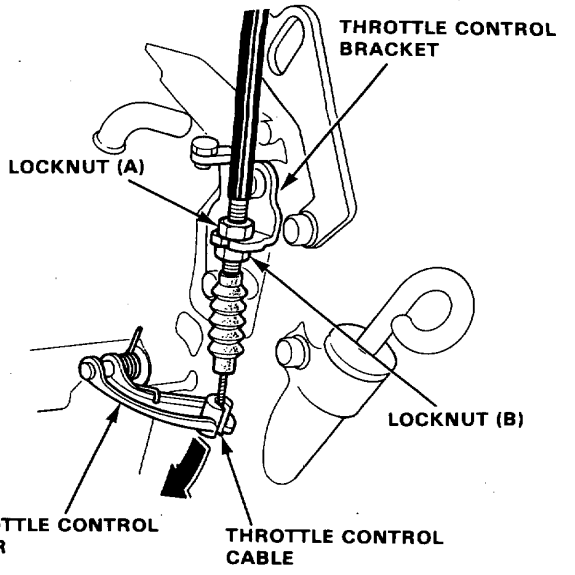
1. Raise car and support with safety stands.
2. Attach the gauge set to the appropriate pressure test port.
3. Remove the cable end of the throttle control cable from the throttle control lever.
   NOTE: Do not loosen the locknuts, simply unhook the cable end.



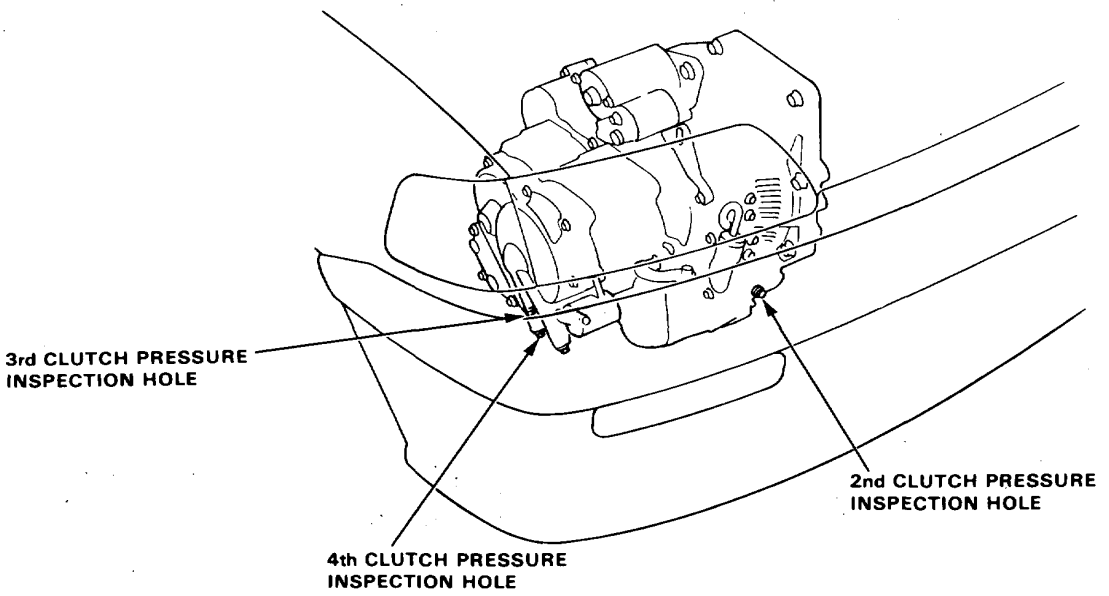
4. Warm up engine to normal operating temperature (cooling fan comes on).
5. With the engine idling, move the selector lever to D3 or D4.
6. Slowly move the throttle linkage to increase engine rpm until pressure is indicated on the appropriate gauge. Then release the throttle linkage, allowing the engine to return to an idle, and record the pressure reading.
7. Repeat step 6 for each clutch pressure being inspected.



8. With the engine idling, lift the throttle control lever up approximately 1/2 of its possible travel and increase the engine rpm until pressure is indicated on the appropriate gauge. Record the highest pressure reading obtained.



9. Repeat step 8 for each clutch pressure being inspected.



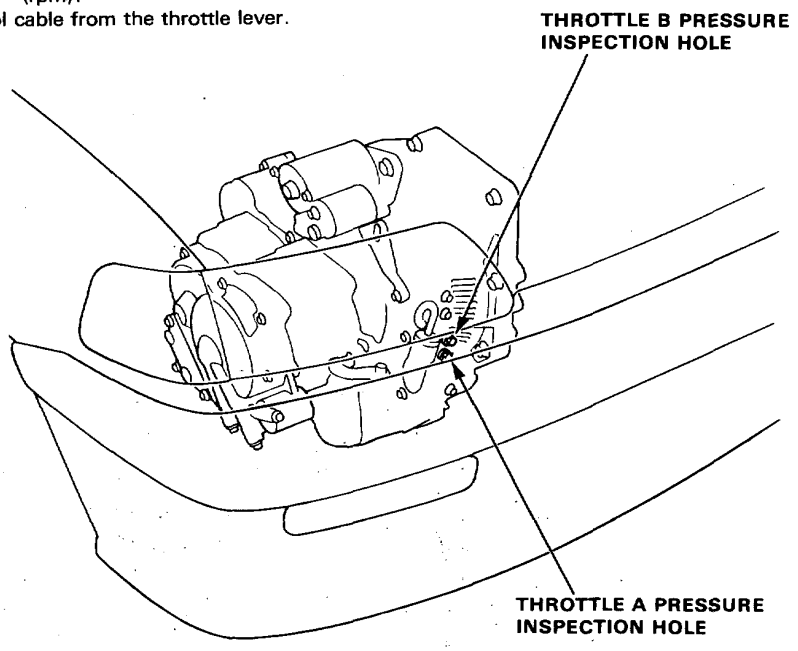
PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
2nd Clutch	D3 or D4	No or low 2nd pressure	2nd Clutch	412—834 kPa (4.2—8.5 kg/cm², 60—121 psi) varies with throttle opening	363 kPa (3.7 kg/cm², 53 psi) with lever released. 736 kPa (7.5 kg/cm², 107 psi) with lever in full throttle position.
3rd Clutch	D3 or D4	No or low 3rd pressure	3rd Clutch		
4th Clutch	D4	No or low 4th pressure	4th Clutch		

(cont'd)

Testing (cont'd)

Throttle Pressure Measurement

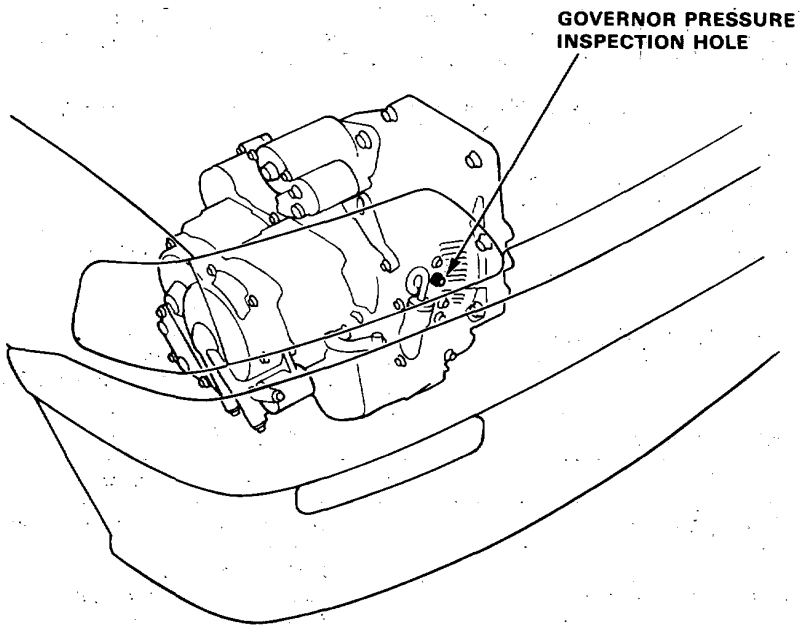
1. Set the paking brake securely and block the wheels.
2. Run the engine at 1,000 min^{-1} (rpm).
3. Disconnect the throttle control cable from the throttle lever.



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Throttle A	D3 or D4	No (or low) throttle pressure	Throttle valve A Throttle modulator valve	0–4.9 kPa (0–0.05 kg/cm², 0–70 psi) with lever released. Carburetor engine: 505–520 kPa (5.15–5.30 kg/cm², 73.2–75.4 psi) PGM-FI engine: 456–471 kPa (4.65–4.80kg/cm², 66–68 psi) DOHC engine: 477–490 kPa (4.85–5.00kg/cm², 69–71 psi)	Carburetor engine: 500 kPa (5.1 kg/cm², 72.5 psi) PGM-FI engine: 451 kPa(4.60kg/cm², 65 psi) DOHC engine: 471 kPa(4.8kg/cm², 68 psi) With lever in full throttle position.
Throttle B	D3 or D4	No (or low) throttle pressure	Throttle valve B	0 kPa (0 kg/cm², 0 psi) with lever released. 785–834 kPa (8.0–8.5 kg/cm², 114–121 psi) with lever in full throttle position.	736 kPa (7.5 kg/cm², 107 psi) with lever in full throttle position.

Governor Pressure Measurement

1. Set the parking brake securely and block the rear wheels.
2. Jack up the front of the car and support it with jack stands.
3. Run vehicle at 60 km/h (38 mph).



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Governor	D3 or D4	No (or low) governor pressure	Governor valve	1.4 ℓ engine: 151-161 kPa (1.54-1.64 kg/cm², 22-23 psi) 1.6 ℓ Carburetor engine: 148-158 kPa (1.51-1.61 kg/cm², 21-23 psi) PGM-FI engine: 220-229 kPa (2.24-2.34 kg/cm², 32-33 psi) DOHC engine: 165-176 kPa (1.68-1.78 kg/cm², 24-25 psi)	1.4 ℓ engine: 146 kPa (1.49 kg/cm², 21 psi) 1.6 ℓ Caburetor engine: 143 kPa (1.46 kg/cm², 21 psi) PGM-FI engine: 215 kPa (2.19 kg/cm², 31 psi) DOHC engine: 160 kPa (1.63 kg/cm², 23 psi)

Stall Speed

Test

CAUTION :

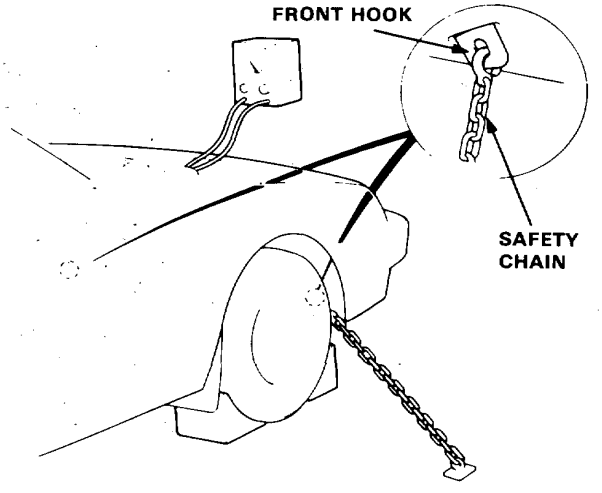
- **To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.**
- **Do not shift the lever while rising the ehgine speed.**
- **Be sure to remove the pressure gauge before testing stall speed.**

1. Engage parking brake and block the front wheels.
2. Connect safety chains to both front two hooks and attach, with minimum slack, to some strong stationary object.
3. Connect tachometer,and start the engine.
4. After the engine has warmed up to normal operating temperature, shift into [2] .
5. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
6. Allow 2 minutes for cooling, then repeat same test in [D4] , and [R] .

NOTE: Stall speed in [D4] , [2] and [R] must be the same, and must also be within limits:

Stall Speed RPM :
Specification : 2,750 min^{-1} (rpm)
Service Limit : 2,300—2,900 min^{-1} (rpm)

TROUBLE	PROBABLE CAUSE
Stall rpm high in [2] , [D4] and [R] .	• Low fluid level • Faulty oil pump • Clogged oil strainer • Pressure regulator valve stuck closed
Stall rpm high in [R] only	• Slippage of 4th clutch
Stall rpm high in [2] only	• Slippage of 2nd clutch
Stall rpm high in [D4] only	• Slippage of 1st clutch or one-way clutch
Stall rpm high in [2] , [D4] and [R] .	• Engine output low • Engine throttle valve not in full open position • Torque converter one-way clutch slipping



Fluid Level

Checking/Changing

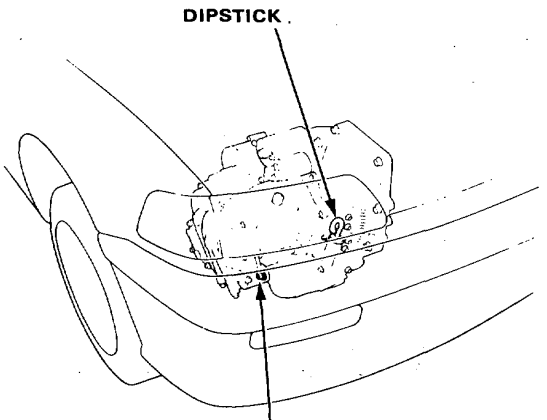
Checking

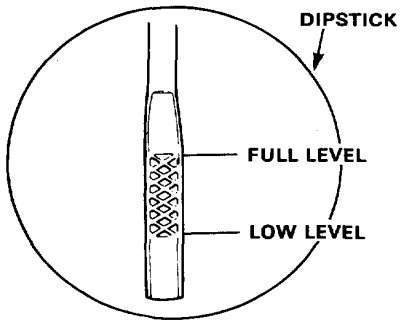
With the car on level ground, pull the transmission dipstick and check the level of fluid immediately after the engine is shut off (within one minute). The fluid level should be between the full and low marks. Push the dipstick all the way in to check the fluid level. If the level is at, or below, the low mark, add DEXRON-II type automatic transmission fluid.

Changing

1. Bring the transmission up to operating temperature by driving the car. Park the car on level ground, turn the engine off, then remove drain plug.
2. Reinstall the drain plug with a new washer, then refill the transmission to the full mark on the dipstick.

Automatic transmission Capacity:
2.4ℓ (2.5 U.S.qts, 2.1 Imp.qt) at change
5.4ℓ (5.7 U.S.qts, 4.8 Imp.qt) after overhaul



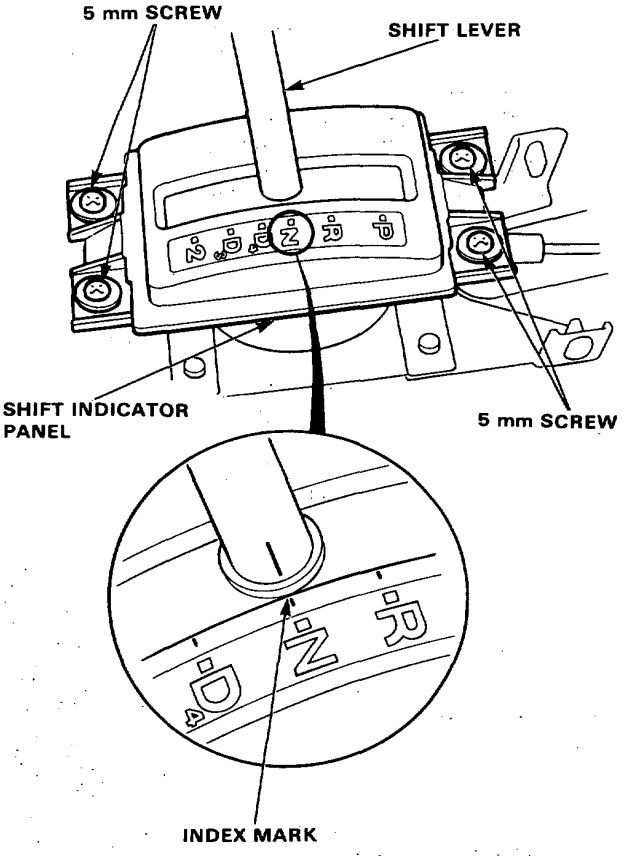


Shift Indicator Panel

Adjustment

1. Check that the index mark of the indicator aligns with the N mark of the shift indicator panel with the transmission in NEUTRAL.
2. If not aligned, remove the panel mounting screws and adjust by moving panel.

   NOTE : Whenever escutcheon is removed for indicator bulb replacement etc., reinstall the panel as described above.



Removal

⚠ WARNING

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

CAUTION :
- **Use the fender covers to avoid damaging the painted surfaces.**
- **Disconnect the wires and harnesses by holding the connectors.**
- **Reconnect the wires, harnesses and hoses properly. Be sure that the hoses and harnesses are not pinched or interfered with any parts.**

1. Discnnect the battery negative (−) and positive (+) cables from the battery, and remove the battery.

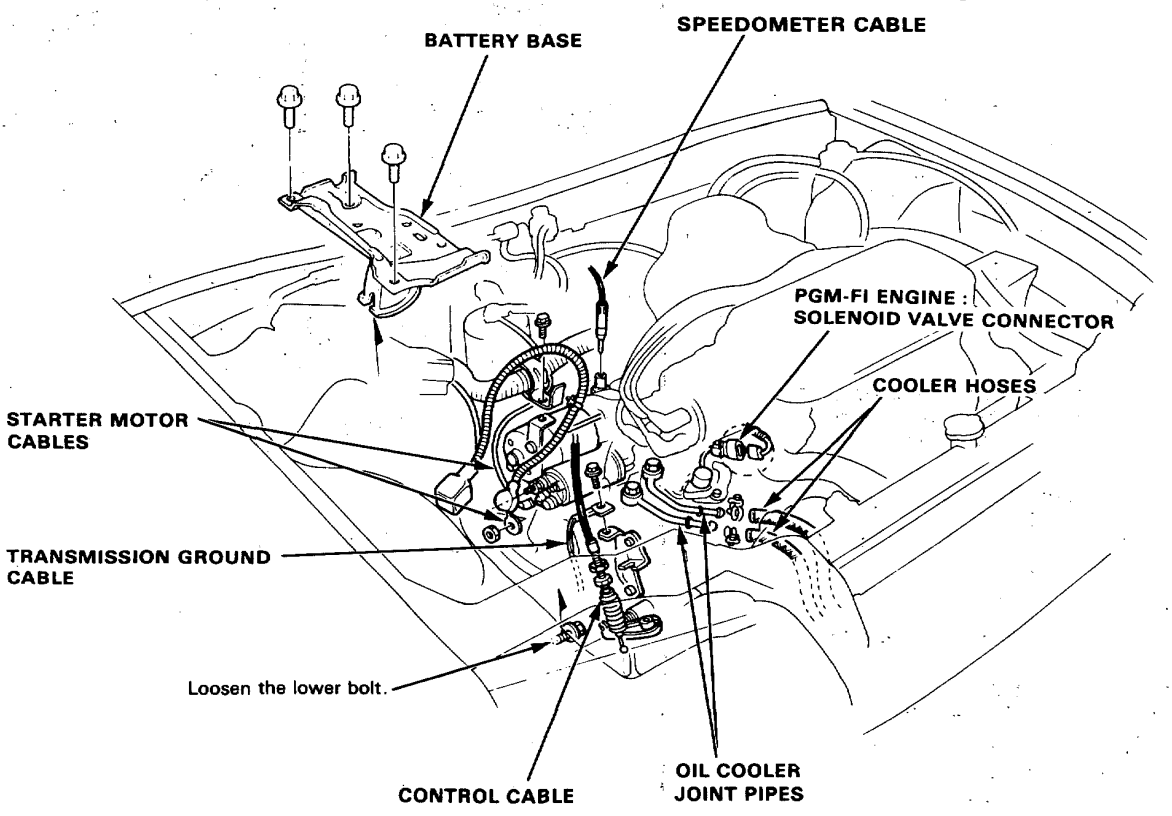
CAUTION:
- **Disconnect the battery negative (−) cable first, then the positive (+) cable from the battery.**

NOTE : Clean the battery terminals with an emery paper and coat with grease before reconnection.

2. Remove the 3 mount bolts and loosen the 1 bolt located at the side of the battery base, and intake hose band of the throttle body.
3. Remove the air cleaner case complete with the intake hose (see Section 6).
4. Disconnect the starter motor and transmission ground cables.
5. Disconnect the speedometer cable (See Section 5).

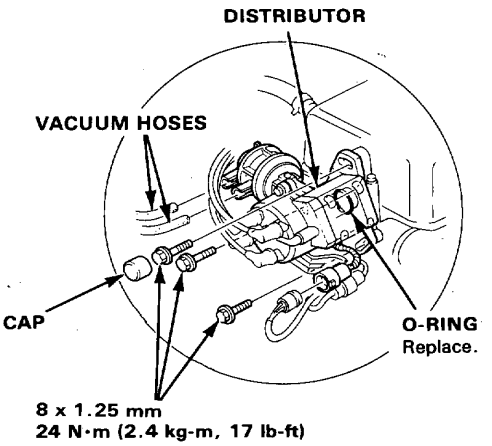
   NOTE: Do not disassemble speedometer gear holder.
6. **PGM-FI engine :**
   Disconnect the lock-up control solenoid valve wire connector.
7. Disconnect the control cable at the control lever.
8. Drain transmission oil/fluid. Use a socket wrench to remove the drain plug. Remove the oil filler plug to speed draining. Reinstall the drain plug with a new washer.
9. Disconnect the cooler hoses at the joint pipes. Turn the ends up to prevent ATF from flowing out.

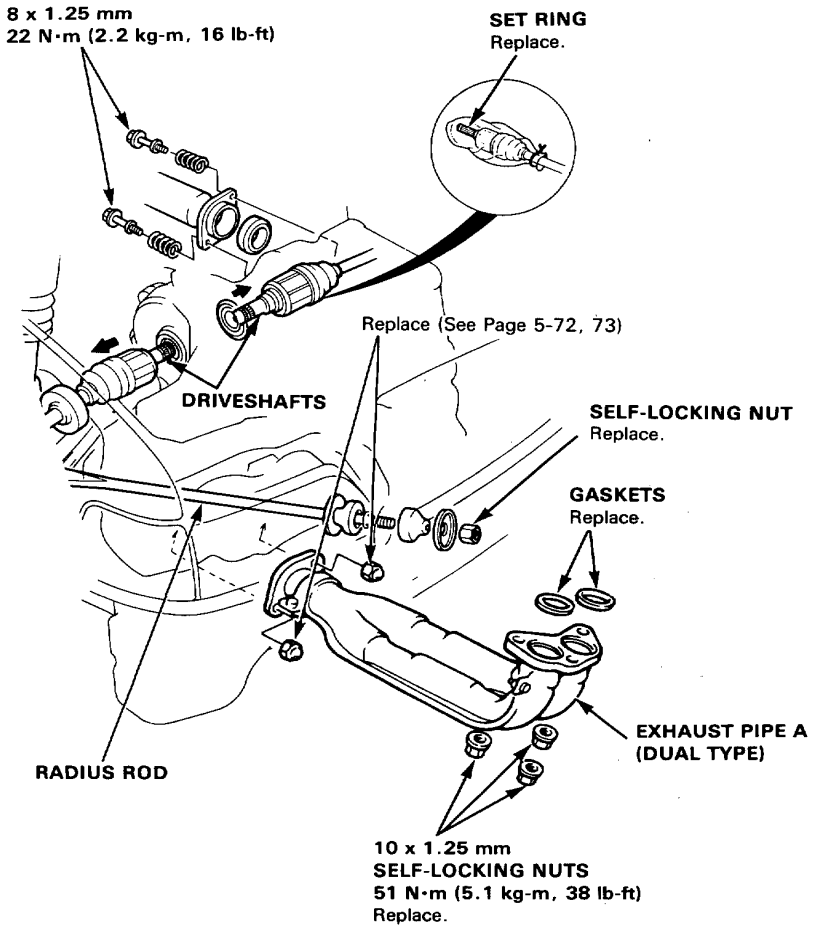
   NOTE: Check for any signs of leak at the hose joints.



10. Disconnect the vacuum hoses and connectors and remove the mount bolts, then remove the distributor from the cylinder head.
    NOTE: Adjust the ignition timing on reinstallation.
11. Remove the right front splash shield.
12. Remove the exhaust pipe A.
13. Remove the cotter pin and front lower arm ball joint nut. Separate the lower arm and ball joint. (page 12-11)
14. Remove the self-locking nut and damper fork bolt. (page 12-12)
15. Remove the two bolts and front side self-locking nut, then remove the right radius rod. (page 12-8, 9)
16. Remove the right and left driveshafts (See section 10).

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

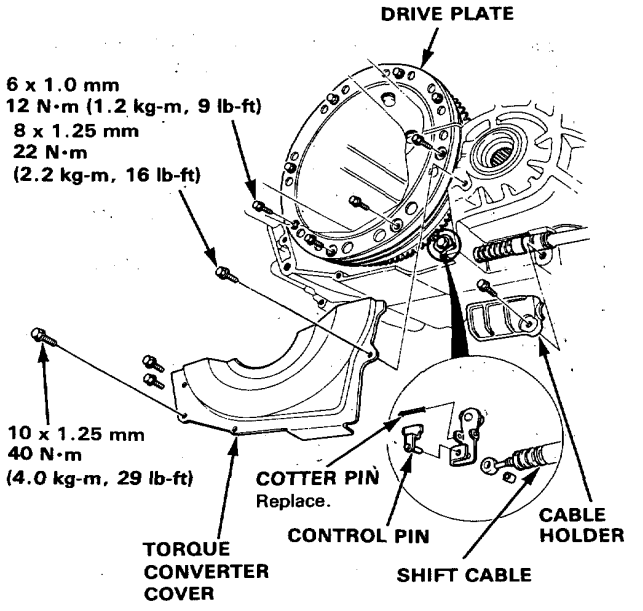


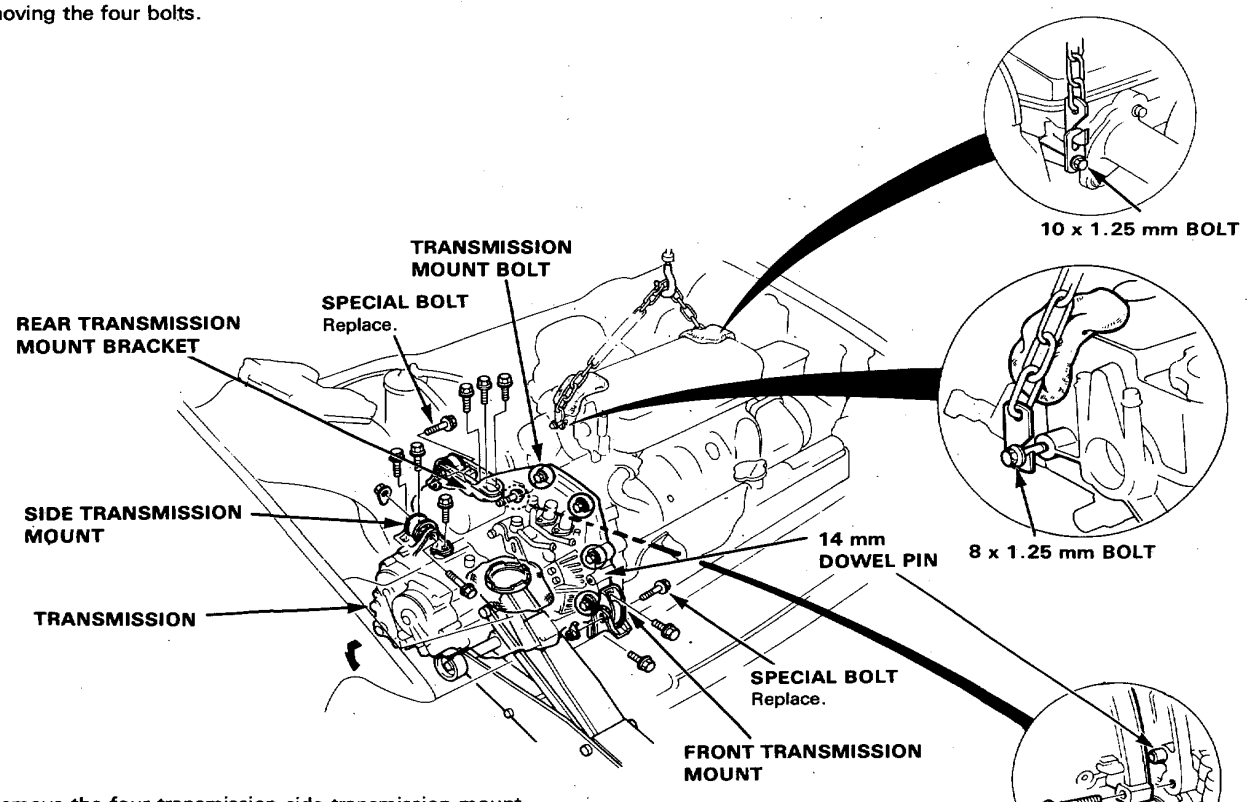


(cont'd)

Removal (cont'd)

17. Remove the header pipe bracket and torque converter cover.
18. Remove the cable holder.
19. Remove the shfit control cable by removing the cotter pin, control pin and control lever roller from the control lever.
20. Remove the drive plate bolts one at a time while rotating the crankshaft pulley counterclockwise.
    CAUTION: The pulley mount bolt has the right hand threads and it might come loose while rotating the pulley. Check the bolt for tightness.
21. Set the 8 mm bolt in the hole at the right side of the cylinder head and 10 mm bolt in the hole at the left side of the cylinder head. Attach the hoist chain to the bolts and lift the engine slightly to unload the mounts.
    NOTE: Be sure to set the bolts securely. Protect the cylinder head and cover with a shop towel while lifting.
22. Place a jack under the transmission and raise the transmission just enough to take weights off the mounts.
23. Remove the side transmission mount and bracket by removing the four bolts.
24. Remove the front transmission mount by removing the three bolts.
25. Remove the rear transmission mount bracket by removing the four bolts.

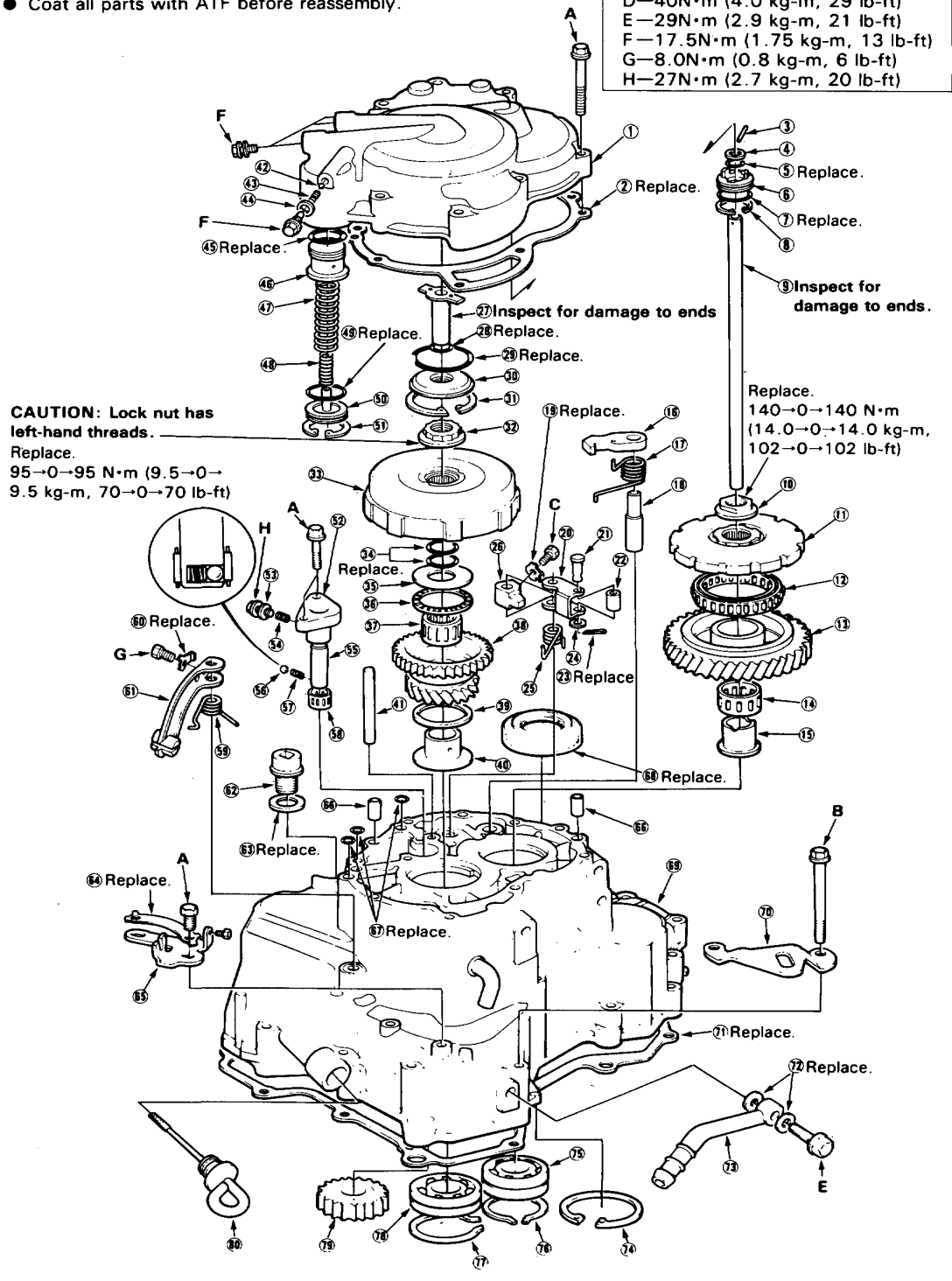




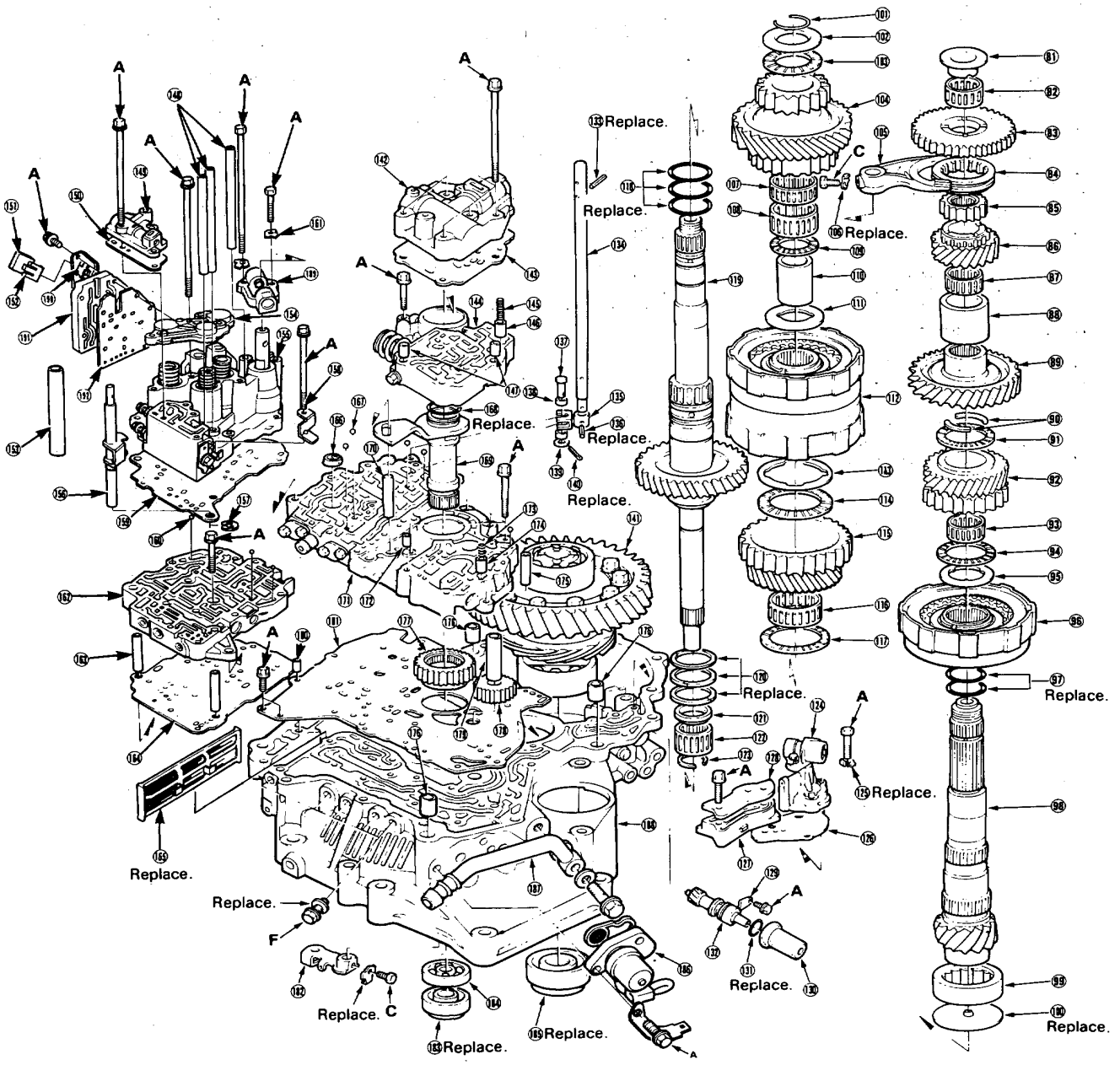
26. Remove the four transmission side transmission mount bolts.
27. Remove the engine side transmission mount bolt.
28. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower on the transmission jack.

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Coat all parts with ATF before reassembly.

Torque Value	Bolt Size
A—12N·m (1.2 kg-m, 9 lb-ft)	6 mm
B—34N·m (3.4 kg-m, 25 lb-ft)	8 mm
C—14N·m (1.4 kg-m, 10 lb-ft)	6 mm
D—40N·m (4.0 kg-m, 29 lb-ft)	14 mm Drain
E—29N·m (2.9 kg-m, 21 lb-ft)	12 mm
F—17.5N·m (1.75 kg-m, 13 lb-ft)	8 mm
G—8.0N·m (0.8 kg-m, 6 lb-ft)	5 mm
H—27N·m (2.7 kg-m, 20 lb-ft)	10 mm



① END COVER
② GASKET
③ PIN 19.8 mm
④ FEED PIPE WASHER
⑤ O-RING 7.7 x 1.9 mm
⑥ FEED PIPE FLANGE
⑦ O-RING 19.8 x 1.9 mm
⑧ SNAP RING 26 mm
⑨ 3rd CLUTCH FEED PIPE
⑩ LOCKNUT 23 mm
⑪ PARKING GEAR
⑫ ONE-WAY CLUTCH
⑬ COUNTERSHAFT 1st GEAR
⑭ NEEDLE BEARING
31 x 36 x 14 mm
⑮ COLLAR
⑯ PARKING PAWL
⑰ PARKING PAWL SPRING
⑱ PARKING PAWL SHAFT
⑲ LOCK WASHER
⑳ PARKING SHIFT ARM
㉑ ROLLER PIN
㉒ PARKING BRAKE ROLLER
㉓ COTTER PIN 1.6 mm
㉔ WASHER 6 mm
㉕ PARKING BRAKE SPRING
㉖ PARKING BRAKE STOPPER
㉗ 1st CLUTCH FEED PIPE
㉘ O-RING 8.5 x 1.9 mm
㉙ O-RING 34 x 1.9 mm
㉚ FEED PIPE GUIDE A
㉛ SNAP RING 38 mm
㉜ LOCKNUT 19 mm
㉝ 1st CLUTCH ASSEMBLY
㉞ O-RINGS 18.8 x 1.9 mm
㉟ THRUST WASHER 23 mm
㊱ THRUST NEEDLE BEARING
35 x 49 x 2 mm
㊲ NEEDLE BEARING
28 x 33 x 16.8 mm
㊳ MAINSHAFT 1st GEAR
㊴ THRUST WASHER
28 x 40 x 1.5 mm
㊵ COLLAR 26 mm
㊶ STOP PIN
㊷ STEEL BALL
㊸ SPRING
㊹ SEALING WASHER
㊺ O-RING 29 x 2.4 mm
㊻ 1st ACCUMULATOR
PISTON
㊼ OUTER SPRING
㊽ INNER SPRING
㊾ O-RING 29 x 2.4 mm
㊿ 1st ACCUMULATOR COVER
(51) SNAP RING 38 mm
(52) IDLER SHAFT HOLDER
(53) WASHER
(54) IDLER SHAFT SPRING A
(55) IDLER SHAFT
(56) STEEL BALL
(57) IDLER SHAFT SPRING B
(58) NEEDLE BEARING
14 x 18 x 15 mm
(59) THROTTLE LEVER SPRING
(60) LOCK WASHER
(61) THROTTLE CONTROL LEVER
(62) DRAIN PLUG
(63) SEALING WASHER
(64) LOCK PLATE
(65) THROTTLE CABLE BRACKET
(66) DOWEL PIN 8 x 14 mm
(67) O-RING 7.7 x 2.3 mm
(68) OIL SEAL 35 x 63 x 9 mm
(69) TRANSMISSION HOUSING
(70) TRANSMISSION HOOK
(71) GASKET
(72) SEALING WASHER
(73) COOLER PIPE
(74) SNAP RING 72 mm
(75) BALL BEARING
25 x 64 x 16 mm
(76) SNAP RING 64 mm
(77) SNAP RING 70 mm
(78) BALL BEARING
26 x 70 x 17 mm
(79) REVERSE IDLER GEAR
(80) OIL LEVEL GAUGE

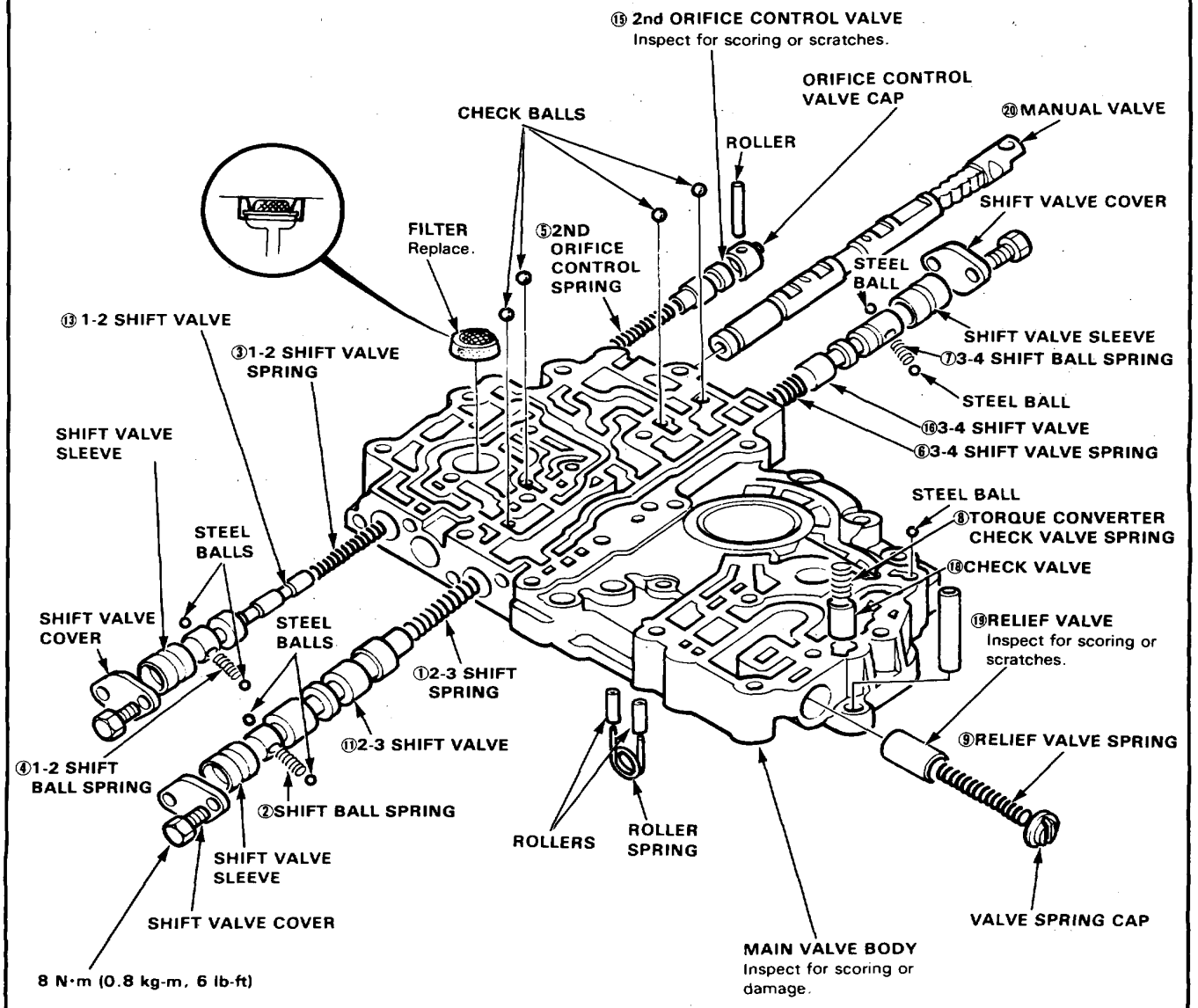

Replace.
A
C
F

(81) REVERSE GEAR COLLAR
(82) NEEDLE BEARING
31 x 36 x 14 mm
(83) COUNTERSHAFT REVERSE GEAR
(84) REVERSE GEAR SELECTOR
(85) SELECTOR HUB
(86) COUNTERSHAFT 4th GEAR
(87) NEEDLE BEARING
28 x 33 x 20 mm
(88) DISTANCE COLLAR 28 mm
(89) COUNTERSHAFT 2nd GEAR
(90) COTTER WASHER
(91) THRUST NEEDLE BEARING
39 x 54 x 2 mm
(92) COUNTERSHAFT 3rd GEAR
(93) NEEDLE BEARING
32 x 38 x 20 mm
(94) THRUST NEEDLE BEARING
35 x 52 x 2 mm
(95) THRUST WASHER
(96) 3rd CLUTCH ASSEMBLY
(97) O-RING
31.2 x 1.9 mm
(98) COUNTERSHAFT
(99) NEEDLE BEARING
36 x 62 x 18 mm
(100) OIL GUIDE PLATE
(101) SNAP RING 26 mm
(102) THRUST WASHER
26 x 45 x 3 mm
(103) THRUST NEEDLE BEARING
32 x 44 x 2 mm
(104) 4th GEAR
(105) REVERSE SHIFT FORK
(106) LOCK WASHER
(107) NEEDLE BEARING
32 x 38 x 14 mm
(108) NEEDLE BEARING
32 x 38 x 20 mm
(109) THRUST NEEDLE BEARING
39 x 54 x 2 mm
(110) 4th GEAR COLLAR
(111) THRUST WASHER
26 x 53 x 4.5 mm
(112) 2nd/4th CLUTCH ASSEMBLY
(113) THRUST WASHER 36.5 mm
(114) THRUST NEEDLE BEARING
36 x 52 x 11 mm
(115) 2nd GEAR
(116) NEEDLE BEARING
36 x 41 x 14.8 mm
(117) THRUST NEEDLE BEARING
42 x 58 x 2 mm
(118) O-RING 31.2 x 1.9 mm
(119) MAINSHAFT
(120) SEALING RING 32 mm
(121) DISTANCE COLLAR 20 mm
(122) NEEDLE BEARING
20 x 26 x 20 mm
(123) SNAP RING 20 mm
(124) GOVERNOR
(125) LOCK WASHER ASSEMBLY
(126) SEPARATOR PLATE
(127) BY-PASS BODY
(128) BY-PASS BODY COVER
(129) LOCK PLATE
(130) BOOT
(131) O-RING
(132) SPEED SENSOR ASSEMBLY
(133) PIN
(134) CONTROL SHAFT
(135) SHIFT LEVER
(136) PIN
(137) MANUAL VALVE PIN
(138) ROLLERS
(139) WASHER
(140) PIN
(141) DIFFERENTIAL ASSEMBLY
(142) LOCK-UP VALVE ASSEMBLY
(143) LOCK-UP SEPARATOR PLATE
(144) REGULATOR VALVE ASSEMBLY
(145) SPRING
(146) TORQUE CONVERTER CHECK VALVE
(147) DOWEL PIN
(148) CLUTCH PIPE
(149) MODULATOR VALVE ASSEMBLY
(150) MODULATOR SEPARATOR PLATE
(151) MAGNET
(152) MAGNET HOLDER
(153) SUCTION PIPE
(154) ACCUMULATOR COVER
(155) SERVO VALVE BODY ASSEMBLY
(156) THROTTLE CONTROL SHAFT
(157) E-CLIP Replace
(158) LOCK PLATE
(159) SERVO SEPARATOR PLATE
(160) STEEL BALL
(161) LOCK WASHER Replace
(162) SECONDARY VALVE BODY ASSEMBLY
(163) DOWEL PIN
(164) SECONDARY SEPARATOR PLATE
(165) FILTER SCREEN
(166) FILTER
(167) STEEL BALL
(168) O-RING 27.5 x 1.7 mm
(169) STATOR SHAFT
(170) STOP PIN
(171) MAIN VALVE BODY ASSEMBLY
(172) DOWEL PIN
(173) CHECK VALVE SPRING
(174) CHECK VALVE
(175) SUCTION PIPE
(176) DOWEL PIN
(177) OIL PUMP DRIVE GEAR
(178) OIL PUMP DRIVEN GEAR
(179) OIL PUMP SHAFT
(180) DOWEL PIN 8 x 14 mm
(181) MAIN VALVE SEPARATOR PLATE
(182) CONTROL LEVER
(183) OIL SEAL 44 x 68 x 8 mm
(184) BALL BEARING
(185) OIL SEAL 35 x 56 x 8 mm
(186) LOCK-UP CONTROL SOLENOID VALVE
(187) COOLER PIPE
PGM-FI engine only
(188) TORQUE CONVERTER HOUSING
(189) SERVO VALVE HOLDER
(190) MAGNET COVER
(191) SERVO COVER
(192) SERVO COVER SEPARATOR PLATE

Main Valve Body

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair.
- Coat all parts with ATF before reassembly.

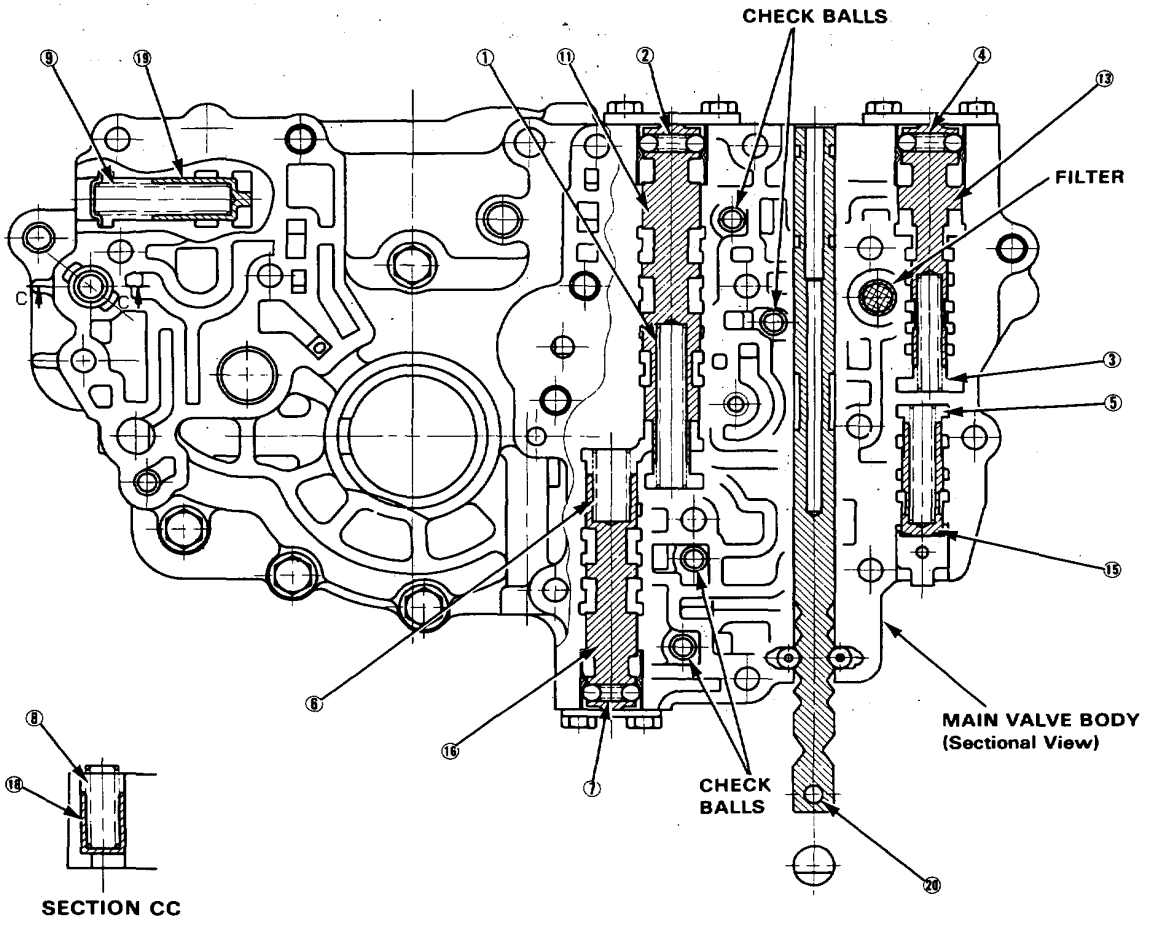


Spring Specifications

Unit of length: mm (in)

No.	Spring		Standard (New)			
			Wire Dia	O. D.	Free Length	No. of Coils
①	2-3 shift spring		0.7 (0.028)	7.6 (0.299)	43.0 (1.693)	12.7
②	2-3 Shift ball spring	Carburetor	0.4 (0.016)	4.5 (0.177)	14.7 (0.579)	7.3
		DOHC	0.45 (0.018)	4.5 (0.177)	13.3 (0.524)	8
③	1-2 shift spring	Carburetor	0.5 (0.020)	4.5 (0.177)	46.8 (1.843)	35.1
		DOHC	0.5 (0.020)	4.4 (0.173)	48.5 (1.909)	35.1
④	1-2 shift ball spring	1.6ℓ Carburetor	0.4 (0.016)	4.5 (0.177)	11.3 (0.445)	8
		1.4ℓ and DOHC	0.45 (0.018)	4.5 (0.177)	12.7 (0.500)	11
⑤	2nd orifice control spring		0.8 (0.031)	6.6 (0.260)	46.3 (1.823)	27.6
⑥	3-4 shift spring	Carburetor	0.7 (0.028)	9.6 (0.378)	32.9 (1.295)	6.4
		DOHC	0.8 (0.031)	9.6 (0.378)	33.9 (1.335)	11.3
⑦	3-4 shift ball spring	Carburetor	0.45 (0.018)	4.5 (0.177)	12.0 (0.472)	6.7
		DOHC	0.5 (0.020)	4.5 (0.177)	10.8 (0.25)	7.4
⑧	Torgue converter check spring		1.1 (0.043)	8.4 (0.331)	36.4 (1.433)	12
⑨	Relief valve spring		1.0 (0.039)	8.4 (0.331)	52.0 (2.047)	23

Sectional View

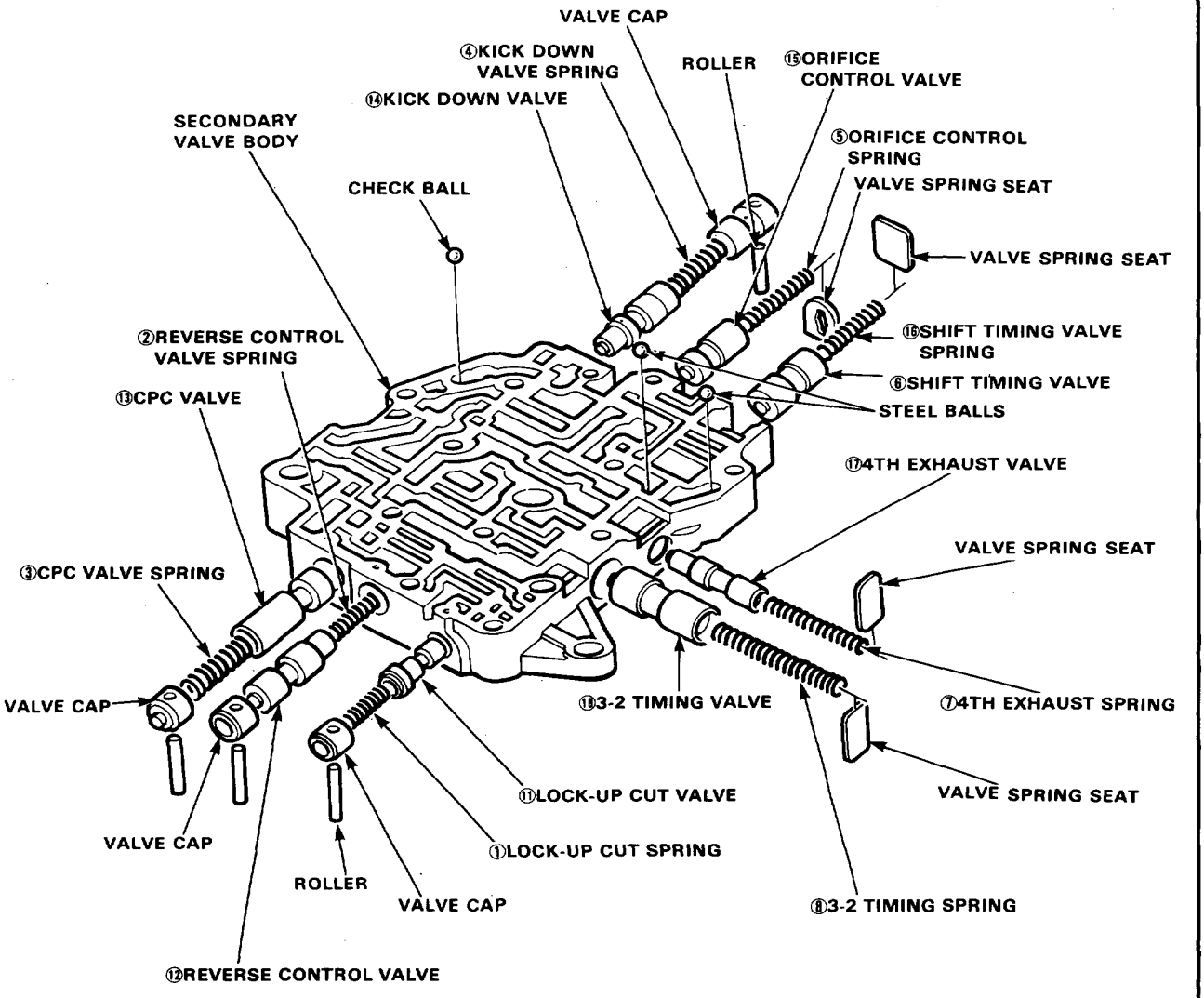


Secondary Valve

Disassembly/Inspection/Reassembly

NOTE:

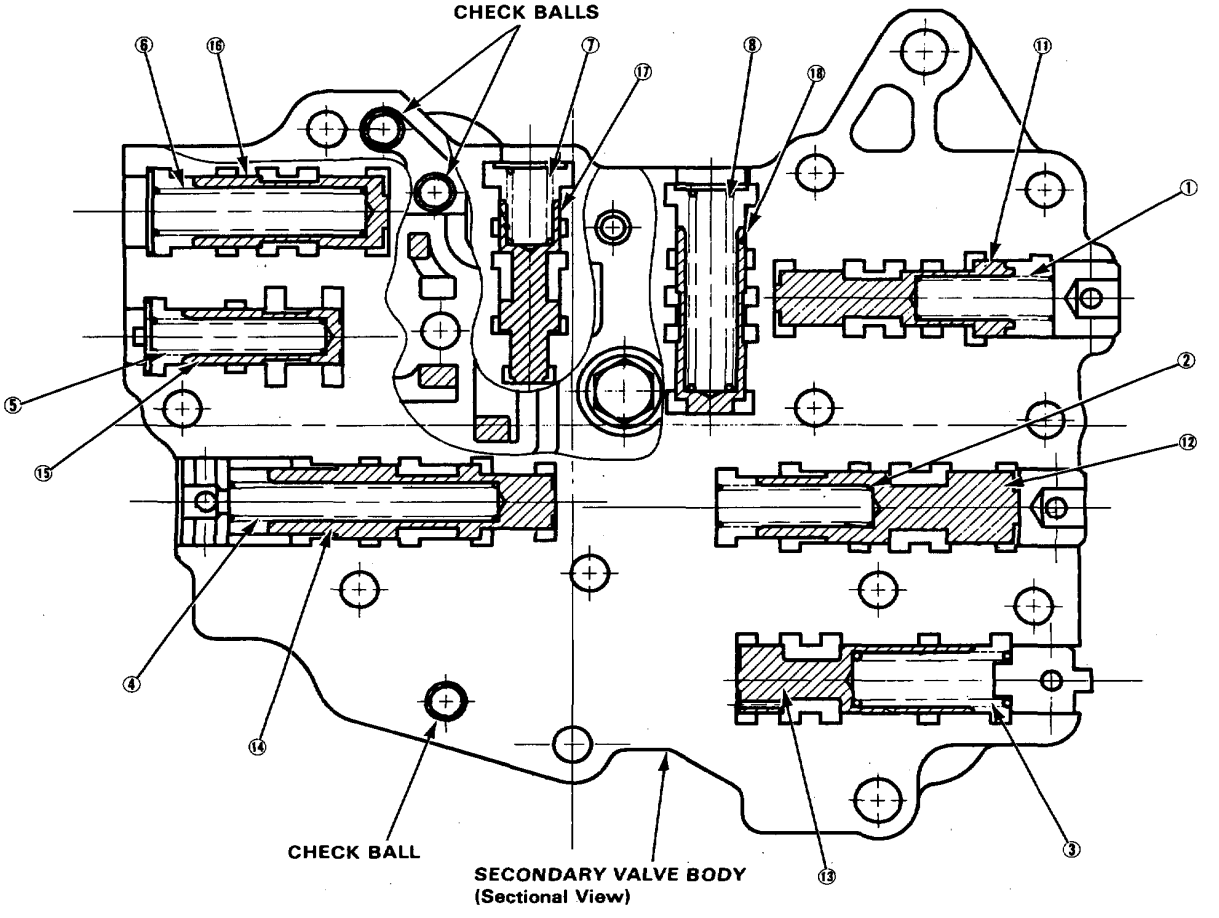
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair.
- Replace as an assembly if any parts are worn or damaged.



Spring Specifications

Unit of length mm (in.)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up cut spring	0.7(0.028)	7.6(0.299)	29.0(1.142)	18
②	Reverse control spring	0.7(0.028)	7.6(0.299)	37.2(1.465)	15.3
③	CPC valve spring	1.4(0.055)	9.4(0.370)	31.6(1.244)	10.9
④	Kick down valve spring	0.9(0.035)	10.1(0.398)	40.8(1.606)	14.5
⑤	Orifice control spring	0.9(0.035)	6.1(0.240)	35.9(1.413)	20
⑥	Shift timing spring	0.9(0.035)	8.6(0.339)	42.9(1.689)	21.4
⑦	4th exhaust spring	0.9(0.035)	6.1(0.240)	43.7(1.720)	20.3
⑧	3-2 timing spring	1.2(0.047)	7.7(0.303)	45.1(1.776)	19.8

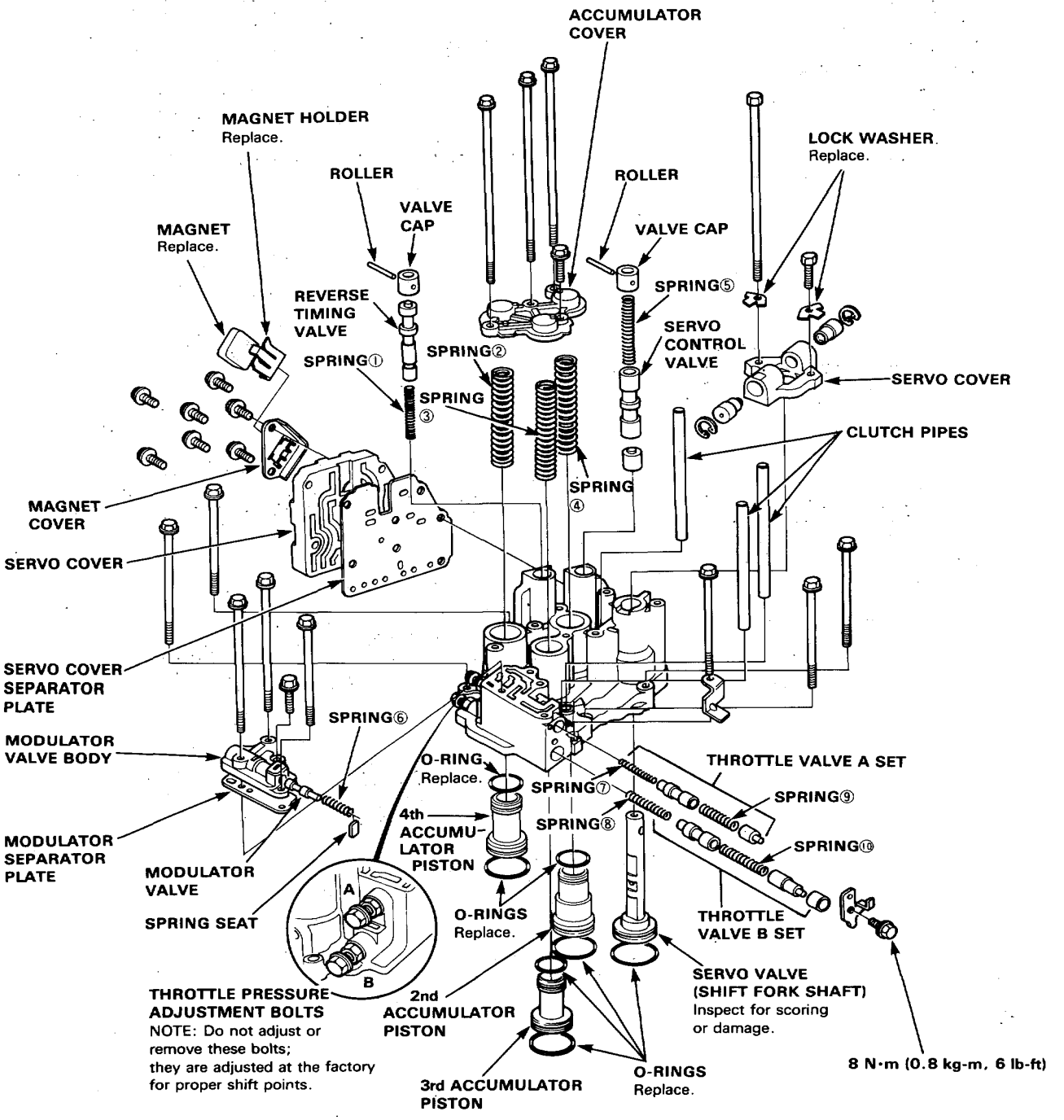


Servo Valve Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair.



*All Bolts Torque: 12 N·m (1.2 kg-m, 9 lb-ft)

Spring Specifications

Unit of length mm (in.)

No.	Spring		Standard (New)			
			Wire Dia.	O.D.	Free Length	No. of Coils
①	Reverse timing spring		0.7(0.028)	5.6(0.220)	43.8(1.724)	21.7
②	4th accumulator spring		3.2(0.126)	18.6(0.732)	78.3(3.083)	10
③	3rd accumulator spring		2.7(0.106)	15.5(0.610)	80.0(3.150)	14.8
④	2nd accumulator spring		3.5(0.138)	20.2(0.795)	76.7(3.020)	9.6
⑤	Servo control spring		1.0(0.039)	7.6(0.299)	44.0(1.732)	18.2
⑥	Modulator spring	Carburetor	1.2(0.047)	9.4(0.370)	27.2(1.071) 26.3(1.035)	8
		PGM-FI	1.2(0.047)	9.4(0.370)	26.3(1.035) 26.4(1.039)	8
⑦	Throttle A adjusting spring		0.8(0.031)	6.2(0.244)	27.0(1.063)	8.5
⑧	Throttle B adjusting spring		0.8(0.031)	6.2(0.244)	30.0(1.181)	8
⑨	Throttle A spring		1.0(0.039)	8.5(0.335)	22.2(0.874)	6
			1.0(0.039)	8.5(0.335)	22.1(0.870)	5.5
⑩	Throttle B spring	Except 1.4 ℓ	1.6(0.063)	8.5(0.335)	41.3(1.626)	13.9
		1.4 ℓ	1.4(0.055)	8.5(0.335)	41.4(1.630)	8.4

Regulator Valve Body

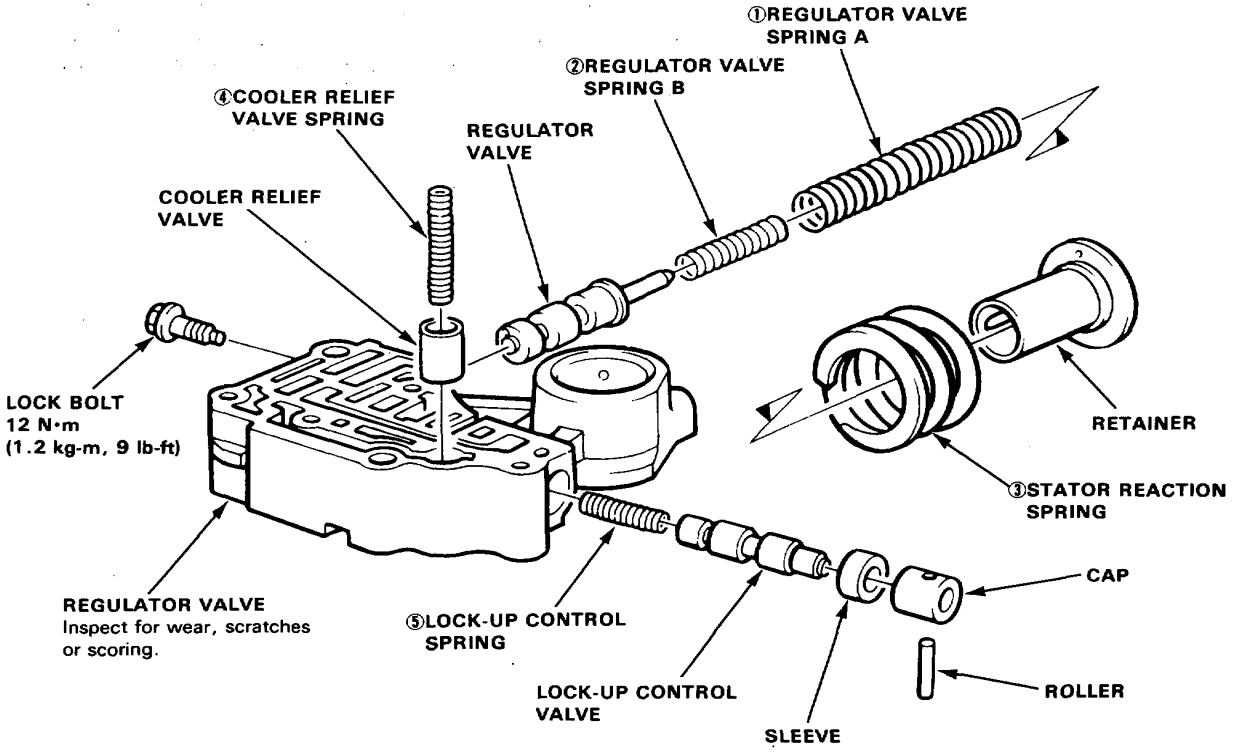
Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement; if any fail to slide freely, see Valve Body Repair.
- Coat all parts with ATF before reassembly.

1. Hold the retainer in place while removing the lock bolt. Once the bolt is removed, release the retainer slowly.

2. Reassembly is in the reverse order of disassembly.
   NOTE: Align the hole in the retainer with the hole in the valve body, then press the retainer into the valve body and tighten the lock bolt.

PGM-FI engine:

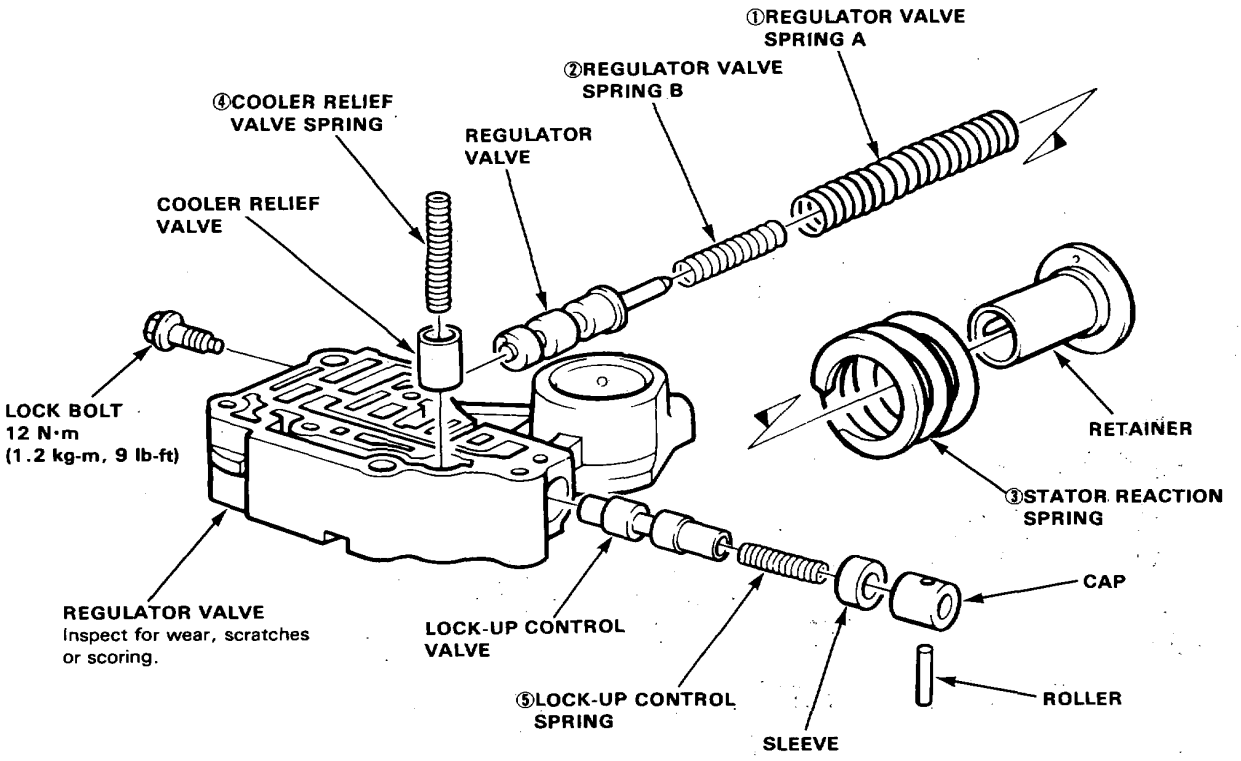


Spring Specifications

Unit of length mm (in.)

No.	Spring		Standard (New)			
			Wire Dia.	O.D.	Free Length	No. of Coils
①	Regulator valve spring A		1.58 x 2.00 (0.062 x 0.079)	14.7(0.579)	86.5(3.406)	20.9
②	Regulator valve spring B		1.8(0.071)	9.6(0.378)	44.0(1.732)	7.5
③	Stator reaction spring		6.0(0.236)	38.4(1.512)	30.3(1.193)	2
④	Cooler relief valve spring		1.1(0.043)	8.4(0.331)	36.4(1.433)	12
⑤	Lock-up control spring	DOHC	0.7(0.028)	6.6(0.260)	35.3(1.390)	15.8
		1.5ℓ, 1.6ℓ	0.7(0.028)	6.6(0.260)	33.8(1.331)	15.8

Carburetor engine:



Spring Specifications

Unit of length mm (in.)

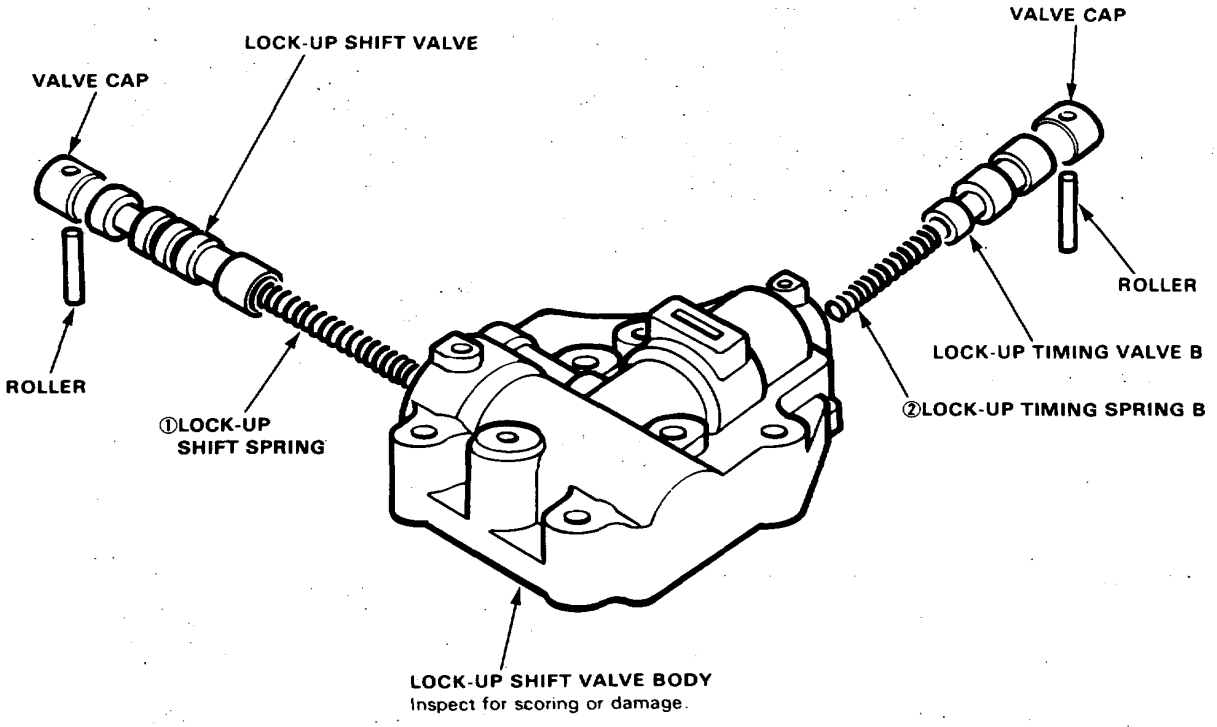
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Regulator valve spring A	1.58 x 2.00 (0.062 x 0.079)	14.7(0.579)	86.5(3.406)	20.9
②	Regulator valve spring B	1.8(0.071)	9.6(0.378)	44.0(1.732)	7.5
③	Stator reaction spring	6.0(0.236)	38.4(1.512)	30.3(1.193)	2
④	Cooler relief valve spring	1.1(0.043)	8.4(0.331)	36.4(1.433)	12
⑤	Lock-up control spring	0.7(0.028)	6.6(0.260)	32.5(1.280)	14

Lock-Up Shift Valve Body

Disassembly/Inspection

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement; if any fail to slide freely, see Valve Body Repair.
- Coat all parts with ATF before reassembly.



Spring Specifications

Unit of length mm (in.)

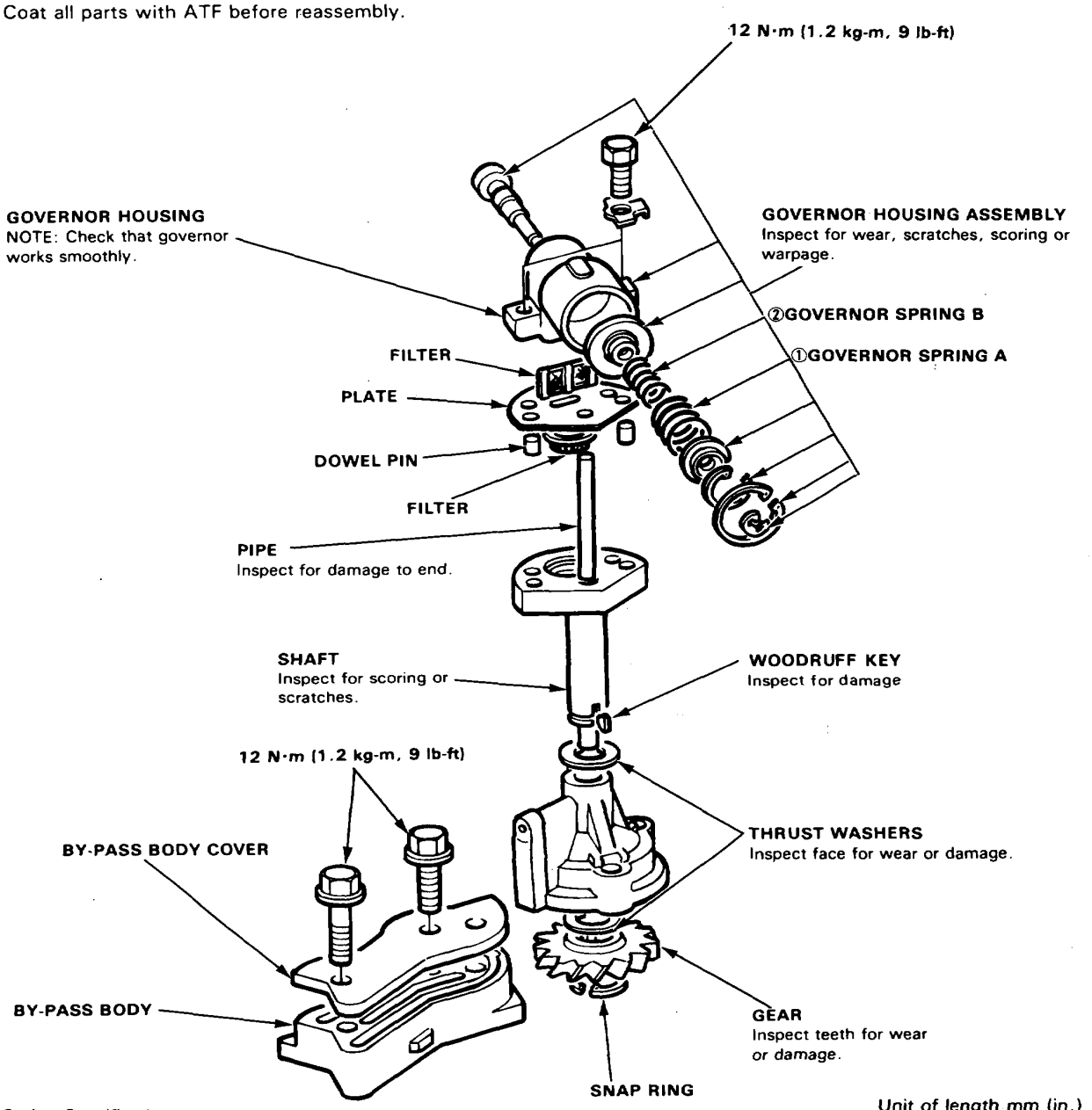
No.	Spring		Standard (New)			
			Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up shift spring	1.4 ℓ	0.7(0.028)	8.1(0.319)	39.0(1.535)	15.4
		1.6 ℓ Carburetor	0.9(0.035)	8.1(0.319)	44.5(1.752)	18.3
		PGM-FI	1.1(0.043)	8.1(0.319)	51.8(2.039)	22.3
②	Lock-up timing spring B	1.4 ℓ	1.0(0.039)	6.6(0.260)	52.3(2.059)	30.1
		1.5 ℓ, 1.6 ℓ	1.0(0.039)	6.6(0.260)	55.6(2.189)	30

Governor Valve

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Check that the governor works smoothly; replace it if it does not.
- Coat all parts with ATF before reassembly.



Spring Specifications

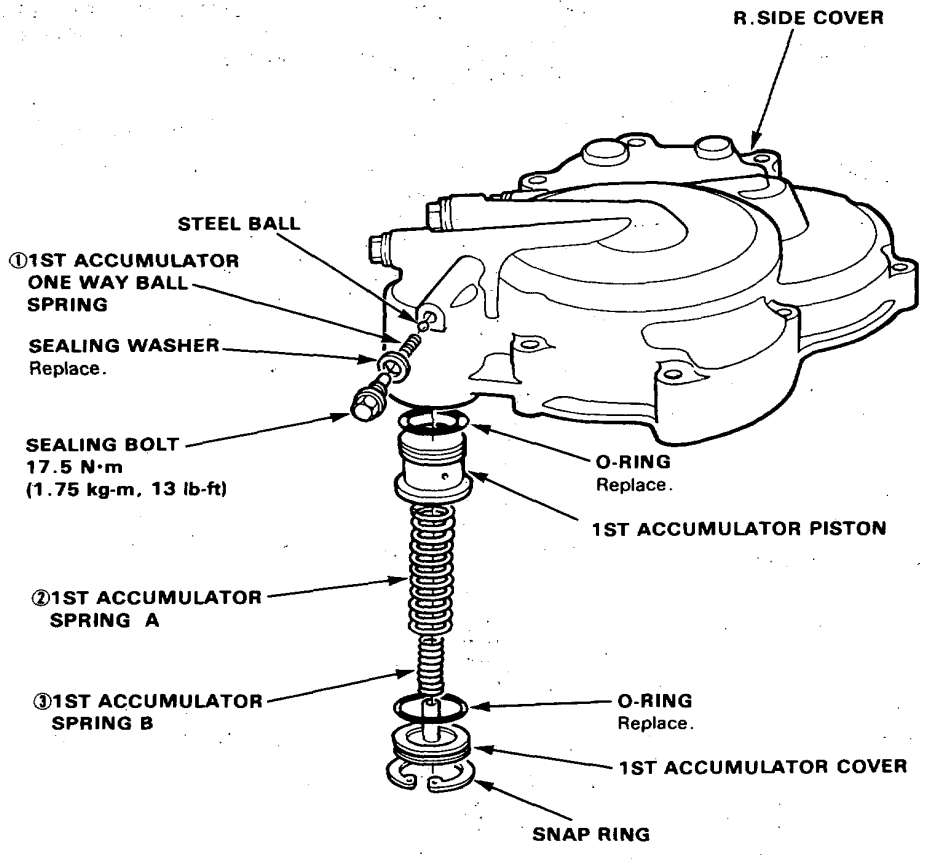
Unit of length mm (in.)

No.	Spring		Standard (New)			
			Wire Dia.	O.D.	Free Length	No. of Coils
①	Governor spring A	1.4 ℓ	1.0(0.039)	18.8(0.740)	20.4(0.803)	4
		1.5 ℓ, 1.6 ℓ	1.0(0.039)	18.8(0.740)	38.1(1.500)	4
②	Governor spring B	1.4 ℓ	0.9(0.035)	11.8(0.465)	26.7(1.051)	6
		1.5 ℓ, 1.6 ℓ	0.9(0.035)	11.8(0.465)	27.8(1.094)	6

1st Accumulator

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Coat all parts with ATF before reassembly.



Spring Specifications

Unit of length mm (in.)

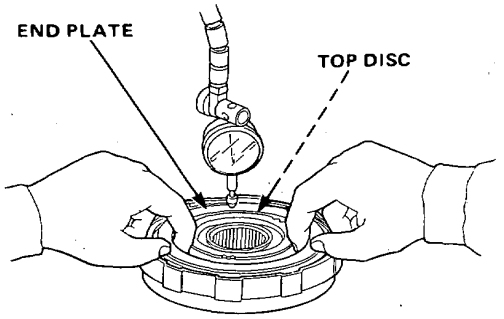
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1st accumulator one way ball spring	0.29(0.011)	4.0(0.157)	14.0(0.551)	13
②	1st accumulator spring A	2.34 x 2.90 (0.092 x 0.114)	21.5(0.846)	66.7(2.626)	10.2
③	1st accumulator spring B	2.8(0.110)	13.1(0.516)	40.0(1.575)	8.8

Reassembly

1. *Measure the clearance between the clutch end plate* and top disc with a dial indicator.
   Zero the dial indicator with the clutch end plate lowered and lift it up to the snap ring. Distance where the clutch end plate moves is the clearance between the clutch end plate and top disc.
   NOTE: Measure at three locations.

End Plate-to-Top Disc Clearance:

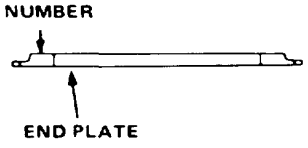
	Service Limit	
1ST	0.65—0.85 mm	(0.026—0.033 in.)
2ND	0.65—0.85 mm	(0.026—0.033 in.)
3RD	0.40—0.60 mm	(0.016—0.024 in.)
4TH	0.40—0.60 mm	(0.016—0.024 in.)



2. If the clearance is not within the service limits, select a new clutch end plate from the following table.

   NOTE: If the thickest clutch and plate is installed but the clearance is still over the standard, replace the clutch discs and clutch plates.

P/N	PLATE NO.	THICKNESS
1	22551—PC9—000	2.4 mm (0.094 in.)
2	22552—PC9—000	2.5 mm (0.098 in.)
3	22553—PC9—000	2.6 mm (0.102 in.)
4	22554—PC9—000	2.7 mm (0.106 in.)
5	22555—PC9—000	2.8 mm (0.110 in.)
6	22556—PC9—000	2.9 mm (0.114 in.)
7	22557—PC9—000	3.0 mm (0.118 in.)
8	22558—PC9—000	3.1 mm (0.122 in.)
9	22559—PC9—000	3.2 mm (0.126 in.)
10	22560—PC9—000	3.3 mm (0.130 in.)
11	22561—PC9—000	2.1 mm (0.082 in.)
12	22562—PC9—000	2.2 mm (0.086 in.)
13	22563—PC9—000	2.3 mm (0.090 in.)

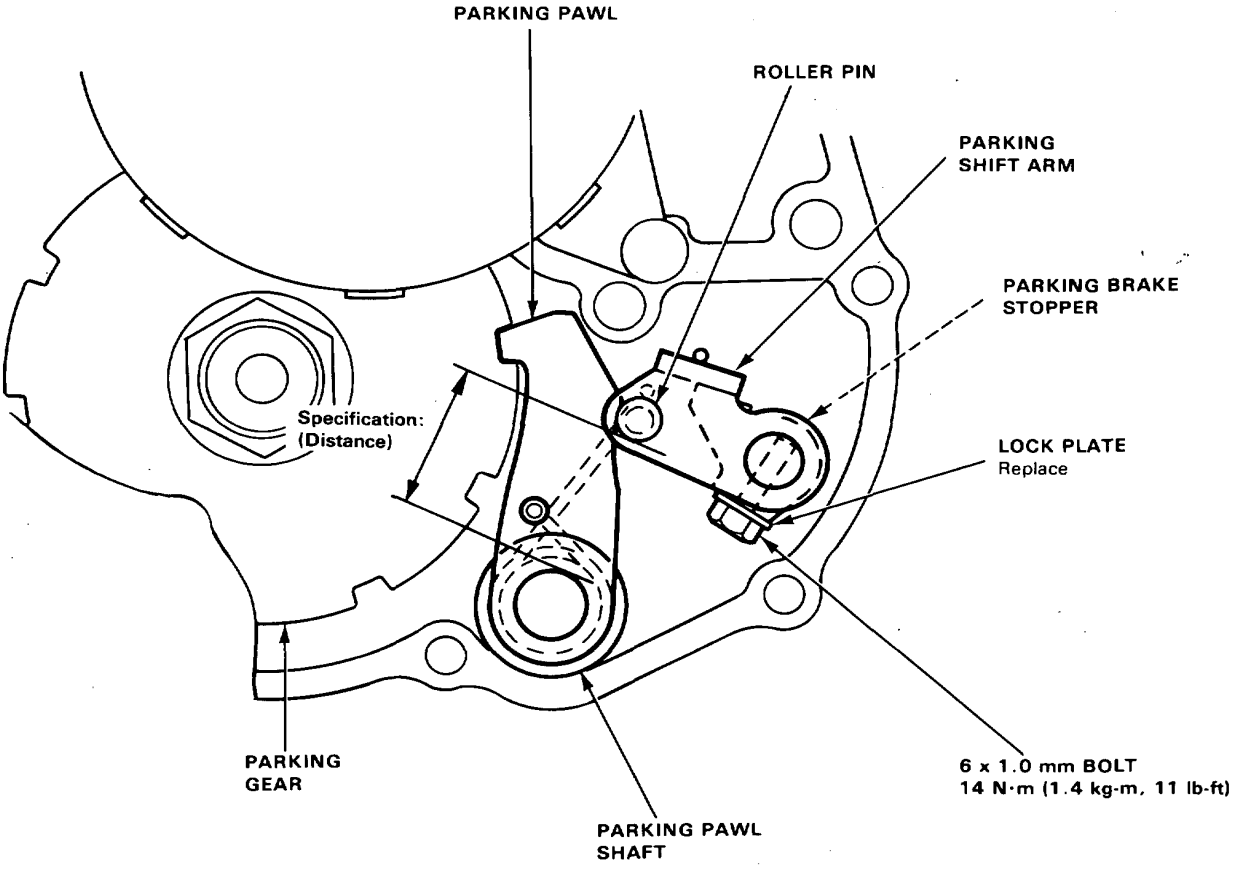


Parking Brake Stopper

Inspection/Adjustment

1. Set the parking shift arm in PARKING position.
2. Measure the distance between the outer face of the parking pawl shaft and outer face of the parking shift arm roller pin.

SPECIFICATION (distance): 28.7–29.7 mm (1.130–1.169 in.)

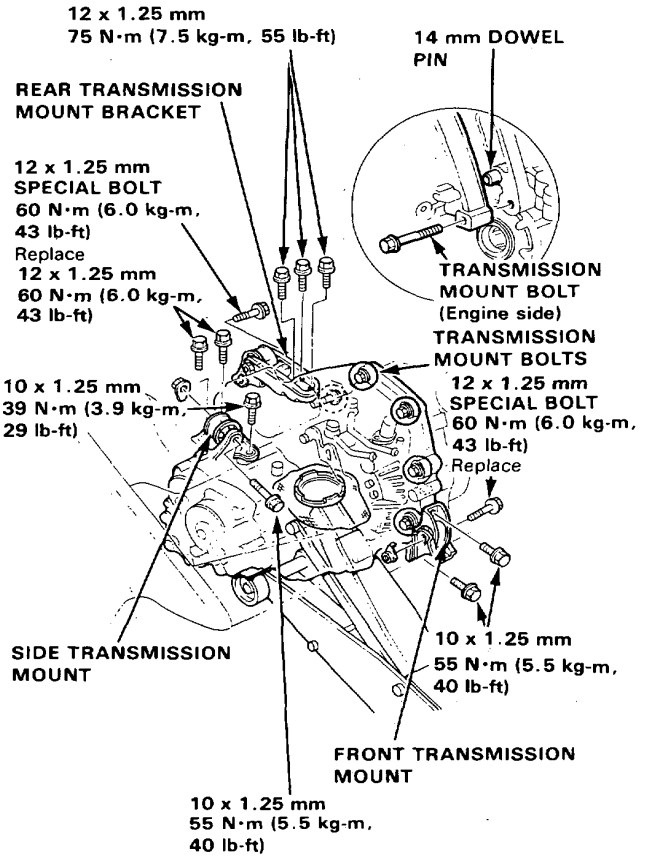


3. If the measurement is out of the specification (distance), select the appropriate parking stopper using the table below, and install it on the parking shift arm.

No.	PART NUMBER
1	24537–PA9–003
2	24538–PA9–003
3	24539–PA9–003

Installation

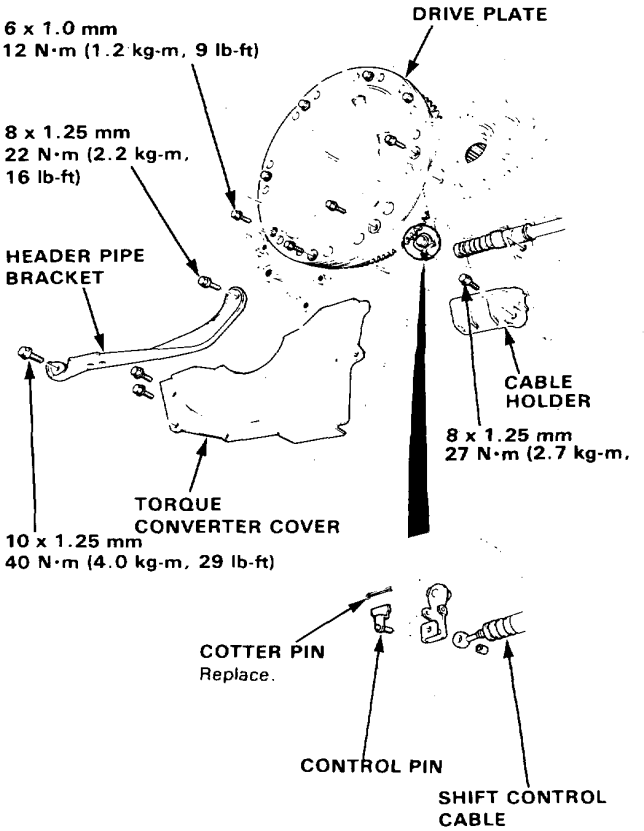
1. Place the transmission on the transmission jack, and raise to the engine level.
2. Check that the two 14 mm dowel pins are installed in the torque converter housing.
3. Loosely install the 4 transmission mount bolts, then torque in the sequence shown.
4. Secure the transmission to engine with the engine side mounting bolt (12 x 1.25 x 70 mm) and torque to 68 N·m (6.8 kg-m, 50 lb-ft).
5. Install the transmission to rear transmission mount bracket.
6. Install the transmission to the front and side transmission mounts.



7. Remove the transmission jack.
8. Remove the chain hoist by removing the hanger plates and bolts.
9. Attach the torque converter to the drive plate with eight (6 x 1.0 x 12 mm) bolts, and torque to 12 N·m (1.2 kg-m, 9 lb-ft). Rotate the crank as necessary to tighten bolts to 1/2 torque, then final torque, in a criss-cross pattern. Check for free rotation after tightening the last bolt.

   CAUTION: The pulley mount bolt has the right hand threads and it might come loose while rotating the pulley. Check the bolt for tightness.

10. Intall the shift control cable and cable holder.

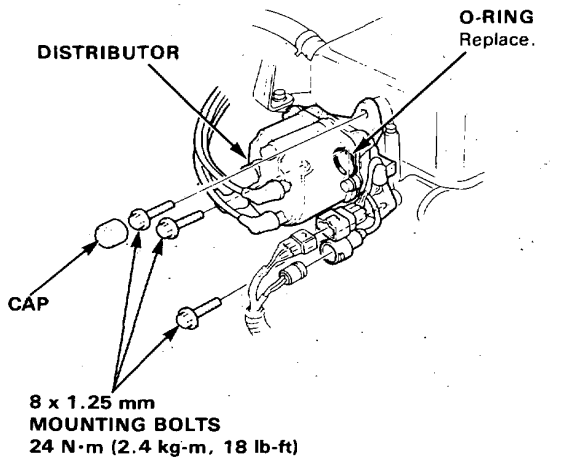


11. Install the torque converter cover and header pipe bracket.

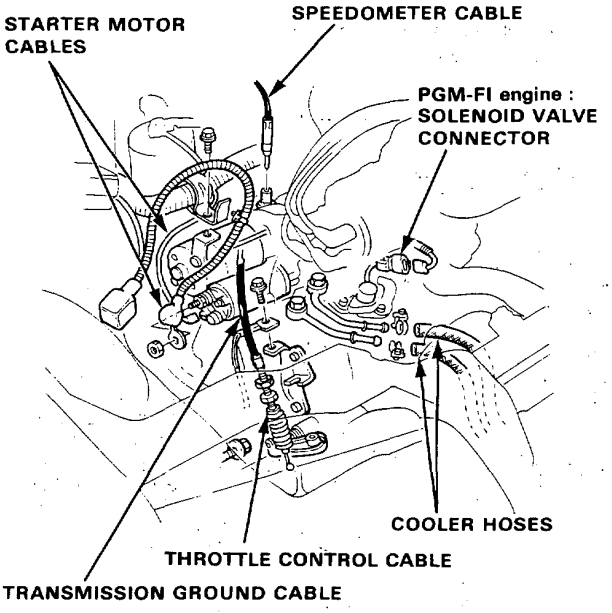
(cont'd)

Installation (cont'd)

12. Install a new set ring on the end of each driveshaft.
13. Install the right and left driveshafts (See Section 10). NOTE: Turn the right and left steering knuckle fully outward, and slide axle into the differential until you feel its spring clip engage the side gear.
14. Install the damper swivel bolt and radius rod. (page 12 -8, 9, 12)
15. Install the ball joints to the front lower arm. (page 12-12)
16. Install the splash shields and exhaust pipe A. (page 5-66)
17. Install the distributor and ignition timing inspection (See Section 16 Ignition Timing Control)



18. **PGM-FI engine :**
    Connect the lockup control solenoid valve wire connector.
19. Connect the cooler hoses to the joint pipes.
20. Connect the throttle control cable to the control lever.
21. Connect the speedometer cable.
22. Install the 3 bolts located at the side of the battery base, and retighten the intake hose band of the throttle body.



23. Refill the transmission with ATF.
24. Connect the starter motor and transmission ground cables.
25. Connect the battery positive (+) and negative (−) cables to the battery.
26. Install the air cleaner case and intake hose.
27. Start the engine, set the parking brake, and shift the transmission through all gears three times. Check for proper control cable adjustment.
28. Check the ignition timing (See Section 16).
29. Let the engine reach operating temperature with the transmission in Neutral or Park, then turn it off and check the fluid level.
30. Road test as described on pages 9-8, 9 and 9-46, 47.

Shift Cable

Removal/Installation

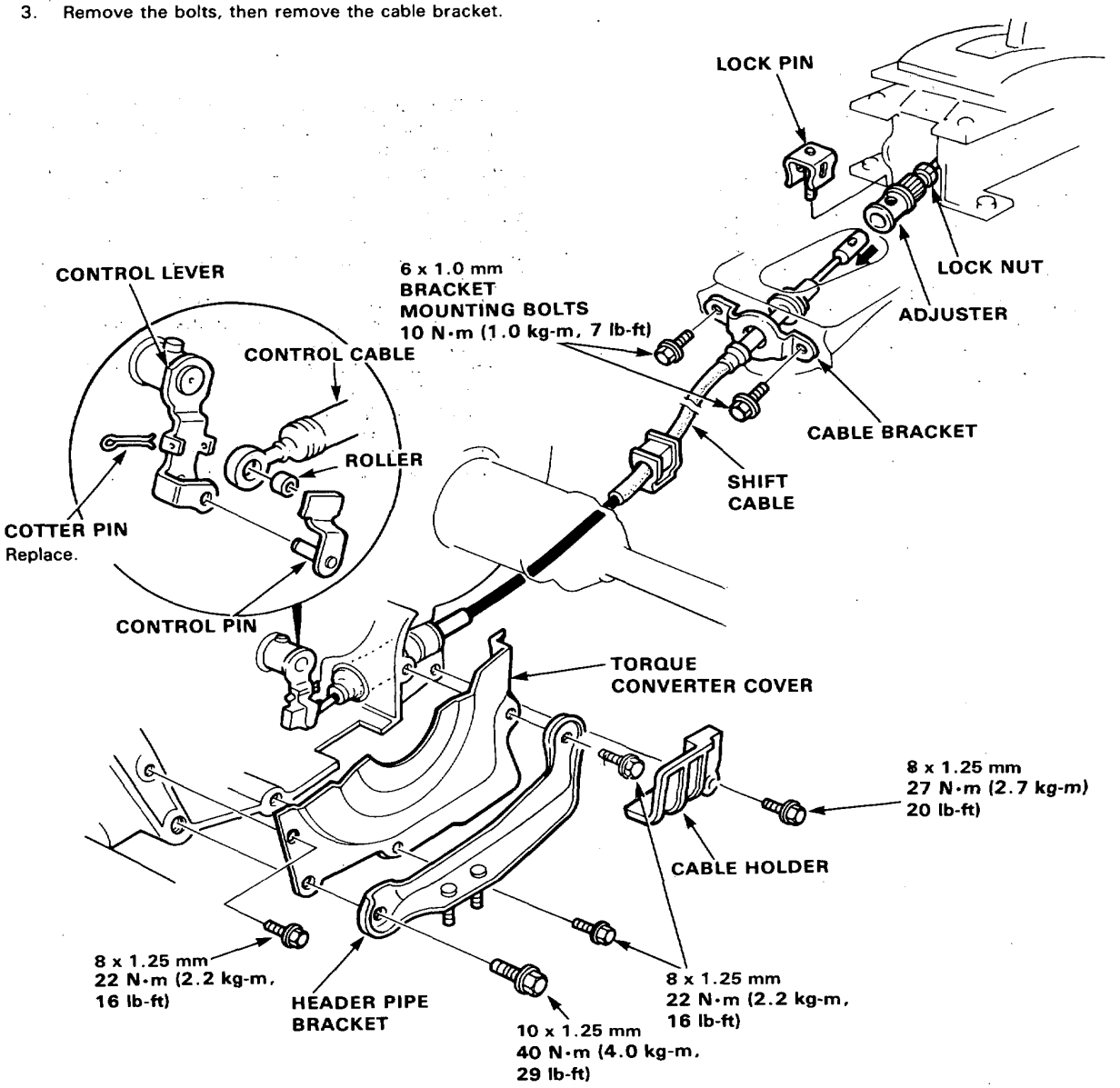
⚠ WARNING

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

1. Remove the header pipe, header pipe bracket, torque converter cover and cable holder.
2. Remove the shift cable by removing the cotter pin, control pin and control lever roller from the control lever.
3. Remove the bolts, then remove the cable bracket.
4. Remove the front console.
5. Remove the lock pin from the cable adjuster, then remove the shift cable.

   CAUTION: Take care not to bend the cable when removing it.

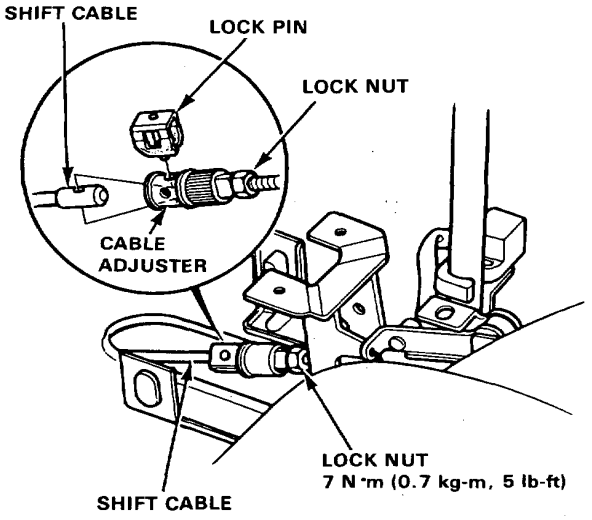
6. Install the shift cable in the reverse order of removal. NOTE: On reassembly, check the cable adjustment (page 9-42).



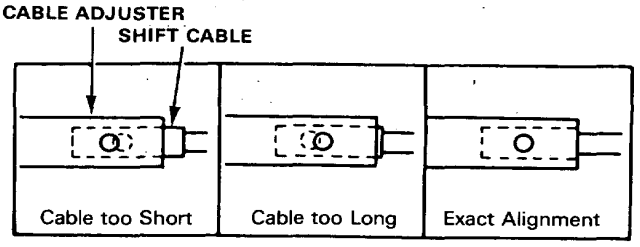
Shift Cable

Adjustment

1. Start the engine. Shift to reverse to see if the reverse gear engages.
   If it does not engage, refer to the Troubleshooting on pages 9-4 and 9-5 and check for its cause.
2. Stop the engine and remove the center console.
3. Shift to neutral and remove the lock pin from the cable adjuster.



4. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable.



NOTE: There are two holes in the end of the shift cable. They are positioned 90° apart to allow cable adjustments in 1/4 turn increments.

5. If not perfectly aligned, loosen the lock nut on the shift cable and adjust by turning the cable adjuster. Insert the lock pin securely.
6. Tighten the lock nut.
7. Start the engine and shift to each gear to check the following.
   - Move the shift lever from neutral to reverse without pressing the push button on the shift lever. The reverse gear should not engage.
   - Engine does not start with the shift lever other than in neutral and park.
   - The back-up light does not come on unless the shift lever is in reverse.
   - Park the car on the inclined surface and shift to park. Check the parking brake for proper operation.

Throttle Control Cable

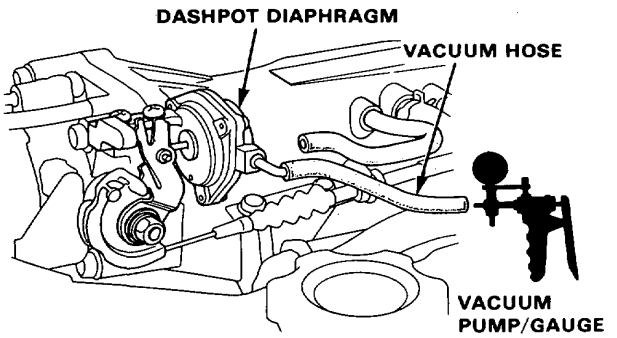
Adjustment/Inspection

NOTE: Before adjusting the throttle control cable, make sure:

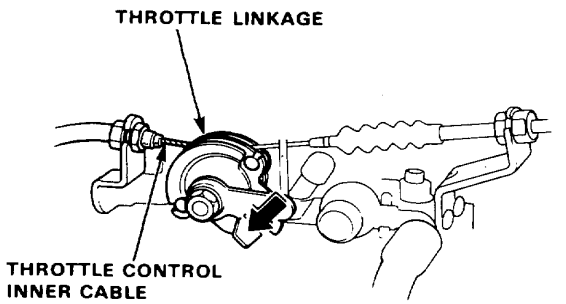
- The throttle cable free play is correct. (See Section 6)
- The engine is at normal operating temperature (cooling fan comes on).
- The idle speed is correct. (See Section 6)

Inspection:
NOTE: You can work the throttle linkage body with your hand.

1. Remove the throttle cable free play.
2. **Carburetor engine:**
   Make sure that the choke is released.
   PGM-FI engine:
   Disconnect #6 hose from the dashpot diaphragm and connect a vacuum pump to the diaphragm. Apply vacuum.



3. Apply light thumb pressure to the throttle control lever, then work the accelerator or throttle linkage. The lever should move just as the engine speed increases above idle. If not, proceed to Adjustment.

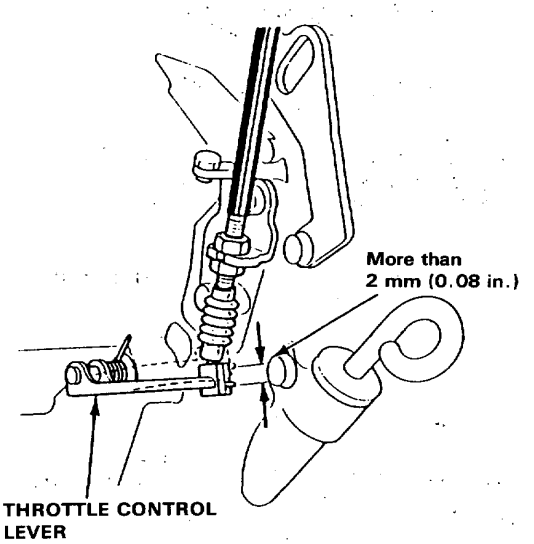


Adjustment:
1. Loosen the nuts on the control cable at the transmission end and synchronize the control lever to the throttle.

NOTE:
- While continuing to press down the throttle control lever, the throttle linkage is open.
  The control lever should begin to move at precisely the same time as the linkage.
- Correct "Fine Tune" adjustment of the throttle control cable is critical for proper operation of the transmission and lock-up torque convertor.

2. Check the following items before starting the engine:

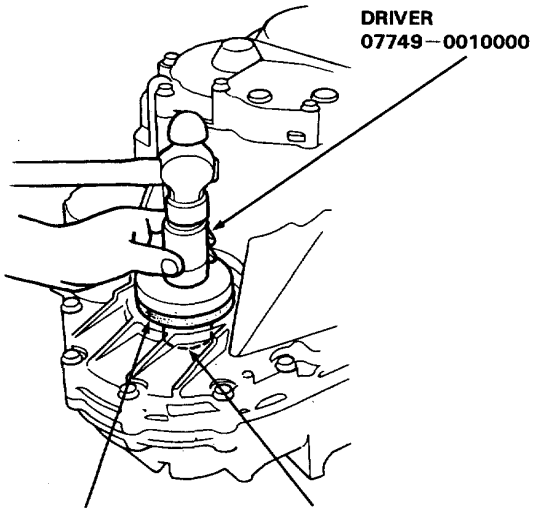
   Depress the accelerator to the floor. While depressed, check that there is play in the throttle control lever.



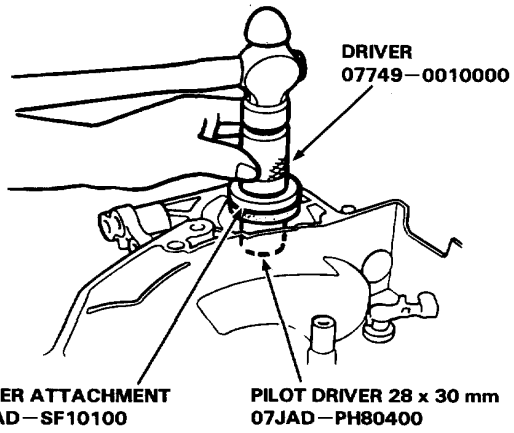
- Check that the cable moves freely by depressing the accelerator.

Oil Seal Installation

1. Install the oil seal in the transmission housing.



2. Install the oil seal in the torque converter housing.



NOTE : After transmission is installed :
- Make sure the floor mat does not interfere with accelerator pedal travel. Fully depress accelerator pedal and check to make sure the throttle lever is fully opened.
- Release the accelerator pedal and check both inner control cables to be sure they have slight play.

Warm up the engine to operating temperature.

D3 and D4 Range

1. Apply parking brake and block the wheels. Start the engine, then move the selector to D4 while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.
2. Check that shift points occur at approximate speeds shown. Also check for abnormal noise and clutch slippage.

Upshift

1.6 ℓ SOHC PGM-FI engine: and 1.5 ℓ engine:

		1st—2nd	2nd—3rd	3rd—4th	Lock-up ON
1/8-throttle	km/h	20.1—22.8	33.6—40.3	48.3—55.0	61.3—68.3
	mph	12.5—14.2	20.9—25.0	30.0—34.2	38.1—42.4
Half-throttle	km/h	28.8—37.8	57.8—70.8	90.7—103.7	———
	mph	17.9—23.5	35.9—44.0	56.4—64.4	———
Full-throttle	km/h	49.8—55.3	90.2—98.7	144.5—153.0	124.9—132.9
	mph	31.0—34.4	56.1—61.3	89.8—95.1	77.6—82.6

Downshift
1.6 ℓ SOHC PGM-FI engine: and 1.5 ℓ engine:

		4th-3rd	3rd—2nd	2nd—1st
1/8-throttle	km/h	4th—2nd: 29.2—32.2		12.0—14.5
	mph	4th—2nd: 18.1—20.0		7.5—9.0
Half-throttle	km/h	———	———	———
	mph	———	———	———
Full-throttle	km/h	122.6—131.6	76.5—85.5	41.3—46.8
	mph	76.2—81.8	47.5—53.1	25.7—29.1

3. Accelerate to about 56 km/h (35mph) so the transmission is in 4th, then shift from D4 to 2. The car should immediately begin slowing down from engine braking.

   CAUTION : Do not shift from D4 or D3 to 2 at speeds over 100km/h (62.5mph) ; you may damage the transmission.

2 (2nd Gear)

1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
2. Upshifts and downshifts should not occur with the selector in this range.

R (Reverse)

Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

P (Park)

Park car on a slope (approx. 16°), apply the parking brake, and shift into Park. Release the brake ; the car should not move.

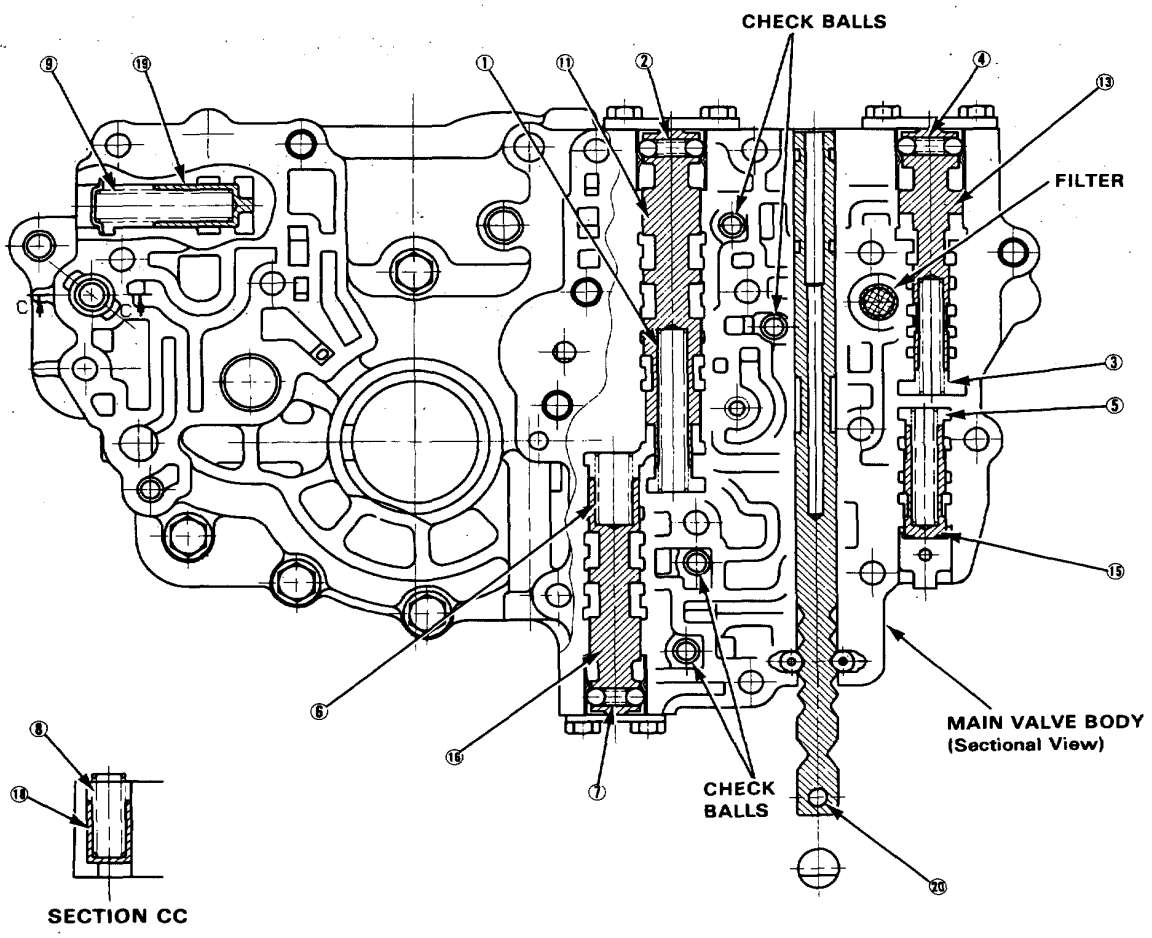
Main Valve Body

1.6 ℓ SOHC PGM-FI engine: and 1.5 ℓ engine:

Unit of length: mm (in)

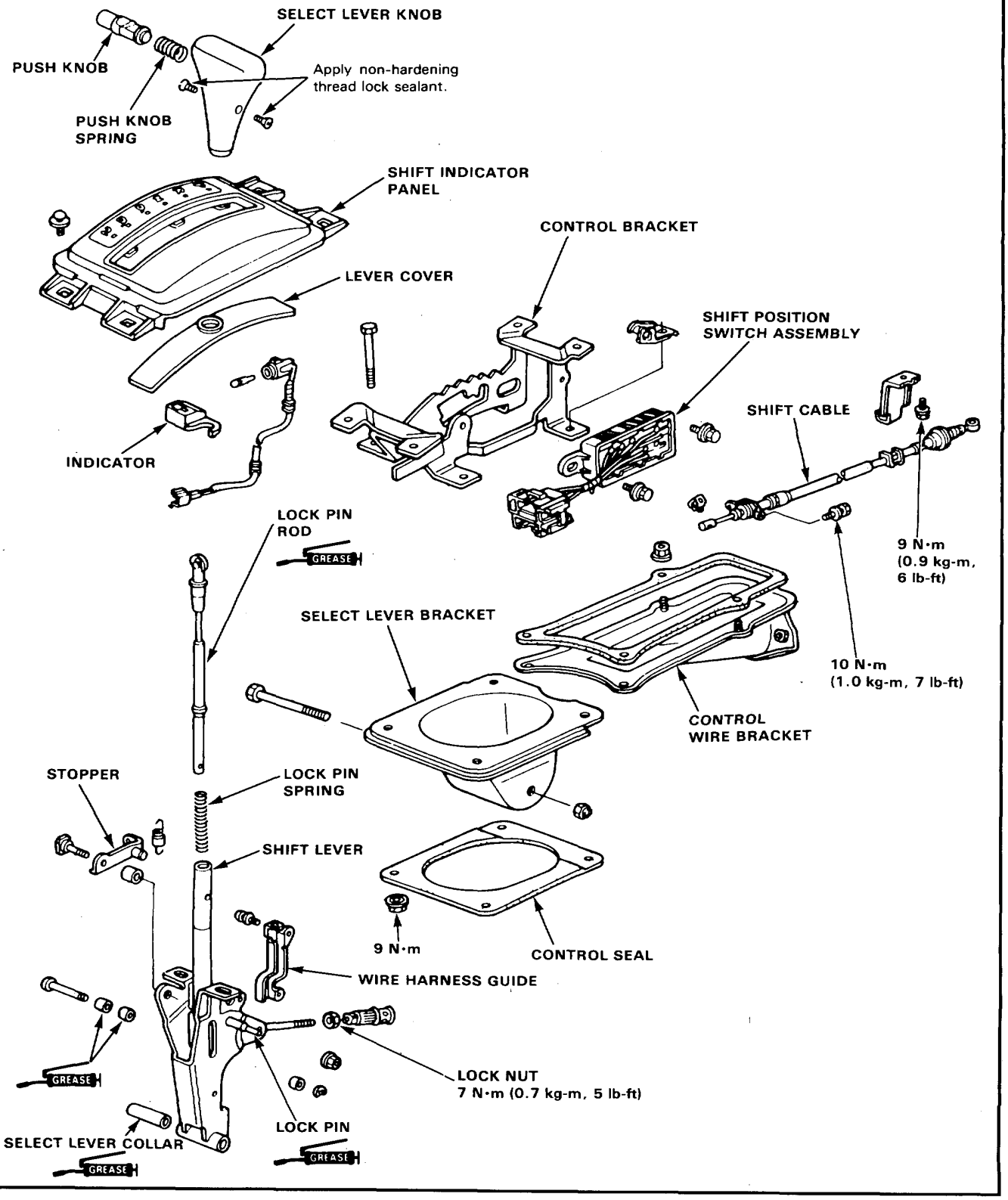
No.	Spring	Standard (New)			
		Wire Dia	O.D.	Free Length	No. of Coils
①	2-3 shift spring	0.9 (0.035)	7.6 (0.299)	46.5 (1.831)	20.7
②	2-3 Shift ball spring	0.4 (0.016)	4.5 (0.177)	14.7 (0.579)	7.3
③	1-2 shift spring	0.6 (0.024)	6.1 (0.240)	41.3 (1.626)	16.5
④	1-2 shift ball spring	0.4 (0.016)	4.5 (0.177)	14.4 (0.567)	8.2
⑤	2nd orifice control spring	0.8 (0.031)	6.6 (0.260)	46.3 (1.823)	27.6
⑥	3-4 shift spring	0.9 (0.035)	9.6 (0.378)	33.1 (1.303)	10
⑦	3-4 shift ball spring	0.5 (0.020)	4.5 (0.177)	11.2 (0.441)	7
⑧	Torgue converter check spring	1.1 (0.043)	8.4 (0.331)	36.4 (1.433)	12
⑨	Relief valve spring	1.0 (0.039)	8.4 (0.331)	52.0 (2.047)	23

Sectional View



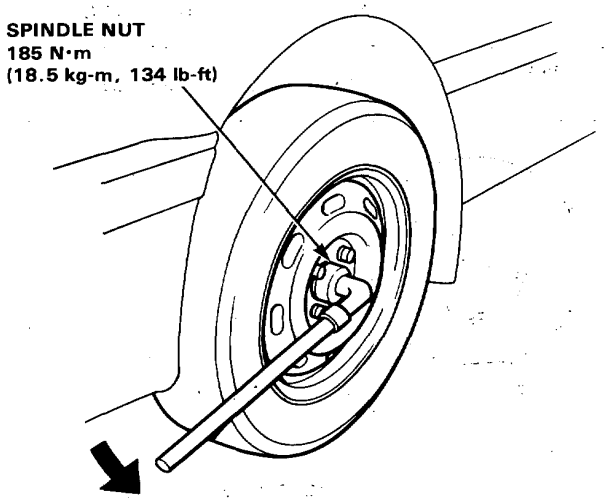
Gear Shift Selector (LHD)

Disassembly/Reassembly

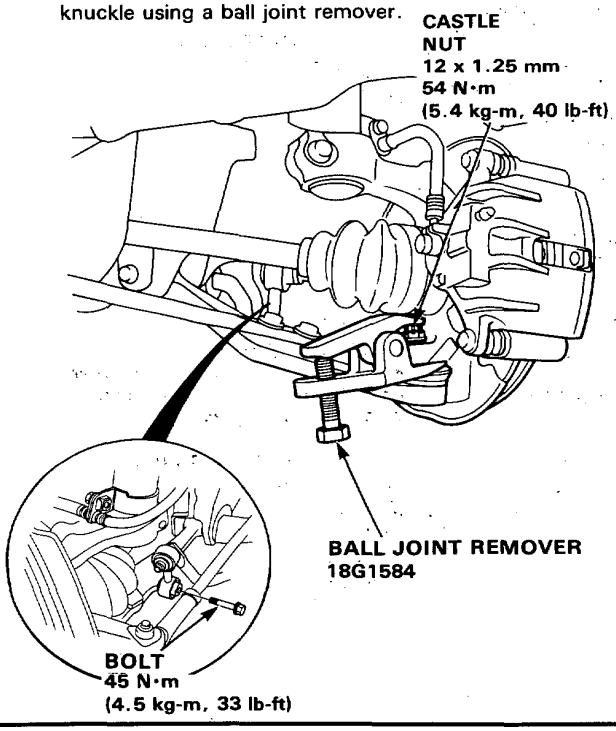


Removal

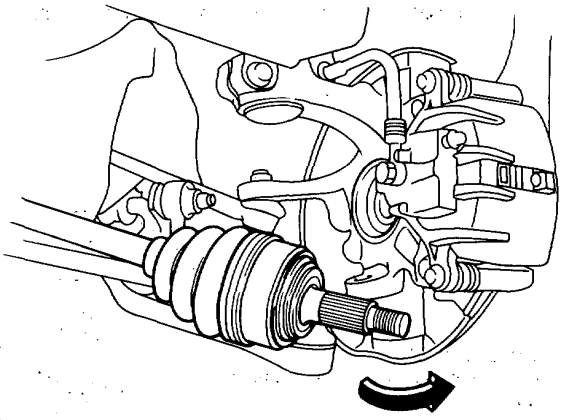
1. Raise the locking tab on the spindle nut and remove it.
2. Loosen the front wheel lug nuts.
3. Raise the front end of the car and place safety stands in the proper locations. Remove the front wheels.
4. Drain the transmission oil.



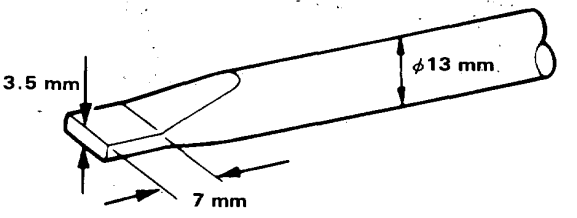
5. Remove the bolt that connects the front stabiliser link and lower arm.
6. Remove the cotter pin and loosen the Knuckle-to-lower arm castle nut, and separate the lower arm from the knuckle using a ball joint remover.

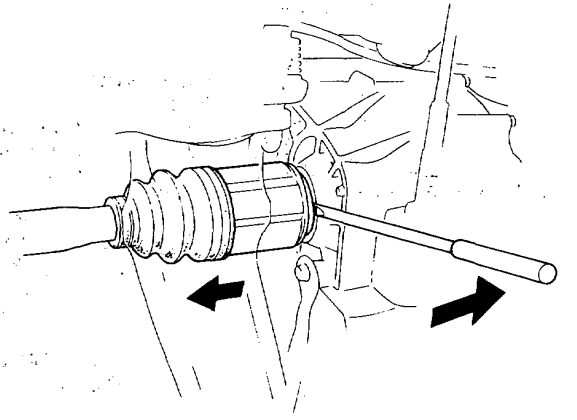


7. Pull the knuckle outward and remove the driveshaft outboard joint from the knuckle using a plastic hammer.



8. Pry the driveshaft assembly with a screwdriver as shown to force the set ring at the driveshaft end past the groove.
9. Pull the inboard joint and remove the driveshaft and CV joint out of the differential case as an assembly.





CAUTION:

- **Do not pull on the driveshaft, as the CV joint may come apart.**
- **Use care when prying out the assembly and pull it straight to avoid damaging the differential oil seal or intermediate shaft dust seal.**

Driveshafts

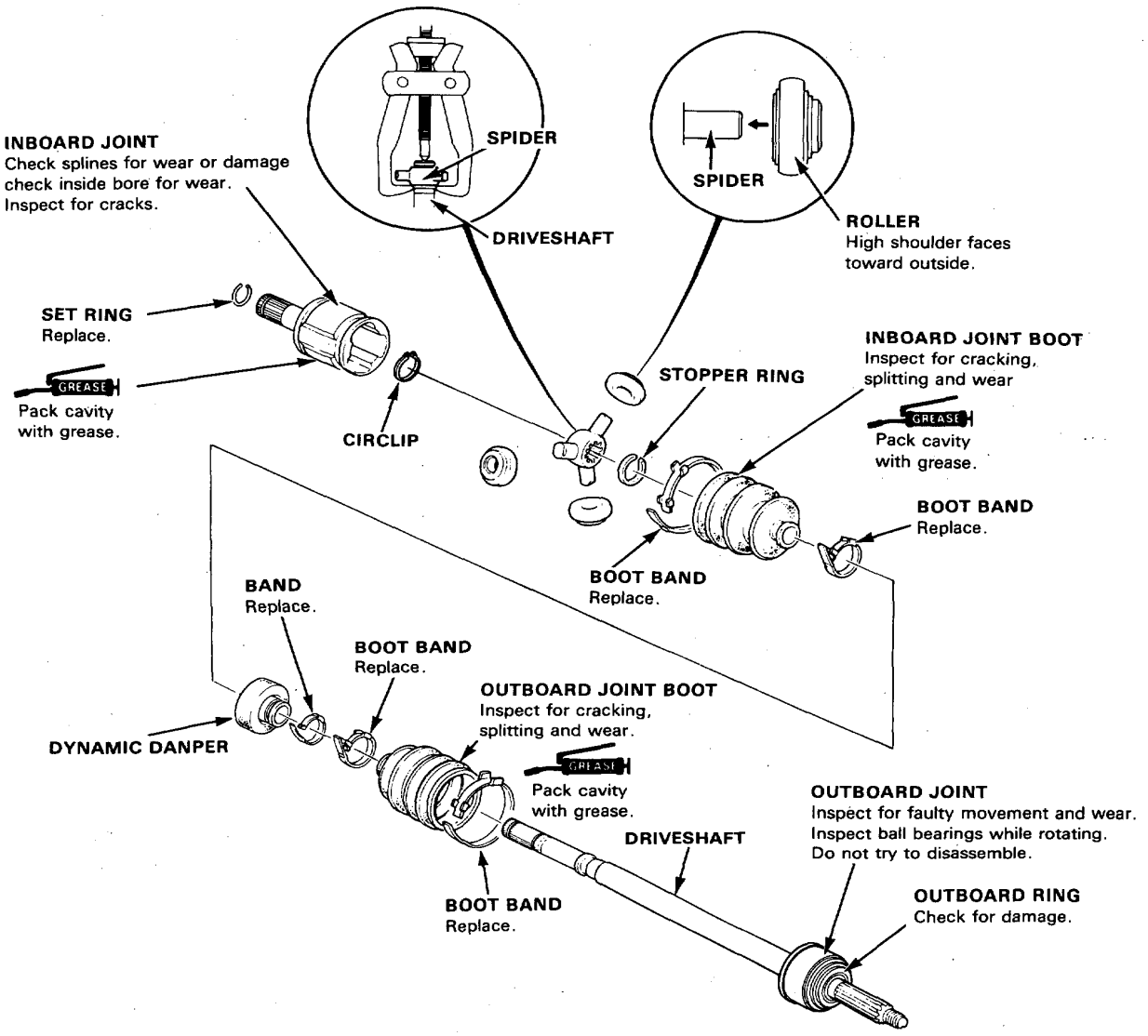
Disassembly/Inspection

NOTE:
- Mark the rollers and roller grooves during disassembly to ensure proper positioning during reassembly.
- Before disassembly, mark the spider and driveshaft so they can be reinstalled in their original positions.
- The inboard joint must be removed to replace the boots.

GREASE Grease is used on the inside surface of the joint boots. Do not mix the two joint boot. The type of grease used on each boot is different.

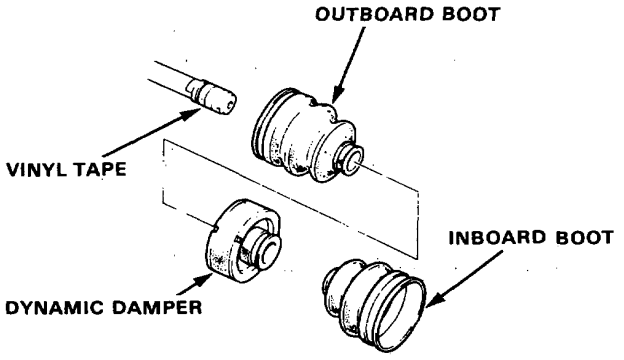
Grease Quantity:

	L. Driveshaft	R. Driveshaft
Inboard Joint	120~130g	120~130g
Outboard Joint	90~100g	90~100g



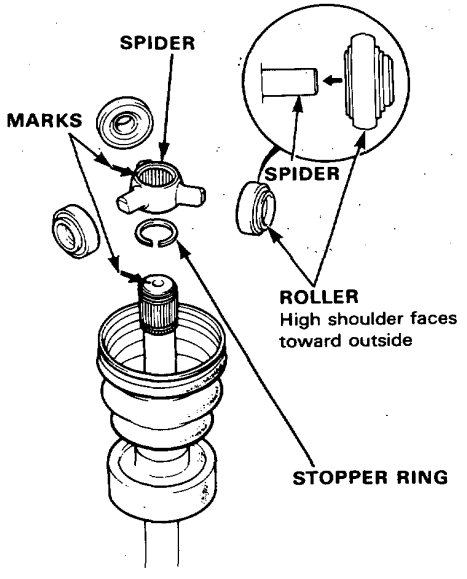
Reassembly

1. Wrap the splines with vinyl tape to prevent damage to the boots and dynamic damper.
2. Install the outboard boot, dynamic damper and inboard boot to the driveshaft, then remove the vinyl tape.

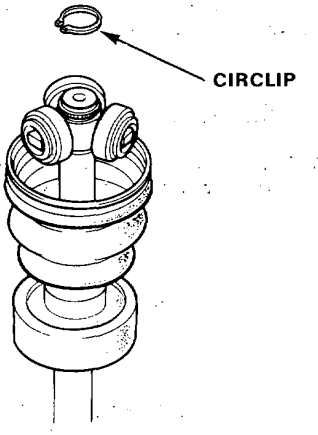


3. Install the stopper ring onto the driveshaft groove.
4. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.
5. Fit the rollers to the spider with their high shoulders facing outward.

CAUTION:
- **Reinstall the rollers to their original positions on the spider.**
- **Hold the driveshaft assembly so the spider and roller points up, to prevent it from falling off.**



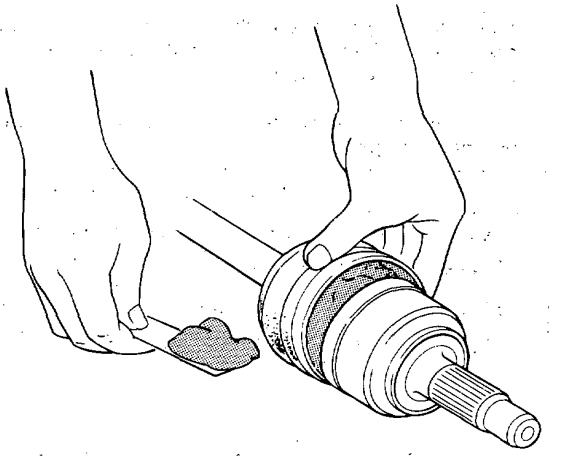
6. Fit the circlip onto the driveshaft groove.



7. Pack the outboard joint boot with greese.

CAUTION:
- **Use grease sold with the inboard joint boot.**
- **Do not use the grease of inboard joint for outboard joint. It may shorten the life of the boot.**

Grease Quantity: **90~100g**



(cont'd)

Reassembly (cont'd)

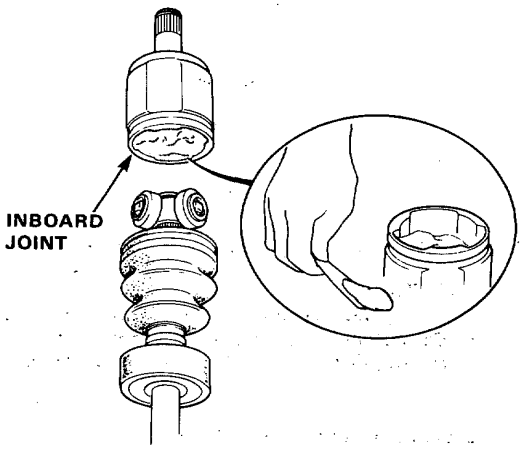
8. Pack the inboard joint with molybdenum disulfide grease.

   Grease Quantity: 120~130g

   CAUTION:
   - **Use grease sold with the inboard joint boot.**
   - **Do not use the grease of outboard joint for inboard joint. It may shorten the life of the boot.**

9. Fit the inboard joint onto the driveshaft.

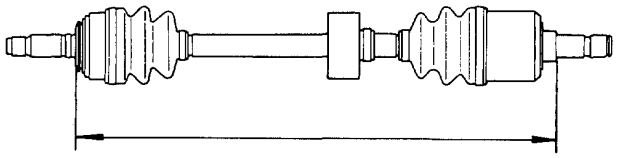
   CAUTION: Hold the driveshaft assmbly so the inboard joint points up, to prevent it from falling off.



10. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and extension.

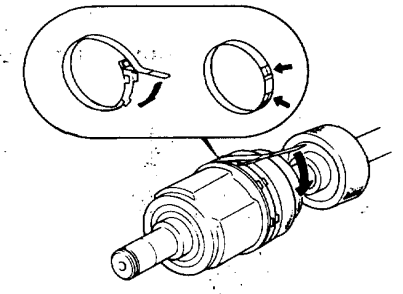
    NOTE: The ends of boots seat in the groove of the driveshaft and joint.

	L. Driveshaft	R. Driveshaft
DOHC Engine	497.6–502.6 mm (19.59–19.79 in)	497.6–502.6 mm (19.59–19.79 in)
SOHC Engine	793.8–798.8 mm (31.25–31.45 in)	496.3–501.3 mm (19.54–19.74 in)

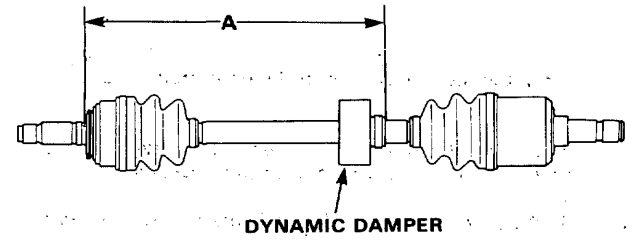


11. Install new boot bands on the boot and bend both sets of locking tabs.

12. Lightly tap on the doubled-over portions to reduce their height.



13. Position the dynamic damper as shown below.



DISTANCE (A):

	L. Driveshaft	R. Driveshaft
DOHC Engine	222±2 mm (8.7±0.08 in)	222±2 mm (8.7±0.08 in)
SOHC Engine	564±2 mm (22.2±0.08 in)	222±2 mm (8.7±0.08 in)

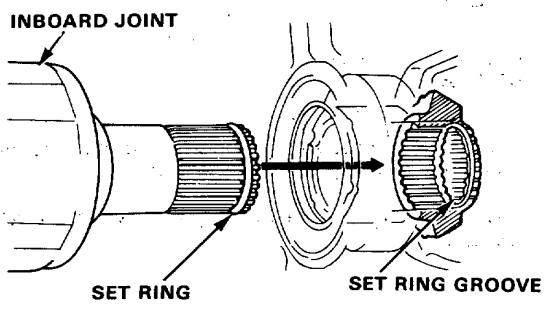
14. Lightly tap on the doubled-over portion to reduce its height.

15. Install a new dynamic damper band and bend down both sets of locking tabs.

16. Install a new set ring in the driveshaft groove.

17. Install the inboard end of the driveshaft into differential.

CAUTION:
- **Always use a new set ring whenever the driveshaft is being installed.**
- **Make sure the driveshaft locks in the differential side gear groove, and the CV joint subaxle bottoms in the differential or intermediate shaft.**

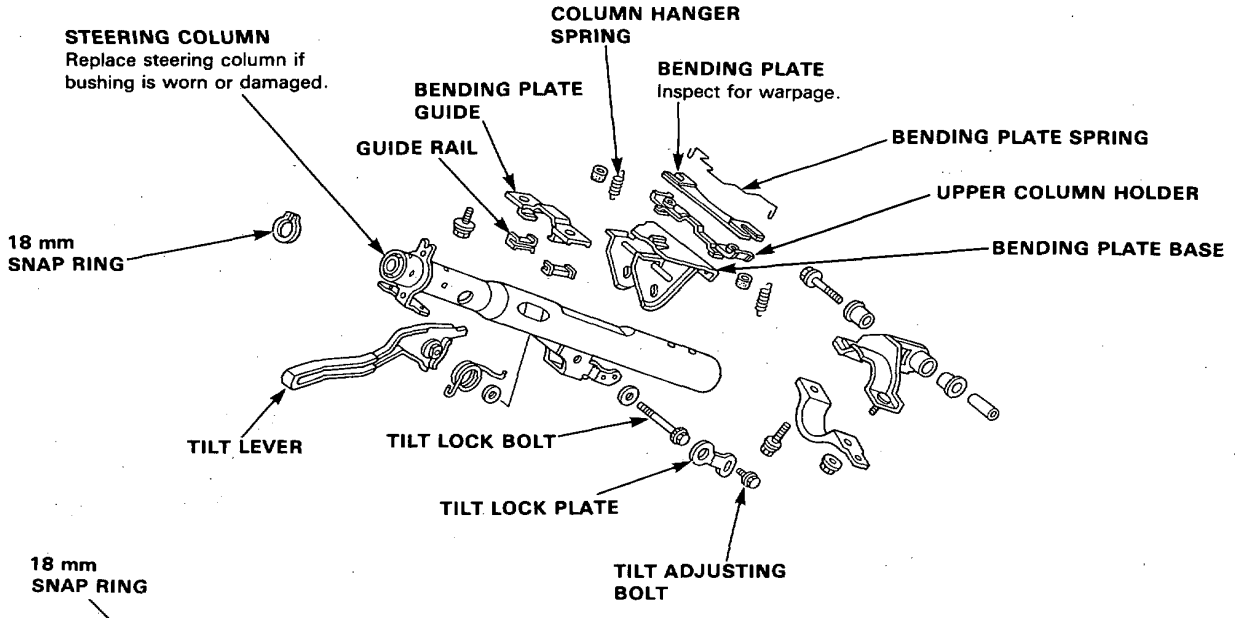


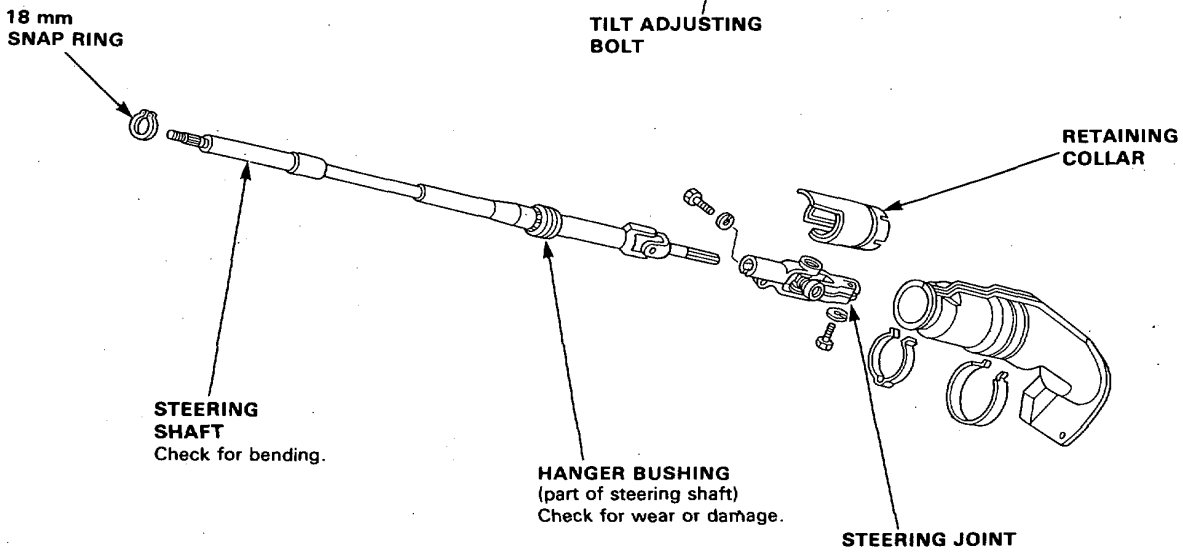
18. Refill the transmission.

Steering Column

Disassembly/Inspection

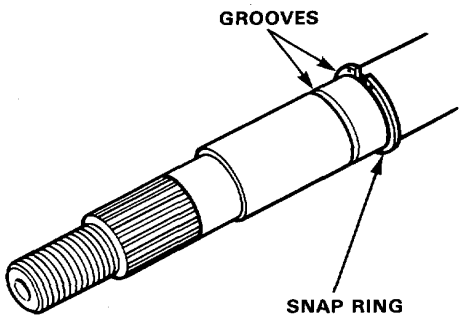
1. Remove the upper column holder, bending plate and bending plate spring.
2. Remove the tilt lock plate by removing the tilt adjusting bolt.
3. Remove the tilt lever, column hanger spring and bending plate base by removing the tilt lock bolt.
4. Position the ignition switch in " I ".
5. Remove the snapring, then remove the steering shaft from bottom of the column.
6. Remove the retaining collar.



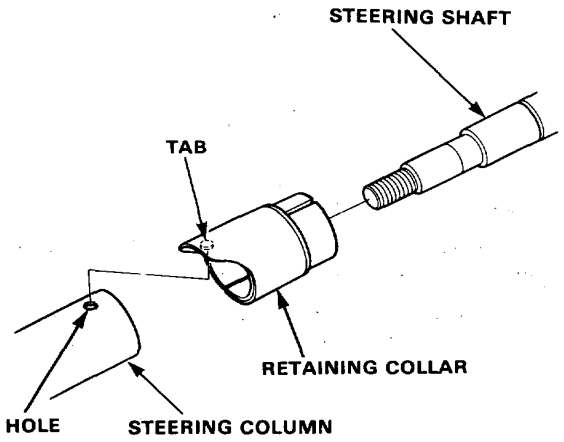


Reassembly

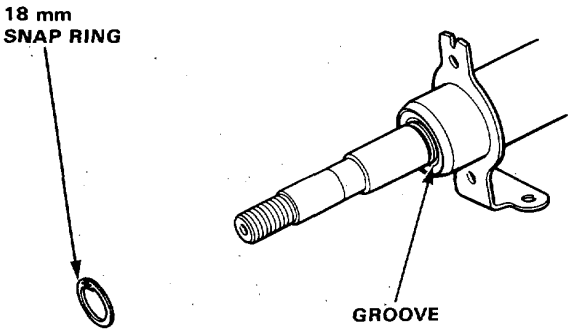
1. Install the snap ring on the groove of the steering shaft as shown.



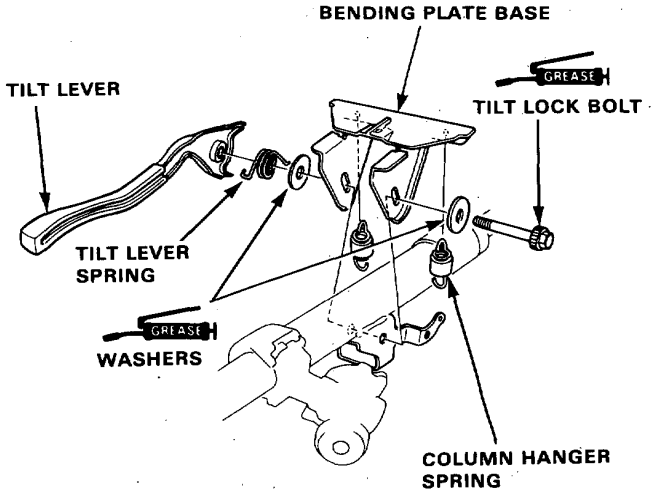
2. Install the retaining collar on the steering column aligning the hole in the column with tab on the retaining collar.



3. Insert the steering shaft into the steering column from the bottom.
4. Install the 18 mm snap ring on the groove of the steering shaft.



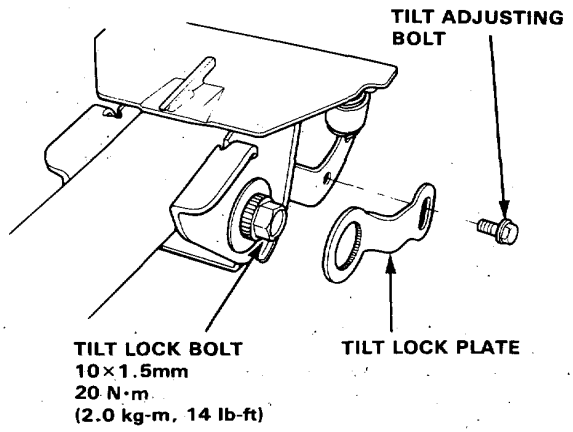
5. Position the bending plate guide on the steering column.
6. Loosely install the tilt lever, spring, washers, and bending plate guide on the steering column with the tilt lock bolt.
7. Instll the column hanger springs between the bending plate base and steering column.



(cont'd)

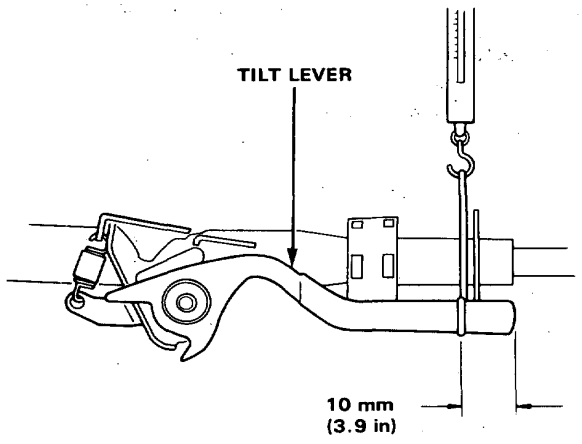
Reassembly (cont'd)

8. Tighten the tilt lock bolt to 20 N · m (2.0 kg-m, 14 lb-ft), then position the tilt lock plate on the splined portion of tilt lock bolt and loosely attach with the tilt adjusting bolt.

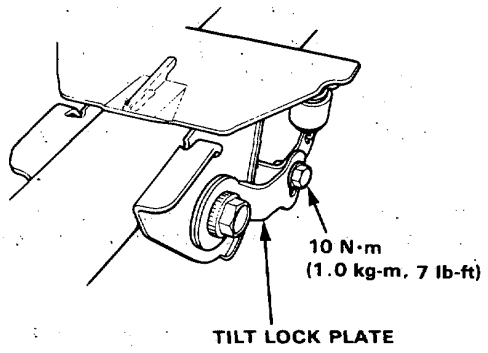


9. Attach a spring scale 10 mm (3.9 in) from the end of the knob. Measure the force required to move the lever.

Preload: 80 N (8.0 kg, 18 lbs)



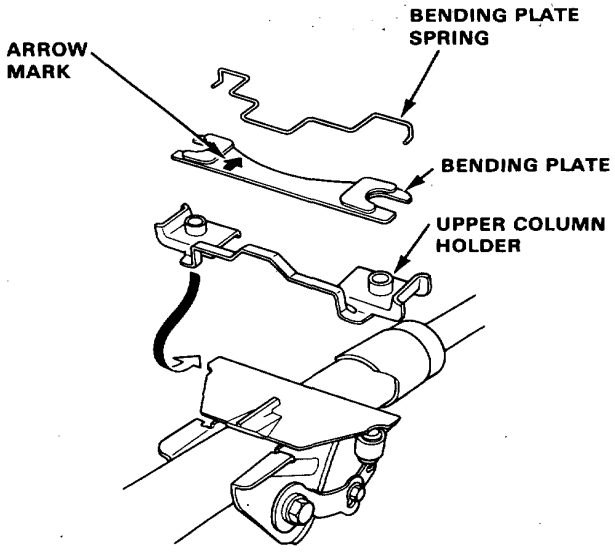
10. If the force measured is not within the specification, remove the tilt lock plate then reset it in the position where the correct force can be obtained.



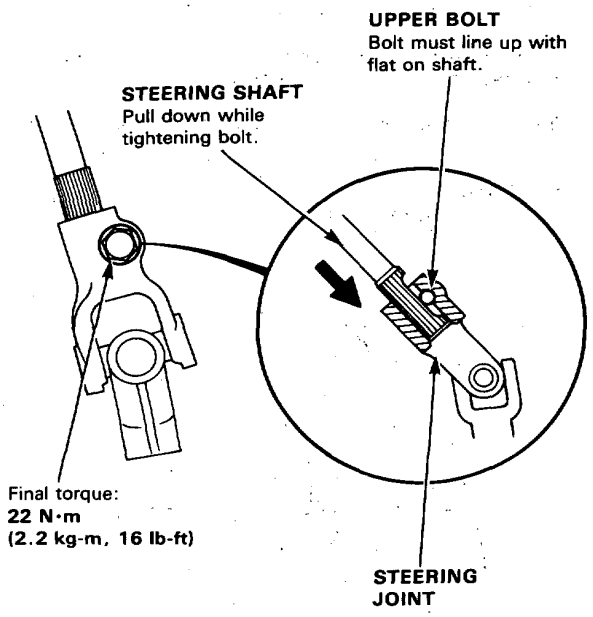
11. Tighten the tilt adjusting bolt.

12. Install the upper column holder and bending plate with the bending plate spring on the bending plate base.

NOTE: Install the bending plate with arrow mark facing the steering gearbox.



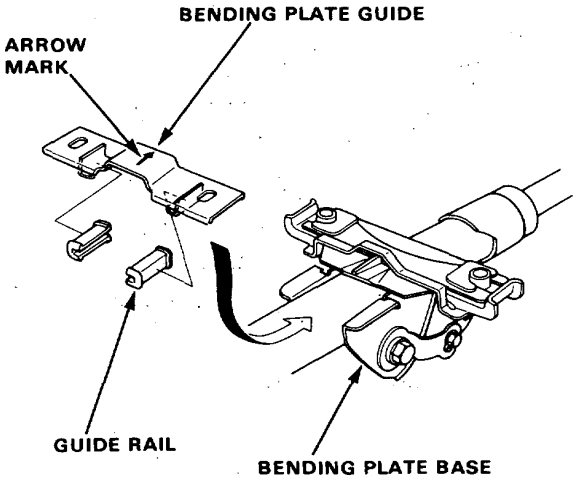
13. Slip the upper end of the steering joint onto the pinion shaft (line up the bolt hole with the groove around the shaft) and loosely install the upper bolt.



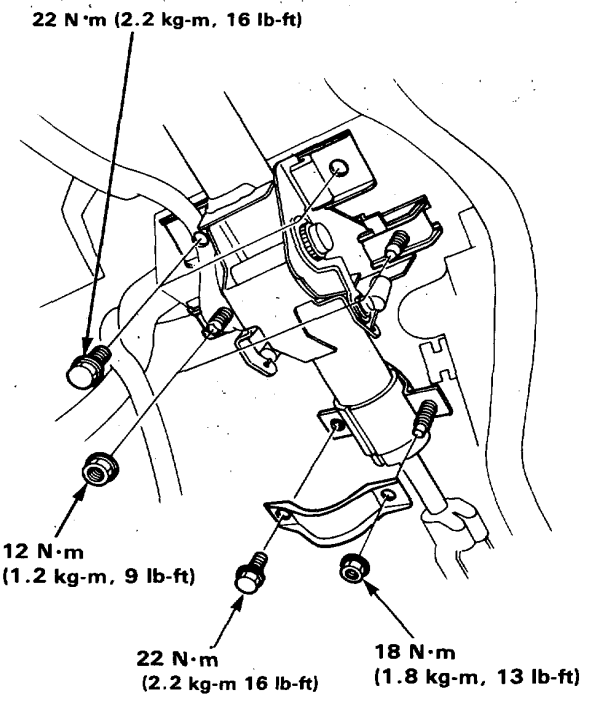
Installation

1. Set the guide rails in the bending plate guide and install the bending plate guide on the bnding plate base.

   NOTE: Install the bending plate guide with its arrow mark toward the gearbox.



2. Loosely install the steering column assembly with the nuts, bolts and lower column bracket.
   Tighten to these torques in step 7, page 11—14.



(cont'd)

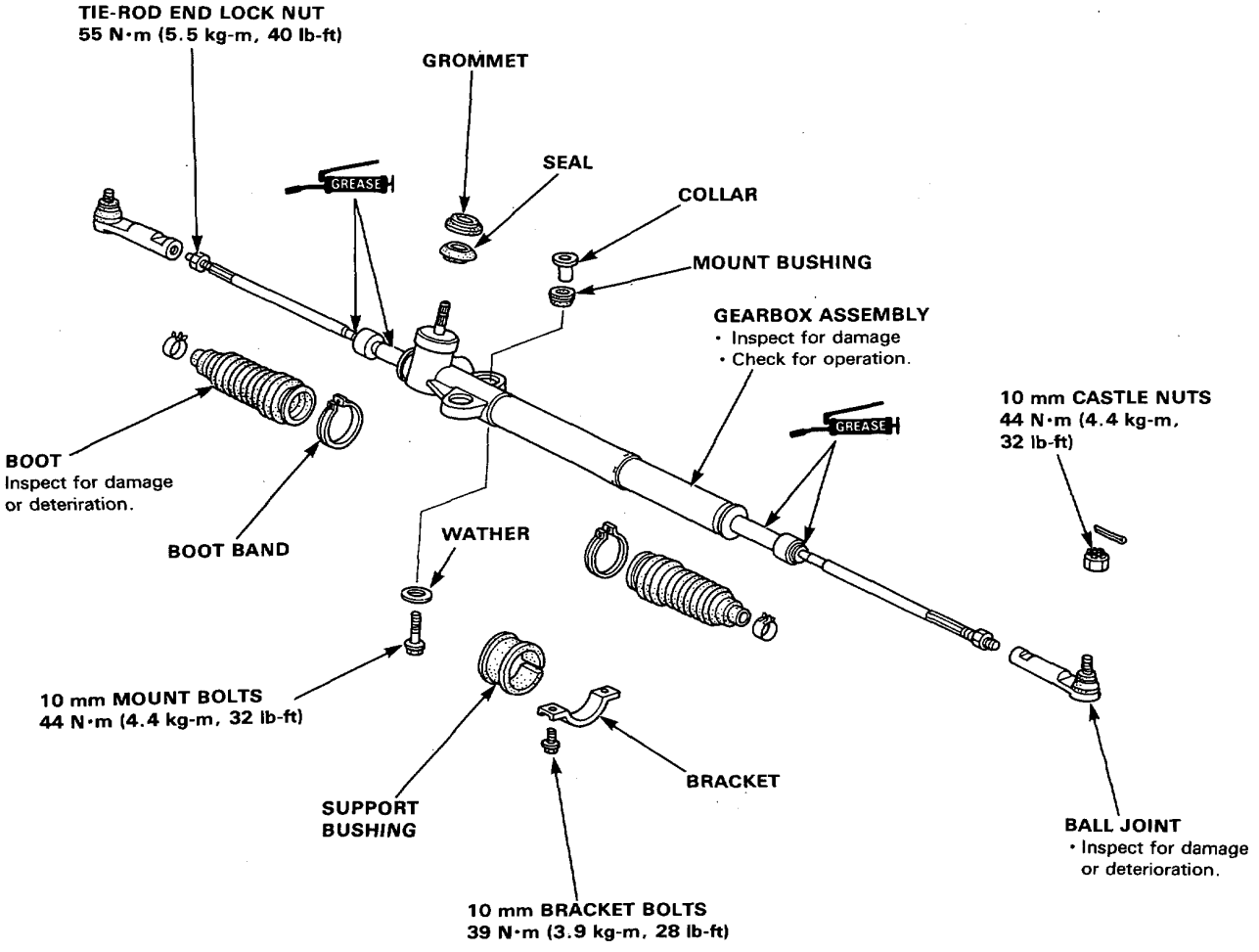
Steering Gearbox

Illustrated Index

CAUTION:

- **Before disassembling the gearbox, wash it off with solevent and a brush.**
- **Thorougly clean all disassembled parts.**
- **Replace parts with damaged sliding surfaces or deterioration.**
- **Do not try to disassemble the gearbox assembly.If the gearbox is faulty, replace the whole gearbox as an assembly.**

NOTE: RH Drive shown, LH Drive is similar.

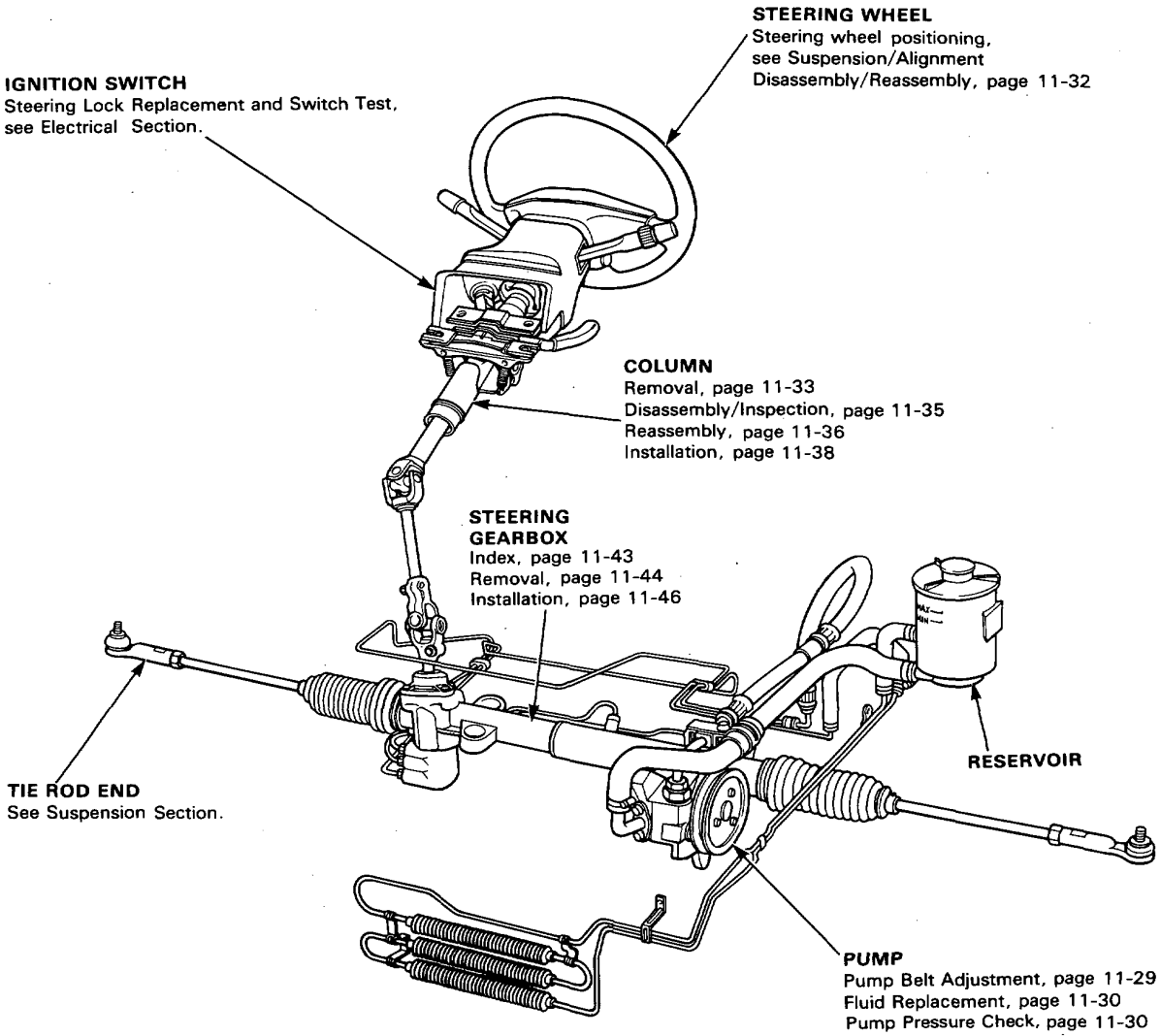


Component Location

Index

The power steering is rack and pinion type. The power operating assembly is integral with the steering gear. Road feel is maintained throughout the entire speed range of the vehicle.

NOTE: RH Drive shown, LH Drive is similar.

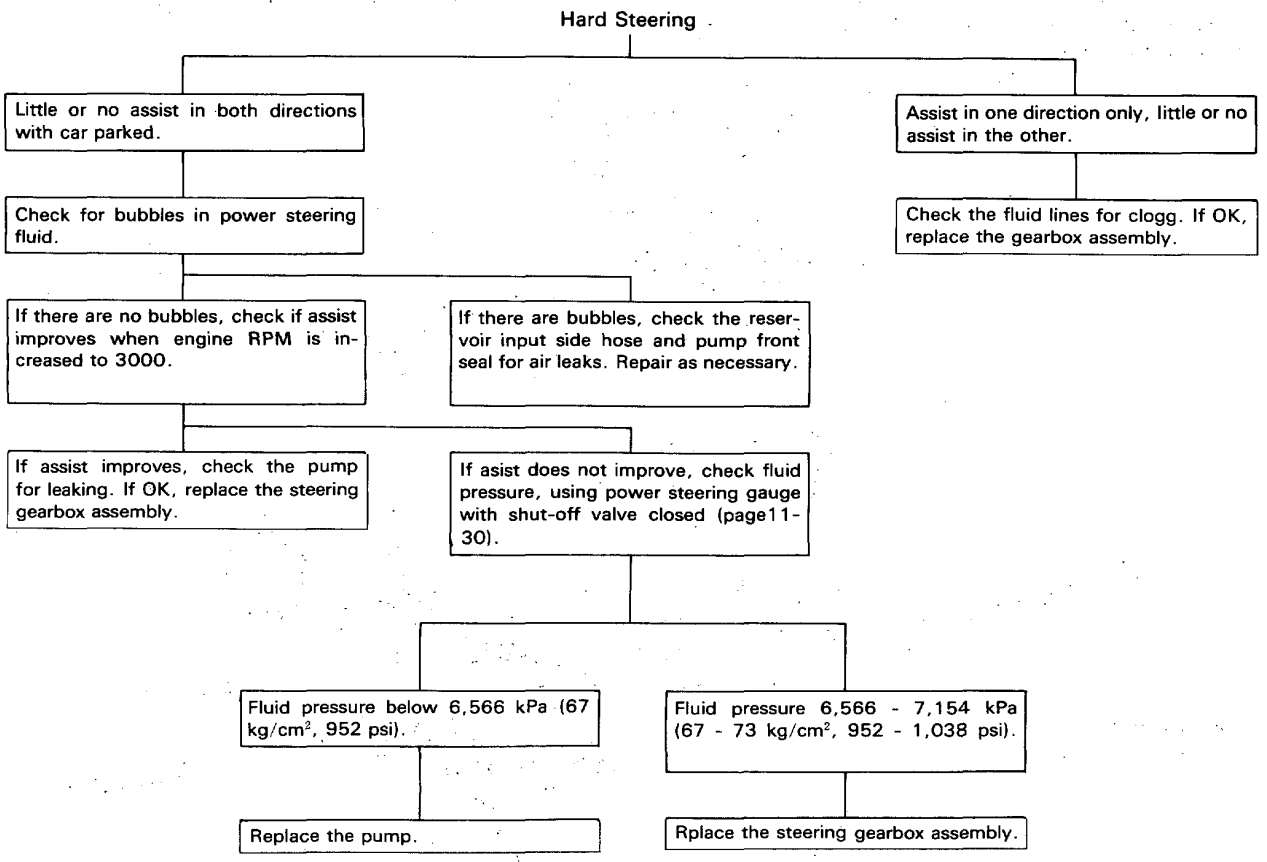


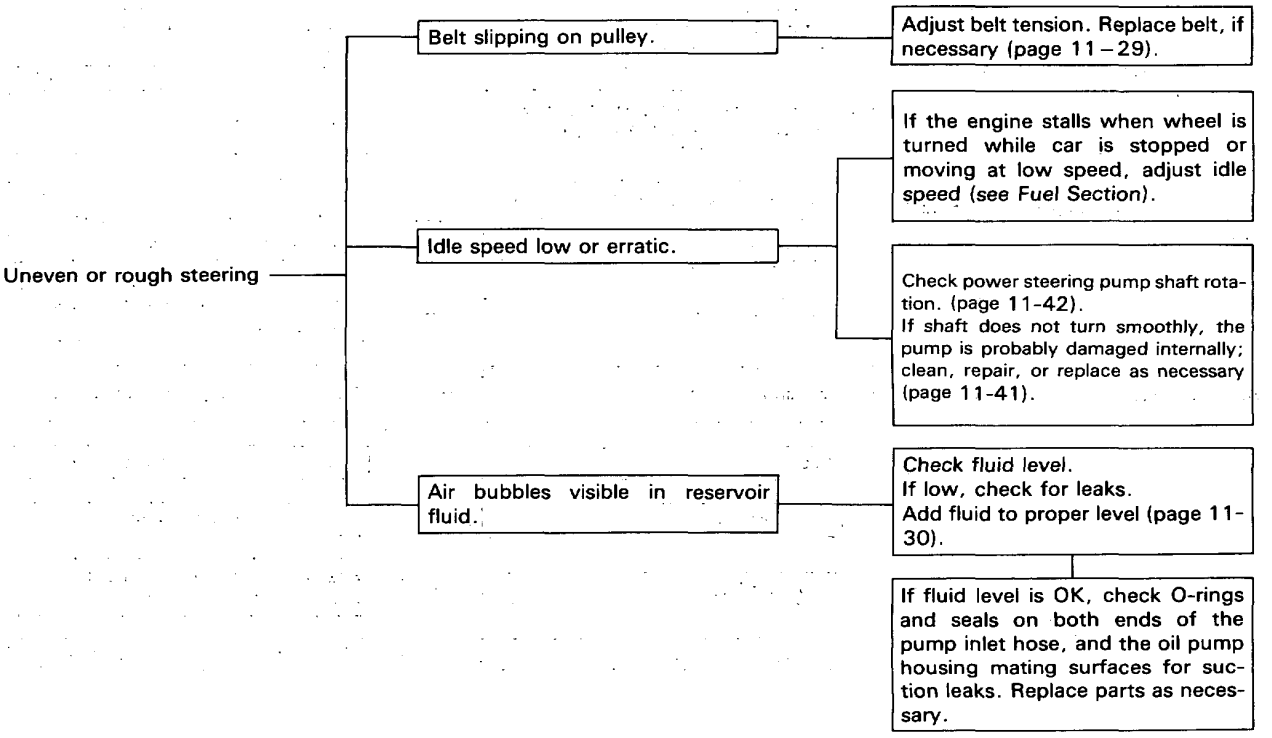
Troubleshooting

General Troubleshooting

Check the following before you begin:

- Has the suspension been modified in a way that would affect steering?
- Are tire size and air pressure correct?
- Is the steering wheel original equipment or equivalent?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?




Uneven or rough steering
Belt slipping on pulley.
Adjust belt tension. Replace belt, if necessary (page 11-29).
Idle speed low or erratic.
If the engine stalls when wheel is turned while car is stopped or moving at low speed, adjust idle speed (see Fuel Section).
Check power steering pump shaft rotation. (page 11-42).
If shaft does not turn smoothly, the pump is probably damaged internally; clean, repair, or replace as necessary (page 11-41).
Air bubbles visible in reservoir fluid.
Check fluid level.
If low, check for leaks.
Add fluid to proper level (page 11-30).
If fluid level is OK, check O-rings and seals on both ends of the pump inlet hose, and the oil pump housing mating surfaces for suction leaks. Replace parts as necessary.

(cont'd)

General Troubleshooting (cont'd)

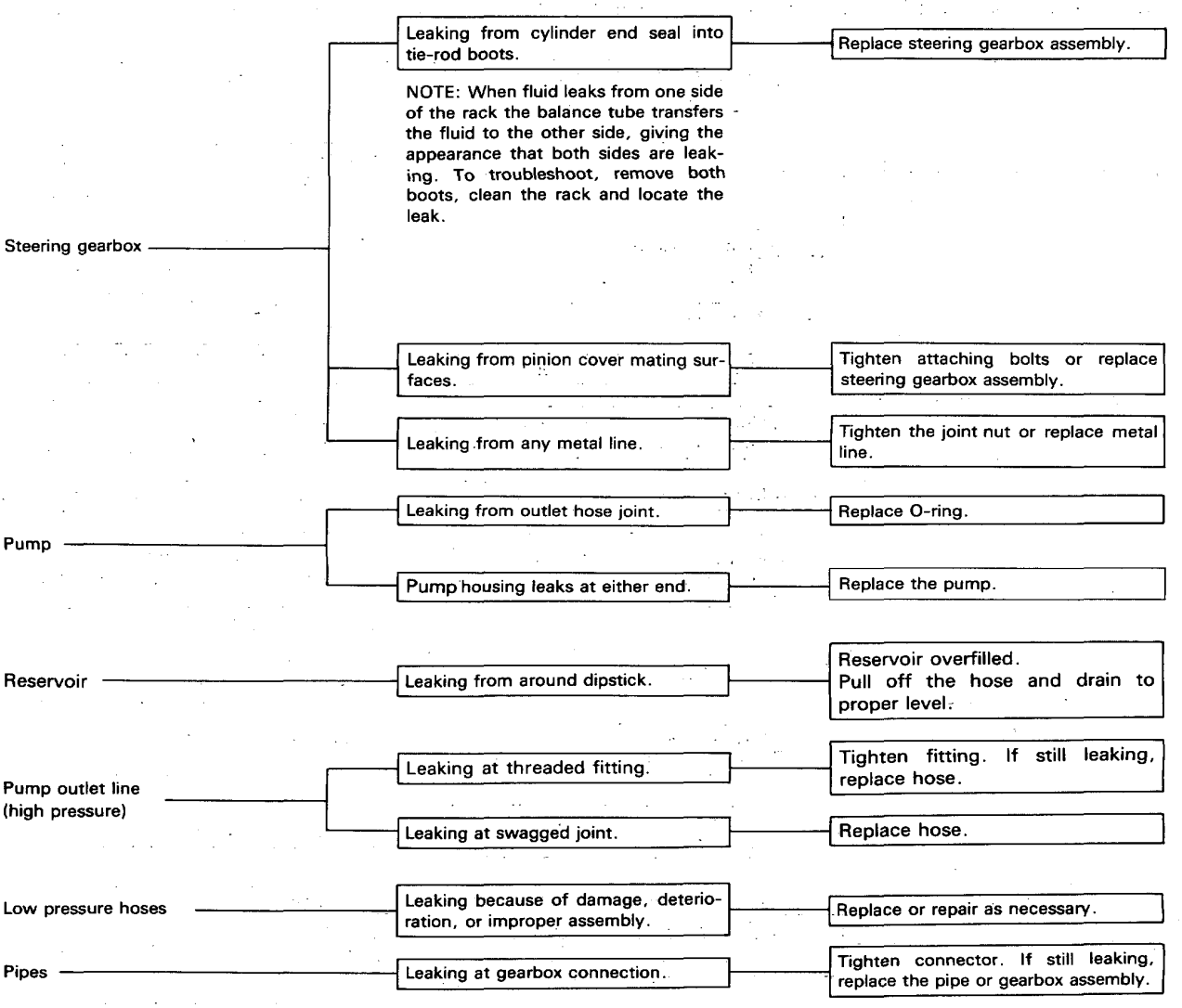
Shock or vibration when wheel is turned to full lock.	Pump belt slipping on pulley (pump stops momentarily).	Adjust belt tension (page 11-29) or replace belt.
	Sticking relief valve; pulsation exceeds 980 kPa (10 kg/cm², 142 psi).	Replace the pump.
Assist (excessively light steering) at high speed.	Measure force required to turn wheel with car parked on dry paved surface (page 11-31).	If below 27-30N (2.7-3.0 kg, 6.0-6.6 lb) check the gearbox and pump. Replace parts as necessary.
Steering kicks back during wide turns.	Pump belt slipping.	Adjust belt tension (page 11-29) or replace belt.
	Sticking power valve machanism.	Replace steering gearbox assembly.
	Rack guide too loose.	Replace steering gearbox assembly.
Wheel will not return smoothly.	Tire pressure too low.	Inflate to correct pressure.
	Improper front wheel alignment.	Readjust front wheel alignment or replace parts as necessary.
	Improperly rack clearance.	Replace steering gearbox assembly.

Noise and Vibration

NOTE: Pump noise in first 2–3 minutes after starting in cold weather (−20°C, −4°F or colder) is normal.

Humming	Humming, due to pulsation of fluid, is normal, particularly when wheel is turned with car stopped.	
	If equipped with Automatic transmission, the hum could be torque converter of pump noise.	Confirm by temporarily removing pump belt.
	High pressure line touching the frame.	Reposition the line.
Squeaking	Pump belt slipping.	Adjust belt tension (page 11-29) or replace belt.
	Pinion shaft seal not lubricated.	Grease it.
	Horn contact not lubricated, or under too much pressure.	Grease the contact, or bend it to reduce the pressure.
	Burrs on the pinion gear.	Replace steering gearbox assembly.
Rattle or chattering	NOTE: A single "clunk" may be a normal amount of linkage clearance. To distinguish this type of clunk, turn the wheel back and forth with the engine OFF.	
	Loose pump pulley.	Tighten or replace pulley. If shaft is loose, replace the pump.
	Loose steering shaft connector, tie-rod, or ball joint.	Check and tighten, or replace parts as necessary.
	Column hanger bushing damaged.	Replace steering shaft.
Hissing	Lines or hoses from the control unit touching each other.	Reposition lines so they don't touch.
	Noise from control valve.	Replace the steering gearbox assembly.
Pump noise	NOTE: Pump noise up 2–3 minutes after starting in cold weather (−20°C, −4°F or colder) is normal. Compare pump noise at operating temperature to another car.	If pump shaft does not turn smoothly, replace the pump.
Grating noise from pump	Cavitation caused by air bubbles in fluid.	Check fluid level. If low, fill reservoir to proper level, and check for leaks. Tighten or replace as necessary.
		Check for crushed suction hose or a loose hose clamp allowing air into the system. Tighten or replace as necessary.

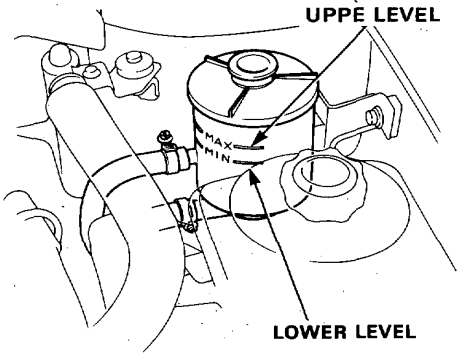
Fluid Leaks


Steering gearbox
Leaking from cylinder end seal into tie-rod boots.
Replace steering gearbox assembly.
NOTE: When fluid leaks from one side of the rack the balance tube transfers the fluid to the other side, giving the appearance that both sides are leaking. To troubleshoot, remove both boots, clean the rack and locate the leak.
Leaking from pinion cover mating surfaces.
Tighten attaching bolts or replace steering gearbox assembly.
Leaking from any metal line.
Tighten the joint nut or replace metal line.
Pump
Leaking from outlet hose joint.
Replace O-ring.
Pump housing leaks at either end.
Replace the pump.
Reservoir
Leaking from around dipstick.
Reservoir overfilled.
Pull off the hose and drain to proper level.
Pump outlet line (high pressure)
Leaking at threaded fitting.
Tighten fitting. If still leaking, replace hose.
Leaking at swagged joint.
Replace hose.
Low pressure hoses
Leaking because of damage, deterioration, or improper assembly.
Replace or repair as necessary.
Pipes
Leaking at gearbox connection.
Tighten connector. If still leaking, replace the pipe or gearbox assembly.

Fluid Replacement

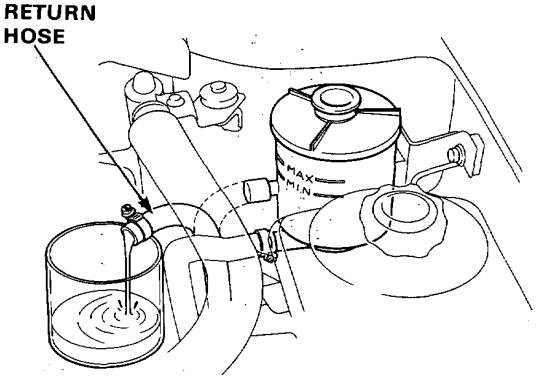
Check the reservoir at regular intervals, and add fluid sasa necessary.

CAUTION: Use only DEXRON® II Automatic Transmission Fluid (ATF). Using other fluids such as ATF or other manufacturer's power steering fluid will damage the system.



Fluid Replacement
CAPACITY: 1.2 liter (1.3 US qt., 1.1 Imp qt.) at change

1. Drain the fluid from the reservoir.
2. Disconnect the return hose from the gearbox at the reservoir, and put the end in a suitable container.
3. Start the engine, let it run at idle, and turn the steering wheel from lock-to-lock several times. When fluid stops running out of the hose, shut off the engine. Discard the fluid.



4. Re-fit the return hose on the reservoir.
5. Fill the reservoir to the upper level mark.
6. Start the engine and run it at fast idle, then turn the steering from lock-to-lock several times to bleed air from the system.
7. Recheck the fluid level and add some if necessary.

CAUTION: Do not fill the reservoir beyond the upper level mark.

Pump Pressure Check

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

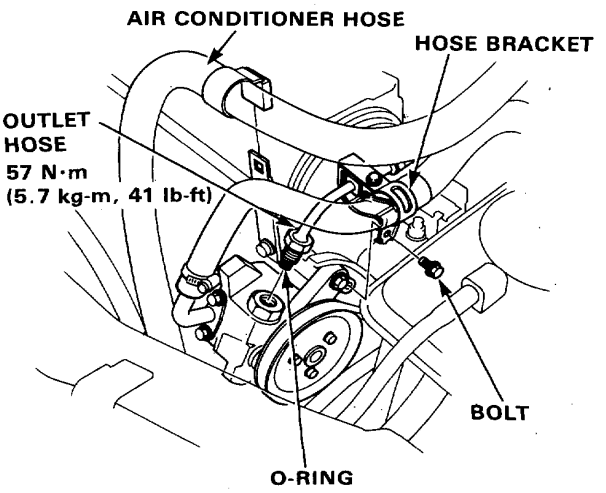
CAUTION: Use fender covers to avoid damaging painted surfaces.

NOTE: First check the power steering fluid level and pump belt tension.

1. Remove the air conditioner hose from the bracket.
2. Remove the hose bracket from the pump bracket by removing the mounting bolt.
3. Disconnect the outlet hose from the pump.

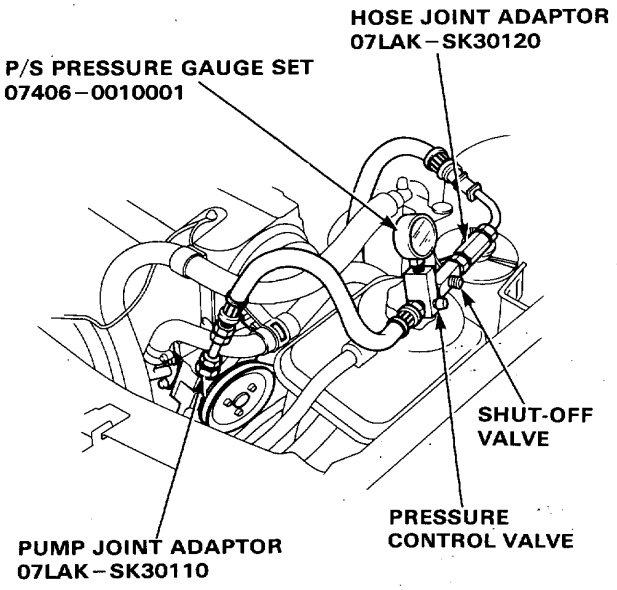
CAUTION: Be careful not to damage the O-ring when disconnecting the hose.

NOTE: Place the shop towel around the pipe fitting to catch the spilled fluid.



4. Install the pump joint adaptor into the pump outlet and tighten it securely.

5. Install the power steering pressure gauge set between the pump and hose joint adaptors as shown.



6. Start the engine and let it idle.

7. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.

8. Close the shut-off valve, then, close the pressure control valve gradually until the pressure gauge needle is stable. Read the pressure.

9. Immediately open the shut-off valve fully.

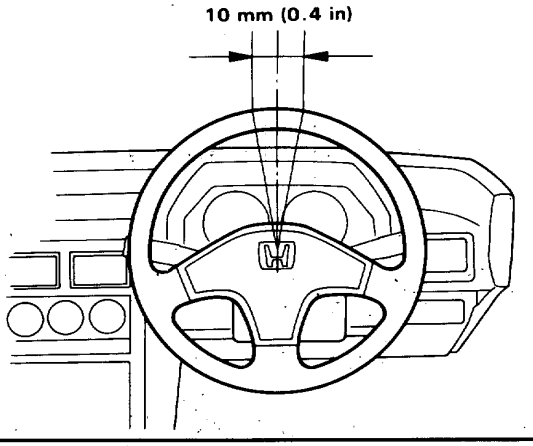
CAUTION: Do not keep the shut-off valve closed more than 5 seconds or the pump could be damaged by over-heating.

If the pump is in good condition, the gauge should read at least 6,566—7,154 kPa (67—73 kg/cm², 952—1,038 psi) A low reading means pump output is too low for full assist. Repair or replace the pump.

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.

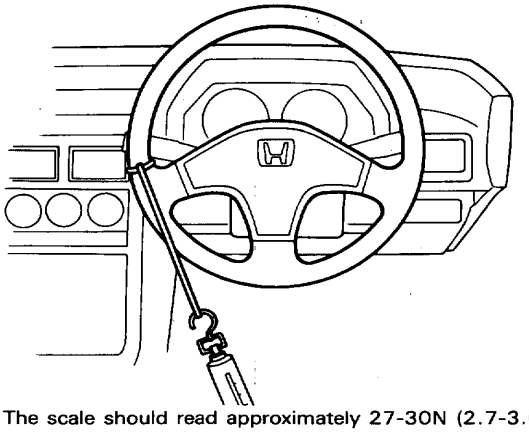


Power Assist Check with Car Parked

1. Check the power steering fluid level and pump belt tension.

2. Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid.

3. Attach a spring scale to the steering wheel. With the engine idling and the car on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.

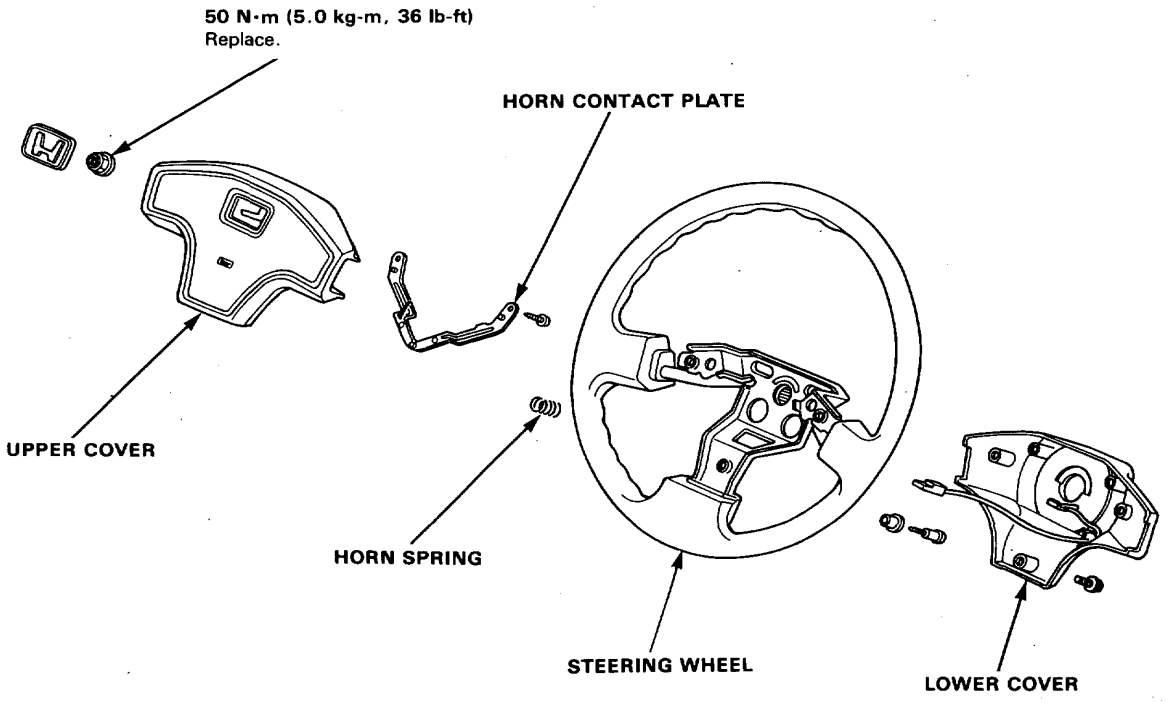


4. The scale should read approximately 27-30N (2.7-3.0 kg, 6.0-6.6 lb)
If the reading is significantly greater or less, check the gearbox and pump.

NOTE: The reading may differ depending on the surface on which the tires lie.

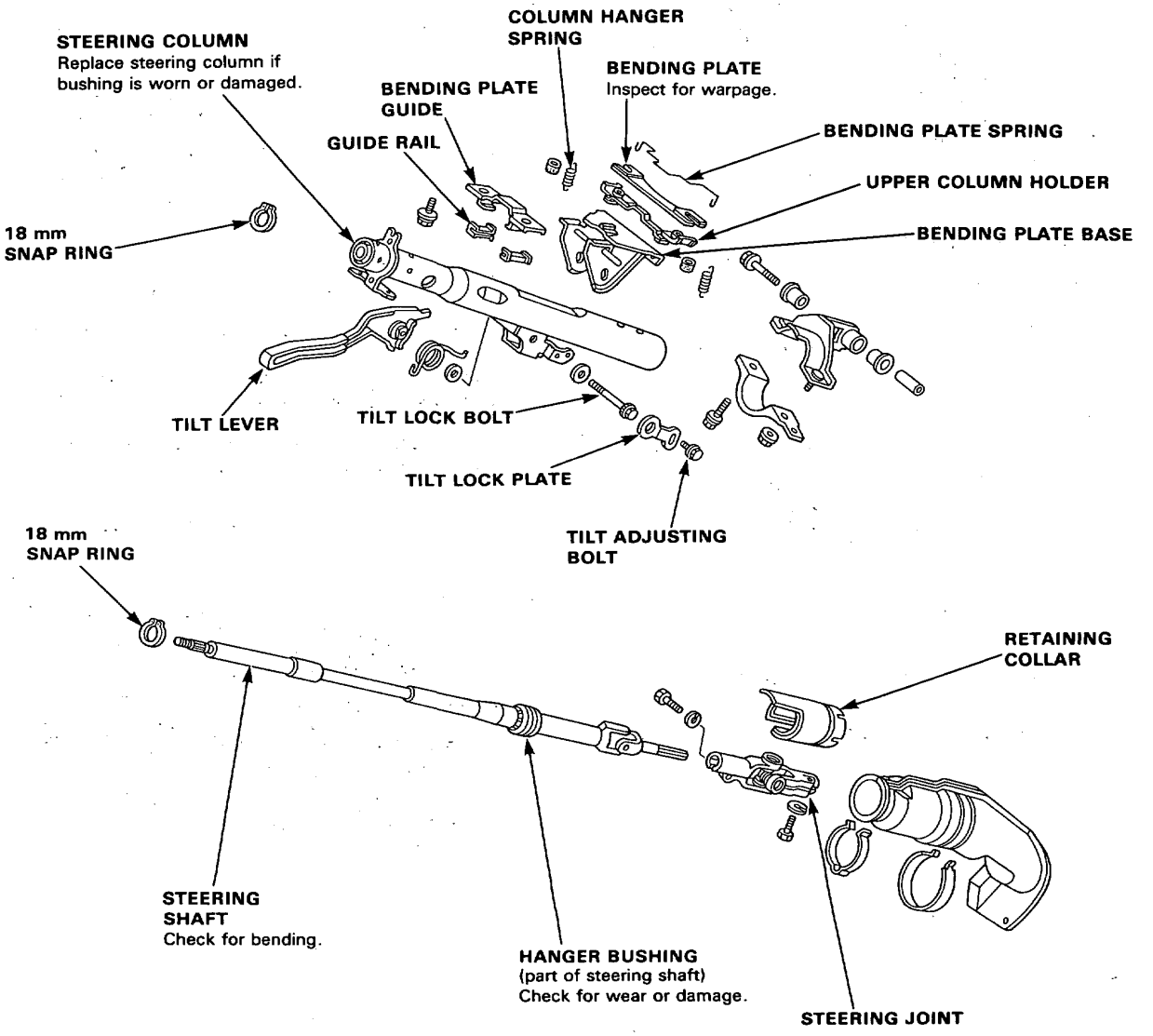
Steering Wheel

Disassembly/Reassembly



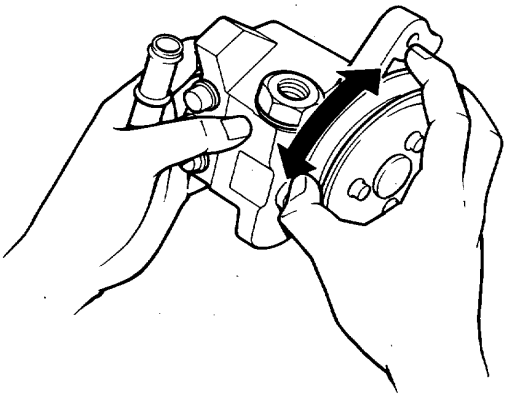
Disassembly/Inspection

1. Remove the upper column holder, bending plate and bending plate spring.
2. Remove the tilt lock plate by removing the tilt adjusting bolt.
3. Remove the tilt lever, column hanger spring and bending plate base by removing the tilt lock bolt.
4. Position the ignition switch in " I ".
5. Remove the snapring, then remove the steering shaft from bottom of the column.
6. Remove the retaining collar.



Inspection

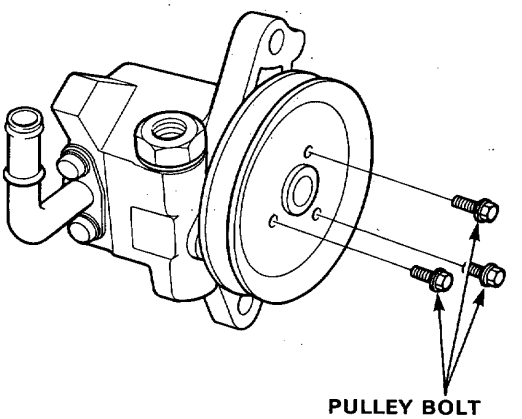
Inspect the steering pump for leak or damage.
Turn the pulley and check that the pump shaft turns smoothly.



Pulley Replacement

Hold the pulley in a vise with soft jaws, and remove the three pulley bolt, then remove the pulley.

CAUTION: Do not try to disassemble the pump. If the pump is faulty, replace the whole pump as an assembly.



PULLEY BOLT
10 N·m
(1.0 kg-m, 7 lb-ft)

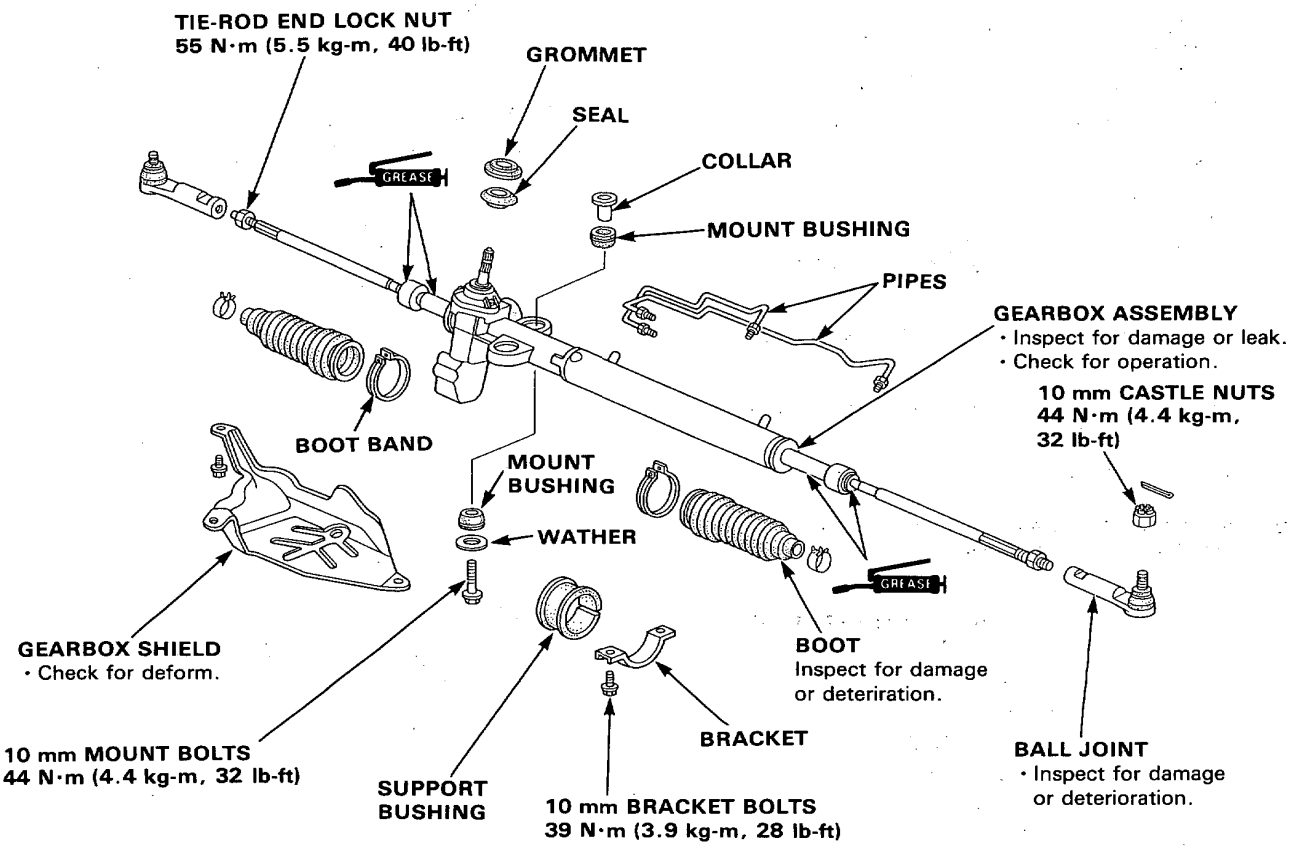
Steering Gearbox

Illustrated Index

CAUTION:

- **Before disassembling the gearbox, wash it off with solevent and a brush.**
- **Thorougly clean all disassembled parts.**
- **Replace parts with damaged sliding surfaces or deterioration.**
- **Do not try to disassemble the gearbox assembly. If the gearbox is faulty, replace the whole gearbox as an assembly.**
- **Do not allow foreign matter to enter the system.**

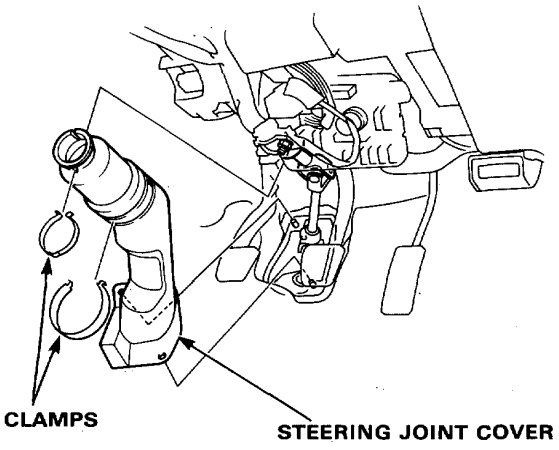
NOTE: RH Drive shown, LH Drive is similar.



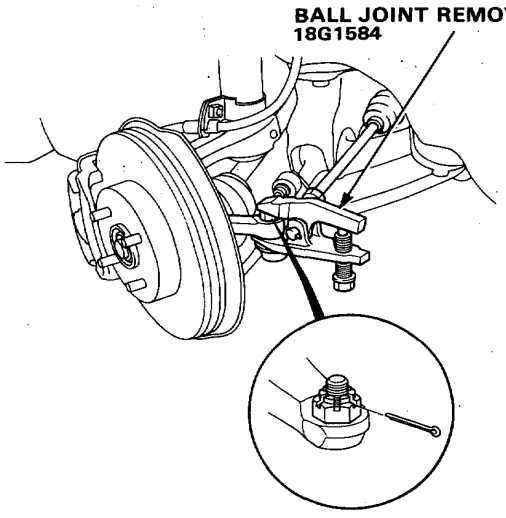
Steering Gearbox

Removal

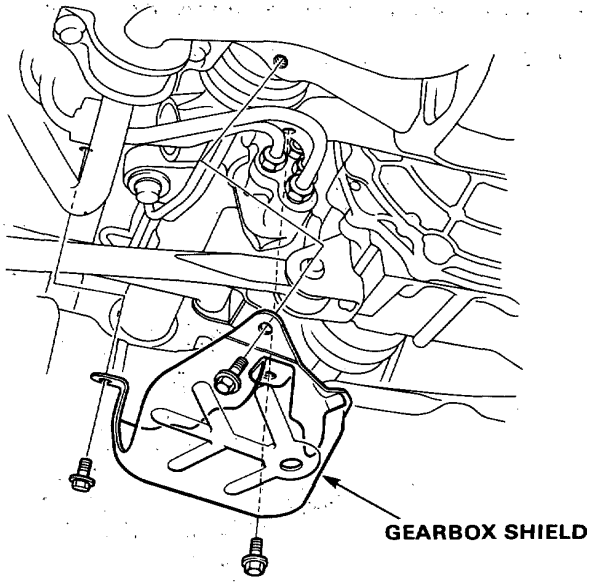
1. Remove the steering joint cover, and disconnect the steering shaft from the gearbox.



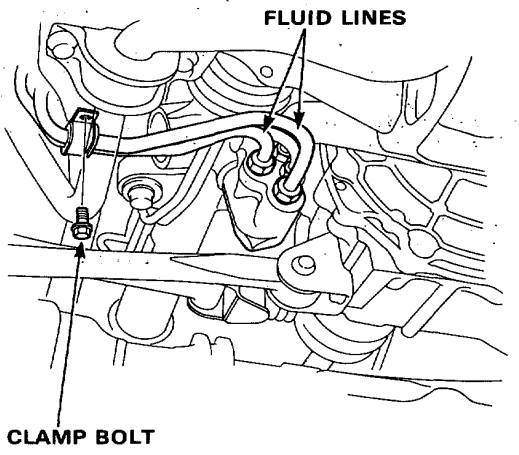
2. Drain the power steering fluid as described on page 11 -30.
3. Raise the front of car and support on safety stands in the proper locations.
4. Remove the front wheels.
5. Disconnect the tie-rods from the steering knuckles using the special tool shown.



6. Remove the gearbox shield.
7. Using solvent and a brush, wash any oil and dirt off the control unit, its lines, and that end of the gearbox. Blow dry with compressed air.

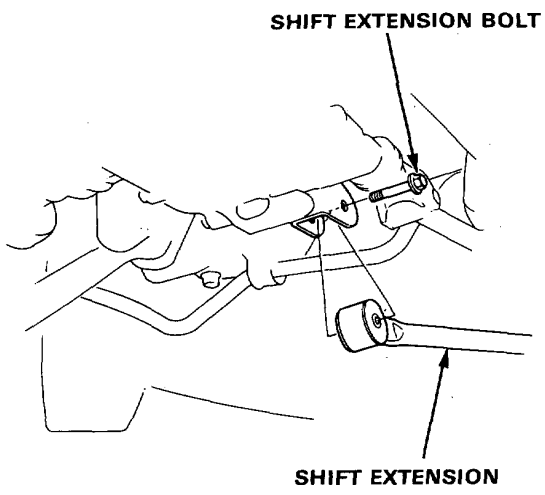


8. Using flare nut wrenches, disconnect the two lines from the control unit. Remove the hose clamp bolt and move the lines outward slightly.



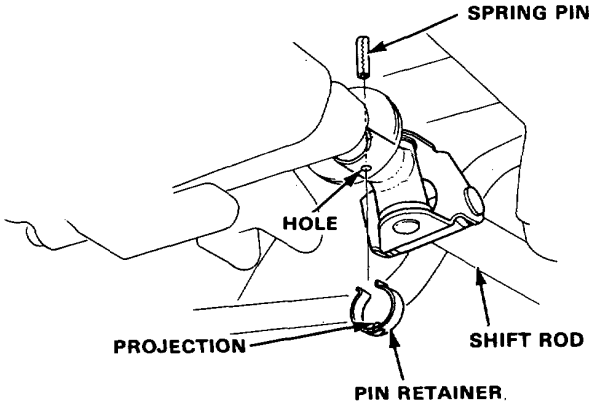
9. (Manual transmission model only)

- Remove the shift extension from the transmission case.



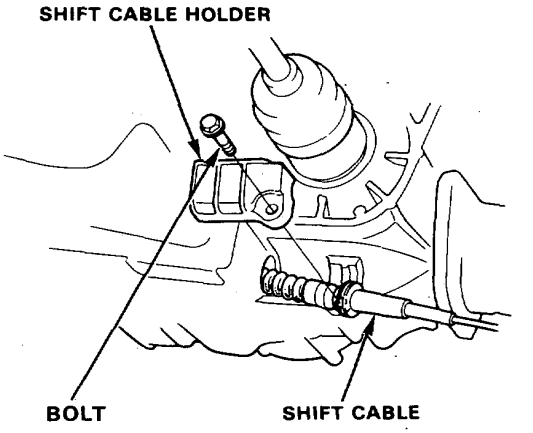
- Slide the boot at the connecting position of the gear shift rod.
- Drive out the spring pin with a punch, then disconnect the shift rod.

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



10. (Automatic transmission only)

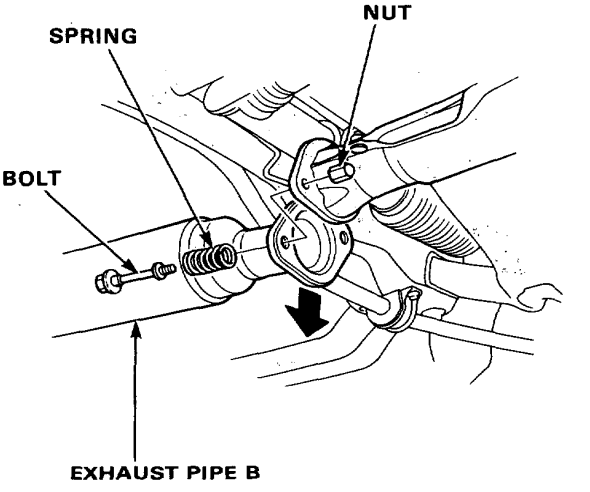
- Remove the shift cable holder and cable from the transmission case.



11. Remove the self-locking nuts connecting the exhaust pipe to exhaust pipe B, then separate exhaust pipe B from the exhaust pipe.

CAUTION: Replace the exhaust gasket and self-locking nuts when you reinstall the pipe.

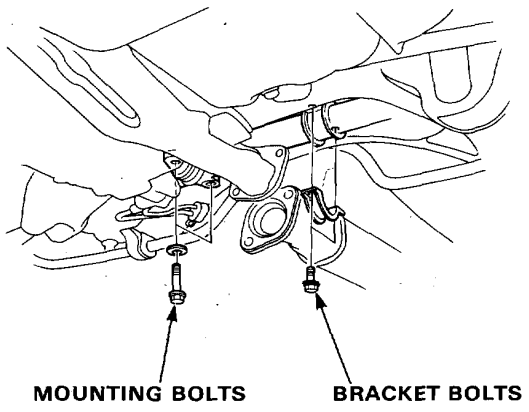
12. Move the exhaust pipe B to dawnward.



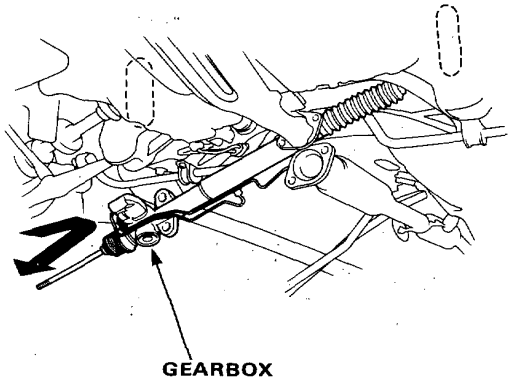
Steering Gearbox

Removal (cont'd)

13. Slide the tie-rod all the way to the left side.
14. Remove the steering geardox mounting and bracket bolts.

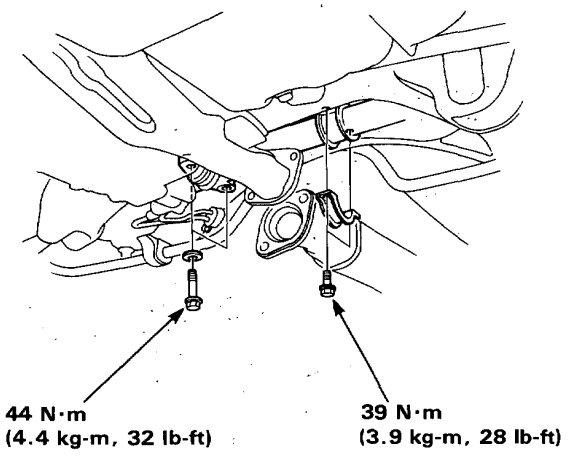


15. Slide the gearbox left so that the right tie-rod clears the bottom of the rear beam, then remove the gearbox.

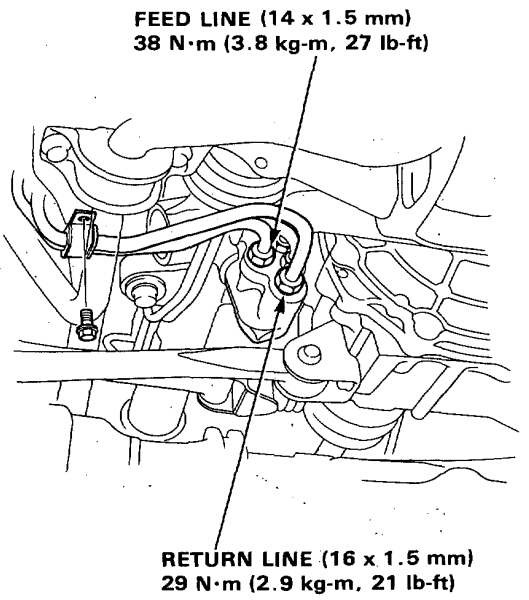


Installation

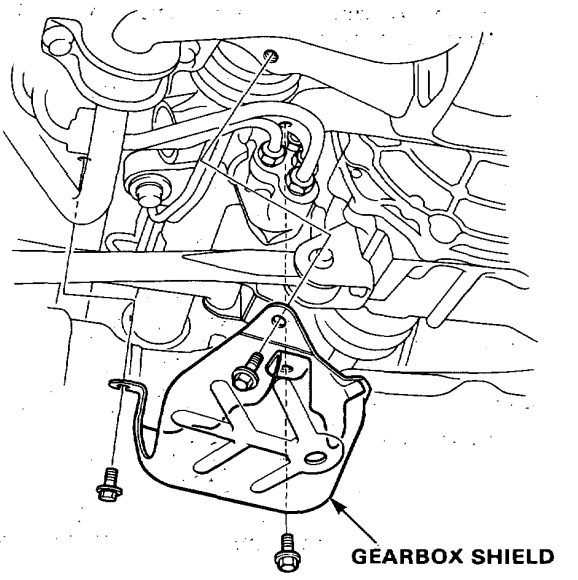
1. Reinstall the gearbox in the reverse order of removal.
2. Tighten the gearbox mounting and bracket bolts.



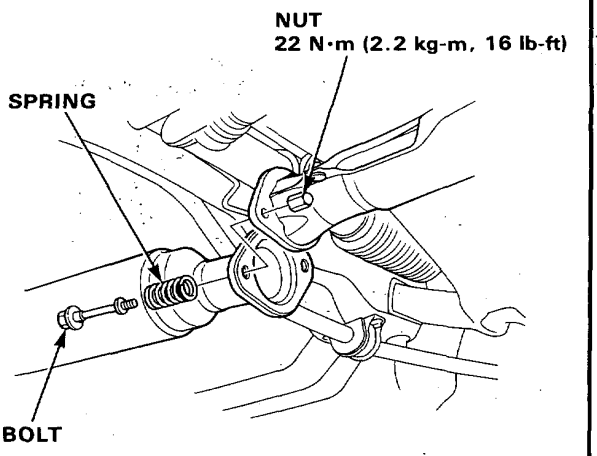
3. Connect the fluid lines to the control unit. Then tighten the clamp bolt.



4. Install the gearbox shield.



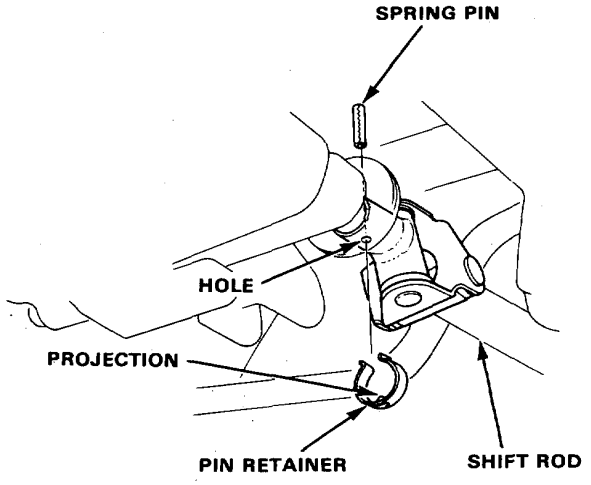
5. Connect the exhaust pipes with new gasket, and tighten the bolts and nuts.



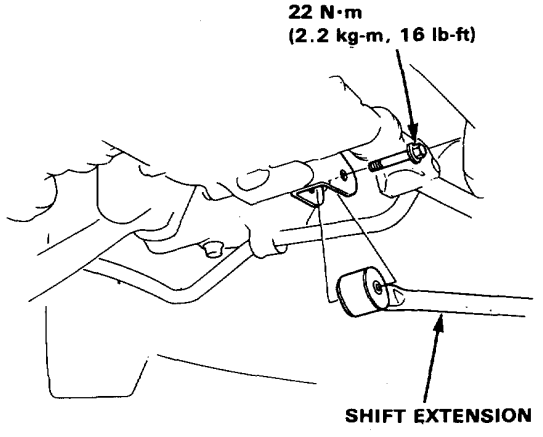
Installation (cont'd)

6-1. (Manual transmission model only)

- Connect the shift rod to the transmission and drive the spring pin with a punch, then install the pin retainer. Be sure that the projection on the pin retainer is in the hole.

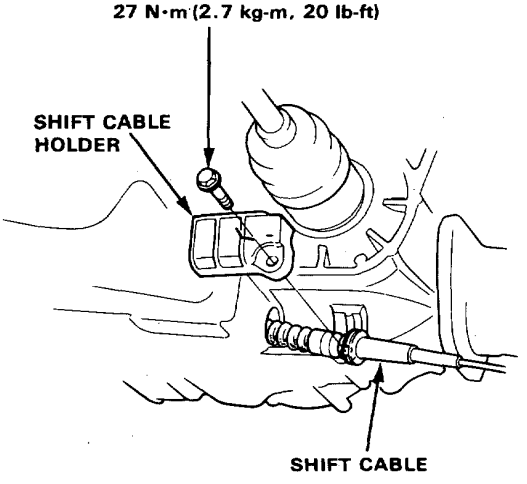


- Install the shift extension to the transmission case.

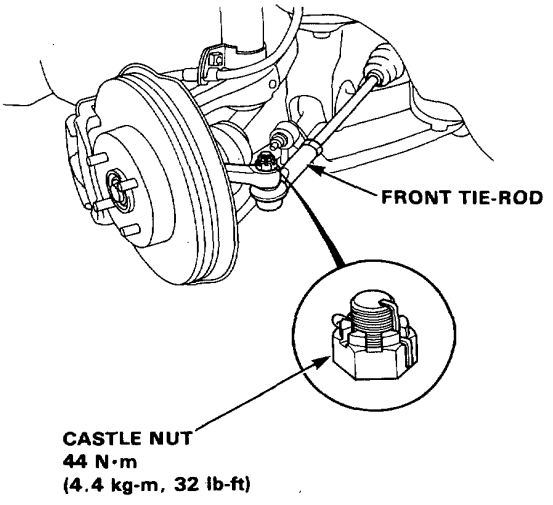


6-2. (Automatic transmission model only).

- Connect the shift cable to the transmission and install the cable holder.



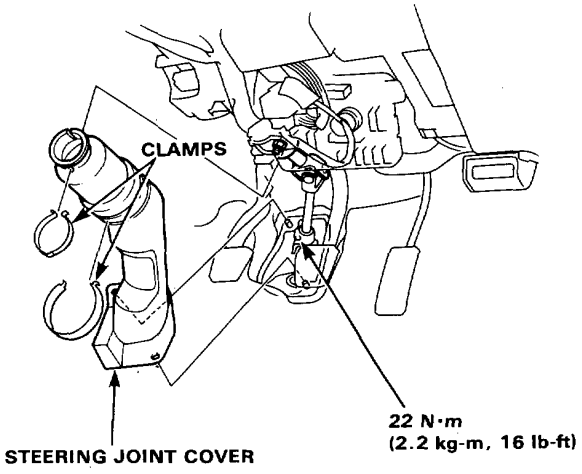
7. Re-connect the tie-rods to the steering knuckles, tighten the castle nut to specified torque, and install new cotter pins.



8. Reconnect the steering shaft to the gearbox.

9. Install the steering joint cover.

CAUTION: Before tightening the steering joint bolts, pull up the steering joint to make sure that the steering joint is fully seated.

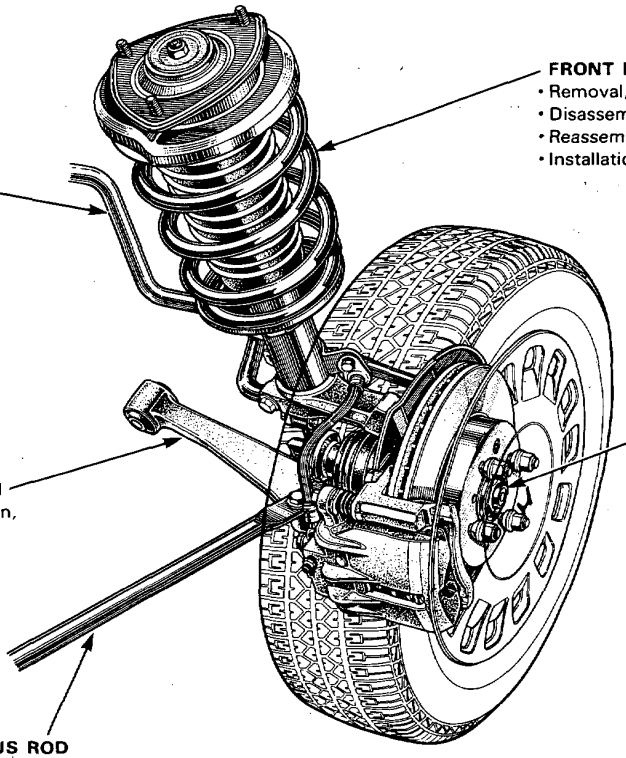


10. Fill the system:
    - Fill the reservoir with new Power Steering Fluid.
    - Start the engine and let it run at fast idle, then turn the steering wheel from lock-to-lock several times to bleed air from the system.
    - Check the fluid again, and add more if necessary.
11. Check the gearbox for leaks, then reinstall the shield.
12. Reinstall the front wheels.

Component Location

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Front Suspension:



FRONT DAMPER
- Removal, page 12-18
- Disassembly/Inspectios, page 12-17
- Reassembly, page 12-19
- Installation, page 12-19

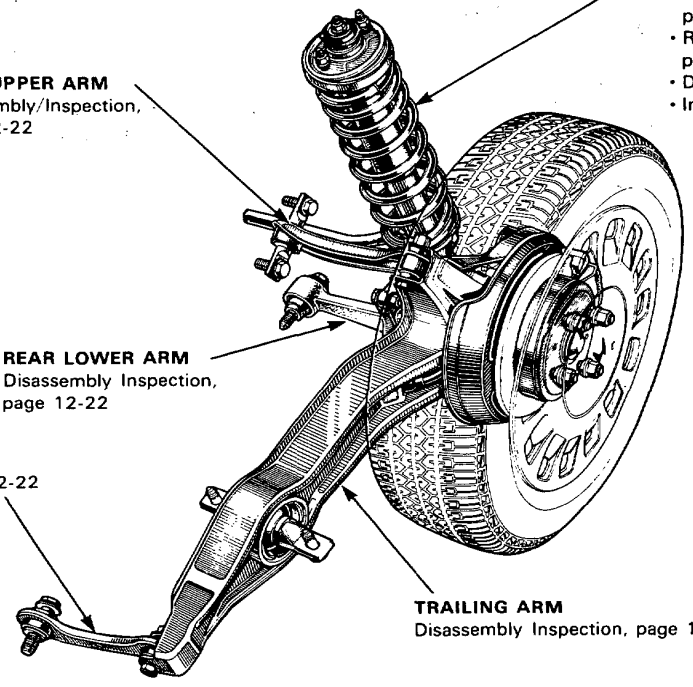
STABILIZER BAR
Disassembly/Inspection, page 12—9

KNUCKLE/HUB
- Replacement, page 12-10
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FRONT LOWER ARM
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RADIUS ROD
Disassembly/Inspection, page 12—9

Rear Suspension:



REAR DAMPER
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REAR UPPER ARM
Disassembly/Inspection, page 12-22

REAR LOWER ARM
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COMPENSATOR ARM
Disassembly Inspection, page 12-22

TRAILING ARM
Disassembly Inspection, page 12-22

Rear Toe Inspection/ Adjustment

1. Release parking brake.

   NOTE: If the parking brake is engaged, you may get an incorrect reading.

   Rear toe in: 2.3±1.4mm (0.09±0.05in)

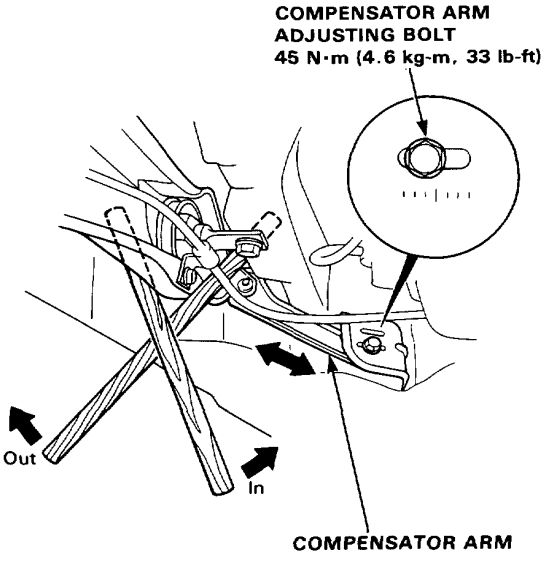
   — If adjustment is required, go to step 2.

   — If no adjustment is required, remove alignment equipment.

2. Before adjustment, note the locations of right and left compensator arm adjusting bolts.

3. Loosen the adjusting bolt and slide the compensator arm in or out as shown, to adjust the toe.

4. Tighten the adjusting bolt.



- Example
  After the rear toe inspection, the wheel is 2 mm (0.079 in.) out of the specification.
  — Move the arm so the adjusting bolt moves 2 mm (0.079 in) inward from the position recorded before the adjustment.
  — The distance the adjusting bolts is moved should be equal to the amount of out-of-specification.

Front Toe Inspection/ Adjustment

NOTE: Check the tire pressure before inspection.

1. Center steering wheel spokes.

   NOTE: Measure difference in toe measurements with the wheels pointed straight ahead.

   Front toe-out: 0.7±1.4mm (0.027±0.05in)

   — If adjustment is required, go on to step 2.

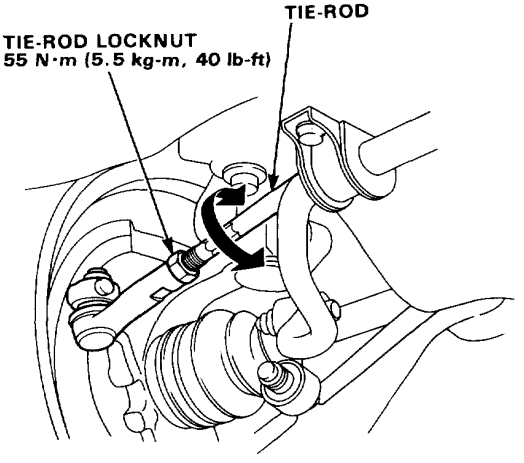
   — If no adjustment is required, remove alignment equipment.

2. Loosen the tie-rod locknuts and turn both tie-rods in the same direction until the front wheels are in straight ahead position.

3. Turn both tie-rods equally until the toe reading on the turning radius gauge is correct.

4. After adjusting, tighten the tie-rod locknuts.

   NOTE: Reposition the tie-rod boot if twisted or displaced after adjustment has been made.

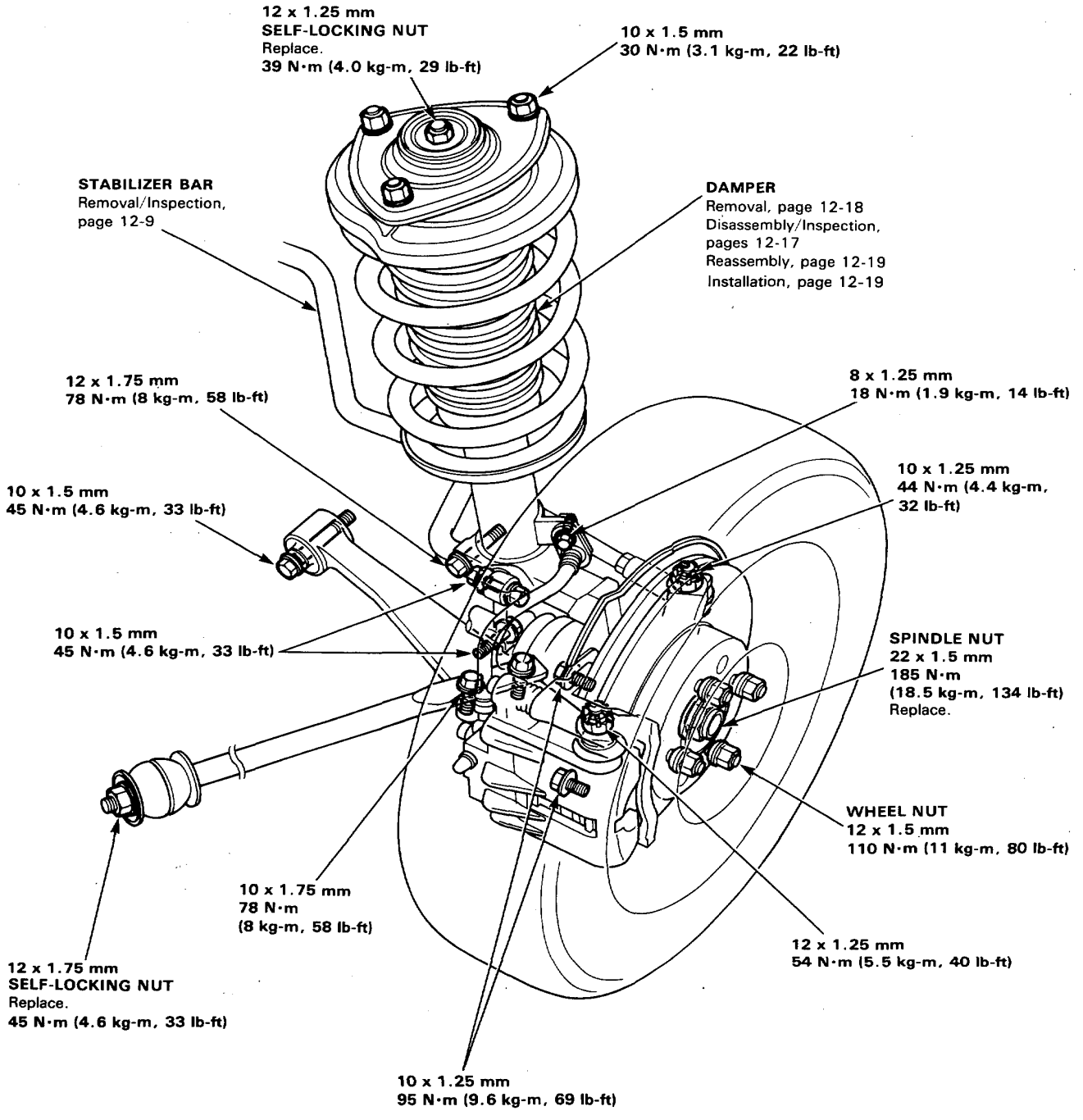


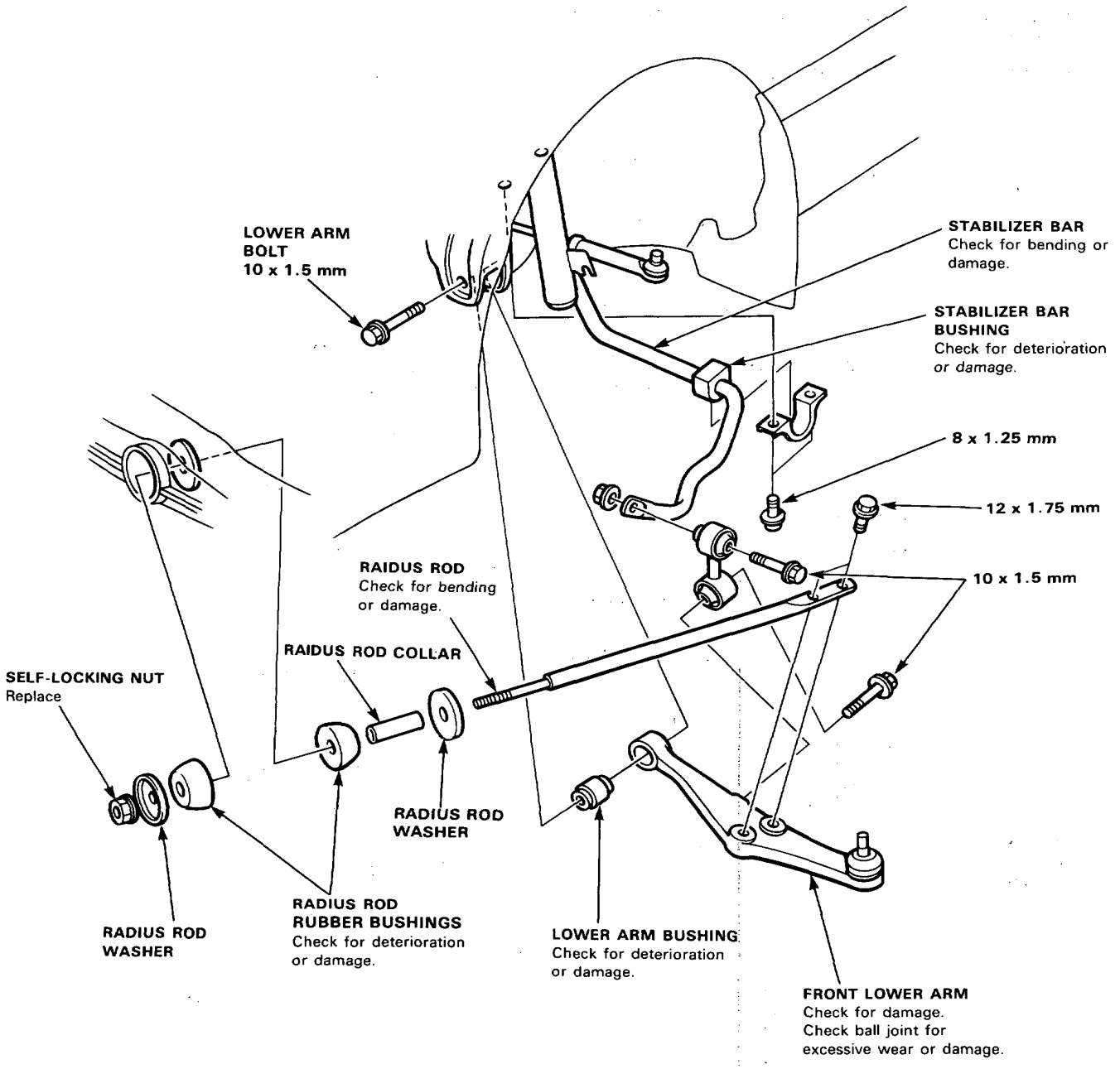
Front Suspension

Torque Specifications

CAUTION:

- **Replace the self-locking nuts after removal.**
- **The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.**




LOWER ARM
BOLT
10 x 1.5 mm
STABILIZER BAR
Check for bending or damage.
STABILIZER BAR
BUSHING
Check for deterioration or damage.
8 x 1.25 mm
12 x 1.75 mm
10 x 1.5 mm
RAIDUS ROD
Check for bending or damage.
RAIDUS ROD COLLAR
SELF-LOCKING NUT
Replace
RADIUS ROD
WASHER
RADIUS ROD
RUBBER BUSHINGS
Check for deterioration or damage.
RADIUS ROD
WASHER
LOWER ARM BUSHING
Check for deterioration or damage.
FRONT LOWER ARM
Check for damage.
Check ball joint for excessive wear or damage.

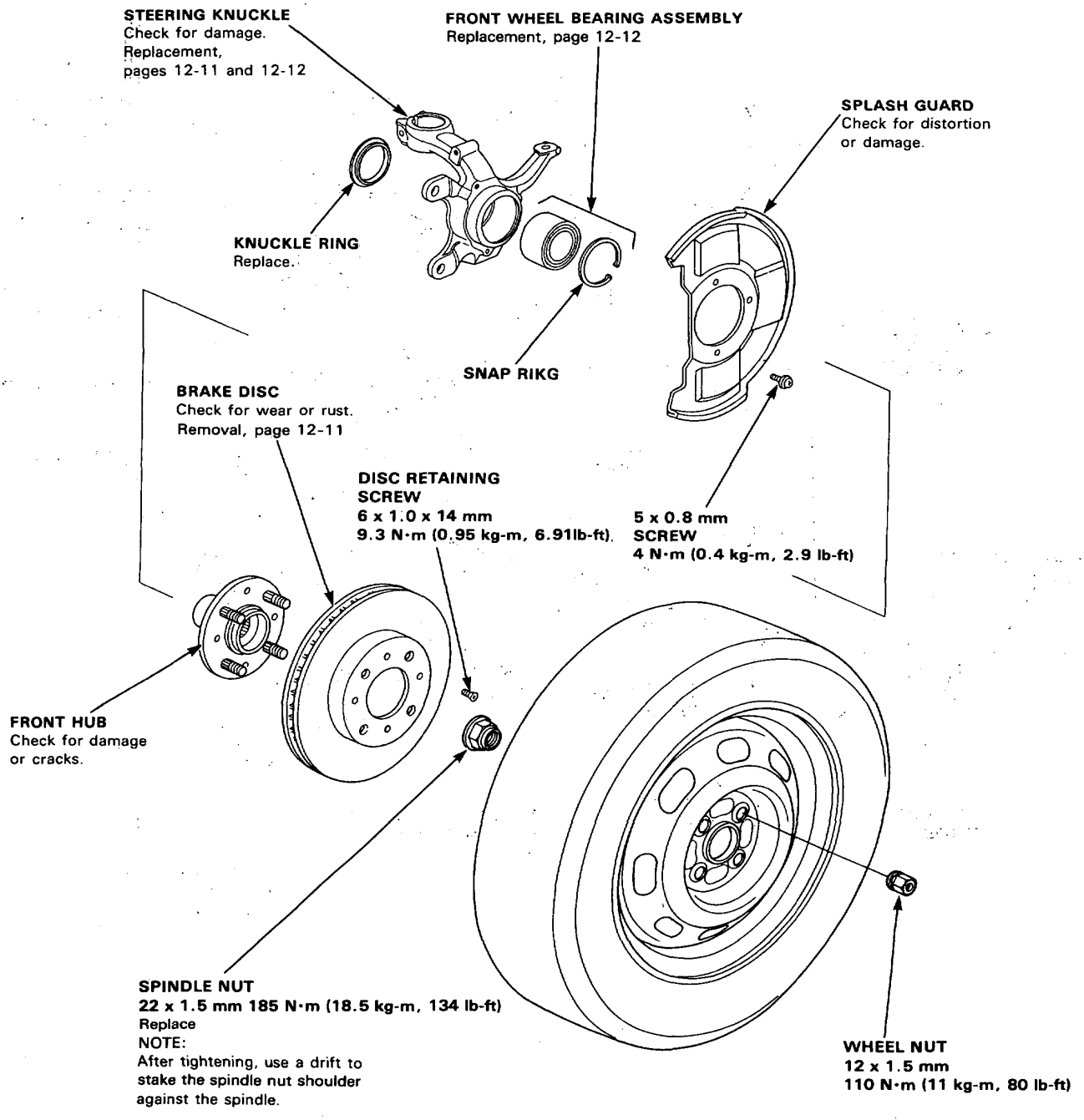
Front Suspension

Knuckle/Hub

NOTE:

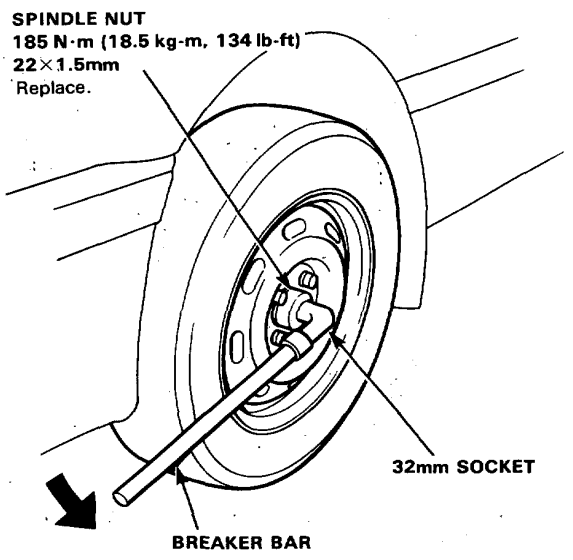
- Use only genuine Honda aluminum wheel weights. Non-genuine aluminum wheel weights may corrode and damage aluminum wheels.
- Remove the center cap by prying it out with a flat screwdriver. Avoid damage to the cap by not allowing it to fall during removal.

CAUTION: Use a rag at the point you are going to pry, because aluminum alloy wheels can be easily damaged.



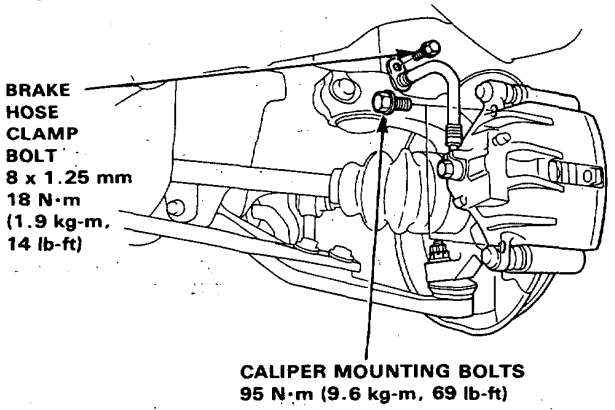
Knuckle/Hub Replacement

1. Pry nut lock tab away from spindle, then loosen nut using 32 mm socket and breaker bar.



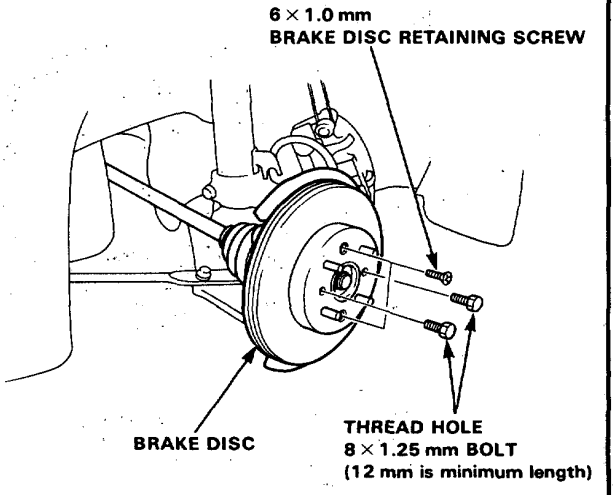
2. Loosen the wheel nuts slightly.
3. Jack up the front of car and support on safety stands in proper locations.
4. Remove the wheel nuts, wheel, and spindle nut.
5. Remove the brake hose clamp bolt.
6. Remove the caliper mounting bolts and hang the caliper assembly to one side.

CAUTION: To prevent accidental damage to the caliper assembly or brake hose, use a short piece of *wire to hang the caliper assembly from the under-*carriage.



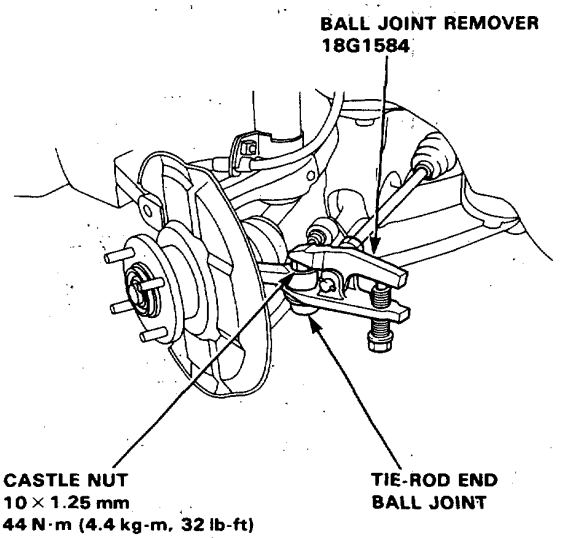
7. Remove the 6 mm brake disc retaining screws.
8. Screw two 8 × 1.25 mm bolts into the disc to push it away from the hub.

NOTE: Turn each bolt two turns at a time to prevent cocking disc excessively.



9. Remove the cotter pin from the tie-rod end and remove the castle nut.
10. Break loose the tie-rod ball joint using the Ball Joint Remover, then lift tie-rod out of the knuckle.

CAUTION: Avoid damage the ball joint boot.

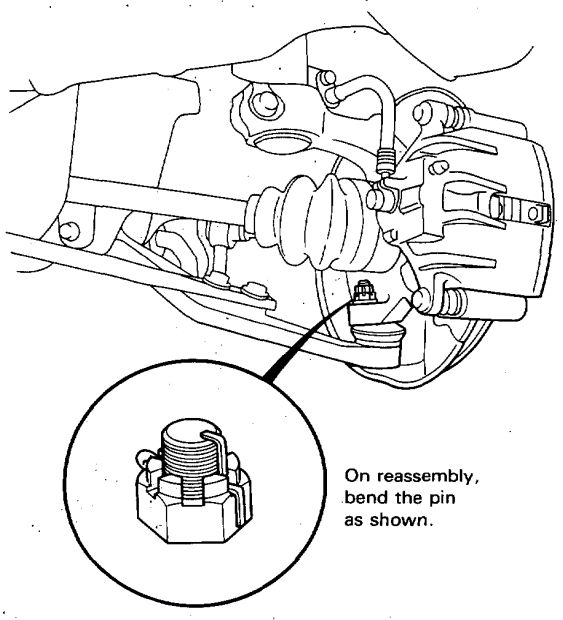


(cont'd)

Knuckle/Hub Replacement (cont'd)

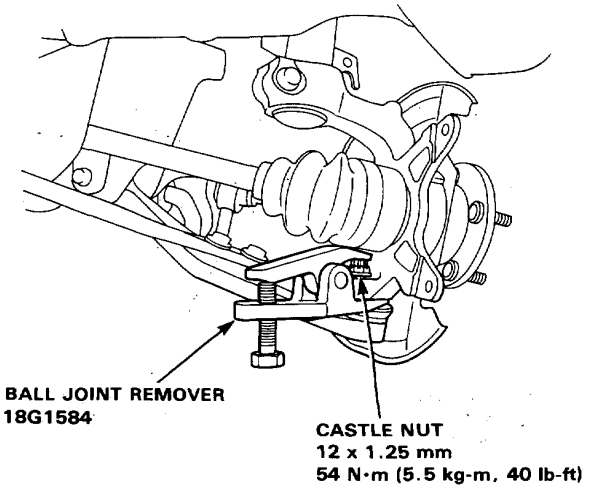
11. Remove the stabilizer link from the front lower arm.

12. Remove the cotter pin from the front lower arm and remove the castle nut.

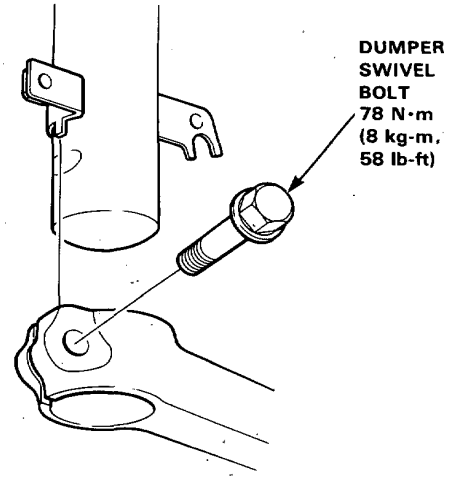


13. Break loose the front lower arm ball joint using the Ball Joint Remover, then down the lower arm out of the knuckle.

CAUTION: Avoid damaging the ball joint boot.



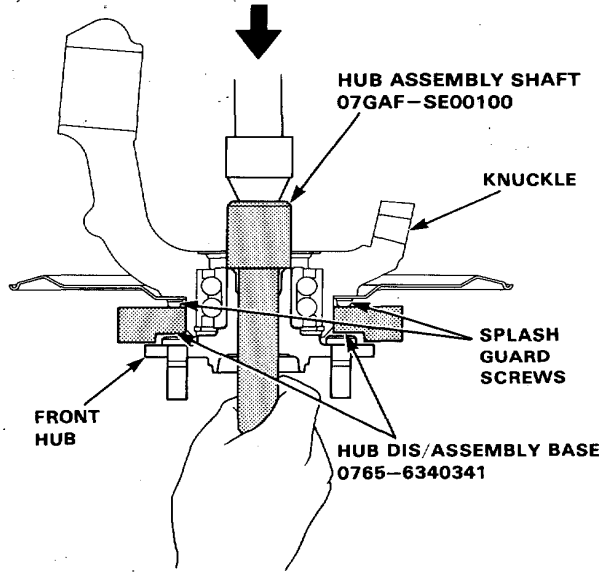
14. Remove the damper swivel bolt, then use a brass or lead hammer to tap knuckle down until it comes off damper.



15. Remove the knuckle and hub by sliding them off the drive shaft.

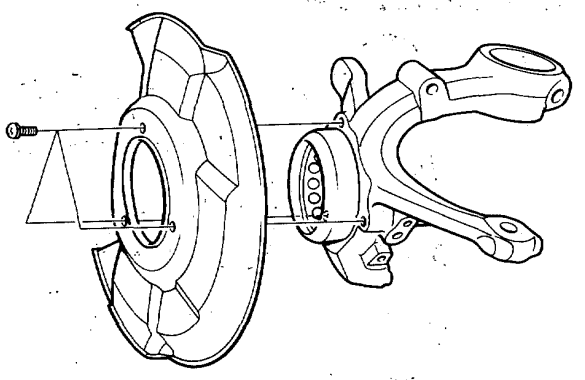
16. Remove the hub from the knuckle using special tools and a hydraulic press.

CAUTION:
- **Take care not to distort splash guard.**
- **Hold on to the hub to keep it from falling when pressed clear.**
- **To prevent damage to the tool make sure the threads are fully engaged before pressing.**

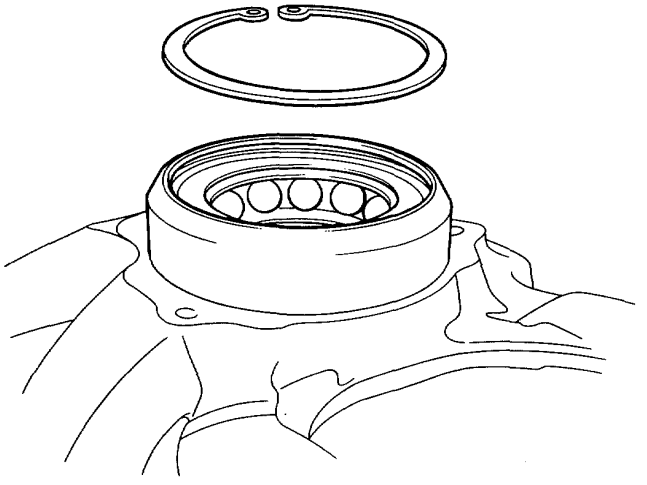


NOTE: Install hub and knuckle in reverse order of disassembly. Use new spindle nut, and stake after torguing.

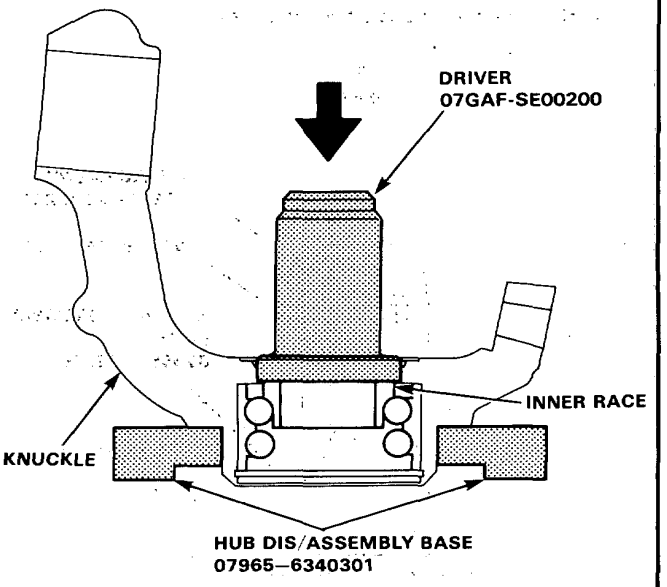
17. Remove the three screws from the splash guard.



18. Remove the knuckle ring and snapring.

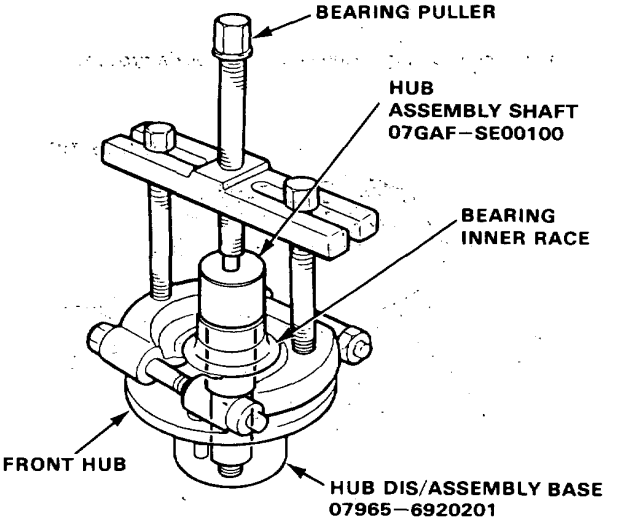


19. Press the wheel bearing out of the knuckle using the special tools, inner race and a hydraulic press as shown below.



20. Remove the out board bearing inner race from the hub, using special tools and a bearing puller.

CAUTION: To prevent damage to the tool make sure the threads are fully engaged before pressing.



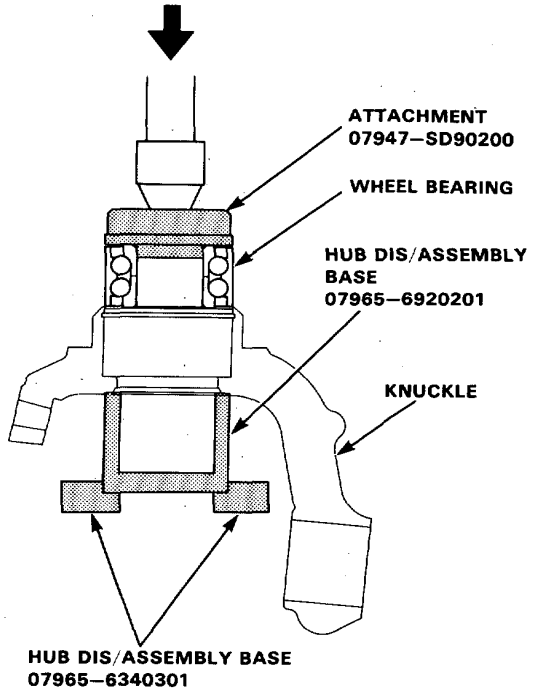
NOTE: Wash the knuckle and hub thoroughly in high flashpoint solvent before reassembly.

(cont'd)

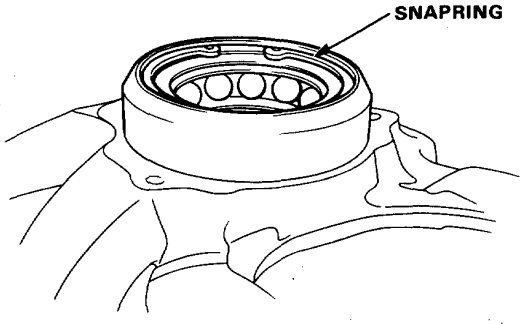
Knuckle/Hub Replacement (cont'd)

NOTE: Replace the bearing with a new one after removal.

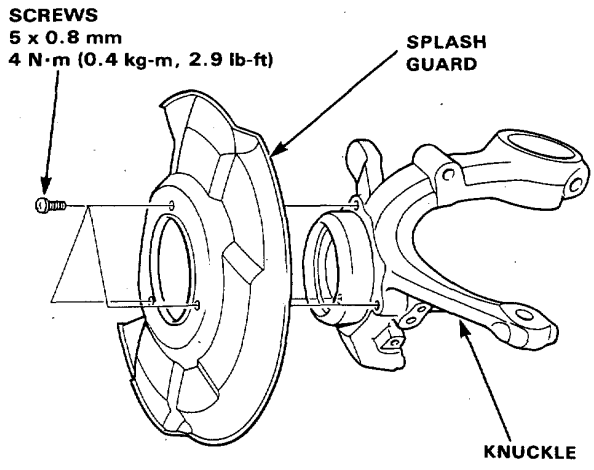
21. Press a new wheel bearing into the hub using the special tools shown and a hydraulic press.



22. Install the snapring securely in the knuckle groove.

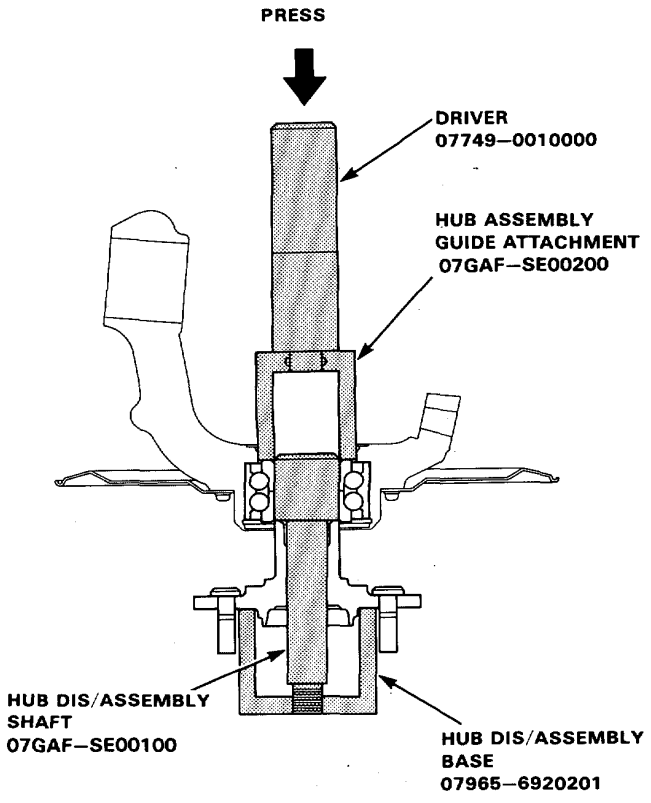


23. Install the splash guard and tighten the screws.

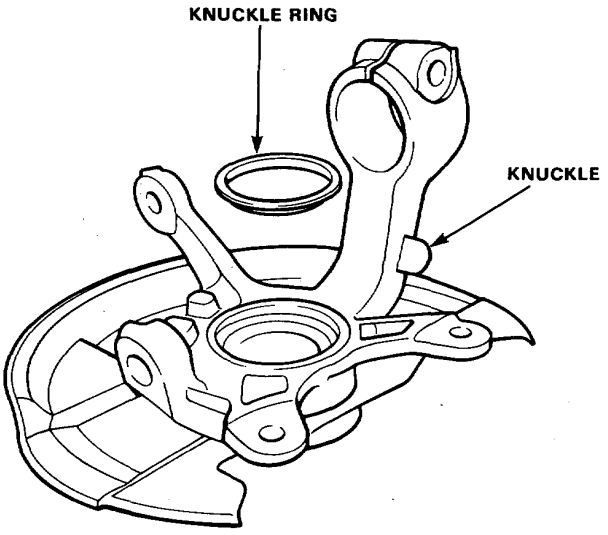


24. Place front hub in special tool fixture, then set knuckle in position and apply downward pressure with hydraulic press.

CAUTION:
- **Maximum press load: 2.0 tons**
- ***To prevent damage to the tool make sure the threads are fully engaged before pressing.***

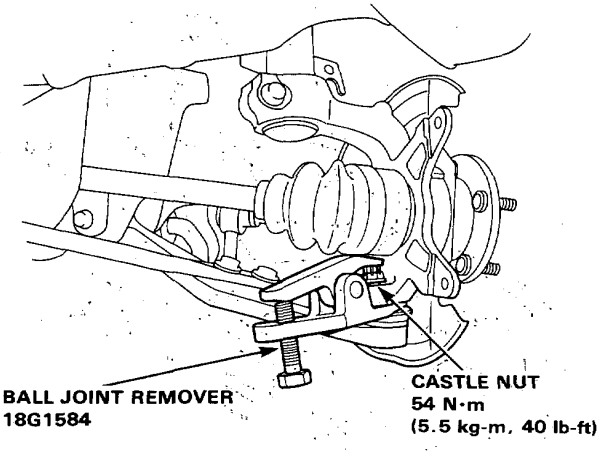


25. Install the front knuckle ring on the knuckle.



Lower Arm Busing Replacement

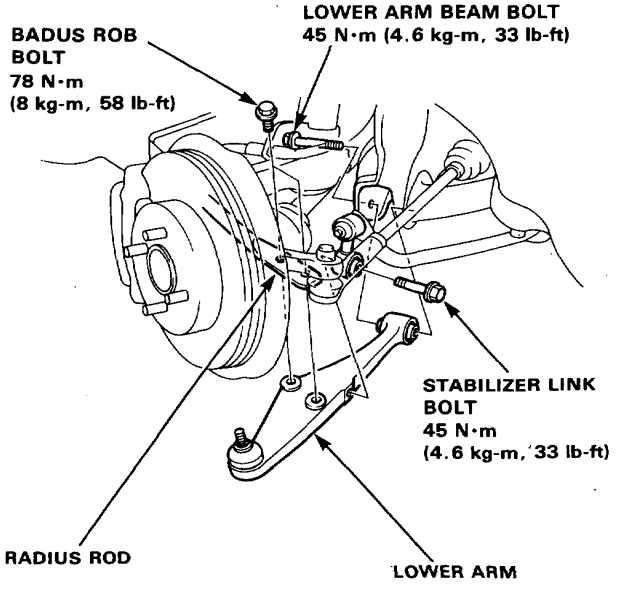
1. Remove the front wheels.
2. Remove the cotter pin from the knuckle and loosen the lower arm ball joint castle nut half the length of the joint threads.



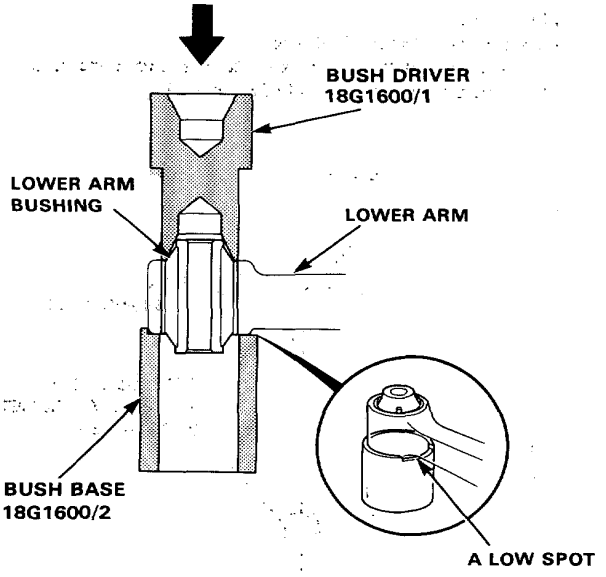
3. Separate the ball joint and knuckle using a ball joint remover.

   CAUTION: Avoid damaging the ball joint boot.

4. Remove the stabilizer link bolt from the lower arm.
5. Remove the radius rod bolt from the lower arm.
6. Remove the lower arm beam bolt then remove the lower arm.

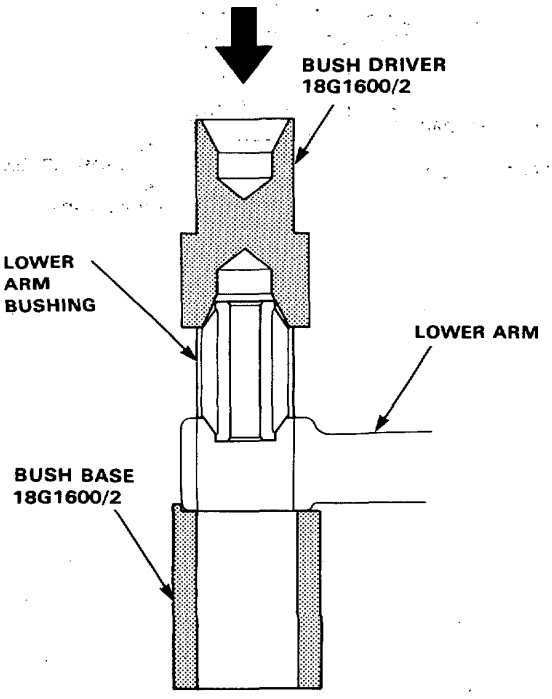


7. Remove the lower arm bushing out of the lower arm from the direction indicated.

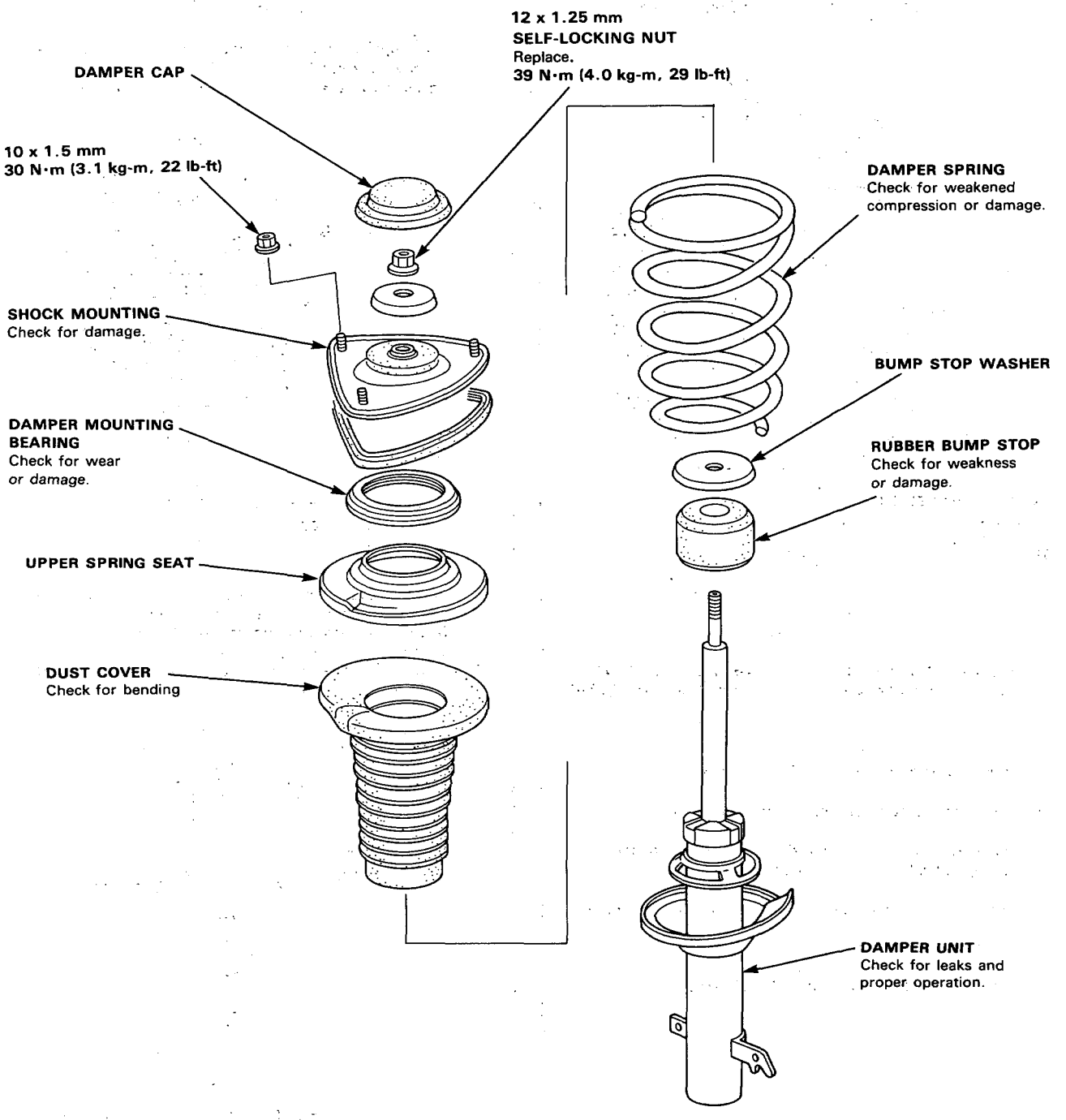


8. Drive the lower arm bushing from the direction indicated.

   NOTE: Drive in the lower arm bushing so that their leading edges are flush with the lower arm.



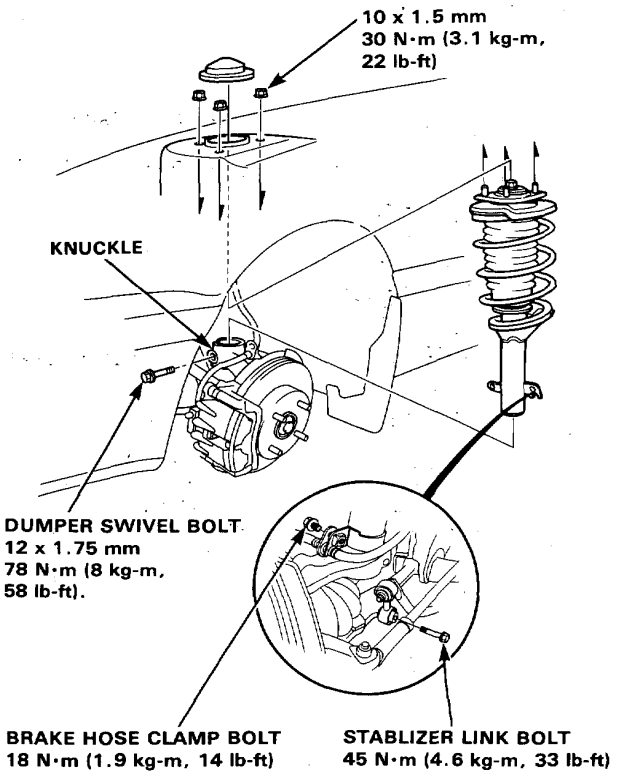
Damper Disassembly/Inspection



Front Suspension

Damper Removal

1. Jack up the front of car and support with safety stands in proper locations, then remove front wheels.



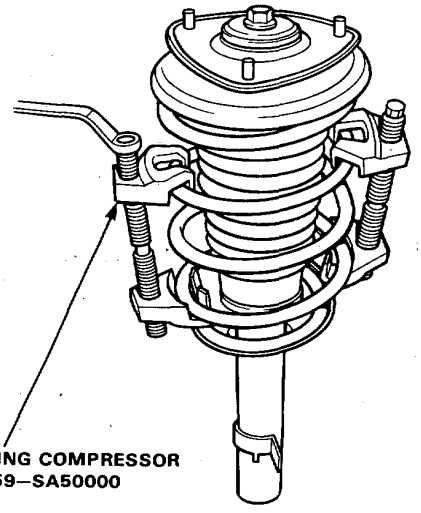
2. Remove brake hose clamp from Damper.
3. Remove the stabilizer link from lower arm.
4. Remove the Damper swivel bolt, then use a hammer to tap knuckle down until it comes off Damper.
5. Remove the rubber cap and nuts from top of Damper.
6. Remove the Damper.

   NOTE: Reinstall in reverse order of removal.

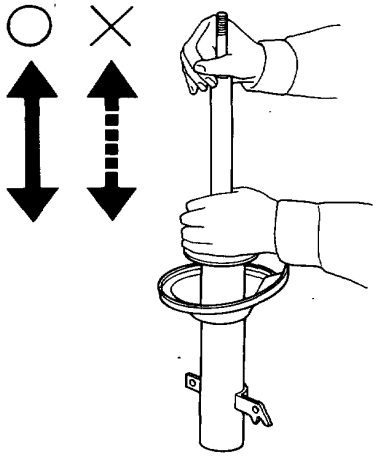
Damper Disassembly

1. Compress damper spring using spring compressor, then remove spring seat nut.

   WARNING **Follow spring compressor manufacturer's instructions carefully. Do not compress spring more than necessary for access to seat nut.**



2. Remove the spring compressor and disassemble the damper as shown in the next column.
3. Check for smooth operation through full stroke, both compression and extension.
4. Also check for smooth operation in short strokes of 5–10cm (2–4in.)

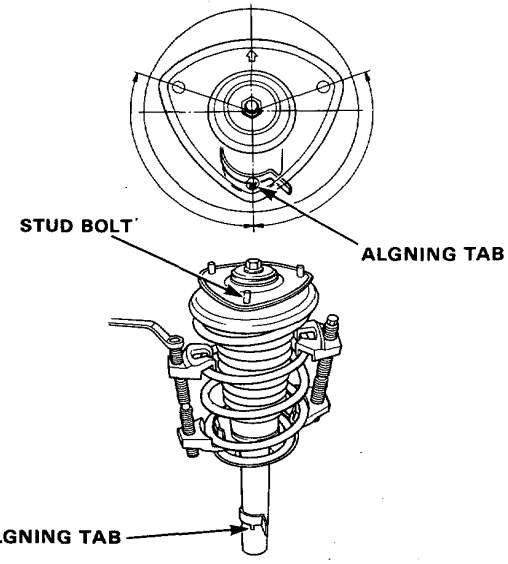


5. Replace the damper if resistance is uneven or jerky.
6. Check for abnormal noise or binding during above tests.
7. Check for oil leaks.

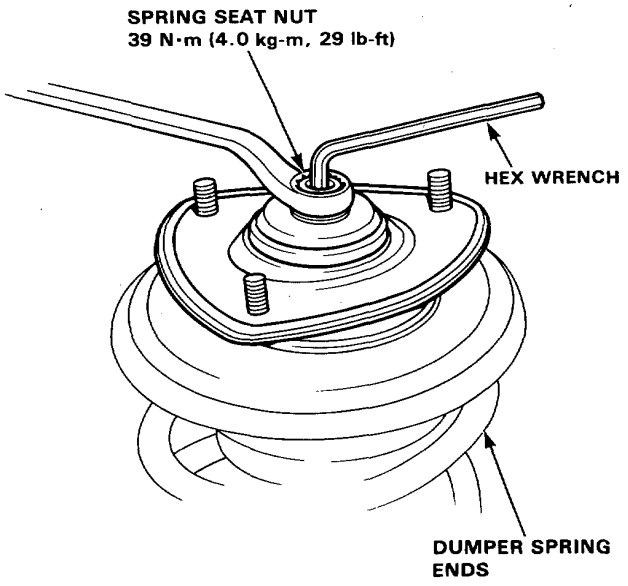
Damper Reassembly

NOTE: Ressemble damper in reverse order of disassembly, noting following.

1. Mark the damper at tow points by measuring around from the damper fork aligning tab. Align the two point with the stud bolts on the mounting base.



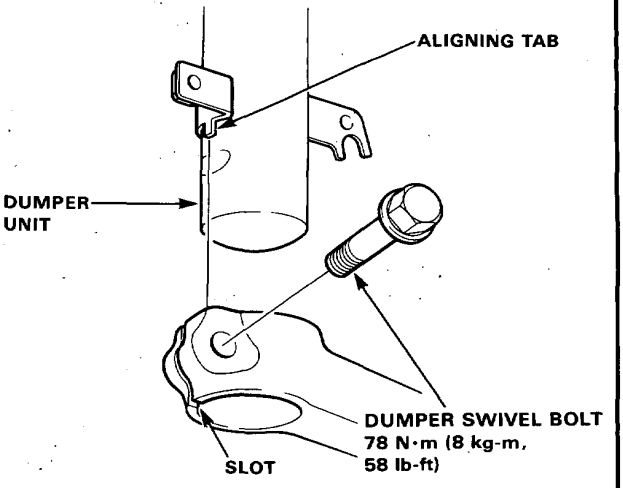
2. Position damper spring ends against steps in upper spring seat and damper unit.
3. To tighten new self locking nut, hold damper rod with hex wrench to keep it from turning.



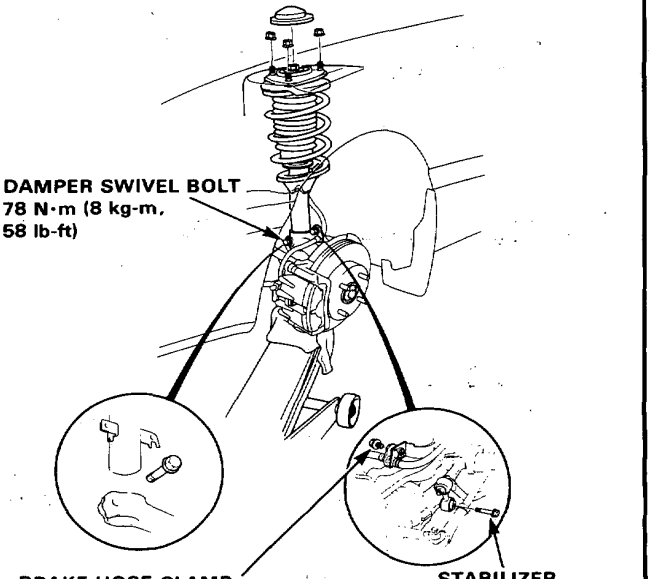
Damper Installation

NOTE: Install front suspension in reverse order of removal, noting the following:

1. Install lower arms loosely in frame.
2. Align tab on damper unit with slot in knuckle and assemble as shown.



3. Place jack under knuckle and raise until car just lifts off of safety stand.

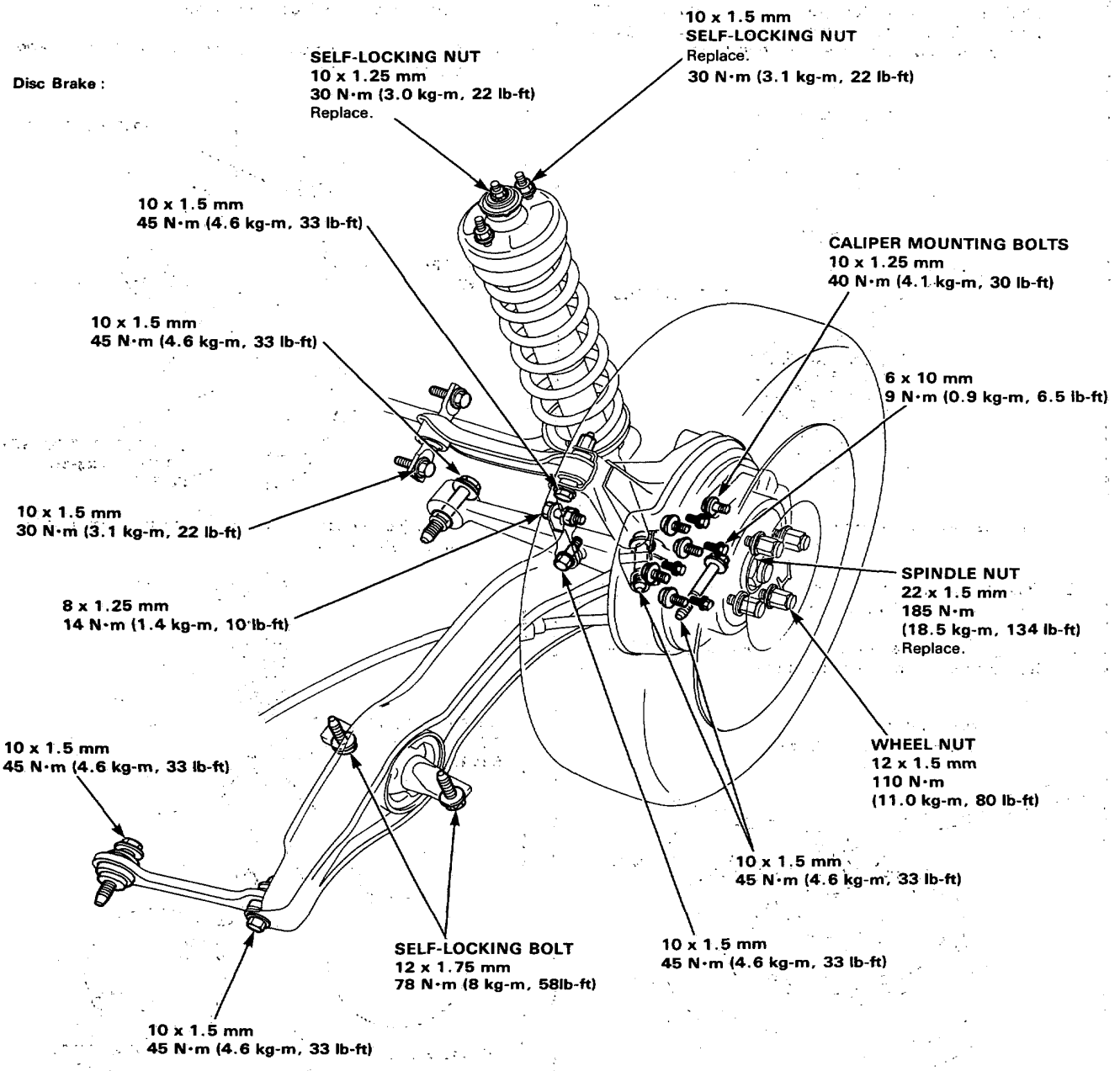


4. Tighten the damper swivel bolt to specified torque.
5. Tighten the stabilizer link bolts.
6. Tighten the brake hose clamp bolt.

Rear Suspension

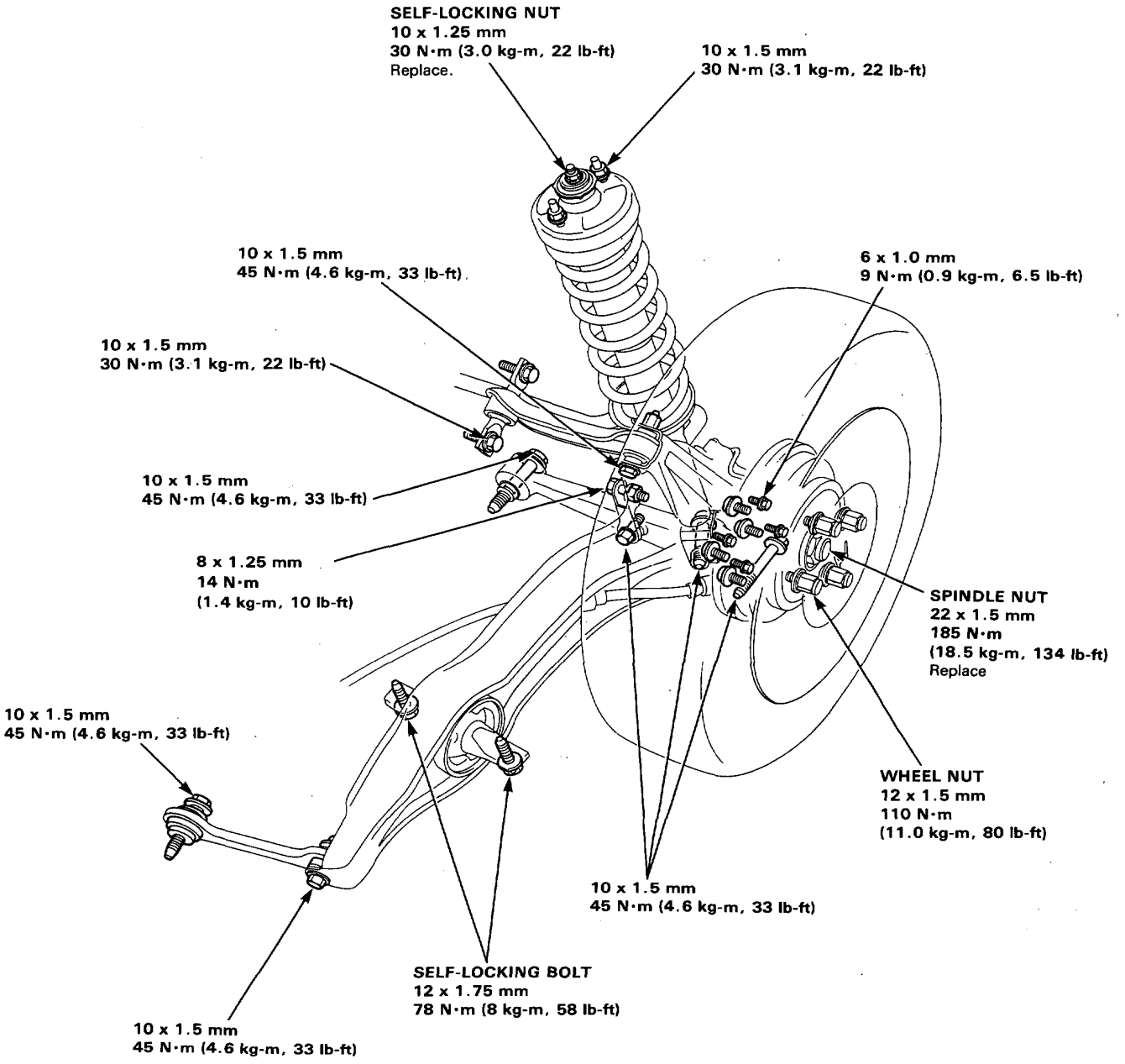
Torque specifications

CAUTION:
- Replace the self-locking nuts after removal.
- Replace the self-locking bolts after removal.



CAUTION : The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

Drum Brake:



CAUTION: The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

Rear Suspension

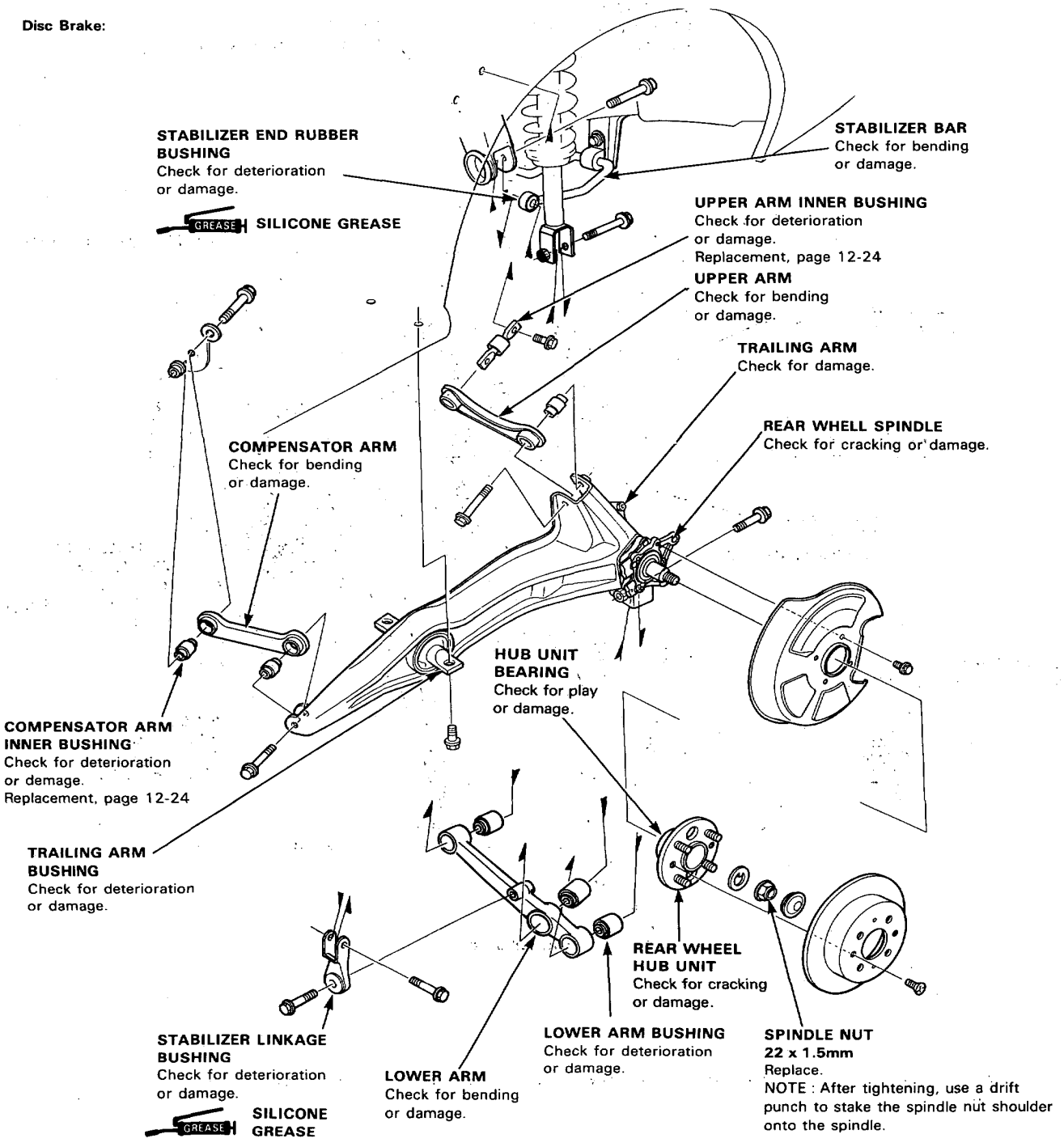
Illustrated Index

NOTE:

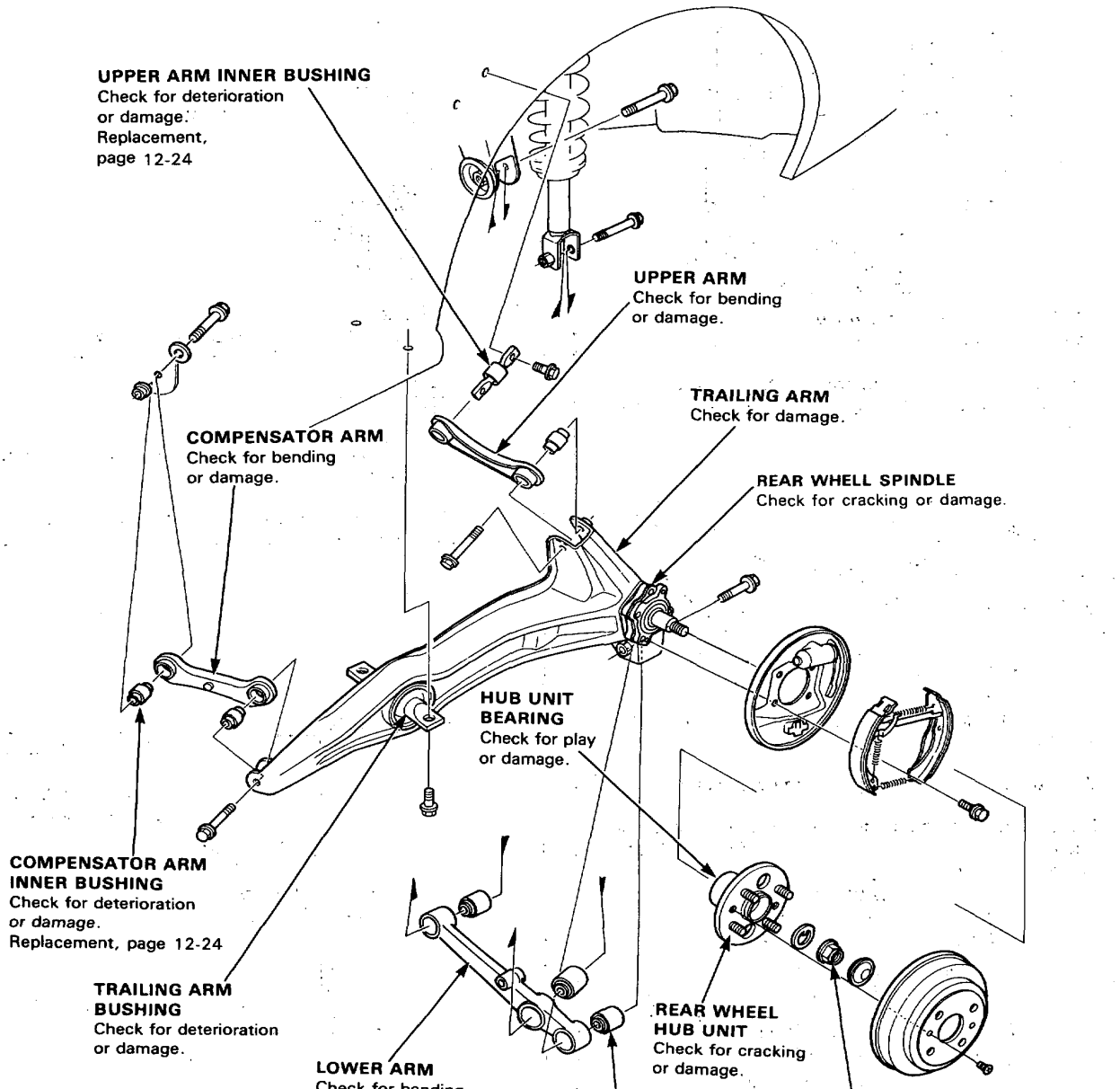
- Use only genuine Honda aluminum wheel weights. Non-genuine aluminum wheel weights may corrode and damage aluminum wheels.
- Remove the center cap by prying it out with a flat screwdriver. Avoid damage to the cap by not allowing it to fall during removal.

CAUTION: Use a rag at the point you are going to pry, because aluminum alloy wheels can be easily damaged.

Disc Brake:

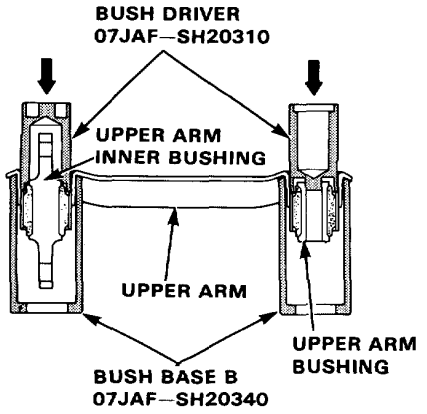


Drum Brake:


UPPER ARM INNER BUSHING
Check for deterioration or damage.
Replacement, page 12-24
UPPER ARM
Check for bending or damage.
TRAILING ARM
Check for damage.
COMPENSATOR ARM
Check for bending or damage.
REAR WHELL SPINDLE
Check for cracking or damage.
HUB UNIT BEARING
Check for play or damage.
COMPENSATOR ARM INNER BUSHING
Check for deterioration or damage.
Replacement, page 12-24
TRAILING ARM BUSHING
Check for deterioration or damage.
LOWER ARM
Check for bending or damage.
LOWER ARM BUSHING
Check for deterioration or damage.
REAR WHEEL HUB UNIT
Check for cracking or damage.
SPINDLE NUT
22x1.5 mm
Replace
NOTE : After tightening, use a drift punch to stake the spindle nut shoulder onto the spindle.

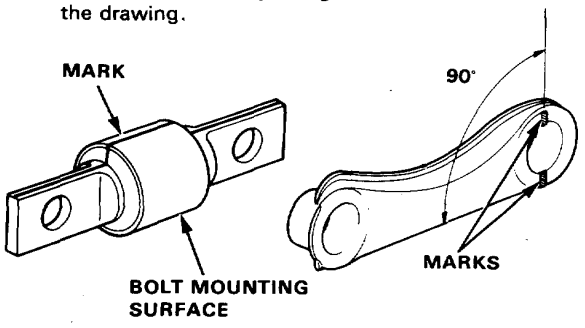
Upper Arm Bushing Replacement

1. Remove the upper arm bushing and inner bushing as shown.



2. Mark a scribe line on the upper arm inner bushing so that it is in line with the bolt mounting surface.

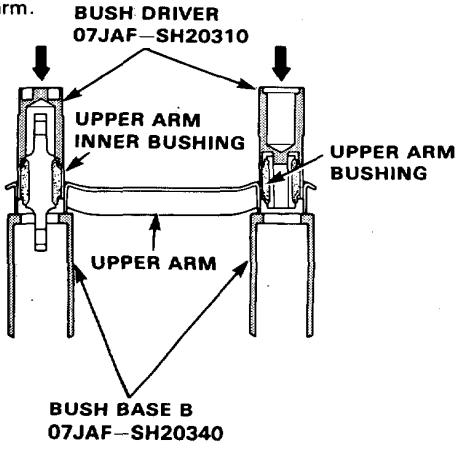
3. Mark on the upper arm at two points so that they are in line and make a right angle with the arm as shown in the drawing.



4. Drive in the upper arm inner bushing with the marks aligned.

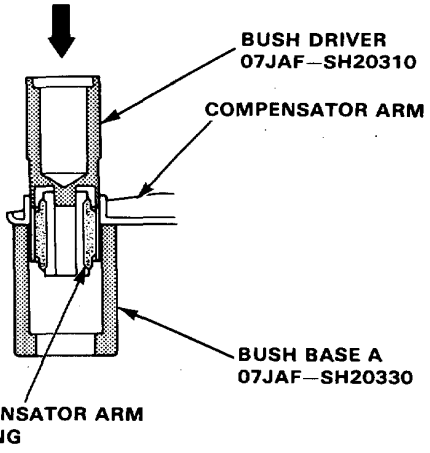
5. Drive the upper arm bushing into the upper arm.

   NOTE : Drive in the upper arm bushing and inner bushing until their leading edges are flush with the upper arm.



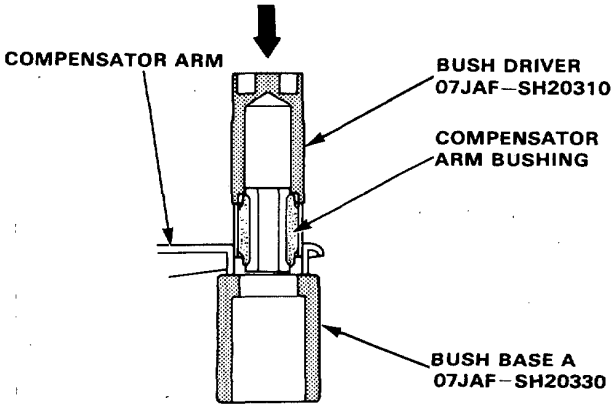
Compensator Arm Bushing Replacement

1. Remove the compensator arm bushings out of the compensator arm from the direction indicated.



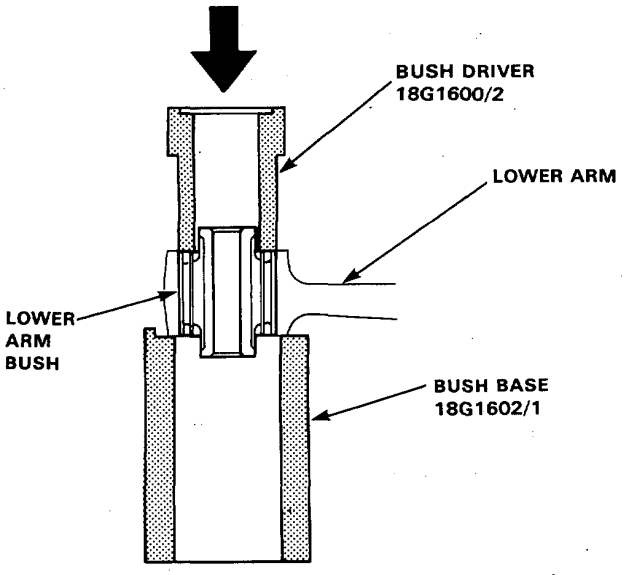
2. Drive the compensator arm bushings from the direction indicated.

   NOTE : Drive in the compensator arm bushings so that their leading edges are flush with the compensator arm.



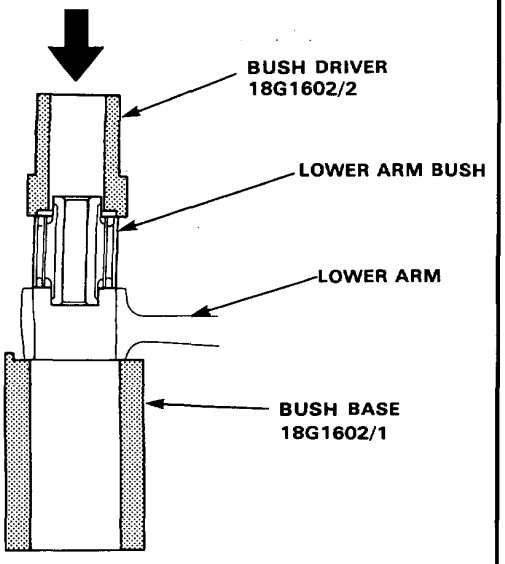
Rear Lower Arm Bushing Replacement

1. Remove the rear lower arm bushings out of the rear lower arm from the direction indicated.



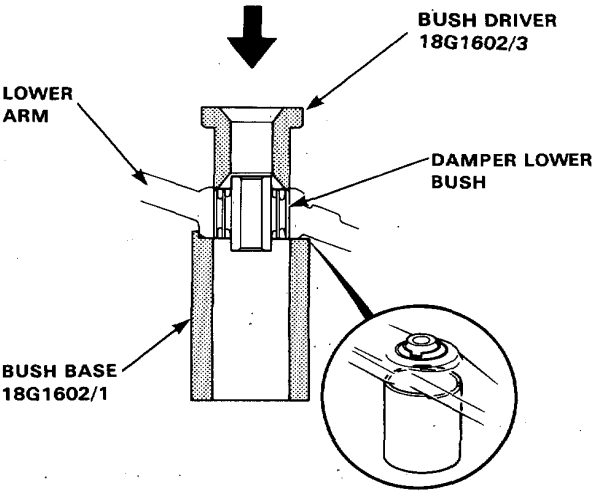
2. Drive the rear lower arm bushings from the direction indicated.

   NOTE: Drive in the rear lower arm bushings so that their leading edges are flush with the rear lower arm.



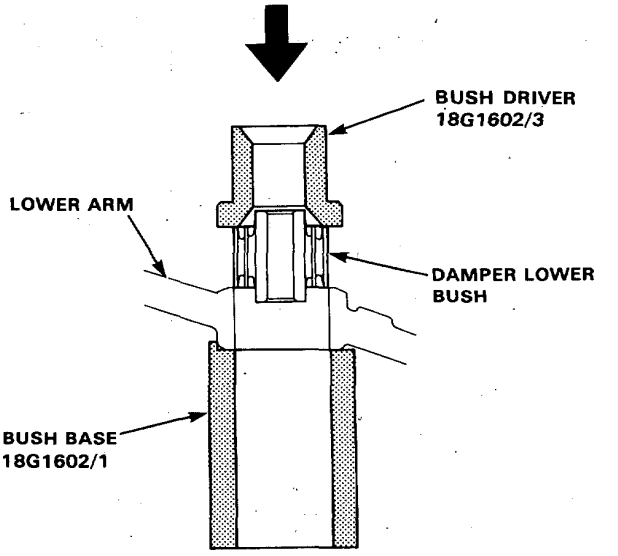
Rear Damper Lower Bushing Replacement

1. Remove the rear damper lower bushing out of the rear lower arm from the direction indicated.



2. Drive the rear damper lower bushing from the direction indicated.

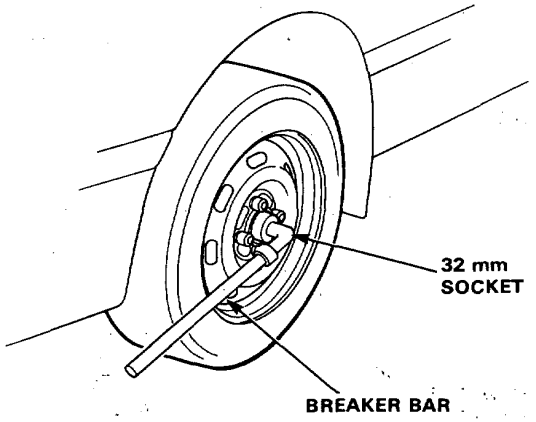
   NOTE: Drive in the rear damper lower bushing so that their leading edges are flush with the rear lower arm.



Hub Unit Bearing Replacement

Disc Brake:

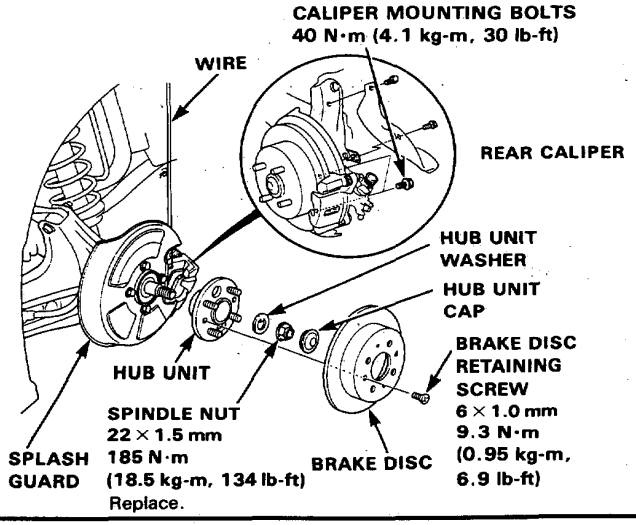
1. Pry nut lock tab away from spindle, then loosen nut using 32 mm socket and breaker bar.



2. Loosen the wheel nuts slighly.
3. Jack up the rear of car and support on safty stands in proper location.
4. Remove the wheel nuts, wheel, and spindle nut.
5. Remove the caliper shield.
6. Remove the caliper mounting bolts and hang the caliper assembly to one side.

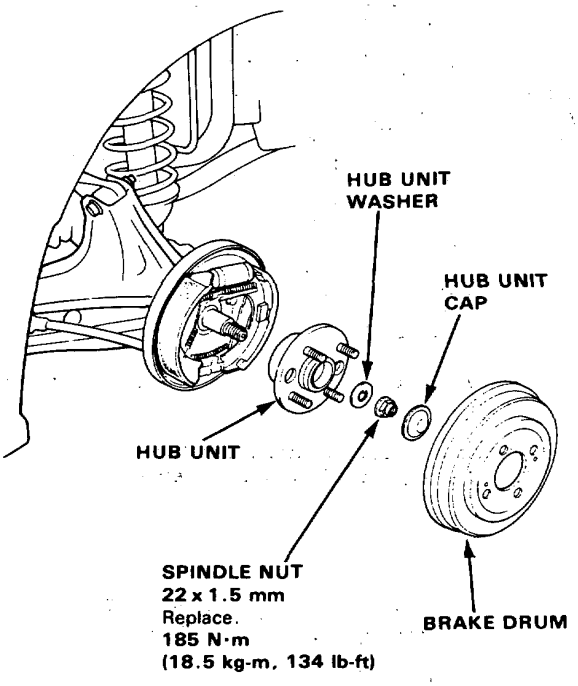
   CAUTION: To prevent accidental damage to the caliper assembly or brake hose, use a short pieace of wire to hang the caliper assembly from the under carriage.

7. Remove the brake disc retaining screws and brake disc.
8. Remove the hub unit and hub unit bearing.



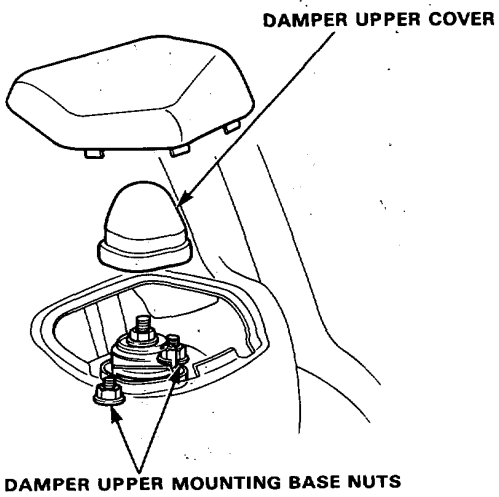
Drum Brake:

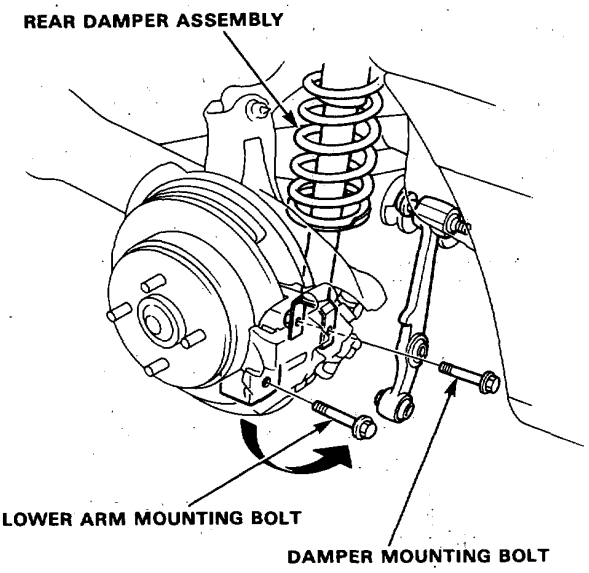
1. Jack up the rear of car and support on safety stands in proper location.
2. Remove the rear wheel and brake drum.
3. Remove the hub unit cap, unstake the spindle nut, then loosen the spindle nut.
4. Remove the hub unit and hub unit bearing.



Damper Removal

1. Jack up the rear of car and support on safety stands in proper locations.
2. Remove the damper upper cover at the rear seat lining.
3. Remove the damper upper mounting base nuts.





4. Remove the damper mounting bolt.
5. Remove the lower arm mounting bolt.
6. Lower the lower arm and remove the damper assembly.

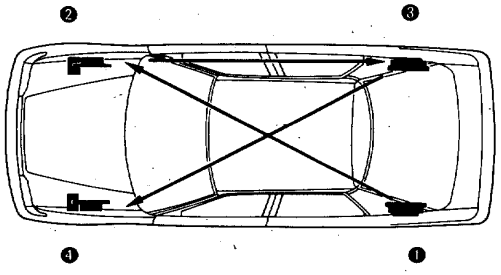
Bleeding

CAUTION

- **Make sure all parts are clean before reassenmbly.**
- **Use only clean DOT 3 or DOT 4 brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Avoid spiling brape fluid on painted, plastic or rubber sufaces as it can damage the finish; Wash spilied brake fluid off immediately with clean water.**
- **Do not mix different brands of brake fluid.**

NOTE: The reservoir on the master cylinder must be full at the start of bleeding procedure, and checked after bleeding each wheel cylinder. Add fluid as required. Use only DOT 3 or 4 brake fluid.

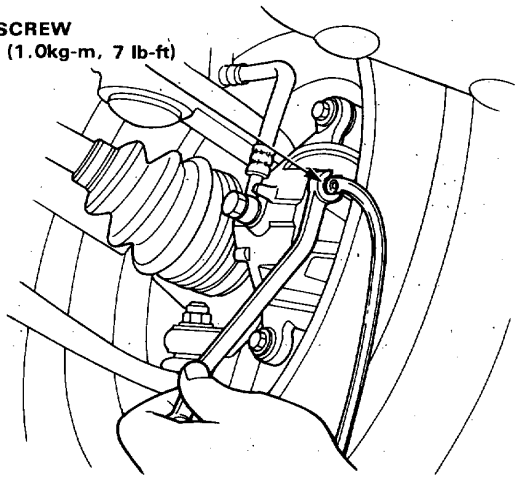
Bleeding Sequence



1. Have someone slowly pump the brake pedal several times, then apply steady pressure.
2. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
3. Repeat the procedure for each wheel in the sequence shown above, until air bubbles no longer appear in the fluid.
4. Check brake performance by road testing.

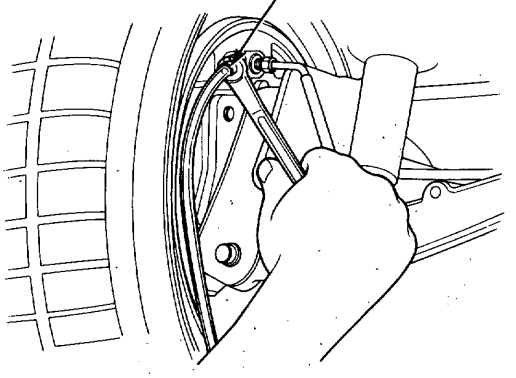
(FRONT)

BLEEDSCREW
10 N·m (1.0kg-m, 7 lb-ft)



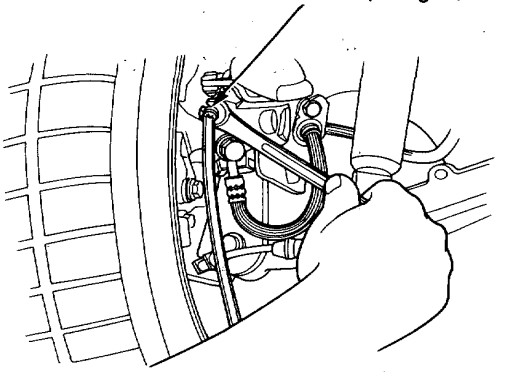
(REAR)
Drum brake

BLEED SCREW
6.5 N·m (0.65kg-m, 4.7 lb-ft)



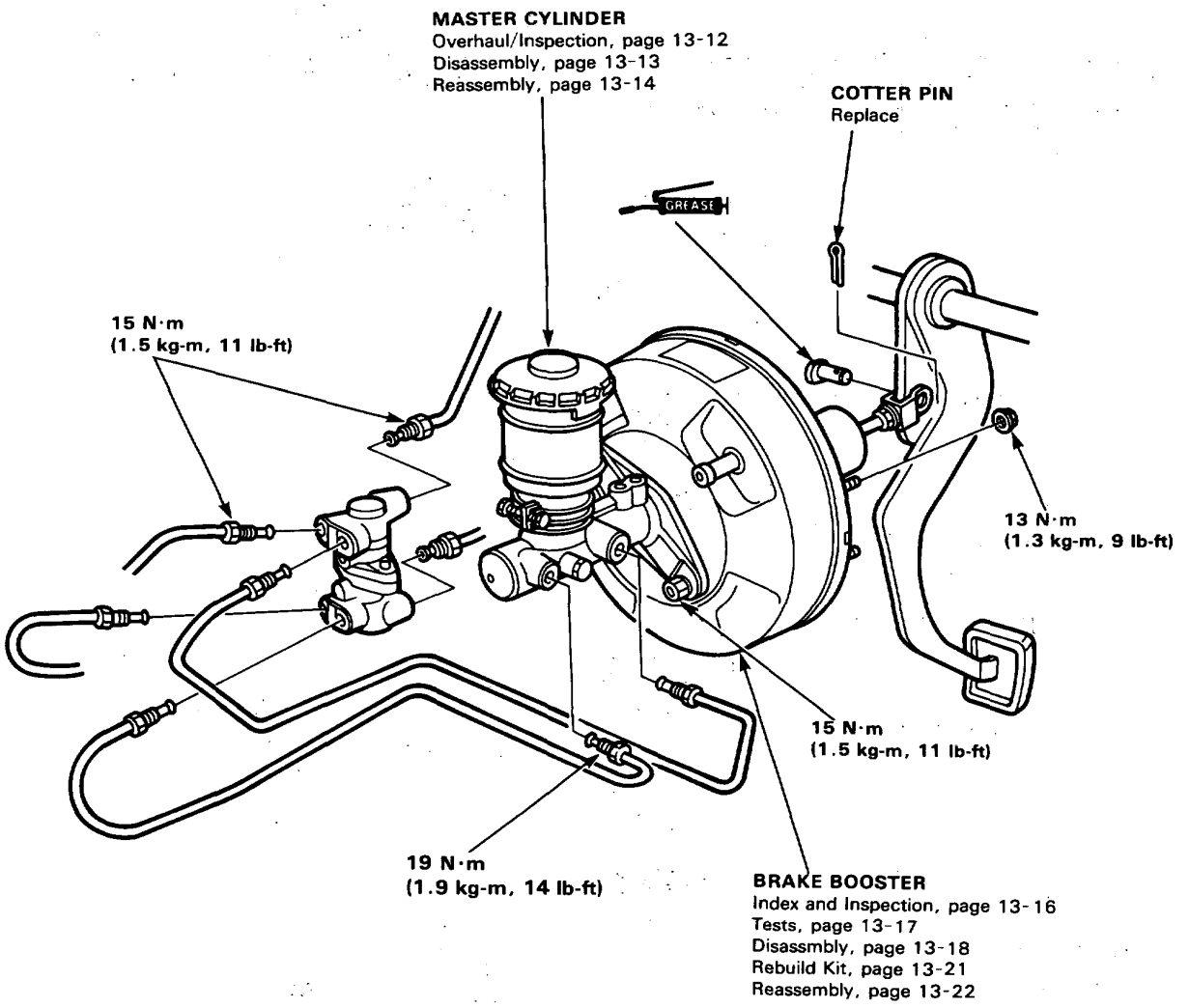
Disc brake

BLEED SCREW
10 N·m (1.0kg-m, 7 lb-ft)



Master Cylinder, Booster

Index



Master Cylinder

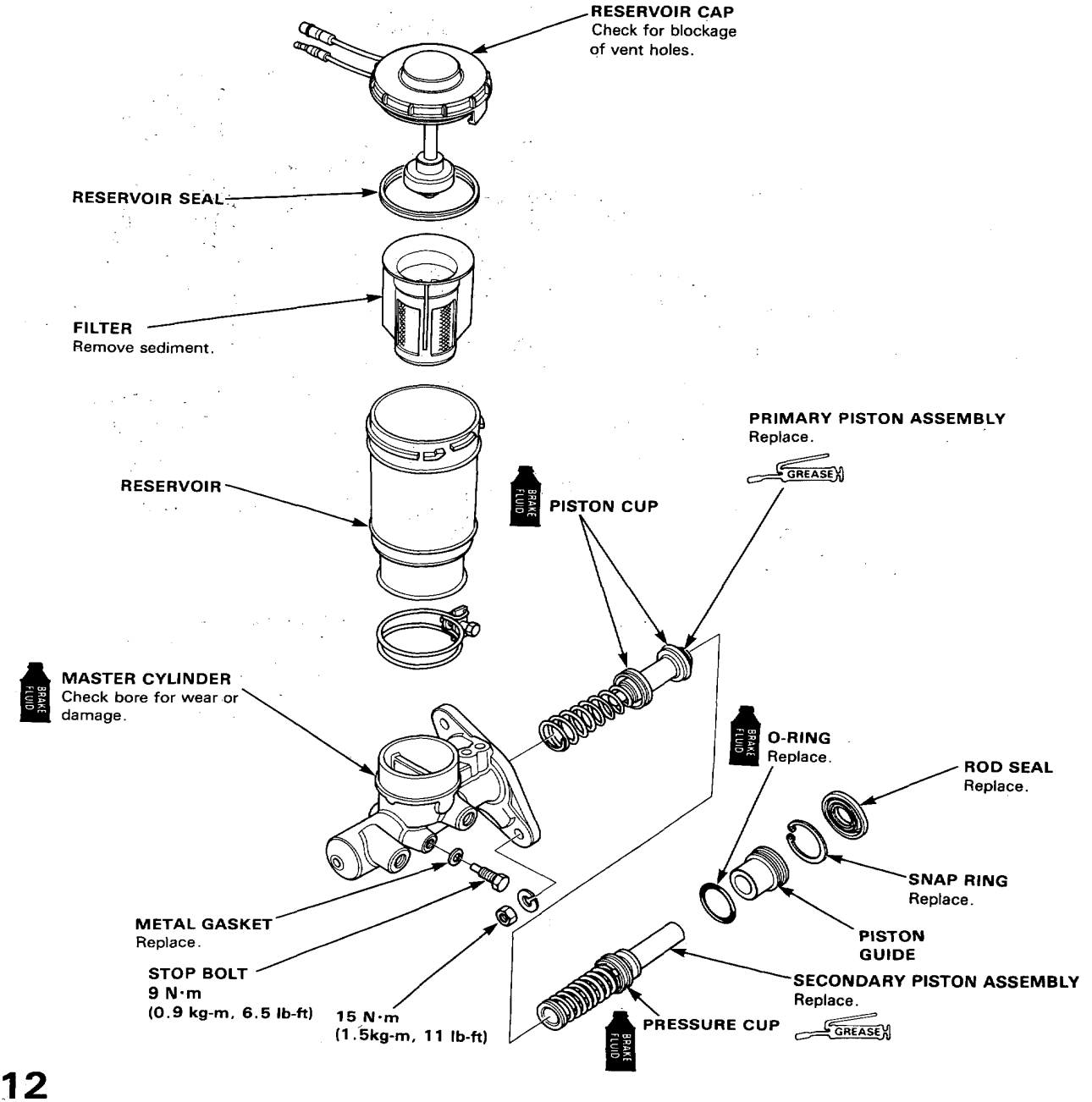
Overhaul/Inspection

CAUTION:

- **Avoid spiling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well clean water.**
- BRAKE FLUID **This symbol represents brake fluid. Use only DOT 3 or 4 brake fluid.**
- GREASE **Use only HONDA Brake Cylinder Grease (P/N 08733—B020E) or equivalent.**
- **Carefully inspect the bore of the master cylinder for pits, scratches or scoring.**
- **Replace the master cylinder if the bore is damaged or worn. Do not hone or attempt to refinish the bore.**

NOTE:

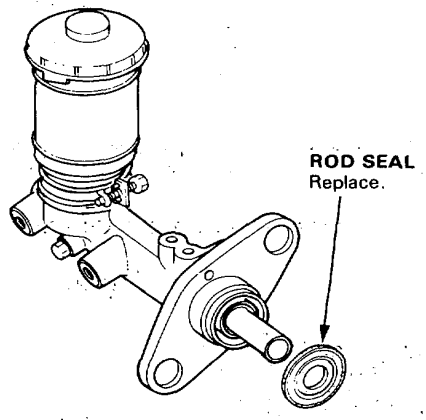
- Wash all removed parts in brake fluid and blow dry with compressed all. Blow open all passages and fluid ports.
- To prevent damage, liberally apply clean brake fluid to the piston cups before installation.
- Do not attempt to refinish master cylinder bore. Replace if pitted or worn.
- Use only DOT 3 or DOT 4 brake flouid.



Disassembly

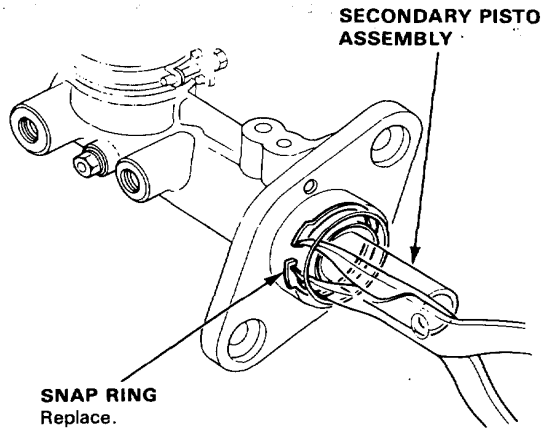
CAUTION:
- **Avoid spilling fluid on painted, plastic or rubber parts as it may damage the finish.**
- **Plug the end of the brake hose with a shop rag to prevent brake fluid from flowing out of the brake hose after disconnecting.**
- **Use only new clean brake fluid.**
- **Clean all parts thorouhly with brake fluid. Blow out all passages with compressed air.**
- **Do not allow foreign matter to enter the system.**
- **Be careful not to bend or damage the brake pipe when removing the master cylinder.**

1. Remove the rod seal.

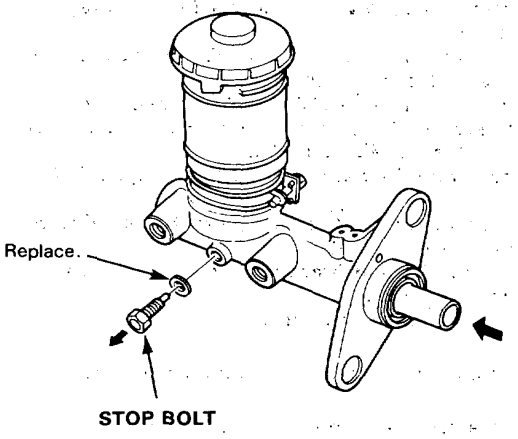


2. Push the secondary piston assembly, then remove the snap ring.

CAUTION:Avoid damaging the master cylinder wall.



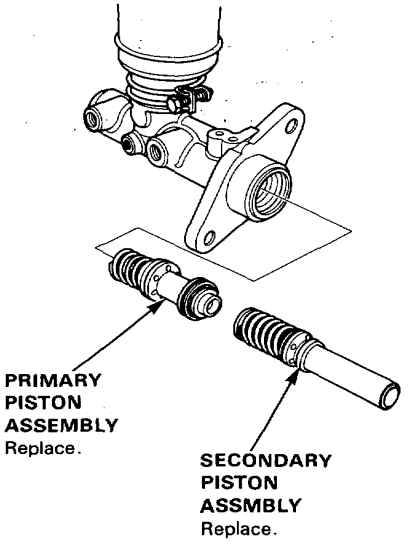
3. Remove the stop bolt while pushing in the secondary piston assembly.



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.**



Master Cylinder

Reassembly

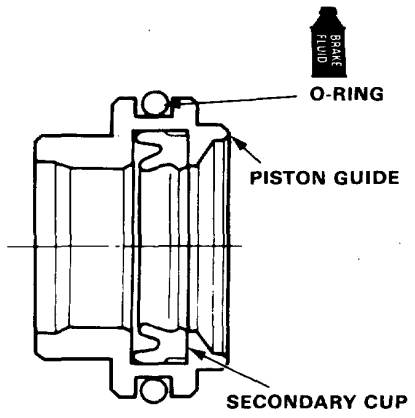
CAUTION:

- **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 DOT3 or DOT4 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.**
- **Do not reuse the drained fluid.**

1. Lubricate the new piston parts with brake fluid.

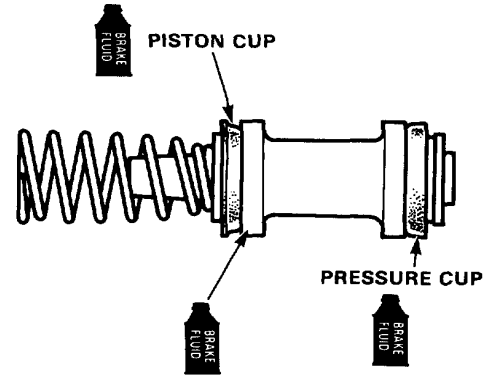
2. Instal the new O-ring onto the piston guide.

PISTON GUIDE ASSMBLY



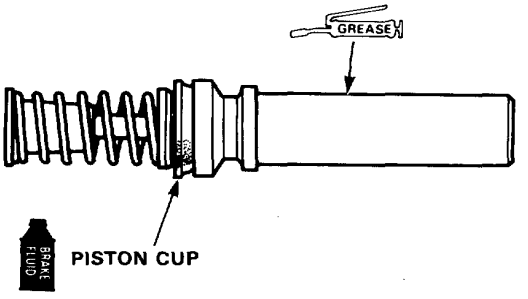
3. Make sure that the primary piston assembly and secondary pision assembly are in good condition.

PRIMARY PISTON ASSEMBLY



NOTE: Reaching through the primary piston stop bolt hole, lightly press on the valve stem to see if it moves smoothly.

SECONDARY PISTON ASSMBLY



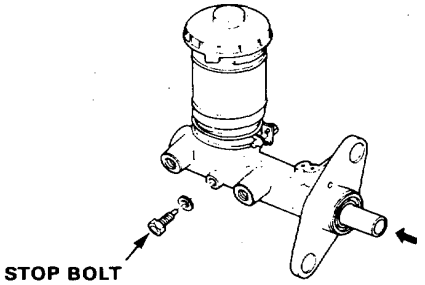
NOTE: Lightly press the stop pin guido to see if the valve stem moves smoothly.

4. Assemble the primary piston assembly, secondary piston assembly and piston guide assembly in the master cylinder body.

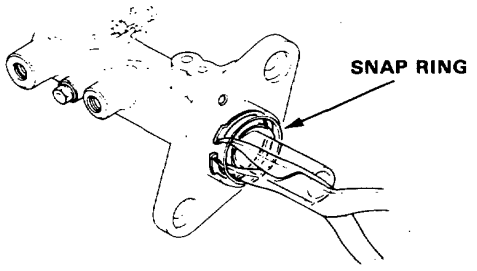
   NOTE: Install the primary piston with the slot on the cylinder facing the stop bolt hole side.

5. Push the secondary piston in until slot aligns with the stop bolt hole, then install and tighten the stop bolt.

   CAUTION:
   - **Replace the stop bolt seal with a new one whenerer disassembled.**
   - **Apply brake fluid to the inner wall of the cylinder and piston cups, being careful that they are not turned inside out during installation.**

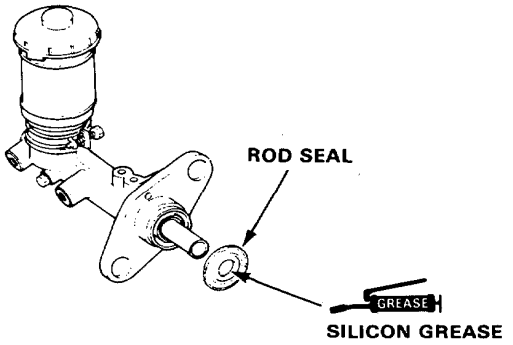


6. Press the secondary piston in and install the new snap ring.



CAUTION: Avoid damaging the sliding surface of the secondary piston when installing the snap ring.

7. Install the new rod seal.



CAUTION:
- **Make sure that there is no interference between the brake pipes and other parts when installing.**
- **Adjust the pushrod length and clearance (page 13-26 and 27).**

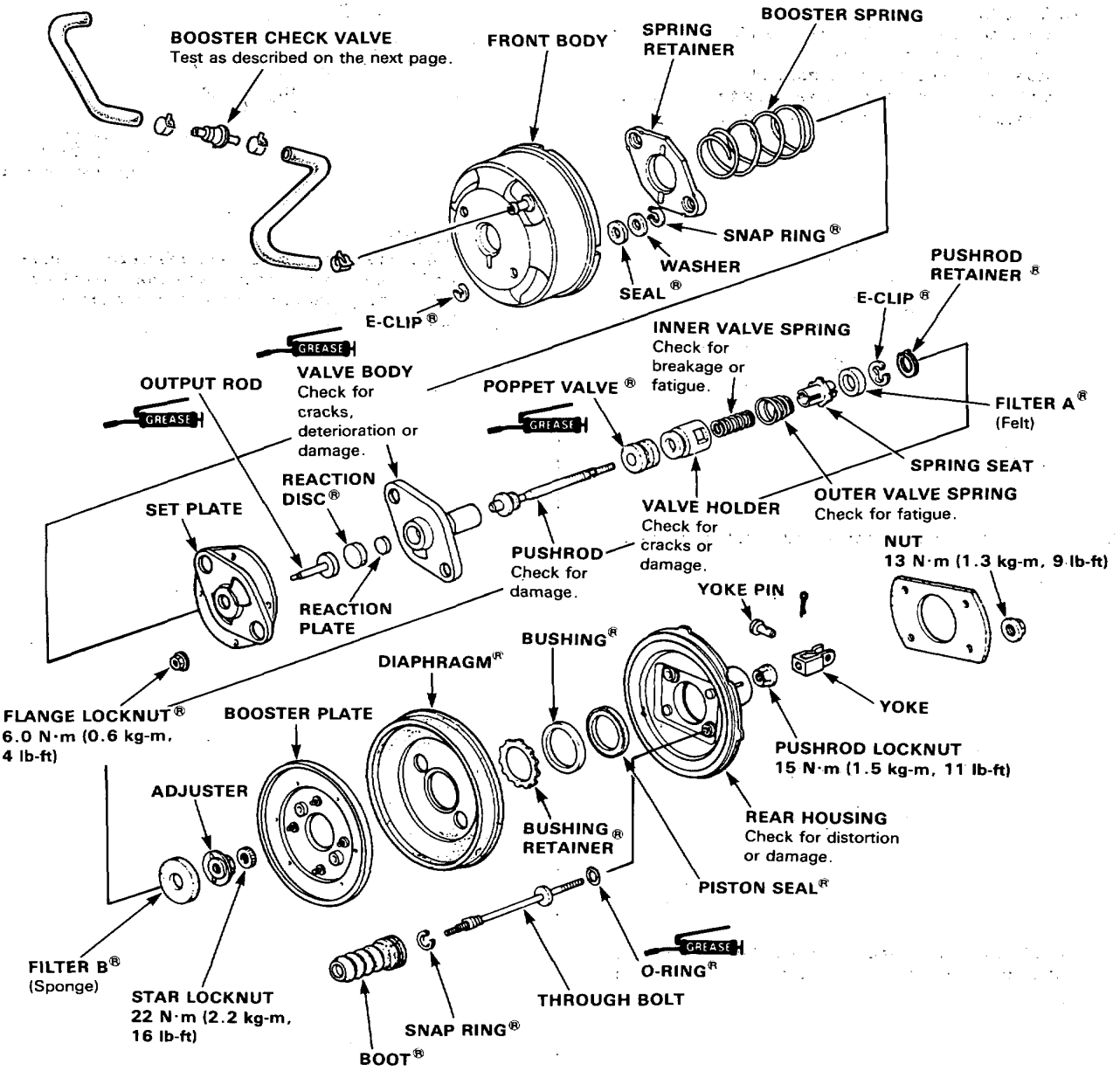
Brake Booster

Index and Inspection

Booster testing is on the next page.

NOTE:

- 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 (page 13-18).

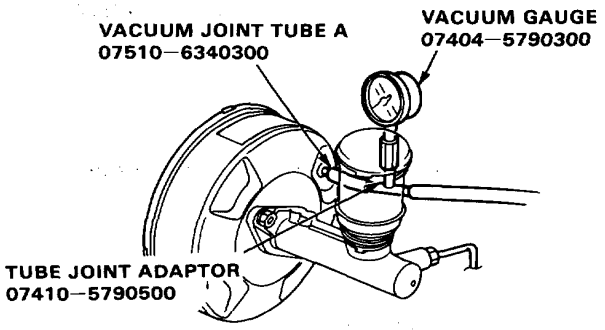


Tests

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 (11.8—19.7 inHg), then stop the engine.
3. Read the vacuum gauge.

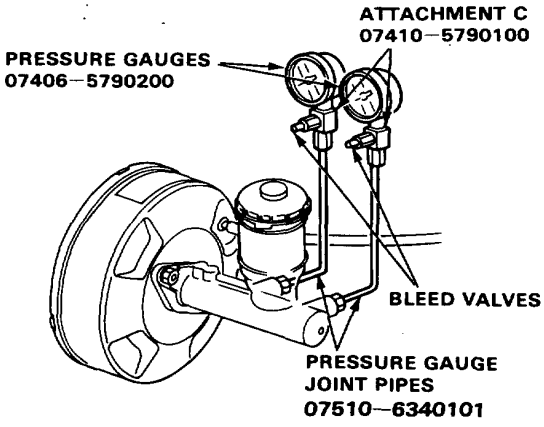
   If the vacuum readings decreases 20 mmHg (0.8 inHg) or more after 30 seconds, check following parts for leaks.
   - Check valve
   - Vacuum hose
   - Seals
   - Diaphragm
   - Master cylinder O-ring and cup



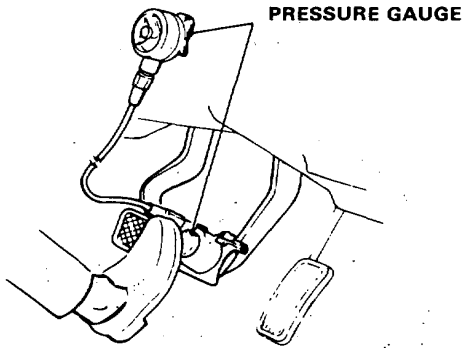
Function Test

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 vavles.

   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.

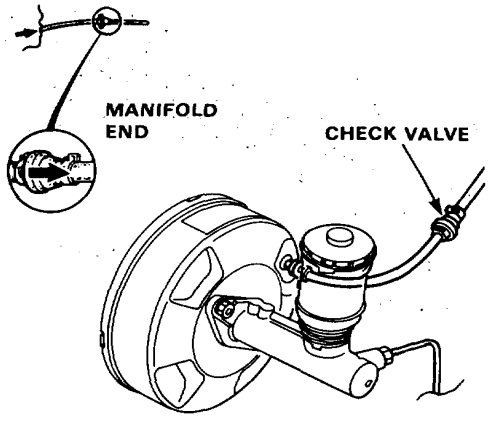


Vacuum mmHg	Line Pressure kPa (kg/cm², psi)
0	1275 (13, 185) minimum
300	4903 (50, 711) minimum
500	7257 (74, 1052) minimum

6. Inspect the master cylinder pistons and cups in the readings do not fall within the limits shown above.

Check Valve Test

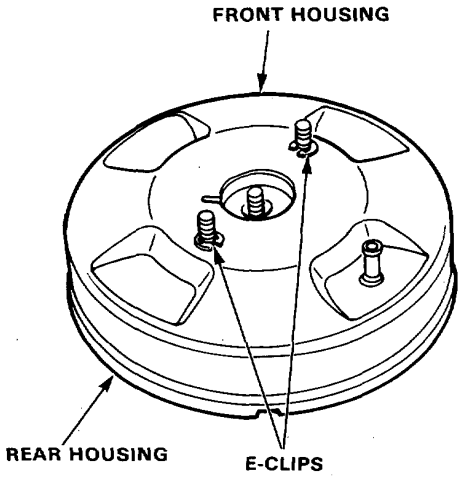
1. Remove the check valve, blow on one end of the hose and then the other; if you can blow through the booster end, but not through the manifold end, the check valve is OK.



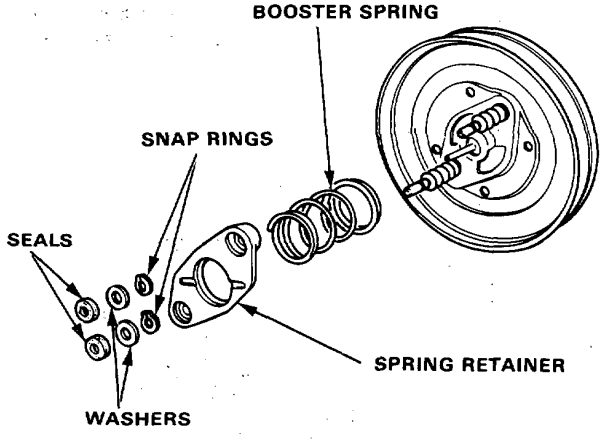
Brake Booster

Disassembly

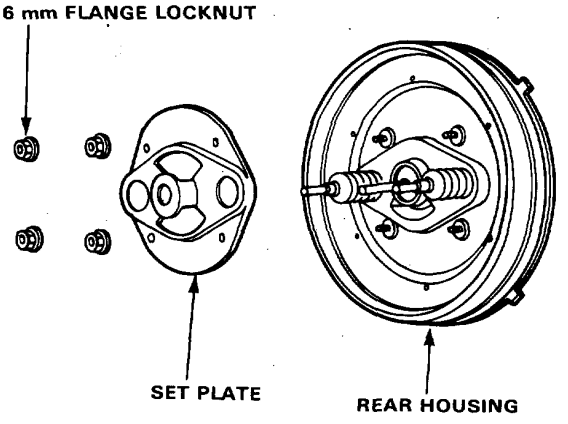
1. Scribe an aligning mark across the front and rear booster housings to ensure proper positioning of parts on reassembly.
2. Remove the E-clips, and separate the front booster housing and the rear booster housing.



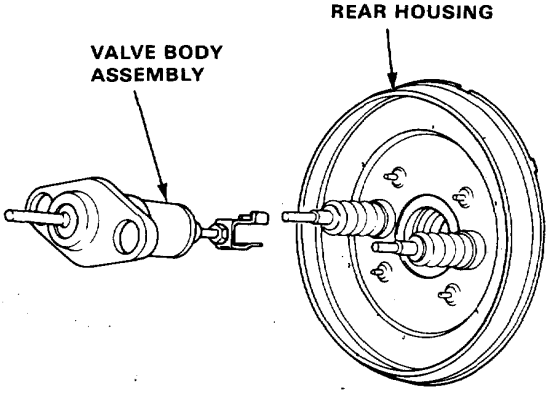
3. Remove the seals and washers from the spring retainer then remove the snap rings.



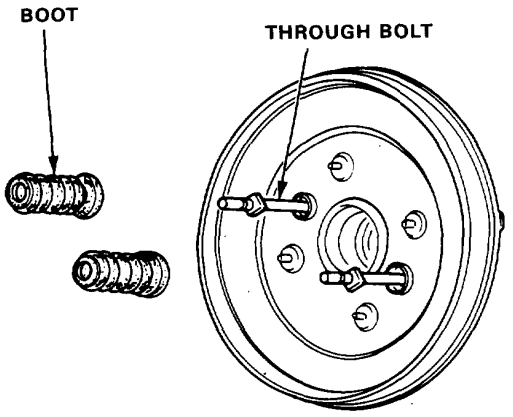
4. Remove the spring retainer and booster spring.
5. Remove the 6 mm flange locknuts and set plate.



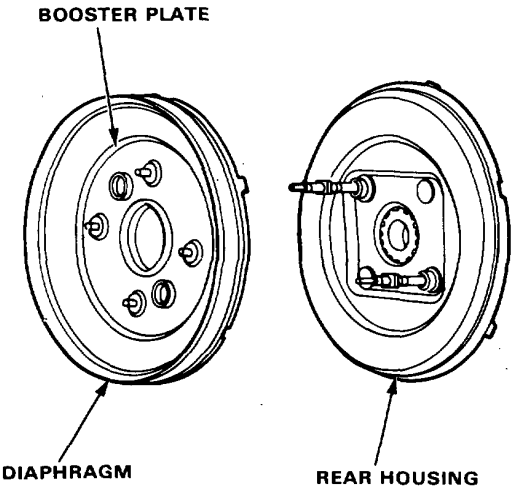
6. Remove the valve body assembly from the rear housing.



7. Remove the boots from the through bolts.

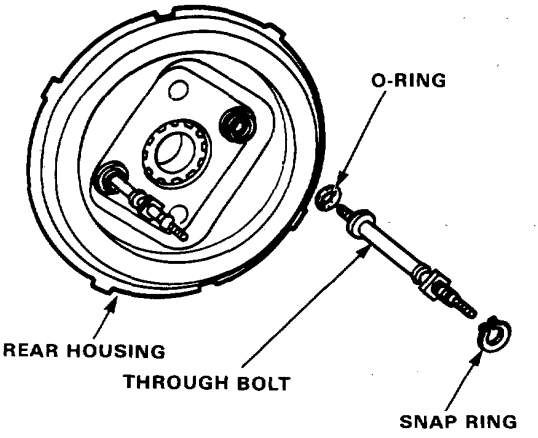


8. Remove the booster plate and diaphragm together from the rear housing.

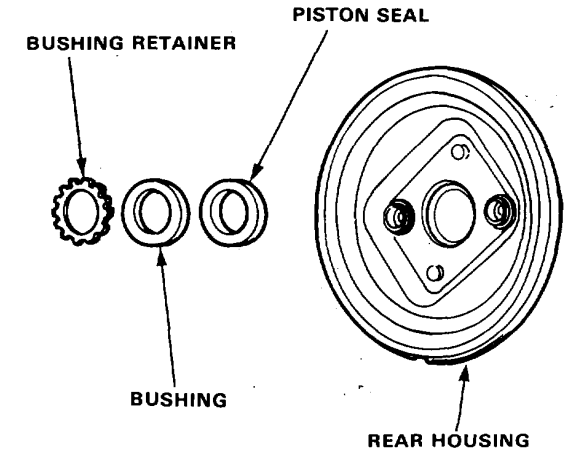


9. Remove the diaphragm from the booster plate.

10. Remove the snap rings, then remove the through bolts and O-rings from the rear housing.



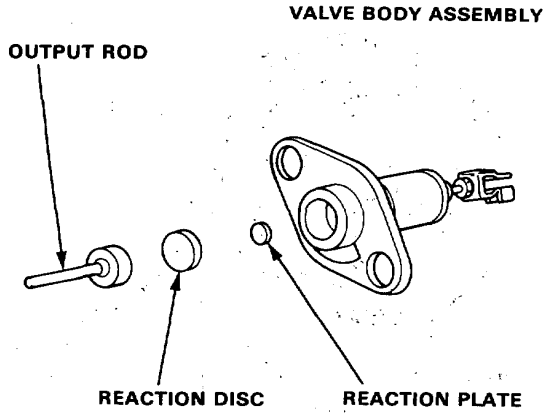
11. Remove the bushing retainer, bushing and piston seal from the rear housing.



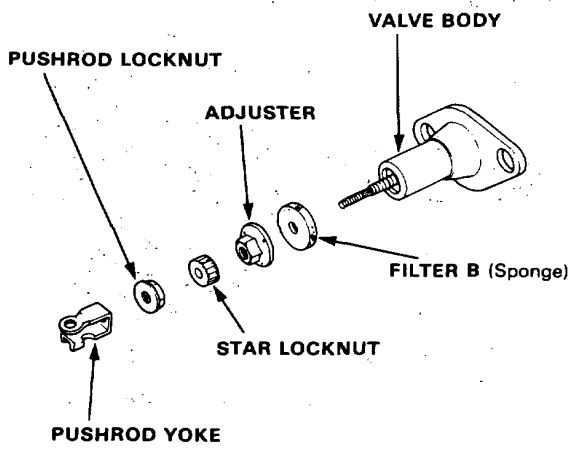
(cont'd)

Disassembly (cont'd)

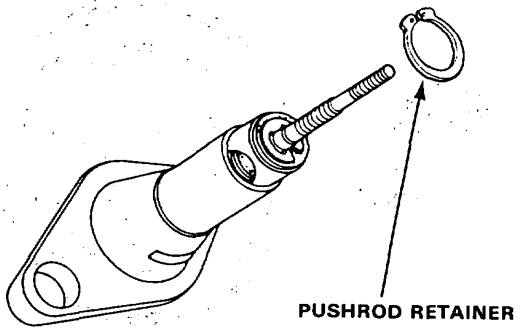
12. Remove the output rod, reaction disc and reaction plate from the valve body assmbly.



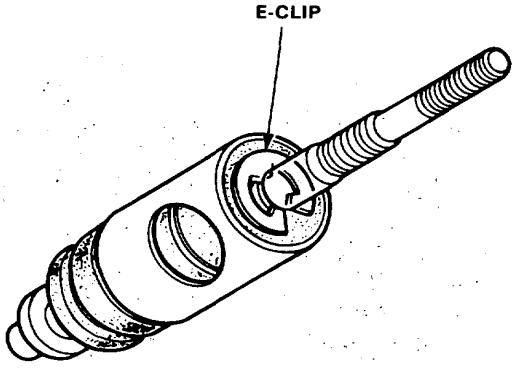
13. Remove the pushrod yoke, locknut, star locknut, adjuster and fillter B from the valve body.



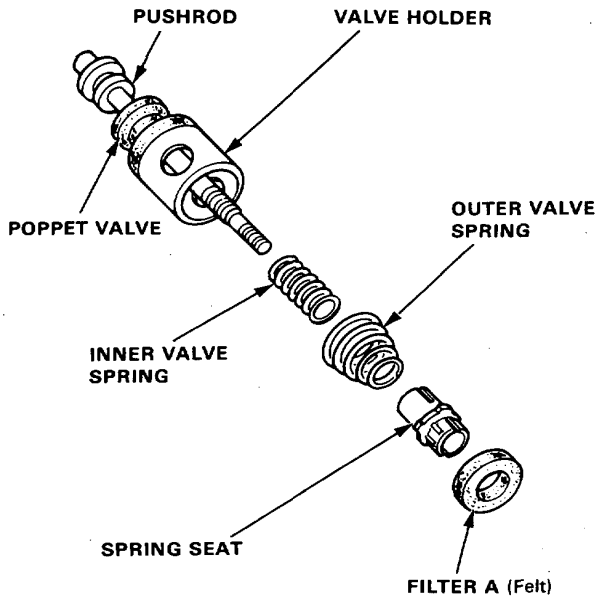
14. Remove the pushrod retainer, then remove the pushrod from the valve body assembly.



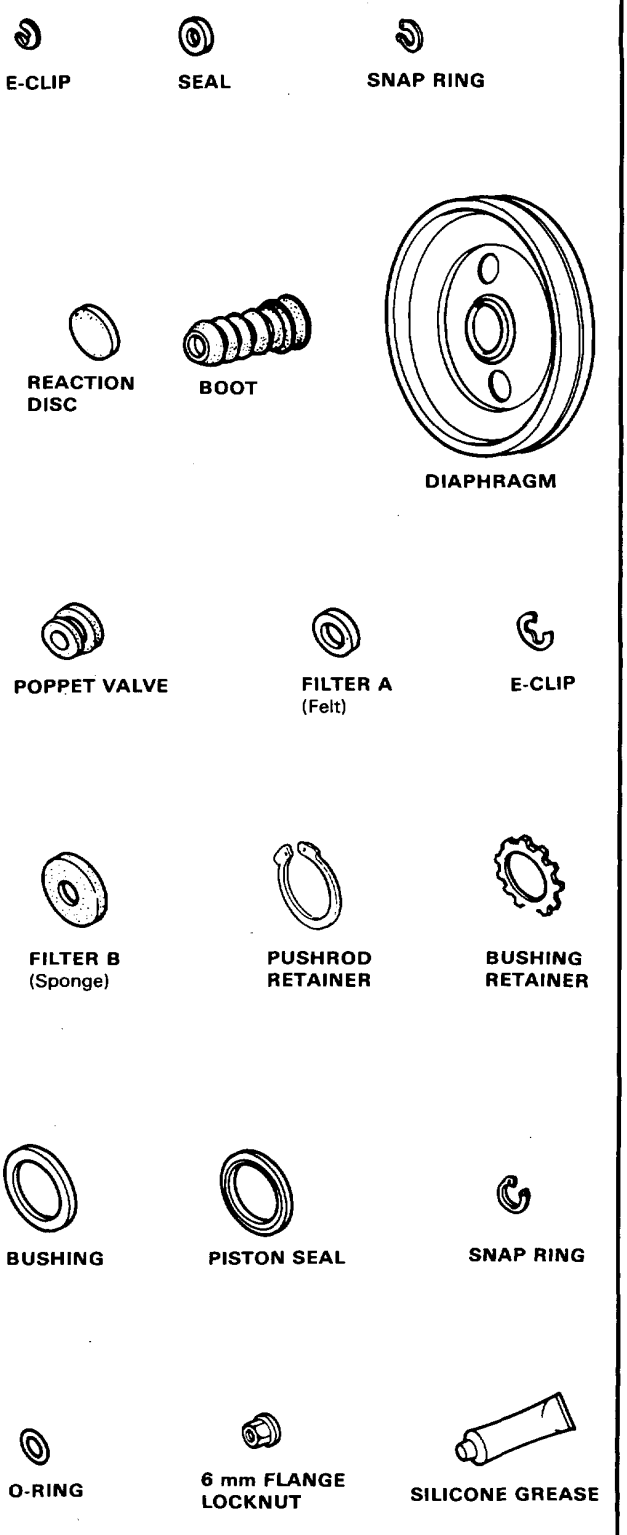
15. Remove the E-clip from the pushrod.



16. Remove the filter A, spring seat, valve springs, valve holder and poppet valve from the pushrod.

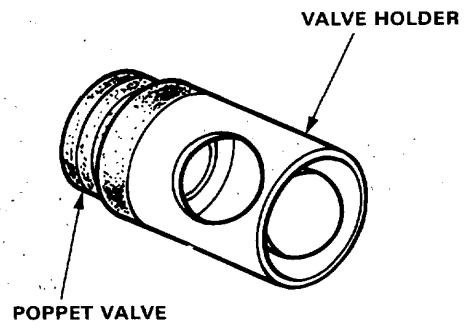


Rebuild Kit

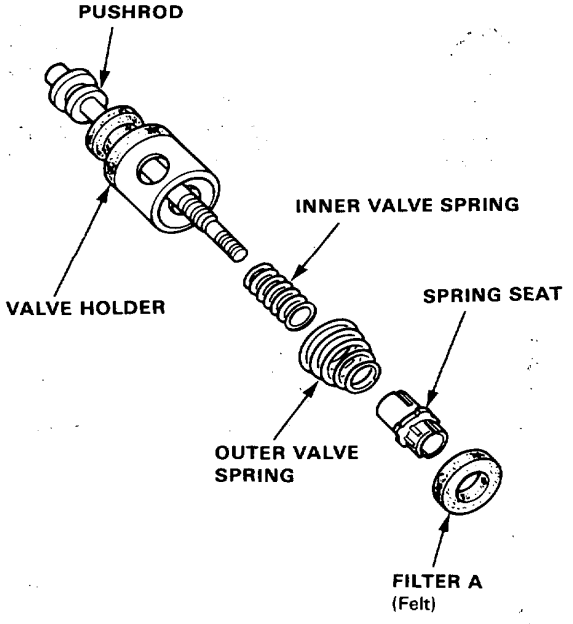


Reassembly

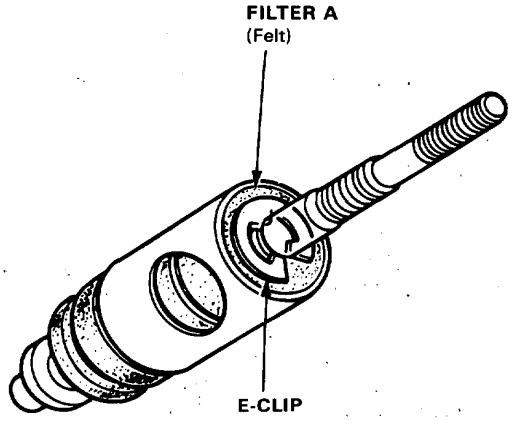
1. Install the poppet valve on the valve holder.



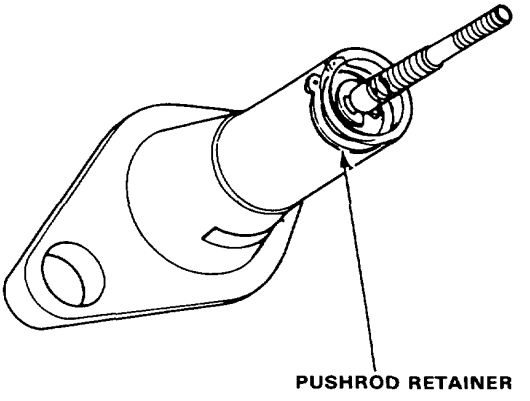
2. Install the valve holder, inner valve spring, outer valve spring and spring seat on the pushrod.



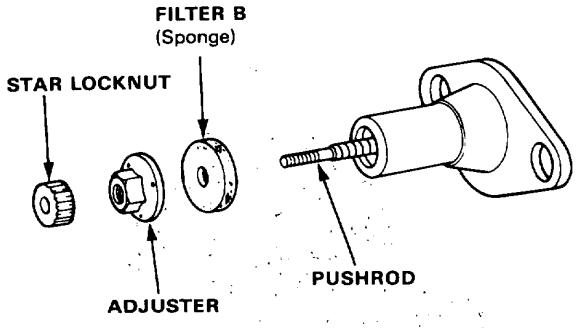
3. Install the filter A and E-clip on the pushrod.



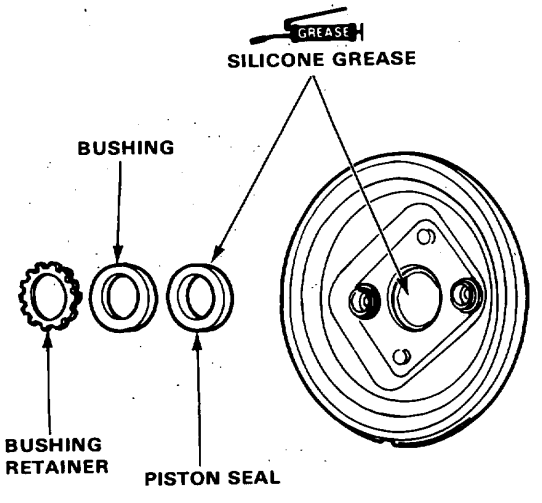
4. Apply silicone grease to the inner and outer surfaces of the valve body tube. Press the pushrod assmbly into the valve body tube, and install the pushrod retainer.



5. Slip the filter B (sponge) over the end of the pushrod. Thread the adjuster and star locknut onto the pushrod but do not tighten.



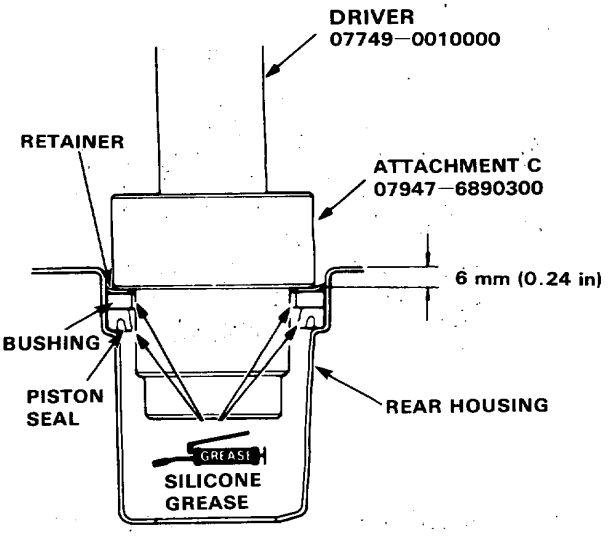
6. Apply silicone grease to the piston seal, then set the seal in position on the housing.



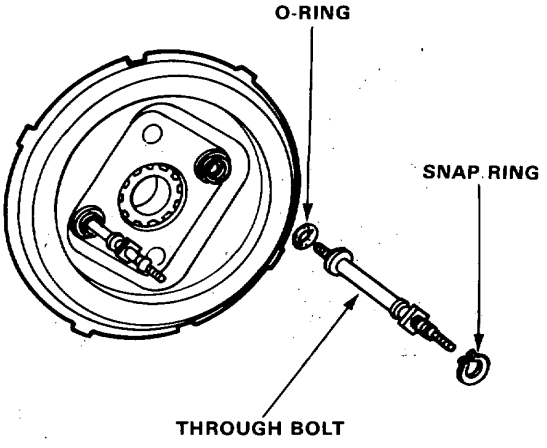
NOTE: Make sure the lip of the seal is facing in, as shown in drawing below.

7. Install the piston seal and bushing in the rear housing, and gently drive the retainer in until it is 6 mm below the edge of the rear housing.

CAUTION: If you drive in the retainer more than 6 mm, you may distort the piston seal.



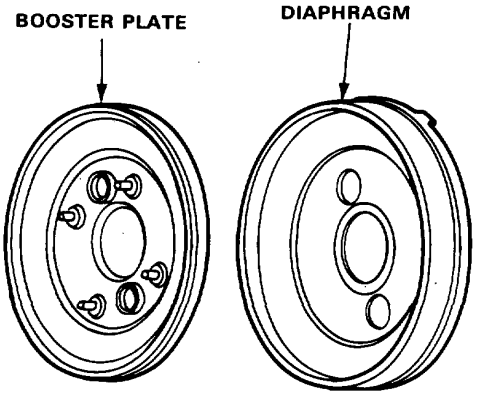
8. Install both through bolts, using the O-rings and snap rings.



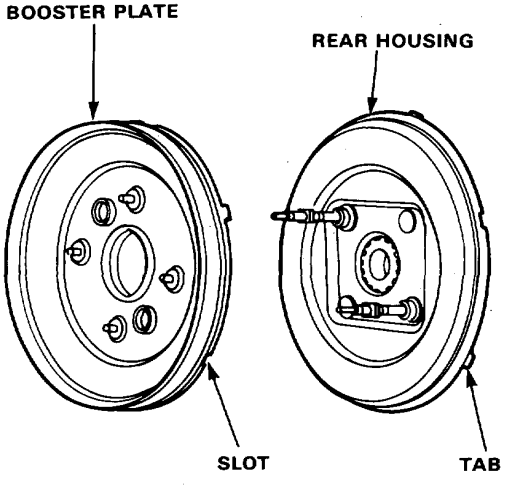
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Reassembly (cont'd)

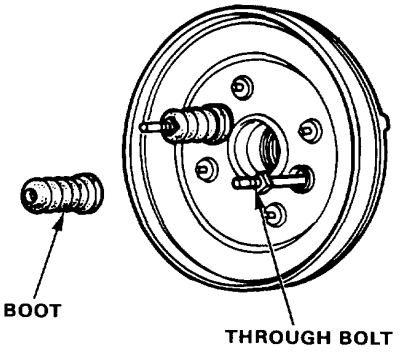
9. Install the diaphragm on the booster plate.



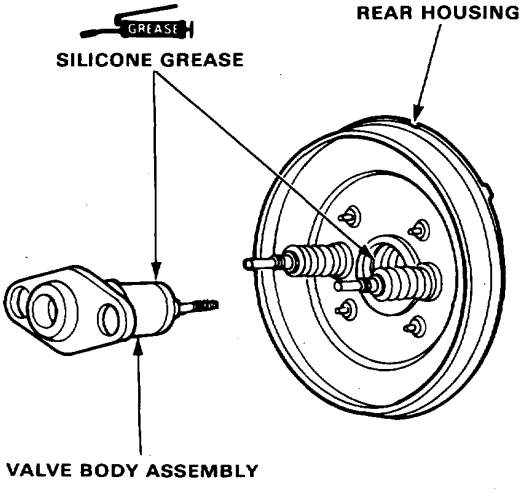
10. Attach the booster plate to the rear housing, aligning their tabs and slots.



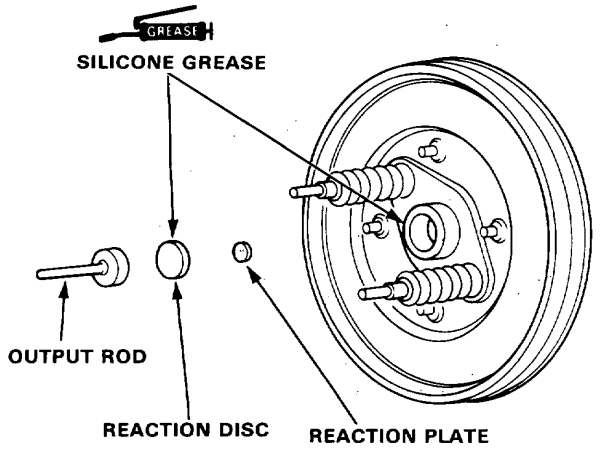
11. Install the boots on the through bolts.



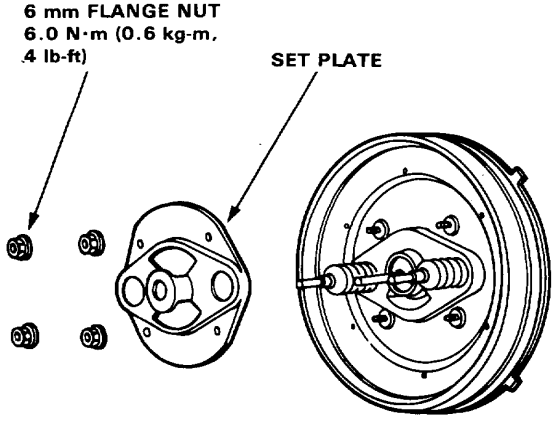
12. Apply silicone grease to the bore of the rear housing and the outer surface of the valve body assembly. Install the valve body assembly in the rear housing.



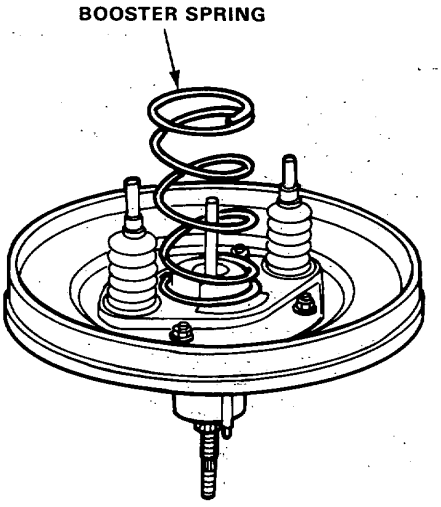
13. Apply silicone grease to the bore of the valve body, then install the reaction plate, reaction disc and output rod.



14. Install the set plate, and tighten the four 6 mm flange nuts.

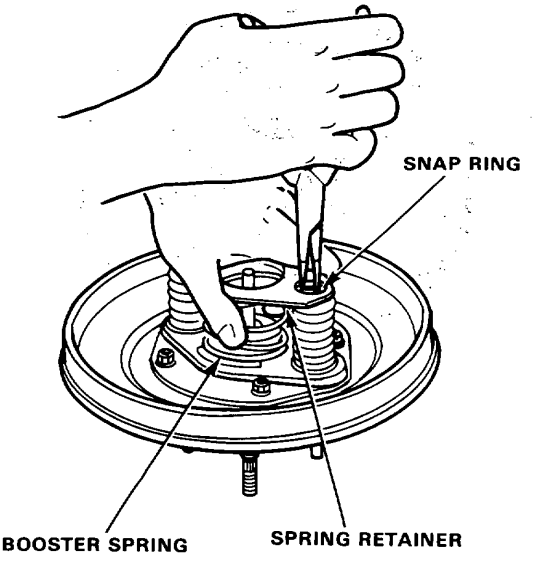


15. Install the booster spring.



16. Install the spring retainer on the through bolts, aligning the square portions of the bolts and retainer.

17. Secure the spring retainer by compressing the booster spring, and installing the snap rings on the through bolts.

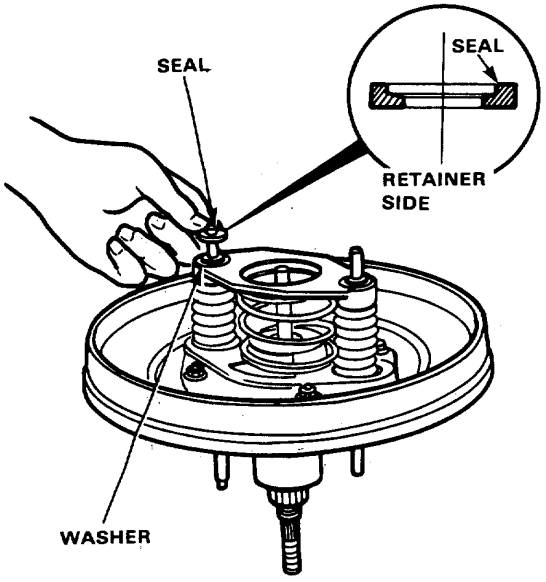


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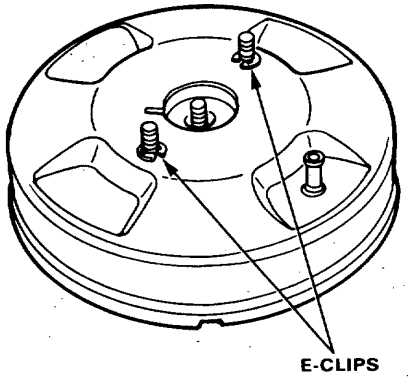
Brake Booster

Reassembly (cont'd)

18. Install the washers and seals.

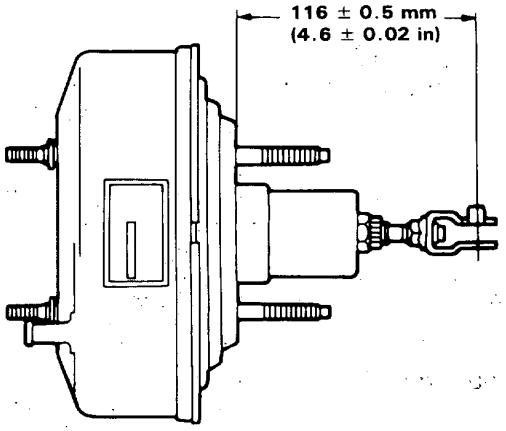


19. Assemble the front and rear housings. Press down on the front housing, then install the E-clips on the through bolts.



Pushrod Adjustment

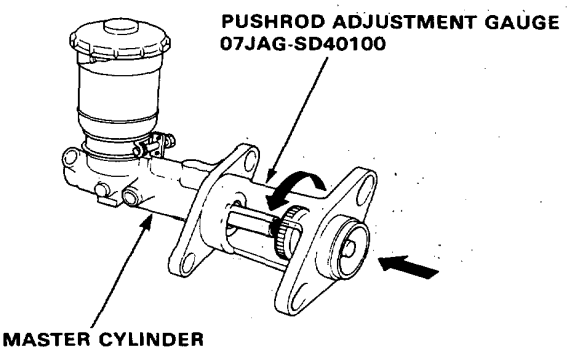
Install the locknut and pushrod yoke on the pushrod, and adjust the pushrod length as shown.



Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

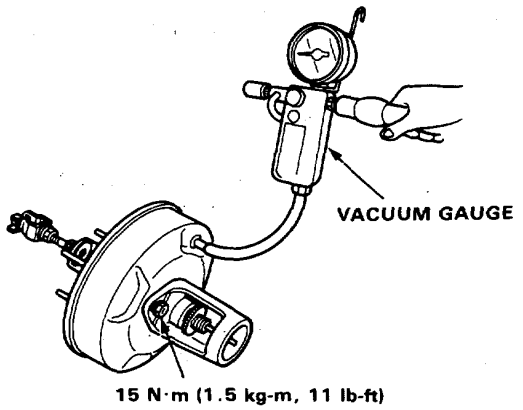
1. Using the Pushrod Adjustment Gauge, adjust bolt so the top of it is flush with end of master cylinder piston.



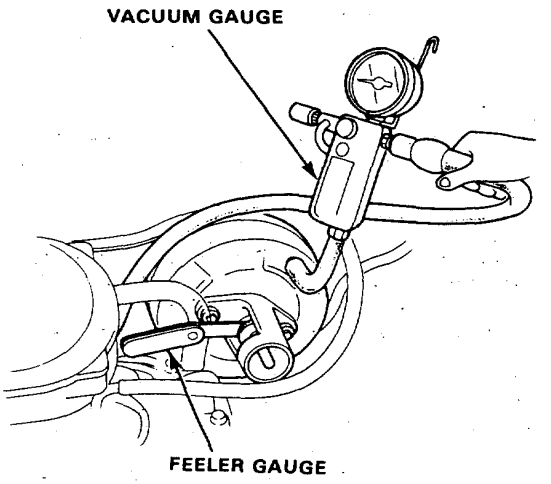
2. Install the master cylinder rod seal between the pushrod adjustment gauge and brake booster.
3. Without disturbing the adjusting bolt's position, put the gauge upside down on the booster.
4. Install the master cylinder nuts and tighten to the specified torque.
5. Connect the booster in-line with a vacuum gauge to the booster's apply a 500 mm Hg (20 in Hg) vacuum and hold.
6. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut.

CLEARANCE: 0—0.4 mm (0—0.016 in)

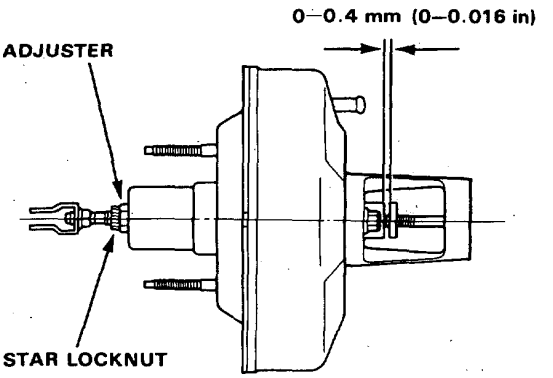
- Inspection with the booster not installed



- Inspection with the booster attached to the car



7. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust. Hold the clevis while adjusting.
8. Tighten the star locknut securely.



NOTE: If the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.4 mm. If the clearance between the gauge body and adjusting nut is 0.4 mm, the pushrod-to-piston clearance in 0 mm.

9. Adjust the pedal height and brake light switch (page 13-4).

Brake Shoes

Index and Inspection

WARNING **Block the front wheels before jacking up the rear of the car.**

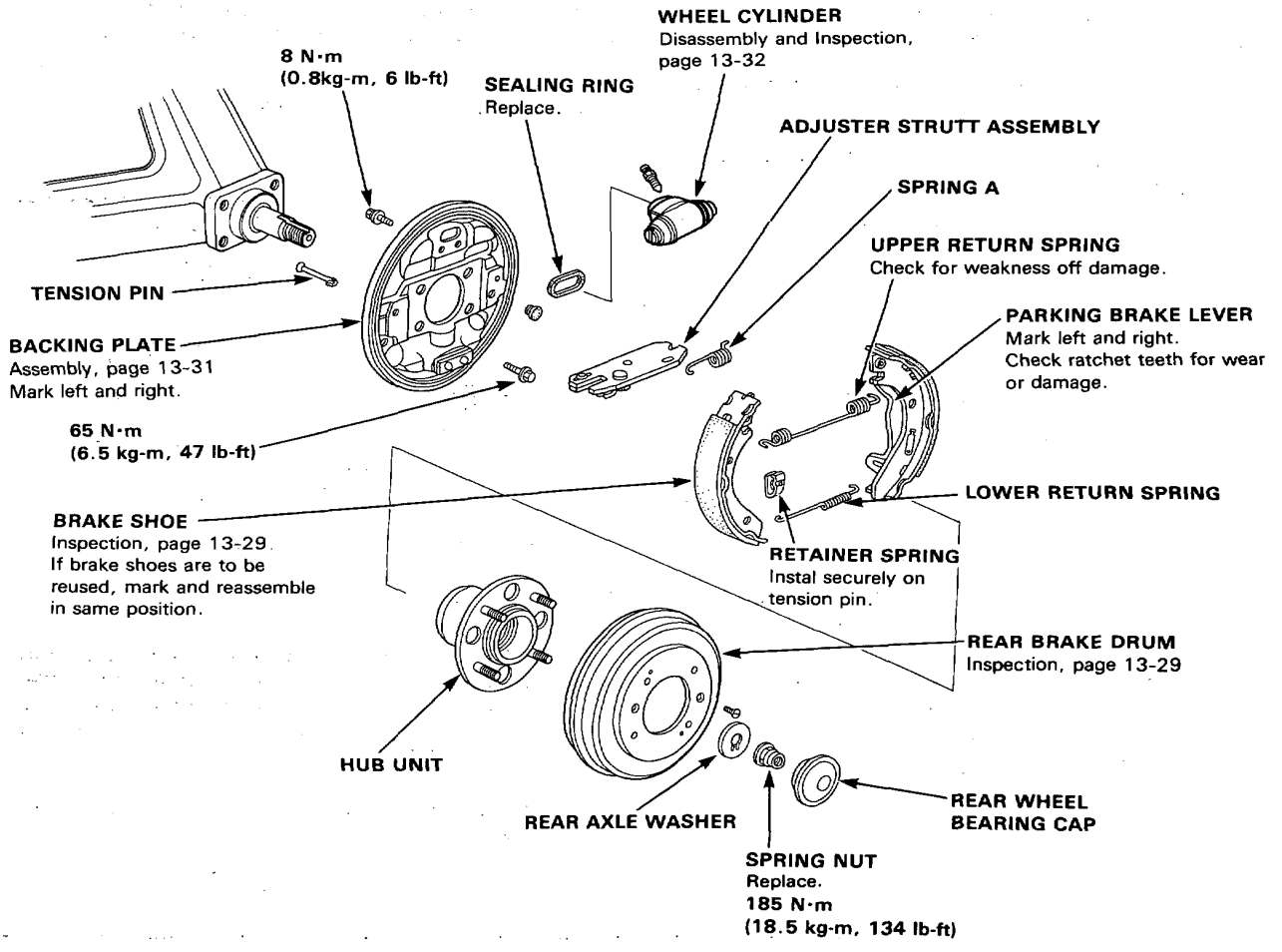
1. Raise the rear of the car and support with safety stands in proper locations.
2. Loosen the parking brake.
3. Remove the rear wheels and rear brake drum.

WARNING

- **Inhaled asbestos fibers have been found to cause respiratory disease and cancer.**
- **Never use an air hose or dry brush to clean brake assemblies.**

CAUTION:

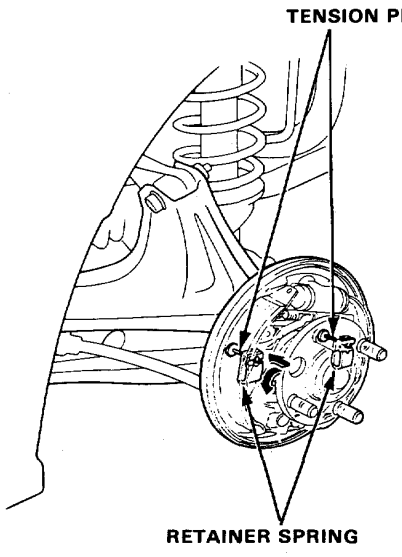
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joint with rags or shop towels.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed 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.**
- **Use only DOT3 or DOT4 brake fluid.**



Brake Shoes

Disassembly

1. Remove the tension pins by pushing the retainer spring and turning them.



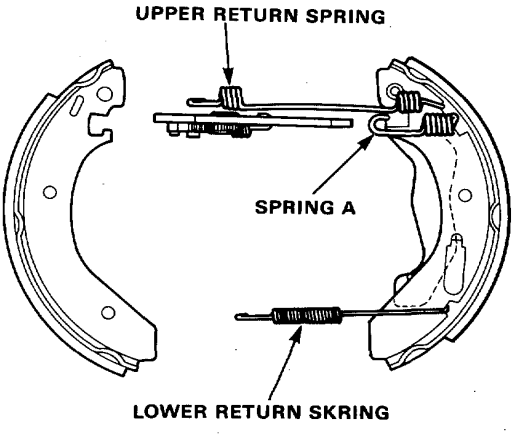
2. Lower the brake shoe assembly and remove the lower return spring.

   NOTE: Make sure not to damage the dust cover on the wheel cylinder.

3. Remove the brake shoe assembly.

4. Disconnect the parking brake cable from the parking brake lever.

5. Remove the spring A and upper return spring, adjuster strut assembly, and separate the brake shoes.



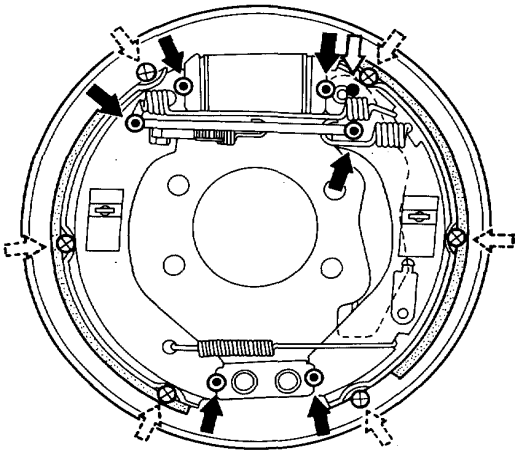
NOTE: Inspect all parts for worn, rust, and damage.

Reassembly

NOTE: Before reassembling, check that all parts are clean.

1. Install the adjuster strutt assembly, then upper return spring and spring A in the brake shoes.
2. Connect the parking cable to the parking brake lever.
3. Apply grease on each sliding surface.

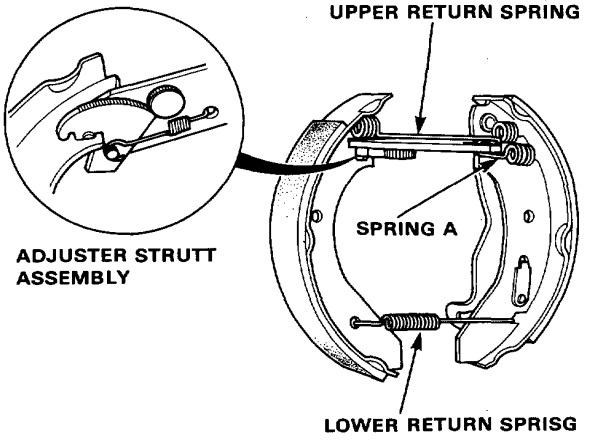
CAUTION: Contaminated the brake linings reduce stopping power. Keep grease or oil off the brake linings. Wipe any excess grease off the parts.





Greasing Tymbols:
Brake shoe ends
Opposite the edge of the shoe
Sliding surface

4. Install the brake shoe assembly, then hook the lower return spring.
5. Install the tension pins and retaining springs.



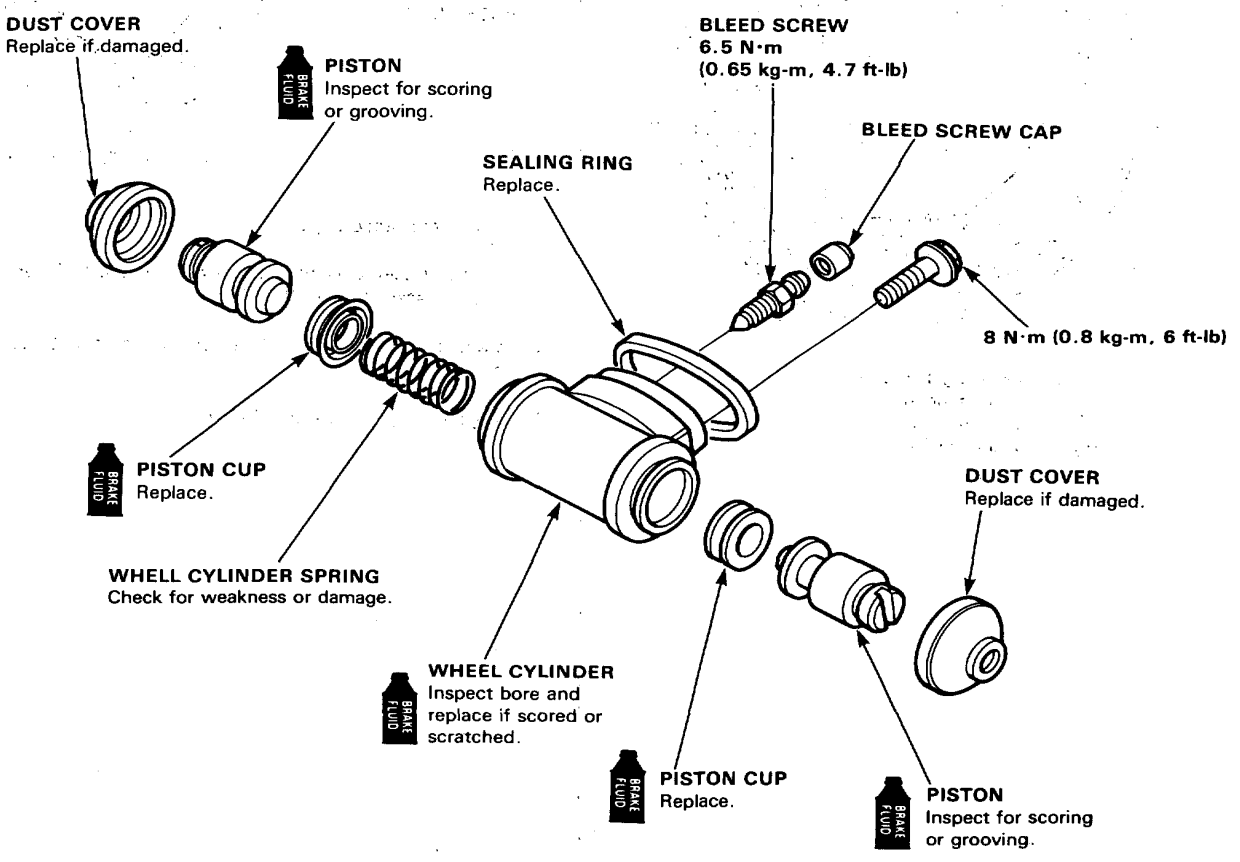
6. Install the brake drum.
7. If the wheel cylinder has been removed, bleed the brake system (page 13-10).
8. Depress the brake pedal several times to set the self adjusting brake.
9. Adjust the parking brake (page 13-4).

Wheel Cylinder

Disassembly and Inspection

CAUTION:

- Use only clean DOT3 or DOT4 brake fluid.
- Use only new replacement parts.
- Brake fluid will damage the painted, plastic and rubber parts. Whenever handling fluid, protect the painted, plastic or rubber parts by covering with a rag. If fluid does get on these parts, wipe it off with a clean cloth.
- Blow all passages with compressed air before reassembling.
- Clean all parts thoroughly with the clean brake fluid.
- Do not allow dirt or other foreign matter to contaminate the brake fluid.
- Do not mix different types of fluid as they may not be compatible.
- Never reuse the brake fluid once it has been drained.
- Lubricate all parts with clean brake fluid during reassembly.



Rear Disc Brakes

Inspetion

WARNING

- Inhaled asbestos fibers have been found to cause respiratory disease and cancer.
- Never use an air hose or dry brush to clean brake assemblies.

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.

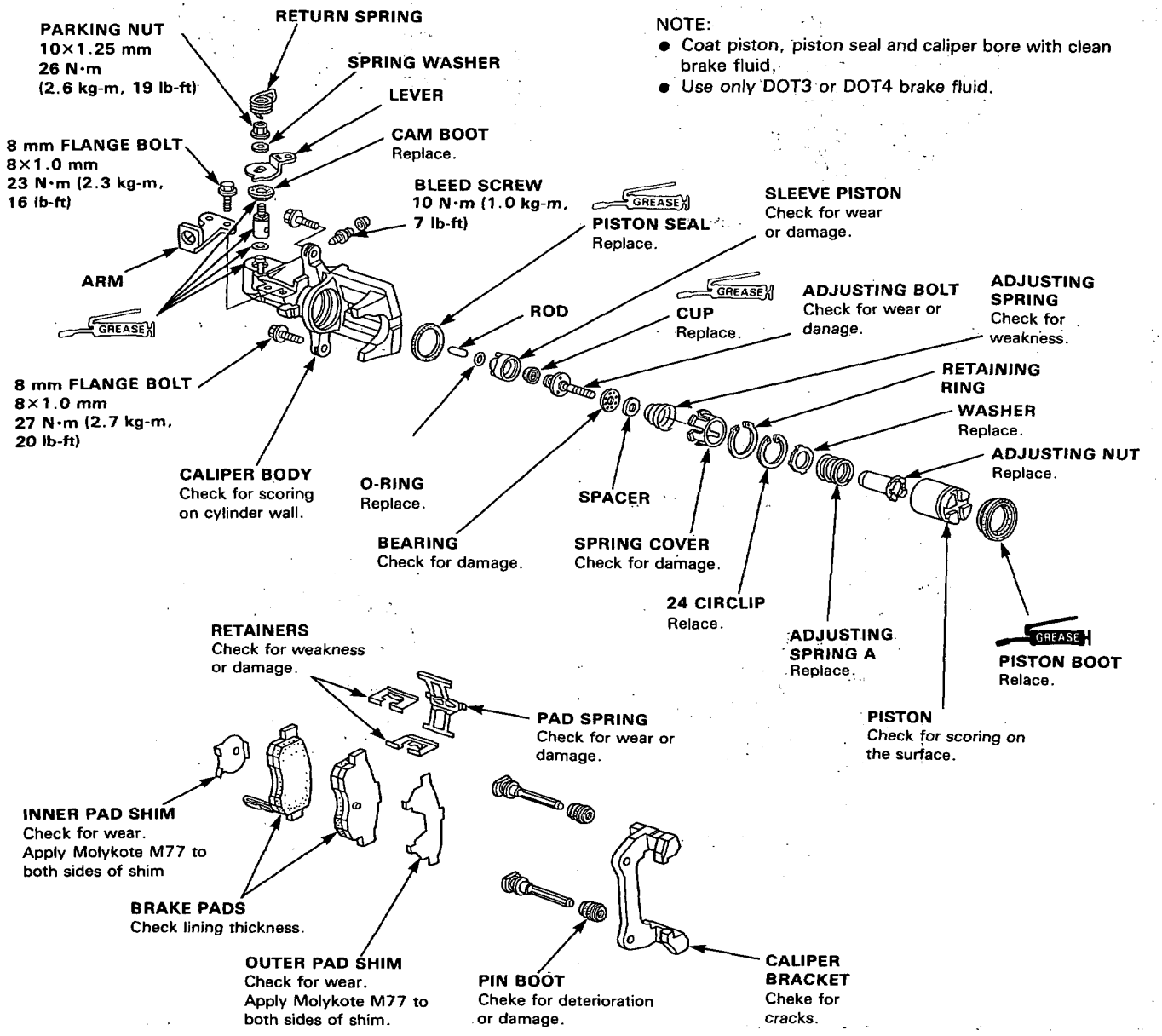
GREASE : BRAKE CYLINDER GREASE (PN 08733-B020E) OR EQUIVALENT RUBBER GREASE

GREASE : SILCONE GREASE

- 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.

NOTE:

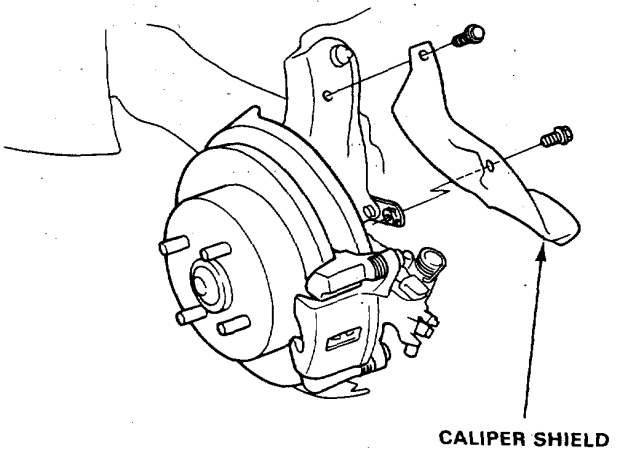
- Coat piston, piston seal and caliper bore with clean brake fluid.
- Use only DOT3 or DOT4 brake fluid.



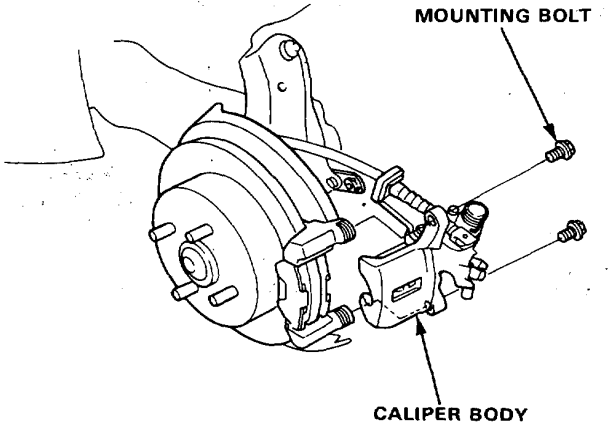
Rear Brake Pad/Disc

Inspection and Replacement

1. Block the front wheels, support the rear of the car on safety stands, then remove the rear wheels.
2. Remove the caliper shield.

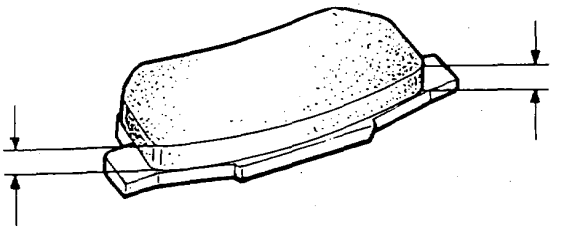


3. Remove the two caliper mounting bolts and the caliper from the bracket.

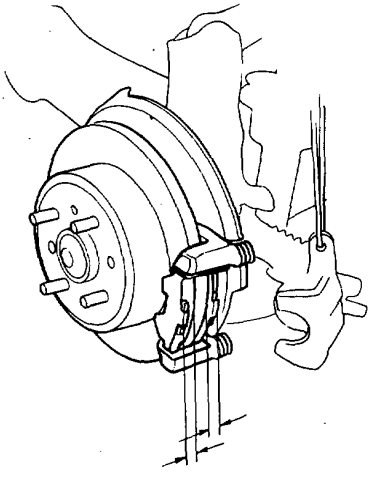


4. Remove the pads and measure the thickness of each brake pad lining using a vernier caliper.

Brake Pad Thickness:
Standard: 8.0 mm (0.31 in)
Service Limit: 1.6 mm (0.06 in)



5. If the lining thickness is less than service limit, replace the brake pads as a set.



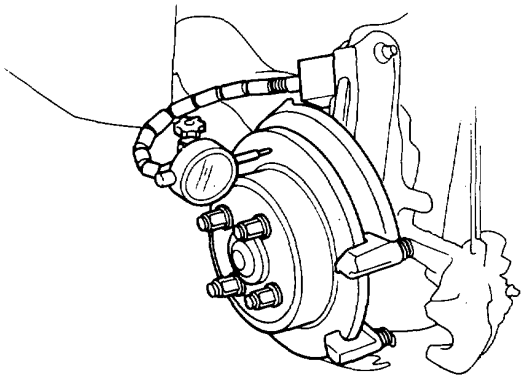
6. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.

7. Mount a dial indicator as shown and measure the runout at 10 mm (0.39 in) in from the outer edge of the disc.

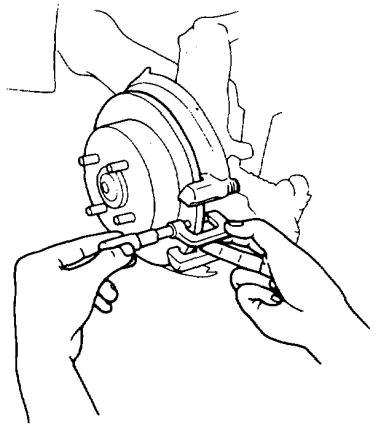
   CAUTION: Use wheel nuts and 3 mm thickness washers to hold the disc securely.

   Brake Disc Run-out:
   Service Limit: 0.15 mm (0.006 in)

8. Resurface or replace the brake disc if beyond the service limit.



9. Using a micrometer, measure the rear brake disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in) in from the outer edge of the disc.

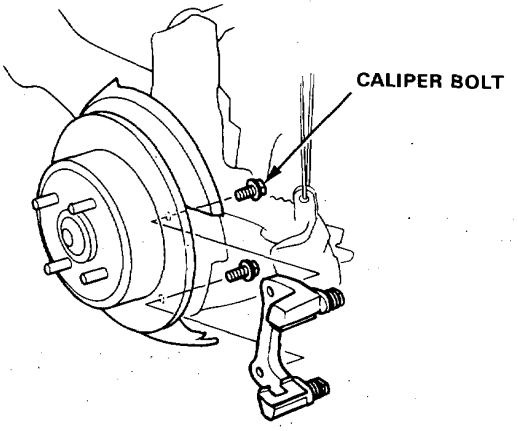


10. Replace the disc if it exceeds the following service limits.

    Brake Disc Thickness:
    Standard: 10.0 mm (0.39 in)
    Service Limit: 8.0 mm (0.31 in)

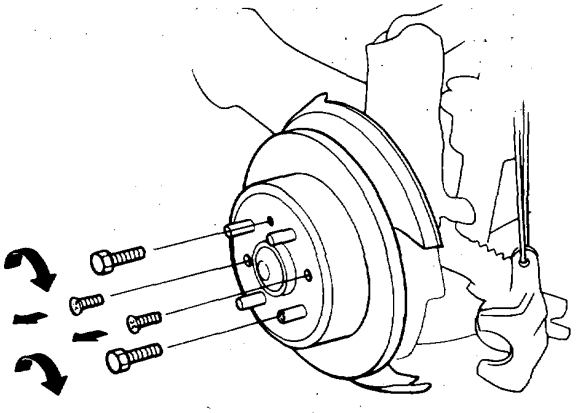
    Brake Disc Parallelism:
    The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in).

11. Remove the two caliper bracket mounting bolts and caliper bracket.



12. Remove the two 6 mm screws and brake disc.

    NOTE: If the brake disc is difficult to remove, install 8 mm bolts into the threaded holes and tighten them.



(cont'd)

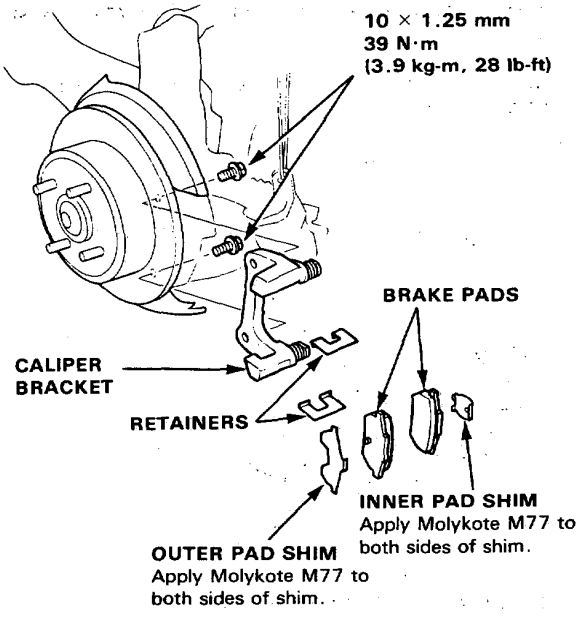
Rear Brake Pad/Disc

Inspection and Replacement (cont'd)

13. Install the new or resurfaced brake disc.

14. Clean the caliper bracket and retainers, then install the caliper bracket with two bolts and retainers.

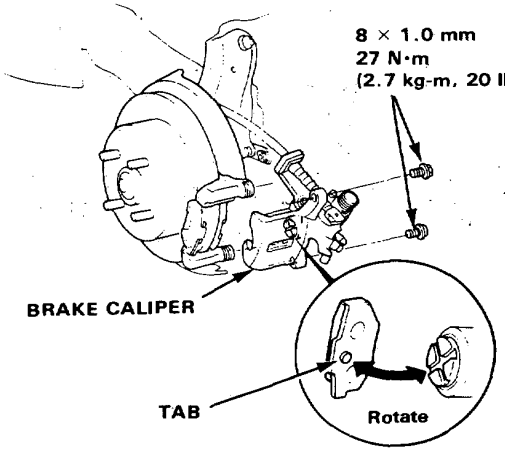
15. Install the new brake pads and pad shims onto the caliper bracket.



16. Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning back the piston back.

CAUTION: Lubricate the boot with silicone grease to avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.

17. Install the brake caliper.

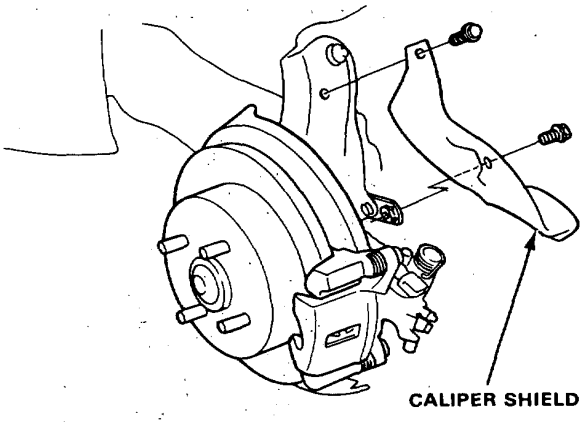


Rear Caliper

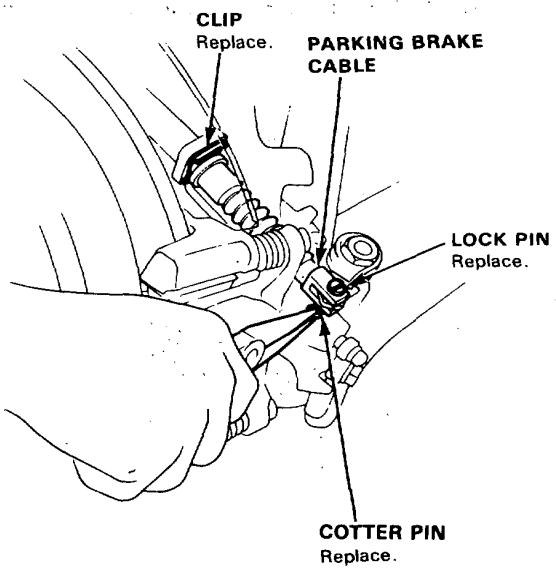
Disassembly

CAUTION:
- **Make sure all parts are clean before ressembly.**
- **Use only new replacement parts.**
- **Use only new clean brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage to finish. Wash spilled brake fluid off immediately with clean water.**

1. Remove the caliper shield.



2. Disconnect the parking brake cable from the lever on the caliper by removing the cotter pin and lockpin and clip.



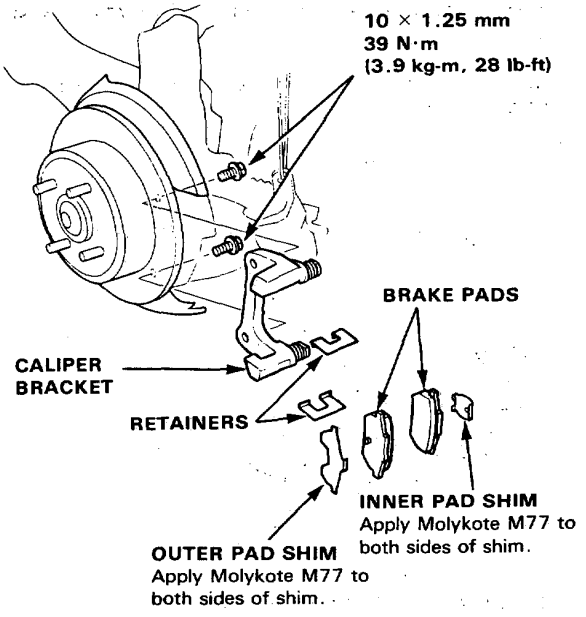
Rear Brake Pad/Disc

Inspection and Replacement (cont'd)

13. Install the new or resurfaced brake disc.

14. Clean the caliper bracket and retainers, then install the caliper bracket with two bolts and retainers.

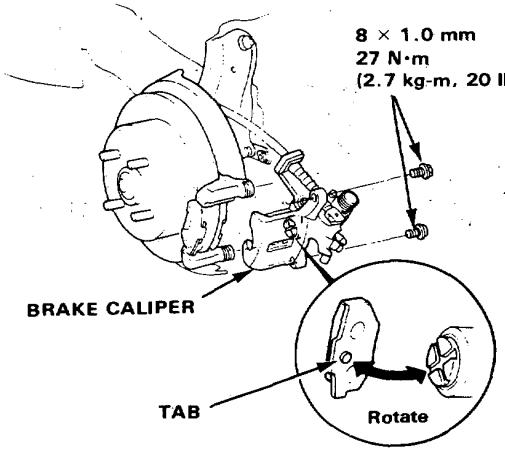
15. Install the new brake pads and pad shims onto the caliper bracket.



16. Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning back the piston back.

CAUTION: Lubricate the boot with silicone grease to avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.

17. Install the brake caliper.

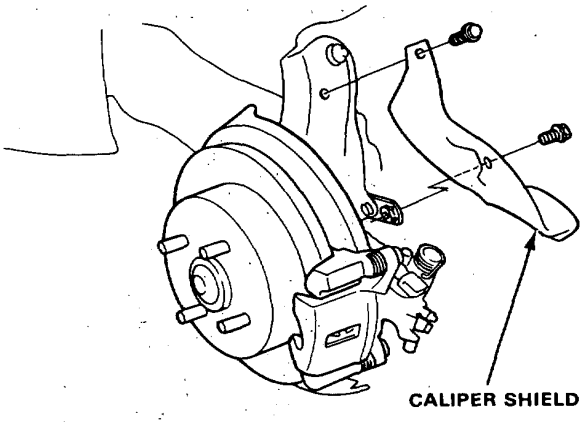


Rear Caliper

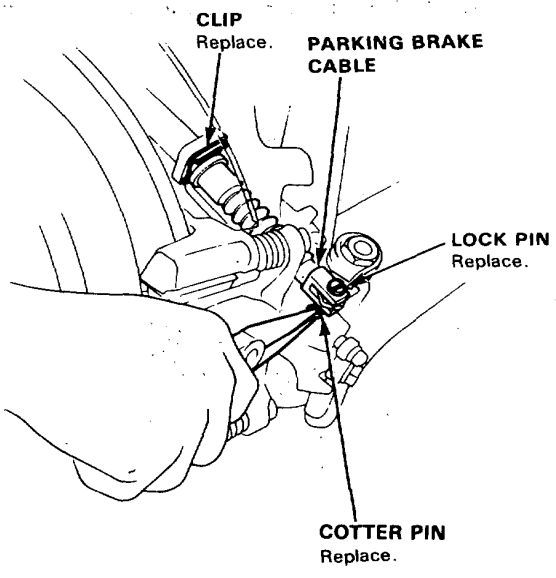
Disassembly

CAUTION:
- **Make sure all parts are clean before ressembly.**
- **Use only new replacement parts.**
- **Use only new clean brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage to finish. Wash spilled brake fluid off immediately with clean water.**

1. Remove the caliper shield.



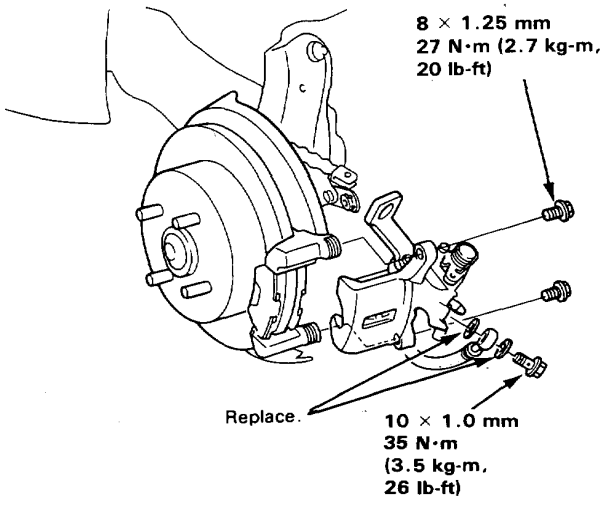
2. Disconnect the parking brake cable from the lever on the caliper by removing the cotter pin and lockpin and clip.



3. Remove the banjo bolt and disconnect the brake hose from the caliper.

4. Remove the two caliper mounting bolts and the caliper from the bracket.

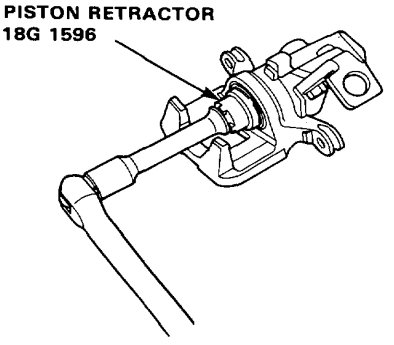
CAUTION:
- **Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.**
- **Plug the end of the brake hose to prevent brake fluid from flowing out.**



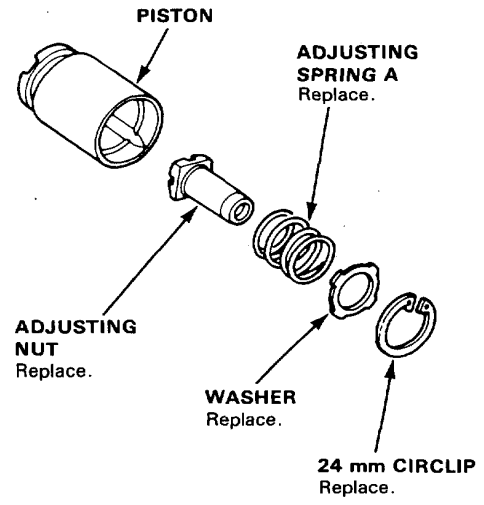
5. Remove the pad spring from the caliper.

6. Remove the piston and piston boot while rotating the piston.

CAUTION: Avoid damaging the piston and piston boot.

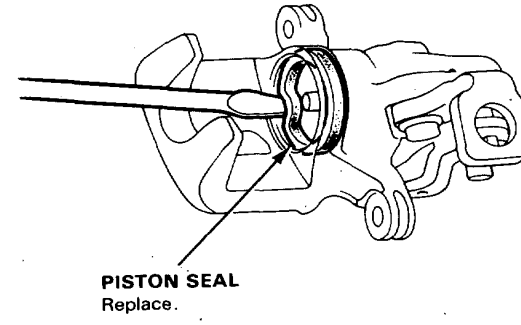


7. Remove the circlip, then washer, adjusting spring A, and the adjusting nut from the piston.



8. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.

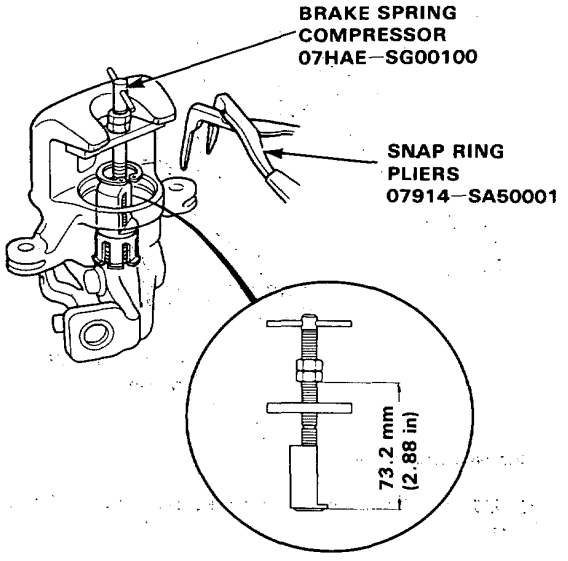


(cont'd)

Disassembly (cont'd)

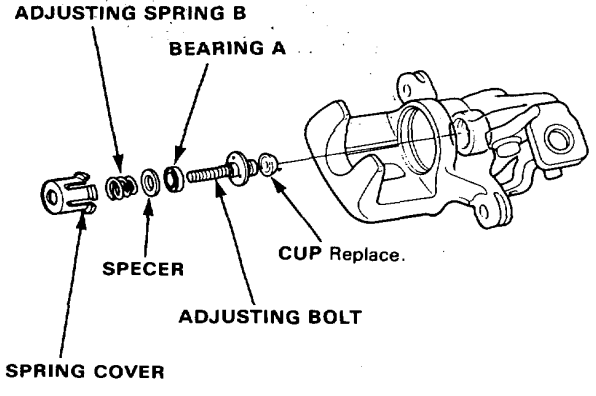
9. Install the special tool between the caliper body and spring guide as shown.

10. Compress the adjusting spring B by turning the shaft of the special tool, then remove the circlip with snap ring pliers.

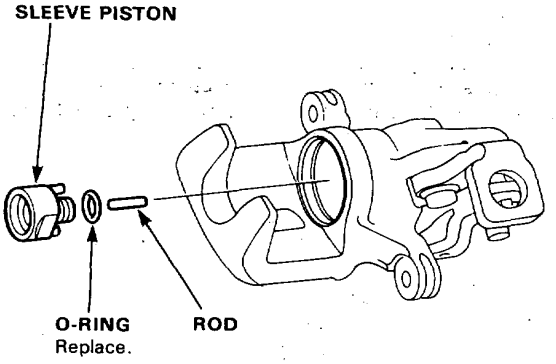


11. Remove the brake spring compressor from caliper body.

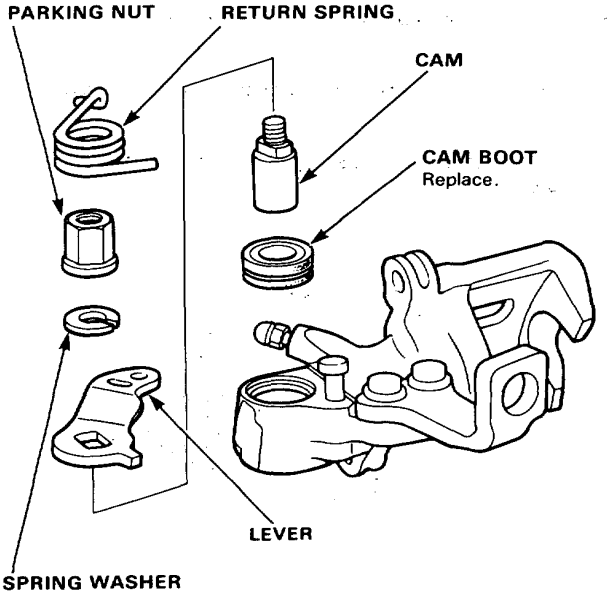
12. Remove the spring cover, adjusting spring B, spacer, bearing A, adjusting bolt and cup.



13. Remove the sleeve piston, then remove the rod from the cam.



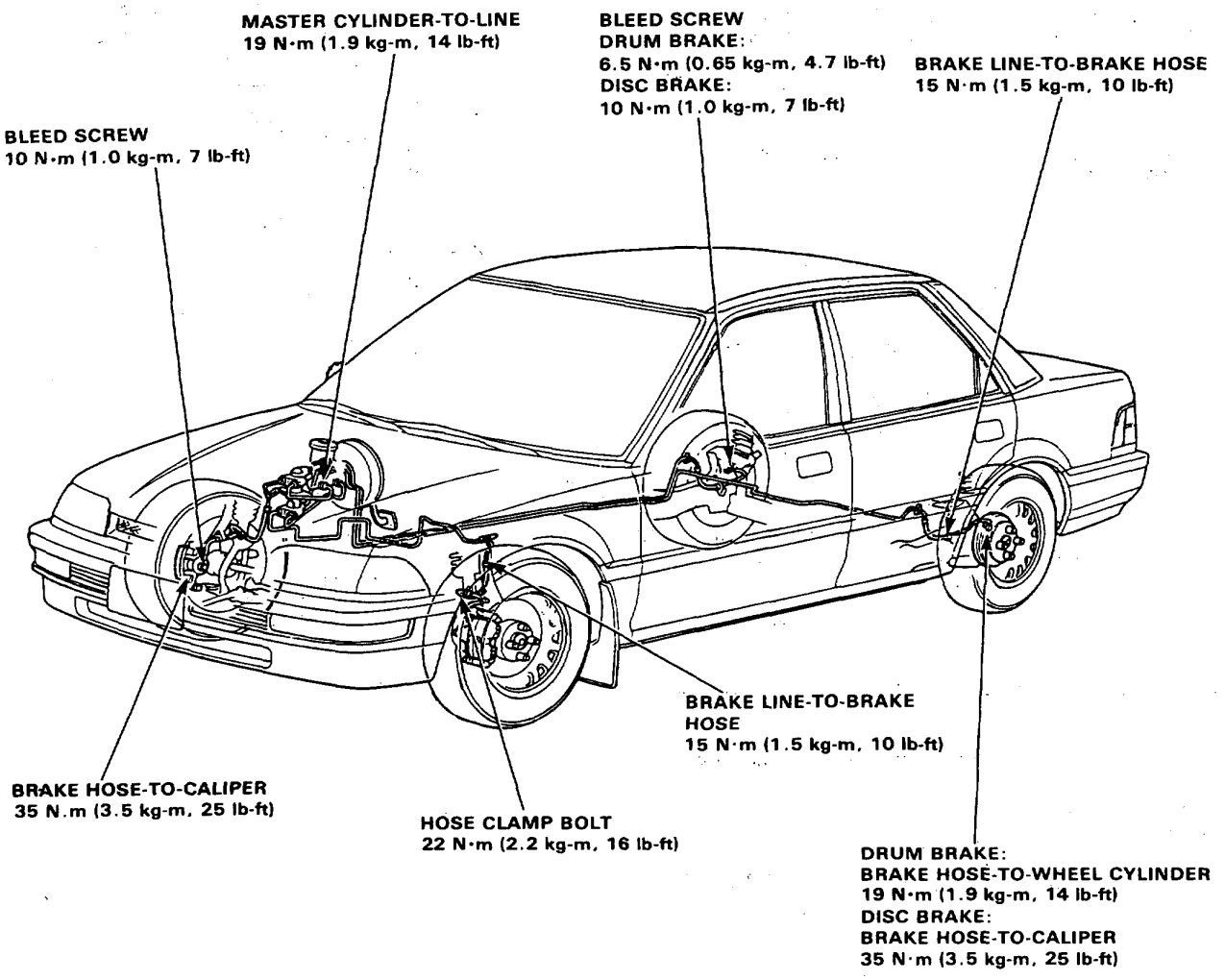
14. Remove the return spring, parking nut, spring washer, lever, cam and cam boot.



Brake Hoses/Pipes

Inspection

1. Inspect the brake hoses for damage, leaks, interference or twisting.
2. Check the brake lines for damage, rusting or leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints or connections, and retighten if necessary.

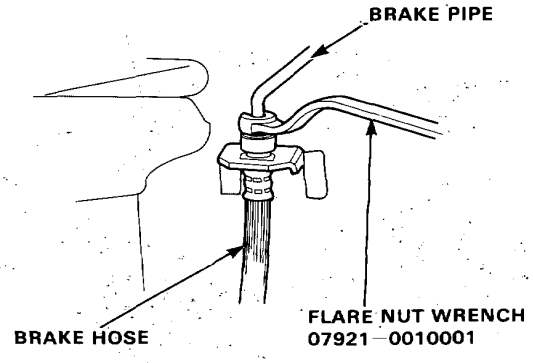


Brake Hose/Pipes

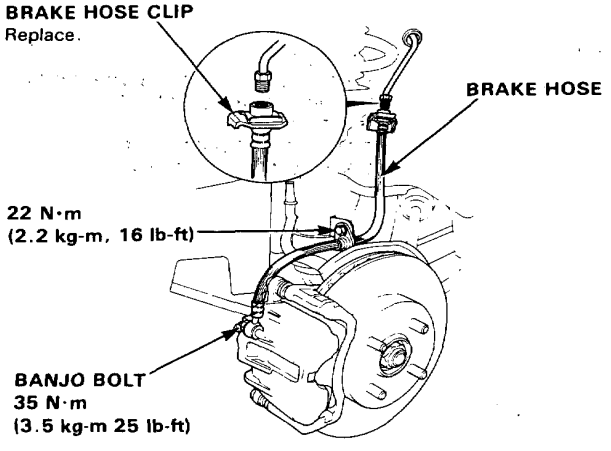
Brake Hoses Replacement

CAUTION:
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Use only clean brake fluid.**
- **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 spill brake fluid on the car, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**

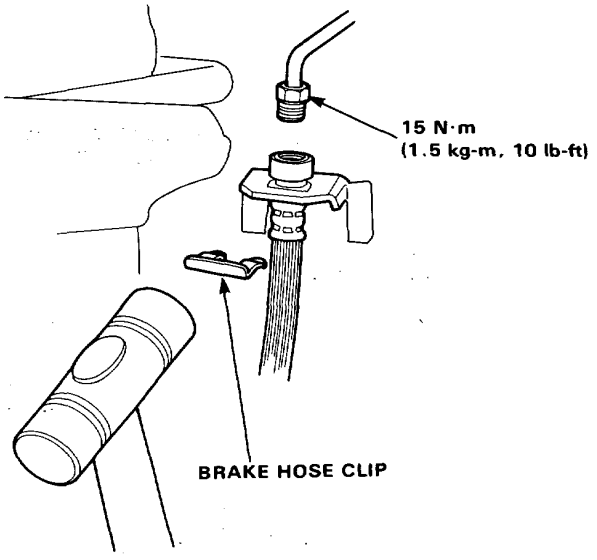
1. Replace the brake hose if the hose is twisted, cracked or if it leaks.
2. Disconnect the brake hose from the brake pipe using a 10 mm flare nut wrench.



3. Remove and discard the brake hose clip from the brake hose.
4. Remove the banjo bolt and disconnect the brake hose from the caliper.
5. Remove the brake hose clamp bolt and brake hose.



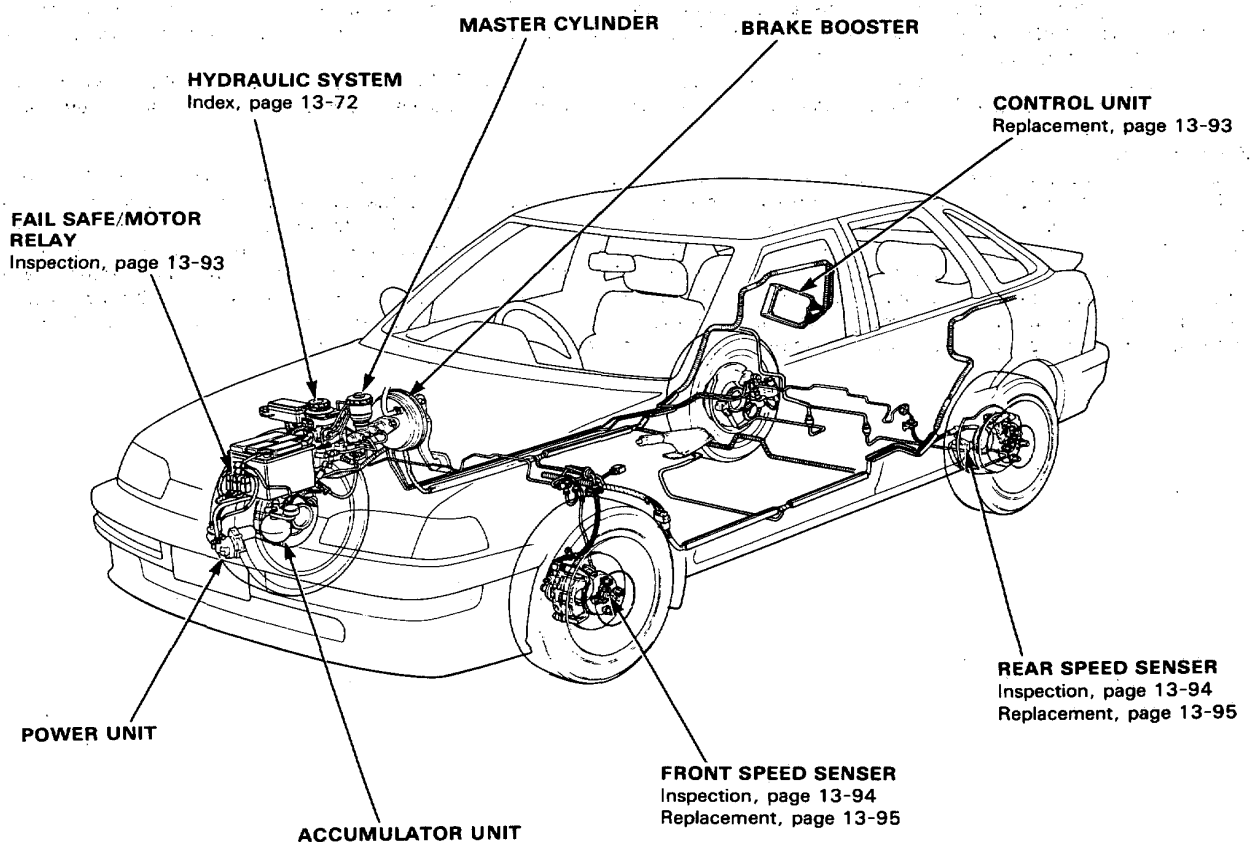
6. Install a new brake hose clip to the brake hose.
7. Connect the brake pipe to the brake hose.



8. Connect the brake hose to the caliper.
9. Install the brake hose clamp bolt.
10. After installing the brake hose, check the hose and line joints for leaks, and tighten it necessary.

Illustrated Index

WARNING The accumlator contains high pressure nitrogen gas, do not puncture expose to flame or attempt to disassemble the accumlator or it may explode; severe personal injury may result.



Description

General/Features/Construction

General

In a conventional brake system, if the brake pedal is depressed excessively, the wheels can lock before the vehicle comes to a stop. In such a case, the stability of the vehicle is reduced if the rear wheels are locked, and maneuverabily of the vehicle is reduced if the front wheels are locked, creating an extremely unstable condition.

The Anti-Lock Brake (ALB) system modulates the pressure of the brake fluid applied to each caliper, thereby preventing the locking of the wheels, whenever the wheels are likely to be locked due to excessive braking. It then restores normal hydraulic pressure when there is no longer any possibility of wheel locking.

Features

- Increased braking stability can be achieved regardless of changing driving conditions.
- The maneuverability of the vehicle is improved as the system prevents the front wheels from locking.
- When the ALB goes into action, kick-back is felt on the brake pedal.
- The ALB system is equipped with a self-diagnosis function. When an abnormality is detected, the dash warning light comes on and the LED display on the control unit blinks. The location of the system's trouble can be diagnosed from the frequency of the LED display blinks.
- This system has individual control of the front wheels and common control ("select low") for the rear wheels."Select Low" means that the rear wheel that would lock first (the one with the lowest resistance to lock-up) determines ALB activation for both rear wheels.

Construction

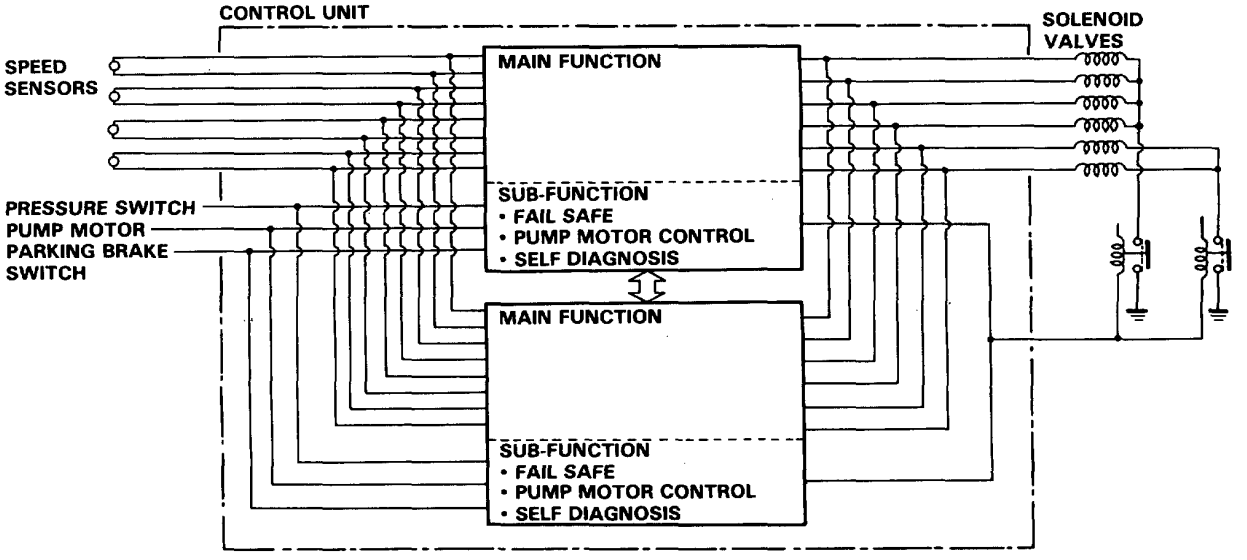
In addition to the conventional braking sysem, the ALB system is composed of: gear pulsers attched to the rotating part of individual wheels; speed sensors, which generate pulse signals in correspondence to the revolution of the gear pulsers; control unit, which controls the working of the ALB system by performing calculations based on the signals from the individual speed sensors and the individual switches; modulator unit, which adjusts the hydraulic pressure applied to each caliper on the basis of the signals received from the control unit; an accumlator, in which high-pressure brake fluid is stored; a pressure swithch, which detects the pressure in the accumlator and transmits signals to the control unit; a power unit, which supplies the high-pressure working fluid to the accumlator by means of a pump; a motor relay for driving the power unit; a fail-safe relay, which cuts off the solenoid valve ground circuit when the fail-safe device is at work; and, a dash warning light.

Control Unit

Costruction

The control unit cosists of a main function section, which controls the operation of ALB system, and sub-function, which controls the pump motor and "self-diagnosis."

1. Main Function
   The main function section of the control unit performs calculations on the basis of the signals from each speed sensor and controls the operation of the ALB system by putting into action the solenoid valves in the modulator unit for each front brake for the two rear brakes.
2. Sub Function
   The sub-function section gives driving signals to the pump motor and also gives "self-diagnosis" signals, necessary for backing up the ALB system.



Self-Diagnostic Function

Since the ALB system modulates the braking pressure when a wheel is about to lock, regardless of the driver's intention, the system operation and the braking powr will be impaired if there is a malfunction in the system. To prevnt this possibildty, at speeds above 10 km/h (6 mph), the self diagnosis function, monitors the main system functions. When an abnormality is detected, the dash warning light goes n.

There is also a check mode of the self-diagnosis system itself: when the ignition switch is first turned on, the dash warning light comes on and stays on for a few seconds after the engine starts, to signify that the self-diagnosis system is functional.

(cont'd)

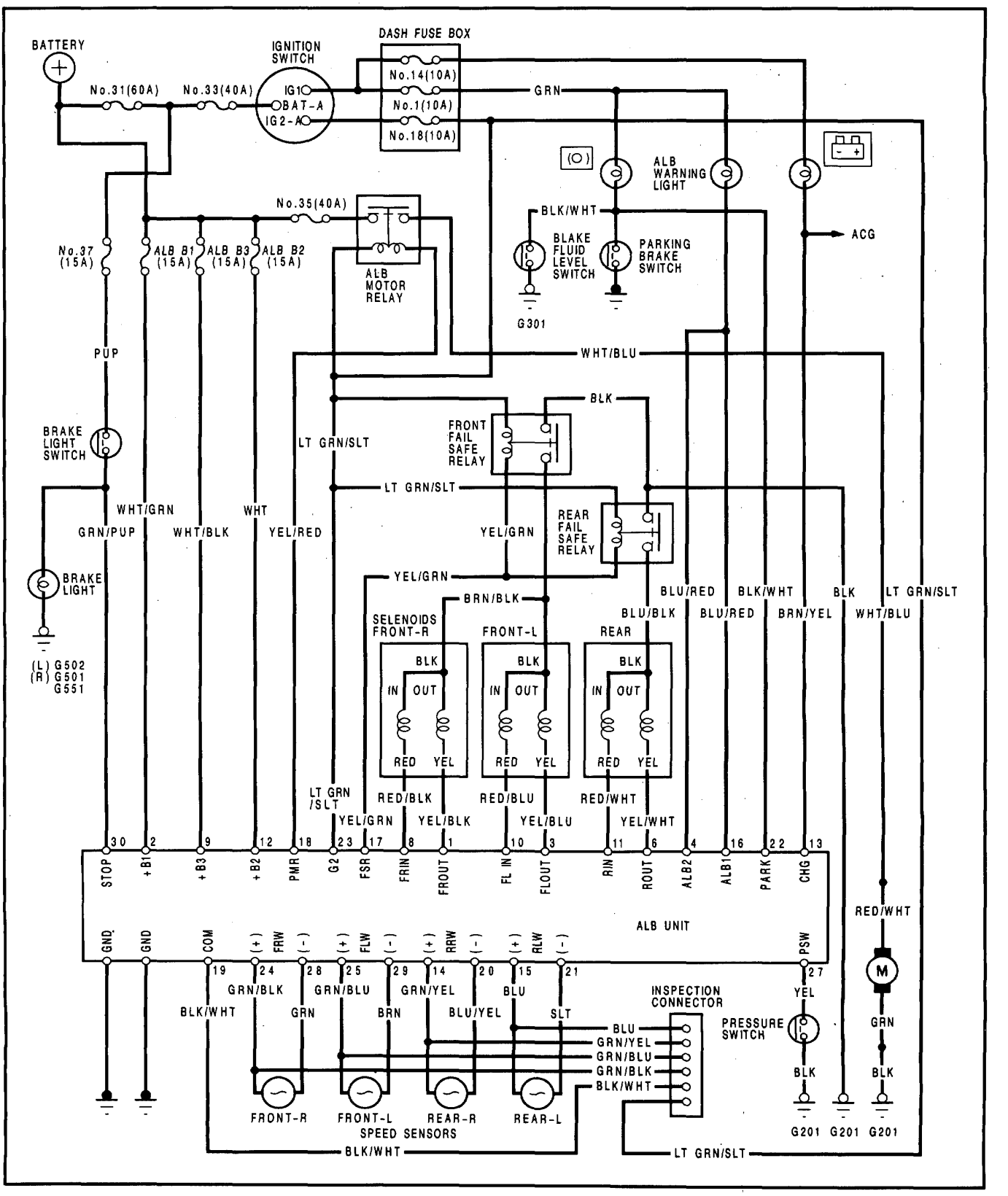
Description

Control Unit (cont'd)

Fail-Safe Function
If an abnormality is detected, the control unit turns off the fail-safe relays and motor relay. In this condition the ALB system is prevented from functioning, yet the basic system continues to operate normally.

The Dash Warning Light comes On
1. When the fluid pressure pump runs more than 120 seconds.
2. When the parkdng brake is applied for more than 30 seconds while the vehicle is being driven.
3. When the rear wheel(s) is (are) locked more than a specified time.
4. When the wheel rotation signal is not transmitted due to faulty wire or senser.
5. When the operation time of the solenoid valve(s) exceeds a predetermined valve and the control unit finds an open in the solenoid circuit.
6. When the output signals from both main functions in the control unit are not tranmitted to the solenoid valve(s).

Circuit Diagram

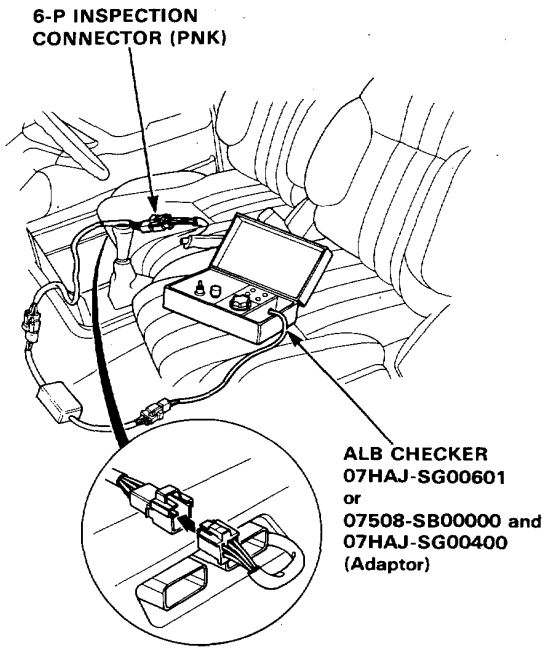


ALB Checker

Wheel Sensor Signal Confirmation

NOTE: Use the ALB checker (mode 0) to confirm proper wheel sensor operation.

1. Concent the 6-P inspection concenctor (PNK) of under the right front seat to the ALB checker.

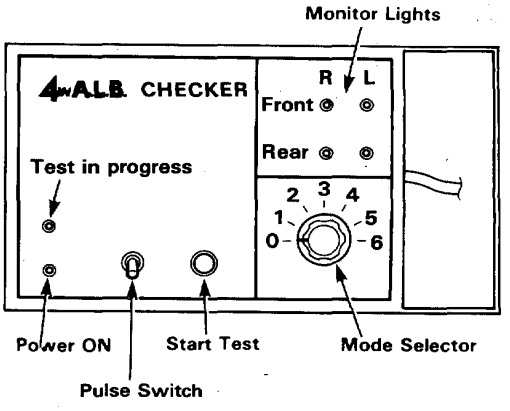


NOTE: The adaptor 07HAJ-SG00400 is not necessary when using of the checker 07HAJ-SG0601.

2. Raise the car so that all four wheels are off the ground and support on safety stands.

3. Turn the ignition switch ON.

4. Turn the Mode Selector switch to "0."



5. With the transmission in neutral, rotate each wheel briskly (one revolution per second) by hand and confirm that its respective monitor light on the checker blinks as the wheel rotares.

   NOTE:
   - Rotating a wheel too slowly will produce only a weak blink of its monitor light that may be difficult to see.
   - In bright sunlight, the monitor light may be difficult to see. Perform tests in a shaded area.
   - In some instances, it may not be posible to spin the front wheels fast enough to get a monitor indication, if necessary, start the engine and slowly accelerate and decelerate the front wheels.
     The monitor lights should blink indicating a good wheel sensor signal.

If any monitor light fails to blink, check the suspected sensor, its air gap and its wiring/connectors.

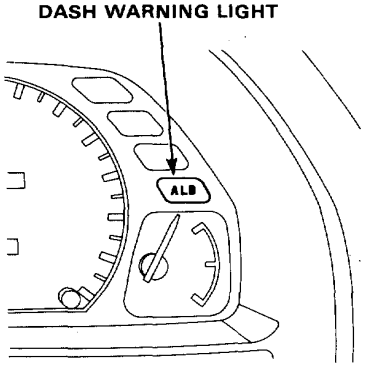
Dash Warning Light

1. The dash warning light will come on and the control unit memorizes the problem under certain conditions.

   NOTE: Problem codes explained on page 13-59.

   - The tire(s) adhesion is lost due to excessive cornering speed.
     Problem codes: 5, 5-4, 5-8.
   - The vehicle loses traction when starting from a stuck condition on a muddy, snowy, or sandy road.
     Problem code: 4.
   - When the parking brake is applied for more than 30 seconds while the vehicle is being driven.
     Problem code: 2.
   - The vehicle is driven on extremely rough road.

   The ALB system is OK, if the dash warning light: goes off after the engine is restared.



2. If you receive a customer's report that the dash warning light, sometimes comes on, check the system using the ALB checker to confirm whether there is any trouble in the system.
   See page 13-54.

3. The dash warning light will come on and the LED (see page 13-56) will display a problem code when there is insufficient battery voltage to the control unit. Anexample would be when the battery is so weak that the car must be jump-started.
   After the battery is sufficiently recharged, the dash warning light will work normally after the engine is stopped and restarted.

   However, after recharging the battery, the LED problem code must be cleared from the control unit's memory by disconnecting the ALB B2 fuse for at least 3 seconds.

Warning Light Circuit:

1. The dash warning light, does not go on when the ignition switch is turned on.
   Check the following items. If they are OK, check the control unit connectors.
   If not loose or discounnected, install a new control unit and recheck:

   - Blown dash warning light bulb.
   - Open circuit in GRN lead between No.1 fuse and combination meter.
   - Open circuit in BLU/RED lead between combination meter and control unit.
   - Loose component grounding of the control unit to the body.

2. The dash warning light remains ON or after the engine is started, however the LED on the control unit does not blink any code, check for the following.

   - Loose or poor conection of the wire harness at the control unit.
   - Faulty ALB B2 (15 A) fuse.
   - Open circuit in WHT lead between ALB B2 (15 A) fuse and control unit.
   - Open circuit in LT GRN/SLT lead between fuse No. 18 (10 A) and fail safe relay(s).
   - Open or short circuit in the YEL/GRN lead between control units.
   - Short circuit in BLU/RED lead between combination meter and control unit.
   - Open circuit in WHT/BLU or BRN/YEL lead between alternator and control unit.

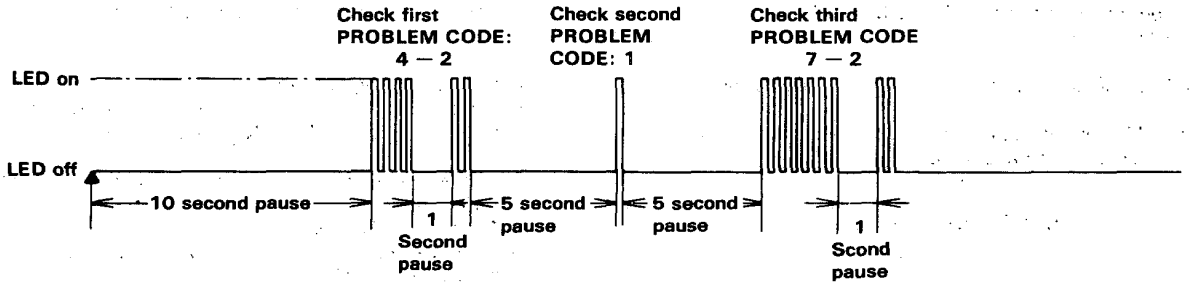
If the problem is not found substitute a known-good control unit and recheck whether the warning light remains ON.

(cont'd)

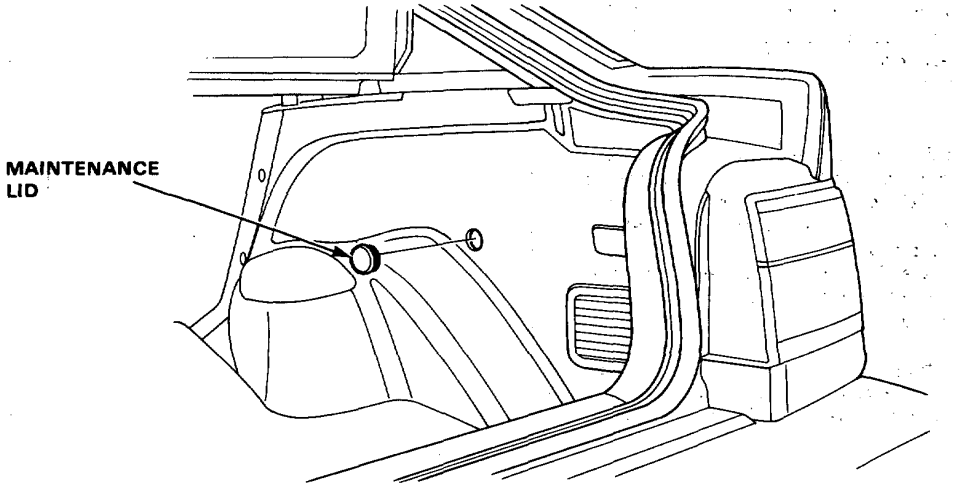
Dash Warning Light (cont'd)

Comes on and remains on while running:

1. Stop the engine.
2. Turn the ignition switch on and make sure that the dash warning light comes on.
3. Restart the engine and check the dash warning light.
   - There is no problem in the ALB system, if the dash warning light goes off.
   - Go step 4, if the dash warning light remains on.
4. Stop the engine.
5. Remove the maintenance lid.
6. Turn the ignititon switch on, but do not start the engine.
7. Record the blinking frequency of the LED on the control unit. The blinking frequency indicates the problem code.



NOTE:
- The control unit can indicate up to three problem codes.
- If the LED does not light, see Troubleshooting of warning light Circuit page 13-53.
- If you miscount the blinking frequency, turn the ignition twitch off, then turn on to blink the LED again.
- After the repair is completed, disconnect the ALB B2 fuse for at least 3 seconds to erase the control unit's memory. Then turn the ignition key on again and recheck.
- The memory of problem code is erased if the connector is disconnected from the control unit or the control unit is removed from the body.



Symptom-to-System Chart

PROBLEM CODE		PROBLEMATIC COMPONENT/ SYSTEM	AFFECTED				See page	OTHER COMPONENT	See page
MAIN CODE	SUB CODE		FRONT RIGHT	FRONT LEFT	REAR RIGHT	REAR LEFT			
1	—	Hydraulic Controlled Components	—	—	—	—	13-60	—ALB fuse —Motor realey —Pressure Switch —Accumulator —Modulator	13-93
2	—	Parking brake switch-related problem	—	—	—	—	13-63	Brake fluid level switch BRAKE light	
3	1	Pulser(s)	○				13-94		
	2			○					
	4				○	○			
4	1	Speed sensor	○				13-64		
	2			○					
	4				○				
	8					○			
5	—	Speed sensor(s)			○	○	13-65	—Modulator	
5	4				○				
	8					○			
6	—	Fail safe relay	—	—	—	—	13-66 (Function Test)	Front or rear fail safe relay	
6	1		—	—	—	—		Front fail safe relay	
	4		—	—	—	—		Rear fail safe relay	
7	1	Solenoid related problem (Open or short)	○				13-70	ALB 3 fuse	
	2			○				ALB 1 fuse	
	4				○	○		—Rear fail safe relay —Pressure Switch —Motor relay	

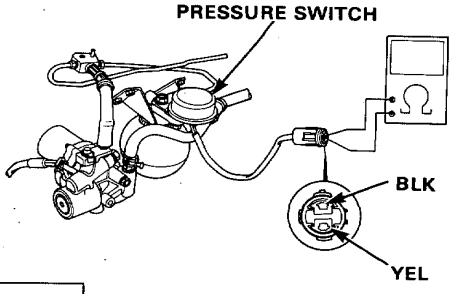
NOTE: In the event of simultaneous speed sensor or solenoid problems (codes 4 or 7), the control unit will only indicate the higher number sub-code.

Flowchart

Problem Code 1: Hydraulic Controlled Components.

NOTE: The LED does not blink when the following failures occur.
- The contact points of the motor relay remain closed (the motor runs continuously even after the ignition key is removed).
- YEL/RED lead is shorted or the control unit is intemally shorted (the motor stops when the ignition switch is turned lock).

Pre-test steps:
- Check No.35 (40A) Fuse.
- Check all brake system hoses and pipes (low and high pressure) for signs of leaking bending or kinking.
- Check reservoir fluid level, and if necessary, fill to the MAX level.



Disconnect the pressure switch connector and check the continuity between BLK andYEL terninals.

Is there continuity? YES → Bleed high pressure fluid from the maintenance bleeder with the ALB T-wrench. (see page 13-92)

NO

Check the continuity of pressure switch between BLK and YEL terminals.

Is there continuity? YES → **Replace the pressure switch (closed).**

NO

Reconnect the pressure switch connector.

Bleed high pressure fluid from the maintenance bleeder with the ALB T-wrench (see page 13-92). Jack up the front of car and support with safety stands, then run the engine in gear above 6 mph (10 km/h).

WARNING Block rear wheels before jacking up front of car.

(To page 13-61)

(From page 13-60)

Does the pump motor run?
- YES → (To page 13-62)
- NO

Disconnect the 18P connector from the control unit.

Check for continuity between the YEL terminal and body ground.

Is there continuity?
- YES → **Repair short in YEL wire between the control unit and pressure switch.**
- NO

Connect the YEL/RED terminal to body ground using a jumper wire. Turn the ignition switch ON.

Does the pump motor run?
- YES → **Faulty control unit.**
- NO

Remove the pump motor relay and check the pump motor relay (page 13-93)

Connect the WHT/RED and WHT/BLU terminals using a jumper wire.

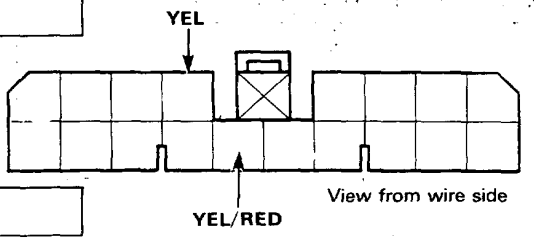
Does the pump motor run?
- NO → (To page 13-63)
- YES

Check voltage between the pump motor relay motor side ⊕ terminal and body ground (−).

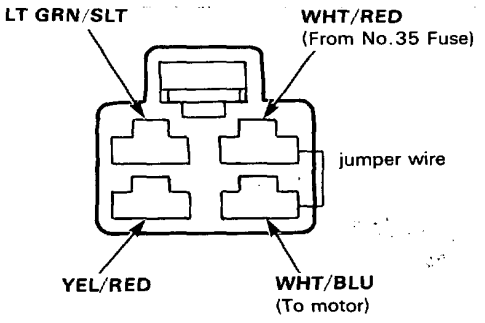
Is there battery voltage?
- NO → **Repair open in LT GRN/SLT wire between the No.18 (10A) fuse and pomp motor relay.**
- YES

Repair open in YEL/RED wire between the control unit and pump motor relay.

<CONTROL UNIT: 18P CONNECTOR>



<PUMP MOTOR RELAY CONNECTOR>



Flowchart(cont'd)

(From page 13-61)

Does the pump motor run with an increasingly loud, raspy sound?

NO → **Pump runs with a constant soft sound: Bleed air from ALB system using the procedure on page 13-92 and check the pump sound again**

YES

Does the pump motor stop after after about 60 seconds?

NO → **Pump stops after about 120 seconds: faulty pressure switch (open).**

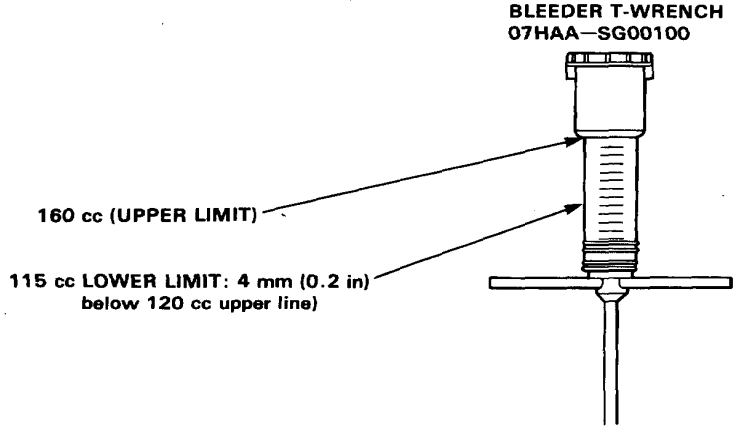
YES

Does the reservoir fluid level go down, and are there no bubbles in the modulator reservoir tank?

NO →
- **If level stays the same and there are bubbles in the modulator reservoir tank, check the accumulator fluid quantity by bleeding the high pressure line with the Bleeder T-wrench:**
  - **—If over 160 cc (upper limit). faulty accumulator.**
  - **—If under 115 cc (lower limit). modulator inlet solenoid leak or accumulator leak.**
- **If level goes up : faulty modulator assembly.**

YES

System is OK; recheck pump motor, to confirm no intermittent problem.



NOTE: The fluid enters the reservoir under pressure; wait 1 or 2 miniutes for air bubbles to disappear and level to stabilize.

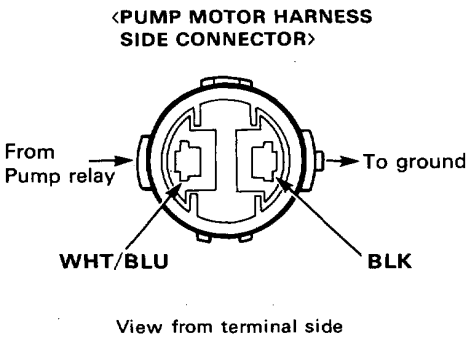
(From page 13-61)

Measure voltage between the WHT/BLU terminal (+) of the pump motor and body ground (−).

Is there battery voltage?

NO → **Repair open in WHT/BLU wire between motor relay and pump motor, or open in BLK wire between pump motor and ground or poor ground.**

YES → **Faulty pump motor.**



View from terminal side

Problem code 2: Parking Brake Switch Related Problem

If the parking brake has been released, the following items are possible causes. If they are OK, check the control unit connectors for good connection. If not loose or disconnected, substitute a known-good control unit and rechceck.

NOTE: Before Troubleshooting Problem Code 2, remove the ALB 2 fuse for three seconds to clear the control unit's memory, then test drive the car.
If the dash warning light and LED stay off, the probability is that the car was driven with the parking brake applied.

- The parking brake is applied for more than 30 seconds while driving.
- The brake fluid level in the master cylinder is too low.
- WHT/BLU lead is shorted between the BRAKE warning light and parking brake switch.
- WHT/BLU lead is shorted between the BRAKE warning light and brake fluid level switch.
- The BRAKE warning light is blown.
- WHT/BLU has an open between the BRAKE warning light and parking brake.
- WHT/BLU has an open between the parking brake switch and control unit.

(cont'd)

Flowchart (cont'd)

Problem Code 4-1 to 4-8: Speed Sensor

NOTE: Control unit will only indicate the higher number sub-code.

Ignition switch: OFF

Disconnect wire harness from speed sensor.

Check for resistance between sensor terminals.

Is there 500-1,000Ω? — NO → **Faulty speed sensor.**

YES

Disconnect the 18P connector from the control unit.

Check each wire for continuty between the sensor and control unit:
GRN/BLK: Front Right Positive
GRN/BLU: Front Left Positive
GRN/YEL: Rear Right Positive
BLU: Rear Left Positive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
SLT: Rear Left Negative

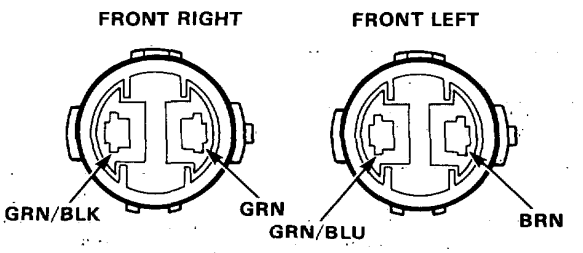
Is there continuity? — NO → **Repair open in sensor wire:**

GRN/BLK: Front Right Positive
GRN/BLU: Front Left Positive
GRN/YEL: Rear Right Positive
BLU: Rear Left Positive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
SLT: Rear Left Negative

YES

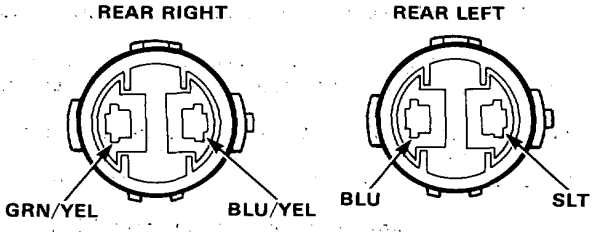
Faulty control unit

<SENSOR SIDE CONNECTOR>



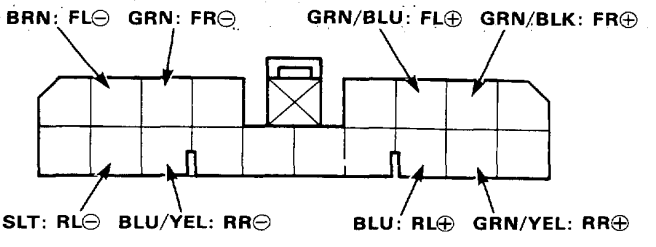
View from terminal side

<SENSOR SIDE CONNECTOR>



View from terminal side

<CONTROL UNIT 18P CONNECTOR>



View from wire side

Problem Code 5 to 5-4, 5-8: Speed Sensor(s)

Disconnect wire harness from speed sensor.

Check for resistance between sensor terminals.

Is there 500—1000 Ω?

NO → **Faulty speed sensor.**

YES

Disconnect the 18P connector from the control unit.

Check each wire for continuity between the sensor and control unit:
GRN/BLK: Front Right Positive
GRN/BLU: Front Left Positive
GRN/YEL: Rear Right Positive
BLU: Rear Left Positive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
SLT: Rear Left Negative

Is there continuity?

NO → **Repair open in sensor wire:**

GRN/BLK: Front Right Positive
GRN/BLU: Front Left Positive
GRN/YEL: Rear Right Positive
BLU: Rear Left Positive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
SLT: Rear Left Negative

YES

Reconnect the 18P connector to the control unit and connectors to the speed sensors.

Connect ALB checker to inspection connector.

Check ALB function in MODE 2 and 3.

Does it work properly?

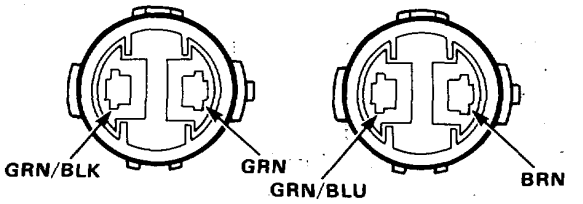
NO → **Faulty modulator.**

YES

- **Incorrect the air gap (page 13-94)**
- **Faulty control unit.**

<SENSOR SIDE CONNECTOR>

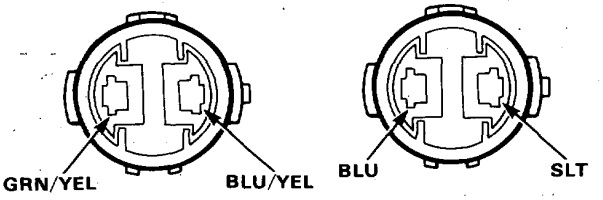
FRONT RIGHT FRONT LEFT



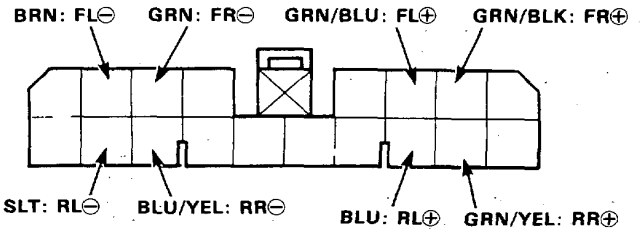
View from terminal side

<SENSOR SIDE CONNECTOR>

REAR RIGHT REAR LEFT



<CONTROL UNIT 18P CONNECTOR>



View from wire side.

Flowchart (cont'd)

Problem Code 6-1: Front Fail Safe Relay Circuit

Remove front fail safe relay

Check relay function (page 13-93)

Does it work properly? NO → **Faulty the front fail safe relay.**

YES

Check for continuity between BLK lead of relay connector and body ground.

Is there conitinuity? NO → **Repair open in BLK wire between the fail safe relay and ground or poor ground.**

YES

Turn ignition switch ON.

Check for voltage between LT GRN/SLT lead (+) and body ground (−).

Is battery voltage available? NO → **Repair open in LT GRN/SLT wire between the fail safe relay and No.18 fuse (10 A).**

YES

Turn ignition switch OFF.

Disconnect the 3P connectors from the front solenoids.

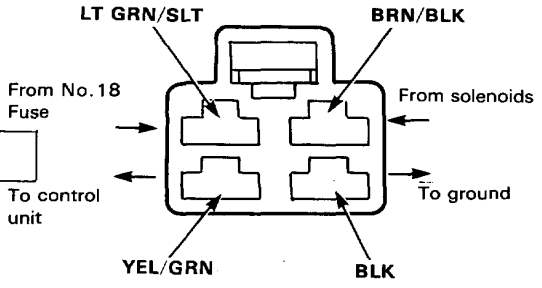
Check for continuity in BRN/BLK lead between fail safe relay and solenoids.

Is there continuity? NO → **Repair open in BRN/BLK wire between the solenoids and fail safe relay.**

YES

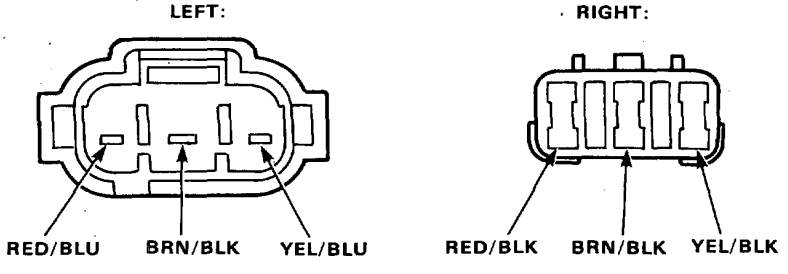
(To page 13-67)

<FRONT FAIL SAFE RELAY CONNECTOR HARNESS SIDE>



View from terminal side

<FRONT SOLENOIDS CONNECTOR HARNESS SIDE>



View from terminal side

(From page 13-66)

Check for resistance between RED and BLK terminals of front solenoids.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Check for resistance between YEL and BLK terminals of front solenoids.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Disconnect the 12P connector from the control unit.

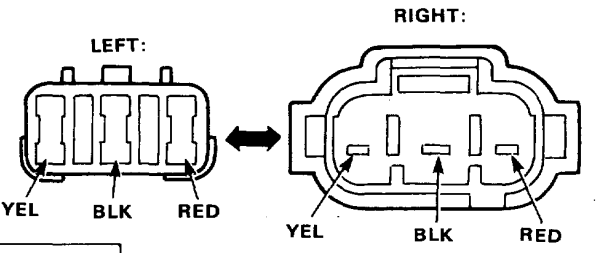
Check for continuity between control unit and front solenoid.
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet.

Is there continuity ? NO → **Repair open in wire:**
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

YES

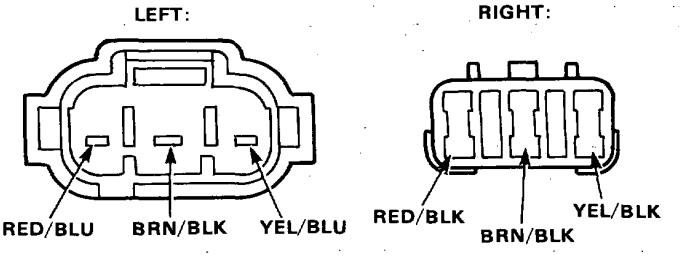
- **Faulty control unit.**
- **Incorrect air gap (page 13-94)**

<FRONT SOLENOID CONNECTOR>



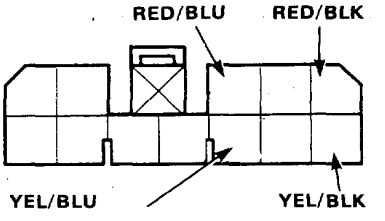
View from terminal side

<FRONT SOLENOIDS CONNECTOR HARNESS SIDE>



View from terminal side

<CONTROL UNIT 12P CONNECTOR>



View from wire side.

Flowchart(cont'd)

Problem Code 6-4: Rear Fail Safe Relay Circuit

Remove rear fail safe relay.

Check relay function (page 13-93)

Does it work properly? NO → **Faulty relay.**

YES

Check for continuity between BLK lead of relay connector and body ground.

Is there continuity? NO → **Repair open in BLK wire between the relay and ground or poor ground.**

YES

Turn ignition switch ON.

Check for voltage between LT GRN/SLT lead (+) of wire harness and body ground (−).

Is battery voltage available? NO → **Repair open in LT GRN/SLT wire between the relay and No.18 fuse.**

YES

Turn ignition switch off.

Disconnect the 3P connector from the rear solenoid.

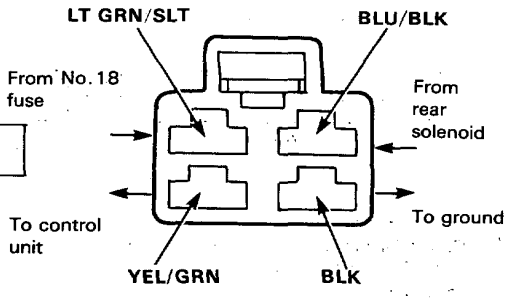
Check for continuity in BLU/BLK lead between fail safe relay and solenoid.

Is there continuity? NO → **Repair open in BLU/BLK wire between the relay and solenoid.**

YES

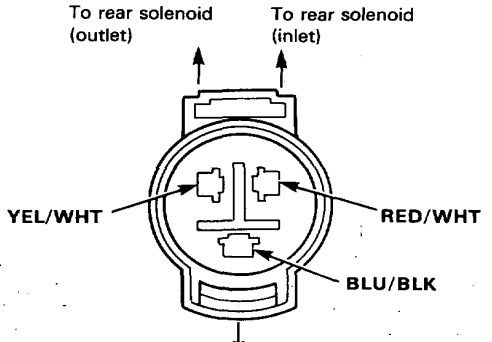
(To page 13-69)

<REAR FAIL SAFE RELAY CONNECTOR HARNESS SIDE>



View from terminal side

<REAR SOLENOID CONNECTOR HARNESS SIDE>



View from terminal side

(From page 13-68)

Disconnect the 18P and 12P connectors from the control unit.

Check for continuity in YEL/GRN lead between fail safe relay and control unit.

Is there continuity? NO → **Repair open in YEL/GRN wire between the relay and control unit.**

YES

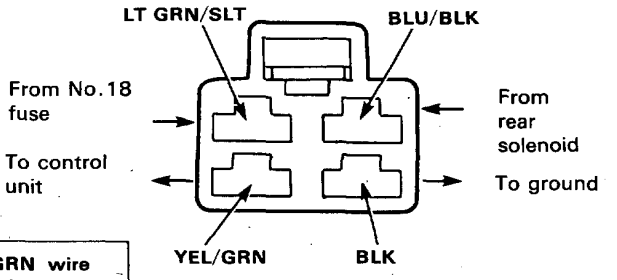
Check for continuity between control unit and rear solenoid.
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

Is there continuity: NO → **Repair open in wire between the solenoid and control unit:**
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet.

YES

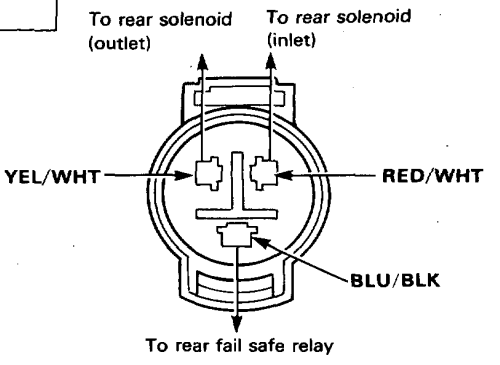
Faulty control unit.

<REAR FAIL SAFE RELAY CONNECTOR HARNESS SIDE>



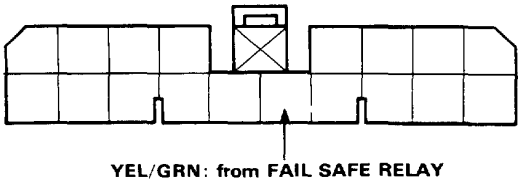
View from terminal side

<REAR SOLENOID CONNECTOR HARNESS SIDE>

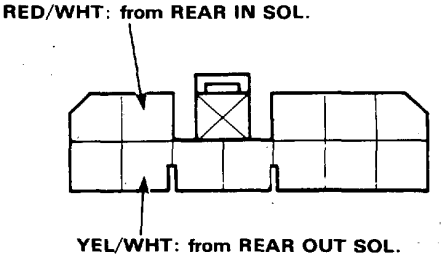


View from terminal side

<CONTROL UNIT 18P CONNECTOR>



<CONTROL UNIT 12P CONNECTOR>



View from wire side

Flowchart (cont'd)

Problem Code 7-1 and 7-2 Front Solenoid Related Problem

Disconnect wire harness from front solenoids

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1-3 Ω? — NO → **Faulty solenoid.**

YES

Check for resistance between YEL and BLK terminals of front solenoid.

Is there 1-3 Ω? — NO → **Faulty solenoid.**

YES

Disconnect the 12P connector from the control unit.

Check for continuity between control unit and front solenoid:
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet.

Is there continuity ? — NO → **Repair open in wire:**
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

YES

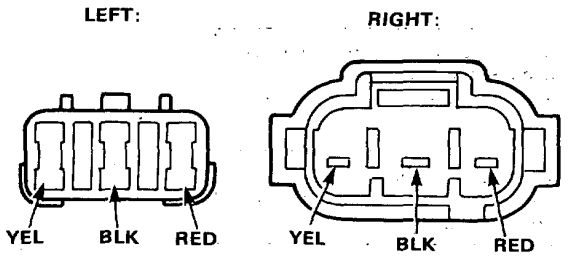
Check for continuity between control unit and body ground.
RED/BLK: Front Right Intel
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Intel
YEL/BLU: Front Left Outlet

Is there continuity? — YES → **Repair short in wire:**
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Intel
YEL/BLU: Front Left Outlet

NO

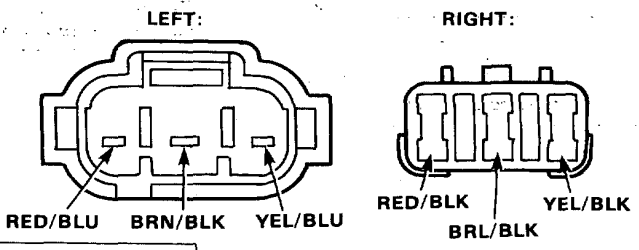
- **Faulty control unit.**
- **Incorrect air gap (page 13-94)**

<FRONT SOLENOID CONNECTOR>



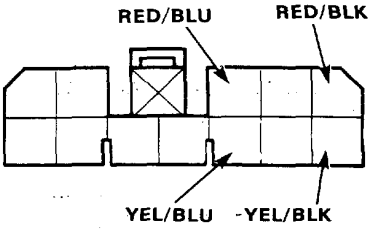
View from terminal side

<FRONT SOLENOIDS CONNECTOR HARNESS SIDE>



View from terminal side

<CONTROL UNIT 12P CONNECTOR>



Problem Code 7-4: Rear Solenoid Related Problem

Disconnect wire hamess from rear solenoid

Check for resistance between RED and BLK terminals of rear solenoid.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Check for resistance between YEL and BLK terminals of rear solenoid.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Disconnect the 12P connector from the control unit.

Check for continuity between control unit and rear solenoid.
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

Is there continuity? NO → ***Repair open in wire between the rear solenoid and control unit:***
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

YES

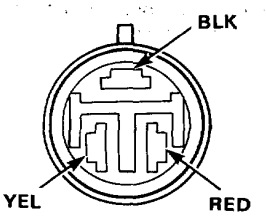
Check for countinuity between control unit and baby ground.
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

Is there continuity? YES → **Repair short in wire:**
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

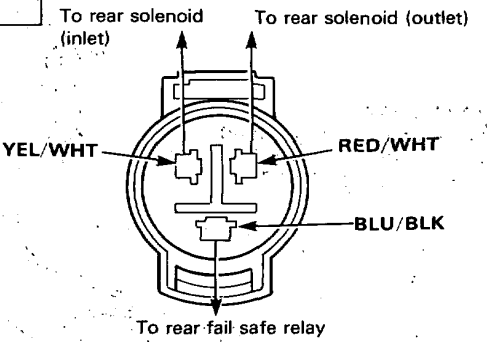
NO

Faulty control unit.

<REAR SOLENOID CONNECTOR>

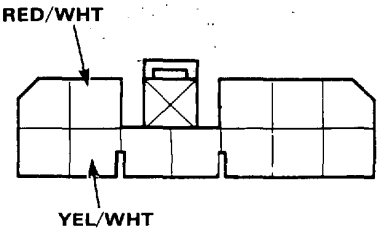


<REAR SOLENOID CONNECTOR HARNESS SIDE>



View from terminal side

<CONTROL UNIT 12P CONNECTOR>



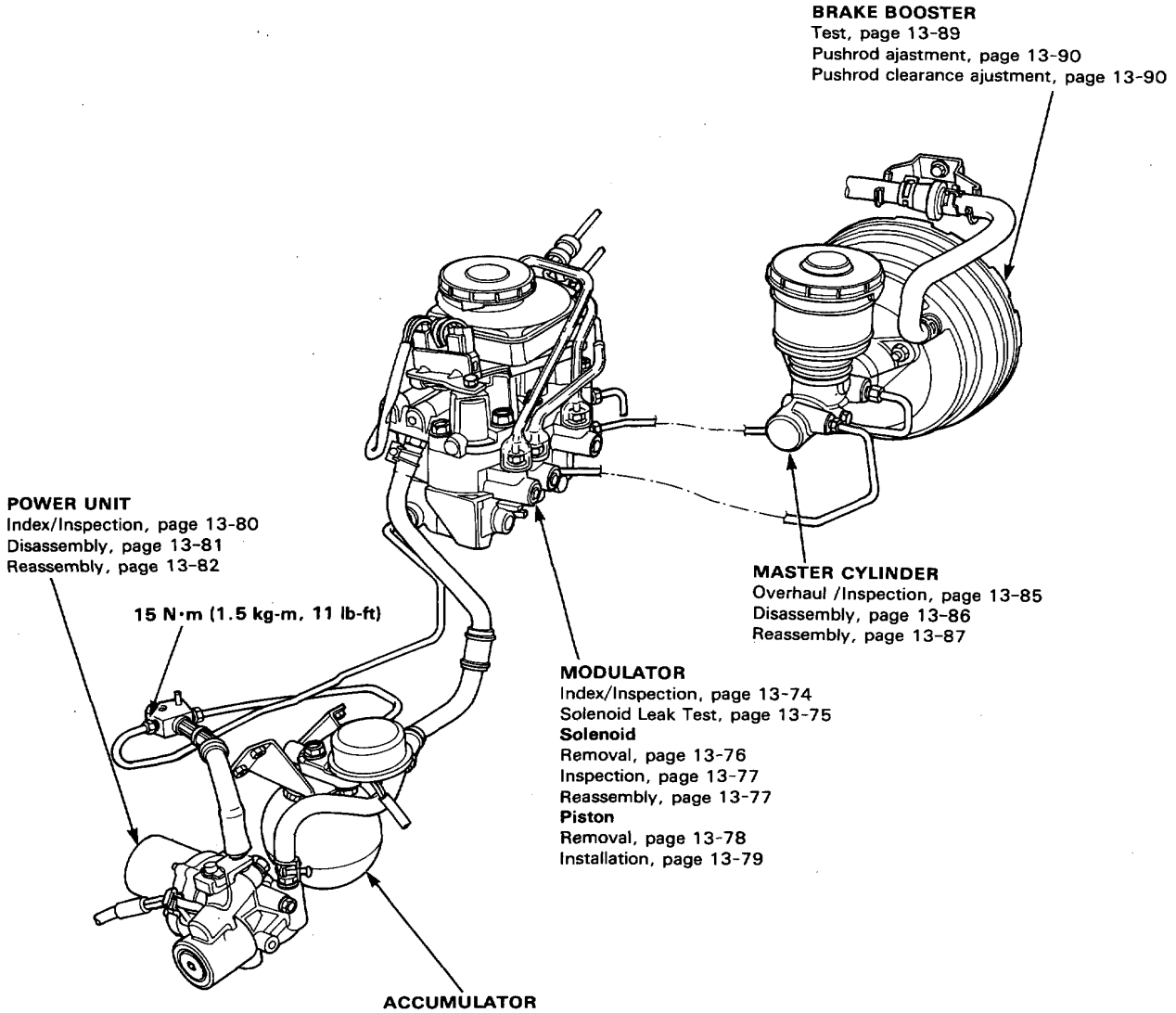
View from wire side.

Hydraulic System

Index

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.
- The flare nuts should be tightened to **19 N·m (1.9 kg-m, 14 lb-ft)**.
- The brake pipes and modulator pipe fittings are color coded.



Relieving Accumulator/Line Pressure

WARNING Use the Bleeder T-Wrench before disassembling the parts shaded in the illustration.

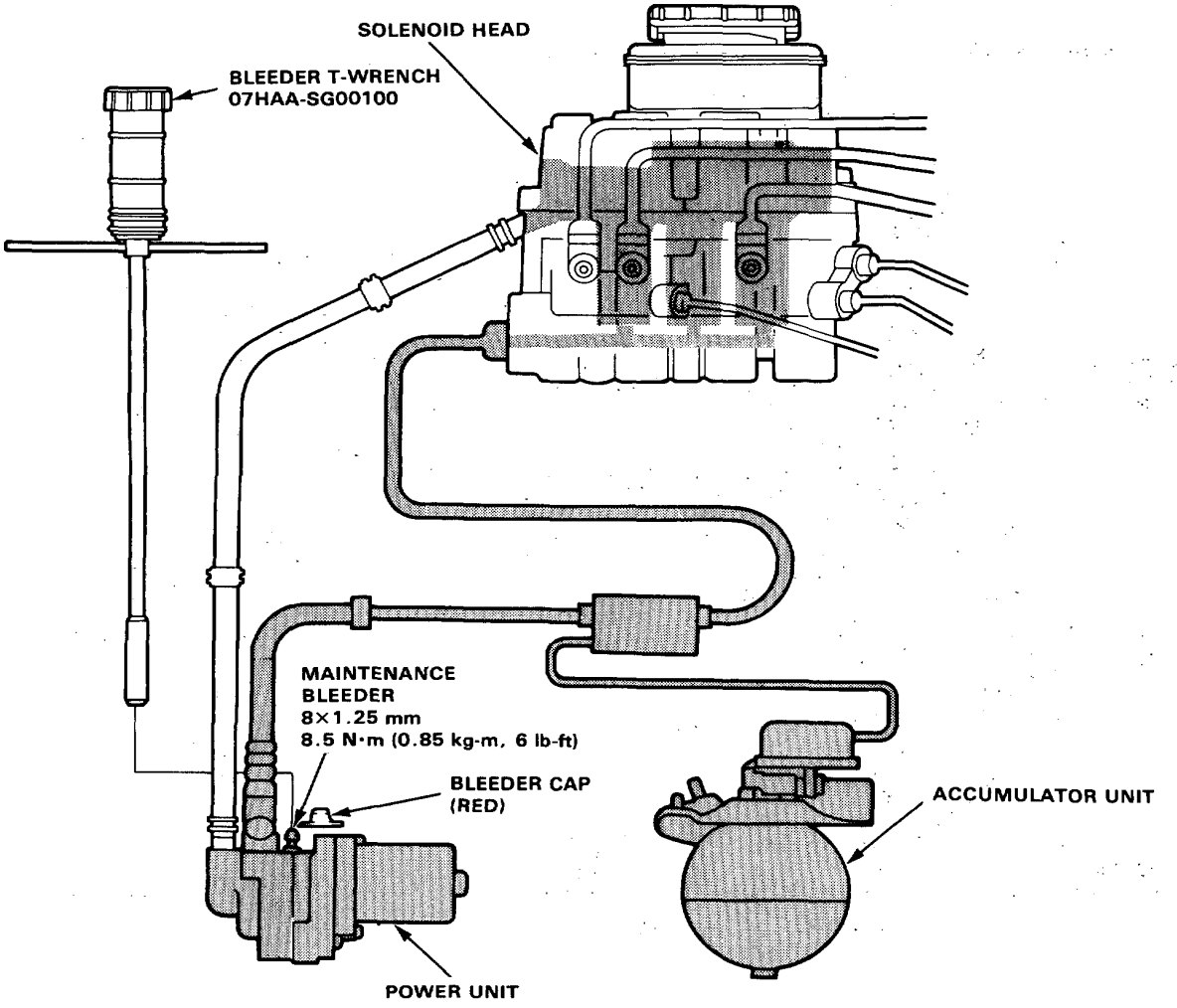
1. Drain the brake fluid from the master cylinder and modulator reservoir thoroughly.
2. On the Fuel-Injected engine, remove the air intake tube.
3. Remove the red cap from the bleeder on the top of the power unit.
4. Install the special tool on the bleeder screw and turn it out slowly 90° to collect high pressure fluid into reservoir. Turn the special tool out one complete turn to drain the brake fluid thoroughly.
5. Retighten the bleeder screw and discard the fluid.
6. Reinstall the red cap.

Brake Fluid Draining

1. Draining brake fluid from modulator tank: The brake fluid may be sucked out through the top of the modulator tank with a syringe. It may also be drained through the pump joint after disconnecting the pump hose.
2. Draining brake fluid from master cylinder: Loosen the bleed screw and pump the brake pedal to drain the brake fluid from the master cylinder.

WARNING

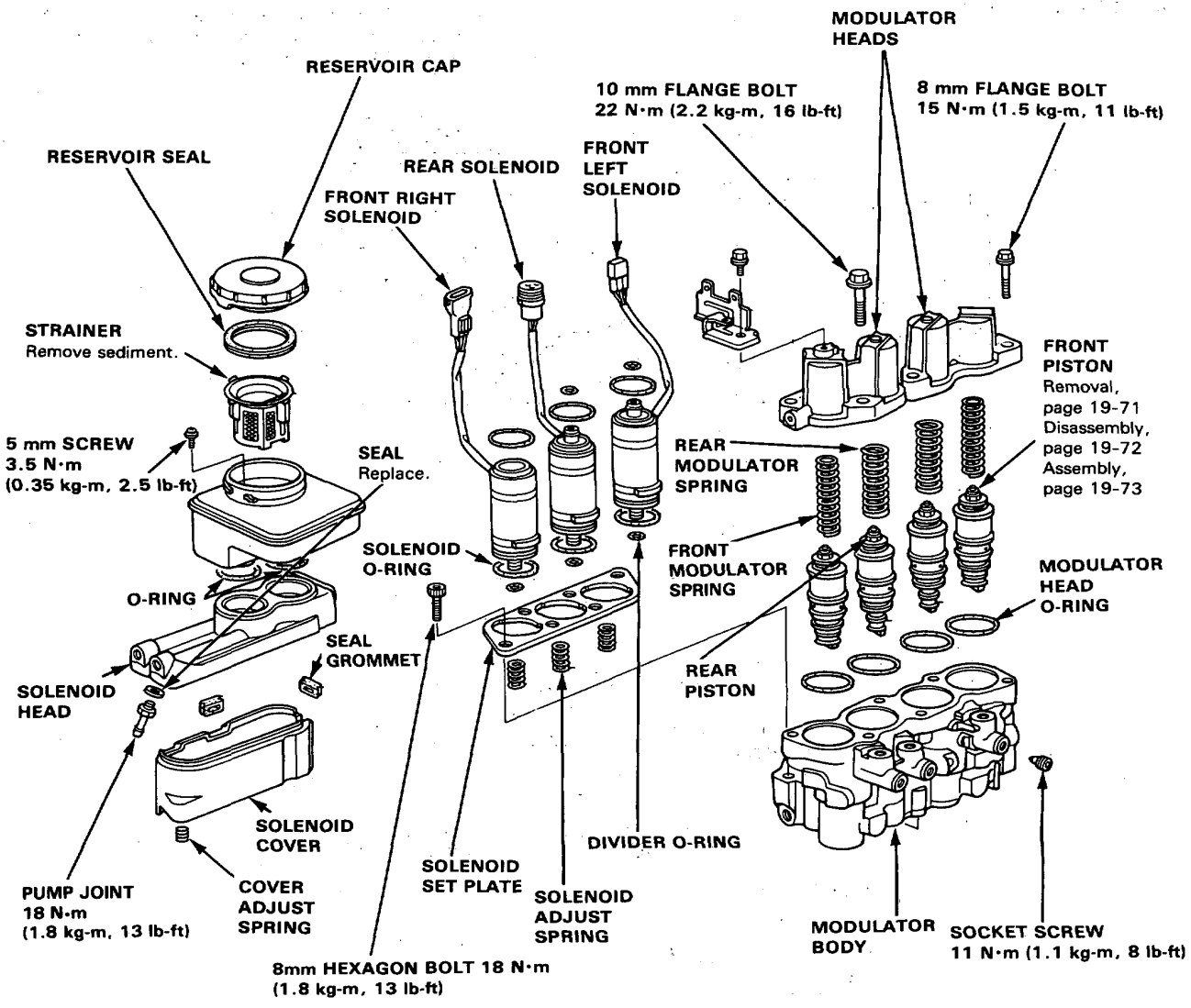
- **High pressure fluid will squirt out if the tube shaded is removed or the solenoid head 8 mm and 10 mm bolts are loosened.**
- **To drain high pressure breke fluid, follow the procedure under Relieving of High Pressure Brake Fluid on this page.**



Modulator

Index/Inspection

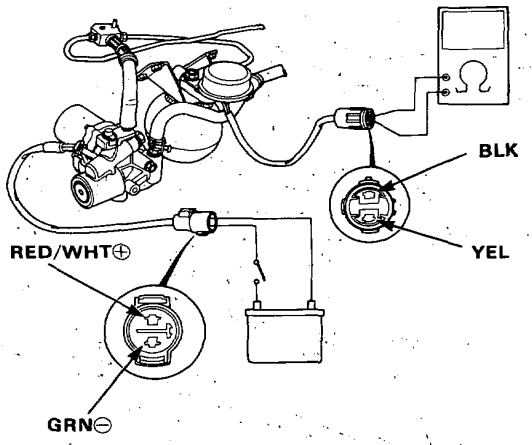
CAUTION:
- Do not spill brake fluid on the car; it may demage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Use only new DOT3 or DOT4 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.
- Do not reuse the drained fluid.
- Replace all rubber parts with new ones whenever the modulator is disassembled.



Solenoid

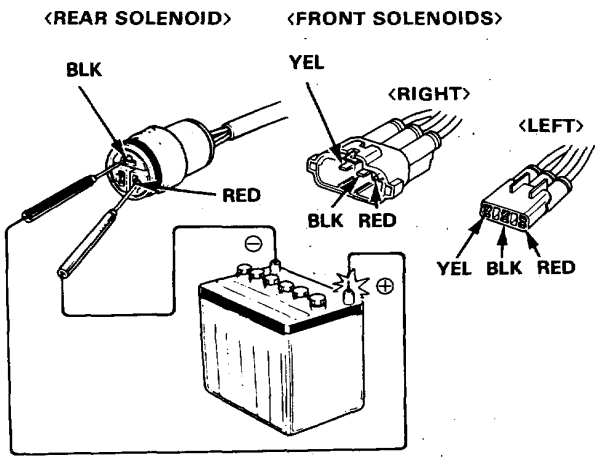
Solenoid Leak Test

1. Connect circuit tester (Ω range) between the BLK and YEL terminels of the accumulator pressure switch connector.
2. Attach the positive (+) lead of a fully charged 12v bettery to the RED/WHT terminal of the power unit motor connector and ndgative (−) lead to the GRN terminal, and install a switch between as shown.
3. Turn the switch on to allow sufficient pressure to build up within the accumulator and check for continuity with the circuit tester. If the circuit tester shows continuity (pressure switch turned on), run the power unit for 4 seconds more, then turn the switch off.



Check for continuity 1 minute after switch was turned off.
No continuity: Leaky solenoid (if the pipe joint is tight) or faulty divider O-ring.

4. Apply 12 V across the BLK and RED terminals of the solenoid connector momentarily.



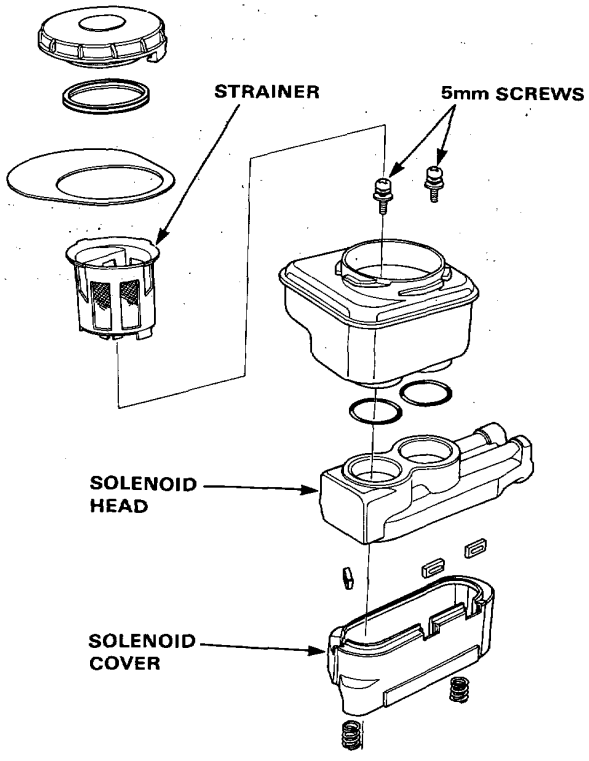
NOTE: Modulator reservoir may overflow.

- Check if the solenoid hisses or squeaks. Replace the modulator if the solenid hisses or squeaks.
- Make sure that the solenoid does not hiss or squeak after it has clicked into position. Replace the modulator if the solenoid hisses or squeaks.
- Check the pressure switch for continuity within one minute. It is normal if there is continuity. If there is no continuity, solenoid is faulty and must be replaced.

Solenoid

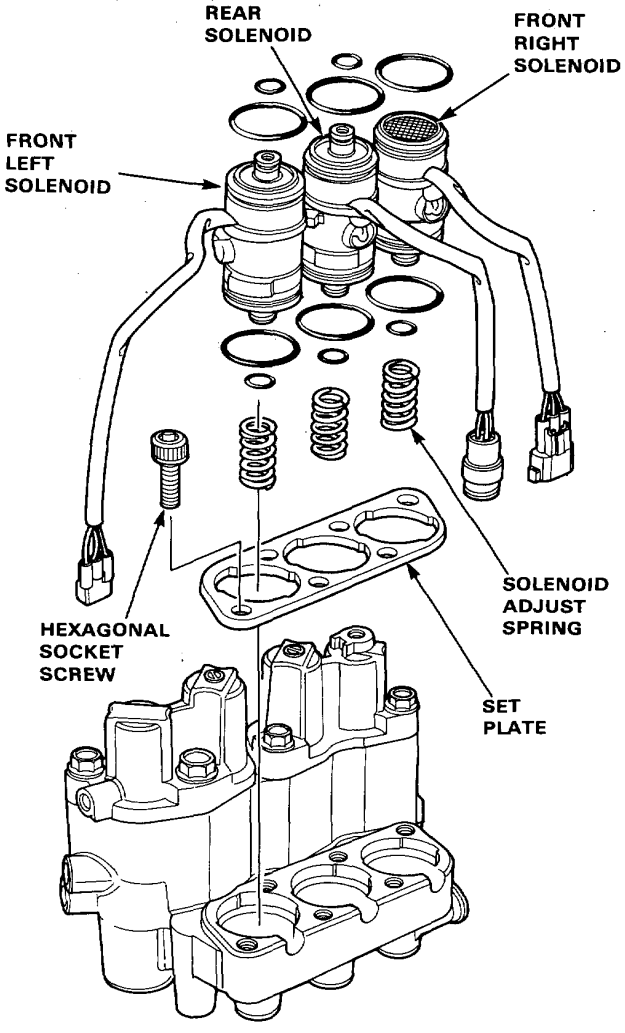
Removal

1. Drain the brake fluid from the modulator tank.
2. Drain the high pressure brake hose (page 13-73).
3. Disconnect the inlet hose.
4. Remove the reservoir strainer.
5. Remove the 5 mm screws and remove the reservoir.
6. Screw the 6 mm bolt into the threaded hole in the center of the solenoid head, reaine the solenoid head parallel to the ground and remove it.
7. Remove the solenoid cover.



8. Remove the hexagonal socket screws and loosen the solenoid set plate.
9. Turn the solenoid valves several times until they move freely and turn the solenoid valves 1/2 turn to align their projection with the cutout in the set plate. Remove the solenoid valves together with the set plate.

CAUTION: The solenoid valves are delicate parts. Be careful not to drop them.



Inspection

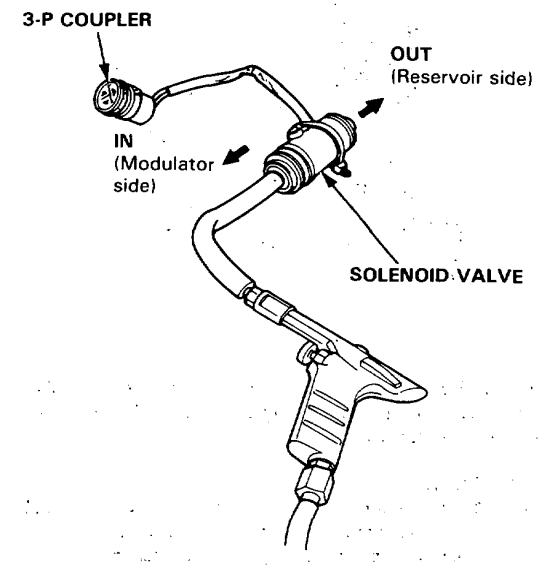
1. Connect a tube to the inlet of the solenoid valve. Apply compressed air to the solenoid valve through the tube.

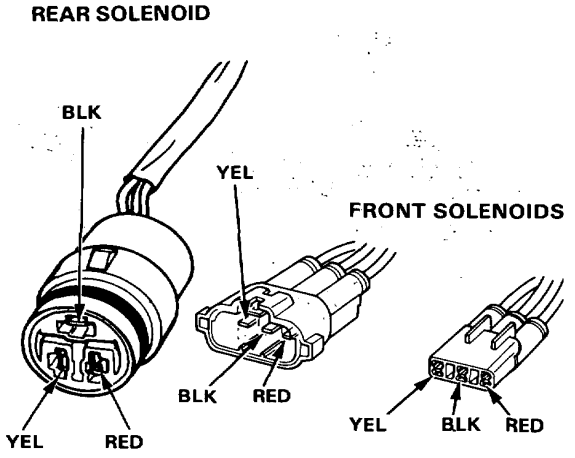
2. Check the solenoid valve for proper operation by connecting a 12 V fully charged battery to the 3-P coupler terminals:

   Voltage not applied: There should be no air flow.

   BLK — RED: There should be air flow through IN and OUT.

   BLK — YEL: There should be air flow through IN.

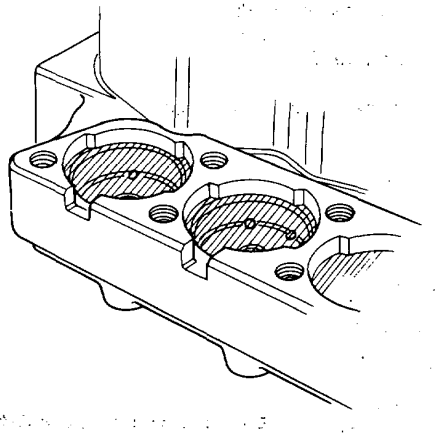




Reassembly

1. Fill the modulator body with brake fluid up to the step in the solenoid mounting hole.

   NOTE: On solenoid valve assembly, place shop rags over the solenoid valve and under the modulator valve to prevent the brake fluid from spilling on the valve.

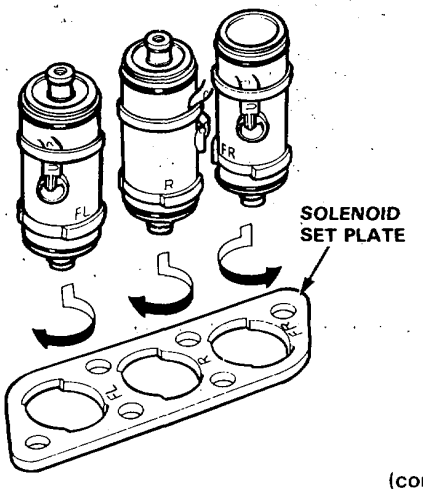


2. Coat the O-ring with the clean brake fluid and install the O-ring onto the solenoid valve.

3. Install the solenoid valves on the set plate.

   WARNING Each solenoid valve and set plate are marked for correct installation. If the solenoid valves are interchanged, the system will not work properly. Refer to the marks and be sure to install them in correct positions.

   - Align the projection on the solenoid valve with the cutout in the set plate and turn the valve 1/2 turn. The solenoid wire should face rearward.

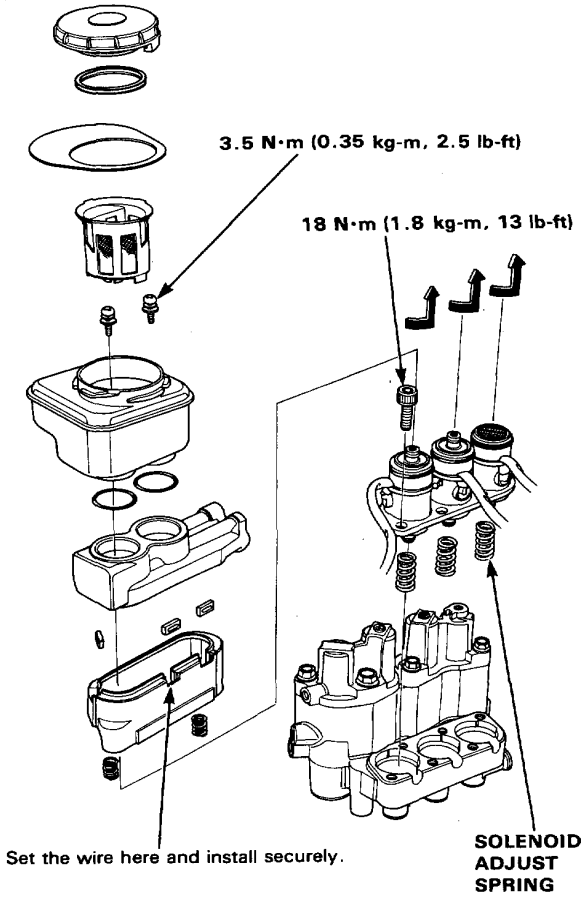


(cont'd)

Solenoid

Reassembly (cont'd)

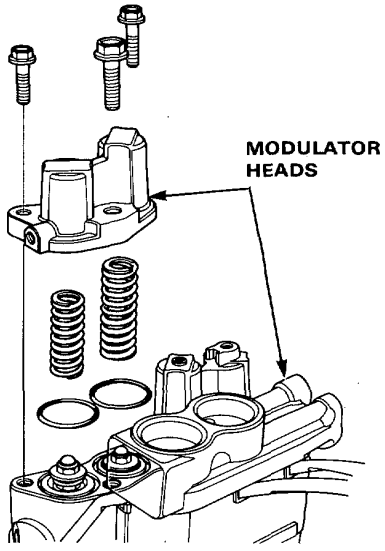
4. Install the solenoid adjust springs on the modulator body.
5. Install the solenoid valves and set plate and secure with the hexagonal socket screws.
6. Install the solenoid cover and solenoid head.
7. Install the reservoir tank.
8. Install the tank filter.
9. Connect the low pressure hose.



Piston

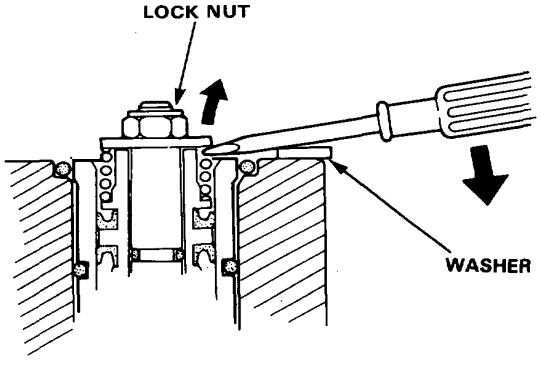
Removal

1. Remove the modulator heads.



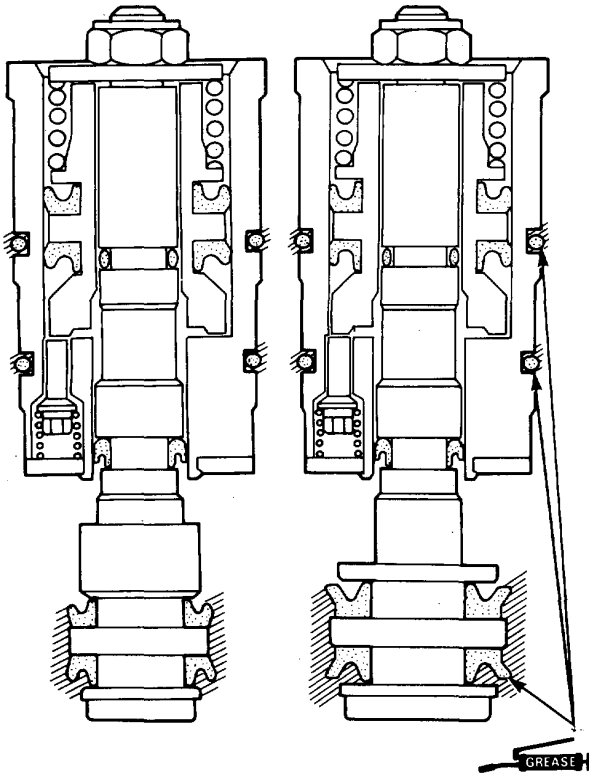
2. Insert the driver into the spring, pry off the piston assembly until it lifts up slightly and pull out the lock nut with a pair of pliers.

CAUTION:
- **Set the washer between the driver and modulator body to prevent damage to the body.**
- **Be careful not to damage the piston sleeve.**

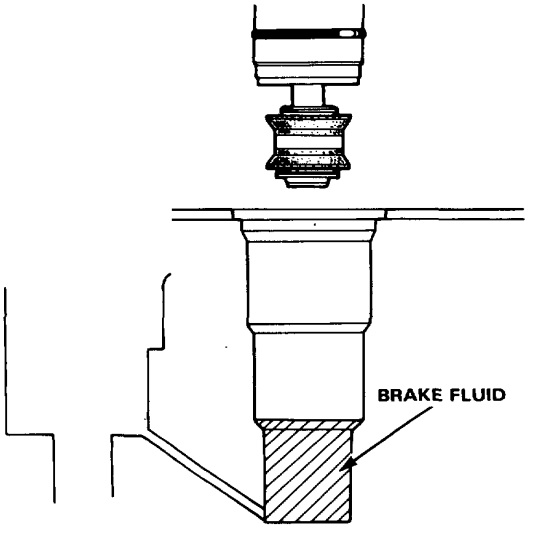


Installation

1. Apply rubber grease to the shaded sections of the piston assembly, shown in the drawing below.

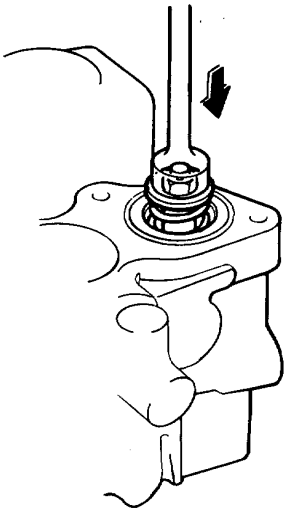


2. Adjust so that the brake fluid flows into the piston mounting hole in the modulator body.



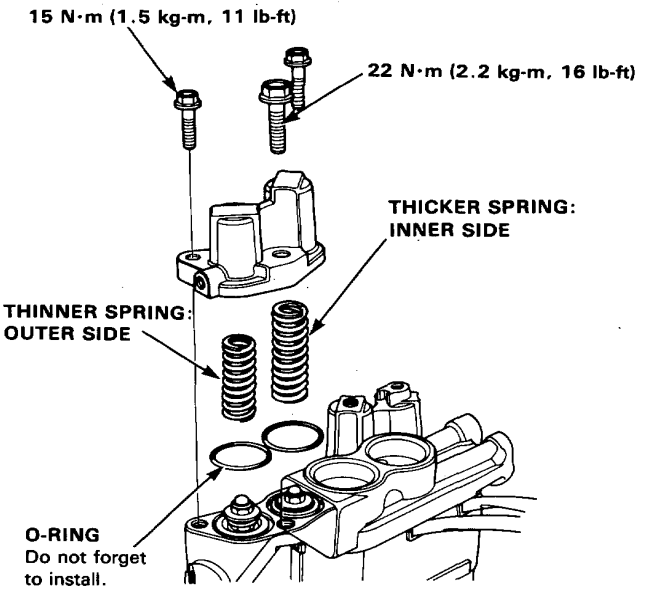
3. Set the piston assembly in the piston mounting hole in the modulator body and push down on the piston.

4. Push on the piston about 5 times until no bubbles come out of the solenoid side.



5. Install the modulator springs.

6. Install the solenoid heads with care not to pinch the O-rings.

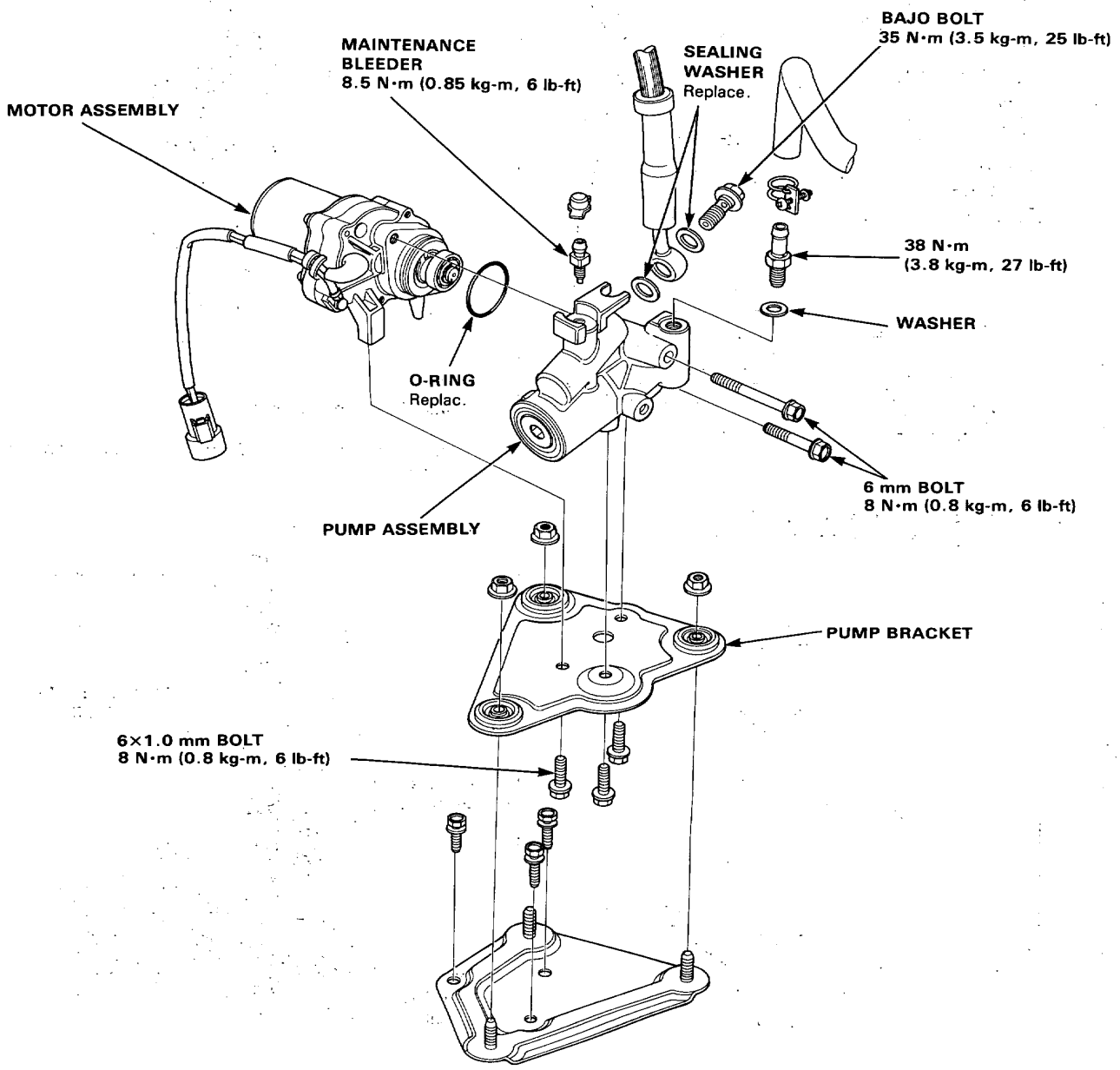


Power Unit

Index/Inspection

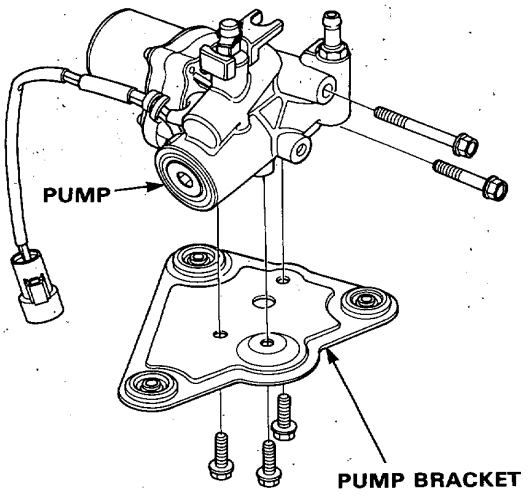
CAUTION:

- Do not attempt to disassemble the power unit parts except for those shown exploded in this illustration.
- 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 reassembing, 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.

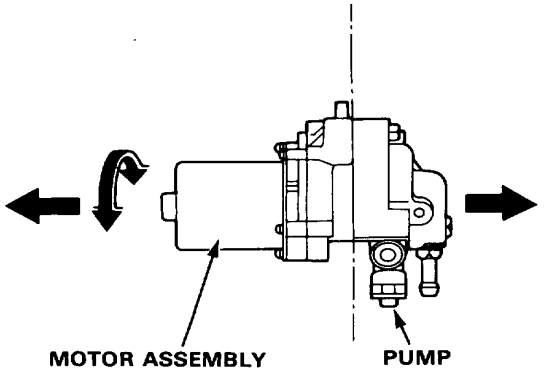


Disassembly

1. Remove the pump bracket.
2. Remove the 6 mm bolts attaching the pump to the pump motor.

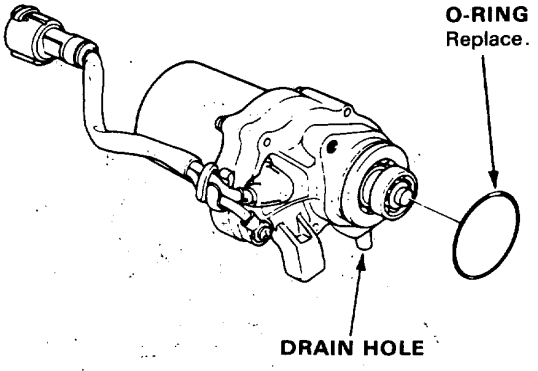


3. Separate the motor from the pump while rotaing the pump right and left.



NOTE: About 10 cc(0.6cu-in)of brake fluid will flow out when the motor is removed from the pump.

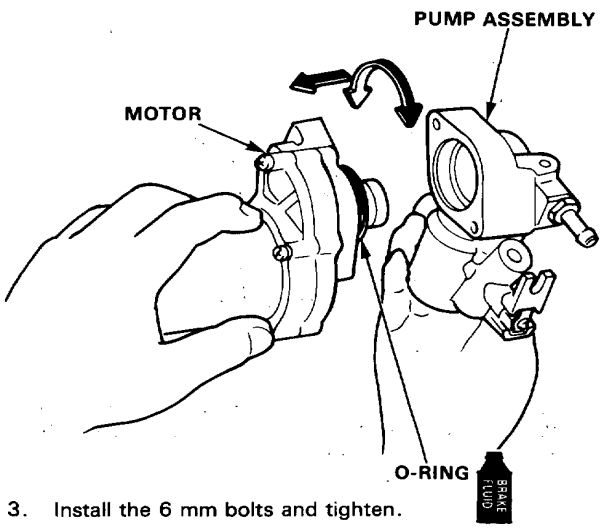
4. Wash the motor with clean brake fluid only on the exposed end and blow dry with compressed air.



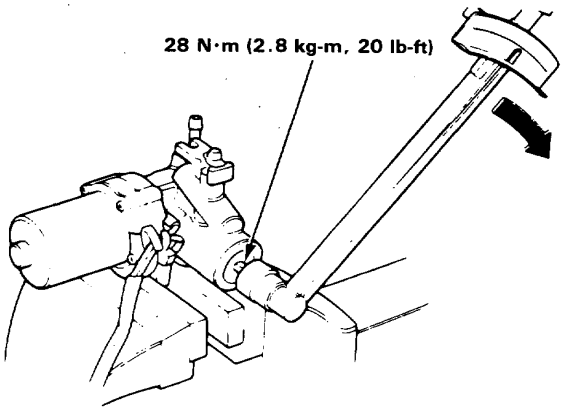
NOTE: Do not wash or dip the motor in brake fluid. Also be careful not to allow oil or water to enter the inside through the water drain hole.

Reassembly

1. Install a new O-ring on the pump motor.
2. Coat the O-ring with clean brake fluid and install the pump assembly on the motor while rotating it right and left by hand.

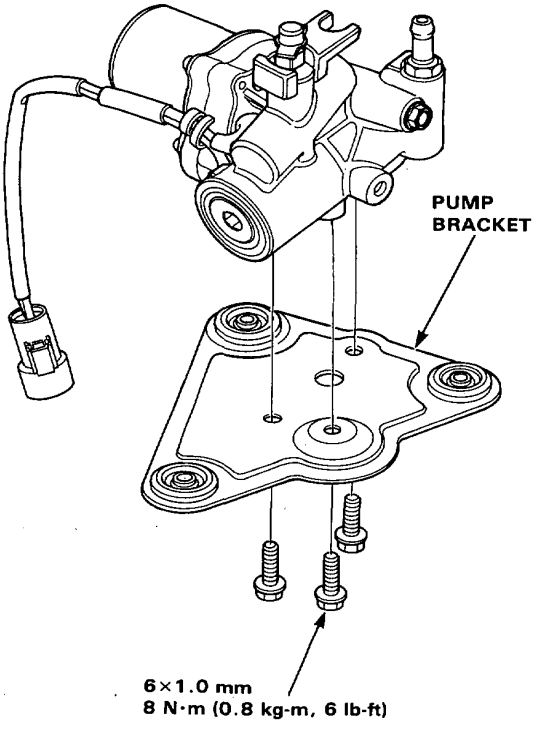


3. Install the 6 mm bolts and tighten.
4. Place the motor in a vise as shown and tighten the outlet plug.



NOTE: Clamp the pump in a vise only as shown above.

9. Install the pump bracket.



Accumulator Unit

Index

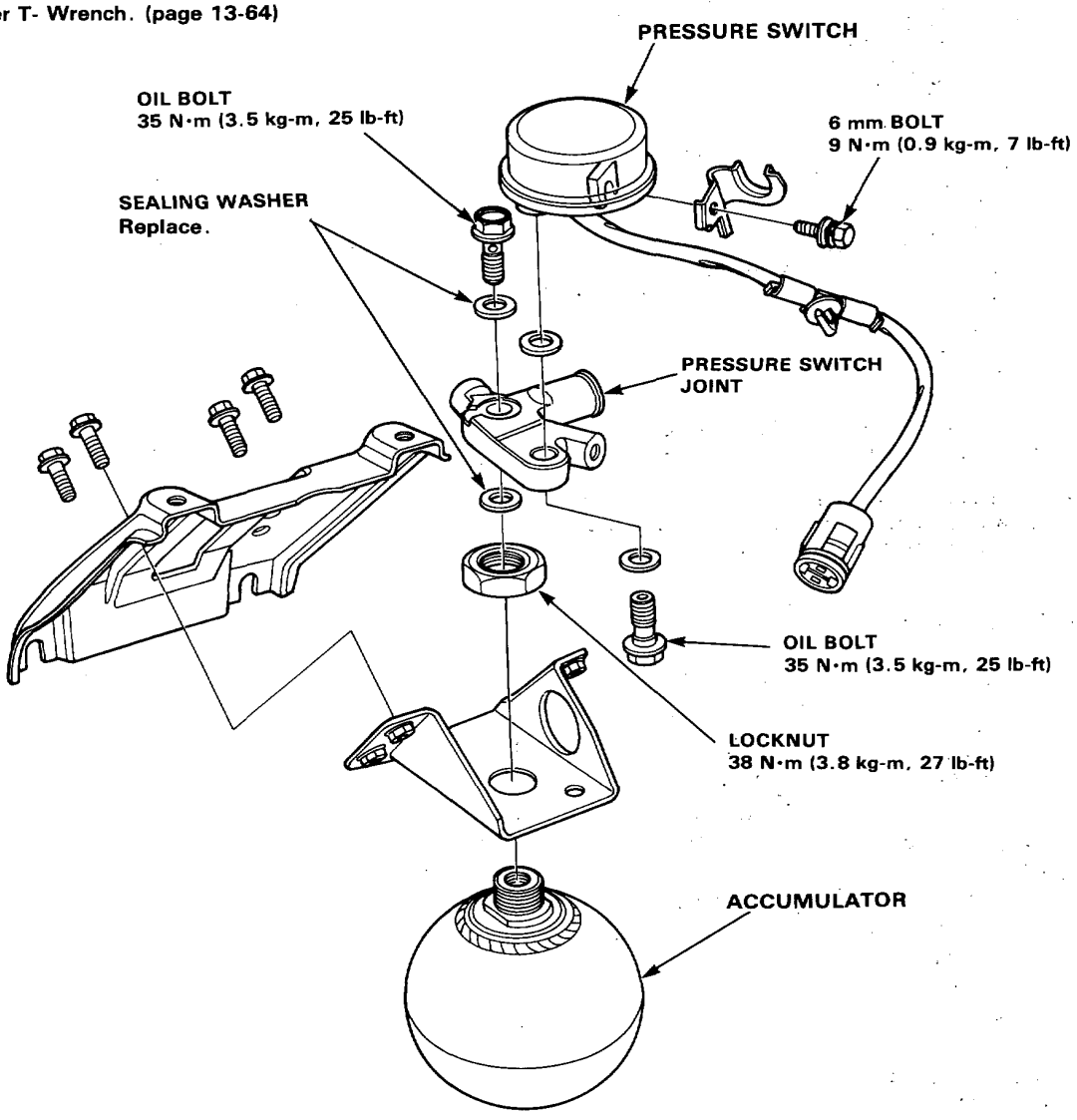
CAUTION:
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed 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.
- Before disassembly the accumulator unit, Bleed the high pressure brake fluid out from the system using the Bleeder T- Wrench. (page 13-64)

- 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.

NOTE:
- Replace O-ring with new one whenever disassembled.

WARNING The accumulator contains high pressure nitrogen gas, do not puncture expose to flame or attempt to disassemble the accumulator or it may explode; severe personal injury may result.

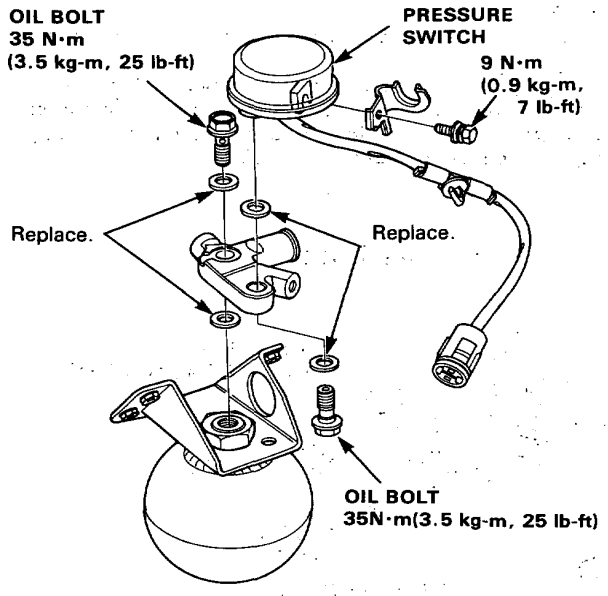


Accumulator

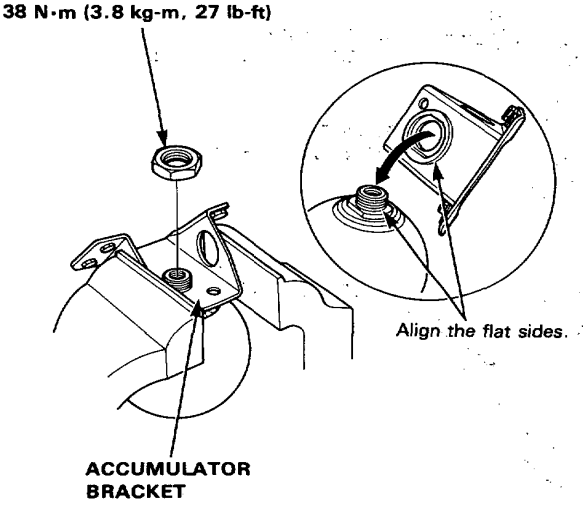
Accumlator/Pressure Switch

WARNING **Drain the high pressur brake fluid from the power unit (see page13-73).**

1. Remove the oil bolt, then remove the accumulator from the pressure switch joint.



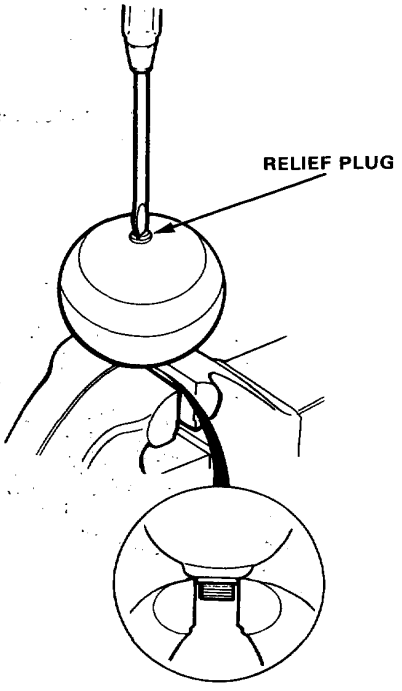
2. Remove the oil bolt, then remove the pressure switch from the pressure switch joint.
3. Set the accumulator bracket in a vise, hold the accumulator with your hand, and remove the accumulator nut with 27 mm socket and impact wrench.



Accumulator Disposal

WARNING **The accumbllator contains high pressure nitrogen gas. Do not puncture, expose to the flame, or attempt to disasserble the accumulator or it may explode and severe personal injury may result.**

1. Secure the accumulator in a vise so that the relief plug points straight up.
2. Slowly turn the plug 3-1/2 turns and then wait 3 minutes for all pressure to escape.
3. Remove the plug completely and dispose of the accumulator unit.



Master Cylinder

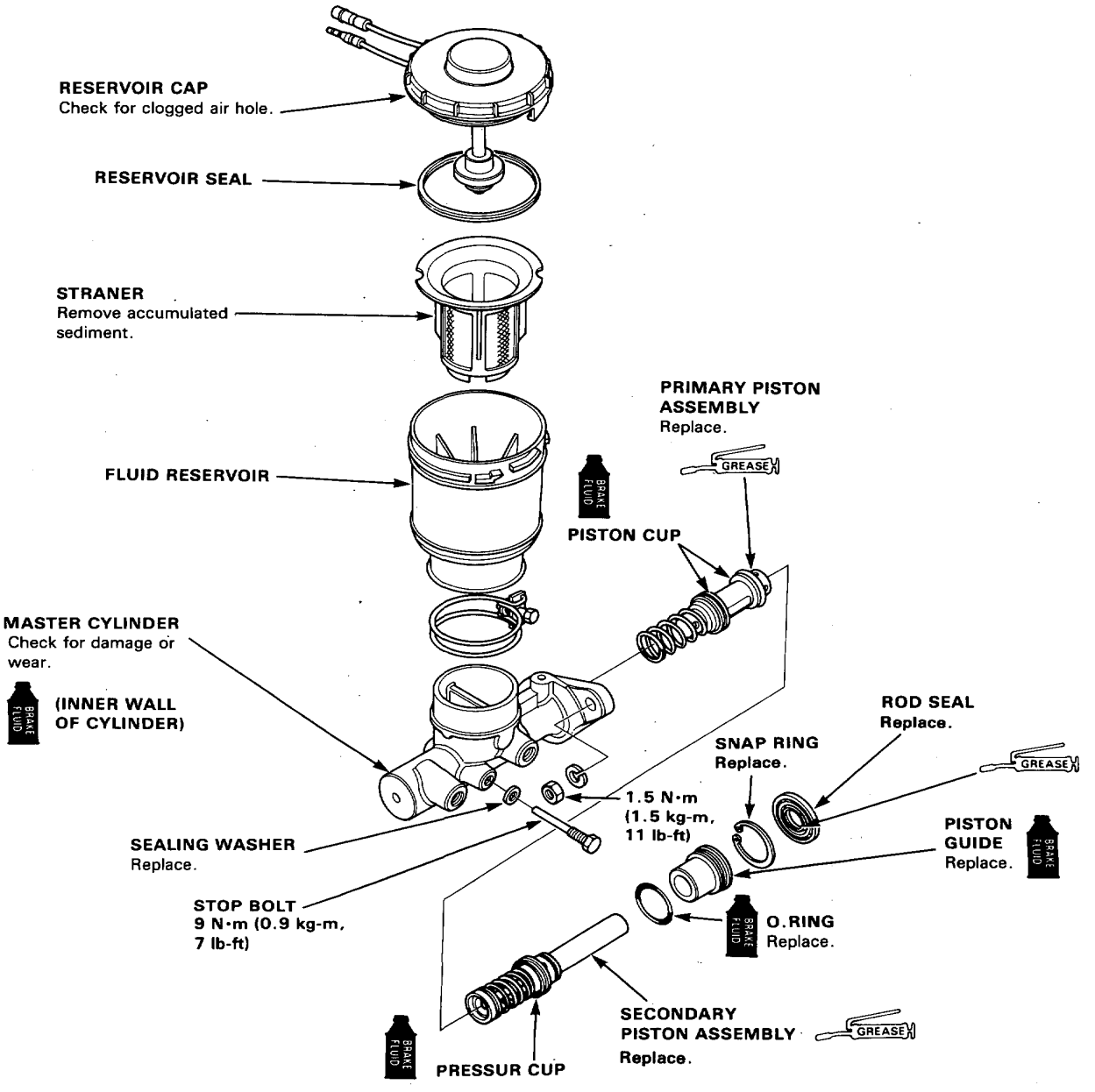
Overhaul/Inspection

CAUTION:

- **Avoid spilling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at onece and rinse well with clean water.**
- **BRAKE FLUID This symbol represents brake fluid. Use only DOT 3 or 4 brake fluid.**
- **GREASE Use only HONDA Brake Cylinder Grease (P/N 08733-B020E)or equivalent.**
- **Carefully inspect the bore of the master cylinder for pits, scratches or scoring.**
- **Replace the master cylinder if the bore in damaged or worn. Do not hone or attempt to refinish the bore.**

NOTE:

- Wash all removed parts in brake fluid and blow dry with compressed air. Blow open all passages and fluid ports.
- 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.
- Do not attempt to refinish master cylinder bore. Replace if pitted or worn.

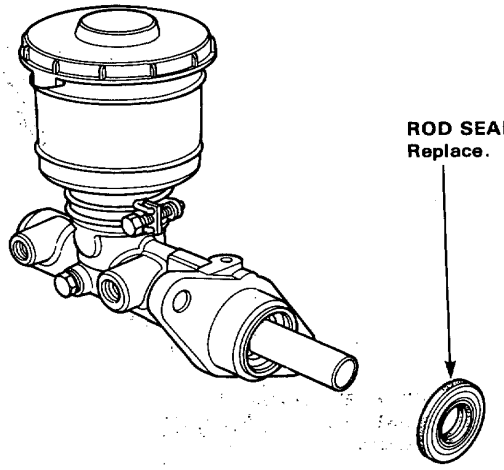


Master Cylinder

Disassembly

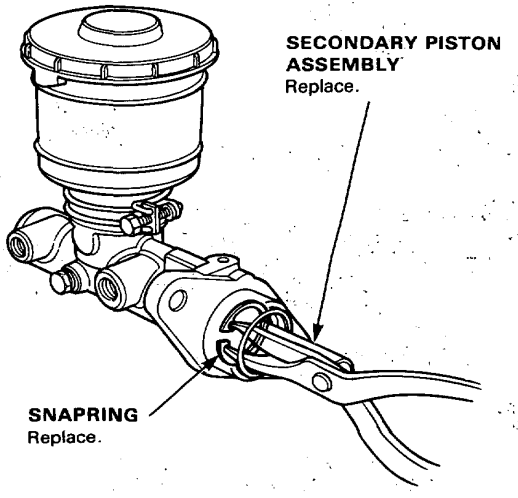
CAUTION:
- **Avoid spilling fluid on painted, plastic or rubber parts as it may damage the finish.**
- **Plug the end of the brake hose with a shop rag to prevent brake fluid from flowing out of the brake hose after disconnecting.**
- **Use only new clen DOT 3 or DOT 4 brake fluid.**
- **Clean all parts thoroughly with brake fluid. Blow out all passages with compressed air.**
- **Do not allow foreign matter to enter the system.**
- **Be careful not to bend or damage the brake pipe when removing the master cylinder.**

1. Remove the rod seal.

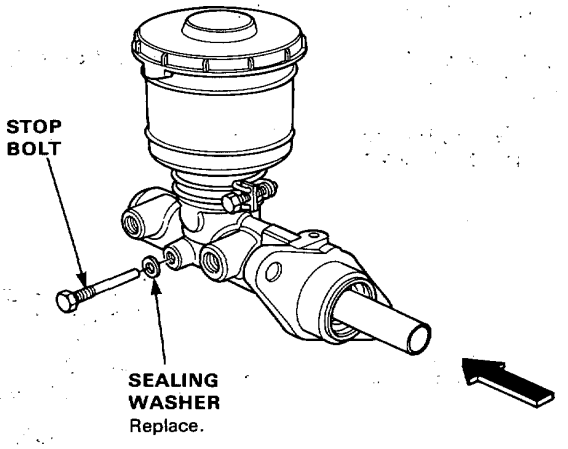


2. Push the secondary piston assembly, then remove the snap ring.

CAUTION:Avoid damaging the master cylinder wall.



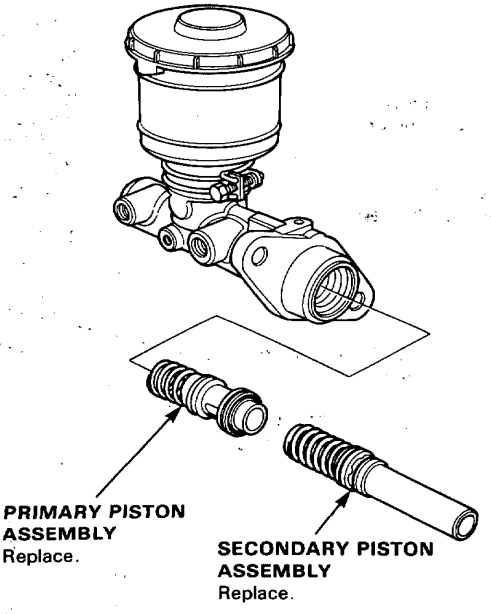
3. Remove the stop bolt while pushing in the secondary piston assembly.



4. Remove the piston guide, secondary piston assembly and pimary 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.**



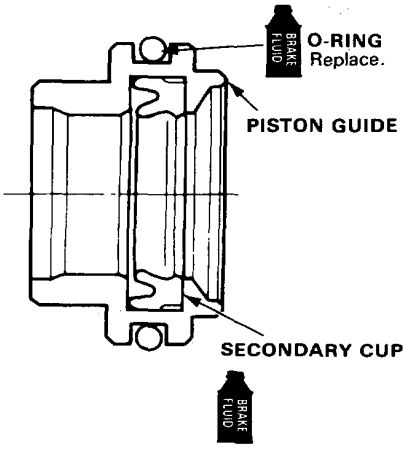
Reassembly

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 DOT3 or DOT4 brake fluid.**
- **Before ressembling, 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.**

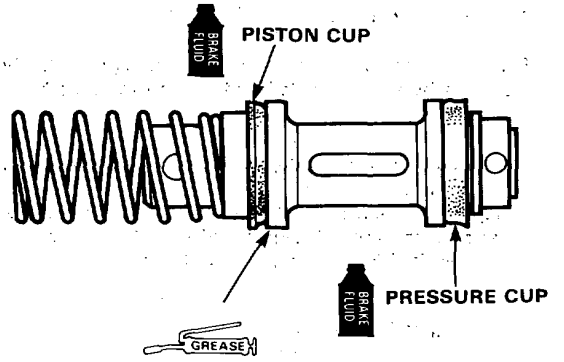
1. Lubricate the new piston parts with brake fluid.
2. Install the new O-ring onto the piston guide.

PISTON GUIDE ASSEMBLY

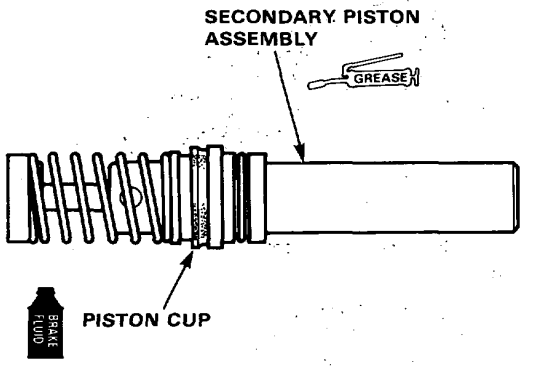


3. Make sure that the primary piston assembly and secondary piston assembly are in good condition.

PRIMARY PISTON ASSEMBLY



NOTE: Reahing through the primary piston stop bolt hole, lightly press on the valve stem to see if it moves smoothly.



NOTE: Lightly press the stop pin guide to see if the valve stem moves smothly.

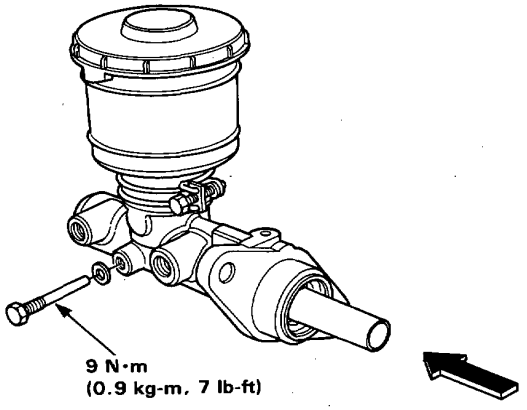
Reassembly(cont'd)

4. Assemble the primary piston assembly, secondary piston assembly and piston guide assembly in the master cylinder body.

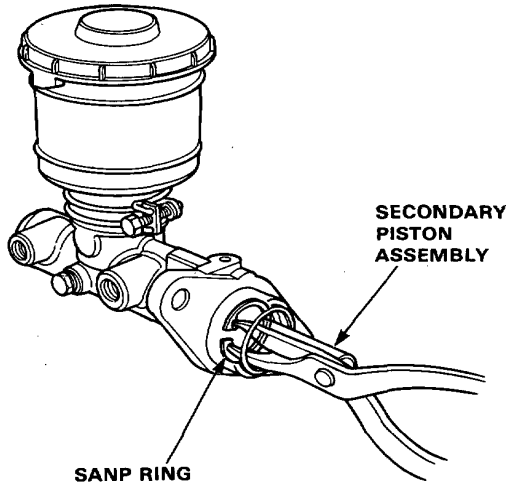
   NOTE: Install the primary piston with the slot on the cylinder facing the stop bolt hole side.

5. Push the secondary piston in until slot aligns with the stop bolt hole, then install and tighten the stop bolt.

   CAUTION:
   - **Replace the stop bolt seal with a new one whenever disassembled.**
   - **Apply brake fluid to the inner wall of the cylinder and piston cups. being careful that they are not turned inside out during installation.**

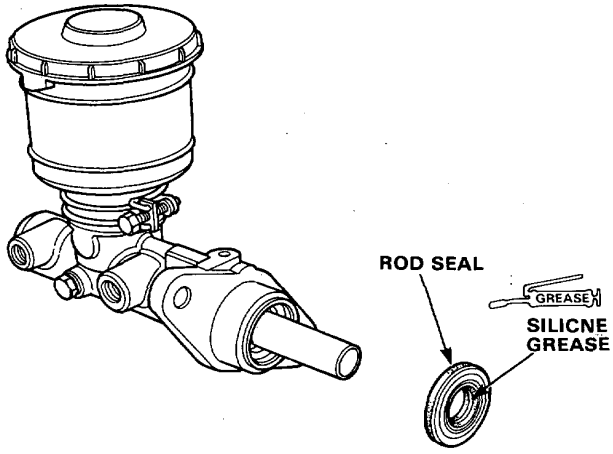


6. Press the secondary piston in and install the new snap ring.



CAUTION: Avoid damaging the sliding surface of the secondary piston when installing the sanp ring.

7. Install the new rod seal.



CAUTION:
- **Make sure that there is no interference between the brake pipes and other parts when installing.**
- **Adjust the pushrod length and clearance (page 13-90 and 91).**

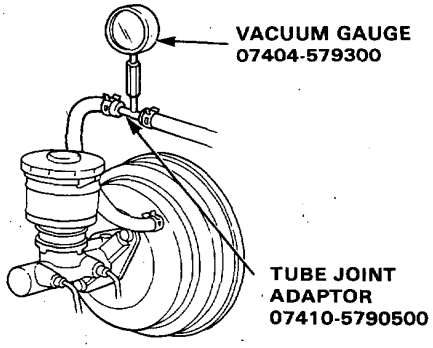
Brake Booster

Test

Leak Test

1. Install the Brake Power Pit (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 (11.8–19.7 inHg), then stop the engine.
3. Read the vacuum gauge.

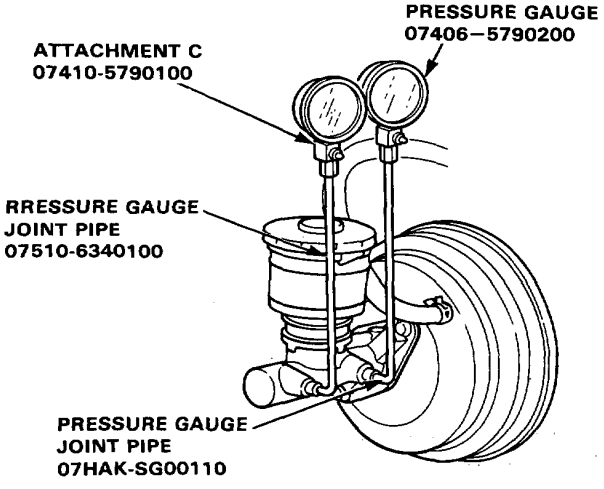
   If the vacuum readings decreases 20 mmHg (0.8 inHg) or more after 30 seconds, check following parts for leaks.
   - Check valve
   - Vacuum hose
   - Seals
   - Master cylinder O-ring and cup
   - Diaphragm



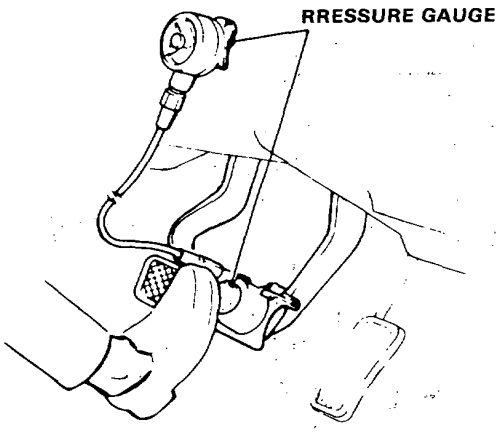
Function Test

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 pagnted, plastic or rubber partsas 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.

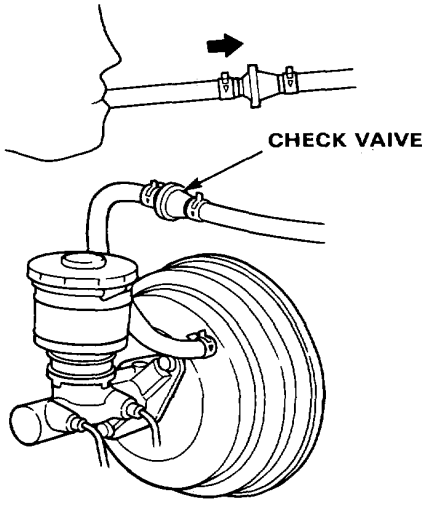


Vacuum mmHg	Line pressure kPa (kg/cm², psi)
0	980 (10.0, 142) minimum
300	5,547 (56.6, 804) minimum
500	8,595 (87.7, 1247) minimum

6. Inspect the master cylinder pistons and cups in the readings do not fall within the limits shown above.

Check Valve Test

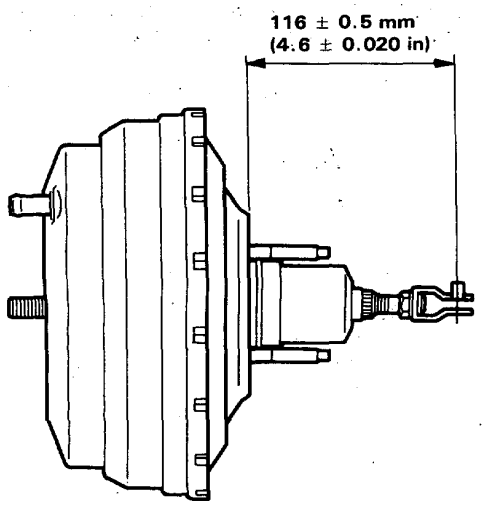
1. Remove the check valve, blow on one end of the hose and then the other; if you can blow through the booster end, but not through the manifold end, the check valve is OK.



Brake Booster

Pushrod Adjustment

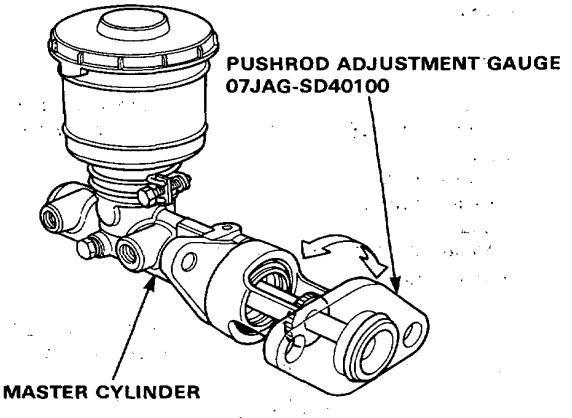
Install the locknut and pushrod yoke on the pushrod, and adjust the pushrod length as shown.



Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing or when replacing master cylinder or booster.

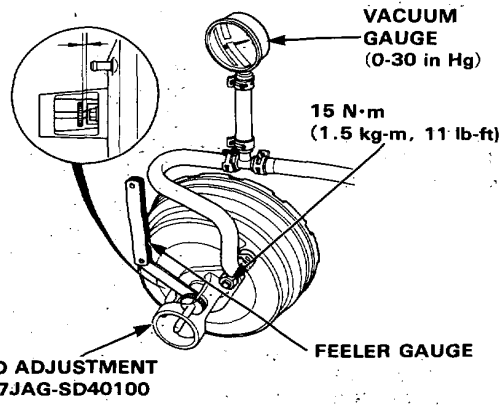
1. Using the special tool, adjust bolt so the top of it is flush with end of master cylinder piston.



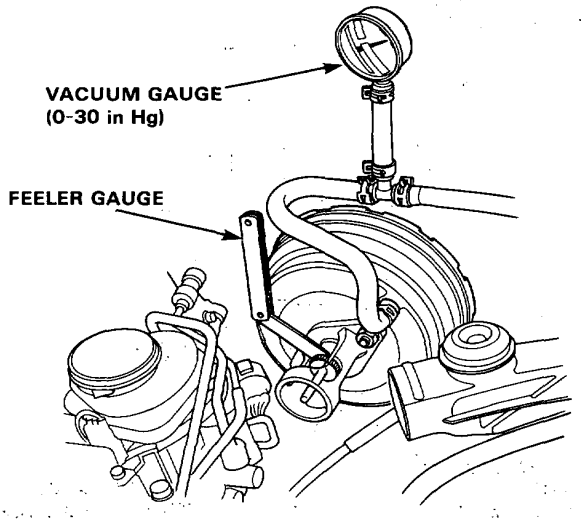
2. Install the master cylinder rod seal on the brake booster.
3. Without disturbing the adjusting bolt's position, put the special tool upside down on the booster.
4. Install the master cylinder nuts and tighten to the specified torque.
5. Connect the booster in-line with a vacuum gauge (0 —30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 500 mm Hg (20 in Hg) vacuum.
6. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut.

CLEARANCE: 0—0.4 mm (0—0.016 in)

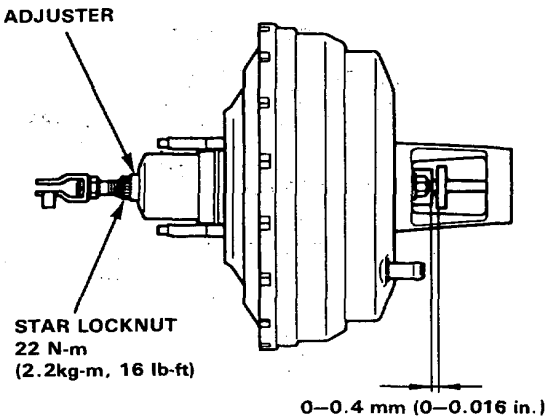
- Inspection with the booster off the car.



- Inspection with the booster on the car.



7. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust. Hold the clevis while adjusting.
8. Tighten the star locknut securely.



NOTE: If the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-pston clearance is 0.4 mm. If the clearance between the gauge body and adjusting nut is 0.4 mm, the pushrod-to-piston clearance is 0 mm.

9. After adjustment, loosen the clevis end pushrod locknut and turn the pushrod to obtain the correct pedal height.

   PEDAL HEIGHT FROM FLOOR;
   (with floor mat removed)
   The pedal should have
   1—5 mm free play.

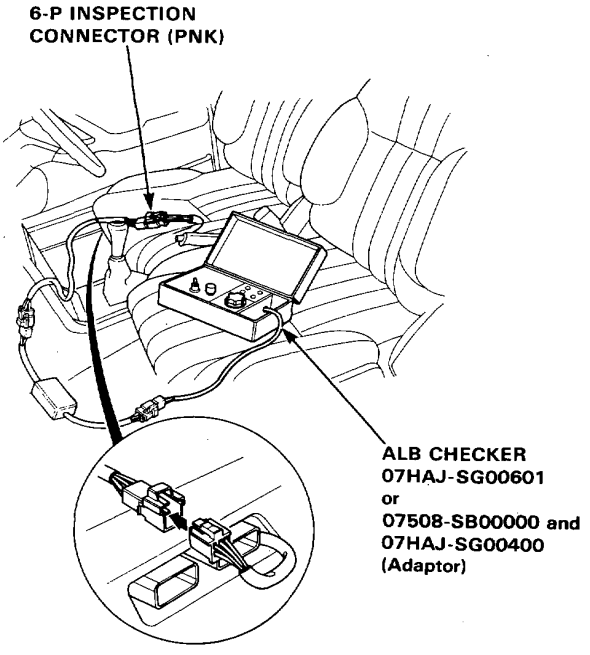
10. Adjust the brake light switch (page 13-4).

Air Bleeding With ALB Checker

NOTE: Do not depress the pedal during air bleeding. Or the bleeding may be affected.

1. Disconnect the 6-P inspection connector under the right front seat and connect the inspection connector to the ALB checker.

   CAUTION: Place the vehicle on level ground with the wheels blocked. Put the transmission in neutral for manual transmission models, and in P for automatic transmisson models.

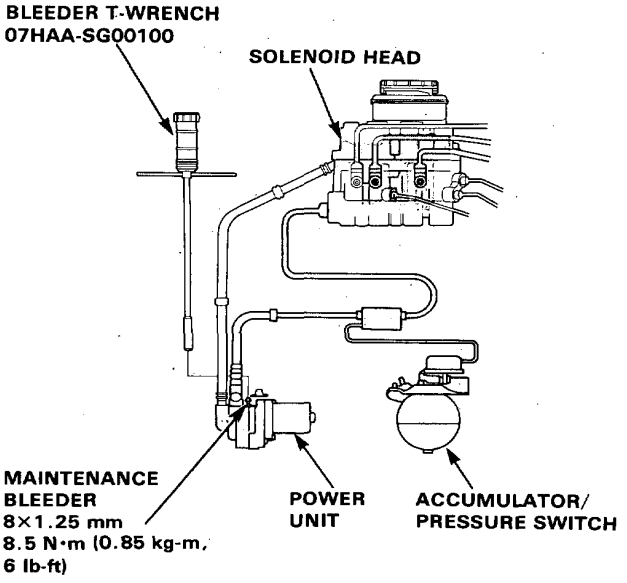


   NOTE: The adaptor 07HAJ-SG00400 is not necessary when using of the checker 07HAJ-SG0601.

2. Fill the modulator reservoir to the MAX level.

   NOTE: Do not reuse aerated brake fluid that has been bled from the power unit.

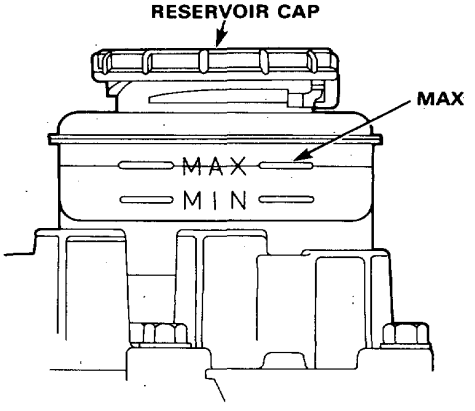
3. Bleed high pressure fluid from the maintenance bleeder with the special tool.



4. Start the engine and release the parking brake.

5. Turn the Mode Selector to 6, depress the brake pedal firmly and press the Start Test button.
   There should be at least two strong kickbacks.
   If not, repeat steps 2 through 5, as necessary.

6. Fill the modulator reservoir up to the MAX level.



7. Install the reservoir cap.

8. Check the ALB function in all modes by using the ALB checker.

   CAUTION: If the kickback is weak, re-bleed air from the system.

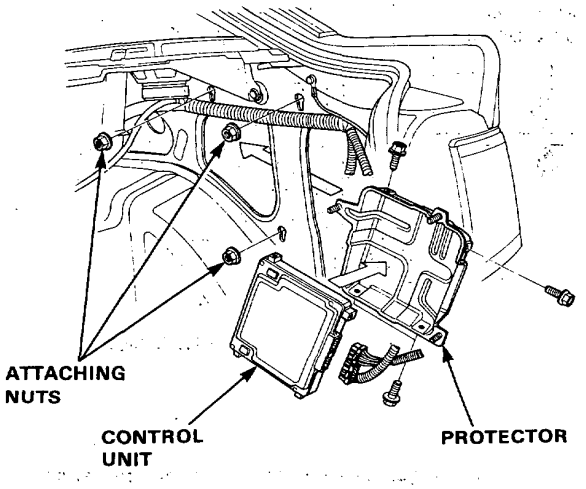
Electronic Components

Control Unit Replacement

CAUTION:
- **Disconnect the battery ground tarminal before remove the control unit.**
- **The memory of the problem code is erased, if disconnect the battery ground tarminal.**

Remove the control unit attaching nuts, then remove the control unit.

CAUTION:
- **Handle the control unit with care.**



Intallation is the reverse order of removal.

NOTE: Check the dash warning light function by turning the ignition switch ON.

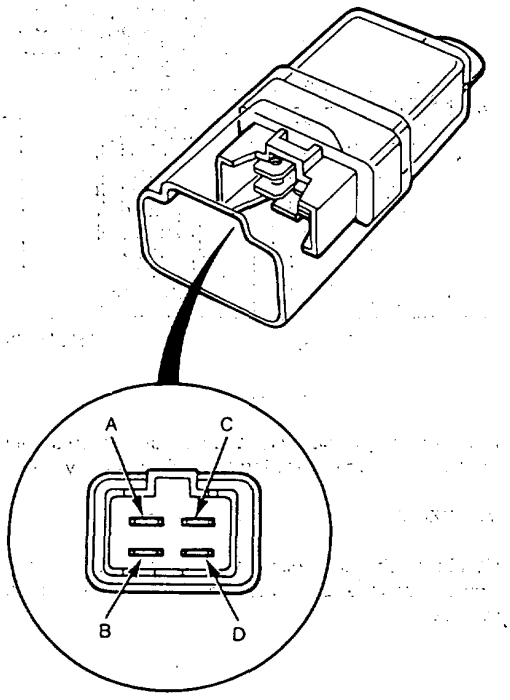
Fail Safe Relays/Motor Relay Inspction

1. Check for continuity between terminals A and B.

   There should be no continuity.

2. Connect a 12V battery across teminals C and D.

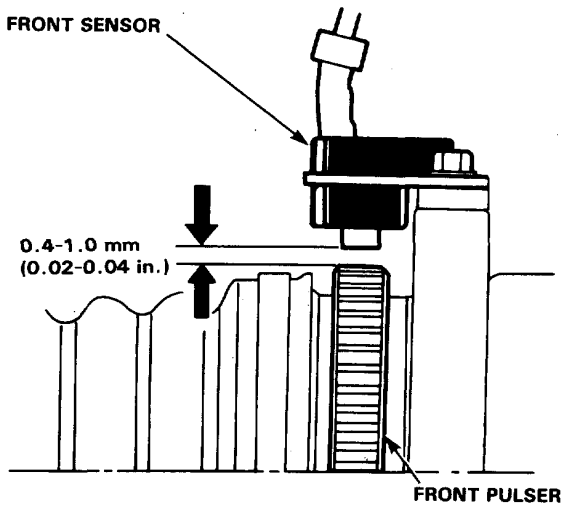
   There should be continuity between terminals A and B.



Inspection

Front

1. Check the pulser for chipped or damaged teeth.



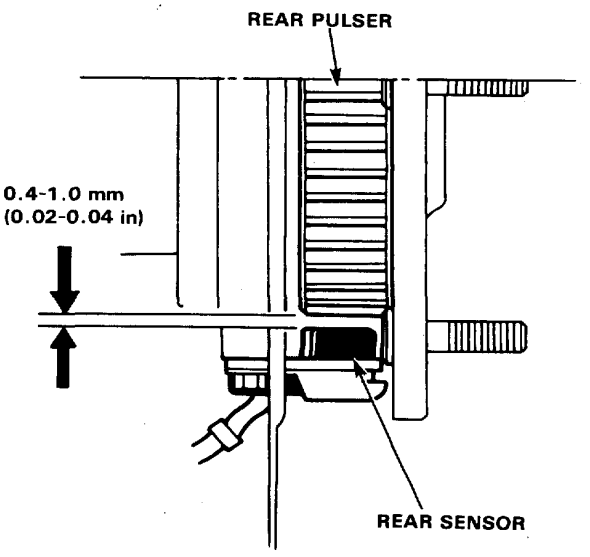
2. Measure air gap between the sensor and pulser all the way around while rotating the driveshaft by hand.

STANDARD: 0.4-1.0 mm (0.02-0.04 in.)

NOTE: If the gap exceeds 1.0 mm (0.04 in), the probability is a distorted knuckle which should be replaced.

Rear

1. Check the rear pulser for chipped or damaged teeth.



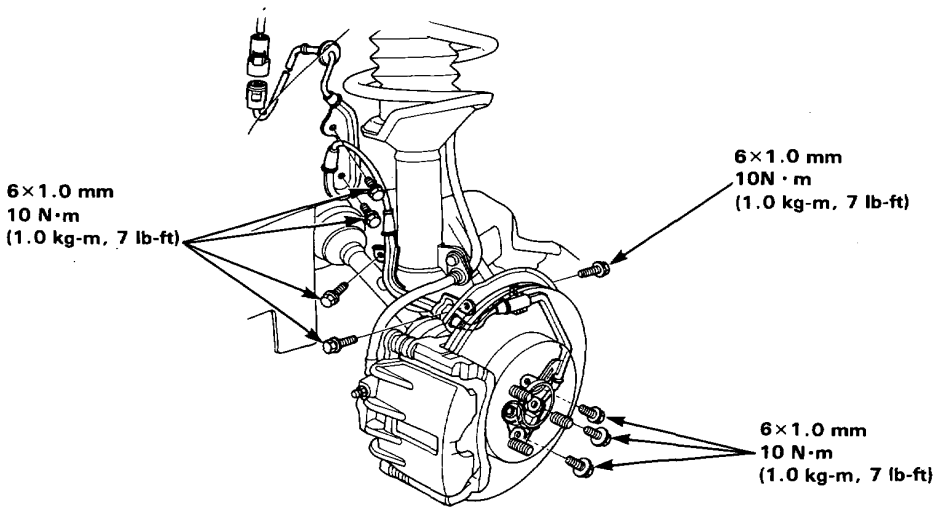
2. Measure the air gap between the sensor and pulser all the way around while rotating the hab bearing unit by hand.

Standard: 0.4-1.0 mm (0.02-0.04 in)

NOTE: If the gap exceeds 1.0 mm (0.04 in.) the probability is a distorted knuckle which should be replaced.

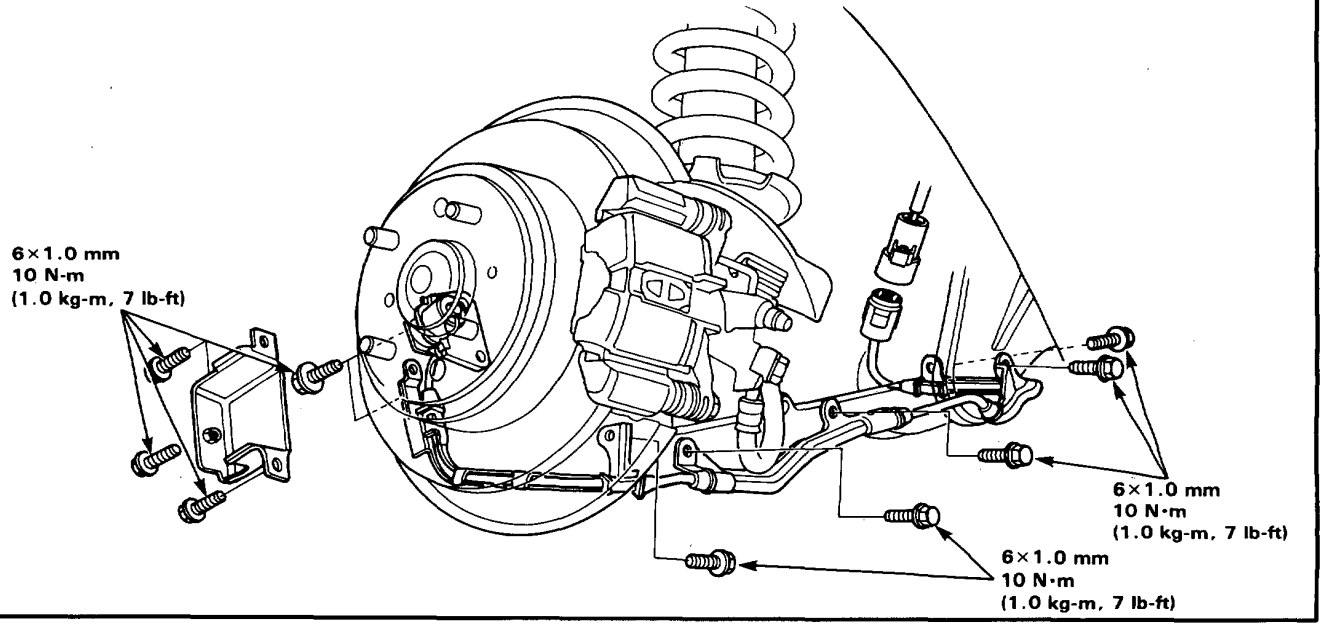
Front Sensor Replacement

NOTE:
- Be careful when installing the sensors to avoid twisting the wires.
- After sensor replacement confirm proper operation (page 13-56).



Rear Sensor Replacement

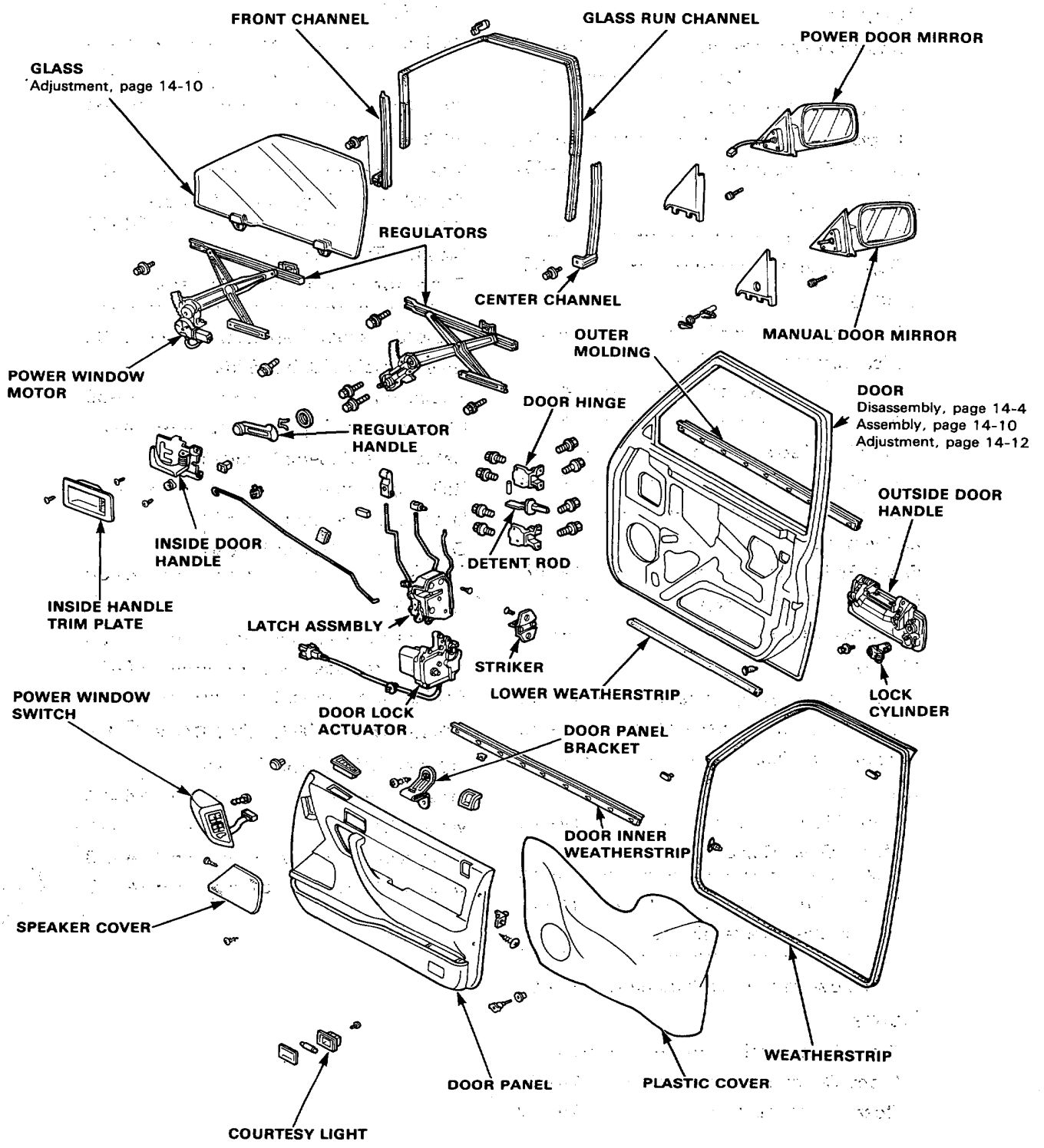
NOTE:
- Be careful when installing the sensors to avoid twisting the wires.
- After sensor replacement, confirm proper operation (page 13-56)



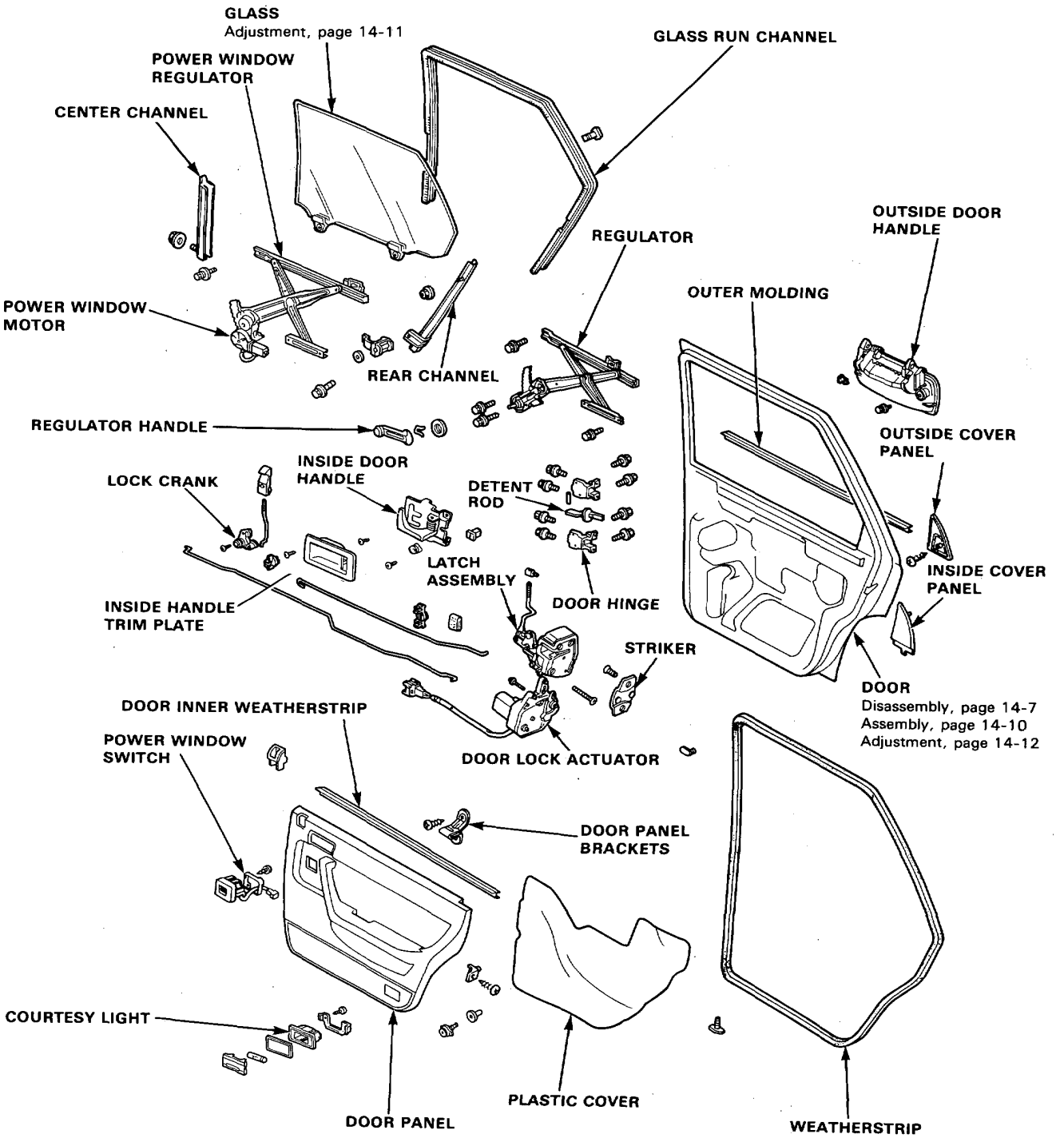
Doors

Index

Front:



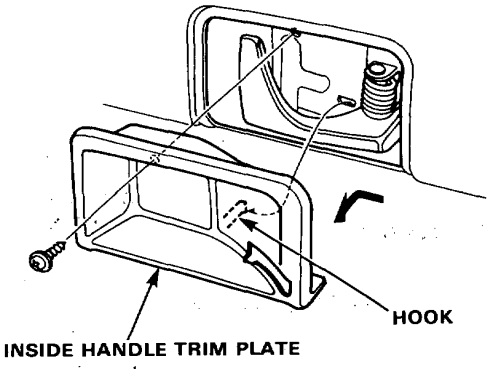
Rear:


GLASS
Adjustment, page 14-11
GLASS RUN CHANNEL
POWER WINDOW REGULATOR
CENTER CHANNEL
REGULATOR
OUTSIDE DOOR HANDLE
OUTER MOLDING
POWER WINDOW MOTOR
REAR CHANNEL
REGULATOR HANDLE
OUTSIDE COVER PANEL
INSIDE DOOR HANDLE
LOCK CRANK
DETENT ROD
INSIDE COVER PANEL
LATCH ASSEMBLY
DOOR HINGE
INSIDE HANDLE TRIM PLATE
STRIKER
DOOR
Disassembly, page 14-7
Assembly, page 14-10
Adjustment, page 14-12
DOOR INNER WEATHERSTRIP
POWER WINDOW SWITCH
DOOR LOCK ACTUATOR
DOOR PANEL BRACKETS
COURTESY LIGHT
PLASTIC COVER
DOOR PANEL
WEATHERSTRIP

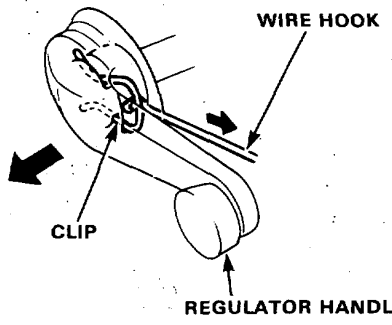
Front Door

Disassembly

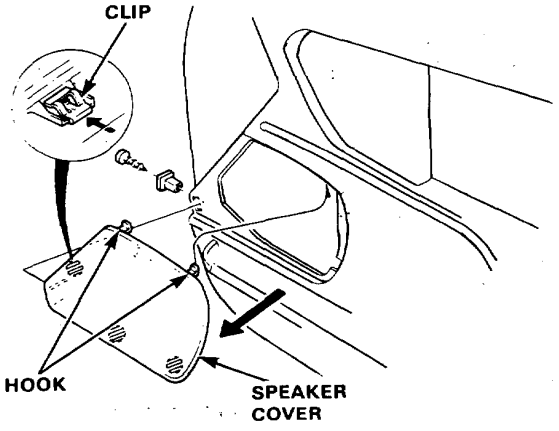
1. Remove the trim plate screw, then carefully remove the inside handle trim plate.



2. If applicable, remove the regulator handle by pulling the clip out with a wire hook.



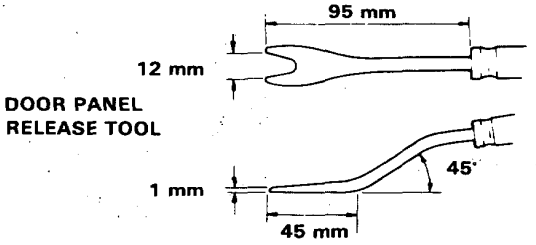
3. Remove the screw and detach the clips, then remove the speaker cover.

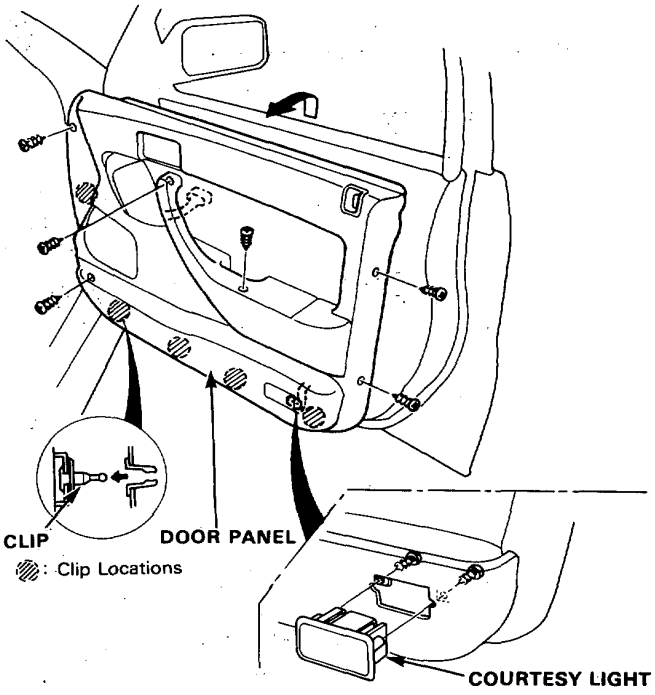


4. Remove the door mirror cover panel (pages 14-13, 14).

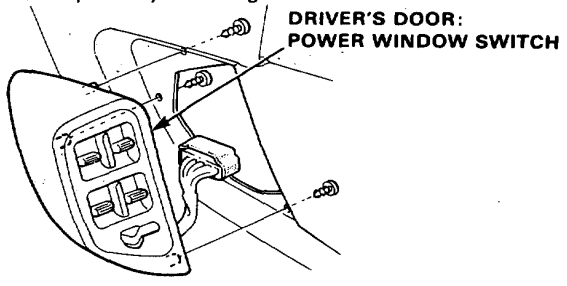
5. Remove the screws and clips (See door panel release tool) attaching the door panel.
Remove the door panel by pulling it upward and disconnect the power window and courtesy light wires.

NOTE: Remove the panel with as little bending as possible to avoid creasing or breaking it.



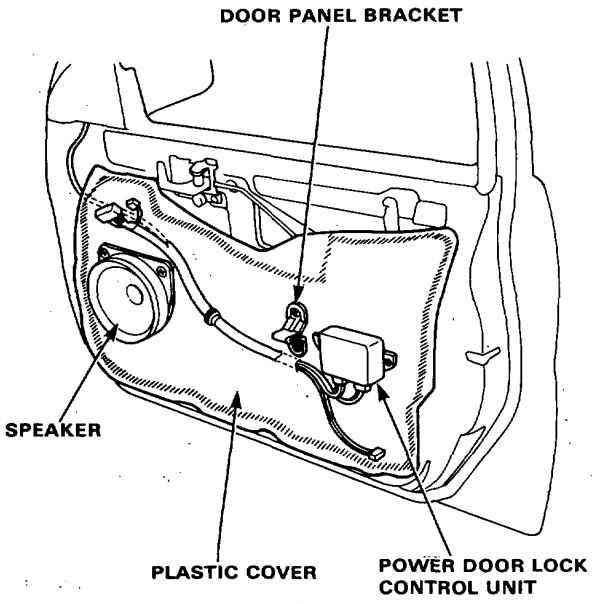


6. Remove the power window switch, if equipped, from the door panel by removing the screws.

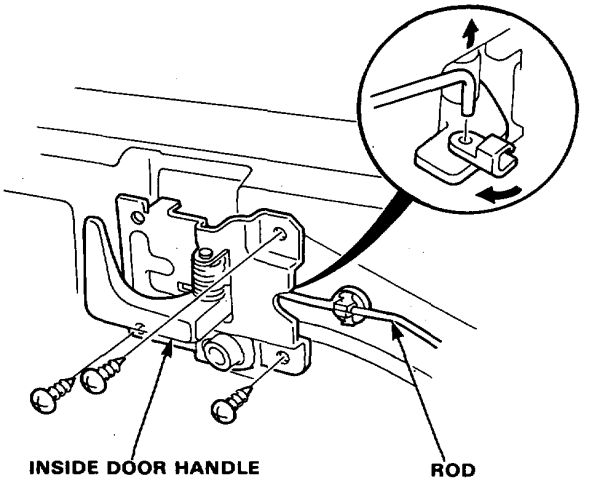


7. Remove the screws, then remove the power door lock control unit, speaker and door panel bracket.

8. Carefully remove the plastic cover.



9. Remove the 3 screws, disconnect the latch rod, then remove the inside door handle.

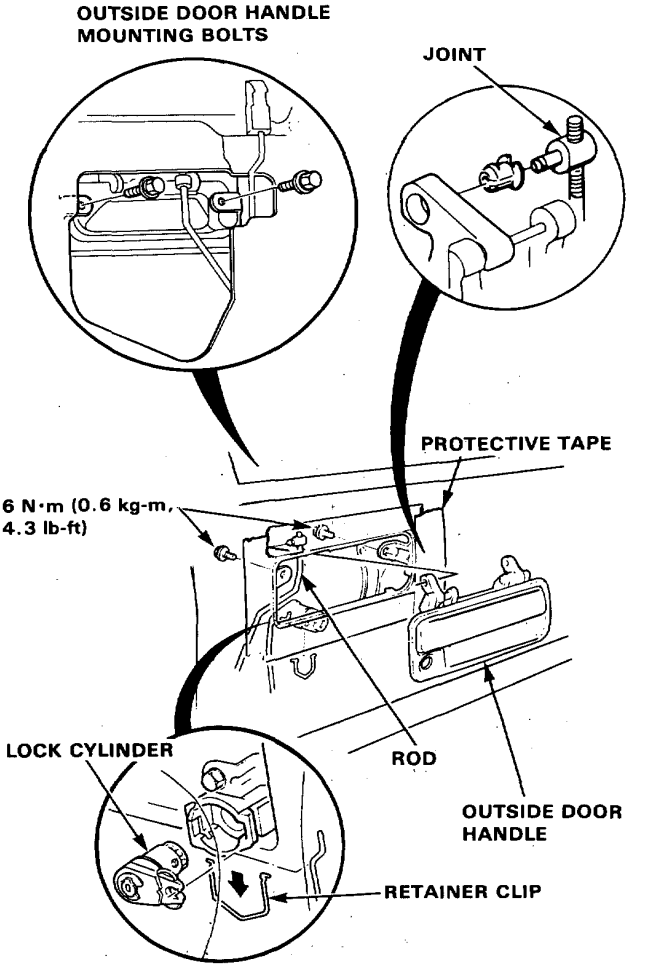


10. Reconnect the window switch or use 12 V battery to operate the window regulator.

11. Raise the window fully.

12. Pull out the retainer clip, and take out the lock cylinder, then disconnect the lock rod.

NOTE: Use protective tape around the edge of the outside door handle to prevent scratching the paint.



13. Remove the mounting bolts for the outside door handle.

14. Pull the outside door handle out, and pry the joint off the handle with a flat tip screwdriver. Remove the handle from the rod.

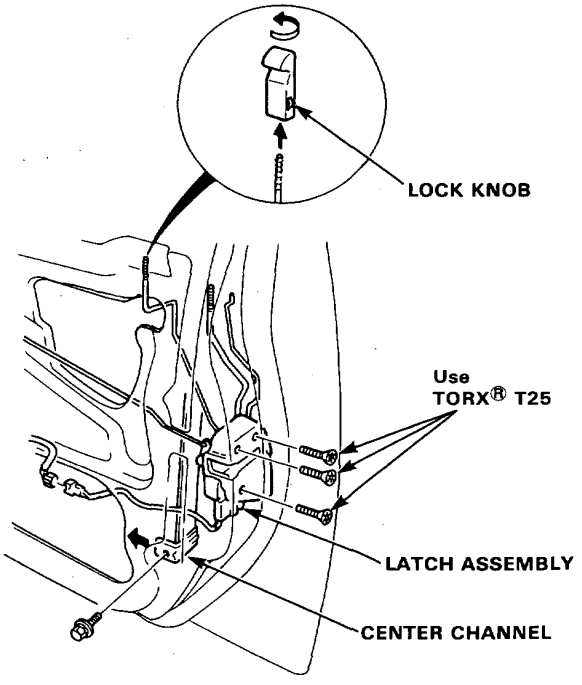
(cont'd)

Disassmbly (cont'd)

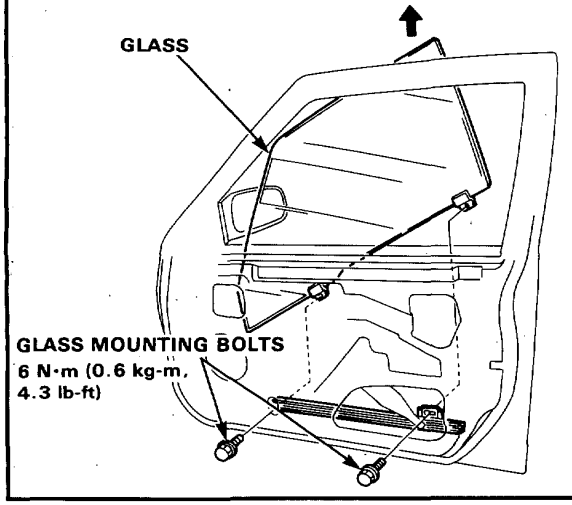
15. Remove the screws and disconnect the wire.

16. Take the door latch off the door, then push the door latch and rod inside the door.

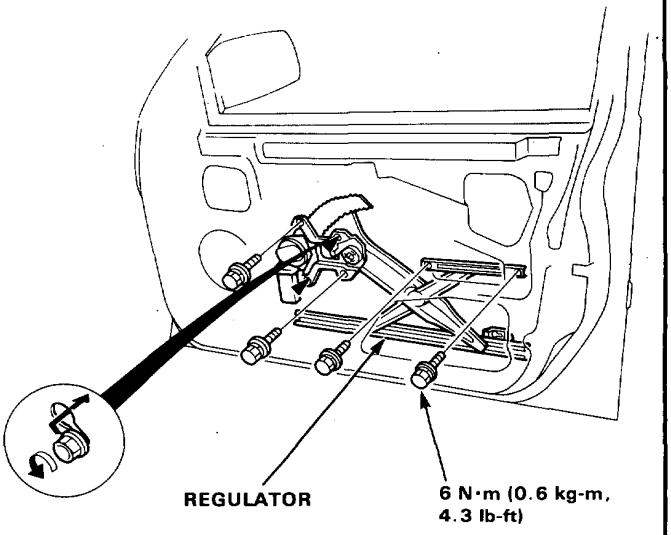
    NOTE:
    - Remove the lower bolt of the rear channel and slide the rear channel.
    - Take care not to bend the latch rods.



17. Carefully lower the window until you can see its mounting bolts. Remove the bolts and pull the door glass out through the window slot.



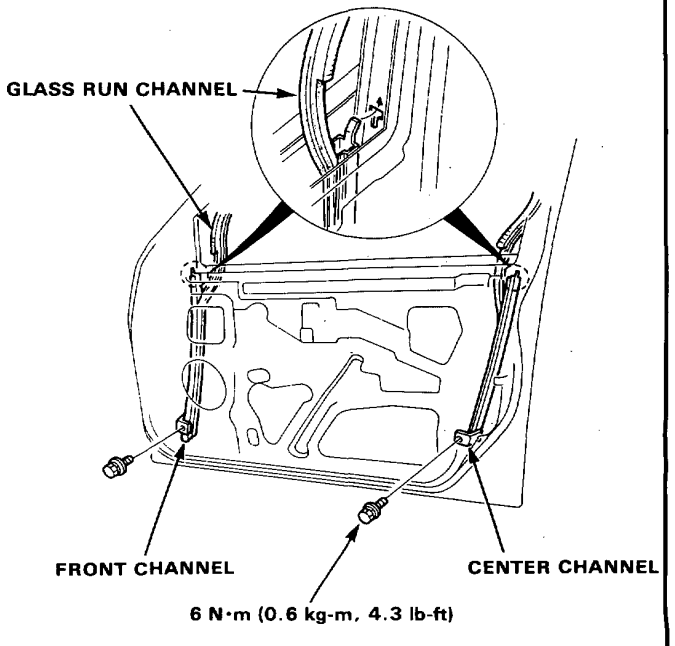
18. Remove the 4 mounting bolts and loosen the 2 motor bolts, then take out the regulator assembly through the lower hole in the door.



19. Remove the glass run channel.

20. Remove the front and center channels by removing the bolts.

    NOTE: Before installation, insert the glass run channel into the front and center channels.

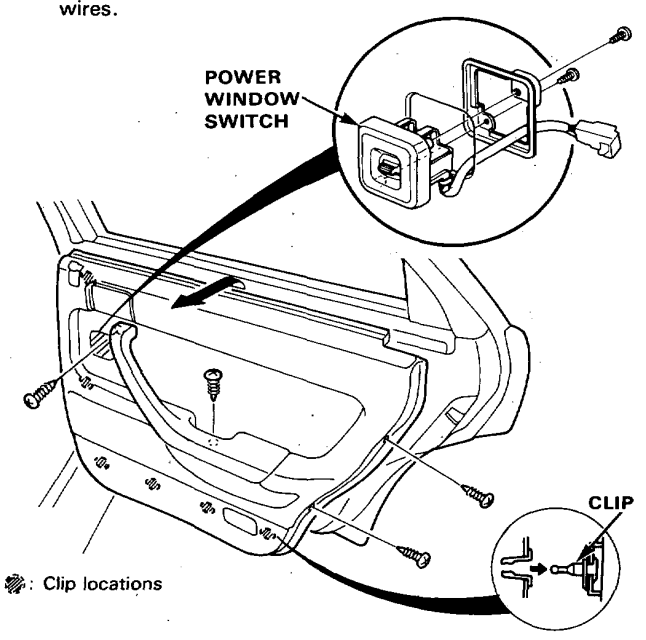


Rear Door

Disassembly

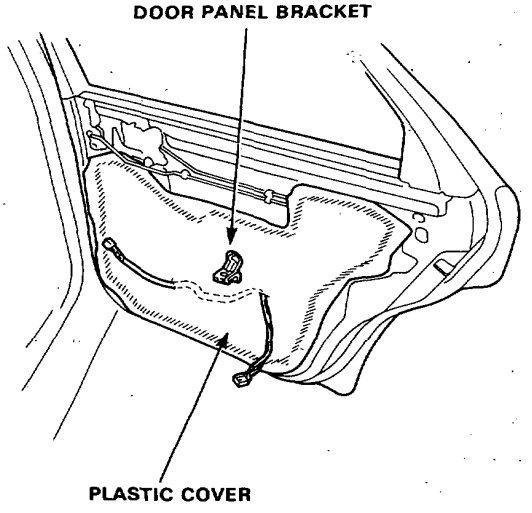
1. Remove the inside handle trim plate and regulator handle (page 14-4).

2. Remove the screws and clips (See door panel release tool) attaching the door panel (page 14-4). Remove the door panel by pulling it upward and disconnect the power window and courtesy light wires.

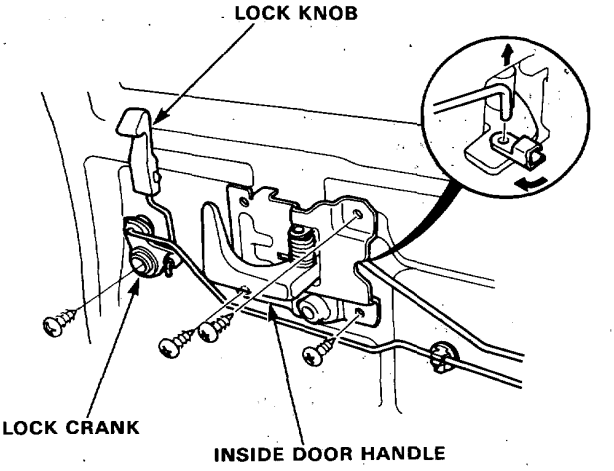


3. Remove the screws, then remove the door panel brackets.

4. Carefully remove the plastic cover.



5. Remove the 3 screws of the inside door handle and the screw of the lock crank, then remove it from the door.

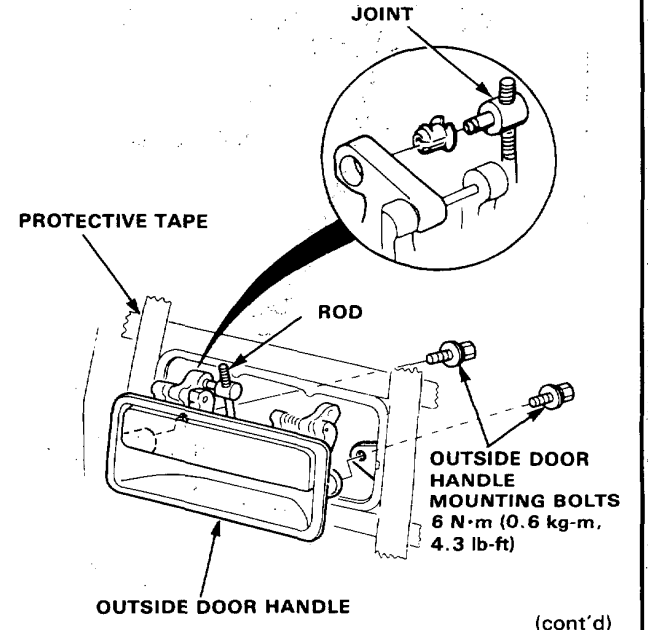


6. Reconnect the window switch or use 12 V battery to operate the window regulator.

7. Raise the window fully.

8. Pull the outside door handle out, and pry the joint off the handle with a flat tip screwdriver. Remove the handle from the rod.

   NOTE: Use protective tape around the edge of the outside door handle to prevent scratching the paint.



(cont'd)

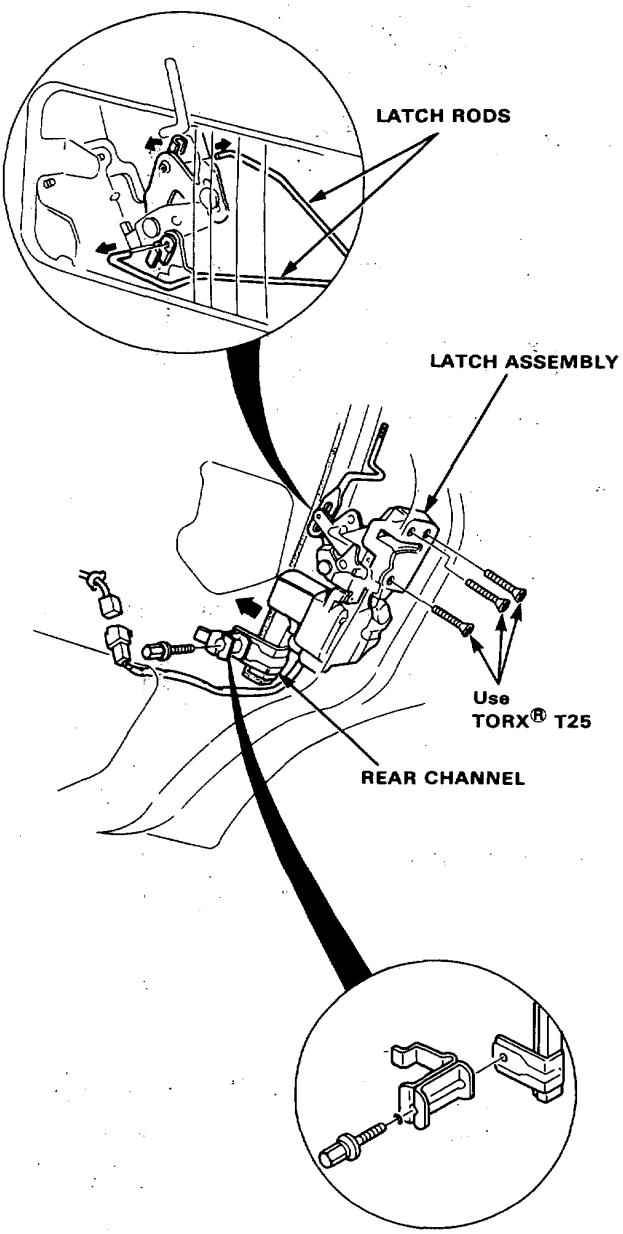
Rear Door

Disassembly (cont'd)

9. Remove the screws and disconnect the latch rod and wire.

10. Take the latch assembly off the door, then push the latch assembly inside the door.

    NOTE:
    - Remove the lower bolt of the rear channel and slide the rear channel.
    - Take care not to bend the latch rods.

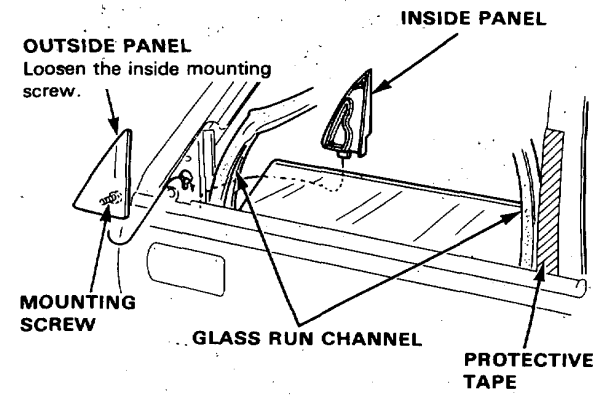


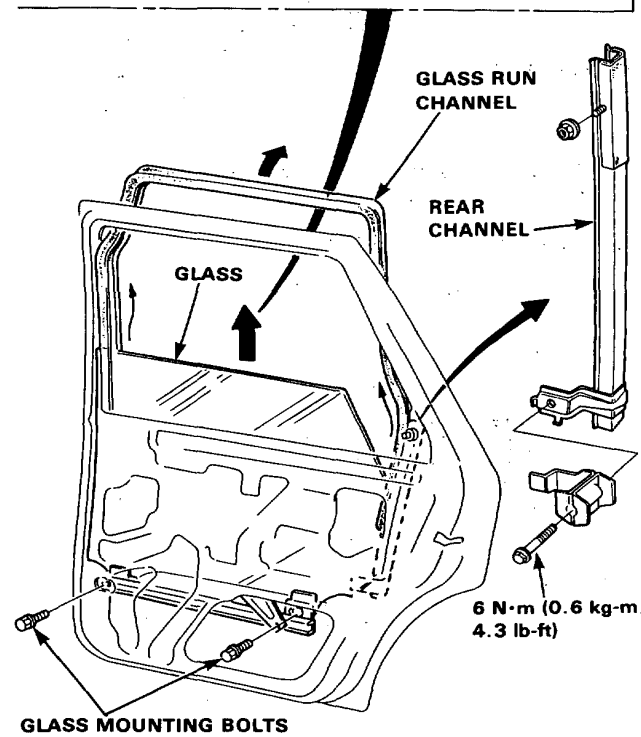
11. Carefully lower the door glass until you can see its mounting bolts.

12. Remove the outside and inside cover panels.

13. Remove the glass run channel and rear channel.

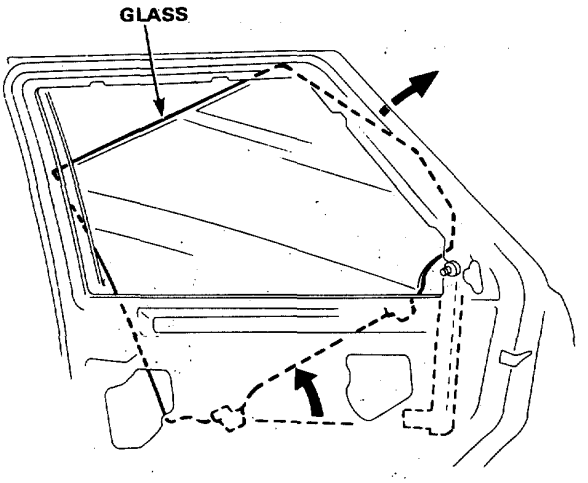
14. Use protective tape as shown to prevent scratching the paint.



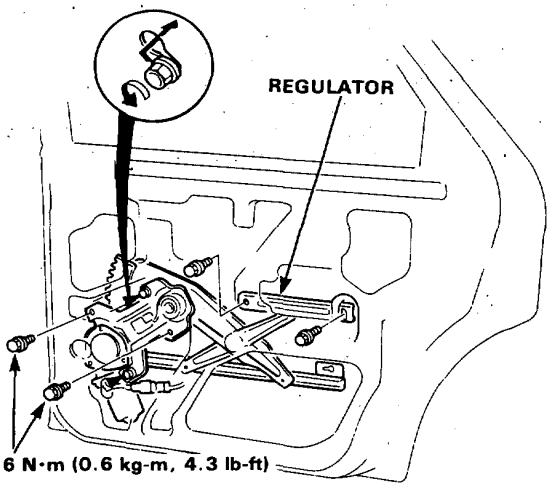


15. Remove the glass mounting bolts.

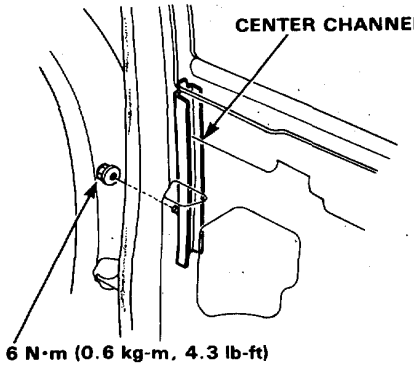
16. Stand next to the outside of the door, tilt the glass as shown, and pull it out through the window opening.



17. Remove the 4 mounting bolts and loosen the 2 motor bolts, then take out the regulator assembly through the lower hole in the door.



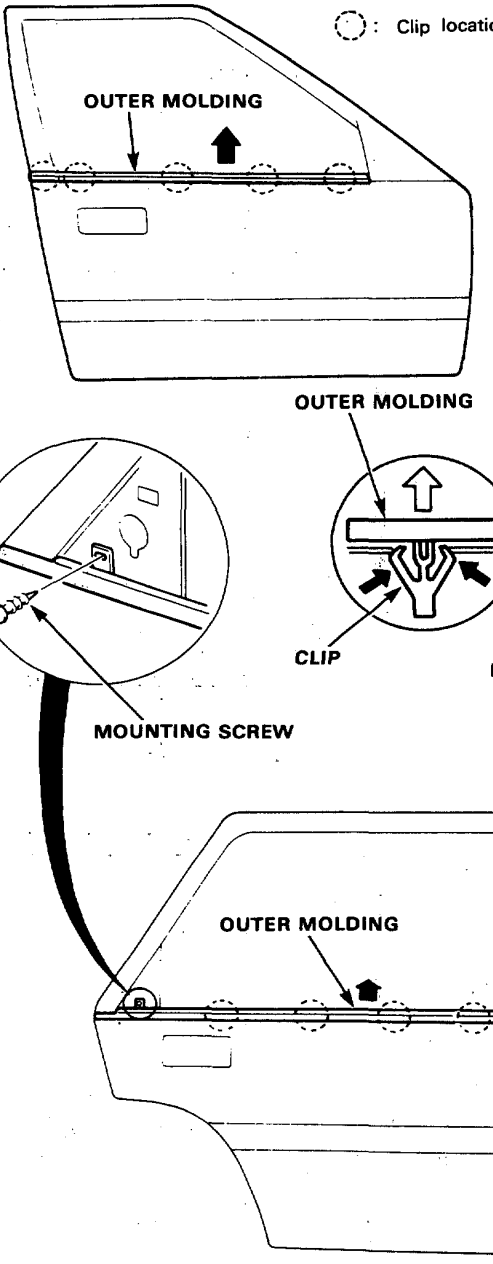
18. Remove the nut, then remove the center channel.



Molding Replacement

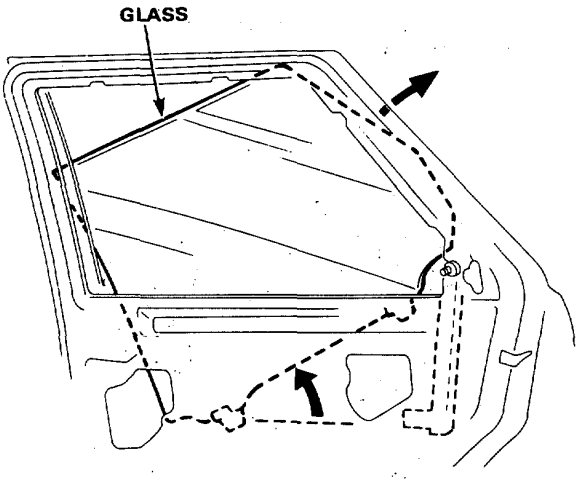
Outer Molding:

1. Lower the window fully.
2. Remove the door mirror (pages 14-13, 14).
3. Remove the screw and detach the clips, then remove the outer molding prying up on the molding starting at the rear.

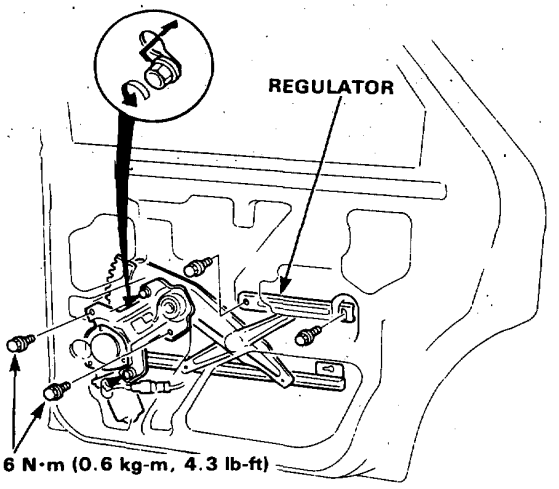


(cont'd)

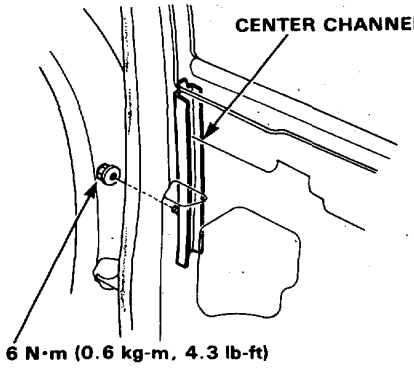
16. Stand next to the outside of the door, tilt the glass as shown, and pull it out through the window opening.



17. Remove the 4 mounting bolts and loosen the 2 motor bolts, then take out the regulator assembly through the lower hole in the door.



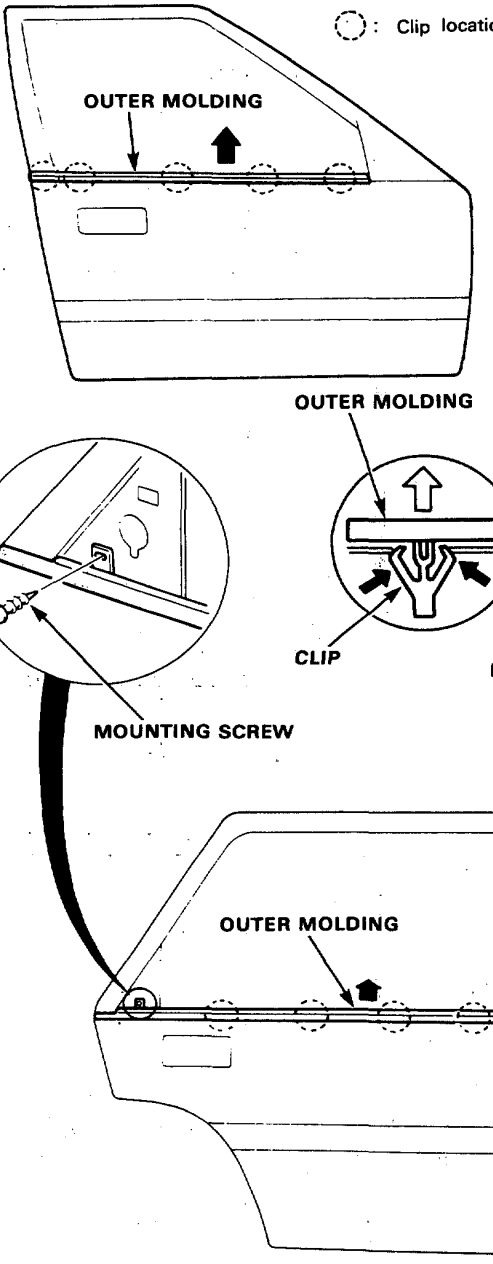
18. Remove the nut, then remove the center channel.



Molding Replacement

Outer Molding:

1. Lower the window fully.
2. Remove the door mirror (pages 14-13, 14).
3. Remove the screw and detach the clips, then remove the outer molding prying up on the molding starting at the rear.



(cont'd)

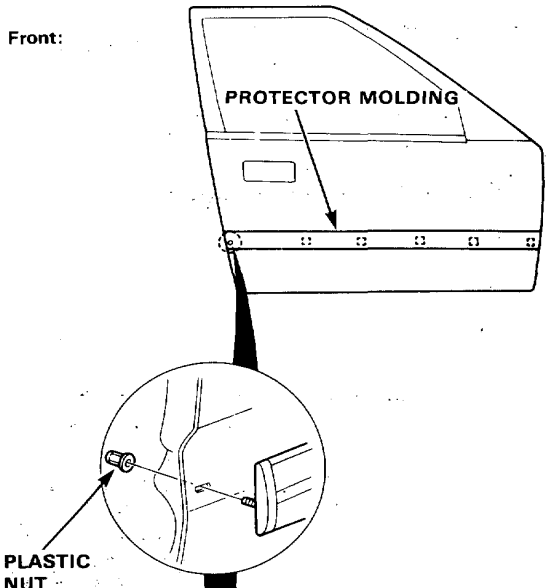
Molding Replacement (cont'd)

Door Protector Molding:

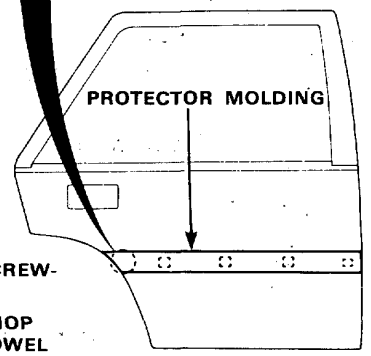
4. Remove the door protector molding by removing the nut and detach the clips from the inside, or outside.

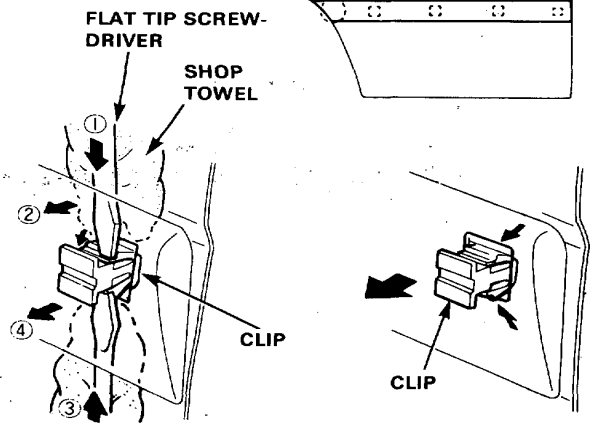
⬚ : Clip locations.

Front:



Rear:



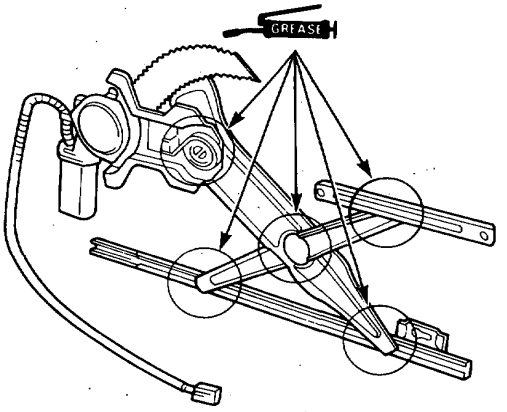


5. Set the clips on to the moldings and protectors, then attaching the moldings and protectors.

Assembly

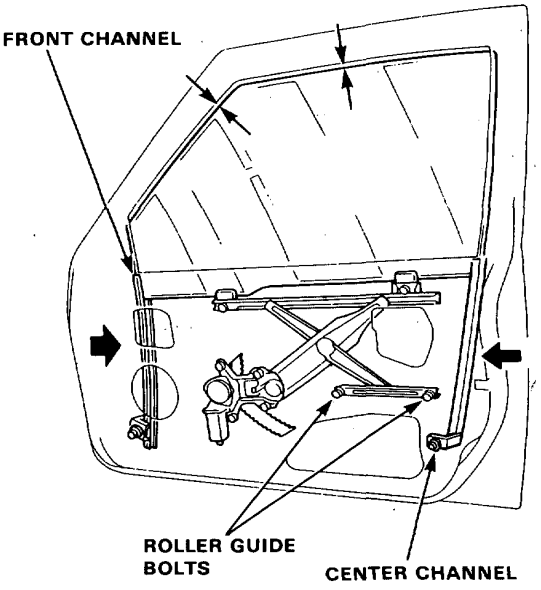
Assemble the door in the reverse order of disassembly, and also:

1. Grease all the sliding surfaces of the window regulator where shown.



2. To adjust window fit in the door, raise the window as far up as possible and hold it against the door sash. Then, tighten the roller guide bolts.
3. Lower the window until there is a small gap between the door glass and the glass run channel.
4. Loosen the roller guide bolts and adjust the window glass so it parallel with the glass run channel.

Front:



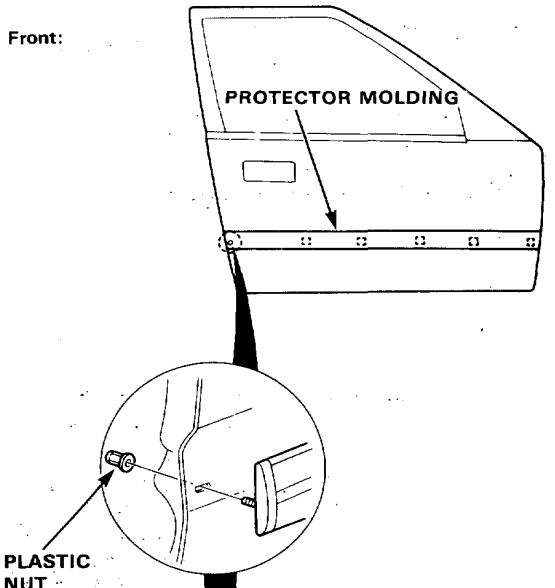
Molding Replacement (cont'd)

Door Protector Molding:

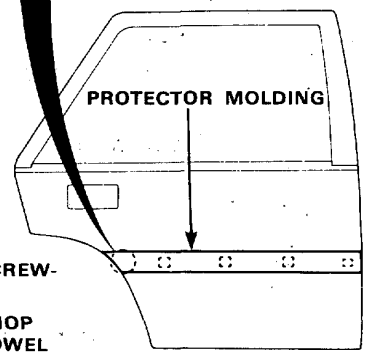
4. Remove the door protector molding by removing the nut and detach the clips from the inside, or outside.

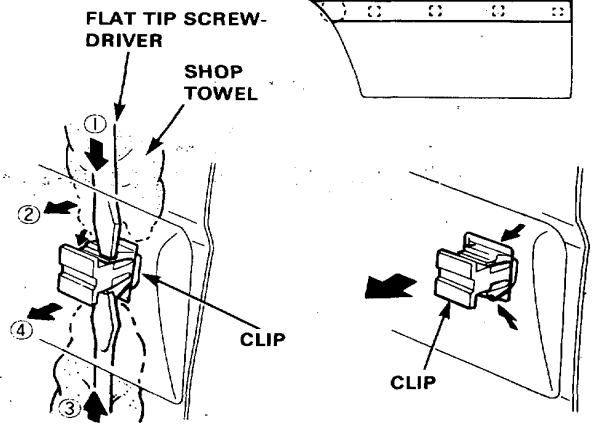
⬚ : Clip locations.

Front:



Rear:



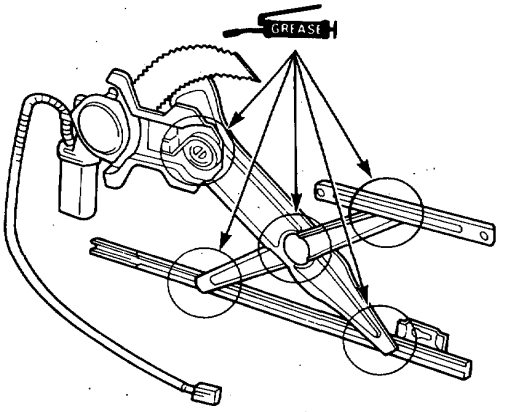


5. Set the clips on to the moldings and protectors, then attaching the moldings and protectors.

Assembly

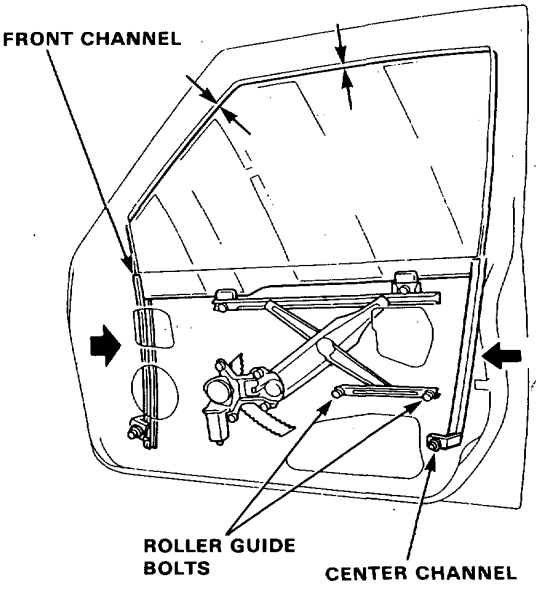
Assemble the door in the reverse order of disassembly, and also:

1. Grease all the sliding surfaces of the window regulator where shown.

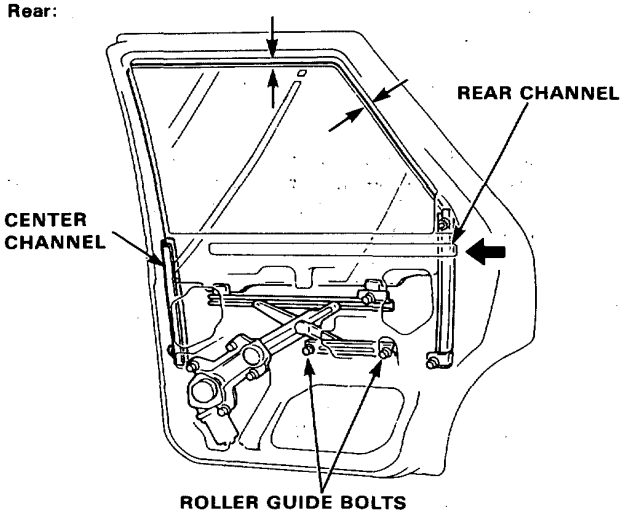


2. To adjust window fit in the door, raise the window as far up as possible and hold it against the door sash. Then, tighten the roller guide bolts.
3. Lower the window until there is a small gap between the door glass and the glass run channel.
4. Loosen the roller guide bolts and adjust the window glass so it parallel with the glass run channel.

Front:



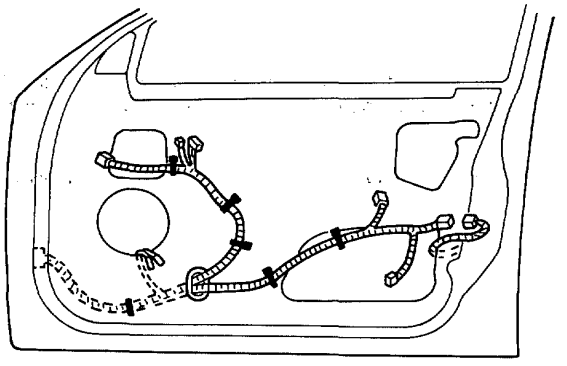
Rear:



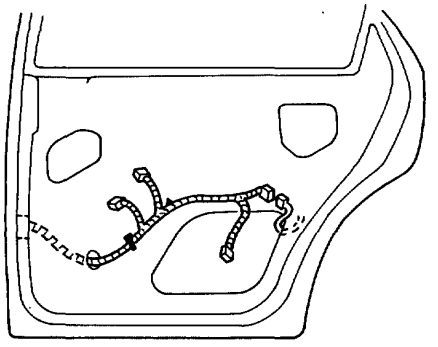
NOTE: Make sure the glass moves smothly.

5. Raise the door glass fully and check gap.
6. Fix the wire harness correctly on the door.

Front:



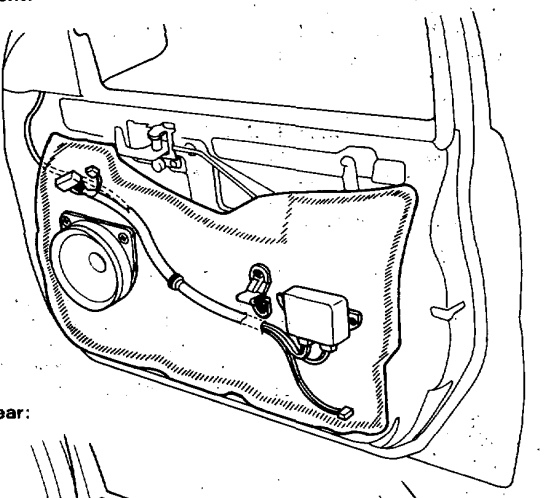
Rear:



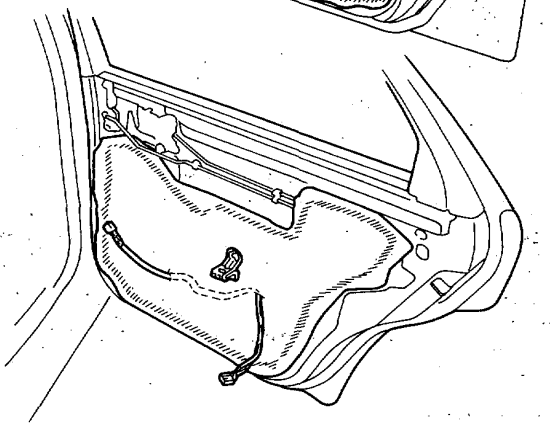
7. When reinstalling the plastic cover, apply adhesive along the edge where necessary to maintain a continuous seal and prevent air/water leaks.

NOTE: Repair any torn section of the plastic cover.

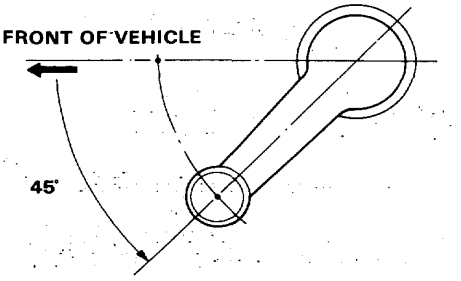
Front:



Rear:



8. Install the regulator handle so it points forward, and down at a 45 degree angle with the window closed.



9. With the door and glass closed fully, check for water and air leaks.

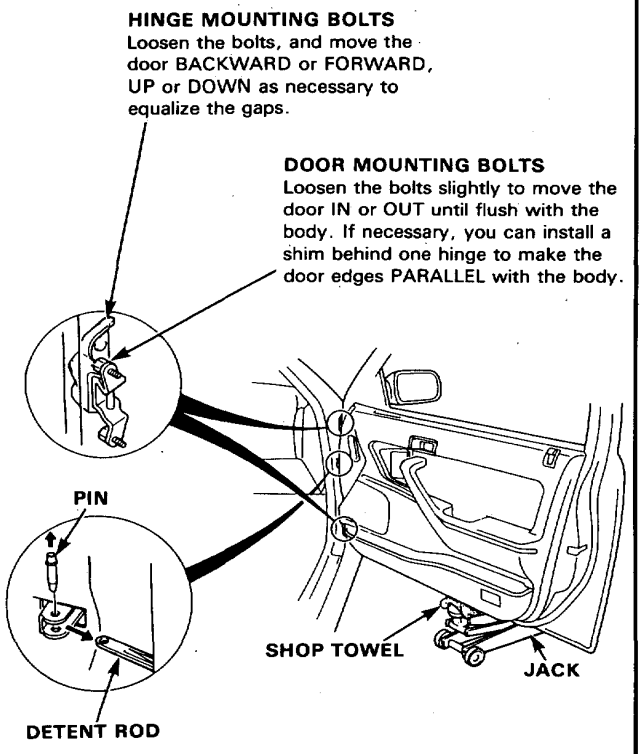
NOTE: Dont use high pressure water.

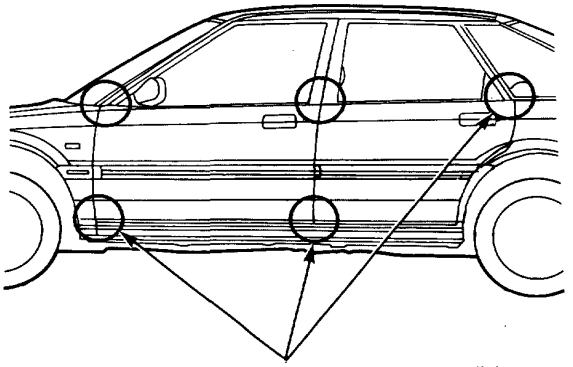
Doors

Door Position Adjustment

After installing the door, check for a flush fit with the body, then check for equal gap between the front and rear, and top and bottom door edges and the body.
The door and body edges should also be parallel. Adjust at the hinges as shown.

CAUTION: Place a shop towel on the jack to prevent damage to the door when the hinge bolts are loosened for adjustment.





The door and body edges should be parallel.

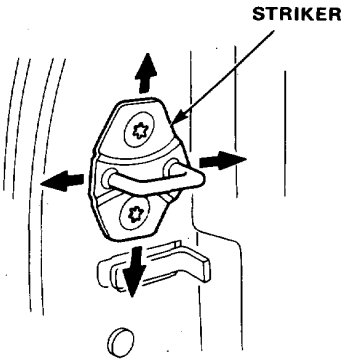
NOTE: Check for water and air leaks.

Door Striker Adjustment

Make sure the door latches securely without slamming. If it needs adjustment:

1. Draw a line aroung the striker plate for reference.

2. Loosen the striker screws, and move the striker IN or OUT to make the latch fit tighter or looser. Move the striker UP or DOWN to align it with the latch opening. Then lightly tighten the screws and recheck.



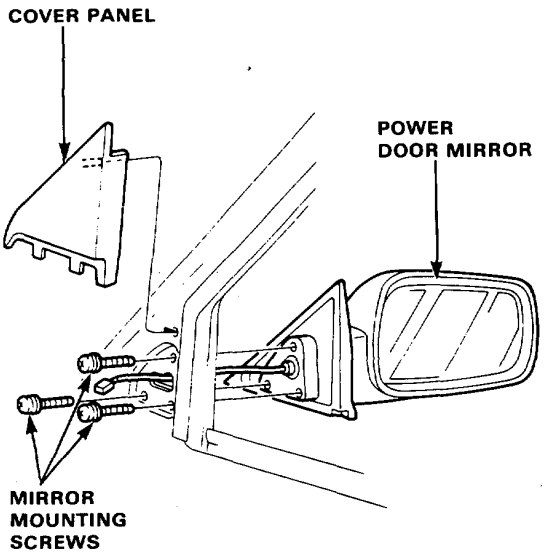
NOTE: Hold the outside handle out and push the door against the body to be sure the striker allows a flush fit.

3. If the door latches properly, tighten the screws and recheck.

Power Door Mirror

Removal

1. Remove the door panel and disconnect the power mirror connector.
2. Pry out the cover panel with a flat tip screwdriver, then remove the cover panel.
3. Remove the mirror mounting screws while holding the mirror.

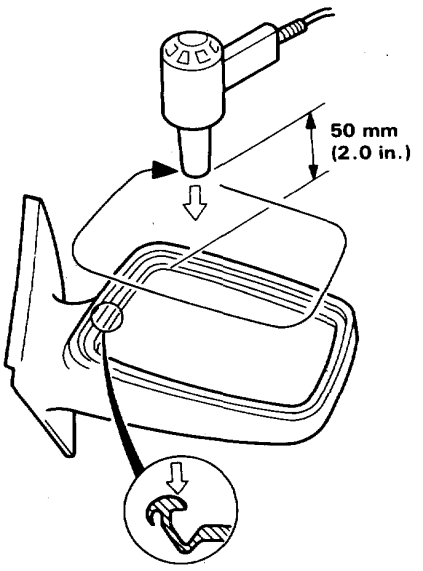


4. Install the door mirror in the reverse order of removal.
5. With the door and door glass closed fully, check for water and air leaks.

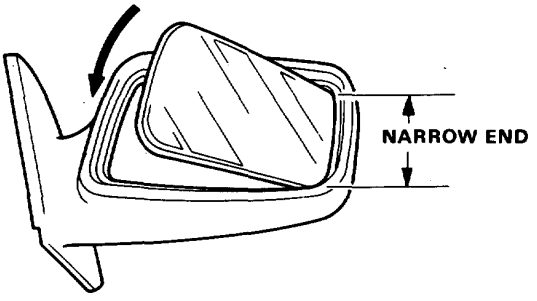
   NOTE: Do not use high pressure water.

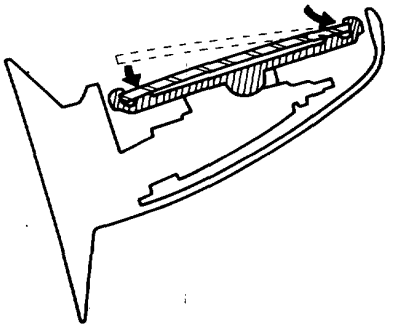
Mirror Glass Replacement

1. Heat the edge of the glass with a low powered heat gun for several minutes, then remove the glass.



2. Install the glass in the mirror case, narrow end first.

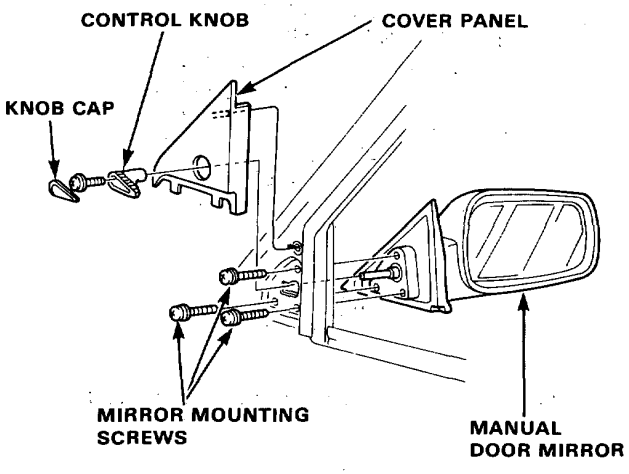




Manual Door Mirror

Removal

1. Remove the knob cap and screw, then remove the control knob.
2. Pry out the cover panel with a flat tip screwdriver, then remove the cover panel.
3. Remove the mirror mounting screws while holding the mirror.

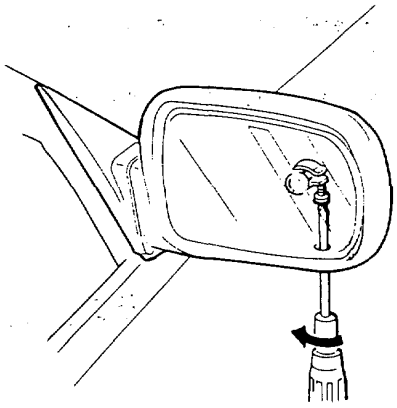


4. Install the door mirror in the reverse order of removal.
5. With the door and door glass closed fully, check for water and air leaks.

   NOTE: Do not use high pressure water.

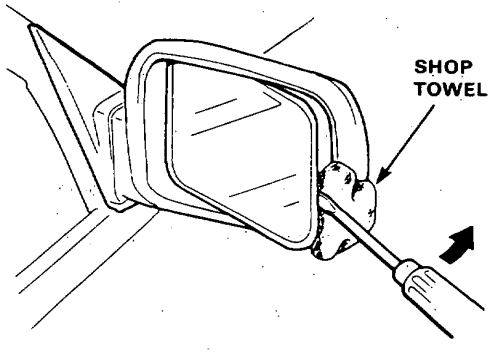
Mirror Glass Replacement

1. Insert a screwdriver in the mirror through the service hole, and loosen the glass retaining screw.

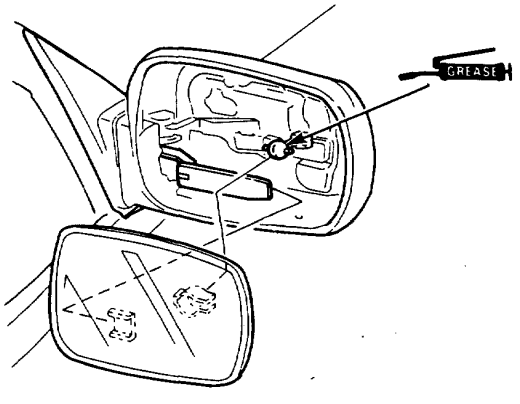


2. Carefully pry out the mirror with a flat tip screwdriver as shown.

   CAUTION: To prevent damage to the mirror, wrap the end of the screwdriver with a shop towel.



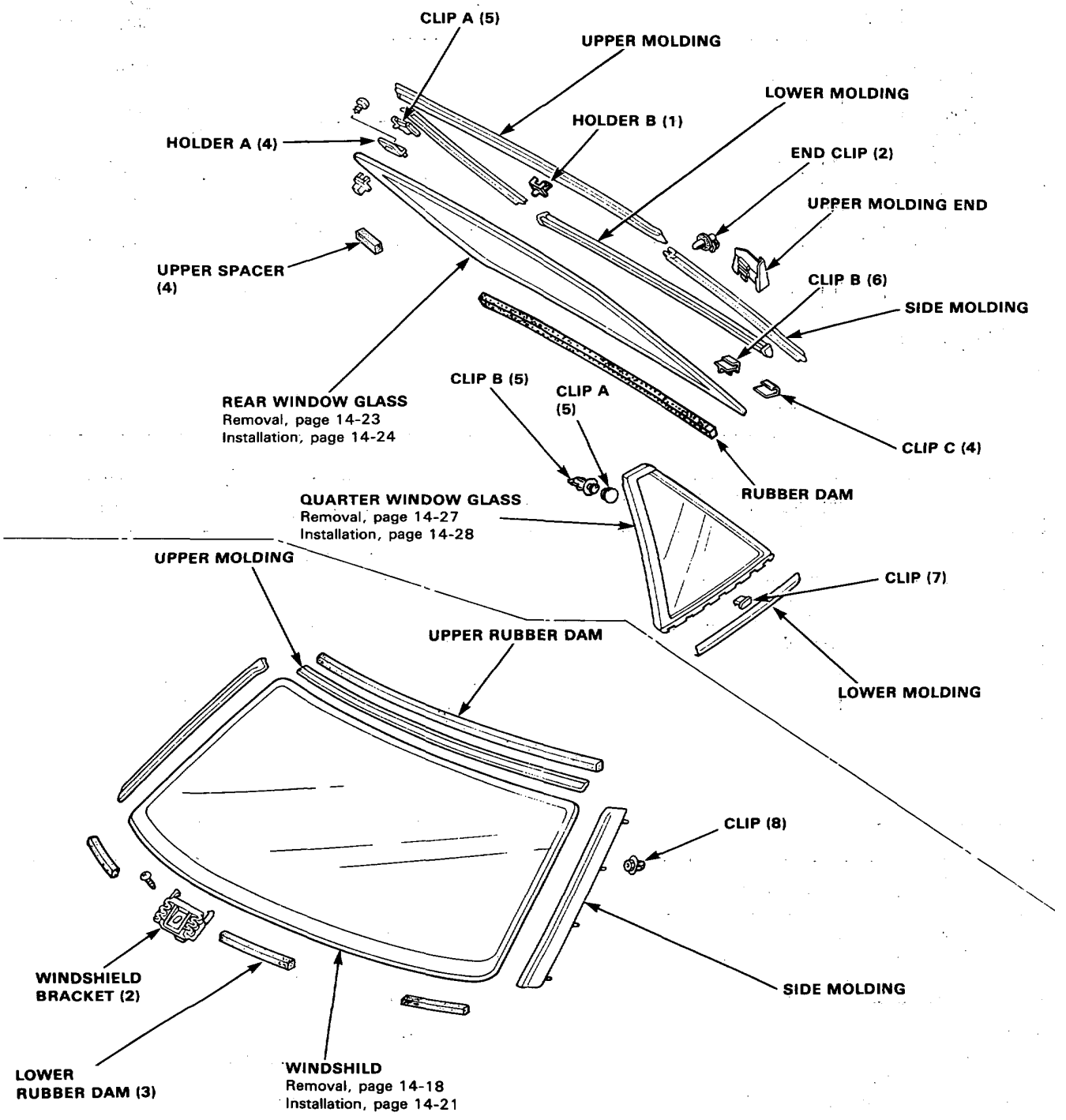
3. Install the mirror in the reverse order of removal, and also apply grease to the location shown.



Windshield, Rear Window Glass, Quarter Window Glass

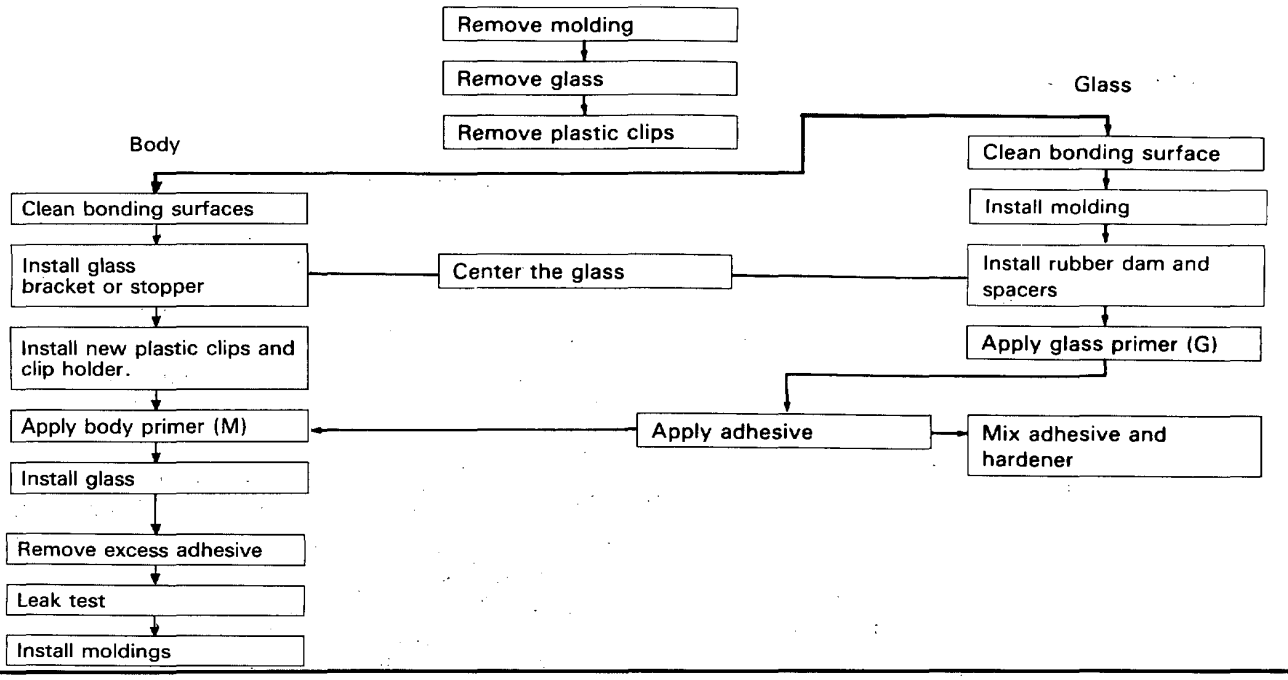
Index

( ): Quantity of part used.



Windshield, Rear Window Glass, Quarter Window Glass

Installtion



Parts

Part Number	Contents	Comment
Adhesive kit — Low temperature 08718–99960 High temperature 08718–99961	Adhesive sealant (500 g) Hardener (75 g) Glass primer G (20 g) Body primer M (20 g) Piano wire (0.6ϕ x 1 m (3f)) Gauze Cartridge Sponge	 For glass primer (G) For applying primers

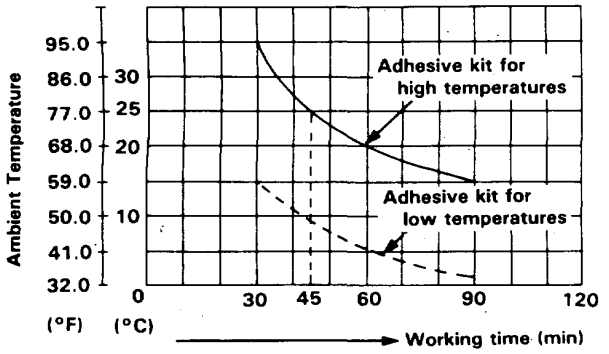
Tools

Tool/Material	Remarks
Glass or steel plate	To mix adhesive and hardener on
Putty knife	To mix adhesive and remove excess
Caulking gun	To apply bead of adhesive to windshield
Suction cups	To install windshield
Knife	To scrape bonding surface around window opening
Awl	To make hole through existing adhesive for piano wire
Two wood sticks	To hold piano wire
Toluene or alcohol	To clean bonding surfaces

Workable Time

Adhesive workable time varies widely according to temperature, so choose the correct adhesive kit for the temperature range you will be working in.
After mixing and applying adhesive, you should install the windshield within the time shown on the chart.

For example, when the ambient temperature is 25°C (77°F), the glass should be installed within 45 minutes using the high temperature type adhesive.
Kit part numbers and contents are listed on the page before.



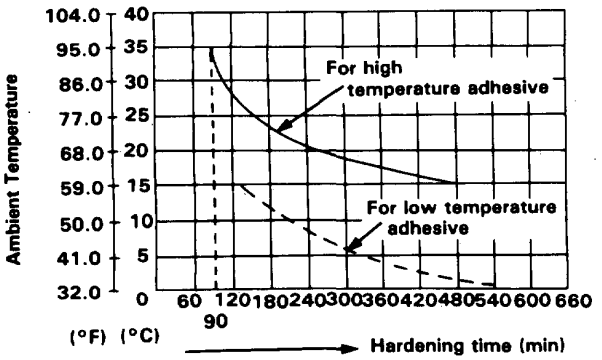
Notes

- Both kits have two types of adhesive primer: one for the body,(metal), and one for glass.
- Always use new genuine Honda adhesive, or equivalent.
- Do not use the adhesive if 6 months have elapsed since date of manufacture.
- Store adhesive in a cool, dry place.
- Open only immediately before you are going to use it.

Hardening Time

Hardening time can be shortened by heating with infrared light.

For example, the adhesive will start to harden within 270 minutes mixing at 20°C (63°F). If however, it is heated to 35°C (95°F), it will start to harden within 90 minutes.



Broken Glass Removal

Remove as much broken glass as possible with a vacuum cleaner.
Blow out the glass in the heater and behind the dashboard with low pressure compressed air:

⚠WARNING **Wear eye protection while using the air gun.**

1. Set the temperature control knob to COLD.
2. Set the mode knob to HEAT/DEF.
3. Set the FRESH/REC lever to REC.
4. Blow compressed air through the defroster center vent outlet.
5. Remove the blower duct, and remove any glass from the air mix chamber.
6. Remove the any glass from the top of the vent/defrost door.
7. Remove any glass from top and bottom of carpet and seats with a vacuum cleaner.

NOTE: It is recommended to remove the seats to shake off any glass.

Windshield

Removal

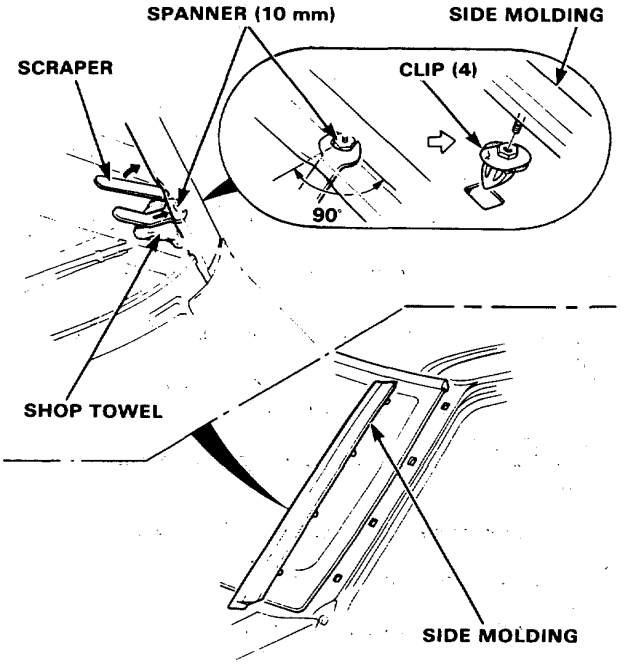
CAUTION:
- **Wear gloves to remove and install the glass.**
- **Use seat covers to avoid damaging surface.**

1. To remove the windshield, first remove the:
   - Front pillar trim (page 14-39)
   - Rearview mirror (page 14-47)
   - Sun visors and holders.
   - Front wiper and air scoop.
   - Front of weatherstrip.

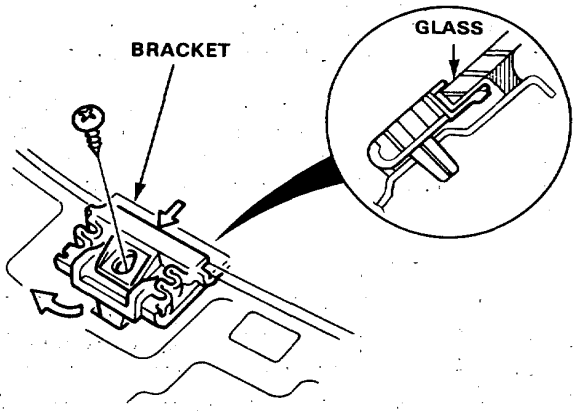
   NOTE: Do not damage the painted surface.

2. Pry out the side molding with a scraper.

3. Remove the clips by turning it 90° with a thin spanner, starting at the under side.



4. Remove the screws, then remove the right and left glass brackets.

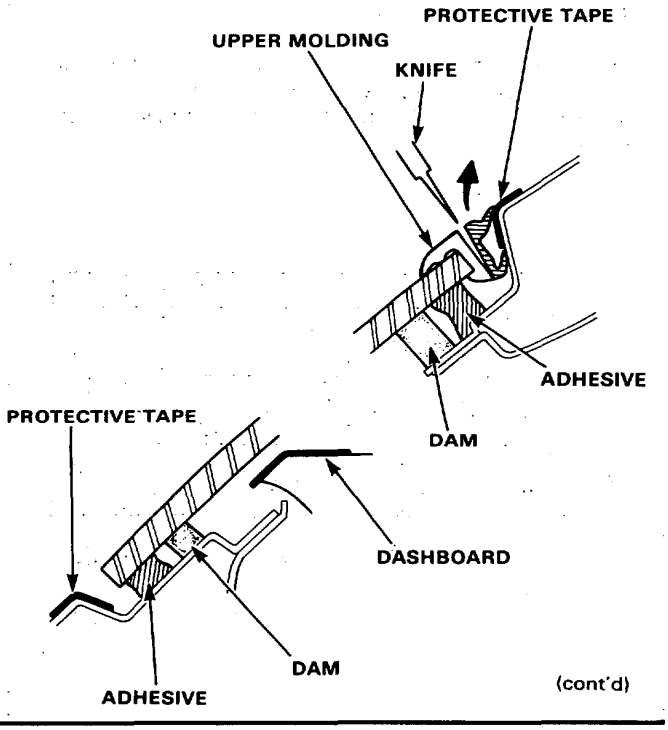


5. Lower the front of the headliner (page 14-40).

   CAUTION: Take care not to bend the headliner excessively.

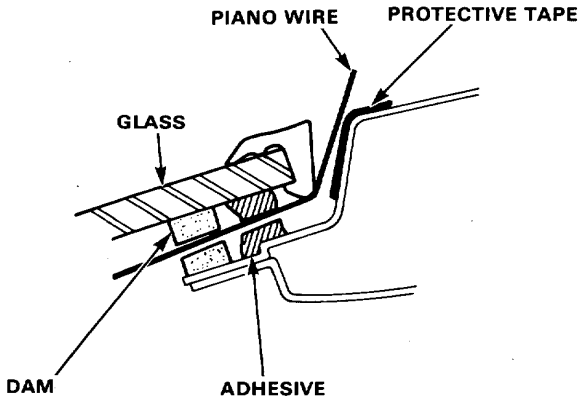
6. Cut the end of upper molding.

7. Apply protective tape along the edge of the dashboard and body next to the glass as shown.



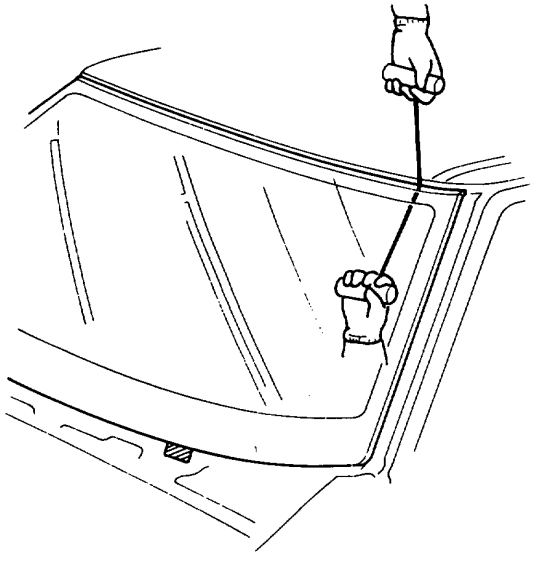
(cont'd)

8. Using an awl, make a hole through the adhesive from inside the car. Push piano wire through the hole and wrap each end around a piece of wood.



9. With a helper on the outside, pull the wire back and forth in a sawing motion and carefully cut trough the adhesive around the entire glass.

CAUTION: Hold the piano wire as close to the glass as possible to prevent damage to the body and dashboard.



10. Remove the molding and the dam.

Installation

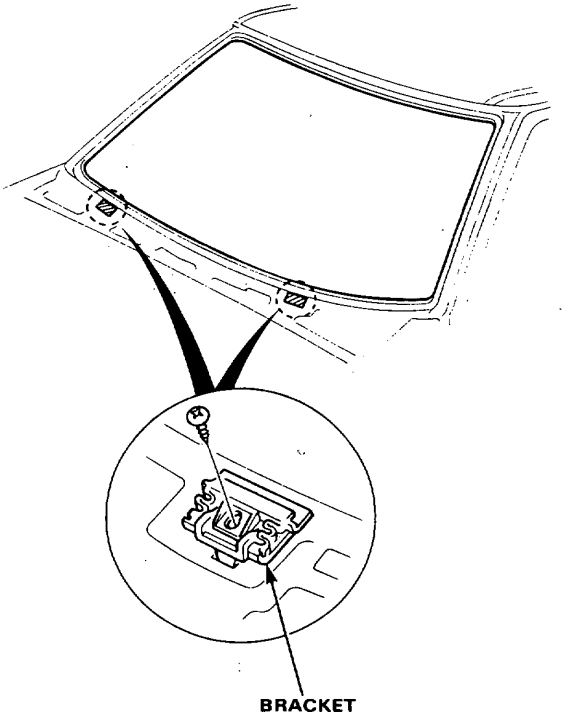
1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire glass flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Remove all traces of the rubber damer material from the body.
   - Mask off surrounding surfaces before applying primer.

2. Clean the body bonding surface with a sponge dampened in alcohol.

   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. Install the glass brackets as shown.



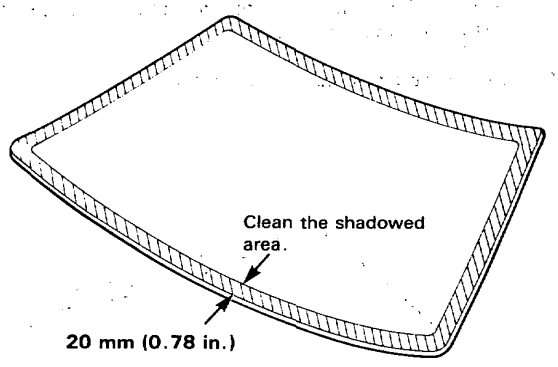
(cont'd)

Removal (cont'd)

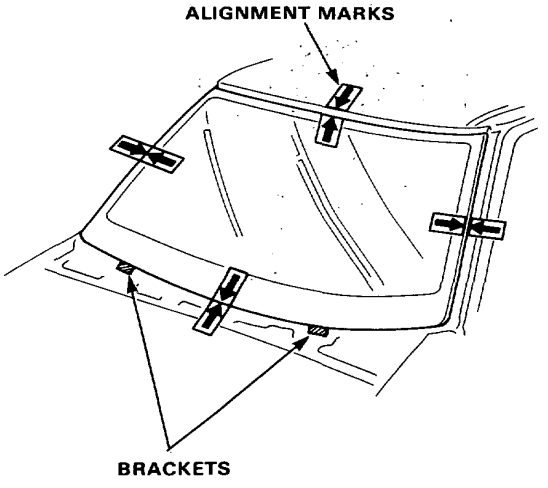
4. If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

   CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.

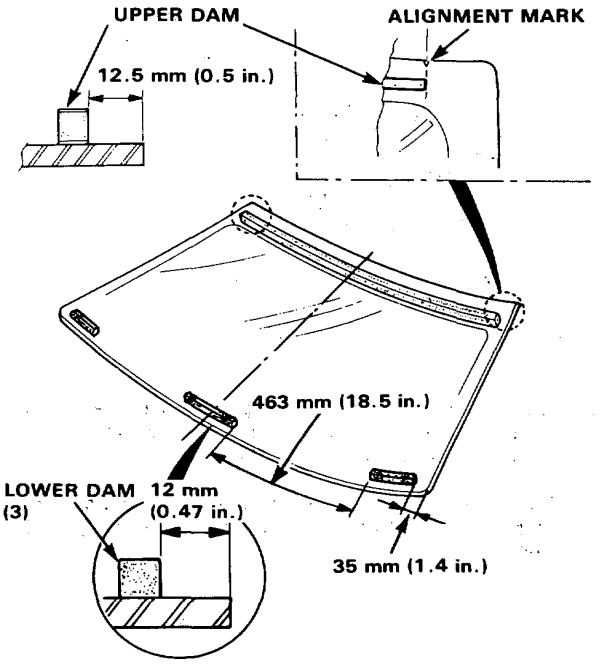


5. Set the glass upright on the spacers, and center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.

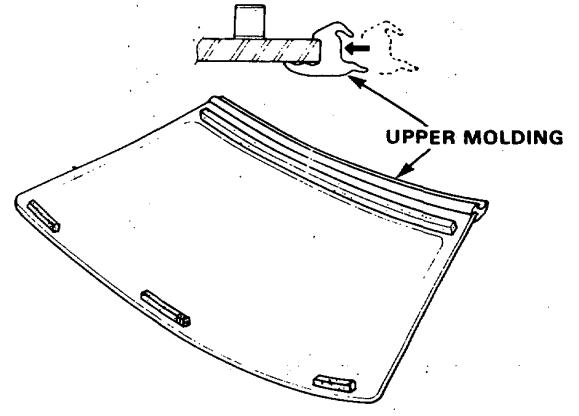


6. Center and glue the rubber dam to the inside face of the glass as shown, to contain the adhesive during installation.

   NOTE: Be careful not to touch the glass where adhesive will be applied.

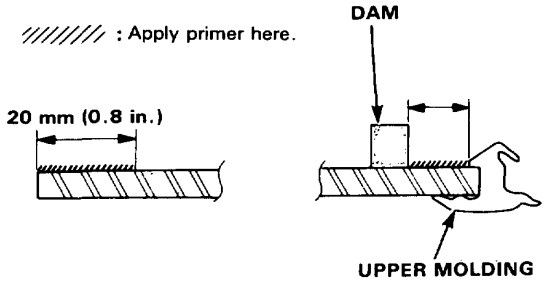


7. Apply the upper molding to the glass as shown.



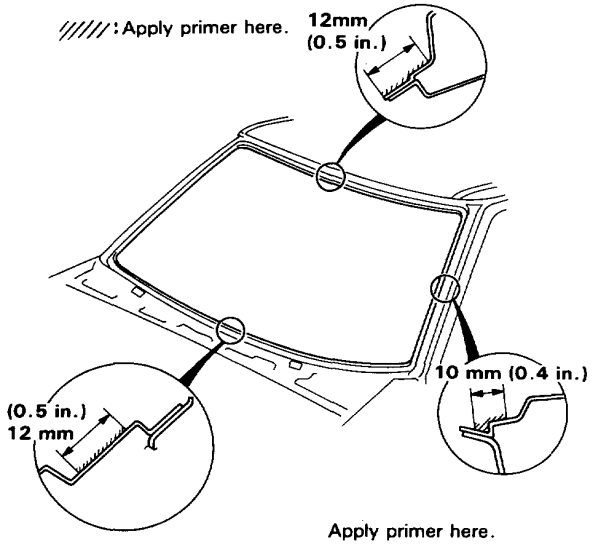
8. With a sponge, apply a light coat of glass primer around the edge of the glass, then lightly wipe it off with gauze or cheesecloth.

NOTE:
- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do,the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.



9. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

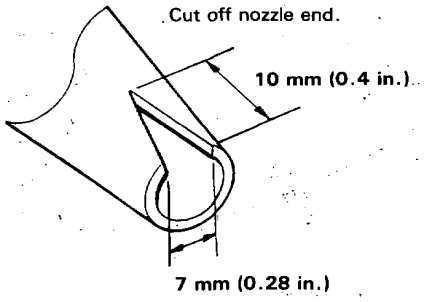
NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.
- Mask off the dashboard before painting the flange.



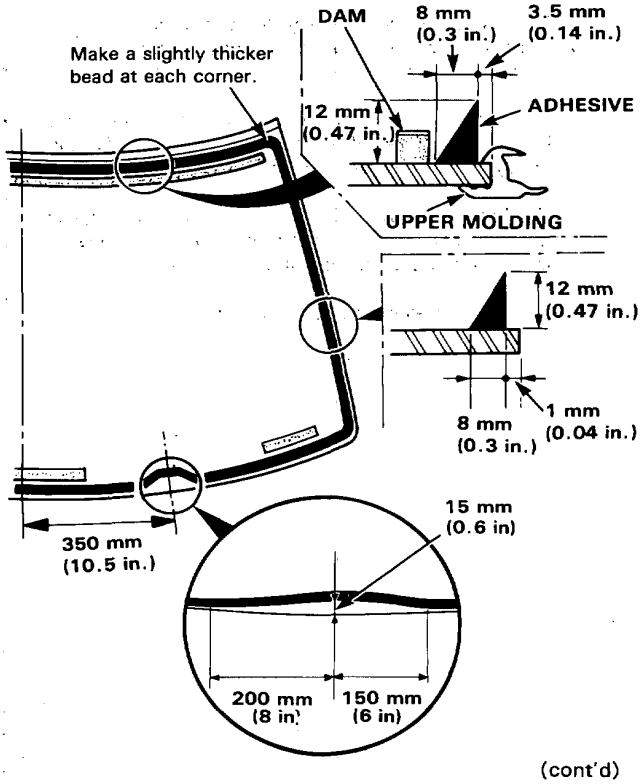
10. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that came with the adhesive.

11. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



12. Pack adhesive into the cartridge without air pockets,to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the glass as shown.



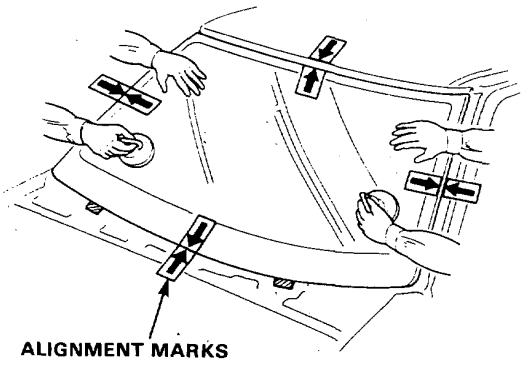
(cont'd)

Windshield

Installation (cont'd)

13. Use suction cups to hold the glass over the opening, align it with the marks made in step 5 and set it down on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

    NOTE: Do not open or close the doors until the adhesive is dry.



14. Install the front side moldings.

15. Scrape or wipe the excess adhesive off with a putty knife or gauze.

    NOTE: Use a soft shop towel dampened with alcohol or unleaded gasoline to remove adhesive from a painted surface or glass.

16. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

    NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

17. Reinstall all remaining removed parts.

Rear Window Glass

Removal

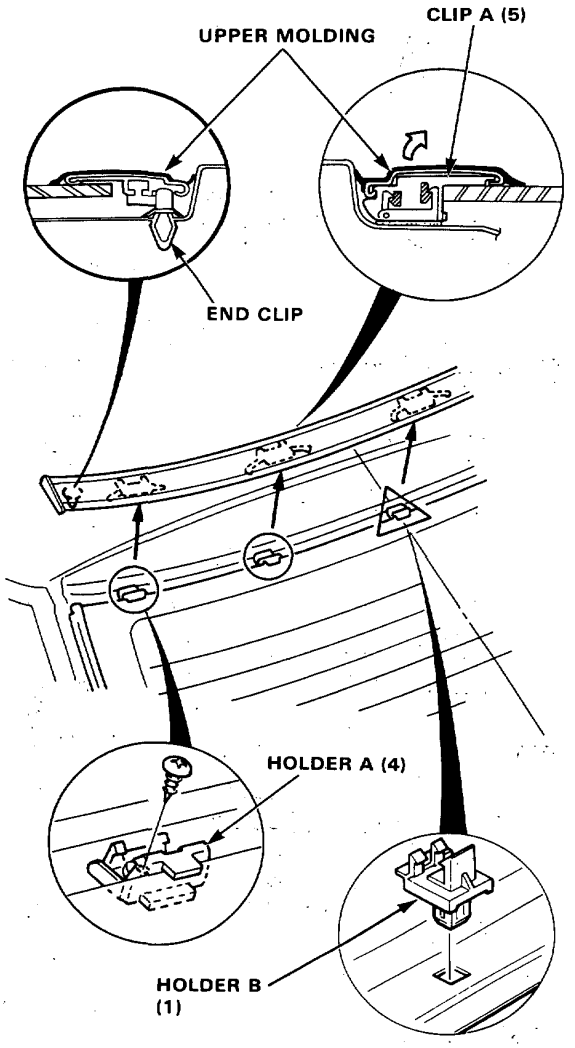
CAUTION:
- **Wear gloves to remove and install the glass.**
- **Do not damage the defroster grid lines.**
- **Use seat covers to avoid damaging surface.**

1. To remove the rear window glass, first remove the:
   - Tailgate trim panel (page 14-56).
   - Rear wiper (See section 16).

2. Disconnect the defroster leads, and remove their holders.

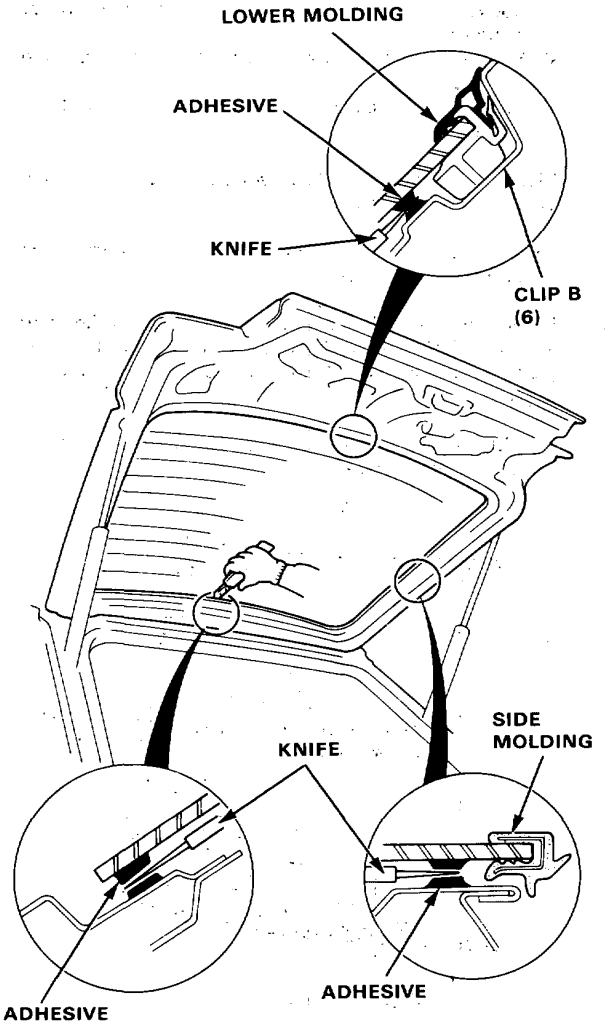
   NOTE: Take care not scratch or score the glass with the cutter blade.

3. Detach the clips and remove the upper molding.



4. Remove the screw, then remove the holder A.

5. Use a knife to cut through the glass adhesive from inside car, all the way around, the glass area.



6. If the glass is to be reinstalled, remove the side moldings and lower molding.

Rear Window Glass

Installation

1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire window glass flange.

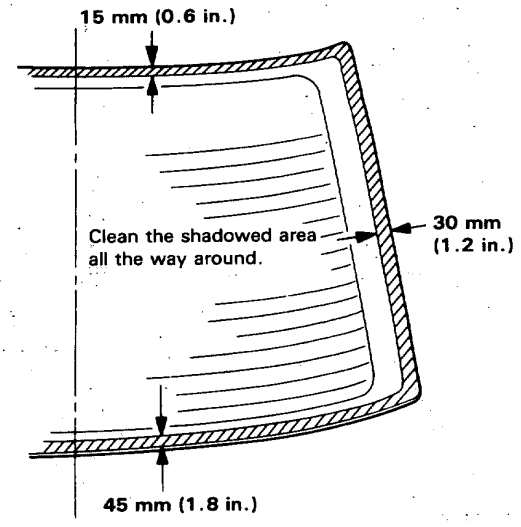
   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Remove all traces of the rubber spacer material from the body.
   - Mask off surrounding surfaces before applying primer.

2. Clean the body bonding surface with a sponge dampened in alcohol.

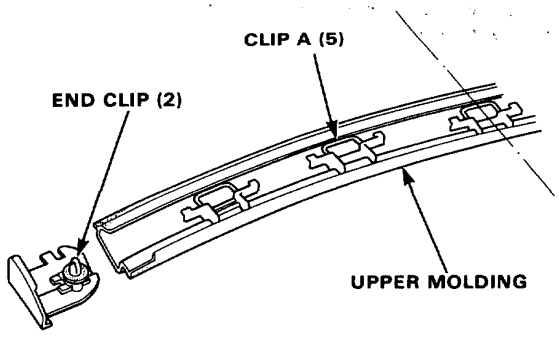
   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

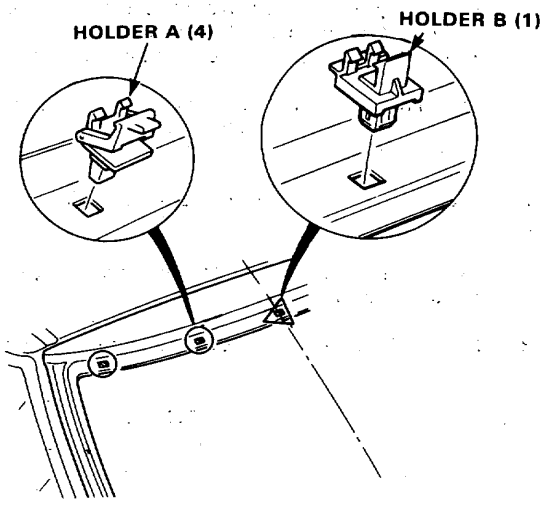
   NOTE: Make sure the bonding surface is kept free of water, oil and grease.



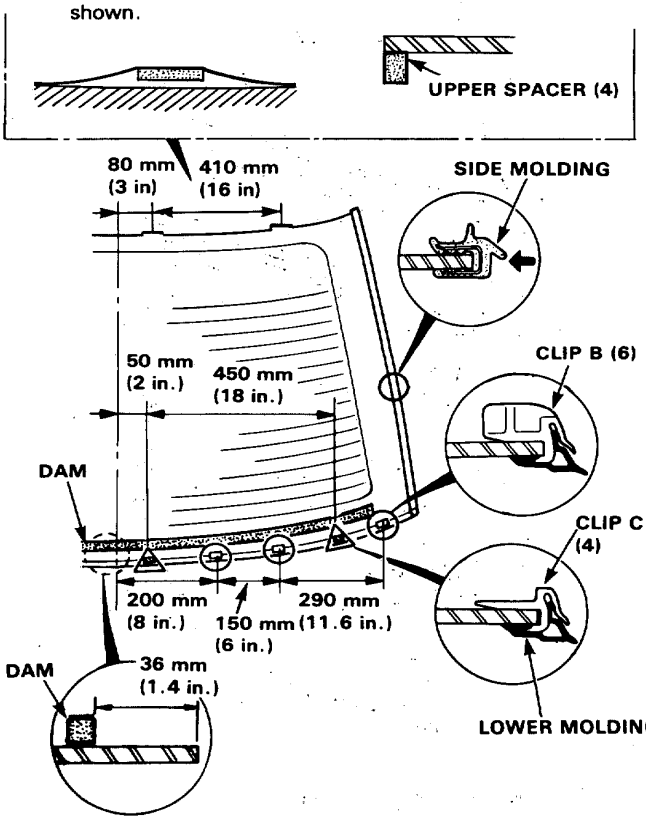
4. Attach the clips to the upper molding as shown.



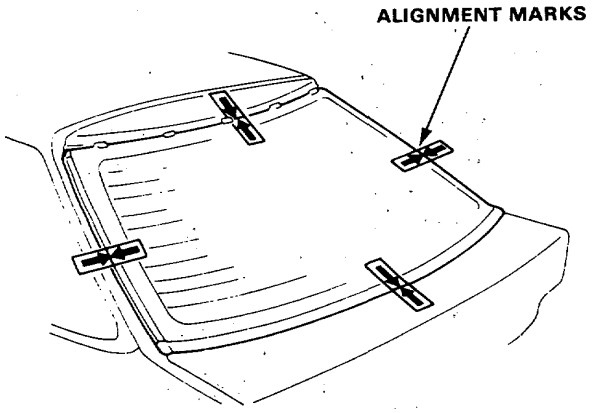
5. Install the holders to the tailgate.



6. Center and glue the rubber dam and upper spacers to the inside face of the glass as shown, to contain the adhesive during installation.
   Install the lower and side moldings to the glass as shown.

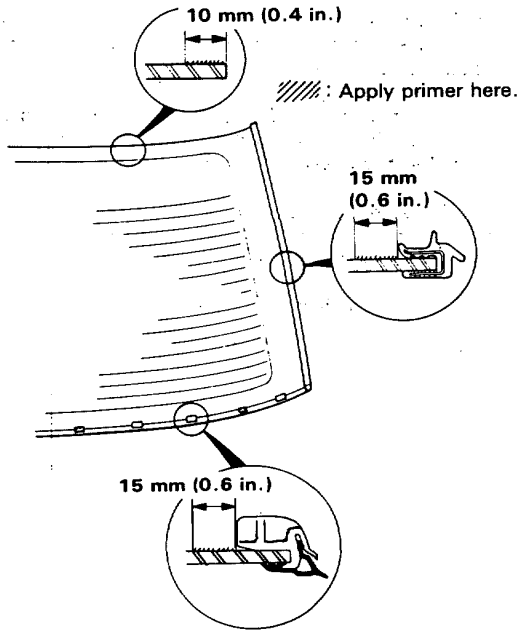


7. Set the glass upright on the tailgate, and center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.



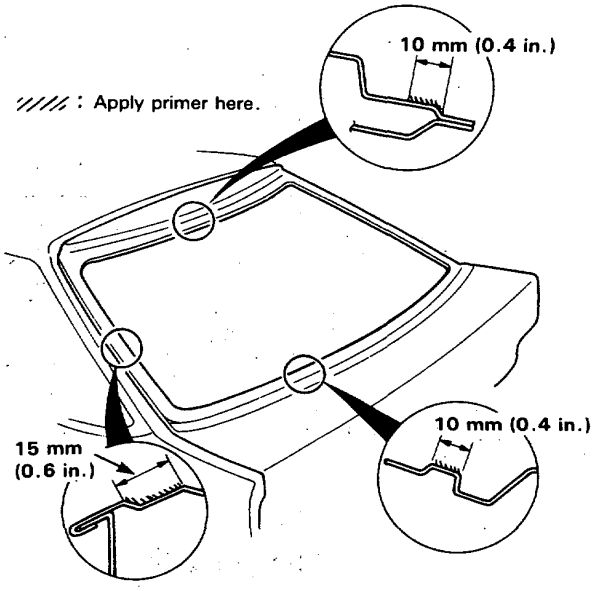
8. With a sponge, apply a light coat of glass primer around the edge of glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:
- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.



9. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

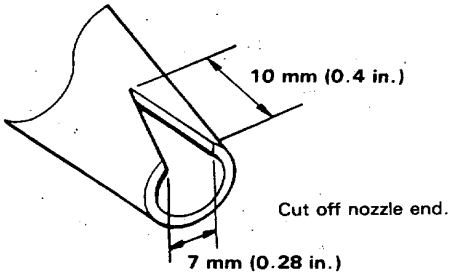
NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.



10. Thoroughly mix all the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.

11. Before filling a cartridge, cut off the end of the nozzle at the angle shown.

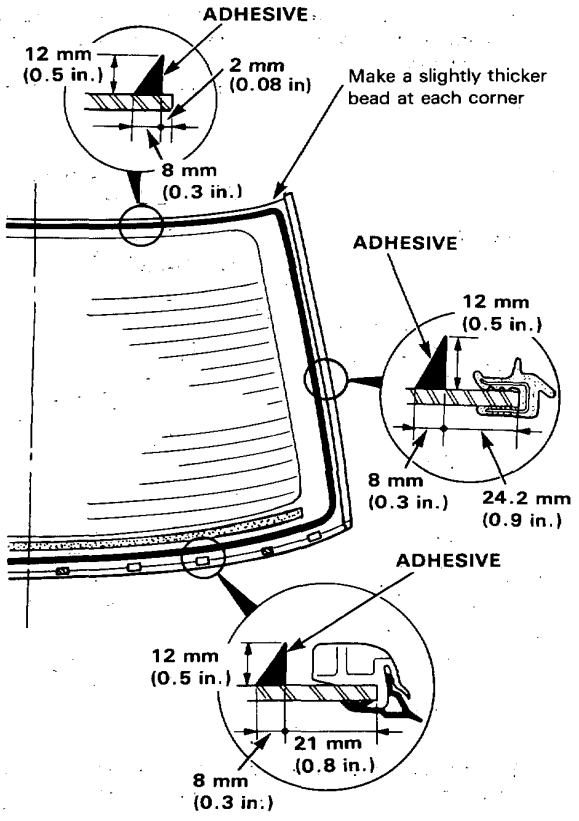


(cont'd)

Rear window Glass

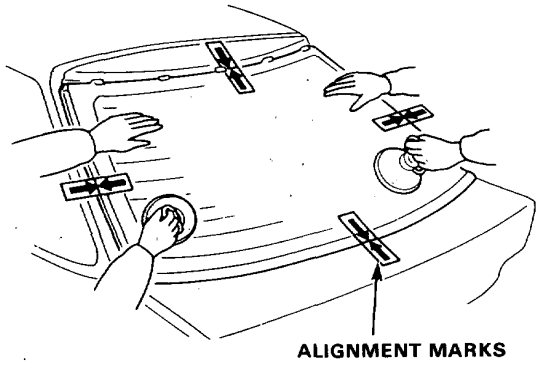
Installation (cont'd)

12. Pack adhesive into the cartridge without air pockets, to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the glass as shown.

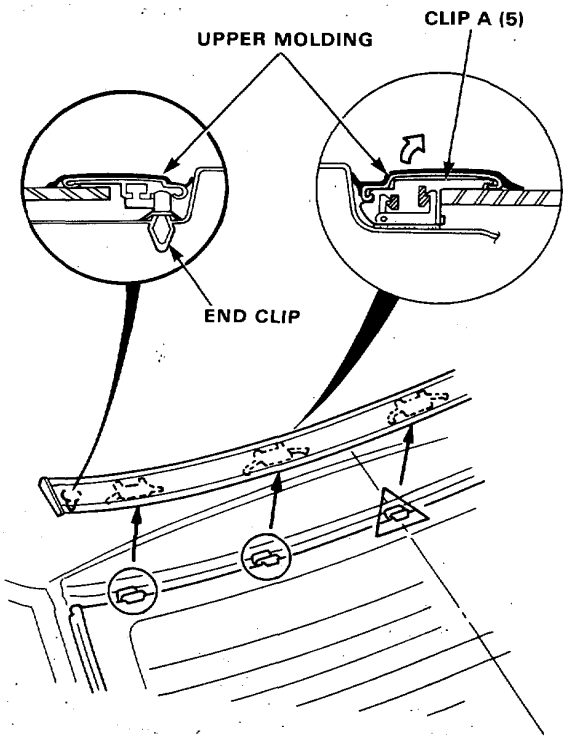


13. Use suction cups to hold the glass over the opening, then set it down on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

    NOTE: Do not open and close the doors until the adhesive is dry.



14. Install the upeer molding as shown.



15. Scrape or wipe the excess adhesive off with a putty knife or gauze.

    NOTE: Use a soft shop towel dampened with alcohol or unleaded gasoline to remove adhesive from a painted surface or glass.

16. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

    NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

17. *Reinstall all remaining removed parts.*

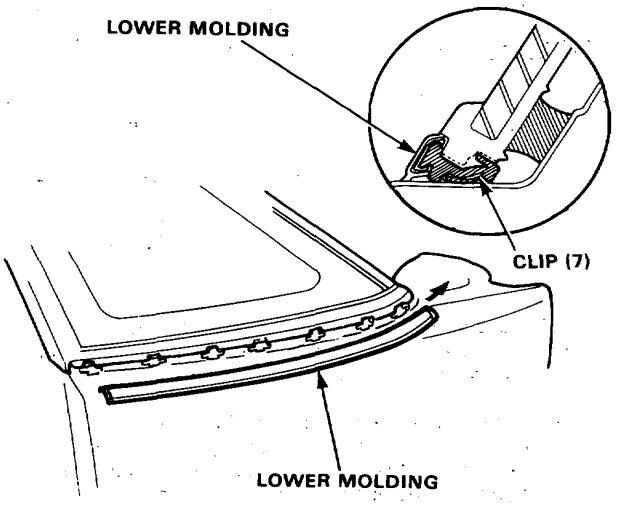
Quarter Window Glass

Removal

CAUTION:
- **Wear gloves to remove and install the glass.**
- **Take care not scratch or score the quarter window moldings.**
- **Use seat covers to avoid damaging surface.**

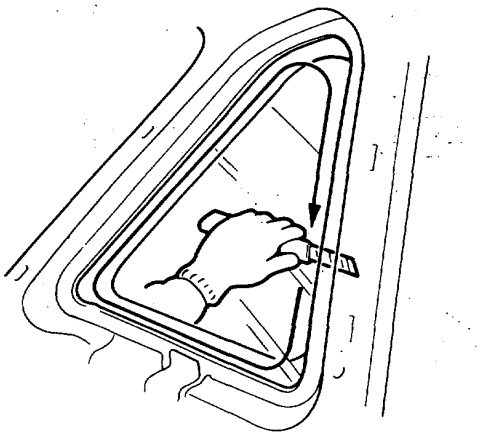
1. Remove the quarter window trim panel (pages 14-39).

2. Remove the quarter lower molding.



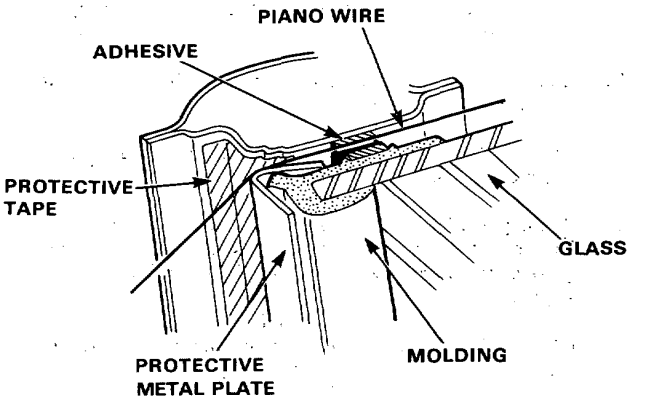
3. Use a knife to cut through the glass adhesive from inside car, all the way around, the glass area.

   NOTE: Be careful not to cut the molding.

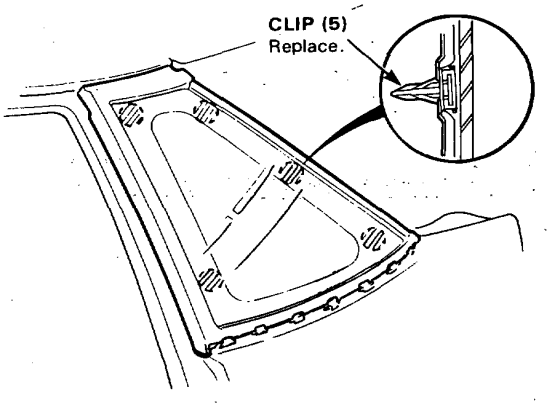


4. Using an awl, make a hole through the glass adhesive from inside the car. Push piano wire through the hole and wrap each end around a piece of wood.

   NOTE: Apply protective metal plate along the edge of the body next to the glass.



5. Use a knife to cut the clips from inside the car.
   NOTE: Be careful not to cut the molding.



6. Carefully take off the clips.

Quarter Window Glass

Installation

1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire window glass flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Mask off surrounding surfaces before applying primer.

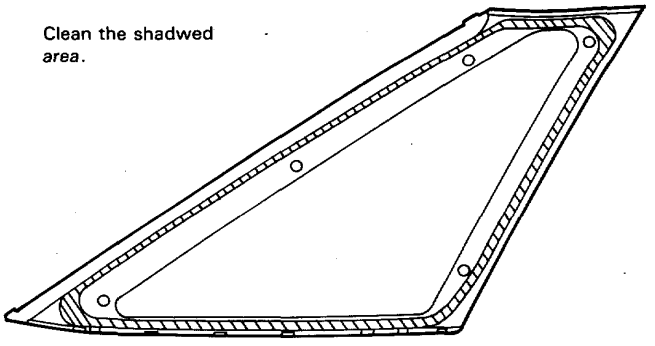
2. Clean the body bonding surface with a sponge dampened in alcohol.

   NOTE After cleaning, keep oil, grease or water from getting on the surface.

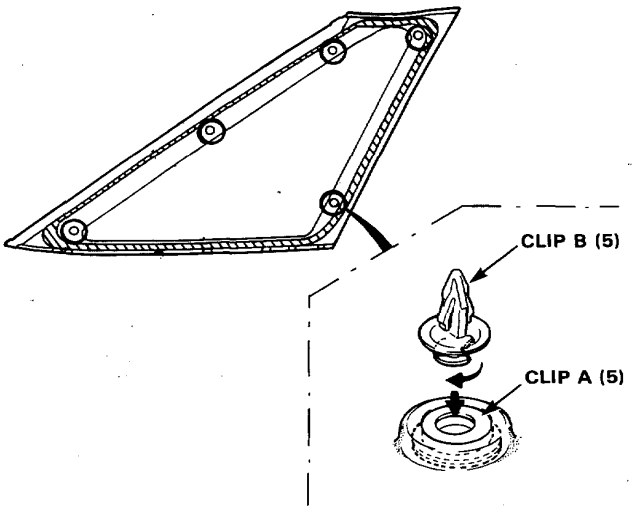
3. If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

Clean the shadwed *area.*

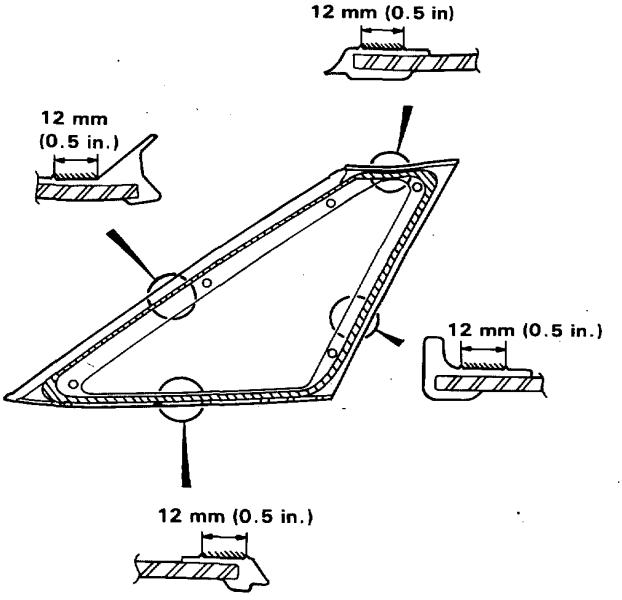


4. Install the clips on the quarter glass as shown.



5. With a sponge, apply a light coat of glass primer around the edge of glass as shown, then lightly wipe it off with gauze or cheesecloth.
   NOTE:
   - Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
   - Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
   - Keep water dust, and abrasive materials away from the primed surface.

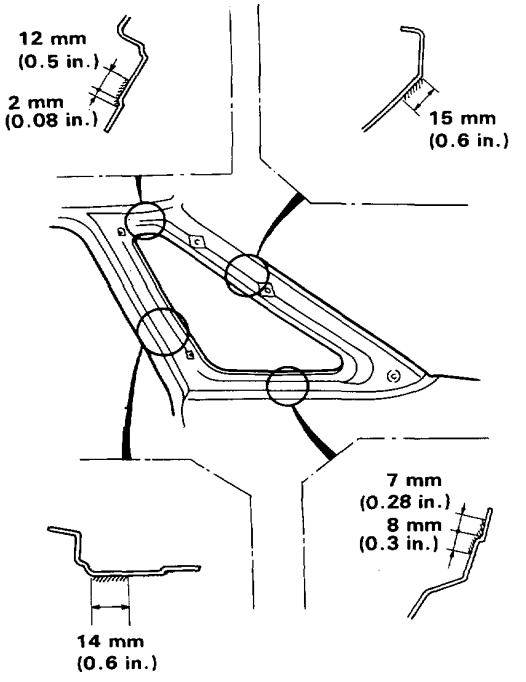
: Apply primer here.



6. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.

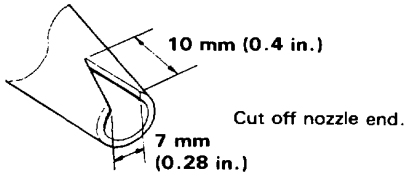
▨ : Apply primer here.



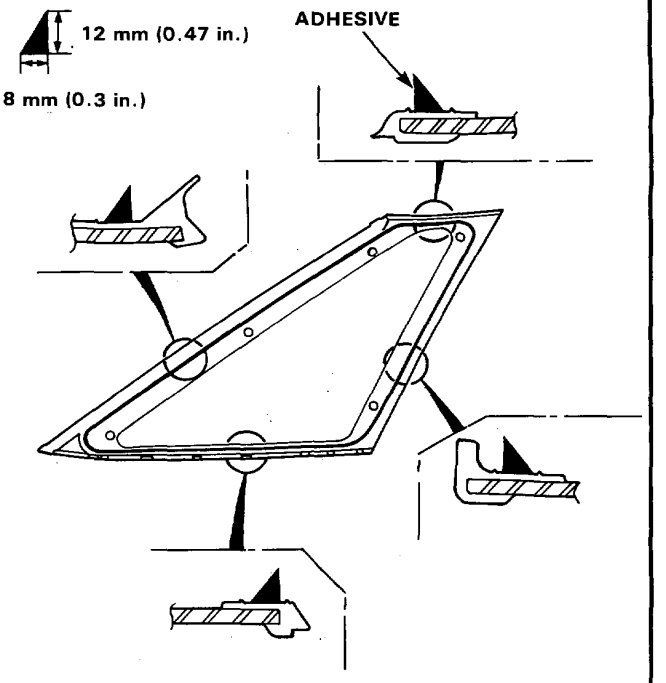
7. Thoroughly mix all the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.

8. Before filling a cartridge, cut off the end of the nozzle at the angle shown.

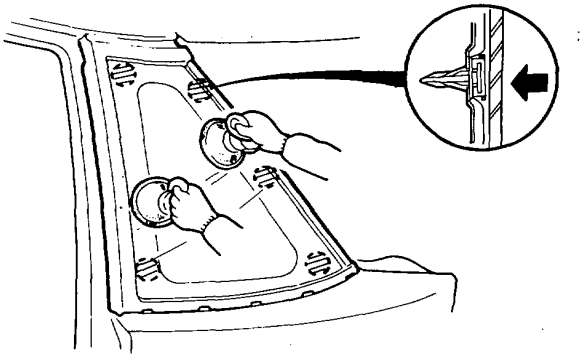


9. Pack adhesive into the cartridge without air pockets, to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the glass as shown.



10. Use suction cups to hold the glass over the opening, then set it down on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

NOTE: Do not open and close the doors until the adhesive is dry.

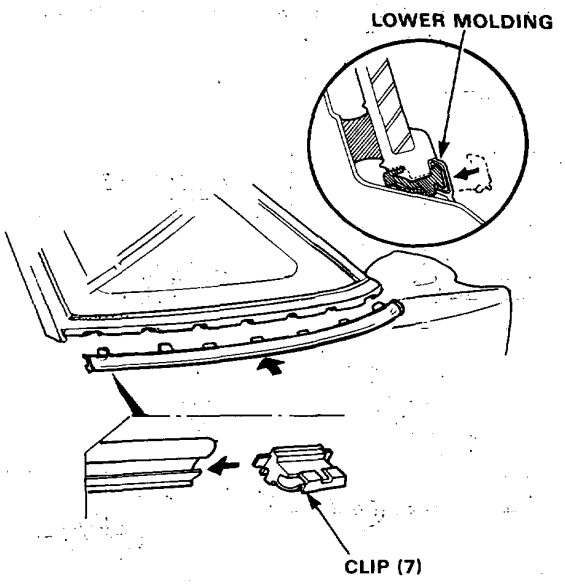


(cont'd)

Quarter Window Glass

Installation (cont'd)

11. Install the quarter lower molding.



12. Scrape or wipe the excess adhesive off with a putty knife or gauze.

    NOTE: Use a soft shop towel dampened with alcohol or unleaded gasoline to remove adhesive from a painted surface or glass.

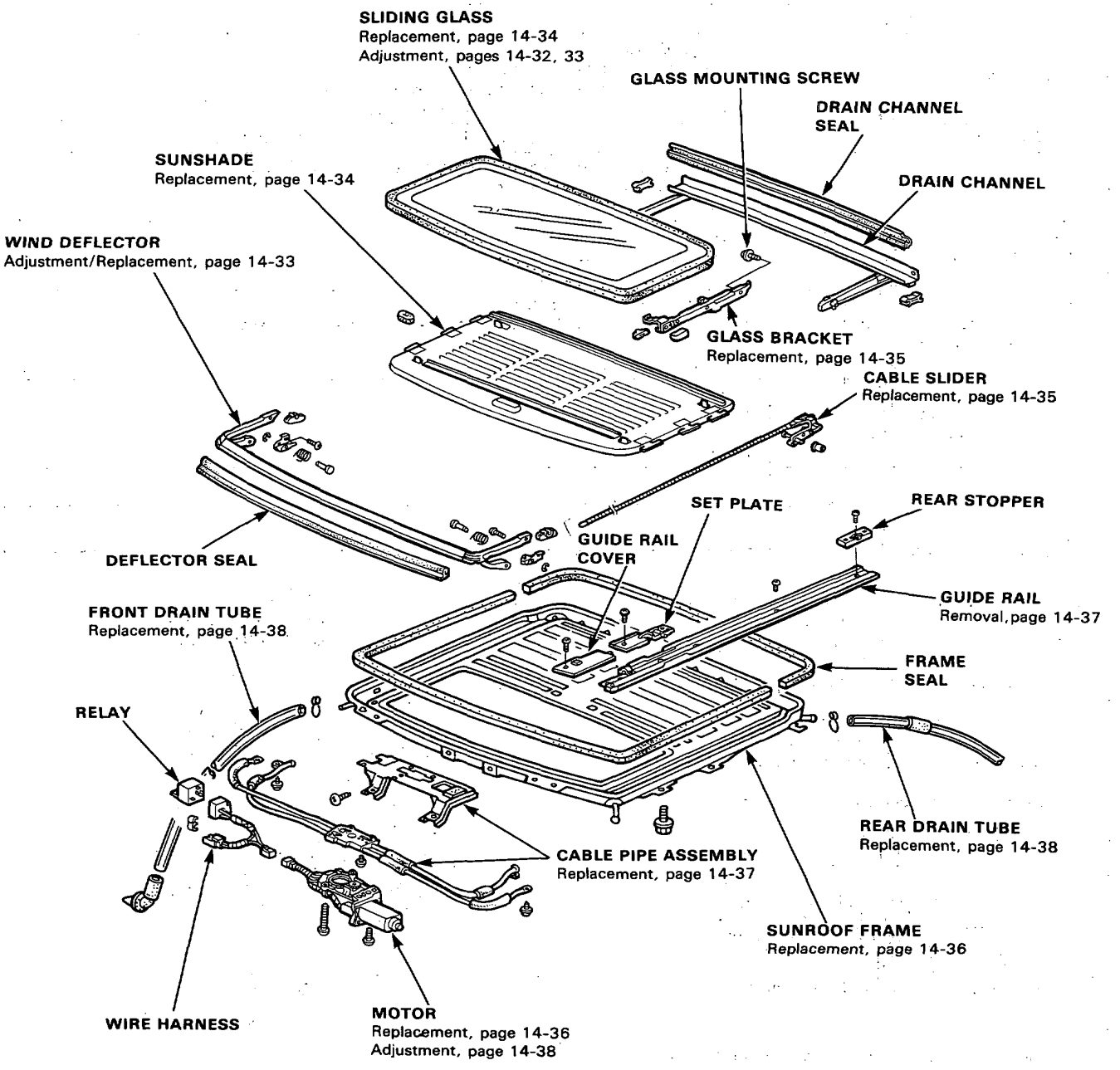
13. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

    NOTE: Let the car stand for least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

14. Reassemble all remaining removed parts.

Sunroof

Index



Sunroof

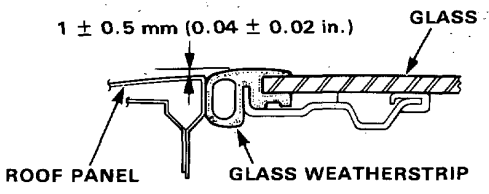
Troubleshooting

Symptom	Probable Cause
Water leak	1. Clogged drain tube. 2. Gap between glass weatherstrip and roof panel. 3. Defective or improperly installed glass weatherstrip. 4. Defective or impropery installed guide rail.
Wind noise	1. Excessive clearance between glass weatherstrip and roof panel.
Deflector noise	1. Improper clearance between deflector seal and roof panel. 2. Insufficient deflector extension. 3. Deformed deflector.
Motor noise	1. Loose motor. 2. Worn gear or bearing. 3. Outer cable deformed.
Sliding glass does not move, bot motor turns	1. Clutch out of adjustment. 2. Foreign matter stuck between guide rail and sliding glass panel. 3. Outer cable loose. 4. Outer cable not attached properly.
Sliding glass does not move and motor does not turn (Sliding glass can be moved with sunroof wrench)	1. Blown fuse. 2. Faulty switch. 3. Battery run down. 4. Defective motor.

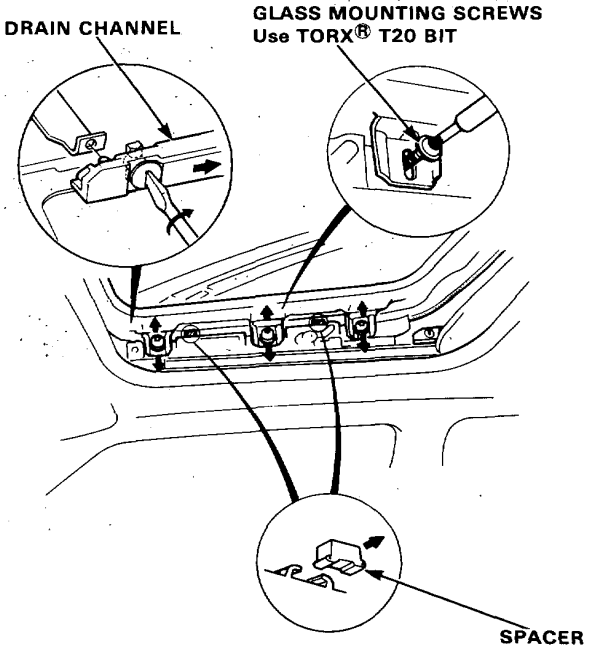
Glass Adjustment

Roof panel should be even with the glass weatherstrip, to within 1 ± 0.5 mm (0.04 ± 0.02 in.) all the way around. If not, slide sunshade back, and:

1. Slide the drain channel to the backward.
2. Loosen the mounting screws and adjust the sliding glass up or down to the gap between the glass weatherstrip and at the roof panel.
3. Repeat on opposite side if necessary.



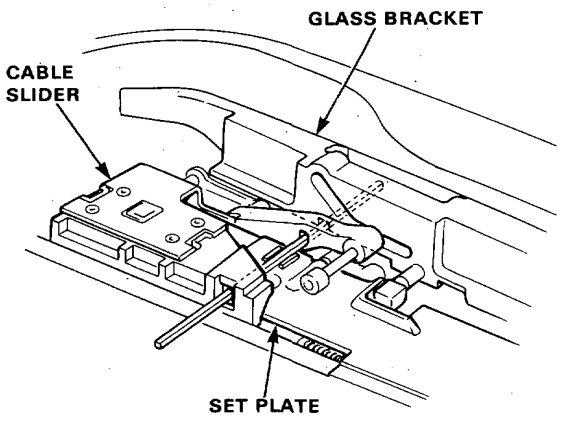
4. Side-to-side fit of glass weatherstrip can be adjusted by loosen the sunroof frame mounthing bolts and moving the frame right or left and forward or backward by hand (page 14-36).



Closing Fit Adjustment

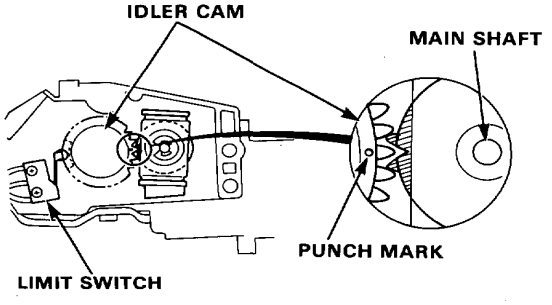
Open the glass about a foot then close it to check where rear edge begins to rise.
If it rises too soon and seats too tightly against the roof panel, or too late and does not seat tightly enough, adjust it.

1. Remove the sliding glass (page 14-34).
2. Remove the sunroof motor (page 14-36).
3. Aligh the fully closed position of the cable slider, set plat and glass bracket by inserting the 3.5~4 mm square rod as shown.



4. Check that the alignment left and right, then install the sunroof motor.

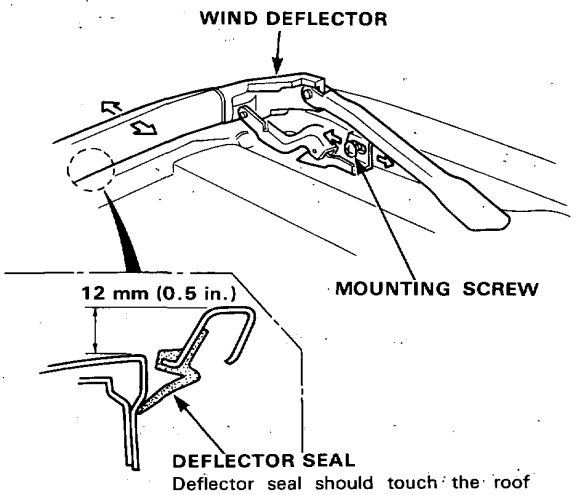
   NOTE: If necessary; check that the closed position of sunroof motor (idler cam) as shown.



Wind Deflector Adjustment and Replacement

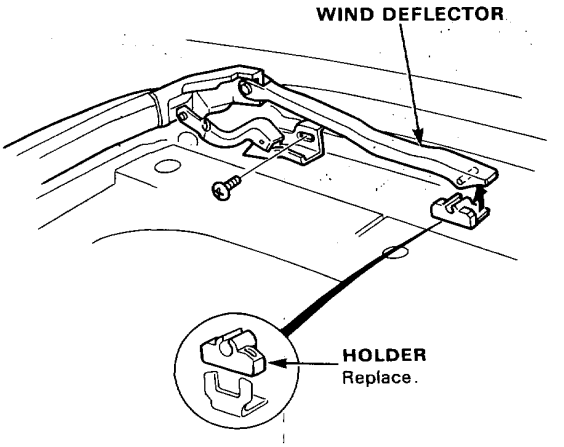
NOTE: A gap between deflector seal and roof panel will cause wind noise when driving at high speed with the sunroof open.

1. Open the sliding glass.
2. Loosen deflector mounting screws.
3. Adjust deflector forward or backward so the edge of its seal touches the roof panel evenly.



NOTE: The height of the deflector when open can not be adjusted, If damaged or deformed, replace it.

4. If necessary, remove the wind deflector by removing the mounting screws and pry the rear edge of deflector off the holder.

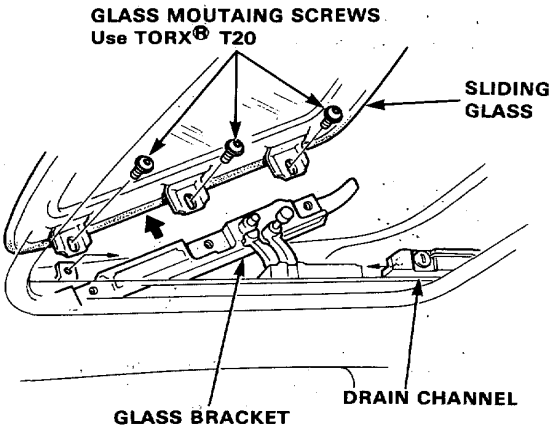


5. Installation is done in the reverse order of removal.

Sunroof

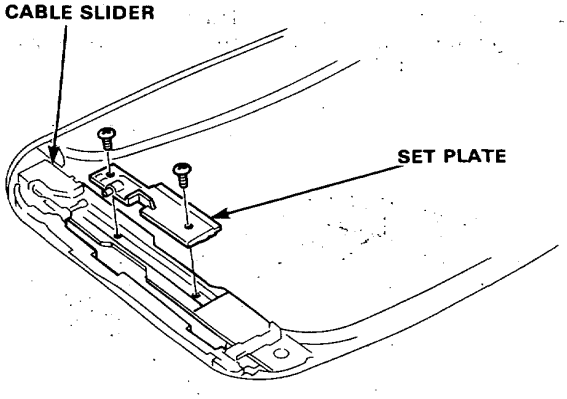
Glass and Sunshade Replacement

1. Tilt-up the sliding glass and open the sunshade.
2. Slide the drain channel to the backward by removing the mounting screws.
3. Remove the glass mounting screws, then lift off the sliding glass from the mounting bracket.

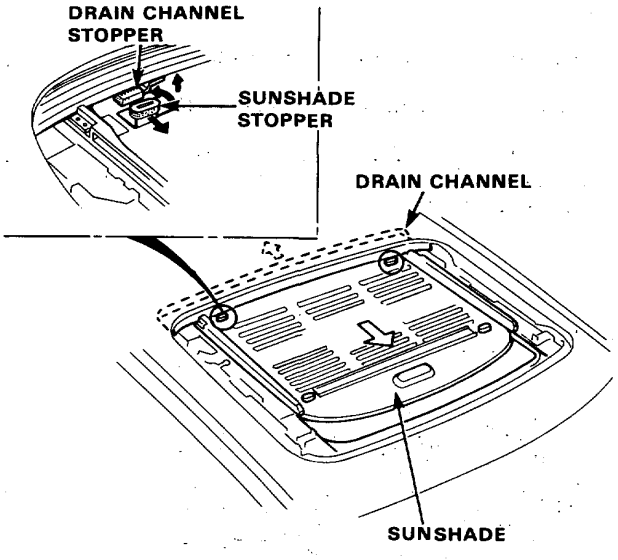


4. Remove the screws, then remove the set plates.

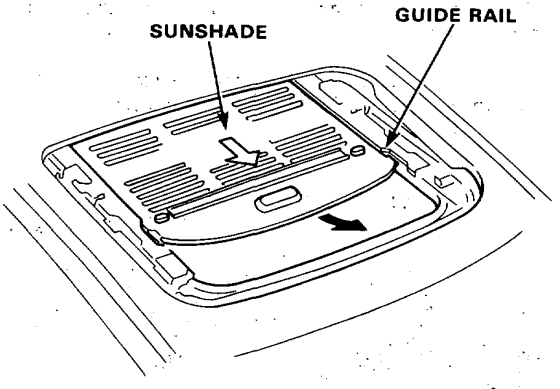
   NOTE: Slide the cable slider to the backward.



5. Slide the sunshade fully to the forward by lifting the drain channel stoppers.



6. Pull out and remove the sunshade from the cut-out of the guide rails.

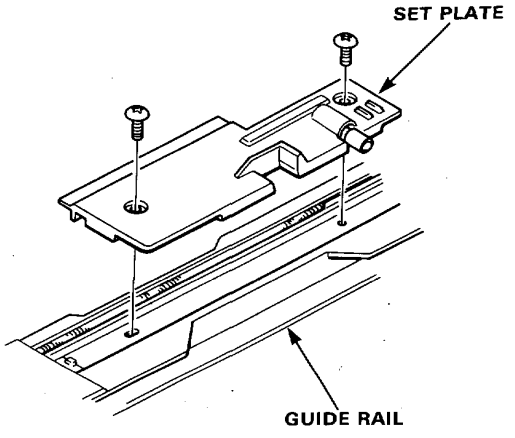


7. To attach, follow the steps described for removal in reverse.

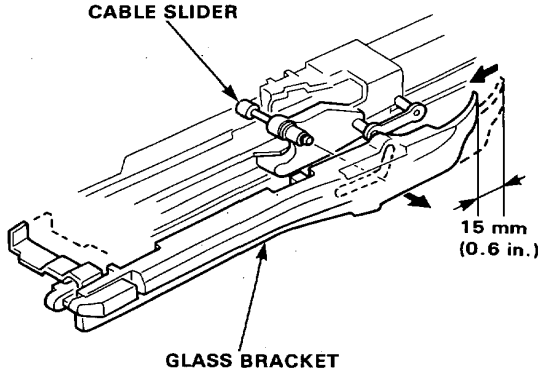
NOTE:
- Check that the sunshade moves smoothly.
- After attachment, check the glass height and alignment.
- Check for water and air leaks.

Glass Bracket and Cable Slider Replacement

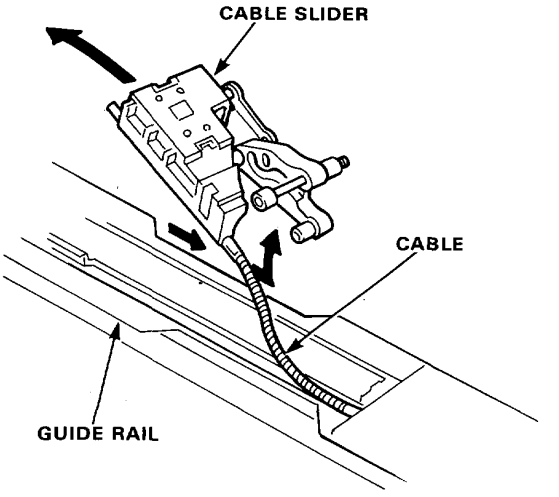
1. Remove the wind deflector (page 14-33).
2. Remove the sliding glass (page 14-34).
3. Pull down the front of headliner.
4. Remove the 3 screws and disconnect the connector, then remove the sunroof motor (page 14-36).
5. Remove the screws, then remove the set plates from the guide rails.



6. Move just the glass bracket backward, then remove the glass brackets from cable sliders as shown below.



7. Lift off the cable sliders from the cut-out of guide rails.
8. Remove the cables from cable pipes.



9. Installation sequence is essentially the reverse order of removal.

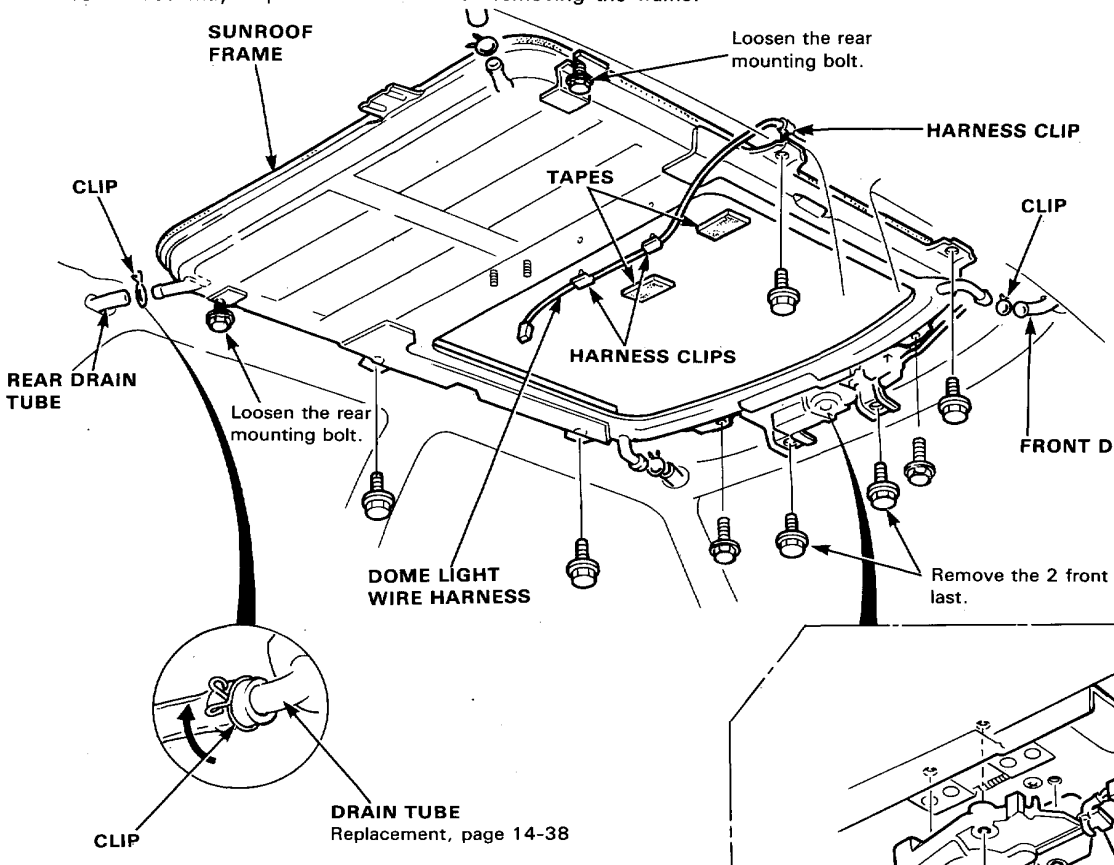
NOTE:
- Check the cables for wear or damage.
- Grease all the moving surfaces of the cable sliders and glass brackets.
- Before installing the sunroof motor, check that the cable sliders and glass brackets with the glass tilt-up position.
- Take care not to bend the cable.

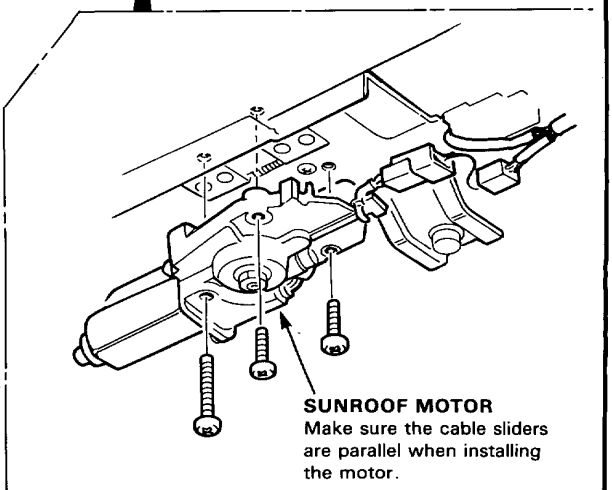
Sunroof

Motor and Frame Replacement

CAUTION: Be careful not to damage the seats or other interior trim.

1. Remove the sliding glass (page 14-34) and the headliner (page 14-40).
2. Disconnect the motor and relay wire harness; remove the clips securing the dome light wire harness.
   NOTE: When removing the sunroof motor, remove the 3 mounting screws.
3. Disconnect the drain tubes.
4. Remove the 6 × 16 mm mounting bolts from the frame, and loosen the 2 rear mounting bolts.
5. Remove the sunroof frame from the car.
   NOTE: You may require assistance when removing the frame.



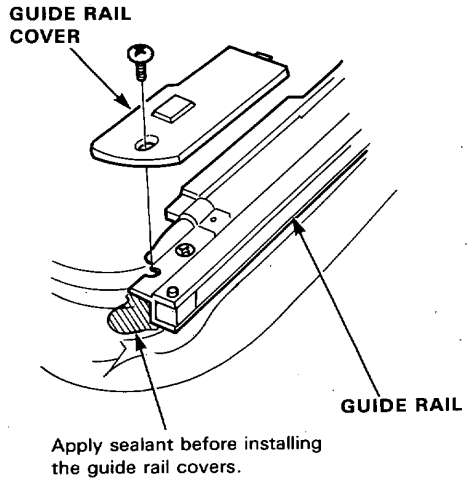


6. To install, insert the frame's rear hooks into the rear mounting bolts, then install parts in the reverse order of removal.

NOTE:
- Install the tube clips with the ends facing the side to ease installation of the headliner.
- Insert over 10 mm of the drain tube onto the nozzle.
- Check for water and air leaks.

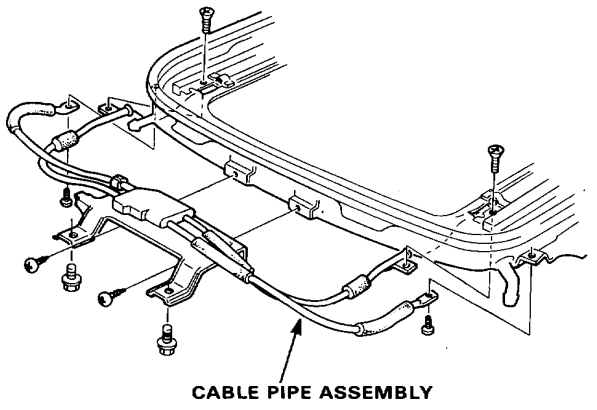
Cable Pipe Assembly Replacement

1. Remove the cable sliders (page 14-35).
2. Remove the guide rail covers.



3. Remove the screws and 2 bolts, then remove the cable pipe assembly from the sunroof frame.

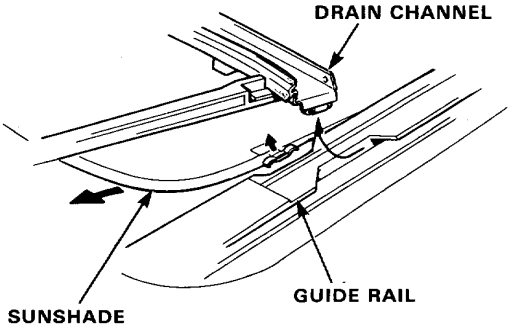
   NOTE: Take care not to deform the cable pipes.



4. Install the cable pipe assembly in the reverse order of removal.

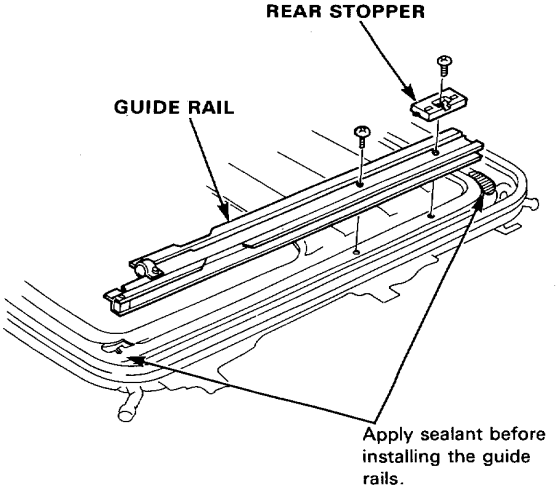
Guide Rail Replacement

1. Remove the sunroof frame (page 14-36).
2. Remove the cable sliders (page 14-35).
3. Lift off the sunshade and drain channel from the cut-out of guide rails.



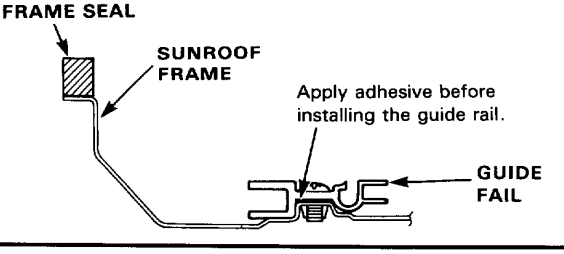
4. Remove the screws and rear stoppers, lift off the gulde rails from the frame.

   NOTE: Remove the guide rail slowly and carefully; it is cemented to the frame.



5. Install the guide rail in the reveres order of removal.

   NOTE: Apply adhesive to guide rails mount faces of the frame.



Sunroof

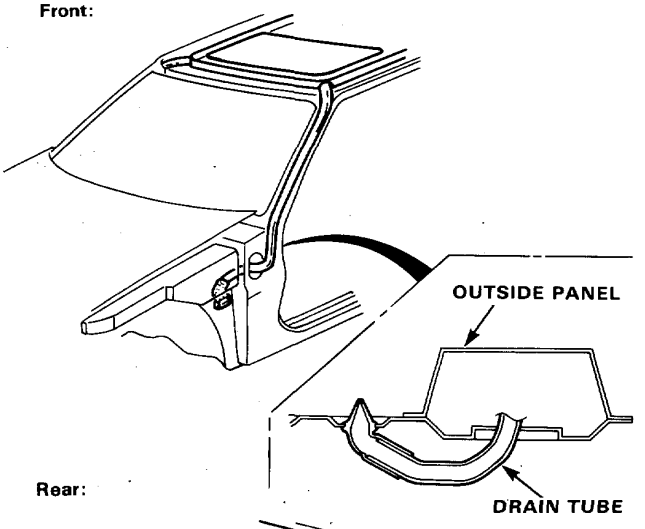
Drain Tube Replacement

1. Detach the clips and grommets.
2. Pull the drain tubes out the front and rear pillars.

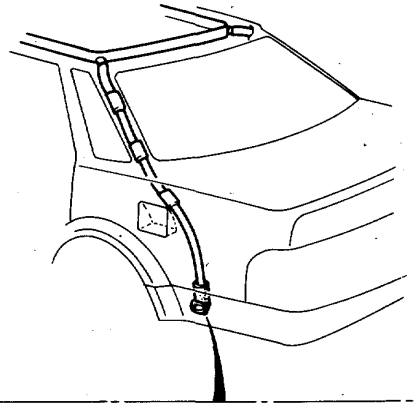
   NOTE: Before pulling out the drain tube, tie a string to the end of it so you can pull it back in when the pillar is reinstalled.
3. Install the drain tube in the revers order of removal.

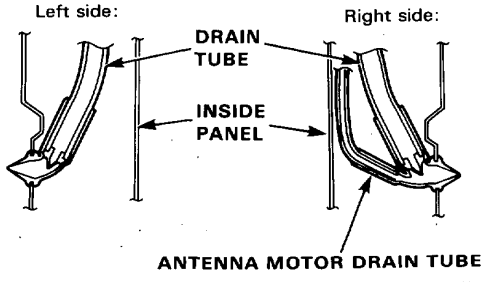
   NOTE:
   - Take care not to pinch tube during reinstallation.
   - Install the grommets firmly.

Front:



Rear:





Drag Check/Closing Force Check

CAUTION: When using the spring scale, protect the leading edge of the sliding glass with a shop towel.

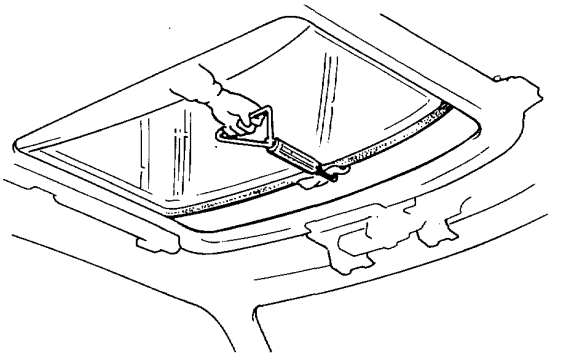
Motor Removed:

1. Before installing the sunroof motor, measure effort required to open sliding glass using a spring scale as shown.
2. If load is over 98 N (10 kg, 22 lb), check side clearance and glass adjustment (page 14-32).

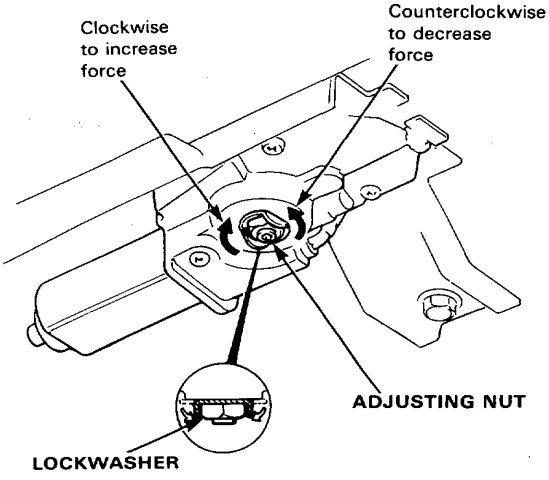
Motor Installed:

1. After installing all removed parts, have a helper hold the switch to close the sunroof while you measure force required to stop it. Attach spring scale as shown. Read force as soon as glass stops moving, then immediately release the switch and spring scale.

   Closing Force: 196–245 N (20–30 kg, 44–55 lb)



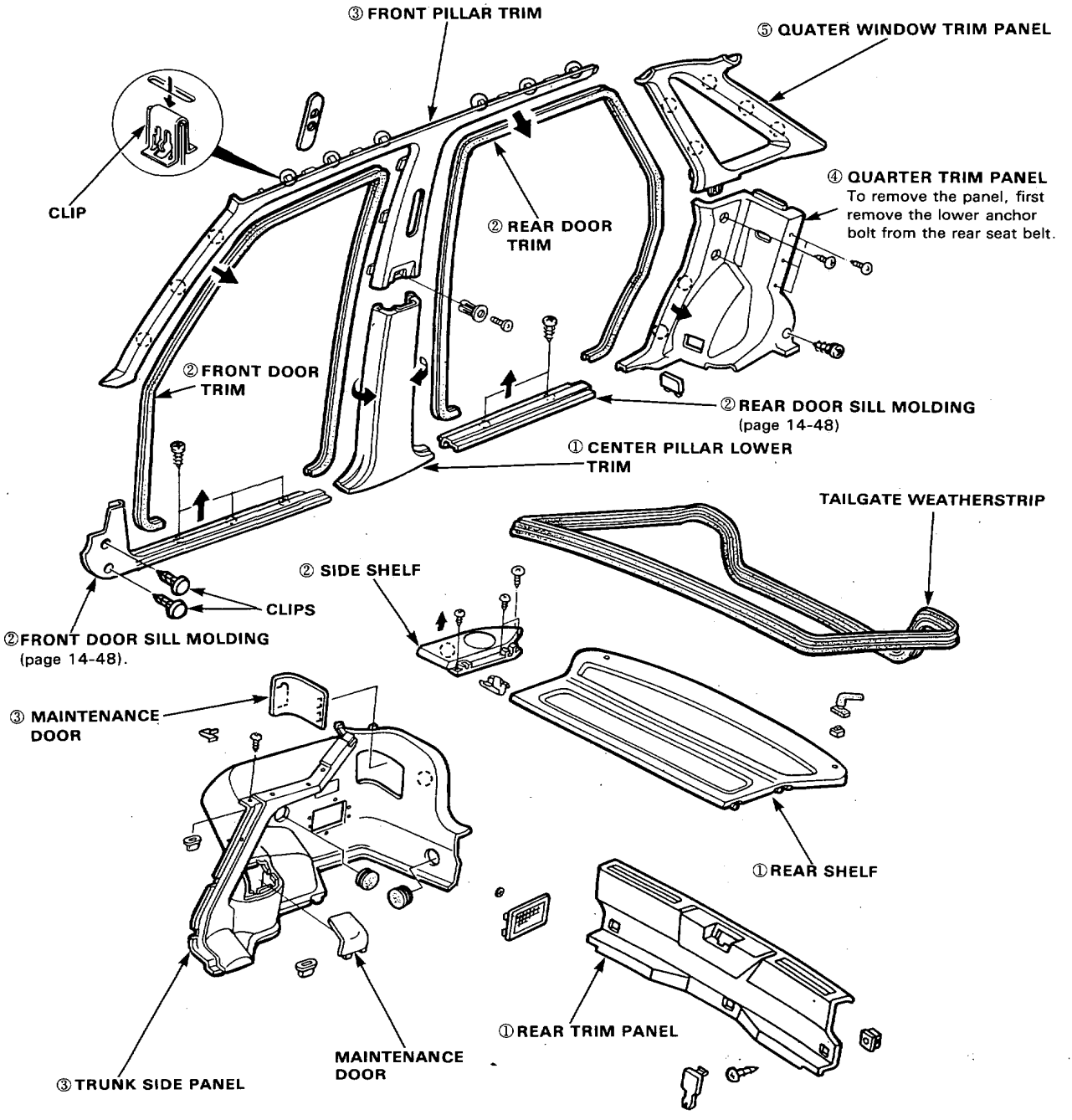
2. If force is not within specification, install a new lockwasher, adjust the tension by turning the sunroof motor clutch adjusting nut, and bend the lockwasher against the adjusting nut.



Interior Trim

Replacement

Disassemble in nurbered sequence.
○ : Clip locations

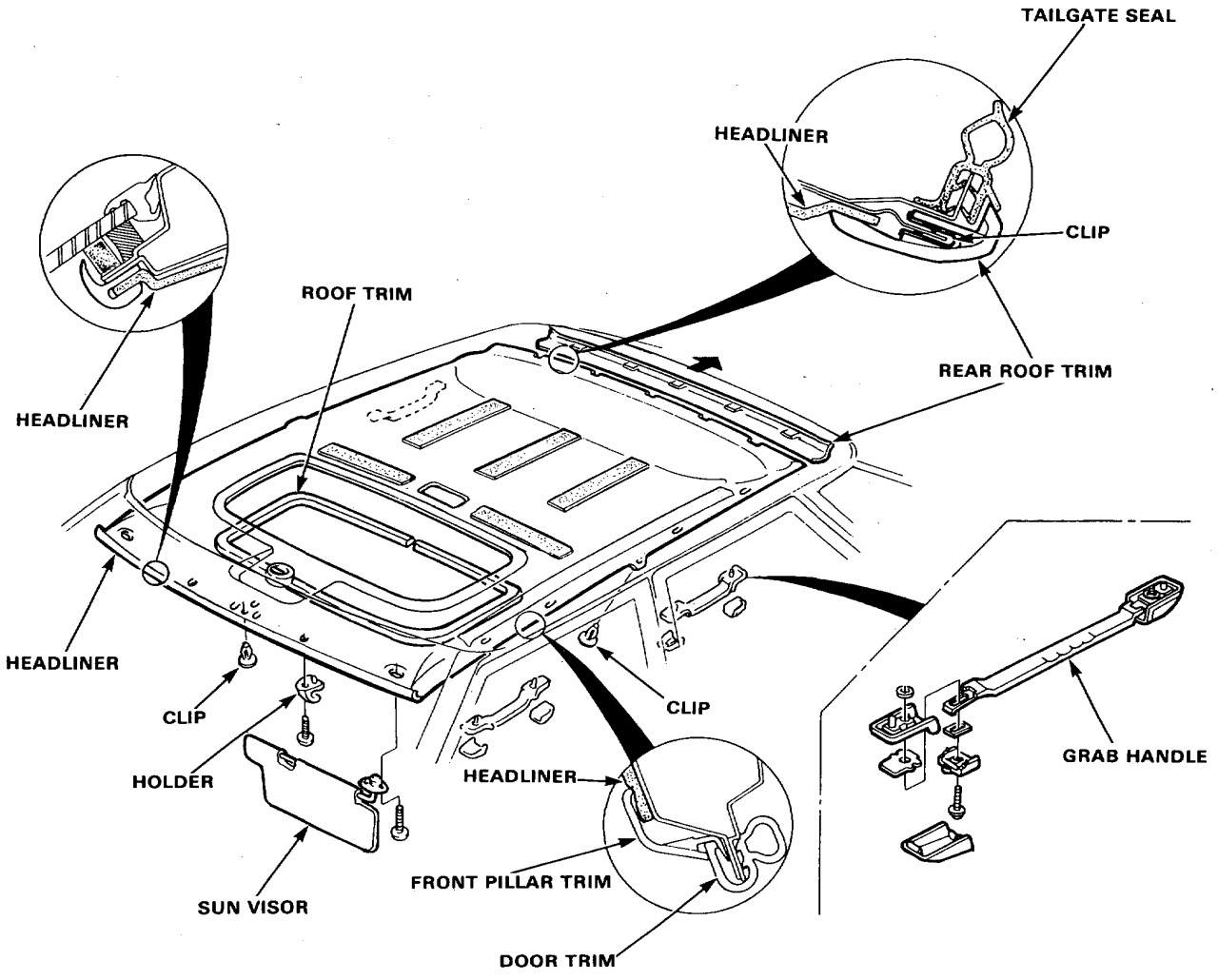


Headliner

Replacement

1. Remove:
   - Sun visors and holders.
   - Front pillar trim (page 14-39).
   - Quarter window trim panel (page 14-39).
   - Dome light.
   - Grab handles.

2. Remove the clips and rear roof trim, then remove the headliner.



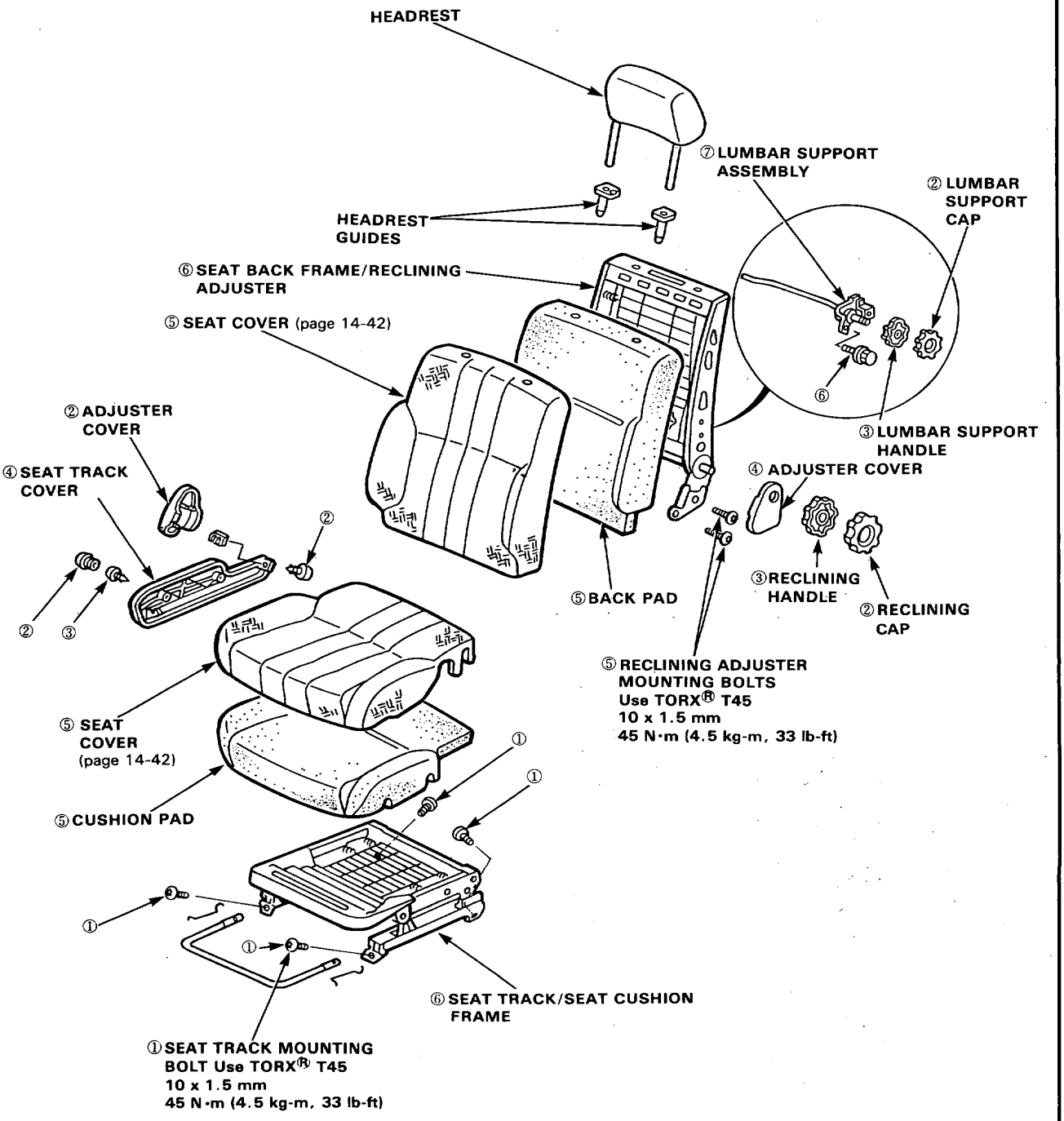
3. Assemble the headliner in the reverse order of disassembly.

NOTE:
- When installing the headliner inside the passenger cabin, be careful not fold or bend it. Also, be careful not to scratch the body.
- Check that the two sides of the headliner are securely attached to the trim.
- When installing the roof trim, install the joint towards the rear (Sunroof model).

Front Seats

Disassembly

Disassemble in numbered sequence.



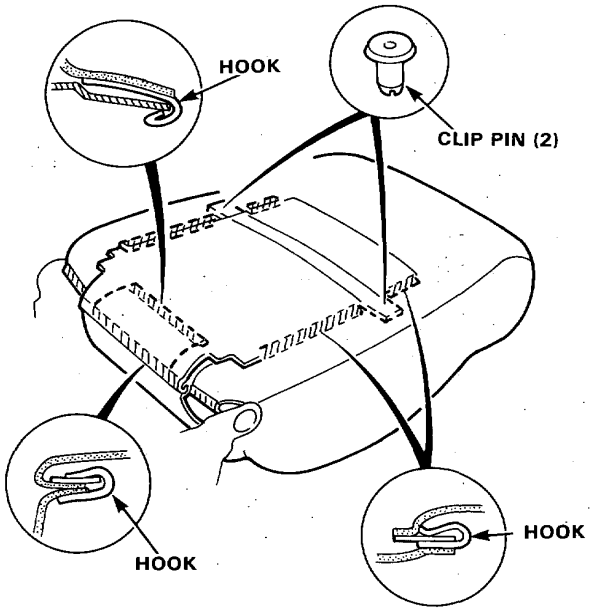
Front Seats

Cover Replacement

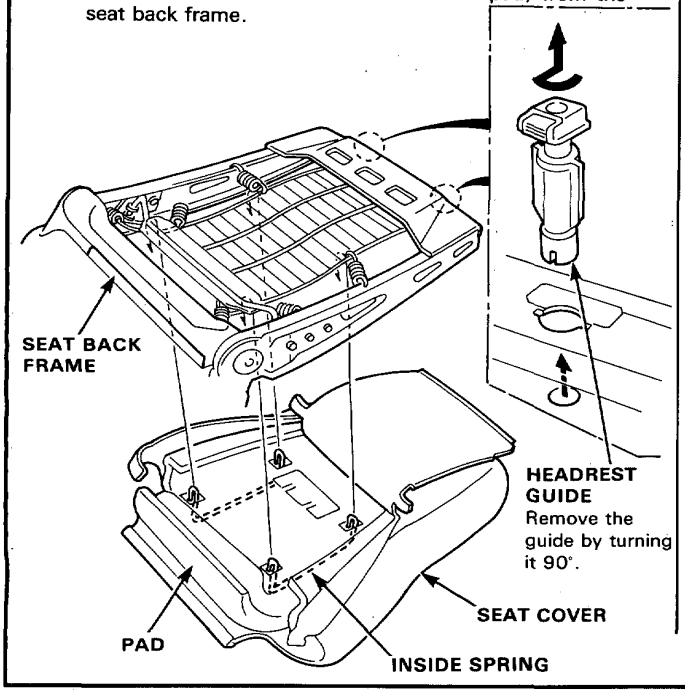
CAUTION: Wear gloves to remove and install the seat cover.

Seat Back removal:

1. Remove the seat assembly from the car.
2. Remove the reclining handle, lumbar support handle and adjuster covers.
3. Remove the clip pins and turn over the seat cover by releasing all the hooks.

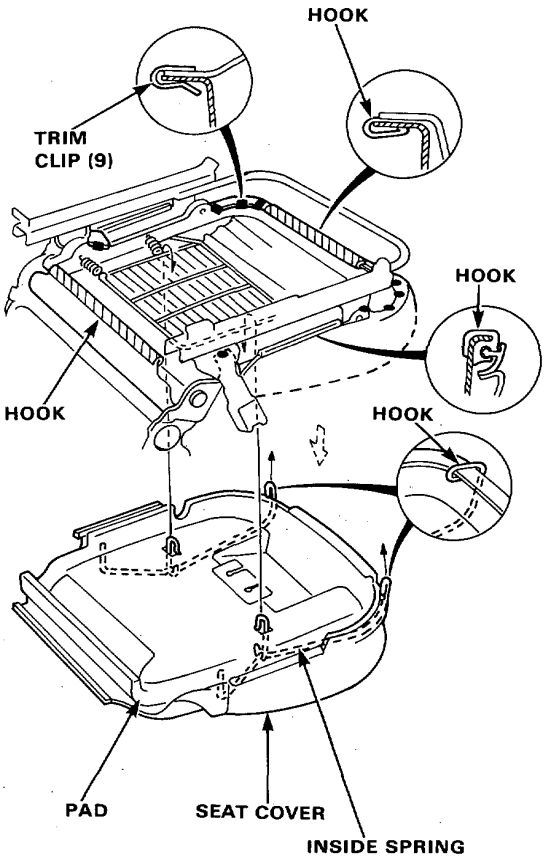


4. Remove the headrest guides and seat back spring hooks, then remove the seat cover and pad, from the seat back frame.



Seat Cushion removal:

1. Remove the the seat track cover.
2. Pry off the clips and turn over the seat cover by releasing all the hooks and inside spring hooks.
3. Remove the seat cover and pad from the cushion frame.



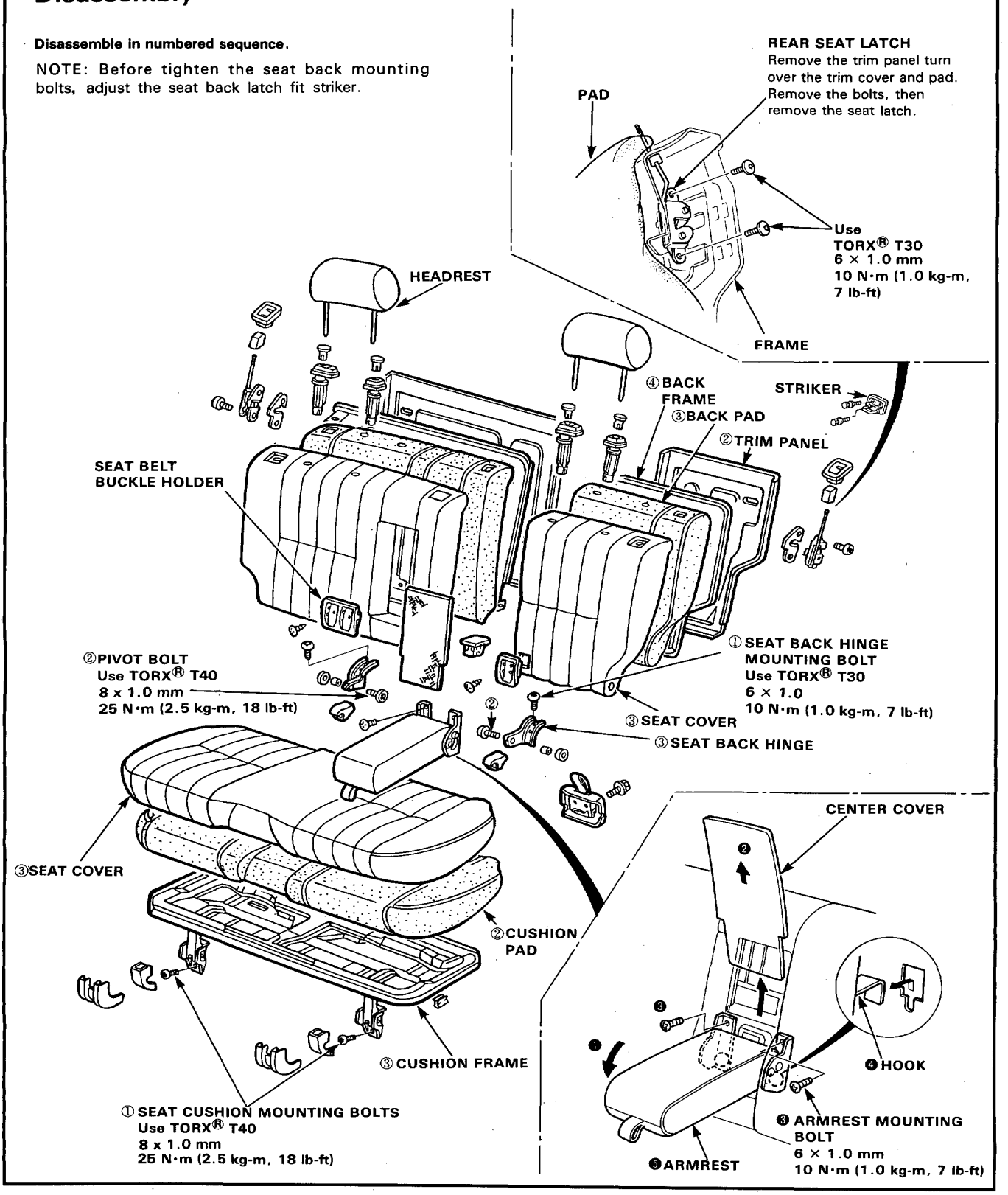
NOTE: To prevent wrinkles when installing a seat cover, make sure the material is stretched evenly over the frame before securing all the clips.

Rear Seats

Disassembly

Disassemble in numbered sequence.

NOTE: Before tighten the seat back mounting bolts, adjust the seat back latch fit striker.

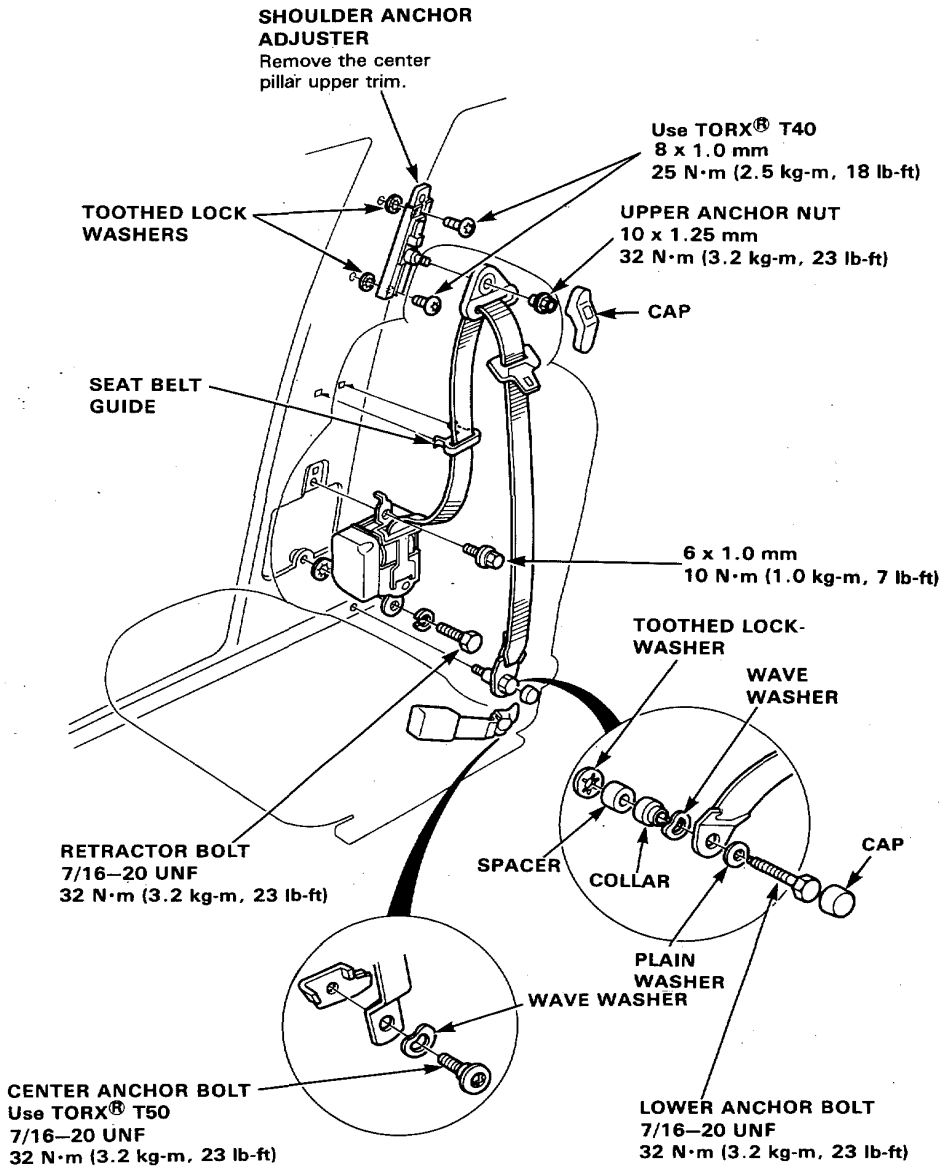


Front Seat Belts

Replacement

CAUTION: Check the seat belts for damage and replace them if necessary. Be careful not to damage them during removal and installation.

1. Remove the center pillar lower trim.
2. Remove the upper anchor nut, lower anchor bolt and retractor bolt with a 17 mm socket or box-end wrench.
3. Remove the front seat, then remove the bolt and the center anchor.



4. Check that the retractor locking mechanism functions as described on page 14-46.
5. Install the front seat belts in the reverse order of removal.

NOTE:

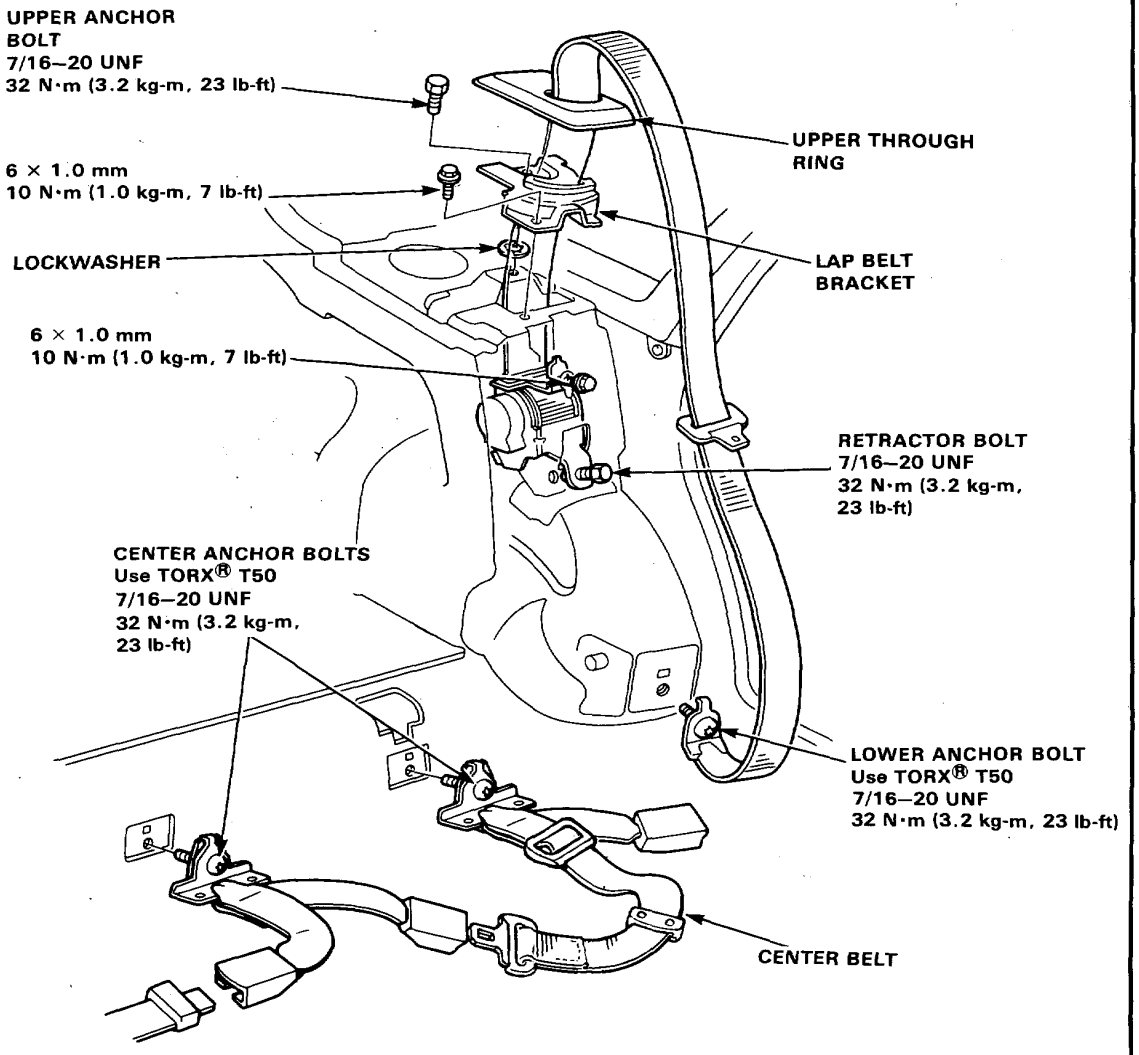
- Make sure you assemble the washers and collars on the upper and lower anchor bolts as shown.
- Before attaching the center pillar lower trim, make sure there are no twists or kinks in the belts.

Rear Seat Belts

Replacement

CAUTION: Check the seat belts for damage and replace them if necessary. Be careful not to damage them during removal and installation.

1. Remove the rear seat (page 14-43).
2. Remove the quarter trim panel and side shelf (page 14-39).
3. Remove the upper anchor bolt and retractor bolt with a 17 mm socket or box-end wrench.



4. Remove the lower anchor bolt and center anchor bolt, the remove the rear seat belts.
5. Check that the retractor locking mechanism functions as described on page 14-46.
6. Install the seat belt in the reverse order of removal.

NOTE: Before attaching the quarter trim panel and rear seat, maek sure there are no twists in the belts.

Seat Belts

Inspection

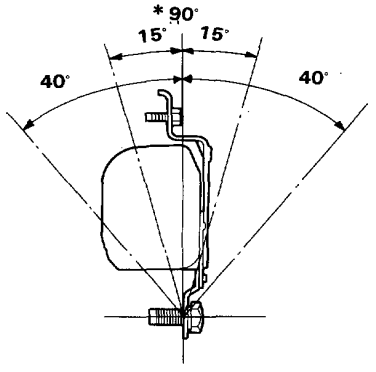
Retractor Inspection

1. With the retractor installed, check that the belt can be pulled out freely.
2. Make sure that the belt does not lock when the retractor is leaned slowl, up to 15° from the mounted position. The belt should lock when the retractor is leaned over 40°.

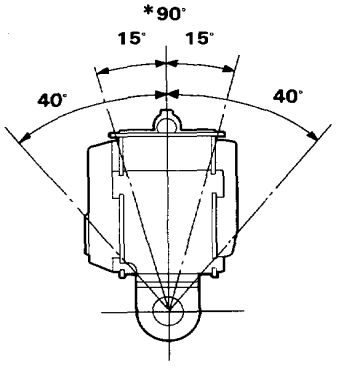
   CAUTION: Do not attempt to disassemble the retractor.

*** : Mounted Position.**

Front:



Rear:



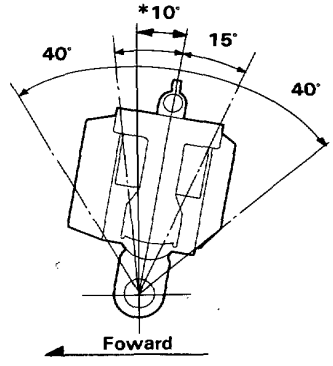
3. Replace the belt with a new one if there is any abnormality.

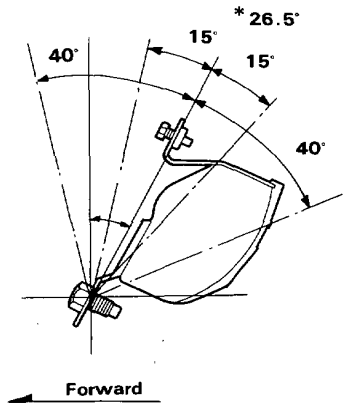
On the Car Belt Inspection

1. Check that the belt is not twisted or caught on anything.
2. After installing the anchors, check for free movement on its retaining bolt, if necessary, remove the bolt and check that the washers and other parts are not damaged or improperly installed.
3. Check the belts for damage or discoloration. Clean with a shop towel if necessary.

   CAUTION: Use only soap and water to clean.

4. Check that the belt does not lock when pulled out slowly. The belt is designed to lock only during a sudden stop or impact.
5. Make sure that the belt will retract automatically when released.
6. Replace the belt with a new one if there is any abnormality.





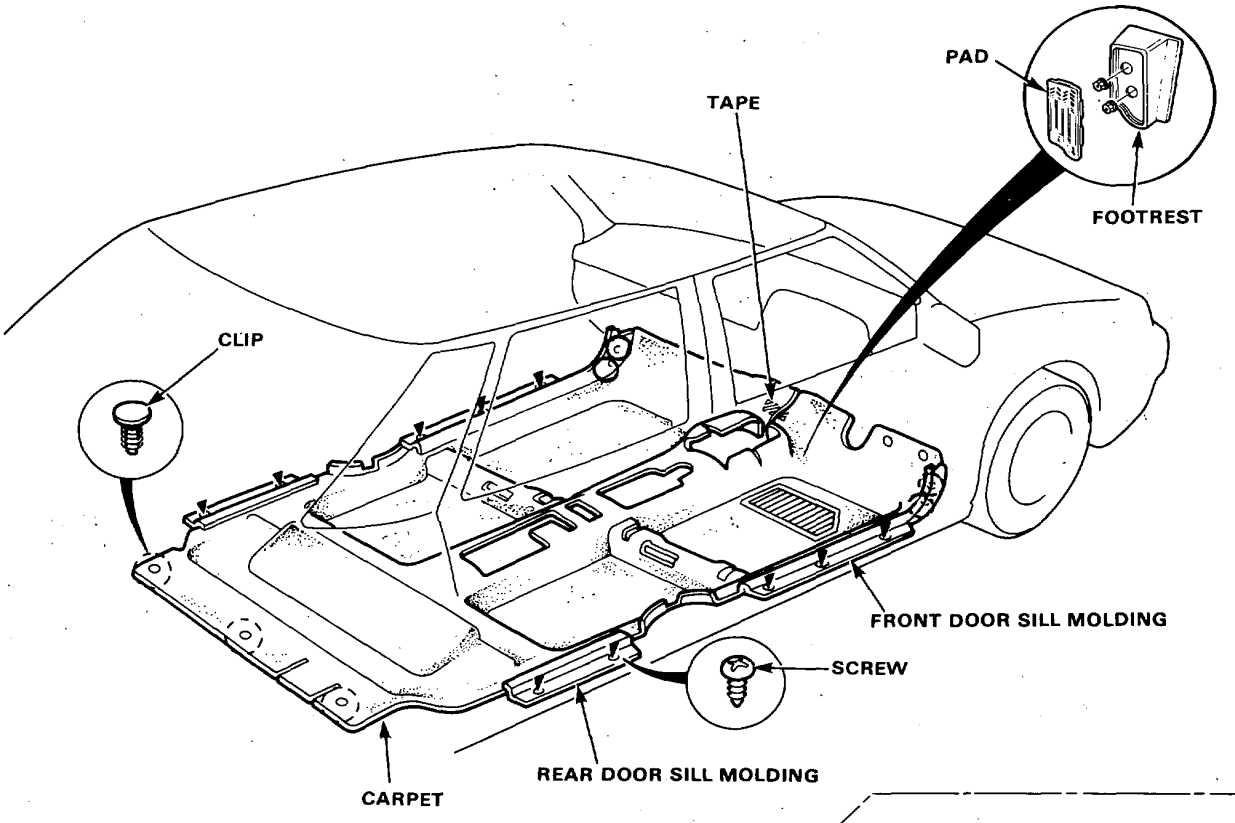
Carpet/Door Sill Moldings

Replacement

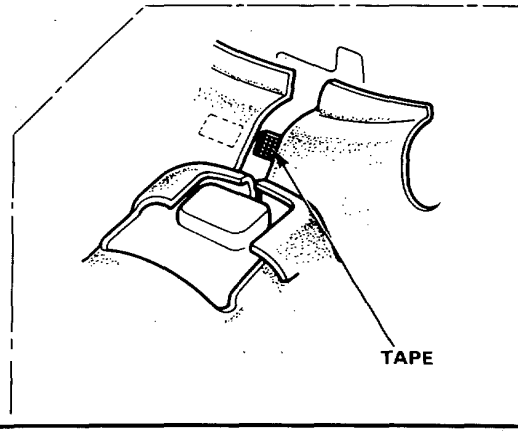
1. Remove:
   - Front seats.
   - Rear seat cushion.
   - Console.
   - Opener cover (page 14-57).

2. Remove the screws, then pull up the door sill moldings.

3. Pry out the clips at the rear edge and under the dashboard, peel off the tape and remove the clip.



◌: Clip Locations
▶: Screw Locations



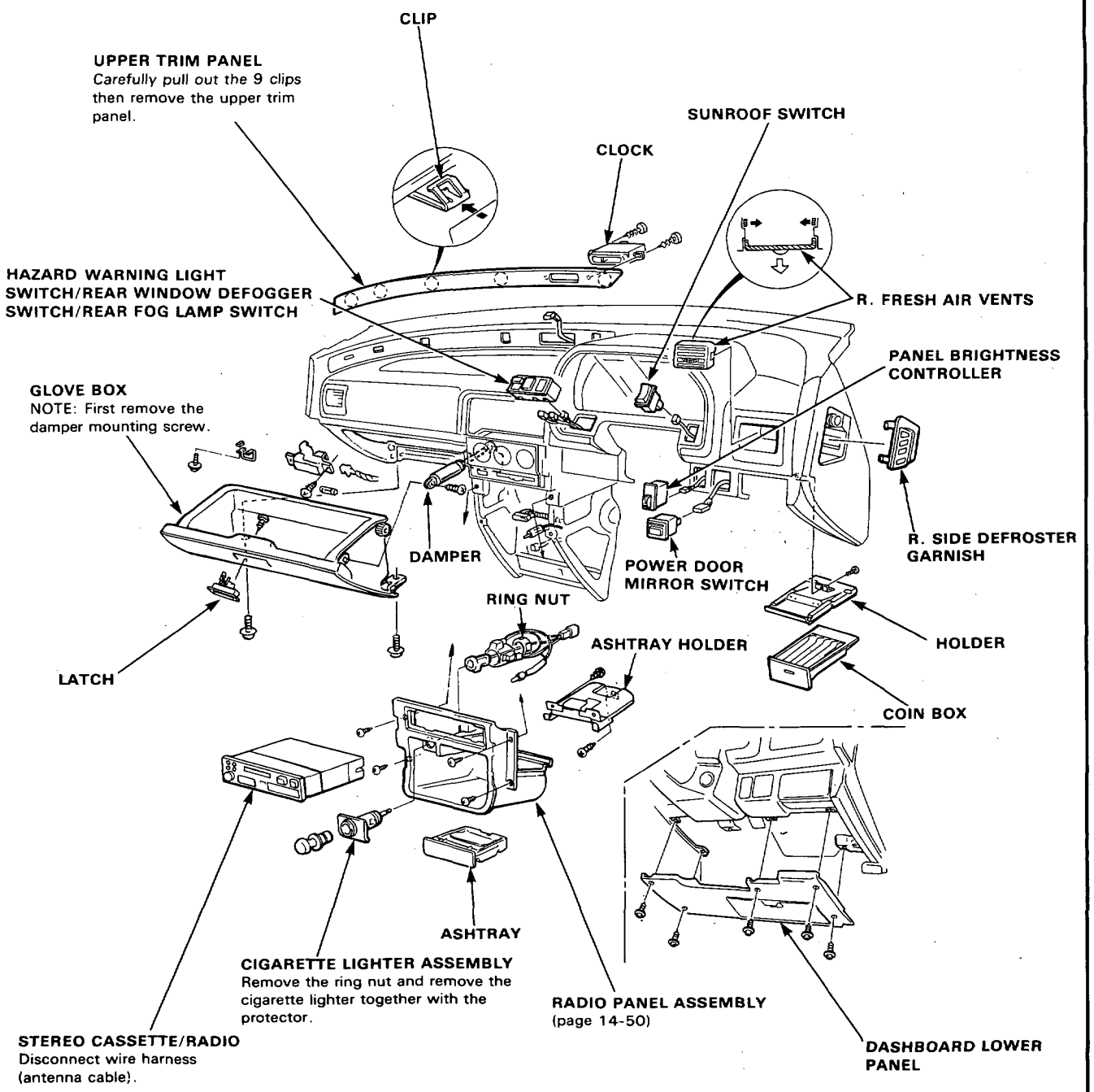
4. Remove the carpet.

5. Install the carpet in the reverse order of removal.

NOTE:
- Reattach the cut areas with tape and tie bands.

Dashboard

Component Removal/Installation



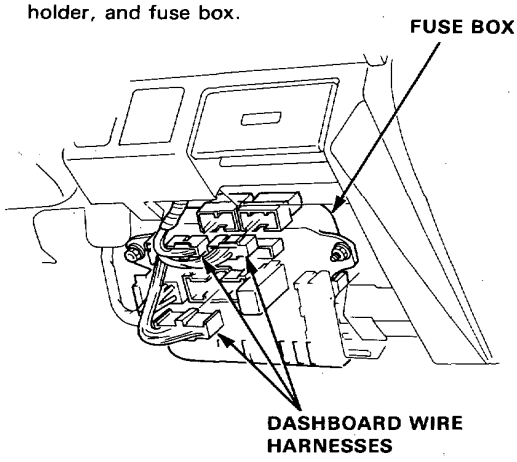
Dashboard

Replacement

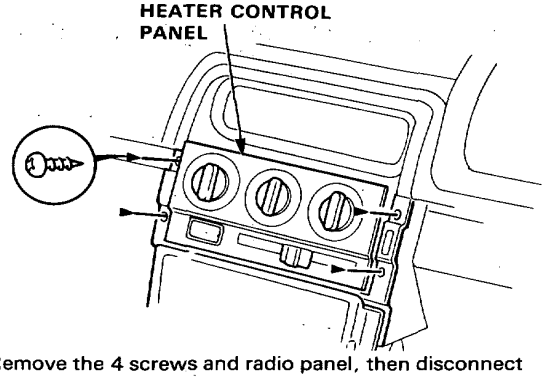
NOTE: Take care not to scratch or score the dashboard and use protective tape on the bottom of the front pillar trim.

1. To remove the dashboard, first slide the seats back fully and remove the:
   - Dashboard lower panel (page 14-49).
   - Center console (page 14-47).

2. Disconnect the wire harnesses from the connector holder, and fuse box.

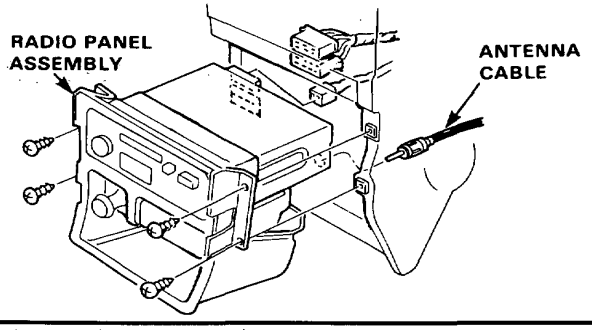


3. Remove the 4 screws attaching the heater control panel to the dashboard.



4. Remove the 4 screws and radio panel, then disconnect the wire connectors and antenna cable.

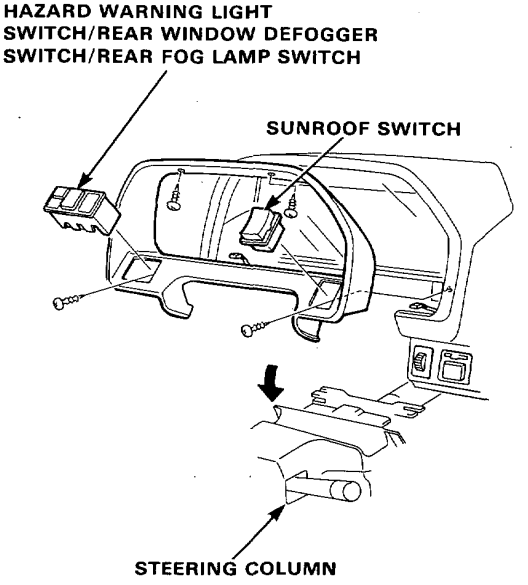
5. Remove the radio panel assembly.



6. Lower the steering column (See section 11).

7. Remove the switches from the dashboard and instrument panel, then disconnect the connectors.

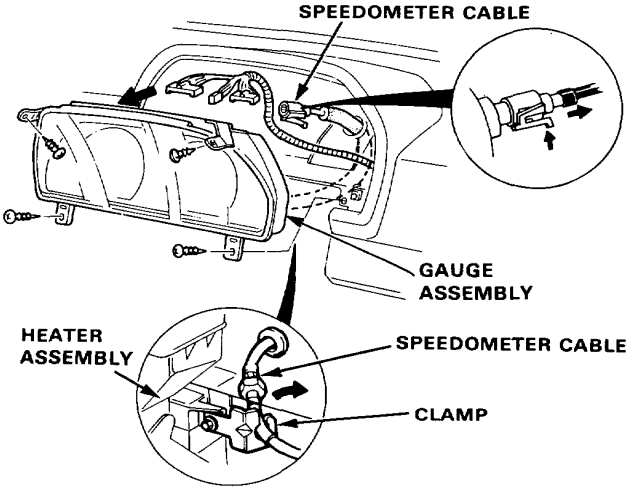
8. Remove the 4 screws, then remove the instrument panel.



9. Disconnect the speedometer cable from the speed sensor (See section 5).

10. Remove the speedometer cable from the cable clamp.

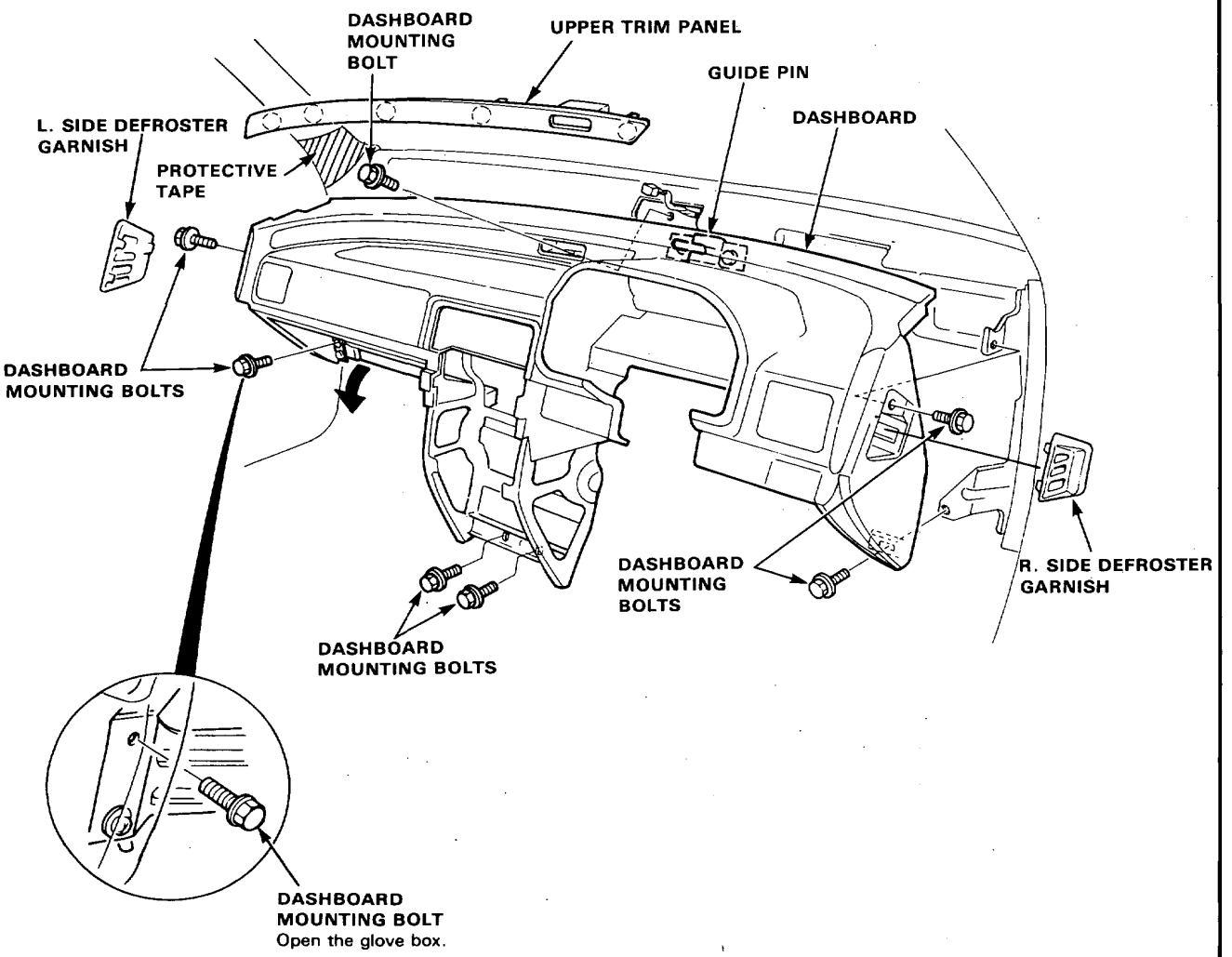
11. Remove the 4 screws, then remove the gauge assembly half-way disconnect the speedometer cable and connectors.



12. Disconnect the main wire harness connectors.
13. Remove the upper trim panel from the top of the dashboard.
14. Remove the side defroster garnishes from both ends of the dashboard.
15. Remove the dashboard mounting bolts.
16. Lift and remove the dashboard.

Reassembly NOTE:

- Make sure the dashboard fits onto the guide pin correctly.
- Before tightening the dashboard mounting bolts, make sure the dashboard wires are not pinched, and that the dashboard is not interfering with the heater control cable.
- Pull speedometer cable to make sure it is secure.

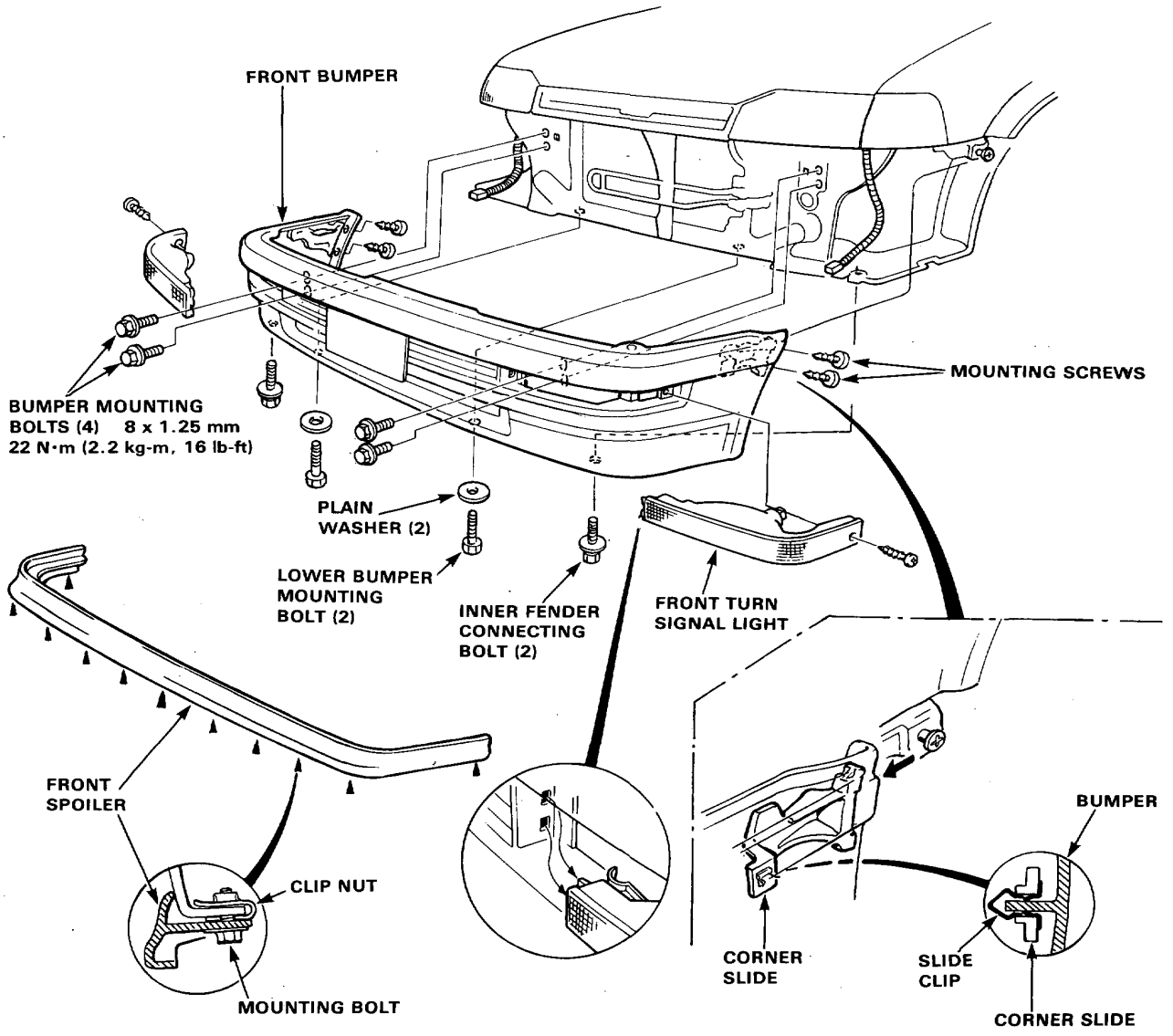


Front Bumper

Replacement

1. Remove the right and left front turn signal lights.
2. Remove the 2 bumper mounting screws on each side at the corner edge of the bumper.
3. Remove the 2 lower bumper mounting bolts and inner fender connecting bolts.
4. Remove the 4 bumper mounting bolts and bumper by sliding it forward.
5. Installation sequence is essentially the reverse order of removal.

   NOTE: Tkae care not to scratch the bumper face.



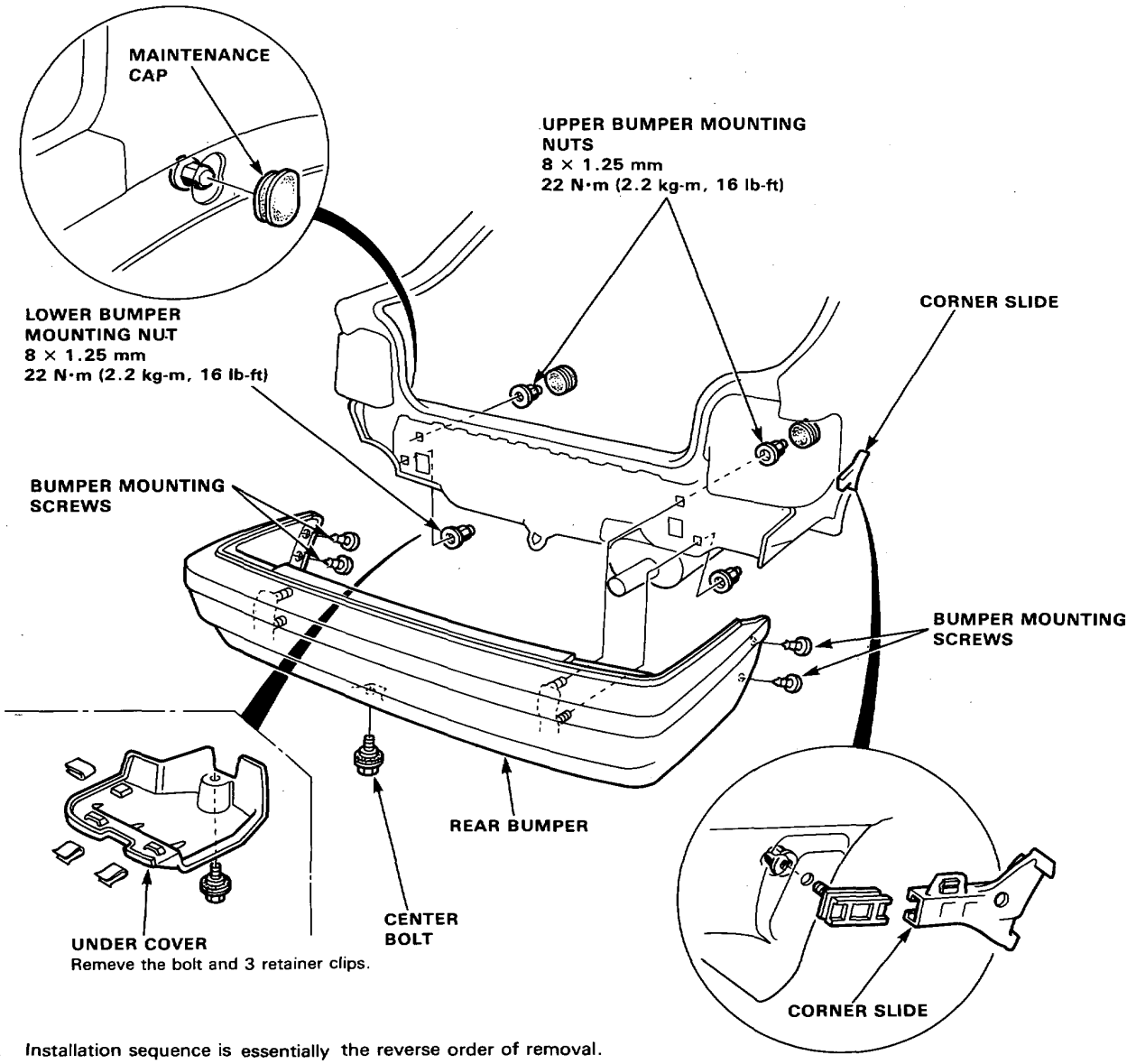
6. Installation sequence is essentially the reveres order of removal.

Rear Bumper

Replacement

1. Remove the 2 bumper mounting screws on each side at the corner edge of the bumper.
2. Remove the under cover (left side), then remove the 2 lower bumper mounting nuts from under the trunk floor and center bolt.
3. Pry off the maintenance caps, then remove the 2 upper bumper mounting nuts from the trunk area.
4. Remove the bumper by sliding it to the rear.

NOTE:
- Do not damage the threads of the bumper bolts.
- Take care not to scratch the bumper face.

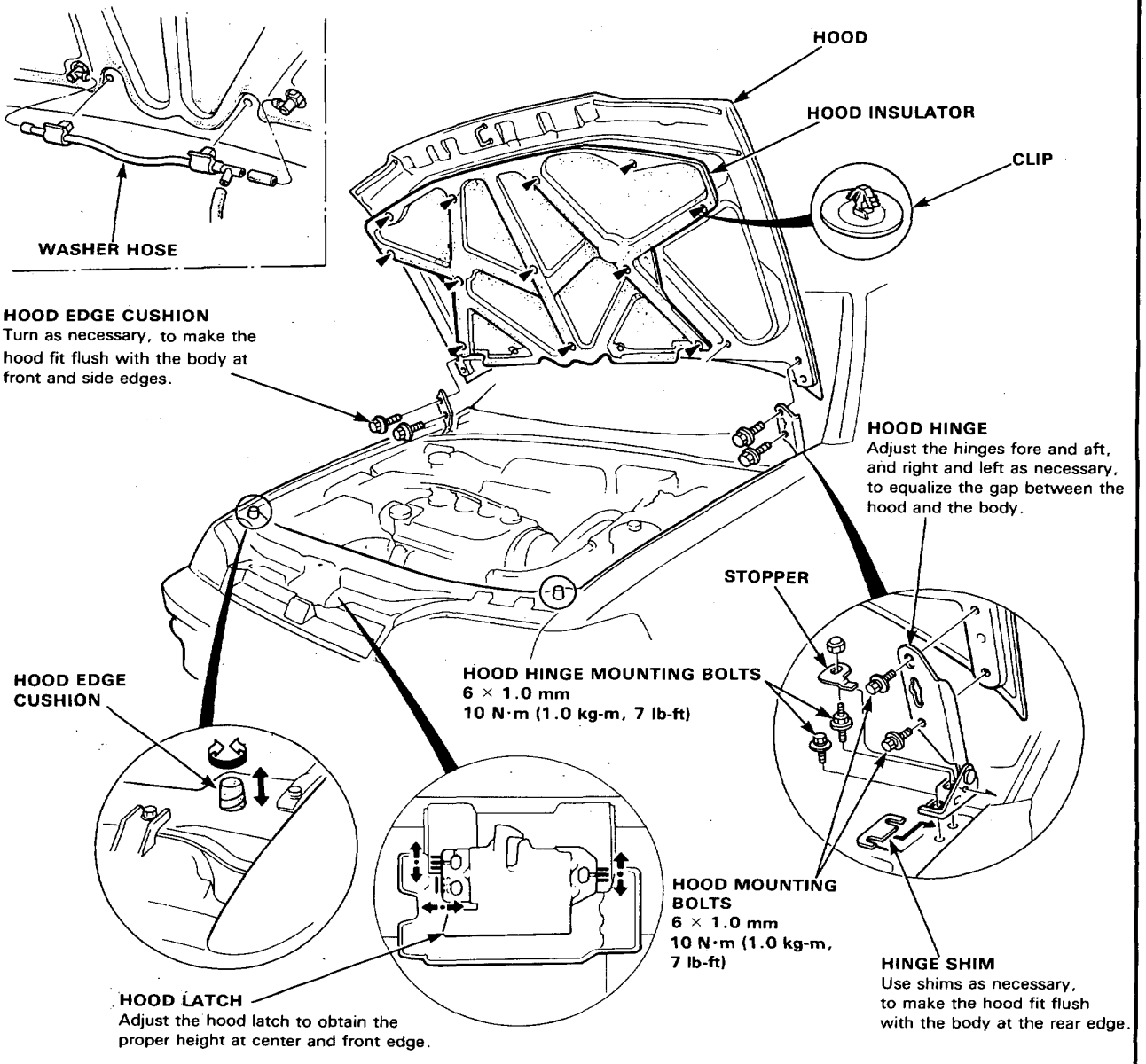


5. Installation sequence is essentially the reverse order of removal.

Hood

Replacement/Adjustment

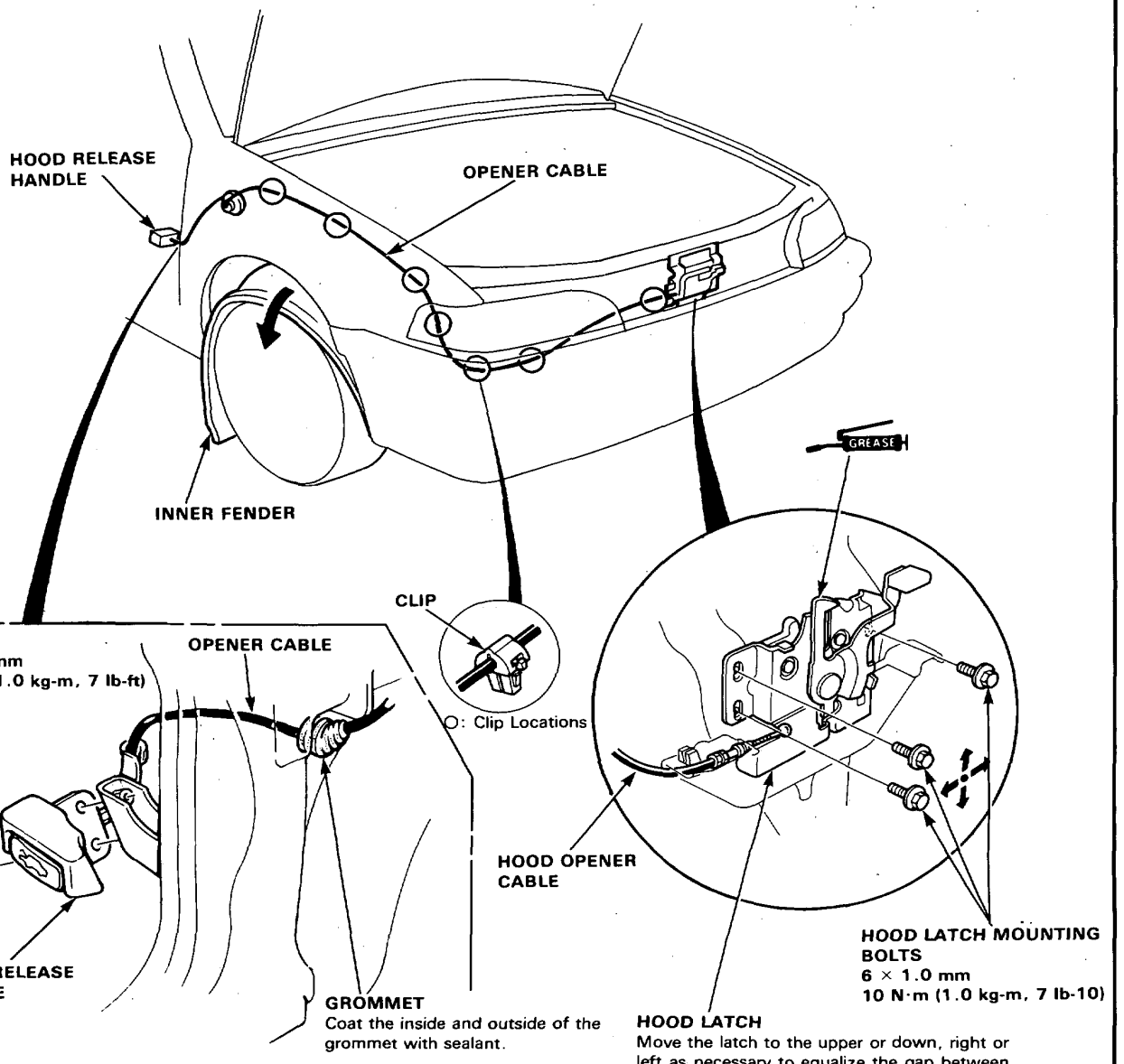
1. Pull the windshield washer hose out of the bood.
2. Hold the hood up and remove the 2 hood mounting bolts on each side, then remove the hood.
3. To remove the hood hinges, remove the front windshield wiper and air scoop.
4. When installing the hood, don't tighten the hinge bolts until you've checked the adjustments shown below.



Opener and Latch Replacement

1. Remove the bolts, then remove the hood release handle and disconnect the opener cable.
2. Remove the front grille (page 14-58).
3. Remove the 3 mounting bolts, then remove the hood latch and disconnect the opener cable.
4. Remove the right side inner fender, then pull out the opener cable.

   NOTE: Before pulling out the opener cable, tie a string to the cable so you can pull it back in later.



5. After installing, adjust the hood fit to the opening.

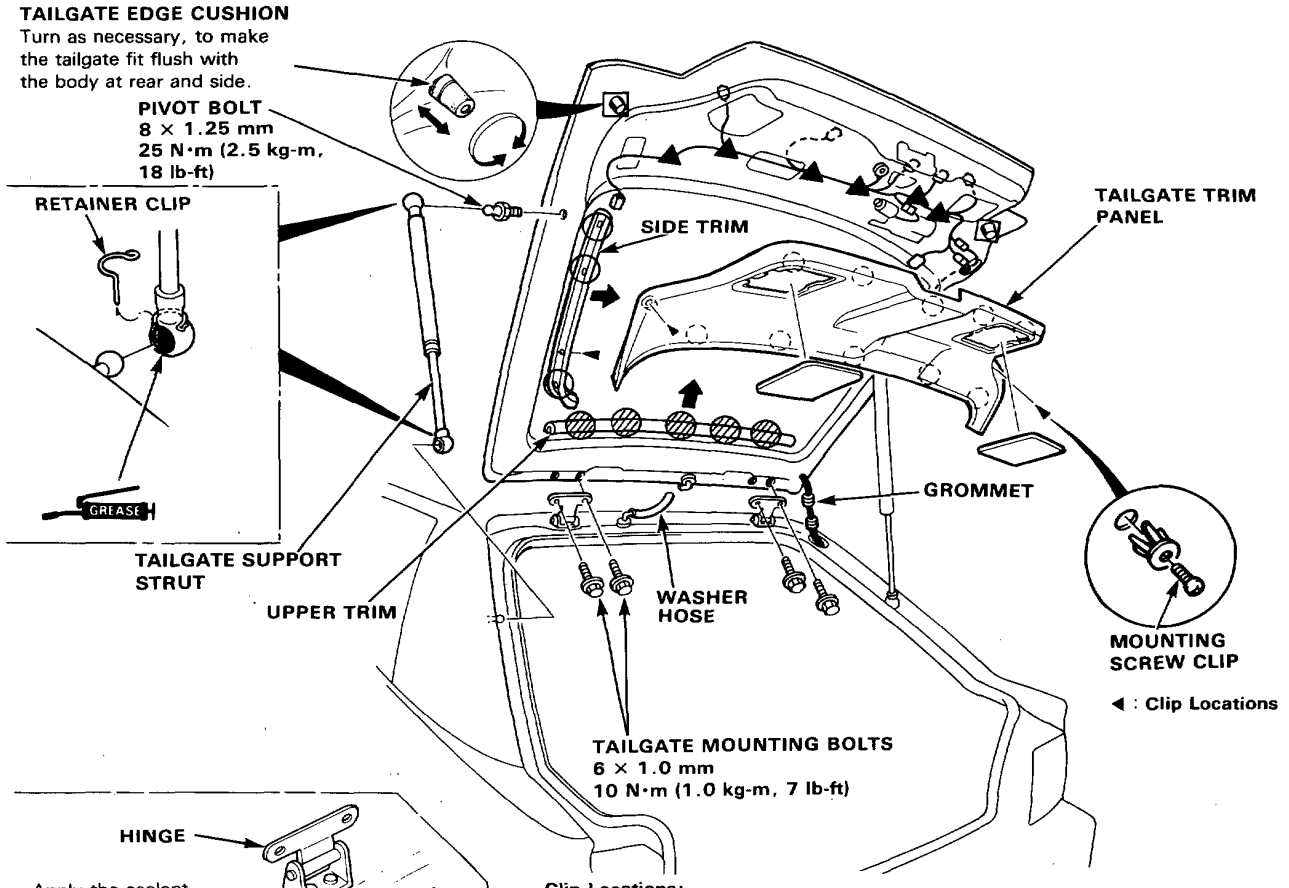
Tailgate

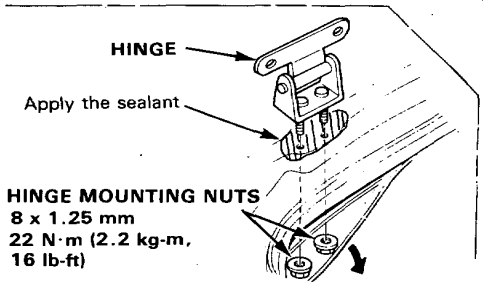
Replacement/Adjustment

1. Remove the screws and detach the clips, then remove the tailgate trim panel.
2. Pull the wire harness out of the tailgate and disconnect the washer hose.
   NOTE: Before pulling out the wire harness, tie a string to the end of it so you can pull it back in when the tailgate is reinstalled.
3. Turn and pull off the retainer clips, then remove the tailgate support struts.
   NOTE: Let an assistant hold the tailgate when removing the struts.
4. Remove the tailgate by removing the tailgate mounting bolts.
   NOTE: Take care not to damage the roof panel.

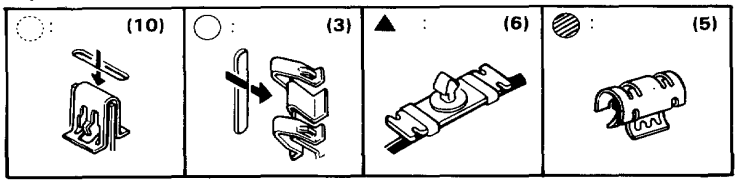
If necessary:

- Lower the rear of the headliner just enough to gain access to the hinge mounting nuts, then remove the hinge by removing the hinge mounting nuts.





Clip Locations:



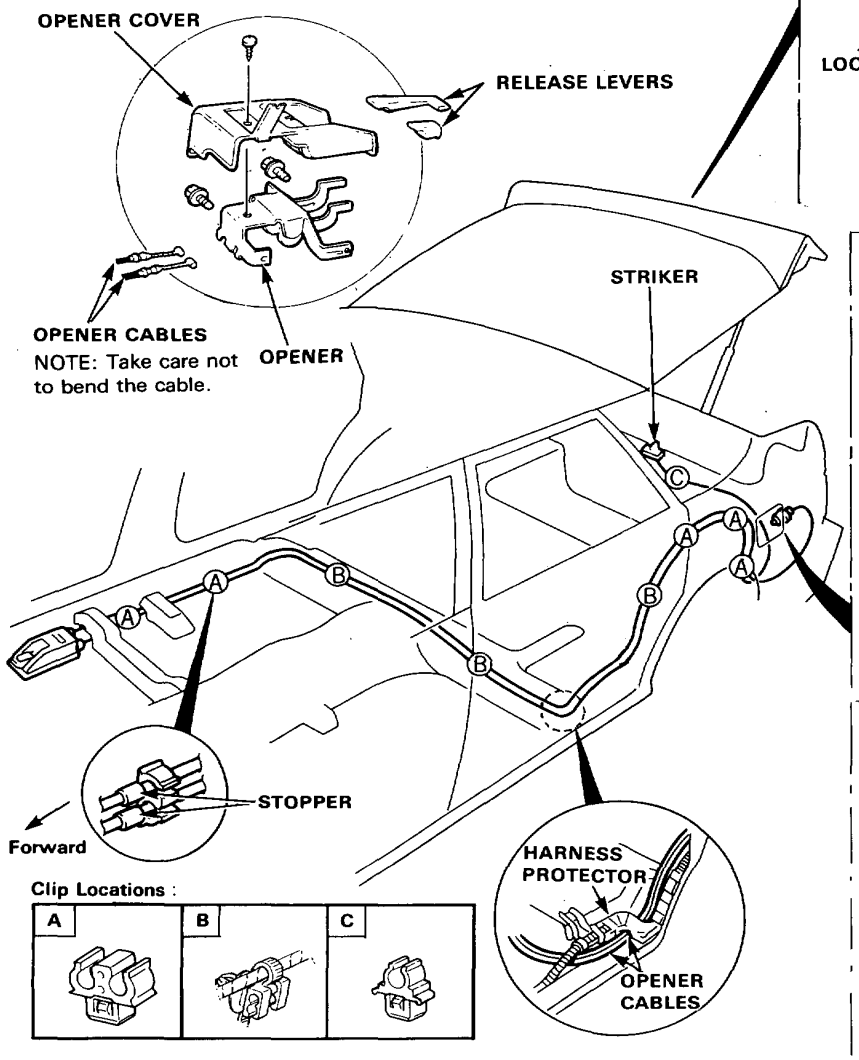
5. Installation sequence is essentially the reverse order of removal. However, observe the following:
   - Before tightening the mounting bolts, adjust the tailgate fit and striker (page 14-57).
   - Use care when pulling the wire harness back in to avoid damaging the body.
   - Coat the inside and outside of the grommet with sealant.

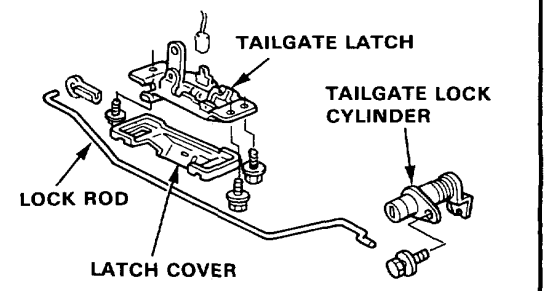
Fuel Filler Opener/Tailgate Opener

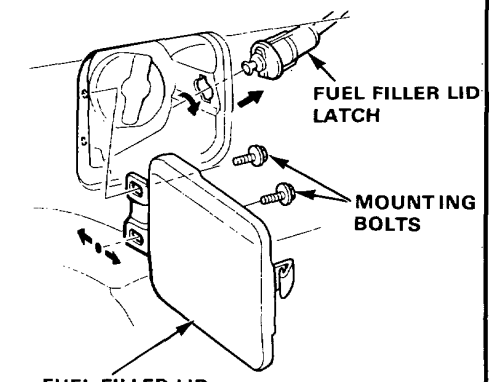
Replacement

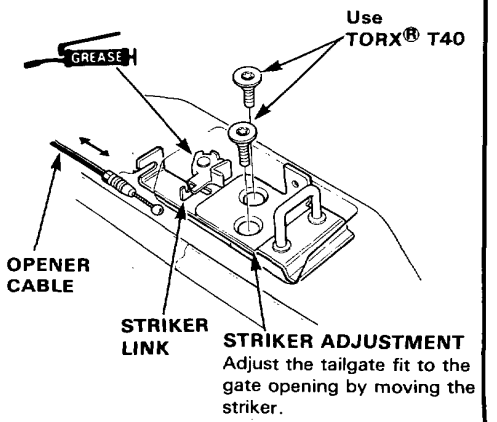
RHD:

1. To remove the opener cables, remove the following parts:
   - Right side door sill moldings, right and rear half of carpet.
   - Left quarter trim panel, trunk side panel and rear trim panel.
2. Remove the screw and the release levers, then remove the opener cover. Remove the opener by removing the 2 bolts.
3. Remove the fuel filler lid latch by turning it 90°.
4. Remove the bolt, then remove the tailgate lock cylinder.
5. Remove the latch cover and 3 bolts, then remove the tailgate latch.
6. Disconnect the opener cable, connector and lock rod.







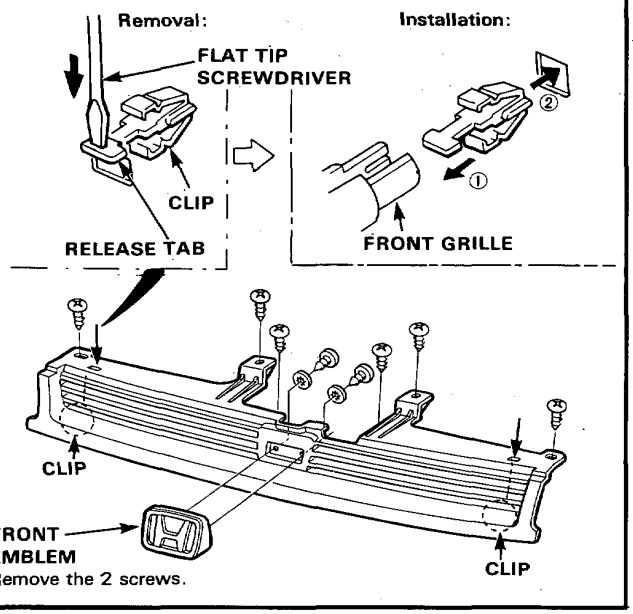


7. To install, reverse the removal procedure.
   Check that the tailgate and fuel filler lid opener cables are routed and connected properly.

Front Grille/Emblem

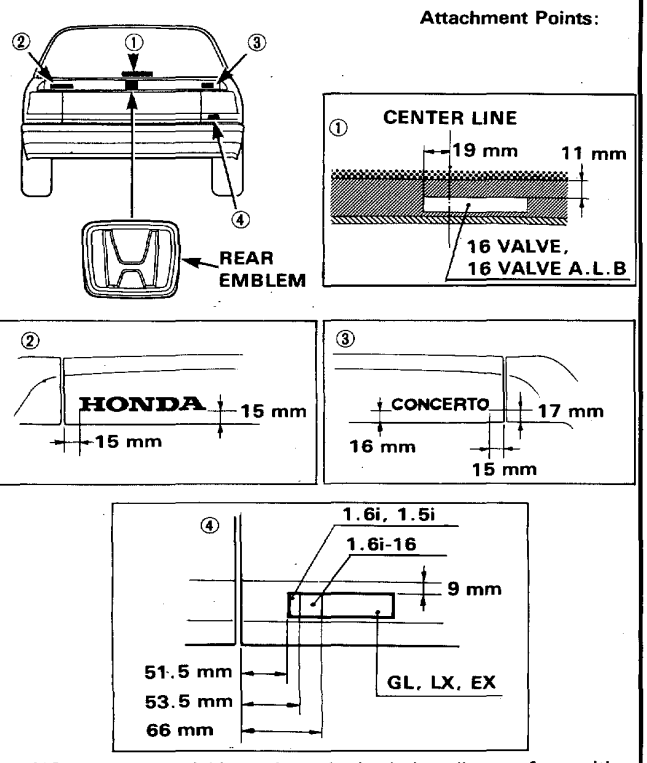
Front Grille Replacement

: Clip Locations



Remove the 2 screws.

Emblem Installation



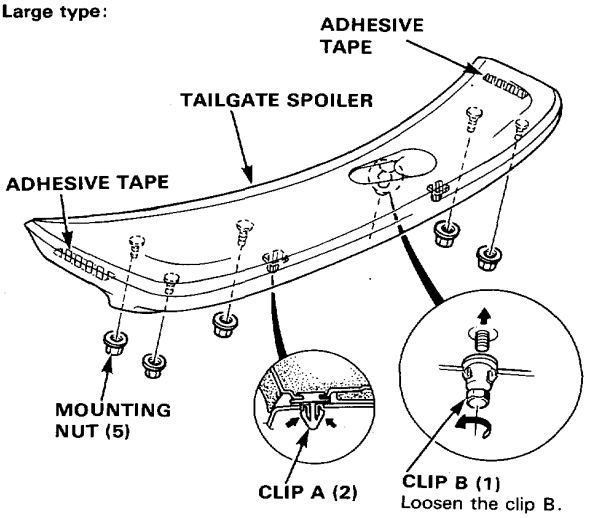
NOTE: Before sticking, clean the body bonding surface with a sponge dampened in alcohol.

Tailgate Spoiler

Replacement

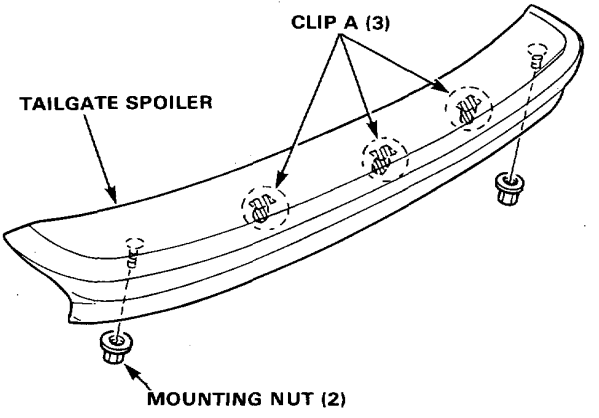
1. Detach the clips and remove the mounting nuts, then carefully pull the spoiler and off of the tailgate.
   NOTE: Take care not to scratch or score the tailgate.

Large type:



Loosen the clip B.

Small type:



2. Install the spoiler in the reverse order removal.

NOTE:

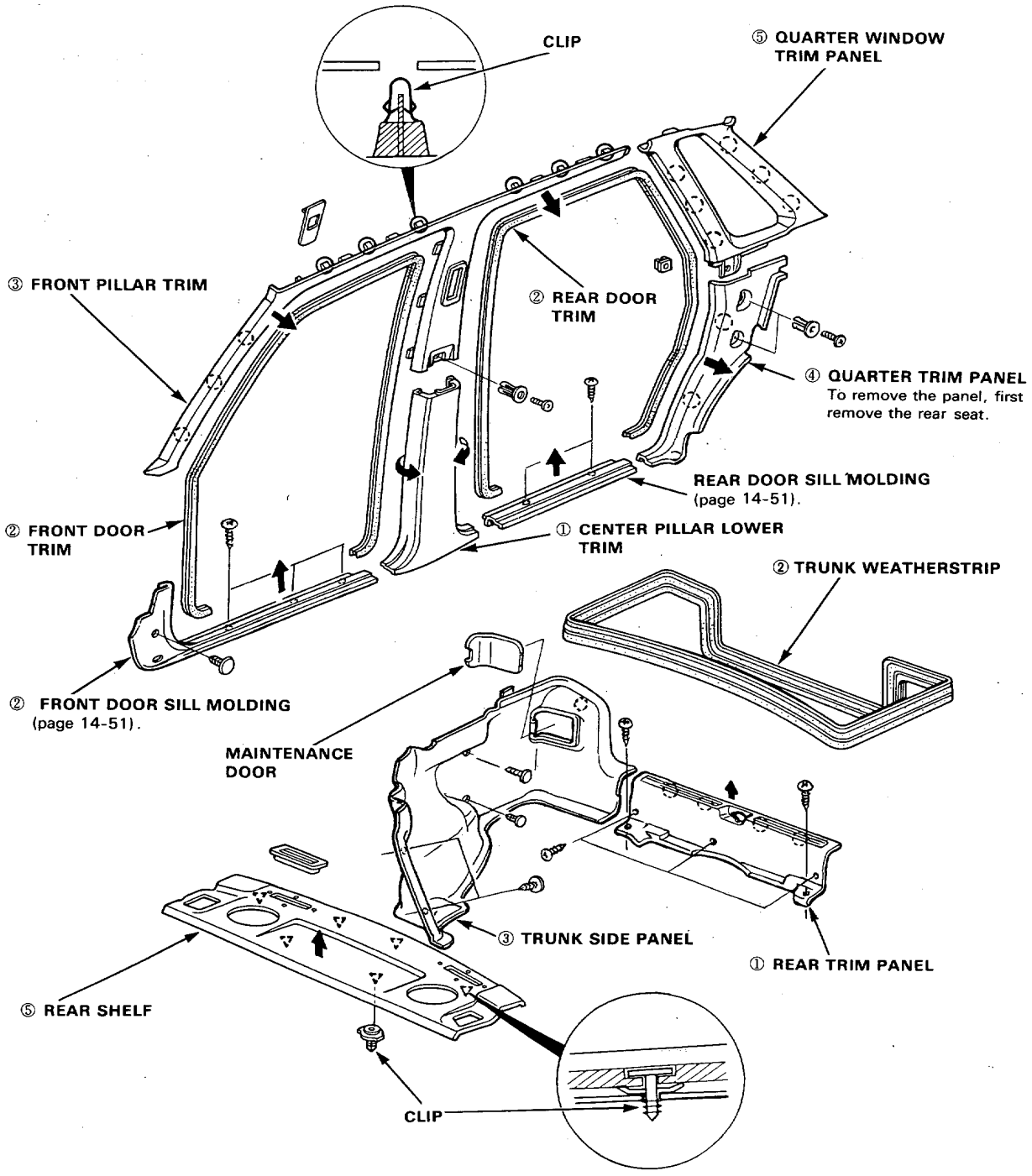
- If necessary, replace any damaged clips.
- Before installing, clean the tailgate bonding surface with a sponge dampened in alcohol.

Interior Trim

Replacement

Disassemble in numbered sequence.

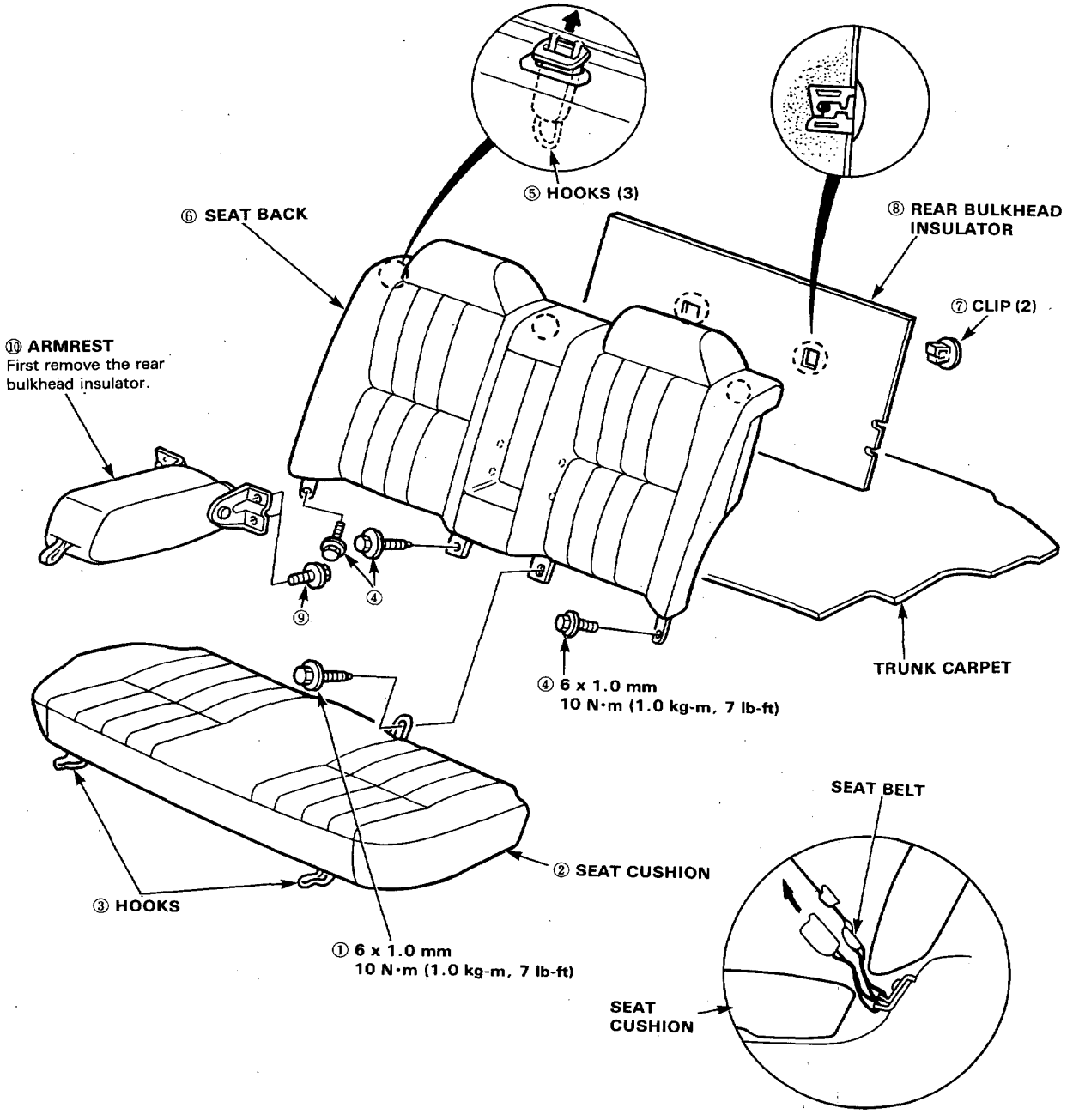
○: Clip locations.



Rear Seats

Replacement

Disassemble in numbered sequence.



NOTE: Attaching the seat cushion, make sure there are no twists in the seat belts.

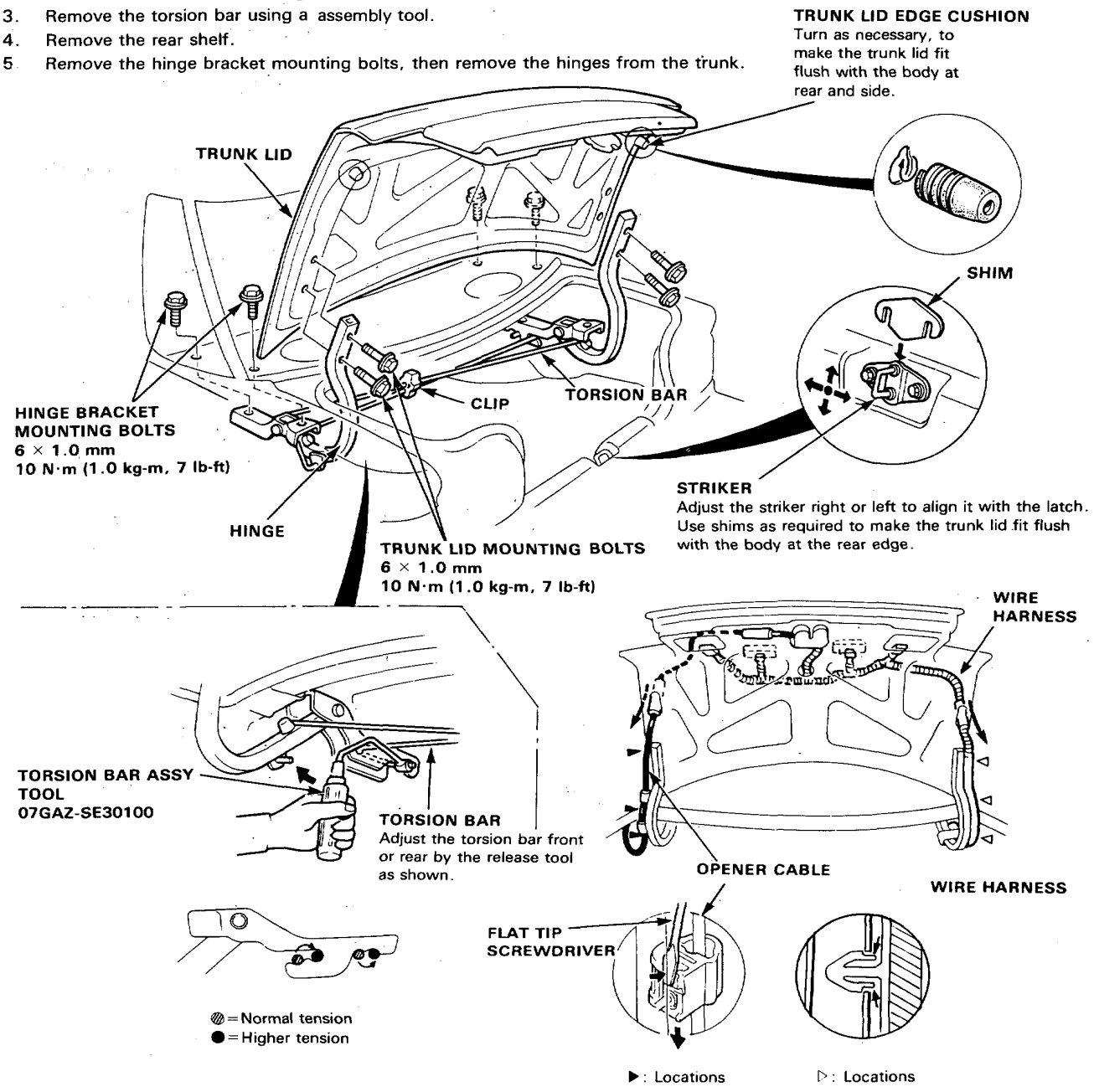
Trunk Lid

Replacement/Adjustment

1. Pull the harness and trunk lid opener cable (page 14-73) out of the trunk lid.

   NOTE: Before pulling out the wire harness and opener cable, tie a string to the end of it so you can pull it back in when the trunk lid is reinstalled.

2. Remove the trunk lid mounting bolts, then lift off the lid.
3. Remove the torsion bar using a assembly tool.
4. Remove the rear shelf.
5. Remove the hinge bracket mounting bolts, then remove the hinges from the trunk.



6. Assemble in the reverse order.

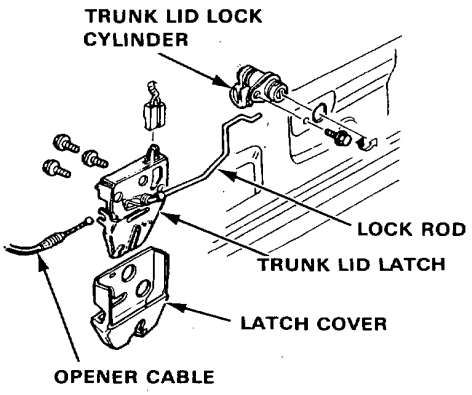
   NOTE: Before tightening the trunk lid mounting bolts, adjust the trunk lid fit and striker.

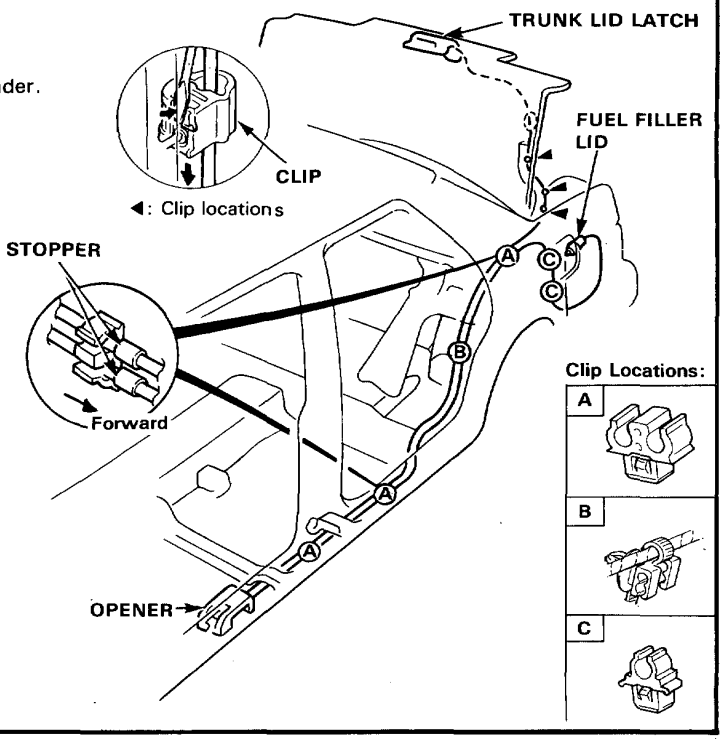
Trunk Lid Opener/Emblem

Trunk Lid Opener Replacement

LHD:

1. To remove the opener cables, remove the following parts:
   - Left side door sill moldings, left and rear half of carpet.
   - Left quarter trim panel, and left trunk side panel.
2. Remove the screw and the release levers, then remove the opener cover. Remove the opener by removing the 2 bolts (page 14—57)
3. Remove the fuel filler lid latch by turning it 90° (page 14—57).
4. Remove the rear panel garnish.
5. Remove the bolt, then remove the trunk lid lock cylinder.
6. Remove the 3 bolts, then remove the trunk lid latch.
7. Disconnect the opener cable, connector and lock rod.

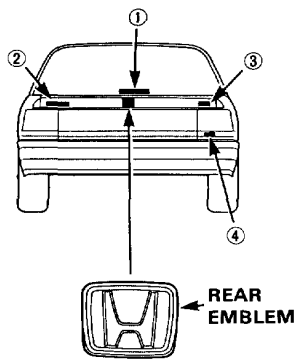


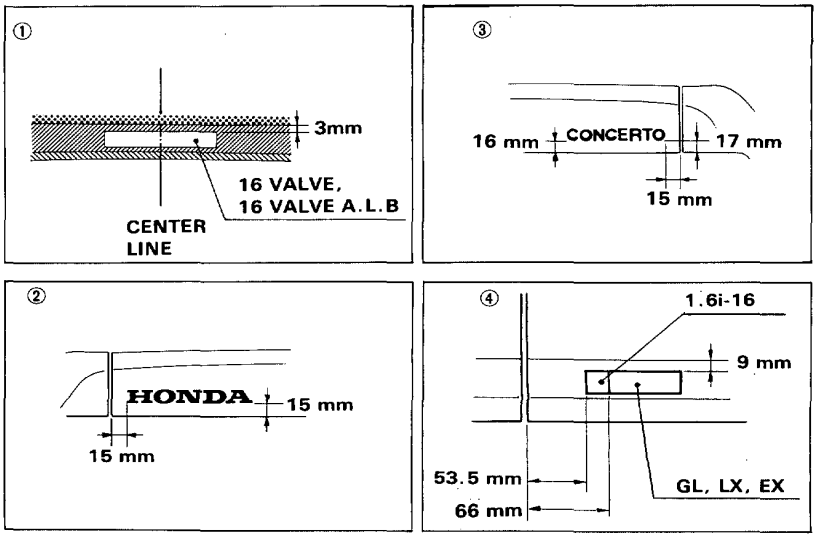


8. To install, reverse the removal procedure. Check that the trunk lid and fuel filler lid opener cables are routed and connected properly.

Emblem Installation

Attachment Points:

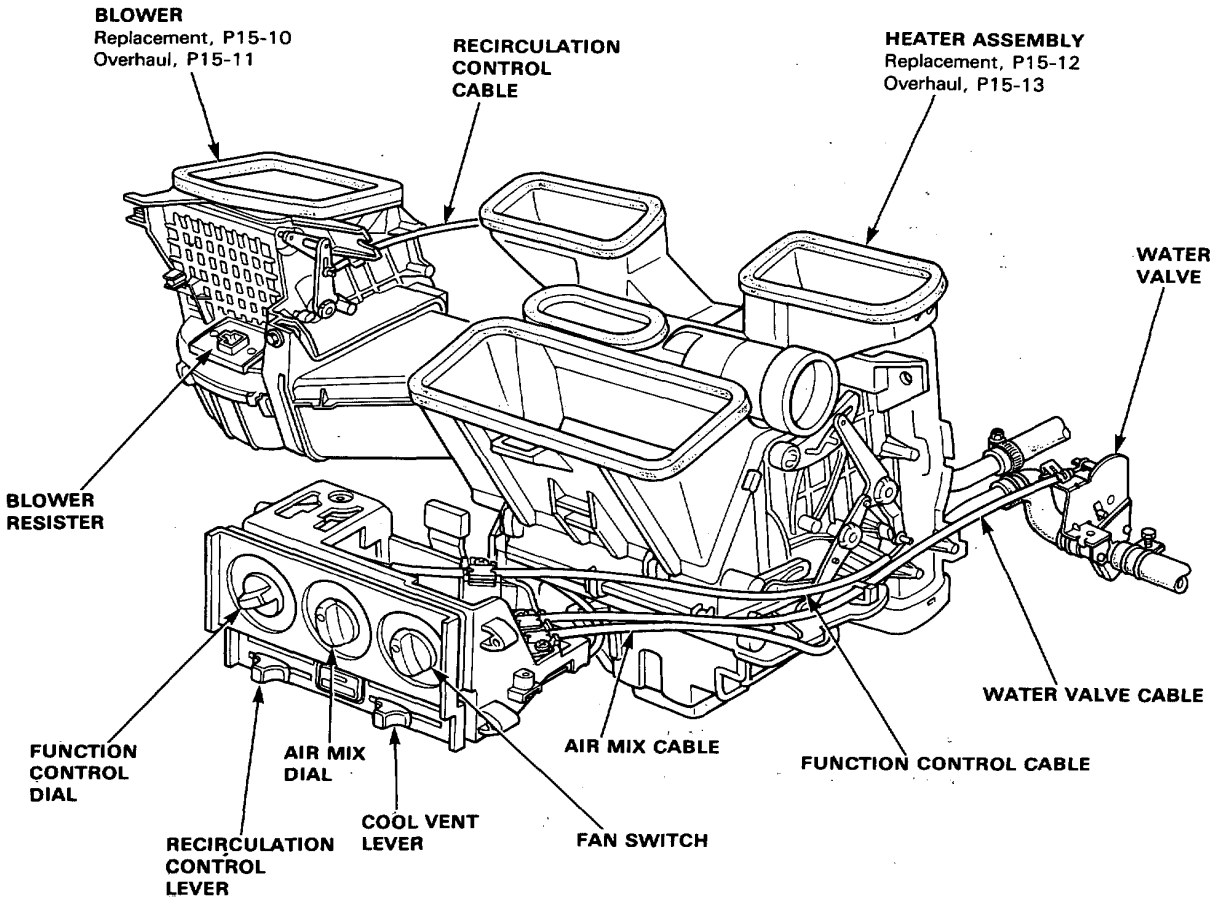




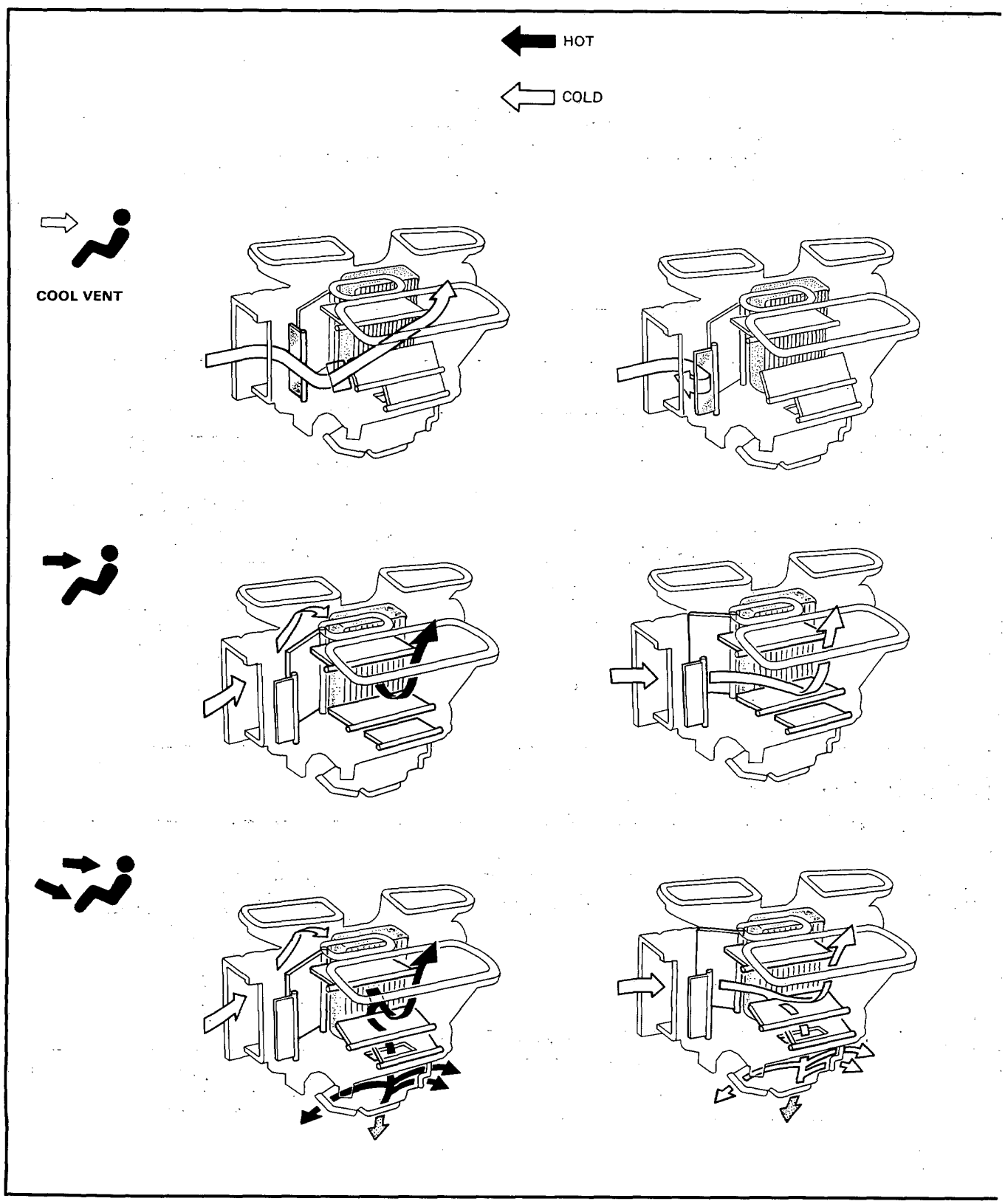
NOTE: Before sticking, clean the body bonding surface with a sponge dampened in alcohol.

Heater

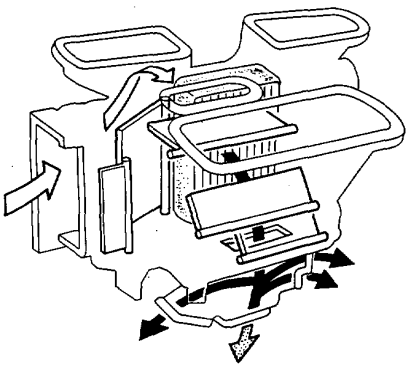
Illustrated Index

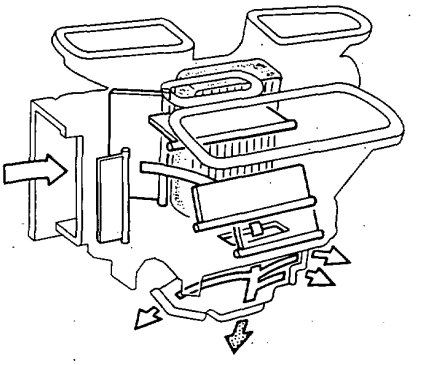


Heater Door Position

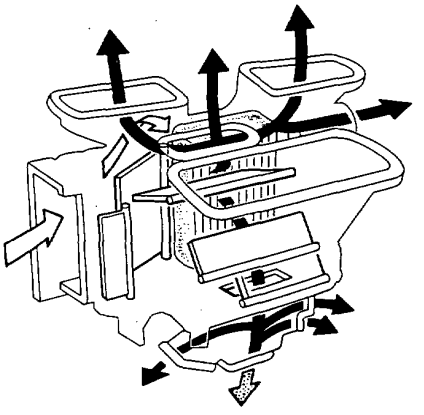


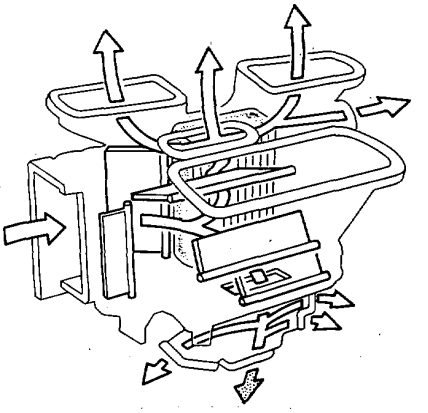




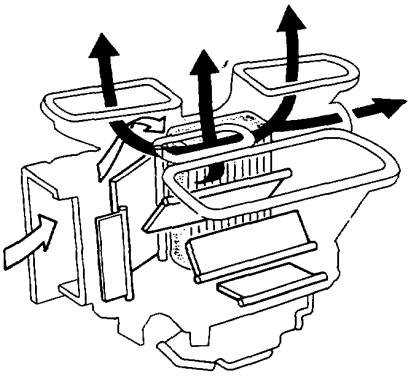


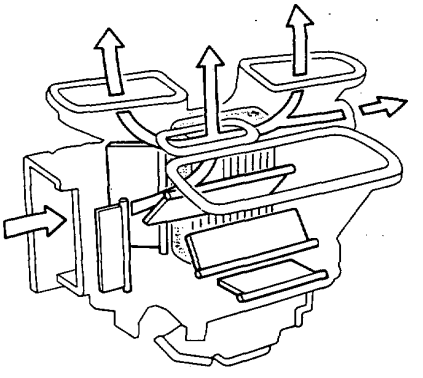












Flow Chart-Blower

Blower motor does not run at all.

Inspect No. 19(30A) fuse.

Is the No.19 fuse OK? — NO → **Replace fuse.**

YES

Disconnect the 2P connector from the blower motor.

Turn the ignition switch ON.

Measure voltage between BRN/GRN terminal (+) and body ground (−).

Is there battery voltage? — NO → **Repair open in BRN/GRN wire between blower and ignition switch.**

YES

Turn the ignition switch OFF.

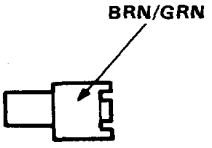
Reconnect the 2P connector to the blower motor.

Connect a jumper wire between the BLK/SLT terminal and body ground. Turn the ignition switch ON.

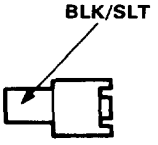
Does blower motor run? — NO → **Replace the blower motor.**

YES

(To page 15-7)



View from wire side



View from wire side

(From page 15-6)

Turn the ignition switch OFF.

Remove the jumper wire.

Disconnect the 6P connector from the fan switch.

Connect the jumper wire between the BLK/SLT terminal and body ground.

Turn the ignition switch ON.

Does the blower motor run?

NO → **Repair open in BLK/SLT wire between blower and fan switch.**

YES

Turn the ignition switch OFF.

Remove the jumper wire.

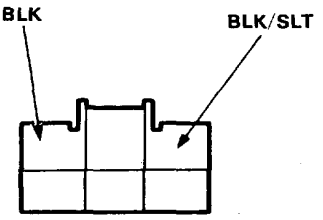
Inspect the fan switch (page 15-9)

Is the fan switch OK?

NO → **Replace the fan switch.**

YES

Repair open in BLK wire between the fan switch and body ground or poor ground (G201).



View from wire side

Blower motor running speed does not change.

Disconnect the 4P connector from the blower resistor.

Check for continuity between the 2 and 4 terminals of the resistor.

Does continuity exist?

NO → **Replace the resistor.**

YES

Reconnect the 4P connector to the resistor.

Disconnect the 6P connector from the fan switch.

Turn the ignition switch on.

Measure voltage between:
- BLK/PNK terminal and body ground.
- BLK/GRN terminal and body ground.
- BLK/YEL terminal and body ground.

Is there battery voltage?

NO → **Repair open in BLK/PNK, BLK/GRN and/or BLK/YEL wire(s) between the fan switch and resistor.**

YES

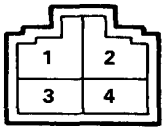
Check for continuity from BLK terminal to body ground.

Is there continuity?

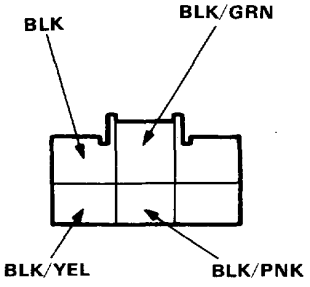
NO → **Repair open in BLK wire between the fan switch and body ground or poor ground (G301).**

YES

Replace the fan switch.



View from terminal side



View from wire side

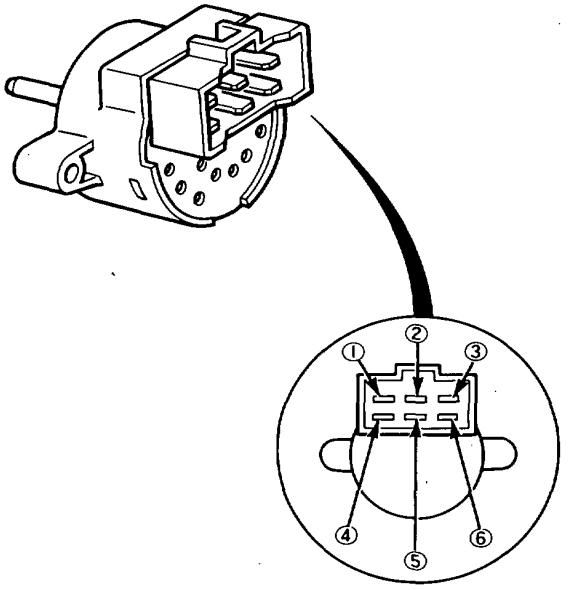
Test

Fan Switch

1. Disconnect the 6P connector from the fan switch.
2. Check for continuity between the terminals of the fan switch according to the table below.

SWITCH CONNECTION

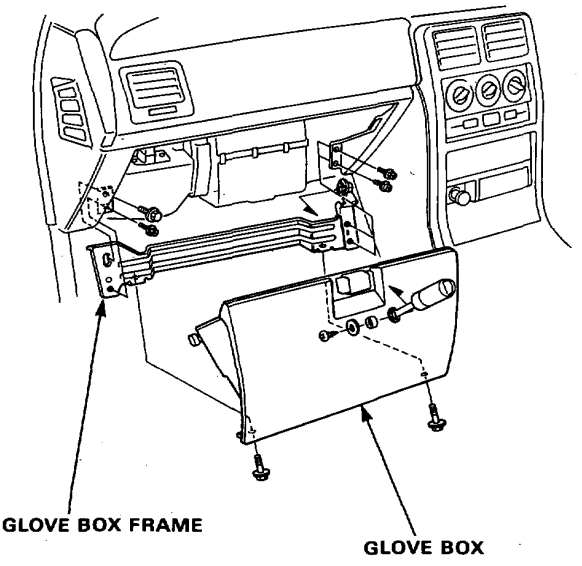
Terminal / Position	①	②	③	④	⑤	⑥
OFF						
1	○			○		○
2	○	○				○
3	○				○	○
4	○		○			○



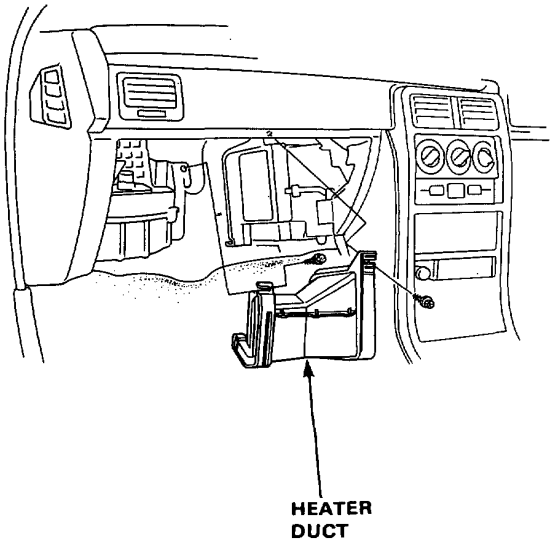
Blower

Replacement

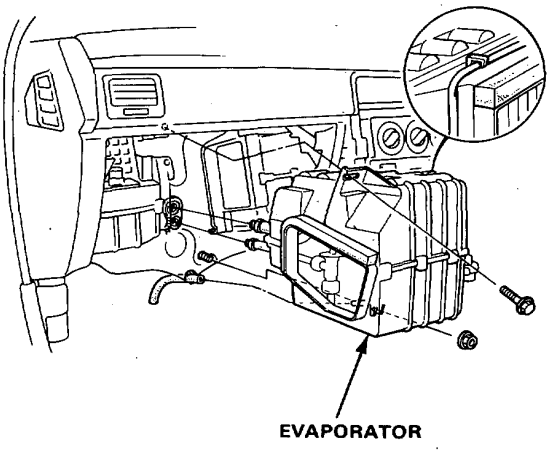
1. Disconnect the battery negative terminal.
2. Remove the glove box and glove box frame.



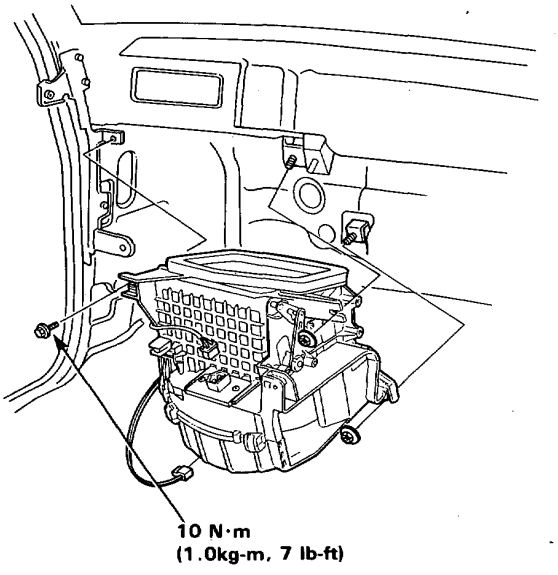
3-a. Remove the tapping screws (2) and remove the heater duct.



3-b. Remove the A/C band and the evaporator.



4. Remove the mounting bolts (3).
5. Disconnect the connectors from the blower motor, resistor then remove the blower.

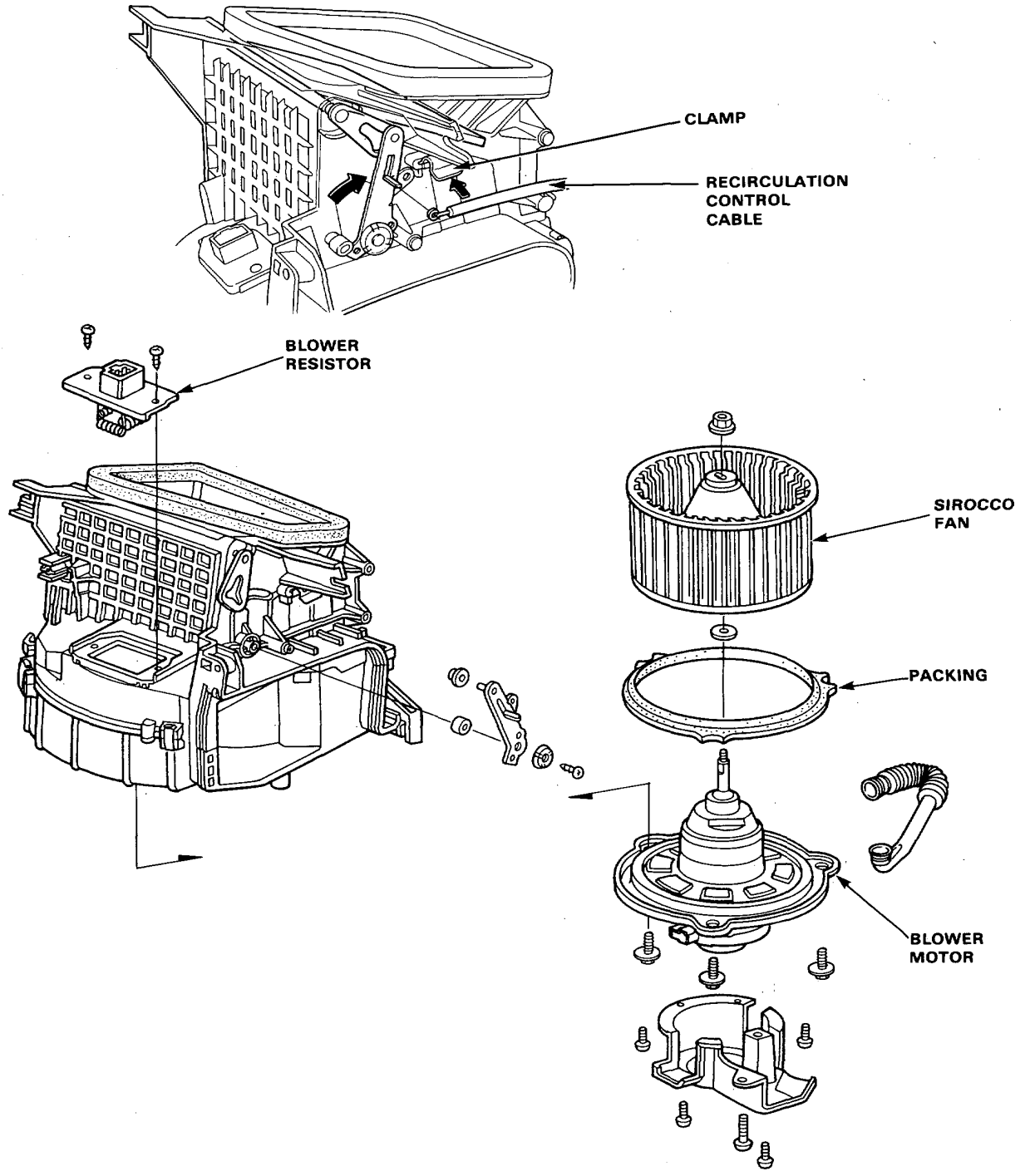


6. Install the blower in the reverse order of removal and make sure there is no air leakage.

Overhaul

NOTE:

- Before reassembly, make sure that the air door and linkage move smoothly without binding.
- RECIRCULATION CONTROL CABLE ADJUSTMENT
  Side the recirculation control lever to "RECIRC". Then connect the control cable to the arm while holding the air doors shut.



Heater assembly

Replacement

1. When the engine is cool, drain coolant from the radiator (Section 5).

   ⚠ WARNING

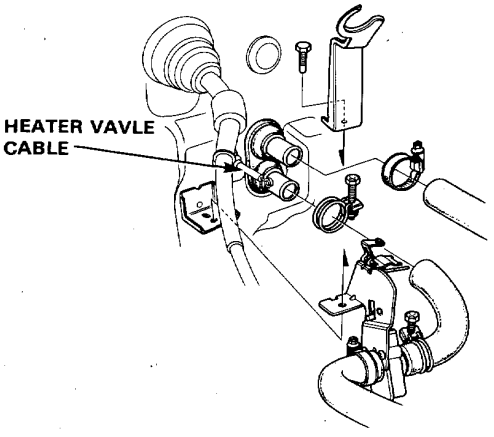
   - **Do not remove the radiator cap when the engine is hot; the coolant is under pressure and could severely scald you.**
   - **Keep hands away from the radiator fan. The fan may start automatically without warning and run for up/to 30 minutes, even after the engine is turned off.**

   CATION: Radiator coolant will damage paint. Quickly rinse any spilled coolant from painted surfaces.

2. Disconnect the heater hoses at the heater.

   NOTE: Coolant will run out when the hoses are disconnected, drain it into a clean drip pan.

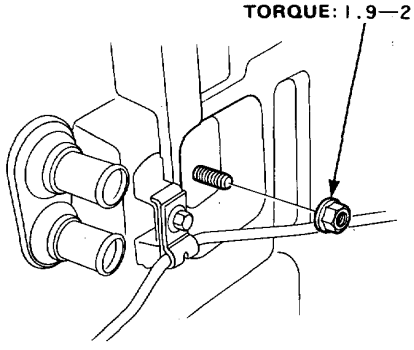
3. Disconnect the heater valve cable from the heater valve.



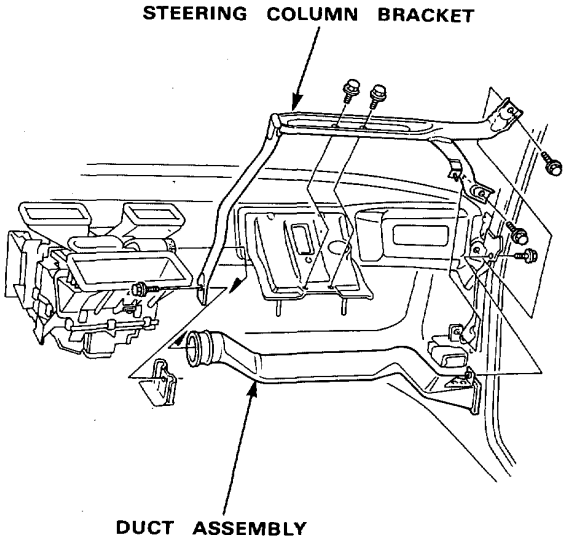
4. Remove the dashboard (Section 14).

5. Remove the heater duct (page 15-10).

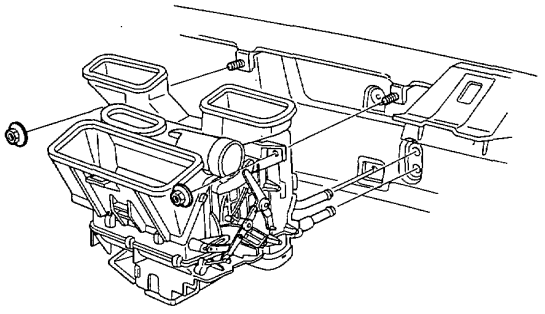
6. Remove the heater lower mounting nut.



7. Remove the steering column bracket and duct assembly.



8. Remove the heater mounting bolts (2) and clip, then remove the heater assembly.

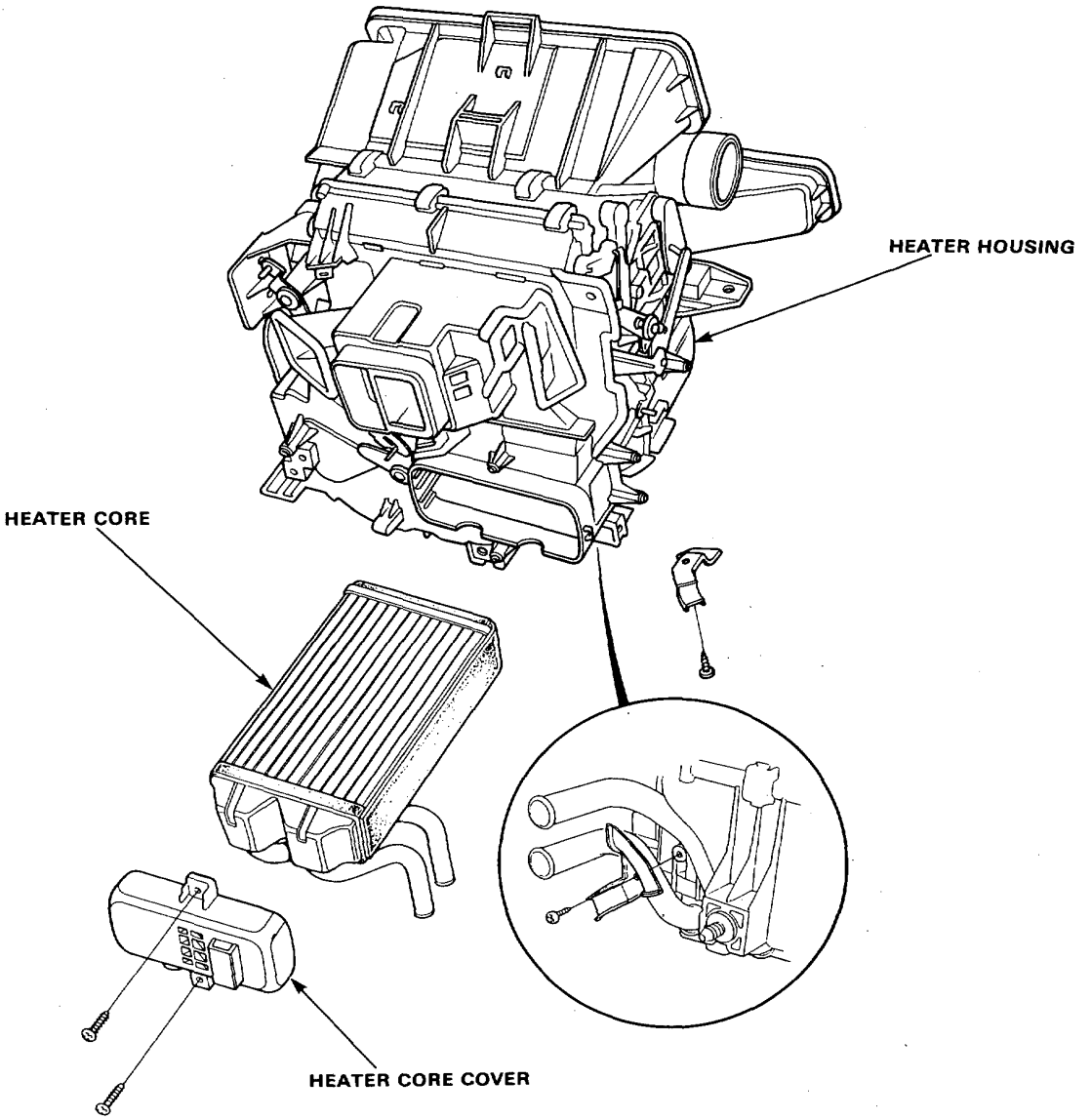


9. Install in the reverse order of removal, and:

   - Apply a sealand to the grommets.
   - Do not interchange the inlet and outlet hoses. Make sure that the hose clamps are secure.
   - Loosen the bleed bolt on the engine and refill the radiator and reservoir tank with the proper coolant mixture.
     Tighten the bleed bolt when all the trapped air has escaped and coolant begins to flow from it.
   - Connect all cables and make sure they are properly adjusted (page 15-16).

Overhaul

1. Remove the heater assembly.
2. Remove the tapping screws (2) and heater core cover.
3. Remove the tapping screw and clamp.
4. Pull out the heater core from the heater housing.

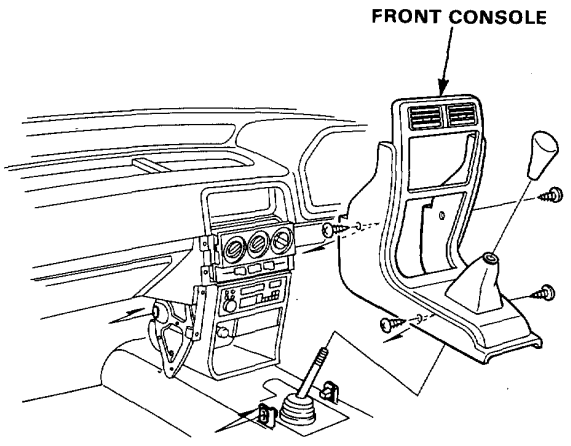


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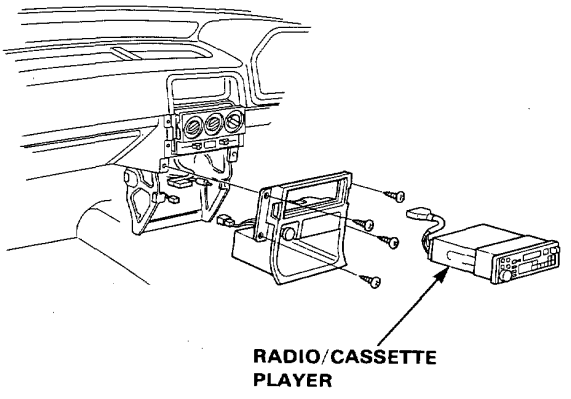
Heater Control Panel

Replacement

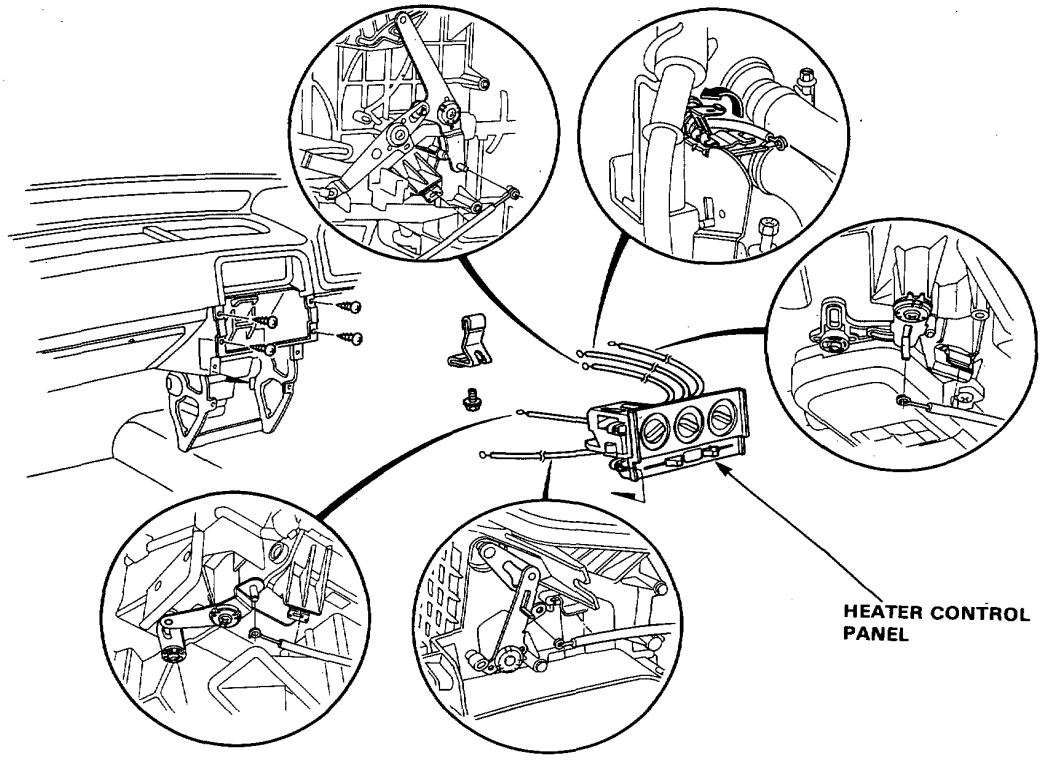
1. Remove the front console.

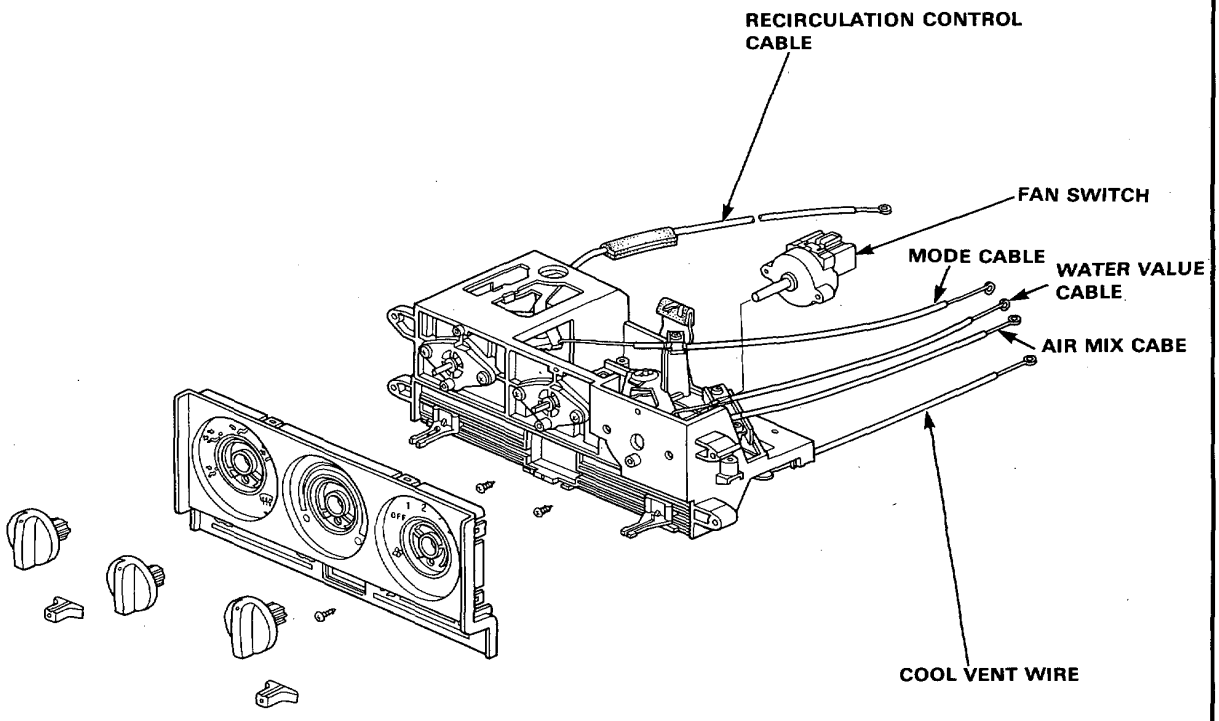


2. Remove the radio/cassette player.



3. Remove the heater control panel.



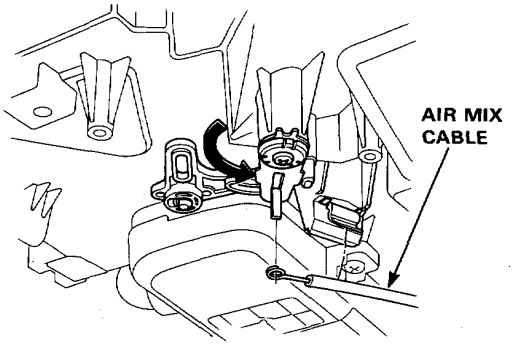

RECIRCULATION CONTROL CABLE
FAN SWITCH
MODE CABLE
WATER VALUE CABLE
AIR MIX CABE
COOL VENT WIRE

Heater Control Cables

Adjustment

- Air Mix Cable

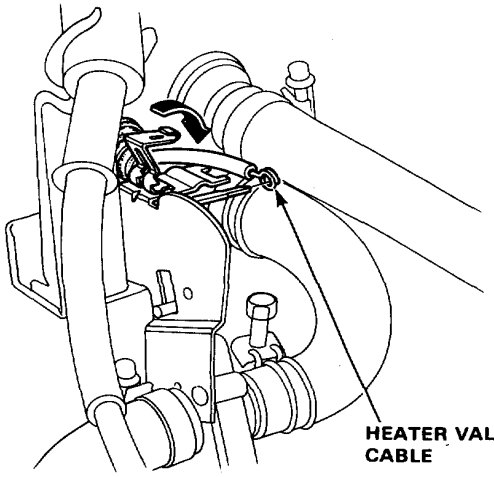
1. Slide the temperature control lever to HOT.
2. Turn the air mix door shaft arm to the left and connect the end of the cable to the arm.
3. Gently slide the cable outer housing back from the end enough to take up any any slack in the cable, but not enough to make temperature control lever move, then snap the cable housing into the clamp.



NOTE: Heater valve cable should be adjusted if the air mix cable has been disconnected.

- Heater valve Cable

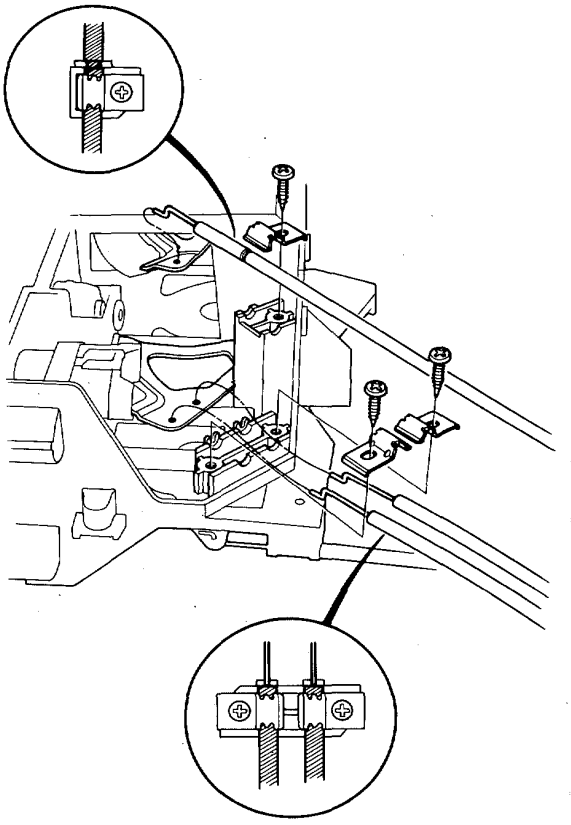
1. Slide the temperature control lever to HOT.
2. Gently slide the cable housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control lever move, then hold the cable housing and snap it in the clamp.



NOTE: Air mix cable should be adjusted if the heater valve cable has been disconnected.

Replacement

Remove the tapping screw, then replace the control cable.



Air Conditioner

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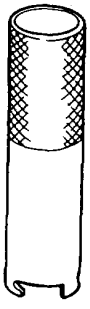
Idle Speed Setting 15-57

Special Tools

Ref. No.	Tool Number.	Description	Q'ty	Page Reference
①	07HAF-SF10300	SHAFT SEAL REMOVER	1	15-48
②	07HAF-SF10400	SEAL REMOVER/INSTALLER	1	15-48,49

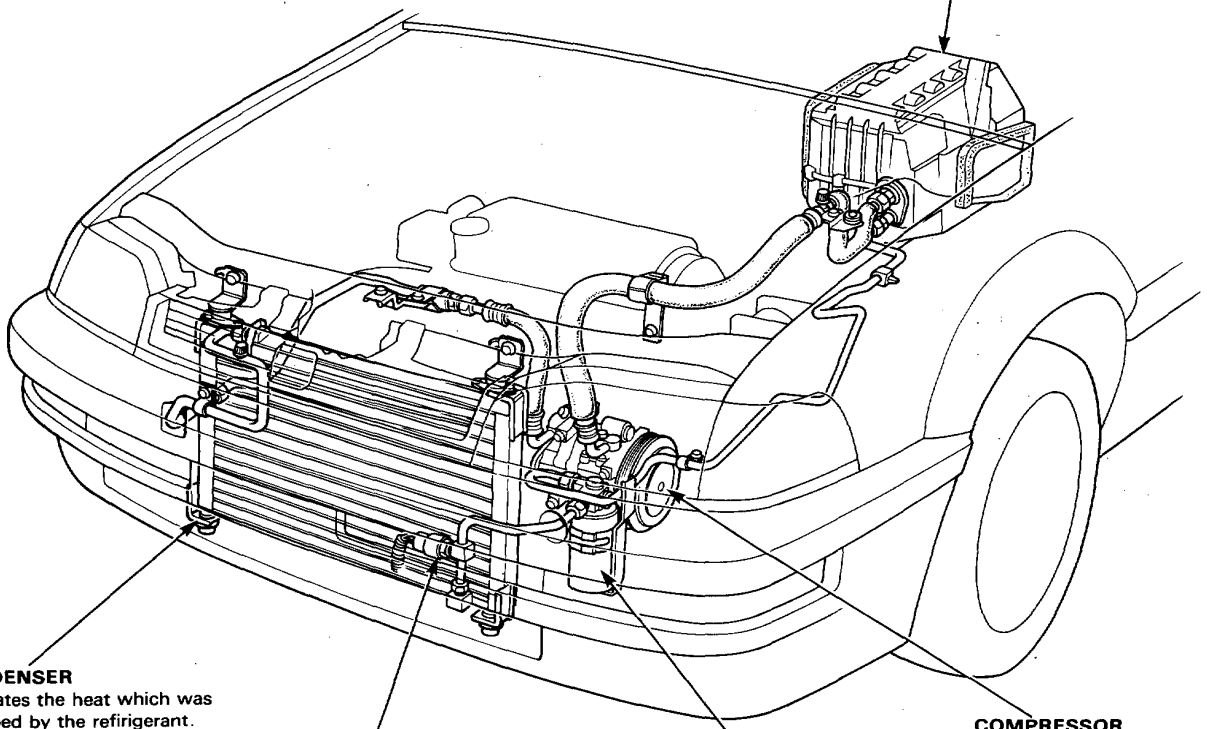


①



②

<RHD>



EVAPORATOR
As refrigerant circulates, heat is absorbed from the surrounding passenger compartment air.
Replacement, page 15-38
Overhaul, page 15-39

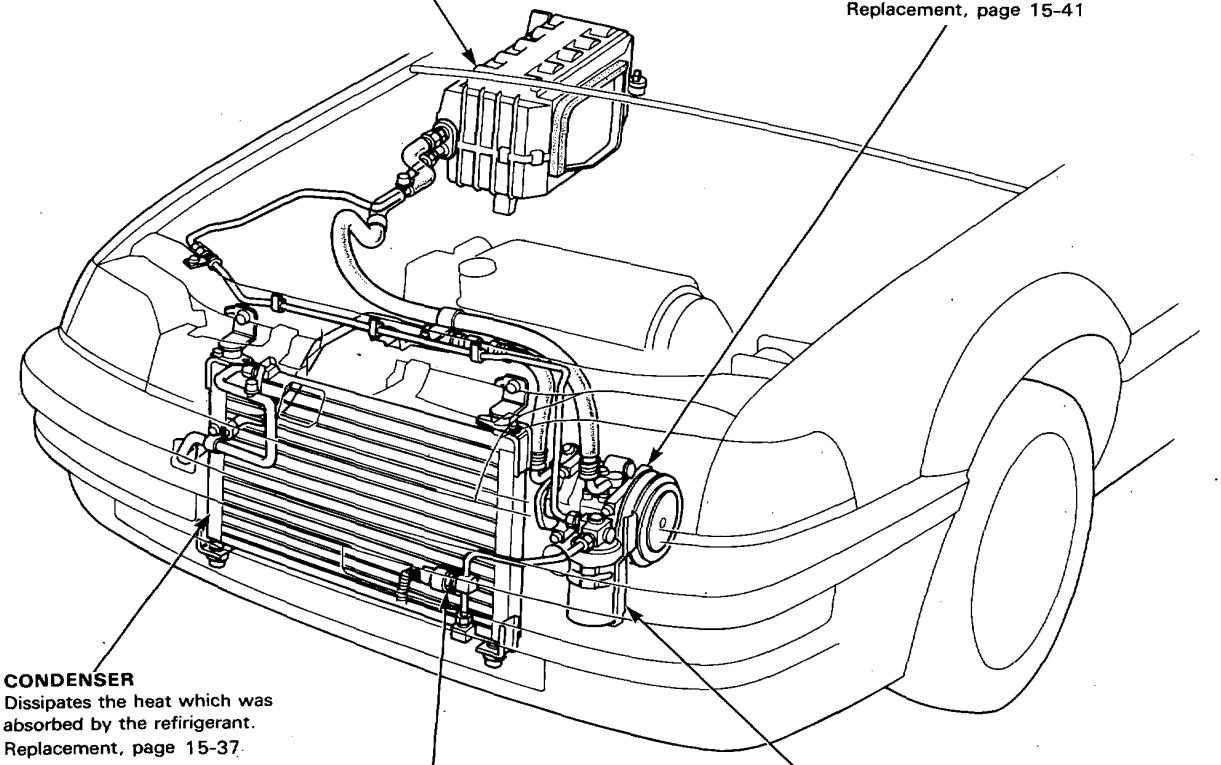
CONDENSER
Dissipates the heat which was absorbed by the refirigerant.
Replacement, page 15-37

DUAL PRESSURE SWITCH
When the refrigerant pressure is below 215 kPa (33 psi) due to refrigerant leakage or above 2350 kPa (340 psi) due to the coolant blockage the dual pressure switch opens the circuit to the A/C control unit and stops the air conditioner to protect the compressor.

COMPRESSOR
Compresses the refrigerant and then forces it through the condenser.
Replacement, page 15-41

RECEIVER AND FILTER/DRYER
Serves as a reservoir which filters and removes moisture from the refrigerant.

* Delay control unit is installed on heater unit assembly side. (Carbureted engine only)



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Replacement, page 15-41

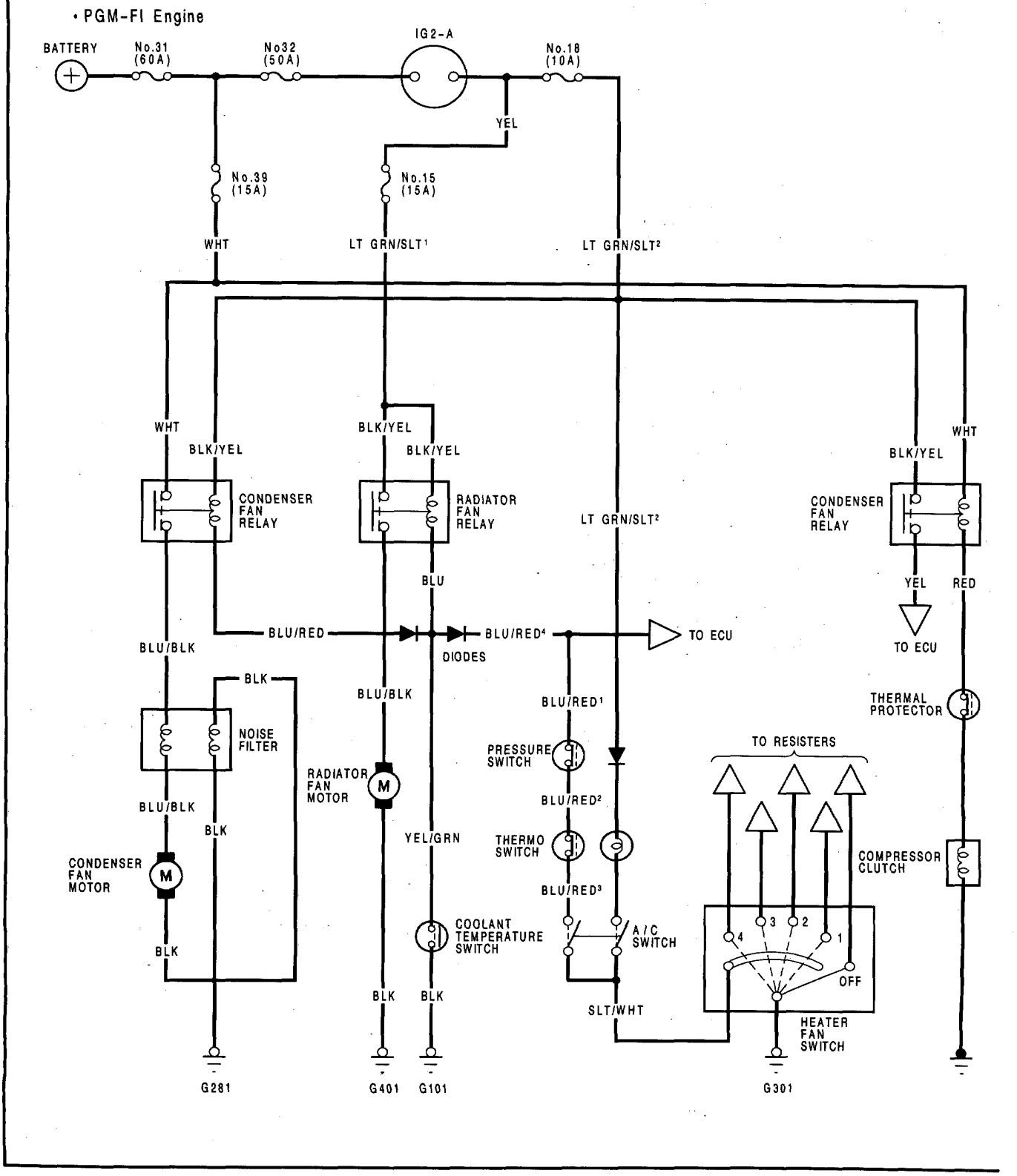
CONDENSER
Dissipates the heat which was absorbed by the refirigerant.
Replacement, page 15-37

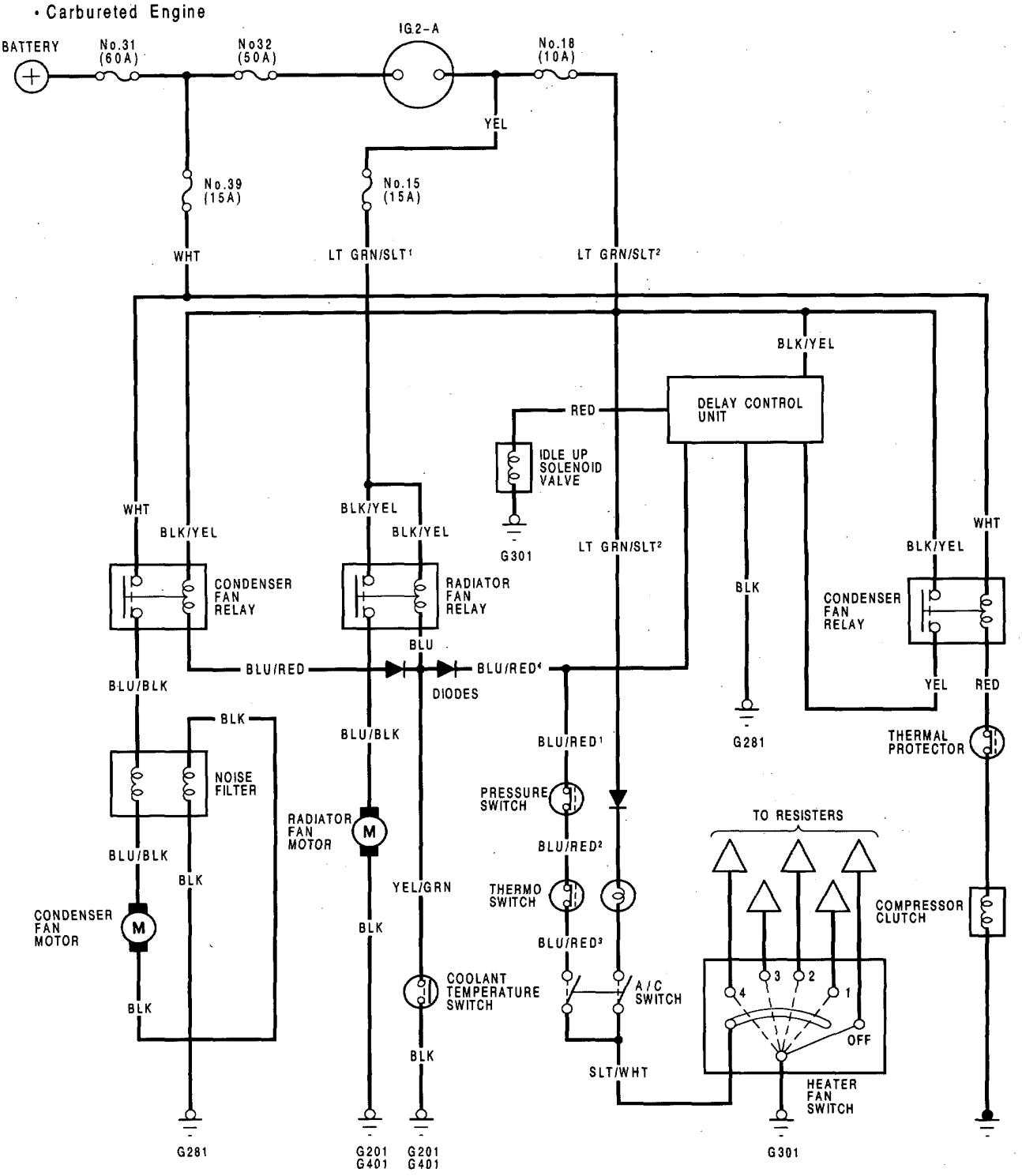
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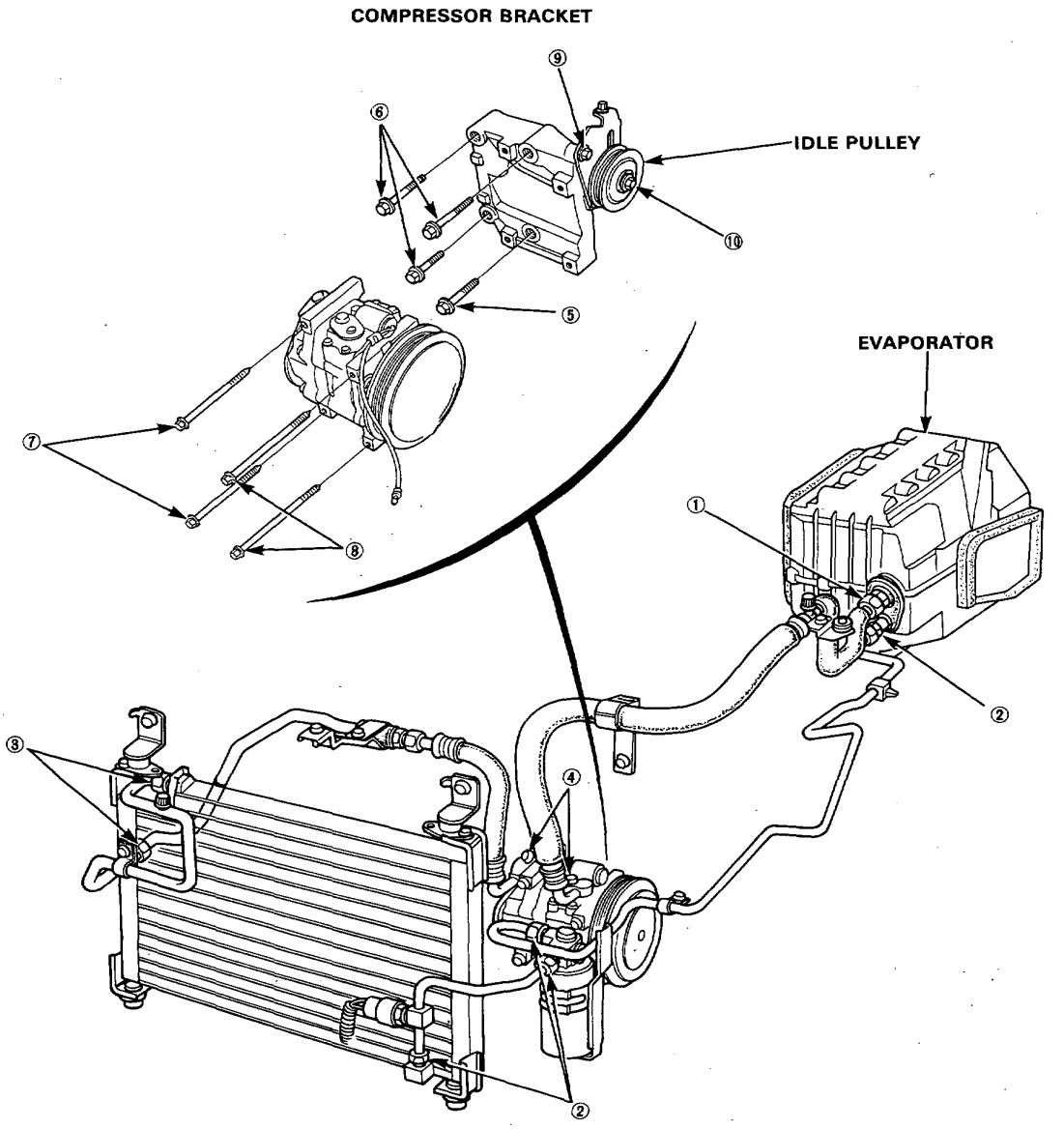
* Delay control unit is installed on heater unit assembly side. (Carbureted engine only)

Circuit Diagram




• Carbureted Engine
BATTERY
No.31 (60A)
No32 (50A)
IG2-A
No.18 (10A)
YEL
No.39 (15A)
No.15 (15A)
WHT
LT GRN/SLT1
LT GRN/SLT2
BLK/YEL
DELAY CONTROL UNIT
RED
IDLE UP SOLENOID VALVE
G301
WHT
BLK/YEL
BLK/YEL
BLK/YEL
LT GRN/SLT2
CONDENSER FAN RELAY
RADIATOR FAN RELAY
BLK
CONDENSER FAN RELAY
WHT
BLK/YEL
BLU
BLU/RED
BLU/RED4
DIODES
YEL
RED
BLU/BLK
BLK
BLU/BLK
BLU/RED1
G281
THERMAL PROTECTOR
NOISE FILTER
PRESSURE SWITCH
TO RESISTERS
RADIATOR FAN MOTOR
BLU/BLK
BLU/RED2
BLK
YEL/GRN
THERMO SWITCH
COMPRESSOR CLUTCH
CONDENSER FAN MOTOR
BLK
BLU/RED3
COOLANT TEMPERATURE SWITCH
A/C SWITCH
4
3
2
1
OFF
BLK
SLT/WHT
HEATER FAN SWITCH
G281
G201
G401
G201
G401
G301

Torque Specifications



① Suction hose (evaporator side)	3.0–3.5kg-m
② Condenser pipe (both side)/Receiver pipe (both side)	1.6–1.8kg-m
③ Discharge hose to condenser	2.0–2.5kg-m
④ Compressor hose mounting bolts	2.8–3.2kg-m
⑤ Compressor bracket mounting bolts(10×50)	4.5–5.0kg-m
⑥ Compressor bracket mounting bolts(10×60)	4.5–5.0kg-m
⑦ Compressor mounting bolts(8×105)	2.0–3.0kg-m
⑧ Compressor mounting bolts(8×120)	2.0–3.0kg-m
⑨ Idle pulley stay bolts(8×16)	2.0–3.0kg-m
⑩ Idle pulley nut (10 mm)	4.5–5.0kg-m

Flow Chart: 1

Only cooling fan does not come on

Check the cooling fan relay.

Is the relay OK? — NO — **Replace the relay.**

YES

A/C switch: ON
Fan switch: ON
Turn ignition: ON

Mesure voltage between BLK/YEL(+)terminal and body round.

Is there battery voltage? — NO — **Repair open in BLK/YEL wire.**

YES

Reconnect the cooling fan relay.

Turn ignition OFF.

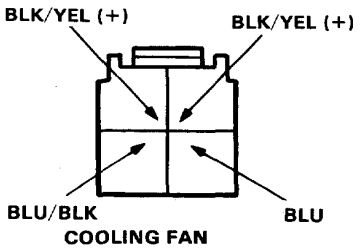
Connect BLU terminal to body ground.

Turn ignition to RUN.

Does cooling fan operate? — YES —
- **Check BLU wire.**
- **Check coolant temperature switch.**

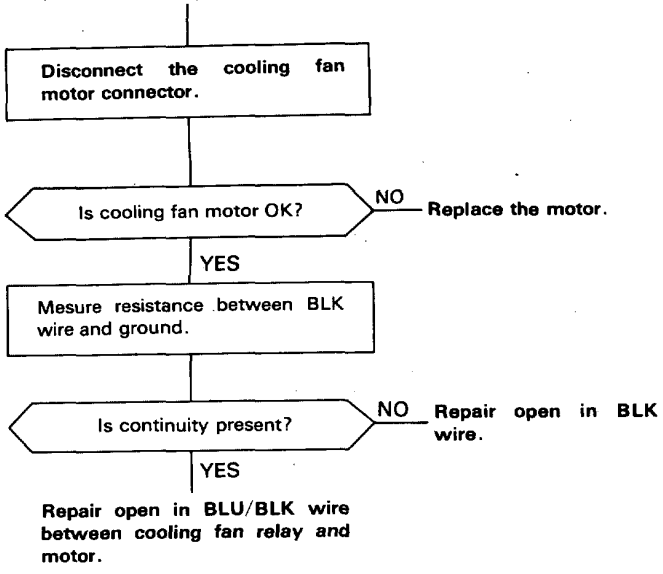
NO

(Continued to next page.)



COOLING FAN RELAY CONNECTOR
View from wire side

(Continued from previous page.)



Flow Chart: 2

Only condenser fan does not operate at all.

Check the condenser fan relay.

Is the relay OK? — NO — **Replace the relay.**

YES

Mesure voltage between WHT (BLK/YEL) wire and ground.

Turn ignition to RUN

Is battery voltage present? — NO — **Repair open in WHT(BLK/YEL) wire.**

YES

Turn ignition OFF

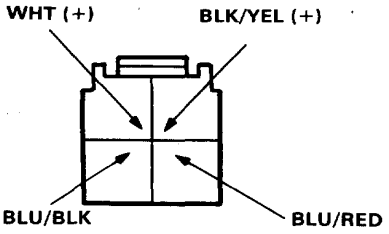
Turn A/C switch ON.

Turn fan switch ON.

Measure resistance between BLU/RED wire and ground.

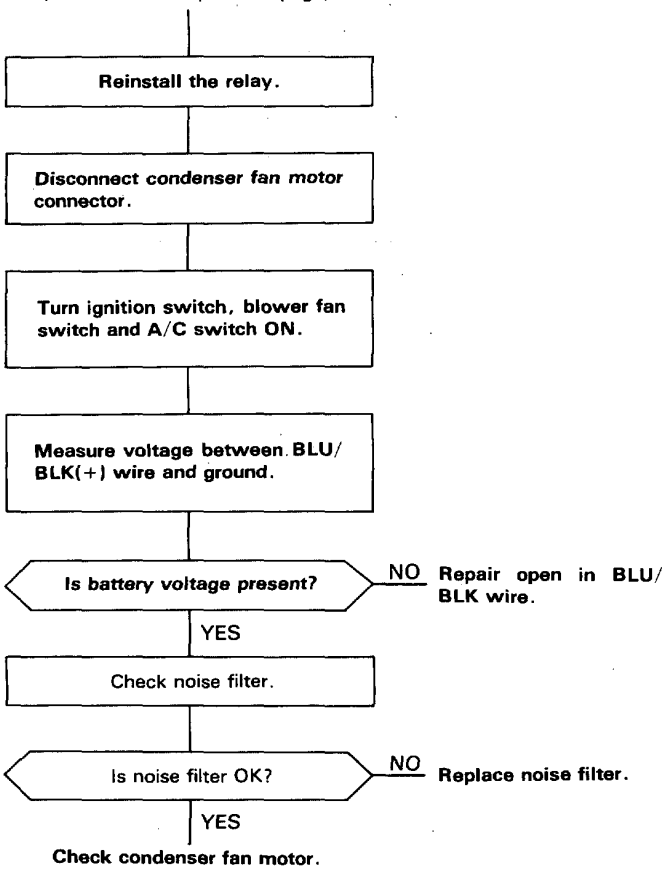
Is continuity present? — NO — **Repair open in BLU/RED wire between condenser fan relay and pressure switch.**

(Continued on next page.)



CONDENSER FAN RELAY CONNECTOR
View from wive side

(Continued from previous page)



Flow Chart:3

A/C compressor clutch does not engage and cooling fans do not run.

- Ignition SW:ON
- A/C SW:ON
- FAN SW:ON

Does A/C ON indicator light?

NO → B

(Continued on next page.)

YES

Is A/C pressure switch open? (should be closed)

YES → **Check refrigerant pressure. If pressure is good, replace A/C pressure switch.**

Is A/C thermostat open?(should be closed)

YES → **Check evaporator temperature. If temperature is above 41°F, replace A/C thermostat.**

NO

Measure resistance BLU/RED$_2$ wire between pressure switch and A/C thermostat.

Is there continuity?

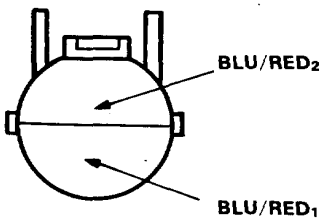
NO → **Repair open is BLU/RED$_2$ wire**

YES

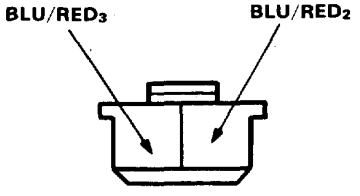
Measure resistance BLU/RED$_3$ wire between thermostat and A/C switch

A

(Continued on next page.)



PRESSURE SWITCH CONNECTOR



View from wire side

A/C THERMOSTAT CONNECTOR

(Continued from previous page.)

A

Is there continuity? — NO — **Repair open in BLU/RED3 wire**

YES

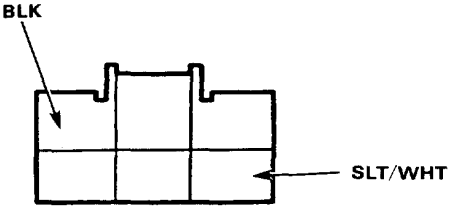
- Check BLU/RED wire between pressure switch and condeser fan relay
  or
- Check diodes

(Continued from previous page.)

B

Disconnect fan switch connector.

Connect voltmeter between SLT/WHT wire (+) and ground (−).



FAN SWITCH CONNECTOR
View from wire side.

Is battery voltage present? — NO — **Check SLT/WHT wire. If wire is good, replace A/C switch.**

YES

Check BLK wire from fan switch. If wire is good, replace fan switch.

Flow Chart: 4

Compressor does not come on.

Isspect No. 18 and 31 fuses.

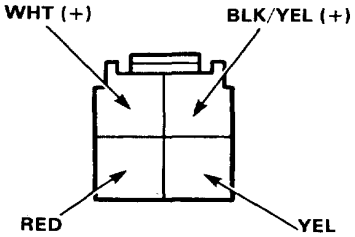
Are the fuses OK? — NO → **Replace the fuse(s).**

YES

Disconnect the 4-P connector from the compressor clutch relay.

Measure voltage between the WHT terminal (+) and body ground.

Turn the ignition switch on.



CLUTCH RELAY
View from wire side.

Is there battery voltage? — NO → **Repair open in WHT wire between the fuse box and compressor clutch relay.**

YES

Measure voltage between the BLK/YEL terminal(+) and body ground.

Is there battery voltage? — NO → **Repair open in BLK/YEL wire between the fuse box and compressor clutch relay.**

YES

Connect the jumper wire between the WHT terminal and RED terminal.

Does the compressor clutch engage? — NO → **Turn the ignition OFF and Reconnect the 4-P connector to the compressor clutch relay**

YES

(To 15-33 page)

(To page 15-34)

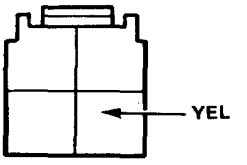
(from 15-32 page)

Turn the ignition switch OFF and reconnet the 4-P reconnector to the compressor clutch relay.

Turn the ignition switch on and connect the jumper wire between the YEL terminal and body ground.

Does the compressor clutch engage? NO → **Replace the compressor clutch relay.**

YES



CLUTCH RELAY
View from wire side.

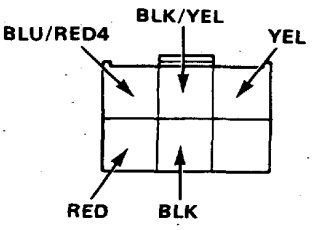
- PGM-FI Engine

Check the A/C signals.
Compressor clutch relay ↔ ECU
A/C switch ↔ ECU
See fuel and emissions section.

- Carbureteb Engine

Disconnect 6P connector from the delay control unit.

Connect a jumper wire between YEL terminal and body ground..



Does the compressor clutch engage? NO → **Repair open in YEL wire between compressor relay and delay control unit.**

YES

Measure voltage between the BLK/YEL terminal (+) and body ground.

Is there battery voltage? NO → **Repair open in BLK/YEL wire between the fuse box and delay control unit.**

YES

Check the continuity between BLK terminal and body ground.

Is there continuity? NO → **Repair open in BLK wire between delay control unit and body ground or poor ground.**

YES

Check the continuity BLU/RED4 terminal between delay control unit and body ground. Then A/C, heater fan switches ON.

Is there continuity? NO → **Repair open in BLU/RED4 wire between delay control unit and body ground.**

YES

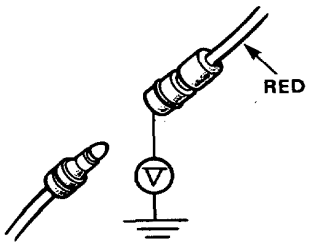
Faulty delay control unit.

Flow Chart: 4 (cont'd)

(From page 15-32)

Disconnect the RED terminal and turn the ignition switch on.

Measure voltage between the RED terminal(+) and body ground.



Is ther battery voltage?

NO

Repair open in RED wire between the compressor clutch relay and compressor clutch connector.

YES

Turn the ignition switch OFF and check the thermal protector(page 22-32, 35).

Is the thermal protector OK?

NO

Replace the thermal protector.

YES

Replace the compressor clutch.

Pressure Check

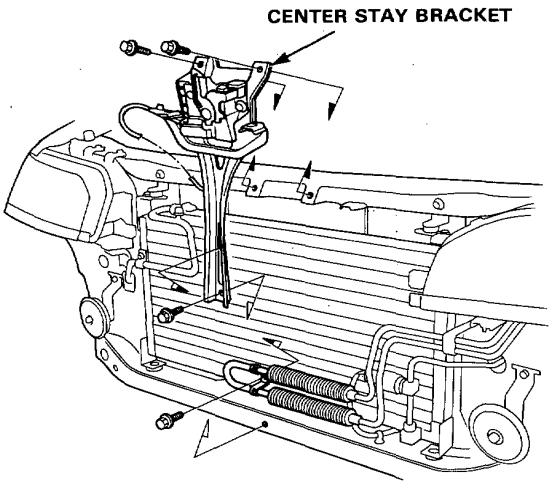
NOTE: Performance Test on page 15-56

TEST RESULTS	RELATED SYMPTOMS	PROBABLE CAUSE	REMEDY
Discharge (high) Pressure abnormally high	After stopping compressor, pressure drops to about 196 kPa (28 psi) quickly, and then falls gradually	Air in system	Evacuate system; then recharge Evacuation: page 15-50 Recharging: 15-52
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as required
	Reduced or no air flow through condenser.	· Clogged condenser or radiater fins · Condenser or radiator fan not working properly	· Clean · Check voltage and fan rpm
	Line to condenser is excessively hot	Restricted flow of refrigerant in system	Expansion valve
Discharge pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot	Insufficient refrigerant in system	· Charge system · Check for leak
	High and low pressures are balanced soon after stopping compressor	· Faulty compressor discharge or inlet valve · Faulty compressor seal	Replace compressor Repair
	Outlet of expansion valve is not frosted, low pressure gauge indicates vacuum	· Faulty expansion valve	Repair or Replace
Suction (low) pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot Expansion valve is not frosted and low pressure line is not cold. Low pressure gauge indicates vacuum.	Insufficient refrigerant · Frozen expansion valve · Faulty expansion valve	Check for leaks. Charge as required. Replace expansion valve
	Discharge temperature is low and the air flow from vents is restricted	Frozen evaporator	Run the fan with compressor off then check the thermostat and capillary tube.
	Expansion valve frosted	Clogged expansion valve	Clean or Replace
	Receiver dryer is cool (Should be warm during opration)	Clogged receiver dryer	Replace
Suction pressure abnormally high	Low pressure hose and check joint are cooler than around evaporator	· Expansion valve open too long · Loose expansion valve	Repair or Replace
	Suction pressure is lowered when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary
	High and low pressure are equalized as soon as the compressor is stopped	· Faulty gasket · Faulty high pressure valve · Foreign particle stuck in high pressure valve	Replace compressor
Suction and discharge pressures abnormally high	Reduced air flow through condenser	· Clogged condenser or radiator fins · Condenser or radiator fan not working properly	· Clean condenser and radiator · Check volatage and fan rpm
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary.
Suction and discharge pressure abnormally low	Low pressure hose and metal end areas are cooler than evaporator	Clogged or kinked low pressure hose parts	Repair or Replace
	Temperature around expansion valve is too low compared with that around receiver-driver.	Clogged high pressure line	Repair or Replace
Refrigerant leaks	Compressor clutch is dirty	Compressor shaft seal leaking	Replace compressor shaft seal
	Compressor bolt(s) are dirty	Leaking around bolt(s)	Replace compressor
	Compressor gasket is wet with oil	Gasket leaking	Replace compressor

Condenser

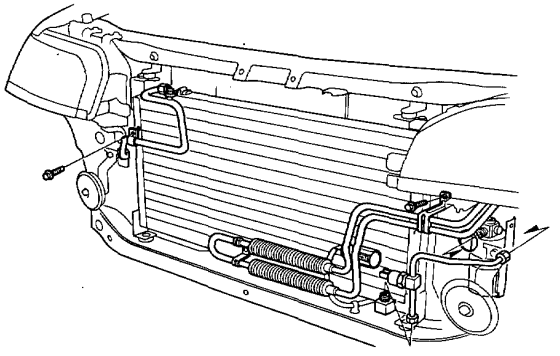
Replacement

1. Discharge the refrigerant.
2. Remove the bumper.
3. Remove the center stay bracket.

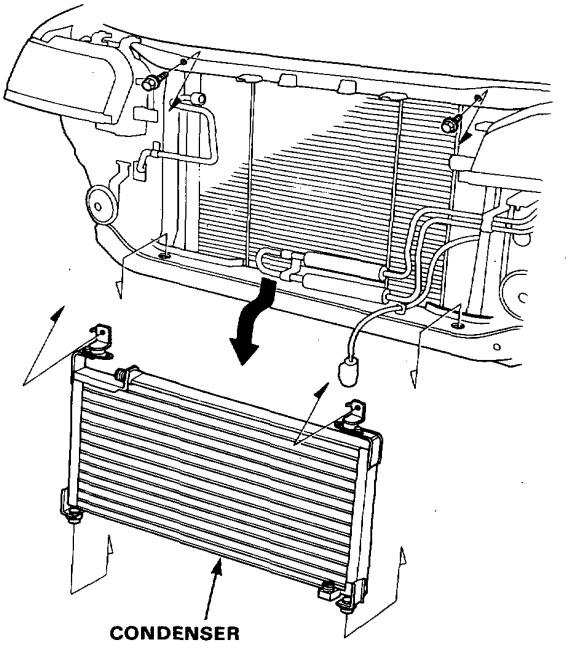


4. Disconnect the condenser pipe and discharge pipe from the condenser.

   CAUTION: Cap the open fittings immediately to keep moisture and dirt out of system.



5. Remove the mounting bolts (2) and condenser.



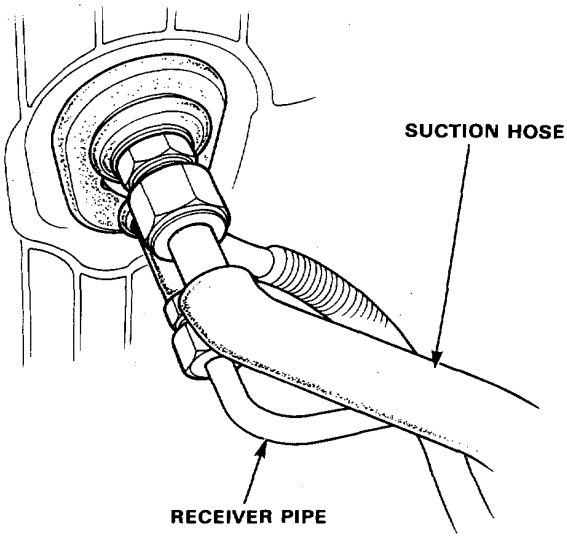
Install in the reverse order of removal, charge the system (page 15-50) and test performance (page 15-56).

Evaporator

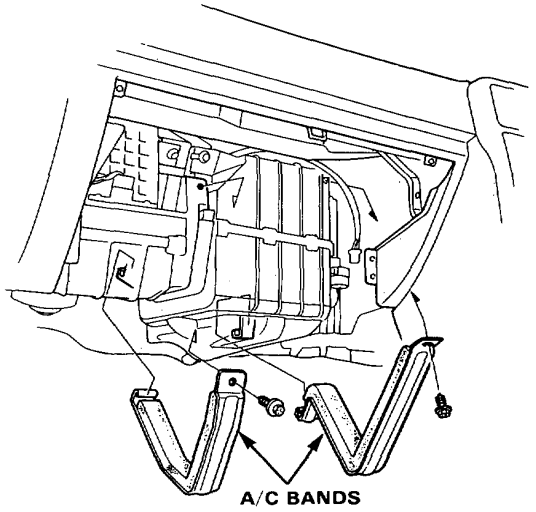
Replacement

1. Disconnect the battery negative terminal.
2. Discharge the refrigerant (page 15-36).
3. Ddiconnect the receiver line and suction hose from the evaporator.

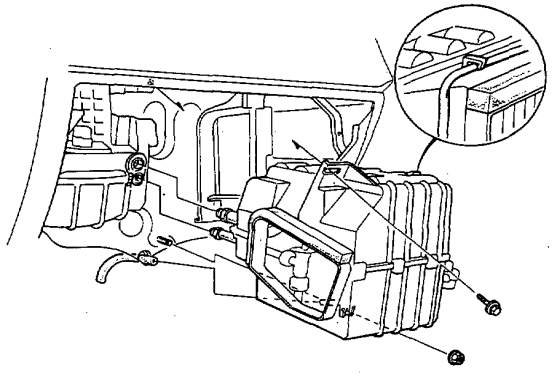
   CAUTION: Cap the open fittings immediately to keep moisture out of the system.



4. Remove the glove box.
5. Disconnect the connector from the A/C thermostat pull off the wire harness from the clamps.
6. Remove the tapping screws (2) and A/C bands.



7. Remove the mounting bolts (2) and evaporator.

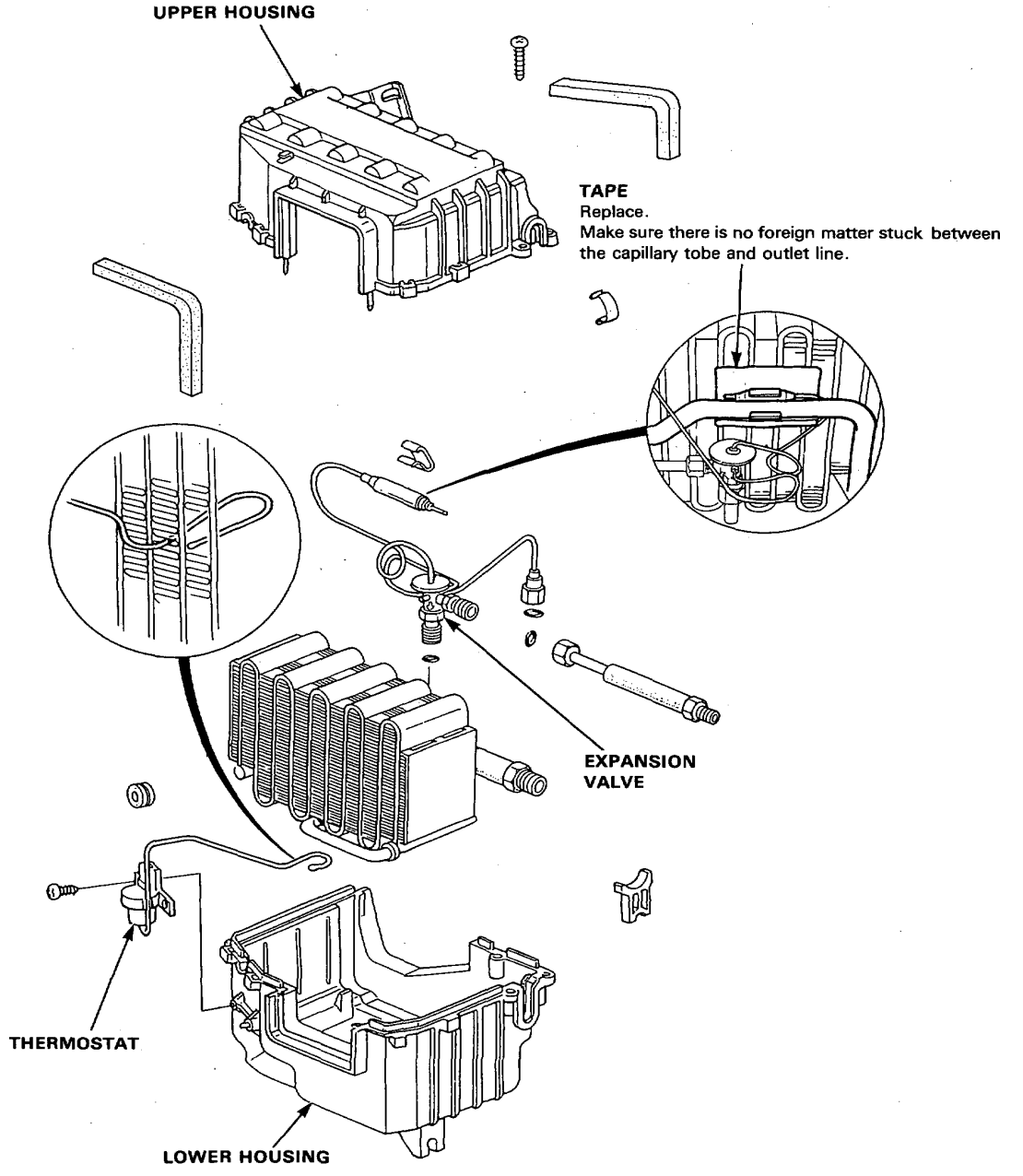


8. Install in the reverse order of removal, and:
   - Apply a sealant to the gromments.
   - Make sure that there is no air leakage.
   - Charge the system (page 15-50) and test performance (page 15-56).

Overhaul

1. Pull out the evaporator sensor from the evaporator fins.
2. Remove the tapping screws and clips from the housing.
3. Carefully separate the hosings and remove the evaporator covers.
4. Remove the expansion valve if necessary.

Assemble the evaporator in the reverse order of disassembly, and:
- Install the expansion valve capillary tube against the suction line, and wrap it with tape.
- Reinstall A/C thermostat in its original location.

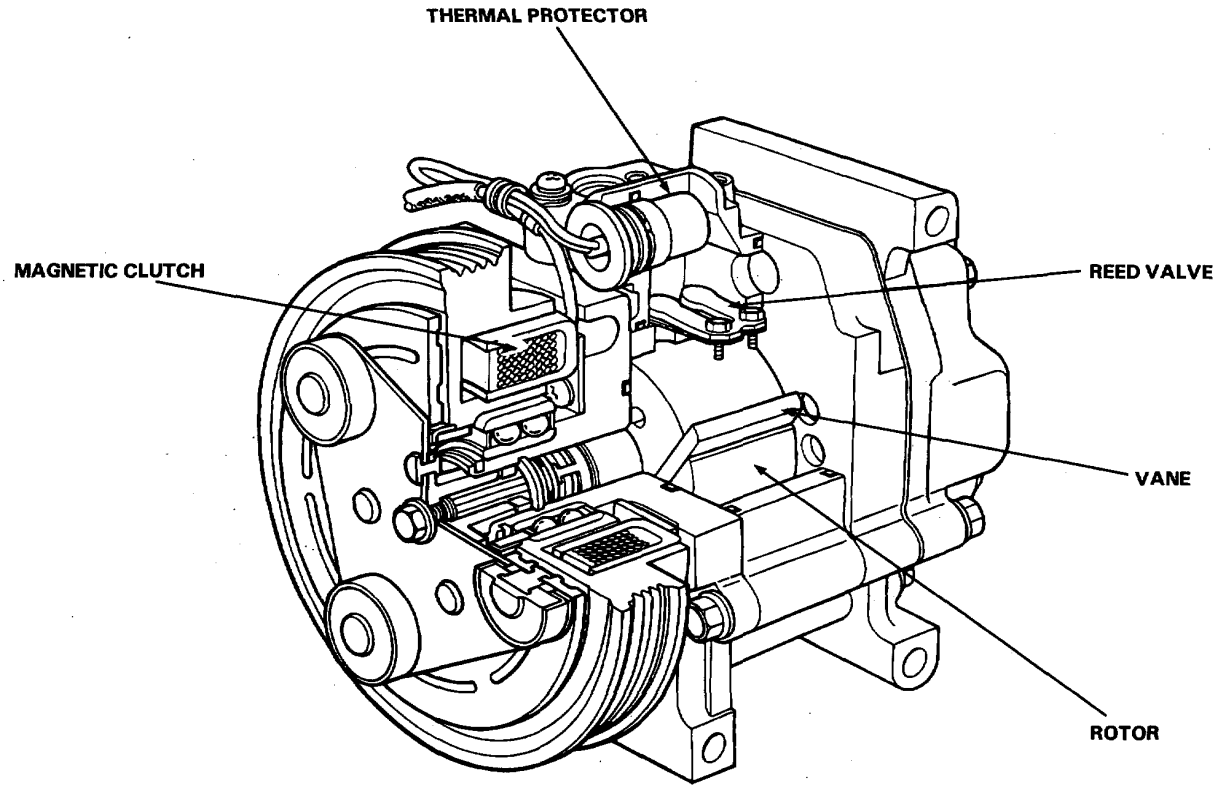


Compressor

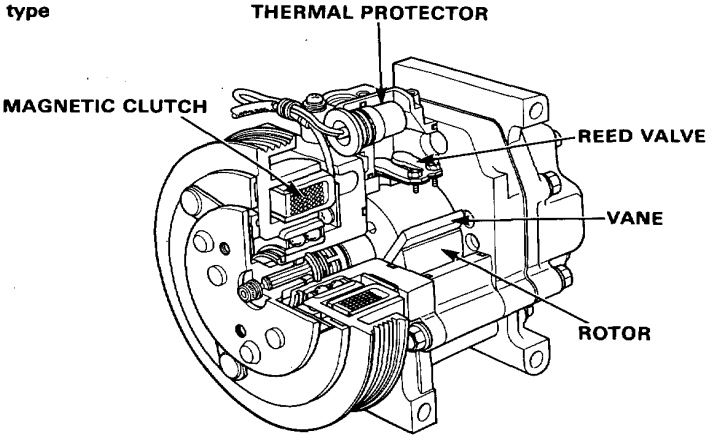
Description (Matsushita)

This compressor is a three-vane, rotary type and consists of three vanes that come out of the rotor to the cylinder wall, reed valve that prevents backflow, and magnetic clutch.
A thermal protector is installed on this compressor.

A type

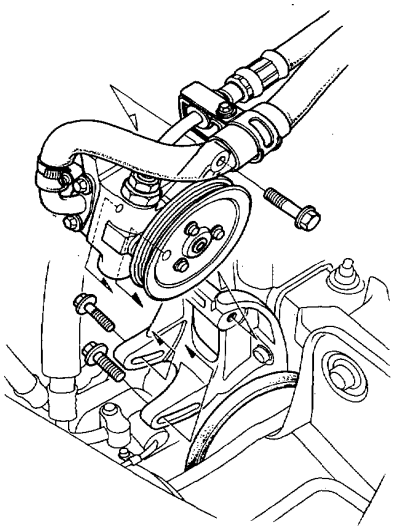


B type



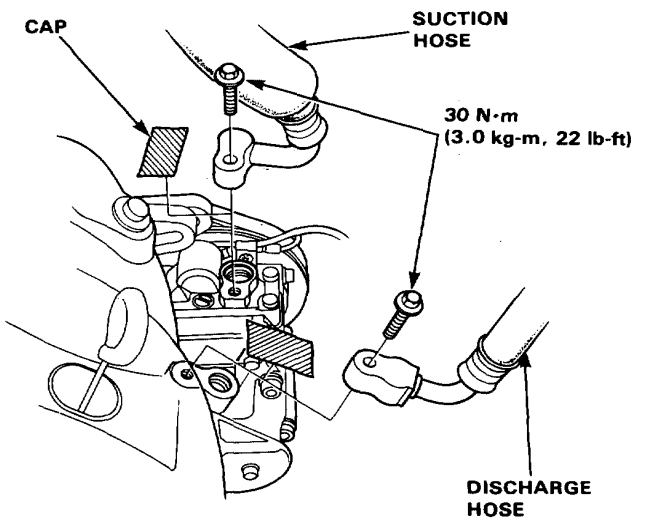
Replacement

1. If the compressor is marginally operable, run the engine at idle speed and turn on the air conditioner fan a few minutes. then shut the engine off and disconect the battery negative terminal.
2. Discharge the refrigerant very slowly from the system page(15-36).
3. Remove the mounting bolts (2) the power stearing pump belt, and the power stearing pump.

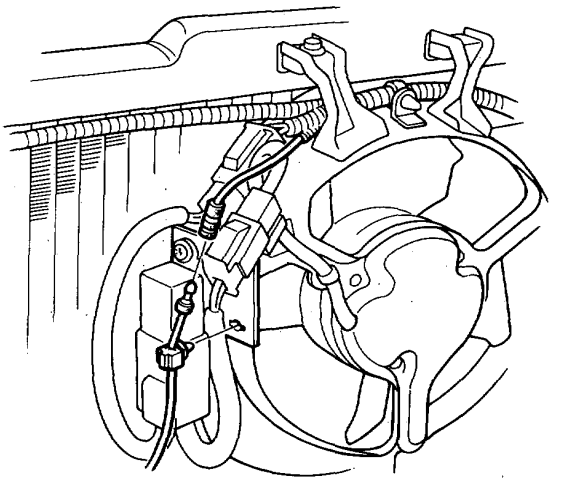


4. Disconnect the suction and discharge hoses from the compressor.

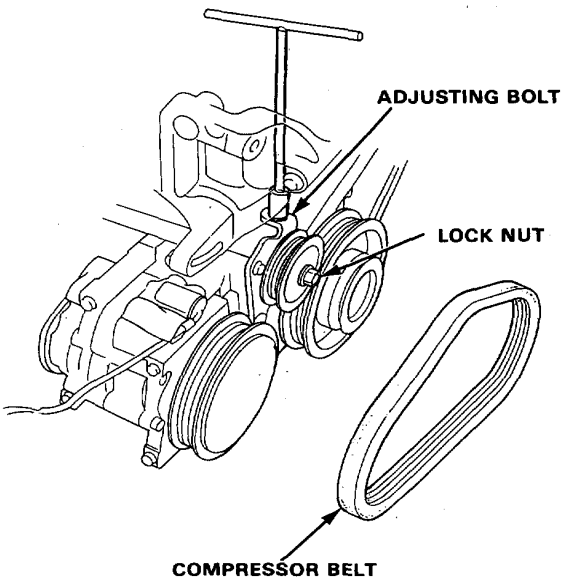
   CAUTION: *Cap the open fittings immediately to keep moisture and dirt out of the system.*



5. Disconnect the compressor connector and the clamp.



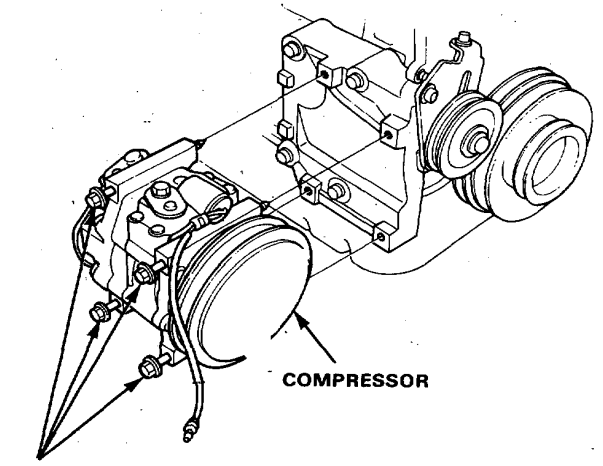
6. Loosen the adjusting bolt and lock nut, then remove the compressor belt.



Compressor

Replacement (cont'd)

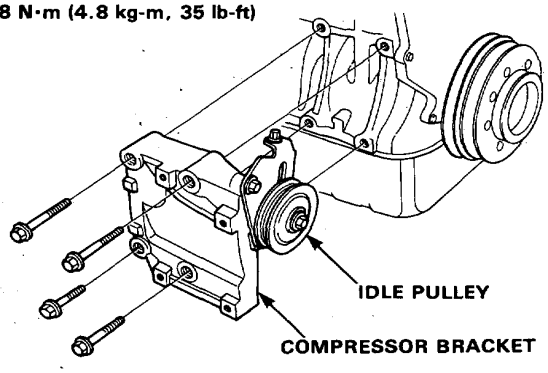
7. Remove the compressor mounting bolts(4)and compressor. Rest the compressor on the front beam.



COMPRESSOR MOUNTING BOLTS
25 N·m
(2.5 kg-m, 18 lb-ft)

8. Remove the mounting bolts (4) and compressor bracket with idle pulley.

ALL TORQUE:
48 N·m (4.8 kg-m, 35 lb-ft)



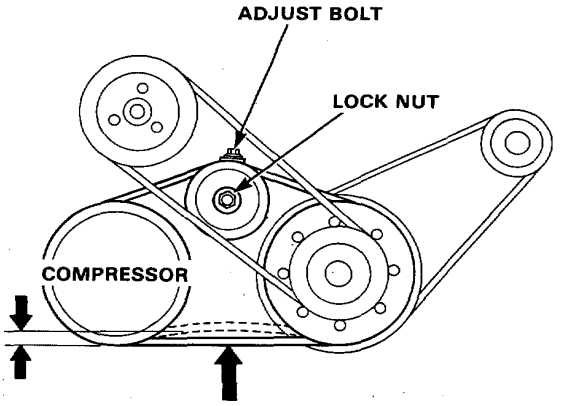
9. Remove the compressor.

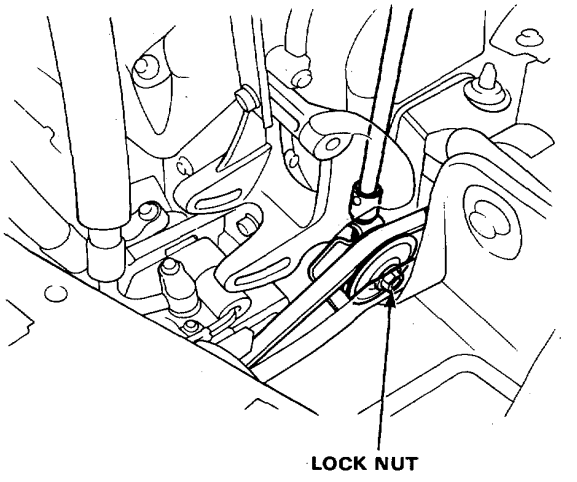
10. Install in the reverse order of removal and:
    - If a new compressor is installed, calculate the amount of refrigerant to be drained through the suction fitting on the compressor:
      150cc (5fl oz,) minus contents of old compressor, equals amount to drain from new compressor.
    - Adjust the compressor belt and the power steering belt.

NOTE: Measure the deflection when 98 N (10kg, 22lb) force is applied between the pulleys.

Compressor belt Adjustment.
9–11 mm (0.35–0.43 in)

{ 7–9 mm (0.28–0.35 in) when new belt is intalled }

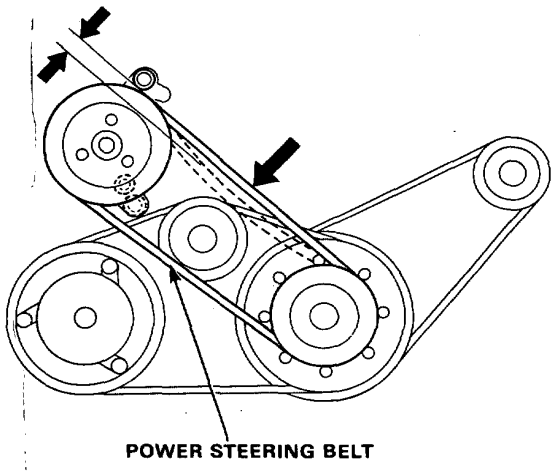




- Charge the system (page 15-50).
- Test the performance (page 15-56).

11. Power steering belt adjustment.
    9–12 mm (0.35–0.47 in).

    (7–10 mm (0.28–0.39 in) when new belt is intalled)



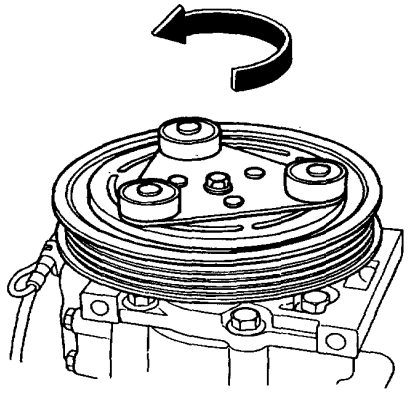
Compressor (Matsushita)

Clutch Inspection

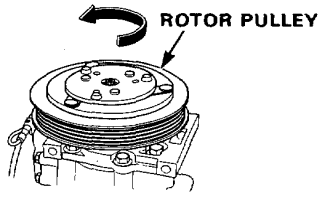
- Check pulley bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play/drag.

ROTOR PULLEY

A type



B type

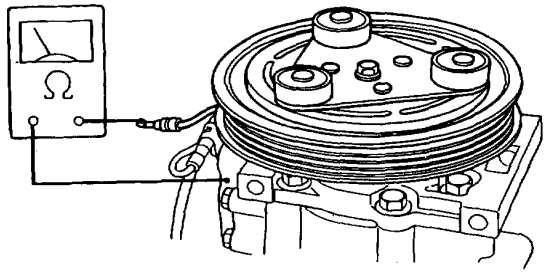


- Check resistance of the field coil:

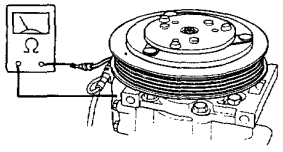
Field Coil Resistance:
3.33 ± 0.17 ohm at 20°C (68°F)

If resistance is not within specifications, replace the coil.

A type



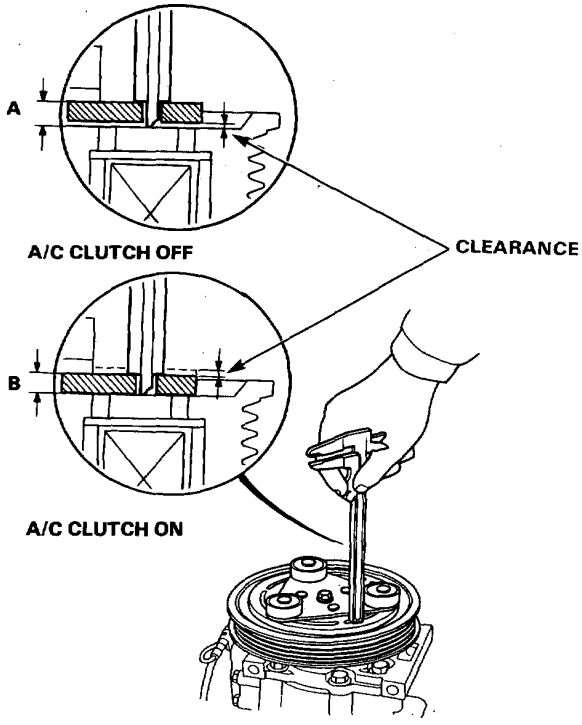
B type



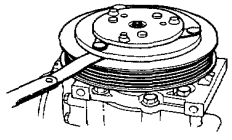
- Measure the clearance between the pulley and pressure plate. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required.

A type:
CLEARANCE: 0.4–0.6 mm (0.016–0.024 in)

CLEARANCE=A(CLUTCH OFF)−B(CLUTCH ON)



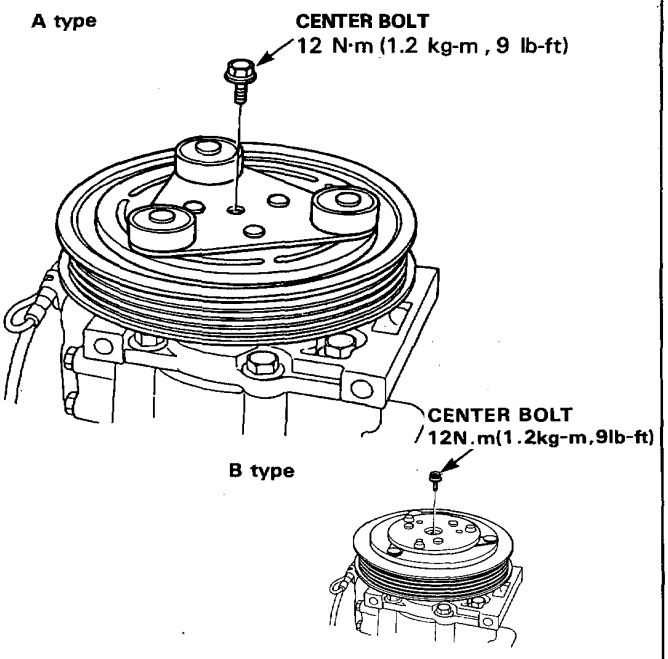
B type:
CLEARANCE: 0.4–0.6 mm (0.016–0.024 in)



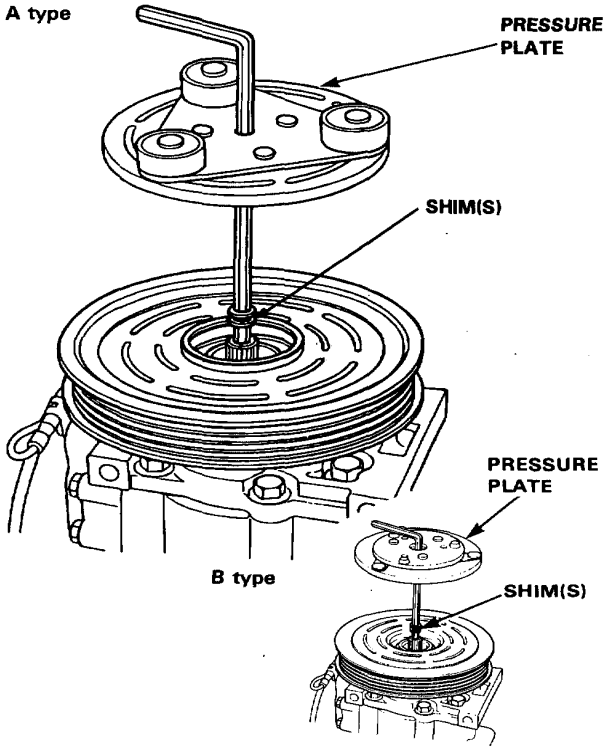
NOTE:
The shims are available in two sizes: 0.2 mm and 0.5 mm of thickness.

Clutch Overhaul

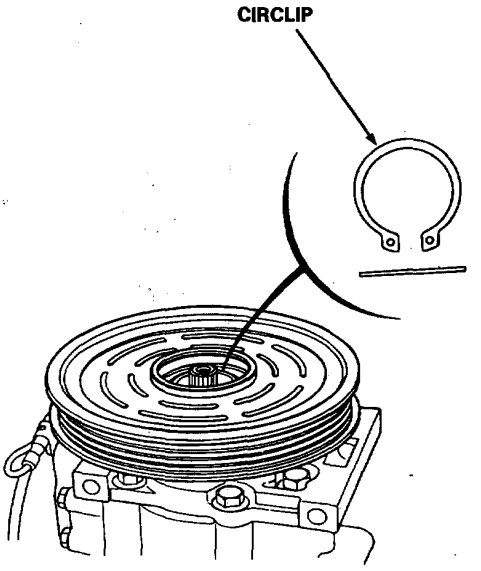
1. Remove the center bolt and washers.



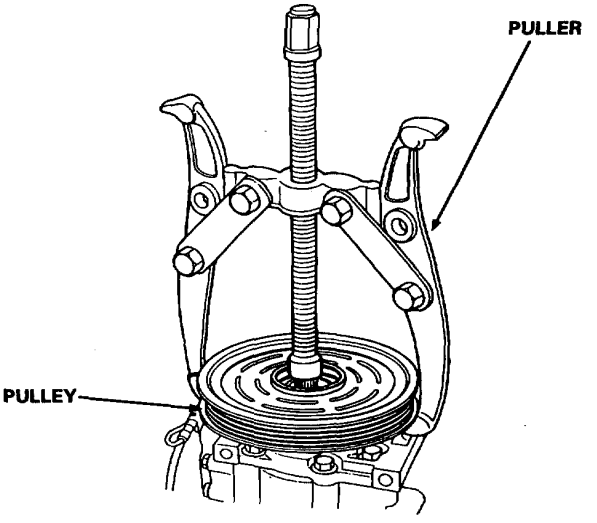
2. Remove the pressure plate and shim(s) taking care not to lose the shims.



3. Use circlip pliers to remove the circlip.



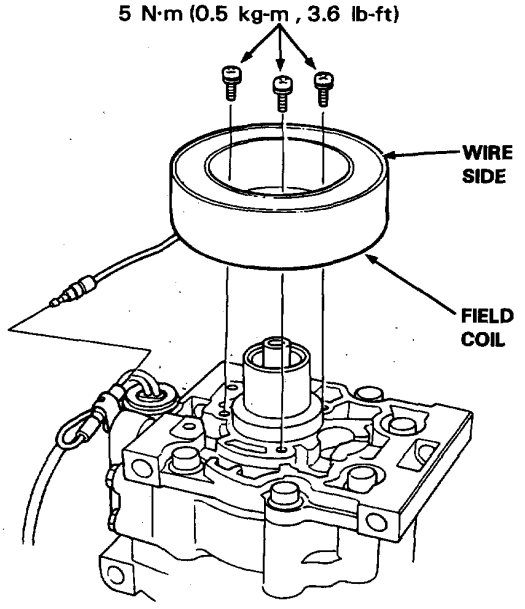
4. Remove the pulley from the shaft using a 2 or 3 jaw puller.
5. Check the pulley, replace the assembly if the pulley is damaged or deformed.



Compressor (Matsushita)

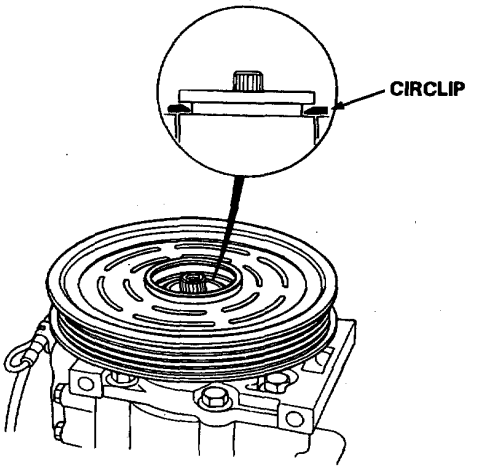
Clutch Overhaul (cont'd)

6. Disconnect the field coil connector and remove the screws (3) and field coil.



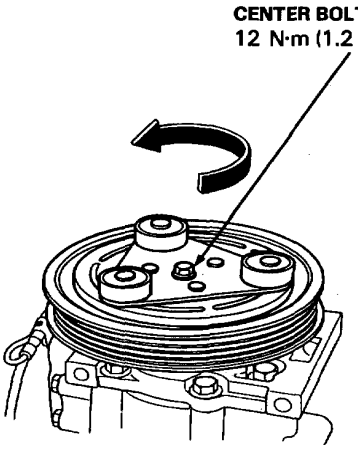
7. Install in the reverse order of removal and:

- Install the field coil with the wire side facing up (see above).
- Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
- Check the pulley bearings for excessive play.
- Make sure the circlip is fitted to the groove properly.

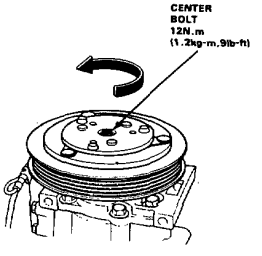


- Apply locking agent to the thread of the center bolt and tighten it securely.
- Make sure that the pulley turns smoothly.

A type



B type



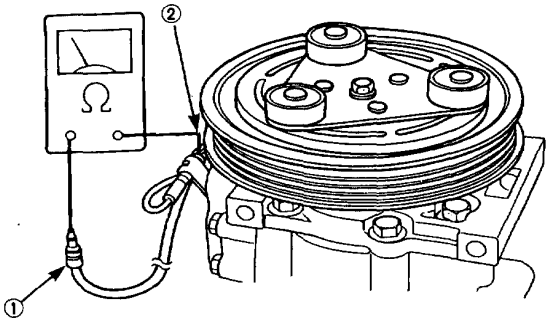
Thermal Protector Inspection

Check for continuity between the 1 and 2 terminals of the compressor connector.

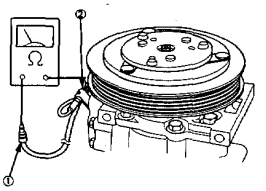
There should be continuity.

- If no continuity, replace the thermal protector.

A type

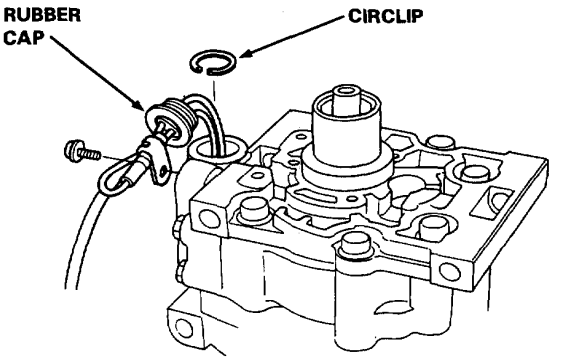


B type



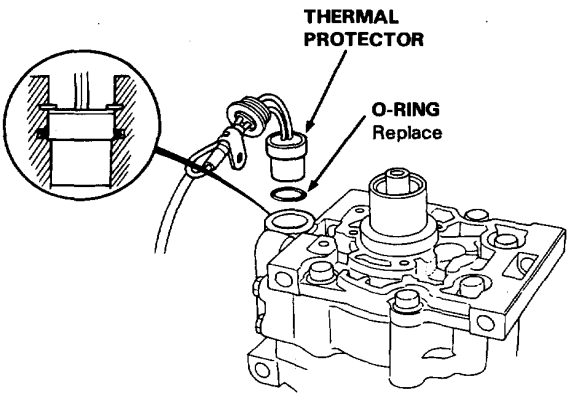
Thermal Protector Replacement

1. Remove the pressure plate and field coil (page 22-29).
2. Pull the rubber cap out from the thermal protector.
3. Remove the screws and wire clips.
4. Remove the circlip and thermal protector.



5. Install in the reverse order of removal.

NOTE:
- Replace the O-rings with new ones.
- Set the new O-rings in place as shown.



Compressor (Matsushita)

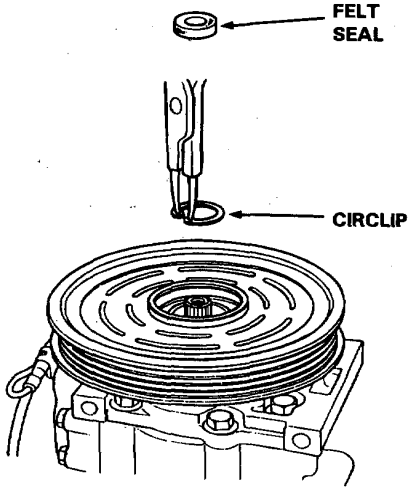
Shaft Seal Replacement

NOTE:
Make sure that the suction and discharge joints are plugged with the caps.

1. Remove the pressure plate (page 24-29).

   NOTE:
   Removal of the clutch pulley and coil is not necessary.

2. Remove the felt seal and circlip.



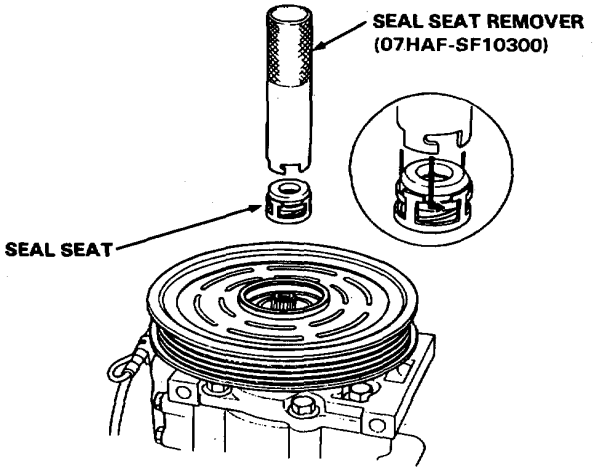
3. Remove the shim(s).

   NOTE:
   After removing, place shim(s) safely in a parts rack.

4. Insert the special tool into the compressor aligning the cutout of the remover with the groove of the seal seat.

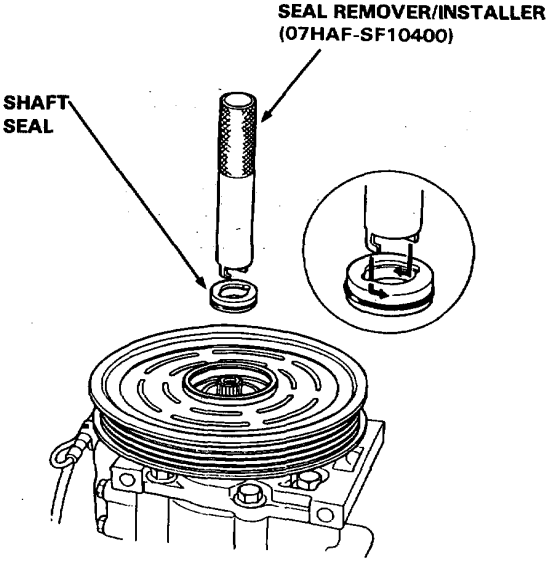
5. Rotate the special tool counterclockwise to make sure that the cutout is engaged with the seal seat.

6. Pull out the seal seat.



7. Insert the special tool into the compressor aligning the cutout of the remover with the metal pawl of the seal case.

8. Rotate the special tool counter clock wise to make sure that the cutout is engaged with the metal pawl.



9. Withdraw the remover.

10. Lay down the compressor and clean the shaft seal contacting face of the compressor with cleaning solvent.

    CAUTION:
    - **Keep the cleaning solvent and dirt out of the compressor.**
    - **Do not use any cloth for cleaning, clean only by rinsing with solvent.**
    - **Do not spill the refrigerant oil from the compressor. Refill the same amount of the oil if the oil is spilled out.**

11. Clean the new shaft seal thoroughly with cleaning solvent.

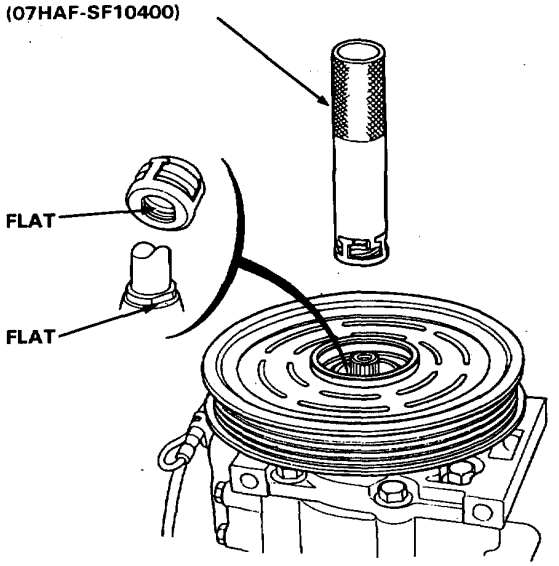
12. Lubricate the shaft seal with refrigerant oil (SUNISO 5GS or equivalent) and install it on the shaft seal remover.

    NOTE:
    - Use only clean refrigerant oil.
    - Do not touch the sealing surfaces of the shaft seal after lubricating.

13. Liberally lubricate the compressor shaft with refrigerant oil.

14. Install the shaft seal onto the compressor shaft aligning the seal case flats with the shaft flats.

SEAL REMOVER/INSTALLER (07HAF-SF10400)



15. Clean the seal seat with cleaning solvent, then lubricate the seal seat with refrigerant oil (SUNISO 5GS or equivalent).

    NOTE:
    - Use only clean refrigerant oil.
    - Do not touch the sealing surface of the seal plate after lubricated.

16. First slide the seal seat into the compressor by hand as far as possible.

17. Press the seal seat with the grip side of the remover.

18. Install the circlip with its chamfered edge inside.

19. Press the circlip with the grip side of the remover, then install the felt seal.

20. Install the shim(s).

21. Install the pressure plate. Measure the clearance between the pulley and pressure plate all the way around. If the clearance is not within the specified limits, [0.4—0.6 mm (0.016—0.024)] shims must be added or removed as required.

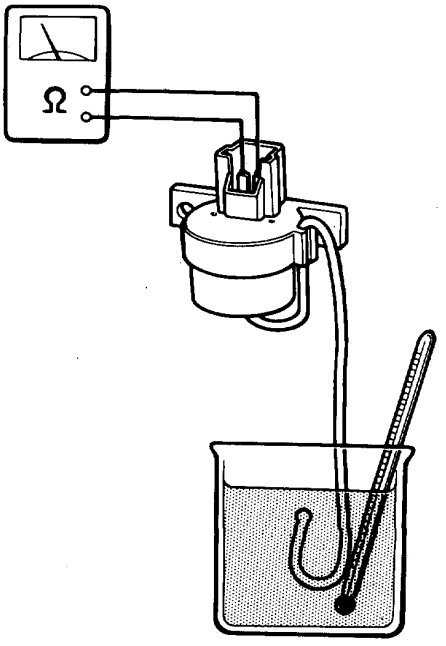
Test

A/C Thermostat

Dip A/C thermostat into a pan filled with ice water, and check for continuity between the terminals.

Cut off 1.5—-0.5°C (35—33°F)
Cut in 2.5—5°C (36—41°F)

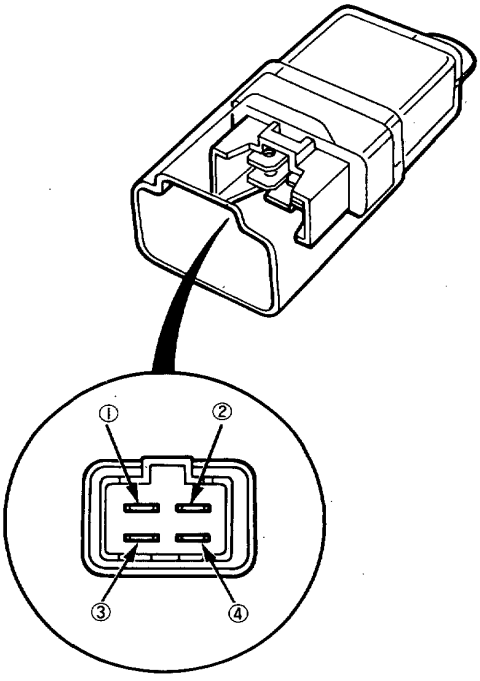
If cut off or cut in temperature is too low or too high, replace the thermostat switch.



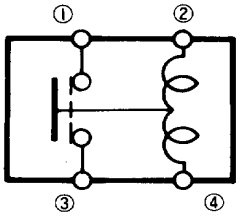
Relay

NOTE: All A/C system ralay are similar.

1. Check for continuity between terminals ① and ③.
2. Connect a 12 V battery across terminals ② and ④. There should be continuity between terminls ① and ③.



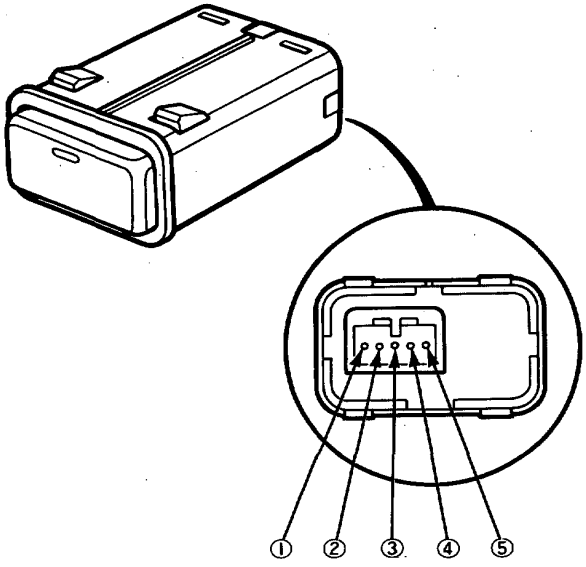
Relay circuit



A/C Switch

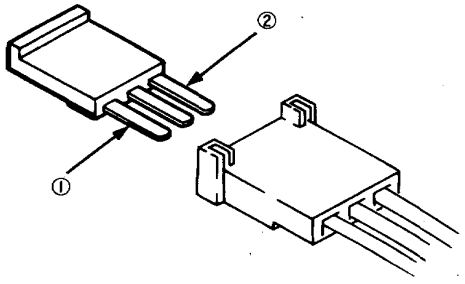
Check for continuity between the reminals according to the table.

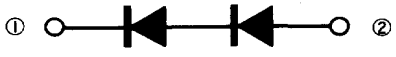
Terminal No. / Position	①	②	③	④	⑤
OFF	●	●	●	◀	●
ON	●	●		●	◀
			●		



Diodes

Check for continuity to ① from ② terminals.





* Diodes are taped with A/C harness.

Performance Test

The performance test will help determine if the air conditioning system is operating within specifications.

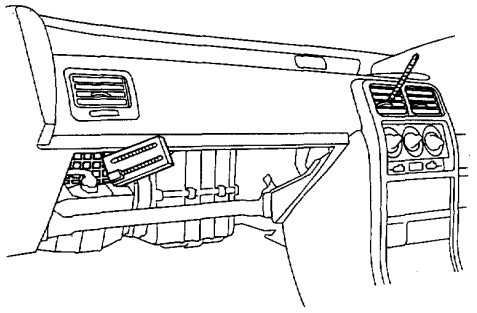
1. Connect the gauges as shown.

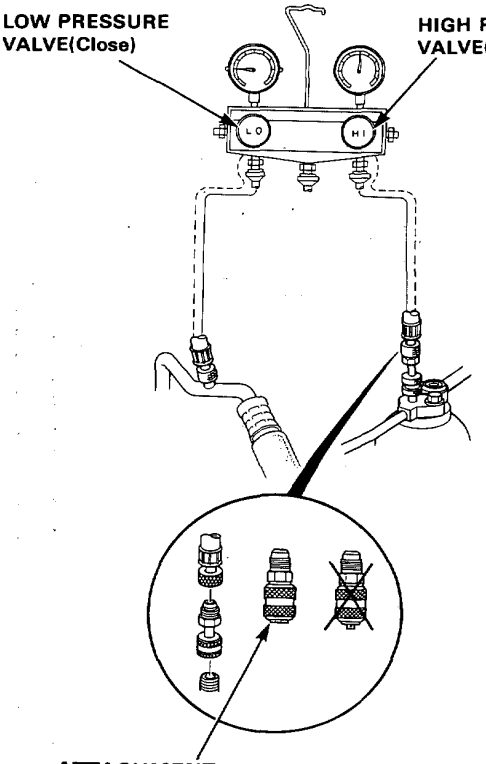
2. Insert a thermometer in the vent outlet. Determine the relative humidity and ambient air temperature by a portable weather station or calling the local weather station.

3. Test conditions:
   - Avoid direct sunlight.
   - Open engine hood.
   - Open front doors.
   - Set the temperature control dial to max and push the vent and fresh air buttons.
   - Turn the fan switch to MAX.
   - Run the engine at 1,500 RPM.
   - No driver or passengers in vehicle

4. After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the A/C gauges.

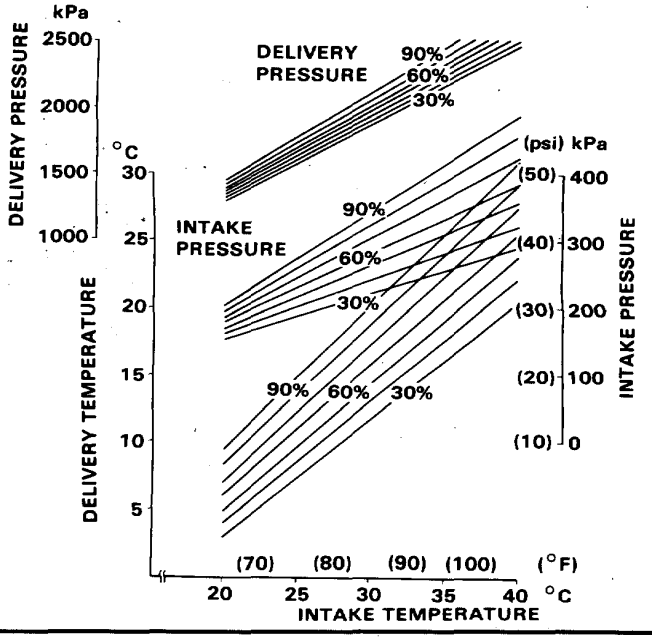
5. To complete the charts:
   - Make the delivery temperature along the vertical line.
   - Mark the intake temperature (ambient air temperature) aolng the bottom line.
   - Draw a line straight up from the air temperature to the humidity.
   - Mark a point one line above and one line below the humidity level.(10% above and 10% below the humidity level)
   - From each point, draw a horizontal line across to the delivery temperature.
   - The delivery temperature should fall between the two lines.
   - Complete the low side pressure test and high side pressure test in the same way.
   - Any measurements outside the line may indicate the need for further inspection.



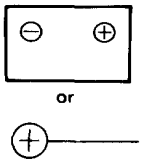
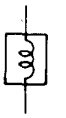
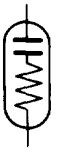
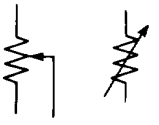
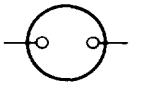


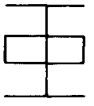
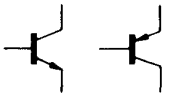
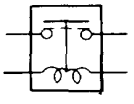
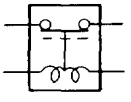
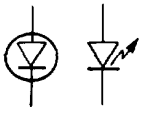
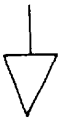
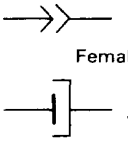
ATTACHMENT (COMMERCIALLY AVAILABLE)

NOTE:Set the attachment to the gauge hose at high pressure side first, then install the gauge set as shown.When disconnecting the gauge hose at high pressure side, remove the attachment from the high pressure charging valve.



Schematic Symbols

BATTERY	GROUND		FUSE	COIL, SOLENOID	CIGARETTE LIGHTER
	Ground terminal 	Component ground 			
RESISTOR	**VARIABLE RESISTOR**	**THERMISTOR**	**IGNITION SWITCH**	**BULB**	**HEATER**
					
MOTOR	**PUMP**	**CIRCUIT BREAKER**	**HORN**	**DIODE**	**SPEAKER, BUZZER**
					

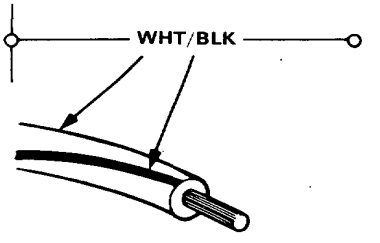
ANTENNA		TRANSISTOR (Tr)
Mast 	Window 	
RELAY (In normal condition)		**CONDENSER**
Normal open relay 	Normal closed relay 	
SWITCH (In normal condition)		**LUMINOUS DIODE (LED)**
Normal open switch 	Normal closed switch 	
CONNECTION	**CONNECTOR**	**REED SWITCH**
Input  Output 	 Male Female	

Wire Color Codes

The following abbreviations are used to identify wire colors in the circuit schematics.

WHT	White	SLT	SLATE
YEL	Yellow	PUP	RURPLE
BLK	Black		
BLU	Blue		
GRN	Green		
RED	Red		
ORN	Orange		
PNK	Pink		
BRN	Brown		
GRY	Gray		
LT BLU	Light Blue		
LT GRN	Light Green		

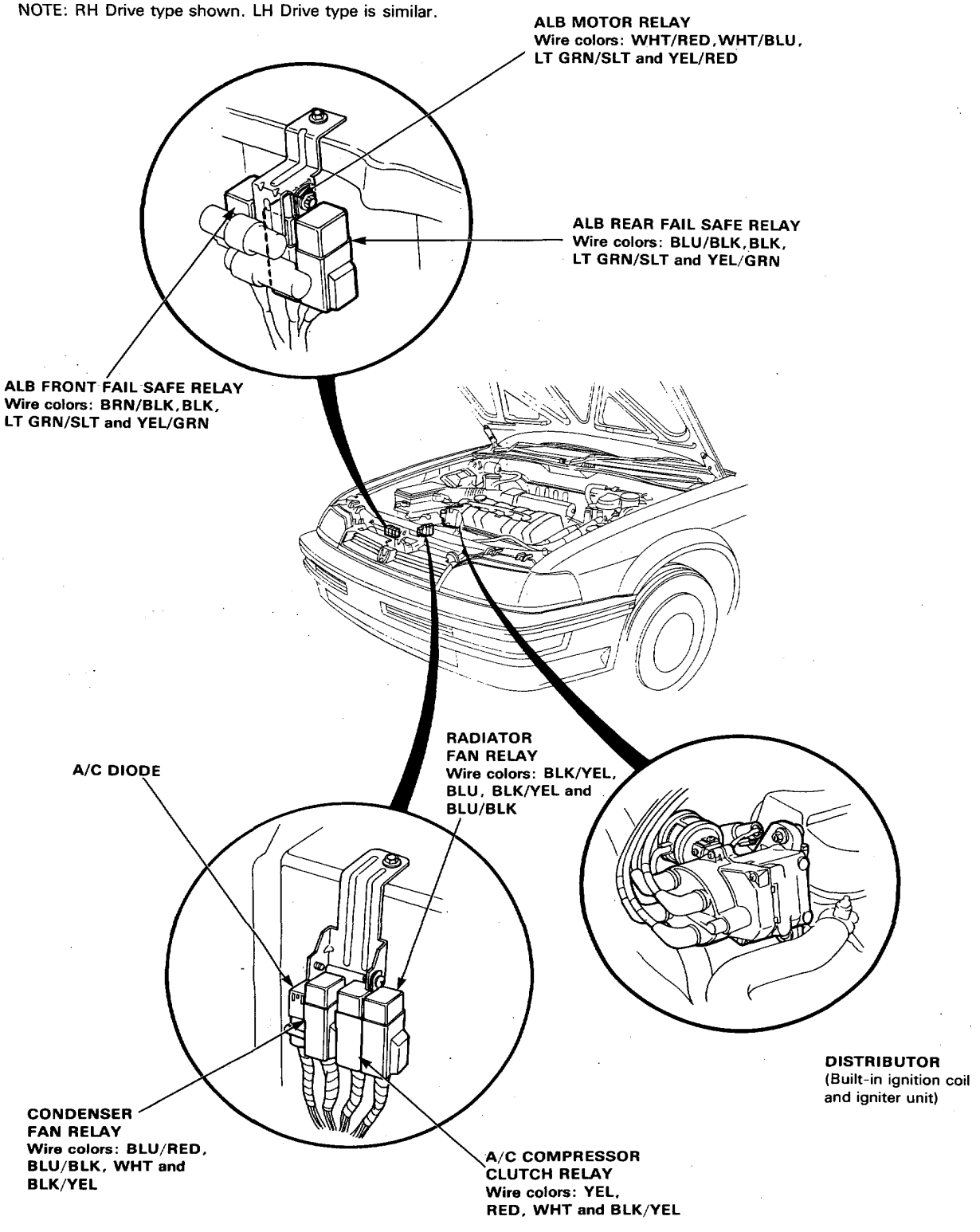
Wire insulator has one color or one color with another color stripe. The second color is the stripe.



Relays and Control Unit Locations

Engine Compartment

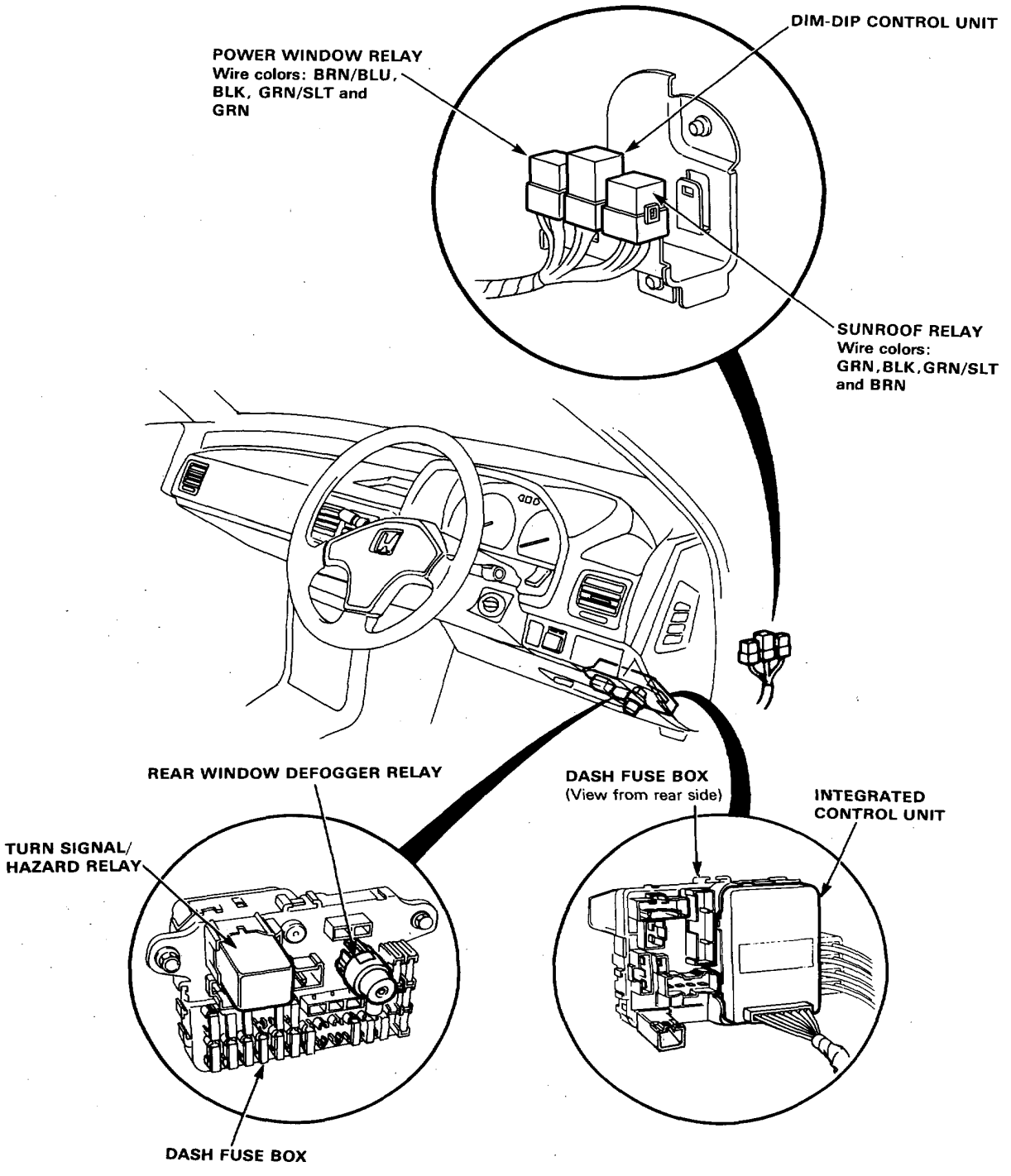
NOTE: RH Drive type shown. LH Drive type is similar.



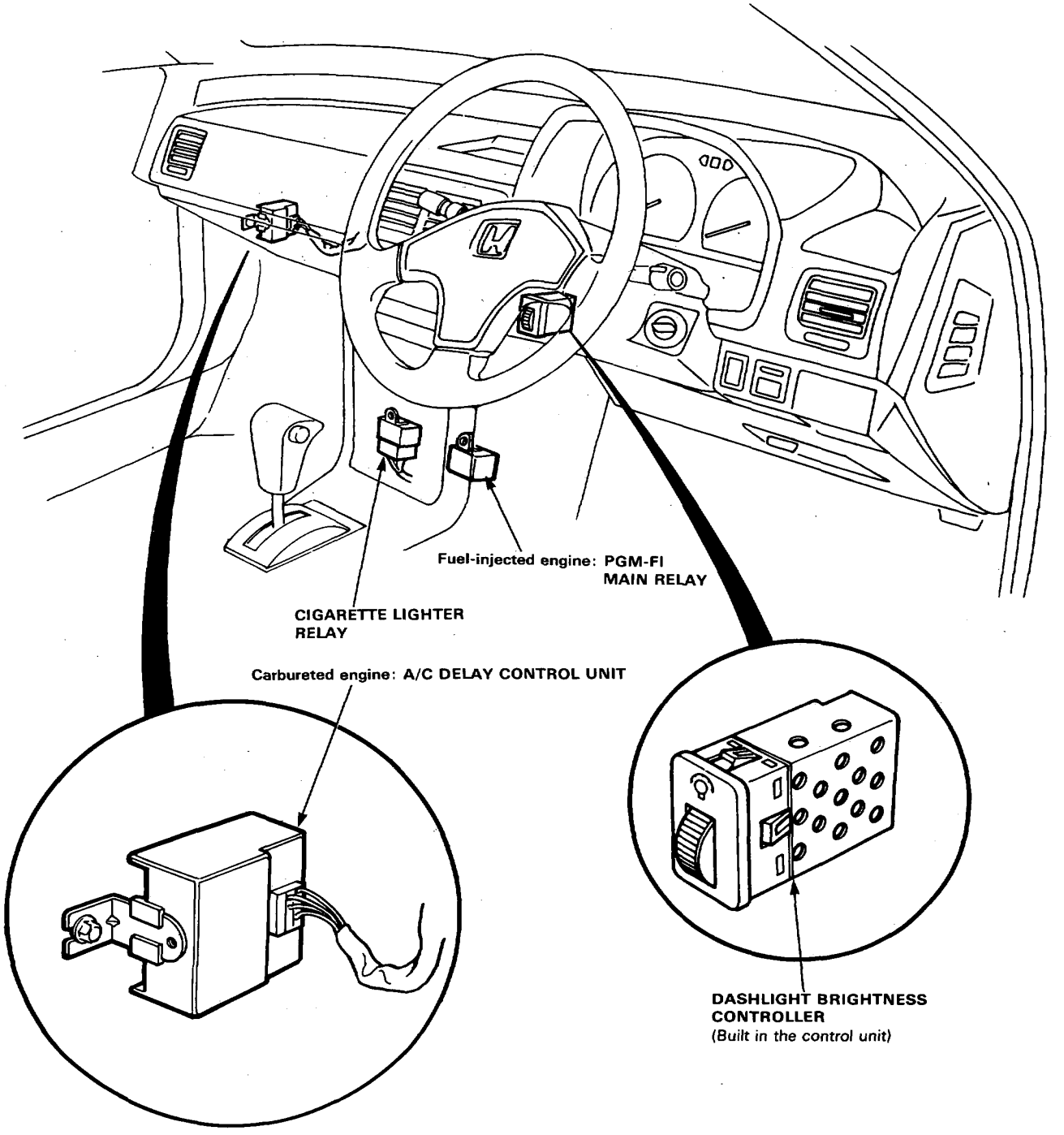
Relays and Control Unit Locations

Dashboard

NOTE: RH Drive type shown. LH Drive type is symmetrical to RH Drive type.

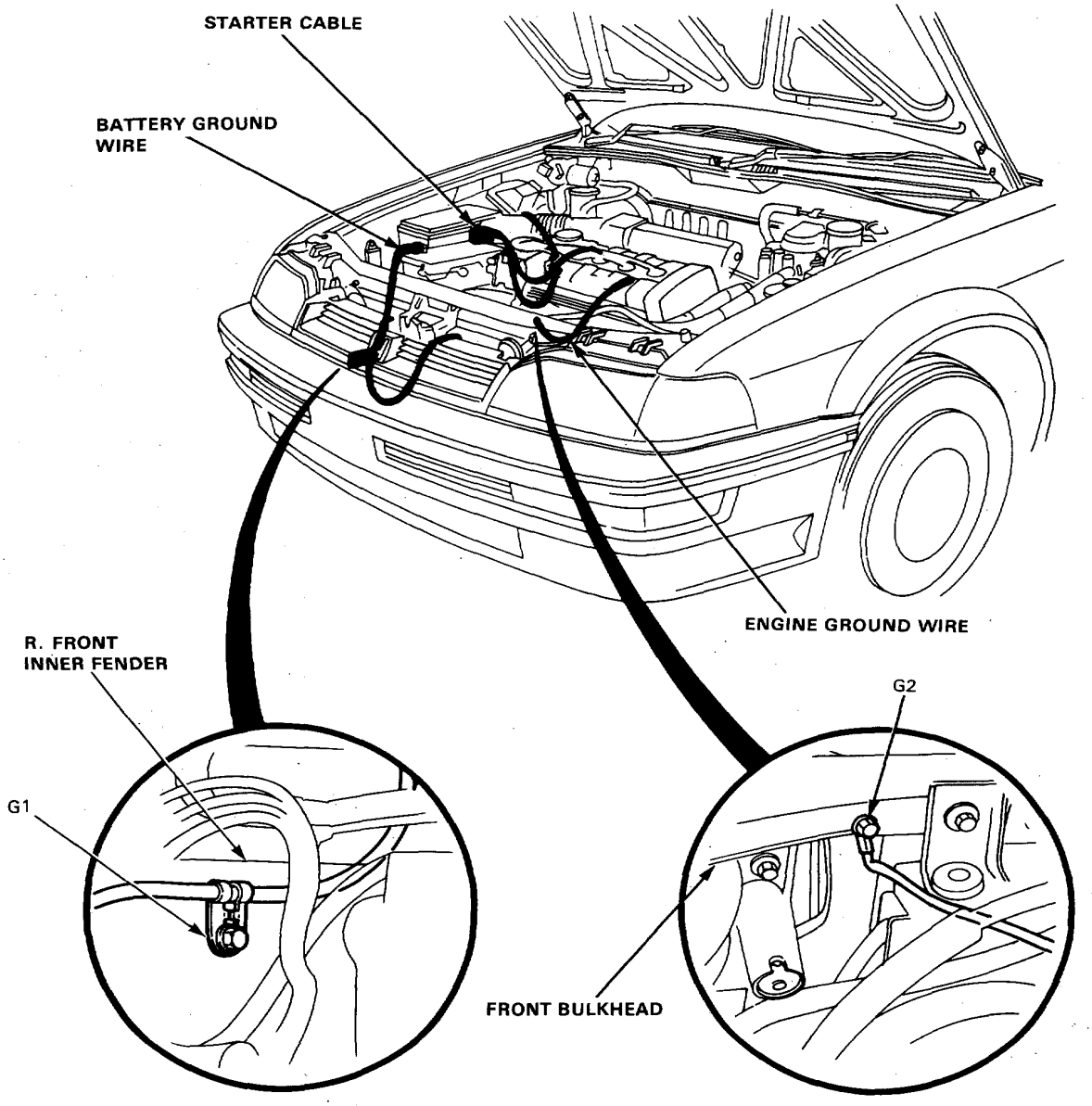


NOTE: RH Drive type shown. LH Drive type is symmetrical to RH Drive type.

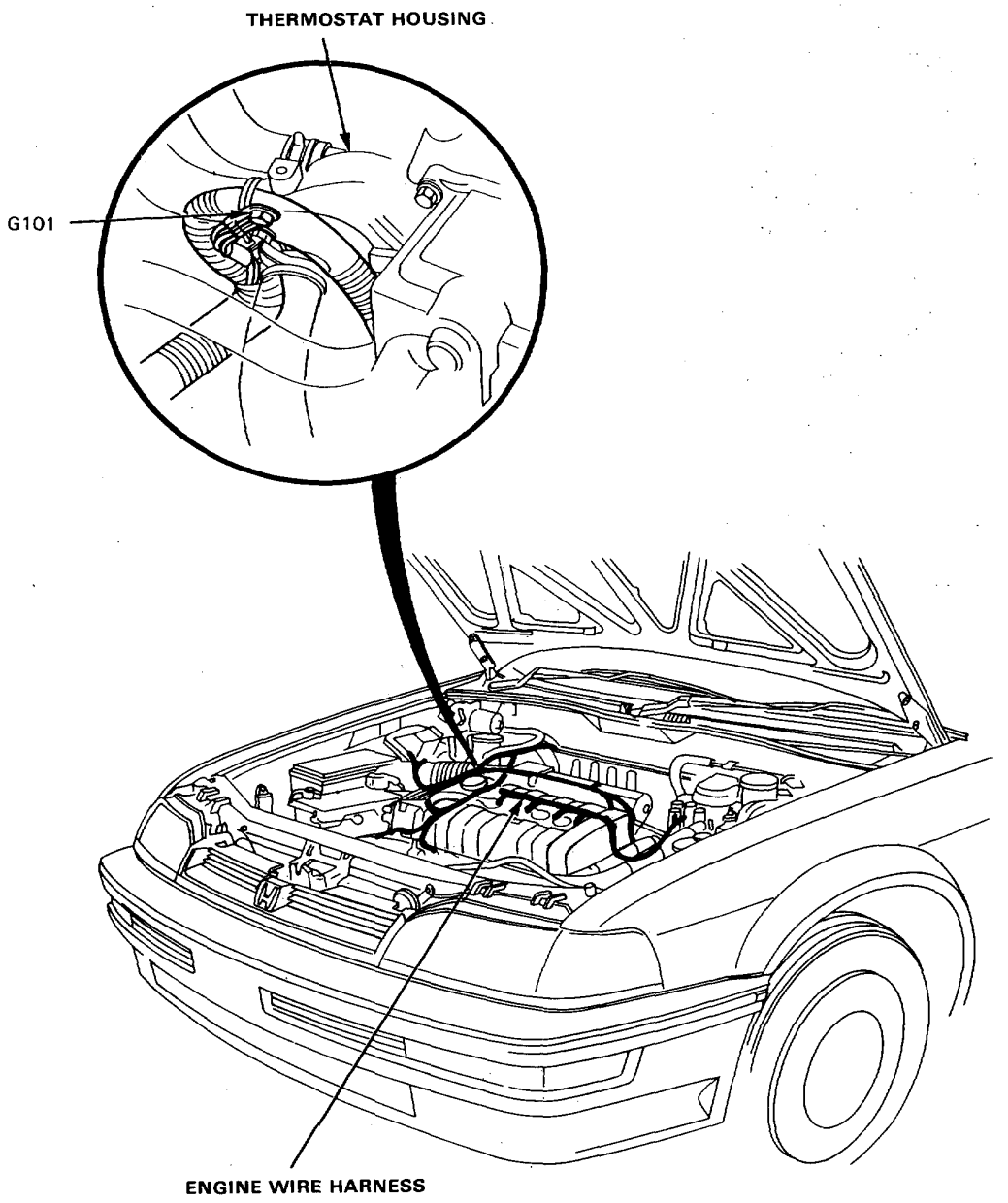


Ground and Wire Harness Routing

NOTE: RH Drive type shown. LH Drive type is similar.



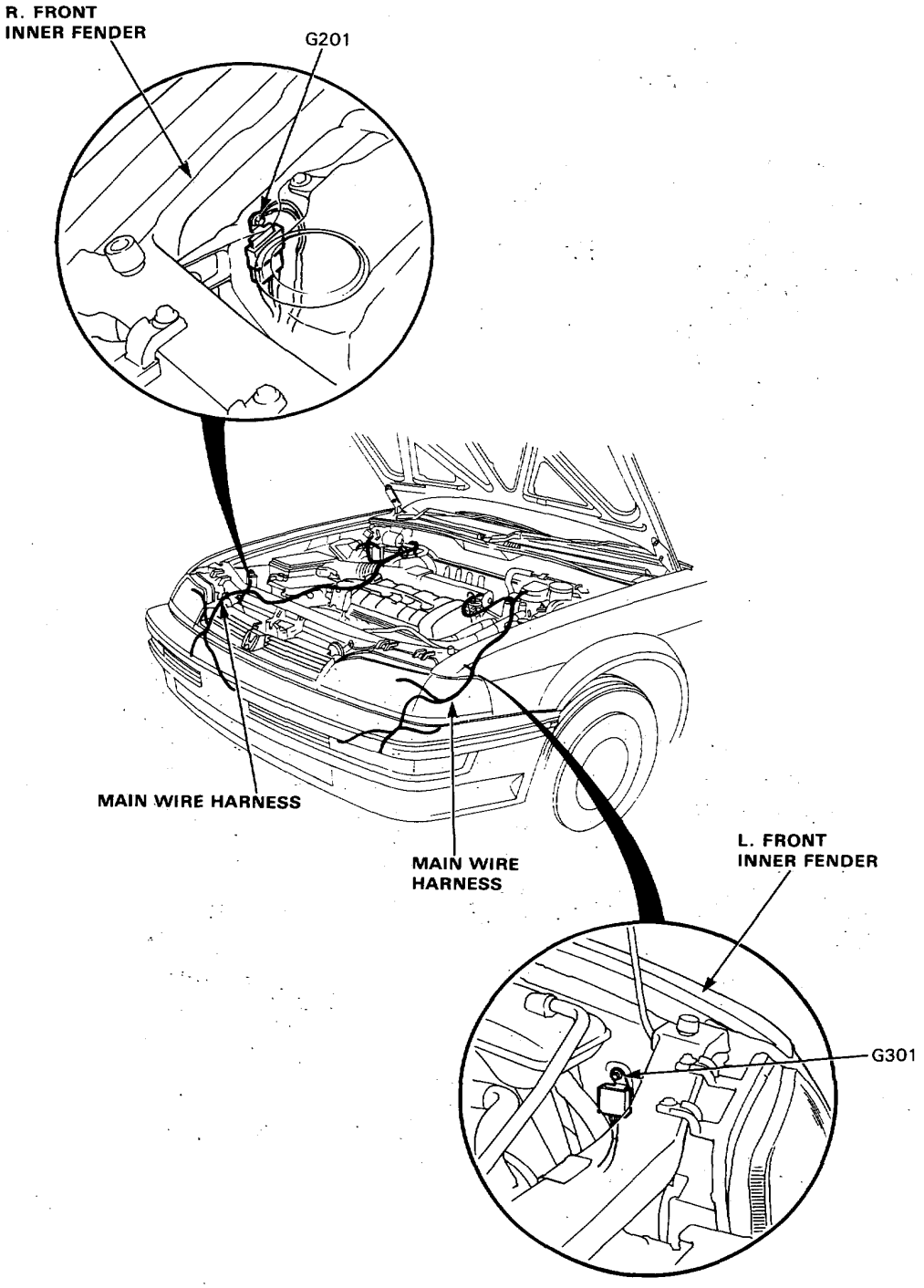
NOTE: RH Drive type shown. LH Drive type is similar.



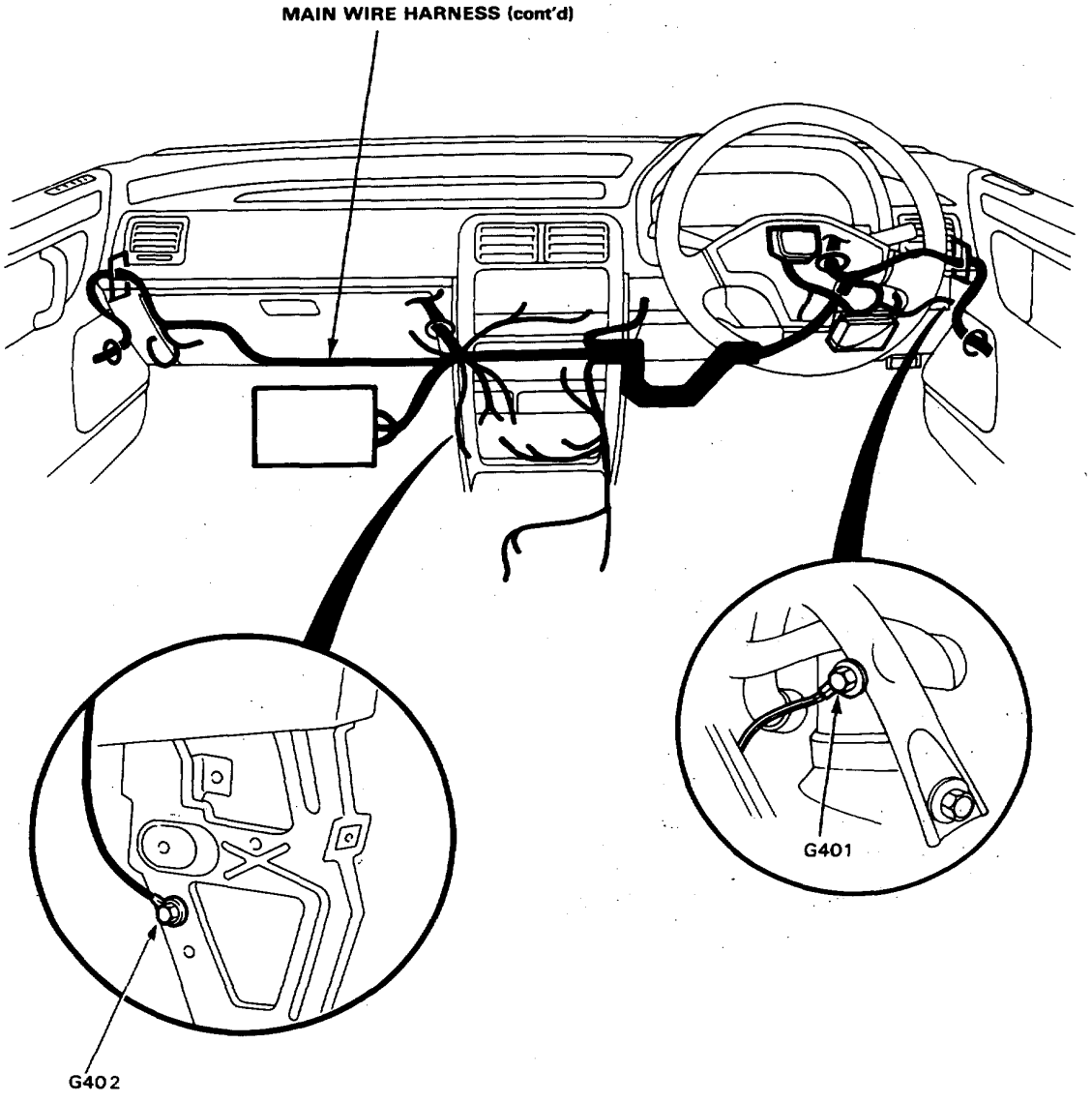
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Ground and Wire Harness Routing

NOTE: RH Drive type shown. LH Drive type is similar.



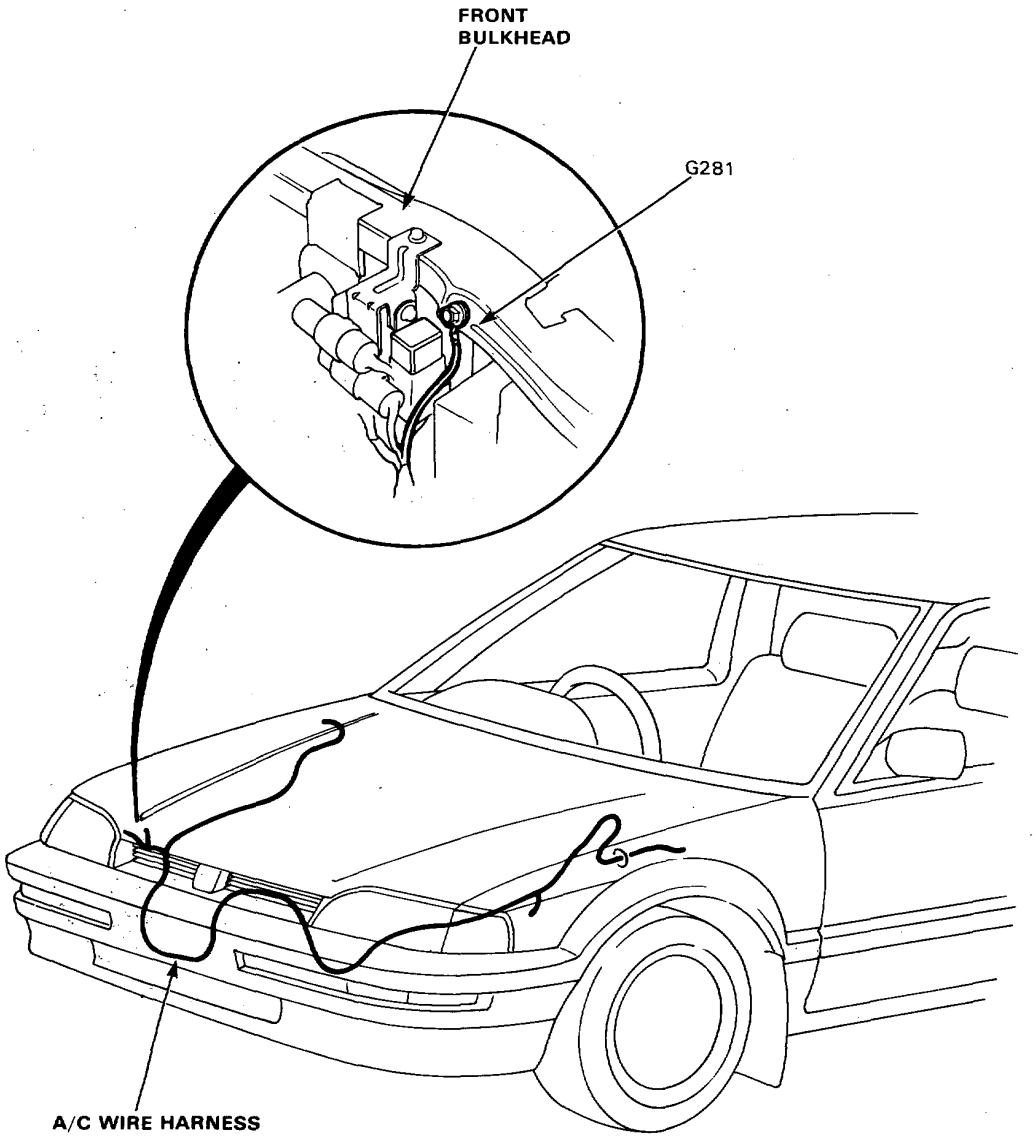
NOTE: RH Drive type shown. LH Drive type is symmetrical to RH Drive type.



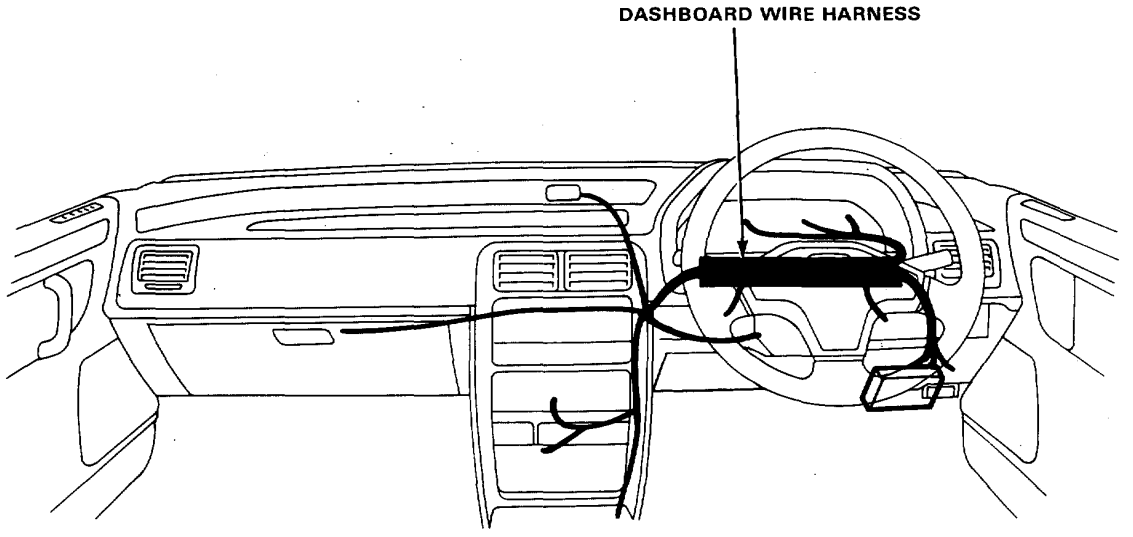
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Ground and Wire Harness Routing

NOTE: RH Drive type shown. LH Drive type is similar.



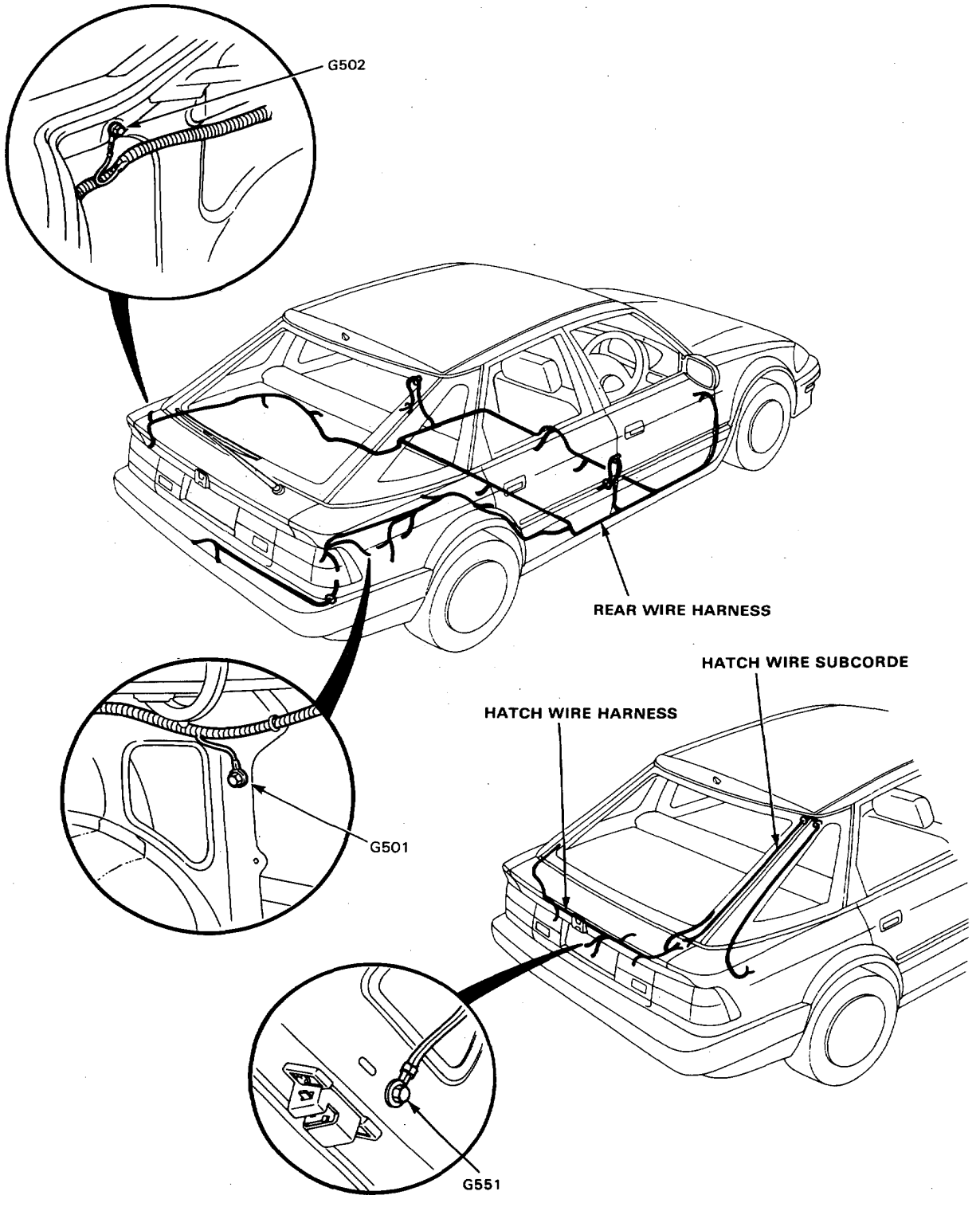
NOTE: RH Drive type shown. LH Drive type is symmetrical to RH Drive type.



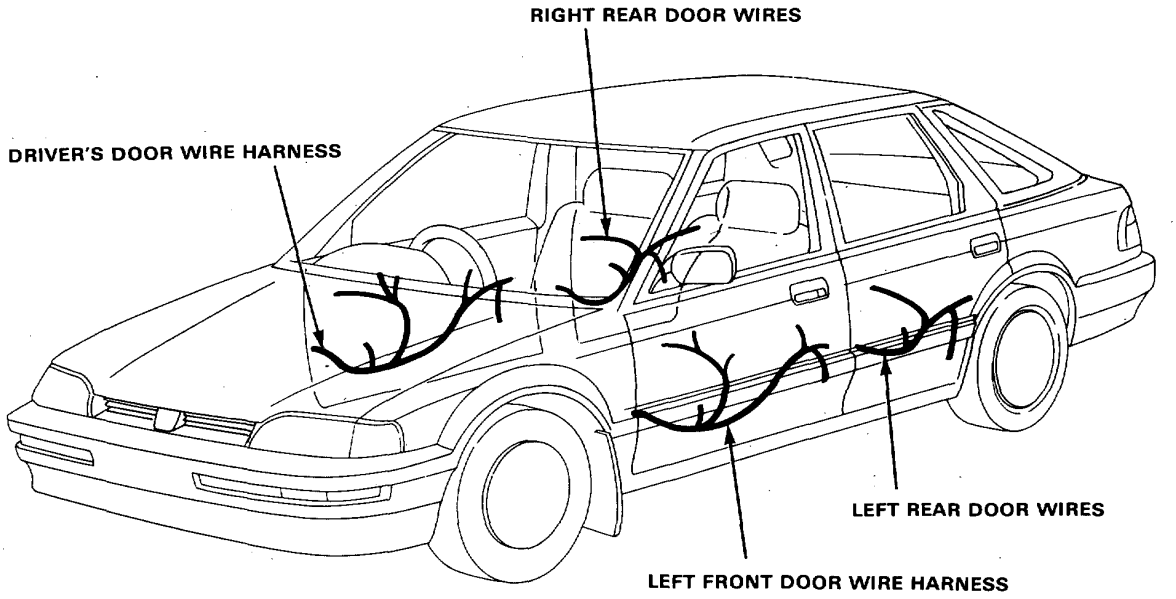
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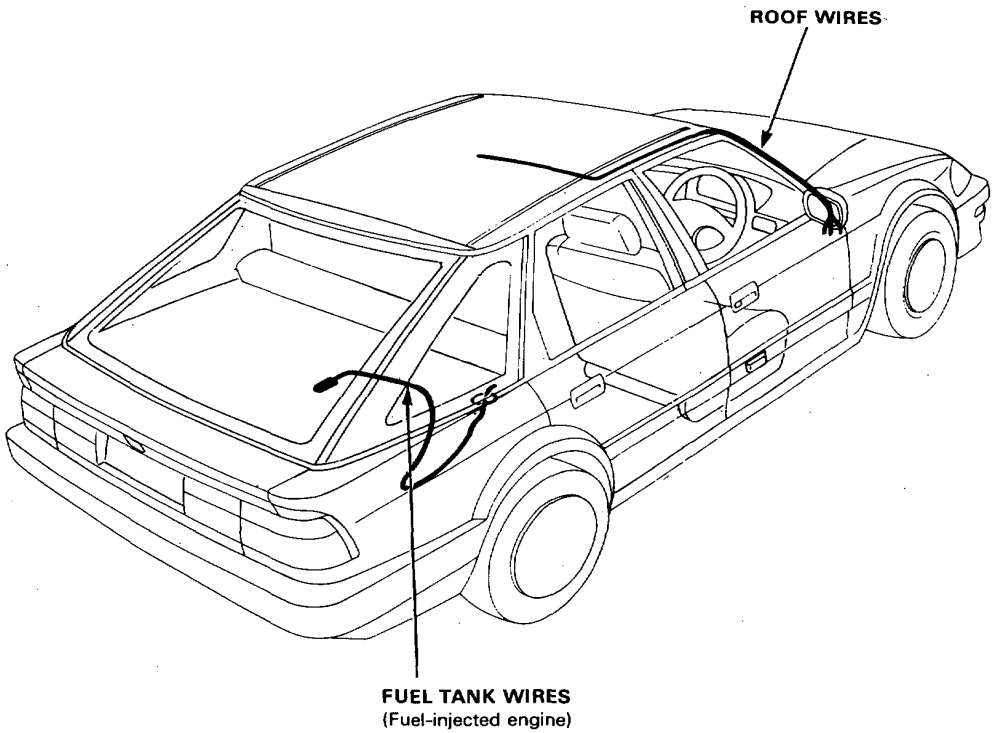
Ground and Wire Harness Routing

NOTE: RH Drive type shown. LH Drive type is similar.



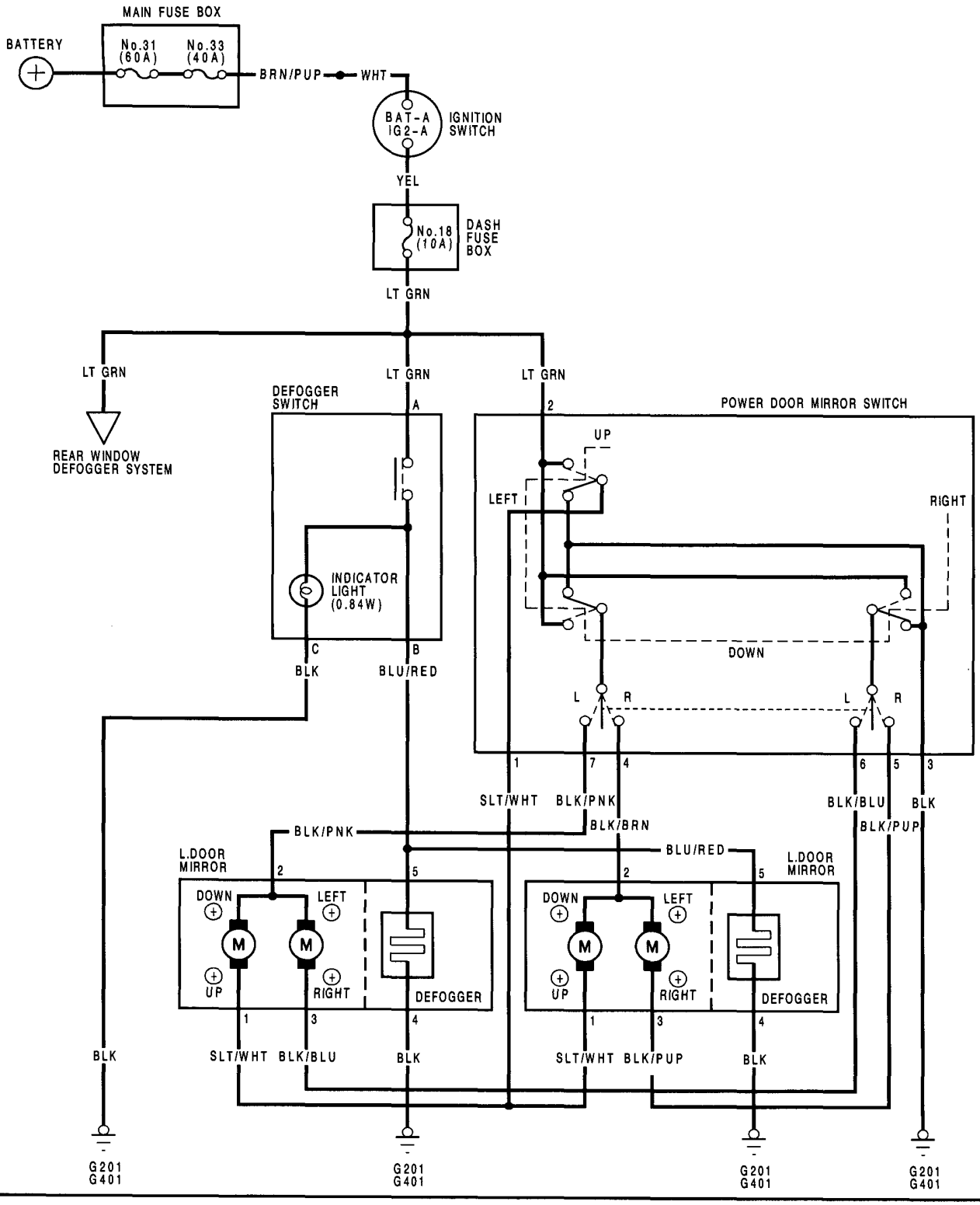
NOTE: RH Drive type shown. LH Drive type is similar.





Power Door Mirrors

Circit Diagram (with Defogger)

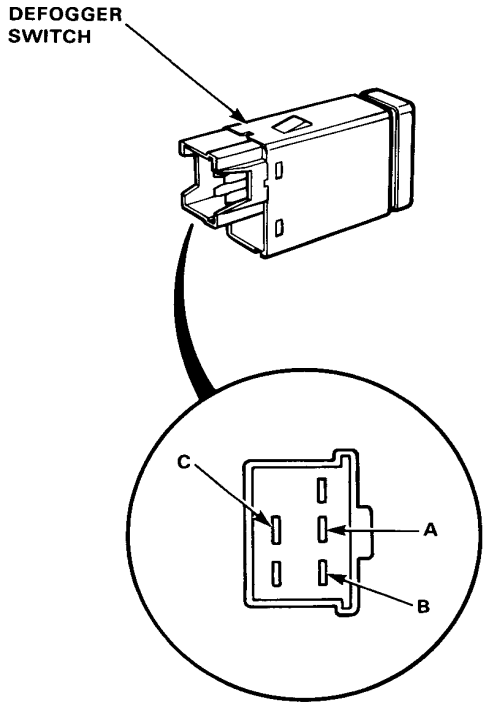


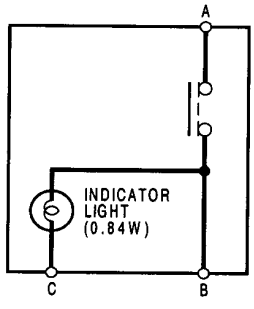
Power Door Mirrors

Switch Test

1. Remove the switch from the instrument panel.
2. Check for continuity between the terminals according to the table.

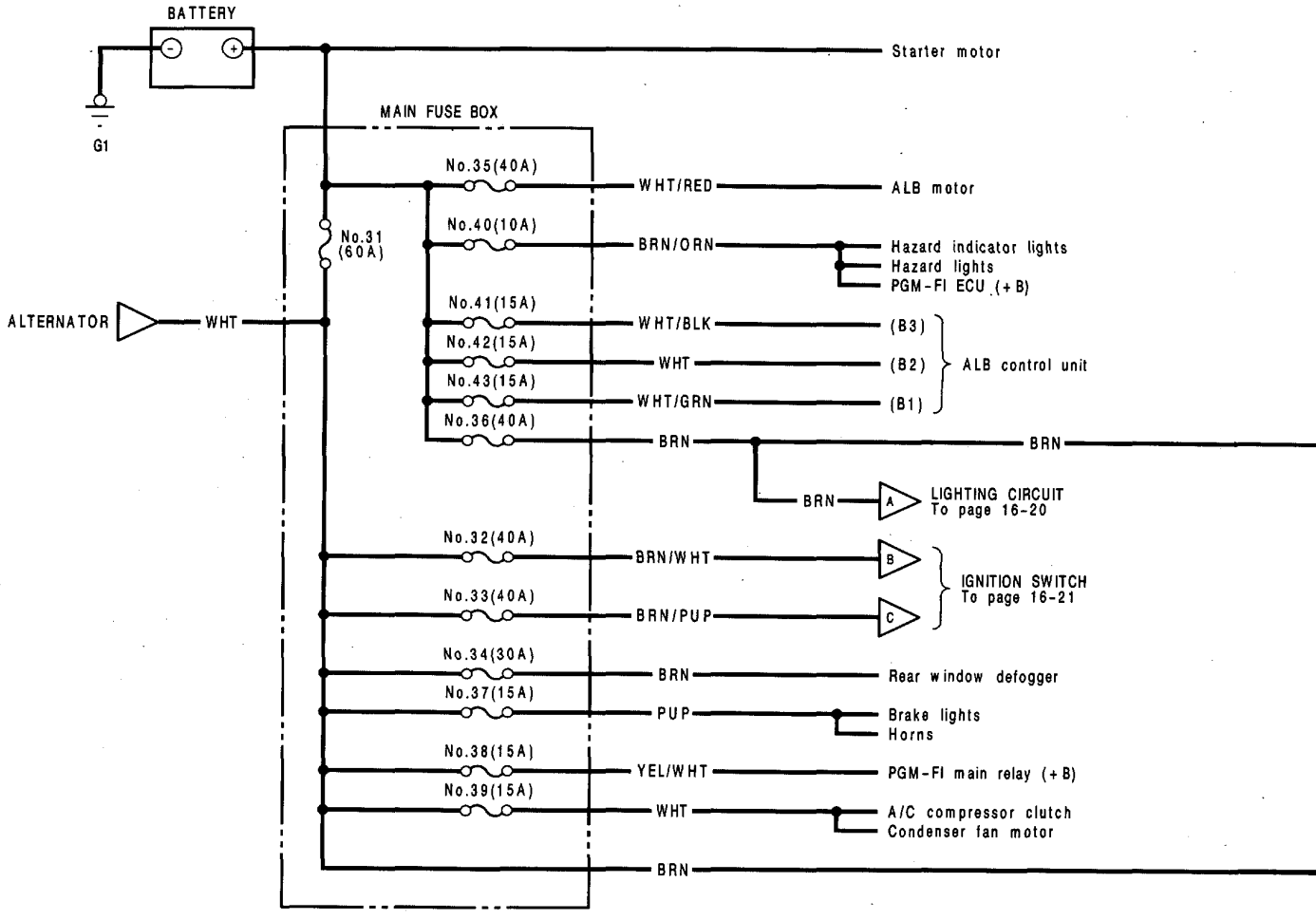
Terminal / Position	A	B		C
ON	○	○	⊖	○
OFF		○	⊖	○

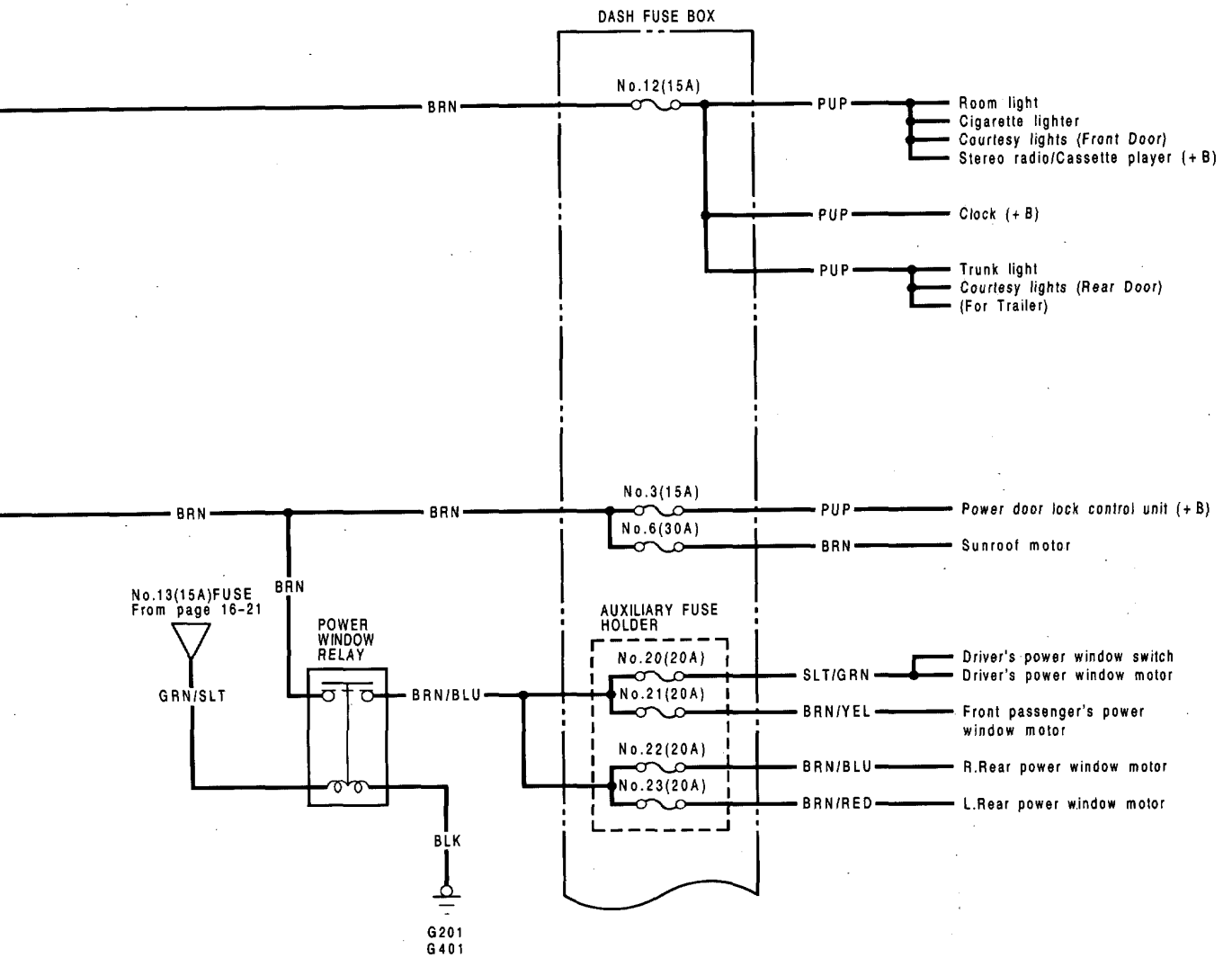




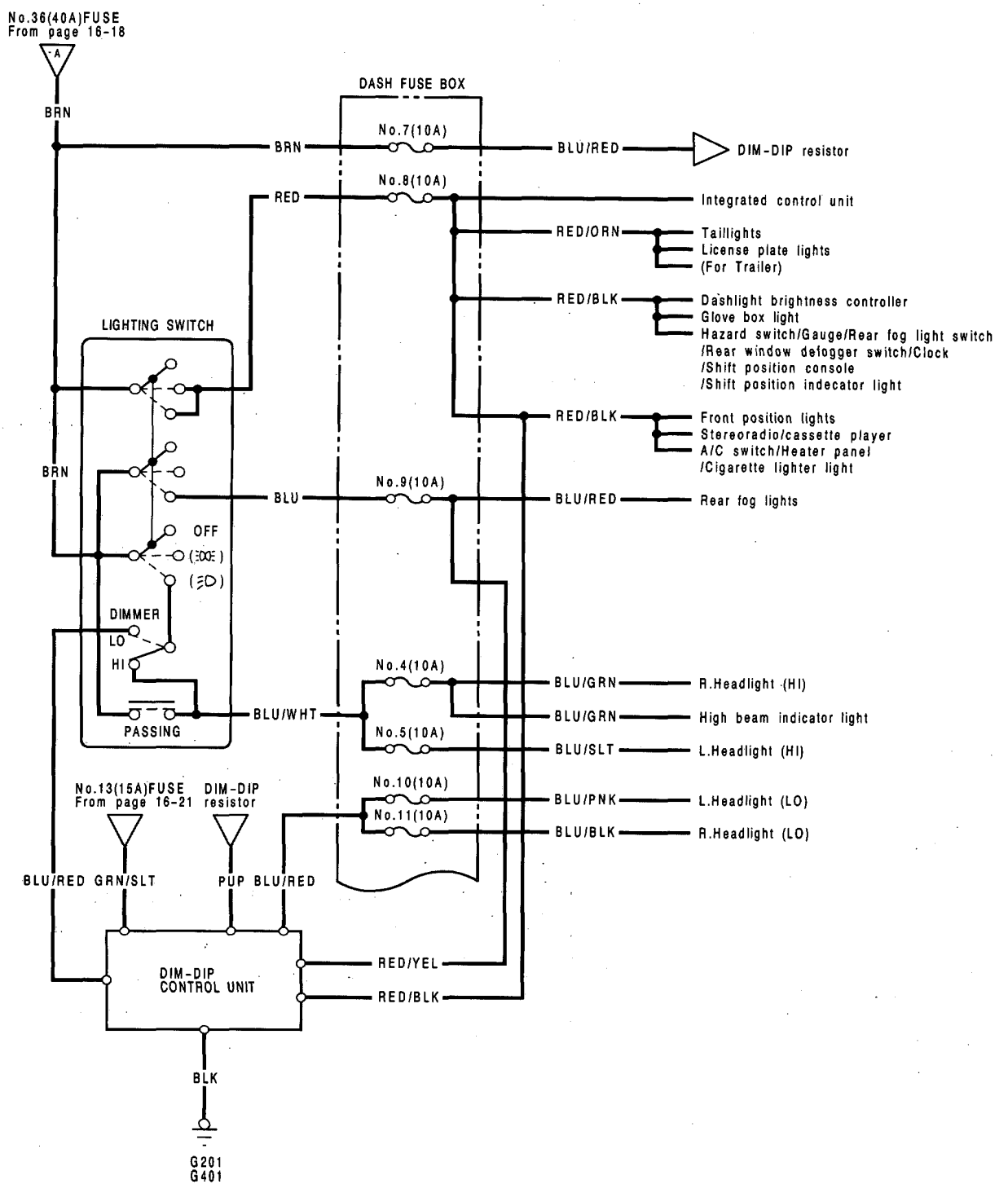
Power Distribution

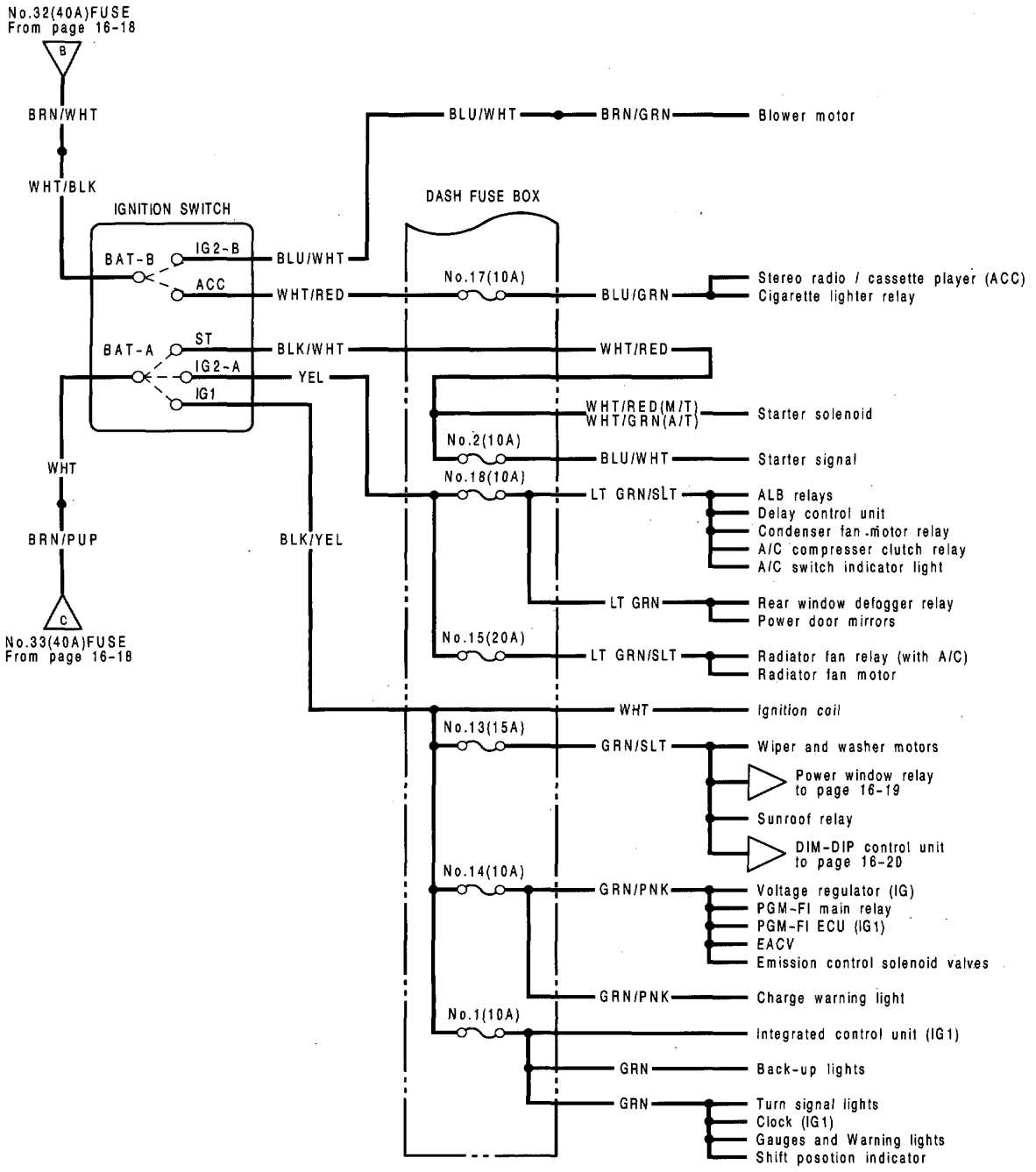
Circuit Identification




DASH FUSE BOX
No.12(15A)
BRN
PUP
Room light
Cigarette lighter
Courtesy lights (Front Door)
Stereo radio/Cassette player (+B)
PUP
Clock (+B)
PUP
Trunk light
Courtesy lights (Rear Door)
(For Trailer)
No.3(15A)
BRN
BRN
PUP
Power door lock control unit (+B)
No.6(30A)
BRN
Sunroof motor
No.13(15A)FUSE
From page 16-21
BRN
POWER
WINDOW
RELAY
GRN/SLT
BRN/BLU
AUXILIARY FUSE
HOLDER
No.20(20A)
SLT/GRN
Driver's power window switch
Driver's power window motor
No.21(20A)
BRN/YEL
Front passenger's power
window motor
No.22(20A)
BRN/BLU
R.Rear power window motor
No.23(20A)
BRN/RED
L.Rear power window motor
BLK
G201
G401

(cont'd)


No.36(40A)FUSE
From page 16-18
A
BRN
DASH FUSE BOX
No.7(10A)
BRN
BLU/RED
DIM-DIP resistor
No.8(10A)
RED
Integrated control unit
RED/ORN
Taillights
License plate lights
(For Trailer)
RED/BLK
Dashlight brightness controller
Glove box light
Hazard switch/Gauge/Rear fog light switch
/Rear window defogger switch/Clock
/Shift position console
/Shift position indecator light
LIGHTING SWITCH
RED/BLK
Front position lights
Stereoradio/cassette player
A/C switch/Heater panel
/Cigarette lighter light
BRN
No.9(10A)
BLU
BLU/RED
Rear fog lights
OFF
DIMMER
LO
HI
No.4(10A)
BLU/GRN
R.Headlight (HI)
BLU/GRN
High beam indicator light
BLU/WHT
PASSING
No.5(10A)
BLU/SLT
L.Headlight (HI)
No.13(15A)FUSE
From page 16-21
DIM-DIP
resistor
No.10(10A)
BLU/PNK
L.Headlight (LO)
No.11(10A)
BLU/BLK
R.Headlight (LO)
BLU/RED
GRN/SLT
PUP
BLU/RED
DIM-DIP
CONTROL UNIT
RED/YEL
RED/BLK
BLK
G201
G401

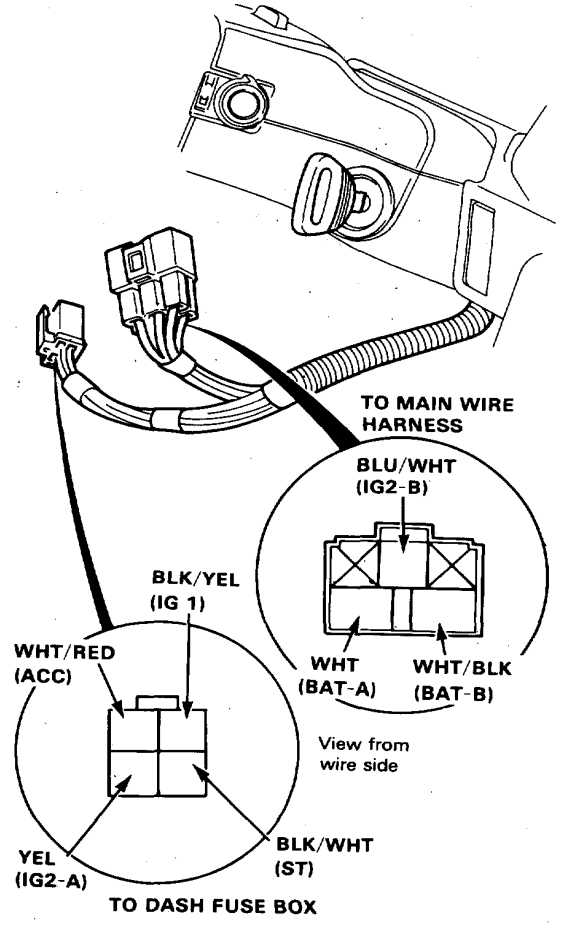

No.32(40A)FUSE
From page 16-18
B
BRN/WHT
WHT/BLK
IGNITION SWITCH
BAT-B
IG2-B
ACC
BAT-A
ST
IG2-A
IG1
BLU/WHT
WHT/RED
BLK/WHT
YEL
WHT
BRN/PUP
C
No.33(40A)FUSE
From page 16-18
BLK/YEL
DASH FUSE BOX
BLU/WHT
BRN/GRN
Blower motor
No.17(10A)
BLU/GRN
Stereo radio / cassette player (ACC)
Cigarette lighter relay
WHT/RED
WHT/RED(M/T)
WHT/GRN(A/T)
Starter solenoid
No.2(10A)
BLU/WHT
Starter signal
No.18(10A)
LT GRN/SLT
ALB relays
Delay control unit
Condenser fan motor relay
A/C compresser clutch relay
A/C switch indicator light
LT GRN
Rear window defogger relay
Power door mirrors
No.15(20A)
LT GRN/SLT
Radiator fan relay (with A/C)
Radiator fan motor
WHT
Ignition coil
No.13(15A)
GRN/SLT
Wiper and washer motors
Power window relay
to page 16-19
Sunroof relay
DIM-DIP control unit
to page 16-20
No.14(10A)
GRN/PNK
Voltage regulator (IG)
PGM-FI main relay
PGM-FI ECU (IG1)
EACV
Emission control solenoid valves
GRN/PNK
Charge warning light
No.1(10A)
Integrated control unit (IG1)
GRN
Back-up lights
GRN
Turn signal lights
Clock (IG1)
Gauges and Warning lights
Shift posotion indicator

Ignition Switch

Test

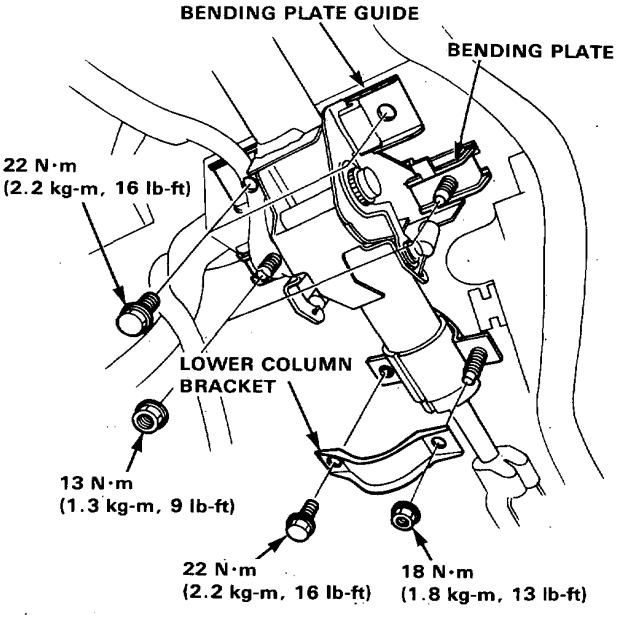
1. Remove the dashboard lower panel.
2. Disconnect the 4-P connector from the dash fuse box and 5-P connector from the main wire harness.
3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	WHT/RED (ACC)	WHT/BLK (BAT-B)	BLU/WHT (IG2-B)	WHT (BAT-A)	BLK/YEL (IG 1)	YEL (IG2-A)	BLK/WHT (ST)
0							
I	○—○						
II	○—○	○		○—○	○	○	
III				○—○	○		○

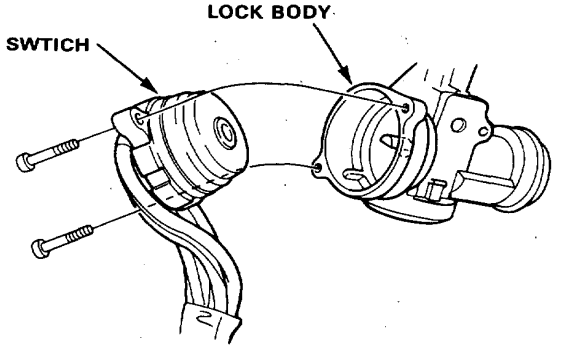


Electrical Switch Replacement

1. Remove the steering wheel, thern remove the steering column covers.
2. Remove the dashboard lower panel.
3. Remove the lower column bracket.
4. Remove the nuts attaching the bending plate guide and bending plate.

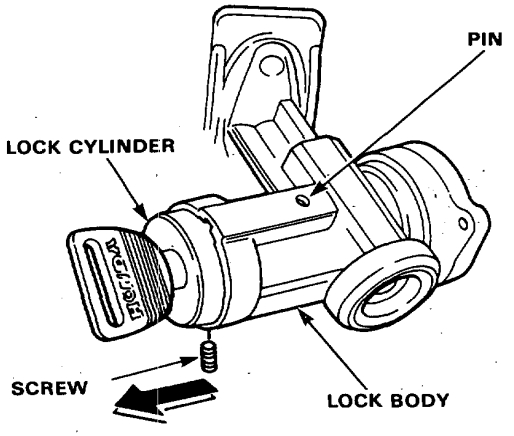


5. Disconnect the 4-P connector from the dash fuse box and 5-P connector from the main wire harness.
6. Insert the key and turn it to "0."
7. Remove the 2 screws and replace the base of the switch.

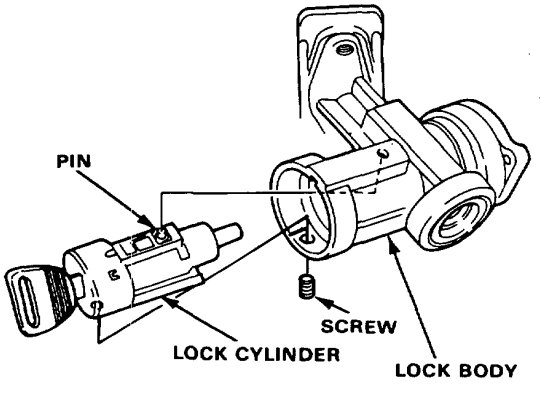


Lock Cylinder Replacement

1. Remove the dashboard lower panel.
2. Remove the steering wheel, then remove the steering column covers.
3. Turn the ignition key to "I".
4. Remove the screw from the lock body.
5. Push the pin in and remove the lock cylinder from the lock body.



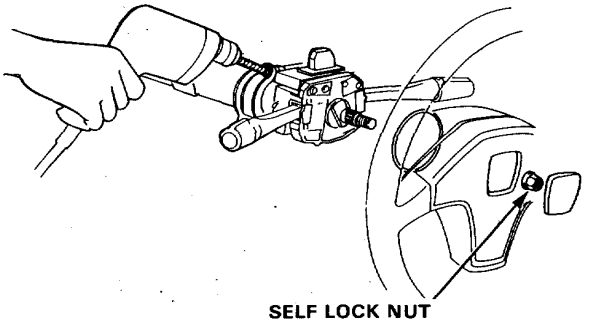
6. Turn the key to "0" and align the lock cylinder with the lock body.
7. Turn the key almost to "I" and insert the lock cylinder until the pin touches the body.
8. Turn the key to the "I", push the pin and insert the lock body cylinder into the lock until the pin clicks into place.
9. Install the screw to the lock body.



Steering Lock Replacement

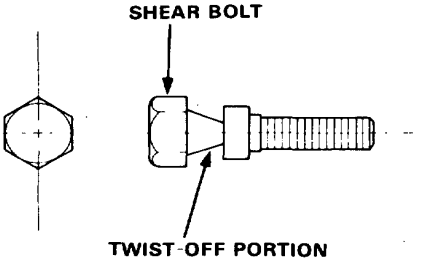
1. Remove the dashboard lower panel.
2. Remove the steering wheel, then remove the steering column covers.
3. Remove the lower column bracket.
4. Remove the nuts attaching the bending plate guide and bending plate. (see page: 16-26)
5. Center punch each of the 2 shear bolts and drill their heads off with a 3/16 in. drill bit.

   CAUTION: Do not damage the switch body when removing the shear heads.
6. Remove the shear bolts from the swtich body.



7. Install the new ignition switch without the key inserted.
8. Loosely tighten the new shear bolts.

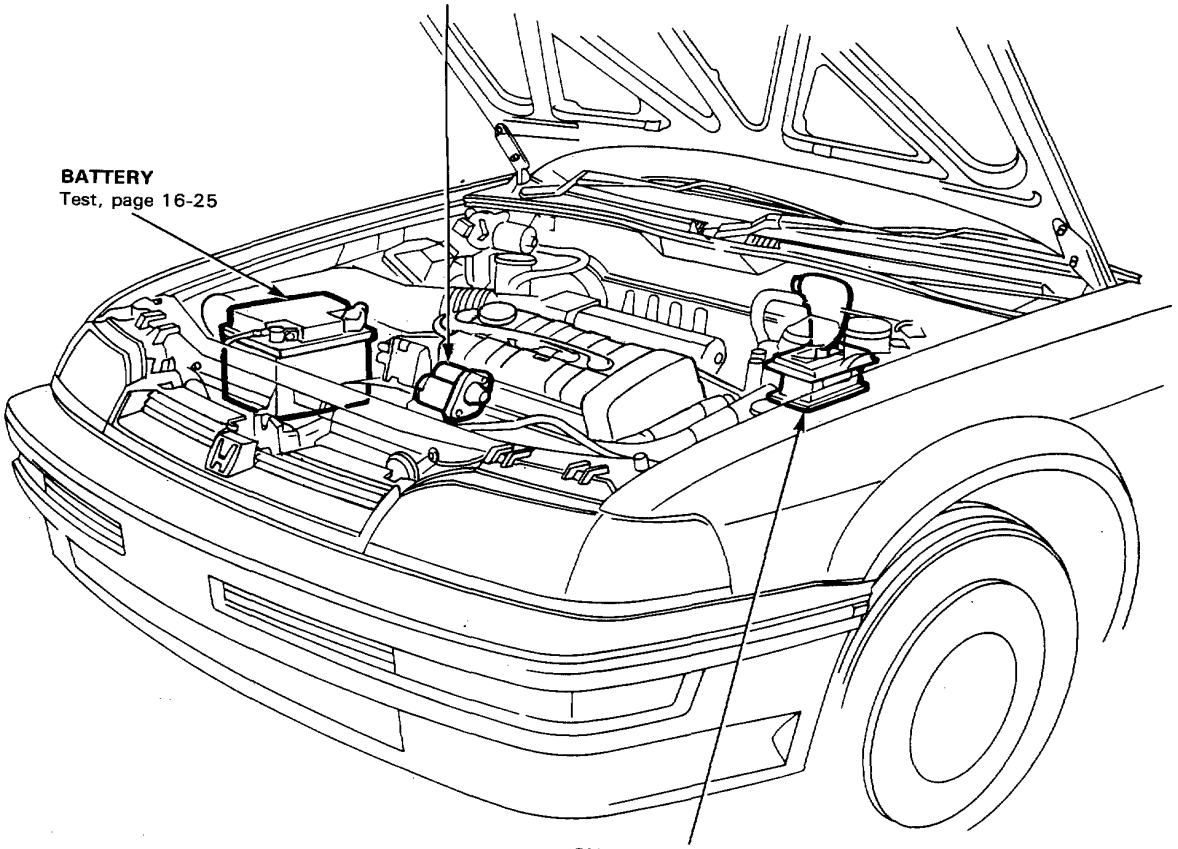
   NOTE: Make sure the projection on the ignition switch is aligned with the hole in the steering column.
9. Insert the ignition key and check for proper operation of the steering wheel lock and that ignition key turns freely.
10. Tighten the shear bolts until the hex heads twist off.



Component Location Index

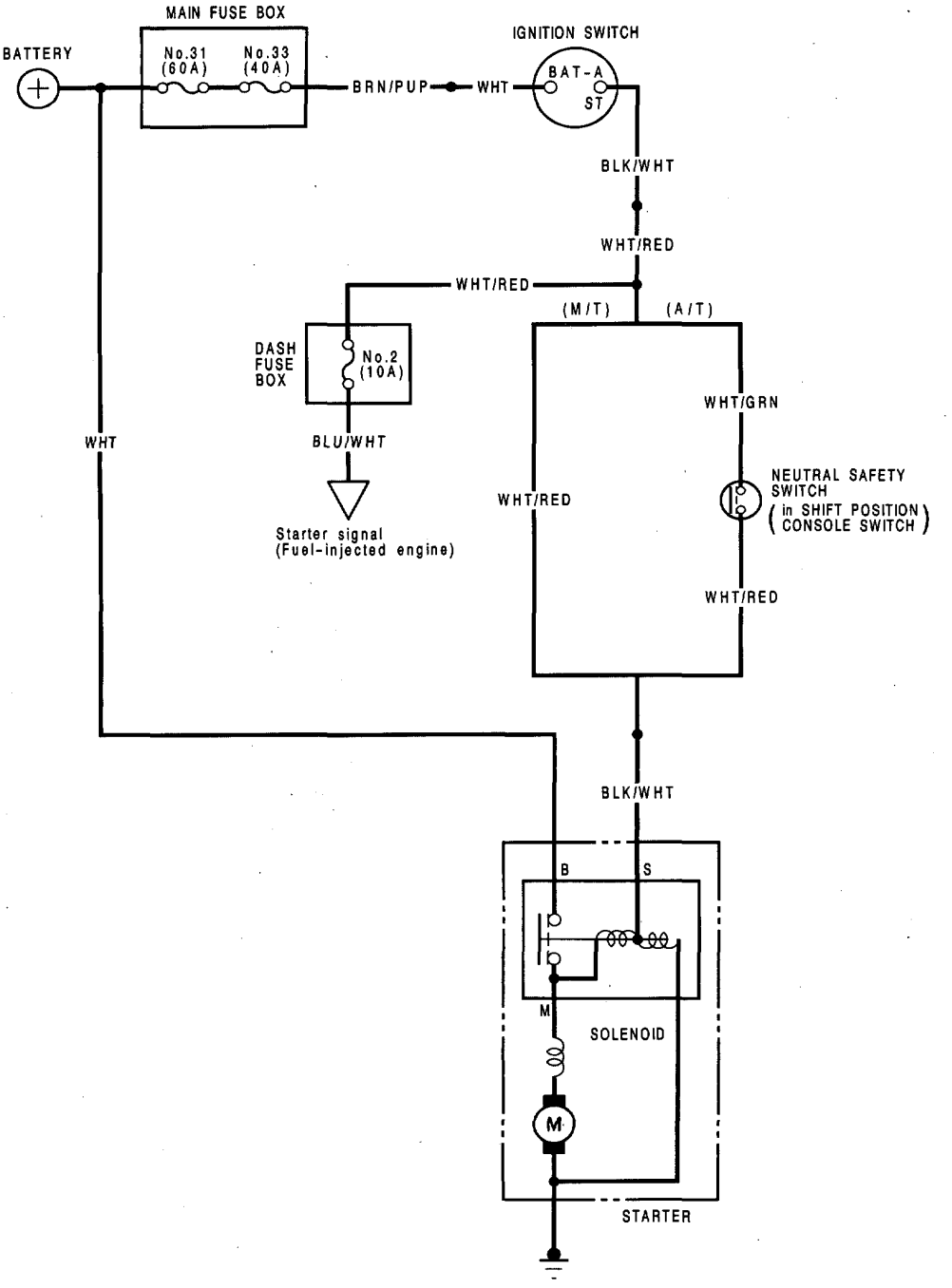
STARTER
Test, page 16-30
Solenoid Test, page 16-32
Replacement, page 16-33
Overhaul, page 16-34
Reassembly, page 16-42

BATTERY
Test, page 16-25



SHIFT POSITION CONSOLE SWITCH (NEUTRAL SAFETY SWITCH) (A/T only)
Test, page 16-98
Replacement, page 16-98

Circuit Diagram



Starter Test

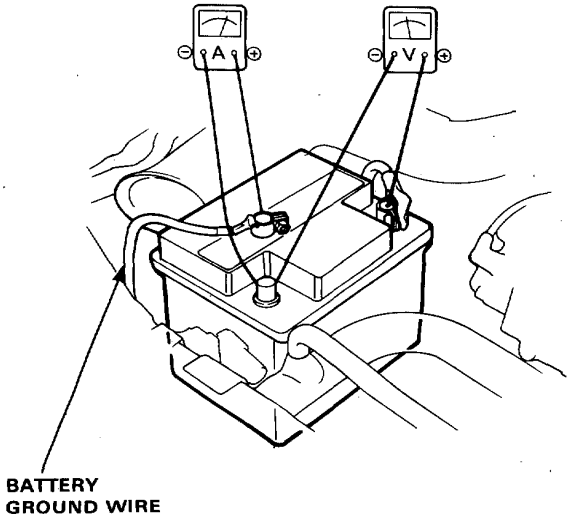
NOTE: The air temperature must be between 15 and 38°C (59 and 100°F) before testing.

Recommended Procedure :

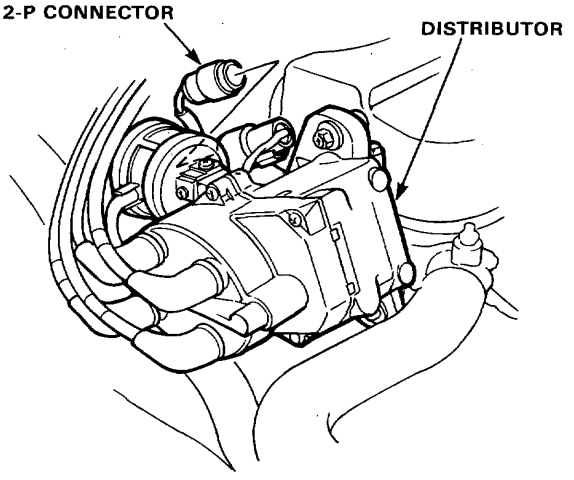
Use a starter system tester.
Connect and operate the equipment in accordance with manufacturer's instructions.
Test and troubleshoot as described.

Alternate Procedure :

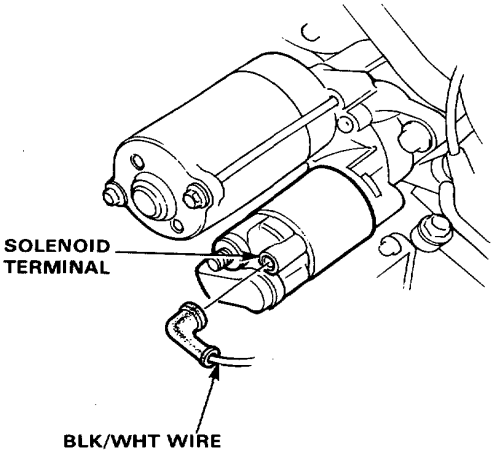
- Use the following equipment :
  — Ammeter, 0-400 A
  — Voltmeter, 0-20 V (accurate within 0.1 volt)
  — Tachometer, 0-1200 rpm
- Hook up voltmeter and ammeter as shown.



1. Disconnect the 2-P connector (Ignition coil primary lead) from the distributor.



2. Check the starter engagement :
   Turn the ignition switch to "Start". The starter should crank the engine.
   - If the starter does not crank the engine, check the battery, battery positive wire and ground, and the wire connections for looseness or corrosion.
   - Test again.
     If the starter still does not crank the engine, bypass the ignition switch circuit as follows :
     Unplug the connector (BLK/WHT wire) from the starter. Connect a jumper wire from the battery positive (+) terminal to the solenoid terminal. The starter should crank the engine.



— If the starter still does not crank the engine, remove the starter and diagnose its internal problems.

— If the starter cranks the engine, check for an open in the BLK/WHT wire circuit between the starter and ignition switch, and connectors. Check the ignition switch. On cars with automatic transmission, check the shift position console switch (neutral safety switch) and connector.

3. Check for wear or damage :
The starter should crank the engine smoothly and steadily.

If the starter engages, but cranks the engine erratically, remove the starter motor. Inspect the starter, drive gear, and flywheel ring gear for damage.
Check the drive gear overrunning clutch for binding or slipping when the armature is rotated with the drive gear held. Replace the gears if damaged.

4. Check cranking voltage and current draw,
Voltage should be no less than specified below :
1.2kw and 1.4kw : 8 volts
1.0kw : 8.5 volts
Current should be no greater than specified below :
1.0kw : 230 amperes
1.2kw : } 350 amperes
1.4kw : }

If voltage is too low, or current draw too high, check for :

- Battery fully charged.
- Open circuit in starter armature commutator segments.
- Starter armature dragging.
- Should armature winding.
- Excessive drag in engine.

5. Check cranking min^{-1} (rpm) :
Engine speed during cranking should be above 100 min^{-1} (rpm).

- Loose battery or starter terminals.
- Excessively worn starter brushes.
- Open circuit in commutator segments.
- Dirty or damaged helical spline or drive gear.
- Defective drive gear overrunning clutch.

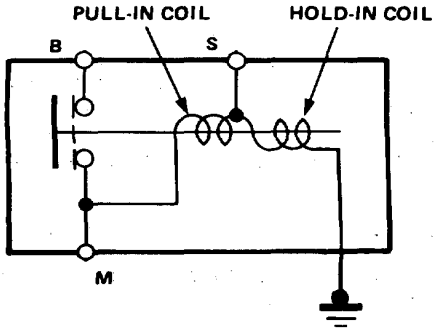
6. Check the starter disengagement :
Turn the ignition switch to "Start" and release to "Run." The starter drive gear should disengage from the flywheel ring gear.

If the drive gear hangs up on the flywheel ring gear, check :

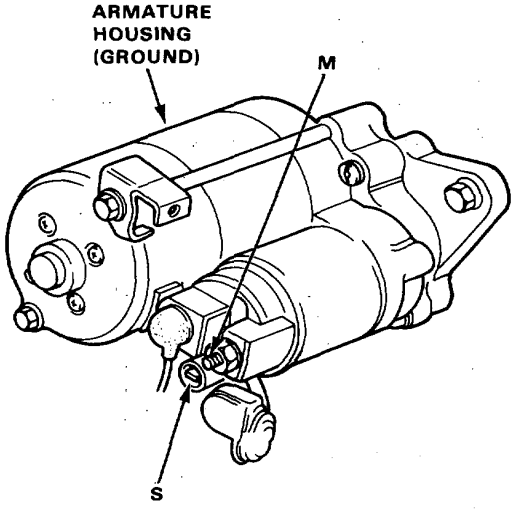
- Solenoid plunger and switch for malfunction.
- Drive gear assembly for dirty or damaged overrunning clutch.

Starter Solenoid Test

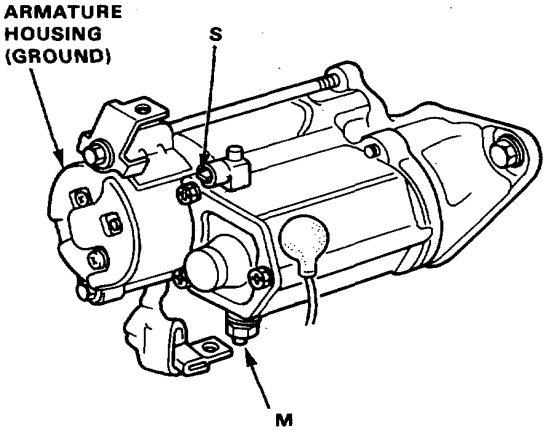
1. Check the hold-in coil for continuity between the S terminal and the armature housing (ground).
   Coil is OK if there is continuity.
2. Check the pull-in coil for continuity between the S and M terminals.
   Coil is OK if there is continuity.



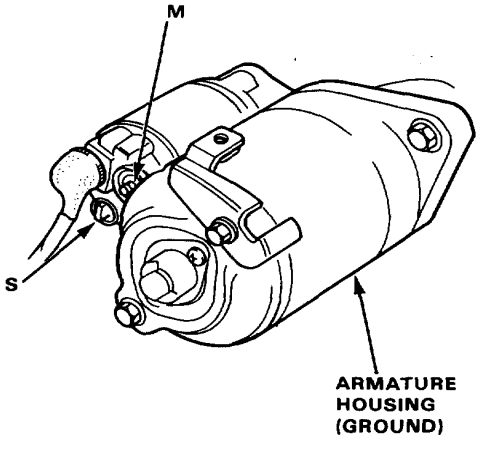
Mitsuba (1.0 kw and 1.4 kw) type:



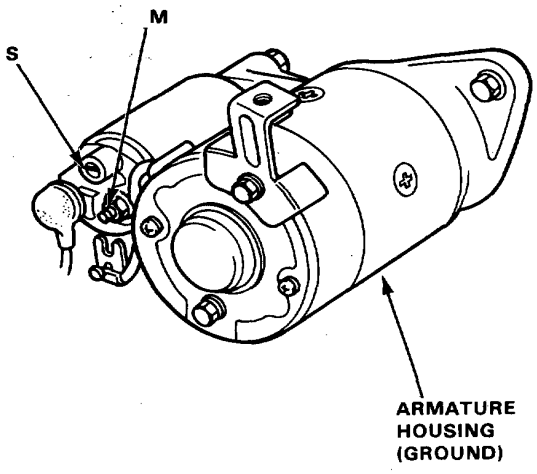
Nippon Denso (1.0 kw and 1.2 kw) type:



Nippon Denso (0.8 kw) type:



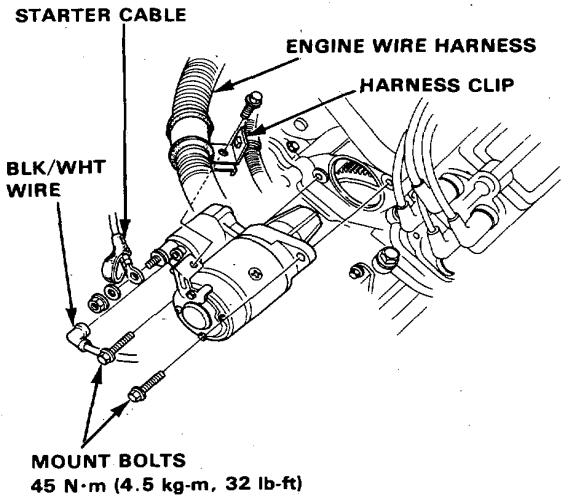
Hitachi (0.8 kw) type:



Starter Replacement

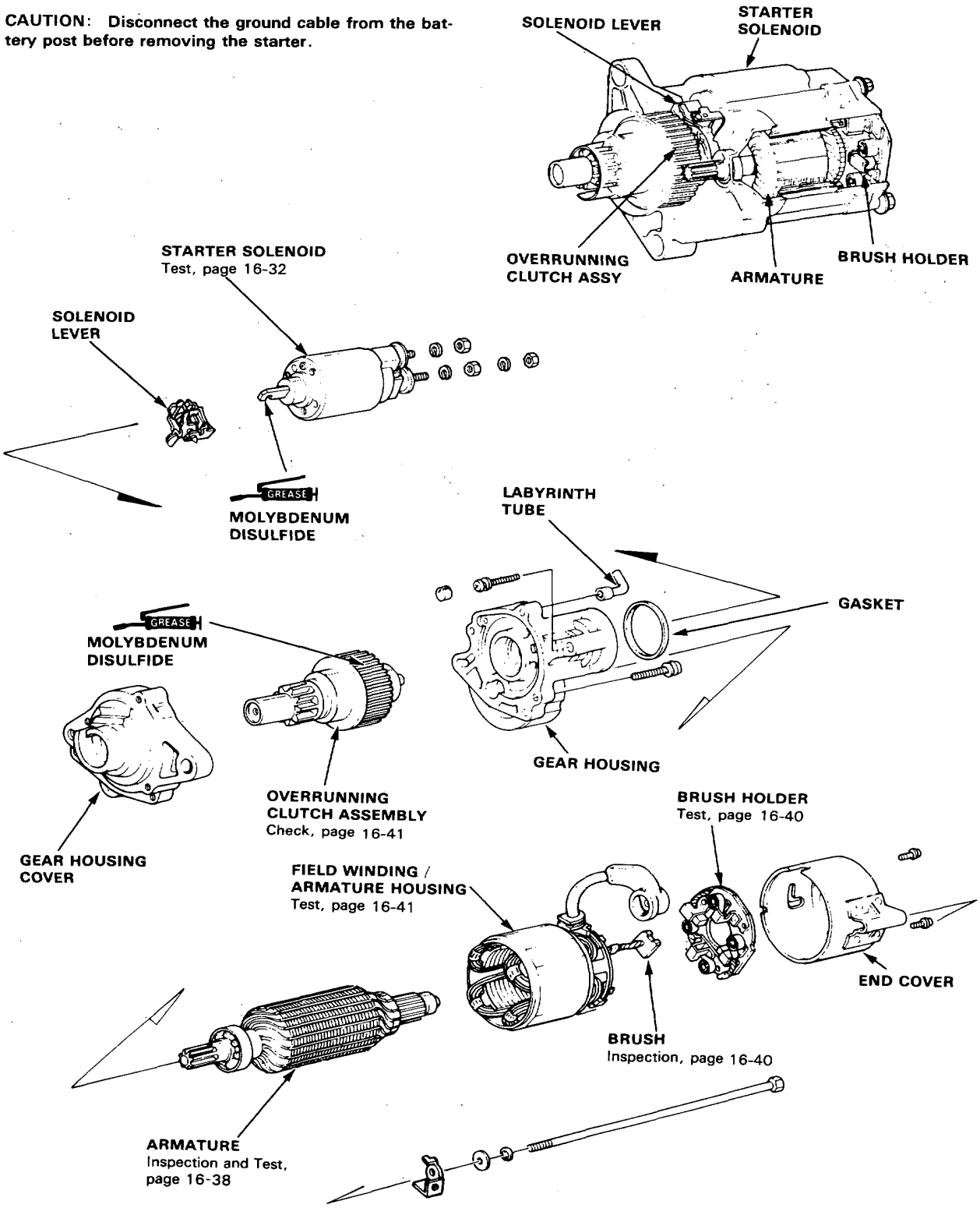
NOTE: After installation, make sure that the wires are clamped.

1. Disconnect the ground wire from the battery negative (−) post.
2. Remove the engine wire harness from the harness clip on the starter motor.
3. Disconnect the starter cable from the B terminal on the solenoid, and the BLK/WHT wire from the S terminal.
4. Remove the 2 bolts holding the starter, and remove the starter.



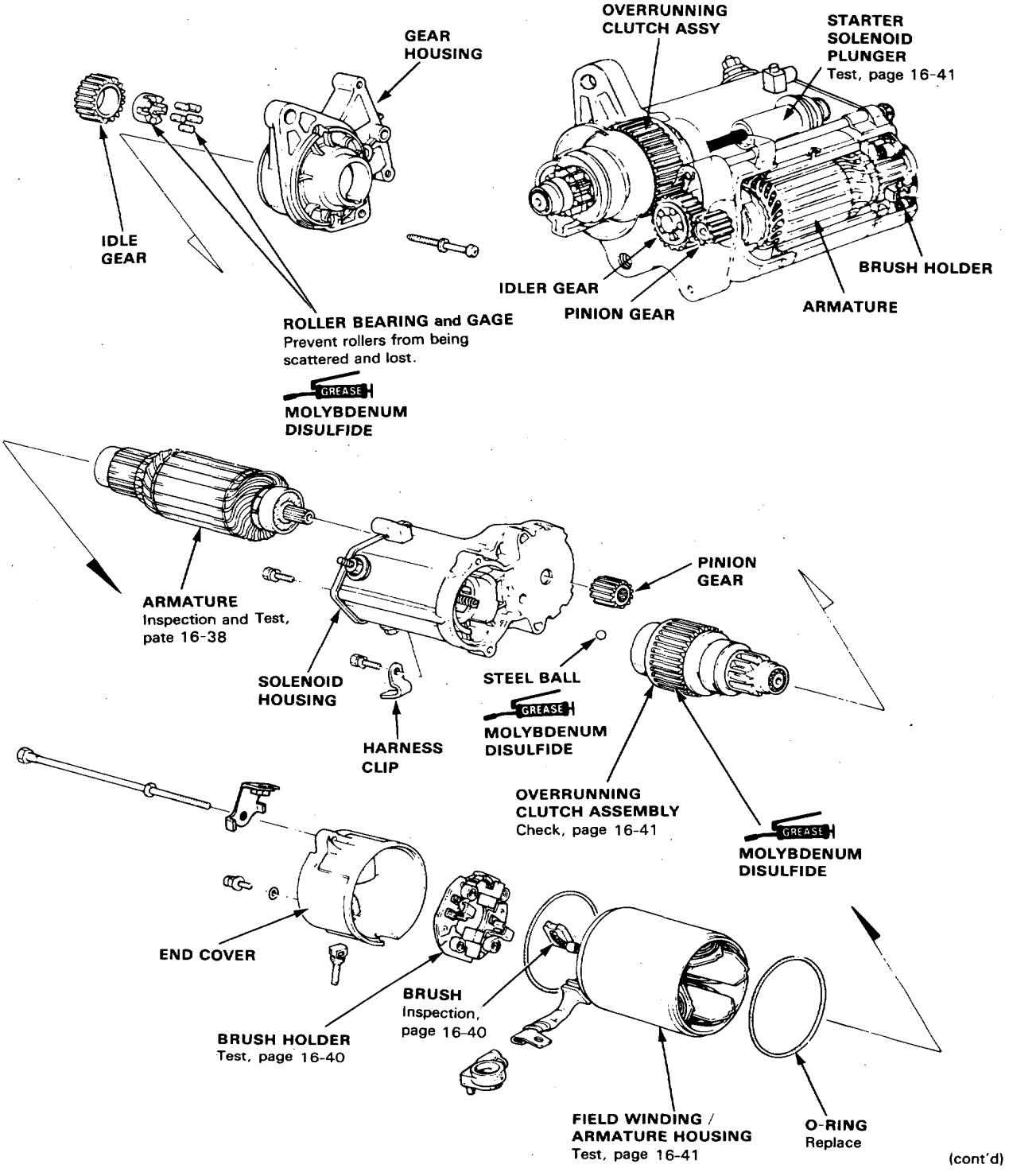
Starter Overhaul (Gear Reduction 1.0kw and 1.4kw, Mitsuba type)

CAUTION: Disconnect the ground cable from the battery post before removing the starter.



Starter Overhaul (Gear Reduction 1.0kw and 1.2kw, ND type)

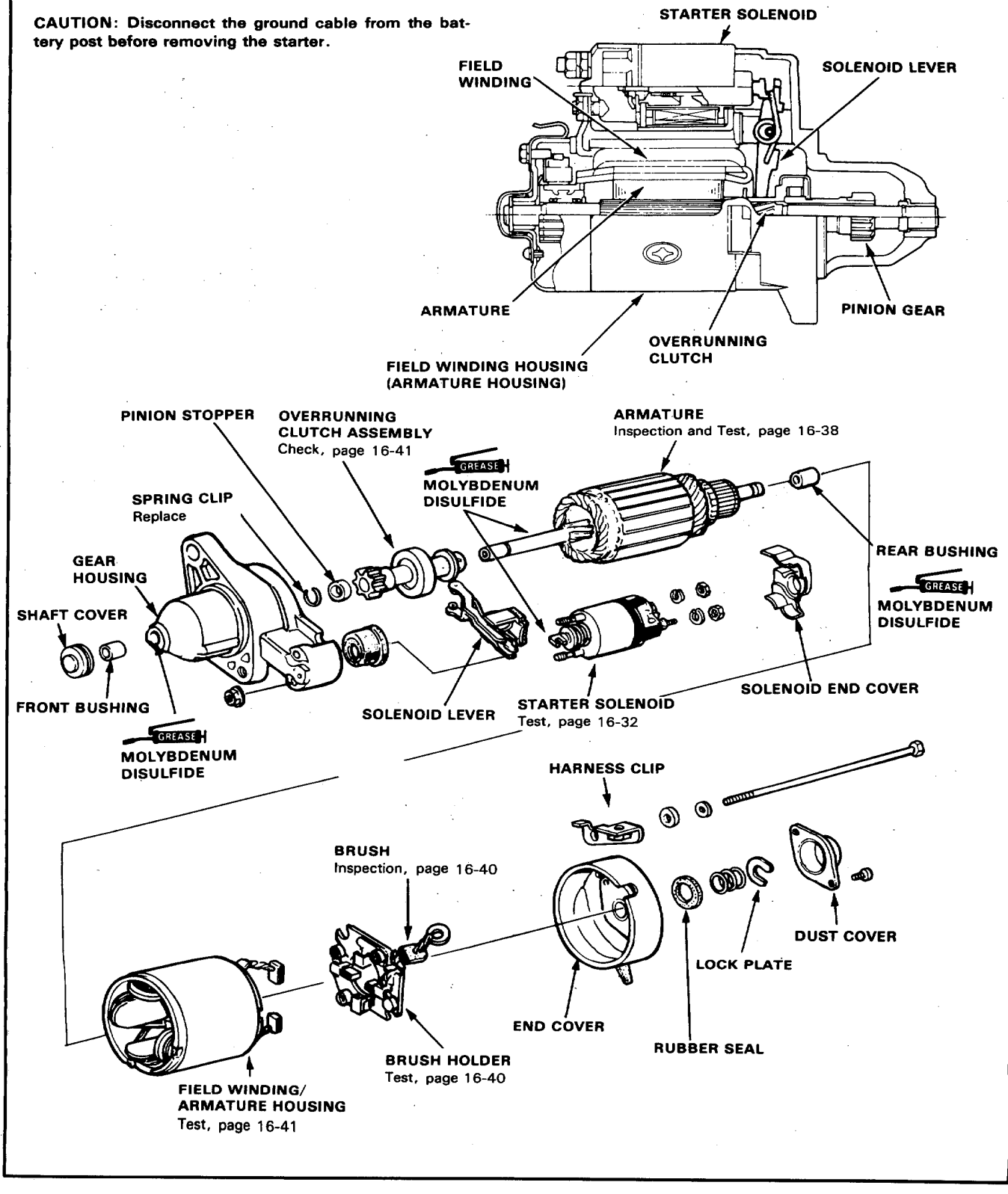
CAUTION: Disconnect ground wire from the battery post before removing the starter.



(cont'd)

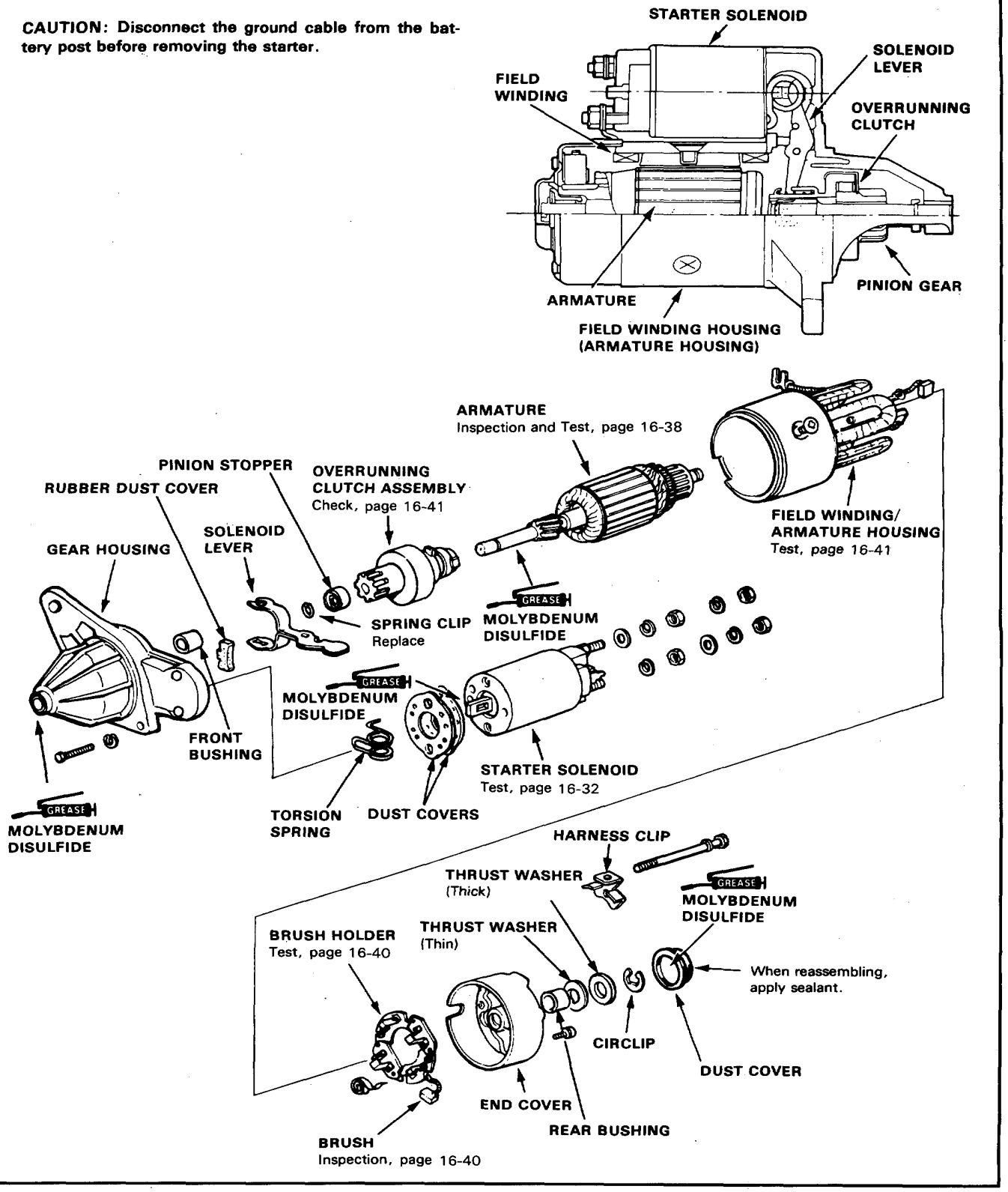
Starter Overhaul (cont'd) (Direct Drive 0.8 kw, ND type)

CAUTION: Disconnect the ground cable from the battery post before removing the starter.



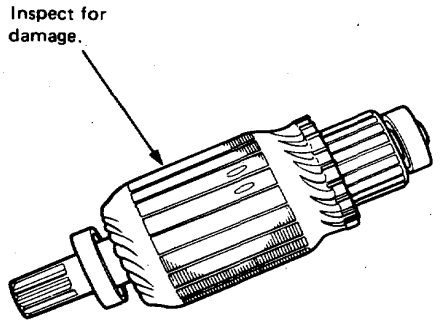
Starter Overhaul (Direct Drive 0.8 kw, Hitachi type)

CAUTION: Disconnect the ground cable from the battery post before removing the starter.



Armature Inspection and Test

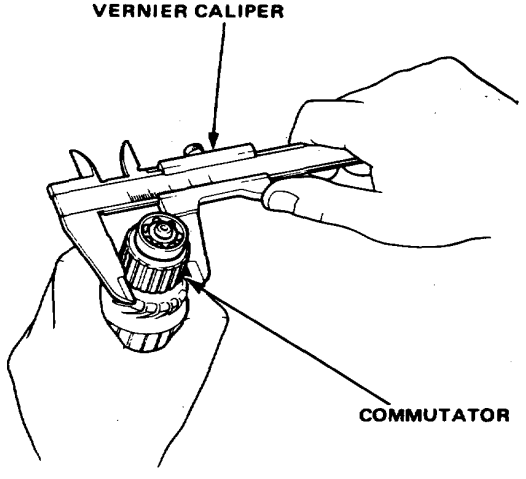
1. Inspect the armature for wear or damage due to contact with the field coil magnets.



2. A dirty or burnt commutator surface may be resurfaced with emery cloth or a lathe within the following specifications.

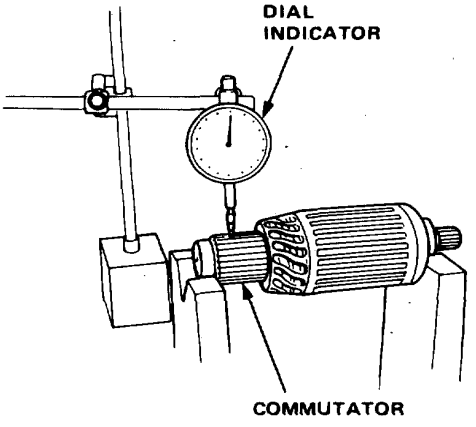
Commutator Diameter

	Standard (New)	Service Limit
ND (1.0kw and 1.2kw)	29.9—30.0 mm (1.177—1.181 in)	29.0 mm (1.14 in)
Mitsuba (1.0kw and 1.4kw)	28.0—28.1 mm (1.102—1.106 in)	27.5 mm (1.08 in)
ND (0.8 kw)	28.0 mm (1.102 in)	27.0 mm (1.06 in)
Hitachi (0.8 kw)	40 mm (1.57 in)	39.0 mm (1.54 in)



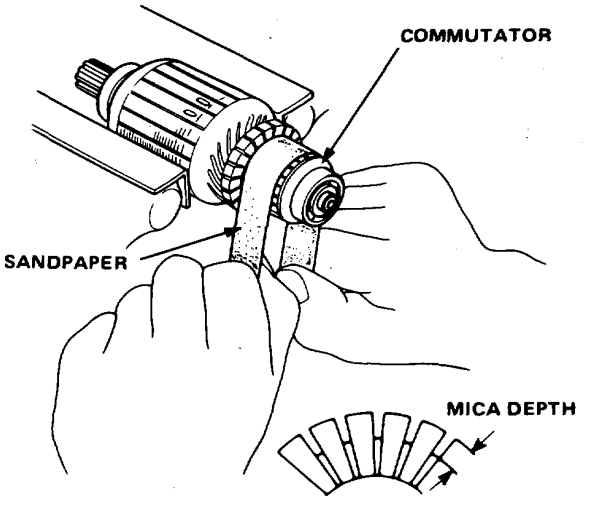
Commutator Runout

	Standard (New)	Service Limit
ND (1.0 kw and 1.2 kw) and Mitsuba (1.0 kw and 1.4 kw)	0—0.02 mm (0—0.001 in)	0.05 mm (0.002 in)
ND (0.8 kw)	0—0.05 mm (0—0.002 in)	0.4 mm (0.016 in)
Hitachi (0.8 kw)	0—0.1 mm (0—0.004 in)	0.4 mm (0.016 in)



3. If the commutator runout and diameter are within limits, check the commutator for damage or for carbon dust or brass chips between the segments.

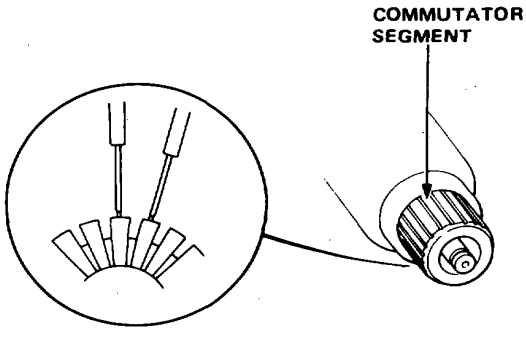
4. If surface is dirty, recondition it with a #500 or #600 sandpaper. Then, check mica depth. If necessary, undercut mica with a hacksaw blade to achieve proper depth.



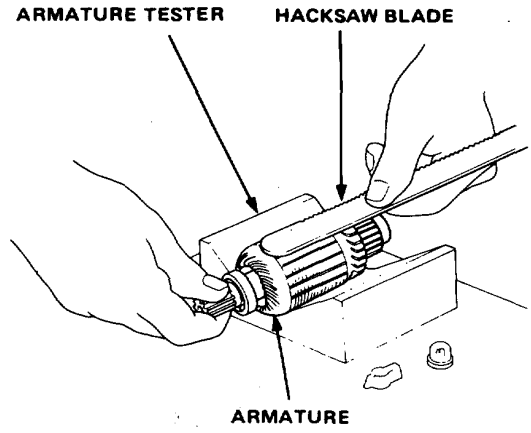
Commutator Mica Depth

	Standard (New)	Service Limit
ND (0.8 kw, 1.0 kw and 1.2 kw) and Hitachi (0.8 kw)	0.5—0.8 mm (0.020—0.031 in)	0.2mm (0.008 in)
Mitsuba (1.0 kw and 1.4 kw)	0.4—0.5mm (0.016—0.020 in)	0.15 mm (0.006 in)

5. Check for continuity between each segment of the commutator. If an open circuit exists between any segment, replace the armature.

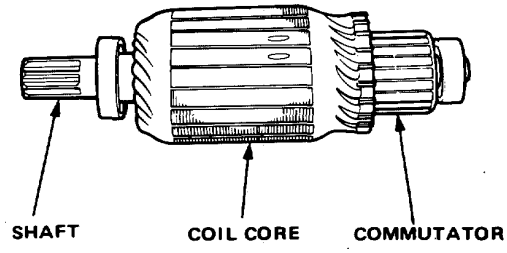


6. Place the armature on an armature tester. Hold a hacksaw blade on the armature core.



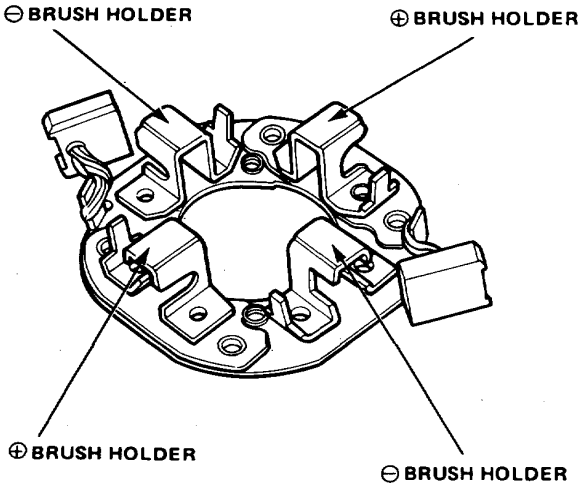
If the blade is attracted to the core or vibrates while core is turned, the armature is shorted. Replace the armature.

7. With an ohmmeter, check that no continuity exists between the commutator and armature coil core, and between the commutator and armature shaft. If continuity exists, replace the armature.



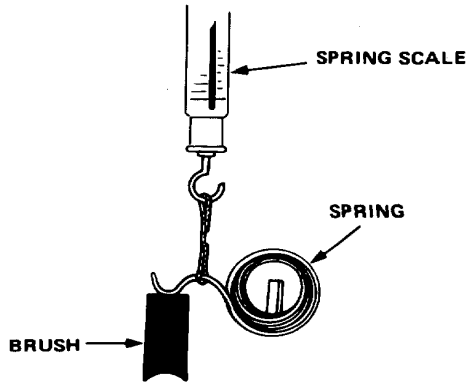
Starter Brush Holder Test

1. Check that there is no continuity between the ⊕ and ⊖ brush holders.
   If continuity exists, replace the brush holder assembly.



2. Insert the brush into the brush holder, and bring the brush into contact with commutator, then attach a spring scale to the spring. Measure the spring tension at the moment the spring lifts off the brush.

Spring Tension:
ND (1.0 kw and 1.2 kw): 18.5—24.4 N (1.85—2.44 kg, 4.1—5.41 lb)
Mitsuba (1.0 kw and 1.4 kw): 20.5—27.0 N (2.05—2.70 kg, 4.5—6.016 lb)
ND (0.8kw) and Hitachi (0.8kw): 16 N (1.6 kg, 3.52 lb)

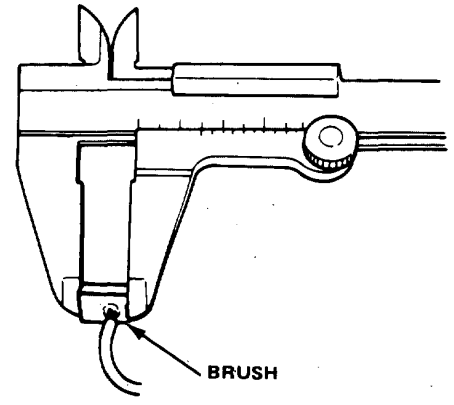


Starter Brush Inspection

Measure brush length. If not within service limit, replace the armature housing and brush holder assembly.

Brush Length

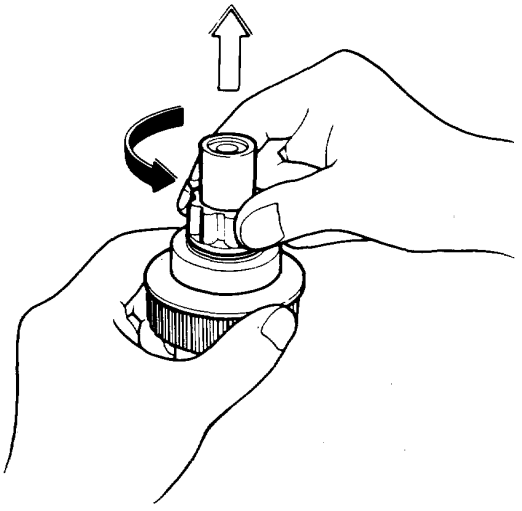
	Standard (New)	Service Limit
ND (1.0 kw and 1.2 kw)	12.5—13.5 mm (0.49—0.53 in)	8.5 mm (0.33 in)
Mitsuba (1.0 kw and 1.4 kw)	14.3—14.7 mm (0.56—0.58 in)	9.3mm (0.37in)
ND (0.8 kw)	15.5—16.5mm (0.61—0.65 in)	10.0 mm (0.39 in)
Hitachi (0.8 kw)	14.5—15.5 mm (0.57—0.61 in)	11.0 mm (0.43 in)



NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to same contour as the commutator.

Overrunning Clutch Check

1. Check if the overrunning clutch moves along the shaft freely. If not, replace the overrunning clutch assembly.
2. Check if the overrunning clutch locks in one direction and rotates smoothly in reverse. If it does not lock in either direction or its locks in both directions, replace the overrunning clutch assembly.

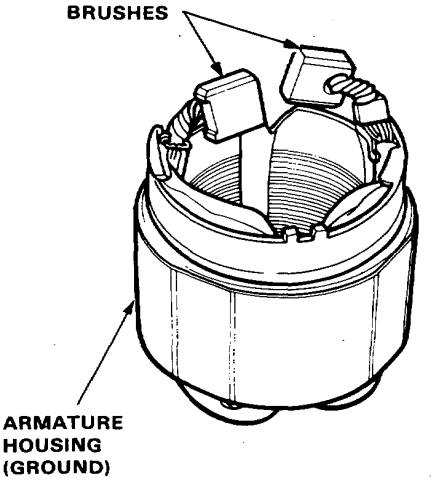


3. Check if the starter drive gear is worn or damaged. If the gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.

   NOTE: Check condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

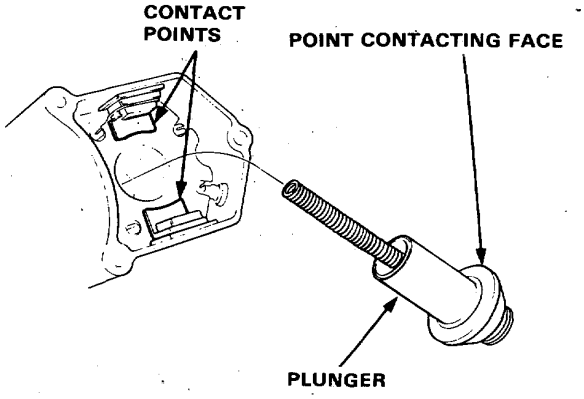
Starter Field Winding Test

1. Check for continuity between the brushes. If no continuity, replace the armature housing.
2. Check for continuity between each brush and the armature housing (ground) .
   If continuity exists, replace the armature housing.



Solenoid Plunger Inspection (1.0kw and 1.2kw, ND type)

Check the contact points, and face of the starter solenoid plunger for burning, pitting or any other defects. If surfaces are rough, recondition with a strip of #500 or #600 sandpaper.

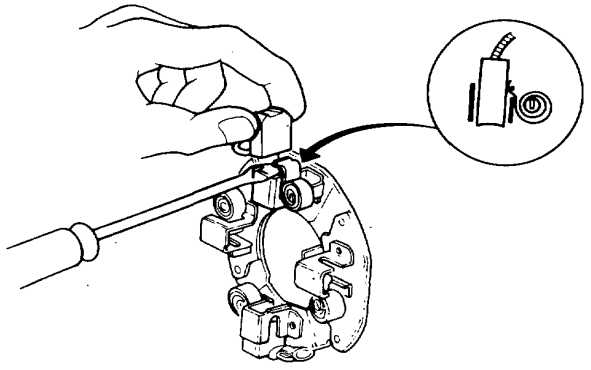


Starter Reassembly

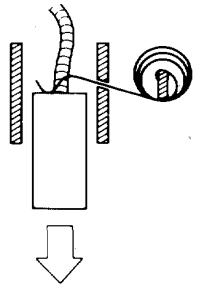
Reassembly the starter in the reverse order of disassembly.

Nippon Denso (1.0kw and 1.2kw) and Mitsuba (1.0kw and 1.4kw) type.

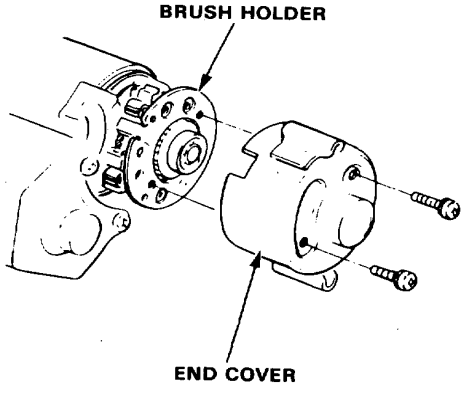
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



2. Install the armature in the housing. Next pry back each brush spring again and push the brush down until it seats against the commutator, then release the spring against the end of the brush.

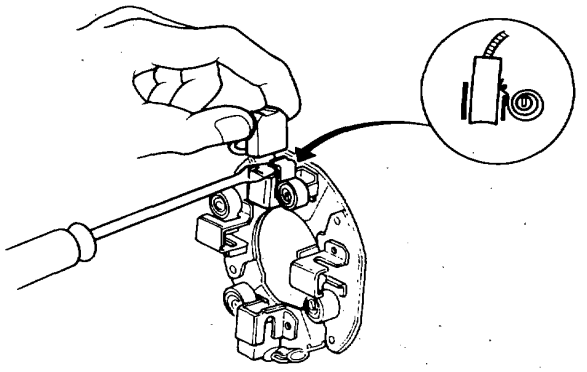


3. Install the end cover on the brush holder.

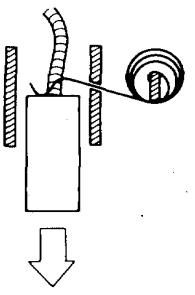


Nippon Denso (0.8 kw) and Hitachi (0.8 kw) type:

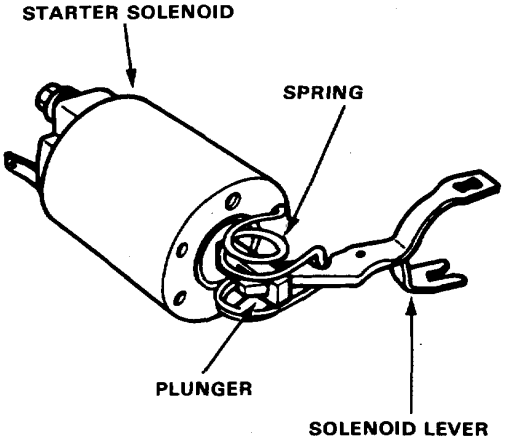
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



2. Install the armature in the housing. Next pry back each brush spring again and push the brush down until it seats against the commutator, then release the spring against the end of the brush.

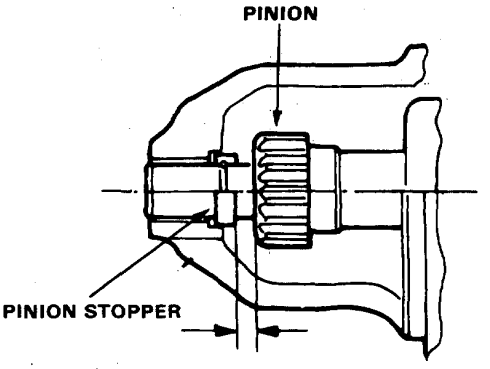


3. For Hitachi (0.8 kw), install the spring as shown.



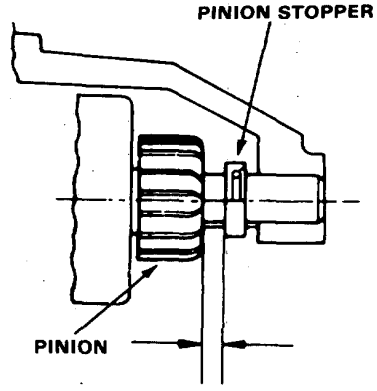
4. After assembling measure the clearance between the pinion stopper and the pinion with the clutch pushed out by the starter solenoid.

Nippon Denso (0.8 kw):



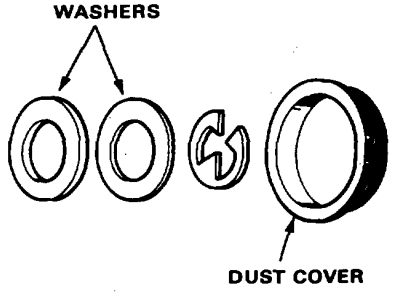
Specified Clearance: 0.1—4.0 mm (0.004—0.157 in.)

Hitachi (0.8 kw):



Specified Clearance: 0.3—2.5 mm (0.012—0.098 in.)

If out of the specifications, adjust by changing the number of washers used.



Ignition System

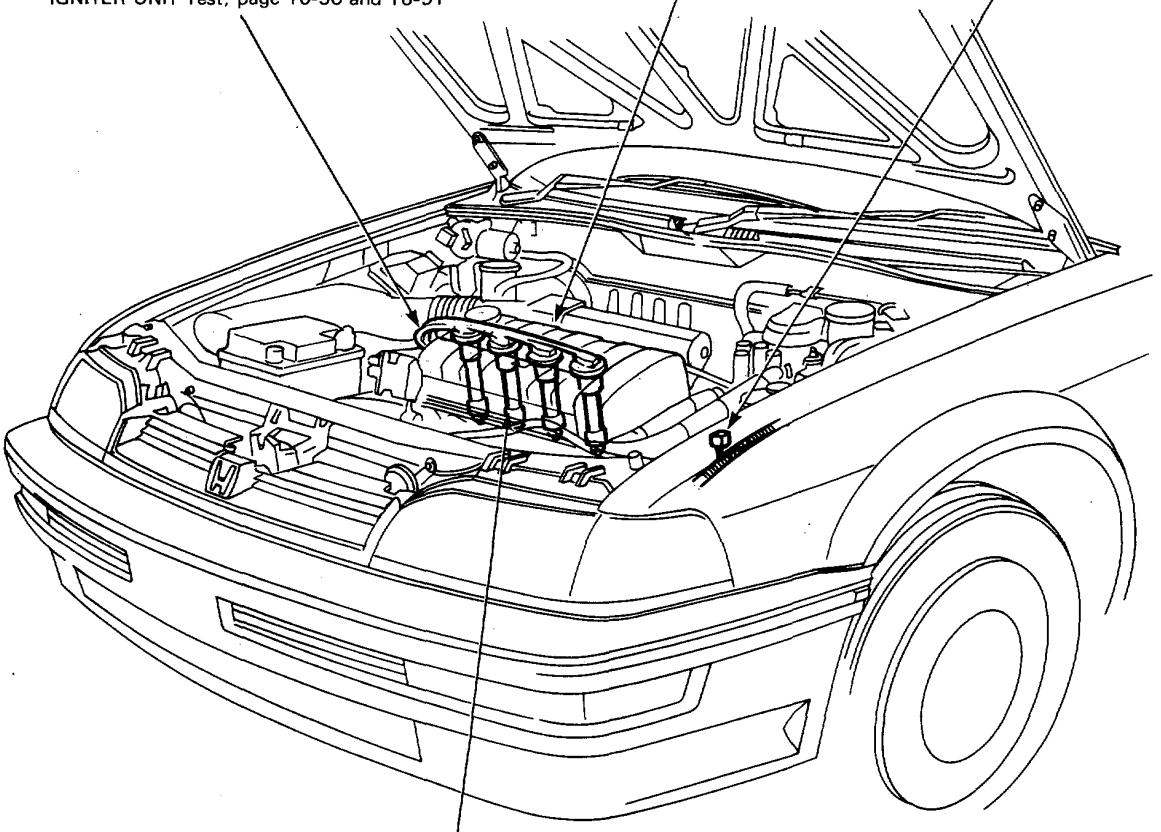
Component Location Index

IGNITION TIMING CONTROL SYSTEM
Troubleshooting, section 6
Inspection and Setting, page 16-47 thru 49

DISTRIBUTOR
Advance Diaphragm Inspection, page 16-52
Top End Inspection, page 16-52
Reluctor and Stator Air Gap Inspection, page 16-53
Reluctor Replacement, page 16-53
Removal/Installation, page 16-54 and 55
Overhaul, page 16-56 and 57
Reassembly, page 16-58
Ignition Coil Test/Replacement, page 16-59 thru 61
IGNITER UNIT Test, page 16-50 and 16-51

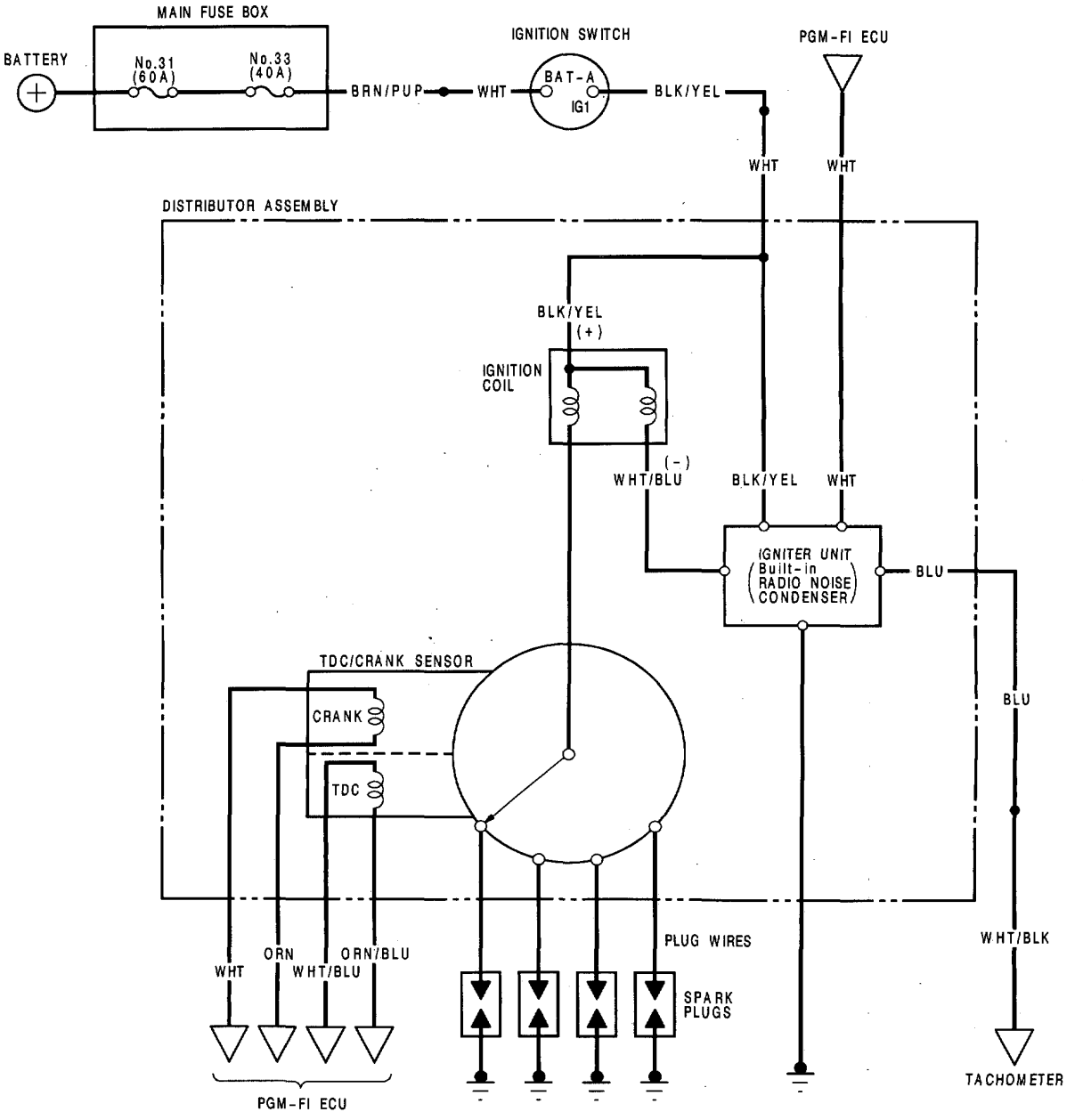
IGNITION WIRES
Inspection and Test, page 16-63

IGNITION TIMING ADJUSTING CONNECTOR
(Fuel-injected engine)

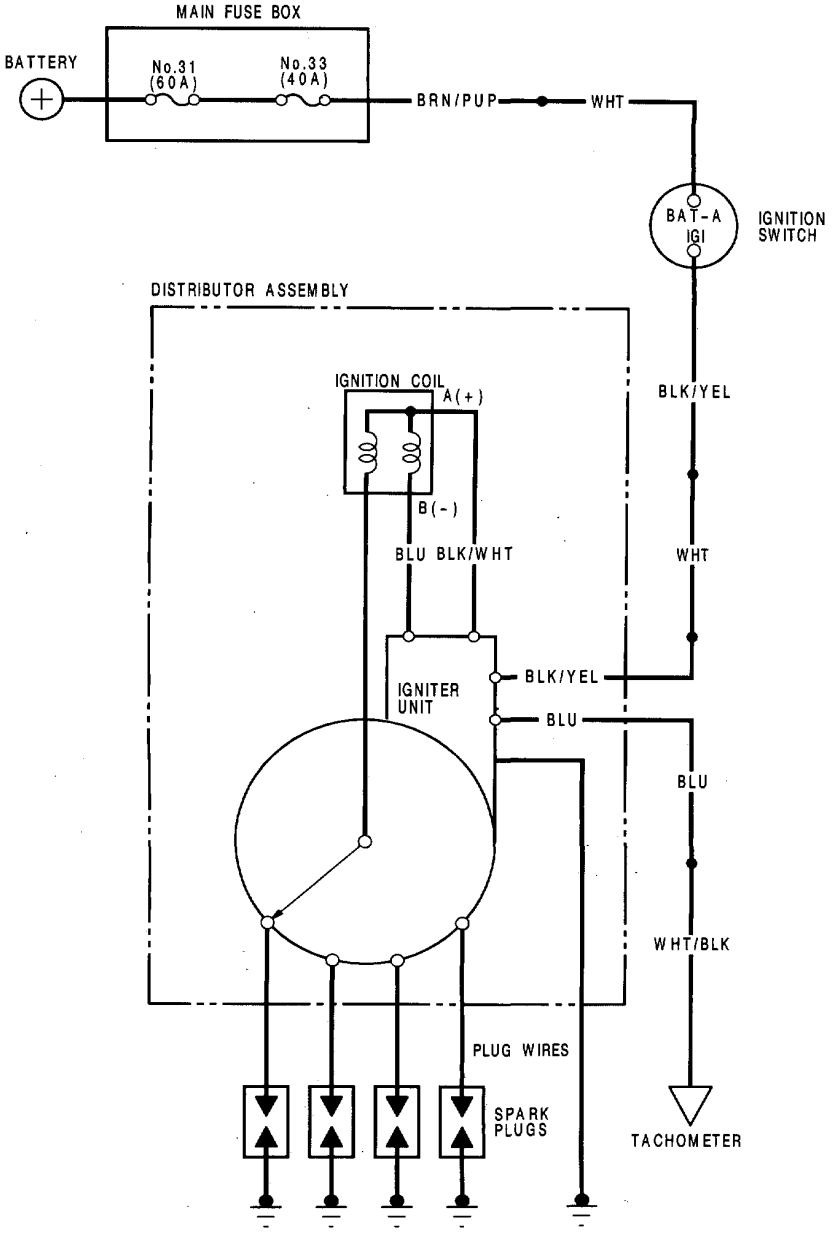


SPARK PLUG
Inspection, page 16-62

Circuit Diagram (Fuel-Injected Engine)

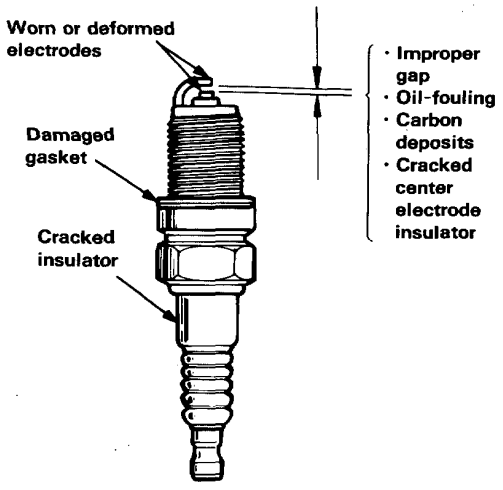


Circuit Diagram (Carbureted Engine)



Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for :



Burned or worn electrodes may be caused by :
- Lean fuel mixture
- Advanced ignition timing
- Loose spark plug
- Plug heat range too high
- Insufficient cooling

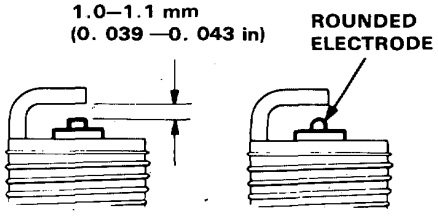
Fouled plug may be caused by :
- Rich fuel mixture
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too low
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition coil or ignition wires

2. Replace the plug if the center electrode is rounded as shown below.

Spark Plug :

Standard
BCPR6E-11 (NGK)
Q20PR-V11 (ND)

Optional
BCPR7E-11 (NGK)
Q22PR-U11 (ND)



3. Adjust the gap with a suitable gapping tool.

   Electrode Gap: 1.0—1.1 mm (0.039—0.043 in)

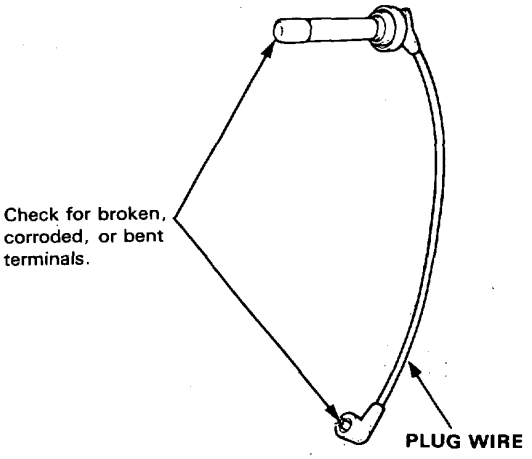
4. Screw the plugs into the cylinder head finger tight, then torque them to 18 N·m (1.8 kg-m, 13 lb-ft) .

   NOTE: Apply a small quantity of anti-seize compound to the plug threads before installing.

Ignition Wire Inspection and Test

CAUTION: Carefully remove the ignition wires by pulling on the rubber boots. Do not bend the wire or the conductor may be broken.

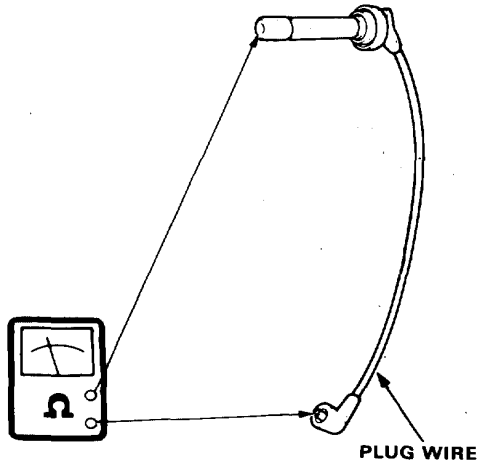
1. Check the condition of the wire terminals. If any terminal is corroded, clean it, and if it is broken or distorted, replace the wire.



2. Connect ohmmeter probes and measure resistance.

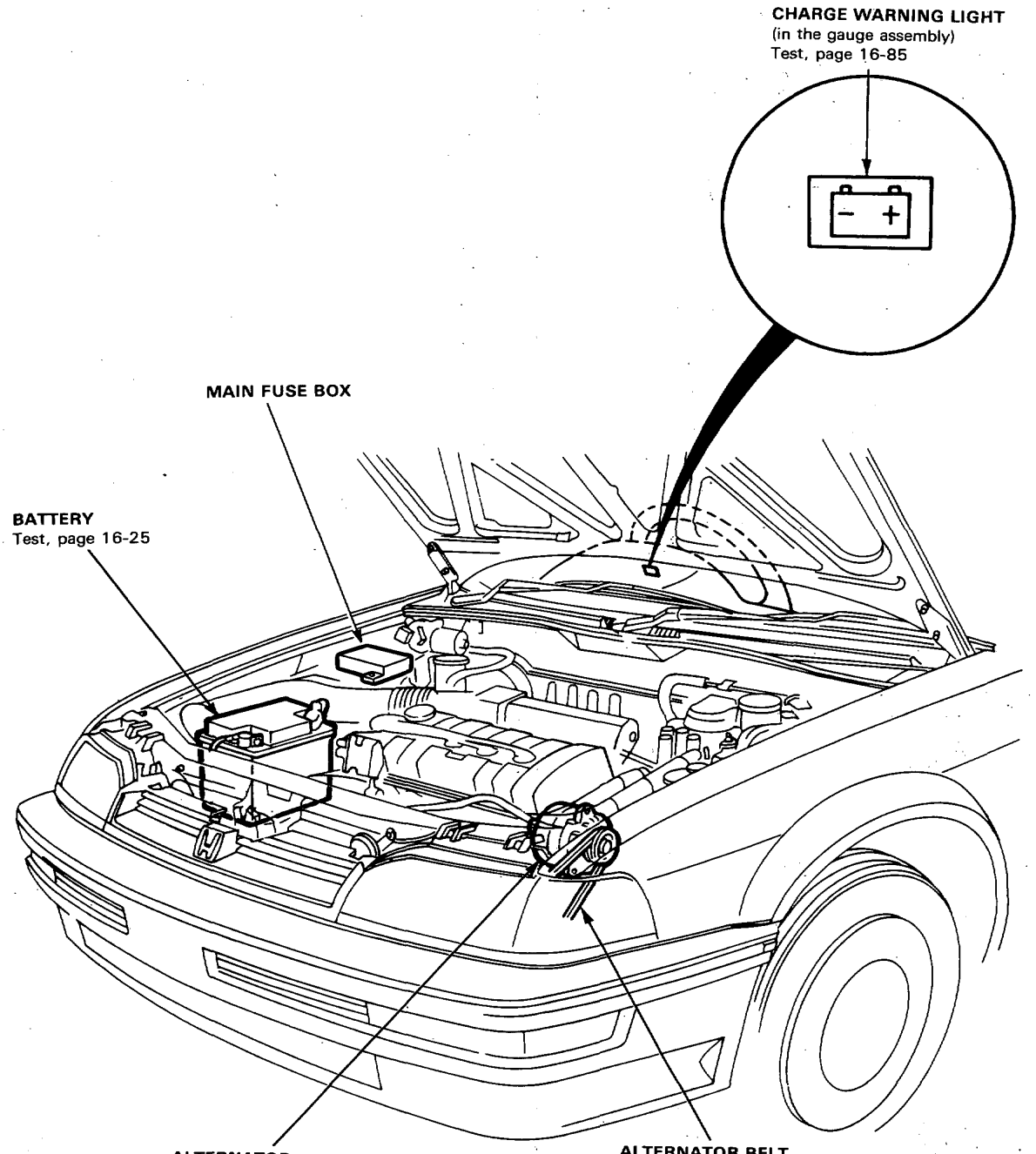
   Ignition Wire Resistance :
   25, 000 ohms max. at 20°C (70°F)

3. If resistance exceeds 25,000 ohms, replace the ignition wire.

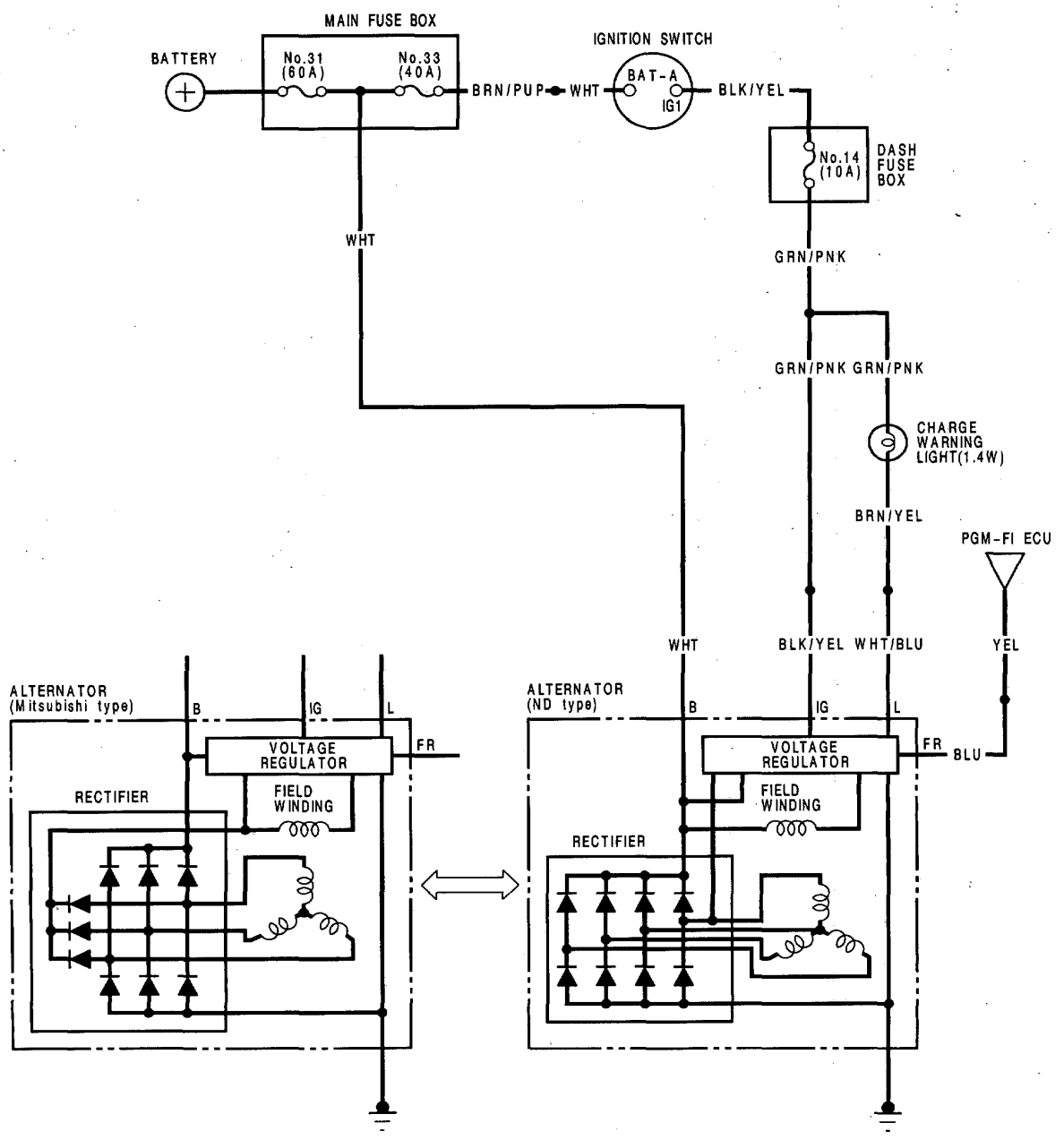


Charging System

Component Location Index

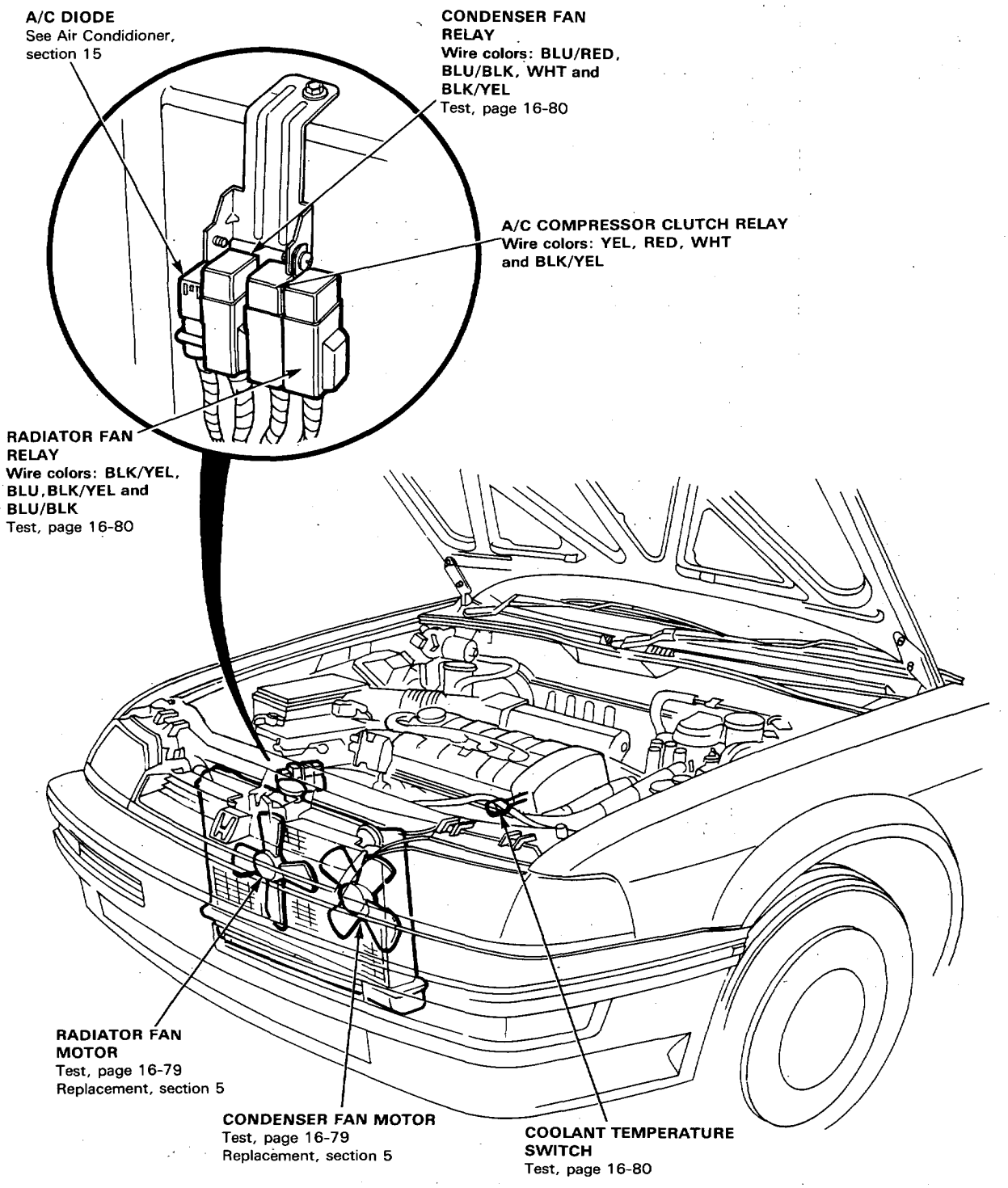


Circuit Diagram



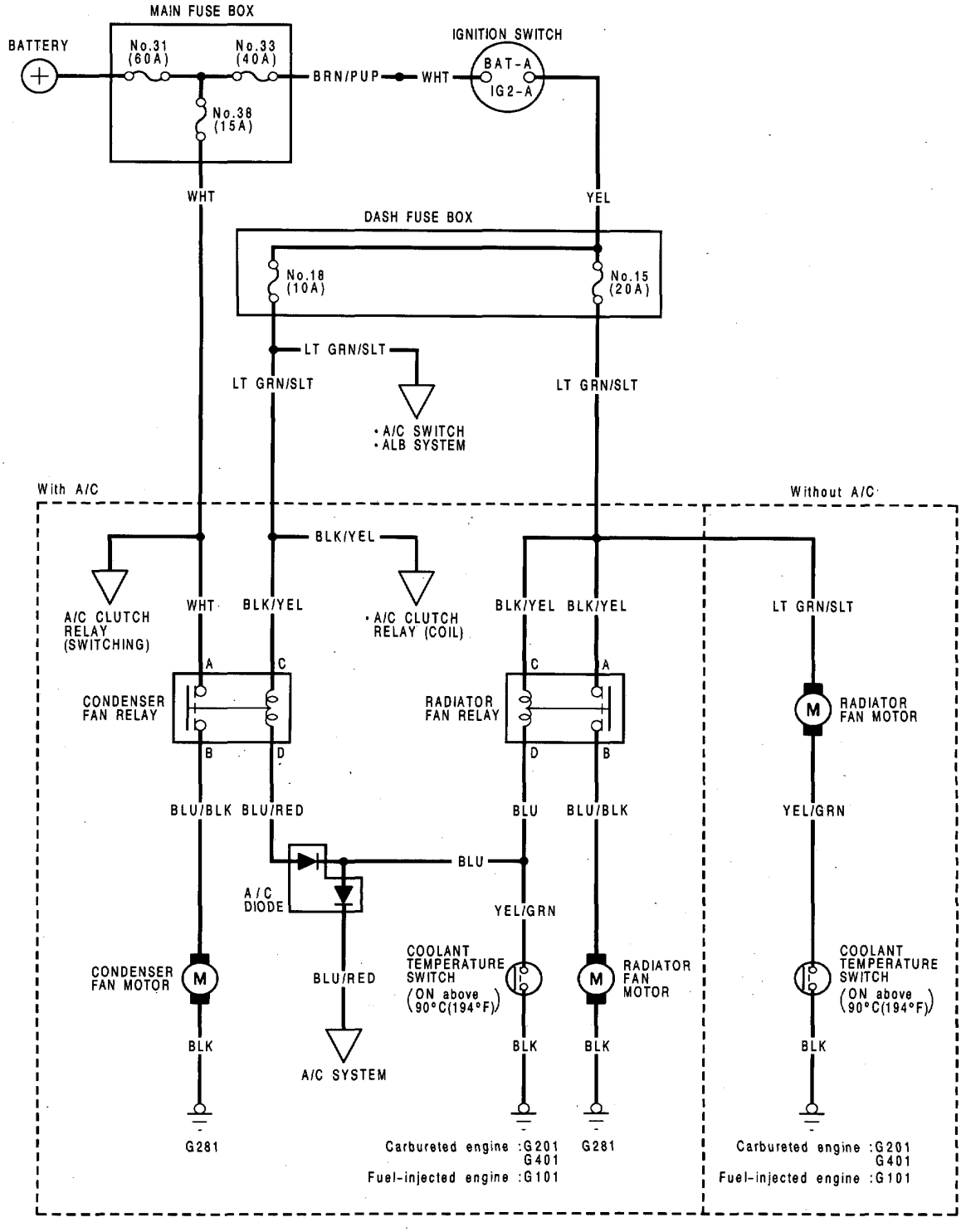
Cooling Fan System

Component Location Index



Cooling Fan System

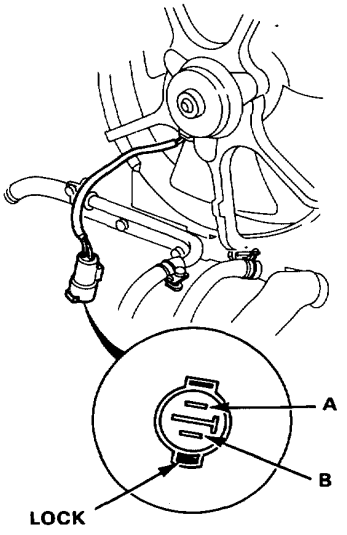
Circuit Diagram



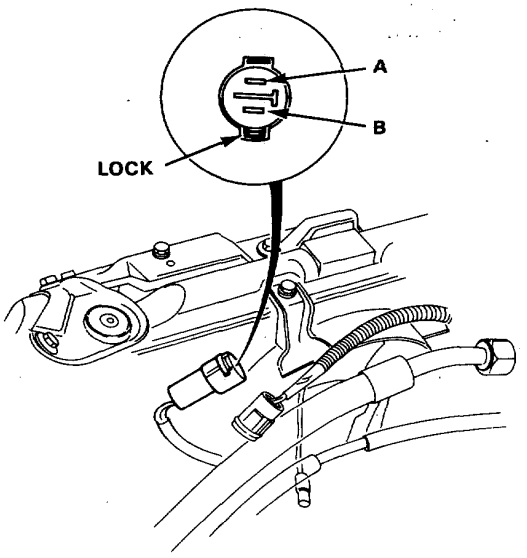
Fan Motor Test

1. Disconnect the 2-P connector from the fan motor.
2. Test motor operation by connecting battery positive to the A terminal, and negative to the B terminal.
3. If the motor fails to run smoothly, replace it.

Radiator Fan Motor :



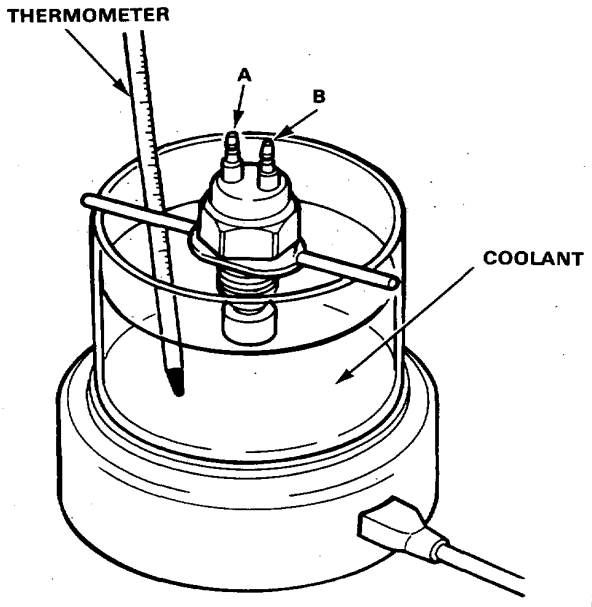
Condenser Fan Motor :



Cooling Fan System

Coolant Temperature Switch Test

1. Remove the coolant temperature switch from the rear of the engine cylinder block.
2. Suspend the coolant temperature switch in a container of coolant as shown.

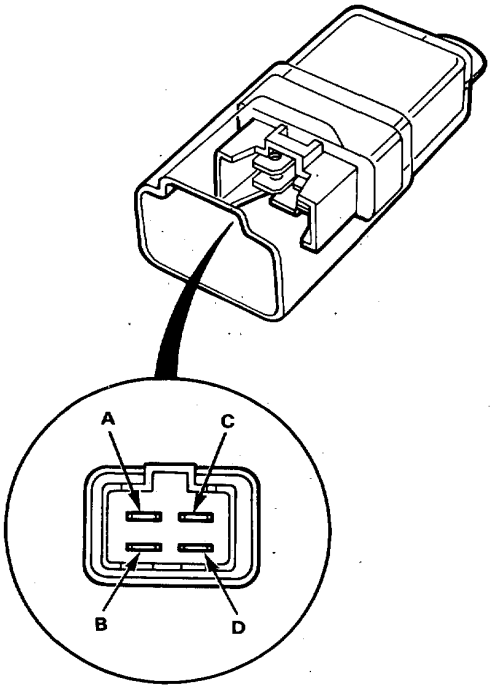


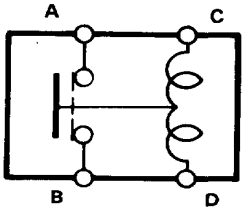
3. Heat the coolant and check coolant temperature with a thermometer (see table below).
4. Check for continuity between the A and B terminals according to the table.

Temperature \ Terminal	A	B
Above 88.5-91.5 °C (191 —197 °F)	○——	——○
Below 83.5-89.5 °C (182 —193 °F)		

Relay Test

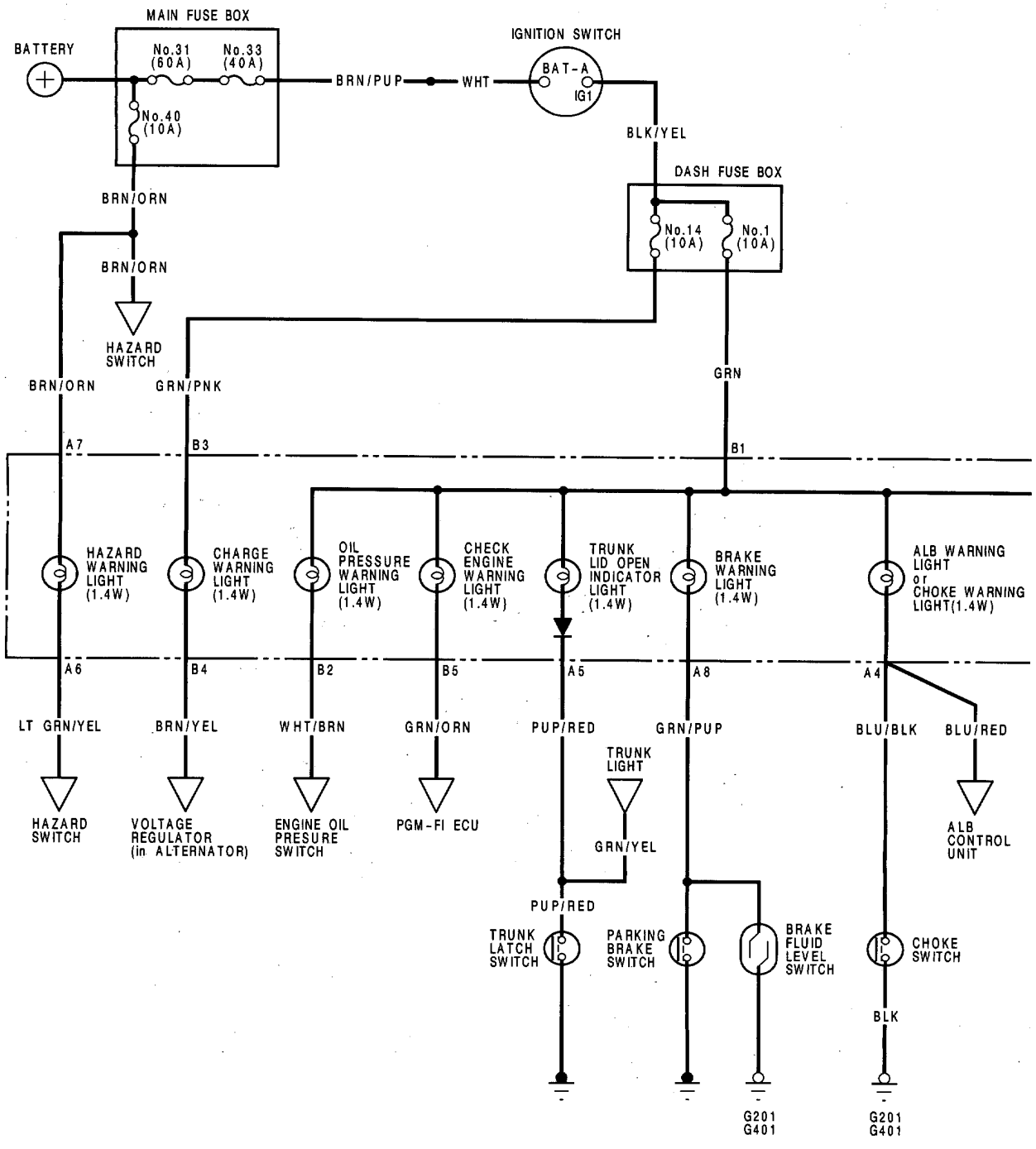
1. Remove the radiator fan relay or condenser fan relay.
2. There should be continuity between the A and B terminals when the battery in connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.

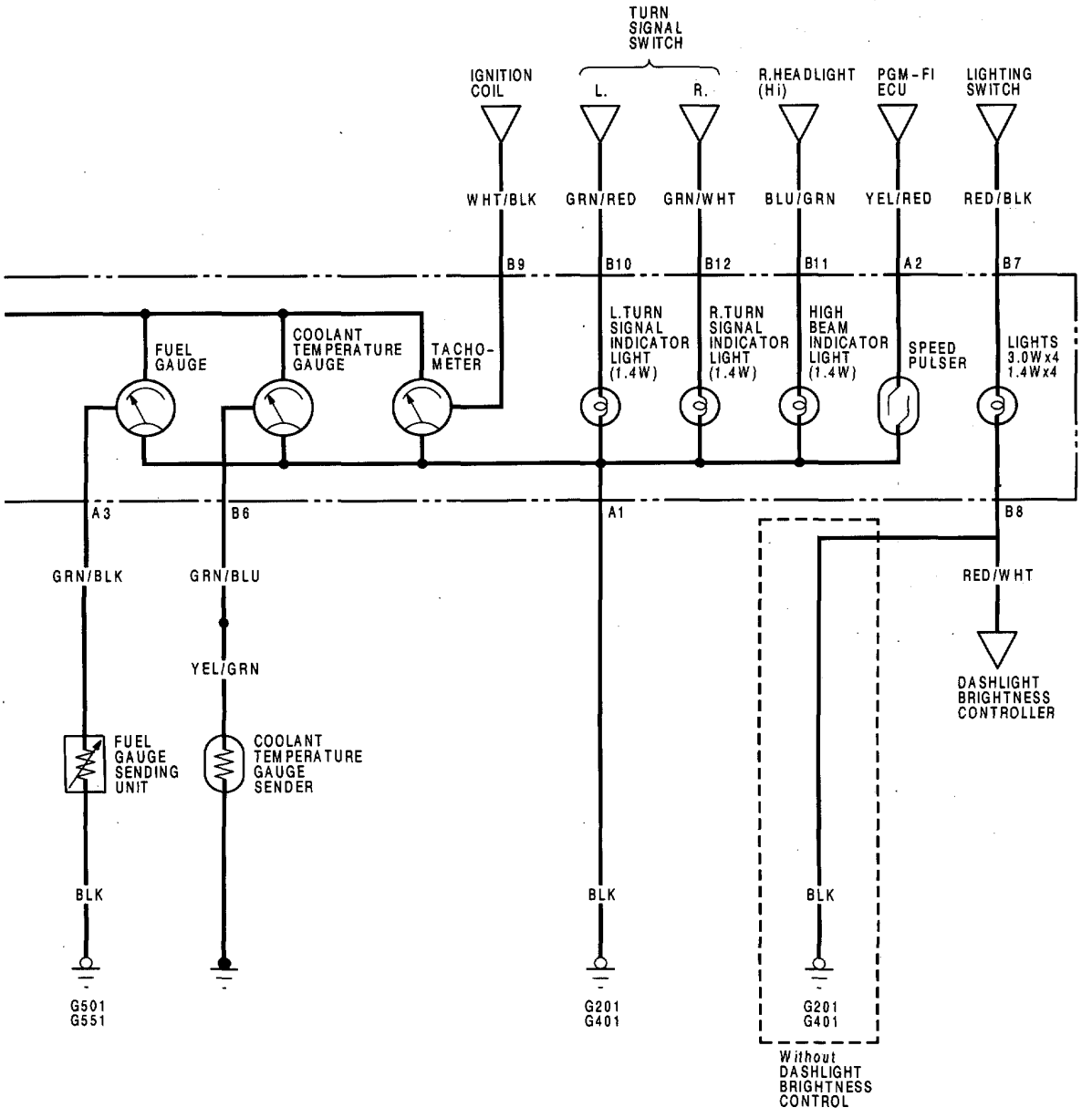




Gauge Assembly

Circuit Diagram

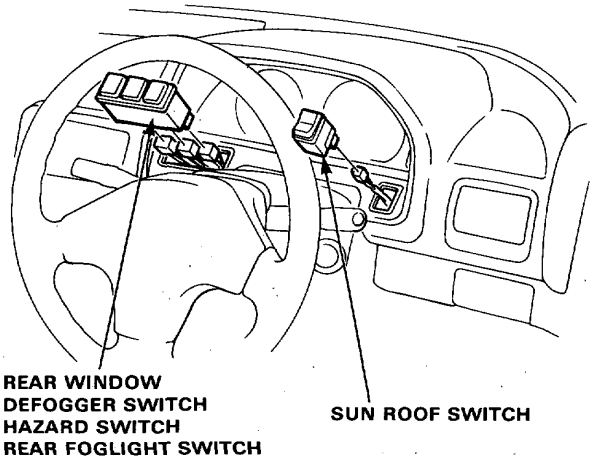



TURN SIGNAL SWITCH
IGNITION COIL
L.
R.
R.HEADLIGHT (Hi)
PGM-FI ECU
LIGHTING SWITCH
WHT/BLK
GRN/RED
GRN/WHT
BLU/GRN
YEL/RED
RED/BLK
B9
B10
B12
B11
A2
B7
FUEL GAUGE
COOLANT TEMPERATURE GAUGE
TACHO-METER
L.TURN SIGNAL INDICATOR LIGHT (1.4W)
R.TURN SIGNAL INDICATOR LIGHT (1.4W)
HIGH BEAM INDICATOR LIGHT (1.4W)
SPEED PULSER
LIGHTS 3.0Wx4 1.4Wx4
A3
B6
A1
B8
GRN/BLK
GRN/BLU
RED/WHT
YEL/GRN
DASHLIGHT BRIGHTNESS CONTROLLER
FUEL GAUGE SENDING UNIT
COOLANT TEMPERATURE GAUGE SENDER
BLK
BLK
BLK
G501
G551
G201
G401
G201
G401
Without DASHLIGHT BRIGHTNESS CONTROL

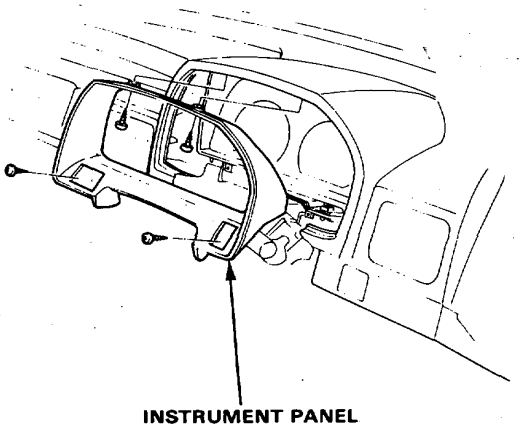
Gauge Assembly

Removal

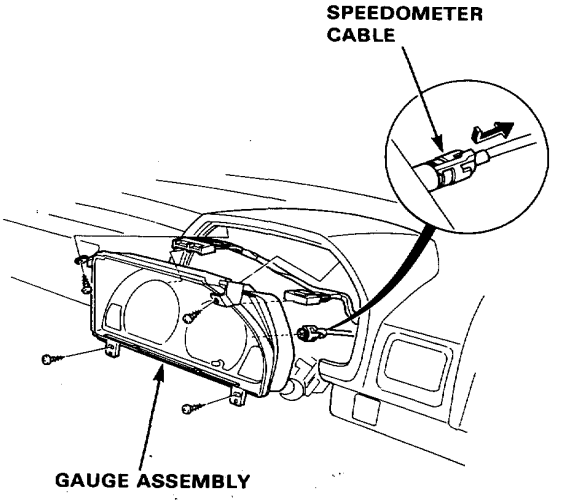
1. Remove the rear window defogger switch and lid.



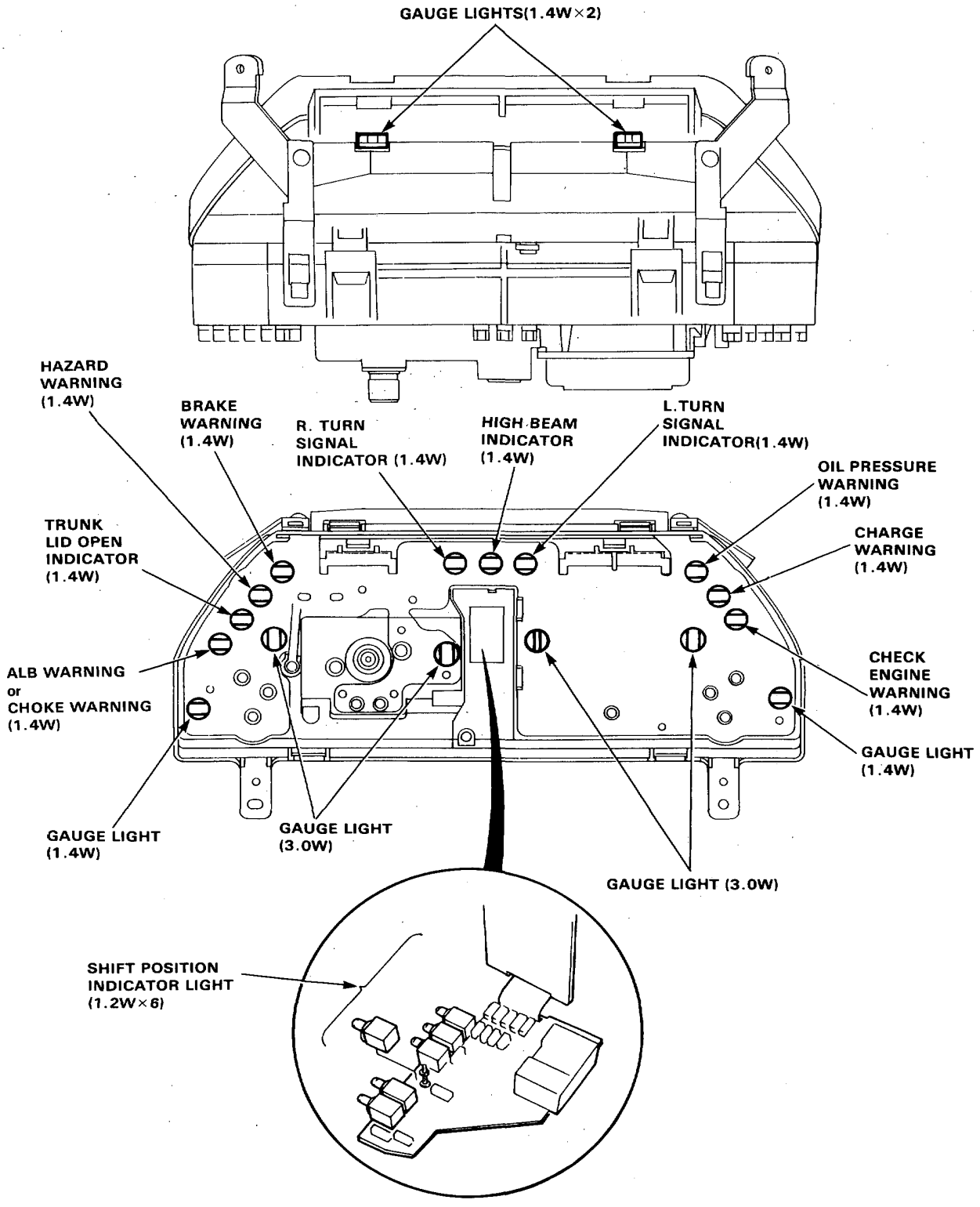
2. Remove the 4 screws, then remove the instrument panel.



3. Remove the 4 screws, then remove the gauge assembly half-way and disconnect the speedometer cable and connectors.



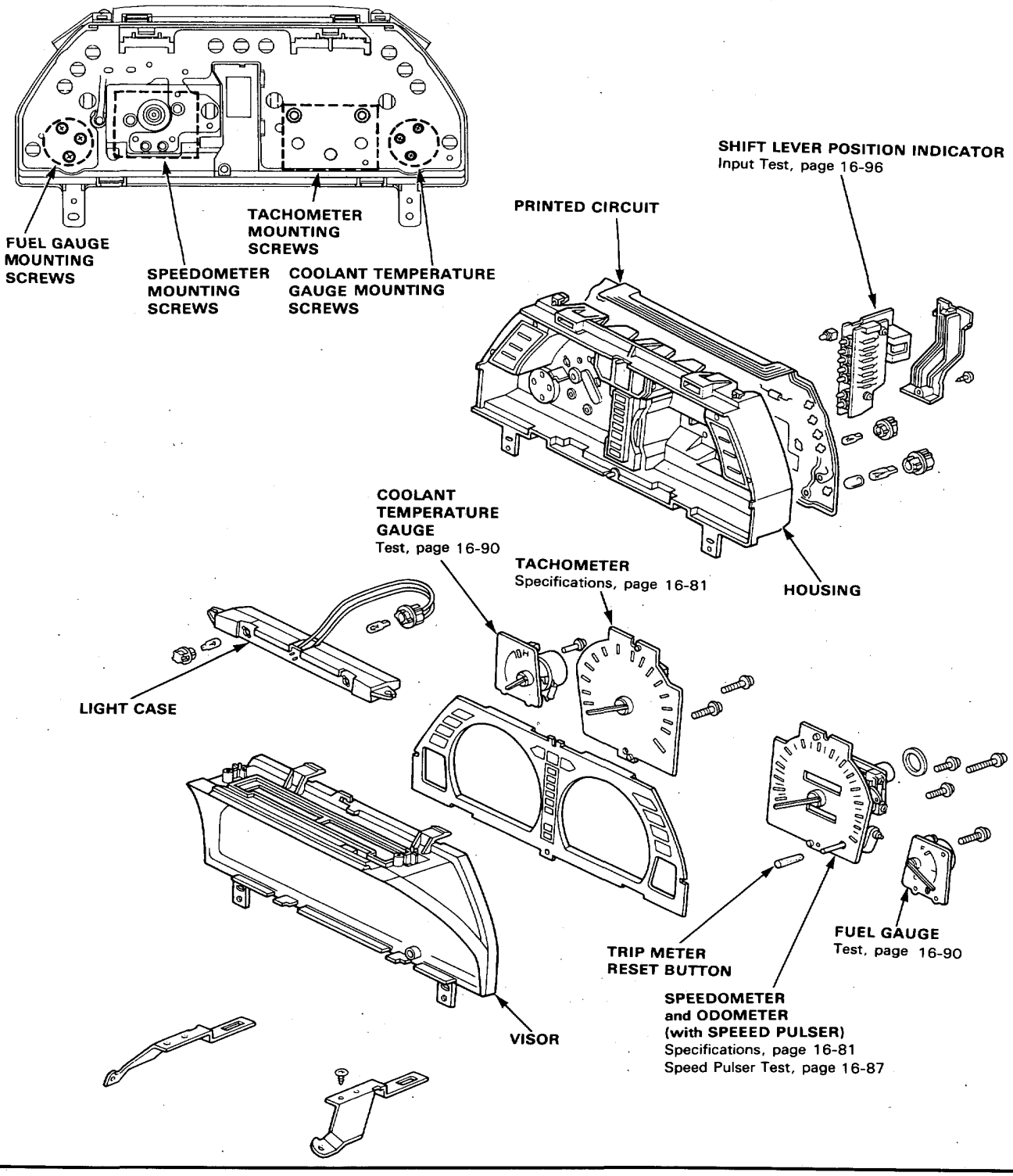
Bulb Locations



Gauge Assembly

Disassembly

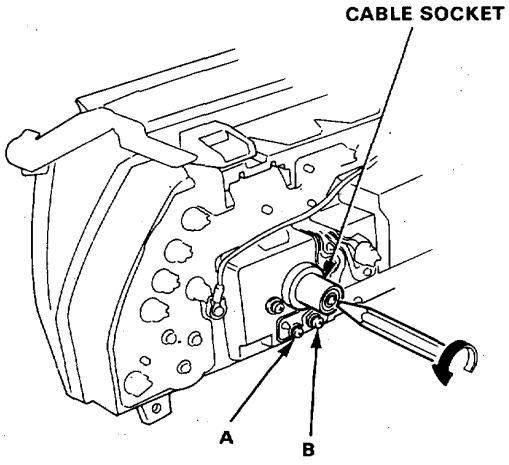
NOTE: Handle the terminals and printed circuits carefully to avoid damaging them.



Speed Pulser Test

1. Remove the gauge assembly from the dashboard, then turn it over.

2. Break the lead off a pencil tip then insert the pencil into the speedometer cable connector socket and turn it.
   Connect an ohmmeter between the A and B terminals.
   There should be continuity 4 times between the A and B terminals per revolution.



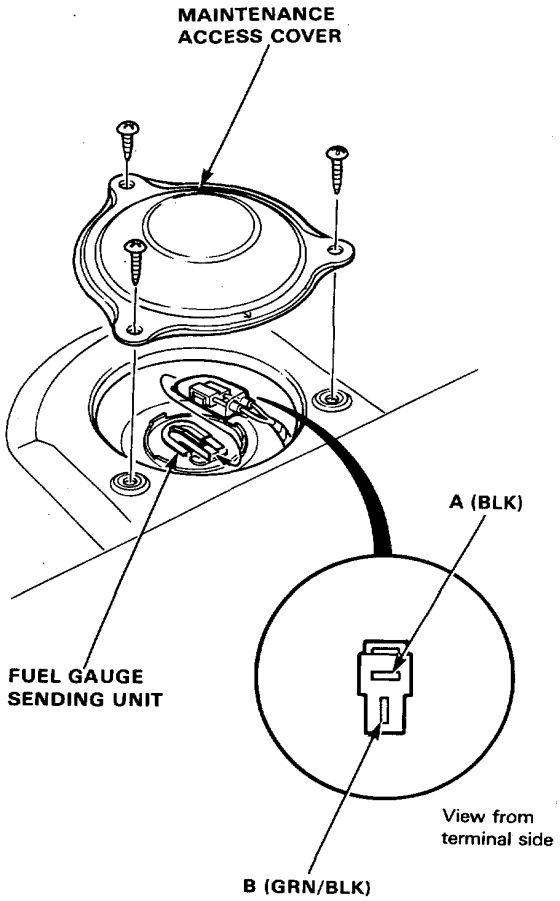
Fuel Gauge

Gauge Test

NOTE: Refer to page 16-82 for wiring description of the fuel gauge circuit.

1. Fold down rear seat back, remove trunk carpet and board, then remove the maintenance accoss cover. (Care should be taken not to damage paint work if leaning in from rear hatch).

2. Disconnect the 2-P connector from the fuel gauge sending unit.



3. Connect the voltmeter positive probe to the B (GRN/BLK) terminal and the negative probe to the A (BLK) terminal, then turn the ignition switch ON. There should be battery voltage.

   - If there is battery voltage, go to step 4.
   - If the voltage is not specified, check for:
     — Blown No. 1 (10A)fuse in the dash fuse box.
     — An open in the GRN, GRN/BLK or BLK wire.
     — Poor ground (G501).

4. Turn the ignition switch OFF. Attach a jumper wire between the A (BLK) and B (GRN/BLK) terminals.

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

   CAUTION: Turn the ignition switch OFF 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.

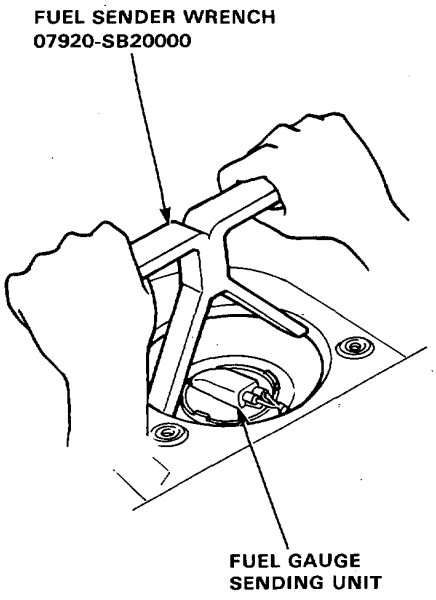
   NOTE: The fuel gauge is a bobbin(cross coil)type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

   - If the pointer of the fuel gauge does not swing at all, replace the gauge.
   - Inspect the fuel gauge sending unit if the gauge is OK.

Sending Unit Test /Replacement

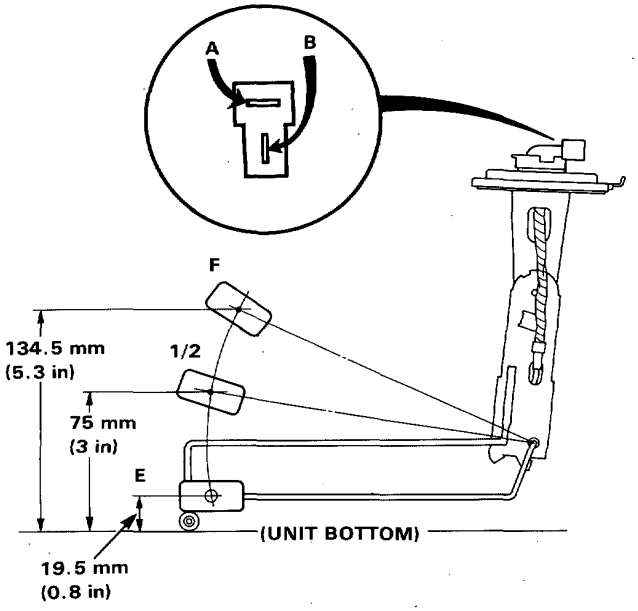
WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Pull down the rear seat (see section 14), them remove the maintenance access cover.
2. Check that the ignition switch OFF, then disconnect the 2-P connector from the fuel gauge sending unit.
3. Remove the fuel gauge sending unit.



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

Float Position	E	1/2	F
Resistance(Ω)	100-105	25.5-39.5	2-5



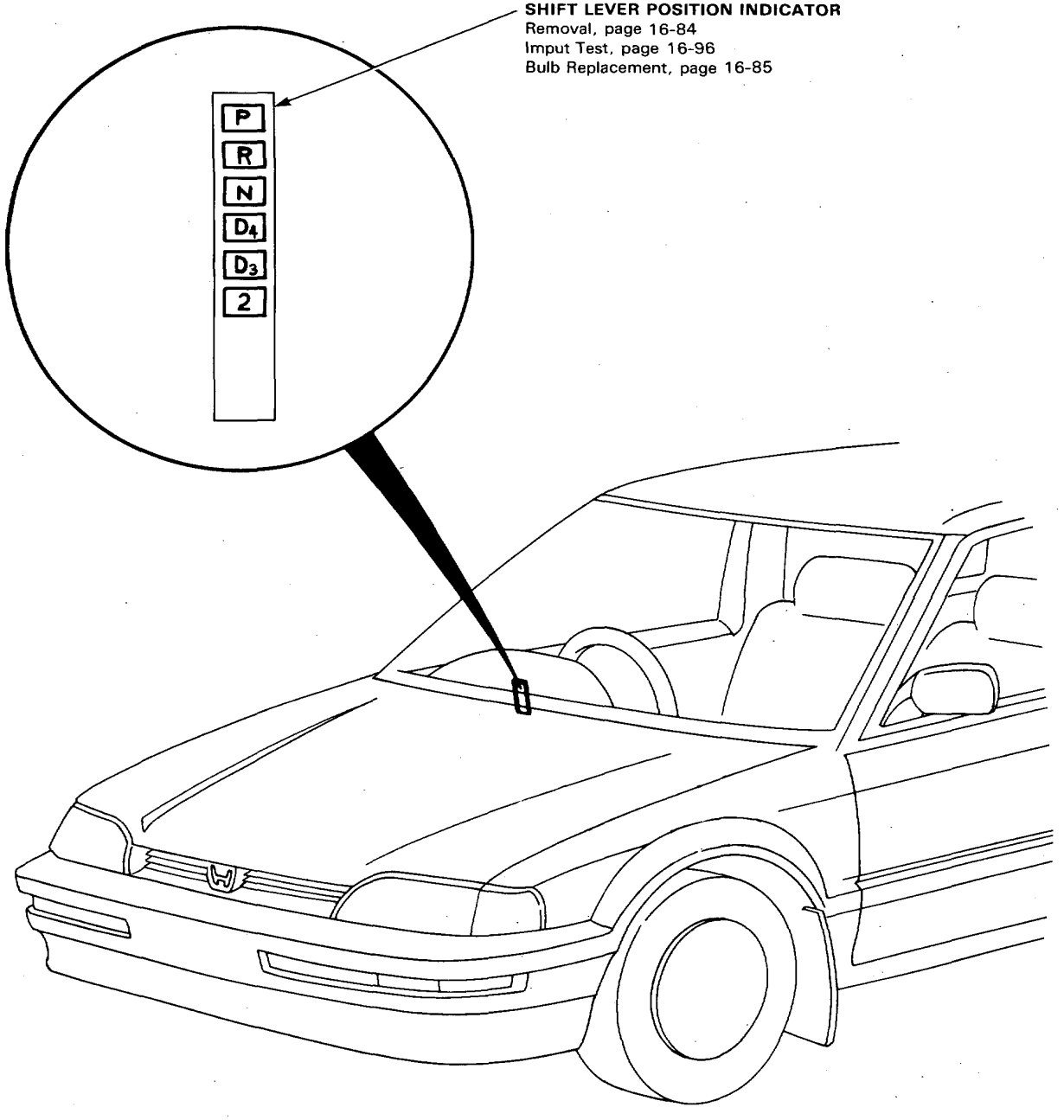
5. If unable to obtain the above readings, replace the fuel gauge sending unit.

Shift Lever Position Indicator

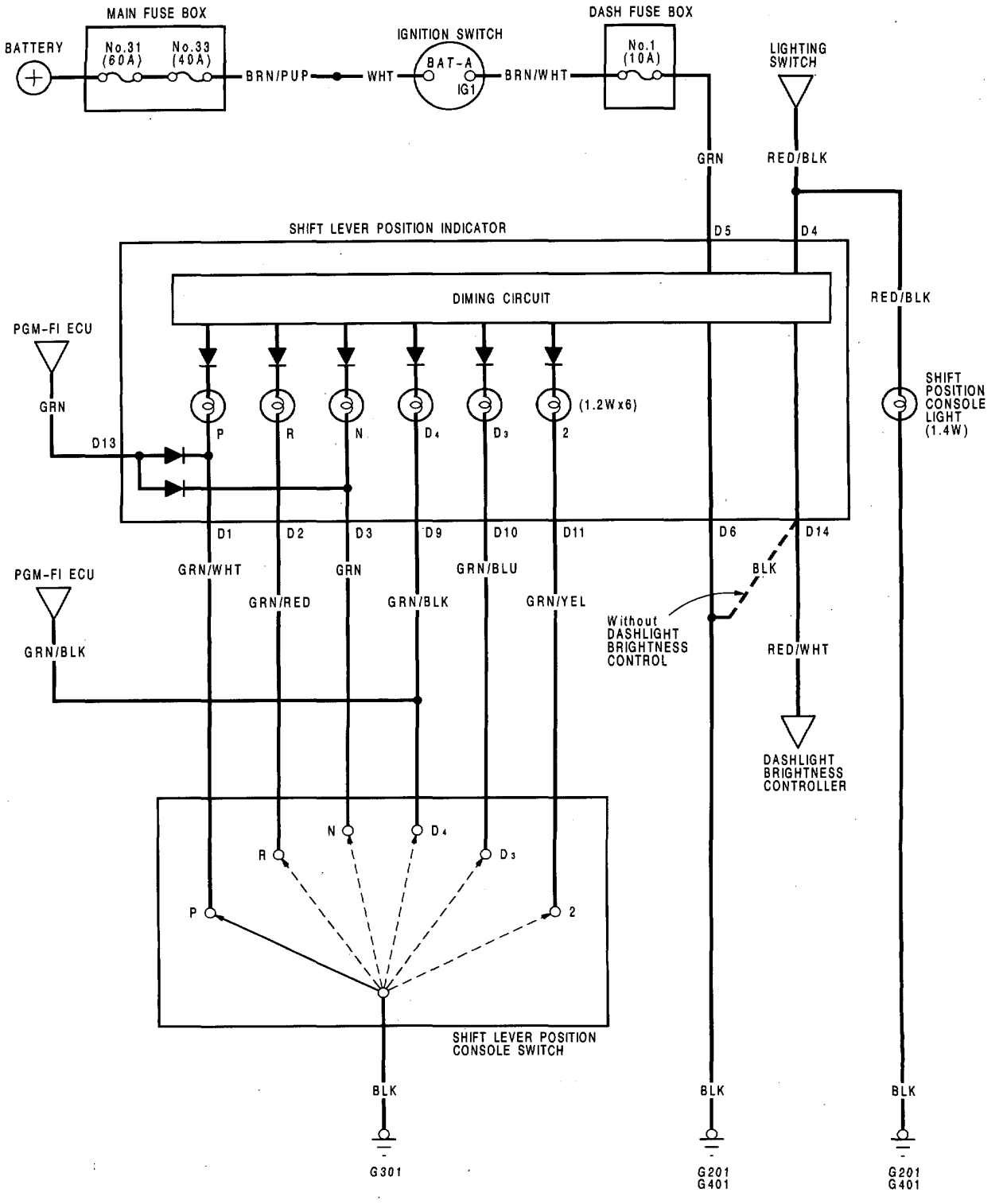
Component Location Index

• **SHIFT POSITION CONSOLE SWITCH**
test, page 16-98
Replacement, page 16-98

SHIFT LEVER POSITION INDICATOR
Removal, page 16-84
Imput Test, page 16-96
Bulb Replacement, page 16-85



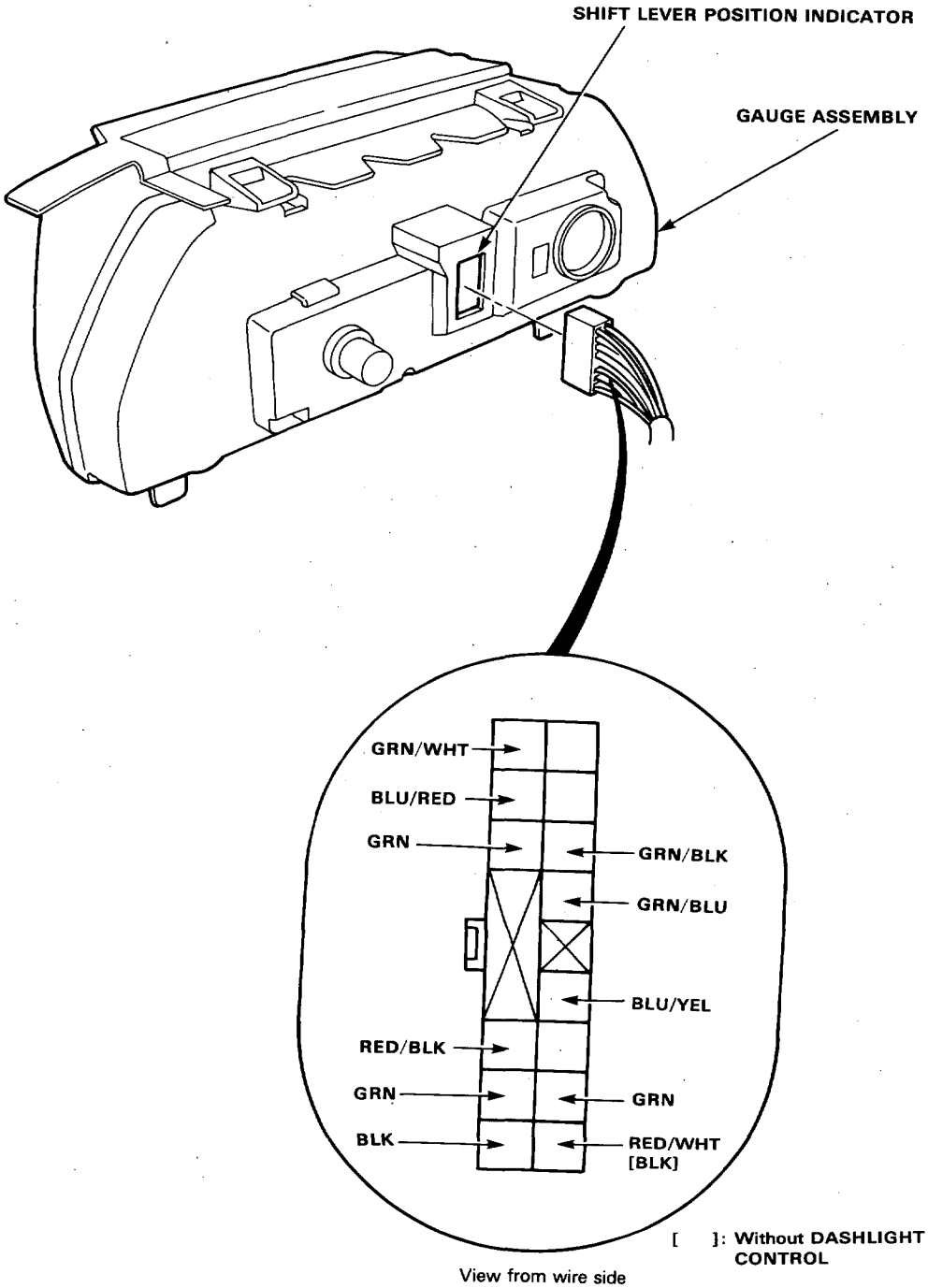
Circuit Daiagram



Shift Lever Position Indicator

Indicator Input Test

Remove the gauge assembly from the dashboard and disconnect the 14-P connector from the indicator.
Make the following input tests at the harness pins. If all tests prove OK, yet the indicator still fails to work, replace the indicator assembly.



[ ]: Without DASHLIGHT BRIGHTNESS CONTROL

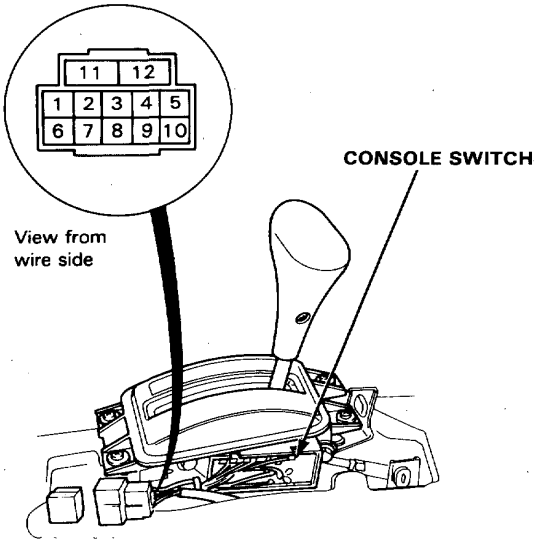
View from wire side

No.	Wire	Test condition	Test : desired result	Possible cause(if result is not obtained)
1	BLK[1] and [BLK[2]]	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G201). · An open in the wire.
2	GRN[1]	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No. 1 (10 A)fuse. · An open in the wire.
3	GRN/WHT	Shift lever position in P.	Check for continuity to ground: should be continuity.	· Faulty shift position console switch. · Poor ground (G201). · An open in the wire.
	BLU/RED	Shift lever position in R.		
	GRN	Shift lever position in N.		
	GRN/BLK	Shift lever position in D_4.		
	GRN/BLU	Shift lever position in D_3.		
	BLU/YEL	Shift lever position in 2.		
4	RED/BLK and RED/WHT	Lighting switch ON and dashlight brightness control dial on full bright.	Check for voltage between RED/BLK and RED/WHT terminals: should be battery voltage. NOTE: If the fuse blows, the RED/WHT and the RED/BLK wires are connected.	· Faulty dashlight brightness control system. · An open in the wire.
5	GRN[2]	Ignition switch ON.	Check for voltage to ground: should be about 5 V.	· Faulty PGM-FI system. · An open in the wire.

Shift Position console switch

Test

1. Remove the center console, then disconnect the 10-P and 2-P connectors from the console switch.
2. Check for continuity between the terminals in each switch position according to the tables.



Shift Position Switch

Terminal / Position	7	8	9	10	5	4	6
2	○	○					
D_3	○		○				
D_4	○			○			
N	○				○		
R	○					○	
P	○						○

Neutral Safety Switch

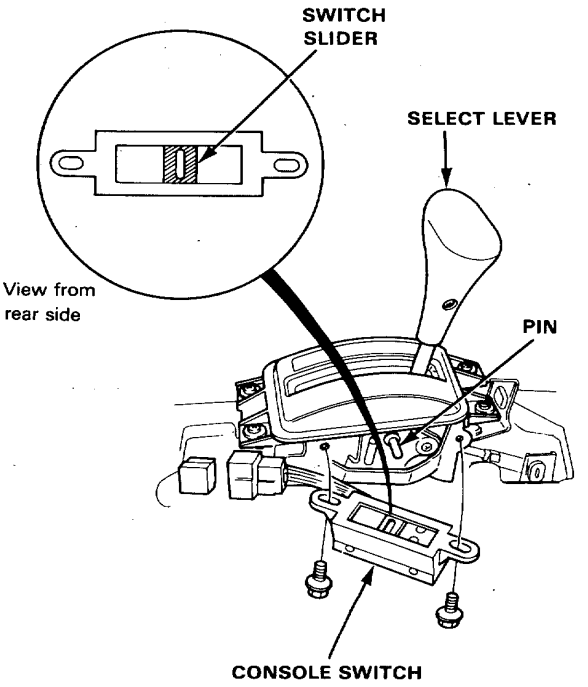
Terminal / Position	11	12
2		
D_3		
D_4		
N	○	○
R		
P	○	○

Back-up Light Switch

2	3
○	○

Replacement

1. Remove the center console, then disconnect the 10-P and 2-P connectors from the console switch.
2. Remove the 2 bolts to replace the console switch.



3. Position the switch slider to "Neutral" as shown above.
4. Shift the select lever to "Neutral", then slip the console switch into position.
5. Tighten the switch with the 2 bolts.

Oil Pressure Warning System

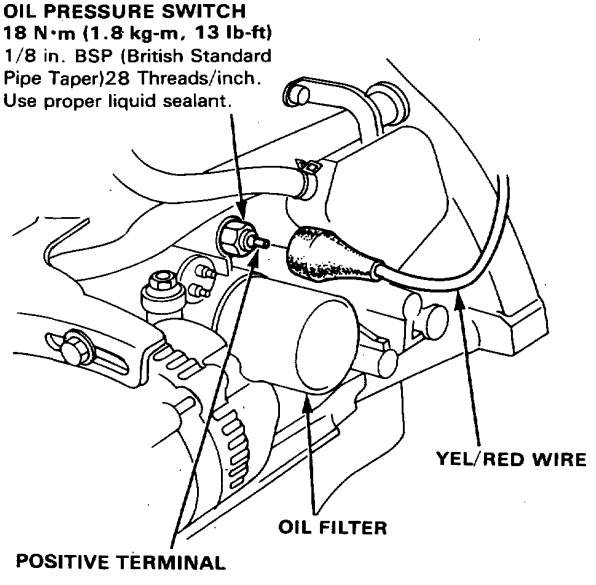
Description

NOTE: Refer to page 16-82 for wiring description of the oil pressure warning circuit.

With the engine running and normal oil pressure, the oil pressure switch is open and the oil pressure warning light does not operate. If engine oil pressure falls below 29kpa(0.3 kg/cm², 4.3 psi), the oil pressure switch is closed, current flows through the oil pressure warning light and the oil pressure switch to ground, and the oil pressure light goes on.

Oil Pressure Switch Test

1. Disconnect the YEL /RED wire from the oil pressure switch.
2. There should be continuity between the positive terminal and the engine (ground) with the engine stopped. There should be no continuity when the engine runs.



3. If the switch fails to operate, check the engine oil level, then inspect the oil pump and pressure if the oil level in correct (see section 5).

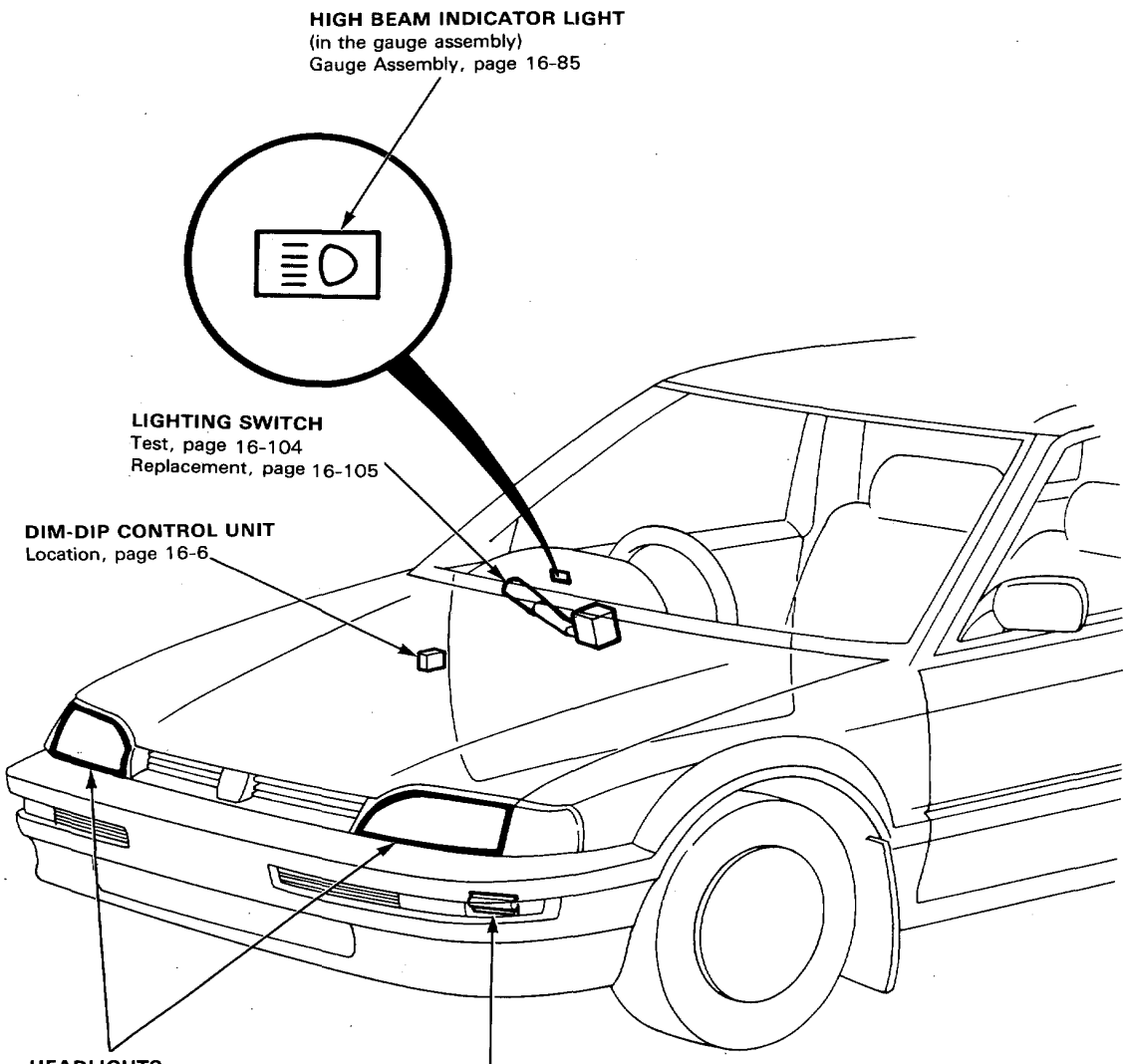
Light-on Warning System

Description

NOTE: Refer to 16-91 for wiring description of the light -on warning circuit, and page 16-91 for the input test of the warning circuit.

When the light on, voltage is applied to the warning circuit on the integrated control unit. When you open the driver's door, the warning circuit senses ground through closed door switch.
With voltage at the "B8" terminal, ground at the "B14" terminal, the beeper is activated to remind the driver to turn of the lights.

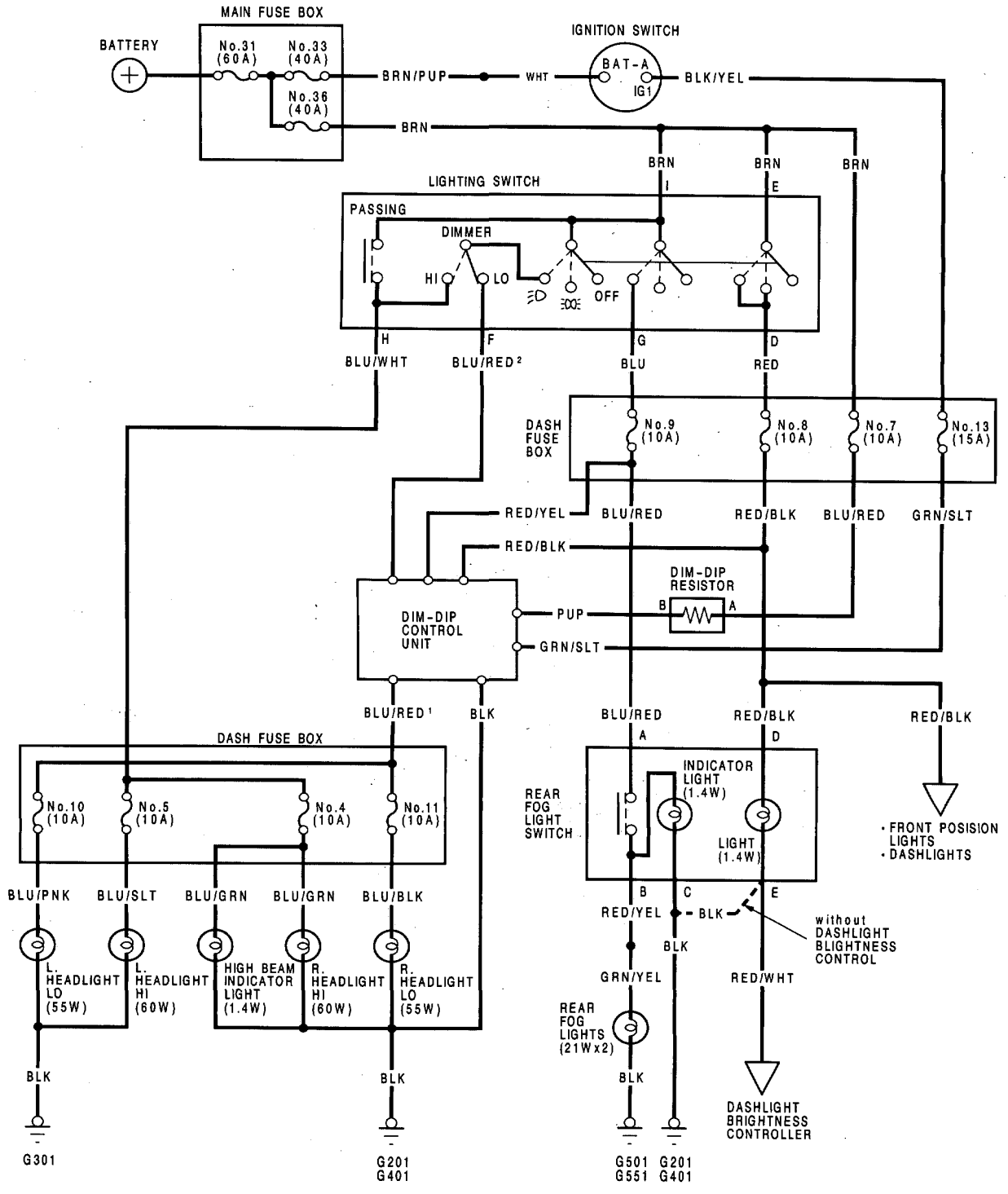
Component Location Index



Lighting System

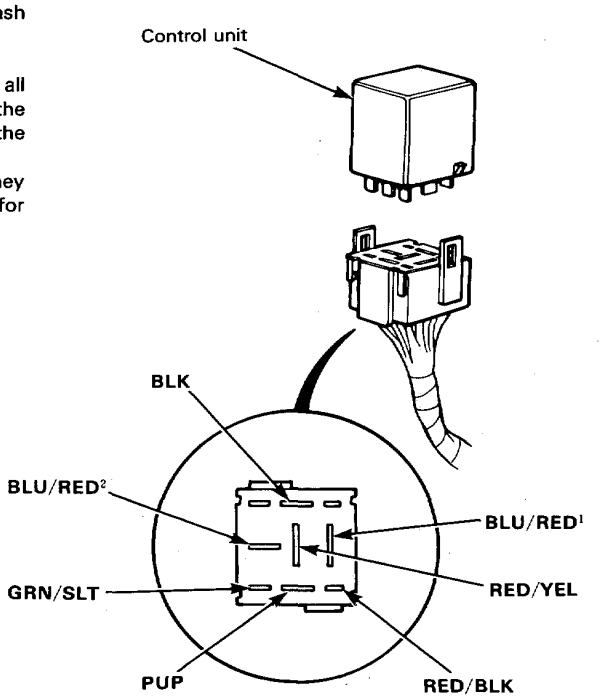
Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example BLU/RED[1] and BLU/RED[2] are not the same).



DIM-DIP Control Unit Input Test

Remove the dashboard lower panel, then slide the dash fuse box.
Disconnect the 7-P connecter ftom the control unit.
Make the following input tests at the harness pins. If all tests prove OK, yet system still fails to work, check the connector for good connection. If OK, then replace the control unit.
NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example BLU/RED' and BLU/RED² are not the same).

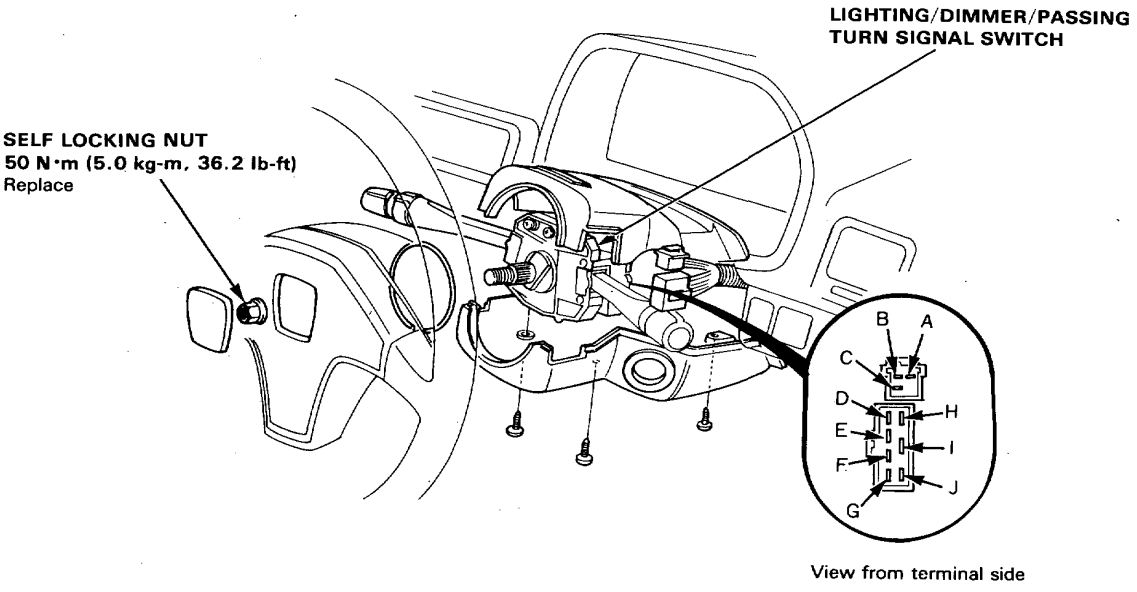


View from wire side

No.	Terminal	Test condition	Test: desired result	Possible cause(if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G201, G401). • Ah open in the wire.
2	PUP	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No.7 (10A) fuse. • Faulty DIM-DIP resistor. • Ah open in the wire.
3	RED/BLK	Lighting switch ON(≡D).	Check for voltage to ground: should be battery voltage.	• Blown No.8 (15A) fuse. • An open in the wire.
4	BLU/RED²	Lighting switch ON(≡D) and dimmer switch LO.	Check for voltage to ground: should be battery voltage.	• Faulty lightig switch.
5	BLU/RED¹	Lighting switch ON(≡D) and dimmer switch LO.	Connect the BLU/RED¹ terminal to the BLU/RED² terminal: Headlights (LO) should come on.	• Blown No.10 (10A) and No.11 (10A) fuses. • Poor ground (G201, G401). • An open in the wire.
6	RED/YEL	Lighting switch ON(≡D).	Check for voltage to ground: should be battery voltage.	• Blown No.9 (10A) fuse. • An open in the wire.
7	GRN/SLT	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No.13 (15A) fuse. • An open in the wire.

Lighting/Turn Signal Switch Test

1. Remove the dashboard lower panel.
2. Remove the steering wheel.
3. Remove the steering column covers then disconnect the 7-P and 4-P connectors.
4. Check for continuity between the terminals in each position according to the tables.



View from terminal side

Lighting/Dimmer/Passing Switch

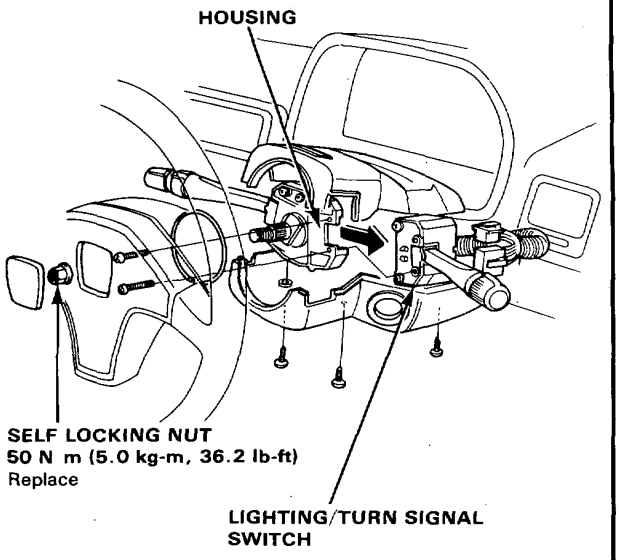
Position \ Terminal		D	E	F	G	H	I
Lighting switch	OFF						
	≡DC	○	○				
	≡D				○	○	○
Dimmer switch	LOW			○	○	○	○
	HIGH				○	○	○
Passing switch	OFF						
	ON					○	○

Turn Signal Switch

Position \ Terminal	A	B	C
R	○	○	
NEUTRAL			
L	○		○

Lighting/Turn Signal Switch Replacement

1. Remove the dashboard lower panel.
2. Remove the steering wheel.
3. Remove the steering column covers then disconnect the 7-P and 4-P connectors from behind the switch.
4. Remove the 2 screws and slide the lighting switch out of housing as shown.

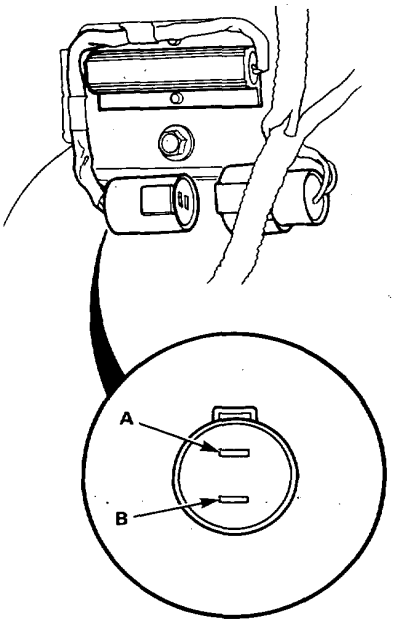


DIM-DIP Resistor Test

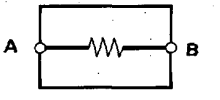
CAUTION: Dim-Dip resistor becomes very hot in use of Dim-Dip headlights; do not touch it or the attaching hardware immediately after they have been turned off.

1. Disconnect the 3-P connector from the resistor.
2. There should be continuity between A and C; between B and C terminals.

RESISTOR (Located left side, engine compartment)

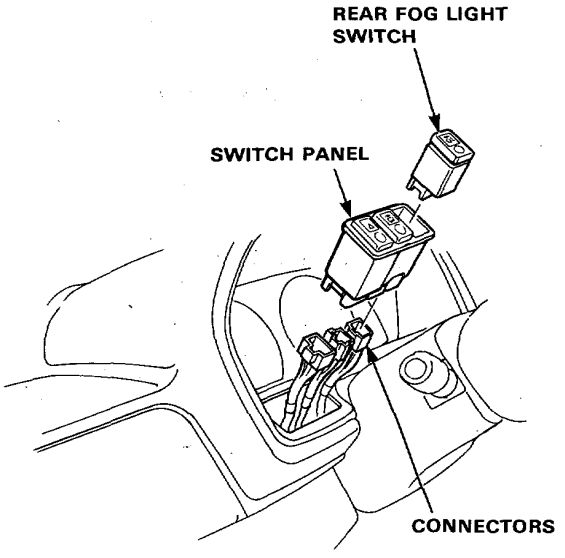


View from wire side

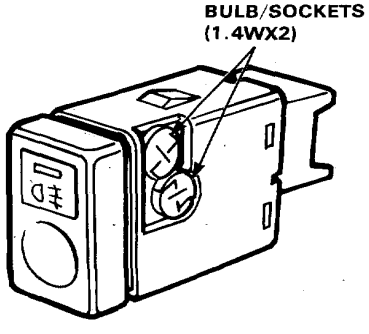


Rear Fog Light Switch Removal

1. Remove the dashboard lower panel. Push out the switchs from behind the instrument panel, then disconnect the connectors from the switchs.
2. Remove the rear fog light switch from the switch panel.



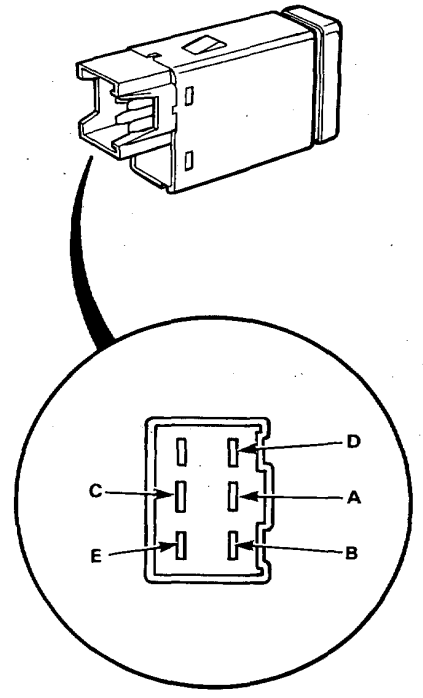
3. Turn the socket 45° counterclockwise (1.4W).

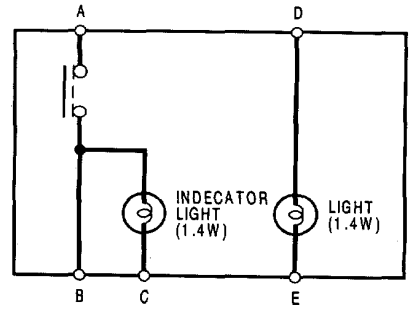


Rear Fog Light Switch Test

1. Remove the switch from the instrument panel.
2. Check for continuity between the terminals according to the table.

Terminal / Position	A		B		C	D		E
ON	○	—	○	○	○	○	○	○
OFF			○	○	○	○	○	○

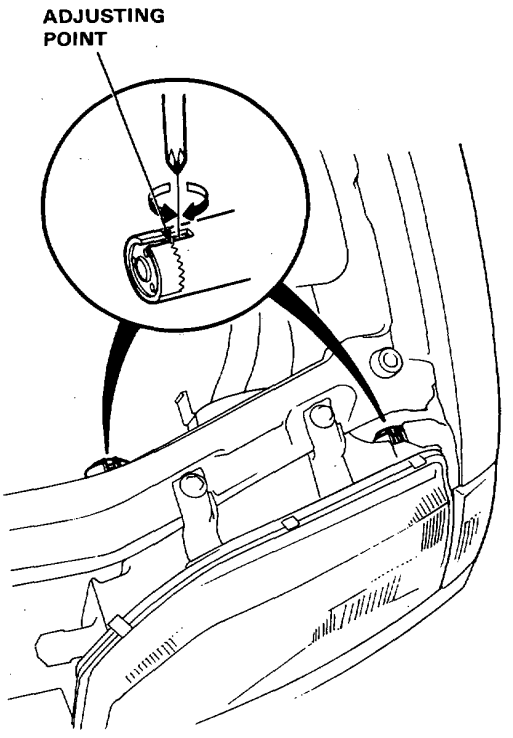




Headlights

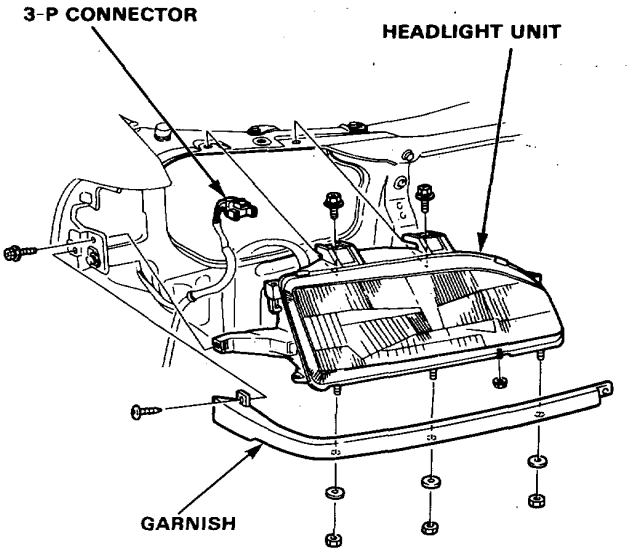
Adjustment

NOTE: Adjust the headlights to local requirements.



Replacement

1. Disconnect the 3-P connector from behind the unit.
2. Remove the front bumper and front position /side turn light.
3. Remove the screw and bolts and nut, then remove the unit.
4. Remove the nuts, then remove the garnish from the unit.
5. After installing the unit, adjust the headlights to local reguirements.

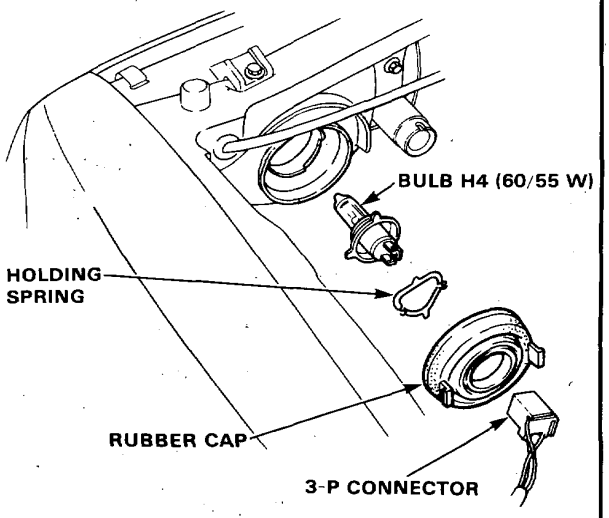


Headlights

Bulb Replacement

CAUTION:

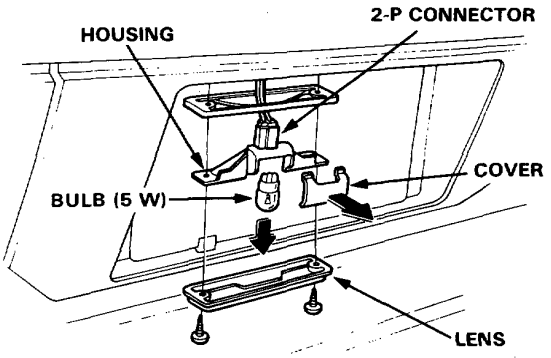
- **Halogen headlights can become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.**
- **Do not try to replace or clean the headlights with the lights on.**



License Plate Light

Bulb Replacement

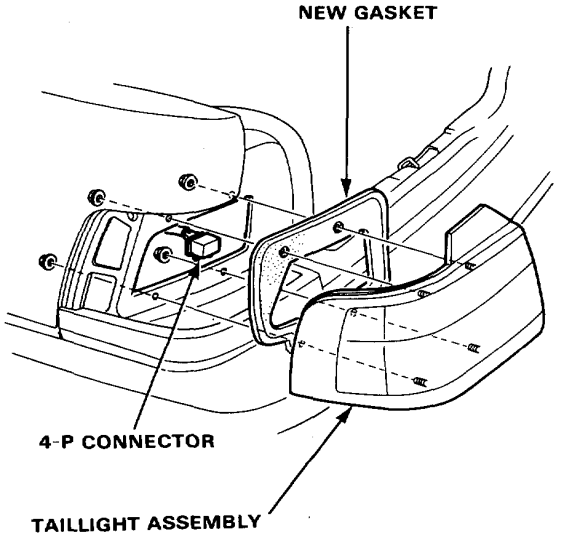
1. Remove the 2 screws and pull out the light assembly from the lid.
2. Disconnect the 2-P connector from the housing.



Taillights Assembly

Replacement

1. Open the trunk lid and remove the trunk side panel.
2. Disconnect the 4-P connector from behind the taillight.
3. Remove the 4 mounting nuts and the taillight assembly.

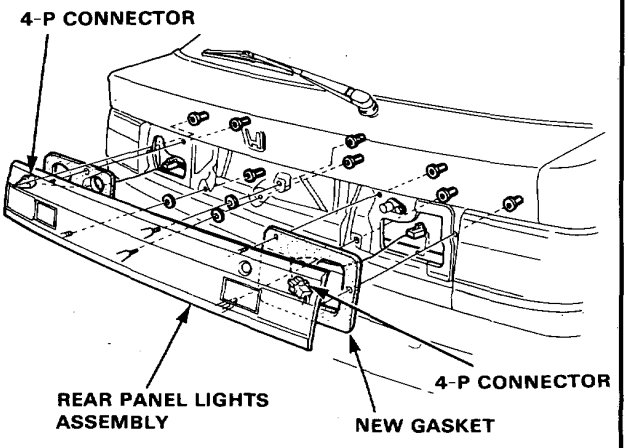


4. Inspect the gasket; replace if it is distorted or overly compressed.

Rear Panel Lights Assembly

Replacement

1. Open the trunk lid and remove the rear trim cover.
2. Disconnect the 4-P connectors from behind the rear panel lights.
3. Remove the 8 mounting nuts and the rear panel lights assembly.

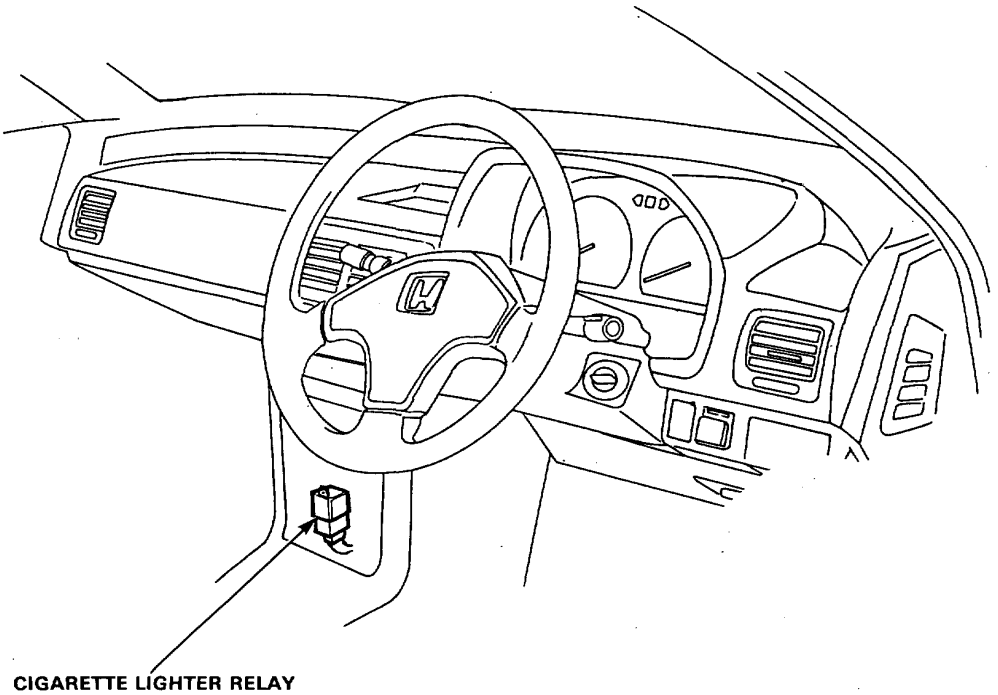


4. Inspect the gasket; replace if it is distorted or overly compressed.

Cigarette Lighter

Component Location Index

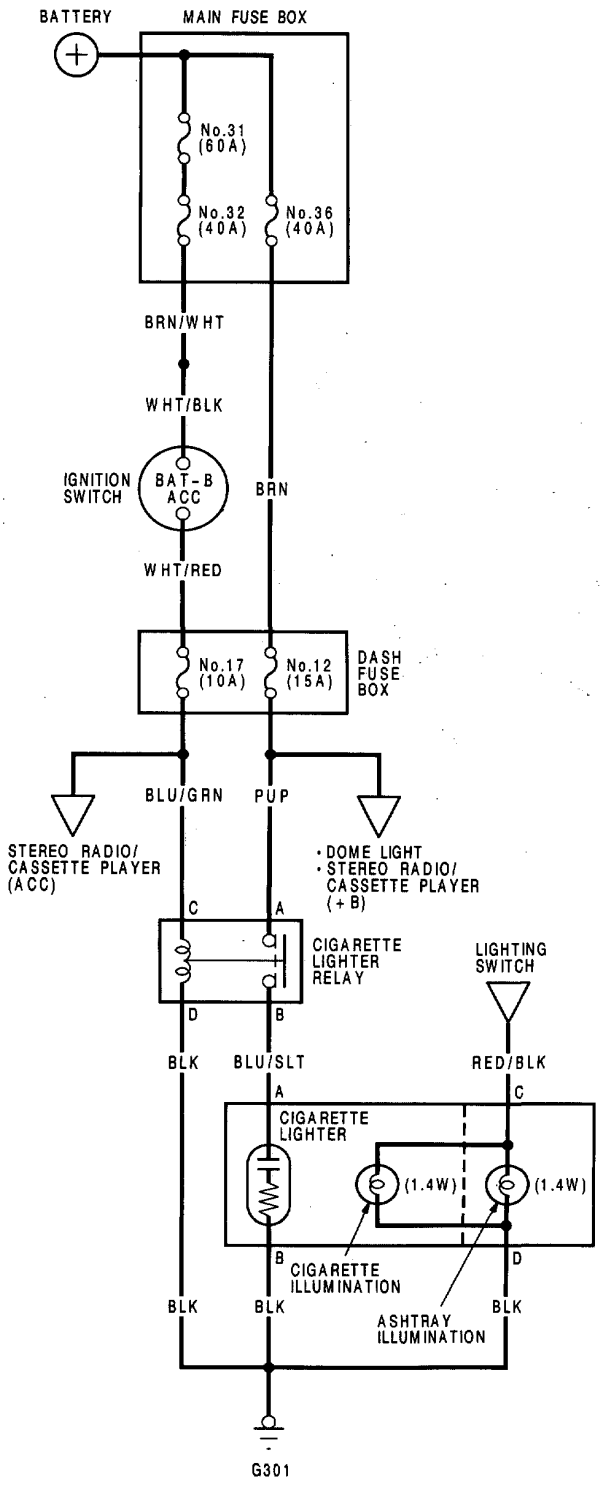
• **CIGARETTE LIGHTER**
Test, page 16-128
Replacement, page 16-129



CIGARETTE LIGHTER RELAY
[Wire colors: BLU/SLT, BLK, BLU/GRN and pup]
Test, page 16-129

Cigarette Lighter

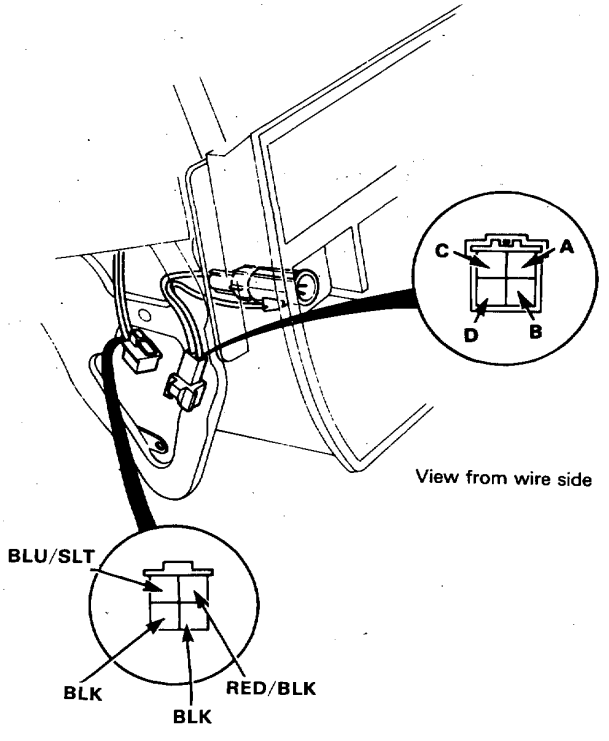
Circuit Diagrm

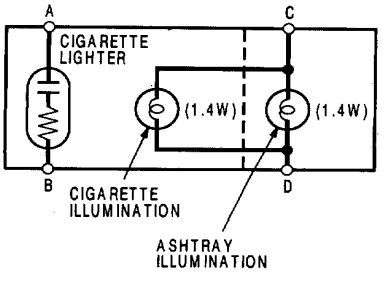


Test

1. Remove the center instrument panel, then disconnect the 4-P connector from the cigarette lighter.

2. Check for voltage between the BLU/SLT and the BLK terminal.
   There should be battery voltage.
   - If there is no voltage, *check for*
     - Blown No.12 (15A) or No.17 (10A) fuse in the dash fuse box.
     - An open in the Pup or BLU/SLT wire.
     - Failty cigarette lighter relay. (Test, page 16-)
   - If there is battery voltage, replace the cigarette lighter assy.

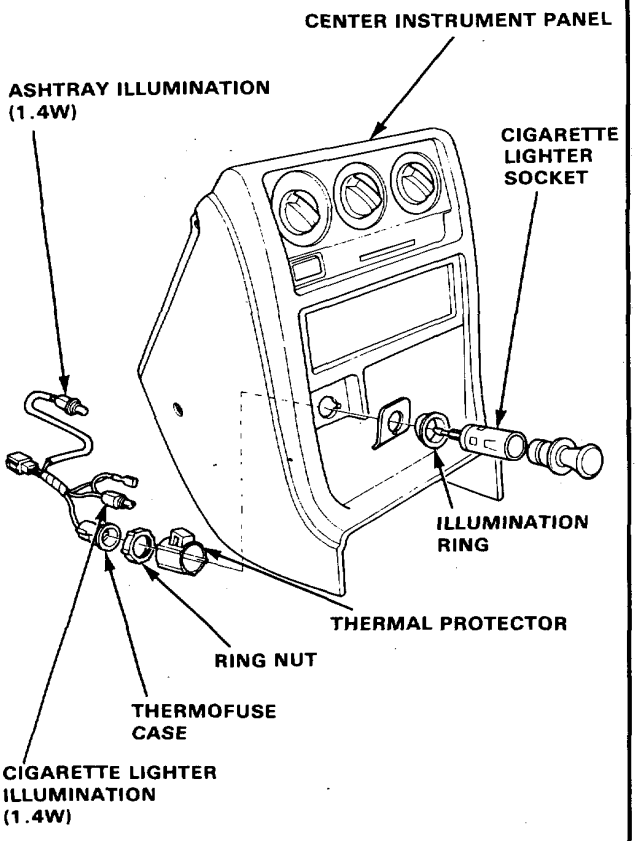




Replacement

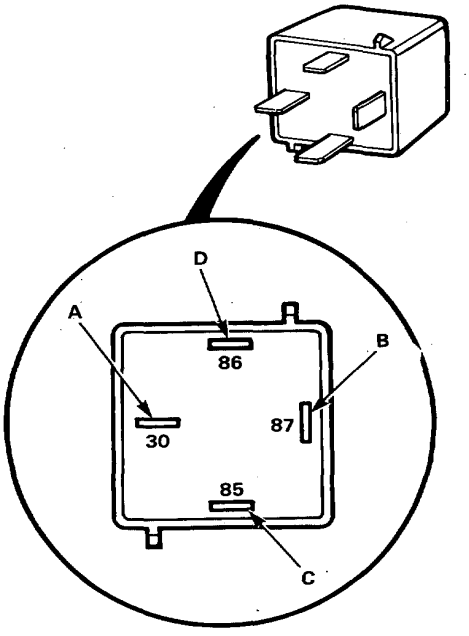
1. Remove the center instrument panel, then disconnect the 4-P connector from the cigarette lighter.
2. Disconnect the thermofuse case from the socket end.
3. Remove the ring nut and separate the cigarette lighter socket.

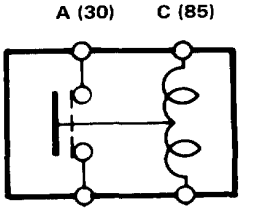
   NOTE: When installing the cigarette lighter, align the lug on the cigarette lighter socket with the slot in the panel.



Cigarette Lighter Relay Test

There should be continuity between the A and B terminals when the battery is connected to the C and D terminals. There should be no continuity when the battery is disconnected.

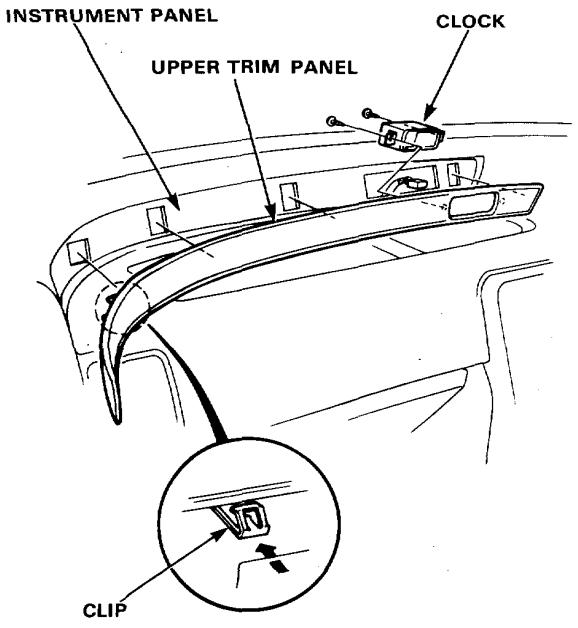




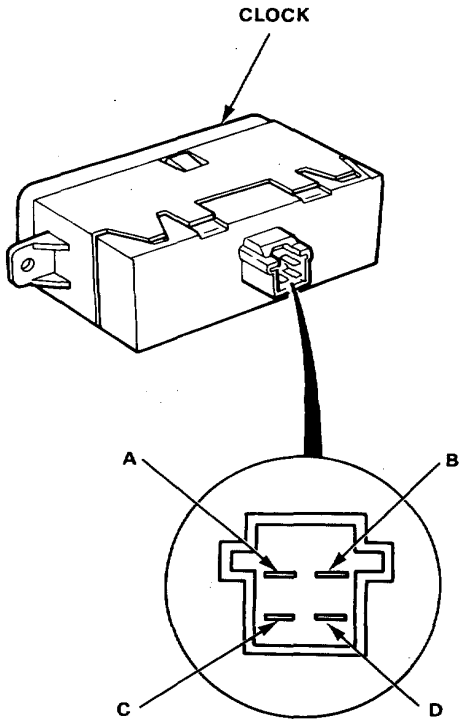
Clock

Removal

1. Remove the upper trim panel from the instrument panel, then carefully pull out the 10 clips.
2. Disconnect the 4-P connector from the clock.
3. Remove the 2 screws and clock from the panel.



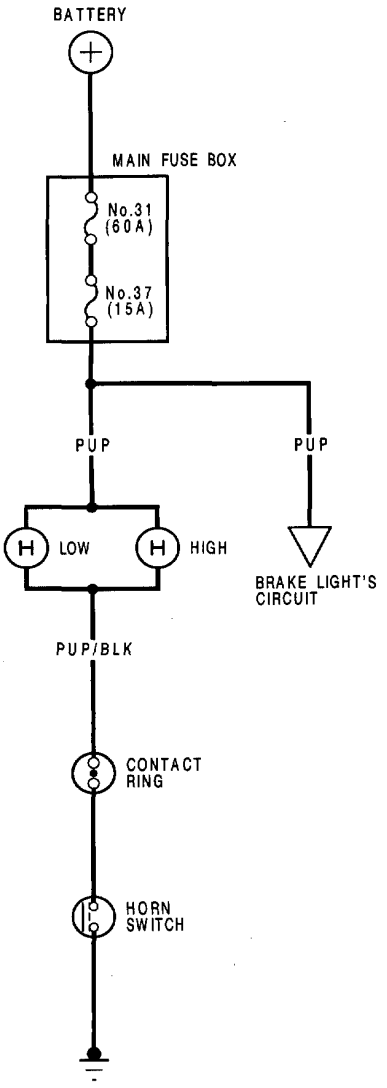
Terminals



Terminal	Wire	Destination
A	WHT/BLU	Constant power (Time memory)
B	YEL	IG1 (Main clock power supply)
C	RED/BLK	Light-on signal
D	BLK	Ground

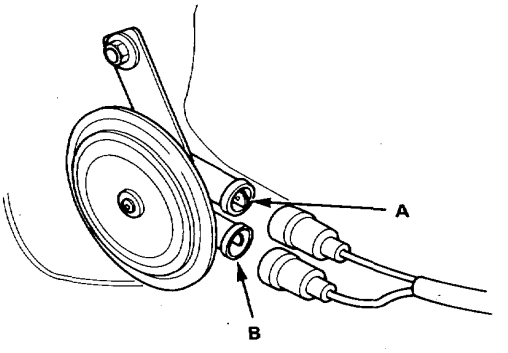
Horn

Circuit Diagram



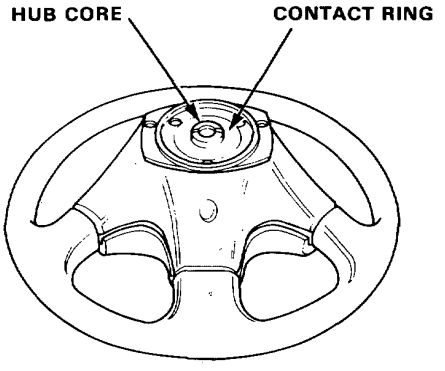
Horn Test

1. Remove the front bumper.
   - Remove the right and left front turn signal lights.
   - Remove the 2 bumper mounting screws on each side at the corner edge of the bumper.
   - Remove the 2 lower bumper mounting bolts and the 4 bumper mounting bolts.
   - Lift and remove the bumper by sliding it forward.
   - Installation sequence is essentially the reverse order of removal.
2. Disconnect the wires from the horn.
3. Test the horn by connecting battery voltage to the A and B terminals. The horn should sound.
4. If the horn fails to sound, replace it.



Switch Test

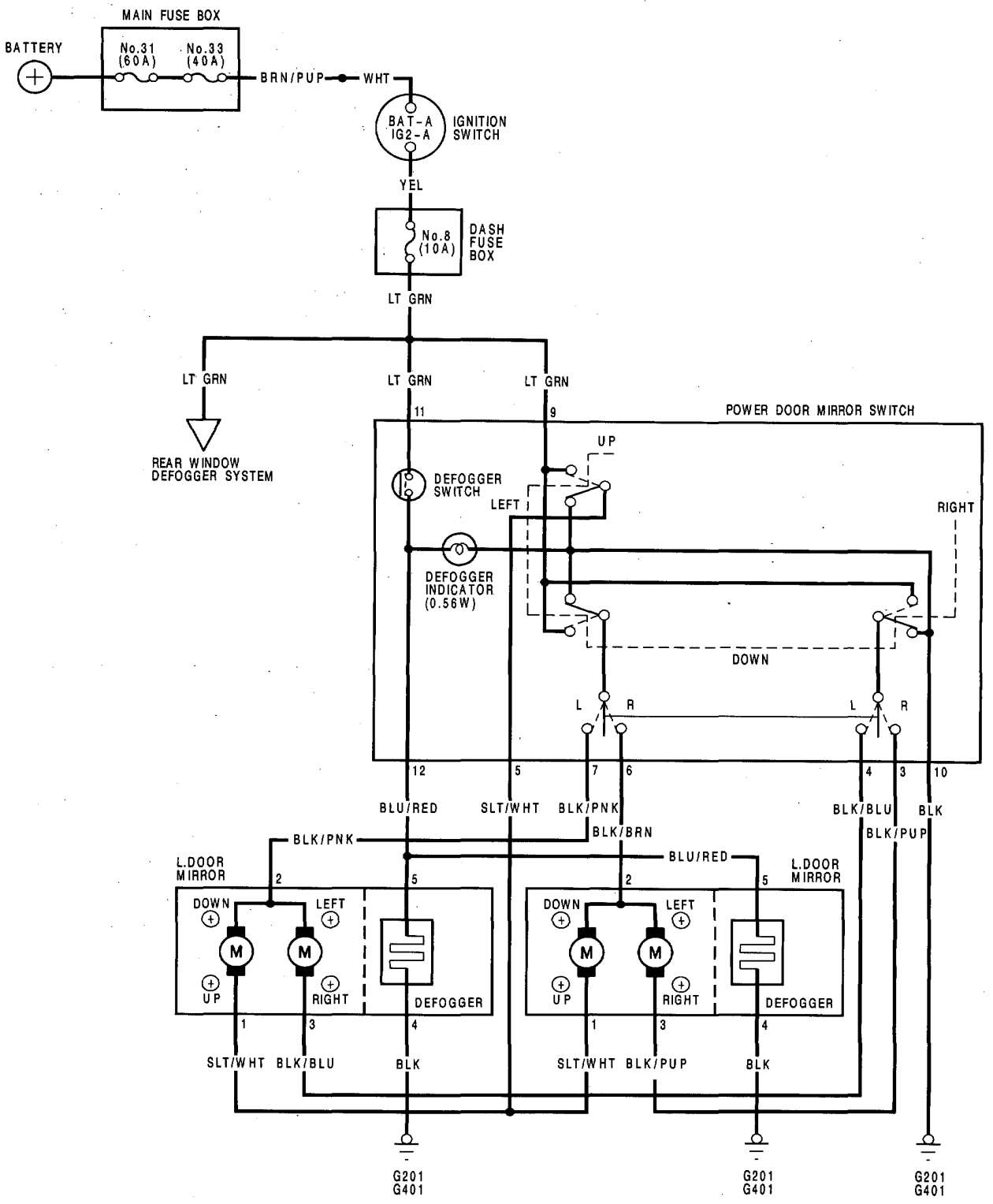
1. Remove the steering wheel, then turn it over. (see, page 16-104)
2. Check for continuity between the contact ring and hub core on the steering wheel with the horn switch pressed.
   There should be continuity.



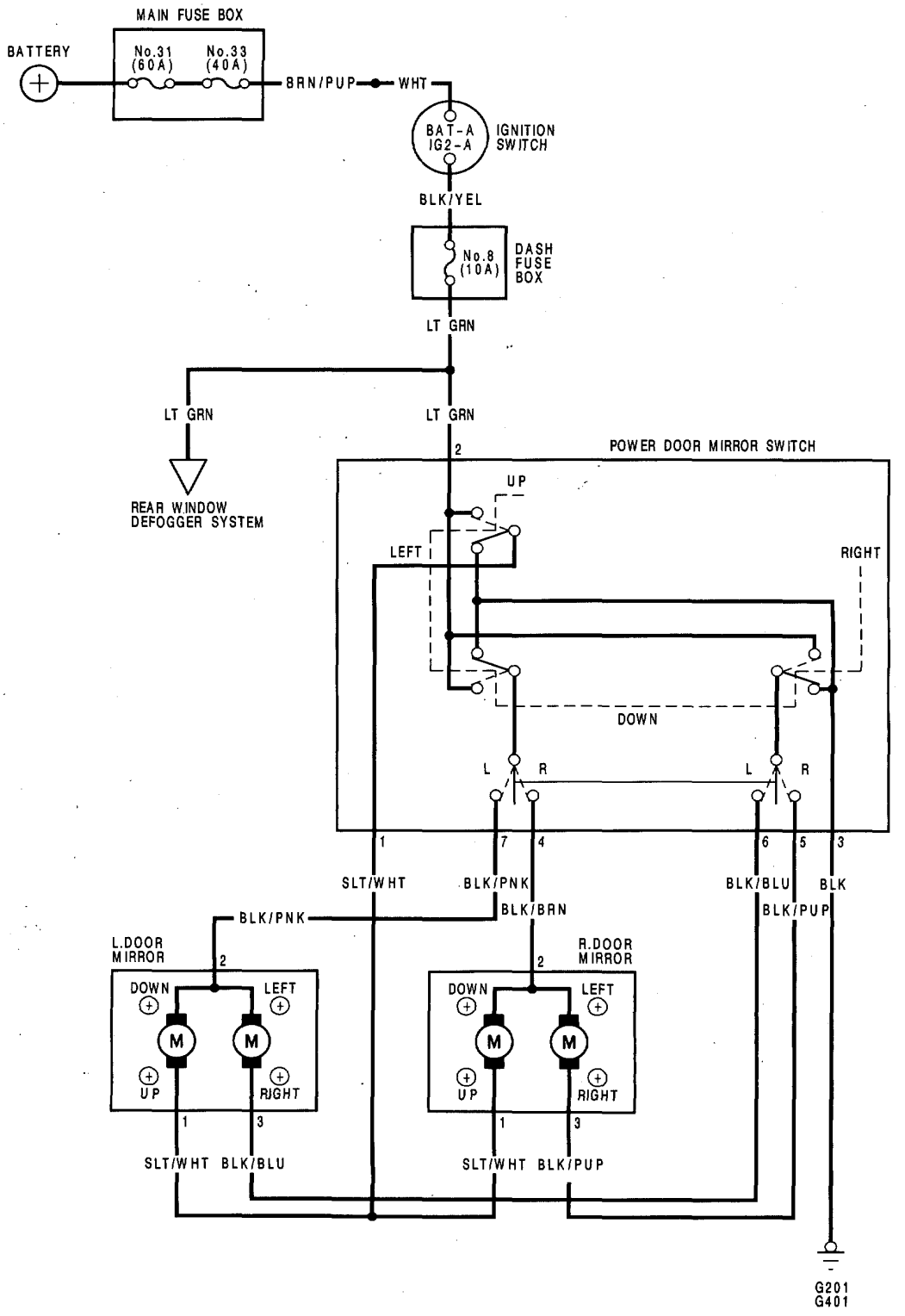
3. If there is no continuity, repair the horn switch.

Power Door Mirrors

Circit Diagram (with Defogger)



(Without Defogger)

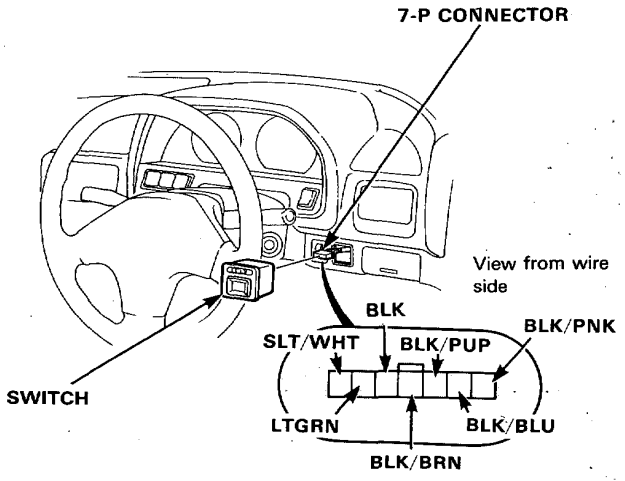


Power Door Mirrors

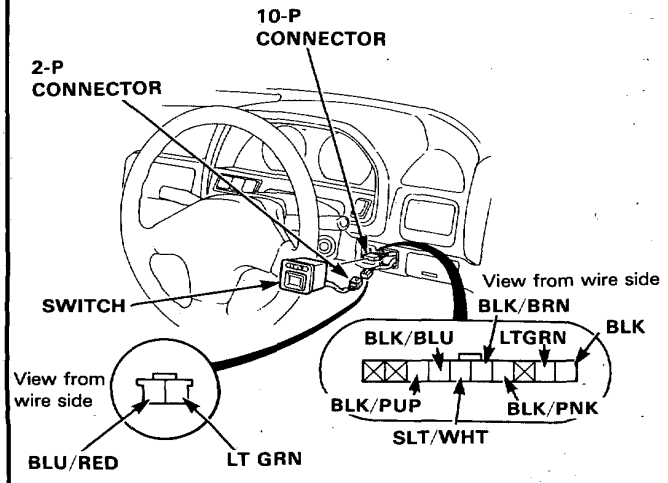
Function Test

NOTE: Before testing, remove the dashboard lower panel and push out the switch from behind the instrument panel, then disconnect the 7-P connector (and 10-P connector and 2-P connector) to remove the switch.

Without defogger:



With defogger:



Mirror Test

One or both inoperative:

1. Check for voltage between the LT GRN terminal and body ground with the ignition switch ON.
   There should be battery voltage.
   - If there is no voltage, check for
     - Blown No.8 (10A) fuse in the dash fuse box.
     - An open in the LT GRN wire.
   - If there is battery voltage, go to step 2.

2. Check for continuity between the BLK terminal and body ground.
   There should be continuity.
   - If there is no continuity, check for
     - An open in the BLK wire.
     - Poor ground (G201, G401).

Right inoperative:

Connect the BLK/BRN terminal to the BLU/GRN terminal and the SLT/WHT (or BLK/PUP) terminal to the body ground with jumper wires.
The right mirror should tilt down (or swing left) when the ignition switch is turned ON.

- If the mirror does not tilt down (or does not swing left), remove the right door trim panel and check for open in the SLT/WHT (or BLK/PUP) wire between the right door mirror and the switch.
  If the wire is OK, check the right door mirror.
- If the mirror neither tilts down nor swings left, repair the BLK/BRN wire.
- If the mirror operates properly, check the mirror switch.

Left inoperative:

Connect the LT GRN terminal to the BLK/PNK terminal and the SLT/WHT (or BLK/BLU) terminal to the body ground with jumper wires.
The left mirror should tilt down (or swing left) when the ignition switch is turned ON.

- If the mirror does not tilt down (or does not swing left), remove the left door trim panel and check for open in the SLT/WHT (or BLK/BLU) wire between the left door mirror and switch.
  If the wire is OK. check the left door mirror.
- If the mirror neither tilts down nor swings left, repair the BLK/PNK wire.
- If the mirror operates properly, check the mirror switch.

Defogger Test

1. Check for voltage between the LT GRN terminal of the 2-P connector and body ground with the ignition switch ON.
   There should be battery voltage.

   - If there is no voltage, check for:
     - Blown No.8 (10A) fuse in the dash fuse box.
     - An open in the LT GRN wire between the dash fuse box and the defogger switch.

   - If there is battery voltage, go to step 2.

2. Connect the LT GRN terminal of the 2-P connector to the BLU/RED terminal with a jumper wire.
   Both the right and left mirrors should gradually warm up when the ignition switch is turned ON.

   - If neither warm up, repair the BLU/RED wire.

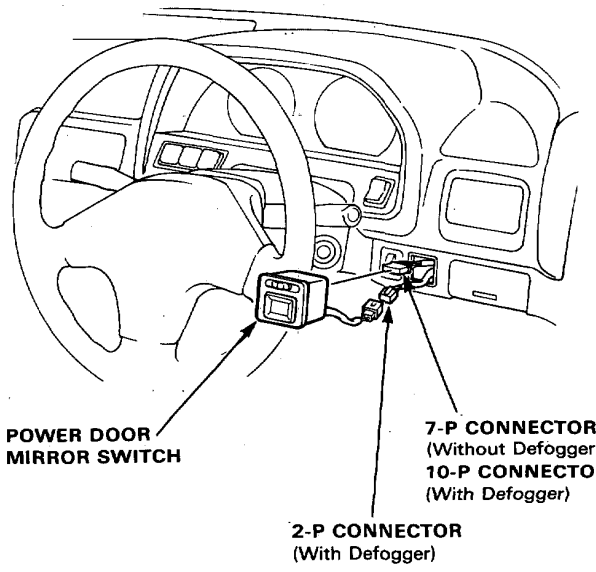
   - If only one fails to warm up, check its mirror defogger element.

   - If both warm up, check the switch.

Switch Removal

1. Remove the dashboard lower panel.

2. Push out the switch from behind the instrument panel, them disconnect the 7-P connector (without Defogger) or 10-P and 2-P connector's (with Defogger) to remove the switch.



Power Door Mirrors

Switch Test

1. Remove the power door mirror switch from the instrument panel.
2. Check for continuity between the terminal's in each switch position according to the table.

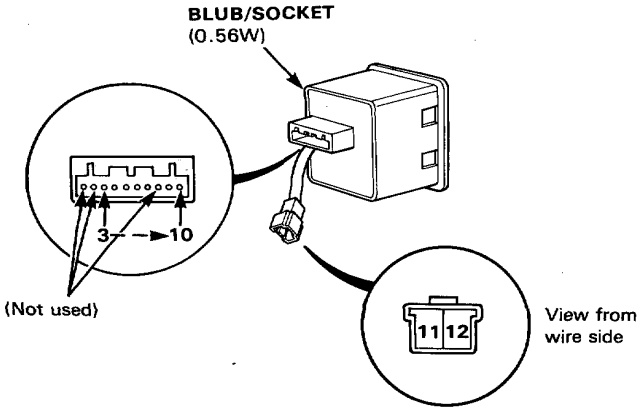
With Defogger:
Mirror switch

Position		Terminal 3	4	5	6	7	9	10
R	OFF	○		○	○			○
	UP			○			○	
	DOWN				○		○	
	LEFT				○		○	
	RIGHT	○					○	
L	OFF		○	○		○		○
	UP			○			○	
	DOWN					○	○	
	LEFT					○	○	
	RIGHT		○				○	

Defogger Switch

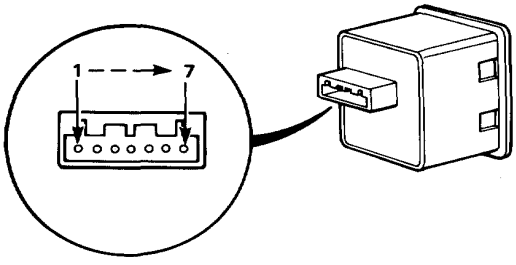
Position	Terminal 11	12		10
OFF		○	(D)	○
ON	○	○	(D)	○

(Internal connection)



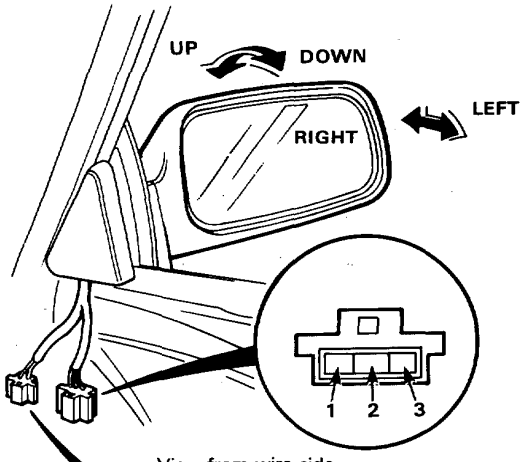
Without Defogger:
Mirror switch

Position		Terminal 1	2	3	4	5	6	7
R	OFF	○		○	○	○		
	UP	○	○					
	DOWN		○		○			
	LEFT		○		○			
	RIGHT		○			○		
L	OFF	○		○			○	○
	UP	○	○					
	DOWN		○					○
	LEFT		○					○
	RIGHT		○				○	

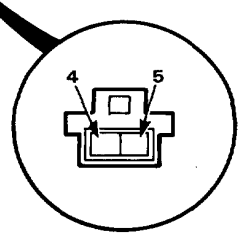


Door Mirror Test

1. Remove the door trim panel, then disconnect the 3-P connector from the mirror.
2. Test actuator operation:
   - TILT UP: Connect battery positive to the No.1 terminal and negative to the No.2 terminal.
   - TILT DOWN: Connect battery positive to the No.2 terminal and negative to the No.1 terminal.
   - SWING LEFT: Connect battery positive to the No.2 terminal and negative to the No.3 terminal.
   - SWING RIGHT: Connect bettery positive to the No.3 terminal and negative to the No.2 terminal.
3. If the mirror fails to operate properly, replace it.
4. For with defogger, check for continuity between the No.4 and No.5 terminals (R x 10^3 scale). There should be continuity.



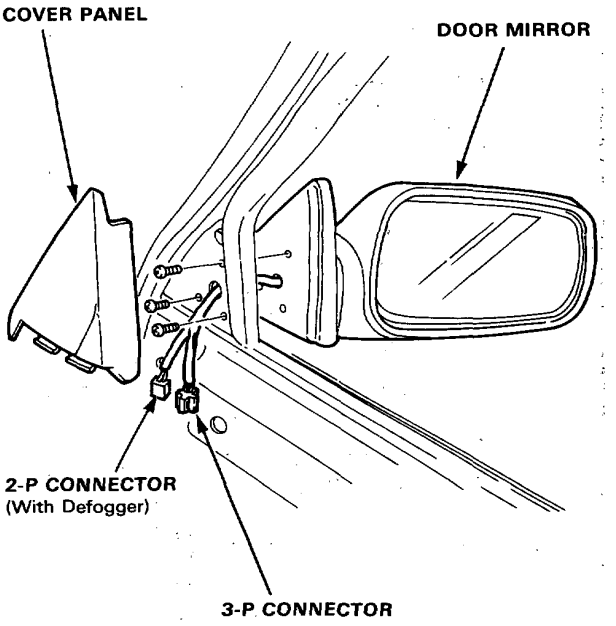
View from wire side



(With Defogger)

Door Mirror Replacement

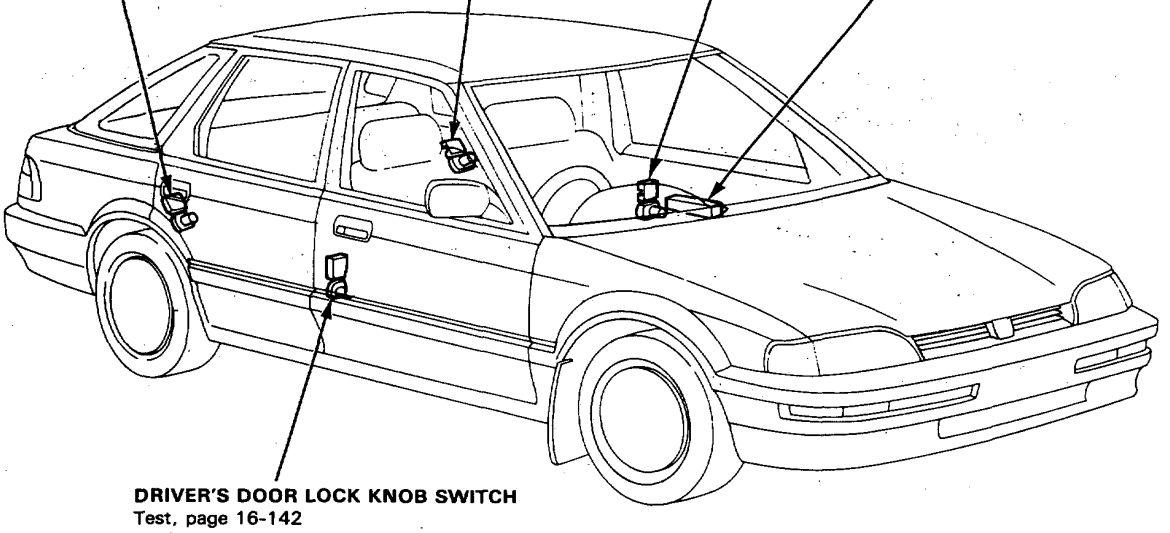
1. Remove the door trim panel, then disconnect the 3-P connector (and 2-P connector) from the mirror.
2. Carefully pry out the cover panel with a flat tip screwdriver.
3. While holding the mirror with one hand, remove its mount screws with the other.



Power Door Locks

Component Location Index

• Troubleshooting, page 16-129



L. REAR DOOR LOCK ACTUATOR
Test, page 16-142
Replacement, section 14

L. FRONT DOOR LOCK ACTUATOR
Test, page 16-142
Replacement, section 14

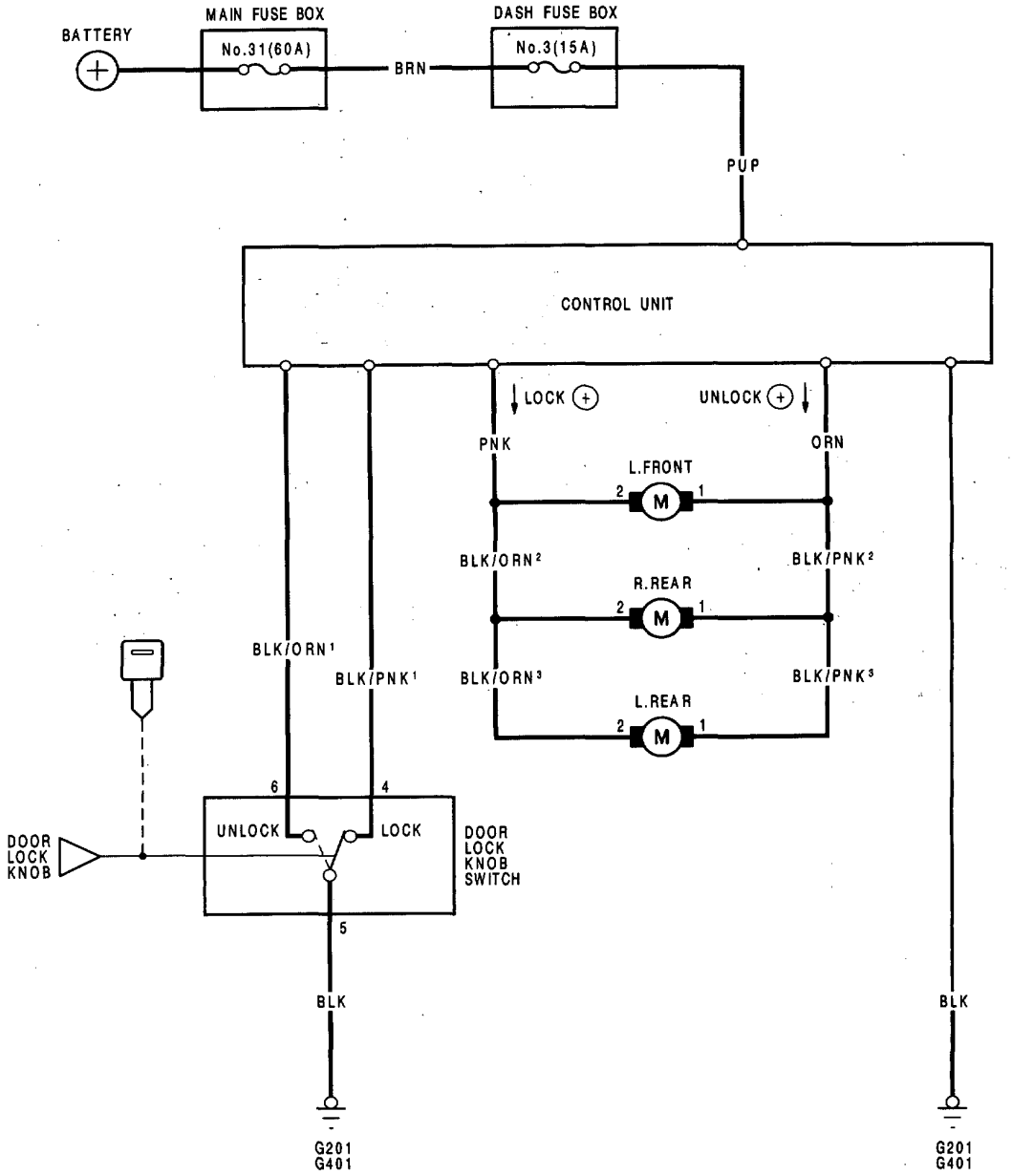
R. REAR DOOR LOCK ACTUATOR
Test, page 16-142
Replacement, section 14

CONTROL UNIT
(Located in the L. front door panel)
Input Test, page 16-141

DRIVER'S DOOR LOCK KNOB SWITCH
Test, page 16-142
Replacement, section 14

Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example BLK/ORN[1] and BLK/ORN[2] are not same).



Power Door Locks

Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

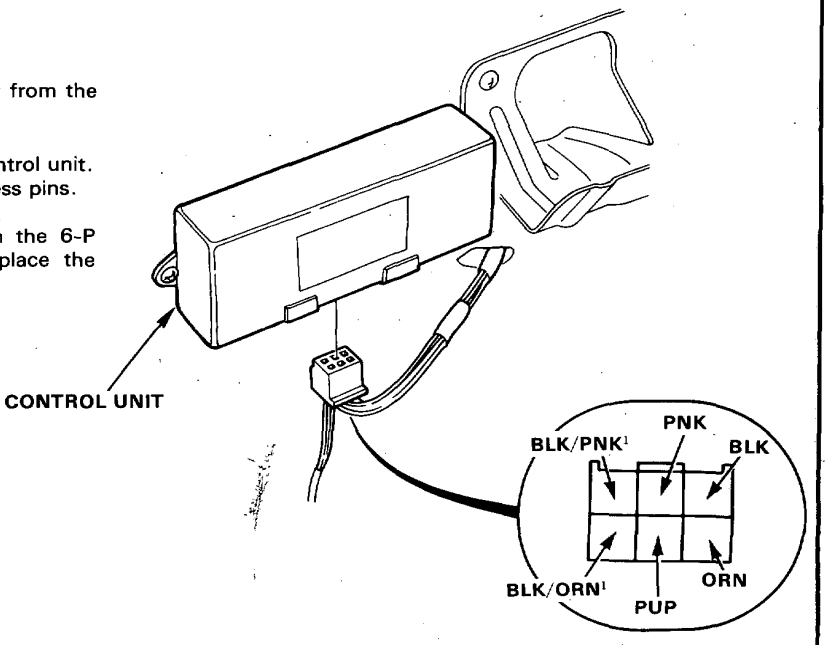
Symptom / Item to be inspected		Blown No.3 (15A) fuse (in the dash fuse box)	Door lock knob switch	Control unit input	Passenger door actuator	Disconnected or obstructed door lock rod/linkage	Poor ground	Open circuit in wires or loose or disconnected terminals
Power door lock system do not operate at all.		1		2			G201 G401	BRN or PUP
Doors do not lock or unlock with driver's door lock knob switch.	All passenger doors.	1	2	3		4	G201 G401	BLK/ORN[1], BLK/PNK[1] PNK or ORN
	One or more passenger door.				1			PNK, ORN BLK/ORN[2] or BLK/PNK[2]

CAUTION: To prevent damage to the motor, apply battery voltage momentarily.

Control Unit Input Test

1. Remove the L.front door trim panel.
2. Remove the 2 screws and the control unit from the door panel.
3. Disconnect the 6-P connector from the control unit. Make the following input tests at the harness pins.

   NOTE : Recheck the connections between the 6-P connector and the control unit, then replace the control unit if all input tests prove OK.



View from wire side

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground : should be continuity.	• Poor ground (G201, G401) • An open in the wire.
2	PUP	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No.3 (15A) fuse. • An open in the wire.
3	BLK/PNK[1]	Driver's door lock knob in LOCK.	Check for continuity to ground : should be continuity.	• Faulty door lock knob switch. • Poor ground (G201, G401). • An open in the wire.
4	BLK/ORN[1]	Driver's door lock knob in UNLOCK.	Check for continuity to ground : should be continuity.	• Faulty door lock knob switch. • Poor ground (G201, G401). • An open in the wire.
5	ORN and PUP	Connect the PUP terminal to the PNK terminal, and the ORN terminal to the BLK terminal momentarily.	Check door lock operation : Passenger doors should lock as the battery in connected momentarily.	• Faulty actuators.
		Connect the PUP terminal to the ORN terminal, and the PNK terminal to the BLK terminal momentarily.	Check door lock operation : Passenger doors should unlock as the battery is connected momentarily.	• An open in the wire.

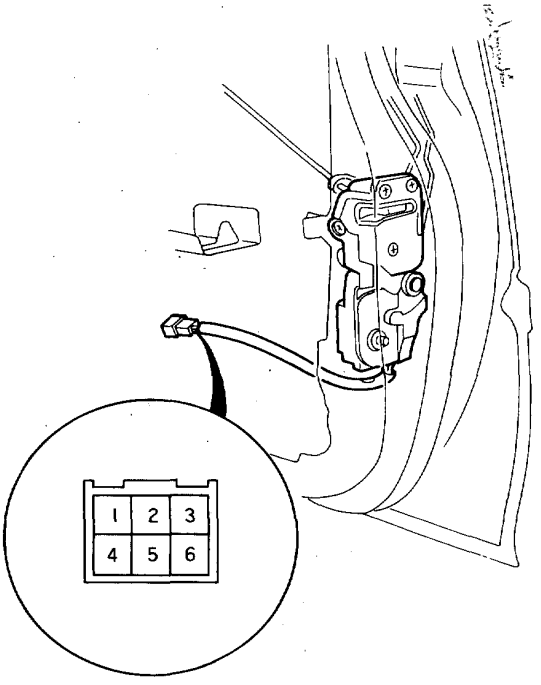
CAUTION : To prevent damage to the motor, apply battery voltage momentarily.

Power Door Locks

Door Lock Knob Switch Test

1. Remove the driver's door trim panel.
2. Disconnect the 6-P connector from the switch.
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	4	5	6
UNLOCK		○——	——○
LOCK	○——	——○	

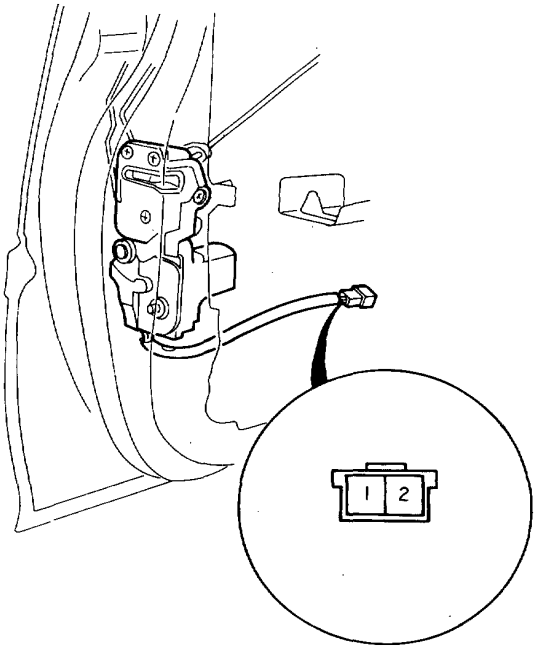


View from wire side

Passenger Door Actuator Test

1. Remove the door trim panel.
2. Disconnect the 2-P connector from the actuator.
3. Test actuator operation by applying battery voltage to the No.1 and No.2 terminals.
   Test the actuator in each direction, by switching the leads from the battery.

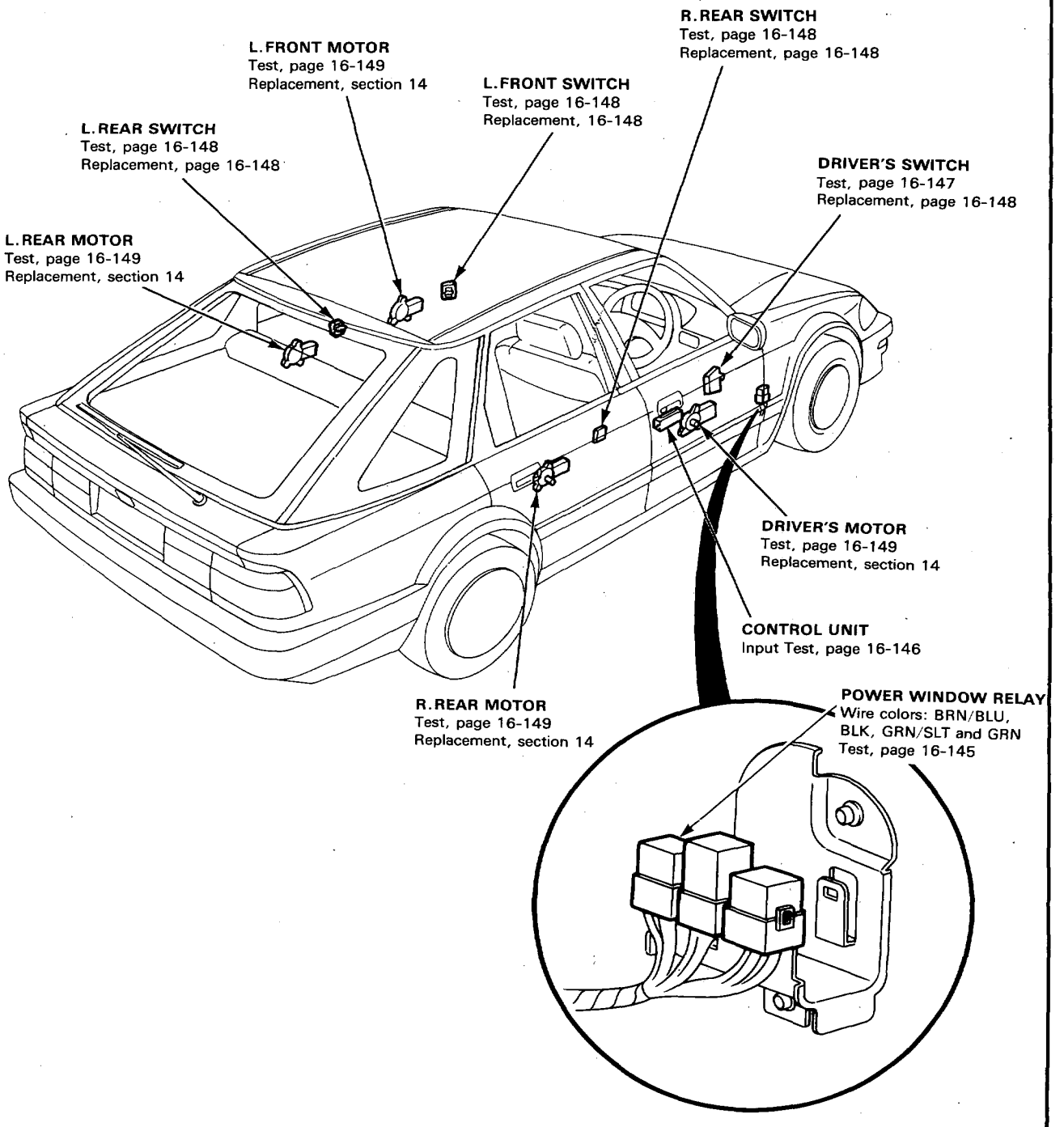
   CAUTION: To prevent damage to the motor, apply battery voltage momentarily.



View from wire side

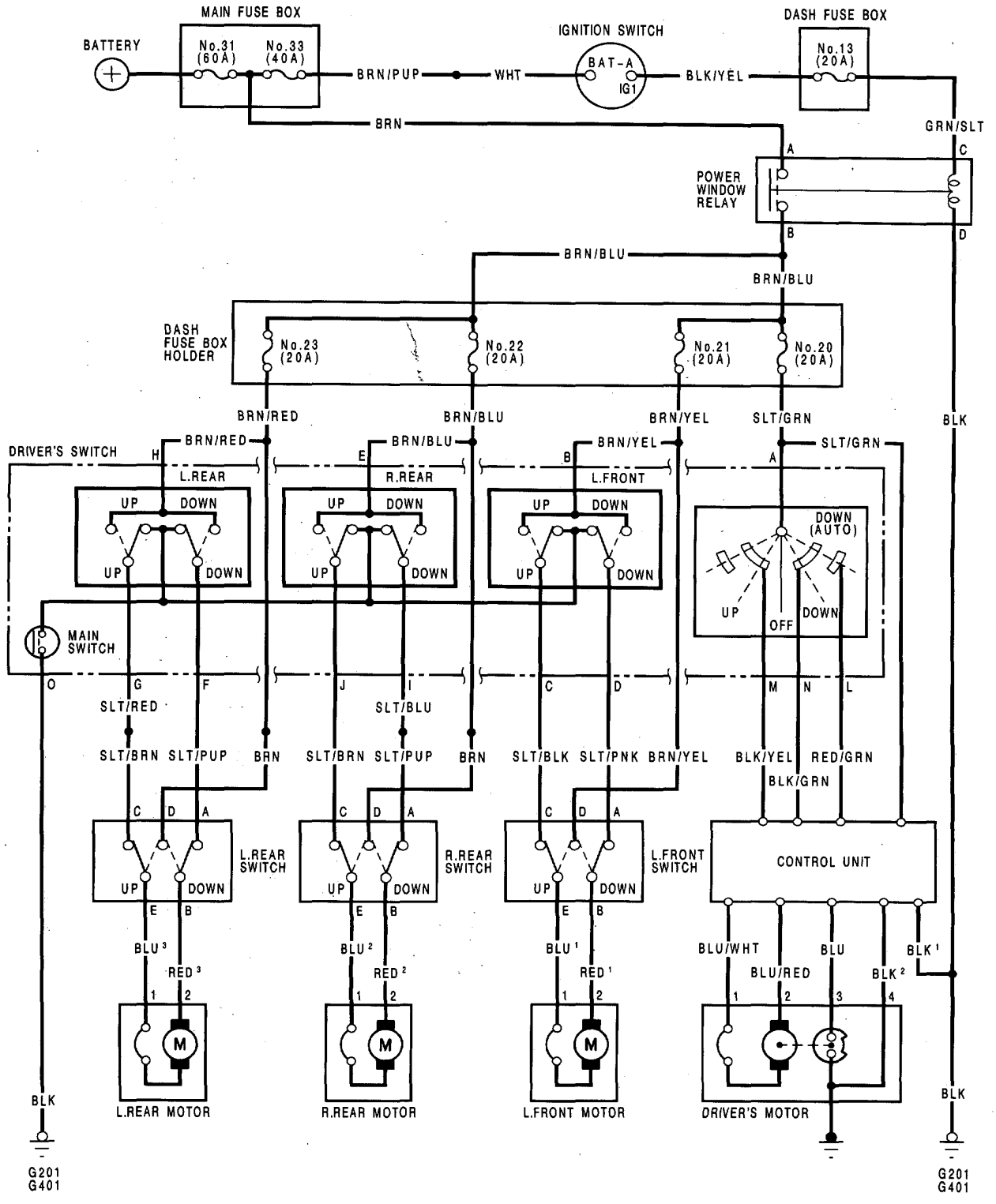
Power Windows

Component Location Index



Power Windows

Circuit Diagram



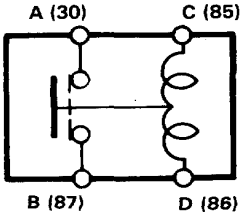
Troubleshooting

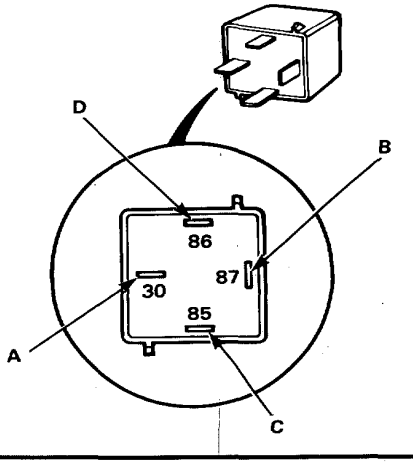
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		State of charge and clean and tight connections of battery	Blown No.13 (20A) fuse (in the dash fuse box)	Power window relay	Blown No.20 (20A)fuse in the dash fuse box holder	Blown No.21 (20A)fuse in the dash fuse box holder	Blown No.22 (20A)fuse in the dash fuse box holder	Blown No.23 (20A)fuse in the dash fuse box holder	Driver's door switch	Passenger switch	Driver's motor	Control unit input test	Passenger's motor	Window regulator	Poor ground	Open circuit in wires or loose or disconnected terminals
All windows do not operate.		1	2	3											G201 G401	BLK/YEL, BRN GRN/SLT or BRN/BLU
Driver's window does not operate.					1				3		4	2		5		SLT/GRN
Driver's window does not operate in AUTO.											2	1				BLU
Passenger windows do not operate.	Left front					1			2	3			4	5		BRN/YEL
	Left rear							1	2	3			4	5		BRN/RED
	Right rear						1		2	3			4	5		BRN/BLU

Relay Test

1. Remove the relay from the dash fuse box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.



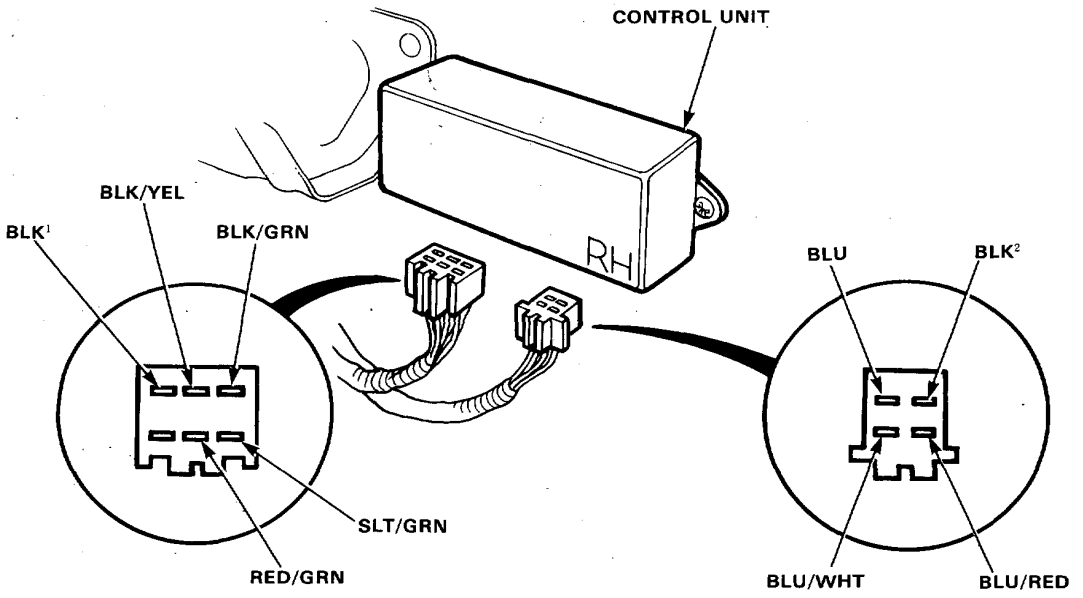


Power Windows

Control Unit Input Test

1. Remove the driver's door trim panel.
2. Remove the 2 screws and the control unit from the door panel.
3. Disconnect the 5-P and the 4-P connectors from the control unit. Make the following input tests at the harness pins.

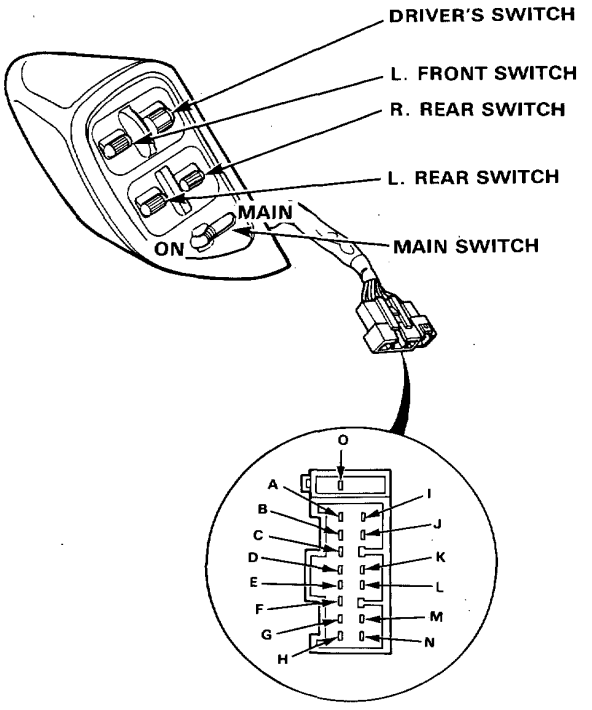
   NOTE: Recheck the connections between the connectors and the control unit , then replace the control unit if all input tests prove OK.



No.		Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK[1]	Under all conditions.	Check for continuity to ground: There should be continuity.	• Poor ground (G201, G401). • An open in the wire.
2	SLT/GRN	Ignition switch "ON".	Check for voltage to ground: There should be battery voltage.	• Blown No. 20 (20A) or No. 13 (20A) fuse. • Faulty power window relay. • An open in the wire.
3	BLK/YEL	Ignition switch "ON". Driver's switch "UP".	Check for voltage to ground: There should be battery voltage.	• Faulty driver's switch. • An open in the wire.
4	BLK/GRN	Ignition switch "ON". Driver's switch "DOWN".		
5	RED/GRN	Ignition switch "ON". Driver's switch "DOWN(AUTO)".		
6	BLU or BLK[2]	Connect the WHT/YEL terminal to the BLU/WHT terminal, and the BLK[1] terminal to the BLU/RED terminal.	Check for resistance between the BLU and BLK[2] terminals: Should indicate between 20-50 ohms as the motor runs.	• Faulty pulser. • Faulty driver's motor. • An open in the wire.

Driver's Switch Test

1. Remove the door trim panel.
2. Dis connect the 15-P connectors from the driver's door harness.
3. Check for continuity between the terminals in each switch position according to the tables.



DRIVER'S SWITCH

Position \ Terminal	A	L	M	N
OFF				
UP	○		○	
DOWN	○			○
DOWN(AUTO)	○	○		

L.FRONT SWITCH

Position	Main switch	B	C	D	O
OFF	ON		○	○	○
	OFF		○	○	
UP	ON			○	○
	OFF	○	○		
DOWN	ON		○		○
	OFF	○		○	

R.REAR SWITCH

Position	Main switch	E	I	J	O
OFF	ON		○	○	○
	OFF		○	○	
UP	ON		○		○
	OFF	○		○	
DOWN	ON			○	○
	OFF	○	○		

L.REAR SWITCH

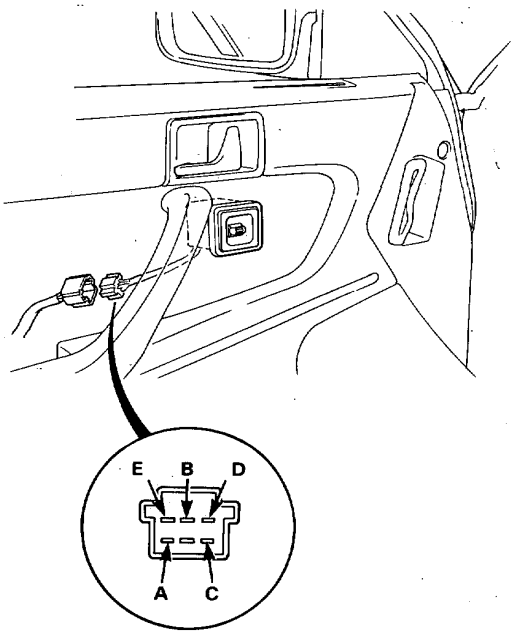
Position	Main switch	F	G	H	O
OFF	ON	○	○		○
	OFF	○	○		
UP	ON	○			○
	OFF		○	○	
DOWN	ON		○		○
	OFF	○		○	

Power Windows

Passenger Switch Test

1. Remove the door trim panel.
2. Check for continuity between the terminals in each switch position according to the table.

   NOTE: Left front switch shown, rear switches similar.



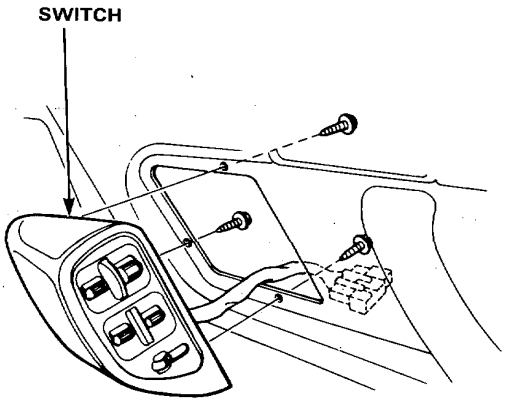
View from wire side

Position \ Terminal	A	B	C	D	E
UP				○—○	
OFF	○—○		○		○
DOWN		○		○	

Switch Replacement

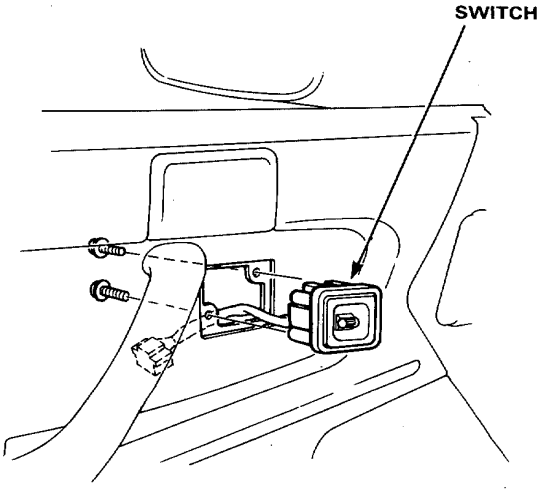
Driver's Switch :

1. Remove the door trim panel.
2. Disconnect the 15-P connector's from the driver's door harness.
3. Remove the switch from the door trim panel by releasing the 3 mounting screws.



Passenger Switches :

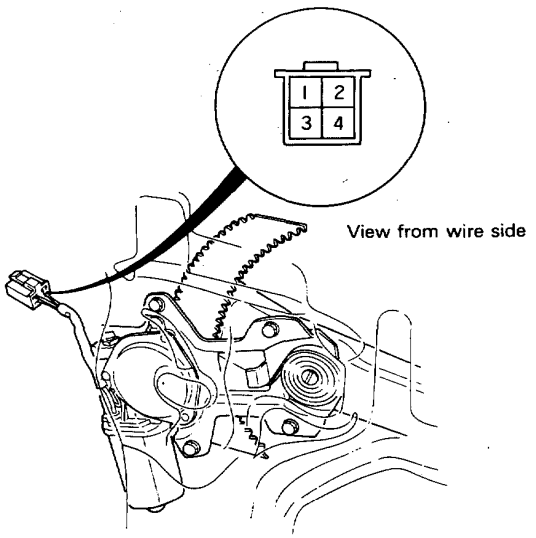
1. Remove the door trim panel.
2. Disconnect the 5-P connector's from the passenger door harness.
3. Remove the switch from the door trim panel by removing the 2 mounting screws.



Driver's Motor Test

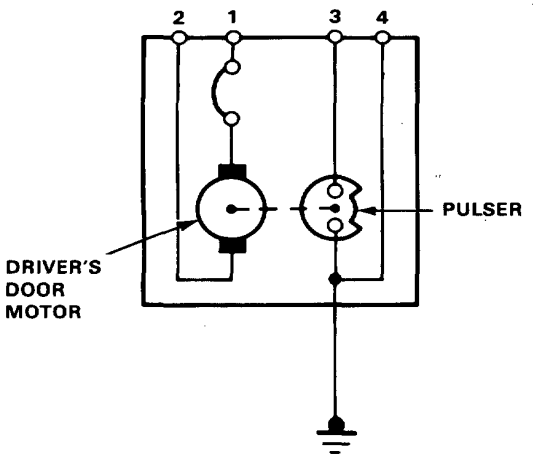
Motor Test :

1. Remove the door trim panel.
2. Disconnect the 4-P connector from the door wire harness.
3. Test motor operation by connecting battery voltage to the No.1 and No.2 terminals.
   Test the motor in each direction, by switching the leads from battery.
4. If the motor does not run, replace it.



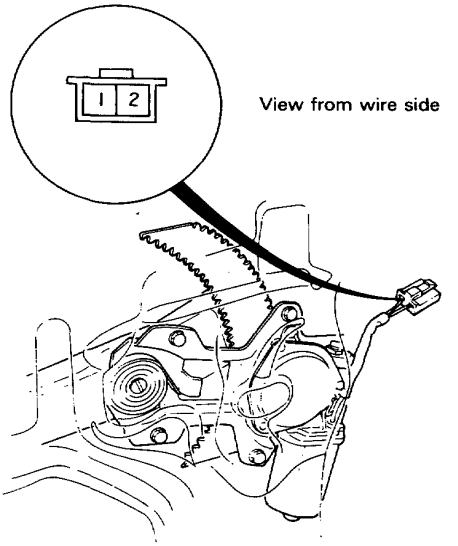
Pulser Test :

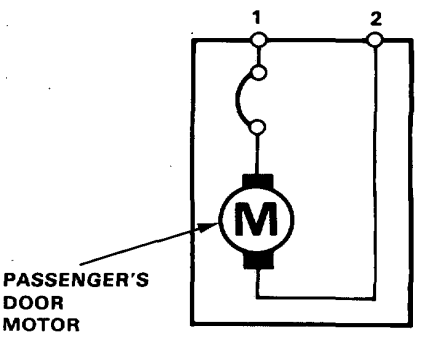
Measure resistance between the No.3 and No.4 terminals when running the motor by connecting battery voltage to the No.1 and No.2 terminals.
Ohmmeter should indicate between 20-50 ohms as the motor runs.



Passenger's Motor Test

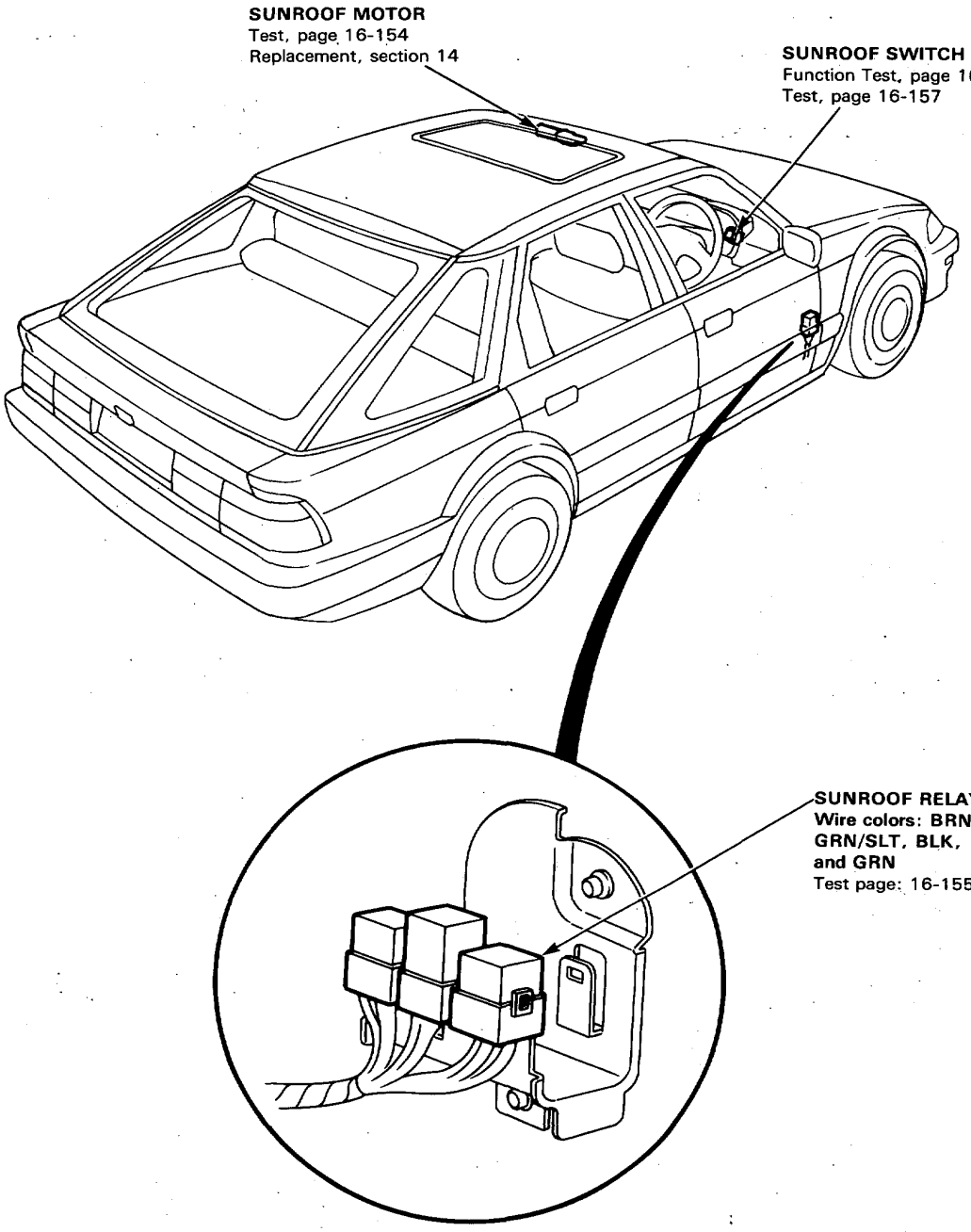
1. Remove the door trim panel.
2. Disconnect the 2-P connector from the motor.
3. Test motor operation by applying battery voltage to the No.1 and No.2 terminals.
   Test the motor in each direction, by switching the leads from the battery.
4. If the motor does not run, replace it.



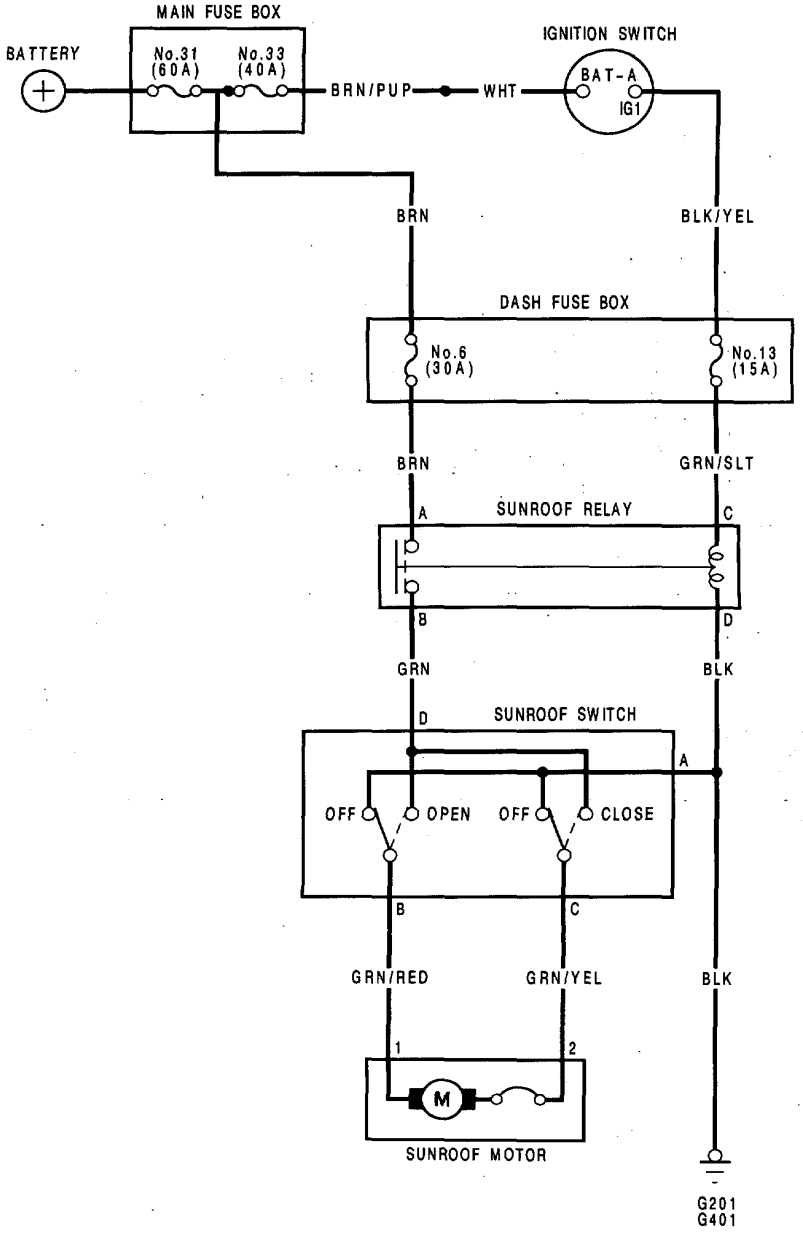


Sunroof

Component Location Index



Circuit Diagram



Electrical Troubleshooting

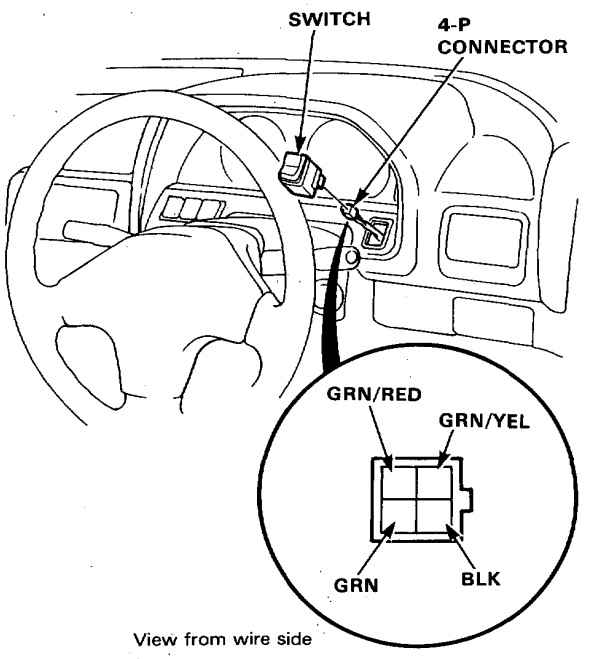
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Clutch out of adjustment, foregin matter stuck between guide rail and sunroof, or outer cable not attached properly	Blown No.6 (30A) fuse (in the dash fuse box)	Blown No.13 (15A) fuse (in the dash fuse box)	Function test	Sunroof relay	Sunroof motor	Sunroof switch	Poor ground	Open circuit in wires or loose or disconnected terminals
Sunroof does not move, but motor turns.		1								
Sunroof does not move and motor does not turn (sunroof can be moved with sunroof wrench).	Switch in any position.		1	2	3	4	5		G201,G401	BRN, GRN/SLT, GRN
	With OPEN switch.							1		GRN/RED
	With CLOSE switch							1		GRN/YEL

Function Test

1. Remove the dashboard lower panel.

2. Push out the switch from behind the instrument panel, then disconnect the 4-P connector to remove the switch.



View from wire side

3. Check for continuity between the BLK terminal and body ground.
There should be continuity.

- If there is no continuity, check for
— An open in the BLK wire.
— Poor ground (G201, G401)

- If there is continuity, go to step 4.

4. Check for voltage between the GRN terminal and the BLK terminal with ignition switch ON.
There should be battery voltage.

- If there is no voltage, check for
— Blown No.13 (15A) or No.6 (30A) fuse in the dash fuse box.
— An open in the GRN/SLT, GRN or BRN wire.
— Faulty sunroof relay.
- If there is battery voltage go to step 5.

5 Connect the GRN terminal to the GRN/RED terminal, and the GRN/YEL terminal to the BLK terminal with jumper wires.
The sunroof should open when the ignition switch is turned ON.

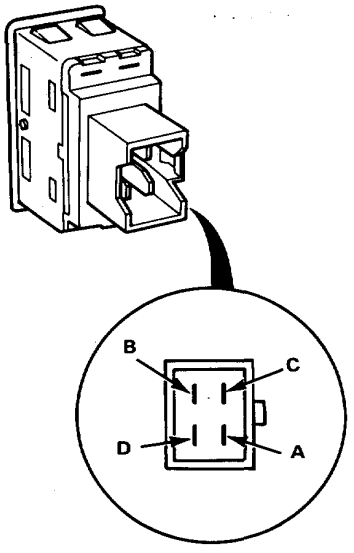
- *If the sunroof opens, check the switch.*
- If sunroof does not open, remove the headliner and check the motor.

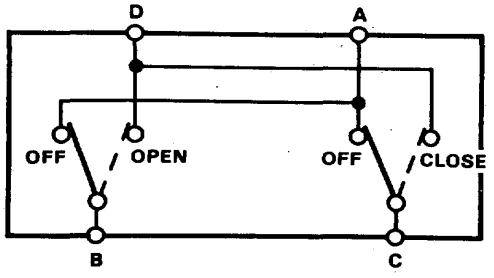
Sunroof

Switch Test

1. Remove the dashboard lower panel.
2. Push out the switch from behind the instrument panel, then disconnect the 4-P connector to remove the switch.
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	A	B	C	D
OFF	○	○	○	
OPEN		○		○
CLOSE			○	○

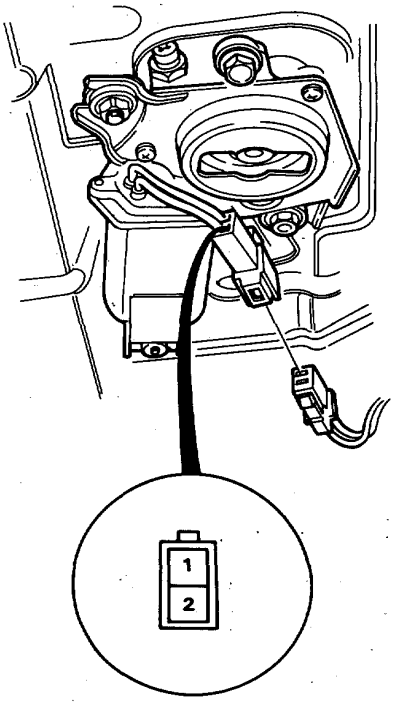




Motor Test

1. Remove the headliner. (see, 14 Section)
2. Disconnect the 2-P connector from the sunroof motor.
3. Test motor operation by connecting a battery to the No.1 and No.2 terminals. Test the motor in each direction, by switching the leads from the battery.
4. If the motor does not run, replace it.

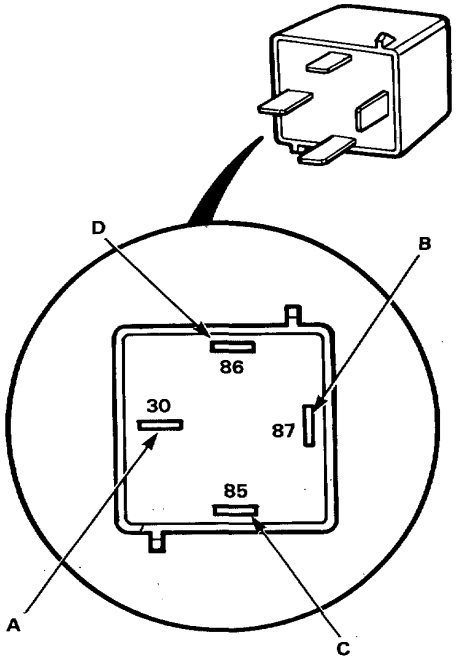
   NOTE: See Closing Force Check in section 14 for motor clutch test.

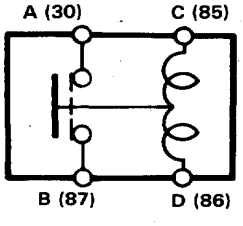


View from wire side.

Relay Test

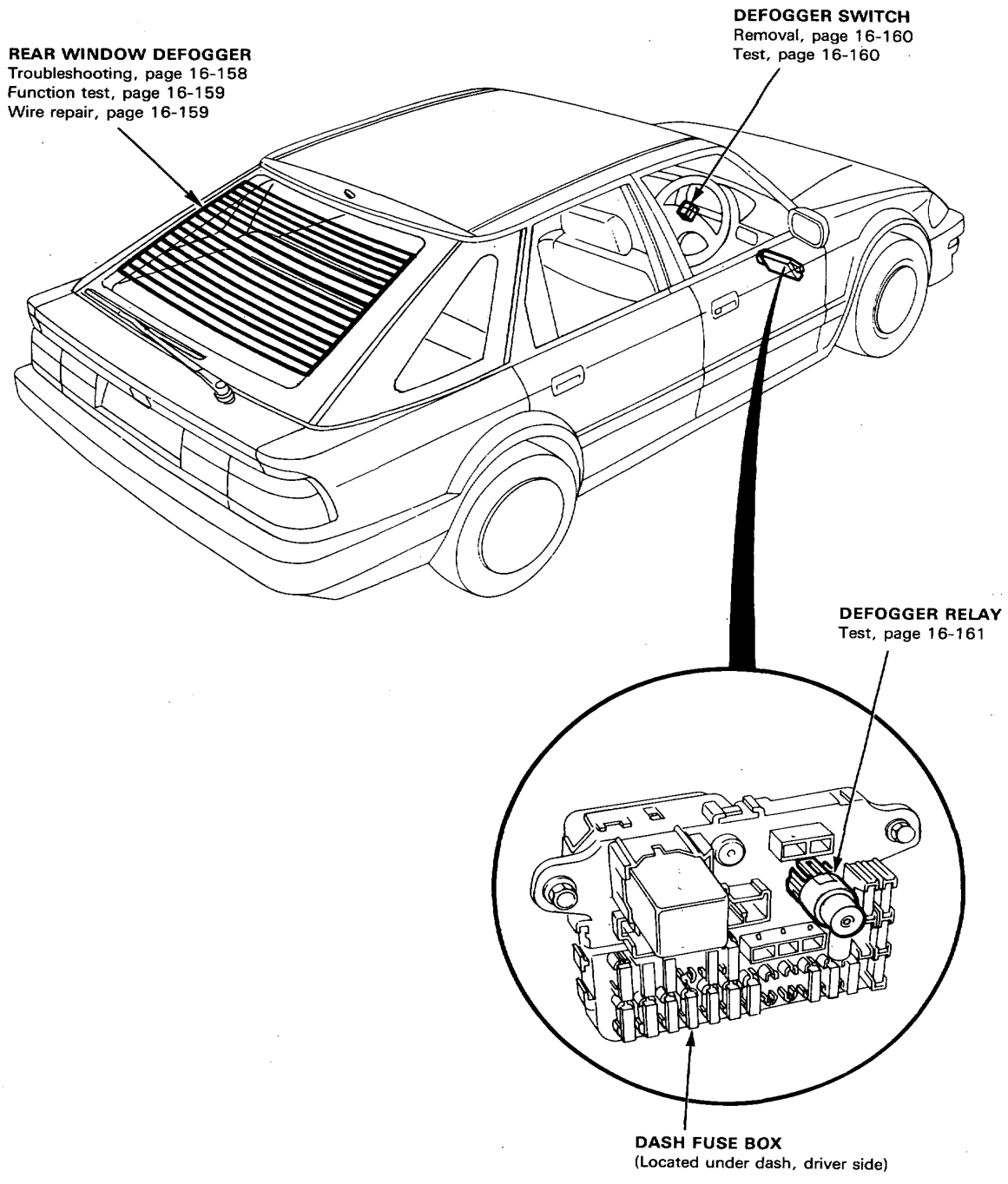
1. Remove the relay from the dash fuse box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.



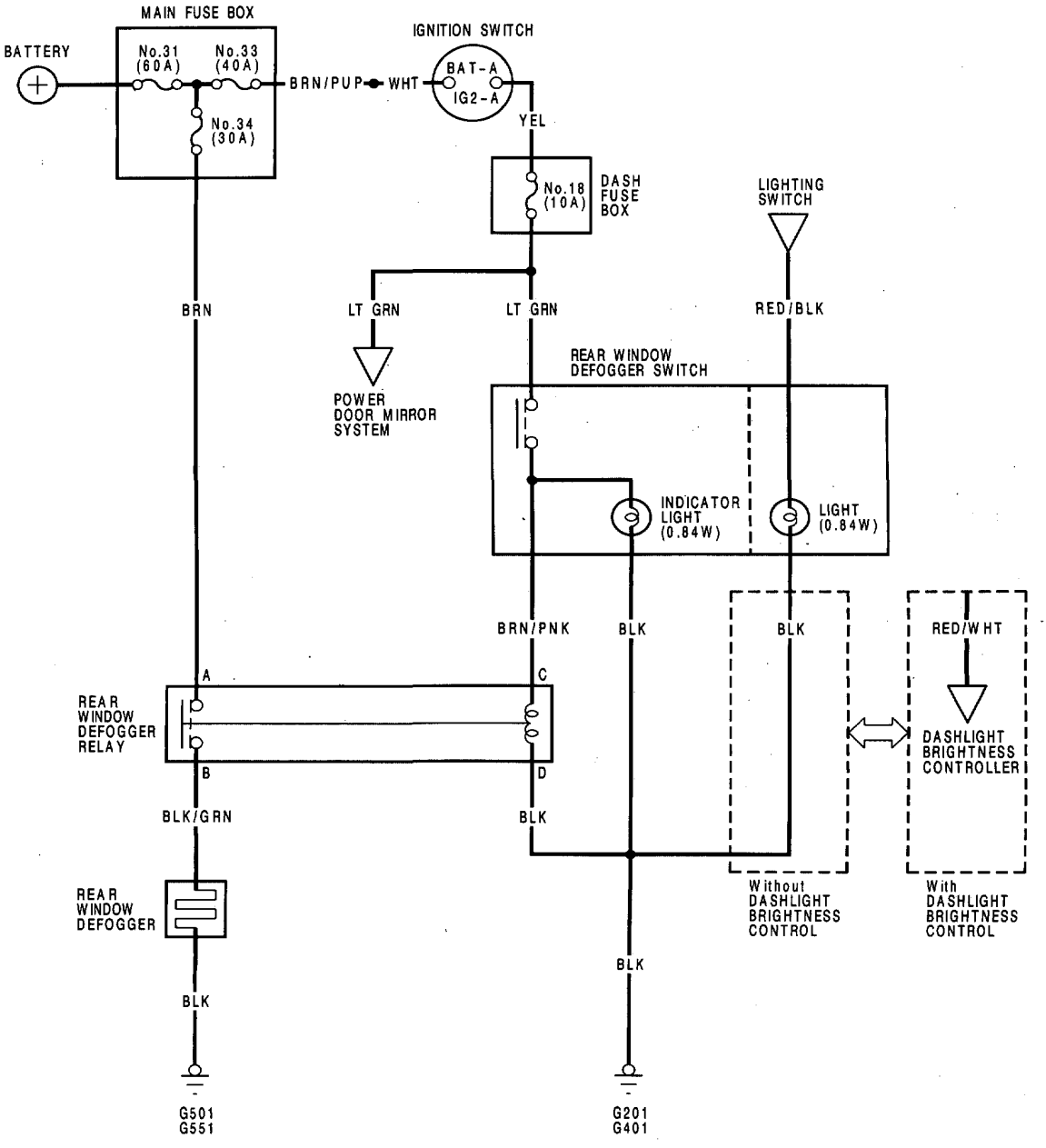


Rear Window Defogger

Component Location Index



Circuit Diagram



Rear Window Defoger

Troubleshooting

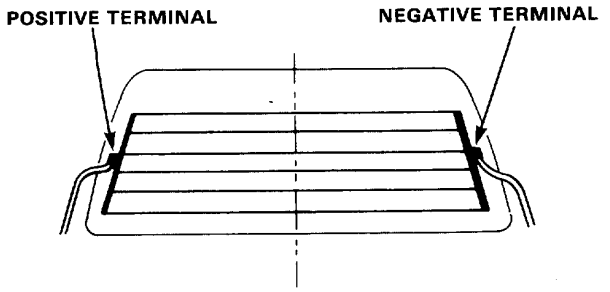
NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom	Blown indicator light bulb	Blown No.18 (10A) fuse (in the dash fuse box)	Blown No. 34 (30A) fuse (in the main fuse box)	Defogger switch	Function test	Defogger relay	Repair defogger wire	Poor ground	Open circuit in wires or loose or disconnected terminals
Defogger operates, but indicator light does not go on.	1								
Defogger does not operate and indicator light does not go on.		1		2				G201, G401	LT GRN or BRN/PNK
Defogger does not operate, but indicator light goes on.			1		2	3		G501 G551	BRN or BLK/GRN
Broken defogger wire							1		

Function Test

CAUTION: Be careful not to scratch or damage the defogger wires with the tester probe end.

1. Check for voltage between the positive terminal and body ground with the ignition switch and the defogger switch ON.
   There should be battery voltage.
   - If there is no voltage, check for :
     — Faulty defogger relay.
     — An open in the BLK, BLK/GRN[2] or YEL/GRN wire.
   - If there is battery voltage, go to step 2.

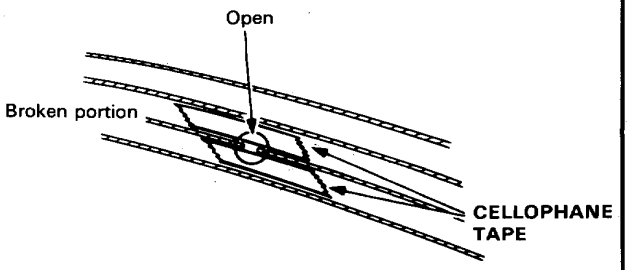


2. Check for continuity between the negative terminal and body ground.
   If no continuity check for open in the defogger ground wire.
3. Lightly touch the voltmeter positive probe to the center of each defogger wire, and the negative probe to the negative terminal.
   There should be approximately 6 V with the ignition switch and the defogger switch ON.
   - If the voltage is as specified, the defogger wire is OK.
   - If there is battery voltage, the defogger wire is broken in the negative side from the center.
   - If there is no voltage, the defogger wire is broken is positive side from the center.

Defogger Wire Repair

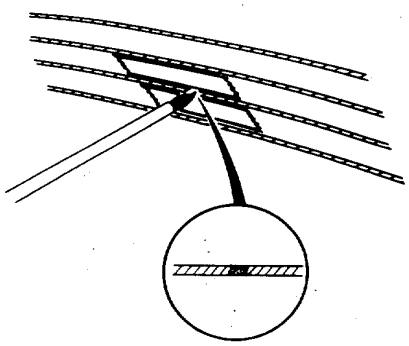
NOTE: Repair section must be no longer than one inch.

1. Lightly rub area around the break with the fine steel wool, then clean with alcohol.
2. Carefully mask above and below the broken portion defogger wire with cellophane tape.



3. Using a small brush, apply heavy coat of silver conductive paint extending about 1/8 in. on both sides of the break. Allow 30 minutes to dry.

   NOTE: Throughly mix paint before use.

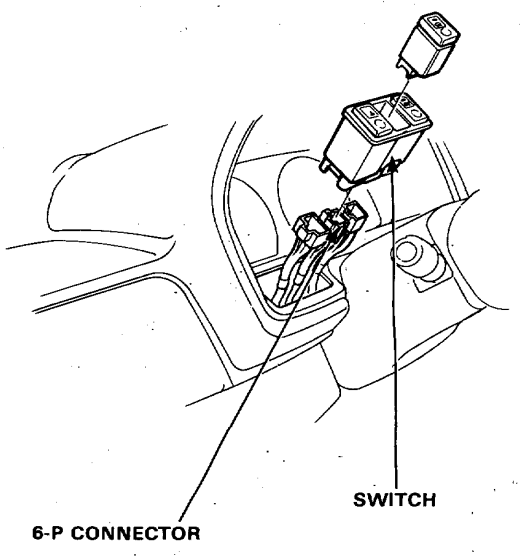


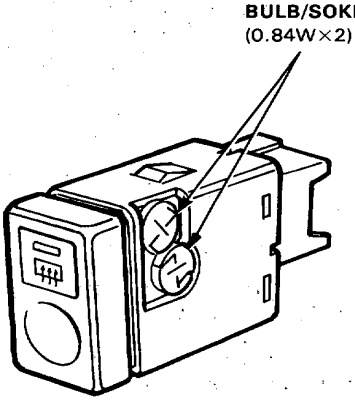
4. Check for proper operation with a voltmeter (approximately 6 V at the mid-point).
5. Apply a second coat of paint in the same manner. Dry 3 hours before removing tape.

Rear Window Defogger

Switch Removal

1. Carefully pull out the switch from the instrument panel, then disconnect the 6-P connector from the switch.

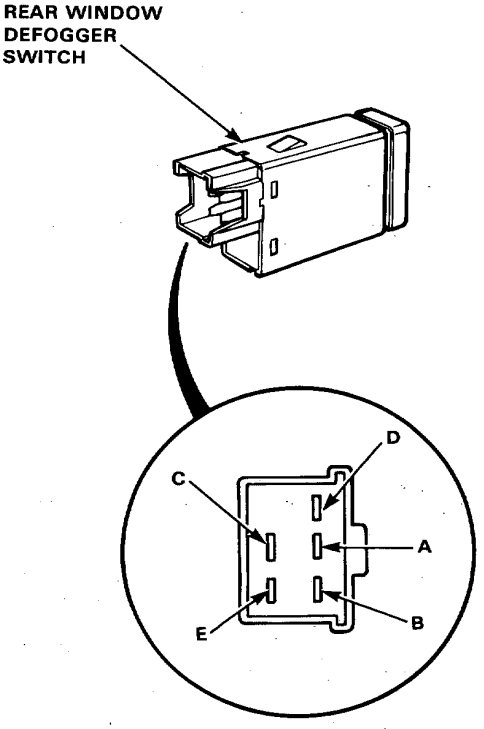


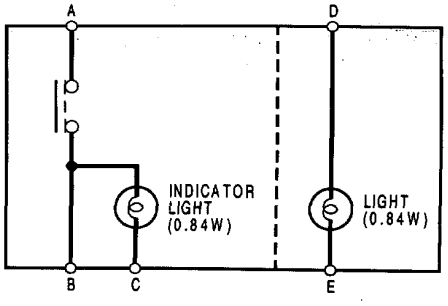


Switch Test

1. Remove the switch from the instrument panel.
2. Check for continuity between the terminals according to the table.

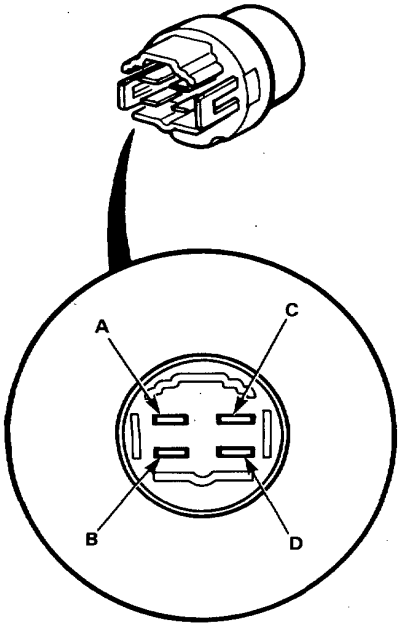
Terminal / Position	A	B		C	D		E
ON	○	○	⊖	○	○	⊖	○
OFF		○	⊖	○	○	⊖	○

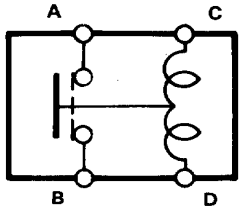




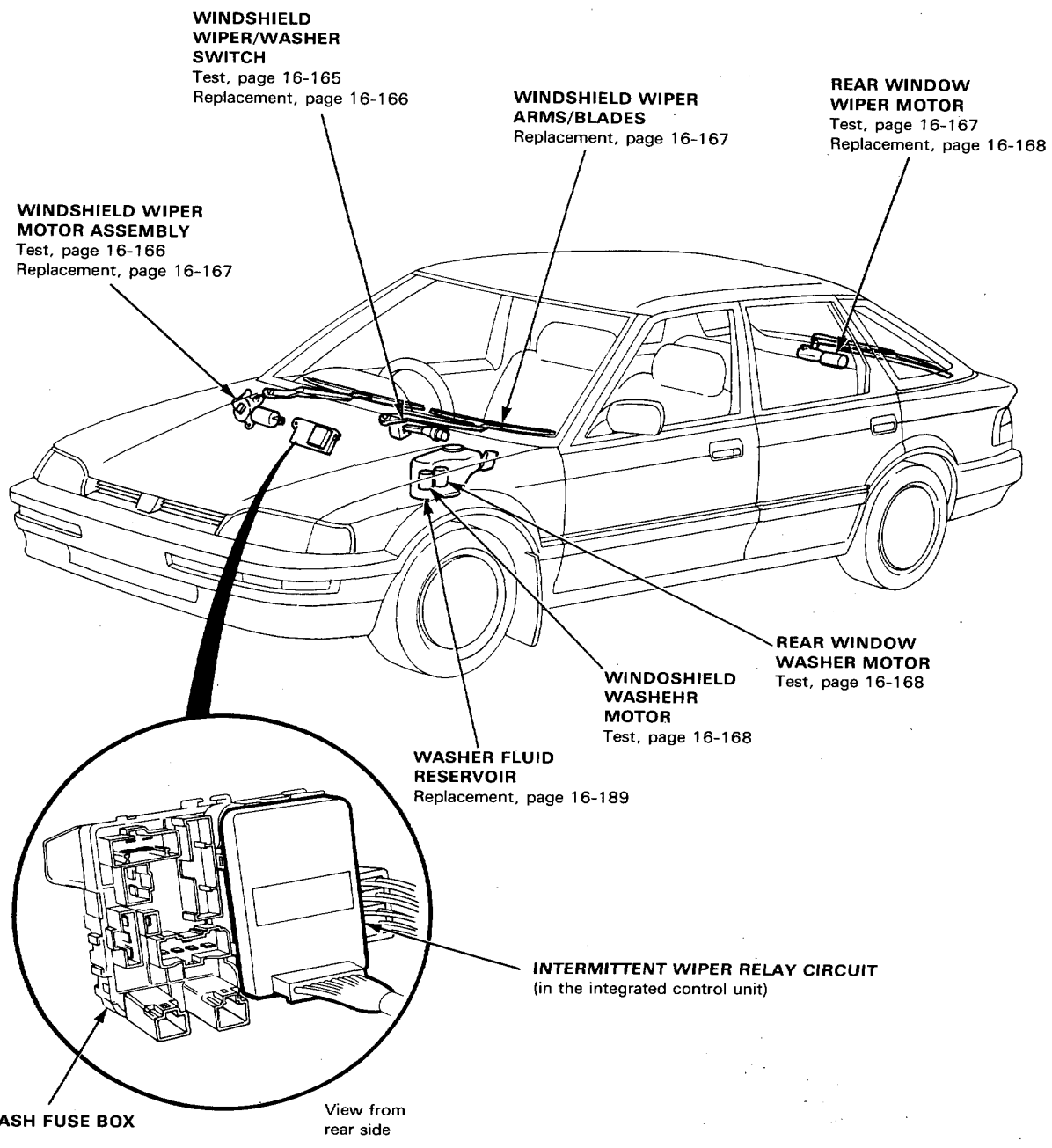
Relay Test

1. Remove the defogger relay from the dash fuse box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.



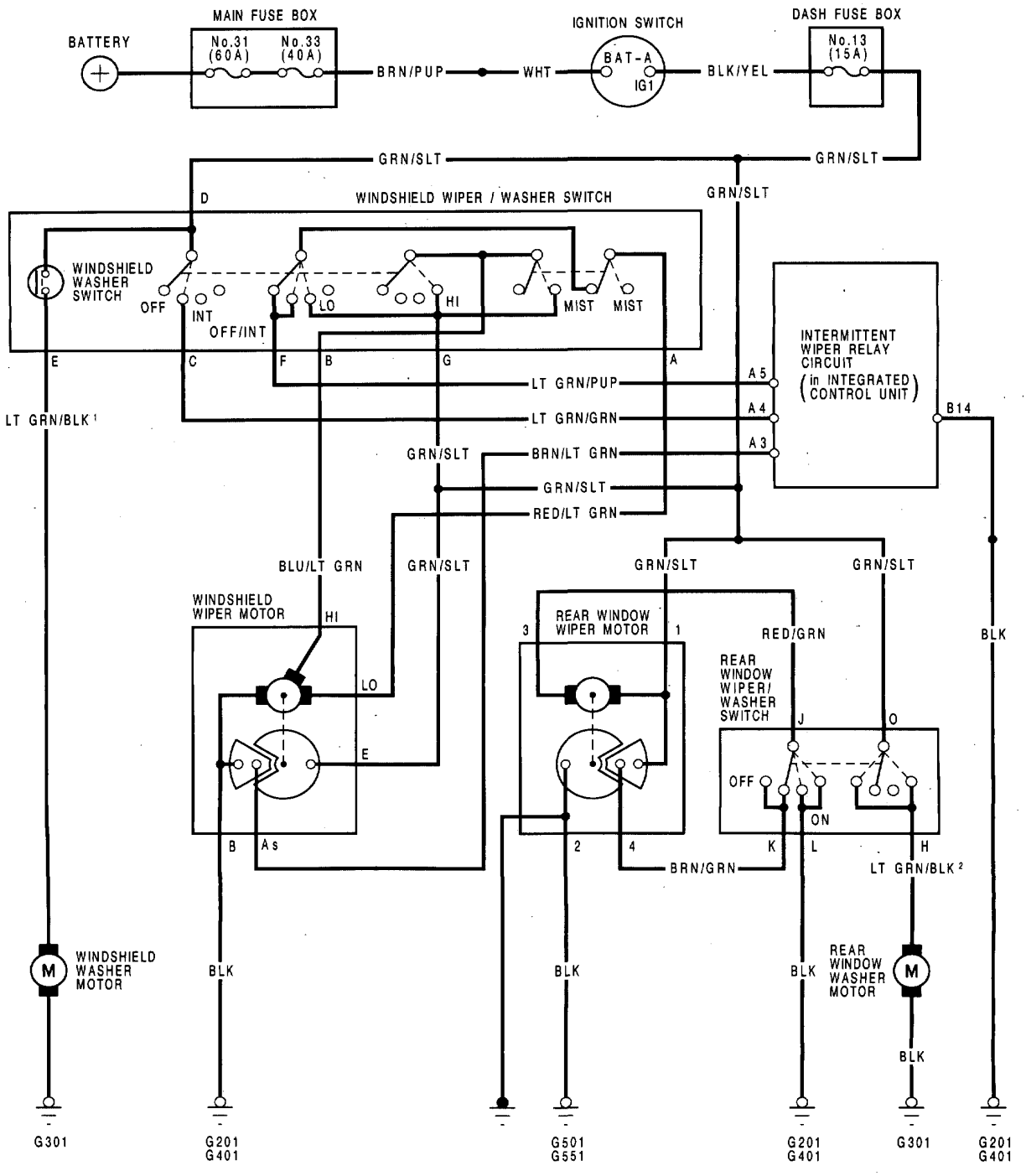


Component Location Index



Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example LT GRN/BLK[1] and LT GRN/BLK[2] are not the same).



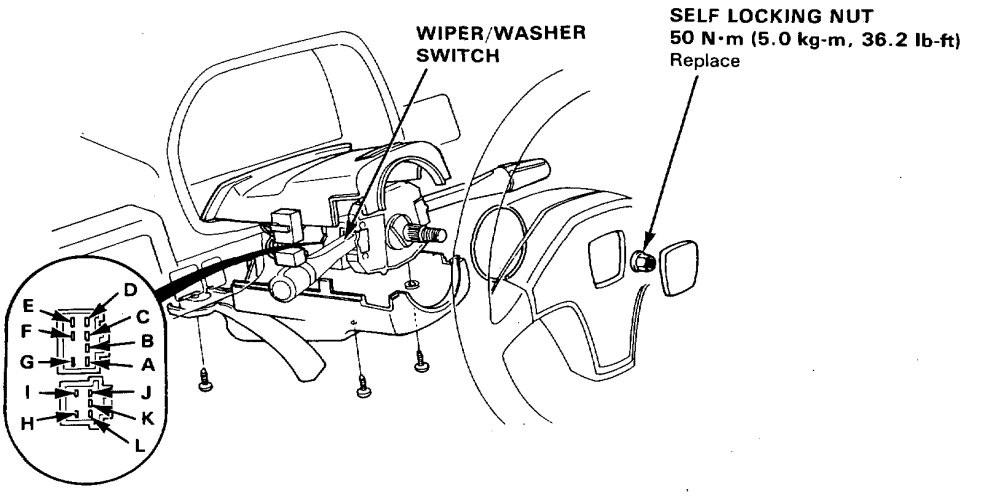
Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Items to be inspected		Blown No.13 (15A) fuse (in the dash fuse box)	Wiper switch	Wisper motor Assembly: Front	Wisper motor Assembly: Rear	Washer switch	Washer motor	Intermittent wiper relay circuit (in the integrated contorl unit)	Insufficient washer fluid in reservoir	Disconnected, blocked washer hose or clogged outlet	Disconnected wiper linkages	Poor ground	Open circuit in wires, loose or disconnected terminals
Front wiper does not operate.	In all positions	1	4	2							3	G201 G401	GRN/SLT
	In INT		1					2					GRN[1], BLU/WHT[1]
	In LO or HI		1										
	In MIST		1										
Rear window wiper does not operate.			1		2							G551	GRN/BLK[1], LT GRN/BLK
Blades do not return to park position when wipers are turned OFF.	Front wiper		2	1									BRN/LT GRN
	Rear wiper				1								BRN/GRN
Erratic intermittent cycle or wipers do not operate intermittently.			1					2					
Little or no washer fluid is pumped.						4	3		1	2		G301	LT GRN/BLK[1], LT GRN/BLK[2]

Wiper/Washer Switch Test

1. Remove the steering wheel and the column covers.
2. Disconnect 8-P and 6-P connectors from the switch.
3. Check for continuity between the terminal in each switch position according to the table.



Windshield

Terminal / Position	A	B	C	D	E	F	G
OFF	○					○	
INT	○		○	○		○	
LO	○						○
HI		○					○
Mist Switch "ON"		○					○
Washer Switch "ON"				○	○		

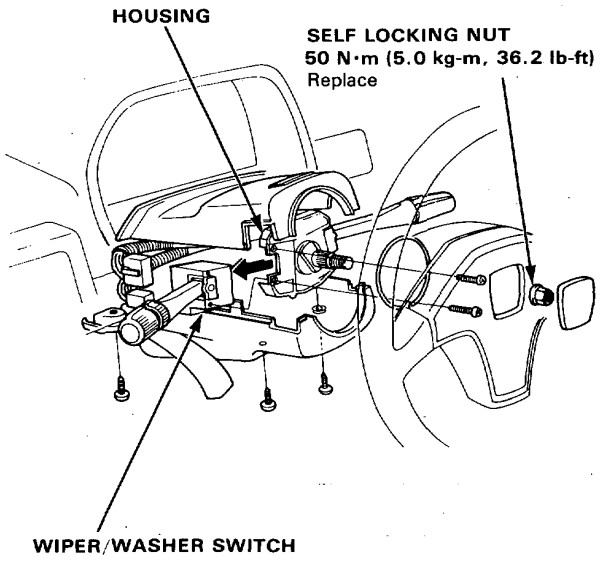
Rear Window

Terminal / Position	H	I	J	K	L
Washer Switch "ON"	○	○			
OFF			○	○	
ON			○		○
Washer Switch "ON"	○	○			

Wiper/Washer Switch Replacement

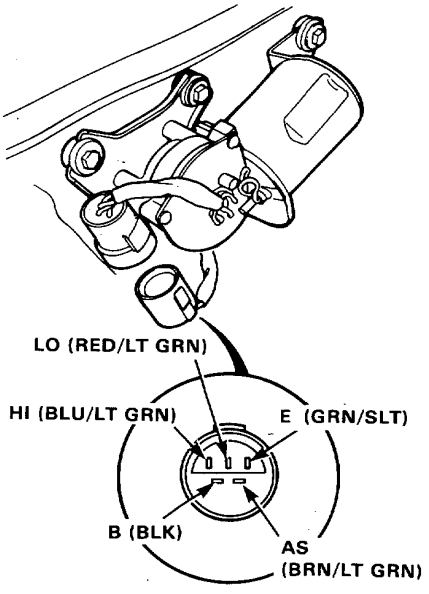
1. Remove the steering wheel and the lower and upper covers from the steering column.
2. Disconnect the 8-P and 6-P connectors from the wiper/washer switch.
3. Remove the 2 screws and slide the wiper/washer switch out of the housing as shown.

   NOTE: Be carefull not to damage the steering wheel cover.



Windshield Wiper Motor Test

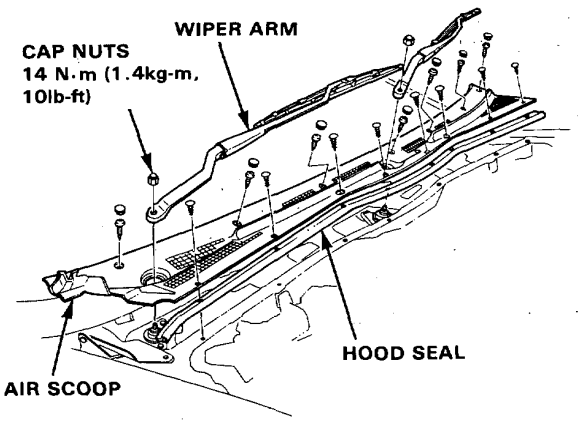
1. Disconnect the 5-P (or the 6-P) connector of the wiper motor assembly.
2. Test motor operation :
   LOW SPEED: Connect battery positive to the Lo (RED/LT GRN) terminal and negative to the B (BLK) terminal.
   HIGH SPEED: Connect battery positive to the Hi (BLU/LT GRN) terminal and negative to the B (BLK) terminal.
3. If the motor fails to run smoothly, replace it.



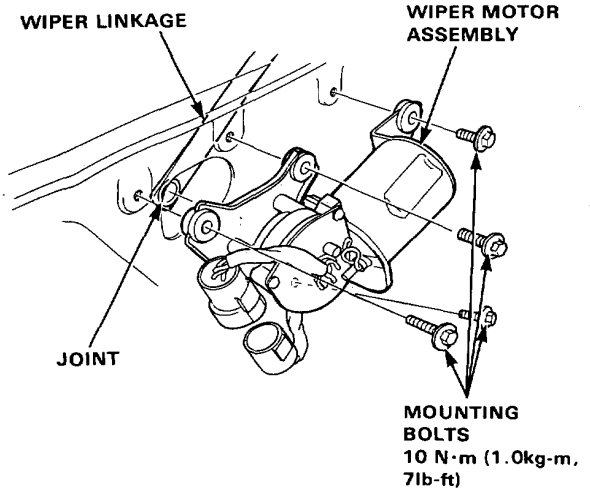
View from terminal side

Windshield Wiper Motor Replacement

1. Remove the cap nuts and the wiper arms.
2. Remove the hood seal and air scoop by prying off the trim clips and removing the screws.



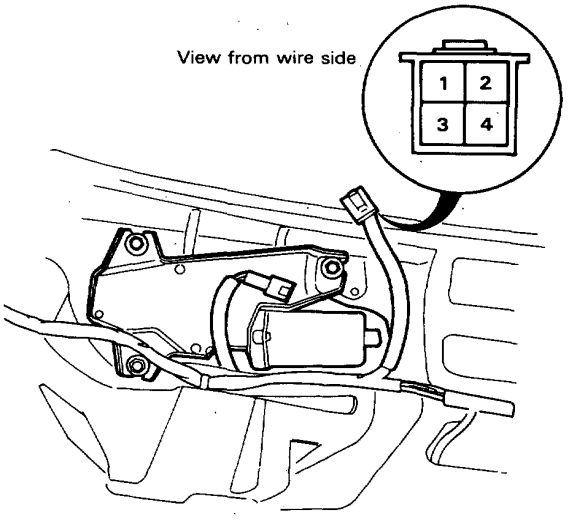
3. Pry the wiper linkage off the motor arm with a screw driver.
4. Disconnect the 5-P connector from the wiper motor assembly, then remove the 4 mounting bolts and the wiper motor assembly.



5. Install the wiper motor assembly in the reverse order of removal.

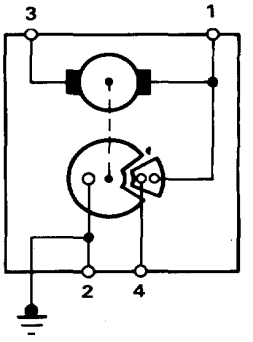
Rear Window Wiper Motor Test

1. Remove the hatch trim panel.
2. Disconnect the 4-P connector.
3. Test wiper motor operation by connecting battery positive wire to the No.2 terminal and nagative to the No.4 terminal.
4. If the motor fails to run smoothly, replace it.



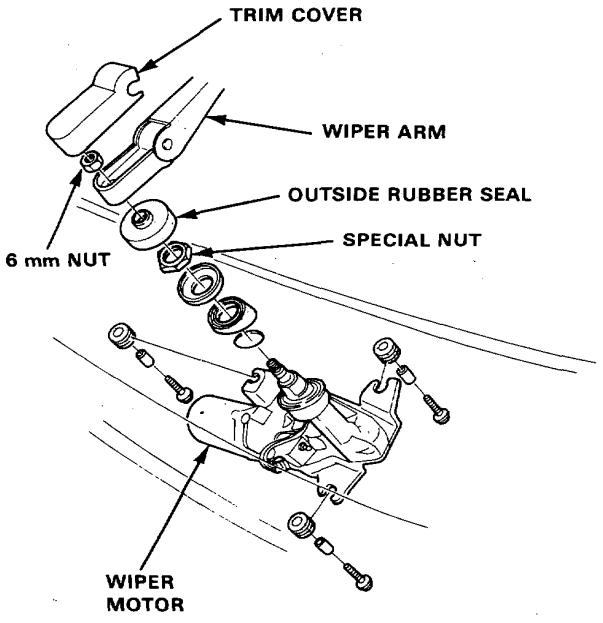
5. Check for continuity between the terminals according to the table.

Terminal / Wiper Blade	1	2	3
At park position		○	○
At center position	○		○



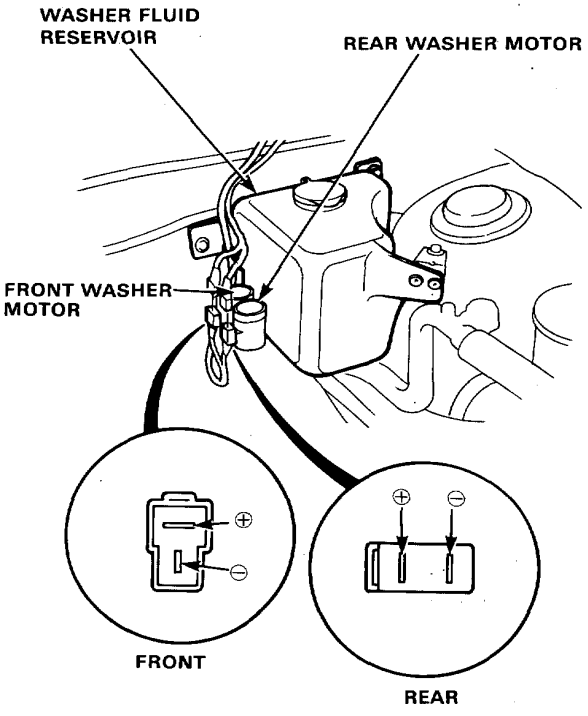
Rear Window Wiper Motor Replacement

1. Remove the hatch trim panel.
2. Remove the trim cover, 6 mm nut, wiper arm, and the outside seal rubber.
3. Disconnect the 4-P connector from the wiper motor.
4. Remove the 3 mount bolts and the wiper motor.



Washer Motor Test

1. Disconnect the 2-P connector from the washer motor.
2. Test either washer motor operation by connecting battery positive to the ⊕ terminal and negative to the ⊖ terminal.

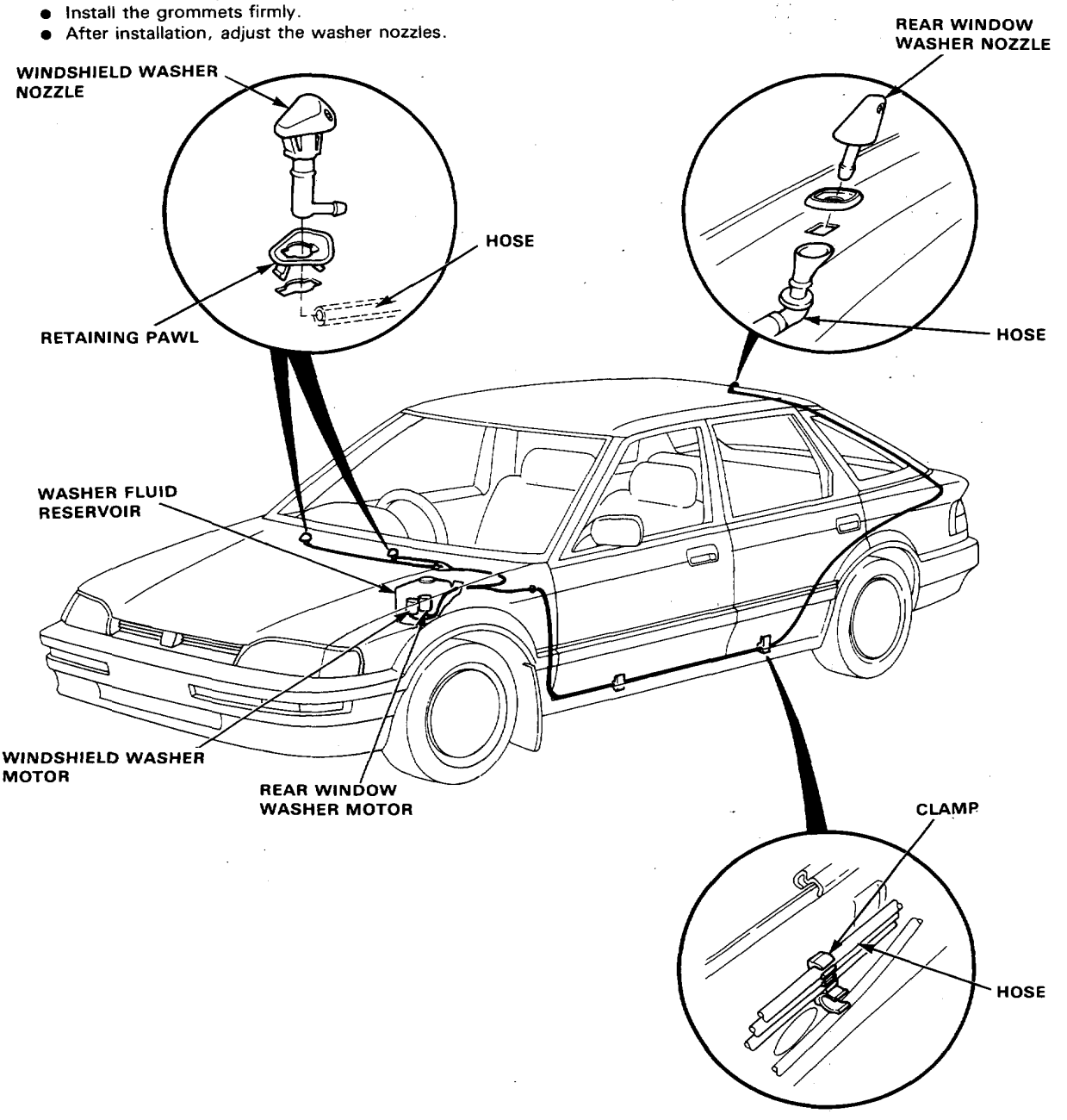


- If the motor fails to run smoothly, replace it.
- If the motor runs smoothly but little or no washer fluid is pumped, check for disconnected or blocked washer-hose, or clogged pump outlet in the motor.

Washer Replacement

1. Remove the washer reservoir by removing the 3 mount bolts and 1 nut.
2. Disconnect the hoses and the 2-P connectors from the front and the rear washer motors.
3. Remove the washer nozzles by releasing the retaining pawls and pushing them out from the underside. (Rear window washer nozzle : Remove the rear spoiler)

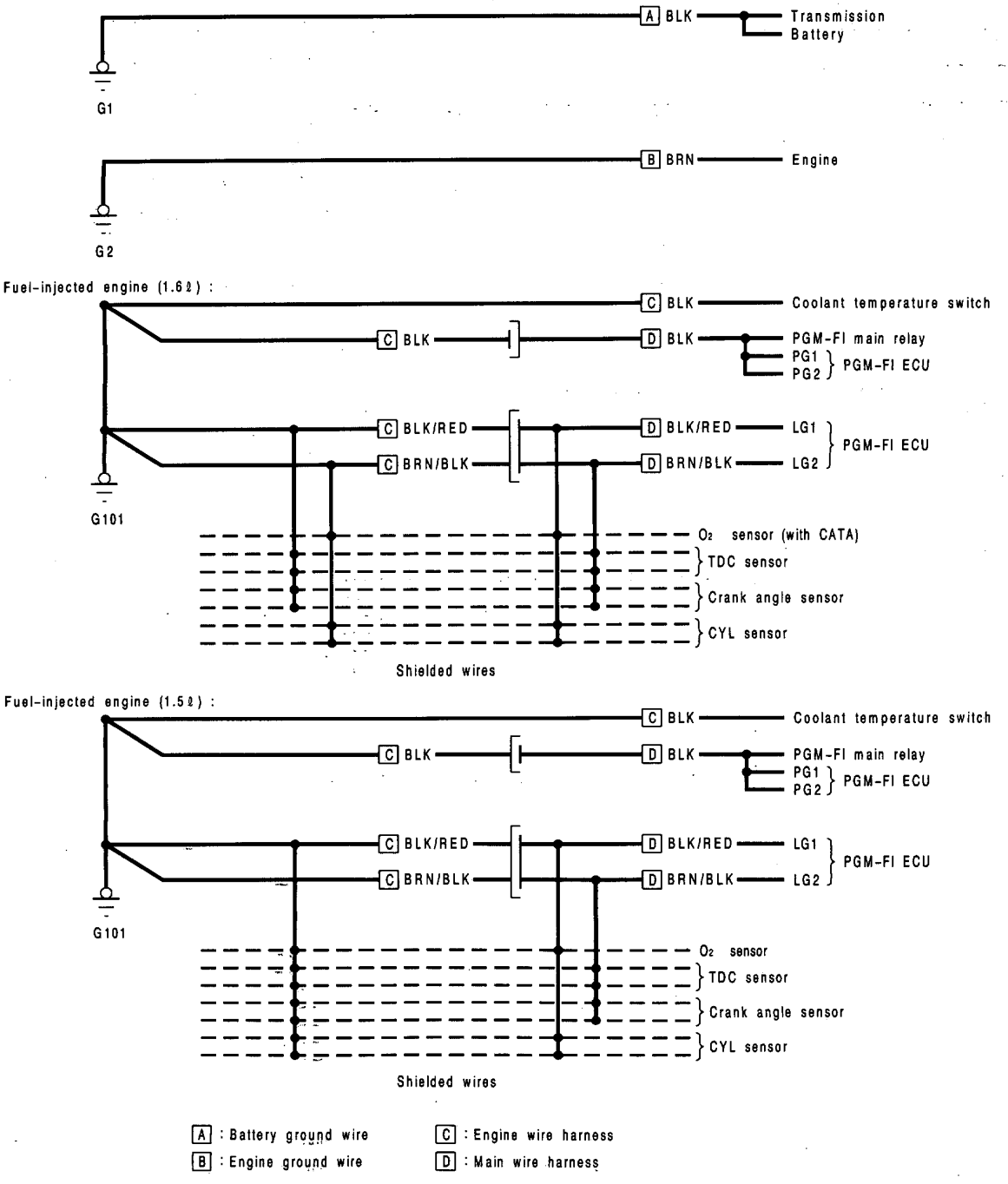
NOTE :
- Clamp the hoses with the wire harness in the left front fender.
- Take care not to pinch hoses during reinstallation.
- Install the grommets firmly.
- After installation, adjust the washer nozzles.



Ground Distribution

Circuit Identification

NOTE: See page 16-8 and 9 for illustrated ground locations.



A : Battery ground wire
B : Engine ground wire
C : Engine wire harness
D : Main wire harness

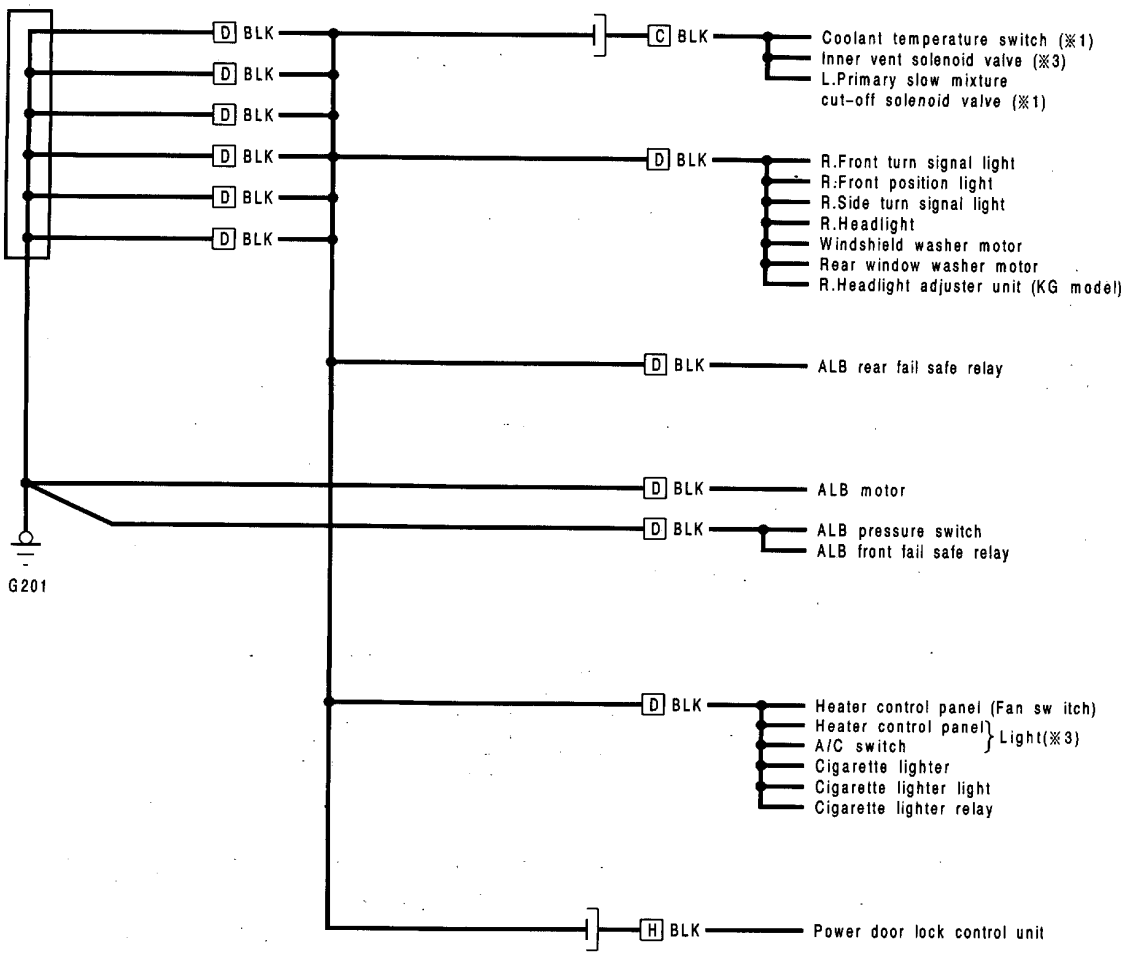
(cont'd)

Ground Distribution

Circuit Identification (cont'd)

LHD:

NOTE: See pages 16-10 for illustrated ground locations.

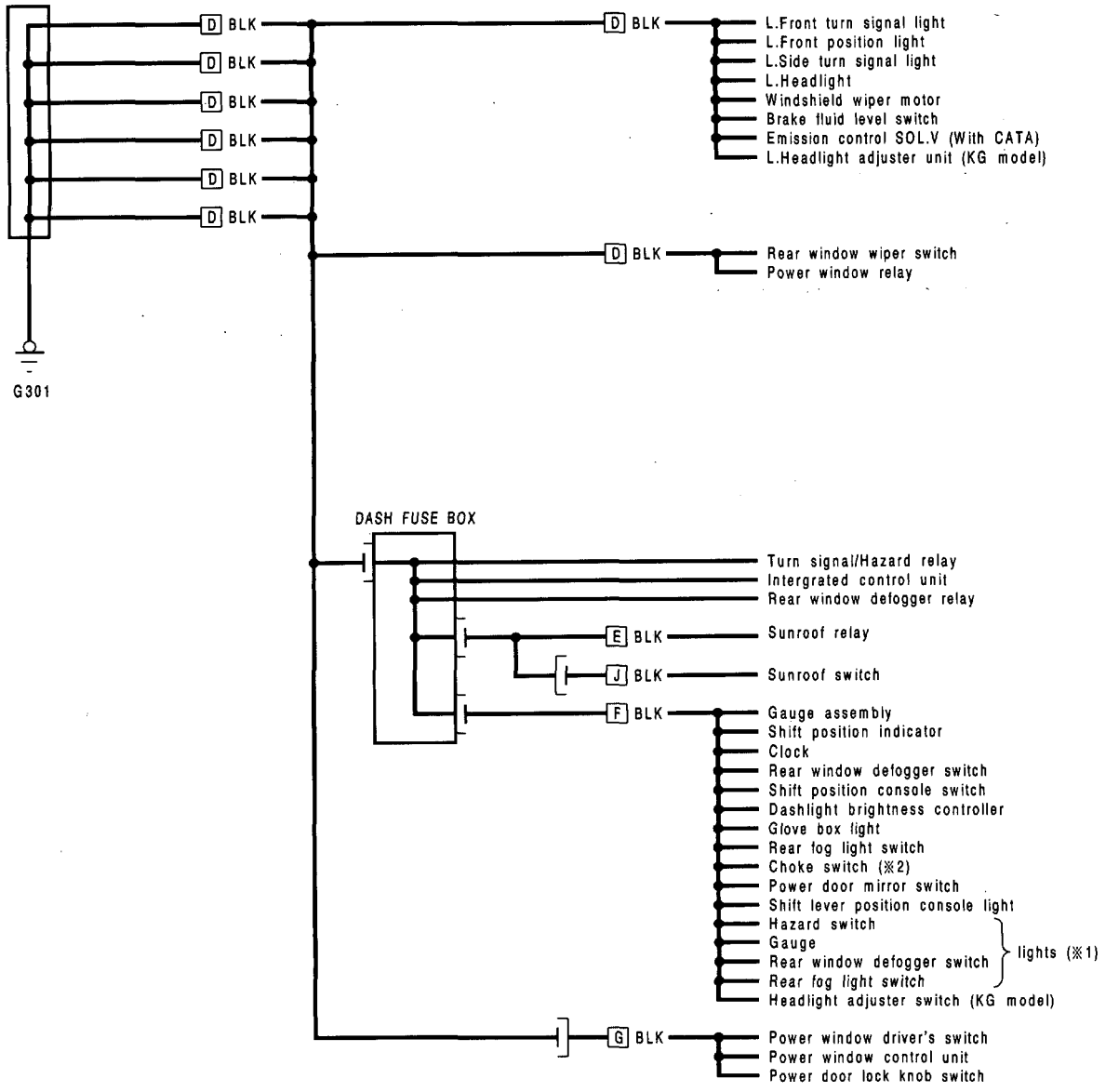


C : Engine wire harness
D : Main wire harness
H : Front passenger's door wire harness

(※1) : Carbureted engine
(※2) : 1.6l Carbureted engine
(※3) : Without dashlight brightness control

LHD:

NOTE: See page 16—10 and 11 for illustrated ground locations.



D : Main wire harness
E : Roof wire
F : Dashboard wire harness
G : Driver door wire harness
J : Sunroof switch subcord

(※1) : Without dashlight brightness control
(※2) : 1.4ℓ Carbureted engine

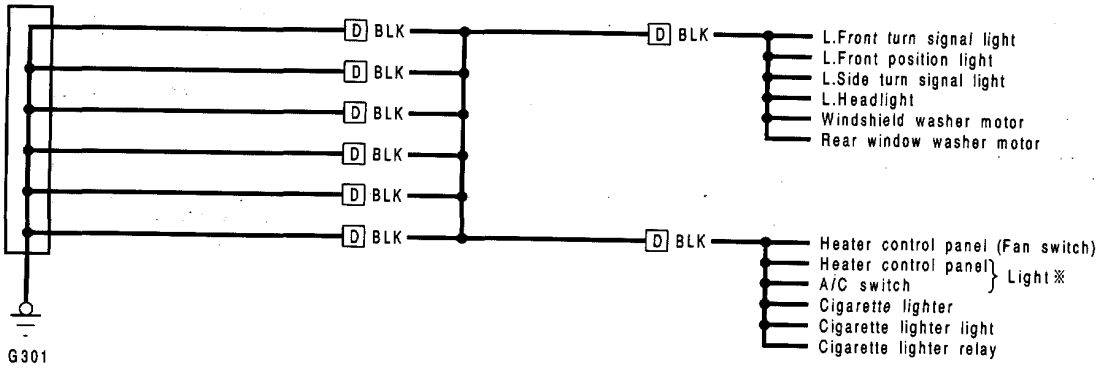
(cont'd)

Ground Distribution

Circuit Identification (cont'd)

RHD:

NOTE: See page 16-10 for illustrated ground locations.

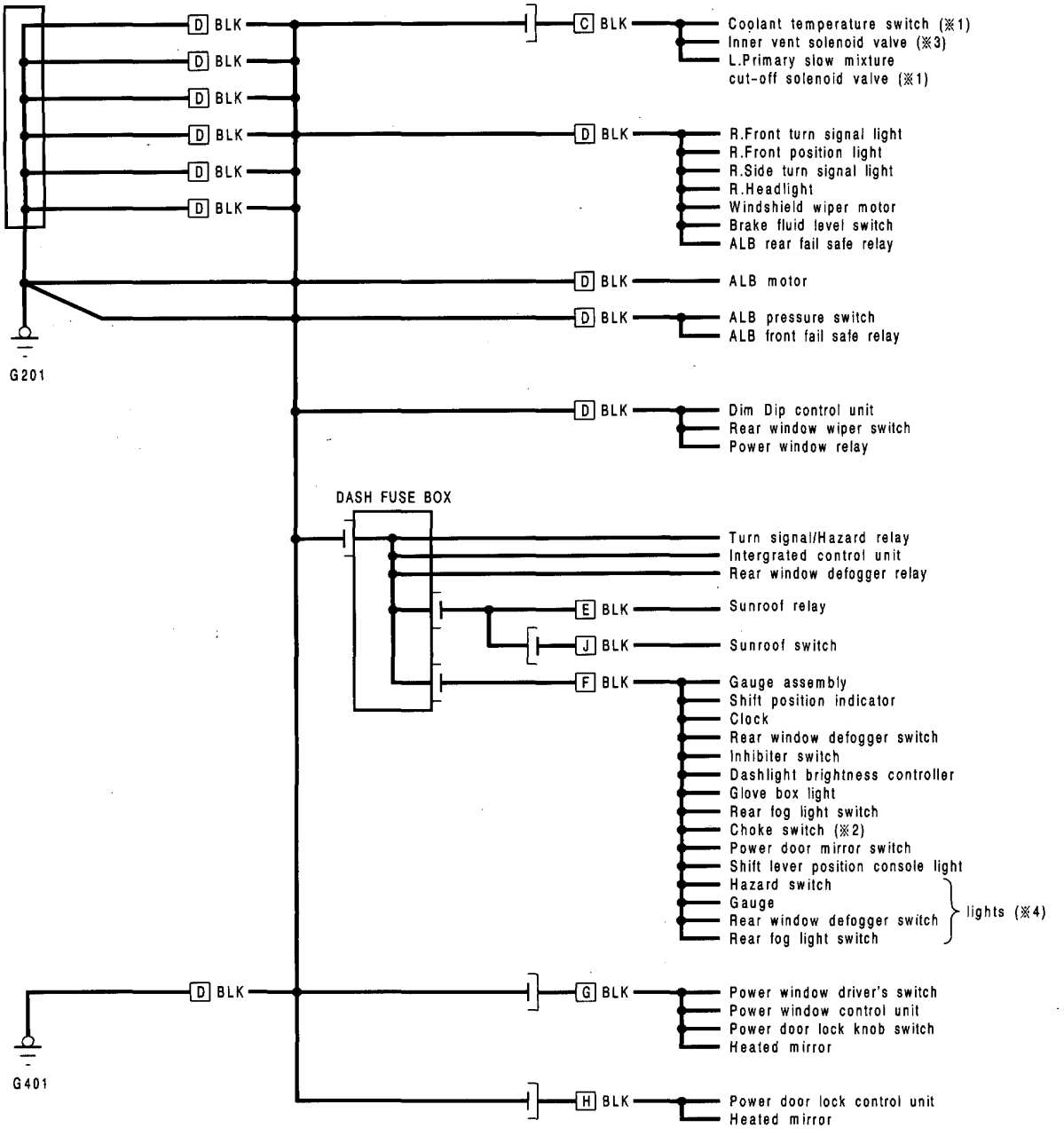


D : Main wire harness

※ : Wituout dashlight brightness control

RHD:

NOTE: See pages 16-10 and 11 for illustrated ground locations.



C : Engine wire harness
D : Main wire harness
E : Roof wire
F : Dashboard wire harness
G : Driver door wire harness
H : Front passenger's door wire harness
J : Sunroof switch subcord

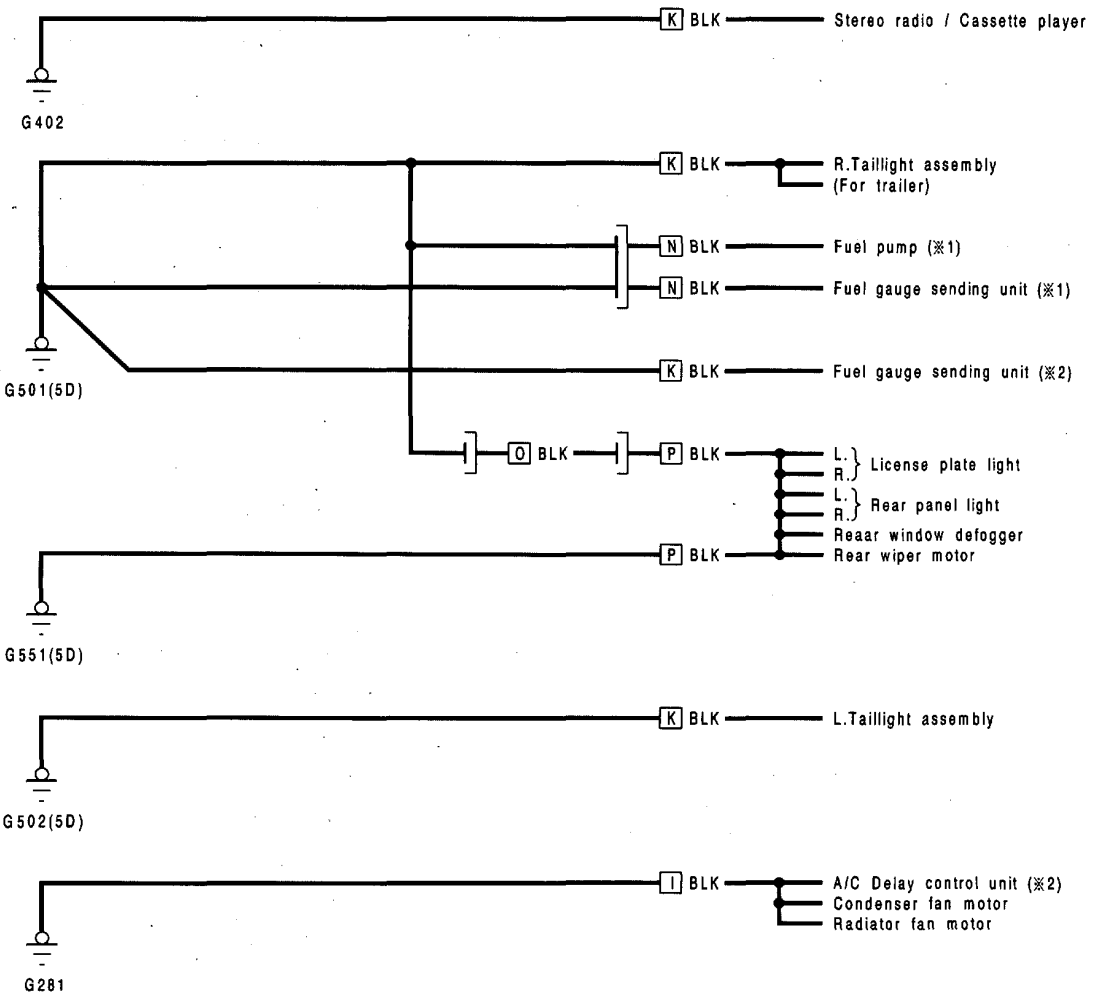
(※1) : Carbureted engine
(※2) : 1.4ℓ Carbureted engine
(※3) : 1.6ℓ Carbureted engine
(※4) : Without dashlight brightness control

(cont'd)

Ground Distribution

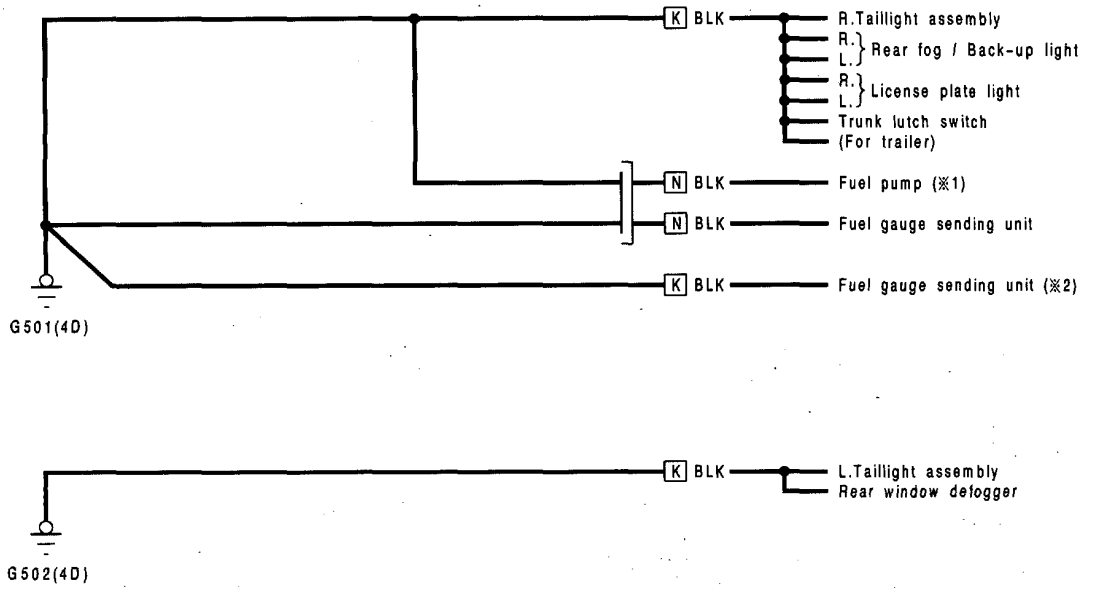
Circuit Identification (cont'd)

NOTE: See pages 16-12 and 14 for illustrated ground locations.



D : Main wire harness
I : A/C wire harness
K : Rear wire harness
N : Fuel tank wires
O : Hatch subcord
P : Hatch wire harness
(※1) : Fuel-injected engine
(※2) : Cabureted engine

NOTE : See pages 16-14 for illustrated ground locations.

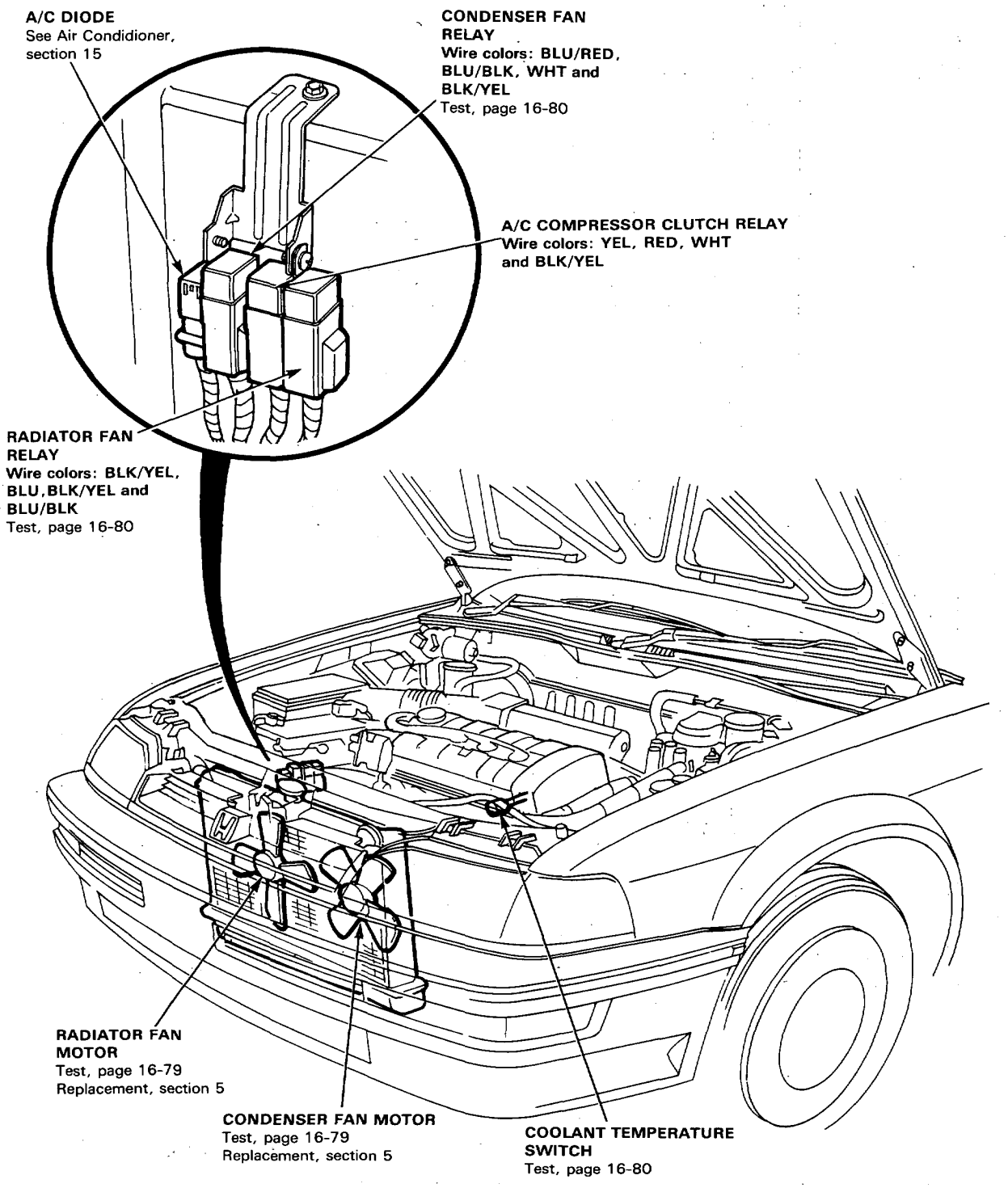


K : Rear wire harness
N : Fuel tank wires

(※1) : Fuel-injected engine
(※2) : Carbureted engine

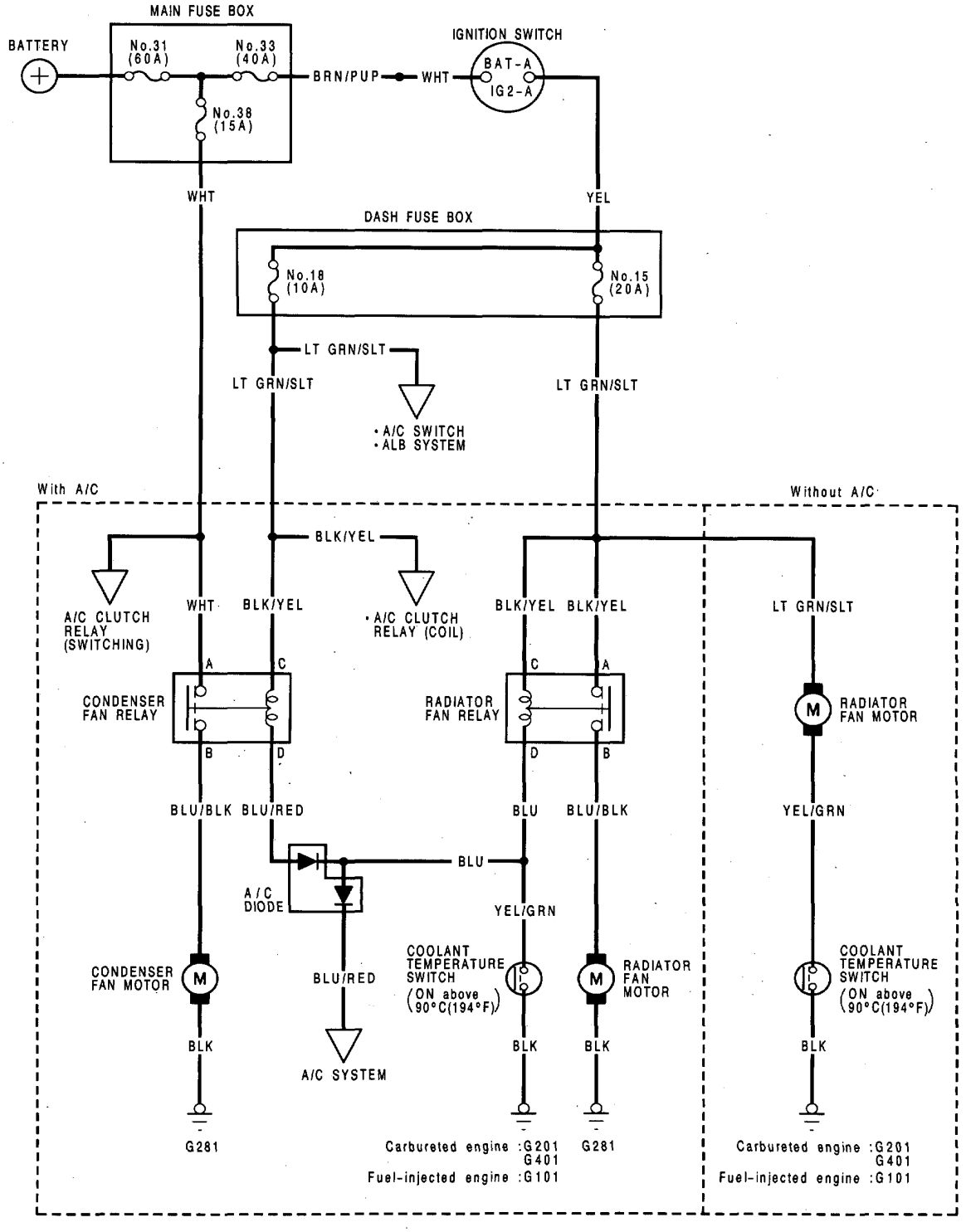
Cooling Fan System

Component Location Index



Cooling Fan System

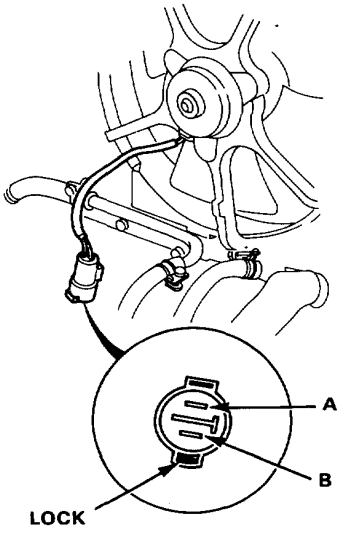
Circuit Diagram



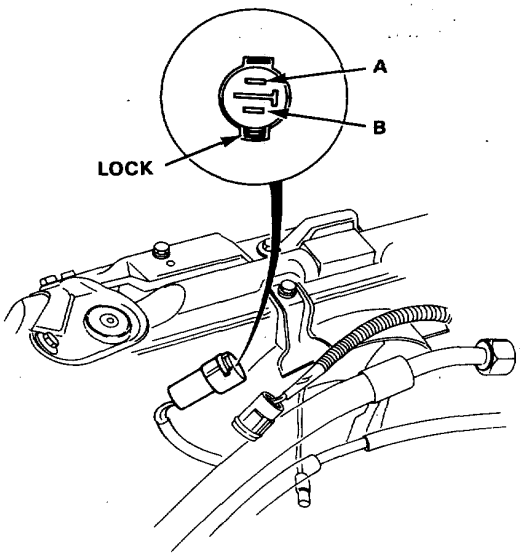
Fan Motor Test

1. Disconnect the 2-P connector from the fan motor.
2. Test motor operation by connecting battery positive to the A terminal, and negative to the B terminal.
3. If the motor fails to run smoothly, replace it.

Radiator Fan Motor :



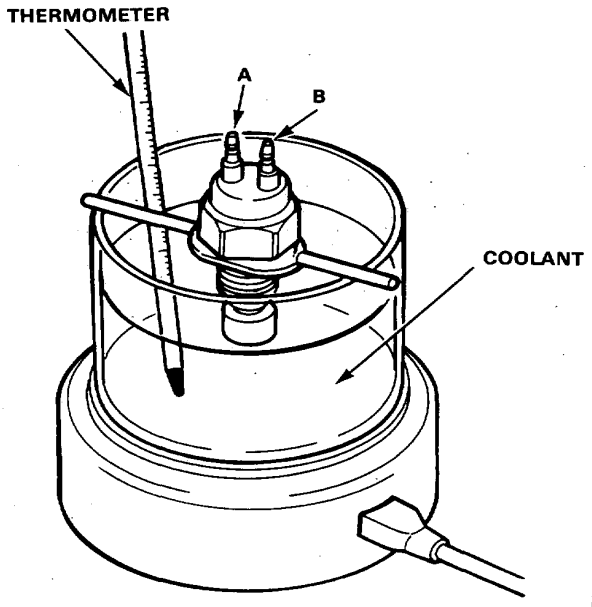
Condenser Fan Motor :



Cooling Fan System

Coolant Temperature Switch Test

1. Remove the coolant temperature switch from the rear of the engine cylinder block.
2. Suspend the coolant temperature switch in a container of coolant as shown.

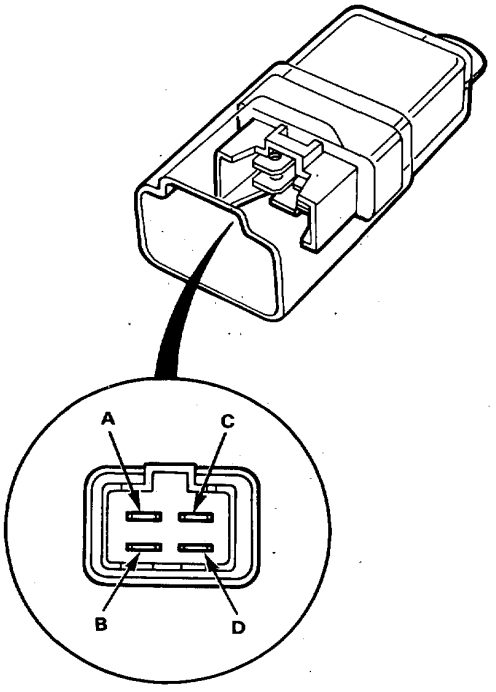


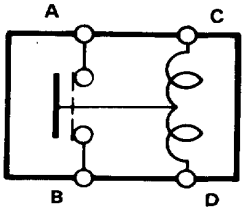
3. Heat the coolant and check coolant temperature with a thermometer (see table below).
4. Check for continuity between the A and B terminals according to the table.

Temperature \ Terminal	A	B
Above 88.5-91.5 °C (191 —197 °F)	○——	——○
Below 83.5-89.5 °C (182 —193 °F)		

Relay Test

1. Remove the radiator fan relay or condenser fan relay.
2. There should be continuity between the A and B terminals when the battery in connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.

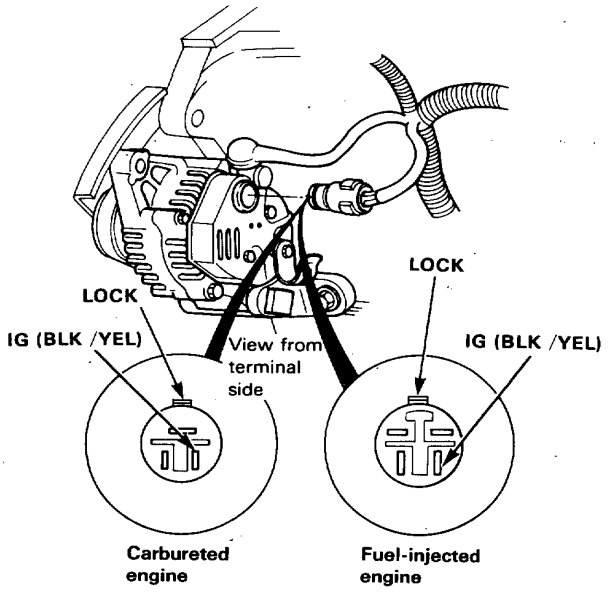




Alternator and Regulator Test

1. First make sure you have a good battery, and that the alternator belt, and connections at the alternator and main fuses are good. Next, check the No. 14 (10A) fuse in the dash fuse box. (If blown, the charge warning light will come on even if the system is working properly.)

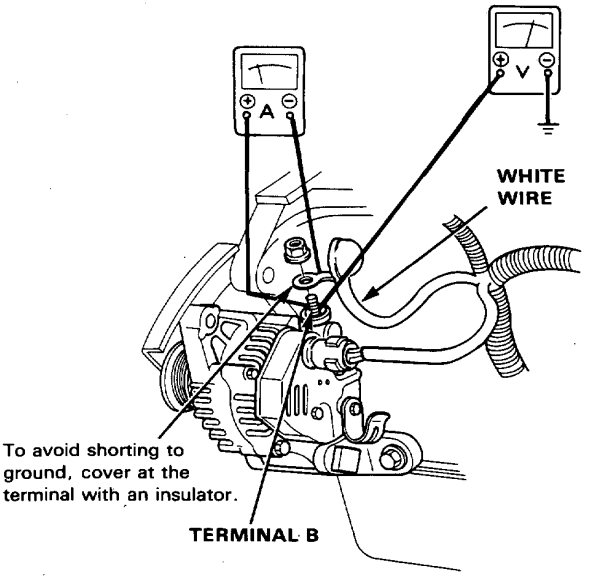
2. Disconnect the alternator connector from the alternator.
   With the ignition switch on, there should be battery voltage between the IG (BLK /YEL) terminal and body ground.



- If there is no voltage, check for an open in the BLK /YEL wire between the dash fuse box and voltage regulator.
- If there is battery voltage, go to step 3.

3. If these check OK, connect a voltmeter between the alternator terminal B and body ground, and an ammeter (100 amp capacity or higher) between the alternator terminal B and the white wire as shown. (An inductive pick up can be used instead of disconnecting the white wire.)

   NOTE: Disconnect the negative terminal of battery and disconnect the WHT wire of B terminal, and connect the ammeter as shown.

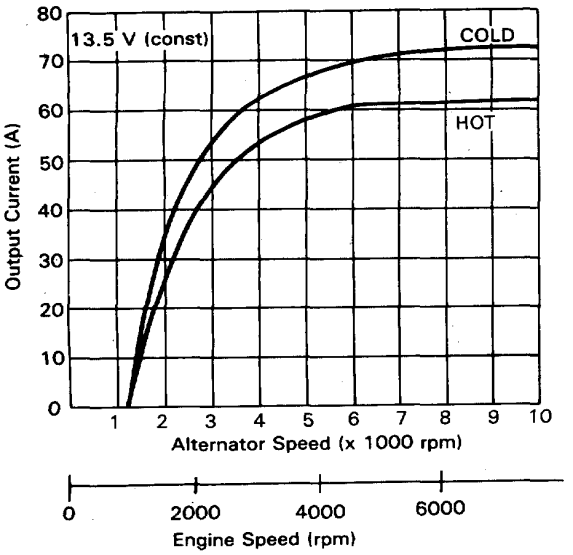


4. Start the engine, and turn on the headlights, blower motor, rear window defogger, etc.

   NOTE: If voltage stays above 13.5 V, apply electrical load more to lower the voltage to less than 13.5 V. If the voltage exceeds 16 V, stop the engine and replace the voltage regulator.

5. Compare the readings to the chart below. If no output or below specification, go to step 7. If output is within specification, go to step 6.

   NOTE: Subtract 5 to 10 amperes from the maximum reading due to engine operation.



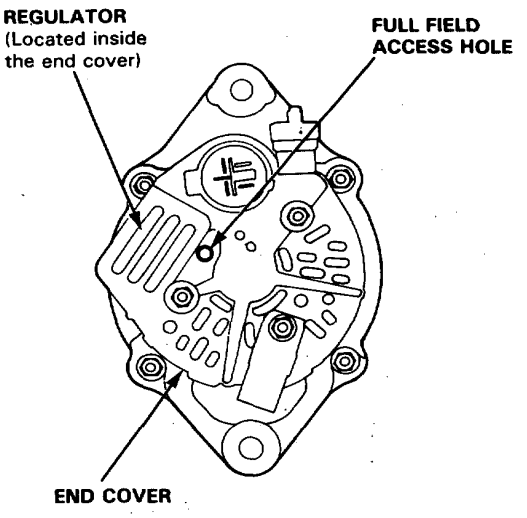
6. Turn off all loads in step 4, then measure the alternator output voltage at 1,500 rpm.

   - If the voltage is between 13.9 V and 15.1 V, the alternator and regulator are OK.
     If the charge warning light is still on, see Charge Warning Light Test. (see page 16-68)

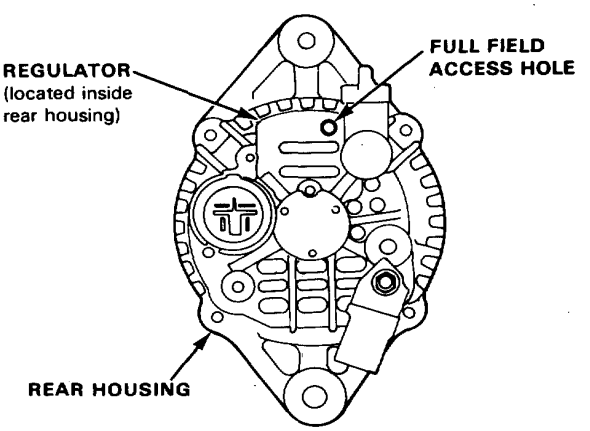
7. Perform a full-field test: Insert a short screwdriver into the full field access hole at the back of the alternator. While grounding the screwdrive and check amperage reading.

   CAUTION: The voltage will rise quickly when the alternator is full fielded. Do not allow the voltage to exceed 18 volts or damage to the electrical system may result.

Nippon Denso type:



Mitsubishi type:

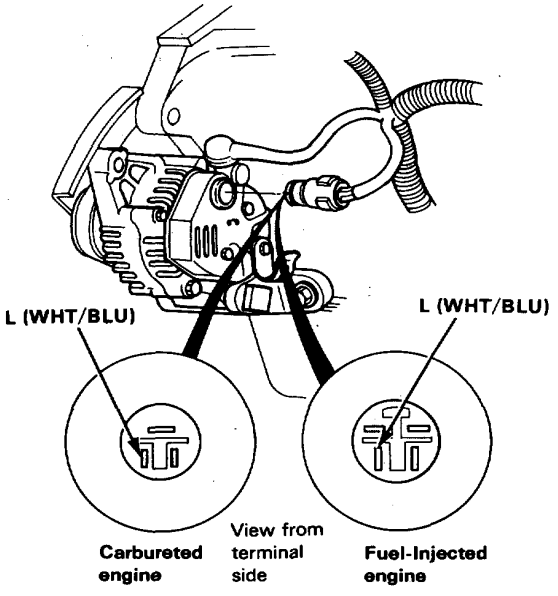


- If the amperage is not within specification, replace the alternator.
- If the amperage is within specification, replace the voltage regulator.

Charge Warning Light Test

NOTE: Before testing, check the wire harness connection and alternator belt tension.

1. Turn the ignition switch on. The charge warning light should come on.
   If it does not come on, unplug the alternator connector and short the pin of the L (WHT/BLU) terminal to ground.



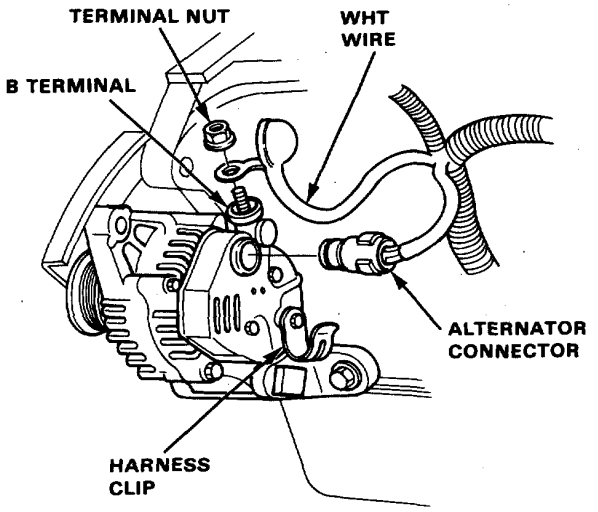
- If the warning light still does not come on, check for:
  - Blown No. 14 (10 A) fuse in the dash fuse box.
  - Bad bulb.
  - An open in the WHT/BLU wire between the warning light and voltage regulator.
  - An open in the BLK/YEL wire between the warning light and the dash fuse box, or the dash fuse box and the ignition switch.
- If the light comes on, check the alternator and regulator (see page 16-66).

2. Start the engine and let it idle. The charge warning light should go off.
   If it stays on this time, check the alternator and regulator (see page 16-66).

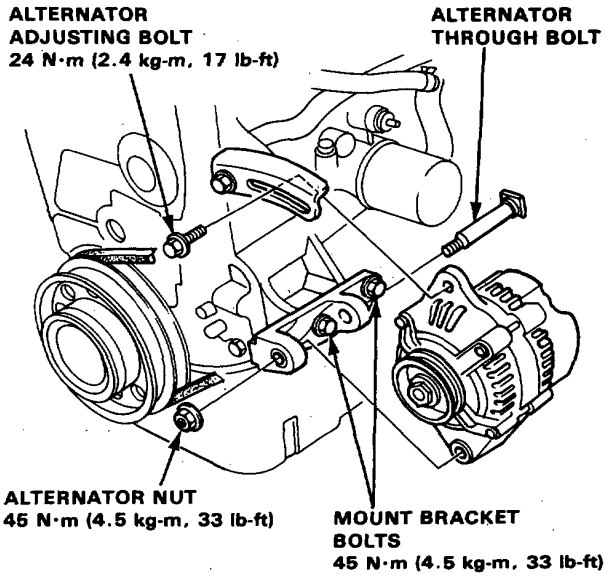
Alternator Replacement

NOTE: After installation, make sure that the wires are clamped.

1. Disconnect the ground wire from the battery negative (−) post.
2. Remove the washer fluid Reservoir.
3. Disconnect the alternator connector from the alternator.
4. Remove the terminal nut and the WHT wire from the B terminal.



5. Remove the adjusting bolt and alternator nut, then remove the alternator belt from the alternator pulley.
6. Remove the alternator throught bolt, then remove the alternator.

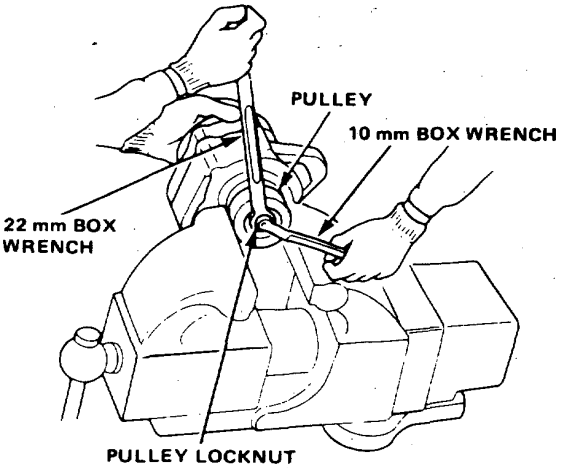


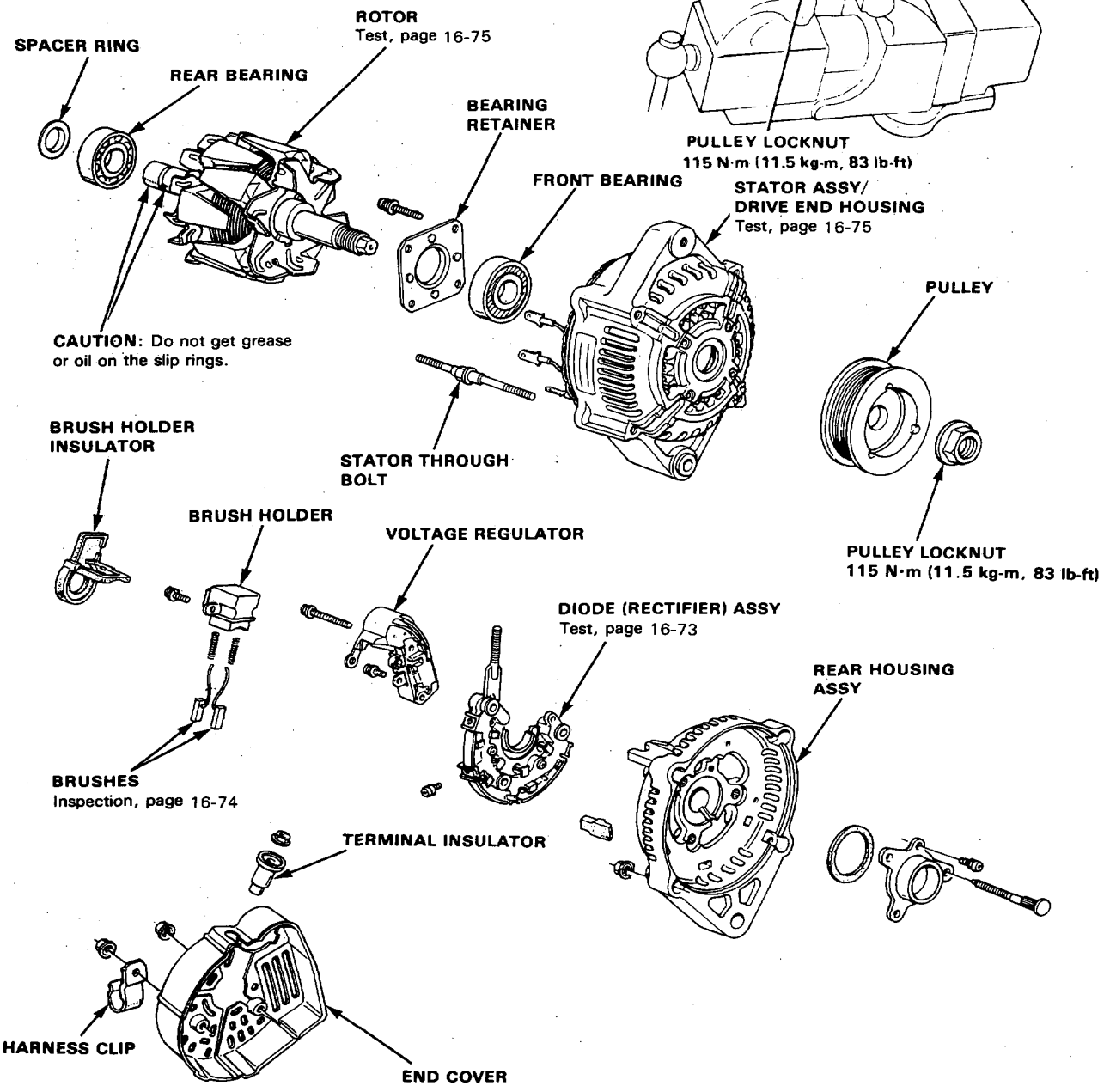
7. If necessary, remove the mount bracket bolts, and the upper and lower mount brackets.
8. adjust the alternator belt tension after installation (see page 16-76).

Alternator Overhaul (ND type)

NOTE: It is only necessary to separate the pulley, drive end housing and rotor when the front bearing needs replacement.

To remove the pulley and rotor, use 10 mm and 22 mm box wrenches to loosen the pulley locknut. Use an impact wrench to remove the nut if necessary.

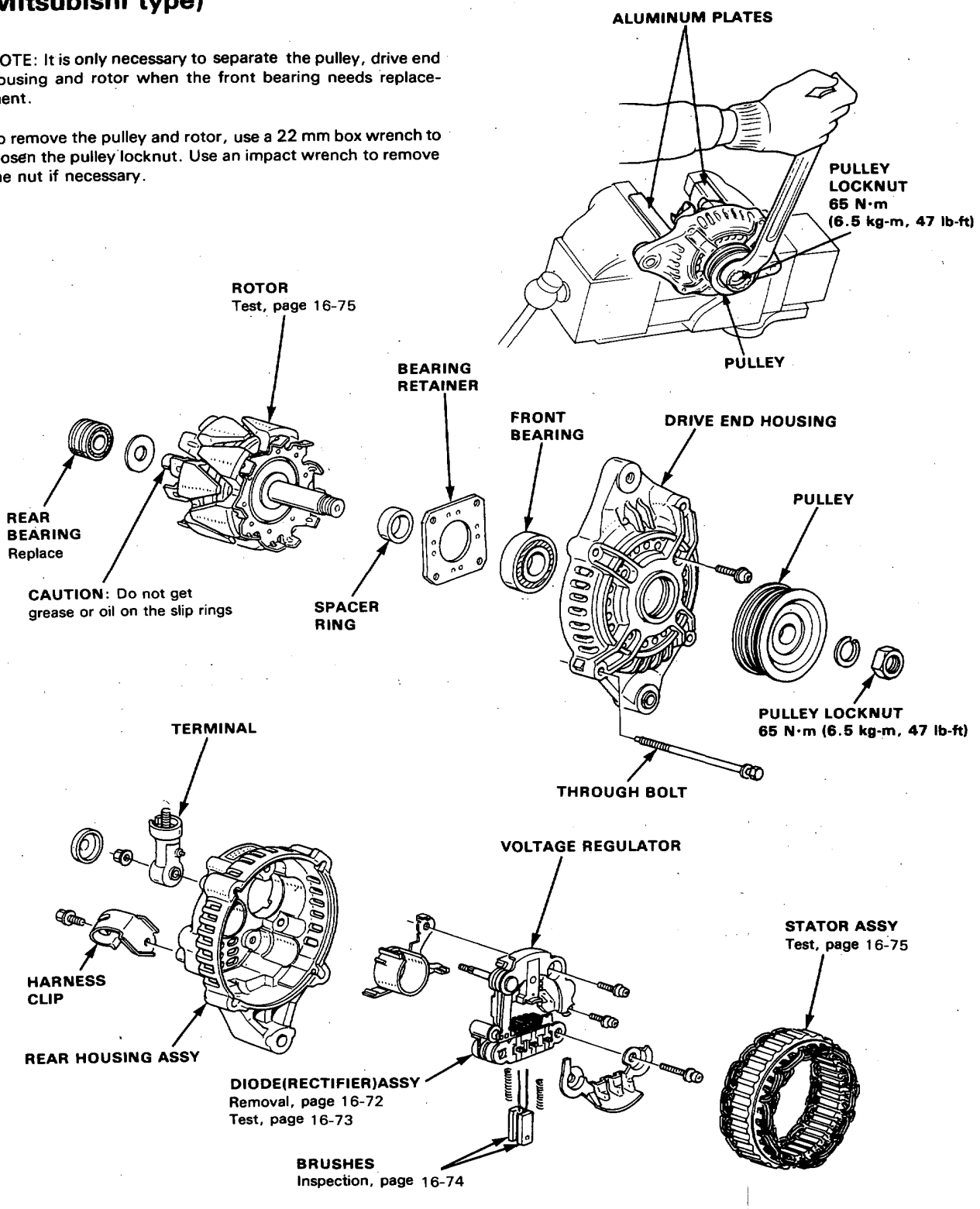




(Mitsubishi type)

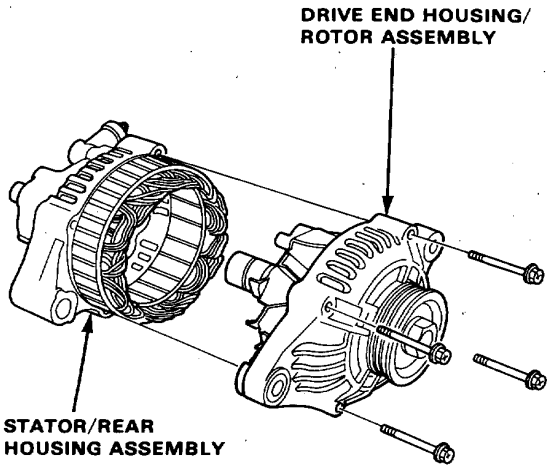
NOTE: It is only necessary to separate the pulley, drive end housing and rotor when the front bearing needs replacement.

To remove the pulley and rotor, use a 22 mm box wrench to loosen the pulley locknut. Use an impact wrench to remove the nut if necessary.

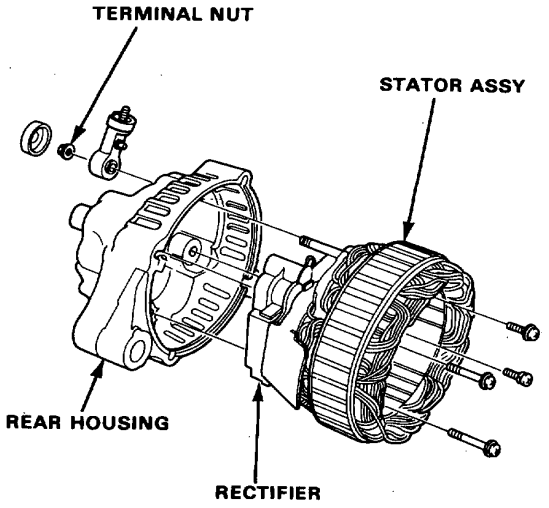


Rectifier Removal (Mitsubishi type)

1. Separate the drive end housing/rotor assembly from the stator/rear housing assembly by removing 4 bolts.

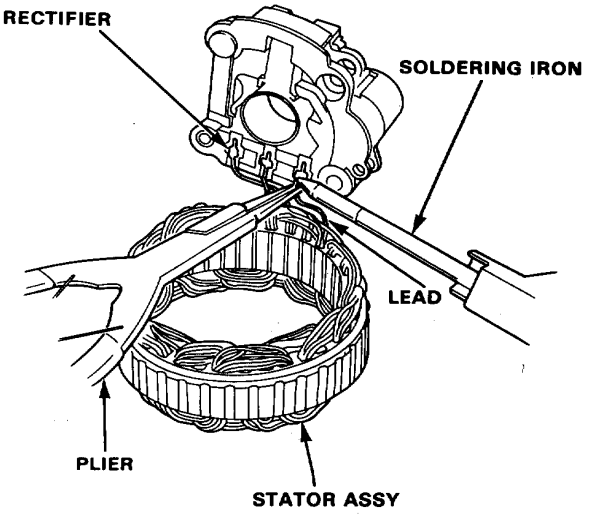


2. Separate the rear housing from the stator assembly by removing 4 screws and the terminal nut from the rear housing.



3. Unsolder the rectifier from the stator leads.

   NOTE: Pinch the stator lead with pliers to take away heat.



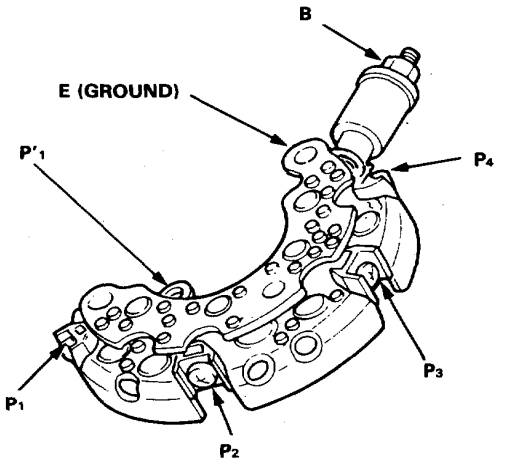
CAUTION: When installing the rectifier, use only a rosin core type solder or solder joints will corrode.

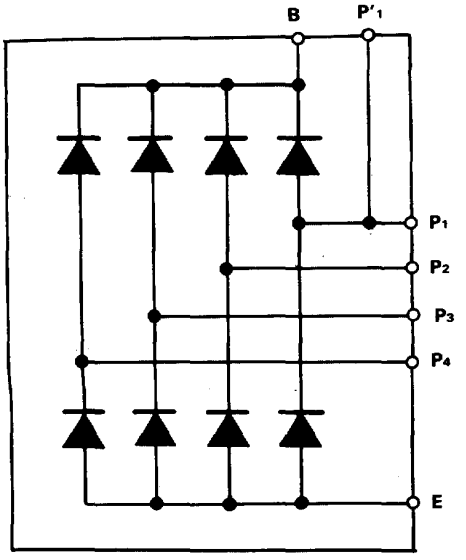
Rectifier Test

Nippon Denso type:

NOTE: The diodes are designed to pass current in one direction and block current in the opposite direction. Since the alternator rectifier is made up of eight diodes (4 pairs), each diode must be tested for continuity in both directions; a total of 16 checks.

1. Check for continuity in each direction, between the B and P (of each diode pair) terminals, and between the E (ground) and P (of each diode pair) terminals. All diodes should have continuity in only one direction.



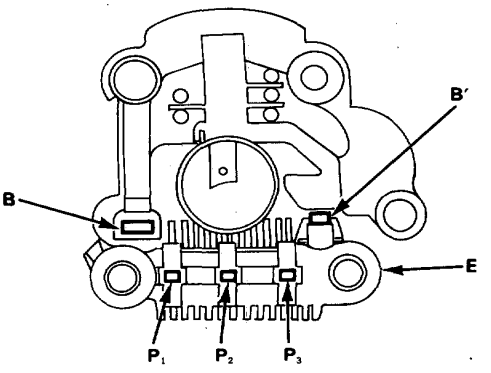


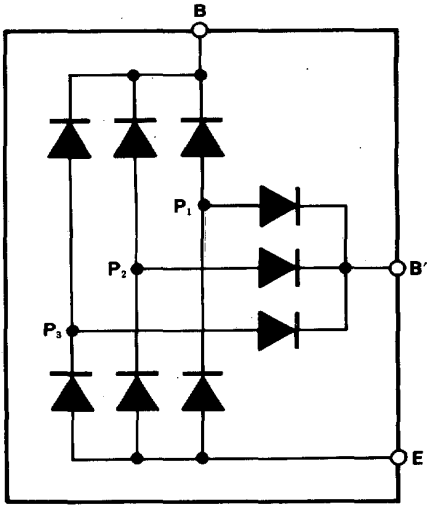
2. If any of the 8 diodes fails, replace the rectifier assembly (diodes are not available separately).

Mitsubishi type:

NOTE: The diodes are designed to pass current in one direction and block current in the opposite direction. Since the alternator rectifier is made up of nine diodes, each diode must be tested for continuity in both directions: a total of 18 checks.

1. Check for continuity in each direction, between the B and P (of each diode pair)terminals, and E (ground) and P(of each diode pair) terminals, and B' and P (of each diode pair) terminals, All diodes should have continuity in only one direction.





2. If any of the 9 diodes fails, replace the rectifier assembly (diodes are not available separately).

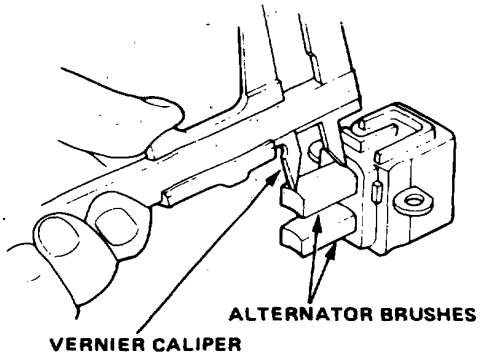
Alternator Brush Inspection

CAUTION: When replacing the brushes, use only a rosin core type solder or solder joints will corrode.

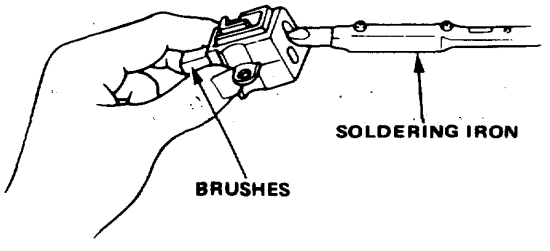
Nippon Denso type:

1. Remove the end cover, then take out the brush holder by removing its 2 screws.
2. Measure length of the brushes with a vernier caliper.

Alternator Brush Length:
Standard : 15.5 mm (0.61 in)
Service Limit: 5.3 mm (0.21 in)



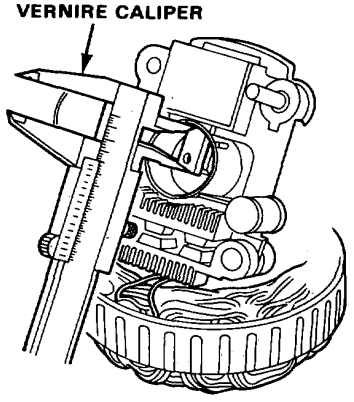
If the brushes are not within the service limit, replace them.



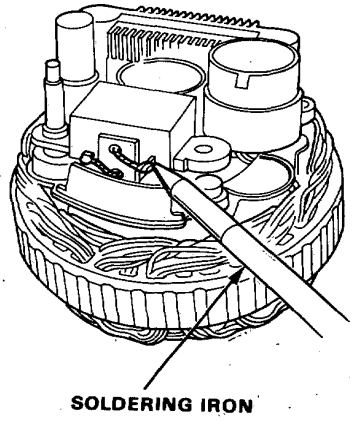
Mitsubishi type:

1. Separate the drive end housing /rotor assembly from the stator/rear housing assembly by removing 4 screws (see page 16-72).
2. Separate the rear housing from the stator assembly by removing 4 screws and the terminal nut fom the rear housing (see page 16-72).
3. Measure length of the brushes with a vernier caliper.

Alternator Brush Length:
Standard : 22.0 mm (0.90 in)
Service Limit : 8.0 mm (0.31 in)

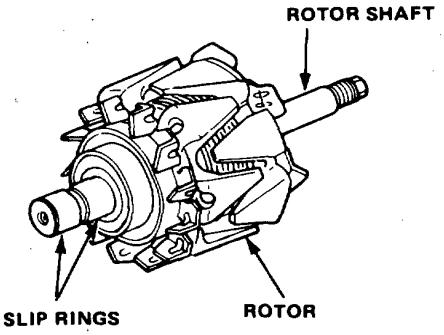


If the brushes are not within the service limit, replace them.



Rotor Slip Ring Test

1. Check that there is continuity between the slip rings.
2. Check that there is no continuity between the rings and the rotor or rotor shaft.

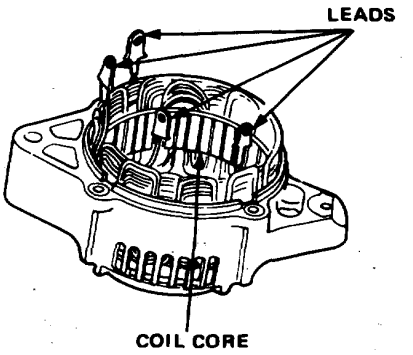


3. If the rotor fails either continuity check, replace it.

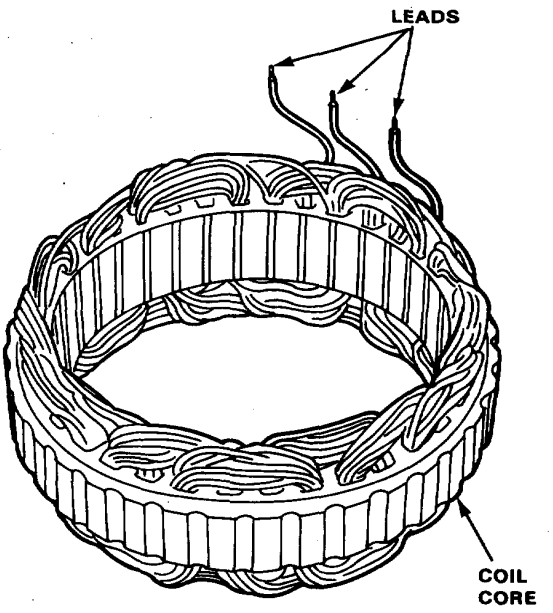
Stator Test

1. Check that there is continuity between each pair of leads.
2. Check that there is no continuity between each lead and the coil core.

Nippon Denso type:



Mitsubishi type:

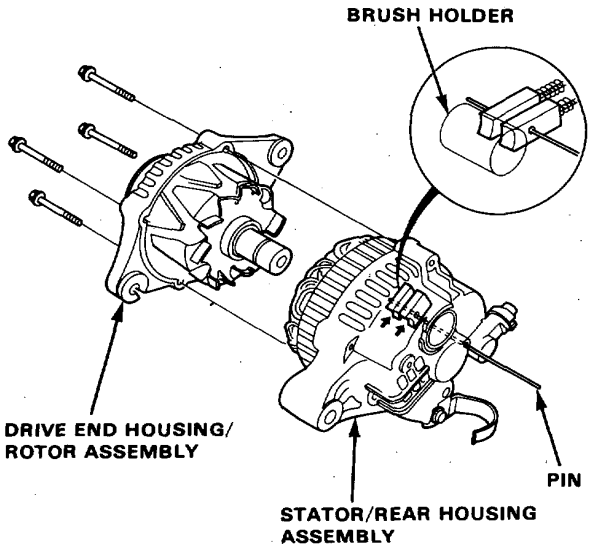


3. If the coil fails either continuity check, replace the stator.

Alternator Reassembly (Mitsubishi type)

Reassembly the alternator in the reverse order of disassembly.

1. Insert a pin into a hole on the brush holder to prevent the brushes from protruding.



2. Set the drive end housing /rotor assembly into the stator/rear housing assembly, tighten the through bolts, then pull out the pin.

Alternator Belt Adjustment

1. Apply a force of 98 N(10 kg, 22 lb) and measure the deflection between the alternator and the crankshaft pulley.

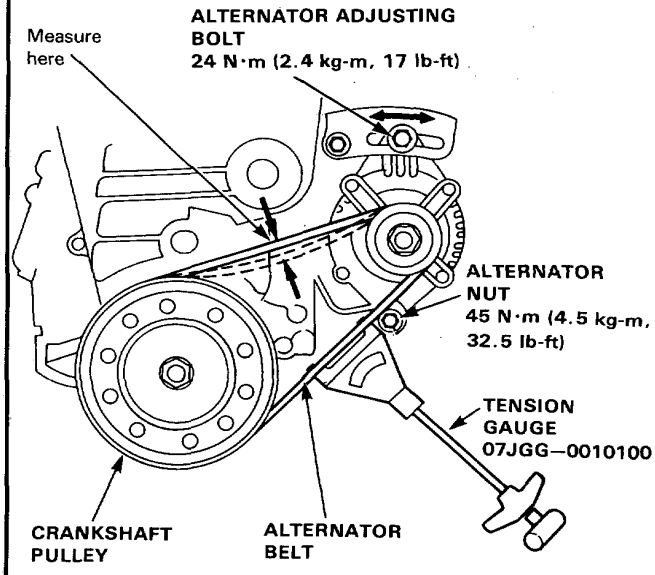
   Deflection: 9—11 mm (0.35—0.43 in)

   NOTE: On a brand-new belt, the deflection should be 7—9 mm (0.25—0.35 in) when first measured.

With Tension Gauge Test
Attach the tension gauge to the alternator belt as shown. Measure the belt tension.

Tension: 35 kg (77 lb)

NOTE: On a brand-new belt, the tension should be 50 kg (110 lb) when first measured.



2. Loosen the alternator adjusting bolt and nut.
3. Move the alternator to obtain the proper belt tension, then retighten the adjusting bolt and nut.
4. Recheck the deflection of the belt.