PRELUDE

CANADIAN PRELUDE CLUB

1987 Service Manual
First Edition

Canada & USA

PRELUDE

INFAMOUZ

INTRODUCTION

How to Use This Manual

This manual is divided into 15 sections. The first page of each section is marked with a black tab that lines up with one of the thumb index tabs on the front and back covers. You can quickly find the first page of each section without looking through a full table of contents. The symbols printed at the top corner of each page can also be used as a quick reference system.

Each section includes:

1. A table of contents, or an exploded view index showing:
   - Parts disassembly sequence.
   - Bolt torques and thread sizes.
   - Page references to descriptions in text.
2. Disassembly/assembly procedures and tools.
3. Inspection.
4. Testing/troubleshooting.
5. Repair.
6. Adjustments.

Special Information

WARNING Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.

CAUTION: Indicates a possibility of personal injury or equipment damage if instructions are not followed.

NOTE: Gives helpful information.

CAUTION: Detailed descriptions of *standard* workshop procedures, safety principles and service operations are not included. Please note that this manual does contain warnings and cautions against some specific service methods which could cause PERSONAL INJURY, or could damage a vehicle or make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by American Honda, might be done, or of the possible hazardous consequences of each conceivable way, nor could American Honda investigate all such ways. Anyone using service procedures or tools, whether or not recommended by American Honda, *must satisfy himself thoroughly* that neither personal safety nor vehicle safety will be jeopardized.

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First Edition 9/86

HONDA MOTOR CO., LTD.
Service Publication Office

Specifications Apply to U.S.A.

General Information

Chassis and Paint Codes

Vehicle Identification Number (Injected)

JHMBA314*HC000001

- **Manufacturer Code**
- **Vehicle Type**
  - M: Passenger Car
- **Prelude (2000)**
- **Transmission and Body Type**
  - 1: 5-Speed manual/2-Door
  - 2: 4-Speed automatic/2-Door
- **Model**
  - 4: 2000
- **Check Digit**
- **Model Year**
  - H: 1987
- **Factory Code**
  - C: Sayama Factory
- **Serial Number**

Vehicle Identification Number (Carb.)

JHMBA612*HC000001

- **Manufacturer Code**
- **Vehicle Type**
  - M:Passenger Car
- **Prelude (1800)**
- **Transmission and Body Type**
  - 1: 5-Speed manual/2-Door
  - 2: 4-Speed automatic/2-Door
- **Model**
  - 2: 1800
- **Check Digit**
- **Model Year**
  - H: 1987
- **Factory Code**
  - C: Sayama Factory
- **Serial Number**

Engine Serial Number

A18AI-1900001

- **Engine Type**
  - A18AI: With Carburetor (1800)
  - A20A3: With Fuel-Injection (2000)
- **Model Year**
  - 1: 1987
- **Emission Group**
  - 9: California (CAL)
  - 6: 49ST
- **Serial Number**

Manual Transmission Number

A2K5 – 2000001

- **Transmission Type**
  - A2K5 : Fuel-Injected Engine
  - A1B5 : Carbureted Engine
- **Serial Number**

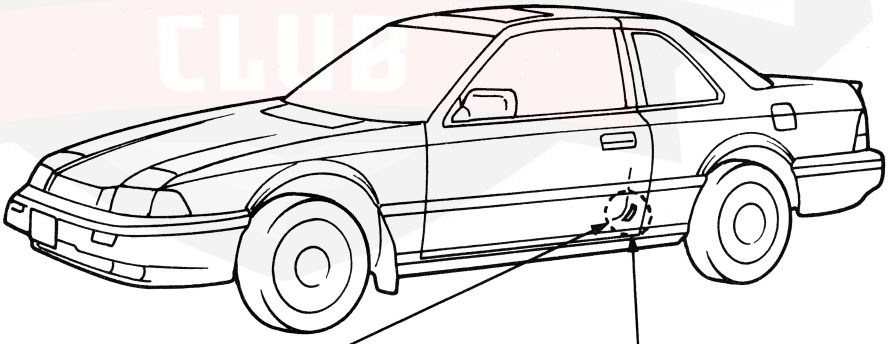
Automatic Transmission Number

F4 – 6000001

- **Transmission Type**
  - F4: Fuel-Injected Engine
  - AS: Carbureted Engine
- **Serial Number**

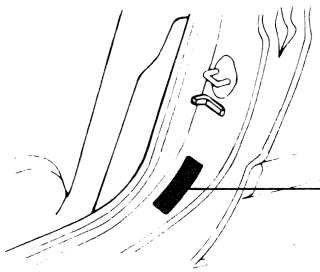
Paint Color Codes

Color Code	Color
B-35M	Montreal Blue Metallic
NH-512	Polar White
R-51	Phoenix Red
NH-91M	Graphite Gray Metallic
B-33MZ	Sonic Blue Metallic Z
NH-503P	Granada Black Pearl



Chassis Number

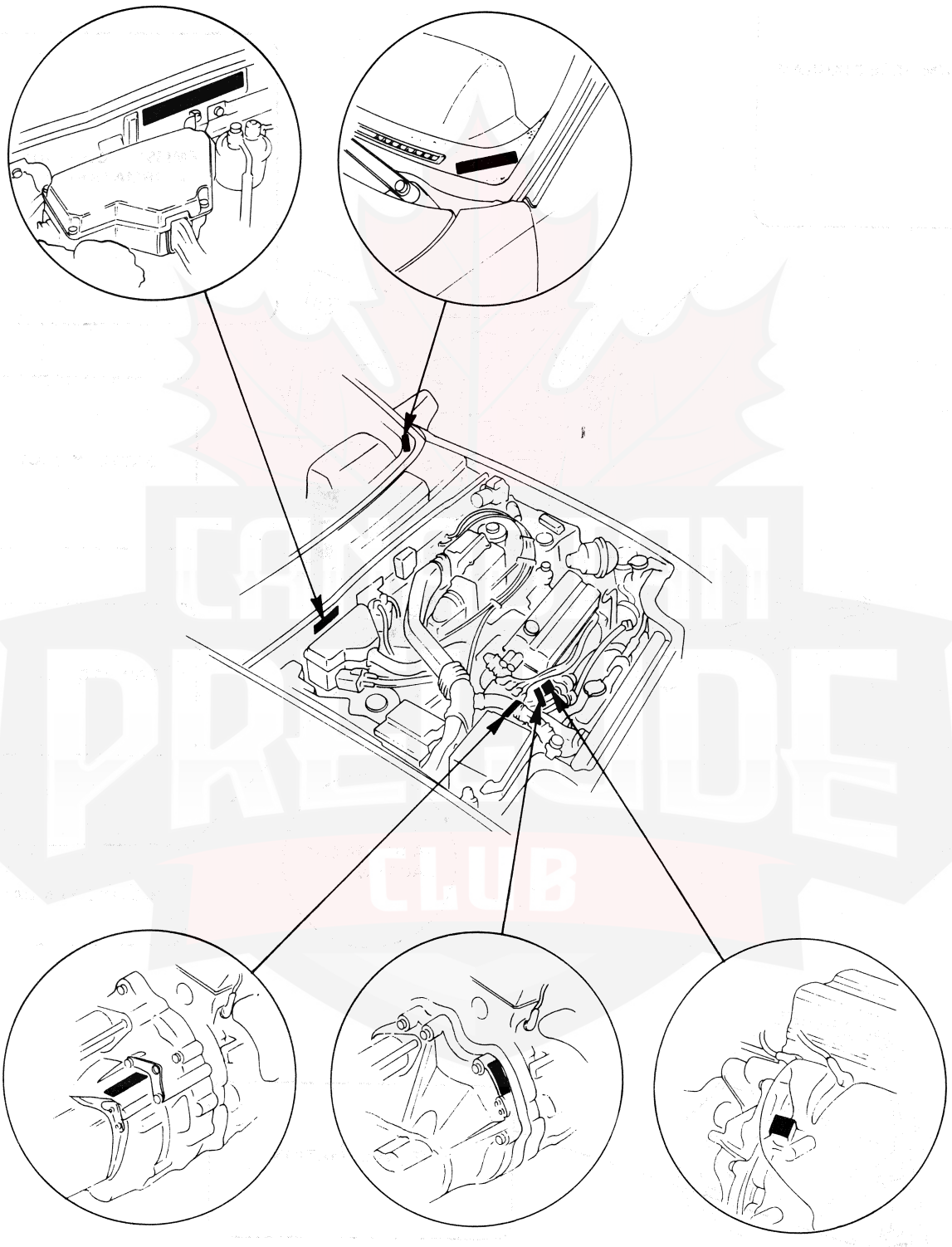
and Federal Motor Vehicle Safety Standard Certification.



Paint Code

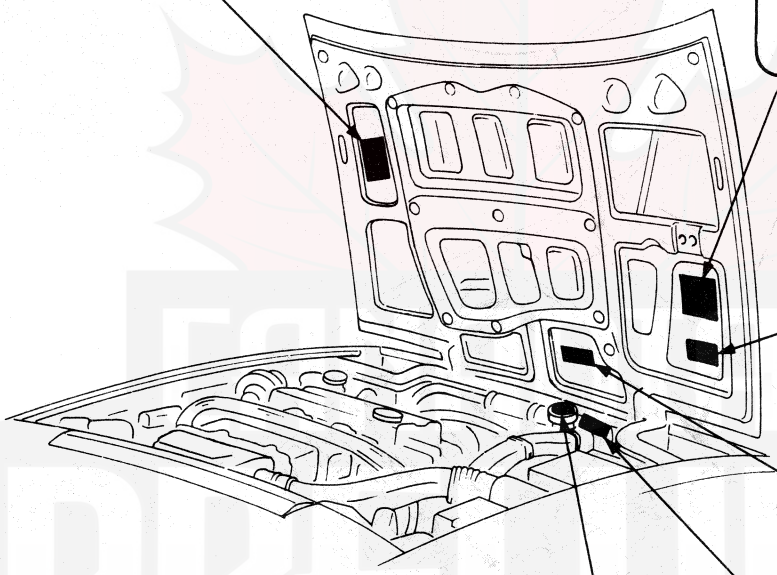
COLOR
NH-91M

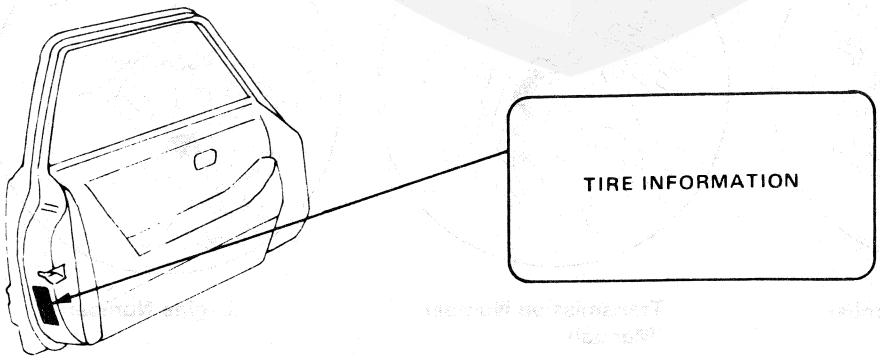
Identification Number Locations



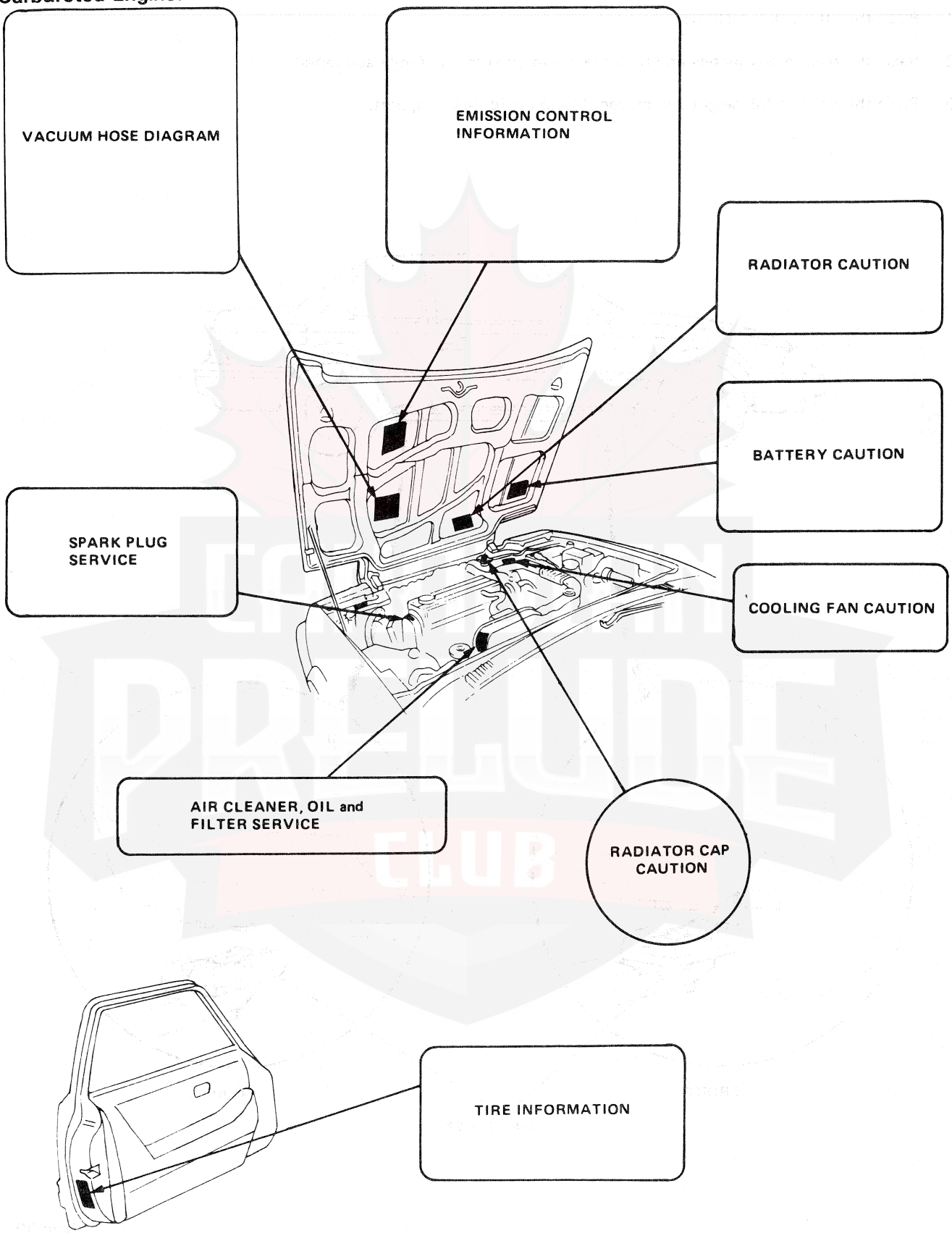
Label Locations

Fuel-Injected Engine:



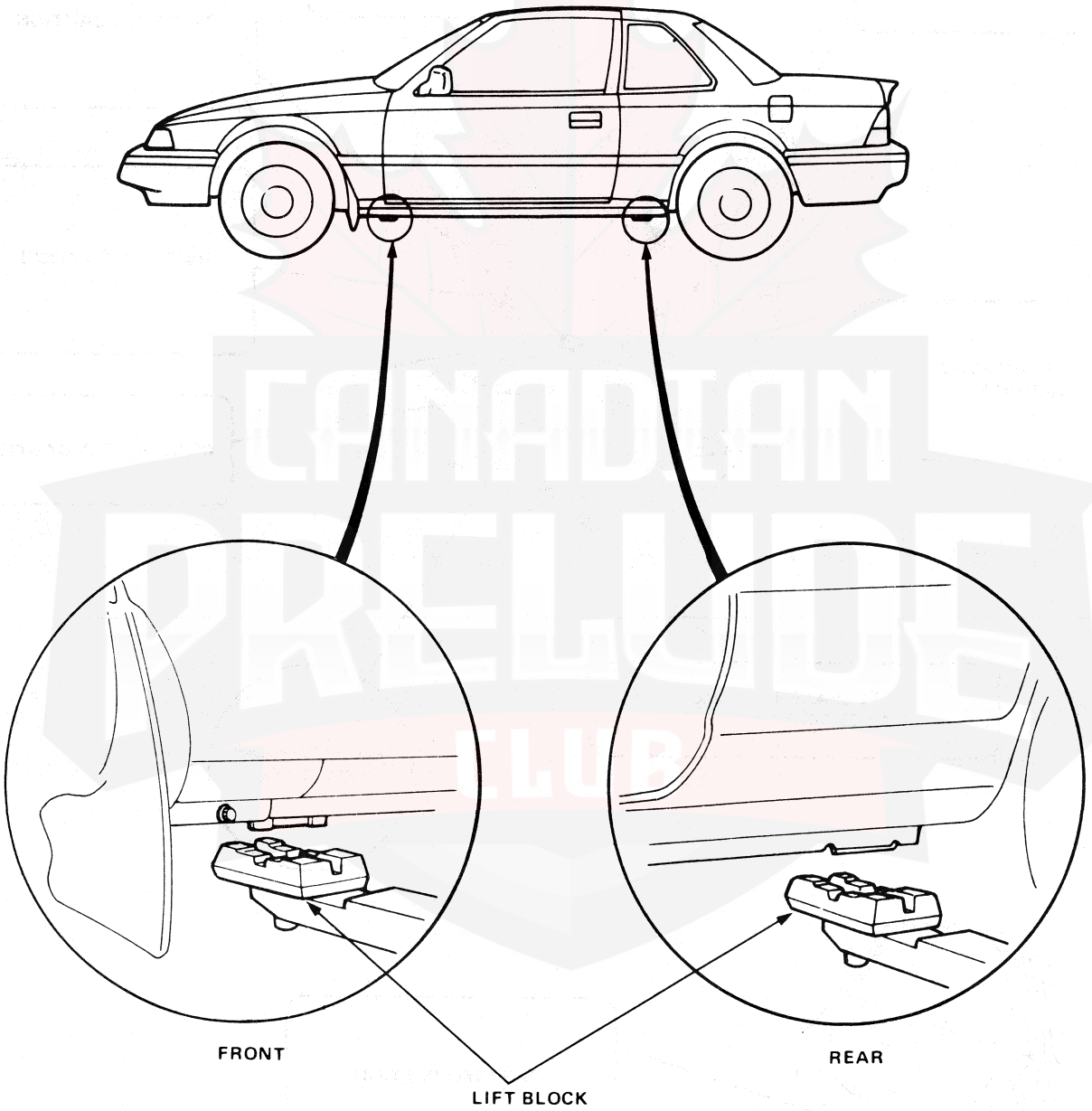


Carbureted Engine:



Lift and Support Points

1. Place the lift blocks as shown.
2. Raise the hoist a few inches and rock the car to be sure it is firmly supported.
3. Raise the hoist to full height and inspect lift points for solid support.



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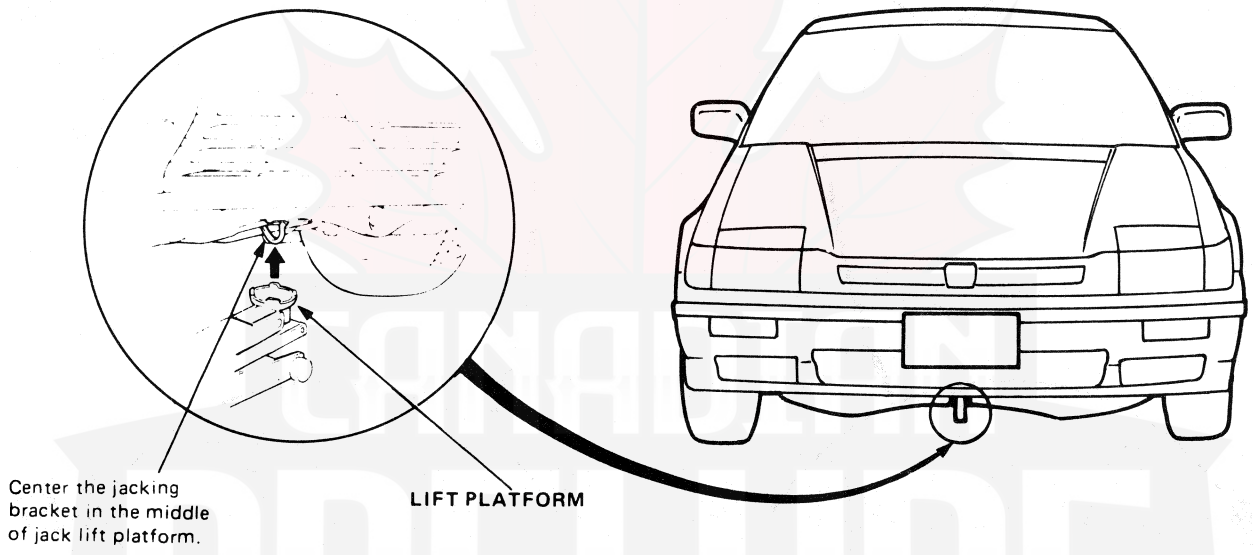
Floor Jack

1. Set the parking brake and block the wheels that are not being lifted.
2. When lifting the rear of the car, put the gear shift lever in reverse (Automatic in PARK).
3. Raise the car high enough to insert the safety stands.
4. Adjust and place the safety stands as shown on page 1-8 so the car will be approximately level, then lower the car onto them.

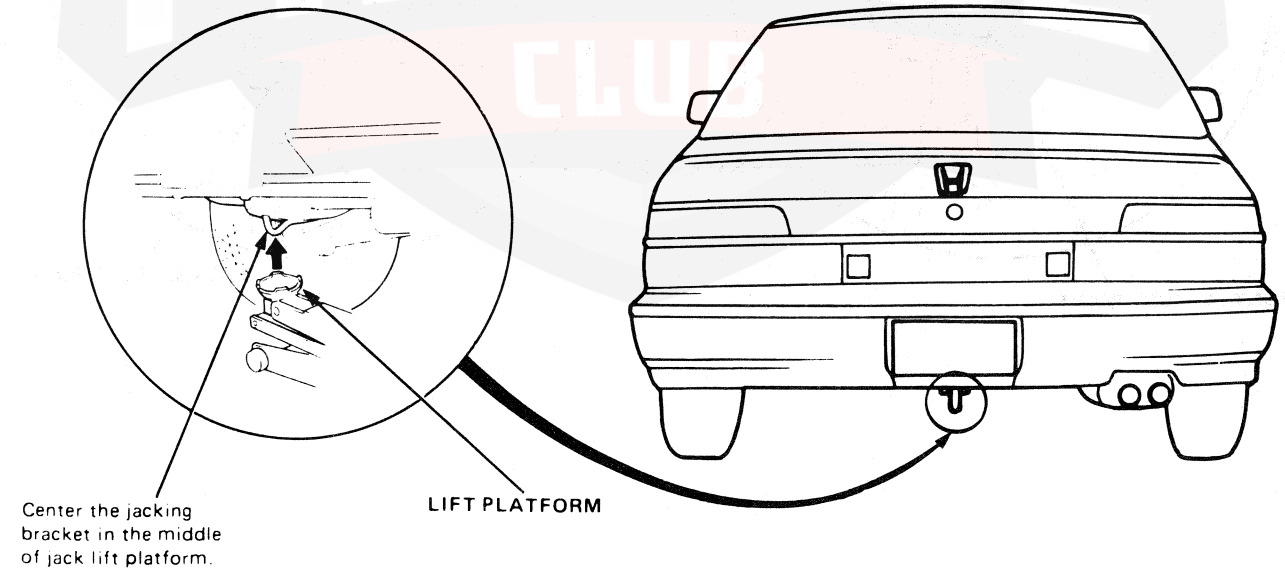
WARNING

- **Always use safety stands when working on or under any vehicle that is supported by only a jack.**
- **Never attempt to use a bumper jack for lifting or supporting the car.**

Front



Rear



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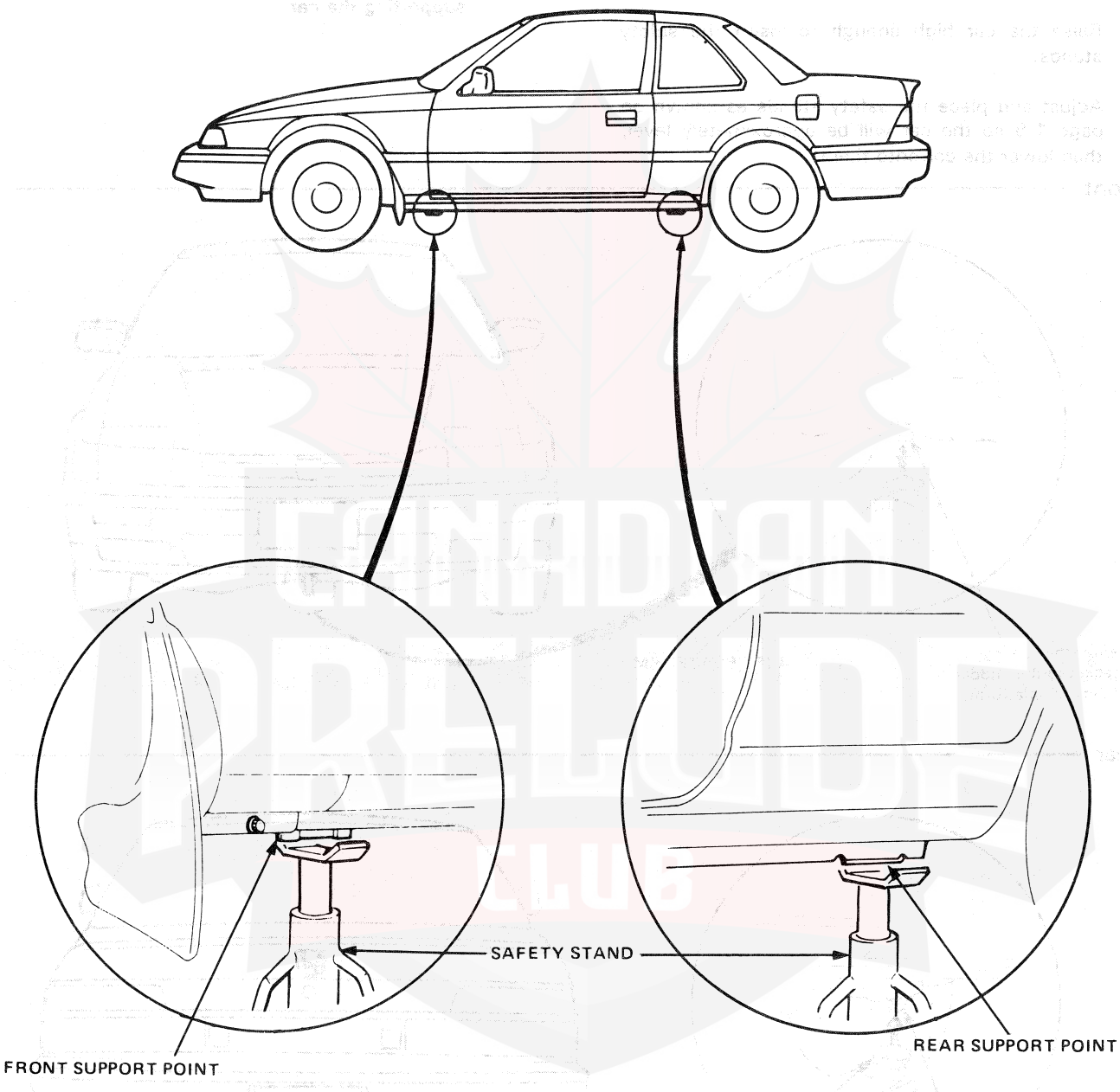
Lift and Support Points (cont'd)

Safety Stands



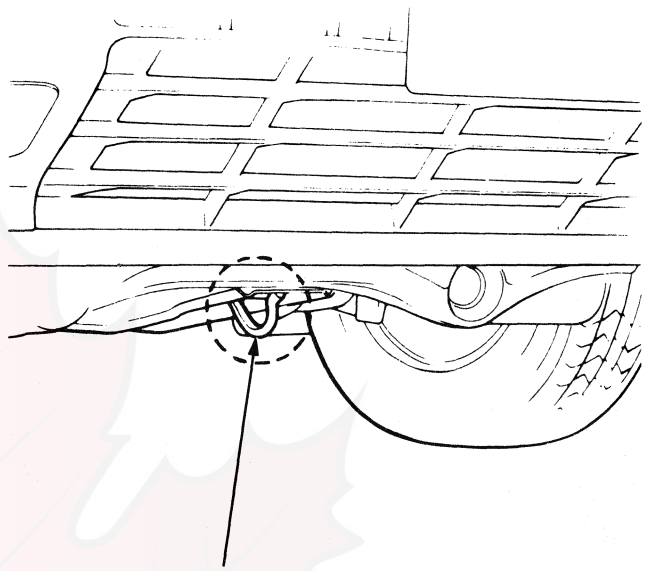
Towing

Towing

If possible, always tow the car with the front wheels off the ground. Do not use the bumpers to lift the car or to support the car's weight while towing. Check local regulations for towing with a chain or frame-mounted tow bar. A chain may be attached to the hook shown in the illustration. Do not attach a tow bar to either bumper.

If the car is to be towed with four wheels on the ground, observe the following precautions:

1. Wheels and axle must not be touching the body or frame.
2. Turn the ignition key to the "I" position and make sure the steering wheel turns freely.
3. Place the transmission in NEUTRAL.
4. Release the parking brake.
5. DO NOT exceed 55KPH (35 MPH) for distances of more than 80 km (50 miles).



Special Tools

Special Tools

NOTE: Some tools may appear in more than one section of this list if they are used for more than one job.

Engine

TOOL NUMBER	DESCRIPTION	PAGE REFERENCE
07749—0010000	Driver	7-17
07924—PD20002 or 07924—PD20001	Ring Gear Holder	7-4
07941—6920002	Ball Joint Remover	(not shown)
07942—SA50000 or 07942—8230000	Valve Guide Remover, 7.0 mm [Exhaust]	6-15
07942—6570100 or 07942—6110000	Valve Guide Remover, 6.6 mm [Intake]	6-15
07947—SB00100	Camshaft Seal Driver	6-17
07947—SB00200	Seal Driver	7-17
07948—SB00101	Seal Driver Attachment	7-17
07973—PE00302 or 07973—SB00301	Adj. Piston Pin Driver	7-11
07973—SB00100	Piston Base Head	7-11
07973—SB00200	Pilot Collar	7-11
07973—SB00400	Piston Pin Base Insert	7-11
07973—6570002 or 07973—6570001	Piston Pin Dis/Assembly Tool Set	7-11
*07973—6570500	*Piston Base	7-11
*07973—6570600	*Piston Base Spring	7-11
07984—SA50000 or 07984—689010A	Valve Guide Reamer 7.0 mm [Exhaust]	6-15
07984—6110000 or 07984—657010A	Valve Guide Reamer, 6.6 mm [Intake]	6-15

* Included in Piston Pin Dis/Assembly Tool Set T/N 07973—6570002

Fuel and Emissions

A9295—237—81167	Vacuum/Pressure Guage, 0—4 in Hg	11-33*, 98*
A973X—041—XXXXX or ST—AH—260—MC7	Vacuum Pump/Gauge, 0—30 in Hg	11-10*, 66*
KS—AHM—32—003	Digital Multimeter**	11-62
07GAC—SE0020A	Fuel Sender Wrench*	11-14
07401—0010000	Float Level Gauge*	11-35
07406—0040001	Fuel Pressure Gauge**	11-86
07614—0050100	Fuel Line Clamp*	11-13
07920—SB20000	Fuel Sender Wrench**	11-95
07999—PD6000A	System Checker Harness**	11-62

*: Carbreted Engine **: Fuel-Injected Engine

Clutch

07708—0010102	10 mm T-Wrench	13-6
07924—PD20002 or 07924—PD20001	Ring Gear Holder	13-6
07974—6890101 or 07974—6890100	Clutch Disc Alignment Tool	13-6

Manual Transmission

TOOL NUMBER	DESCRIPTION	PAGE REFERENCE
07736—A01000A	Adj. Bearing Remover, 25—40 mm	14-10
07746—0010400	Attachment, 52 x 55 mm	14-11
07749—0010000	Driver	14-10
07923—6890101	Mainshaft Holder, Manual	14-6
07936—6340000	Bearing/Transmission Case Puller	14-7
07947—6110500	Seal Driver Attachment	14-30
07947—6340000	Seal Driver	14-11
07947—6340500	Driver Attachment, E	14-10

Automatic Transmission <F4>

07GAB—PF50100	Mainshaft Holder, Automatic		15-12
07GAC—PG40100 or 07GAC—PF40100	Transmission Housing Puller		15-15
07GAE—PG40000	Clutch Spring Compressor Set	or 07960—612000 + 07960—6890100	15-36
*07GAE—PG40100	*Compressor Attachment		15-36
*07GAE—PG40200	*Compressor Bolt Assembly		15-36
*07960—6120100	*Compressor Attachment		15-36
07406—0020003 or 07406—0020002	Oil Pressure Gauge Set		15-7
07406—0070000	Low Pressure Gauge		15-7
07736—A01000A	Adj. Bearing Remover, 25—40 mm		15-45
07746—0010500	Attachment, 62 x 68 mm		15-46
07749—0010000	Driver		15-44
07936—6340000	Bearing/Transmission Case Puller		15-45
07947—6110500	Seal Driver Attachment		15-44
07947—6340201	Driver Attachment, B		15-45
07947—6340500	Driver Attachment, E		15-44

* Included in Clutch Spring Compressor Set T/N 07GAE—PG40000

Automatic Transmission <AS>

07GAC—PG40100 or 07GAC—PF40100	Transmission Housing Puller		15-85
07GAE—PG40000	Clutch Spring Compressor Set	or 07960—612000 + 07960—6890100	15-103
*07GAE—PG40100	*Compressor Attachment		15-103
*07GAE—PG40200	*Compressor Bolt Assembly		15-103
*07960—6120100	*Compressor Attachment		15-103
07406—0020003 or 07406—0020002	Oil Pressure Gauge Set		15-77
07406—0070000	Low Pressure Gauge		15-77
07736—A01000A	Adj. Bearing Remover, 25—40 mm		15-112
07746—0010400	Attachment, 52 x 55 mm		15-112
07749—0010000	Driver		15-110
07923—6890201	Mainshaft Holder, Automatic		15-82
07936—6340000	Bearing/Transmission Case Puller		15-112
07947—6110500	Seal Driver Attachment		15-111
07947—6340201	Driver Attachment, B		15-111
07947—6340500	Driver Attachment, E		15-110
07974—6890300	Throttle Control Cable Adjustment Gauge		15-132

* Included in Clutch Spring Compressor Set T/N 07GAE—PG40000

(cont'd)

Special Tools

Differential

TOOL NUMBER	DESCRIPTION	PAGE REFERENCE
07746—0030100	Driver, 40 mm I.D.	16-4
07749—0010000	Driver	16-8
07947—6110500	Seal Driver Attachment	16-10
07947—6340500	Driver Attachment, E	16-8

Power Steering

07GAK—SE00110	P/S Pump Joint Adaptor	19-9
07GAK—SE00120	P/S Hose Joint Adaptor	19-9
07406—0010101	Bypass Tube Joint	19-11
07406—0010300	Oil Pressure Valve	19-9
07406—0010400	Pressure Gauge	19-9
07725—0030000 or 07725—0010100	Universal Holder	19-20
07746—0010300 or 07965—6920500	Attachment, 42 x 47 mm	19-39
07749—0010000	Driver	19-39
07900—SA50000	P/S Seal Replacement Tool Set	(not shown)
*07974—SA50100	*Piston Seal Ring Guide	19-41
*07974—SA50200	*Piston Seal Ring Sizing Tool	19-41
*07974—SA50300	*Cylinder End Packing Slider	19-42
*07974—SA50400	*End Seal Guide	19-44
*07974—SA50600	*Dust Seal Guide	19-46
07916—SA50001	Steering Gearbox Locknut Wrench, 40 mm	19-8
07941—6920002	Ball Joint Remover	19-34
07974—SA50800	Ball Joint Clip Installation Guide, B	19-27
07974—6790000	Tie-Rod Boots Driver	19-27

* Included in P/S Seal Replacement Tool Set T/N 07900—SA50000

Suspension

07410—0010200	Wheel Alignment Gauge ATT.,B	20-3
07749—0010000	Driver	20-14
07941—6920002	Ball Joint Remover	20-12
07946—6920100	Bearing Driver Attachment	20-24
07959—SA50000	Absorber Spring Compressor	20-22
07965—SA00600	Front Hub Dis/Assembly Tool, F	20-15
07965—SB00100	Ball Joint Remover/Installer	20-11
07965—SB00200	Ball Joint Remover Base	20-11
06965—SB00300	Ball Joint Installer Base	20-11
07965—6340100	Front Hub Dis/Assembly Tool Pin, A	20-13
07965—6340301	Front Wheel Bearing Dis/Assembly Tool Base, A	20-13
07965—6920100	Front Hub Dis/Assembly Tool A	20-14
07965—6920201	Front Hub Dis/Assembly Tool B	20-14
07965—6920300	Front Hub Dis/Assembly Tool C	20-14
07965—6920400	Front Hub Dis/Assembly Tool D	20-14
07965—6920500	Front Hub Dis/Assembly Tool E	20-15
07974—SA50700	Ball Joint Boot Clip Installation Guide, A	20-11

Brakes

TOOL NUMBER	DESCRIPTION	PAGE REFERENCE
07GAG—SE00100	Brake Booster Adjustment Gauge	21-54
07749—0010000	Driver	21-19
108—0005—04 109—0120—05	Kwik-way Brake Lache with Power Feed Unit	(mot shown) Available from Kwik-Way Manufacturing Co.
07783—0070001 or	Brake Disc Grinder or	(not shown)
07914—SA50001	Snap-ring Pliers	21-27
07914—3230001	Snap-ring Pliers	21-12
07947—6890300	Driver Attachment, C	21-51
07946—6920100 or 07947—6710100	Bearing Driver Attachment	21-19
07960—SA50002	Brake Spring Compressor	21-27
07973—SA50000	Rear Caliper Guide	21-29
07975—SA50001	Brake Booster Rod Adjustment Gauge	21-22

Body

07GAZ—SE30100	Torsion Rod Assembly Tool	22-43

Heater and Air Conditioner

A973X—041—XXXXX or ST-AH-260-MC7	Vacuum/Gauge, 0—30 in Hg	23-11
07GAB—PJ60100 or 07923—PB80001	A/C Clutch Holder	24-9
07934—PB80001	A/C Clutch Puller	24-9

specs

Specifications

Standards and Service Limits

○ : Fuel-Injected Engine * : Carbureted Engine

Cylinder Head/Valve Train — Section 6

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	300 rpm and wide-open throttle		Nominal	○ 1,226 kPa (12.5 kg/cm², 178 psi) * 1,274 kPa (13.0 kg/cm², 125 psi)
			Minimum	○ 1,030 kPa (10.5 kg/cm², 149 psi) * 1,078 kPa (11.0 kg/cm², 156 psi)
			Maximum variation	196 kPa (2 kg/cm², 28 psi)
Cylinder head	Warpage		—	0.05 (0.002)
	Height		90 (3.54)	89.8 (3.54)
Camshaft	End play		0.05–0.15 (0.002–0.006)	0.5 (0.02)
	Oil clearance No. 1, 3 and 5 Journals		0.050–0.089 (0.002–0.004)	0.15 (0.006)
	No. 2 and 4 journals		0.130–0.169 (0.005–0.007)	0.23 (0.009)
	Runout		0.03 (0.001) max.	0.06 (0.002)
	○ Cam lobe height Manual and	IN A	○ 38.853 (1.5296)	—
	Automatic	IN B	○ 38.604 (1.5198)	—
	Manual	EX	○ 38.796 (1.5274)	—
	* Cam lobe height Manual	IN A	* 38.86 (1.530)	—
		IN B	* 38.41 (1.512)	—
		EX	* 38.92 (1.532)	—
	Automatic	IN A	* 38.67 (1.522)	—
		IN B	* 38.22 (1.505)	—
		EX	* 38.42 (1.513)	—
Valve	Valve clearance	IN	0.12–0.17 (0.005–0.007)	—
		EX	0.25–0.30 (0.010–0.012)	—
	Valve stem O.D.	IN	6.58–6.59 (0.2591–0.2594)	6.55 (0.258)
		EX	6.94–6.95 (0.2732–0.2736)	6.91 (0.272)
	Stem-to-guide clearance	IN	0.02–0.05 (0.001–0.002)	0.08 (0.003)
		EX	0.06–0.09 (0.002–0.004)	0.12 (0.005)
	Stem installed height	IN	48.59 (1.913)	49.34 (1.943)
		EX	47.66 (1.876)	48.41 (1.906)
Valve seat	Width	IN and EX	1.25–1.55 (0.049–0.061)	2.0 (0.08)
Valve spring	Free length	IN	49.2 (1.94)	48.2 (1.90)
		EX Inner	39.8 (1.57)	38.8 (1.53)
		Outer	49.8 (1.96)	48.8 (1.92)
	Squareness Inner and Outer		—	1.75 (0.068)
Valve guide	I.D.	IN	6.61–6.63 (0.260–0.261)	6.65 (0.262)
		EX	7.01–7.03 (0.276–0.277)	7.05 (0.278)
Rocker arm	Arm-to-shaft clearance		0.008–0.054 (0.0003–0.0021)	0.08 (0.003)

Engine block — Section 7

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface		0.08 (0.003) max.	0.10 (0.004)
	Bore diameter	A	○ 82.71–82.72 (3.2562–3.2566)	82.75 (3.2579)
		B	○ 82.70–82.71 (3.2559–3.2562)	82.74 (3.2575)
		A	* 80.01–80.02 (3.1500–3.1504)	80.05 (3.1516)
		B	* 80.00–80.01 (3.1496–3.1500)	80.04 (3.1512)
	Bore taper		0.007–0.012 (0.0003–0.0005)	0.05 (0.002)
	Reboring limit		—	0.5 (0.02)
Piston	Skirt O.D. (At 21 mm (0.83 in) from bottom of skirt)	A	○ 82.68–82.69 (3.2551–3.2555)	82.67 (3.2547)
		B	○ 82.67–82.68 (3.2547–3.2551)	82.66 (3.2543)
		A	* 79.98–79.99 (3.1488–3.1492)	79.97 (3.1484)
		B	* 79.97–79.98 (3.1484–3.1488)	79.96 (3.1480)
	Clearance in cylinder		0.02–0.04 (0.0008–0.0016)	0.08 (0.003)
	Piston-to-ring clearance (top and second)		○ 0.030–0.060 (0.0012–0.0024)	0.13 (0.005)
			* 0.020–0.045 (0.0008–0.0018)	0.13 (0.005)
Piston ring	Ring end gap	Top	○ 0.20–0.35 (0.008–0.014)	0.6 (0.02)
			* 0.15–0.25 (0.006–0.010)	0.6 (0.02)
		Second	○ 0.30–0.42 (0.012–0.017)	0.6 (0.02)
			* 0.20–0.35 (0.008–0.014)	0.6 (0.02)
			○ 0.20–0.90 (0.008–0.035)	1.1 (0.04)
		Oil	* 0.20–0.70 (0.008–0.020)	1.1 (0.04)
Connecting rod	Pin-to-rod interference		0.013–0.032 (0.0005–0.0013)	0.013 (0.0005)
	Large end bore diameter		Nominal 48 (1.89)	—
	End play installed on crankshaft		0.15–0.30 (0.006–0.012)	0.40 (0.016)

Standards and Service Limits (cont'd)

○ : Fuel-Injected Engine * : Carbureted Engine Unit: mm (in.)

Engine Block — Section 7

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Crankshaft	Main journal diameter	49.970–49.994 (1.9673–1.9683)	–
	Taper/out-of-round, main journal	0.005 (0.0002) max.	0.010 (0.0004)
	Rod journal diameter	44.976–45.000 (1.7707–1.7717)	–
	Taper/out-of-round, rod journal	0.005 (0.0002) max.	0.010 (0.0004)
	End play	0.10–0.35 (0.004–0.014)	0.45 (0.018)
	Runout	0.024 (0.0009) max.	0.04 (0.0016)
Bearing	Main bearing-to-journal oil clearance No. 1, 2, 4, and 5 Journals	0.026–0.055 (0.0010–0.0022)	0.07 (0.003)
	No. 3 Journal	0.032–0.061 (0.0013–0.0024)	0.07 (0.003)
	Rod bearing-to-journal oil clearance	0.020–0.038 (0.0008–0.0015)	0.07 (0.003)

Engine Lubrication — Section 8

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US. qt, Imp. qt.)		4.0 (4.2, 3.5) After engine disassembly 3.5 (3.7, 3.1) After oil change, including oil filter 3.0 (3.2, 2.6) After oil change, without oil filter	
Oil pump	Displacement		40.3 ℓ (10.6 US. gal., 8.9 Imp. gal.) 5,500 rpm	
	Inner-to-outer rotor radial clearance		0.15 (0.006) max.	0.2 (0.008)
	Pump body-to-rotor radial clearacne		0.10–0.18 (0.004–0.007)	0.2 (0.008)
	Pump body-to-rotor side clearance		0.30–0.108 (0.001–0.004)	0.15 (0.006)
Relief valve	Pressure setting 80°C (176°F)	Idle	98 kPa (1.0 kg/cm², 14 psi) min.	
		3,000 rpm	373–451 kPa (3.8–4.6 kg/cm², 54–65 psi)	

Cooling — Section 10

	MEASUREMENT	STANDARD (NEW)	
Cooling fan belt	Deflection midway between pulleys/load	○ 6–9 (0.24–0.35)/98N (10 kg, 22 lb) for used belt ○ 5 (0.20)/98N (10 kg, 22 lb) after replacement of belt * 7–10 (0.3–0.4)/98N (10 kg, 22 lb) for used belt * 5–7 (0.2–0.3)/98N (10 kg, 22 lb) after replacement of belt	
Radiator	Capacity (incl. heater) ℓ (US. Gal., Imp. Gal.) (Includes reservoir tank 0.8 (0.21, 0.18)	Manual 6.8 (1.8, 1.5) ○ Automatic 6.7 (1.8, 1.5) * Automatic 7.5 (2.0, 1.7)	
	Pressure cap opening pressure	74–103 kPa (0.75–1.05 kg/cm², 11–15 psi)	
Thermostat	Starts to open	Primary: 82°C ± 2 (180°F ± 3) Secondary: 85°C ± 2 (185°F ± 3)	86–90°C (187–194°F)
	Full open	95°C (203°F)	100°C (212°F) OPTIONAL
	Valve lift at full open	8 (0.31) max.	8 (0.31) max.
Water pump	Gear ratio (crakshaft)	○ 1.34 * 1.29	
	Capacity: ℓ per min/at rpm	124/5,000 (32.7 US. gal./5,000 rpm)	
Cooling fan	Fan-to-core clearance	23,0 (0.90)	
	Thermoswitch "ON" temperature	87°–93°C (188°–199°F)	
	Thermoswitch "OFF" temperature	83°C (181°F) or more (hysteresis 2°C (35°F) or more)	

Fuel — Section 11

	MEASUREMENT	STANDARD (NEW)
○ Fuel pump	Delivery pressure	250 kPa (2.55 kg/cm², 36 psi)
	Displacement	230 cc/min in 10 seconds
	Relief valve opening pressure	441–588 kPa (4.5–6.0 kg/cm², 64–85 psi)
* Fuel pump	Delivery pressure	14.7–19.6 kPa (0.15–0.20 kg/cm², 2.1–2.8 psi)
	Displacement	680 cc/min at 12V (41 cu. in./12V)
○ Pressure regulator	Pressure	245–255 kPa (2.5–2.6 kg/cm², 35–37 psi)
Fuel Tank	Capacity	60 ℓ (15.9 US. Gal., 13.2 Imp. Gal.)

(cont'd)

Standards and Service Limits (cont'd)

○ : Fuel-Injected Engine * : Carbureted Engine

Fuel — Section 11

MEASUREMENT		STANDARD (NEW)		
Fast idle (rpm)		Manual ○ 1,000–1,800, * 1,250–1,750 Automatic ○ 1,000–1,800, * 1,200–1,700		
Idle speed (rpm)	with headlights and cooling fan off	Model	CAL	49st and HI/ALT
		○ Manual Automatic (in "N" or "P")	750 ± 50	
* ↕: The lower number is if idle is measured at high altitude: the higher number is if idle is measured at low altitude.		* Manual Automatic (in gear)	800 ± 50	800 ± 50 700 ± 50
Idle CO		0.1 %		
Float level (from gasket)		15–17 (0.59–0.67)		

Clutch — Section 13

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height	176 (6.9) to floor	–
		137 (5.4) to carpet	–
		○ 138–143 (5.4–5.6)	–
	Stroke	133–143 (5.2–5.6)	–
	Pedal play	23–28 (0.9–1.1)	–
	Disengagement height	86 (3.4) min. to floor	–
		47 (1.9) min. to carpet	–
Clutch arm	Release arm adjustment	5.2–6.4 (0.20–0.25)	–
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch plate	Rivet head depth	1.3 (0.05) min.	0.2 (0.008)
	Surface runout	0.8 (0.03) max.	1.0 (0.04)
	Radial play in splines	0.7–2.1 (0.028–0.083)	4.0 (0.16)
	Thickness	8.1–8.8 (0.32–0.35)	5.7 (0.22)
Clutch release bearing holder	I.D.	31.00–31.059 (1.220–1.223)	31.09 (1.224)
	Holder-to-guide sleeve clearance	0.05–0.15 (0.002–0.006)	0.22 (0.009)
Clutch cover	Uneveness of diaphragm spring	0.8 (0.03) max.	1.0 (0.04)

Manual Transmission — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US. qt., Imp. qt.)	○ 2.6 (2.7, 2.3) at assembly ○ 2.5 (2.6 2.2) at oil-change * 2.5 (2.6, 2.2) at assembly * 2.4 (2.5, 2.1) at oil change	
Mainshaft	End play	0.10–0.35 (0.004–0.014)	0.5 (0.02)
	Diameter of needle bearing contact area	28.002–28.015 (1.1024–1.1030)	27.95)1.100)
	Diameter of ball bearing contact area	24.980–24.993 (0.9835–0.9840)	24.93 (0.9811)
	Runout	0.04 (0.0016) max.	0.10 (0.004)
Mainshat third and fourth gears	I.D.	37.009–37.025 (1.4570–1.577)	37.07 (1.459)
Gear	End play	37.009–37.025 (1.4570–1.577)	37.07 (1.459)
	End play	0.03–0.13 (0.0012–0.0051)	37.07 (1.459)
	Thickness	29.92–29.97 (1.180–1.1799)	29.8 (1.173)
Countershaft	End play	0.10–0.35 (0.004–0.014)	0.5 (0.02)
	Diameter of needle bearing contact area	33.000–33.015 (1.2992–1.2998)	32.95 (1.297)
	Diameter of ball bearing contact area	24.980–24.993 (0.9835–0.9840)	24.93 (0.981)
	Diameter of low gear contact area	33.984–34.000 (1.3380–1.3386)	33.93 (1.336)
	Runout	0.04 (0.0016)	0.10 (0.004)
Counershaft low gear	I.D.	39.008–39.025 (1.5357–1.5364)	39.07 (1.538)
	End play	0.03–0.08 (0.0012–0.0031)	0.18 (0.007)
Countershaft Secnd gear	I.D.	43.008–3.025 (1.6932–1.6939)	43.07)1.696)
	End play	0.003–0.10 (0.0012–0.0039)	0.18 (0.007)
	Thickness	30.42–30.47 (1.1976–1.996)	30.3 (1.193)

Manual Transmission — Section 14

○ : Fuel-Injected Engine ＊ : Carbureted Engine

Unit: mm (in.)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Spacer collar (Mainshaft fourth and fifth gears)	I.D. O.D. Length	25.002–25.012 (0.9843–0.9847) 31.989–32.000 (1.2594–1.2598) 27.03–27.08 (1.0642–1.0661)	25.06 (0.987) 31.93 (1.257) 27.01 (1.063)
Reverse Idler gear	I.D. Gear-to-reverse gear shaft clearance	17.016–17.043 (0.6699–0.6710) 0.032–0.077 (0.0013–0.0030)	17.09 (0.673) 0.15 (0.006)
Synchronizer ring	Ring-to-gear clearance (ring pushed against gear)	○ 0.73–1.18 (0.031–0.046) ＊ 0.85–1.10 (0.03–0.043)	0.4 (0.016) 0.4 (0.016)
Shift fork	Synchronizer sleeve gear Fork-to-synchronizer sleeve clearance	6.75–6.85 (0.266–0.270) 0.35–0.65 (0.014–0.026)	6.0 (0.24) 1.0 (0.04)
Reverse shift fork	End gap Fork-to-reverse idler gear clearance Groove width Fork-to-fifth/reverse shift shaft clearance	11.8–12.1 (0.46–0.48) 0.2–1.0 (0.008–0.039) 7.05–7.25 (0.278–0.285) 0.05–0.35 (0.002–0.014)	—— 1.7 (0.07) —— 0.5 (0.02)
Shift arm	Width of groove in shift rod guide Shift arm-to-shift rod guide clearance Width in shift guide Shift arm-to-shift guide clearance	11.8–12.0 (0.46–0.47) 0.05–0.35 (0.002–0.014) 7.9–8.0 (0.311–0.315) 0.1–0.3 (0.004–0.012)	—— 0.8 (0.03) —— 0.6 (0.02)
Shift rod guide	I.D. Guide-to-shaft clearance O.D. Guide-to-fifth/reverse shift shaft clearance	14.000–14.068 (0.5512–0.5539) 0.011–0.092 (0.0004–0.0036) 11.9–12.0 (0.469–0.472) 0.2–0.5 (0.008–0.020)	—— 0.15 (0.006) —— 0.8 (0.03)
Selector arm	Width Arm-to-shift rod guide clearance End gap Arm-to-interlock clearance Arm-to-holder clearance	11.9–12.0 (0.469–0.472) 0.05–0.25 (0.002–0.010) 10.05–10.15 (0.396–0.400) 0.05–0.25 (0.002–0.010) 0.01–0.20 (0.0004–0.0079)	—— 0.5 (0.02) —— 0.7 (0.03) Selection with 5 types of shims

Automatic Transmission (Fuel-Injected Engine) — Section 15

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US. qt., Imp qt.)		3.0 (3.2, 2.6) at oil change 6.0 (6.3, 5.3) at assembly	
Hydraulic pressure	Line pressure at 2,000 rpm		834–883 kPa (8.5–9.0 kg/cm², 121–128 psi)	785 kPa (8.0 kg/cm², 114 psi)
	4th, 3rd, 2nd clutch pressure at 2,000 rpm		441–883 kPa (4.5–9.0 kg/cm², 64–128 psi)	785 kPa (8.0 kg/cm², 114 psi) with throttle more than 3/8 open
	1st clutch pressure at 2,000 rpm		785–883 kPa (8.0–9.0 kg/cm², 114–128 psi)	785 kPa (8.0 kg/cm², 114 psi)
	Governor pressure at 60 km/h		221–230 kPa (2.25–2.35 kg/cm², 32–33 psi)	216 kPa (2.2 kg/cm², 31 psi)
	Throttle pressure A		495–510 kPa (5.05–5.20 kg/cm², 72–74 psi)	490 kPa (5.0 kg/cm², 71 psi)
	Throttle pressure B		834–883 kPa (8.5–9.0 kg/cm², 121–128 psi)	785 kPa (8.0 kg/cm², 114 psi)
Stall speed	Check with car on level ground		2,500–2,800 rpm	——
Clutch	Clutch initial clearance	1st	0.65–0.85 (0.026–0.033)	——
		2nd	0.50–0.70 (0.020–0.028)	——
		3rd, 4th	0.40–0.60 (0.016–0.024)	——
	Clutch return spring free length		31.0 (1.22)	29.0 (1.14)
	Clutch disc thickness		1.88–2.0 (0.074–0.079)	Until grooves worn out
	Clutch plate thickness		1.95–2.05 (0.077–0.079)	Discoloration
	Clutch end plate thickness	Mark 1	2.05–2.10 (0.081–0.083)	
		Mark 2	2.15–2.20 (0.085–0.087)	
		Mark 3	2.25–2.30 (0.089–0.091)	
		Mark 4	2.35–2.40 (0.093–0.094)	
		Mark 5	2.45–2.55 (0.096–0.098)	
		Mark 6	2.55–2.60 (0.100–0.102)	
		Mark 7	2.65–2.70 (0.104–0.106)	
		Mark 8	2.75–2.80 (0.108–0.110)	
		Mark 9	2.85–2.90 (0.112–0.114)	
		Mark 10	2.95–3.00 (0.116–0.118)	Discoloration
Transmission	Diameter of needle bearing contact area on main and stator shaft		22.980–22.993 (0.9047–0.9052)	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 (1.2588–1.2594)	
	Diameter of needle bearing contact area on mainshaft 1st gear collar		30.975–30.991 (1.2180–1.2201)	
	Diameter of needle bearing contact area on countershaft (L side)		38.505–38.515 (1.5159–1.5163)	Wear or damage

(cont'd)

Standards and Service Limits (cont'd)

Automatic Transmission (Fuel-Injected Engine) — Section 15

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Diameter of needle bearing contact area on countershaft 3rd gear		31.975 – 31.991 (1.2589 – 1.2595)	Wear or damage
	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		31.975 – 31.991 (1.2589 – 1.2595)	
	Diameter of needle bearing contact area on countershaft L gear collar		31.975 – 31.991 (1.2589 – 1.2595)	
	Diameter of needle bearing contact area on reverse idle gear		13.994 – 14.000 (0.5509 – 0.5512)	
	Reverse idler shaft holder diameter		14.416 – 14.434 (0.5676 – 0.5683)	
	Mainshaft 2nd gear I.D.		41.000 – 41.016 (1.6141 – 1.6148)	
	Mainshaft 1st gear I.D.		36.000 – 36.016 (1.4173 – 1.4179)	
	Countershaft 4th gear I.D.		33.000 – 33.016 (1.2992 – 1.2998)	
	Countershaft 3rd gear I.D.		38.000 – 38.016 (1.4961 – 1.4966)	
	Countershaft 2nd gear I.D.		31.000 – 31.016 (1.2204 – 1.2210)	
	Countershaft 1st gear I.D.		38.000 – 38.016 (1.4961 – 1.4966)	
	Countershaft reverse gear I.D.		38.000 – 38.016 (1.4961 – 1.4966)	
	Reverse idle gear I.D.		18.006 – 18.017 (0.7089 – 0.7093)	Wear or damage
	Mainshaft 4th gear end play		0.10 – 0.22 (0.004 – 0.009)	
	Mainshaft 2nd gear end play		0.07 – 0.15 (0.003 – 0.006)	
	Mainshaft 1st gear end play		0.08 – 0.24 (0.003 – 0.009)	
	Countershaft 3rd gear end play		0.07 – 0.15 (0.003 – 0.006)	
	Countershaft 2nd gear end play		0.08 – 0.40 (0.003 – 0.016)	
	Reverse idler gear end play		0.05 – 0.18 (0.002 – 0.007)	
	Countershaft reverse gear end play		0.10 – 0.25 (0.004 – 0.016)	
	Reverse gear hub O.D.		51.87 – 51.90 (2.0421 – 2.0433)	Wear or damage
	Thrust washer thickness			
	Mainshaft 2nd gear	A	3.97 – 4.00 (0.156 – 0.157)	
		B	4.02 – 4.05 (0.158 – 0.159)	
		C	4.07 – 4.10 (0.160 – 0.161)	
		D	4.12 – 4.15 (0.162 – 0.163)	
		E	4.17 – 4.20 (0.164 – 0.165)	
		F	4.22 – 4.25 (0.166 – 0.167)	
		G	4.27 – 4.30 (0.168 – 0.169)	
		H	4.32 – 4.35 (0.170 – 0.171)	
		I	4.37 – 4.40 (0.172 – 0.173)	
	Mainshaft bearing contact area (R side)		2.95 – 3.05 (0.116 – 0.120)	Wear or damage
	Mainshaft 1st gear		2.43 – 2.50 (0.096 – 0.098)	Wear or damage
	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)	
	Countershaft 4th gear collar thickness	A	38.97 – 39.00 (1.5342 – 1.5354)	
		B	39.02 – 39.05 (1.5362 – 1.5374)	
		C	39.07 – 39.10 (1.5382 – 1.5394)	
		D	39.12 – 39.15 (1.5402 – 1.5413)	
		E	39.17 – 39.20 (1.5421 – 1.5433)	
		F	39.22 – 39.25 (1.5441 – 1.5453)	
		G	39.27 – 39.30 (1.5461 – 1.5472)	
	Thrust washer thickness (mainshaft 1st gear L side)		1.45 – 1.50 (0.057 – 0.059)	1.4 (0.055)
	Mainshaft 1st gear collar length		24.50 – 24.55 (0.9646 – 0.9665)	
	Mainshaft 1st gear collar flange thickness		2.5 – 2.6 (0.098 – 0.102)	Wear or damage
	Countershaft reverse gear collar length		12.0 – 12.1 (0.472 – 0.476)	
	Countershaft reverse gear collar flange thickness		2.4 – 2.6 (0.096 – 0.098)	Wear or damage
	Countershaft 1st gear collar length		12.0 – 12.1 (0.472 – 0.476)	
	Countershaft 1st gear collar flange thickness		2.4 – 2.6 (0.095 – 0.102)	Wear or damage
	Diameter of countershaft one-way clutch contact area		83.339 – 83.365 (3.2811 – 3.2821)	Wear or damage
	Diameter of parking gear one-way clutch contact area		66.635 – 66.695 (2.6254 – 2.6258)	Wear or damage
	Mainshaft feed pipe O.D. (at 20 mm from end)		6.97 – 6.98 (0.2744 – 0.2748)	6.95 (0.274)
	Countershaft feed pipe O.D. (at 20 mm from end)		7.97 – 7.98 (0.3138 – 0.3142)	7.95 (0.31)
	Mainshaft sealing ring 32 mm Thickness		1.980 – 1.995 (0.0780 – 0.0785)	1.8 (0.071)
	Mainshaft bushing I.D.		6.018 – 6.030 (0.2369 – 0.2374)	6.045(0.238)
	Mainshaft bushing I.D.		9.000 – 9.015 (0.3543 – 0.3549)	9.03(0.356)
	Countershaft bushing I.D.		8.000 – 8.015 (0.3150 – 0.3156)	8.03(0.316)
	Mainshaft sealing ring groove width		2.025 – 2.060 (0.0797 – 0.0811)	2.08(0.082)

Unit: mm (in.)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Regulator valve body	Sealing ring contact area diameter	35.000 – 35.025 (1.3780 – 1.3789)	35.05 (1.38)
Shifting device and parking brake control	Reverse shift fork thickness	5.9 – 6.0 (0.232 – 0.236)	5.4 (0.21)
	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 (0.003)
	Oil pump gear-to-body clearance	Drive: 0.240 – 0.265 (0.009 – 0.010)	——
		Driven: 0.125 – 0.175 (0.005 – 0.007)	——
	Stator camshaft needle bearing bore I.D.	27.000 – 27.021 (1.0630 – 1.0638)	Wear or damage
	Stator camshaft needle bearing contact and O.D.	29.000 – 29.013 (1.1417 – 1.1422)	Wear or damage
	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

Springs		Wire Dia.	O.D.	No. of coils	Free Length
	Regulator valve outer spring	1.8 (0.07)	14.7 (0.58)	17	88.6 (3.49)
	Regulator valve inner spring	1.8 (0.07)	9.6 (0.38)	7.5	44.0 (1.73)
	Stator reaction spring	6.0 (0.24)	38.4 (1.51)	2	30.3 (1.19)
	Torque converter check valve spring	1.2 (0.05)	8.4 (0.33)	15	37.5 (1.48)
	Relief valve spring	0.8 (0.03)	8.4 (0.33)	15	47.7 (1.88)
	2nd orifice control valve spring	0.8 (0.03)	6.6 (0.26)	27.6	48.5 (1.91)
	Servo orifice control valve spring	0.9 (0.04)	6.1 (0.24)	20	35.9 (1.41)
	Throttle control valve A outer spring	0.8 (0.03)	6.2 (0.24)	8.5	27.0 (1.06)
	*Throttle control valve A inner spring	1.0 (0.04)	8.5 (0.33)	5.8 or 5.4	21.0 (0.83)
	Throttle control valve B outer spring	0.8 (0.03)	6.2 (0.24)	8	30.0 (1.18)
	Throttle control valve B inner spring	1.4 (0.06)	8.5 (0.33)	8.4	30.0 (1.18)
	Low one-way ball spring	0.4 (0.02)	4.0 (0.16)	10	14.6 (0.58)
	1 – 2 shift spring	0.7 (0.03)	6.1 (0.24)	25	38.1 (1.50)
	1 – 2 shift ball spring	0.45 (0.02)	4.5 (0.18)	11	12.7 (0.50)
	2 – 3 shift spring	0.9 (0.04)	7.6 (0.30)	28	66.6 (2.62)
	2 – 3 shift ball spring	0.5 (0.02)	4.5 (0.18)	10.5	11.7 (0.46)
	3 – 4 shift spring	0.9 (0.04)	9.6 (0.38)	10	35.3 (1.39)
	3 – 4 shift ball spring	0.5 (0.02)	4.5 (0.18)	7.4	11.8 (0.47)
	Low accumulator A spring	1.71 x 3.50 (0.07 x 0.14)	22.5 (0.89)	10.3	69.2 (2.72)
	Low accumulator B spring	2.3 (0.09)	12.8 (0.50)	7.8	29.4 (1.16)
	4th accumulator spring	2.9 (0.11)	18.6 (0.73)	17	100.4 (3.95)
	2nd accumulator spring	3.5 (0.14)	20.2 (0.80)	12.7	79.3 (3.12)
	3rd accumulator spring	20 x 3.3 (0.08 x 0.13)	15.5 (0.61)	22.7	86.2 (3.39)
	L/C control spring	1.2 (0.06)	8.6 (0.34)	28	70.5 (2.78)
	L/C timing valve A spring	0.9 (0.04)	8.6 (0.34)	18.7	55.1 (2.17)
	L/C timing valve B spring	1.1 (0.04)	7.6 (0.30)	29.4	62.0 (2.44)
	CPC valve spring	1.4 (0.06)	9.4 (0.32)	10.9	31.6 (1.24)
	Servo return spring	2.6 (0.10)	28.8 (1.13)	3.3	40.3 (1.59)
	Governor spring A	1.1 (0.04)	18.8 (0.74)	4	33.8 (1.33)
	Governor spring B	0.9 (0.04)	11.8 (0.46)	6.2	30.0 (1.18)
	L/C shift valve spring	1.1 (0.04)	8.1 (0.32)	22.3	51.8 (2.04)
	L/C cut valve spring	0.7 (0.03)	7.6 (0.30)	18	29.0 (1.14)
	Throttle modulator valve spring	1.2 (0.05)	9.4 (0.37)	8	28.2 (1.11)
	Kick down valve spring	1.0 (0.04)	6.6 (0.26)	33.4	58.5 (2.3)
	REV control spring	0.8 (0.03)	7.6 (0.30)	17.2	36.1 (1.4)
	Accumulator control spring	1.2 (0.05)	7.7 (0.30)	21.8	45.6 (1.80)
	Timing accumulator spring	1.1 (0.04)	11.7 (0.46)	6.8	28.2 (1.11)

*Selective-fit at factory

(cont'd)

Standards and Service Limits (cont'd)

Automatic Transmission (Carbureted Engine) — Section 15

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US. qt., Imp. qt.)	28 (3.0, 2.5) at oil change 5.6 (5.9, 4.9) at assembly	
Hydraulic pressure	Line pressure at 2,000 rpm	784–834 kPa (8.0–8.5 kg/cm², 114–121 psi)	785 kPa (7.5 kg/cm², 107 psi)
	4 th clutch pressure at 2,000 rpm	539–834 kPa (5.5–8.5 kg/cm², 78–121 psi)	735 kPa (7.5 kg/cm², 107 psi)
	3rd clutch pressure at 2,000 rpm	539–834 kPa (5.5–8.5 kg/cm², 78–121 psi)	735 kPa (7.5 kg/cm², 107 psi)
	2nd clutch pressure at 2,000 rpm	539–834 kPa (5.5–8.5 kg/cm², 78–121 psi)	735 kPa (7.5 kg/cm², 107 psi)
	1st clutch pressure at 2,000 rpm	784–834 kPa (8.0–8.5 kg/cm², 114–121 psi)	735 kPa (7.5 kg/cm², 107 psi)
	Governor pressure at 60 km/h	216–226 kPa (2.2–2.3 kg/cm², 31–33 psi)	211 kpa (2.15 kg/cm², 31 psi)
	Throttle pressure A	505–519 kPa (5.15–5.30 kg/cm², 73–75 psi)	500 kPa (5.1 kg/cm², 73 psi)
	Throttle pressure B	784–834 kPa (8.0–8.5 kg/cm², 114–121 psi)	735 kpa (7.5 gk/cm², 107 psi)
Stall speed	Check with car on level ground	2,250–2,550 rpm	—
Clutch	Clutch initial clearance 1st	0.4–0.7 (0.016–0.028)	—
	2nd	0.65–0.80 (0.026–0.031)	—
	3rd, 4th	0.4–0.6 (0.016–0.024)	—
	Clutch return spring free length Except low	30.5 (1.20)	28.5 (1.12)
	Low	32.0 (1.26)	32.0 (1.18)
	Clutch disc thickness	1.88–2.0 (0.074–0.079)	Until grooves worn out
	Clutch plate thickness	1.95–2.05 (0.077–0.081)	Discoloration
	Clutch end plate thickness Mark 1	2.3–2.4 (0.090–0.094)	
	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)	Discoloration
Transmission	Diameter of needle bearing contact area on main and stator shaft	19.980–19.983 (0.7866–0.7867)	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 (1.2588–1.2594)	
	Diameter of needle bearing contact area on mainshaft 1st gear collar	29.980–29.993 (1.1803–1.1808)	
	Diameter of needle bearing contact area on counershaft (L side)	32.984 –33.000 (1.2986–1.2993)	
	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)	
	Diameer 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 L gear collar	29.980–29.993 (1.1803–1.1808)	
	Diameter of needle bearing contact area on reverse idle gear	13.994–14.000 (0.5509–0.5512)	
	Reverse idle shaft holder diameter	14.016–14.034 (0.5518–0.5525)	
	Mainshaft 2nd gear I.D.	41.000–41.016 (1.6141–1.6148)	
	Mainshaft 1st gear I.D.	36.000–36.016 (1.4173–1.4179)	
	Countershaft 4th gear I.D.	33.000–33.016 (1.2992–1.2998)	
	Countershaft 3rd gear I.D.	38.000–38.016 (1.4961–1.4966)	
	Countershaft 2nd gear I.D.	31.000–31.016 (1.2204–1.2210)	
	Countershaft 1st gear I.D.	35.000–35.016 (1.3779–1.3785)	
	Countershaft reverse gear I.D.	36.000–36.016 (1.4173–1.4179)	
	Reverse idle gear I.D.	18.007– 18.020 (0.7086–0.7094)	Wear or damage
	Mainshaft 4th gear end play	0.07–0.12 (0.003–0.005)	—
	Mainshaft 2nd gear end play	0.07–0.12 (0.003–0.005)	—
	Mainshaft 1st gear end play	0.08–0.24 (0.003–0.009)	—
	Countershaft 3rd gear end play	0.07–0.12 (0.003–0.005)	—
	Countershaft 2nd gear end play	0.07–0.12 (0.003–0.005)	

Unit: mm (in.)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Reverse idle gear end play		0.05 – 0.18 (0.002 – 0.007)	—
	Countershaft reverse gear end play		0.10 – 0.20 (0.004 – 0.008)	—
	Reverse gear hub O.D.		51.87 – 51.90 (2.0421 – 2.0433)	Wear or damage
	Thrust washer thickness			
	Mainshaft 4th gear	A	3.32 – 3.35 (0.1307 – 0.1319)	—
		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)	—
	Mainshaft right side bearing		2.95 – 3.05 (0.1161 – 0.1201)	Wear or damage
	Mainshaft 1st gear		2.43 – 2.50 (0.0957 – 0.0984)	Wear or damage
	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)	
	Countershaft 4th gear collar thickness	A	38.97 – 39.00 (1.5342 – 1.5354)	
		B	39.02 – 39.05 (1.5362 – 1.5374)	
		C	39.07 – 39.10 (1.5382 – 1.5394)	
		D	39.12 – 39.15 (1.5402 – 1.5413)	
		E	39.17 – 39.20 (1.5421 – 1.5433)	—
		F	39.22 – 39.25 (1.5441 – 1.5453)	—
		G	39.27 – 39.30 (1.5461 – 1.5472)	—
	Thrust washer thickness (mainshaft 1st gear L side)		1.45 – 1.50 (0.057 – 0.059)	1.4 (0.055)
	Mainshaft 1st gear collar length		22.50 – 22.55 (0.8858 – 0.8878)	—
	Mainshaft 1st gear collar flange thickness		2.5 – 2.6 (0.098 – 0.102)	Wear or damage
	Countershaft reverse gear collar length		14.0 – 14.1 (0.551 – 0.555)	—
	Countershaft reverse gear collar flange thickness		2.45 – 2.50 (0.096 – 0.098)	Wear or damage
	Countershaft 1st gear collar length		11.0 – 11.1 (0.433 – 0.437)	
	Countershaft 1st gear collar flange thickness		2.4 – 2.6 (0.094 – 0.102)	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 and countershaft feed pipe O.D. (at 20 mm from end)		7.97 – 7.98 (0.3138 – 0.3142)	7.95 (0.31)
	Mainshaft sealing ring 32 mm Thickness		1.980 – 1.995 (0.0780 – 0.0785)	1.8 (0.071)
	Mainshaft bushing I.D.		6.018 – 6.030 (0.2369 – 0.2374)	6.045 (0.238)
	Mainshaft bushing I.D.		9.000 – 9.015 (0.3543 – 0.3549)	9.03 (0.356)
	Countershaft bushing I.D.		8.000 – 8.015 (0.3150 – 0.3156)	8.03 (0.316)
	Mainshaft sealing ring groove width		2.025 – 2.060 (0.0797 – 0.0811)	2.08 (0.082)
Regulator valve body	Sealing contact area diameter		32.000 – 32.025 (1.2598 – 1.2608)	32.05 (1.26)
Shifting device and parking brake control	Reverse shift fork thickness		5.9 – 6.0 (0.232 – 0.236)	5.4 (0.21)
	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 (0.003)
	Oil pump gear-to-body clearance		Drive: 0.21 – 0.27 (0.008 – 0.011)	
			Driven: 0.05 – 0.09 (0.002 – 0.004)	
	Stator camshaft needle bearing bore I.D.		24.000 – 24.021 (0.9449 – 0.9457)	Wear or damage
	Stator camshaft needle bearing contact and O.D.		26.000 – 26.013 (1.0236 – 1.0241)	Wear or damage
	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 (cont'd)

Automatic Transmission (Carbureted Engine) — Section 15

	MEASUREMENT	STANDARD (NEW)			
		Wire Dia.	O.D.	No. of coils	Free Length
Springs	Regulator valve outer spring	2.0 (0.08)	15.1 (0.59)	15	71.2 (2.80)
	Regulator valve inner spring	1.8 (0.07)	9.6 (0.38)	9	44.0 (1.73)
	Stator reaction spring	6.0 (0.24)	38.4 (1.51)	2	30.3 (1.19)
	Torque converter check valve spring	1.1 (0.04)	8.4 (0.33)	12	36.4 (1.43)
	Relief valve spring	0.8 (0.03)	8.4 (0.33)	15	47.7 (1.88)
	Orifice control valve spring	0.8 (0.03)	6.1 (0.24)	20.7	38.3 (1.51)
	Throttle control valve A outer spring	1.0 (0.04)	8.5 (0.33)	5.5	20.7 (0.81)
	Throttle control valve A inner spring	0.8 (0.03)	6.2 (0.24)	8	30.0 (1.18)
	Throttle control valve B spring	1.4 (0.06)	8.5 (0.33)	8.5	30.7 (1.21)
	1—2 shift valve spring	0.8 (0.03)	6.8 (0.26)	25	38.7 (1.50)
	1—2 shift valve ball spring	0.45 (0.02)	4.5 (0.18)	11	15.0 (0.58)
	2—3 shift valve spring	1.0 (0.04)	7.6 (0.30)	31	64.4 (2.49)
	2—3 shift valve ball spring	0.45 (0.02)	4.5 (0.18)	8	13.3 (0.52)
	3—4 shift valve spring	0.9 (0.04)	9.6 (0.38)	10	35.3 (1.37)
	3—4 shift valve ball spring	0.5 (0.02)	4.5 (0.18)	7	10.5 (0.40)
	Low accumulator spring	2.3 (0.09)	20 (0.79)	7.9	49.8 (1.96)
	4th accumulator spring	2.6 (0.10)	18.6 (0.73)	13.8	96.4 (3.80)
	2nd accumulator spring	3.95 x 2.3 (0.16 x 0.09)	20 (0.79)	16	81.2 (3.20)
	3rd accumulator spring	3.95 x 2.3 (0.16 x 0.09)	20.4 (0.80)	14	88.1 (3.47)
	L/C control valve spring (selective)	1.0 (0.04)	9.6 (0.38)	17.5	59.9 (2.32)
	L/C control valve spring (selective)	1.0 (0.04)	9.6 (0.38)	17.5	56.5 (2.19)
	L/C timing valve spring	1.0 (0.04)	6.8 (0.27)	13	29.5 (1.16)
	CPC valve spring	1.4 (0.06)	9.4 (0.32)	10.5	33.0 (1.30)
	Servo return spring	2.6 (0.10)	28.8 (1.13)	3.3	40.3 (1.59)
	Governor spring A	1.0 (0.04)	18.8 (0.74)	4	41.2 (1.62)
	Governor spring B	0.8 (0.03)	11.8 (0.46)	7	22.9 (0.90)
	L/C shift valve spring	1.1 (0.04)	8.3 (0.33)	12.3	38.9 (1.50)
	L/C cut valve spring	0.8 (0.03)	6.8 (0.27)	20	26.9 (1.06)
	Throttle modulator valve spring	1.2 (0.05)	9.4 (0.37)	8	27.2 (1.05)

Differential — Section 16

○ : Fuel-Injected Engine * : Carbureted Engine

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Ring gear	Backlash	0.14—0.20 (0.006—0.008)	0.25 (0.010)
Differential Carrier	Pinion shaft bore diameter	18.000—18.018 (0.7087—0.7094)	18.1 (0.71)
	Carrier-to-pinion shaft clearance	0.016—0.052 (0.0006—0.0020)	0.1 (0.004)
	Driveshaft bore diameter		
	○	28.000—28.021 (1.1024—1.1032)	—
	* Manual	*26.000—26.021 (1.0236—1.0244)	—
	* Automatic	*28.000—28.021 (1.1024—1.1032)	—
	Carrier-to-driveshaft clearance	0.025—0.066 (0.0010—0.0026)	0.12 (0.005)
	Side clearance	0.10—0.20 (0.004—0.008)	0.15 (0.006)
Differential pinion gear	Backlash	0.05—0.15 (0.002—0.006)	Selection with 8 types of washers
	Pinion gear bore diameter	18.041—18.061 (0.7103—0.7111)	—
	Pinion gear-to-pinion shaft clearance	0.057—0.093 (0.0022—0.0037)	0.15 (0.006)

Driveshaft — Section 17

○ Fuel-Injected Engine * Carbureted Engine

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Driveshaft	Right boot	As installed	506.0—510.5 (19.9—20.1)	—
	Left boot	As installed MT	805.0—809.5 (31.7—31.9)	—
		AT	812.0—816.5 (32.0—32.1)	—
* Driveshaft	Right Boot	As installed	514.0—518.5 (20.2—20.4)	—
	Left boot	As installed	809.0—813.5 (31.9—32.0)	—

○ Fuel-Injected Engine ＊Carbureted Engine Unit: mm (in.)

Power Steering — Section 19

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Steering wheel	Play	10 (0.39) Max.	—
	Pinion starting torque N•m (kg-m, ft-lb)	○ 1.0 (0.10, 0.72) ＊ 1.2 (0.12, 0.37)	—
Power steering	Pump pressure with vlave closed (Oil temp./ speed: 40°C (104°F) min/idle. Do not run for more than 5 seconds) kPa (kg/cm², psi)	7845–8826 (80–90, 1138–1280)	—
	Fluid capacity Reservoir	0.5ℓ (0.53 US gt., 0.44 Imp gt.)	—
	At change	approx 1.5ℓ (1.6 US gt., 1.3 Imp gt.)	—

Suspension — Section 20

	MEASUREMENT		STANDARD (NEW)		SERVICE LIMIT
Wheel alignment			Front	Rear	
	Camber		0° 00′		
	Caster		0°-1/2± 1°		
	Toe-in		0 ± 3 (0 ± 0.118)	2 ± 2 (0.079 ± 0.079)	
	Kingpin inclination		○ 6° 50′ ＊6°51′		
	Steering angle R/L	Inside	38°		
		Outside	30°		
Wheel	Rim runout Steel	Axial	0–1.0 (0–0.39)		—
		Radial	0–1.0 (0–0.39)		—
	Aluminum	Axial	0–0.7 (0–0.028)		—
		Radial	0–0.7 (0–0.028)		—

Brake — Section 21

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke 200N (20 kg, 44 lbs)		To be locked when pulled 4–8 notches	
Foot brake pedal	Pedal height		176 (6.9) to floor	—
	Free play		1–5 (0.04–0.20)	5 (0.20)
Master cylinder	Piston-to-push rod clearance		0–0.4 (0–0.016)	—
Disc brake	Disc thickness	Front	19.0 (0.75)	17.0 (0.67)
		Rear	10.0 (0.39)	8.0 (0.31)
	Disc runout		—	0.15 (0.006)
	Disc parallelism		—	0.015 (0.0006)
	Pad thickness	Front	9.5 (0.37)	3.0 (0.11)
		Rear	8.0 (0.31)	1.6 (0.06)

		Vacuum (mm Hg)	Pedal Pressure kg (lbs)	Line Pressure kg/cm² (psi)
Brake booster	Characteristics	0	20 (44)	○ 12.0 (171) min ＊ 13 (185)
		300	20 (44)	○ 48.6 (691) min ＊ 53 (754)
		500	20 (44)	○ 72.9 (1,037) min ＊ 65 (924)

(cont'd)

Standards and Service Limits (cont'd)

Engine Electrical — Section 25

○ Fuel-Injected Engine * Carbureted Engine Unit: mm (in.)

	MEASUREMENT		STANDARD (NEW)	
Ignition coil	Rated voltage		12 Volts	
	Primary winding resistance		* 1.06 – 1.24 ohms ○ 1.2 – 1.5 ohms	
	Secondary winding resistance		* 7,400 – 11,000 ohms ○ 11,074 – 11,526 ohms	
Ignition wire	Resistance		25,000 ohms max.	
Spark plug	Type		See page 25-27	
	Gap		1.0 – 1.1 (0.039 – 0.043)	
Ignition timing	At idling	○ Manual ○ Automatic (in gear)	15 ± 2° BTDC 15 ± 2° BTDC	
		* Manual * Automatic (in gear)	20 ± 2° BTDC 12 ± 2° BTDC	
Battery	Lighting capacity (20-hour ratio) Starting capacity (5-second ratio)		50 Ampere Hours 8.5 V minimum at 150 Ampere draw	
Alternator	Output at no-load Output		○ 14 V at 1,000 rpm max. * 14V at 820 rpm max. ○ 14V/65A at 5,500 rpm max. * 14V/60A at 3,500 rpm max.	
	Coil resistance (rotor) Slip ring O.D. Brush length Brush spring tension		2.8 – 3.0 ohms 32.5 (1.28) ○ 10.5 (0.41) * 15.5 (0.61) ○ 300 – 500 g (10.6 – 18.6 oz) * 330.8 (11.6 oz)	± 0.1 ohms 32.1 (1.26) ○ 5.5 (0.22) * 5.3 (0.21) —
Starting motor	MEASUREMENT		1.4 KW (MITSUBA) STANDARD (NEW)	SERVICE LIMIT
	Mica depth		0.4 – 0.5 (0.016 – 0.020)	0.15 (0.006)
	Commutator runout		0 – 0.02 (0.0008)	0.05 (0.002)
	Commutator O.D.		28.0 (1.10)	27.5 (1.08)
	Brush length		14.5 (0.57)	9.3 (0.37)
	Spring pressure (new)		2.1 kg (4.6 lb)	—

Design Specifications

	ITEMS		METRIC	ENGLISH	NOTE
DIMENSIONS	Overall Length	Si	4.375mm	172.2in.	
		Dx	4.295mm	169.1in.	
	Overall Width		1,700mm	66.9in.	
	Overall Height		1,295mm	51.0in.	
	Wheelbase		2,450mm	96.5in.	
	Tread F/R		1,470/1,470mm	57.9/57.9in.	
	Ground Clearance		150mm	5.9in.	
	Seating Capacity		Five		
	Overhang F/R	Si	930/995mm	36.6/39.2in.	Includes bumper
		Dx	890/955mm	35.0/37.6in.	
WEIGHTS	Curb Weight Without A/C 5-MT	Si	1,079 kg	2,379 lb.	5-MT: 5 speed manual transmission 4-AT: 4 speed automatic transmission with torque converter Curb weight + A/C—23kg (51 lb.) + Cargo—45kg (99 lb.) + Passengers—68kg x 5 (150 lb. x 5) + Tolerance = G.V.W.R.
		Dx	1,040 kg	2,293 lb.	
	4-AT	Si	1,099 kg	2,423 lb.	
		Dx	1,051 kg	2,317 lb.	
	With A/C 5-MT	Si	1,100 kg	2,425 lb.	
		Dx	1,063 kg	2,344 lb.	
	4-AT	Si	1,120 kg	2,469 lb.	
		Dx	1,074 kg	2,368 lb.	
	Gross Vehicle Weight Rating (MVSS)	Si	1,515kg	3,340lb.	
		Dx	1,474kg		
	Carrying (loading) Weight Capacity		45kg	99lb.	
ENGINE	Type		Water cooled, 4-cycle O.H.C.		
	Cylinder Arragement		4-cylinder in line, transverse		
	Bore and Stroke	Si	82.7 x 91.0mm	3.26 x 3.58in.	
		Dx	80.0 x 91.0mm	3.15 x 3.58in.	
	Displacement	Si	1,955cm^3 (cc)	119cu. in.	
		Dx	1,829cm^3 (cc)	112cu. in.	
	Compression Ratio	Si	8.8:1		
		Dx	9.1:1		
	Valve Train		Timing belt drive, single overhead camshaft		
	Lubrication System		Trochoid pump		
	Fuel Required		Unleaded grade gasoline with 91 research octane number or higher.		
	Engine wet Weight	Si	122kg	269lb.	Except radiator, transmission
		Dx	129kg	284lb.	
STARTER	Type	ND	Gear reduction		
		MITSUBA	Gear direct		
	Normal output		1.4KW		
	Nominal voltage		12V		
	Hour rating		30 seconds		
	Direction of rotation		Clockwise as viewed from gear end		
	Weight	ND	4.5kg	9.9lb.	
		MITSUBA	3.7kg	8.1lb.	
TRANSMISSION	Clutch	5-MT	Single plate dry, diaphragm spring.		
		4-AT	Torque Converter		
	Transmission	5-MT	5 speed forward, 1 speed reverse, constant mesh.		
		4-AT	4 forward speed, 1 speed reverse, constant mesh.		

		5-MT		4-AT	
		Si	Dx	Si	Dx
Primary Reduction		1.000	1.000	1.000	1.000
Gear Ratio	I	3.181	3.181	2.529	2.380
	II	1.842	1.944	1.481	1.560
	III	1.250	1.250	1.060	1.032
	IV	0.937	0.933	0.734	0.777
	V	0.771	0.757	—	—
	Reverse	3.000	3.000	1.904	1.954

Final Reduction	5-MT	Si	Single helical gear, 4.066	
		Dx	Single helical gear, 3.875	
	4-AT	Si	Single helical gear, 4.066	
		Dx	Single helical gear, 4.071	
Clutch Facing Area		Si	176cm^2	27.3sq. in.
		Dx	160cm^2	24.8sq. in.

(cont'd)

Design Specifications (cont'd)

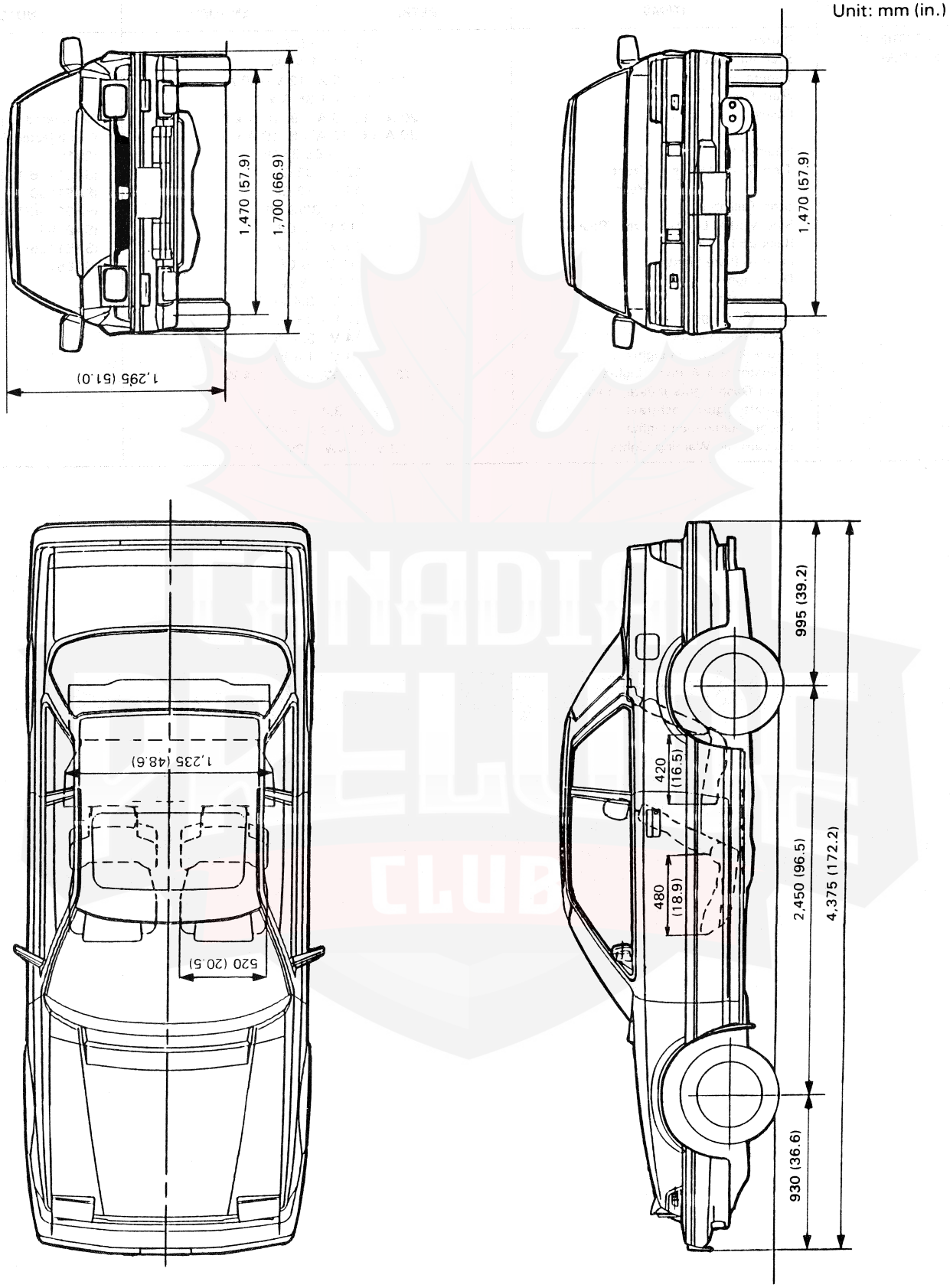
	ITEMS		METRIC	ENGLISH	NOTE
AIR CONDITIONER	Cooling capacity		3,350 Kcal/h	13,292 BTU/h	
	— Conditions:				
	Compressor rpm		1,800 rpm		
	Outside air temperature		27.5°C	81.5°F	
	Outside air humidity		50 %		
	Condenser air temperature		35°C	95°F	
	Condenser air velocity		4.5 m/sec.		
	Blower capacity		390 m^3/h	13,773 cu. ft/h	
	Compressor	Type	Radial type		
		No. of cylinders	4		
		Piston displacement	150 cc/rev.	9.15 cu. in/rev.	
		Max. rpm	7,000 rpm		
		Lubricant/capacity	80 cc	2.7 US oz.	
	Receiver Dryer	With dessicant	Includes fusible safety plug.		
	Condenser		Corrugated fin type		
	Evaporator		Corrugated fin type		
	Blowr	Type	sirocco fan		
		Motor input	145 W (12 V)		
		Speed control	Infinitely variable		
		Max. capacity	390 m^3/h	13,773 cu. ft/h	
	Temp. Control		Air-mix type		
	Comp. Clutch	Type	Dry, single plate, V-belt-1A		
		Power consumption	48 W max. 12 V		
	Refrigerant	Type	R-12		
		Quantity	0.8 ± 0.05 kg	1.76 ± 0.11 lbs	
STEERING SYSTEM	Type		Rack and Pinion		
	Overall Ratio		14.9 : 1		
	Turns, lock-to-lock		2.84		
	Steering Wheel Dia.		370 mm	14.6 in.	
	Power Steering Oil Capacity		1.5 lit.	1.6 US. qt., 1.3 Imp qt.	
	Power Steering Oil		HONDA Genuine Power Steering Fluid		
SUSPENSION SYSTEM	Type, Front		Independent by double wishbones, coil springs		
	Type, Rear		Independent, Mac'Pherson strut, coil springs		
	Shock Absorber	Front/Rear	Telescopic, hydraulic		
WHEEL ALIGNMENT	Wheel alignment				
	Camber	Front	0°		
		Rear	0°		
	Caster	Front	0°		
	Toe-in	Front	0 mm	0 in.	
		Rear	2 mm	0.080 in.	
	Kingpin Inclination		6°50'		
BRAKE SYSTEM	Type, Front		Power assisted self-adjusting ventilated disc		
	Type, Rear		Power assisted self-adjusting disc.		
	Lining Surface Area:	Front/Rear Si	43.3/21.0 cm^2	6.7/3.3 sq. in.	(Pad)
		Dx	35.8/20.9 cm^2	5.5/3.2 sq. in.	(Pad)
	Effective Disc Dia.	Front Si	207 mm	8.1 in.	
		Dx	190 mm	7.5 in.	
		Rear	208 mm	8.2 in.	
	Parking Brake Kind and Type		Mechanical actuating, rear two wheel brakes		
TIRES	Front/Rear		185/70 R13 86H		
	Spare		185/70 SR13 T105/80D13		

	ITEMS	METRIC	ENGLISH	NOTE
ELECTRICAL SYSTEM	Battery	12 V – 50 AH		
	Starting Motor	12 V – 1.4 KW		
	Generator	12 V – 65 A, 12 V – 60 A		
	Main Fuse	65 A x 1, 35 A x 1		
	Fuses	20 A x 6, 15 A x 9, 10 A x 8		Carbureted Engine
		20 A x 6, 15 A x 6, 10 A x 7		Fuel-Injected Engine
	Headlights	12 V – 65/35 W		(2B1)
	Turn Signal Lights Front	12 V – 32 CP		(SAE1156/194)
	Rear	12 V – 32 CP		(SAE1156)
	Stop/Taillights	12 V – 32/3 CP		(SAE1156/194)
	Side Marker Lights Front/Rear	12 V – 3 CP		(SAE194)
	Back-up Lights	12 V – 32 CP		(SAE1156)
	License Plate Lights	12 V – 4 CP		(SAE67)
	Dome light	12 V – 8 W		
	Trunk Light	12 V – 3.4 W		
	Glove Box Light	12 V – 3.4 W		
	Illumination Lights	14 V – 3.4 W		
	Gauge Illumination Lights	14 V – 1.4 W		
	Indicator and Warning Lights	12 V – 1.4 W, 14 V – 1.4 W		
	Other Dash Lights (heater, radio, cigarette lighter, ashtray)	12 V – 3.4/1.4/1.2 W		
	Gauge Illumination Lights	12 V – 3.4/1.4 W		
	Indicator an Warning Lights	12 V – 1.4W, 12V – 1.2 W		

Body Specifications

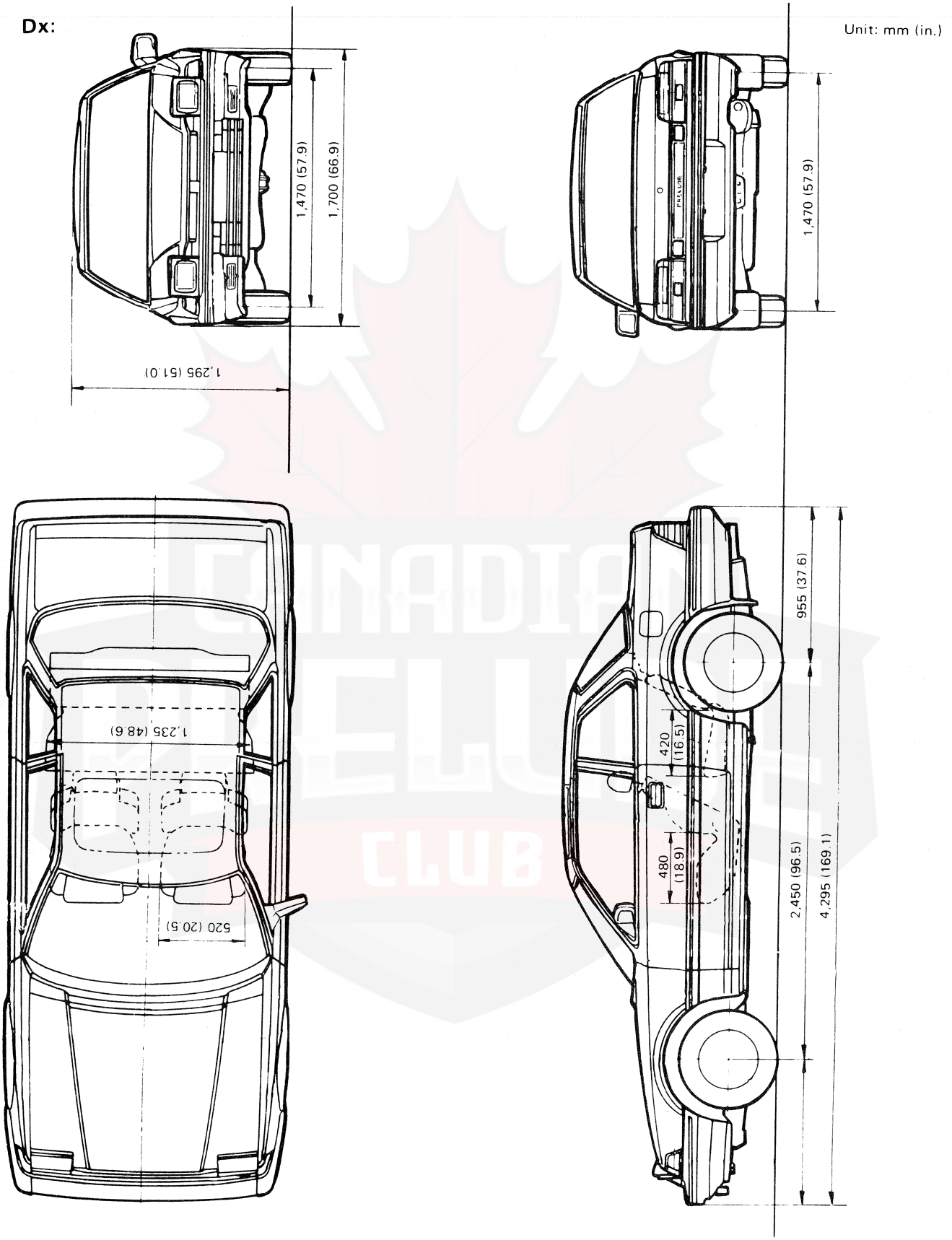
Si:

Unit: mm (in.)



Dx:

Unit: mm (in.)

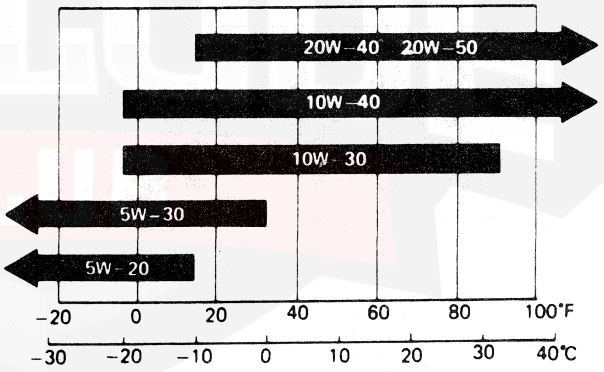


Maintenance

Lubrication Points

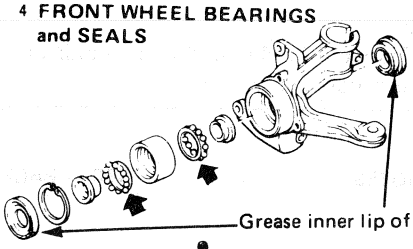
No.	LUBRICATION POINTS		LUBRICANT
1	Engine		API service Grade: "Fuel Efficient" SF SAE Viscosity: See chart below.
2	Transmission	Manual Automatic	API Service Grade: SE or SF SAE30, 10W–30, 10W–40 or 20W–40 grade oil DEXRON® Automatic transmission fluid
3	Brake reservoir		Brake fluid DOT 3 or DOT 4
4 5 6 7 8	Front wheel bearings and seals Rear wheel bearings and seals Front stabilizer bar end bushings Tie rod ball joints Steering gearbox (Manual)		Multipurpose Grease
8	Steering gearbox (Power)		Honda steering grease P/N 08704–99969
9 10 11 12 13	Shift lever pivot (Manual) Select lever (Automatic) Lower arm ball joints upper and lower Pedal linkage Headlight retractors		Multipurpose Grease
14	Power steering reservoir		Honda steering grease P/N 08704-99969
15	Calipers	Piston seal Dust seal Caliper pin Piston	Silicone Grease
16 17 18 19 20 21 22 23	Shift rod clevis bushings Door hinges upper and lower Door opening detents Engine hood latch Hood hinges Fuel filler door Trunk hinges Front upper arm		Multipurpose Grease

Recommended Engine Oil
("Fuel Efficient" SF Grade Only)

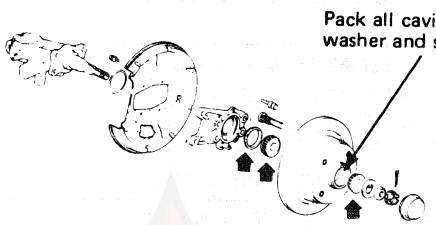


Engine oil viscosity for ambient temperature ranges.

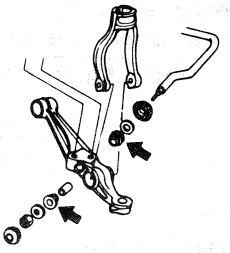
4 FRONT WHEEL BEARINGS and SEALS



5 REAR WHEEL BEARINGS and SEALS

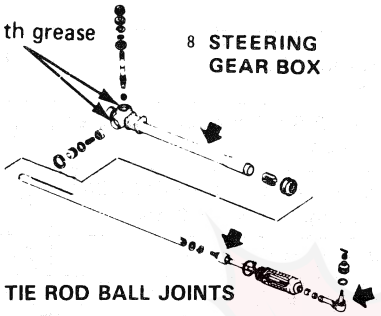


6 FRONT STABILIZER BAR END BUSHINGS



Pack with grease

8 STEERING GEAR BOX

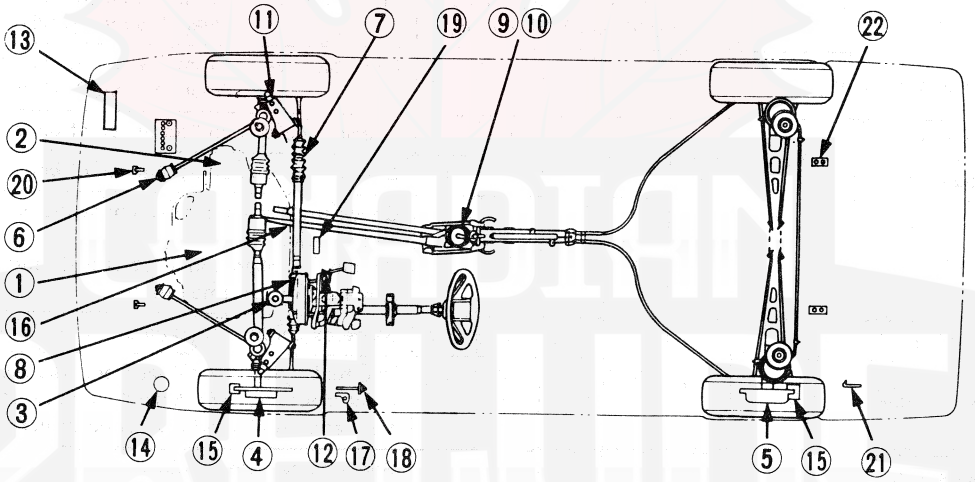


9 SHIFT LEVER PIVOTS

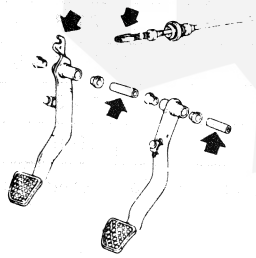
11 LOWER ARM BALL JOINT

7 TIE ROD BALL JOINTS

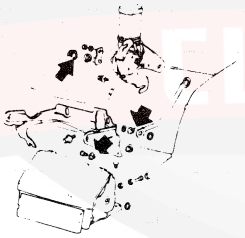
10 SELECT LEVER



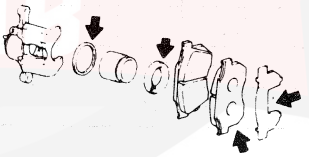
12 PEDAL LINKAGE



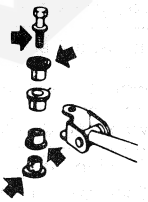
13 HEADLIGHT RETRACTORS



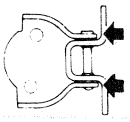
15 CALIPERS
Silicone grease



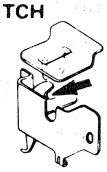
16 SHIFT ROD CLEVIS BUSHINGS



17 DOOR HINGES

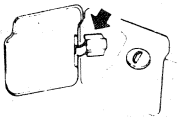


19 ENGINE HOOD LATCH

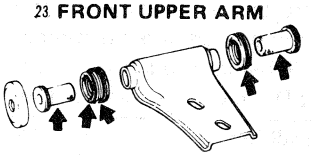


20 ENGINE HOOD HINGE

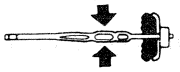
21 FUEL FILLER DOOR



23 FRONT UPPER ARM



18 DOOR OPENING DETENTS



Maintenance Schedule

The maintenance listed below must be performed at mileage intervals shown to ensure safe and efficient operating conditions and proper emission levels. This check list is arranged in hot/cold/hot sequence so you can work on a hot engine while waiting for it to cool, and then run cold and hot emissions checks.

R = Replace
C = Clean
I = Inspect
After inspection, clean, adjust, repair or replace if necessary.

MAINTENANCE ITEM	MAINTENANCE INTERVALS					NOTES	SEC & PAGE
x 1,000 miles	15	30	45	60	75		
x 1,000 km	24	48	72	96	120		
months	12	24	36	48	60		
Engine oil and filter	Replace every 7,500 miles (12,000 km) or 6 months					3.5 ℓ (3.7 qts.) w/filter change	8-3, 4
Manual transmission oil		R		R		Fuel injected Engine 2.5 ℓ (2.6 qts.) carbureted Engine 2.4 ℓ (3.5 qts.)	14-2
Automatic transmission fluid		R		R		Fuel Injected Engine 2.6 ℓ (2.7 qts.) DEXRON® A.T.F. Carbureted Engine 2.8 ℓ (3.0 qts.)	15-8, 78
Parking brake	I	I		I		Fully engaged: 4-8 clicks	21-3
Rear wheel bearing grease				R		Use multipurpose grease	4-3
Brake pads	Inspect every 7,500 miles (12,000 km) or 6 months					Min. thickness: Front 3 mm (0.12 in.) Rear 1.6 mm (0.06 in.)	21-4 25,37,58
Brake discs, calipers and pads	I	I	I	I	I	Min. thickness: Front 17 mm (0.67 in.) Rear 8 mm (0.31 in.)	21-7, 35,40,66
Exhaust pipe and muffler	I	I	I	I	I	Check condition and tightness of bolts	9-5, 6
Suspension mounting bolts	I	I	I	I	I	Check condition and tightness of bolts	20-10, 21
*Fuel line connections		I ***		I		Check fuel lines for loose connections, cracks and deterioration. Retighten loosen connections and replace any damaged or deformed parts.	11-2
OFuel line connections				I		Same as carbureted Engine	11-41
*Fuel filter and hoses (Inc. aux filter)				R		The rubber fuel hoses need periodic replacement since they are subject to cracks and deterioration during a long period of use.	11-2, 13
OFuel filter and hoses ilter)				R		Same as carbureted Engine	11-41, 90
Steering operation, tie rod ends, steering gearbox and boots.	I	I		I		Check rack grease, and steering linkage. Check the boot for damage or leaking grease.	19-26
Brake hoses and lines	I	I	I	I	I		21-32
Front wheel alignment	I	I	I	I	I		20-3,4,5
Power steering system	I	I	I	I	I		19-3
Powr steering pump belt		I*		I			19-8

* Tension adjustment only
O Fuel-Injected Engine * Carbureted Engine
** Thereafter, replace every 2 years or 30,000 miles (48,000 km) whichever comes first.
*** Recommended by manufacturer only for cars sold in California.

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

Condition	Maintenance item	Maintenance operation	Interval
AB · · ·	Engine oil and oil filter	R	Every 3,000 miles (5,000 km) or 3 months
AB · DE	Brake discs, carlipers and rear brake pads	I	Every 7,500 miles (12,000 km) or 6 months
ABC · E	Clutch release-arm travel	I	
· BC · E	Power steering system	I	

MAINTENANCE ITEM	MAINTENANCE INTERVALS					NOTES	SEC & PAGE
x 1,000 miles	15	30	45	60	75		
x 1,000 km	24	48	72	96	120		
months	12	24	36	48	60		
Brake fluid		R		R		Use only DOT 3 or 4 fluid Check that brake fluid level is between the upper and lower marks on the reservoir.	21-9
Clutch release-arm travel	I	I	I	I	I	Free play at arm: 5.2—6.4 mm (0.20—0.25 in.)	13-3
Cooling system hoses and connections		I		I			10-2,3
Radiator coolant			R **			Cooling system capacity ○ Manual 6.8 ℓ (1.8 US gals) ○ Automatic 6.7 ℓ (1.8 US gals) *Manual 6.4 ℓ (1.7 US gals) *Automatic 7.1 ℓ (1.9 US gals) Check specific gravity for freezing point.	10-2, 3
Alternator drive belt		I *		I		○ 6—9 mm (0.24—0.35 in.) @10 kg (22 lbs) tension *7—10 mm (0.3—0.4 in.) @10 kg (22 lbs) tension.	10-8, 9
Crankcase emission control system —PCV valve		I ***		I		Disconnect PCV valve from chamber. If clicking sound is heard as you place finger over the inlet of valve, valve is OK.	○ 12-64 * 12-25
*—Blow-by filter		I ***				Replace if filter is dripping with oil or obstructed by dust.	12-25
Distributor cap and rotor				I			25-15
Ignition wiring				I		Maximum resistance 25,000 ohms	25-13
Spark plugs		R		R		○ NGK: BPR5EY-11 or ND: W16EXR-U11 *NGK: BPR6EY-11 or ND: W20EXR-U11 Gap: 1.0—1.1 mm (0.039—0.043 in.)	25-28
Valve clearance (engine cold)	I	I	I	I	I	In: 0.12—0.17 mm (0.005—0.007 in.) Ex: 0.25—0.30 mm (0.010—0.012 in.)	6-22
Air cleaner element		R		R			○ 11-41 * 11-3
*Choke mechanism		C		I		Spray with carburetor cleaner.	11-9
*Choke opener operation (cold)				I		Disconnect upper hose from choke opener. Start engine and check for vacuum. Vacuum should be available when coolant temp. is above 15°C (59°F).	11-9
*Intake air temp. control system (cold)				I		Door should stay up for 3 sec. after cranking.	12-25
Evaporative emission control system (cold)				I		Disconnect upper hose at purge control diaphragm valve and connect vacuum gauge to hose. Start engine and let idle. Vacuum should not appear.	○12-27 *12-64
*E.G.R. System (cold)				I		Connect vacuum gague to EGR valve hose. Vacuum should not be available at 4,500—5,000 rpm.	12-27

Fuel-Injected Engine
* Carbureted Engine

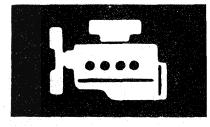
(cont'd)

Maintenance Schedule (cont'd)

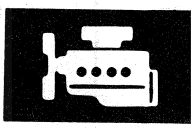
MAINTENANCE ITEM	MAINTENANCE INTERVALS					NOTES	SEC & PAGE
	x 1,000 miles	15	30	45	60	75	
	x 1,000 km	24	48	72	96	120	
	months	12	24	36	48	60	
Warm up the engine to normal operating temperature.							
* Intake air temp. control system (hot)					I		Door should be down.	12-35
Ignition timing at idle					I		○ Manual 15° (BTDC) * 20° (BTDC) ○ Automatic 15° (BTDC) * 12° (BTDC)	25-27
Ignition timing control					I		Vacuum advance at idle.	○ 12-70 * 12-45, 46
Idle speed					I		○ Manual 750 ± 50 rpm ○ Automatic 750 ± 50 rpm (in "N" or "P") * Manual 800 ± 50 rpm * Automatic 800 ± 50 rpm (in gear)	○ 11-85 * 11-27
Idle CO					I		Check with propane enrichment or CO meter.	○ 12-63 * 11-27, 30
E.G.R. System (hot)					I		See Emission Secion.	○ 12-67 * 12-35
* Secondary air supply system					I		There should be a bubbling noise from the air suction port at idle. Heat air bleed valve A to approx. 60°C (140°F); bubbling noise should stop.	12-47
Evaporative emission control system (hot)					I			○ 12-65 * 12-37
—Two-way valve					I		Draw 5—15 mm (0.2—0.6 in.) Hg vacuum. Pressurize to 25—55 mm (1.0—2.2 in) Hg.	○ 12-66 * 12-39
* —Inner vent cut-off solenoid valve					I		Disconnect upper hose from solenoid valve and connect a vacuum pump to valve. Turn ignition switch on and draw vacuum. Vacuum should remain steady. Start engine. Vacuum should drop to zero within several seconds.	12-40
Catalytic converter heat shield.					I		Check condition and tightness	○ 12-63 * 12-48

○ Fuel-Injected Engine
* Carbureted Engine

Engine



Engine Removal/Installation



Engine Removal/Installation

Fuel-Injected Engine shown; Carbureted Engine similar

WARNING

- **Make sure jacks and safety stands are placed properly (pages 1-6 thru 8), and hoist brackets are attached to correct positions on the engine (page 5-7).**
- **Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.**

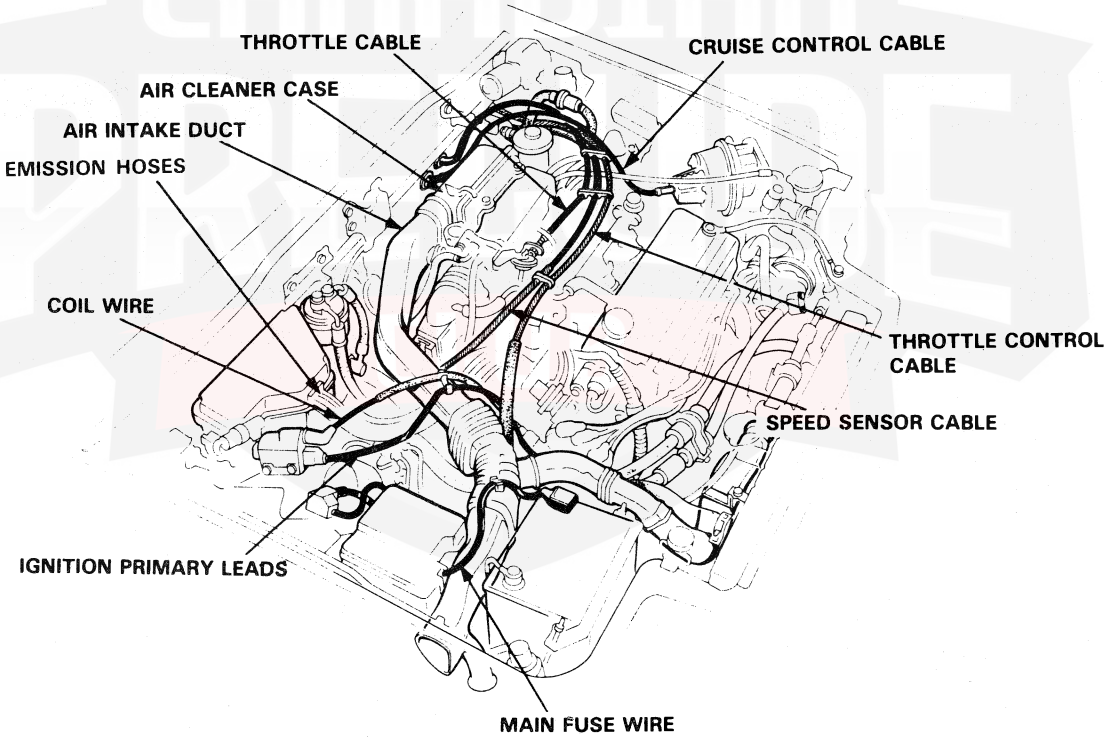
CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Disconnect the battery negative terminal first, then the positive terminal.
2. Unbolt the hood brackets and remove the hood.

   CAUTION: Use care when storing the hood to avoid damaging the paint.
3. Drain the engine oil. Remove the oil filler cap to speed draining. Reinstall the drain plug with a new washer.

   CAUTION: Do not re-use old washer.
4. Drain the coolant from the radiator into a clean pan so it may be re-used. Remove the radiator cap to speed draining.

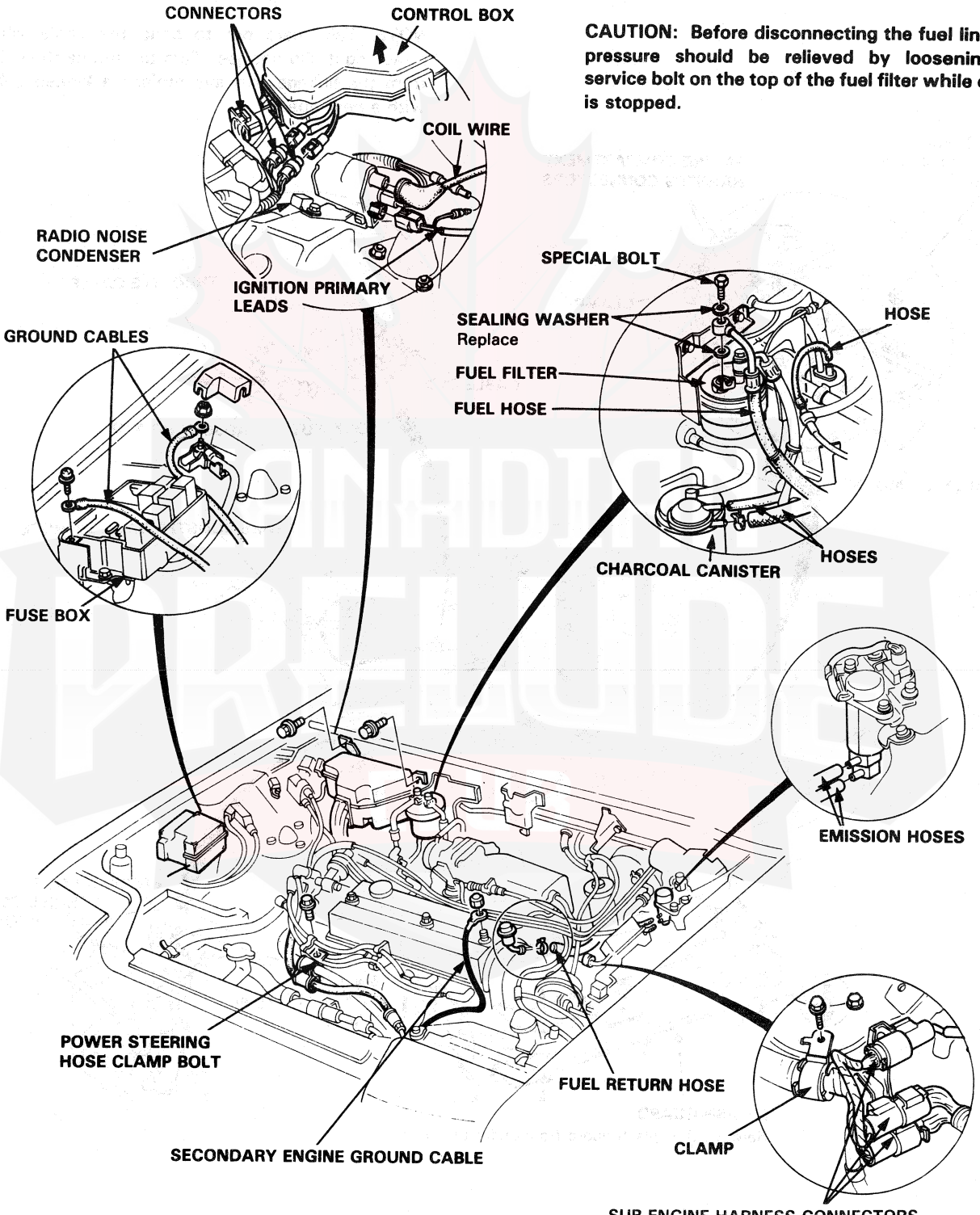
   WARNING Use care when removing radiator cap to avoid scalding by hot coolant or steam.
5. Drain transmission oil/fluid. Use a 3/8" drive socket wrench to remove the drain plug. Remove the oil filler plug to speed draining. Reinstall the drain plug with a new washer.
6. Remove the air intake duct and remove the air cleaner case mounting nuts then remove the air cleaner case.



7. Relieve fuel pressure (Fuel-Injected Engine, Section 11).

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

CAUTION: Before disconnecting the fuel line, fuel pressure should be relieved by loosening the service bolt on the top of the fuel filter while engine is stopped.



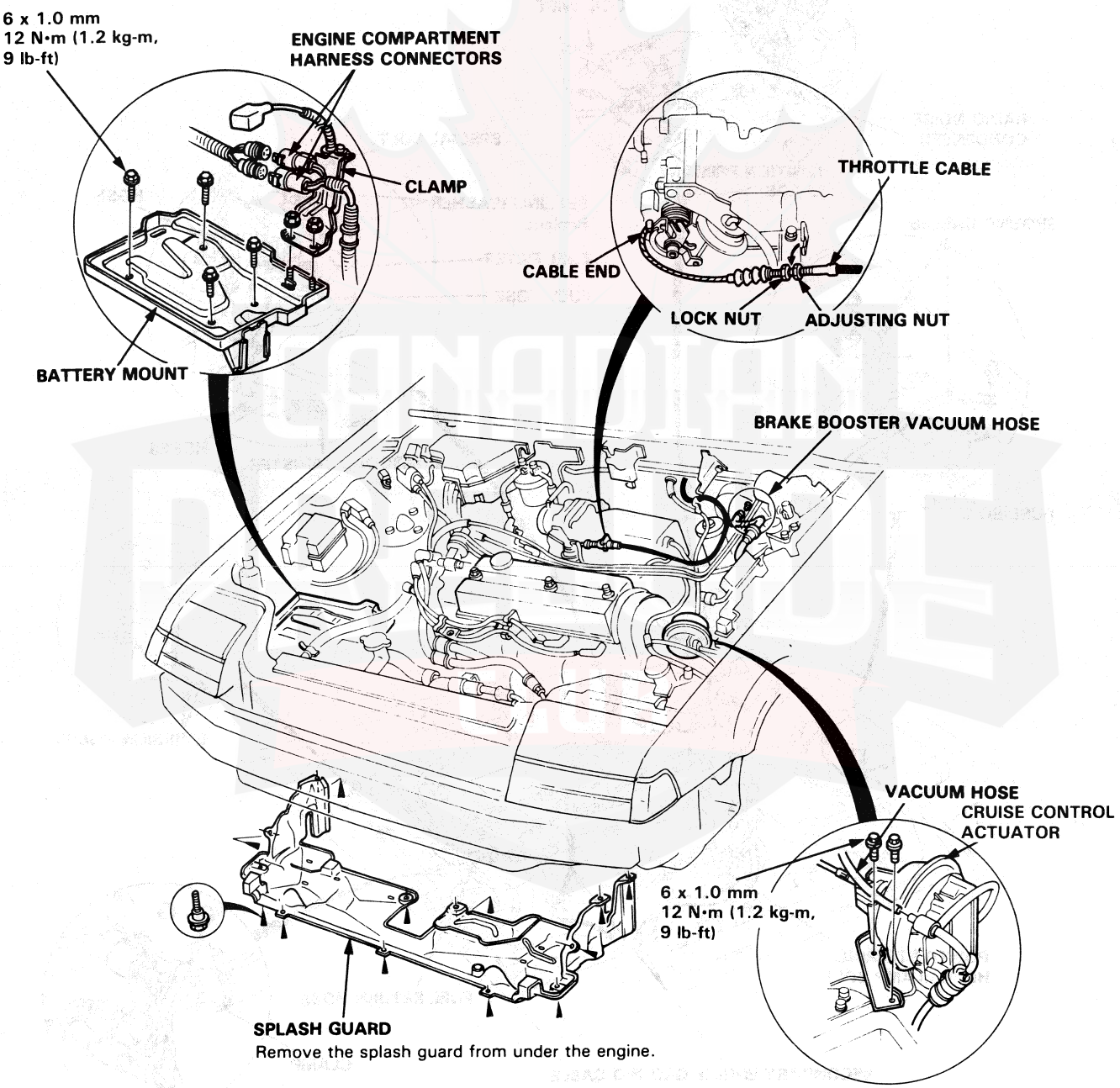
(cont'd)

Engine Removal/Installation (cont'd)

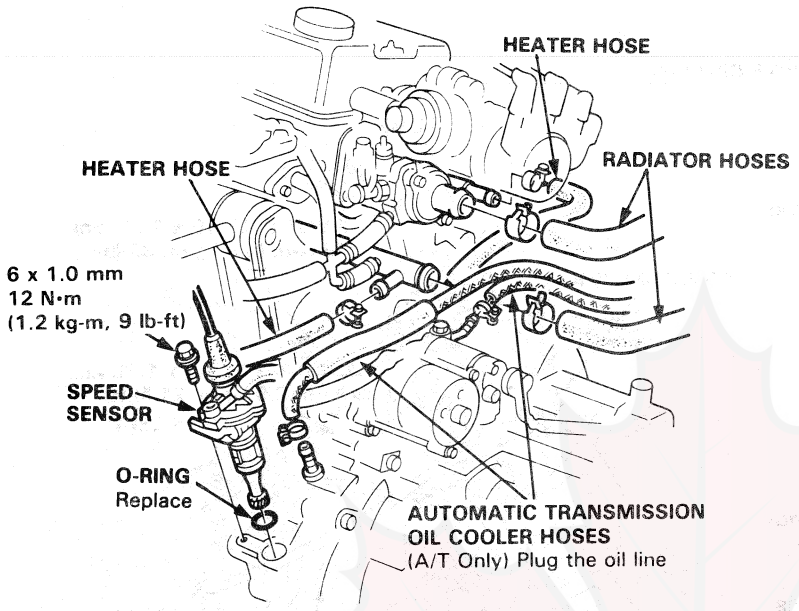
Fuel-Injected Engine shown; Carbureted Engine similar:

THROTTLE CABLE
Remove the throttle cable by loosening the locknut and adjusting nut, then slip the cable and out the bracket and linkage.

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

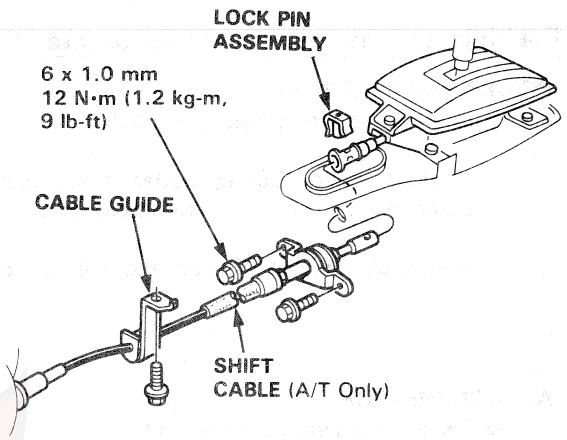


SPLASH GUARD
Remove the splash guard from under the engine.



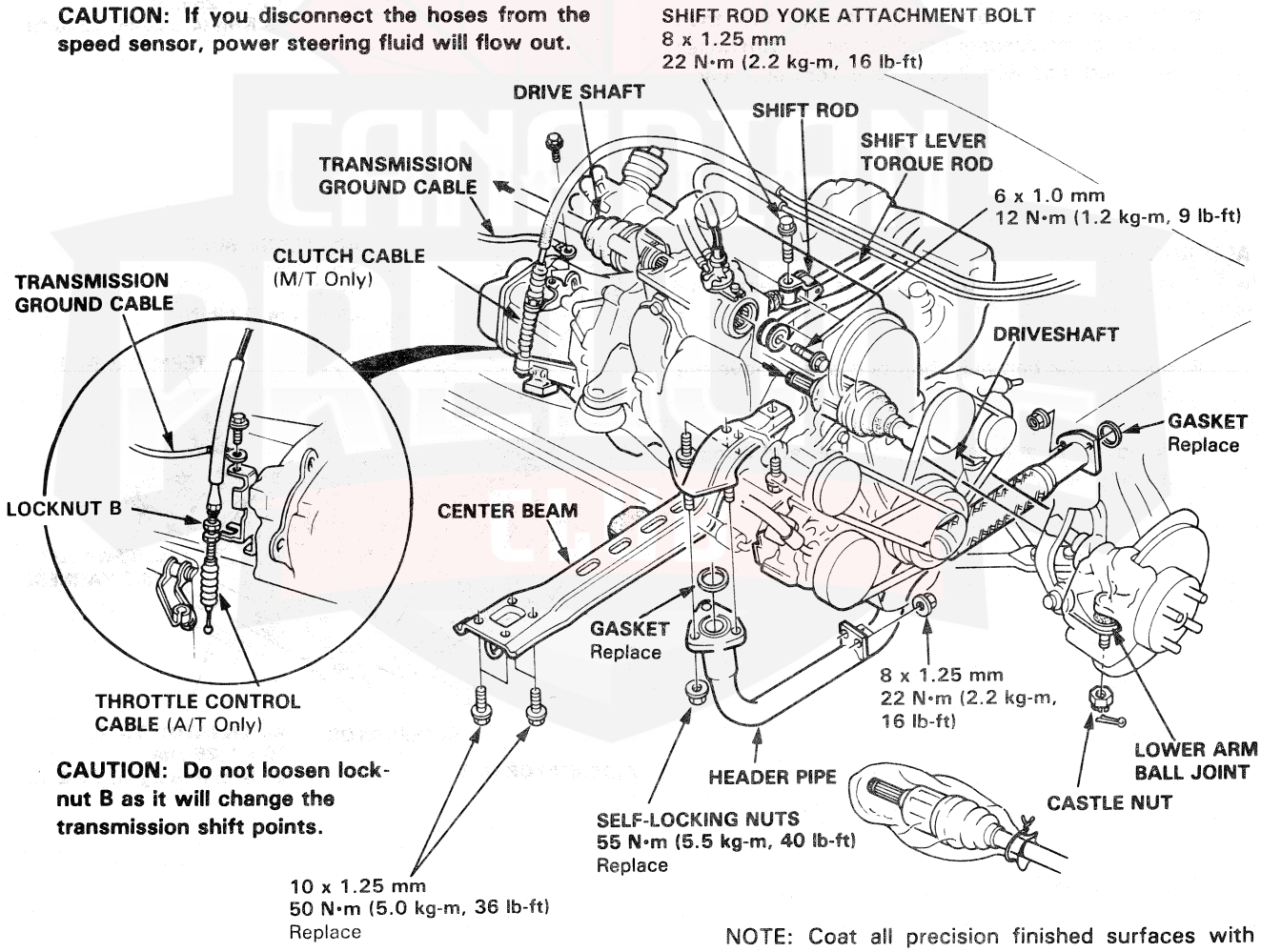
- Remove speed sensor complete with hoses.

CAUTION: If you disconnect the hoses from the speed sensor, power steering fluid will flow out.



- Remove the center console.
- Place the shift lever in reverse, then remove the lock pin from the end of the shift cable.

NOTE: On reassembly, check the cable adjustment (section 15).



CAUTION: Do not loosen locknut B as it will change the transmission shift points.

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

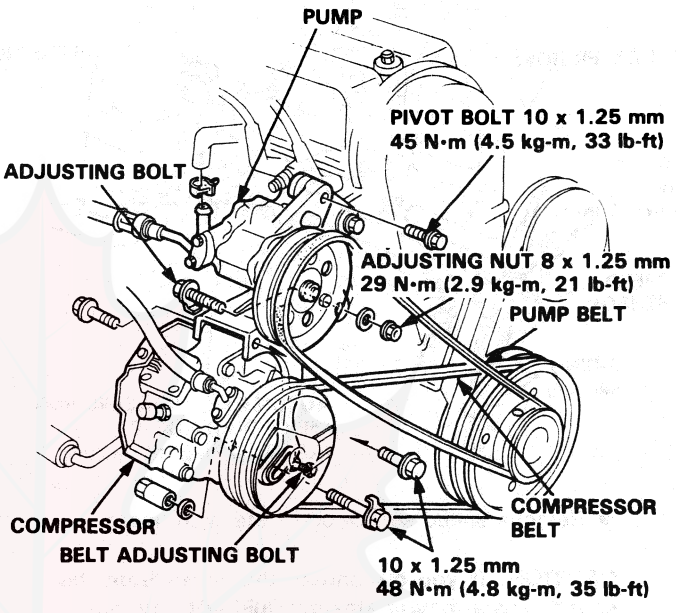
(cont'd)

Fuel-Injected Engine shown; Carbureted Engine similar:

POWER STEERING PUMP

- Remove adjusting bolt and V-belt.
- Without disconnecting outlet hose, pull the pump away from its mounting bracket.

  Do not disconnect hose or fluid will flow out.



A/C COMPRESSOR

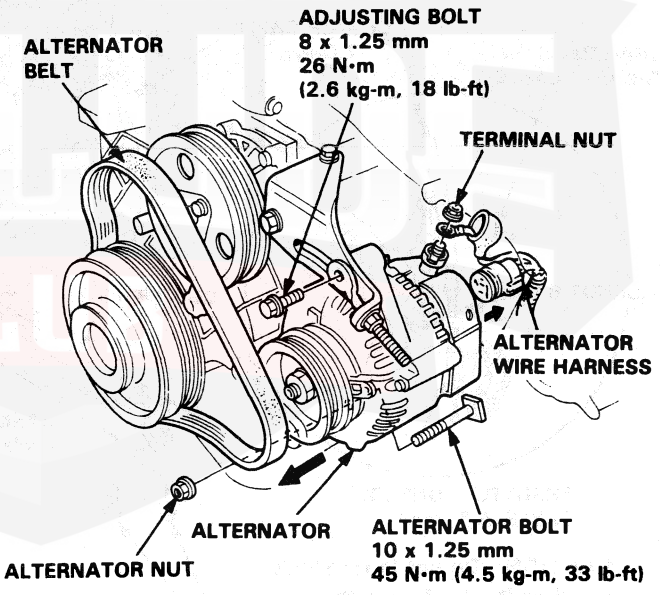
- Loosen the belt adjusting bolt.
- Loosen the compressor mount bolts and adjusting bolt then remove the compressor belt.

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

- Remove the compressor mounting bolts, then lift the compressor out of the bracket with hoses attached, and wire it up to the front bulkhead.

ALTERNATOR

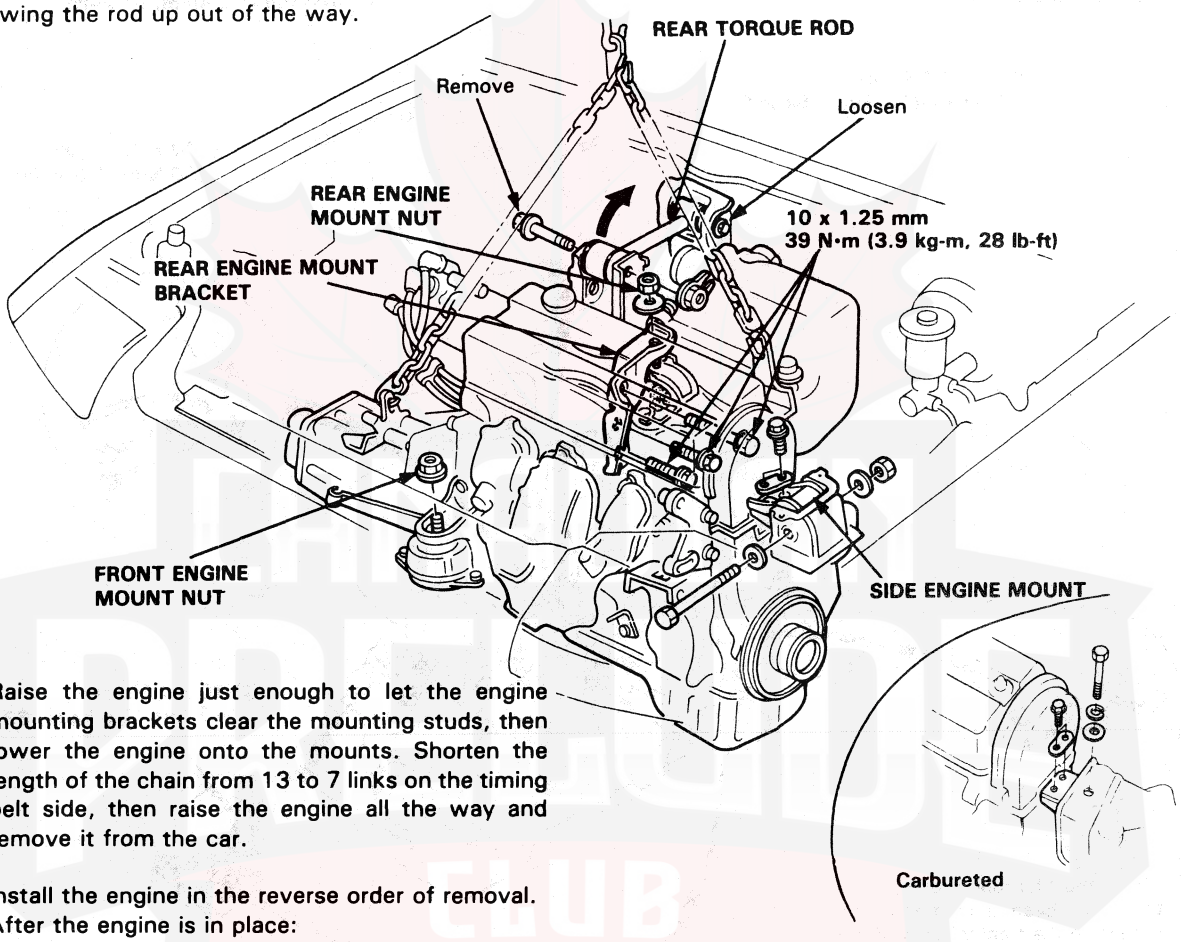
- Disconnect the alternator wire harness connectors.
- Remove the belt adjusting bolt and remove the belt.
- Remove the alternator mount bolt and remove the alternator.



8. Attach a chain hoist to the engine block and raise the hoist just enough to remove slack from chain.

9. Check that the engine/transaxle is completely free of vacuum, fuel, and coolant hoses, and electrical wires.

10. Remove the bolt from the rear torque rod at the engine, then loosen the bolt in the frame mount and swing the rod up out of the way.



11. Raise the engine just enough to let the engine mounting brackets clear the mounting studs, then lower the engine onto the mounts. Shorten the length of the chain from 13 to 7 links on the timing belt side, then raise the engine all the way and remove it from the car.

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

- Torque engine mount bolts in sequence shown on next page.

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

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

CAUTION: Use new spring clips on installation.

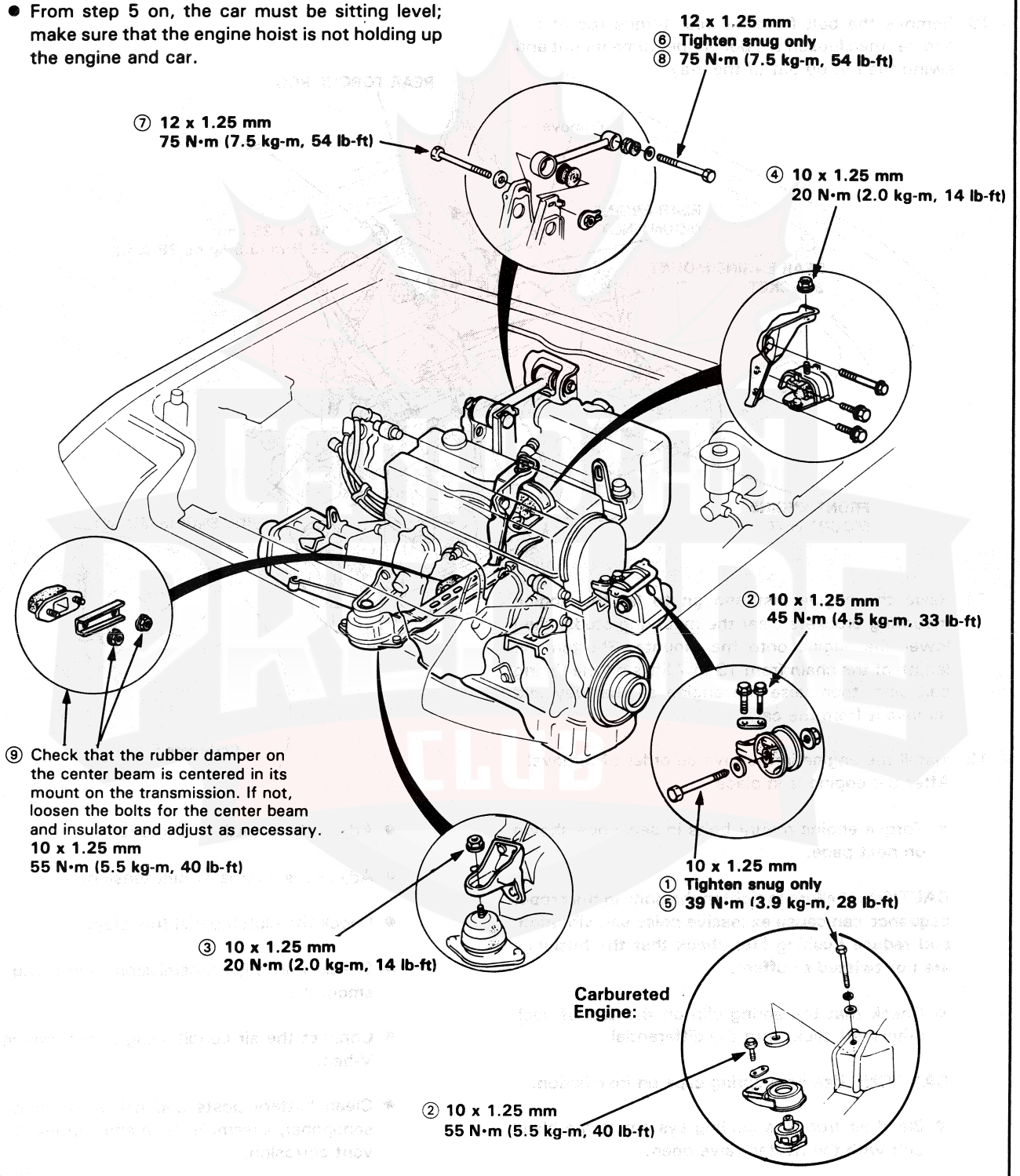
- Bleed air from the cooling system at the bleed bolt with the heater valve open.
- Adjust the throttle cable tension.
- Adjust the alternator belt tension.
- Check the clutch pedal free play.
- Check that the transmission shifts into gear smoothly.
- Connect the air conditioning hoses, wiring and V-belt.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

(cont'd)

Fuel-Injected Engine shown; Carbureted Engine similar:

NOTE:

- For proper suppression of noise and vibration, and maximum bushing life, tighten the bolts in the sequence shown with the bushings centered in their mounts.
- From step 5 on, the car must be sitting level; make sure that the engine hoist is not holding up the engine and car.



Cylinder Head/Valve Train

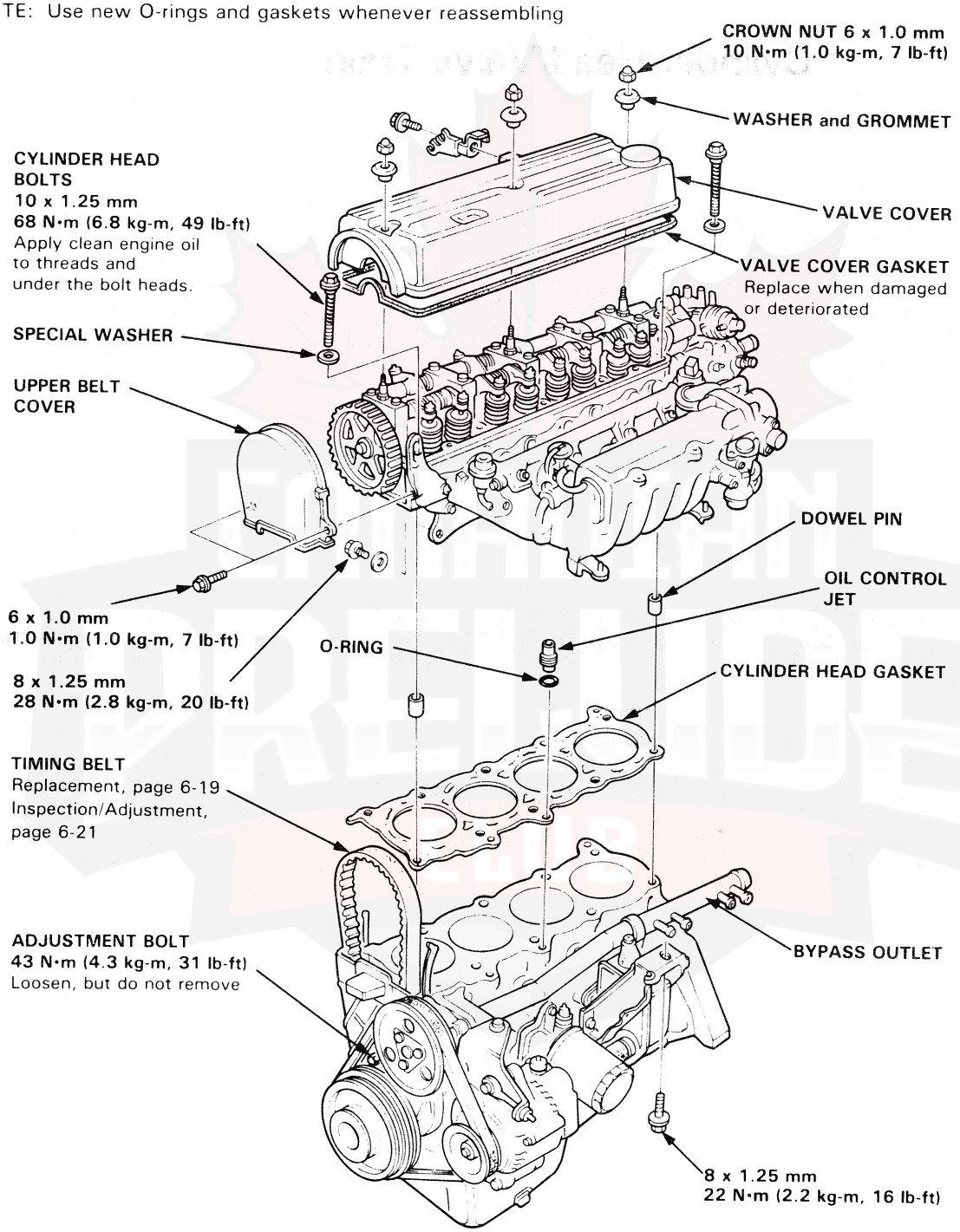
Cylinder Head/Valve Train

Illustrated Index

Fuel-Injected Engine:

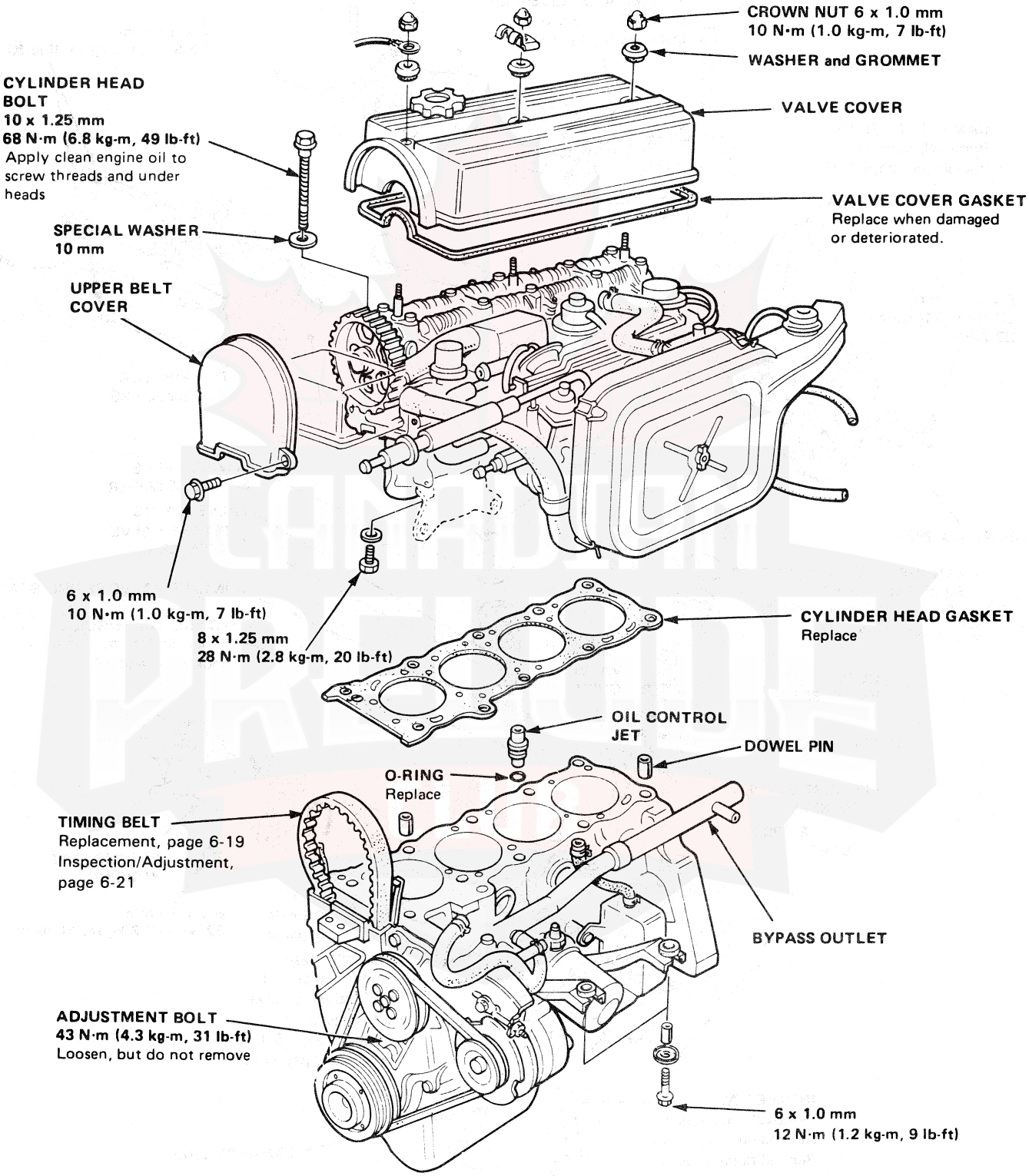
CAUTION: To avoid damaging the cylinder head, wait until the coolant temperature drops below 38°C (100°F) before removing it.

NOTE: Use new O-rings and gaskets whenever reassembling



Carbureted Engine:

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

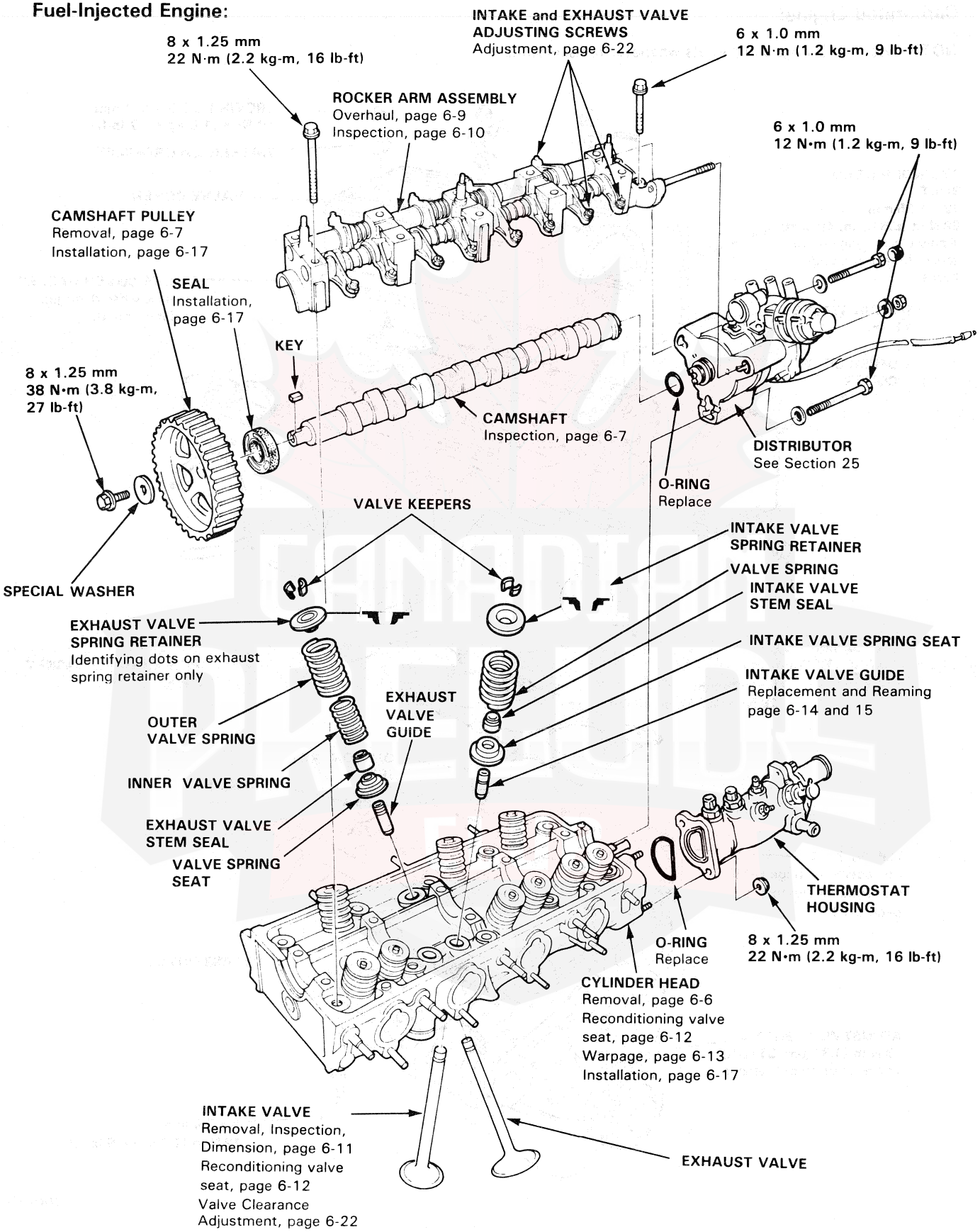


(cont'd)

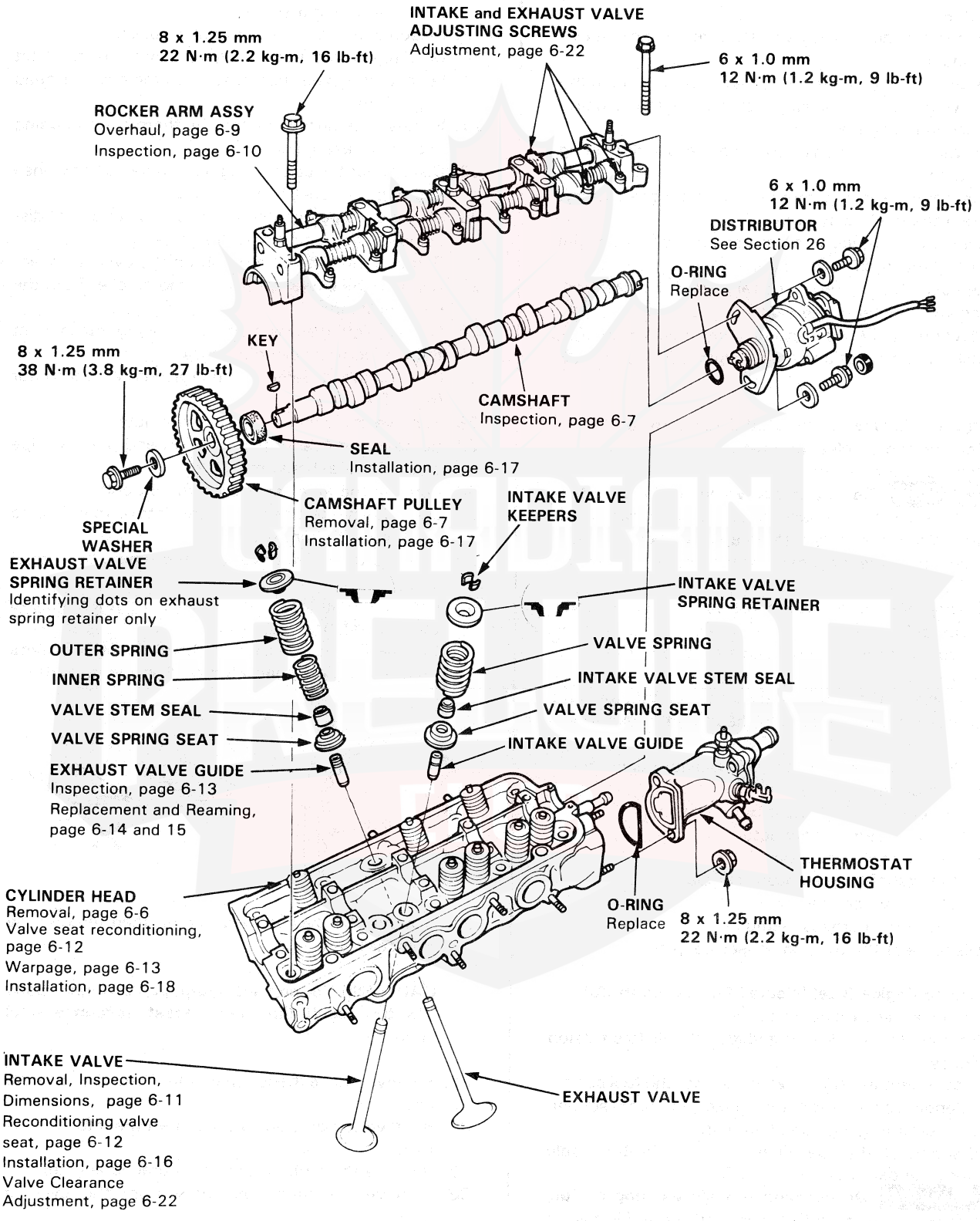
Cylinder Head/Valve Train

Illustrated Index (cont'd)

Fuel-Injected Engine:



Carbureted Engine:



Cylinder Head

Removal (engine removal not required)

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

NOTE:

- Inspect the timing belt before removing the cylinder head.
- Before removal of the cylinder head, turn the flywheel so that the No. 1 cylinder is at top-dead-center (page 6-20).
- Mark all emissions hoses before disconnecting them.

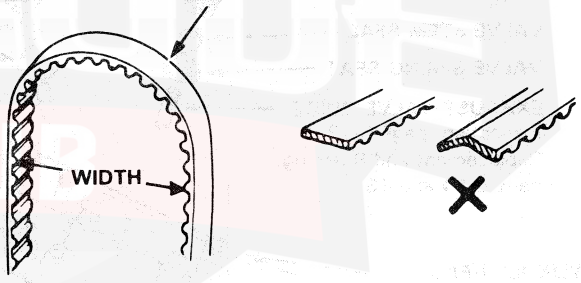
1. Disconnect the negative terminal from the battery.
2. Drain the cooling system.
3. Remove the brake booster vacuum tube from the tubing manifold (page 5-4).
4. Remove the engine secondary ground cable from the valve cover (page 5-3).
5. Disconnect the radio noise condenser connector, coil wire and ignition primary connector (page 5-3).

Fuel-Injected Engine (Carbureted Engine, go to 13):

6. Remove the air cleaner cover.
7. Relieve fuel pressure.
   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.
8. Disconnect the fuel hose and fuel return hose (page 5-3).
9. Disconnect the throttle cable at the throttle body (page 5-4).
10. Disconnect the charcoal canister tube at the throttle valve.
11. Disconnect the engine sub harness connectors and couplers from the cylinder head and intake manifold.
    - Four injector couplers • TA sensor connector
    - Temperature unit connector
    - Ground terminals near by the fuel pipe
    - Throttle sensor connector
    - TW sensor connector
    - Crankshaft angle snesor coupler
    - EGR valve connector
    - Four wire harness clamps
12. Disconnect the oxygen sensor coupler.

Carbureted Engine (Fuel-Injected Engine, go to 20):

13. Remove the air cleaner cover.
14. Remove the air cleaner and identify all its emission hoses.
15. Disconnect the electrical wires from the fuel cut-off solenoid valve, automatic choke thermosensor and temperature gauge sending unit.
16. Disconnect the fuel lines and the throttle cable from the carburetor (page 5-5).
    WARNING Do not smoke while working on fuel system. Keep open flame or spark away from work area.
17. Disconnect the connector from the distributor and remove the vacuum hoses.
18. Disconnect the No. 1 control box emission hoses from the tubing manifold.
19. Disconnect the air jet controller hoses.
20. Disconnect the upper radiator hose, heater inlet hose, and bypass inlet hose from the cylinder head (page 5-6).
21. Remove the hose between the thermostat housing and the intake manifold.
22. Disconnect the connecting pipe-to-valve body hose and bypass outlet hose.
23. Remove the power steering oil pump but do not disconnect the pump hoses (page 5-7).
24. Remove the hose clamp bolt on the cylinder head.
25. Remove the power steering pump bracket from the cylinder head.
26. On cars equipped with air conditioning, disconnect the idle control solenoid hoses.
27. If so equipped, remove the cruise control actuator (page 5-4).
28. Remove the exhaust header pipe nuts.
29. Remove the header pipe bracket and pull the pipe clear of the exhaust manifold.
30. Remove the air cleaner base mount bolts.
31. Disconnect the hose from the intake manifold to the breather chamber.
32. Remove the valve cover and the timing belt upper cover.
33. Loosen the tensioner adjustment bolt, then remove the timing belt.
    CAUTION: Do not crimp or bend timing belt more than 90° or less than 25 mm (1 in.) in diameter.



34. Remove the cylinder head bolts, then remove the cylinder head.

    CAUTION: To prevent warpage, unscrew bolts 1/3 turn each time and repeat sequence until loose.

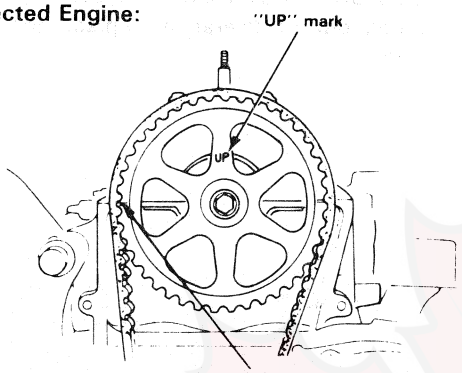
35. Remove the exhaust manifold from the cylinder head.
36. Remove the air cleaner base from the intake manifold.
37. Remove the carburetors. (Carbureded engine).
38. Remove the intake manifold from the cylinder head.

Camshaft Pulley

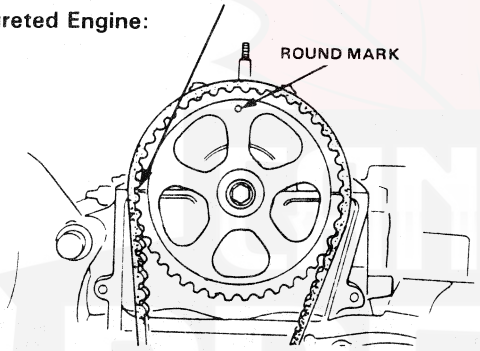
Removal

1. To ease reassembly, turn the pulley until the "UP" or round mark faces up, and the front timing mark is aligned with the valve cover surface.

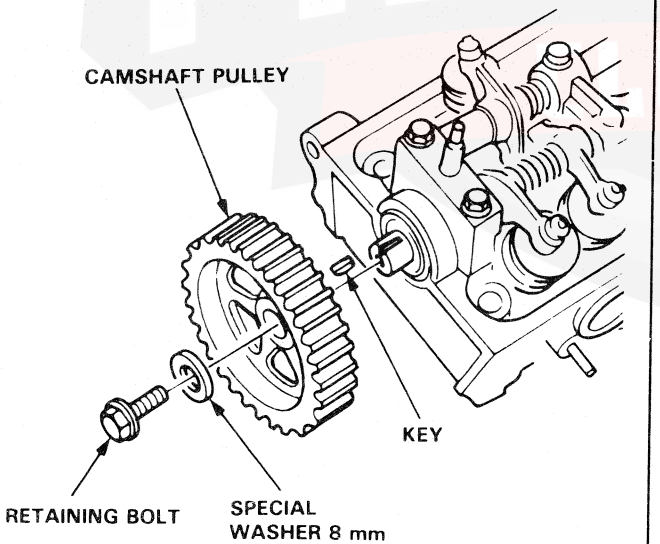
Fuel-Injected Engine:



Carbureted Engine:



2. Remove the pulley retaining bolt and washer, then remove the pulley.



NOTE: Before removing rocker arm assembly, check camshaft end play.

Camshaft

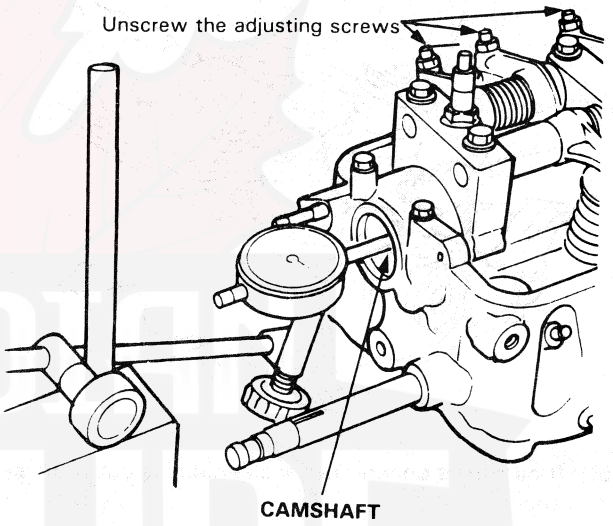
Inspection

NOTE: Do not rotate camshaft during inspection; loosen the adjusting screws before starting.

1. Seat camshaft by prying it toward distributor end of head with screwdriver.

2. Zero dial indicator against end of distributor drive, then pry camshaft back and forth, and read end play.

Camshaft End Play:
Standard (New): 0.05—0.15 mm (0.002—0.006 in.)
Service Limit: 0.5 mm (0.02 in.)



3. Remove the rocker arm bolts, then remove the rocker assembly from the cylinder head.

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

- Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.
- Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.
- Insert plastigage strip across each journal.
- Install the rocker arm assembly and torque bolts to values and in sequence shown on page 6-17, then remove the bolts and the rocker arm assembly.

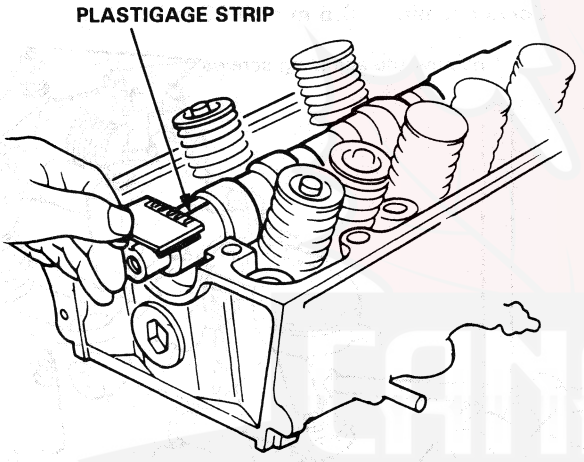
(cont'd)

Camshaft

Inspection (cont'd)

4. Measure widest portion of plastigage on each journal.

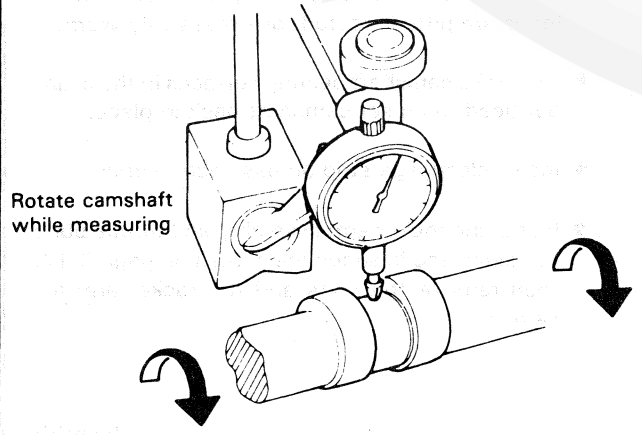
No. 1, 3 and 5 JOURNALS
Camshaft Bearing Radial Clearance:
Standard (New): 0.050—0.089 mm (0.002—0.004 in.)
Service Limit: 0.15 mm (0.006 in.)
No. 2 and 4 JOURNALS
Standard (New): 0.130—0.169 mm (0.005—0.007 in.)
Service Limit: 0.23 mm (0.009 in.)



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

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

Camshaft Total Runout:
Standard (New): 0.03 mm (0.001 in.)
Service Limit: 0.06 mm (0.002 in.)

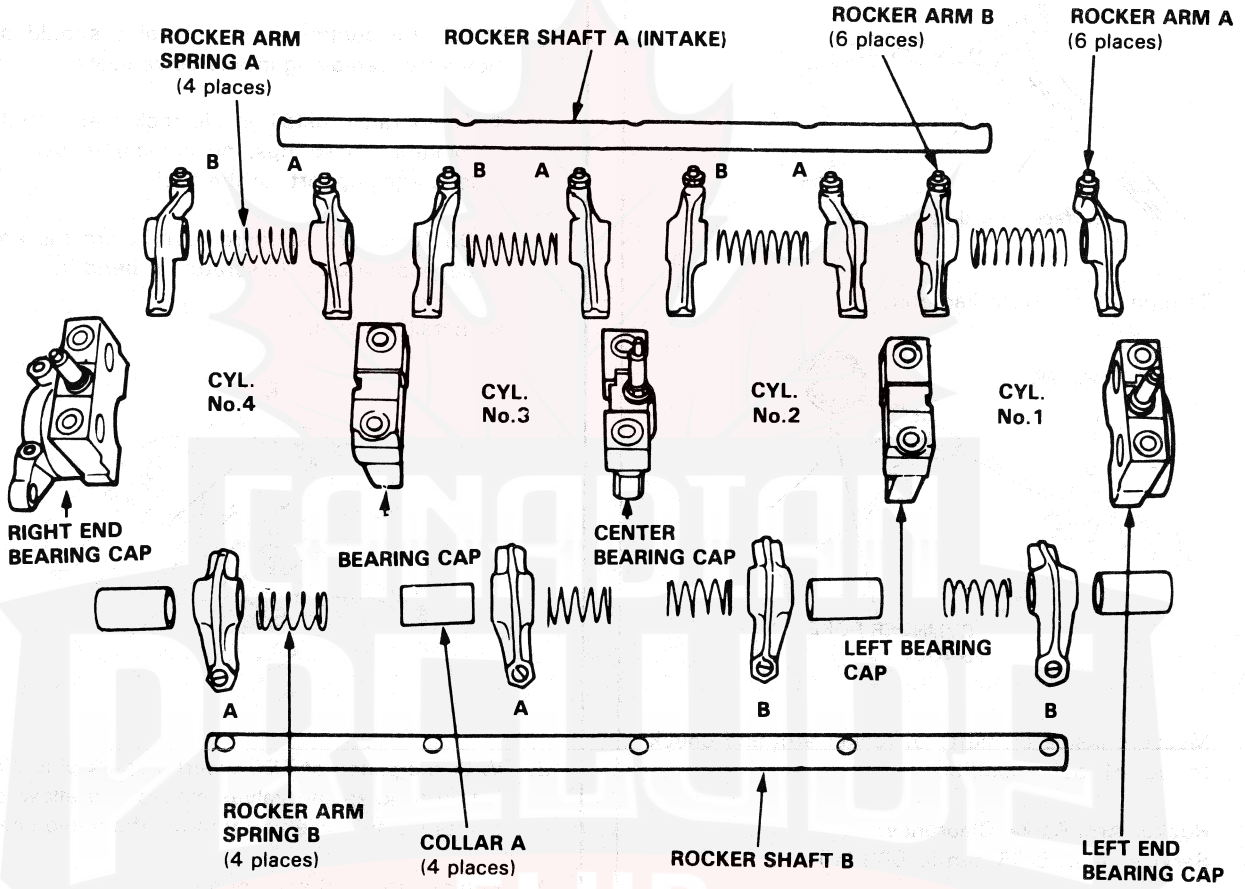


— If the total runout of the camshaft is within tolerance, replace the cylinder head.

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

Rocker Arms

Overhaul



NOTE:

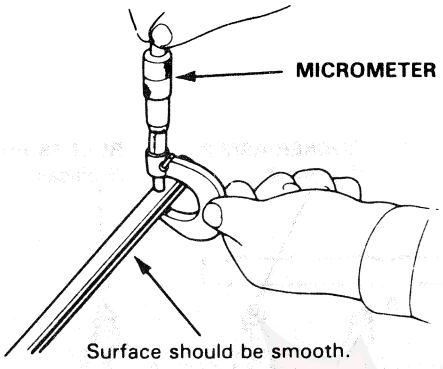
- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (page 6-10).
- Rocker arms must be installed in the same position if reused.

Rocker Arms

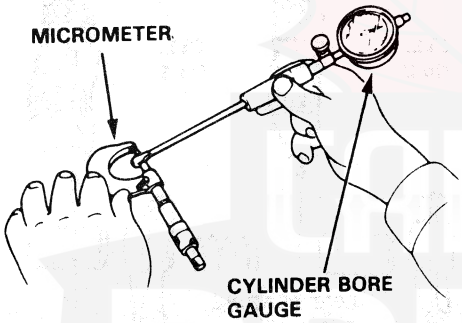
Clearance

Measure both the intake/exhaust rocker shaft.

1. Meausre diameter of shaft at first rocker location.

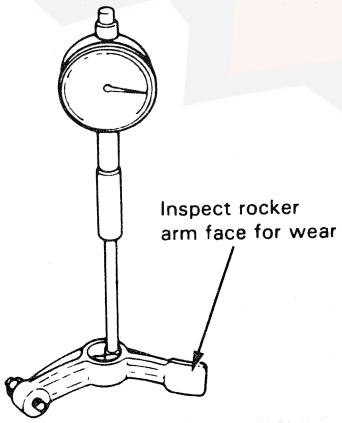


2. Zero gauge to shaft diameter.



3. Measure inside diameter of rocker arm and check for out-of-round condition.

Rocker Arm Radial Clearance:
Service Limit: 0.08 mm (0.003 in.)



Repeat for all rockers. If over limit, replace rocker shaft and all over-tolerance rocker arms.

Valve Springs and Valve Seals

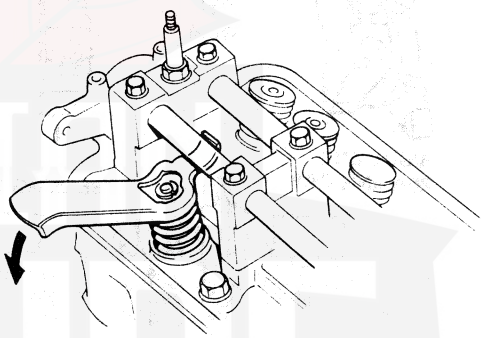
Replacement (Cylinder head removal not required)

NOTE: This procedure requires a commercially-available valve spring compressor. A typical style is illustrated.

1. Remove the valve cover.
2. Remove the rocker arm assembly.

NOTE: Air suction pipe and valve should be removed for removing intake valve seals.

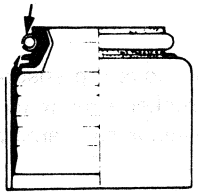
- Temporarily install an old rocker arm shaft (no rockers, no springs, no collars) to serve as a leverage support for the tool.
- Don't use the shaft removed from the engine, because you could scratch or bend it.
- Install the tool.



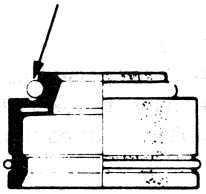
3. With the piston at TDC insert a spark plug air hold fitting to keep the valves closed and allow spring compression while you remove the valve keepers.
4. Remove the tool and springs.
5. Remove the valve seal.
6. Install the valve seals and springs in the reverse order of removal.

NOTE: Exhaust and intake valve seals are not interchangeable.

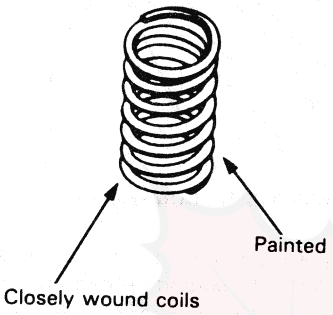
EXHAUST VALVE SEAL
Replace
(BLACK SPRING)



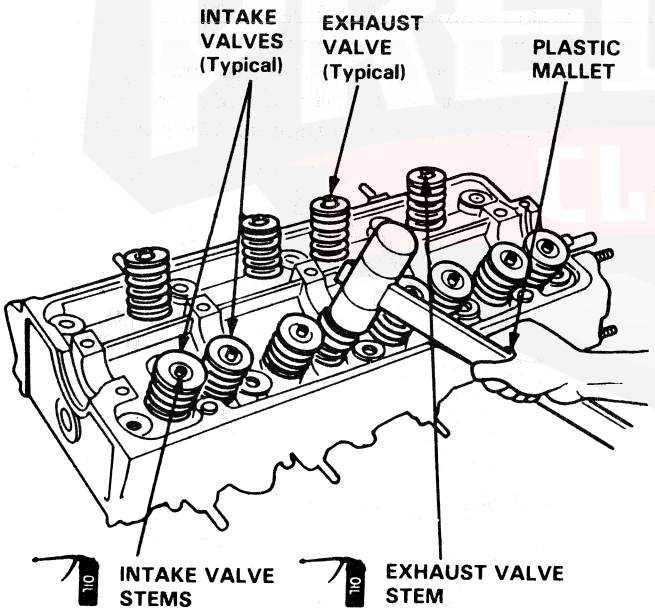
INTAKE VALVE SEAL
Replace
(WHITE SPRING)



- Place the valve springs with closely wound coils or painted part toward the cylinder head.



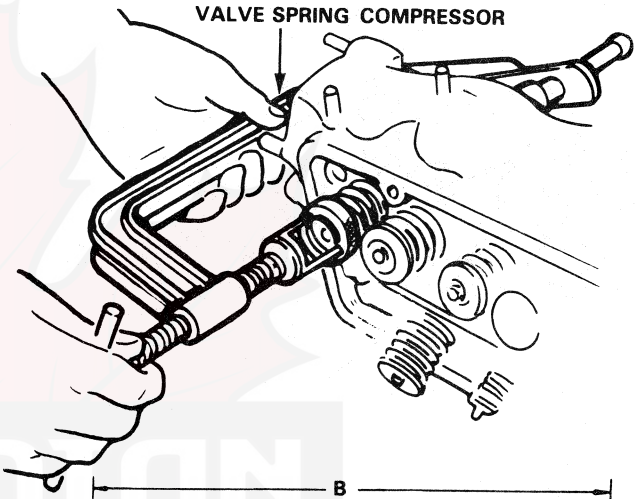
When springs are in place, lightly tap the end of each valve stem two or three times with a plastic mallet to ensure proper seating of valve and valve keepers.

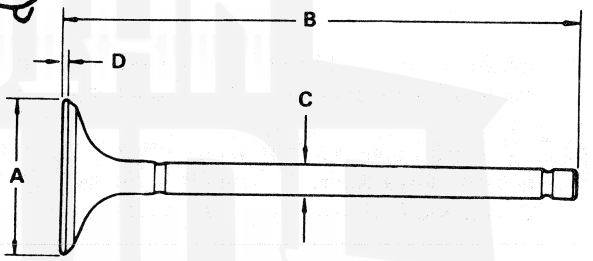


Replacement

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

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





Intake Valve Dimensions
A Standard (New): 29.9—30.1 mm (1.177—1.185 in.)
B Standard (New): 120.29—120.59 mm (4.736—4.748 in.)
C Standard (New): 6.58—6.59 mm (0.2591—0.2594 in.)
C Service Limit: 6.55 mm (0.258 in.)
D Standard (New): 1.35—1.65 mm (0.053—0.065 in.)
D Service Limit: 1.15 mm (0.045 in.)

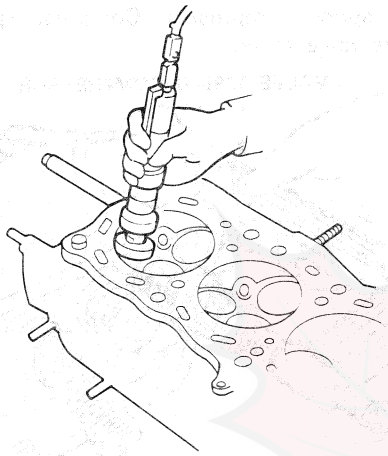
Exhaust Valve Dimensions
A Standard (New): 34.9—35.1 mm (1.374—1.382 in.)
B Standard (New): 120.66—120.96 mm (4.750—4.762 in.)
C Standard (New): 6.94—6.95 mm (0.2732—0.2736 in.)
C Service Limit: 6.41 mm (0.272 in.)
D Standard (New): 1.65—1.95 mm (0.065—0.077 in.)
D Service Limit: 1.45 mm (0.057 in.)

Valve Seats

Reconditioning

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

   NOTE: If guides are worn (page 6-13), replace them (page 6-14) before grinding valve seats.

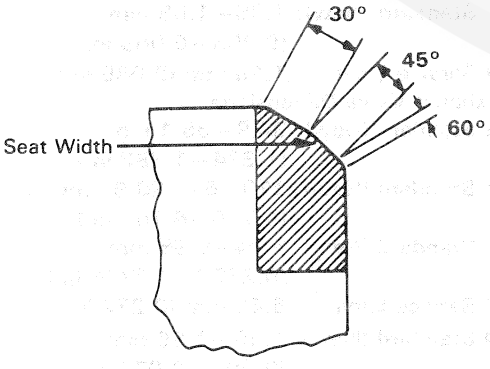


2. Carefully grind a 45° seat, removing only enough material to ensure a smooth and concentric seat.

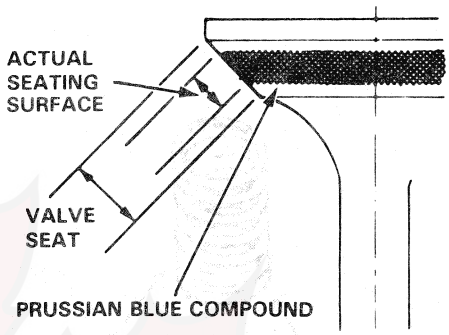
3. Bevel the upper edge of seat with the 30° stone and the lower edge of seat with the 60° stone. Check width of seat and adjust accordingly.

4. Make one more very light pass with the 45° stone to remove any possible burrs caused by the other stones.

   Valve Seat Width:
   Standard: 1.25–1.55 mm (0.049–0.061 in.)
   Service Limit: 2.0 mm (0.08 in.)



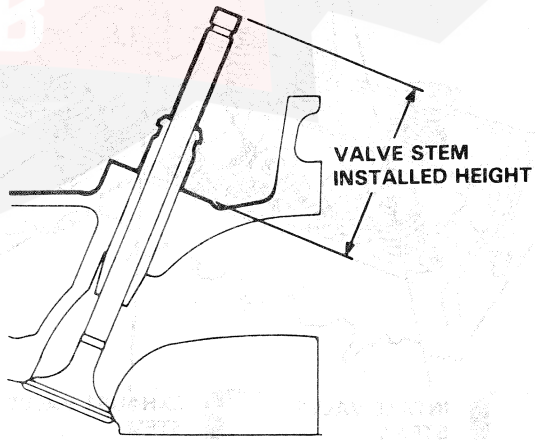
5. After resurfacing seat, inspect for even valve seating: Apply Prussian blue compound to valve face, and insert valve in original location in head, then lift it and snap it closed against seat several times.



6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
   - If it is too high (closer to the valve stem), you must make a second cut with the 60° stone to move it down, then one more cut with the 45° cutter to restore seat width.
   - If it is too low (closer to valve edge), you must make a second cut with the 30° stone to move it up, then one more cut with the 45° stone to restore seat width.

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

7. Insert intake and exhaust valves in head and measure valve stem installed height.
   Intake Valve Stem Installed Height:
   Standard (New): 48.59 mm (1.913 in.)
   Service Limit: 49.34 mm (1.943 in.)
   Exhaust Valve Stem Installed Height:
   Standard (New): 47.66 mm (1.876 in.)
   Service Limit: 48.41 mm (1.906 in.)



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

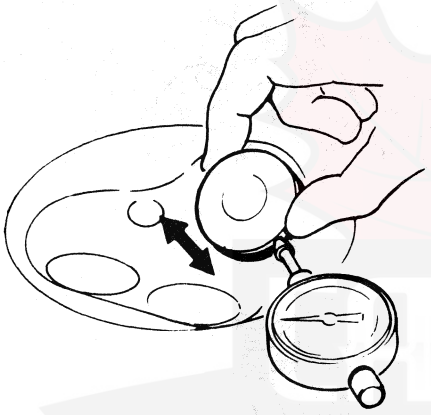
Valve Guide-to-Valve Stem Clearance

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

Intake Valve Stem-to-Guide Clearance

Standard (New): 0.04–0.10 mm (0.0016–0.004 in.)
Service Limit: 0.16 mm (0.006 in.)
Exhaust Valve Stem-to-Guide Clearance
Standard (New): 0.12–0.18 mm (0.005–0.007 in.)
Service Limit: 0.24 mm (0.009 in.)

Valve extended 10 mm out from seat.



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

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

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

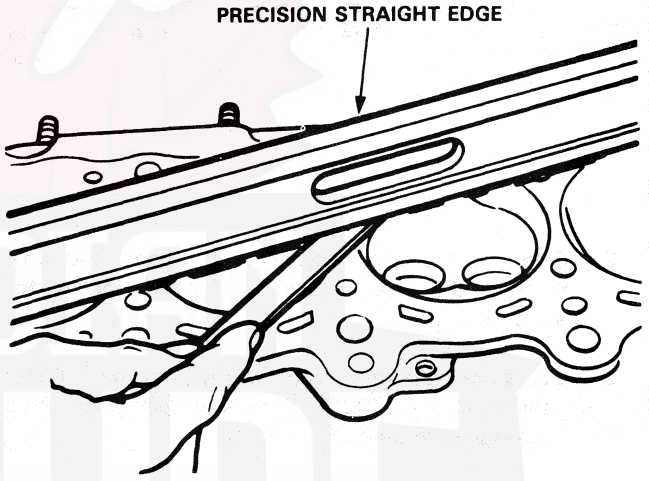
Intake Valve Stem-to-Guide Clearance
Standard (New): 0.02–0.05 mm (0.001–0.002 in.)
Service Limit: 0.08 mm (0.003 in.)
Exhaust Valve Stem-to-Guide Clearance
Standard (New): 0.06–0.09 mm (0.002–0.004 in.)
Service Limit: 0.12 mm (0.005 in.)

Warpage

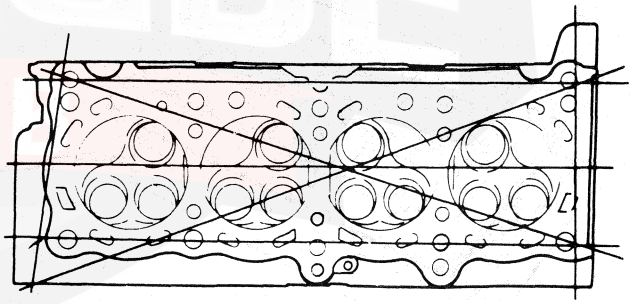
NOTE: If camshaft bearing clearances are not within specification, the head cannot be resurfaced (page 6-7).

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

- If warpage is less than 0.05 mm (0.002 in.) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in.) and 0.2 mm (0.008 in.), resurface cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in.) based on height of 90.0 mm (3.54 in.).



Measure along edges, and 3 ways across center.

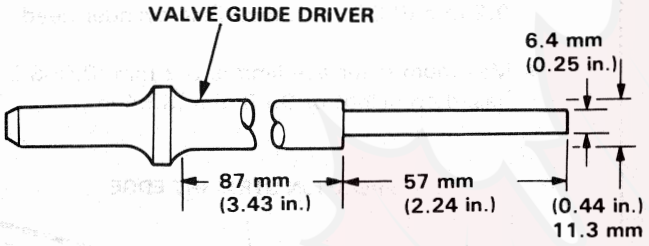


Cylinder Head Height:
New: 90.0 mm (3.54 in.)
Service Limit: 89.8 mm (3.54 in.)

Valve Guides

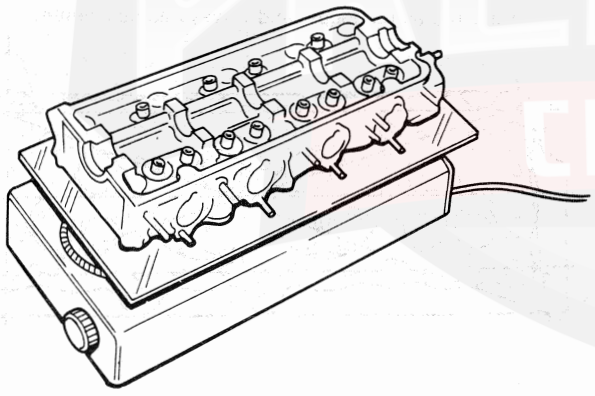
Replacement

1. As illustrated, the removal steps of this procedure use a commercially-available air-impact driver attachment which may need to be modified to fit the diameters of Honda guides.
   In most case, the same procedure can be done using Honda Valve Guide Drivers and a conventional hammer. See tool numbers at the end of this procedure.



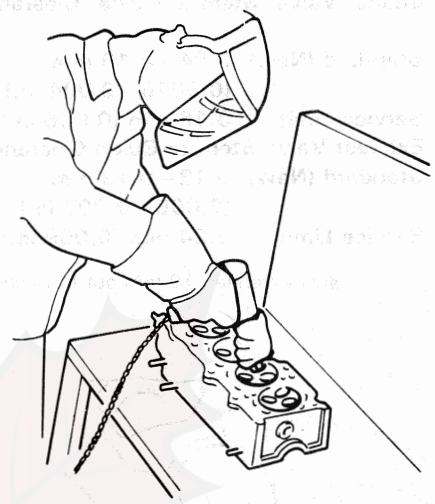
2. Select the proper replacement guides and chill them in the freezer section of a refrigerator for about an hour.

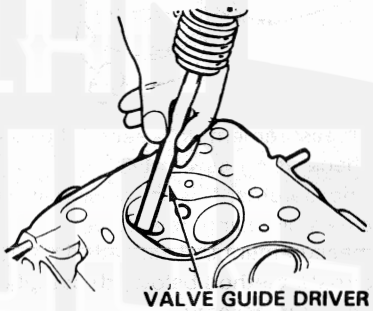
3. Use a hot plate or oven to evenly heat the cylinder head to 150°C (300°F). Check temperature with a cooking thermometer.



CAUTION:
- **Do not use a torch; it may warp the head.**
- **Do not get the head hotter than 150°C (300°F); excessive heat may loosen the valve seats.**
- **To avoid burns, use heavy gloves when handling the heated cylinder head.**

4. First, use the driver and an air hammer from the camshaft side to drive the guide about 2 mm towards the combustion chamber. This will knock off some of the carbon and make removal easier.





CAUTION:
- **Always wear safety goggles or a face shield when using the air hammer.**
- **Hold the air hammer directly in line with the valve guide to prevent damaging the driver.**

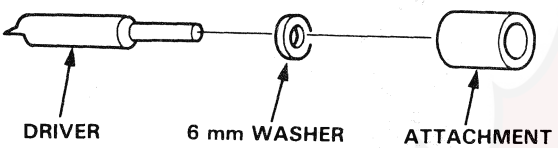
5. Turn the head over and drive out the guide toward the camshaft side of head.

   If a valve guide still won't move, drill it out with a 5/16 inch bit, then try again.

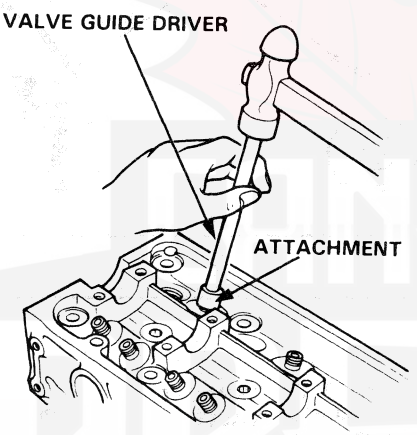
   CAUTION: Drill guides only in extreme cases; you could damage the cylinder head if the guide breaks.

6. Remove the new guide(s) from the refrigerator, one at a time, as you need them.

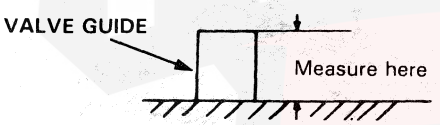
7. Slip a 6 mm steel washer and the correct driver attachment over the end of the driver (The washer will absorb some of the impact and extend the life of the driver).



8. Then install the new guide(s) from the camshaft side of the head; drive each one in until the attachment bottoms on the head If you have all twelve guides to do, you may have to reheat the head one or two times.



Installation
Intake: 15.5 mm (0.61 in.)
Exhaust: 15.5 mm (0.61 in.)



NOTE: Valve guide replacement can be performed with the special tools below.

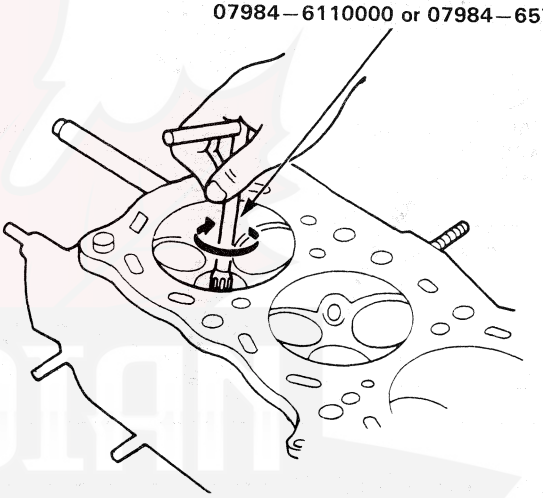
Removals
[Intake]
VALVE GUIDE REMOVER, 6.6 mm
07942—6570100 or 07942—6110000
[Exhaust]
VALVE GUIDE REMOVER, 7.0 mm
07942—SA50000 or 07942—8230000

Reaming

NOTE: For new valve guides only.

1. Coat reamer and valve guide with cutting oil.
2. Rotate reamer clockwise the full length of the valve guide bore.

[Exhaust]
VALVE GUIDE REAMER, 7.0 mm
07984—SA50000 or 07984—689010A
[Intake]
VALVE GUIDE REAMER, 6.6 mm
07984—6110000 or 07984—657010A



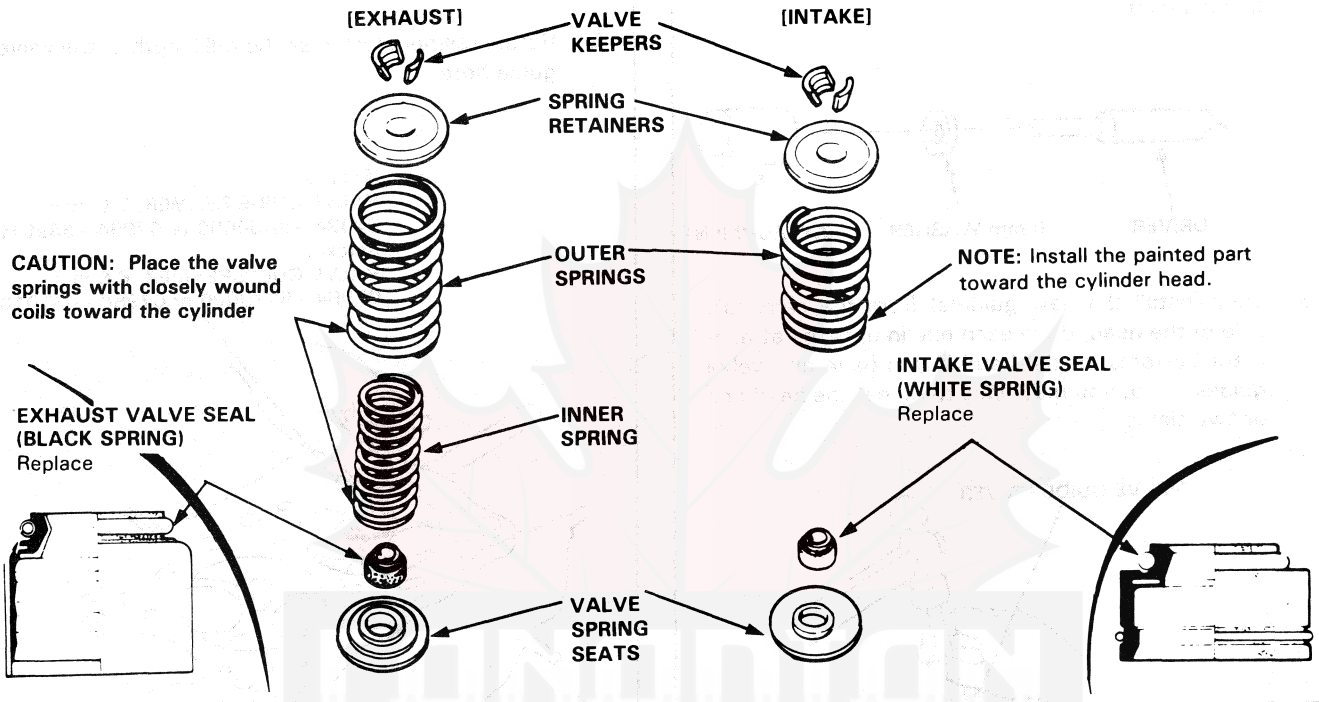
Turn reamer in clockwise direction only

3. Continue to rotate reamer clockwise while removing.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check clearance with valve (page 6-13).

Valve Springs, Valves

Valve Spring Installation Sequence

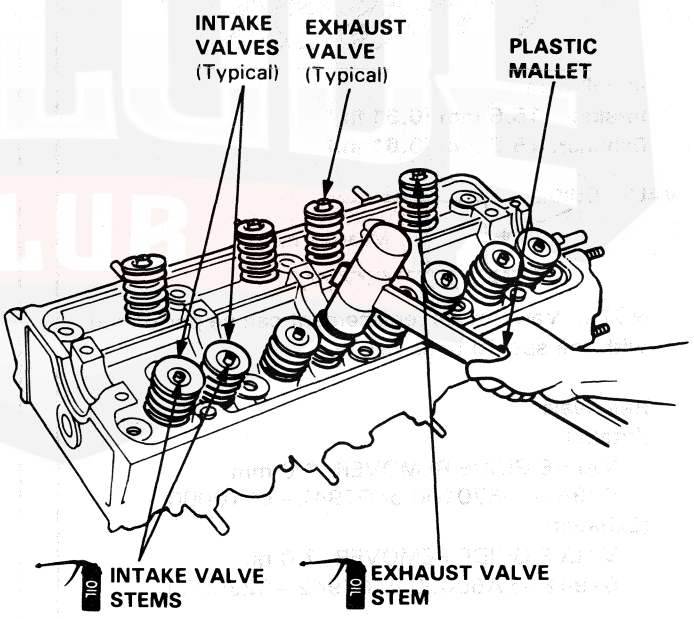
NOTE: Exhaust and intake valve seals are NOT interchangeable.



Valve Installation

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

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



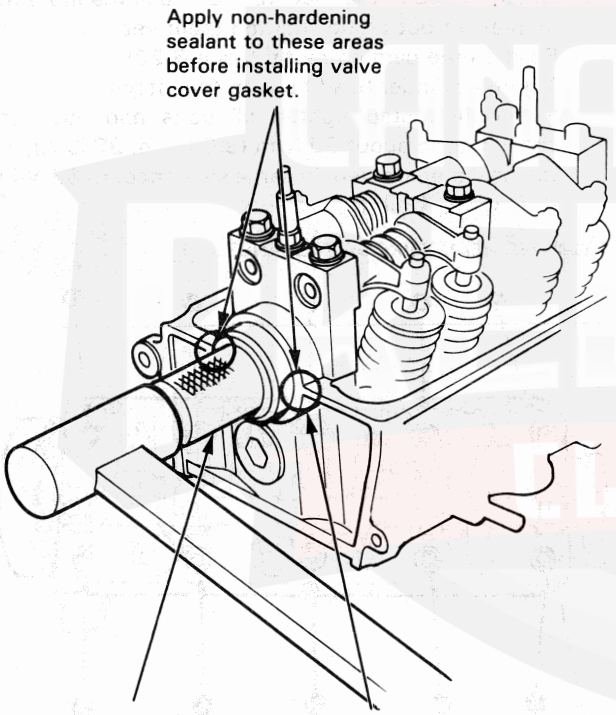
Installation

CAUTION:
- **Make sure that all rockers are in alignment with valves when torquing rocker assembly bolts.**
- **Valve locknuts should be loosened and adjusting screws backed off before installation.**

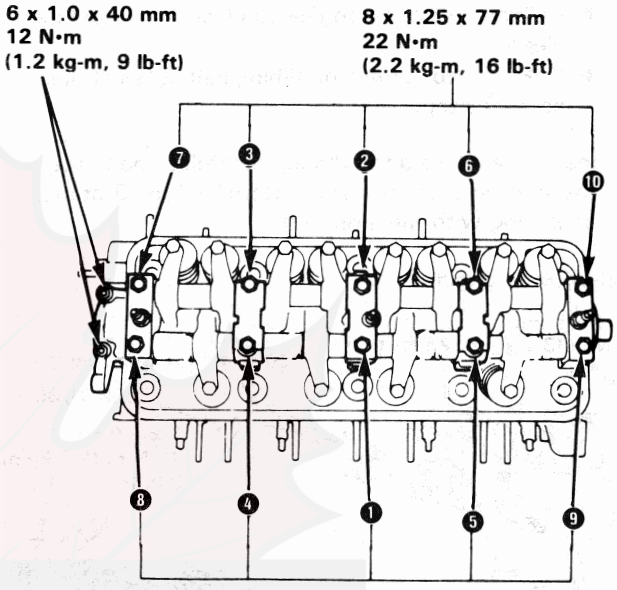
1. After wiping down cam and journals in cylinder head, lubricate both surfaces and install camshaft.
2. Turn camshaft until its keyway is facing up. (No. 1 cylinder TDC).
3. Install the camshaft seal with the open side (spring) facing in.

OIL Lubricate cam lobes after reassembly.

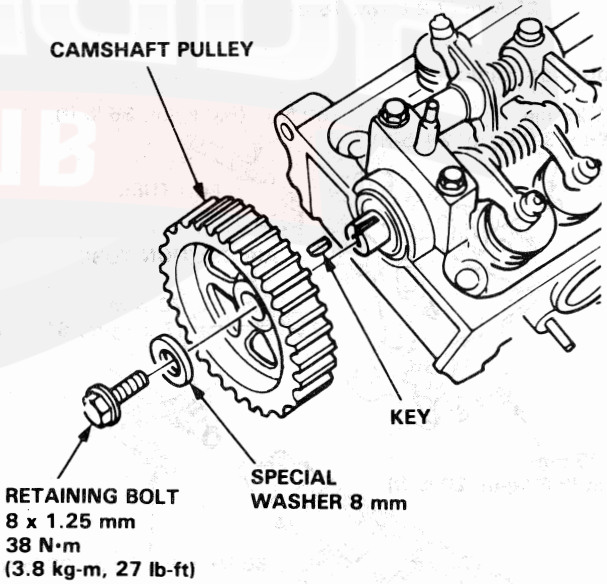
4. Set rocker arm assembly in place and loosely install the bolts.
5. Drive in the camshaft oil seal securely with the special tool.



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



7. Install key into groove in camshaft.
8. Push camshaft pulley onto camshaft, then tighten retaining bolt to torque shown.

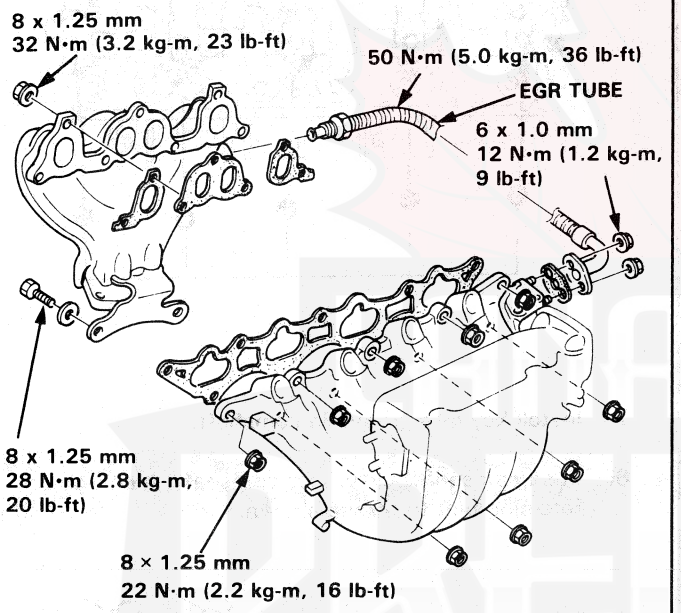


Cylinder Head

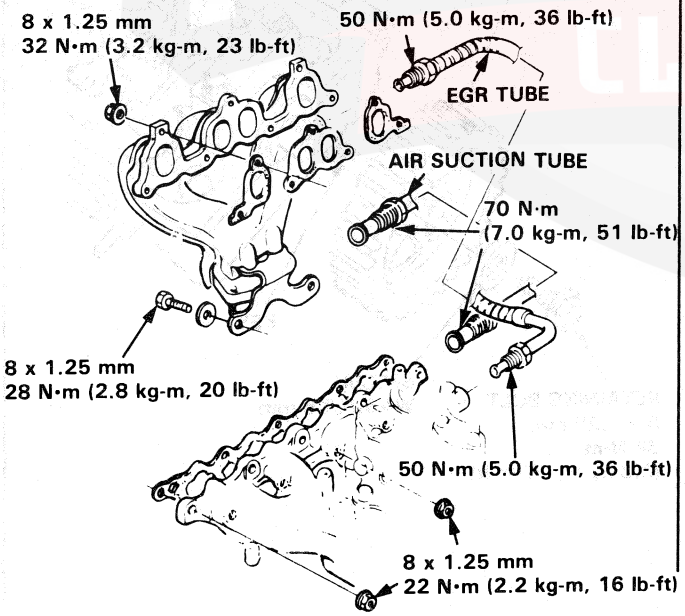
Installation

1. Install the cylinder head in reverse order of removal:
   - Always use a new head gasket.
   - Cylinder head and engine block surface must be clean.
   - "UP" or round mark on timing belt pulley should be at the top.
2. Install the intake and exhaust manifolds and tighten the nuts in a criss-cross pattern in 2 or 3 steps, beginning with the inner nuts.

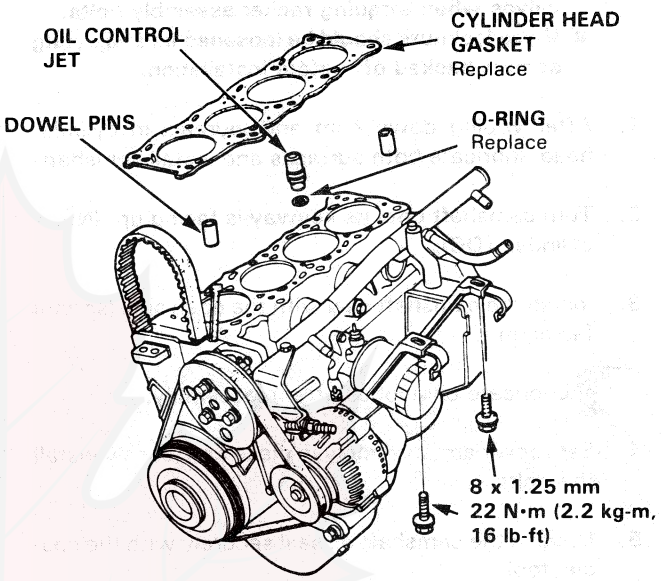
Fuel-Injected Engine:



Carbureted Engine:

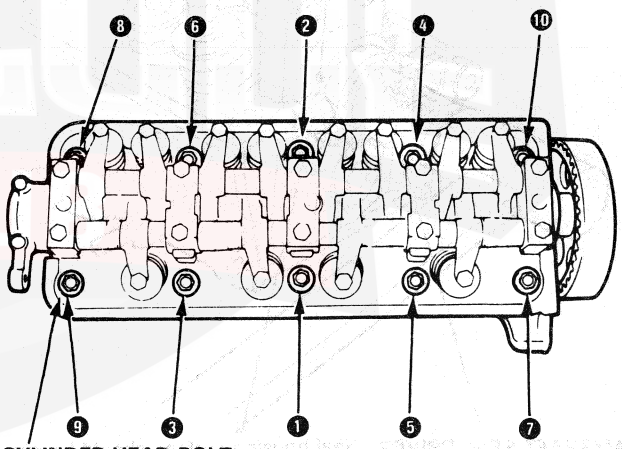


3. Cylinder head dowel pins and oil control jet must be aligned.



4. Install the bolts that secure the intake manifold to its bracket but do not tighten them yet.
5. Position the cam correctly (page 6-20).
6. Tighten cylinder head bolts in two steps.
   In the first step tighten all bolts and nuts, in sequence, to about 30 N·m (3.0 kg-m, 22 lb-ft); in the final step tighten, in same sequence, to 68 N·m (6.8 kg-m, 49 lb-ft).

CYLINDER HEAD TORQUE SEQUENCE



7. Install the header pipe on the exhaust manifold. Tighten the bolts for the intake manifold bracket.
8. Install the header pipe on its bracket.
9. After the installation, check that the tubes, hoses and connectors are installed correctly.
10. Adjust the valve timing (page 6-20).

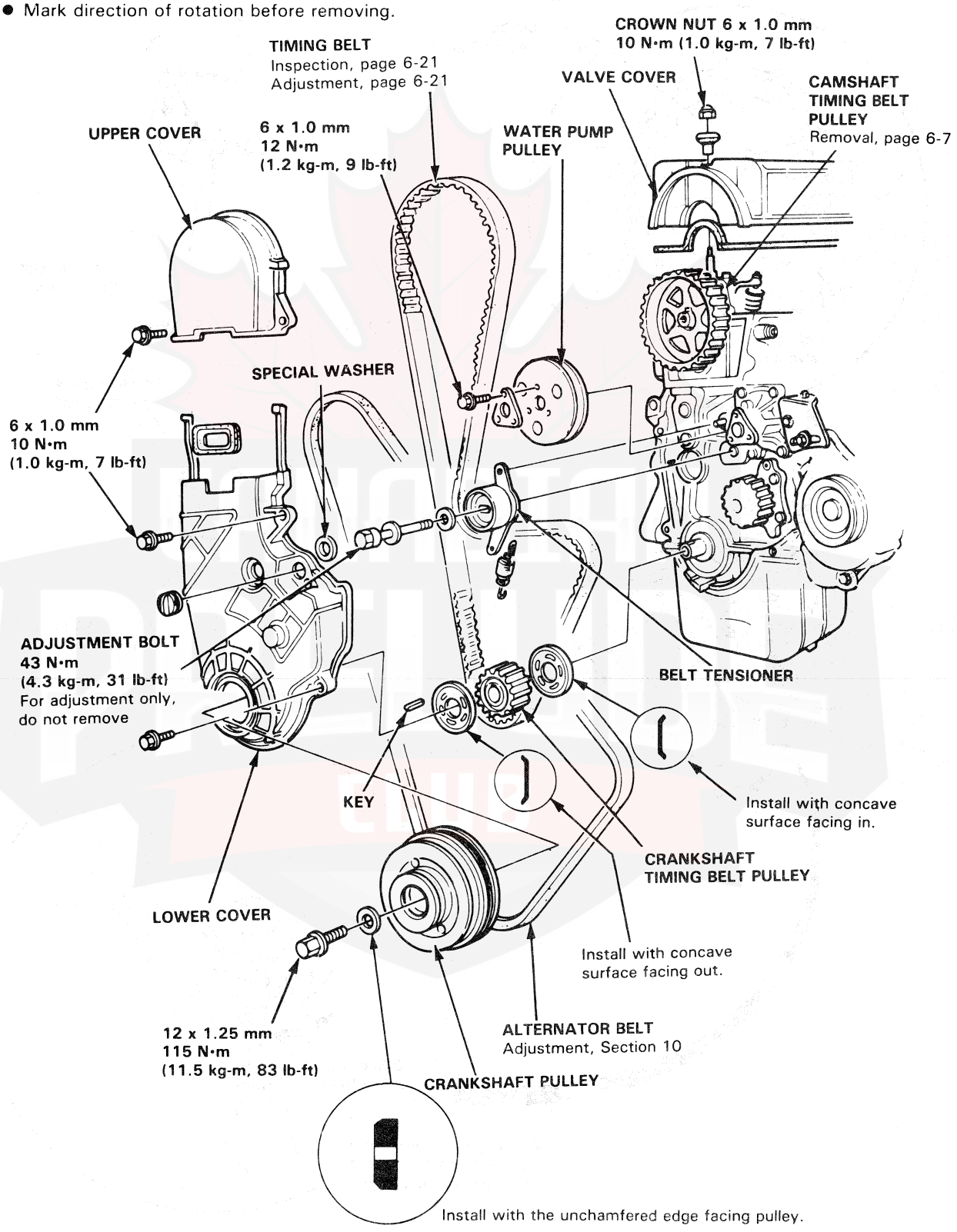
Timing Belt

Replacement

(Fuel-Injected Engine Shown; Carbureted Engine Similar)

NOTE:

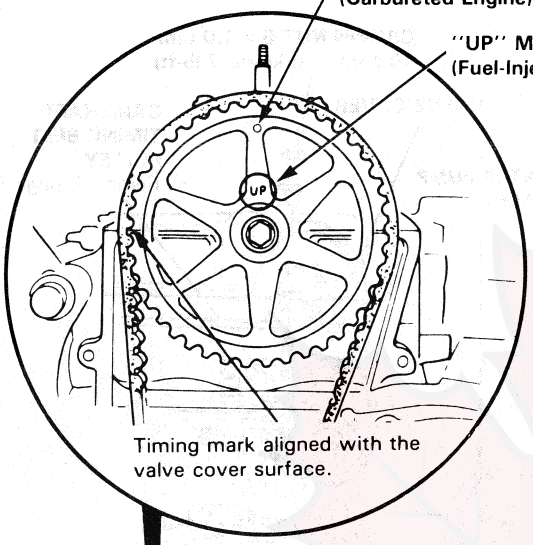
- Refer to next page for positioning crank and pulley before installing belt.
- Refer to cooling system, page 10-8, for alternator belt adjustment.
- Mark direction of rotation before removing.



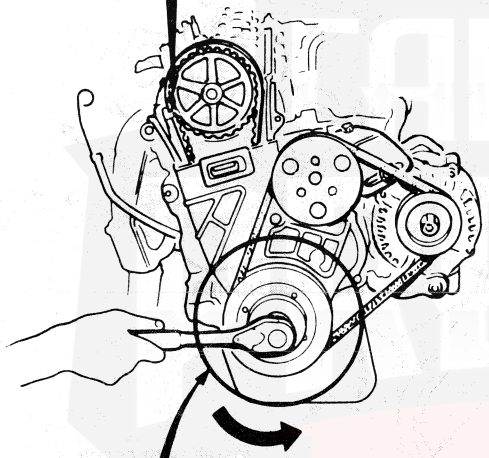
Timing Belt

Positioning Crankshaft Before Installing Timing Belt

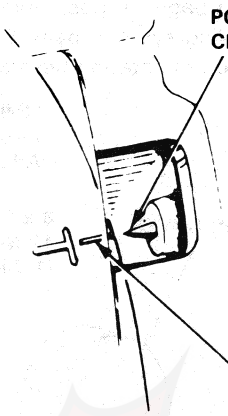
NOTE: Install the timing belt with the No. 1 piston at TDC (Top Dead Center) of the compression stroke.



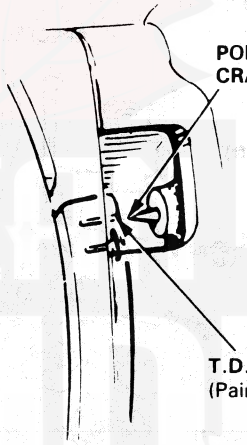
Timing mark aligned with the valve cover surface.

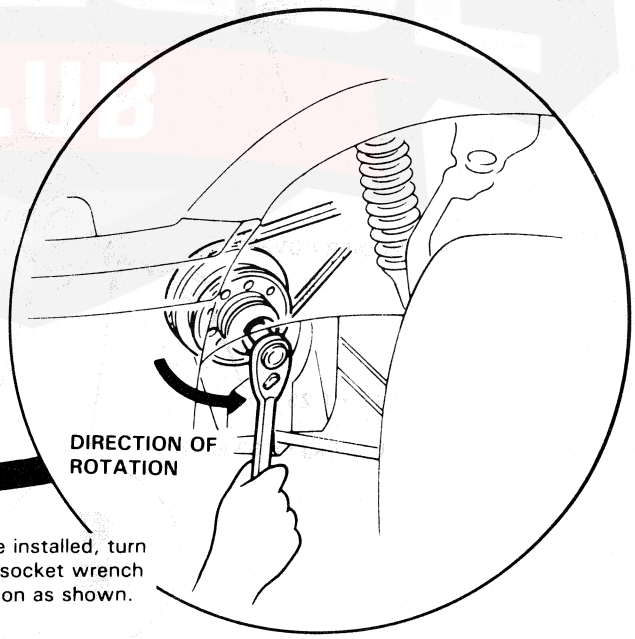


MANUAL TRANSMISSION:



AUTOMATIC TRANSMISSION:

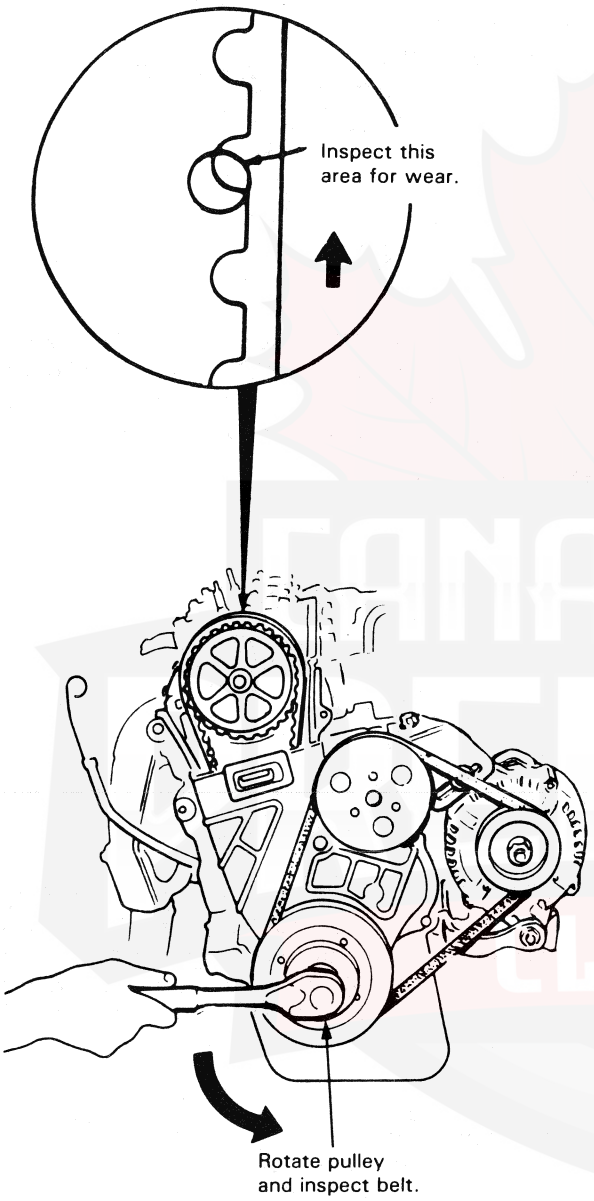




With engine installed, turn crank with socket wrench and extension as shown.

Inspection

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

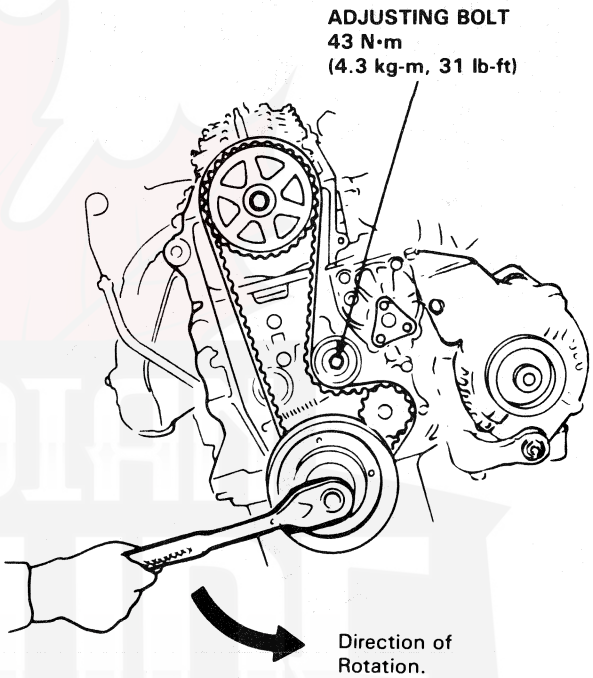


Tension Adjustment

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

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

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



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

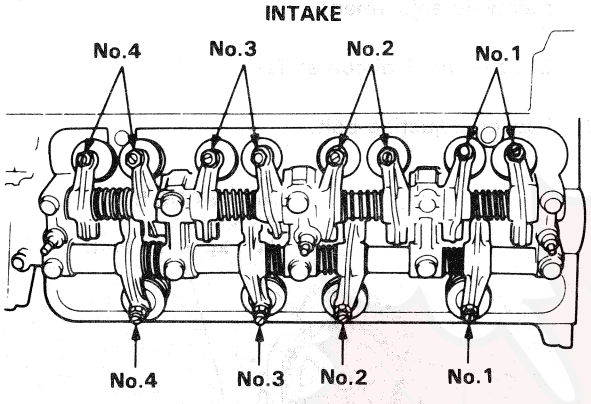
   NOTE: Put transmission in gear and set parking brake before retorquing pulley bolt.

Valve Clearance

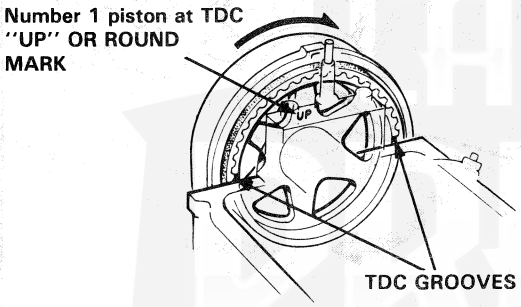
Adjustment

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

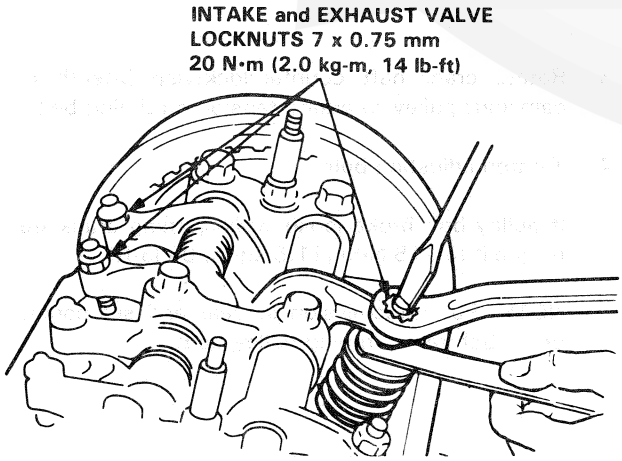
1. Remove valve cover.



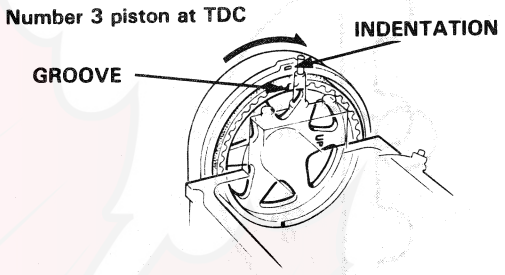
2. Set No. 1 piston at TDC. ''UP'' or round mark on pulley should be at top, and TDC grooves on back side of pulley should align with cylinder head surface. The distributor rotor must be pointing towards No. 1 plug wire.



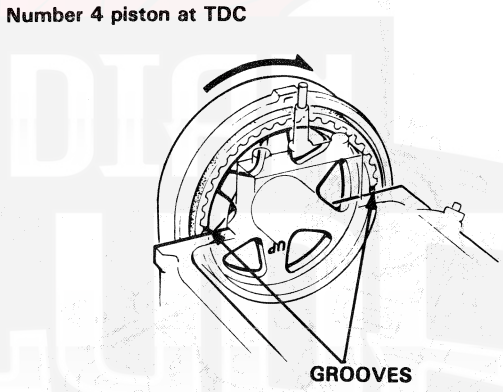
3. Adjust valves on No.1 cylinder.
   Intake: 0.12—0.17 mm (0.005—0.007 in.)
   Exhaust: 0.25—0.30 mm (0.010—0.012 in.)
4. Loosen locknut and turn adjustment screw until feeler gauge slides back and forth with slight amount of drag.



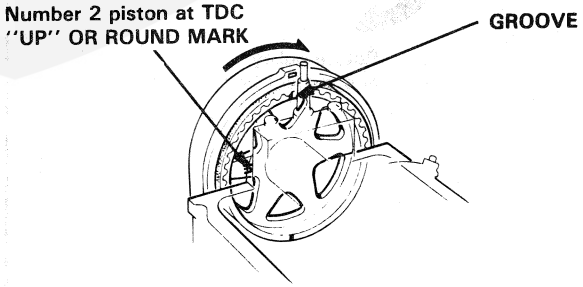
5. Tighten locknut and check clearance again. Repeat adjustment if necessary.
6. Rotate crankshaft 180° counterclockwise (cam pulley turns 90°). TDC groove should be aligned with the indentation in the belt cover. ''UP'' or round mark should not be visible. Distributor rotor should point to No. 3 plug wire. Adjust valves on No. 3 cylinder.



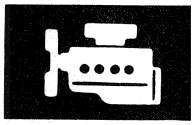
7. Rotate crankshaft 180° counterclockwise to bring No. 4 piston to TDC. Both TDC grooves are once again visible and distributor rotor points to No.4 plug wire. Adjust valves on No.4 cylinder.



8. Rotate crankshaft 180° counterclockwise to bring No. 2 piston to TDC. Mark on pulley should align with indentation on the belt cover. ''UP'' or round mark should be visible. Distributor rotor should point to No. 2 plug wire. Adjust valves on No. 2 cylinder.



Engine Block



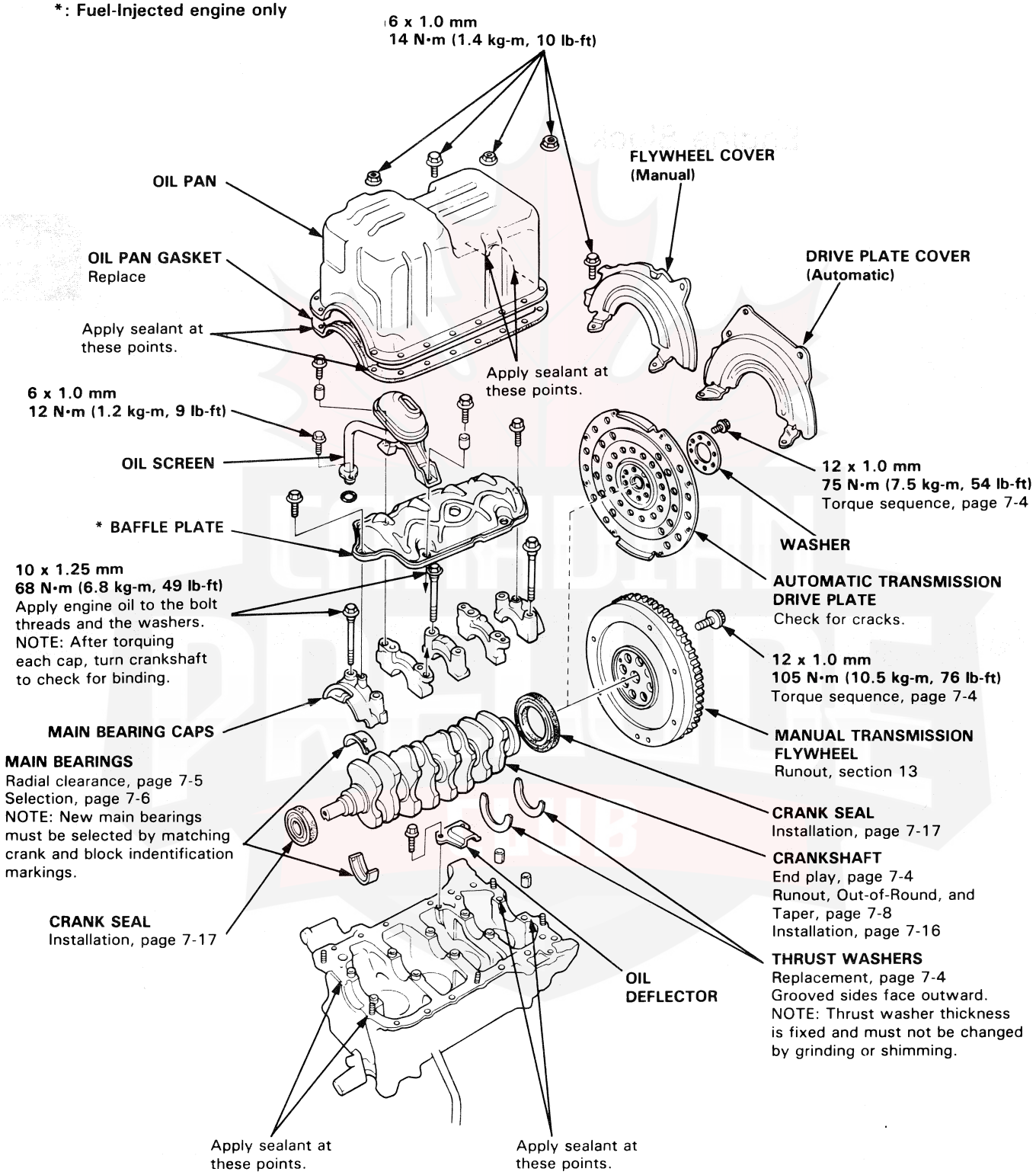
Engine Block

Illustrated Index

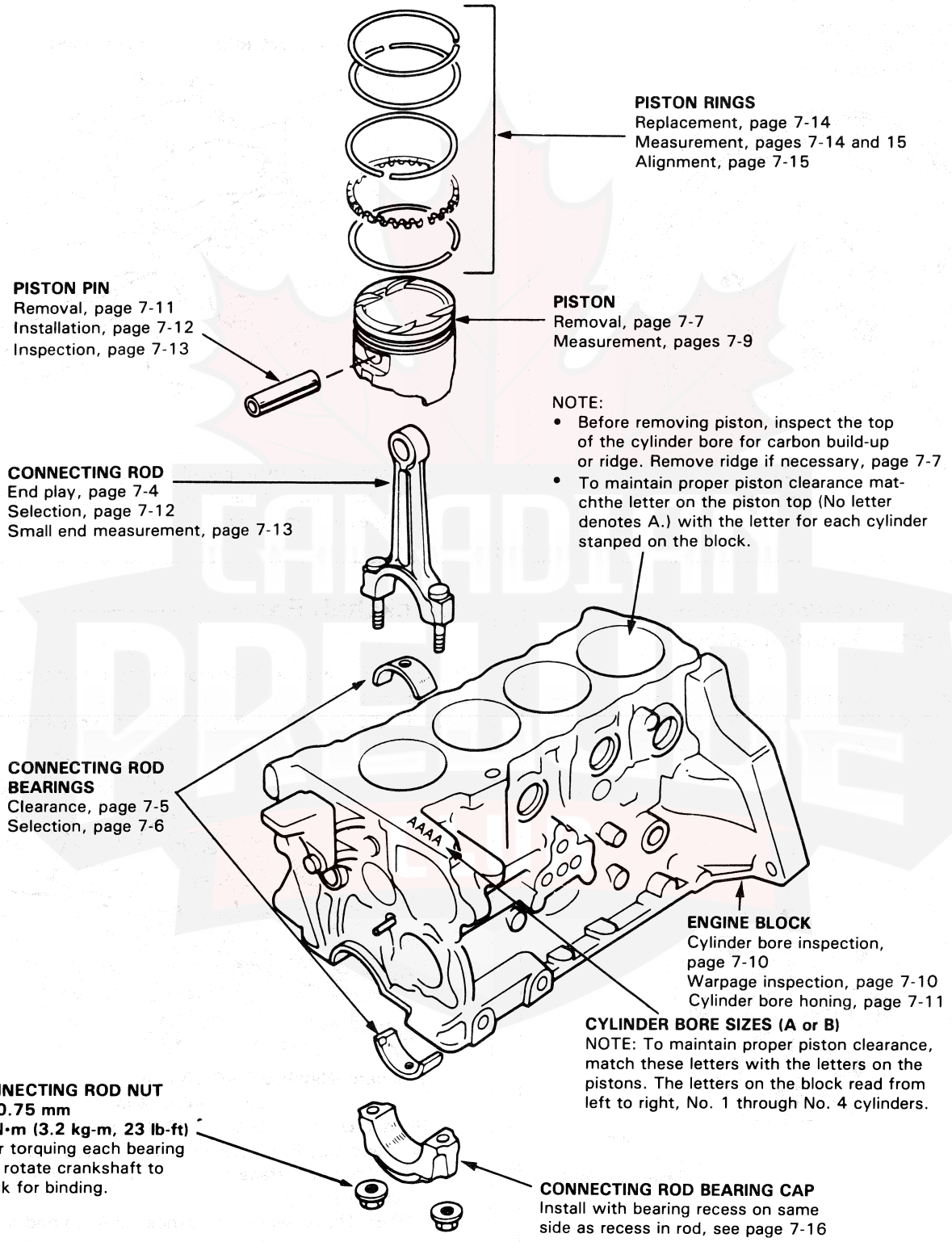
Fuel-Injected Engine Shown; Carbureted Engine Similar:

Lubricate all internal parts with engine oil during reassembly.

*: Fuel-Injected engine only



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



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

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

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

NOTE:
- Before removing piston, inspect the top of the cylinder bore for carbon build-up or ridge. Remove ridge if necessary, page 7-7
- To maintain proper piston clearance matchthe letter on the piston top (No letter denotes A.) with the letter for each cylinder stanped on the block.

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

CONNECTING ROD BEARINGS
Clearance, page 7-5
Selection, page 7-6

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

CYLINDER BORE SIZES (A or B)
NOTE: To maintain proper piston clearance, match these letters with the letters on the pistons. The letters on the block read from left to right, No. 1 through No. 4 cylinders.

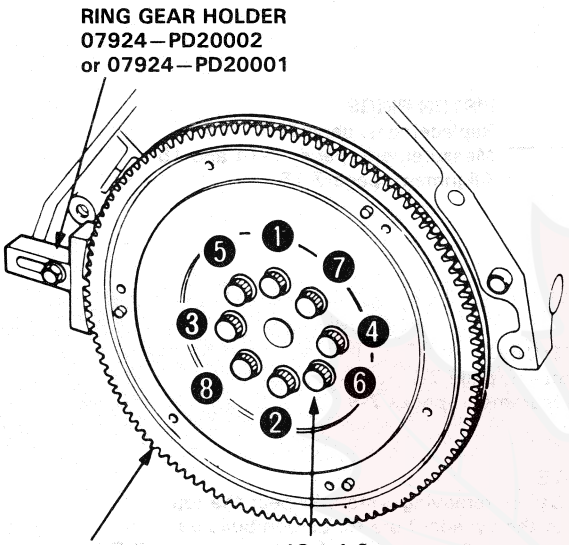
CONNECTING ROD NUT
8 x 0.75 mm
32 N·m (3.2 kg-m, 23 lb-ft)
After torquing each bearing cap, rotate crankshaft to check for binding.

CONNECTING ROD BEARING CAP
Install with bearing recess on same side as recess in rod, see page 7-16

Engine Block

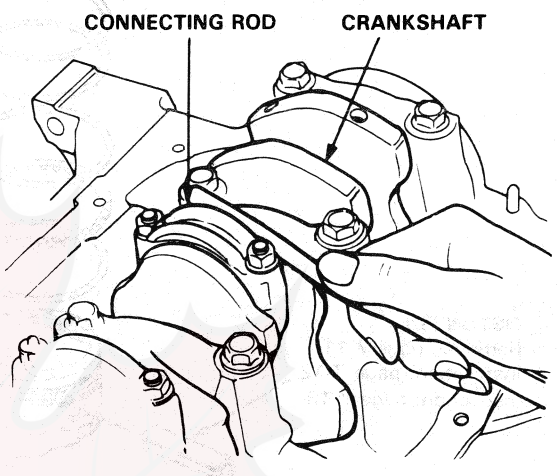
Flywheel Replacement (Manual Transmission)

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



Connecting Rod End Play

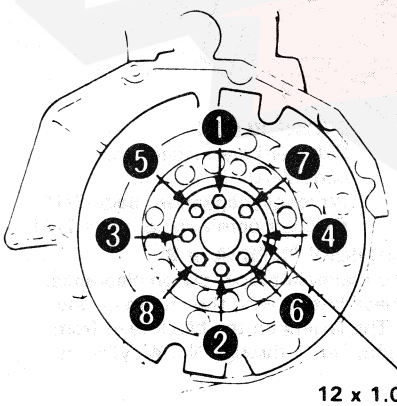
Standard (New): 0.15—0.30 mm (0.006—0.012 in.)
Service Limit: 0.40 mm (0.016 in.)



- If out-of tolerance, install new connecting rod.
- If still out-of-tolerance, replace crankshaft (pages 7-7 and 7-16).

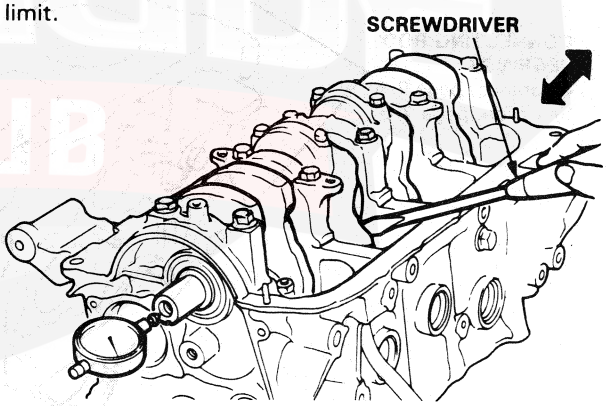
Drive Plate Replacement (Automatic Transmission)

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



Crankshaft End Play

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



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

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

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

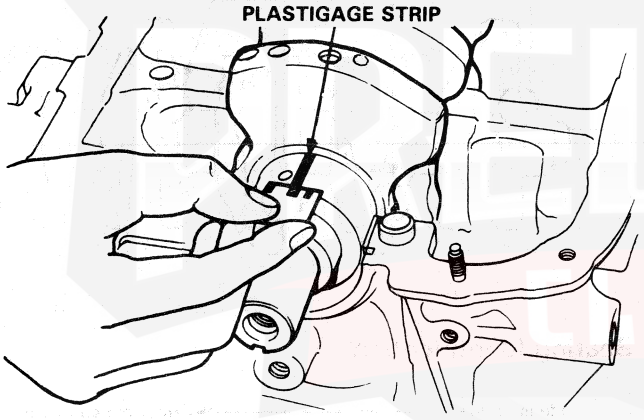
Main Bearings

Clearance

1. To check main bearing clearance, remove the main caps and bearing halves.
2. Clean each main journal and bearing half with a clean shop rag.
3. Place one strip of plastigage across each main journal.
   NOTE: If the engine is still in the car when you bolt the main cap down to check clearance, the weight of the crank and flywheel will flatten the plastigage further than just the torque on the cap bolts, and give you an incorrect reading. For an accurate reading, support the crank with a jack under the counterweights and check only one bearing at a time
4. Reinstall the bearings and caps, them torque the bolts to 68 N·m (6.8 kg-m, 49 lb-ft).
5. Remove the caps and bearings again, and measure the widest part of the plastigage.

Main Bearing Clearance:
Standard (New):

No. 1, 2, 4 and 5 Journals	**0.026—0.055 mm (0.0010—0.0020 in.)**
No. 3 journal	**0.032—0.061 mm (0.0013—0.0024 in.)**
Service Limit:	**0.07 mm (0.003 in.)**



6. If the plastigage measures too wide or too narrow, (remove the engine if it's still in the car), remove the crank, remove the upper half of the bearing, then install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance.
   CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check again.
   NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crank and start over.

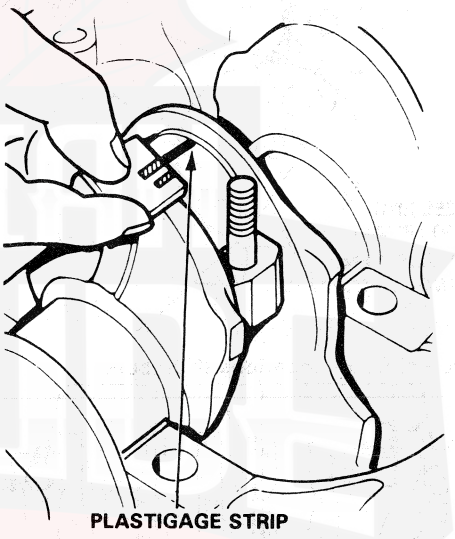
Rod Bearings

Clearance

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

   NOTE: Do not rotate the crank during inspection.
5. Remove the rod cap and bearing half and measure the widest part of the plastigage.

Connecting Rod Bearing Clearance:
Standard (New): 0.020—0.038 mm (0.0008—0.0015 in.)
Service Limit: 0.07 mm (0.003 in.)



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

   CAUTION: Do not file, shim, or scrape the bearing or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again.

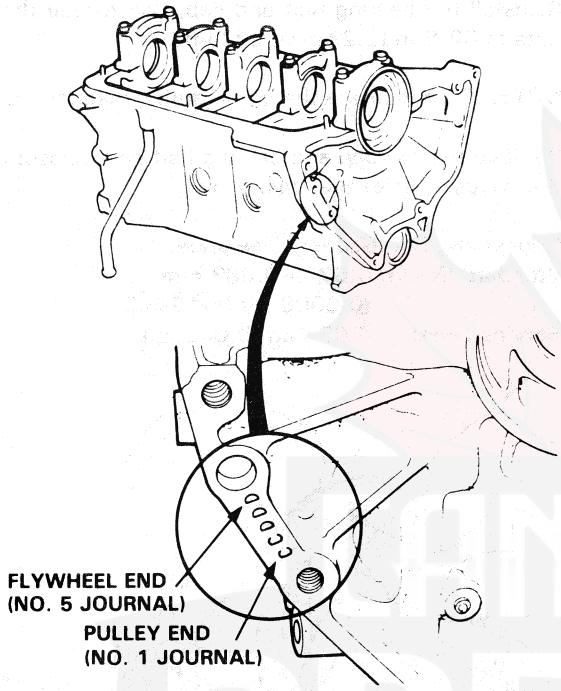
   NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crank and start over.

Main Bearings

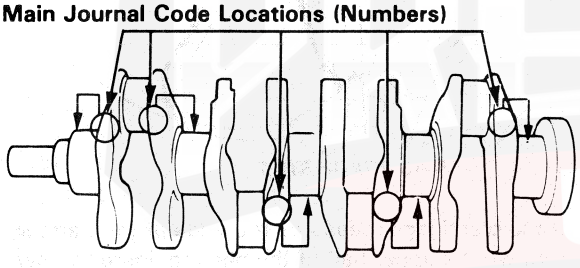
Selection

Crank Bore Code Location (Marks)

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



Main Journal Code Locations (Numbers)



Bearing Identification

Color code is on the edge of the bearing

→ Larger crank bore

A or I	B or II	C or III	D or IIII

→ Smaller bearing (thicker)

Red	Pink	Yellow	Green
Pink	Yellow	Green	Brown
Yellow	Green	Brown	Black
Green	Brown	Black	Blue

1 or I
2 or II
3 or III
4 or IIII

Smaller main journal

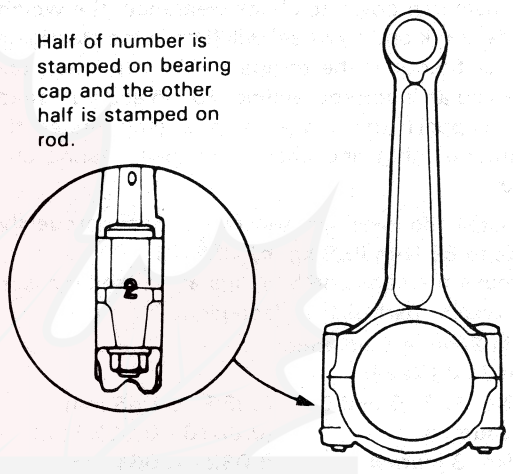
Smaller bearing (thicker)

Rod Bearings

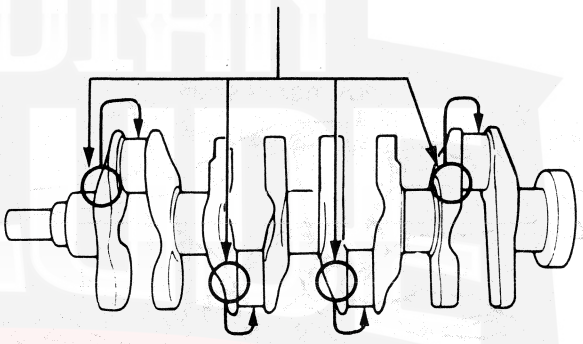
Selection

Rod Code Location (Numbers)

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



Rod Journal Code Locations (Letters)



Bearing Identification

Color code is on the edge of the bearing

→ Larger big end bore

1 or I	2 or II	3 or III	4 or IIII

→ Smaller bearing (thicker)

Red	Pink	Yellow	Green
Pink	Yellow	Green	Brown
Yellow	Green	Brown	Black
Green	Brown	Black	Blue

A or I
B or II
C or III
D or IIII

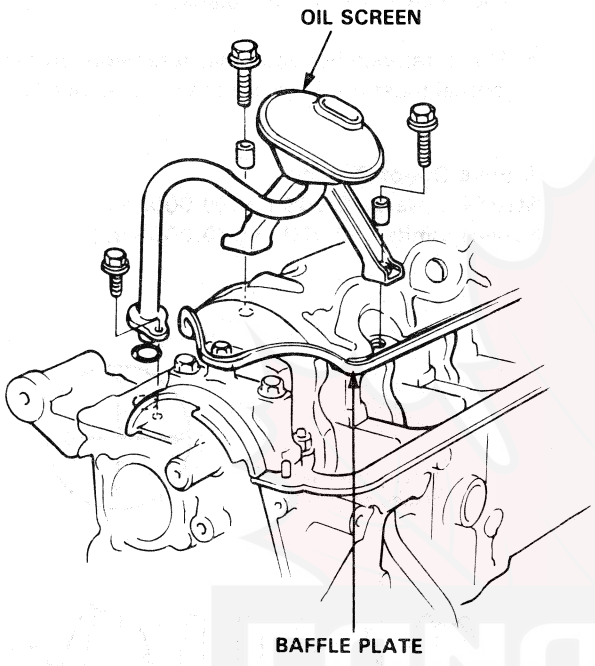
Smaller rod journal

Smaller bearing (thicker)

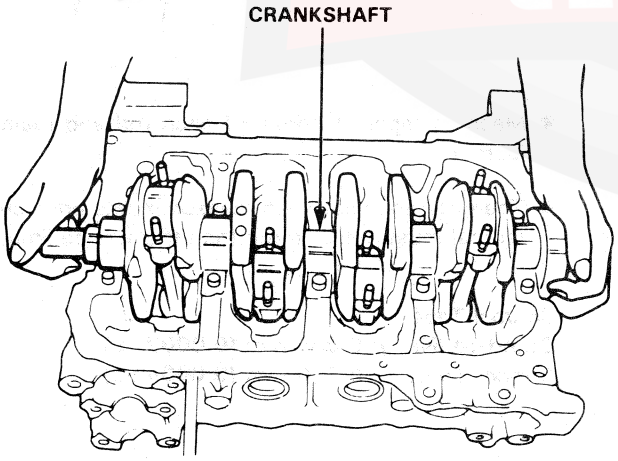
Crankshaft/Pistons

Removal

1. Remove the oil screen.

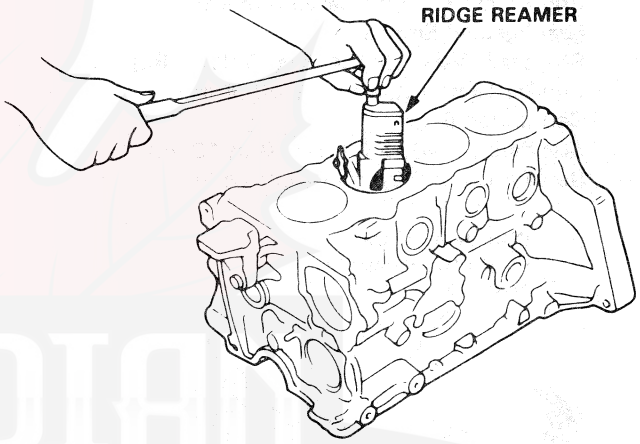


2. Remove the baffle plate (Fuel-Injected Engine Only).
3. Turn the crankshaft so No. 2 and 3 crankpins are at the bottom.
4. Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.
5. Lift the crankshaft out of engine, being careful not to damage journals.

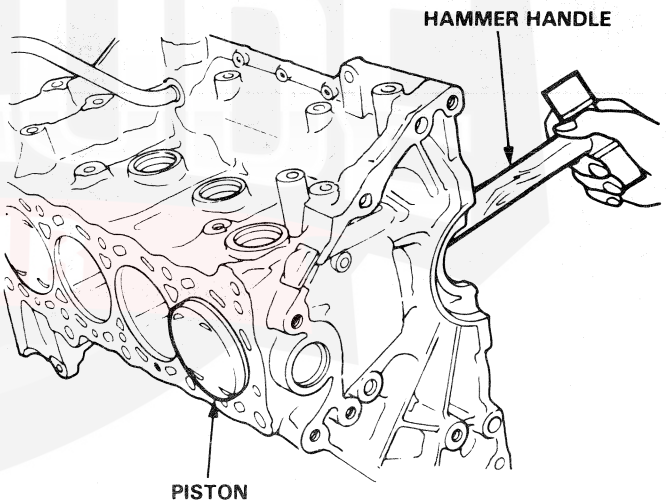


6. Remove upper bearing halves from connecting rods and set aside with their respective caps.
7. Reinstall main cap and bearings on engine in proper order.
8. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer. Follow reamer manufacturer's instructions.

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



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



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

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

Crankshaft

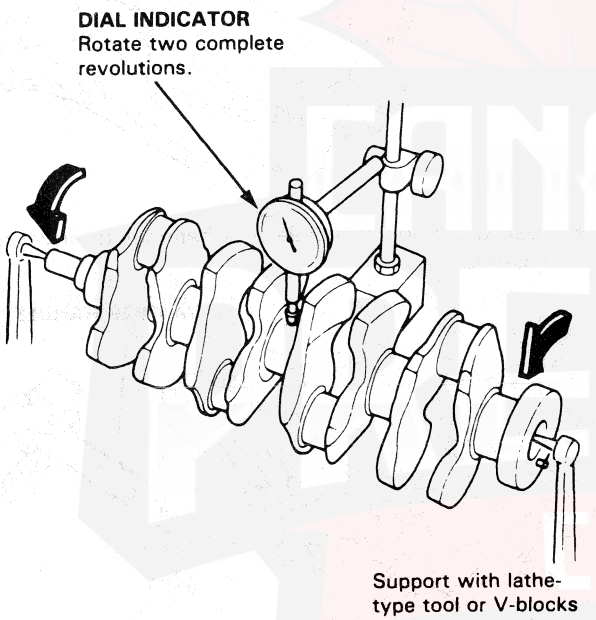
Inspection

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

Alignment

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

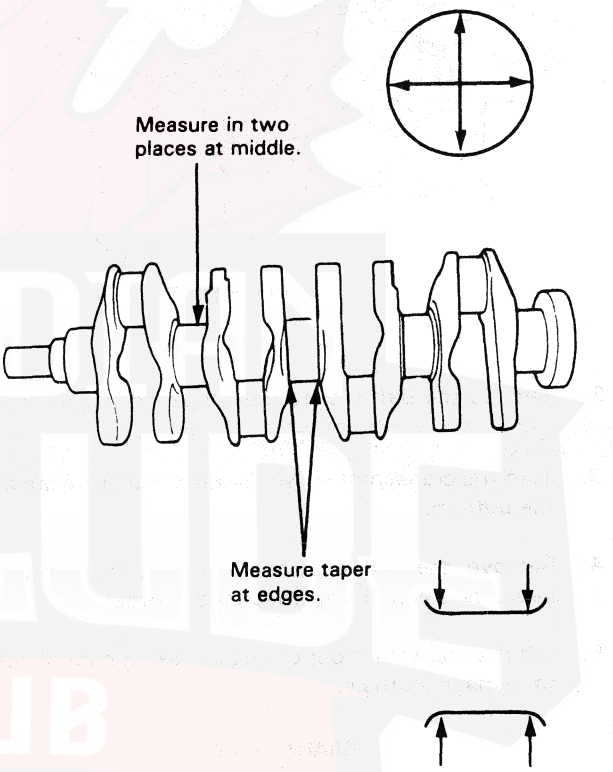
Crankshaft Total Indicated Runout:
Fuel-Injected Engine
Standard (New): 0.024 mm (0.0009 in.)
Service Limit: 0.04 mm (0.0016 in.)
Carbureted Engine
Standard (New): 0.03 mm (0.0012 in.)
Service Limit: 0.06 mm (0.0024 in.)



Out-of-Round and Taper

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

Journal Out-of-Round:
Standard (New): 0.005 mm (0.0002 in.)
Service Limit: 0.010 mm (0.0004 in.)



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

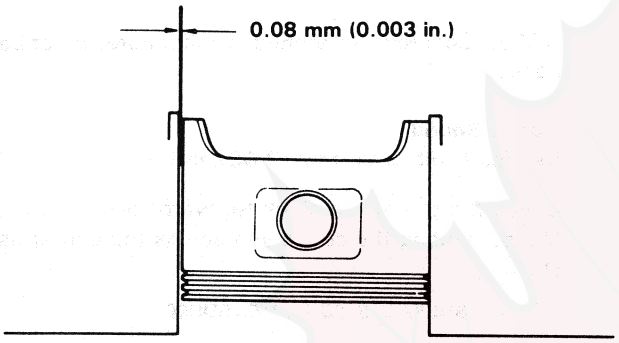
Journal Taper:
Standard (New): 0.005 mm (0.0002 in.)
Service Limit: 0.010 mm (0.0004 in.)

Cylinder Block

Piston-to-Block Clearance

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

   Service Limit: 0.08 mm (0.003 in.)



   If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive wear.
   To confirm the feeler gauge check, further measurement with a micrometer will be necessary.

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

   Piston-to-Cylinder Clearance:
   Standard (New): 0.02—0.04 mm (0.0008—0.0016 in.)
   Service Limit: 0.08 mm (0.003 in.)

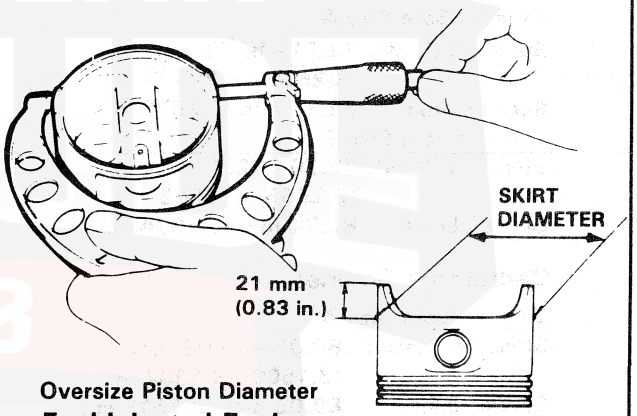
Pistons

Inspection

1. Check the piston for distortion or cracks.
   NOTE: If cylinder is bored, an oversized piston must be used.
2. Measure piston diameter at a point 21 mm (0.83 in.) from bottom of skirt.
   NOTE: There are two standard-size pistons (A and B). The letter (No letter denotes A) is stamped on the top of the piston. These letters are also stamped on the block as cylinder bore sizes.

   Fuel-Injected Engine:
   Piston A Diameter
   Standard (New): 82.68—82.69 mm (3.2551—3.2555 in.)
   Service Limit: 82.67 mm (3.2547 in.)
   Piston B Diameter
   Standard (New): 82.67—82.68 mm (3.2547—3.2551 in.)
   Service Limit: 82.66 mm (3.2543 in.)

   Carbureted Engine:
   Piston A Diameter
   Standard (New): 79.98—79.99 mm (3.1488—3.1492 in.)
   Service Limit: 79.97 mm (3.1484 in.)
   Piston B Diameter
   Standard (New): 79.97—79.98 mm (3.1484—3.1488 in.)
   Service Limit: 79.96 mm (3.1480 in.)



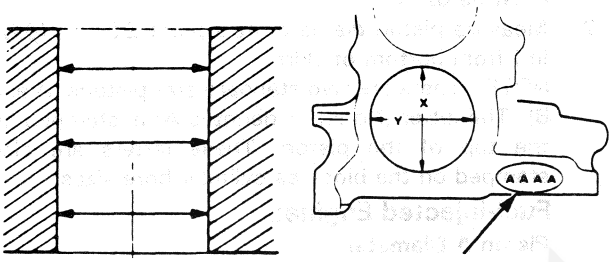
   Oversize Piston Diameter
   Fuel-Injected Engine:
   Standard 0.30 82.98—82.99 mm (3.2669—3.2673 in.)
   Carbureted Engine:
   Standard 0.25: 80.22—80.23 mm (3.1583—3.1587 in.)
   Standard 0.5: 80.47—80.48 mm (3.1681—3.1685 in.)
3. Check the piston pin-to-piston clearance. Coat the piston pin with engine oil.
   It should then be possible to push the piston pin into the piston hole with thumb pressure.

   Piston Pin-to-Piston Clearance:
   Service limit: 0.012—0.024 mm (0.0005—0.0009 in.)

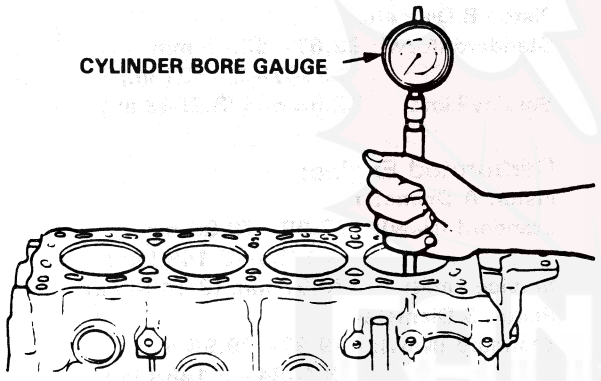
Cylinder Block

Inspection

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



CYLINDER BORE SIZES (A or B)
Read the letters from left-to-right for No. 1 through No. 4 cylinders.



Fuel-Injected Engine:

Cylinder Bore Size A
Standard (New): 82.71—82.72 mm (3.2562—3.2566 in.)
Service Limit: 82.75 mm (3.2578 in.)
Cylinder Bore Size B
Standard (New): 82.70—82.71 mm (3.2559—3.2562 in.)
Service Limit: 82.74 mm (3.2574 in.)

Carbureted Engine:

Cylinder Bore Size A
Standard (New): 80.01—80.02 mm (3.1500—3.1504 in.)
Service limit: 80.05 mm (3.1516 in.)
Cylinder Bore Size B
Standard (New): 80.00—80.01 mm (3.1496—3.1500 in.)
Service Limit: 80.04 mm (3.1512 in.)

Oversize

Fuel-Injected Engine:

Standard 0.30 (New): 83.01—83.02 mm (3.2681—3.2685 in.)

Carbureted Engine:

Standard 0.25 (New): 80.25—80.26 mm (3.1594—3.1598 in.)
Standard 0.5 (New): 80.50—80.51 mm (3.1693—3.1697 in.)

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

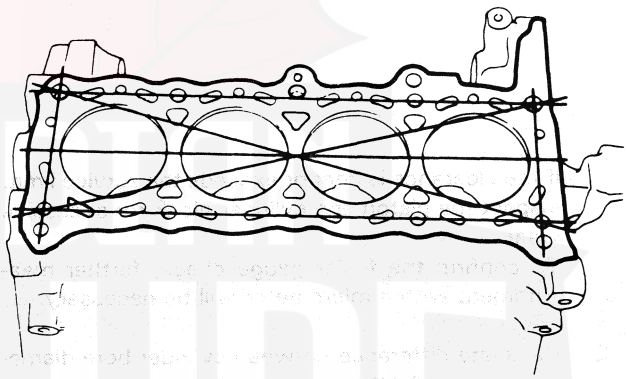
- If measurements in any cylinder are beyond Oversize Bore Service Limit, replace the block.
- If block is to be rebored, refer to Piston Clearance Inspection (page 7-9) after reboring.

NOTE: Scored or scratched cylinder bores must be honed.

Out-of-Round
Service Limit: 0.05 mm (0.002 in.)

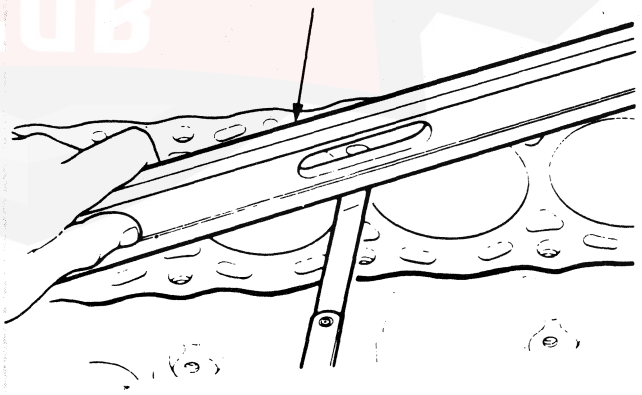
2. Check the top of the block for warpage. Measure along the edges and across the center as shown.

SURFACES TO BE MEASURED



Engine block Warpage:
Standard (New): 0.08 mm (0.003 in.)
Service Limit: 0.10 mm (0.004 in.)

PRECISION STRAIGHT EDGE

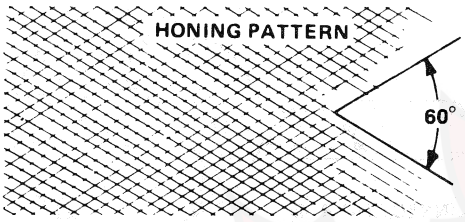


Piston Pins

Bore Honing

1. Measure cylinder bores as shown on page 7-10. If the block is to be re-used, hone the cylinders and remeasure the bores.

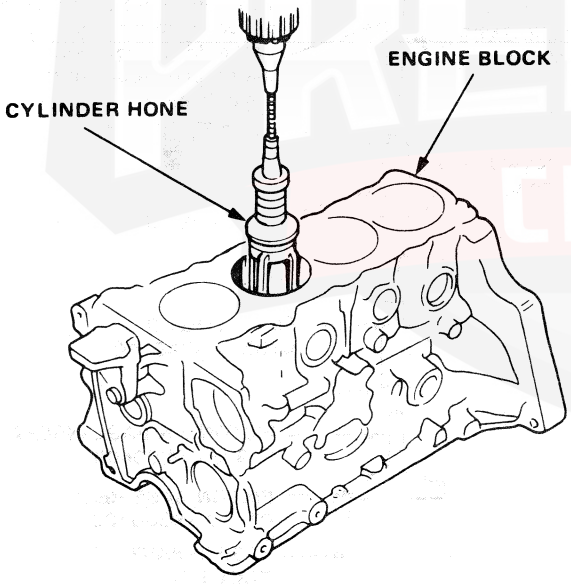
2. Hone cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch pattern.



3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.

4. If Scoring or scratches are still present in cylinder bores after honing to service limit, rebore the engine block.

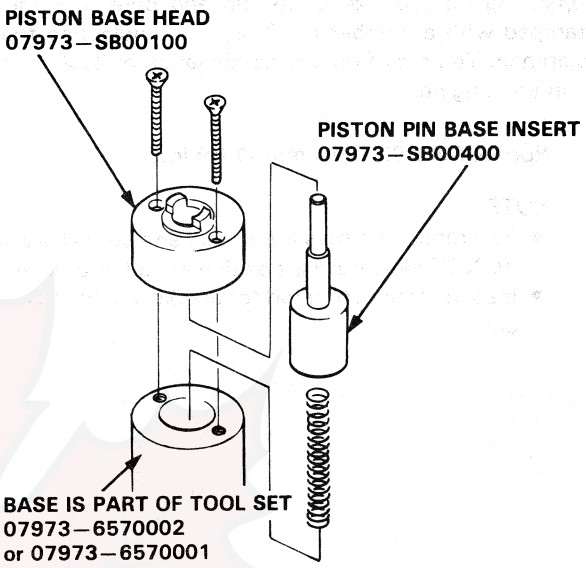
   NOTE: Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail and does not run the full length of the bore.



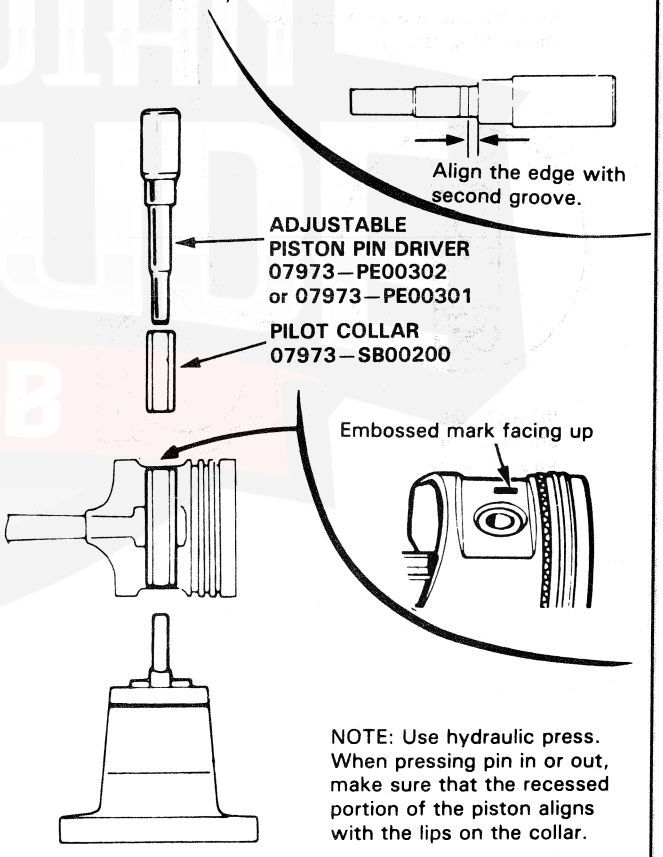
NOTE:
- After honing, clean the cylinder thoroughly with soapy water.
- Only scored or scratched cylinder bore must be honed.

Removal

1. Install the attachment on the piston base.



2. Turn the handle of the piston pin driver so that the end of the drive aligns with the second groove of the driver body as shown.



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

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

Connecting Rods

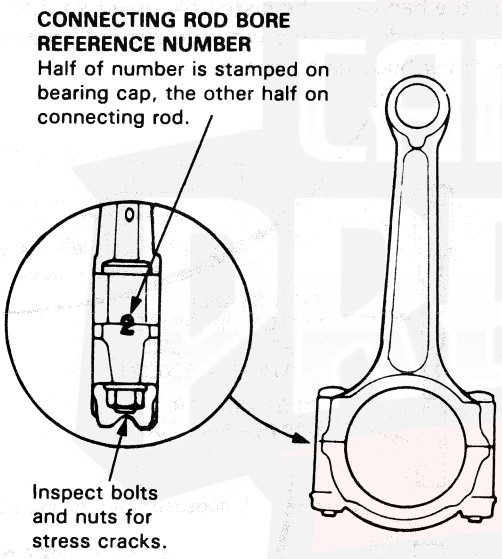
Selection

Each rod is sorted into one of four tolerance ranges (from+0.006 to 0.0024 mm, in 0.006 mm increments) depending on the size of its big end bore. It's then stamped with a number (1, 2, 3, or 4) indicating that tolerance. You may find any combination of 1, 2, 3, or 4, in any engine.

Normal Bore Size: 48 mm (1.89 in.)

NOTE:

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

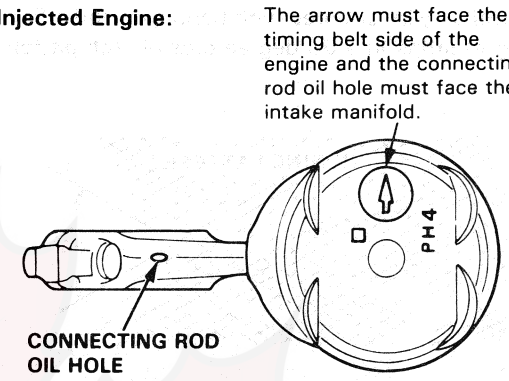


Piston Pins

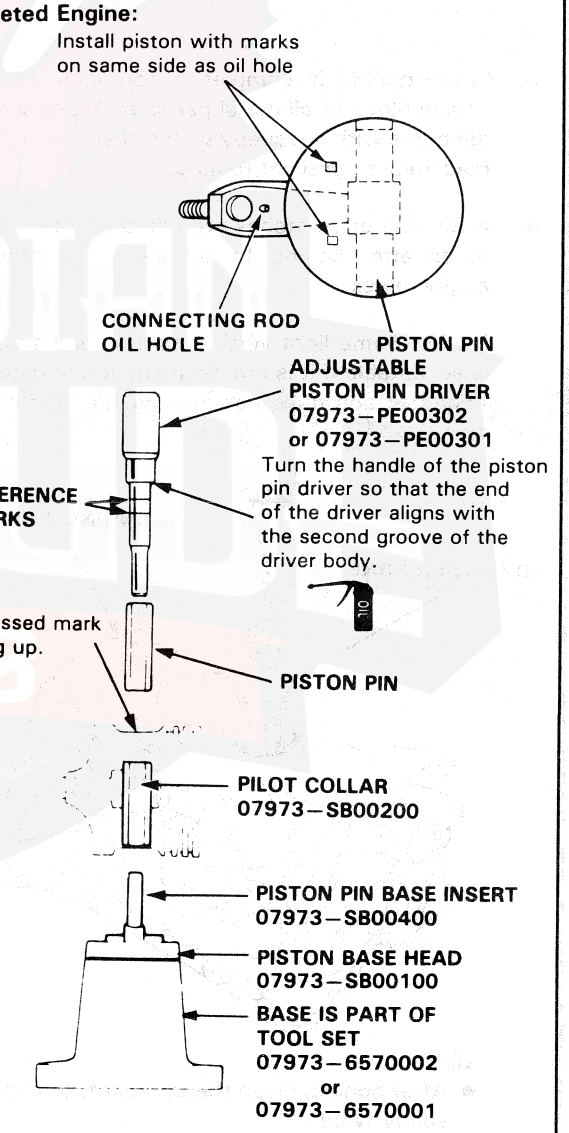
Installation

1. Use a hydraulic press for installation.
   - When pressing pin in or out, be sure you position the recessed flat on the piston against the lugs on the base attachment.

Fuel-Injected Engine:



Carbureted Engine:



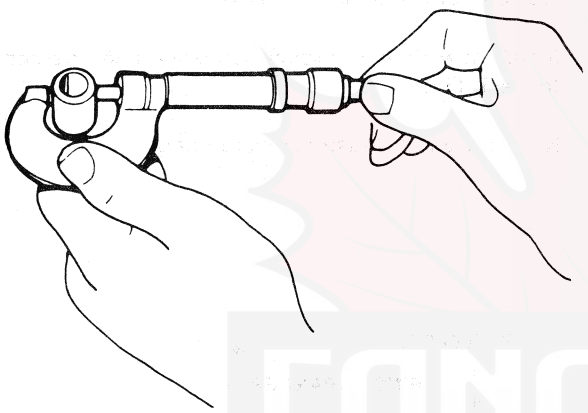
NOTE: Install the assembled piston and rod with the oil hole facing the intake manifold.

Inspection

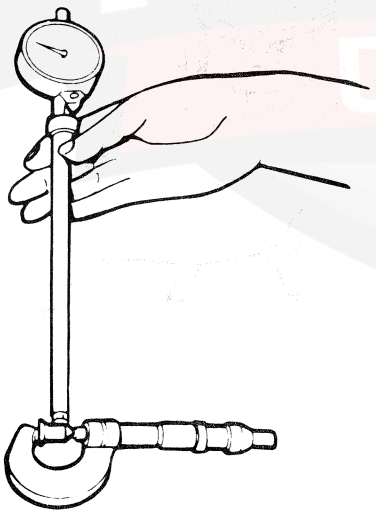
1. Measure the diameter of the piston pin.

Piston Pin Diameter:
Standard (New): 19.994—20.0 mm (0.7872—0.7874 in.)
Oversize: 19.997—20.003 mm (0.7873—0.7875 in.)

NOTE: All replacement piston pins are oversize.



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

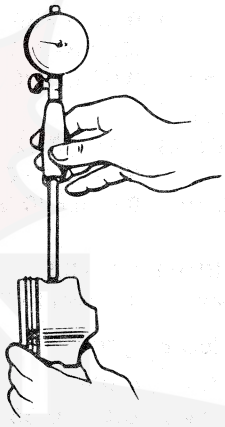


3. Measure the piston pin-to-piston clearance.

NOTE: Check the piston for distortion or cracks.

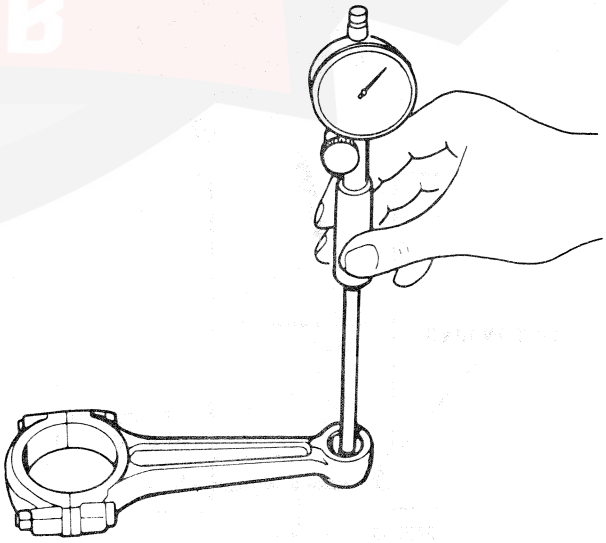
If the piston pin clearance is greater than 0.024 mm (0.0009 in.), re-measure using an oversize piston pin.

Piston Pin-to-Piston Clearance:
Service Limit: 0.012—0.024 mm (0.0005—0.0009 in.)



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

Piston Pin-to-Connecting Rod Interference:
Standard (New): 0.013—0.032 mm (0.0005—0.0013 in.)



Piston Rings

End Gap

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

Piston Ring End-Gap:

Fuel-Injected Engine:

Top Ring
Standard (New): 0.20—0.35 mm (0.008—0.014 in.)
Service Limit: 0.60 mm (0.02 in.)

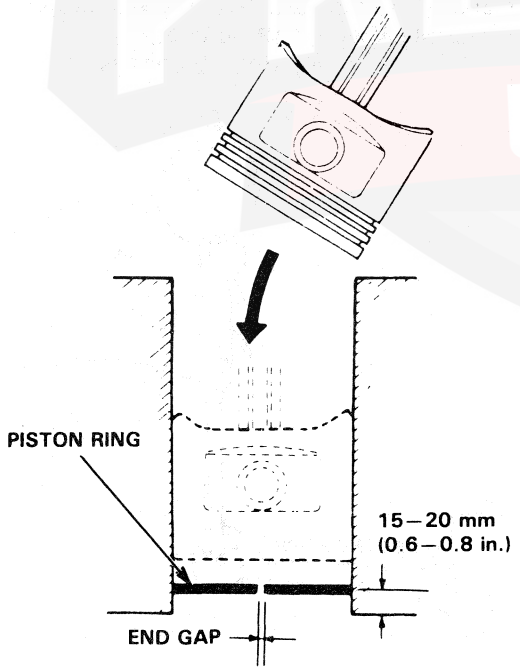
Second Ring
Standard (New): 0.30—0.42 mm (0.012—0.017 in.)
Service Limit: 0.6 mm (0.02 in.)

Oil Ring
Standard (New): 0.2—0.9 mm (0.008—0.035 in.)
Service Limit: 1.1 mm (0.04 in.)

Carbureted Engine:

Top and Second Ring
Standard (New): 0.15—0.35 mm (0.006—0.014 in.)
Service Limit: 0.60 mm (0.02 in.)

Oil Ring
Standard (New): 0.20—0.70 mm (0.008—0.035 in.)
Service Limit: 1.1 mm (0.04 in.)



Replacement

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

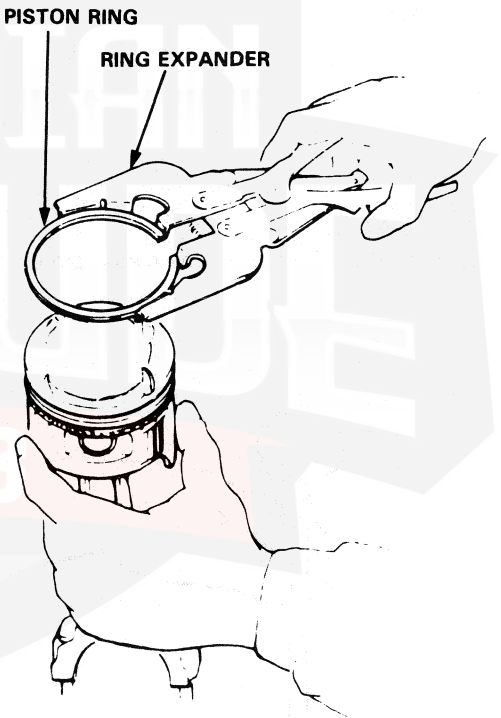
   NOTE: Use squared-off broken ring, or file down blade on ring groove cleaner to fit (compression rings are 1.5 mm wide; oil ring is 4.0 mm wide).

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

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

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

   NOTE: Do not re-use old piston rings.



Land Clearances

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

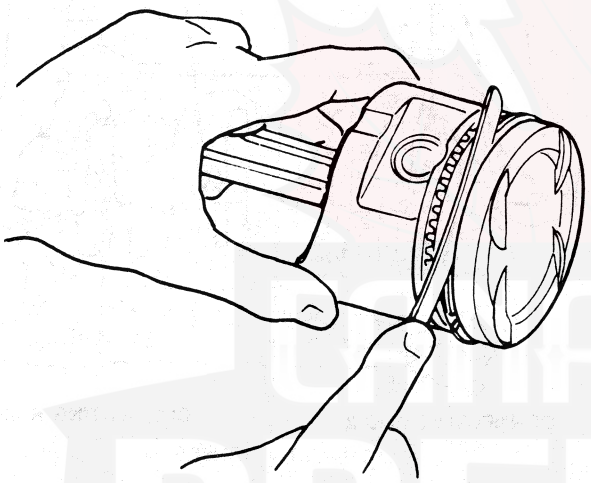
Top and Second Rings Clearance

Fuel-Injected Engine:

Standard (New): 0.030—0.060 mm (0.0012—0.0024 in.)
Service Limit: 0.13 mm (0.005 in.)

Carbureted Engine:

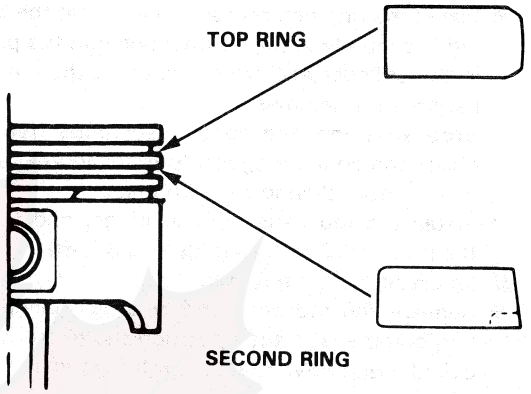
Standard (New): 0.020—0.045 mm (0.0008—0.0018 in.)
Service Limit: 0.13 mm (0.005 in.)



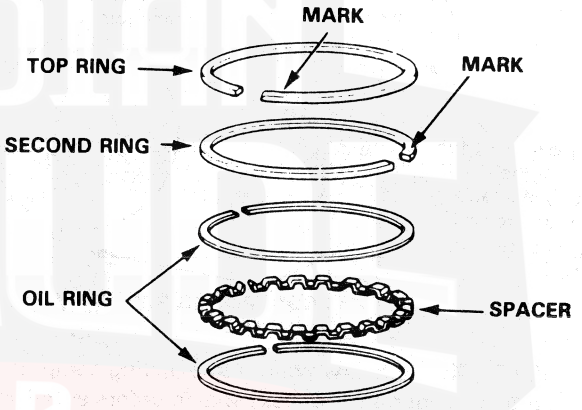
Alignment

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

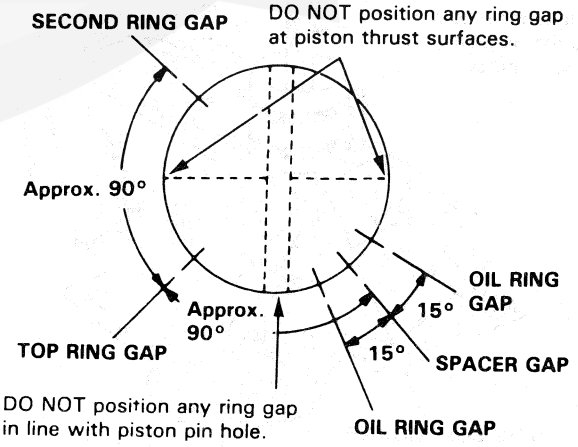
   Identify top and second rings by the chamfer on the edge, and make sure they are in proper grooves on piston.



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



4. Position the ring end gaps as shown:



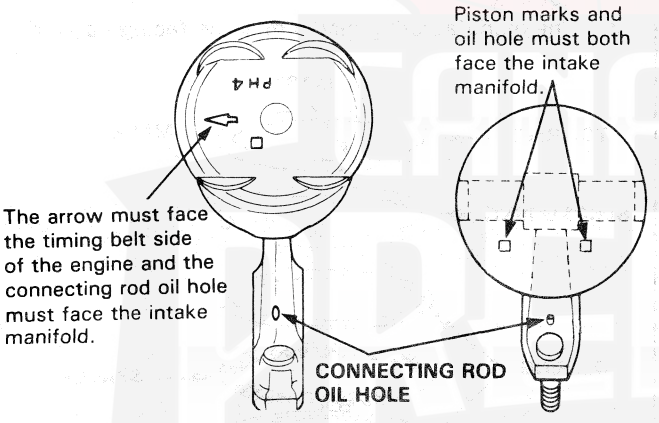
Pistons

Installation

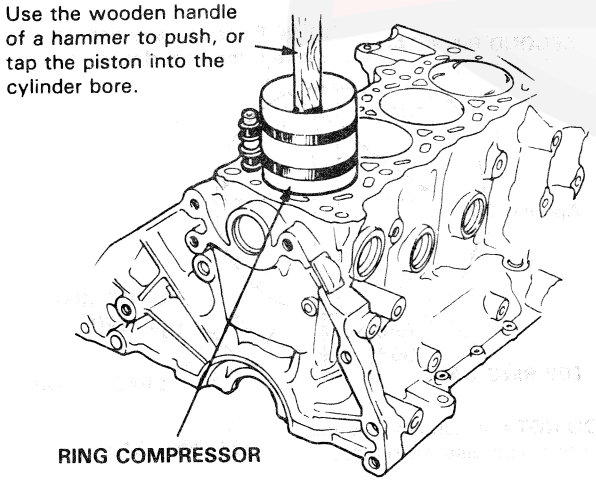
Before installing the piston, apply a coat of engine oil to the ring grooves and cylinder bores.

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

Fuel-Injected Engine: **Carbureted Engine:**



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

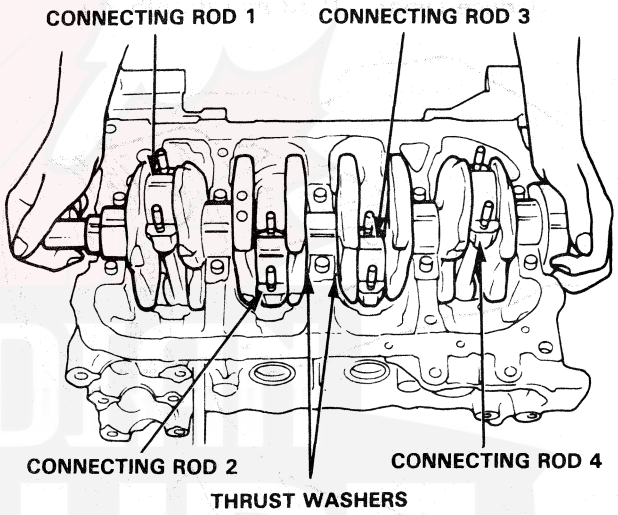


Crankshaft

Installation

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

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



4. Rotate the crankshaft clockwise, seat journals into connecting rods No. 1 and No. 4, and install the rod caps and nuts finger tight.
5. Install the thrust washers, main bearing halves and caps, check clearance with plastigage (page 7-5), then torque the nuts to 68 N•m (6.8 kg-m, 49 lb-ft). Oil thrust washer surfaces.
6. Check the rod bearing clearance with plastigage (page 7-5), then torque nuts to 32 N•m (3.2 kg-m, 23 lb-ft).

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

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

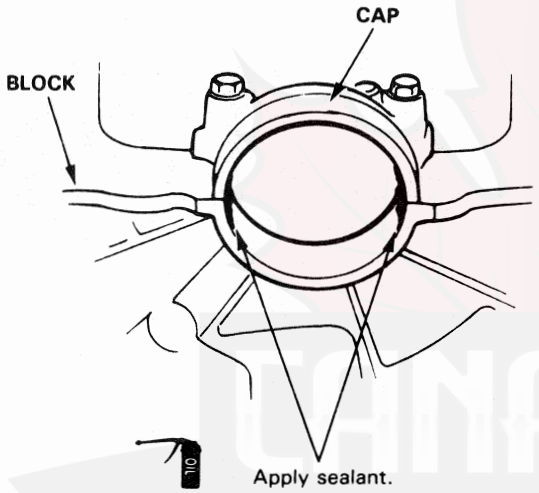
Oil Seals

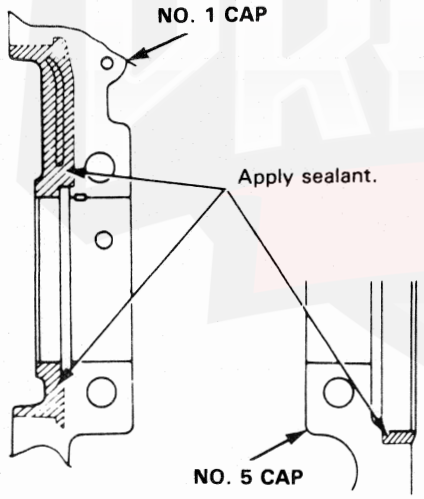
Installation

NOTE: Install the seals before you tighten the main bearing cap bolts.

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

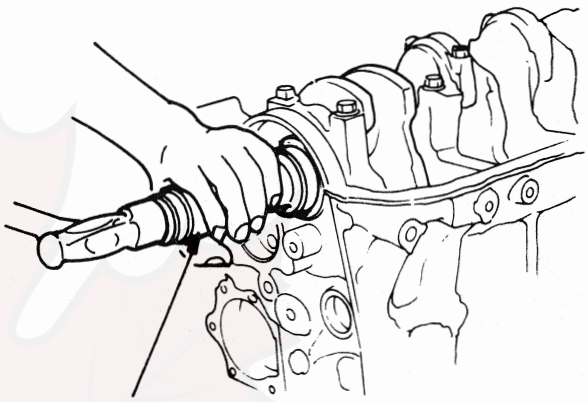
1. Apply non-hardening sealant along the seams where the cap joins the block before installing the seals.





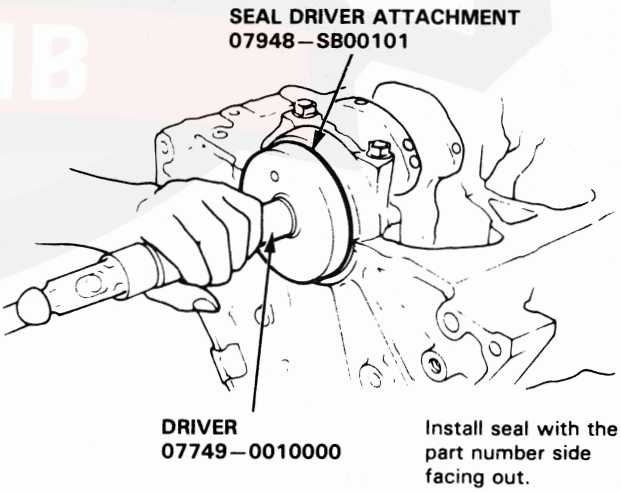
2. Apply a light coat of grease to the sealing surfaces of both oil seals. Also fill the back (the spring side) of each seal with grease to help keep the spring in place during installation.

3. Drive in pulley-end seal until the driver bottoms against crankshaft snout.

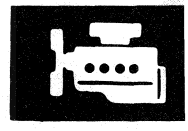


4. Drive in flywheel-end seal until the driver bottoms against block.

NOTE: Align the hole in the driver attachment with the pin on the crankshaft.



Engine Lubrication

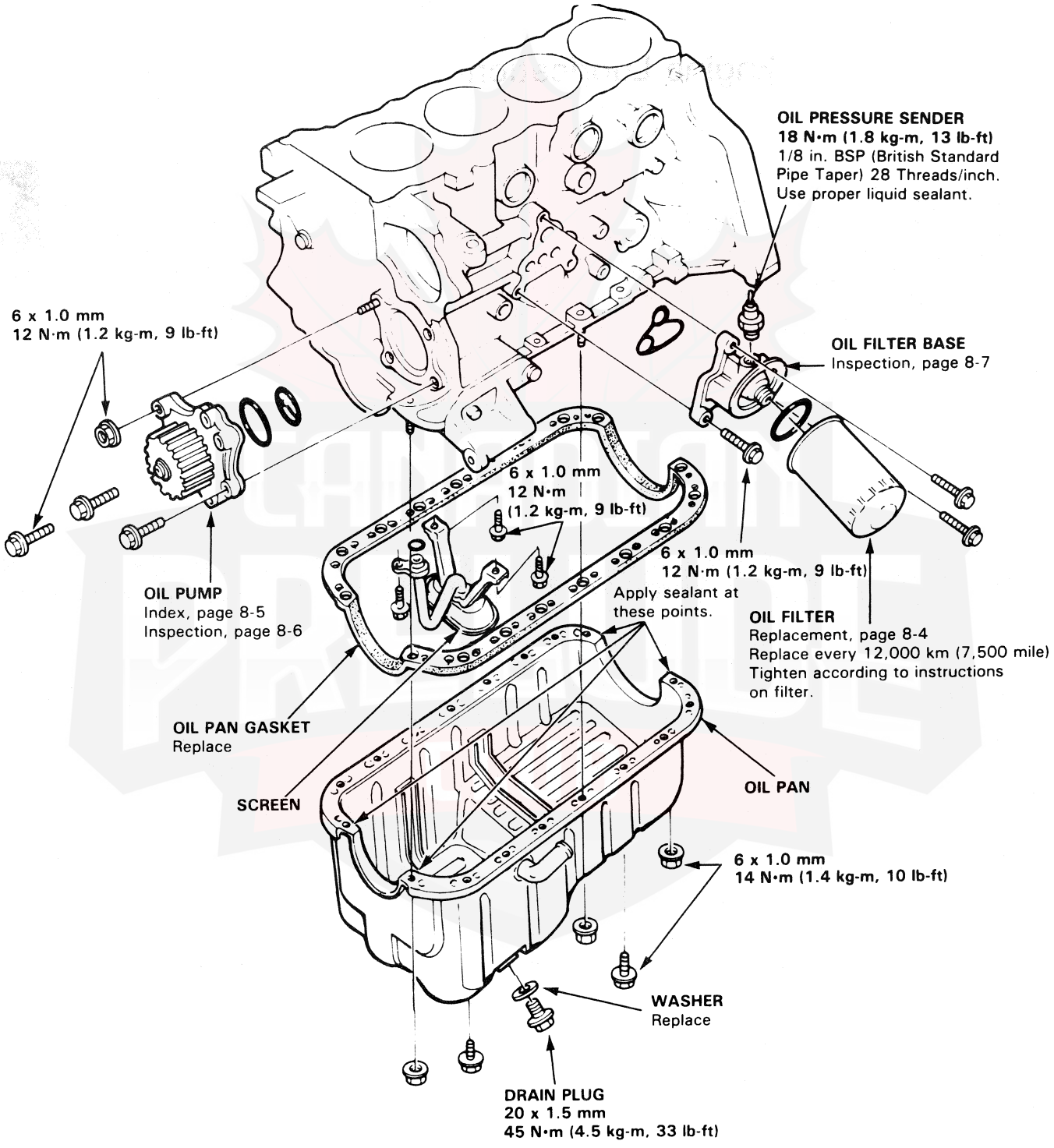


Engine Lubrication

Illustrated Index

Fuel-Injected Engine Shown; Carbureted Engine Similar

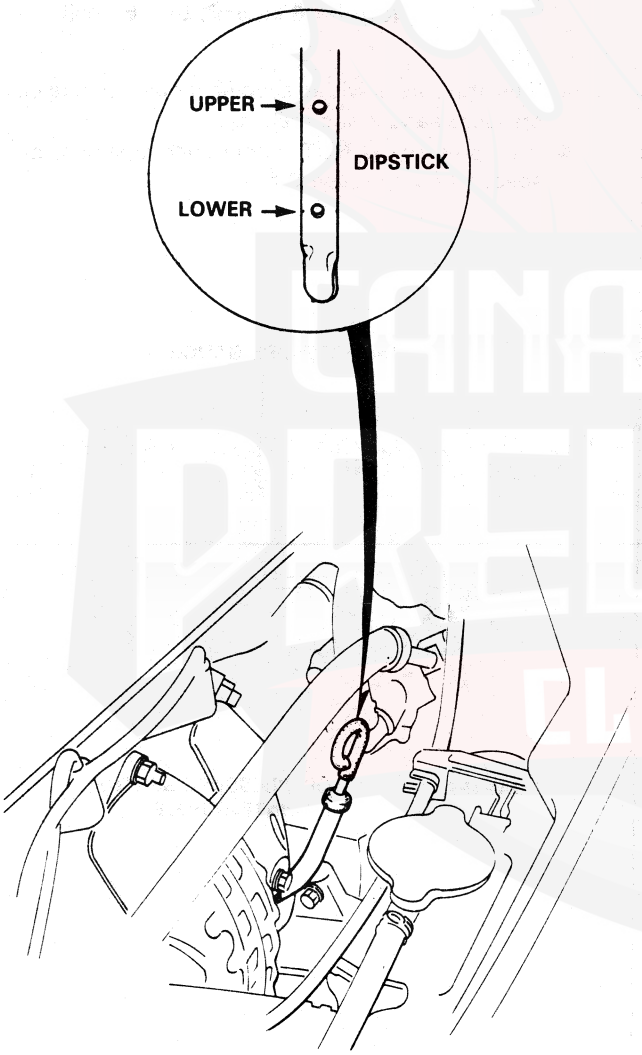
NOTE:
- Use new O-rings whenever reassembling.
- Apply oil to O-rings before installation.



Oil Level

Inspection

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

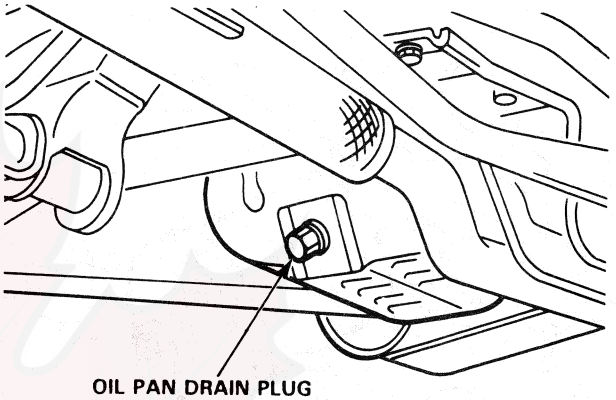


Engine Oil

Replacement

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

   NOTE: Remove the filler cap to speed draining.

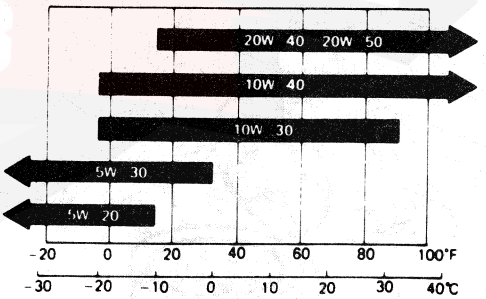


OIL PAN DRAIN PLUG
45 N·m (4.5 kg-m, 33 lb-ft)

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

Requirement	"Fuel Efficient" SF Grade only
Capacity	3.7 U.S. qt (3.5 ℓ) at change, including filter. 4.2 U.S. qt (4.0 ℓ) after engine overhaul.
Change	Every 12,000 km (7,500 miles)

Engine Oil Viscosity for Outside Temperature Ranges.



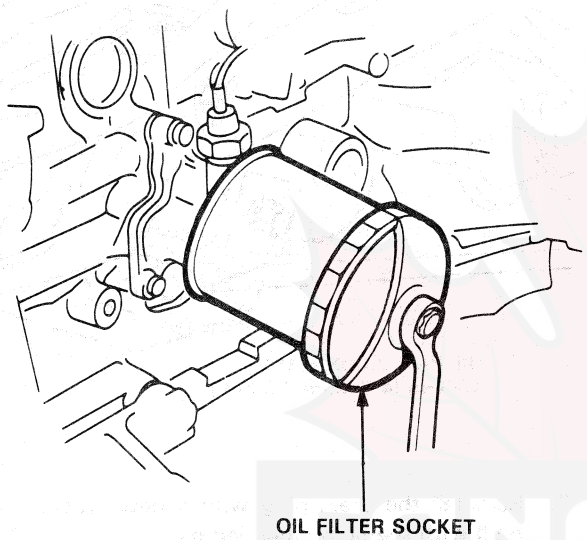
NOTE: Oil filter should be replaced at each oil change.

Oil Filter

Replacement

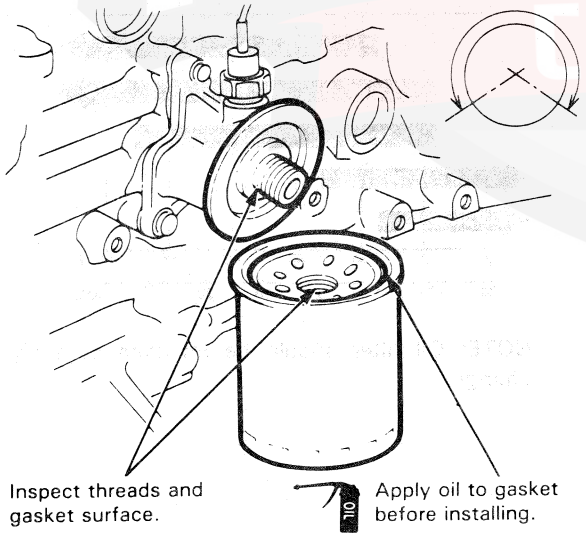
CAUTION: After the engine has been run, the exhaust pipes will be hot; be careful when working around the exhaust manifold.

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



OIL FILTER SOCKET
07912–6110001
22 N·m (2.2 kg-m, 16 lb-ft)

2. Inspect the threads and gasket on the new filter. Wipe off seat on engine block, then apply a light coat of oil on the gasket, and install the filter. Tighten according to instructions on, or with, the filter.
NOTE: Use only filters with a built-in bypass system.



Inspect threads and gasket surface.

Apply oil to gasket before installing.

Oil Pressure

Test

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

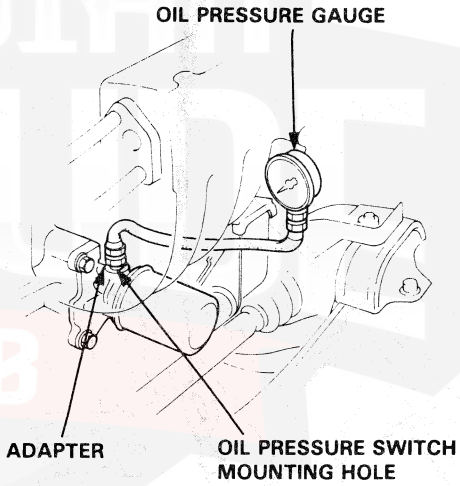
1. Remove the oil pressure sender and install an oil pressure gauge.

2. Start the engine and allow to reach operating temperature (fan comes on at least twice).

3. Pressure should be:

Engine Oil Pressure:
at idle: 98 kPa (1.0 kg/cm², 14 psi) minimum
at 3,000 rpm: 373–451 kPa (3.8–4.6 kg/cm², 54–65 psi)

- If oil pressure is within specifications, replace oil pressure sender and recheck.
- If oil pressure is NOT within specifications, inspect oil pump (page 8-6).



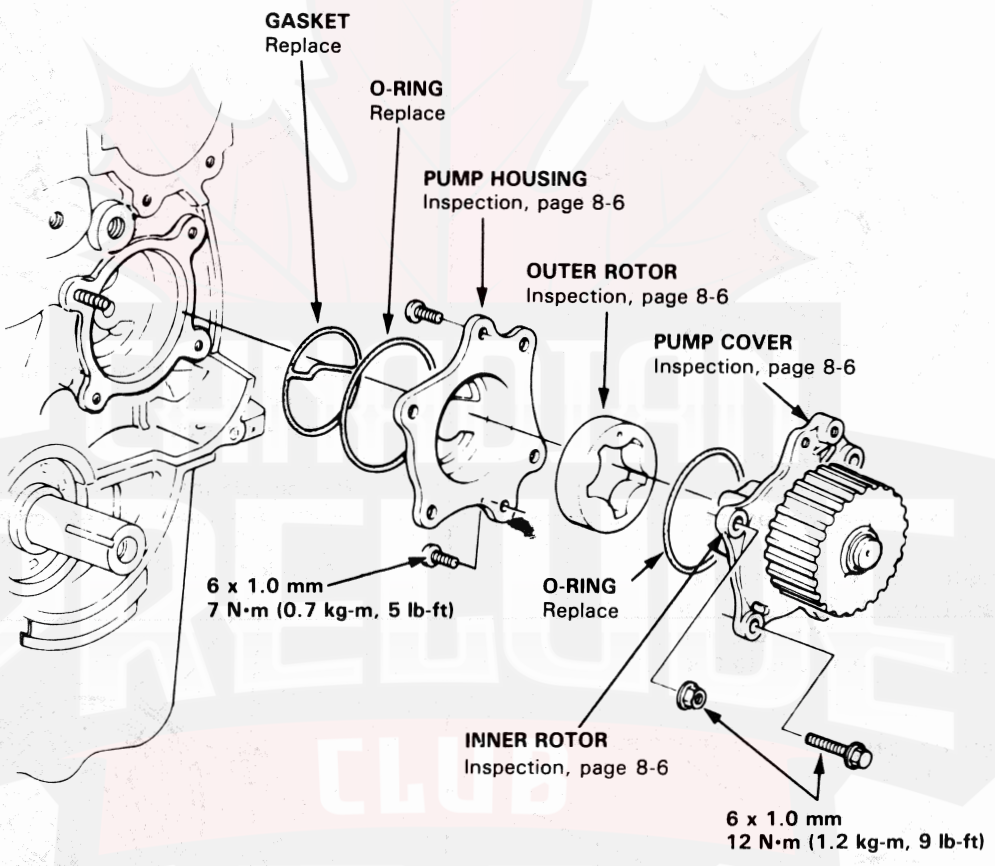
OIL PRESSURE GAUGE

ADAPTER

OIL PRESSURE SWITCH MOUNTING HOLE

Oil Pump

Illustrated Index

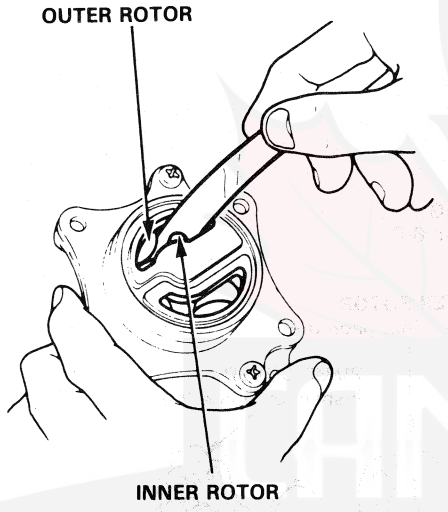


Oil Pump

Removal/Inspection

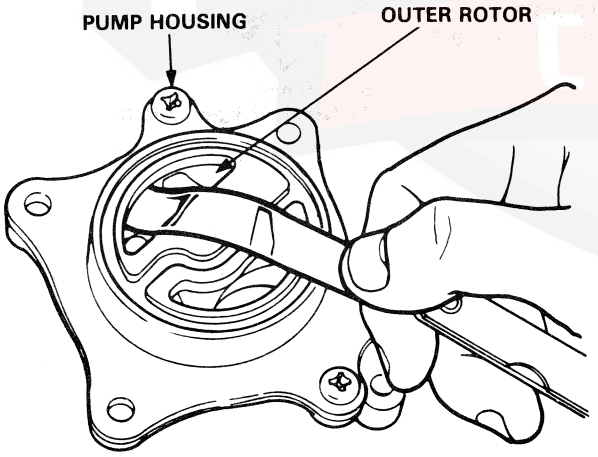
1. Drain the engine oil.
2. Remove the three bolts and one nut that secure the oil pump to the engine block, then remove the pump.
3. Check the radial clearance on the pump rotor.

Rotor Radial Clearance
Standard (New): 0.15 mm (0.006 in.)
Service Limit: 0.2 mm (0.008 in.)



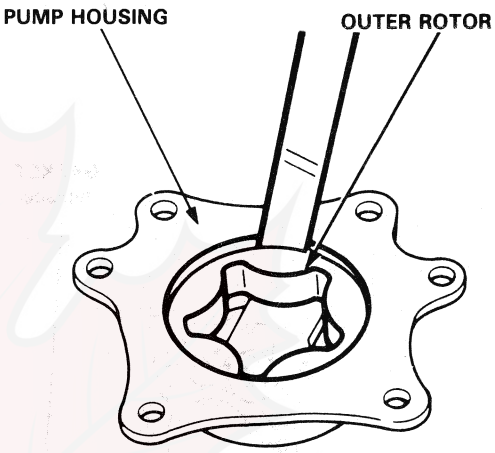
4. Check the axial clearance on the outer pump rotor.

Housing-to-Rotor Axial Clearance
Standard (New): 0.03—0.108 mm (0.001—0.004 in.)
Service Limit: 0.15 mm (0.006 in.)

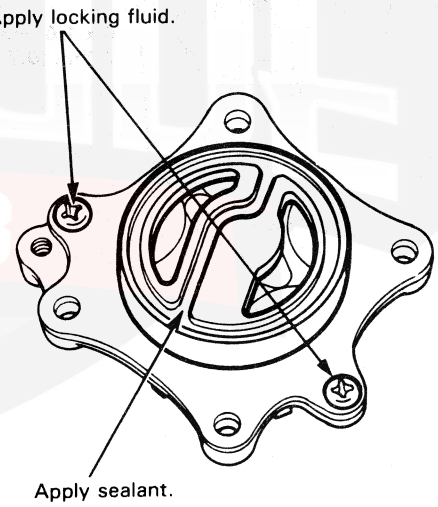


5. Remove the two screws from the pump housing, then separate the housing and cover.
6. Check the radial clearance between the housing and the outer rotor.

Housing-to-Rotor Radial Clearance
Standard (New): 0.1—0.18 mm (0.004—0.007 in.)
Service Limit: 0.2 mm (0.008 in.)



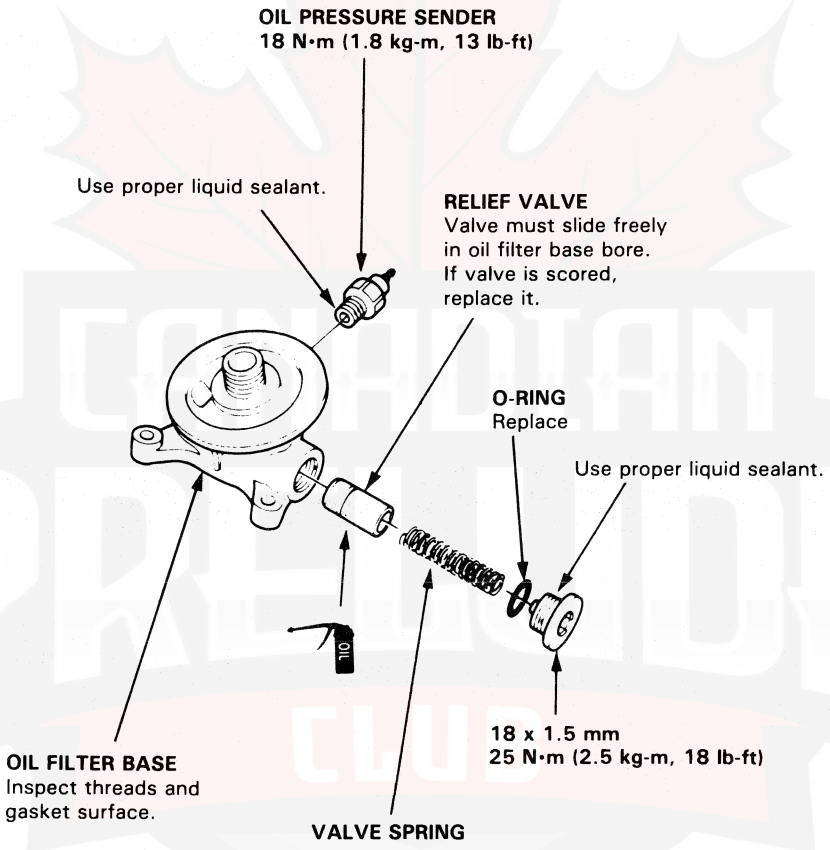
7. Inspect both rotors and pump housing for scoring or other damage.
   Replace parts as necessary.
8. Reassemble the oil pump, applying thread locking fluid to the pump housing screws.



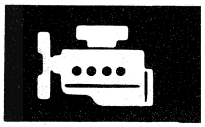
9. Apply sealant around the O-ring groove, then install the new O-ring.
10. Install a new gasket to the pump housing and re-install the oil pump.
11. Check that the oil pump turns freely.

Oil Filter Base

Inspection



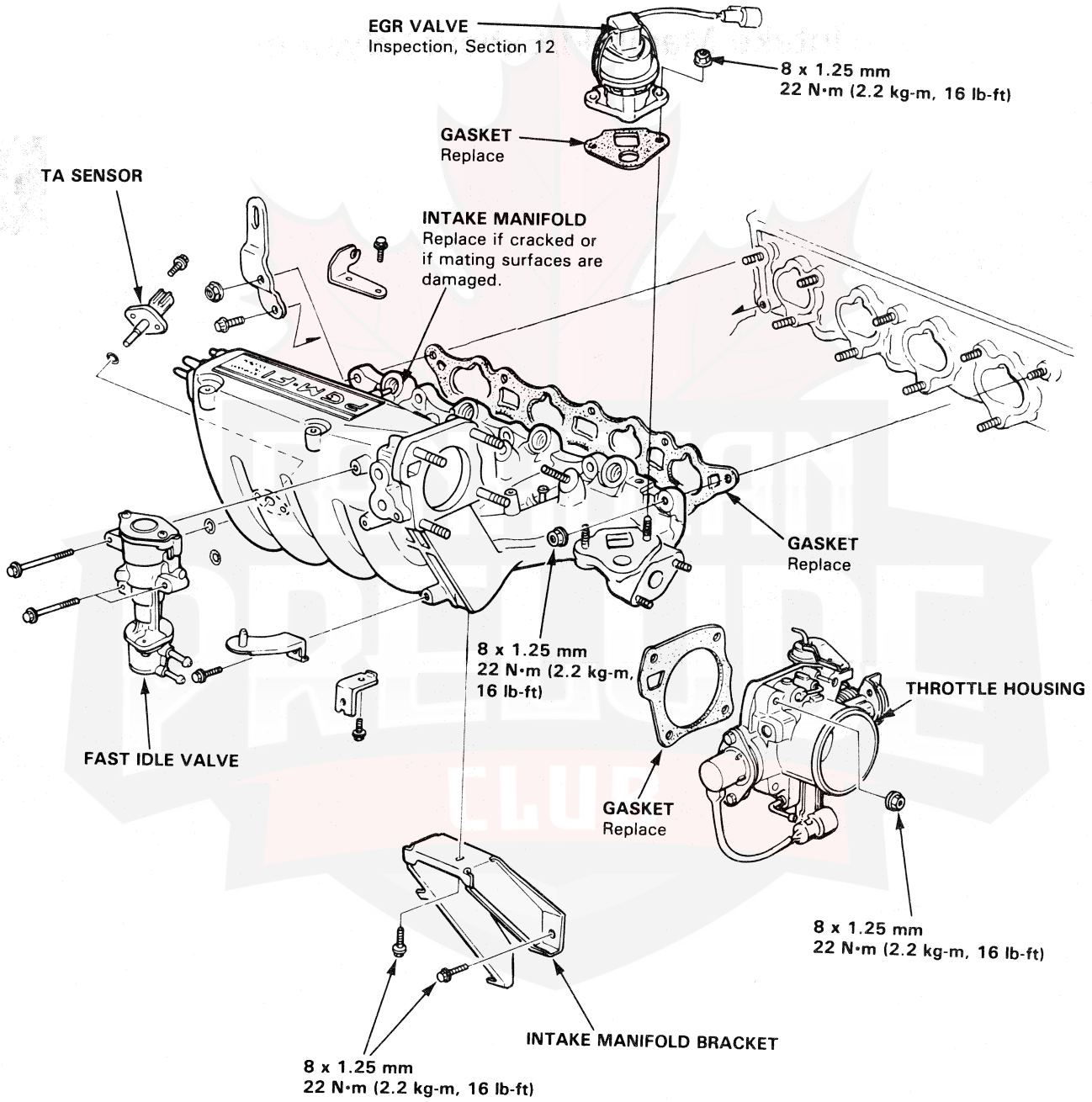
Intake Manifold/Exhaust System



Intake Manifold

Illustrated Index

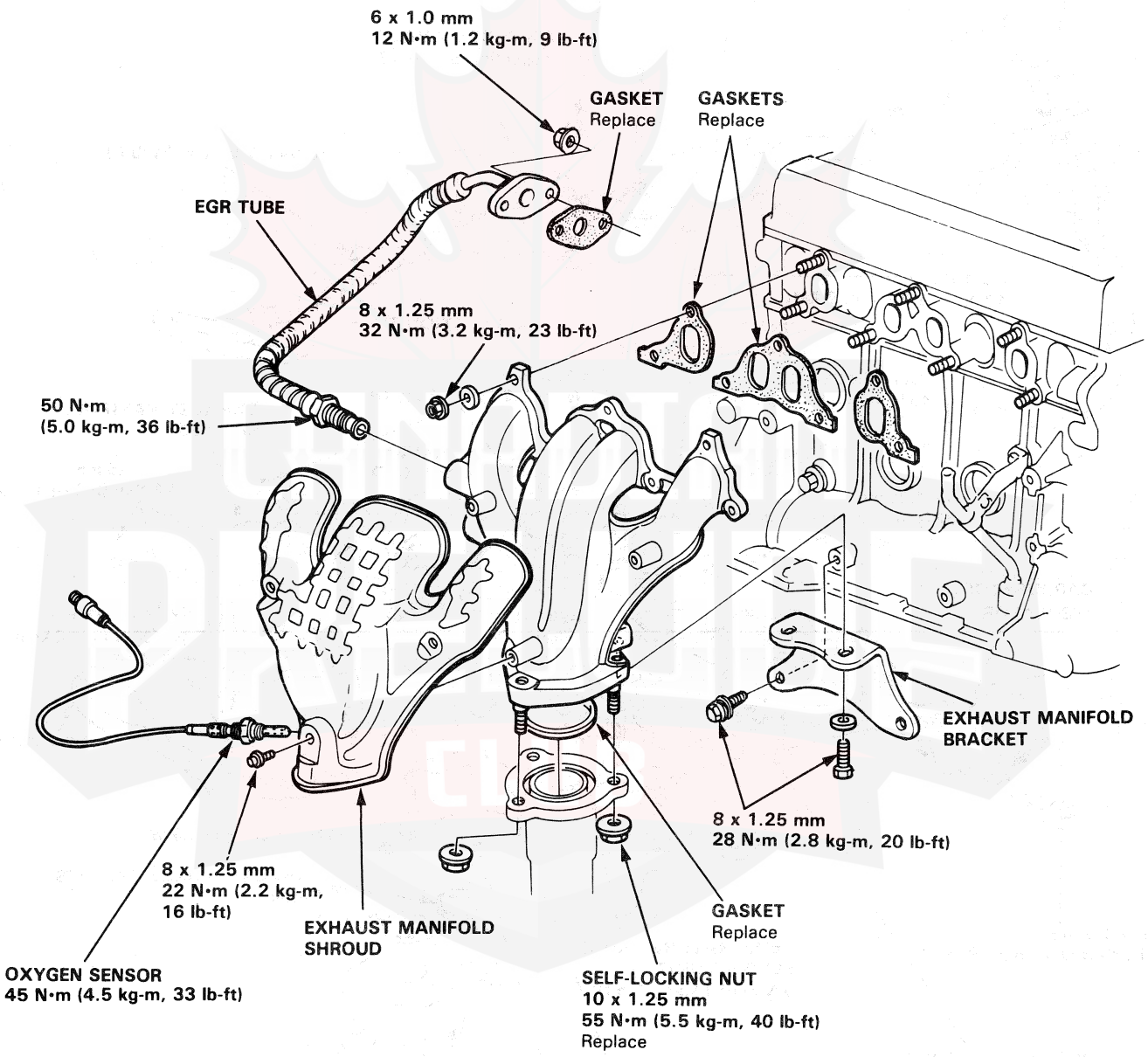
Fuel-Injected Engine:



Exhaust Manifold

Illustrated Index

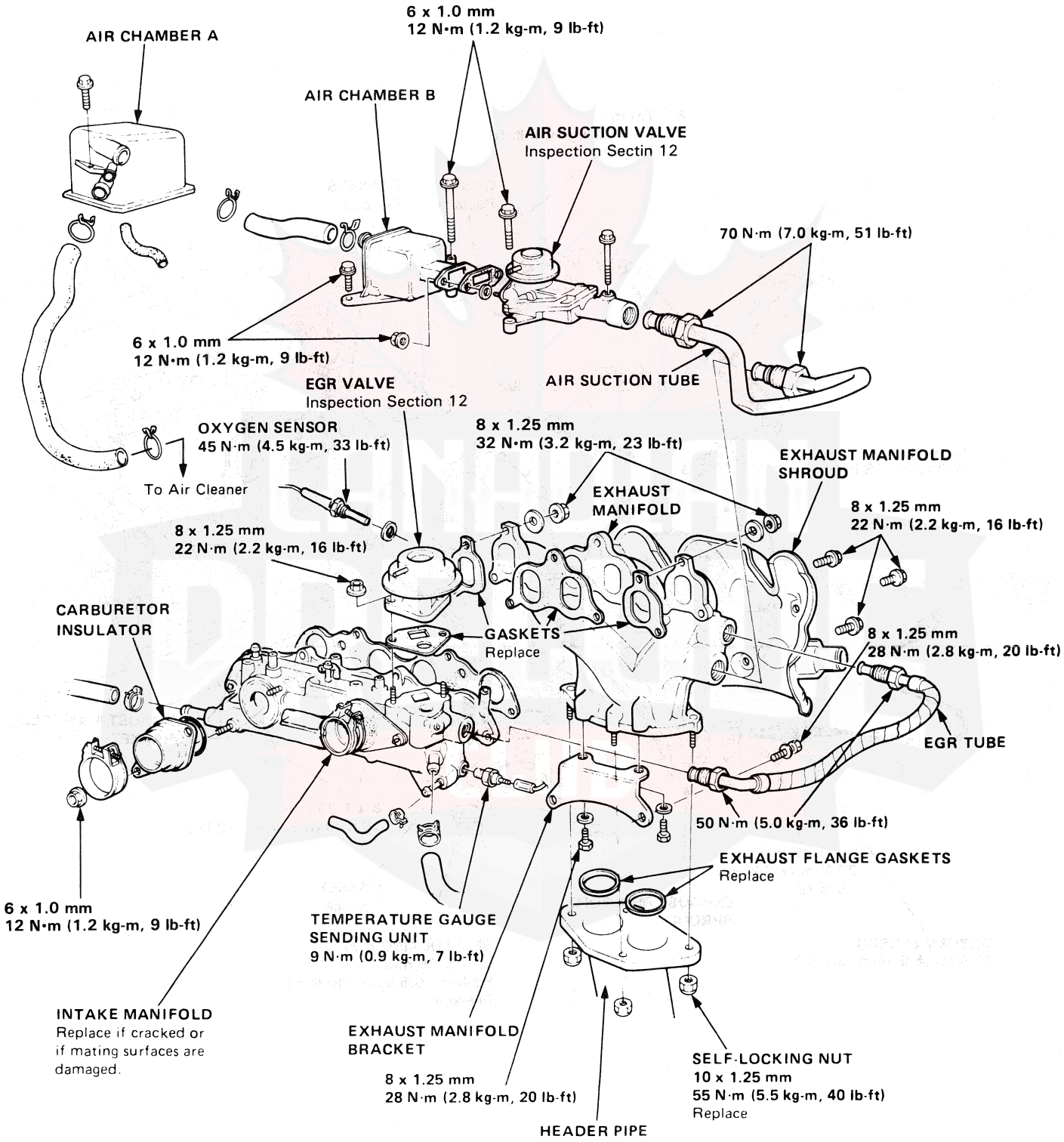
Fuel-Injected Engine:



Intake Manifold/Exhaust Manifold

Illustrated Index

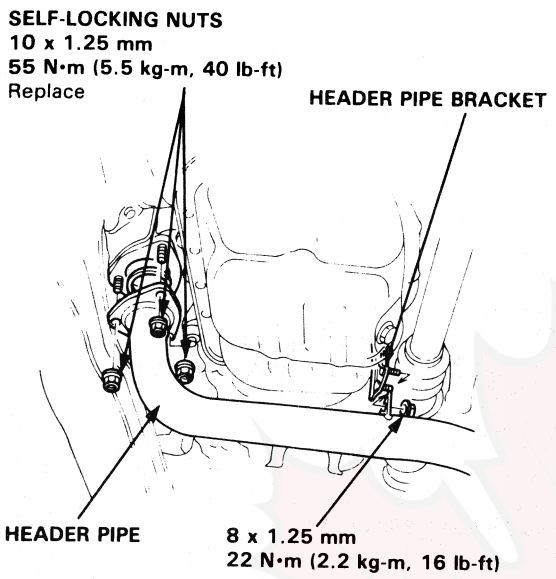
Carbureted Engine:

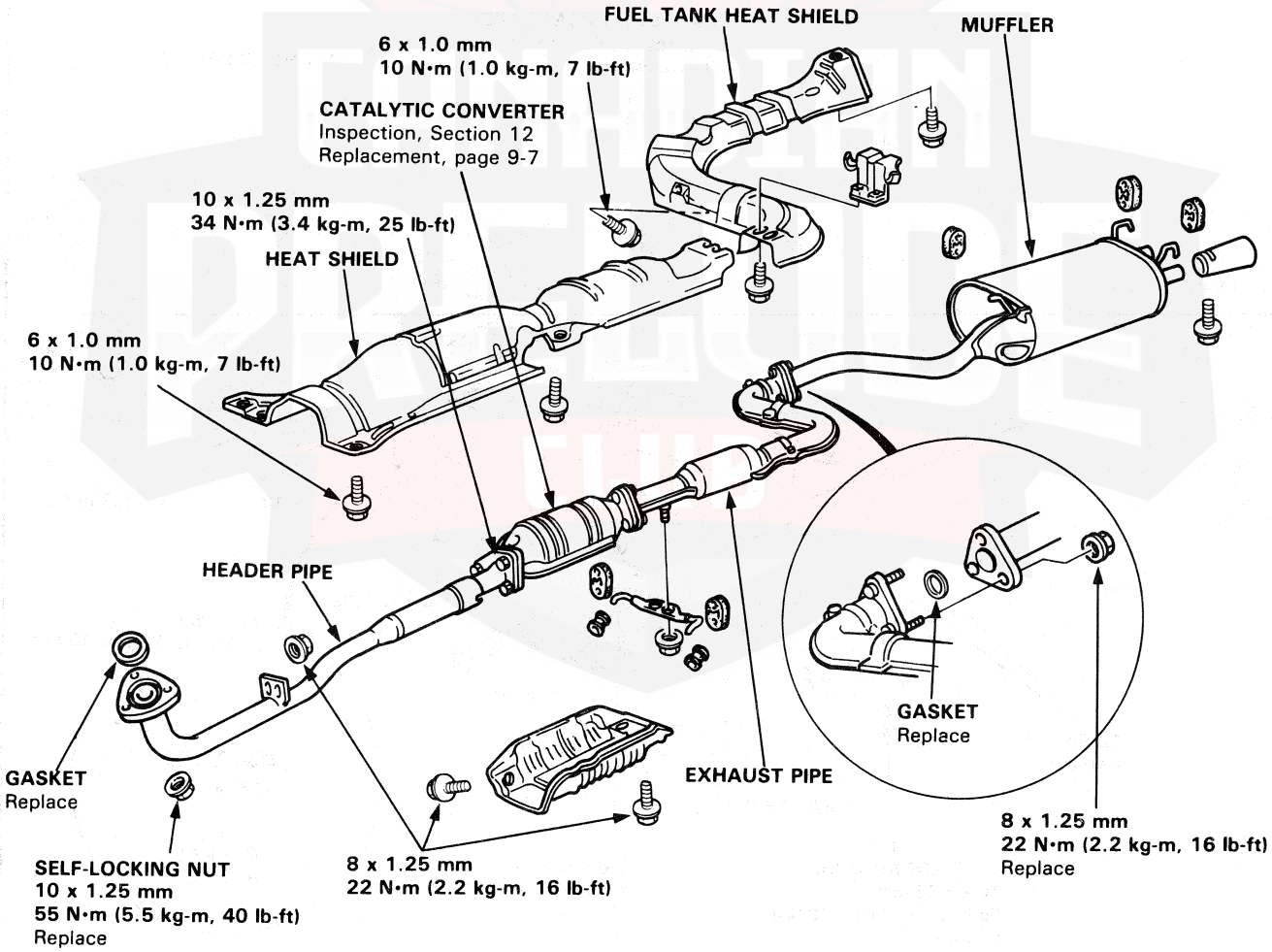


Exhaust Pipe and Muffler

Replacement

Fuel-Injected Engine:



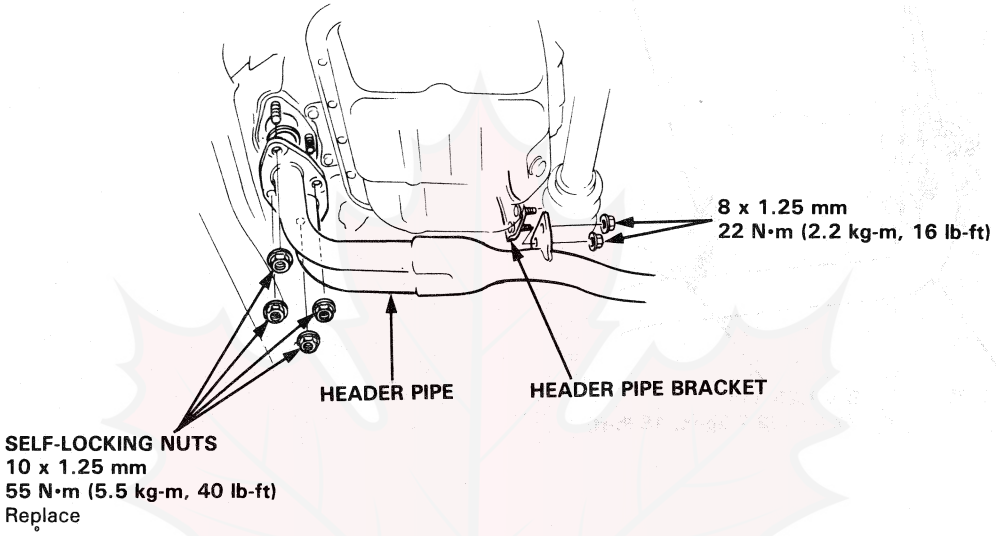


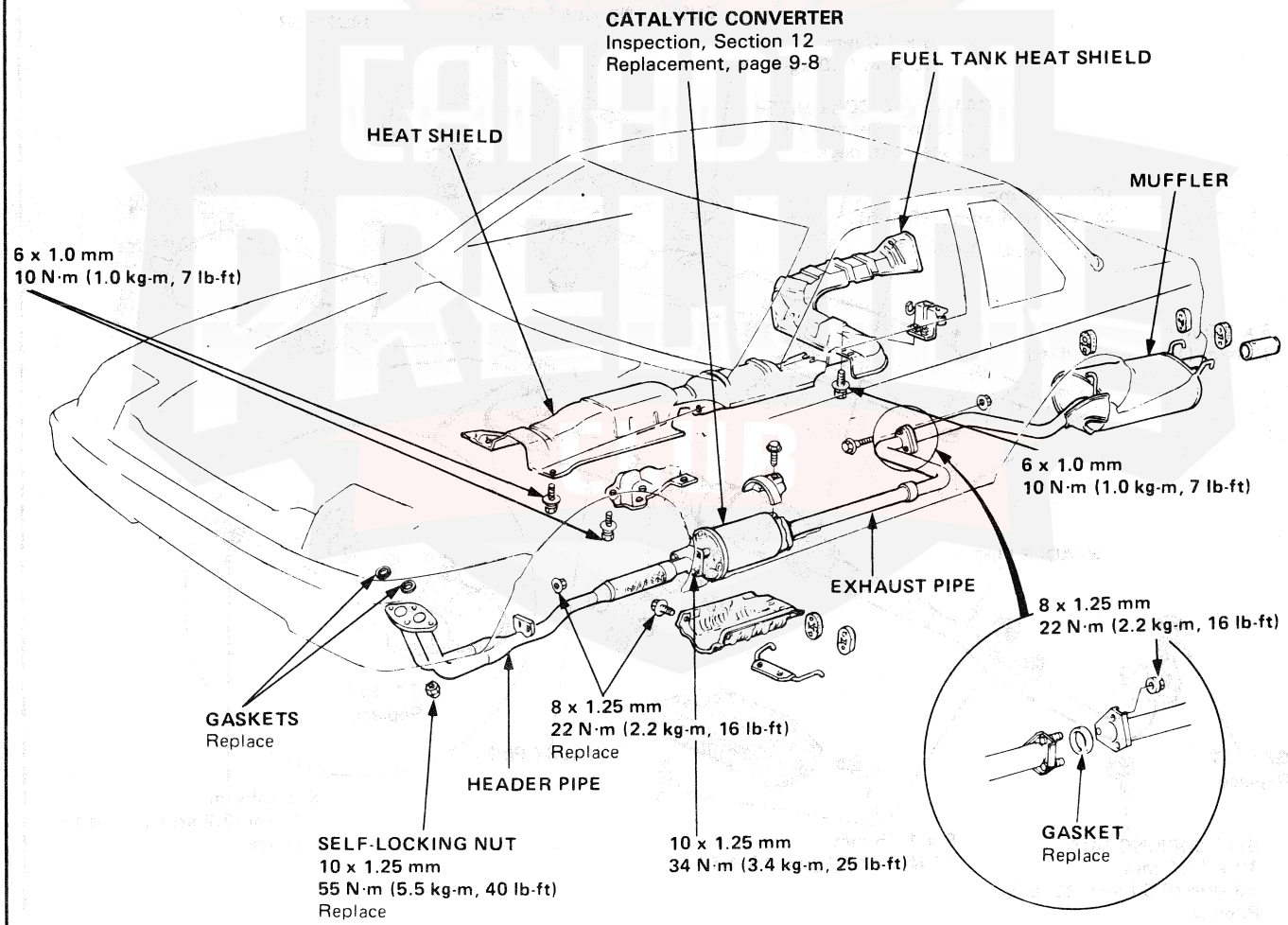
(cont'd)

Exhaust Pipe and Muffler

Replacement (cont'd)

Carbureted Engine:





Catalytic Converter

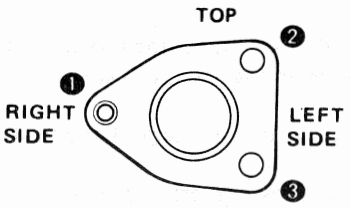
Replacement

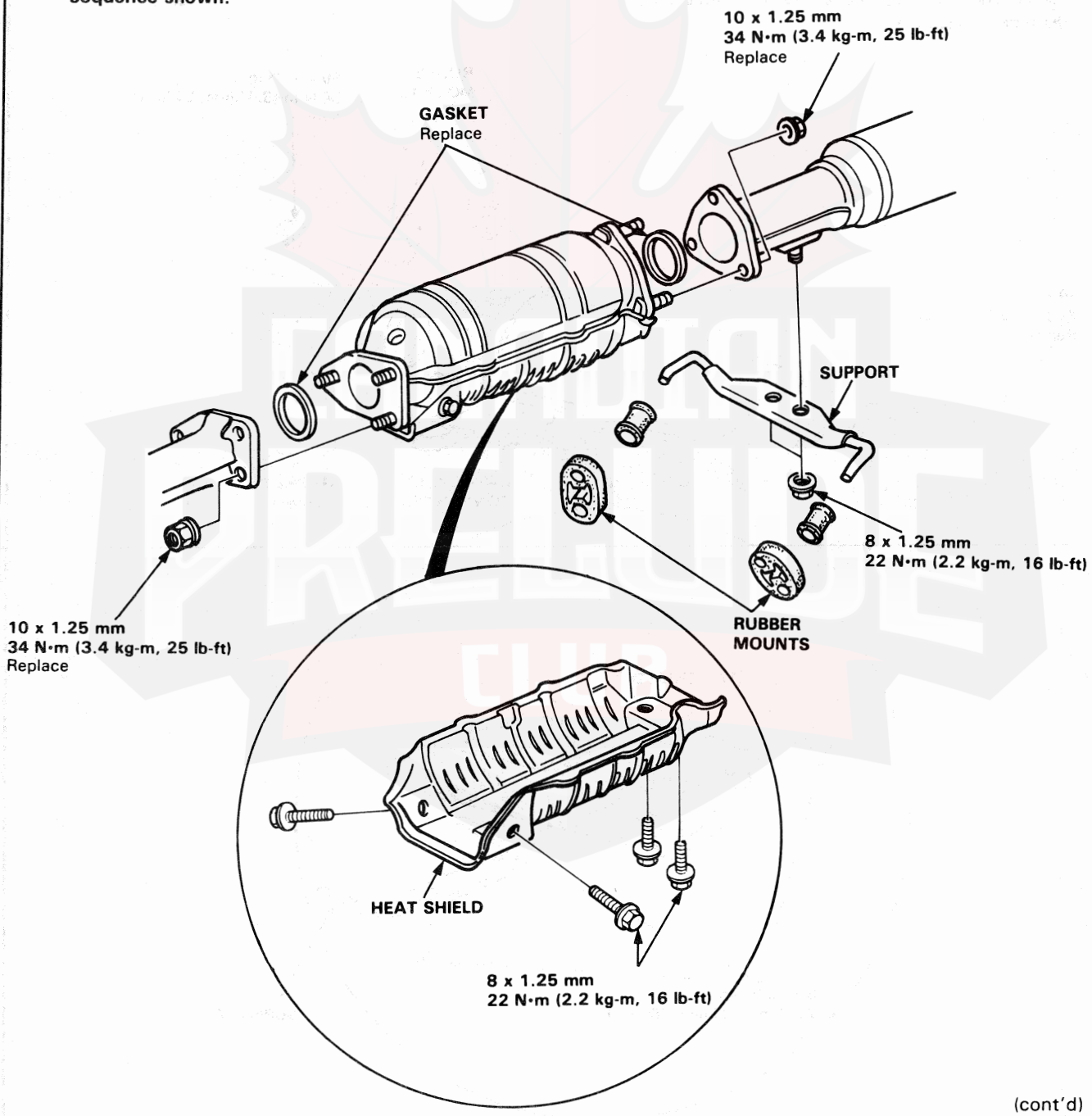
Fuel-Injected Engine:

1. Disconnect the rubber mounts from the catalytic converter support.
2. Remove the six nuts, then remove the catalytic converter from the exhaust system.
3. Remove the converter support and heat shield.
4. Install in the reverse order of removal.

CAUTION: Torque the converter flange nuts in the sequence shown.

CATALYTIC CONVERTER TORQUE SEQUENCE





(cont'd)

Catalytic Converter

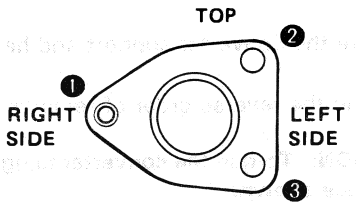
Replacement (cont'd)

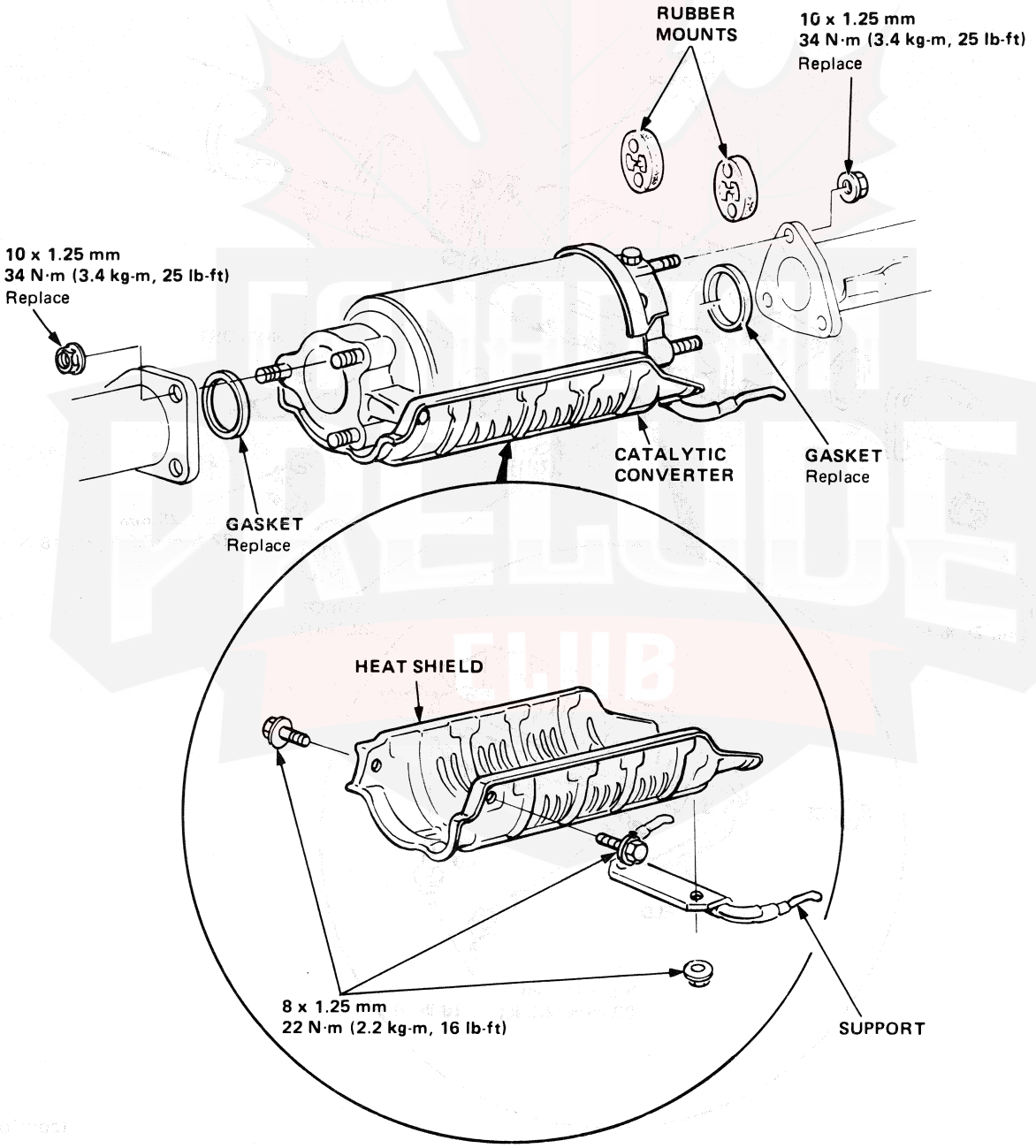
Carbureted Engine:

1. Disconnect the rubber mounts from the catalytic converter support.
2. Remove the six nuts, then remove the catalytic converter from the exhaust system.
3. Remove the converter support and heat shield.
4. Install in the reverse order of removal.

CAUTION: Torque the converter flange nuts in the sequence shown.

CATALYTIC CONVERTER TORQUE SEQUENCE





Cooling

Radiator

Replacement

Fuel-Injected Engine:

WARNING

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

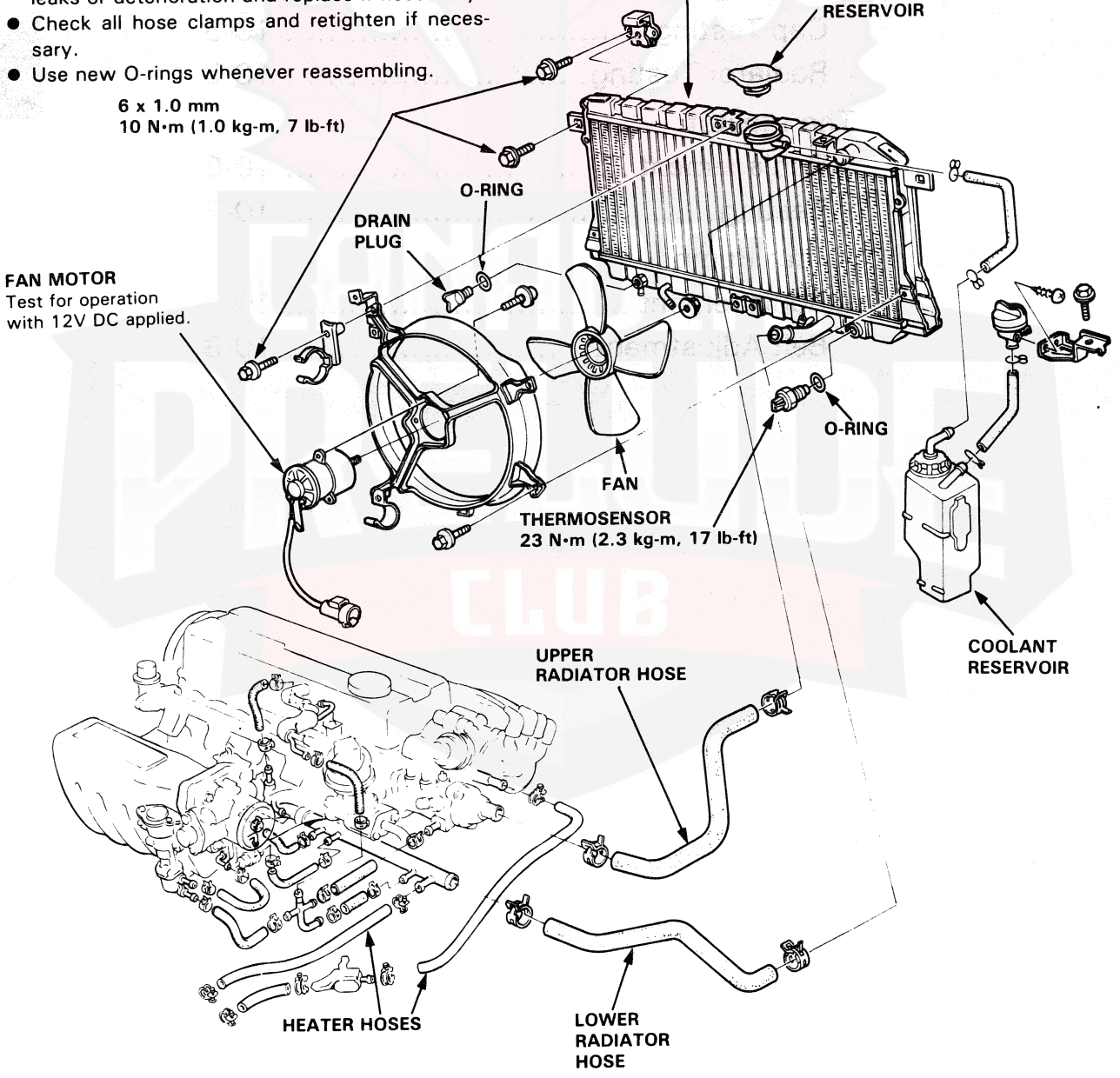
Total Cooling System Capacity (Incl. heater, and reservoir tank:

Manual: 6.8 liter (1.8 U.S. gal.)
Automatic: 6.7 liter (1.8 U.S. gal.)

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

NOTE:

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



Carbureted Engine:

WARNING

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

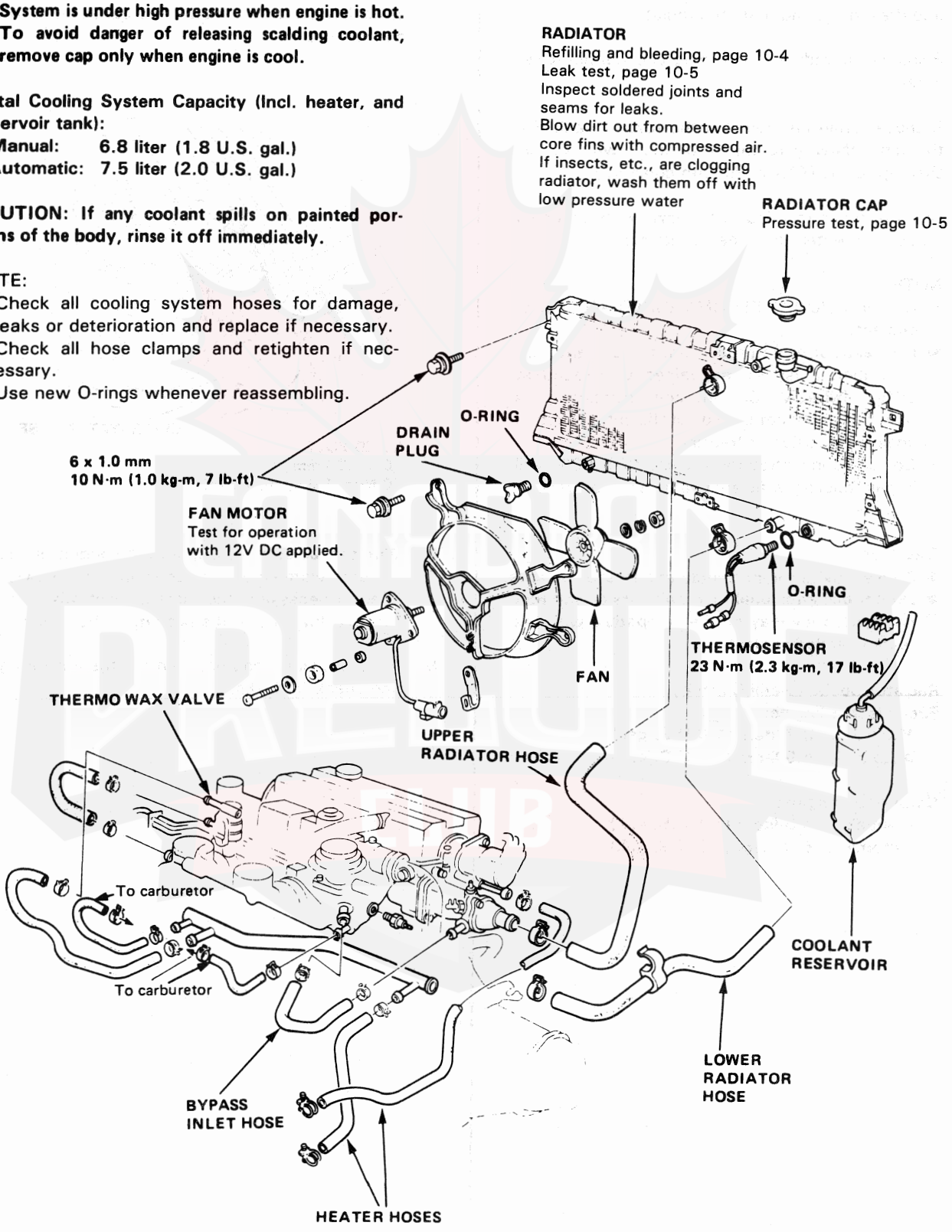
Total Cooling System Capacity (Incl. heater, and reservoir tank):

Manual: 6.8 liter (1.8 U.S. gal.)
Automatic: 7.5 liter (2.0 U.S. gal.)

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

NOTE:

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



Radiator

Refilling and Bleeding

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

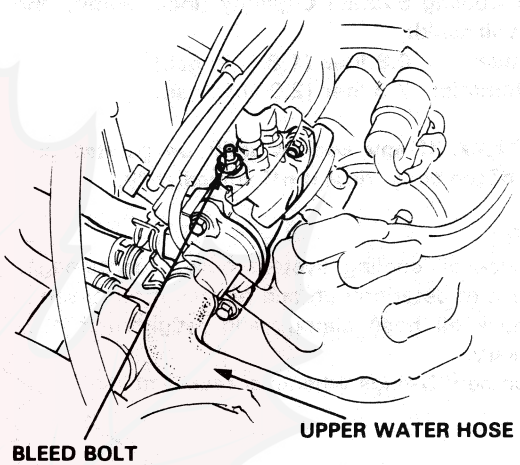
   NOTE:
   - Use only HONDA-RECOMMENDED anti-freeze/coolant.
   - For best corrosion protection, the coolant concentration must be maintained year-round at 50% MINIMUM. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.
   - Coolant concentrations greater than 60% will impair cooling efficiency and are not recommended.

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

   Radiator Coolant Refill Capacity
   Fuel-Injected Engine:
   Manual: 3.7 liters (1.0 U.S. gal.)
   Automatic: 4.5 liters (1.2 U.S. gal.)

   Carbureted Engine:
   Manual: 4.3 liters (1.1 U.S. gal.)
   Automatic: 5.0 liters (1.3 U.S. gal.)

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

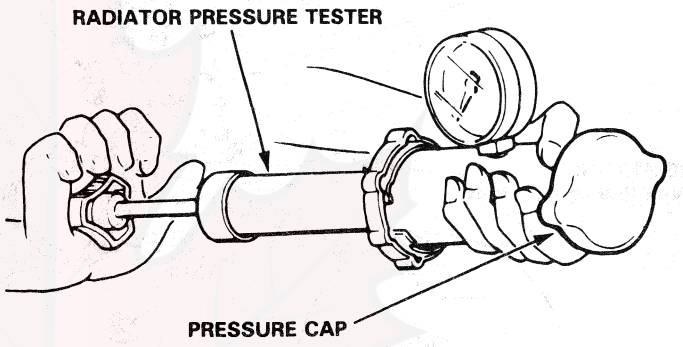


BLEED BOLT
10 x 1.25 mm
10 N·m (1.0 kg-m, 7 lb-ft)

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

Cap Testing

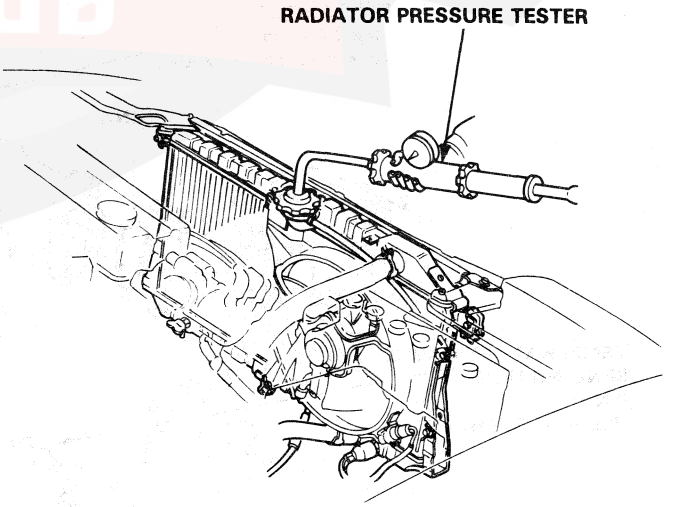
1. Remove the radiator cap, wet its seal with coolant, then install it on the pressure tester.
2. Apply a pressure of 74—103 kPa (0.75—1.05 kg/cm², 11—15 psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.



Radiator Testing

1. Wait until the engine is cool, then carefully remove the pressure cap and fill the radiator with coolant to the top of the filler neck.
2. Attach the pressure tester to the radiator and apply a pressure of 74—103 kPa (0.75—1.05 kg/cm², 11—15 psi).
3. Inspect for coolant leaks and a drop in pressure.
4. Remove the tester and reinstall the pressure cap.

   NOTE: Check for engine oil in coolant and/or coolant in engine oil.

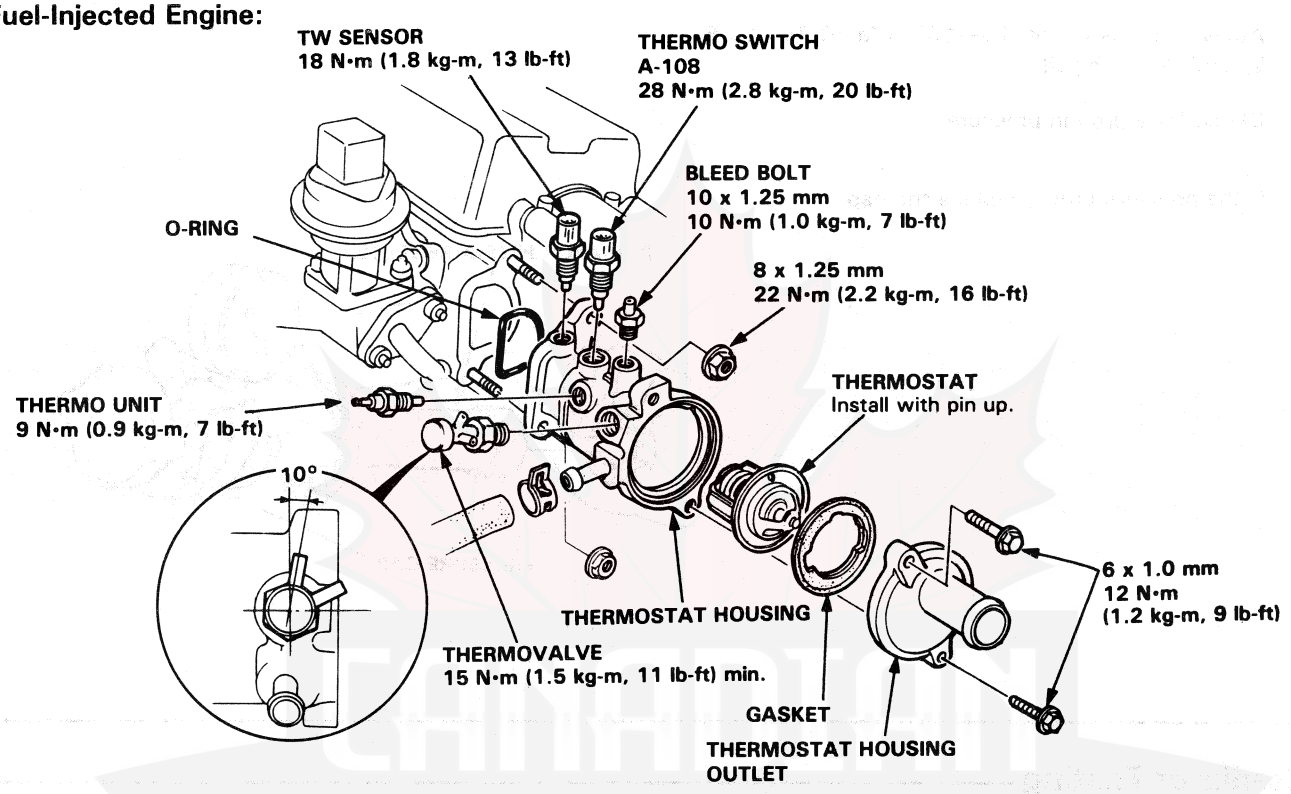


Thermostat

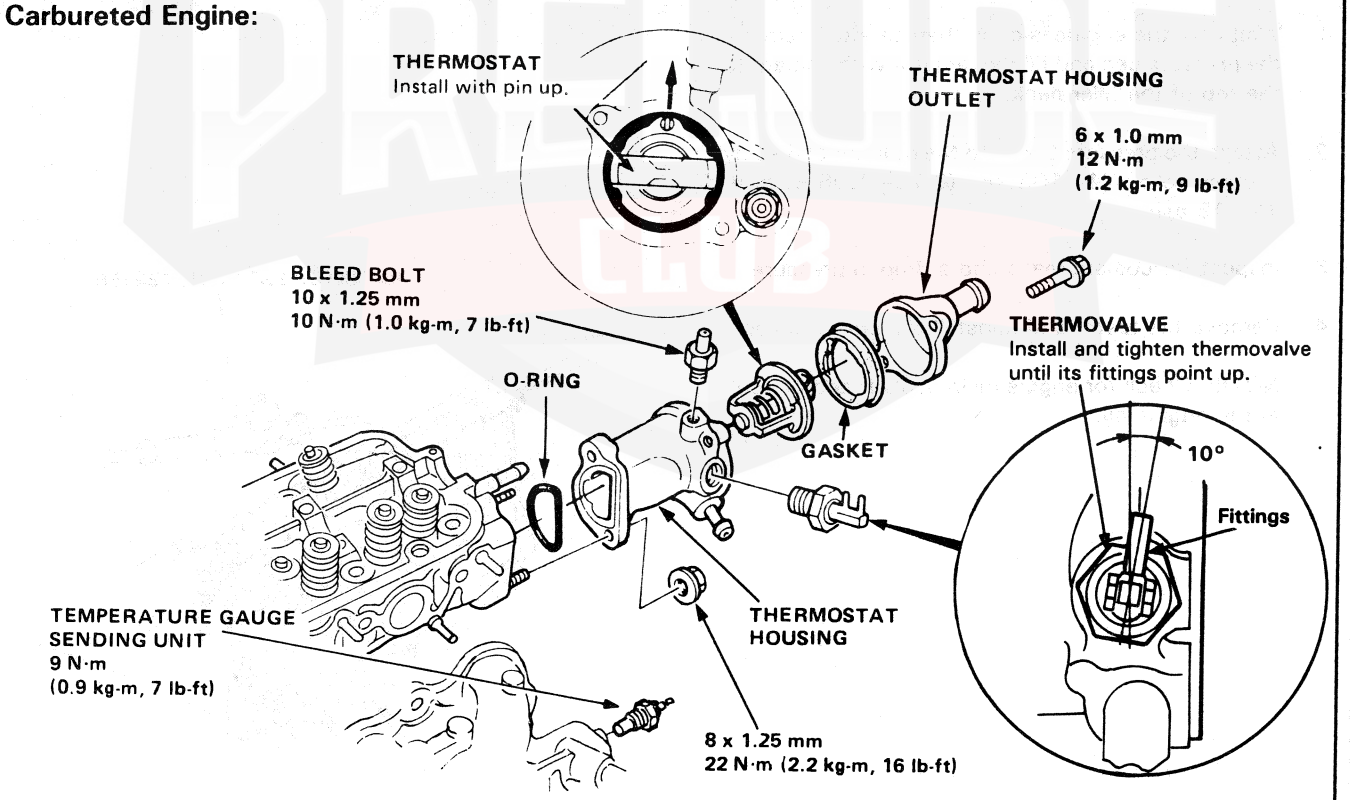
Replacement

NOTE: Use new gaskets and O-rings whenever re-assembling.

Fuel-Injected Engine:



Carbureted Engine:



Thermostat/Water Pump

Thermostat Testing

Replace thermostat if it is open at room temperature.

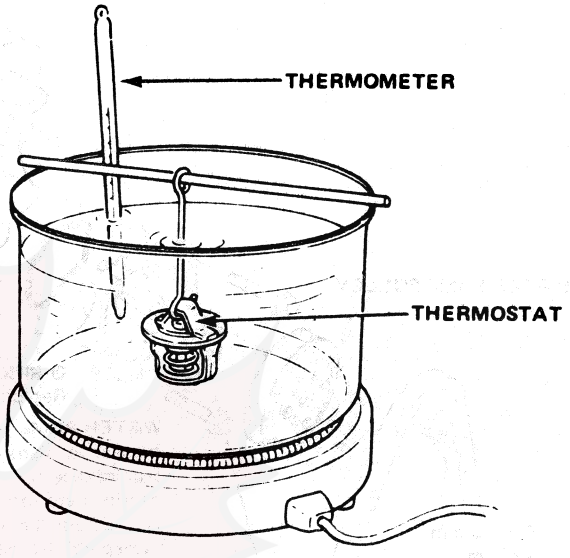
To test a closed thermostat:

1. Suspend the thermostat in a container of water as shown.

2. Heat the water and check the temperature with a thermometer. Check the temperature at which the thermostat first opens and at full lift.

   CAUTION: Do not let thermometer touch bottom of hot container.

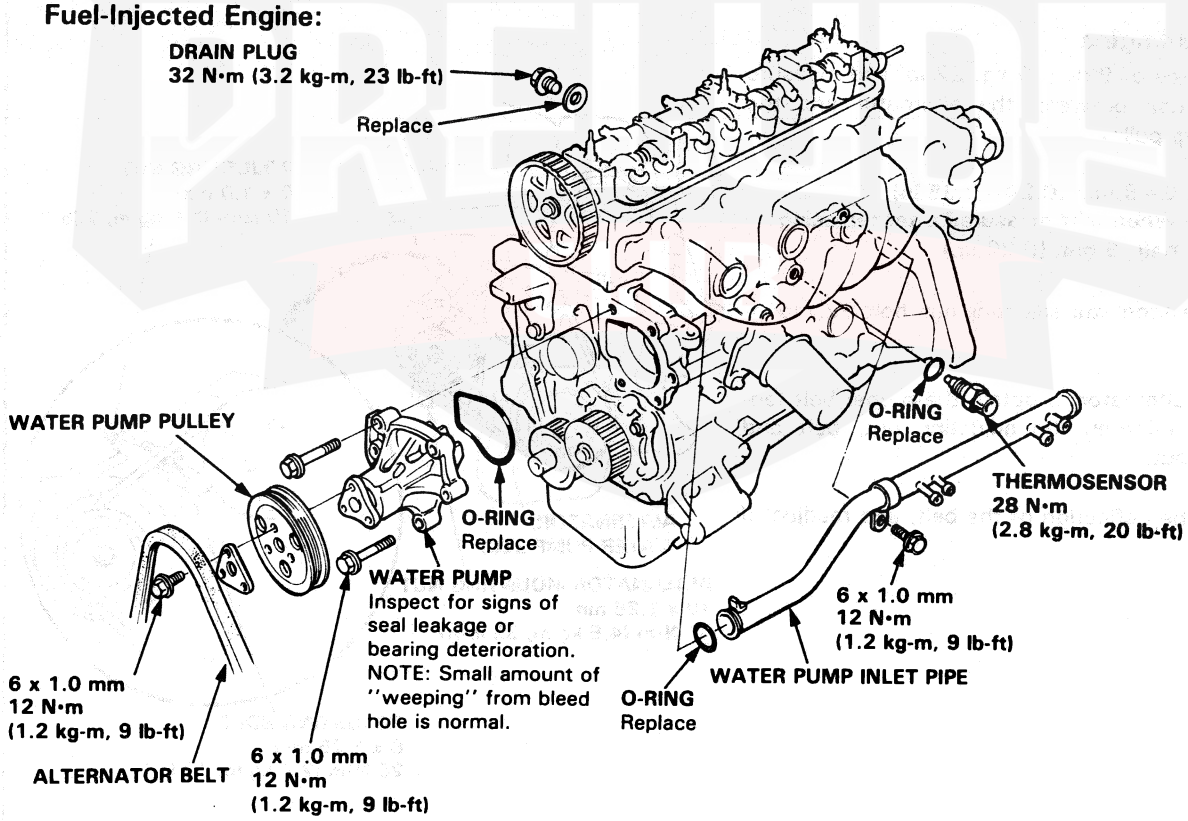
3. Measure lift height of thermostat when fully open.



STANDARD THERMOSTAT
Lift height: 8 mm (0.31 in.)
Starts opening:
Primary: 82°C ± 2 (180°F ± 3)
Secondary: 85°C ± 2 (185°F ± 3)
Fully open: 95°C (203°F)
OPTIONAL THERMOSTAT
Lift height: 8 mm (0.31 in.)
Starts opening: 86–90°C (187–194°F)
Fully open: 100°C (212°F)

Water Pump Replacement

Fuel-Injected Engine:

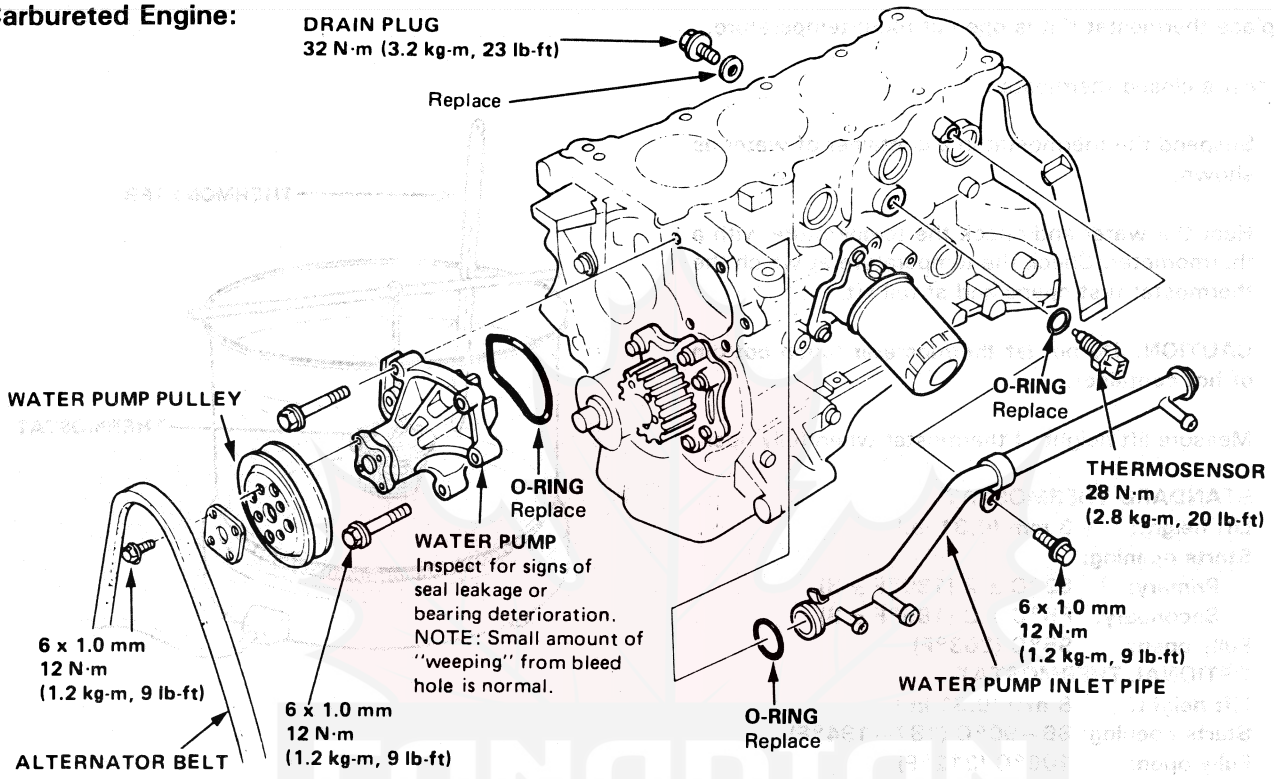


(cont'd)

Water Pump/Water Pump Belt

Replacement (cont'd)

Carbureted Engine:



Belt Adjustment

Fuel-Injected Engine:

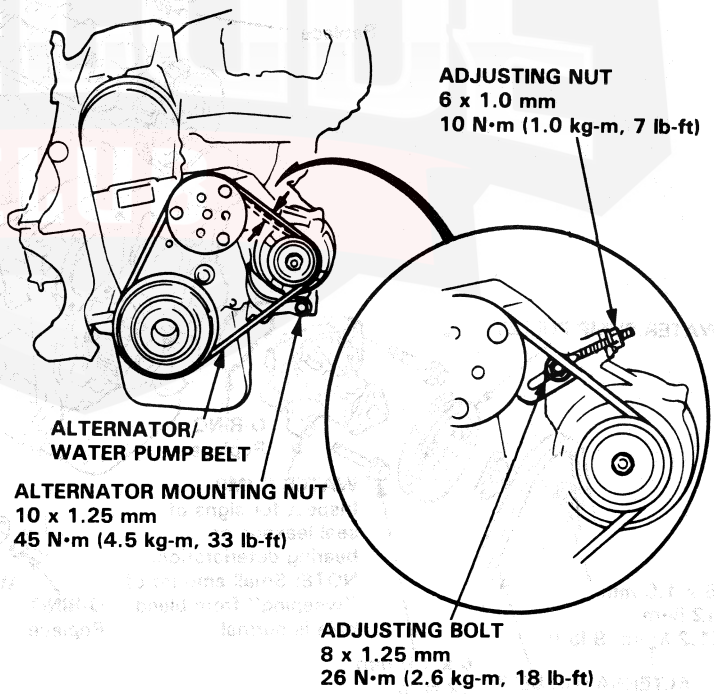
1. Apply a force of 98N (10 kg, 22 lb) and measure the deflection between the alternator and the water pump pulley.

   Deflection: 6—9 mm (0.24—0.35 in)
   When first measured after replacing belt: 5 mm (0.20 in.)

2. Loosen the alternator adjusting nut, bolt and mounting nut.

3. Move the alternator to obtain the proper belt tension and retighten the adjusting nut, bolt and mounting nut.

4. Recheck the deflection of the belt, and readjust if necessary.



Belt Adjustment

Carbureted Engine:

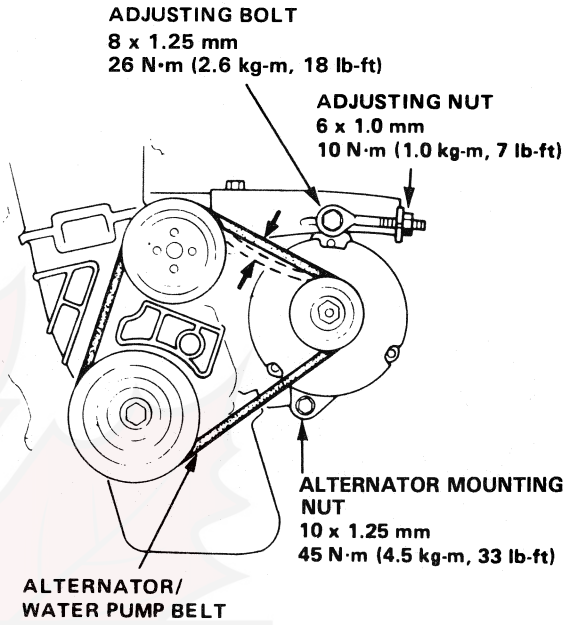
1. Apply a force of 98N (10 kg, 22 lb) and measure the deflection between the alternator and the water pump pulley.

   Deflection: 7—10 mm (0.3—0.4 in.)
   When first measured after replacing belt: 5—7 mm (0.2—0.3 in.)

2. Loosen the alternator adjusting nut, bolt and mounting nut.

3. Move the alternator to obtain the proper belt tension and retighten the adjusting nut, bolt and mounting nut.

4. Recheck the deflection of the belt, and readjust if necessary.

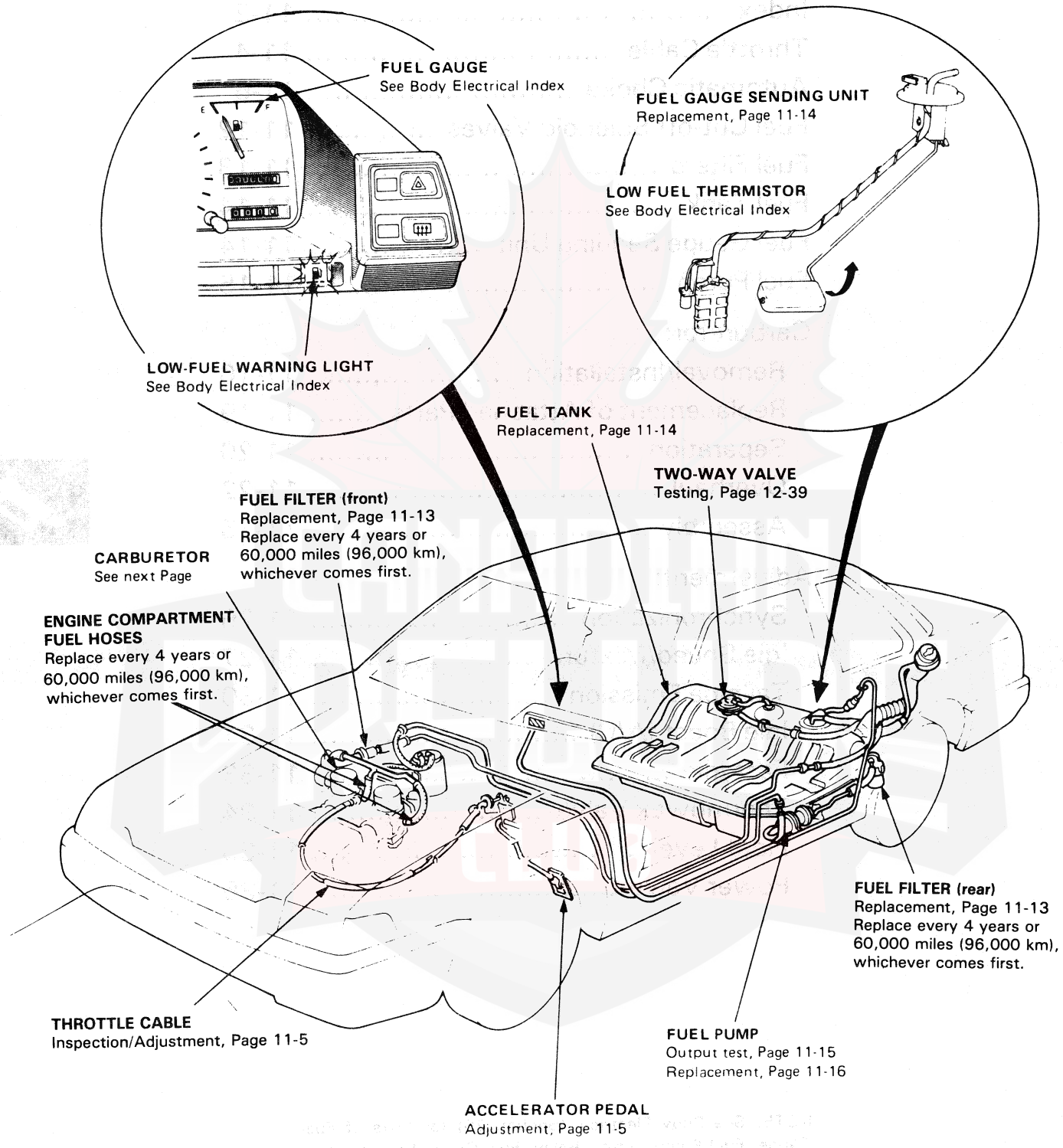


Fuel

Fuel

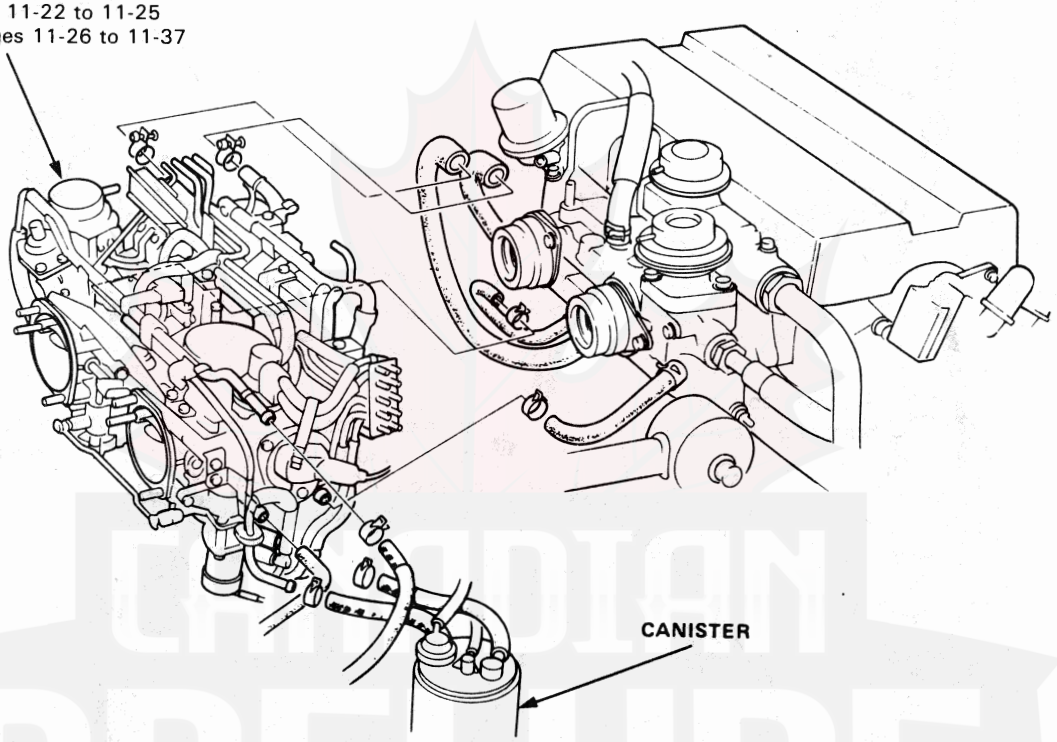
NOTE: See Body Electrical (Section 26) for tests of Fuel Gauge, Fuel Pump Cut-off Relay, Fuel Gauge Sending Unit, and Low Fuel Warning Light.

Fuel System

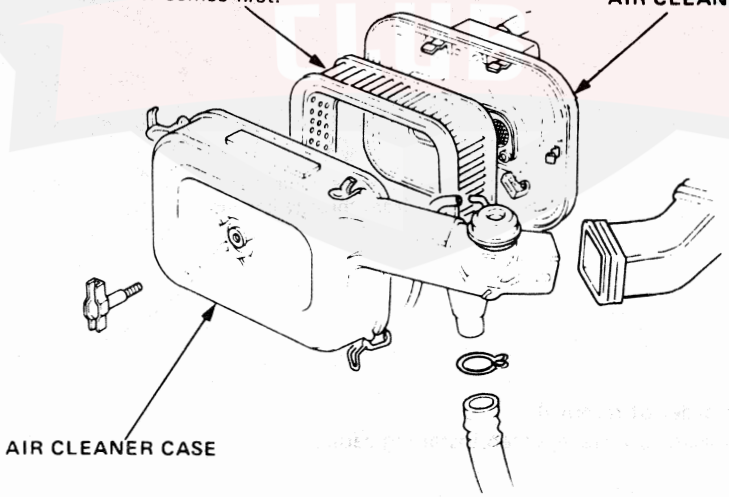


NOTE: Use new gaskets and O-rings whenever reassembling.

CARBURETOR ASSEMBLY
Removal/Installation, Page 11-16
Separation, Pages 11-20 to 11-22
Overhaul, Pages 11-22 to 11-25
Adjustment, Pages 11-26 to 11-37



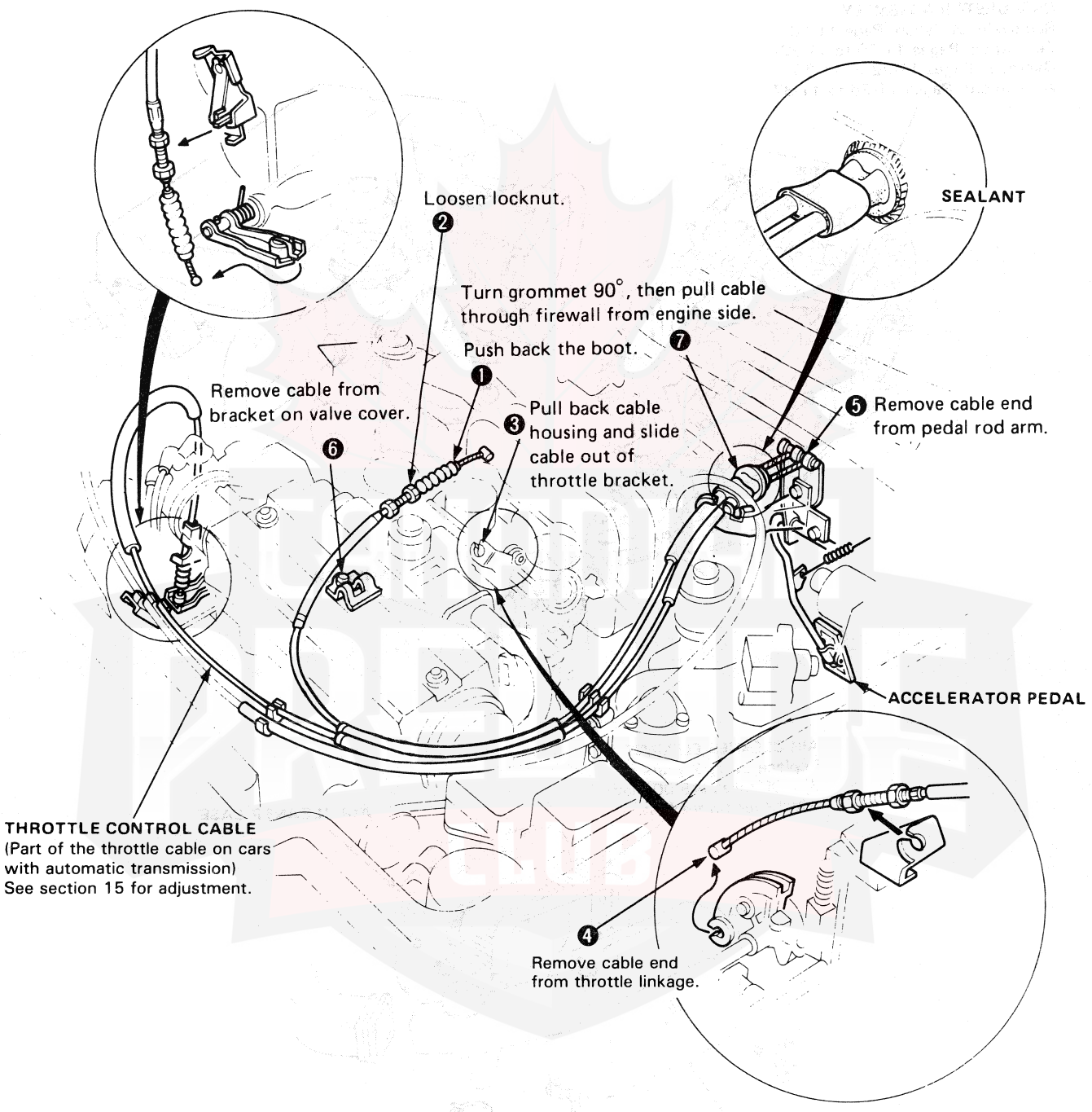
AIR CLEANER ELEMENT
Replace every 2 years or
30,000 miles (48,000 km),
whichever comes first.



Throttle Cable

Replacement

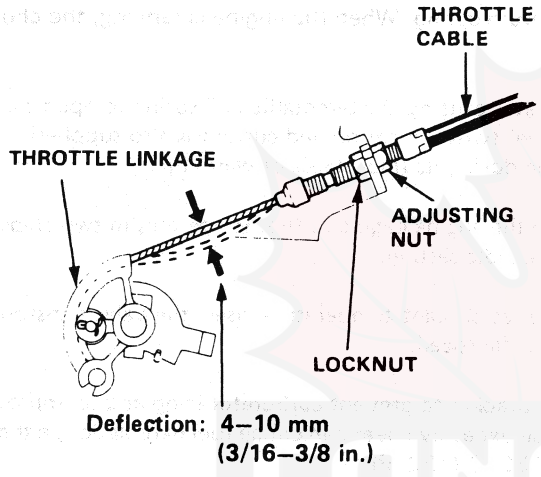
NOTE: Detach cable in the numbered sequence shown.



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

Inspection/Adjustment

1. Warm up engine to normal operating temperature (cooling fan comes on).
2. Check that throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free-play at throttle linkage. 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. Check throttle valve to be sure it returns to idle position whenever you release accelerator.

   NOTE: For cars with automatic transmission, after adjustment, adjust A/T throttle control cable (section 15).

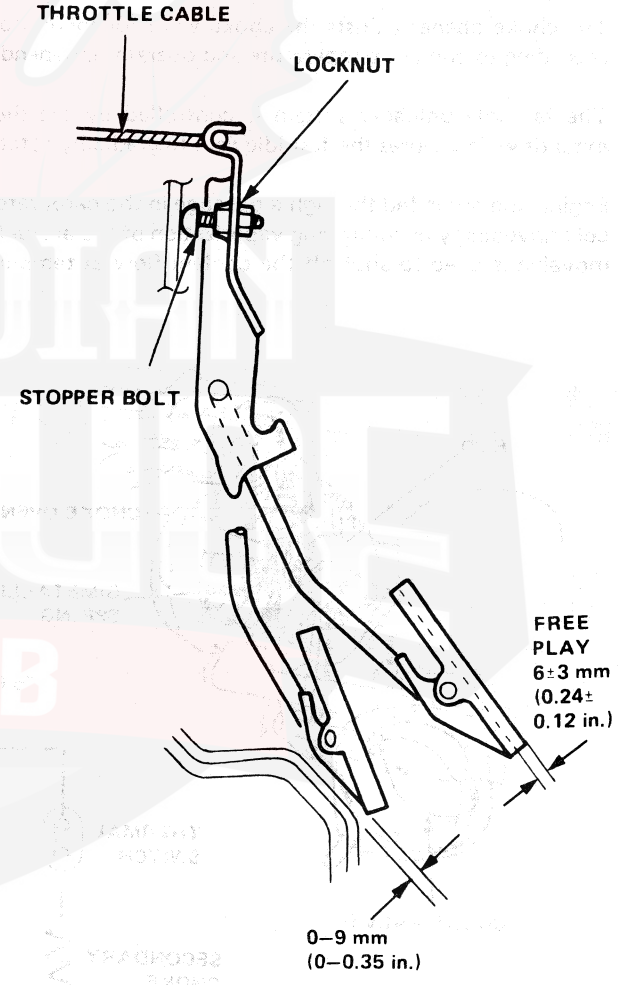
Accelerator Pedal Adjustment

1. With the accelerator pedal held to floor and throttle valve opened fully, measure the clearance between the pedal and floor.

   STANDARD: 0–9 mm (0–0.35 in.)

   If adjustment is necessary, loosen the throttle cable lock nut and turn the adjusting nut until the correct clearance is obtained.
2. Check pedal free-play at the pedal. To adjust free-play, loosen the locknut and turn the stopper bolt.

   STANDARD: 6 ± 3 mm (0.24 ± 0.12 in.)



Automatic Choke

Description

This system provides easy engine starting under a wide range of air temperatures.

The system consists of the following:

a) The choke valve and its linkage system
b) The choke heater electrical circuit
c) The choke opener (page 11-8)
d) The fast idle and fast idle unloader system (page 11-7)

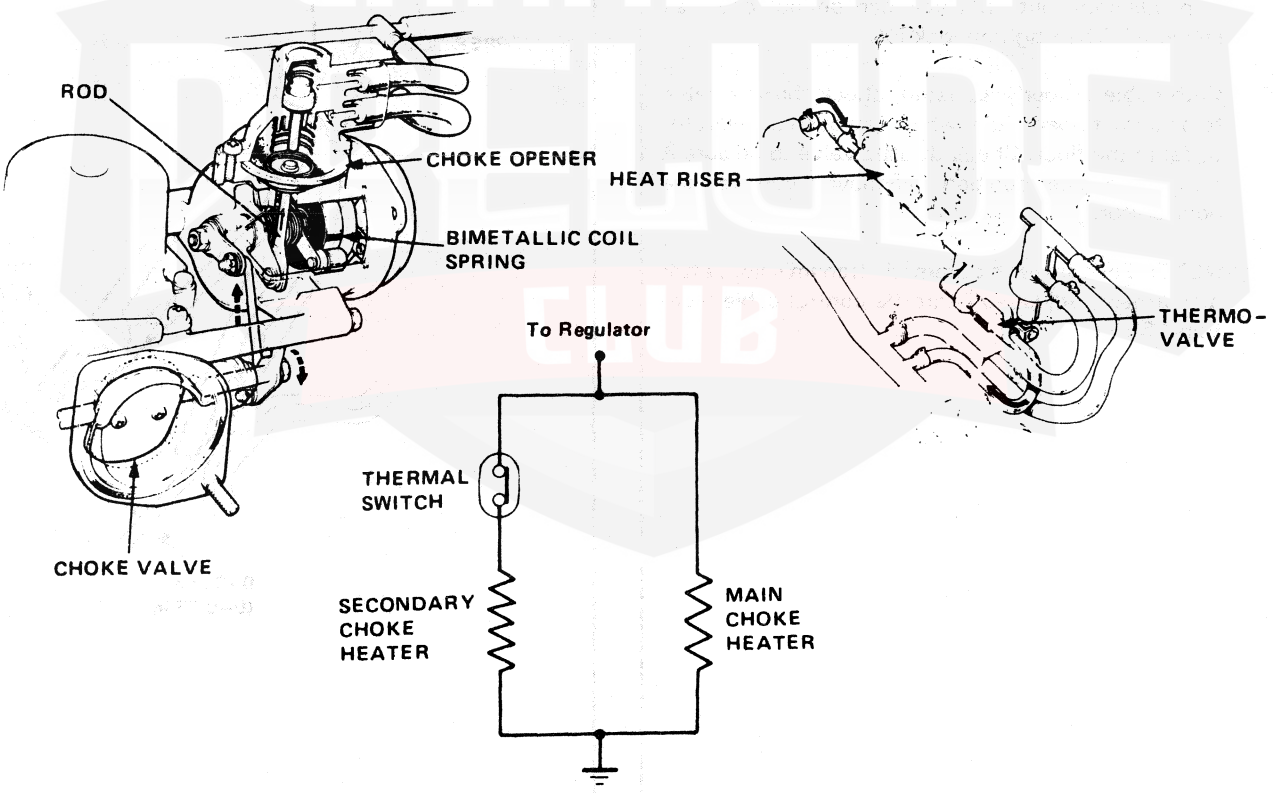
The choke valves are located in the air intakes of the carburetors. When the engine is not running, the choke valve angle is determined by the bimetallic coil spring acting against the choke return spring. When the engine is running, the choke opener also affects the choke valve angle.

When the engine is started, current is supplied to the main choke heater causing the bimetallic coil spring to open the choke valve. As the air temperature in the choke cap rises, the thermal switch turns on and current is also supplied to the secondary choke heater. This speeds the opening of the choke valve during its final stages of warm up.

The choke opener adjusts the choke valve for increased air flow once the engine begins to fire. It operates in two steps according to coolant temperature and operates independently of the fast idle setting.

The fast idle unloader system is controlled by the thermowax valve; as coolant temperature rises, the valve's piston extends which causes the fast idle cam to gradually rotate and decrease idle speed.

Engine coolant is fed through a passage in the carburetor's cast front bracket to prevent carburetor icing and to improve cold driveability by improving vaporization of the air/fuel mixture. Since excessive heat can cause fuel percolation, a thermovalve is used to shut off the coolant flow at temperatures above 50°C (122°F).



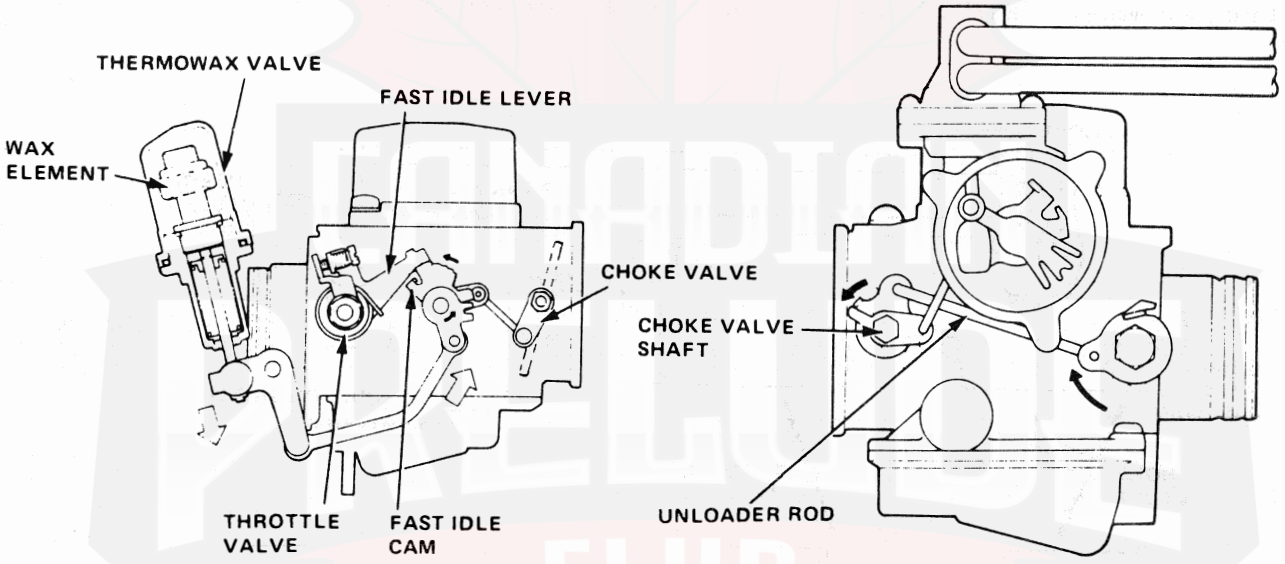
Electric diagram of choke cap

Fast Idle Unloader

The fast idle cam is initially positioned by the bimetallic coil spring, according to the ambient temperature.

As the choke heater warms the bimetallic coil spring, its lever turns clockwise to open the choke valve. The fast idle cam and lever will remain where originally set unless the throttle is depressed to wide open, or the coolant temperature rises enough to cause the thermowax valve piston to extend, which rotates the fast idle cam and causes the lever to step down and decrease the idle speed.

During cold acceleration, if the throttle is opened, with the choke valve still closed, the unloader rod will adjust the choke valve opening with that of the throttle to prevent an over-rich condition.



Automatic Choke

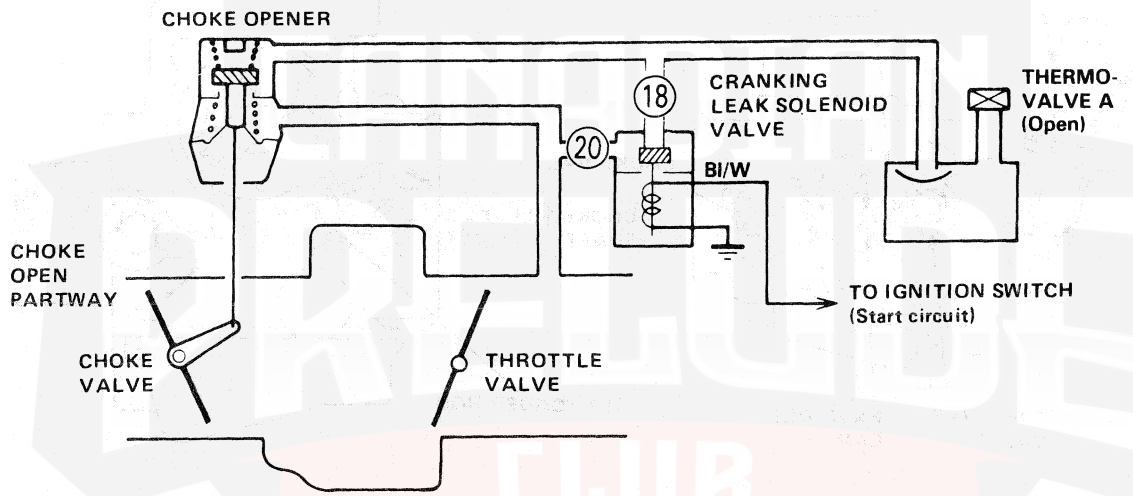
Choke Opener System

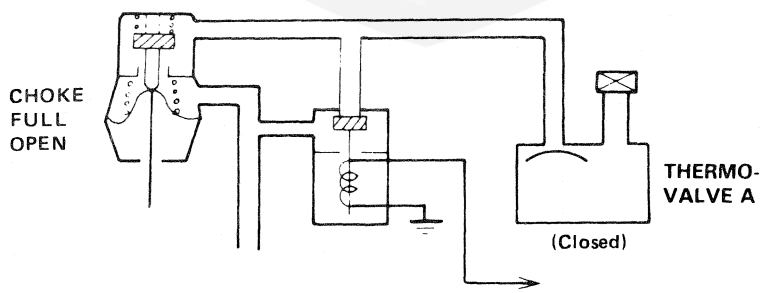
The choke opener assures adequate fuel enrichment on cold start and it adjusts the choke valve opening, once the engine starts, to prevent an over-rich condition from developing. It does this by sensing manifold vacuum, coolant temperature, and ignition switch position.

- Coolant temperature is monitored by thermovalve A; if the coolant temperature is below its set temperature, thermovalve A is open and bleeds off manifold vacuum that would normally open the choke valve.
- When the ignition switch is in the start position, the cranking leak solenoid is energized; this bleeds off manifold vacuum that would normally open the choke valve.

On cold start:
Once the engine starts, and the ignition switch is returned to the run position, the cranking leak solenoid is de-energized; the cranking leak solenoid is now closed and manifold vacuum opens the choke valve a fixed amount. The amount that the choke valve can open is determined by the balance of manifold vacuum and choke opener spring tension. As the coolant warms, and exceeds thermovalve A's set temperature, thermovalve A will close causing full manifold vacuum to be applied to the choke opener.

On warm starts (above thermovalve A's set temperature but still below normal coolant operating temperature):
During cranking, the cranking leak solenoid is energized so the choke remains in its partially closed position.
Once the engine starts, and the ignition switch is returned to the run position, the cranking leak solenoid is de-energized and thermovalve A is closed so full manifold vacuum is applied to the choke opener.





Choke Coil Tension and Linkage

COLD ENGINE

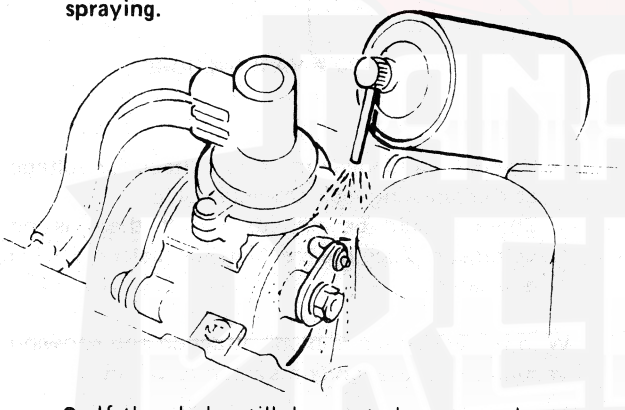
1. Remove the air cleaner.
2. Open and close the throttle fully to let the choke close.

   The choke blade should close completely.

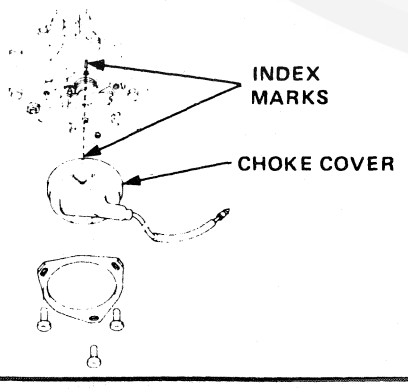
   NOTE: Above about 28°C (82°F), the choke will not close completely, but should still close to less than 3 mm (1/8 in.).

   - If the choke closes properly, go on to the choke opener test in the next column.
   - If the choke does not close properly, spray its linkage with carburetor cleaner, and check it again (use a spray can with an extension on the nozzle to reach the linkage). Also check for binding in the choke linkage.

   CAUTION: Carburetor cleaner is very caustic; always wear safety goggles or a face shield when spraying.



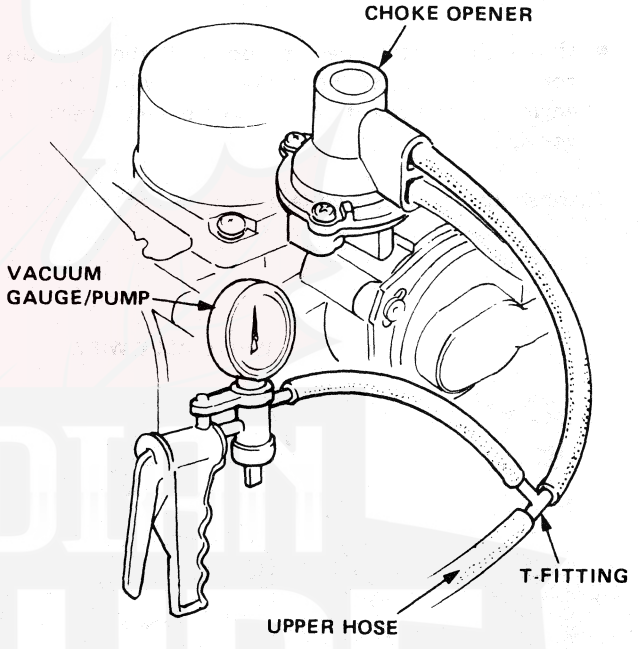
   - If the choke still does not close properly, remove the choke cover (page 11-12) and inspect the linkage inside the choke housing for free movement. Repair or replace parts as necessary. Then reinstall the cover and adjust it.
   - If the choke still does not close properly, replace the cover (page 11-12).



Choke Opener

COLD ENGINE

1. Disconnect the upper hose.
2. Connect a hand vacuum pump/gauge to the disconnected hose as shown.
3. Start the engine and check for vacuum.



Above 15°C (59°F)	Coolant Temperature, vacuum should be available.
Below 15°C (59°F)	Coolant Temperature, there should be no vacuum.

- If the vacuum test results are not as specified, check for blocked or pinched vacuum hoses. If they are OK, replace thermovalve A and retest.

Automatic Choke

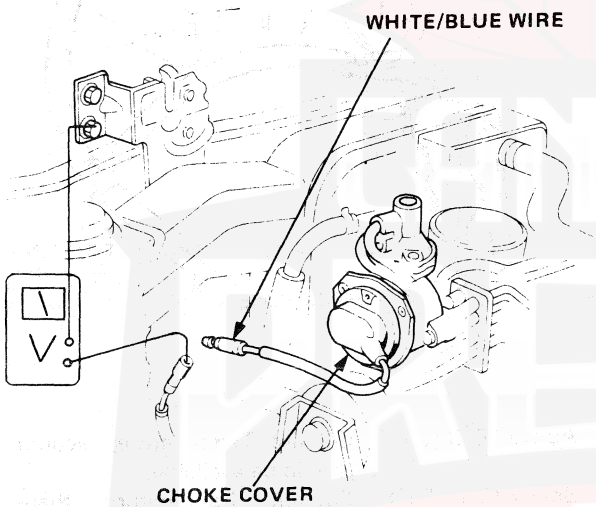
Choke Coil Heater

HOT ENGINE

Start the engine and let it run. As the engine reaches normal operating temperature, the choke blade should fully open:

- If it does, go on to thermowax valve adjustment on page 11-33.
- If it doesn't, inspect the linkage, and clean or repair it as necessary (page 11-9).
- If the choke still does not open all the way, disconnect the white/blue choke cover wire from the engine compartment wire harness and check for voltage.

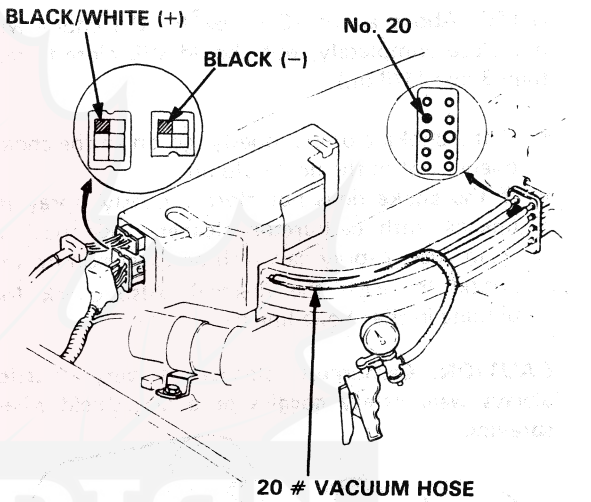
There should be battery voltage with the engine running.



– If voltmeter reads 0 volts, check for an open circuit in the white/blue wire between the choke cover connector and voltage regulator connector, then check the charge warning light circuit.

Cranking Leak Solenoid Valve

1. Disconnect the #20 vacuum hose (the side that goes into the emissions box) at the metal tubing manifold.
2. With the ignition off, apply vacuum to that hose using a vacuum pump.



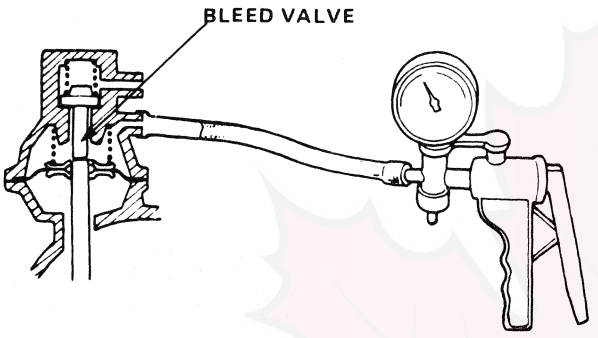
– If should hold vacuum. If not, check for voltage at the cranking leak solenoid valve.
There should be no voltage. If there is no voltage, replace the cranking leak solenoid valve and retest.

3. With the vacuum pump still attached and showing vacuum, turn the ignition switch to START.

– The vacuum should be bled off. If not, check that there is voltage at the cranking leak solenoid valve with the switch in the START position. If voltage is present, replace the cranking leak solenoid valve.

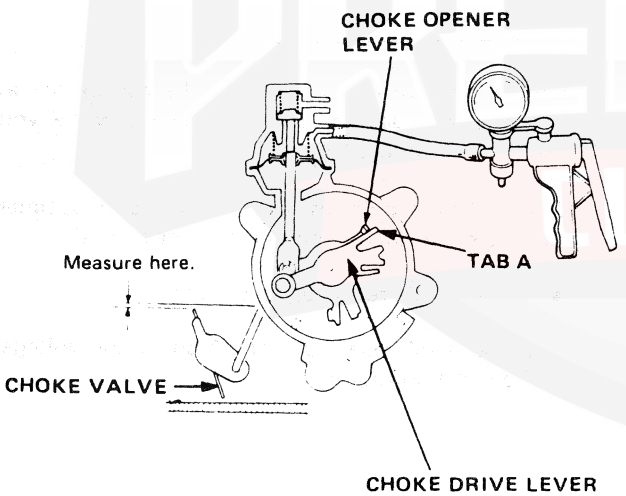
Choke Linkage Adjustment

1. Remove the air cleaner.
2. Remove the choke cover (page 11-12).
3. Disconnect the upper choke opener hose to the thermovalve and leave open to atmosphere. Disconnect the lower hose and attach a hand vacuum pump as shown. Apply at least 200 mm Hg (8 in. Hg).



If vacuum drops below 200 mm Hg (8 in. Hg), you have opened the bleed valve. Slowly reapply vacuum until you can maintain the highest level without losing vacuum; this will bring the opener rod as close as possible to the bleed valve.

4. Turn the choke drive lever counter-clockwise until it touches the choke opener lever and measure the clearance between the choke valve and the casting.

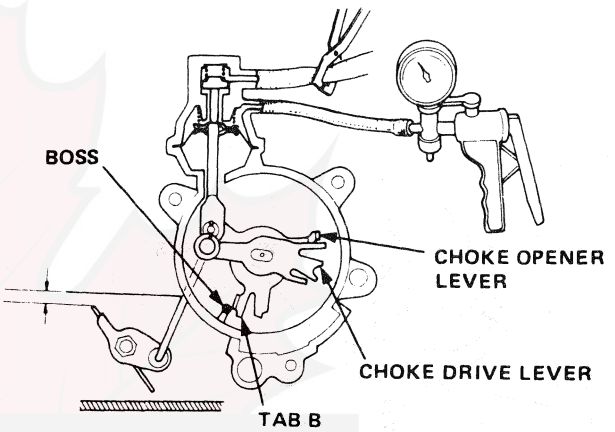


1st Stage Clearance:

M/T	3.11 ± 0.07 mm (0.122 ± 0.003 in.)
A/T	2.39 ± 0.07 mm (0.094 ± 0.003 in.)

Adjust clearance by bending Tab A.

5. Clamp off the upper vacuum hose as shown, then pull the choke opener rod to the full extended position, by using the hand vacuum pump until it shows 150–180 mm Hg (6–7 in. Hg).
6. Turn the choke drive lever counterclockwise until Tab A seats against the choke opener lever, and measure clearance between the choke valve and casting:

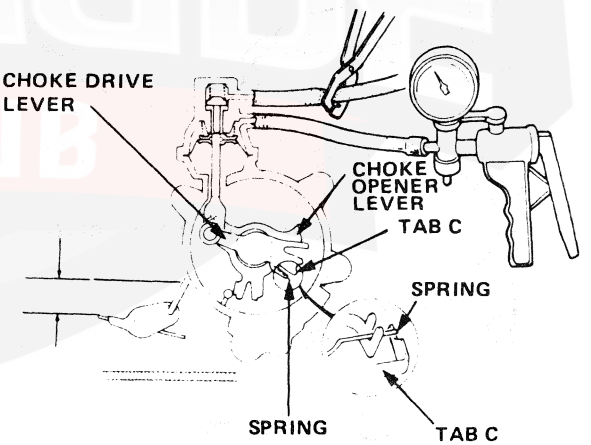


2nd Stage Clearance:

M/T	5.19 ± 0.09 mm (0.204 ± 0.004 in.)
A/T	5.19 ± 0.09 mm (0.204 ± 0.004 in.)

Adjust clearance by bending Tab B.

7. While still holding the opener lever against the tab, turn the choke drive lever until Tab C touches the spring and measure clearance at the choke valve:



3rd Stage Clearance:

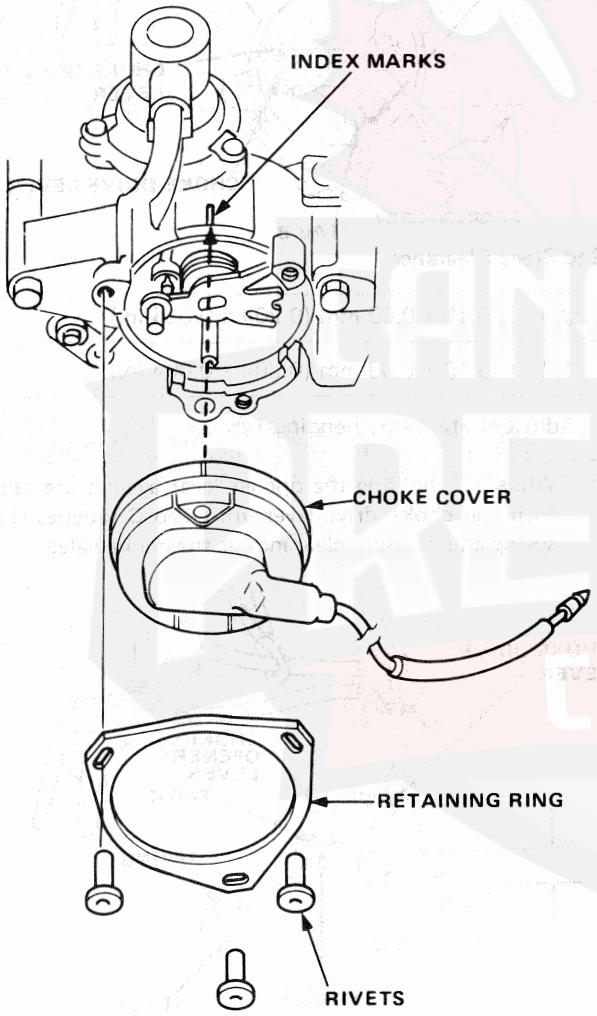
M/T	10.25 ± 0.24 mm (0.403 ± 0.009 in.)
A/T	10.25 ± 0.24 mm (0.403 ± 0.009 in.)

Adjust clearance by bending Tab C.

Automatic Choke

Choke Cover Replacement

1. Using a 5/32" or 4.1 mm diameter drill, drill out the rivets and remove the retaining ring.
2. Remove the choke cover.
3. Reinstall cover and adjust it so that the index marks align.
4. Reinstall the retainer ring and secure with rivets.



Fuel Cut-off Solenoid Valves

Inspection

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

WARNING

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

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

NOTE: You should test the solenoids several times to ensure that there is no intermittent failure.

- If the needle retracts, go to steps 3.
- If the needle does not retract, check the voltage from the control unit.

— If voltage is present, replace the solenoid valve and re-test.
— If voltage is not present, check the wiring and go to troubleshooting (page 12-50).

3. Reinstall the solenoid valve.

4. Start the engine, wait for it to warm up. Cooling fan comes on.

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

6. Place the shift or selector lever in second or 2 position and accelerate, then suddenly release the throttle and check for voltage during deceleration above 15 mph.

There should be no voltage.

- If voltage is not present, test is complete.
- If voltage is present, go to troubleshooting (page 12-50).

Fuel Filters

Replacement

Replace both front and rear filters every 4 years or 60,000 miles (96,000 km), whichever comes first.

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

Front

1. Use fuel line clamps to pinch off the fuel lines.
2. Disconnect the fuel lines and remove the fuel filter.

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

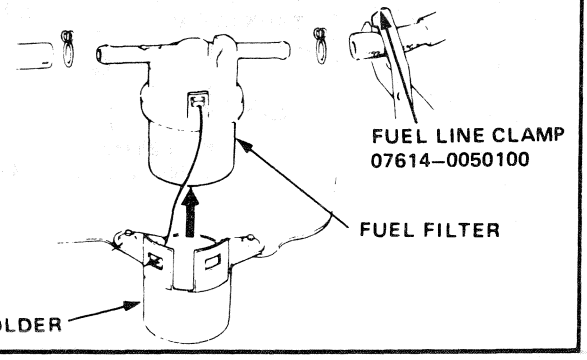
3. Remove the filter cover from the old filter and install it on the new filter.
4. Install the new fuel filter.
5. Remove the fuel line clamps.

Rear

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

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

6. Install in the reverse order of removal.



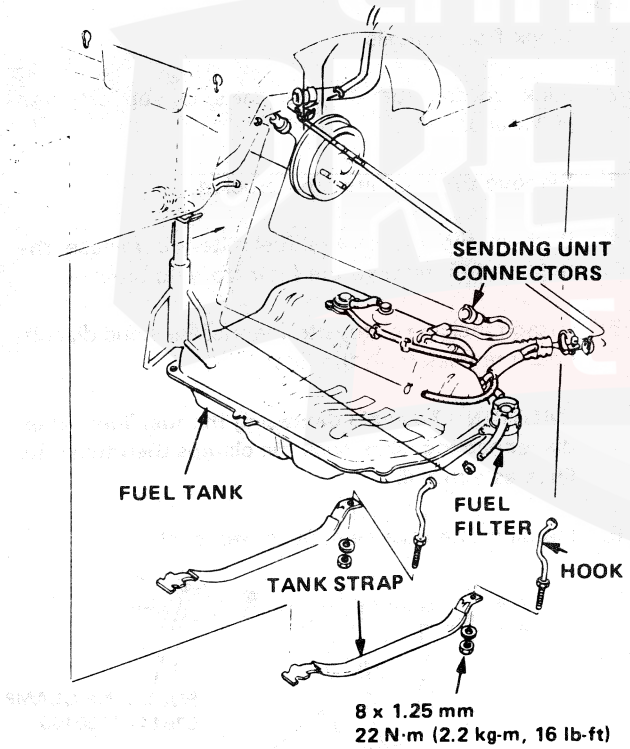
Fuel Tank

Replacement

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

1. Block front wheels.
2. Jack up the rear of the car and support with jackstands.
3. Remove the drain bolt and drain the fuel into an approved container.
4. Disconnect the sending unit connectors.
5. Disconnect the hoses.

   CAUTION: When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.
6. Place a jack, or other support, under the tank.
7. Remove the strap nuts and let the straps fall free.
8. Remove the fuel tank.
9. Install a new washer on the drain bolt, then install parts in the reverse order of removal.

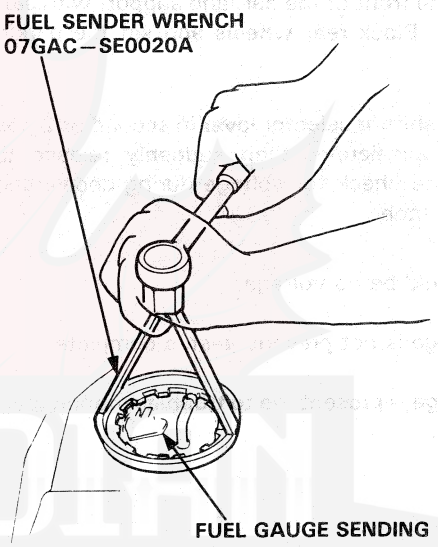


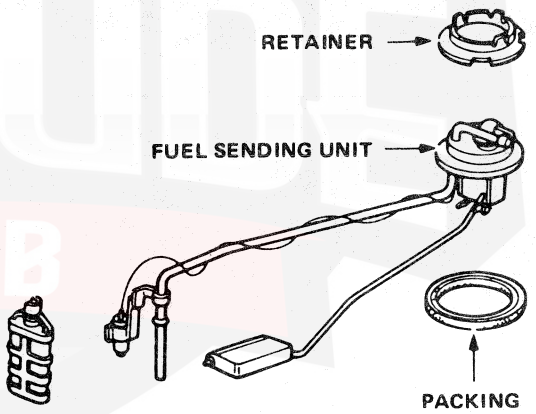
Fuel Gauge Sending Unit

Replacement

1. Check that ignition switch is OFF, then disconnect fuel sending unit connector at tank.

   WARNING **Do not smoke while working on fuel system. Keep open flame away from work area. Drain fuel only into an approved container.**
2. Drain and remove fuel tank as shown on this page.
3. Remove fuel sending unit from tank.





NOTE: See Body Electrical for test of the Fuel Gauge Sending Unit.

Fuel Pump

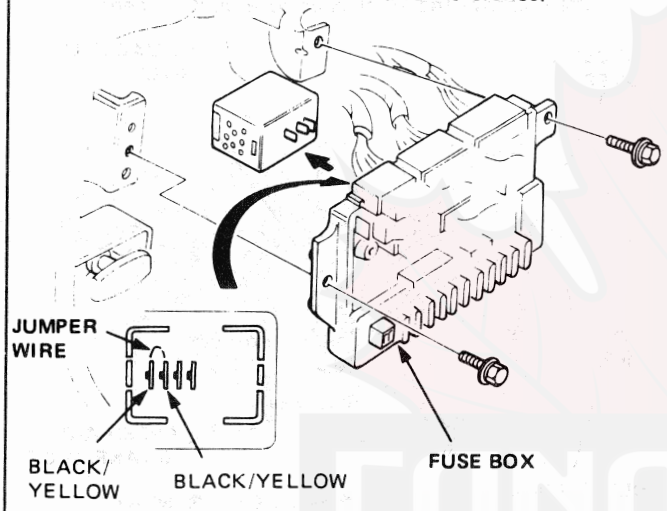
Output Test

NOTE: See Body Electrical for Test of Fuel Pump Cut-off Relay.

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

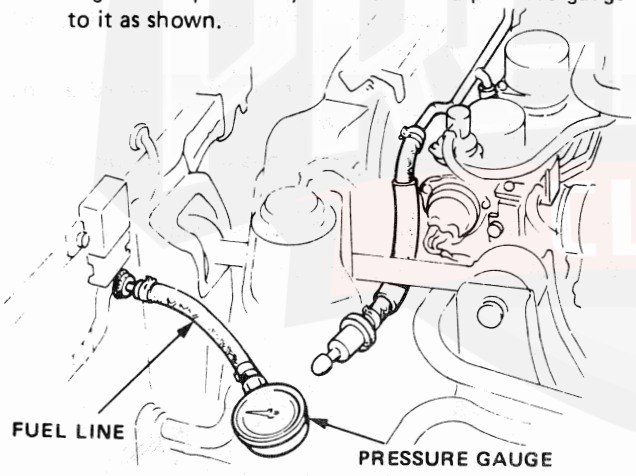
2. Connect a jumper wire between the two black/yellow wires at the fuel pump cut-off relay connector.

NOTE: Fuse box shown removed for reference.



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

3. Disconnect the fuel line at the fuel filter in the engine compartment, and connect a pressure gauge to it as shown.



4. Turn ignition ON until pressure stabilizes, then turn key off.

   Pressure should be 13.8–20.6 kPa (2–3 psi).

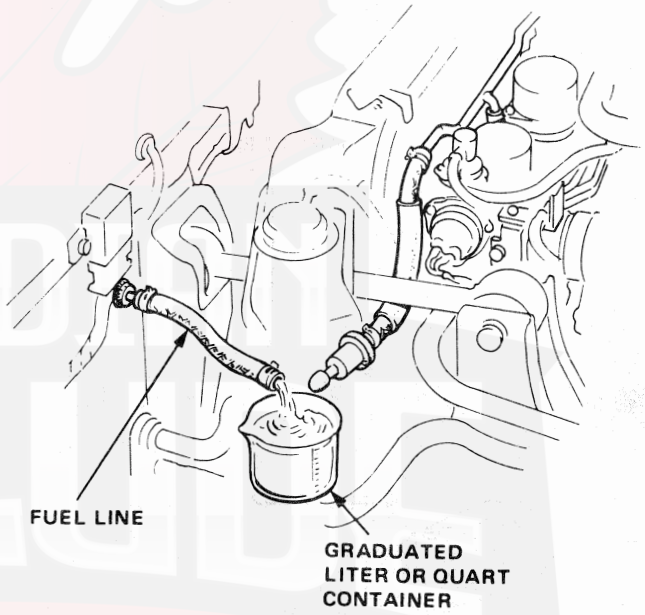
   - If gauge shows at least 13.8 kPa (2 psi) go on to step 4.
   - If gauge shows less than 13.8 kPa (2 psi), replace pump and re-test.

5. Remove pressure gauge and hold a graduated container under the hose.

6. Turn ignition ON, measure amount of fuel flow for 60 seconds, then turn ignition OFF.

   Fuel flow should be more than 680cc (23 oz.) in 60 seconds with battery voltage at 10 volts minimum.

   - If fuel flow is 680cc (23 oz.) or more in 60 seconds, reconnect cut-off relay and fuel hose.
   - If fuel flow is less than 680cc (23 oz.) replace the fuel pump and re-test.



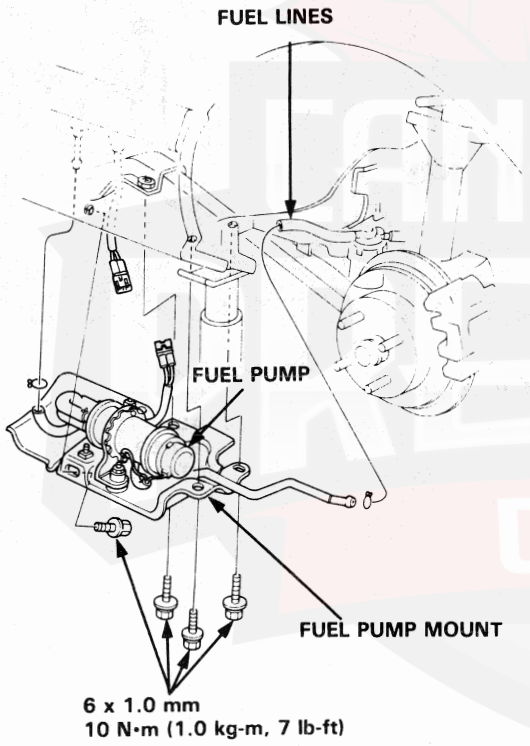
Fuel Pump

Replacement

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

1. Block front wheels.
2. Jack up rear of car and support with jack stands.
3. Remove left rear wheel.
4. Attach fuel line clamps to fuel pump lines.
5. Disconnect fuel lines and connector at fuel pump.

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



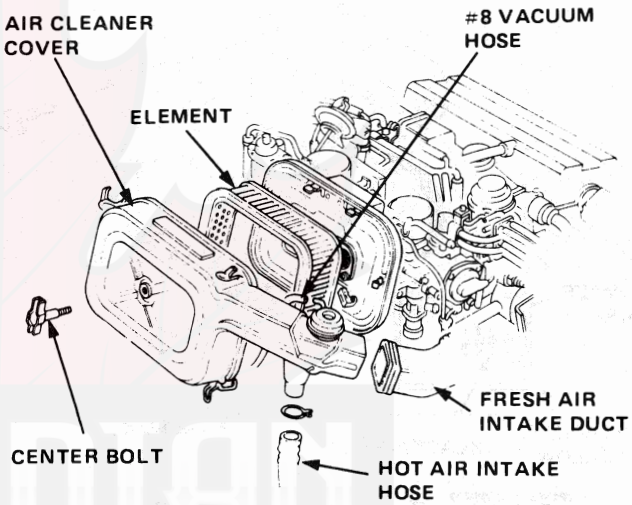
6. Remove fuel pump with mount.
7. Remove fuel pump from its mount.
8. Install in the reverse order of removal.

Carburetor

Removal/Installation

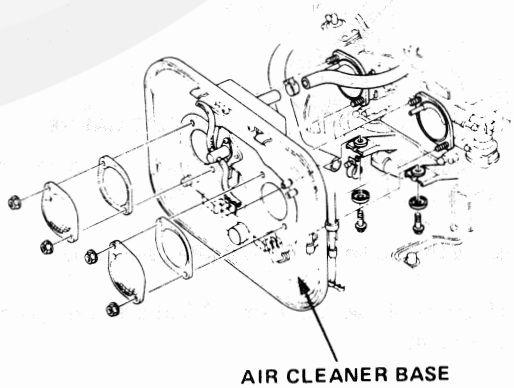
WARNING **Do not smoke during this procedure. Keep any open flame away from your work area.**

1. Disconnect the fresh air intake duct and hot air intake hose from the air cleaner cover.
2. Disconnect the vacuum hose #8 (to hot air intake control diaphragm).
3. Unsnap the four clips and remove the center bolt, then remove the air cleaner cover and element.



4. Disconnect the breather hose from the valve cover.
5. Disconnect the hoses attached to the air cleaner base.

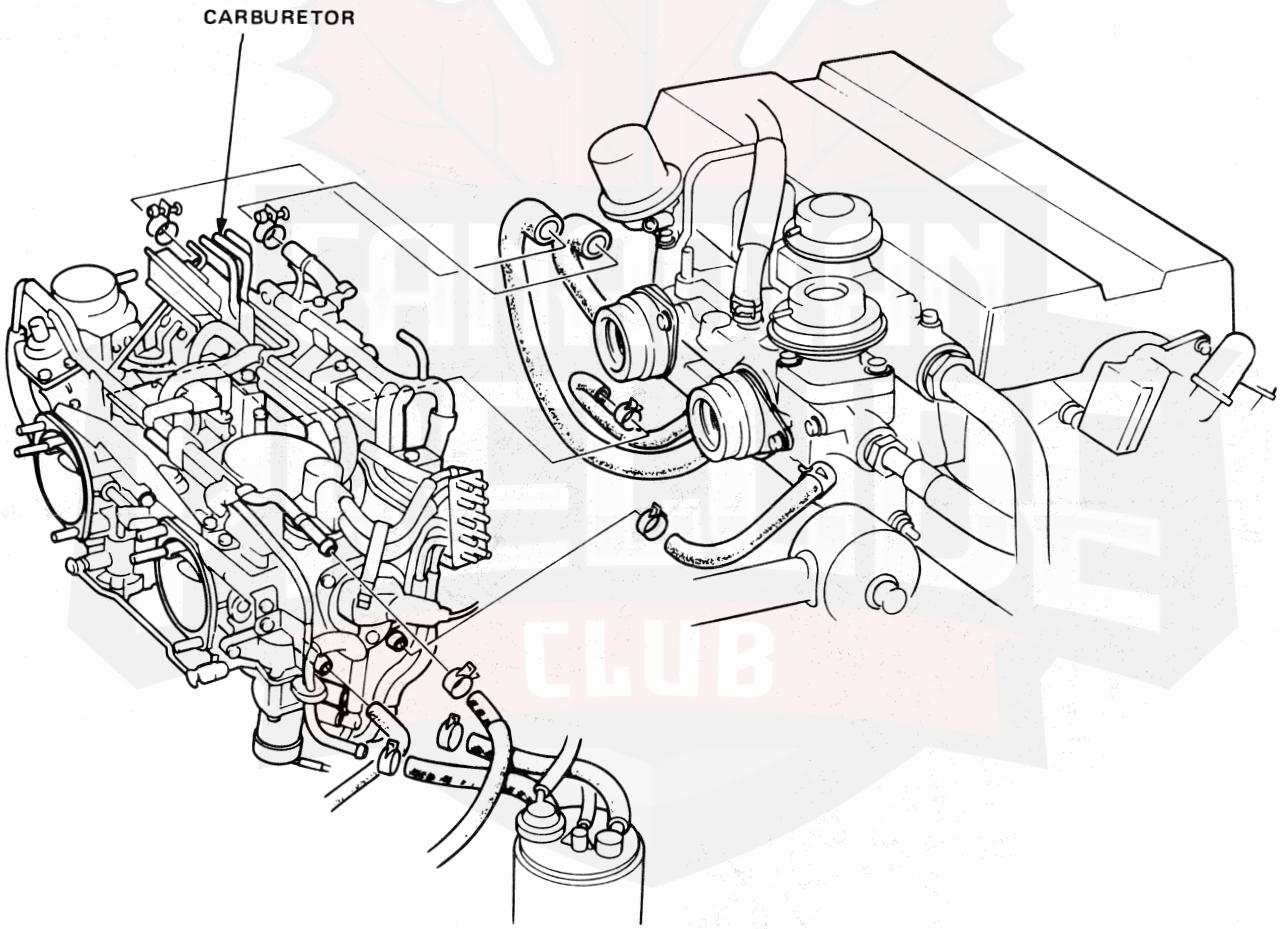
   NOTE: Identify the hose connections so they can be reconnected correctly.
6. Disconnect the connectors to the solenoid at the top of the air cleaner base.
7. Remove the two 10 mm bolts under the air cleaner base.
8. Remove the four nuts, air screens and flanges.
9. Remove the air cleaner base.



10. Disconnect all vacuum hoses and lines from the carburetor.

    NOTE: Identify the hose connections so they can be correctly reconnected.

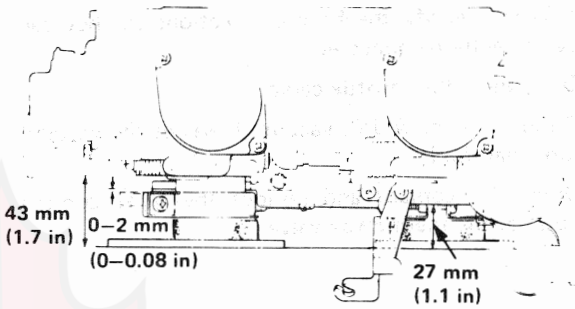
11. Disconnect the throttle cable.
12. Disconnect the A.J.C. vacuum hoses at the vacuum tube manifold.
13. Drain the coolant and remove the three coolant hoses at the thermowax valve.
14. Disconnect the vent hose from canister to the air vent cut-off solenoid valve.
15. Disconnect the canister purge hose at the vacuum tube manifold.
16. Disconnect the carburetor wire connector and choke heater wire connector.
17. Remove the main fuel hose from the right side of vacuum tube manifold.
18. Loosen the insulator bands and remove the carburetor with the vacuum tube manifold attached.

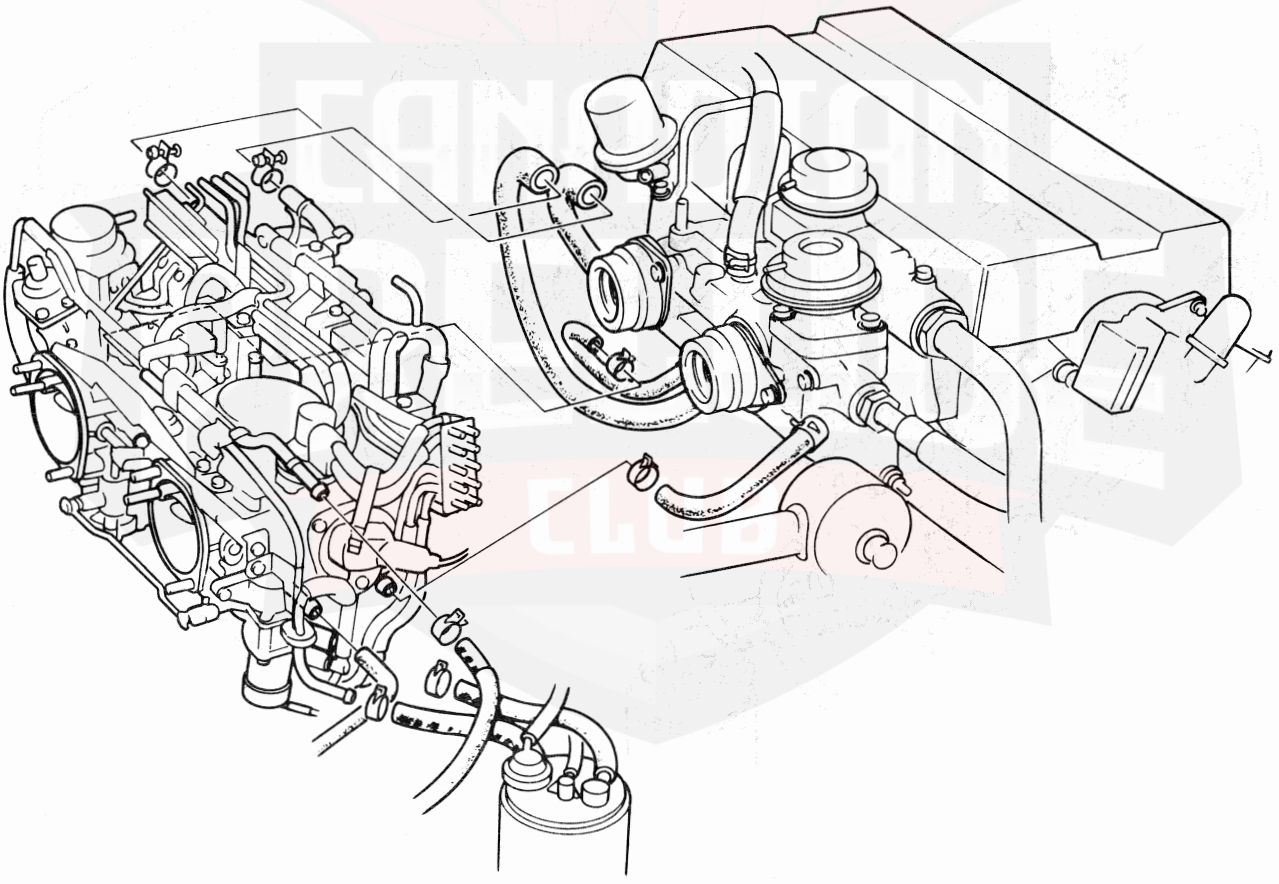


(cont'd)

Removal/Installation (cont'd)

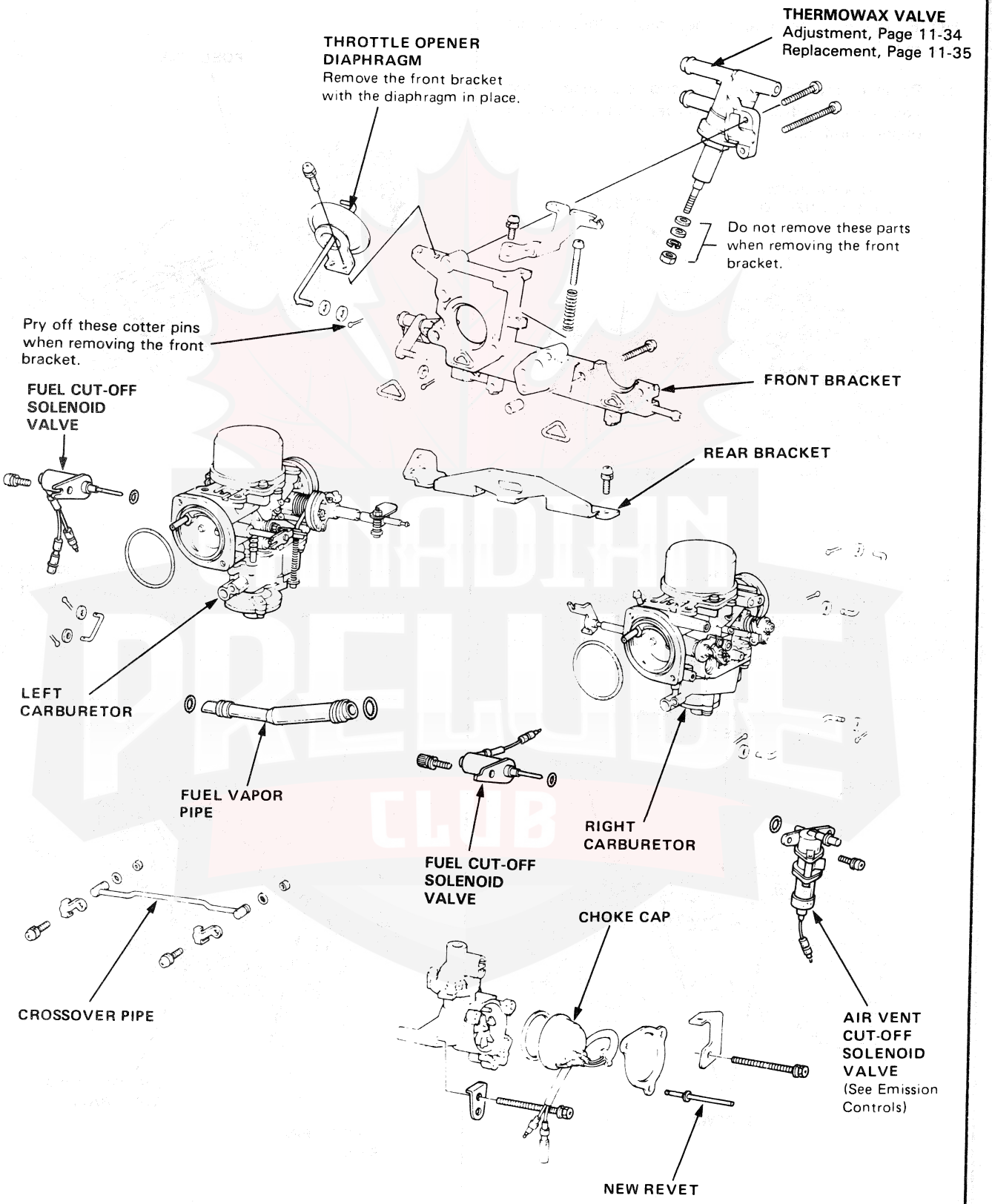
19. Install the carburetors in the reverse order, checking the following items:
    - Check that the vacuum hoses are routed properly and that they are not pinched or kinked.
    - Fill the engine with coolant, then bleed air from the system. Check the level of the coolant and add up to proper level if necessary.
    - Check idle speed, fuel/air mixture and carburetor synchronization, and adjust if necessary.
    - Make sure that the carburetors are fully seated in the insulator and tight.





Replacement of Attached Parts

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

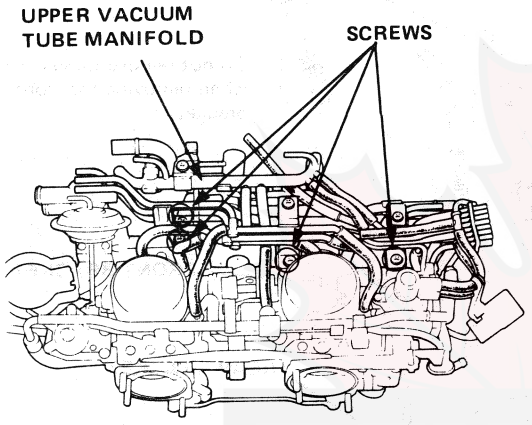


Separation

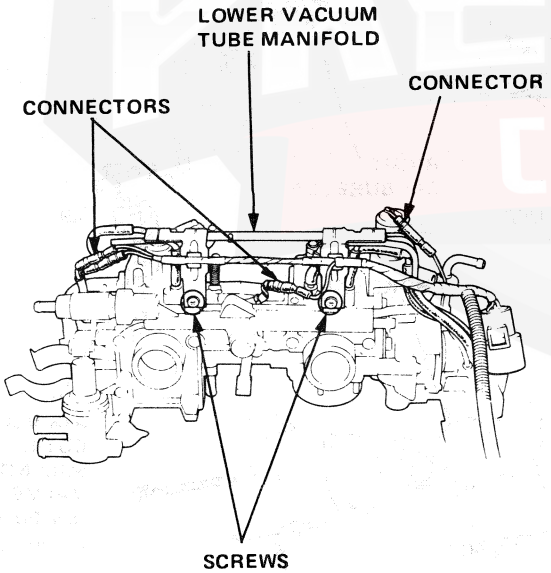
WARNING **Don't smoke during this procedure. Keep any open flames or sparks away from your work area.**

NOTE: Identify the hose connections so they can be reinstalled correctly.

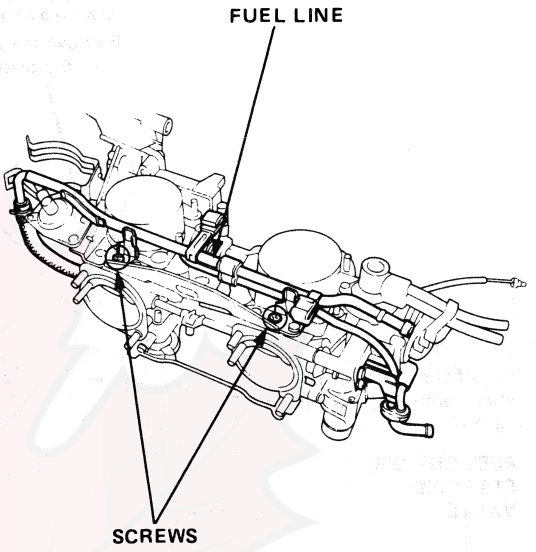
1. Remove the four screws and disconnect the vacuum tubes from carburetors, then remove the upper manifold.



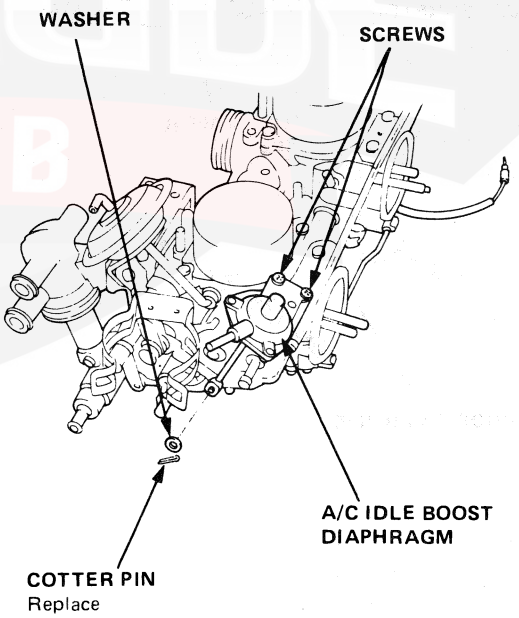
2. Disconnect the connectors for the fuel cut-off solenoid valve and air vent cut-off solenoid valve. Disconnect the vacuum hose from the carburetor and remove the two screws and then remove the lower vacuum tube manifold.



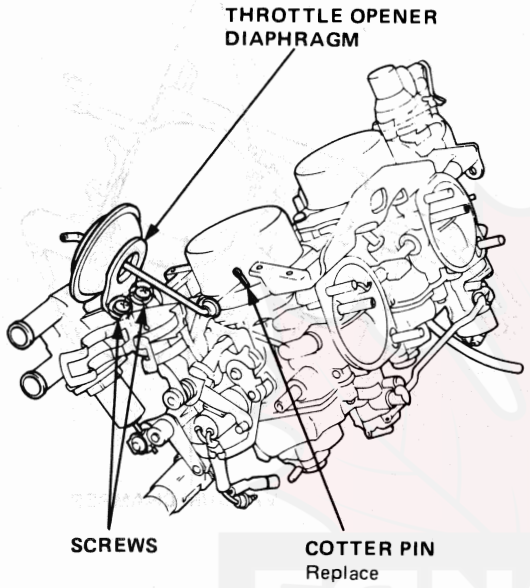
3. Disconnect the fuel hoses from the carburetors and remove the two screws and fuel line.



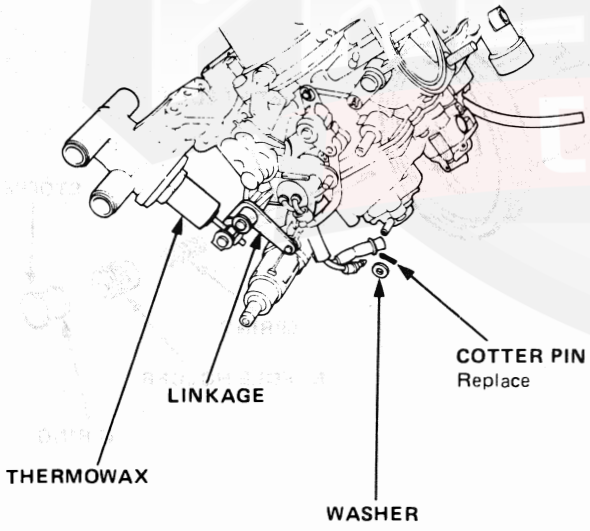
4. Remove the two screws that secure the idle boost diaphragm. Pull out the cotter pin and washer then remove the A/C idle boost diaphragm.



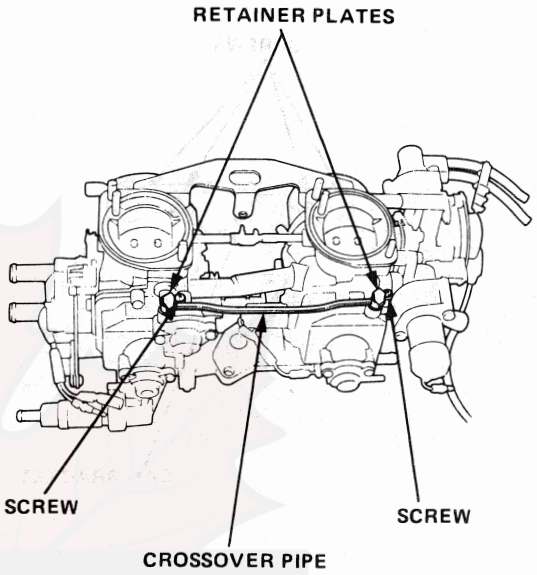
5. Remove the two screws and disconnect the linkage by pulling out the cotter pin. Discard the cotter pin. Remove the throttle opener diaphragm.



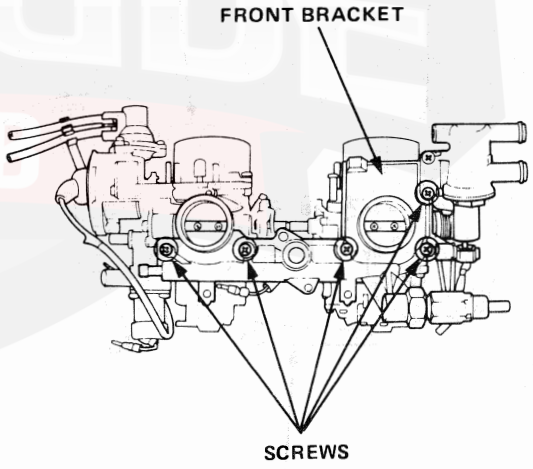
6. Remove the cotter pin and discard it then disconnect the thermowax linkage.



7. Remove the two screws and fuel crossover pipe.



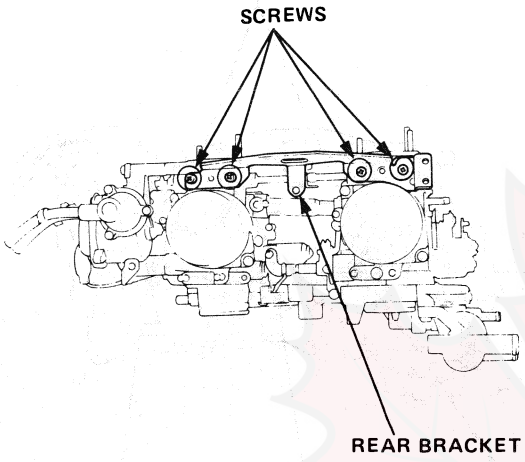
8. Remove the five screws and front bracket.



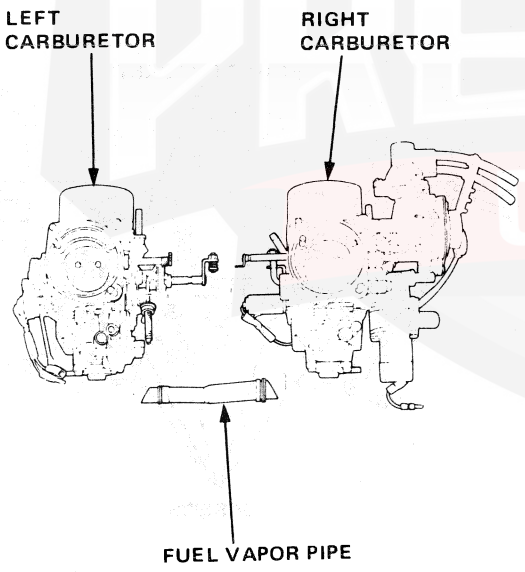
(cont'd)

Separation (cont'd)

9. Unhook the choke shaft spring. Remove the four screws and rear bracket.

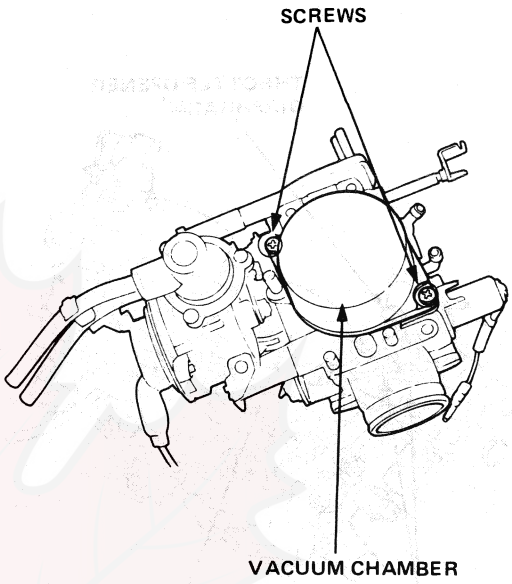


10. Separate the left and right carburetors.

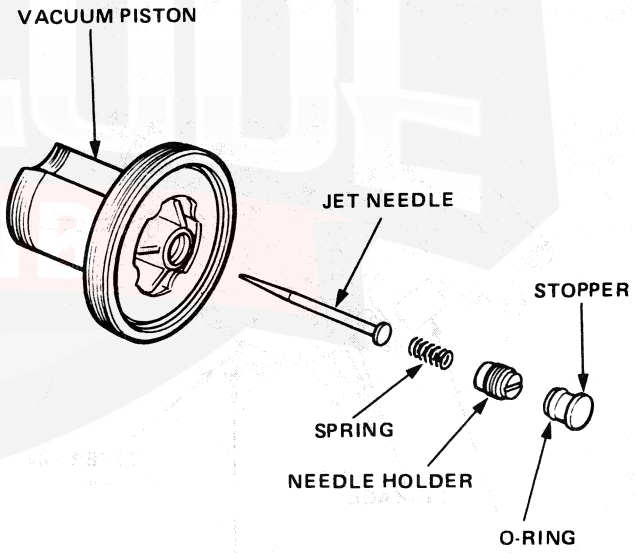


Overhaul

1. Remove the vacuum chamber. Remove the vacuum piston and spring.

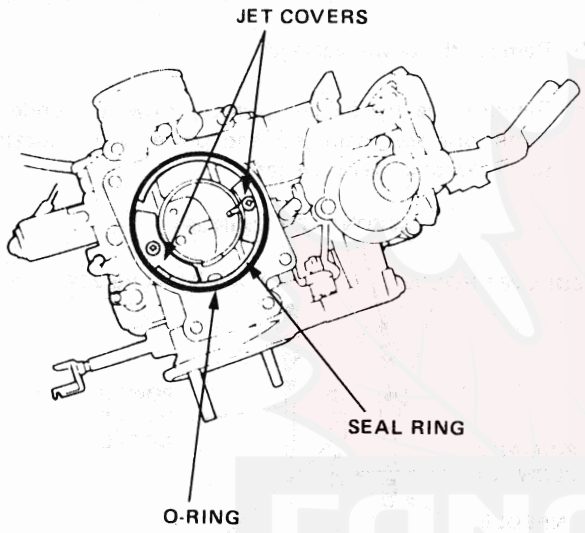


2. Check the piston and needle for wear or damage. Replace if necessary.



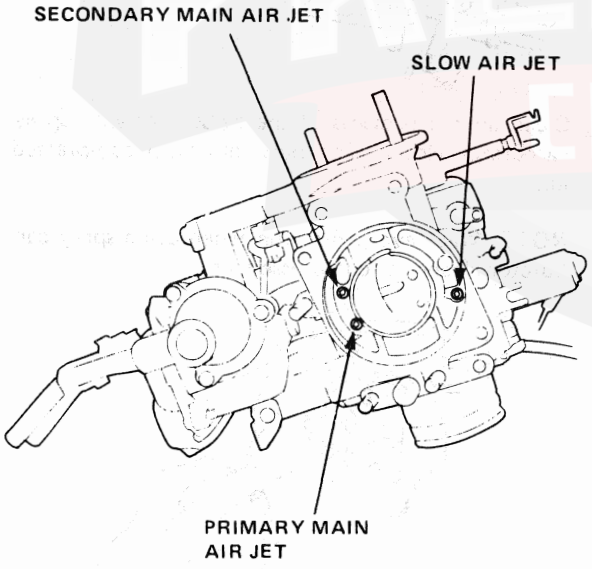
3. Remove the seal ring and O-ring.

4. Remove the two screws, plate, jet covers and gaskets from the carburetor to expose the air passages.



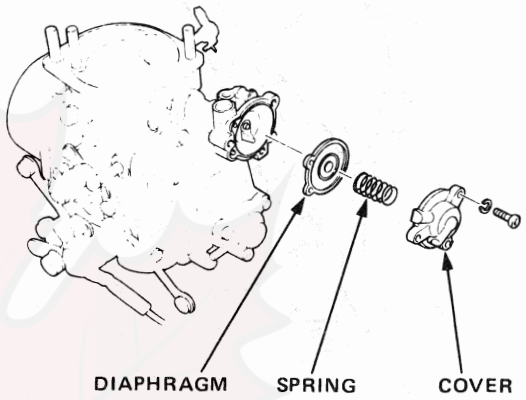
5. Remove the primary and secondary main air jets and slow air jet.

NOTE: Don't mix up the jets.

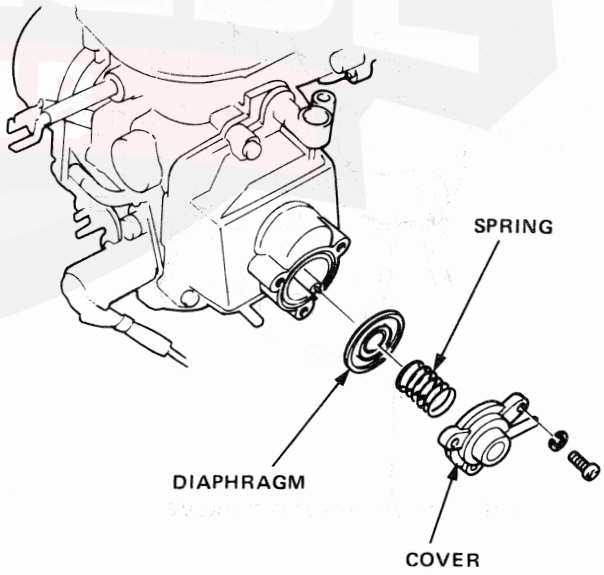


6. Remove the accelerator pump cover, spring and diaphragm from the left carburetor.

7. Check the diaphragm and spring for cracks or damage. Replace as necessary.



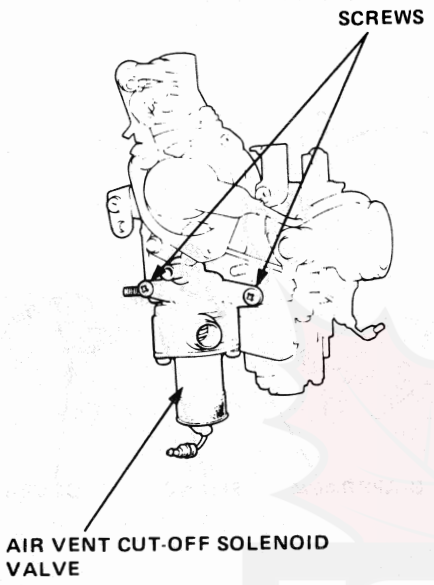
8. Remove the three screws, power valve cover, spring and the diaphragm.
Check the diaphragm and spring for damage. Replace as necessary.



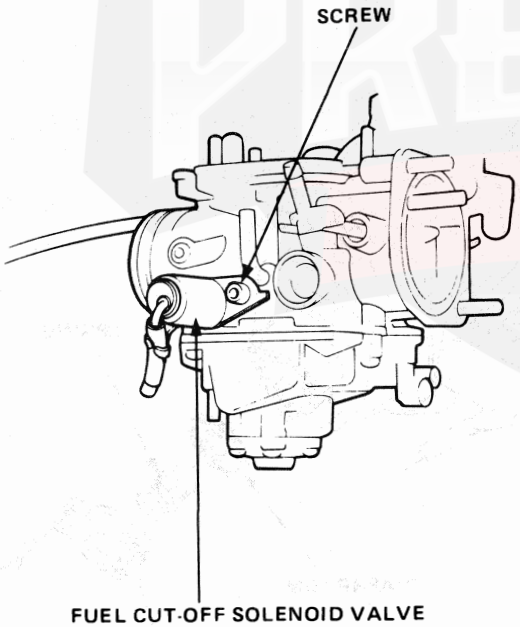
(cont'd)

Overhaul (cont'd)

9. Remove the air vent cut-off solenoid valve at the right carburetor.



10. Remove the fuel cut-off solenoid valve.



11. Remove the float bowl.

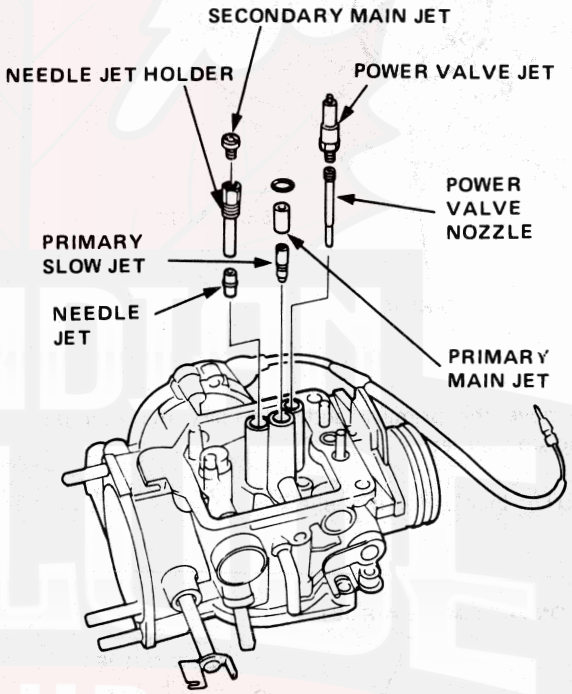
12. Remove the float arm pin, float and float valve.

13. Remove the secondary main jet and needle jet holder.

14. Remove the primary main jet (press fit with O-ring).

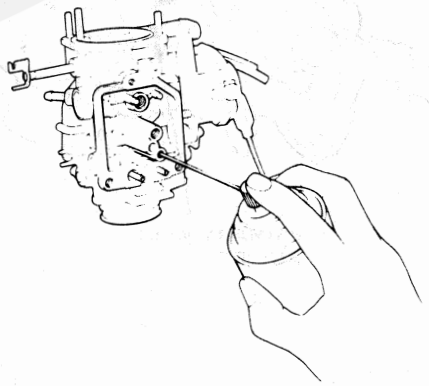
15. Remove the power valve jet.

16. Remove the needle jet, primary slow jet (underneath primary main jet) and power valve nozzle (underneath power valve jet).



17. Clean all the passages of the carburetor with spray carburetor cleaner and blow out with compressed air.

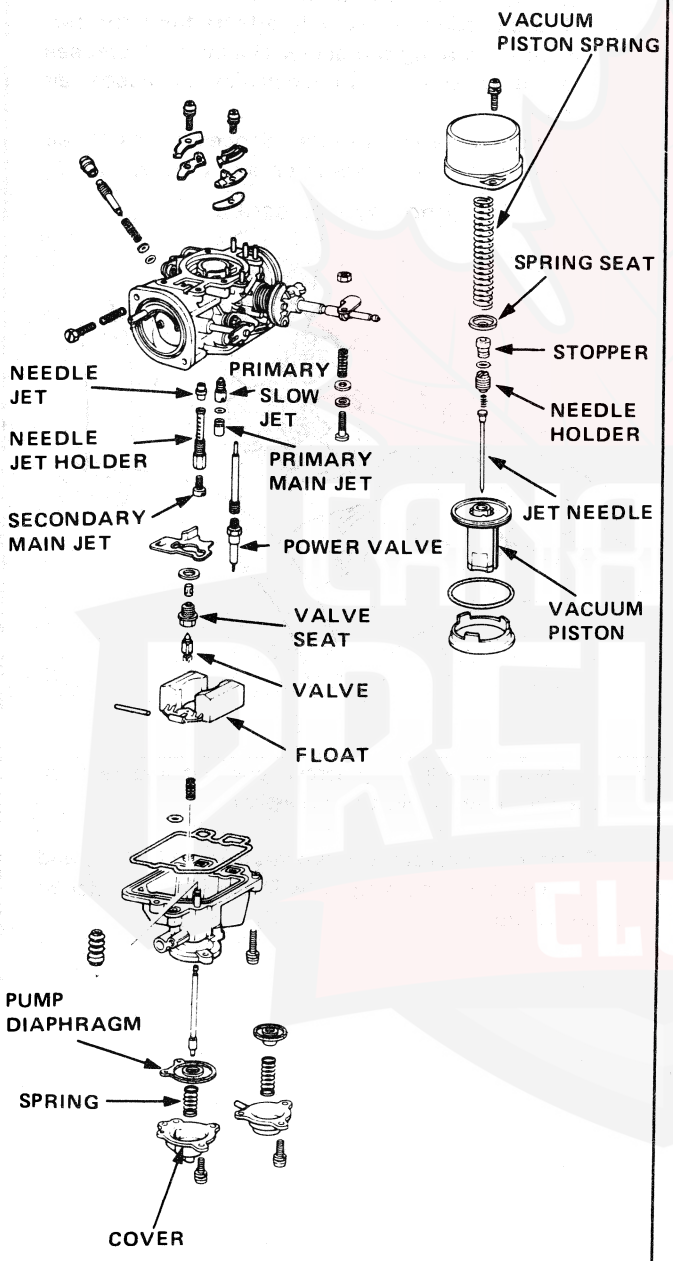
NOTE: Wear eye protection when using spray carburetor cleaner or compressed air.



18. Reinstall all the jets into their proper positions. Replacing O-rings and filter where necessary.

19. Check float level and adjust as necessary (page 11-35).

20. Reinstall the removed parts in the reverse order of disassembly.

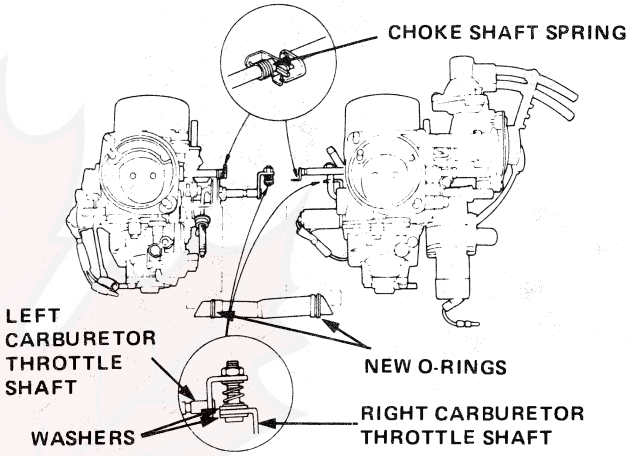


Assembly

1. Insert the right carburetor's throttle shaft end (forked), between the washers on the left 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.

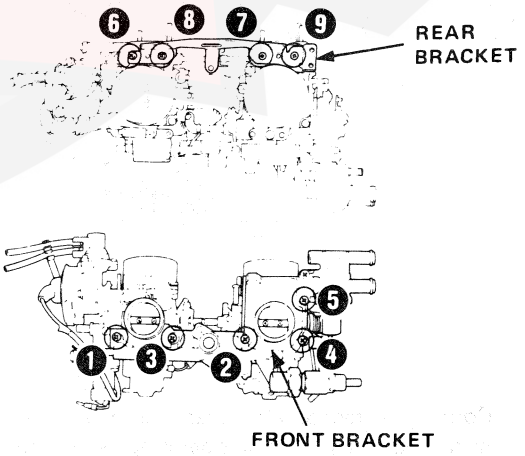
5. Install the rear bracket but don't tighten its screws yet.

6. 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.

7. Check that the choke and throttle shafts move smoothly without binding.

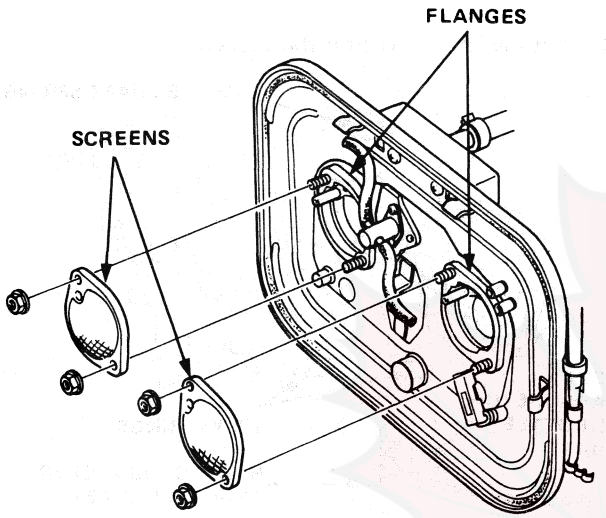
8. Tighten the screws in the sequence shown.



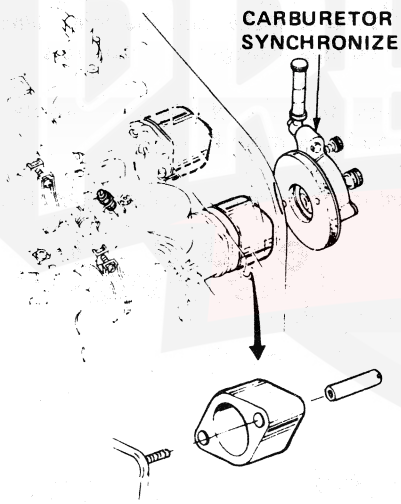
9. Reinstall the removed parts in the reverse order of removal.

Synchronization Inspection/Adjustment

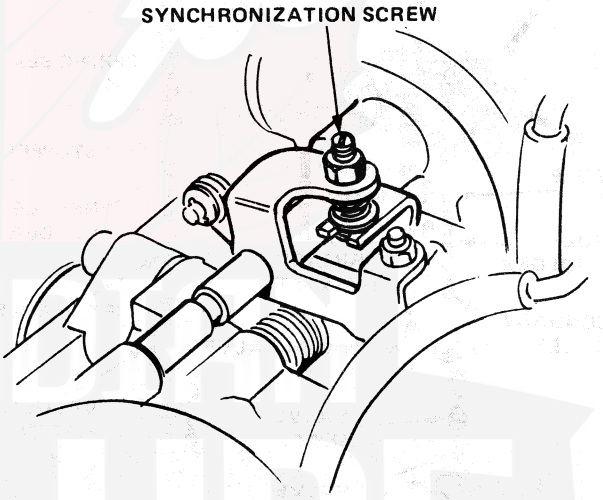
1. Remove the air cleaner cover and element.
2. Remove the air intake screens and air intake flanges.



3. Install the syncronization adapters and torque the nuts to 5 N·m (0.5 kg-m, 3.6 lb-ft).



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 through both adapters using the carburetor synchronizer.
   - If the flow rates are identical, remove the synchronizer, adapters 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, adapters, and reinstall the remaining parts in the reverse order of disassembly.

Idle Speed/Mixture Inspection

Propane Enrichment Method

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

NOTE:
- This procedure requires a propane enrichment kit.
- Check that the carburetors are synchronized properly before making idle speed and mixture inspections.

1. Start engine and warm up to normal operating temperature; the cooling fan will come on.
2. Remove the vacuum hose from intake air control diaphragm and clamp the hose end.
3. Connect a tachometer.
4. Check idle speed with the headlights, heater blower, rear window defroster, cooling fan, and air conditioner off.
   Idle speed should be:

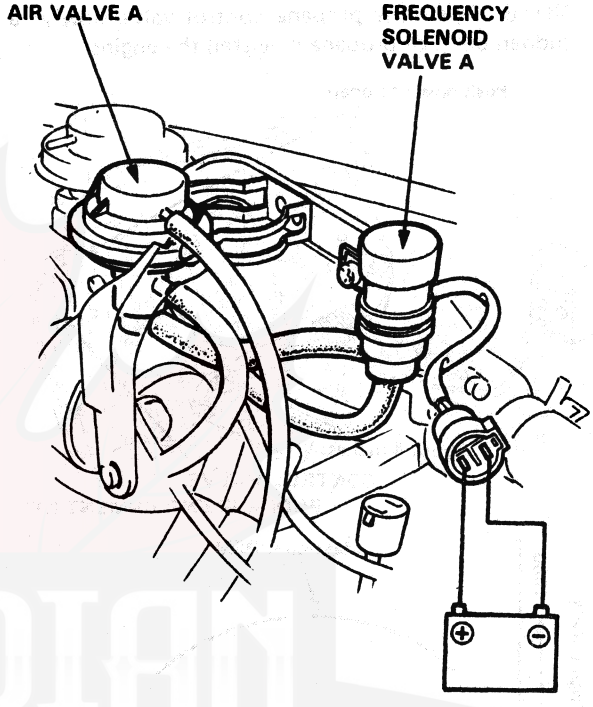
	CAL	49 ST and HI ALT
Manual	800 ± 50 rpm	800 ± 50 rpm ↕ 700 ± 50 rpm
Automatic (in gear)	800 ± 50 rpm	800 ± 50 rpm ↕ 700 ± 50 rpm

↕: The lower number is if idle is measured at high altitude; the higher number is if idle is measured at low altitude.

Adjust the idle speed, if necessary, by turning the throttle stop screw.

5. On Automatic Car only:

   Remove the connector from frequency solenoid valve A and connect a battery as shown.



6. Insert the propane enrichment hose into the opening of the intake tube about 4-inches.

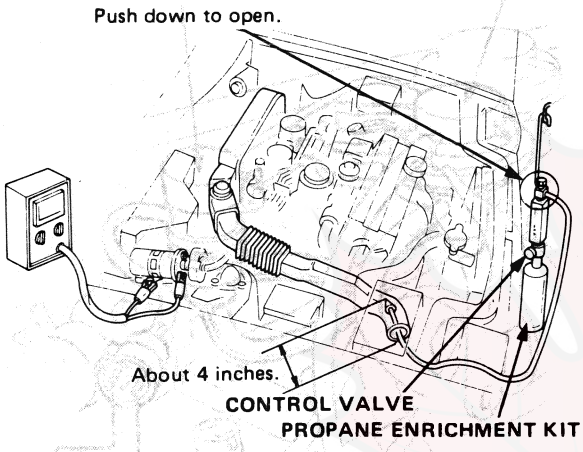
NOTE:
- It isn't necessary to disconnect the intake tube; its opening is just behind the right headlight.
- Check that propane bottle has adequate gas before beginning test.

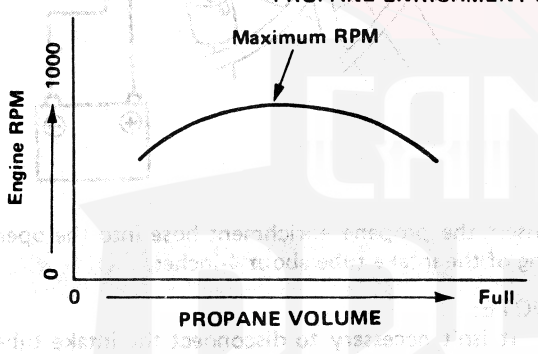
(cont'd)

Idle Speed/Mixture Inspection (cont'd)

7. With engine idling, depress push button on top of propane device, then slowly open the propane control valve to obtain maximum engine speed. Engine speed should increase as percentage of propane injected goes up.

   NOTE: Open the propane control valve slowly: a sudden burst of propane may stall the engine.





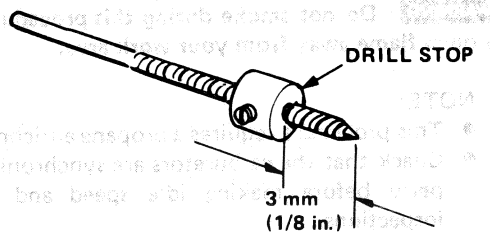
Propane Enriched Maximum RPM

Transmission	RPM increase
Manual	65 ± 20
Automatic	130 ± 25 (in D3 or D4)

- If engine speed does not increase per specification, mixture is improperly adjusted. Go to step 8.
- If engine speed increases per specification, go to step 18.

8. Remove the carburetors (page 11-16).

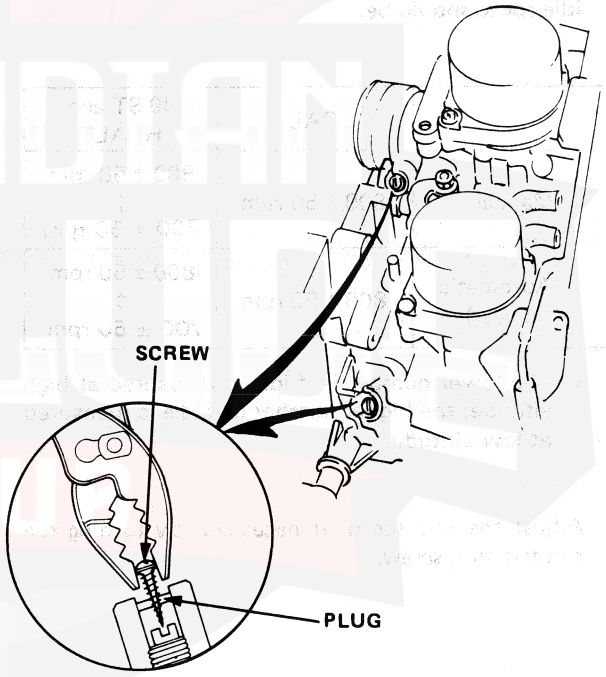
9. Place a drill stop on a 3 mm (1/8 in.) drill bit, as shown, then drill through the center of each carburetor's mixture screw hole plug.



CAUTION: If you drill deeper than this measurement, the bit may damage the mixture adjusting screw.

10. Screw a 5 mm sheet metal screw into the hole plug.

11. Grab the screw head with a pair of pliers and remove the hole plug.



12. Reinstall the carburetors (page 11-18).

13. Start engine and warm up to normal operating temperature; the cooling fan will come on.

14. Recheck the maximum propane enriched rpm.

    - If the propane enriched speed is too low, mixture is too rich: turn both mixture screws 1/4-turn clockwise and recheck.
    - If the propane enriched speed is too high, mixture is too lean: turn both mixture screws 1/4-turn counterclockwise and recheck

15. Close the propane control valve.

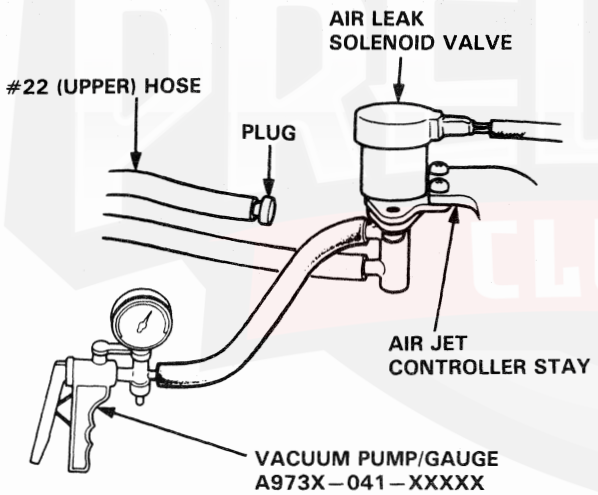
16. Run the engine at 2,500 rpm for 10 seconds to stabilize mixture conditions, then check the idle speed.

    - If idle speed is as specified (step 4), go to step 18.
    - If idle speed is not as specified (step 4), go to step 17.

17. Adjust idle speed by turning the throttle stop screw, then repeat steps 14 through 16.

18. Disconnect #5 vacuum hose from the air suction valve and plug the hose.

19. Disconnect the upper #22 vacuum hose from the air leak solenoid valve at the air jet controller stay, and plug the end of the hose, then connect a vacuum gauge to the solenoid valve.



20. With the engine idling, depress the push button on top of the propane device, then slowly open the propane control valve and check the vacuum. There should be vacuum.

    - If there is no vacuum, inspect the air leak solenoid valve (page 12-45).

21. Inspect thermovalve C (page 12-44).

22. Remove the propane enrichment kit and reconnect the connector.

23. Install new plugs into the idle mixture screw holes.

Tailpipe Emission Inspection

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

1. Follow steps 1 through 4 of the propane enrichment method (page 11-27).

2. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.

3. Turn the engine off; restart the engine and complete the idle CO check within three minutes of re-starting, with the headlights, heater blower, window defroster, cooling fan and air conditioner off.

   CO meter should indicate 0.1% CO maximum.

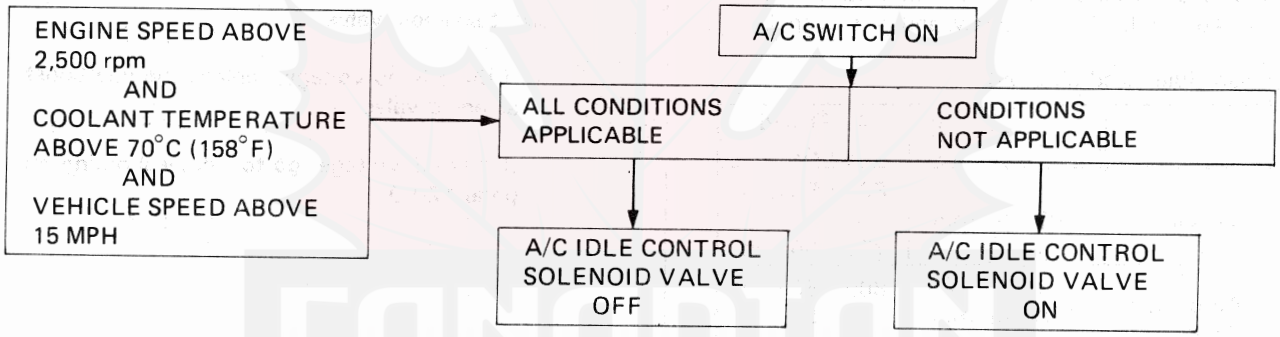
Idle Boost Control (A/C)

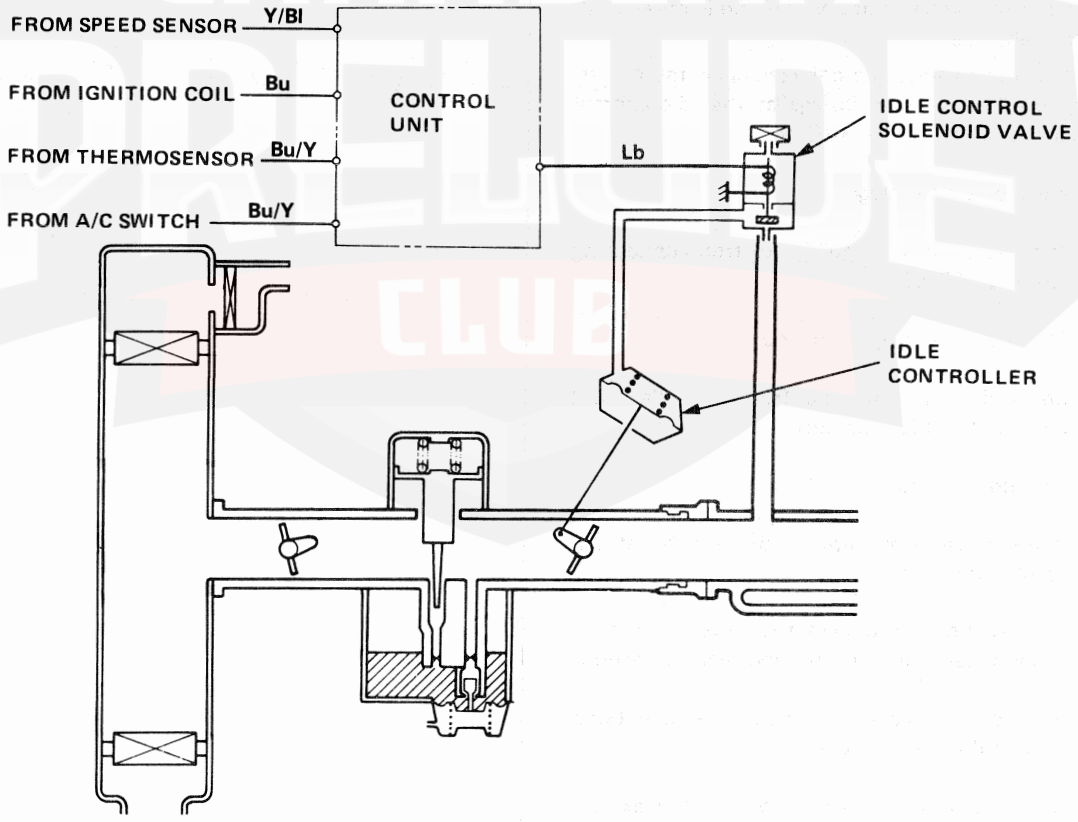
Description

This system prevents the idle speed from dropping when the A/C compressor is turned on.

When the compressor is on, manifold vacuum is introduced into the diaphragm chamber of the idle controller through the idle control solenoid valve which is activated by the compressor switch. The idle controller's diaphragm rod is retracted to open the throttle valve a certain amount. The amount of this throttle valve opening is adjusted with the idle control screw on the idle controller to maintain the original idle speed.

When the compressor is off, or engine coolant temperature, vehicle speed, and engine speed are above the set value, the idle control solenoid valve is deactivated to close the vacuum passage and the vacuum stored in the controller is released through the filter on the solenoid valve.





(cont'd)

Idle Boost Control (A/C) (cont'd)

Inspection

COLD ENGINE

NOTE: Engine coolant temperature must be below 70°C (158°F).

1. Start the engine and allow it to idle.
2. Turn the A/C switch on and check the engine speed with the compressor running.

   Engine idle speed should increase to specified speed with A/C on.

   - If the engine speed is not within specifications, adjust with adjusting screw, and go to step 4.

   Engine idle speed (A/C on)

	CAL	49 ST and HI ALT
Manual	800 ± 50 rpm	800 ± 50 rpm ↕ 750 ± 50 rpm
Automatic (in gear)	800 ± 50 rpm	800 ± 50 rpm ↕ 750 ± 50 rpm

↕: The lower number is if idle is measured at high altitude; the higher number is if idle is measured at low altitude.

   - If the speed cannot be adjusted with the adjusting screw, check for voltage at the idle control solenoid valve with the A/C on.

     There should be voltage.

     – If there is no voltage, go to troubleshooting on page 12-50.

     – If there is voltage, go to step 3.

3. Disconnect the vacuum tube from the idle boost diaphragm and feel for vacuum.

   There should be vacuum.

   - If there is vacuum, replace the idle boost diaphragm and retest.
   - If no vacuum, disconnect the lower tube from the idle boost solenoid valve and feel for vacuum.

     – If there is vacuum, replace the idle boost solenoid valve and retest.

     – If no vacuum, check for blockage or leaks and clean the vacuum line as necessary.

HOT ENGINE

4. Reconnect the vacuum tube and wait for engine to warm up; cooling fan must come on.
5. Disconnect the hose from the idle boost diaphragm and connect the hose to the vacuum pump. Start the engine at over 2,500 rpm and feel for vacuum.

   There should be no vacuum.

   - If there is no vacuum, the test is complete.
   - If there is vacuum, check for voltage at the idle boost solenoid valve.

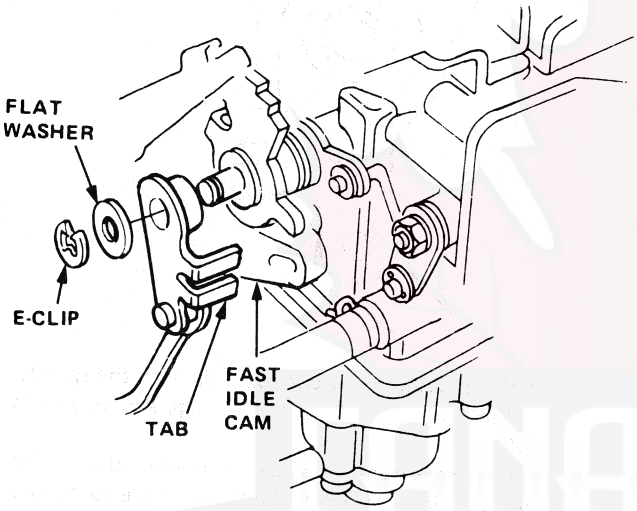
     – If there is no voltage, replace the idle boost solenoid valve.

     – If there is voltage, go to troubleshooting on page 12-50.

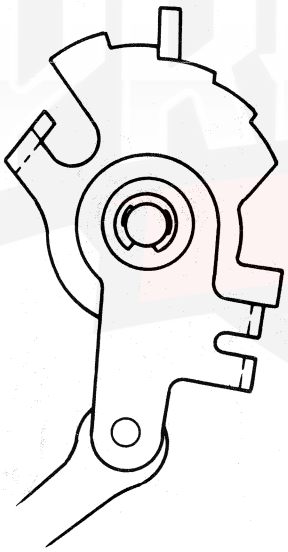
Fast Idle Inspection/Adjustment

1. Start the engine and allow it to warm up to its normal operating temperature; the cooling fan should come on.
2. Stop the engine.
3. Remove the E-clip and flat washer from the thermowax linkage, then slide out the linkage until its tab is clear of the fast idle cam.

   CAUTION: Be careful not to bend the linkage or the fast idle speed will be changed.



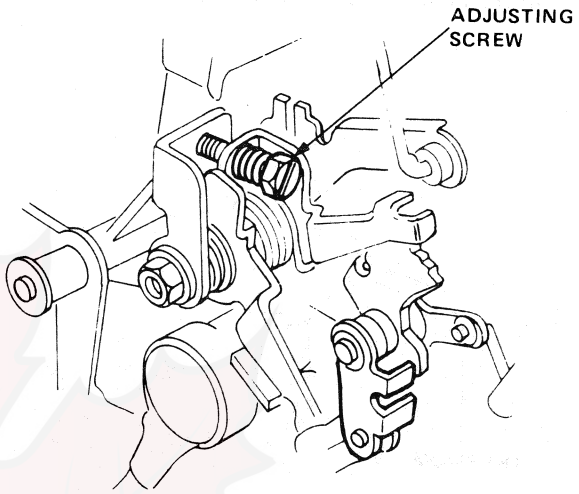
4. Hold the throttle open and turn the fast idle cam counterclockwise until the fast idle lever is aligned as shown.



5. Without opening the throttle, start the engine. Check the idle speed. Idle speed should be:

Manual Transmission	1,750 ± 500 rpm
Automatic	1,700 ± 500 rpm

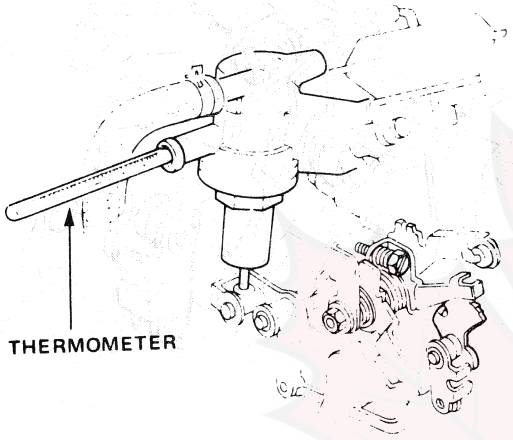
Adjust the idle speed, if necessary, by turning the fast idle adjusting screw.



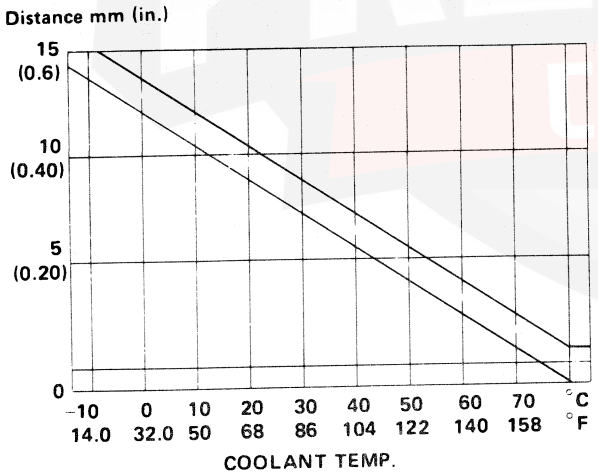
6. Stop the engine and reconnect the thermowax linkage.
7. Start the engine and check that the idle speed decreases as the engine temperature increases.
   - If the speed doesn't drop, spray the fast idle linkage with carburetor cleaner and recheck. If it still doesn't drop, check for stuck or damaged linkage parts. Repair or replace parts as necessary.

Thermowax Valve Adjustment

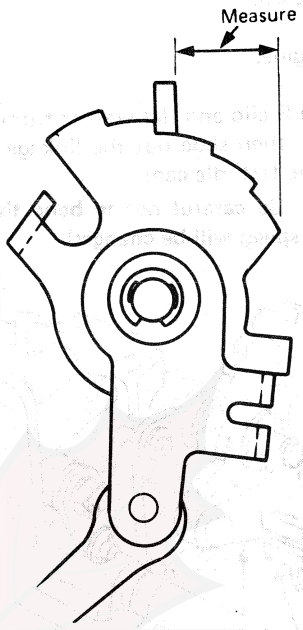
1. Disconnect the lower coolant hose from the thermowax valve.
2. Insert a thermometer into the open coolant fitting.



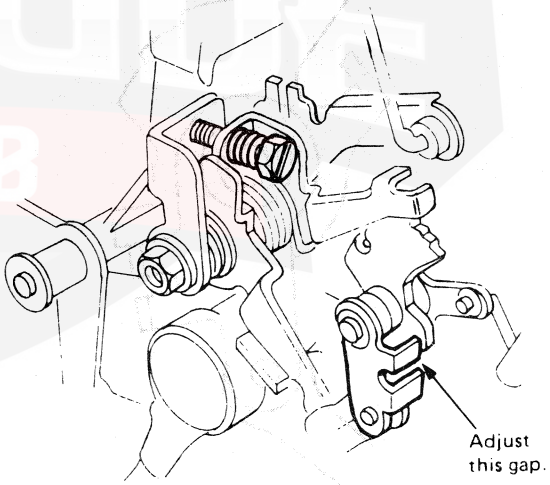
3. Measure the coolant temperature and refer to the chart below. Find your temperature on the chart then draw an imaginary line upward. Where your line intersects with the diagonal line on the chart is the measurement (noted on the left edge of the chart) that you should have for the linkage.



4. Measure from the end of the fast idle cam to the end of the fast idle lever.



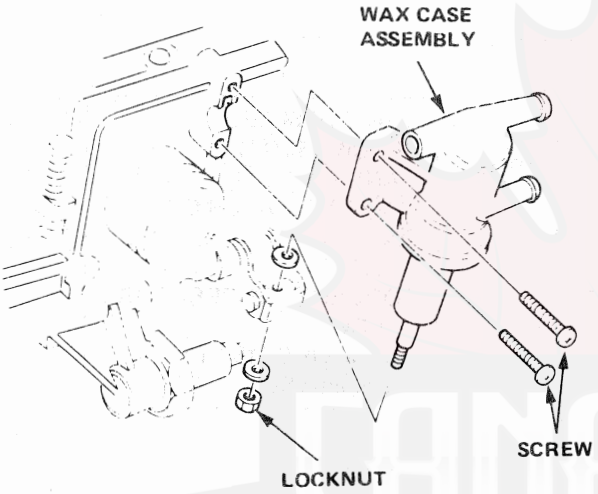
- If this measurement corresponds with the specification from the chart, the linkage adjustment is OK.
- If this measurement doesn't correspond with the specification from the chart, you have to spread or narrow the gap in the tabs as necessary, then recheck.



5. Remove thermometer and reinstall lower coolant hose. Top off the cooling system, if necessary.

Thermowax Valve Replacement

1. Remove the screws for the throttle opener diaphragm and swing it out of the way.
2. Disconnect both coolant hoses from the thermowax valve.
3. Remove the locknut and phillips screws, then remove the valve.



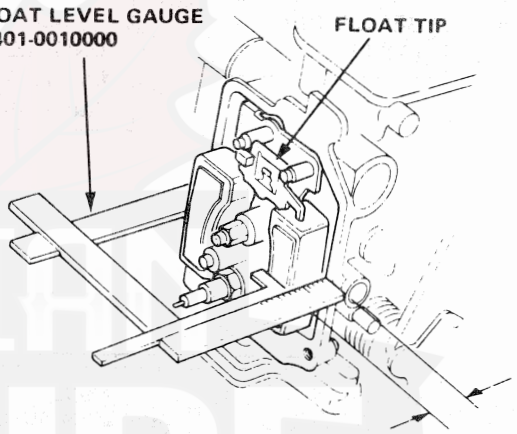
4. Install a new thermowax valve in the reverse order of removal and check the adjustment (page 11-34).

Float Level Inspection

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

1. Remove the carburetors (page 11-16).
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.)



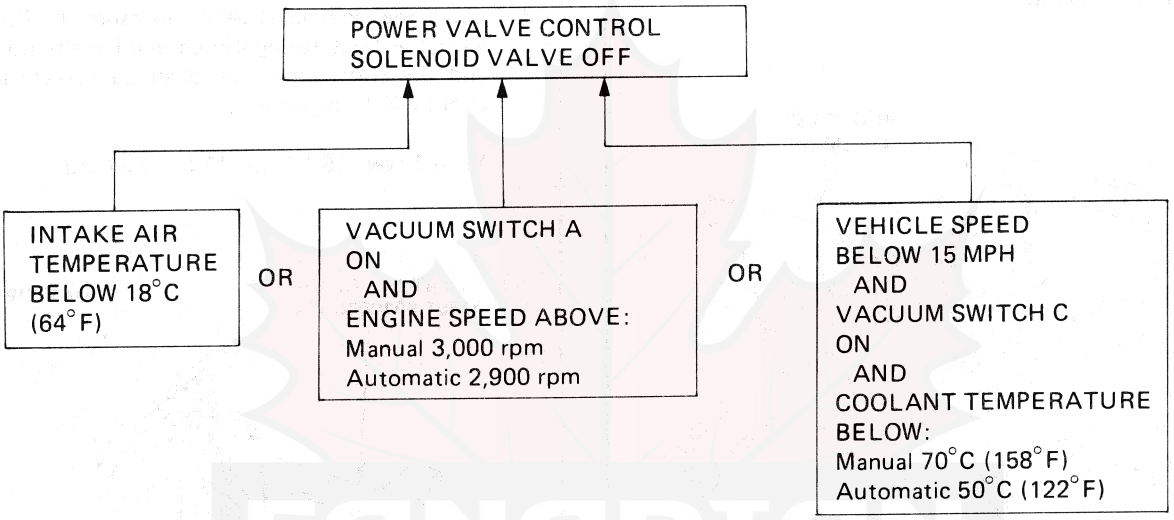
Adjust as necessary.

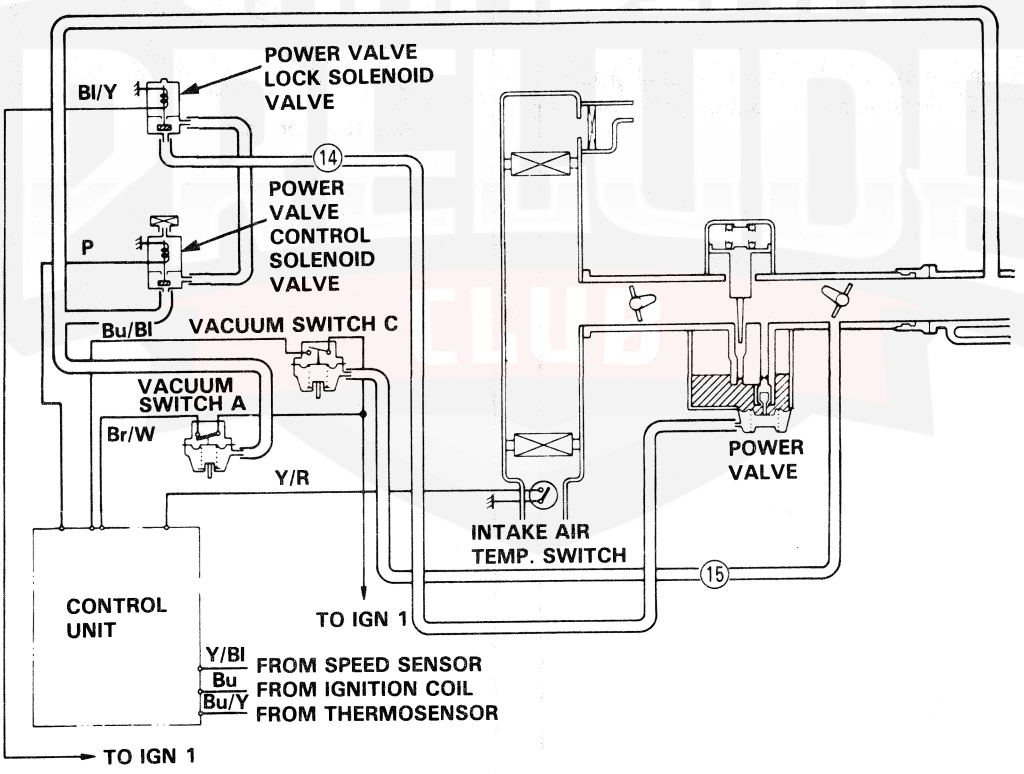
Power Valve

Description

This system provides supplementary fuel into the primary main fuel passage when the car is run in the power mode.

When the ignition switch is turned on, the power valve lock solenoid valve opens, and the power valve control solenoid valve is operated by the control unit.



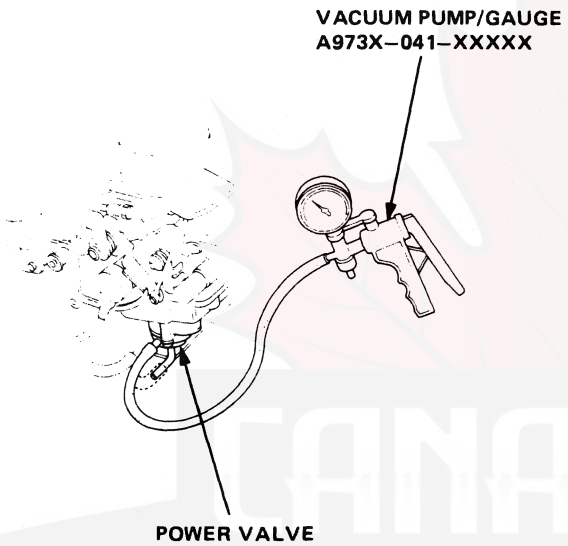


Inspection

HOT ENGINE

1. Disconnect the hose from the power valve and connect a hand vacuum pump to the valve. Draw vacuum.

   Vacuum should remain steady.



   - If vacuum remains steady, go on to step 2.
   - If vacuum decreases, replace the diaphragm and re-test.

2. Start the engine and disconnect the hose from the power valve and connect a vacuum gauge to the hose.

   Vacuum should be available at idle.

   - If vacuum is available, go on to step 4.
   - If no vacuum, check the voltage at the lock solenoid.
     - If there is no voltage, check the wiring and fuse.
     - If there is voltage, go on to step 3.

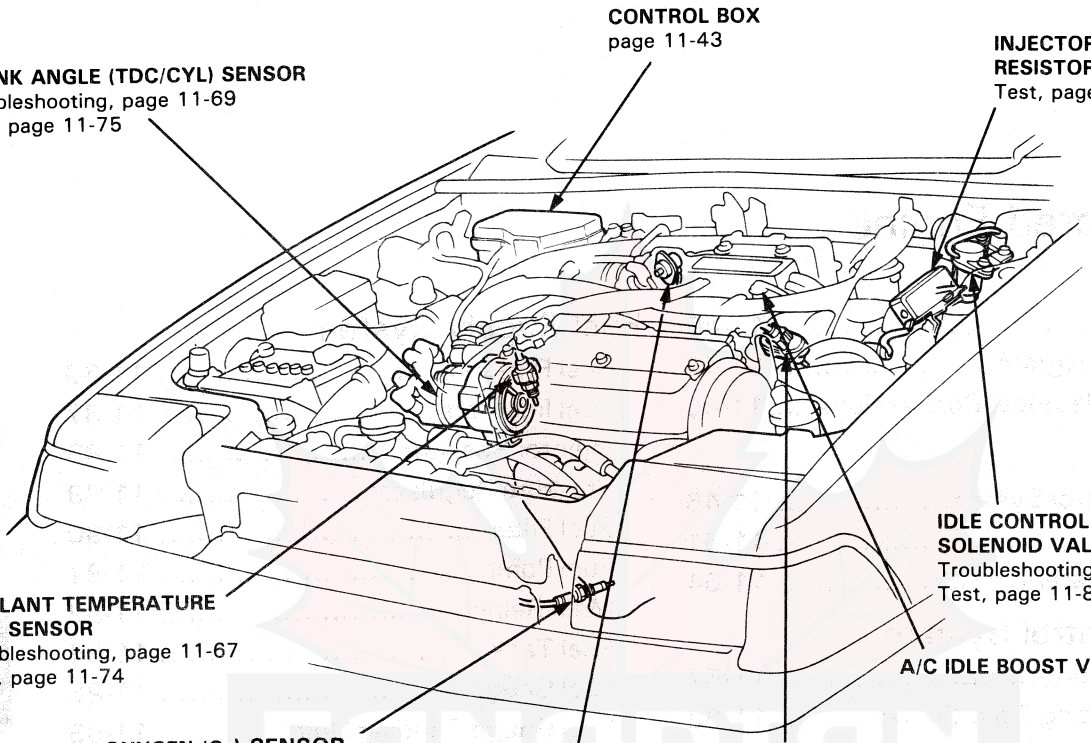
3. Check for vacuum between the power valve control solenoid valve and lock solenoid valve.
   - If there is vacuum, replace the lock solenoid and re-test.
   - If there is no vacuum, check the voltage at the power valve control solenoid valve.
     - If there is voltage, replace the power valve control solenoid valve and recheck for the voltage.
     - If there is no voltage, go to troubleshooting on page 12-50.

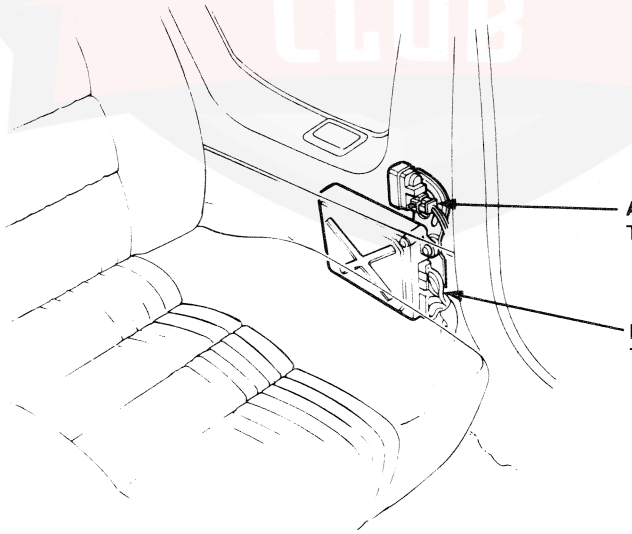
4. Turn the ignition switch off. Vacuum should remain steady.
   - If vacuum remains steady, go to step 4.
   - If vacuum does not remain steady, replace the lock solenoid valve and retest.

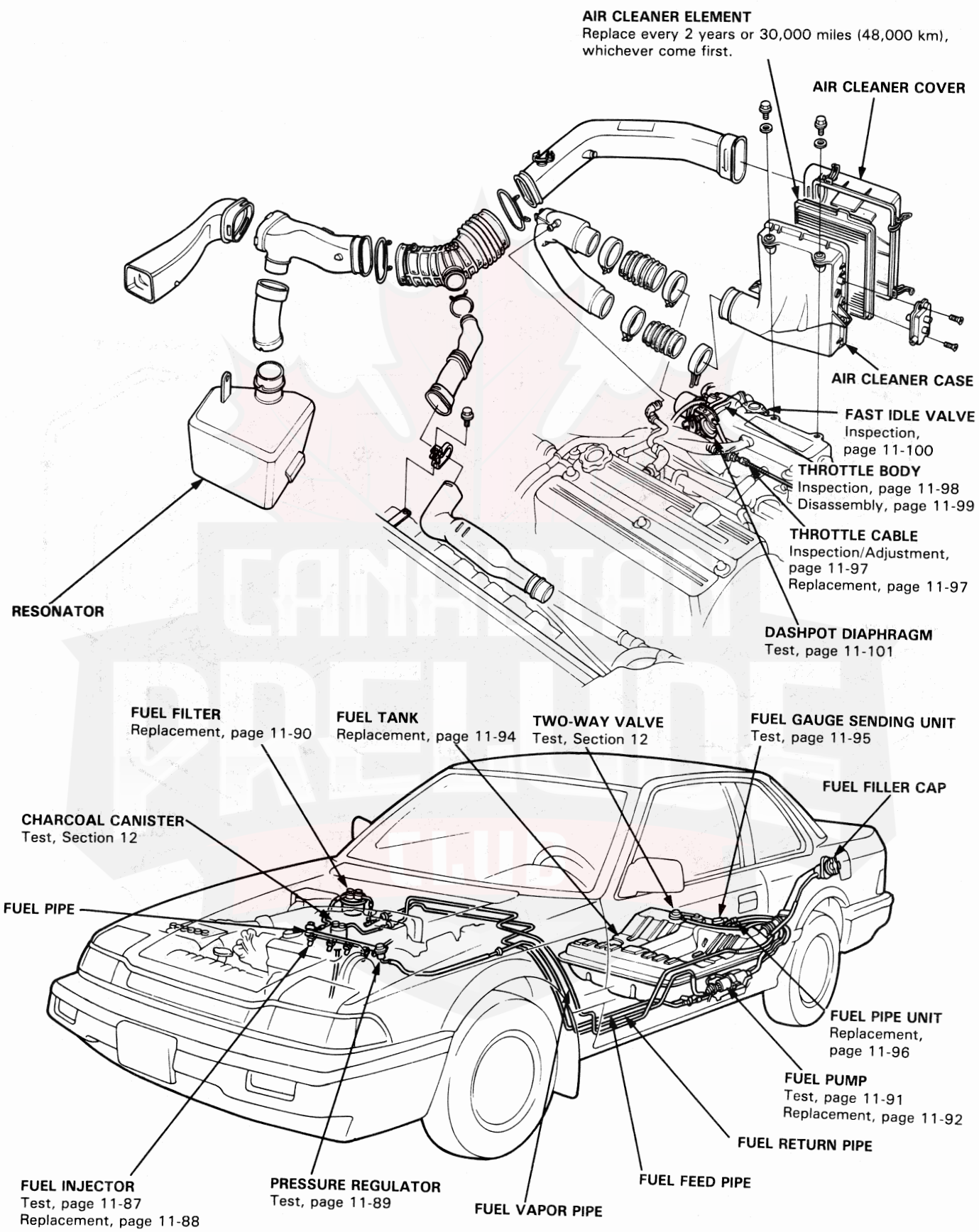
5. Remove the #1 control box cover and pinch the hose connected to the vacuum switch A. Disconnect the upper tube from the lock solenoid valve and connect the hand vacuum pump. Check for vacuum with the engine speed 3,000 rpm.

   There should be no vacuum.
   - If there is no vacuum, test is complete.
   - If there is vacuum, check the voltage at the power valve control solenoid valve.
     - If there is voltage, go to troubleshooting on page 12-50.
     - If there is no voltage, replace the power valve control solenoid valve and retest.

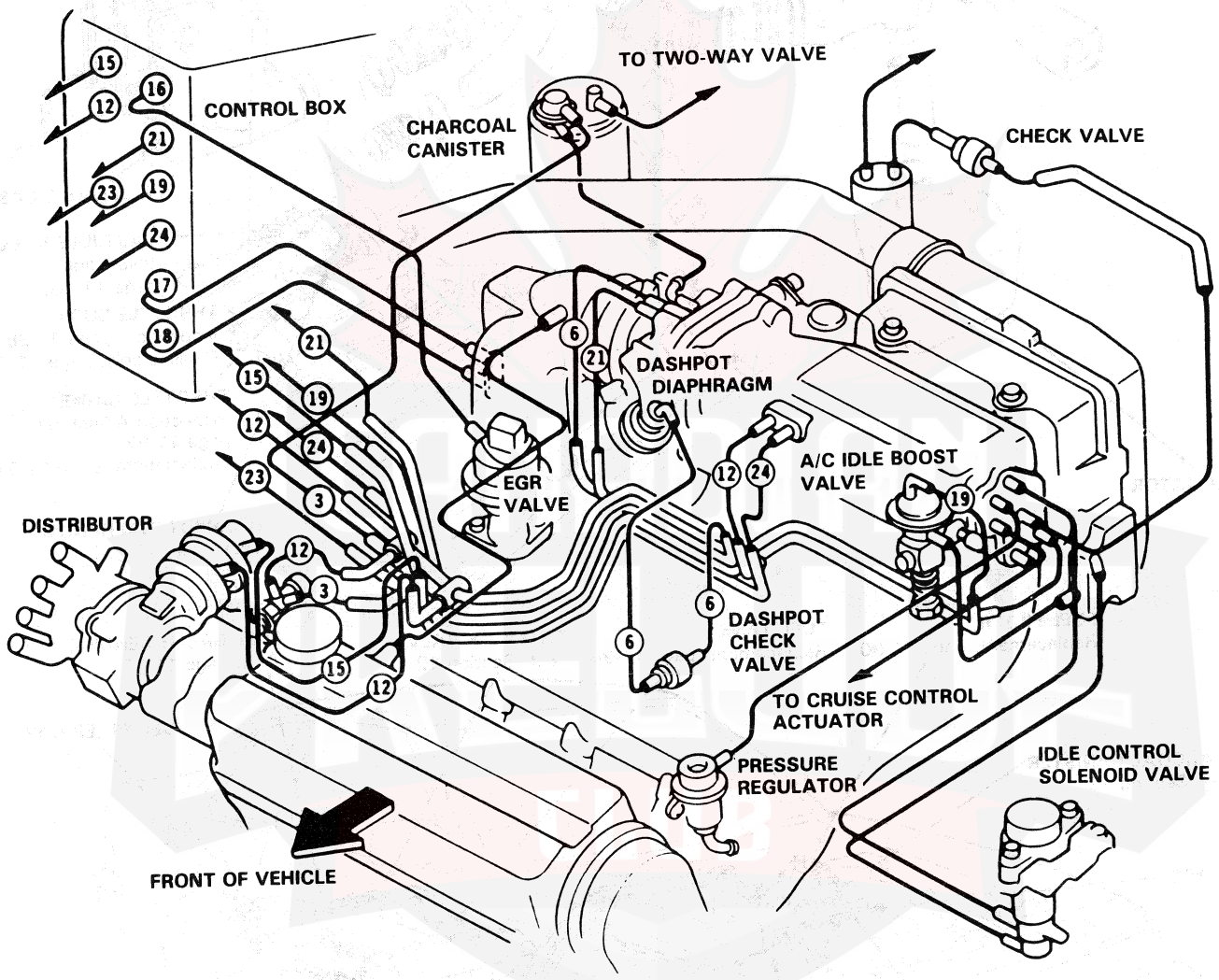
Fuel-Injected Engine





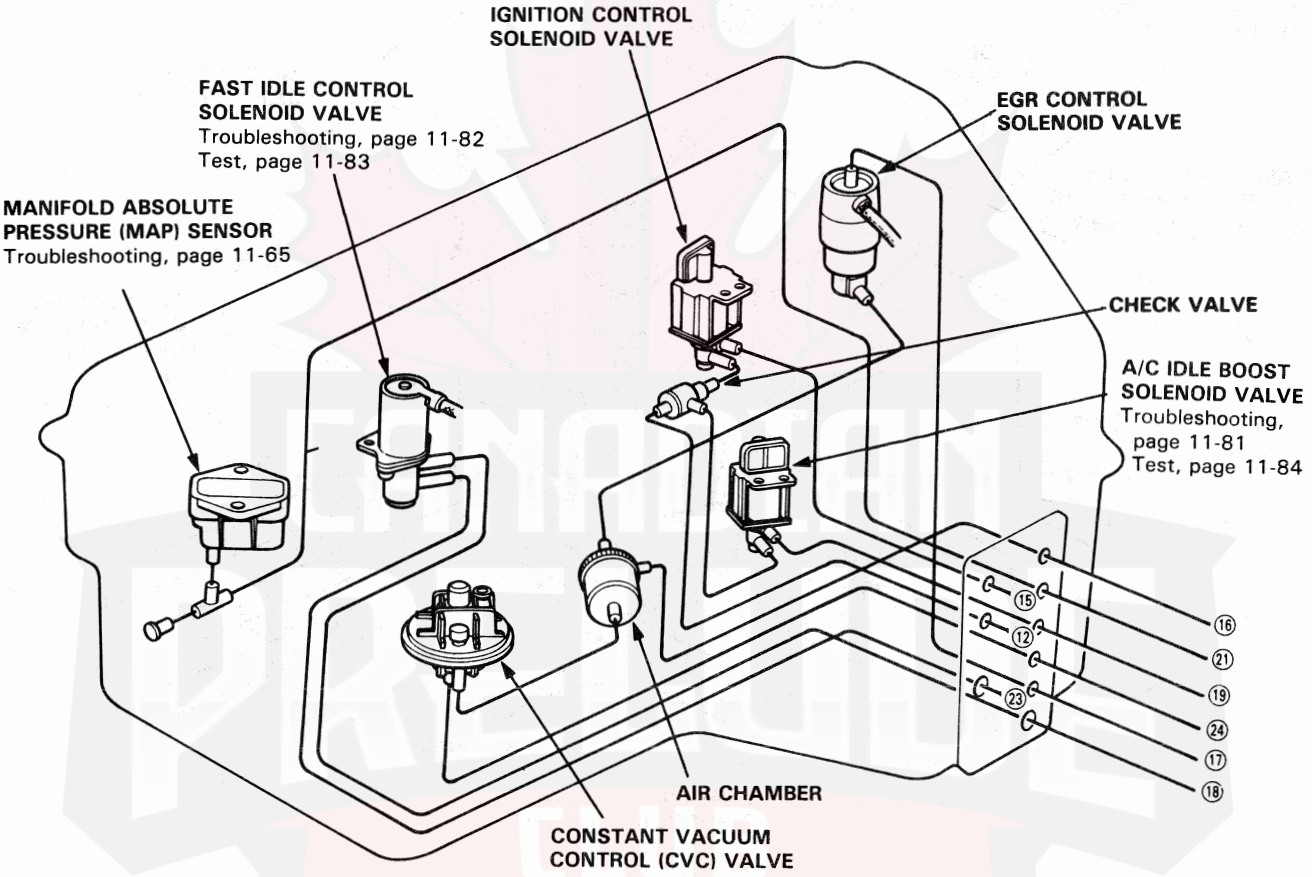


Interconnect Diagram



Control Box

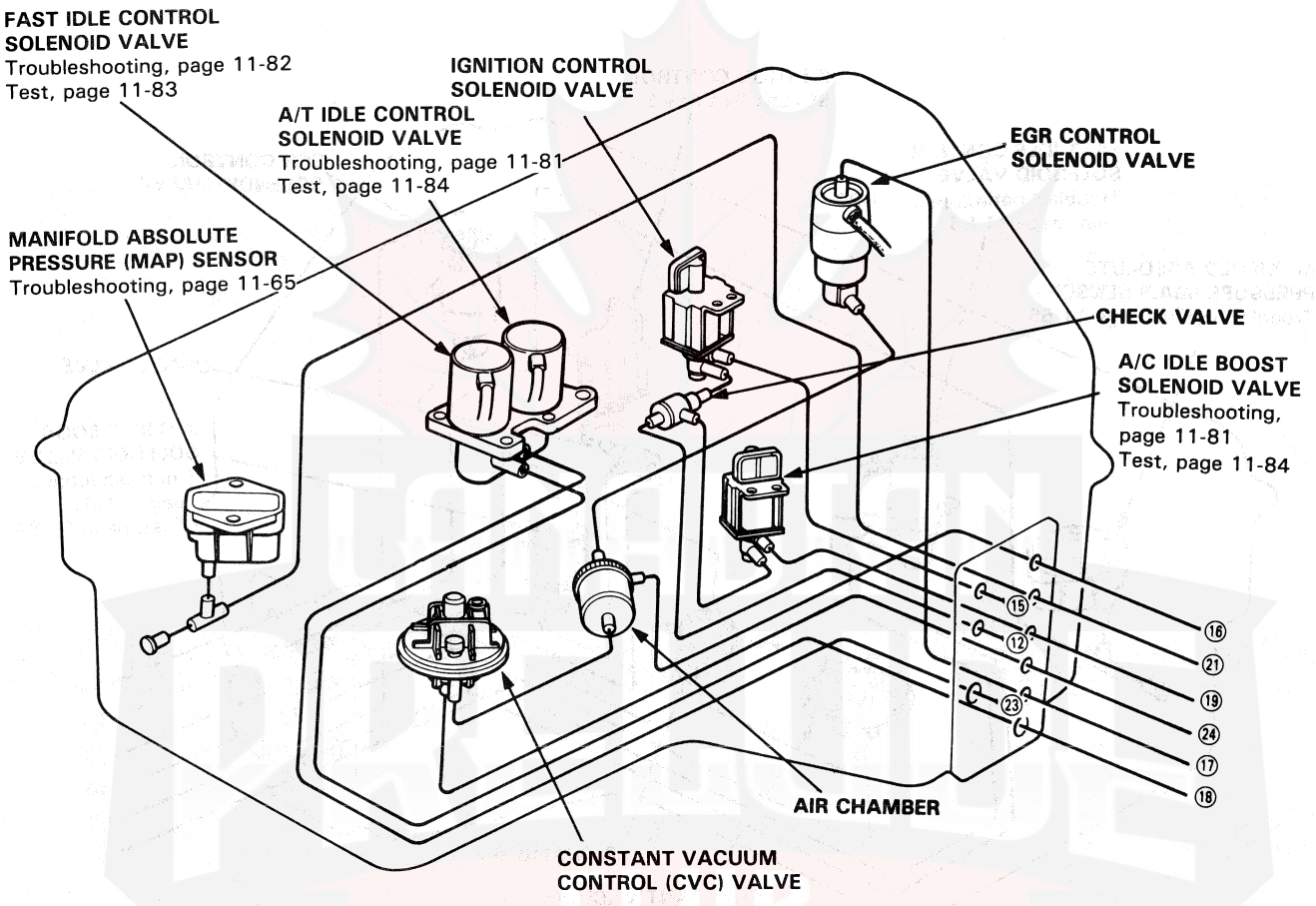
Manual Transmission



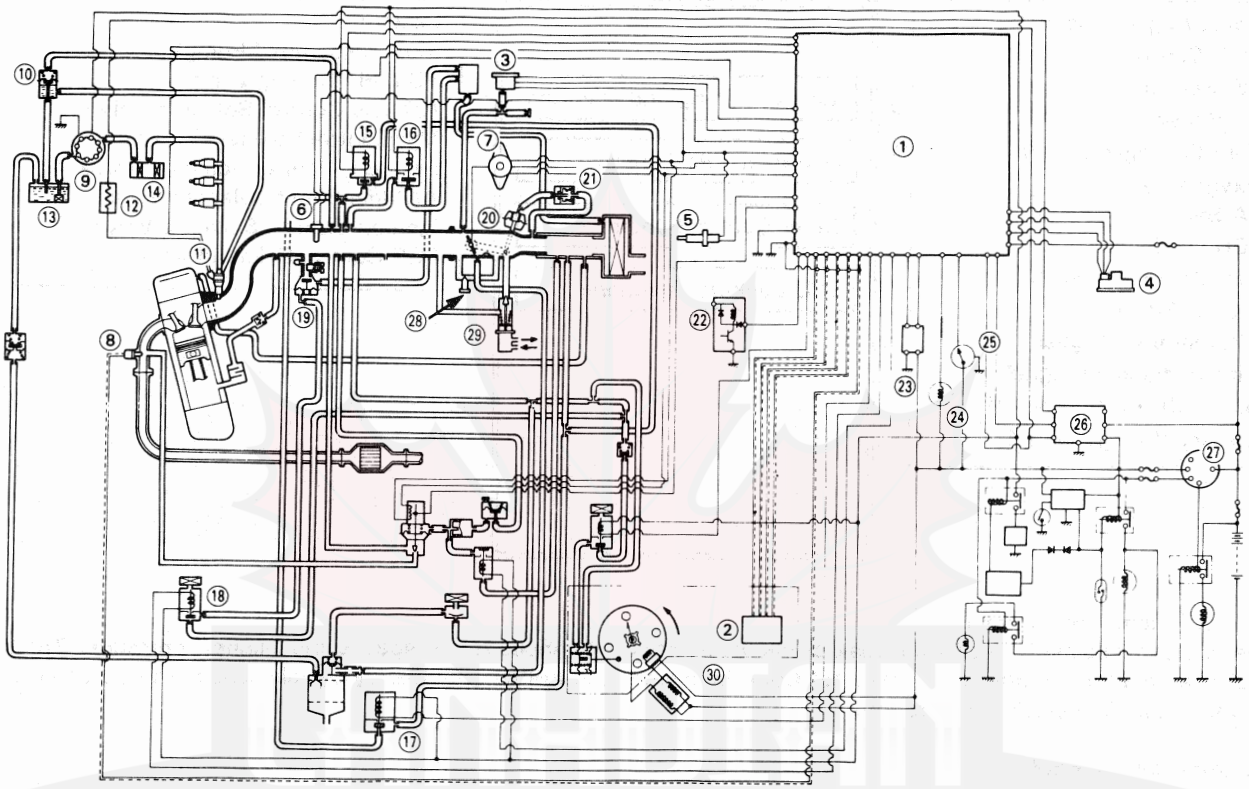
Interconnect Diagram

Control Box

Automatic Transmission



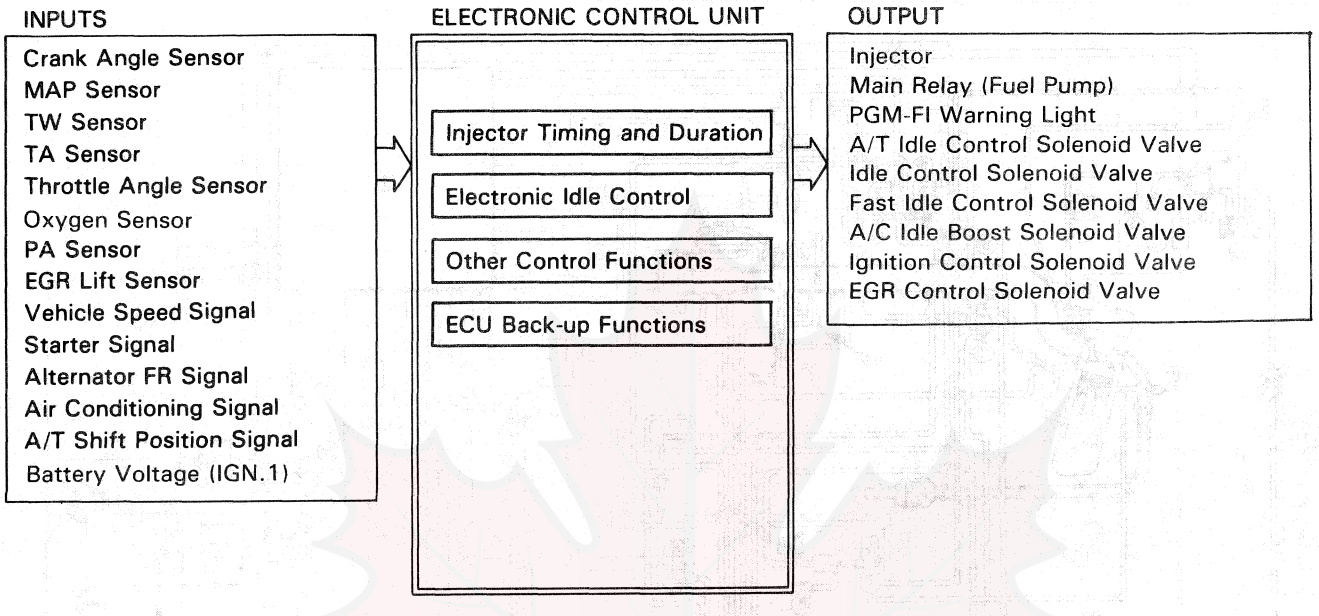
Vacuum and Electrical Connections



① ECU (Electronic Control Unit)
② CRANK ANGLE (TDC/CYL) SENSOR
③ MAP (Manifold Absolute Pressure) SENSOR
④ PA (Atmospheric Pressure) SENSOR
⑤ TW (Coolant Temperature) SENSOR
⑥ TA (Intake Air Temperature) SENSOR
⑦ THROTTLE ANGLE SENSOR
⑧ O_2(Oxygen) SENSOR
⑨ FUEL PUMP
⑩ PRESSURE REGULATOR
⑪ FUEL INJECTOR
⑫ INJECTOR RESISTOR
⑬ FUEL TANK
⑭ FUEL FILTER
⑮ A/T IDLE CONTROL SOLENOID VALVE (A/T only)
⑯ IDLE CONTROL SOLENOID VALVE
⑰ FAST IDLE CONTROL SOLENOID VALVE
⑱ A/C IDLE BOOST SOLENOID VALVE
⑲ A/C IDLE BOOST VALVE
⑳ DASHPOT
㉑ DASHPOT CHECK VALVE
㉒ ALTERNATOR
㉓ A/T SHIFT POSITION SWITCH
㉔ PGM-FI WARNING LIGHT
㉕ SPEED SENSOR
㉖ MAIN RELAY
㉗ IGNITION SWITCH
㉘ IDLE ADJUSTING SCREW
㉙ FAST IDLE VALVE
㉚ IGNITION COIL

Description

PGM-FI Control System



Injector Timing and Duration

The ECU contains memories for the basic discharge durations at various engine speeds and manifold pressures. The basic discharge duration, after being read out from the memory, is further modified by signals sent from various sensors to obtain the final discharge duration.

Electronic Idle Control

Idle Control/Fast Idle Control/A/T Idle Control/A/C Idle Boost Solenoid Valves

When the engine is cold, the A/C compressor is on, the transmission is in gear (A/T only), or the alternator is charging, the ECU controls these solenoid valves to maintain correct idle speed.

Other Control Functions

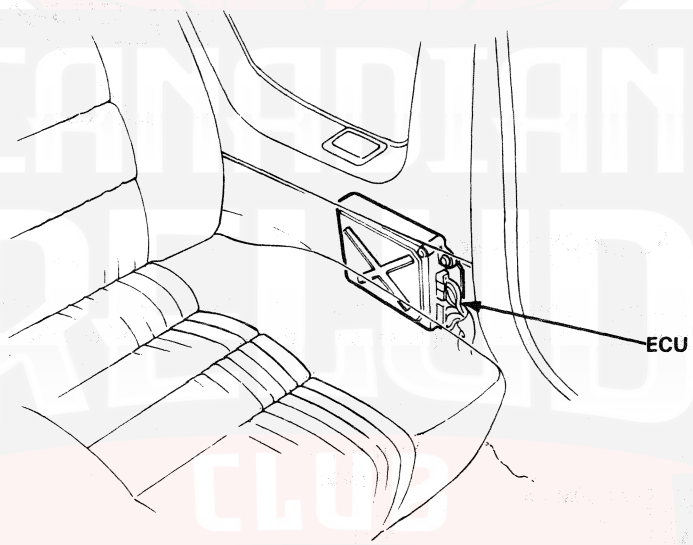
1. Starting Control
   When the engine is started, the ECU provides a rich mixture.
2. Fuel Pump Control
   - When the ignition switch is initially turned on, the ECU supplies ground to the main relay which supplies current to the fuel pump for 2 seconds to pressurize the fuel system.
   - When the engine is running the ECU supplies ground to the main relay which supplies current to the fuel pump.
   - When the engine is not running and the ignition is on, the ECU cuts ground to the main relay which cuts current to the fuel pump.
3. Fuel Cut-off Control
   - During deceleration with the throttle valve closed, current to the injectors is cut-off at speeds over 1,100 rpm, to improve fuel economy.
   - Fuel cut-off action also takes place when engine speed exceeds 6,700 rpm regardless of the position of the throttle valve to protect engine from over running.
4. Ignition Control Solenoid Valve (ICSV)
   When the coolant temperature is above 60°C (140°F) and manifold vacuum is low, the ECU cuts ground to the ICSV which cuts vacuum to advance diaphragm B to prevent detonation.
5. EGR Control Solenoid Valve (EGRCSV)
   When the EGR is required for control of oxides nitrogen (NOx) emissions, the ECU supplying ground to the EGRCSV which supplies regulated vacuum to the EGR valve.

ECU Back-up Functions

1. Fail-Safe Function
   When an abnormality occurs in a signal from a sensor, the ECU ignores that signal and assumes a pre-programmed value that allows the engine to continue to run.

2. Back-up Function
   When an abnormality occurs in the ECU itself, the injections are controlled by a back-up circuit independent of the main system in order tot permit minimal driving.

3. Self-diagnosis Function (PGM-FI warning light and LED indicator).
   When an abnormality occurs in a signal from a sensor, the ECU lights the PGM-FI warning light, stores the failure code in erasable memory and indicates the code with LED display on the ECU anytime the ignition is on. When the ignition is initially turned on, the ECU supplies ground for the PGM-FI warning light for about 2 seconds.



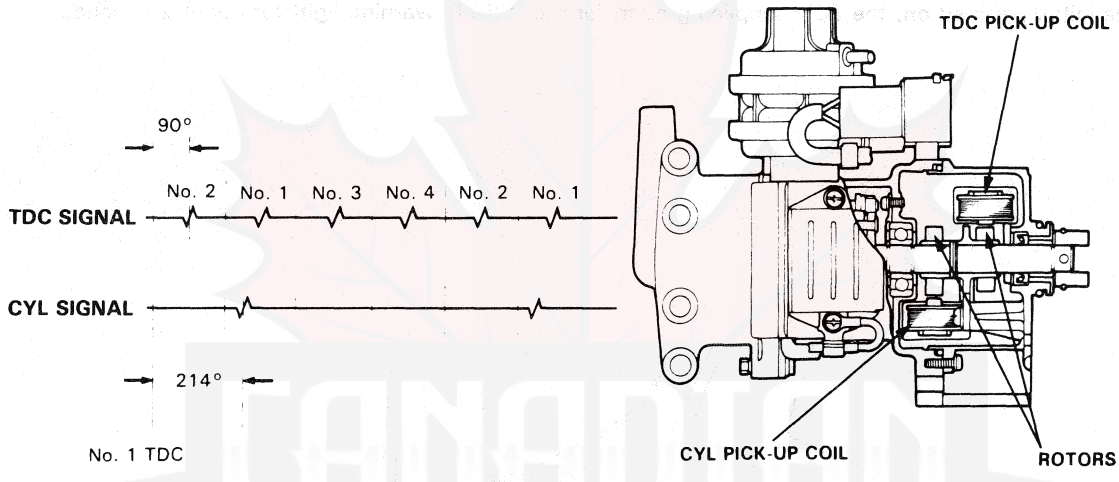
(cont'd)

PGM-FI Control System (cont'd)

Crank Angle (TDC/CYL) Sensor

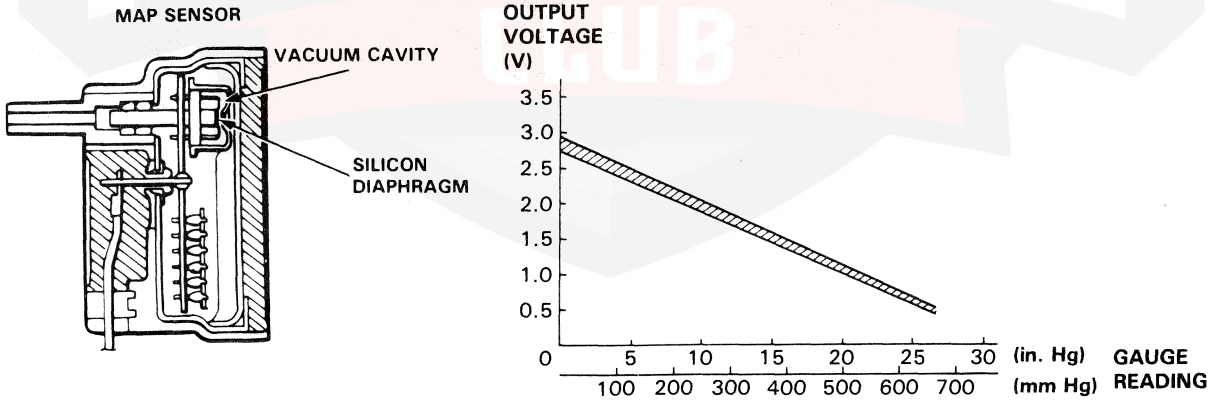
The sensor is part of the distributor coil assembly. It consists of a pair of rotors (TDC and CYL) and a pickup for each rotor. Since the rotors are coupled to the camshaft, they turn together as a unit as the camshaft rotates. The CYL sensor detects the position of the No. 1 cylinder as the base for the Sequential Injection whereas the TDC sensor serves to determine the injection timing for each cylinder. The TDC sensor is also used to detect engine speed to read out the basic discharge duration for different operating conditions.

CAUTION: Pick-up coil adjustment is factory-set and cannot be adjusted. If the coils are faulty, replace the crank angle sensor as an assembly.



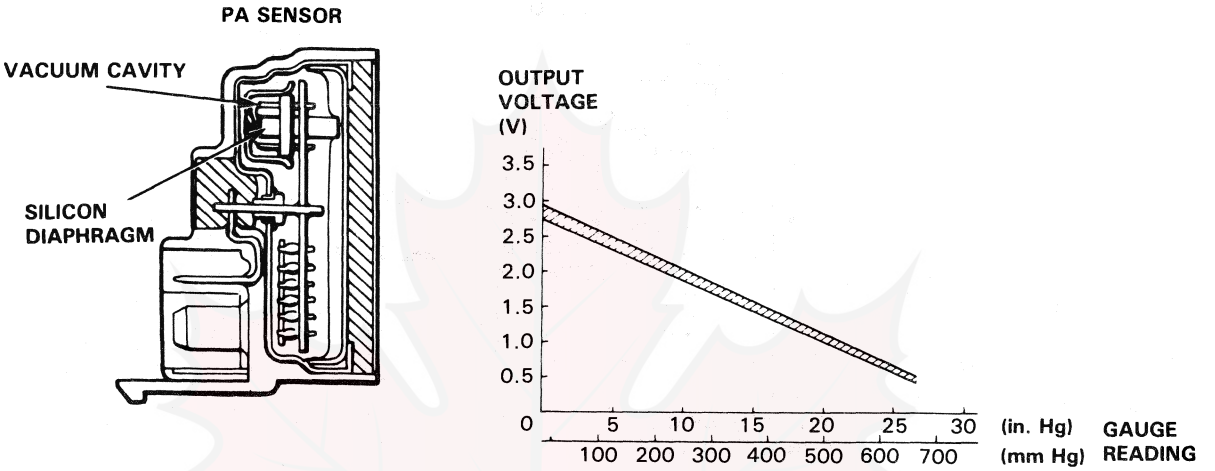
Manifold Absolute Pressure (MAP) Sensor

The sensor converts manifold absolute pressure readings into electrical voltage signals and sends them to the ECU. This information together with signals from the crank angle sensor is then used to read out the basic discharge duration from the memory.



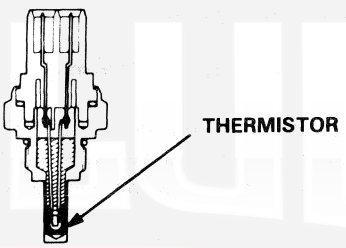
Atmospheric Pressure (PA) Sensor

Like the MAP sensor, the unit converts atmospheric pressures into voltage signals and sends them to the ECU. The signals then modify the basic discharge duration to compensate for changes in the atmospheric pressure.



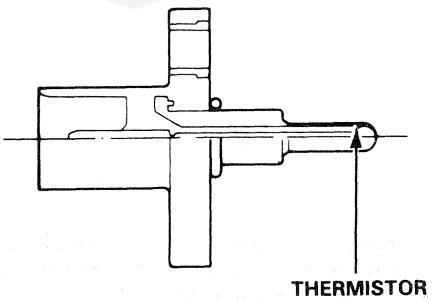
Coolant Temperature (TW) Sensor

The sensor uses a temperature-dependent diode (thermistor) to measure differences in the coolant temperature. The basic discharge duration is read out by the signals sent from this sensor through the ECU. The resistance of the thermistor decreases with a rise in coolant temperature.



Intake Air Temperature (TA) Sensor

This device is also a thermistor and is placed in the intake manifold. It acts much like the TW sensor but with a reduced thermal capacity for quicker response. The basic discharge duration read out from the memory is again compensated for different operating conditions by the signals sent from this sensor through the ECU.



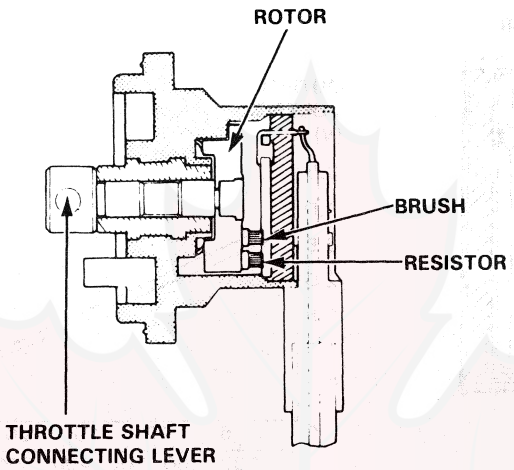
(cont'd)

Description

PGM-FI Control System (cont'd)

Throttle Angle Sensor

This sensor is essentially a variable resistor. In construction, the rotor shaft is connected to the throttle valve shaft such that, as the throttle valve is moved, the resistance varies, altering the output voltage to the ECU.



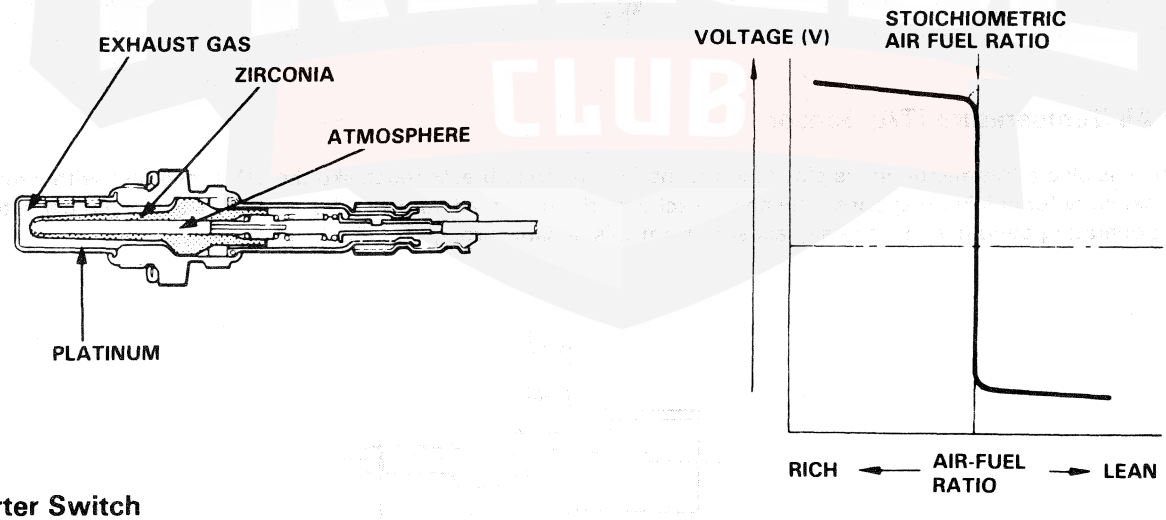
Oxygen (O_2) Sensor

The oxygen sensor, detect the oxygen content in the exhaust gas, and inputs the ECU. In operation, the ECU receives the signals from the sensor and varies the duration during which fuel is injected. The oxygen sensor is located in the exhaust manifold.

The sensor is a hollow shaft of zirconia with a closed end. The inner and outer surfaces are plated with platinum, thus forming a platinum electrode. The inner surface or chamber is open to the atmosphere whereas the outer surface is exposed to the exhaust gas flow through the manifold.

CAUTION: Keep all cleaning materials away from the sensor; they could contaminate it and make it stop working.

Voltage is induced at the platinum electrode when there is any difference in oxygen concentration between the two layers of air over the surfaces. Operation of the device is dependent upon the fact that voltage induced changes sharply as the stoichiometric air-fuel ratio is exceeded when the electrode is heated above a certain temperature.



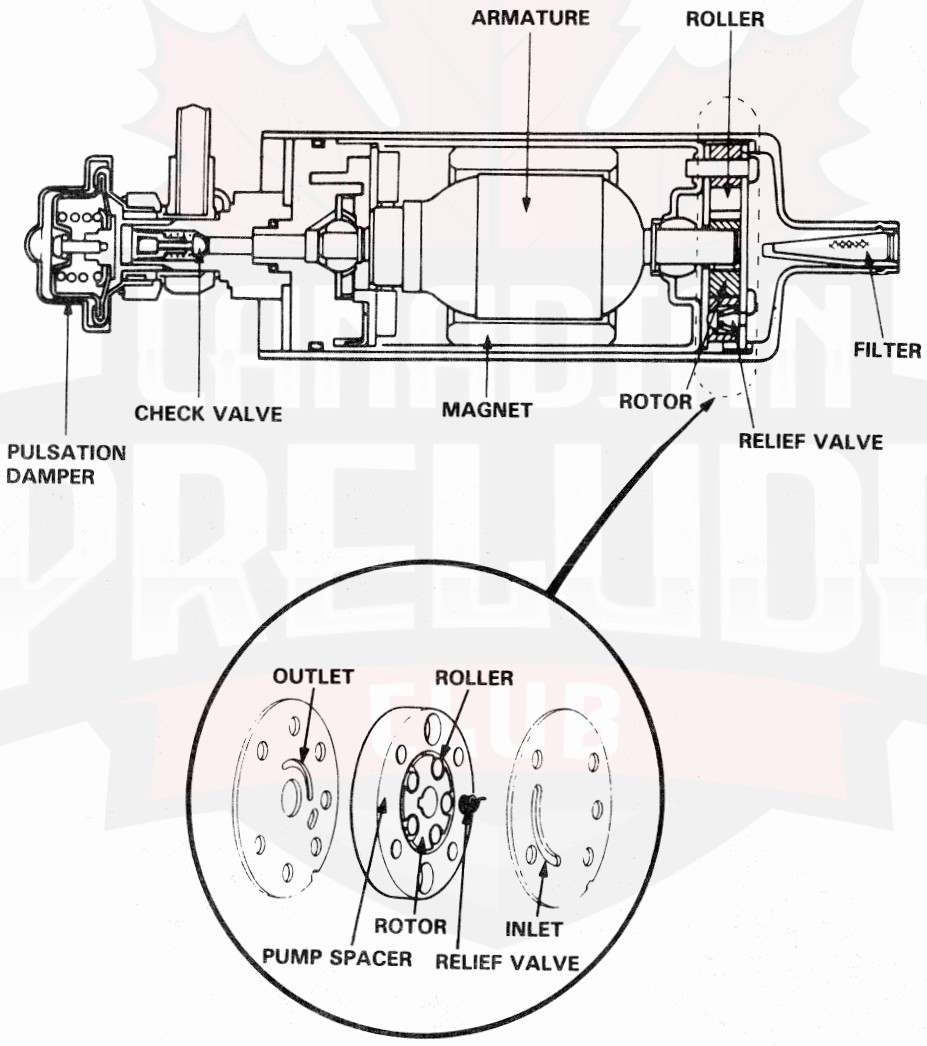
Starter Switch

The air-fuel mixture must be rich for starting. During cranking, the ECU detects signals from the starter switch and increases the amount of fuel injected into the manifold according to the engine temperature. The amount of fuel injected is gradually reduced when the starter switch is turned OFF.

Fuel Pump

The fuel pump is an in-line, direct drive type. Fuel is drawn into the pump through a filter, flows around the armature through the check valve and is delivered to the engine compartment. A pulsation damper is provided to prevent fuel pulsation. The fuel pump has a relief valve to prevent excessive pressure. It opens if there is a blockage in the discharge side. When the relief valve opens, fuel just flows from the high pressure side to the low pressure side.
A check valve is provided to maintain fuel pressure in the line after the pump is stopped. This is to ease re-starting.

The pump section is composed of a rotor, rollers, and pump spacer as shown.
When the rotor turns, the rollers turn and travel along the inner surface of the pump spacer by centrifugal force.
The volume of the cavity enclosed by these three parts changes, drawing and pressurizing the fuel.



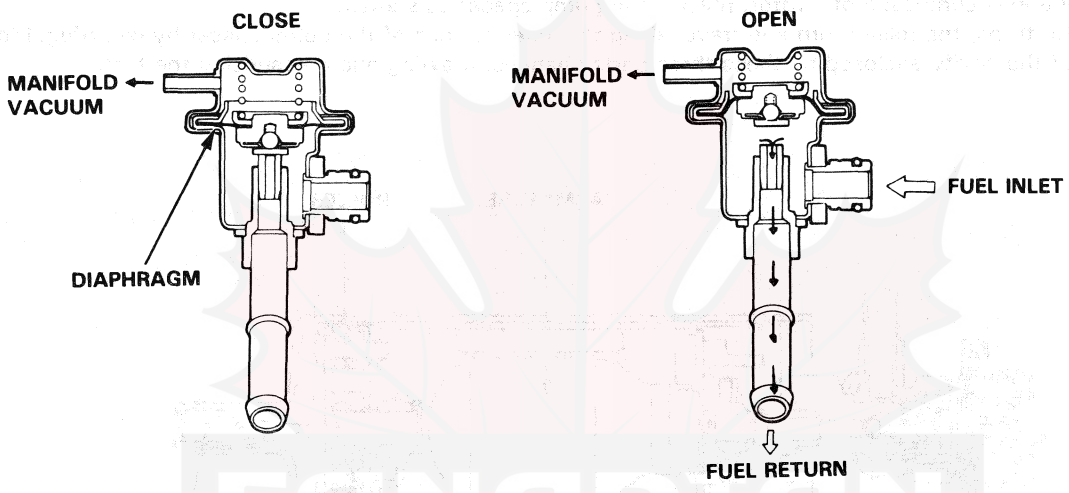
(cont'd)

Description

Fuel System (cont'd)

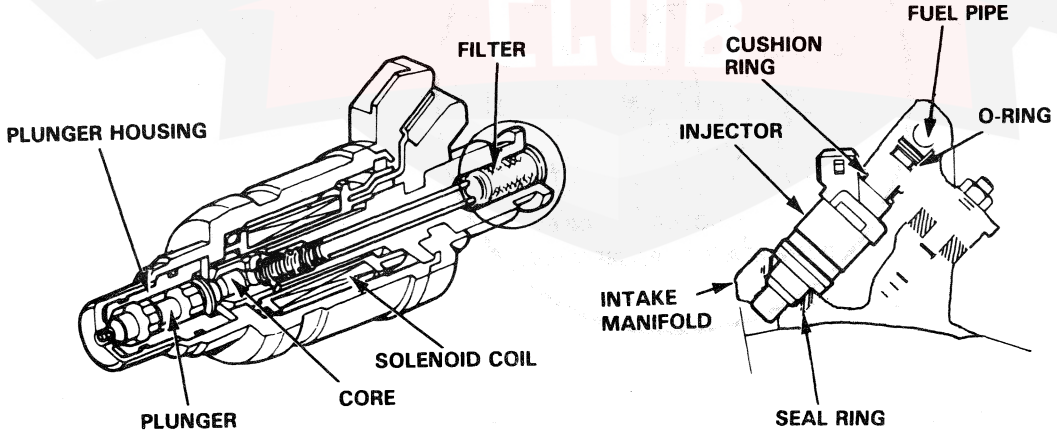
Pressure Regulator

The fuel pressure regulator maintains a constant fuel pressure to the injectors. When the difference between the fuel pressure and manifold pressure exceeds 2.55 kg/cm² (36 psi), the diaphragm is pushed upward, and the excess fuel is fed back into the fuel tank through the return line.



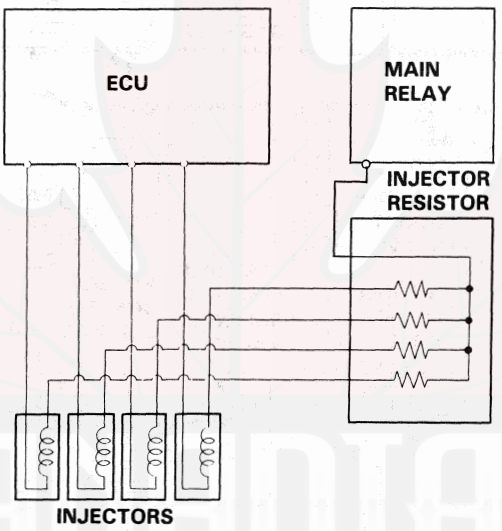
Fuel Injector

The injector is of the solenoid-actuated constant-stroke pintle type consisting of a solenoid, plunger needle valve and housing. When current is applied to the solenoid coil, the valve lifts up and pressurized fuel is injected close to the intake valve. Because the needle valve lift and the fuel pressure are constant, the injection quantity is determined by the length of time that the valve is open, (i.e., the duration the current is supplied to the solenoid coil). The injector is sealed by an O-ring and seal ring at the top and bottom. These seals also reduce operating noise.



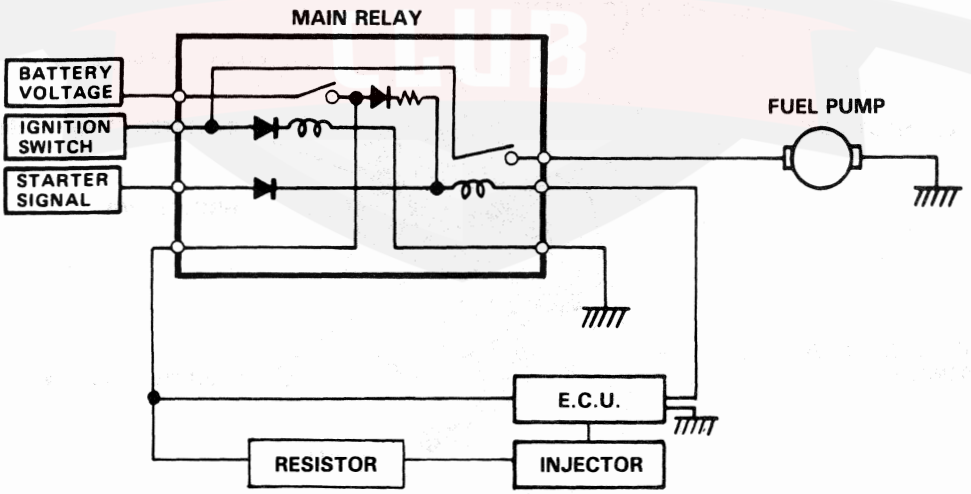
Injector Resistor

For the best possible injector response, it is necessary to shorten the current rise time when voltage is applied to the injector coil. Therefore, the number of windings of the injector coil is reduced. This, however, makes low resistance in the coil. Flow of current in the coil is therefore restricted by a resistor installed in series between the electric power source and the injector coil.



Main Relay

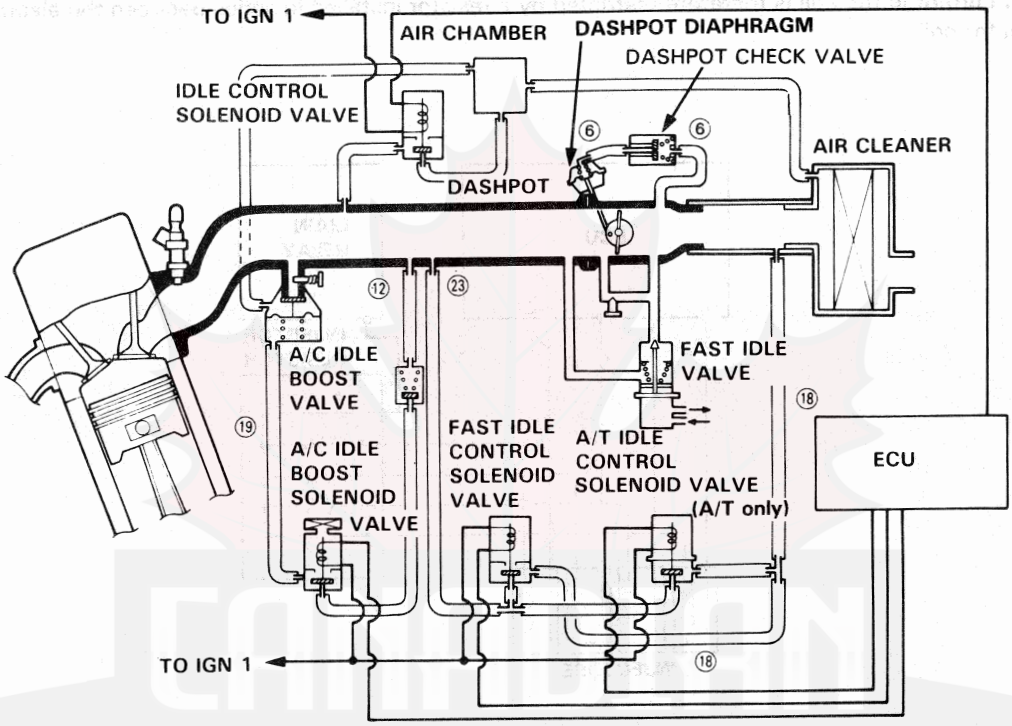
The main relay actually contains two individual relays. This relay is installed at the left side of the cowl. One relay is energized whenever the ignition is on which supplies the battery voltage to the ECU, power to the injectors, and power for the second relay.
The second relay is energized for 2 seconds, when the ignition is switched on and when the engine is running which supplies power to the fuel pump.



Description

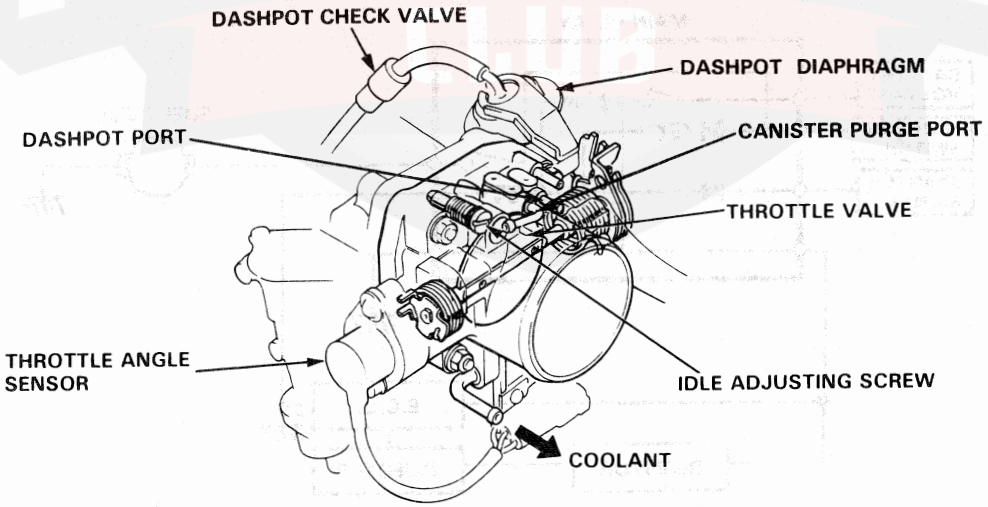
Air Intake System

The system supplies air for all engine needs. It consists of the air cleaner, air intake pipe, throttle body, idle control system, fast idle mechanism, and intake manifold. A resonator in the air intake pipe provides additional silencing as air is drawn into the system.



Throttle Body

The throttle body is a single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant which is led from the cylinder head. The idle adjusting screw which increases/decreases bypass air and the canister/purge port are located on the top of the throttle body. A dashpot is used to slow the throttle as it approaches the closed position.

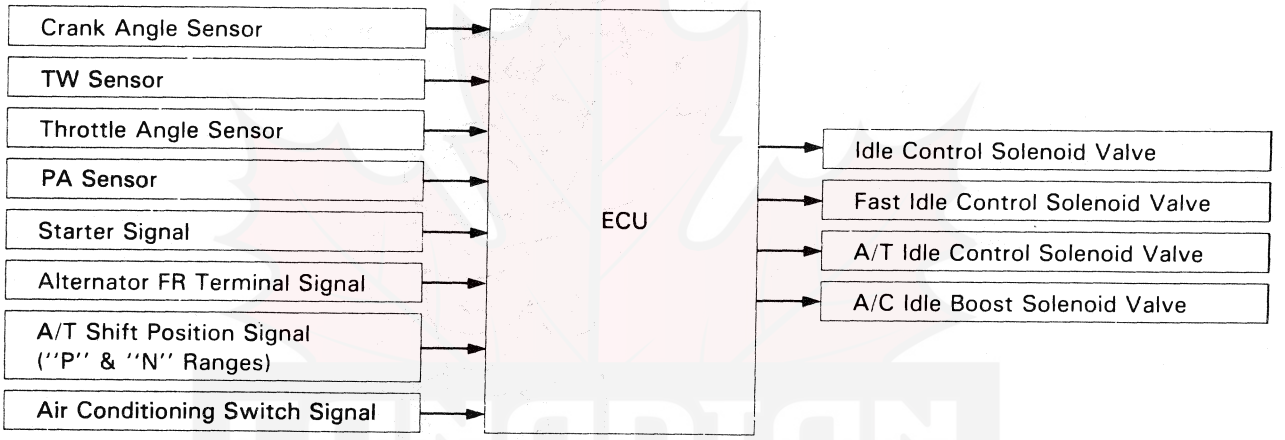


Dashpot System

The dashpot is employed to slow the closing of the throttle valve during gear shifting or deceleration.

Idle Control System

The idle speed is controlled by the electronic control unit and various solenoid valves such as idle control, fast idle, A/T idle control, and A/C idle boost solenoid valves. These change the amount of air bypassing into the air intake manifold. The A/C idle boost solenoid valve opens the A/C idle boost valve to increase the air flow when the air conditioner is turned on.



Idle Control Solenoid Valve

When the idle speed is reduced due to electrical, or other, loads on the engine, the valve opens to bypass additional air into the intake manifold. This additional air will allow the idle speed to increase to its normal speed (750 ± 50 rpm). The operation depends upon changes in the voltage at the FR terminal of the alternator for quick response. The valve also lowers the fast idle speed during warm-up, after the coolant temperature has reached 40°C (104°F). To prevent erratic running after the engine first fires, the valve is opened during cranking and immediately after starting to provide additional air into the intake manifold.

Fast Idle Control Solenoid Valve

To prevent erratic running when the engine is cold, a higher idle speed is needed. When the engine is cold, the valve opens to bypass additional air into the intake manifold. This operation is dependent upon coolant temperature and atmospheric pressure. The valve is open below −15°C (5°F) or (below 40°C (104°F) at high altitude).

A/T Idle Control Solenoid Valve

With the A/T shift lever is in gear, the idle speed will tend to lower. To compensate for this, the valve opens to maintain the specified idle speed (750 ± 50 rpm).

A/C Idle Boost Solenoid Valve

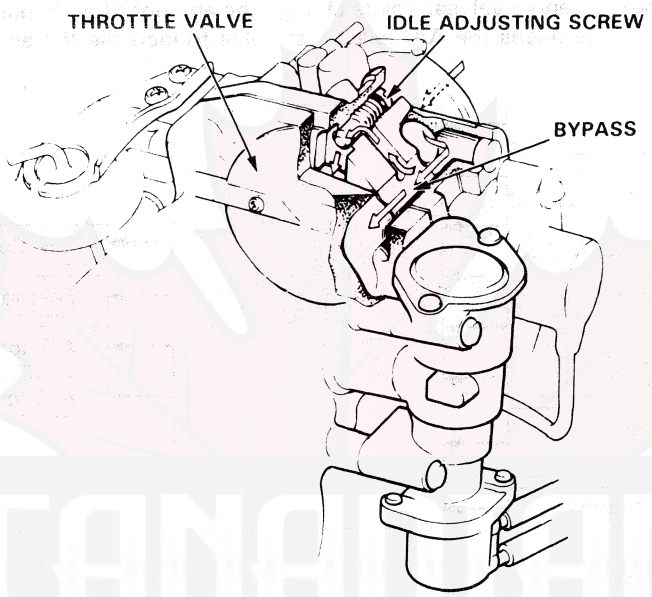
When the air conditioner compressor is on, the A/C idle boost solenoid valve is energized, the A/C idle boost valve opens to increase the air flow, and the idle speed is maintained at 750 ± 50 rpm. Adjust idle rpm with the A/C idle boost valve adjusting bolt.

(cont'd)

Air Intake System (cont'd)

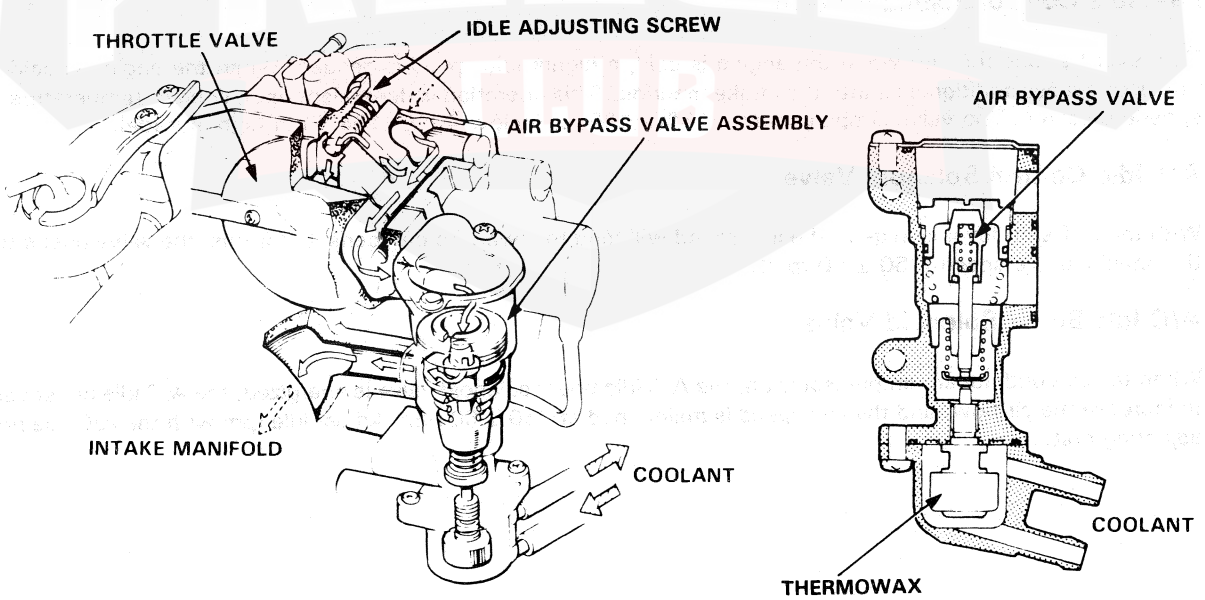
Idle Adjuster (Bypass Circuit)

The throttle body contains an adjustable bypass circuit. This circuit is designed to control the amount of air bypassing into the intake manifold without changing the position of the throttle valve.
Usually it is not necessary to adjust idle speed by the idle adjusting screw since idle speed is adjusted automatically by the idle control system. Idle speed does not change by turning the idle adjusting screw while idle control system is in operation.



Fast Idle Mechanism

To prevent erratic running when the engine is warming up, it is necessary to raise the idle speed.
The fast idle air bypass valve is controlled by a thermowax plunger. When the engine is cold the engine coolant surrounding the thermowax contacts the plunger, allowing additional air to be bypassed into the intake manifold so that the engine idles faster. When the engine reaches operating temperature, the valve closes, reducing the amount of air bypassing into the manifold.



Troubleshooting

Before starting troubleshooting on the PGM-FI system, check that other items that affect engine performance are within specification. Check the valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in pages 11-54 and 11-55.

(cont'd)

PGM-FI Control System

Troubleshooting (cont'd)

SYMPTOM \ CAUSAL PART		ECU	INJECTOR	FUEL PUMP	FUEL LINE	FAST IDLE MECHANISM	THROTTLE BODY	CRANK ANGLE SENSOR	MAP SENSOR
ENGINE WON'T START		FAULTY ECU	• OPEN/SHORT CIRCUIT • DAMAGED INJECTORS	• FAULTY PUMP/MAIN RELAY • POOR GROUNDING	• FROZEN FUEL LINE • BLOCKED FILTER			• OPEN/SHORT CIRCUIT • FAULTY SENSOR	
DIFFICULT TO START ENGINE WHEN COLD		↑	• OPEN/SHORT CIRCUIT • FAULTY INJECTOR	↑	• ICE IN FUEL LINE • CLOGGED FILTER	STUCK AIR BYPASS VALVE		↑	
IRREGULAR IDLING	WHEN COLD	↑	• OPEN/SHORT CIRCUIT • STUCK INJECTOR			↑		↑	• OPEN/SHORT CIRCUIT • BROKEN/DISCONNECTED HOSE • FAULTY SENSOR
	AFTER WARMING UP	↑	↑			↑		↑	↑
	RPM TOO HIGH					↑	• IDLE ADJUSTING SCREW OUT OF ADJUSTMENT • THROTTLE VALVE STUCK OPEN		↑
	RPM TOO LOW						• IDLE ADJUSTING SCREW OUT OF ADJUSTMENT		
FREQUENT STALLING	WHILE WARMING UP	FAULTY ECU	• OPEN/SHORT CIRCUIT • STUCK INJECTOR	• FAULTY PUMP/MAIN RELAY • POOR GROUNDING	• IMPROPER LINE PRESSURE • CLOGGED FILTER	STUCK AIR BYPASS VALVE			• OPEN/SHORT CIRCUIT • BROKEN/DISCONNECTED HOSE • FAULTY SENSOR
	AFTER WARMING UP	↑	↑	↑	↑		IDLE ADJUSTING SCREW OUT OF ADJUSTMENT	• OPEN/SHORT CIRCUIT • FAULTY SENSOR	↑
POOR PERFORMANCE	POOR DRIVEABILITY HIGH FUEL CONSUMPTION	↑	↑	↑	↑	STUCK AIR BYPASS VALVE		↑	↑
	AFTERBURN	↑	↑						↑
	BACKFIRE	↑	↑	• FAULTY PUMP/MAIN RELAY • POOR GROUNDING	• IMPROPER LINE PRESSURE • CLOGGED FILTER				↑
	KNOCKING	↑	↑	↑	↑				
	LACK OF POWER AT LOW RPM	↑	↑	↑	↑				
	LACK OF POWER AT MID RPM	↑	↑	↑	↑				• OPEN/SHORT CIRCUIT • BROKEN/DISCONNECTED HOSE • FAULTY SENSOR
	LACK OF POWER AT HIGH SPEED	↑		↑	↑				↑
WARNING/ INDICATOR LIGHT TURNS ON	PGM-FI WARNING LIGHT	↑						• OPEN/SHORT CIRCUIT • FAULTY SENSOR	↑
	SELF DIAGNOSIS INDICATOR	↑						↑	↑

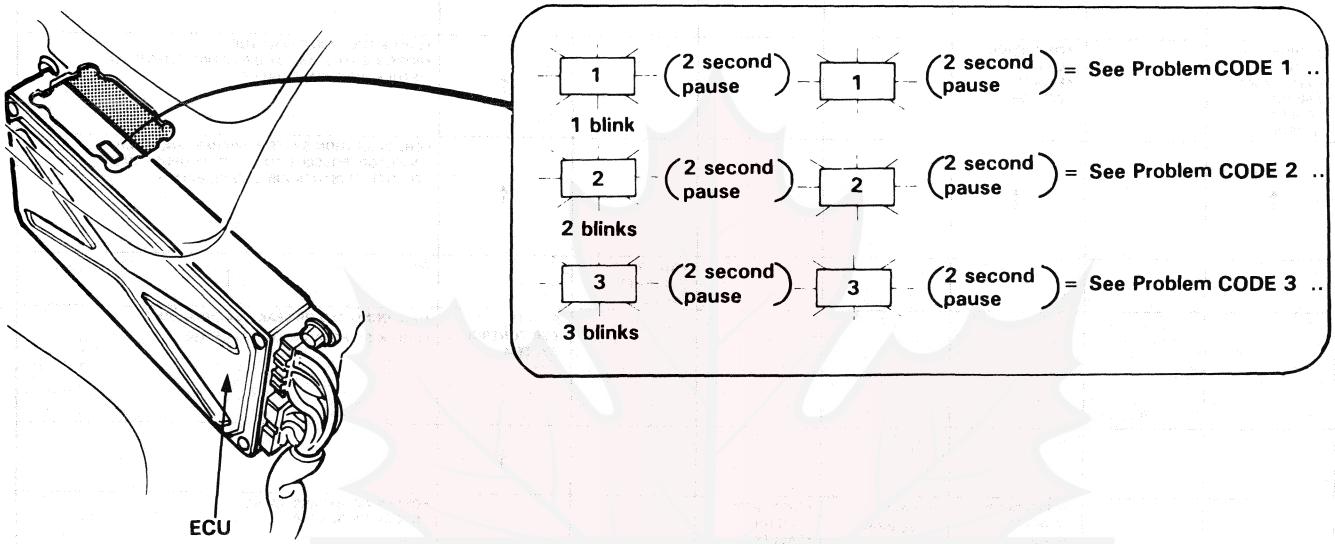
ATMOSPHERIC PRESSURE SENSOR	O_2 SENSOR	TW SENSOR	THROTTLE ANGLE SENSOR	TA SENSOR	IDLE CONTROL SYSTEM	EGR CONTROL SYSTEM	IMPORTANT POINTS
						FAULTY EGR CONTROL SYSTEM	• CHECK FUEL PUMP INJECTOR
(AT HIGH ALTITUDE) • OPEN SHORT CIRCUIT • FAULTY SENSOR		• OPEN SHORT CIRCUIT • FAULTY SENSOR				↑	• CHECK FUEL PUMP INJECTOR • POSSIBLE TO START BY OPERATING THROTTLE? (STUCK AIR BYPASS VALVE)
↑		↑				↑	• CHECK IGNITION SYSTEM (SPARKS) AND EACH INJECTOR POSSIBLE TO START BY OPERATING THROTTLE? (STUCK AIR BYPASS VALVE)
					FAULTY SOLENOID VALVE		↑
						FAULTY EGR CONTROL SYSTEM	• DISCONNECTED OR LEAKY VACUUM LINES • CHECK SELF DIAGNOSIS INDICATOR
						↑	
		• OPEN SHORT CIRCUIT • FAULTY SENSOR	• FAULTY SENSOR	• OPEN SHORT CIRCUIT • FAULTY SENSOR		↑	• CHECK AIR BYPASS VALVE • CHECK TW SENSOR
					• FAULTY SOLENOID VALVE (RPM DOWN)		• CHECK IDLE SPEED • CHECK FOR FUEL CUT-OFF OPERATION
	• OPEN SHORT CIRCUIT • FAULTY SENSOR	• OPEN SHORT CIRCUIT • FAULTY SENSOR	• OPEN SHORT CIRCUIT • FAULTY SENSOR	• OPEN SHORT CIRCUIT • FAULTY SENSOR	FAULTY SOLENOID VALVE (STUCK OPEN)		• CHECK IGNITION TIMING • CHECK FOR FUEL CUT-OFF OPERATION
		↑	↑				↑
		↑	↑			FAULTY EGR CONTROL SYSTEM	• CHECK IGNITION TIMING • CHECK MAP SENSOR INJECTORS
		↑	↑				• CHECK IGNITION TIMING
	• OPEN/SHORT CIRCUIT • FAULTY SENSOR	↑	↑				• CHECK IGNITION TIMING (DISCONNECTED OR BROKEN LINES) • CHECK INJECTORS
	↑	↑	↑				• CHECK IGNITION TIMING
							• CHECK MAP SENSOR • CHECK IGNITION TIMING
• OPEN/SHORT CIRCUIT • FAULTY SENSOR	• OPEN/SHORT CIRCUIT • FAULTY SENSOR	• OPEN/SHORT CIRCUIT • FAULTY SENSOR	• OPEN/SHORT CIRCUIT • FAULTY SENSOR	• OPEN/SHORT CIRCUIT • FAULTY SENSOR		FAULTY EGR CONTROL SYSTEM	• CONSULT TROUBLESHOOTING CHART ON PAGE 11-61
↑	↑	↑	↑	↑		↑	↑

(cont'd)

PGM-FI Control System

Troubleshooting (cont'd)

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



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

Sometimes the PGM-FI warning light and/or ECU LED display will come on, indicating a system problem, when, in fact, there is a bad or intermittent electrical connection. To troubleshoot bad connections, note the ECU LED display blink frequency, refer to the diagnosis chart on page 11-61 and check the connectors associated with the items mentioned in the "Possible Cause" column. Clean or repair connections if necessary.

NOTE:

- The ECU's memory is retained even with the ignition off. It is necessary, therefore, to reset the memory after making repairs by disconnecting Hazard fuse for at least 10 seconds.
  After reconnecting the Hazard fuse, check that the LED display is turned off.
- The memory for the "PGM-FI" warning light will be erased when the ignition switch is turned off; however, the memory for the LED display will not be cancelled. Thus, the warning light will not come on when the ignition is again turned on unless the trouble is once more detected. Troubleshooting should be done according to the LED display even if the warning light is OFF.
  If the LED display fails to come on when the ignition switch is turned on again, check for:
  — Blown Hazard fuse (10A).
  — Open circuit in White/Yellow wire between ECU A17 terminal and Hazard fuse.
  Then, if there is no problem, substiute a known-good ECU and re-check.
- Turn the ignition switch ON. The PGM-FI warning light should come on for about 2 seconds.
  If the warning light won't come on, check for:
  — Blown No. 5 fuse (also the fuse for the back-up lights, seat belt alarm, and clock)
  — Open circuit in Yellow wire between No. 5 fuse and combination meter.
  — Open circuit in Green/Red wire between combination meter and ECU B6 terminal.
  — Open circuit in Black wires between ECU A2, A4 and ground 1.
  — Blown warning light bulb.
  Then, if there is no problem, substitute a known good ECU and re-check.

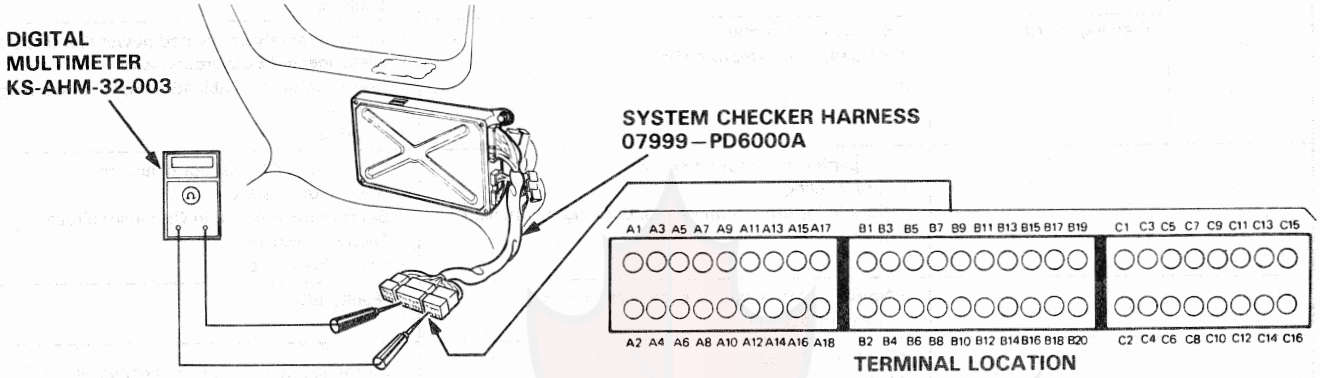
No. of LED Blinks between 2 second pauses		Symptom	Possible cause	Page
0	Warning light off	• Engine will not start	• Disconnected ECU ground wire • Faulty ECU	62
	Warning light on	• Engine will not start • No particular symptom shown	• Loose or poorly connected power line to ECU • Disconnected ECU ground wire • Short circuit in combination meter or warning light wire • Faulty ECU	62
1		• No particular symptom shown • Erratic idling (Erratic injector, connector and wiring Insufficient fuel)	• Disconnected O_2 sensor connector • Spark plug mis-fire • Short or open circuit in O_2 sensor cirucit • Faulty O_2 sensor • Faulty fuel system	63
2		• No particular symptom shown or system does not operate	• Faulty ECU	65
3		• Fuel fouled plug • Frequent engine stalling • Hesitation	• Disconnected MAP sensor connector • Short or open circuit in MAP sensor wire • Faulty MAP sensor	65
4		• No particular symptom shown or system does not operate	• Faulty ECU	65
5		• Hesitation • Fuel fouled plug • Frequent engine stalling	• Disconnected MAP sensor piping	66
6		• High idle speed during warm-up • High idle speed • Hard starting at low temp	• Disconnected TW sensor connector • Open or short circuit in TW sensor wire • Faulty TW sensor (thermostat housing)	67
7		• Poor engine response to opening throttle rapidly • High idle speed • Engine does not rev up when cold	• Disconnected throttle angle sensor connector • Open or short circuit in throttle angle sensor wire • Faulty throttle angle sensor	68
8		• Engine does not rev up • High idle speed • Erratic idling	• Short or open circuit in crank angle sensor wire • Crank angle sensor wire interfering with spark plug wires • Crank angle sensor at fault	69
9		• Same as above	• Same as above	69
10		• High idle speed • Erratic idling when very cold	• Disconnected TA sensor connector • Open or short circuit in TA sensor wire • Faulty TA sensor	70
11		• No particular symptom shown or system does not operate	• Faulty ECU	71
12		• Frequent engine stalling • Erratic or unstable running at low speed • No particular symptom shown	• Disconnected EGR control system connector • Shorted or disconnected EGR control wire • Faulty EGR control system	71
13		• Poor acceleration at high altitude • Hard starting at high altitude when cold	• Disconnected PA sensor connector • Shorted or disconnected PA sensor wire • Faulty PA sensor	72

NOTE:

- If the number of blinks between 2 second pauses exceeds 13, or if the LED indicator stays on, the ECU is faulty.
- Some failure indications (such as, one blink) require the full test procedures on the following pages to confirm that the failure has or has not been eliminated.

Troubleshooting Flow Chart

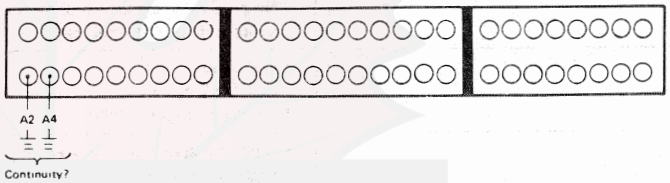
Use the system checker harness and digital multimeter to check the system.



0 — **Self-diagnosis indicator remain off — The warning light is not lit.**

Connect the system checker harness between the ECU and connector.

Check for continuity between the A2 (Black), the A4 (Black) terminals and body ground.



Does continuity exist?

NO — Faulty ground circuit at GND-1.

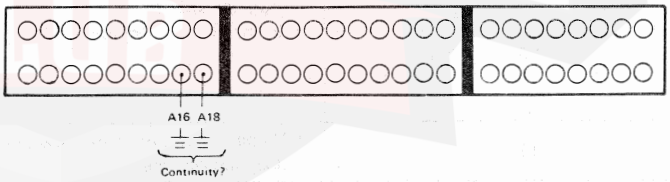
YES

Substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.
If symptom does not go away, check to see if the warning light is on and the LED indicator is now blinking, and troubleshoot the true cause.

0 — **Self-diagnosis indicator remains off — The dash warning light is lit.**

Connect the system checker harness between the ECU and connector.

Check for continuity between the A16 (Brown/Black), the A18 (Black/Red) terminals and body ground.



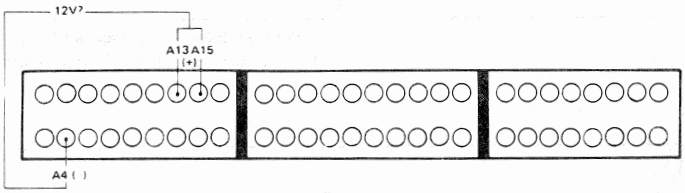
Does continuity exist?

NO — Faulty ground circuit at GND-2.

YES

Turn the ignition switch ON.

Measure voltage between A15 (Yellow/Black (+)), the A13 (Black/Yellow (+)) terminals and the A4 terminal (Black (–)).



(To page 11-63)

(From page 11-62)

Is 12 V available?

NO
- Fuse (15 A) blown
- Open circuit in Yellow/Blue wire between Fuse (15 A) and main relay
- Faulty main relay
- Open circuit in Yellow/Black wire between main relay and ECU
- Regulator fuse (10 A) blown (fuel pump is not working).
- Open circuit in Black/Yellow wire between Regulator fuse and main relay
- Open circuit in main relay ground wire (Black)
- Faulty ECU.

NOTE: No voltage available.

YES

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

Are wires normal?

NO — Faulty circuit or combination meter.

YES

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

1 — **Self diagnosis indicator blinks once**

NOTE: First, check the spark plugs. Plug mis-fire can be another source of this trouble.

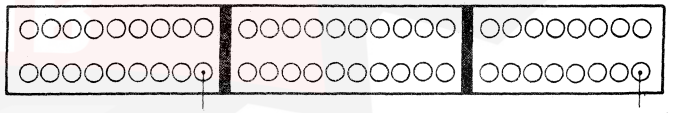
Warm the engine to normal operating temperature (cooling fan comes on).

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

Stop engine.

Connect system checker harness between ECU and connector.

Attach positive probe of voltmeter to C16 terminal (White (+)) of checker, and negative probe to A 18 (Black/Red (−)) terminal.



0.6 V at throttle wide open?
0.4 V at full close?

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

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

Is voltage above 0.6 V ... below 0.4 V?

NO
- Stop engine.
- Disconnect engine wire harness from oxygen sensor.

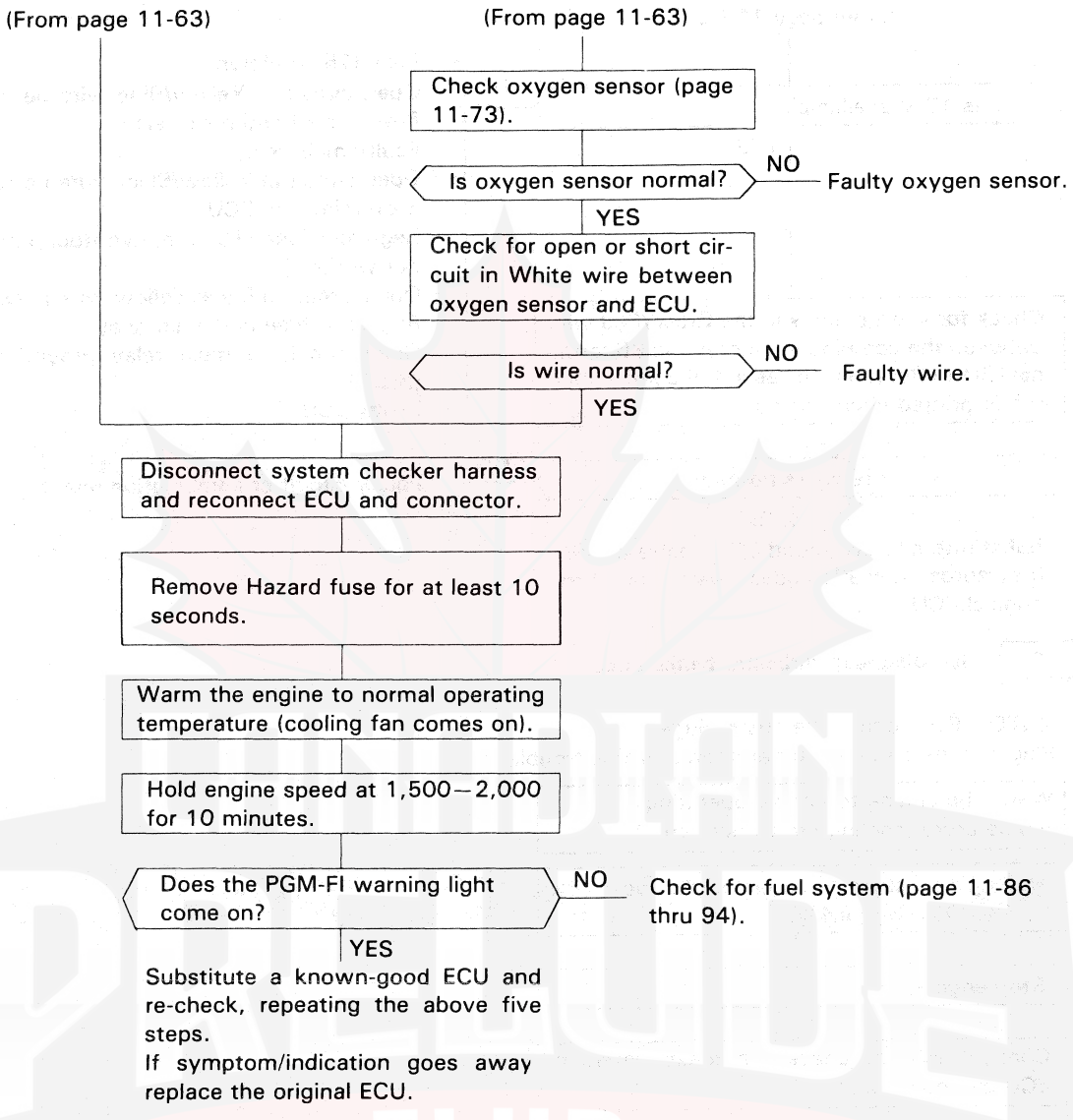
(To page 11-64)

YES

(To page 11-64)

(cont'd)

Troubleshooting Flow Chart (cont'd)



2 **Self diagnosis indicator blinks twice.**

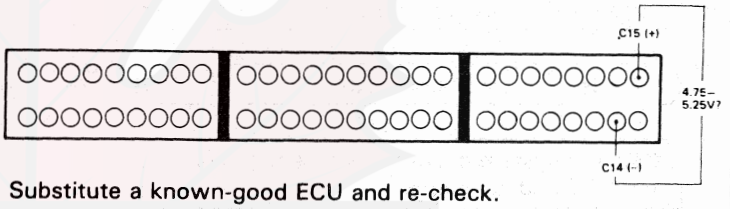
Count the number of blinks again. If the LED is, in fact, blinking twice between pauses, substitute a known-good ECU and re-check.
If the indication goes away, replace the original ECU.

3 **Self diagnosis indicator blinks three times.**

Connect system checker harness between the ECU and connector.

Turn ignition switch ON.

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

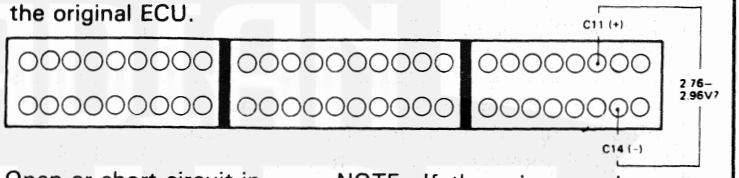


Is voltage between 4.75 and 5.25 V?

NO — Substitute a known-good ECU and re-check.
If prescribed voltage is now available, replace the original ECU.

YES

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



Is voltage between 2.76 and 2.96 V?

NO — Open or short circuit in Red/White, White/Blue or Blue/White wire between MAP sensor and ECU.

Faulty MAP sensor.

NOTE: If there is no voltage or if voltage is low, check for shorted wire. If voltage is high, wire may be open or bad contact.
If the wires are normal, the sensor is at fault.

YES

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

4 **Self diagnosis indicator blinks four times.**

Count the number of blinks again. If the LED is, in fact, blinking four times, substitute a known-good ECU and re-check.
If the indication goes away, replace the original ECU.

(cont'd)

Troubleshooting Flow Chart (cont'd)

5 **Self diagnosis indicator blinks five times.**

Check that the MAP sensor pipe is connected securely.

NOTE: Also check hose routing inside control box.

Is routing normal? — NO → Reconnect routing.

YES

Disconnect pipe from the MAP sensor and plug open end.

Disconnect #21 vacuum hose from throttle body.

Connect vacuum pump to #21 vacuum hose and check for a leak.

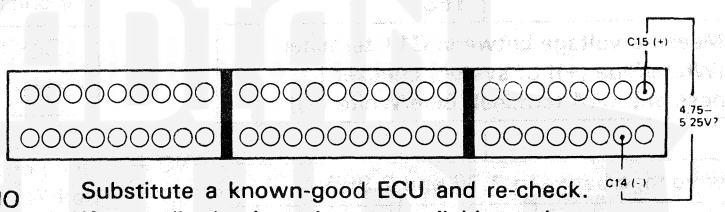
Is vacuum maintained? — NO → Replace vacuum hose.

YES

Connect system checker harness between the ECU and connector.

Turn ignition switch ON.

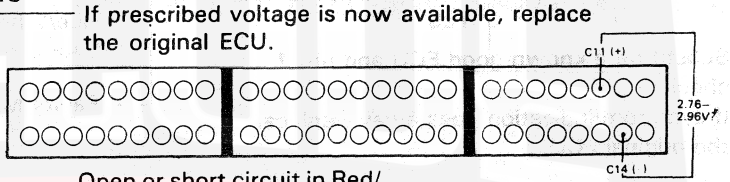
Measure voltage between C15 terminal (Red/White (+)) of system checker harness and C14 terminal (Blue/White (−)).



Is voltage between 4.75 and 5.25 V? — NO → Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

YES

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



Is voltage between 2.76 and 2.96 V? — NO → Open or short circuit in Red/White, White/Blue or Blue/White wire between MAP sensor and ECU.

NOTE: If there is no voltage or if voltage is low, check for a shorted wire. If voltage is high, wire may be open or bad contact. If wire is normal, the MAP sensor is at fault.

YES

Connect vacuum pump to the MAP sensor.

Check that voltage changes as vacuum is applied.

Has voltage changed? — NO → Faulty MAP sensor.

YES

Substitute a known-good ECU and re-check.

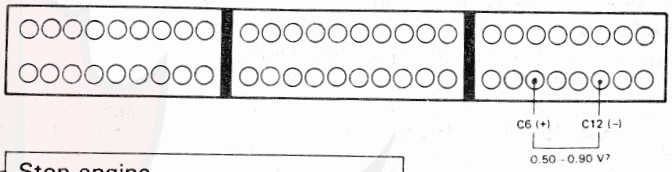
If symptom/indication goes away, replace the original ECU.

6 **Self diagnosis indicator blinks six times.**

Connect system checker harness between the ECU and connector.

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

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



Is voltage between 0.50 and 0.90 V?

NO → Stop engine.

Check TW sensor (page 11-74).

Is sensor normal?

NO → Faulty TW sensor

YES

Check for open or short circuit in Yellow/Green and Green/White wires between TW sensor and the ECU.

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

Are wires normal?

NO → Faulty wires

YES

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

YES

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

(cont'd)

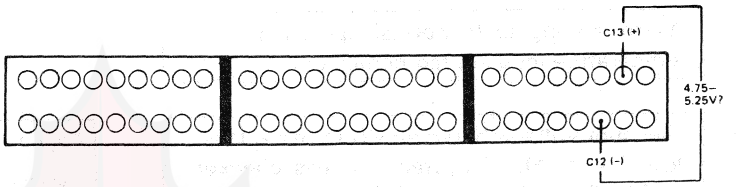
Troubleshooting Flow Chart (cont'd)

7 — **Self diagnosis indicator blinks seven times.**

Connect system checker harness harness between ECU and connector.

Turn ignition switch ON.

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

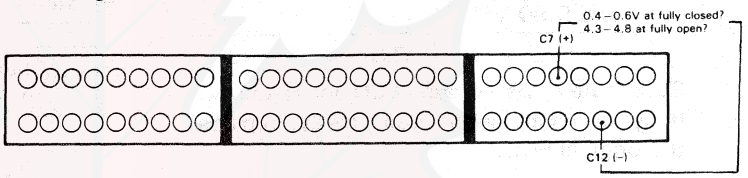


Is 4.75—5.25 V attained?

NO — Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

YES

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



Operate accelerator pedal from fully closed to fully open.

Check that 0.4—0.6 V is available at fully closed, and 4.3—4.8 V at fully open.

Are voltages within above ranges?

NO — Check the throttle angle sensor (page 11-74).

YES

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

Is the sensor normal?

NO — Faulty throttle angle sensor.

YES

Check for short or open circuit in Yellow/White, Red/Yellow and Green/White wires between the ECU and throttle angle sensor

Are wires normal?

NO — Faulty wires.

YES

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

8 **Self diagnosis indicator blinks eight times.**

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

NOTE: Check that crank angle sensor harness is not interfering with the spark plug wires.

Are wires normal? — NO — Replace wires.

YES

Check crank angle sensor (page 11-75).

Is sensor normal? — NO — Faulty crank angle sensor.

YES

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

9 **Self diagnosis indicator blinks nine times.**

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

NOTE: Check that sensor harness is not interfering with the spark plug wires.

Are wires normal? — NO — Replace wires.

YES

Check crank angle sensor (page 11-75).

Is sensor normal? — NO — Faulty crank angle sensor.

YES

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

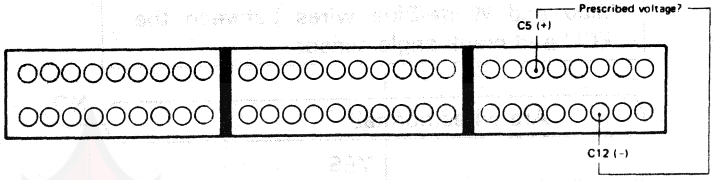
(cont'd)

Troubleshooting Flow Chart (cont'd)

10 — **Self diagnosis indicator blinks ten times.**

Connect system checker harness between the ECU and harness connector.

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



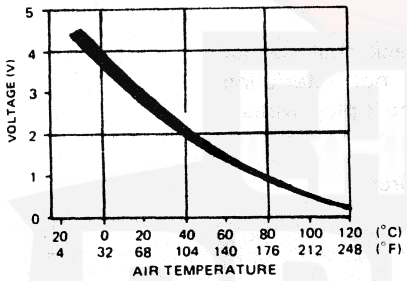
Turn ignition switch ON.

Check that voltage is correct for the intake air temperature.

Is voltage correct? — NO → Check TA sensor (page 11-73).

YES

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



Is sensor normal? — NO → Faulty TA sensor.

YES

Turn ignition switch OFF.

Check for open or short circuit in White/Red and Green/White wires between TA sensor and the ECU.

NOTE: If voltage is low, or there is no voltage, check wires for short circuit. If voltage is high, probability is open or bad contact.

Are wires normal? — NO → Faulty wires.

YES

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

11 **Self diagnosis indicator blinks eleven times.**

Count the number of blinks again. If the LED is, in fact, blinking eleven times between pauses, substitute a known-good ECU and re-check.
If the indication goes away, replace the original ECU.

12 **Self diagnosis indicator blinks twelve times.**

Test EGR Control System (section 12).

(cont'd)

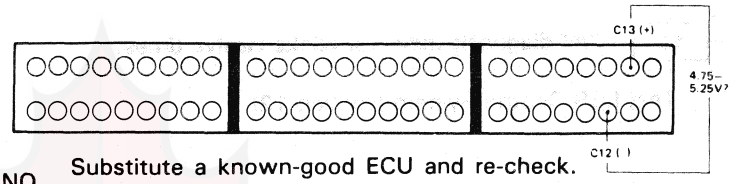
Troubleshooting Flow Chart (cont'd)

13 — **Self diagnosis indicator blinks thirteen times.**

Connect system checker harness between the ECU and harness connector.

Turn ignition switch ON.

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

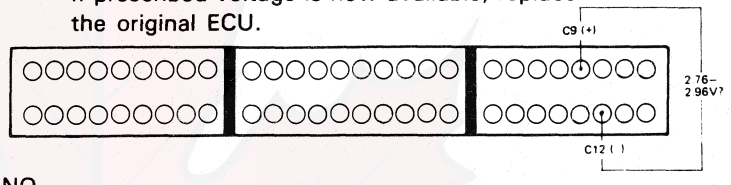


Is 4.75—5.25 V available?

NO — Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

YES

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



Is 2.76—2.96 V available?

NO — Open or short circuit in Yellow/White, Red, Green/White wire between PA sensor and ECU.

Faulty PA sensor.

YES

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

NOTE: If there is no voltage or if voltage is low, check for shorted wire. If voltage is high wire may be open or poorly contacted. If the wires are normal, the PA sensor is at fault.

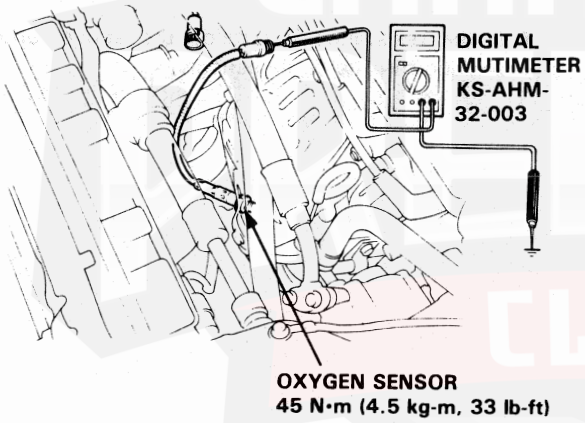
NOTE: If the number of blinks between 2 second pauses exceeds 13, or if the LED indicator stays on, the ECU is faulty.

Sensors

O_2 Sensor Test

1. Disconnect the connector of the O_2 sensor.
2. Start the engine and warm up for 2 minutes at 3,000 rpm under no load. Raise the engine speed to 4,000 rpm and release the throttle suddenly at least 5 times.
3. Within one minute after the engine has been warmed up, measure the voltage between the connector terminal and body ground as described in steps 4 and 5.

   NOTE: If it takes more than one minute to complete the checks, warm up the engine as in step 2 before continuing.
4. Raise the engine speed to 5,000 rpm, then lower to 2,000 rpm by operating the accelerator pedal.
   Voltage should be below 0.4 V.
5. Disconnect the #21 vacuum hose from the throttle body; plug the opening in the throttle body. Connect a vacuum pump to the open end of the vacuum hose and apply 300 mmHg, and raise the engine speed to 4,000 rpm.
   Voltage should be above 0.6 V.



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

6. Reconnect the connector.

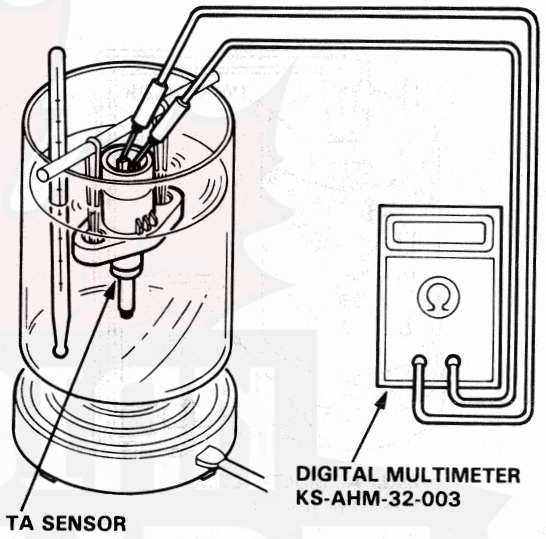
NOTE:
- Avoid damaging the wire harness.
- To prevent cross-threading, first tighten the sensor finger tight, then tighten to the specified torque with a torque wrench.
- O_2 sensor does not operate when its intake is clogged.

- Be extremely careful not to spray anything over the O_2 sensor.

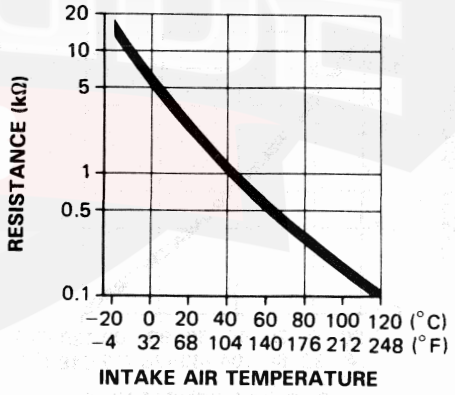
TA Sensor Test

1. Disconnect the connector, then remove the TA sensor.
2. To test the sensor, suspend it in cold water and heat the water slowly. Make sure more than half the coupler is submerged. Measure the resistance between the terminals.

STANDARDS: 0.98–1.34 kΩ at 40°C (104°F)
0.22–0.35 kΩ at 80°C (176°F)



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



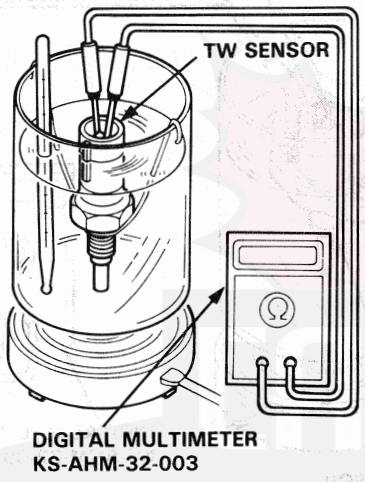
- Replace the sensor if resistance is outside the range.

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

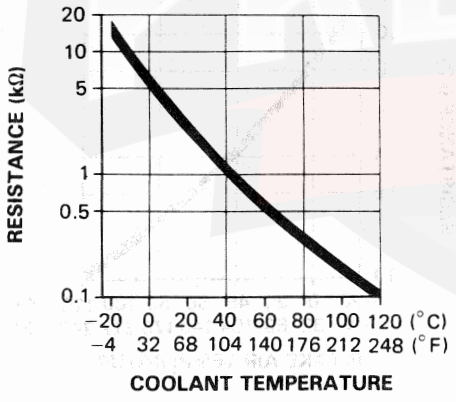
TW Sensor Test

1. Disconnect the connector, then remove the TW sensor from thermostat housing.
2. To test the sensor, suspend it in cold water and heat the water slowly. Make sure more than half the coupler is submerges. Measure the resistance between the terminals.

STANDARDS: 0.98–1.34 kΩ at 40°C (104°F)
0.22–0.35 kΩ at 80°C (176°F)



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



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

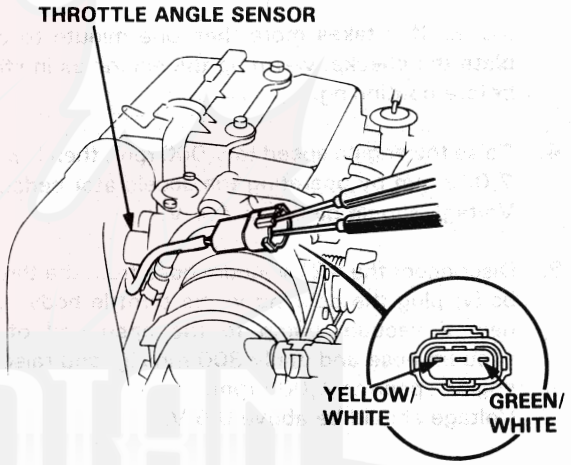
NOTE:
- Don't let the sensor touch the bottom of the container.
- During the test, stir the water in the container to ensure even temperature.

Throttle Angle Sensor Test

CAUTION; The throttle stop screw is non-adjustable.

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

Resistance should be: 4–6 kΩ



- If the resistance is outside the above range, replace throttle angle sensor.

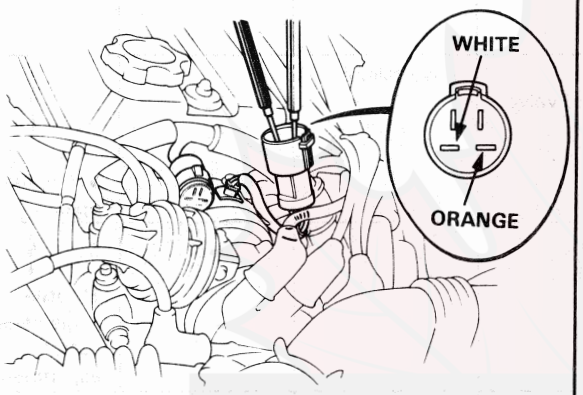
Crank Angle Sensor Test

NOTE: If either the CYL or TDC sensor tests bad, replace the crankangle sensor assembly.

CYL Sensor Inspection

1. Disconnect the connector of the distributor.
2. Measure the resistance between the White terminal and Orange terminal at the sensor.

   Resistance should be: 0.65—0.85 kΩ



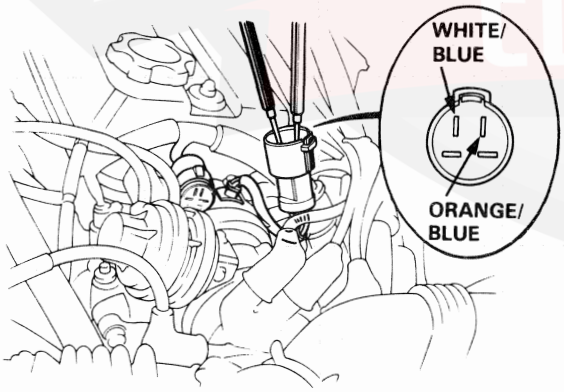
3. Check for continuity between the White terminal and body ground, and the Orange terminal and body ground at the terminals.

   There should be no continuity.

TDC Sensor Inspection

1. Disconnect the connector of the distributor.
2. Measure the resistance between the Orange/Blue terminal and White/Blue terminal at the sensor.

   Resistance should be: 0.65—0.85 kΩ



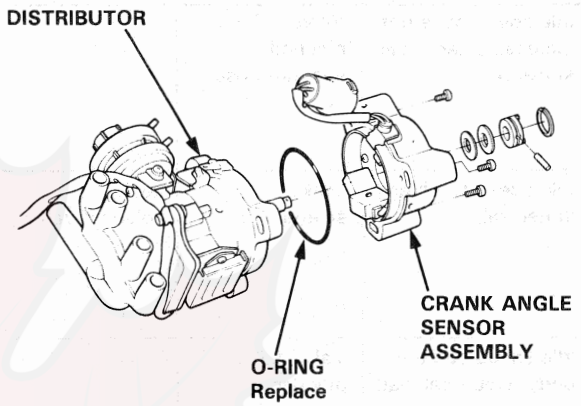
3. Check for continuity between the White/Blue terminal and body ground, and the Orang/Blue terminal and body ground at the terminals.

   There should be no continuity.

Crank Angle Sensor Replacement

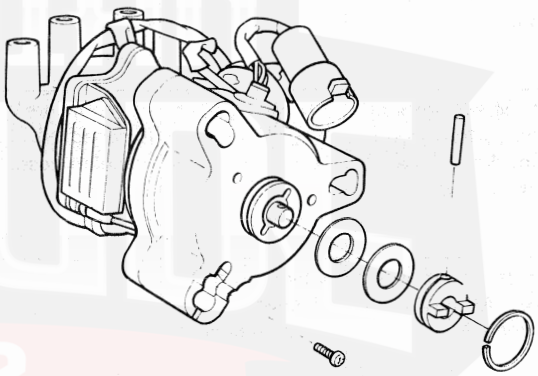
Removal:

1. Remove the distributor (section 23).
2. Remove the crank angle sensor assembly from the distributor.



Installation:

1. Install a new O-ring.
2. Install the sensor to the distributor.



3. Install the distributor to the cylinder head (section 23).

Idle Control

Troubleshooting

Part / page / Symptom	Idle control solenoid valve 80	Fast idle control solenoid valve 82	A/T idle control solenoid valve 81	A/C idle boost solenoid valve 81	A/C idle boost valve *	Throttle body 98
Idle speed does not increase after initial start-up.	Valve failure/ pinched vacuum hose					Adjusting screw out of adjustment
Idle speed too high in neutral.	Leaky solenoid valve	Leaky solenoid valve	Leaky solenoid valve	Valve failure		↑ Valve stuck open
Idle speed changes under electrical load.	Valve failure/ pinched vacuum hose					↑ Throttle angle sensor out of adjustment
Idle speed drops when blipping throttle with electrical load.						
On models with automatic transmission, the idle speed drops in gear.		Valve failure/ pinched vacuum hose				
Idle speed drops when A/C switch is turned ON.	Valve failure/ pinched vacuum hose		Valve failure/ pinched vacuum hose	Valve failure/ pinched vacuum hose	Adjusting bolt out of adjustment	
Idle speed fluctuates when idle control comes into operation.	Valve failure					
Fast idle speed too low at high altitude (above 1,200 m, 4,000 ft)		Valve failurue/ pinched vacuum hose				

Fast idle mechanism	Starter switch signal	Alternator FR terminal signal	A/T shift position signal	A/C switch signal	ECU	Hoses and connections	Remarks
100	78	78	79	80	61	*	*
	Open circuit				Failure in ECU	Broken/ disconnected hose	Is signal available at ECU?
Leaky fast idle valve					Failure (signal not stopped)	↑	• Pinch idle control solenoid valve hose and readjust. • Any intake or bypass leak.
					Failure (signal not available)	↑	Is idle control solenoid valve working?
		Open circuit			Failure in ECU	↑	Is there big difference between no load and loaded conditions?
			Abnormal signal		↑	↑	• Is shift signal available at ECU? • Is A/T idle control solenoid valve working?
				Open circuit	↑	↑	• Is vacuum applied to A/C idle boost valve? • Is A/C idle boost valve openning adjusted properly?
					↑	↑	Is condition improved when solenoid valve is replaced?
					↑	↑	↑

Idle Control

Troubleshooting Flow Chart

Starter Switch Signal Inspection

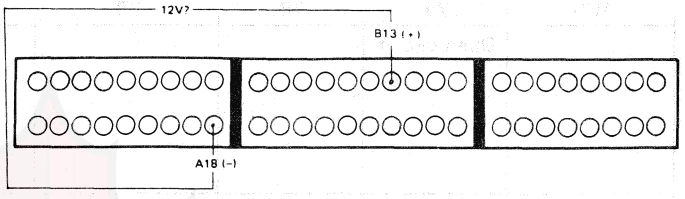
Connect system checker harness between ECU and wire harness connector.

Turn ignition switch to START.

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

Is battery voltage available?

NO — Blown starter fuse (10A) in the fuse holder
Open circuit in Black/White wire between starter fuse (10A) and ECU.



Alternator FR Terminal Signal Inspection

Before inspection, check operation of alternator as follows:
With the engine running, and the upper vacuum hose of idle control solenoid valve pinched (to cut off the idle control system), turn the headlights on and off.
Engine speed should be changed. If engine speed remains steady, recharge battery and re-test.

Connect system checker harness between ECU and wire harness connector.

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

Start engine.

Turn headlights ON and OFF.

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

Is voltage changed?

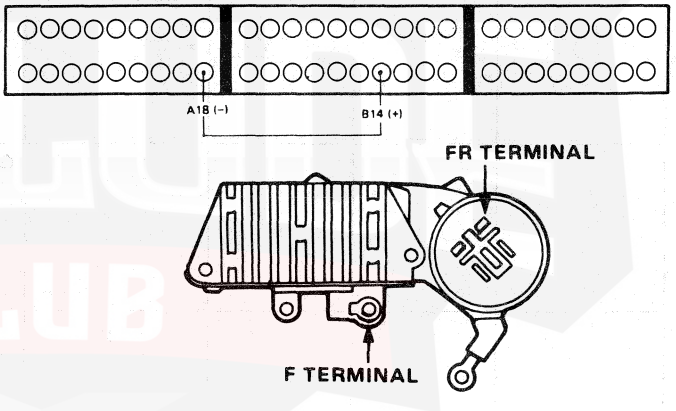
NO — Stop engine.

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

Is there continuity?

NO — Open circuit in harness

YES — Faulty voltage regulator or alternator

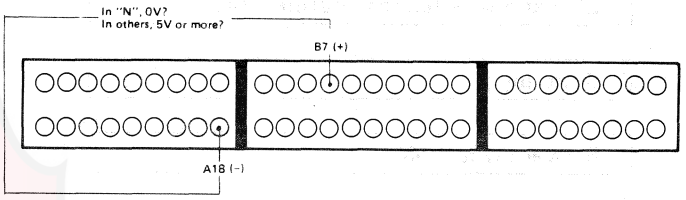


NOTE: FR terminal diode is faulty if continuity or no continuity exists in both directions between F and FR terminals of voltage regulator.

A/T Shift Position Signal Inspection

Connect system checker harness between ECU and wire harness connector.

Attach positive probe of voltmeter to B7 terminal (Green (+)) and negative probe to A18 terminal (Black/Red (−)) of system checker harness.



Turn ignition switch ON.

Move shift lever into gear.

Check that more than 5 V appears in positions other than "N" (0 V in "N").

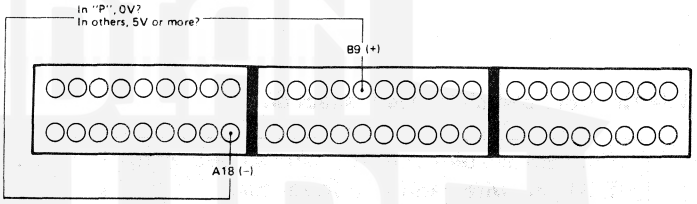
Is correct voltage available?

NO
- Open circuit in Green wire between A/T position indicator and ECU.
- Faulty A/T "N" switch

YES

Turn ignition switch OFF.

Connect positive probe of voltmeter to B9 terminal (Grenn/White (+)) and negative probe to A18 terminal (Black/Red (−)) of system checker harness.



Turn ignition switch ON.

Move shift lever into gear.

Check that more than 5 V appears in positions other than "P" (0 V in "P").

Is correct voltage available?

NO
- Open circuit in Green/White wire between A/T position indicator and ECU.
- Faulty A/T "P" switch

(cont'd)

Idle Control

Troubleshooting Flow Chart (cont'd)

Air Conditioner Switch Signal Inspection

Connect system checker harness between ECU and wire harness connector.

↓

Start engine.

↓

Blower switch ON.

↓

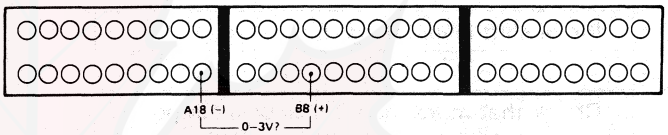
A/C switch ON.

↓

Check that compressor and condenser cooling fan work.

↓

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



↓

Is 0—3 V available?

NO — Open circuit in Blue/Red wire between A/C diode connector and ECU.

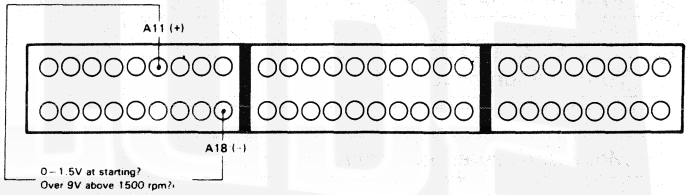
NOTE: Voltage will be over 9 V if compressor or condenser cooling fan stops when power is cut-off by pressure switch or thermostat.

Idle Control Solenoid Valve Inspection

Connect system checker harness between ECU and wire harness connector.

↓

Attach positive probe of voltmeter to A 11 terminal (Green/Black (+)) and negative probe to A 18 terminal (Black/Red (−)) of system checker harness.



↓

Start engine.

NOTE: Measure within 10 seconds.

↓

Is 0—1.5 V available?

NO —
- Open circuit in Black/Yellow wire between Regulator fuse (10A) and idle control solenoid valve.
- Open circuit in Green/Black wire between idle control solenoid valve and ECU.
- Open circuit in idle control solenoid valve.

NOTE: No voltage available.

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

↓

Raise engine speed over 1,500 rpm.

↓

Is more than 9 V available?

NO — Faulty ECU.

A/T Idle Control Solenoid Valve Inspection

NOTE: Apply parking brake securely.

Connect system checker harness between ECU and wire harness connector.

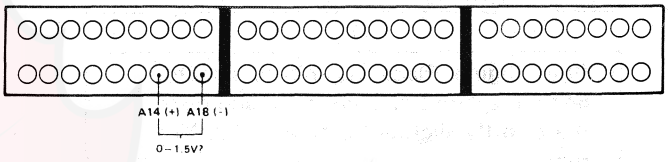
Start engine.

Shift transmission into "D_3" or "D_4".

Measure voltage between A14 terminal (Green (+)) and A18 terminal (Black/Red (−)) of system checker harness.

Is 0−1.5 V available?

NO



- Open circuit in Black/Yellow wire between Regulator fuse (10A) and A/T idle control solenoid valve.
- Open circuit in Red wire between A/C idle boost solenoid valve and ECU.
- Open circuit in A/T idle control solenoid valve.

NOTE: No voltage available.

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

A/C Idle Boost Solenoid Valve Inspection

Connect system checker harness between ECU and wire harness connector.

Start engine.

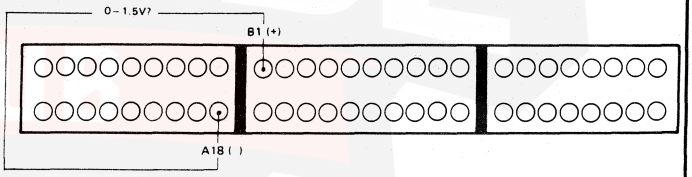
Turn A/C switch ON.

Check that compressor and condenser cooling fan work.

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

Is 0−1.5 V available?

NO



- Open circuit in Black/Yellow wire between Regulator fuse (10A) and A/C idle boost solenoid valve.
- Open cirucit in Green wire between A/T idle control solenoid valve and ECU.
- Open circuit in A/C idle boost solenoid valve.

NOTE: No voltage available.

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

(cont'd)

Troubleshooting Flow Chart (cont'd)

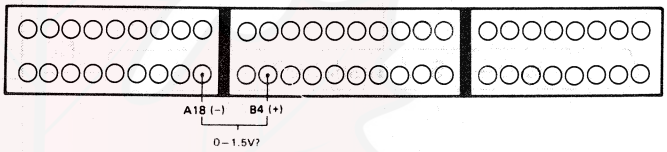
Fast Idle Control Solenoid Valve Inspection

Connect system checker harness between ECU and wire harness connector.

Jack up the front of the car and support with jackstands. Block rear wheels and set the parking break.

Start engine. Place the shift or selector lever in spcond or 2 position, and open the throttly slightly (to at least 2,000 rpm).

Measure voltage between B4 terminal (Blue/Black (+)) and A18 terminal (Black/Red (−)) of system checker harness.



Is 0−1.5 V available?

NO

- Open circuit in Black/Yellow wire between Regulator fuse (10A) and fast idle control solenoid valve.
- Open circuit in Red/Green wire between fast idle control solenoid valve and ECU.
- Open cirucit in fast idle control solenoid valve.

NOTE: No voltage available.

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

NOTE: This inspection can also be taken at idle when engine is cold and atmospheric pressure is below 660 mm Hg.

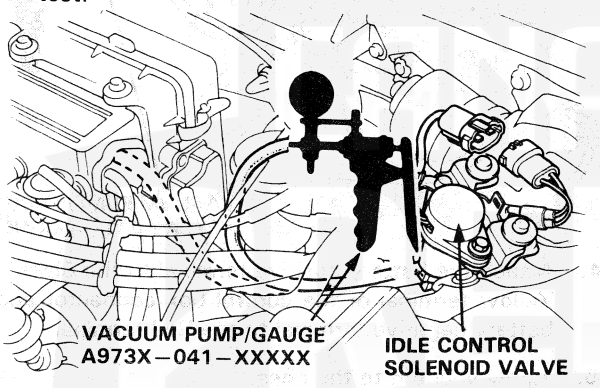
Idle Control Solenoid Valve Test

The idle control solenoid valve is activated by commands from the ECU. When the solenoid valve opens, this causes vacuum in the upper vacuum hose of the solenoid valve (from the intake manifold) and increases idle speed under the following conditions:

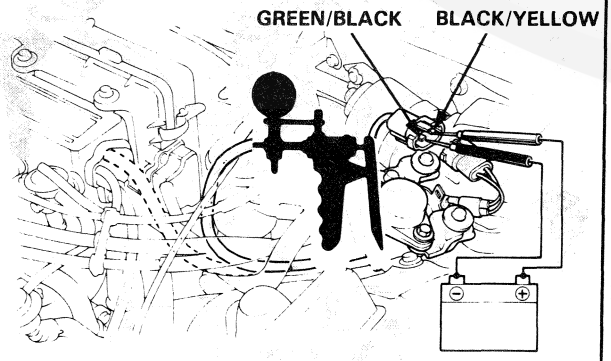
- For a short period after starting the engine.
- Whenever electrical loads are turned ON (vacuum will disappear when engine speed is raised over 1,500 rpm by operating the throttle).

When the valve is open, 9V or more should be available between the Black/Yellow terminal (+) and Green/Black terminal (−) of the main harness.

1. Disconnect the wire harness from the idle control solenoid valve.
2. Disconnect the upper vacuum hose of the solenoid valve from the intake manifold.
3. Apply vacuum to the hose.
   Vacuum should hold steady.
   If it does not hold vacuum, replace the valve and re-test.



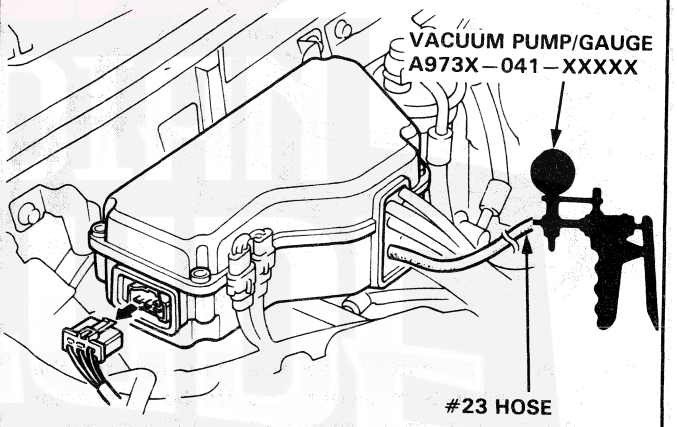
4. Attach the battery positive terminal to the Black/Yellow terminal of the solenoid valve, and battery negative terminal to the Green/Black terminal.
5. Apply vacuum to the hose.
   It should not hold vacuum.
   If it holds vacuum, replace the valve and re-test.



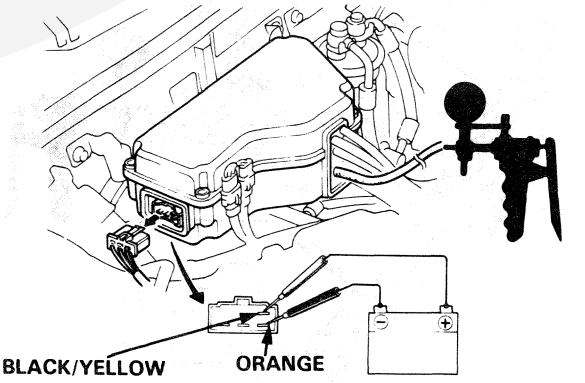
Fast idle Control Solenoid Valve Test

The fast idle control solenoid valve is open when the coolant temperature is below −15°C (5°F). If the coolant temperature is below 40°C (104°F), it is energized only when the atmospheric pressure is 660 mmHg or less. In either case, vacuum is produced in the #18 vacuum hose between the solenoid valve and air flow tube.
Also, the solenoid valve opens with the vehicle speed more than 10 mph and the engine speed more than 2,000 rpm.
When the valve is open, 9 V or more should be available between the Black/Yellow terminal (+) and Red/Green terminal (−) of the main harness at the control box.

1. Disconnect the 6-P connector from the control box.
2. Disconnect #23 vacuum hose from the vacuum hose mainfold.
3. Apply vacuum to #23 hose.
   It should hold vacuum.
   If it does not hold vacuum, replace the valve and re-test.



4. Attach the battery positive terminal to the Black/Yellow terminal of the control box connector and battery negative terminal to the Orange terminal.
5. Apply vacuum to the hose.
   It should not hold vacuum.
   If it holds vacuum, replace the valve and retest.



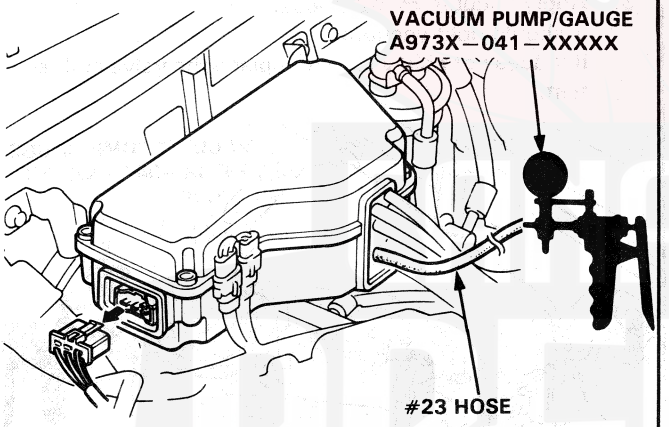
Idle Control

A/T Idle Control Solenoid Valve Test

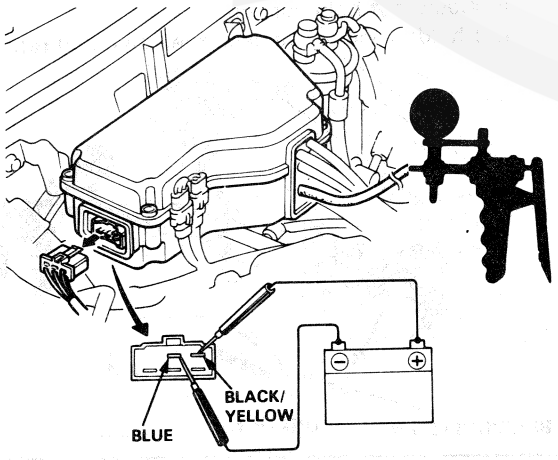
The A/T idle control solenoid valve is energized when the A/T shift lever is in gear, allowing air to bypass the throttle valve and maintain the specified idle speed.

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

1. Disconnect the 6-P connector from the control box.
2. Disconnect the #23 vacuum hose from the vacuum hose manifold.
3. Apply vacuum to #23 vacuum hose.
   It should hold vacuum.
   If it does not hold vacuum, replace the valve and re-test.



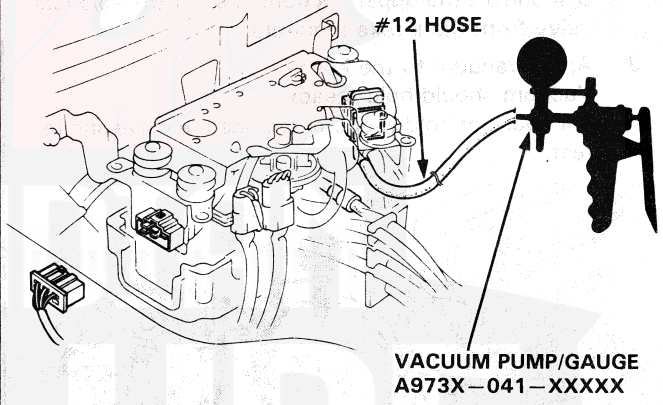
4. Attach the battery positive terminal to the Black/Yellow terminal of the control box connector and battery negative terminal to the Blue terminal.
5. Apply vacuum to the hose.
   It should not hold vacuum.
   If it holds vacuum, replace the valve and retest.



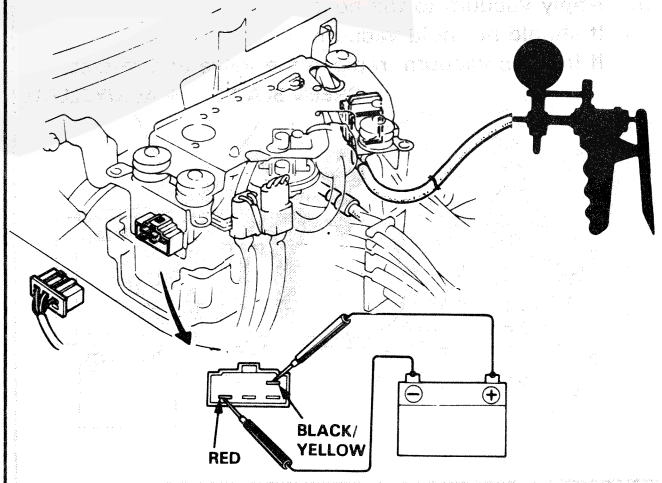
A/C Idle Boost Solenoid Valve Test

When the solenoid valve is energized, vacuum is directed from #12 vacuum hose to the A/C idle boost valve through vacuum hose #19. 9V or higher should be detected betwen the Black/Yellow terminal (+) and Red terminal (−) of the main harness at the control box.

1. Open the control box lid and disconnect the 6-P connector from the control box.
2. Disconnect the lower vacuum hose of the A/C idle boost solenoid valve (between the valve and the check valve) from the check valve.
3. Apply vacuum to the hose.
   It should hold vacuum.
   If it does not hold vacuum, check for the check valve.
   - If the check valve is OK, replace the solenoid valve and re-test.

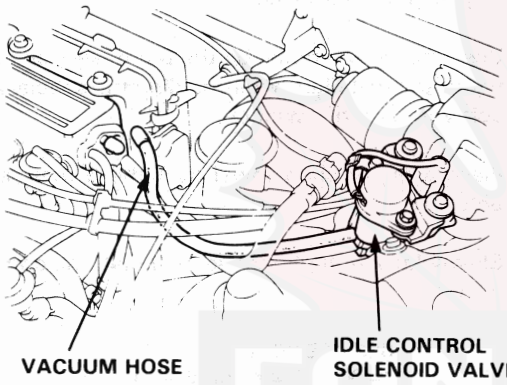


4. Attach the battery positive terminal to the Black/Yellow terminal of the control box connector and battery negative terminal to the Red terminal.
5. Apply vacuum to the hose.
   It should not hold vacuum.
   If it holds vacuum, check for the check valve.
   - If the check valve is OK, replace the solenoid valve and retest.



Inspection/Adjustment

1. Start engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect a tachometer.
3. Disconnect the upper vacuum hose of the idle control solenoid valve (between the valve and intake manifold) from the intake manifold.
4. Cap the end of the hose and intake manifold.

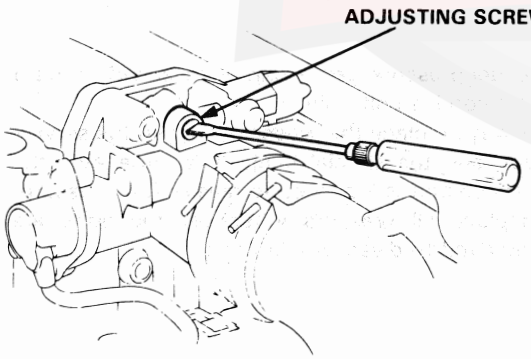


5. Check the idle speed with headlights, heater blower, rear window defogger, cooling fan and air conditioner off.

   Idle Speed should be:

Manual	750 ± 50 rpm
Automatic	750 ± 50 rpm (in ''N'' or ''P'')

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

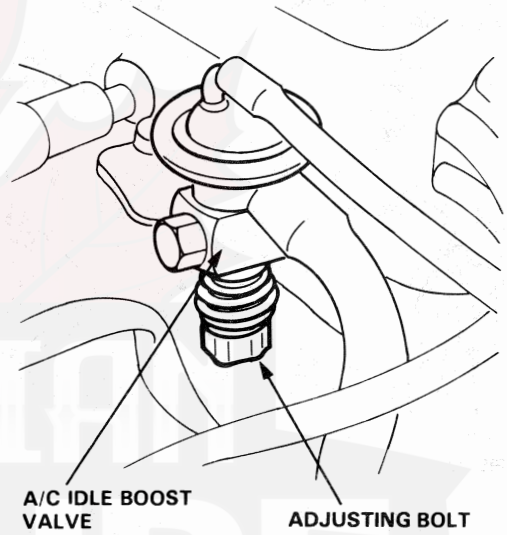


6. Check the idle speed with heater fan switch at HI (right end) and air conditioner on.

   Idle Speed should be:

Manual	750 ± 50 rpm
Automatic	750 ± 50 rpm (in ''N'' or ''P'')

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



7. After adjustment, connect the idle control solenoid valve vacuum hose.
8. On Automatic Transmission model, after adjusting the idle speed, check that it remains within the specified limit when shifted in gear (''D_3'' or ''D_4'').

   Idle speed should remain:
   750 ± 50 rpm (in ''D_3'' or ''D_4'')

9. Check the idle speed with headlights, heater blower, rear window defroster, and cooling fan on but air conditioner off.
   It should be the same as normal idle speed.

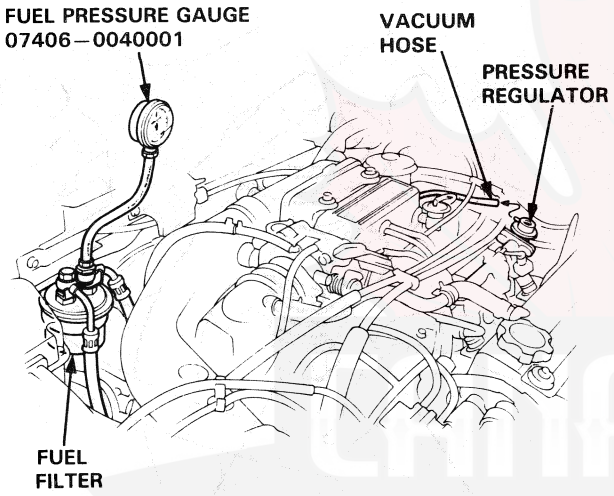
   NOTE: If the idle speed is not within specifications, see Troubleshooting on page 11-68 and 69.

Fuel Pressure

Test

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 the vacuum hose of the pressure regulator disconnected.

   Pressure should be:
   250—279 kPa (2.55—2.85 kg/cm², 36—41 psi)



- If the fuel pressure is not as specified, first check the fuel pump (page 11-91). If the pump is OK, check the following:

— If the pressure is higher than specified, inspect for:
  - Pinched or clogged fuel return hose or piping.
  - Faulty pressure regulator.

— If the pressure is lower than specified, inspect for:
  - Clogged fuel filter
  - Pinched or clogged fuel hose from the fuel tank to the fuel pump
  - Pressure regulator failure (page 11-89).
  - Leakage in the fuel line

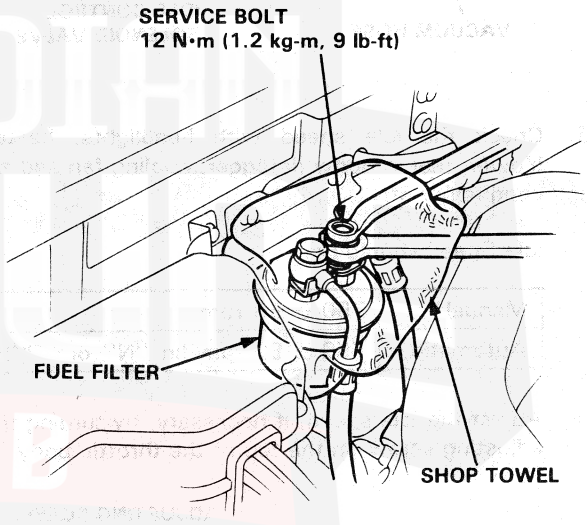
Relieving

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



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

Fuel Injectors

Test

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

If the engine will run:

1. With the engine idling, disconnect each injector connector individually and inspect the change in the idling speed.
   - If the idle speed drop is almost the same for each cylinder, the injectors are normal.
   - If the idle speed or quality remains the same when you disconnect a particular injector, replace the injector and re-test.

2. Check the clicking sound of each injector by measns of a stethoscope when the engine is idling.

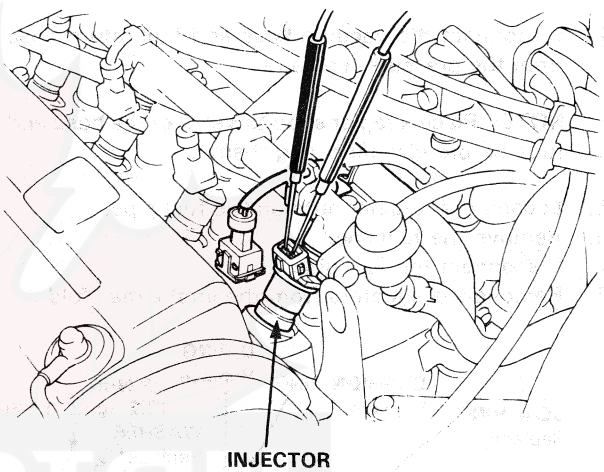
- If any injector fails to make the typical clicking sound, check the sound again after replacing the injector.
  - — If clicking sould is still absent, check the following:
    - Whether there is any short-circuiting, wire breakage, or poor connection in the Yellow/Black wire between the resistor and the main relay.
    - Whether the resistor is open or corroded (page 11-89).
    - Whether there is any short-circuiting, wire breakage, or poor connection in the Red/Black wire between the resistor and the injector.
    - Whether there is any short-circuiting, wire breakage, or poor connection in the wire between the injector and the ECU.

If all are OK, check the ECU (page 11-61).

If the engine cannot be started.

1. Remove the connector of the injector, and measure the resistance between the 2 terminals of the injector.

Resistance should be: 1.5—2.5Ω



INJECTOR

- If resistance is not as specified, replace the injector.
- If the resistance is as specified, check the fuel pressure (page 11-86).
  - — If the fuel pressure is as specified, check the following:
    - Whether there is any short-circuiting, wire breakage, or poor connection in the Yellow/Black wire between the resistor and main relay.
    - Whether the resistor is open or corroded (page 11-89).
    - Whether there is any short-circuiting, wire breakage, or poor connection in the Red/Black wire between the resistor and the injector.
    - Whether there is any short-circuiting, wire breakage, or poor connection in the wire between the injector and the ECU.

If all are OK, check the ECU (page 11-61).

Fuel Injectors

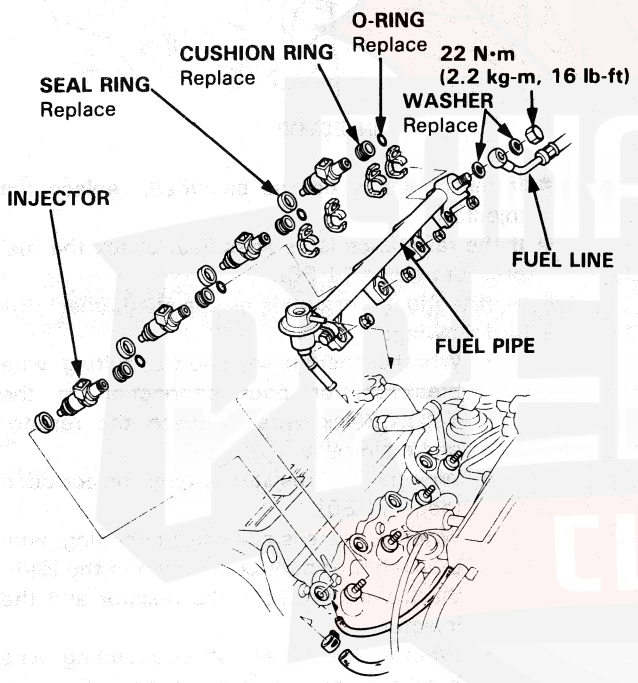
Replacement

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

1. Disconnect the battery negative cable from the battery negative terminal.
2. Relieve fuel pressure (page 11-86).
3. Disconnect the connectors of the injectors.
4. Disconnect the vacuum hose and fuel return hose from the pressure regulator.

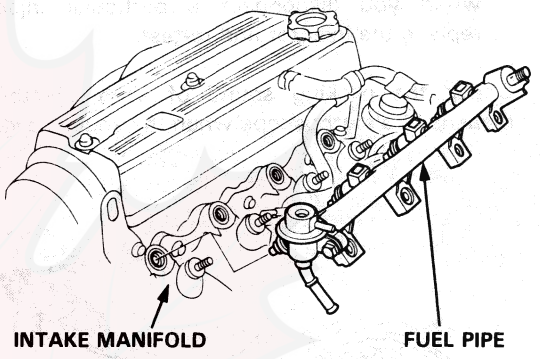
   NOTE: Place a rag or shop towel over the hose and tube before disconnecting them.

5. Loosen the retainer nuts on the fuel pipe.
6. Remove the fuel line.
7. Disconnect the fuel pipe.
8. Remove the injectors from the intake manifold.

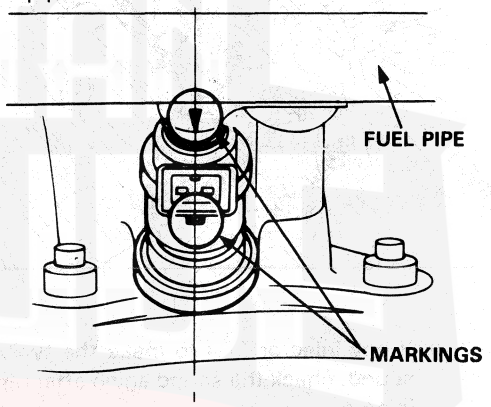


9. Slide new cushion rings onto the injector.
10. Coat new O-rings with clean engine oil and put them on the injectors.
11. Insert the injectors into the fuel pipe first.
12. Coat new seal rings with clean engine oil and press them into the intake manifold.
13. Install the injector and fuel pipe assembly in the manifold.

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



14. Align the center line o the coupler with the mark on the fuel pipe.



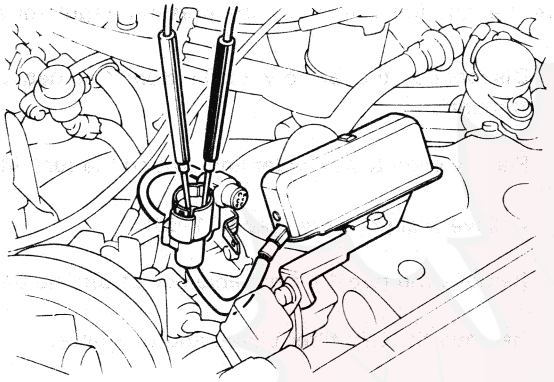
15. Install the fuel line.
16. Install and tighten the retainer nuts.
17. Connect the vacuum hose and fuel return hose to the pressure regulator.
18. Install the couplers on the injectors.
19. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approximately two seconds,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

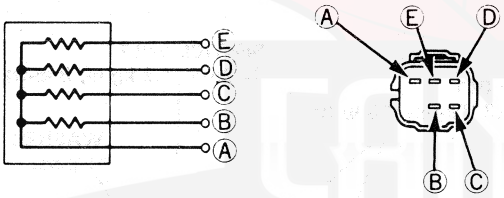
Injector Resistor

Test

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.

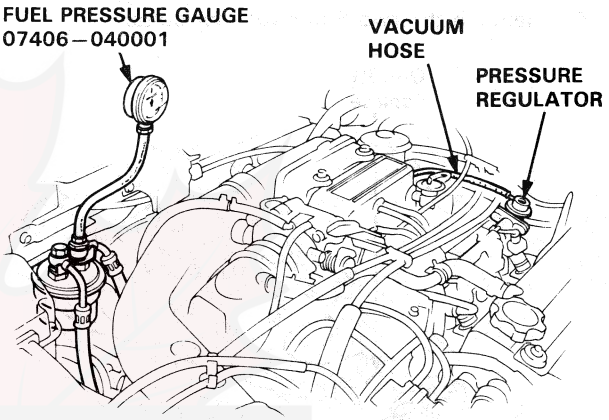
Pressure Regulator

Test

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

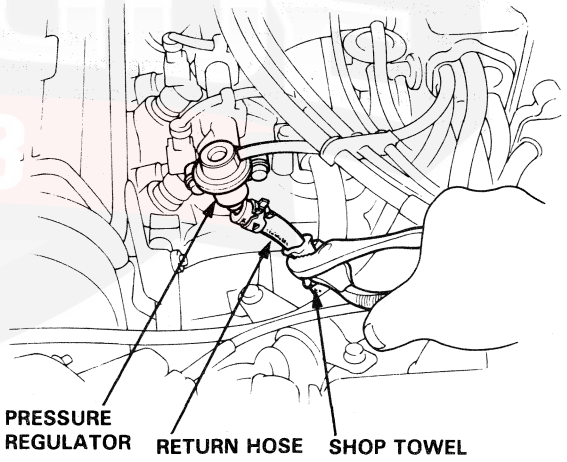
1. Attach a pressure gauge to the service port of the fuel filter (page 11-86).

Pressure should be:
250—279 kPa (2.55—2.85 kg/cm², 36—41 psi)



2. Check that the fuel pressure rises by disconnecting the vacuum hose from the regulator.

- If the fuel pressure does not rise, check whether it rises when the return hose is lightly pinched.



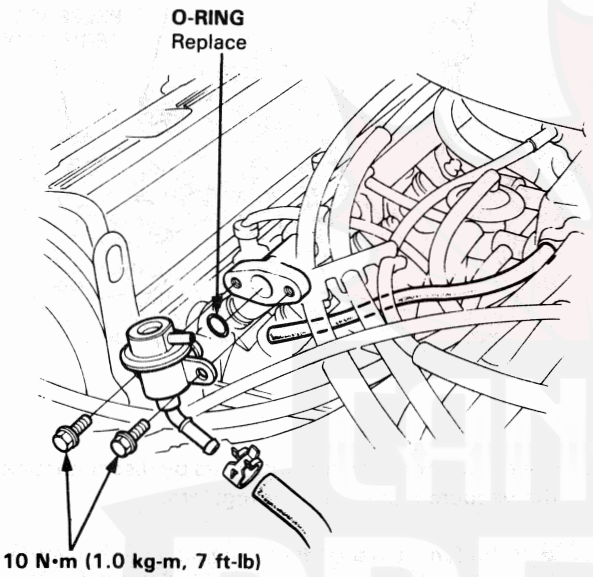
— If the pressure does not rise, replace the regulator and re-test.

Pressure Regulator

Replacement

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

1. Disconnect the negative terminal of the battery.
2. Place a shop towel under the pressure regulator, then relieve fuel pressure (page 11-86).
3. Disconnect the vacuum hose and fuel return hose.
4. Remove the two 6 mm retainer bolts.



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

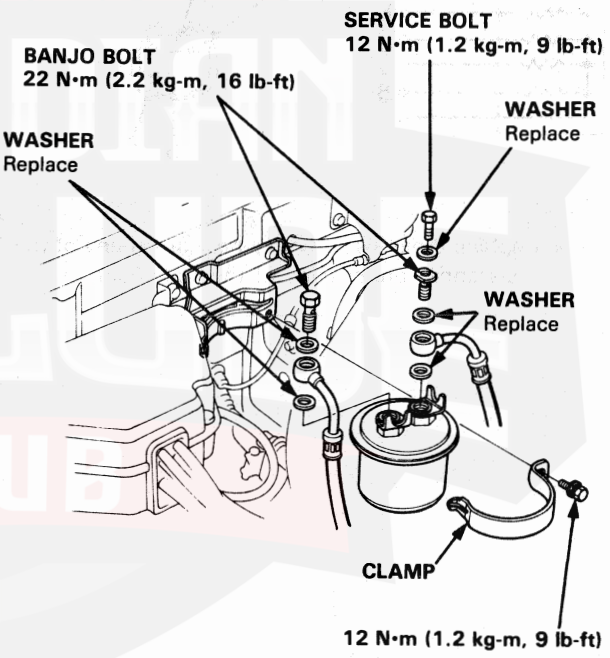
Fuel Filter

Replacement

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

The filter should be replaced: every 4 years or 60,000 miles (96,000 km), whichever comes first or whenever the fuel pressure drops below the specified value (250—279 kPa, 2.55—2.85 kg/cm², 36—41 psi with the vacuum pressure hose disconnected) after making sure that the fuel pump and the pressure regulator are OK.

1. Disconnect the battery cable from the negative terminal.
2. Place a shop towel under and around the fuel filter.
3. Relieve fuel pressure (page 11-86).
4. Remove the two 12 mm banjo bolts from the filter.
5. Remove the fuel filter clamp and fuel filter.
6. When assembling, use new washers, as shown.

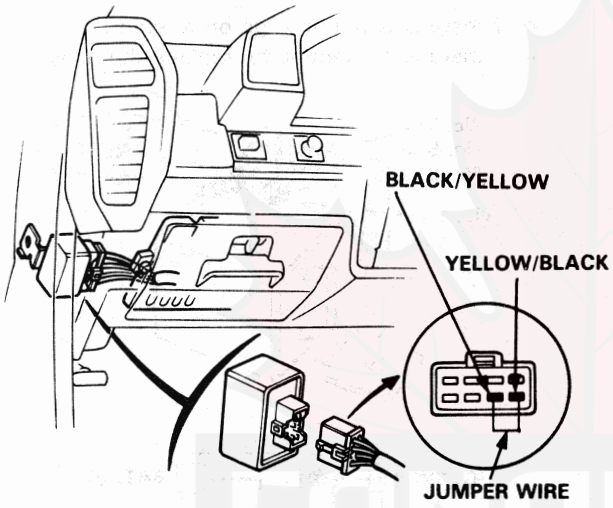


Fuel Pump

Test

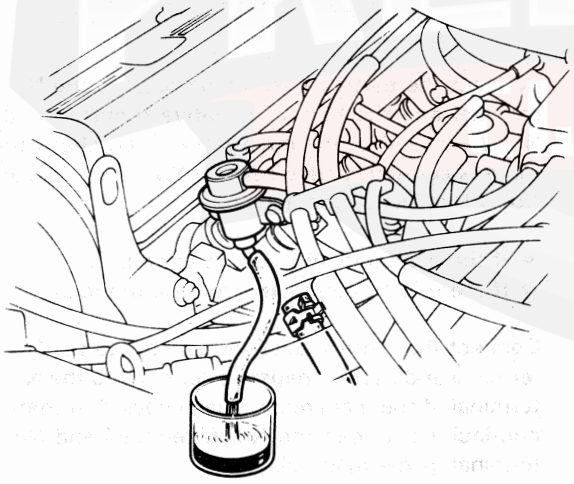
WARNING **Do not smoke during the test. Keep open flame away from your work area.**

1. With the ignition switch OFF, disconnect the connector from the main relay near the under-dash fuse box.
2. Connect the Yellow/Black wire and Black/Yellow wire with a jumper wire.



3. Relieve fuel pressure as described on page 11-85, then tighten the service bolt.
4. Disconnect the fuel return hose from the regulator.
5. Turn the ignition switch ON, measure the amount of fuel flow for 10 seconds, then turn the ignition switch OFF.

Amount should be:
230 cc (7.8 oz) min. in 10 seconds at 12 V



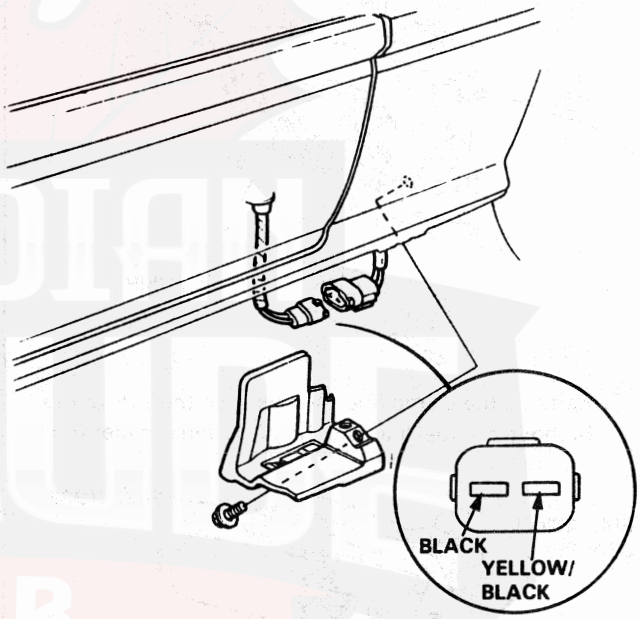
- If fuel flow is less than 230 cc (7.8 oz), or there is no fuel flow, check for:
  - Clogged fuel filter
  - Clogged fuel line
  - Pressrue regulator failure

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

1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the fuel pump cover and disconnect the connector.

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

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



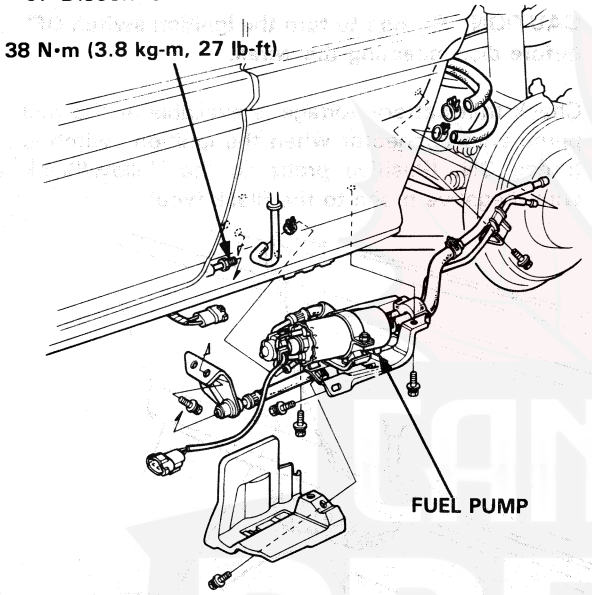
- If battery voltage is available, replace the fuel pump.
- If there is no voltage, check the main relay and wire harness (page 11-93).

Fuel Pump

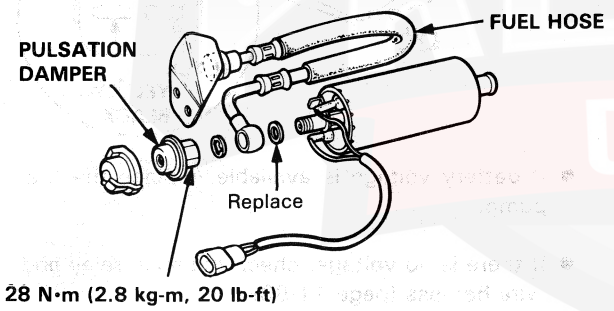
Replacement

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

1. Relieve fuel pressure (page 11-86).
2. Block front wheels. Jack up the rear of the car and support with jackstands.
3. Remove left rear wheel.
4. Remove the fuel pump cover.
5. Remove the three bolts, then remove the fuel pump with its mount.
6. Disconnect the fuel lines and 2-P connector.



7. Remove the clamp and then remove the fuel pump.
8. Remove the fuel line and the pulsation damper from the pump.



CAUTION: Do not disassemble the pump

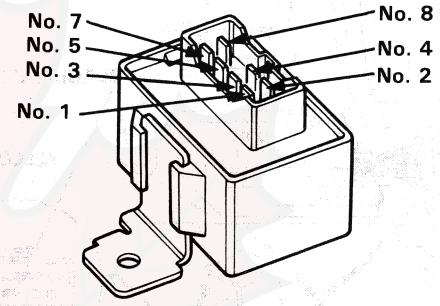
9. Install the new fuel pump onto its mount.
10. Carefully clean the sealing surface of the flared fuel line, then install it onto the fuel pump and tighten the flare nut. Reinstall the fuel hose and pulsation damper onto the front of the fuel pump.
11. Reconnect the 2-P connector and reinstall the fuel pump.
12. Have someone turn the ignition switch to ON while you watch the fuel pump connections for leaks. Repeat this check two or three times to be sure that there are no fuel leaks.

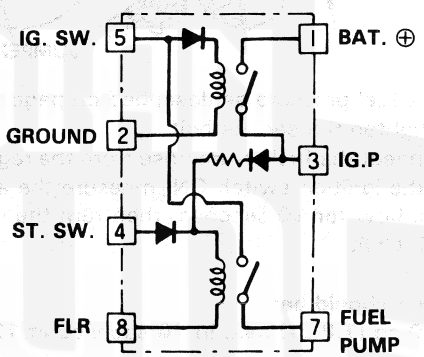
Main Relay

Test

1. Remove the main relay, near the under-dash fuse box.
2. Connect the battery positive terminal to the No. 4 terminal and the battery negative terminal to the No. 8 terminal of the main relay. Then check for continuity between the No. 5 terminal and No. 7 terminal of the main relay.

- If there is continuity, go on to step 3.
- If there is no continuity, replace the relay.





3. Connect the battery positive terminal to the No. 5 terminal and the battery negative terminal to the No. 2 terminal of the main relay. Then check that there is continuity between the No. 1 terminal and No. 3 terminal of the main relay.

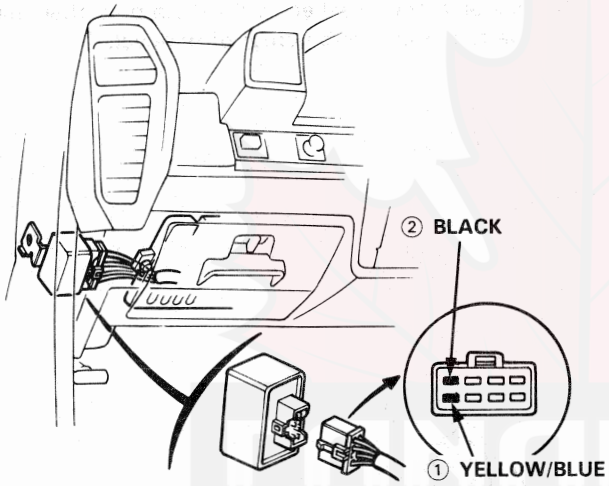
- If there is continuity, go on to step 4.
- If there is no continuity, replace the relay.

4. Connect the battery positive terminal to the No. 3 terminal and battery negative terminal to the No. 8 terminal of the main relay. Then check that there is continuity between the No. 5 terminal and No. 7 terminal of the main relay.

- If there is continuity, the relay is OK; if the fuel pump still does not work, go to Harness Testing in the next column.
- If there is no continuity, replace the relay.

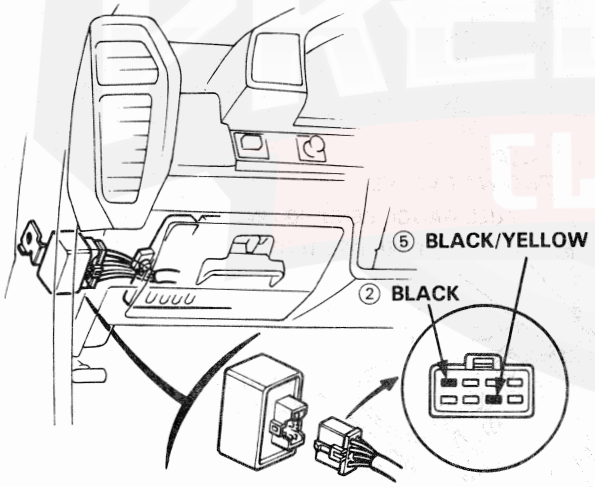
Harness Test

1. Keep the ignition switch in the OFF position.
2. Disconnect the main relay connector.
3. Check for continuity between the Black wire (2) in the connector and body ground.
4. Attach the positive probe of voltmeter to the Yellow/Blue wire (1) and the negative probe to the Black wire (2).



- If there is no voltage, check the wiring between the battery and the main relay as well as ECU fuse (15A) in the under-hood relay box.

5. Attach the positive probe of voltmeter to the Black/Yellow wire (5) and the negative probe to the Black wire (2).

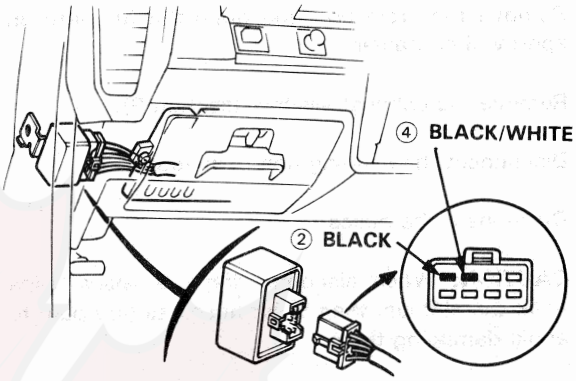


6. Turn the ignition switch ON.

   Battery voltage should be available.

   - If there is no voltage, check the wiring from the ignition switch and the main relay as well as Regulator fuse (10A).

7. Attach the positive probe of voltmeter to the Black/White wire (4) and the negative probe to the Black wire (2).

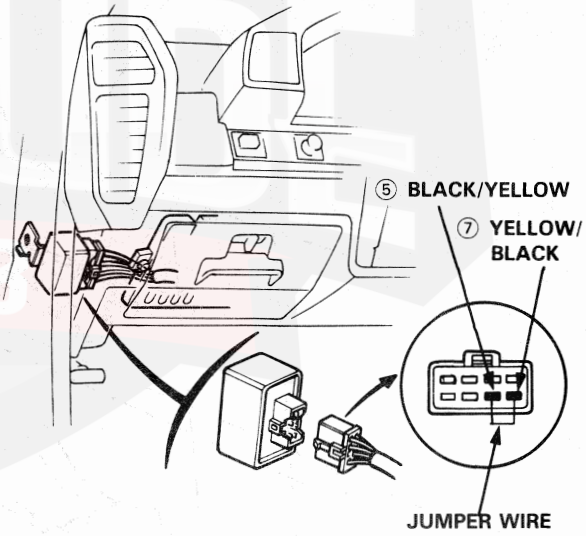


8. Turn the ignition switch to START position.

   Battery voltage should be available.

   - If there is no voltage, check the wiring between the ignition switch and main relay as well as starter fuse (10A).

9. Connect a jumper wire between the Black/Yellow wire (5) and Yellow/Black 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 (Black wire).

Fuel Tank

Replacement

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

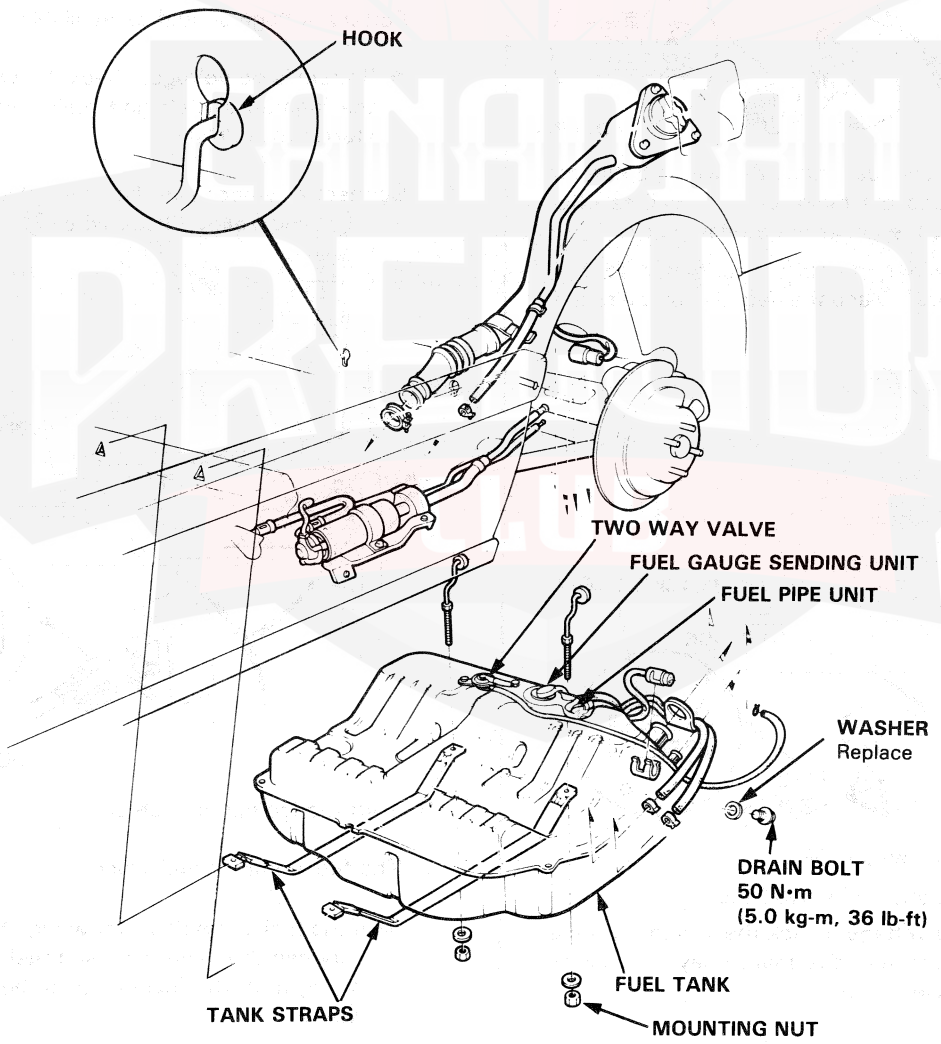
1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Remove the exhaust silencer (section 9).
4. Disconnect the sending unit connector.
5. Disconnect the hoses.

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

6. Place a jack or other support, under the tank.
7. Remove the strap nuts and let the straps fall free.
8. Remove the fuel tank.

   NOTE: The tank may have stuck on the undercoat applied to its mount. To remove carefully pry it off the mount.

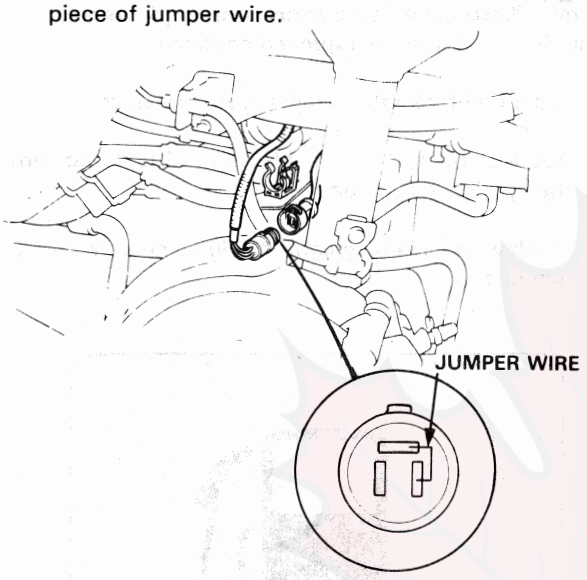
9. Install a new washer on the drain bolt, then install parts in the reverce order of removal.



Fuel Gauge

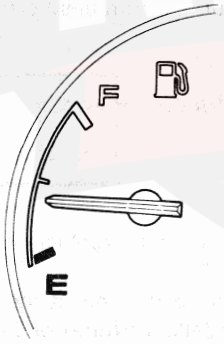
Test

1. Disconnect the fuel gauge sending unit connector and connect the Yellow/White terminal and the Black terminal at the power source side with a piece of jumper wire.



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

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

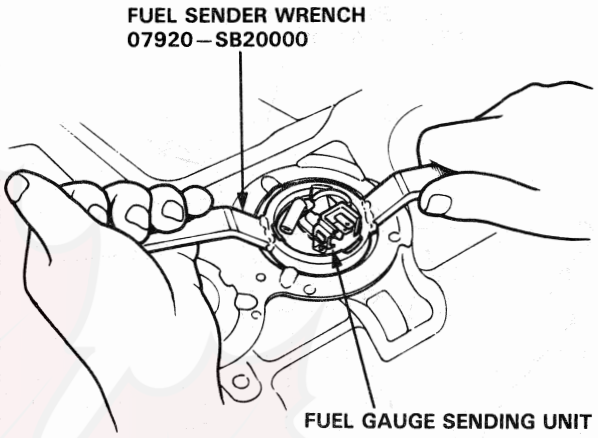


- If the pointer of the fuel gauge does not swing at all, check the fuse, wire harness and connector. Replace the fuel gauge if they are normal.
- Inspect the fuel gauge sending unit if the fuel gauge if OK.

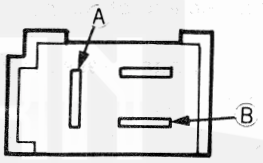
Fuel Gauge Sending Unit

Test

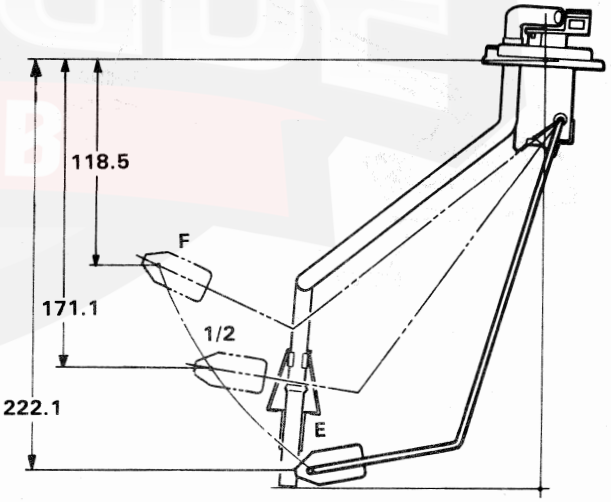
1. Remove the fuel tank (page 11-94).
2. Remove the fuel gauge sending unit.



3. Measure the resistance between 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)	105–110	25.5–39.5	2–5

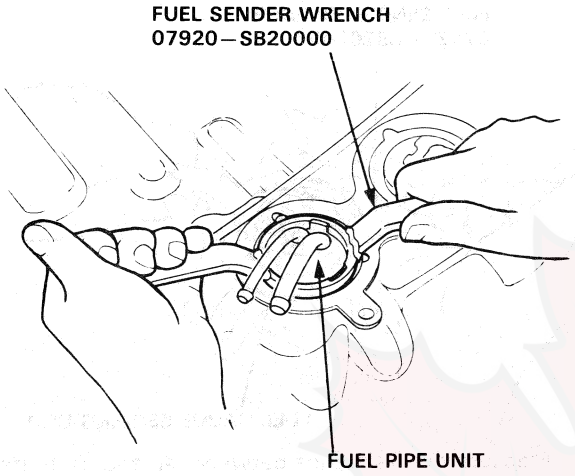


- If unable to obtain the above readings, replace the fuel unit with a new one.

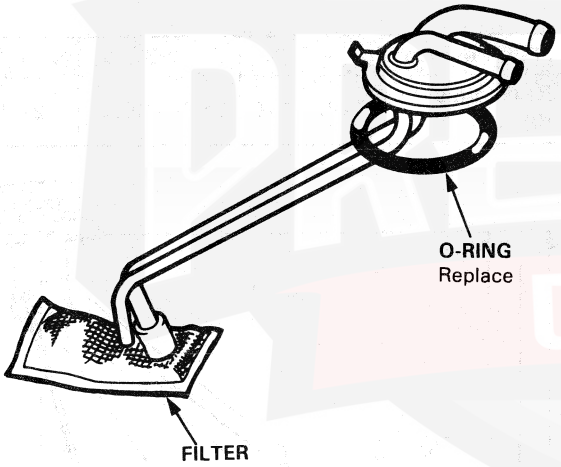
Fuel Pipe Unit

Replacement

1. Remove the fuel tank (page 11-94).
2. Remove the fuel pipe unit.



3. Clean the filter at the end of the pipe unit.
4. Apply a thin layer of white grease to the new O-ring before installation.



Low Fuel Warning Light

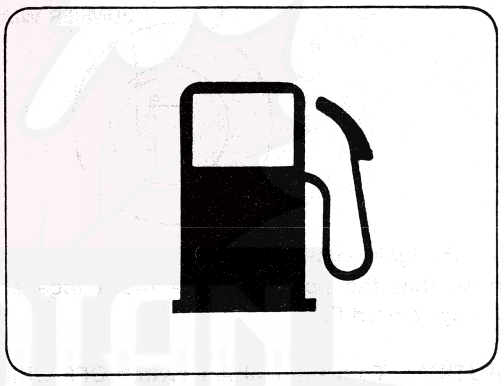
Test

1. Park car on level ground.

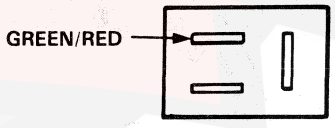
WARNING Do not smoke while working on fuel system. Keep open flame away from work area. Drain fuel only into an approved container.

2. Drain fuel tank into an approved container.
3. Add less than 10ℓ (2.6 U.S. Gal.) of fuel and turn the ignition switch on.

   The low fuel warning light should come on within 3 minutes.



- If the warning does not come on, remove the fuel tank (page 11-94) disconnect the connector from the fuel gauge sending unit, connect the positive (+) terminal of the voltmeter to the Green/Red terminal of the 3P connector, ground the negative (−) terminal of the voltmeter to the body ground, and measure the voltage.



  — If there is voltage, replace the fuel gauge sending unit.
  — If there is no voltage, it indicates broken wire harness (Yellow/White) or faulty connection of the terminals.

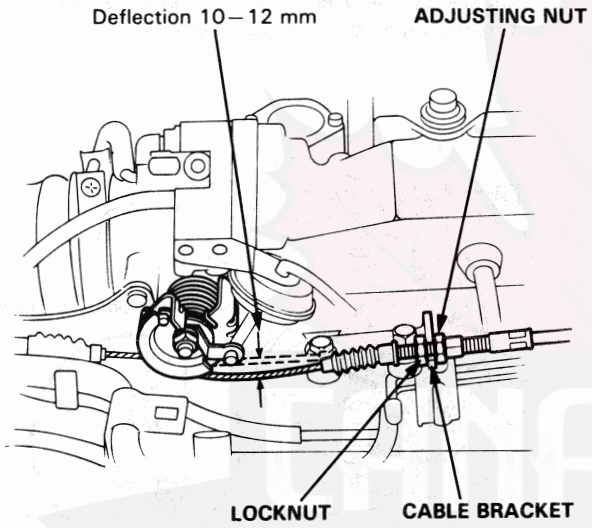
- If the warning comes on, make sure that it goes off with the connector disconnected from the fuel gauge sending unit.

  — If the warning light stays on, it indicates shorted harness.
  — If the warning light goes off, replace the fuel gauge sending unit.

Throttle Cable

Inspection/Adjustment

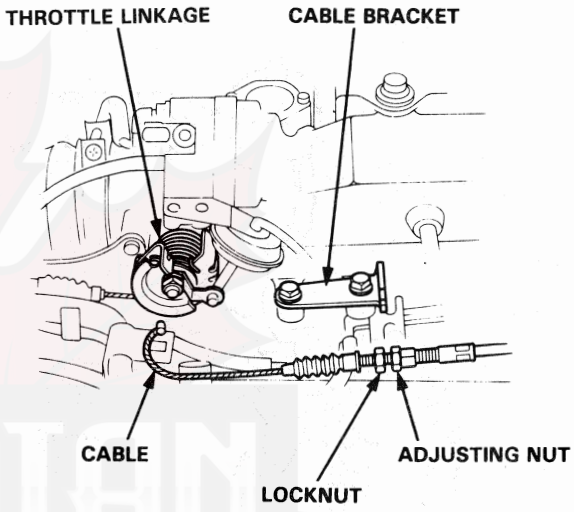
1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10—12 mm (0.39—0.47 in.)



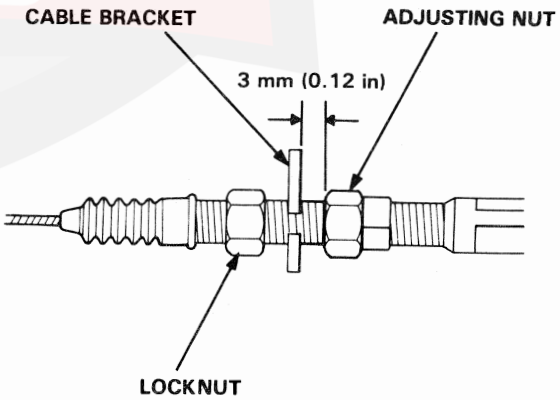
4. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure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

Replacement

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



3. Hold the cable sheath, removing all slack from the cable.
4. Turn the adjusting nut until it is 3 mm (0.12 in) away from the cable bracket.
5. Tighten the locknut. The cable deflection should now be 10—12 mm (0.39—0.49 in). If not, see Inspection/Adjustment.

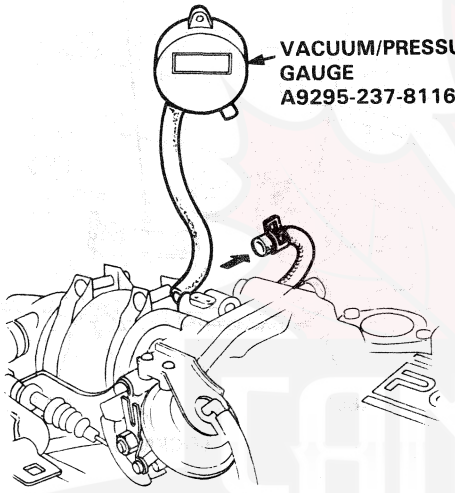


Throttle Body

Inspection

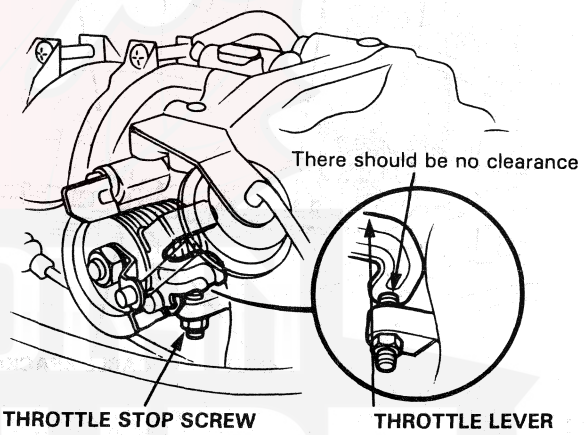
CAUTION: Do not adjust the throttle stop screw since it can not be reset except at the factory.

1. Start engine and warm up to 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.



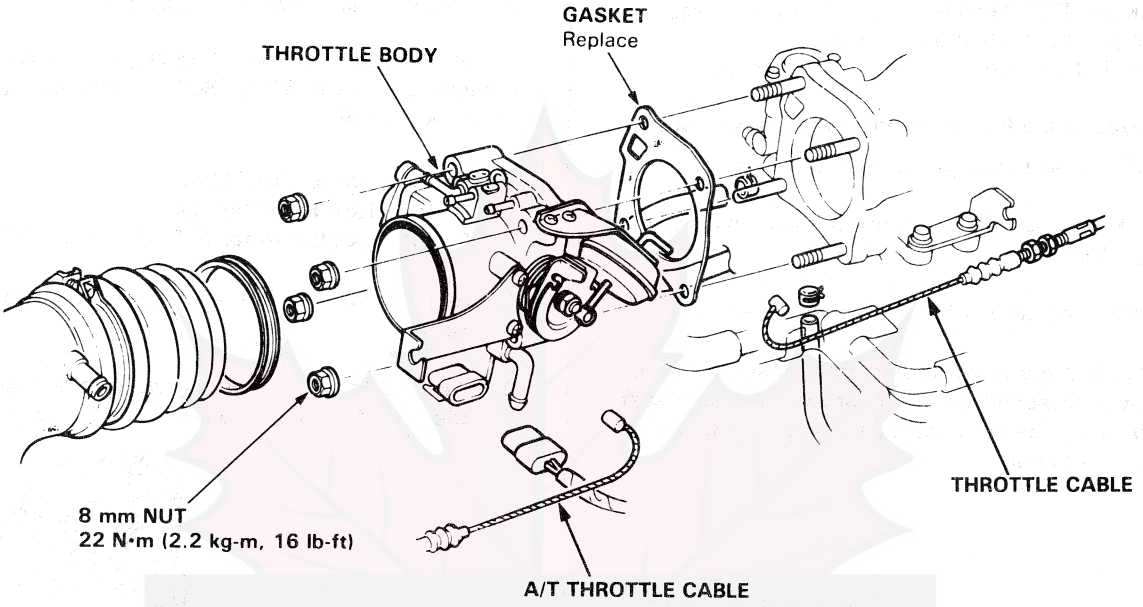
3. Allow the engine to idle and check that the gauge indicates no vacuum.
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
   - If the gauge indicates no vacuum, check the canister port. If the canister port is clogged, clean it with carburetor cleaner.
5. 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.



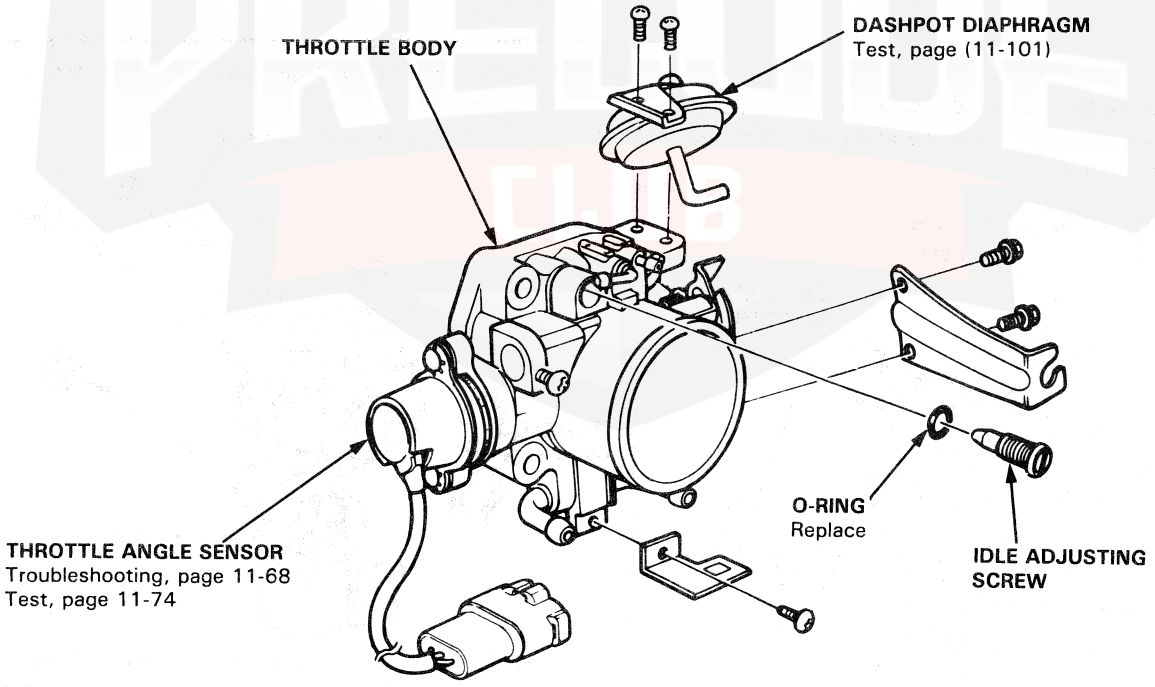
Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

Disassembly



CAUTION:

- The throttle valve stop screw is non-adjustable.
- On cars with A/T, adjust the throttle cable (page 11-97) and A/T throttle control cable (section 15) after reassembly.



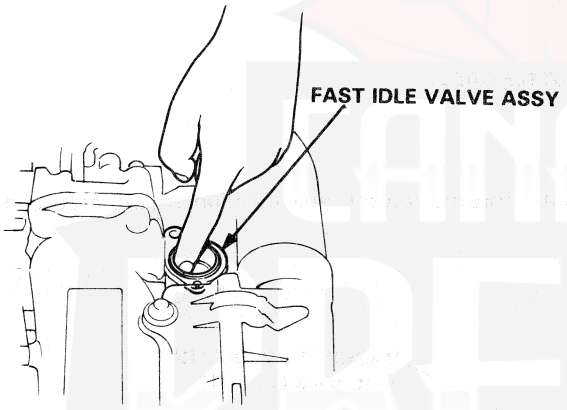
Fast Idle Valve

Inspection

NOTE:
- The fast idle valve is factory adjusted, it should not be disassembled.
- Check the PCV (engine breather) circuit hoses for proper connection and condition.
- Check that the throttle valve is fully closed.

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

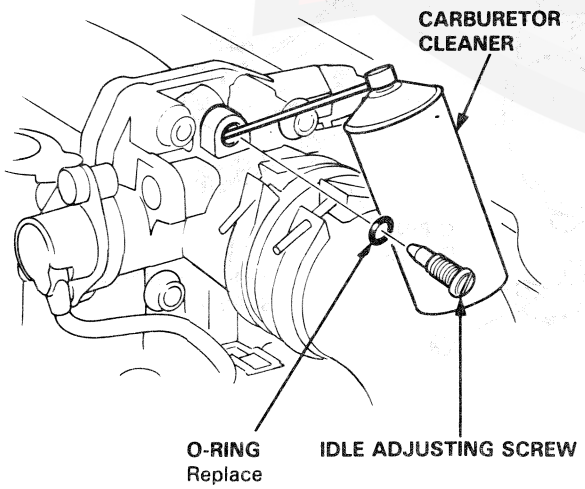
1. Confirm that the engine is fully warmed up.
2. Check whether the idling control function is normal (page 11-85).
3. Remove the cover of the fast idle valve.
4. Check that the valve is completely closed. If not, an air suction sound can be heard in the valve seat area. It can be detected by putting your finger on valve seat area.



- If any suction is heard, the valves is leaking. Replace the fast idle valve and adjust idle speed (page 11-82).

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

1. Remove the idle adjusting screw.

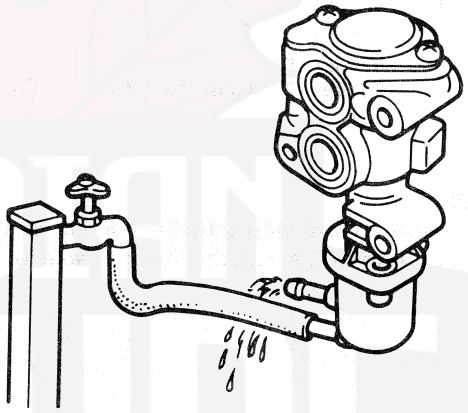


2. Wash the idle adjusting screw and the air bypass channel with carburetor cleaner.
3. Readjust idle speed after cleaning.

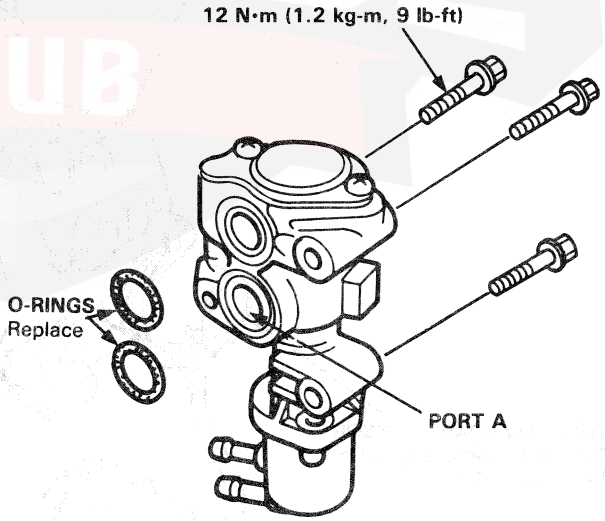
If fast idle speed is low when engine is cold (coolant temperature below 30°C (86°F). (Fast idle valve may be stuck closed):

Fast idle speed should be:
1,000—1,800 rpm for M/T
1,000—1,800 rpm for A/T (in "N" or "P")

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



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

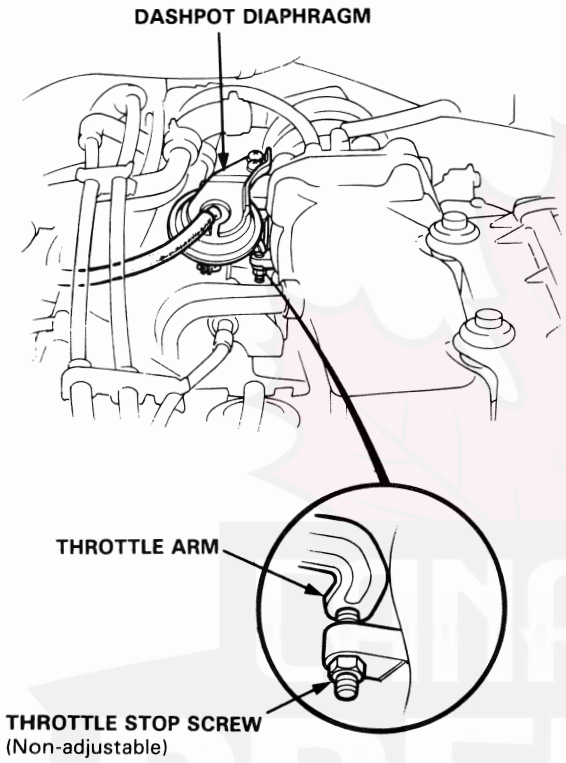


- If air does not flow or the resistance is large, replace the fast idle valve and adjust idle speed. (page 11-82)

Dashpot System

Test

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



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

   Time should be: less than 2 seconds

   - If the time is over 2 seconds, replace the dashpot check valve and re-test.
   - If the rod does not operate, check for bound linkage, or for clogged check valve or vacuum line.

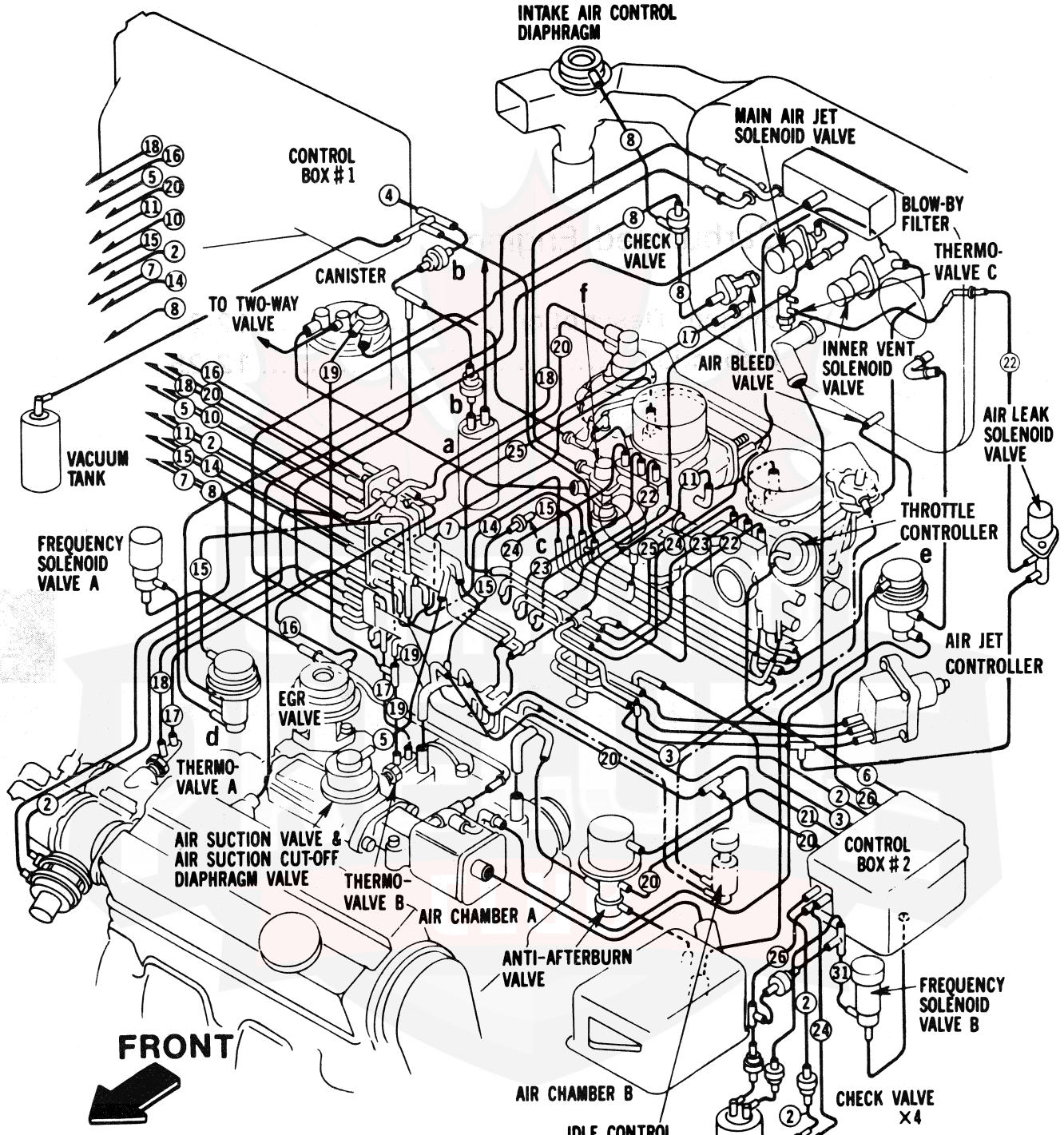
   — If they are OK, replace the dashpot diaphragm with a new one.

Emission Controls

Carbureted Engine

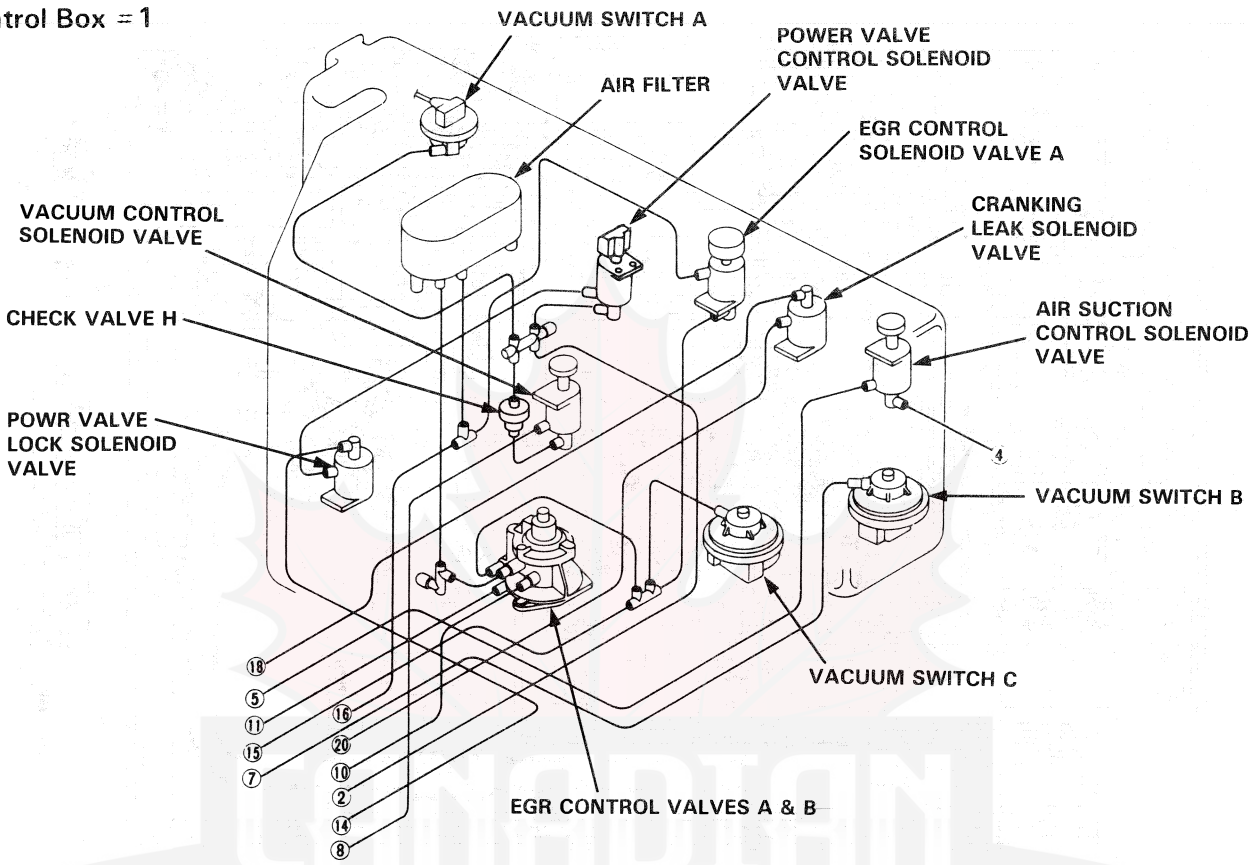
Description

Interconnect Diagram

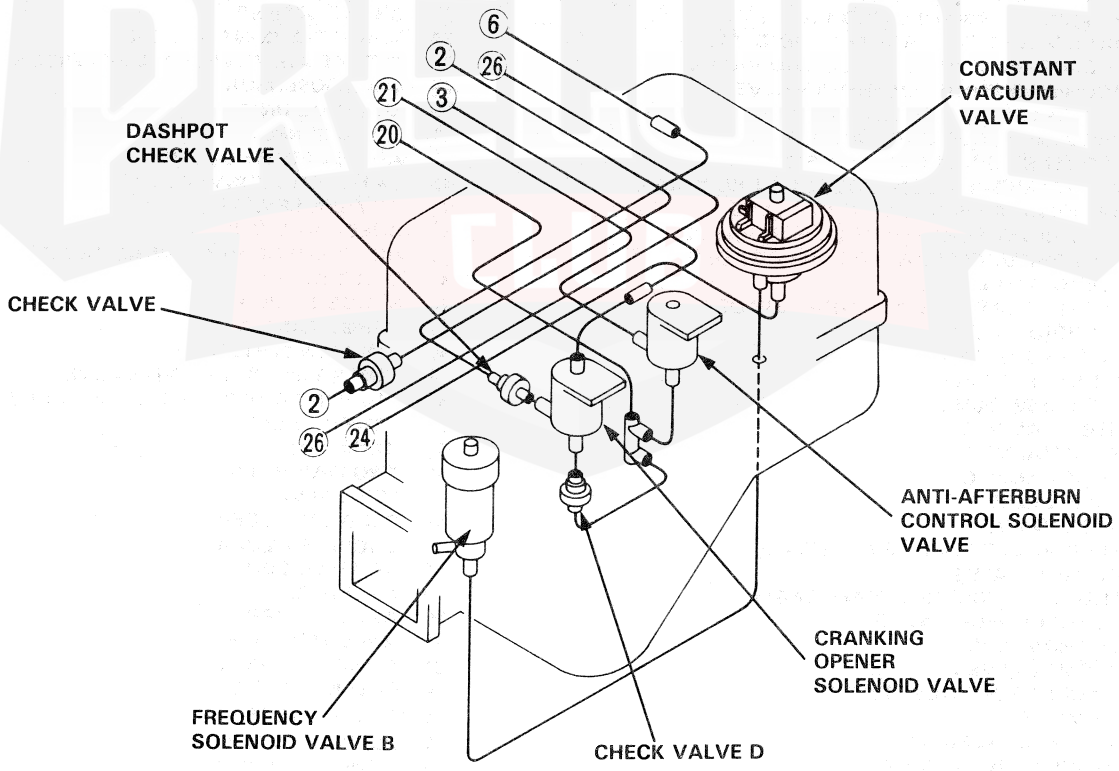


a. VACUUM TANK
b. CHECK VALVE
c. JET
d. AIR CONTROL VALVE A
e. AIR CONTROL VALVE B
f. AIR VENT CUT-OFF SOLENOID VALVE

Control Box = 1

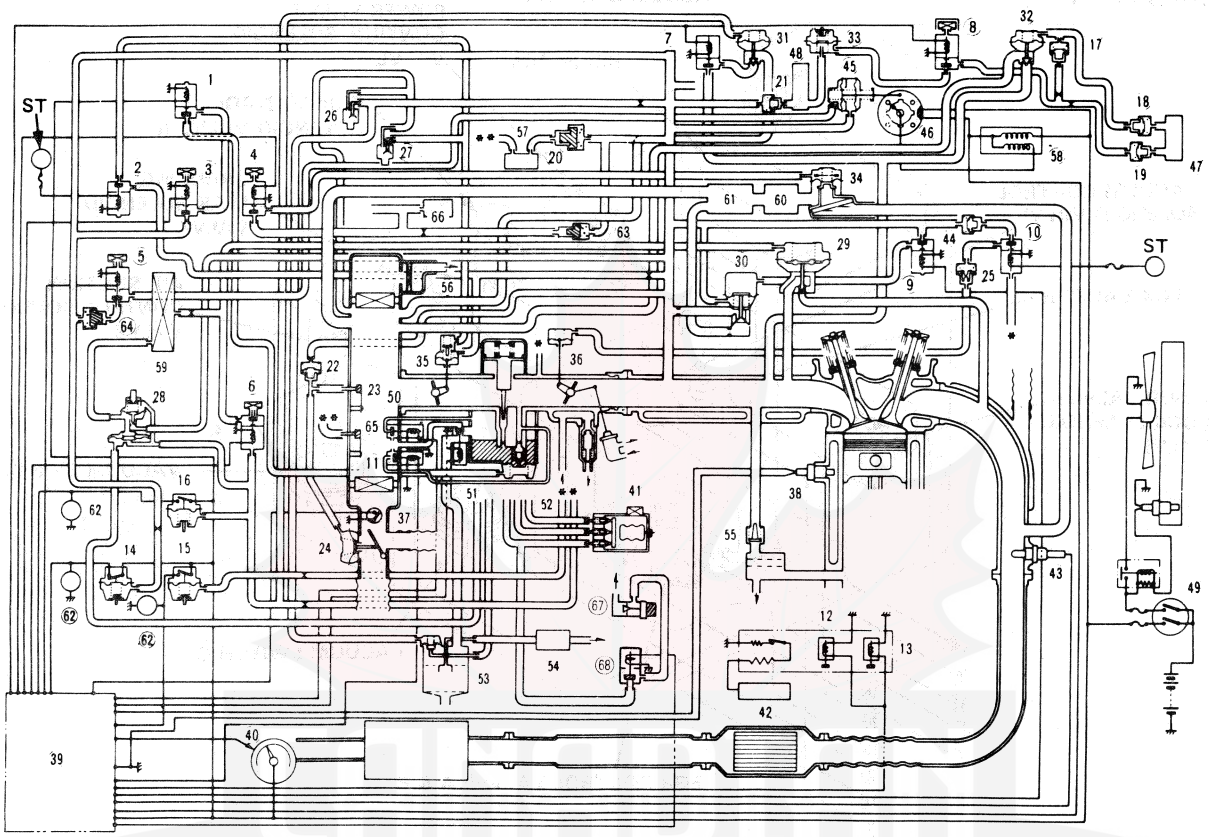


Control Box = 2



Description

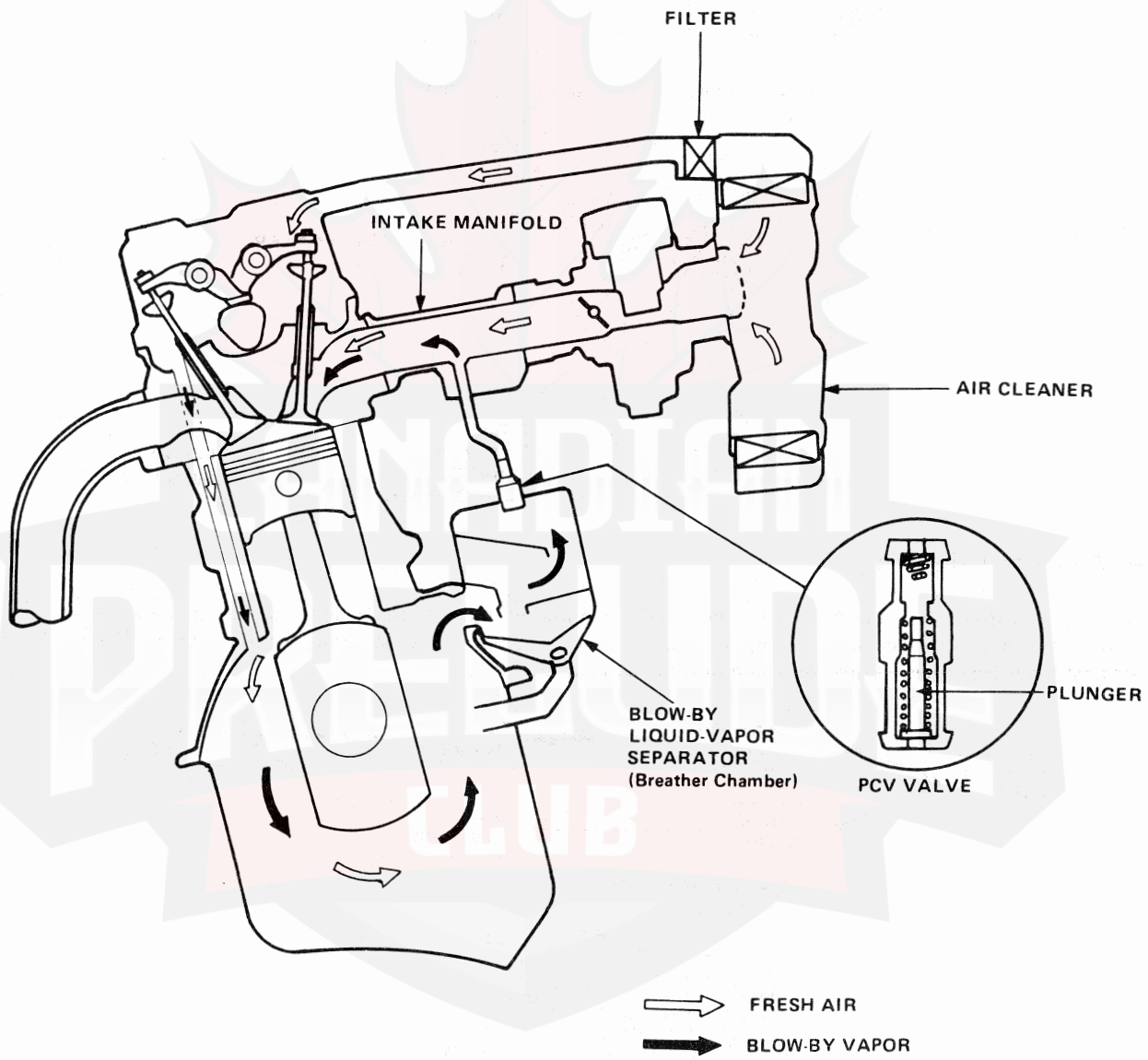
Vacuum and Electrical Connections



① POWER VALVE LOCK SOLENOID VALVE
② CRANKING LEAK SOLENOID VALVE
③ POWER VALVE CONTROL SOLENOID VALVE
④ AIR SUCTION CONTROL SOLENOID VALVE
⑤ VACUUM CONTROL SOLENOID VALVE
⑥ EGR CONTROL SOLENOID VALVE A
⑦ FREQUENCY SOLENOID VALVE A
⑧ FREQUENCY SOLENOID VALVE B
⑨ ANTI-AFTERBURN CONTROL SOLENOID VALVE
⑩ CRANKING OPENER SOLENOID VALVE
⑪ MAIN AIR JET CONTROL SOLENOID VALVE
⑫ RIGHT PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE
⑬ LEFT PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE
⑭ VACUUM SWITCH A
⑮ VACUUM SWITCH B
⑯ VACUUM SWITCH C
⑰ CHECK VALVE A
⑱ CHECK VALVE B
⑲ CHECK VALVE C
⑳ CHECK VALVE F
㉑ CHECK VALVE E
㉒ CHECK VALVE (INTAKE AIR TEMP.)
㉓ AIR BLEED VALVE A
㉔ INTAKE AIR CONTROL DIAPHRAGM
㉕ DASHPOT CHECK VALVE
㉖ THERMOVALVE B
㉗ THERMOVALVE A
㉘ EGR CONTROL VALVES A & B
㉙ EGR VALVE
㉚ ANTI-AFTERBURN VALVE
㉛ AIR CONTROL VALVE A
32 AIR CONTROL VALVE B
33 CONSTANT VACUUM VALVE
㉞ AIR SUCTION VALVE
㉟ CHOKE OPENER
㊱ THROTTLE CONTROLLER
㊲ INTAKE AIR TEMPERATURE SWITCH
㊳ THERMOSENSOR
㊴ CONTROL UNIT
㊵ SPEED SENSOR
㊶ AIR JET CONTROLLER
㊷ CATALYTIC CONVERTER
㊸ OXYGEN SENSOR
㊹ CHECK VALVE D
㊺ DISTRIBUTOR VACUUM ADVANCE
㊻ DISTRIBUTOR
㊼ SURGE TANK A
㊽ SURGE TANK B
㊾ IGNITION SWITCH
㊿ INNER VENT SOLENOID VALVE
51 AIR VENT CUT-OFF SOLENOID VALVE
52 POWER VALVE
53 CANISTER
54 TWO-WAY VALVE
55 PCV VALVE
56 BLOW-BY FILTER
57 VACUUM TANK A
58 IGNITION COIL
59 AIR FILTER
60 AIR CHAMBER A
61 AIR CHAMBER B
62 AUXILIARY COIL
63 CHECK VALVE G
64 CHECK VALVE H
65 AIR BLEED VALVE B
66 VACUUM TANK B
67 THERMOVALVE C (in the air cleaner case)
68 AIR LEAK SOLENOID VALVE

Crankcase Control

The positive crankcase ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is sucked directly into the intake manifold.



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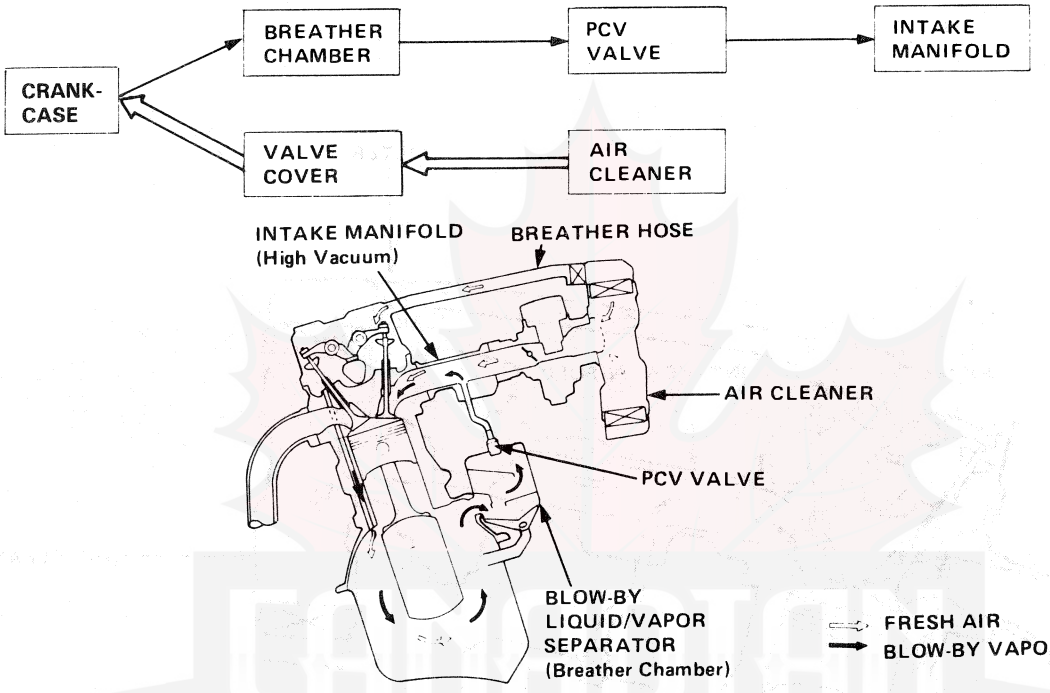
Description

Crankcase Controls (cont'd)

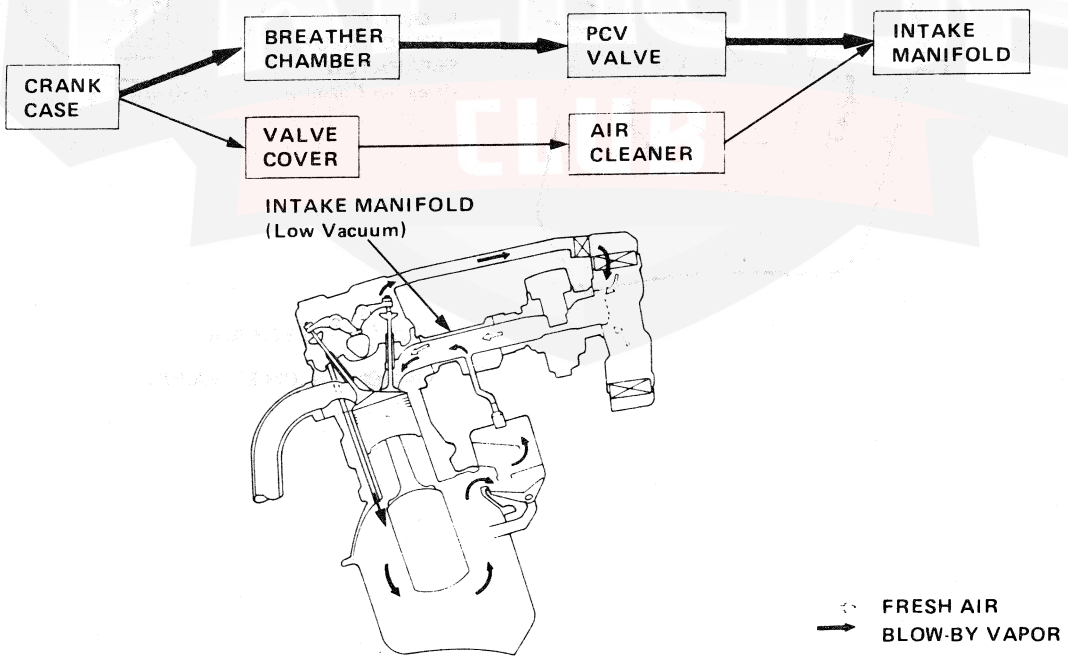
At Idle and Partially Open Throttle:

When the throttle valves are closed (idle) or partially open, blow-by vapor is returned directly to the intake manifold through the breather chamber and positive crankcase ventilation (PCV) valve with fresh air.



At Wide Open Throttle:

When the throttle valves are wide open, the intake manifold vacuum decreases and vacuum in the air cleaner increases. In response to intake manifold vacuum, PCV valve increases the blow-by vapor flow. A small amount of vapor is returned through the valve cover breather hose and into the air cleaner.



Evaporative Controls

Fuel Tank Venting

A two-way valve regulates the pressure or vacuum caused by changes in temperature and fuel level inside the tank.

(1) Pressure relief – fuel vapor is allowed to escape as vapor pressure increases with temperature.

(2) Vacuum relief – fuel tank vacuum is relieved when temperature decreases, or fuel is pumped out to the carburetor.

Thermovalve B

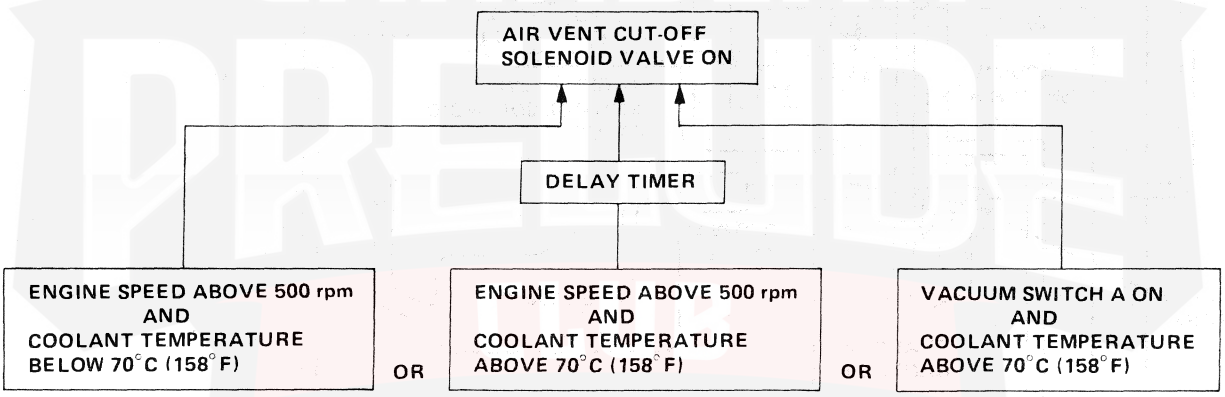
When the engine coolant temperature is above the set temperature of thermovalve B, it closes and the purge control diaphragm valve in the canister is opened by intake manifold vacuum. Fuel vapor is purged from the charcoal canister through the purge control diaphragm valve by venturi vacuum.

Fuel Filler Cap

A two-way valve in the fuel filler cap acts as a safety device if the evaporative control system malfunctions.

Carburetor Venting

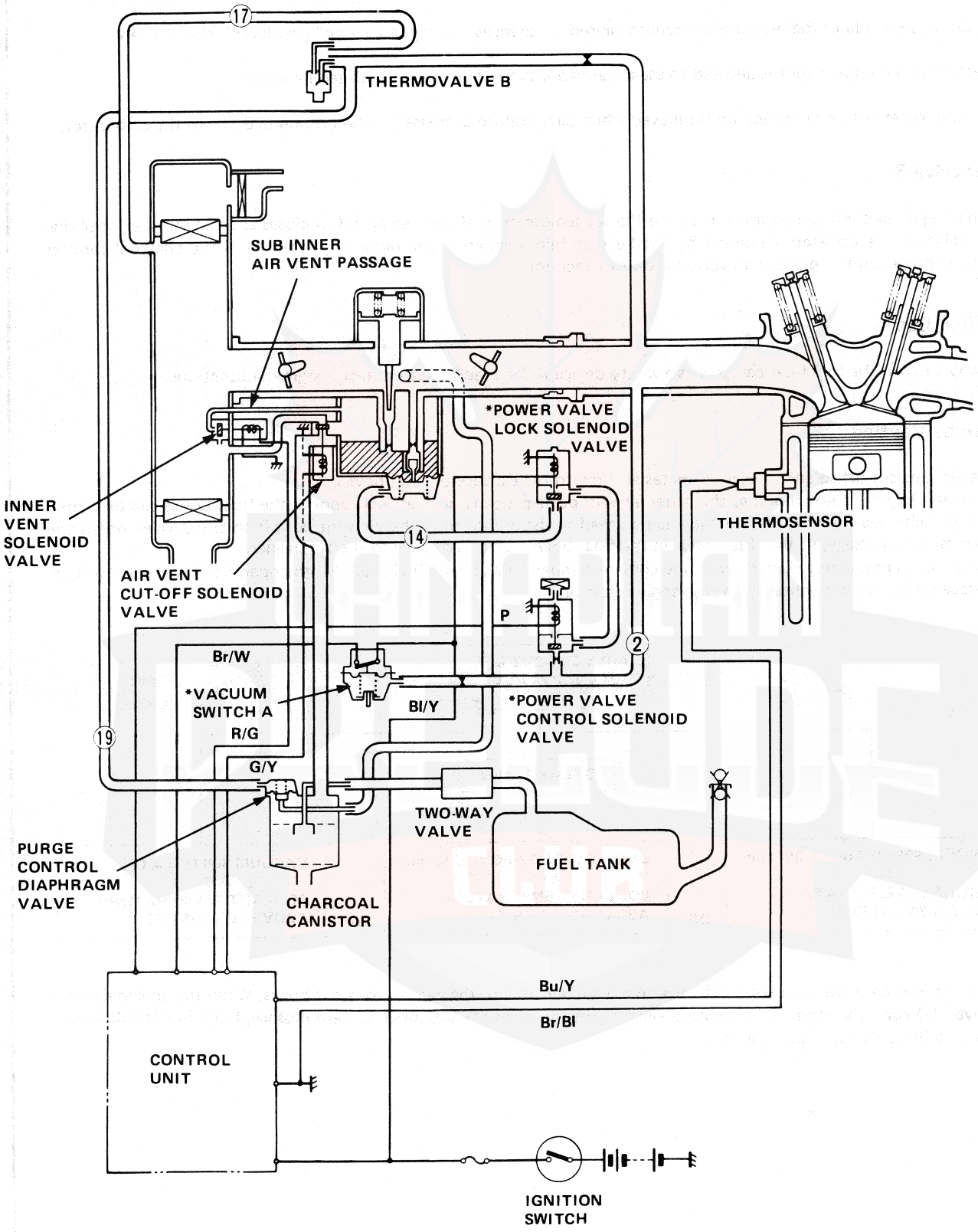
(1) The air vent cut-off solenoid valve regulates air flow to the carburetor float bowls.
When the engine is not running, the outer air vent passage opens, so that fuel vapor in the float bowls can be vented into the charcoal canister. When the engine speed is above 500 rpm, the air vent cut-off solenoid valve opens the inner air vent passage, so that fuel vapor in the float bowls can be vented into the air cleaner.
When the engine is hot started, with the coolant temperature above 70°C (158°F), the opening of the inner air vent passage is delayed momentarily to ease engine start up.



(2) There is also an inner vent solenoid valve to control air flow to the carburetor float bowls. When the engine speed is above 500 rpm, the inner vent solenoid valve normally opens the sub inner air vent passage, but will only allow fuel vapor to be vented to the air cleaner.

(cont'd)

Evaporative Controls (cont'd)



*Located in control box #1

Exhaust Controls

Exhaust emissions are controlled by the ten interrelated systems.
Although the individual parts which make up the systems are different for some vehicles and each emission requirement, the principles of operation are the same.

Control Systems

The ten systems used to control exhaust emissions are:

(1) Intake Air Temperature Controls
(2) Ignition Timing Controls
(3) Throttle Control System
(4) Anti-afterburn Valve
(5) Air Jet Controller
(6) Exhaust Gas Recirculation
(7) Catalytic Converter
(8) Secondary Air Supply System
(9) Main Air Jet Control System
(10) Feedback Control System

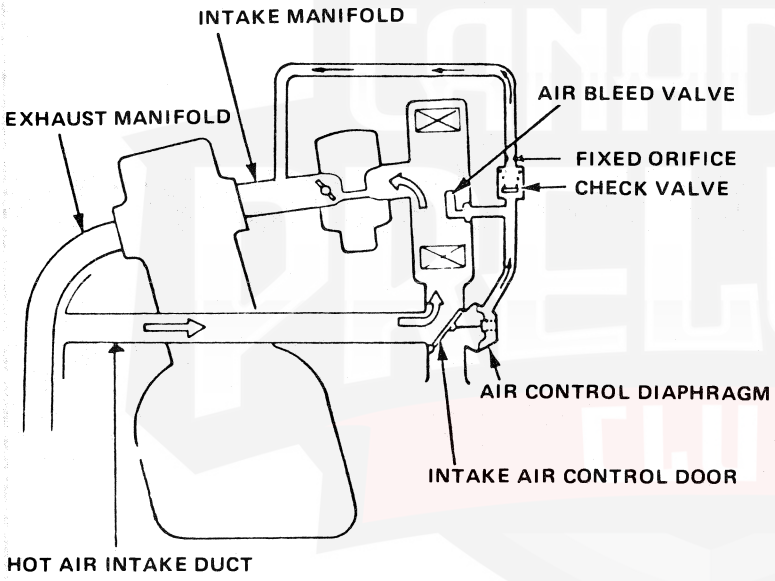
Description

Intake Air Controls

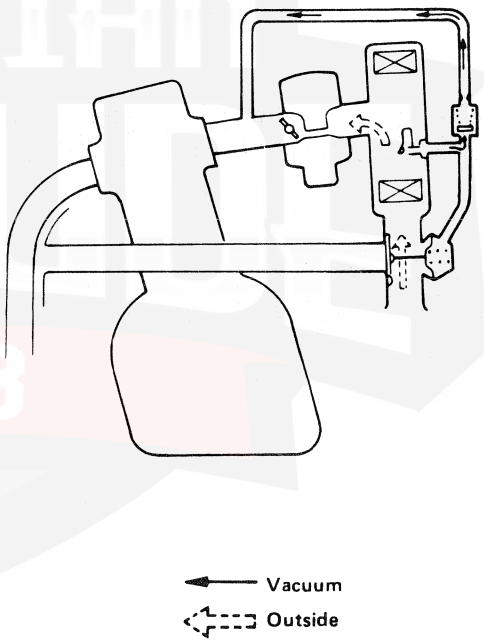
This system maintains uniform air temperature inside the air cleaner (approximately 100°F). The carburetor receives fresh air, controlled within a narrow temperature range, regardless of outside temperature.

CONDITION / PART	COLD – Below 100°F (approx.)	HOT – Above 100°F (approx.)
Air Bleed Valve	– closed, manifold vacuum builds.	– open, manifold vacuum bleeds off.
Diaphragm	– vacuum pulls up on control door.	– internal spring pushes down on control door.
Air Control Door	– rises, pre-heated air enters (outside air blocked).	– falls, outside air enters (heated air blocked.)
Check Valve	– prevents vacuum loss from air control diaphragm at wide-open throttle.	
Fixed Orifice	– prevents rapid pressure changes. Allows smooth operation of control door.	

Air temperature in air cleaner below 100°F

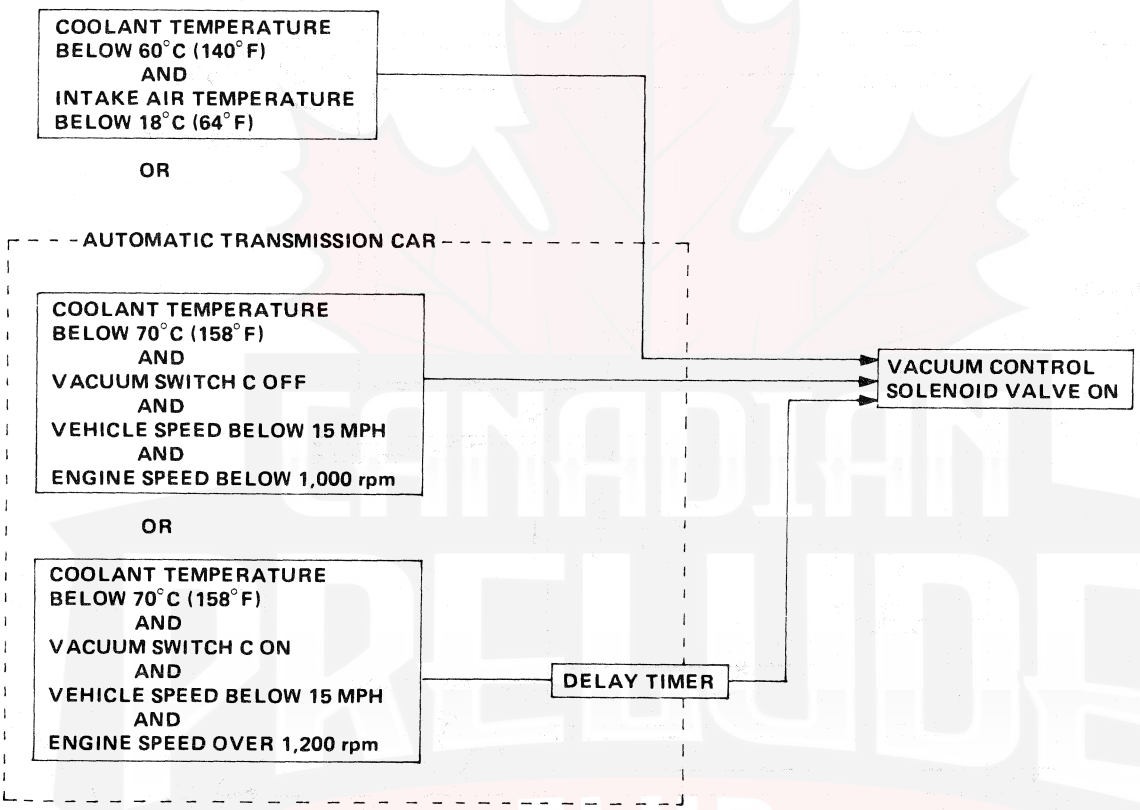


Air temperature in air cleaner above 100°F



Ignition Timing Controls

This system is designed to improve driveability at cold engine temperature by advancing the ignition timing.
The vacuum control solenoid valve is operated by the control unit which receives signals from the intake air temp. sensor and the thermosensor (and the ignition coil, the vacuum switch C and the speed sensor for automatic).
When the vacuum control solenoid valve opens to introduce manifold vacuum to the vacuum advance unit, the distributor breaker plate is turned and ignition timing is advanced.



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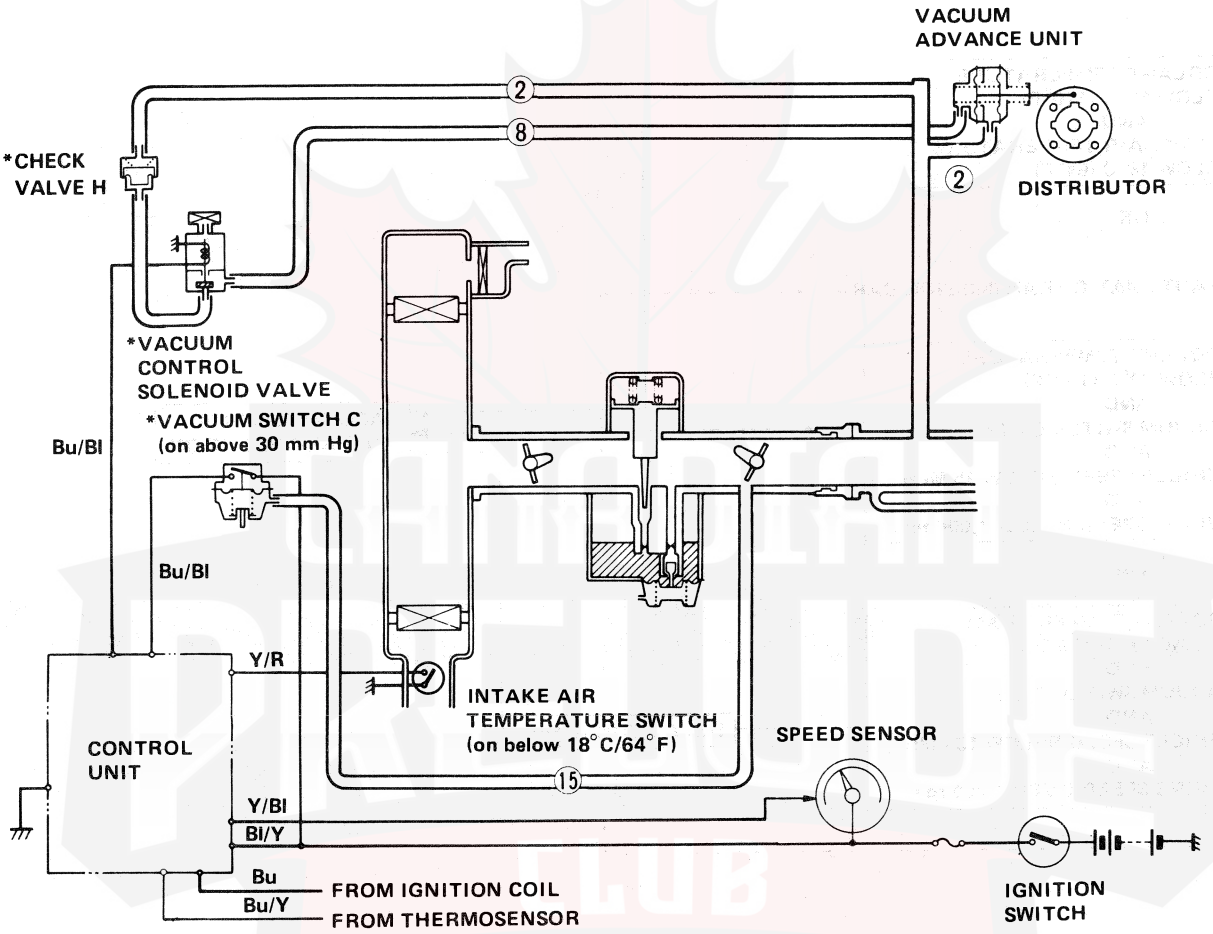
Description

Ignition Timing Controls (cont'd)



*Located in control box #1

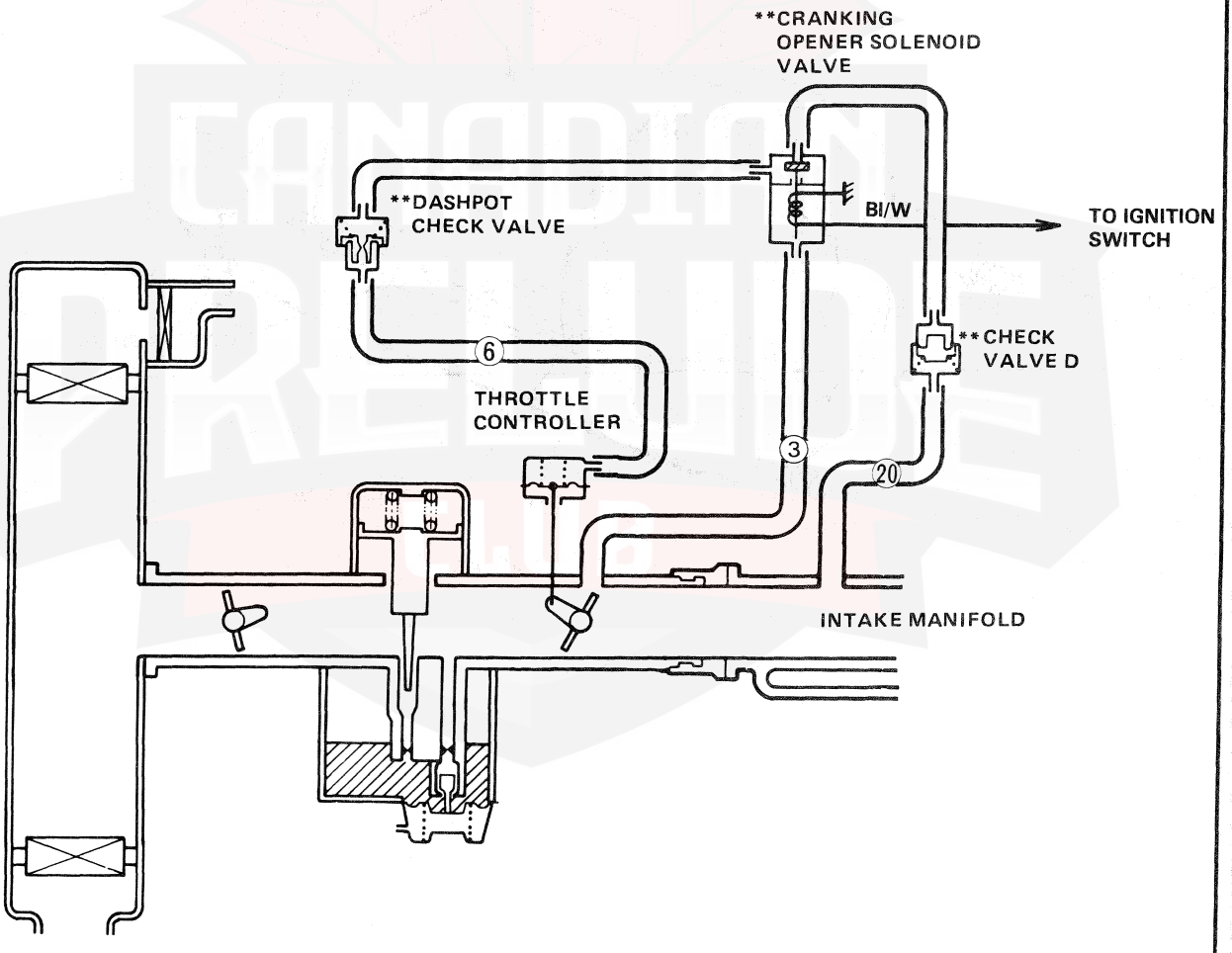
Throttle Controls

Dashpot System

To improve combustion, a throttle controller holds the throttle open slightly to admit additional air during periods of gear shifting and deceleration. When the engine is running above idle, ported vacuum in the carburetor is applied to the throttle controller through a dashpot check valve. On deceleration, the vacuum bleeds off through the orifice in the dashpot check valve, gradually decreasing until the throttle closes completely. Throttle closing speed is determined by the size of the dashpot check valve orifice, tension of the throttle return spring, and the amount of vacuum available at the carburetor port.

Throttle Controller

This system is provided for easy starting of the engine.
When cranking the engine to start, the cranking opener solenoid valve is activated to allow intake manifold vacuum into the diaphragm so that appropriate throttle opening angle is obtained.

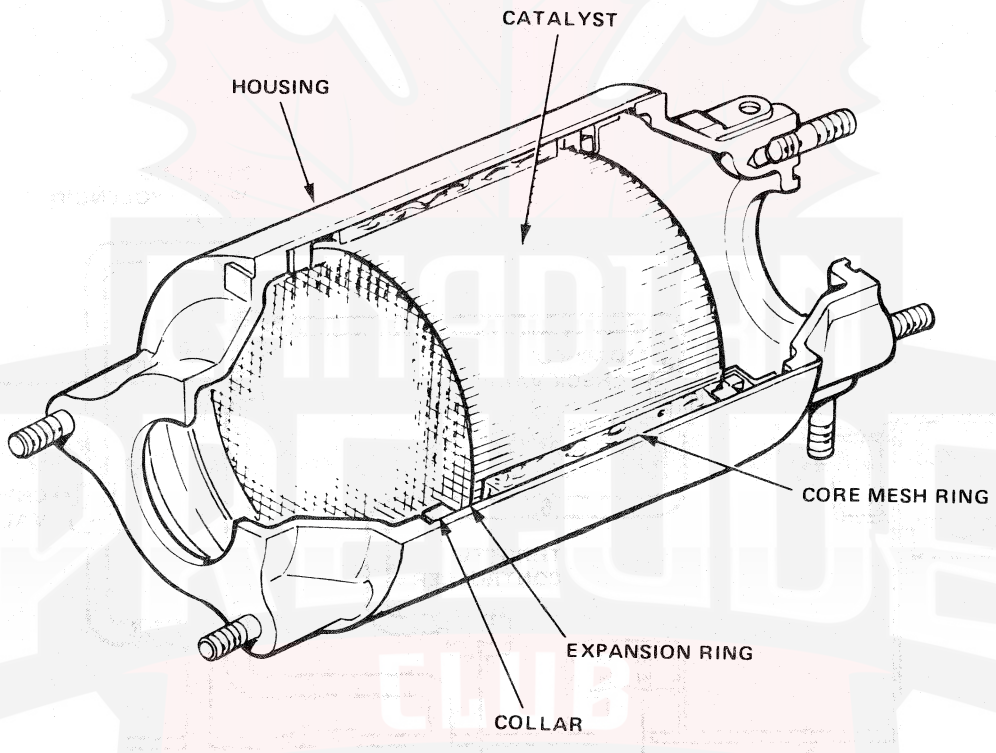


**Located in control box #2

Description

Catalytic Converter

The catalytic converter is used to convert hydrocarbons (HC), carbon monoxide (CO) and oxides of nitrogen (NOx) in the exhaust gas, to carbon dioxide (CO_2), dinitrogen (N_2) and water vapor.



EGR

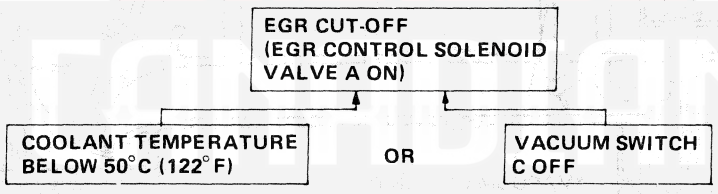
The EGR System is designed to reduce oxides of nitrogen emissions (NOx), by recirculating exhaust gas through the EGR valve and the intake manifold into the combustion chambers. It is composed of an EGR valve, EGR control valves A and B, EGR control solenoid valve A, thermosensor, and vacuum switch C.

The EGR valve is operated by vacuum from the carburetor port and provides EGR volume proportional to engine loads (intake air volume) by the operation of the EGR control valves A and B.

The EGR system recirculates exhaust gas only after the engine is up to normal operating temperature and then only while accelerating or crusing; these two conditions create the majority of NOx emissions. EGR flow is cut off during idle, deceleration, and cold engine operation to assure good combustion during these conditions.

- The vacuum signal is ported above the idle throttle valve position to eliminate EGR at idle.

The control unit senses the engine coolant temperature and intake manifold vacuum, and EGR flow is cut off by the EGR control solenoid valve A from the signal of control unit.
When engine coolant temperature is cold, EGR flow is cut off in order to maintain driveability, and when the engine coolant temperature is hot, EGR flow is cut off during deceleration or idling.



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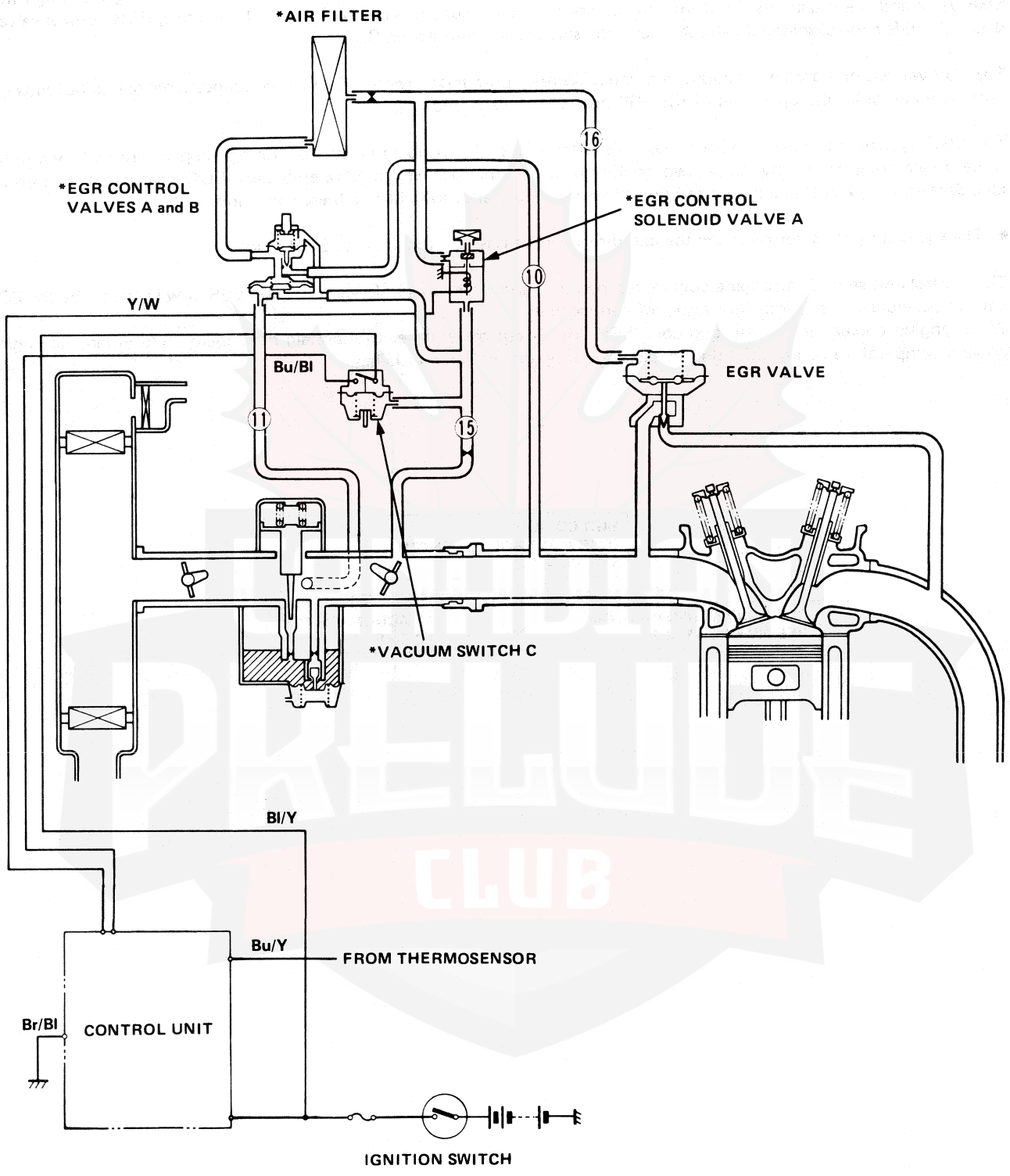
EGR (cont'd)



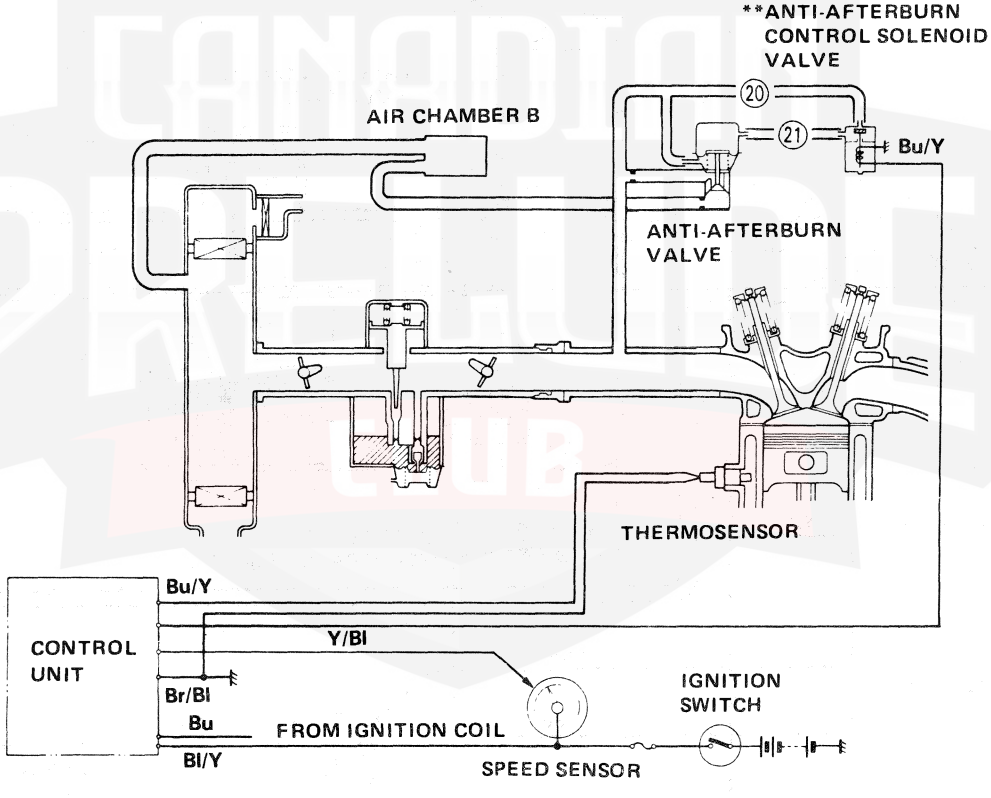
*Located in control box #1

Anti-Afterburn Valve

The anti-afterburn valve lets fresh air into the intake manifold when manifold vacuum suddenly increases; such as, during deceleration.
When manifold vacuum suddenly increases (i.e. sudden deceleration), the diaphragm/valve unit is pulled downward. Air flow from the air chamber to the sensing chamber is restricted by an orifice, creating a pressure differential on the diaphragm, which holds the valve open. This unbalanced condition lasts for a few seconds until the pressure in both chambers is equalized by air entering through the orifice, then the spring pushes the diaphragm up, closing the valve.

The anti-afterburn control solenoid valve is designed to cut off manifold vacuum flow to the top side of the anti-afterburn valve diaphragm.
When the anti-afterburn control solenoid valve opens, the anti-afterburn valve does not open because there is no vacuum difference on both sides of the diaphragm.

MANUAL TRANSMISSION	AUTOMATIC TRANSMISSION
ANTI-AFTERBURN CONTROL SOLENOID VALVE ON	ANTI-AFTERBURN CONTROL SOLENOID VALVE ON
ENGINE SPEED BELOW 3,000 rpm AND COOLANT TEMPERATURE BELOW 70°C (158°F)	VEHICLE SPEED BELOW 15 MPH AND COOLANT TEMPERATURE BELOW 70°C (158°F)

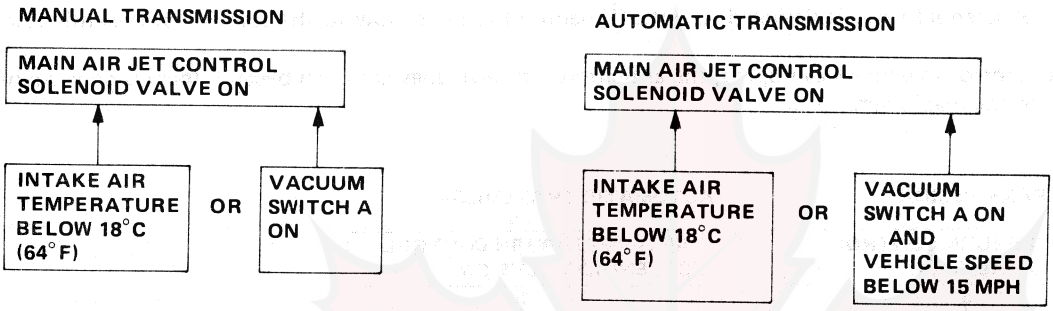


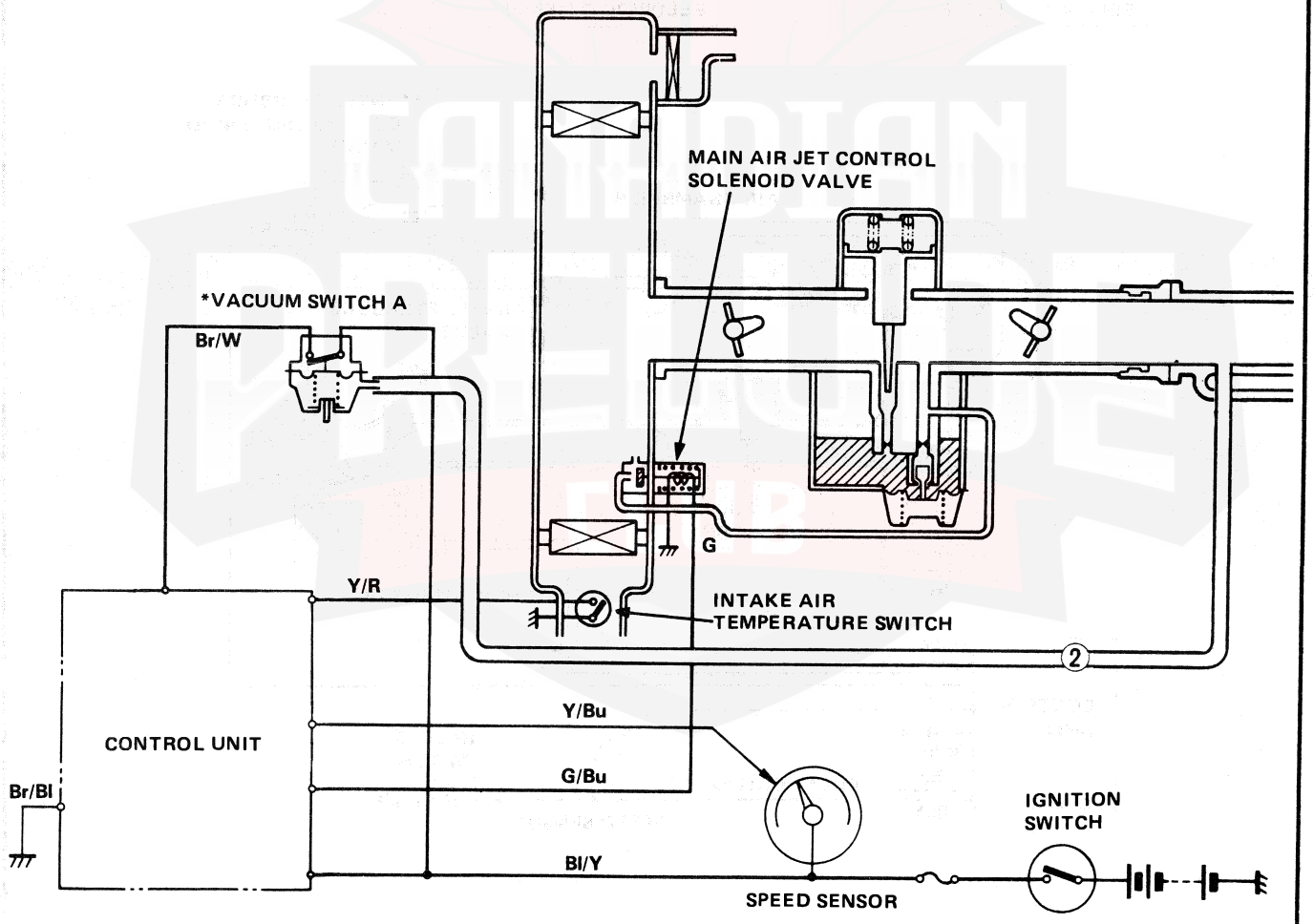
**Located in control box #2

Description

Main Air Jet Control System

To maintain optimum air-fuel ratio, the main air jet control system controls air flow into the main air jets of the carburetor throats. When the car is being started, or running in the power mode, the control unit energizes the main air jet solenoid valve in the air cleaner to close the extra air passage, increasing fuel flow.





*Located in control box #1

Secondary Air Supply System

This system makes use of vacuum pulses in the exhaust manifold to draw air from the air cleaner to the exhaust manifold to promote oxidation of hydrocarbons.
The control unit energizes the air suction control solenoid valve to apply manifold vacuum to the air suction cut-off diaphragm valve, which opens the secondary air passage. When negative pressure, created by exhaust pulses, opens the air suction reed valve, fresh air pours into the exhaust manifold.

The air chambers act as silencers to reduce exhaust noise and the delay valve maintains the proper air/fuel mixture when shifting gears or during deceleration.

AIR SUCTION CONTROL SOLENOID VALVE ON

INTAKE AIR TEMPERATURE ABOVE 18°C (64°F)
AND
VACUUM SWITCH A OFF
AND
ENGINE SPEED BELOW;
Manual Transmission: 3,000 rpm
Automatic Transmission: 2,900 rpm
AND
COOLANT TEMPERATURE BELOW;

CAR / TRANS	CAL	HI ALT and 49 ST
Manual	35°C (95°F)	50°C (122°F)
Auto-matic	35°C (95°F)	65°C (149°F)

OR

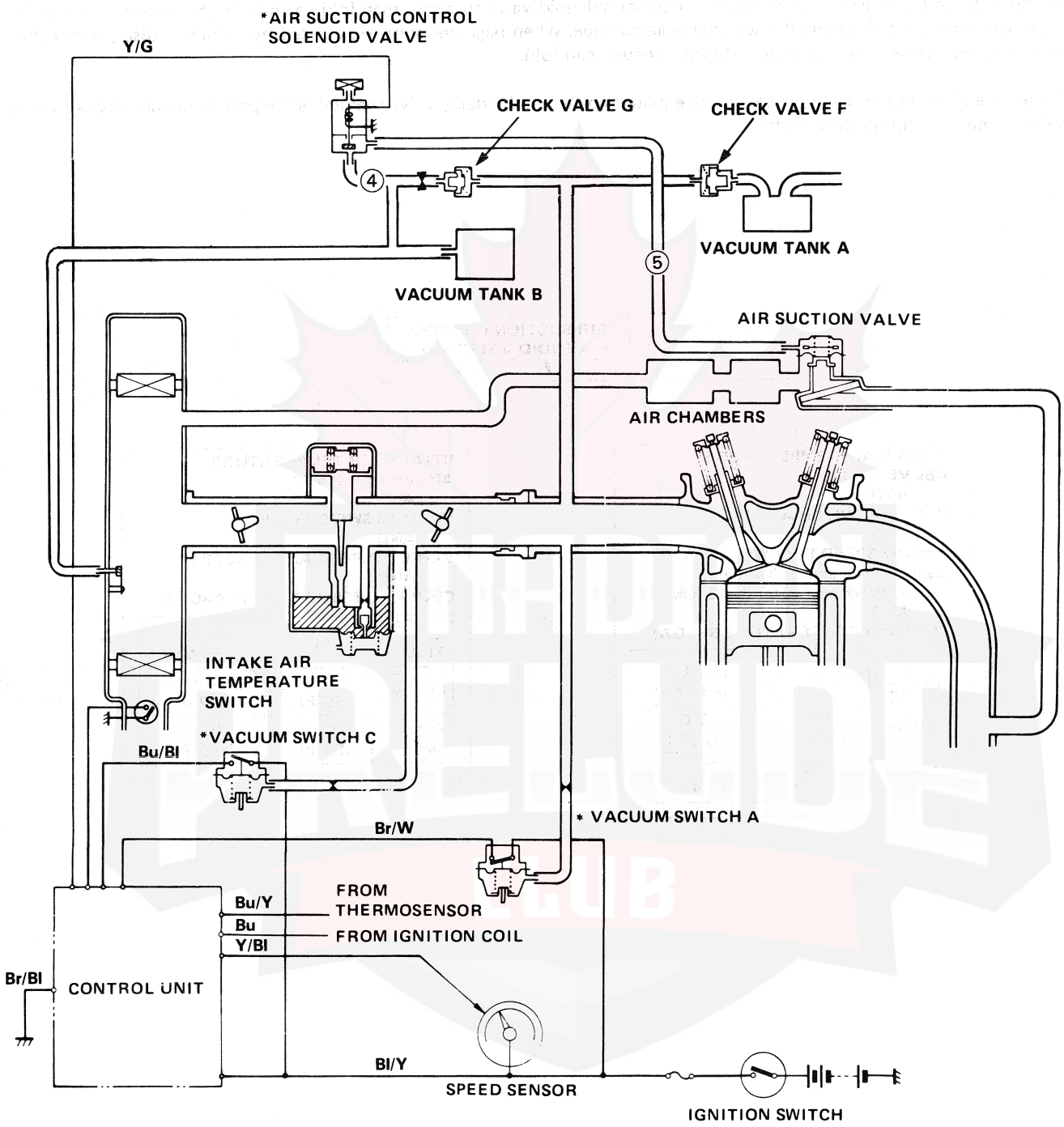
INTAKE AIR TEMPERATURE ABOVE 18°C (64°F)
AND
VACUUM SWITCH C OFF
AND
VEHICLE SPEED ABOVE 15 MPH
AND
COOLANT TEMPERATURE ABOVE;

CAR / TRANS	CAL	HI ALT and 49 ST
Manual	35°C (95°F)	50°C (122°F)
Auto-matic	35°C (95°F)	65°C (149°F)

(cont'd)

Description

Secondary Air Supply System (cont'd)



*Located in control box #1

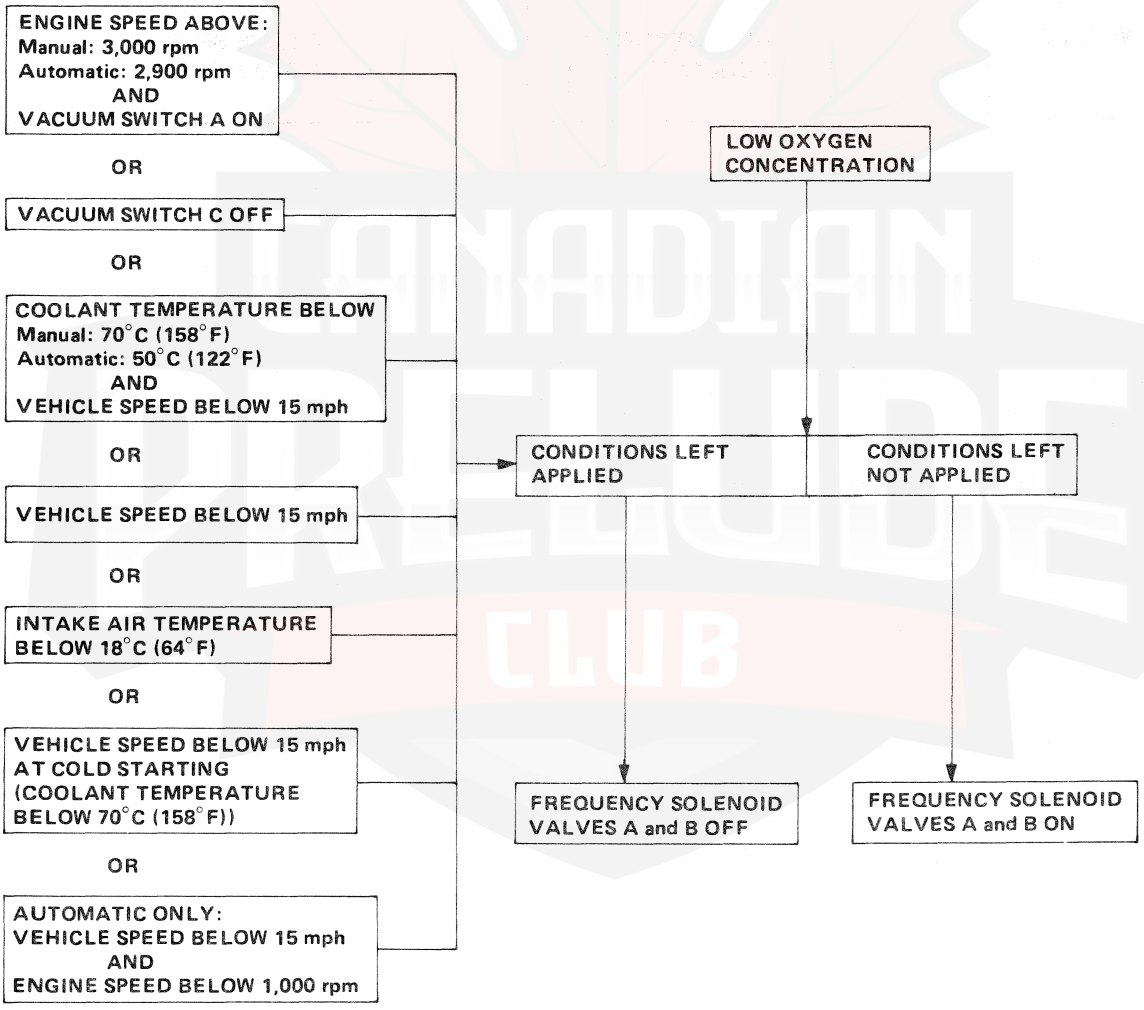
Feedback Control

The Feedback Control System maintains the proper air/fuel mixture ratio by allowing air into the intake manifold, as is necessary, to adjust a temporarily fuel-rich condition. This system is made up of three subsystems: the X-system, the M-system and the Idle Feedback Control system.

The X-system consists of Air Control Valve B, Frequency Solenoid Valve B, Constant Vacuum Valve, Check Valves A, B, C and E, Surge Tanks A and B, and the Control Unit. When Frequency Solenoid Valve B is opened by the Control Unit, manifold vacuum, which is constantly modulated by the Constant Vacuum Valve, is applied to Air Control Valve B. When Valve B opens, it allows the correct amount of air to be fed into the intake manifold.

Surge Tank A and check valves act as a vacuum reservoir while Surge Tank B dampens the vacuum pulses so that relatively steady vacuum is applied to Air Control Valve B.

The M-system consists of Air Control Valve A, Frequency Solenoid Valve A, and the Control Unit. When Frequency Solenoid Valve A is opened by the Control Unit, Air Control Valve A, which has been already opened by vacuum from the carburetor port, feeds the correct amount of air into the intake manifold. The amount of air is proportional to intake air volume.

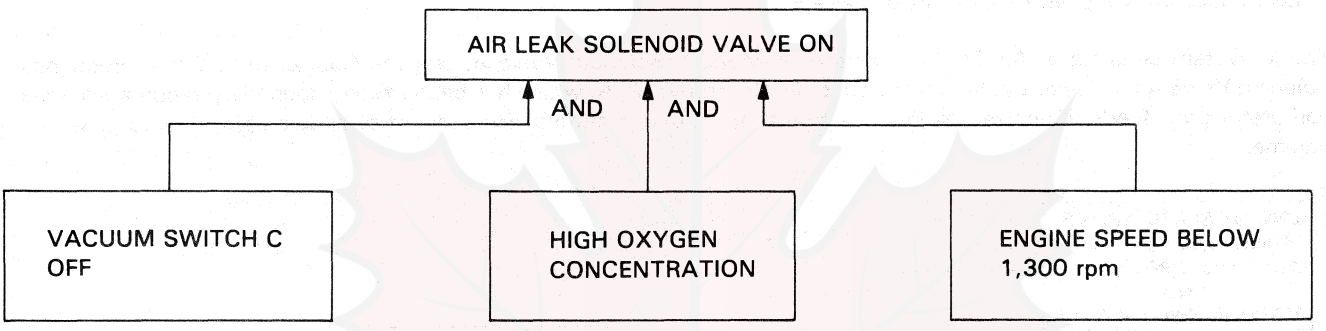


(cont'd)

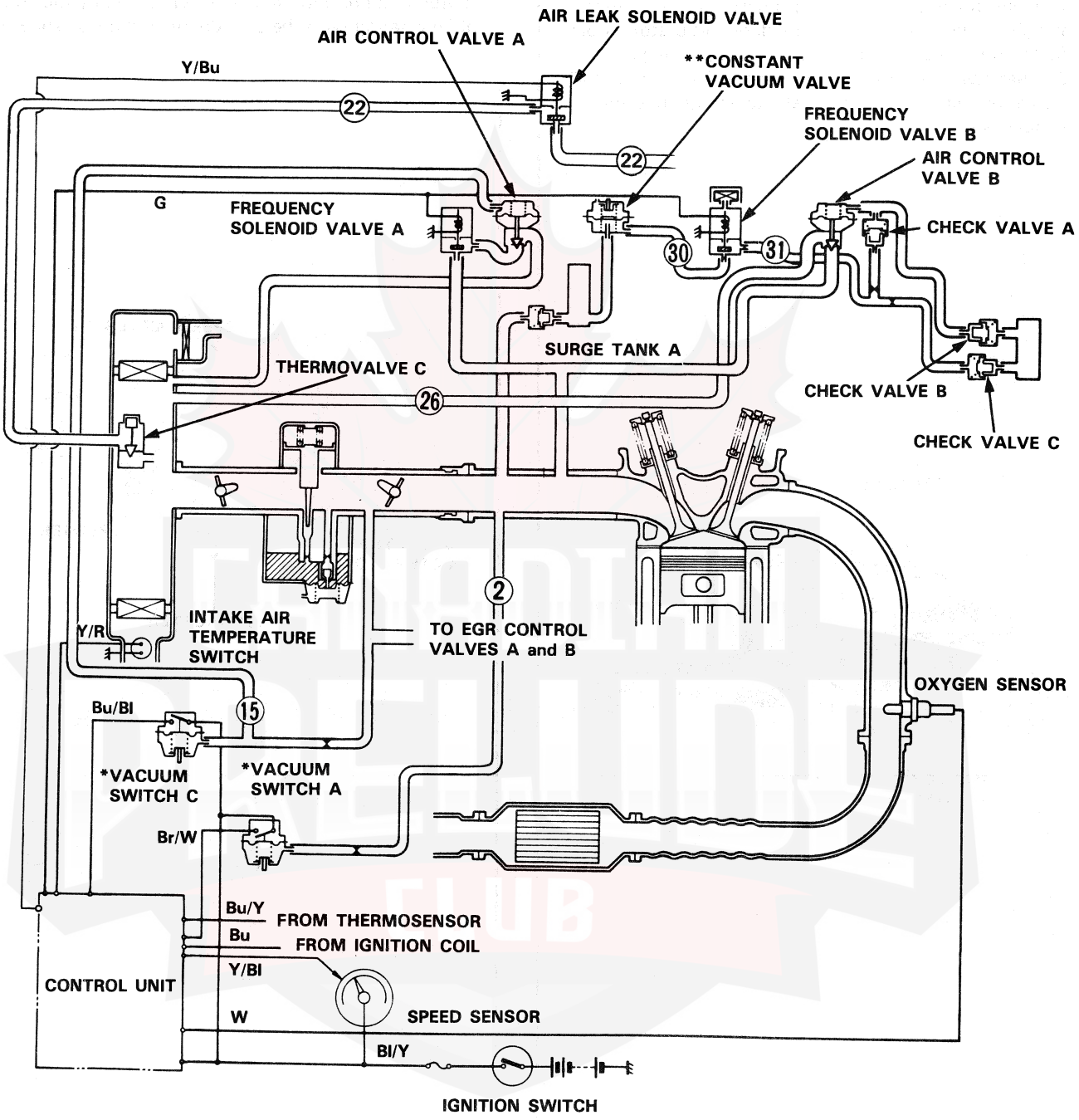
Description

Feedback Control (cont'd)

The idle feedback control system consists of thermovalve C and the air leak solenoid valve. Thermovalve C, located in the air cleaner case, senses intake air temperature and opens to introduce air to the air leak solenoid valve. The air leak solenoid valve is activated by a control unit, which processes the signals from the ignition coil (engine speed), vacuum switch C (carburetor vacuum), and oxygen sensor (oxygen content). The engine speed and carburetor vacuum signals are used to identify idling conditions. The solenoid valve opens and allows air into the carburetor primary slow air jet depending on the oxygen content in the exhaust gas. This idle feedback control system operates and decreases idle emissions when air injection to the exhaust manifold is cut off.



Feedback Control (cont'd)

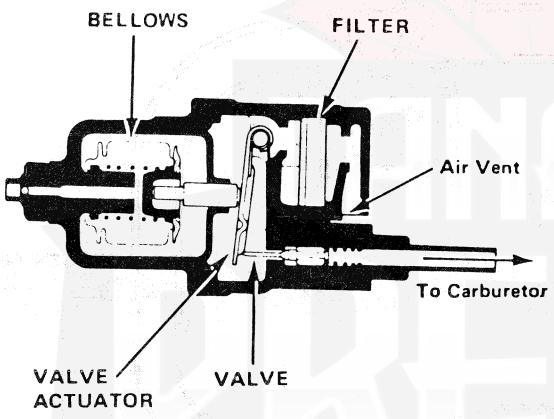


*Located in control box #1
**Located in control box #2

Description

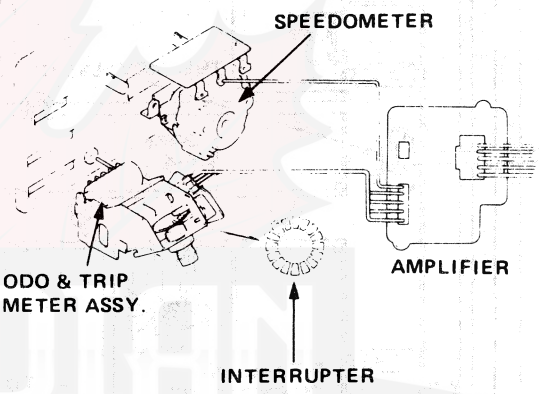
Air Jet Controller

The air jet controller is an atmospheric pressure sensing device which controls the amount of air flow into the slow and main air jets of the primary carburetor throat, and the slow air jet of the secondary carburetor throat. As the outside pressure is reduced by increasing altitude, the bellows expands to open the valve in the AJC, increasing air flow to the jets to maintain optimum air-fuel ratio.



Speed Sensor

The speed sensor which is essentially a photo-interrupter, is mounted in the speedometer. It is actuated at a pre-determined vehicle speed by the sealed plate rotating with the speedometer shaft as shown.

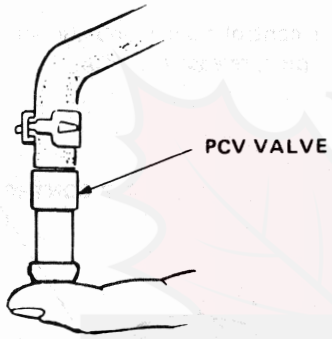


Inspection

Crankcase Controls

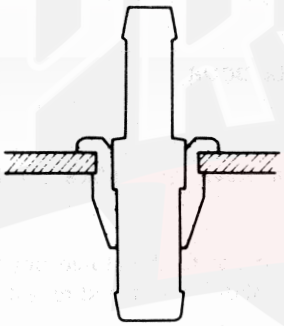
PCV Valve

1. Check the crankcase ventilation hoses and connections for leaks and clogging.
2. Disconnect the PCV valve from the breather chamber.
3. Start the engine and allow it to idle.
4. Place your finger over the PCV valve and listen for a clicking noise from the PCV valve.



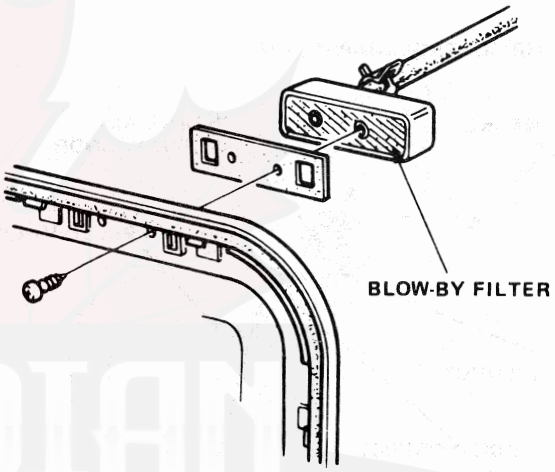
- If a clicking noise is heard, go on to step 5.
- If no noise is heard, replace the PCV valve and re-test.

5. Install the PCV valve with large end down.



Blow-by Filter

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



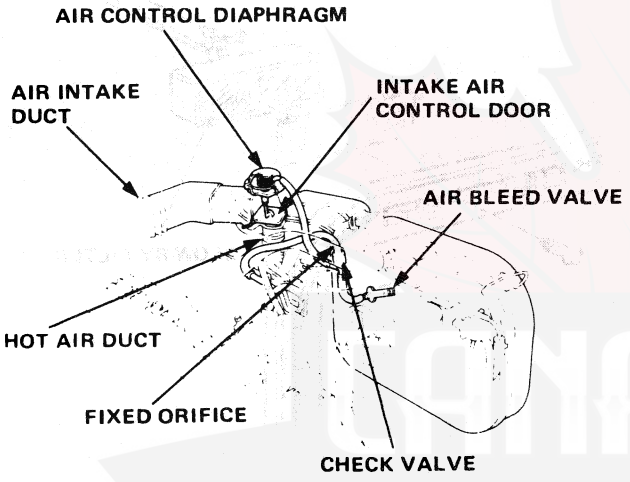
Inspection

Intake Air Controls

COLD ENGINE

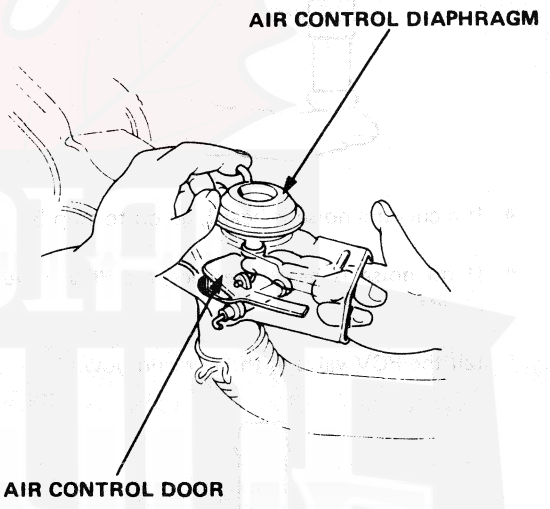
(Hot engine inspection on page 12-35)

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



- If door rises, intake air control is OK; reinstall filter element and air cleaner cover. Connect air intake and hot air ducts. If performing inspection on intake air controls, only go on to page 12-35 for hot engine inspection.
- If door DOES NOT rise: Check to see if door is binding. If door still fails to rise, or fails to stay up for 3 seconds after cold cranking test, go to step 3.

3. Disconnect and plug hose leading to air bleed valve.
4. Crank starter for approximately 5 seconds:
   - If the air control door does not rise or stay open for at least 3 seconds, proceed to Step 5.
   - If door rises and stays up for at least 3 seconds, replace the air bleed valve, and re-test (Steps 2 thru 4).
5. Disconnect vacuum hose from air control diaphragm.
6. Raise air control door manually and while blocking the inlet pipe, release the door.



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

7. Reinstall filter element and air cleaner cover.
8. Connect air intake and hot air ducts.

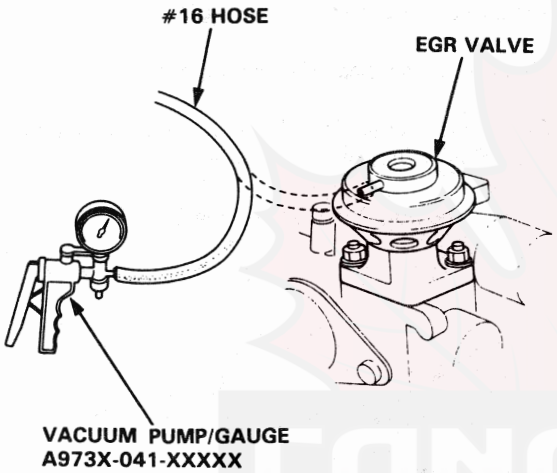
EGR

COLD ENGINE

(Hot engine inspection on page 12-35)

NOTE: Engine coolant temperature must be below 50°C (122°F).

1. Disconnect vacuum hose #16 from the EGR valve and connect a vacuum gauge to the hose.



2. Start the engine and raise the engine speed to 4,500–5,000 rpm.

   Vacuum should not be available.

   - If vacuum is not available, go on to page 12-35 for hot engine inspection.
   - If vacuum is available, check for voltage at EGR control solenoid valve A (Box #1, yellow/white).

     There should be voltage.

     – If there is voltage, replace EGR control solenoid valve A (Box #1) and re-test.

     – If there is no voltage, go to troubleshooting on page 12-50.

Evaporative Controls

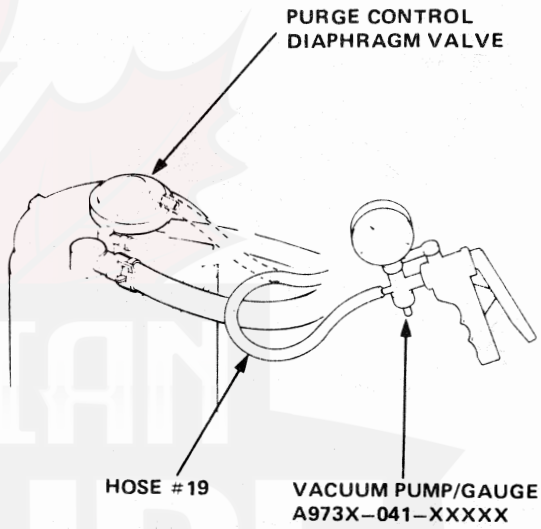
Charcoal Canister

COLD ENGINE

(Hot engine inspection on page 12-37)

NOTE: Engine coolant temperature must be below thermovalve B set temperature (40 ± 4°C, 104 ± 7°F).

1. Disconnect vacuum hose #19 at purge control diaphragm valve (on the charcoal canister) and connect vacuum gauge to the hose.



2. Start the engine and allow to idle.

   Vacuum should not be available.

   - If there is no vacuum, disconnect the vacuum gauge and reconnect the hose.
   - If there is vacuum, replace the thermovalve B and retest.

Inspection

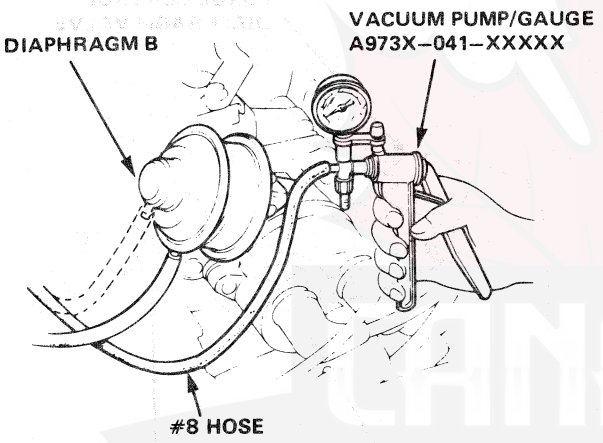
Ignition Timing Controls

COLD ENGINE

(Hot engine inspection on page 12-45)

NOTE: Engine coolant temperature must be below 60°C (140°F). Intake air temperature must be below intake air temperature switch set temperature; switch must have continuity.

1. Disconnect vacuum hose #8 from the vacuum advance diaphragm B on the distributor and connect a vacuum gauge to the hose.



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

   There should be vacuum.

   - If there is vacuum, go on to page 12-45 for hot engine inspection.
   - If there is no vacuum, check for voltage at vacuum control solenoid valve in emission box #1 4P connector (blue/black).
     - If there is voltage, replace vacuum control solenoid valve and re-test.
     - If there is no voltage, go to troubleshooting on page 12-50.

Secondary Air Supply System

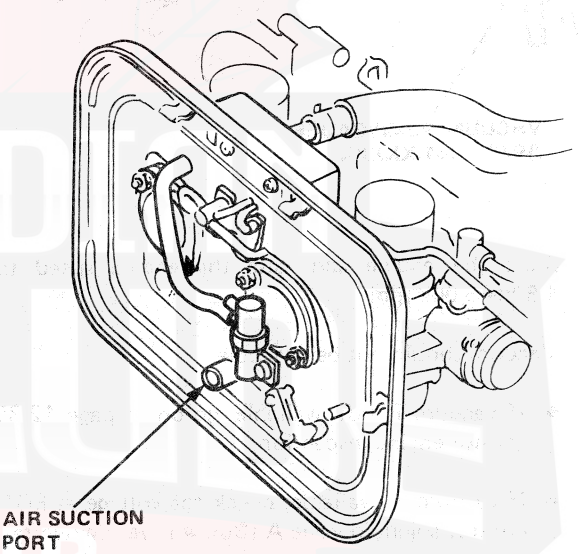
COLD ENGINE

(Hot engine inspection on page 12-47)

NOTE: Intake air temperature must be below intake air temperature switch set temperature; switch must have continuity. Engine speed must be above 3,000 rpm.

1. Disconnect the air suction hose (lower hose) from the anti-afterburn valve and plug it.
2. Remove the air cleaner cover and filter.
3. Start the engine and check for a bubbling noise from the air suction port at idle.

   A bubbling noise should not be heard.



- If bubbling noise is not heard, go on to step 4.
- If bubbling noise is heard, check for voltage at the air suction control solenoid valve (Box #1, yellow/green).
  - If there is voltage, go to troubleshooting on page 12-50.
  - If there is no voltage, go on to step 4.

(cont'd)

Secondary Air Supply System (cont'd)

4. Disconnect the vacuum hose #5 from the air suction cut-off diaphragm and connect a vacuum gauge to the disconnected hose. Check for vacuum.

   - If there is vacuum, replace the air suction control solenoid valve and re-test.
   - If no vacuum, replace the air suction cut-off diaphragm and re-test.

5. Disconnect the intake air temperature switch connector and check for a bubbling noise from the air suction port at idle.

   NOTE: Engine coolant temperature must be below 50°C, 122°F (CAL: 35°C, 95°F).

   A bubbling noise should be heard at idle.

   - If bubbling noise is heard, go on to page 12-45 for hot engine inspection.
   - If bubbling noise is not heard, check for voltage at the air suction control solenoid valve (Box #1, yellow/green).

   — If there is no voltage, go to troubleshooting on page 12-50.

   — If there is voltage, disconnect the vacuum hose #5 from the air suction cut-off diaphragm and check for vacuum.

   • If there is vacuum, replace the air suction cut-off diaphragm and re-test.

   • If no vacuum, check the air bleed valve and check for leaks or disconnected hose. If there are no defects, replace the air suction control solenoid valve and re-test.

Anti-Afterburn Valve

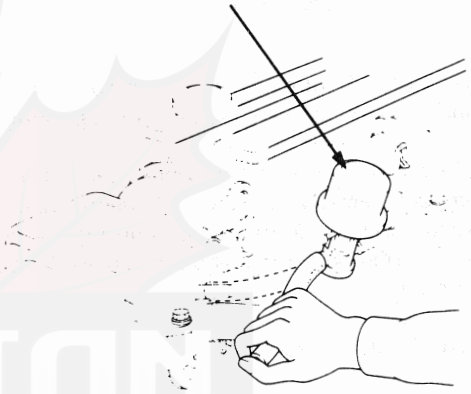
COLD ENGINE

(Hot engine inspection on page 12-31)

NOTE: Engine coolant temperature must be below 70°C (158°F).

1. Disconnect the air suction lower hose at the anti-afterburn valve.

ANTI-AFTERBURN VALVE



2. Start the engine and quickly raise engine speed to 2,500 rpm and close the throttle suddenly.

   There should be no vacuum.

   - If there is no vacuum, go on to step 3.
   - If you feel vacuum, check for voltage at the anti-afterburn control solenoid valve (Box #2, blue/yellow).

(cont'd)

Anti-Afterburn Valve (cont'd)

— If there is no voltage, go to troubleshooting on page 12-50.

— If there is voltage, disconnect vacuum hose #21 from the anti-afterburn valve. Check for vacuum at the hose.

- If no vacuum, check for leaks or disconnected hose. If there are no defects, replace the anti-afterburn control solenoid valve and re-test.
- If there is vacuum, replace the anti-afterburn valve and re-test.

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

4. Place the shift or selector lever in second or 2 position and accelerate, then suddenly release the throttle and check for vacuum during deceleration above 3,000 rpm for manual or above 15 mph for automatic.

   There should be vacuum.

   - If there is vacuum, go on to page 12-30 for hot engine inspection.
   - If no vacuum, check for voltage at the anti-afterburn control solenoid valve above 3,000 rpm for manual or above 15 mph for automatic.

     — If there is voltage, go to troubleshooting on page 12-50.

     — If there is no voltage, disconnect vacuum hose #21 from the anti-afterburn valve and check for vacuum above 3,000 rpm for manual or above 15 mph for automatic.

     - If there is vacuum, replace the anti-afterburn control valve and re-test.
     - If no vacuum, disconnect vacuum hose #20 from the anti-afterburn valve and check for vacuum.

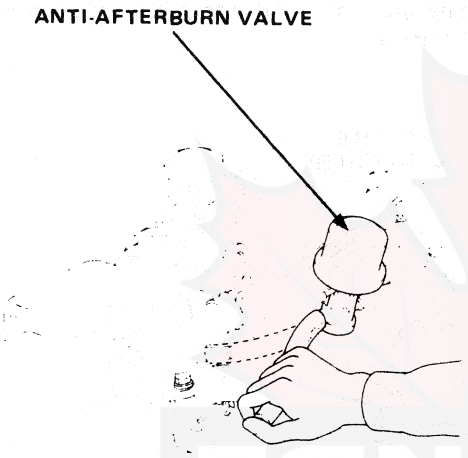
       — If no vacuum, check for leaks or disconnected hose and re-test.

       — If there is vacuum, replace the anti-afterburn valve and re-test.

HOT ENGINE

(Cold engine inspection on page 12-29)

1. Disconnect the air suction lower hose at the anti-afterburn valve.



2. Start the engine and quickly raise engine speed to 3,500 rpm and close the throttle suddenly.

   There should be vacuum.

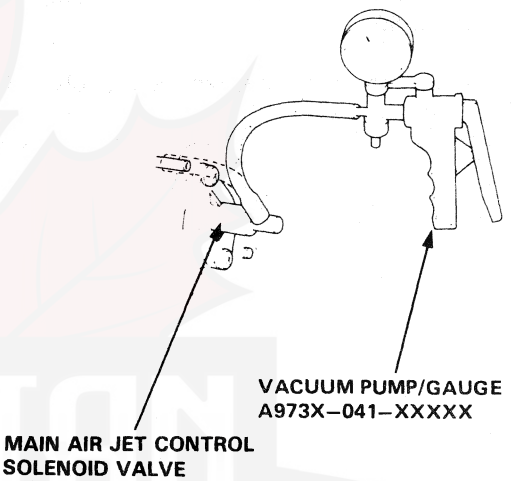
   - If there is vacuum, test is complete.
   - If no vacuum, check for voltage at anti-afterburn control solenoid valve (Box #2, blue/yellow).
     - If voltage is available, go to troubleshooting on page 12-50.
     - If no voltage, replace the anti-afterburn control solenoid valve and re-test.

Main Air Jet Control System

HOT ENGINE

NOTE: Intake air temperature must be above intake air temperature sensor set temperature; sensor must have no continuity.

1. Remove the air cleaner cover and filter element.
2. Disconnect the hose from the main air jet control solenoid valve and connect a vacuum pump to the solenoid valve.



3. Start the engine and draw vacuum at idle.
   - If no vacuum, go on to step 4.
   - If there is vacuum, check for voltage at main air jet control solenoid valve.
     - If there is voltage, go to troubleshooting on page 12-50.
     - If there is no voltage, replace the solenoid valve and re-test.

(cont'd)

Main Air Jet Control System (cont'd)

4. Disconnect vacuum hose #2 from box #1 and draw vacuum at idle.

   Vacuum should remain steady.

   - If vacuum remains steady, disconnect the vacuum gauge and reconnect the hoses.
     Install the filter element and air cleaner cover.

   - If there is no vacuum, check for voltage at main air jet solenoid valve.

     – If no voltage, go to troubleshooting on page 12-50.

     – If there is voltage, replace the solenoid valve and re-test.

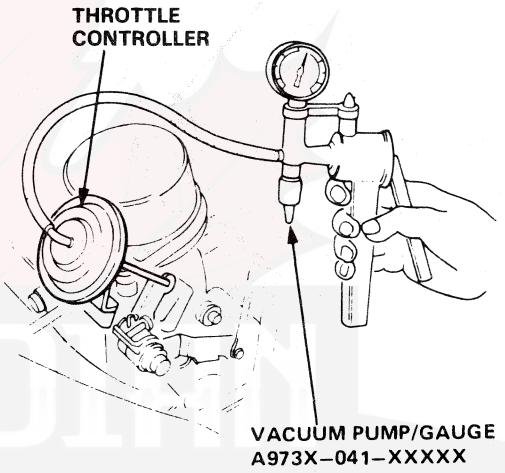
Throttle Controls

HOT ENGINE

1. Connect a tachometer, start the engine and allow it to reach normal operating temperature (cooling fan comes on).

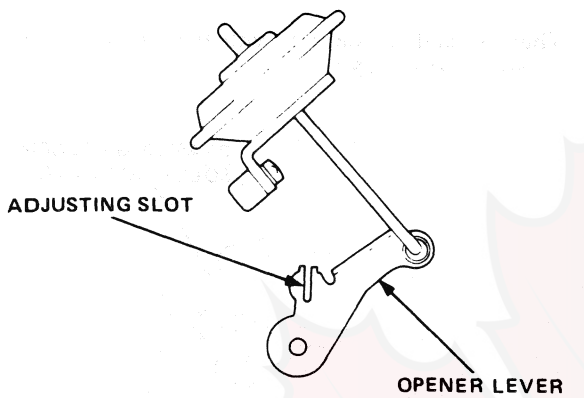
2. Disconnect vacuum hose #6 from the throttle controller, connect a hand vacuum pump to the controller and apply 200 mmHg (8 in. Hg) vacuum.

   Engine speed should rise to 2,000 ± 500 rpm within 1 minute.



   - If the engine speed rises to 2,000 ± 500 rpm, go on to step 3.

- If rpm is too LOW: Widen the adjusting slot in the opener lever with a screwdriver.



- If the rpm is too HIGH: Narrow the adjusting slot in the lever with long nose pliers.
- If the rpm cannot be adjusted, or the diaphragm will not hold vacuum, replace the throttle controller and re-test.

3. Disconnect the vacuum pump and reconnect the hose. Raise the engine speed to 3,500 rpm and maintain for 2 to 3 seconds. Release the throttle suddenly, and watch how long the throttle controller arm takes to fully extend.

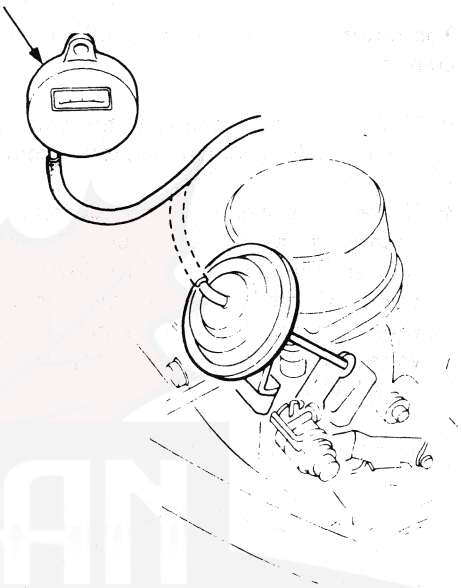
   Return time should be 1 to 4 seconds.

   - If the engine speed returns to idle in 1 to 4 seconds with the arm fully extended, test is complete.
   - If return to idle takes less than 1 second, go on to step 4.
   - If the throttle takes longer than 4 seconds to return, check the throttle controller linkage for free movement, then replace the dashpot check valve and re-test.

4. Disconnect #6 hose from the throttle controller and connect a vacuum gauge to the disconnected hose.
   Start and run the engine at 4,000 rpm.

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

VACUUM/PRESSURE GAUGE
A9295–237–81167



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

(cont'd)

Throttle Controls (cont'd)

Cranking Opener Solenoid Valve

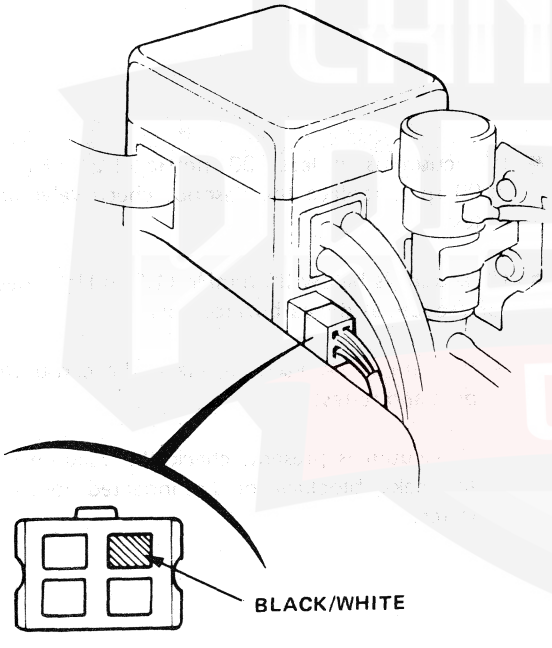
HOT ENGINE

1. Complete rpm check outlined on previous page.
2. Ground the coil secondary wire to prevent the engine from starting. Turn the ignition key to III (START).

   The throttle controller arm should retract when you crank the engine.

   - If the controller operates, the cranking opener solenoid valve is functional; test is complete.
   - If the controller does not operate, check for voltage at the cranking opener solenoid valve. Connect the connector, then insert the positive probe of the voltmeter into the black/white wire. Ground the negative probe and read the voltage with the ignition key turned to III (START).

   There should be voltage.

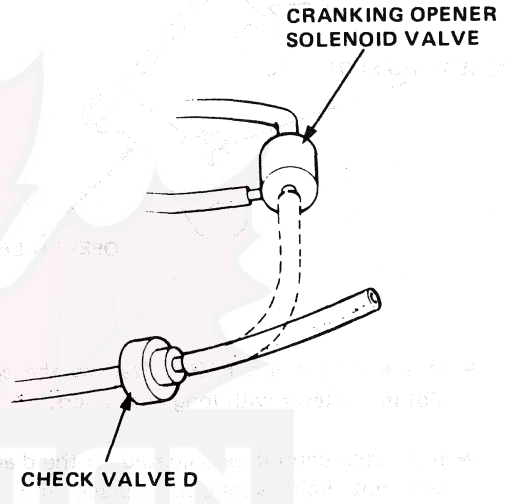


   – If voltage is present, go on to step 3.

   – If no voltage, check wiring and fuse. Repair and replace defective parts and re-test.

3. Remove the #2 control box cover and disconnect vacuum hose #20 between the cranking opener solenoid valve and check valve D at the solenoid valve, and check for vacuum when cranking the engine.

   There should be vacuum with the ignition switch turned to III (START).



   - If there is vacuum, replace the cranking opener solenoid valve and re-test.
   - If no vacuum, check the vacuum line for leaks or blockage. If there is no defect, replace the check valve and re-test.

Intake Air Control

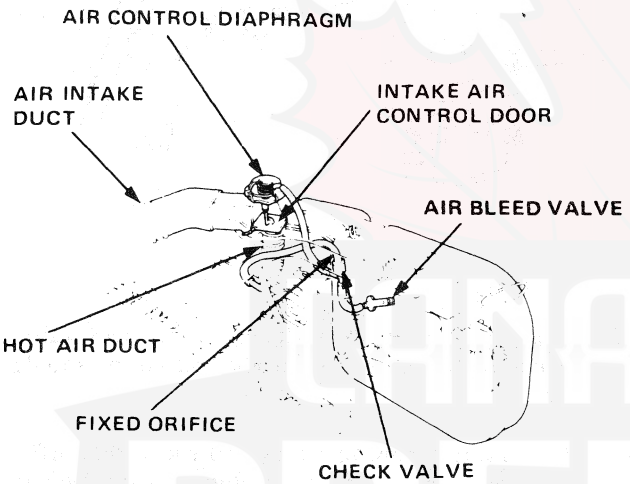
HOT ENGINE

(Cold engine inspection on page 12-26)

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

1. With engine running and cooling fan on, disconnect air intake duct and immediately check control door position.

   The air control door should be down.



   - If the control door has dropped down to fully close the hot air intake duct, stop engine, connect air intake duct. Test is complete.
   - If control door HAS NOT dropped to the fully closed position, go to Step 2.

2. Disconnect the vacuum hose to the air control diaphragm.
   - If the control door now closes, replace the air bleed valve and re-test.
   - If the control door does not close, correct whatever is causing the door to bind, and/or replace air control diaphragm. Re-test.

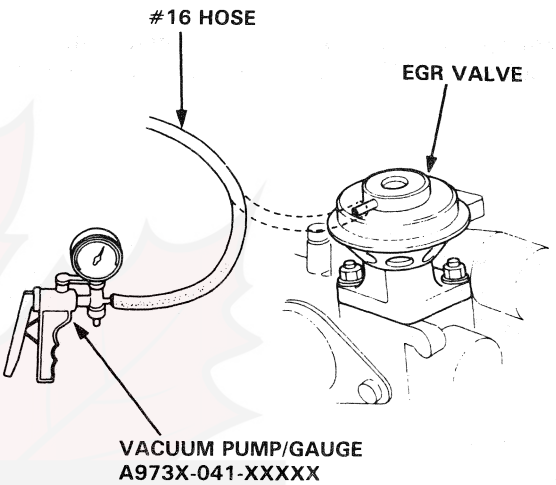
3. Stop engine, connect air intake duct. Test is complete.

EGR

HOT ENGINE

(Cold engine inspection on page 12-27)

1. Disconnect vacuum hose #16 from the EGR valve and connect a vacuum gauge to the hose.



2. Attach the positive probe of the voltmeter to yellow/white terminal at control box #1, and the negative probe to black terminal.

3. Start engine and wait for engine to warm up; cooling fan must come on.

Vacuum and voltage should be as shown below:

	Condition	Vacuum at EGR Hose #16	Voltage at yellow/white wire of EGR control solenoid valve A
1	Idle	No	Yes
2	Rapid Acceleration	Yes 2–6"Hg	No
3	4,500 rpm	Yes 2–6" Hg	No
4	Deceleration	No	Yes

(cont'd)

EGR (cont'd)

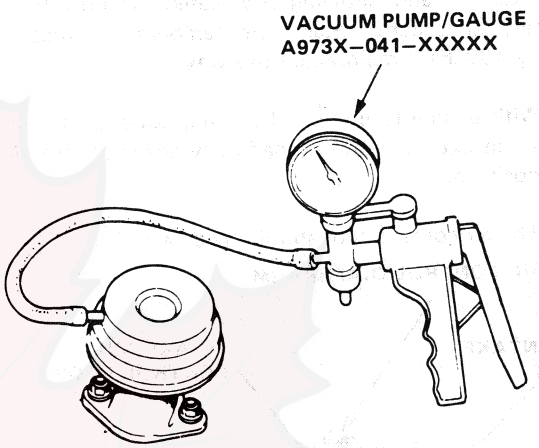
Vacuum available for condition 1 or no vacuum available for conditions 2 & 3.
Verify vacuum hose routing. If there are no defects, replace the EGR control valves A and B (Box #1).

No voltage for condition 1 or 4, or voltage available for conditions 2 or 3.
Go to troubleshooting on page 12-50.

Voltage and vacuum available for condition 4.
Replace the EGR control solenoid valve A and re-test.

EGR Valve

1. Start engine and allow to idle.
2. Disconnect #16 vacuum hose from EGR valve and connect a hand vacuum pump to EGR valve.

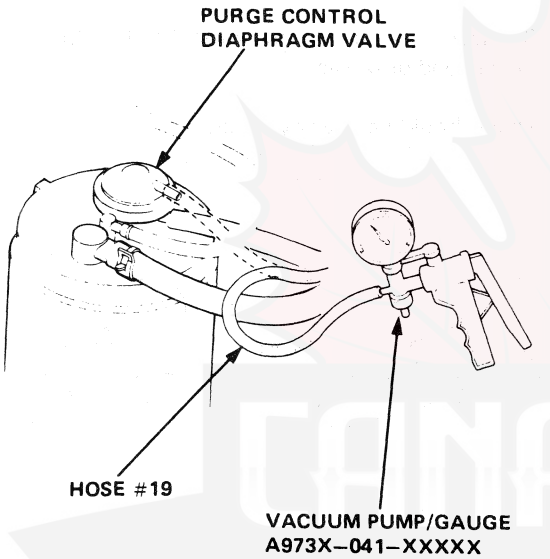


3. Apply 150 mm Hg (6 in. Hg) vacuum to EGR Valve. Vacuum should remain steady and engine should die.
   - If vacuum remains steady and engine dies, EGR valve is working properly. Remove hand vacuum pump and reconnect EGR vacuum hose, test complete.
   - If vacuum does not remain steady and engine does not die, replace EGR valve and retest.
   - If vacuum remains steady but engine does not die: Remove EGR valve; check EGR valve and manifold for blockage, clean or replace as necessary and retest.

HOT ENGINE

(Cold engine inspection on page 12-27)

1. Disconnect vacuum hose #19 at the purge control diaphragm valve (on the charcoal canister) and connect vacuum gauge to hose.
2. Wait for engine to warm up.



There should be vacuum at idle, once engine is warm.

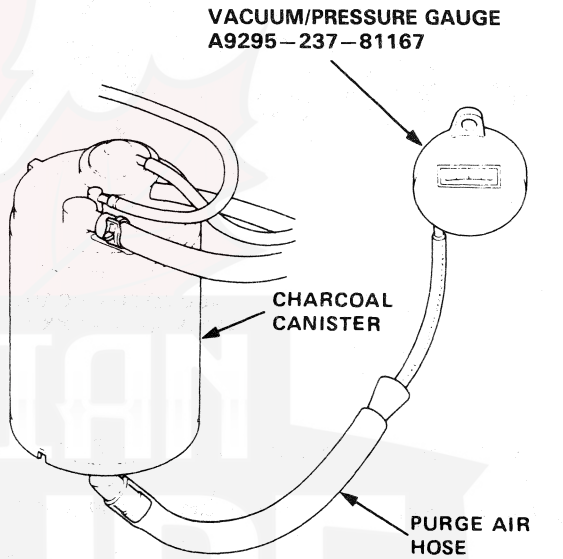
- If vacuum is available, go on to Step 3.
- If vacuum is not available, check thermovalve B by pinching off the hose to the air filter.
  - If vacuum is now available to the canister, replace thermovalve B.
  - If vacuum is not available, check hoses #17 and #19 for leaks or blockage.

3. Disconnect vacuum gauge and reconnect hose.

Charcoal Canister

HOT ENGINE

1. Connect tachometer, start engine and allow to reach normal operating temperature (cooling fan comes on).
2. Remove fuel filler cap.
3. Remove canister purge air hose from frame and connect hose to vacuum gauge as shown.



4. Start engine and raise speed to 3500 rpm.

   Vacuum should appear on gauge within 1 minute.

   - If vacuum appears on gauge in 1 minute, remove gauge and go on to Step 8.
   - If no vacuum, disconnect vacuum gauge and reinstall fuel filler cap.

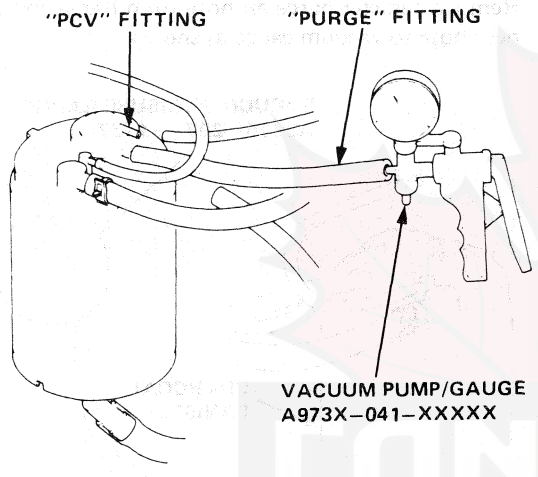
5. Remove charcoal canister and check for signs of damage or defects.
   If defective, replace canister.
   If OK, go on to step 6.

(cont'd)

Evaporative Controls (cont'd)

6. Stop engine. Disconnect hose from canister "PCV" fitting.
   Connect hand vacuum pump to canister "purge" fitting as shown, and draw vacuum.

   Vacuum should remain steady.



- If vacuum remains steady, go on to Step 7.
- If vacuum drops, replace canister and re-test.

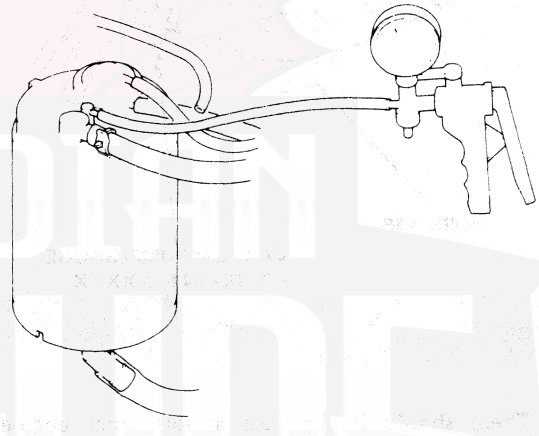
7. Re-start engine. Re-connect hose to canister "PCV" fitting.

   "PURGE" side vacuum should drop to zero.

- If "PURGE" side vacuum does not drop to zero, disconnect the hose from "PCV" fitting and check for vacuum at the hose.
  - If there is vacuum, replace the canister and re-test.
  - If no vacuum, recheck the thermovalve B operation on previous page.
- If "PURGE" side vacuum drops to zero, connect vacuum gauge to the "PURGE" hose and check vacuum with the engine speed at 3,500 rpm.
  - If there is vacuum at 3,500 rpm, replace the canister and re-test.
  - If no vacuum, check the vacuum line for leaks or blockage, and the carburetor port for blockage. Repair, replace or clean as necessary and re-test.

8. Connect vacuum pump to "TANK" fitting as shown, and draw vacuum.

   There should not be any vacuum.

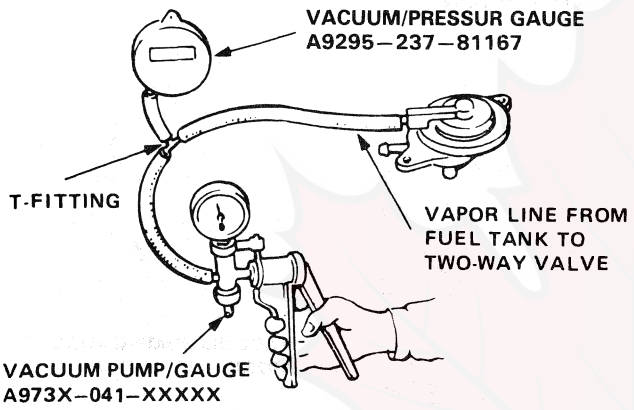


- If no vacuum, reinstall fuel filler cap and canister, test is complete.
- If there is vacuum, replace canister and re-test.

Two-Way Valve

1. Remove the filler cap.

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

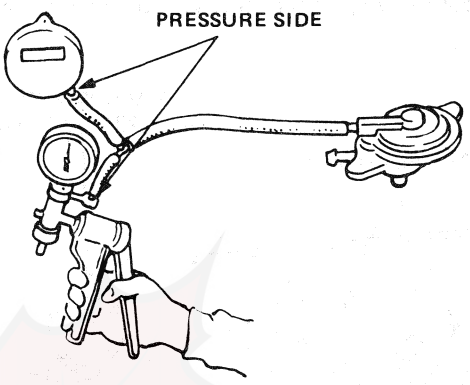


3. Slowly draw a vacuum while watching the gauge.

   Vacuum should stabilize at 5 to 15 mmHg (0.2 to 0.6 in.Hg).

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

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



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

   Pressure should stabilize at 25 to 55 mmHg (1.0 to 2.2 in.Hg).

   - If pressure momentarily stabilizes (valve opens) at 25 to 55 mmHg (1.0 to 2.2 in.Hg), the valve is OK.
   - If pressure stabilizes below 25 mmHg (1.0 in.Hg) or above 55 mmHg (2.2 in.Hg), install a new valve and re-test.

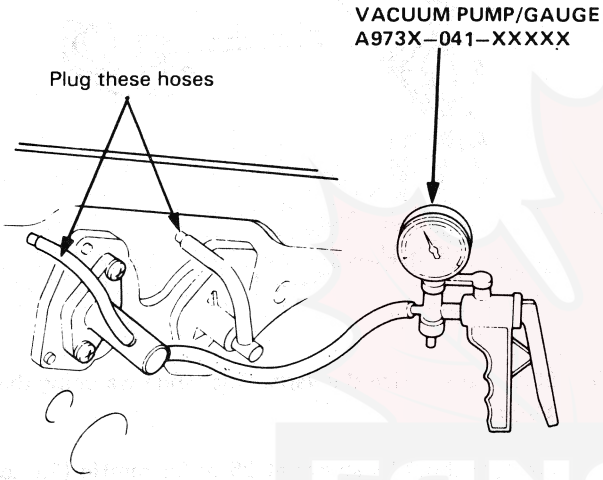
(cont'd)

Inspection

Evaporative Controls (cont'd)

Inner Vent Solenoid Valve

1. Remove the air cleaner cover and filter element.
2. Disconnect the three hoses from the inner vent solenoid valve, plug two of fittings and install a vacuum pump to the inner vent solenoid valve.



3. Turn the ignition switch on and draw vacuum (less than 250 mmHg, 10 in.Hg).

   Vacuum should remain steady.

   - If vacuum remains steady go on to step 3.
   - If vacuum is not available, check for voltage at inner vent solenoid valve.
     - If there is no voltage, replace the solenoid valve and re-test.
     - If there is voltage go to troubleshooting on page 12-50.

4. Start the engine.

   Vacuum should drop to zero.

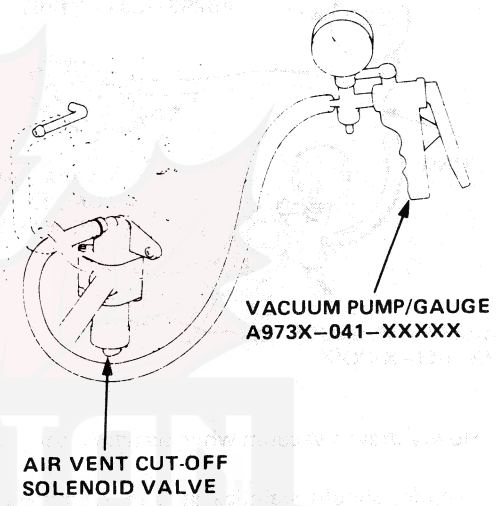
   - If vacuum drops to zero, test is complete.
   - If vacuum does not drop to zero, check for voltage at inner vent solenoid valve.
     - If there is voltage, replace the solenoid valve and re-test.
     - If no voltage, go to troubleshooting on page 12-50.

Air Vent Cut-Off Solenoid Valve

HOT ENGINE

NOTE: Engine coolant temperature must be below 70°C (158°F).

1. Disconnect the upper hose from the air vent cut-off solenoid valve and install a vacuum pump to the solenoid valve.



2. Turn the ignition switch on and draw between 100–125 mmHg (4–5 in.Hg) vacuum.

   Vacuum should remain steady.

   - If vacuum remains steady, go on to step 3.
   - If vacuum is not available, check for voltage at air vent cut-off solenoid valve.
     - If there is no voltage, replace the solenoid valve and re-test.
     - If there is voltage, go to troubleshooting on page 12-50.

3. Start the engine.
   After a time delay of 5–6 seconds, the vacuum should drop to zero.

   - If it drops to zero, test is complete.
   - If vacuum does not drop to zero, check for voltage at air vent-cut-off solenoid valve.
     - If there is voltage, replace the solenoid valve and re-test.
     - If no voltage, go to troubleshooting on page 12-50.

HOT ENGINE

1. Disconnect hose #14 from the box #1 and install a plug in box #1.

2. Start the engine and check that the frequency solenoid valves A and B are operating while running the engine at approximately 2,500 rpm.

   NOTE:
   - It may be easier to determine if the valves are working by placing your hand on each valve individually.

   The frequency solenoid valves should be clicking on and off continuously.

   - If both solenoid valves operate properly, go on to step 3.
   - If either solenoid valve A or B does not operate properly, replace it and re-test.
   - If both solenoid valves do not operate properly, check for voltage between the frequency solenoid valve connector terminals while running the engine at approx. 2500 rpm.
     - If the voltmeter indicates 12 volts and 0 volts alternately, replace the solenoid valves and re-test.
     - If the voltmeter indicates 0 volts, go to troubleshooting on page 12-50.
     - If the voltmeter indicates 12 volts and the engine operating condition is normal, check the vacuum lines of the system for blockage, leaks or disconnected hose. If there is no problem, check each valve of the system.
     - If the voltmeter indicates 12 volts and the engine operating condition is abnormal or the engine stops, go to troubleshooting on page 12-50.

3. Connect hose #14 to the power valve. With the air conditioner off, if so equipped, check that frequency solenoid valves A and B are not operating while idling the engine.

   - If the solenoid valves do not operate, the system is OK. Test is complete.
   - If the solenoid valves operate, go on to troubleshooting on page 12-50.

(cont'd)

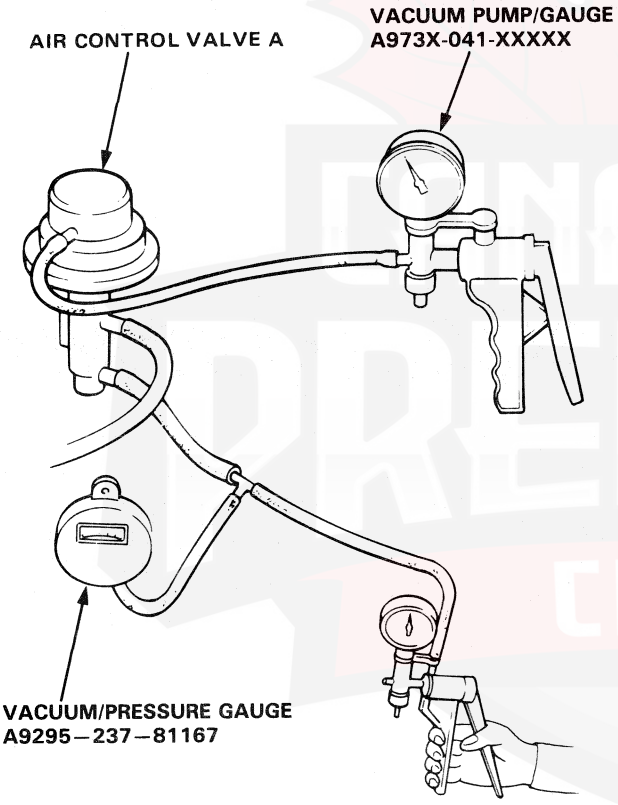
Feedback Control (cont'd)

Air Control Valve A

1. Disconnect hose #15 from air control valve A and install a hand vacuum pump to the air control valve A.
2. Disconnect the air hose from the frequency solenoid valve A and attach a pressure gauge and hand pump. Blow air through the hose to check air control valve A.

   When vacuum is applied to the valve, air should flow without resistance; the pressure gauge should not register any pressure.

   When vacuum is released, air should flow with resistance; the pressure gauge should register pressure.



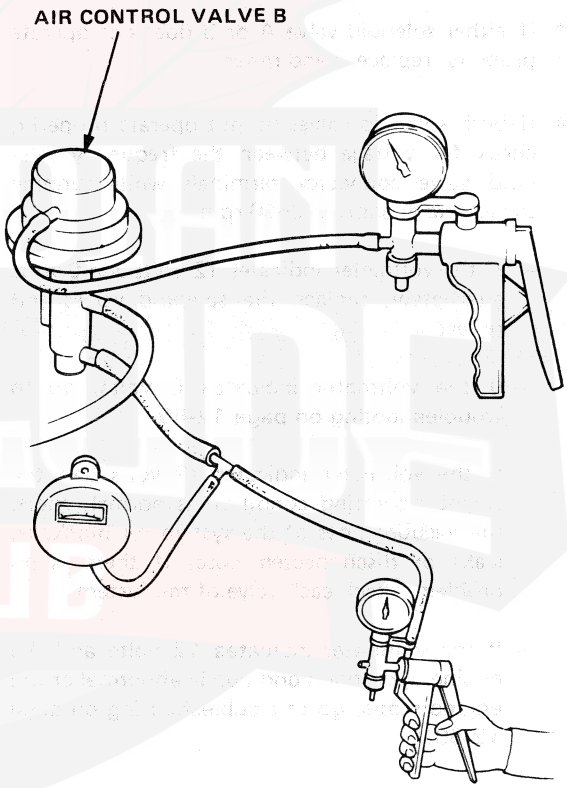
If the valve fails either check, replace it.

Air Control Valve B

1. Disconnect the vacuum hose #26 from air control valve B and connect a hand vacuum pump to the valve.
2. Disconnect the air hose from the vacuum hose manifold and connect a pressure gauge and hand pump. Blow air from the hose to check the air control valve A.

   When vacuum is applied to the diaphragm of the air control valve, air should flow; the gauge should not register any pressure.

   When vacuum is released, air should not flow; the gauge should register pressure.



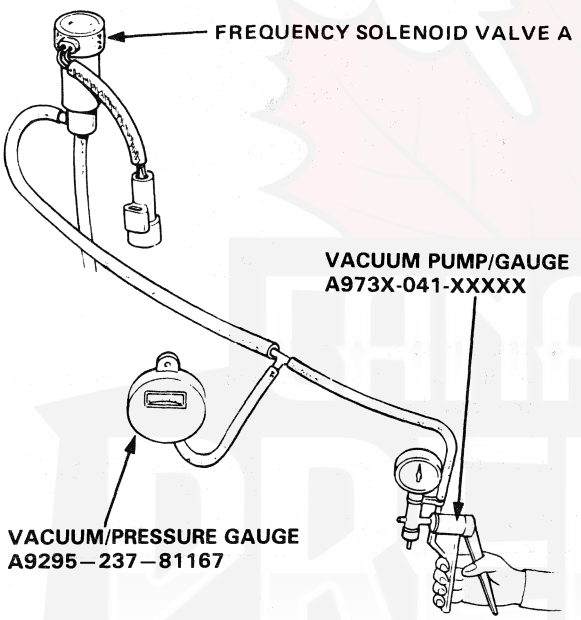
If the valve fails either check, replace it.

Frequency Solenoid Valve A

1. Disconnect the air hose routed from air control valve A. Connect a pressure gauge and hand pump as shown, then blow air into the hose.

   Air should not flow; the gauge should register pressure.

   - If air does not flow, go on to step 2.
   - If air flows (the gauge doesn't register pressure), replace the frequency solenoid valve.



2. Apply battery voltage to the frequency solenoid valve and blow air to the valve.

   Air should flow; the gauge shouldn't register pressure.

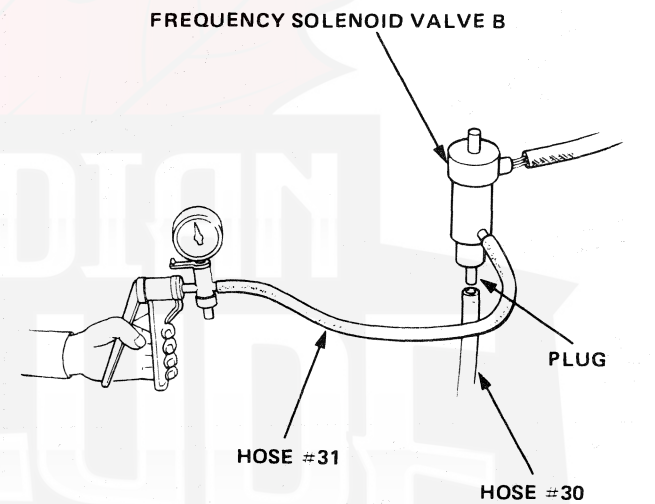
   - If air flows, the frequency solenoid valve is OK. Re-connect the air hose to the frequency solenoid valve.
   - If air does not flow (the gauge registers pressure), replace the frequency solenoid valve.

Frequency Solenoid Valve B

1. Disconnect hose #30 from frequency solenoid valve B and plug the inlet pipe of the valve.
2. Disconnect hose #31 from frequency solenoid valve B and connect a hand vacuum pump to the valve.
3. Apply vacuum to the valve.

   The valve should not hold vacuum.

   - If vacuum is not available, go on to step 4.
   - If vacuum is available, replace frequency solenoid valve B.



4. Apply battery voltage to the frequency solenoid valve and draw vacuum.

   Vacuum should remain steady.

   - If vacuum remains steady, the frequency solenoid valve is OK. Reconnect the hoses #30 and #31 to the valve.
   - If vacuum is not available, replace the frequency solenoid valve.

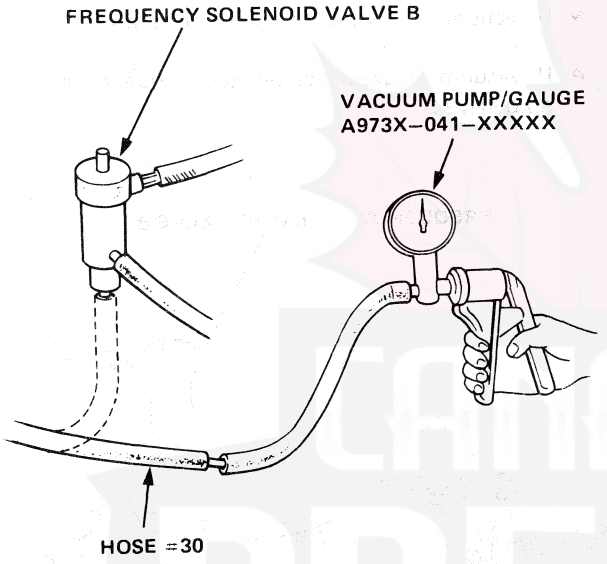
(cont'd)

Feedback Control (cont'd)

Constant Vacuum Valve

1. Disconnect the hose #30 from the frequency solenoid valve B and connect a vacuum gauge to the hose.
2. Start the engine, allow it to idle, then check for vacuum.

   Vacuum should stabilize at 100 to 200 mmHg (3.9 to 7.9 in.Hg).



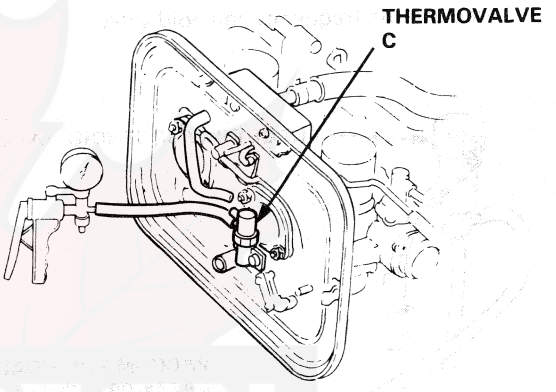
- If vacuum stabilizes between 100 and 200 mmHg (3.9 and 7.9 in.Hg), the constant vacuum valve is OK. Reconnect the hose to frequency solenoid valve B.
- If vacuum stabilizes below 100 mmHg (3.9 in.Hg) or above 200 mmHg (7.9 in.Hg), replace the constant vacuum valve.

Thermovalve C

1. Disconnect the lower vacuum hose of thermovalve C and connect a vacuum pump to the thermovalve.

NOTE: Intake air temperature must be below 55°C (130°F).

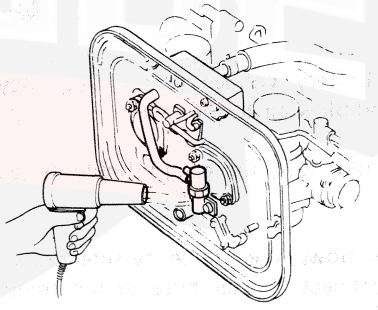
2. Apply vacuum to the thermovalve.



   It should hold vacuum.
   - If it does not hold vacuum, replace the thermovalve.

3. Warm thermovalve C with a dryer or heat gun.

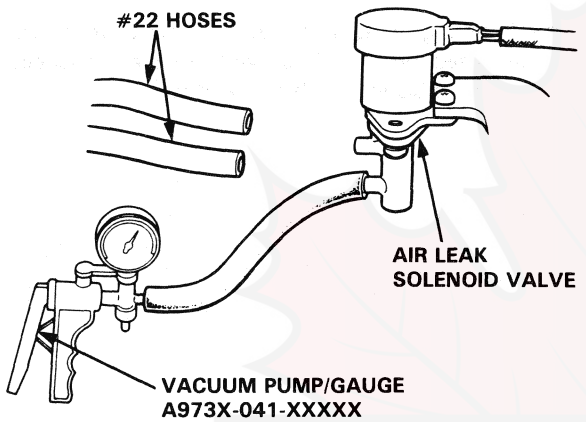
NOTE: Thermovalve C opens at 65°C (149°F).



4. Apply vacuum to the thermovalve.
   It should not hold vacuum.
   - If it holds vacuum, replace thermovalve C.

Air Leak Solenoid Valve

1. Disconnect the connector on the air leak solenoid valve at the air jet controller stay.
2. Disconnect both #22 vacuum hoses from the solenoid valve and connect a vacuum pump to the lower fitting.
3. Apply vacuum to the solenid valve.



It should hold vacuum.

- If it does not hold vacuum, replace the solenoid valve and re-test.

4. Connect the battery positive terminal to yellow/blue terminal of the connector, and the negative terminal to black terminal.
5. Apply vacuum to the solenoid valve.

It should not hold vacuum.

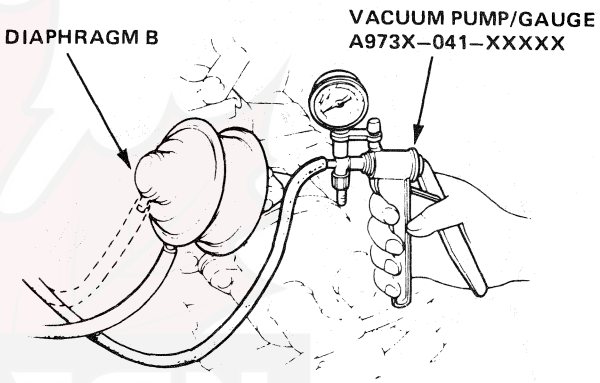
- If it holds vacuum, replace the solenoid valve and re-test.
- If it still does not hold vacuum, go to troubleshooting for the air leak solenoid valve (page 12-50).

Ignition Timing Controls

HOT ENGINE

(Cold engine inspection on page 12-28)

1. Connect a tachometer, disconnect vacuum hose #8 from the vacuum advance diaphragm B on the distributor and connect a vacuum gauge to the hose.



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

There should be no vacuum.

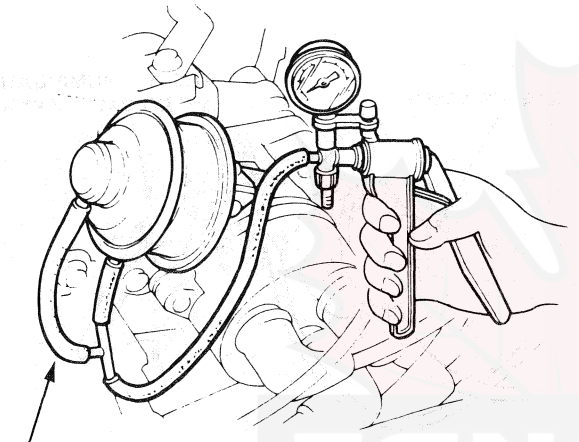
- If there is no vacuum, go on to step 3.
- If there is vacuum, check for voltage at the vacuum control solenoid valve in emission box 4P connector (blue/black).
  - If there is voltage, go to troubleshooting on page 12-50.
  - If there is no voltage, replace the vacuum control solenoid valve and re-test.

(cont'd)

Ignition Timing Controls (cont'd)

3. Attach a hand vacuum pump to vacuum advance diaphragms A and B by using a T-fitting. Plug the ends of the advance hoses. Pinch off the hose to diaphragm B. Start the engine and pull 400 mmHg (16 in.Hg) vacuum.

   Timing should advance and remain steady.



Pinch this hose.

- If timing advances, go on to step 4.
- If timing will not stay advanced (diaphragm leaks,) replace advance diaphragm and re-test.
- If timing does not advance, stop the engine and remove distributor cap. Turn breaker plate right and left to check for freedom of movement. If there is no evidence of binding, replace advance diaphragm and re-test.

4. Release the pinched hose and pull 400 mmHg (16 in.Hg) vacuum.

   Timing should advance more than you recorded on step 3 and remain steady.

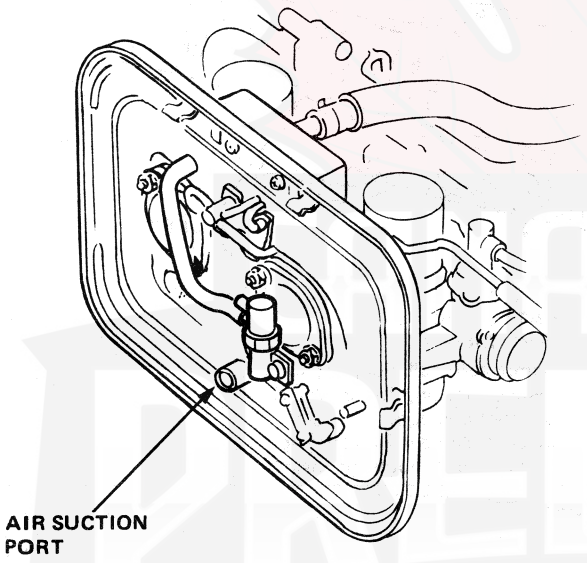
- If timing advances more than previous test, disconnect tachometer and reconnect advance hoses to distributor. Test is complete.
- If timing does not advance more than you recorded on step 3 or will not stay advanced, replace advance diaphragm and re-test.

Secondary Air Supply System

HOT ENGINE

(Cold engine inspection on page 12-28)

1. Disconnect the air suction hose (lower hose) from the anti-afterburn valve and plug it.
2. Remove the air cleaner cover and filter.
3. Jack up the front of the car and support with safety stands. Block rear wheels and set the parking brake.
4. Place the shift or selector lever in second or 2 position and accelerate above 15 mph, then release the throttle and check for a bubbling noise from the air suction port at idle.

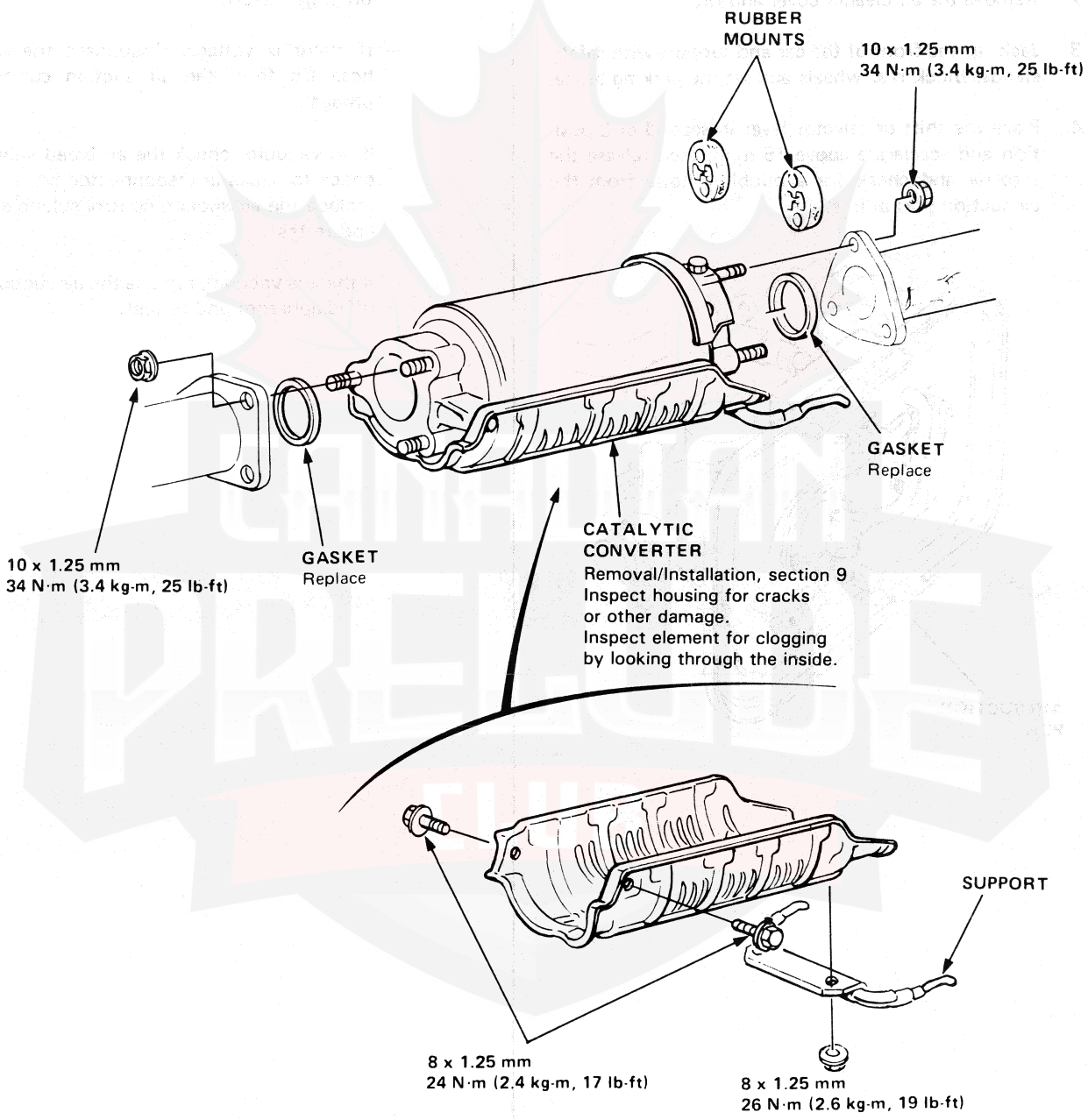


- If bubbling noise is heard, test is complete.
- If bubbling noise is not heard, check for voltage at the air suction control solenoid valve (Box #1, yellow/green).
  - If there is no voltage, go to troubleshooting on page 12-50.
  - If there is voltage, disconnect the vacuum hose #5 from the air suction cut-off diaphragm.
    - If no vacuum, check the air bleed valve and check for leaks or disconnected hose. If OK, replace the air suction control solenoid valve and re-test.
    - If there is vacuum, replace the air suction cut-off diaphragm and re-test.

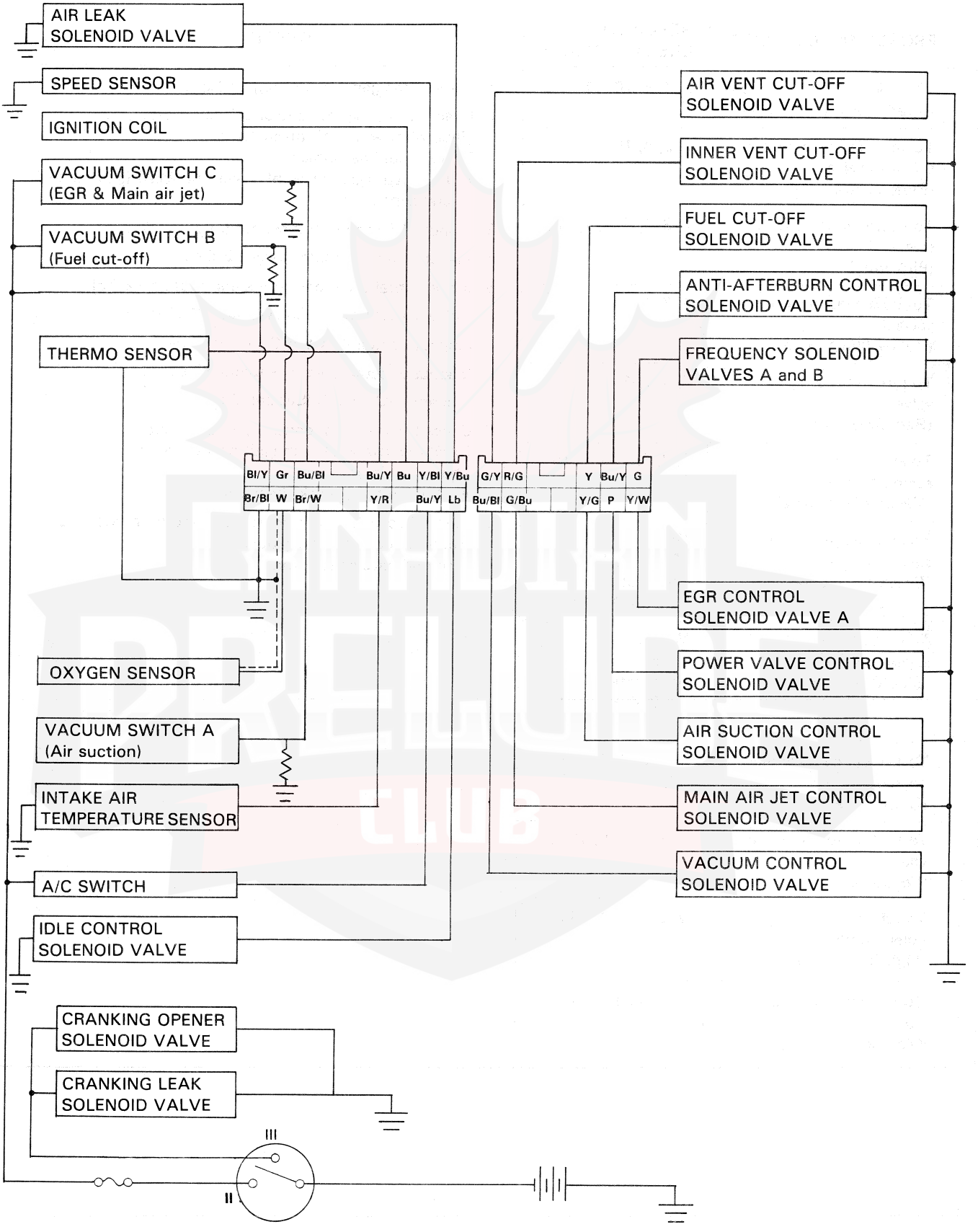
Inspection

Catalytic Converter

If damage or clogging is suspected, remove the catalytic converter from car and make a visual check for clogging, cracks or other damage. If bad, replace converter.



Control Unit



Inspection

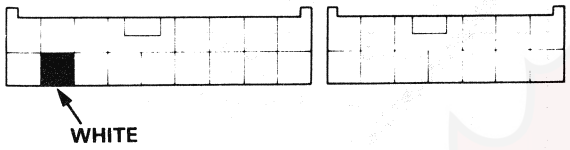
Troubleshooting

If there is no voltage from the control unit when there should be voltage or if there is voltage from the unit when there shouldn't be voltage, inspect as follows and if no defects can be found, replace the control unit and re-test.

PROBLEMATIC CIRCUIT	REFER TO CHECK NUMBER:	CHECK
To air vent cut-off solenoid valve (Green/Yellow wire)	2, 4, 6, 10, 11	1. Inspect oxygen sensor (page 12-51). 2. Check for voltage at control unit connector (Blue wire) with ignition switch on. There should be voltage. ● If no voltage, check blue wire between ignition coil and control unit. 3. Inspect 15 mph speed sensor (page 12-51). 4. Inspect thermosensor (page 12-52). 5. Inspect intake temperature sensor (page 12-53). 6. Inspect vacuum switch A (page 12-53). 7. Inspect vacuum switch C (page 12-54). 8. Inspect vacuum switch B (page 12-53). 9. Inspect A/C switch (Section 24). 10. Check for voltage at control unit connector (black/yellow wire) with ignition switch on. There should be voltage. ● If no voltage, check the wiring. 11. Check brown/black wire for continuity between control unit and a suitable ground. It should have continuity.
To anti-afterburn control solenoid valve (Blue/Yellow wire)	2, 3, 4, 10, 11	
To power valve control solenoid valve (Pink wire)	2, 3, 4, 5, 6, 7, 10, 11	
To EGR control solenoid valve A (Yellow/White wire)	4, 7, 10, 11	
To inner vent solenoid valve (Red/Green wire)	2, 10, 11	
To air suction control solenoid valve (Yellow/Green wire)	2, 3, 4, 5, 6, 7, 10, 11	
To main air jet control solenoid valve (Green/Blue wire)	Manual: 5, 6, 10, 11 Automatic: 3, 5, 6, 10, 11	
To vacuum control solenoid valve (Blue/Black wire)	Manual: 4, 5, 10, 11 Automatic: 2, 3, 4, 5, 7, 10, 11	
To frequency solenoid valves A and B (Green wire)	1, 2, 3, 4, 5, 6, 7, 10, 11	
To fuel cut-off solenoid valves A and B (Yellow wire)	2, 3, 4, 6, 8, 10, 11	
To idle control solenoid valve (Light blue wire)	2, 3, 4, 9, 10, 11	
To air leak solenoid valve (Yellow/Blue wire)	1, 2, 7, 10, 11	

Oxygen Sensor

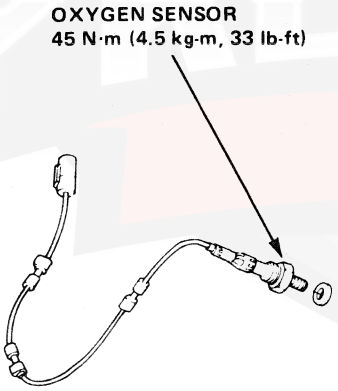
1. Push the voltmeter positive probe into the white wire terminal of the control unit connector. Connect the negative probe to a suitable ground.



2. Start the engine and warm up to normal operating temperature. Rev the engine several times while observing the voltmeter.

   The voltmeter should reach 0.5 volt or higher during this test.

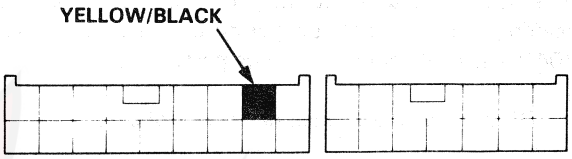
   - If the voltmeter does not show voltage, check the wiring or fuse. If OK, replace the oxygen sensor and re-test.



Speed Sensor

1. Jack up front of car, support with safety stands, block rear wheels, and set hand brake.

2. Push the voltmeter, or test light, positive probe into the yellow/black wire terminal at the control unit connector. Connect the negative probe to a suitable ground.



3. Start engine. Select 2nd gear or 2 position and accelerate slowly, while observing voltmeter.

   Voltmeter should show battery voltage below 11 mph and no voltage above 16 mph.

   - If there is voltage below approximately 11 mph, and there is no voltage above 16 mph, speed sensor is OK. Go on to step 5.
   - If voltmeter readings do not correspond to above mph ranges, install a new speed sensor and re-test.
   - If there is no voltage during speed sensor test, go to step 4.

4. Check for bad electrical connection, fuse or failed speed sensor. Replace or repair as necessary and re-test per step 3.

5. Stop the engine, lower the car to ground, and disconnect the voltmeter.

Inspection

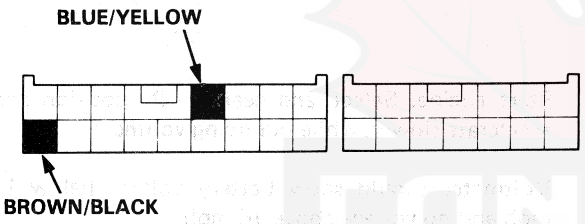
Thermosensor

In order to confirm proper operation, this thermosensor must be tested for resistance twice: once in a "cold" engine and again in a "hot" engine.

The test is to confirm a significant difference in resistance from cold (high resistance) to hot (low resistance).

To make sure the engine is cold enough for the first test, disconnect hose #19 at the charcoal canister. If there is no vacuum at idle, thermovalve B is open, meaning the coolant temperature is less than 40°C (104°F) and the cold test can be performed.

1. Disconnect the connector at control unit.
2. Check for resistance between blue/yellow and brown/black terminals.



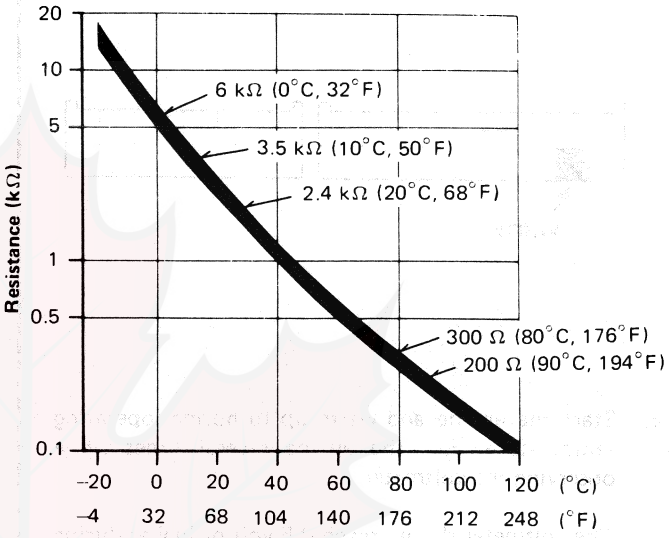
Resistance should be above 1 kΩ.

Then, run the engine until the cooling fan comes on at least once, 90°C (194°F), and check the resistance again.

Resistance should be about 200 Ω.

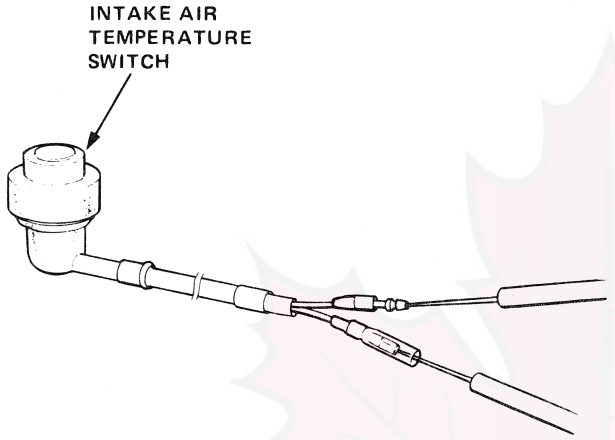
- If resistance is outside above ranges, replace thermosensor and re-test.
- If ohmmeter shows no continuity, check wires and if there is no defects, replace thermosensor and re-test.

The chart below shows the change in resistance over a range of coolant temperatures.



Intake-Air Temperature Switch

Disconnect the intake air temperature switch connector, and check continuity across its terminals:



The sensor should have:

- No continuity if the air temperature is above 23°C (73°F).
- Continuity, if the air temperature is below 4.5°C (40°F).

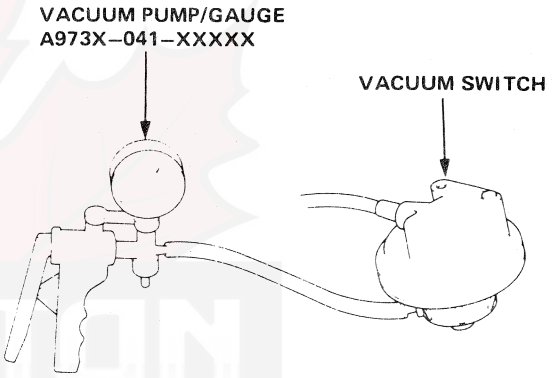
Replace the sensor if continuity is not as specified.

Vacuum Switches

Vacuum Switch A

1. Disconnect hose #2 to the control box at the vacuum hose manifold and connect a hand vacuum pump to the hose.
2. Check for continuity between the black/yellow and brown/white wire terminals of the control box connector.

   There should be no continuity when vacuum above 100 mmHg (3.9 in.Hg) is applied, and there should be continuity when vacuum is released.



Vacuum Switch B

1. Disconnect hose #7 to the control box at the vacuum hose manifold and connect a hand vacuum pump to the hose.
2. Check for continuity between the black/yellow and gray wire terminals of the control box connector.

   There should be continuity when vacuum above 30 mmHg (1.2 in.Hg) is applied, and there should be no continuity when vacuum is released.

(cont'd)

Vacuum Switches (cont'd)

Vacuum Switch C

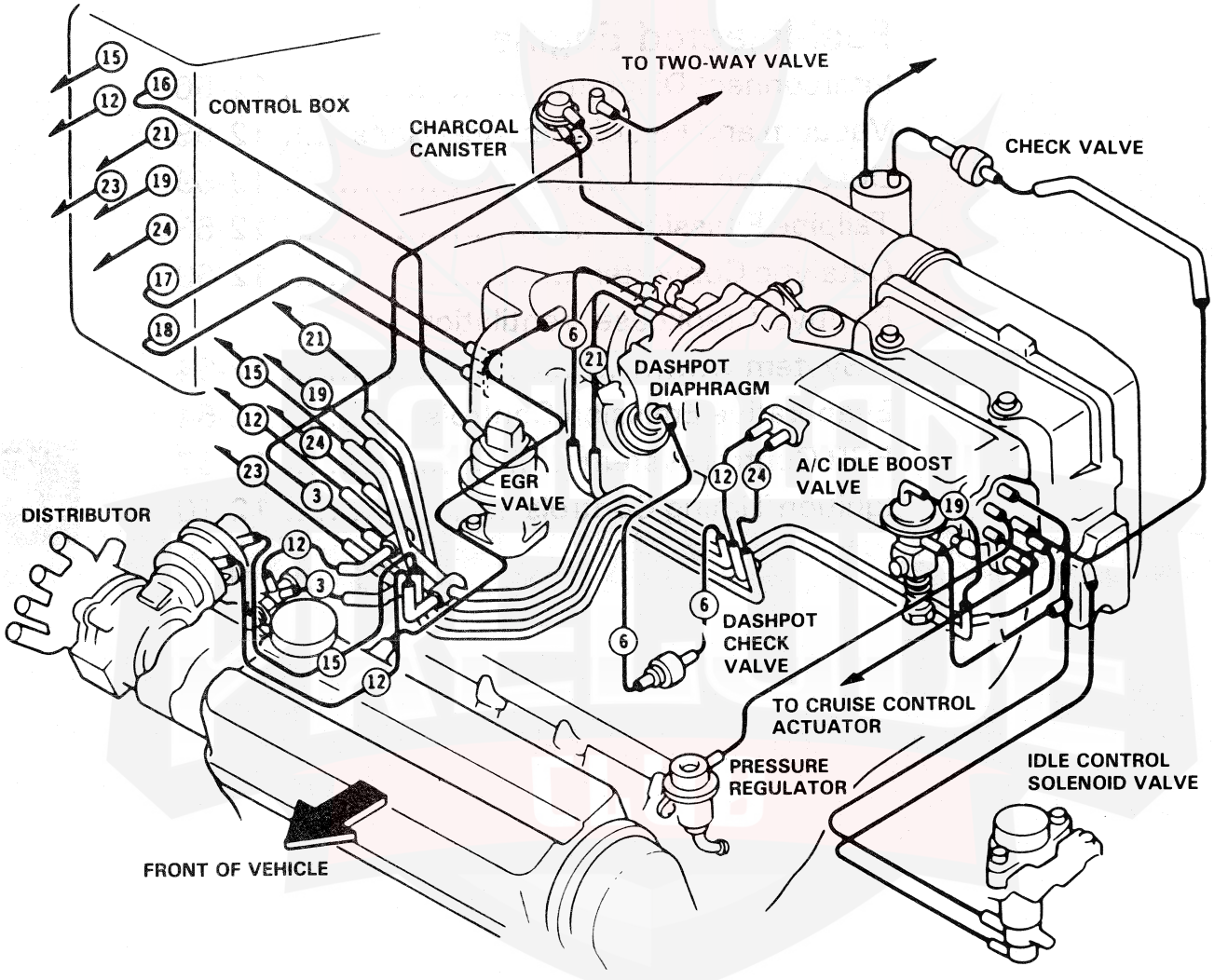
1. Disconnect hose #15 to the control box at the vacuum hose manifold and connect a hand vacuum pump to the hose.

2. Check for continuity between the black/yellow and blue/black (6P connector) wire terminals of the control box connector.

   There should be continuity when vacuum above 30 mmHg (12 in.Hg) is applied, and there should be no continuity when vacuum is released.

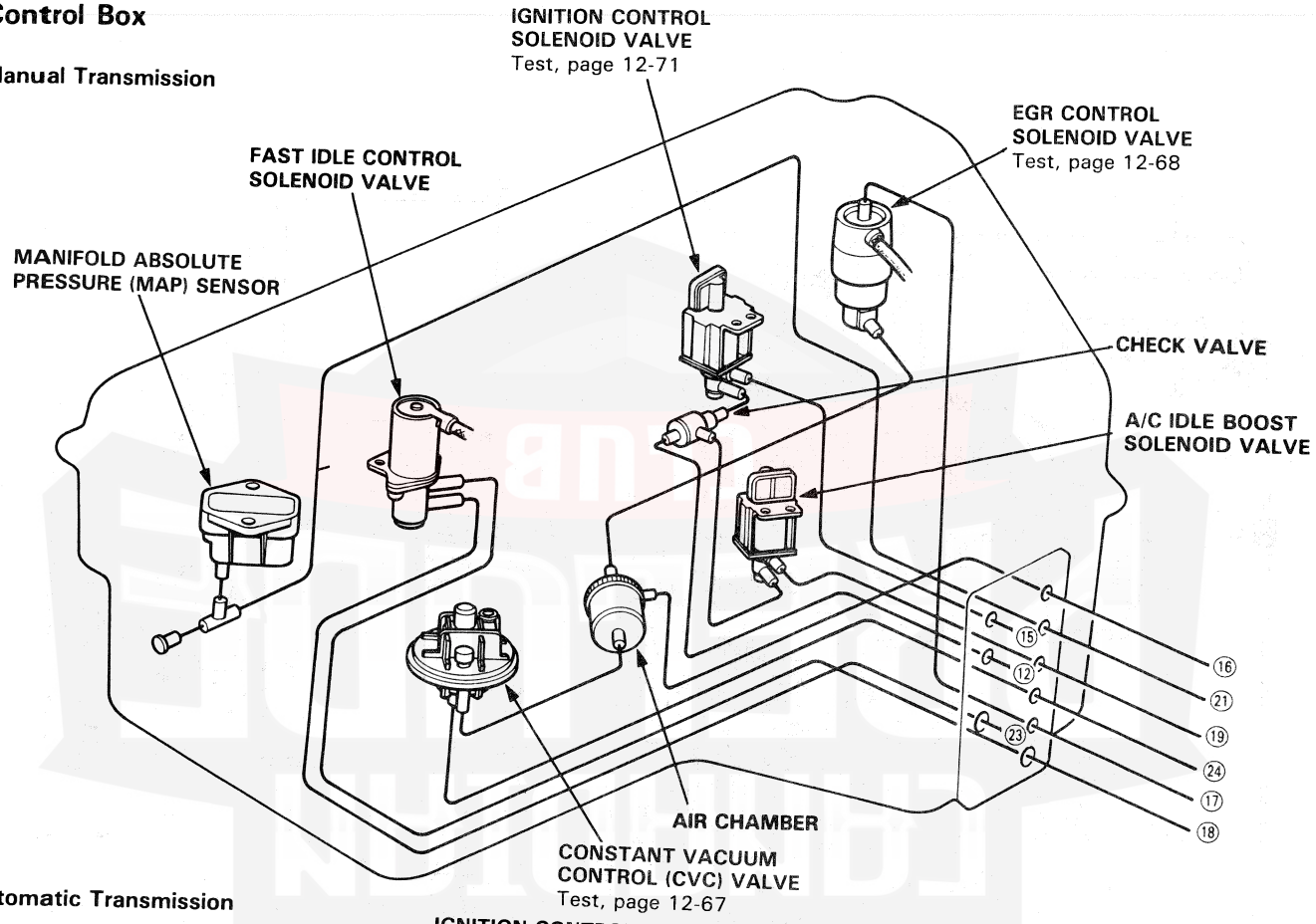
Fuel-Injected Engine

Insterconnect Diagram

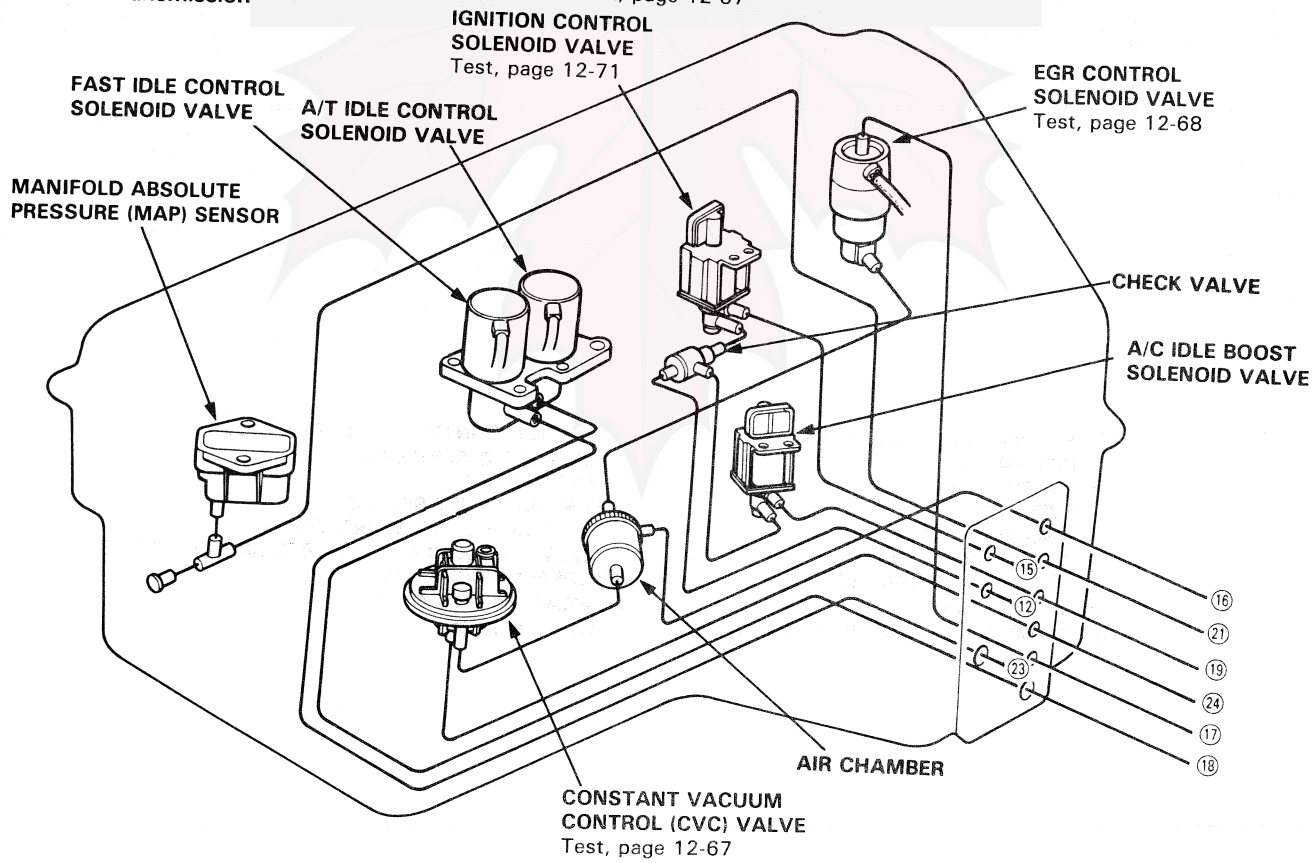


Control Box

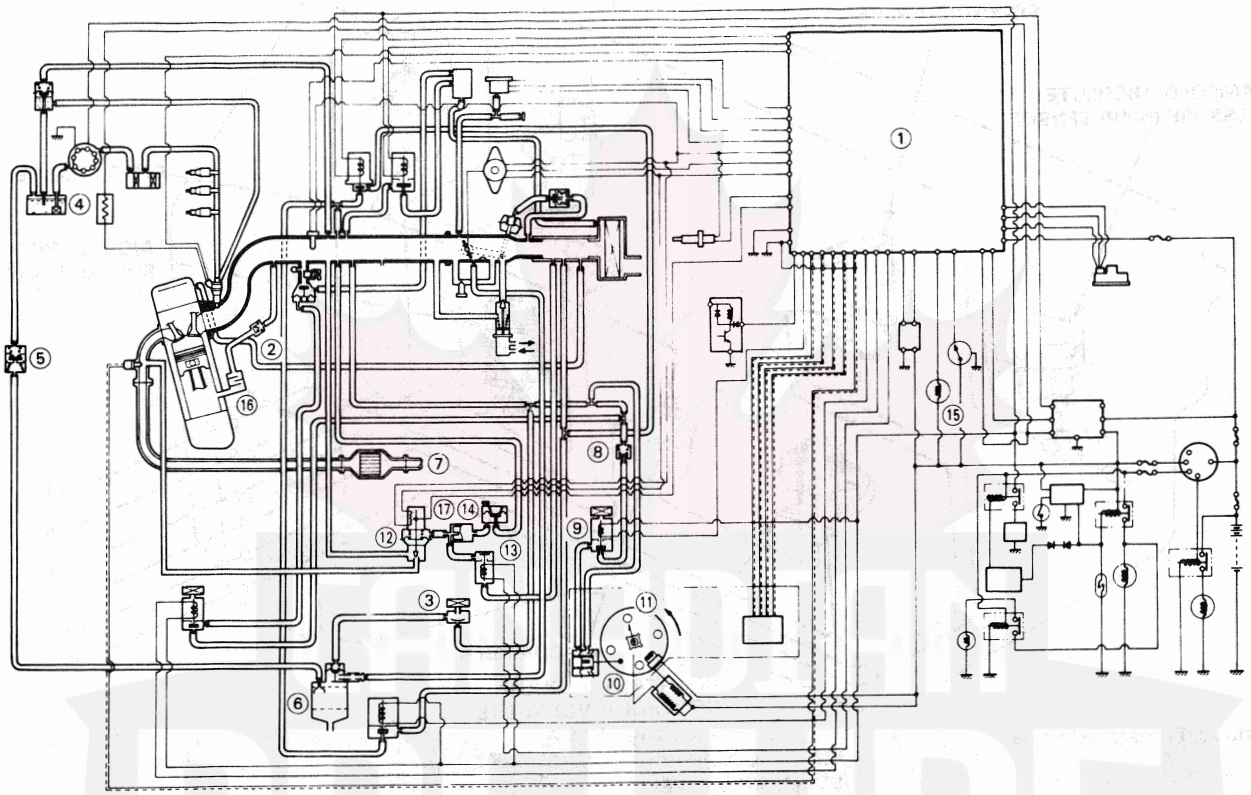
Manual Transmission



Automatic Transmission



Vacuum and Electical Connections

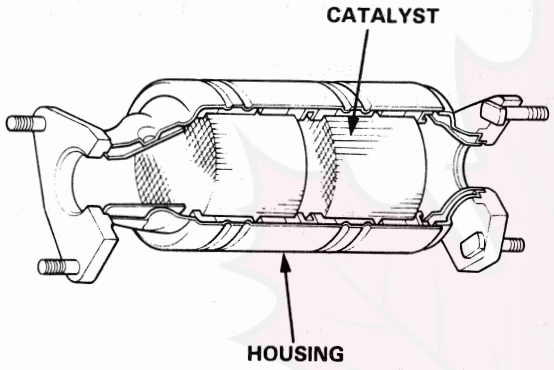


① ECU (Electronic Control Unit)
② PCV VALVE
③ THERMOVALVE
④ FUEL TANK
⑤ TWO-WAY VALVE
⑥ CHARCOAL CANISTER
⑦ CATALYTIC CONVERTER
⑧ CHECK VALVE
⑨ IGNITION CONTROL SOLENOID VALVE
⑨ IGNITION CONTROL SOLENOID VALVE
⑩ ADVANCE DIAPHRAGM
⑪ DISTRIBUTOR
⑫ EGR VALVE LIFT SENSOR
⑬ EGR CONTROL SOLENOID VALVE
⑭ CONSTANT VACUUM CONTROL (CVC) VALVE
⑮ PGM-FI WARNING LIGHT
⑯ BREATHER CHAMBER
⑰ AIR CHAMBER

Description

Catalytic Converter

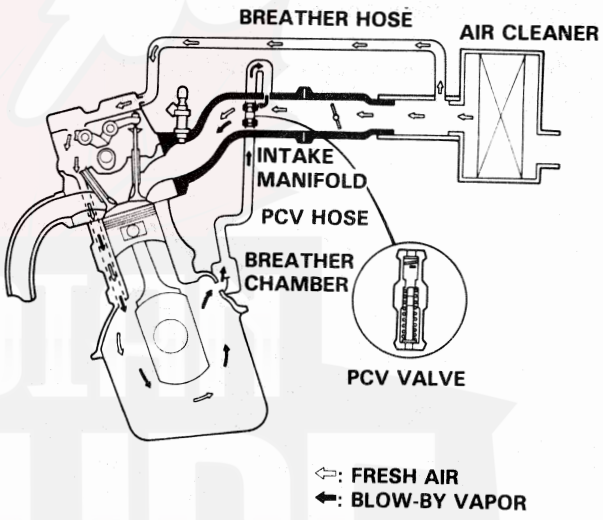
The 3-way catalytic converter is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) in the exhaust gas, to carbon dioxide (CO_2), dinitrogen (N_2) and water vapor.



Positive Crankcase Ventilation System

The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by vapor from escaping to the atmosphere. The PCV valve contains a spring loaded plunger.

When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by vapor is drawn directly into the intake manifold.



Description

Evaporative Emission Controls

The evaporative controls are designed to minimize the amount of the fuel vapor escaping to the atmosphere. The system consists of the following components:

A. Charcoal Canister

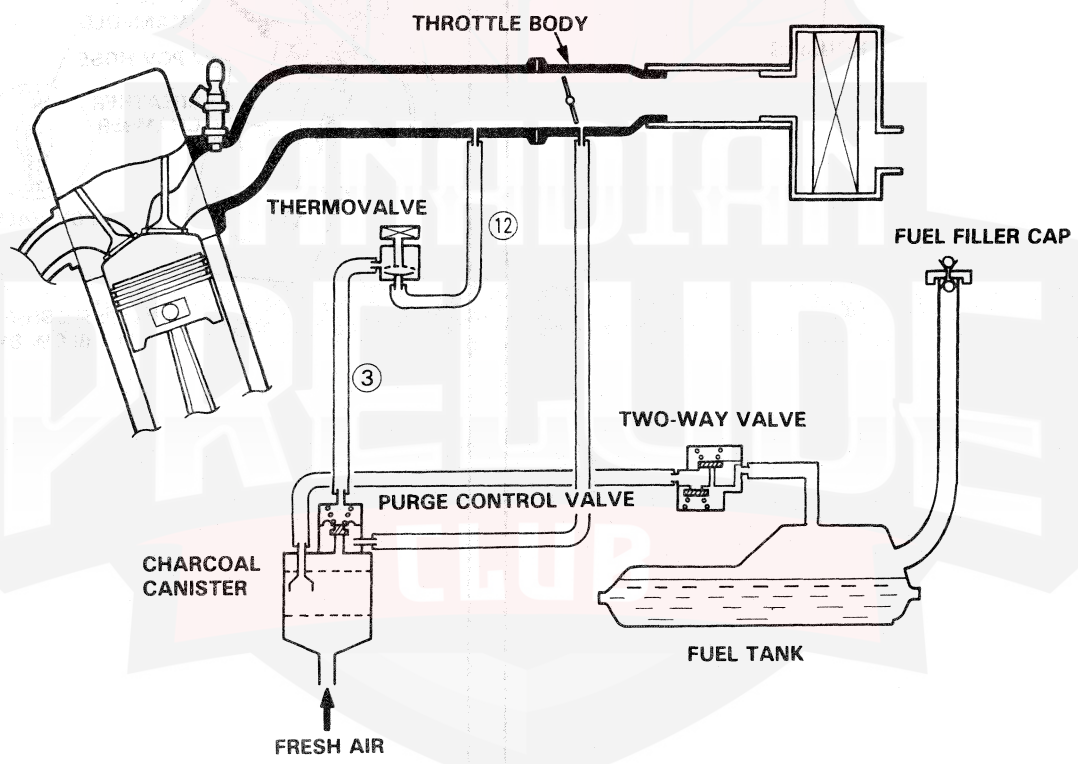
A canister for the temporary storage of fuel vapor until the fuel vapor can be purged from the canister into the engine and burned.

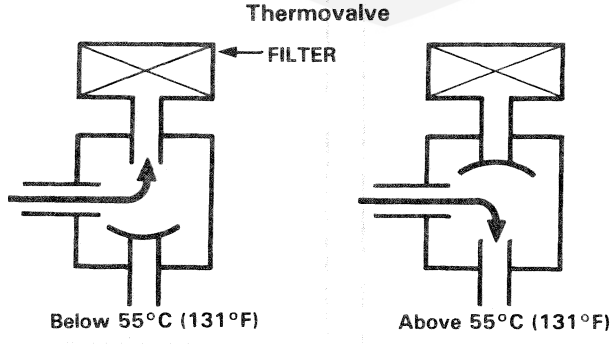
B. Vapor Purge Control System

Canister purging is accomplished by drawing flesh air through the canister and into a port on the throttle body. The ported vacuum is controlled by the Purge Control Valve.
When thermovalve is above 55°C (131°F) it directs manifold vacuum to the purge control valve.
When thermovalve is below 55°C (131°F) it does not provide mainfold vacuum to the purge control.

C. Fuel Tank Vapor Control System

When fuel vapor pressure in the fuel tank is higher than the set valve of the two-way valve, the valve opens and regulates the flow of fuel vapor to the canister.

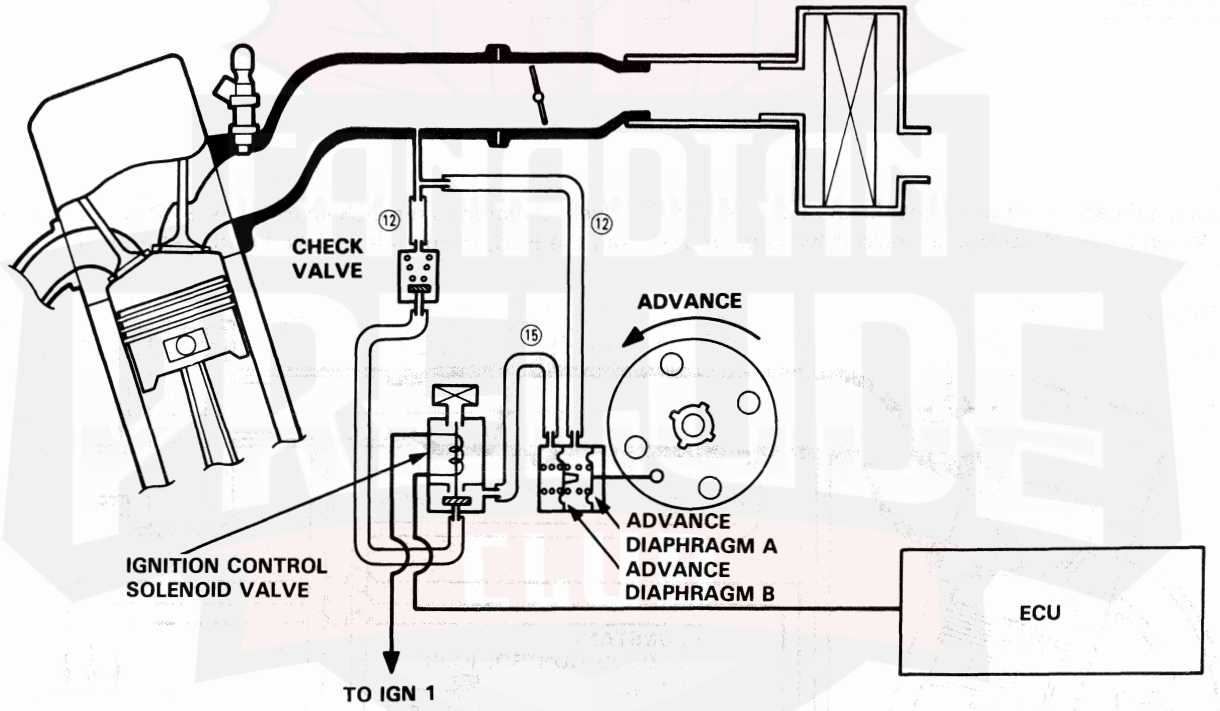




Ignition Timing Controls

Ignition timing control, combined with the internal distributor control (centrifugal advance), affects the time at which each spark plug ignites the air-fuel mixture, in accordance with engine speed, load and coolant temperature.
This control system gives vacuum advance in response to the manifold vacuum and coolant temperature. This optimizes ignition timing during and after engine warm-up to control emission levels while maximizing fuel economy and engine performance.

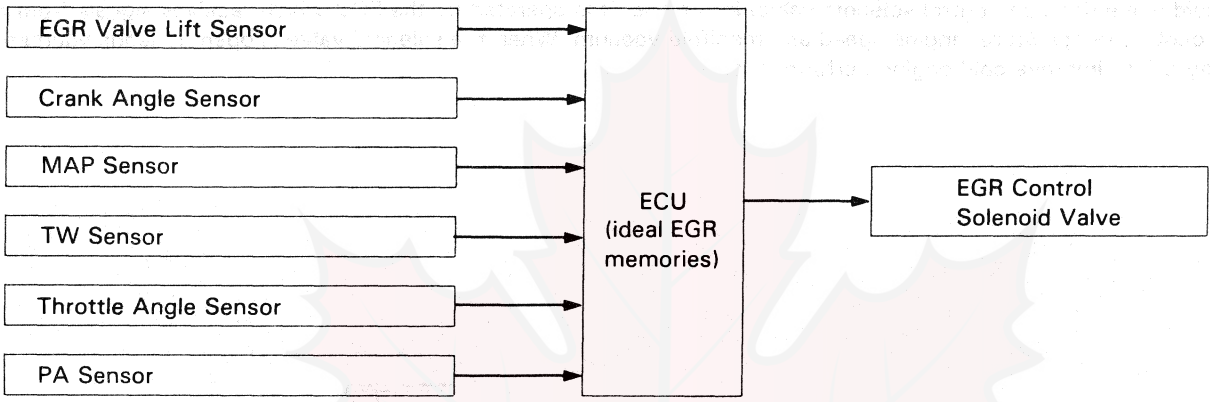
The distributor has two separate vacuum advance diaphragms which operate on manifold vacuum. Diaphragm B also has a solenoid valve (ignition control solenoid valve) in the line. It is operated by the ECU which receives signals from the engine coolant temperature, engine speed and manifold vacuum. When the solenoid valve is open, it sends vacuum to Diaphragm B to improve cold engine performance.



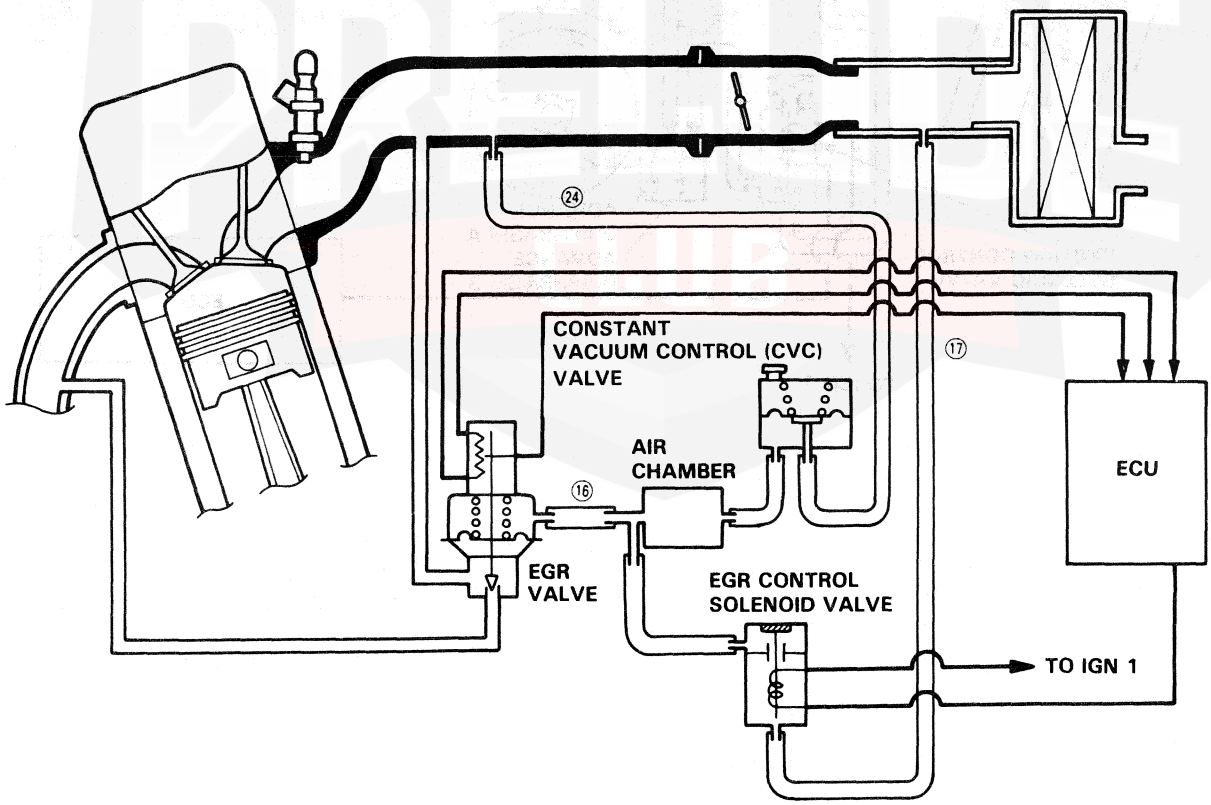
Description

EGR Control System

The EGR System is designed to reduce oxides of nitrogen emissions (NOx), by recirculating exhaust gas through the EGR valve and the intake manifold into the combustion chambers. It is composed of the EGR valve, CVC valve, EGR control solenoid valve, ECU (Electronic Control Unit) and various sensors.
The ECU contains memories for ideal EGR valve lifts for varying operating conditions. The EGR valve lift sensor detects the amount of EGR valve lift and sends the information to the ECU. The ECU then compares it with the ideal EGR valve lift which is determined by data sent from the other sensors. If there is any difference between the two, the ECU triggers the EGR control solenoid valve to reduce vacuum applied to the EGR valve.



Vacuum regulated by the Constant Vacuum Control (CVC) valve is directed to the EGR valve by the EGR control solenoid valve. When the EGR control solenoid valve is energized from the ECU, vacuum is supplied to the EGR valve.



Tailpipe Emission

Inspection

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

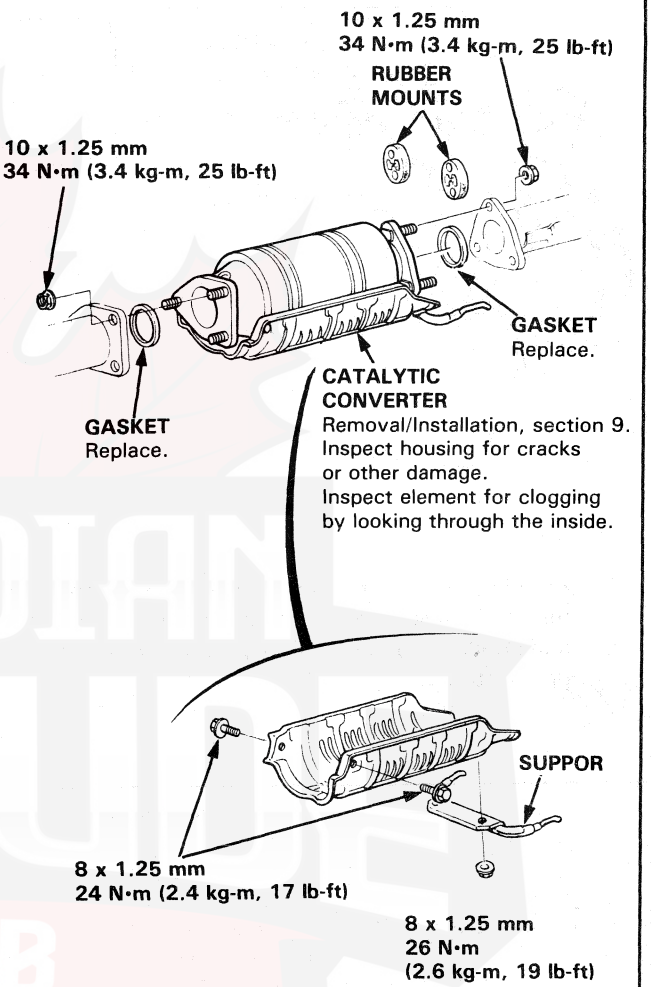
1. Start engine and warm up to normal operating temperature cooling fan comes on).
2. Connect a tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 11-85).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

   CO meter should indicate 0.1% maximum.

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.

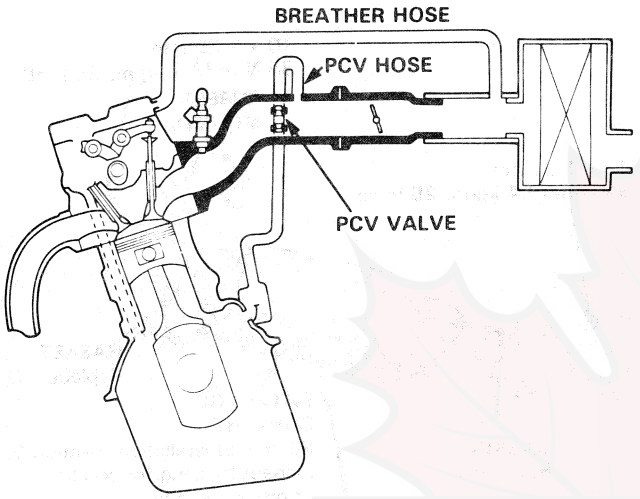


Positive Crankcase Ventilation System

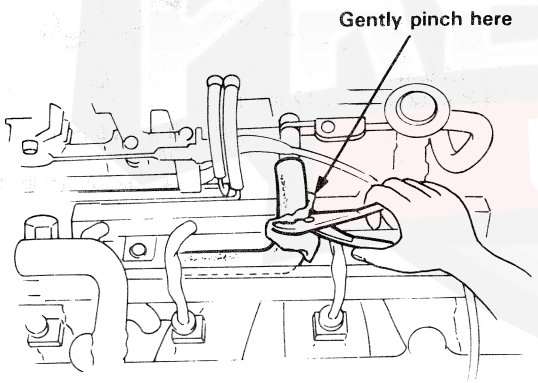
Test

PCV Valve

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



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



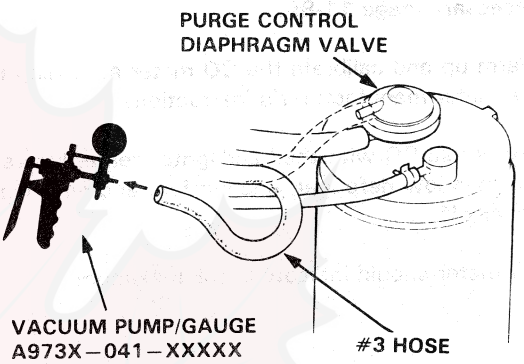
- If there is no clicking sound, check the PCV valve grommet for cracks or damage.
- If the grommet is OK, replace the PCV valve and recheck.

Evaporative Emission Controls

Test

COLD ENGINE

1. Disconnect #3 vacuum hose at the purge control diaphragm valve (on the charcoal canister) and connect vacuum gauge to the hose.



2. Start the engine and allow to idle.

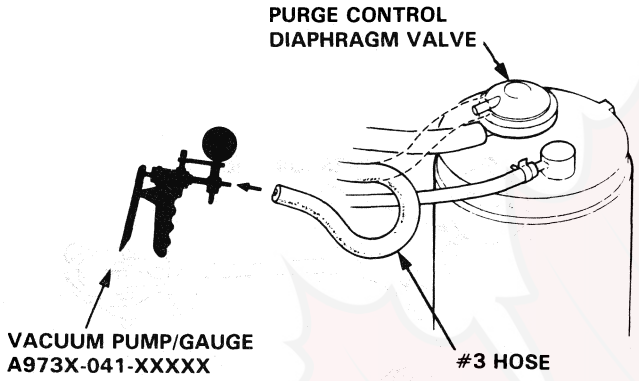
   NOTE: Engine coolant temperature must be below 55°C (131°F)

   Vacuum should not be available.

   - If there is no vacuum, disconnect the vacuum gauge and reconnect the hose.
   - If there is vacuum, replace the thermovalve.

HOT ENGINE

1. Disconnect #3 vacuum hose at the purge control diaphragm valve (on the charcoal canister) and connect vacuum gauge to the hose.



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

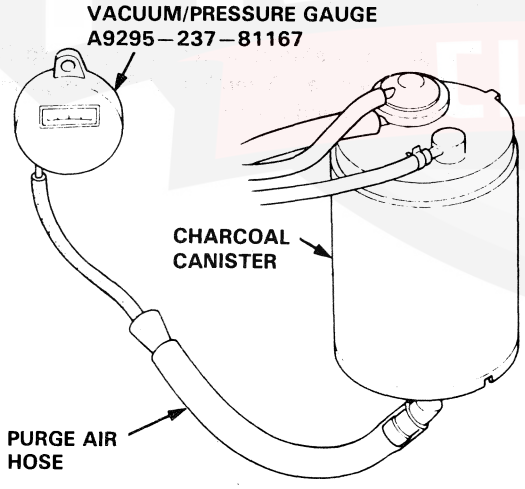
   There should be vacuum at idle, once the engine is warm.

   - If vacuum is not available, check the hose for clogging, kinking or leakage.
     If the hose is OK, replace the thermovalve.

3. Disconnect vacuum gauge and reconnect the hose.

4. Remove fuel filler cap.

5. Remove canister purge air hose from frame and connect hose to vacuum gauge as shown.



6. Raise engine speed to 3,500 rpm.
   Vacuum should appear on gauge within 1 minute.

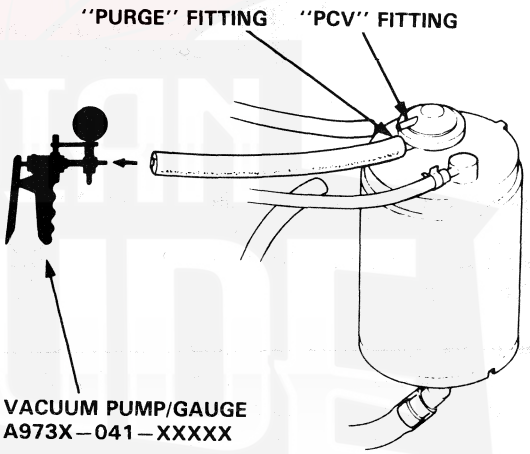
   - If vacuum appears on gauge in 1 minute, remove gauge, test is complete.
   - If no vacuum, disconnect vacuum gauge and reinstall fuel filler cap.

7. Remove charcoal canister and check for signs of damage or defects.

   - If defective, replace canister.

8. Stop engine. Disconnect #3 vacuum hose from canister ''PCV'' fitting.
   Connect vacuum pump to canister ''purge'' fitting as shown, and apply vacuum.

   Vacuum should remain steady.



   - If vacuum drops, replace canister and retest.

9. Restart engine. Reconnect hose to canister ''PCV'' fitting.

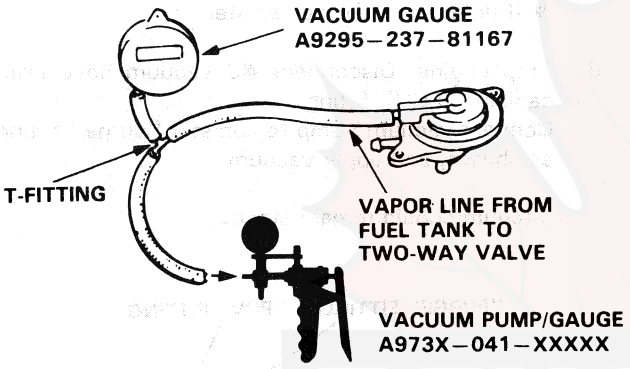
   ''PURGE'' side vacuum should drop to zero.

   - If ''PURGE'' side vacuum does not drop to zero, replace the canister and retest.

Test (cont'd)

Two-Way Valve

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.

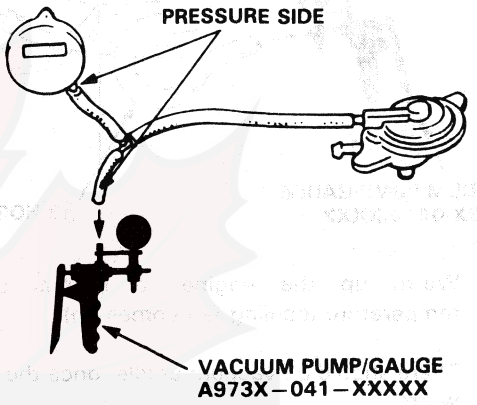


3. Slowly apply a vacuum while watching the gauge.

   Vacuum should stabilize at 5 to 15 mmHg (0.2 to 0.6 in. Hg).

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

4. Move 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 25 to 55 mmHg (1.0 to 2.2 in. Hg).

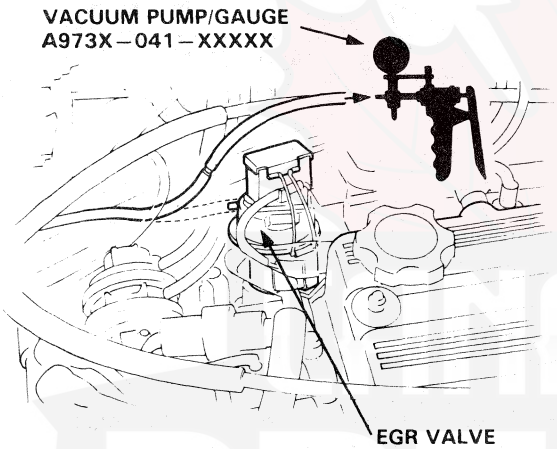
   - If pressure momentarily stabilizes (valve opens) at 25 to 55 mmHg (1.0 to 2.2 in. Hg), the valve is OK.
   - If pressure stabilizes below 25 mmHg (1.0 in. Hg) or above 55 mmHg (2.2 in. Hg), install a new valve and re-test.

Test

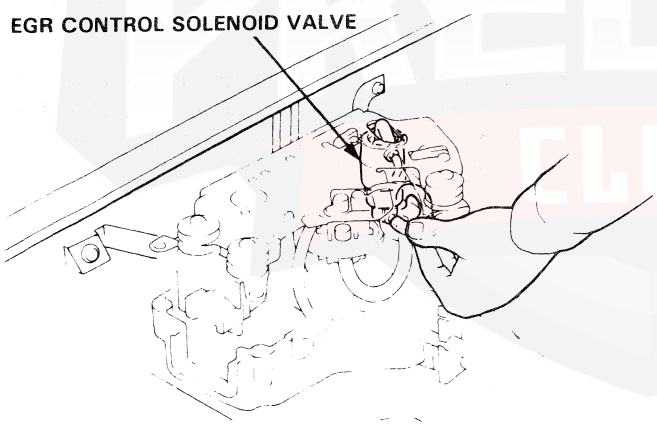
If the self diagnosis indicator blinks twelve times, check the #16 and #24 vacuum hoses for loose connection, disconnection of connector, and open or short circuit, before going into the steps described below.

Also perform the following inspection when the engine misses or runs rough at low speed, or when it tends to stall at idle, even if self-diagnosis system does not indicate a problem.

1. Start the engine and warm it up until the cooling fan comes on.
2. Open the control box lid and disconnect #16 vacuum hose from the top of EGR valve, and connect a vacuum pump to the hose.

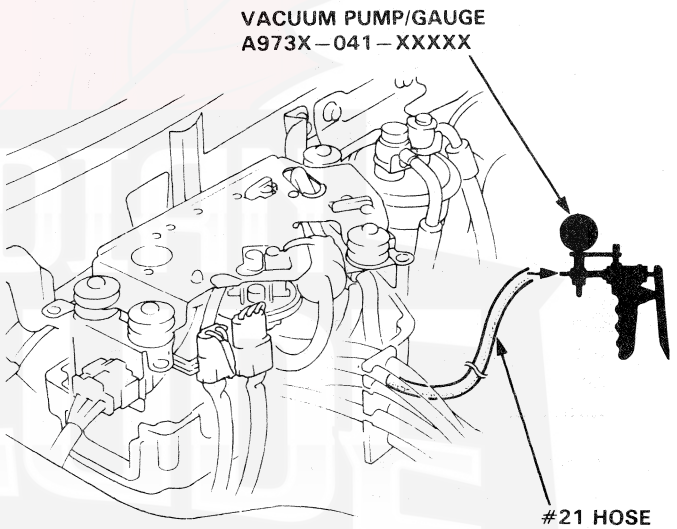


3. Pinch the lower hose of the EGR control solenoid valve in the control box, and measure vacuum at idle.



- If vacuum stabilizes at 150–250 mmHg (6–10 in.Hg) within one second, the CVC valve and EGR hose routing is OK.
- If vacuum is not 150–250 mmHg (6–10 in.Hg) within one second, check the hose between the intake manifold and the CVC valve for clogging, or leakage.
  If the hose is OK, replace the CVC valve.

4. Unclamp the lower hose pinched in step 3; again measure the amount of vacuum on the vacuum gauge.
   - If vacuum is below 30 mmHg (1.2 in.Hg), the EGR control solenoid valve and hoses are OK.
   - If the amount of vacuum exceeds 30 mmHg (1.2 in.Hg), check the air flow hose to the EGR control solenoid valve, and the #17 vacuum hose for blockage.
     If the hoses are not collapsed or blocked, replace the EGR control solenoid valve and recheck.
5. Stop the engine. Reconnect the #16 vacuum hose, then disconnect the #21 vacuum hose from the throttle body. Plug the vacuum tap at the throttle body, connect a vacuum pump to the #21 vacuum hose, and apply a vacuum of 300 mmHg (12 in. Hg).



6. Raise engine speed to 2,000–2,500 rpm. Feel operation of the EGR control solenoid valve with your fingers.
   - If the EGR control solenoid valve is operating, the system is OK.
   - If the EGR control solenoid valve is not operating, check the EGR control solenoid valve (page 12-68). If the solenoid valve is OK, check Black/Yellow wire between the solenoid valve and Regulator fuse (10A), and Yellow wire between the solenoid valve and ECU. If wires are OK, see ECU trableshooting (section 11)

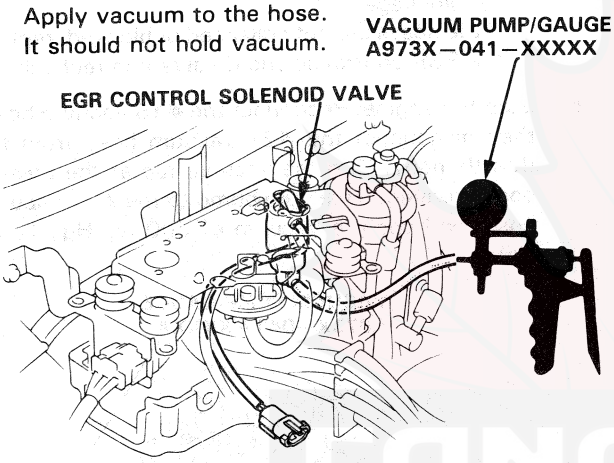
     If the EGR control solenoid valve is normal, check the EGR valve and lift sensor (page 12-67).

(cont'd)

Test (cont'd)

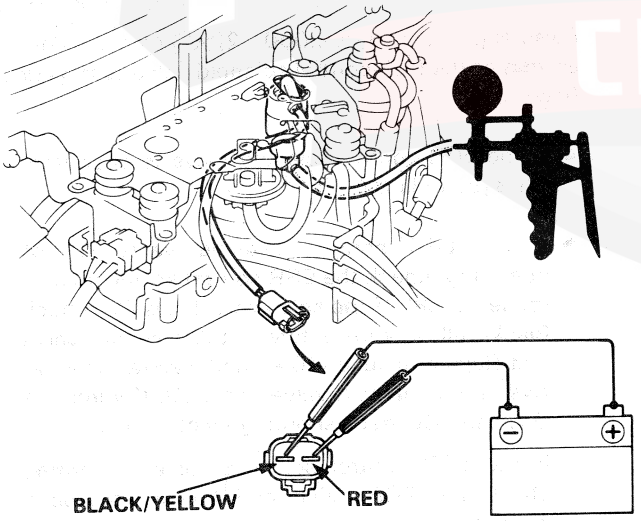
EGR Control Solenoid Valve

1. Open the control box lid and disconnect the wire harness from the control box.
2. Disconnect the lower vacuum hose of the EGR control solenoid valve (between the EGR control solenoid valve and the air chamber), from the air chamber.
3. Apply vacuum to the hose. It should not hold vacuum.



- If it holds vacuum, replace the EGR control solenoid valve and re-test.

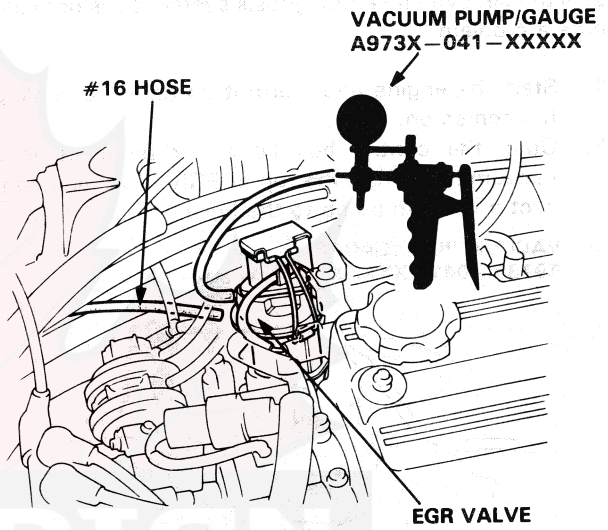
4. Connect the positive terminal of a 12 V battery to the Black/Yellow terminal of the control box connector and the negative terminal to the Red terminal.
5. Apply vacuum to the hose. It should hold vacuum.



- If it does not hold vacuum, replace the EGR control solenoid valve and re-test.

EGR Valve

1. Start the engine and let it idle.
2. Disconnect #16 vacuum hose from the EGR valve and connect a vacuum pump to the EGR valve.



3. Apply vacuum of 150 mmHg (6 in.Hg).
   - If vaccum remains steady and the engine dies, the EGR valve is working properly.
   - If vacuum does not remain steady and the engine does not die, replace the EGR valve and re-test.
   - If vacuum remains steady but engine does not die, remove the EGR valve; check the EGR valve and manifold for blockage, clean or replace as necessary and re-test.

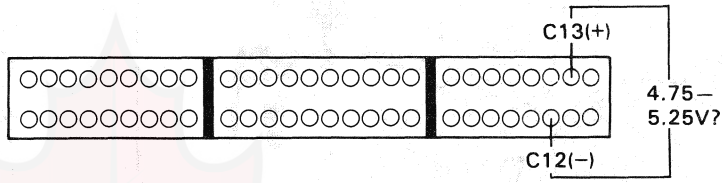
(cont'd)

EGR Valve Lift Sensor

Connect System Checker harness between ECU and connector.

Turn ignition switch ON.

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

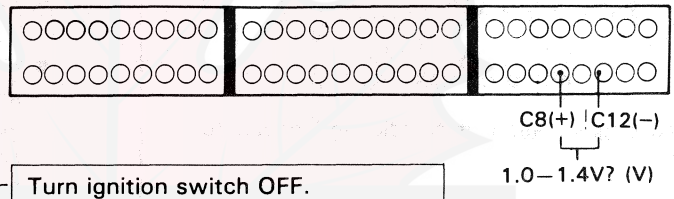


Is 4.75−5.25 V attained?

NO — Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

YES

Measure voltage between C8 terminal (Red/Blue (+)) of system checker harness and C12 terminal (Green/White (−)).



Does 1.0−1.4V appear?

NO — Turn ignition switch OFF.

YES

Substitute a known-good ECU and re-test EGR components as on page 12-67. If EGR still does not operate properly, replace the original ECU.

Check for open or short circuit in Yellow/White, Yellow and Green/White wire between EGR valve lift sensor and ECU.

NOTE: If there is no voltage, or if the voltage is low, check for a shorted wire. If voltage is high, there may be an open in the wire or a bad contact.

Is there any abnormality?

NO — Faulty wires.

YES

Turn ignition switch ON.

Remove the # 16 vacuum hose from the EGR valve, then connect a vacuum pump to upper hose of EGR valve.

While applying vacuum, measure voltages between C8 terminal (Red/Blue (+)) of system checker harness and C12 terminal (Green/White (−)).

Does the voltage rise gradually?

NO — Faulty EGR valve lift sensor.

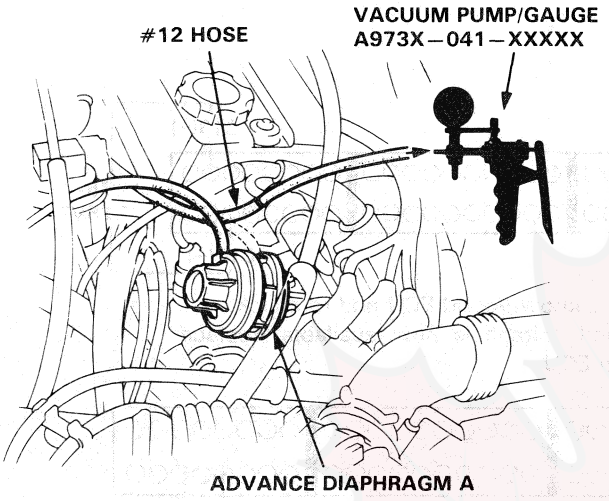
YES

Substitute a known-good ECU and re-test EGR components as on page 12-67. If EGR now operates properly, replace the original ECU.

Ignition Timing Controls

Test

1. Disconnect #12 vacuum hose from the advance diaphragm A on the distributor and connect a vacuum pump/gauge to the hose.



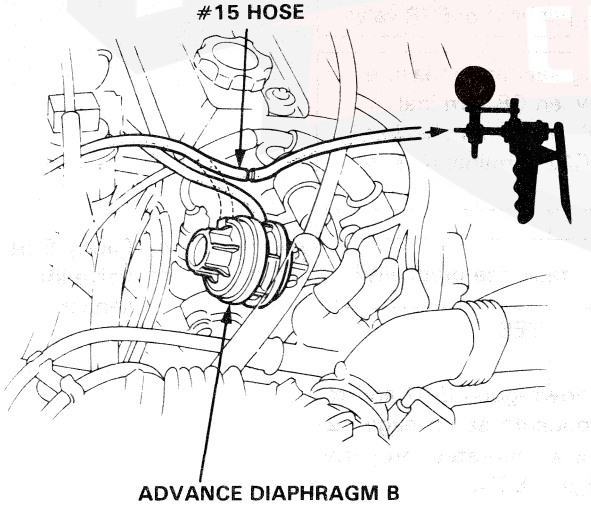
2. Start the engine, allow it to idle and check for vacuum.

   There should be vacuum.

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

3. Disconnect #15 vacuum hose from the advance diaphragm B on the distributor and connect a vacuum pump/gauge to the hose.

   NOTE: Engine coolant temperature must be below set temperature (60°C, 140°F).



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

   There should be vacuum.

   - If there is no vacuum, check the vacuum line for leaks, blockage or a disconnected hose. If no problem, check the ignition control solenoid valve (page 12-71). If the solenoid valve is OK, check Black/Yellow wire between the solenoid valve and Regulator fuse (10A), and Blue/Red wire between the solenoid valve and the ECU. If wires are OK, see ECU troubleshooting (section 11).

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

   There should be no vacuum.

   - If there is vacuum, check the ignition control solenoid valve (page 12-71). If the solenoid valve is OK, check Blue/Red wire between the solenoid valve and the ECU. If the wire is OK, see ECU troubleshooting (section 11).

6. Raise engine speed to above 1,500 rpm and check for vacuum.

   There should be vacuum.

   - If there is no vacuum, check the ignition control solenoid valve (page 12-71). If the solenoid valve is OK, check Black/Yellow wire between the solenoid valve and Regulator fuse (10A), and Blue/Red wire between the solenoid valve and ECU. If wires are OK, see ECU troubleshooting (section 11).

7. If there is no abnormality at each test, inspect the advance diaphragm (section 25).

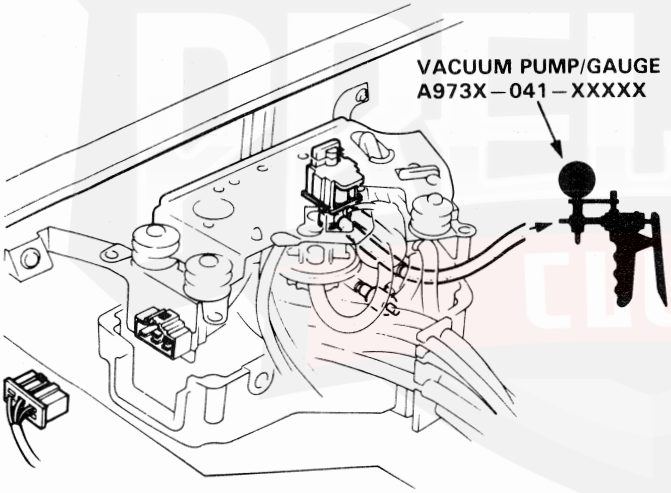
Ignition Control Solenoid Valve Test

The ignition control solenoid valve is activated by commands from the ECU. When the solenoid valve opens, this causes vacuum in the #15 vacuum hose and sends vacuum to advance diaphroagm B to improve cold engine performance under the following conditions:

- Whenver the coolant temperature is below 60°C (140°F).
- When the coolant temperature is 60—100°C (140—212°F), it is operated by the control unit which receives signals from the engine speed and manifold vacuum.

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

1. Open the control box lid and disconnect the 6-P connector from the control box.
2. Disconnect the lower vacuum hose of the ignition control solenoid valve (between the solenoid valve and the check valve) from the check valve.
3. Disconnect #15 vacuum hose from the vacuum hose manifold.
4. Connect a vacuum pump to the hose.

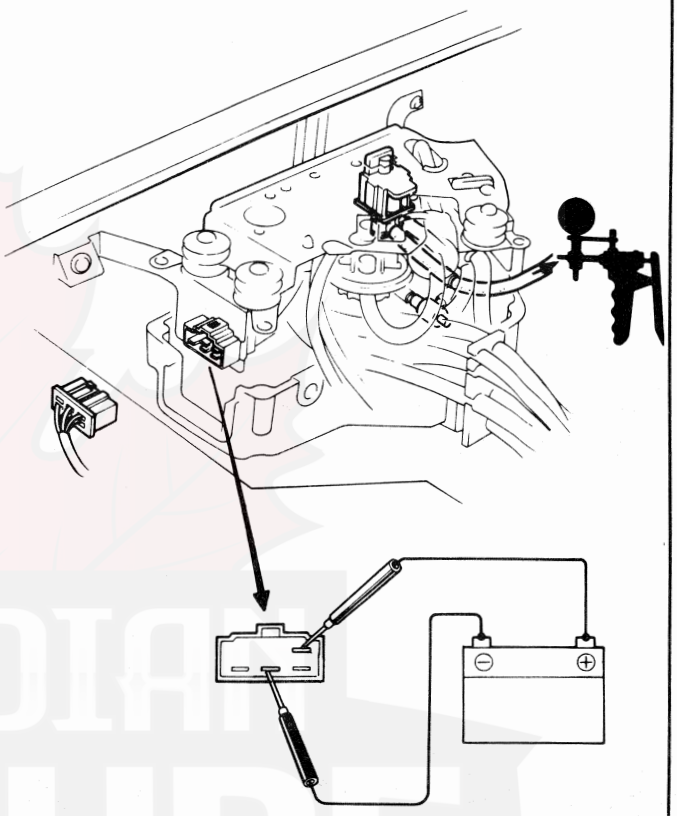


5. Apply vacuum to the hose.

   It should hold vacuum.

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

6. Connect the battery positive terminal to the Black/Yellow terminal of the control box connector, and the battery negative terminal to the Yellow/Green terminal.

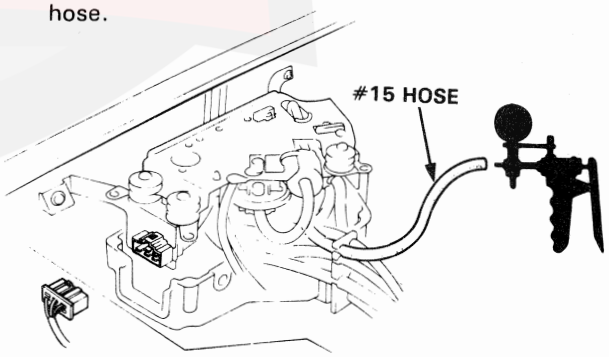


7. Apply vacuum to the hose.

   It should not hold vacuum.

   - If it holds vacuum, replace the solenoid valve and retest.

8. Disconnect the vacuum pump from the hose, and connect the vacuum pump to the #15 vacuum hose.



9. Apply vacuum to the hose.

   It should not hold vacuum.

   - If it holds vacuum, replace the solenoid valve.

Transaxle

Clutch

Manual Transmission

Automatic Transmission (Fuel-Injected Engine)

(Carbureted Engine)

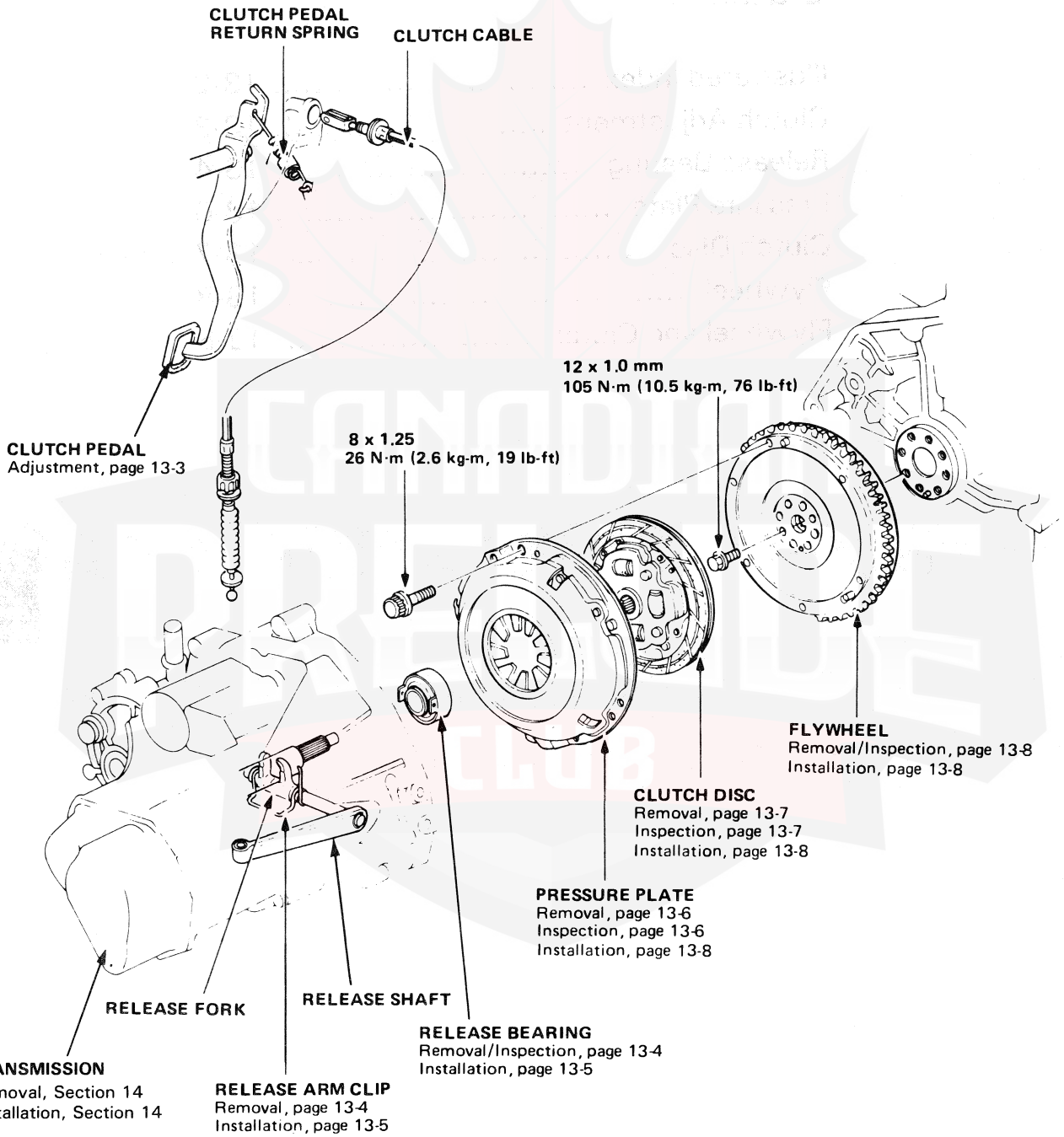
Differential

Driveshafts

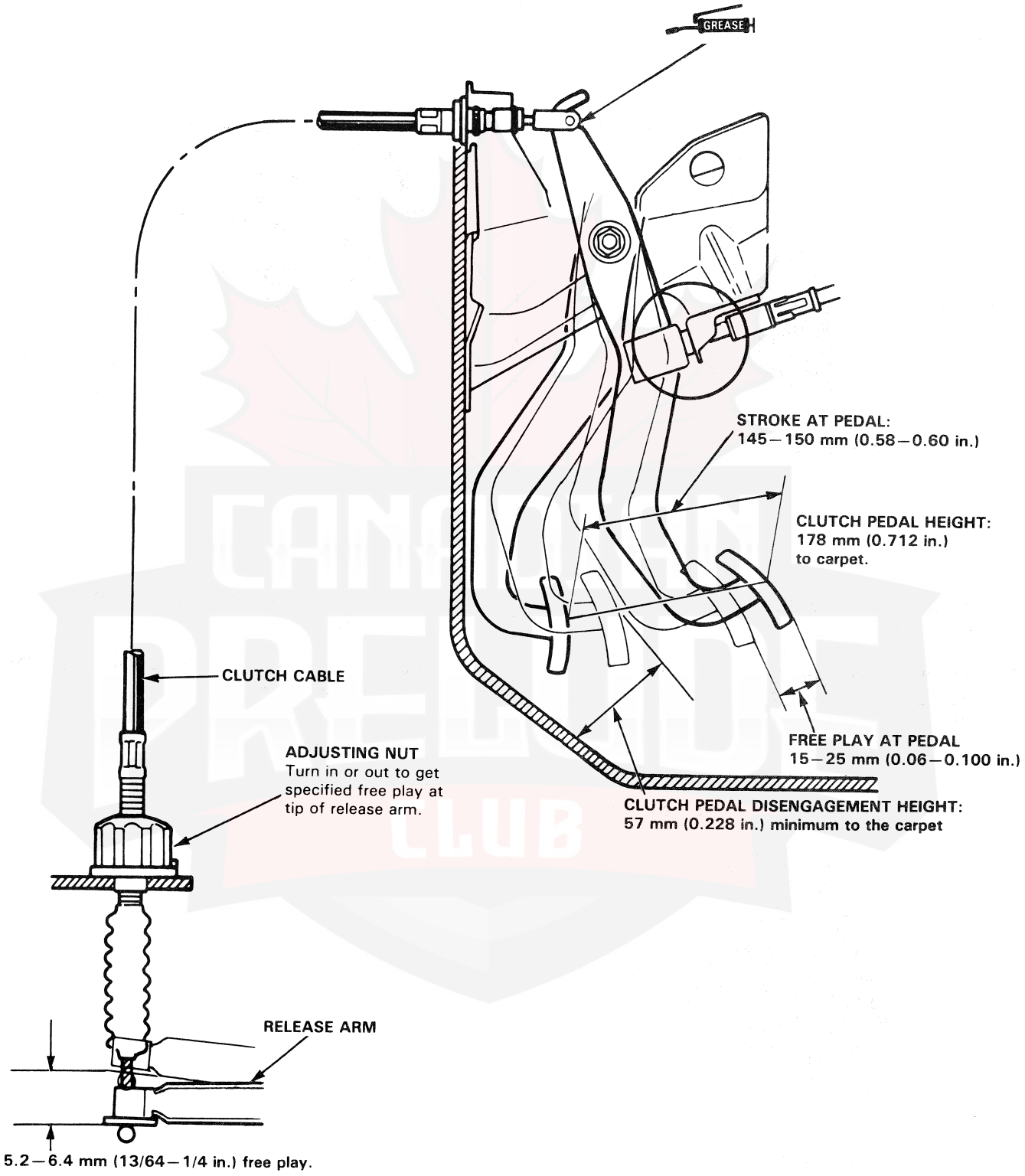
Clutch

Illustrated Index

NOTE: Whenever the transmission is removed, the release bearing sliding surface should be cleaned and greased.



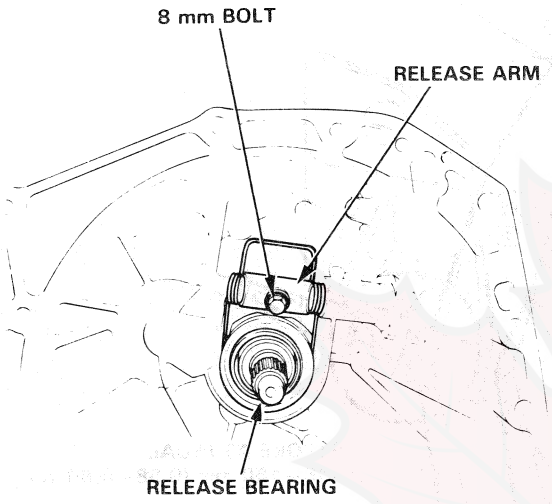
Adjustment



Release Bearing

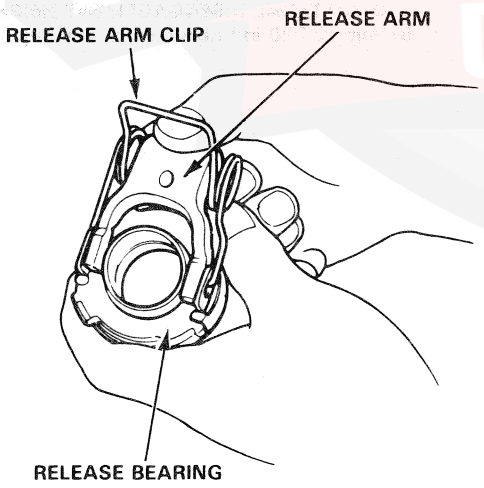
Removal

1. Remove the 8 mm special bolt.

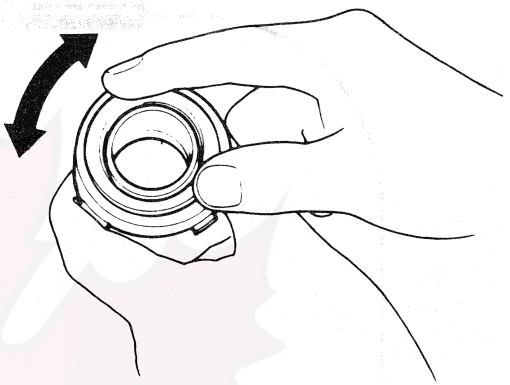


2. Remove the release shaft and release bearing assembly.

3. Separate the release arm from the bearing by removing the clip from the holes in the release bearing.



4. Check the release bearing for excessive play by spinning it by hand.

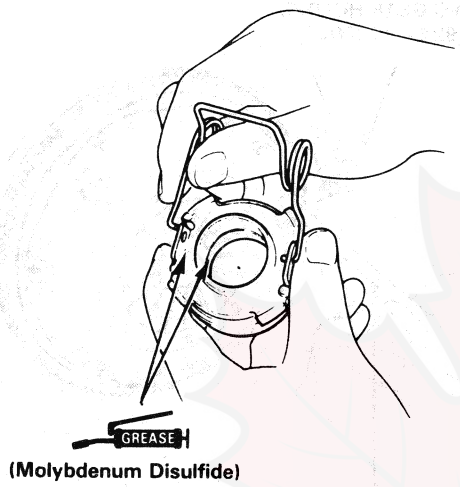


5. Replace the bearing with a new one if there is excessive play.

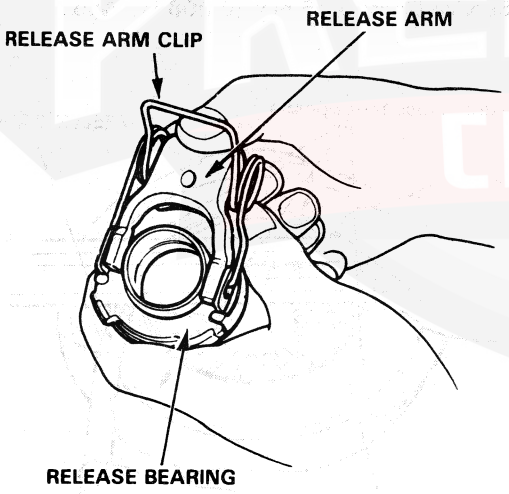
CAUTION: The bearing is packed with grease. Do not wash it in solvent.

Installation

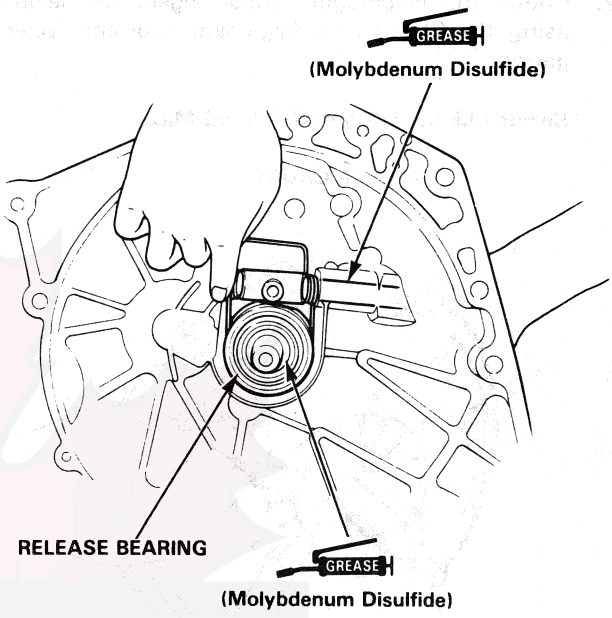
1. Align the release arm with the locating holes of the release bearing.



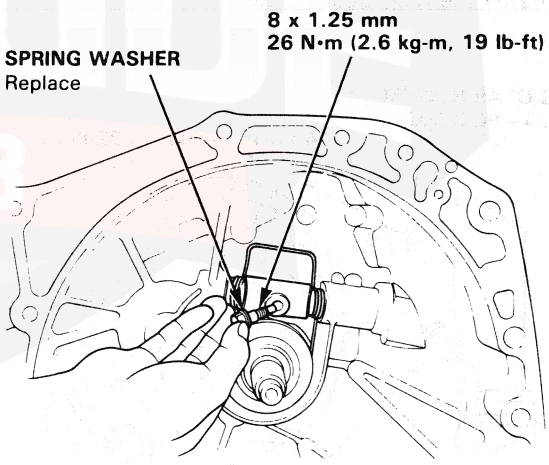
2. Install the release arm clip in the locating holes as shown.



3. Install the release shaft and the release bearing.



4. Align the release shaft and release arm, then install a new spring washer and bolt.



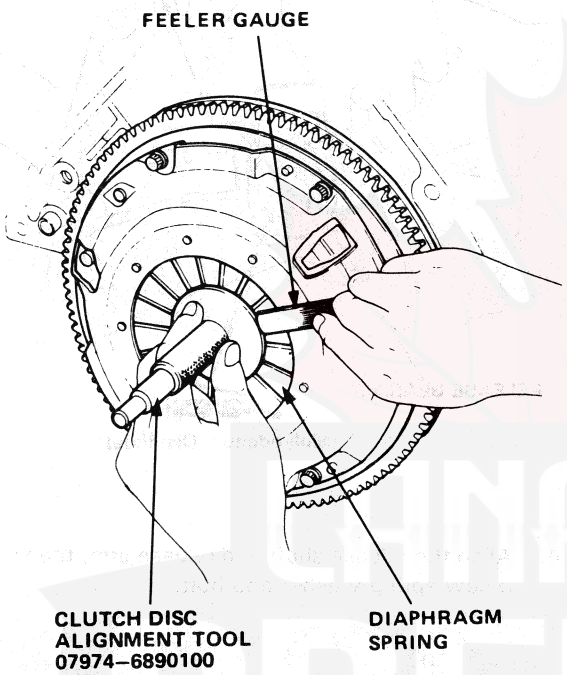
5. Move the release arm up and down to make sure the fork fits properly against the bearing, and that the bearing slides freely.

Pressure Plate

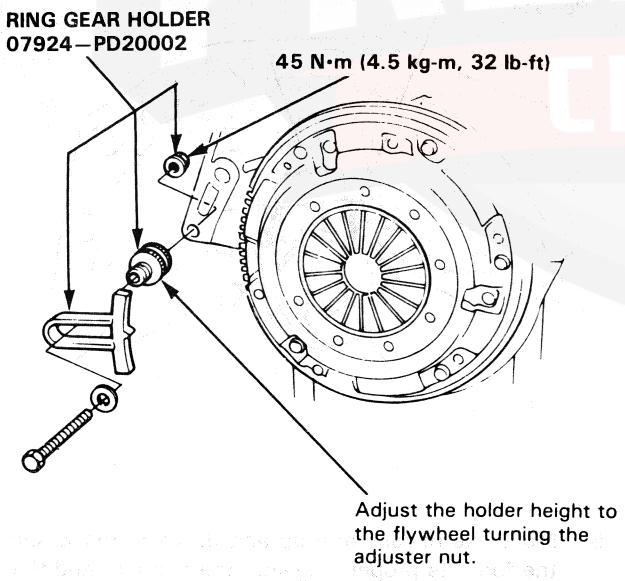
Removal/Inspection

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.

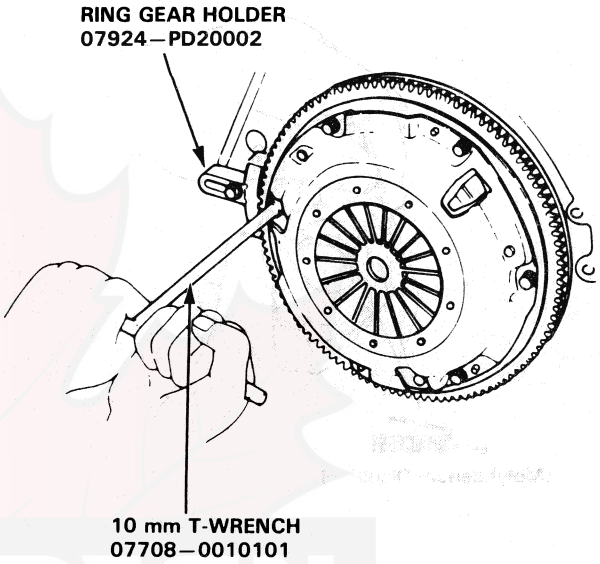
   Service Limit: 1.0 mm (0.04 in.) Max.



3. Install the Ring Gear Holder.

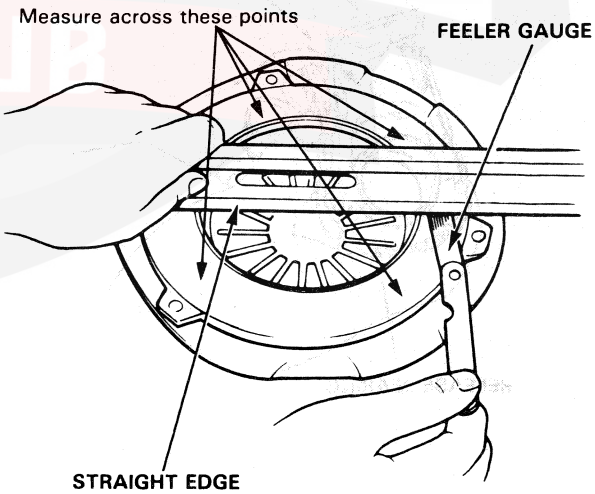


4. To prevent warping, unscrew the pressure plate mounting bolts two turns at a time in a crisscross pattern using a 10 mm T-wrench, then remove the pressure plate and clutch disc.



5. Inspect the pressure plate surface for wear, cracks, or burning.
6. Inspect for warpage using a straight edge and feeler gauge.

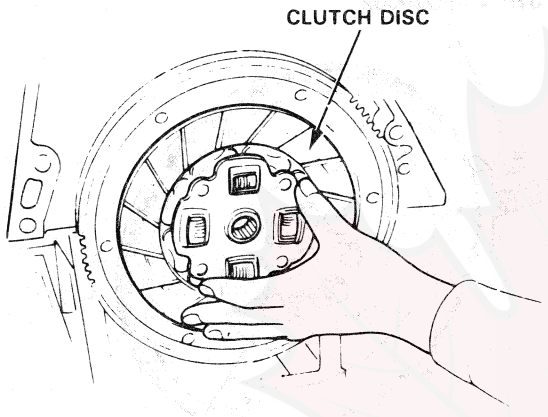
   Service Limit: 0.15 mm (0.006 in.) Max.



Clutch Disc

Inspection

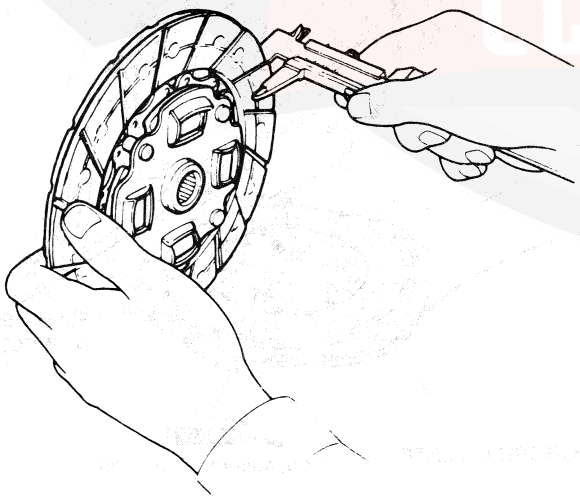
1. Inspect lining of the clutch disc for signs of slipping or oil. Replace it if it is burned black or oil soaked.



2. Measure the clutch disc thickness.

Clutch Disc Thickness:

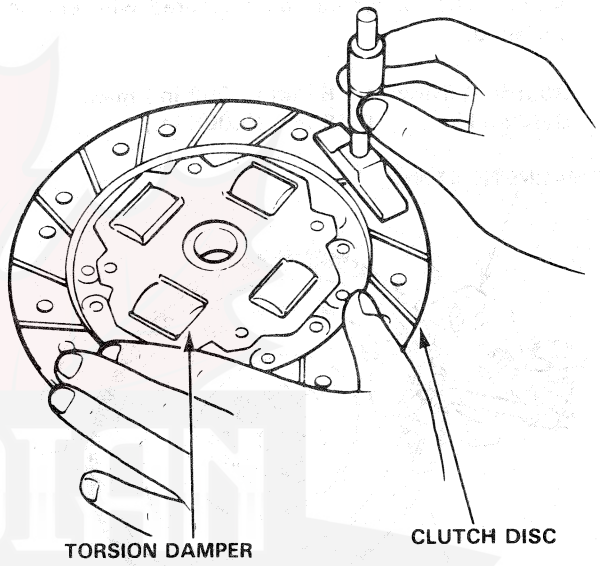
	Fuel-Injected Engine	Carbureted Engine
Standard (New)	8.3—9.0 mm (0.33—0.35 in)	8.1—8.8 mm (0.32—0.346 in)
Service Limit	5.9 mm (0.23 in)	5.7 mm (0.22 in)



3. Check for loose rubber torsion dampers. 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.)



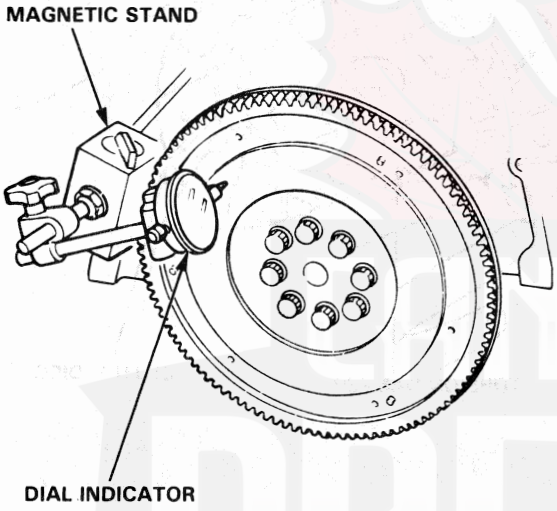
Flywheel

Inspection/Removal

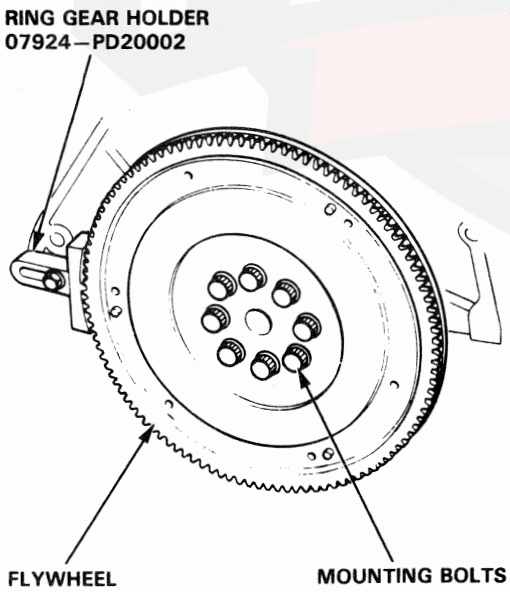
1. Inspect the ring gear teeth for wear or damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks or burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push it against the flywheel each time you turn it to take up the crankshaft 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.)



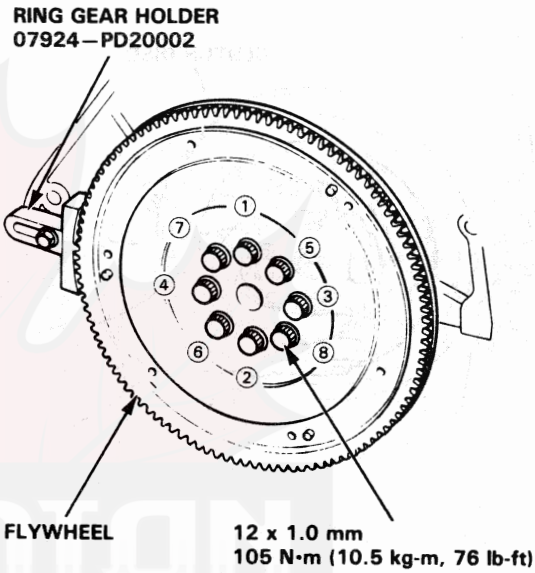
4. Remove the eight flywheel mounting bolts and flywheel.



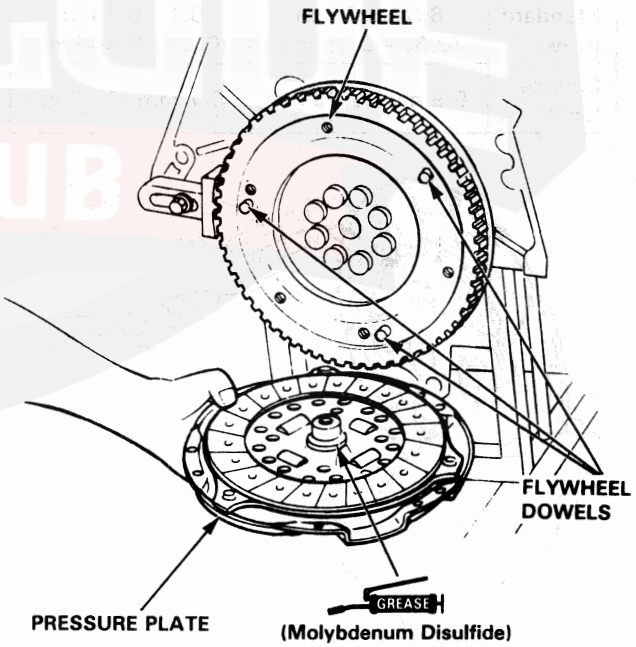
Flywheel and Clutch

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.

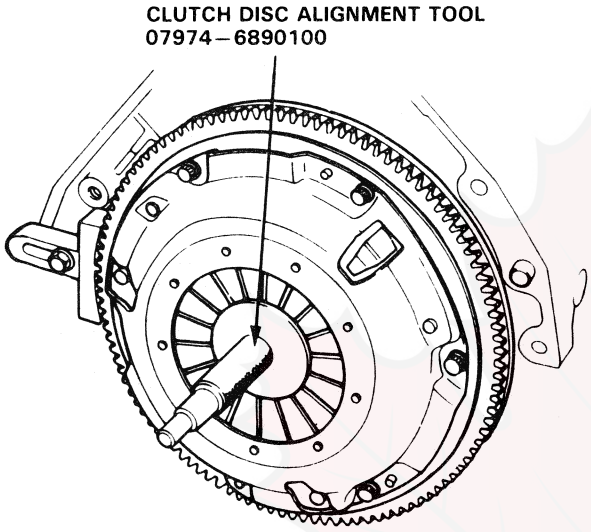


3. Install the clutch disc and pressure plate by aligning the flywheel dowels with dowel holes in the pressure plate.

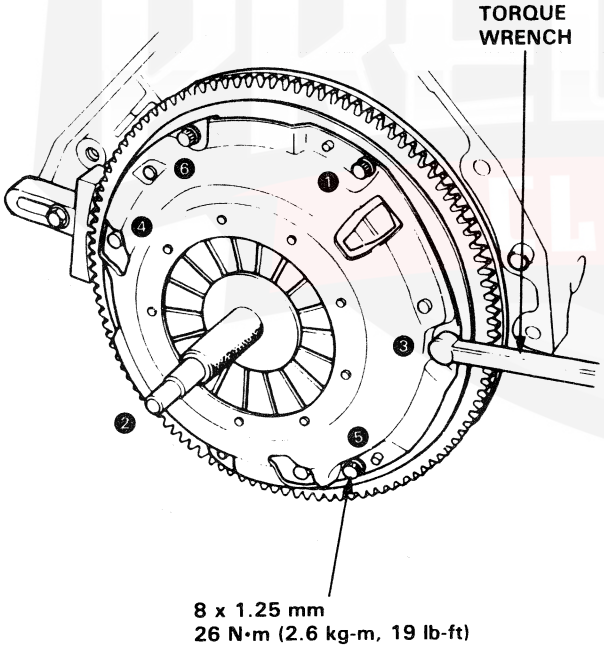


4. Install the attaching bolts finger tight.

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.

Manual Transmission

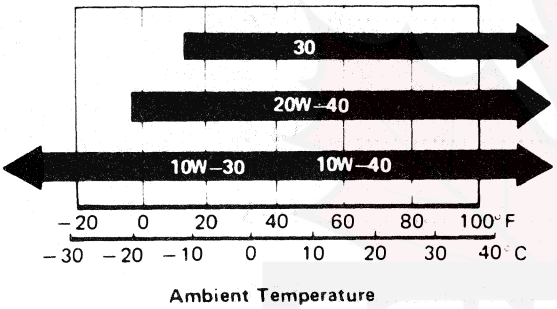
Maintenance

Oil Level Inspection

1. Check with oil at operating temperature, engine OFF, and car on level ground.
2. Remove oil filler plug and check level with finger.
3. Oil level must be up to fill hole. If it is below hole, add oil until it runs out, then reinstall plug.

Oil Change

Change oil every 48,000 km (30,000 miles).
Use only SAE30, 10W-30, 10W-40, or 20W-40 weight oil rated SE or SF grade.



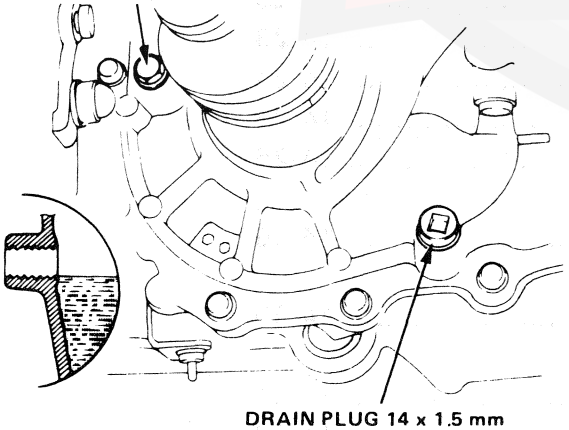
1. With transmission oil at operating temperature, engine OFF, and car on level ground, remove drain plug and drain transmission.
2. Reinstall drain plug with new washer, and refill to proper level.

NOTE: Drain plug washer should be replaced at every oil change.

Oil Capacity

2.3ℓ (2.4 U.S. qt.) after drain.
2.4ℓ (2.5 U.S. qt.) after overhaul.

OIL FILLER PLUG
32 x 1.5 mm 70 N·m (7.0 kg-m, 51 lb-ft)



Transmission

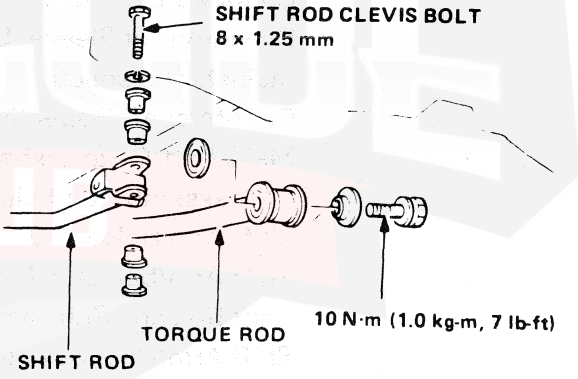
Removal

Car on Ground

1. Disconnect ground cable at battery and at transmission.
2. Release steering lock and place gear selector in neutral position.
3. Disconnect engine compartment wiring as follows:
   - Battery positive cable from starter motor.
   - Black/white wire from starter solenoid.
   - Green/black and yellow wires from back-up light switch.
4. Release engine sub-wire harness from clamp at clutch housing.
5. Disconnect clutch cable at the release arm.
6. Remove the two upper transmission mounting bolts.

Car Raised on Hoist

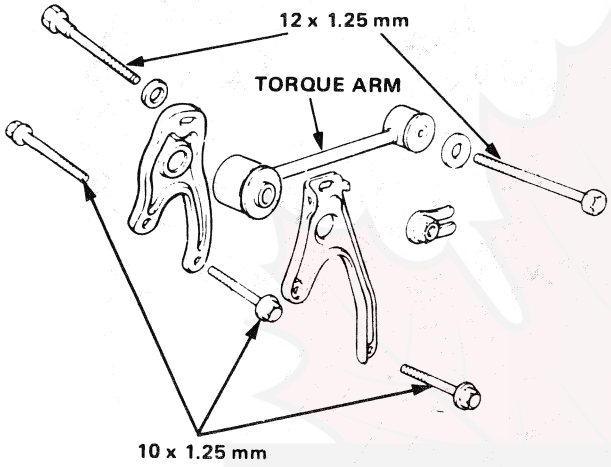
7. Drain transmission oil. Reinstall drain plug and washer.
8. Remove front wheels.
9. Place transmission jack securely beneath transmission.
10. Remove bolt securing speedometer drive holder and pull assembly out of transmission.
11. Disconnect shift lever torque rod from clutch housing.
12. Remove bolt from shift rod clevis.



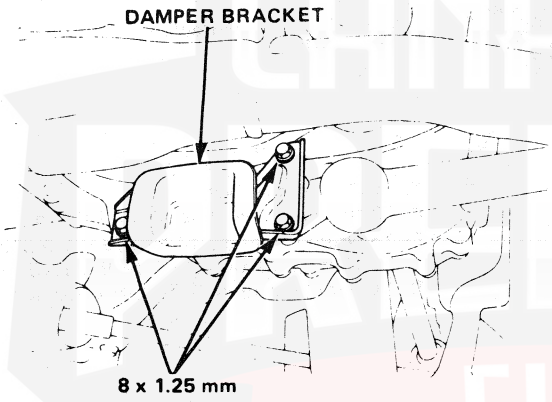
13. Disconnect the tie-rod ball joints and remove using the Ball Joint Remover (page 20-8).
14. Remove the lower arm ball joint bolt from the right-side lower control arm, then use a puller to disconnect the ball joint from the knuckle. Remove the damper fork bolt (page 20-17).

15. Turn each steering knuckle to its most outboard position. With screwdriver, pry right-side CV joint out approximately 1/2'', then pull sub-axle out of transmission housing. Repeat on opposite side.
Remove the right-side radius rod.

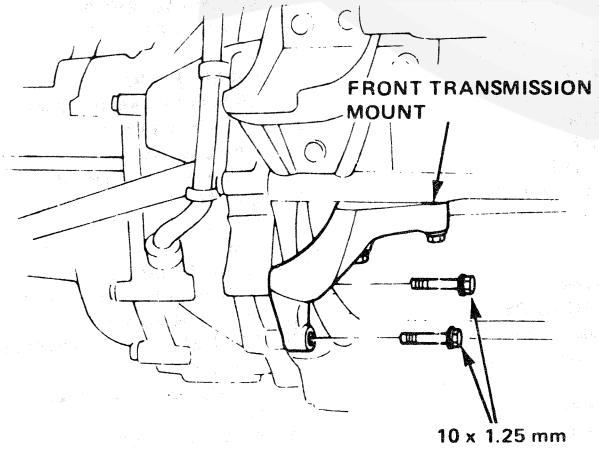
16. Remove the torque arm bracket bolts from the clutch housing.



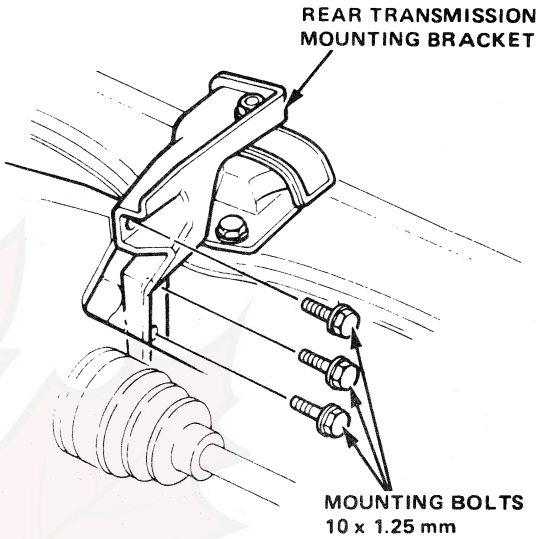
17. Remove the damper bracket from the transmission.



18. Remove the clutch housing bolts from the front transmission mount.



19. Remove the clutch housing bolts from the rear transmission mounting bracket.

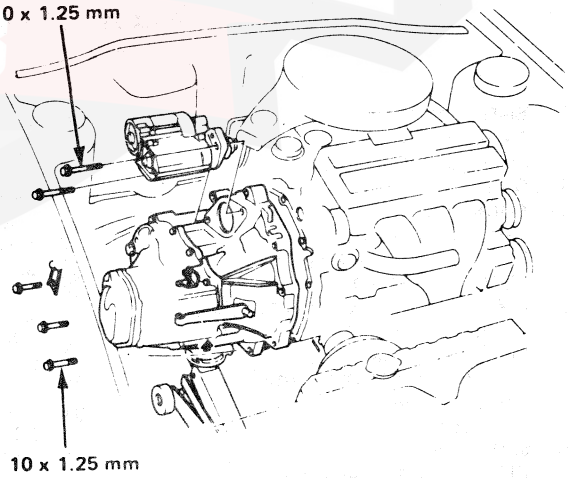


20. Remove the clutch cover.

21. Remove the starter mounting bolts. Detach the starter motor and lower through chassis.

22. Remove the front transmission mounting bolt.

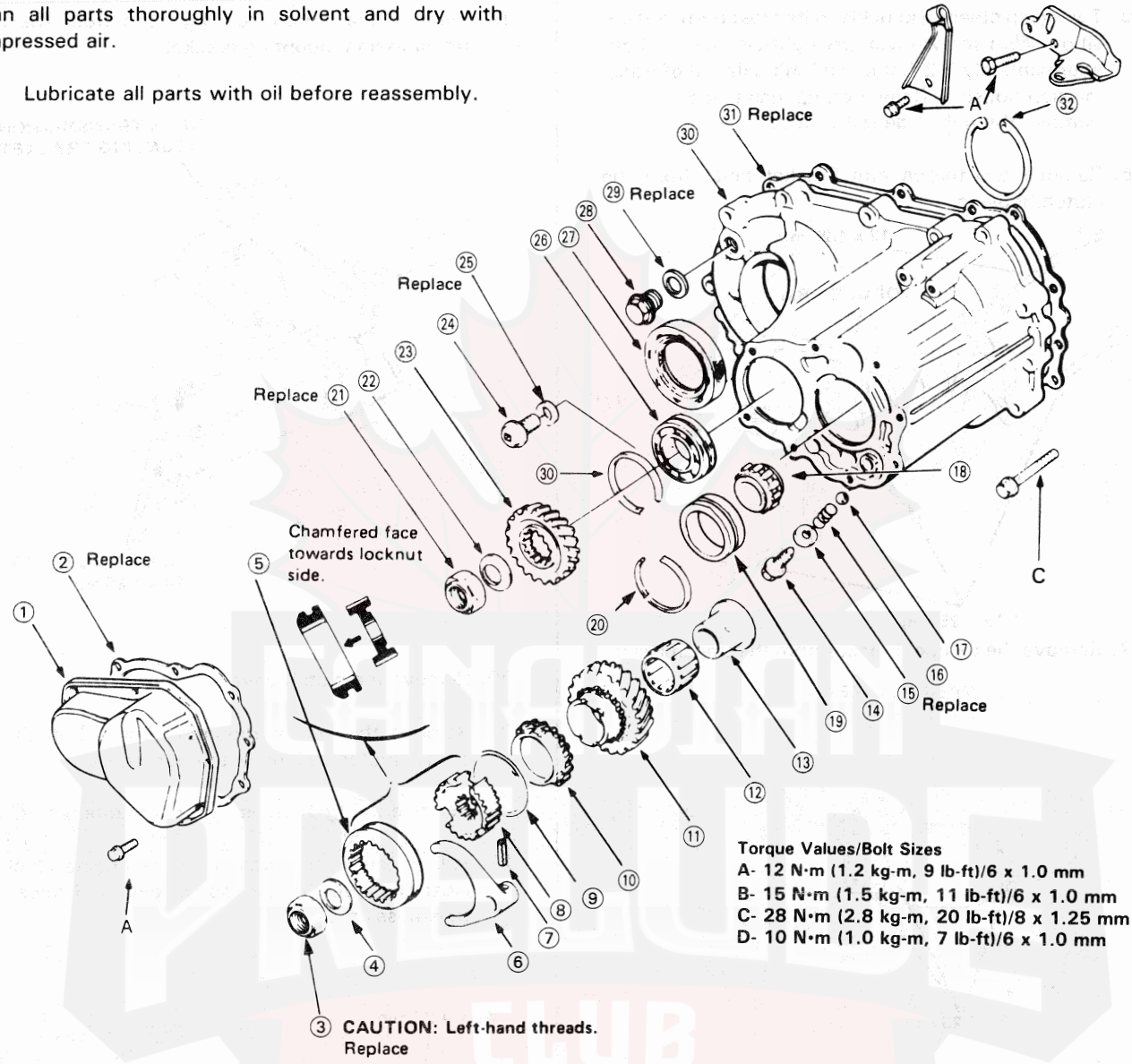
23. Pull transmission away from the engine block to clear the two 14 mm dowel pins and lower on transmission jack.



Illustrated Index

Clean all parts thoroughly in solvent and dry with compressed air.

Lubricate all parts with oil before reassembly.



Torque Values/Bolt Sizes
A- 12 N·m (1.2 kg-m, 9 lb-ft)/6 x 1.0 mm
B- 15 N·m (1.5 kg-m, 11 lb-ft)/6 x 1.0 mm
C- 28 N·m (2.8 kg-m, 20 lb-ft)/8 x 1.25 mm
D- 10 N·m (1.0 kg-m, 7 lb-ft)/6 x 1.0 mm

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3. **LOCKNUT**
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12. **NEEDLE BEARING**
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    22 N·m (2.2 kg-m, 16 lb-ft)
15. **WASHER 12 mm**
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22. **SPRING WASHER**
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    40 N·m (4.0 kg-m, 29 lb-ft)
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28. **OIL FILLER BOLT**
    45 N·m (4.5 kg-m, 33 lb-ft)
29. **WASHER 20 mm**
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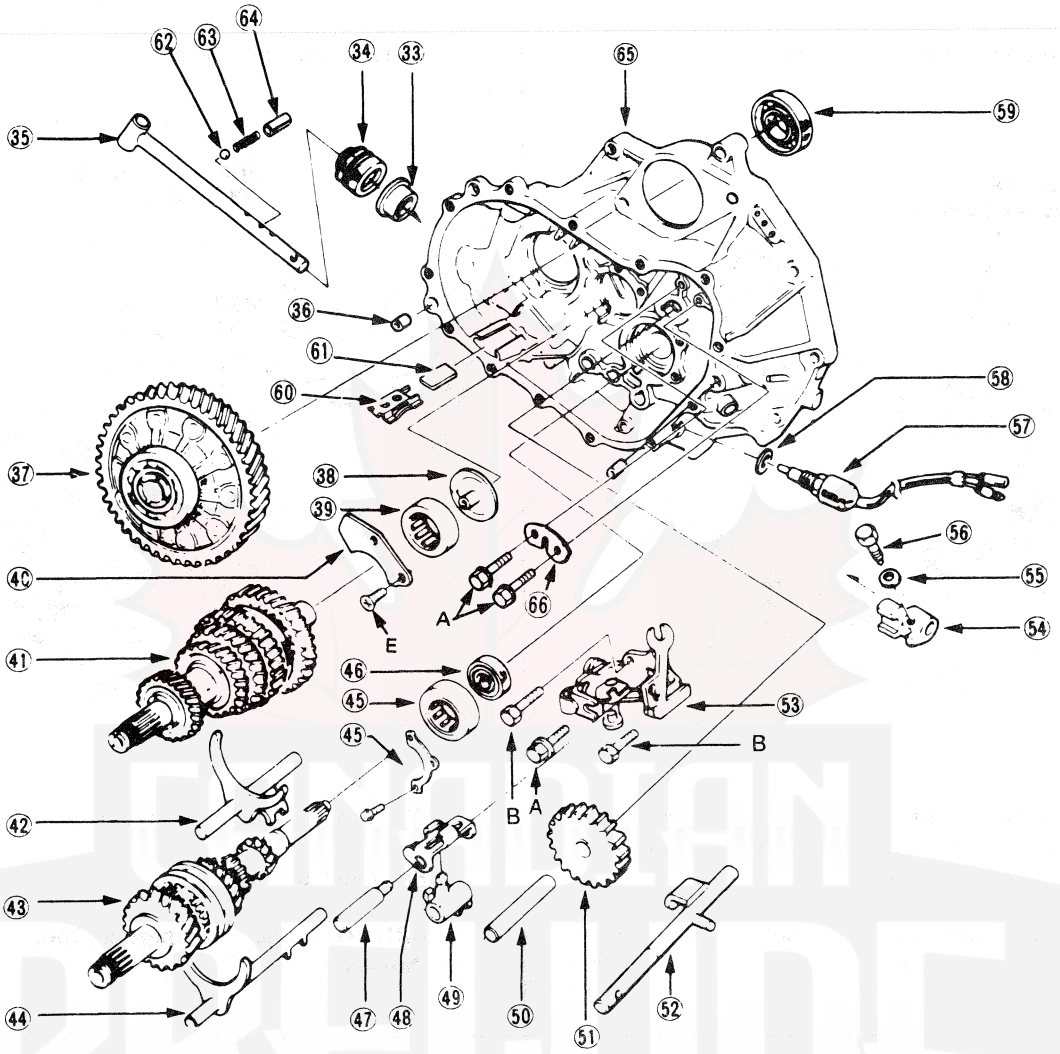
31. **GASKET**
32. **SNAP RING 80 mm**



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(65) **CLUTCH HOUSING**
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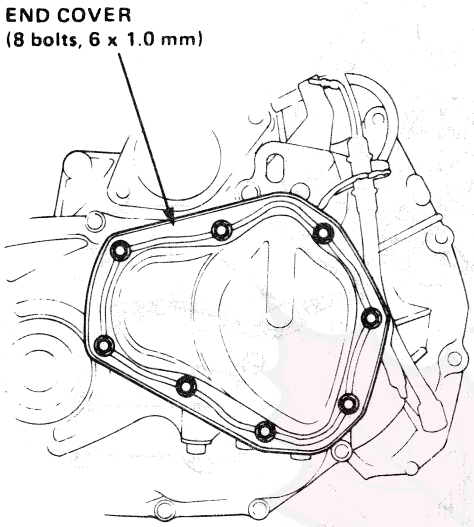
Transmission Housing

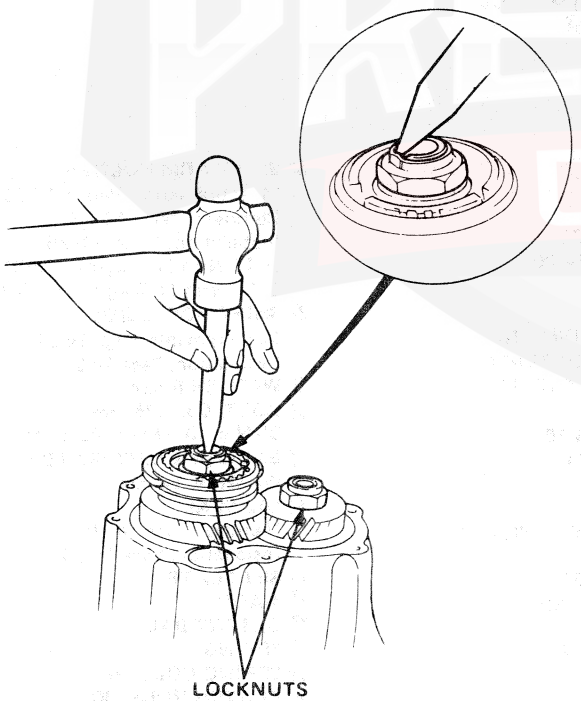
Disassembly

1. Remove transmission end cover.

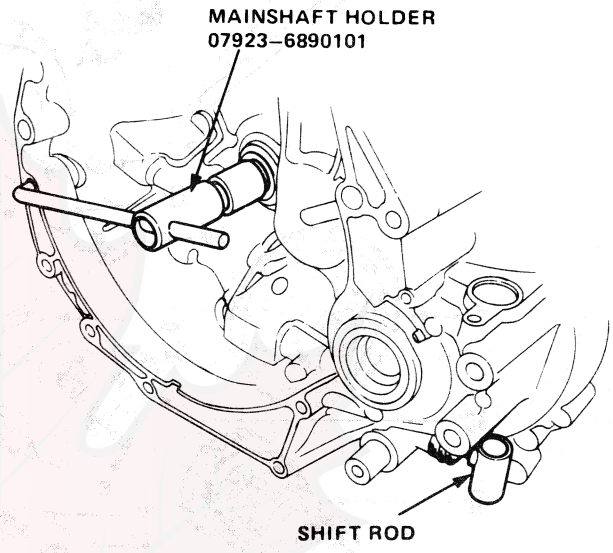


NOTE: Before removing mainshaft/countershaft locknuts, measure clearance between spacer collar and shoulder on fifth gear.

2. Bend locking tab on locknuts out of slots in mainshaft and countershaft.

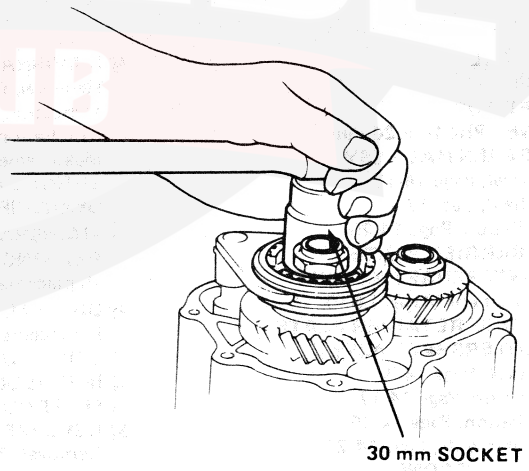


3. Install mainshaft holder.



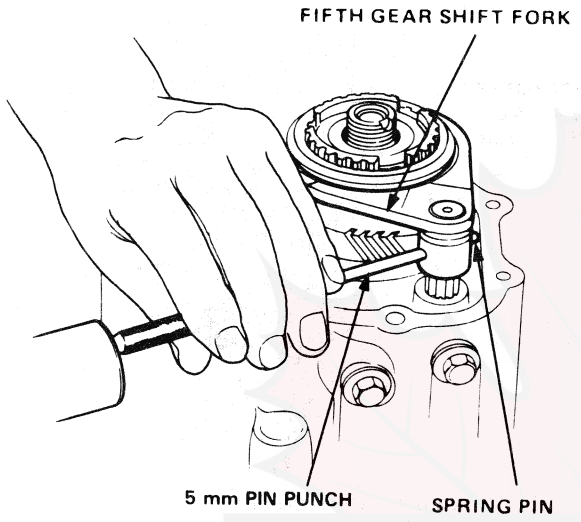
4. Shift transmission into reverse gear.
5. Remove locknuts.

CAUTION: The mainshaft locknut has left-hand threads.



6. Remove mainshaft holder.

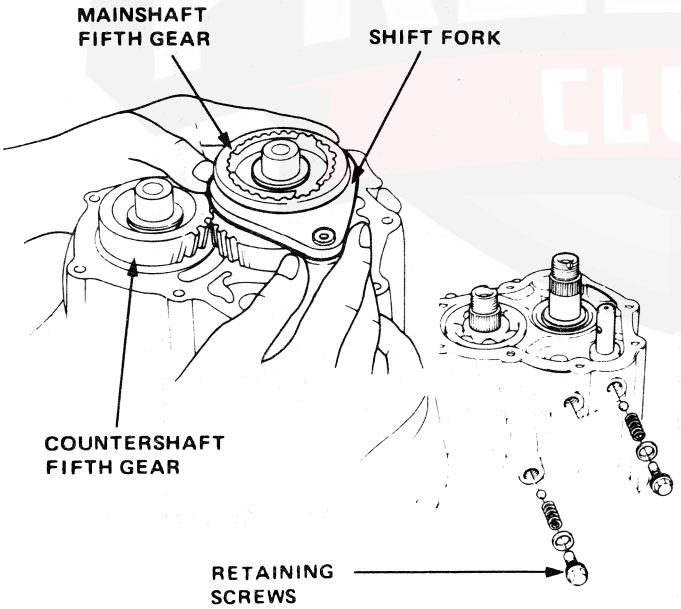
7. Drive out spring pin securing fifth gear shift fork to shaft.



8. Remove mainshaft fifth gear, shift fork, synchronizer sleeve, hub, ring and spring as a unit.

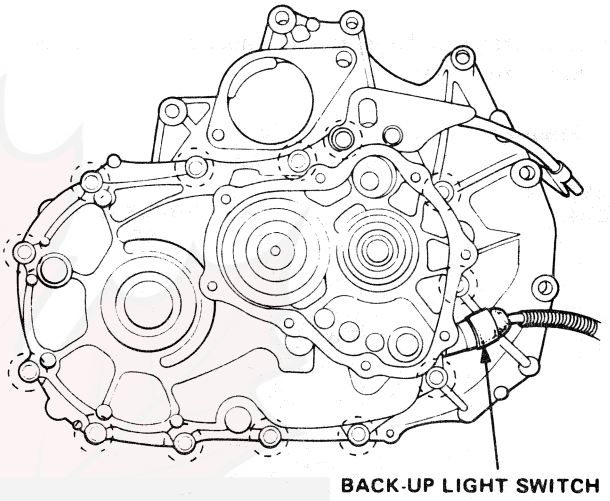
9. Remove countershaft fifth gear.

10. Remove three retaining screws and detent balls.

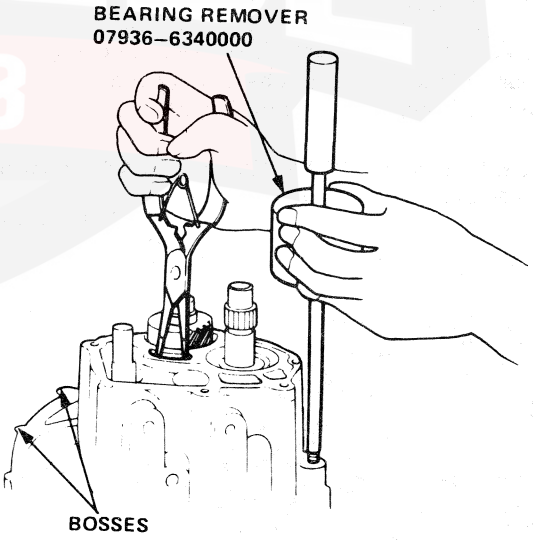


11. Remove back-up light switch.

12. Remove thirteen housing bolts.



13. Loosen the transmission housing by tapping on bosses around its edge with a soft hammer. Remove the attachment from the remover then screw its threaded end into the hole in the transmission housing as shown. Expand the snap ring while tapping upward on the case using the bearing remover.



Reverse Fork

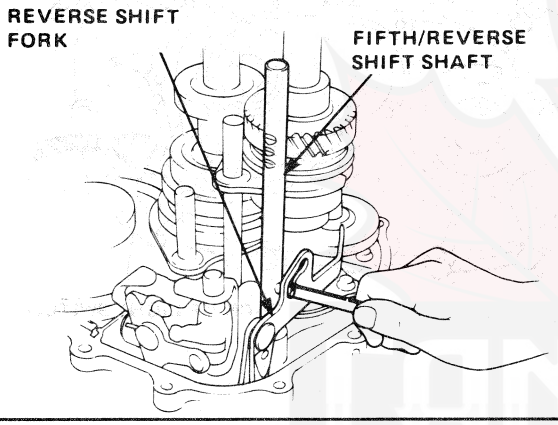
Shift Shaft Clearance

1. Check clearance between fifth/reverse shift shaft pin and reverse shift fork.

   PIN-TO-FORK CLEARANCE
   Standard (New): 0.05—0.35 mm (0.002—0.014 in.)
   Service Limit: 0.5 mm (0.02 in.)

2. If clearance is beyond limit, measure width of slot in reverse shift fork.

   Standard (New): 7.05—7.25 mm (0.278—0.285 in.)



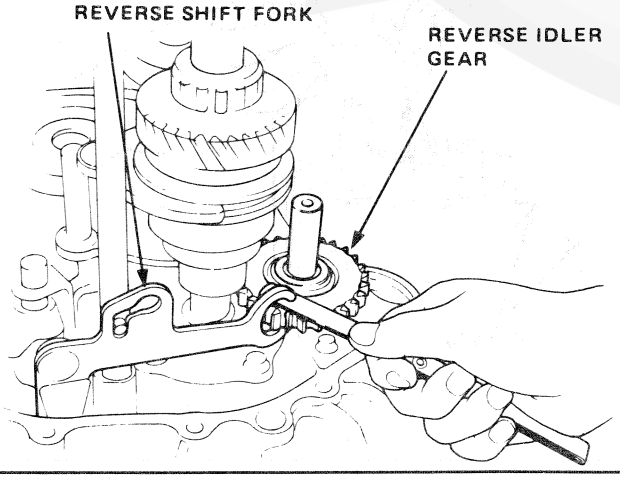
Gear Clearance

1. Check reverse idler gear-to-shift fork clearance.

   GEAR-TO-FORK CLEARANCE
   Standard (New): 0.2—1.0 mm (0.008—0.04 in.)
   Service Limit: 1.7 mm (0.07 in.)

2. Pull out the reverse idler shaft and remove gear. If gear-to fork clearance is beyond limit, measure gap between ends of shift fork fingers.

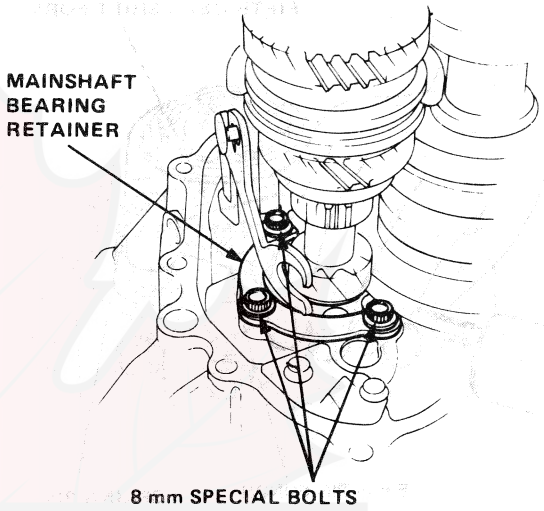
   Standard (New): 11.8—12.1 mm (0.46—0.48 in.)



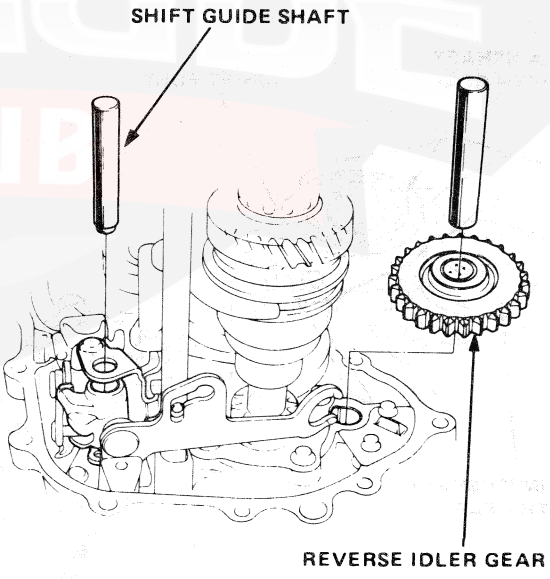
Countershaft/Mainshaft

Removal

1. Shift transmission into neutral.
2. Remove the mainshaft bearing retainer plate.

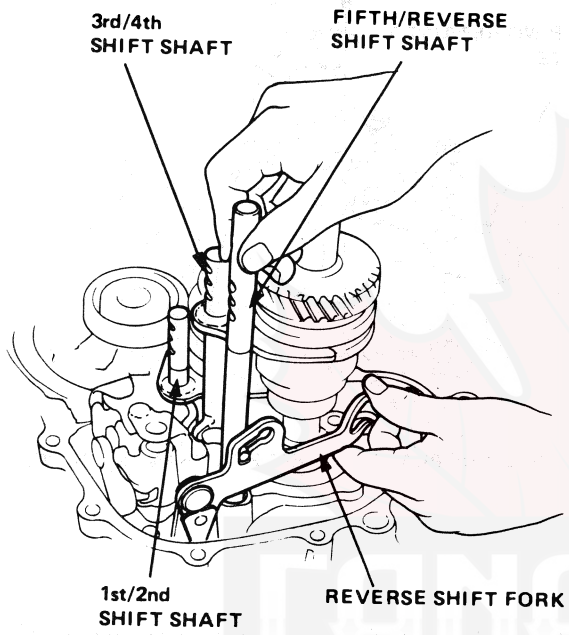


3. Pull out the shift guide shaft.
4. Pull out reverse idler shaft and remove gear.

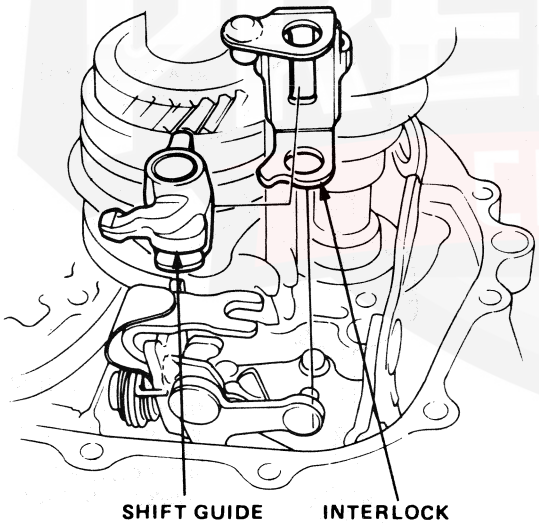


5. Pull the 3rd/4th and 1st/2nd shift shafts up, to shift into fourth and second.

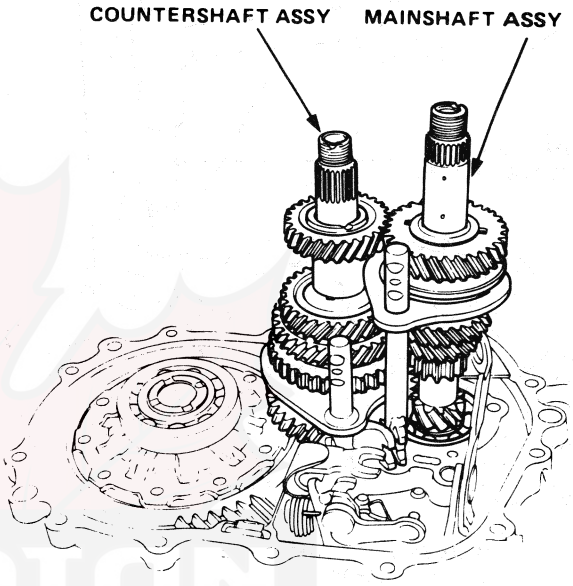
6. Remove the 5th/reverse shift shaft by pulling it up while lifting the reverse shift fork.



7. Tilt interlock and shift guide to the side, then lift them out.



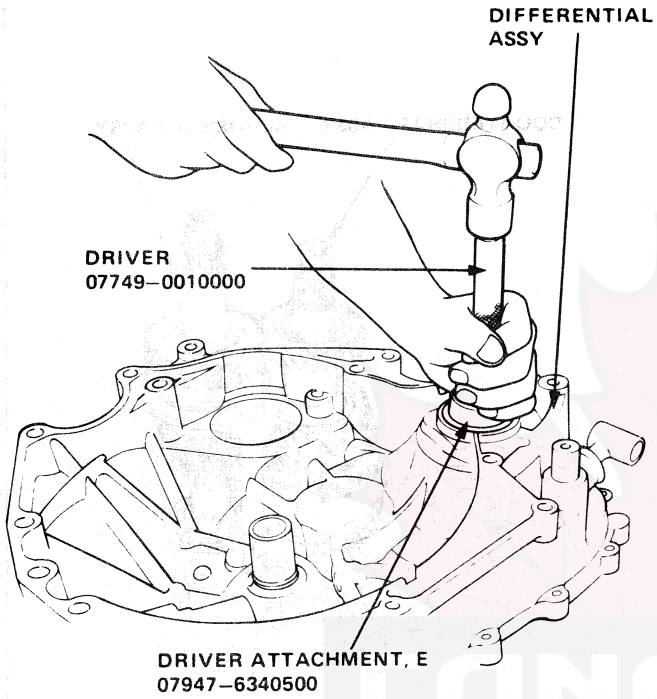
8. Remove countershaft and mainshaft as an assembly, with 1st/2nd & 3rd/4th shift shafts.



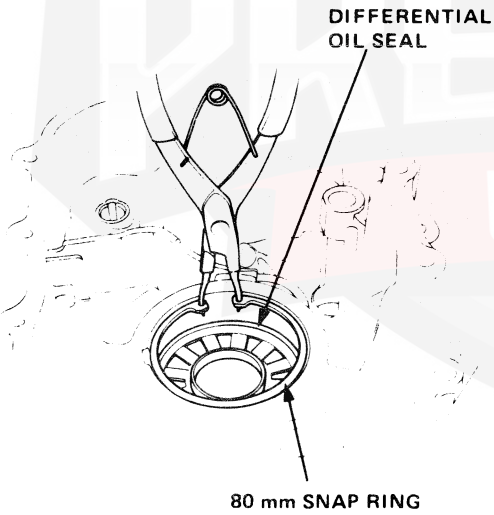
Differential Oil Seal

Removal

1. If seals are to be replaced, or if differential needs repair, remove differential assembly.



2. Drive the differential oil seal out of the clutch housing.
3. Remove 80 mm snap ring in transmission housing.



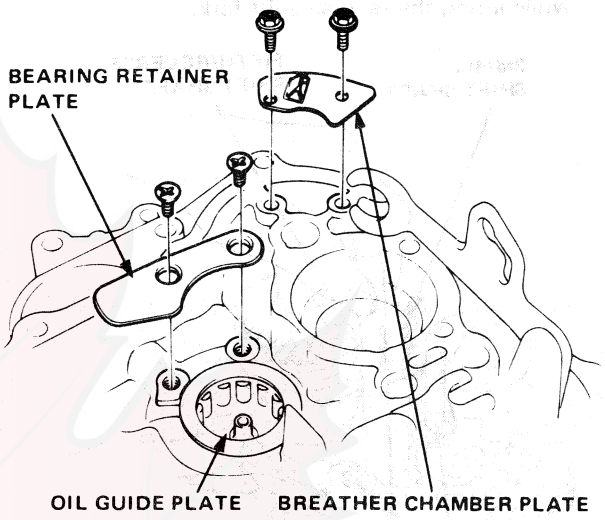
4. Drive the differential oil seal out of the transmission housing.

NOTE: Replace the differential oil seal in the transmission housing whenever disassembled.

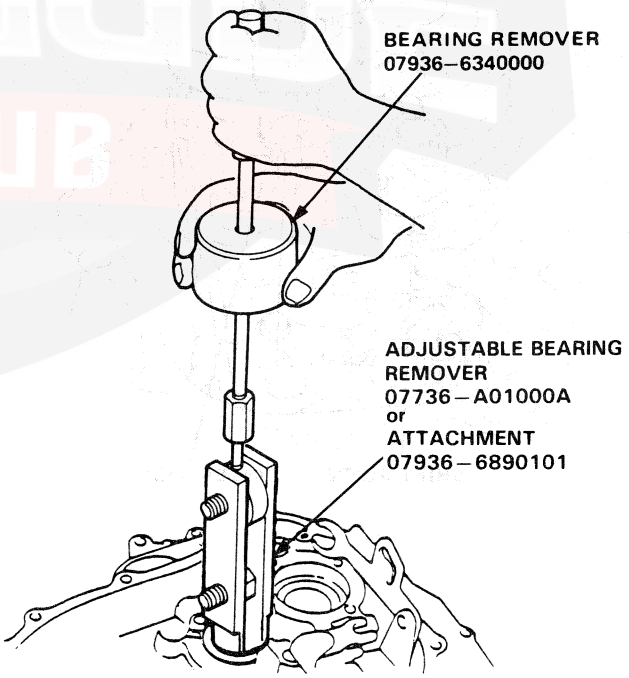
Bearings and Seals

Replacement (Clutch Housing)

1. Remove countershaft bearing retainer plate.
2. Remove the breather chamber plate.

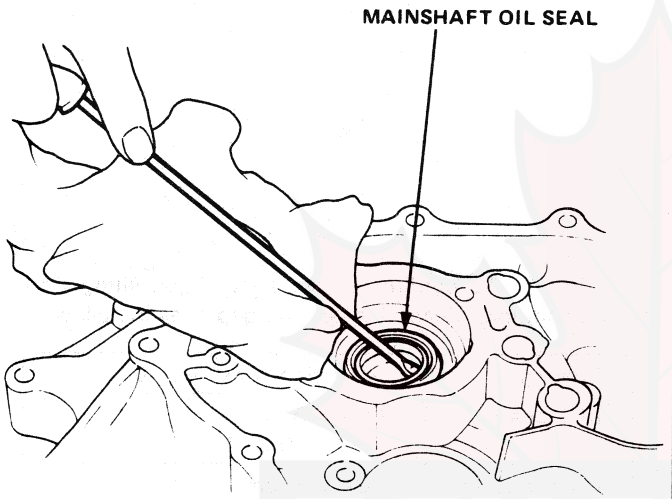


3. Insert Bearing Remover with attachment into countershaft bearing.
4. Raise slide hammer rapidly and strike against handle.
   Repeat several times to remove bearing.



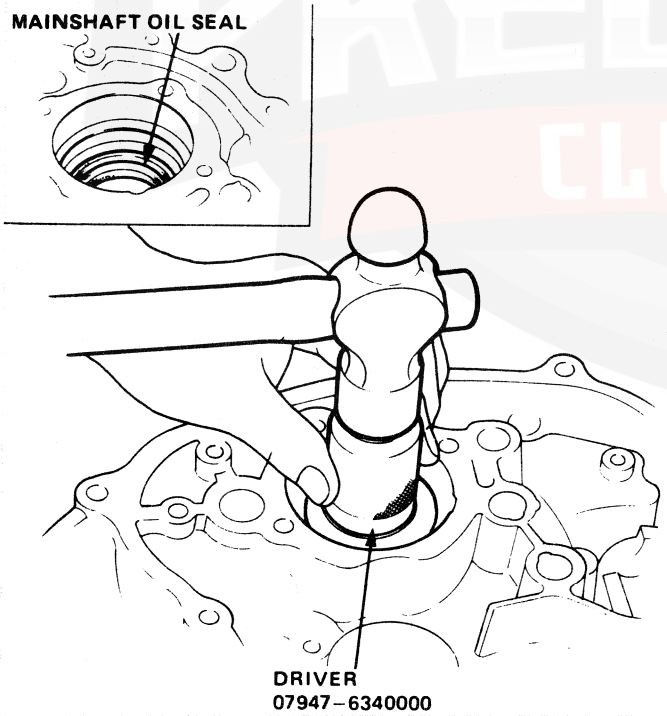
5. Remove mainshaft bearing and oil seal from clutch housing by prying out with a screwdriver.

NOTE: Always install new oil seal. Do not reinstall old one.

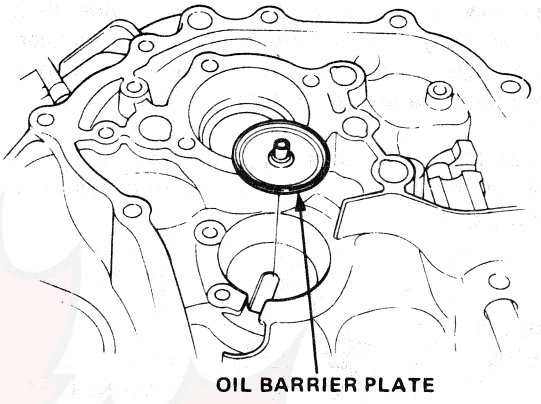


6. Install the mainshaft oil seal.

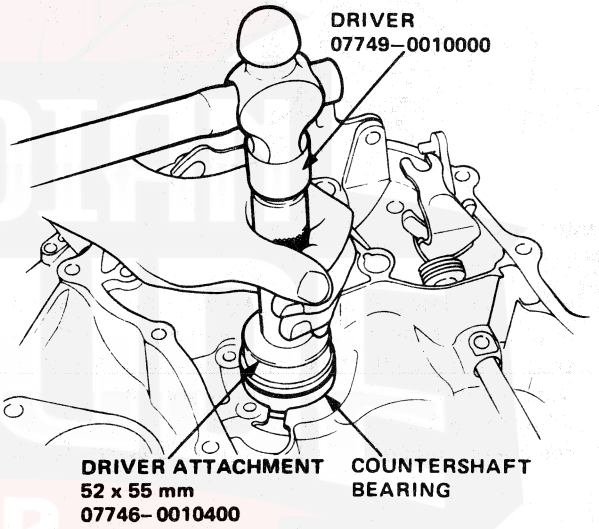
NOTE: Install the oil seal with the sealing lips facing the mainshaft bearing.



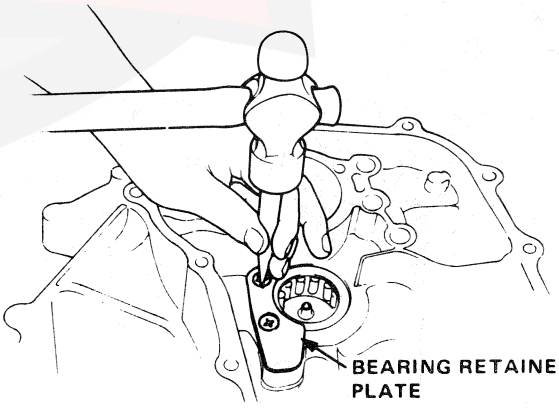
7. Install the countershaft oil barrier plate.



8. Drive in countershaft bearing with support block placed under case to support bearing boss.



9. Reinstall bearing retainer plate. Install screws using impact driver. Stake the screws.



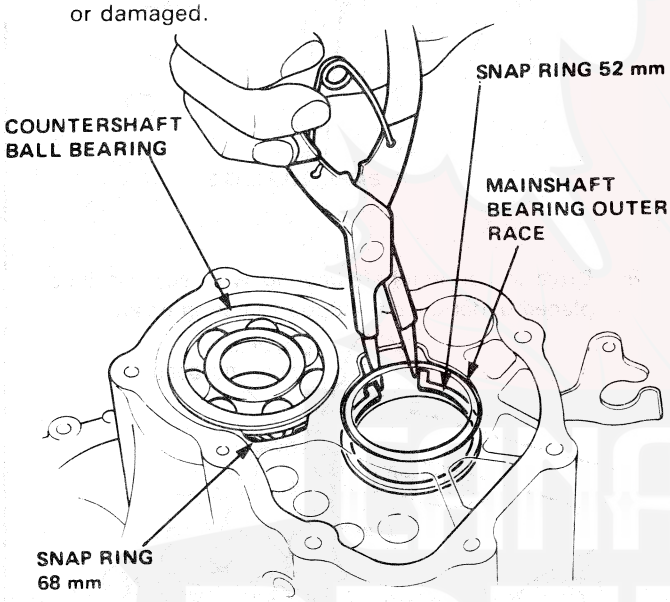
10. Reinstall the breather chamber plate.

Replacement (Transmission Housing)

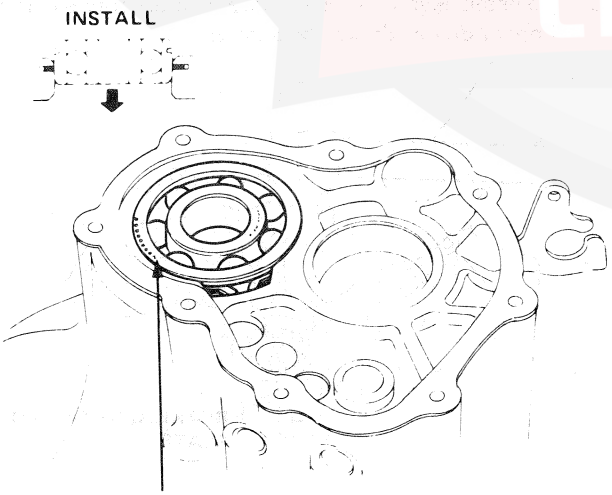
1. Using snap ring pliers, carefully expand the snap ring and press the bearing out into the case.

   CAUTION: Do not expand the ring any wider than to clear the groove in the bearing. Over-expansion or off-angle use of the pliers can damage the snap ring and/or the groove in the trans housing.

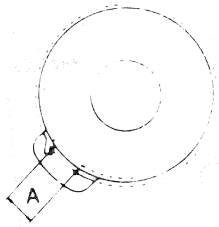
   NOTE: Inspect the snap rings for wear. Replace any snap rings that are worn excessively or damaged.



2. Install the new bearing with the part number facing out. Using snap ring pliers, carefully expand the snap ring, press the bearing into the case, and then seat the snap ring in the bearing groove.
3. After the bearing has entered the snap ring, remove the pliers, and press the bearing into place by hand.



4. Check that the snap ring is securely seated in both the grooves of the bearing and the case.



NOTE: To confirm proper snap ring seating and condition, measure snap ring gap A as installed:

Bearing	Dimension A as installed
Mainshaft	3.0—8.0 mm (0.118—0.314 in)
Countershaft	7.0—7.1 mm (0.276—0.279 in)

Reseat or carefully replace the snap ring if the gap is outside the specification.

Mainshaft

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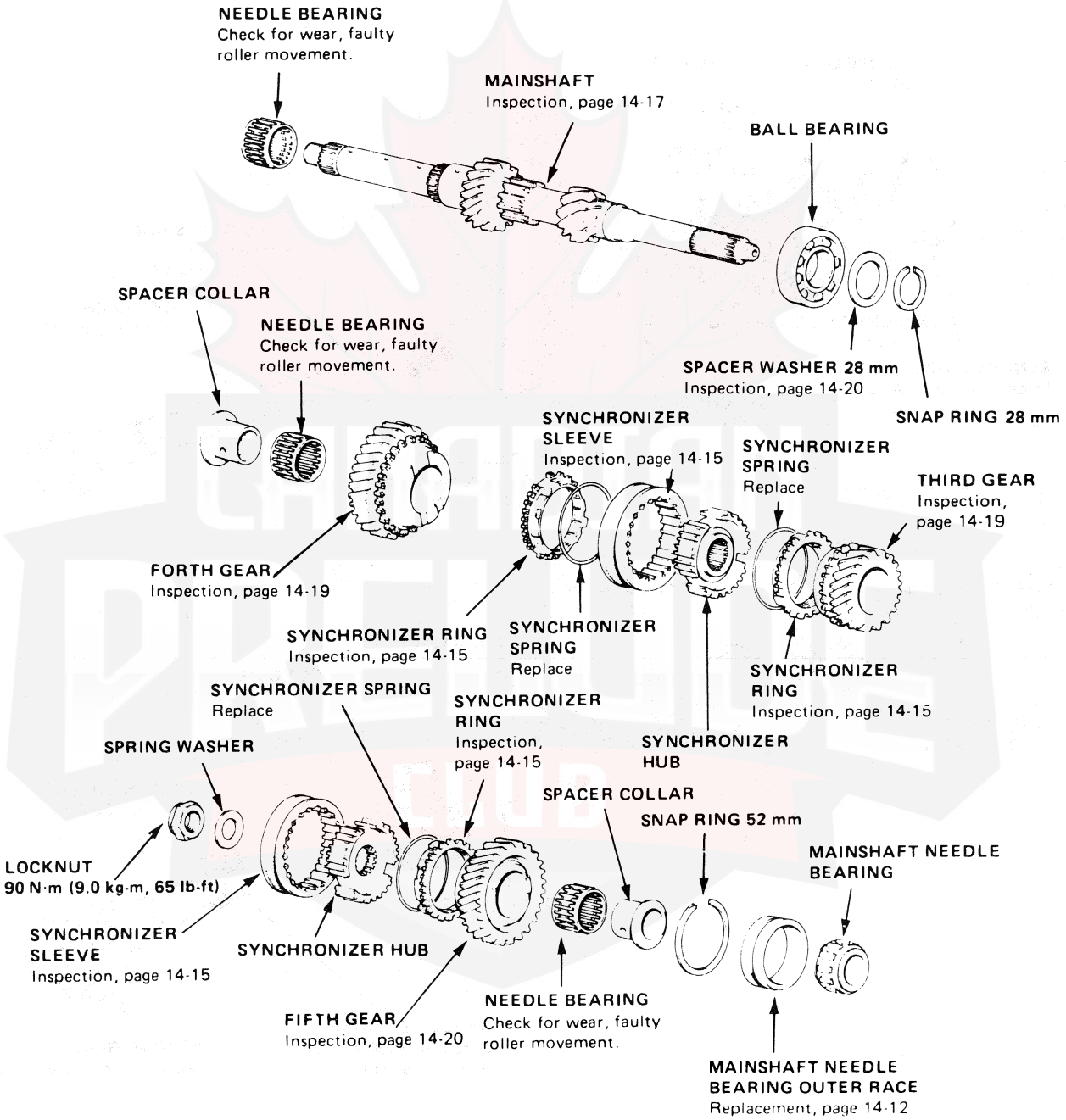
NOTE:

- Clean all parts thoroughly in solvent and dry with compressed air.
- Third, fourth and fifth gear needle bearings are identical.

Lubricate all parts with oil before reassembly.



Countershaft

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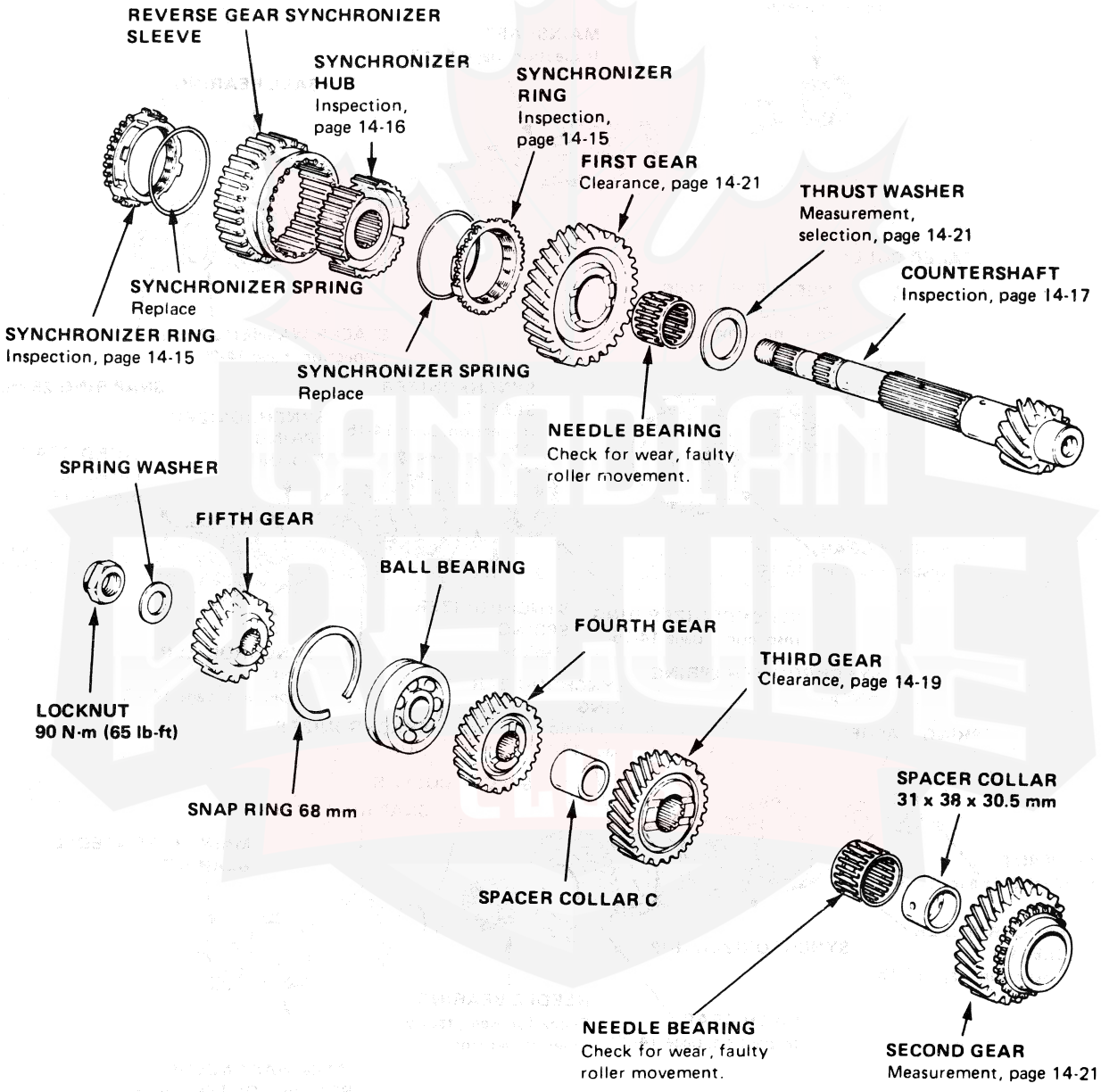
NOTE:

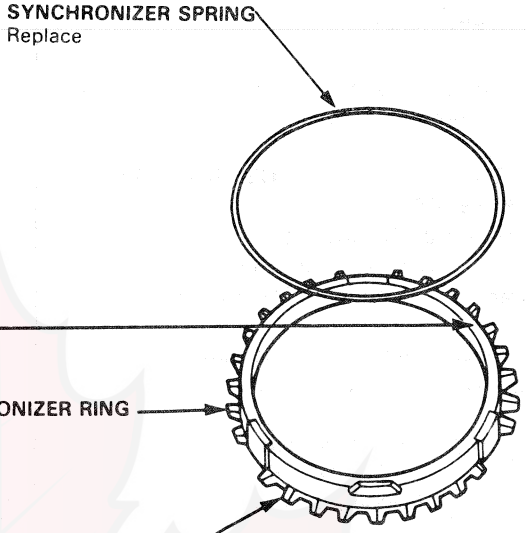
- Clean all parts thoroughly in solvent and dry with compressed air.
- First and second gear needle bearings are not identical.

Lubricate all parts with oil before reassembly.



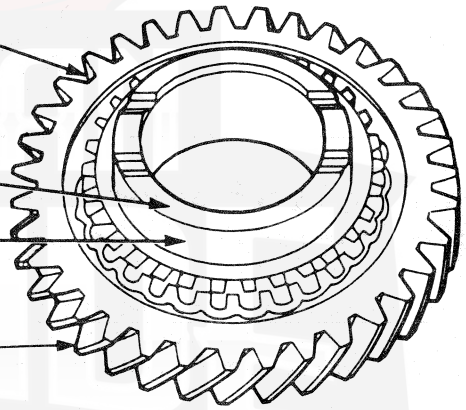
Gear and Synchronizer Ring

Inspections



1. Inspect the inside of synchronizer ring for wear.

2. Inspect the synchronizer ring teeth and matching teeth on gear for wear (rounded off).



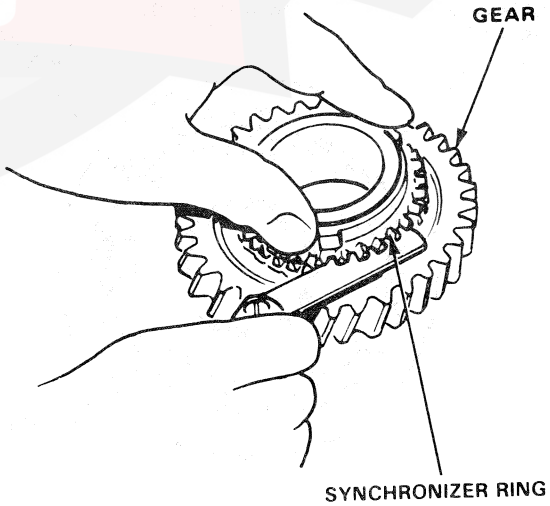
3. Inspect the gear hub thrust surface for wear.

4. Inspect the cone surface for wear on 1st, and 2nd, countershaft gears; 3rd, 4th and 5th mainshaft gears.

5. Inspect the teeth on all gears for uneven wear, scoring, galling, cracks.

6. Place the synchronizer ring on matching gear cone and rotate until it stops (approx. 10 to 20 degrees), then measure the clearance between ring and gear.

   Ring-to-Gear Clearance:
   Standard (New): 0.73—1.18 mm (0.029—0.047 in.)
   Service Limit: 0.4 mm (0.016 in.)



7. Separate the synchronizer ring and gear, and coat them with oil.

8. Install the synchronizer spring on synchronizer ring.

9. Put the synchro ring on gear cone again, rotate until it stops, then set it aside for later reassembly.

Synchronizer Sleeve, Shift Shaft

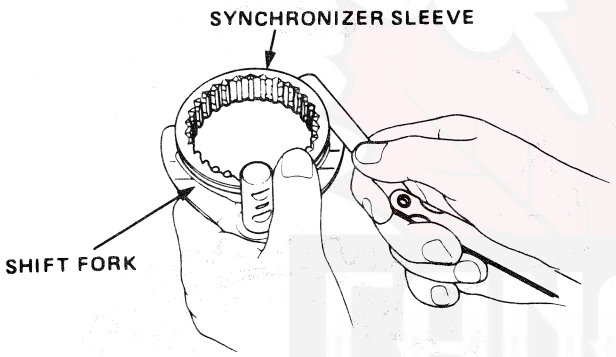
Shift Fork to Synchronizer Sleeve Clearance

1. Check clearance between each shift fork and its matching synchronizer sleeve.

   FORK-TO-SLEEVE CLEARANCE (ALL THREE FORKS & SLEEVES)
   Standard (New): 0.35—0.65 mm (0.014—0.026 in.)
   Service Limit: 1.0 mm (0.039 in.)

2. If fork-to-sleeve clearance is too great, measure width of groove in synchronizer sleeve.

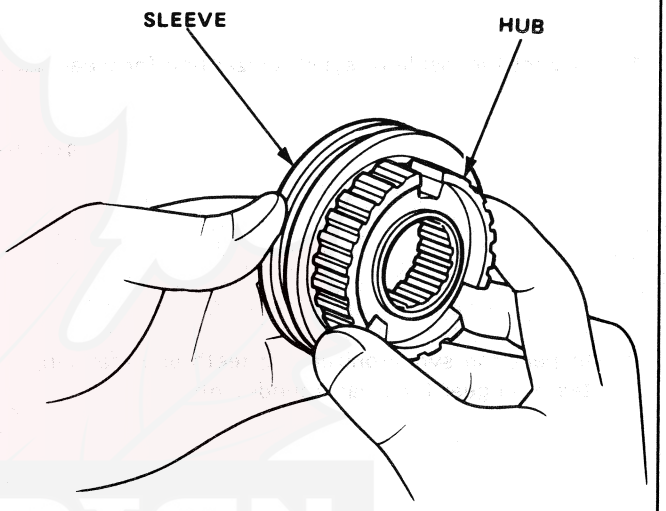
   Standard (New): 6.75—6.85 mm (0.266—0.270 in.)



Synchronizer Sleeve and Hub Inspections

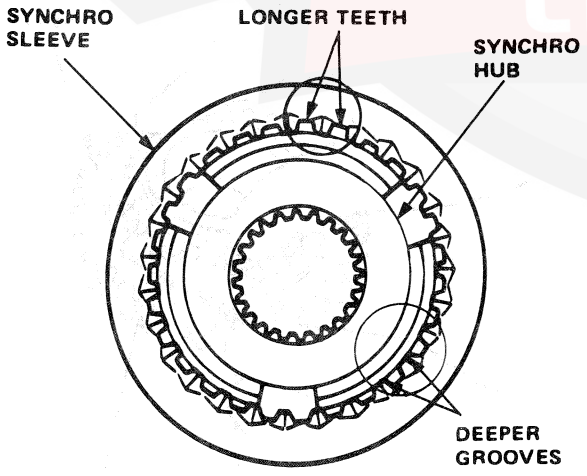
1. Inspect gear teeth on all synchro hubs and sleeves for rounded off corners, indicating wear.

2. Install each hub in its mating sleeve and check for freedom of movement.



Installing Synchronizer Hubs in Sleeves

Each synchronizer sleeve has three sets of longer teeth (120 degrees apart) that must be matched with the three sets of deeper grooves in the hub when assembled.



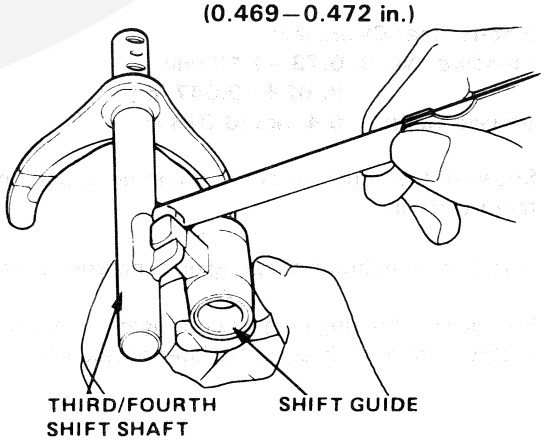
Third/Fourth Shift Shaft to Shift Guide Clearance

1. Check third/fourth shift shaft-to-shift guide clearance as shown.

   SHAFT-TO-GUIDE CLEARANCE
   Standard (New): 0.2—0.5 mm (0.008—0.02 in.)
   Service Limit: 0.8 mm (0.03 in.)

2. If clearance is too great, measure width of shift guide tab.

   Standard (New): 11.9—12.0 mm (0.469—0.472 in.)

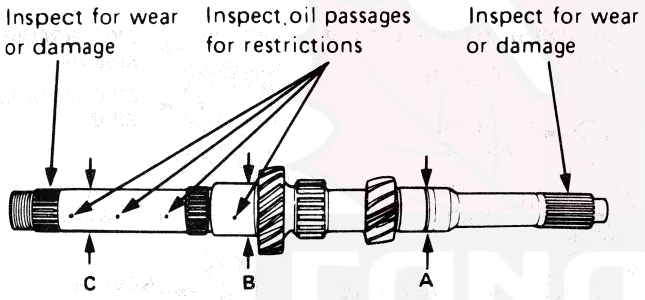


Mainshaft

Inspection

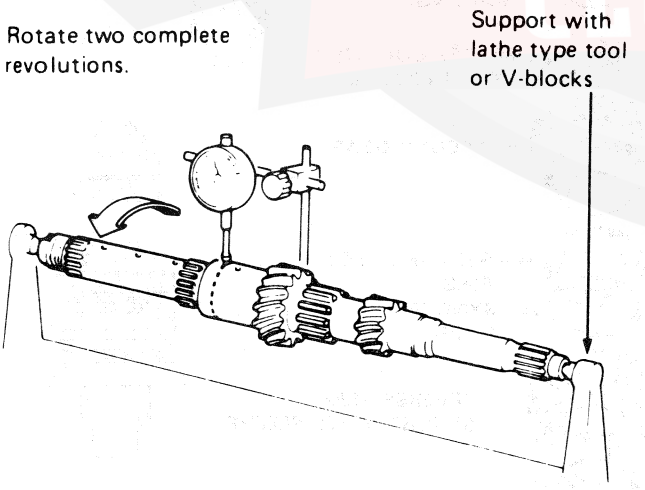
Wear

Outside Diameter:
Standard (New): A: 26.004—26.017 mm (1.0238—1.0243 in.)
B: 31.984—32.000 mm (1.2592—1.2598 in.)
C: 24.980—24.993 mm (0.9835—0.9840 in.)
Service Limit: A: 25.95 mm (1.022 in.)
B: 31.93 mm (1.257 in.)
C: 24.93 mm (0.98 in.)



Runout

Standard (New): 0.04 mm (0.0016 in.)
Service Limit: 0.10 mm (0.004 in.)

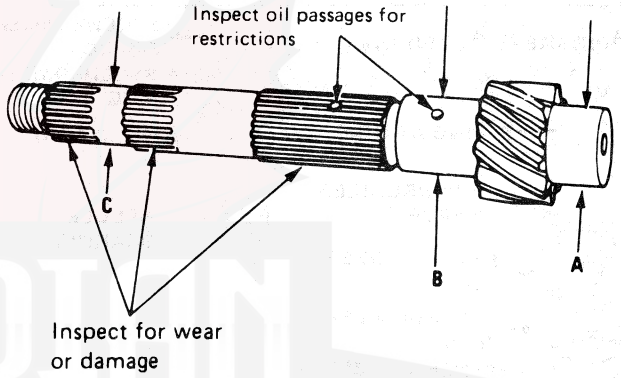


Countershaft

Inspection

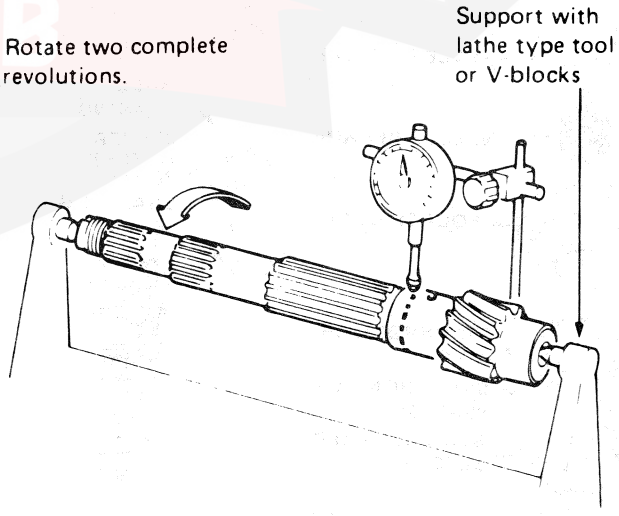
Wear

Outside Diameter:
Standard (New): A: 33.000—33.015 mm (1.2992—1.2998 in.)
B: 33.984—34.000 mm (1.3380—1.3386 in.)
C: 24.980—24.993 mm (0.9835—0.9840 in.)
Service Limit: A: 32.95 mm (1.297 in.)
B: 33.93 mm (1.336 in.)
C: 24.93 mm (0.981 in.)



Runout

Standard (New): 0.04 mm (0.0016 in.)
Service Limit: 0.10 mm (0.004 in.)



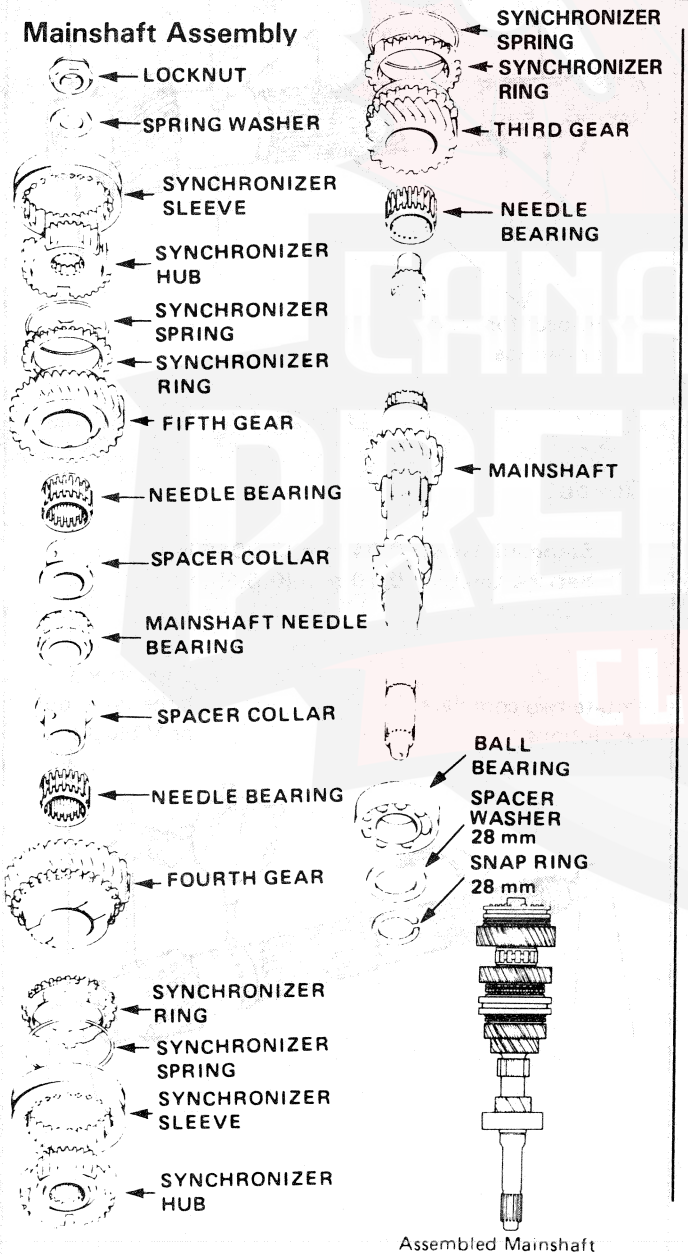
Mainshaft/Countershaft

Reassembly and Measurement

1. Remove both mainshaft and countershaft bearings from transmission housing.
2. Assemble mainshaft and countershaft including bearings and fifth gear components, as shown below. Lubricate all parts with oil before final reassembly.
3. Install mainshaft/countershaft assembly into clutch housing.
4. Install the mainshaft holder to prevent shafts from turning, and shift transmission into gear.
5. Torque the countershaft and mainshaft locknuts to 90 N·m (9.0 kg-m, 65 lb-ft) before checking clearances.

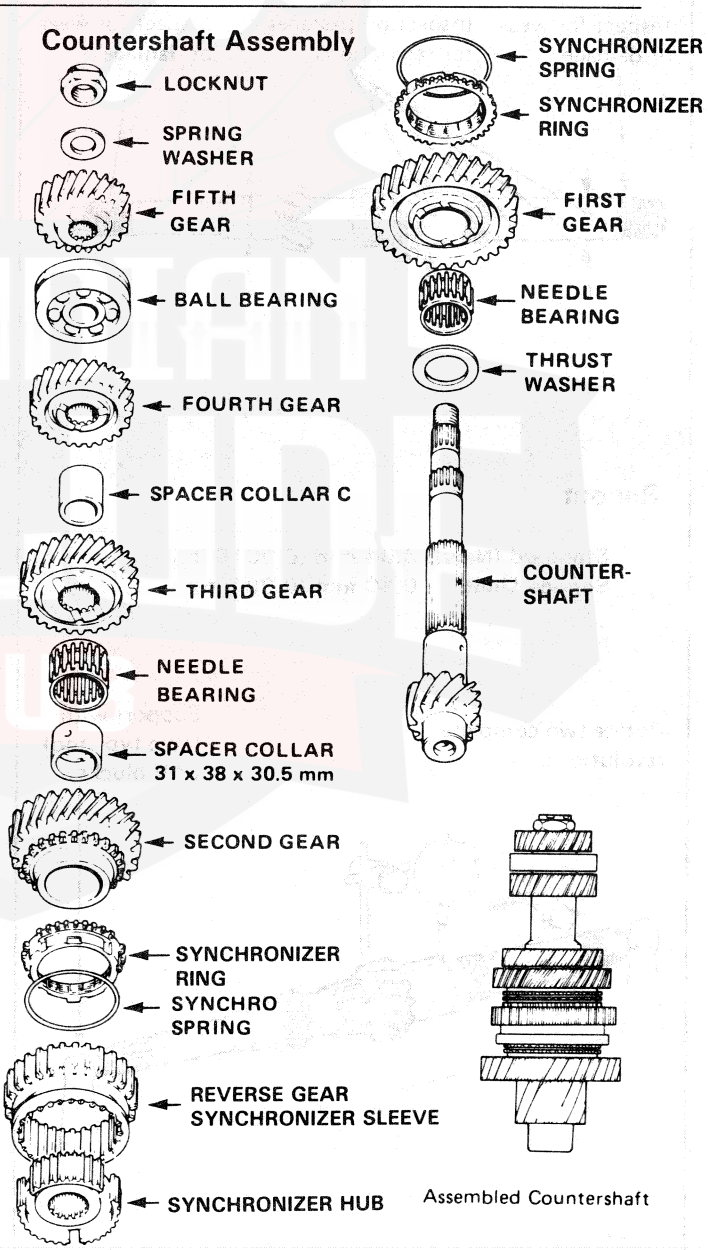
   CAUTION: Incorrect gear clearances can be caused by overtorquing the countershaft or mainshaft locknuts. Whenever locknuts are installed, use an accurately calibrated torque wrench.
6. Remove transmission shafts from clutch housing and measure clearances as described on next two pages.

Mainshaft Assembly



Assembled Mainshaft

Countershaft Assembly

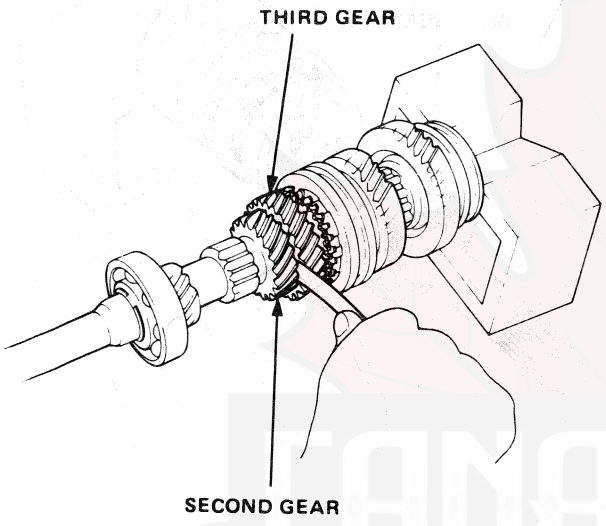


Assembled Countershaft

Mainshaft Measurements

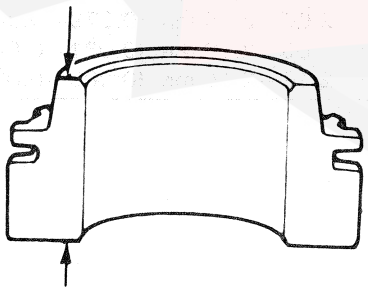
7. Measure clearance between shoulder on third gear and shoulder on second gear.

THIRD GEAR CLEARANCE
Standard (New): 0.03—0.18 mm (0.0012—0.0071 in.)
Service Limit: 0.3 mm (0.012 in.)



8. If out of tolerance, measure thickness of third gear.

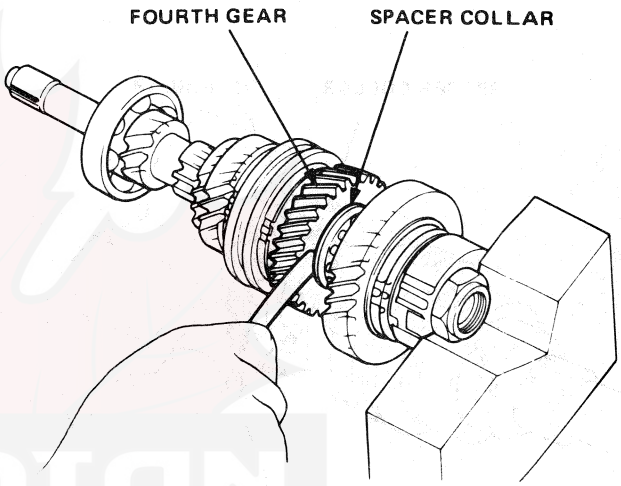
THIRD GEAR THICKNESS
Standard (New): 31.42—31.47 mm (1.237—1.239 in.)
Service Limit: 31.30 mm (1.232 in.)



If third gear is OK, replace synchronizer hub if necessary after all other measurements are complete.

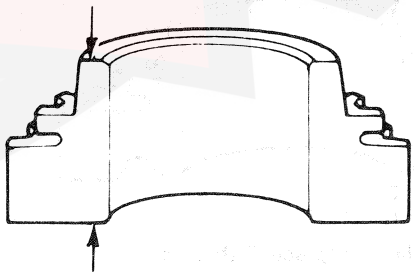
9. Measure clearance between spacer collar and shoulder on fourth gear.

FOURTH GEAR CLEARANCE
Standard (New): 0.03—0.18 mm (0.0012—0.0071 in.)
Service Limit: 0.3 mm (0.012 in.)



10. If out of tolerance, measure thickness of fourth gear.

FOURTH GEAR THICKNESS
Standard (New): 31.42—31.47 mm (1.237—1.239 in.)
Service Limit: 31.30 mm (1.232 in.)



If fourth gear is OK, replace synchronizer hub if necessary after all other measurements are complete.

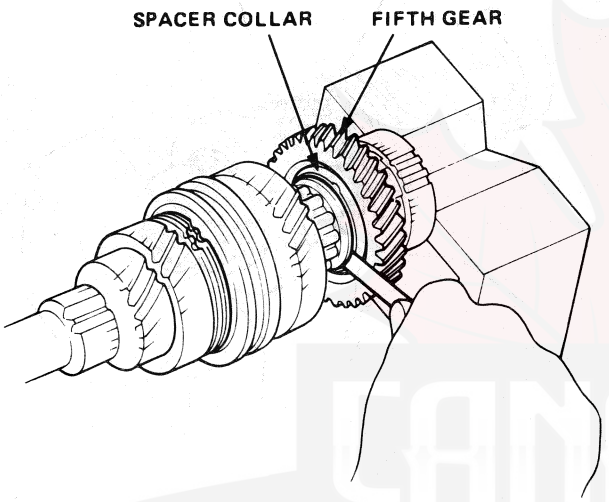
(cont'd)

Reassembly and Measurement (cont'd)

Mainshaft Measurements

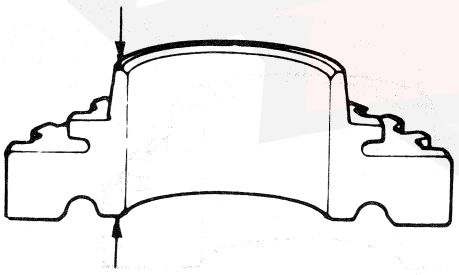
11. Measure clearance between spacer collar and shoulder on fifth gear.

FIFTH GEAR CLEARANCE
Standard (New): 0.03—0.13 mm (0.001—0.005 in.)
Service Limit: 0.25 mm (0.01 in.)



12. If out of tolerance, measure thickness of fifth gear.

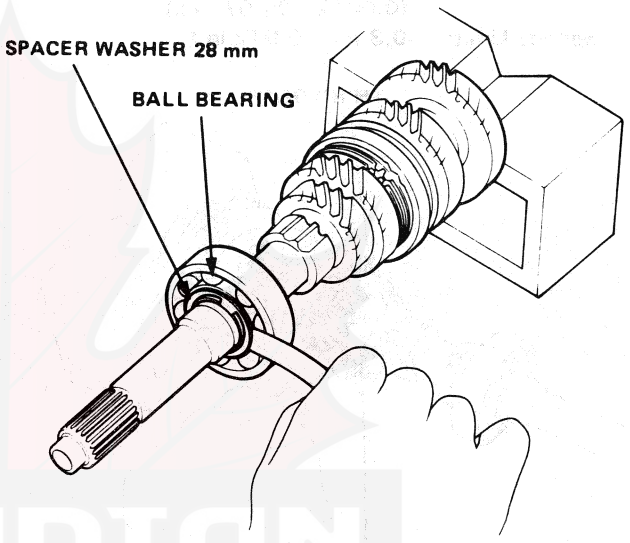
FIFTH GEAR THICKNESS
Standard (New): 32.42—32.47 mm (1.276—1.278 in.)
Service Limit: 32.30 mm (1.272 in.)



If out of limit, replace fifth gear.

13. Measure clearance between 28 mm spacer washer and ball bearing.

BALL BEARING CLEARANCE
Standard (New): 0—0.1 mm (0—0.004 in.)



If out of tolerance, change thickness of 28 mm spacer washer after measuring all other clearances.

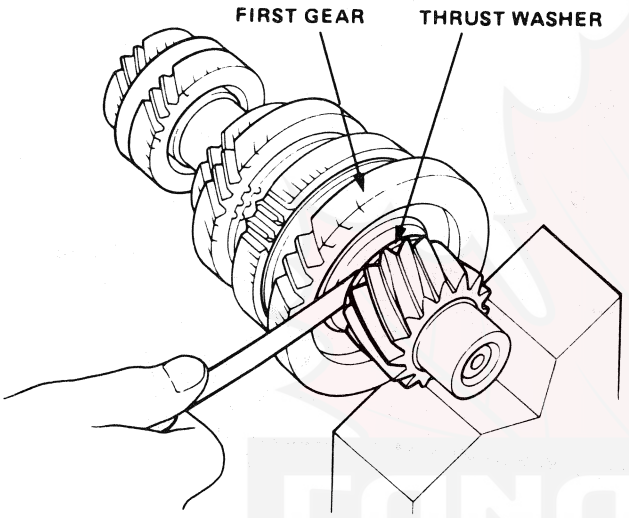
REPLACEMENT SPACER WASHERS

IDENTIFICATION	THICKNESS
A	1.88—1.92 mm (0.074—0.075 in.)
B	1.94—1.98 mm (0.076—0.078 in.)
C	2.00—2.04 mm (0.079—0.080 in.)
D	2.06—2.10 mm (0.081—0.082 in.)
E	2.12—2.16 mm (0.083—0.085 in.)

Countershaft Measurements

14. Measure clearance between first gear thrust washer and shoulder on first gear.

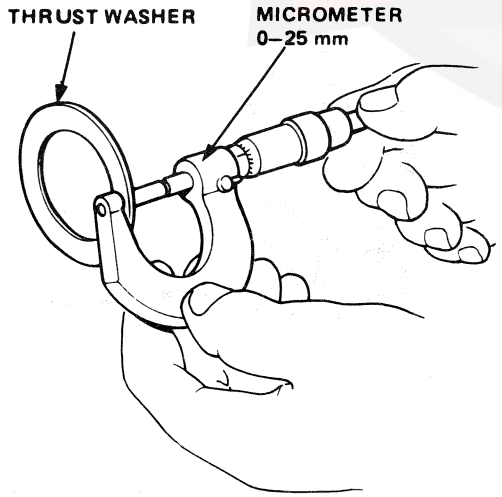
FIRST GEAR CLEARANCE
Standard (New): 0.03—0.08 mm (0.001—0.003 in.)



If out of tolerance, change thickness of first gear thrust washer after measuring all other clearances.

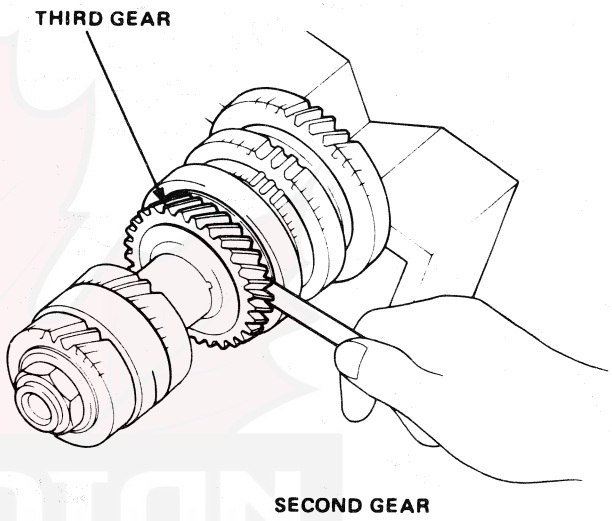
REPLACEMENT THRUST WASHERS

IDENTIFICATION	THICKNESS
A	2.02—2.04 mm (0.080—0.081 in.)
B	2.00—2.02 mm (0.079—0.080 in.)
C	1.98—2.00 mm (0.078—0.079 in.)
D	1.96—1.98 mm (0.077—0.078 in.)



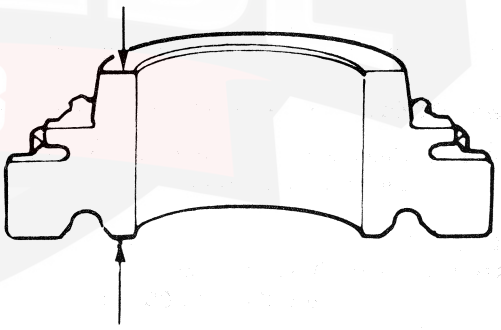
15. Measure clearance between shoulder on third gear and shoulder on second gear.

SECOND GEAR CLEARANCE
Standard (New): 0.03—0.1 mm (0.0012—0.004 in.)
Service Limit: 0.18 mm (0.007 in.)



16. If out of tolerance, measure thickness of second gear.

SECOND GEAR THICKNESS
Standard (New): 30.42—30.47 mm (1.198—1.200 in.)
Service Limit: 30.30 mm (1.193 in.)



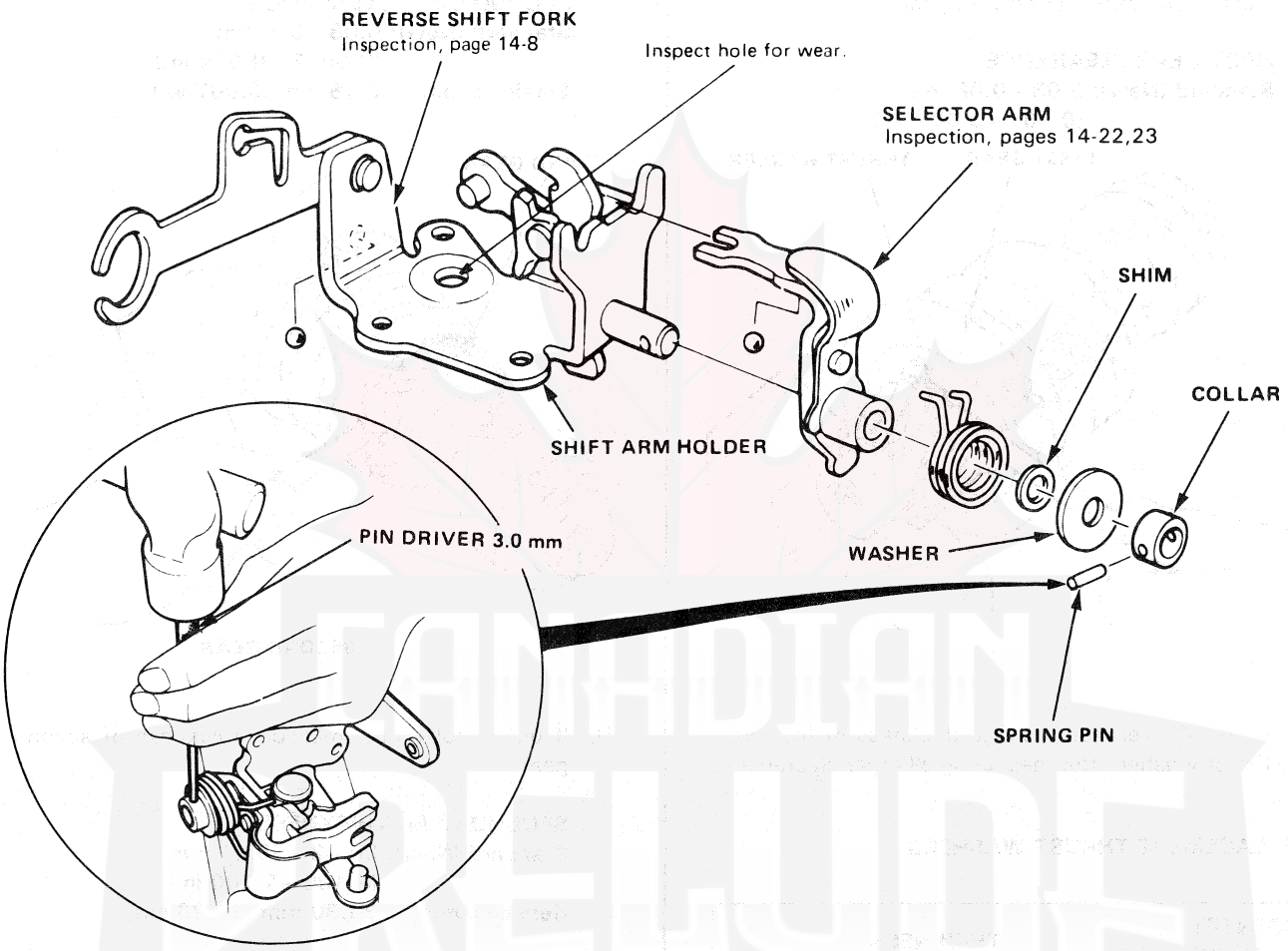
If out of limit, replace second gear.

17. After all clearances have all been checked, and those out of limits corrected, reassemble transmission mainshaft and countershaft and recheck all clearances.
If they are correct, disassemble fifth gear components and reinstall bearings in transmission housing.

Shift Arm Holder

Index

To remove selector arm from holder for shimming or replacement, drive out spring pin with driver.



Clearances

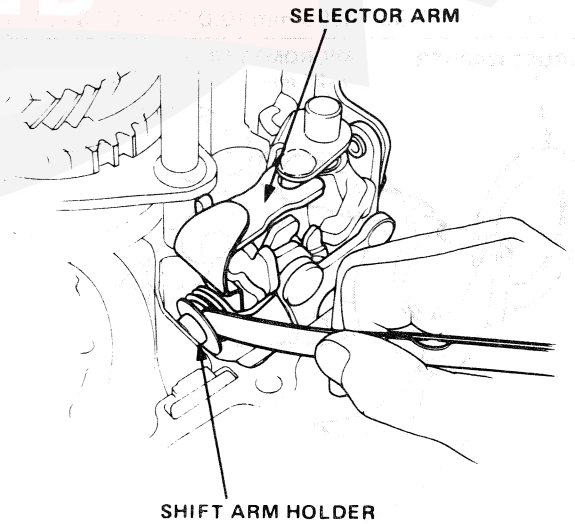
1. Measure clearance between collar and shim on shaft of selector arm as shown.

   CLEARANCE
   Standard (New): 0.01—0.2 mm
   (0.0004—0.008 in.)

2. If out of tolerance, select a new shim from following table.

Collar-to-Selector Arm Shim Clearance:

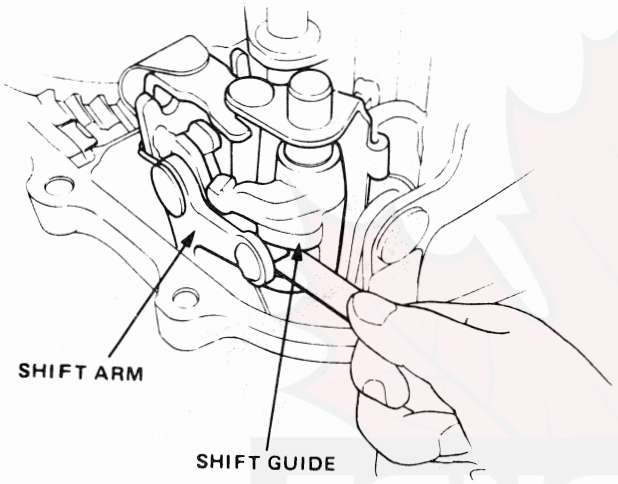
IDENTIFICATION	THICKNESS
A	0.8 mm (0.031 in.)
B	1.0 mm (0.039 in.)
C	1.2 mm (0.047 in.)
D	1.4 mm (0.055 in.)
E	1.6 mm (0.063 in.)



Shift Arm/Selector Arm

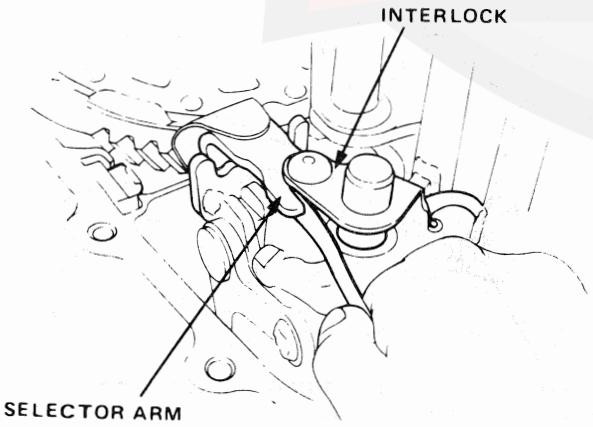
Shift Guide Clearance

1. Check shift arm-to-shift guide clearance.
   Standard (New): 0.1–0.3 mm (0.004–0.012 in.)
   Service Limit: 0.6 mm (0.024 in.)
2. If not within service limit, measure width of slot in shift guide.
   Standard (New): 7.9–8.0 mm (0.311–0.315 in.)
3. If slot is wider than standard, replace shift guide.



Interlock Clearance

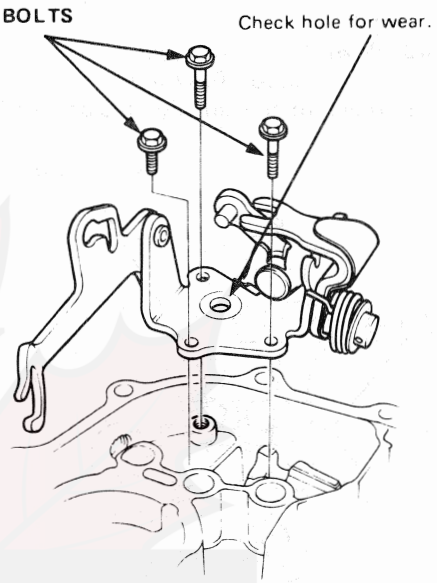
1. Check selector arm-to-interlock clearance.
   Standard (New): 0.05–0.25 mm (0.002–0.01 in.)
   Service Limit: 0.7 mm (0.03 in.)
2. If not within service limit, measure gap between selector arm fingers.
   Standard (New): 10.05–10.15 mm (0.396–0.4 in.)
3. If gap is wider than standard, replace arm.



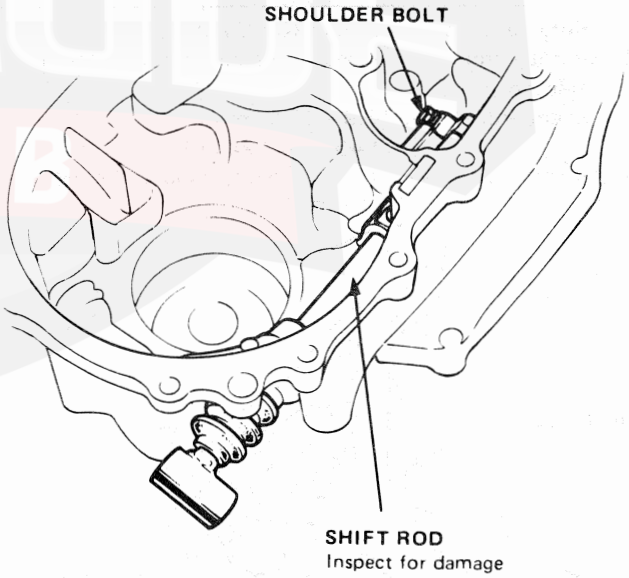
Shift Rod and Shift Arm Holder

Removal

1. Remove shift arm holder (3 bolts).



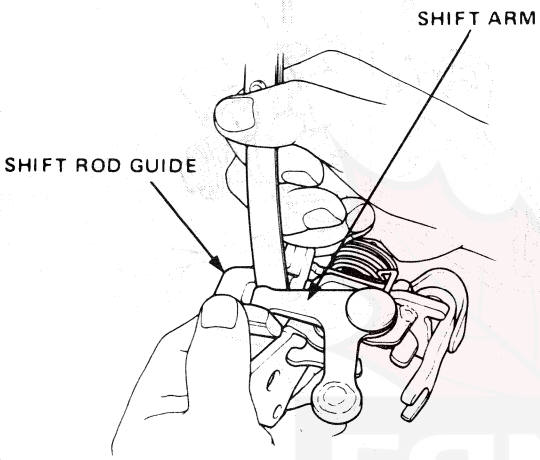
2. Remove shift rod by removing shoulder bolt.



Shift Arm/ Gear Selector Arm

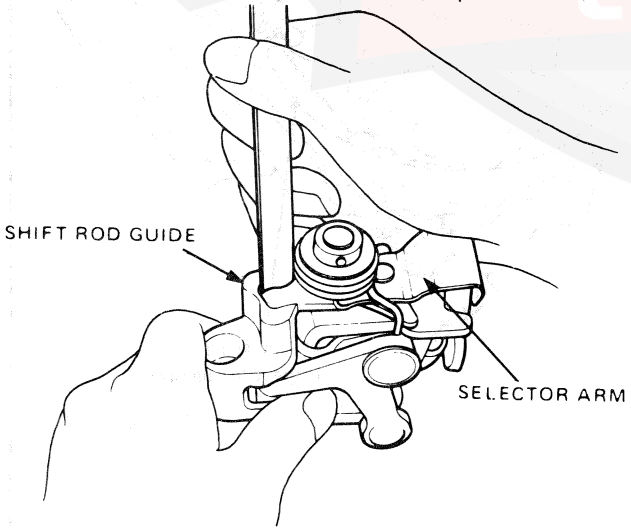
Shift Rod Guide Clearance

1. Check shift arm-to-shift rod guide clearance.
   Standard (New): 0.05—0.35 mm (0.002—0.01 in.)
   Service Limit: 0.8 mm (0.03 in.)
2. If not within service limit, measure width of slot in shift rod guide.
   Standard (New): 11.8—12.0 mm (0.46—0.47 in.)
3. If slot is wider than standard, replace shift rod guide.



Shift Rod Guide Clearance

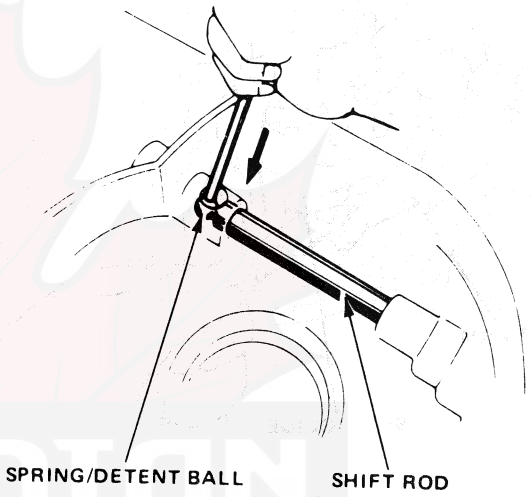
1. Check selector arm-to-shift rod guide clearance.
   Standard (New): 0.05—0.25 mm (0.002—0.01 in.)
   Service Limit: 0.5 mm (0.02 in.)
2. If not within service limit, measure width of tab on selector arm.
   Standard (New): 11.9—12.0 mm (0.469—0.472 in.)
3. If tab is narrower than standard, replace the arm.



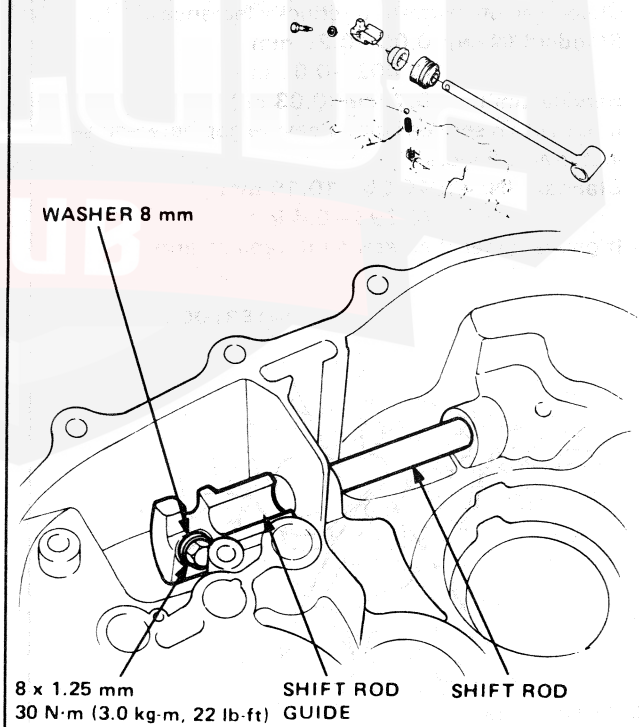
Shift Rod

Installation

1. Install shift rod with detent notches facing downward.
2. Install spring and detent ball. Lubricate spring with molylube.
3. Install shift rod while pushing detent ball in.



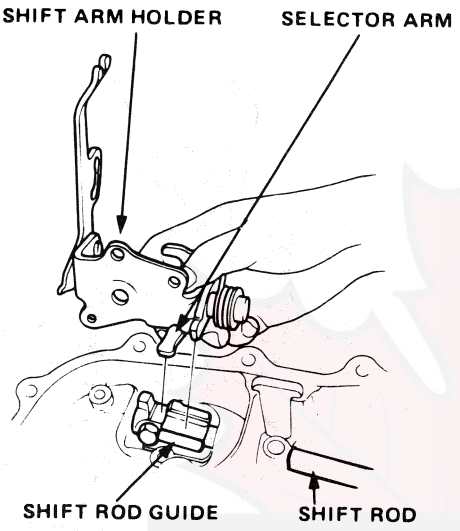
4. Install shift rod guide on shift rod.



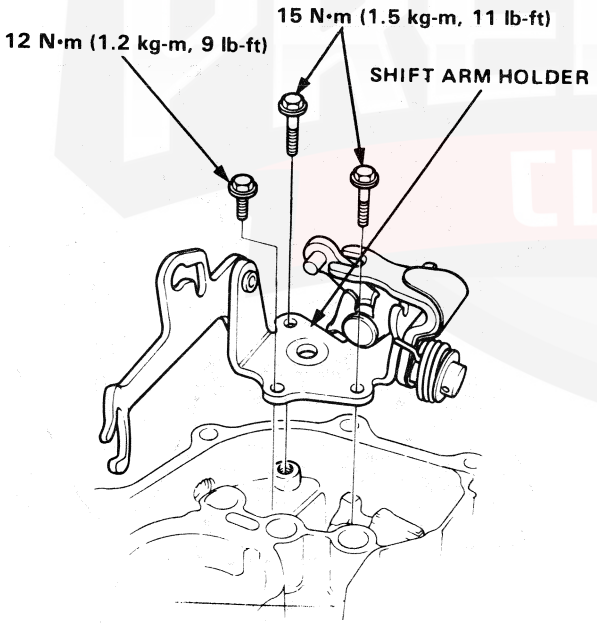
Shift Arm Holder Assy

Installation

1. Hook selector arm and shift arm into shift rod guide.

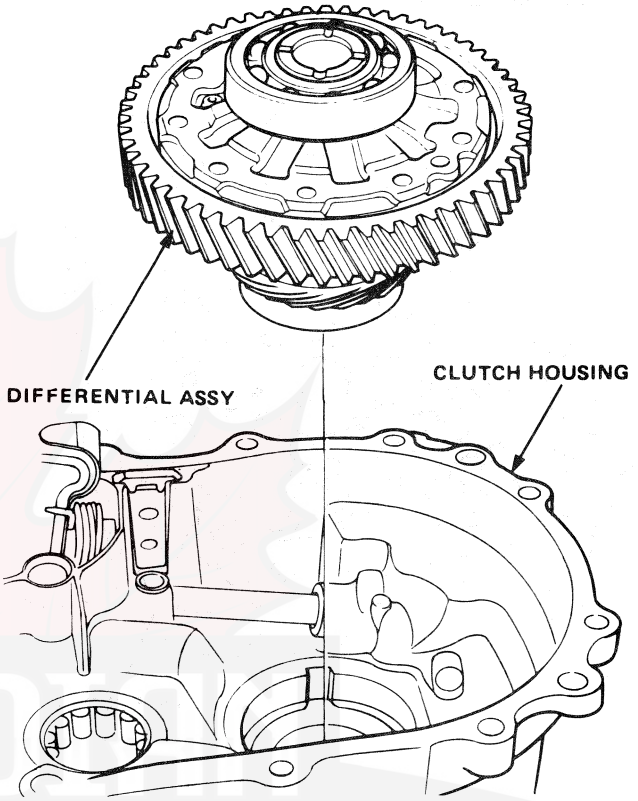


2. Install bolts in shift arm holder.

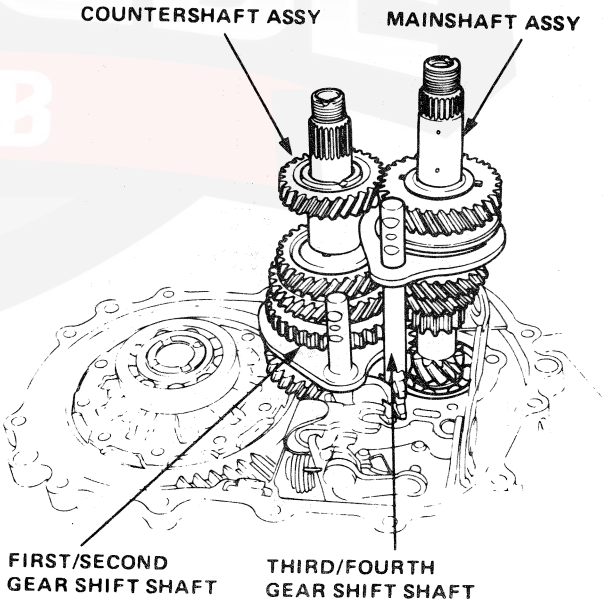


Reassembly

1. Install differential assembly in clutch housing.



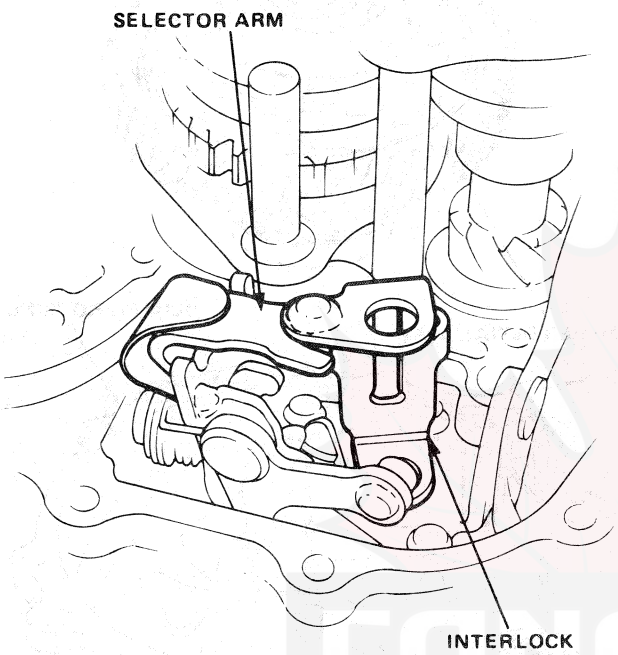
2. Install mainshaft, countershaft, first/second gear shift shaft and third/fourth gear shift shaft together as an assembly. Make sure forks are in fourth and second gear positions to make installation easier.



(cont'd)

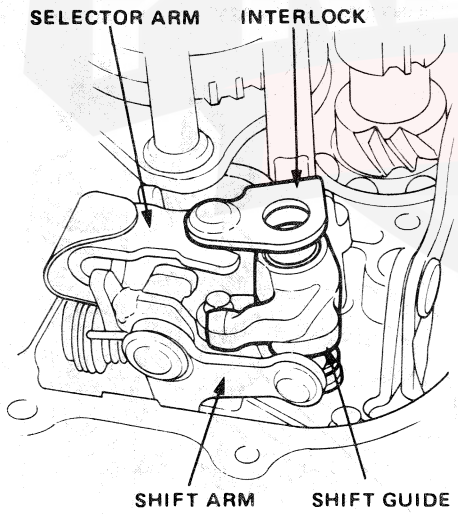
Reassembly (cont'd)

3. Lift mainshaft as shown and install interlock into the selector arm.

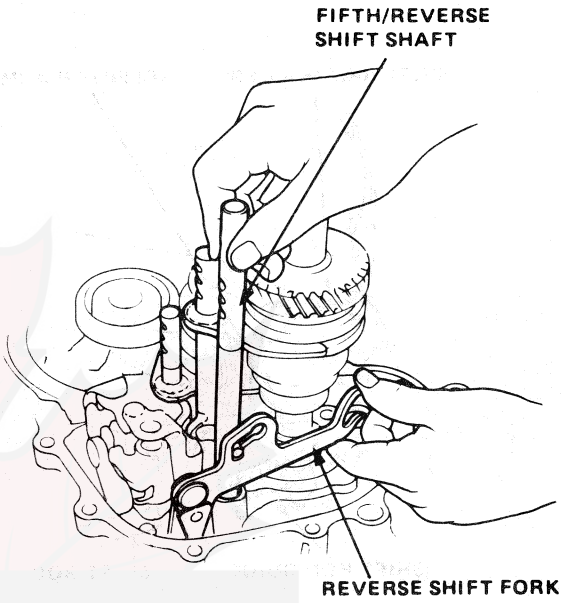


4. Place shift rod in neutral.

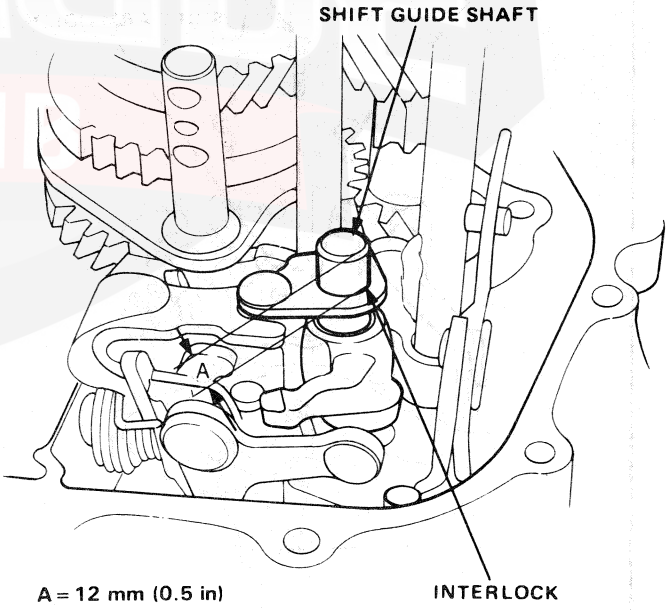
5. Hook interlock into selector arm, first/second gearshift shaft and third/fourth gearshift shaft. Hook shift guide into shift arm.



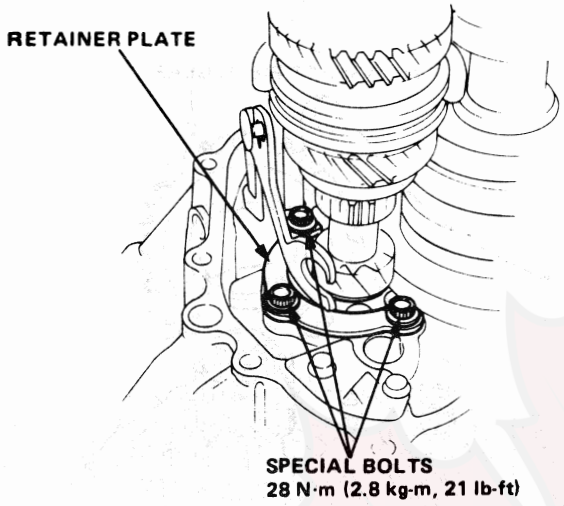
6. Install fifth/reverse shift shaft and hook its pin into reverse shift fork slot.



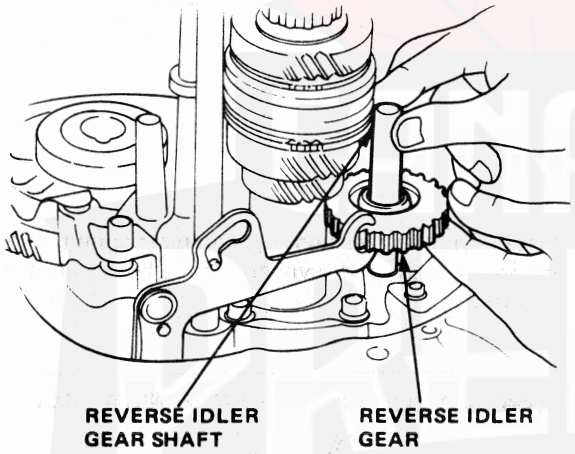
7. Install shift guide shaft so it bottoms securely in clutch housing hole. End of shaft should extend no more than 12 mm (0.5 in.) above interlock as shown.
If not, check installation.



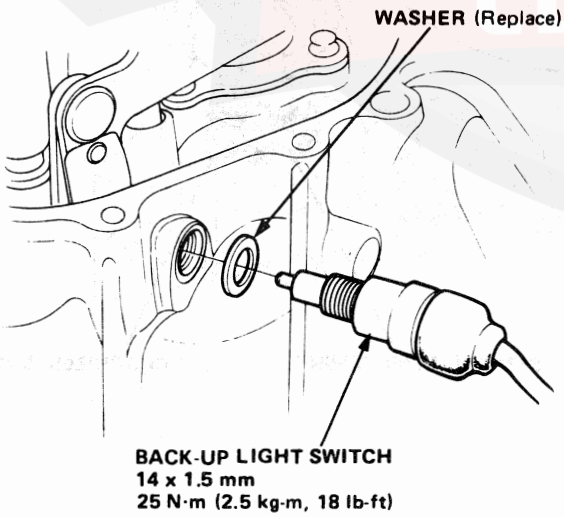
8. Install mainshaft bearing retainer plate.



9. Install reverse idler gear and shaft.



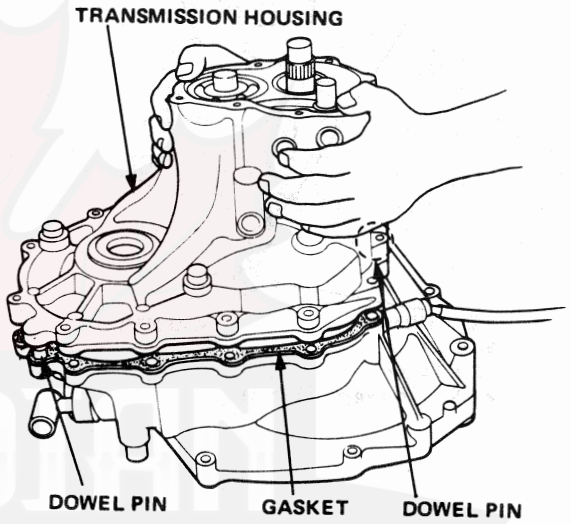
10. Install back-up light switch with new washer.



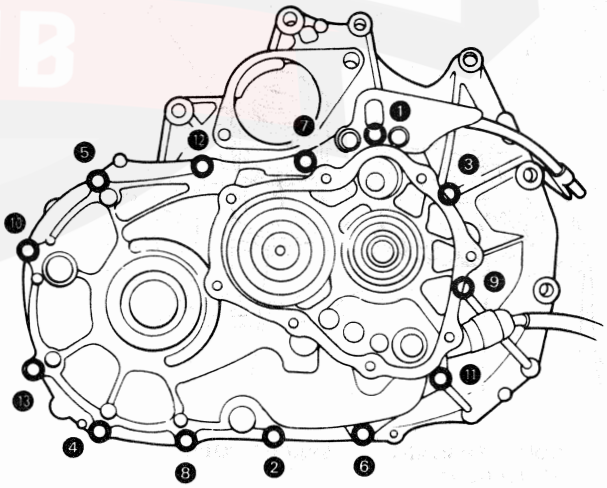
11. Place new gasket on clutch housing.

12. Install dowel pins.

13. Shift transmission into third gear to position shift guide shaft for reassembly. Install transmission housing being careful to line up shafts. Shift guide shaft must seat in blind hole in transmission housing. Do not force installation of housing.



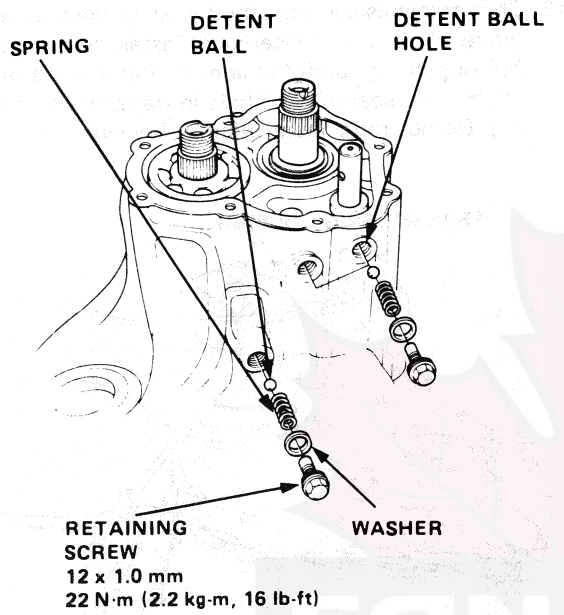
14. Torque bolts (8 × 1.25 mm) in sequence shown, to 28 N•m (2.8 kg-m, 21 lb-ft).



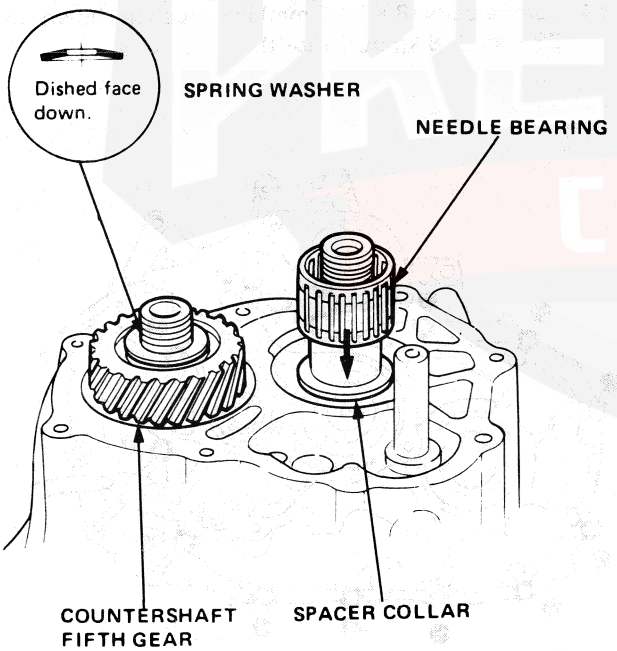
(cont'd)

Reassembly (cont'd)

15. Install three detent balls, washers, and retaining screws.

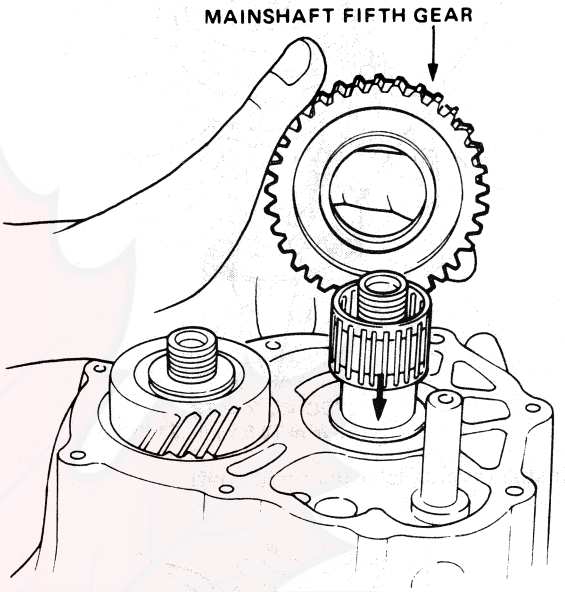


16. Install countershaft fifth gear with high side facing down. Then install spring washer with dished surface facing fifth gear.

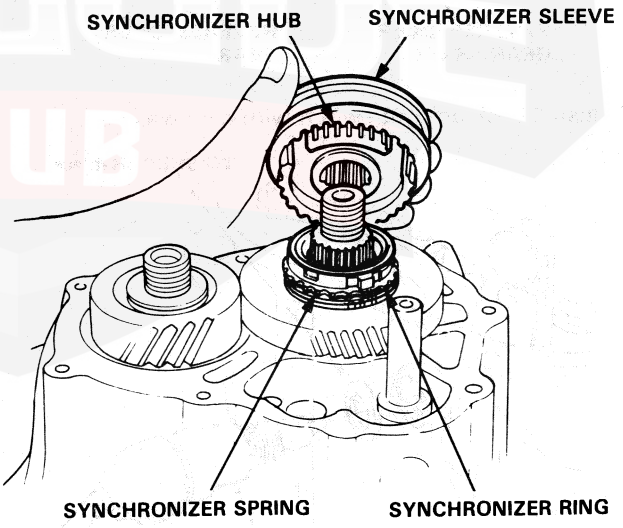


17. Install spacer collar and needle bearing on the mainshaft.

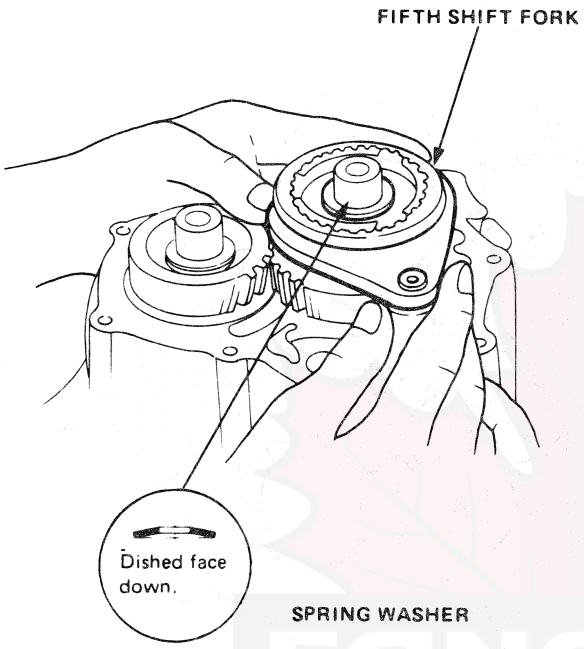
18. Install mainshaft fifth gear.



19. Install synchronizer ring, synchronizer spring, synchronizer hub and synchronizer sleeve on the mainshaft.

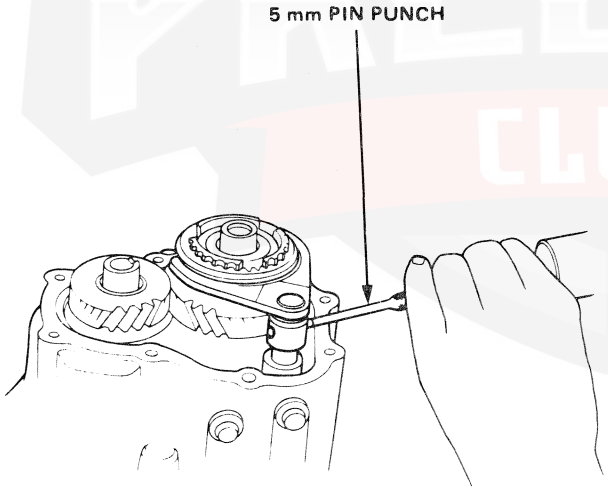


20. Install fifth shift fork into synchronizer sleeve.



21. Install spring washer with dished (concave) surface facing synchronizer hub.

22. Drive spring pin into fifth gear shift fork.

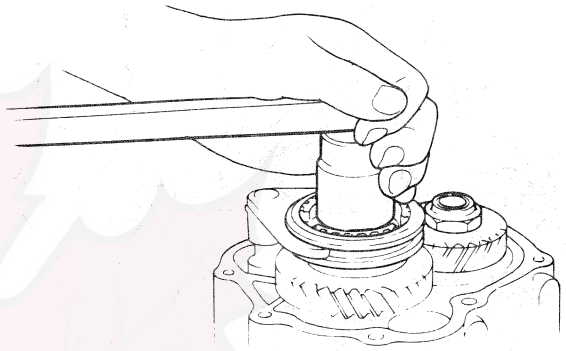


23. Install mainshaft holder 07923–6890101 to prevent shaft from rotating, then shift transmission into reverse gear.

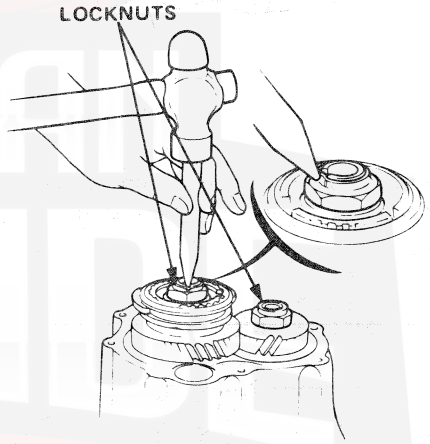
24. Torque mainshaft and countershaft locknuts. Tighten to specified torque, then loosen and retighten to same torque.

    90 N·m (9.0 kg-m, 65 lb-ft) → 0 → 90 N·m (9.0 kg-m, 65 lb-ft)

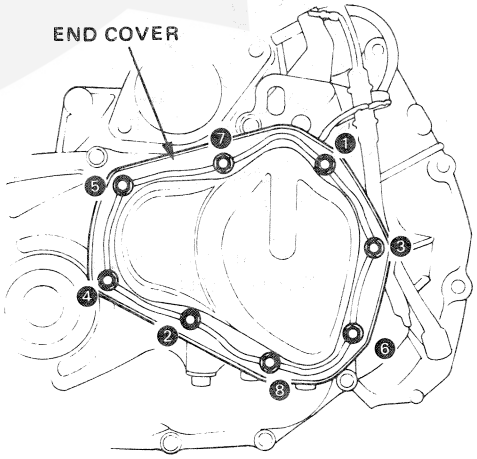
    CAUTION: The mainshaft locknut has left-hand threads.



25. Stake shoulders on locknuts into slots in mainshaft and countershaft.



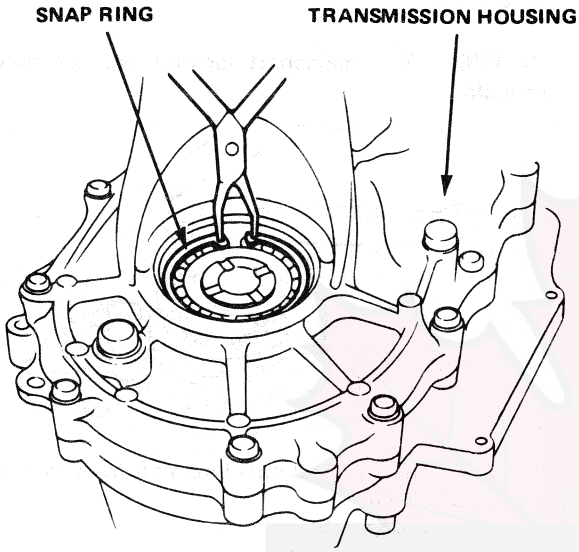
26. Install end cover on transmission housing with new gasket.
27. Torque bolts (6 × 1.0 mm) in sequence shown to 12 N·m (1.2 kg-m, 9 lb-ft).



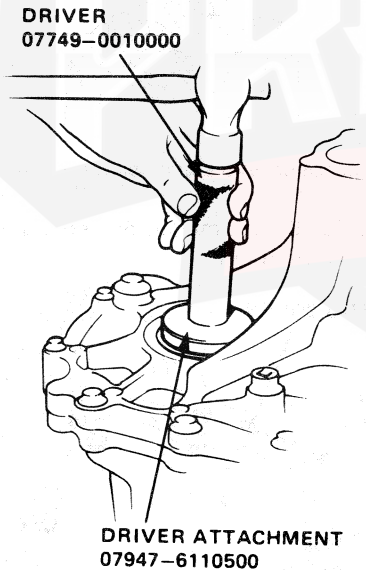
Differential Oil Seal

Installation

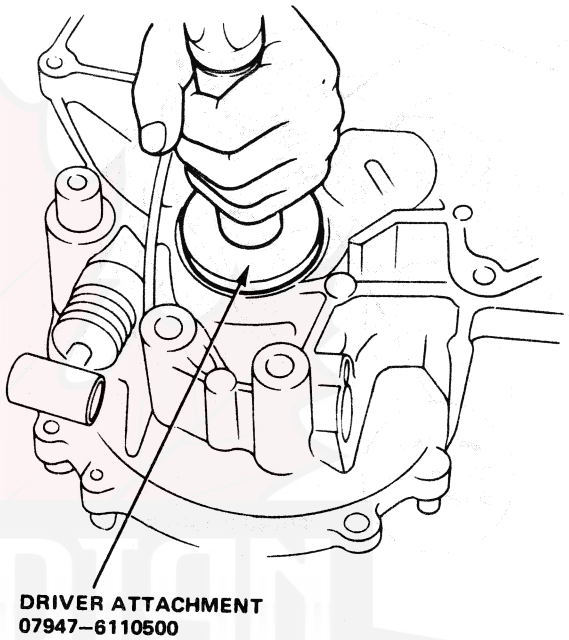
1. Install 80 mm snap ring in transmission housing. If differential bearings or carrier were replaced, select snap ring of correct thickness as shown on page 16-10.



2. Drive oil seal into transmission housing with part number side facing away from snap ring.



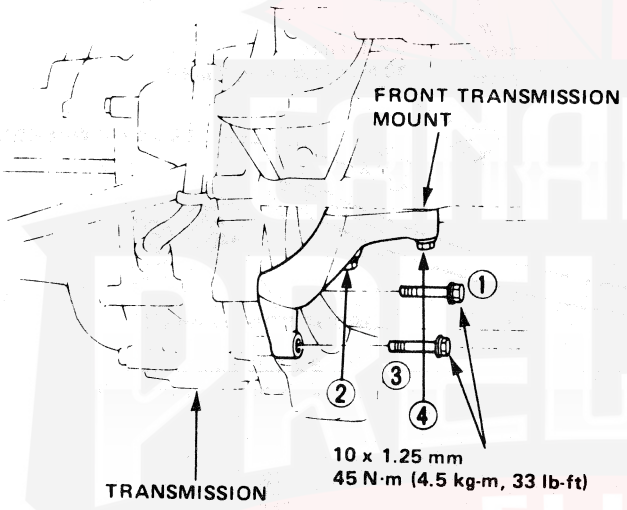
3. Drive differential oil seal into clutch housing with part number side facing away from bearing.

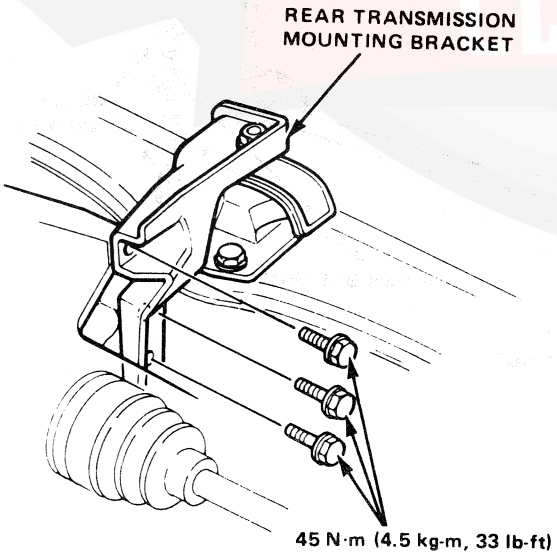


Installation

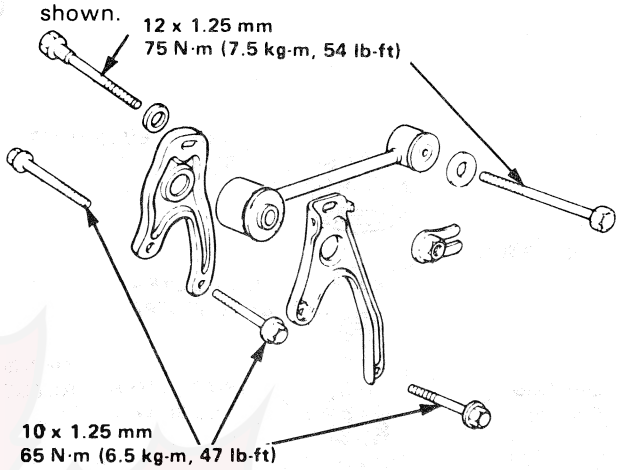
Car Raised on Hoist

1. Place transmission on transmission jack.
   NOTE: Clean and grease the release bearing sliding surface.
2. Check that two 14 mm dowel pins are installed in clutch housing.
3. Raise transmission far enough to align dowel pins with matching holes in block.
4. Roll transmission toward engine and fit mainshaft into clutch disc splines. If driver's side suspension was left in place, install new spring clips on both axles, then carefully insert left axle into differential as you install transmission.
5. Push and wiggle transmission until it fits flush with engine flange.
6. Tighten bolts until clutch housing is seated against block.
7. Loosely install the bolts for the front transmission mount, then torque to 45 N·m (4.5 kg-m, 33 lb-ft) in the sequence shown.





8. Install the upper torque arm and its brackets as shown.



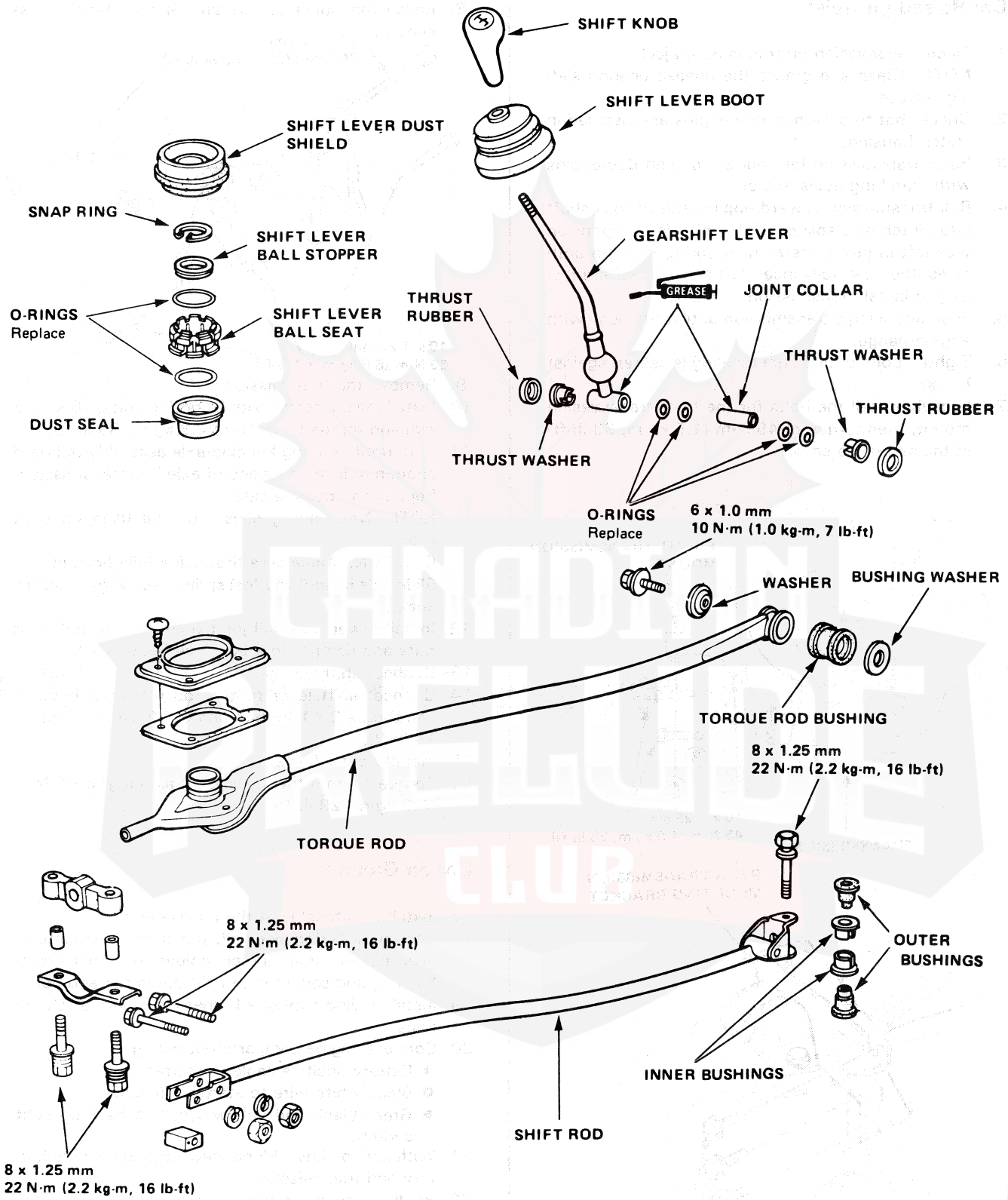
9. Remove the transmission jack.
10. Install the starter with its mounting bolts, 10 × 1.25 mm and torque to 45 N·m (4.5 kg-m, 33 lb-ft).
11. Turn right steering knuckle/axle assembly outward enough to insert free end of axle into transmission. Repeat on opposite side.
    NOTE: New spring clips must be used on both axles.
    CAUTION: Make sure that axles fully bottom. Slide axle in until you feel spring clips engage differential.
12. Install lower arm ball joint bolts, tie-rod ball joint nuts and damper fork bolt (see Section 20).
13. Connect shift linkage.
14. Connect shift lever torque rod to clutch housing and torque 8 × 1.25 mm bolt to 22 N·m (2.2 kg-m, 16 lb-ft).
15. Install front wheels.
16. Torque 14 mm transmission drain plug to 40 N·m (4.0 kg-m, 29 lb-ft).

Car on Ground

17. Install clutch cable at the release arm.
18. Coat new O-ring with oil, put it on speedometer gear holder, then install holder in transmission housing and secure with hold-down tab and bolt.
19. Install engine sub-wire harness in clamp at clutch housing.
20. Connect engine compartment wiring:
    - Battery positive cable to starter.
    - Black/white wire to starter solenoid.
    - Green/black and yellow wires to back-up light switch.
21. With ignition key OFF connect ground cable to battery and transmission.
22. Refill transmission with recommend oil (page 14-2).
23. Check transmission for smooth operation.

Gearshift Mechanism

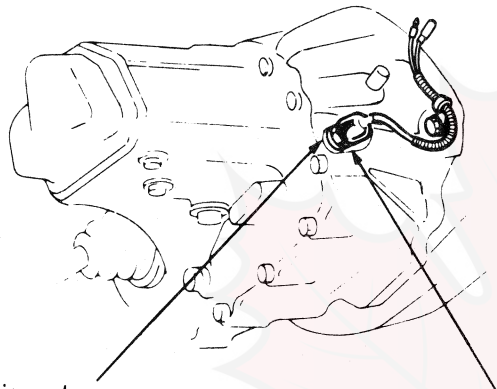
Overhaul



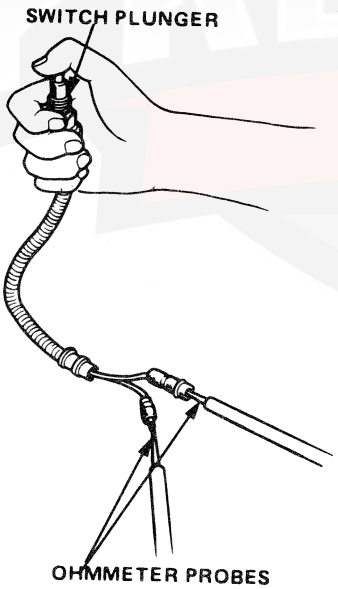
Back-up Light Switch

Testing

1. Test back-up light switch by placing gearshift lever in reverse and turning ignition switch to ON.
2. If back-up lights do not go on, check the fuse.
3. If the fuse is good, remove the back-up light switch.

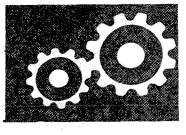


4. Using an ohmmeter, check for switch continuity by pressing in on switch plunger. If no continuity, replace switch.



Automatic Transmission

(Fuel-Injected Engnie)



Description

The Honda Automatic Transmission is a combination of a 3-element torque converter and dual-shaft automatic transmission which provides 4 speeds forward and 1 speed reverse. The entire unit is positioned in line with engine.

TORQUE CONVERTER, GEARS, AND CLUTCHES

The torque converter consists of a pump, turbine and stator, assembled in a single unit.
They are connected to the engine crankshaft so they turn together as a unit as the engine turns. Around the outside of the torque converter is a ring gear which meshes with the starter pinion when the engine is being started. The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.
The transmission has two parallel shafts, the mainshaft and countershaft. The mainshaft is in line with the engine crankshaft.
The mainshaft includes the clutches for 1st, and 2nd/4th, and gears for 3rd, 2nd, 4th, Reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with 4th gear).
The countershaft includes 3rd clutch and gears for 3rd, and 4th, Reverse and 1st.
4th and reverse gears can be locked to the countershaft at its center, providing 4th gear or Reverse, depending on which way the selector is moved.
The gears on the mainshaft are in constant mesh with those on the countershaft. When certain combinations of gears in the transmission are engaged by the clutches, power is transmitted from the mainshaft to the countershaft to provide D3 , D4 , 2 or REVERSE.

HYDRAULIC CONTROL

The valve assembly includes the main valve body, secondary valve body, servo valve body, modulator valve body, regulator valve body and lock-up shift valve body, through the respective separator plates.
They are bolted to the torque converter case as an assembly.
The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, pressure relief valve, 2nd orifice control valve, and oil pump gear.
The secondary valve body includes the CPC valve, REV control valve, lock-up cut valve, kickdown valve, 3-2 timing valve and shift timing valves.

The servo valve body contains the accumulator pistons, 3rd orifice control valve, throttle A and B valves, and the modulator valve. The regulator valve body contains the lock-up timing valves, pressure regulator valve and lock-up control valve. Fluid from the regulator passes through the manual valve to the various control valves.

The lock-up shift valve body contains a lock-up timing valve and lock-up shift valve. The 1st, 3rd and 4th cluches receive oil from their respective feed pipes.

LOCK-UP MECHANISM

In D4, in 2nd, 3rd and 4th, pressurized fluid is drained from the back of the torque converter through an oil passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft.

The lock-up shift valve body controls the range of lock-up according to vehicle speed and throttle pressure. The lock-up timing valve controls the flow of oil to the lock-up shift valve in 2nd, 3rd and 4th gears (in D4 range).

The lock-up cut valve is housed in the secondary valve body and prevents lock-up from taking place when the throttle is not opened sufficiently.

GEAR SELECTION

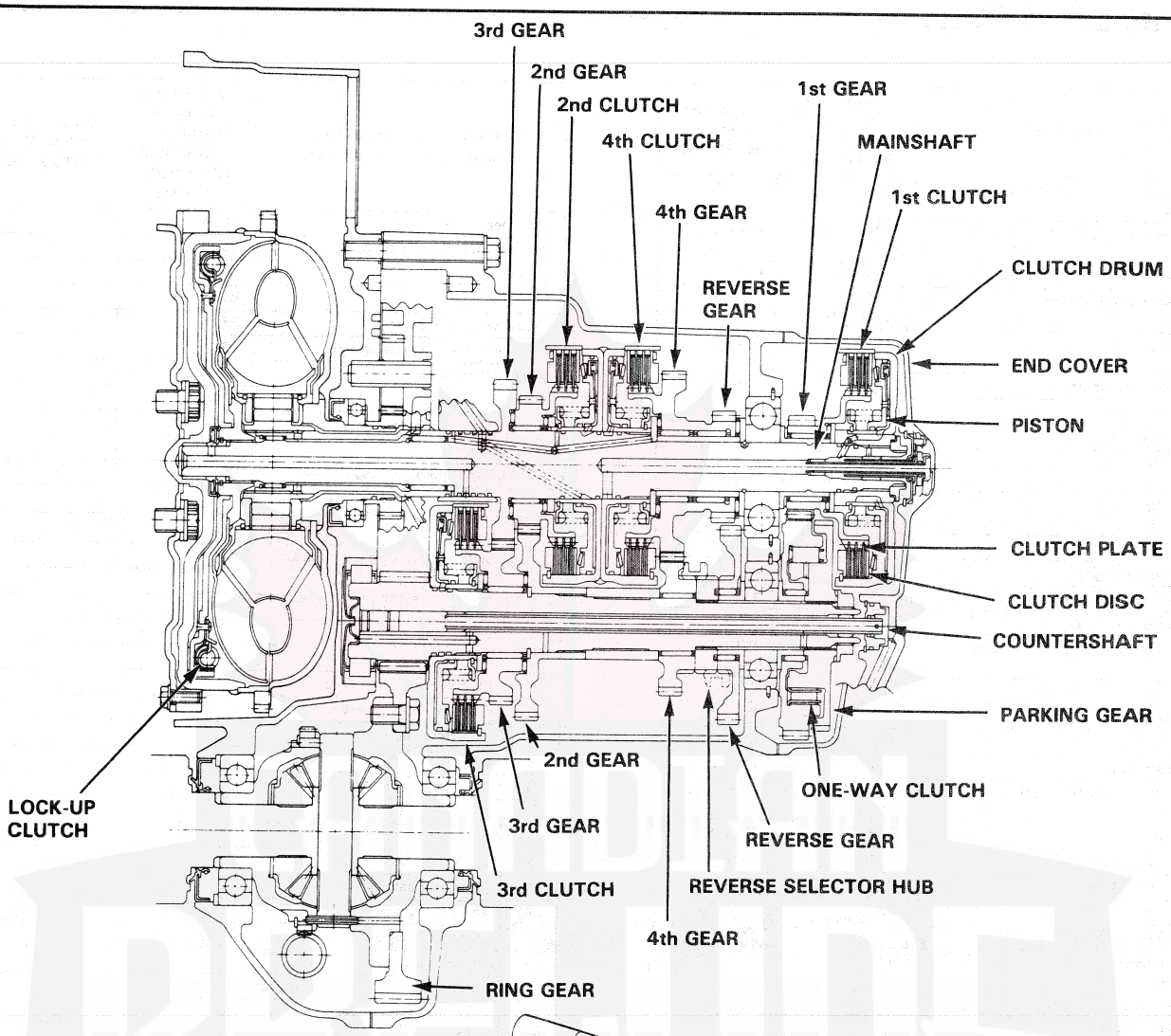
The selector lever has six positions: P PARK, R REVERSE, N NEUTRAL, D4 1st through 4th gear ranges, D3 1st through 3rd gear ranges, and 2 2nd gear.

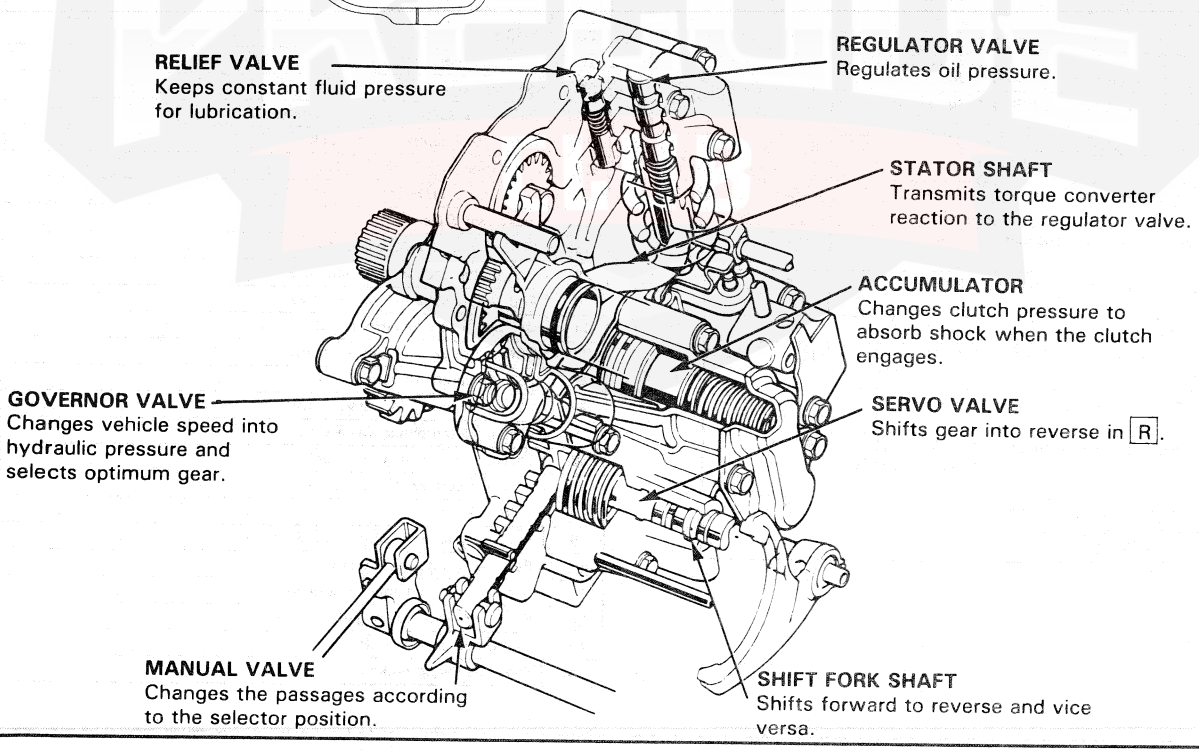
Position	Discription
P PARK	Front wheels locked; parking pawl engaged with parking gear on countershaft. All clutches released.
R REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th gear clutch locked.
N NEUTRAL	All clutches released.
D4 DRIVE (1 through 4)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshifts through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism comes into operation in 2nd, 3rd and 4th when the transmission is in D4.
D3 DRIVE (1 through 3)	For rapid acceleration at highway speeds and general driving; starts off in 1st, shifts automatically to 2nd, then 3rd, depending on vehicle speed and throttle position. Downshifts through 2nd to 1st on deceleration to stop.
2 SECOND	For engine braking or better traction starting off on loose or slippery surfaces; stays in 2nd gear, does not shift up or down.

Starting is possible only in P and N trough use of a slide-type, neutral-safety switch.

POSITION INDICATOR

A position indicator in the instrument panel shows what gear has been selected without having to look down at the console.





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, 44, 48	C, M, O
Car moves in D3, D4 and R, but not in 2.	9, 30, 49	C, L
Car moves in D3, D4 and 2, but not in R.	1, 11, 12, 22, 38, 39, 40	C, L, Q
Car moves in N.	1, 8, 9, 10, 11 46, 47	C, D
Excessive idle vibration.	5, 17	B, K, L
Slips in all gear.	6, 7, 16	C, L, U
Slips in low gear.	8, 29, 44, 45, 48	C, N, O, U
Slips in 2nd gear.	9, 20, 23, 30, 45, 49	C, L, U
Slips in 3rd gear.	10, 21, 23, 31, 44, 45	C, L, U
Slips in 4th gear.	11, 23, 32, 45	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, 47	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.	43, 50	L, P, Q
Axle(s) stuck in trans.	43	L, Q
Ratcheting noise when shifting into R.	6, 7, 38, 39, 40	K, L, Q
Loud popping noise when taking off in R.	38, 39, 40	L, Q
Ratcheting noise when shifting from R to P, or from R to N.	38, 39, 40, 51	L, Q
Noise from trans in all selector lever positions.	6, 17	K, L, Q
Noise from trans only when wheels rolling.	39, 42	L, Q
Gear whine, rpm related (pitch changes with shifts).	6, 41	K, L, Q
Gear whine, speed related (pitch changes with speed).	39, 42	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	E, L, V
Transmission has multitude of problems shifting, at disassembly large deposits of metal found on magnet.	43	L, Q

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 lock 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.	3rd 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.	4rh/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.	Shift fork bent
39.	Reverse gears worn/damaged (3 gears)
40.	Reverse selector gear worn
41.	3rd gears worn/damaged (2 gears)
42.	Final gears worn/damaged (2 gears)
43.	Differential pinion shaft worn
44.	Feedpipe O-ring broken

PROBABLE CAUSE	
45.	Servo valve check valve loose
46.	Gear clearance incorrect
47.	Clutch clearance incorrect
48.	Sprag clutch defective
49.	Sealing rings/guide worn
50.	Axle-inboard joint clip missing
51.	4th gears worn/damaged (2 gears)

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 on page 15-51.
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 whirring 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 assy and replace oil screen and thoroughly 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 case. 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 cable adjustment may clear this problem. See page 15-72
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.

Road Test

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**

	1st → 2nd	2nd → 3rd	3rd → 4th	LC. ON
Full-throttle Acceleration from a stop	31—36 mph	58—64 mph	88—94 mph	74—81 mph
Half-throttle Acceleration from a stop	18—22 mph	37—43 mph	57—64 mph	41—47 mph
Closed-throttle Coasting down-hill from a stop	10—12 mph	19—23 mph	26—32 mph	14—18 mph

- **Downshift**

	4th → 3rd	3rd → 2nd	2nd → 1st
Full-throttle When car is slowed by increased grade, wind, etc.	73—80 mph	53—60 mph	21—27 mph

	4th → 2nd	2nd → 1st
Closed-throttle Coasting or braking to a stop	15—19 mph	5—8 mph

3. Accelerate to about 35 mph 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 60 mph; 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)

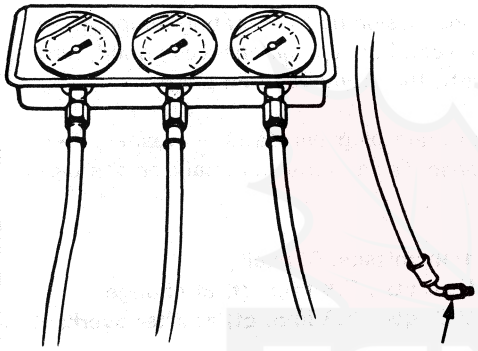
Park car on a slope (approx. 16°), apply the parking brake, and shift into Park. Then release the brake; the car should not move.

Pressure Test

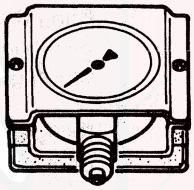
NOTE:

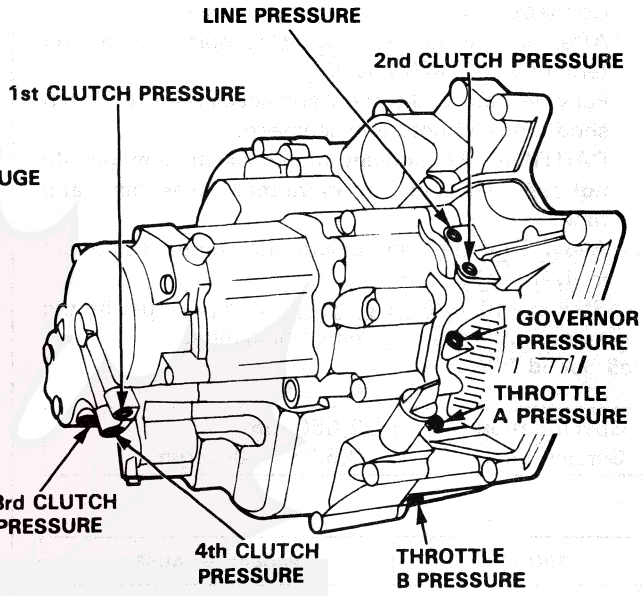
- Stop engine when attaching hoses for pressure tests.
  Torque hose fitting to 18 N·m (1.8 kg-m, 12 lb-ft).
- Do not reuse aluminum washers.
- For throttle and governor test, use Low Pressure Gauge, 07406–0070000.

GAUGE SET 07406–00200003
(includes pressure hose set 07406–0020201)



LOW PRESSURE GAUGE
(07406–0070000)





HOSE FITTING

CAUTION: Before checking, be sure transmission is filled to proper level.

PRESSURE	SELECTOR POSITION	MEASUREMENT	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
					Standard	Service Limit
LINE	N or P	• With parking brake applied • Run engine at 2,000 rpm	No (or low) LINE pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump	834–883 kPa (8.5–9.0 kg/cm², 121–128 psi)	785 kPa (8.0 kg/cm², 114 psi)
1st	D3 or D4	MEASUREMENTS • With parking brake applied raise front wheels off ground and support with safety stands. • Run engine at 2,000 rpm	No (or low) First pressure	1st clutch O-rings	785–883 kPa (8.0–9.0 kg/cm², 114–128 psi)	785 kPa (8.0 kg/cm², 114 psi)
2nd	2		No (or low) SECOND pressure	2nd clutch O-rings	441–883 kPa (4.5–9.0 kg/cm², 64–128 psi) varies with throttle opening.	392 kPa (4.0 kg/cm², 57 psi) with lever released. 785 kPa (8.0 kg/cm², 114 psi) with lever in full throttle.
3rd	D3		No (or low) THIRD pressure	3rd clutch		
4th	D4		No (or low) FOURTH pressure	4th clutch		
	R			Servo valve		
THROTTLE	D3 or D4	• With parking brake applied raise front wheels off ground and support with safety stands. • Run engine at 1,000 rpm. • Disconnect throttle control cable at throttle lever. • Read pressure with lever released. • Manually push lever up simulating full throttle. • Read pressure with lever in full throttle position.	No (or low) THROTTLE pressure	Throttle valve A Throttle modulator valve	0 kPa (0 kg/cm², 0 psi) lever is released. 495–510 kPa, (5.05–5.20 kg/cm², 72–74 psi) with lever in full throttle position.	490 kPa (5.00 kg/cm², 71 psi) with lever in full throttle position.
				Throttle valve B	0 kPa (0 kg/cm², 0 psi) with lever released. 834–883 kPa (8.5–9.0 kg/cm², 121–128 psi) with lever in full throttle position.	785 kPa (8.0 kg/cm², 114 psi)
GOVERNOR	D3 or D4	• Place vehicle on chassis dynamometer, or jack up front of car, support with safety stands, block rear wheels, and set hand brake. • Run vehicle at 38 mph	No (or low) GOVERNOR pressure	Governor valve	221–230 kPa (2.25 2.35 kg/cm², 32–33 psi)	216 kPa (2.20 kg/cm², 31 psi)

Stall Speed

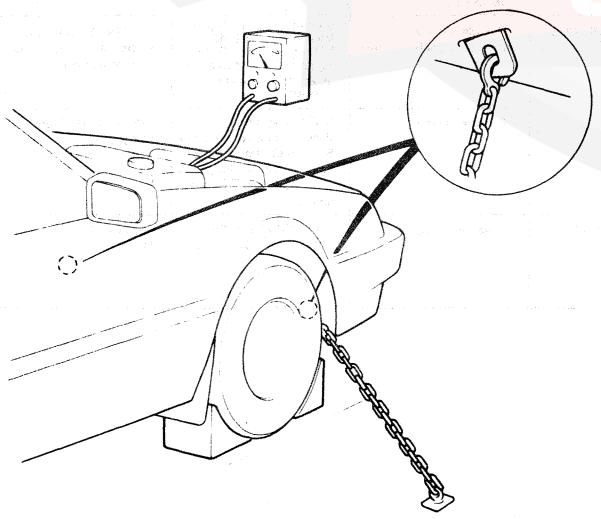
Test

1. Engage parking brake and block front wheels.
2. Connect safety chains to both front tow hooks and attach, with minimum slack, to some strong stationary object.
3. Connect tachometer, and start engine.
4. After engine has warmed up to normal operating temperature, shift into [D3].
5. Fully depress brake pedal and acceleraror for 6 to 8 seconds, and note engine speed.
   CAUTION: To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.
6. Allow 2 minutes for cooling, then repeat same test in [D4], [2] and [R]
   Stall speed in [D3], [D4], [2], and [R] must be the same, and must also be within limits:

Stall Speed RPM:

Specification:	2,650 rpm
Service Limit:	2,500—2,800 rpm

TROUBLE	PROBABLE CAUSE
Stall rpm high in [2], [D3], [D4] & [R].	Low fluid level or oil pump output, clogged oil strainer, pressure regulator valve stuck closed. Slipping clutch.
Stall rpm high in [D3], [D4] only.	Slippage of 1st clutch
Stall rpm low in [2], [D3], [D4] & [R].	• Engine output low, throttle cable misadjusted at throttle body. • Oil pump seized. • Torque Converter one-way clutch slipping.



Maintenance

Checking/Changing

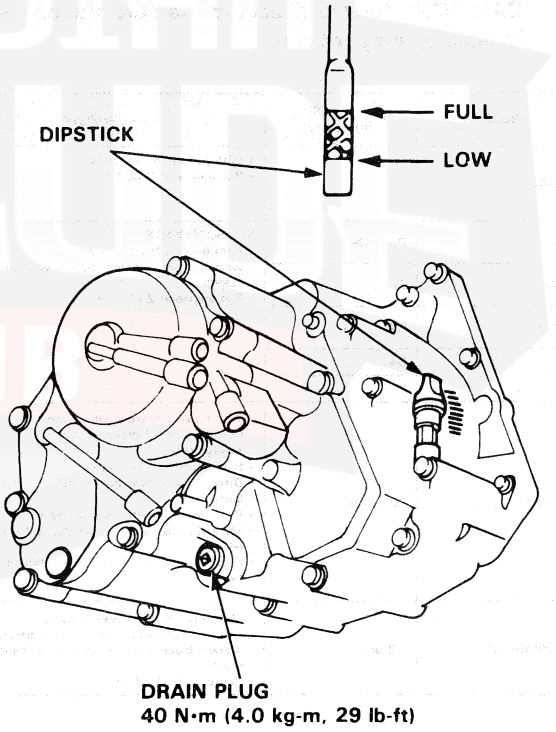
Checking

With the car on level ground, unscrew 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. Do not screw dipstick in to check the fluid level. If the level is at, or below, the low mark, add DEXRON-type automatic transmission fluid.

Changing

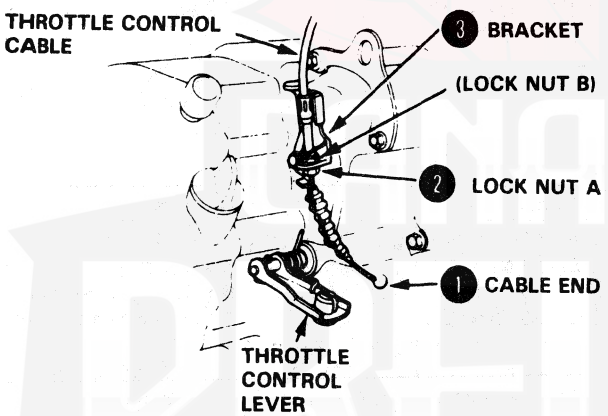
1. Bring the transmission up to operating temperature by driving the car. Park the car on level ground, turn the engine off, then remove drain plug.
2. Reinstall the drain plug with a new washer, then refill the transmission to the full mark on the dipstick.

Automatic transmission Capacity:
3.0 ℓ (3.2 U.S. qts., 2.6 Imp. qt) at change
6.0 ℓ (6.3 U.S. qts., 5.3 Imp. qt) at after overhaul



Removal

1. Disconnect ground cable at battery and transmission.
2. Release steering lock, and shift gear selector to N.
3. Disconnect wiring:
   - Battery positive cable from starter.
   - Black/white wire from starter solenoid.
4. Disconnect cooler hoses, and wire them up next to the radiator so ATF won't drain out.
5. Remove starter mounting bolts and top transmission mounting bolt.
6. Loosen front wheel nuts.
7. Apply parking brake, block rear wheels, then raise front end on jack stands and remove front wheels.
8. Drain transmission. Reinstall drain plug with a new washer.
9. Remove throttle control cable:
   - Remove the cable end from the throttle lever.
   - Loosen the lock nut A only.
   - Remove the cable from bracket.

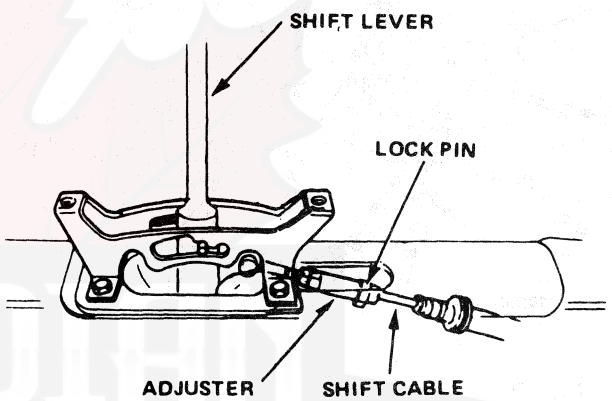


NOTE: For cable adjustment see page 15-72.

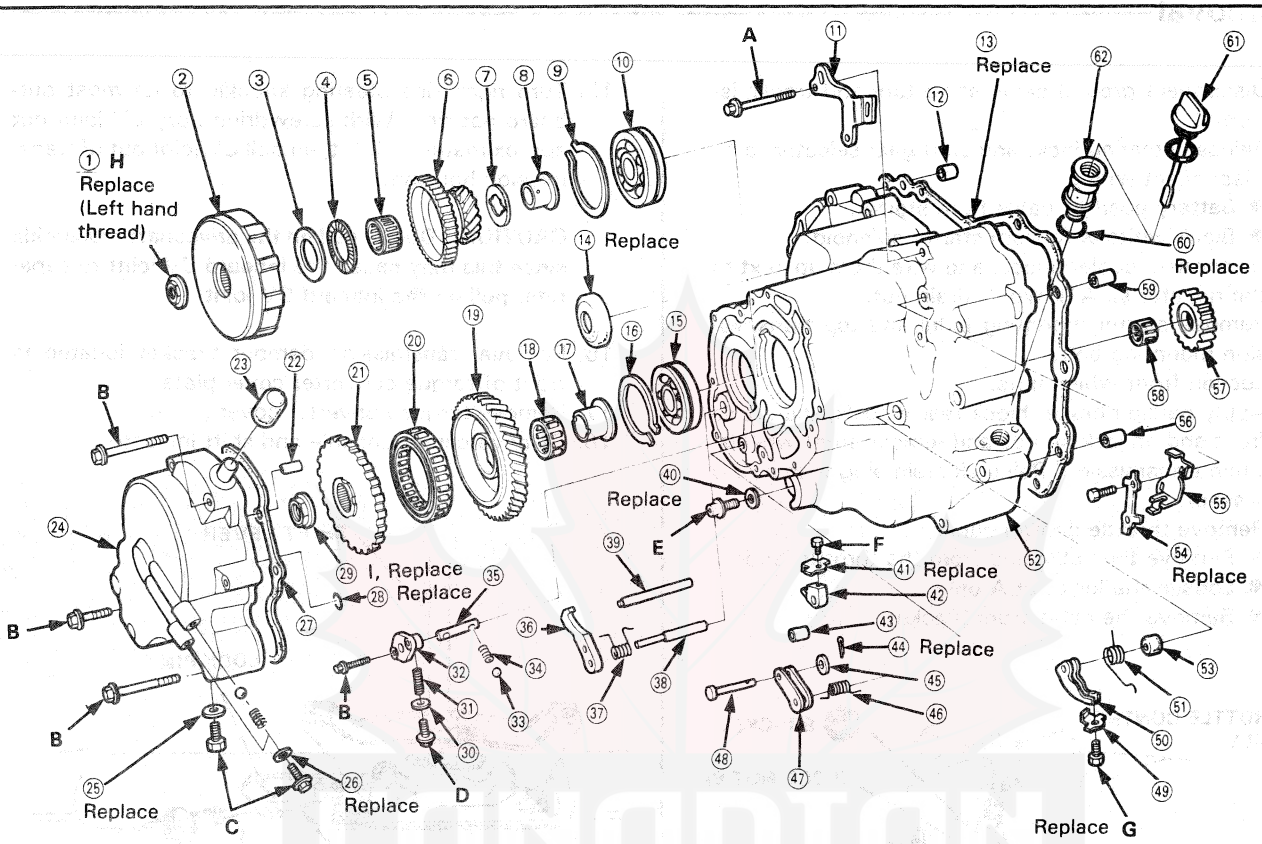
10. Remove power steering speed sensor complete with speedometer cable and hoses.
11. Remove two upper transmission mounting bolts.
12. Place transmission jack securely beneath transmission, and hook hanger plate with hoist; make sure hoist chain is tight.
13. Remove subframe center beam and splash pan.
14. Remove the ball joint pinch bolt from the right-side lower control arm, then use a puller to disconnect the ball joint from the knuckle. Removethe damper fork bolt.
15. Turn right side steering knuckle to its most outboard position. With screwdriver, pry CV joint out approximately 1/2'', then pull CV joint out of transmission housing.

    CAUTION: Do not pull on the driveshaft or knuckle since this may cause the inboard CV joint to separate; pull on the inboard CV joint.

16. Remove transmission damper bracket located in front of torque converter cover plate.
17. Remove torque converter cover plate.
18. Remove center console and shift indicator.



19. Remove lock pin from adjuster and shift cable.
    NOTE: On reassembly, check cable adjustment page 15-71.
20. Remove both bolts and pull shift cable out of housing.
21. Unbolt torque converter assy from drive plate by removing eight bolts.
22. Remove the three rear engine mounting bolts from transmission housing.
    Remove the rear engine mount.
23. Remove the front transmission mount's two bolts.
24. Remove the lower transmission mounting bolt.
25. Pull transmission away from the engine to clear the two 14 mm dowel pins.
    - Pry left-side CV joint out approximately 1/2''.
    - Pull transmission out and lower on tansmission jack.
    - Remove torque converter from transmission.



NOTE:

- Clean all parts throughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Coat all parts with ATF before reassembly.

Torque	Bolt size
A—45 N·m (4.5 kg-m, 32 lb-ft)	10 x 1.25 mm
B—12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm
C—18 N·m (1.8 kg-m, 13 lb-ft)	8 x 1.25 mm Sealing
D—28 N·m (2.8 kg-m, 20 lb-ft)	10 x 1.25 mm Special
E—40 N·m (4.0 kg-m, 29 lb-ft)	14 x 1.5 mm Drain
F—14 N·m (1.4 kg-m, 11 lb-ft)	6 x 1.0 mm Special
G—8 N·m (0.8 kg-m, 6 lb-ft)	5 x 0.8 mm
H—95 → 0 → 95 N·m (9.5 → 0 → 9.5 kg-m, 70 → 0 → 70 lb-ft)	19 x 1.25 mm
I—140 → 0 → 140 N·m (14.0 → 0 → 14.0 kg-m, 102 → 0 → 102 lb-ft)	23 x 1.25 mm

① **MAINSHAFT LOCK NUT**
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Installation, page 15-61
② **1st CLUTCH**
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③ **THRUST WASHER 26 mm**
④ **THRUST NEEDLE BEARING 31 x 47 x 2 mm**
⑤ **NEEDLE BEARING 31 x 36 x 18.5 mm**
⑥ **MAINSHAFT 1st GEAR**
⑦ **THRUST WASHER**
⑧ **COLLAR 26 mm**
⑨ **SNAP RING 75 mm**
⑩ **MAINSHAFT BEARING**
Replacement, page 15-47
⑪ **HANGER**
⑫ **DOWEL PIN 14 x 25 mm**
⑬ **GASKET**
⑭ **DIFFERENTIAL OIL SEAL**
Installation, page 15-45
⑮ **COUNTERSHAFT BEARING**
⑯ **SNAP RING 68 mm**
⑰ **1st GEAR COLLAR**
⑱ **NEEDLE BEARING**
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⑳ **ONE-WAY CLUTCH**
㉑ **PARKING GEAR**
㉒ **DOWEL PIN 8 x 14 mm**
㉓ **BREATHER CAP**
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㉕ **WASHER**
㉖ **WASHER**
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㊴ **STOP PIN**
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㊶ **LOCK PLATE**
㊷ **PARKING LEVER**
㊸ **PARKING PAWL ROLLER**
㊹ **COTTER PIN**
㊺ **WASHER**
㊻ **RETURN SPRING**
㊼ **PARKING SHIFT ARM**
㊽ **ROLLER PIN**
㊾ **LOCK PLATE**
㊿ **THROTTLE CONTROL LEVER**
(51) **THROTTLE CONTROL SHAFT SPRING**
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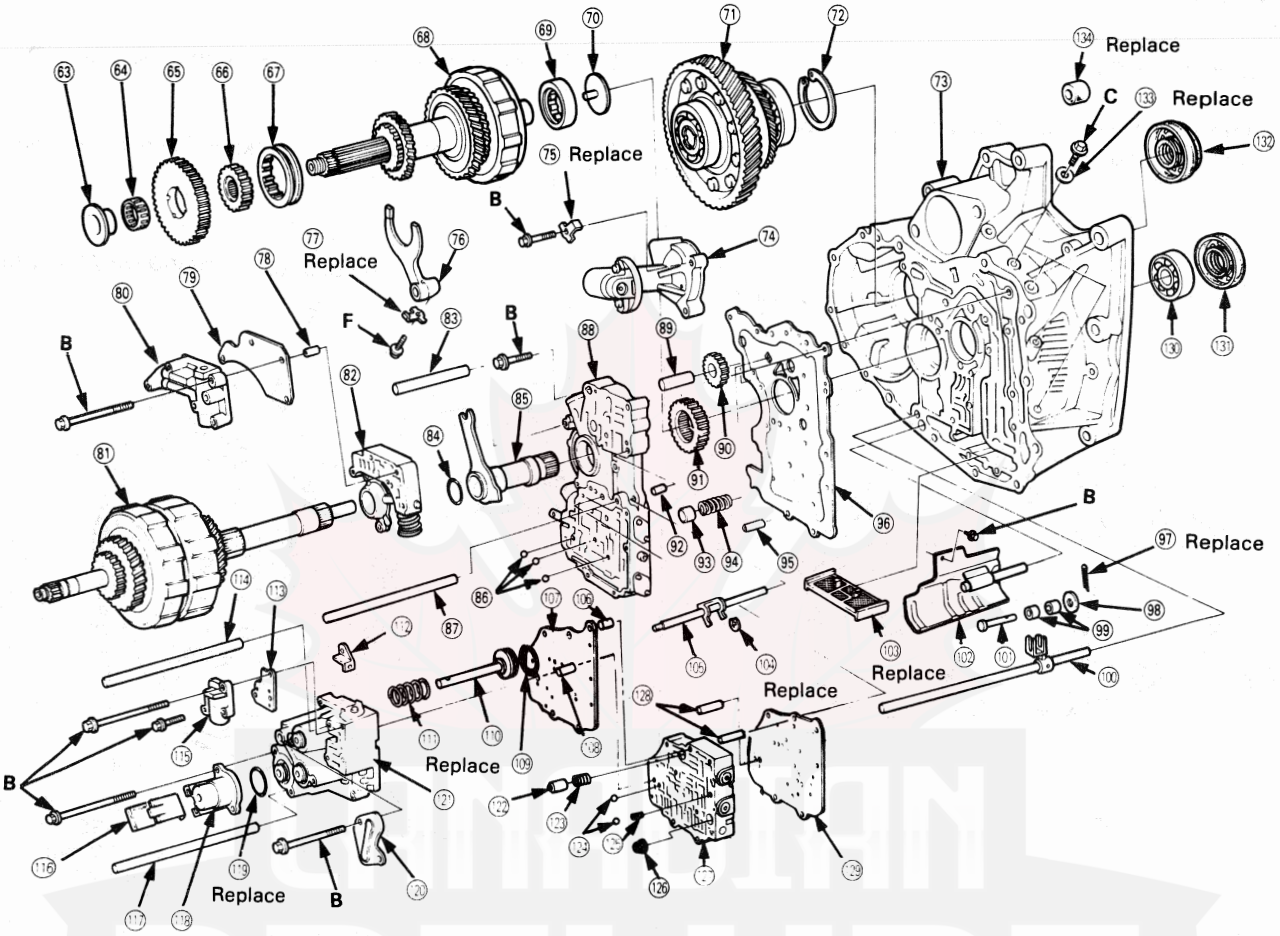
(52) **TRANSMISSION HOUSING**
(53) **THROTTLE CONTROL SHAFT SEAL**
(54) **LOCK PLATE**
(55) **THROTTLE CONTROL CABLE BRACKET**
(56) **DOWEL PIN 14 x 25 mm**
(57) **REVERSE IDLER GEAR**
Replacement, page 15-57
(58) **NEEDLE BEARING**
(59) **DOWEL PIN 14 x 20 mm**
(60) **O-RING**
(61) **DIPSTICK**
(62) **DIPSTICK GUIDE PIPE**



(63) REVERSE GEAR COLLAR
(64) NEEDLE BEARING
(65) COUNTERSHAFT REVERSE GEAR
(66) SELECTOR HUB
(67) REVERSE GEAR SELECTOR
(68) COUNTERSHAFT ASSY
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(70) OIL GUIDE PLATE
(71) DIFFERENTIAL
(72) SNAP RING 80 mm
(73) TORQUE CONVERTER HOUSING
(74) GOVERNOR VALVE
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(76) REVERSE SHIFT FORK
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(90) PUMP DRIVEN GEAR
(91) PUMP DRIVE GEAR
(92) DOWEL PIN
(93) TORQUE CONVERTER CHECK VALVE
(94) SPRING
(95) DOWEL PIN
(96) MAIN VALVE SEPARATOR PLATE
(97) COTTER PIN
(98) WASHER
(99) ROLLERS
(100) CONTROL SHAFT
(101) MANUAL VALVE PIN
(102) BAFFLE PLATE
(103) FILTER SCREEN
(104) E-CLIP
(105) THROTTLE CONTROL SHAFT
(106) DOWEL PIN
(107) SERVO SEPARATOR PLATE
(108) DOWEL PIN
(109) O-RING
(110) SERVO VALVE
(111) RETURN SPRING
(112) CHECK VALVE STOP PLATE
(113) SEPARATOR PLATE
(114) 4th CLUTCH PIPE
(115) MODULATOR VALVE BODY
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(117) 3rd CLUTCH PIPE
(118) 4th ACCUMULATOR COVER
(119) O-RING
(120) 2nd/3rd ACCUMULATOR COVER
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(125) SPRING
(126) SECONDARY FILTER
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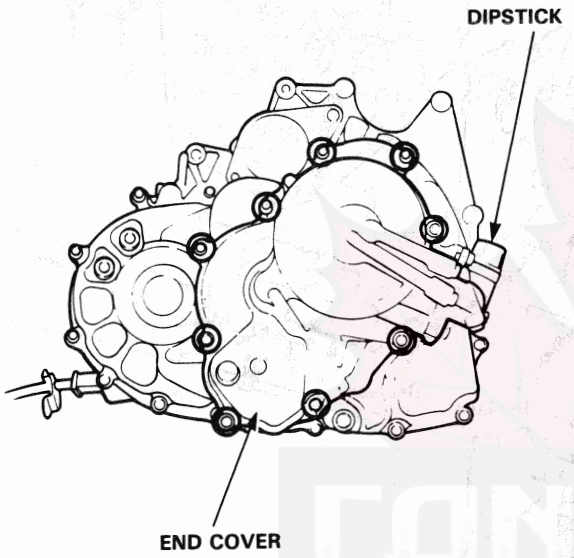
(129) SECONDARY SEPARATOR PLATE
(130) MAINSHAFT BEARING
(131) MAINSHAFT OIL SEAL
(132) DIFFERENTIAL OIL SEAL
(133) WASHER
(134) OIL SEAL

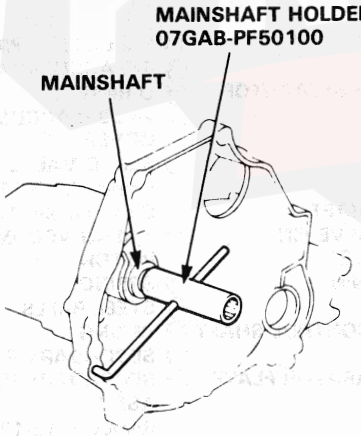
Transmission Housing

Removal

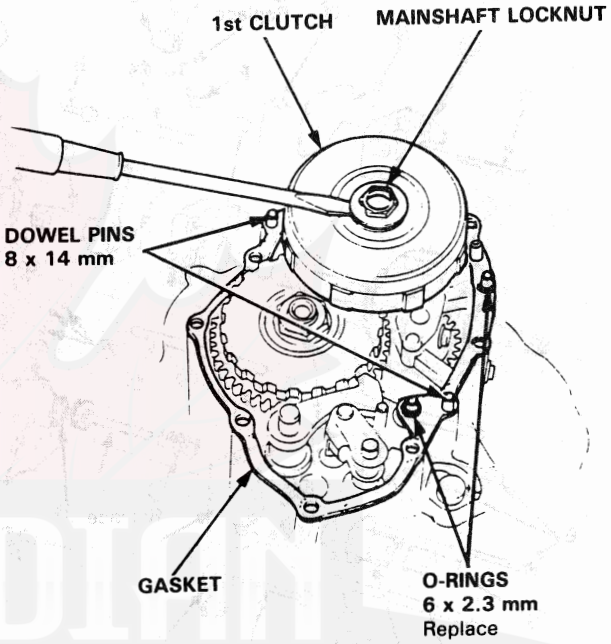
1. Remove the dipstick.
2. Remove the nine bolts from the end cover, then remove the cover.



3. Shift the transmission to PARK.
4. Lock the mainshaft using the mainshaft holder.

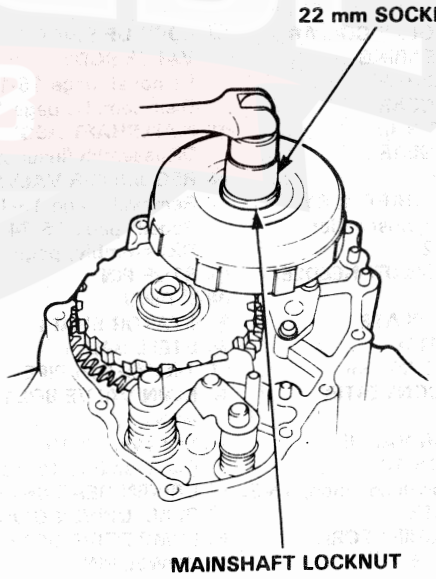


5. Remove the end cover gasket, dowel pins, and O-rings.
6. Pry the staked edge of the locknut flange out of the notch in the 1st clutch.



7. Remove the mainshaft locknut.

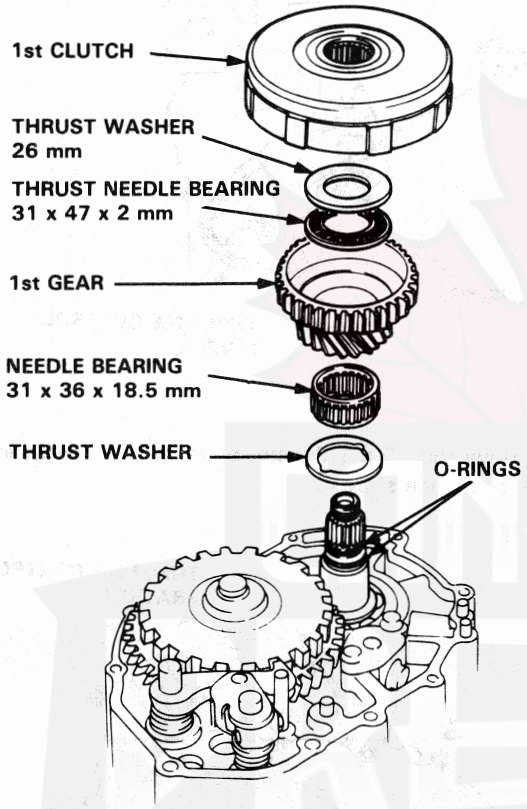
CAUTION: The mainshaft locknut has left-hand threads.



8. Remove the 1st clutch.

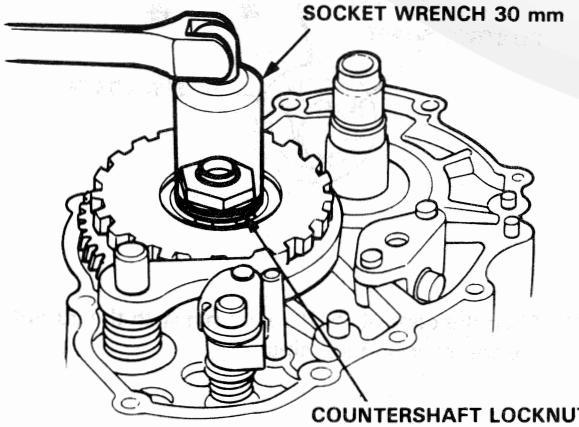
9. Remove the needle bearing and thrust washer from the mainshaft.

10. Remove the O-rings and first gear from the mainshaft.

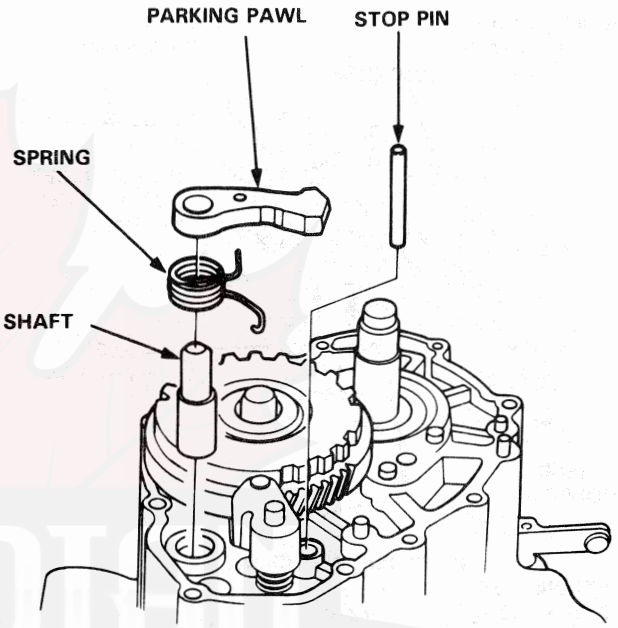


11. Pry the staked edge of the locknut out of the notch in the parking gear.

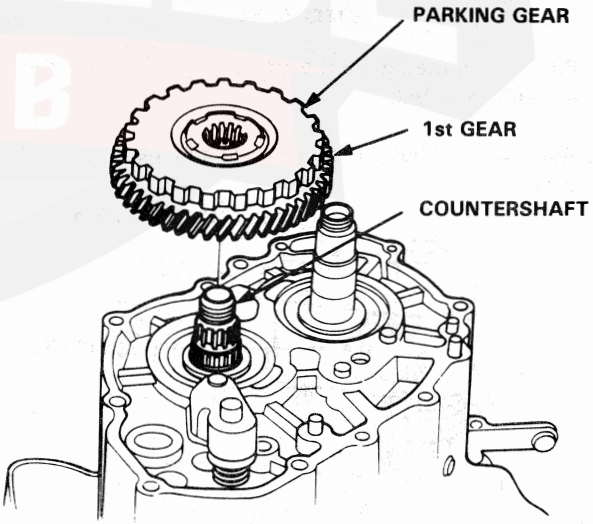
12. Remove the countershaft locknut.



13. Remove the parking pawl, shaft, stop pin and spring.



14. Remove the parking gear and countershaft 1st gear as a unit.

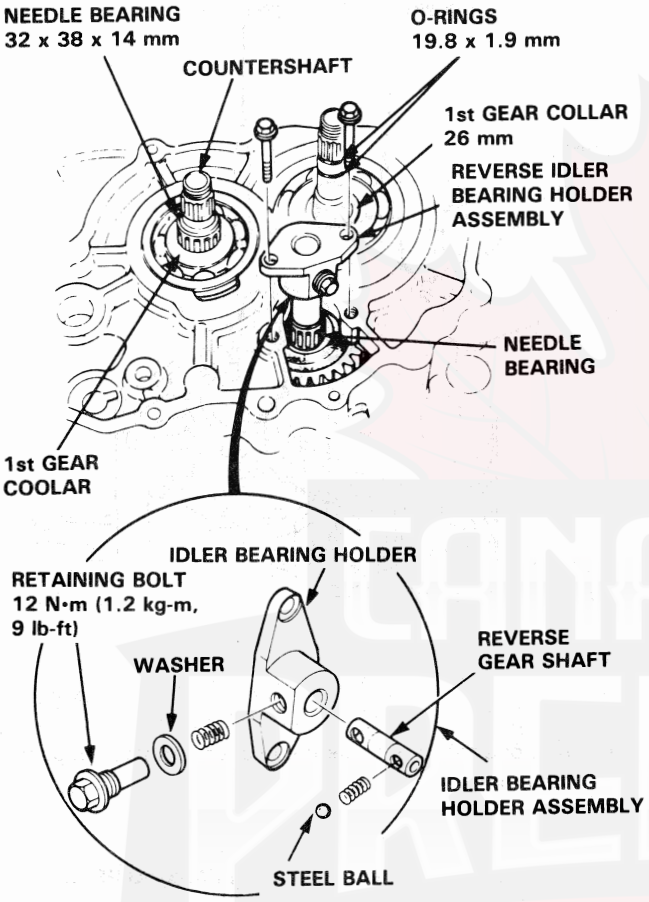


(cont'd)

Removal (cont'd)

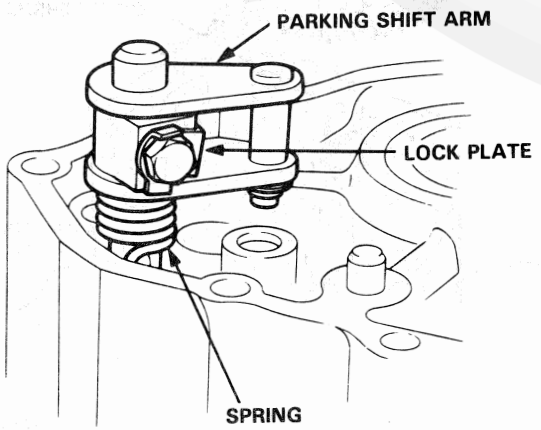
15. From the countershaft, remove the needle bearing and 1st gear collar. From the mainshaft, remove the 1st gear collar.

16. Remove the reverse idler bearing holder assembly.

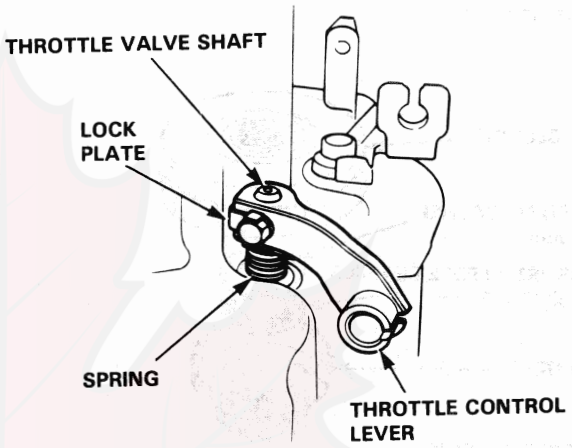


17. Bend down the tab on the lock plate under the parking shift arm bolt.

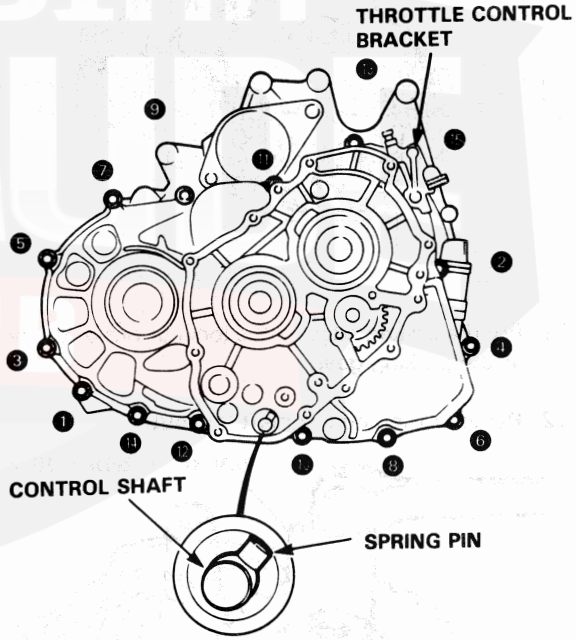
18. Remove the bolt, then remove the parking shift arm.



19. Bend down the tab on the throttle control lever bolt lock plate, then remove the bolt. Remove the throttle control lever and spring from the throttle valve shaft.

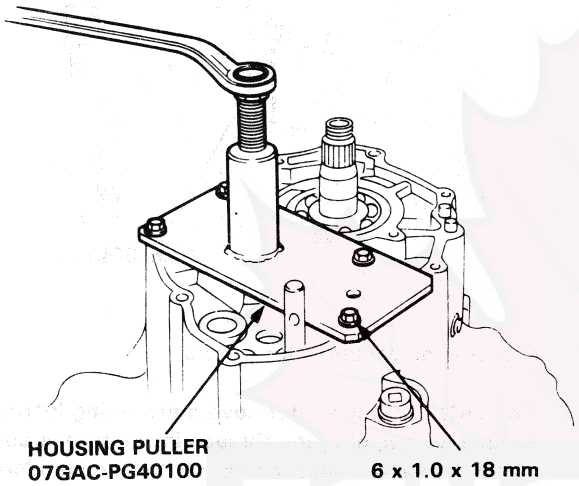


20. Remove the 10 x 1.25 mm bolts, (1) thru (15), in the sequence shown.



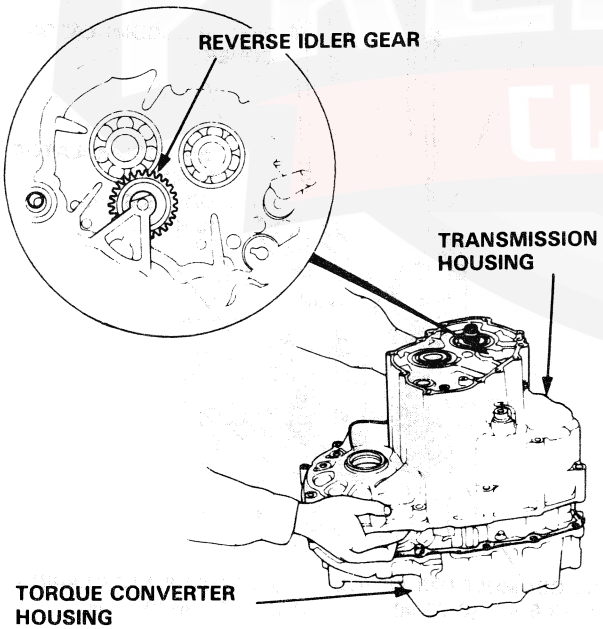
21. Align the control shaft spring pin with the cutout in the transmission housing.

22. Install the transmission housing puller over the countershaft with four bolts and tighten securely. Then screw in the puller bolt against the end of the countershaft until the transmission housing comes loose.



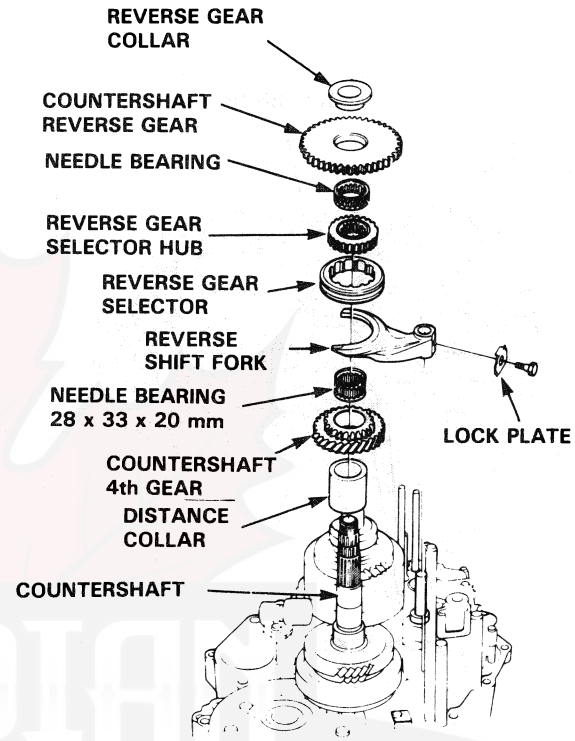
23. Remove the puller and separate the housings. Remove the reverse idler gear and needle bearing from the transmission housing.

24. Remove the gasket and the dowel pins.

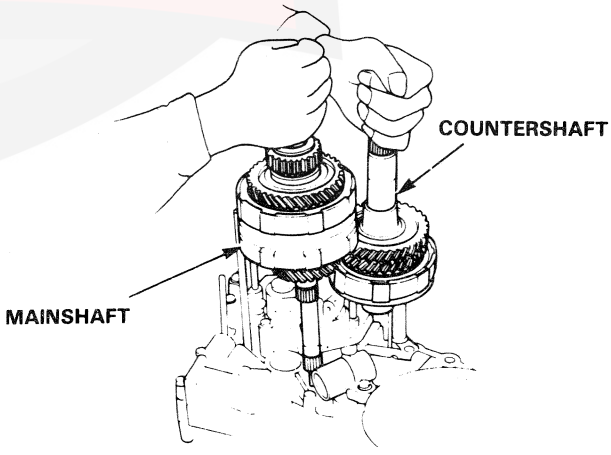


Removal

1. Remove the reverse gear collar, countershaft reverse gear and needle bearing.



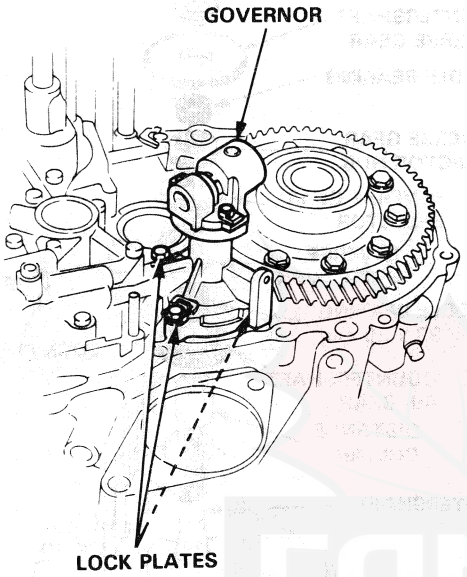
2. Bend down the tab on the lock plate and remove the bolt from the reverse shift fork.
3. Remove the reverse shift fork and reverse gear selector as a unit.
4. Remove the selector hub, countershaft 4th gear, needle bearing and distance collar.
5. Remove the mainshaft and countershaft together. NOTE: It will be necessary to pull up the countershaft at a slight angle to clear the governor.



Governor Valve

Removal

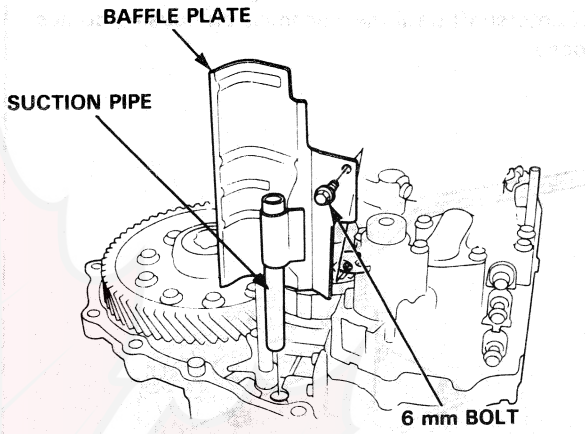
Bend down the tabs on the lock plates, remove the bolts holding the governor to the torque converter housing, and remove the governor.



Main Valve Body

Removal

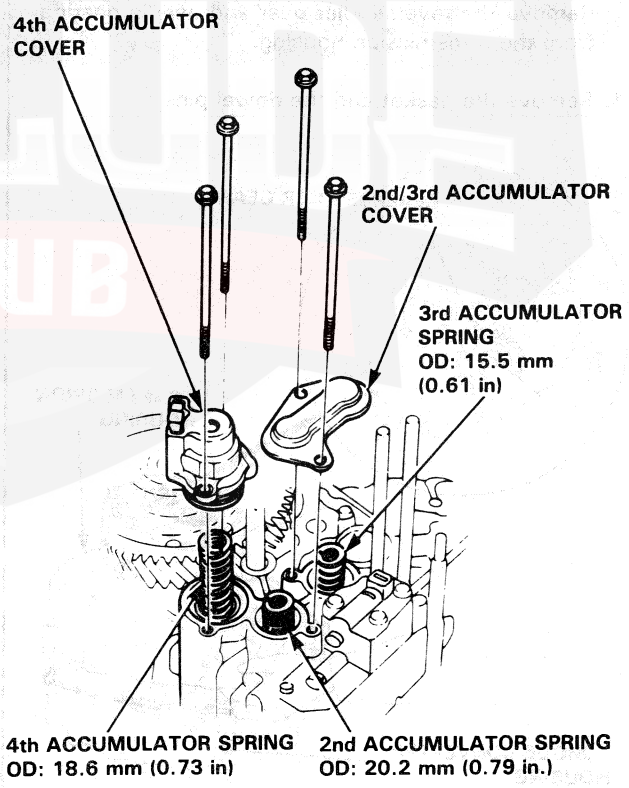
1. Remove the baffle plate with the suction pipe.



2. Remove the accumulator covers.

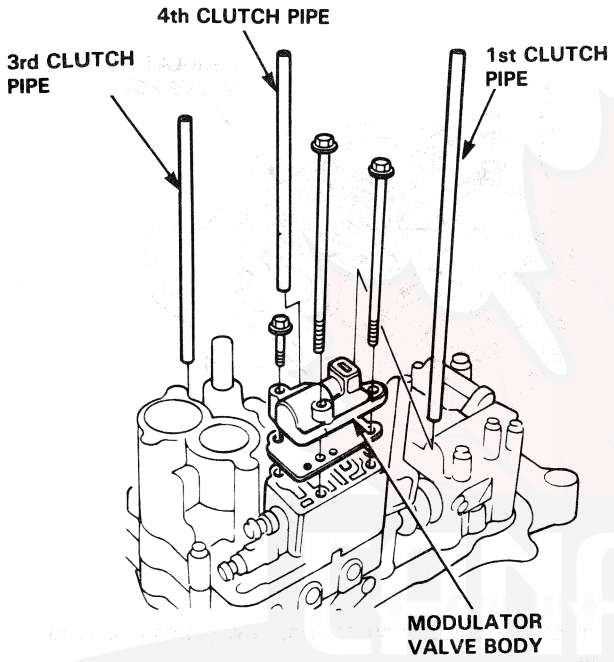
CAUTION: Accumulator covers are spring loaded; to prevent stripping the threads in the torque converter housing, press down on the accumulator covers while unscrewing the bolts in a criss-cross pattern.

3. Remove the accumulator springs.



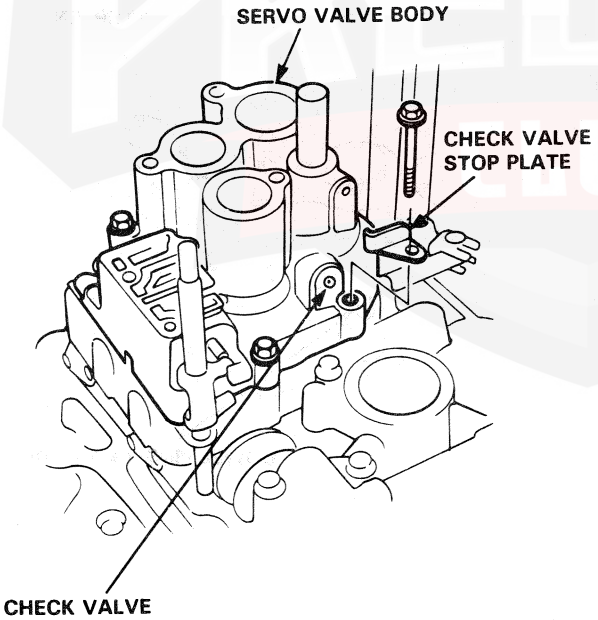
4. Remove the three bolts attaching the modulator valve body.

5. Remove the 1st, 4th and 3rd clutch pipes.



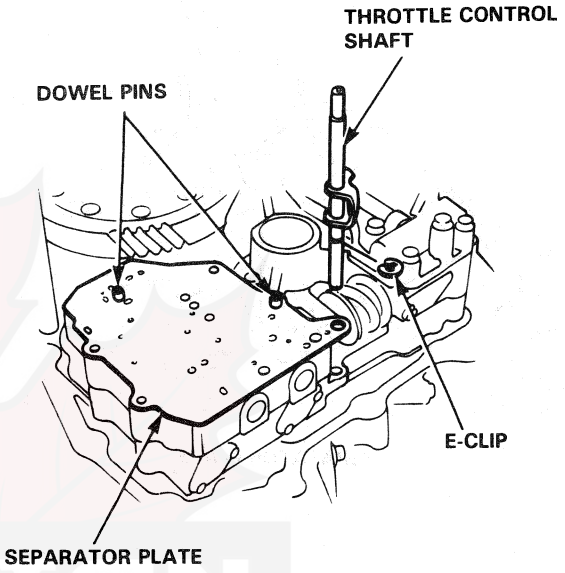
6. Remove the servo valve body (3 bolts).

7. Remove the check valve stop plate.



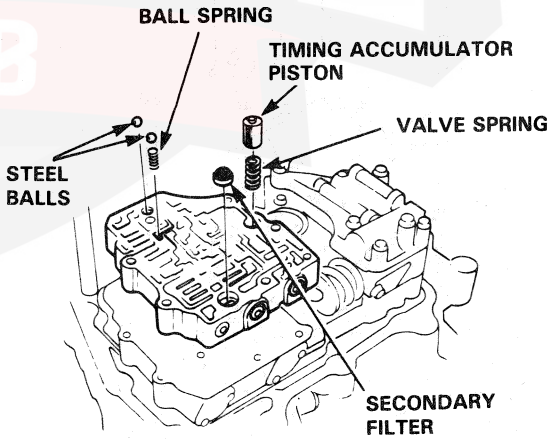
8. Remove the E-clip. Then remove the thottle control shaft from the separator plate.

9. Remove the separator plate and dowel pins.



10. Remove the secondary valve body, being careful not to lose the 2 steel balls, ball spring, timing accumurator piston, spring, and secondary filter.

CAUTION: Do not use a magnet to remove the steel balls; it may magnetize the balls.

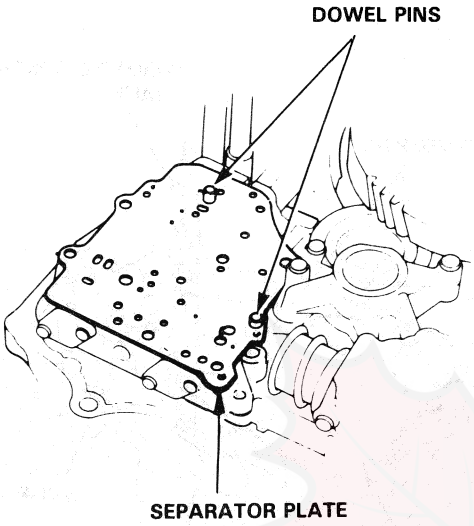


(cont'd)

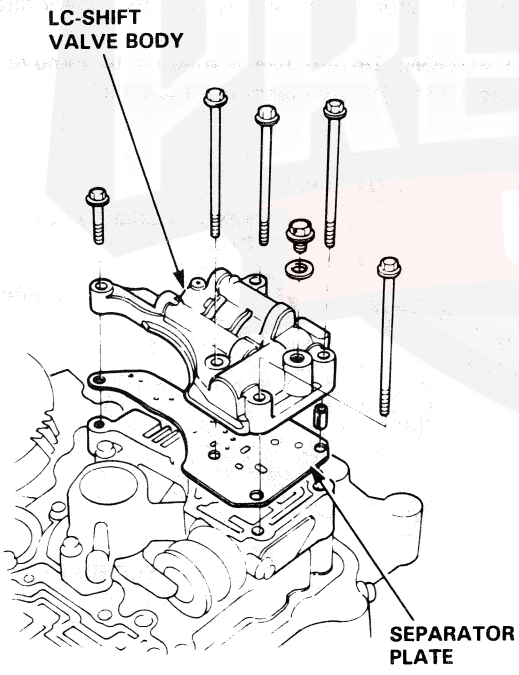
Main Valve Body

Removal (cont'd)

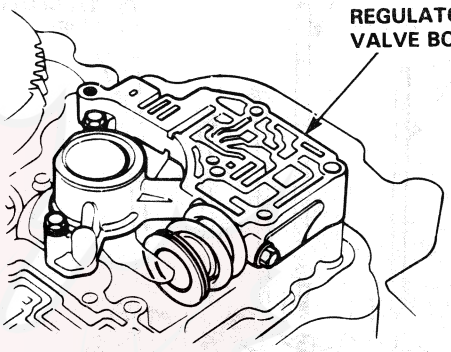
11. Remove the separator plate and dowel pins.



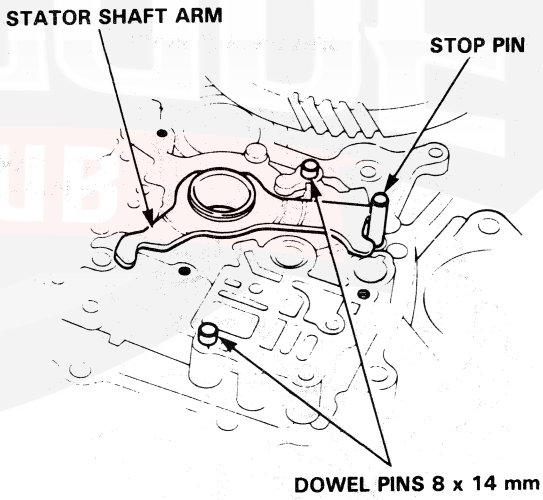
12. Remove the LC-Shift valve body and separator plate (5 bolts).



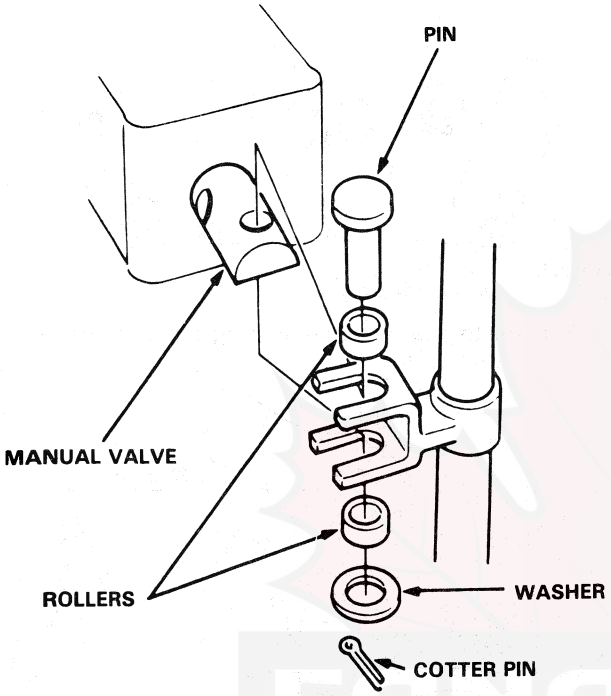
13. Remove the regulator valve body.



14. Remove the stator shaft arm, dowel pins and stop pin.

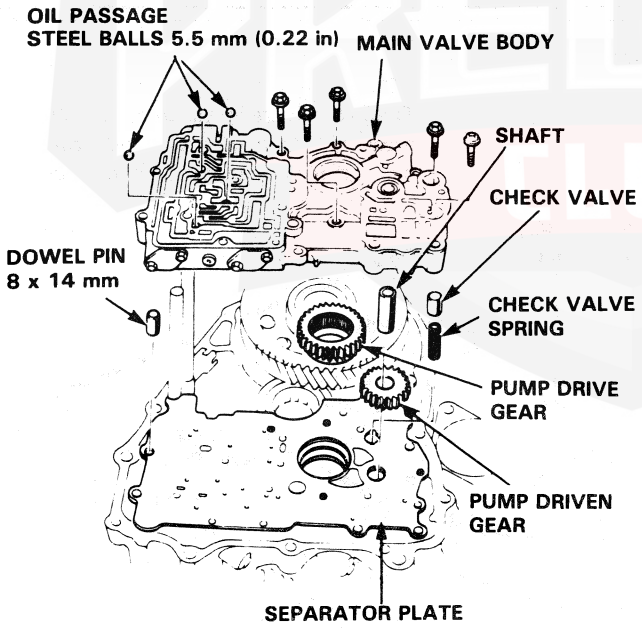


15. Remove the cotter pin, washer, rollers, and pin from the manual valve.



16. Remove the main valve body being careful not to lose the 3 steel balls, torque converter check valve and spring.

CAUTION: Do not use a magnet to remove the steel balls; it may magnetize the balls.

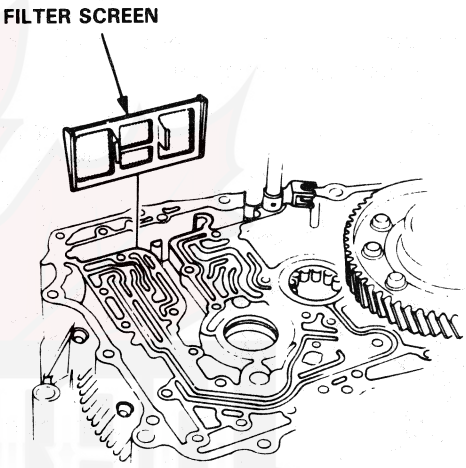


17. Remove the pump gears and shaft.

18. Remove the separator plate, dowel pins, check valve, and spring.

19. Remove the filter screen.

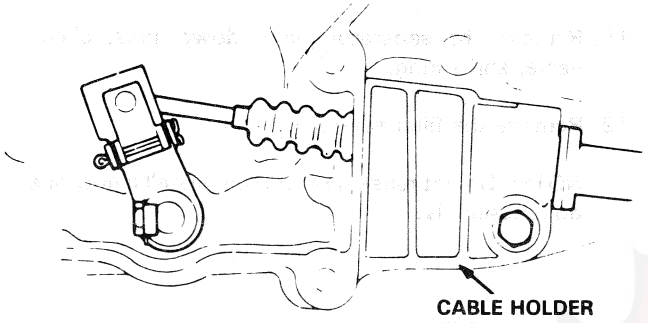
NOTE: Do not reuse filter screen; install a new one on reassembly.



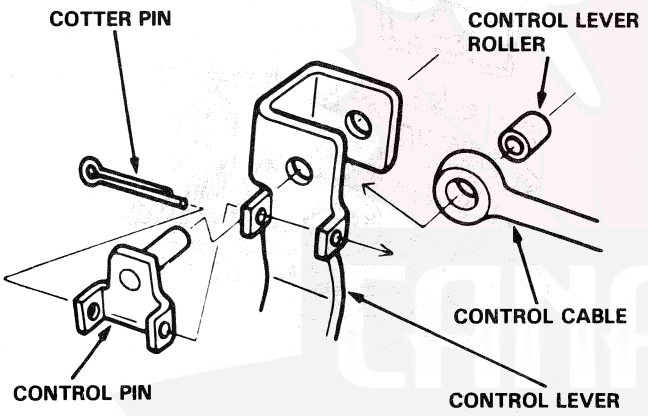
Control Shaft

Removal

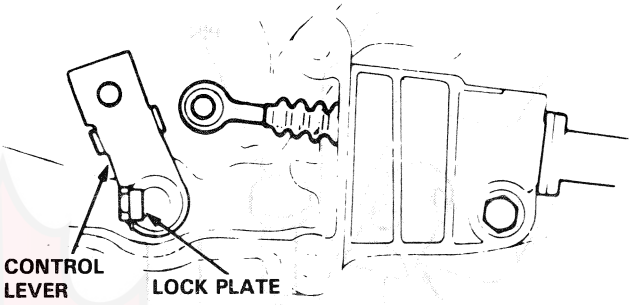
1. Remove the cable holder.



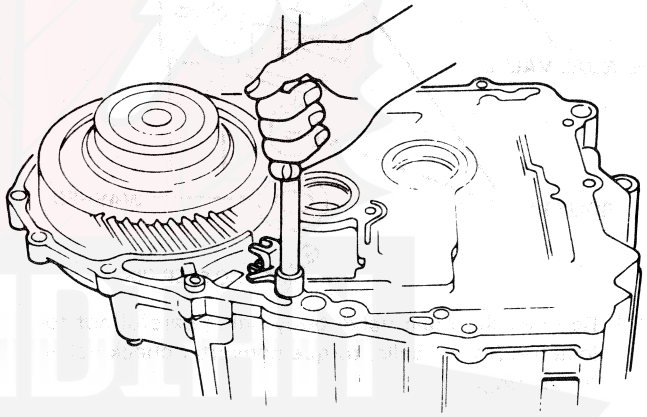
2. Remove the cotter pin, control pin, and control lever roller from the control lever.



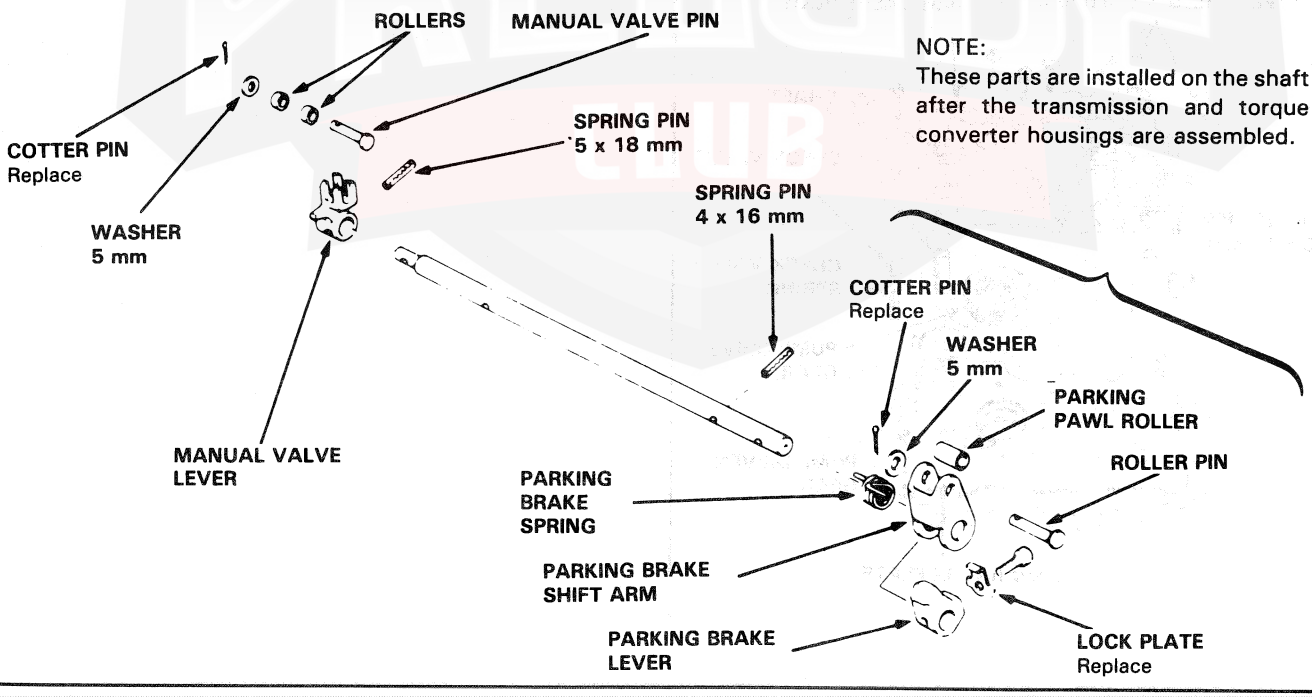
3. Bend down the tab on the lock plate under the bolt in the control lever. Then remove the bolt and lever.



4. Turn the torque converter housing over and remove the control shaft.



Disassembly/Reassembly

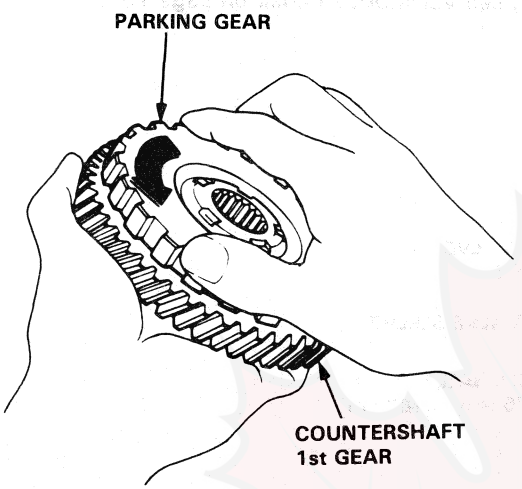


NOTE:
These parts are installed on the shaft after the transmission and torque converter housings are assembled.

One-Way Clutch/Parking Gear

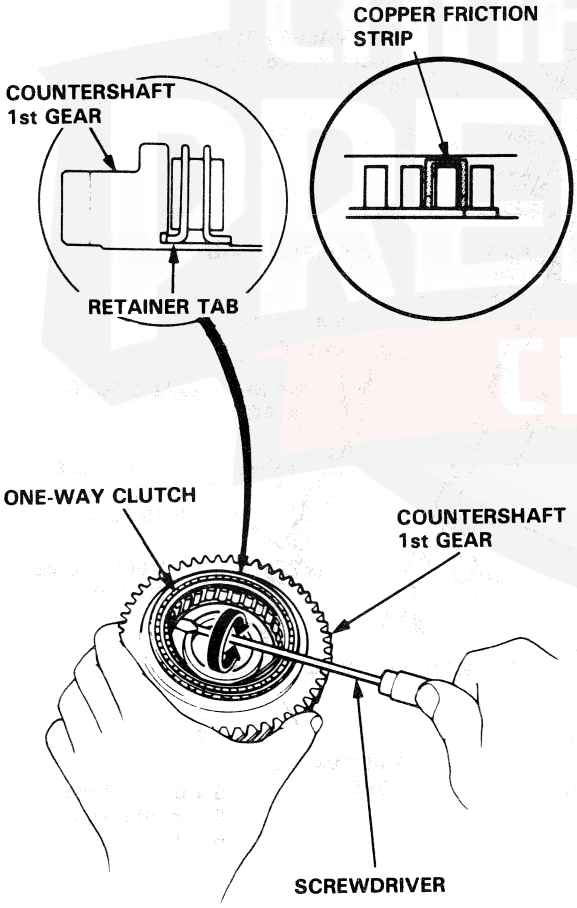
Disassembly and Inspection

1. Separate the countershaft 1st gear from the parking gear by turning the parking gear in the direction shown.



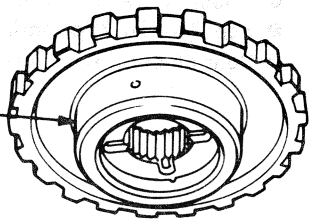
2. Remove the one-way clutch by prying it up with the end of a screwdriver.

CAUTION: Do not pry on the three copper friction strips; if you break a strip, the clutch will not work properly.

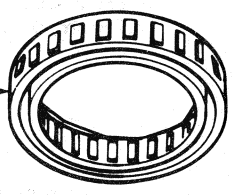


Inspect the parts as follows:

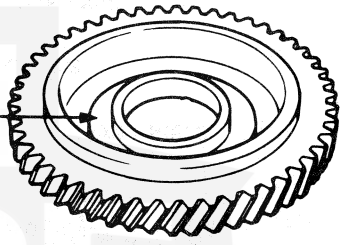
Inspect the parking gear for wear or scoring



Inspect the one-way clutch for damage or faulty movement



Inspect the countershaft 1st gear for wear or scoring



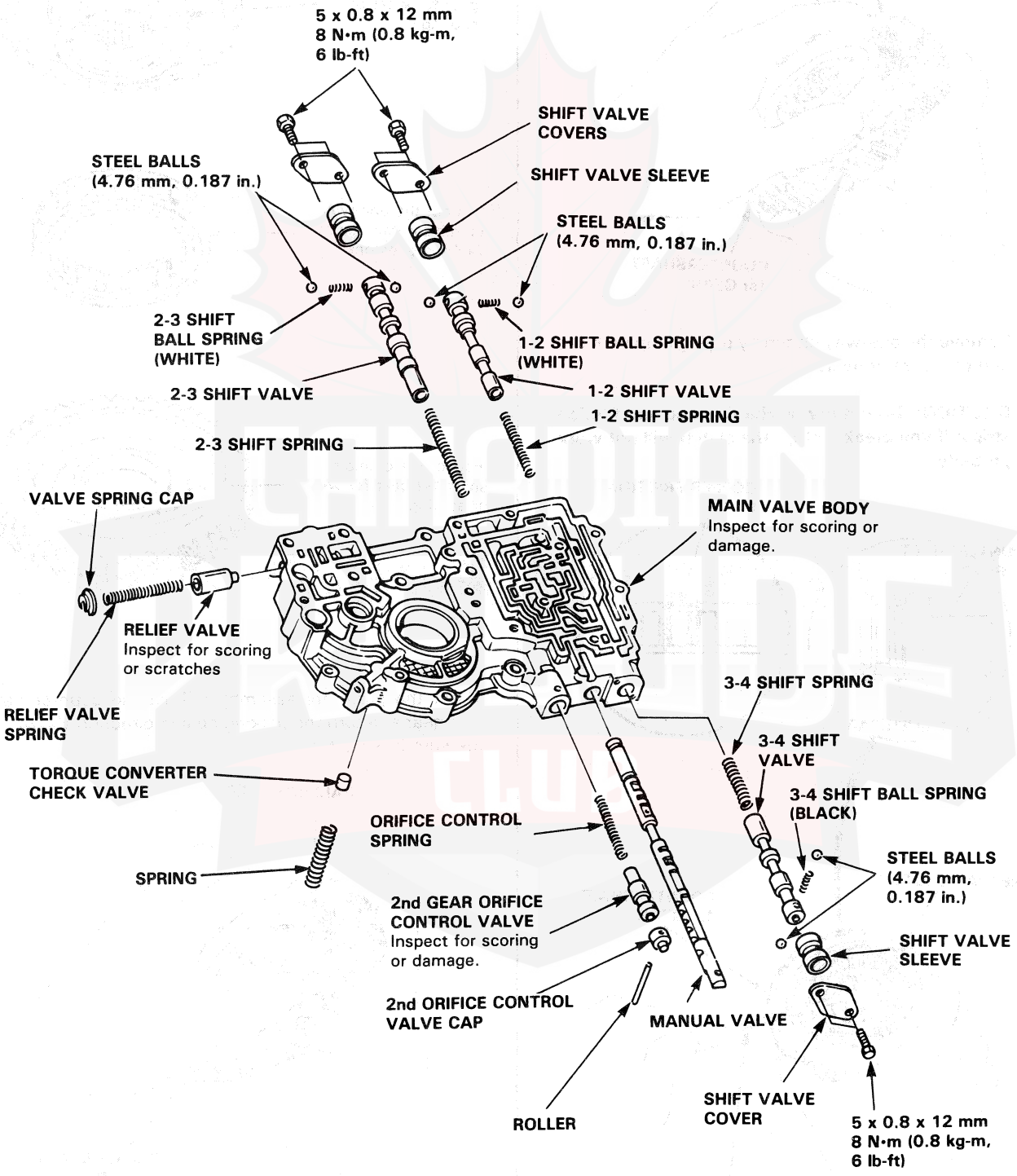
After the parts are assembled, hold the countershaft 1st gear and turn the parking gear in direction shown to be sure it turns freely.

Main Valve Body

Disassembly

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 on page 15-24.
- See Section 3 for spring specifications.
- Coat all parts with ATF before reassembly.

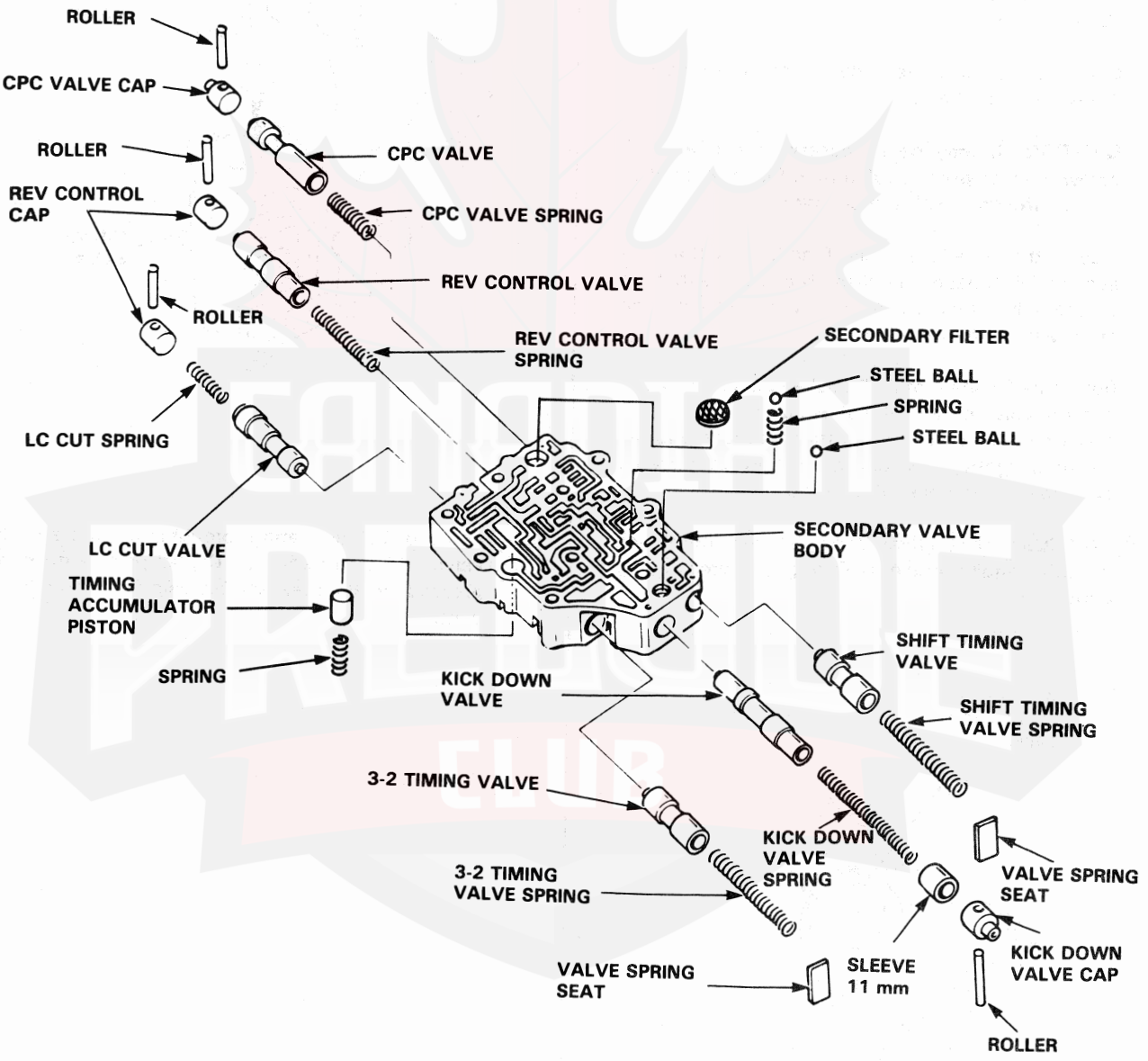


Secondary Valve Body

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 on page 15-24.
- See Section 3 for spring specifications.



Valve Body

Repair

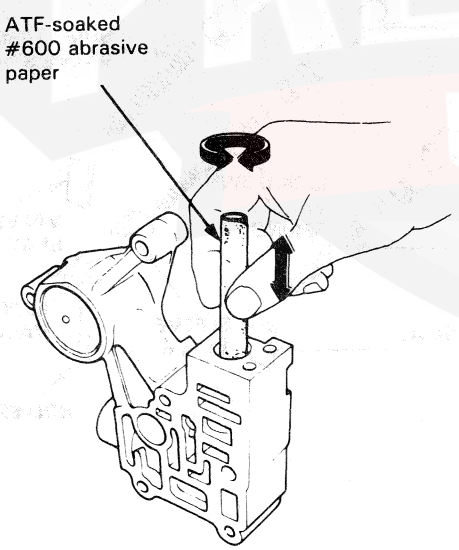
NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. You may use this procedure to free the valves in the main valve body, regulator valve body, lock-up shift valve body, and servo valve body. DO NOT use this procedure to free the valves in the governor; if any governor valves are stuck, the governor must be replaced as an assembly.

1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore.

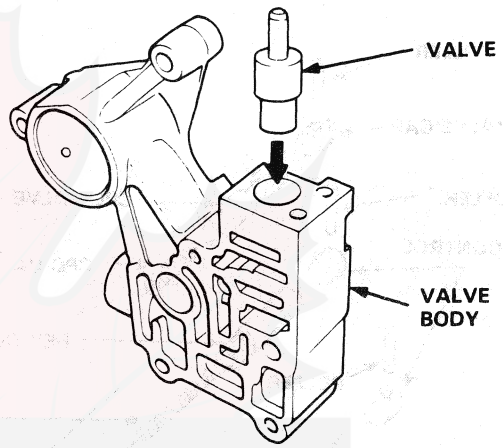
   CAUTION: It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

3. Inspect the valve for any scuff marks. Use the ATF-soaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.
4. Roll up half a sheet of ATF-soaked paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

   CAUTION: The valve body is aluminum and doesn't require much polishing to remove any burrs.



5. Remove the #600 paper and thoroughly wash the entire valve body in solvent, then dry with compressed air.
6. Coat the valve with ATF then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat step 4, then retest.

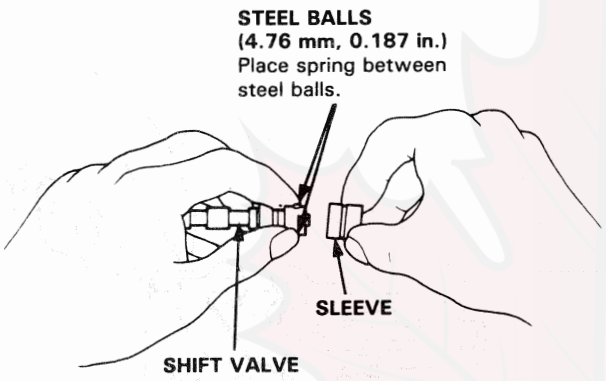


7. Remove the valve and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

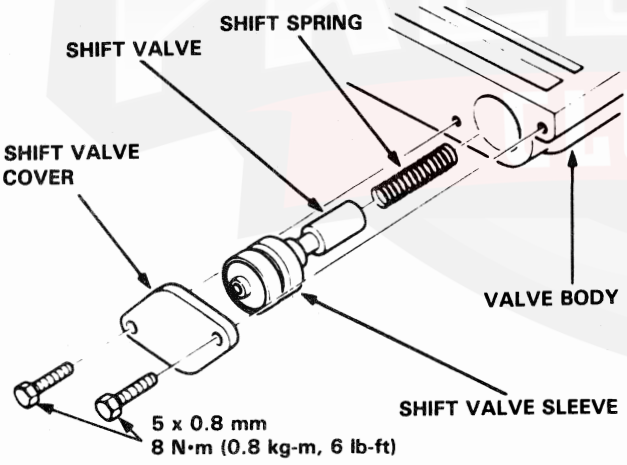
Reassembly

NOTE: Coat all parts with ATF before assembling.

1. Slide the spring into the hole in the big end of the shift valve.
   While holding the steel balls with the tips of your fingers, put the sleeve over the shift valve.

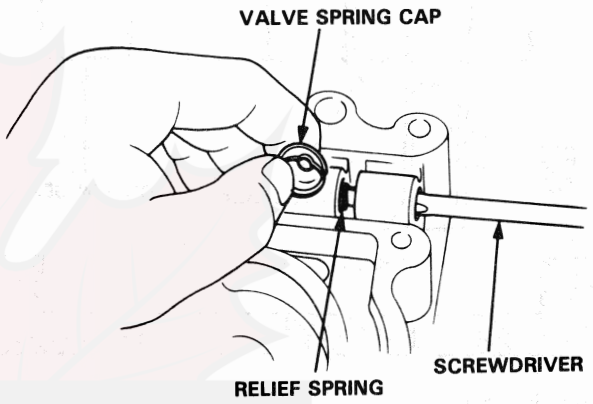


2. Place the shift spring in the shift valve, then slip it into the valve body and install the valve cover.

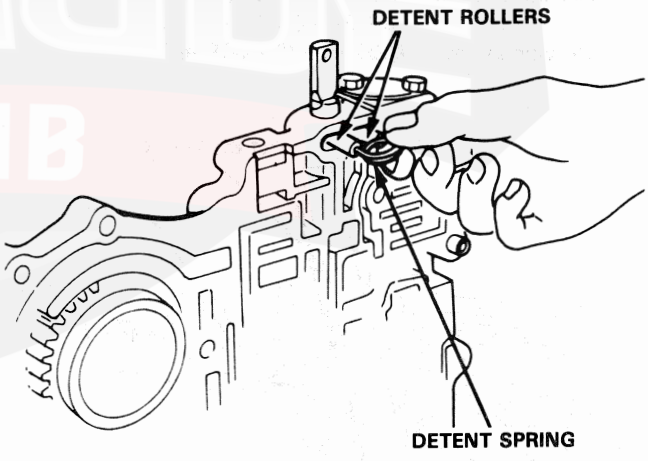


3. Set the relief spring in the relief valve and install it in the main valve body.

4. Install the spring with a screwdriver, then install the check valve cap with the cutout aligned with the screwdriver.



5. Install the manual valve, detent rollers and spring.

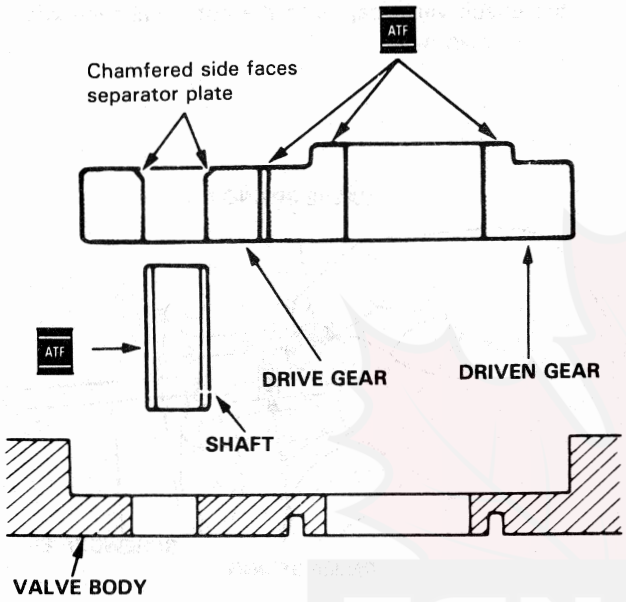


(cont'd)

Main Valve Body

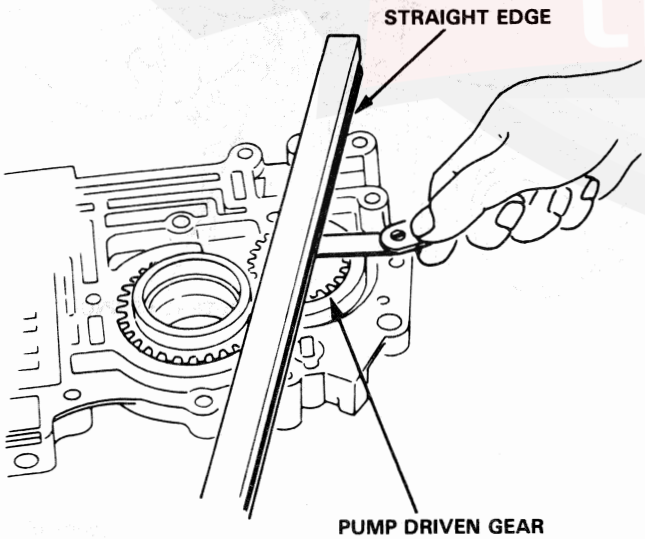
Reassembly (cont'd)

6. Install the pump gears and shaft in the main valve body.



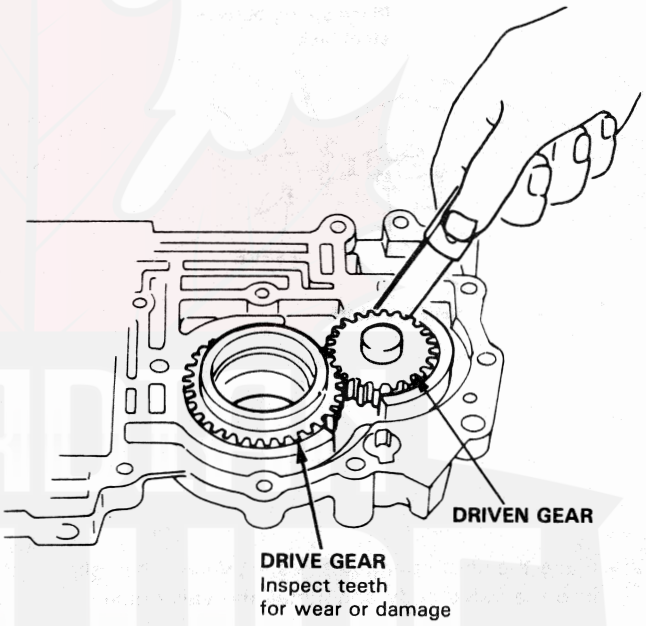
7. Measure the thrust clearance of the driven gear-to-valve body.

Drive/Driven Gear thrust (Axial) Clearance:
Standard (New): 0.03—0.05 mm (0.001—0.002 in.)
Service Limit: 0.07 mm (0.0028 in.)



8. Install the oil pump shaft and measure the side clearance of the drive and driven gears.

Pump Gears Side (Radial) Clearance:
Standard (New): Drive gear 0.240—0.265 mm (0.0094—0.0104 in.)
Driven gear 0.063—0.088 mm (0.0025—0.0035 in.)

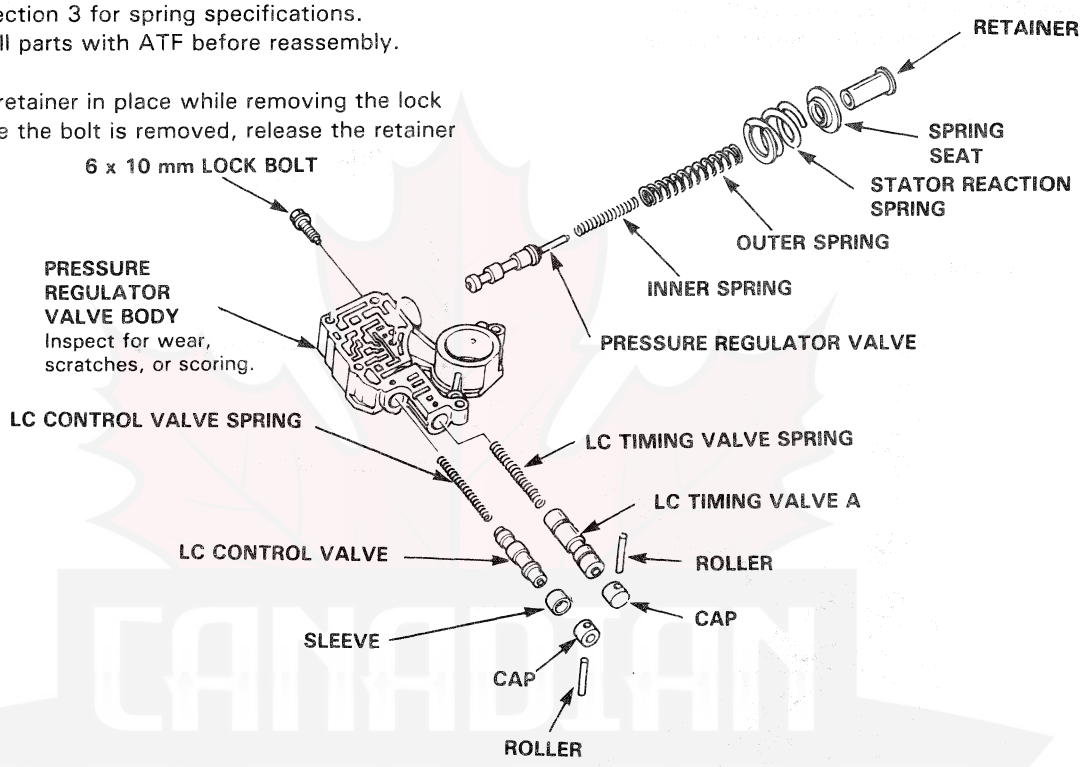


Regulator Valve Body

Disassembly/Inspection

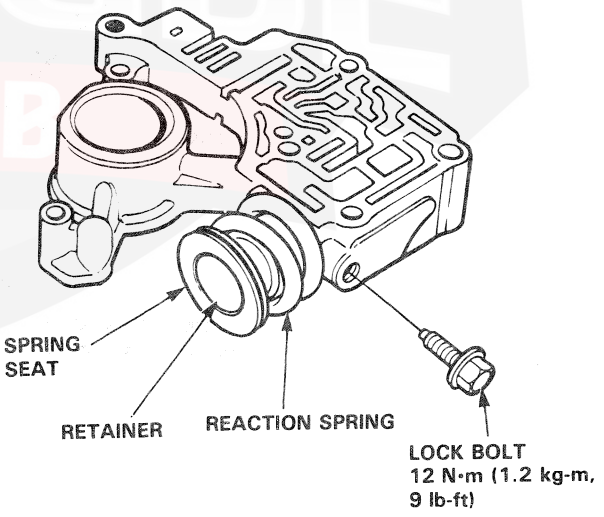
NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner.
- Replace valve body as assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 15-24.
- See Section 3 for spring specifications.
- Coat all parts with ATF before reassembly.

1. Hold the retainer in place while removing the lock bolt. Once the bolt is removed, release the retainer slowly.



Reassembly

1. Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
2. Coat all valves with ATF.
3. Install the pressure regulator valve, and the inner and outer springs.
4. Install the reaction spring, spring seat, and retainer. 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.

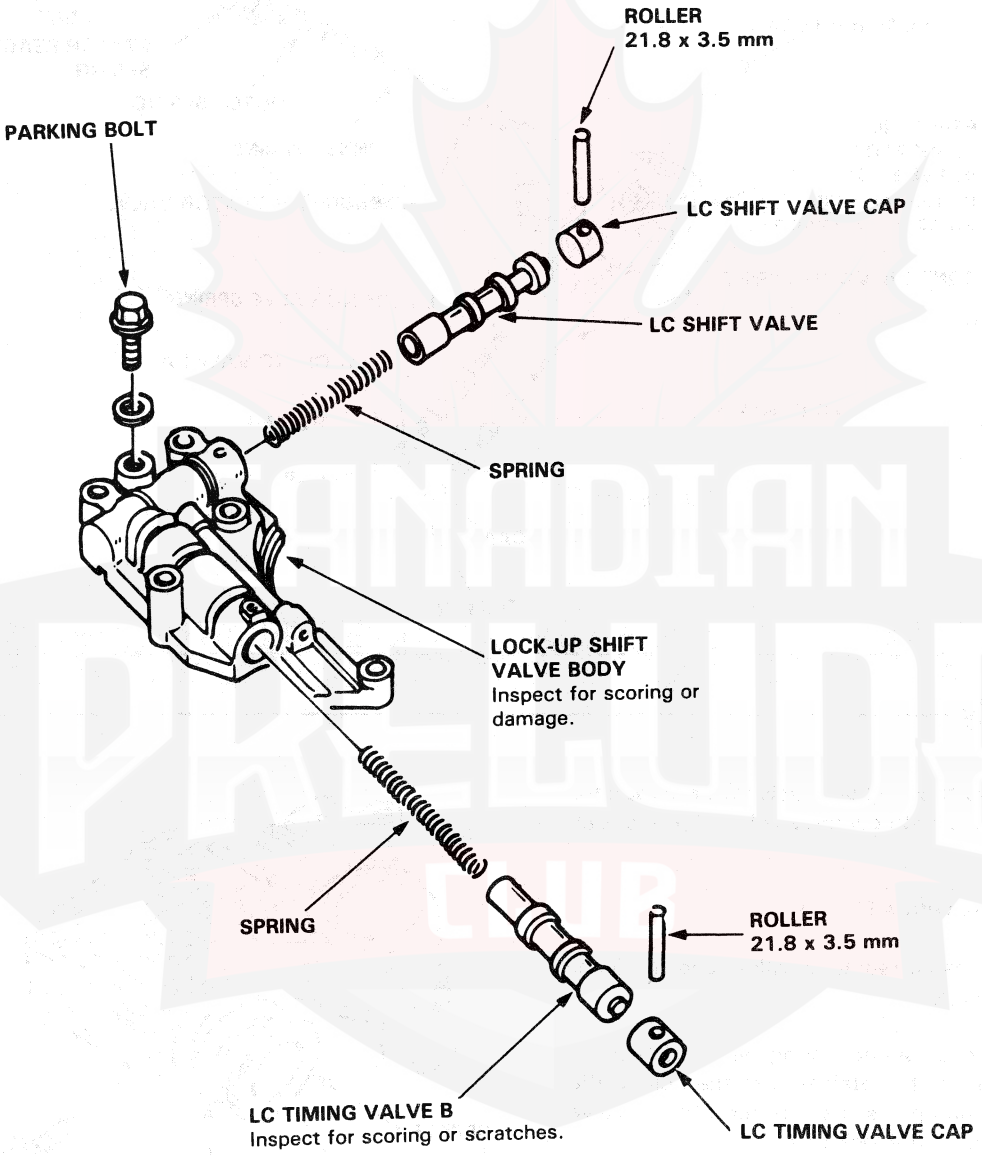


Lock-Up Shift Valve Body

Disassembly/Inspection

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner.
- Replace valve body as assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 15-24.
- See Section 3 for spring specifications.
- Coat all parts with ATF before reassembly.

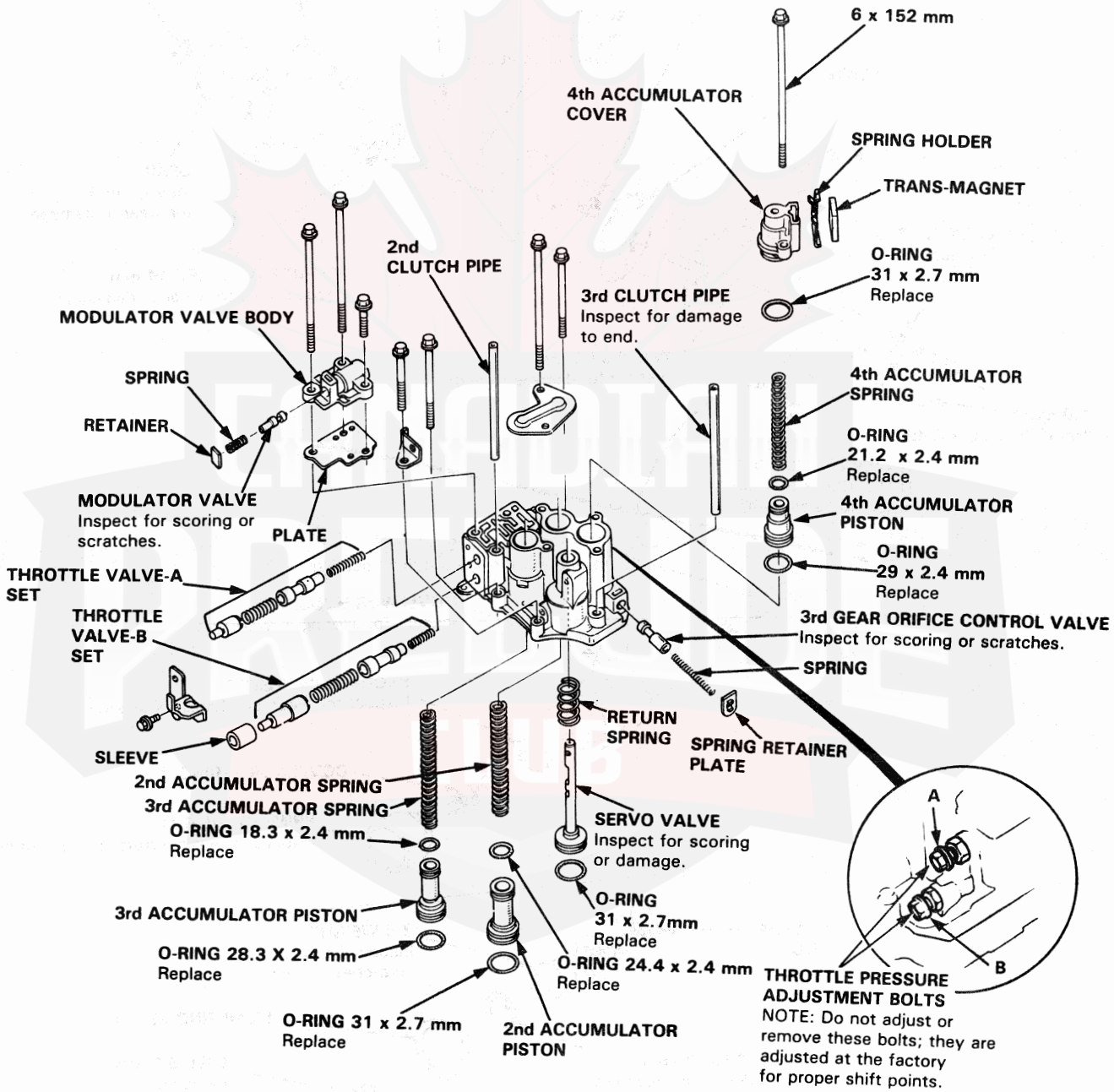


Servo Valve Body

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 on page 15-24.
- See Section 3 for spring specifications.

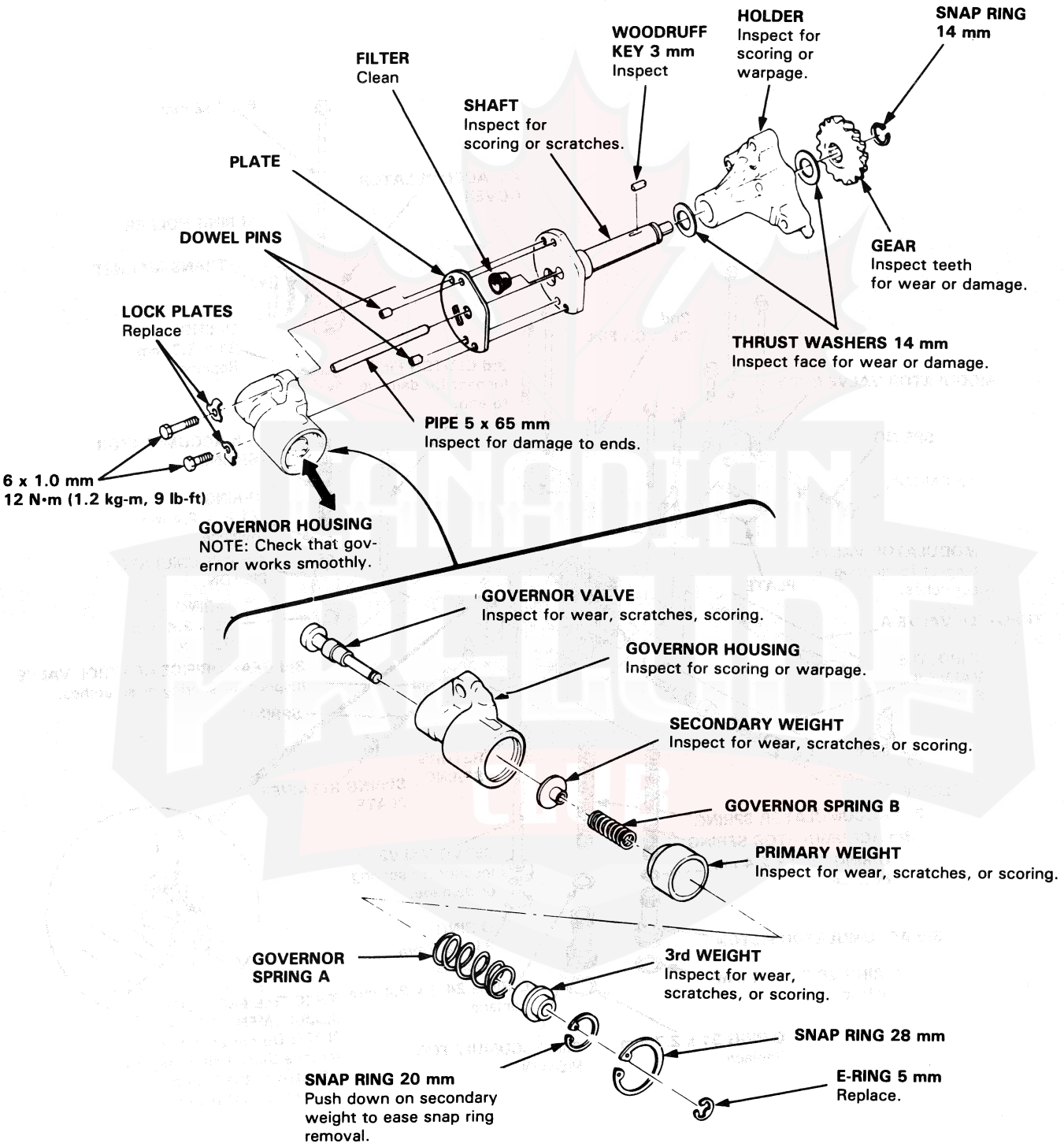


Governor Valve

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly 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.
- See Section 3 for spring specifications.
- Coat all parts with ATF before reassembly.

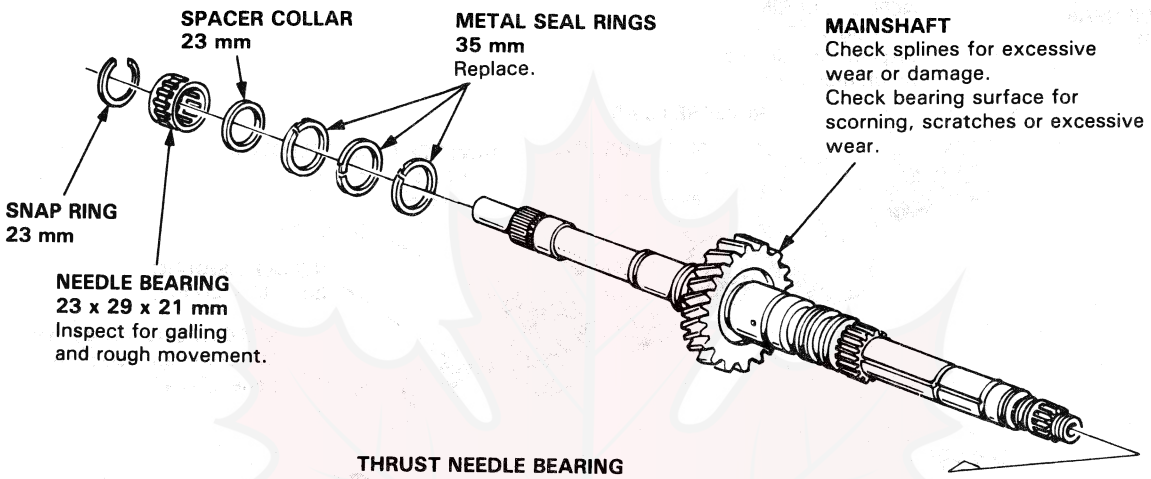


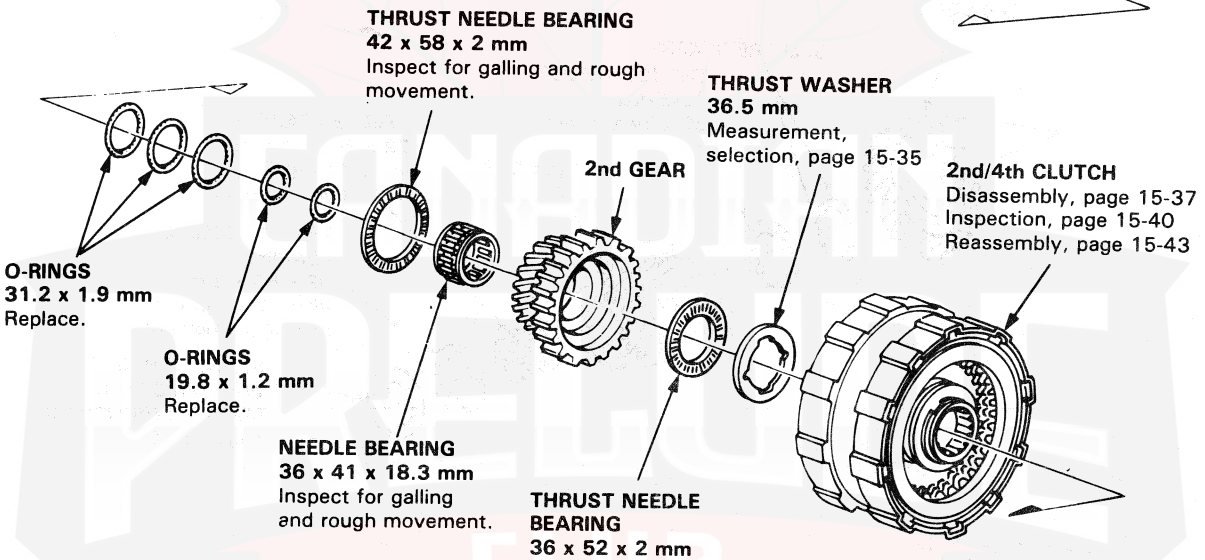
Mainshaft

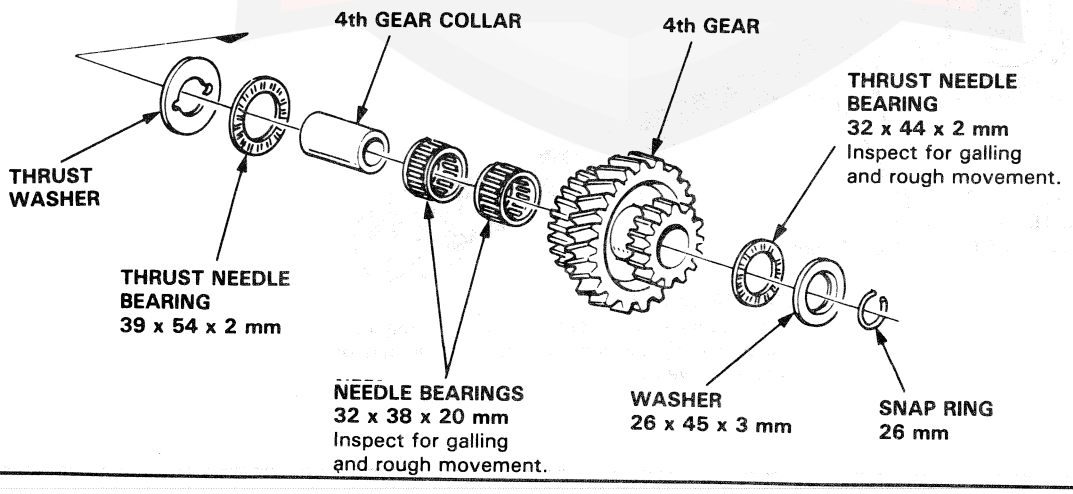
Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing washer.





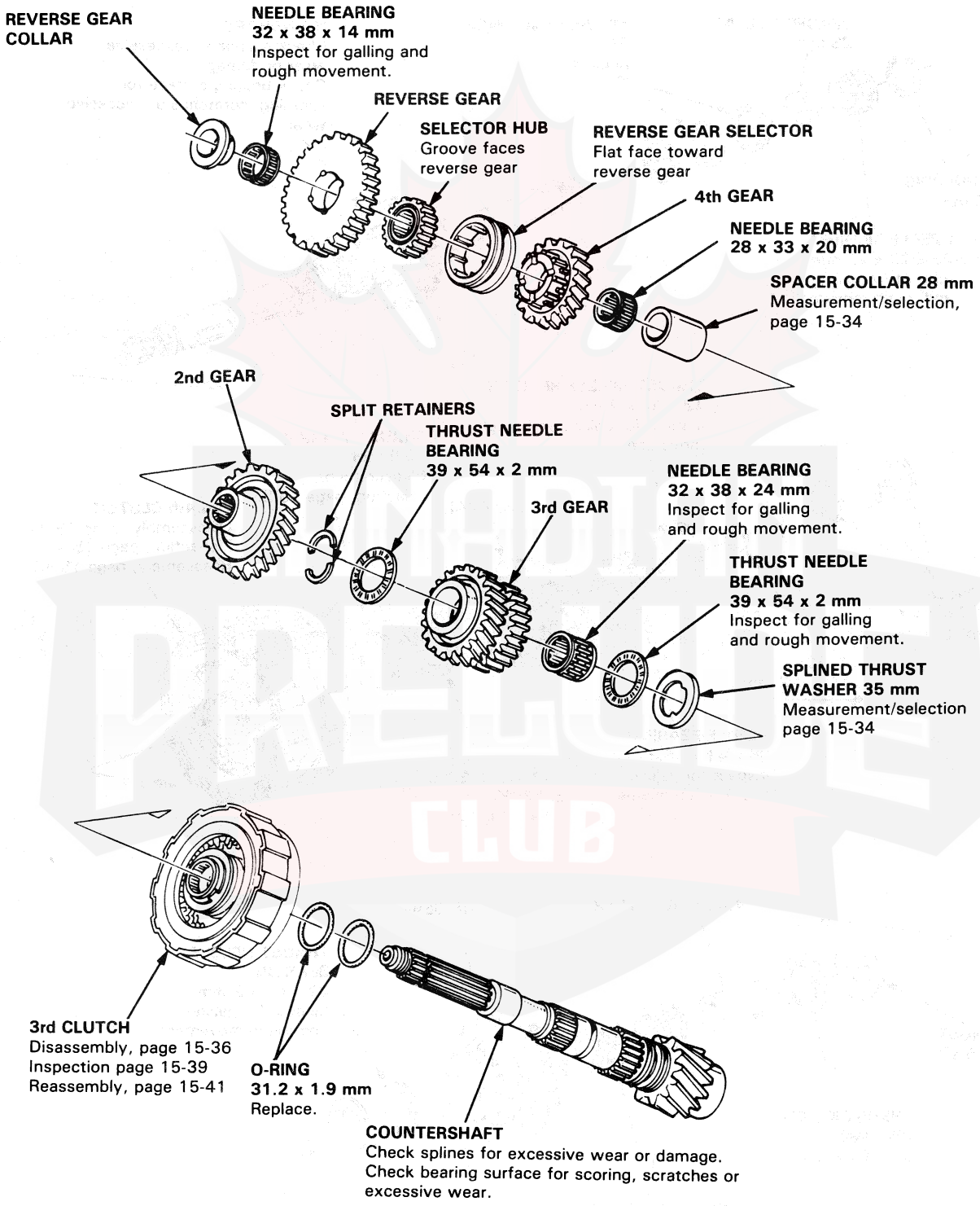


Countershaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearing with unrolled edge of bearing retainer facing washer.

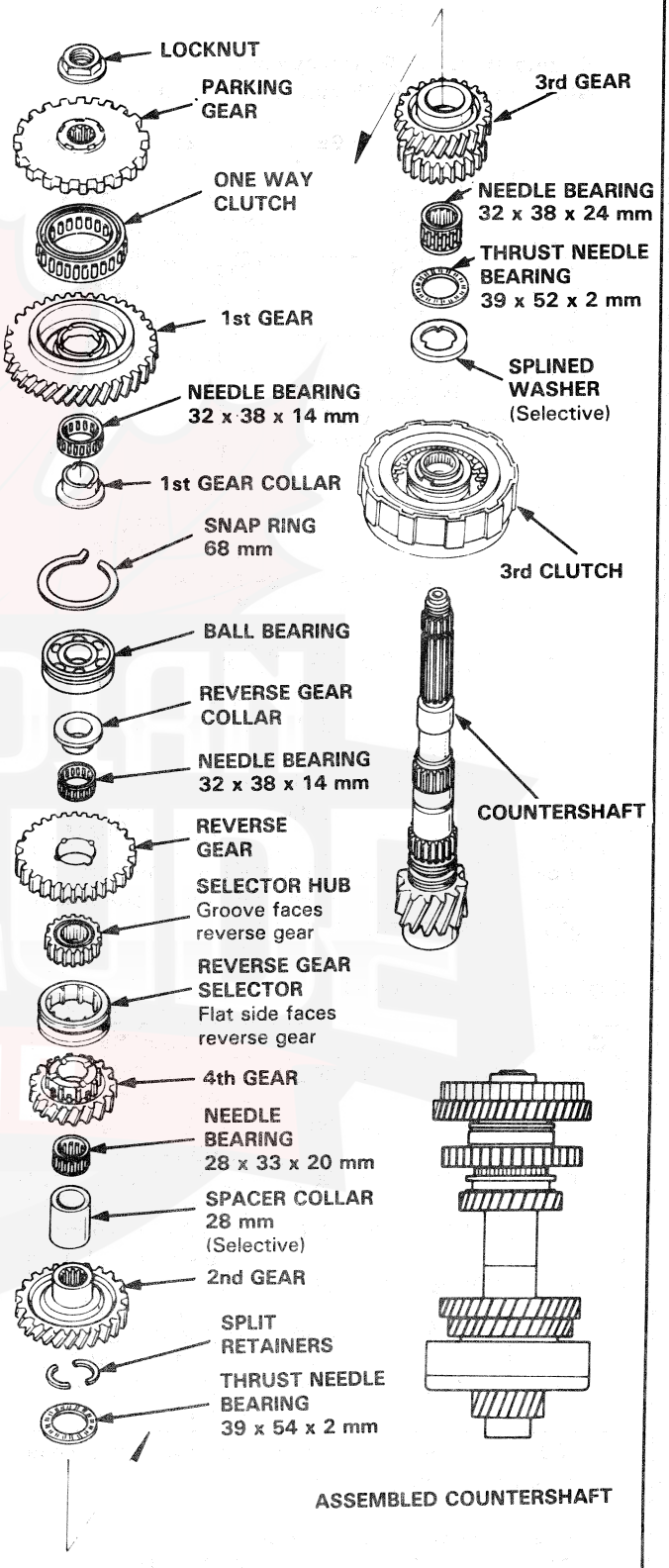


Clearance Measurements

1. Remove both the mainshaft and countershaft bearings from the transmission housing.
2. Assemble the mainshaft and the countershaft including bearings and all parts shown below.
3. Install the mainshaft and countershaft assemblies into the torque converter housing.
4. Install the mainshaft holder to prevent the shafts from turning.
5. Torque the mainshaft locknut to 35 N•m (3.5 kg-m, 25 lb-ft). (Left-hand threads).
6. Hold the parking gear on the countershaft with your hand and torque the countershaft locknut to 35 N•m (3.5 kg-m, 25 lb-ft).
7. Measure clearances as described on the next page.

ATF Lubricate all parts with ATF before final reassembly.

Countershaft Assembly

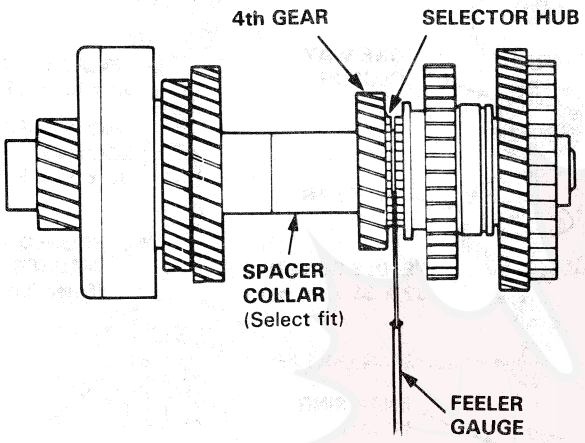


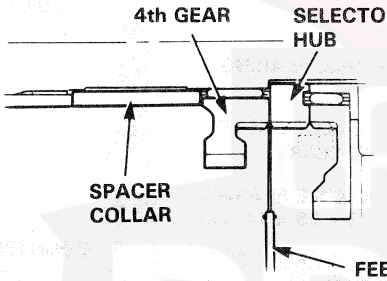
(cont'd)

Clearance Measurements (cont'd)

8. On the countershaft, measure the clearance between the shoulder on the selector hub and the shoulder on 4th gear.

Countershaft 4th Gear Clearance:
Standard: 0.07–0.15 mm (0.003–0.006 in.)





If clearance exceeds the service limit, measure the thickness of the spacer collar and select one which gives correct clearance.

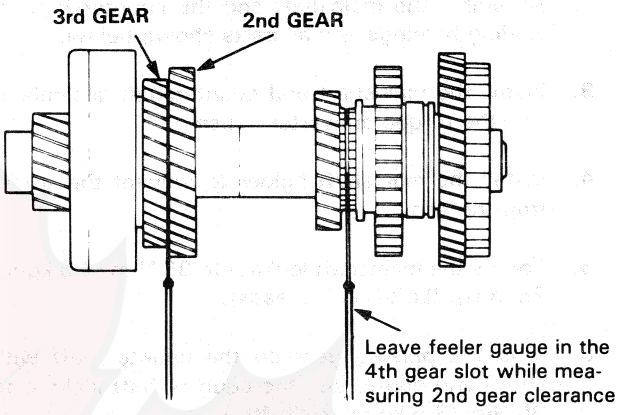
Replacement spacer collars:

CLASS	P/N	THICKNESS
A	90503–PC9–000	38.97–39.00 mm (1.534–1.535 in.)
B	90504–PC9–000	39.02–39.05 mm (1.536–1.537 in.)
C	90505–PC9–000	39.07–39.10 mm (1.538–1.539 in.)
D	90507–PC9–000	39.12–39.15 mm (1.540–1.541 in.)
E	90508–PC9–000	39.17–39.20 mm (1.542–1.543 in.)
F	90509–PC9–000	39.22–39.25 mm (1.544–1.545 in.)
G	90510–PC9–000	39.27–39.30 mm (1.546–1.547 in.)

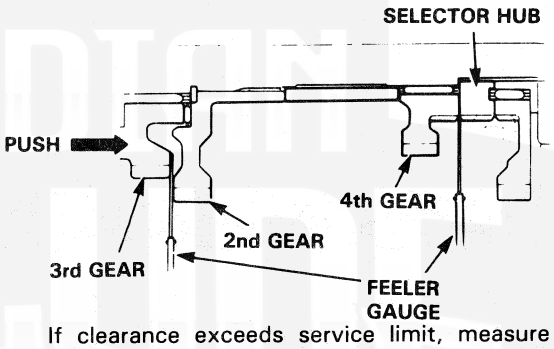
NOTE: Leave feeler gauge in place (4th gear) while measuring 2nd gear clearance.

Countershaft 2nd Gear Clearance:
Standard: 0.07–0.15 mm (0.003–0.006 in.)

9. Slide the 3rd gear out fully. Measure and record the clearance between the 2nd and 3rd gears with a feeler gauge.



- Slide the 3rd gear in fully and again measure the clearance between the 2nd and 3rd gears with another feeler gauge.
- Calculate the difference between the two readings to determine the actual clearance between the two gears.

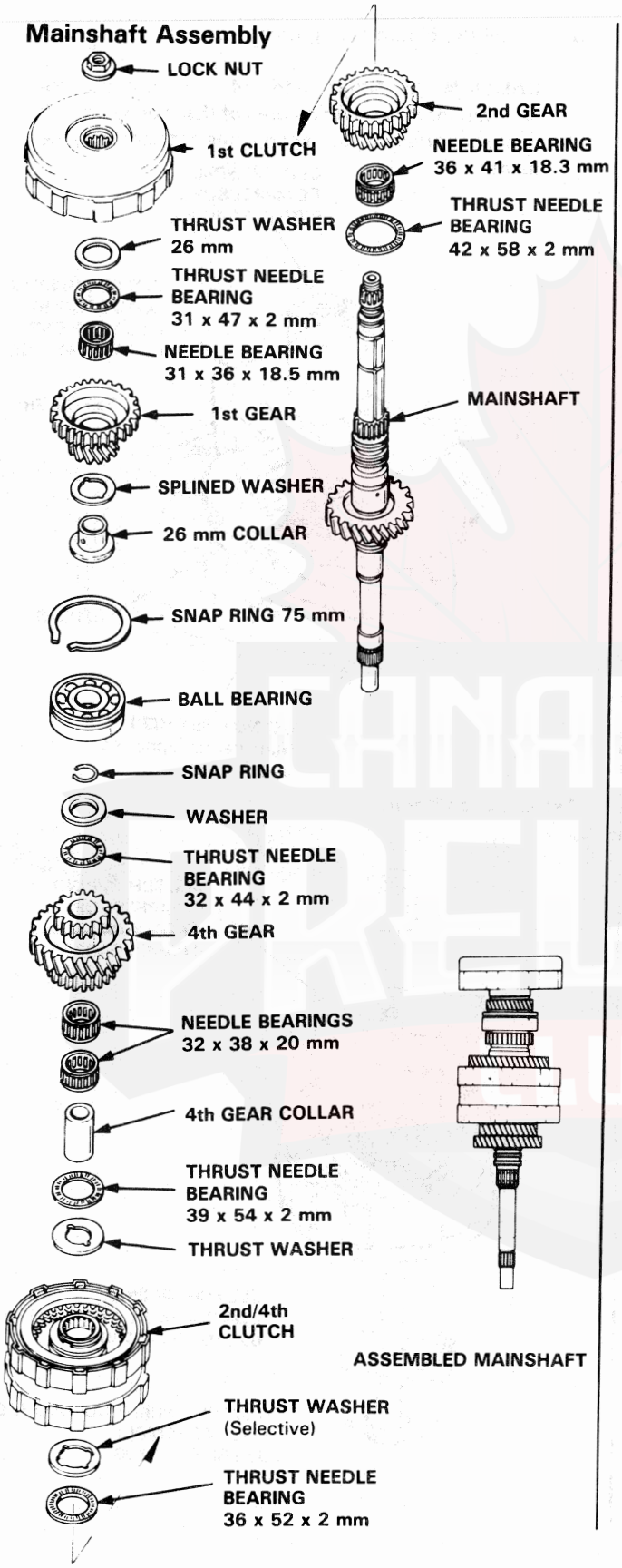


If clearance exceeds service limit, measure the thickness of the splined thrust washer (35 mm I.D.) and select one which gives the proper clearance.

Replacement splined thrust washers:

CLASS	P/N	THICKNESS
A	90411–PF4–010	2.97–3.00 mm (0.117–0.118 in.)
B	90412–PF4–010	3.02–3.05 mm (0.119–0.120 in.)
C	90413–PF4–010	3.07–3.10 mm (0.121–0.122 in.)
D	90414–PF4–010	3.12–3.15 mm (0.123–0.124 in.)
E	90415–PF4–010	3.17–3.20 mm (0.125–0.126 in.)
F	90416–PF4–010	3.22–3.25 mm (0.127–0.128 in.)
G	90417–PF4–010	3.27–3.30 mm (0.129–0.130 in.)
H	90418–PF4–010	3.32–3.35 mm (0.131–0.132 in.)
I	90419–PF4–010	3.37–3.40 mm (0.133–0.134 in.)

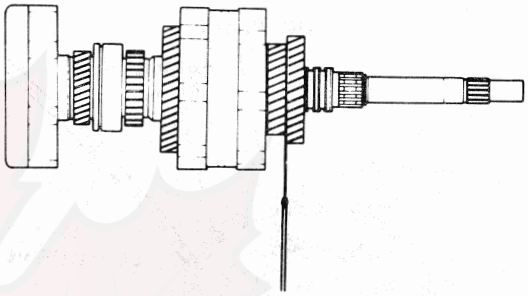
Mainshaft Assembly



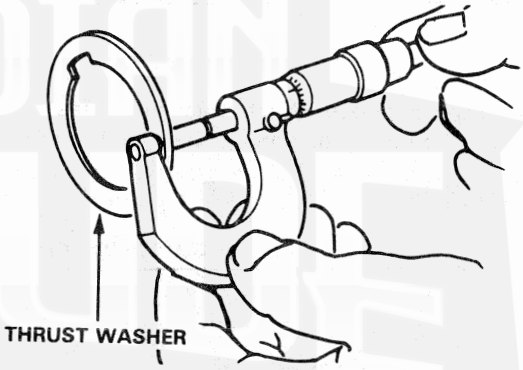
NOTE: Make all measurements before changing the thrust washers. Recheck after making the adjustments.

10. On the mainshaft measure the clearance between the shoulder of 2nd gear and main 3rd gear, the same way you did on the countershaft in step 9.

Mainshaft 2nd Gear Clearance:
Standard (New): 0.07—0.15 mm (0.003—0.006 in.)



If the clearance exceeds the service limit, measure the thickness of the 2nd clutch thrust washer (36 mm I.D.) and select one which gives the correct clearance.



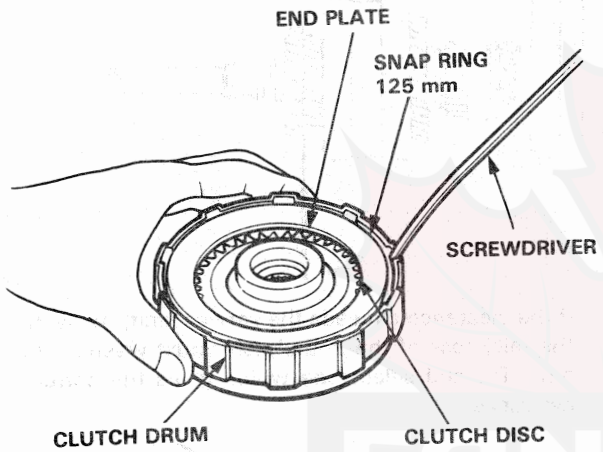
Replacement washer (36 mm I.D.)

CLASS	P/N	THICKNESS
A	90441—PF4—000	3.97—4.00 mm (0.156—0.157 in.)
B	90442—PF4—000	4.02—4.05 mm (0.158—0.159 in.)
C	90443—PF4—000	4.07—4.10 mm (0.160—0.161 in.)
D	90444—PF4—000	4.12—4.15 mm (0.162—0.163 in.)
E	90445—PF4—000	4.17—4.20 mm (0.164—0.165 in.)
F	90446—PF4—000	4.22—4.25 mm (0.166—0.167 in.)
G	90447—PF4—000	4.27—4.30 mm (0.168—0.169 in.)
H	90448—PF4—000	4.32—4.35 mm (0.170—0.171 in.)
I	90449—PF4—000	4.37—4.40 mm (0.172—0.173 in.)

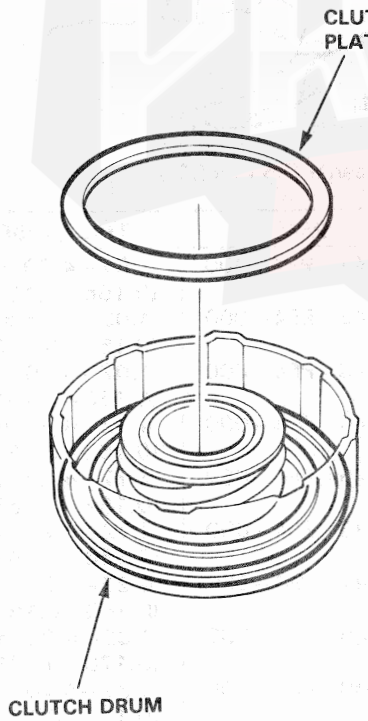
Disassembly

NOTE:
- The 1st and 3rd clutches are identical except for the piston plate installed in the 1st clutch.
- To disassemble the 2nd/4th clutch, use the special tool in Step 3 in the same manner as for the 1st and 3rd clutches.

1. Remove the snap ring.

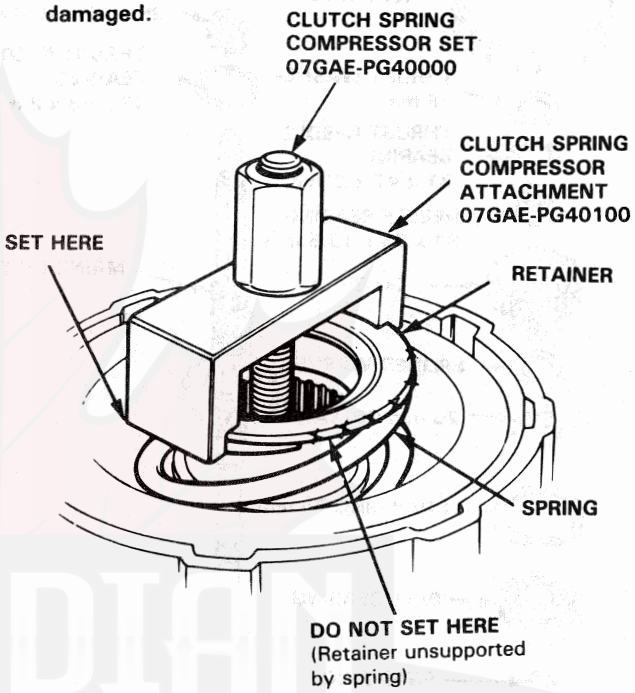


2. Remove the end plate, clutch discs and plates.
1st clutch only: Also remove the clutch piston plate.

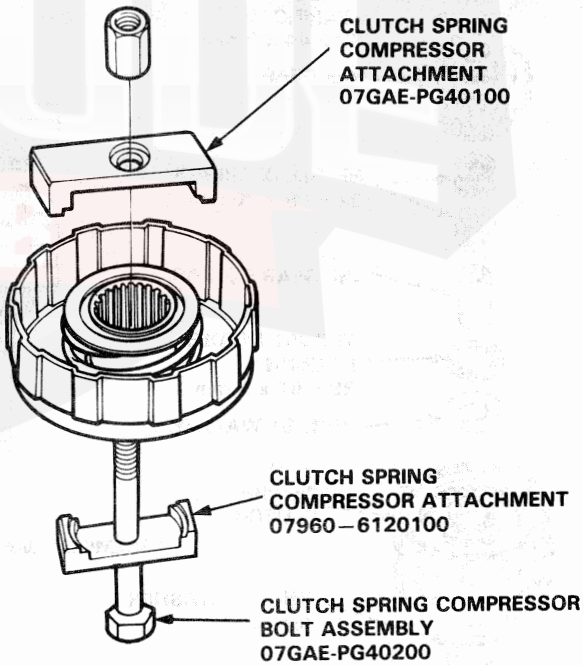


3. Install the clutch spring compressor as shown.

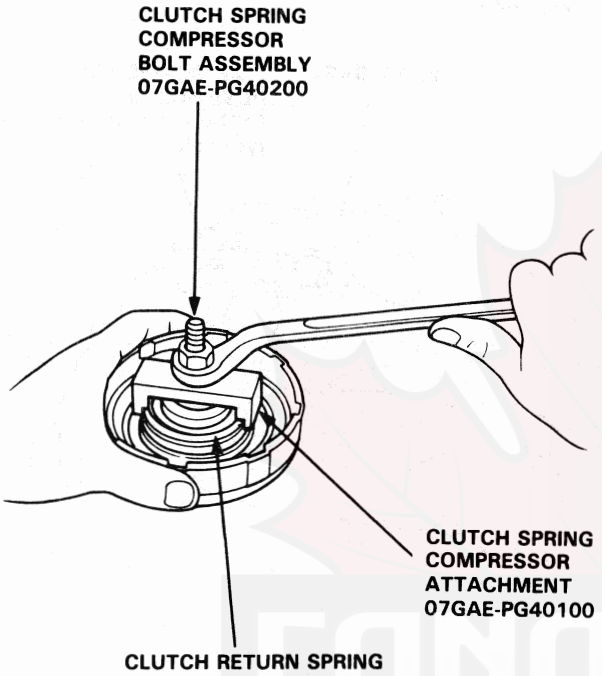
CAUTION: If either end of the compressor attachment is set over an area of the retainer which is unsupported by the spring, the retainer may be damaged.



1st and 3rd Clutches

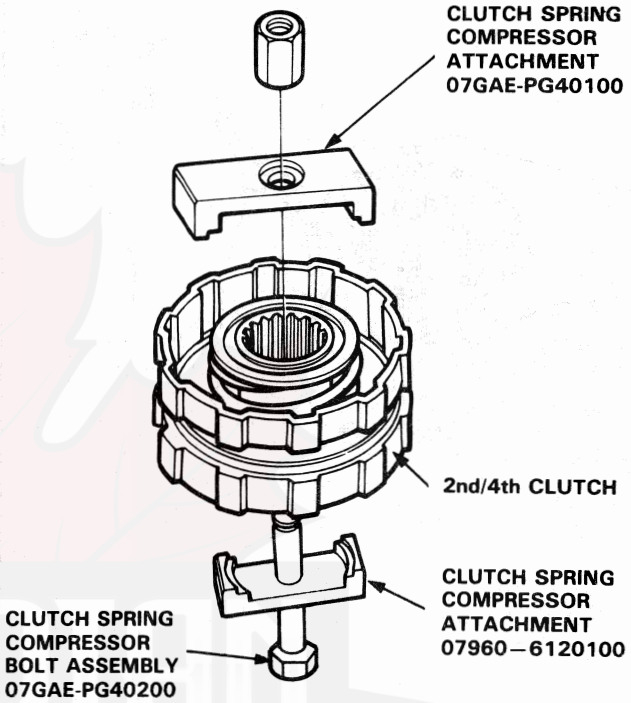


- Compress the clutch return spring.

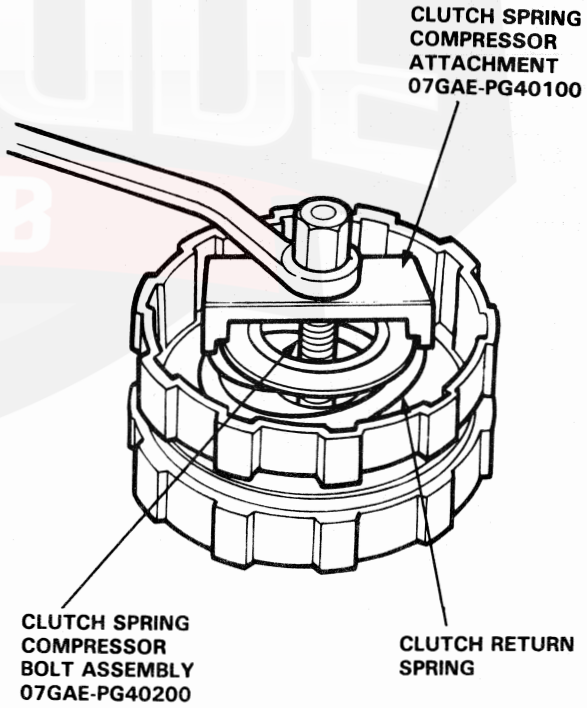


2nd/4th Clutch

- Assemble the spring compressor on the clutch drum.



- Compress the clutch return spring.



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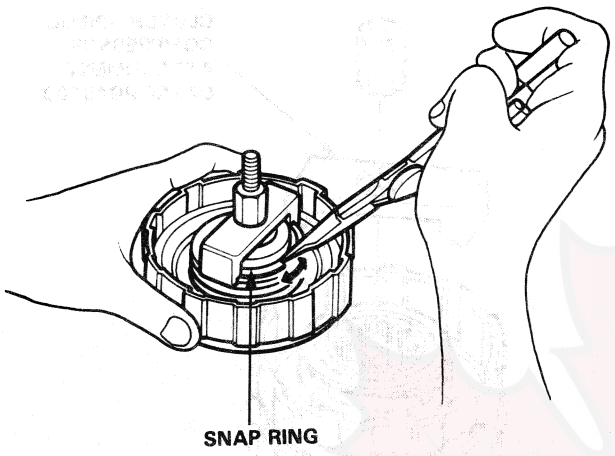
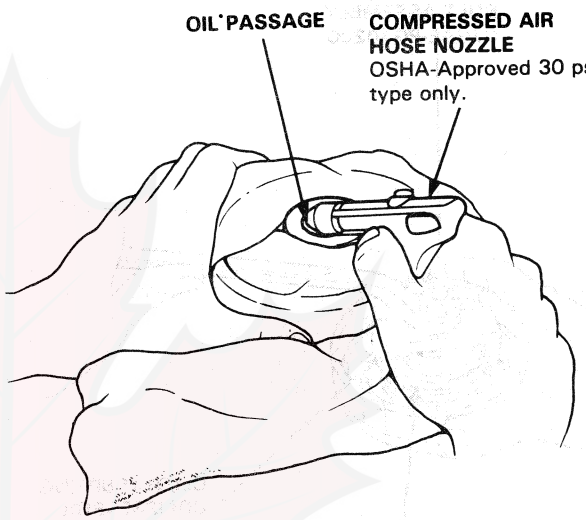
Disassembly (cont'd)

4. Remove the snap ring, then remove the clutch spring compressor, spring retainer and spring.



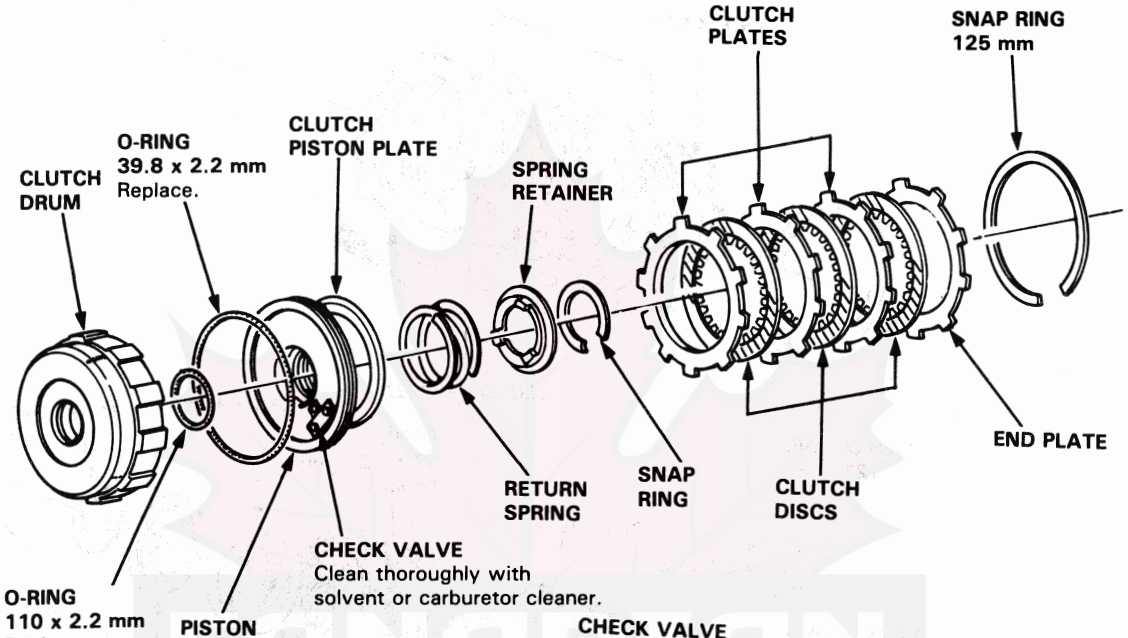
5. Wrap a shop rag around the clutch drum and apply air pressure to the oil passage to remove the piston. Place a finger tip on the other end while applying air pressure.



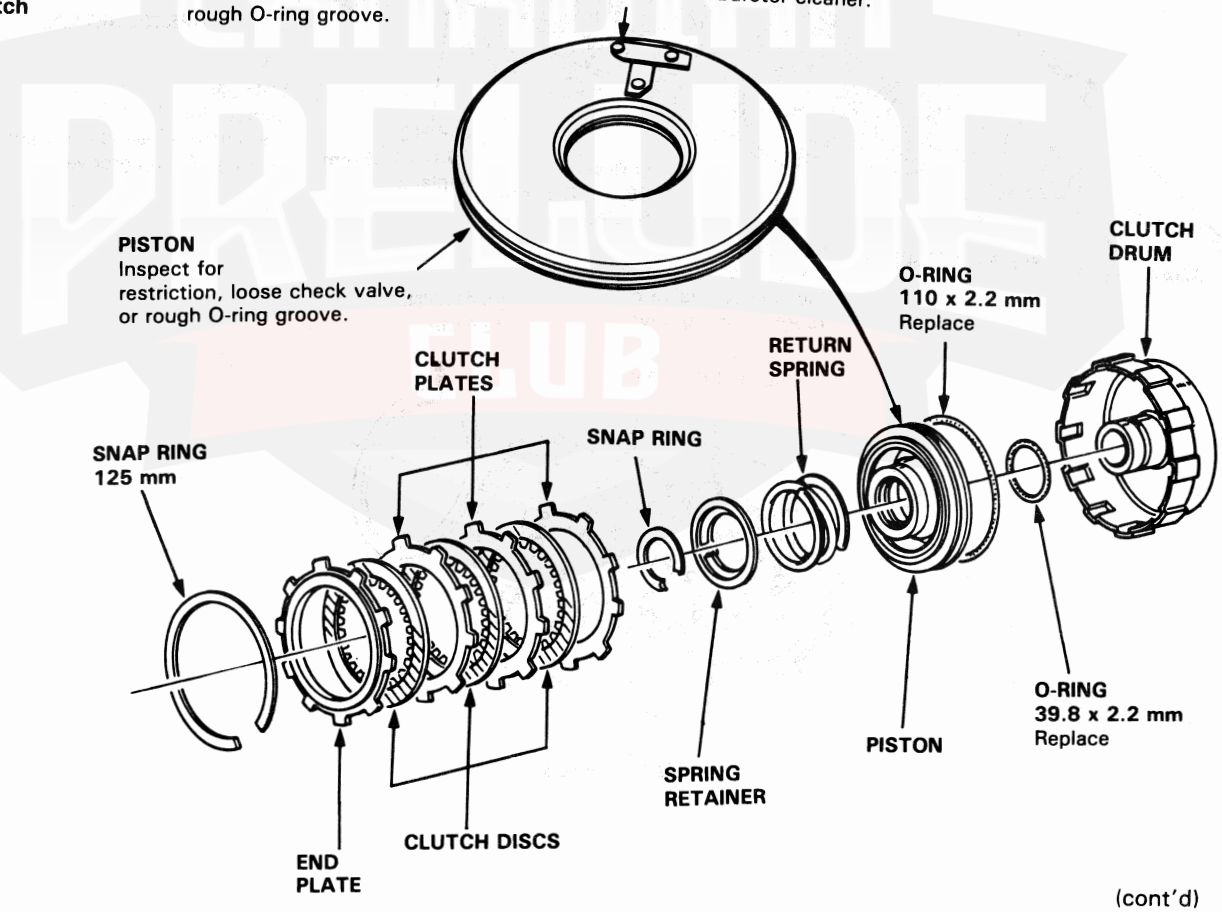
Disassembly/Inspection

1st Clutch

NOTE: Piston plate is installed in the 1st clutch.



3rd Clutch



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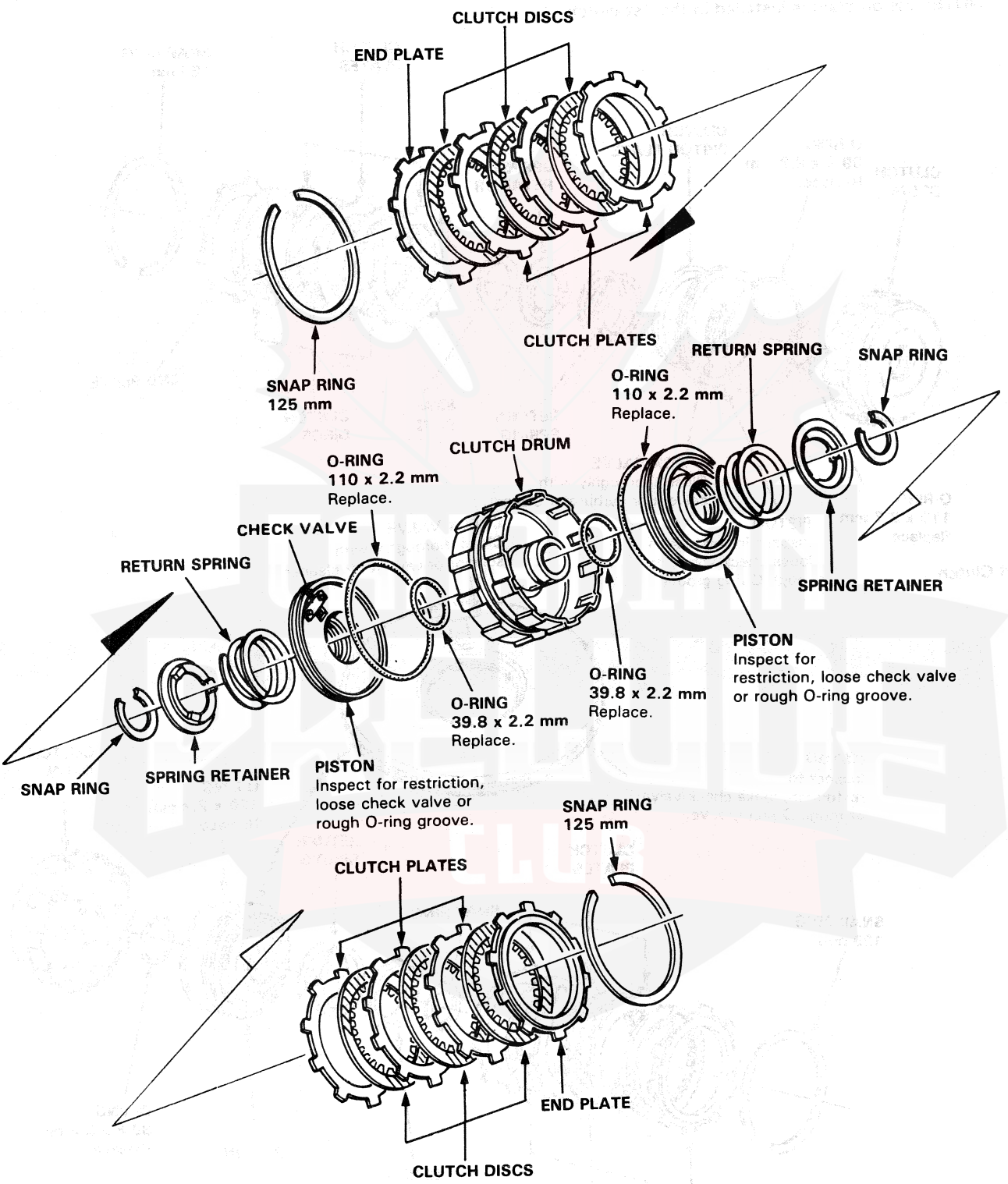
Disassembly/Inspection (cont'd)

2nd/4th Clutch

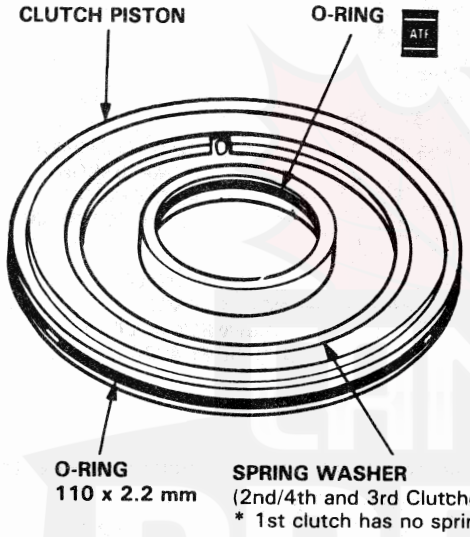


Reassembly

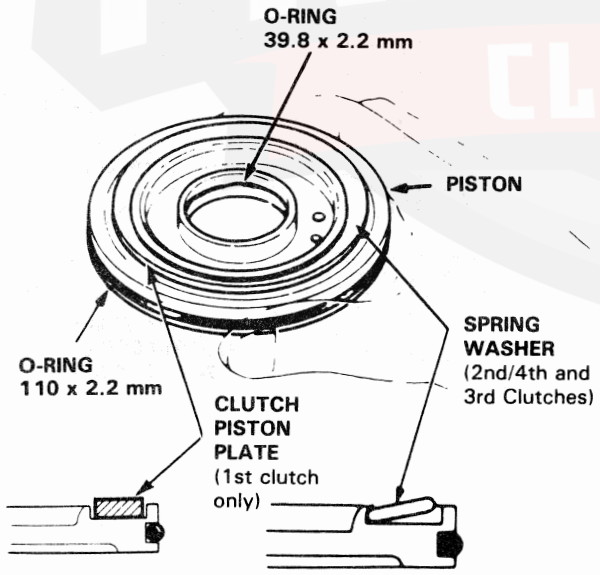
NOTE:
- The 1st and 3rd clutch assemblies are identical except installing the clutch piston plate in the 1st clutch.
- To reassemble the 2nd/4th clutch, use the special tool in Step 7 in the same manner as for the 1st and 3rd clutches.

1. Clean all parts thoroughly in solvent, and dry with compressed air. Blow out all passages.

2. Lubricate all parts with ATF before reassembly.



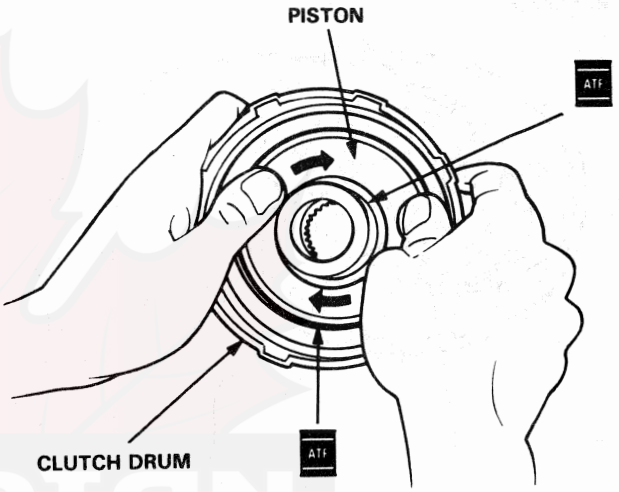
3. Install new O-ring on clutch piston.
2nd/4th and 3rd Clutches:
Make sure the spring washer is properly positioned as shown.



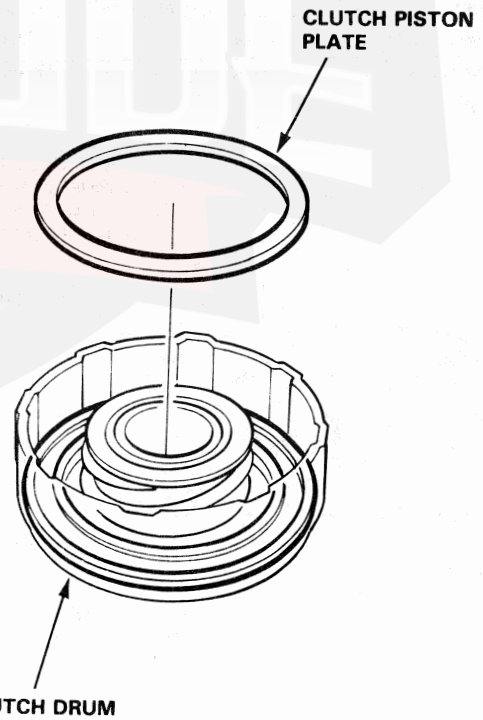
4. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

NOTE: Lubricate the piston O-ring with ATF before installing.

CAUTION: Do not pinch O-ring by forcing piston installation.



- 1st clutch only:
Install the clutch piston plate.



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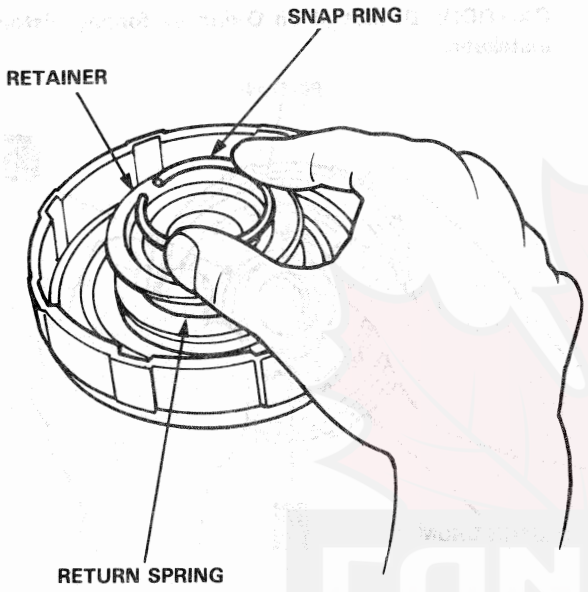
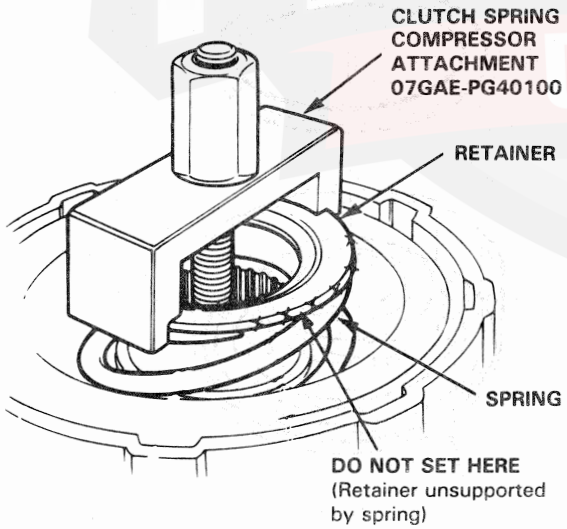
Reassembly (cont'd)

5. Install the return spring and retainer.
6. Position the snap ring on the spring retainer.



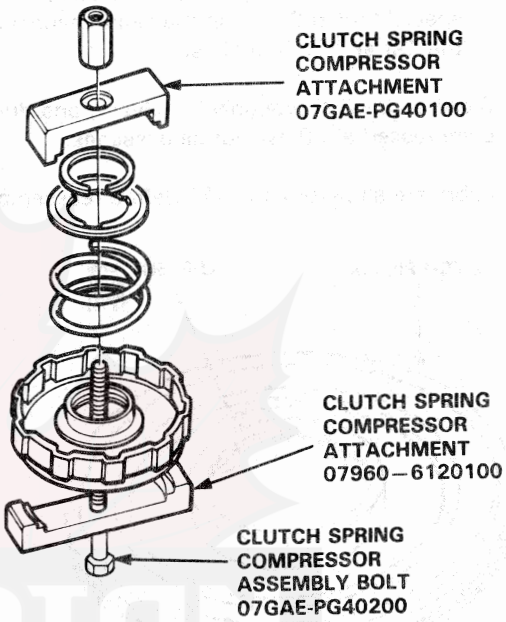
7. Assemble the spring compressor on the clutch drum.

CAUTION: If either end of the compressor attachment is set over an area of the retainer which is unsupported by the spring, the retainer may be damaged.

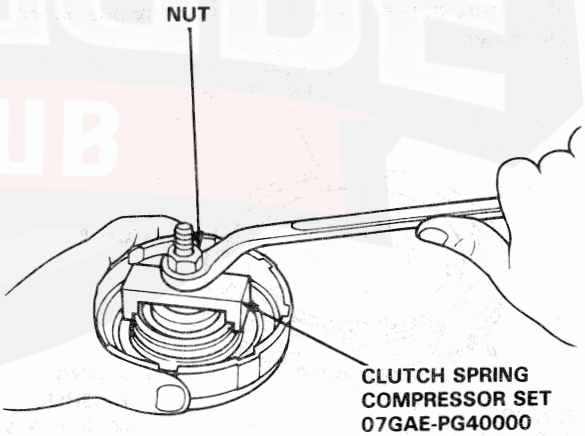


1st and 3rd clutches

- Assemble the spring compressor on the clutch drum.

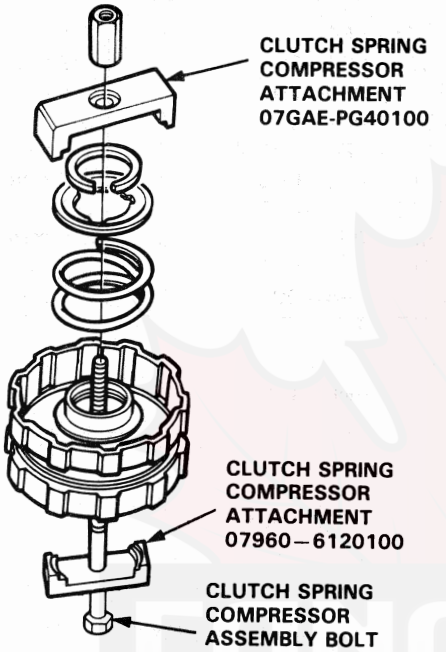


8. Compress the spring until the retainer is below the snap ring groove in the hub.

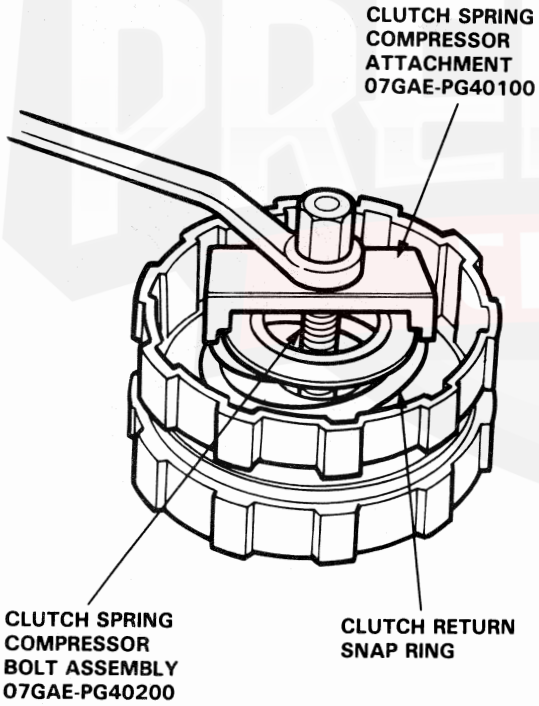


2nd/4th Clutch

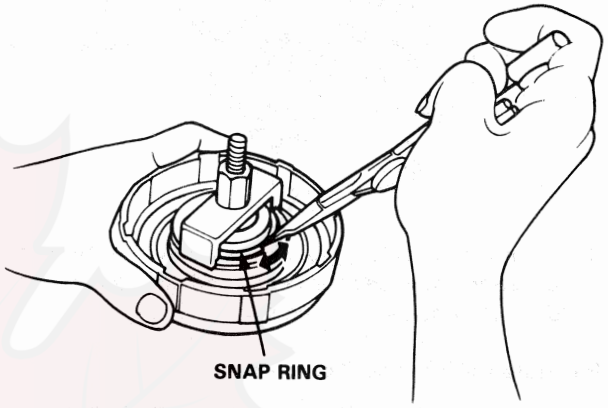
- Assemble the spring compressor on the clutch drum.



- Compress the clutch return spring.



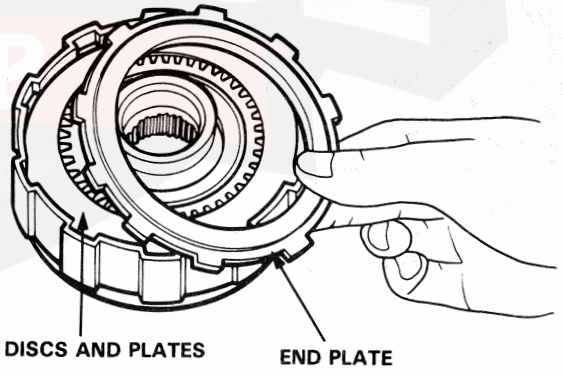
9. Install the snap ring (with its rounded edge facing in) in the hub groove and remove the spring compressor.



10. Soak the clutch discs thoroughly in automatic transmission fluid for a minimum of 30 minutes.

11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with flat side toward the disc.

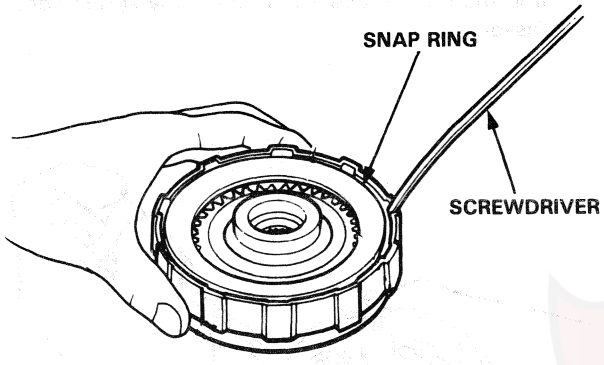
    NOTE: Before installing the plates and discs, make sure the inside of the clutch drum is free of grit or other foreign matter.



(cont'd)

Reassembly (cont'd)

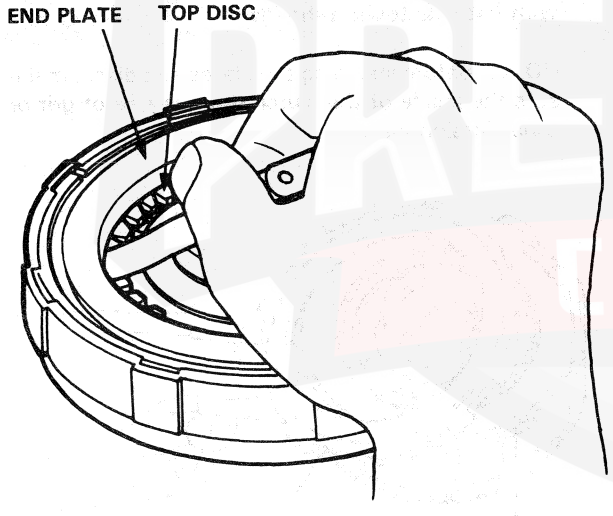
12. Install the 125 mm snap ring.



13. Using bent feeler gauges, carefully measure the clearance between the clutch end plate and the top disc. Do not damage the disc.

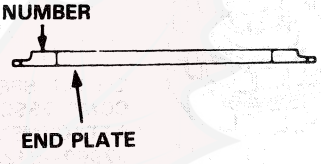
End Plate-to-Top Disc Clearance:

	Service Limit	
LOW	0.65—0.85 mm	(0.026—0.033 in.)
2ND	0.50—0.70 mm	(0.020—0.028 in.)
3RD	0.40—0.60 mm	(0.016—0.024 in.)
4TH	0.40—0.60 mm	(0.016—0.024 in.)

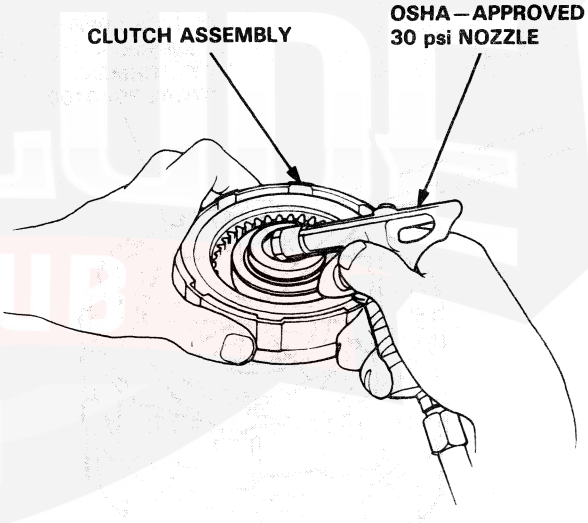


14. If not within service limit, select a new clutch end plate from the following table.

P/N	PLATE NO.	THICKNESS
22551—PF4—000	1	2.1 mm (0.082 in.)
22552—PF4—000	2	2.2 mm (0.086 in.)
22553—PF4—000	3	2.3 mm (0.090 in.)
22554—PF4—000	4	2.4 mm (0.094 in.)
22555—PF4—000	5	2.5 mm (0.098 in.)
22556—PF4—000	6	2.6 mm (0.102 in.)
22557—PF4—000	7	2.7 mm (0.106 in.)
22558—PF4—000	8	2.8 mm (0.110 in.)
22559—PF4—000	9	2.9 mm (0.114 in.)
22560—PF4—000	10	3.0 mm (0.118 in.)



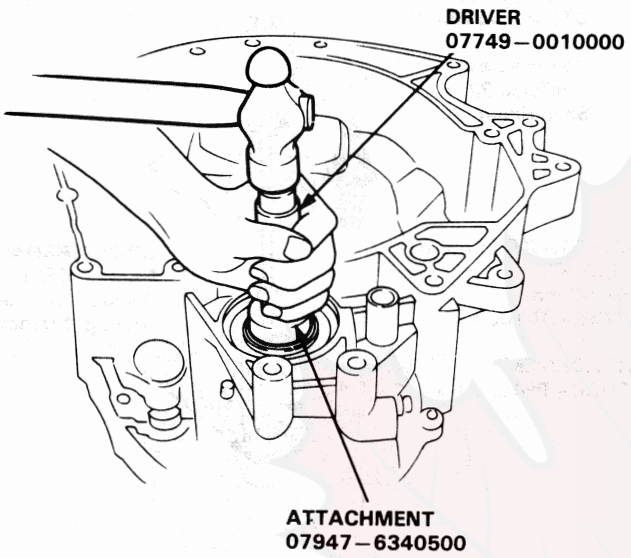
15. Check the clutch engagement by blowing air into the oil passage in the clutch drum hub. Remove the air pressure and check that the clutch releases.



Differential and Seal

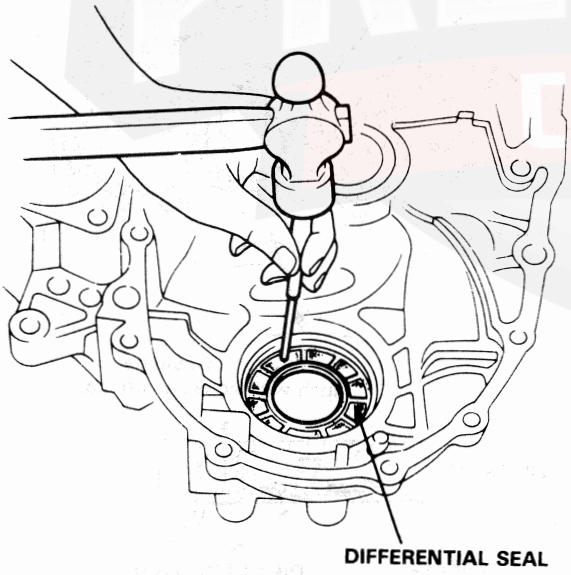
Replacement

1. If seals are to be replaced, or if differential needs repair, remove the differential.

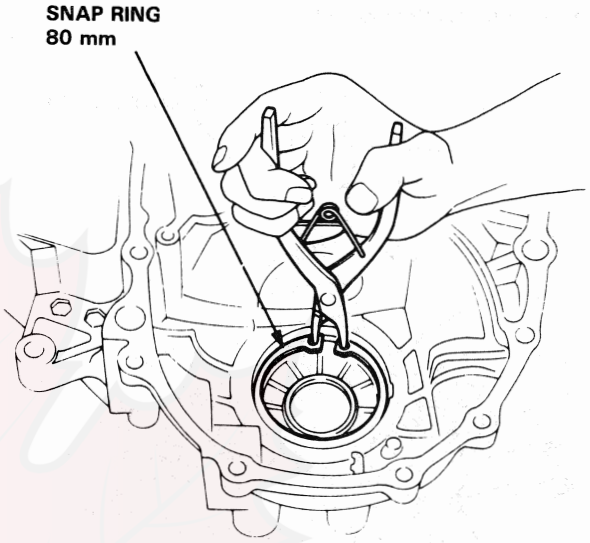


2. On the torque converter housing, remove the 80 mm snap ring, then drive out the seal as shown.

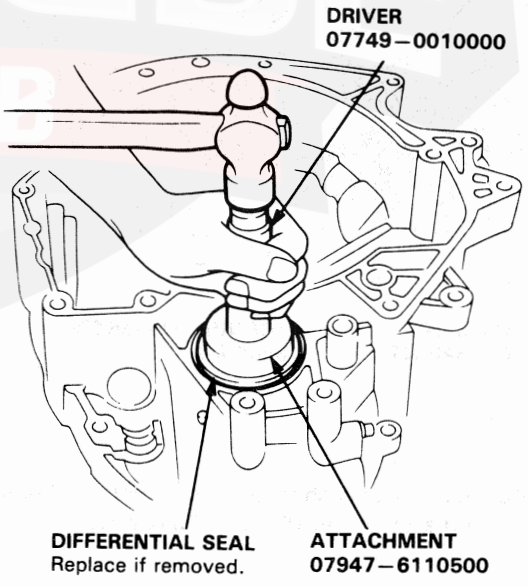
3. Remove the differential seal from the transmission housing in the same way.



4. On the torque converter housing, install the differential 80 mm snap ring if removed.



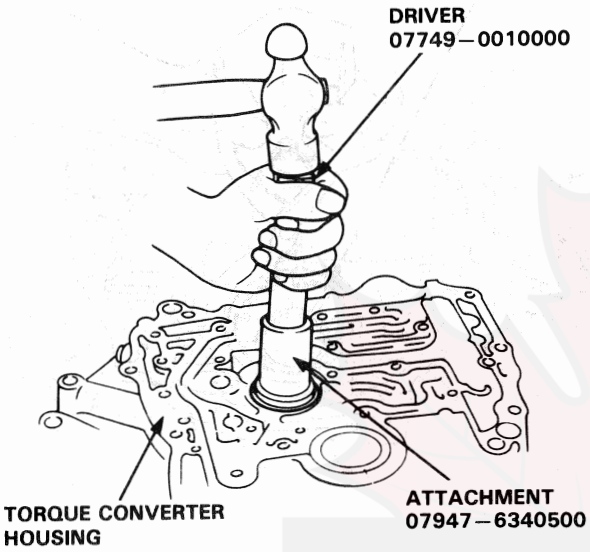
5. Install the differential seals into the torque converter housing and transmission housing.



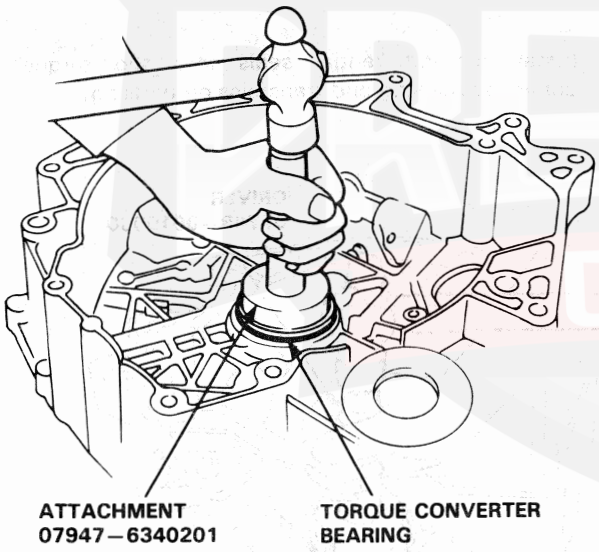
Replacement

Torque converter housing

1. Remove the mainshaft bearing and seal from the torque converter housing.

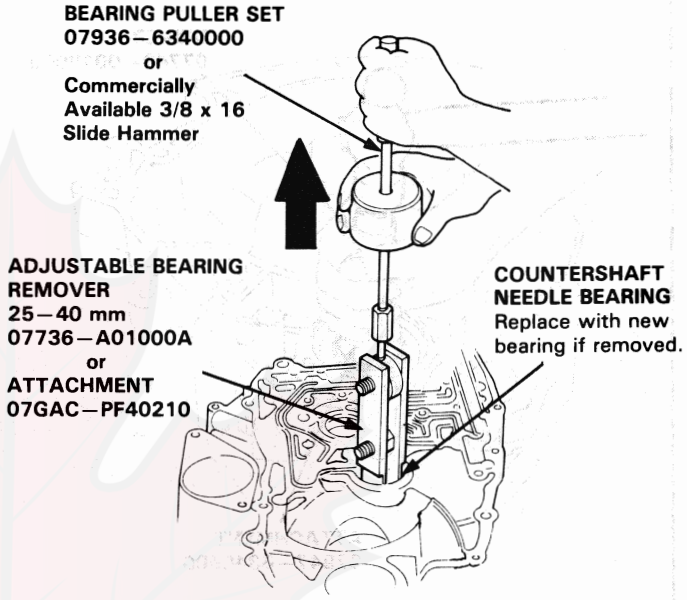


2. Drive in the new mainshaft bearing until it bottoms in housing.

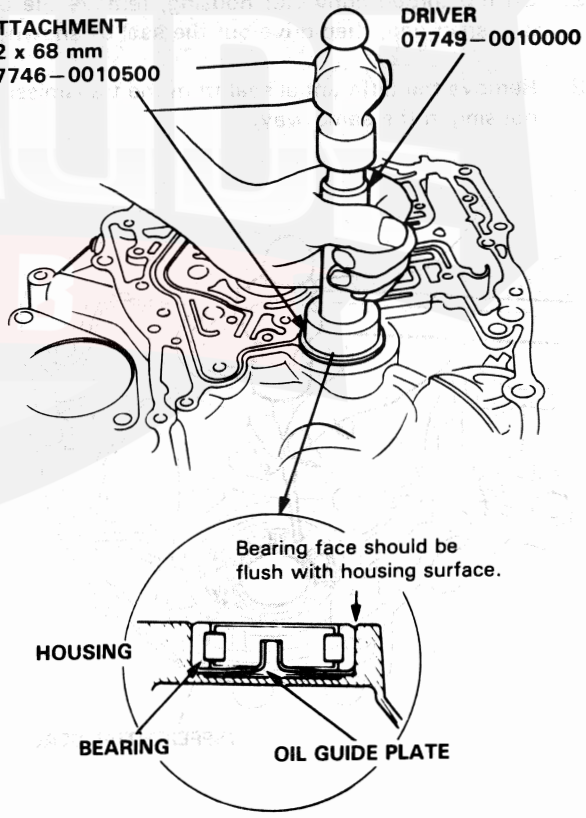


3. Install the new mainshaft seal flush with the housing, using attachment 07947–6340201.

4. Turn the torque converter housing over and remove the countershaft bearing.



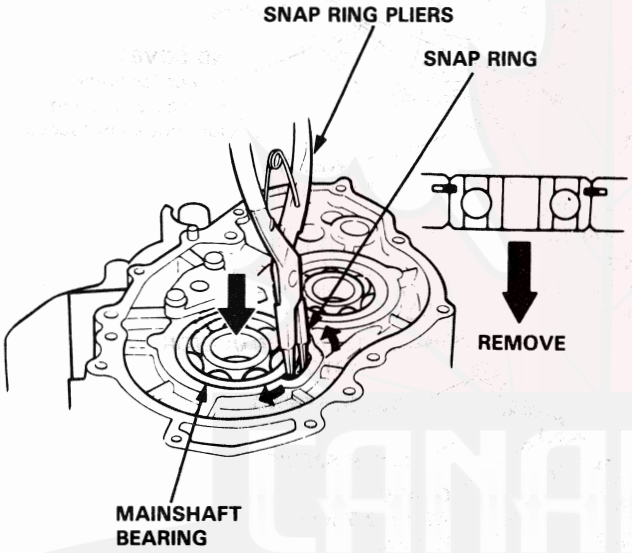
5. Make sure the oil guide plate is installed in the bearing hole, then install a new countershaft bearing flush with the housing.

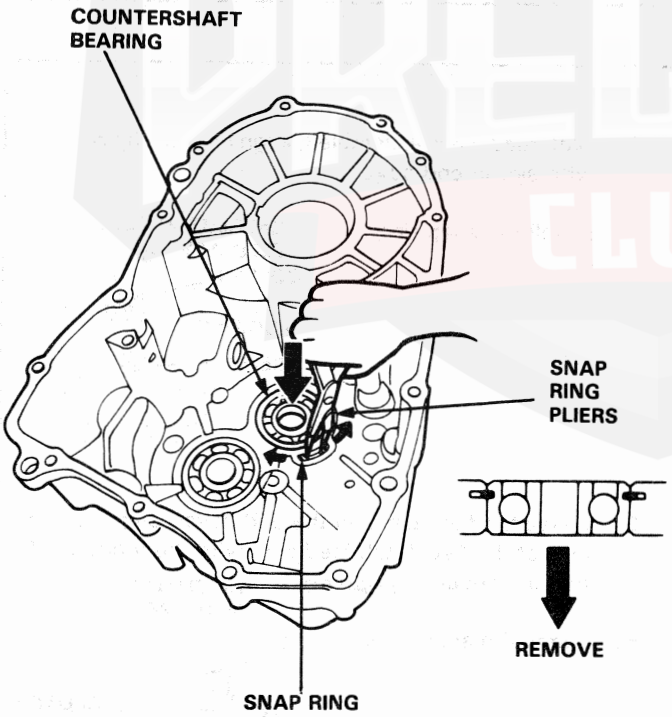


Transmission housing

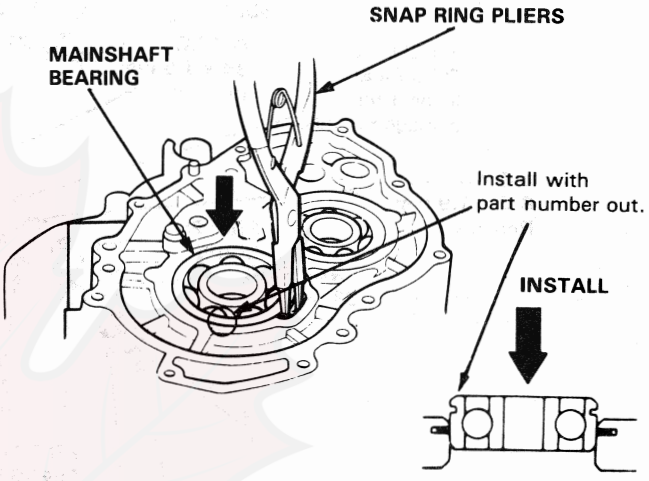
1. To remove the mainshaft and countershaft bearings from the transmission housing, expand each snap ring with snap ring pliers, then push the bearing out by hand.

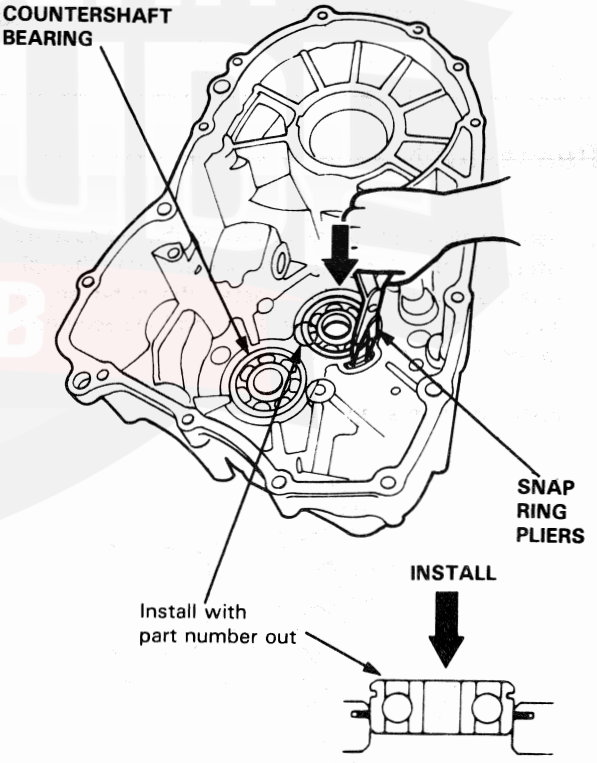
   NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing.





2. Expand each snap ring with snap ring pliers, insert the new bearing part-way into it, then release the pliers. Push the bearing down into the transmission until the ring snaps in place around it.



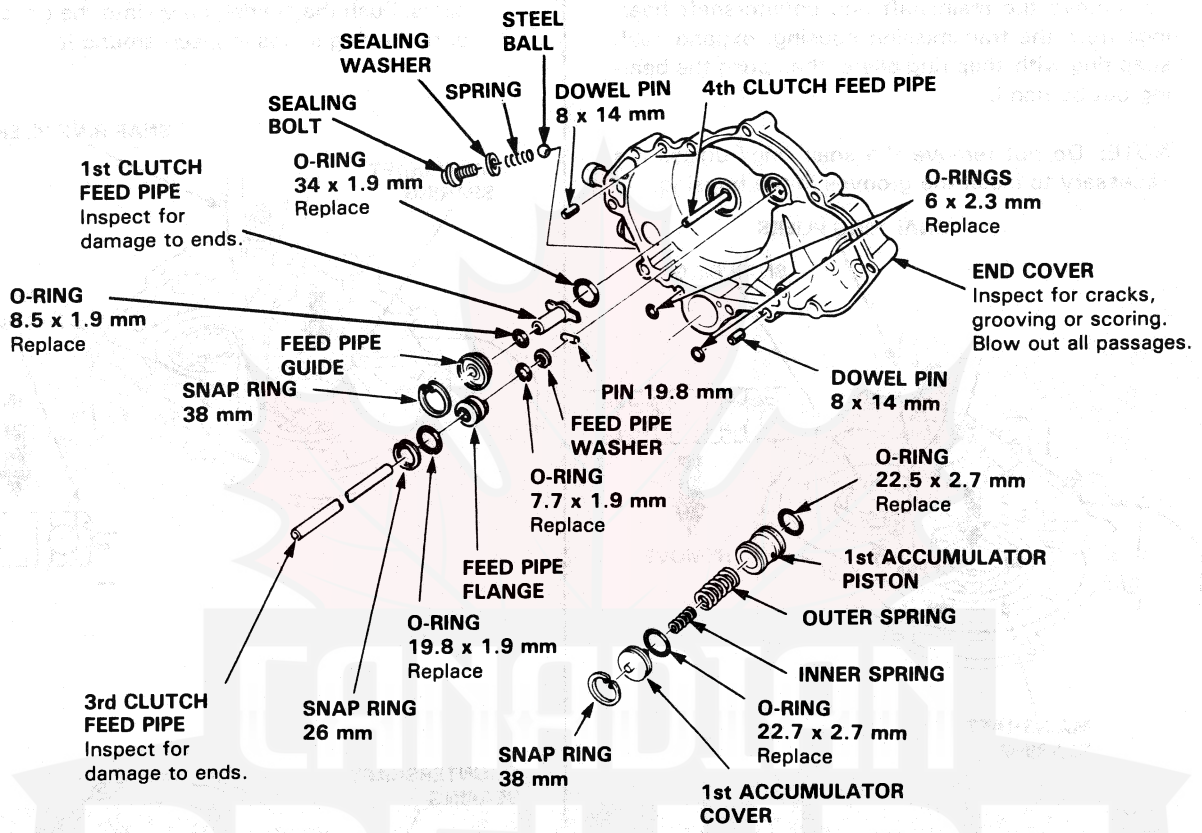


3. Make sure the snap rings are seated in the bearing and housing grooves.

End Cover

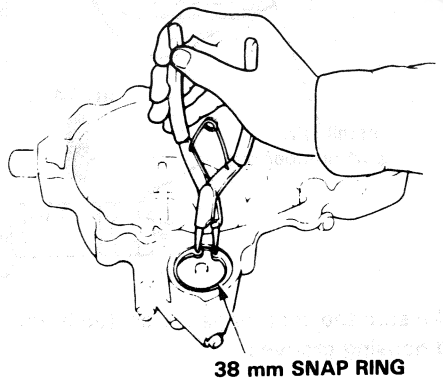
Disassembly/Inspection

CAUTION: Remove and install parts carefully to avoid damaging them.

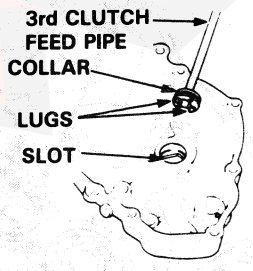


Reassembly

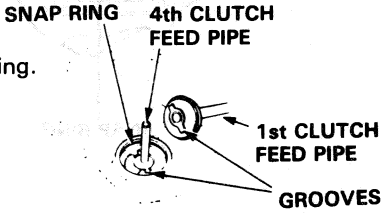
1. Seat a new O-ring in the groove of the 1st accumulator, and slide the accumulator piston into the right side transmission cover. Install the outer spring, inner spring, another new O-ring and the accumulator cover, in that order.
2. Install 38 mm snap ring.



3. With feed pipes assembled, align lugs on the collars with slot in end cover.
4. Install the snap ring.

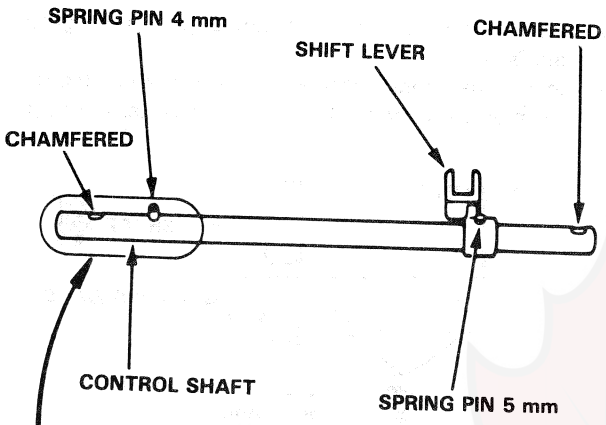


5. Install the feed pipes in the end cover, aligning the lugs of the 1st clutch feed pipe with the grooves of the end cover.
6. Install the snap ring.

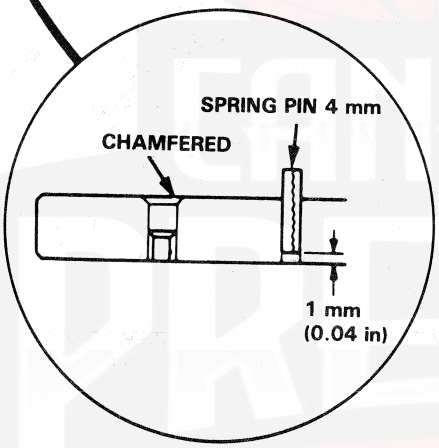


Control Shaft

Installation



Drive the 4 mm spring pin to a depth 1 mm in from the side that is opposite the chamfer in the threaded hole.



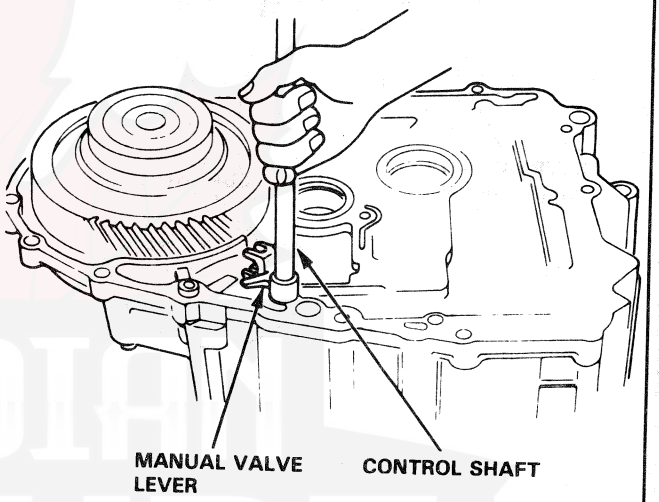
Transmission

Reassembly

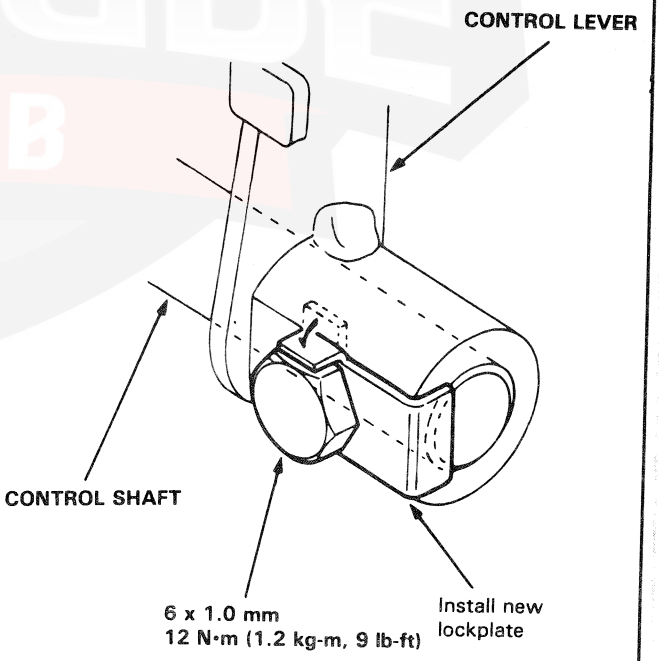
NOTE: Lubricate all parts with ATF during reassembly.

1. Install the differential assembly. If the torque converter housing, transmission housing and/or differential side bearings were replaced, the differential side clearance must be checked as shown in Section 16.

2. Assemble the manual valve lever on the control shaft, then install in the torque converter housing as shown.



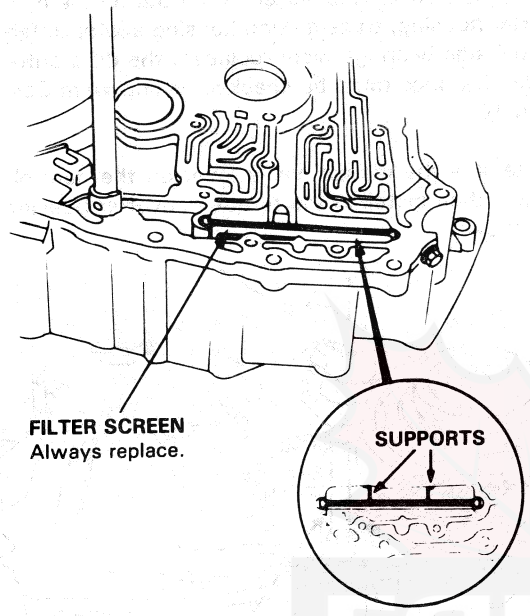
3. Install the control lever and new lock plate on the other end of the shaft. Tighten the bolt to the torque shown, then bend the tab over against the bolt head.



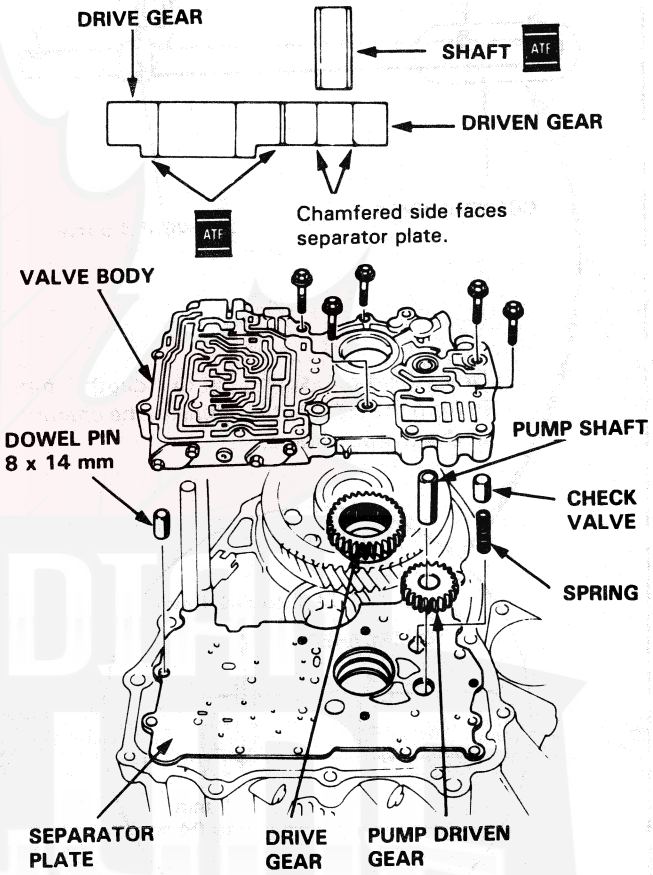
(cont'd)

Reassembly (cont'd)

4. Install a new filter screen.



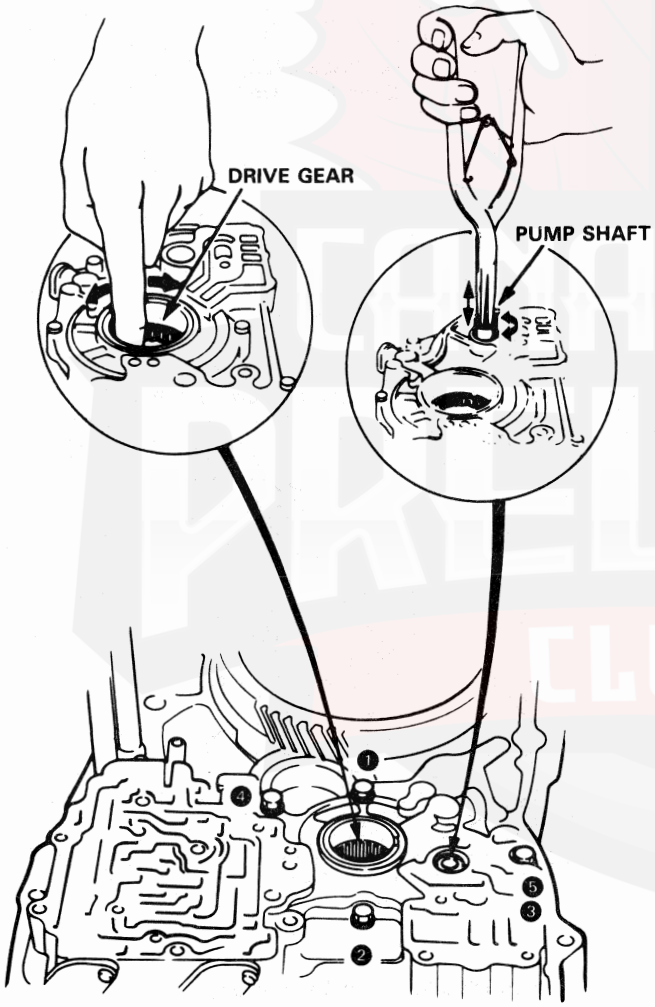
5. Install the separator plate, dowel pin, pump gears and shaft.
6. Install the check valve and spring, then install the main valve body on the torque converter housing.



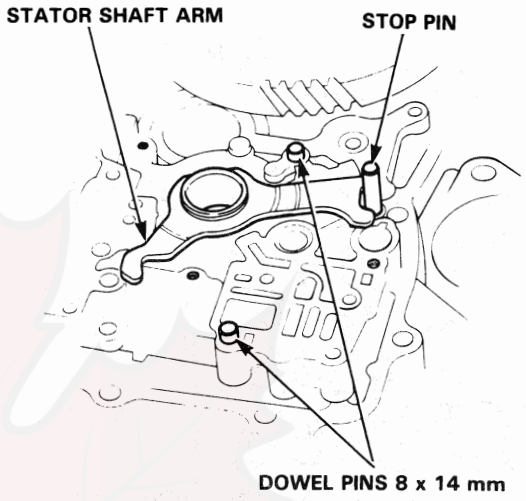
7. Tighten the 4 valve body bolts in the sequence shown. Make sure the pump drive gear rotates smoothly in the normal operating direction and the pump shaft moves smoothly in both the axial and normal operating directions.

8. Torque the valve body bolts to 12 N·m (1.2 kg-m, 9 ft-lb), and again check that the pump gear and pump shaft move freely.

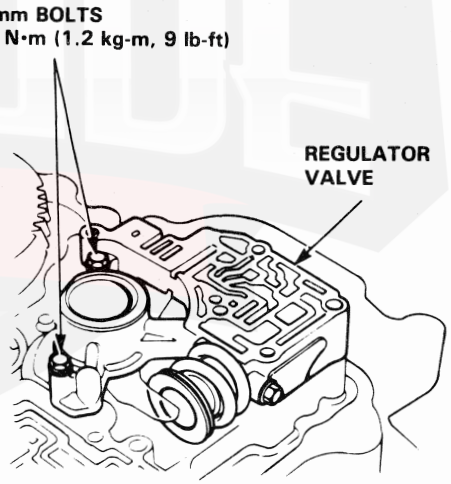
CAUTION: If the pump gear and pump shaft do not move freely, loosen the valve body bolts, realign the shaft, and then retighten to the specified torque. Failure to align the pump shaft correctly will result in seized pump gear or pump shaft.



9. Install the stator shaft arm, stop pin and dowel pins.



10. Install the regulator valve and torque its 2 bolts to 12 N·m (1.2 kg-m, 9 lb-ft).

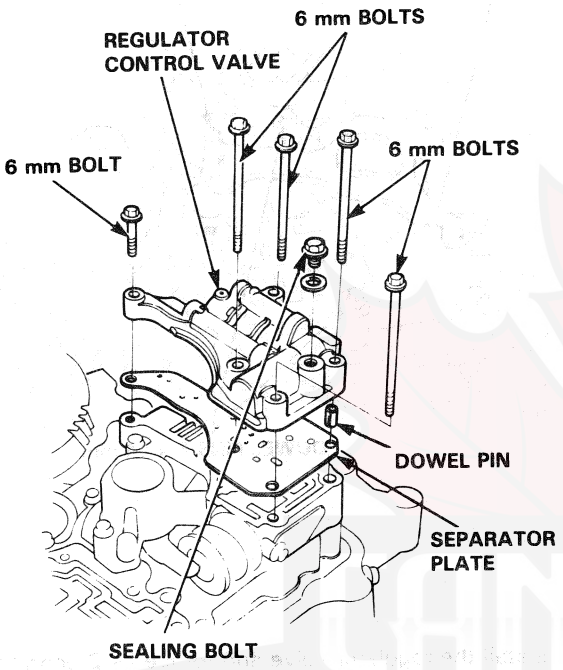


(cont'd)

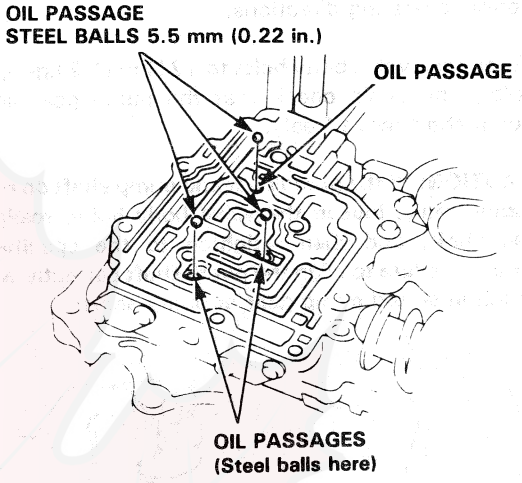
Reassembly (cont'd)

11. Install the dowel pin and separator plate.

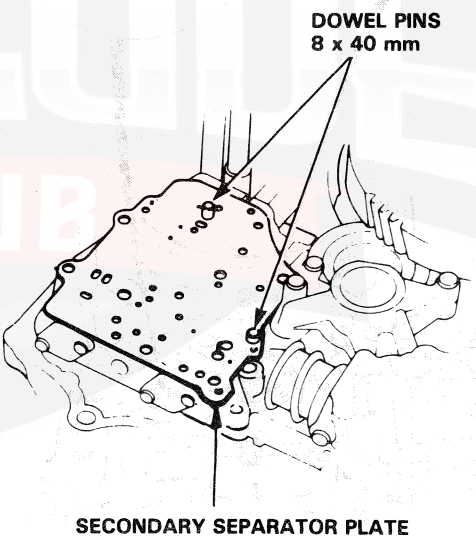
12. Install the regulator control valve body bolts as shown, and torque to 12 N·m (1.2 kg-m, 9 lb-ft).



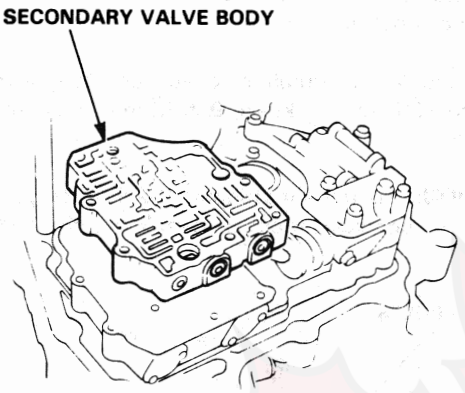
13. Install the 3 steel balls in main valve body oil passages.



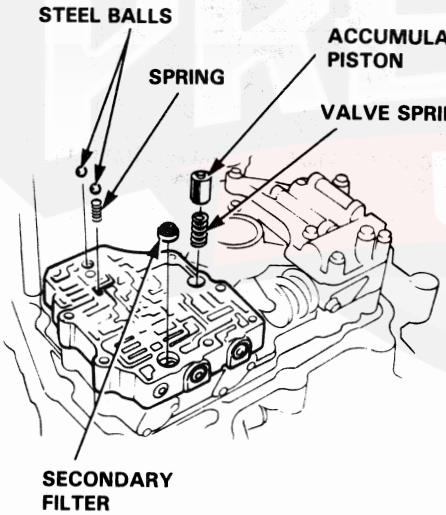
14. Install the separator plate and dowel pins.



15. Install the secondary valve body.

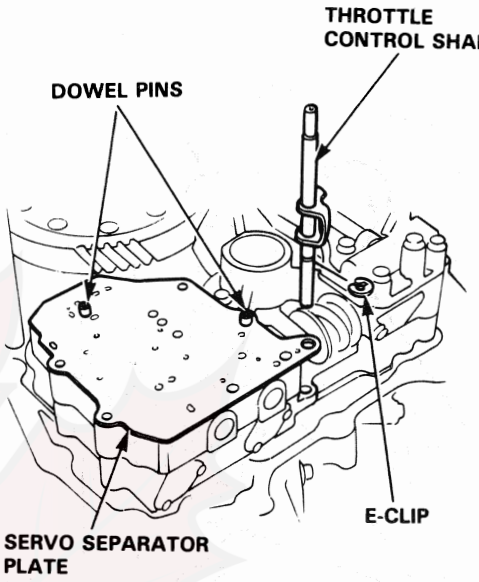


16. Install the steel balls, ball spring, shift timing accumulator piston, valve spring and secondary filter in the secondary valve body.

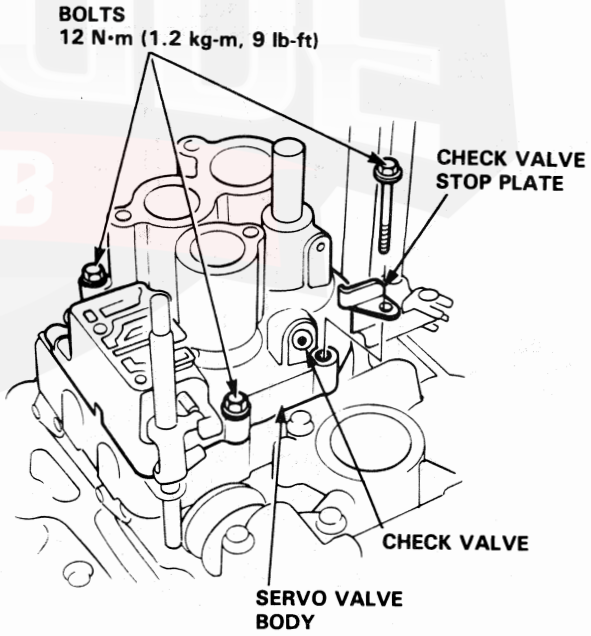


NOTE: The ball for the top oil passage has a spring to press the ball against the separator plate.

17. Install the separator plate and dowel pins, then install the throttle control shaft.



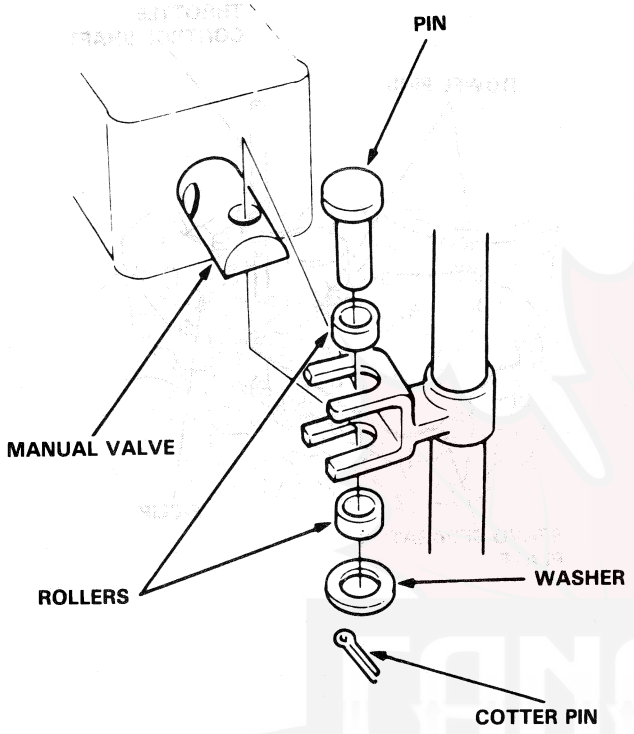
18. Install the servo valve body (2 bolts) and check valve stop plate (1 bolt) as shown.



(cont'd)

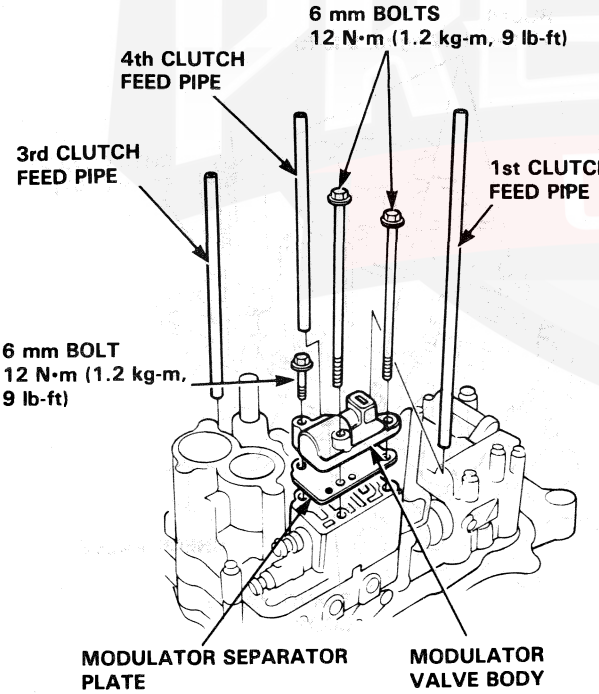
Reassembly (cont'd)

19. Put the rollers on each side of the manual valve stem, then attach the valve to the lever with the pin. Secure with the lock pin.



20. Install the separator plate.

21. Install the 1st, 3rd and 4th clutch feed pipes.

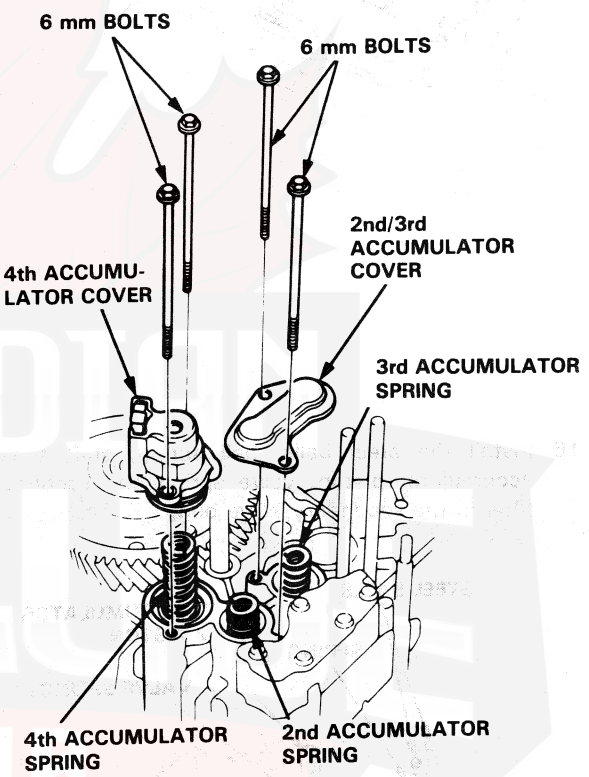


22. Install the accumulator springs.

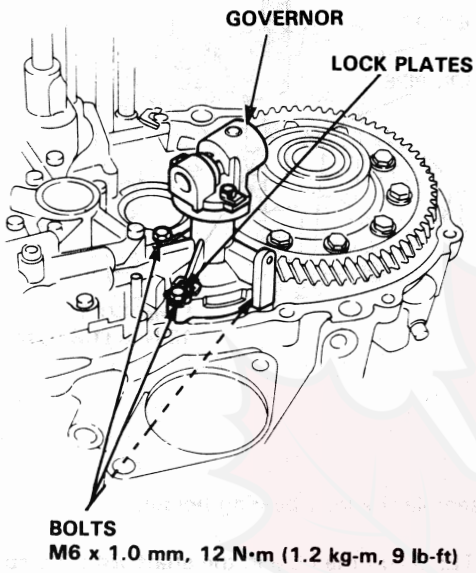
23. Install the 2nd/3rd accumulator cover, and torque the bolts to 12 N·m (1.2 kg-m, 9 lb-ft) in a criss-cross pattern.

24. Install the 4th accumulator cover, and torque the bolts to 12 N·m (1.2 kg-m, 9 lb-ft) in a criss-cross pattern.

CAUTION: To prevent stripping the threads, press down on accumulator cover, then install the bolts.

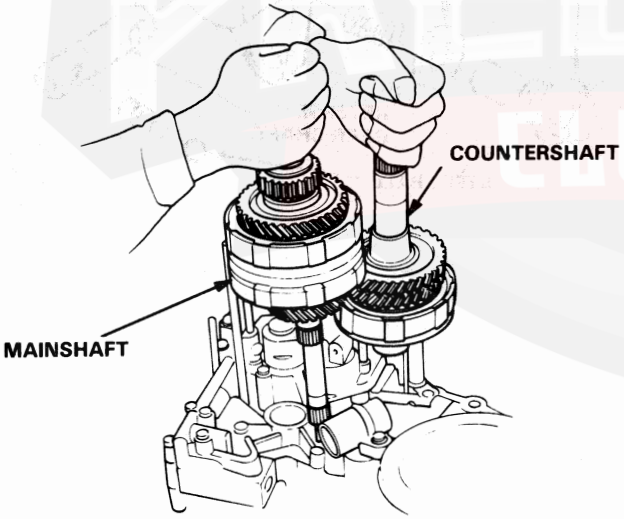


25. Install the governor valve using new lock plates, and the three 6 mm bolts.



26. Set the countershaft and mainshaft in place as an assembly.

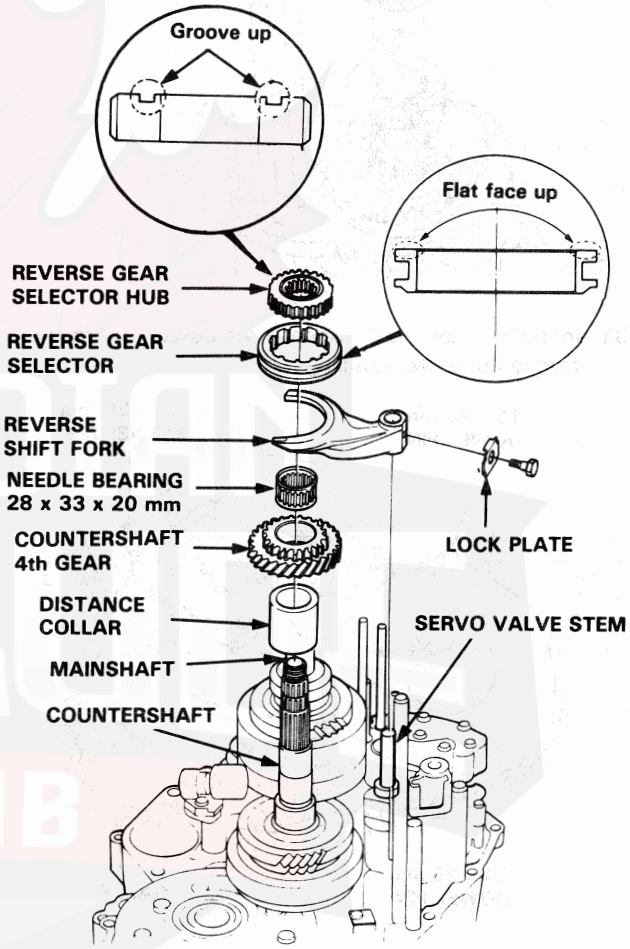
NOTE: Do not tap on the shafts with a hammer to drive in.



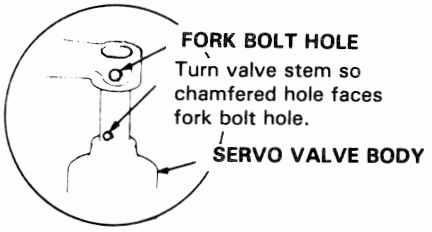
27. Install 4th gear and its needle bearing, and the countershaft 4th gear and its selector hub.

28. Assemble the reverse shift fork and selector sleeve, then install them as an assembly on the countershaft.

NOTE:
- Install the sleeve with its flat face up.
- Install the reverse gear selector hub with the groove facing up.



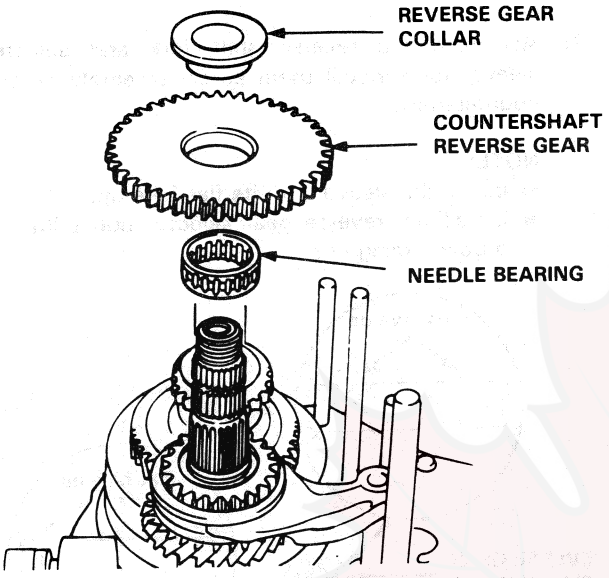
29. Install the reverse shift fork over the servo valve stem. Align the hole in the stem with hole in fork as shown, and install the bolt and new lock plate. Bend the lock tab against the bolt head.



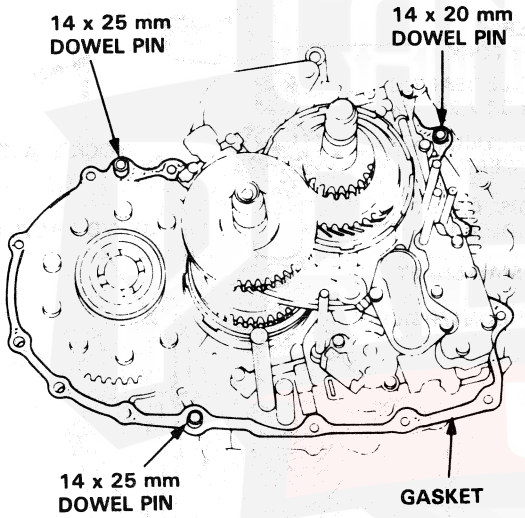
(cont'd)

Reassembly (cont'd)

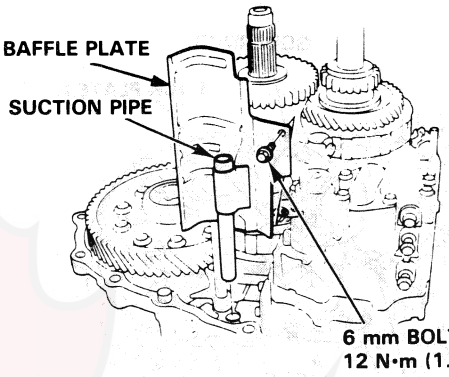
30. Install the countershaft reverse gear, needle bearing, and reverse gear collar.



31. Install the new gasket and three dowel pins in the torque converter housing.

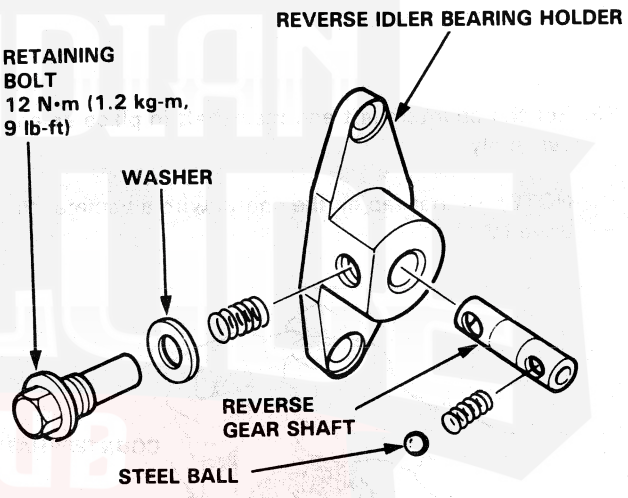


32. Install the baffle plate with the suction pipe.



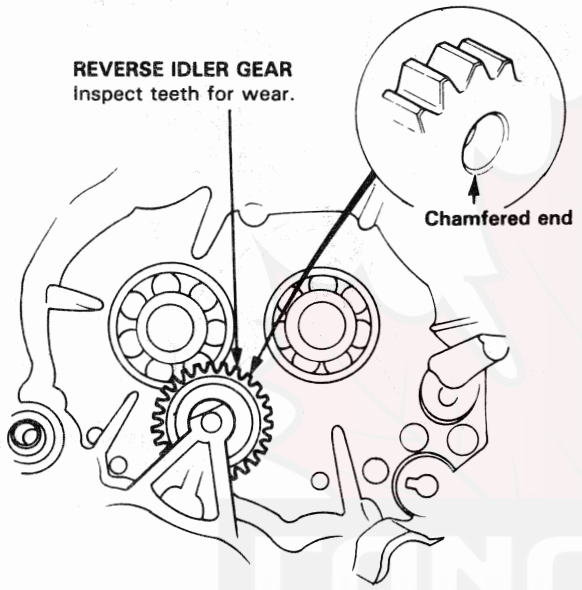
33. Assemble the idler bearing holder.

NOTE: Align the hole in the shaft with the spring.



34. Install the reverse idler gear.

NOTE: Install the reverse idler gear so that the larger chamfer on the shaft bore faces the torque converter housing.

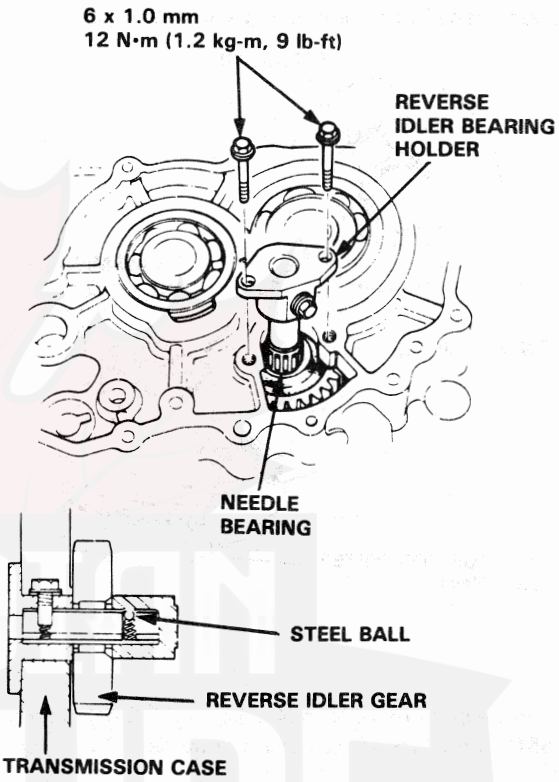


35. Install the needle bearing into the idler gear.

36. Install the idler bearing holder into the transmission housing.

37. Tighten the reverse idler bearing holder bolts.

38. Install the spring and then tighten the retaining bolt with sealed washer.

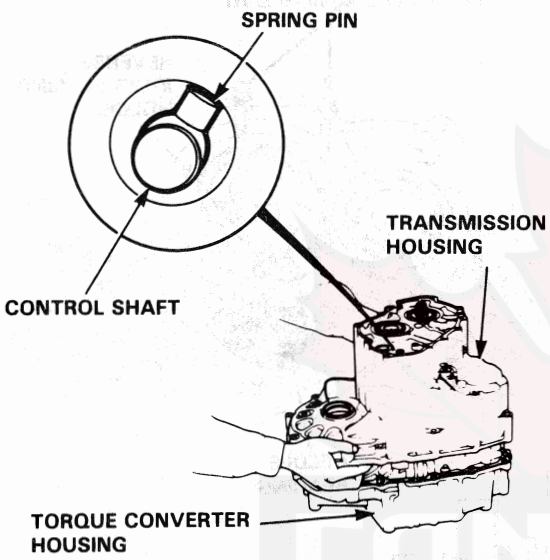


(cont'd)

Reassembly (cont'd)

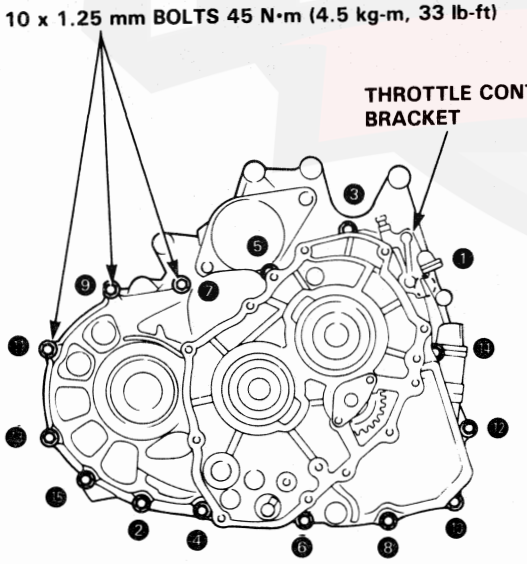
39. Place the transmission housing on the torque converter housing.

    NOTE: Be sure the main valve control shaft lines up with the hole in the housing and that the reverse idler gear meshes with the mainshaft and countershaft, or the housing will not go on.



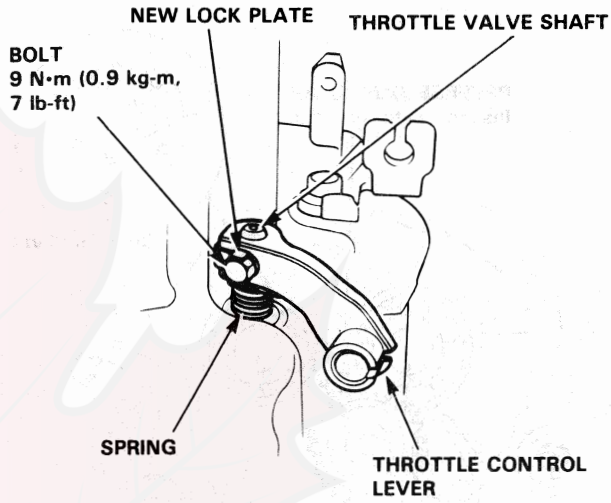
40. Torque bolts to 45 N·m (4.5 kg-m, 33 lb-ft) in order of (1) thru (15) in two or more steps.

    NOTE: When tightening the transmission housing bolts, take care that you do not distort or damage the throttle control bracket; distortion or damage to the bracket will change transmission shift points.



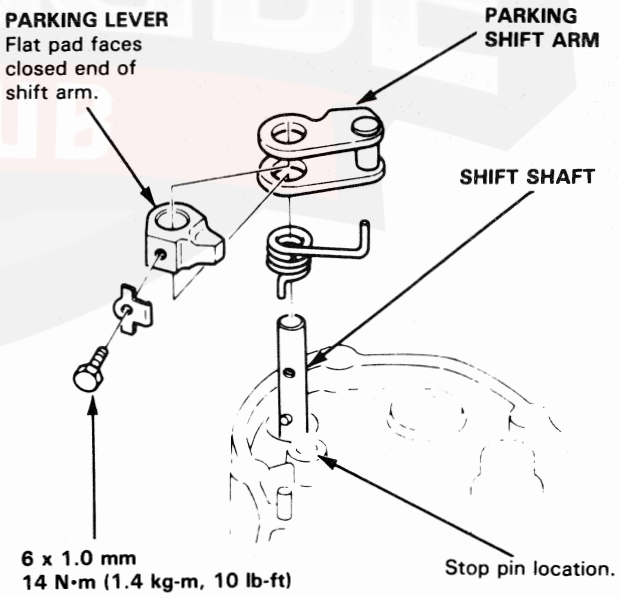
41. Install the throttle control lever and spring on the throttle control shaft.

42. Install the bolt and new lock plate. Bend the lock tab against the bolt head.



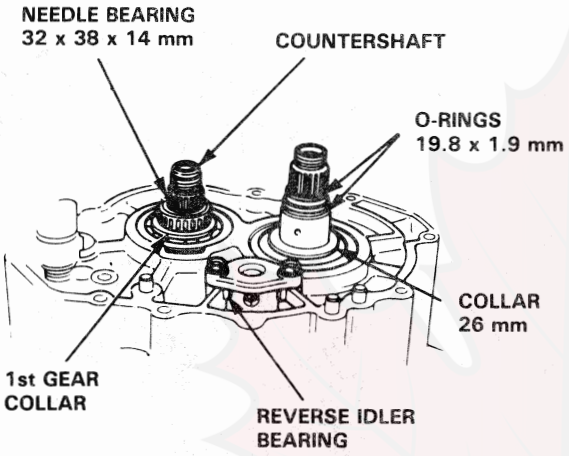
43. Install the parking shift arm and spring on the shift shaft with the bolt and a new lock plate. Bend the lock tab against the bolt head.

    NOTE: The spring should put clockwise tension on the shift arm, forcing it against the stop pin.

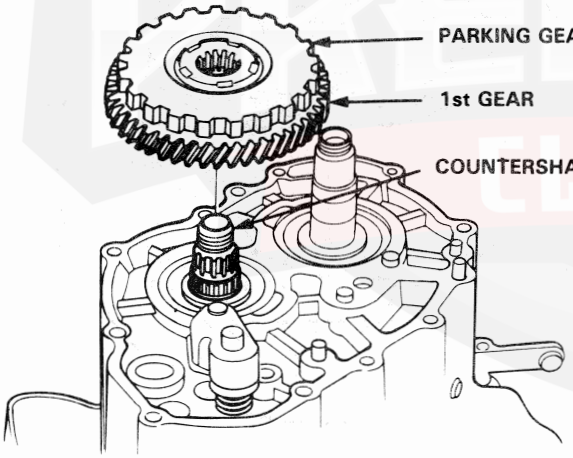


44. Install the 1st gear collar and needle bearing on the countershaft. Install the 26 mm collar on the mainshaft.

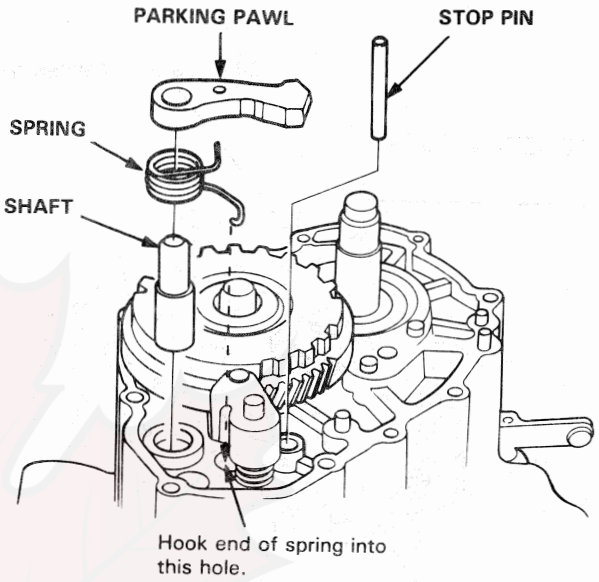
45. Install new 19.8 x 1.9 mm O-rings on the mainshaft.



46. Install the countershaft 1st gear and parking gear on the countershaft.



47. Install the stop pin, parking pawl shaft, parking pawl, and pawl release spring.



NOTE:

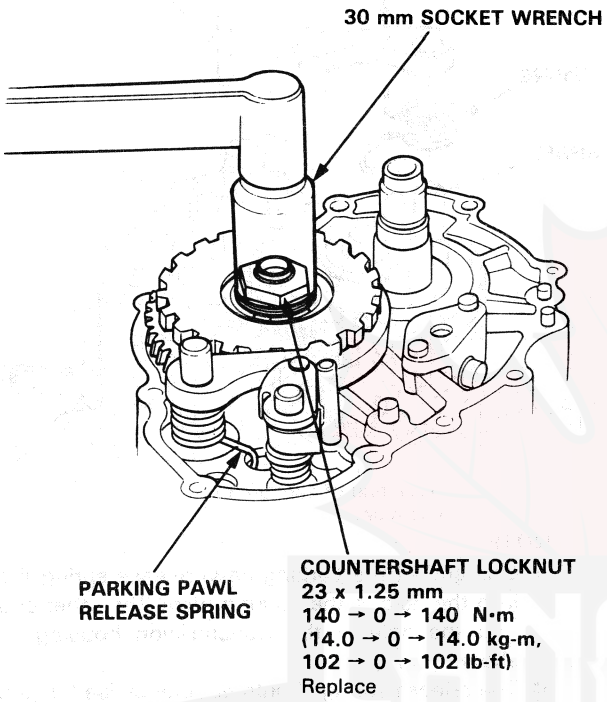
- One end of the parking pawl release spring fits into the hole in the parking pawl, the other end into the hole in the transmission housing as shown.
- The release spring should put clockwise tension on the pawl, forcing it away from the parking gear.

(cont'd)

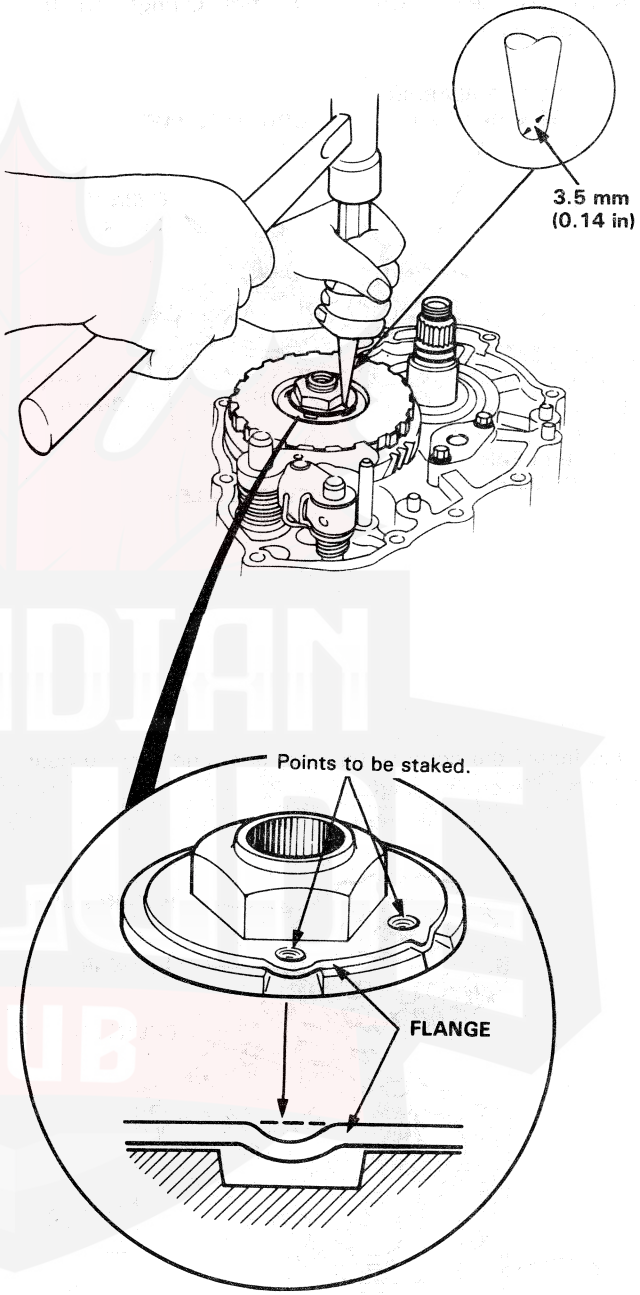
Reassembly (cont'd)

48. Shift to PARK and install the mainshaft holder.

49. Install and torque the new countershaft locknut.

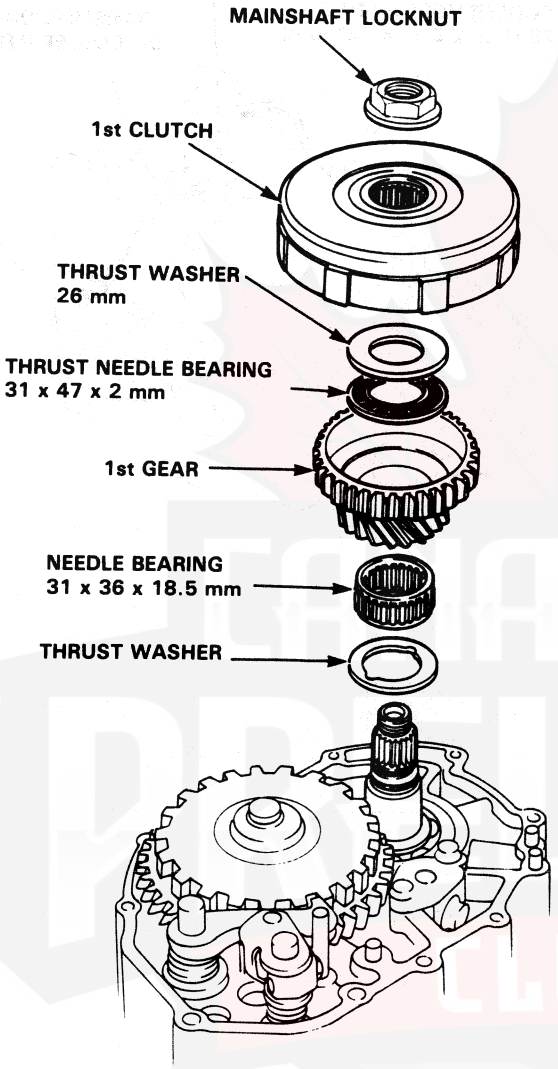


50. Stake the locknut flange at two places into the gear grooves using a 3.5 mm punch.



51. Install 31 x 36 x 18.5 mm needle bearing and thrust washer on the mainshaft.

52. Install 1st gear, thrust needle bearing, and the thrust washer on the mainshaft.

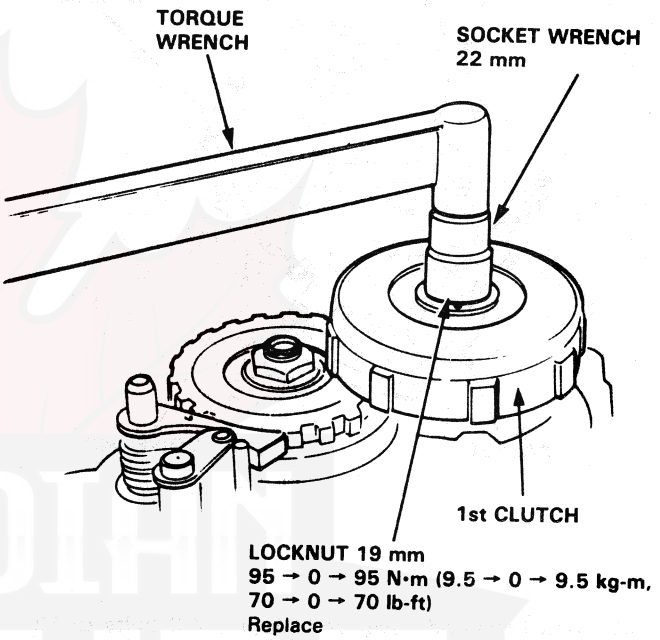


53. Install the 1st clutch on the mainshaft.

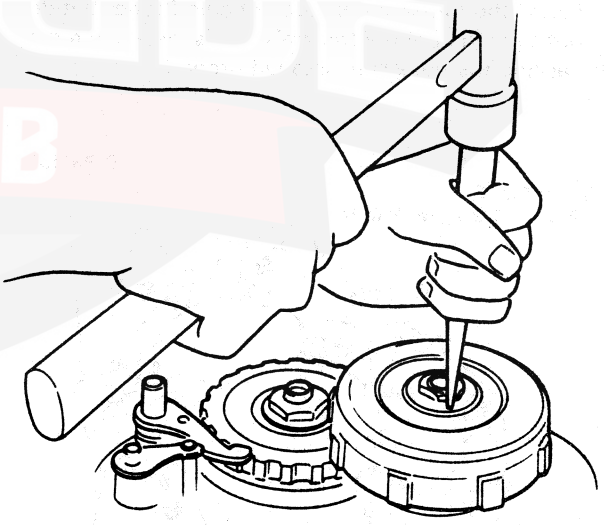
54. Attach the mainshaft holder from the underside of the torque converter case.

55. Install and torque the new mainshaft locknut.

CAUTION: Locknut has left-hand threads.



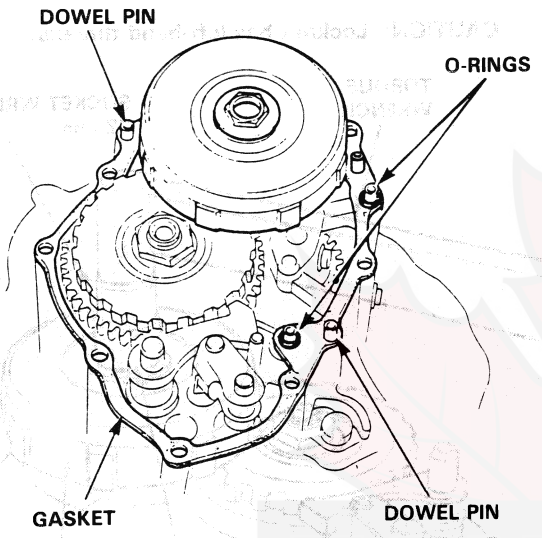
56. Stake the locknut flange into the groove in the 1st clutch.



(cont'd)

Reassembly (cont'd)

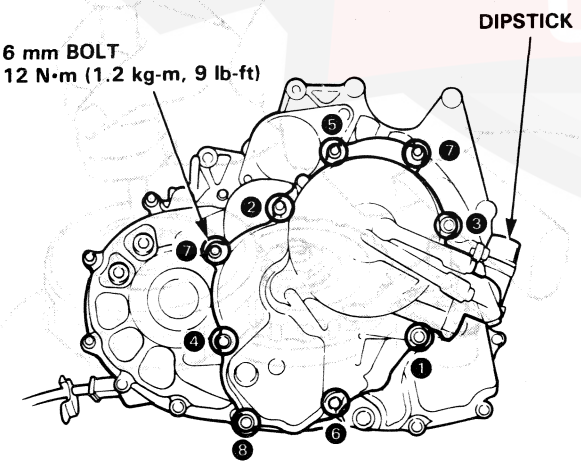
57. Install the gasket, dowel pins, and O-rings on the transmission housing.



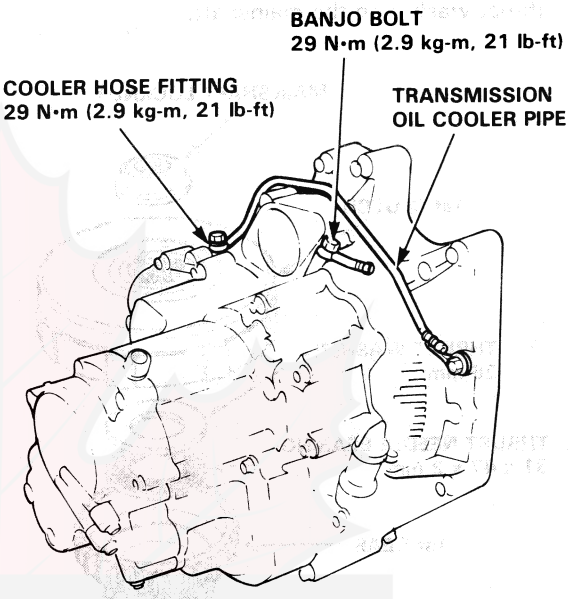
58. Install the end cover and torque all 9 bolts to 12 N•m (1.2 kg-m. 9 lb-ft).

59. Install the dipstick.

60. Install the transmission cooler banjo fitting, but do not tighten until the transmission is installed in the car and the hose is positioned properly.

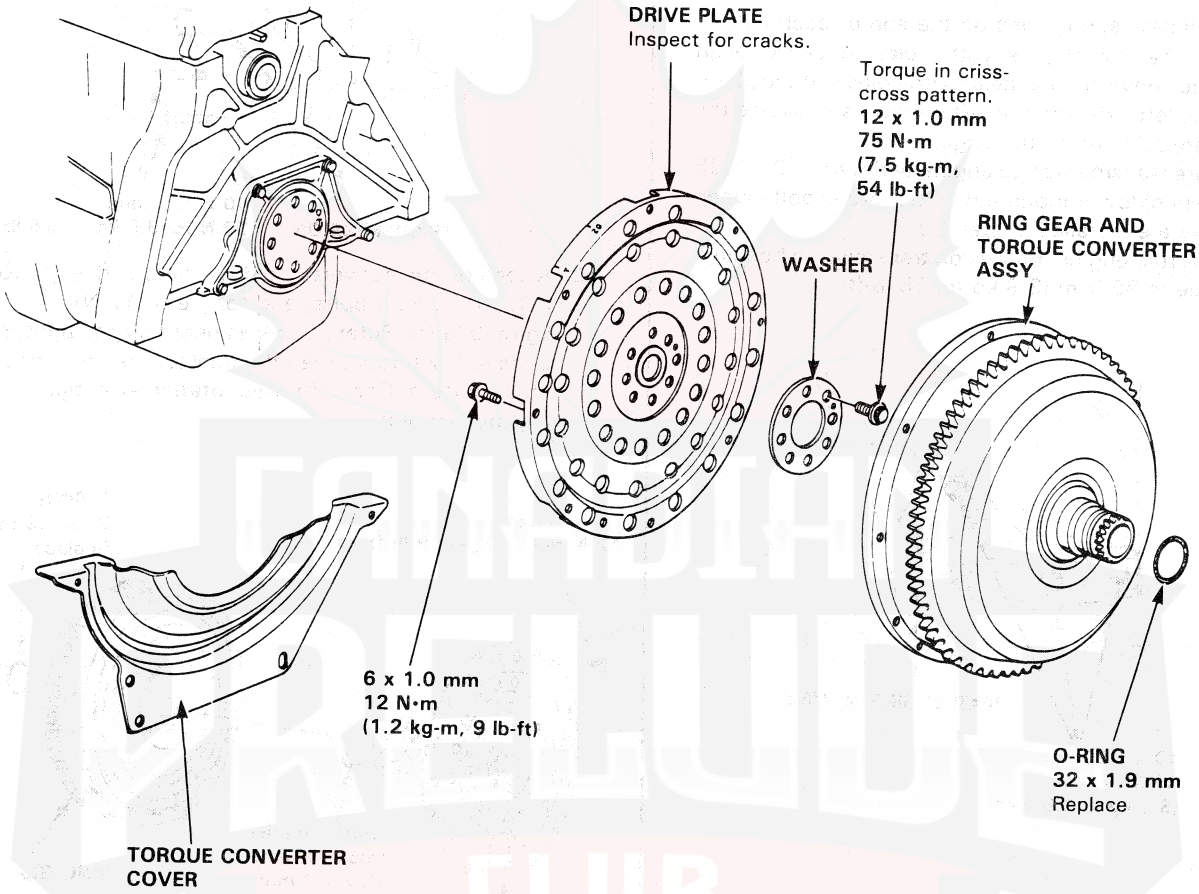


61. Install the transmission cooler hose fitting and torque to 29 N•m (2.9 kg-m, 21 lb-ft).



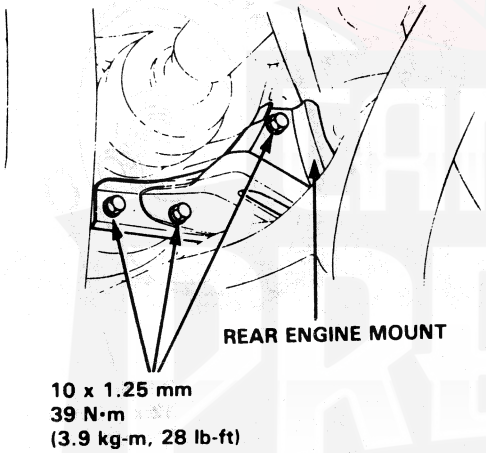
Torque Converter

Disassembly

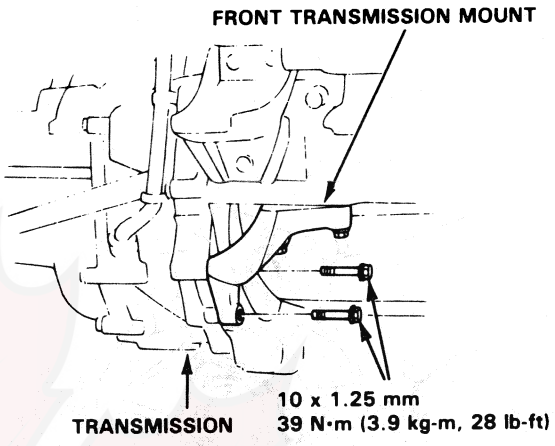


Installation

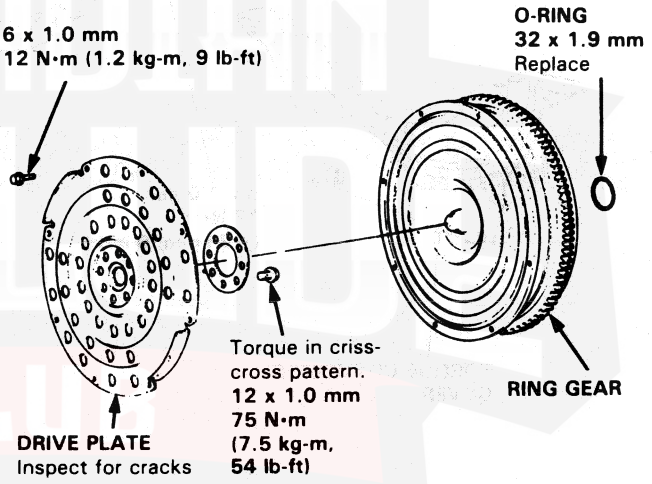
1. Attach shift cable to shift arm with pin, then secure cable to edge of housing with cable holder and bolt, 12 N•m (1.2 kg-m, 9 lb-ft).
2. Install torque converter on transmission.
3. Place transmission on transmission jack, and raise to engine level.
4. Hook hanger plate with hoist and make hoist chain tight.
5. Check that the two 14 mm dowel pins are installed in transmission housing.
6. Install new spring clips on the end of each axle.
7. Align the dowel pins with holes in block; align torque converter bolt head with holes in drive plate.
8. Fit the left axle into the differential as you raise the transmission up to the engine.
9. Secure transmission to engine with two (10 x 1.25 x 90 mm) lower mounting bolts, torque bolts when others are installed in step 23.
10. Install rear engine mounts on transmission housing, torque to 39 N•m (3.9 kg-m, 28 lb-ft).



11. Install the front transmission mount bolts and torque to 39 N•m (3.9 kg-m, 28 lb-ft).

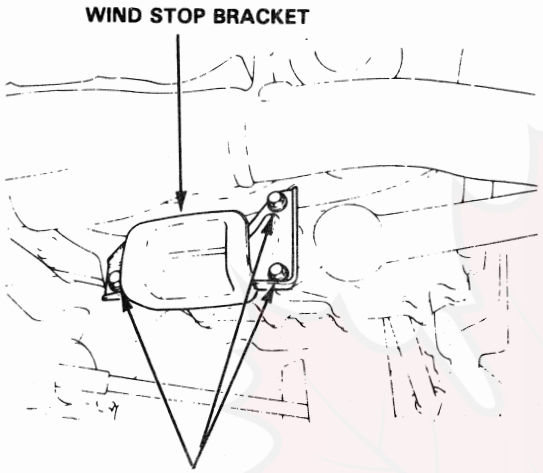


12. Attach torque converter to drive plate with eight (6 x 1.0 x 12 mm) bolts, and torque to 12 N•m (1.2 kg-m, 9 lb-ft). Rotate crank as necessary to tighten bolts to 1/2 torque, then the final torque, in a criss-cross pattern. Check for free rotation after tightening the last bolt.

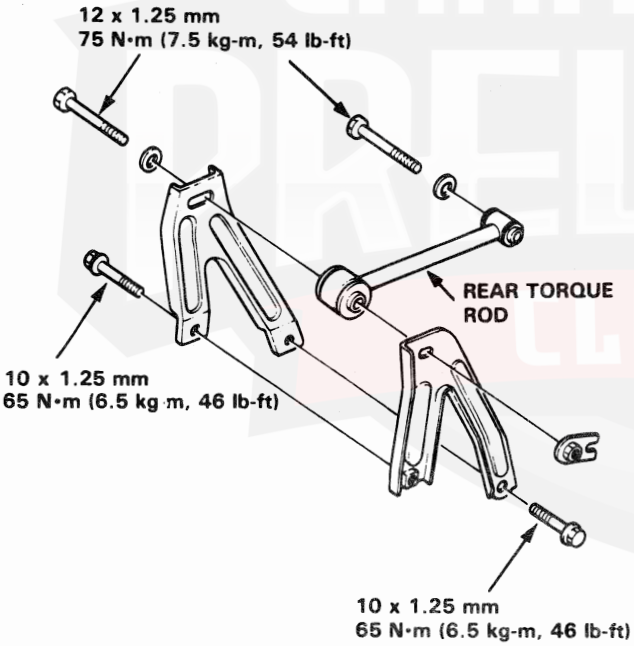


13. Remove the transmission jack.
14. Install torque converter cover plate, torque two 6 x 1.0 mm bolts (in oil pan flange) to 12N•m (1.2 kg-m, 9 lb-ft).

15. Install the wind stop rubber on the center beam, torque 10 x 1.25 mm nuts to 55 N•m (5.5 kg-m, 40 lb-ft), and install wind stop bracket on the transmission housing , torque three 8 x 1.25 mm bolts to 31 N•m (3.1 kg-m, 22 lb-ft).



16. Remove hoist from transmission.
17. Install starter mount bolts (10 x 1.25 x 125 mm) and torque to 45 N•m (4.5 kg-m, 33 lb-ft).
18. Install the rear torque rod and brackets as shown.

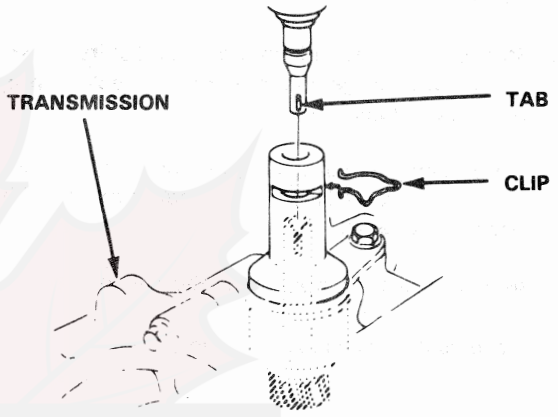


19. Turn right steering knuckle fully outward, and slide axle into differential until you feel its spring clip engage the side gear.

20. Reconnect ball joint to knuckle, then torque its bolt to 55 N•m (5.5 kg-m, 40 lb-ft).
Reinstall the damper fork and torque its bolt to 44 N•m (4.4 kg-m, 32 lb-ft).

21. Install speedometer cable.

- Align tab on cable end with slot in holder.
- Install clip so bent leg is on groove side.



NOTE: After installing, pull speedometer cable to see that it is secure.

22. Install front wheels, lower car to ground, and torque nuts to 110 N•m (11.0 kg-m, 80 lb-ft).

23. Install transmission mounting bolt (10 x 1.25 x 90 mm), and torque all bolts to 45 N•m (4.5 kg-m, 33 lb-ft).

24. Connect cooler hoses, and torque banjo bolts to 29 N•m (2.9 kg-m, 21 lb-ft).

25. Connect wiring:

- Battery positive cable to starter.
- Black/white wire to starter solenoid.
- Yellow/green wire to water temperature sending unit.
- Black/yellow and yellow wires to ignition timing thermosensor.

26. With ignition key in 0 position, connect ground cable to battery and transmission.

(cont'd)

Installation (cont'd)

27. Unscrew the dipstick from top of transmission end cover and add 3.2 quarts Dexron® ATF through the hole. Reinstall dipstick.

    NOTE: If transmission and torque converter have been disassembled, add a total of 6.3 quarts.

28. Install and reconnect shift cable (page 15-71).

29. Install console.

30. Start engine, set parking brake, and shift transmission through all gears three times. Check for proper shift cable adjustment (page 15-71).

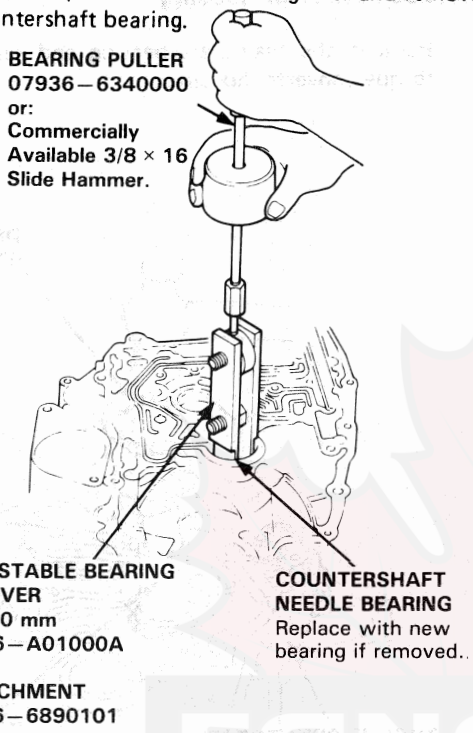
31. Let engine reach operating temperature with transmission in Neutral or Park, then turn it off and check fluid level.

32. Install throttle control cable and adjust.

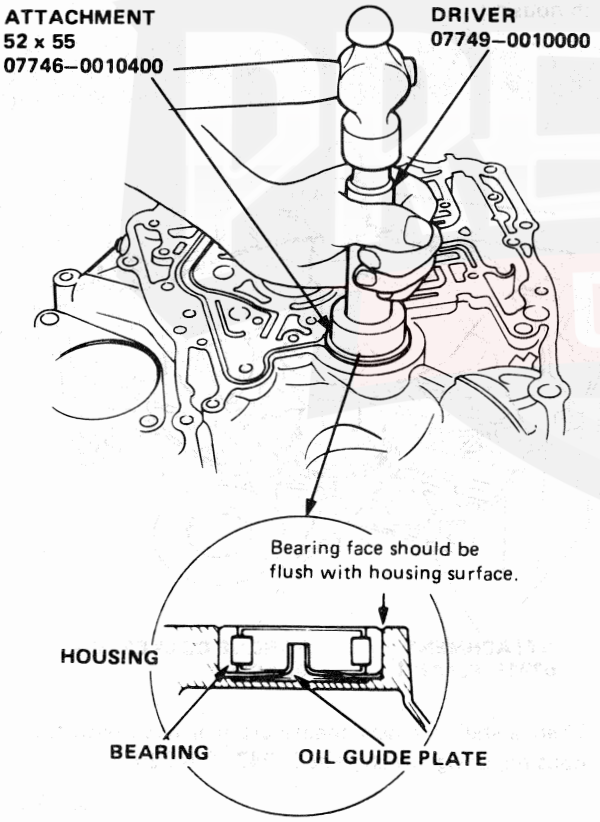
33. Road test as described on page 15-6.

Replacement (cont'd)

4. Turn the torque converter housing over and remove the countershaft bearing.



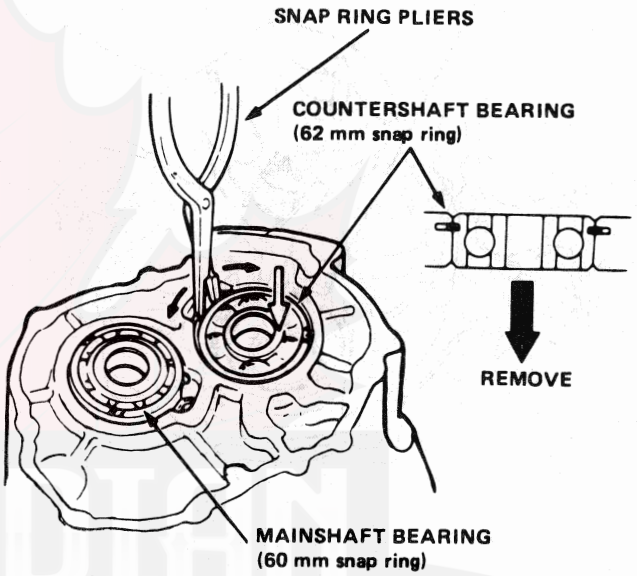
5. Make sure the oil guide plate is installed in the bearing hole, then install a new countershaft bearing flush with the housing.



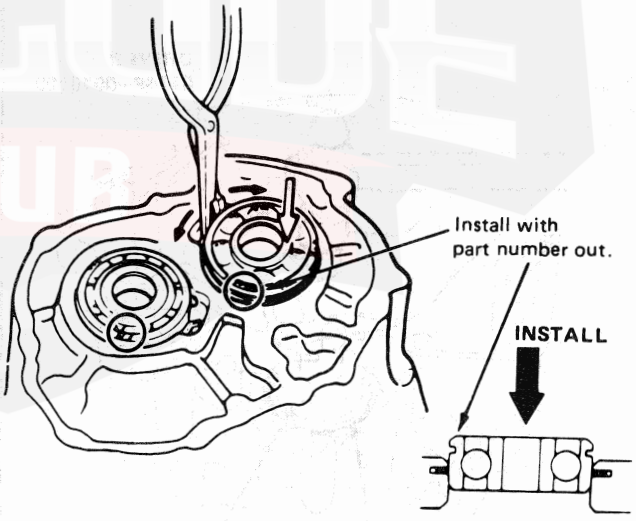
Transmission housing

1. To remove the mainshaft and countershaft bearings from the transmission housing, expand each snap ring with snap ring pliers, then push the bearing out by hand.

   NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing.

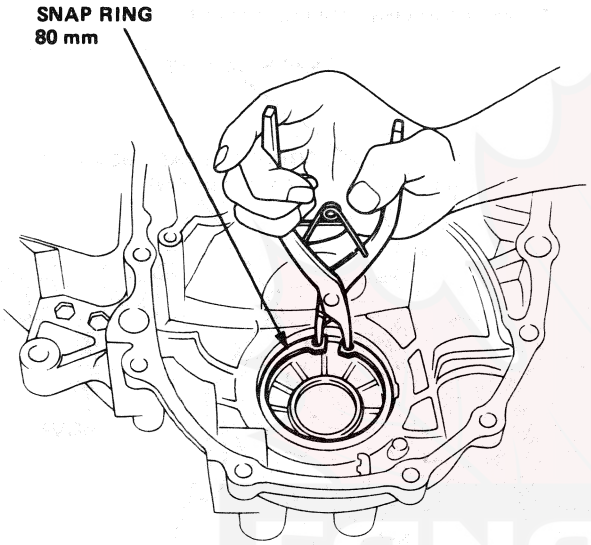


2. Expand each snap ring with snap ring pliers, insert the new bearing part-way into it, then release the pliers. Push the bearing down into the transmission until the ring snaps in place around it.

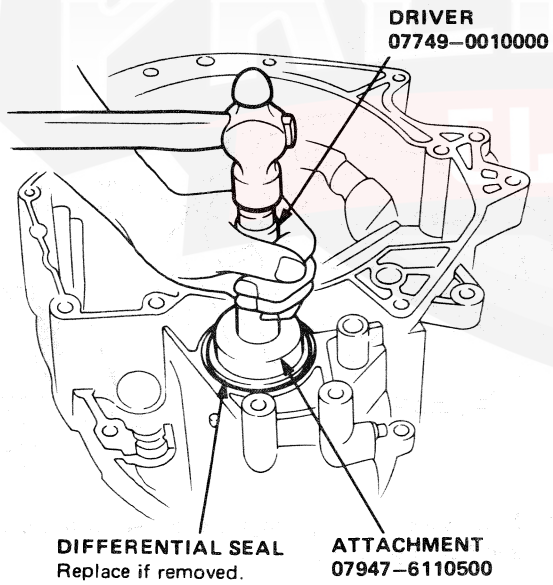


3. Make sure the snap rings are seated in the bearing and housing grooves.

4. On the torque converter housing, install the differential 80 mm snap ring if removed.



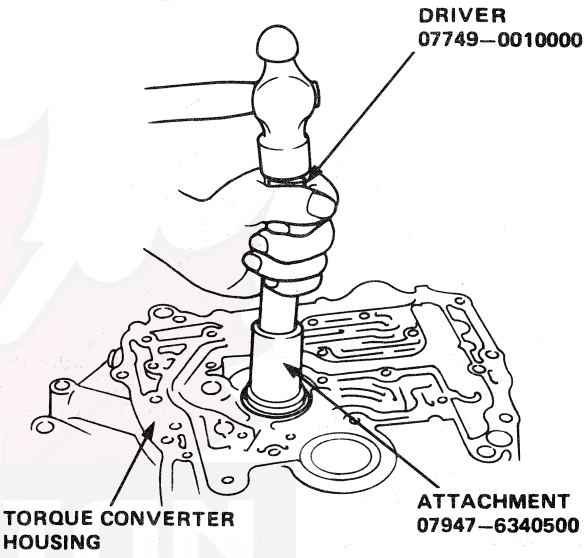
5. Install the differential seals into the torque converter housing and transmission housing.



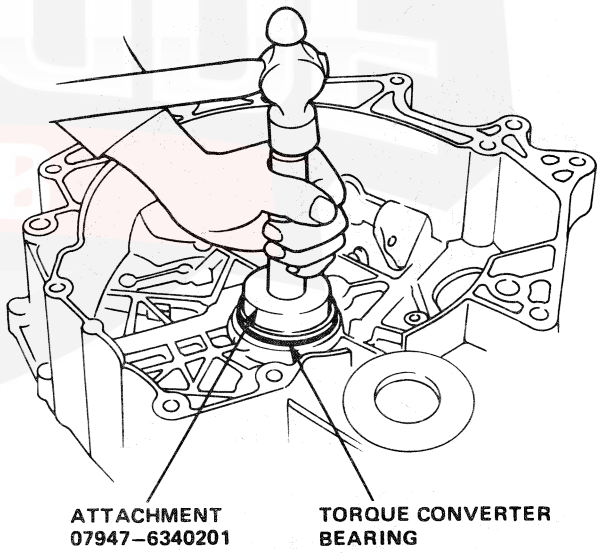
Replacement

Torque converter housing

1. Remove the mainshaft bearing and seal from the torque converter housing.



2. Drive in the new mainshaft bearing until it bottoms in housing.



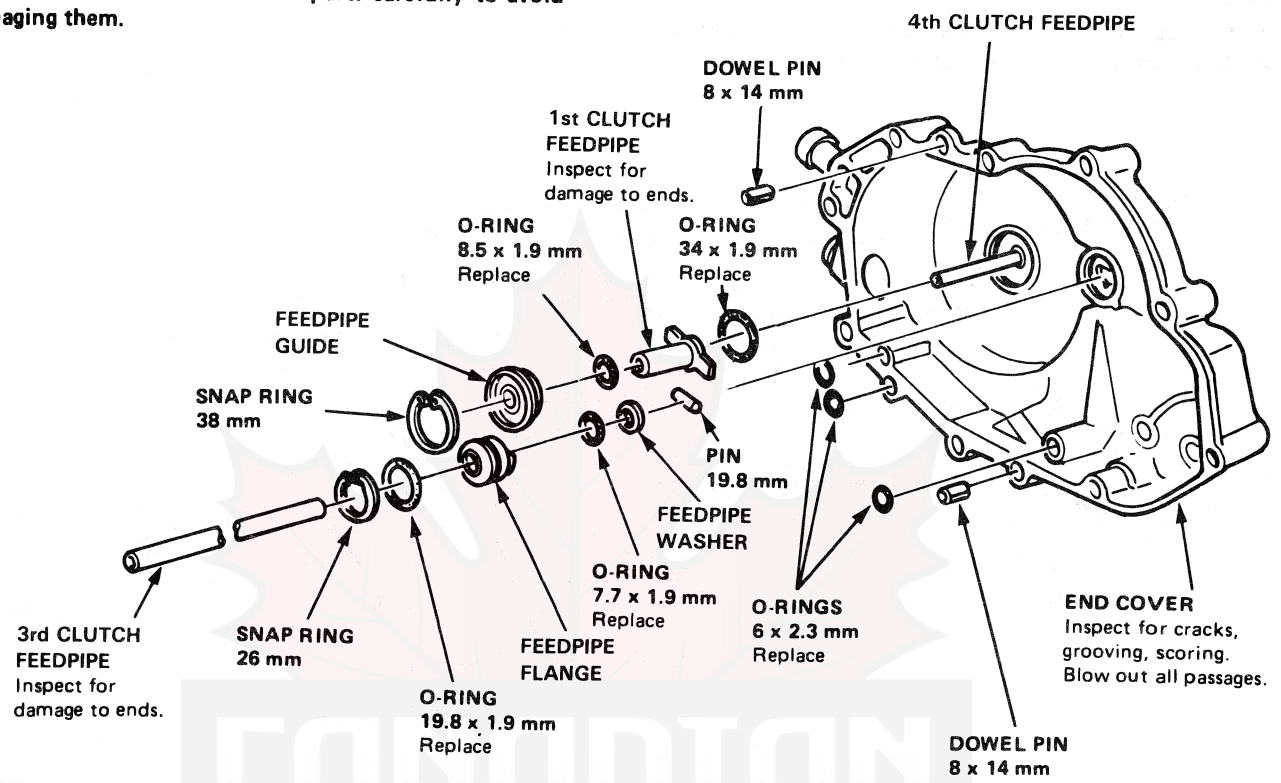
3. Then install the new mainshaft seal flush with the housing, using attachment 07947–6340201.

(cont'd)

End Cover

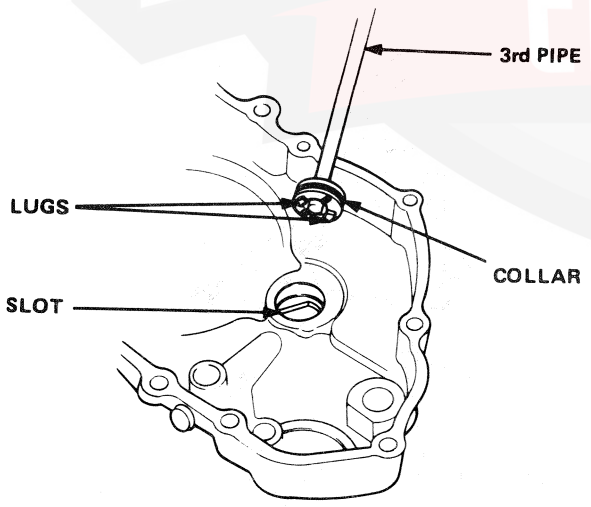
Disassembly/Inspection

CAUTION: Remove and install parts carefully to avoid damaging them.

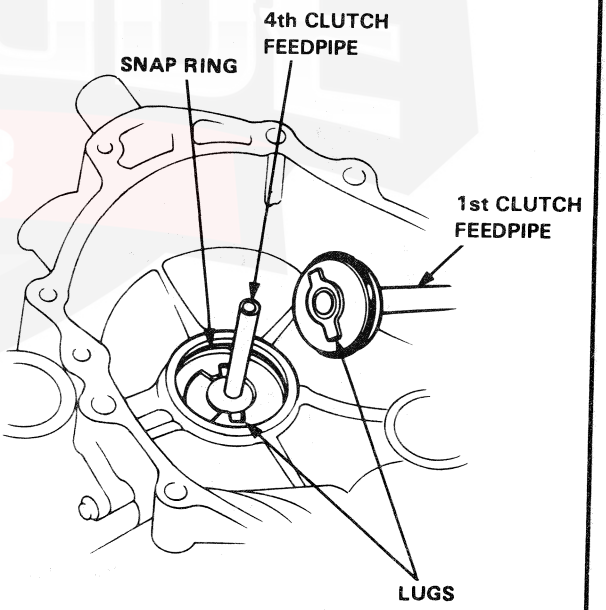


Reassembly

1. With feedpipes assembled, align lugs on the collars with slot in end cover.
2. Install the snap ring.



3. Install the feedpipes in the end cover, aligning the lugs of the 1st clutch feedpipe with the grooves of the end cover.

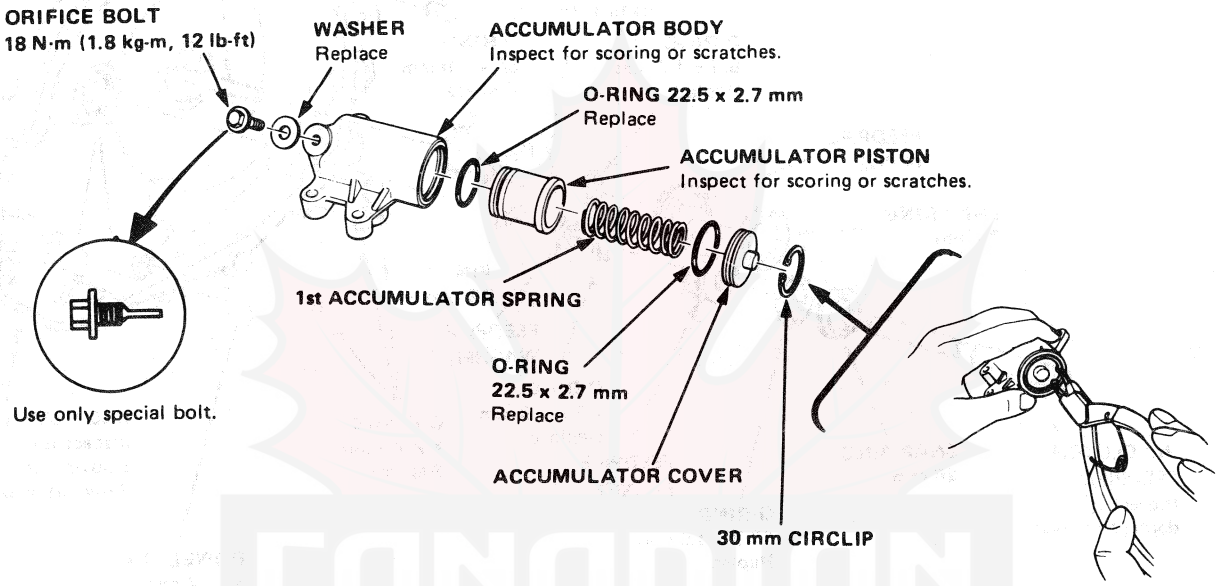


4. Install the snap ring.

1st Accumulator

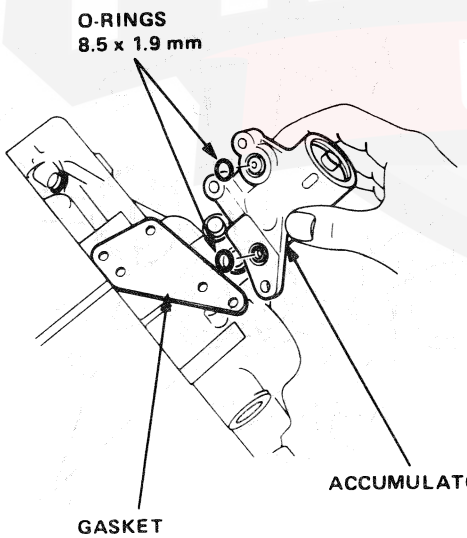
Disassembly/Inspection

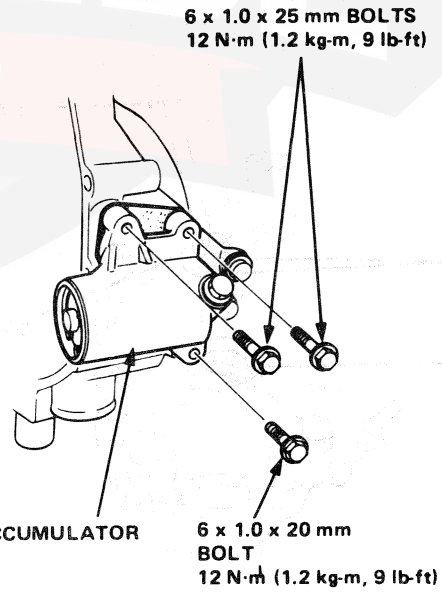
NOTE:
- The 1st accumulator can be removed with the end cover installed.
- See Section 3 for spring specifications.



Installation

1. Install new gasket onto the end cover.
2. Install new O-rings onto the 1st accumulator body.
3. Set the accumulator body and tighten the three 6 mm bolts.

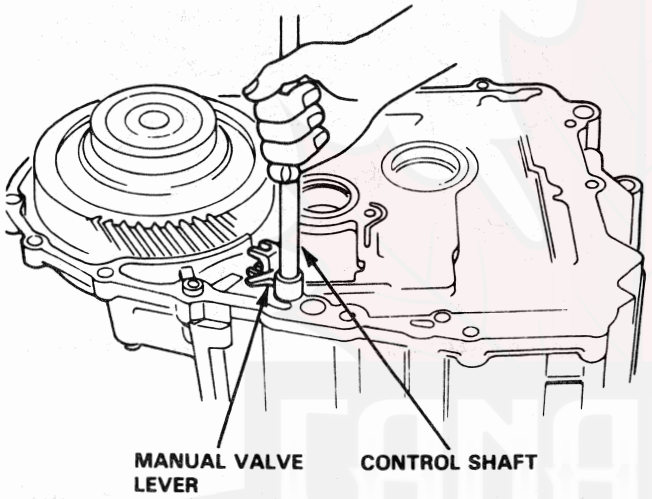




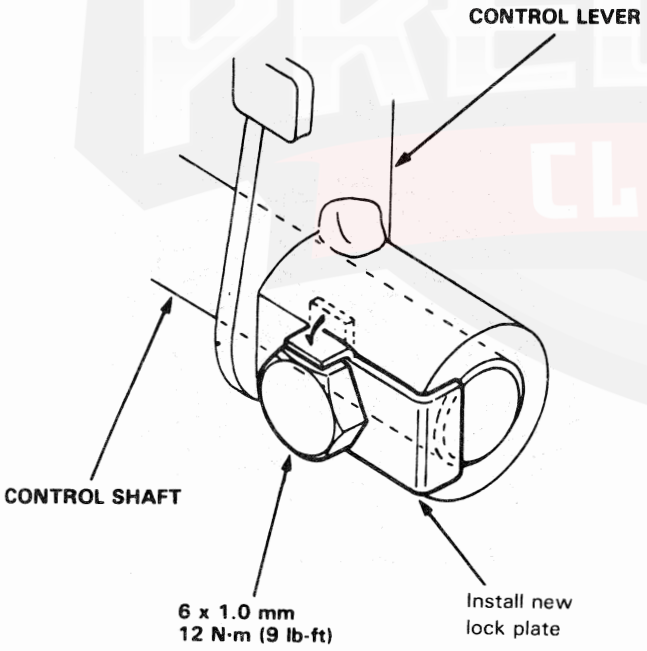
Reassembly

NOTE: Lubricate all parts with ATF during reassembly.

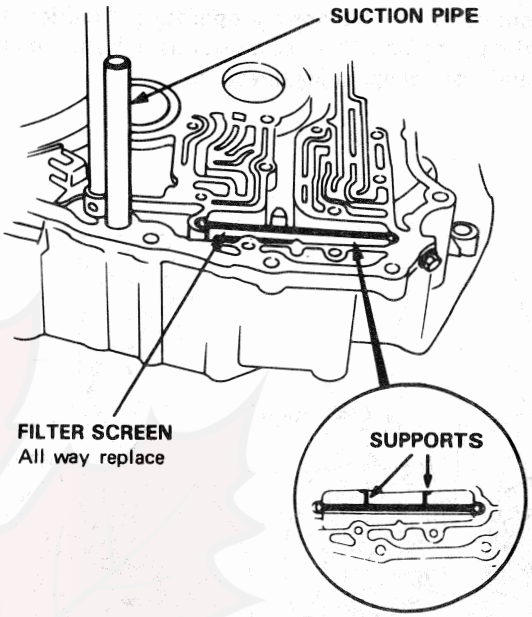
1. Install the differential assembly. If the torque converter housing, transmission housing and/or differential side bearings were replaced, the differential side clearance must be checked as shown in section 16.
2. Assemble the manual valve lever on the control shaft, then install in the torque converter housing as shown.



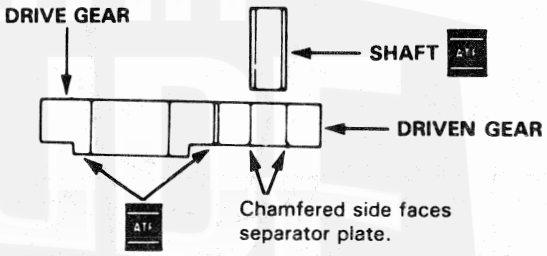
3. Install the control lever and new lock plate on the other end of the shaft. Tighten the bolt to the torque shown, then bend the tab over against the bolt head.

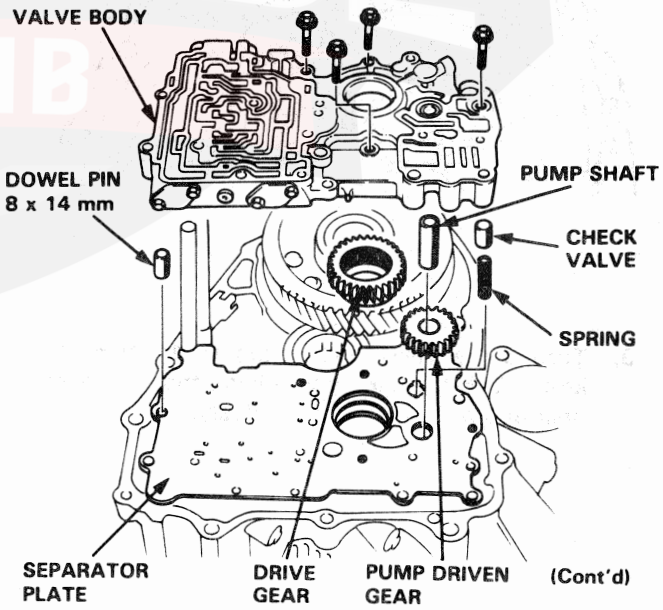


4. Install the suction pipe and new filter screen.



5. Install the separator plate, dowel pin, pump gears, and shaft.
6. Install the check valve and spring, then install the main valve body on the torque converter housing.

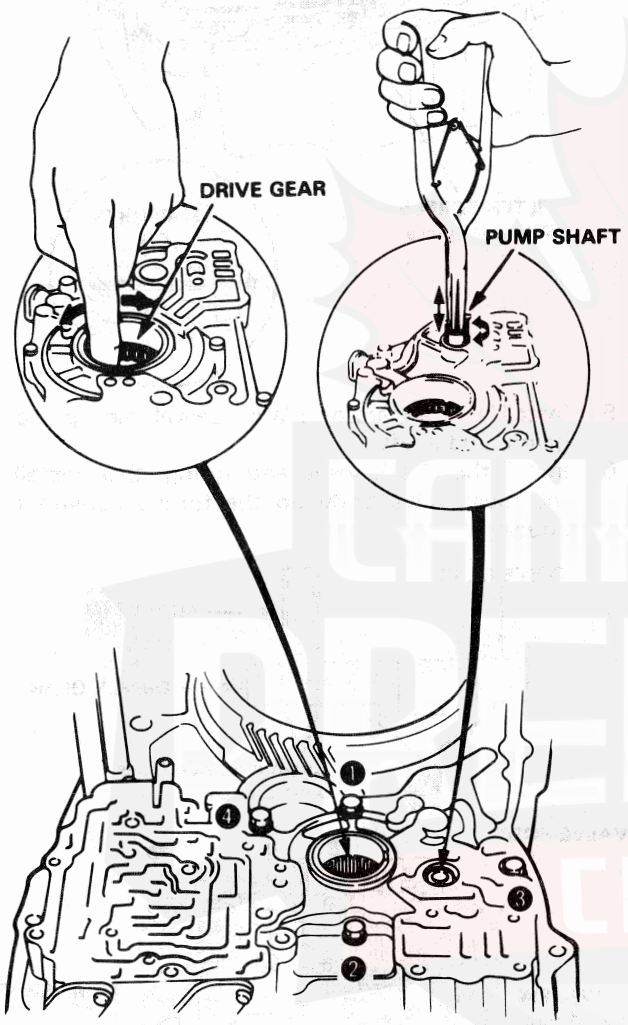




(Cont'd)

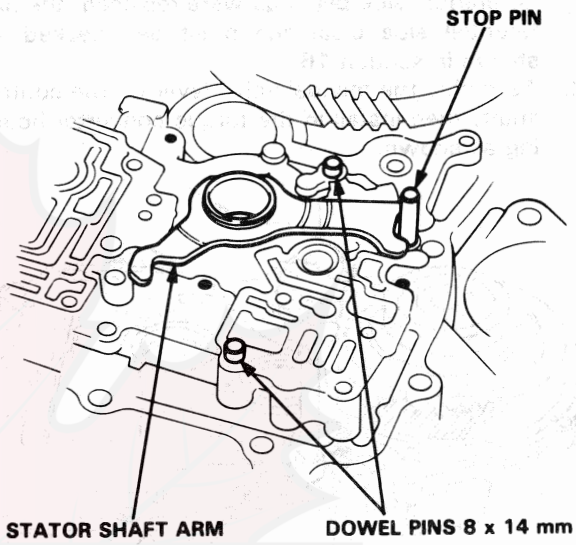
Reassembly (cont'd)

7. Tighten the 4 valve body bolts in the sequence shown. Make sure the pump drive gear rotates smoothly in the normal operating direction and the pump shaft moves smoothly in both the axial and normal operating directions.

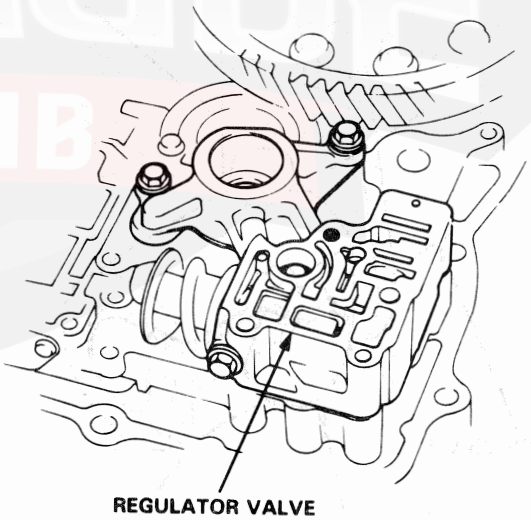


8. Torque the valve body bolts to 12 N·m (1.2 kg-m, 9 lb-ft), and again check that the pump gear and pump shaft move freely.

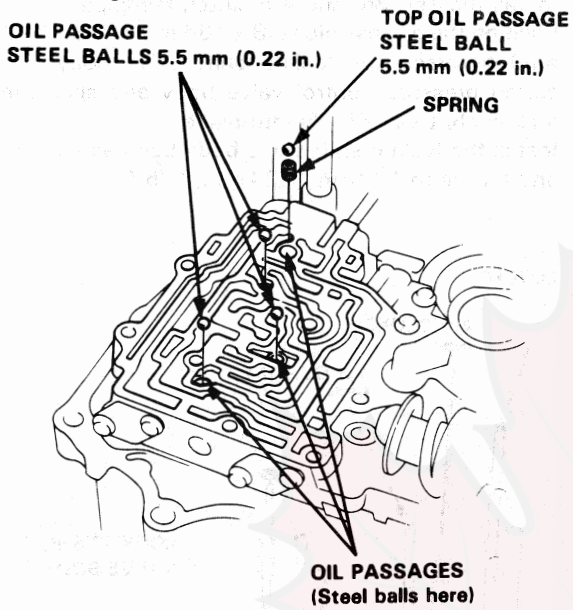
9. Install the stator shaft arm, stop pin and dowel pins.



10. Install the regulator valve and torque its 3 bolts to 12 N·m (1.2 kg-m, 9 lb-ft).

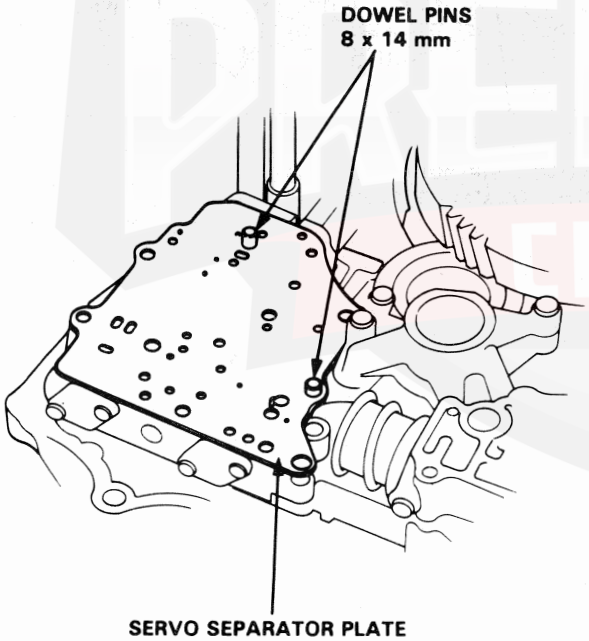


11. Install the 4 steel balls in main valve body oil passages.

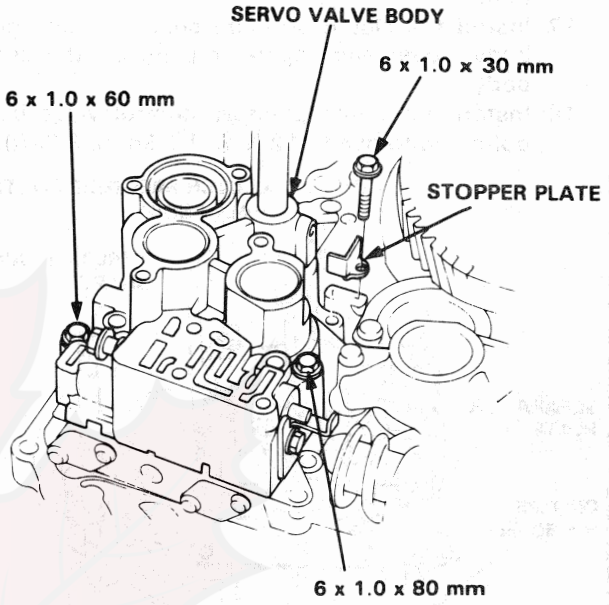


NOTE: The ball for the top oil passage has a spring to press the ball against the separator plate.

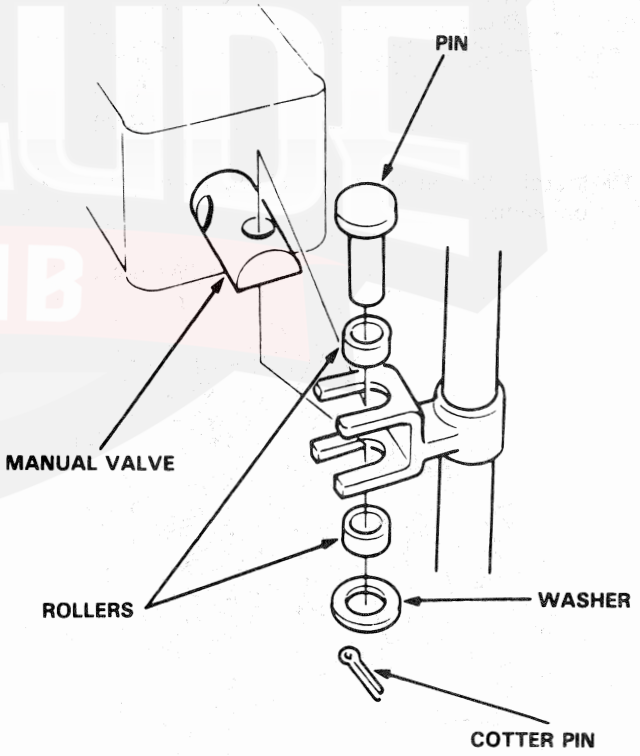
12. Install the separator plate and dowel pins.



13. Install the servo valve body (2 bolts) and stopper plate (1 bolt) as shown.



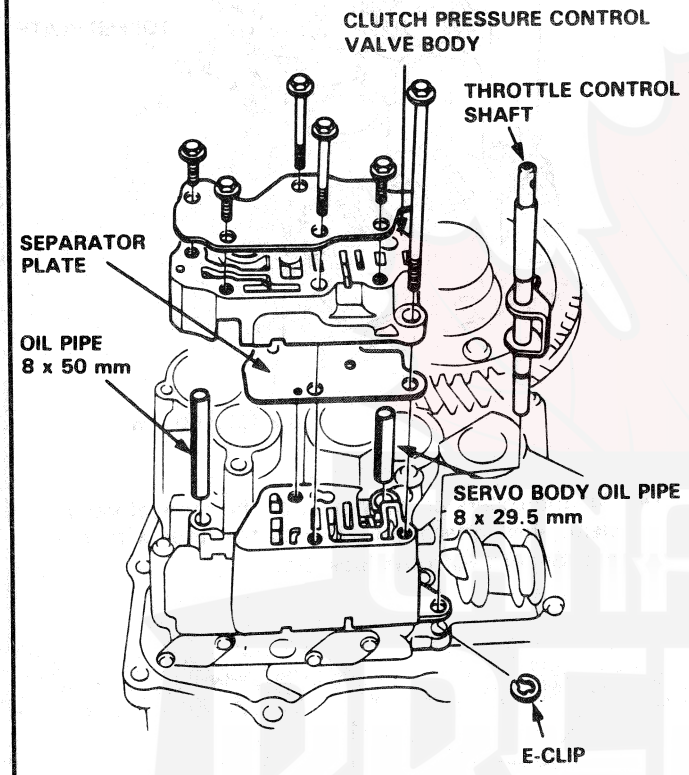
14. Put the rollers on each side of the manual valve stem, then attach the valve to the lever with the pin. Secure with the lock pin.



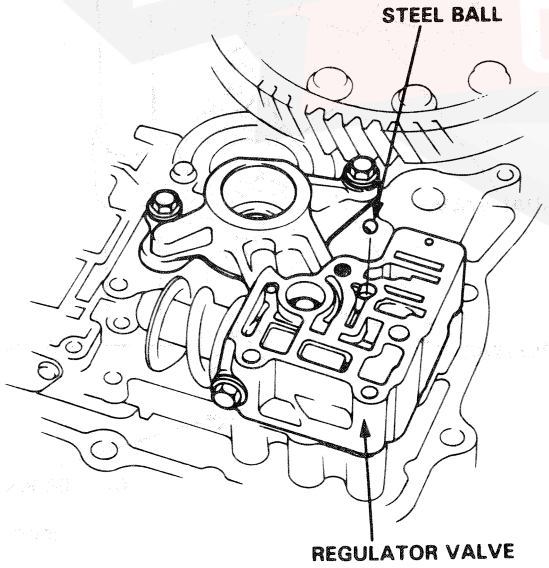
(cont'd)

Reassembly (cont'd)

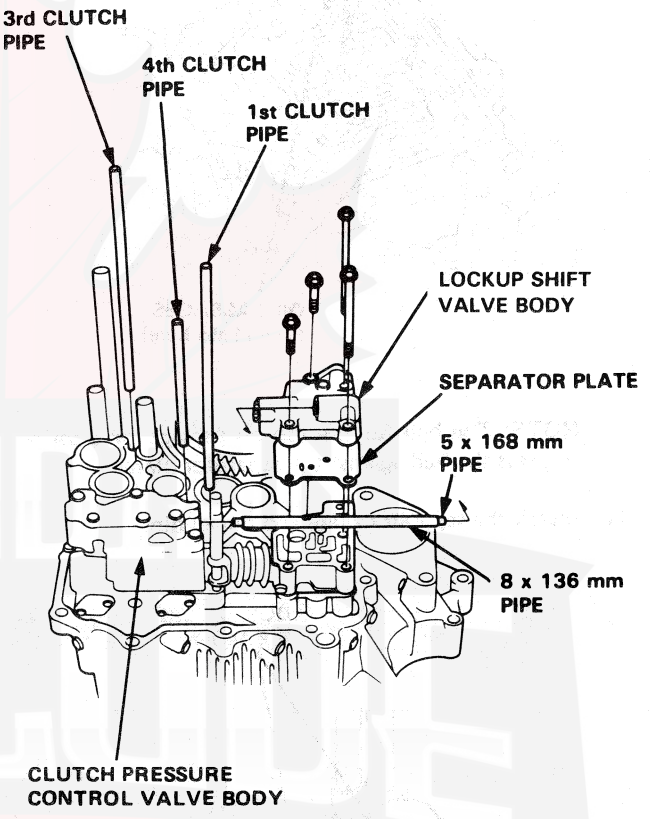
15. Install the throttle control shaft and E-clip.
16. Install the oil pass pipes (8 x 50 mm and 8 x 29.5 mm).
17. Install the clutch pressure control valve body, body cover and separator plate on the servo body.
18. Install the clutch pressure control valve body bolts and torque to 12 N·m (1.2 kg-m, 9 lb-ft).



19. Install the steel ball in regulator valve oil passage.

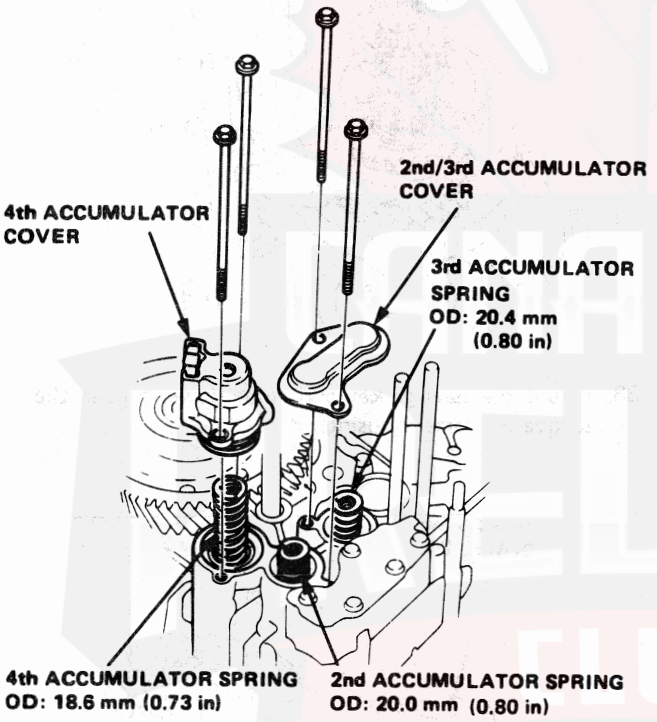


20. Install the separator plate.
21. Install the 1st, 3rd and 4th clutch feedpipes.
22. Position the oil pass pipes (8 x 136 mm and 5 x 168 mm) between the lockup shift valve boby and clutch pressure control valve body and slide the lockup shift valve body into place.
23. Install the lockup shift valve body bolts as shown, and torque to 12 N•m (1.2 kg-m, 9 lb-ft).

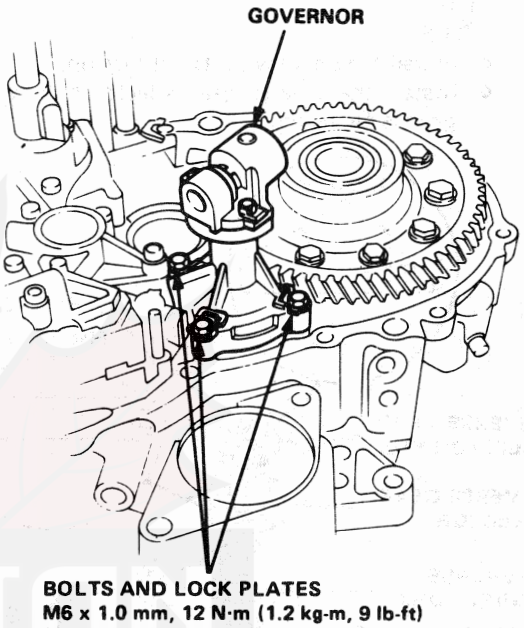


24. Install the accumulator springs.
25. Install the 2nd/3rd accumulator cover, and torque the bolts to 12 N·m (1.2 kg-m, 9 lb-ft) in a criss-cross pattern.
26. Install the 4th accumulator cover, and torque the bolts to 12 N·m (1.2 kg-m, 9 lb-ft) in a crisscross pattern.

CAUTION: To prevent stripping the threads, press down on accumulator cover, then install the bolts.

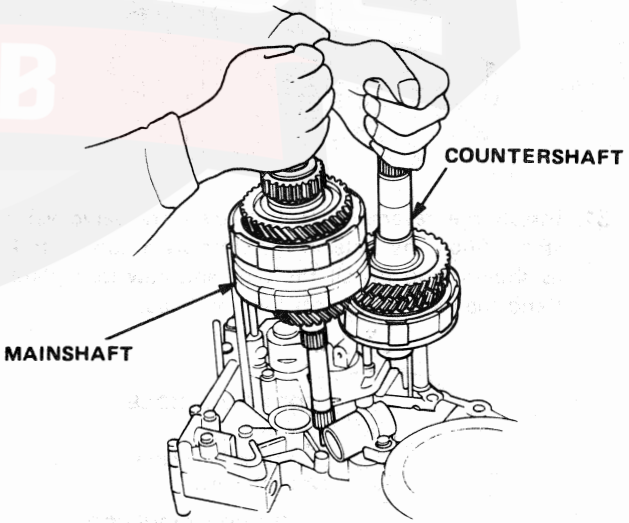


27. Install the governor valve using new lock plates, and the three 6 mm bolts.



28. Set the countershaft and mainshaft in place as an assembly.

NOTE: Do not tap on the shafts with a hammer to drive in.

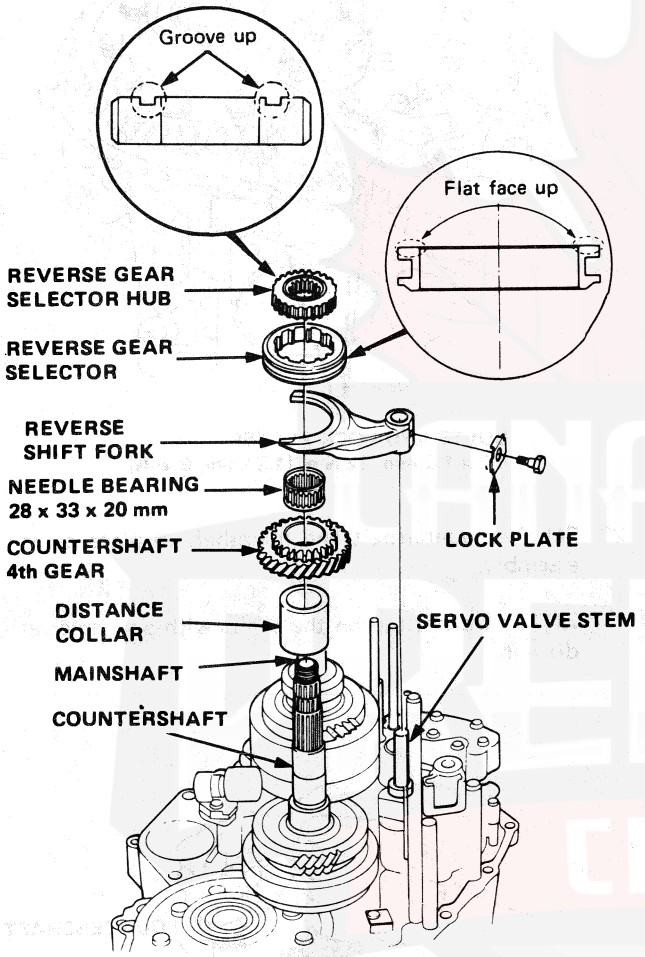


(cont'd)

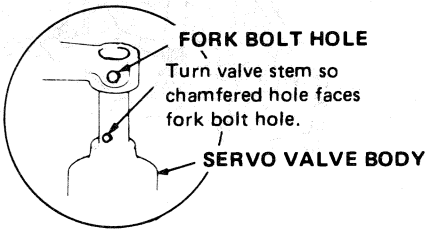
Reassembly (cont'd)

29. Install 4th gear and its needle bearing, and the countershaft 4th gear and its selector hub.

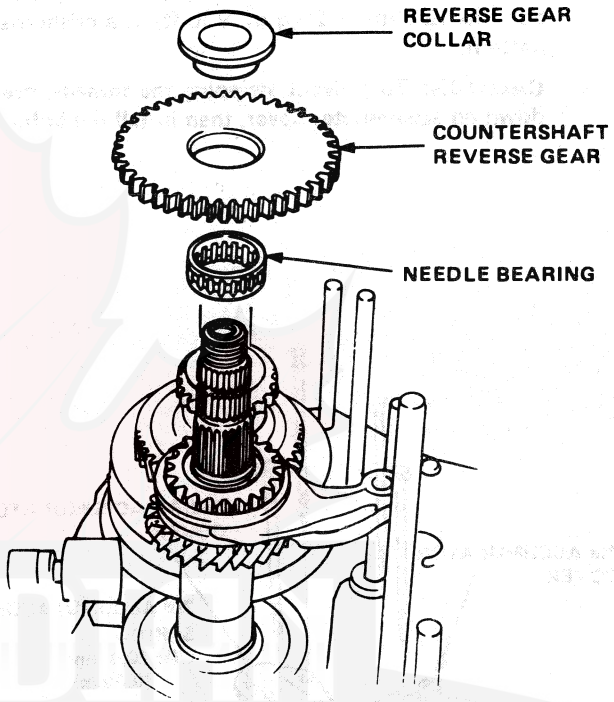
30. Assemble the reverse shift fork and selector sleeve, then install them as an assembly on the countershaft.
NOTE:
- Install the sleeve with its flat face up.
- Install the reverse gear selector hub with the groove facing up.



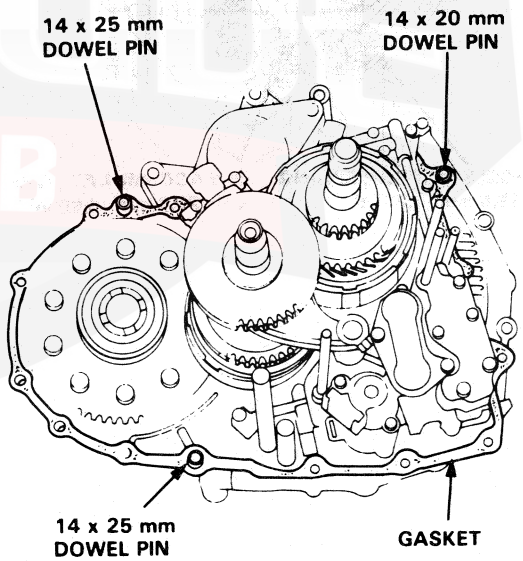
31. Install the reverse shift fork over the servo valve stem. Align the hole in the stem with hole in fork as shown, and install the bolt and new lock plate. Bend the lock tab against the bolt head.



32. Install the countershaft reverse gear, needle bearing, and reverse gear collar.

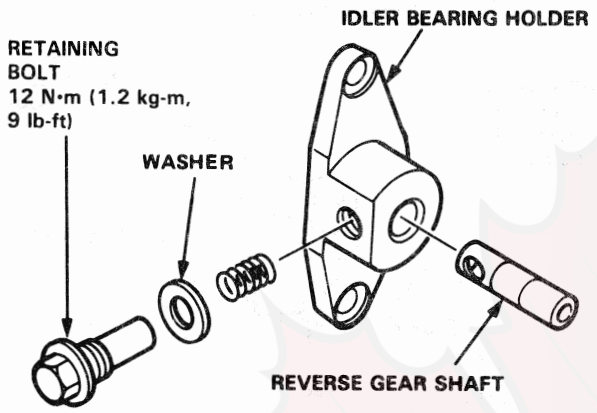


33. Install the new gasket and three dowel pins in the torque converter housing.



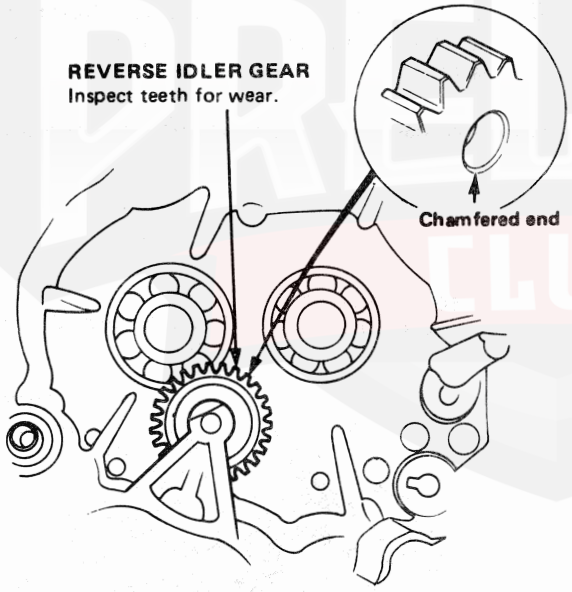
34. Assemble the idler bearing holder.

NOTE: Align the hole in the shaft with the spring.



35. Install the reverse idler gear.

NOTE: Install the reverse idler gear so that the larger chamfer on the shaft bore faces the torque converter housing.

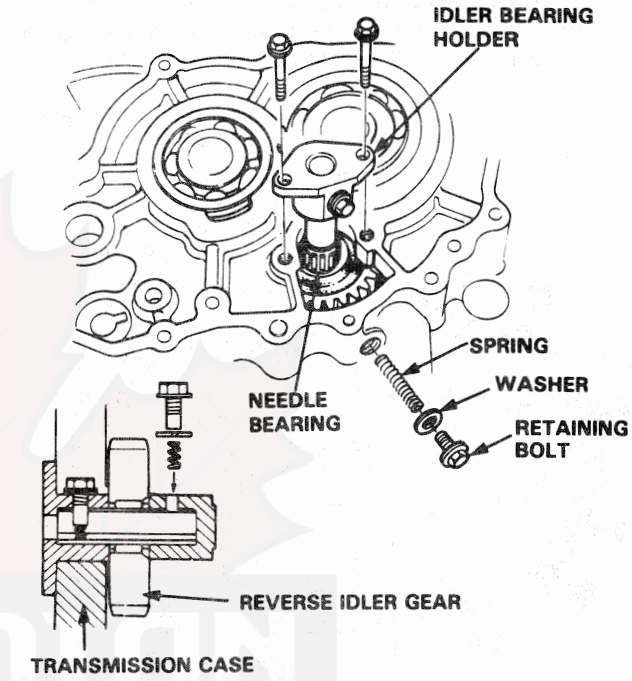


36. Install the needle bearing into the idler gear.

37. Install the idler bearing holder into the transmission housing.

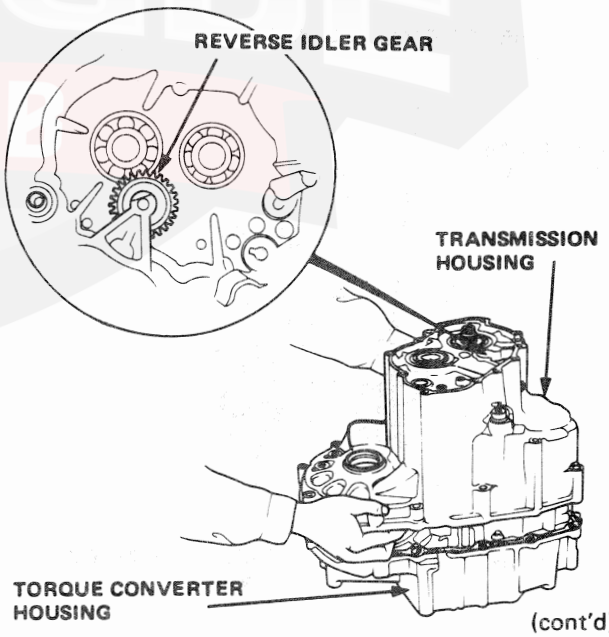
38. Tighten the reverse idler bearing holder bolts.

39. Install the spring and then tighten the retaining bolt with sealed washer.



40. Place the transmission housing on the torque converter housing.

NOTE: Be sure the main valve control shaft lines up with the hole in the housing and that the reverse idler gear meshes with the mainshaft and countershaft, or the housing will not go on.

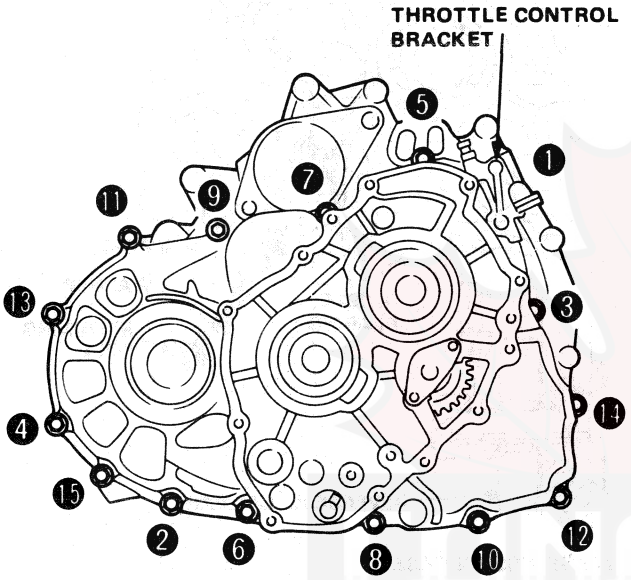


(cont'd)

Reassembly (cont'd)

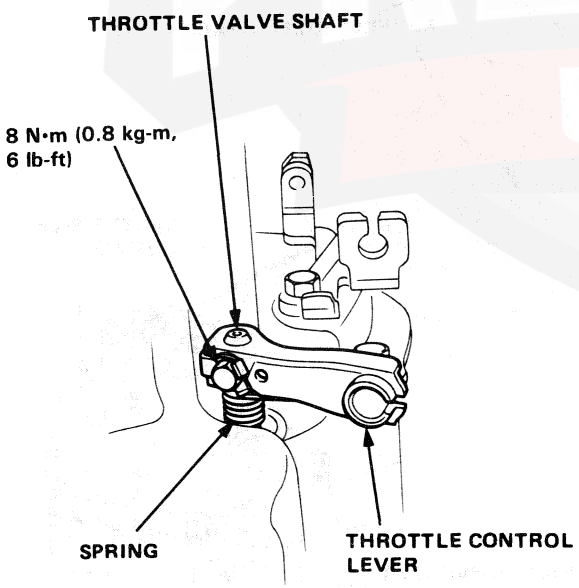
41. Torque bolts to 27 N·m (2.7 kg-m, 20 lb-ft) in order of (1) thru (15) in two or more steps.

    NOTE: When tightening the transmission housing bolts, take care that you do not distort or damage the throttle control bracket; distortion or damage to the bracket will change transmission shift points.



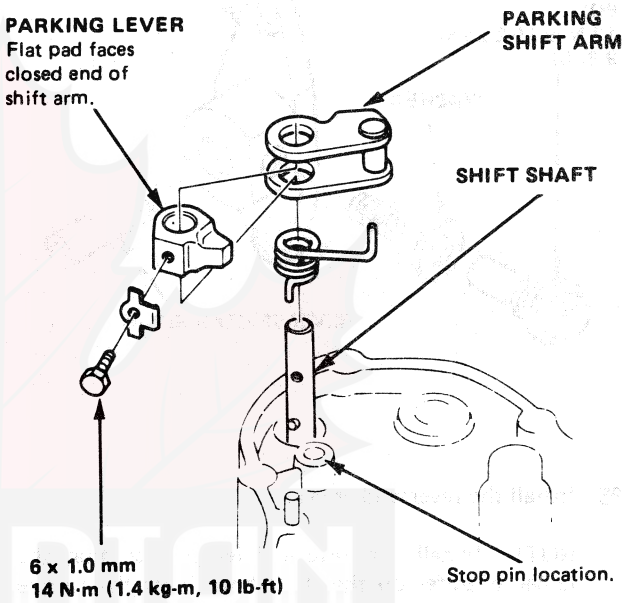
42. Install the throttle control lever and spring on the throttle control shaft.

43. Install the bolt and new lock plate. Bend the lock tab against the bolt head.



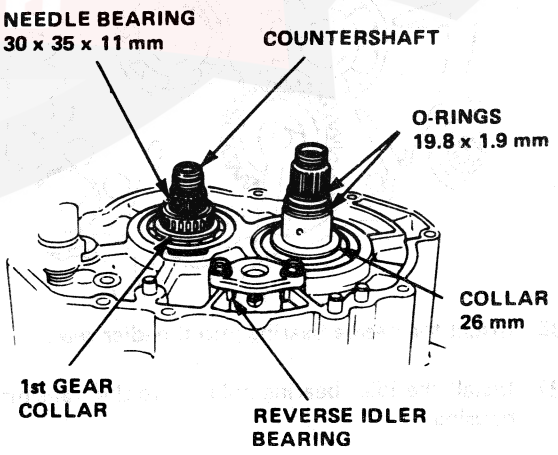
44. Install the parking shift arm and spring on the shift shaft with the bolt and a new lock plate. Bend the lock tab against the bolt head.

    NOTE: The spring should put clockwise tension on the shift arm, forcing it against the stop pin.

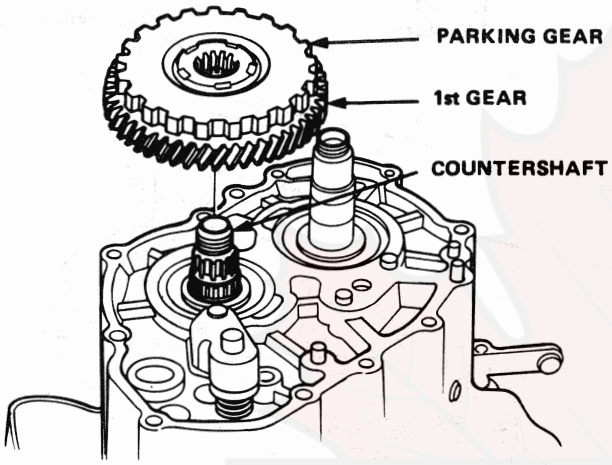


45. Install the 1st gear collar and needle bearing on the countershaft. Install the 26 mm collar on the mainshaft.

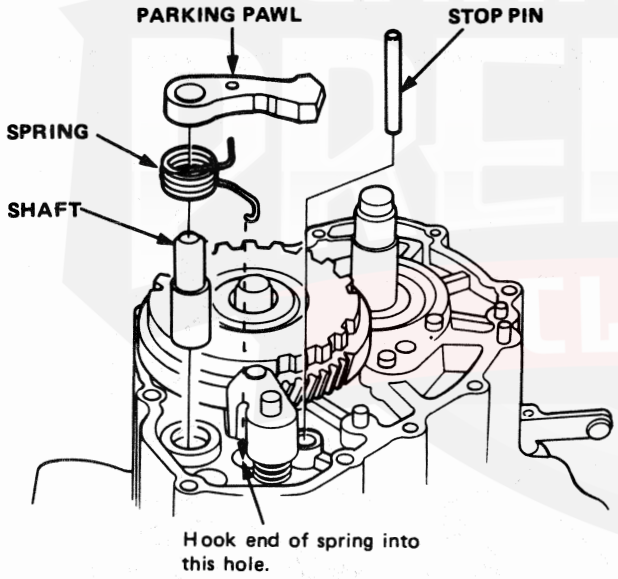
46. Install new 19.8 x 1.9 mm O-rings on the mainshaft.



47. Install the countershaft 1st gear and parking gear on the countershaft.



48. Install the stop pin, parking pawl shaft, parking pawl, and pawl release spring.

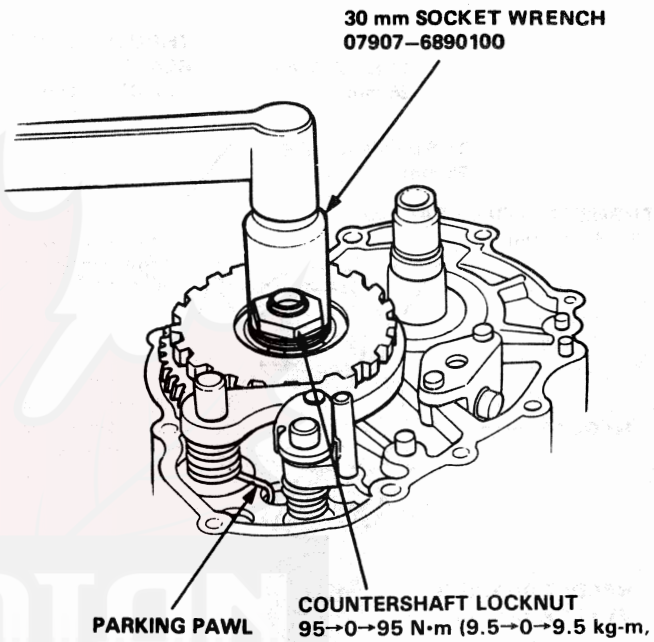


NOTE:

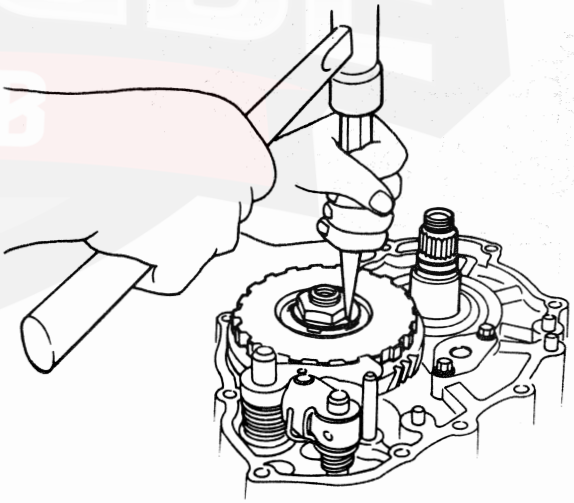
- One end of the parking pawl release spring fits into the hole in the parking pawl, the other end into the hole in the transmission howsing as shown.
- The release spring should put clockwise tension on the pawl, forcing it away from the parking gear.

49. Shift to PARK and install the mainshaft holder.

50. Install and torque the new countershaft locknut.



51. Stake the locknut flange into the gear groove.

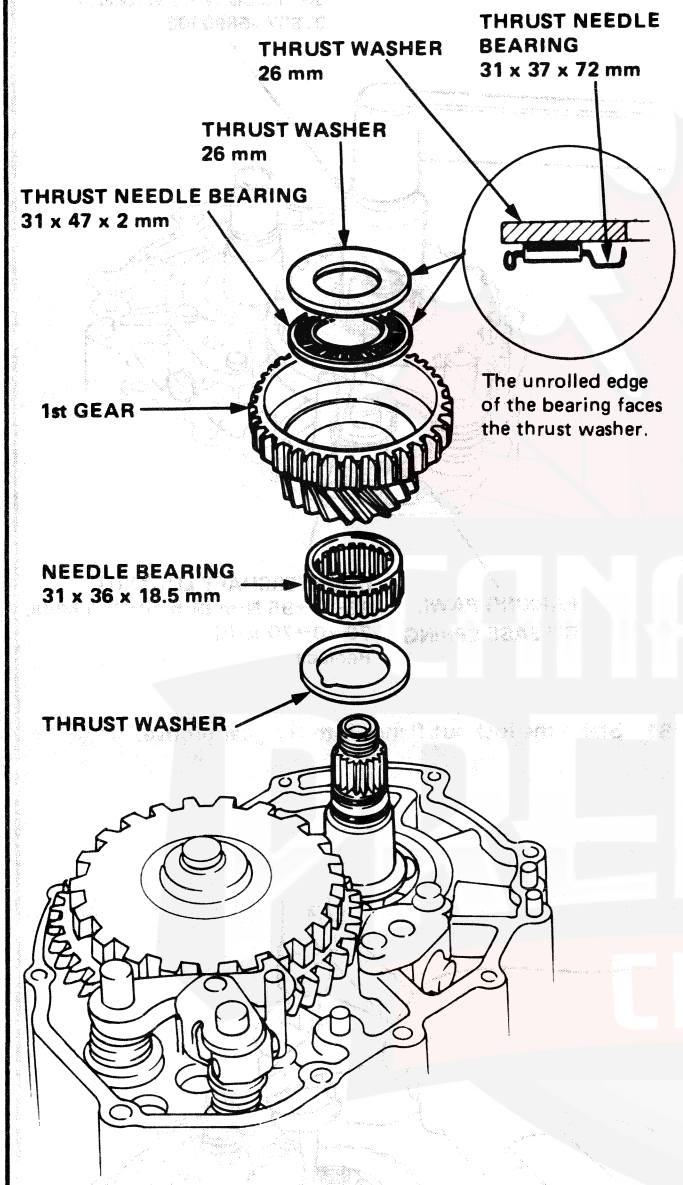


(cont'd)

Reassembly (cont'd)

52. Install 31 x 36 x 18.5 mm needle bearing and thrust washer on the mainshaft.

53. Install 1st gear, thrust needle bearing, and the thrust washer on the mainshaft.

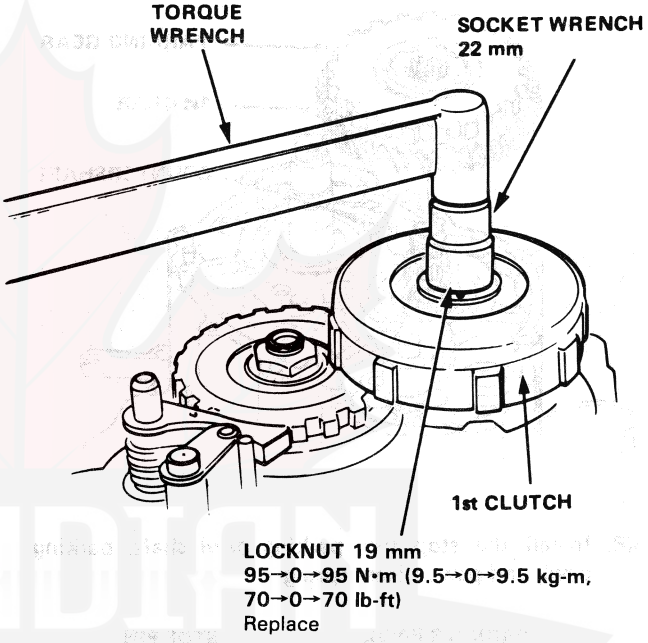


54. Install the 1st clutch on the mainshaft.

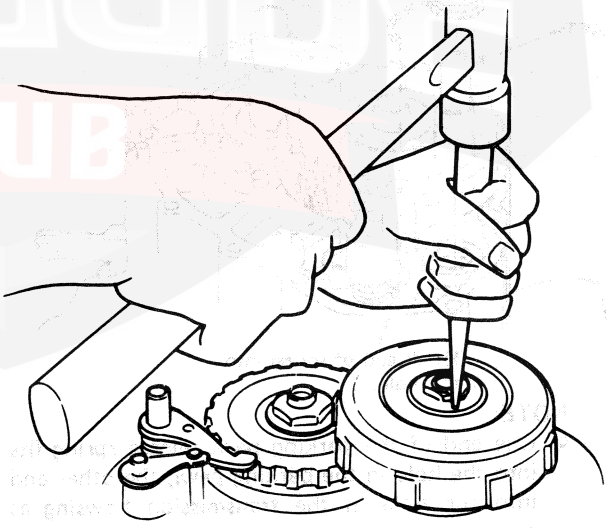
55. Attach the mainshaft holder from the underside of the torque converter case.

56. Install and torque the new mainshaft locknut.

CAUTION: Locknut has left-hand threads.



57. Stake the locknut flange into the groove in the 1st clutch.

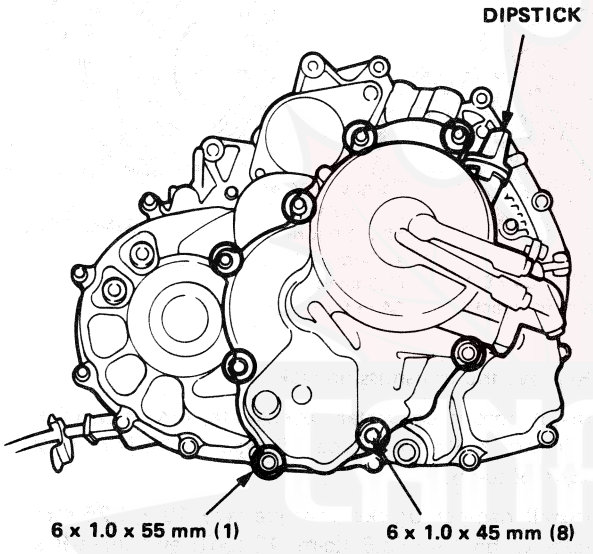


58. Install the gasket, dowel pins, and O-rings on the transmission housing.

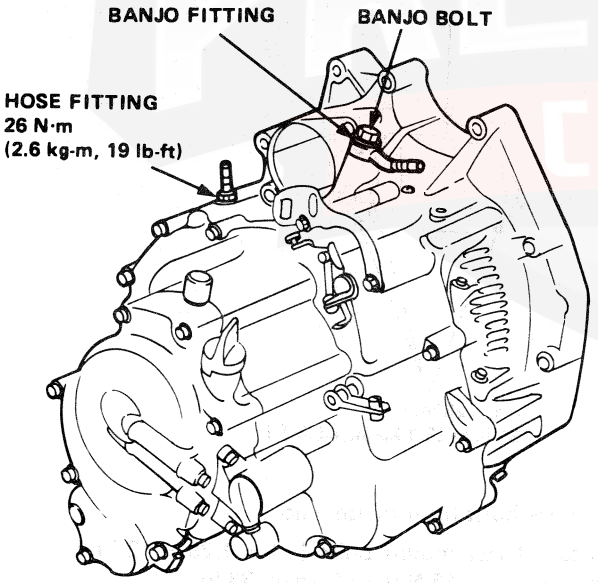
59. Install the end cover and torque all bolts (9) to 12 N·m (1.2 kg-m, 9 lb-ft).

60. Install the dipstick.

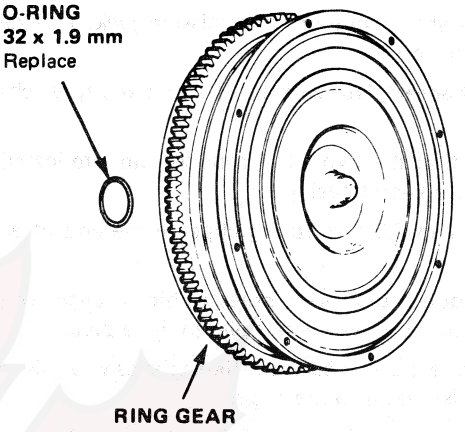
61. Install the transmission cooler banjo fitting, but do not tighten until the transmission is installed in the car and the hose is positioned properly.

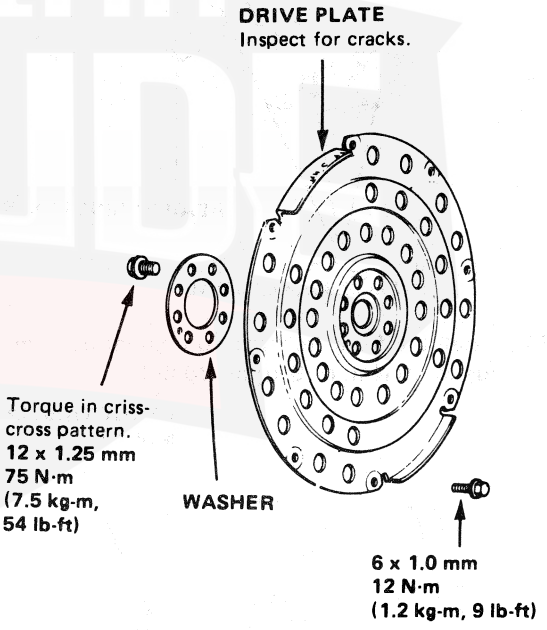


62. Install the transmission cooler hose fitting and torque to 26 N·m (2.6 kg-m, 19 lb-ft).



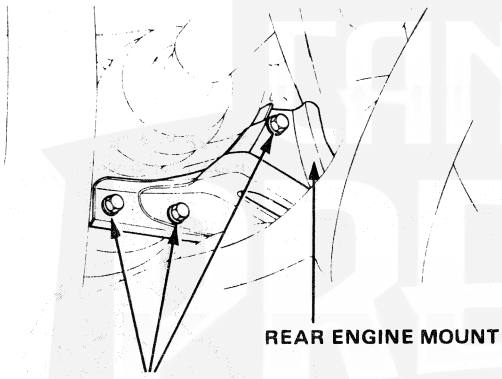
Disassembly



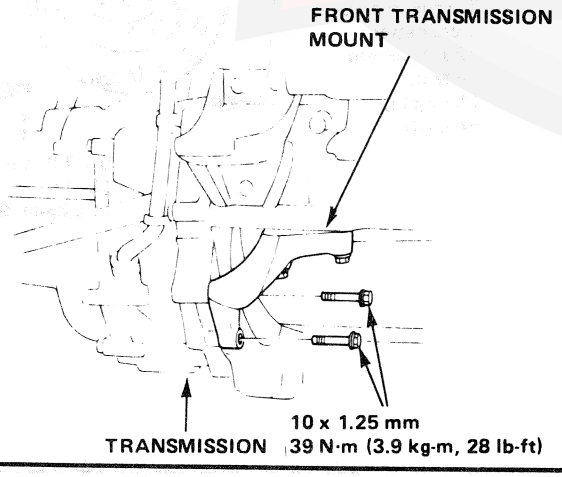


Installation

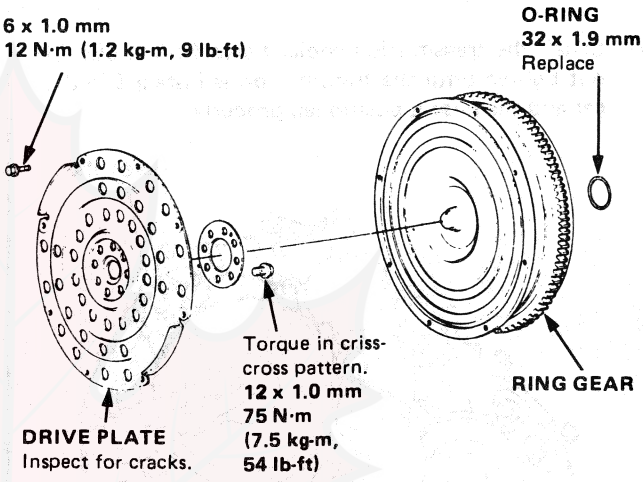
1. Attach shift cable to shift arm with pin, then secure cable to edge of housing with cable holder and bolts, 12 N·m (1.2 kg-m, 9 lb-ft).
2. Install torque converter on transmission.
3. Place transmission on transmission jack, and raise to engine level.
4. Hook hanger plate with hoist and make hoist chain tight.
5. Check that the two 14 mm dowel pins are installed in transmission housing.
6. Install new 26 mm spring clips on the end of each axle.
7. Align dowel pins with holes in block; align torque converter bolt head with holes in drive plate.
8. Fit the left axle into the differential as you raise the transmission up to the engine.
9. Secure transmission to engine with two (10 x 1.25 x 90 mm) lower mounting bolts, torque bolts when others are installed in step 23.
10. Install rear engine mounts on transmission housing, torque to 39 N·m (3.9 kg-m, 28 lb-ft).



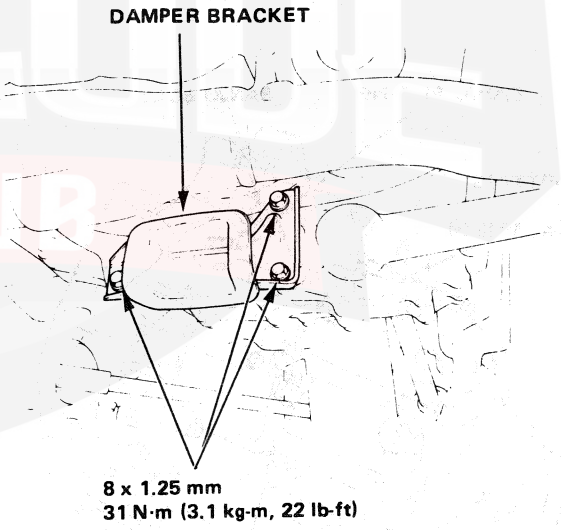
11. Install the front transmission mount bolts and torque to 39 N·m (3.9 kg-m, 28 lb-ft).



12. Attach torque converter to 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 crank as necessary to tighten bolts to 1/2 torque, then the final torque, in a criss-cross pattern. Check for free rotation after tightening the last bolt.

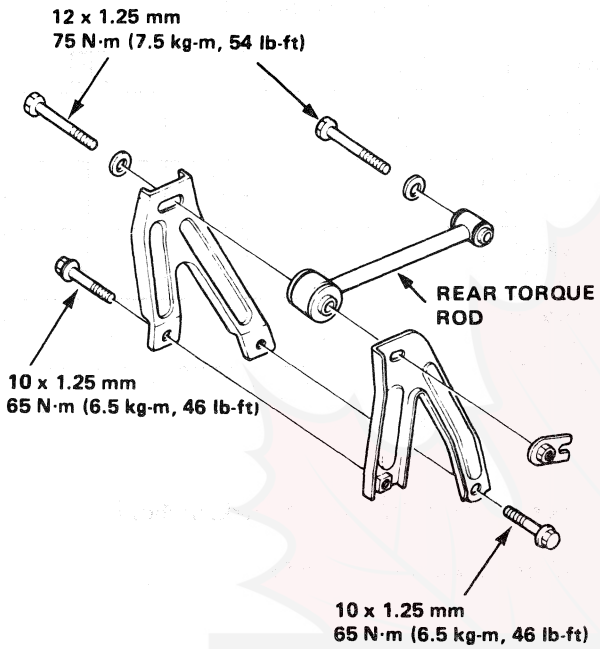


13. Remove the transmission jack.
14. Install torque converter cover plate, torque two 6 x 1.0 mm bolts (in oil pan flange) to 12 N·m (1.2 kg-m, 9 lb-ft).
15. Install damper bracket, torque two 10 x 1.25 mm nuts to 55 N·m (5.5 kg-m, 40 lb-ft) and three 8 x 1.25 mm bolts to 31 N·m (3.1 kg-m, 22 lb-ft).



16. Remove hoist from transmission.
17. Install starter mount bolts (10 x 1.25 x 125 mm) and torque to 45 N·m (4.5 kg-m, 33 lb-ft).

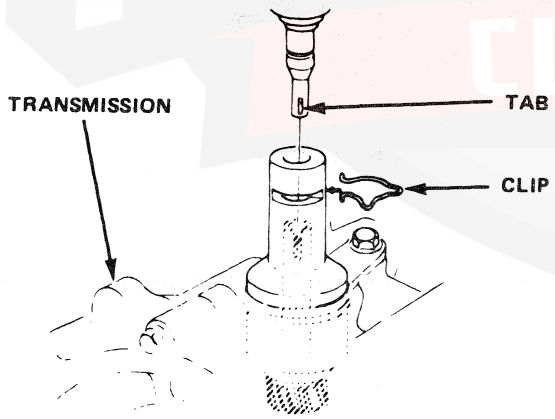
18. Install the rear torque rod bracket as shown.



19. Turn right steering knuckle fully outward, and slide axle into differential until you feel its spring clip engage side gear. Check that the left axle spring clip is engaged in its side gear.

20. Reconnect ball joint to knuckle, then torque its bolt to 55 N·m (5.5 kg-m, 40 lb-ft).
Reinstall the damper fork and torque its bolt to 44 N·m (4.4 kg-m, 32 lb-ft).

21. Install speedometer cable.
- Align tab on cable end with slot in holder.
- Install clip so bent leg is on groove side.



NOTE: After installing, pull speedometer cable to see that it is secure.

22. Install front wheels, lower car to ground, and torque nuts to 110 N·m (11.0 kg-m, 80 lb-ft).

23. Install transmission mounting bolt (10 x 1.25 x 90 mm) and torque all bolts to 45 N·m (4.5 kg-m, 33 lb-ft).

24. Connect cooler hoses, and torque banjo bolts to 29 N·m (2.9 kg-m, 21 lb-ft).

25. Connect wiring:
- Battery positive cable to starter.
- Black/white wire to starter solenoid.
- Yellow/green wire to water temperature sending unit.
- Black/yellow and yellow wires to ignition timing thermosensor.

26. With ignition key in 0 position, connect ground cable to battery and transmission.

27. Unscrew dipstick from top of transmission end cover and add 3.0 quarts Dexron® ATF through the hole. Reinstall dipstick.

NOTE: If transmission and torque converter have been disassembled, add a total of 6.0 quarts.

28. Install and reconnect shift cable (page 15-133).

29. Install console.

30. Start engine, set parking brake, and shift transmission through all gears three times. Check for proper shift cable adjustment (page 15-133).

31. Let engine reach operating temperature with transmission in Neutral or Park, then turn it off and check fluid level.

32. Install throttle control cable and adjust.

33. Road test as described on page 15-78.

Shift Position Switch

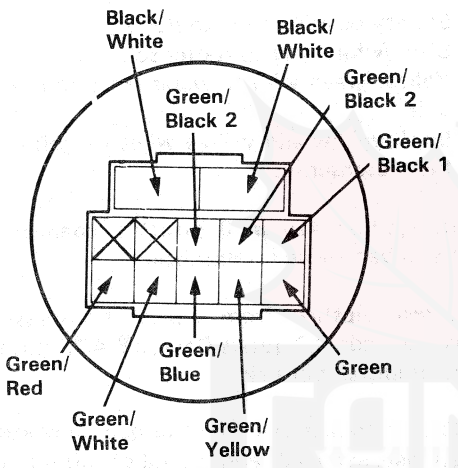
Check and Installation

Move the selector lever to shift position to check continuity of combined neutral safety (Inhibiter) and shift position switch.

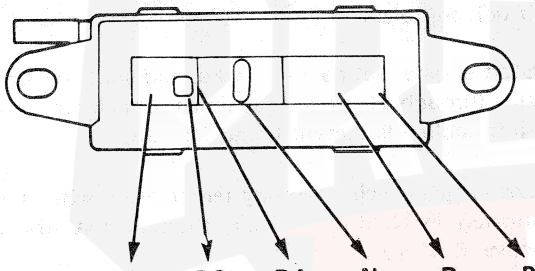
Replace the switch if there is no continuity between connector terminals shown on the chart.

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example G/Bl[1] and G/Bl[2] are not the same).

View from wire side



SHIFT POSITION SWITCH

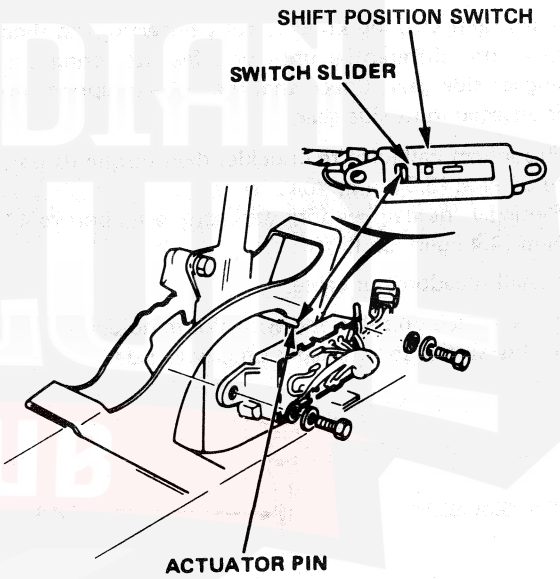


Wire color	2	D3	D4	N	R	P
GND	○	○	○	○	○	○
Green/ Yellow	○					
Green/ Blue		○				
Green/ Black			○			
Green				○		
Green/ Red					○	
Green/ White						○

INHIBITER SWITCH

Wire color	N	R	P
Black/ White	○		○
Green/ Black 2		○	
Black/ White	○		○
Green/ Black 2		○	

1. Position the switch slider to Park, as shown.
2. Shift the selector lever to Park.

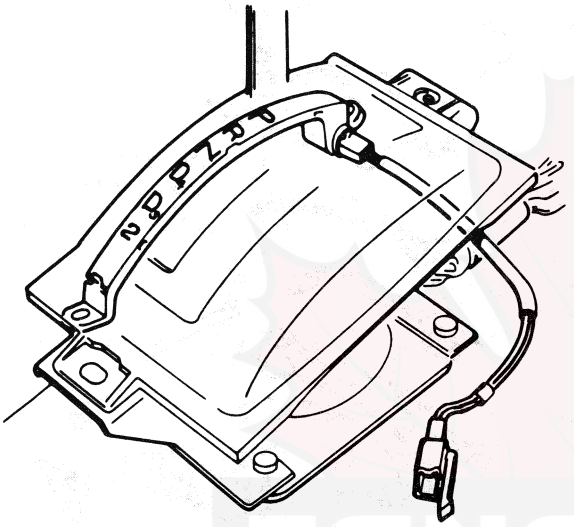


3. Tighten the switch with two bolts and lockwashers.

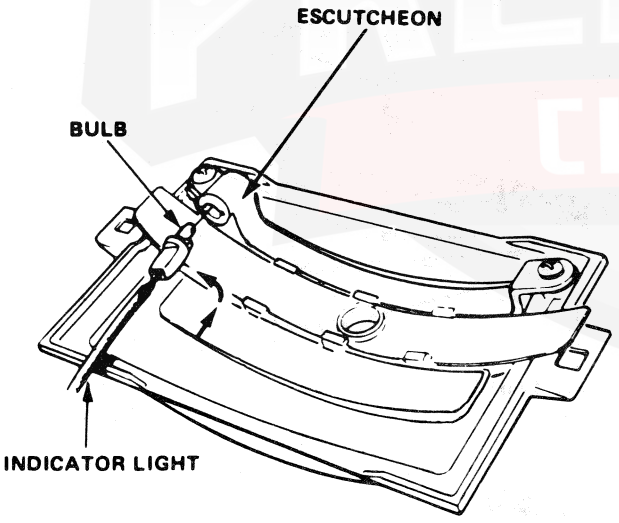
Shift Indicator Light

Check and Installation

Check for continuity between indicator light connector terminals as shown. If there is no continuity, check for burned out bulb or open circuit.



1. Install the indicator bulb in the bulb housing. Insert the bulb housing into slot in escutcheon, then turn 90° to bulb housing.

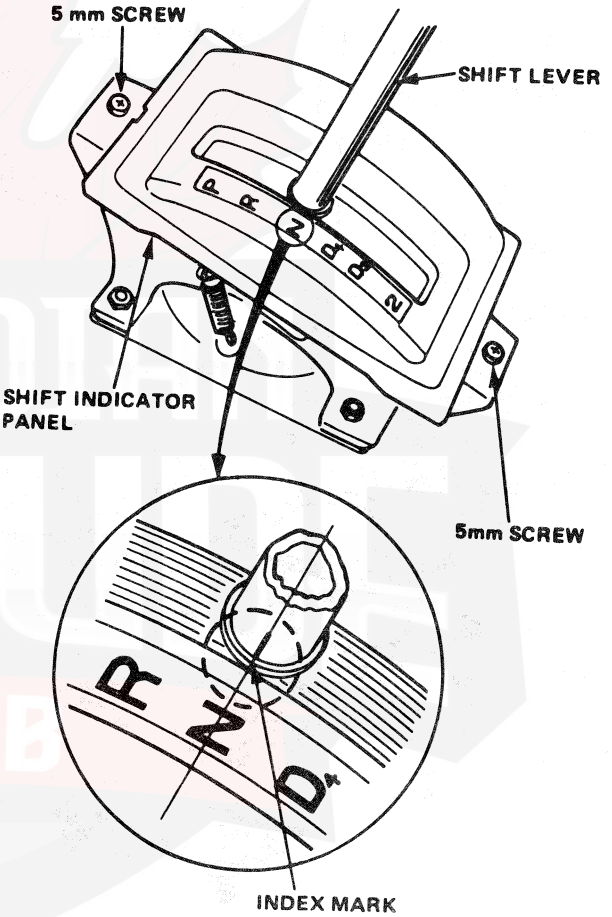


Shift Indicator Panel

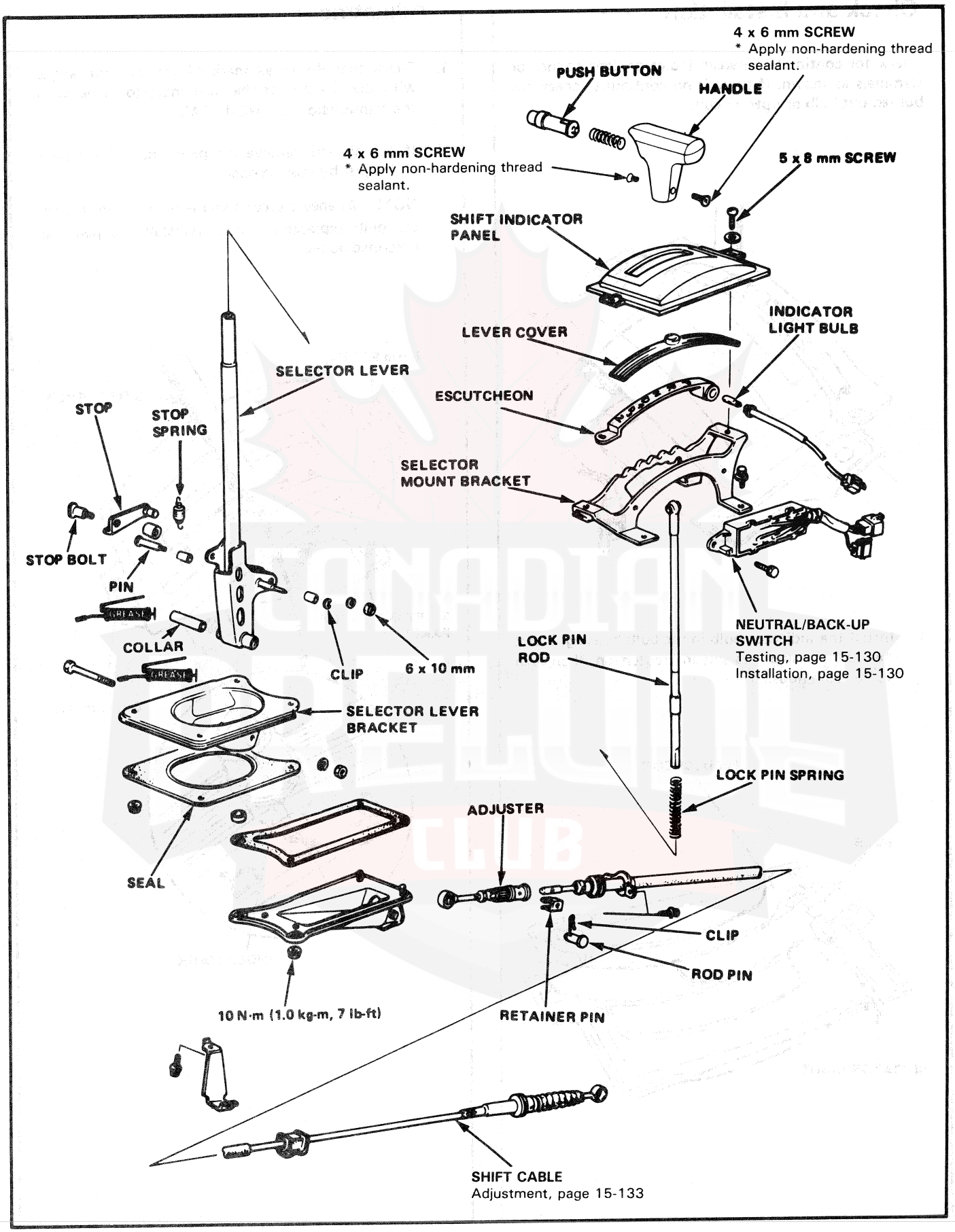
Adjustment

1. Check that the index mark of the indicator aligns with the N mark of the shift indicator panel with the transmission is 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.



Gearshift Selector

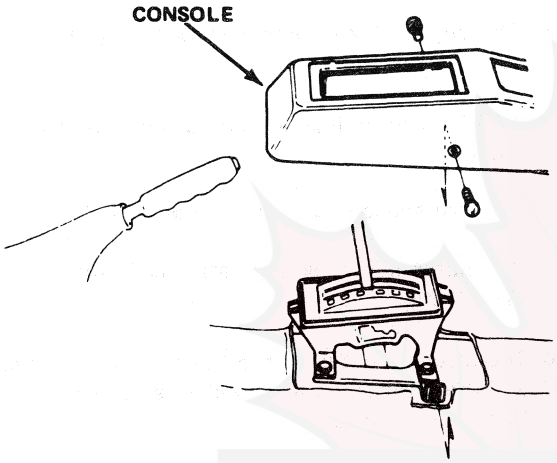


Shift Cable

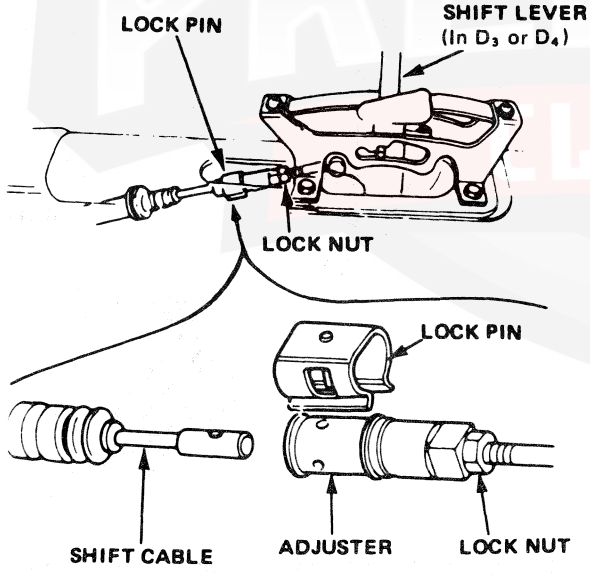
Adjustment

1. Start the engine. Shift to Reverse to see if the reverse gear engages. If not, refer to troubleshooting on page 15-76.

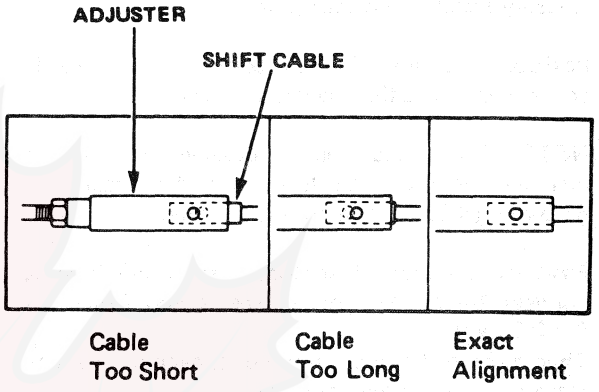
2. With the engine off, remove the console.



3. Shift to Drive, then 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 locknut on shift cable and adjust as required.

6. Tighten the locknut.

7. Install the lock pin on the adjuster.

NOTE: If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted again.

8. Start the engine and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting on page 15-76.

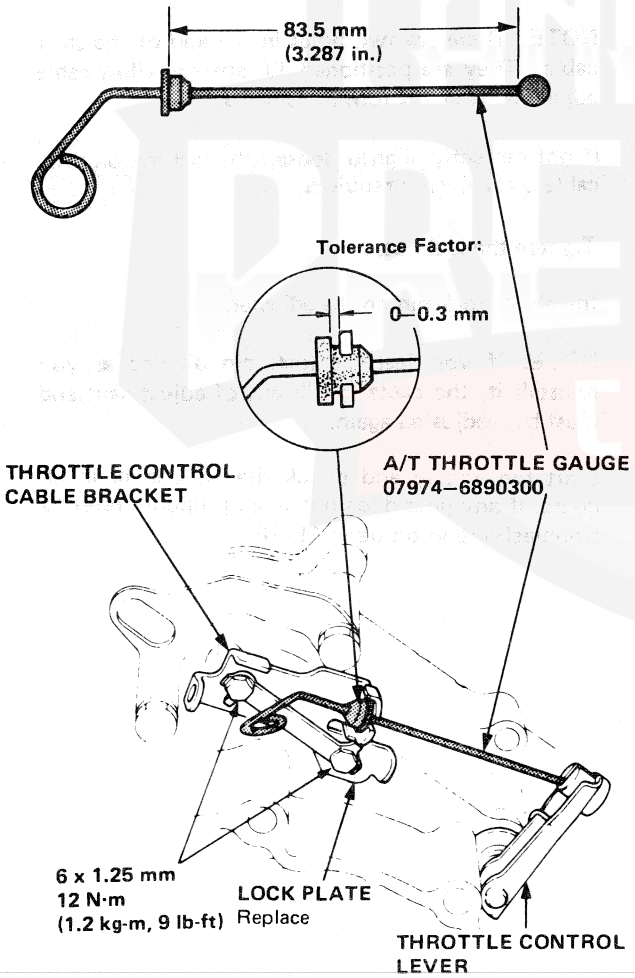
Throttle Control Cable Bracket

Adjustment

1. Disconnect the throttle control cable from the throttle control lever.
2. Bend down the lock tabs of the lock plate and remove the two 6 mm bolts to free the bracket.
3. Loosely install a new lock plate.
4. Position the special tool between the throttle control lever and the bracket as shown.

   NOTE: The special tool is designed so that the distance between the lever and the bracket is 83.5 mm (3.287 in.) when it is installed.
5. Position the bracket so that there is no binding between the bracket and the special tool (tolerance 0 ± 0.3 mm).
   Then tighten the two 6 mm bolts, bend up the lock plate tabs against the bolts heads.

   CAUTION: Make sure the control lever doesn't get pulled toward the bracket side as you tighten the bolts.



Throttle Control Cable

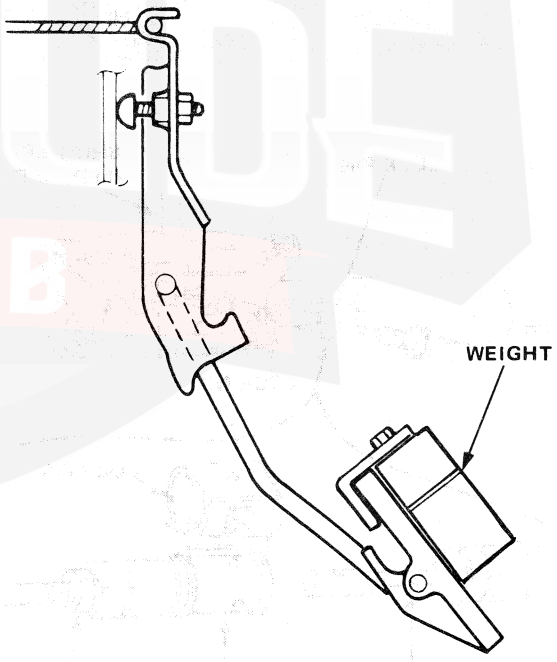
Adjustment

NOTE: Perform the following inspections before adjusting the throttle control cable.

- The accelerator pedal adjustment is correct. See Section 11.
- The carburetor throttle cable play is correct. See Section 11.
- The engine is warmed-up to operating temperature.

  NOTE: The cooling fan should come on twice or more.
- The idle speed is correct, see Section 11.
- The automatic choke operation is correct. See Section 11.
- The distance between the throttle control lever and the throttle control bracket is correct. See previous column.

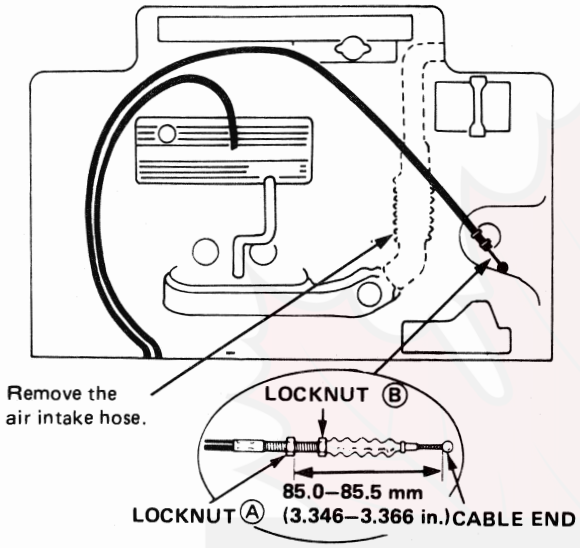
1. Attach a weight of about 1.5 kg (3 lbs) to the accelerator pedal. Raise the pedal, then release it, this will allow the weight to remove the normal free play from the throttle cable.



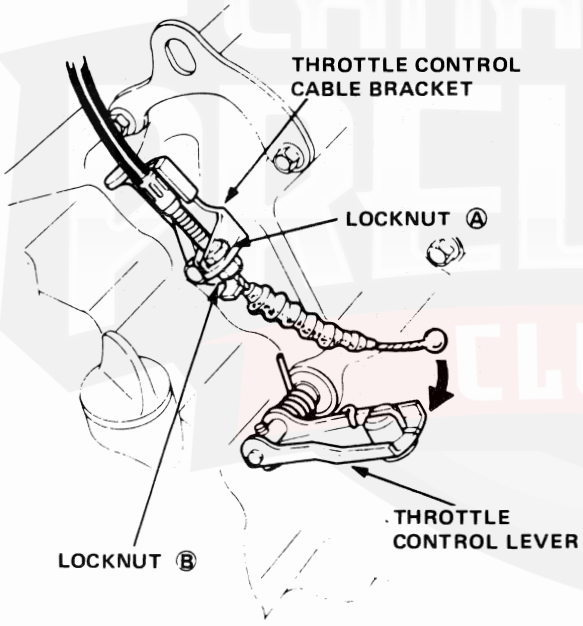
2. Secure the throttle control cable with clamps as shown.
3. Remove the air intake duct.

4. Lay the end of the throttle control cable on the shock tower.

5. Adjust the distance between the throttle control cable end and nut (A) to 85.0–85.5 mm (3.346–3.366 in.).



6. Insert the end of throttle control cable in the groove of the throttle control lever.



7. Insert the throttle control cable in the bracket and secure with locknut (B).

   NOTE: Make sure the cable is not kinked or twisted.

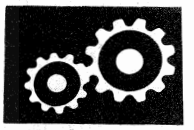
8. Check that the cable moves freely by depressing the accelerator.

9. Start the engine and check the synchronization between the carburetor and the throttle control cable.

   NOTE: The throttle control lever should start to move as engine speed increases.

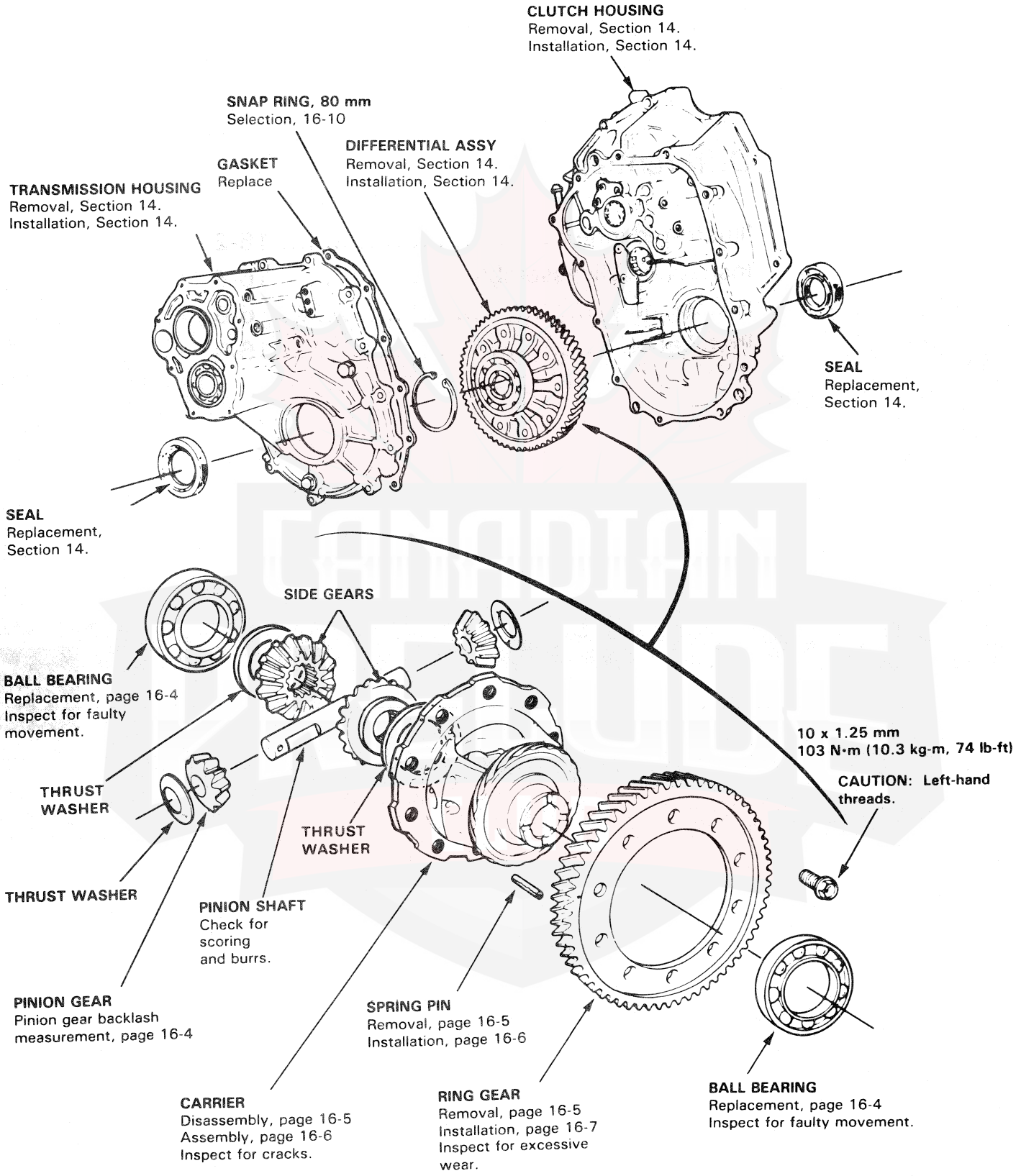
   - If the throttle control lever moves before engine speed increases, turn the cable locknut A counter clockwise and tighten locknut B.
   - If the throttle control lever moves after engine speed increases, turn locknut A clockwise and tighten the locknut B.

Differential



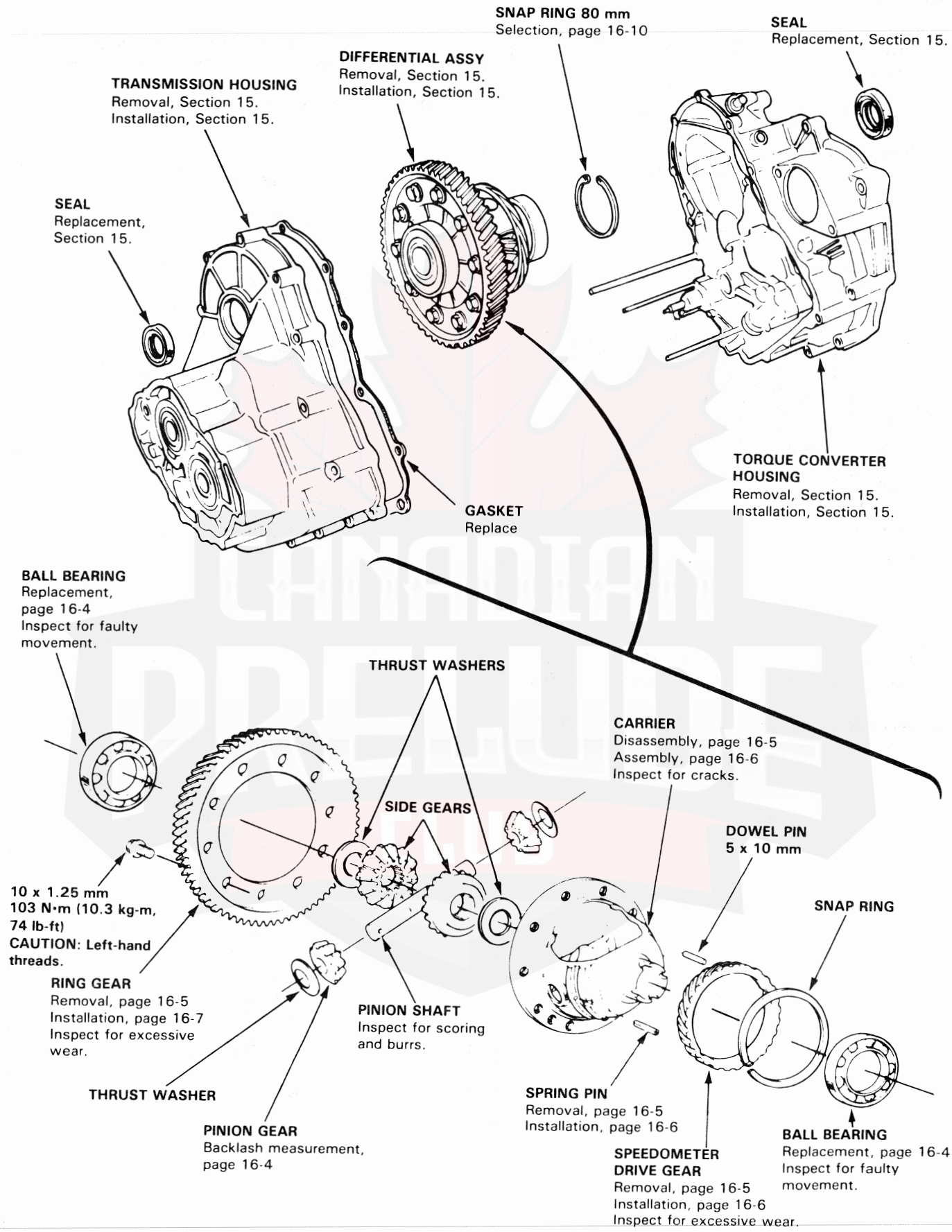
Differential (Manual Transmission)

Index



Differential (Automatic Transmission)

Index

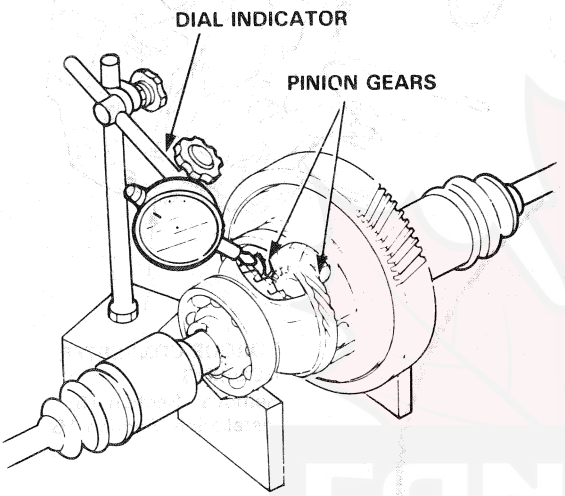


Differential

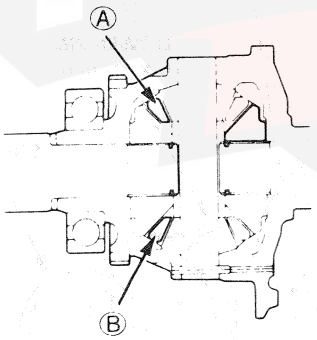
Backlash Inspection

1. Place differential assembly on V-blocks and install both axles.
2. Check backlash of both pinion gears.

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



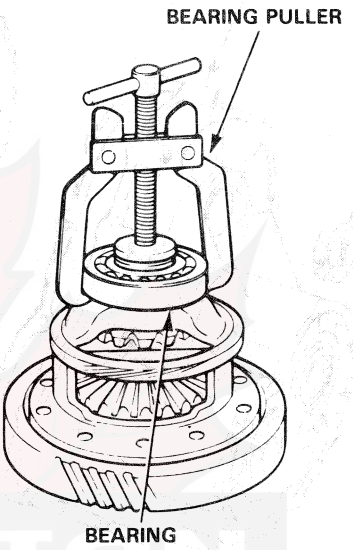
3. If out of tolerance, disassemble differential and select new thrust washers as shown on page 16-6.
4. Measure clearances in the A and B position of the drive pinion.



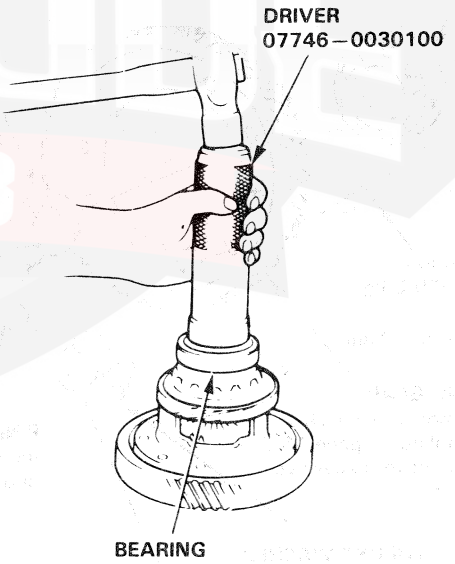
Bearing Replacement

NOTE: Check bearings for wear and rough rotation. If bearings are OK, removal is not necessary.

1. Remove bearings using a standard bearing puller.



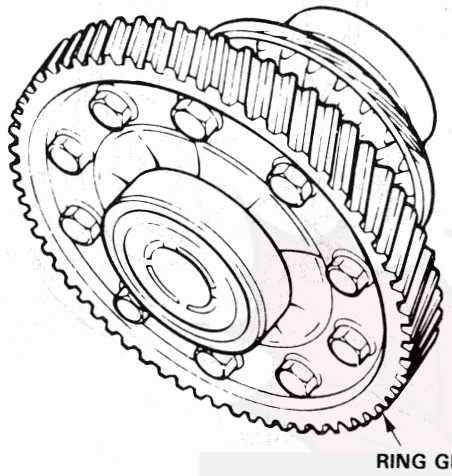
2. Install new bearings.



Inspection/Disassembly

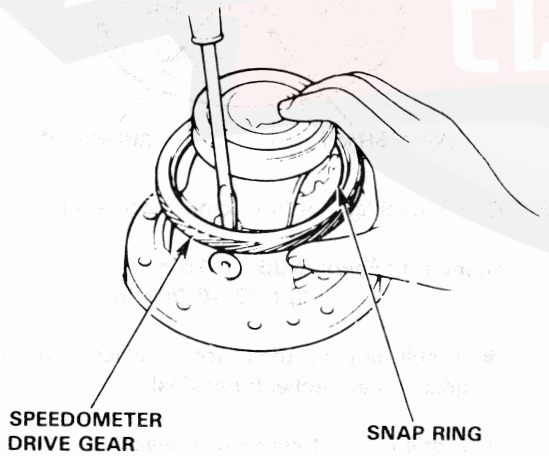
1. Remove ring gear and inspect teeth for wear or damage.

   CAUTION: The ring gear bolts have left-hand threads.

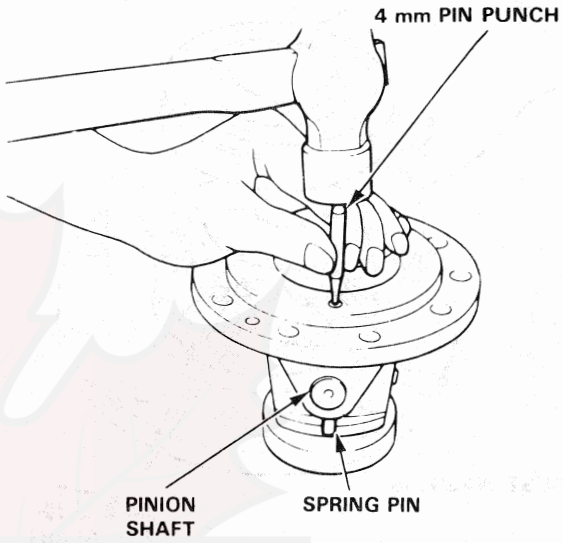


2. Automatic Only:
   Pry snap ring off carrier, then remove speedometer drive gear and dowel pin.

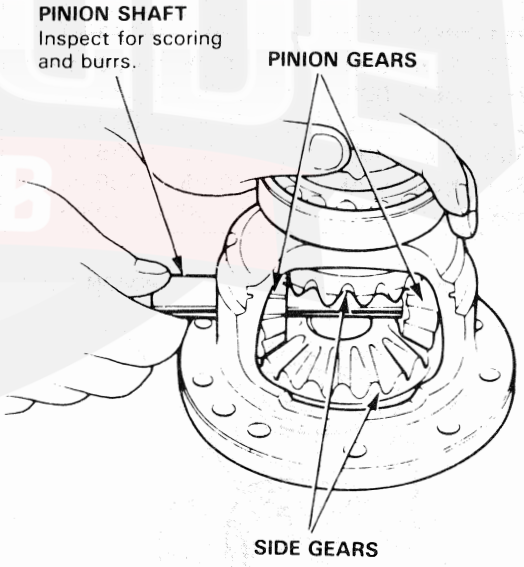
   CAUTION: The speedometer drive gear has sharp edges; use care when handling it.



3. Drive out spring pin with pin punch.



4. Remove pinion shaft, pinion gears, and thrust washers.

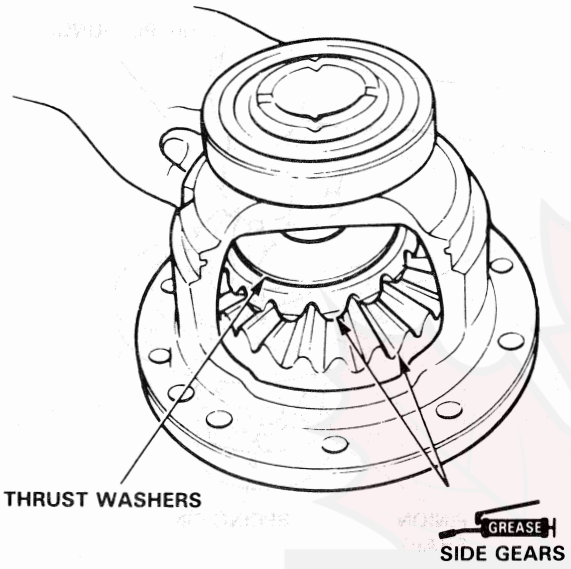


5. Wash parts thoroughly in solvent and dry with compressed air. Inspect all parts for wear or damage and replace any that are defective.

Reassembly

1. Install the side gears in differential carrier.

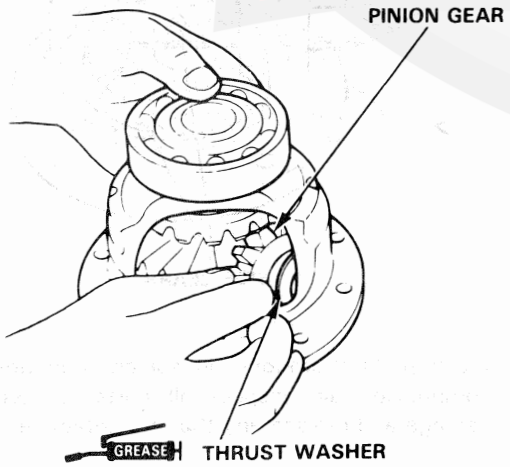
   CAUTION: Coat all gears with molybdenum disulfide grease on all sides.



2. Set pinion gears in place exactly opposite each other in mesh with side gears, then install a thrust washer behind each one. Washers must be of equal thickness.

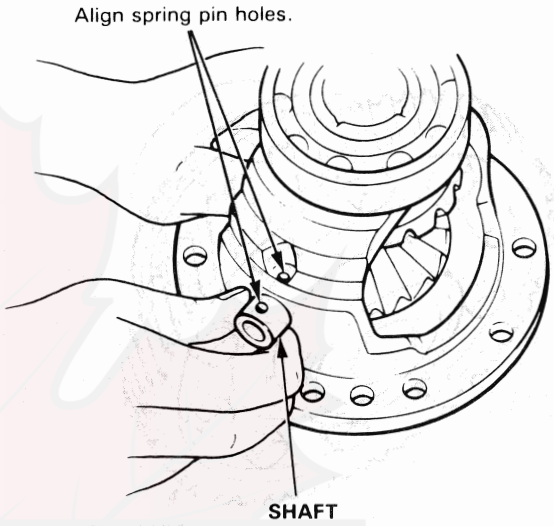
Thrust Washers

PART NUMBER	THICKNESS
41351–689–000	0.7 (0.028 in)
41355–PC8–000	0.75 (0.029 in)
41352–689–000	0.8 (0.031 in)
41356–PC8–000	0.85 (0.032 in)
41353–689–000	0.9 (0.035 in)
41357–PC8–000	0.95 (0.036 in)
41354–689–000	1.0 (0.039 in)

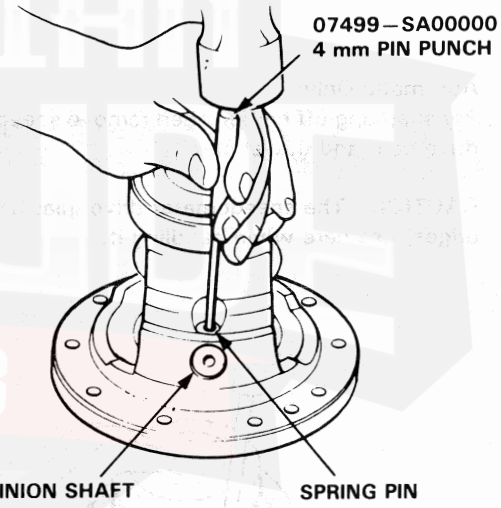


3. Rotate gears as shown until shaft holes in pinion gears line up with shaft holes in carrier.

4. Insert pinion shaft and align spring pin holes in one end with matching hole in carrier.



5. Drive in spring pin with pin punch.



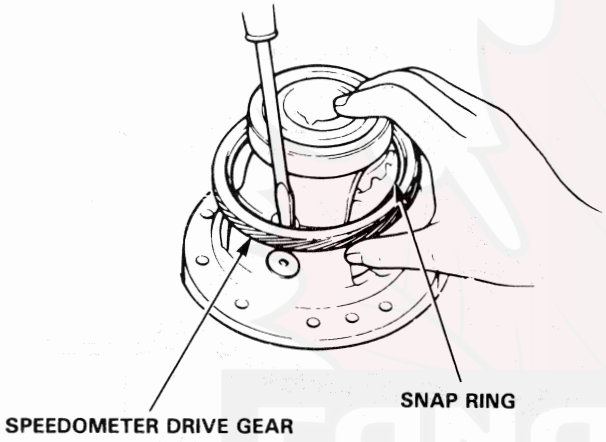
6. Check backlash of both pinion gears again.

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

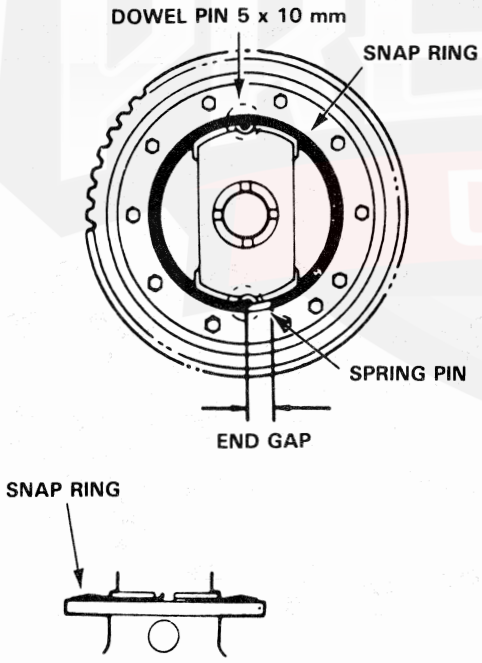
   - If still out of tolerance, replace both pinion gears, then recheck backlash.
   - If still out of tolerance, replace side gears, and recheck backlash.
   - If still out of tolerance, replace carrier assembly.

7. Automatic Only:
Install speedometer drive gear with its chamfer (on inside diameter) facing carrier and secure with snap ring.

CAUTION: The speedometer drive gear has sharp edges; use care when handling it.



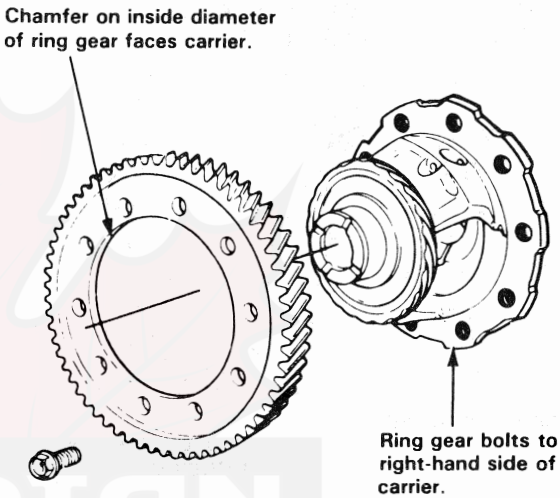
8. Automatic Only:
Align snap ring on carrier as shown.



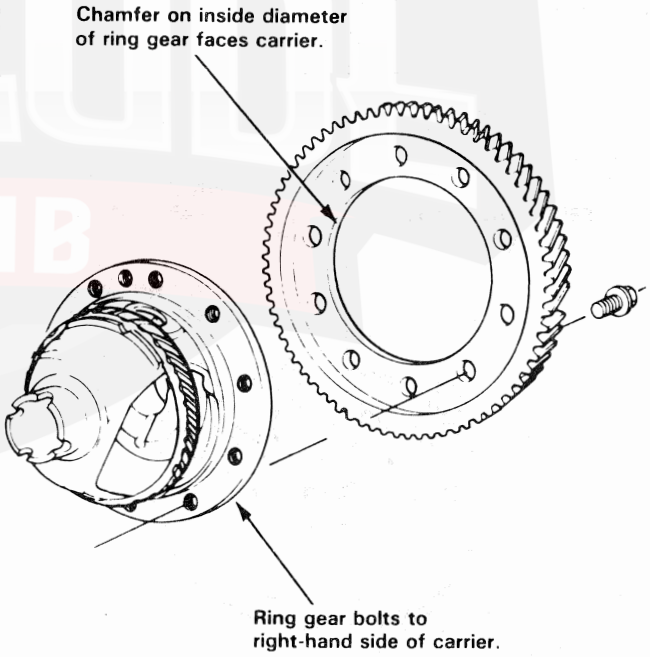
9. Install ring gear. Torque bolts to 103 N·m (10.3 kg-m, 74 lb-ft).

CAUTION: Ring gear bolts have left-hand threads.

Manual

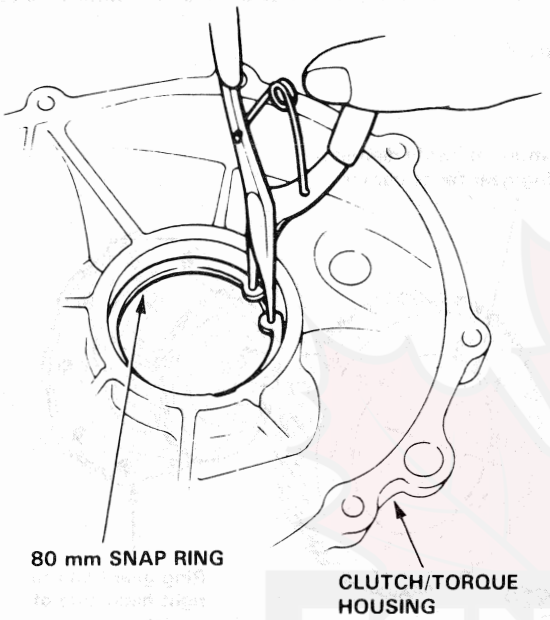


Automatic

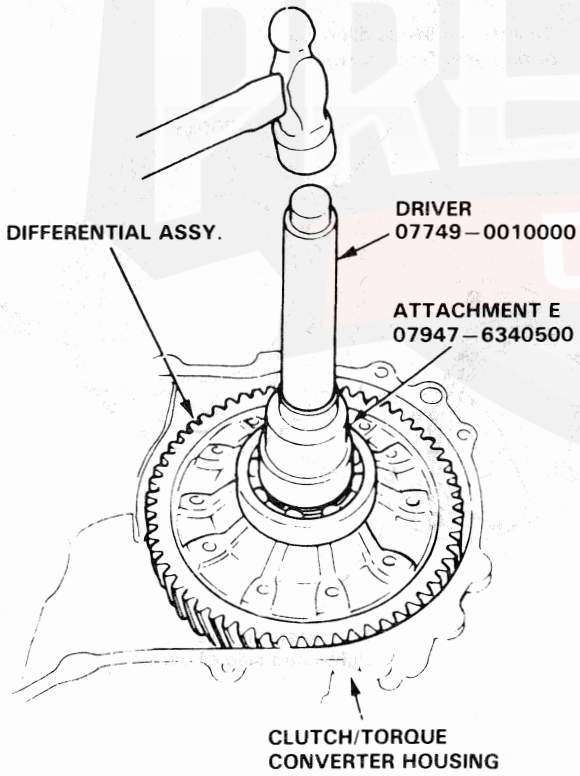


Installation

1. Automatic Only:
   Install 80 mm snap ring in clutch/torque converter housing. Do not install oil seal yet.



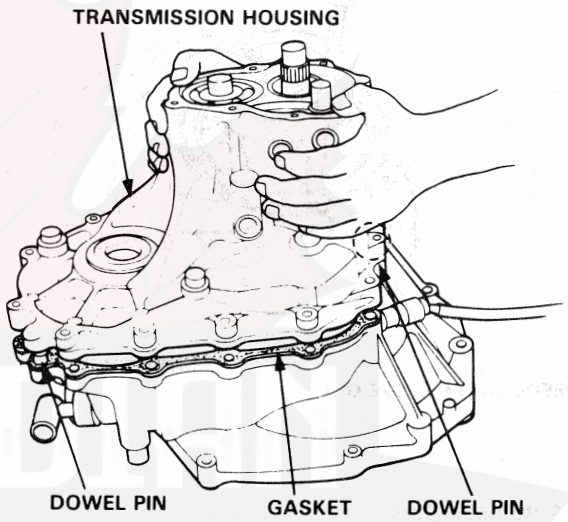
2. Install differential assembly in clutch/torque converter housing using driver. Tap on differential with driver and attachment to seat the snap ring in clutch/ torque converter housing.



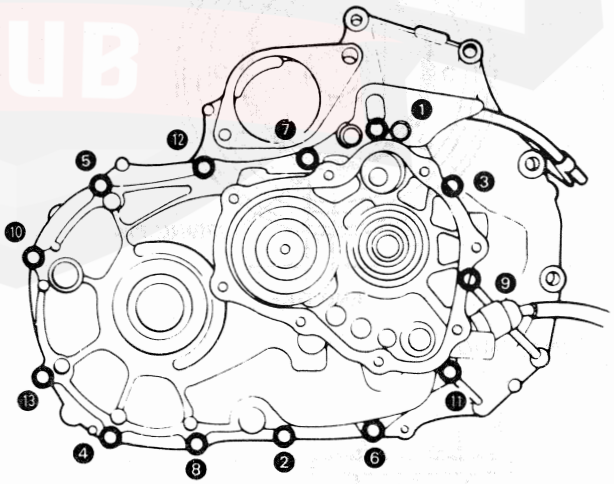
3. Install all transmission gear assemblies in clutch/torque converter housing. Refer to Section 14 (Manual) or Section 15 (Automatic).

4. Manual Only:
   Shift transmission into 3rd gear to position shift guide shaft for reassembly.

5. Place new gasket on clutch/torque converter housing and install both dowel pins, then carefully lower the transmission housing into place.

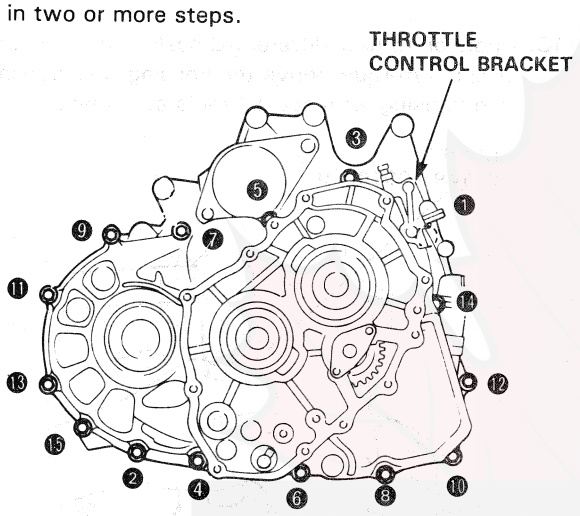


6. Manual Only:
   Bolt housings together and torque all thirteen bolts to 27 N·m (2.7 kg-m, 20 lb-ft) in sequence shown.



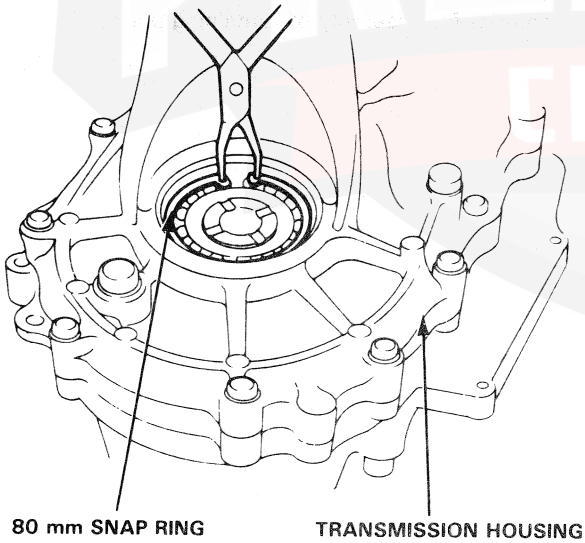
7. Automatic Only:
(Carbureted Engine)
Torque bolts to 27 N•m (2.7 kg-m, 20 lb-ft) in order in two or more steps.

(Fuel-Injected Engine)
Torque bolts to 45 N•m (4.5 kg-m, 33 lb-ft) in order in two or more steps.



NOTE: When tightening transmission housing bolts, take care that you do not distort or damage the throttle control bracket; distortion or damage to bracket will change transmission shift points.

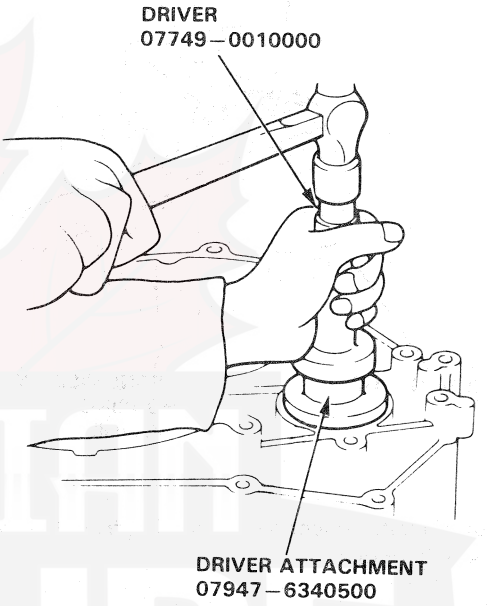
8. Manual Only:
Install 80 mm snap ring in transmission housing.



Side Clearance Measurement:

NOTE: If torque converter housing, transmission housing, differential carrier, or differential bearings were replaced, the differential side clearance must be measured.

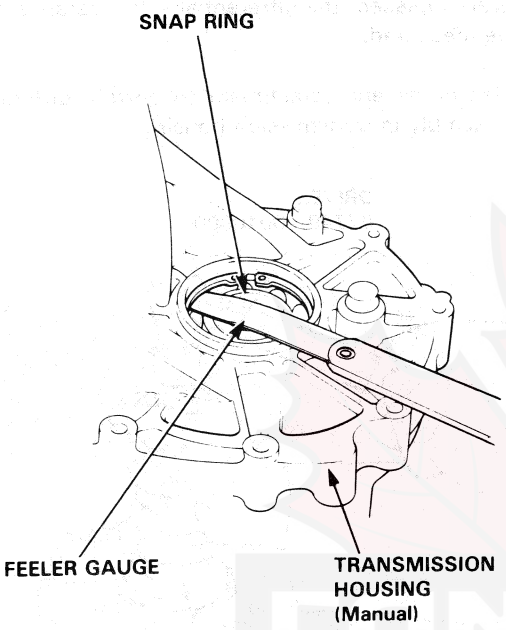
9. Use driver and attachment to bottom differential assembly in transmission housing.



(cont'd)

Installation (cont'd)

10. Measure clearance between snap ring and outer race of bearing in transmission housing (Manual), or torque converter housing (Automatic).



If out of limits, select new snap ring from following table and install:

Side Clearance: 0.15 mm (0.006 in.) Max.

Manual only:

Part Number	Thickness
90414—PC8—000	2.50 mm (0.098 in.)
90415—PC8—000	2.60 mm (0.102 in.)
90416—PC8—000	2.70 mm (0.106 in.)
90417—PC8—000	2.80 mm (0.110 in.)
90418—PC8—000	2.90 mm (0.114 in.)

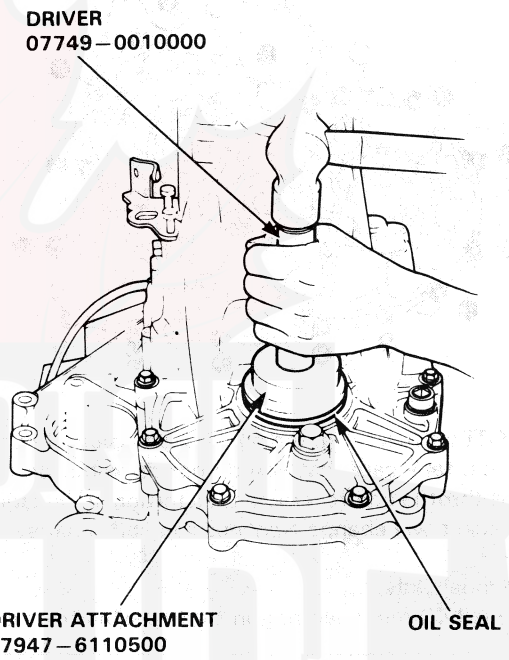
Automatic only:

Part Number	Thickness
90414—689—000	2.50 mm (0.098 in.)
90415—689—000	2.60 mm (0.102 in.)
90416—689—000	2.70 mm (0.106 in.)
90417—689—000	2.80 mm (0.110 in.)
90418—689—000	2.90 mm (0.114 in.)

11. Turn transmission over and seat new snap ring against the clutch/torque converter housing as shown in step 1.

12. Then turn transmission back over, seat differential again as shown in step 9, and recheck bearing-to-snap ring clearance.

13. Apply oil to new differential seals and install them in clutch/torque converter housing and transmission housing with special tools as shown.



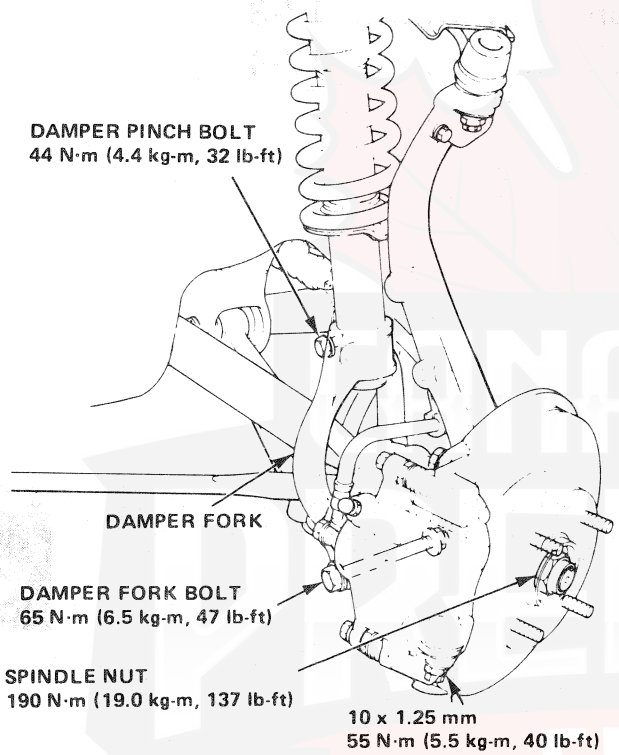
Refer to Section 14 (Manual) or Section 15. (Automatic) for assembly of remaining parts.

Driveshafts

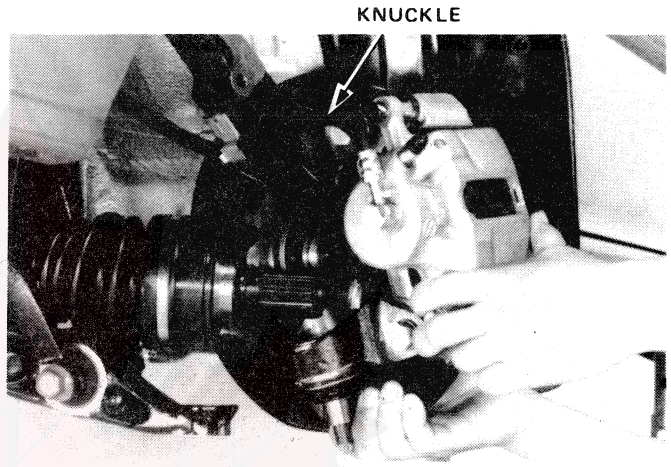
Driveshafts

Removal

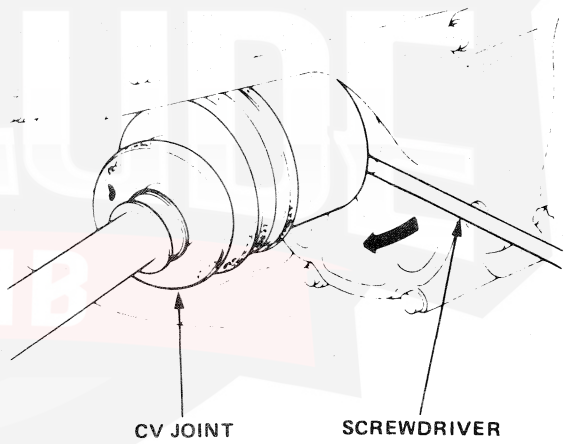
1. Loosen the front wheel lug nuts.
2. Raise the front end of the car and place safety stands in the proper locations. Remove the front wheels.
3. Drain the transmission oil.
4. Raise the locking tab on the spindle nut and remove it with a 32 mm (1.25 in.) socket wrench (section 20).
5. Remove the damper fork bolt and damper pinch bolt. Remove the damper fork.



6. Separate the lower arm ball joint from the lower control arm (section 20).
7. Pull the front hub outward, all the way off the driveshaft.



8. Pry the inboard CV joint out approximately 12 mm (1/2 in.) to force spring clip past the groove in splines of differential side gear, then pull the driveshaft out of the transmission case.



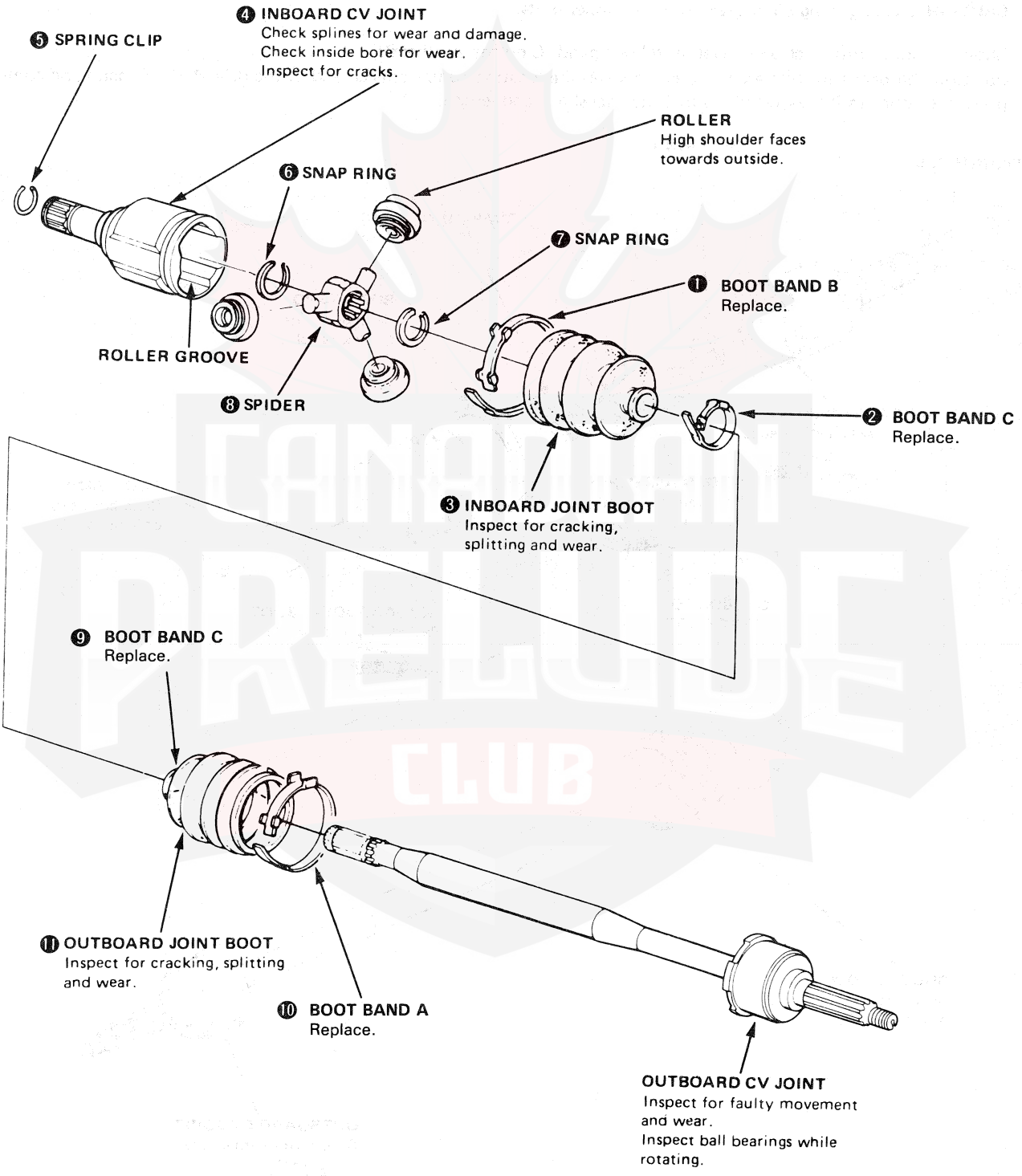
CAUTION:

- Do not pull on the inboard CV joint, it may come apart.
- Use care when prying with a screwdriver to avoid damaging the oil seal.

Disassembly/Inspection

Disassemble in numbered sequence.

NOTE: Mark the rollers and roller grooves during disassembly to ensure proper positioning during reassembly.



Reassembly

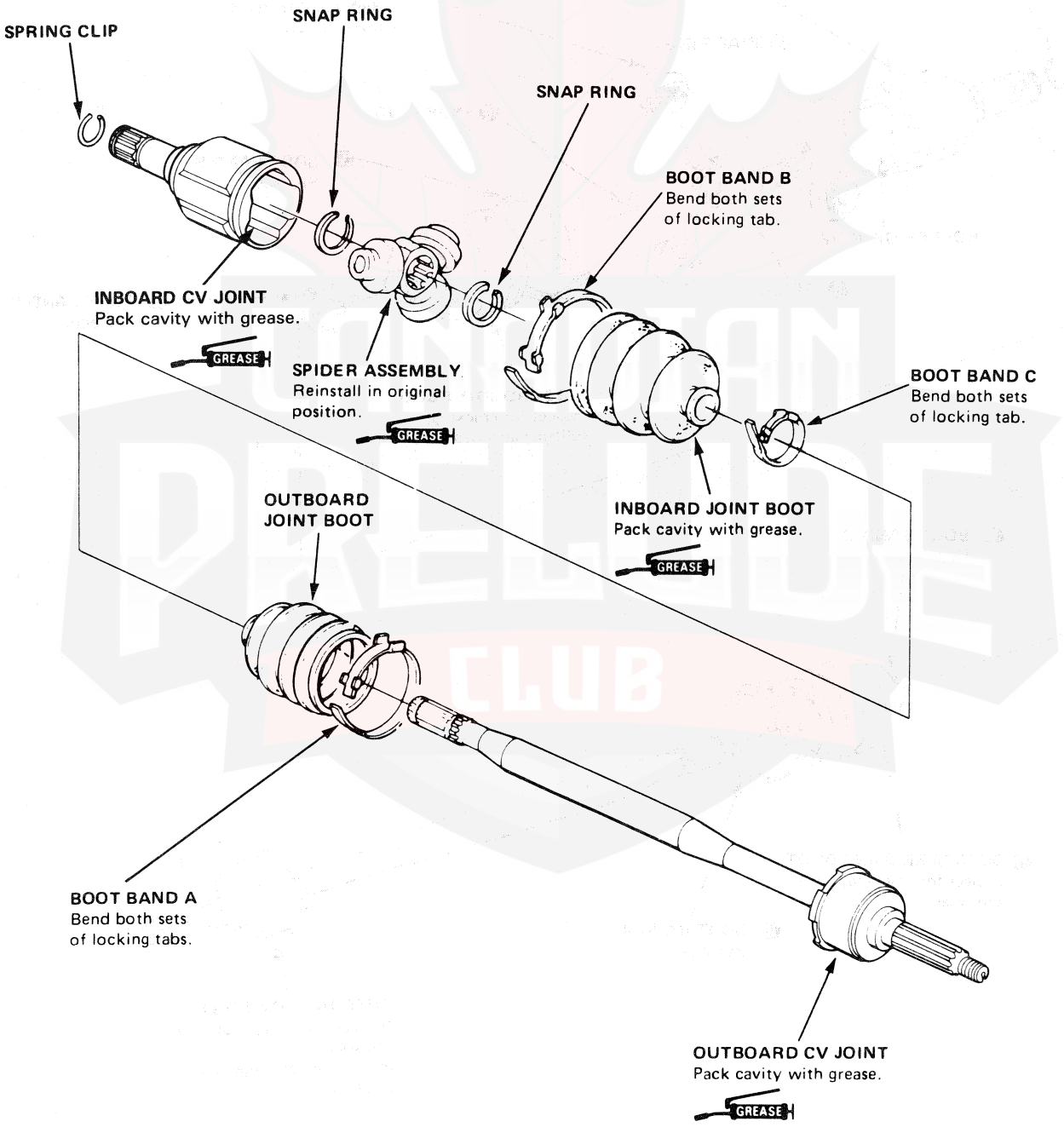
1. Reassemble the driveshafts in reverse order of disassembly.

GREASE Thoroughly pack the bearings and both the inboard and outboard CV joints with high quality molybdenum disulfide grease when reassembling the driveshaft.

2. Install the rollers and bearing races on the spider shafts, then slide the spider assembly into the inboard shaft joint.

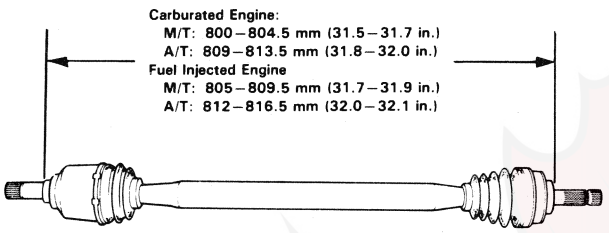
CAUTION: Avoid getting oil or grease on the rubber parts.

3. Slide the boots into place and install new boot bands C on the small ends. Position the bands so they are centered between the locating humps at each end of the driveshaft. Expand and compress the boots until they return to their normal shape and length.

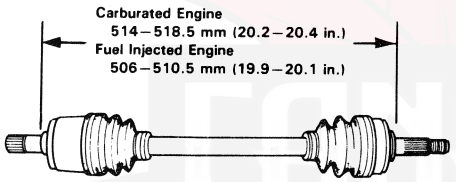


4. Adjust the length of the driveshafts to the figures given below, then adjust the boots to halfway between full compression and full extension.

LEFT DRIVE SHAFT



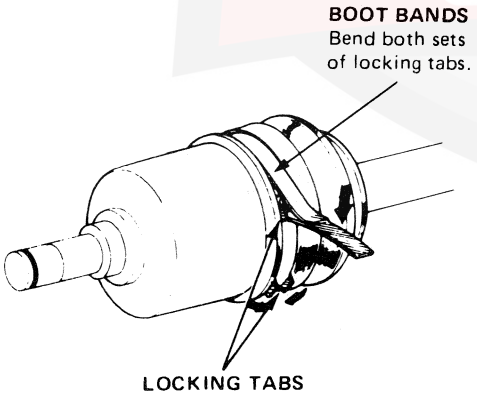
RIGHT DRIVESHAFT



5. Install the new boot bands A and B on the boots.

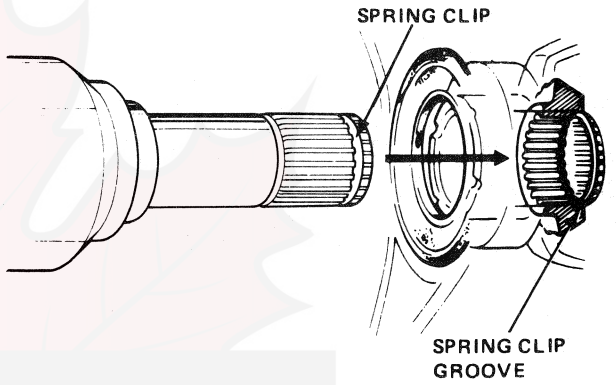
NOTE:
- Be sure to bend both sets of the locking tabs.
- Lightly tap on the doubled-over portions to reduce their height.

CAUTION: Do not strike the boot.



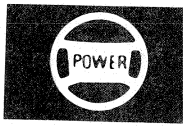
6. Install the inboard end of the driveshaft.

CAUTION:
- **When reinstalling, make sure that the CV joint subaxle bottoms in the differential and that the spring clip locks in differential side gear groove.**
- **Replace the spring clip with a new one whenever the driveshaft is disassembled.**



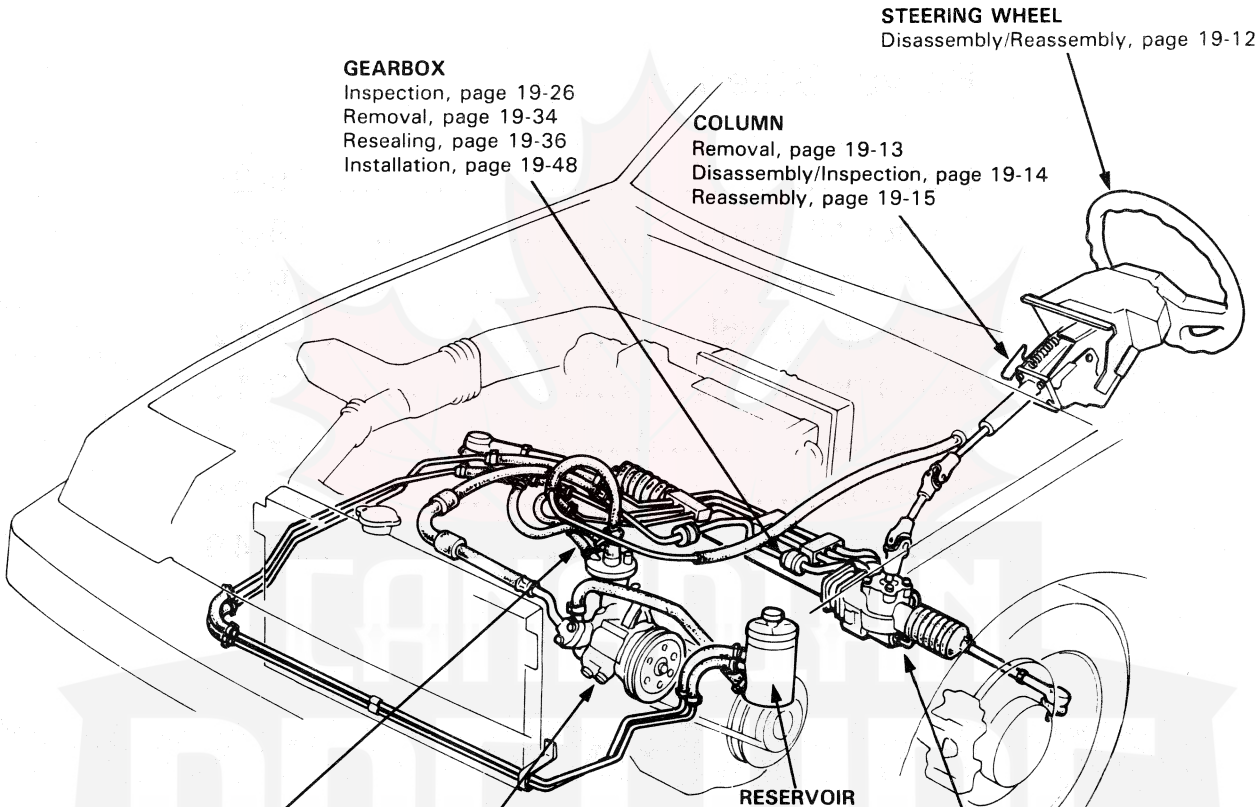
7. Add the transmission oil.

Power Steering



Power Steering

Index

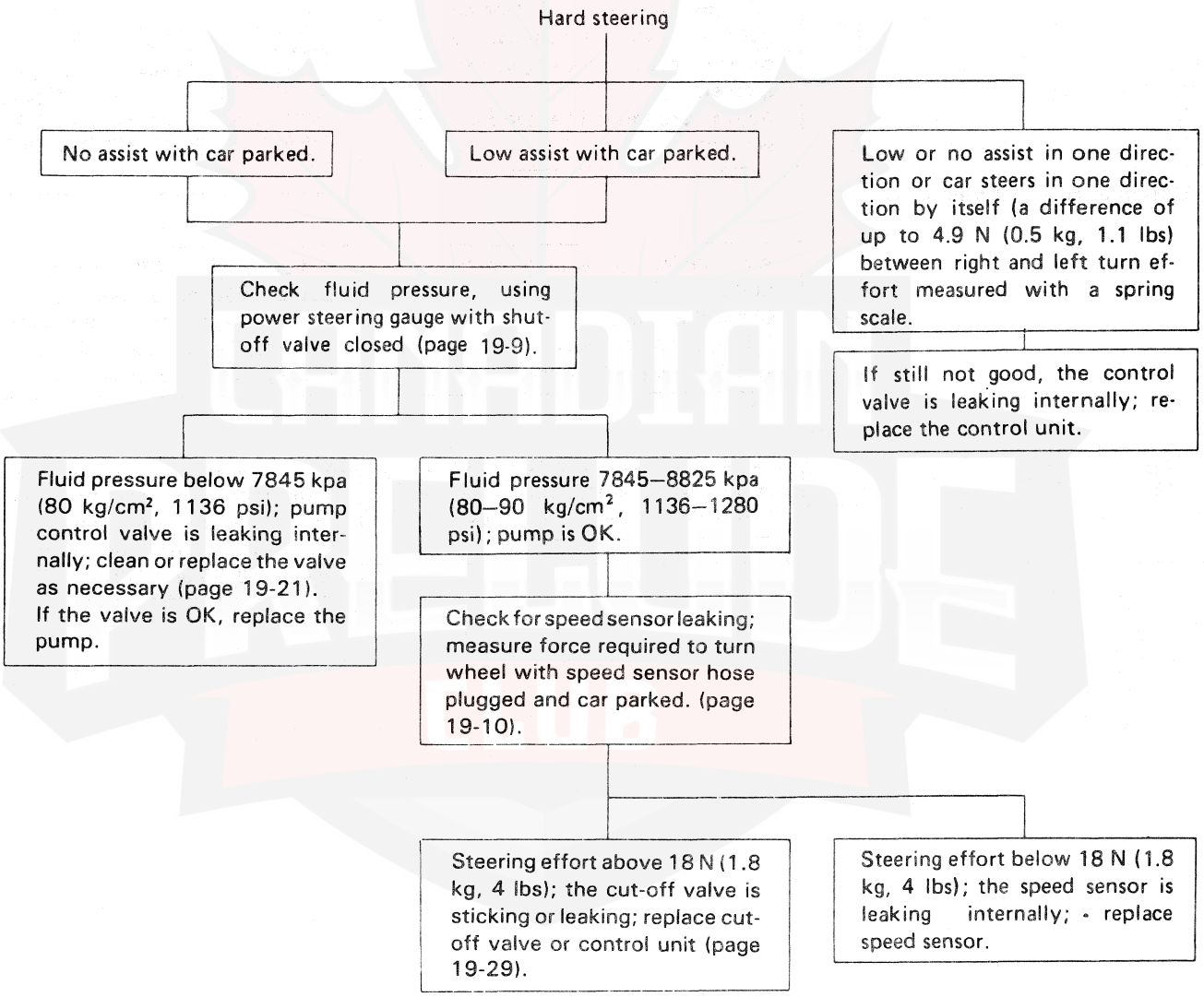


Troubleshooting

General

Check the following before you begin:

- Has the suspension been modified in a way that would affect steering?
- Are tire sizes and air pressure as specified?
- 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?



(cont'd)

General (cont'd)

Uneven or rough steering.

- Belt slipping on pulley.
  Adjust belt tension. Replace belt if necessary (page 19-8).
- Cut-off valve sticking or leaking.
  Replace cut-off valve or control unit (page 19-29).
- **Idle speed low or erratic (engine stalls when wheel is turned while car is stopped or moving at low speeds).**
  Adjust carburetor idle (see Fuel section).
  - Check Power Steering Pump Preload (page 19-19).
    If preload is above 4 N•m (0.4 kg-m, 3 lb-ft) the pump is probably damaged internally; clean or replace it as necessary (page 19-19).
- Air bubbles visible in reservoir fluid.
  Check fluid level.
  If low, check for leaks.
  Add fluid to proper level.
  - If fluid level is OK, check the pump inlet hose (both ends) and O-rings under the port housing, for suction leaks. Replace parts as necessary.
- Improperly adjusted rack guide.
  Adjust rack guide (page 19-8).
  - If the rack guide abjustment is OK, check the pinion bearings for wear; if worn, replace them (pages 19-36 and 38).

- **Shock or vibration when wheel is turned to full lock.**
  - Pump belt slipping on pulley (pump stops momentarily); adjust belt tension or replace belt.
  - Sticking relief valves; pulsation exceeds 980 kPa (10 kg/cm², 142 psi); during pump pressure test (page 19-9).
- **Assist (excessively light steering) at high speed.**
  - Measure force required to turn wheel with bypass tube installed and car parked on dry, paved surface (page 19-10).
    - If below 50 N (5.0 kg, 11 lbs); valve is sticking replace cut-off valve or control unit (page 19-29).
- **Steering kicks back during wide turns.**
  - Pump belt slipping; adjust belt (page 19-8).
  - Cut-off valve sticking. replace Cut-off valve or control unit (page 19-29).
  - Rack guide adjusted too loose; adjust guide (page 19-8).
- **Wheel will not return smoothly.**
  - Tire pressure too low; inflate to correct pressure.
  - Improper front end alignment; re-align front end.
  - Gearbox lines bent or crushed; replace damaged lines.
  - Improperly adjusted rack guide; adjust guide (page 19-8).

Troubleshooting

Noise and Vibration

NOTE: Pump noise within 2–3 minutes after starting in cold weather (−20°F or colder) is normal.

Humming

- Humming, due to pulsation of fluid, is normal, particularly when wheel is turned with car stopped.
- Hum could be automatic transmission torque converter noise; confirm by temporarily removing pump belt.
- High pressure line touching the frame; reposition the line.

Squeaking

- Belt slipping; tighten 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; remove pinion and file burrs smooth.

Rattling or chattering

- Normal "clunk" of linkage taking up clearance when wheel is turned with engine off.
- Loose pump pulley; tighten or replace it. If shaft is loose, replace the pump.
- Loose steering shaft connector, tie-rod, or ball joint; check and tighten, or replace parts.
- Lower column hanger bushing damaged; replace bushing.

Hissing

- Lines or hoses from the control unit touching each other; reposition lines so they don't touch.
- If the control unit lines are not touching, and noise is from control valve replace the control unit.

Pump gear noise

- Normal. Check pump noise on a car you know is OK, then compare.

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 parts.
- Check for crushed suction hose or loose hose clamp allowing air into the system. Tighten or replace parts.

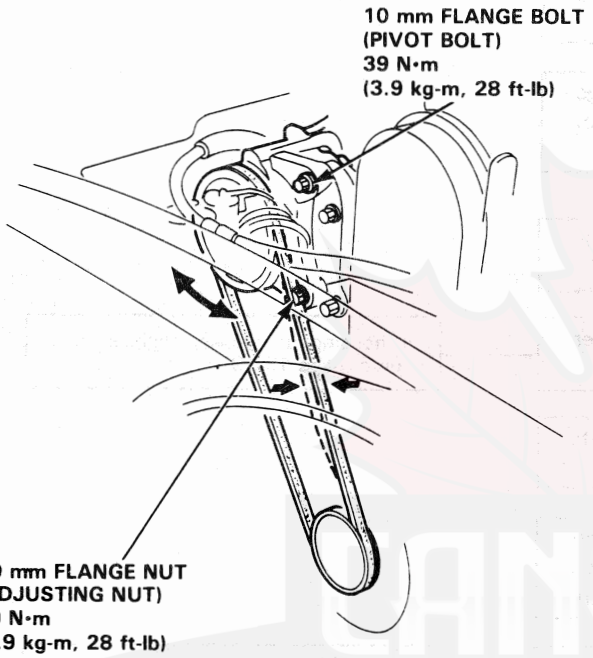
Fluid Leaks

Steering gearbox	Leaking from cylinder end seal into tie-rod boots; replace seals.	
	Leaking from top (gearbox face) or either side of valve body; replace all control unit seals and O-rings.	
	Leaking from drilled passage plug (steel ball); replace control valve body.	
Pump	Front seal leaking; replace it (page 19-23).	
	Pump housing leaks at either end; replace housing O-rings.	If housing still leaks, replace the pump (page 19-19).
	Inlet-outlet fitting leaks from its base; replace fitting O-rings.	
	Leaking from return fitting (on front of pump), or from drilled passage plug; replace the pump.	
	Leaking from hose connection at inlet-outlet fitting; tighten the connection.	If it still leaks, check for damage and foreign matter in the hose and the fitting; if necessary, replace the hose and/or fitting.
Speed sensor	Leaking anywhere; replace the sensor.	
Reservoir	Leaking from around dipstick; reservoir overfilled. Pull off hose and drain to proper level.	
Pump outlet line (high pressure)	Leaking at threaded fitting; tighten fitting. If still leaking, replace hose.	
	Leaking at swaged joint; replace hose.	
Low pressure hoses	Leaking because of damage, deterioration, or improper assembly; replace or repair as necessary.	

Pump Belt Adjustment

A properly adjusted belt should deflect about 18-22 mm (3/4—7/8 in.) when you push on it mid-way between the pulleys with a force of about 100 N (10 kg, 22 lbs).

1. Loosen the pump adjusting nut, and pivot bolt.

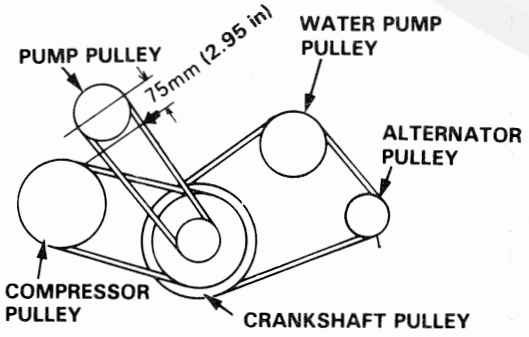


2. Pry the pump away from the engine to get the proper tension, then retighten the adjusting nut, and pivot bolt.

On-Car Check

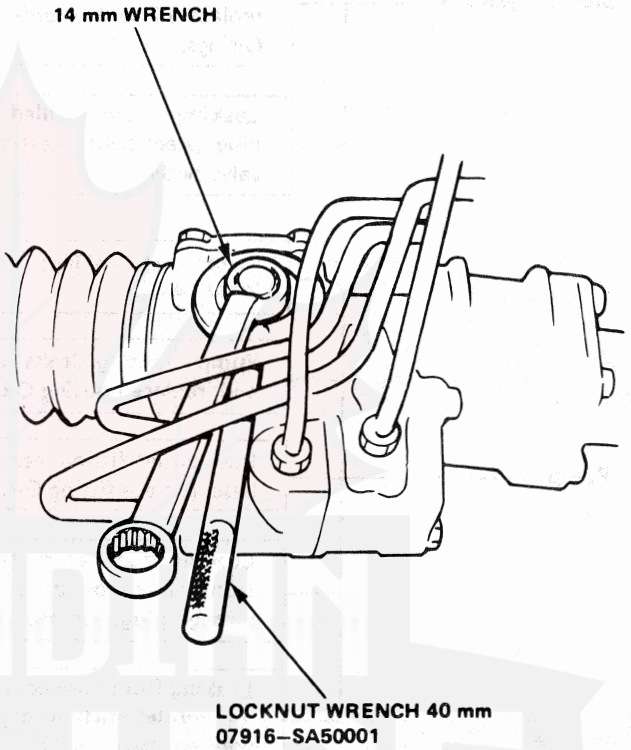
Measure the pump belt tension by pushing on it 75 mm (2.95 in) from the center of the pump pulley with a force of about 100 N (10 kg, 22 lbs).

Pump belt should deflect about 14—17 mm (0.55—0.67 in).



Rack Guide Adjustment

1. Loosen the locknut on the rack guide screw with the special wrench as shown.



2. Tighten the guide screw until it compresses the spring and seats against the guide; then loosen it, and retighten it to about 3 N·m (0.3 kg-m, 2 lb-ft) and back it off about 25° (about 1/12 of a turn). Tighten the locknut to about 25 N·m (2.5 kg-m, 18 lb-ft) while preventing the guide screw from moving.

   NOTE: Apply Three Bond® No. 2 thread locking sealant to the guide screw threads.

3. Check the steering effort as described on page 19-10.

On-Car Checks

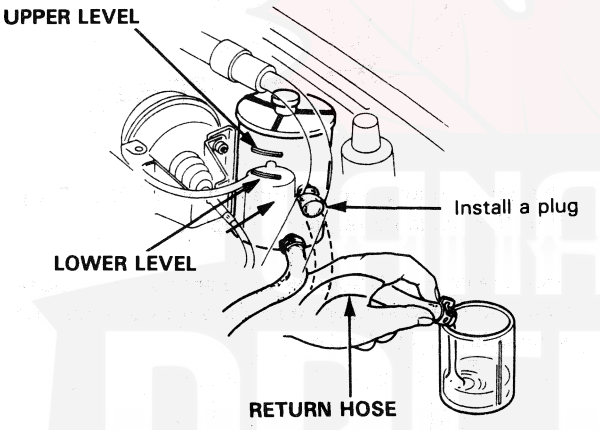
Fluid Replacement

Check the reservoir at regular intervals, and add fluid as necessary.

CAUTION: Use only GENUINE HONDA Power Steering Fluid. Using other fluids such as ATF or other manufacturer's power steering fluid will damage the system.

The fluid should be replaced whenever the system is opened for repairs or if the fluid gets water or dirt in it.

1. Disconnect the return hose from the gearbox at the reservoir, and put the end in a suitable container.
2. 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.



3. Refit the return hose on the reservoir.
4. Fill the reservoir to the upper level mark.
5. 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.
6. Recheck the fluid level and add some if necessary.

CAUTION: Do not fill the reservoir beyond the upper level mark.

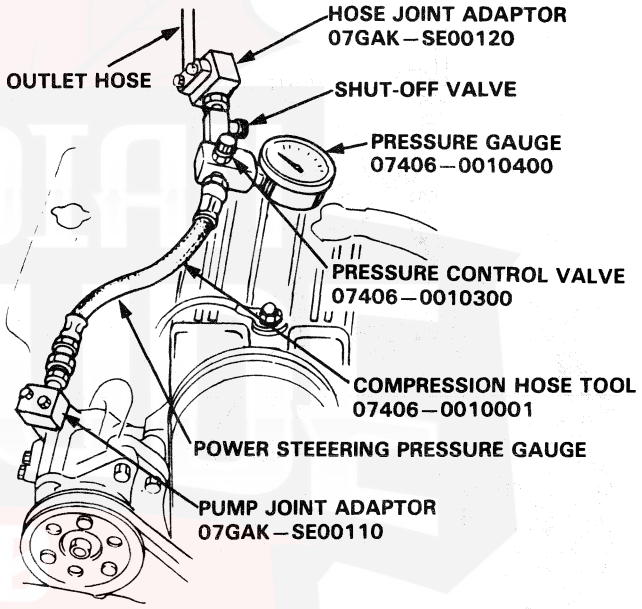
Pump Pressure Check

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

NOTE: First check the power steering fluid level and pump belt tension.

1. Disconnect the outlet hose from the pump outlet fitting, and install the hose joint adaptor on the outlet hose.
2. Install the pump joint adaptor to the pump outlet.
3. Install the power steering pressure gauge between the hose and pump joint adaptors as shown.

NOTE: If power steering gauge (07406—0010000) is used, the pressure control valve (07406—0010300) and pressure gauge (07406—0010400) must be installed as shown.



4. Open the shut-off valve fully.
5. Open the pressure control valve fully.

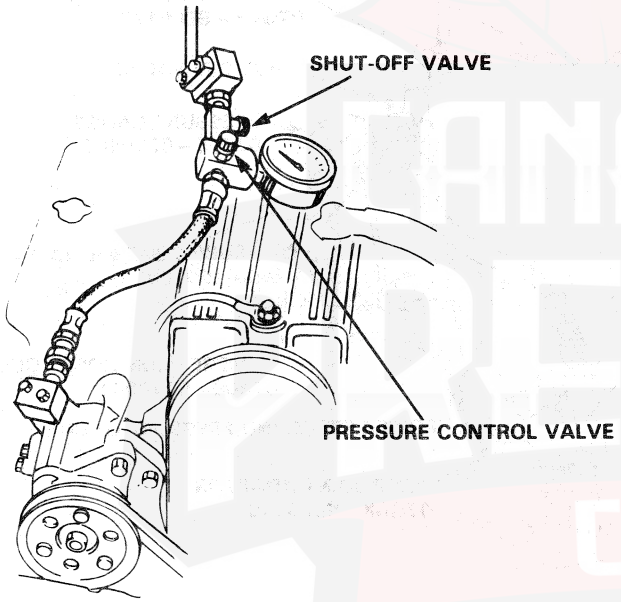
(cont'd)

Pump Pressure Check (cont'd)

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 pressure.
9. Open the shut-off valve fully.

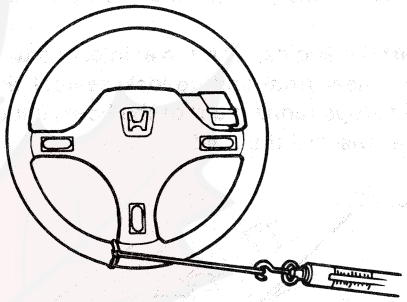
CAUTION: Do not keep the shut-off valve closed more then 5 seconds or the pump could be damaged by over-heating.

If the pump is in good condition, the gauge should read at least 7845—8421 kPa (80—90 kg/cm², 1137—1280 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.



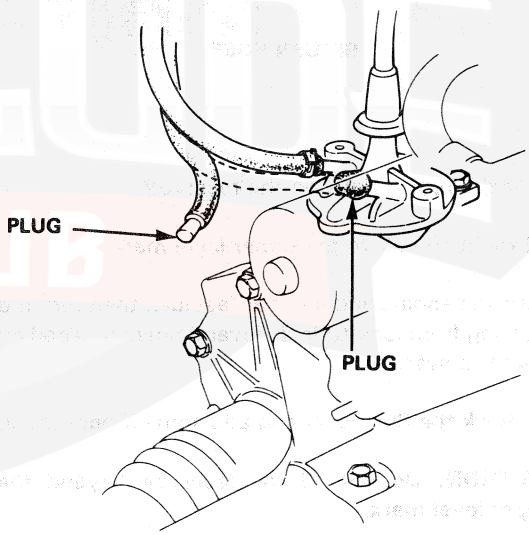
Assist Check with Car Parked

1. Check the power steering fluid level and pump belt tension.
2. Start the engine, allow 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.



The scale should read no more than 18 N (1.8 kg, 4lb). If it reads more, go on step 4.

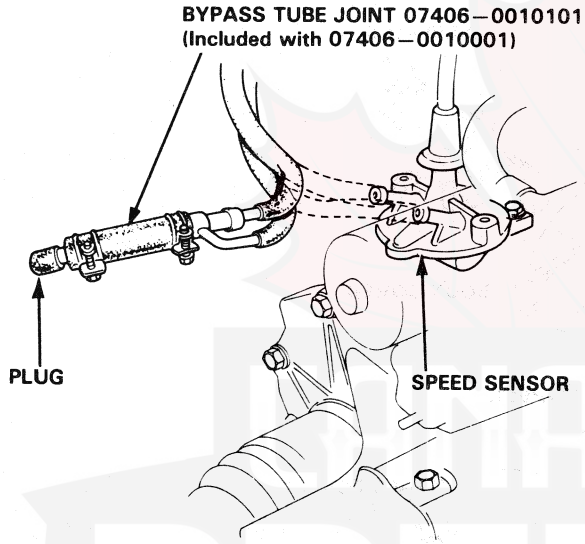
4. Stop the engine. Disconnect the speed sensor hose from the speed sensor and plug both hose and the sensor fitting as shown.



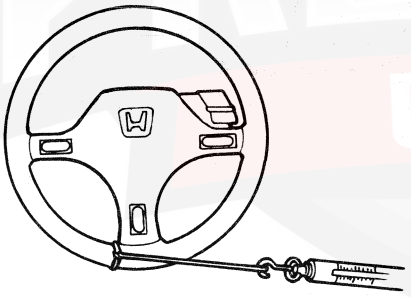
5. Start the engine and let it idle.
   - If the reading is now 18 N (1.8 kg, 4 lbs) or less, replace the speed sensor, see page 19-6.
   - If the reading is still more than 18 N (1.8 kg, 4 lbs) check the gearbox and pump.

Assist Check, Simulated 50 km/h (30 mph)

1. Check the power steering fluid level and pump belt tension.
2. Start the engine, let it warm up to normal temperature, and turn the steering wheel lock-to-lock a few times to warm up the fluid.
3. Stop the engine. To simulate speeds above 50 km/h (30 mph), disconnect the hoses from the speed sensor and connect them to the Bypass Tube Joint.



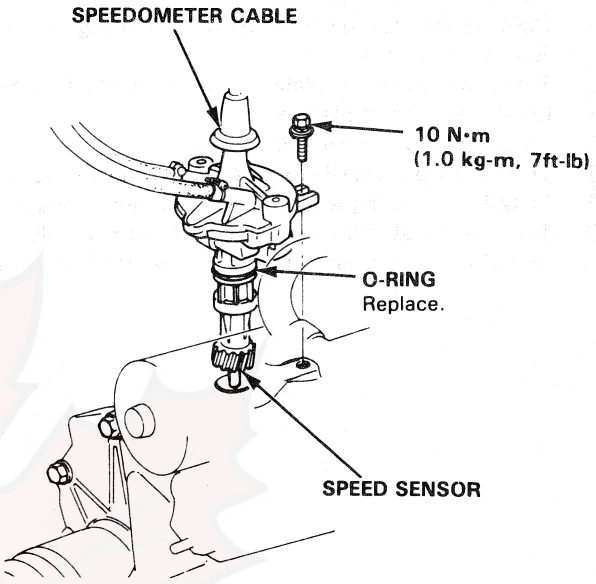
4. Attach the spring scale to the steering wheel. With the engine idling and the car on a clean, dry floor, pull the scale as shown; read it as soon as the tires begin to turn.



- If the scale reads a normal 50 N (5.0 kg, 11 lbs), or more, the assist at high speeds is being caused by reduced speed sensor output. Replace the sensor.
- If the scale reads less than 50 N (5.0 kg, 11 lbs), the sensor is OK, and the problem is in the sensor feed line, the pump, or the control unit. See if the feed line is pinched or bent then check pump.

Speed Sensor Replacement

1. Remove the speed sensor mounting bolt and pull the speed sensor from the transmission housing.



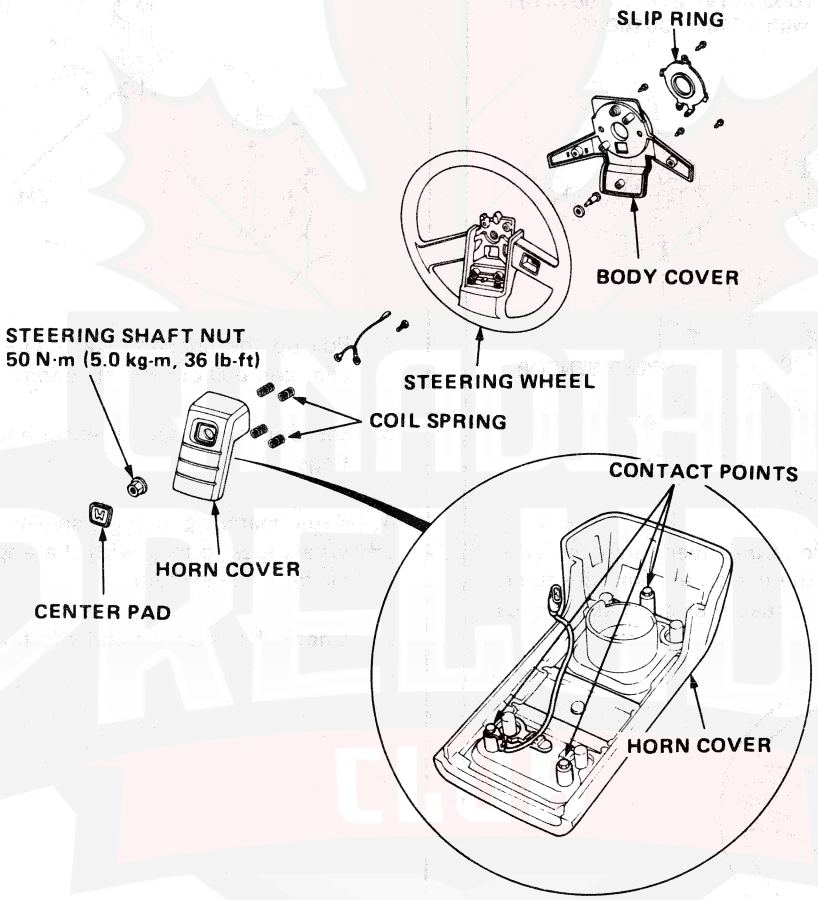
2. Pull up the speedometer cable boot, remove the clip, and pull out the speedometer cable.
3. Disconnect the speed sensor hoses and plug the fittings.
4. After installing a new sensor, turn the steering wheel lock-to-lock with the engine idling to bleed air from the system.
5. Check the reservoir and add fluid if necessary.

Steering Wheel

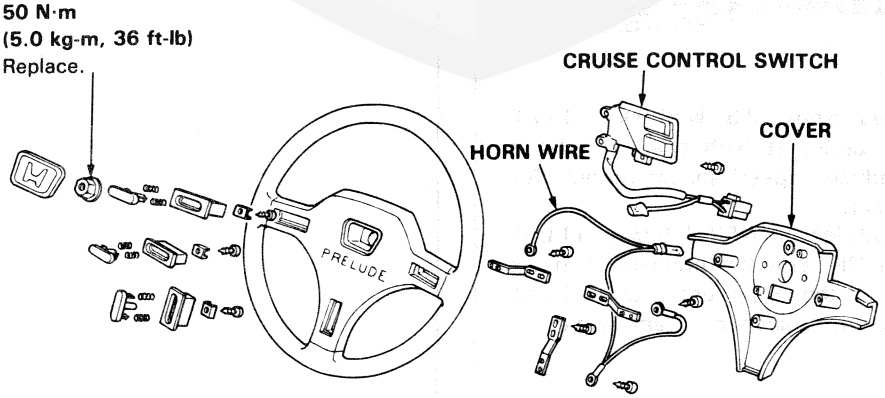
Overhaul

Carbureted Model

1. Remove the center pad.
2. Remove the steering shaft nut.
3. Remove the steering wheel by rocking it slightly side-to-side as you pull steadily with both hands.
4. Remove the horn cover.
5. Remove the contact plate. Check the contact points and repair if necessary.
6. Clean the contact plate points.
7. Install the horn cover and body cover.
8. Turn the front wheels to a straight ahead position.
9. Install the steering wheel in a straight ahead position.
10. Tighten the steering wheel mount nut securely.
11. Install the center pad, then check that the horn works.



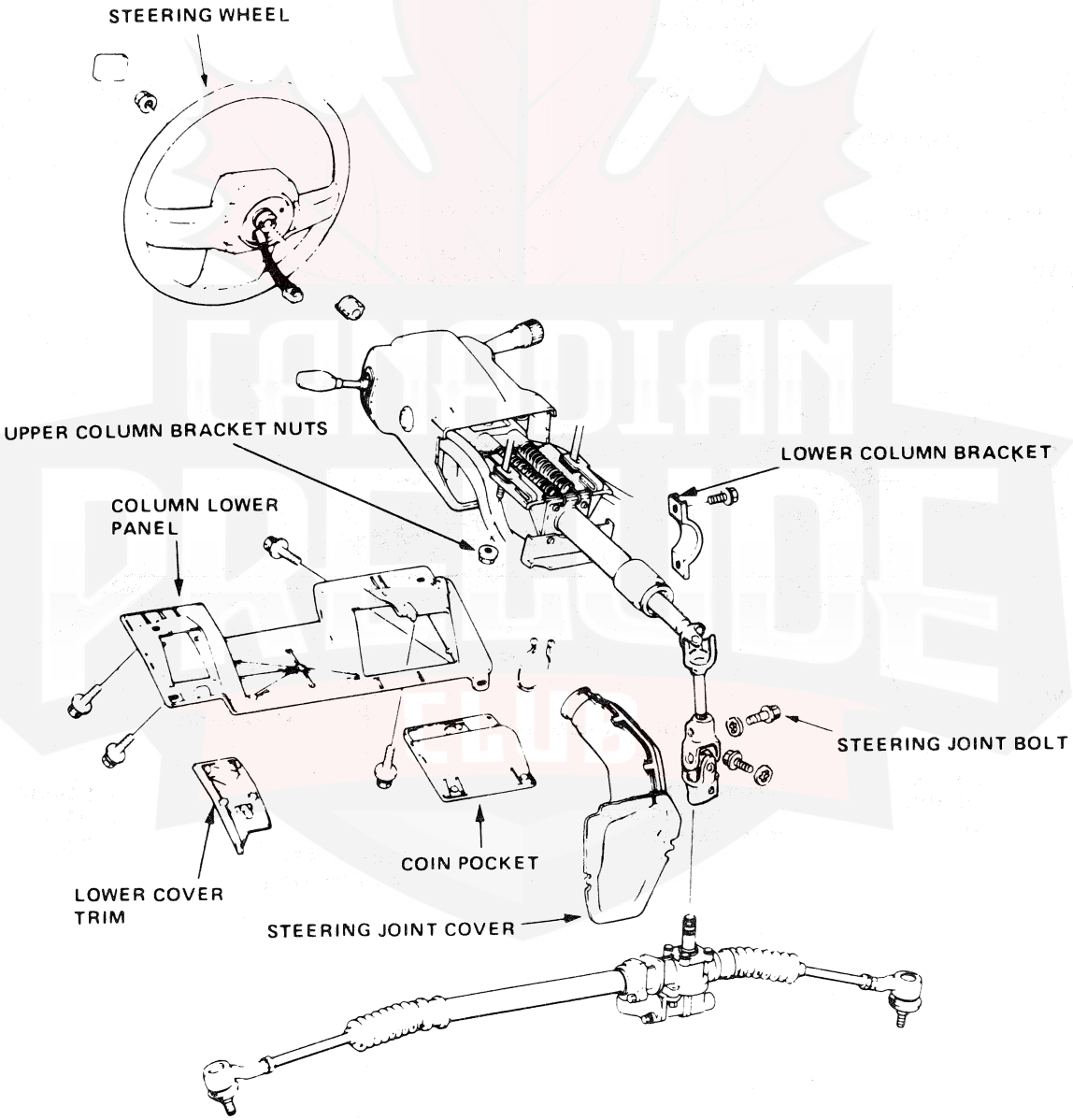
Fuel Injected Model



Column

Removal

1. Remove the steering wheel (page 19-12).
2. Remove the coin pocket and lower cover trim.
3. Remove the column lower panel. Disconnect the combination, wiper, ignition and door chime wire couplers.
4. Remove the steering joint cover.
5. Remove the steering joint bolts.
6. Remove the lower column bracket.
7. Remove the upper column bracket nuts.
8. Disconnect the steering joint from the gearbox, remove the steering stem.



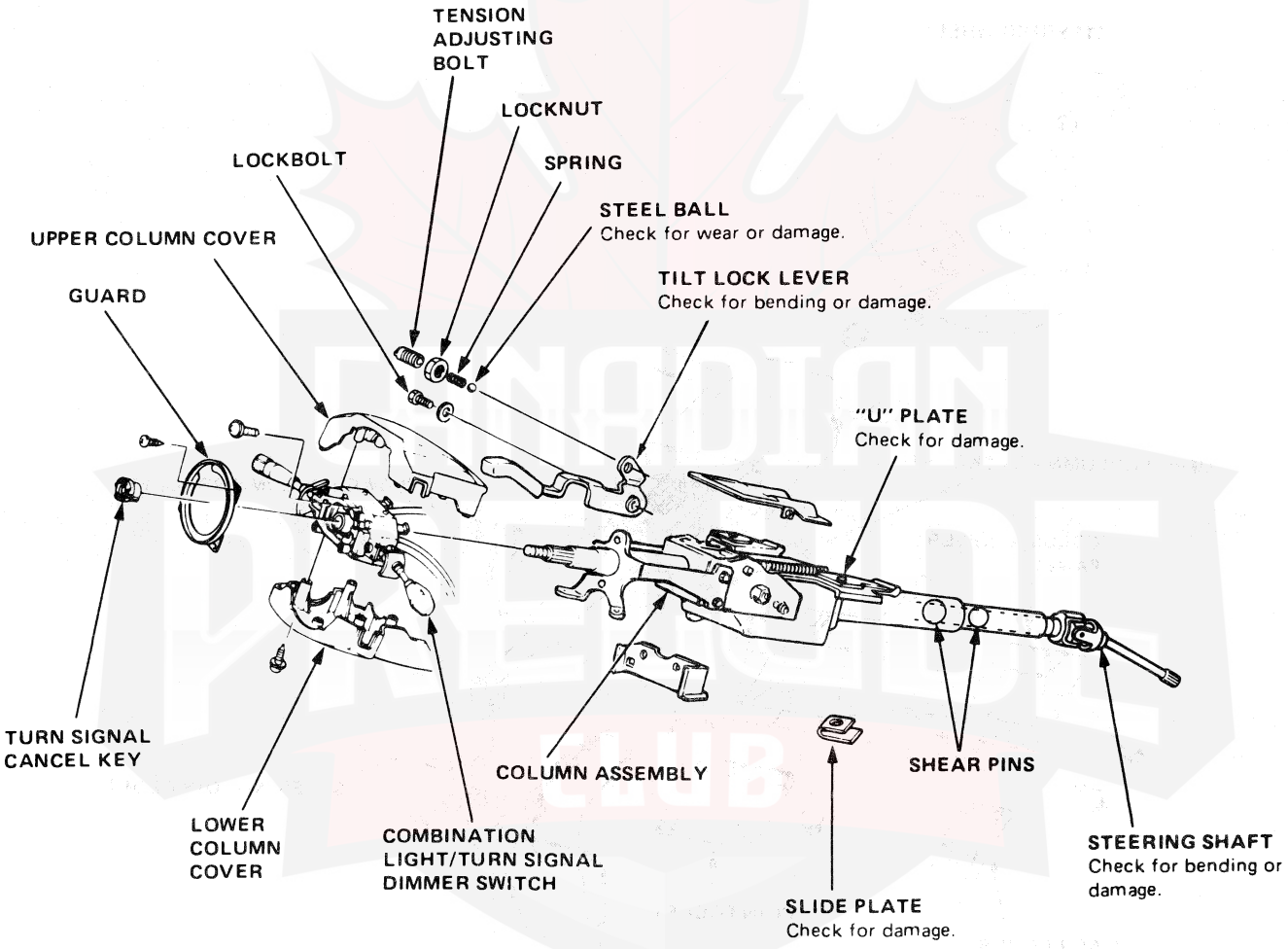
Column

Disassembly/Inspection

CAUTION : Do not drop the steering shaft; the impact may break the shear pins.

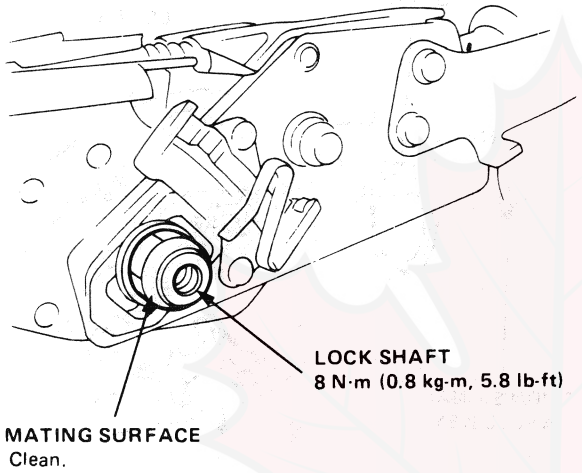
1. Remove the upper and lower column covers.
2. Remove the turn signal cancelling sleeve.
3. Remove the screws securing the slip ring guard then remove the guard.
4. Remove the screws holding turn signal switch, then remove the switch.
5. Remove the sliding plates.
6. Remove the lock lever bolt and washer, then remove the lock lever, steel ball and spring.

CAUTION : Don't disassemble the tilt mechanism and steering shaft from the column assembly.

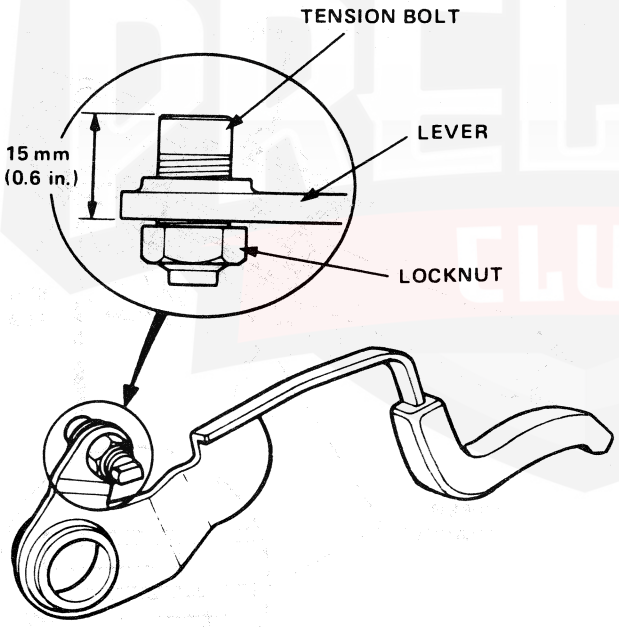


Reassembly

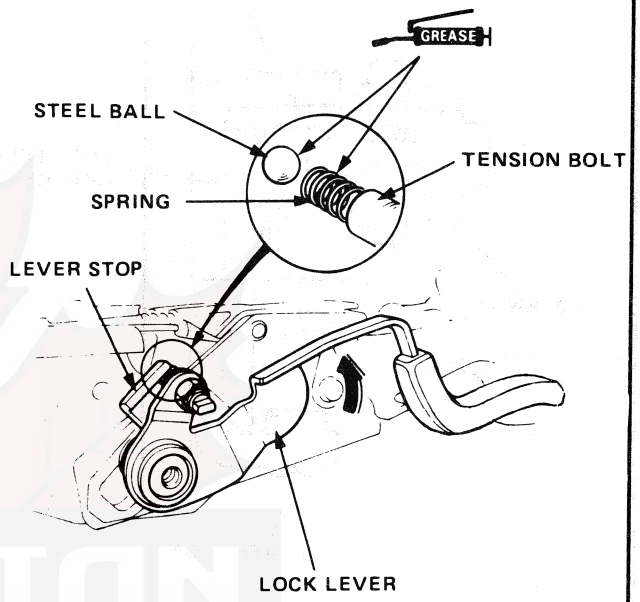
1. Tighten the tilt lock shaft to 8 N·m (0,8 kg-m, 5.8 lb-ft).
2. Clean the mating surfaces of the lock shaft and lock lever.



3. Screw in the tension adjusting bolt until its end is about 15 mm (0.6 in.) from the edge of the lock lever.

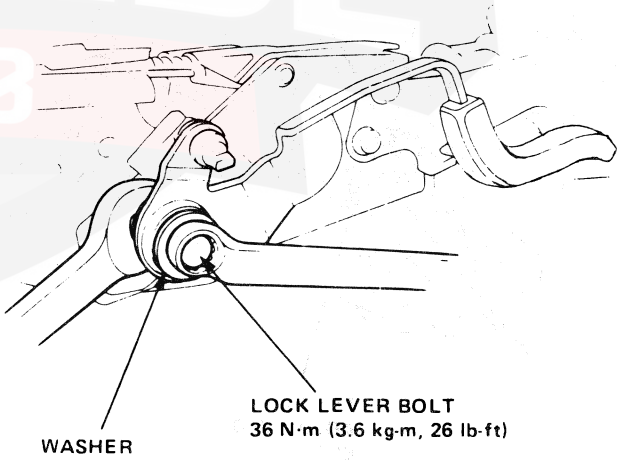


4. Loosely install the locknut onto the adjusting bolt.
5. Apply grease to the spring and steel ball and insert them into the tension adjusting bolt.
6. Slip the lock lever onto the lock shaft, then turn it counterclockwise until it contacts the lever stop.



7. Install the lock lever bolt and washer.
8. Hold the lock shaft and tighten the lock lever bolt.

TORQUE: 36 N·m (3.6 kg-m, 26 lb-ft)

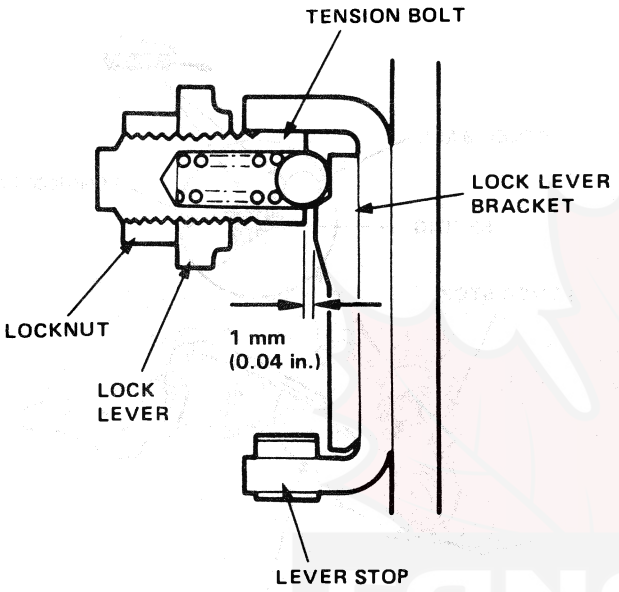


(cont'd)

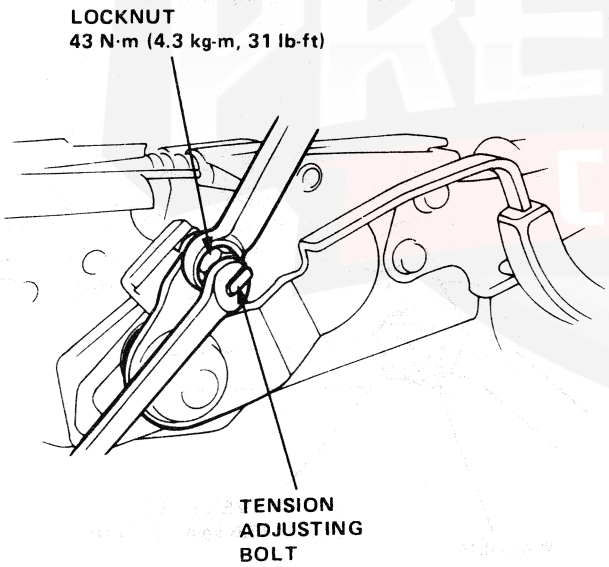
Reassembly (cont'd)

9. Adjust the clearance between the tension bolt and the lock lever bracket.

   Clearance: 1 mm (0.04 in.)



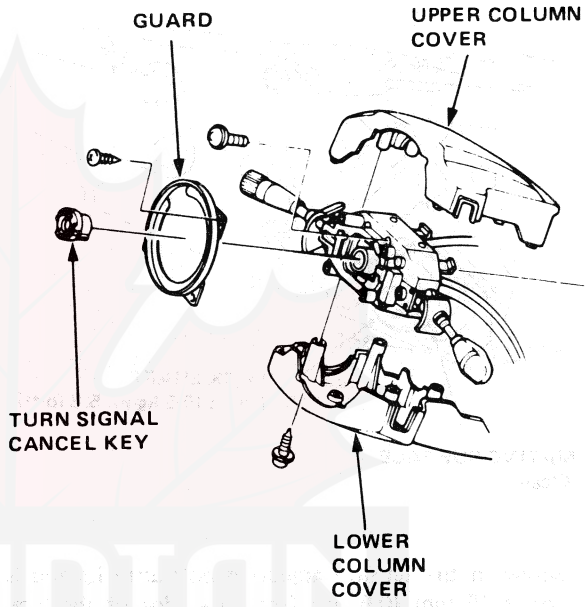
10. Tighten the locknut to 43 N·m (4.3 kg-m, 31 lb-ft) while holding the tension adjusting bolt.



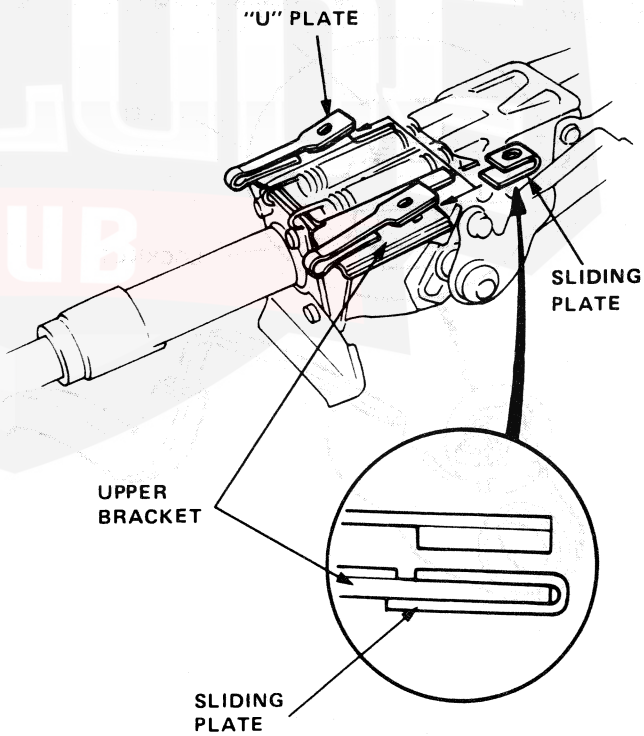
11. Apply grease to the steel ball sliding surface on the lock lever bracket.

12. Install the turn signal switch (4 screws) and turn signal cancelling sleeve.

13. Install the slip ring guard (2 screws) and steering column upper and lower covers (6 screws).

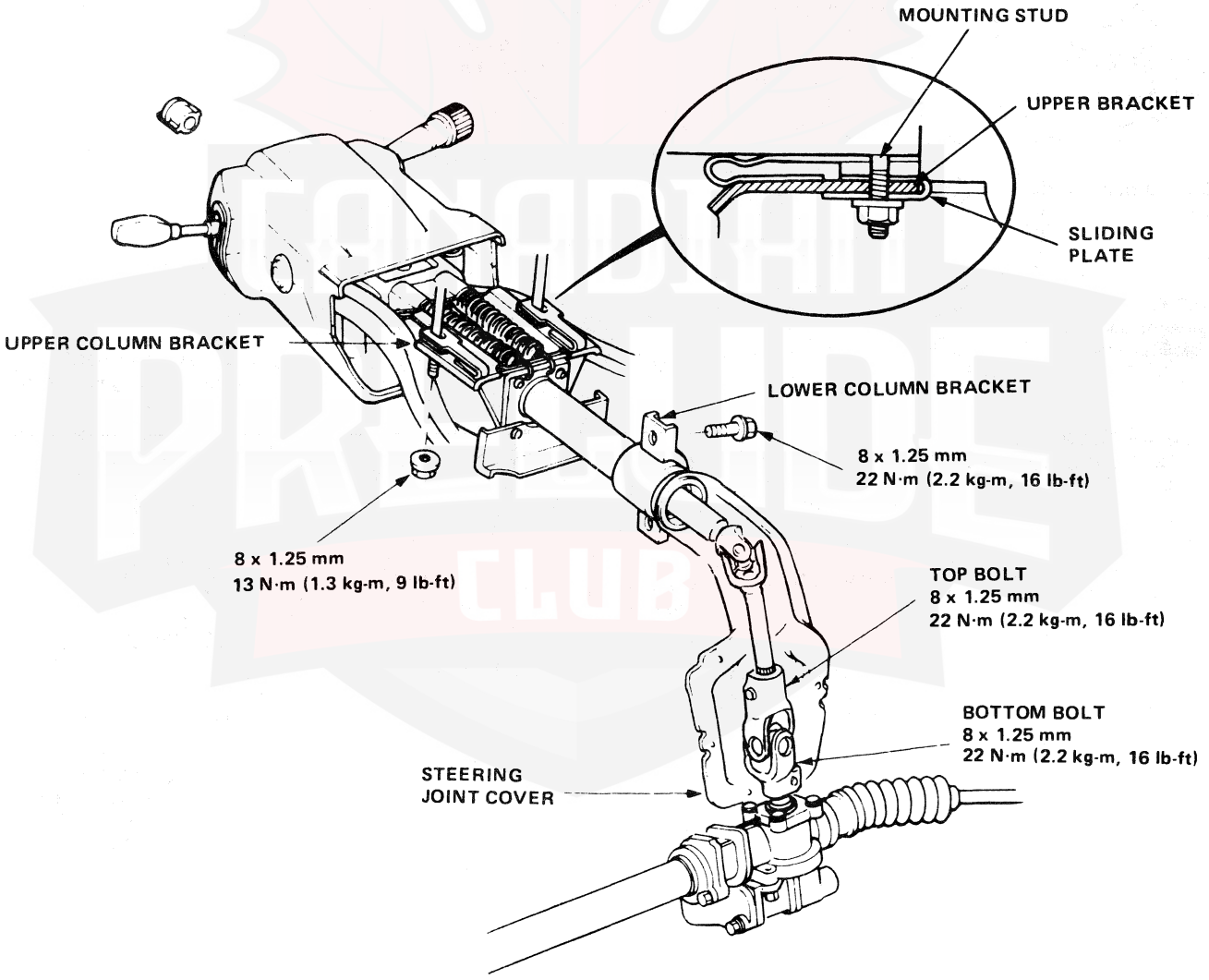


14. Install the sliding plates onto the upper column bracket with the longer tab facing down.



Installation

1. Slip the upper (longer) end of the joint onto the bottom end of the steering shaft, so its bolt hole lines up with the flat part of the shaft.
2. Slip the lower end of the joint onto the pinion shaft (line up its bolt hole with the groove around the shaft), install the bottom bolt.
3. Make sure that the sliding plates are in place, then hold the column in position while you loosely attach its upper bracket to the mounting studs.
4. Loosely install the lower bracket.
5. Pull up the column to be sure the mounting hole ends of the upper mount are seated against the mounting studs, then torque the upper mount nuts to 13 N·m (1.3 kg-m, 9 lb-ft).
6. Torque the lower bracket bolts to 22 N·m (2.2 kg-m, 16 lb-ft).
7. Reconnect the wire harness connectors.
8. Pull down on the column joint, then tighten top joint bolt and bottom bolt to 23 N·m (2.3 kg-m, 16 lb-ft).
9. Install the steering joint cover.
10. Install the column lower panel, lower cover trim and the coin pocket.
11. Install the steering wheel.



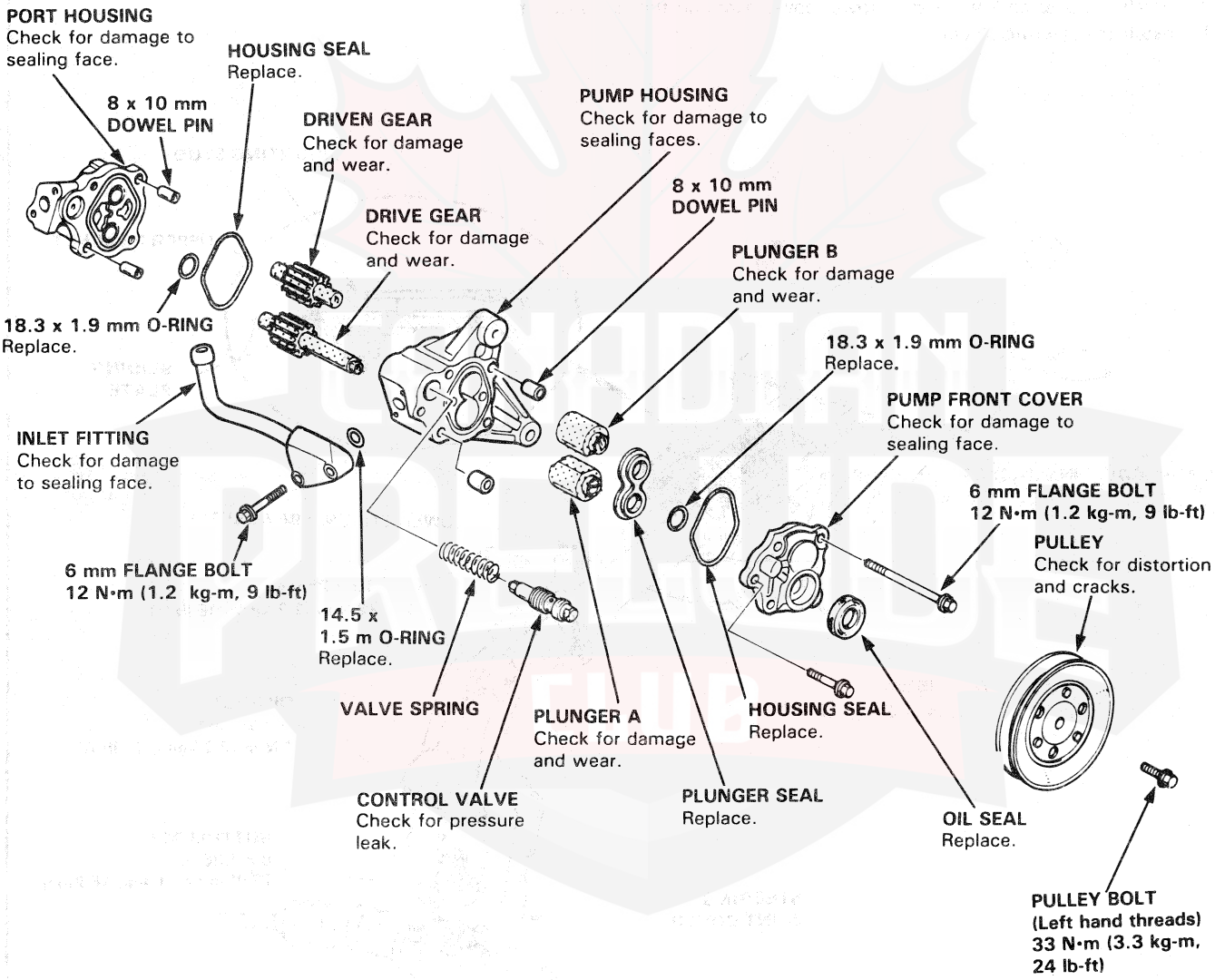
Pump

Inspection

GREASE Use only STEERING GREASE ..... (Honda part number 08740-99969) on seals and O-rings.

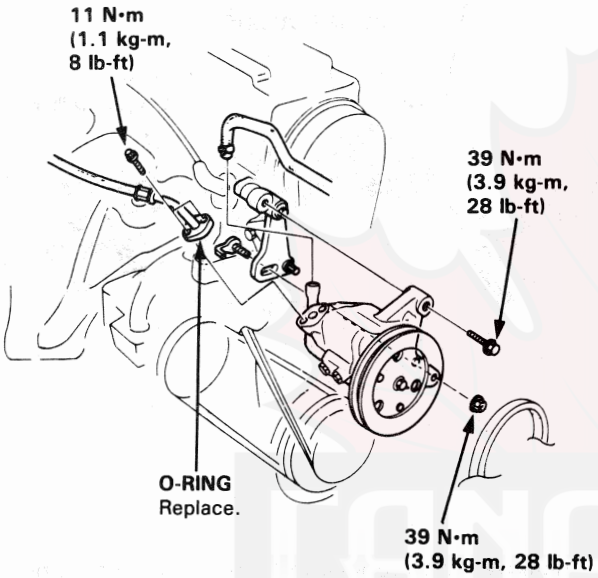
CAUTION: Pump components are made of aluminum. Be careful not to damage them when servicing.

- Clean all the disassembled parts thoroughly.
- Replace all O-rings and seals. Do not dip new O-rings and seals in solvent; coat O-rings with steering grease before installation, and make sure they stay in place during reassembly.
- The shaded parts are selectively fitted, and should not be disassembled except to replace seals. If any one of them is faulty, replace the whole pump as an assembly.



Removal/Installation

1. Drain the fluid from the system (page 19-9).
2. Disconnect the inlet and outlet hoses from the pump and plug them.
3. Remove the belt by loosening the pump pivot bolt and adjusting nut, then remove the pump.

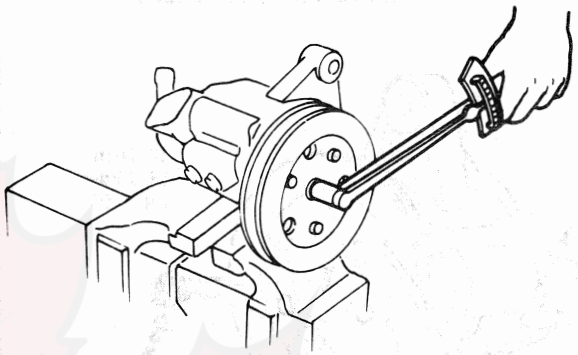


4. Loosely install the new pump on the bracket.
5. Connect the inlet and outlet hoses to the pump.
6. Adjust the belt tension (page 19-8).
7. Fill the reservoir with new fluid to the UPPER level on the reservoir.
8. Start the engine and let it run at fast idle while turning the steering wheel lock-to-lock several times to bleed air from the system.
9. Check the reservoir and add fluid if necessary.

Preload Inspection

Check the pump preload with a torque wrench.

Preload: 4 N·m (0.4 kg-m, 3 lb-ft)

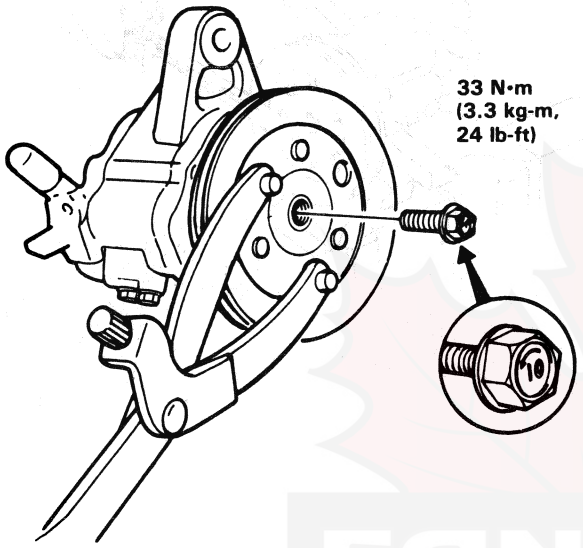


Pump

Pulley Replacement

1. Hold the pulley with universal holder, and remove the pulley bolt, then remove the pulley.

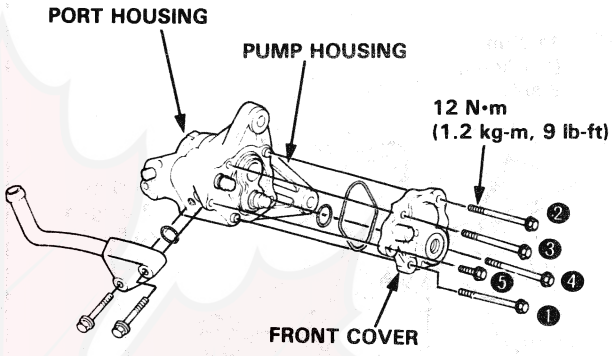
   NOTE: Pulley bolt has left hand threads.



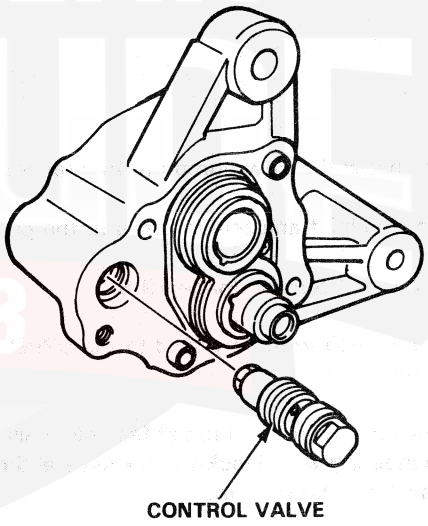
UNIVERSAL HOLDER
07725—0030000 or
07725—0010101

Control Valve Inspection and Replacement

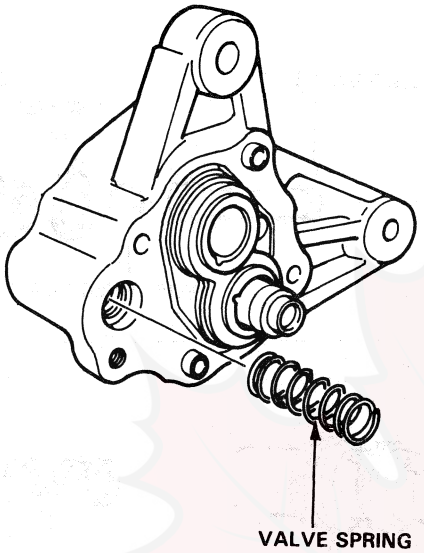
1. Remove the five 6 mm bolts in the order shown, then separate the pump front cover, pump housing and port housing.



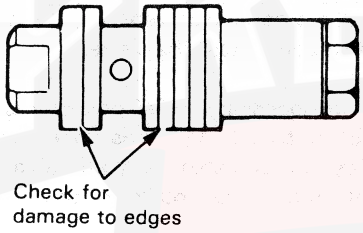
2. Remove the control valve from the pump housing.



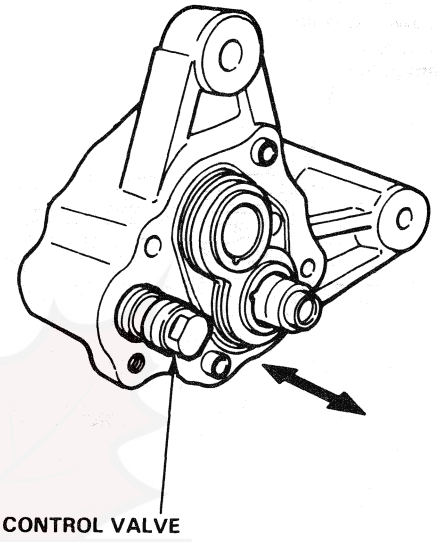
3. Remove the valve spring from the pump housing.



4. Check for wear, burrs, and other damage to the edges of the grooves in the valve.

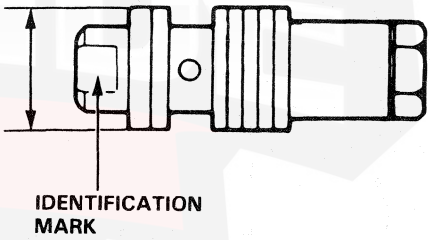


5. Slip the valve back in the pump and check that it moves up and down smoothly.



If OK, go on to step 6, if not, replace the valve:

- The original valve was selected for a precise fit in the pump housing bore, so make sure the new one has the same identification mark.

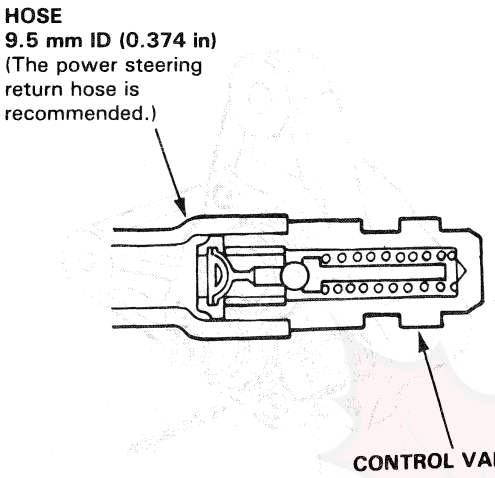


Mark	Part Number	Part Name	Size mm (in)
A	56350–PC1–010	CONTROL VALVE A	15.995–16.000 (0.6297–0.6299)
Without mark	56360–PC1–010	CONTROL VALVE B	16.000–16.006 (0.6299–0.6302)

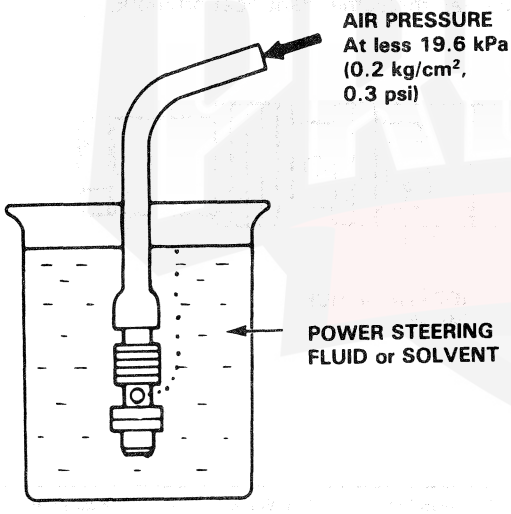
(cont'd)

Control Valve Inspection and Replacement (cont'd)

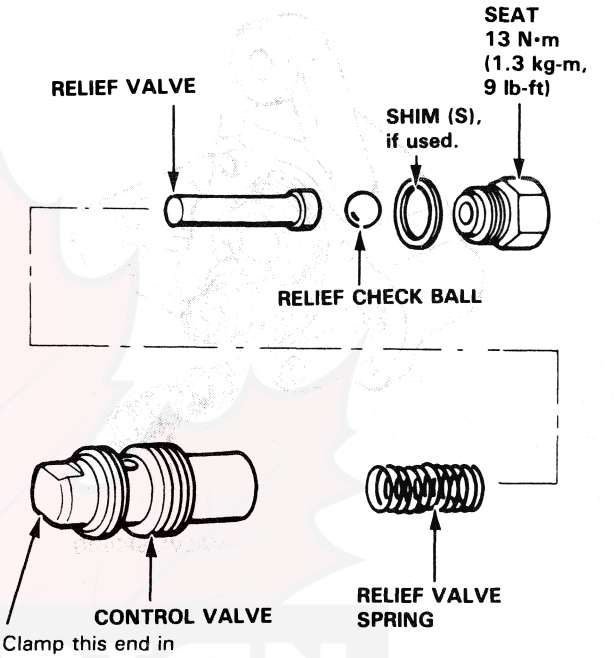
6. Attach a hose to the end of the valve as shown.



7. Then submerge the valve in a container of power steering fluid or solvent, and blow on the hose. If air bubbles leak through the valve, replace it or repair it as follows.



8. If the valve leaks, clamp the bottom end of it in a vise with soft jaws.



9. Unscrew the seat in the top end of the valve, and remove any shims, the relief check ball, relief valve and relief valve spring.

10. Clean all the parts in solvent, dry them off, then re-assemble and re-test the valve.

    NOTE: If necessary, relief pressure is adjusted at the factory by adding shims under the check ball seat. If you found shims in your valve, be sure you reinstall as many as you took out.

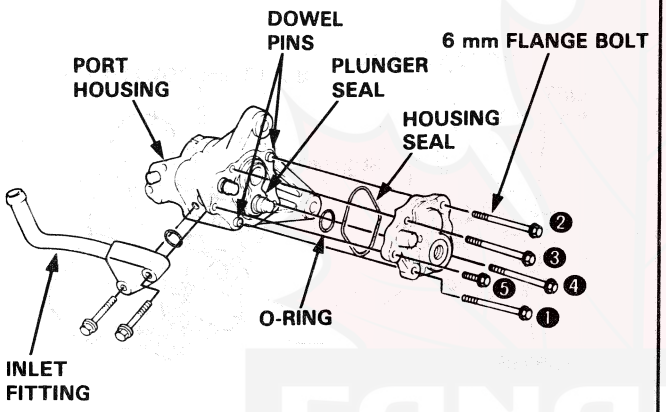
11. Install the control valve in the reverse order of removal.

    - Apply steering grease (Honda P/N 08740—99969) to new O-rings.
    - Coat the control valve with power steering fluid then install the relief spring and control valve.

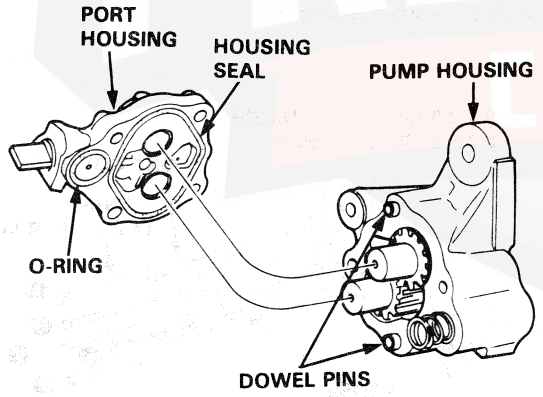
Resealing

CAUTION: The pump components are made of aluminum, be carefull not to damage them when servicing.

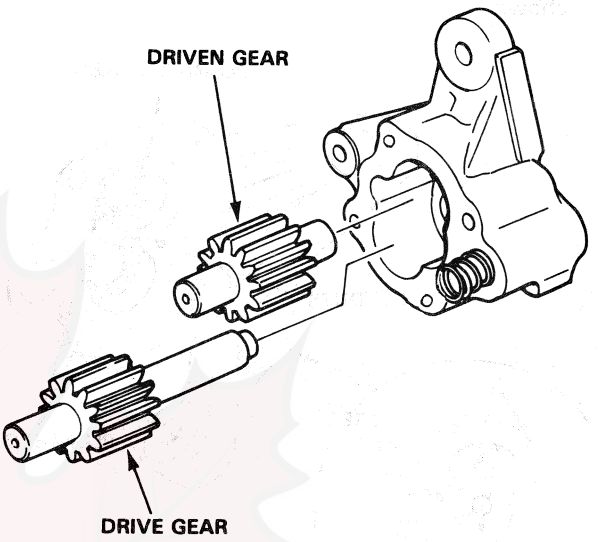
1. Remove the pump from car (page 19-19), and remove the pulley and pump front cover (page 19-20).
2. Remove the housing seal from the pump housing.
3. Remove the inlet fitting.



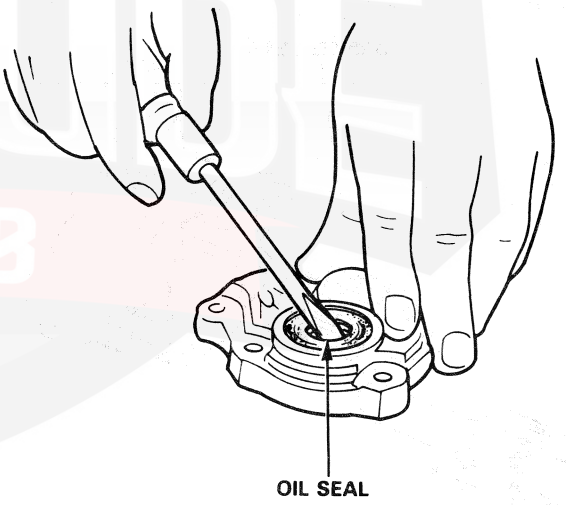
4. Remove the dowel pins, plunger seal and O-ring from the pump housing.
5. Separate the port housing from the pump housing.



6. Remove the dowel pins from the pump housing, and remove the housing seal and O-ring from the port housing.
7. Remove the pump drive and driven gears from the pump housing.



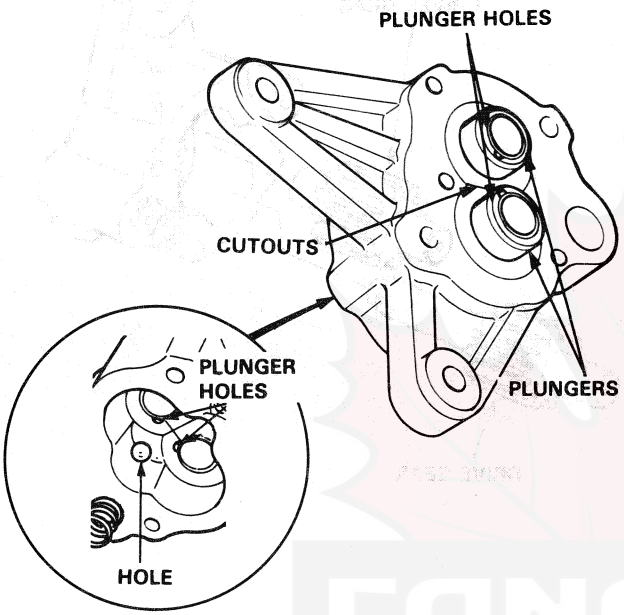
8. Remove the plungers from the pump housing.
9. Pry the seal out of the pump front cover.



(cont'd)

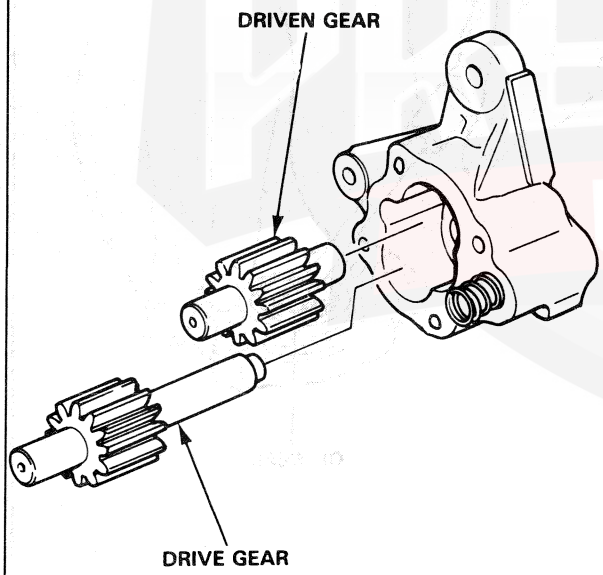
Reassembling (cont'd)

10. Coat the outer surface of the plungers with power steering fluid, then install them in the pump housing. Make sure the plunger holes are positioned as shown.



11. Coat the inside of the plungers with power steering fluid.

12. Install the pump drive and driven gears in the pump housing.

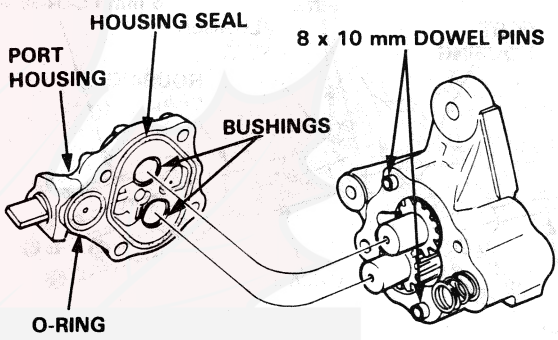


13. Coat the bushings on the port housing with power steering fluid.

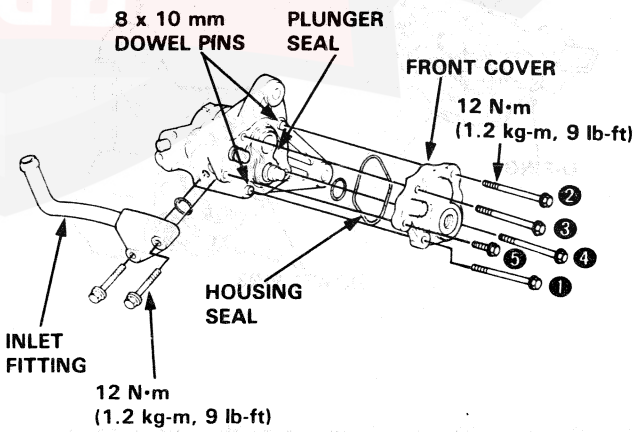
14. Install the two dowel pins in the pump housing, then install the housing seal and 18.3 x 1.9 mm O-ring in the port housing.

    NOTE: Coat the new housing seal and O-ring with grease.

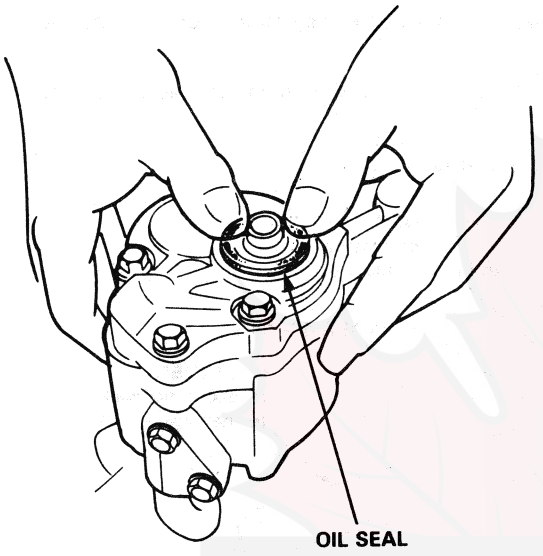
15. Install the port housing on the pump housing.



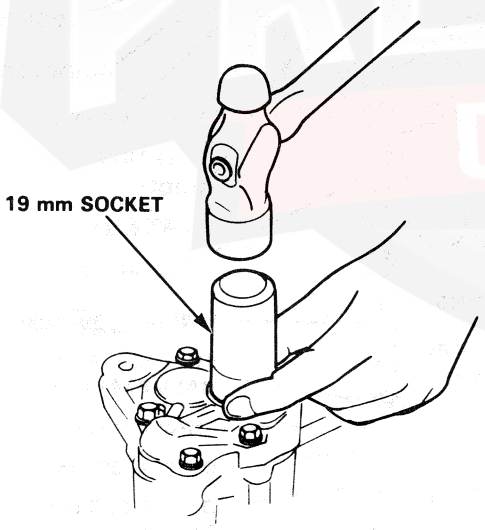
16. Grease the new plunger seal and install it over the plungers.
17. Install the dowel pins.
18. Fill the groove of the pump housing with grease and install the new housing seal in the pump housing.
19. Grease the new O-ring and install it in the pump housing.
20. Install the pump front cover with the five 6 mm bolts and tighten them in the order shown below.
21. Install the inlet fitting.



22. Loosely install the new oil seal in the pump front cover.



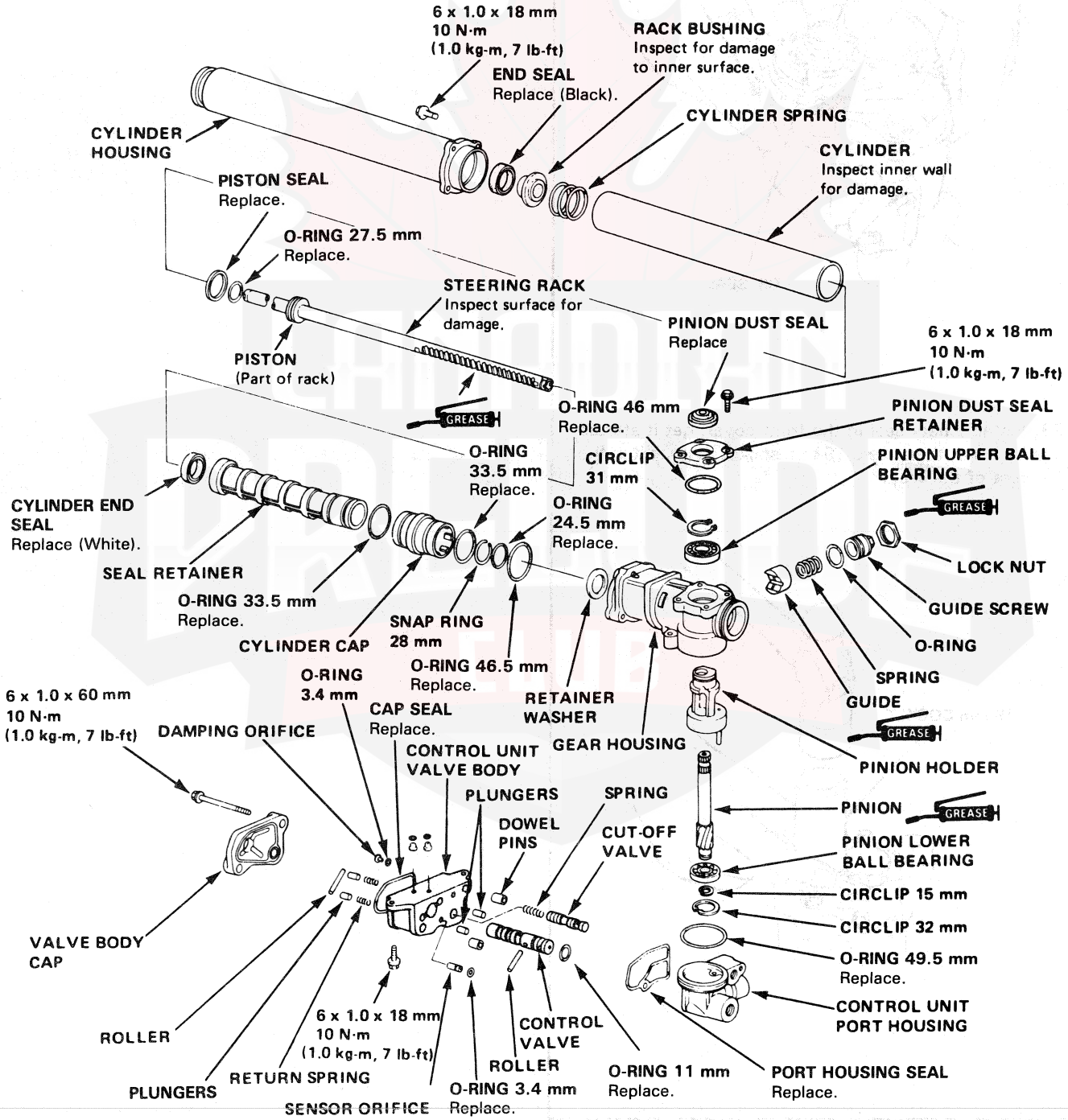
23. Install a new seal in the front cover; get it started by hand, then use a 19 mm socket to push it in the rest of the way.



Inspection

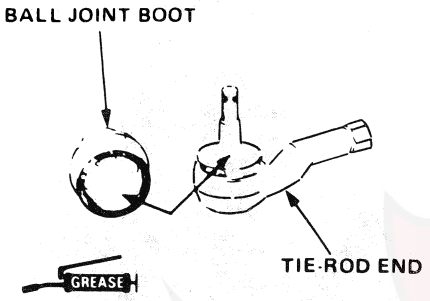
- Before disassembling the gearbox, wash it off with solvent and a brush.
- Thoroughly clean all disassembled parts.
- Always replace O-rings and seals.
- Replace parts with damaged sliding surfaces.
- Do not dip seals and O-rings in solvent; coat O-rings with grease, and make sure they stay in position during reassembly.
- The shaded parts (valve body, control valve, cut-off valve) are a matched set; if any of them are faulty, replace all of them.

GREASE • STEERING GREASE ..... Honda parts number 08740–99969

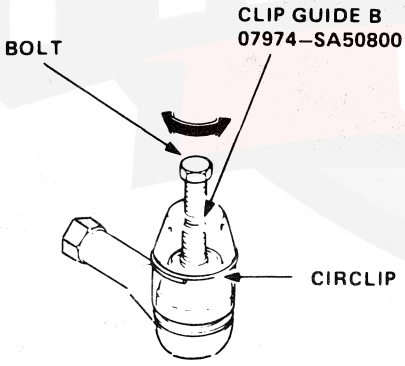


Ball Joint Boot Installation

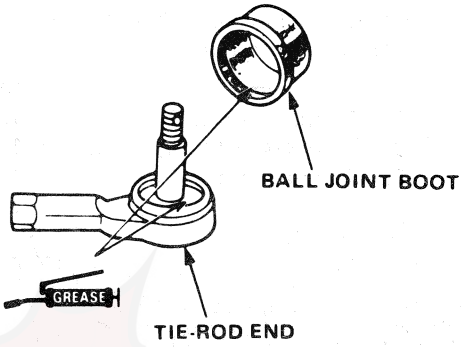
CLIP TYPE:

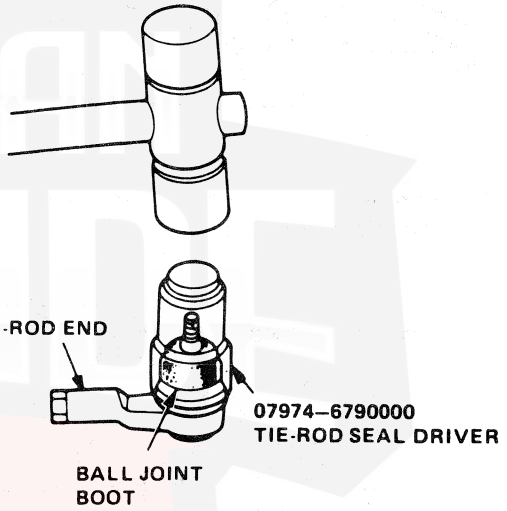


Install the circlip on the Clip Guide, adjust the boot height with the bolt, and press the clip down onto the boot.



PRESS-ON TYPE:



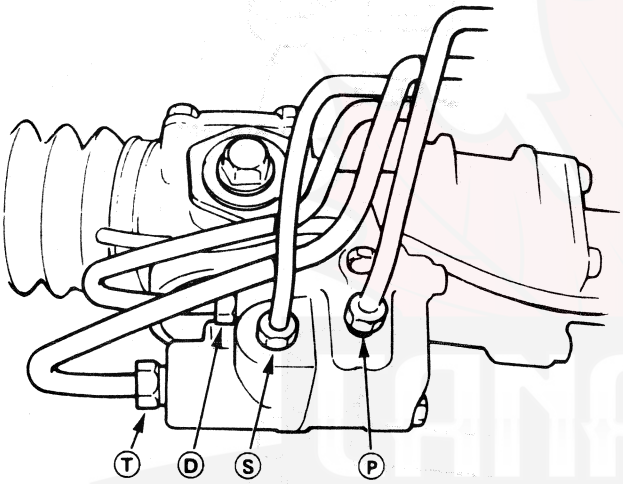


NOTE: After driving the boot onto the ball joint, apply sealant between the tie-rod end and ball joint boot.

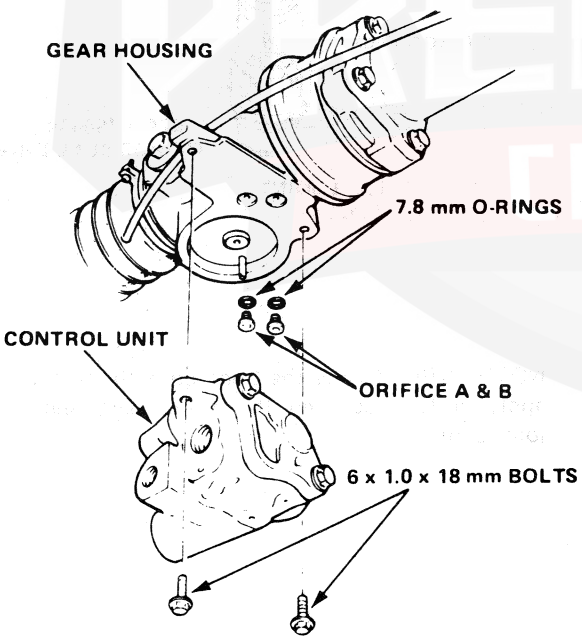
Control Unit Disassembly

1. Drain the power steering fluid (page 19-9).
2. Remove the gearbox shield.
3. 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.
4. Using flare nut wrenches, disconnect the four lines from the control unit.

P:	From pump	14 mm wrench
S:	To speed sensor	12 mm wrench
D:	To reservoir thru speed sensor	12 mm wrench
T:	To reservoir thru cooler	17 mm wrench

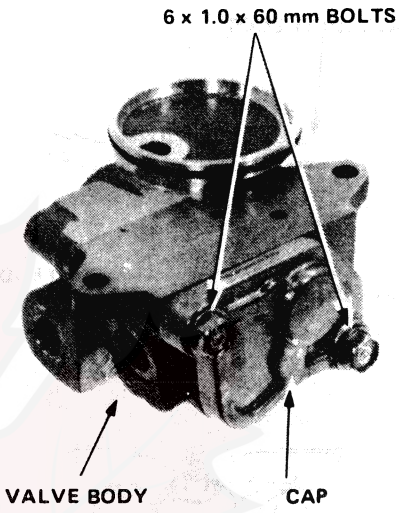


5. Remove the two 6 mm bolts holding the control unit to the gear housing.

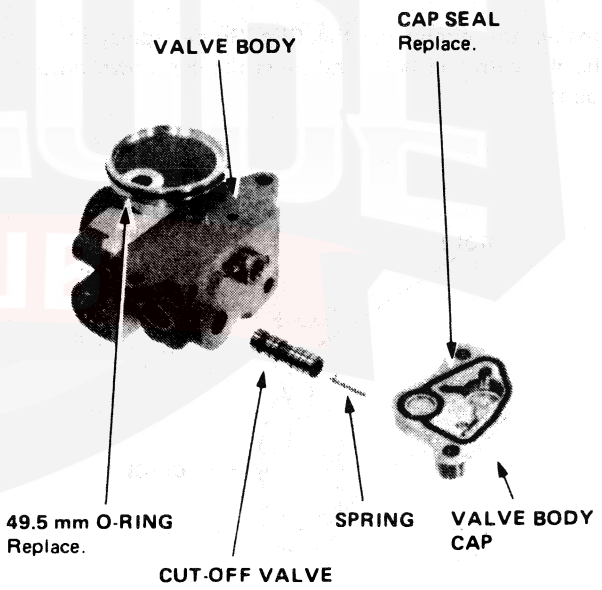


6. Remove orifice A, B and their 7.8 mm O-rings.

7. Remove the two 6 x 60 mm bolts and remove the cap from the valve body.

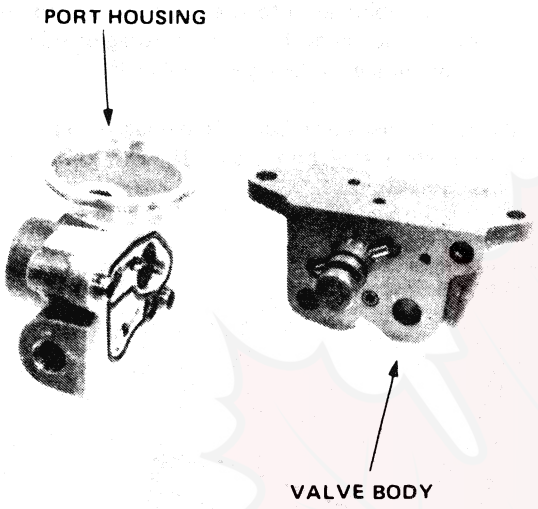


8. Remove the 49.5 mm O-ring.

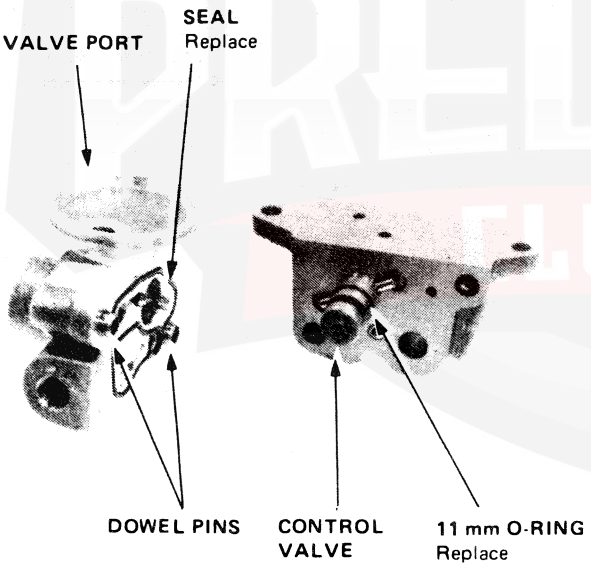


9. Remove the cap seal from the valve body cap.
10. Remove the cut-off valve and spring from the valve body.

11. Separate the valve body and port housing.



12. Remove the seal and dowel pins from the valve port housing.



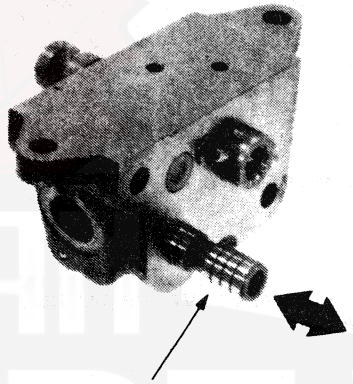
13. Remove the 11 mm O-ring from the control valve.

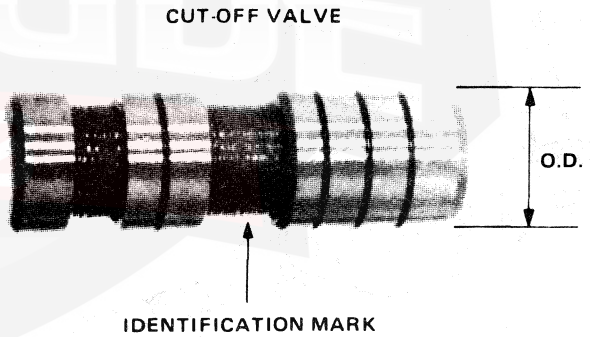
14. Check the cut-off valve:

- Inspect its surface for scoring or scratches.
- Slip it back into the valve body, and make sure it slides smoothly without drag and side play.

NOTE:

- The cut-off valve is sized to fit the valve body, so, if you replace it, make sure the new valve has the same identification mark on it.
- If the valve body is damaged, replace all three parts (valve body, cut-off valve and control valve) as a set.





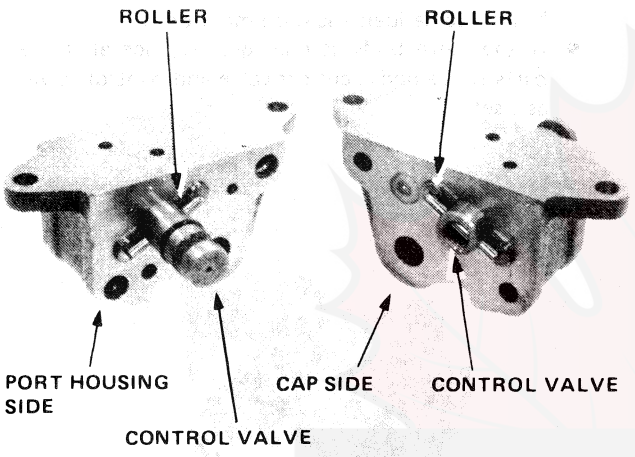
Identification mark	Outside diameter	Part number
A	10.000–10.005 mm (0.3937–0.3939 in.)	53650–SA5–9500
B	9.995–10.000 mm (0.3935–0.3937 in.)	53651–SA5–9500
C	9.990–9.995 mm (0.3933–0.3935 in.)	53652–SA5–9500

(cont'd)

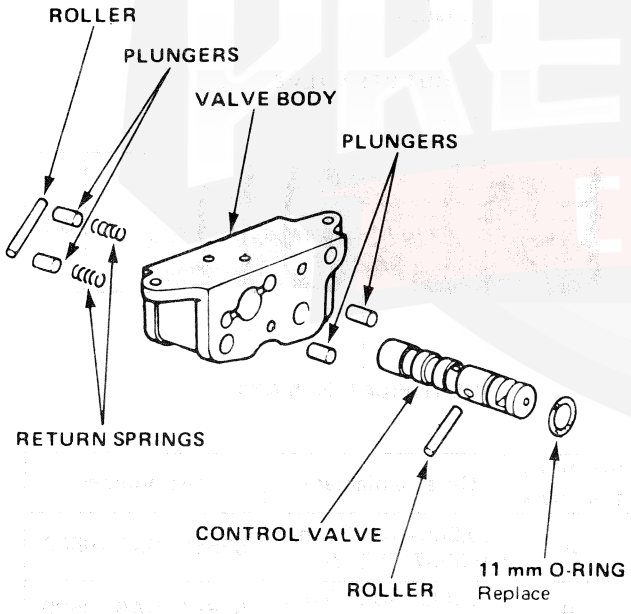
Control Unit Disassembly (cont'd)

15. Remove the rollers from the control valve by pushing the valve out one side of the valve body, and then the other.

    NOTE: When removing the rollers, hold the plungers with your fingers to keep them from popping out.



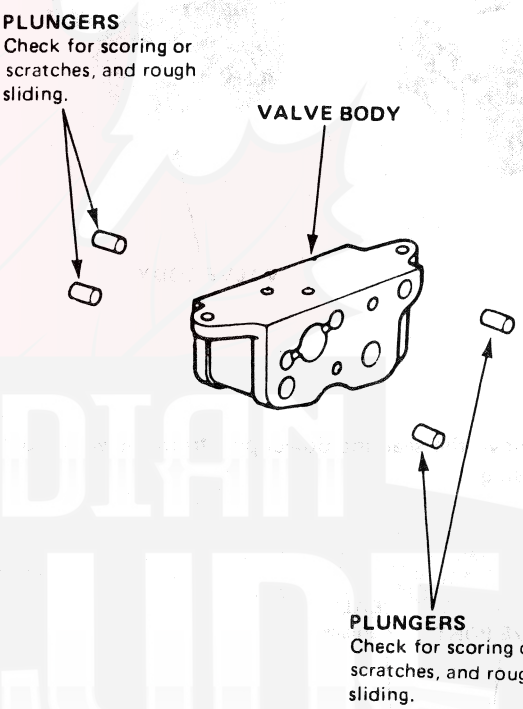
VALVE BODY, CONTROL VALVE, PLUNGERS and RELATED PARTS



16. Check the plungers.

- Inspect their surface for scoring or scratches.
- Slip each plunger into the valve body, and make sure it slides smoothly, without drag or side play. If any plunger is damaged, replace it.

NOTE: If the valve body is damaged, replace all three parts (valve body, cut-off valve and control valve) as a set.

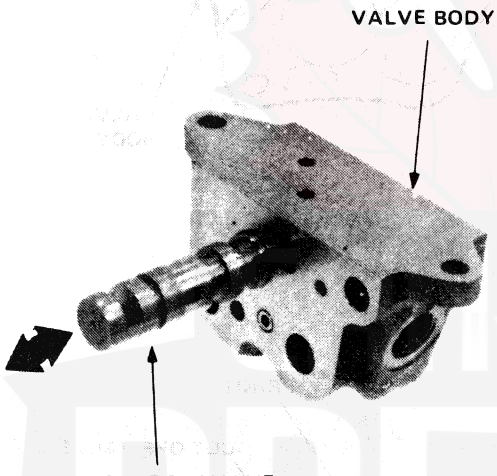


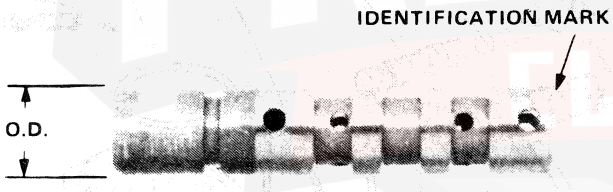
17. Check the control valve.

- Inspect its surface for scoring or scratches.
- Slip it into the valve body, and make sure it slides smoothly, without drag or side play.

NOTE:

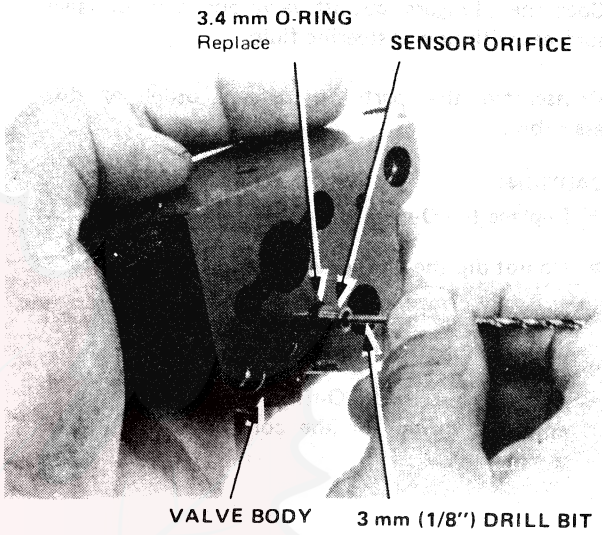
- The control valve is sized to fit the valve body, so, if you replace it, make sure the new valve has the same identification mark on it.
- If the valve body is damaged, replace all three parts (valve body, control valve and cut-off valve) as a set.





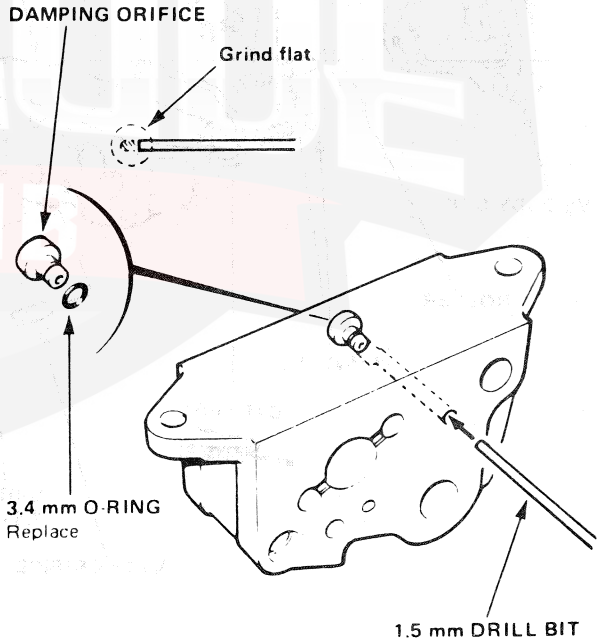
Identification mark	Outside diameter	Part number
X	13.998–14.003 mm (0.5511–0.5513 in.)	53646–SA5–9511
Y	13.993–13.998 mm (0.5509–0.5511 in.)	53647–SA5–9511
Z	13.988–13.993 mm (0.5507–0.5509 in.)	53648–SA5–9511

18. Using a 3 mm (1/8") drill bit, remove the sensor orifice and 3.4 mm O-ring.



19. Using a 1.5 mm (1/16") drill bit, push the damping orifice and 3.4 mm O-ring out of the valve body.

CAUTION : Grind the shank end of the drill bit flat before using.

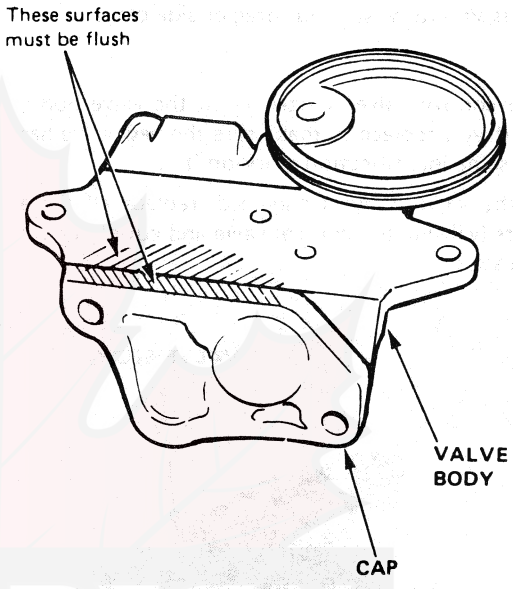


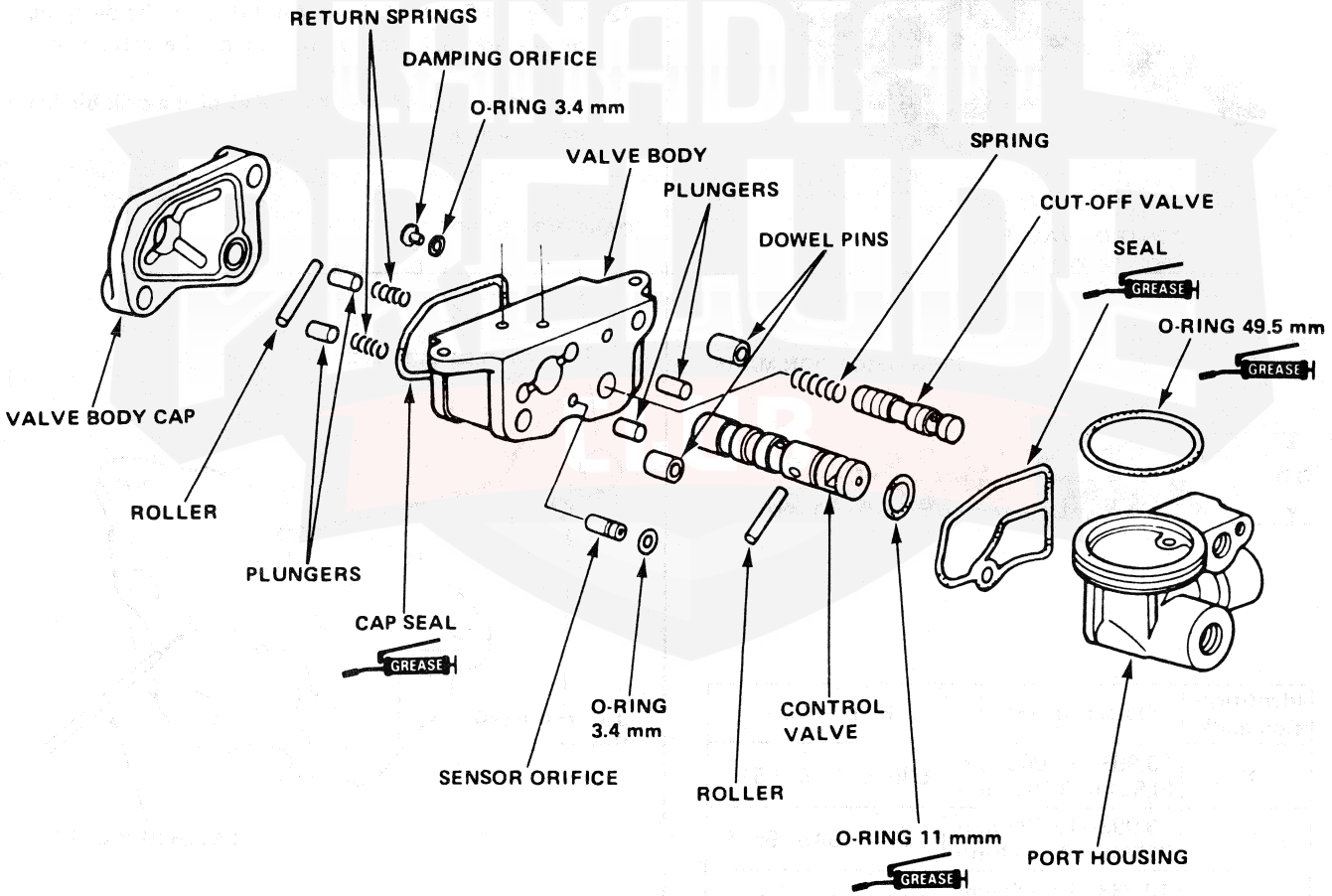
Control Unit Assembly

1. Thoroughly clean the disassembled parts shown below.
2. Coat the plungers, cut-off valve and control valve surfaces with power steering fluid.
3. Reassemble the parts in reverse order of disassembly.

CAUTION:

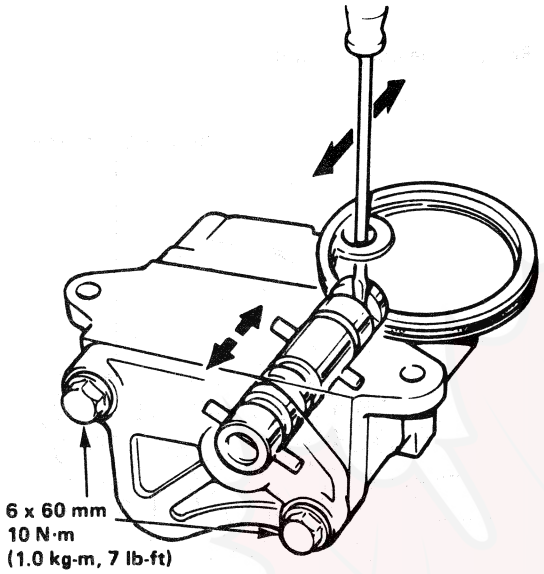
- **Replace the O-rings and seals with new ones.**
- **Do not dip the O-rings and seals in solvent.**
- **Apply grease in the cap seal and port housing seal grooves to keep the seals in place.**
- **Apply grease to the O-ring for the port housing, and the O-ring for the control valve to keep them in place.**
- **Make sure the mating surfaces of the valve body and cap are flush at the upper side.**





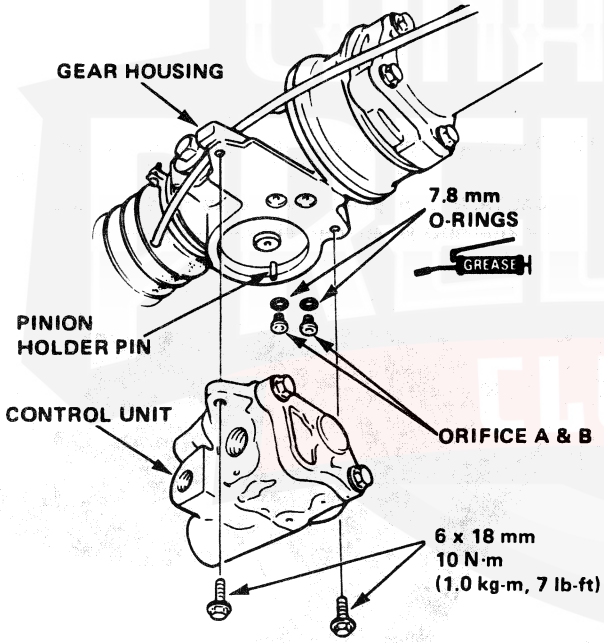
(cont'd)

4. Tighten the 6 x 60 mm bolts in the control unit.



5. Make sure the control valve moves smoothly, and returns to neutral position.

6. Coat the 7.8 mm O-rings with grease, and install them together with orifices A and B.



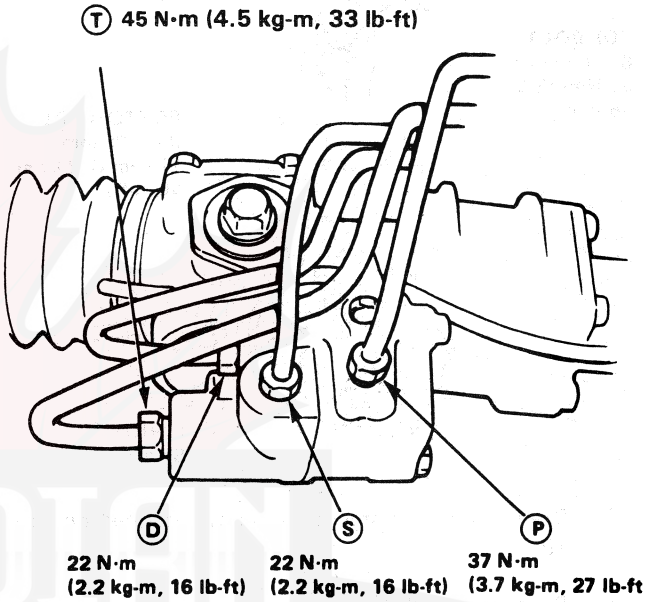
7. Install the control unit on the gear housing with the two 6 x 18 mm bolts.

CAUTION:

- **When installing, be carefull not to hit the pinion holder pin.**
- **Make sure the 49.5 mm O-ring is not pinched or missing.**

8. Connect the four lines to the control unit, using flare nut wrenches.

P:	From pump	14 mm wrench
S:	To speed sensor	12 mm
D:	To reservoir thru speed sensor	12 mm
T:	To reservoir thru cooler	17 mm



9. Fill the reservoir with power steering fluid, and bleed air from the system.

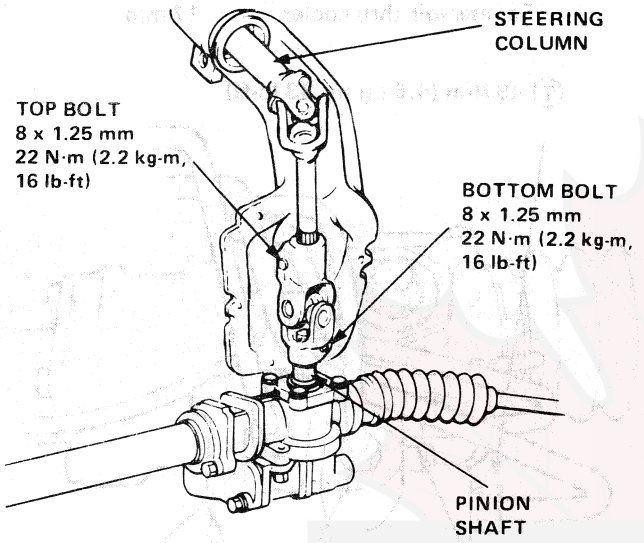
10. Make sure there are no fluid leaks, then install the shield.

11. Recheck the fluid level in the reservoir.

Removal

1. Turn the steering wheel all the away to the left.

2. Remove the boot from the base of the steering column, loosen the top and lower bolts in the steering shaft connector, and slide the connector up off the pinion shaft.



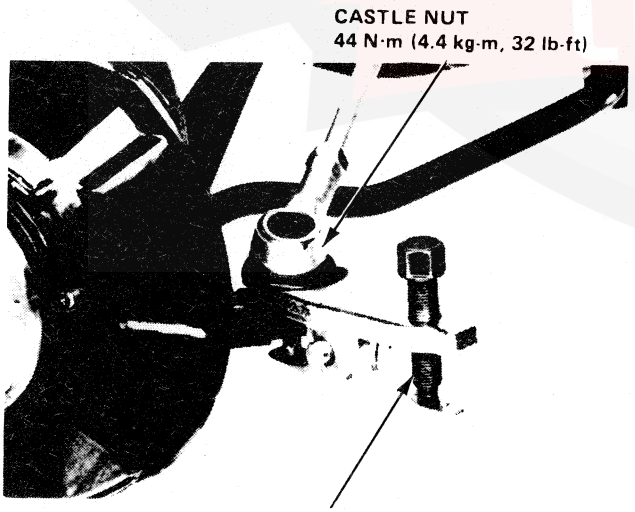
3. Drain the power steering fluid as described on page 19-9.

4. Remove the gearbox shield.

5. 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.

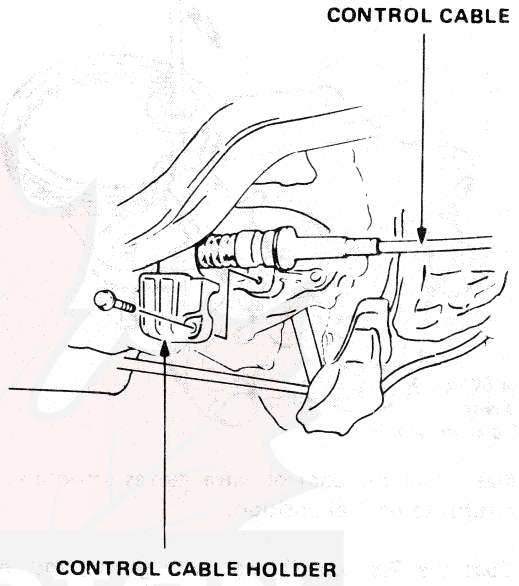
6. Remove the front wheels.

7. Disconnect the tie rods from the steering knuckles using the special tools shown.



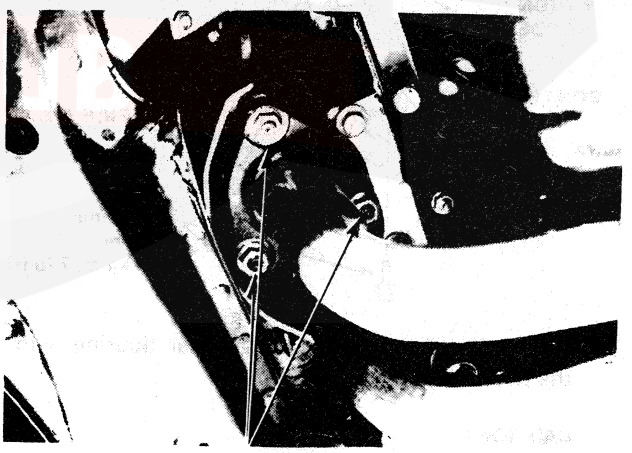
8. Remove the center beam.

9. Remove the control cable holder.



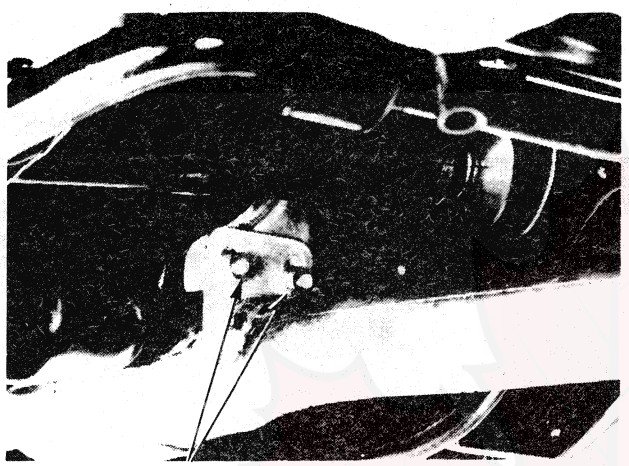
10. Disconnect the exhaust header pipe at the manifold.

CAUTION : Replace the exhaust gasket and self-locking nuts when you reinstall the pipe.



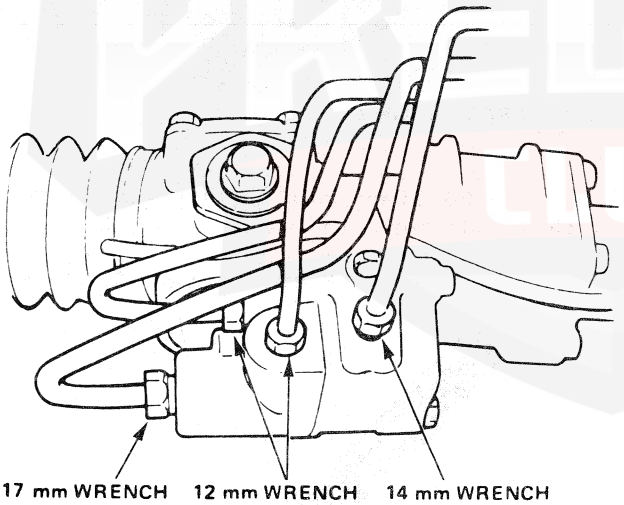
(cont'd)

11. Remove the exhaust header pipe joint nuts.

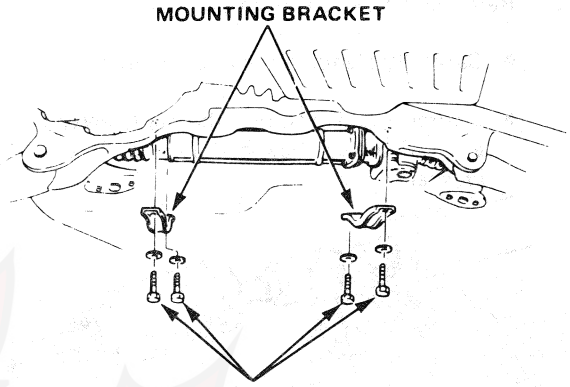


JOINT NUTS
22 N·m (2.2 kg-m, 16 lb-ft)

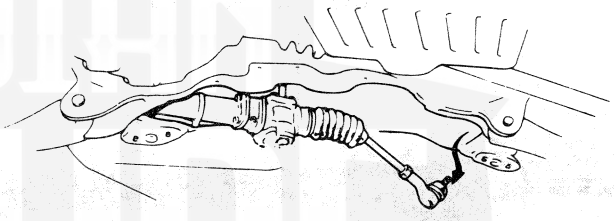
12. Using the size flare nut wrenches shown, disconnect the fluid lines from the control unit.



13. Remove the steering gearbox mounting brackets.



14. Pull the gearbox down (so the end of the pinion shaft clevis clears the frame), then move it all the way to the right (so the left tie rod drops free), and lower it out of the car to the left.

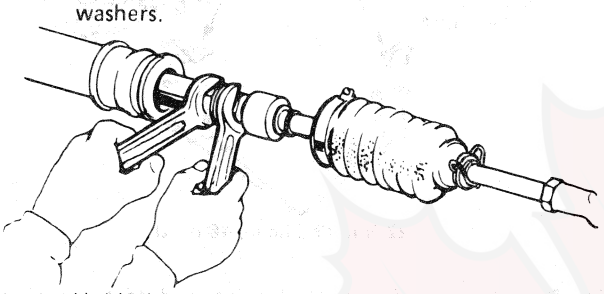


Resealing

1. Remove the control unit as described on page (19-28).

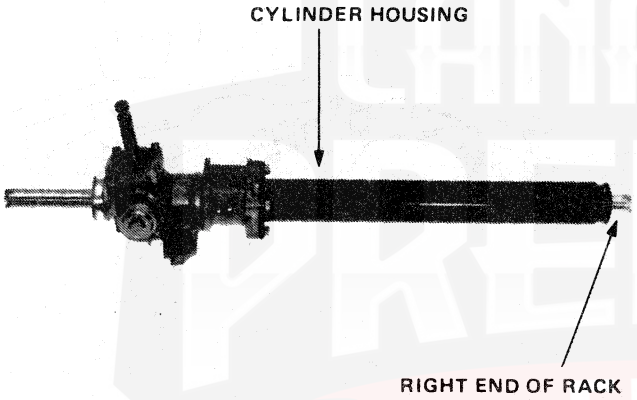
2. Remove the tie rods from the rack:

   - Carefully clamp the gearbox in a vise.
   - Loosen the bands, pull the boots away from the ends of the gearbox, and unbend the tie-rod lock washers.

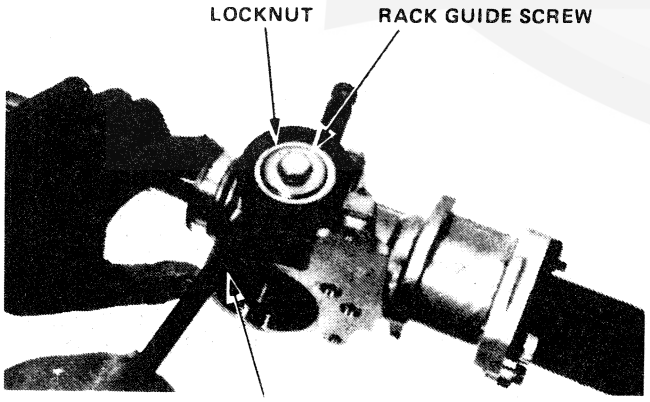


   - Hold the rack with a 19 mm wrench, and unscrew the tie-rods with another 19 mm wrench.

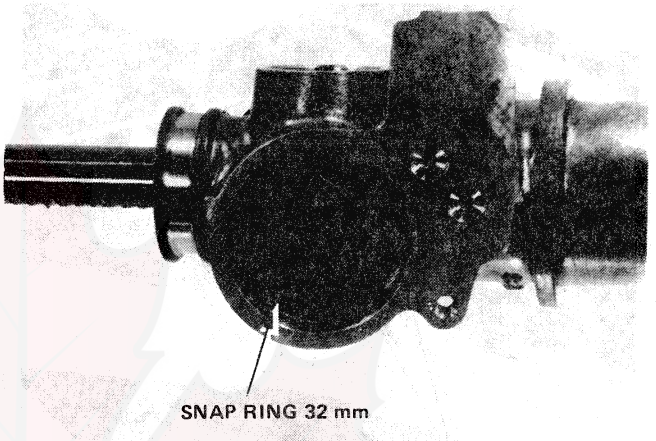
3. Push the right end of the rack back into the cylinder housing so the smooth surface that rides against the seal won't be damaged.



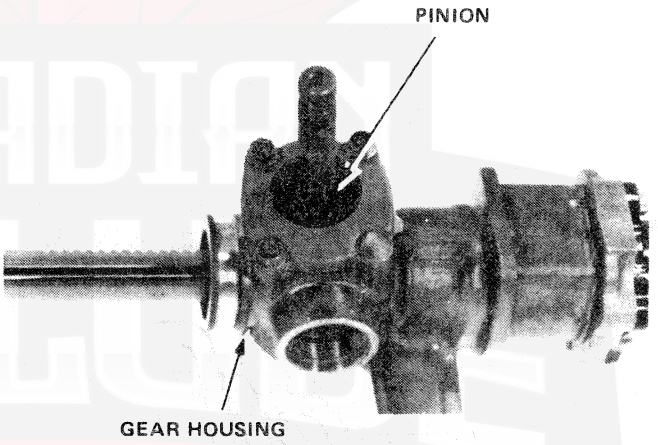
4. Remove the locknut and rack guide screw.



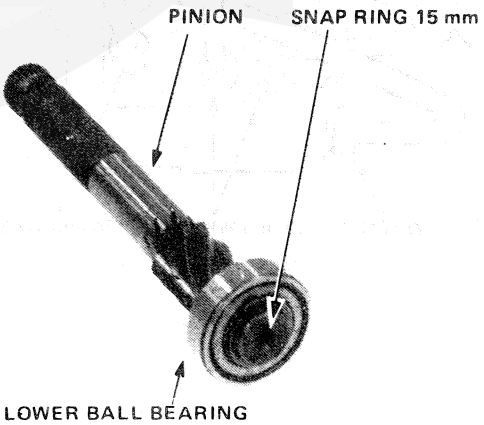
5. Remove the 32 mm snap ring securing the pinion lower ball bearing.



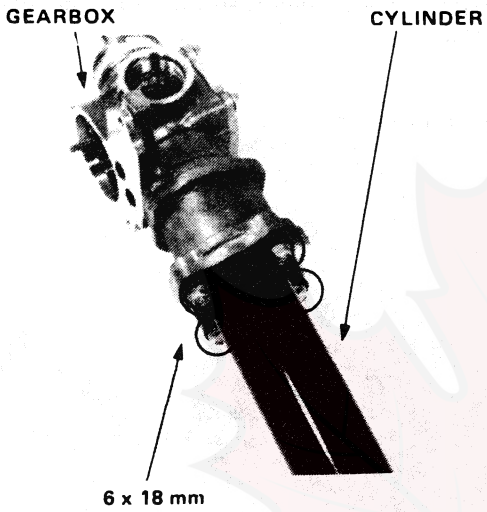
6. Remove the pinion from the gear housing by tapping it lightly.



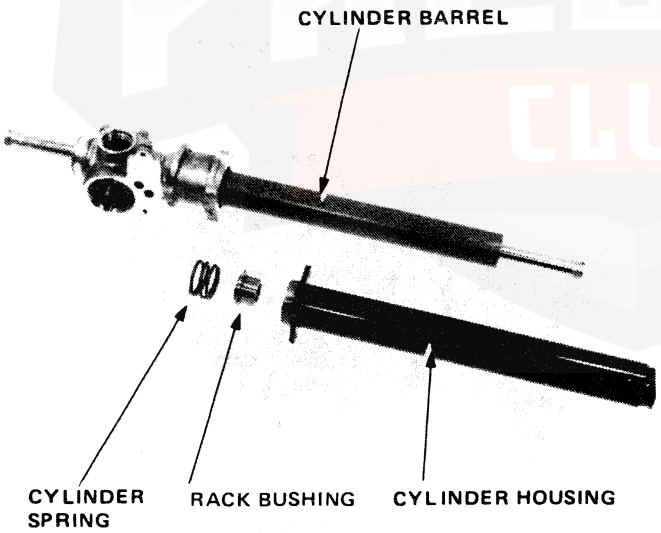
7. Remove the 15 mm snap ring, then separate the pinion and the lower ball bearing.



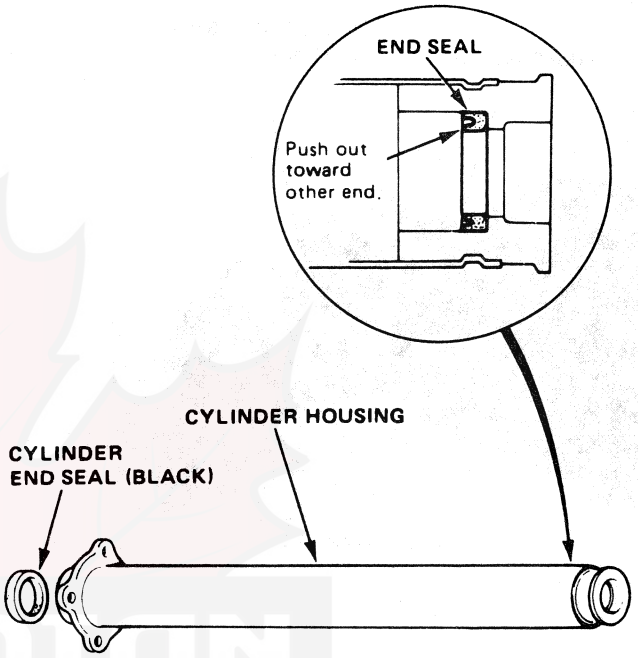
8. Remove the four bolts from the end of the cylinder housing, then slide the housing off the rack.



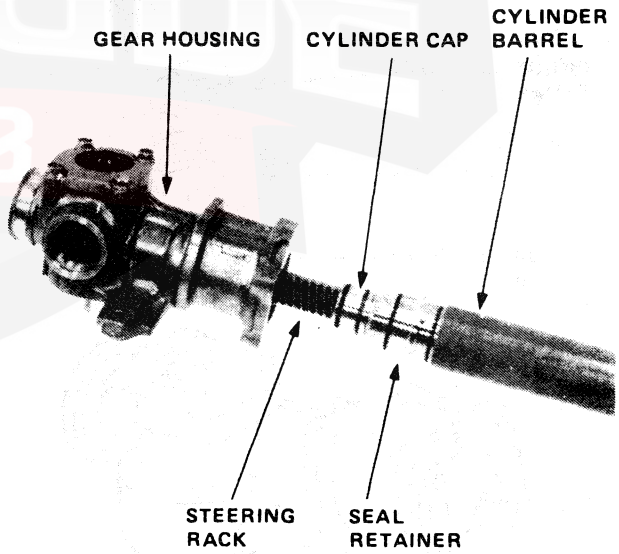
9. Remove the rack bushing and cylinder spring.



10. Remove the cylinder end seal from the cylinder. Use your fingers or a wooden stick to avoid damaging the housing.



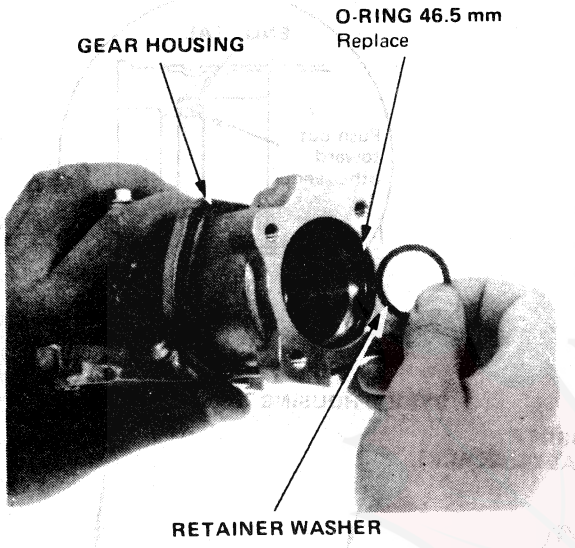
11. Remove the cylinder seal retainer, cylinder cap and steering rack from the gear housing.



(cont'd)

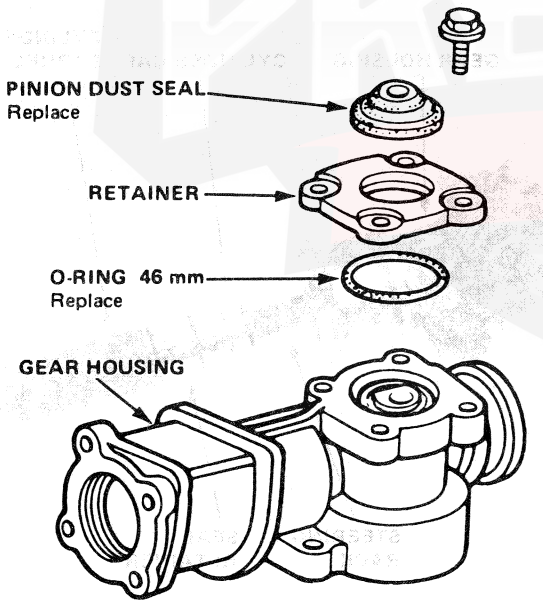
Resealing (cont'd)

12. Remove the retainer washer from the gear housing.



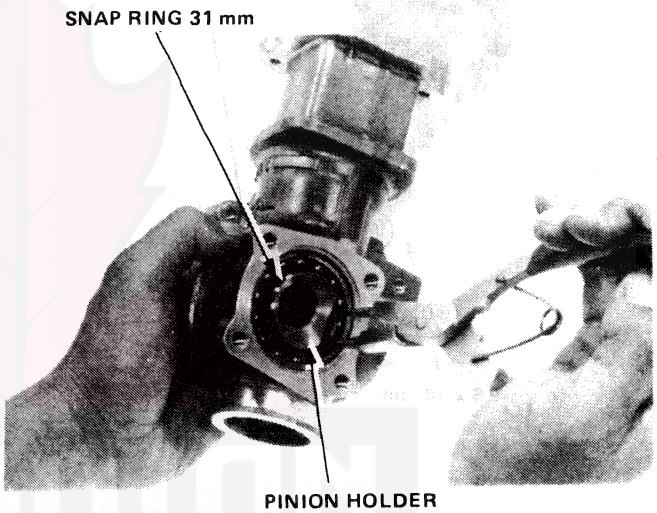
13. Remove the 46.5 mm O-ring from the gear housing.

14. Remove the bolts, then remove the pinion dust seal retainer from the gear housing. Remove the dust seal and 46 mm O-ring from the retainer.

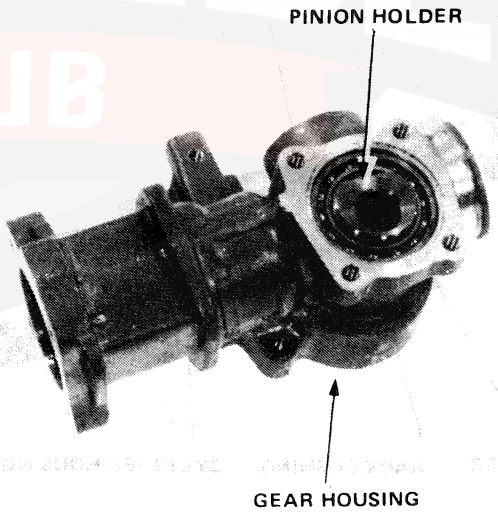


15. Check the upper bearing for free movement and excessive play; if it is OK and the grease in it is clean, go on to step 16. If it is damaged, or if dirt has gotten past the seal into the grease replace the bearing.

- Remove the 31 mm snap ring from the pinion holder.

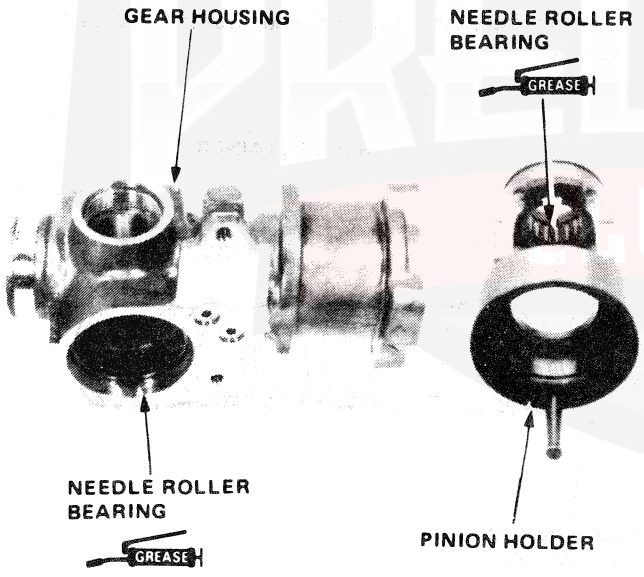


- Remove the pinion holder from the gear housing.

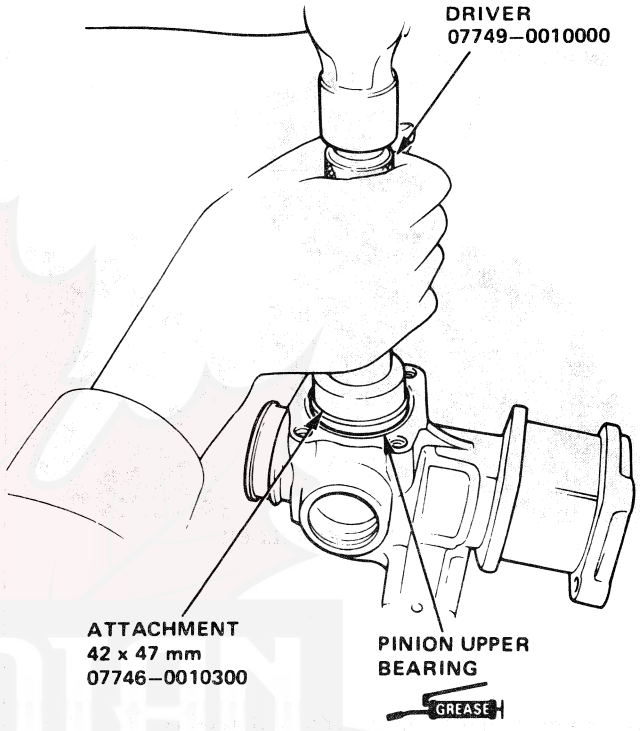


- Drive out the pinion upper bearing.

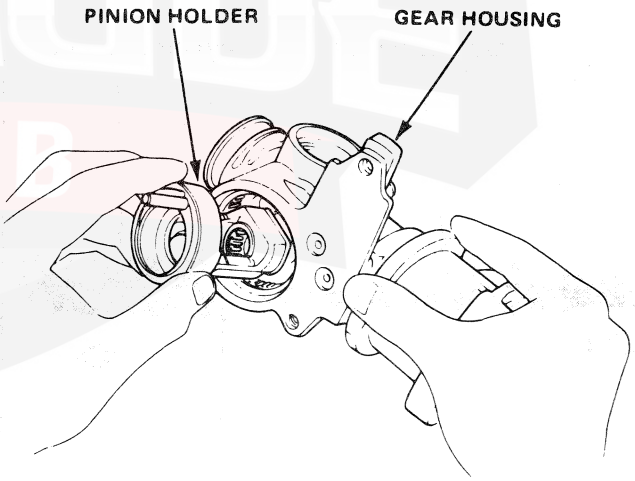
- Check the needle roller bearings in the pinion holder and in the gear housing for damage; if they are OK, pack them with grease. If the bearings are damaged, replace them.



- Pack a new upper bearing with grease, then install it with the tools shown.



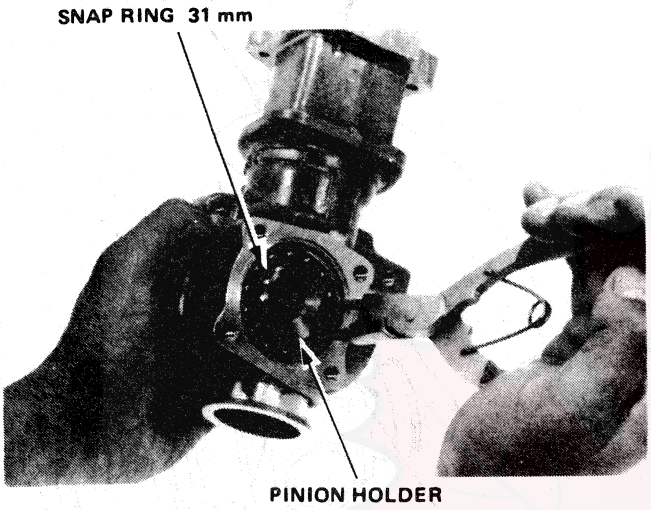
- Install the pinion holder in the gear housing.



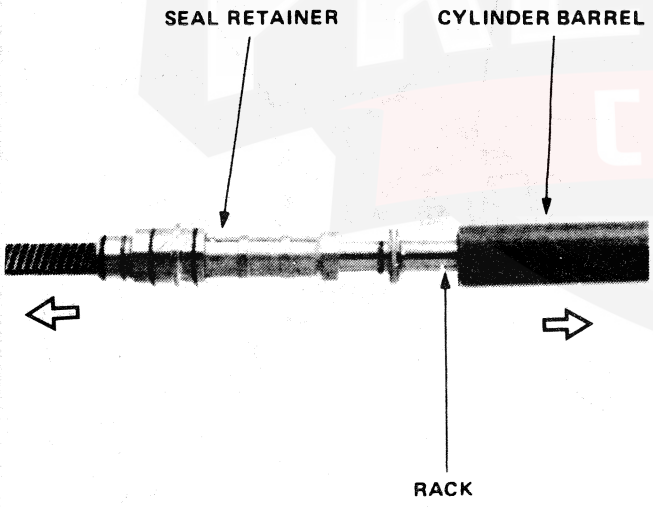
(cont'd)

Resealing (cont'd)

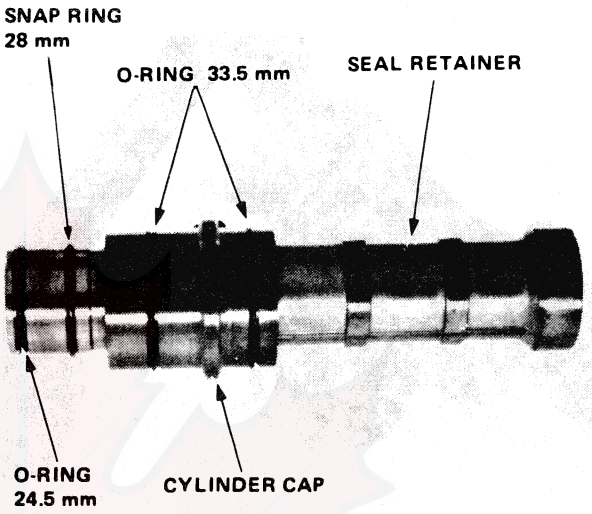
- Reinstall the snap ring with its tapered side facing out.



16. Remove the cylinder and seal retainer from the rack.

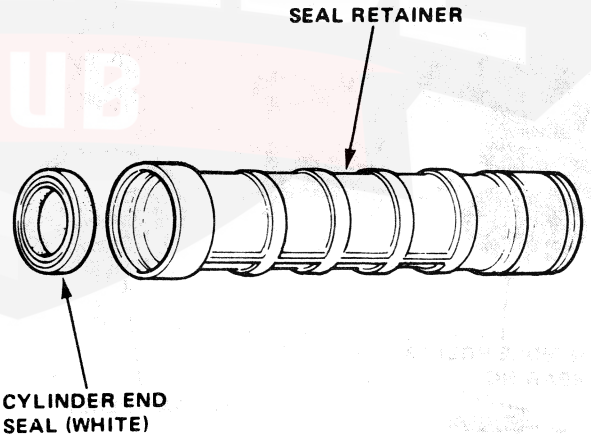


17. Remove the two 33.5 mm O-rings from the cylinder cap.

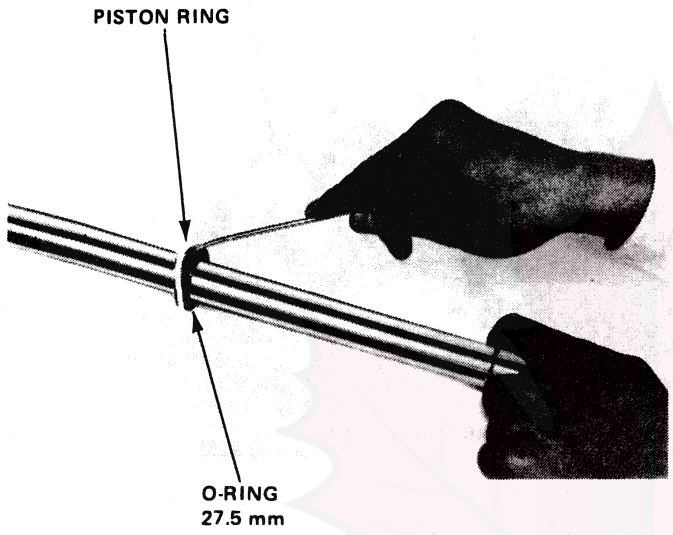


18. Remove the 24.5 mm O-ring and 28 mm snap ring from the seal retainer then slide the cylinder cap off the seal retainer.

19. Carefully pry the cylinder end seal off the seal retainer.

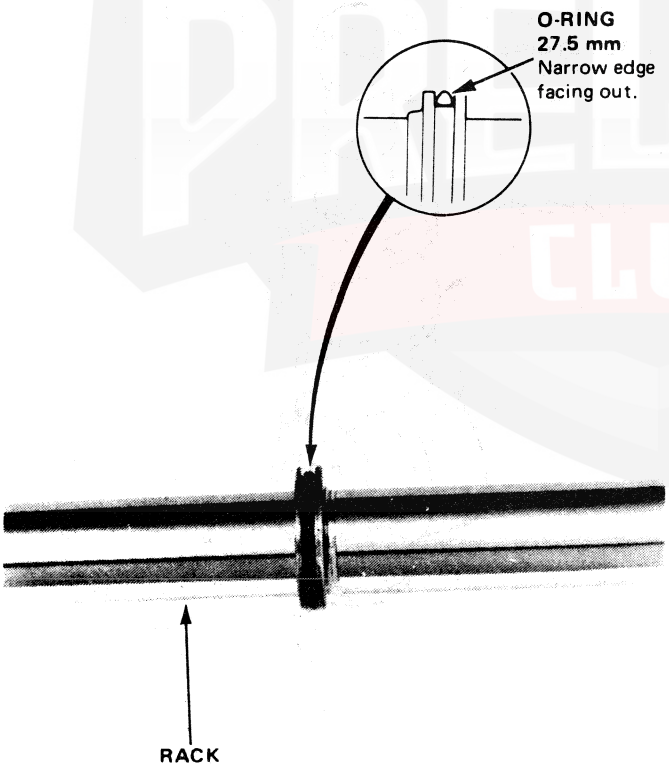


20. Carefully pry the piston ring and the O-ring under it off the rack.



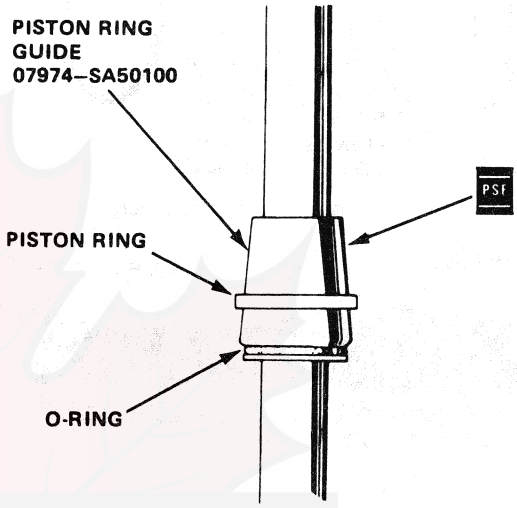
NOTE: Before reassembling any parts, inspect them as described on page 19-26, and make sure they are clean. Replace worn or damaged parts.

21. Install a new O-ring on the rack.



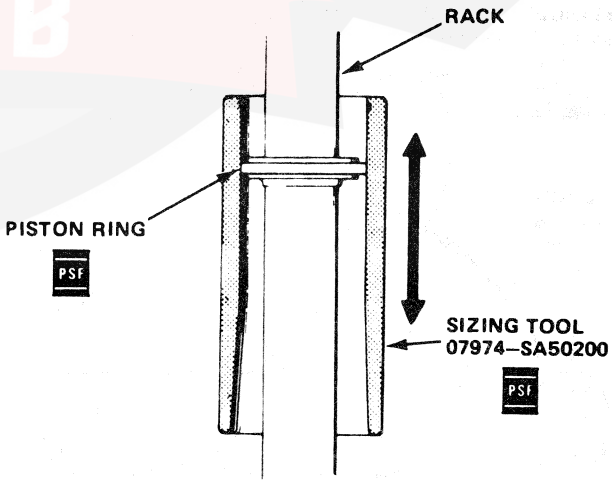
22. Install a new piston ring:

- Coat the piston ring guide tool with power steering fluid, and slide it onto the rack, big end first.



- Slide the new piston ring onto the guide tool, work it down to the big end of the tool, and then pull it off into the piston groove, on top of the O-ring.

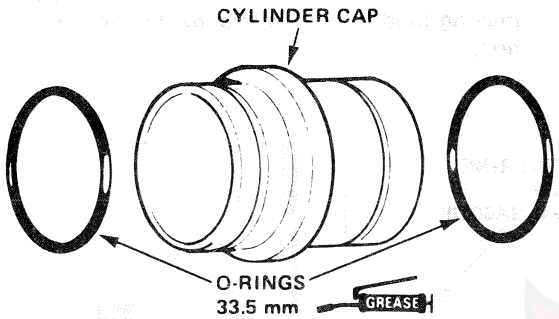
23. Coat the piston ring and the inside of the sizing tool with power steering fluid.
Carefully slide the tool onto the rack and over the piston ring, then rotate the tool as you move it up and down to seat the piston ring.



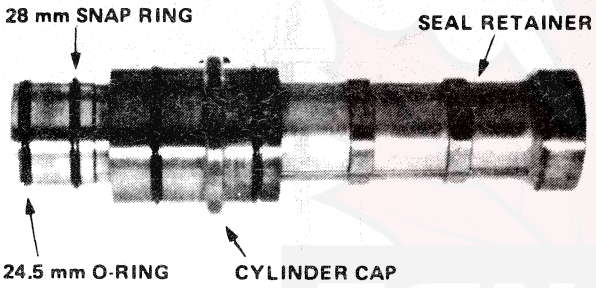
(cont'd)

Resealing (cont'd)

24. Coat new O-rings with grease and install them on the cylinder cap.



25. Slide the cylinder cap onto the seal retainer.

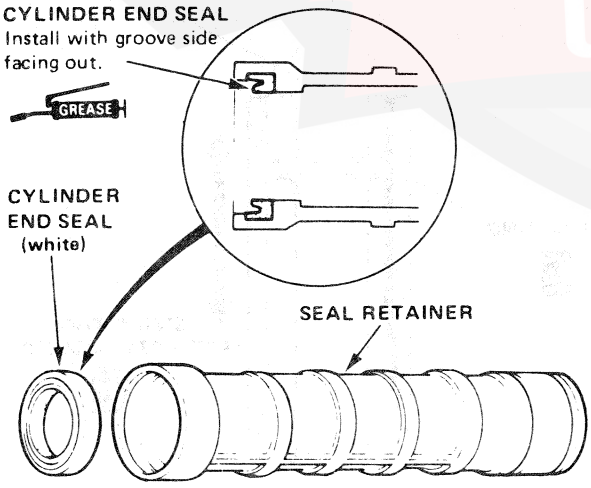


26. Reinstall the 28 mm snap ring on the seal retainer.

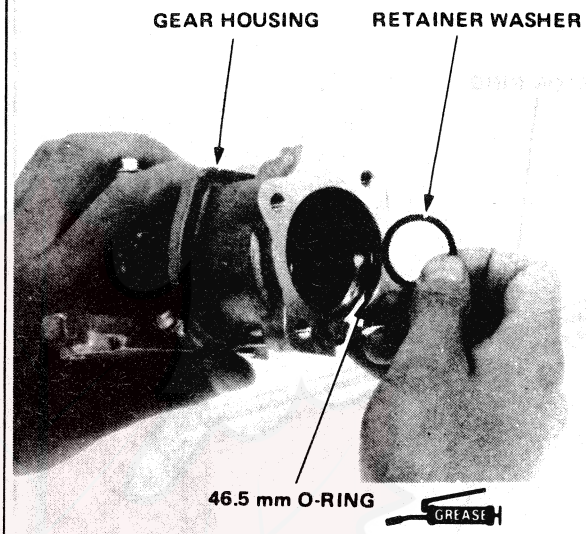
27. Install a new 24.5 mm O-ring on the retainer.

28. Grease the sliding surface of a new cylinder end seal (white) and install it in the seal retainer.

CAUTION:
- **Install the seal with its groove side facing out.**
- **Both cylinder end seals are the same size, but are not interchangeable: the white seal goes in the end of the retainer; the black seal in the end of the cylinder housing.**

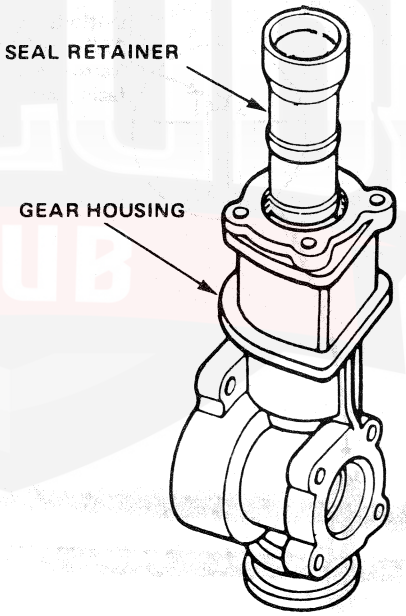


29. Reinstall the 46.5 mm O-ring and retainer washer into the gear housing.

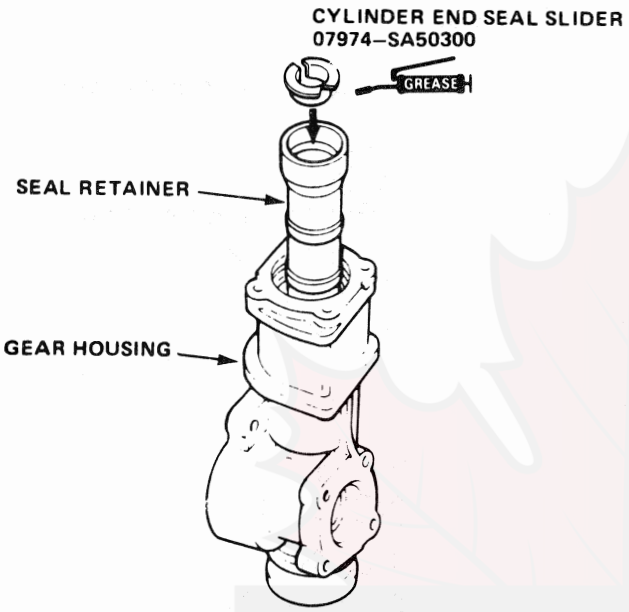


30. Apply grease on the O-ring surface.

31. Press the seal retainer into the gear housing and stand the housing on the work bench.

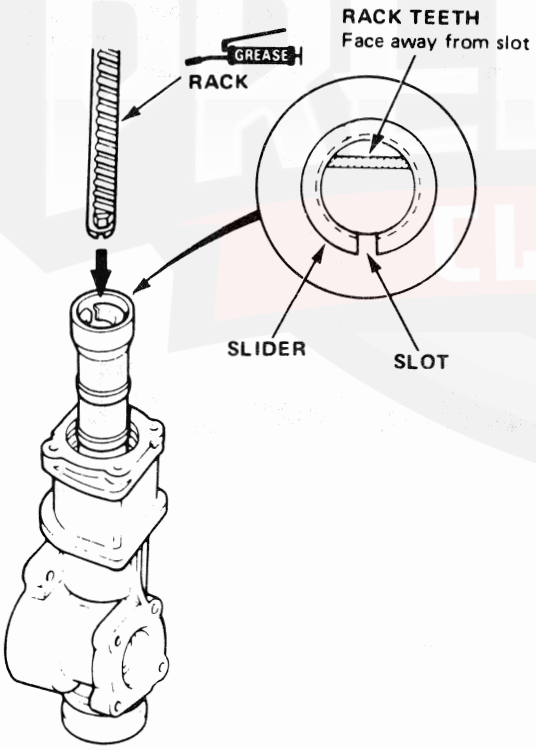


32. Coat the end seal slider tool with grease, and make sure its surface is not damaged. Then install on the seal retainer.

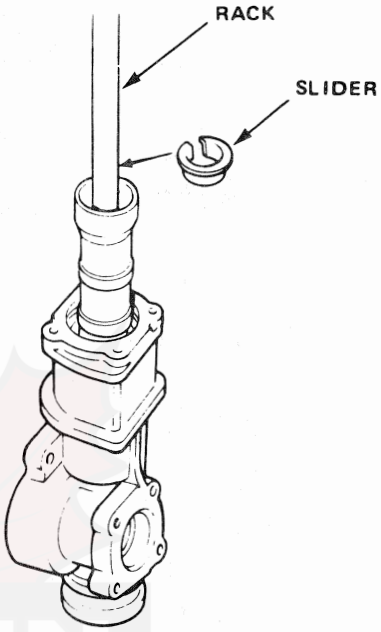


33. Coat the rack and fill its teeth with grease, then insert the rack into the seal retainer.

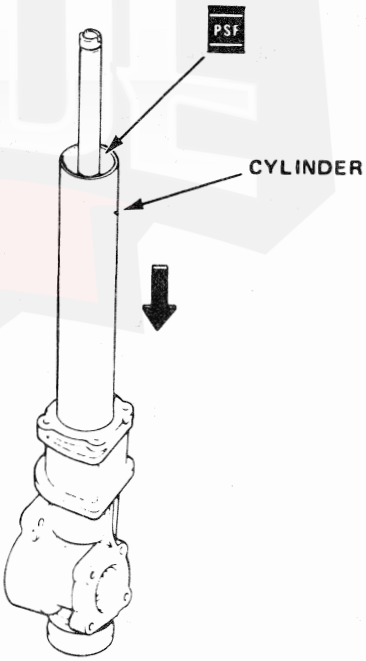
CAUTION: Make sure the rack teeth do not face the slot in the slider tool.



34. Pull the slider tool out of the retainer, spread its ends and remove it from the rack.

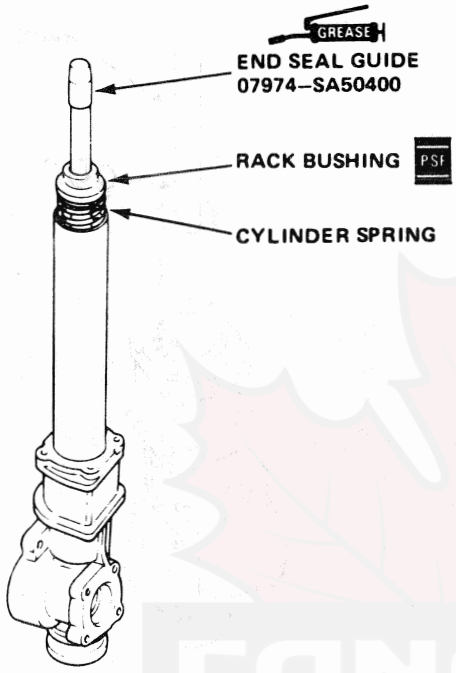


35. Coat the inside surface of the cylinder with power steering fluid, slide it over the rack and into the gear housing; press it in to the housing until it seats.



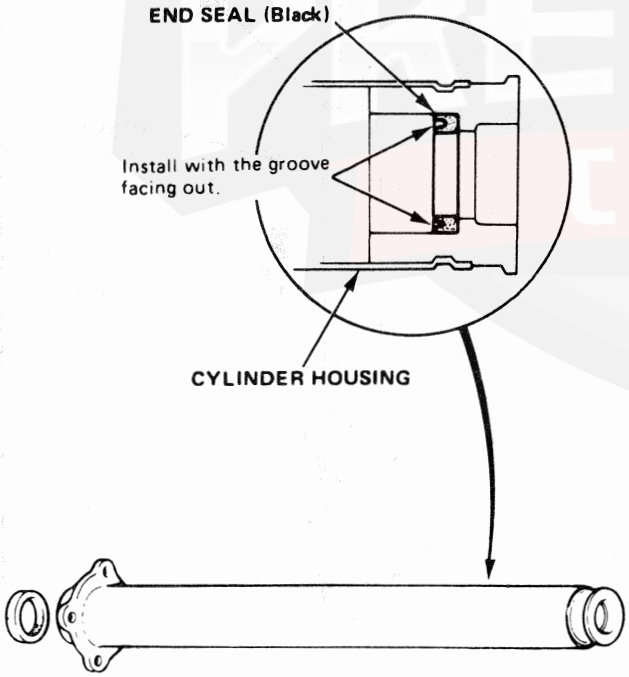
Resealing (cont'd)

36. Install the cylinder spring over the rack, then coat the rack bushing with power steering fluid, and install it on the spring.



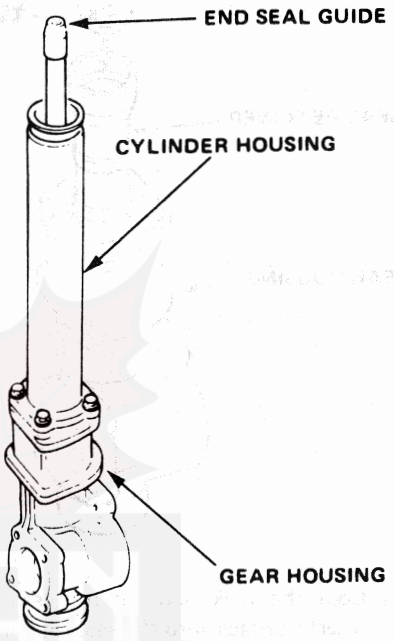
37. Coat the end seal guide tool with grease and slip it onto the end of the rack.

38. Coat the inside surface of the cylinder housing with power steering fluid and install the cylinder end seal (black).



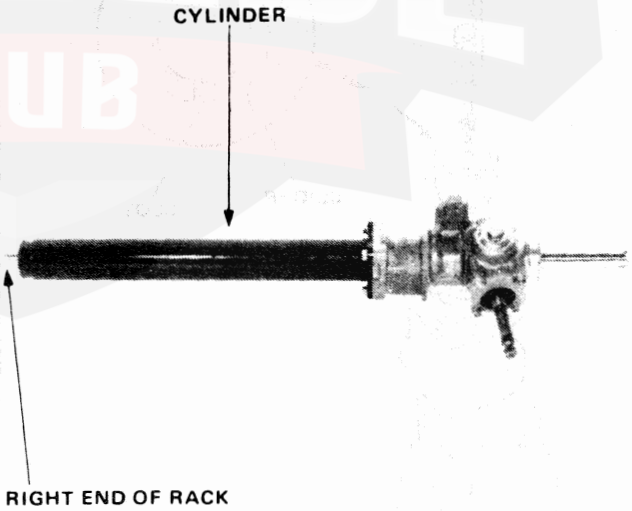
39. Carefully slide the cylinder housing over the rack and install it on the gear housing.

CAUTION : Be careful not to damage the end seal in the housing.



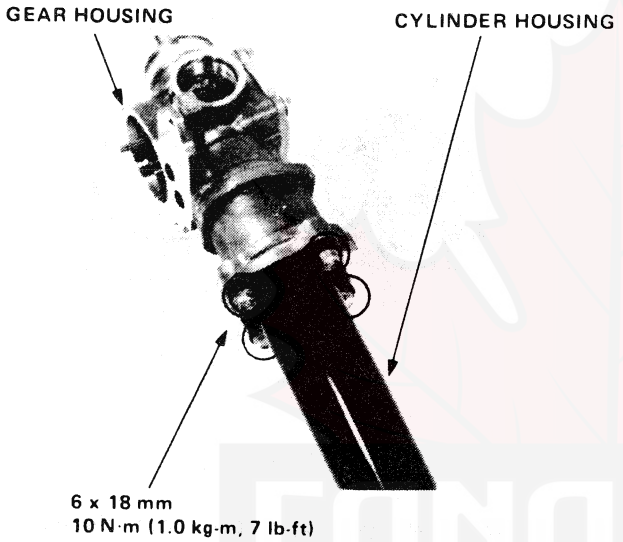
40. Slip the end seal guide off the rack.

41. Lay the gearbox down, and push the right end of the rack back into the cylinder housing so its smooth surface won't be damaged.

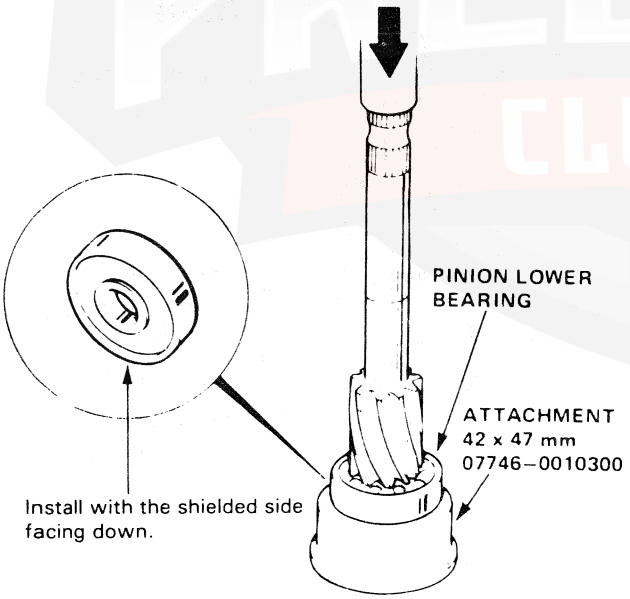


42. Secure the cylinder housing to the gear housing with the four 6 x 18 mm bolts.

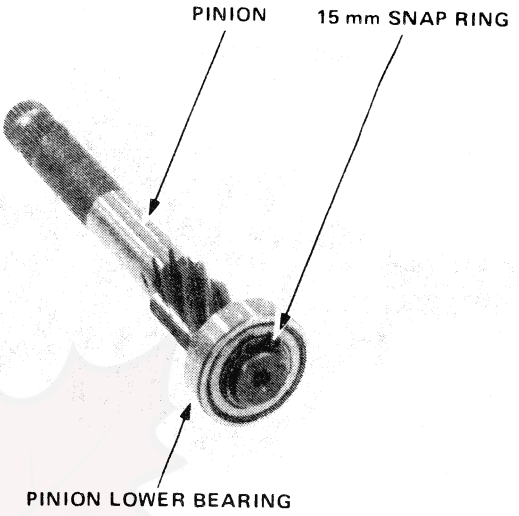
NOTE: Before tightening, make sure the mating surfaces of the cylinder and gear housings fit properly by pushing them together; hold them together while you tighten the bolts.



43. Using a press install the lower bearing on the pinion, with its shielded-side facing down.

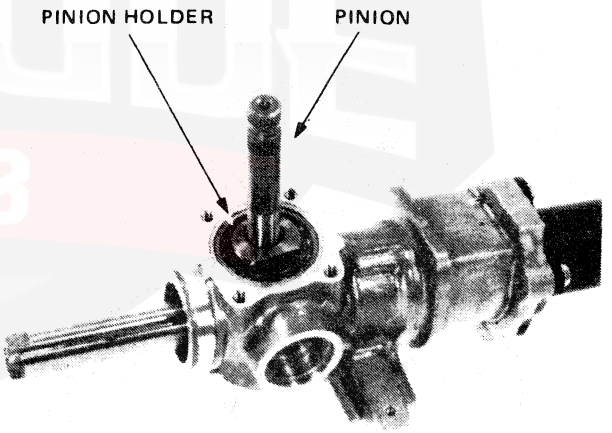


44. Install the 15 mm snap ring on the pinion.



45. Grease the lower bearing and make sure that it turns smoothly.

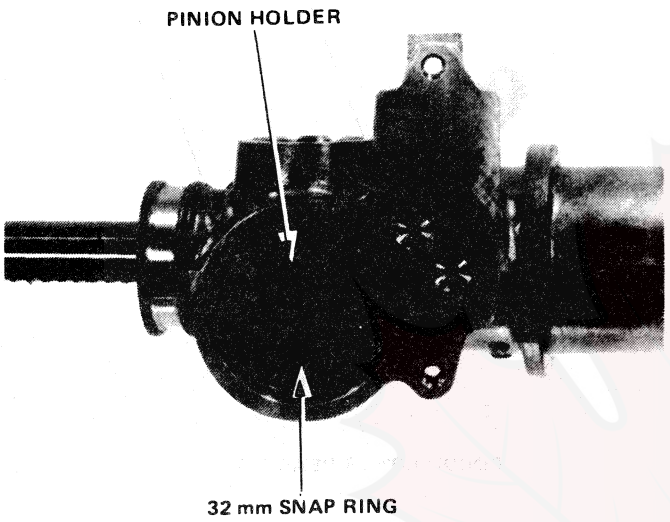
46. Install the pinion and the pinion holder in the gear housing.



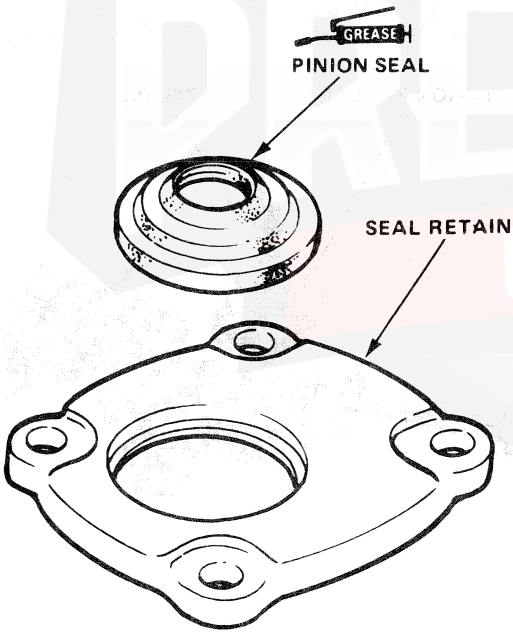
(cont'd)

Resealing (cont'd)

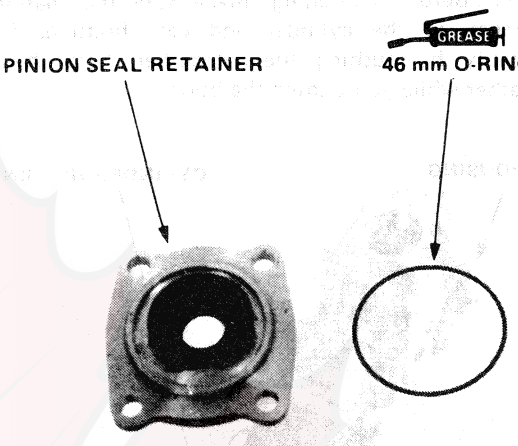
47. Install the 32 mm snap ring with its tapered side facing out in the groove in the pinion holder from the underside of the gear housing.



48. Coat the lip of the pinion seal with grease and install it in the retainer.

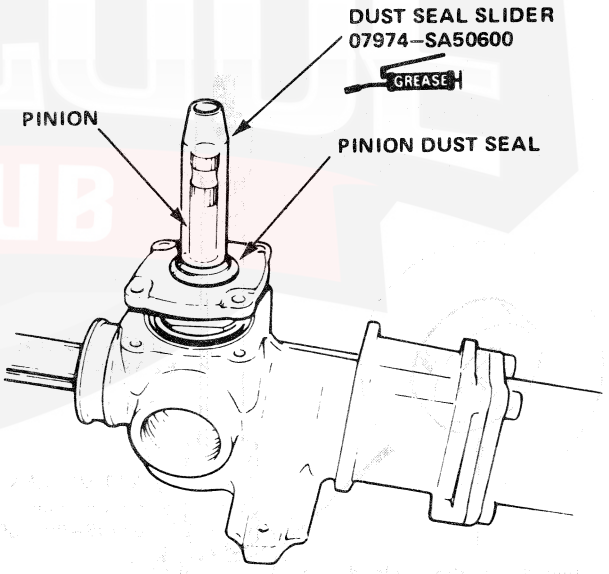


49. Coat the 46 mm O-ring with grease and install it in the groove in the seal retainer.

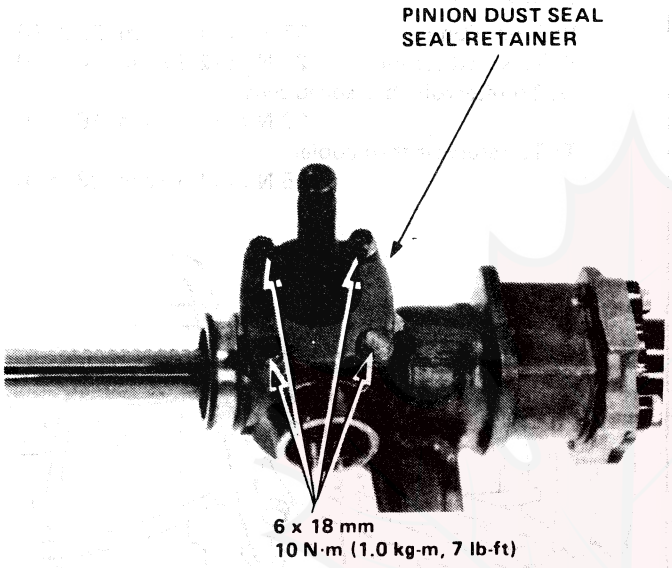


50. Grease the special tool, install it over the pinion, then install the dust seal on the Pinion.

CAUTION : Be careful not to damage or distort the lip of the seal, or the seal spring may be dislodged.

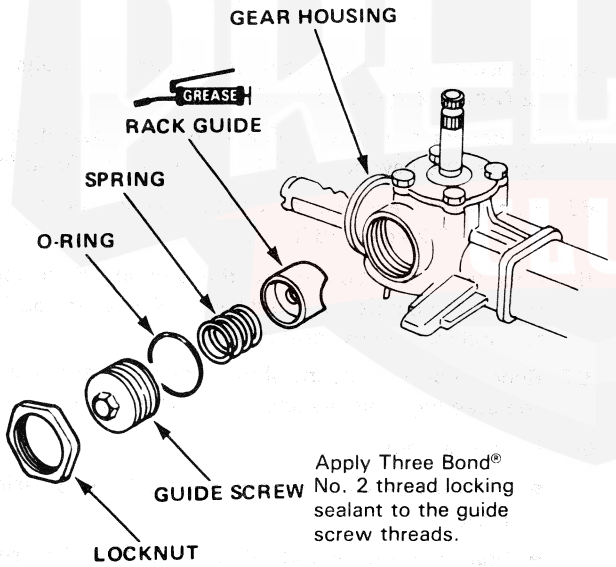


51. Tighten the four 6 x 18 mm bolts to secure the retainer to the gear housing.



52. Install the control unit on the gear housing (page 19-31).

53. Coat the rack guide with grease.

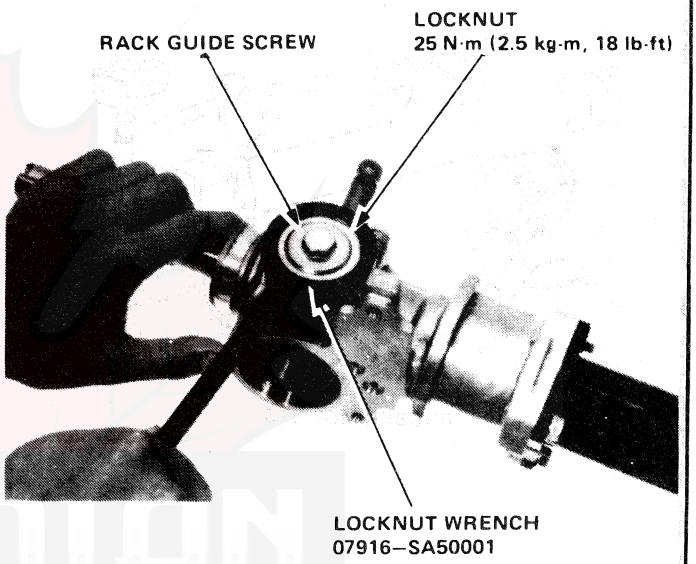


54. Install the rack guide, spring, O-ring and rack guide screw in the gear housing.

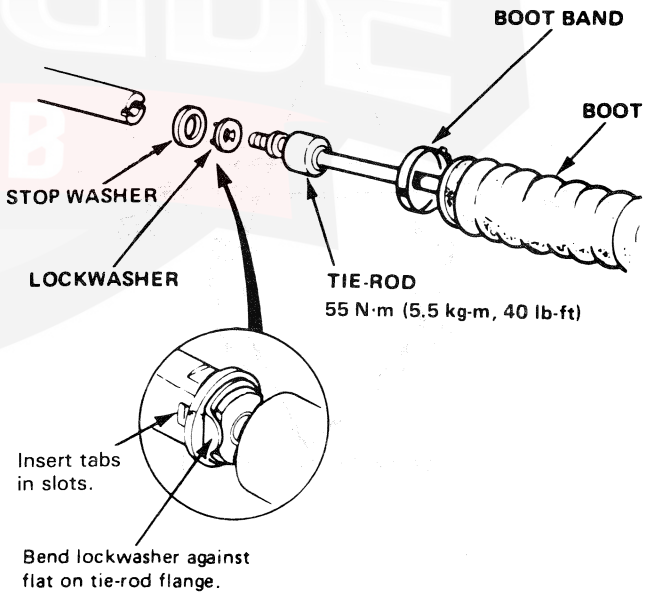
55. Install the locknut finger tight on the rack guide screw.

56. Tighten the guide screw until it compresses the spring and seats against the guide, then loosen it. Then retighten it to 3 N·m (0.3 kg-m, 2 lb-ft) and back off about 25° (about 1/12 of a turn).

While holding the guide screw in its position, tighten the locknut to 25 N·m (2.5 kg-m, 18 lb-ft) with the locknut wrench.



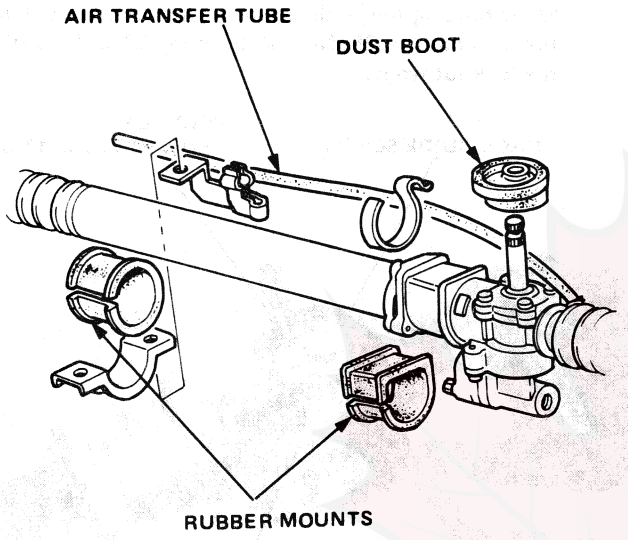
57. Screw each tie-rod into the rack while holding the lockwasher so its tabs are in the slots in the rack end. Tighten the tie-rod securely, then bend the lockwasher back against the flat on the flange as shown. Install the boots and bands.



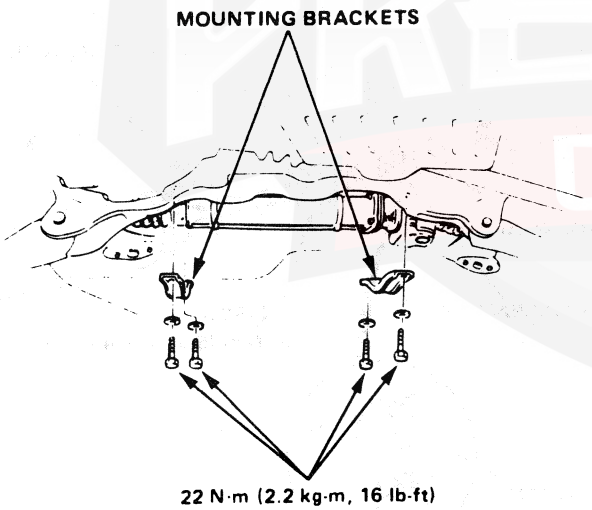
(cont'd)

Resealing (cont'd)

58. Reinstall the boot on the top of the gear housing, and install the air transfer tube between the boots.



59. Reinstall the rubber mounts on the gearbox, then reinstall the gearbox.

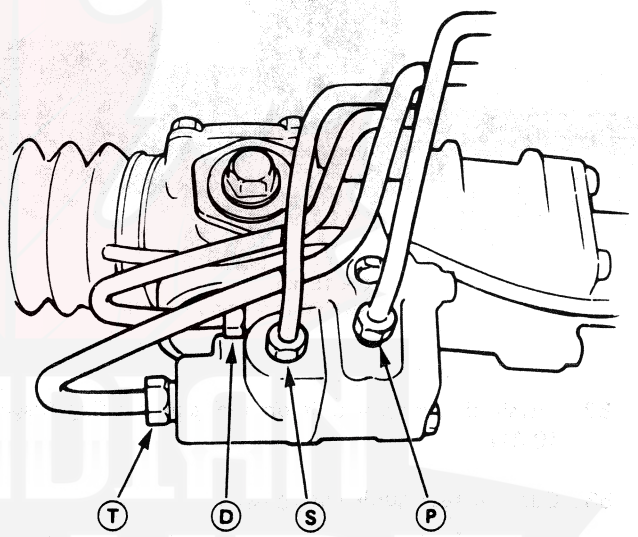


60. Re-connect the shift rod torque arm, and tighten the bolt to 11 N·m (1.1 kg-m, 8 lb-ft).

61. Snap the rubber cushion on the transmission shift cable back into its bracket.

62. Unplug the fluid lines, and re-connect them to the control unit:

P: From Pump — 37 N·m (3.7 kg-m, 28 lb-ft)
S: To speed sensor — 22 N·m (2.2 kg-m, 16 lb-ft)
D: To reservoir thru speed sensor — 22 N·m (2.2 kg-m, 16 lb-ft)
T: To reservoir thru cooler — 45 N·m (4.5 kg-m, 33 lb-ft)



63. Reinstall the center beam, and tighten the bolts to 22 N·m (2.2 kg-m, 16 lb-ft).

64. Reconnect the header pipe with a new gasket, and tighten the new nuts to 50 N·m (5.0 kg-m, 36 lb-ft).

65. Reinstall the exhaust joint pipe nuts and tighten to 22 N·m (2.2 kg-m, 16 lb-ft).

66. Reconnect the tie-rods to the steering knuckles, torque the castle nuts to 44 N·m (4.4 kg-m, 32 lb-ft), and install new cotter pins.

67. Reconnect the steering shaft connector, and adjust the steering shaft as shown on page 19-17.

68. Fill the system:

- Fill the reservoir with new Honda 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.

69. Check the control unit for leaks, then reinstall the shield.

70. Reinstall the front wheels.

System Description

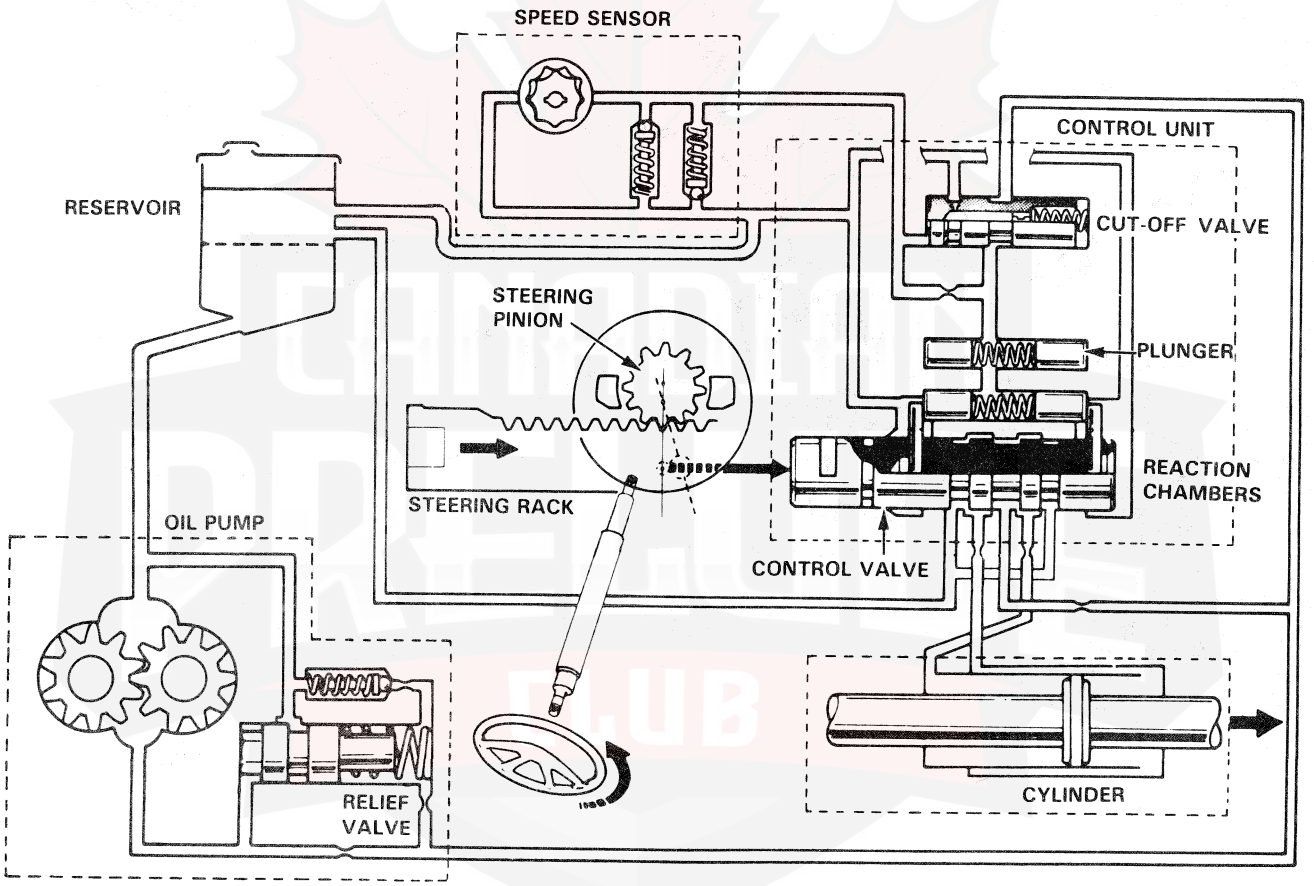
Fluid Flow and Interconnect Diagram

The reservoir supplies power steering fluid to the pump, the pump pressurizes the fluid to about 8000 kPa (1200 psi), and delivers it through a high pressure hose to the control unit on the gearbox.

The control valve (in the control unit) controls the direction of the turn by shifting fluid to the left or right side of the piston on the rack (in the power cylinder). The cut-off valve, also in the control unit, controls the amount of assist by regulating the stroke of the control valve.

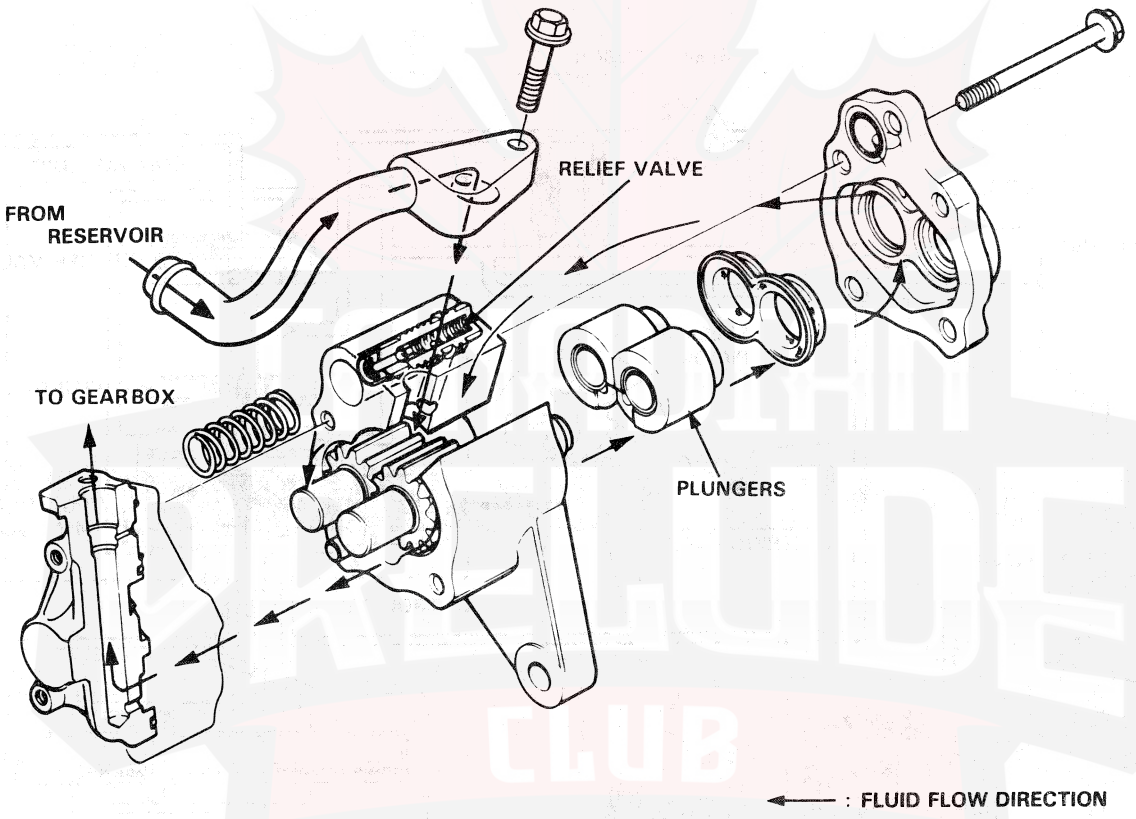
Fluid returning from the power cylinder flows back through the control valve and out to the reservoir through the cooler.

Fluid flow from the cut-off valve to the reservoir is controlled by the speed sensor; this varies the assist by regulating fluid pressure in the control unit according to the speed of car.



Pump

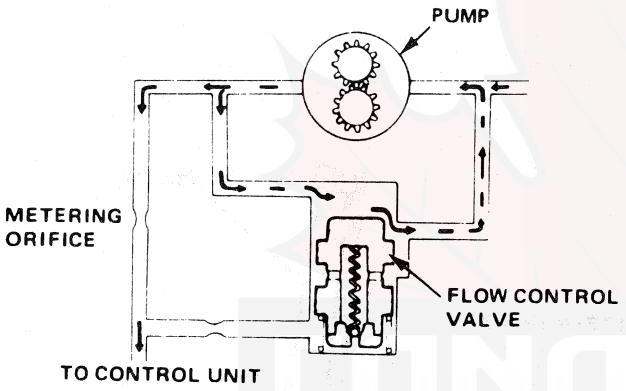
The power steering pump is mounted at the left front corner of the engine and is driven by a V-belt from the crankshaft pulley. It uses a combination flow-control/relief valve to keep output pressure between 7839—8825 kPa (80—90 kg/cm^2, 1135—1280 psi). The pump is made of aluminum to reduce its weight and help it run cooler. It uses the a pressure balance system which allows fluid pressurized by the pump to flow behind two ''floating'' plungers, automatically maintaining the correct clearance between the other ends of the plungers, and the pump gears. This not only increases pump efficiency, but also improves durability, since the plungers can move to compensate for the expansion caused by high temperatures; otherwise the clearance would decrease, allowing more rapid pump wear.



Flow Control

Fluid from the pump runs through a metering orifice to the control unit. This creates a pressure difference between the pump and control unit sides of the orifice. When pressure in the pump side is higher than the force of the spring holding the flow control valve closed, it pushes the valve down (open), and excess fluid returns to the pump inlet. The combined effect of the metering orifice and the flow control valve provides a relatively constant flow of fluid to the control unit.

FLOW CONTROL VALVE OPEN

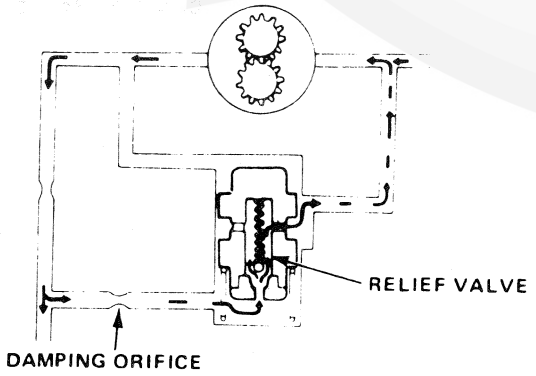


Pressure Relief

As pressure on the control unit side builds up it pushes the relief valve ball (inside the flow control valve) up against its spring, and excess fluid returns to the pump inlet. As the pressure under the flow control valve drops, the relief valve ball is closed by its spring, and the flow control valve is forced down again, allowing excess fluid from the pump side to return to the inlet.

This flow control valve-relief valve cylinder keeps pump output pressure between 7839–8825 kPa (80–90 kg/cm^2, 1136–1280 psi).

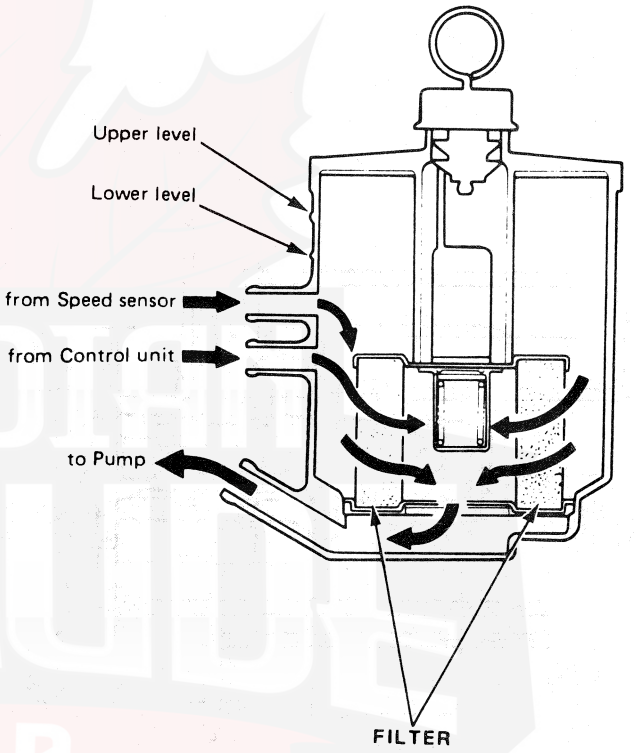
RELIEF VALVE OPEN



Reservoir

A one piece reservoir and filter is attached to the fender apron on the left side of the engine compartment.
The fluid and the filter/reservoir should be replaced if the system is opened for repairs, or if the fluid gets water or dirt in it.

CAUTION : Use only Honda Power Steering Fluid. The use of other fluids such as A.T.F., or other manufacturer's power steering fluid will cause damage to the system.



Reservoir Capacity . . . . . 0.5 liter (0.5 U.S. qt.)
System Capacity . . . . . 1.5 liter (1.6 U.S. qt.)

Operation

Control Valve

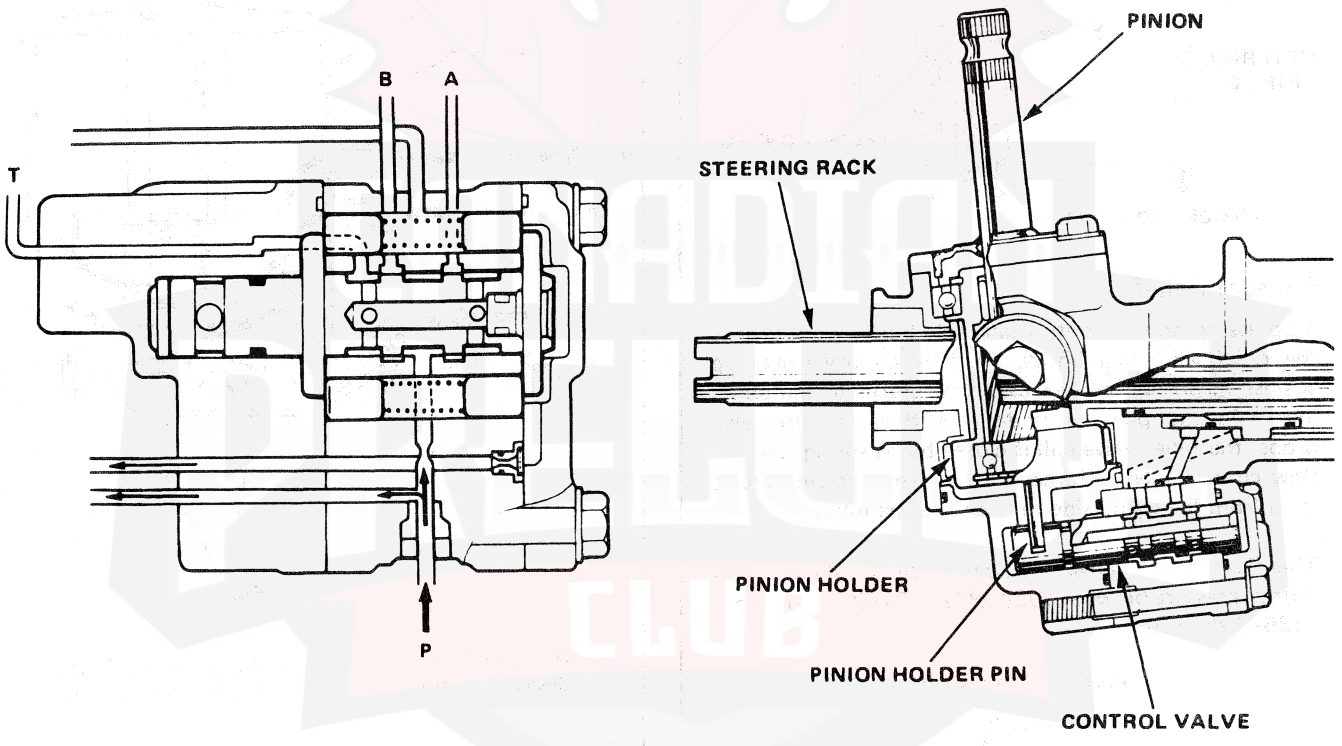
Mounted on the lower side of the gearbox is a control valve, that is moved horizontally by a pin on the pinion holder to shift fluid pressure to the right or left side of the Power Cylinder when the steering wheel is turned.

It has thrust pins at both ends, and two inter-connected reaction chambers, one on each side.

Each reaction chamber contains a pair of spring loaded plungers that ride against right and left thrust pins.

The following valve body fluid passages are controlled by the control valve.

P: From pump
T: To reservoir
A: To right side of cylinder
B: To left side of cylinder

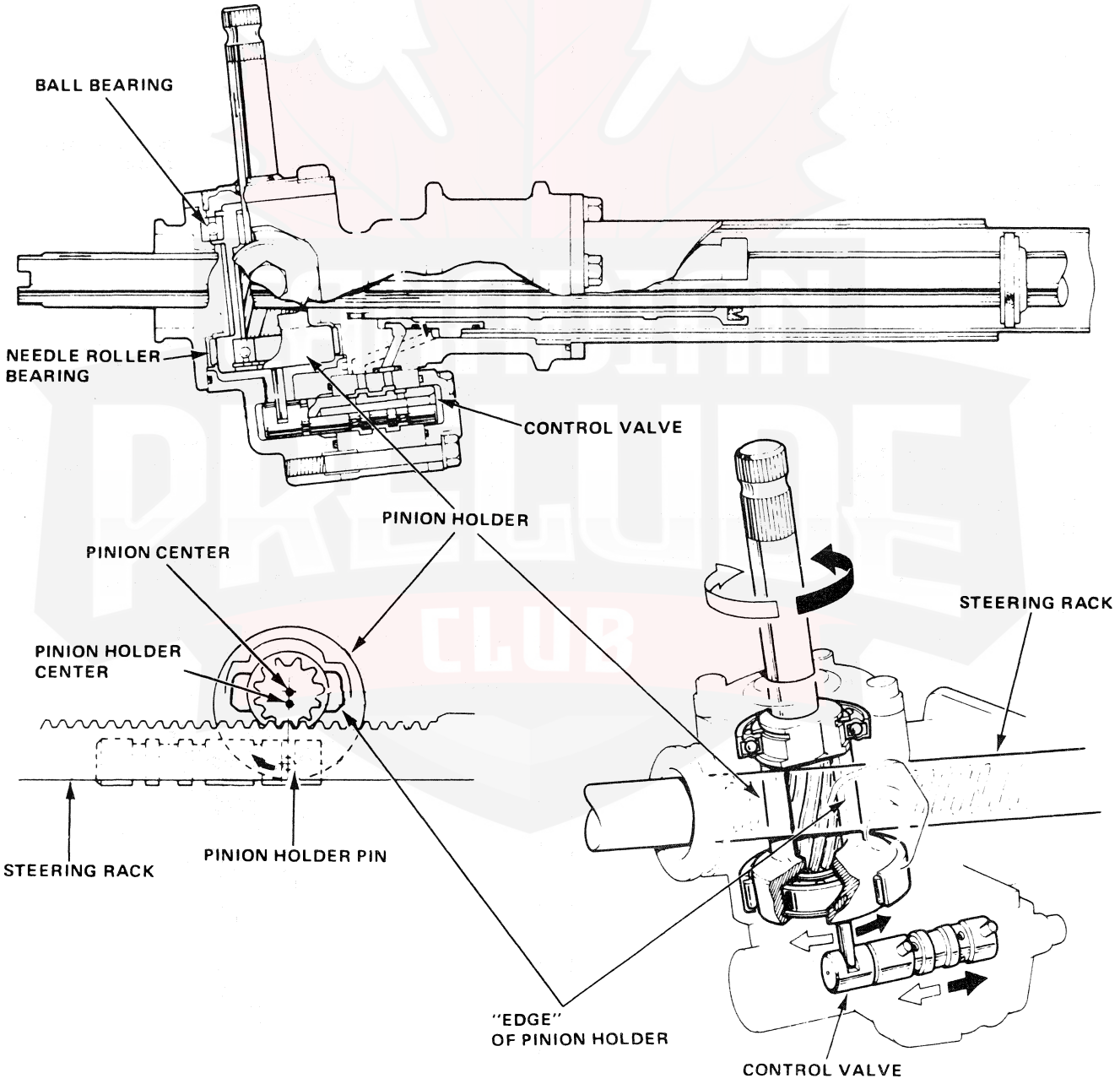


In the power steering unit, the method used to direct a single source of fluid pressure in either of two directions (for left or right turns) involves the pinion gear transferring a "message" of direction to the fluid Control Valve.

The pinion is mounted slightly off-center in a pair of bearings, which are in turn mounted in a Pinion Holder cylinder that rotates, centered in its own outer bearings. At the bottom of the Pinion Holder is a pin, which fits in a slot in the Control Valve.

As the pinion is turned (to turn left or right), because it is off-centered it also moves slightly along the rack. This movement is transferred to the holder. The pin in the holder then moves the Control Valve, to direct fluid pressure to either side of the rack Power Cylinder.

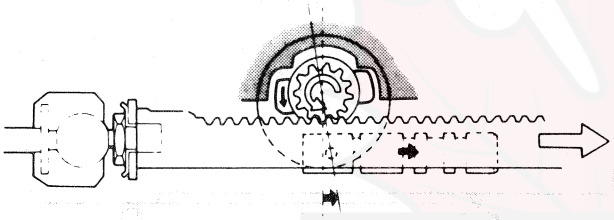
The back edges of the pinion holder (facing away from the rack) hit stops cast into both sides of the gear housing to avoid pushing the control valve too far in either direction. The front edge of the pinion holder cuts off assist at full lock as described on the next page.



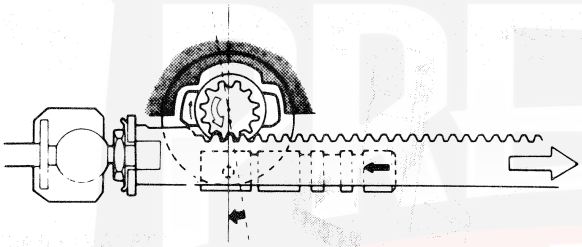
Operation

Unloader System

The control valve shifts the direction of fluid flow when the Steering wheel is turned, right or left. However, when the wheel is turned to right or left lock at parking speed, the edge of the pinion holder rides up on the end of the rack, moving the pin in the opposite direction which pulls the control valve back to neutral.
This keeps pump pressure from building up (which could cause idle speed to drop), and improves steering feel by increasing resistance at left and right lock.



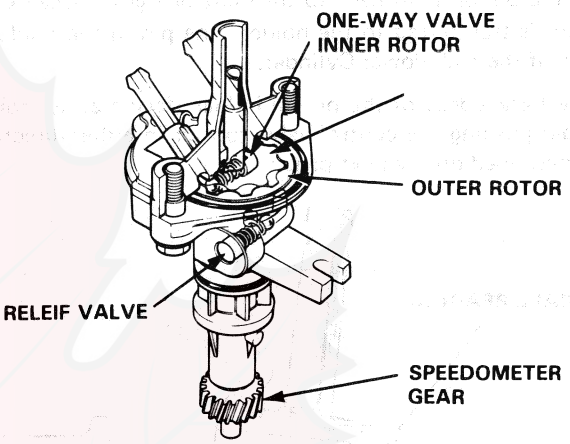
Control in "assist" position



Control valve moves back "neutral" position

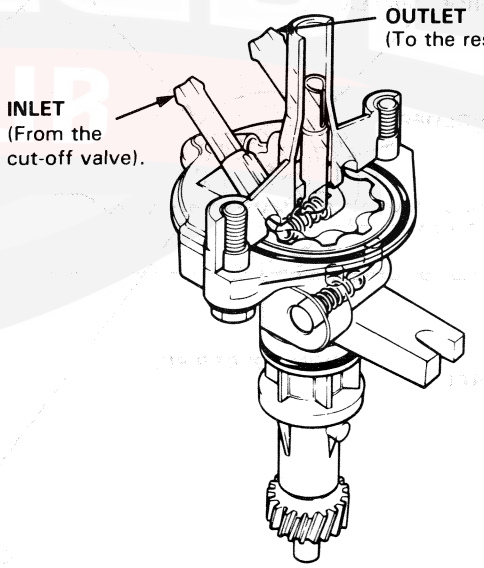
Speed Sensor

The speed sensor is a trochoid-rotor, hydraulic pump combined with a relief valve and a one-way valve. It is driven by the speedometer gear shaft which in turn is driven by a helical gear on the differential.



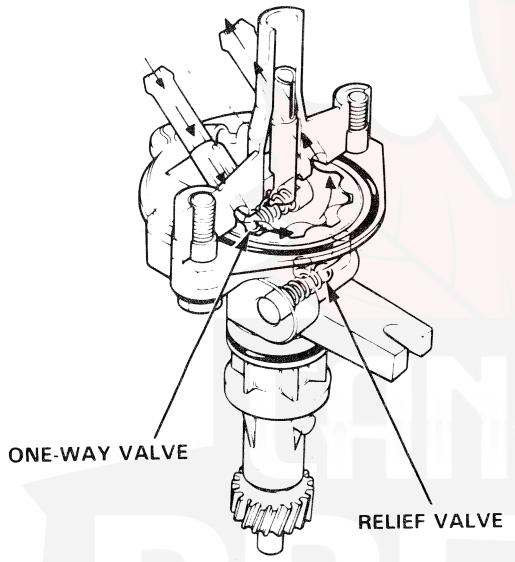
It turns only when the car is moving, controlling the cut-off valve by regulating fluid pressure in the control unit according to the speed of the car.

With the engine running in a parked car, fluid flow through the sensor rotors is blocked because the rotors are not turning.



As the car is driven away, the rotors start turning and pump fluid back to the reservoir, reducing pressure at the cut-off valve. The cut-off valve begins cycling, staying open for longer and longer intervals as the car accelerates and the sensor reduces the pressure further. This allows pressure in the reaction chambers to rise, restricting control valve movement more and more, and gradually reducing the assist as speed increases.

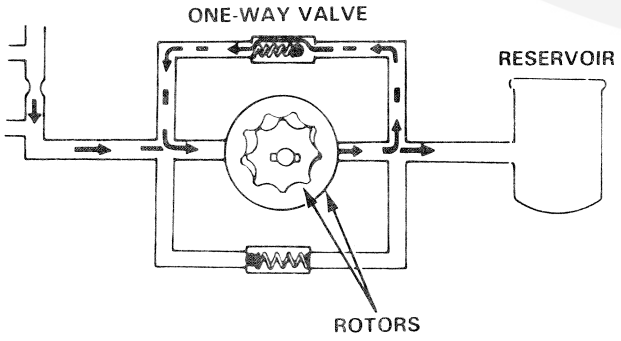
Driving Forward:



One-way Valve (In Speed Sensor)

When the car is moving at high speed, negative pressure develops at the sensor inlet because the sensor is pumping faster than the fluid can be supplied. To compensate for this, the outlet and inlet ports are connected internally by a passage containing a one-way valve that lets output fluid recirculate to the inlet port to equalize pressure.

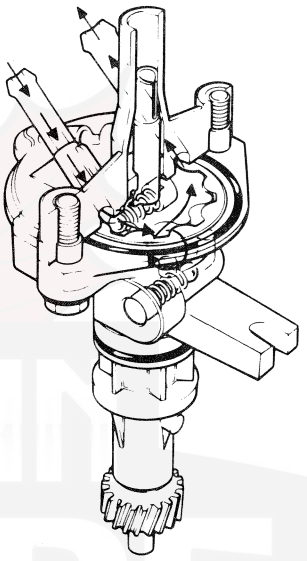
Driving at High Speed:

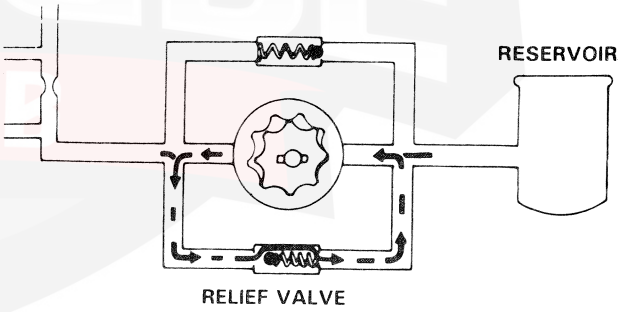


Relief Valve (In Speed Sensor)

When the car is moving in reverse, the speed sensor also turns backward and pumps fluid in the opposite direction. To avoid building up pressure in the reaction chambers that would increase steering effort while driving in reverse, the inlet and outlet-ports are connected by a second internal passage containing a relief valve that allows the fluid to recirculate.

Driving in Reverse:





Suspension

FRONT WHEEL ALIGNMENT
Adjustment, pages 20-3, 4, 5
Spring Height Inspection, page 20-6

FRONT DAMPER
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Disassembly/Inspection, page 20-18
Reassembly and Installation
page 20-19

UPPER ARM
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KNUCKLE, HUB, DISC
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Bearing Removal and
Installation page 20-14

FRONT STABILIZER BAR
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LOWER ARM
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RADIUS ROD
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WHEEL BEARING
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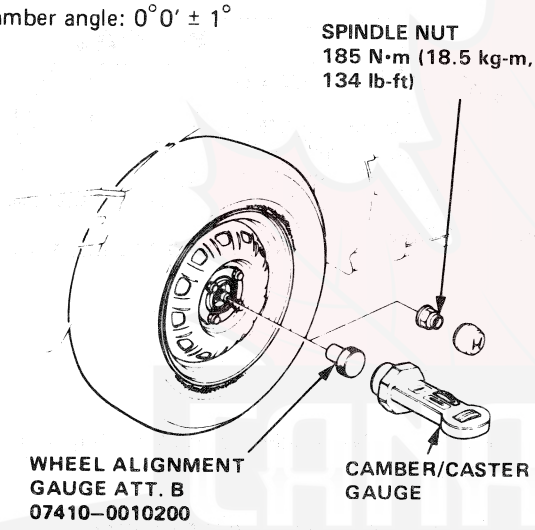
Camber Inspection/Adjustment

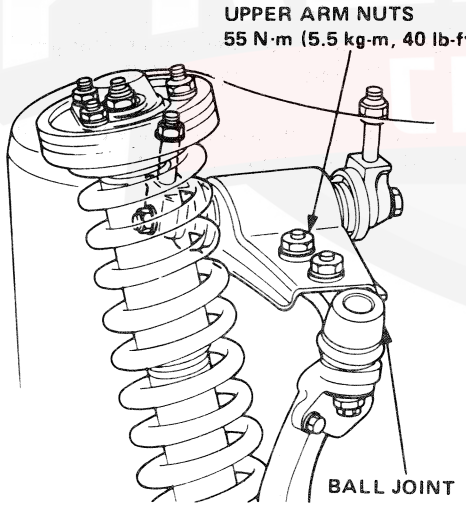
NOTE: Alignment adjustments must be carried out in this order: camber, caster then toe.

1. With the wheels in a straight ahead position, remove the spindle nut and install the special tool on the spindle as shown.
2. Set up the camber/caster gauge.
3. Read the camber on the gauge with the bubble at the center of the gauge.

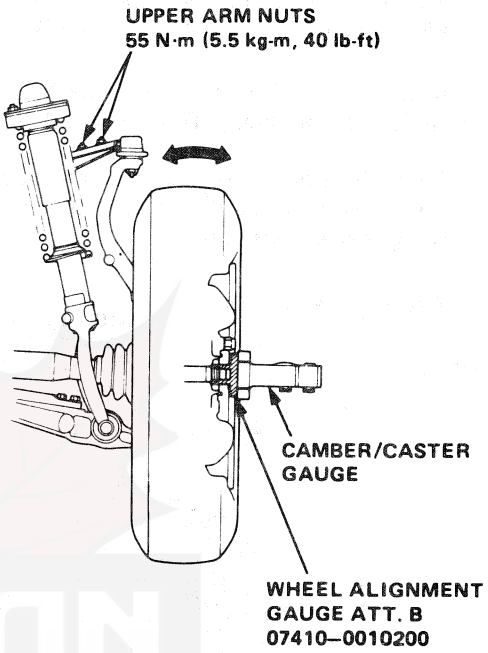
   Camber angle: 0°0′ ± 1°



4. If adjustment is required, go to step 5. If adjustment is not required, remove alignment equipment.
5. Loosen the upper arm nuts so that the ball joint slides freely.



6. Hold the wheel by hand and adjust camber to 0°0′ on the gauge.
7. Tighten the upper arm nuts.



8. Remove the gauge and reinstall the spindle nut.

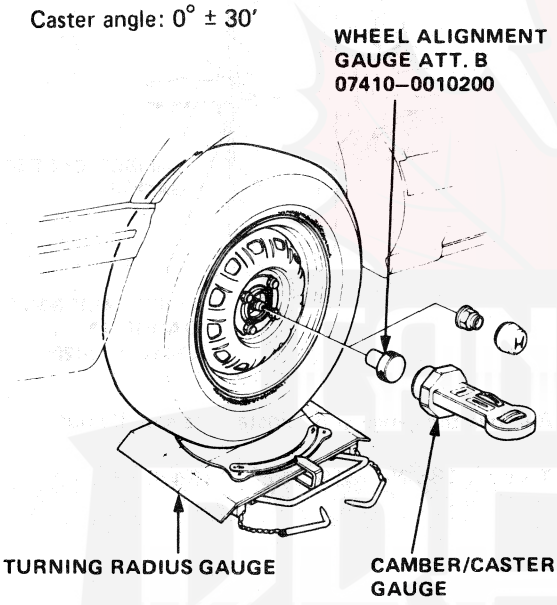
   Torque: 185 N·m (18.5 kg-m, 134 lb-ft)

Wheel Alignment

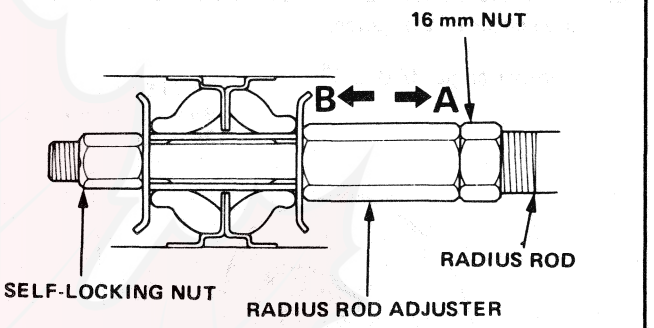
Caster Inspection/Adjustment

1. Jack up the front of the car and set the turning radius gauges beneath the front wheels, then lower the car.
2. Remove the spindle nut and install special tool Wheel Alignment Gauge Attachment Body.
3. Install Camber/Caster Gauge on the Attachment and apply the front brake. Turn the wheel 20° inward.
4. Turn the adjust screw so that the bubble in the caster gauge is at 0°. Return the wheel to the straight ahead position.

   Caster angle: 0° ± 30′



5. If adjustment is required, go to step 7. If adjustment is not required, remove alignment equipment.
6. Record the difference between the measurement and the standard specification.
7. Loosen the 16 mm nut and adjuster on the front beam radius rods.



8. Adjust caster angle by turning the radius rod adjuster.

   To increase caster: Turn the adjuster so it moves in direction A.
   To decrease caster: Turn the adjuster in direction B.
   After adjusting, turn the self-locking nut, snug.

   NOTE: Turning the adjuster one full turn changes caster 0°8′ (the radius rod is moved 1.25 mm (0.049 in.)).

9. Hold the radius rod adjuster and torque the 16 mm nut to 80 N·m (8.0 kg-m, 56 lb-ft).
10. Hold the 16 mm nut and torque the self-locking nut to 44 N·m (4.4 kg-m, 32 lb-ft).

Front Wheel Toe Adjustment

1. Center steering wheel spokes.

   NOTE: Measure difference in toe measurements with the wheels pointed straight ahead.

   Front toe in: 0 ± 3 mm (0 ± 0.118 in.)

   – 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 is correct with a turning radius gauge.
4. After adjusting, tighten the tie-rod locknuts.

   NOTE: Reposition the tie-rod boot if twisted or displaced after adjustment has been made.

Rear Wheel Toe Adjustment

1. Release parking brake.

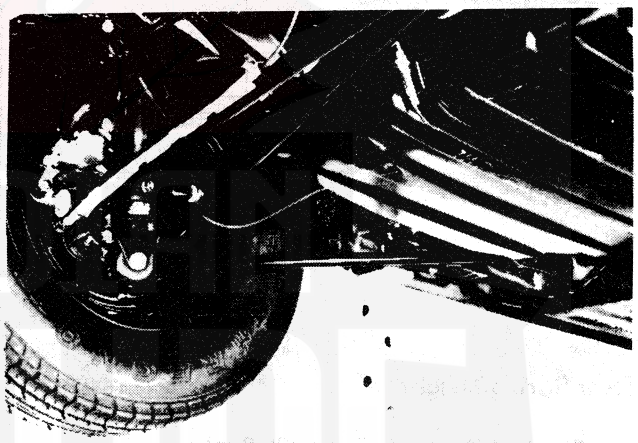
   NOTE: If the parking brake is engaged, you may get an incorrect reading.

   Rear toe in: 2 ± 2 mm (0.08 ± 0.08 in.)

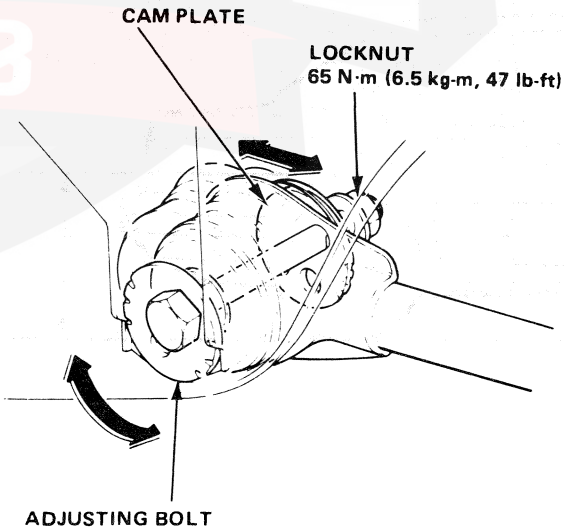
   – If adjustment is required, go to step 2.

   – If no adjustment is required, remove alignment equipment.

2. Loosen locknut while holding adjusting bolt.
3. Turn adjusting bolt until toe-in is correct.



4. Tighten locknut after adjustment.



Spring Height

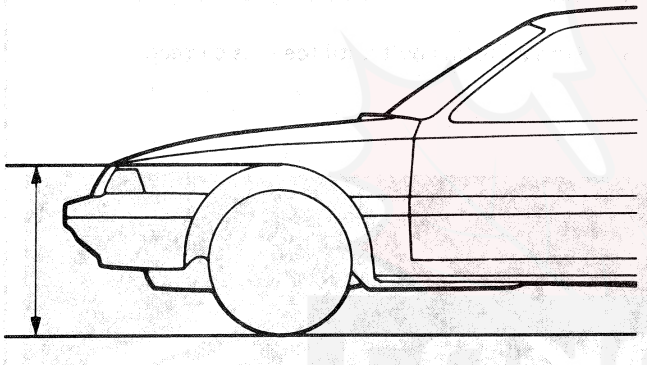
Inspection

NOTE:

- Car must be empty, parked on a level surface, and tires checked for proper inflation and wear (tread wear indicator must not be showing).
- Bounce the front or rear of the car up and down several times before measuring.

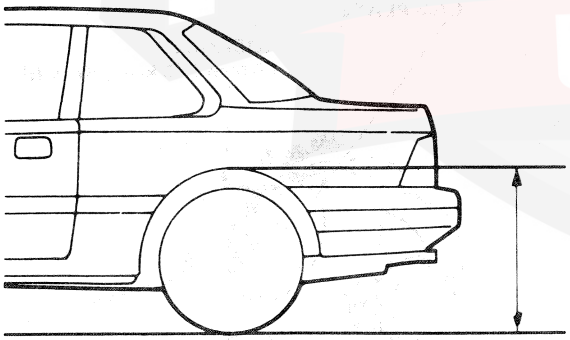
Front Spring Height

Standard (New): 665 mm (26.2 in)
Service Limit: 650 mm (25.6 in)



Rear Spring Height

Standard (New): 657 mm (25.8 in)
Service Limit: 642 mm (25.3 in)

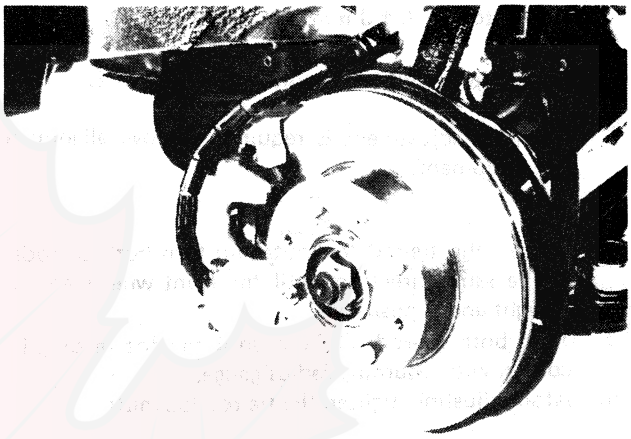


Wheel Measurement

Bearing End Play

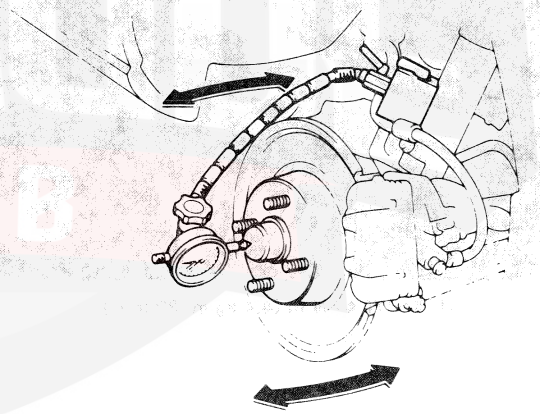
Front Wheel End Play

Standard: 0–0.05 mm (0–0.002 in.)



Rear Wheel End Play

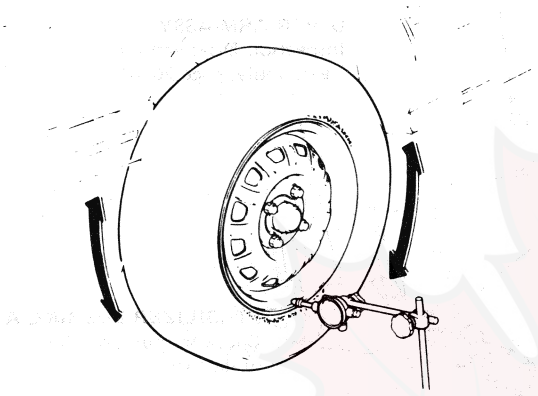
Standard: 0



Runout

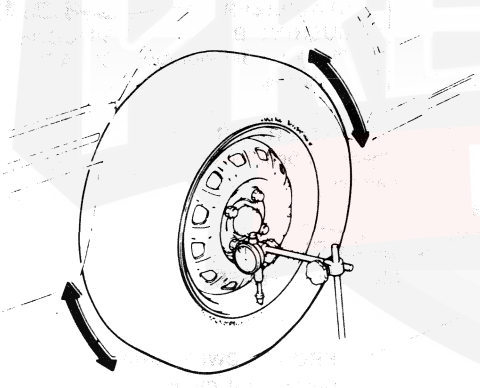
Front and Rear Wheel Axial Runout

Standard: Steel— 0—1.0 mm (0.039 in.)
Aluminum— 0—0.7 mm (0.028 in.)

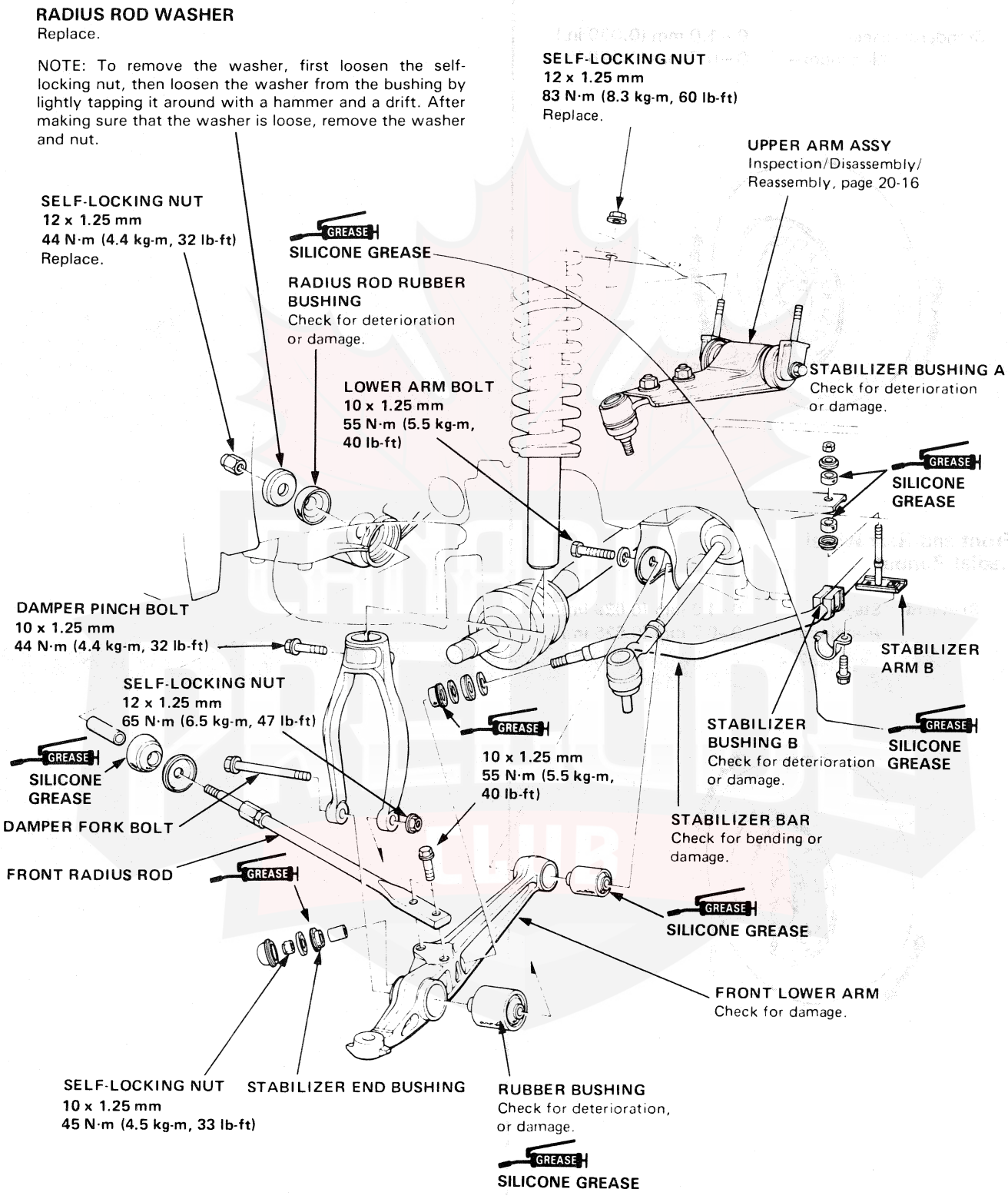


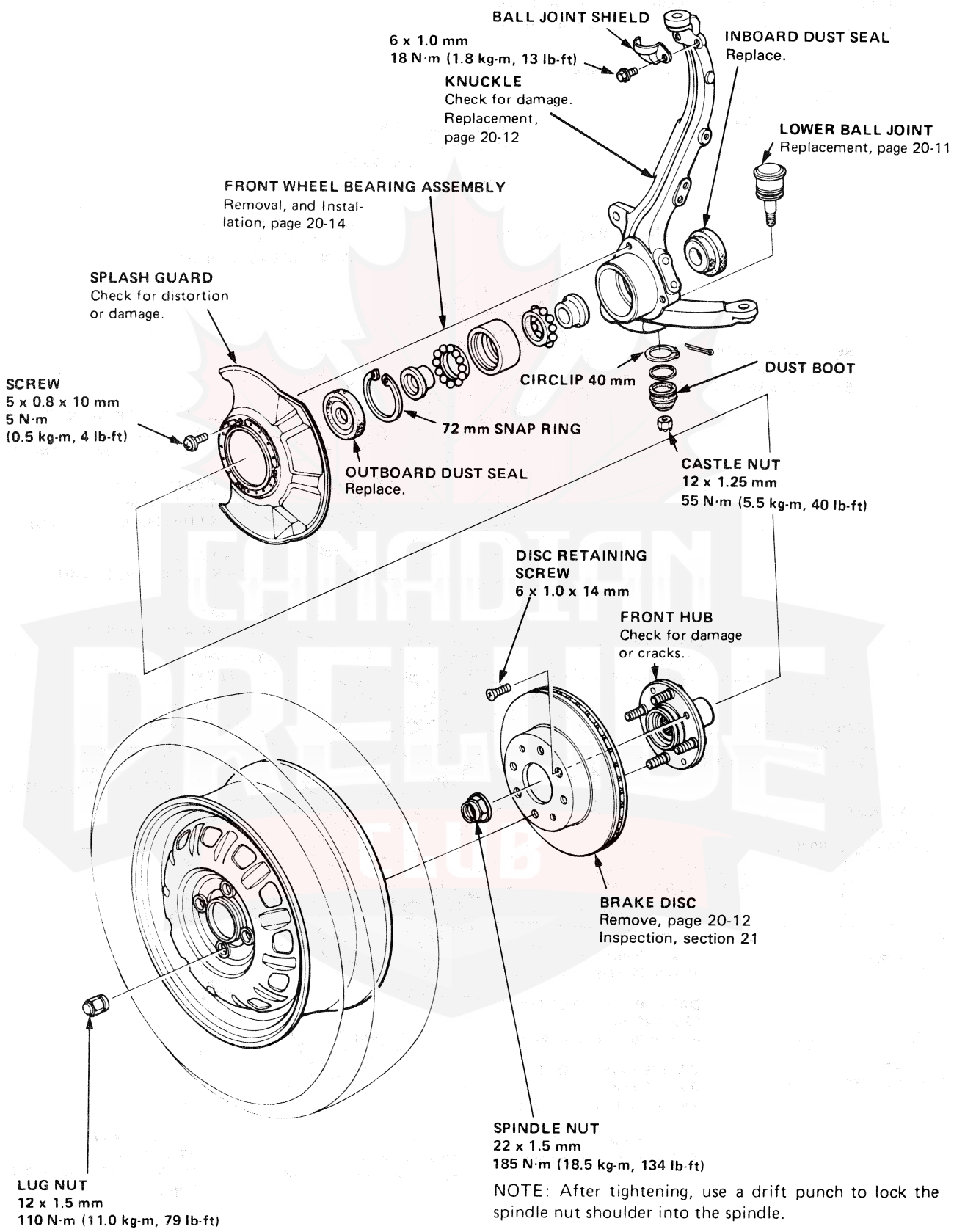
Front and Rear Wheel Radial Runout

Standard: Steel — 0—1.0 mm (0.039 in.)
Aluminum — 0—0.7 mm (0.028 in.)



Disassembly and Inspection



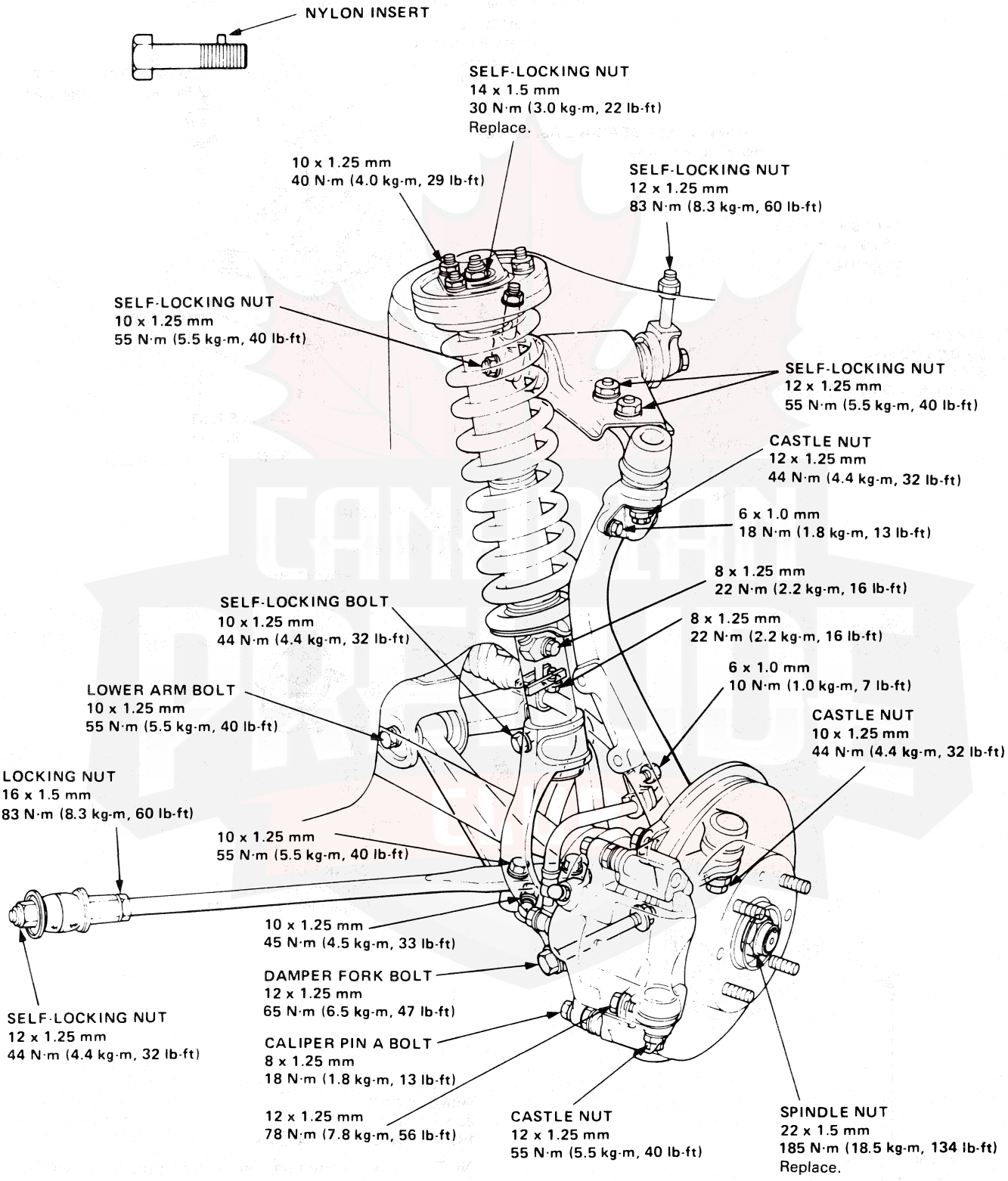


NOTE: After tightening, use a drift punch to lock the spindle nut shoulder into the spindle.

Front Suspension

Torque Specs

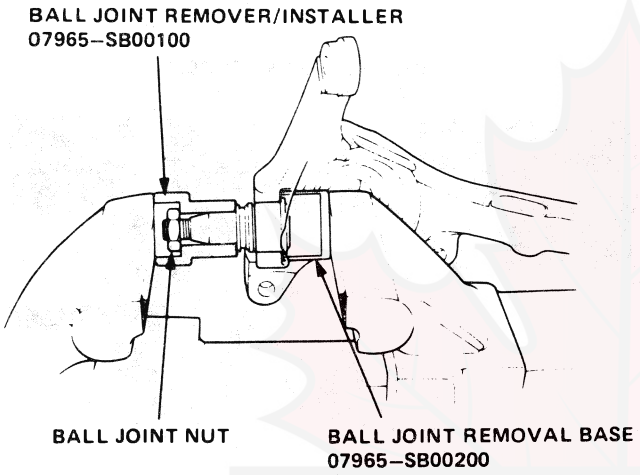
NOTE: Replace the self-locking bolts if you can easily thread a nut past their nylon locking inserts.



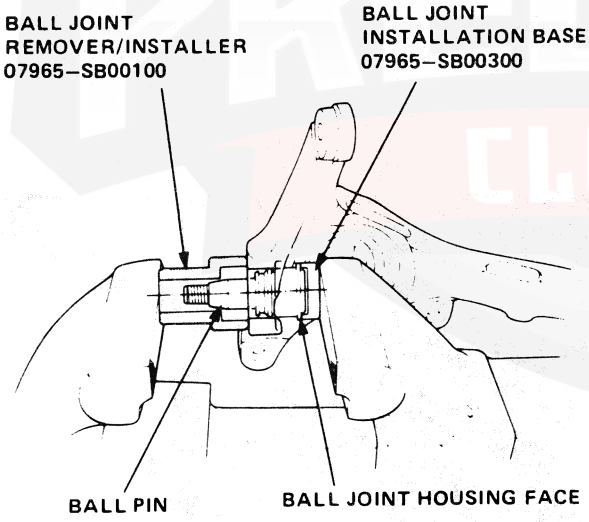
Lower Ball Joint Replacement

NOTE: See page 20-12 for knuckle removal.

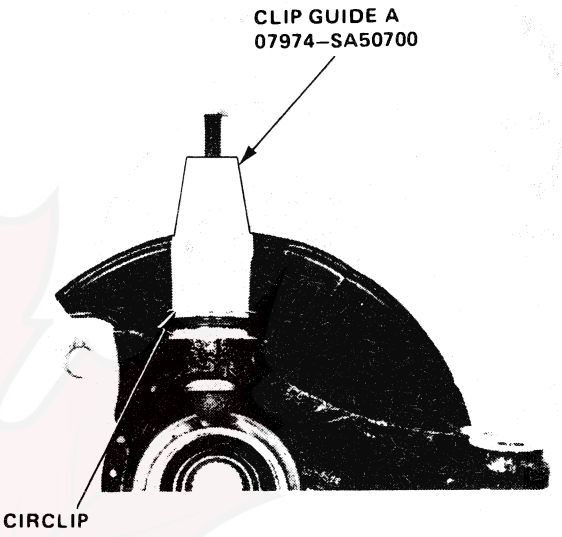
1. Remove the boot by prying the circlip off.
2. Pry the snap ring out of groove in the ball joint.
3. Tighten the ball joint nut using the special tool.



4. Position the special tool between the ball joint housing and knuckle and set them in a vise. Press the ball joint out of the knuckle.
5. Press the ball joint into place in the hole of the knuckle by hand.
6. Install the special tool on the ball joint inside out.

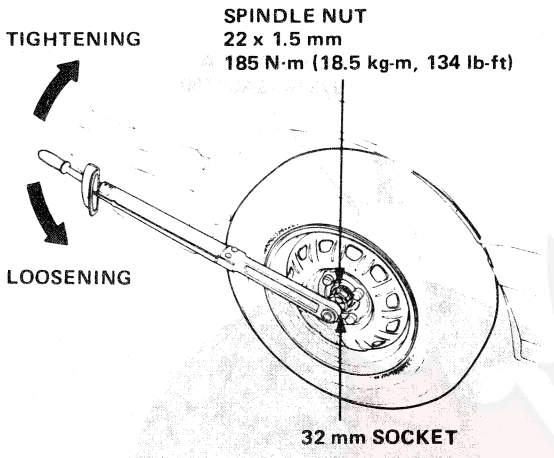


7. Install special tool between the jaws of a vise and end of the ball joint housing and press the ball joint into place in the knuckle.
8. Seat snap ring in groove of the ball joint.
9. Install the boot and circlip using the Clip Guide A.



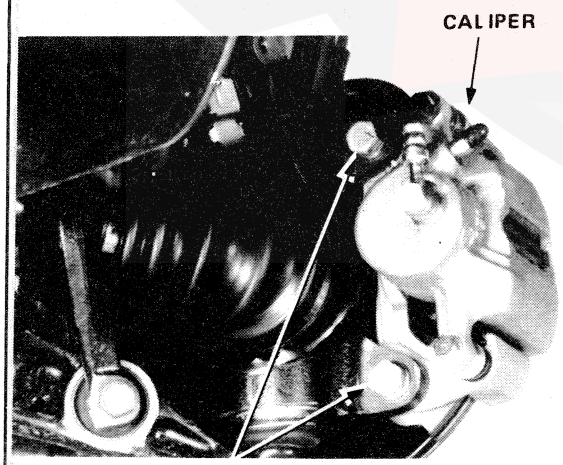
Knuckle/Hub Replacement

1. Pry the spindle nut lock tab away from the spindle, then loosen the nut using a 32 mm socket.



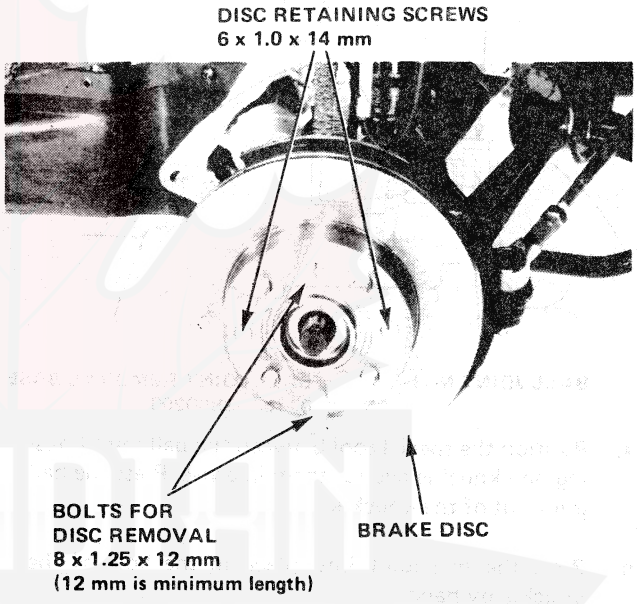
2. Loosen the lug nuts slightly.
3. Raise the front of car and support on safety stands in proper locations.
4. Remove the lug nuts, wheel, and spindle nut.
5. Remove the caliper mounting bolts and hang the caliper assembly to one side.

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 undercarriage.

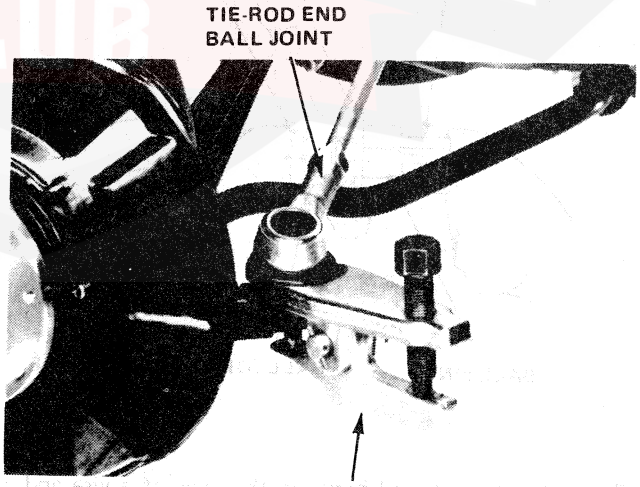


6. Remove the 6 mm brake disc retaining screws.
7. Screw the two 8 x 1.25 x 12 mm bolts into the disc to push it away from the hub.

NOTE: Turn each bolt two turns at a time to prevent cocking disc excessively.

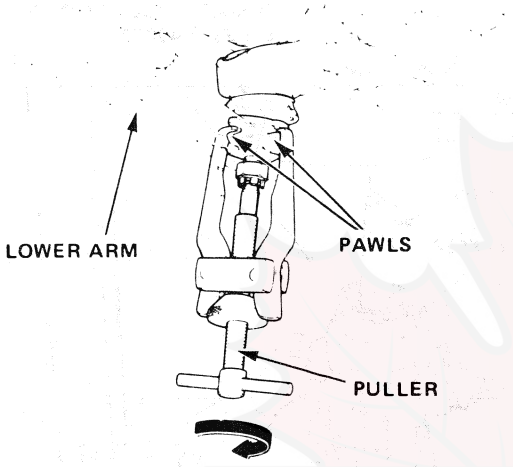


8. Remove the cotter pin from the tie-rod end and remove the castle nut.
9. Break loose the tie-rod ball joint using Ball Joint Remover, then lift the tie-rod out of the knuckle.



10. Pry the cotter pin off and loosen the lower arm ball joint nut half the length of the joint threads.

11. Separate the ball joint and lower arm using a puller with the pawls applied to the lower arm.



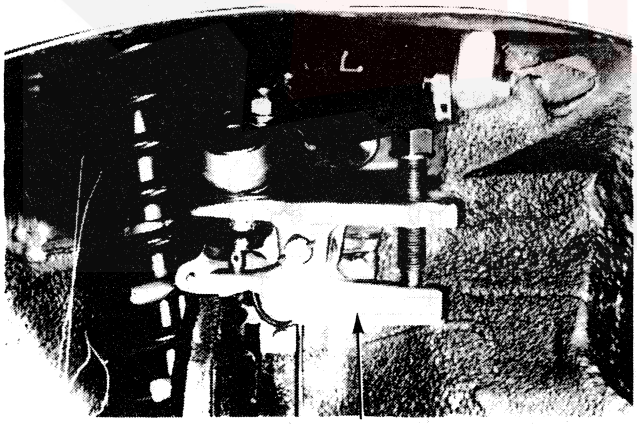
CAUTION : Avoid damaging the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

12. Remove the upper ball joint shield.

13. Pry off the cotter pin and remove the upper arm ball joint nut.

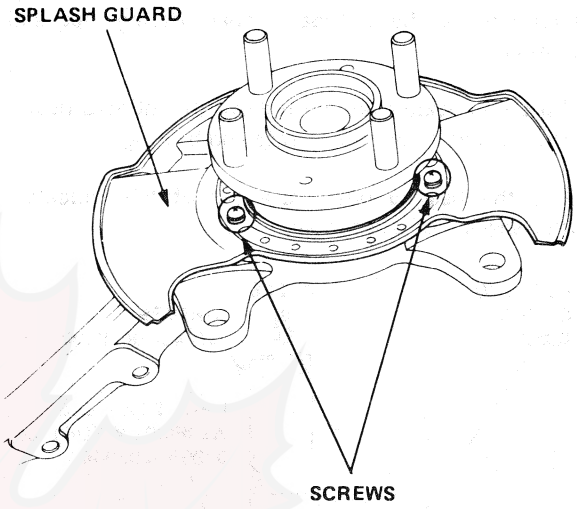
14. Separate the upper ball joint and knuckle using the Ball Joint Remover.



BALL JOINT REMOVER
07941–6920002

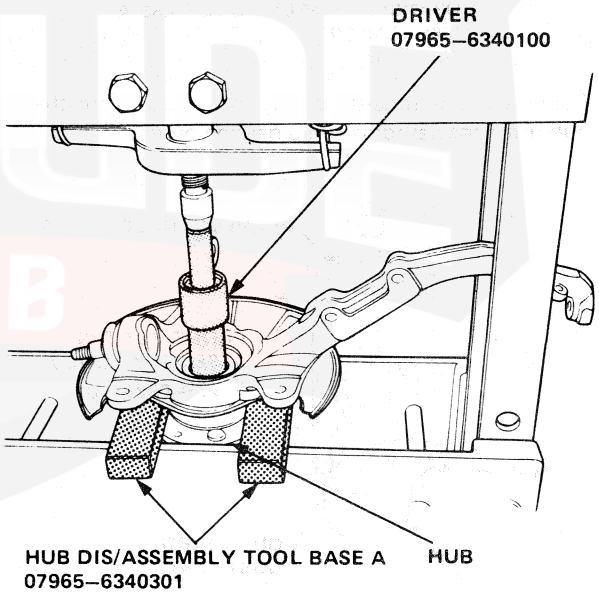
15. Remove the knuckle and hub by sliding them off the driver shaft.

16. Remove the two screws from the knuckle.



17. Separate the hub from the knuckle using special tools and a hydraulic press.

CAUTION :
- **Take care not to distort the splash guard.**
- **Hold onto the hub to keep it from falling when pressed clear.**



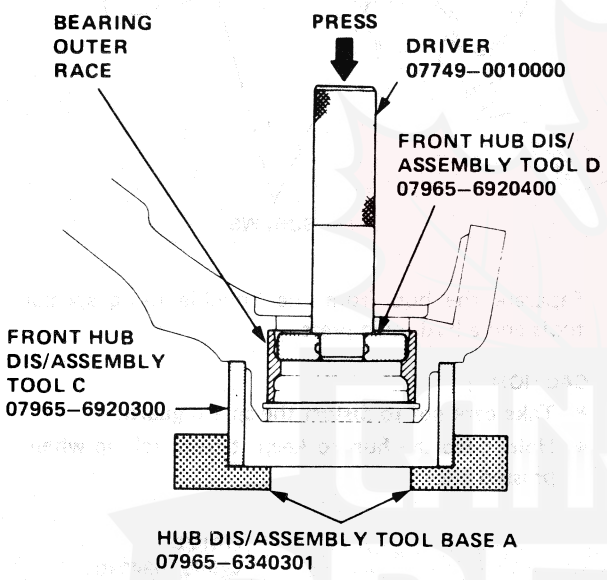
18. Remove the splash guard.

NOTE: Assemble the hub and knuckle in the reverse order of disassembly. Use a new spindle nut, and stake after torquing.

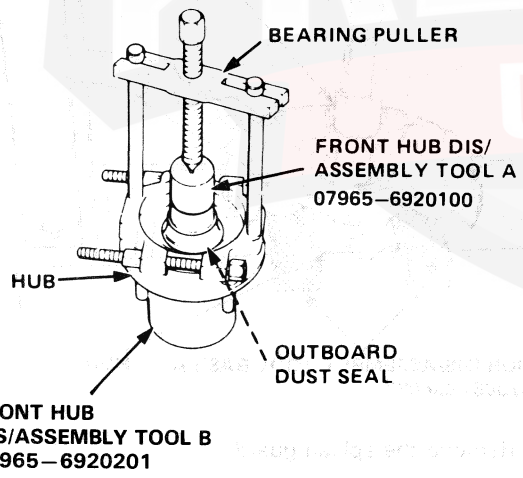
Wheel Bearing Replacement

Removal

1. Remove the outboard dust seal and 72 mm snap ring, then remove the outboard inner bearing race and bearing.
2. Flip the knuckle over and remove the inboard dust seal, inboard inner bearing race and bearing.
3. Press the bearing outer race out of the knuckle using special tools as shown.



4. Remove the outboard bearing inner race from the hub using special tools and a bearing puller.



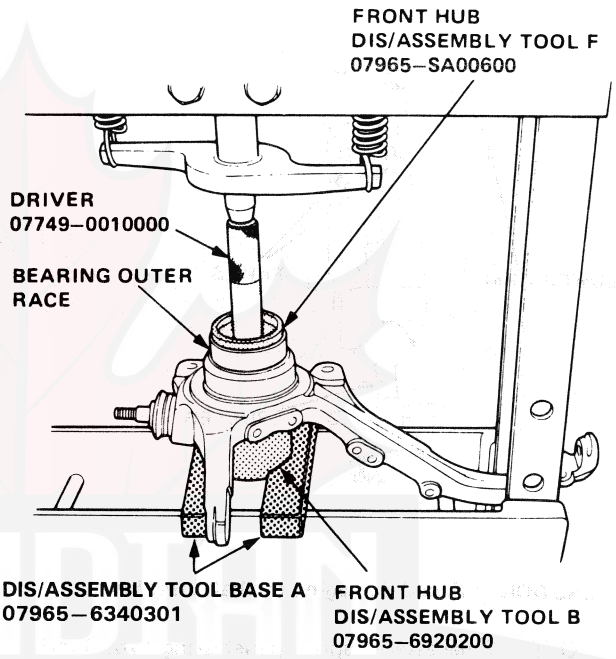
5. Then, remove the outboard dust seal from the hub.

NOTE: Wash the knuckle and hub thoroughly before re-assembly.

Installation

1. Press the bearing outer race into the knuckle using special tools.

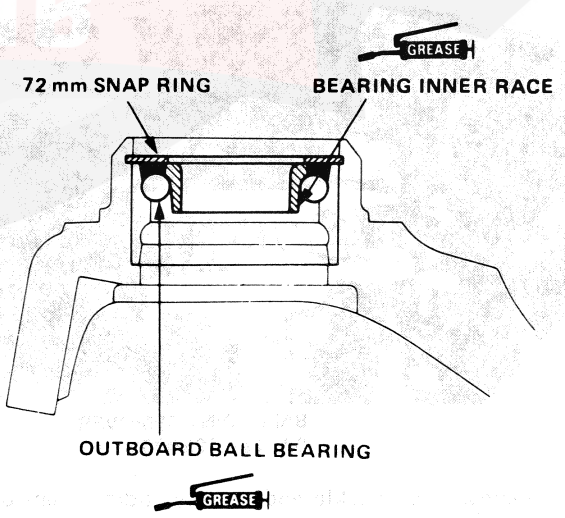
CAUTION: Maximum press load: 2.5 tons.



2. Install the outboard ball bearing and its inner race in the knuckle.

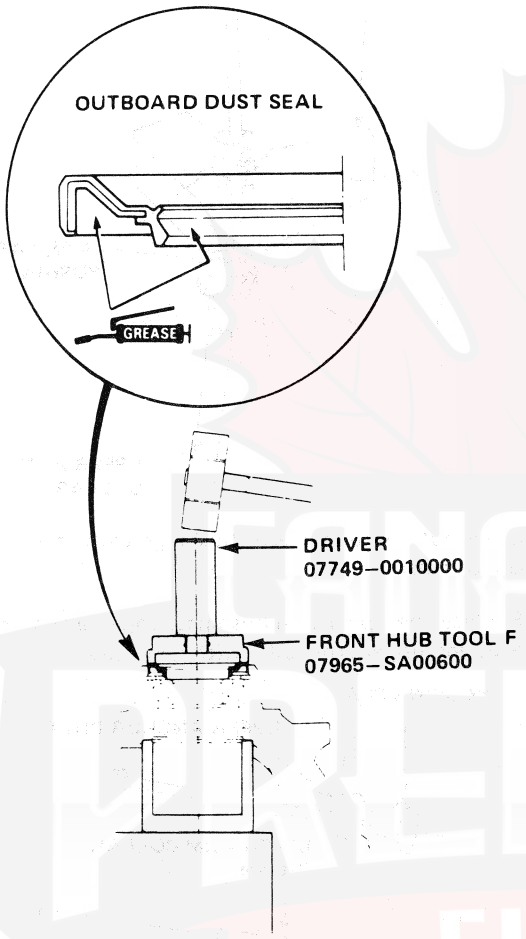
NOTE: Pack both wheel bearings with grease before installation. Also apply grease to the outer race and both inner races.

3. Install the 72 mm snap ring in the knuckle groove securely.

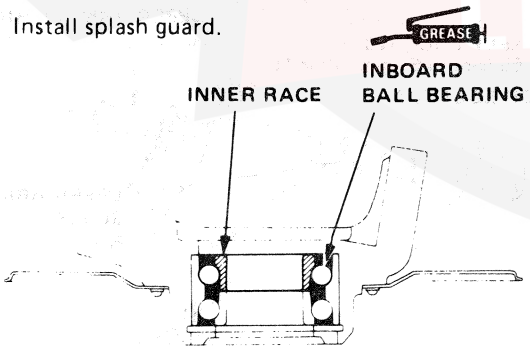


4. Pack grease in the groove and around the sealing lip of the outboard dust seal.

5. Drive the outboard dust seal into the knuckle, using special tools and hammer, until it is flush with the knuckle surface.



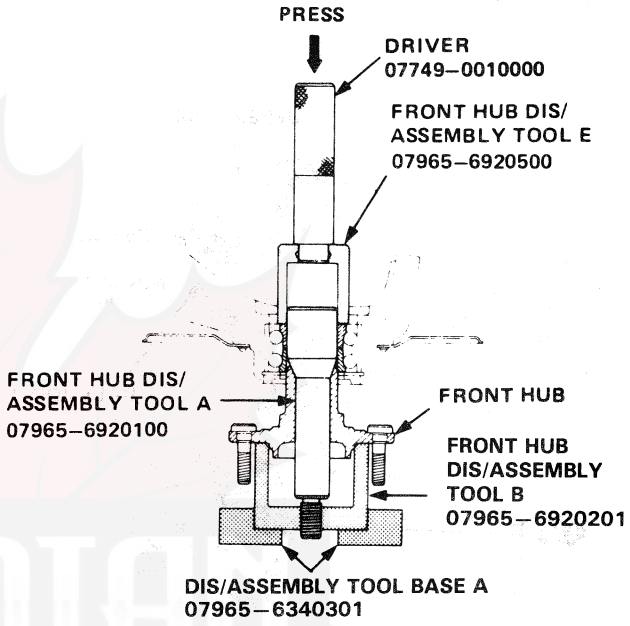
6. Install splash guard.



7. Turn the knuckle upside down and install the inboard ball bearing and its inner race.

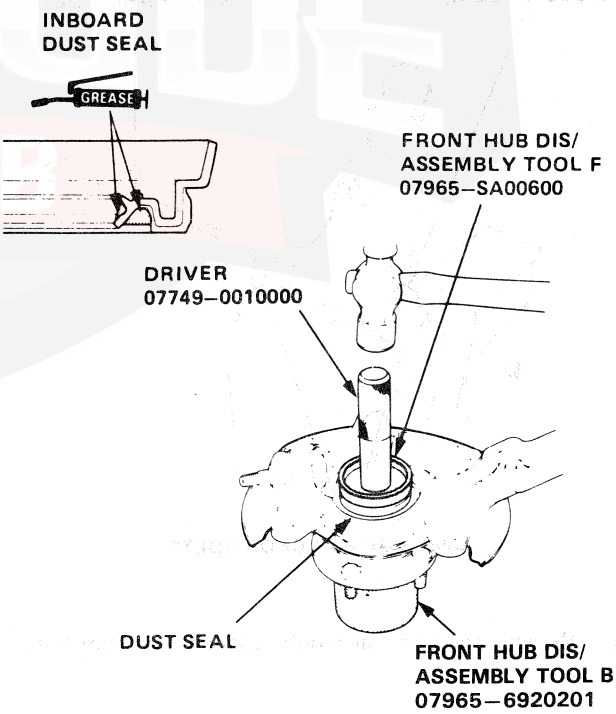
8. Place the front hub in special tool fixture, then set the knuckle in position and apply downward pressure with a hydraulic press.

CAUTION: Maximum press load: 2.0 tons



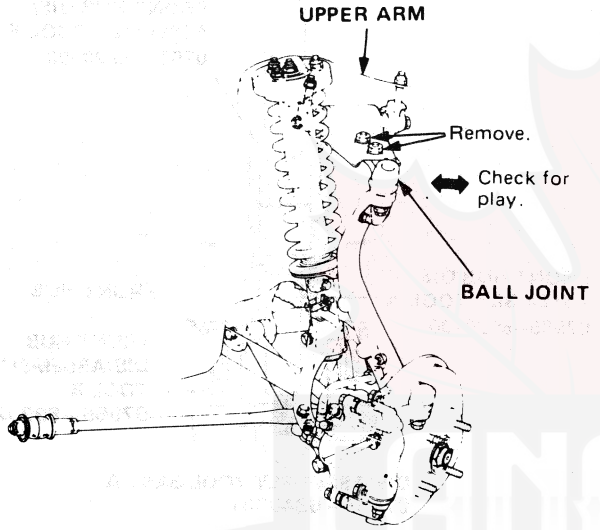
9. Pack grease in the groove and around the sealing lip of the inboard dust seal.

10. Drive the inboard dust seal into the knuckle using special tools.

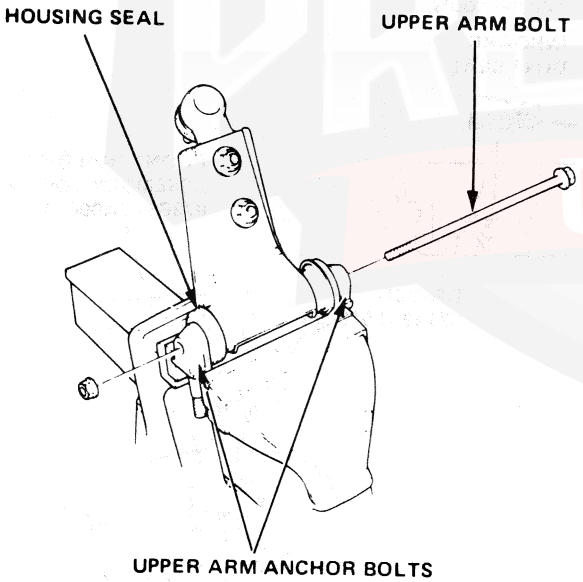


Upper Arm Inspection/Disassembly/Reassembly

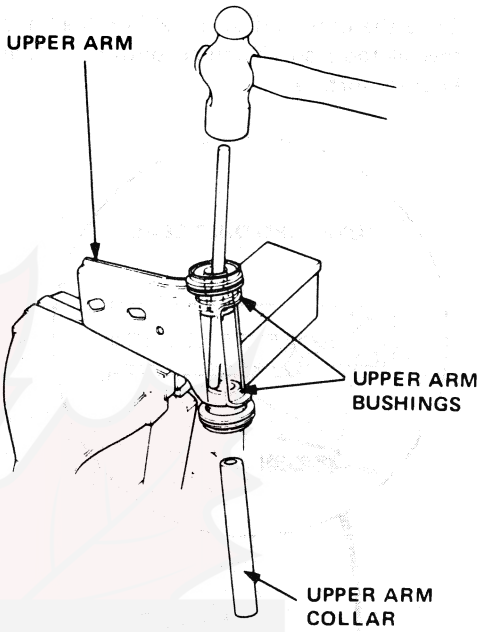
1. Remove the front wheels.
2. Rock the upper ball joint front-to-back with a force of approx. 30 kg (65 lb).
3. Replace the upper arm bushings as follows if there is any play.



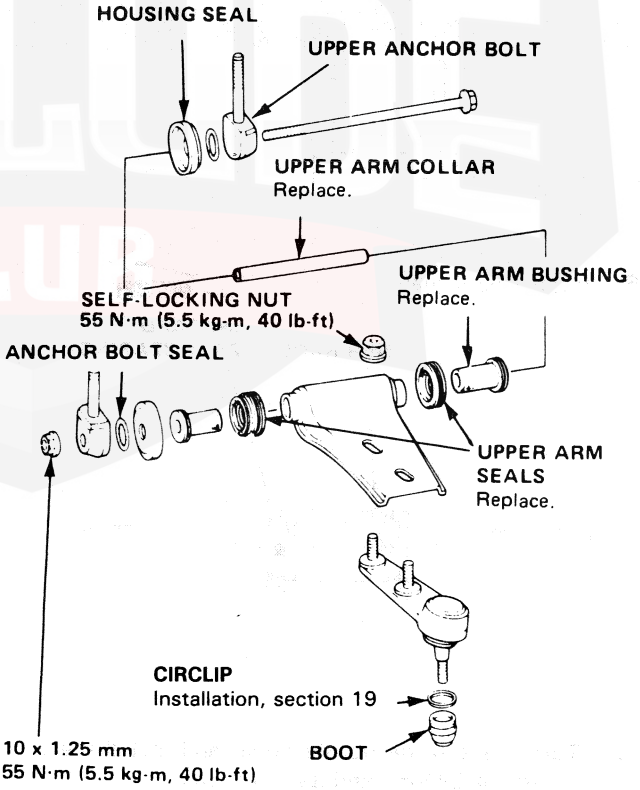
4. Lightly hold the upper arm anchor bolts in the jaws of a vise as shown.



5. Remove the upper arm bolt, upper arm anchor bolts and seals.
6. Install the upper arm in a vise.
7. Remove the upper arm collar.

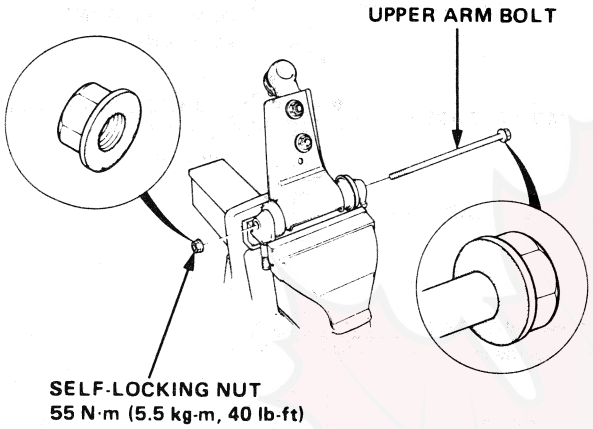


8. Drive out the upper arm bushings with the round end of a bar.
9. Replace the upper arm bushings, upper arm bushing seals and upper arm collar with new ones.



10. Coat the ends and insides of the upper arm bushings and sealing lips of the upper arm bushing seals with grease.

11. Lightly hold the upper arm anchor bolts in a vise.



12. Apply sealant to the threads and underside of the upper arm bolt heads and self-locking nut. Install the upper arm bolt and tighten the self-locking nut.

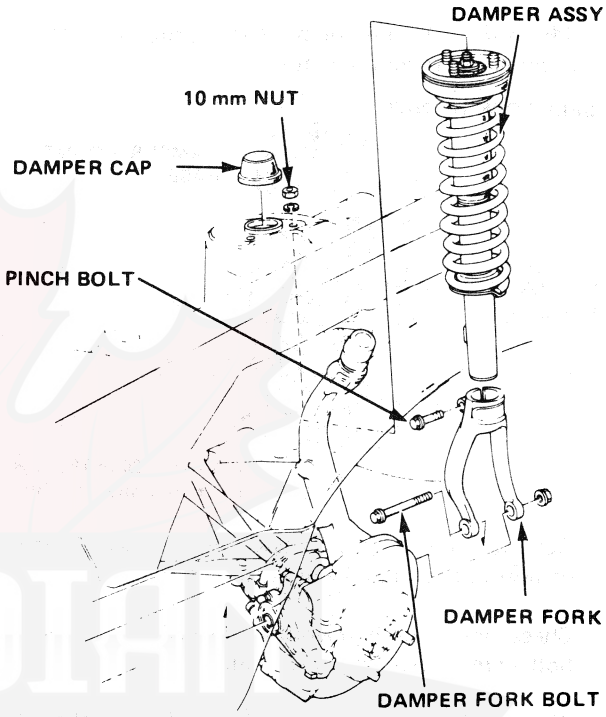
    NOTE: Do not apply sealant to the areas other than specified.

13. After installing, adjust the camber (page 20-3).

Damper Removal

1. Remove the damper pinch bolt.

2. Remove the damper fork bolt and remove the damper fork.



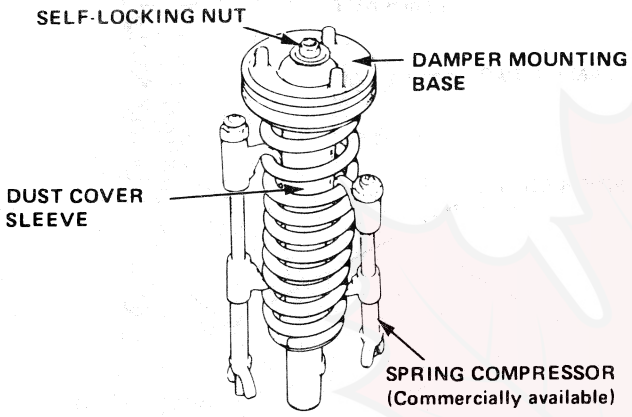
3. Remove the damper assembly.

Damper Disassembly and Inspection

1. Compress the Damper spring using a Spring Compressor, then remove the self-locking nut.

   WARNING Follow spring compressor manufacturer's instructions carefully.

   CAUTION : Do not compress the spring more than necessary to remove the nut.

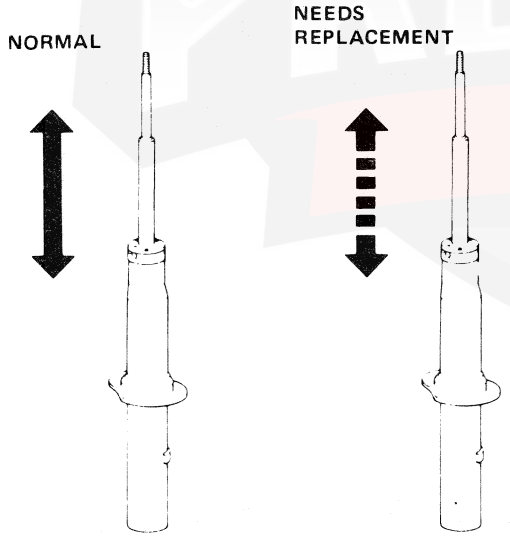


2. Remove the spring compressor and disassemble the damper as shown in the next column.

3. Check for smooth operation through full stroke, both compression and extension.

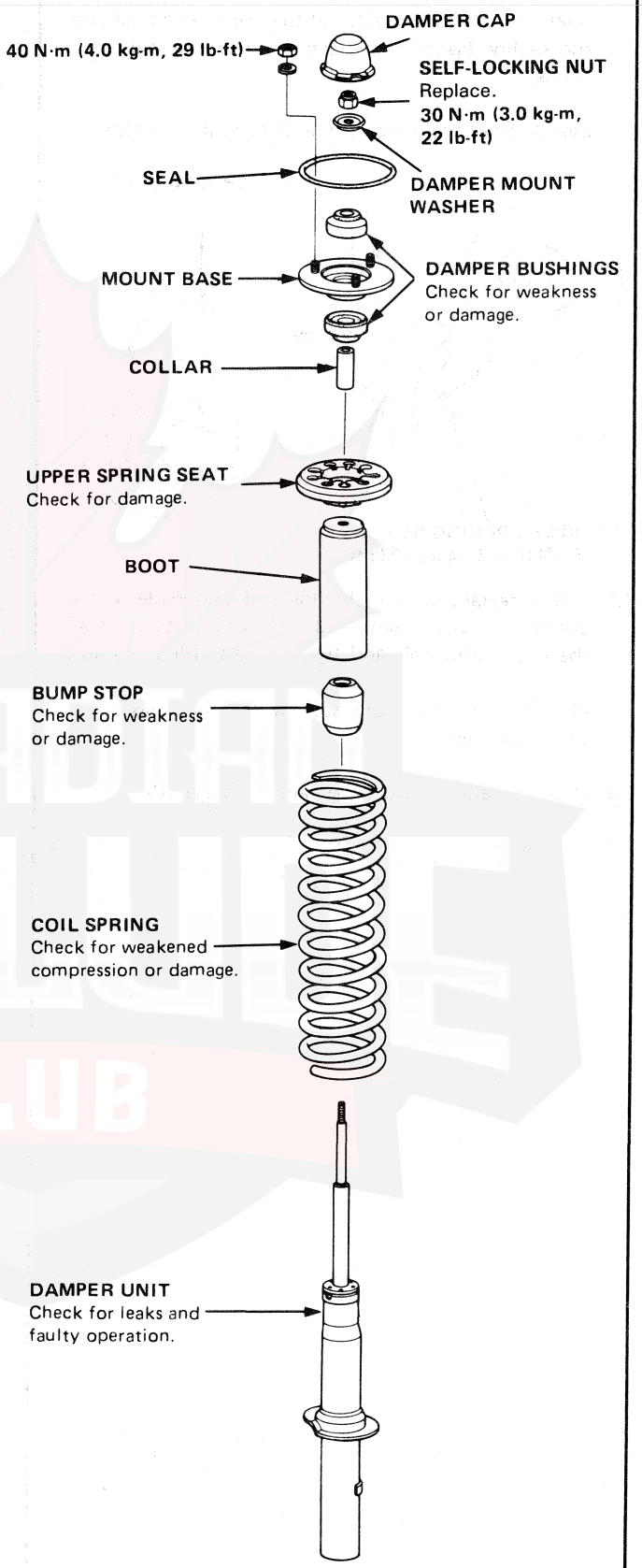
4. Also check for smooth operation in short strokes of 5–10 cm (2–4 in).

   Replace the damper if resistance is uneven or jerky.



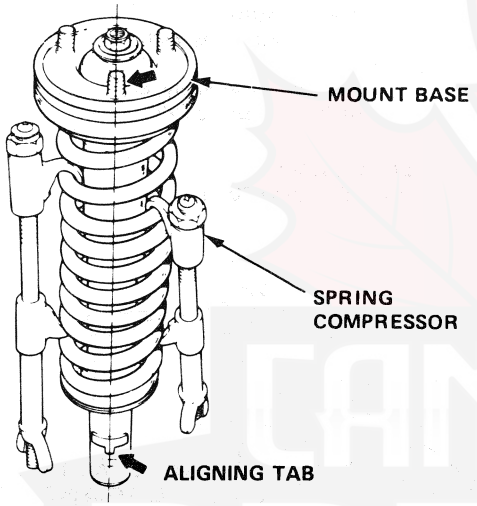
5. Check for abnormal noise or binding during these tests.

6. Check for oil leaks.

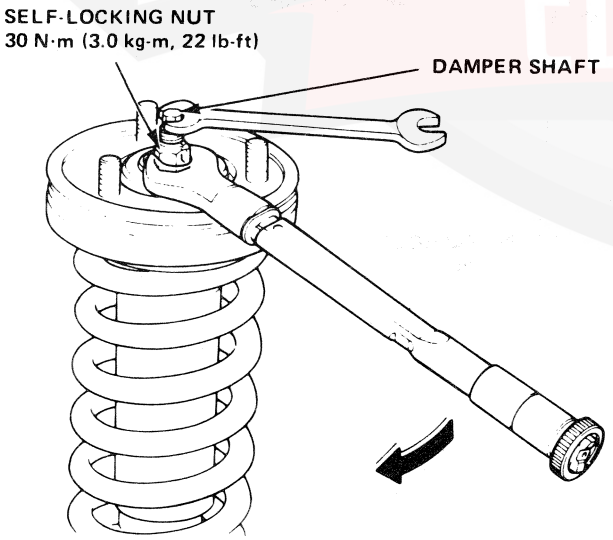


Damper Reassembly

1. Compress the shock absorber spring in the Spring Compressor, and install the spring on the damper.
2. Install the bump stop, boot, upper spring seat, collar and bushing on the damper shaft.
3. Install the mount base and bushing on the damper shaft. Position the mount base so that one of its stud bolts aligns with the aligning tab on the damper.

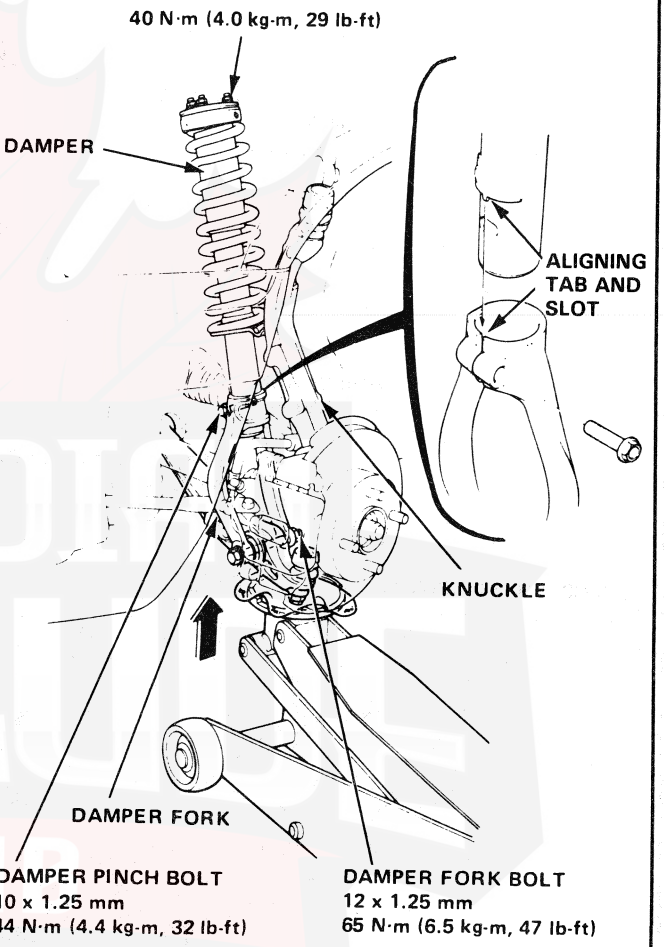


4. Install the washer on the damper shaft. Install and tighten a new self-locking nut.



Damper Installation

1. Loosely install the damper on the frame with the aligning tab facing the inside of the frame.
2. Install the damper fork on the driveshaft and lower arm. Install the damper in the damper fork with the aligning tab aligned with the slot in the damper fork.



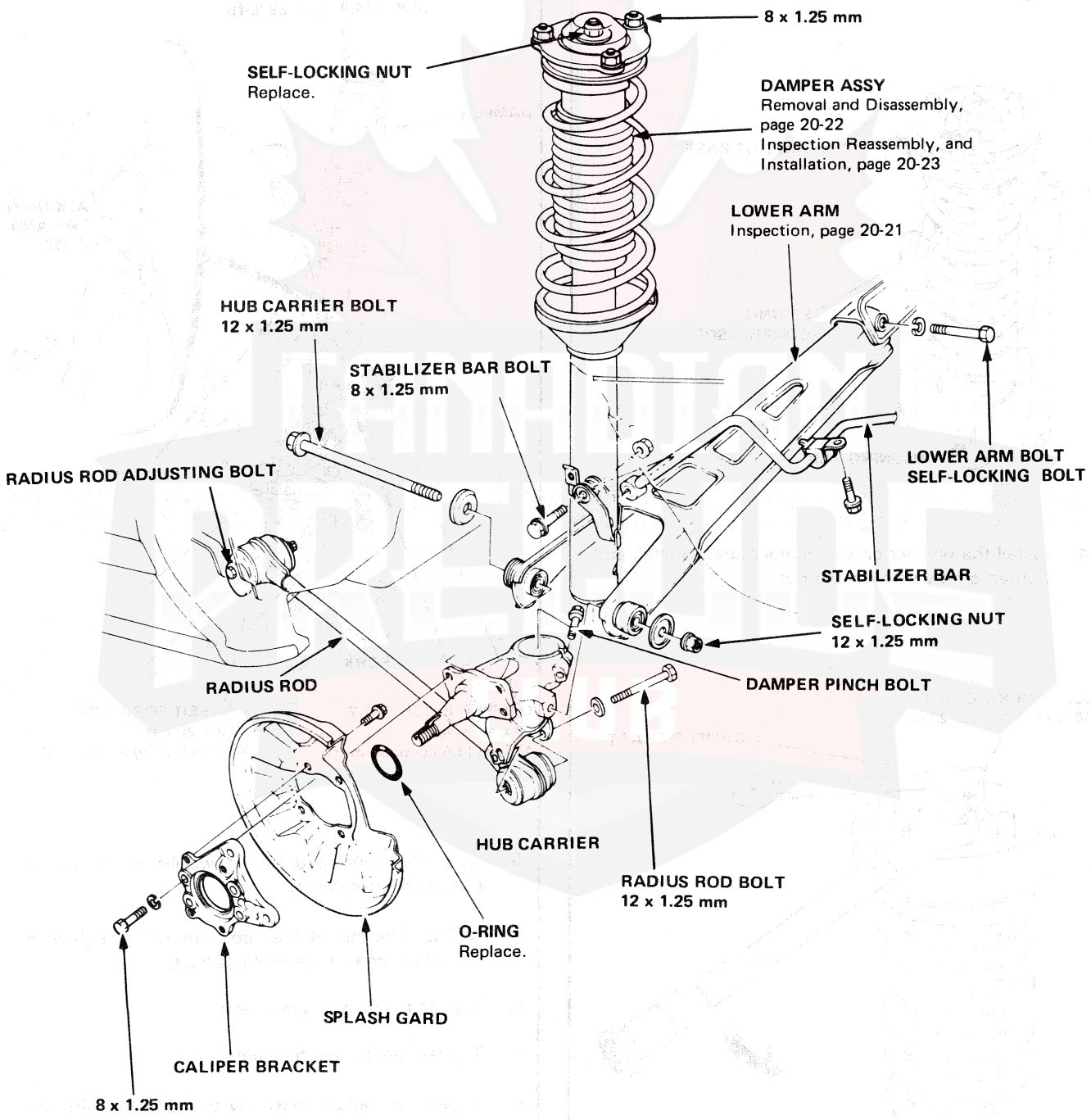
3. Raise the knuckle until the weight of the car is placed on the damper.

   NOTE: The mount base bolts should be tightened with the damper under vehicle load.
4. Tighten the damper pinch bolt.
5. Tighten the damper fork bolt.
6. Secure the damper assembly to the frame with the 8 mm mount nuts.

Disassembly

WARNING **Block the front wheels before jacking up the car.**

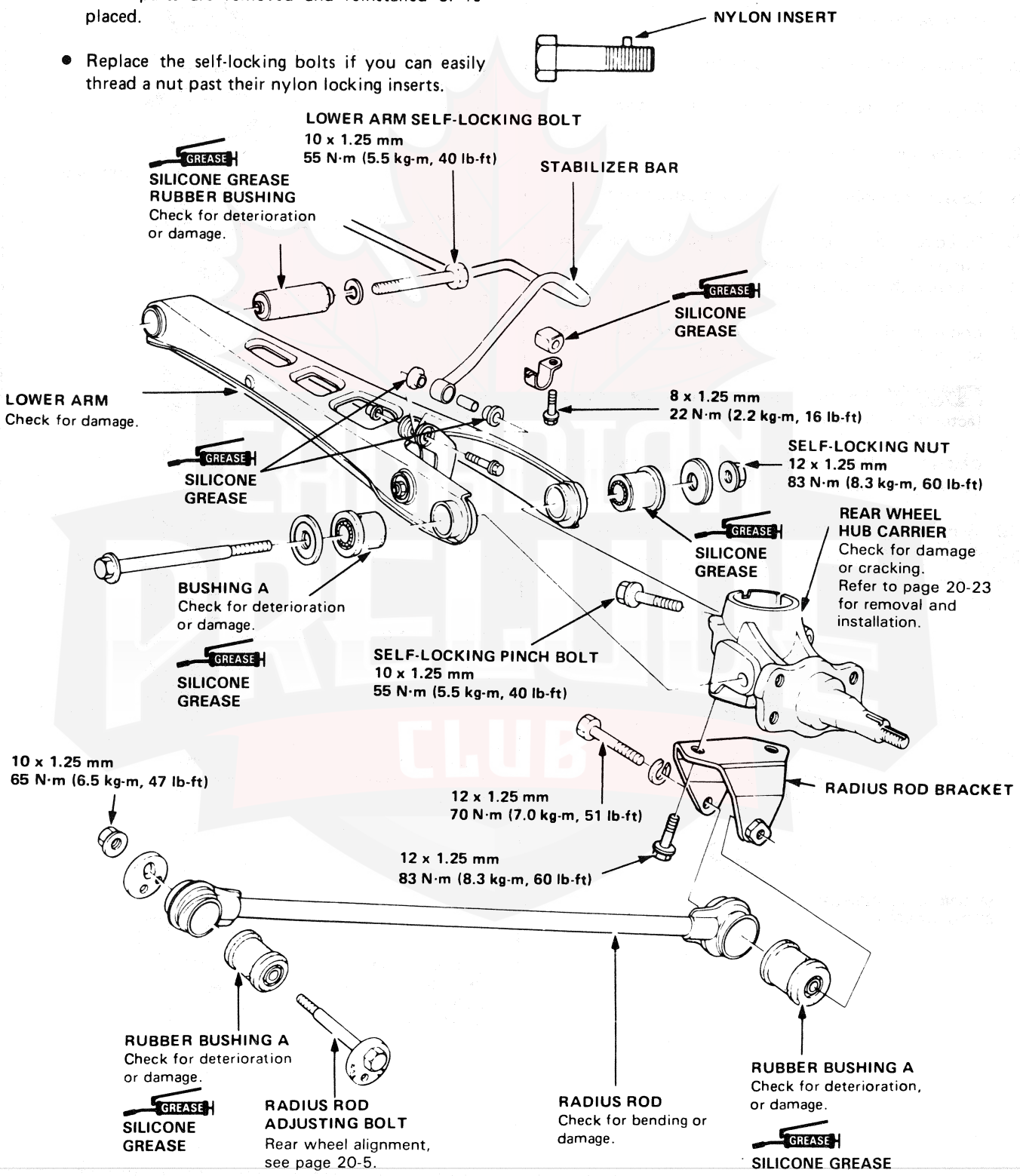
1. Jack up the rear of the car and support with safety stands in proper locations.
2. Remove the rear wheel and brake disc.
3. Remove the caliper bracket and splash guard.
4. Remove the radius rod bolt and radius rod adjusting bolt, then remove the radius rod.
5. Unscrew the stabilizer bolt and remove the stabilizer spring.
6. Loosen the damper lock bolt and remove the hub carrier from the rear damper.
7. Unscrew the lower arm bolt and remove the lower arm.



Inspection and Reassembly

NOTE:

- Check all rubber parts for deterioration or damage.
- Adjust the rear wheel alignment when any of these parts are removed and reinstalled or replaced.
- Replace the self-locking bolts if you can easily thread a nut past their nylon locking inserts.



Damper Removal and Disassembly

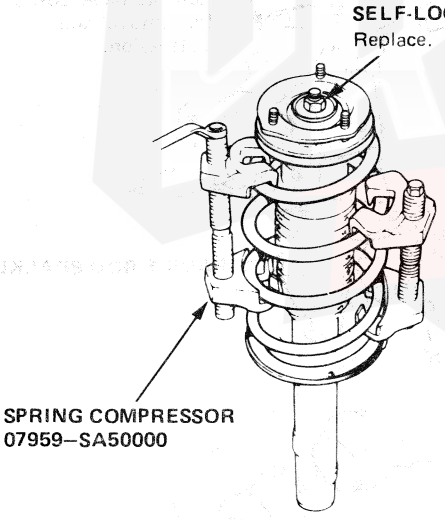
WARNING **Block front wheels before jacking up rear of car.**

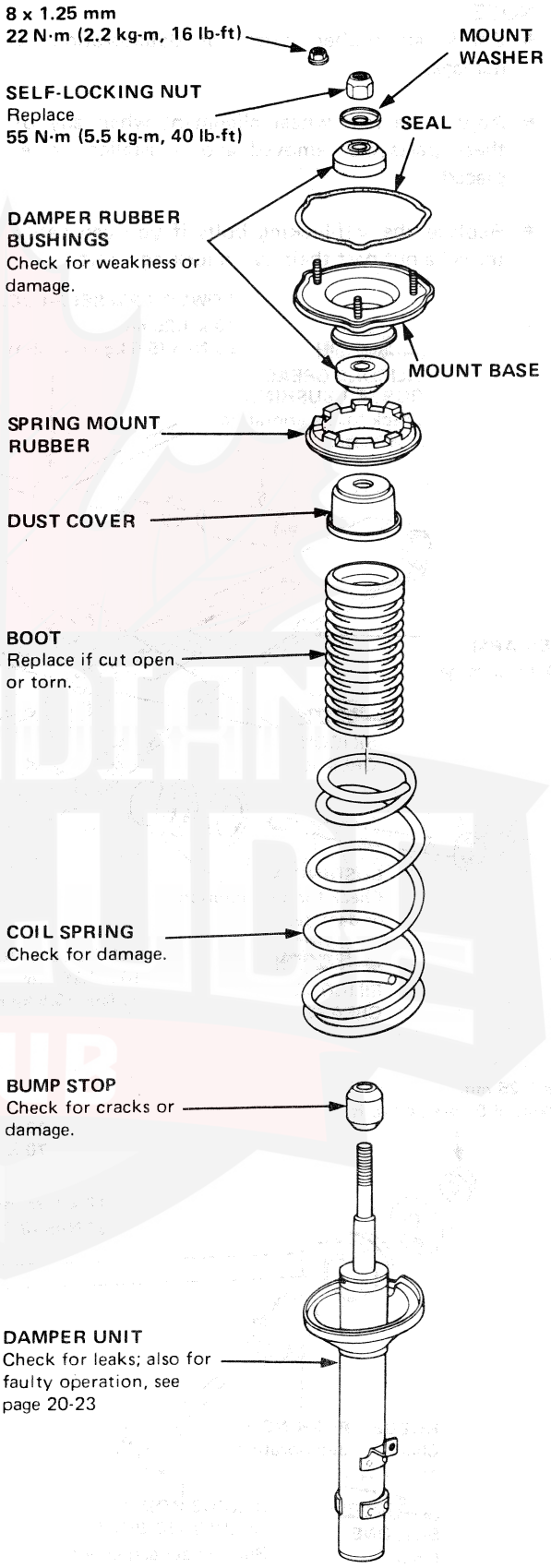
1. Jack up rear of car and support on safety stands in proper locations.
2. Remove rear wheel.
3. Remove the brake hose clamp bolt.
4. Remove the stabilizer bar from the lower arm.
5. Loosen the lower arm bolt.
6. Loosen the radius rod nut and hub carrier bolt.
7. Remove the damper lock bolt and remove the damper from the hub carrier.
8. Unscrew the mount nuts and remove the damper.
9. Compress the damper spring using Spring Compressor and remove the self-locking nut.

WARNING **Follow spring compressor manufacturer's instructions carefully.**

CAUTION : Do not compress the spring more than necessary to remove the center locknuts.

10. Remove Spring Compressor and disassemble the damper. See next column.

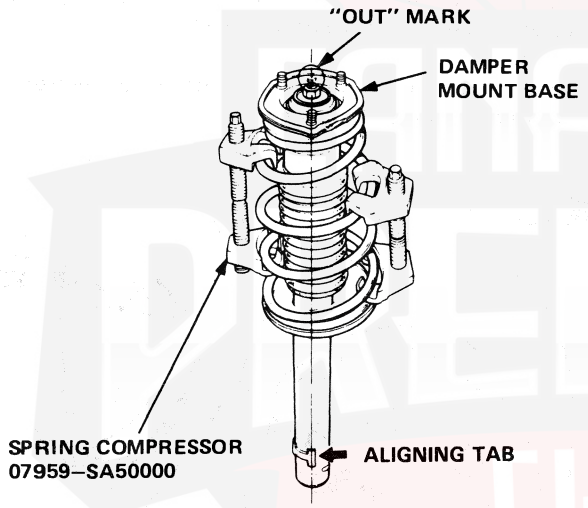




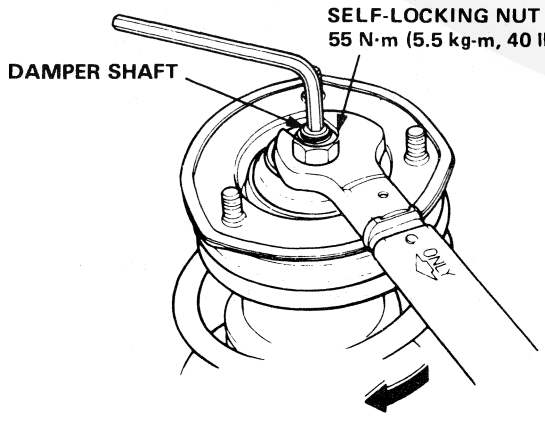
Damper Inspection and Reassembly

1. Check for smooth operation through full stroke, both compression and extension.
2. Also check for smooth operation in short strokes of 5–10 cm (2–4 in.).

   Replace the damper if resistance is uneven or jerky.
3. Check for abnormal noise or binding during above tests.
4. Check for oil leaks.
5. Compress the damper spring in the Spring Compressor and install the spring on the damper.
6. Install the bump stop, dust cover, boot and spring mount rubber.
7. Install the damper mount base with its "OUT" mark opposite the aligning tab on the damper.



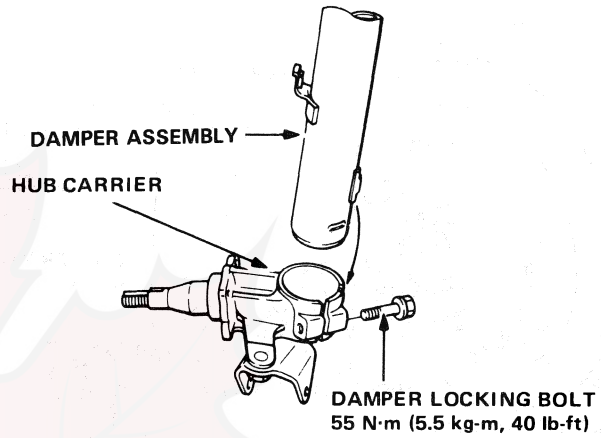
8. Install the damper rubber bushing and mount washer on the damper shaft. Install and tighten a new self-locking nut.



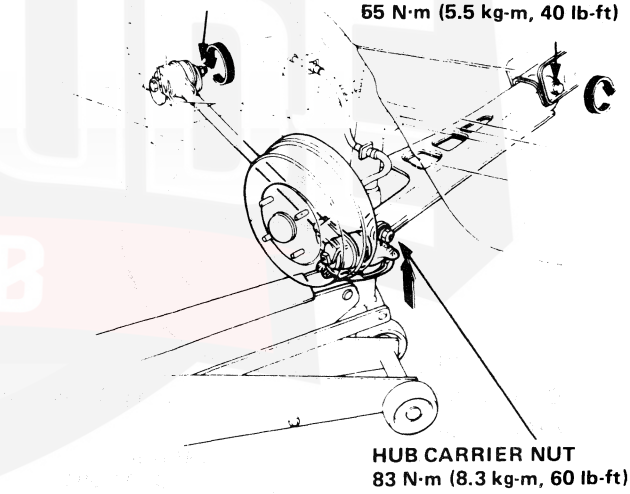
Damper Installation

NOTE: Install the rear suspension in the reverse order of removal, noting the following:

1. Align the tab on the shock absorber with the slot in the hub carrier and assemble.



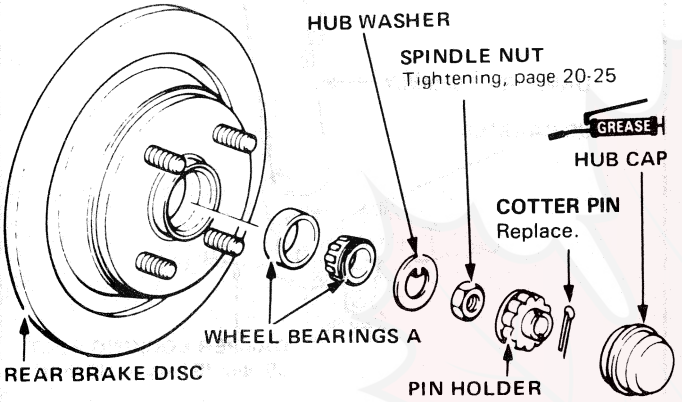
2. Tighten the self-locking bolt to the specified torque.
3. Tighten the lower arm bolt and the radius rod adjusting bolt loosely in frame.



4. Place jack under the hub carrier and raise until the car just lifts off of safety stand.
5. Tighten the lower arm bolt to the specified torque.
6. Install the stabilizer bar.
7. Tighten the radius rod adjusting bolt to the specified torque.

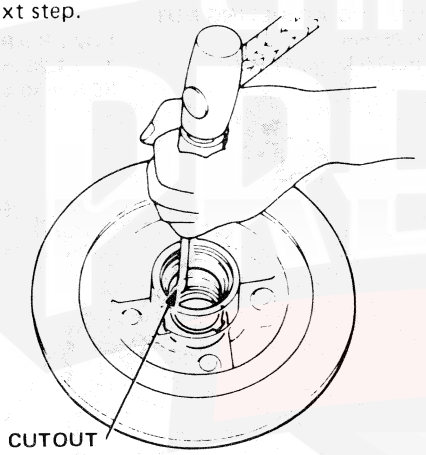
Wheel Bearing and Seal

1. Remove the rear brake caliper (section 21).
2. Remove the rear hub cap.
3. Remove the cotter pin and pin holder.
4. Remove the spindle nut, then pull the brake disc off.

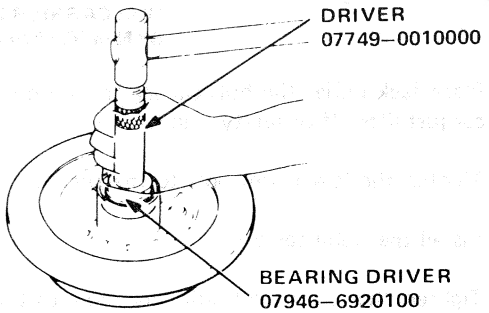


5. Drive the outboard and inboard bearing races out of the brake disc. Punch in a criss-cross pattern to avoid cocking the bearing race in the bore.

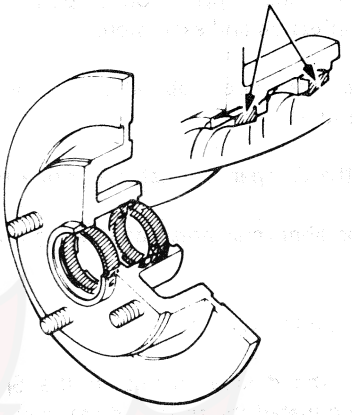
   NOTE: Clean bearing seats thoroughly before going on to next step.



6. Drive in the inboard bearing race using Driver and Attachment.

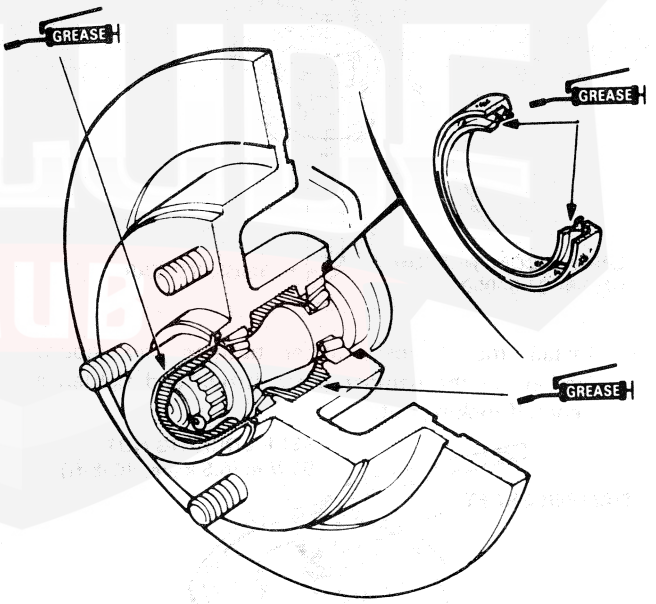


7. Turn the disc over and drive in the outboard bearing race the same way.
8. Check that the bearing races are seated properly.



9. Pack multipurpose grease into both bearings and also in the shaded areas shown below.
10. Place the inboard bearing in the disc.
11. Apply grease to the hub seal, as shown below, and carefully tap into place using a mallet.

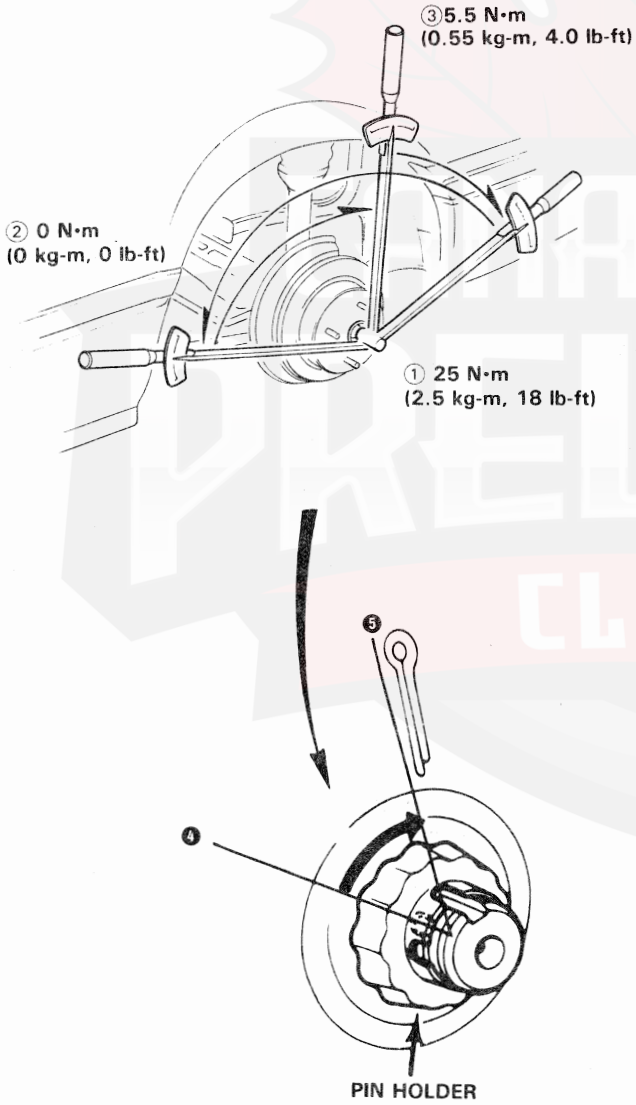
    NOTE: Tap in a criss-cross pattern to prevent cocking the seal in the bore.



12. Slip the disc over the spindle, then install the outboard bearing, hub washer, and spindle nut.
13. Torque the spindle nut and secure as shown on next page.

Wheel Bearing Adjustment

1. Apply grease or oil on the spindle nut and spindle threads.
2. Install and tighten the spindle nut to 25 N•m (2.5 kg-m, 18 lb-ft) and rotate the brake disc 2-3 turns by hand, then retighten the spindle nut to 25 N•m (2.5 kg-m, 18 lb-ft).
3. Repeat step 2 until the spindle nut holds that torque.
4. Loosen the spindle nut to 0 N•m (0 kg-m, 0 lb-ft).
   NOTE: Loosen the nut until it just breaks free, but does not turn.
5. Retighten the spindle nut to 5.5 N•m (0.55 kg-m, 40 lb-ft).
6. Set the pin holder so slots will be as close as possible to hole in spindle.
7. Tighten the spindle nut just enough to align slot and hole, then secure with a new cotter pin.

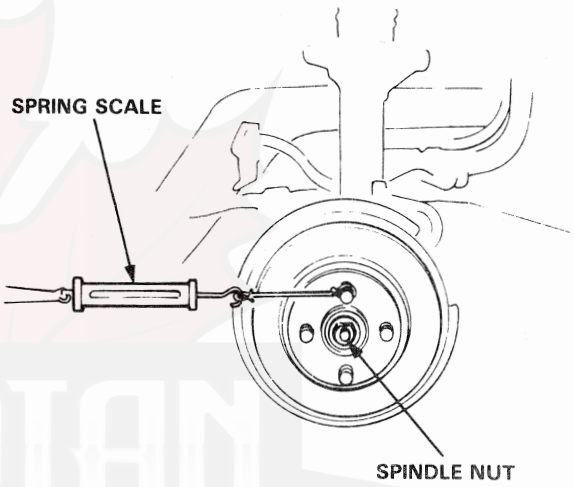


Bearing Drag Measurement

1. Remove the both rear brake calipers.
2. Check drag on rear bearing by turning the brake disc with spring scale.

   Standard bearing drag:
   4—18 N (0.4—1.8 kg, 0.9—4.0 lb)

   If reading exceeds limit, check spindle nut torque and check for damaged bearing.



Brakes

Carbureted Model

Fuel Injected Model

Brakes

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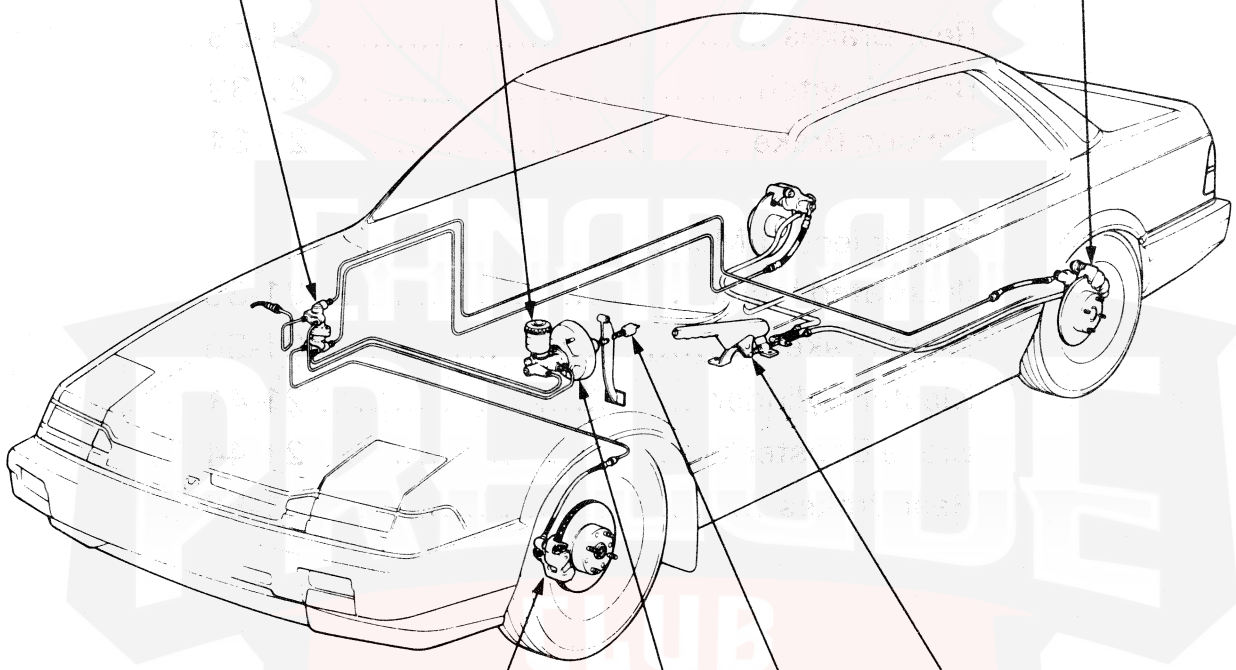

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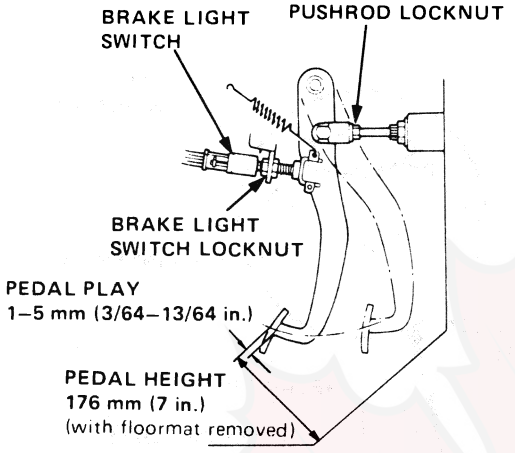
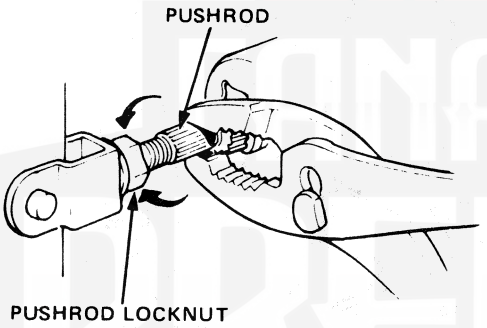
Pedal Height

Adjustment

1. Loosen the brake light switch locknut and back off the brake light switch until it is no longer touching the brake pedal.

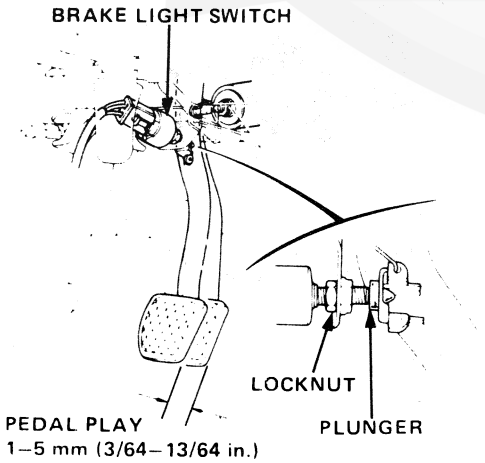


2. Loosen the pushrod locknut and screw the pushrod in or out with pliers until the pedal is 176 mm (7 in.) from the floor. After adjustment, tighten the locknut firmly.



3. Screw in the brake light switch until its plunger is fully depressed (threaded end touching the pad on the pedal arm). Then back off the switch 1/2 turn and tighten the locknut firmly.

CAUTION : Check that brake lights go off when pedal is released.



Parking Brake

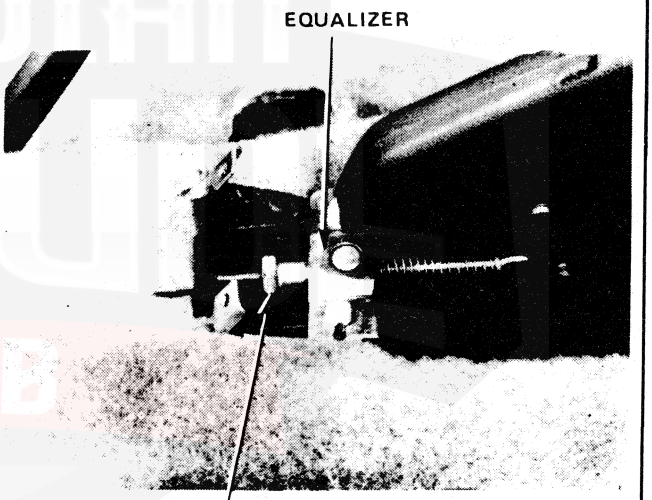
Adjustment

NOTE: When the rear brake caliper has been serviced, depress the brake pedal several times to set the self-adjusting brakes before adjusting the parking brake cable.

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

1. Raise the rear wheels off the ground.
2. Loosen the equalizer adjusting nut in the console.
3. Pull the parking brake lever up one notch.
4. Tighten the equalizer adjusting nut until the rear wheels drag slightly when turned.
5. Release the brake lever and check that the rear wheels do not drag when turned. Readjust if necessary.

With the equalizer properly adjusted, the rear brakes should be fully applied when the parking brake lever is pulled up 4 to 8 clicks.

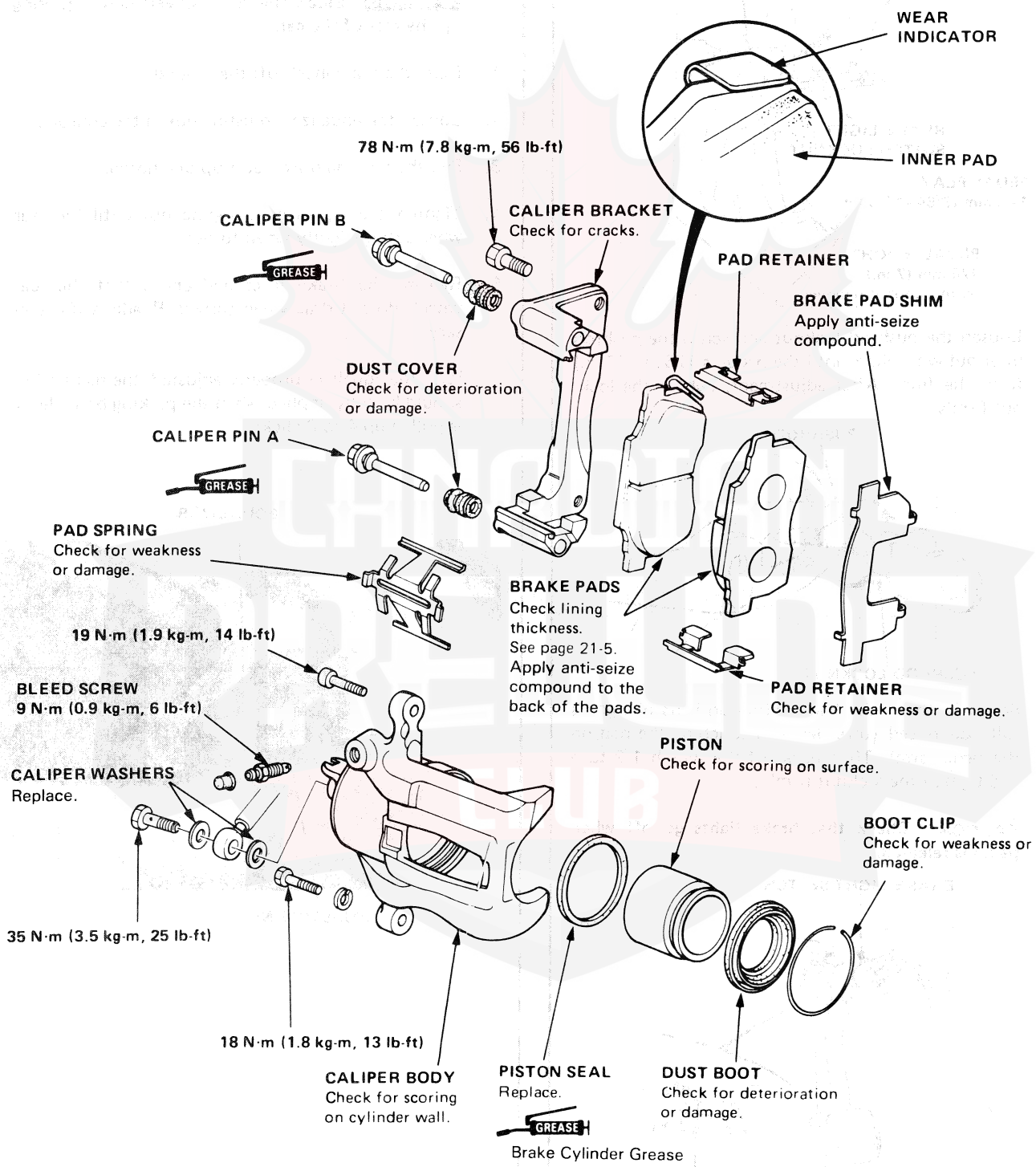


Front Brakes

Index/Inspection

NOTE:

- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.

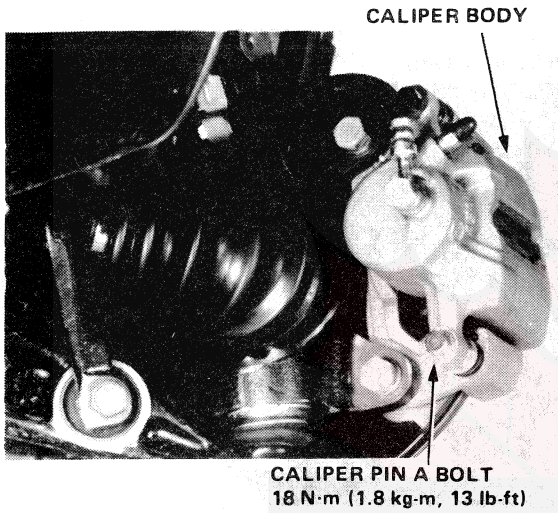


Brake Pad

Inspection/Replacement

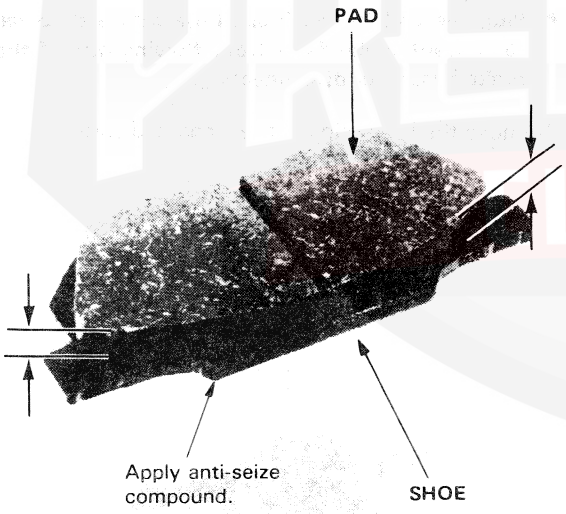
1. Remove the front wheels and support the front of car on safety stands.

2. Remove caliper pin A bolt and pivot caliper up out of the way.



3. Remove the pad shim and pads.

4. Using a vernier caliper, measure the thickness of each brake pad lining.



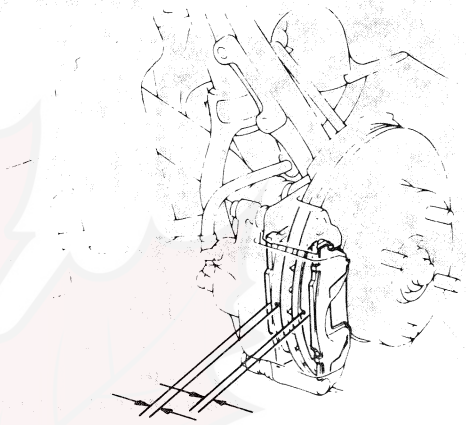
NOTE: Measurement does not include shoe thickness.

Brake Pad Thickness:

Standard:	9.5 mm (0.374 in.)
Service Limit:	3.0 mm (0.118 in.)

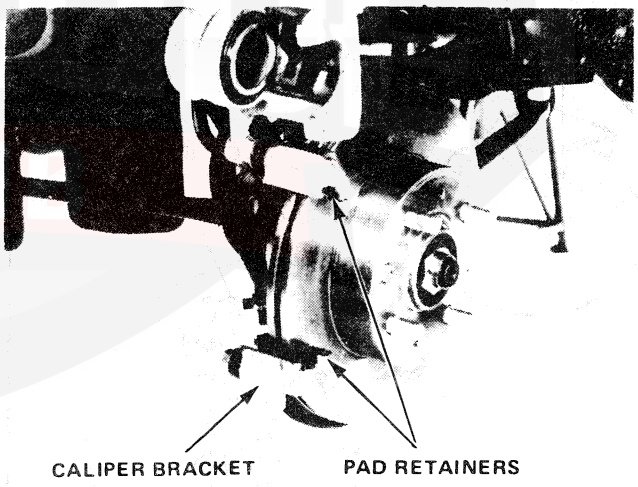
5. If lining thickness is less than service limit, replace both pads as a set.

NOTE: Before replacing or installing new brake pads, coat the backs of the pads and shims with anti-seize compound.



6. Check for grooves, cracks or rust.
Clean the caliper thoroughly and remove all rust.

7. Install the pad retainers.

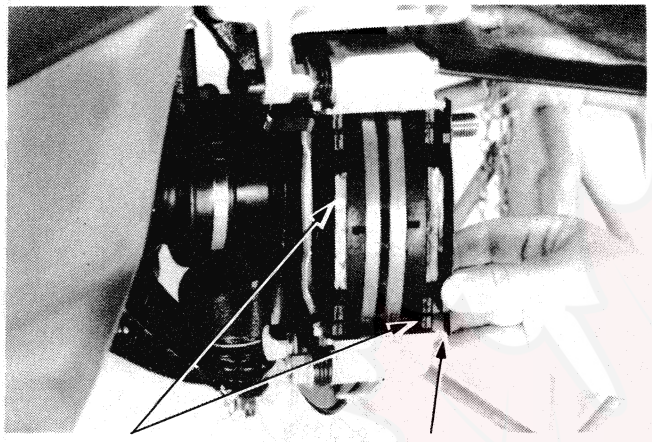


(cont'd)

Brake Pad

Inspection/Replacement (cont'd)

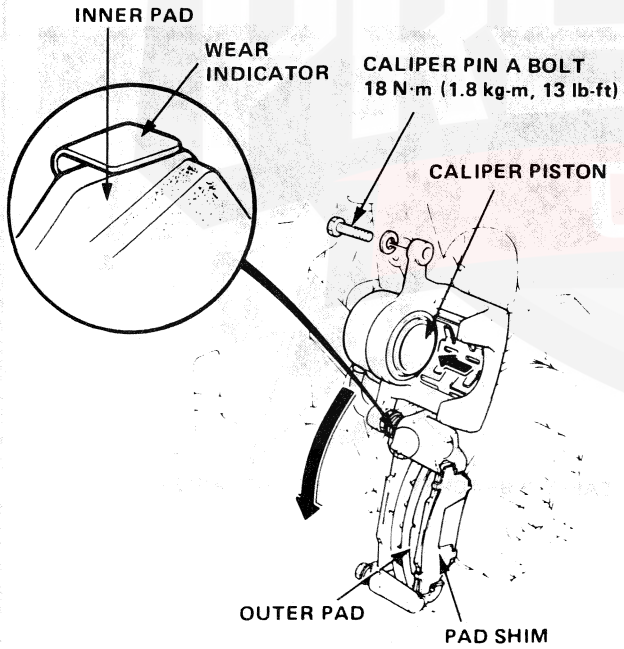
8. Apply a thin coat of anti-seize compound between the shim and the pad, then install them with the shim on the outside.



9. Loosen the bleed screw slightly and push in the piston so the caliper will fit over the pads. Tighten the bleed screw.

10. Pivot the caliper down into position, then reinstall the caliper pin A bolt and tighten to 18 N·m (1.8 kg-m, 13 lb-ft).

NOTE: Install the inner pad with pad wear indicator on the inside.



10. Depress the brake pedal several times to make sure the caliper works, then road-test.

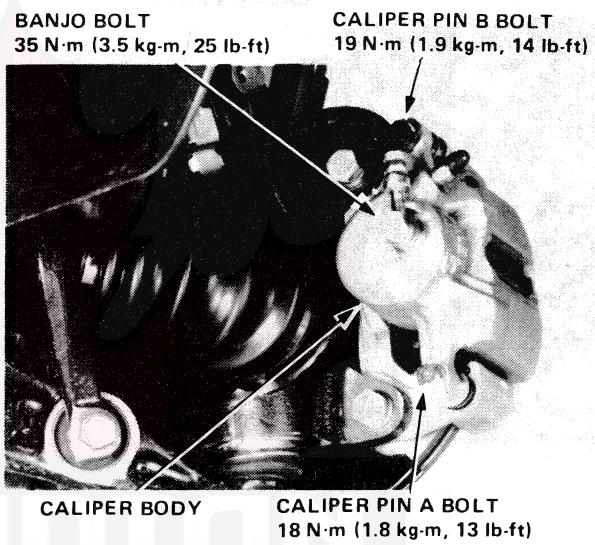
Brake Caliper

Disassembly

1. Unscrew the banjo bolt and remove the brake line.

2. Remove the caliper pin bolts, then remove the caliper.

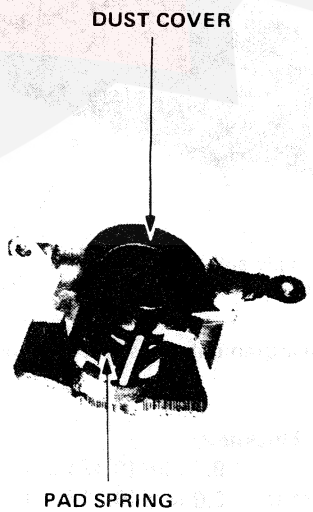
NOTE: Avoid damaging the splash guard on the caliper pin B side.



CAUTION :

- **Avoid spilling brake fluid on paint 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.**

3. Remove the boot clip dust seal and pad spring.



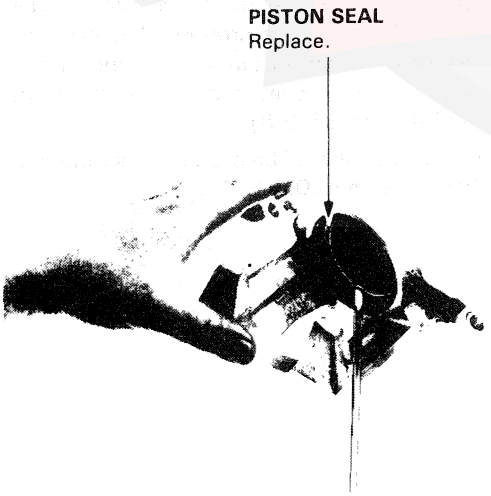
4. Place a wooden block or shop rag in the caliper opposite the piston, then carefully remove the piston from the caliper by applying air pressure through the brake line hole.

WARNING

- **Do not place your fingers in front of the piston.**
- **Do not use high air pressure; use an OSHA-approved 30 PSI nozzle.**

5. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.



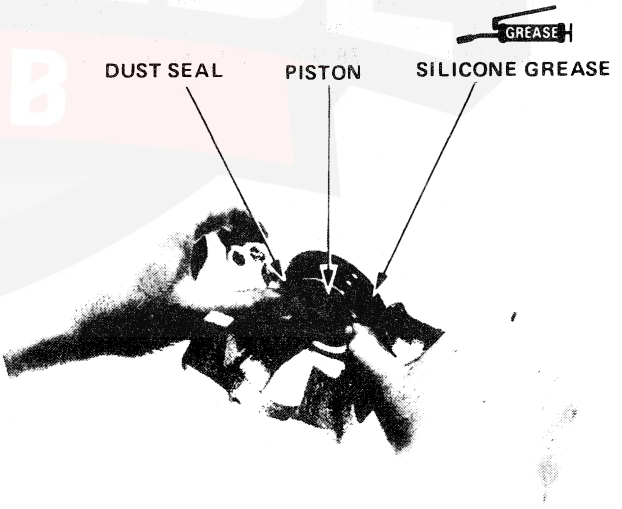
Reassembly

1. Clean the piston and cylinder bore with brake fluid and inspect for wear or damage.

2. Apply brake fluid to a new piston seal, then install a new piston seal in cylinder groove.

3. Lubricate the piston with brake fluid, then slip the boot onto the groove-less end of the piston.

4. Hold the piston slightly above the caliper, then gently guide the bottom ridge of the boot into the caliper wall.

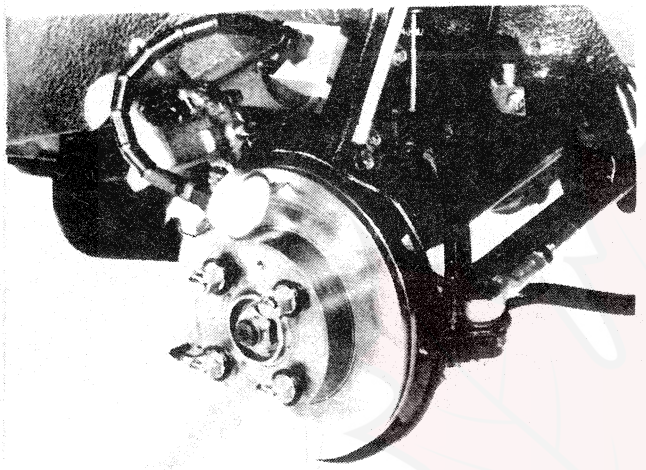


5. When the boot is evenly seated, push the piston until the upper ridge of the boot is seated in the piston groove.

Front Brake Disc

Run-Out

1. Remove the front wheels, and support the front of car on safety stands.
2. Remove caliper pin A bolt, then pivot the caliper up out of the way on the upper guide pin bolt, and remove the pads and pad retainers (page 21-5).



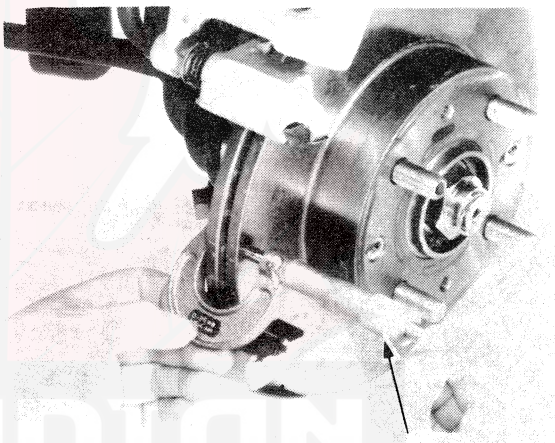
3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.
4. Use the lug nuts to hold the disc securely against the hub, then mount a dial indicator as shown.

Brake Disc Runout:
Service Limit: 0.10 mm (0.004 in.)

5. If the disc is beyond the service limit, refer to the Honda Brake Disc Grinder Manual to see if it can be ground. If it can't be ground, remove it and install a new one. Then, reinstall the caliper bracket and torque the bolts to 78 N·m (7.8 kg-m, 56 lb-ft).

Thickness and parallelism

1. Remove the front wheels, and support the front of car on safety stands.
2. Move the caliper and pads out of the way as described in the preceding column.
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in.) in from the outer edge of the disc.



MICROMETER
Measure at 10 mm (0.39 in.) from edge.

Brake Disc Thickness:

Standard:	**19 mm (0.75 in.)**
Max. Refinishing Limit:	**17 mm (0.67 in.)**

Brake Disc Parallelism:
The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in.).

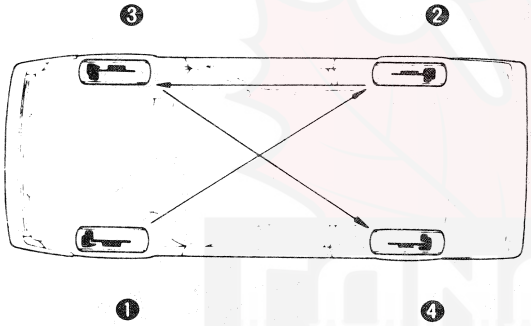
4. If the disc is beyond the limits for thickness or parallelism, refer to the Honda Brake Disc Grinder Manual to see if it can be ground. If it can't be ground, remove it and install a new one. Then, reinstall the caliper bracket and torque the bolts to 78 N·m (7.8 kg-m, 56 lb-ft).

NOTE: A new disc should be ground if its runout is greater than 0.10 mm (0.004 in).

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.

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.

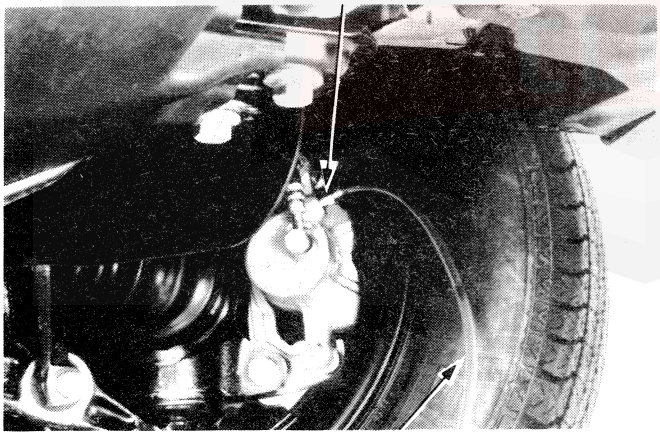
Bleeding Sequence



3. Repeat the procedure for each wheel in the sequence shown above, until air bubbles no longer appear in the fluid.

FRONT

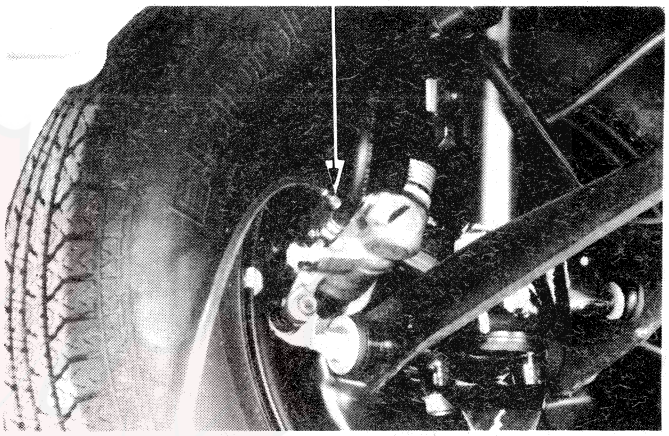
BRAKE BLEED SCREW
10 x 1.0 mm (0.39 x 0.04 in.)
9 N·m (0.9 kg-m, 7 lb-ft)



BLEED HOSE
(Insert in clear plastic bottle half-filled with brake fluid.)

REAR

BRAKE BLEED SCREW
9 N·m (0.9 kg-m, 6 lb-ft)

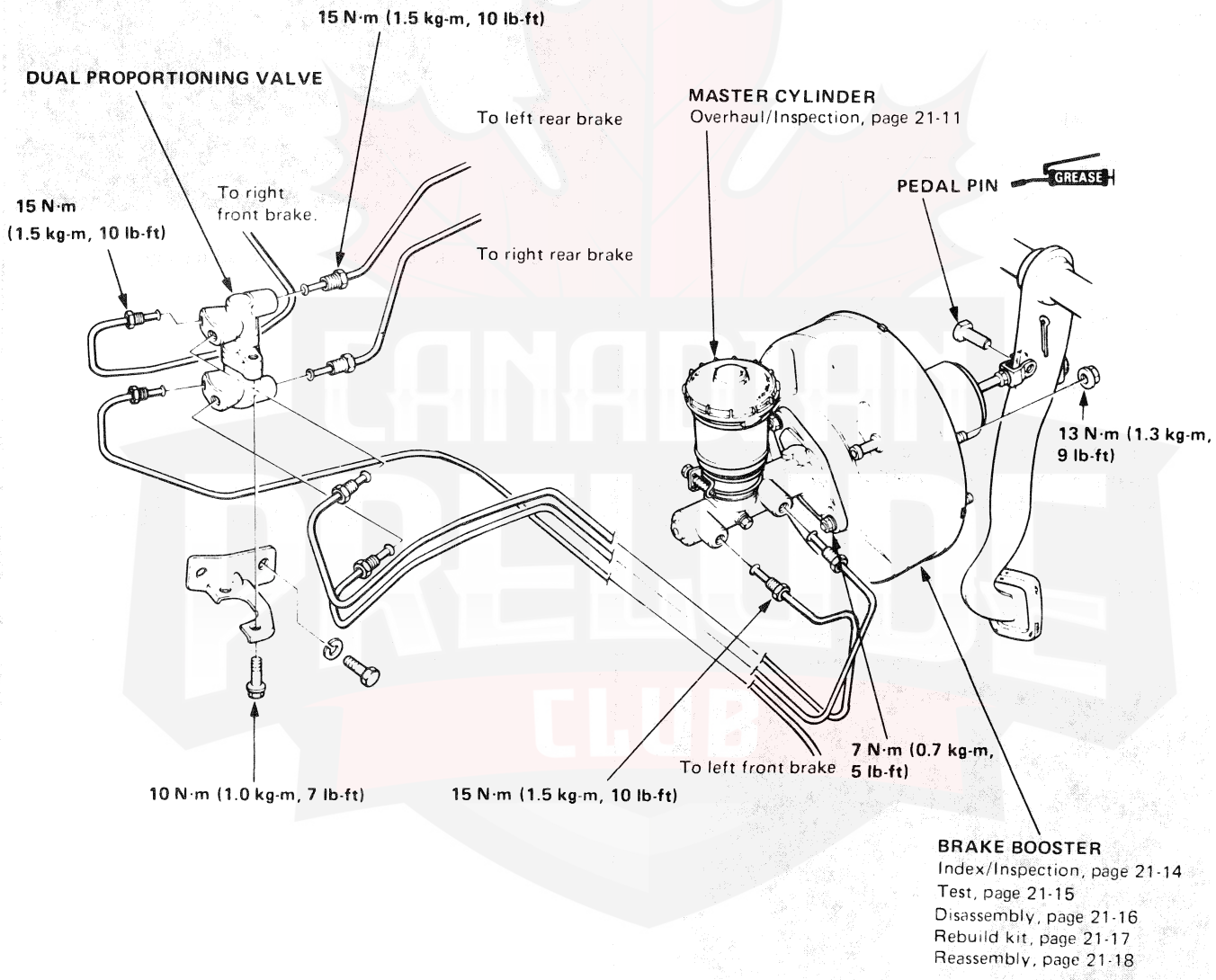


4. Check brake performance by road testing.

Brake Booster, Master Cylinder, Proportioning Valve

Index

CAUTION : Avoid spilling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.



Master Cylinder

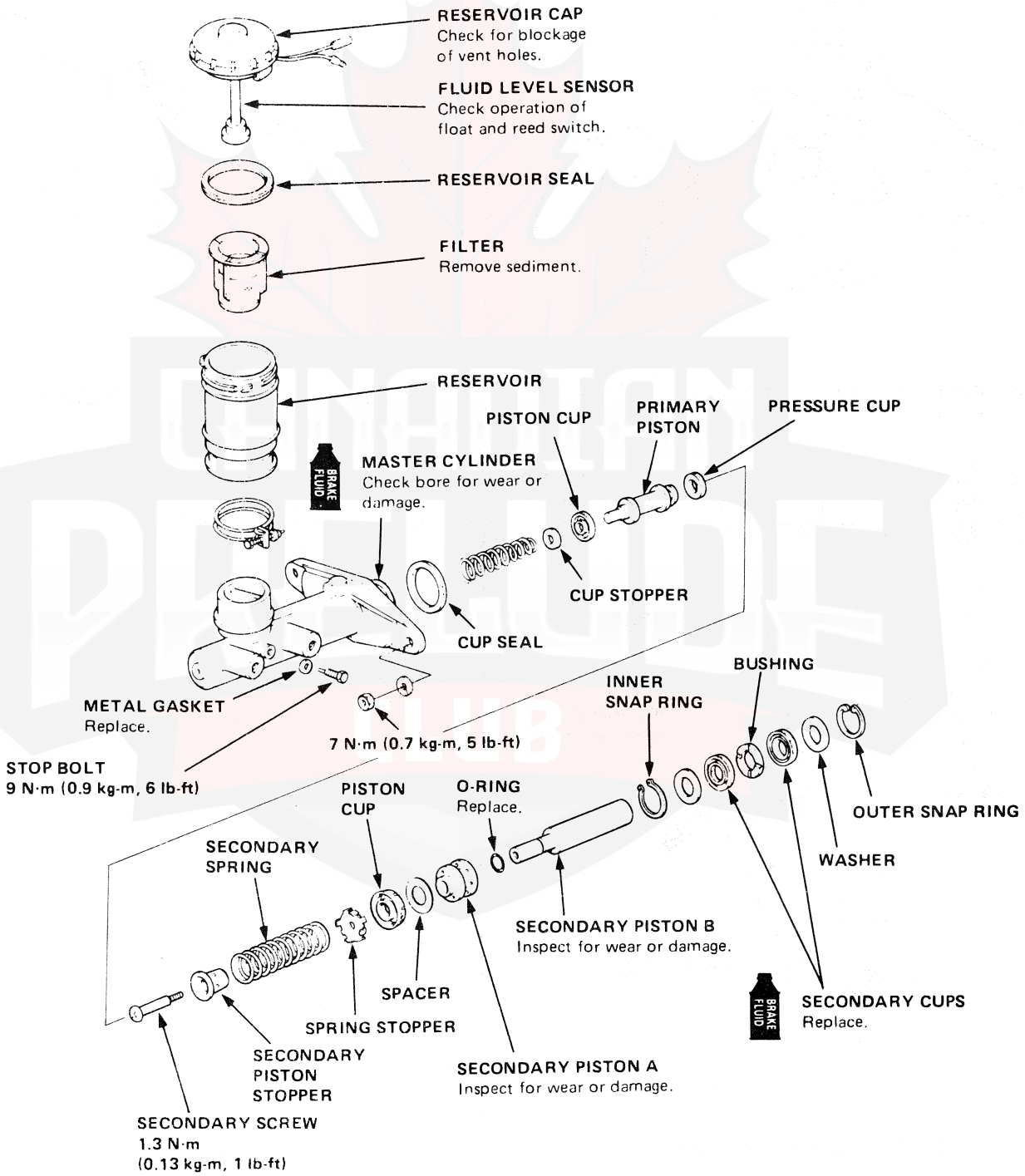
Overhaul/Inspection

CAUTION :

- Avoid spilling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.
- BRAKE FLUID This symbol represents brake fluid. Use only DOT 3 or 4 brake fluid.

NOTE:

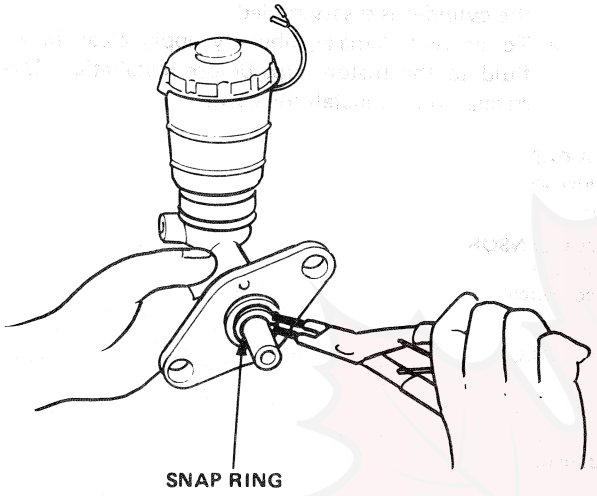
- Wash all removed parts in brake fluid and blow dry with compressed air. Blow open all passages and fluid ports.
- Replace all rubber parts with new ones whenever the cylinder is disassembled.
- To prevent damage, liberally apply clean brake fluid to the piston cups before installation. Use special tool to install the cups.



Master Cylinder

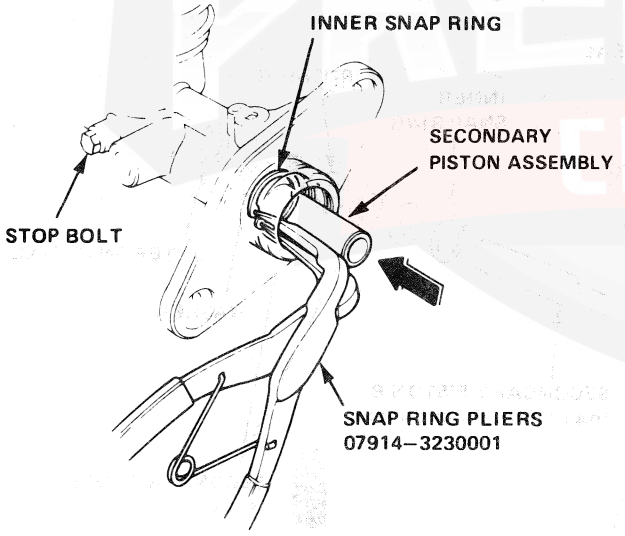
Disassembly

1. Remove the outer snap ring.



2. Remove the washer, secondary cup, and secondary piston bushing.

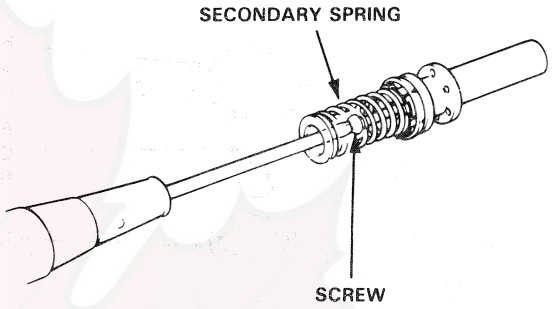
3. Remove the stop bolt, and remove the inner snap ring with the snap ring pliers while pushing on the secondary piston assembly.



NOTE: Avoid damaging the master cylinder wall.

4. Remove the secondary and primary assembly.

5. Remove the screw from the secondary piston assembly, and remove the secondary spring.

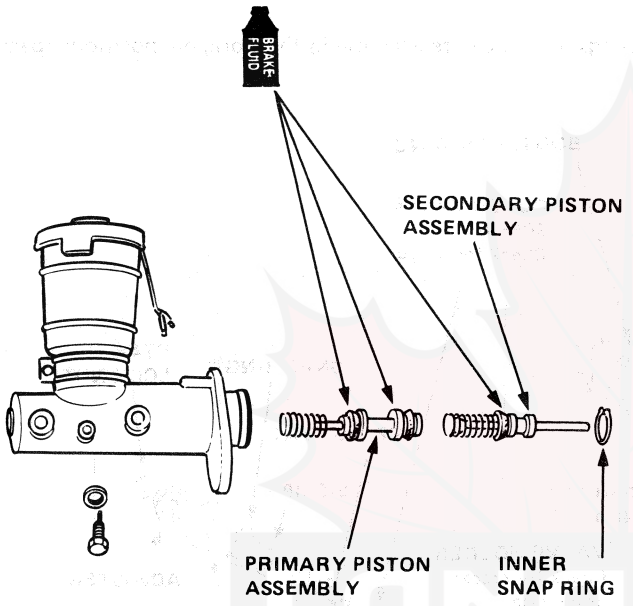


6. Clean all parts thoroughly with BRAKE FLUID only.

Reassembly

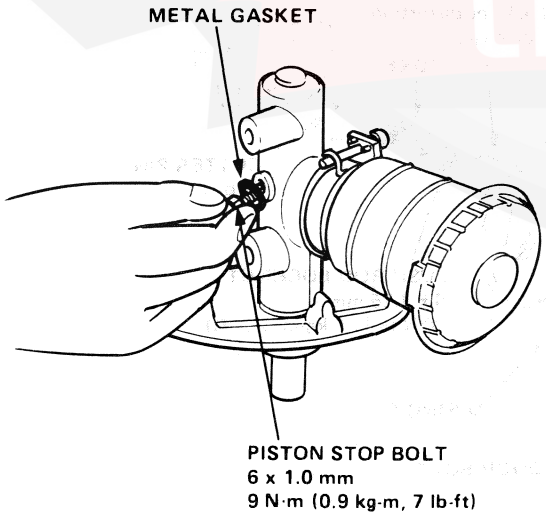
1. Lubricate new piston assemblies with brake fluid, then install in the master cylinder.

   NOTE: To ease assembly, rotate the pistons while inserting.



2. Press down on the cylinder as shown, then install the stop bolt.

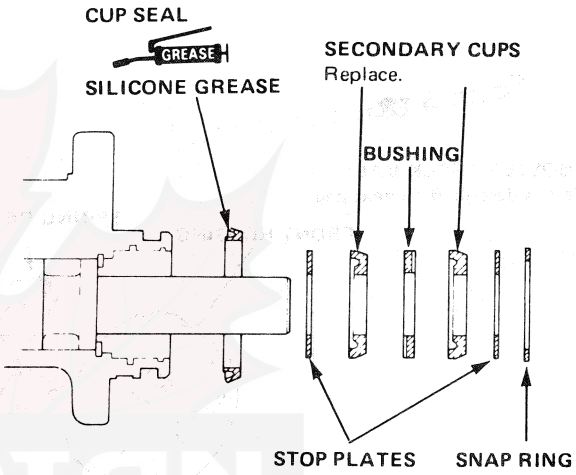
   NOTE: Replace the piston stop bolt metal gasket with a new one.



3. Turn the master cylinder over, press down on the secondary piston, then install the inner snap ring.

4. Install the secondary cups, bushing, and outer snap ring.

5. Install the seal on the master cylinder mounting flange.



NOTE: Master cylinder push rod-to-piston clearance must be checked and adjustments made, if necessary, before installing the master cylinder (page 21-22).

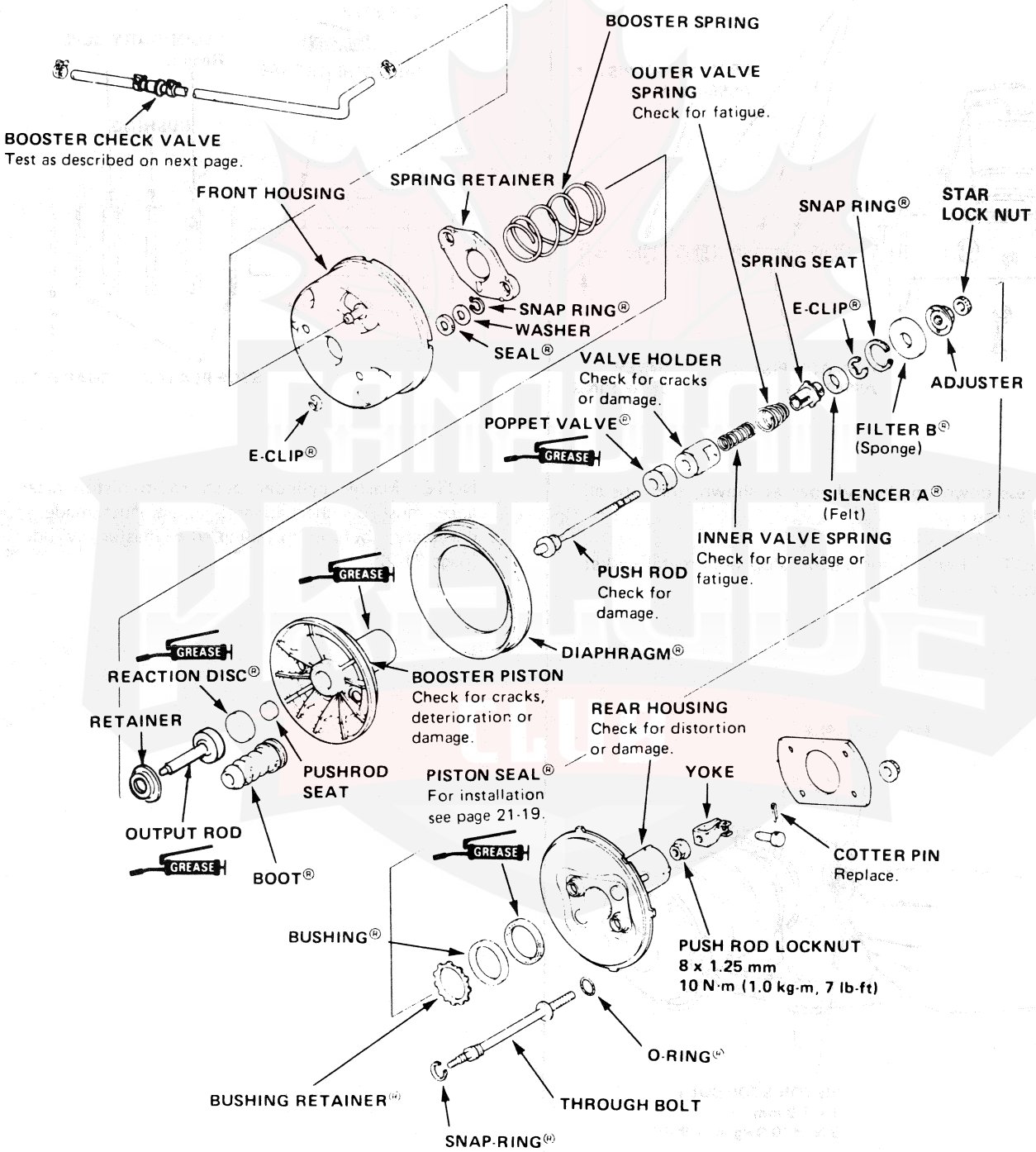
Brake Booster

Index and Inspection

Booster testing is on 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 21-16).



Tests

Functional Test

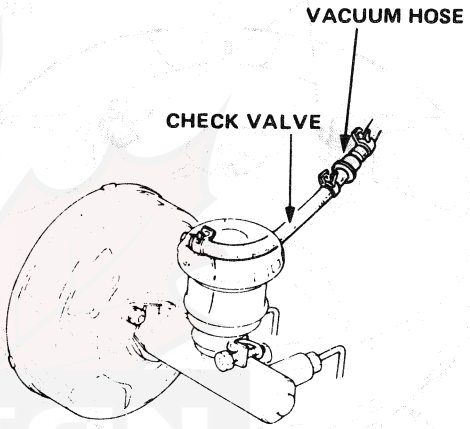
1. With the engine stopped, depress the brake pedal several times, then depress the pedal hard and hold that pressure for 15 seconds. If the pedal sinks, the master cylinder, brake line or a wheel cylinder is faulty.
2. Start the engine with the pedal depressed. If the pedal sinks slightly, the vacuum booster is working. If the pedal height does not vary, the booster or check valve is faulty.

Leak Test

1. Depress the brake pedal with the engine running, then stop the engine. If the pedal height does not vary while depressed for 30 seconds, the vacuum booster is OK. If the pedal rises, the booster is faulty.
2. With the engine stopped, depress the brake pedal several times using normal pressure. When the pedal is first depressed, it should be low. On consecutive applications, pedal height should gradually rise. If the pedal position does not vary, check the booster check valve.

Check Valve Test

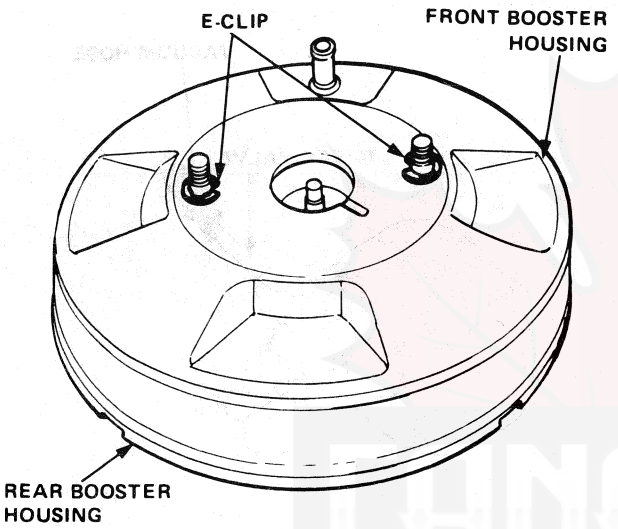
1. Disconnect the brake booster vacuum hose at the booster.
2. Start the engine and let it idle. There should be vacuum available. If no vacuum is available, the check valve is not working correctly. Replace the check valve and retest.



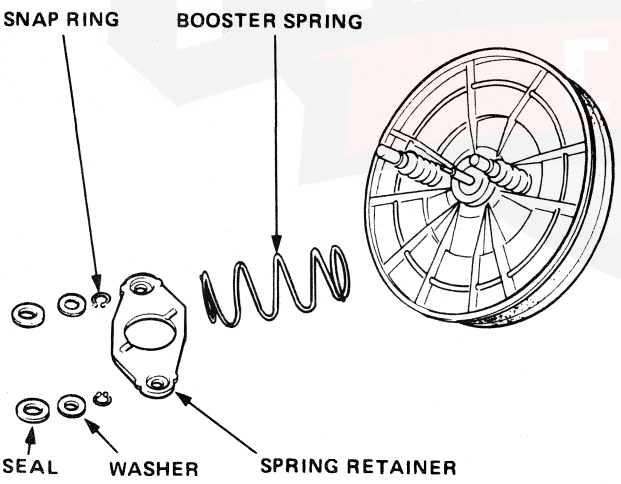
Brake Booster

Disassembly

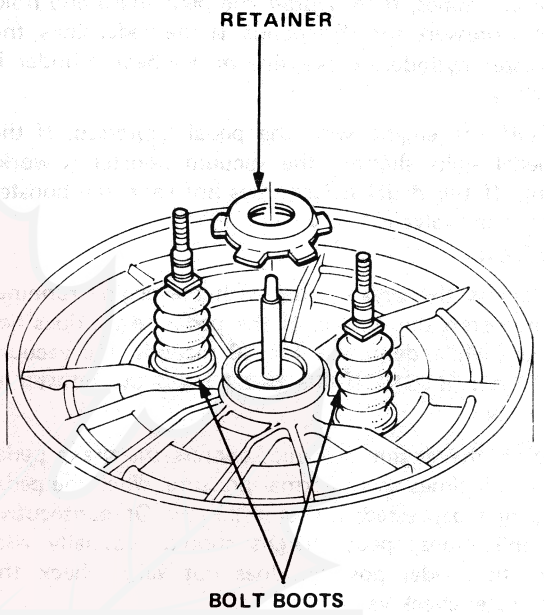
1. Scribe an aligning mark across the front and rear booster housings to ensure proper positioning of parts on reassembly.
2. Remove the master cylinder.
3. Remove the E-clips, and separate the front booster housing and the rear booster housing.



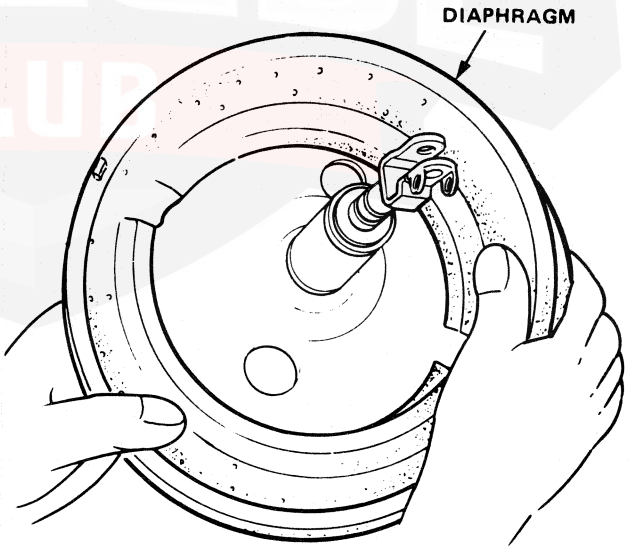
4. Remove the washers and seals from the rear housing, then remove the snap ring.



5. Remove the spring retainer and booster spring.
6. Remove the retainer and the through bolt boots.

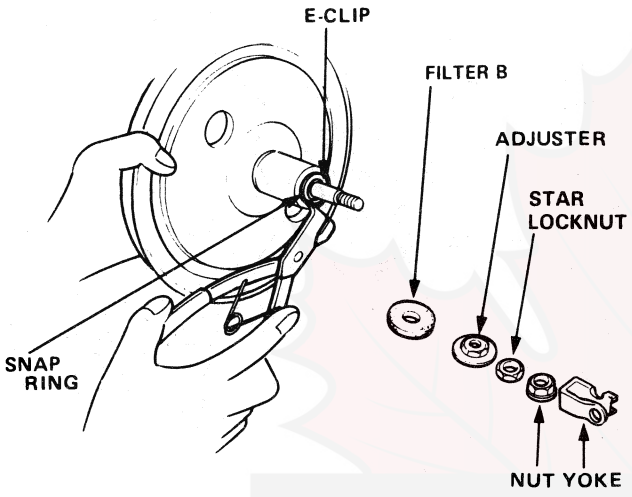


7. Remove the diaphgram from the rear housing.



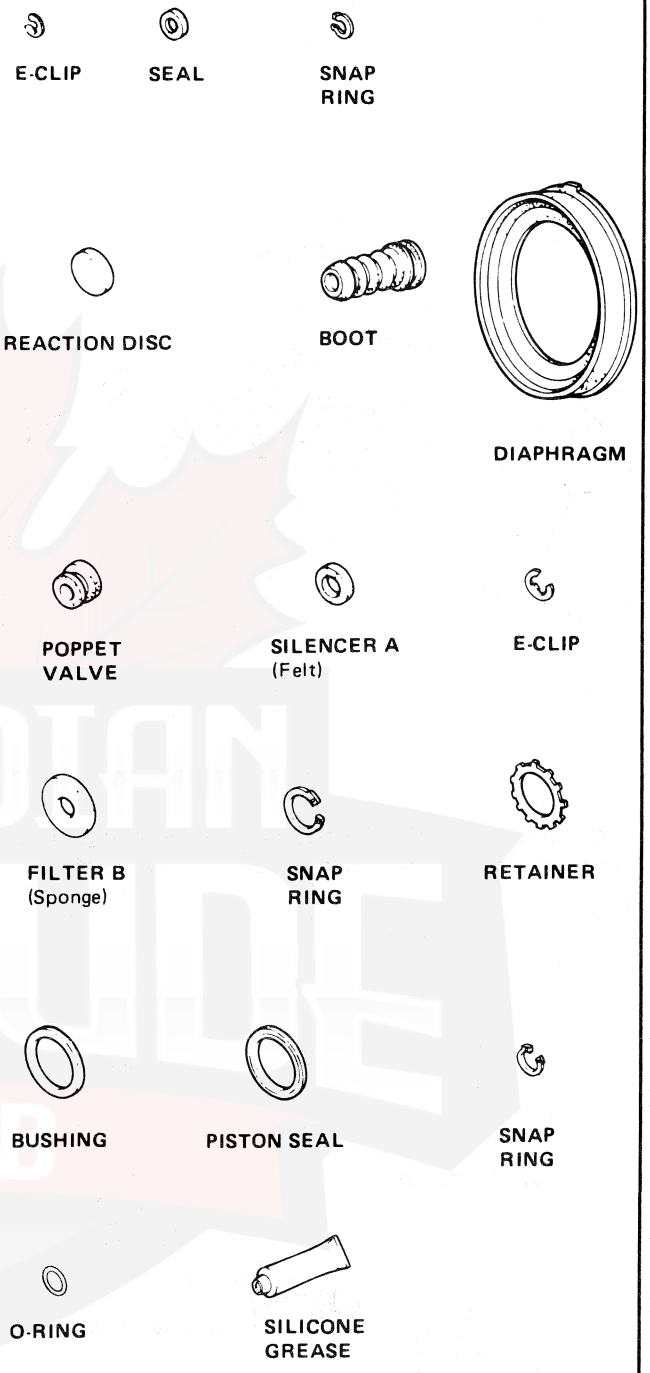
8. Remove the yoke, push rod locknut, star locknut, adjuster and filter.

9. Remove the snap ring, then remove the valve holder assembly.



10. Remove the E-clip from the valve holder assembly and disassemble.

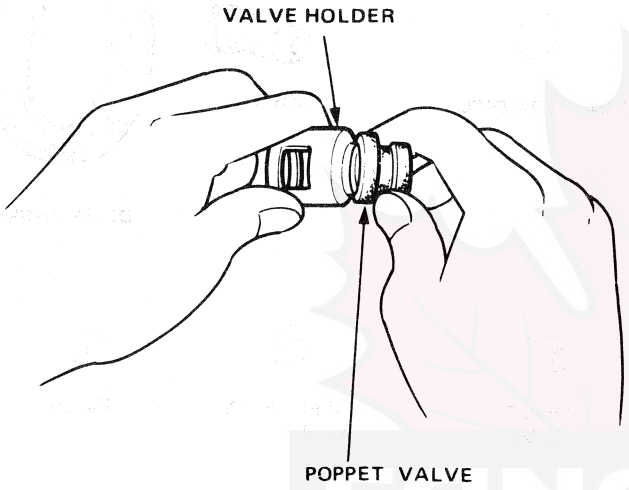
Rebuild Kit



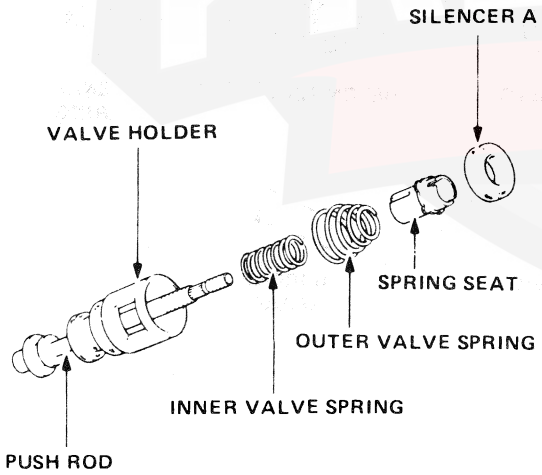
Brake Booster

Reassembly

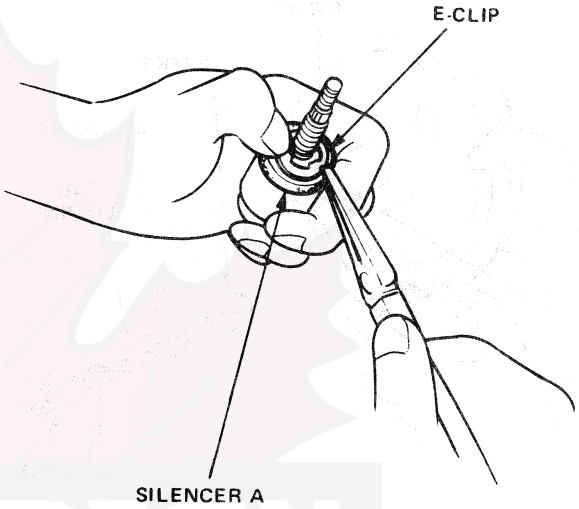
1. Install the poppet valve on the valve holder.



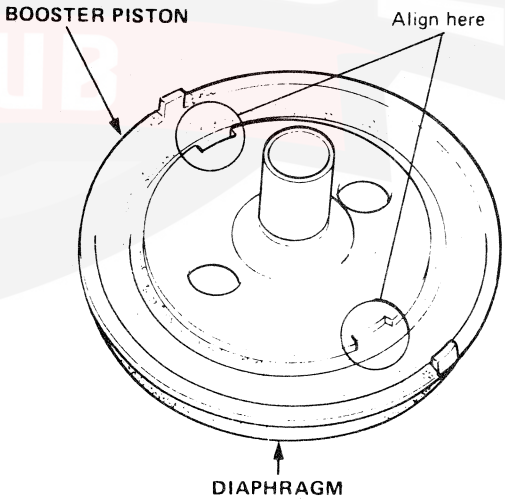
2. Install the valve holder, inner valve spring, outer valve spring, and spring seat onto the push rod.



3. Install the silencer with the E-clip.

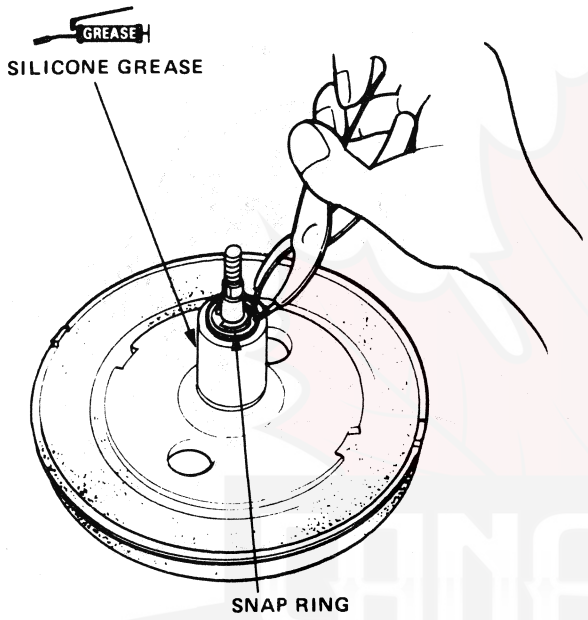


4. Install the diaphragm onto the booster piston with the diaphragm tabs aligned with the slots in the piston.

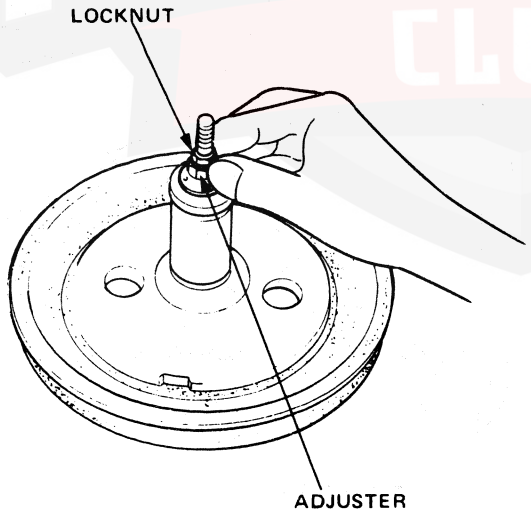


5. Apply silicone grease to the inner and outer surfaces of the piston tube.

   Press the valve holder assembly into the booster piston tube, and install the snap ring.



6. Slip the filter (foam) over the end of the pushrod. Thread the adjuster and locknut onto the shaft but do not tighten.

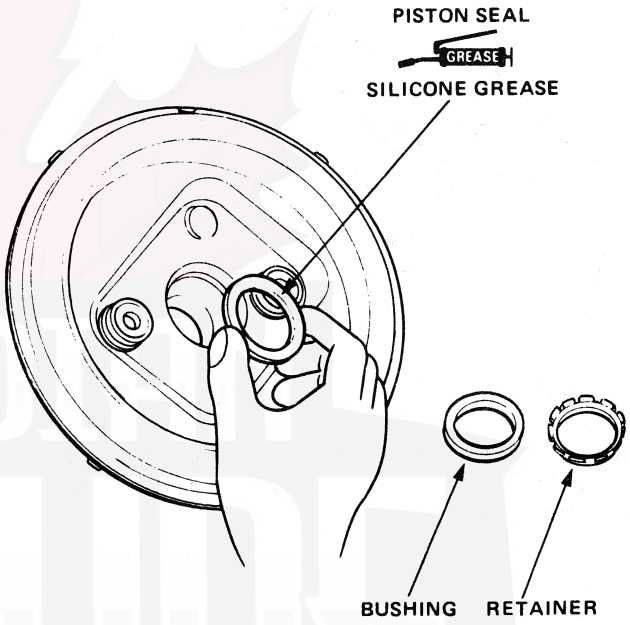


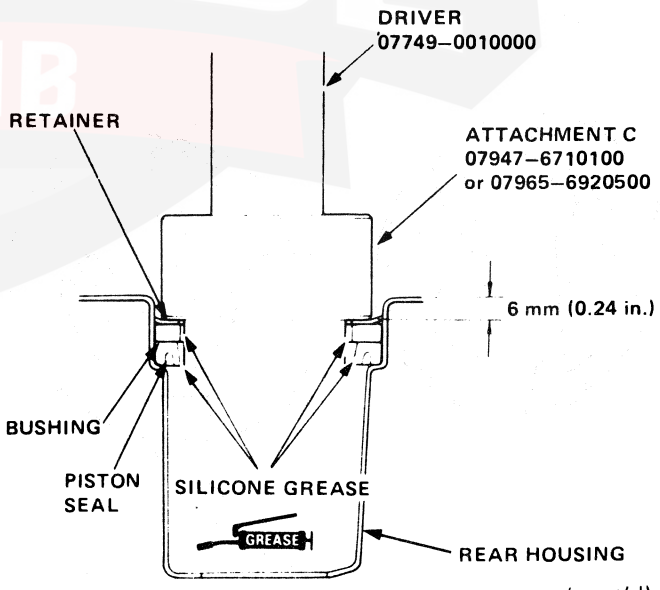
7. Apply silicone grease to the piston seal, then set the seal in position on the housing.

   NOTE: Make sure the lip of the seal is facing in, as shown in drawing below.

8. 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.

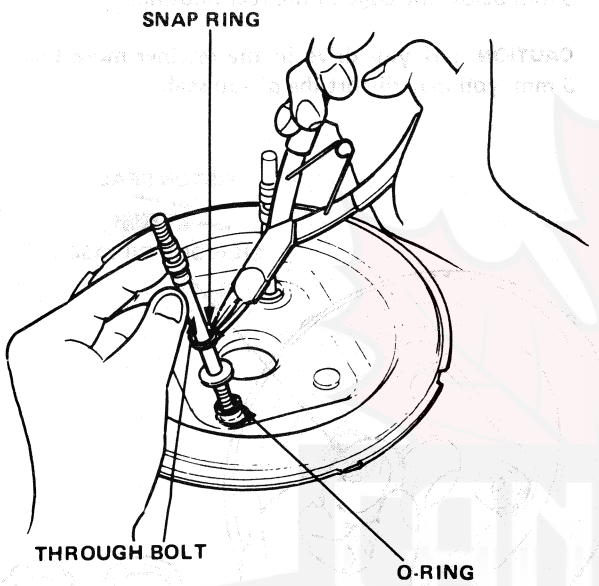




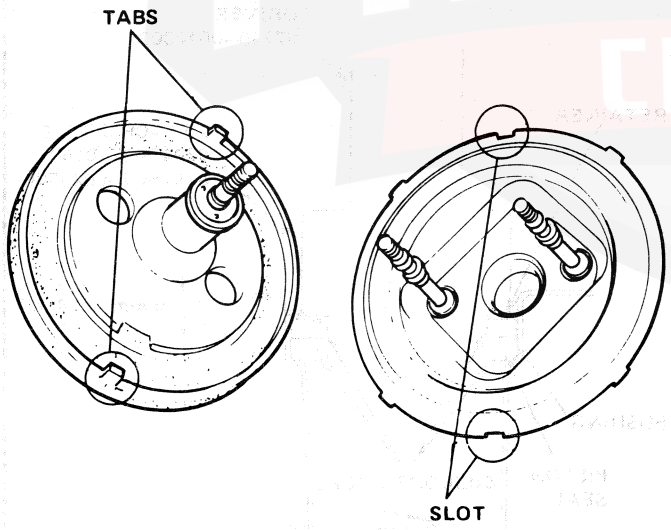
(cont'd)

Reassembly (cont'd)

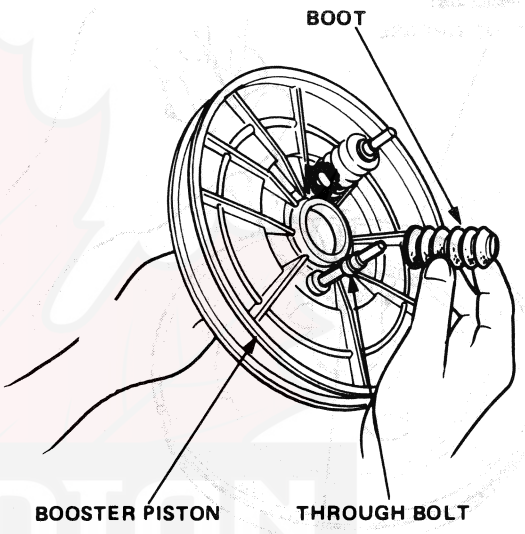
9. Install both through bolts, using the O-rings and snap rings.



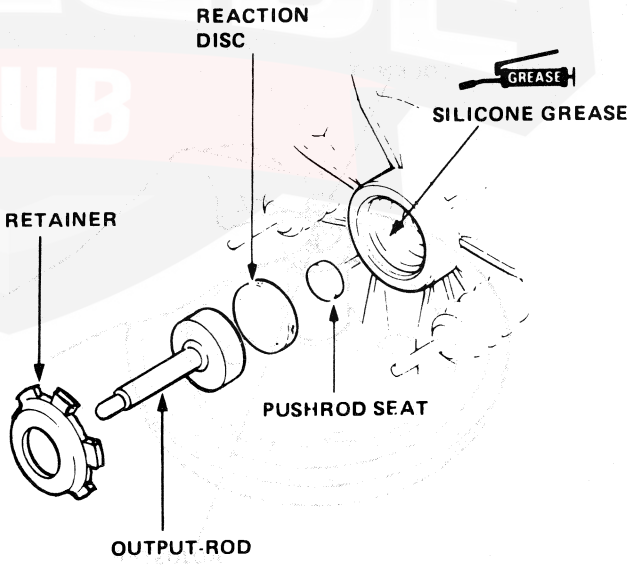
10. Attach the booster piston to the rear housing, aligning the tab of the booster piston with the slot in the rear housing.



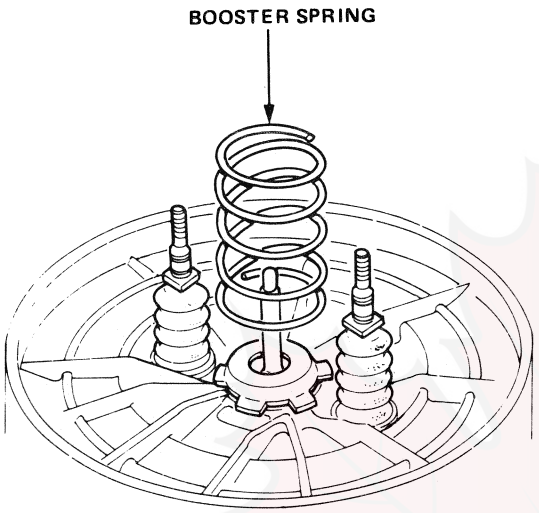
11. Install the boots onto the through bolts.



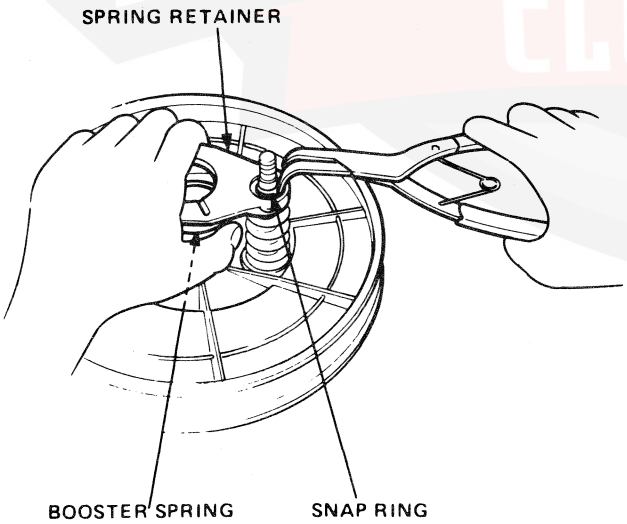
12. Apply silicone grease to the bore of the booster piston, then install the push rod seat, reaction disc, output-rod, and retainer.



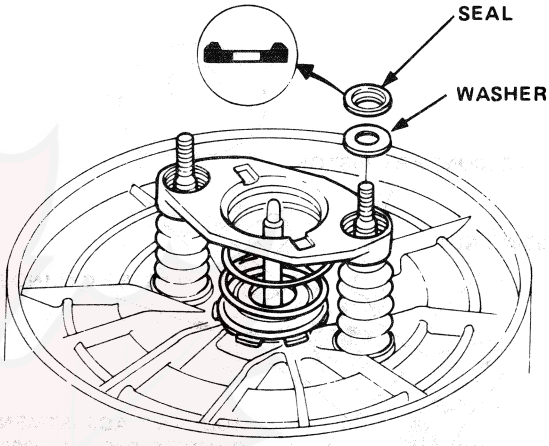
13. Install the booster spring.



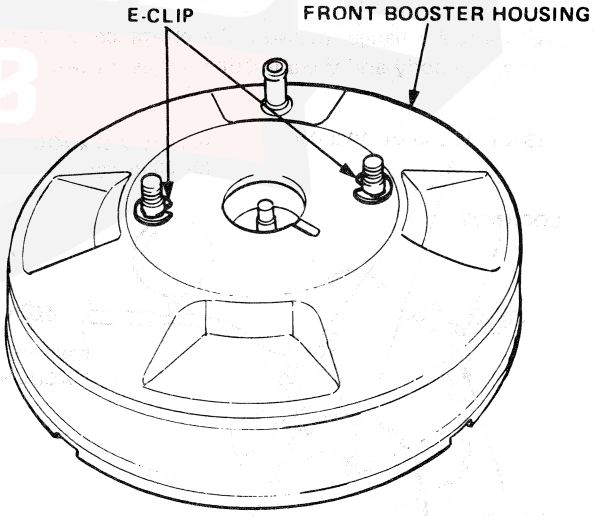
14. Install the spring retainer by compressing the booster spring, then installing the snap rings on the through bolts.



15. Install the washers and seals.



16. Assemble the front booster housing onto the rear booster housing, press down on the front housing, then install the E-clips on the through bolts.



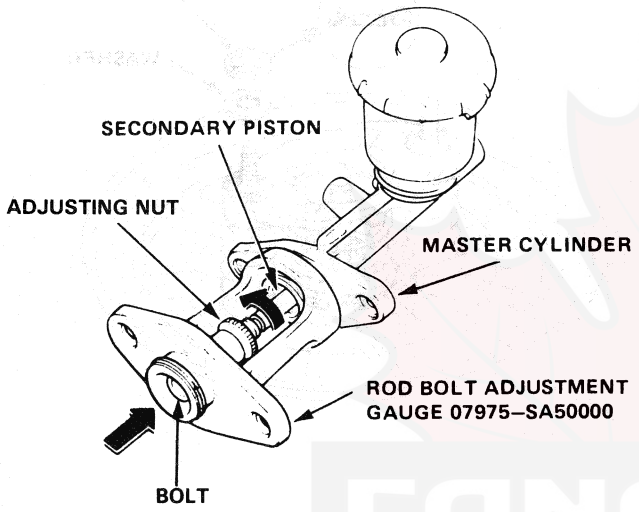
17. Adjust the pushrod clearance (page 21-22), and install the master cylinder.

Brake Booster

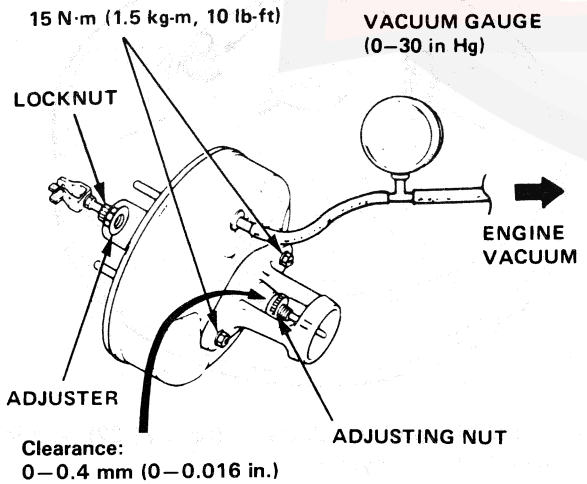
Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

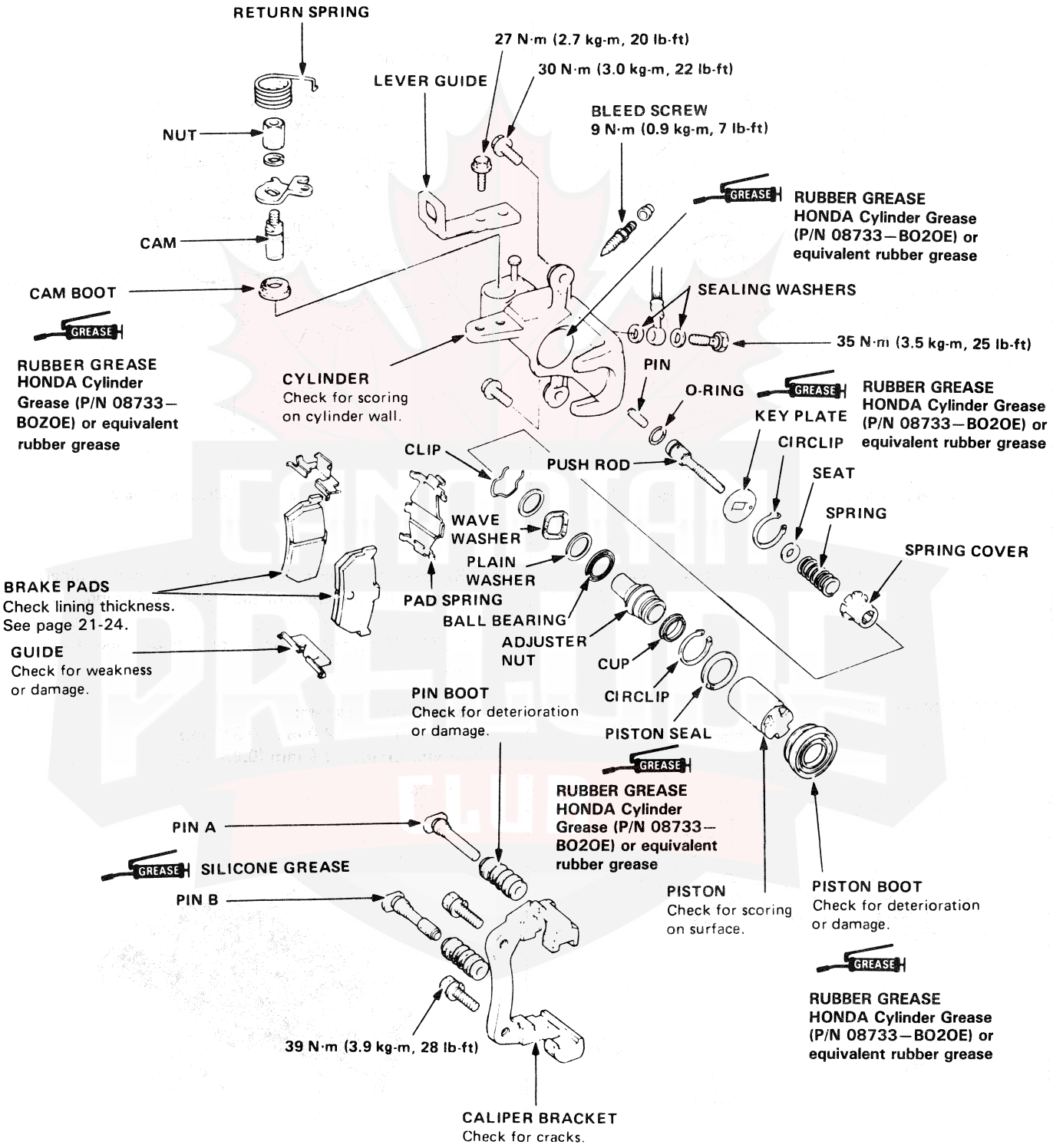
1. Using the Rod Bolt Adjustment Gauge, adjust bolt so the top of it is flush with end of master cylinder piston.



2. Without disturbing the adjusting bolt's position, put the gauge upside down on the booster.
3. Install the master cylinder nuts and tighten to the specified torque.
4. Connect the booster in-line with a vacuum gauge (0–30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 500 mm Hg (20 in Hg) vacuum.
5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.



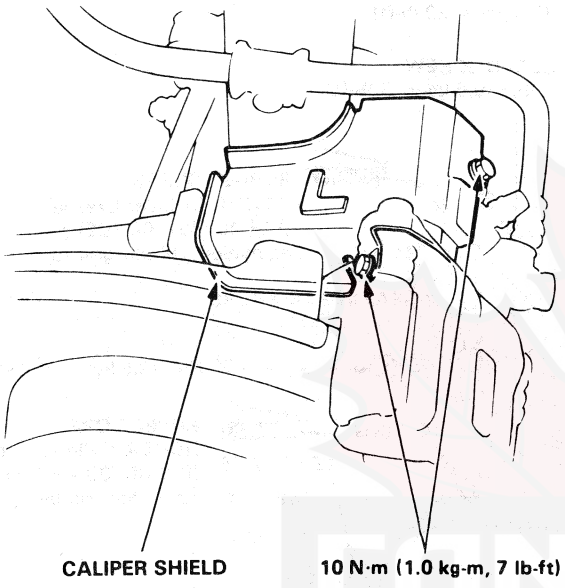
6. If clearance is incorrect, loosen star locknut and turn adjuster in or out to adjust.
7. Tighten star locknut securely.



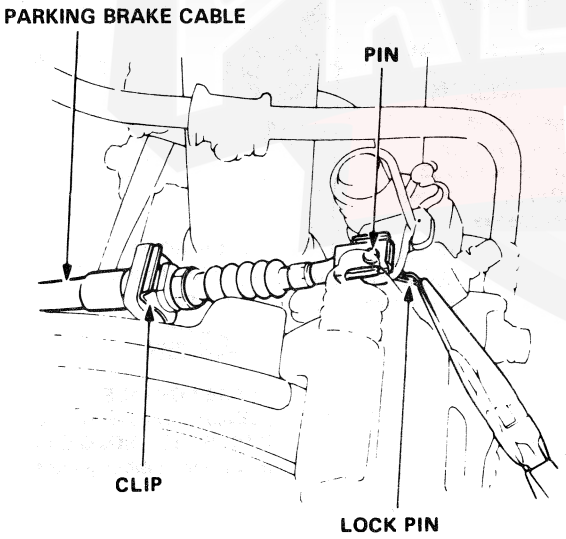
Brake Pad

Inspection/Replacement

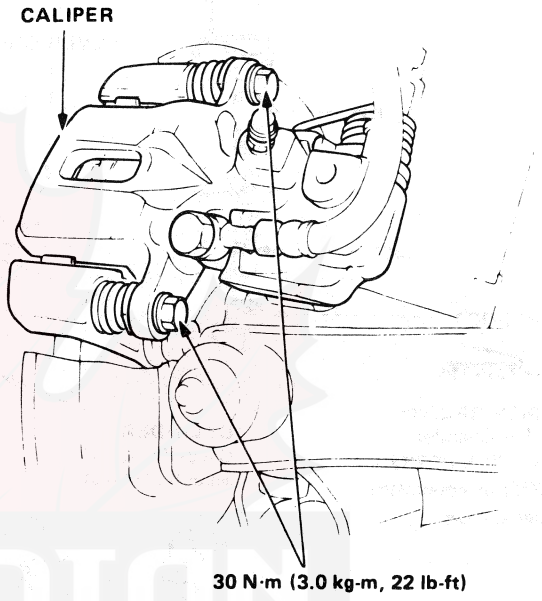
1. Remove the caliper shield.



2. Remove the parking brake cable from the caliper.



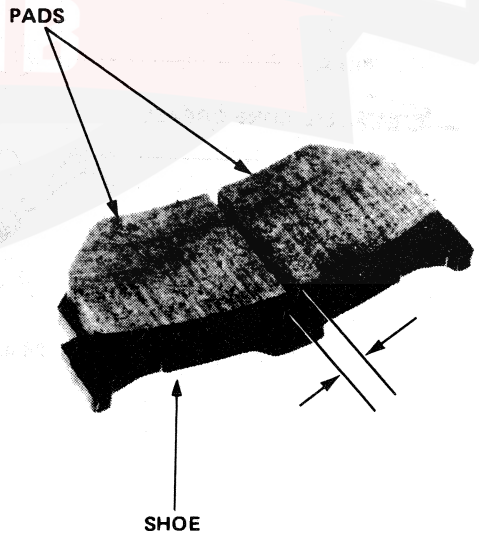
3. Remove the caliper mounting bolts, then remove the caliper.



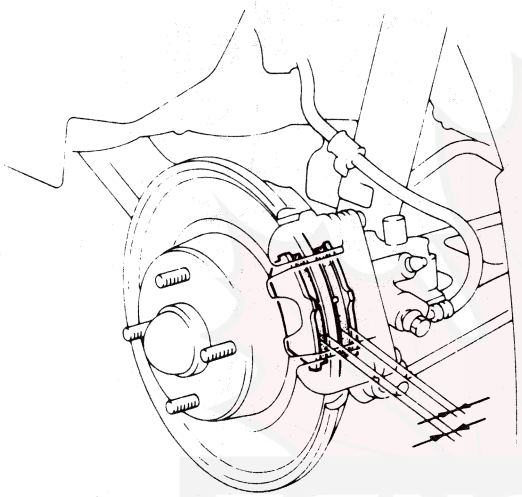
4. Remove the pads and using a vernier caliper, measure the thickness of each brake pad lining.

NOTE: Measurement does not include shoe thickness.

Brake Pad Thickness:
Standard: 8.0 mm (0.315 in.)
Service Limit: 1.6 mm (0.063 in.)



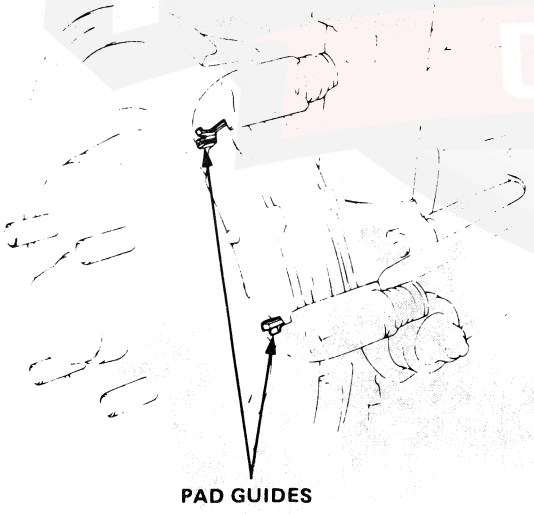
5. If lining thickness is less than the service limit, replace both pads as a set.



6. Remove the pads and pad guides.

7. Inspect the disc surface for grooves, cracks and rust.

8. Clean the caliper thoroughly and remove all rust. Install the pad guides.

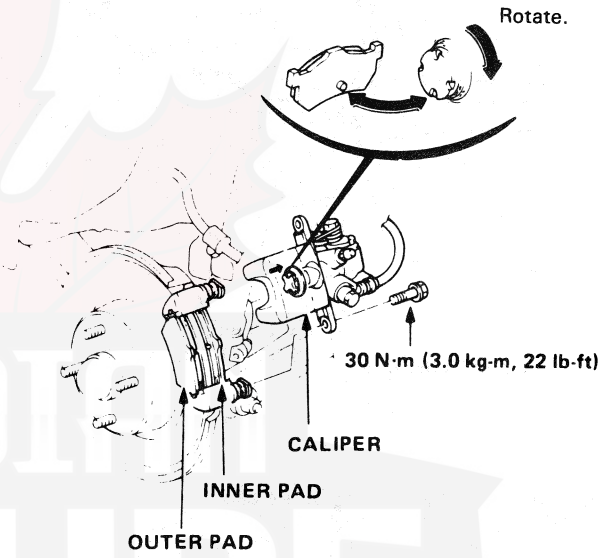


9. Install new brake pads.

10. Rotate the caliper piston clockwise into place in the cylinder and align the cutout in the piston with the tab on the inner pad by turning back the piston.

CAUTION : Avoid twisting the piston boot. If the piston boot is twisted, back it out to set properly.

11. Install the brake caliper.

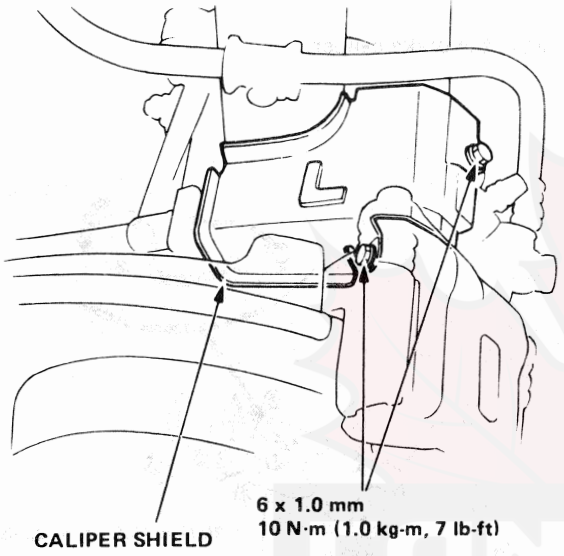


12. Install the parking brake cable.

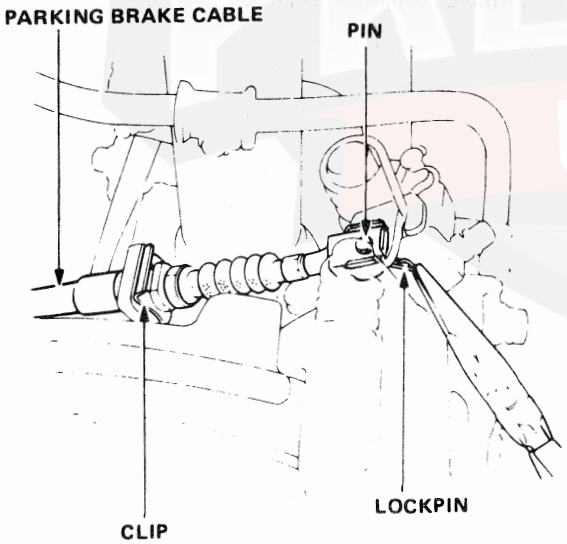
Brake Caliper

Disassembly

1. Remove the caliper shield.

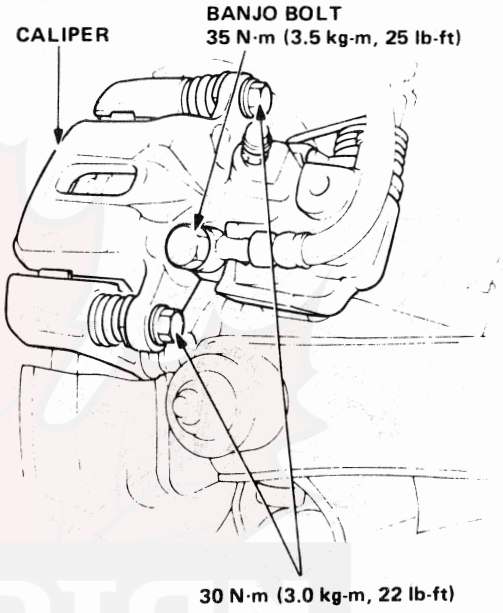


2. Remove the parking brake cable.



3. Disconnect the brake hose from the caliper by removing the banjo bolt.

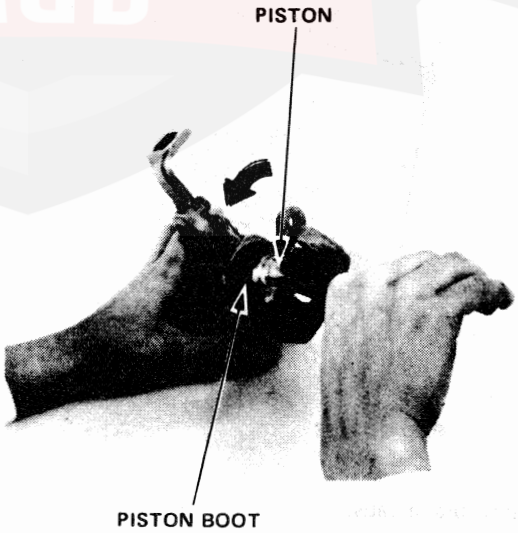
4. Remove the caliper by removing the caliper mount bolts.



CAUTION :
- **Avoid spilling brake fluid on paint and instrument lenses as it may damage the finish.**
- **After disconnecting the brake hose, plug the end with a shop rag to prevent brake fluid from flowing out.**
- **Thoroughly clean the outside of the caliper before disassembly to prevent dust and dirt from entering inside.**

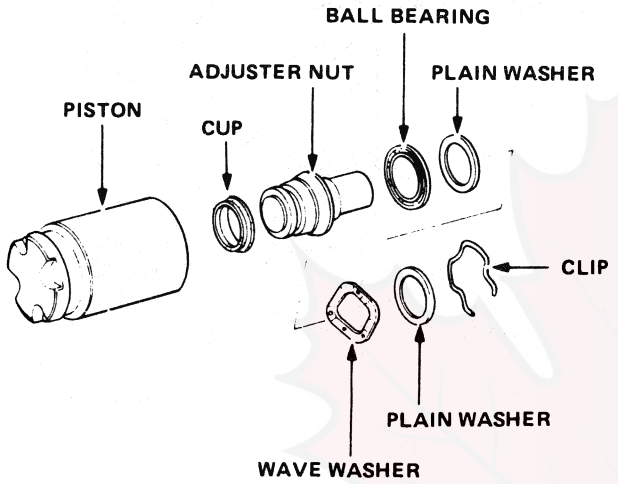
5. Remove the piston and piston boot while rotating the piston.

CAUTION : Avoid damaging the piston and piston boot.



6. Pry off the clip and remove the adjuster nut.

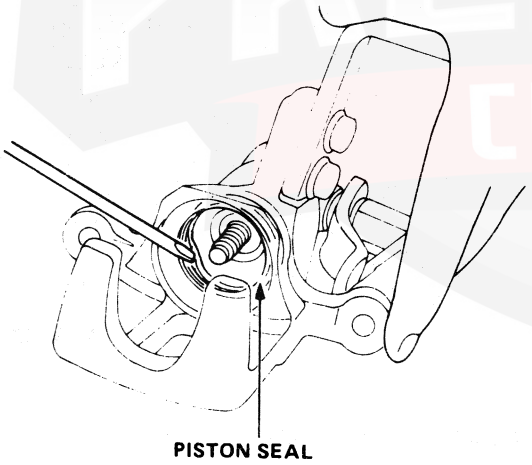
7. Remove the cup.



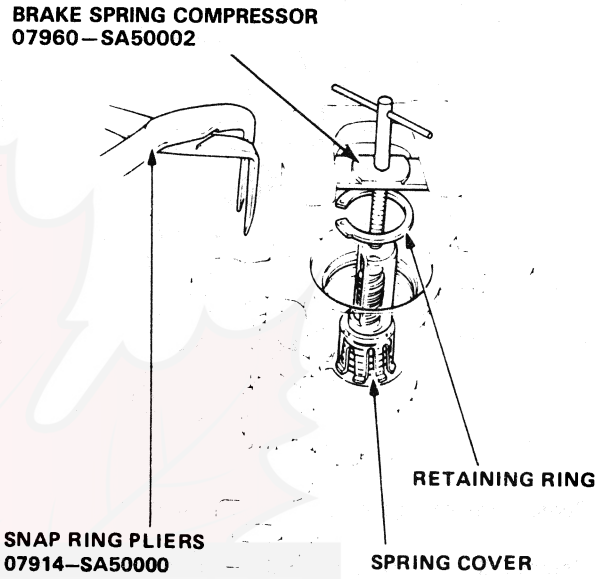
8. Remove the plain washer, wave washer and ball bearing.

9. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.

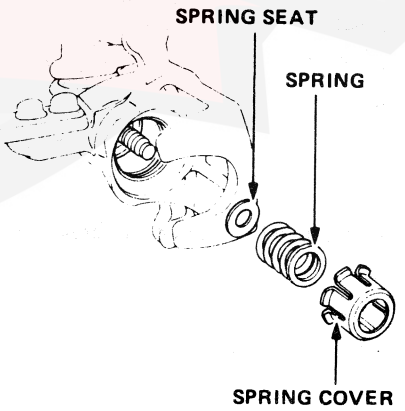


10. Set up the Spring Compressor in the caliper body as shown.



11. Compress the spring by turning the spring compressor shaft.

12. Remove the retaining ring with Snap Ring Pliers.



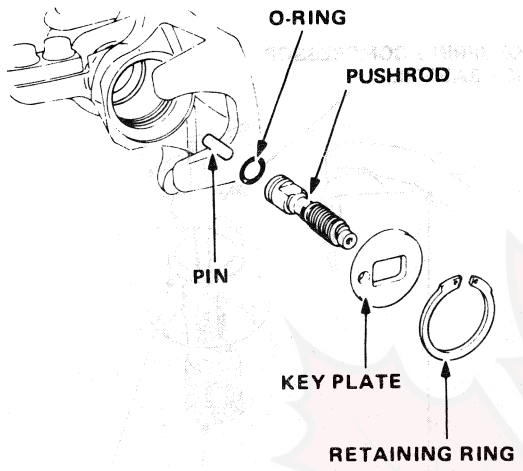
13. Remove the special tools, then remove the spring cover, spring and seat.

(cont'd)

Brake Caliper

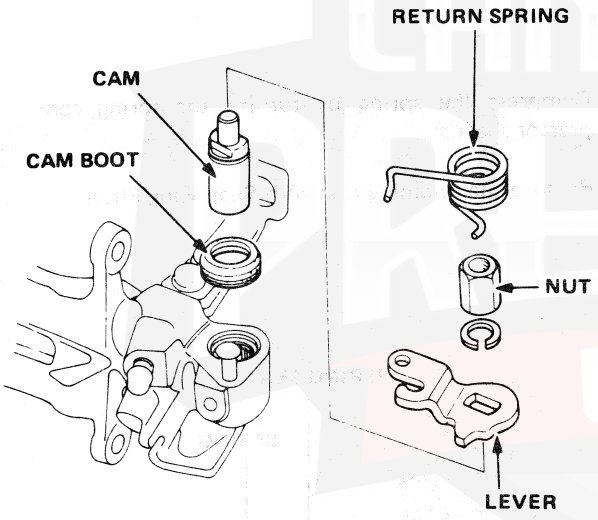
Disassembly (cont'd)

14. Remove the retaining ring, using circlip pliers.



15. Remove the key plate, pushrod, O-ring and pin.

16. Remove the return spring, nut, lever, cam and cam boot.

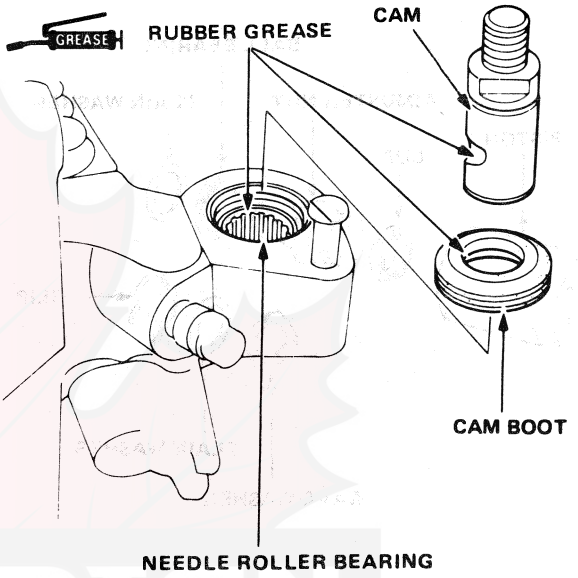


17. Wash clean all removed parts in clean brake fluid.

Reassembly

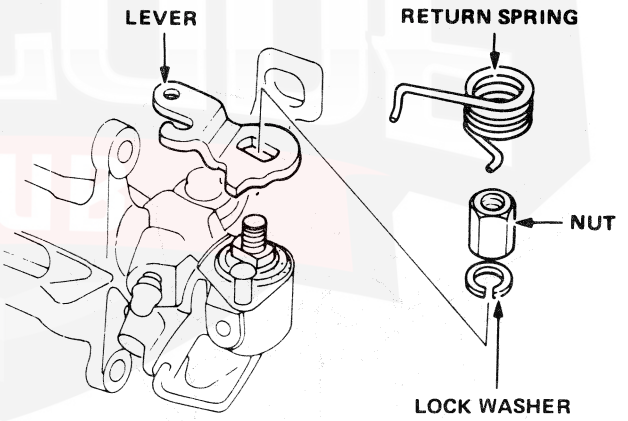
1. Coat the cam boot with rubber grease and install it.

2. Pack all cavities of the needle roller bearing with silicone grease and install the cam with the threaded end facing up.



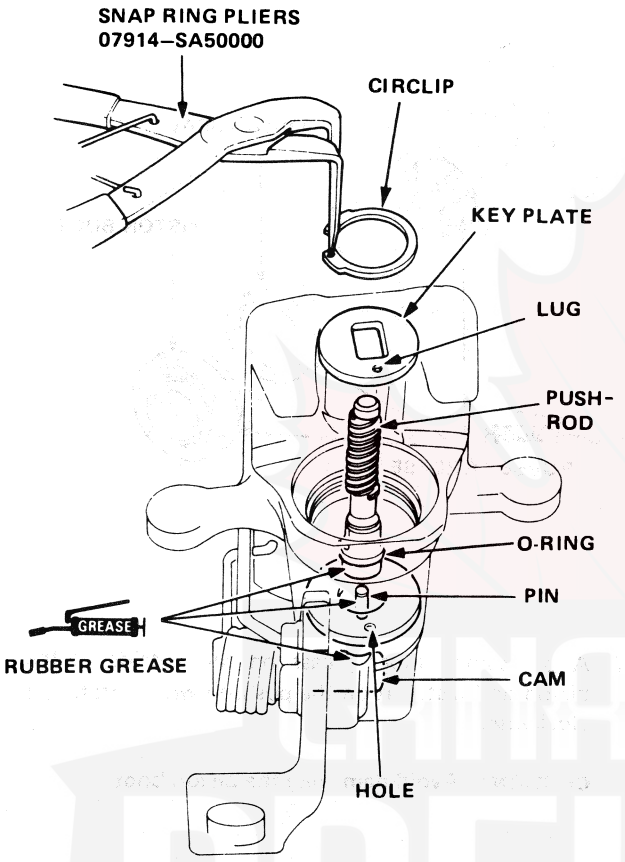
CAUTION : Avoid damaging the cam boot since it must be installed before installing the cam.

3. Install the lever, lock washer and nut.



4. Install the return spring.

5. Install the key plate on the pushrod using a new O-ring.



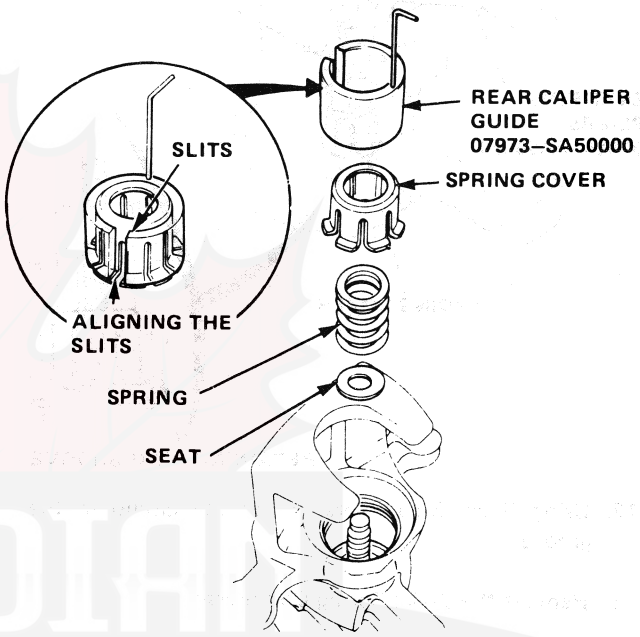
6. Install the pin, then coat the pushrod with clean grease and install on the cam being careful not to let it fall.

   NOTE: Align the lug on the key plate with the hole in the cylinder.

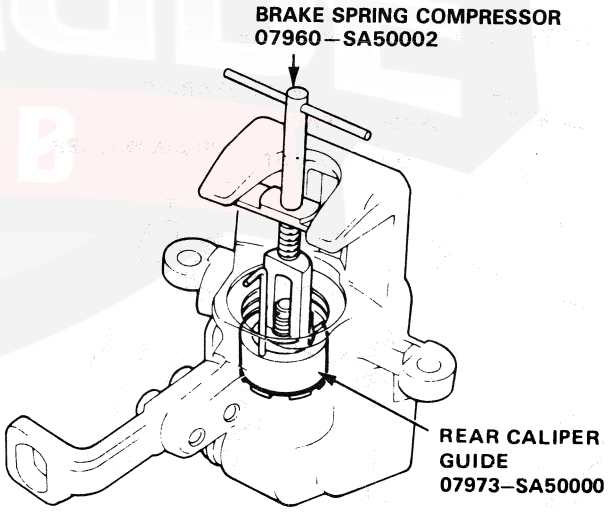
7. Using the Snap Ring Pliers, install the circlip over the key plate.

8. Install the seat and spring on the pushrod. Place the spring cover in the cylinder aligning the slits in the Rear Caliper Guide with the grooves in the cover.

   NOTE: Make sure that the grooves in the spring cover are aligned with the slits in the Rear Caliper Guide when installing the cover.



9. Install the Brake Spring Compressor on the spring cover.



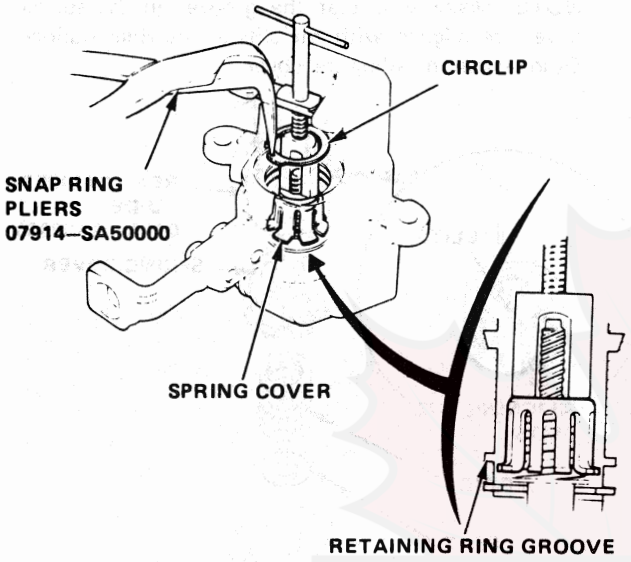
10. Compress the spring until it bottons out.

    NOTE: Check that the caliper guide doesn't hang up while the spring is being compressed.

(cont'd)

Reassembly (cont'd)

11. Remove the Caliper Guide. Check that the flared end of the spring cover is below the circlip groove as shown.



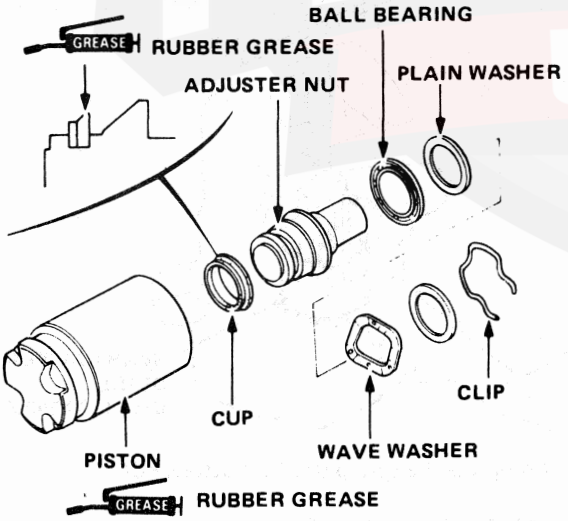
12. Using Snap Ring Pliers, install the circlip in the groove.

13. Remove the Brake Spring Compressor.

    NOTE: Check that the circlip is seated properly in the groove.

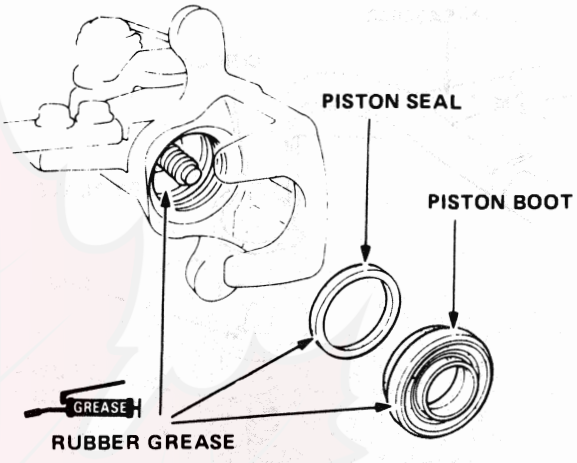
14. Apply some rubber grease to a new piston cup and install it on the adjuster nut.

    NOTE: Note the installation direction.



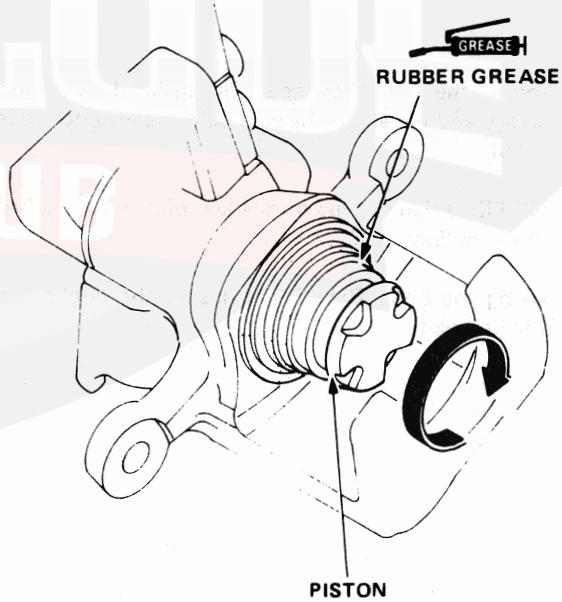
15. Install the ball bearing, plain washer, wave washer and plain washer on the adjuster nut. Slide the nut into the piston and secure with the clip.

16. Coat a new piston seal and piston boot with rubber grease and install them in the caliper.



17. Apply some rubber grease on the outside of the piston and install it on the pushrod while rotating it clockwise.

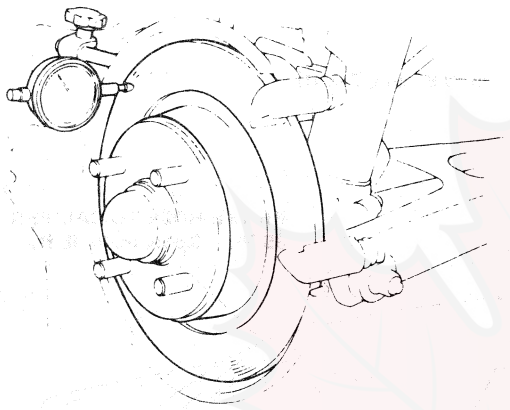
    CAUTION: Avoid damaging the piston boot.



Rear Brake Disc

Run-Out

1. Block the flont wheels, support the rear of the car on safety stands, then remove the rear wheels.
2. Remove the caliper bolts, lift the caliper up out of the way, then remove the pads and pad guides (page 21-24).



3. Inspect the disc surface for grooves, cracks, and rust. Clean disc thoroughly and remove all rust.
4. Mount a dial indicator as shown.

   Brake Disc Runout:
   Service Limit: 0.15 mm (0.006 in.)

5. Replace the disc if beyond the service limit. Remove the caliper bracket and the old disc, then install a new one. Rainstall the caliper bracket, and torque the bolts to 39 N·m (3.9 kg-m, 28 lb-ft).

Thickness and Parallelism

1. Block the front wheels, support the rear of the car on safety stands, then remove the rear wheels.
2. Move the caliper and pads out of the way as described in the preceding column.
3. Using a micrometer, measure the disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in.) from the outer edge of the disc.

   Replace the disc if it exceeds the following service limits:

   Brake Disc Thickness:
   Standard: 10.0 mm (0.39 in.)
   Max. Refinishing Limit: 8.0 mm (0.31 in.)

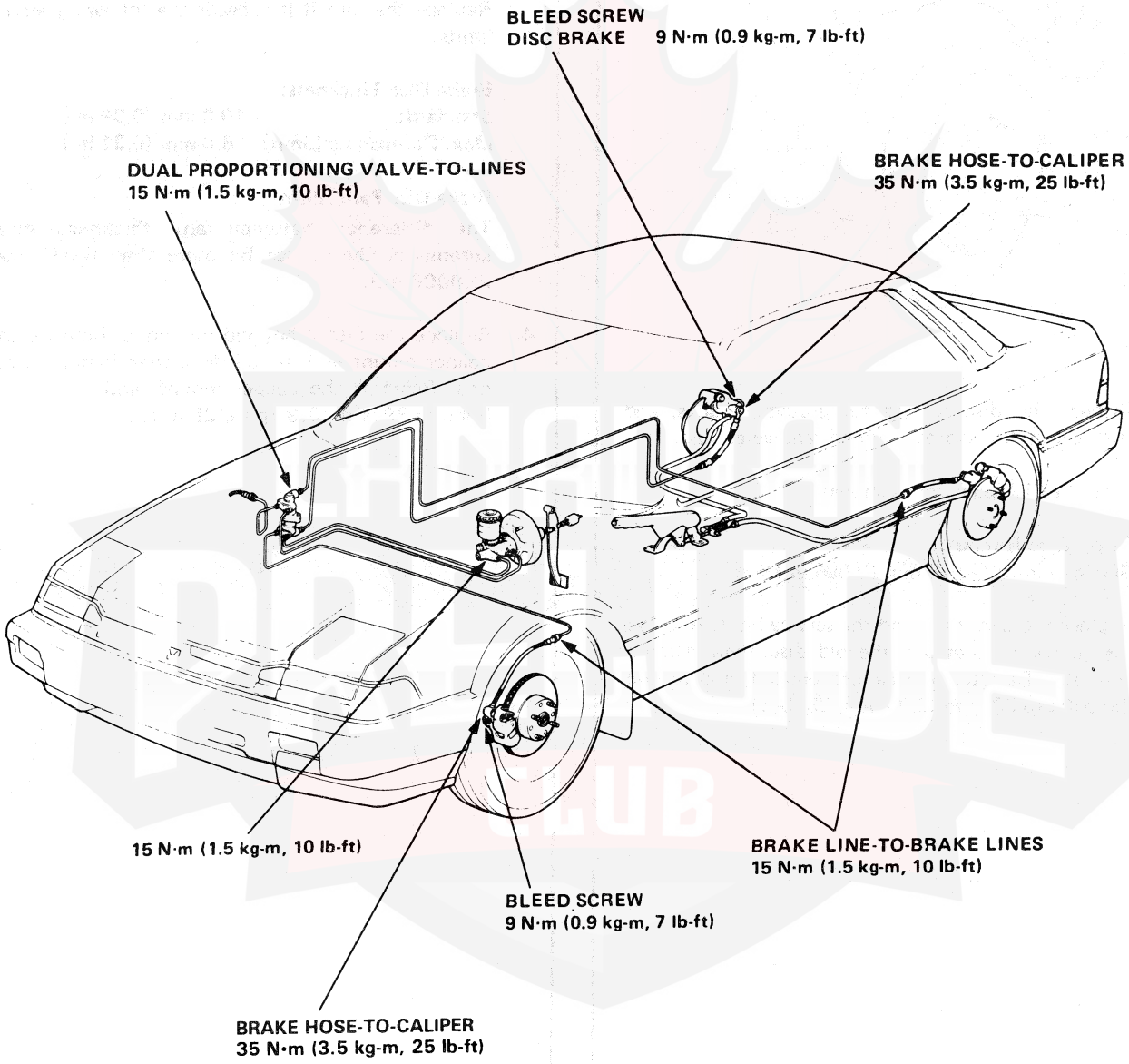
   Brake Disc Parallelism:
   The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in.).

4. Replace the disc if beyond the limits. Remove the caliper mount and the oil disc, then install a new one. Reinstall the caliper mount, and torque the bolts to 39 N·m (3.9 kg-m, 28 lb-ft).

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.

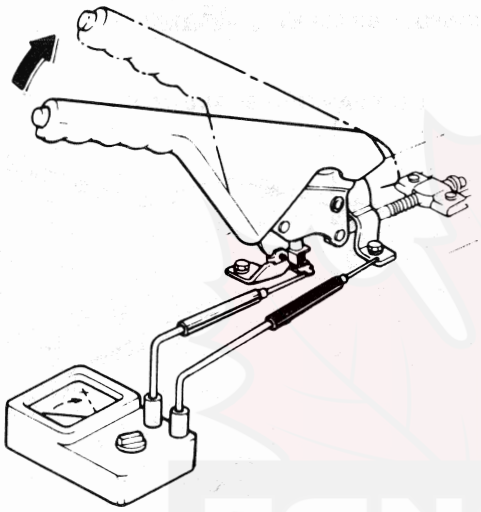


Parking Brake Switch
Brake Light Switch

Parking Brake Switch Test

Attach one test probe of an ohmmeter to the switch, and the other to the body.

- With the brake lever up, there should be continuity.
- With the brake lever down, there should be no continuity.



If continuity readings are incorrect, replace switch.

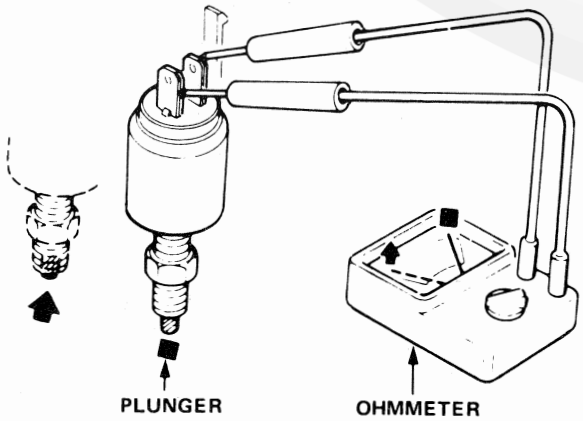
Brake Light Switch Test

Check for continuity between both terminals with an ohmmeter.

- With the switch plunger pushed in, there should be no continuity.
- With the switch plunger released, there should be continuity.

If no continuity, replace switch.

NOTE: If you replace the brake light switch, or change its position, readjust pedal height (page 21-3).

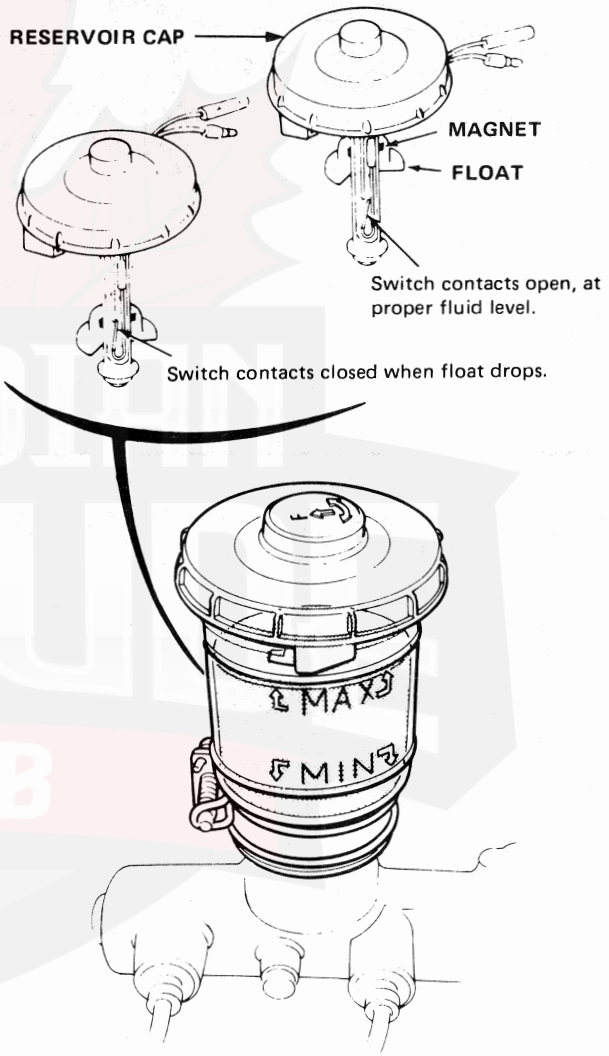


Brake Fluid Level Switch

Test

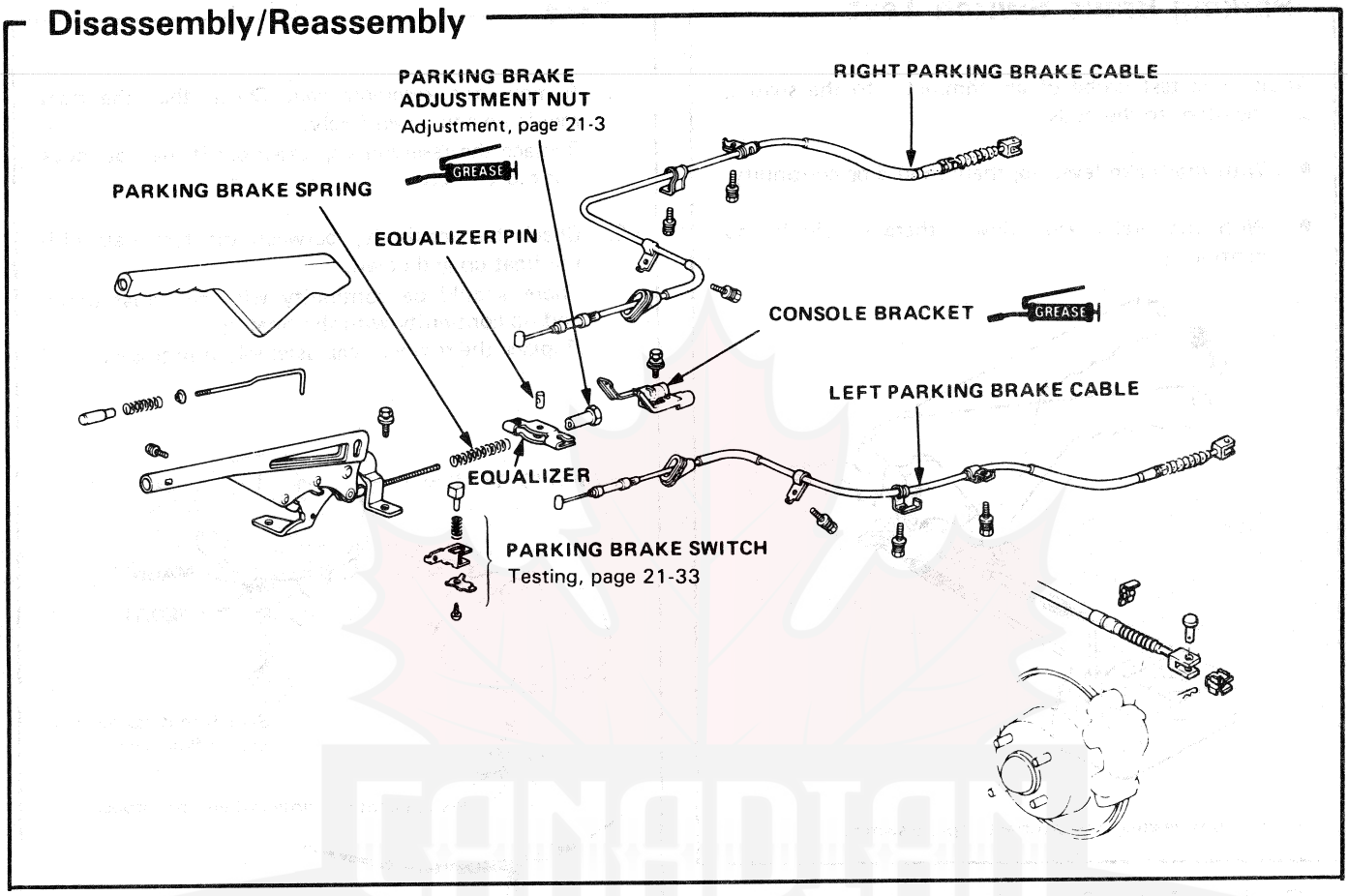
1. Remove the reservoir cap. Check that the float moves up and down freely.
   Replace the reservoir cap assembly if the float does not move freely.

2. Check for continuity between the terminals with the float up and down.
   There should be continuity with the float down and no continuity with the float up.
   Replace the reservoir cap assembly if necessary.



Parking Brake

Disassembly/Reassembly



Fuel Injected Model Brakes

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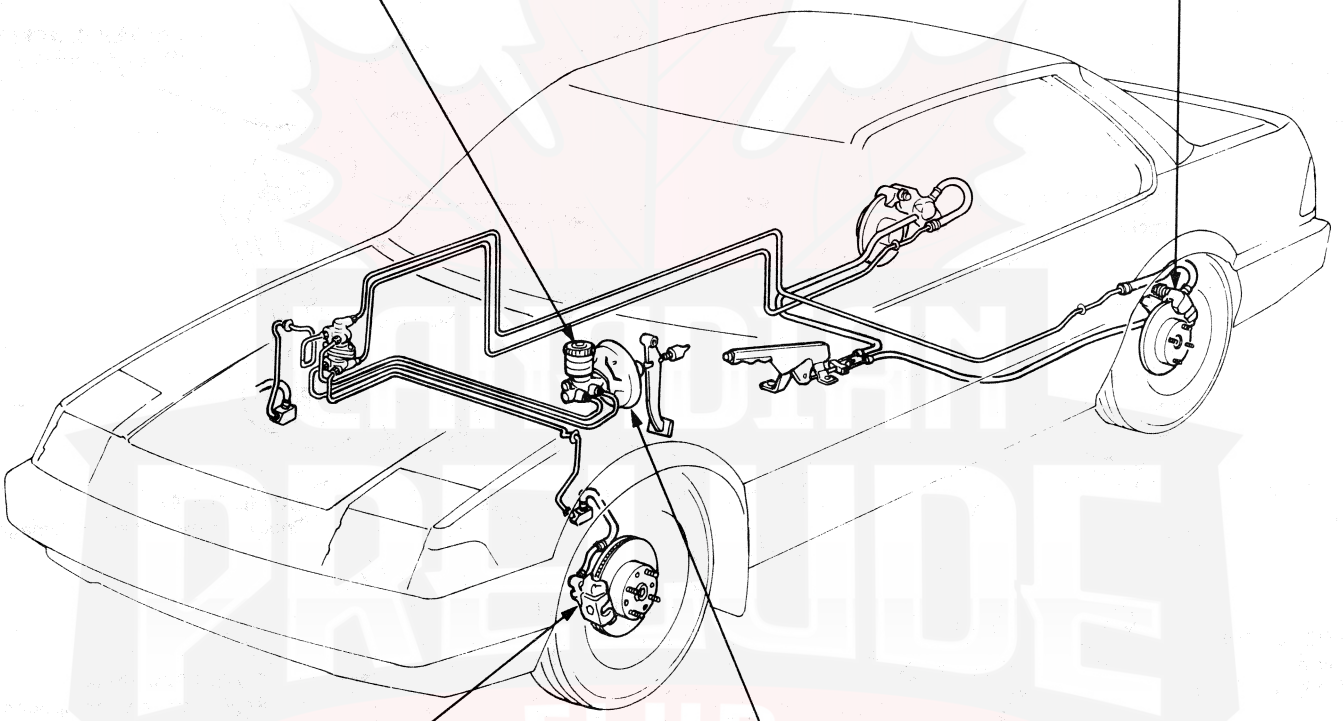

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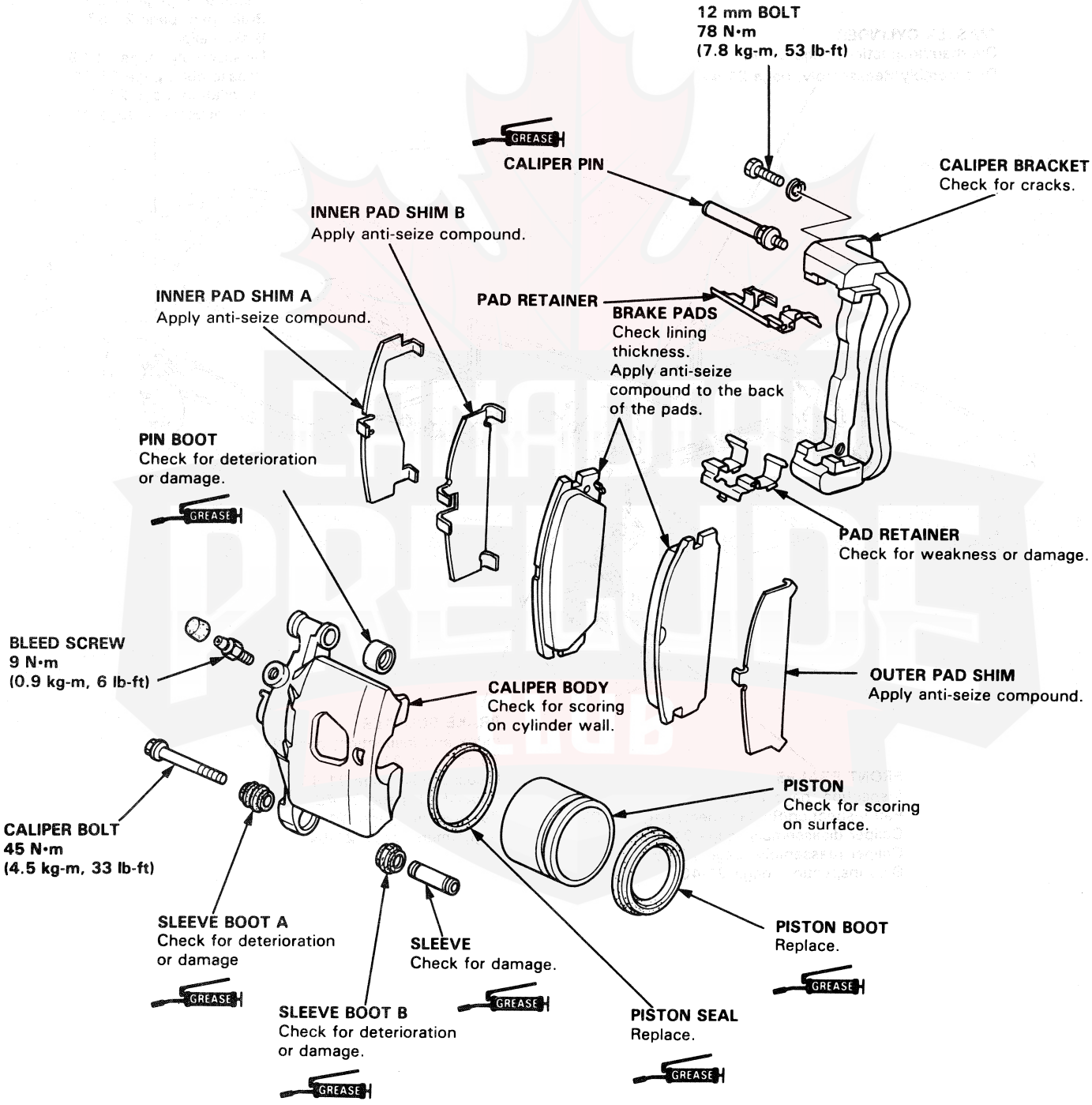
Inspection

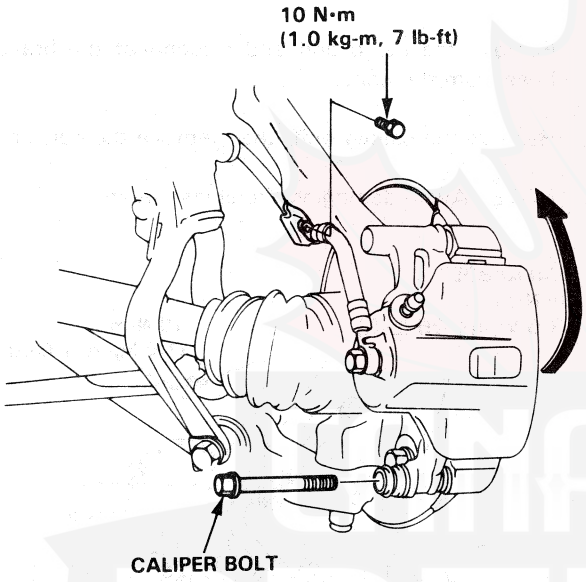
NOTE:
- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.



Brake Pad

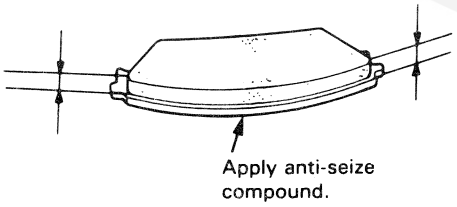
Inspection/Replacement

1. Separate the front wheels and support the front of car on safety stands.
2. Separate the brake hose clamp from the knuckle by removing the bolt.
3. Remove caliper bolt and pivot caliper up out of the way.



4. Remove the pad shim and pads.
5. Using a vernier caliper, measure the thickness of each brake pad lining.

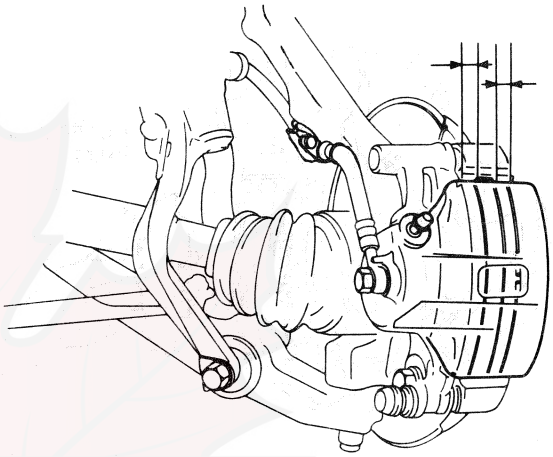
Brake Pad Thickness:
Standard: 10 mm (0.39 in)
Service Limit: 3 mm (0.12 in)



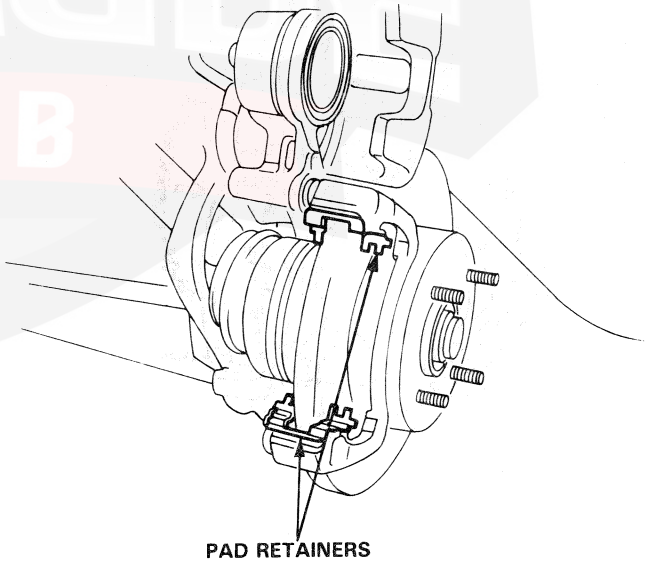
NOTE: Measurement does not include pad backing thickness.

6. If lining thickness is less than service limit, replace both pads as a set.

NOTE: Before replacing or installing new brake pads, coat the backs of the pads and shims with anti-seize compound.



7. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
8. Install the pad retainers.



(cont'd)

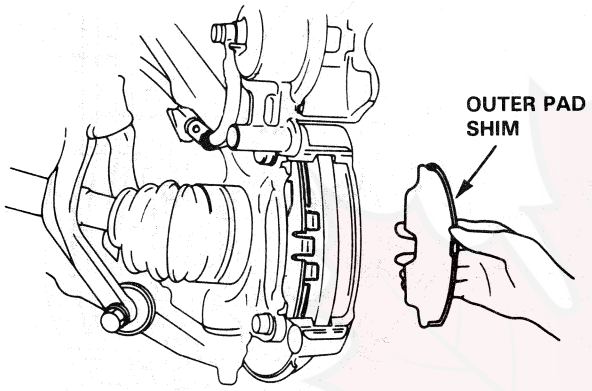
Brake Pad

Inspection/Replacement (cont'd)

9. Apply anti-seize compound to both sides of the pad shims and back of the pads.

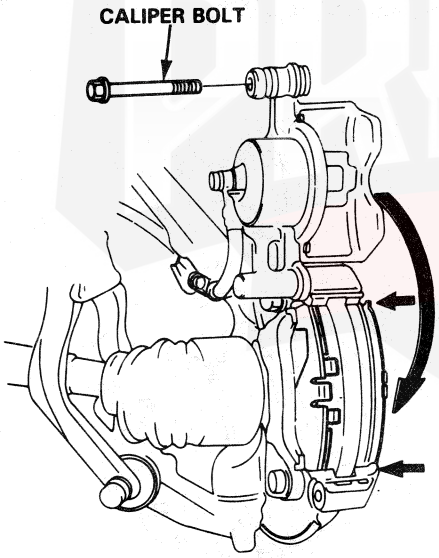
10. Install the brake pads, inner pad shim A and B, and outer pad shim.

    NOTE: Install the pad with the wear indicator on the inside.



11. Push in the piston so that the caliper will fit over the pads. Keep the boot in position to prevent damaging the boot when pivoting the caliper down.

12. Pivot the caliper down into position, then install the caliper bolt and tighten to 45 N·m (4.5 kg-m, 33 lb-ft).



13. Depress the brake pedal several times to make sure the brakes work, then road-test.

Brake Caliper

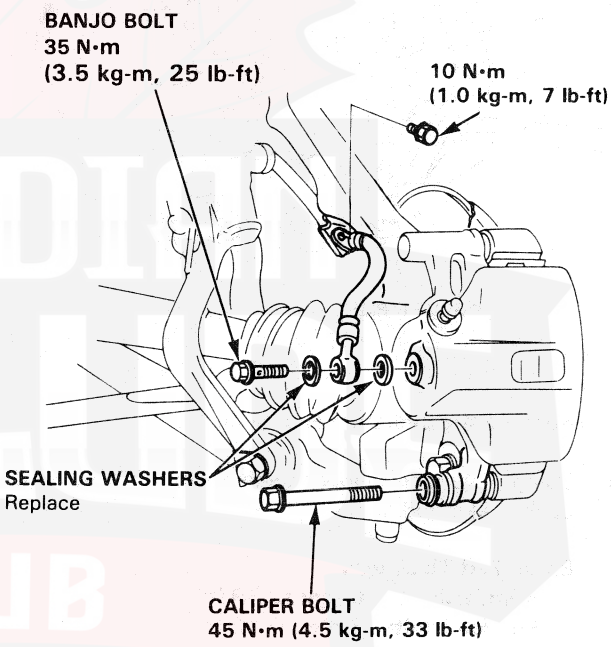
Disassembly

CAUTION:
- **Avoid spilling brake 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.**
- **Clean all parts thoroughly with the clean brake fluid. Blow out all passages with compressed air.**
- **Do not allow the foreign matter to enter the system.**

1. Remove the banjo bolt and disconnect the brake hose from the caliper.

2. Remove the caliper bolt, then remove the caliper.

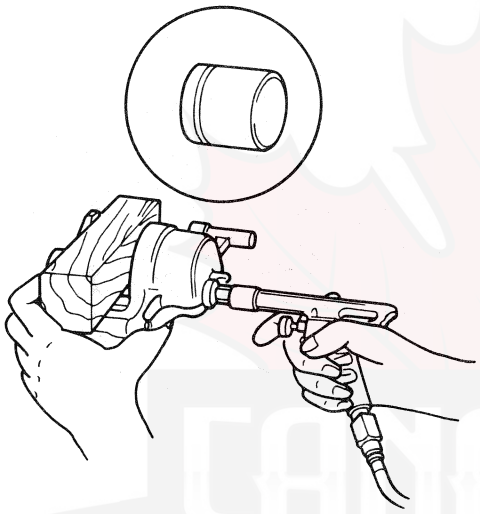
   NOTE: Avoid damaging the splash guard.



3. Place a wooden block or shop rag in the caliper opposite the piston, then carefully remove the piston from the caliper by applying air pressure through the brake line hole.

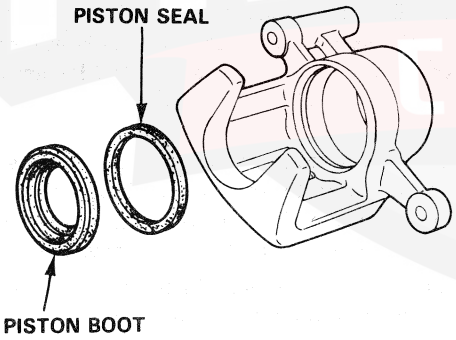
WARNING

- **Do not place your fingers in front of the piston.**
- **Do not use high air pressure; use an OSHA-approved 30 PSI nozzle.**



4. Remove the piston boot and piston seal.

CAUTION: Take care not to damage the cylinder.



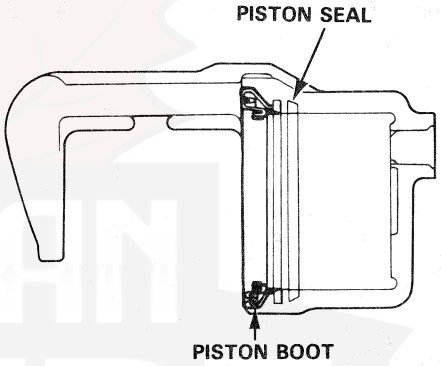
Reassembly

CAUTION:

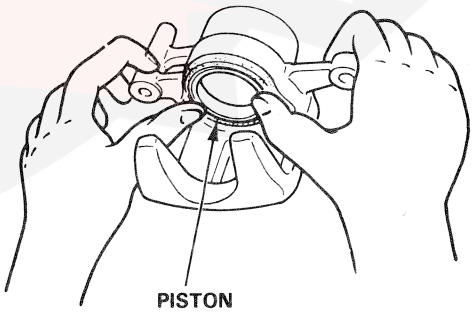
- **Make sure all parts are clean before reassembly.**
- **Use only new replacement parts.**
- **Use only new clean brake fluid.**
- **Do not allow dirt or other foreign mattes to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as its can damage the finish. Wash spilling brake fluid off immediately with clean water.**

1. Clean the piston and cylinder bore with brake fluid and inspect for wear or damage.

2. Apply brake fluid to a new piston seal, then install the piston seal in the cylinder groove.



3. Lubricate the caliper cylinder and piston with clean brake fluid, then install the piston in the caliper cylinder with the piston dished end facing in.



4. Reinstall the caliper in the reverse order of removal.

5. Fill the brake reservoir up and bleed the system.

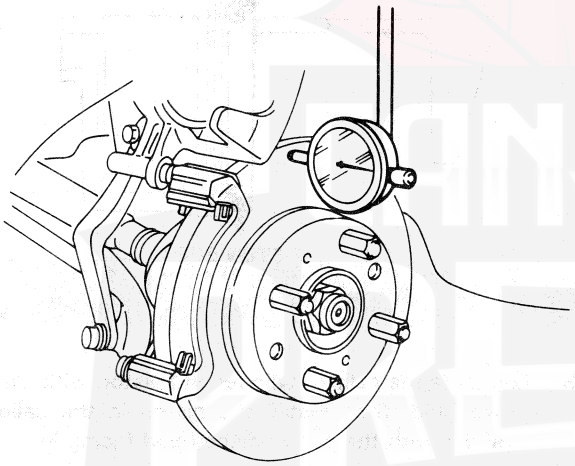
Front Brake Disc

Run-Out

1. Remove the front wheels, and support the front of car on safety stands.
2. Remove caliper pin A bolt, then pivot caliper up out of the way on the upper guide pin A bolt, and remove the pads and pad retainers (page 21-37).
3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.
4. Use the lug nuts to hold the disc securely against the hub, then mount a dial indicator as shown.

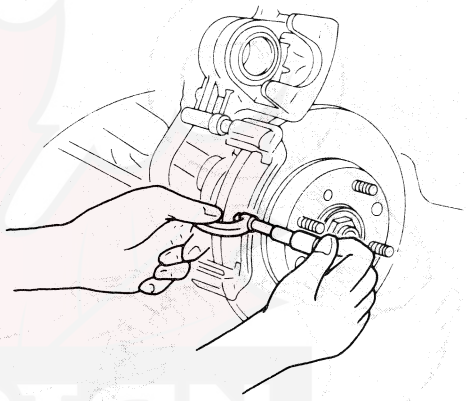
   Brake Disc Runout:
   Service Limit: 0.10 mm (0.004 in.)

5. If the disc is beyond the service limit, refer to the Honda Brake Disc Grinder Manual to see if it can be ground. If it can't be ground, remove it and install a new one.



Thickness and Parallelism

1. Remove the front wheels, and support the front of car on safety stands.
2. Move the caliper and pads out of the way as described in the preceeding column.
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in.) in from the outer edge of the disc.



Brake Disc Thickness:
Standard: 19 mm (0.75 in.)
Max. Refinishing Limit: 17 mm (0.67 in.)

Brake Disc Parallelism:
The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in.)

4. If the disc is beyond the limits for thickness or parallelism, refer to the Honda Brake Disc Grinder Manual to see if it can be ground. If it can't be ground, remove it and install a new one.

   NOTE: A new disc should be ground if its runout is greater than 0.10 mm (0.004 in).

Master Cylinder

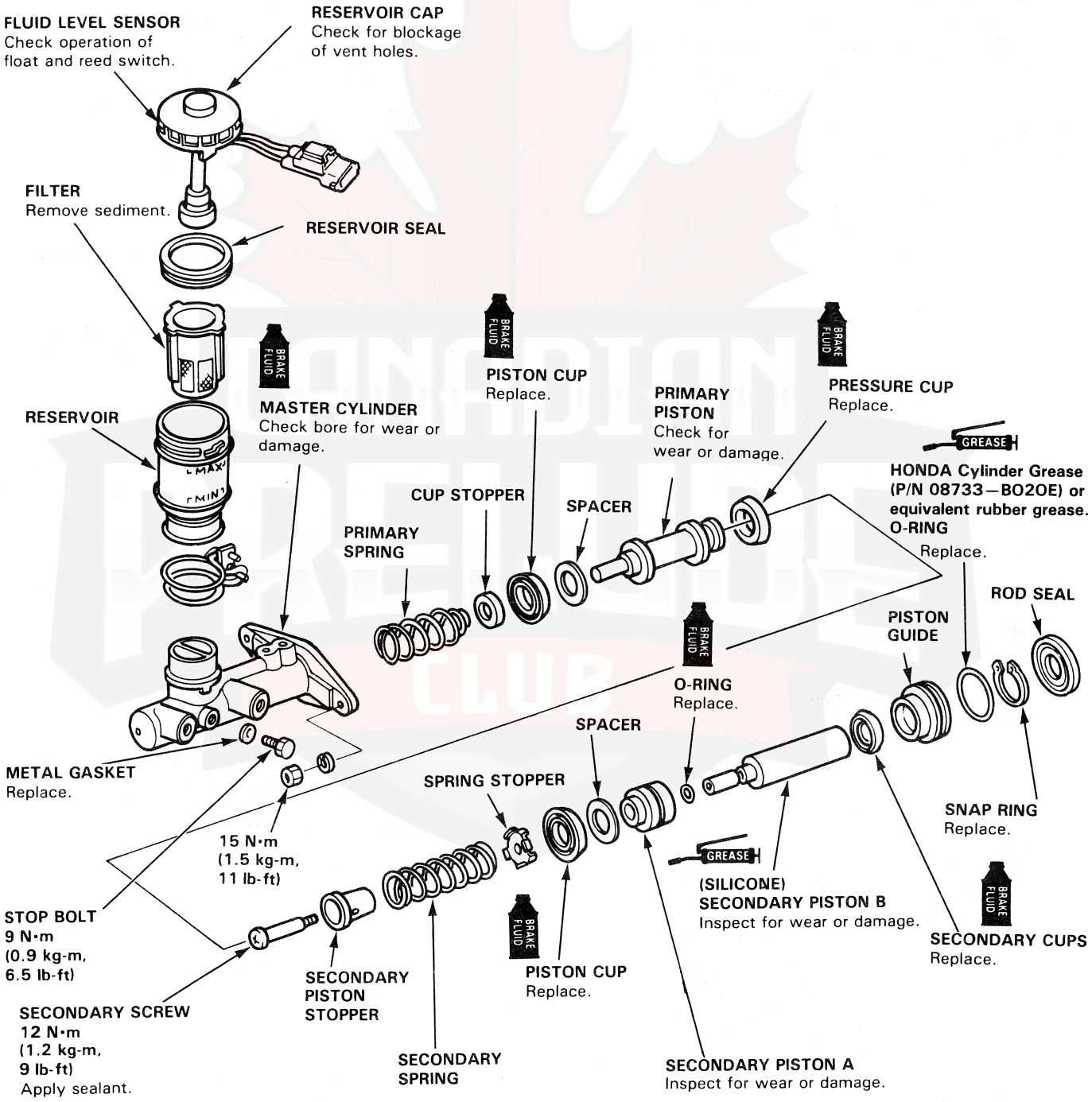
Overhaul/Inspection

CAUTION:

- **Avoid spilling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.**
- **This symbol represents brake fluid. Use only DOT 3 or 4 brake fluid.**

NOTE:

- Wash all removed parts in brake fluid and blow dry with compressed air. Blow open all passages.
- Replace all rubber parts with new ones whenever the cylinder is disassembled.
- To prevent damage, liberally apply clean brake fluid to the piston cups before installation. Use special tool to install the cups.

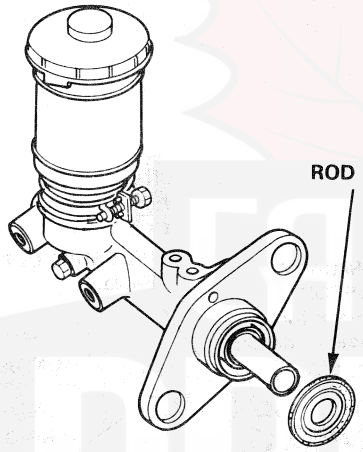


Master Cylinder

Disassembly

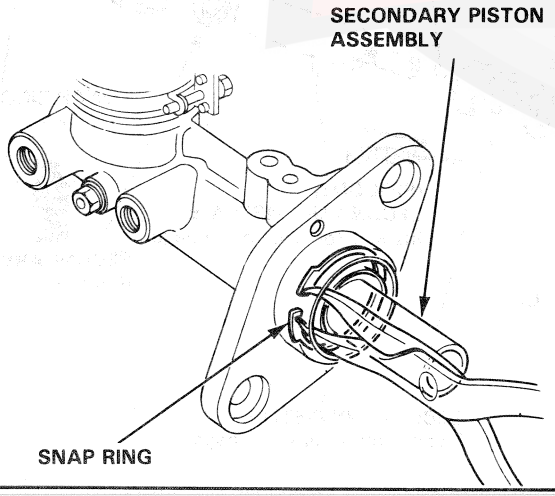
CAUTION:
- **Avoid spilling fluid on painted, plastic, or rubber parts as it may damage the finish.**
- **Plug the end of the brake hose with a shop rag to prevent brake fluid from flowing out of the brake hose after disconnecting.**
- **Do not mix different brands of brake fluid.**
- **Use only new clean brake fluid.**
- **Clean all parts thoroughly with the brake fluid. Blow out all passages with compressed air.**
- **Do not use high air pressure; use an OSHA-approved 30 psi nozzle.**
- **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.

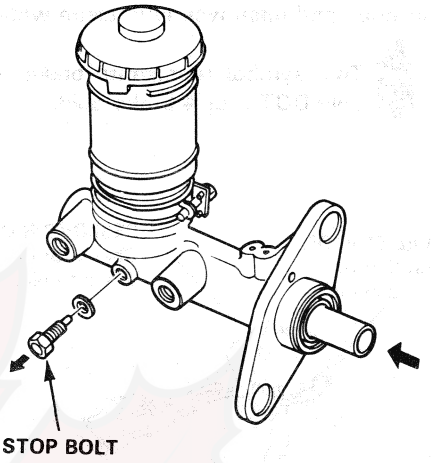


2. Push in the secondary piston assembly, then remove the snap ring.

CAUTION: Avoid damaging the master cylinder wall.



3. Remove the stop bolt while pushing in the secondary piston assembly.

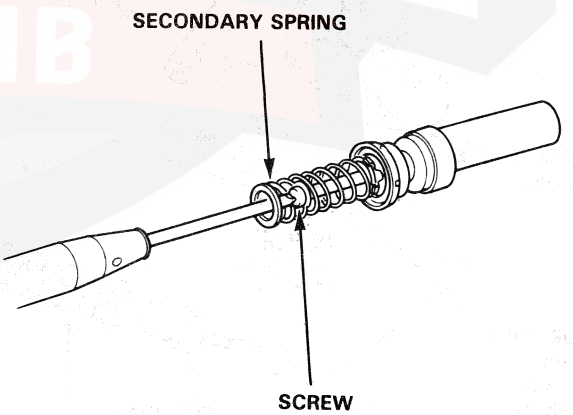


4. Remove the piston guide, secondary piston assembly and primary piston assembly.

NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side outlet.

CAUTION:
- **Do not use high pressure air or bring the nozzle too close to the inlet.**
- **Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.**

5. Remove the screw from the secondary piston assembly, then remove the secondary spring.



6. Clean all parts with brake fluid.

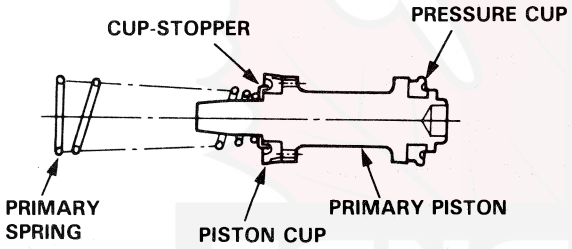
Reassembly

CAUTION:

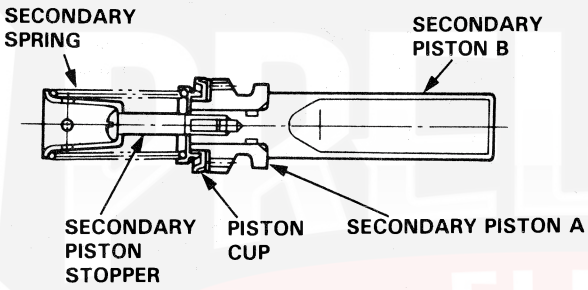
- **Make sure all parts are clean before reassembly.**
- **Use only new replacement parts.**
- **Use only new clean brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish.**
- **Wash spilled brake fluid off immediately with clean water.**

1. Lubricate new piston assemblies with brake fluid, then fit them together.

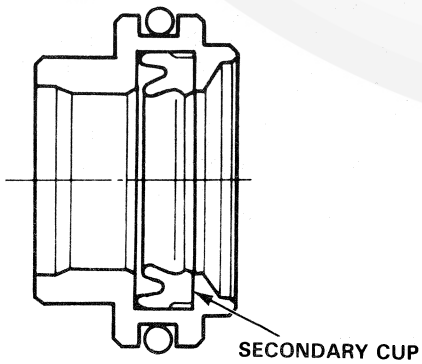
PRIMARY PISTON ASSEMBLY



SECONDARY PISTON ASSEMBLY



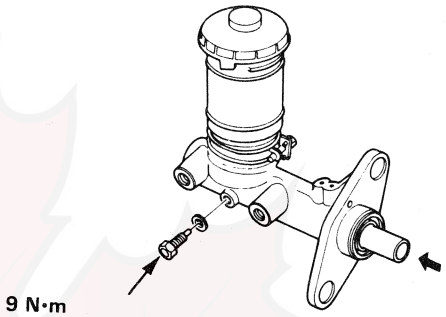
PISTON GUIDE ASSEMBLY



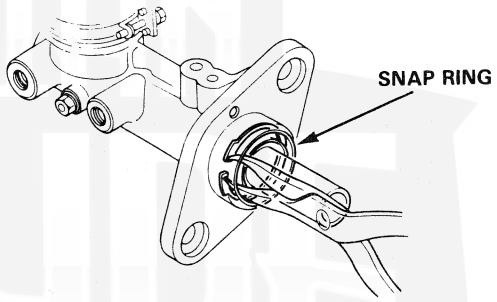
2. Install the piston assemblies in the mastor cylinder.

   NOTE: To ease assembly, rotate the pistons while inserting.

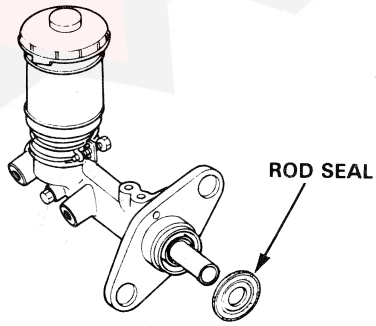
3. Install the stop bolt and new sealing washer while pushing in the secondary piston assembly, then tighten the stop bolt.



4. Install the snap ring while pushing in the secondary piston assembly.



5. Install a new rod seal.



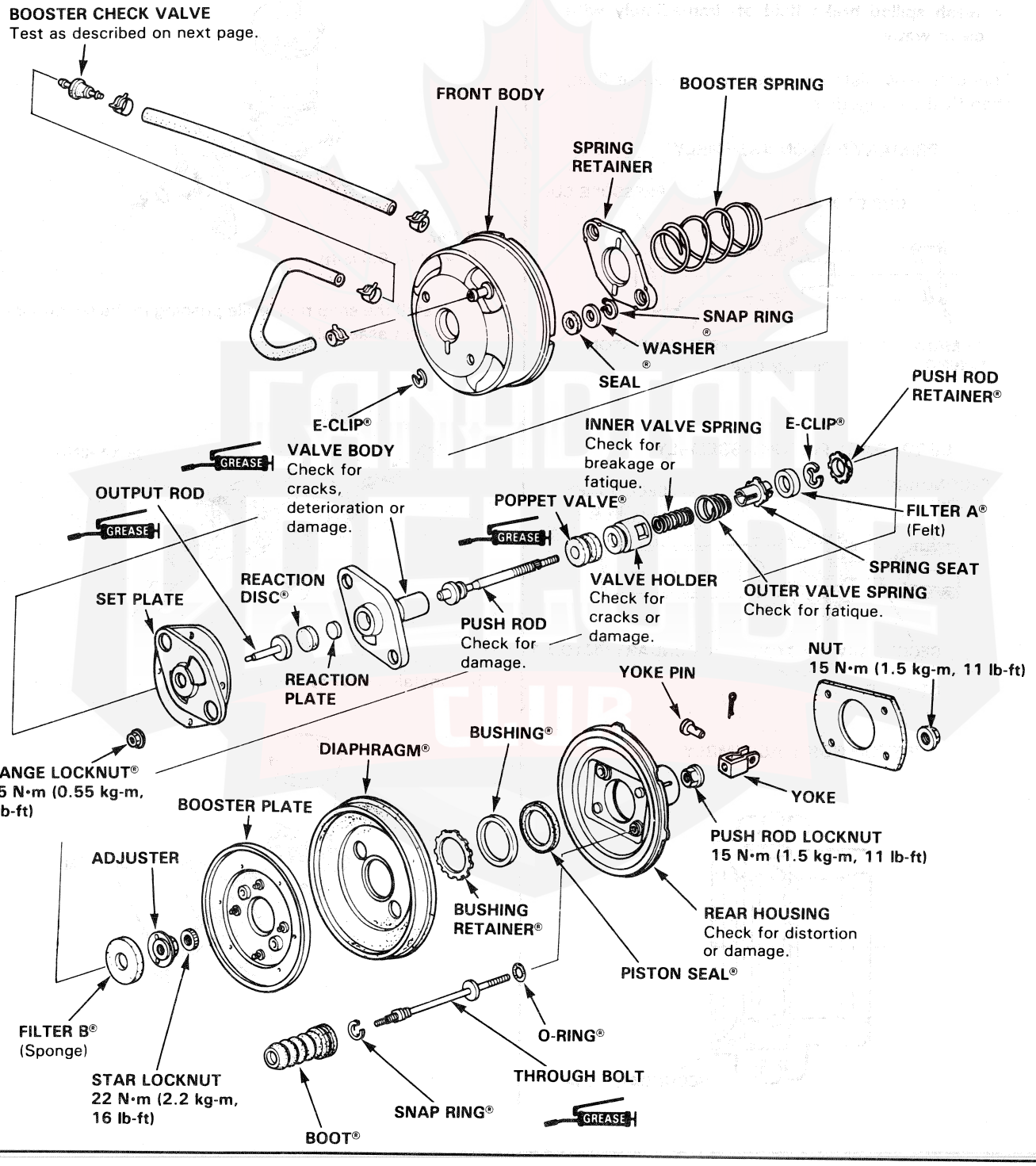
Brake Booster

Index and Inspection

Booster testing is on 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 21-46).



Tests

Functional Test

1. With the engine stopped, depress the brake pedal several times, then depress the pedal hard and hold that pressure for 15 seconds. If the pedal sinks, the master cylinder, brake line or a wheel cylinder is faulty.

2. Start the engine with the pedal depressed. If the pedal sinks slightly, the vacuum booster is working. If the pedal height does not vary, the booster or check valve is faulty.

Leak Test

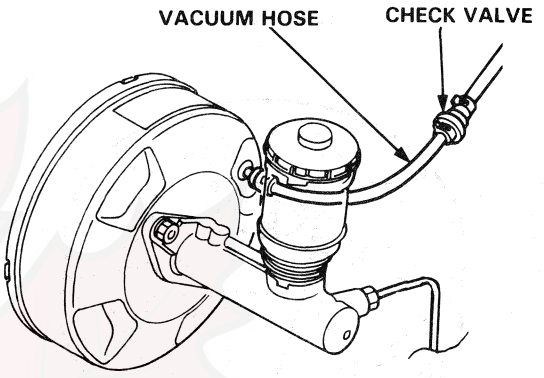
1. Depress the brake pedal with the engine running, then stop the engine. If the pedal height does not vary while depressed for 30 seconds, the vacuum booster is OK. If the pedal rises, the booster is faulty.

2. With the engine stopped, depress the brake pedal several times using normal pressure. When the pedal is first depressed, it should be low. On consecutive applications, pedal height should gradually rise. If the pedal position does not vary, check the booster check valve.

Check Valve Test

1. Disconnect the brake booster vacuum hose at the booster.

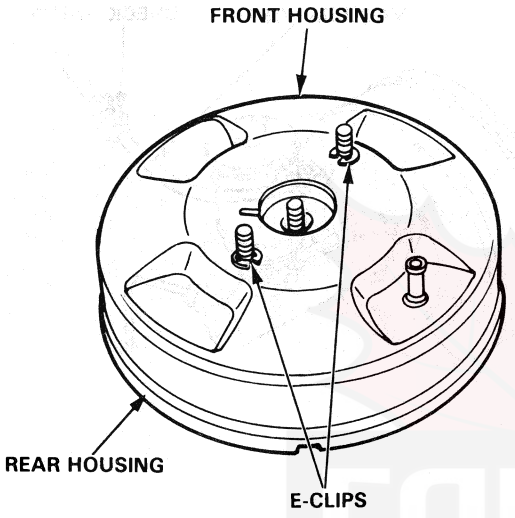
2. Start the engine and let it idle. There should be vacuum available. If no vacuum is available, the check valve is not working correctly.
   Replace the check valve and retest.



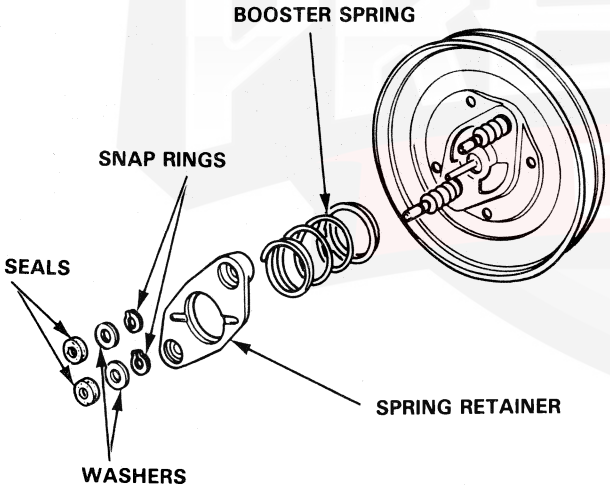
Brake Booster

Disassembly

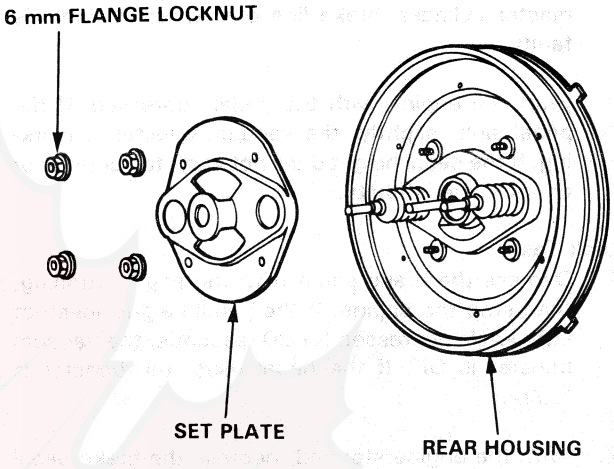
1. Scribe an aligning mark across the front and rear booster housings to ensure proper positioning of parts on reassembly.
2. Remove the master cylinder.
3. Remove the E-clips, and separate the front booster housing and the rear booster housing.



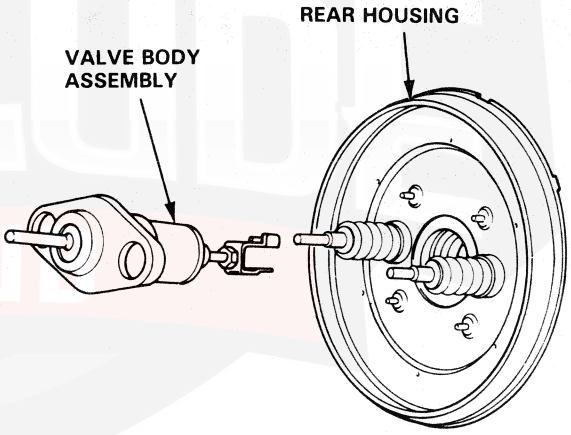
4. Remove the seals and washers from the spring retainer then remove the snap rings.



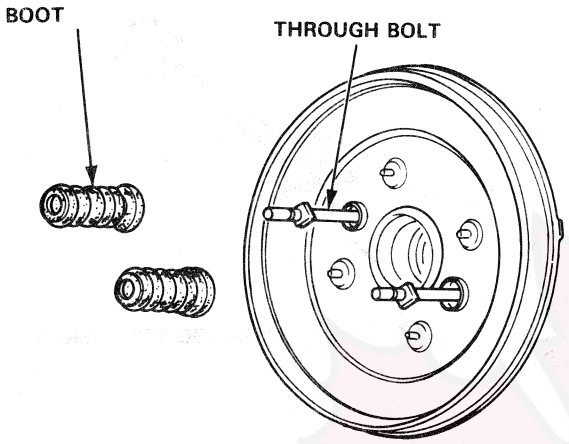
5. Remove the spring retainer and booster spring.
6. Remove the 6 mm flange locknuts and set plate.



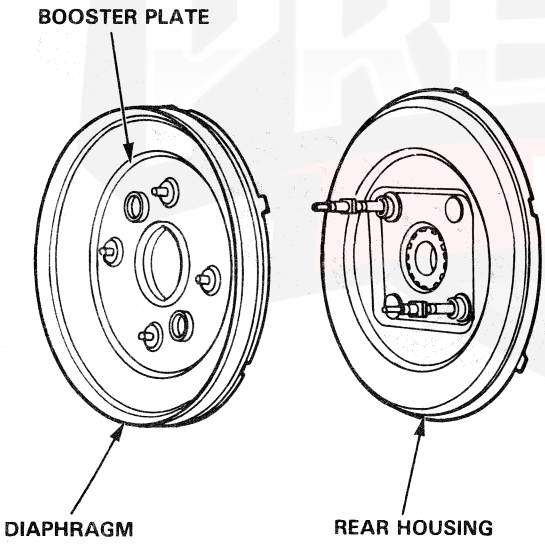
7. Remove the valve body assembly from the rear housing.



8. Remove the boots from the through bolts.

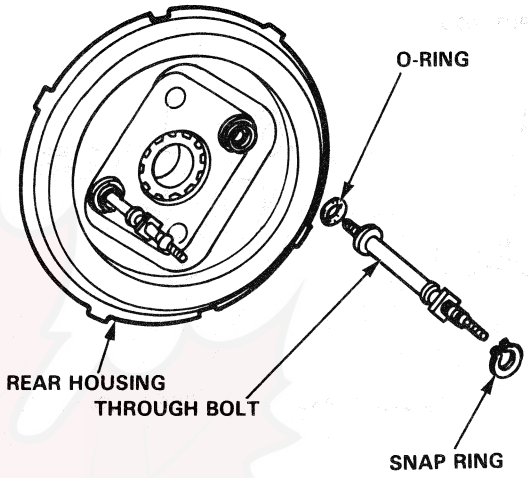


9. Remove the booster plate and diaphragm together from the rear housing.

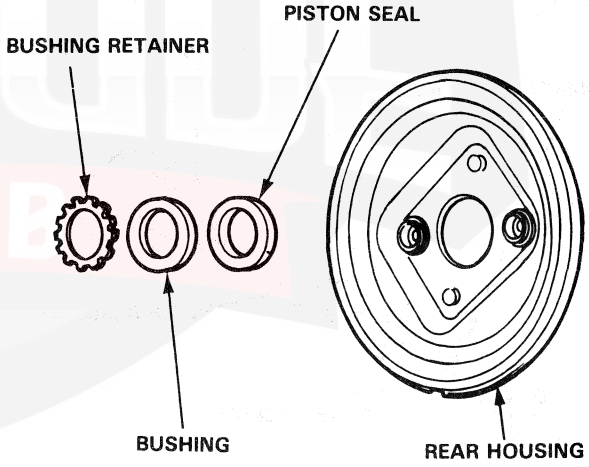


10. Remove the diaphragm from the booster plate.

11. Remove the snap rings, then remove the through bolts and O-rings from the rear housing.



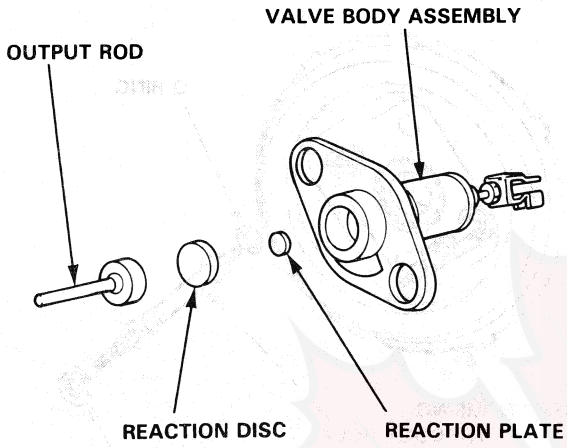
12. Remove the bushing retainer, bushing and piston seal from the rear housing.



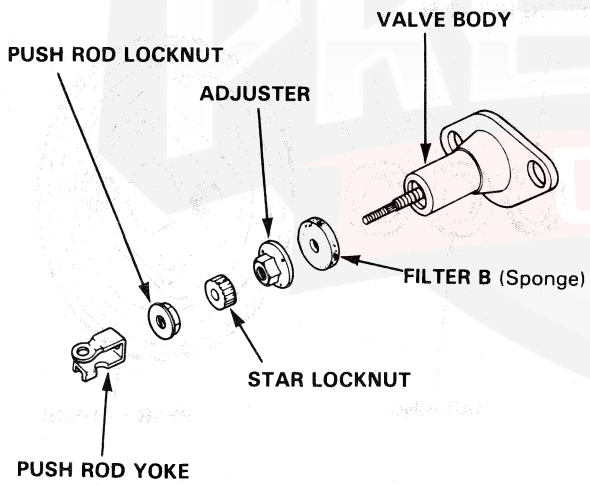
(cont'd)

Disassembly (cont'd)

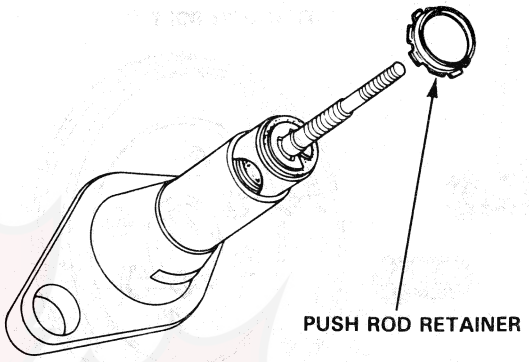
13. Remove the output rod, reaction disc and reaction plate from the valve body assembly.



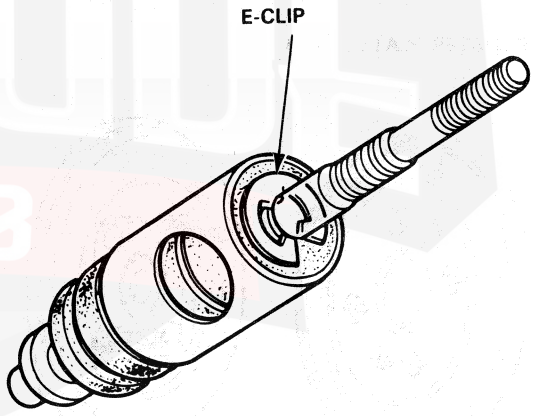
14. Remove the push rod yoke, locknut, star locknut, adjuster and filter B from the valve body.



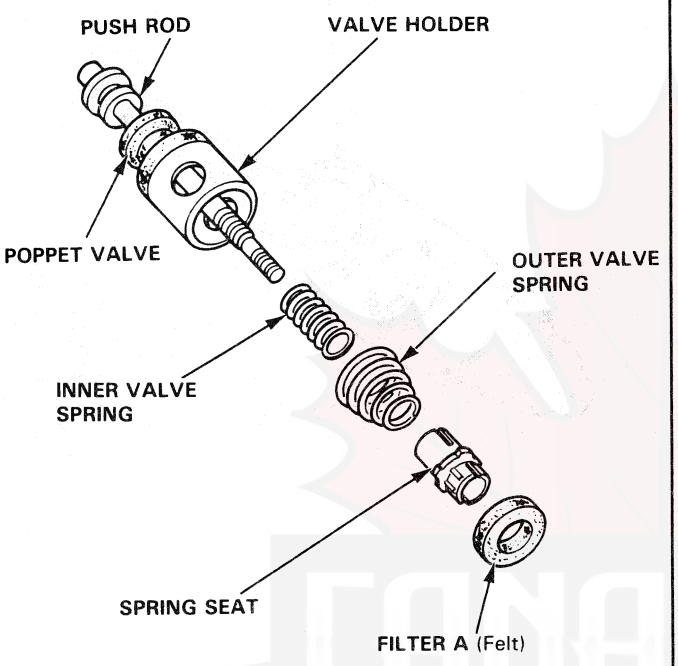
15. Remove the push rod retainer, then remove the push rod from the valve body assembly.



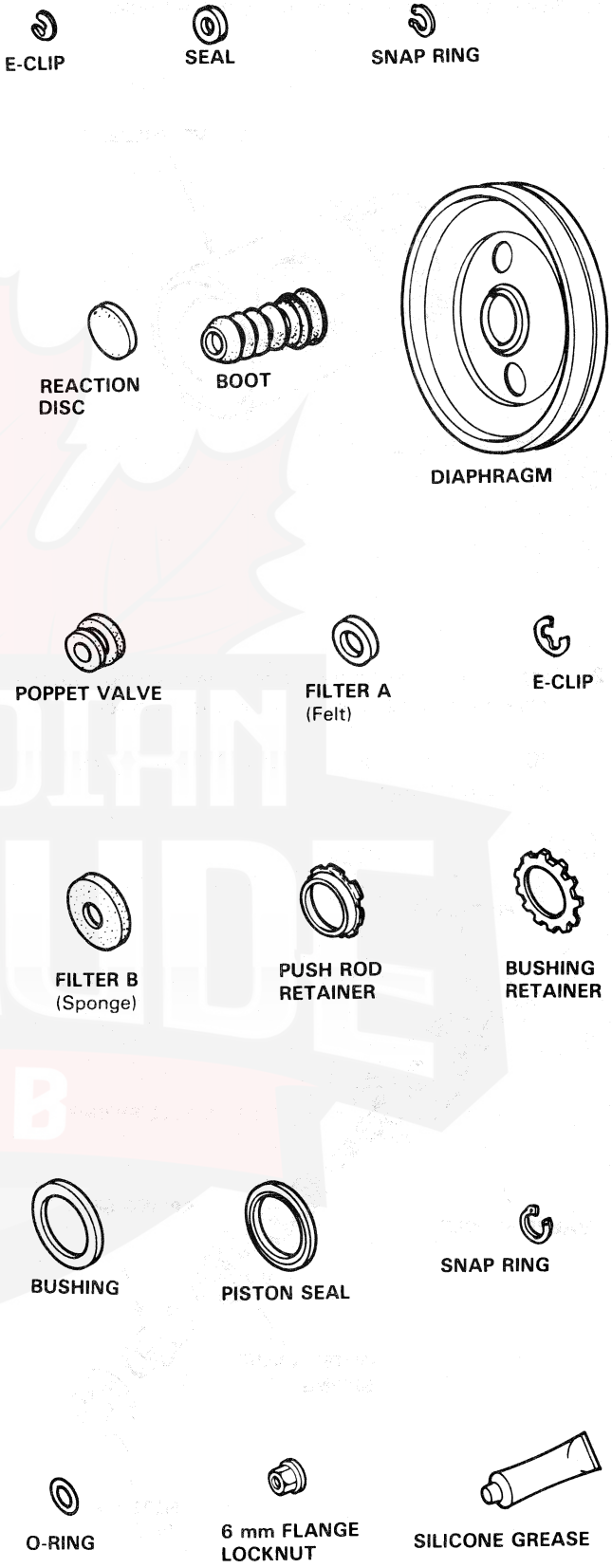
16. Remove the E-clip from the push rod.



17. Remove filter A, the spring seat, valve springs, valve holder and poppet valve from the push rod.

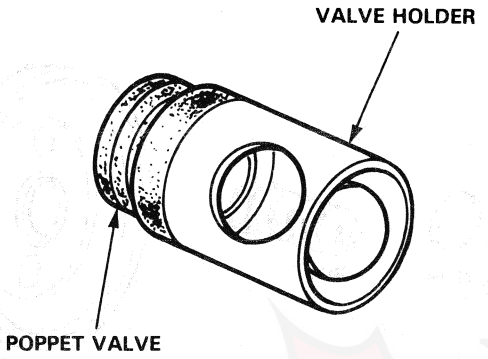


Rebuild Kit



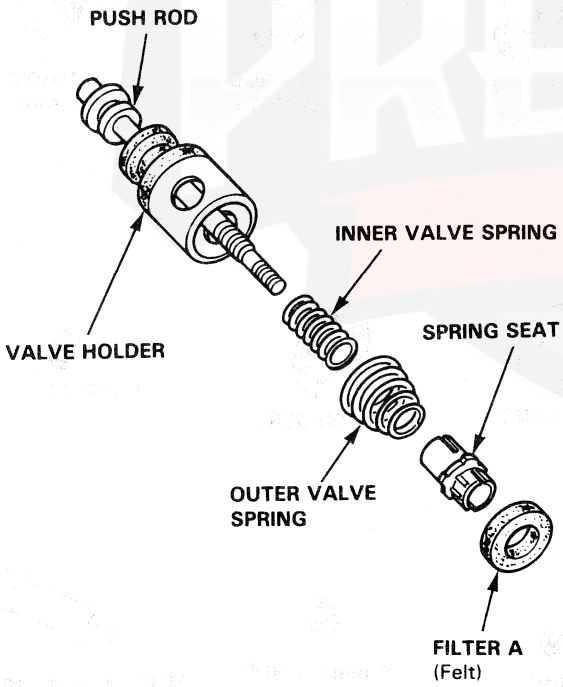
Reassembly

1. Install the poppet valve on the valve holder.

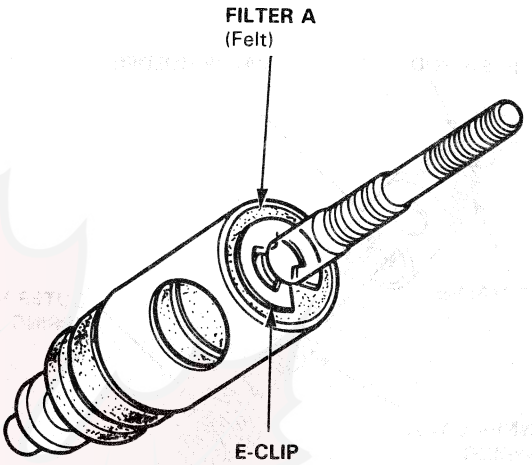


2. Install the valve holder, inner valve spring, outer valve spring and spring seat on the push rod.

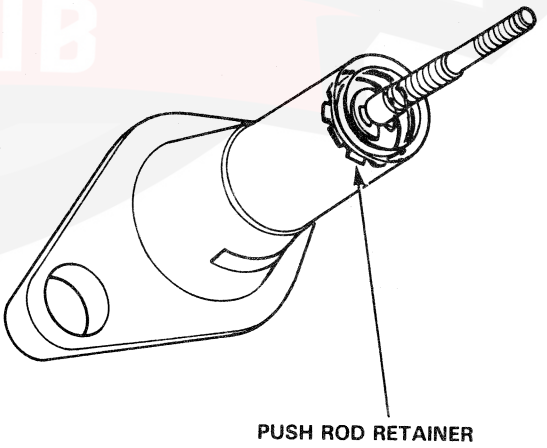
   NOTE: Install the spring seat with its short end facing the filter side.



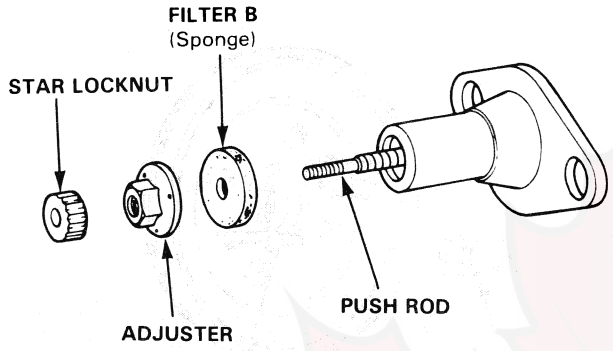
3. Install filter A and the E-clip on the push rod.



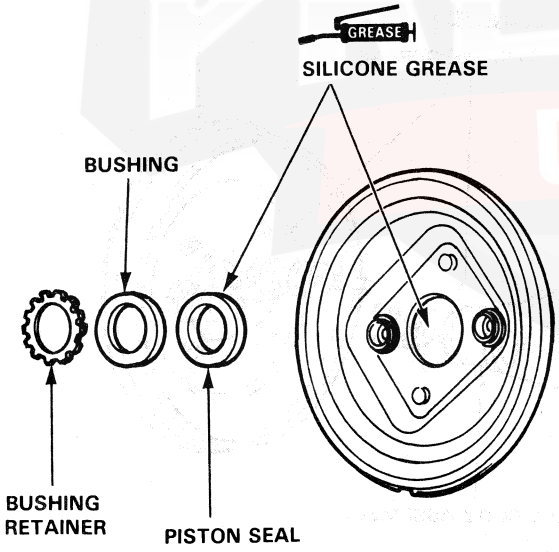
4. Apply silicone grease to the inner and outer surfaces of the valve body tube. Press the push rod assembly into the valve body tube, and install the push rod retainer.



5. Slip filter B (sponge) over the end of the push rod. Thread the adjuster and star locknut onto the push rod but do not tighten.



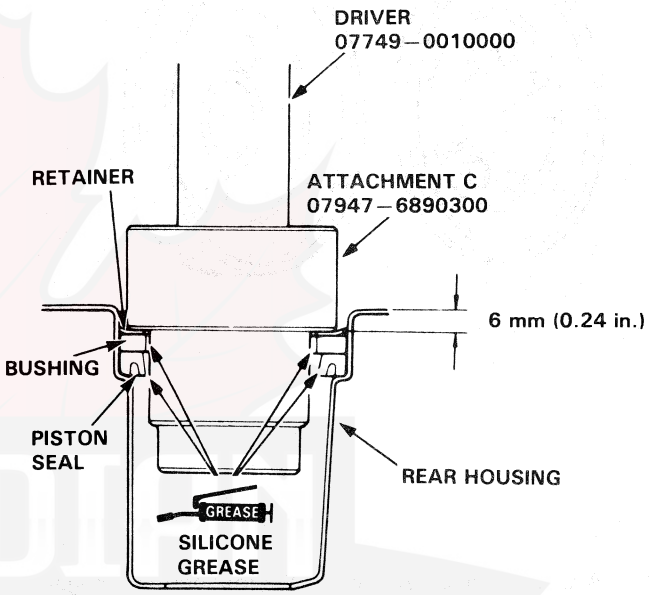
6. Apply silicone grease to the piston seal, then set the seal in position on the housing.



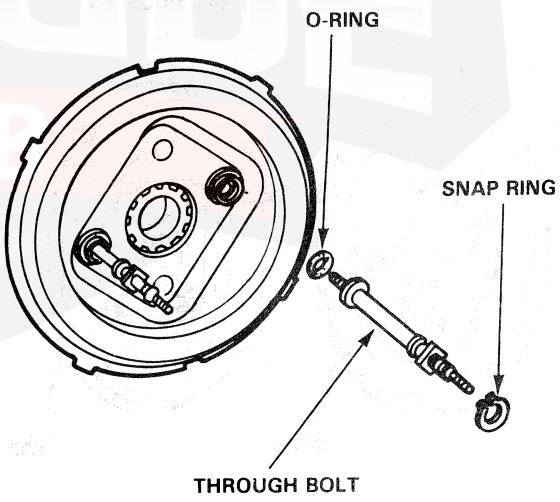
7. Install the piston seal and bushing in the rear housing, and gently drive the retainer in until it is 6 mm below the edge of the rear housing.

NOTE: Make sure the lip of the seal is facing in, as shown in drawing below.

CAUTION: If you drive in the retainer more than 6 mm, you may distort the piston seal.



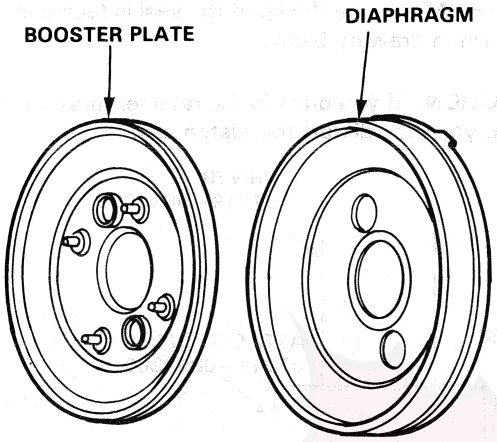
8. Install both through bolts, using the O-rings and snap rings.



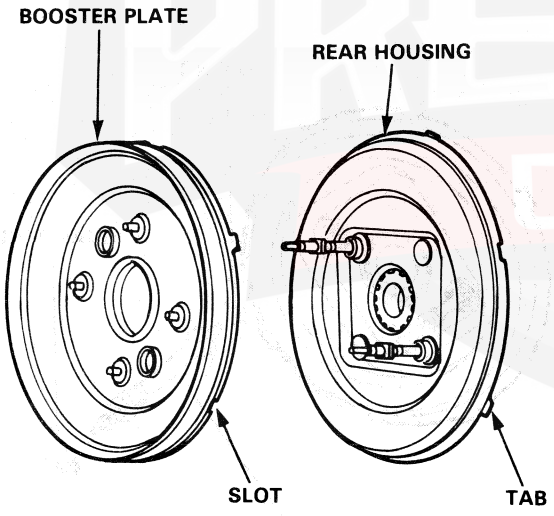
(cont'd)

Reassembly (cont'd)

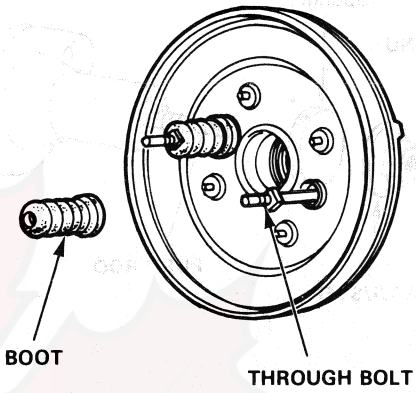
9. Install the diaphragm on the booster plate.



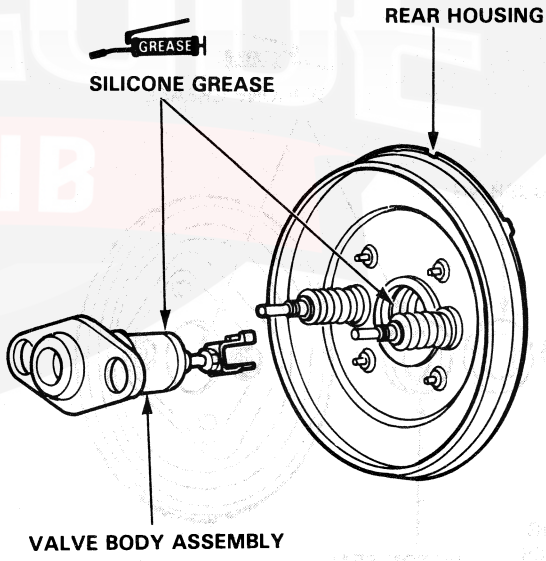
10. Attach the booster plate to the rear housing, aligning their tabs and slots.



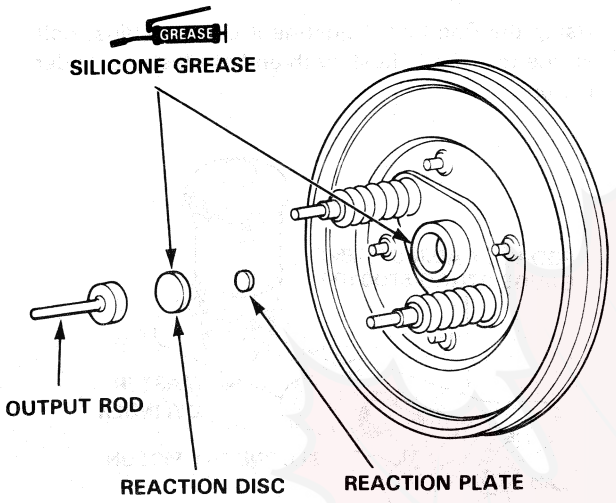
11. Install the boots on the through bolts.



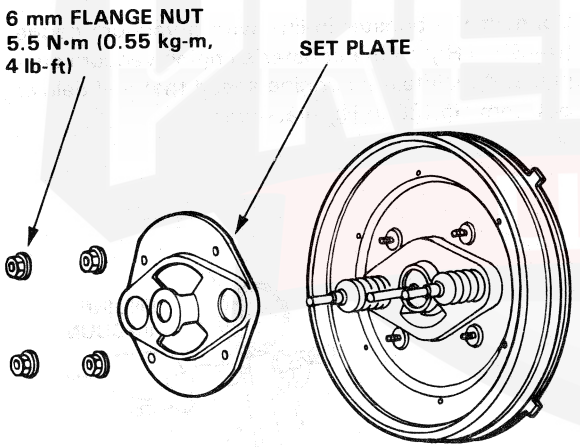
12. Apply silicone grease to the bore of the rear housing and the outer surface of the valve body asssembly. Install the valve body assembly in the rear housing.



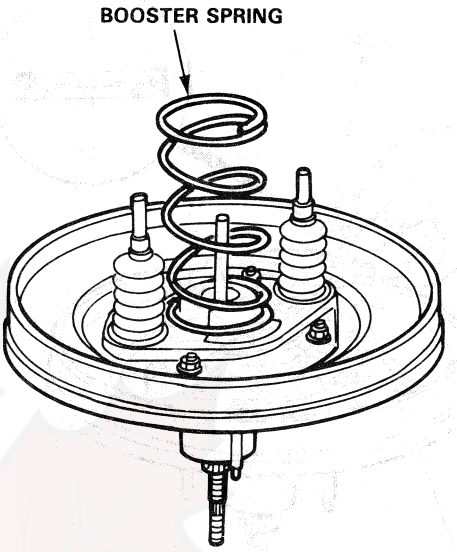
13. Apply silicone grease to the bore of the valve body, then install the reaction plate, reaction disc and output rod.



14. Install the set plate, and tighten the four 6 mm flange nuts.

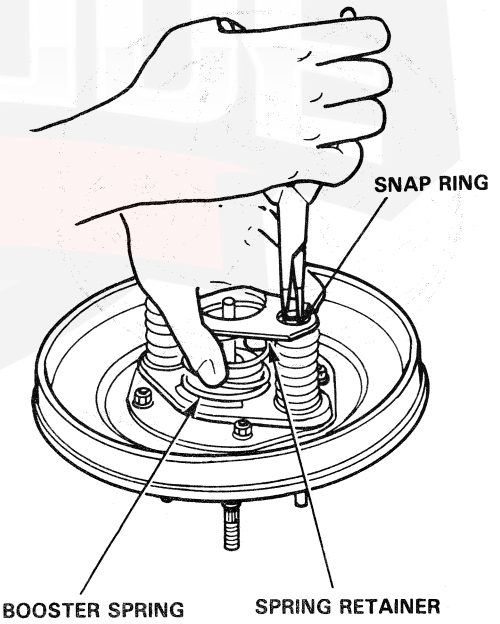


15. Install the booster spring.



16. Install the spring retainer on the through bolts aligning the square portions of the bolts and retainer.

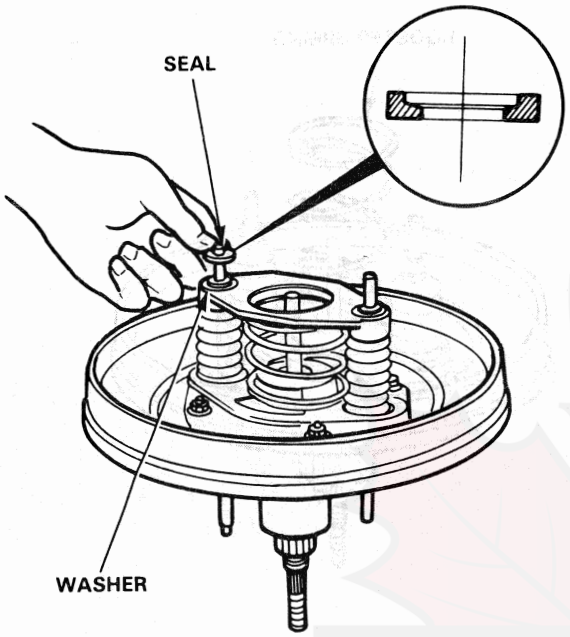
17. Secure the spring retainer by compressing the booster spring, and installing the snap rings on the through bolts.



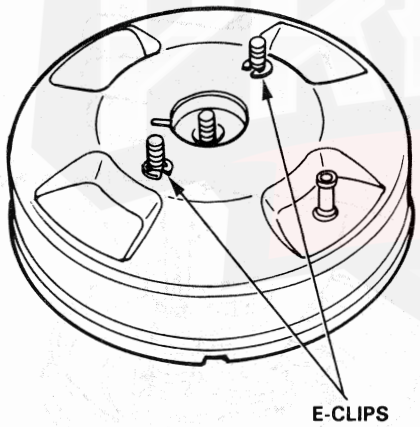
(cont'd)

Reassembly (cont'd)

18. Install the washers and seals.



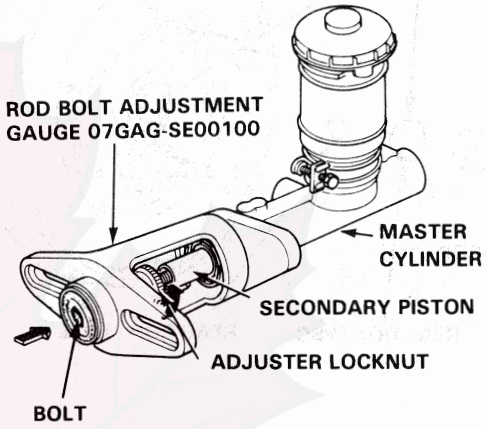
19. Assemble the front and rear housings.
Press down on the front housing, then install the E-clips on the through bolts.



Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

1. Using the Rod Bolt Adjustment Gauge, adjust bolt so the top of it is flush with end of master cylinder piston.

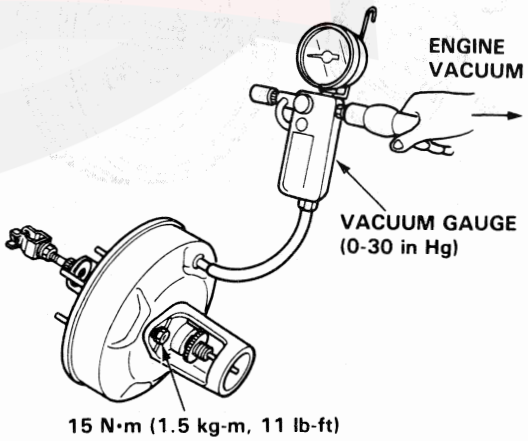


2. Install the rod seal of the master cylinder between the brake booster and rod bolt adjustment gauge.

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 (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.

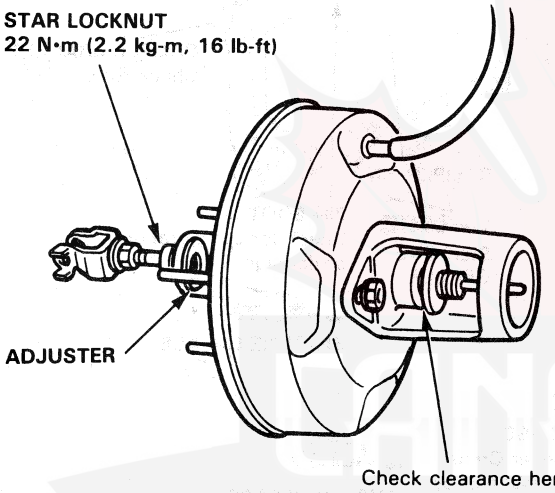


6. With a feeler gauge, measure the clearance between the gauge body and the adjuster locknut as shown.

   Clearance: 0—0.4 mm (0—0.016 in.)

7. If clearance is incorrect, loosen star locknut and turn adjuster in or out to adjust.

8. Tighten locknut securely.

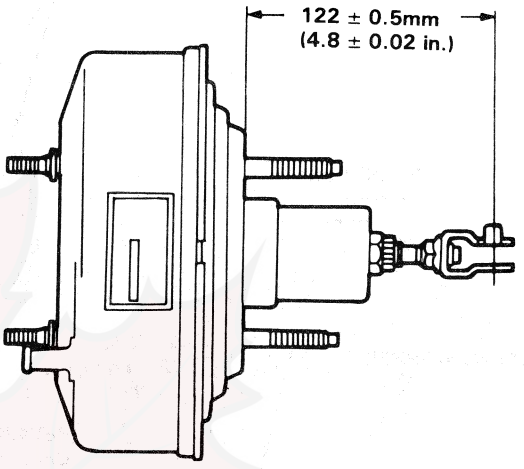


Pushrod-to-Piston clearance:
0—0.4 mm (0—0.16 in.)

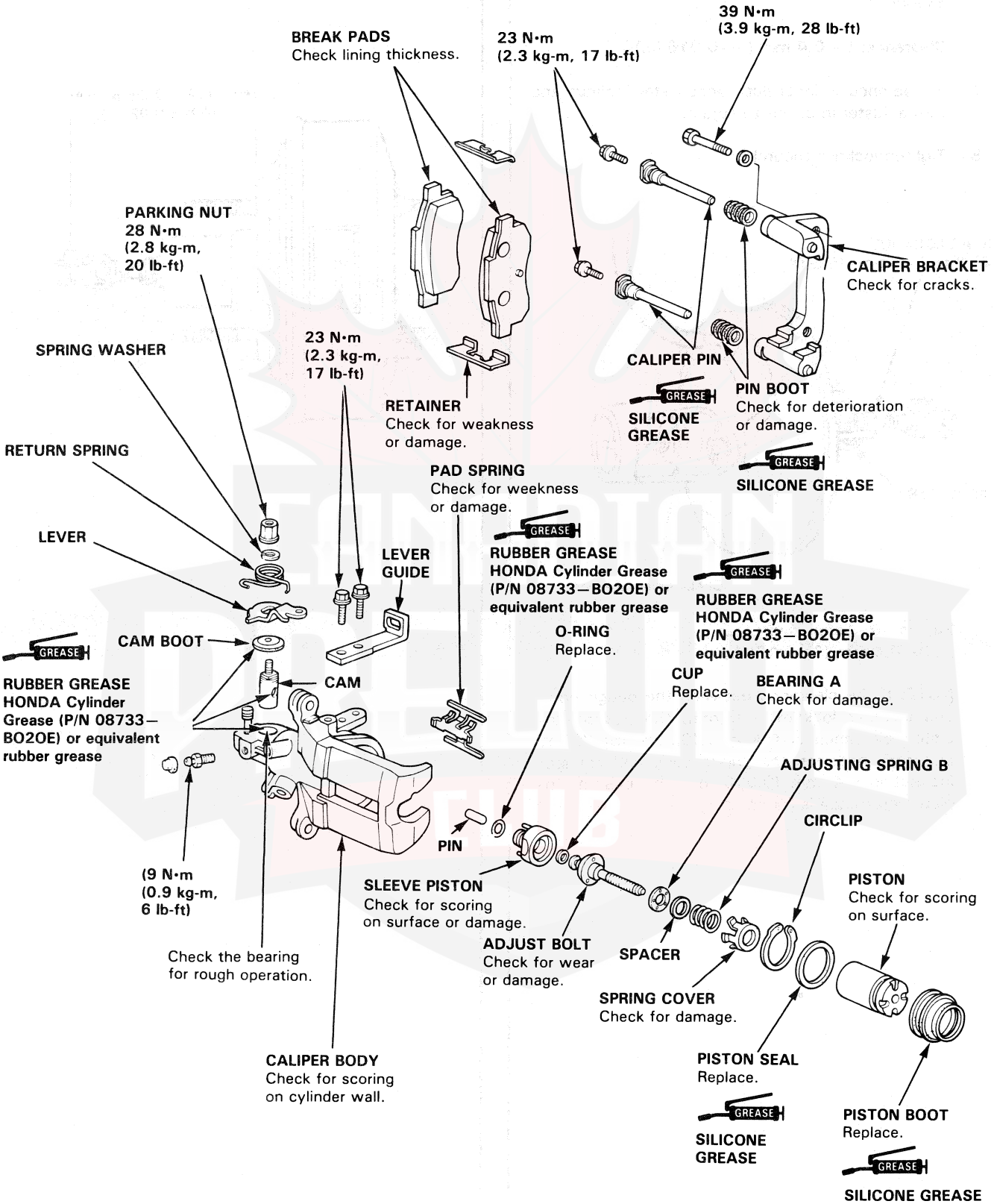
NOTE: If the clearance between the gauge body and adjuster locknut is 0 mm, the pushrod-to-piston clearance is 0.4 mm (0.016 in.). If the clearance between the gauge body and adjuster locknut is 0.4 mm (0.016 in.), the pushrod-to-piston clearance is 0 mm.

Pushrod Adjustment

Install the locknut and pushrod yoke on the pushrod; adjust the pushrod length as shown.



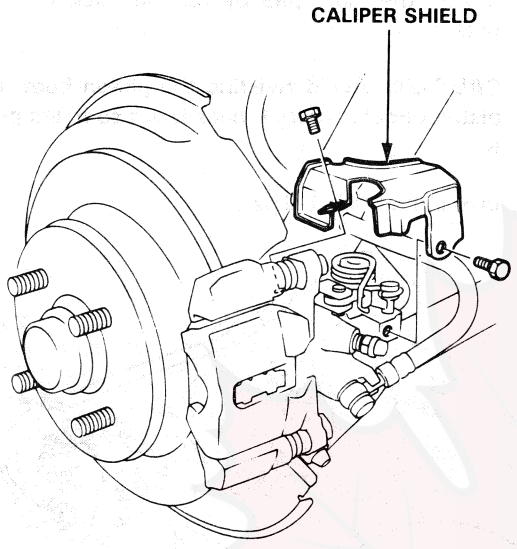
Inspection



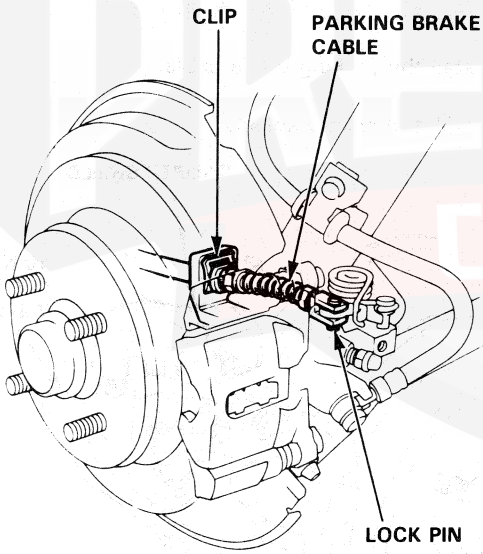
Brake Pad

Inspection/Replacement

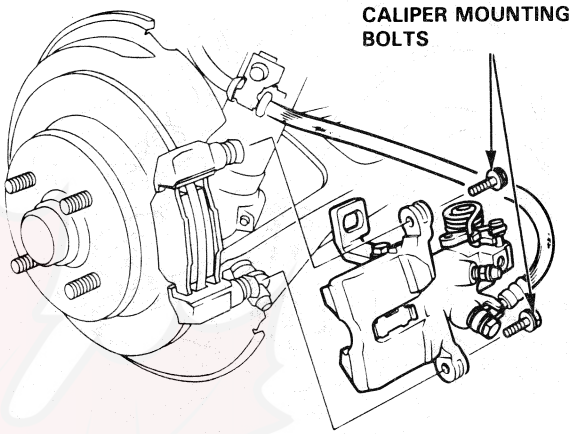
1. Remove the caliper shield.



2. Remove the parking brake cable from the caliper.



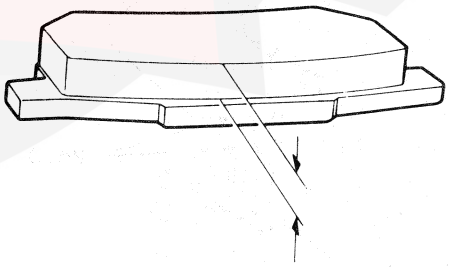
3. Remove the caliper mounting bolts, then remove the caliper.



4. Remove the pads and, using a vernier caliper, measure the thickness of each brake pad lining.

NOTE: Measurement does not include shoe thickness.

Brake Pad Thickness:
Standard: 8.0 mm (0.315 in.)
Service Limit: 1.6 mm (0.063 in.)



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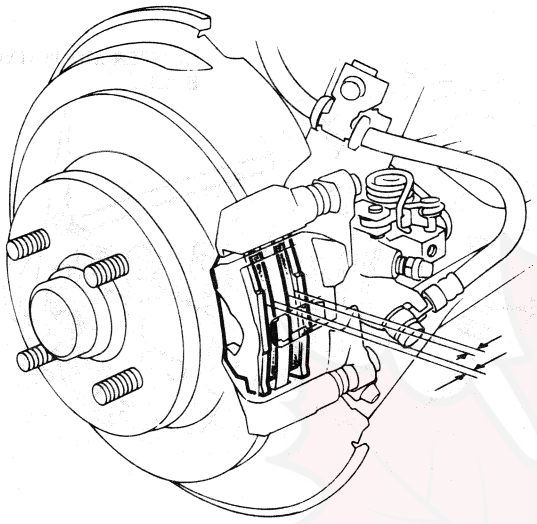
Inspection/Replacement (cont'd)

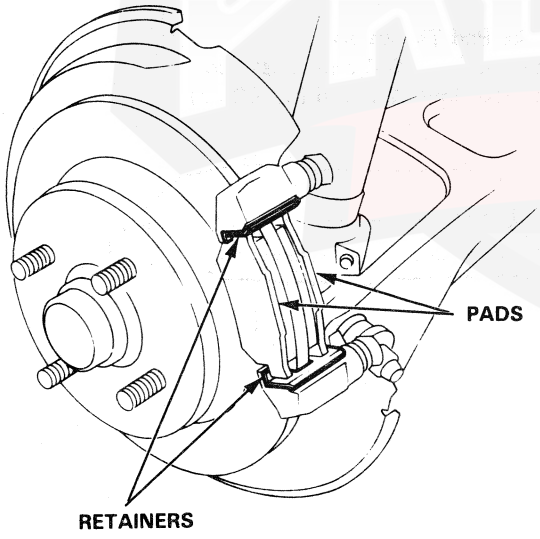
5. If lining thickness is less than the service limit, replace both pads as a set.



6. Remove the pads and pad guides.

7. Inspect the disc surface for grooves, cracks and rust.

8. Clean the caliper thoroughly and remove all rust. Install the pad retainers.

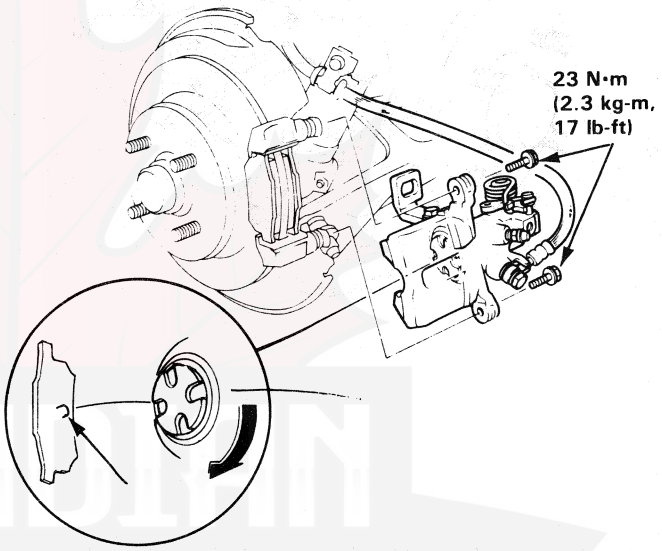


9. Install new brake pads.

10. 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.

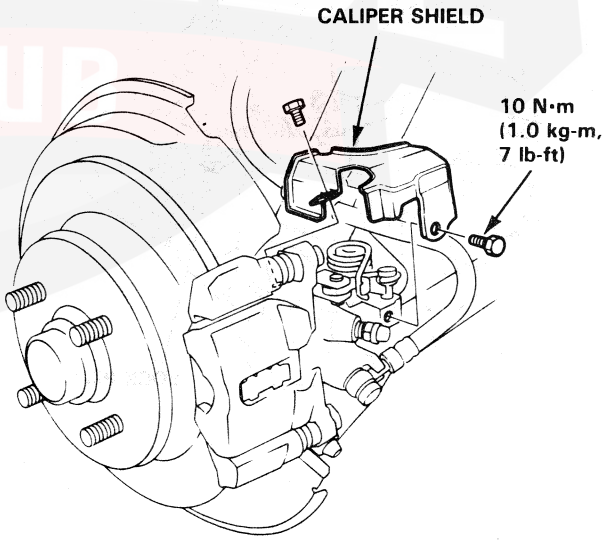
CAUTION: Avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.

11. Install the brake caliper.



12. Install the parking brake cable.

13. Install the caliper shield.



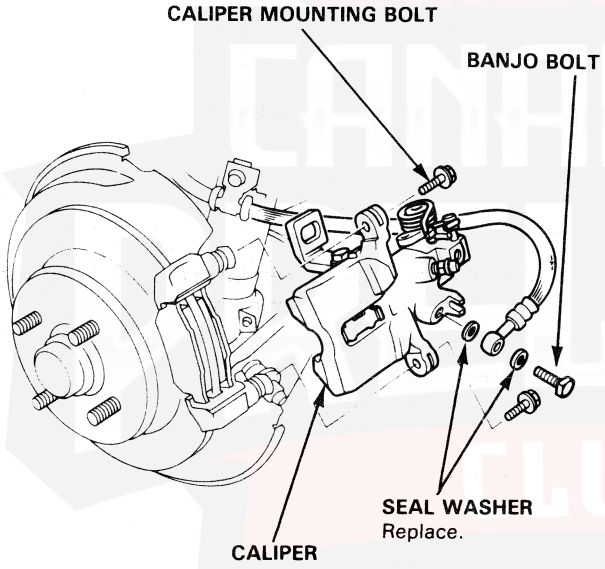
Brake Caliper

Disassembly

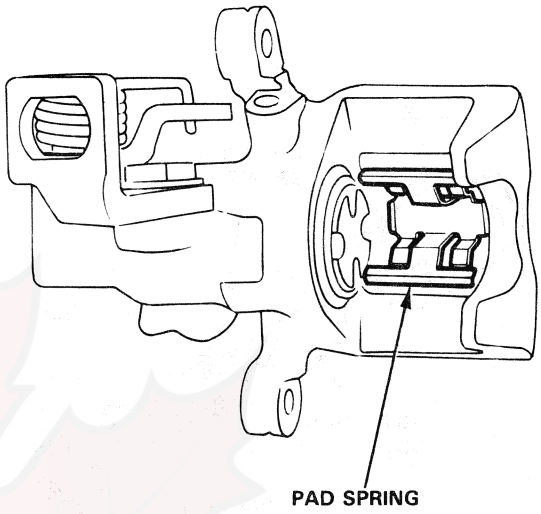
CAUTION:
- **Make sure all parts are clean before reassembly.**
- **Use only new replacement parts.**
- **Use only new clean brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as its can damage the finish. Wash spilling brake fluid off immediately with clean water.**

1. Remove the caliper shield and disconnect the parking brake cable.
2. Remove the banjo bolt and remove the brake hose from the caliper.
3. Remove the two caliper mounting bolts, and remove the caliper from the caliper bracket.

CAUTION: Thoroughly clean the outside of the caliper to prevent dust and dirt from entering.

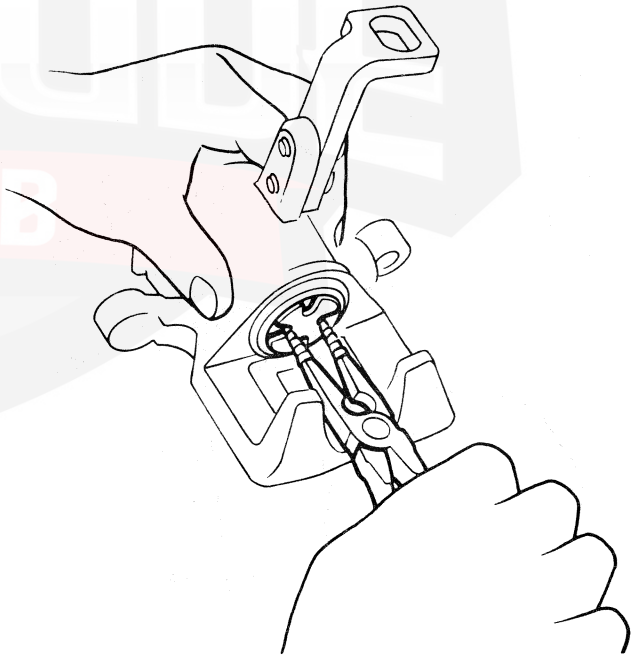


4. Remove the pad spring from the caliper.



5. Remove the piston and piston boot while rotating the piston.

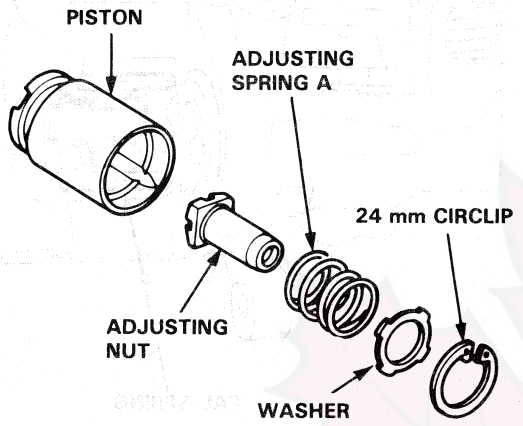
CAUTION: Avoid damaging the piston and piston boot.



(cont'd)

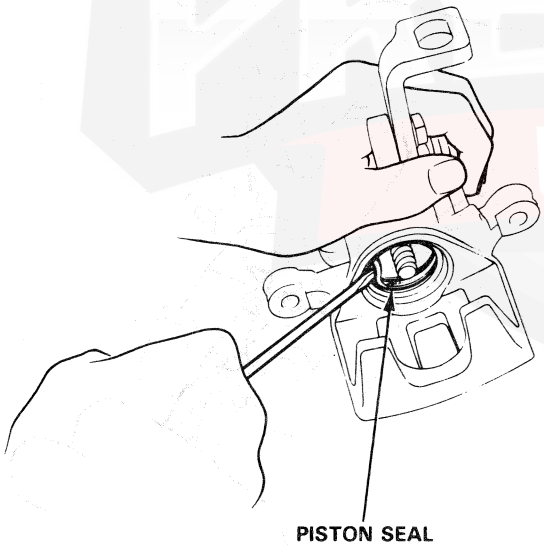
Disassembly (cont'd)

6. Remove the circlip, then washer, adjusting spring A, and the adjusting nut from the piston.



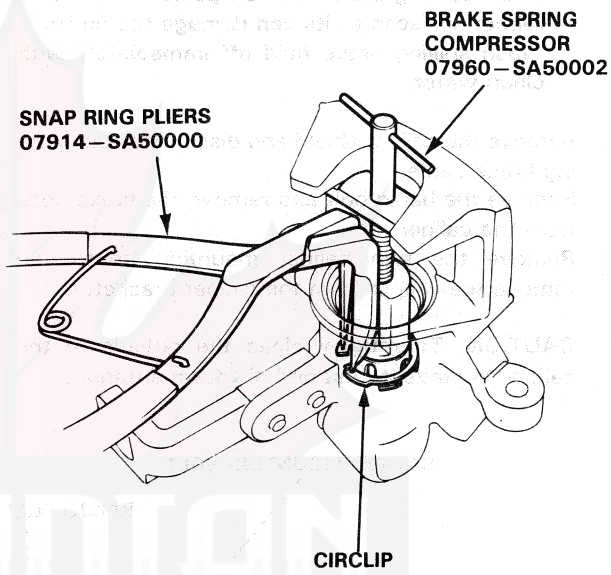
7. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.

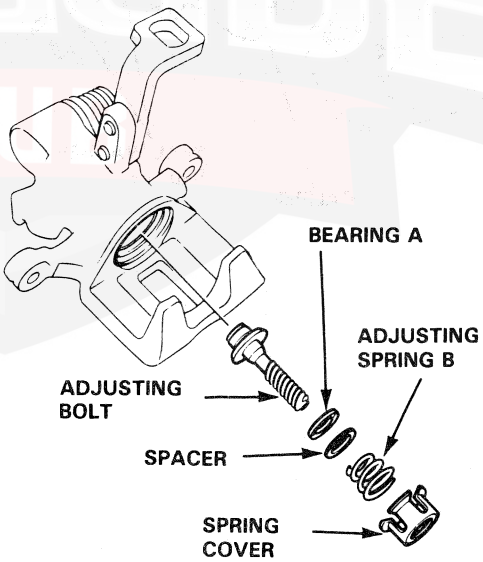


8. Install the special tool between the caliper body and spring guide as shown.

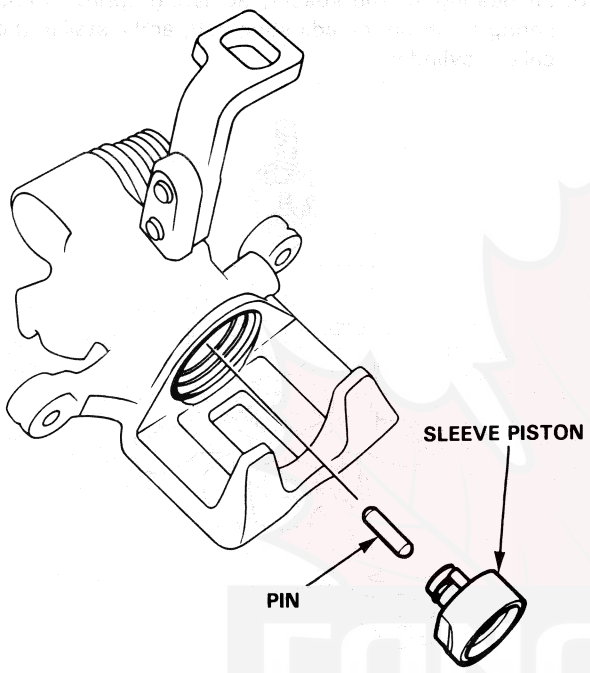
9. Compress the adjusting spring B by turning the shaft of the special tool, then remove the circlip with snap ring pliers.



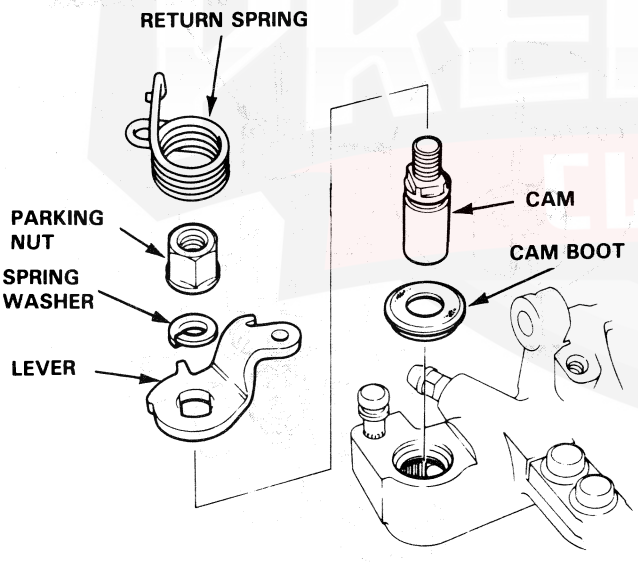
10. Remove the spring cover, adjusting spring B, spacer, bearing A and adjusting bolt.



11. Remove the sleeve piston, and remove the pin from the cam



12. Remove the return spring, parking nut, spring washer, lever, cam and cam boot.



Reassembly

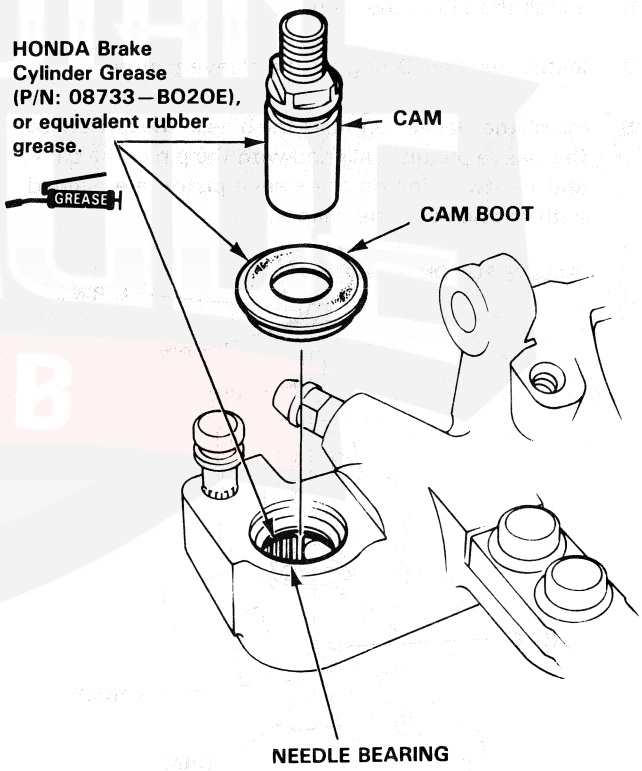
CAUTION:
- **Make sure all parts are clean before reassembly.**
- **Use only new replacement parts.**
- **Use only new clean brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as its can damage the finish. Wash spilling brake fluid off immediatery with clean water.**

1. Pack all cavities of the needle bearing with Honda Brake Cylinder Grease (P/N: 08733—B020E), or equivalent rubber grease.

2. Coat the new cam boot with Honda Brake Cylinder Grease (P/N: 08733—B020E), or equivalent rubber grease and install in the caliper.

3. Install the cam with threaded end facing up.

   CAUTION: Avoid damaging the cam boot since it must be installed before the cam.

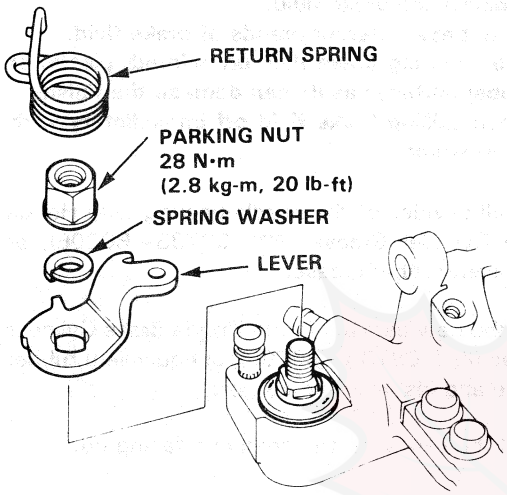


(cont'd)

Reassembly (cont'd)

4. Install the lever, spring washer and parking nut, then tighten the parking nut.

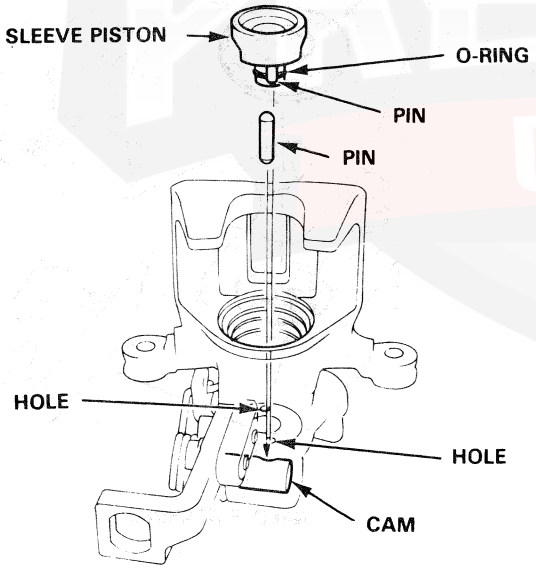
5. Install the return spring.



6. Install the pin in the cam.

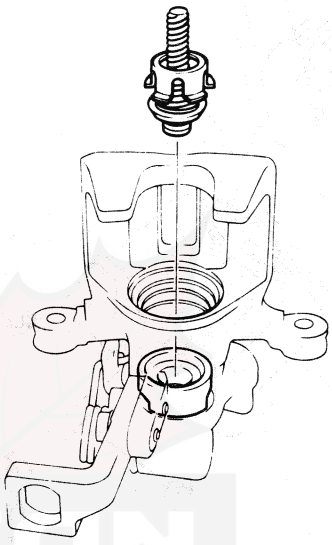
7. Install the new O-ring on the sleeve piston.

8. Install the sleeve piston so the hole in the bottom of the sleeve piston is aligned with the pin in the cam, and the two pins on the sleeve piston are aligned with the holes in the caliper.

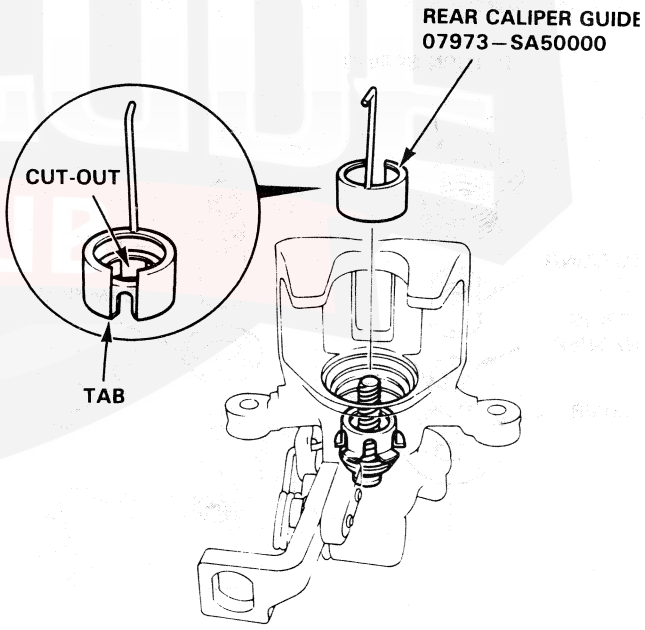


9. Install the new cup with its groove facing the bearing A side on the adjusting bolt.

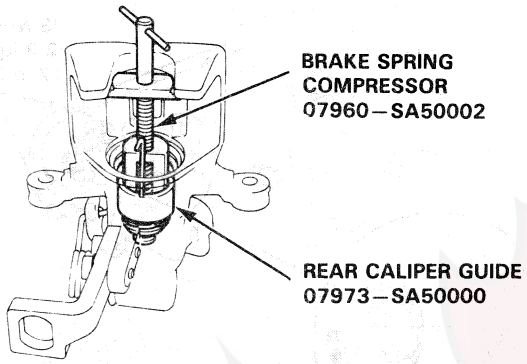
10. Fit bearing A, the spacer, adjusting spring B and spring cover on the adjusting bolt, and install in the caliper cylinder.



11. Install the rear caliper guide in the cylinder, aligning the cutout on the tool with the tab on the spring cover.



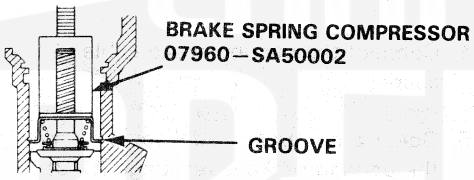
12. Install the brake spring compressor as shown.



13. Compress the spring until it bottom out.

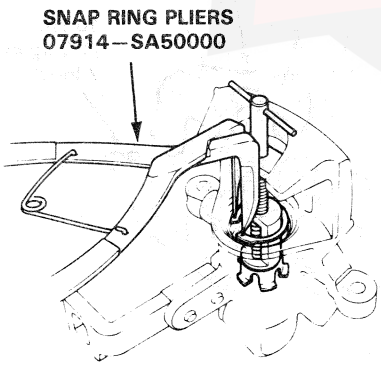
NOTE: Check that the rear caliper guide doesn't hang up while the spring being is compressed.

14. Remove the rear caliper guide. Check that the flared end of the spring cover is below the circlip groove.

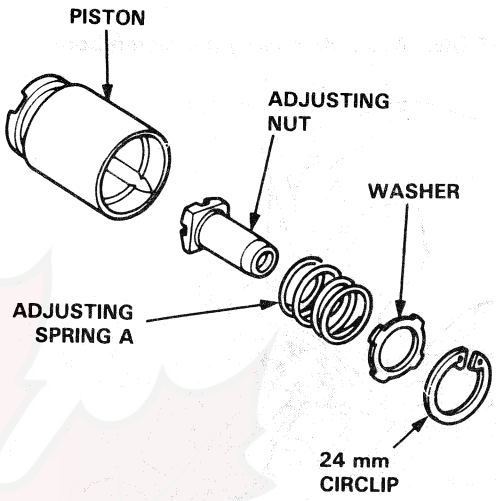


15. Install the circlip then remove the brake spring compressor.

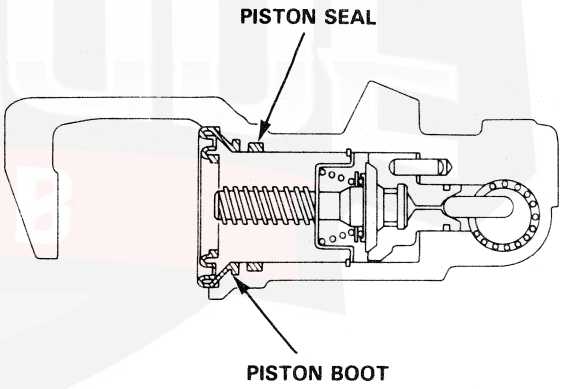
NOTE: Check that the circlip is seated in the groove properly.



16. Install the adjusting nut, adjusting spring A, and washer, and secure with the circlip.



17. Coat the new piston seal and piston boot with silicone grease and install them in the caliper.

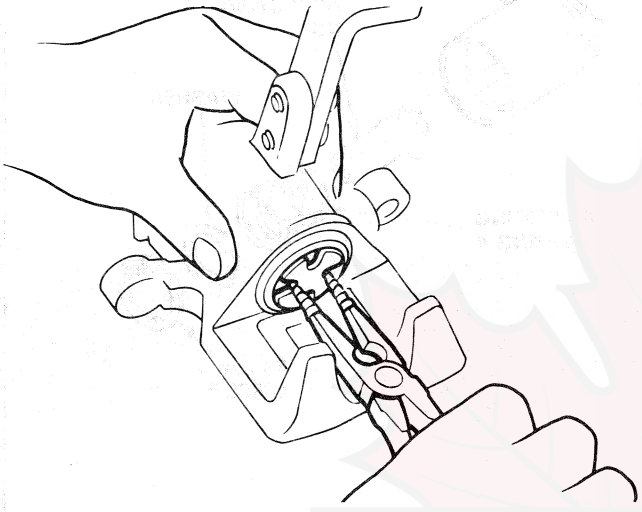


(cont'd)

Reassembly (cont'd)

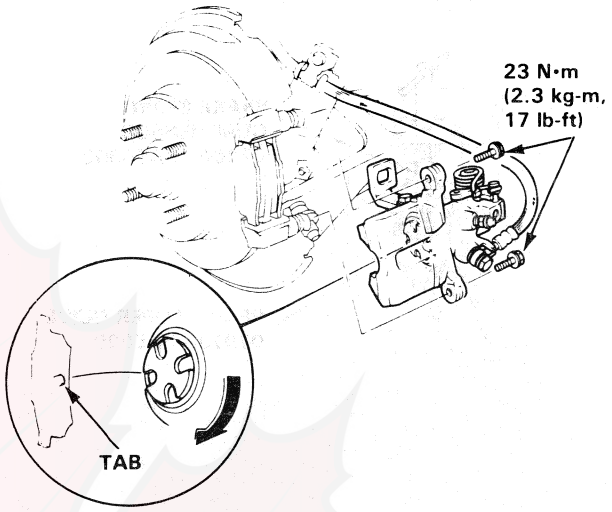
18. Coat the outside of the piston with silicone grease, and install it on the adjusting bolt while rotating it clockwise.

    CAUTION: Avoid damaging the piston boot.



19. Install the brake pad retainers and brake pads.

20. Install the pad springs on the caliper.



21. Install the caliper on the caliper bracket and tighten the caliper mounting bolts.

22. Connect the brake hose to the caliper with new sealing washers and tighten the banjo bolt.

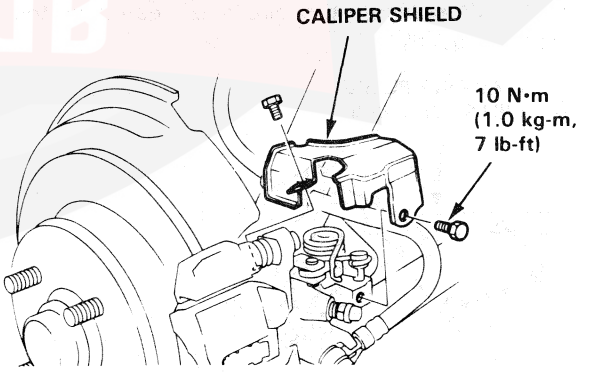
23. Bleed the air from the system.

24. Connect the parking brake cable to the arm on the caliper.

25. Operate the brake pedal several times, then adjust the parking brake lever (page 21-3).

    NOTE: Before adjustments, make sure the parking brake arm on the caliper touches the pin.

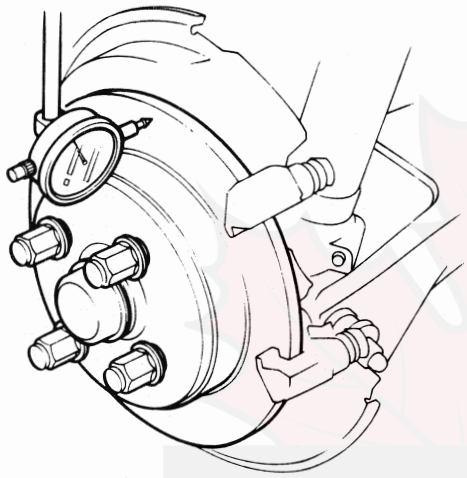
26. Install the caliper shield and tighten the bolts.



Rear Brake Disc

Run-Out

1. Block the flont wheels, support the rear of the car on safety stands, then remove the rear wheels.
2. Remove the caliper bolts, lift the caliper up out of the way, then remove the pads and pad guides (page 21-58).



3. Inspect the disc surface for grooves, cracks, and rust. Clean disc thoroughly and remove all rust.
4. Mount a dial indicator as shown.

   Brake Disk Runout:
   Service Limit: 0.15 mm (0.006 in.)

5. Replace the disc if beyond the service limit. Remove the caliper bracket and the old disc, then install a new one.

Thickness and Parallelism

1. Block the flont wheels, support the rear of the car on safety stands, then remove the rear wheels.
2. Move the caliper and pads out of the way as described in the preceding column.
3. Using a micrometer, measure the disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in.) from the outer edge of the disc.

   Replace the disc if it exceeds the following service limits:

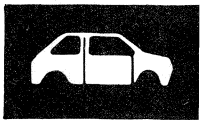
   Brake Disk Thickness:

Standard	**10.0 mm (0.39 in.)**
Max. Refinishing 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.)

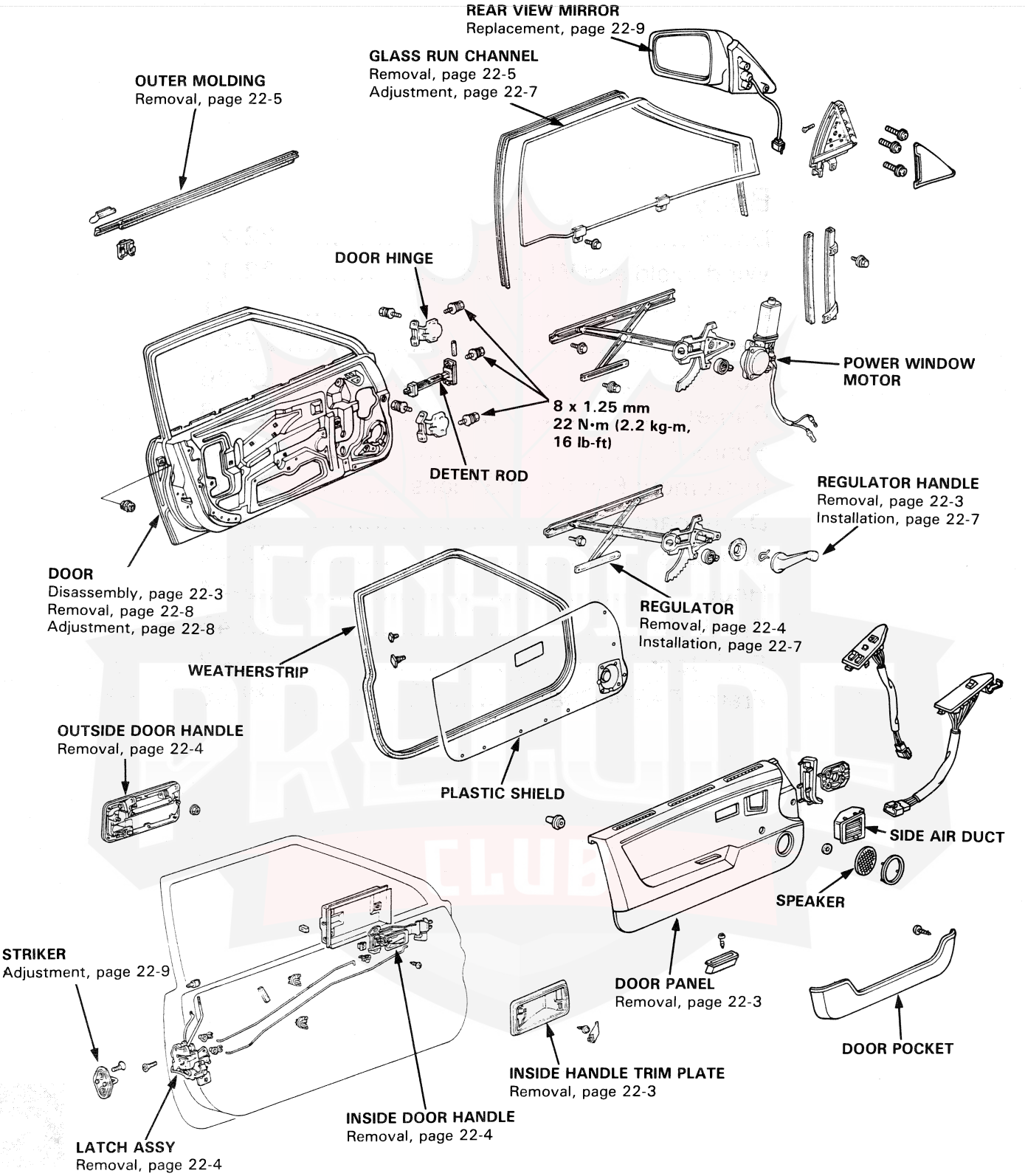
4. Replace the disc if beyond the limits. Remove the caliper mount and the oild disc, then install a new one.

Body



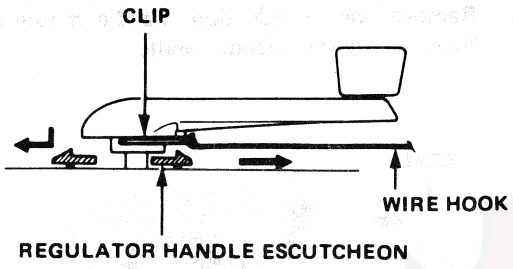
Doors

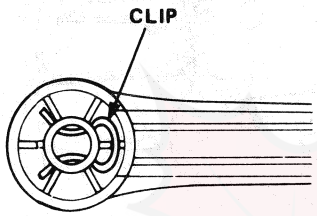
Illustrated Index



Disassembly

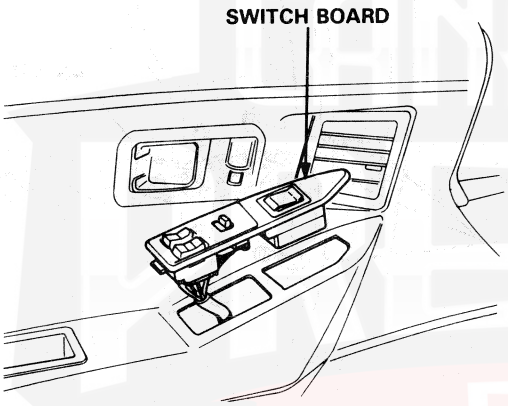
1. Push the clip off the regulator handle with a screwdriver, or pull it off from the other direction with a wire hook. Remove the regulator handle.



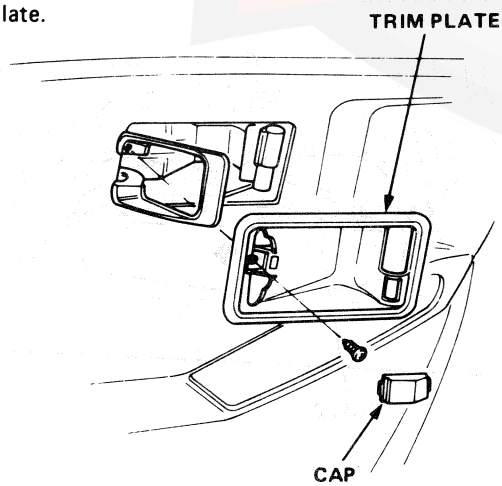


Remove the switch board carefully to avoid damaging it.

NOTE: When removal is difficult, remove the door panel for the removal.



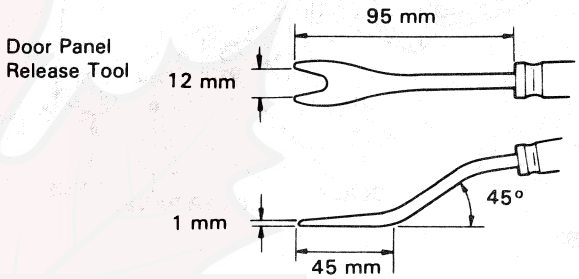
2. Remove the cap from the trim plate and remove the screw. Then pull the handle and remove the trim plate.

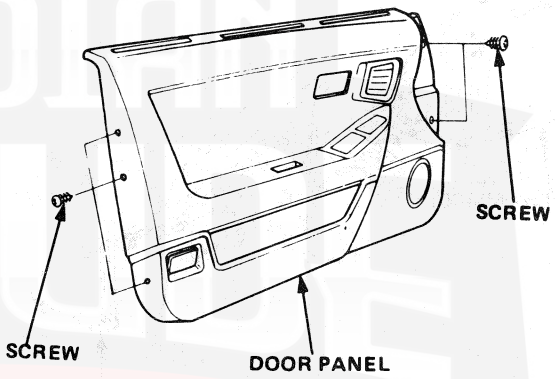


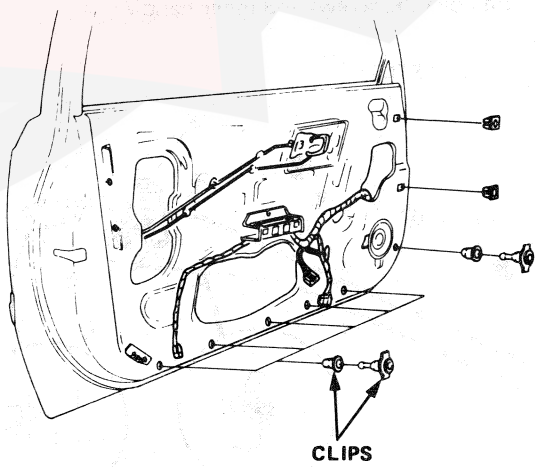
3. Remove the front and rear screws from the door panel.

To remove the door panel, insert a stiff putty knife between the panel and the plastic shield, slide it around the edge until it hits a retainer clip, then pry it up sharply to remove the clip. Repeat at all clip locations until the panel is free, then lift it straight up off the window sill, and disconnect the courtesy light and power window wires. Peel off the plastic shield without tearing it.

NOTE: Remove the panel with as little bending as possible to avoid creasing or breaking it.







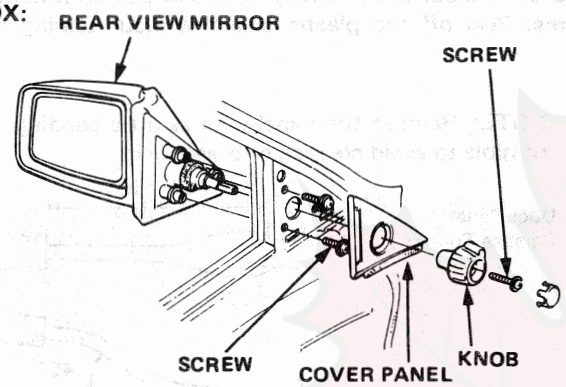
(cont'd)

Disassembly (cont'd)

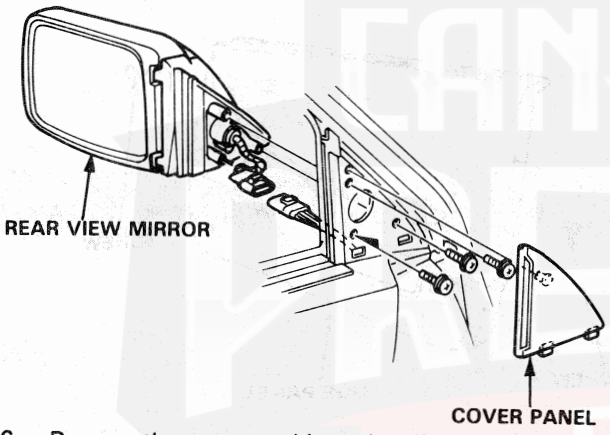
5. Remove the rear view mirror.

   - Remove the screw and control knob.
   - Carefully pry off the cover panel with a screwdriver to avoid damaging it, then, while holding the mirror with one hand, remove its 3 screws with the other.
   - Remove the mirror from the door.

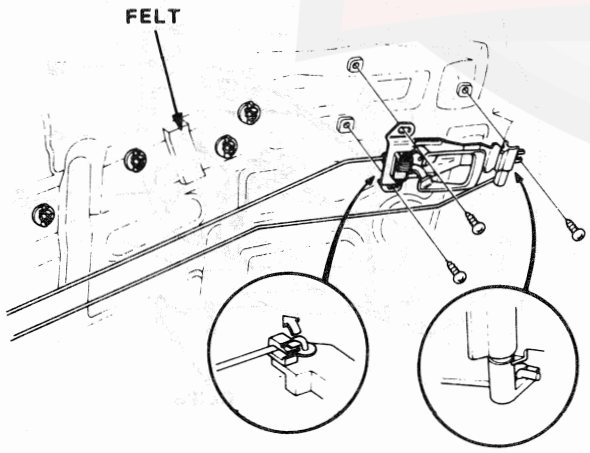
DX:



Si:

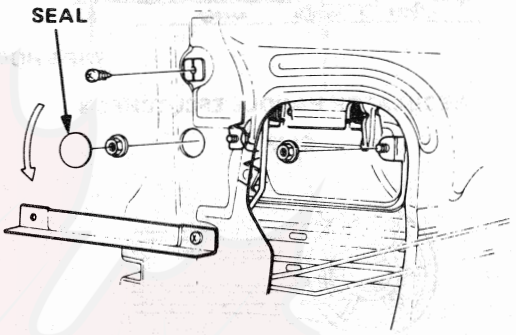


6. Remove the screws and inner handle.

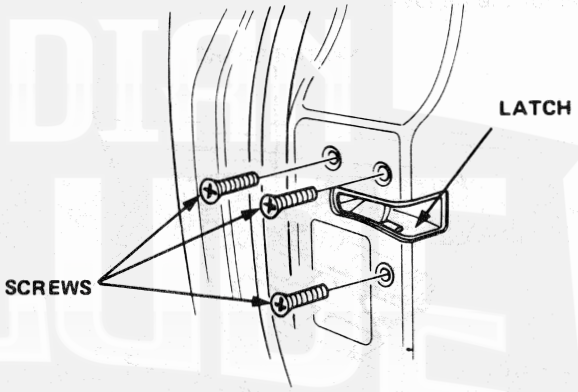


7. Remove the circlip from the back of the lock, then disconnect the lock lever and rod.

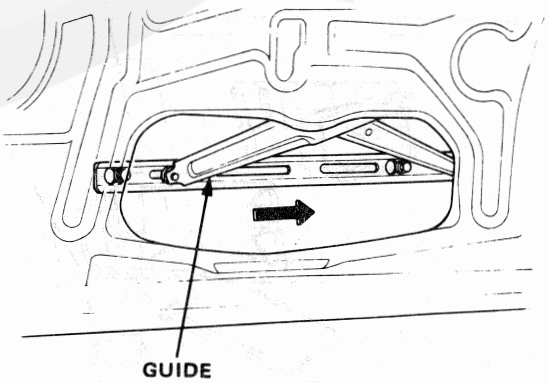
8. Remove the outside door handle mounting nuts, then remove the outside handle.



9. Remove the screws from the door latch.

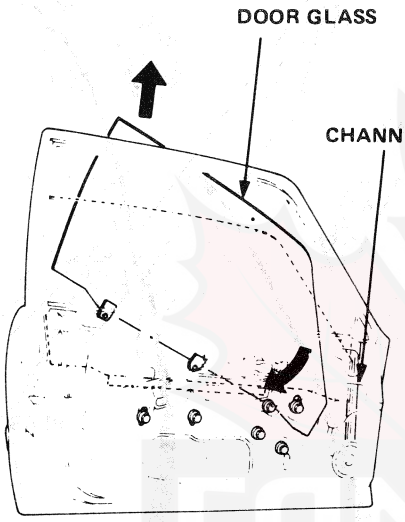


10. Carefully lower the door glass until you can see its mounting bolts.



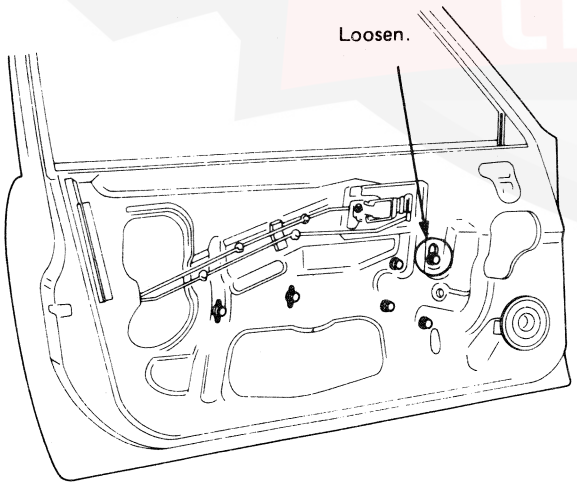
11. Loosen the door mounting bolts and slide the guide forward. Remove the glass from the guide, then remove two bolts from the glass.

12. Lower the glass, disengage the front side from the channel, and remove the glass.



CAUTION: To avoid damaging the door glass, store it in a safe place.

13. Remove the regulator mounting bolts, except for the one that is circled in the drawing; that bolt should only be loosened and not removed.

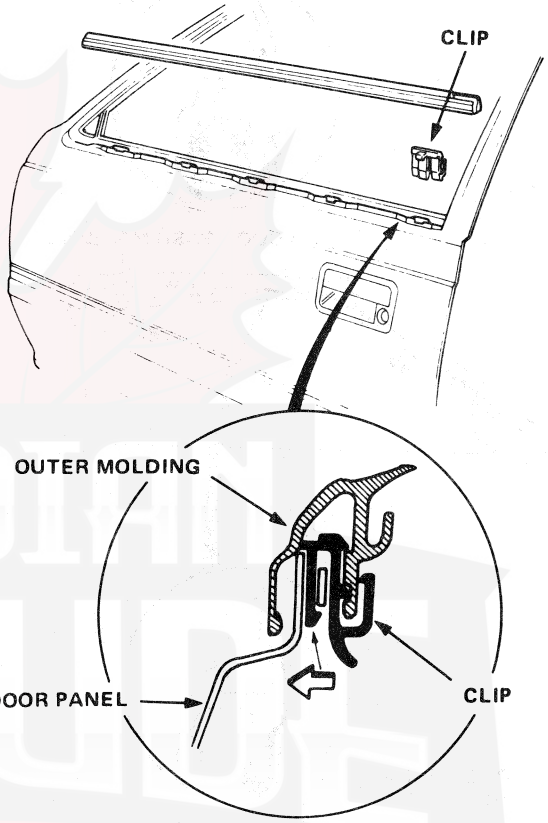


14. Remove the regulator.

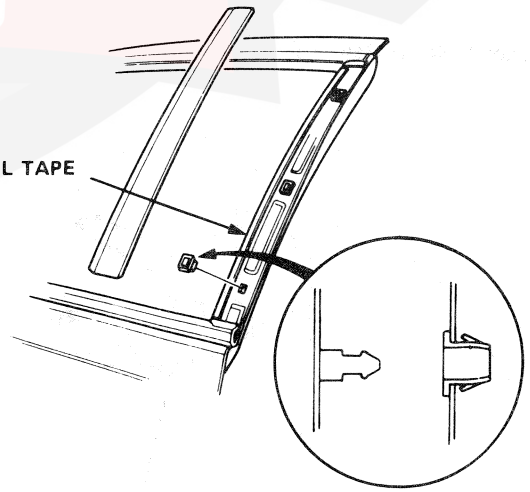
NOTE: Inspect for regulator gear wear, damage, spring slackness, loose linkage, etc. Replace parts as necessary.

15. Remove the moldings.

Outer Molding Removal



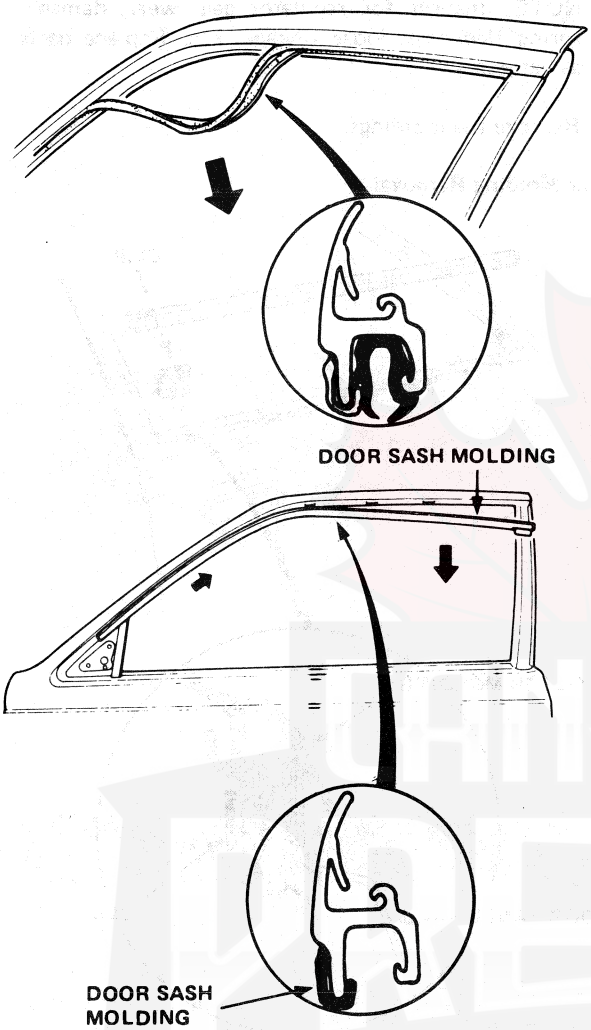
Door Sash Garnish Removal



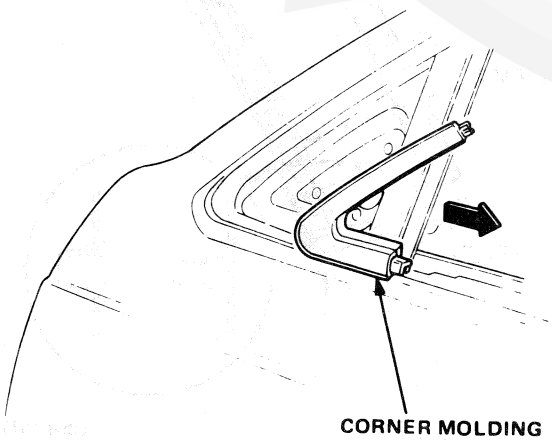
(cont'd)

Disassembly (cont'd)

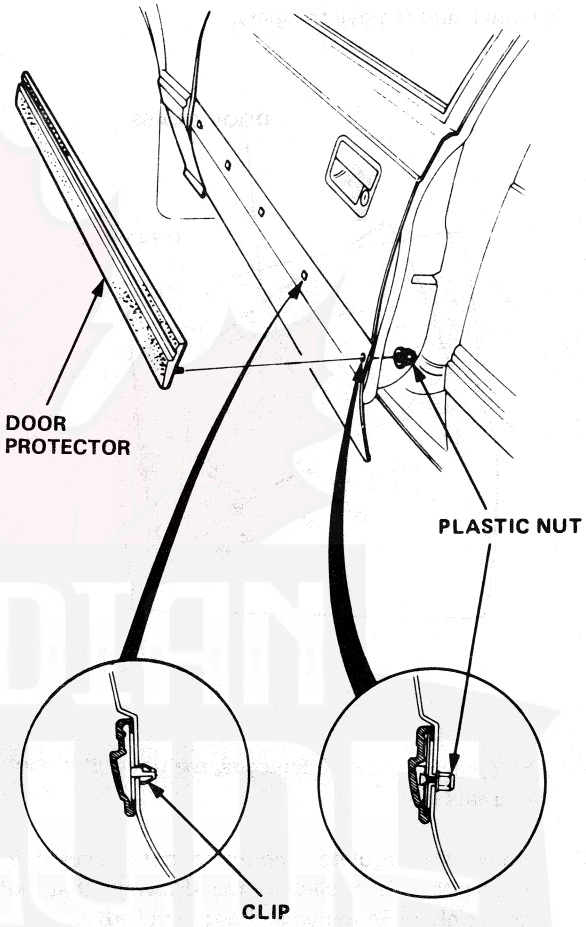
Door Sash Molding Removal



Corner Molding Removal



16. Remove the door protector by removing the nut and clips from the inside.

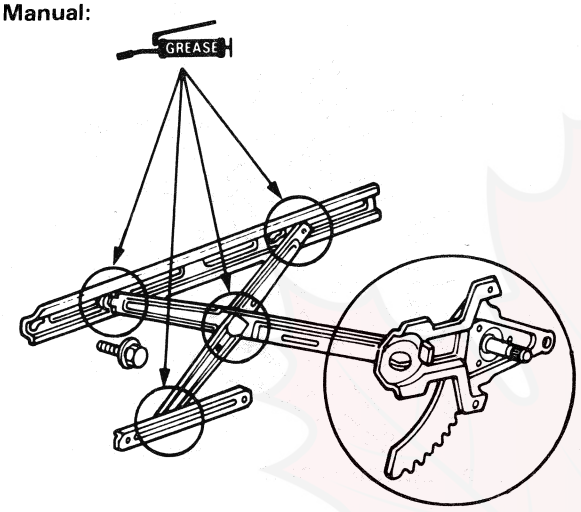


Assembly

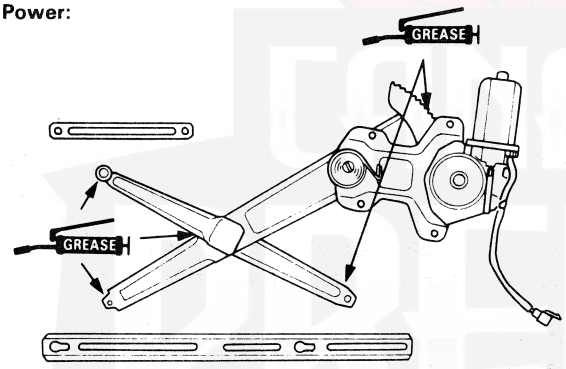
Assemble the door in the reverse order of disassembly, and also:

1. Grease all the sliding surfaces of the window regulator where shown.

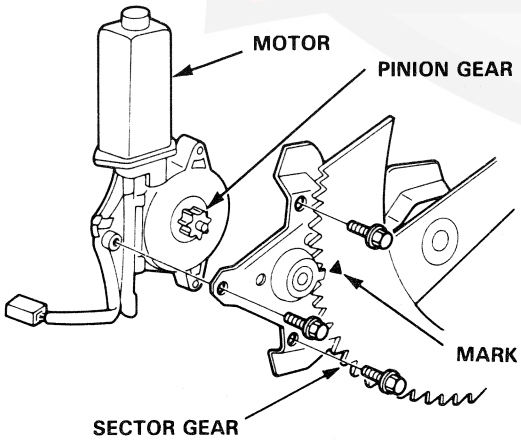
Manual:



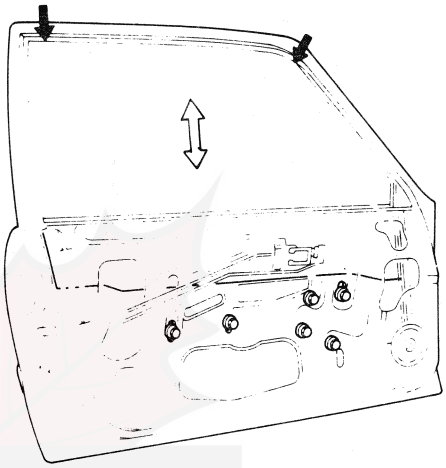
Power:



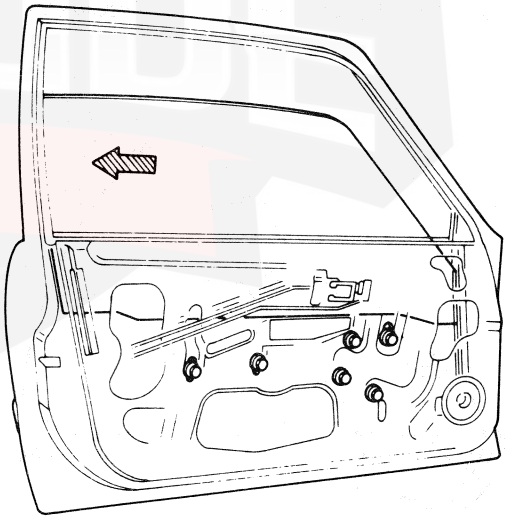
2. Position the motor on its mount by aligning the pinion with the sector, and install using the three mount bolts. Move the window regulator to the original position by connecting a 12V battery to the motor.



3. Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and door sash when the glass is closed.



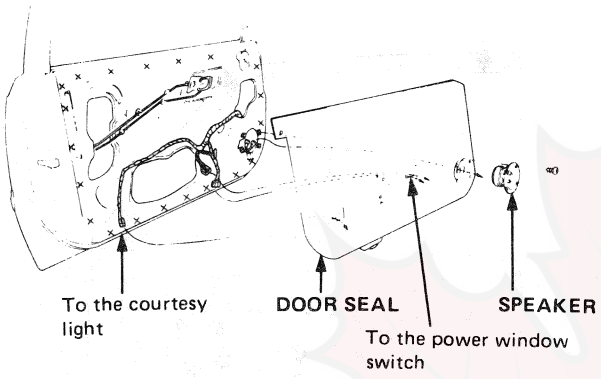
4. Roll the glass down partway, then push it to the rear and tighten the regulator mounting bolts and the glass run channel bolts.



(cont'd)

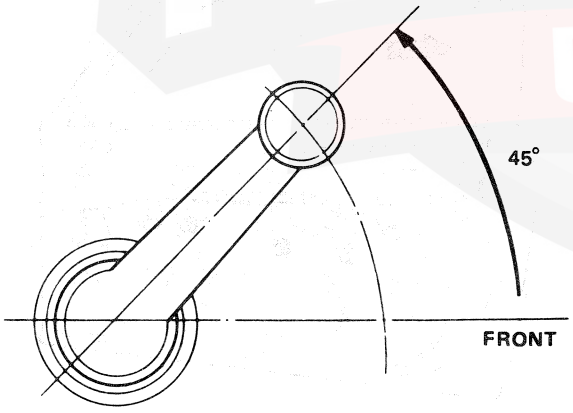
Assembly (cont'd)

4. When reinstalling the plastic shield, apply adhesive along the edge where necessary to maintain a continuous seal and prevent air/water leaks.



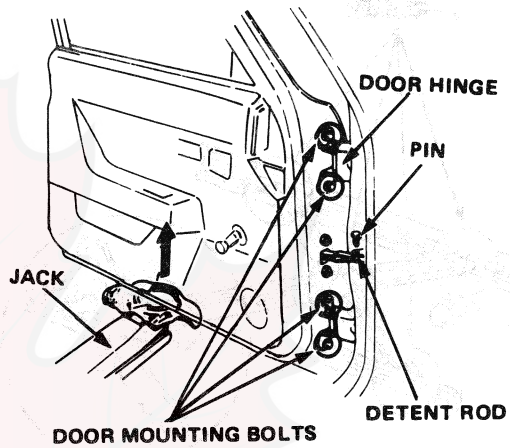
NOTE: Apply sealing agent at the part marked by x. At this time, carefully wipe off any protruding sealing agent.

5. Install the regulator handle so it points forward, and up at a 45 degree angle with the window closed.



Removal

1. Cover the platform of a floor jack with several rags, then support the weight of the door with the jack.



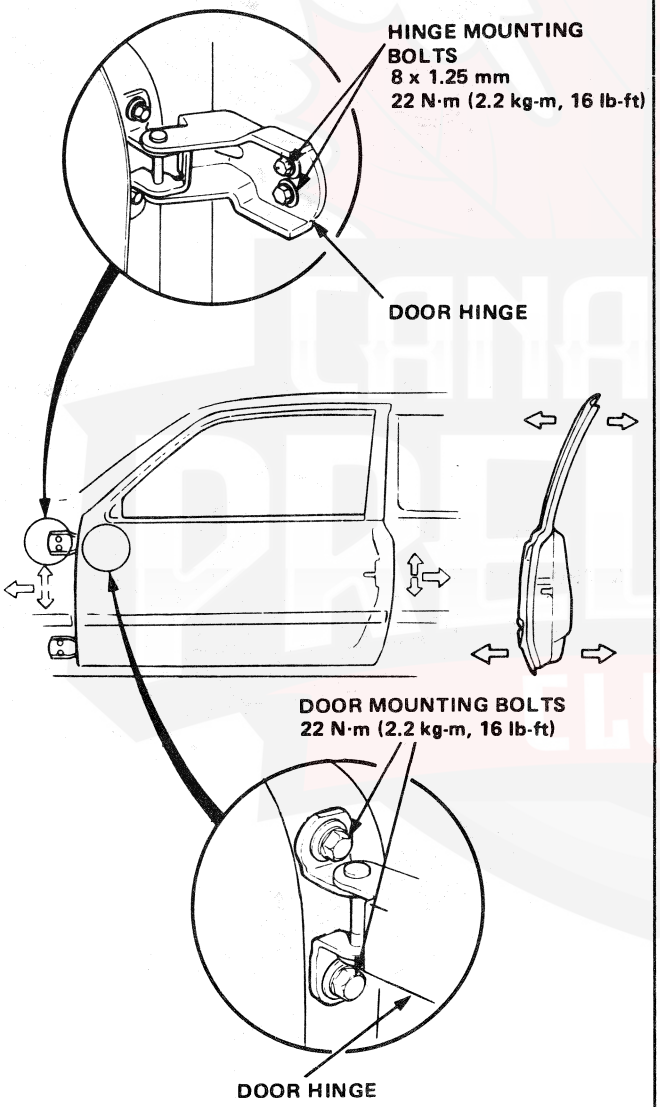
2. Use a hammer to drive the pin out of the detent rod.
3. With a helper balancing the door on the jack, remove the upper and lower door mounting bolts.
4. If necessary, remove the hinge mounting bolts, and remove the hinges.

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 rag or shop towel on the jack to prevent damage to the door when the hinge bolts are loosened for adjustment.

Is the door aligned side-to-side and up-and-down? If not, loosen the hinge bolts slightly and move the door up or down, or back or forth. Then lightly tighten the bolts and recheck. If the door fits properly, tighten the bolts securely.

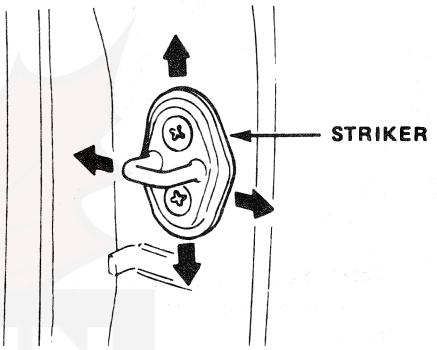


Is the front edge of the door flush with the fender? If not, loosen the door mounting bolts and move the door in or out slightly. Then tighten the bolts and recheck.

Door Striker Adjustment

Make sure the door is not loose, and latches securely without slamming. If it needs adjustment:

1. Draw a line around 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.

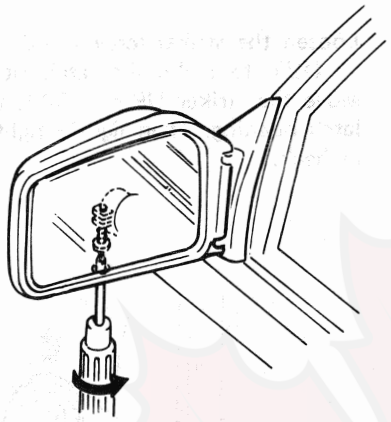
3. If the door latches properly, tighten the screws and recheck.

Door Mirror

Mirror Glass Replacement

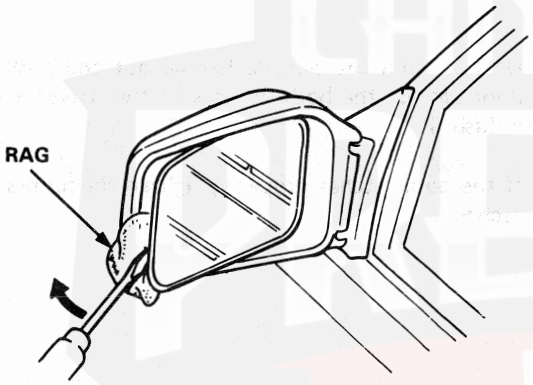
Manual Door Mirror:

1. Insert a screwdriver in the mirror through the service hole, and loosen the glass retaining screw.

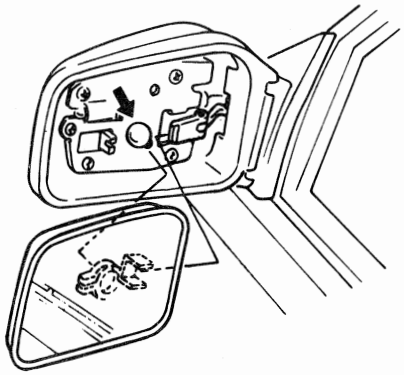


2. Carefully pry out the mirror with a screwdriver as shown.

   CAUTION: To prevent damage to the mirror, wrap the end of the screwdriver with a rag or shop towel.

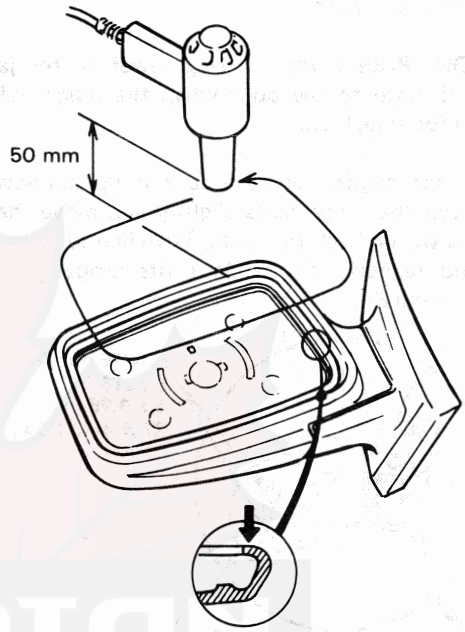


3. Install the mirror in the reverse order of removal, and also apply grease to the location indicated by the arrow.

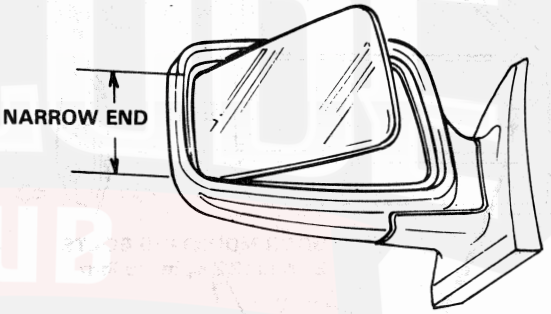


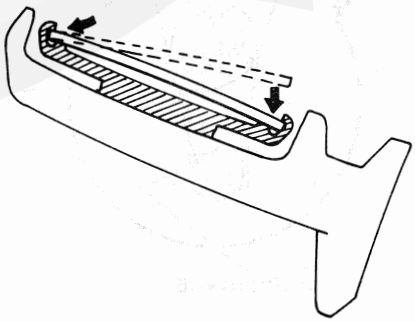
Power Door Mirror:

1. Heat the edge of the glass with a low powered heat gun for several minutes, then remove the glass.



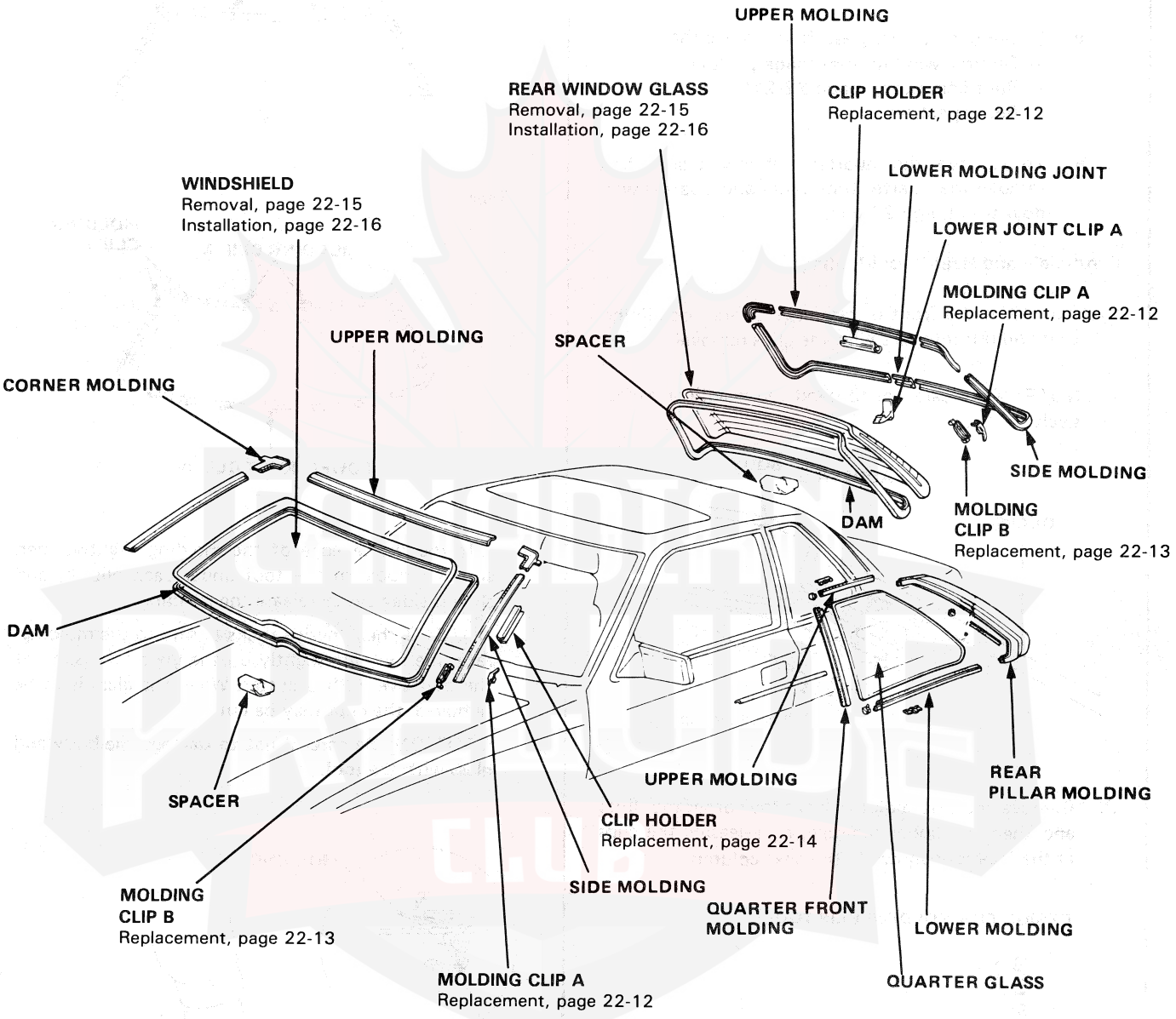
2. Install the glass in the mirror case, narrow end first.





Windshield, Rear and Quarter Window Glass

Illustrated Index



Windshield, Rear and Quarter Window Glass

Molding Removal

- To remove the windshield, first remove the:
  - Inside rear view mirror (page 22-25).
  - Sunvisor.
  - Front pillar trim (page 22-21).
  - Roof lining trim (page 22-21).
  - Wipers (section 25).

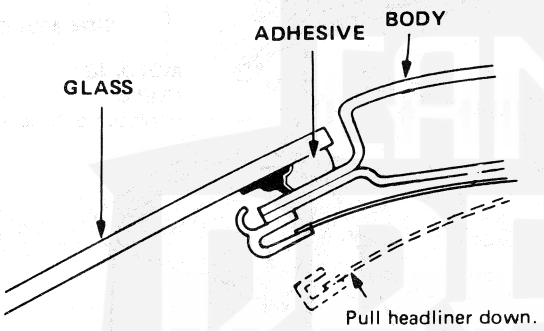
- To remove the rear glass, first remove the:
  - Quarter window trim (page 22-21).
  - Roof lining trim (page 22-21).
  - Rear speakers.

- To remove the quarter window glass, first remove the quarter trim panel and quarter window trim (page 22-21).

Windshield and Rear Glass Molding

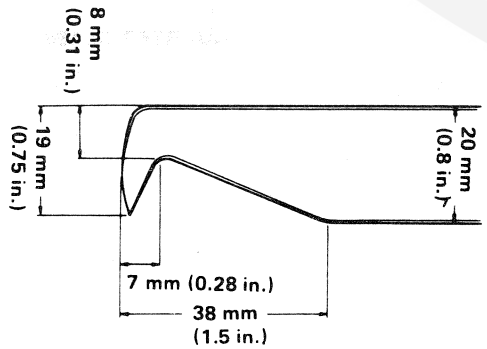
1. Pull down the front or rear edge of the roof lining so it will not interfere with the glass removal.

   NOTE: Take care not to bend the headliner excessively.

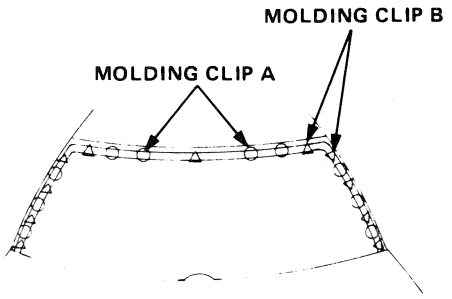


2. Remove the side molding, next the corner moldings and then the upper molding, by releasing the clips at the locations shown in the next column.

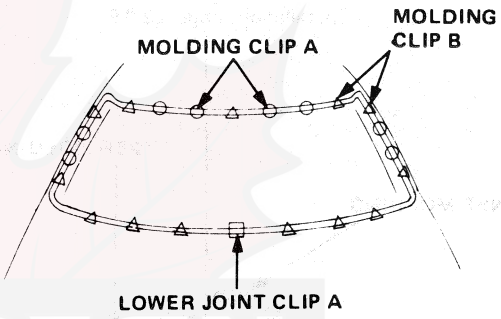
DESIGN FOR MOLDING CLIP TOOL:



Front



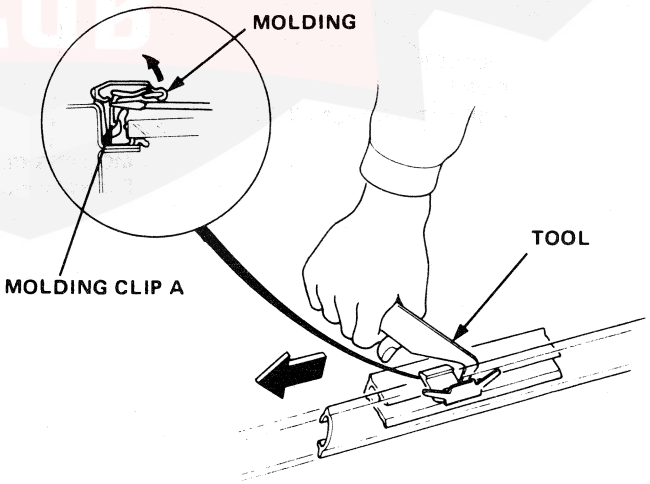
Rear



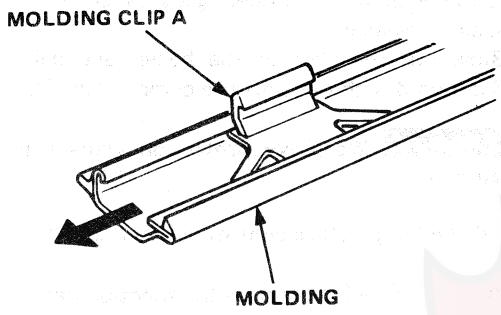
3. Lift the inside edge of the molding slightly, then slip the hook of the tool under each clip A, and slide it sideways to release the molding.

   NOTE: If the adhesive sticks tightly to the molding, raise the molding slightly on the glass side, and cut the adhesive with a cutter. When the glass is to be removed, the clips may be cut.

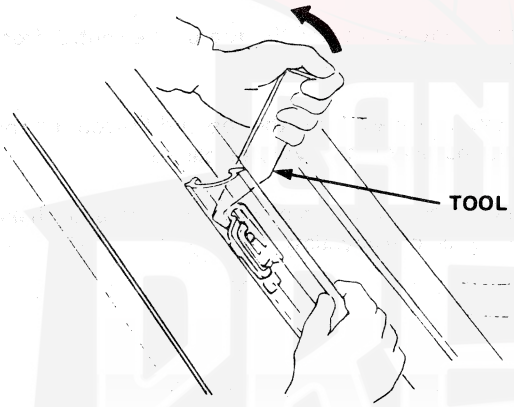
   CAUTION: Be careful not to damage the body and glass with the tool.



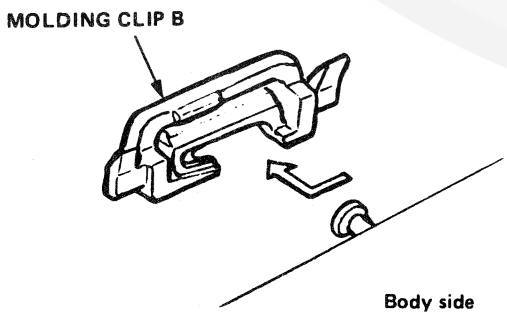
Molding Clip A Removal



4. Lift the inside edge of the molding slightly, then slip the hook of the tool in back of each clip B and lift it to release the molding.



Molding Clip B Removal



Quarter Window Molding

1. Remove the quarter window upper and lower moldings by sliding them to the side.

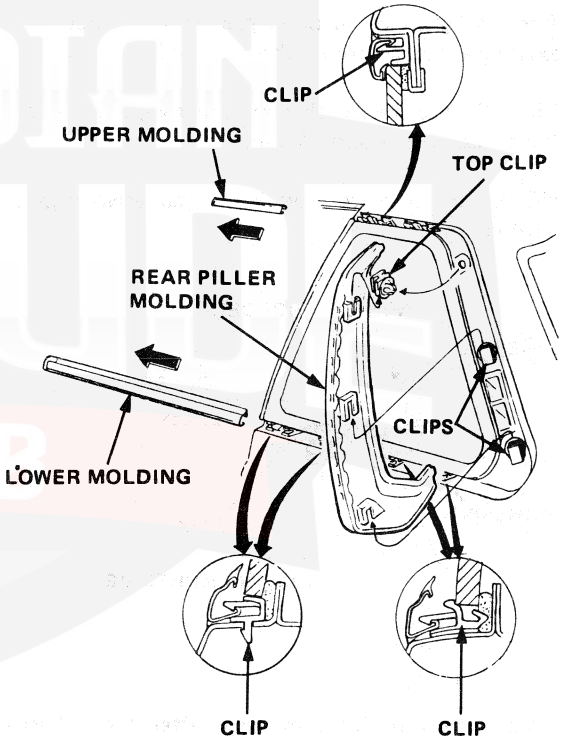
   NOTE: If the adhesive sticks tightly to the molding, raise the molding slightly on the glass side, and cut the adhesive with a cutter. When the glass is to be removed, the clips may be cut.

   CAUTION: Be careful not to damage the body and glass by sliding the molding.

2. To remove the rear pillar molding, first carefully pry out the top clip. Then slide the molding upward to free it from the two lower clips.

   NOTE: If the top clip is difficult to pry out, it may be cut and replaced.

   CAUTION: Be careful not to damage the body and glass by sliding the molding pieces.



3. For replacement, the two lower clips can be removed by turning them 90°.

Windshield, Rear and Quarter Window Glass

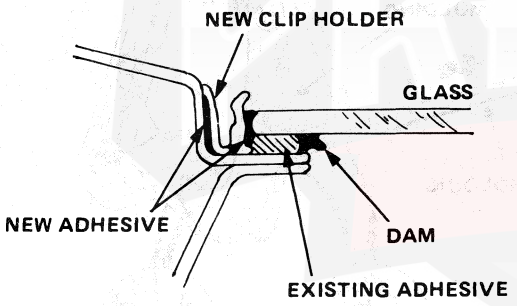
Broken Molding Clip Holder Replacement

1. Remove the windshield molding, then cut the broken clip holder away from the adhesive with a knife.
2. Cut the adhesive away just enough to make the clip holder mounting surface smooth and even.

   CAUTION: Do not scrape down to the painted surface; adhesive will not bond to damaged paint.
3. Clean the bonding surface on the body with alcohol.
4. Heat the body bonding surface to about 40°C (105°F) with a dryer, wipe it with a clean dry cloth, then immediately install the new clip holder on it.

   NOTES:
   - Install clip holders as soon as possible after heating the body.
   - Make sure clip holders are cemented in place securely.
5. Apply a light coat of body primer to the body and existing adhesive around the clip holder.
6. Then fill the area with new adhesive, and remove the excess with a putty knife.

   NOTE: Be sure you work the adhesive into all cavities.



7. Install the windshield molding after the adhesive hardens.

   CAUTION: Be sure to let the adhesive harden thoroughly before installing the molding, so the clip won't be pulled loose.

Broken Glass Removal

Windshield:

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.

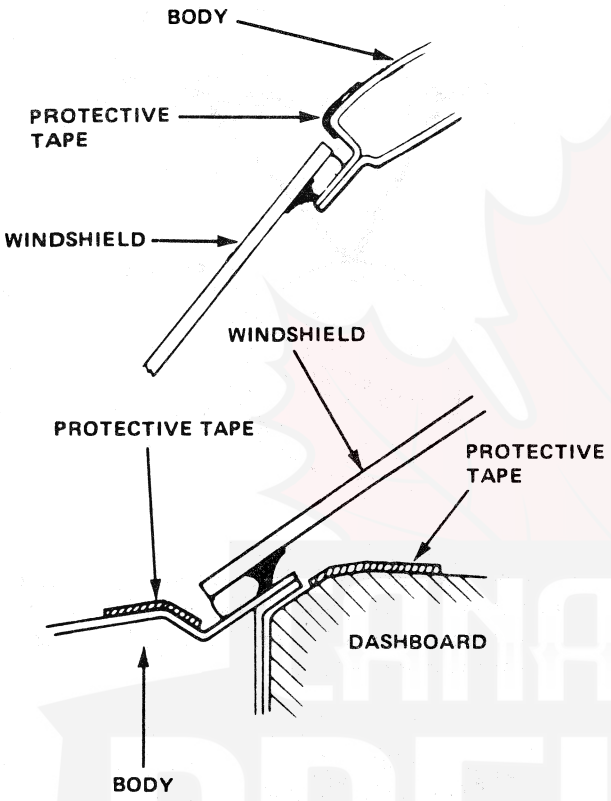
1. Set the temperature control lever to COLD.
2. Push the HEAT button on the function panel.
3. Make sure the recirculation button is out (OFF).
4. Blow compressed air through the defroster center vent outlet.
5. Remove the blower duct, and remove any glass from the air mix chamber.
6. Remove any glass from the top of the vent/defrost door.
7. Remove any glass from the top and bottom of the carpet and seats with a vacuum cleaner.

   NOTE: You should remove the seats and shake them to remove any glass.

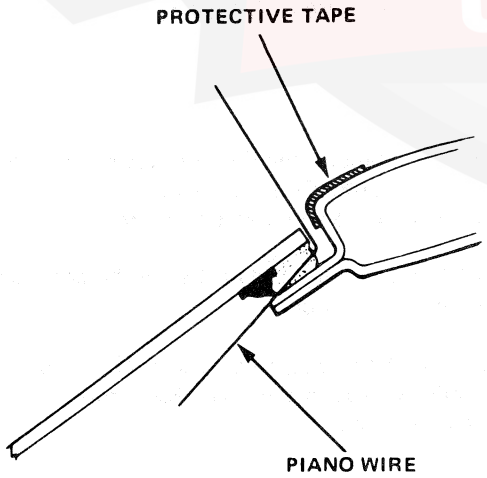
Removal

NOTE: Windshield removal is shown; procedure for removal of other glass is similar.

1. Apply protective tape along the edge of the dashboard and body next to the windshield as shown.

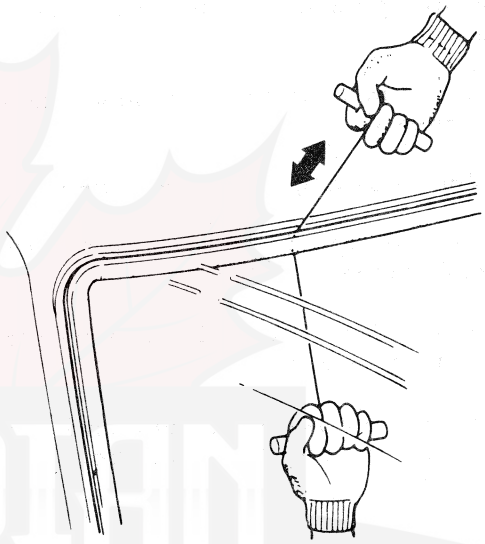


2. Using an awl, make a hole through the windshield adhesive from inside the car. Push piano wire through the hole and wrap each end around a piece of wood.



3. With a helper on the outside, pull the wire back and forth in a sawing motion and carefully cut through the adhesive around the entire windshield.

CAUTION: Hold the piano wire as close to the glass as possible to prevent damage to the body and dashboard.



4. Cut the windshield molding clips and rubber spacers away from the body; they are cemented in place.

NOTE: Replace the windshield clips and rubber spacers with new ones whenever the windshield has been removed.

Windshield, Rear and Quarter Window Glass

Installation

NOTE: Windshield and rear window glass replacement is shown; the procedure for quarter glass replacement is similar.

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 windshield flange.

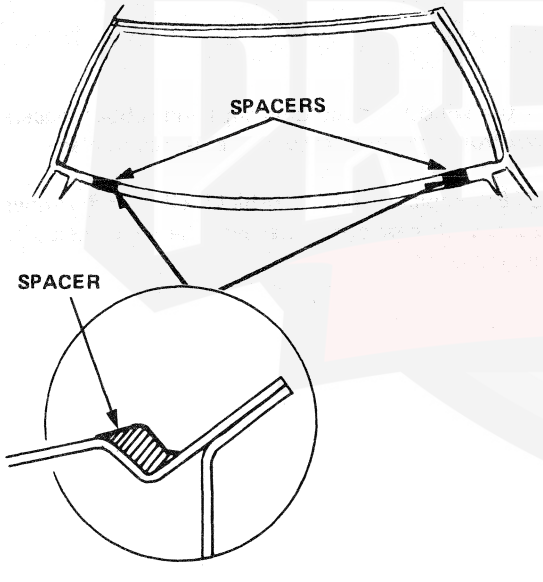
   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Remove all traces of the rubber spacer material from the body.
   - Mask off surrounding surfaces before painting.

2. Clean the body bonding surface with a sponge dampened in alcohol.

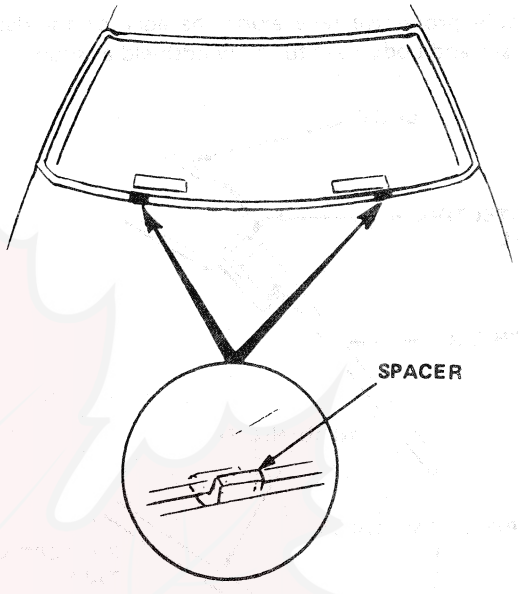
   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. Peel the lining off each spacer, then install the spacers by pressing them firmly into place at the locations shown.

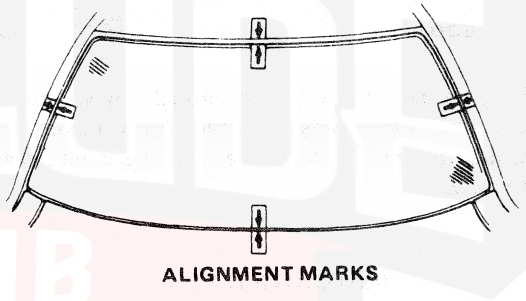
Front



Rear



4. Set a new windshield 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.

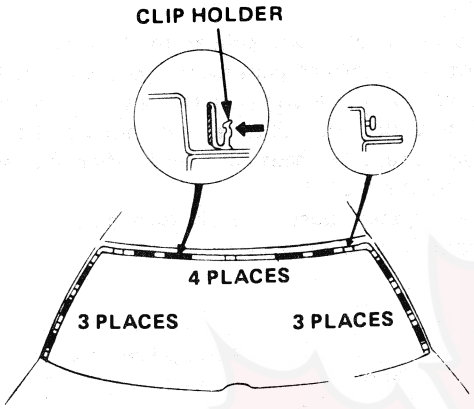


5. Heat the clip holder bonding surfaces on the body to about 40°C (105°F) using a dryer.
   Do not get water, oil, or grease on them.

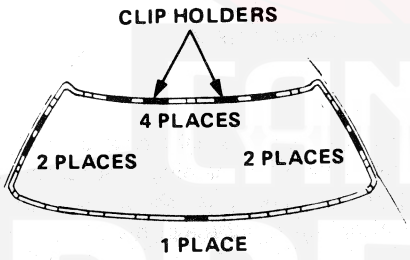
6. Peel off the lining and install the clip holders using maximum hand pressure.

   NOTE: Install the clip holders as soon as possible after applying heat to the body. Make sure they are cemented securely.

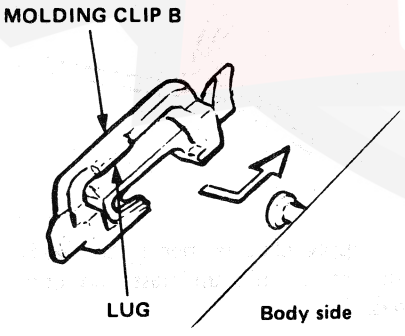
Front



Rear

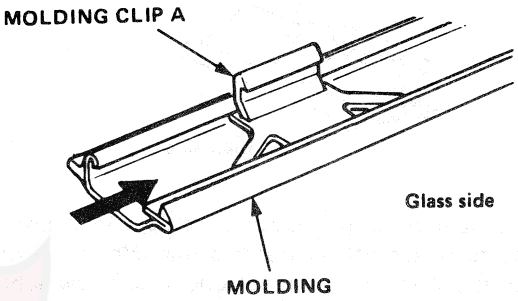


7. Install molding clips B as shown (page 22-12).

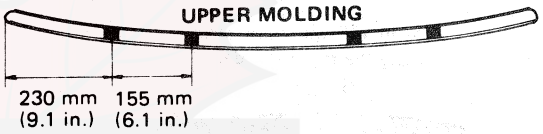


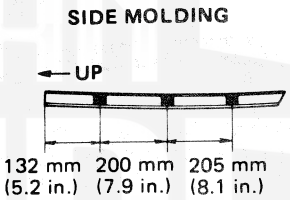
NOTE: Turn the lug to the body side.

8. Install molding clips A onto the molding.

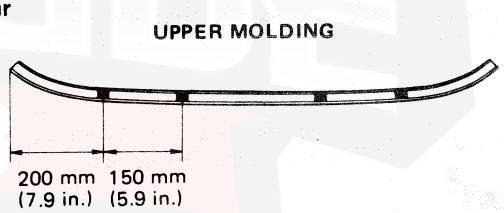


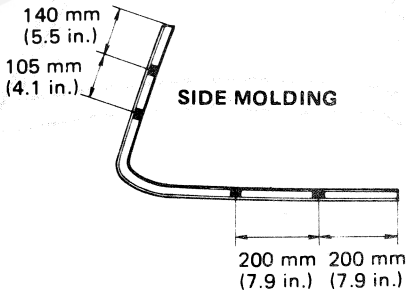
Front





Rear

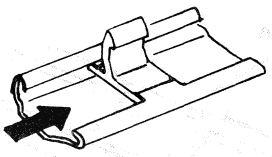




(cont'd)

Installation (cont'd)

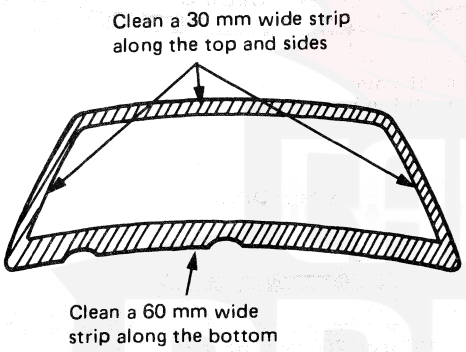
Lower Molding Joint Removal



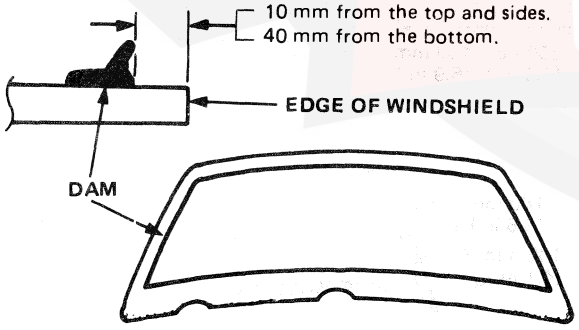
Glass side

9. If you are re-using a piece of glass, 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.

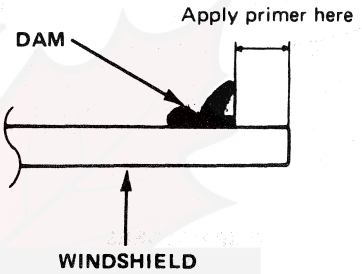


10. Then glue the rubber dam onto the inside of the glass according to the measurements shown.

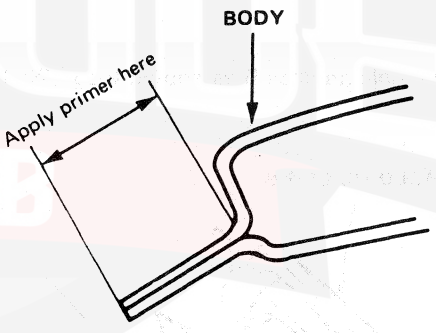


11. With a sponge, apply a light coat of glass primer to the surface outboard of the dam, then lightly wipe with gauze or cheesecloth.

    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 windshield is installed.
    - Keep water, dust, and abrasive materials away from the primed surface.



12. With a sponge, apply a light coat of body primer to original adhesive remaining around the window opening flange. The glass should be installed 10 minutes after you apply the primer.



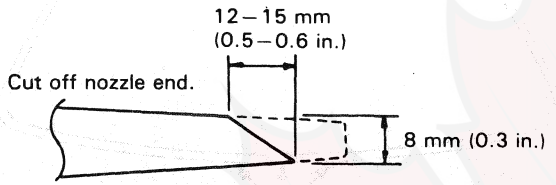
NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.
- Mask off the dashboard before painting the flange.

13. Thoroughly mix all the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:

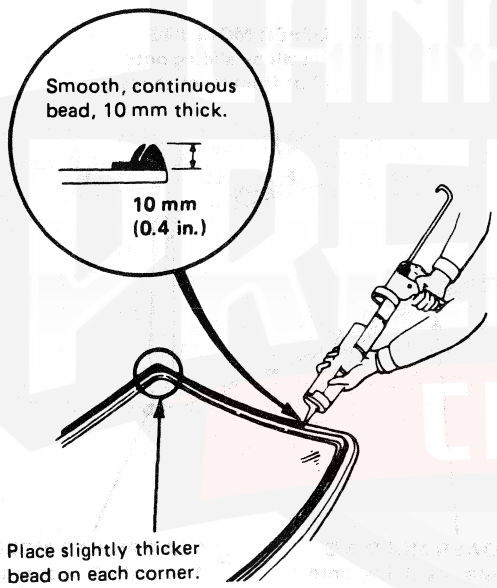
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.

14. Before filling a cartridge, cut off the end of the nozzle at the angle shown.

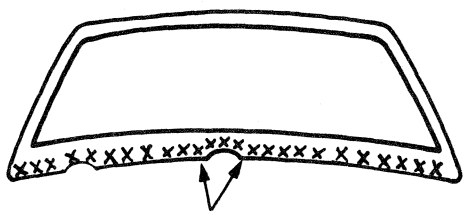


15. Pack adhesive into the cartridge, without air pockets, to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the glass as shown.

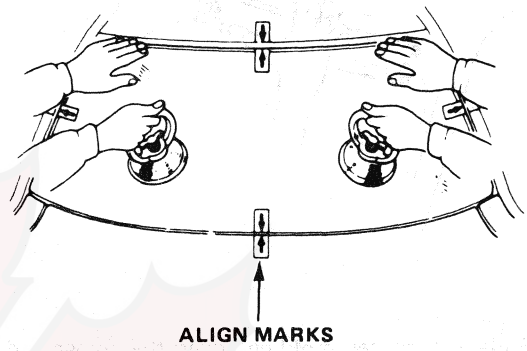
NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



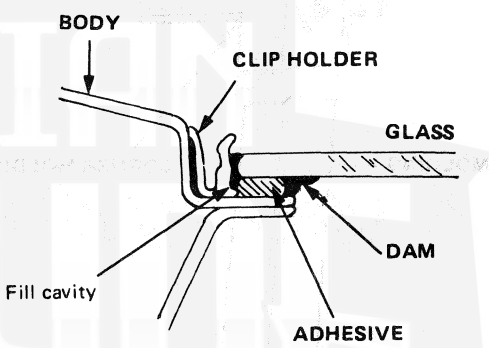
Then apply an additional bead along the lower inside edge of the glass.



16. Use suction cups to hold the glass over the opening, align it with the marks made in step 4 and set it down on the adhesive. Lightly push on the glass until its edge is fully seated on the adhesive all the way around.



17. Scrape or wipe excess adhesive off with putty knife or gauze. Fill all cavities around clips holder.



18. Spray water on the windshield 1—2 hours after installing the glass. Mark any leaks and let the windshield dry, then seal leaking area with urethan windshield adhesive.

NOTE:

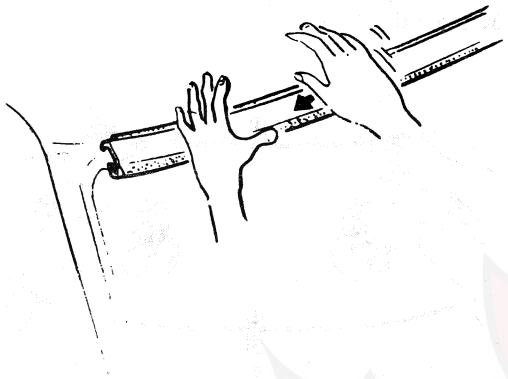
- Do not squirt water on freshly applied adhesive.
- Drive the car slowly if it must be driven during the first 4 hours after the windshield has been installed.

CAUTION: Let the adhesive dry for at least 4 hours before installing the moldings.

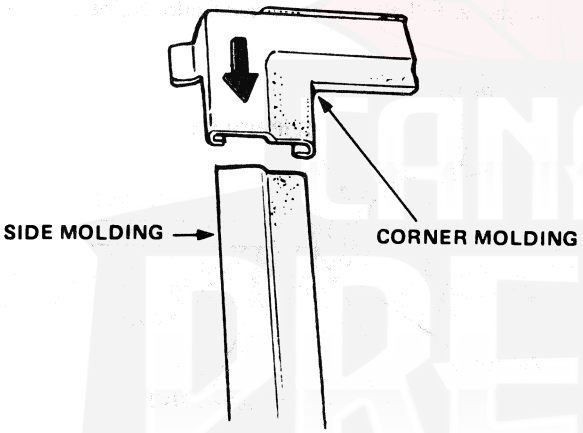
Molding

Installation

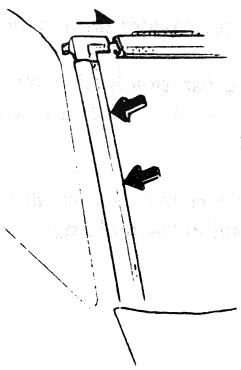
1. Hold the upper molding in place and tap on it until the upper edge snaps over the molding clips.



2. Slide the corner moldings over the upper end of the side moldings.

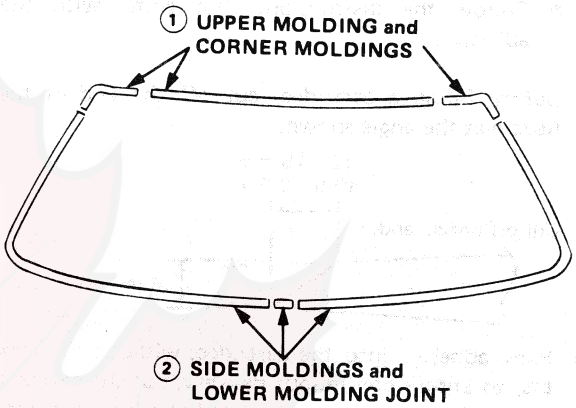


3. Snap corner molding onto the upper molding, then push to the middle.
Push the side molding at the place where molding clips A and B meet.



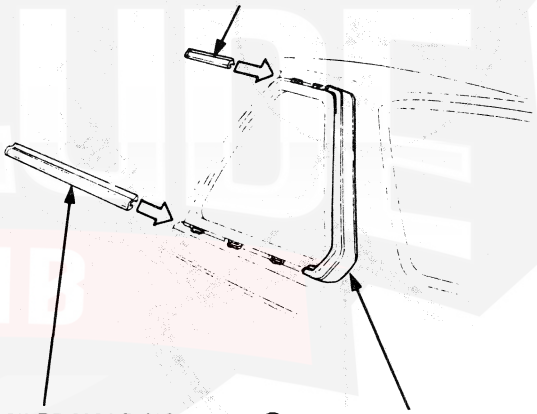
4. Install the rear and quarter window molding in numbered sequence.

Rear



Quarter

② **UPPER MOLDING**
Install by sliding onto clips from front to rear.



③ **LOWER MOLDING**
Install by sliding onto clips from front to rear.

① **REAR PILLAR MOLDING**
Attach the 3 clips to the rear pillar molding, align the clips with the holes in the pillar and push the molding into place.

Replacement

FRONT PILLER TRIM
1. Remove the door trim.
2. Remove the grab rail (only passenger side).
3. Insert a thin plate between garnish and front pillar, remove the 3 clips, and remove the garnish.
4. Slide the garnish to the rear, and remove it from the roof clip.

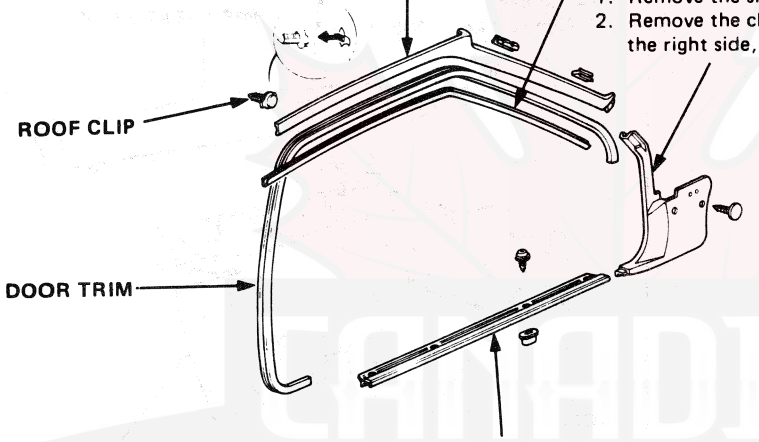
QUARTER WINDOW TRIM
1. Remove the rear seat belt (page 22-23).
2. Remove the side lining.
3. Remove the screw, and remove the quarter lining from the clip part.

ROOF LINING TRIM

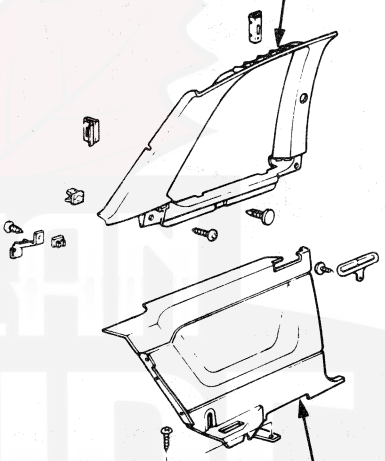
COWL SIDE LINING
1. Remove the side garnish.
2. Remove the clip, and bolts (1 on the right side, 2 on the left).

ROOF CLIP

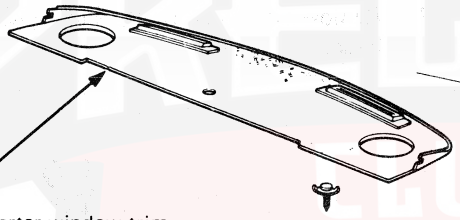
DOOR TRIM



SIDE GARNISH
Remove 4 screws, then remove the garnish.

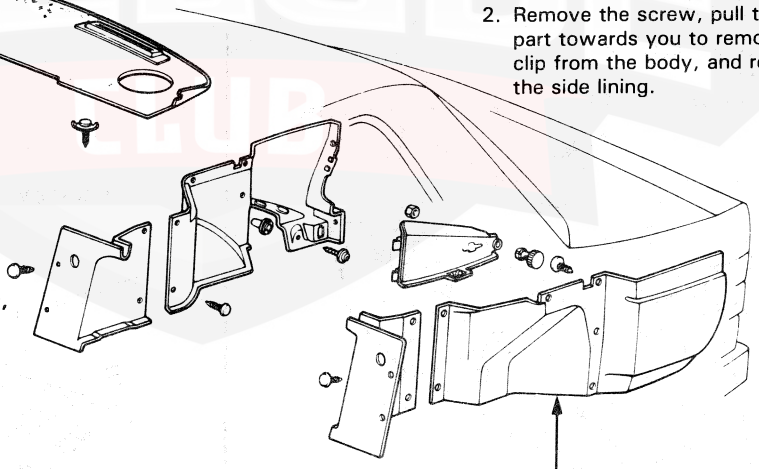


QUARTER TRIM PANEL
1. Remove the rear seat (page 22-22).
2. Remove the screw, pull the upper part towards you to remove the clip from the body, and remove the side lining.



REAR SHELF
1. Remove the quarter window trim and speakers.
2. Remove the clips by hitting them lightly with a plastic hammer from the underside of the rear shelf.

CAUTION:
- **Do not bend the rear shelf excessively, as it breaks easily.**
- **At the time of installation, check the wiring for the rear window defroster wires.**

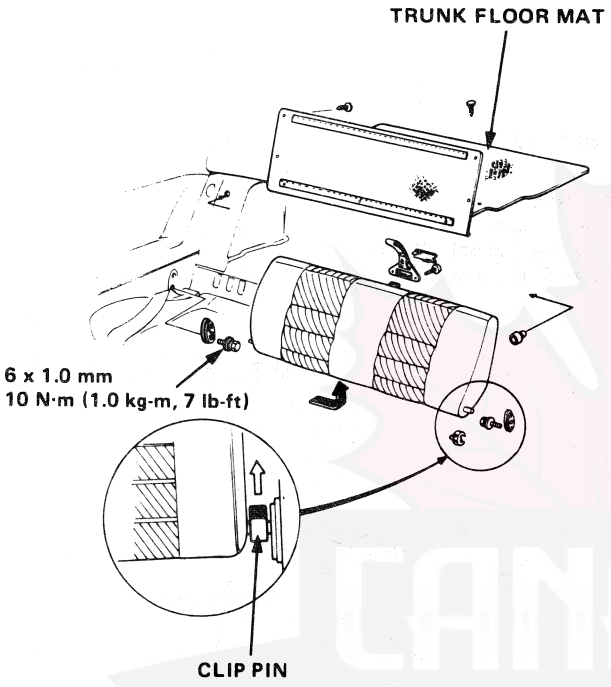


TRUNK SIDE GARNISH

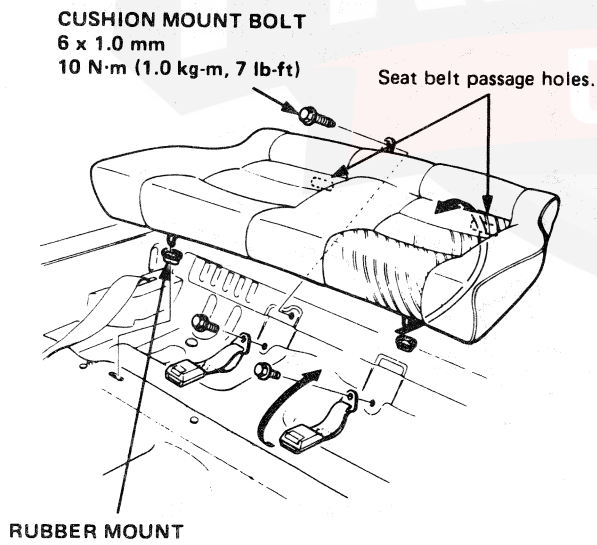
Rear Seat

Replacement

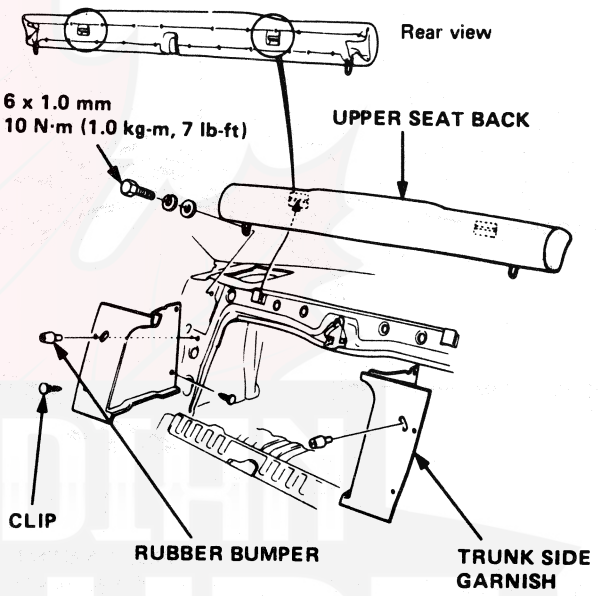
1. Pull the seat back all the way down, and pull the trunk floor mat from the trunk to the inside.
2. Pull the clip pin on the left side of the seat, and remove the seat back by sliding it to the left.



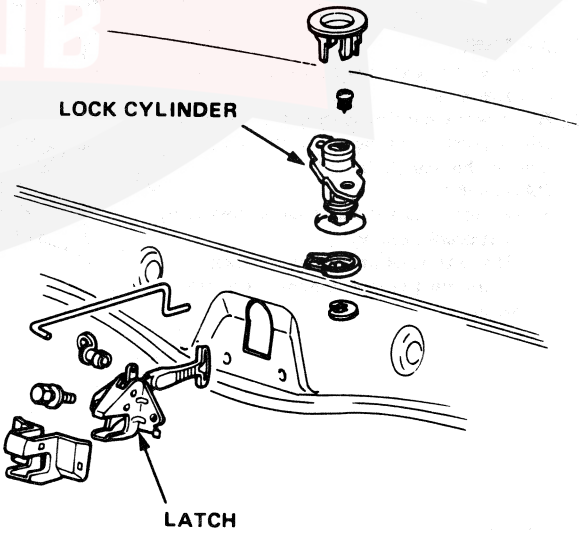
3. Remove the seat cushion mount bolt, raise the seat toward the front, and disengage the front hooks from the floor holes.



4. Remove the clips and rubber bumpers from the trunk side garnishes.
5. Remove the two mount bolts from the rear upper seat back.
6. Pull the bottom of the upper seat back to the front and raise it to remove it from the hooks.



7. Remove the rear shelf, and remove the rear seat latch.

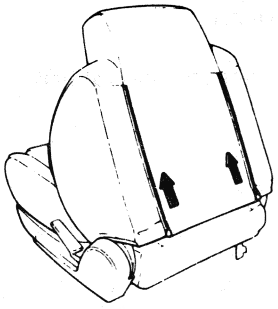


Seat Cover

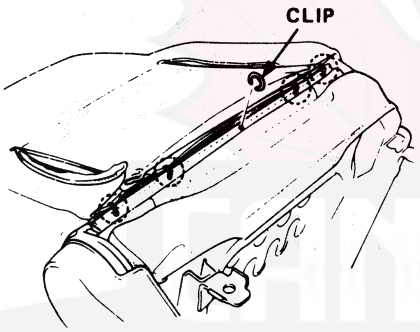
Replacement

Front seat back

1. Open the zippers on the rear of the seat.

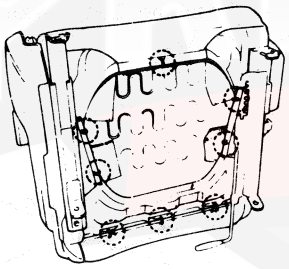


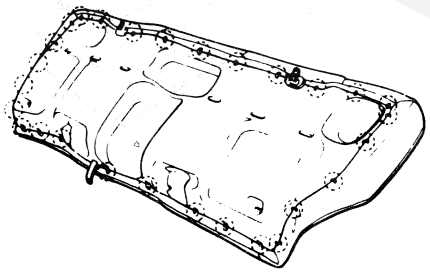
2. Remove the clips, and separate the cover from the seat cushion.



Other seats

1. Open all clips on the rear of the seat and remove them.





NOTE: To prevent wrinkles when installing a seat cover, make sure the material is stretched evenly over the frame before securing all the clips.

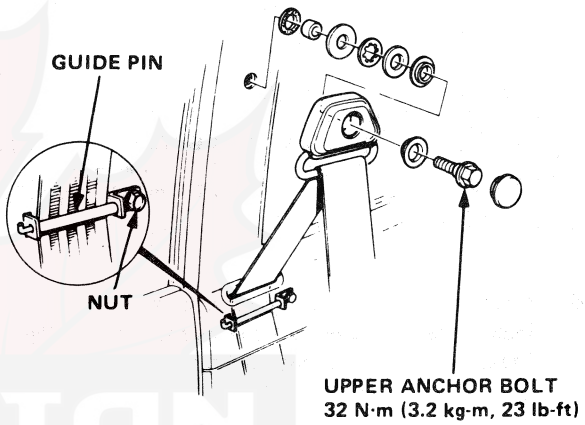
Front Seat Belts

Replacement

CAUTION: Check the seat belts for damage, and replace them if necessary. Be careful not to damage them during removal and installation.

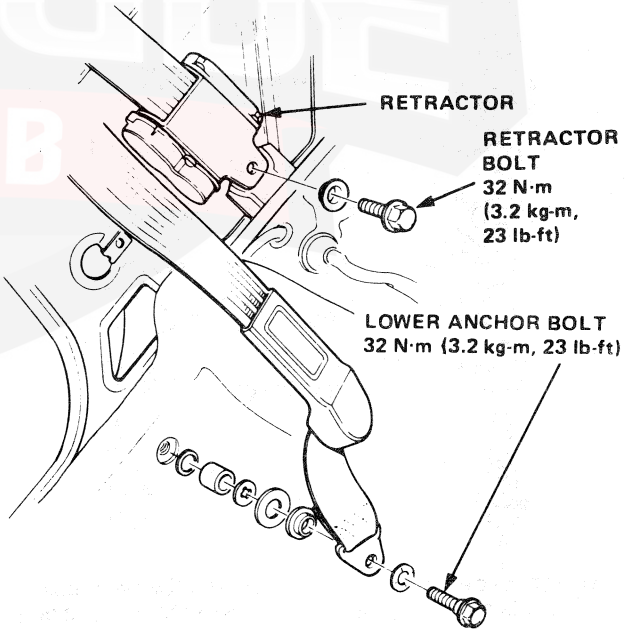
1. Remove the rear seat and quarter trim panel (pages 22-21 and 22).

2. Remove the upper anchor bolt with a 17 mm socket or box-end wrench.



3. Remove the belt guide pin and nut.

4. Remove the lower anchor bolt and retractor bolt.

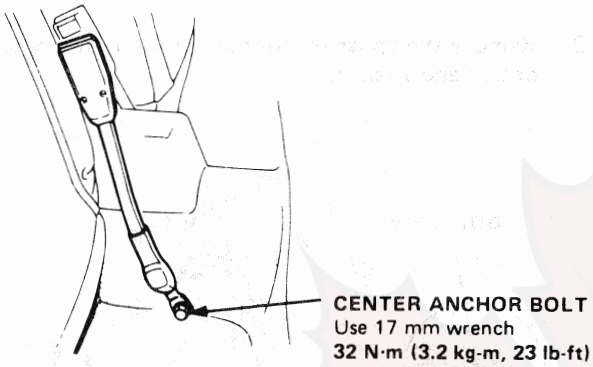


(cont'd)

Front Seat Belts

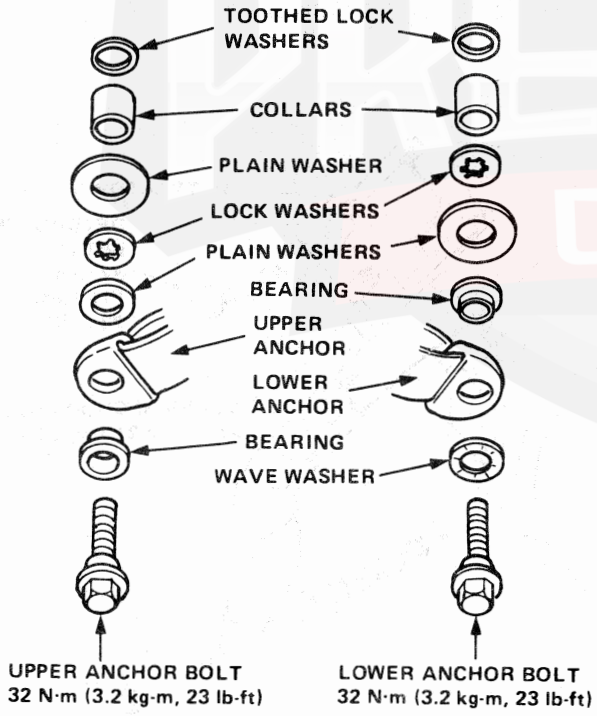
Replacement (cont'd)

5. Slide the front seat foward until the seat belt center anchor bolt is accessible, then remove the bolt and the center anchor.



6. Install the seat belt in the reverse of removal. Make sure you assemble the washers and collars on the upper and lower anchor bolts.

NOTE: Before attaching the quarter trim panel, make sure there are no twists in the belt.



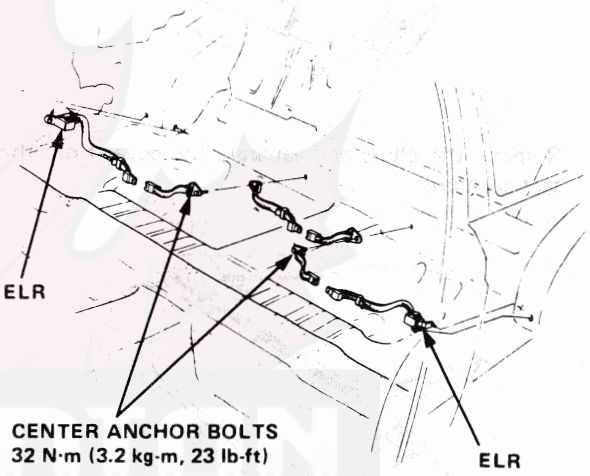
Rear Seat Belts

Replacement

1. Remove the rear seat and quarter trim panel (pages 22-21 and 22).

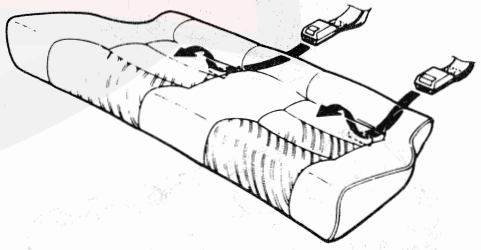
2. Remove the upper anchor bolt with a 17 mm socket or box-end wrench.

3. Remove the bolts and the seat belts.



4. Install the seat belt in the reverse of removal. Pass the seat belts through the notches of the seat cushion.

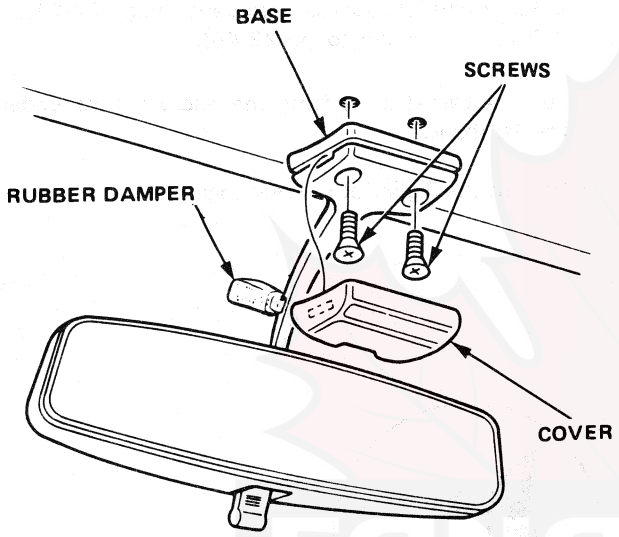
NOTE: When installing belt, make sure it is not twisted behind the seat.



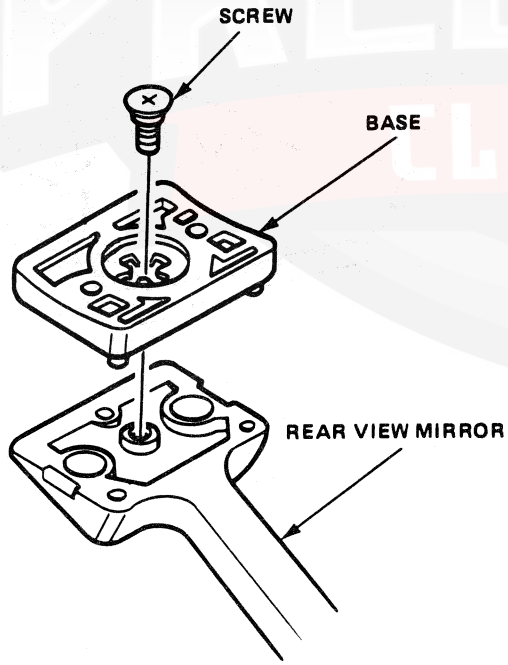
Rear View Mirror

Replacement

1. Remove the rubber damper.
2. Pry the cover off using the end of a slot-head screwdriver.



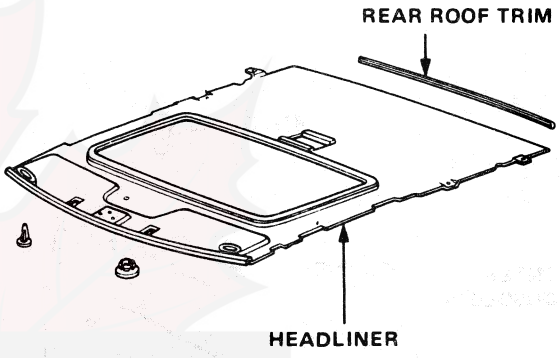
3. Remove both mounting screws from the mirror base then remove the mirror assembly.
4. Remove the base from the bracket by removing the screw.



Headliner

Replacement

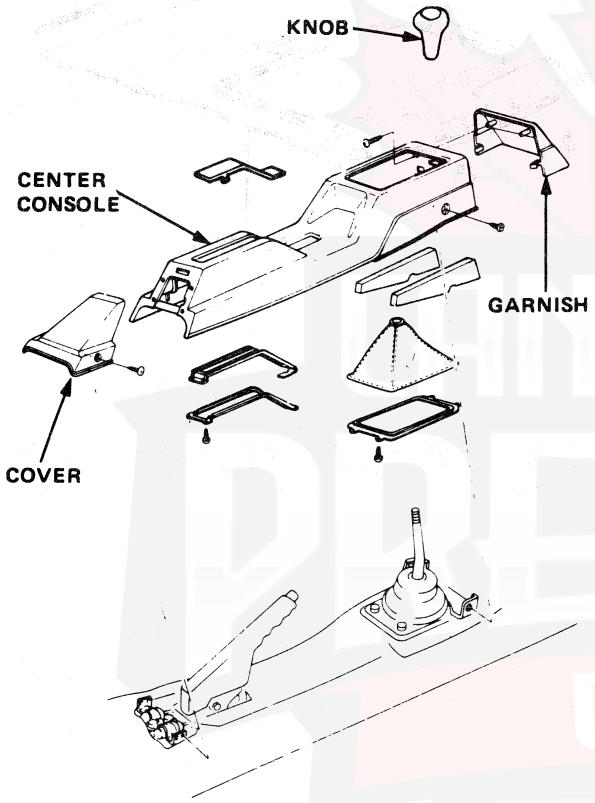
1. Remove:
   - Sunvisors
   - Rear view mirror and base.
   - Front pillar trim (page 22-21).
   - Interior light.
   - Quarter window trim (page 22-21).
2. Remove the rear roof trim and the clips, then remove the roof lining.



Console

Replacement

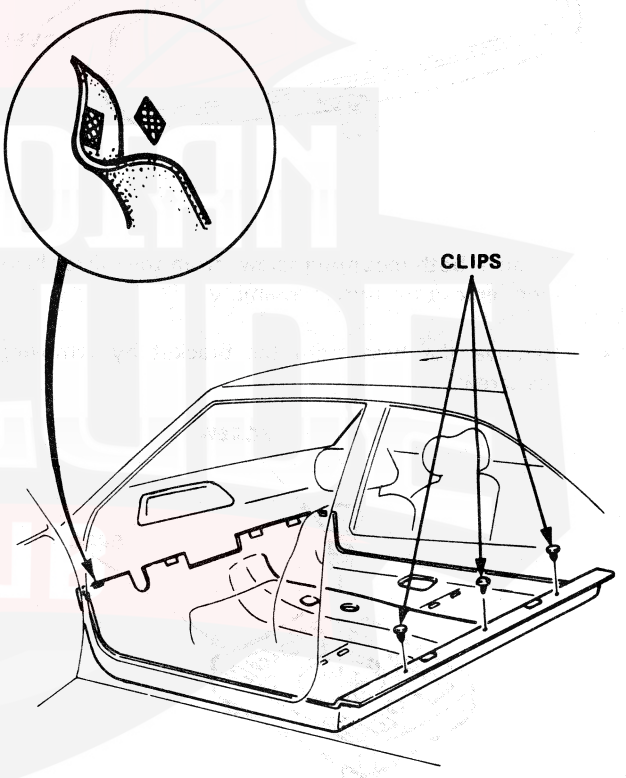
1. Remove the gear shift knob (5-speed) or selector lever handle (Automatic).
2. Remove the 4 mounting screws for the center console, and remove the center console and its garnish.
3. Remove the 2 screws from the rear of the console and remove the console cover piece.



Carpet

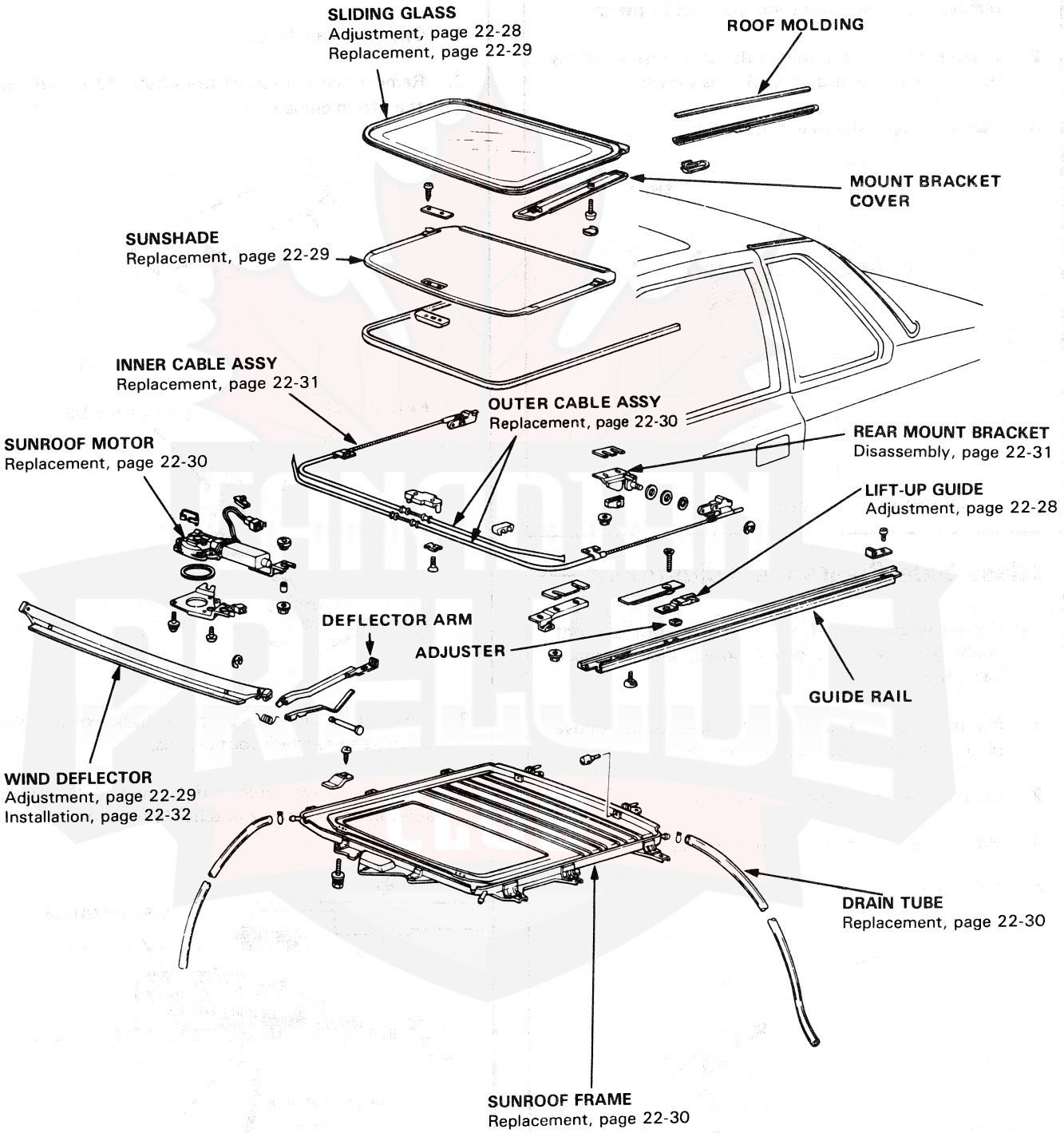
Replacement

1. Remove:
   - Right and left front seats.
   - Rear seat cushion (page 22-22).
   - Center console.
   - Right and left cowwl side linings (page 22-21).
   - Right and left side garnishes (page 22-21).
   - Right and left front seat belt floor anchor bolts.
   - Right and left quarter trim panel (page 22-21).
   - Trunk lid opener (page 22-46).
2. Pull the carpet away from the velcro® strips under the dashboard.
3. Pry out the 3 clips at the rear edge.



Sunroof

Illustrated Index

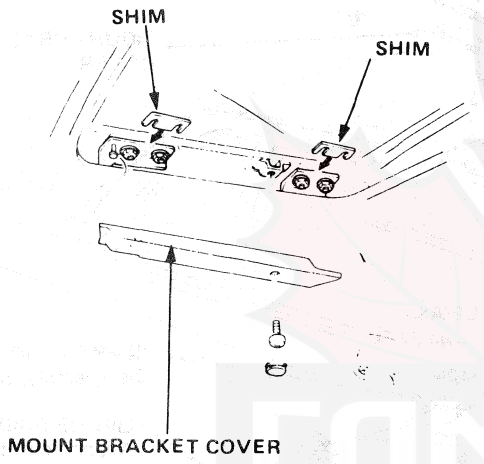


Sunroof

Glass Height Adjustment

Roof molding should be even with the glass weatherstrip, to within 1 ± 1.5 mm (0.04 ± 0.06 in.) all the way around. If not, slide sunshade back, and:

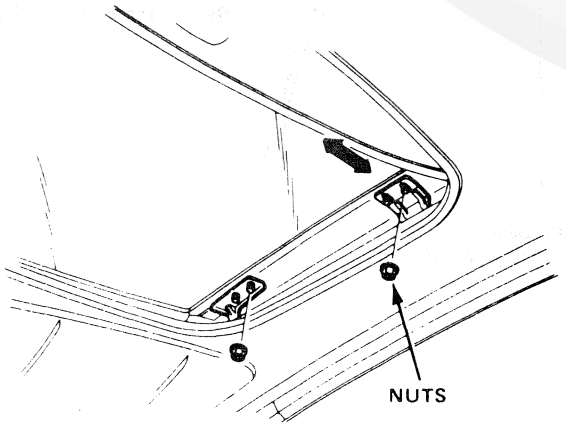
1. Pry plug out of the glass mount bracket cover, remove the screw, then slide cover off to the rear.
2. Loosen mount bracket nuts and install shims between glass frame and bracket as shown.
3. Repeat on opposite side if necessary.



Glass Side Clearance Adjustment

If glass weatherstrip fits too tight against the roof molding on one side when closed, slide sunshade back, then:

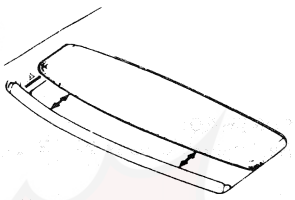
1. Pry plug out of each mount bracket cover, remove screw, then slide cover off to the rear.
2. Loosen all eight mount bracket nuts.
3. Move the glass right or left as necessary.
4. Tighten nuts.

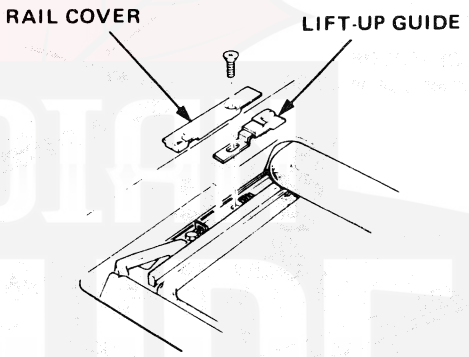


Rear Edge Closing Adjustment

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 tight against roof molding, or too late and does not seat tight enough, adjust it:

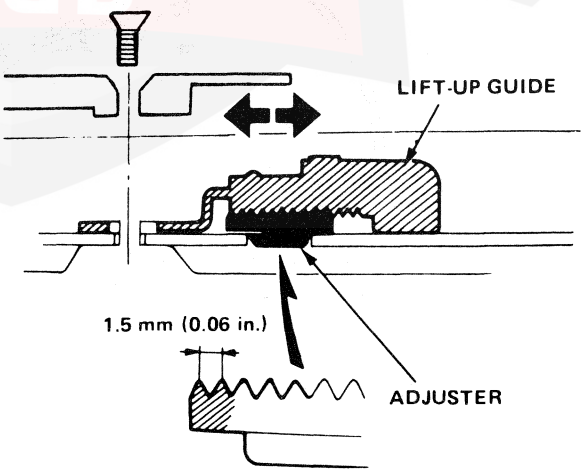
1. Open the glass fully.
2. Remove the rail covers from both sides, and loosen the lift-up guide screws.





3. Move the guides forward or back, then tighten screws and re-check roof closing.

The guides have notches of 1.5 mm (0.06 in.) each and can be adjusted 2 notches forward or back.

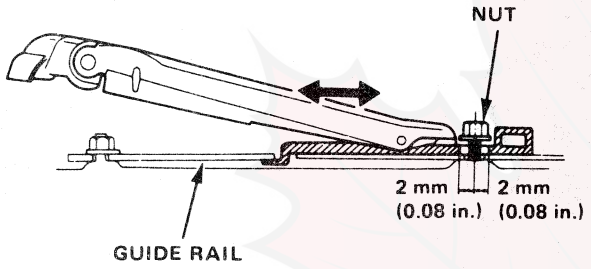


Wind Deflector Adjustment

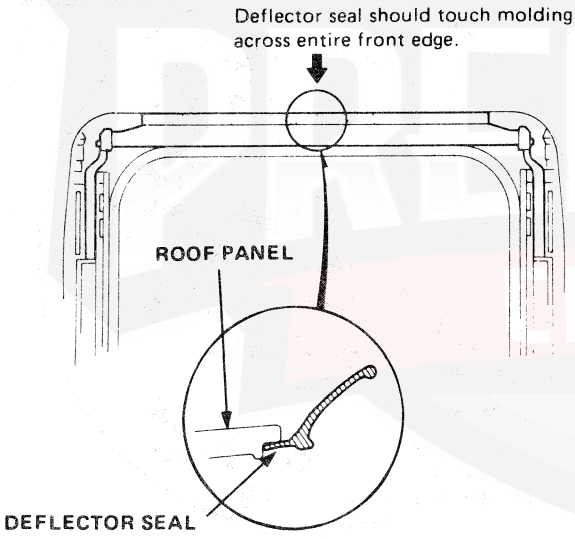
NOTE: A gap between deflector seal and roof molding will cause wind noise when driving at high speed with the roof open.

1. Open the sunroof and pry the rail covers off both sides.
2. Loosen deflector mounting nuts.

   NOTE: Wind deflector can be adjusted 2 mm (0.08 in.) forward or back.



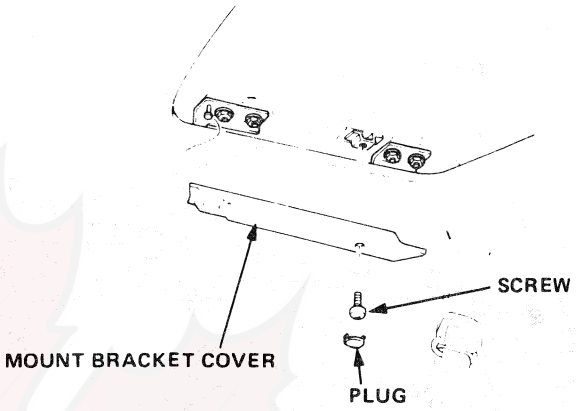
3. Adjust deflector forward or back so the edge of its seal touches the roof molding evenly.



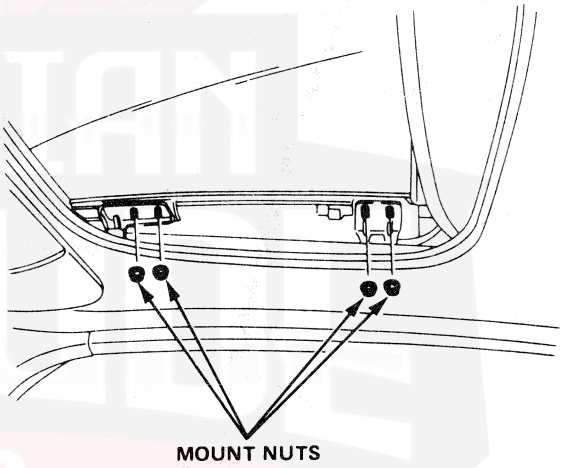
NOTE: The height of the deflector when open cannot be adjusted. If damaged or deformed, replace it.

Glass and Sunshade Replacement

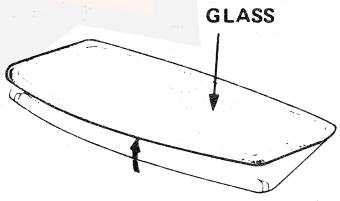
1. Slide sunshade all the way back.
2. Pry plug out of each bracket cover, remove screw, and slide cover off to the rear.



3. Close the glass fully.
4. Remove the nuts from front and rear mounts on both sides.



5. Remove the glass by lifting up and pulling forward as shown.



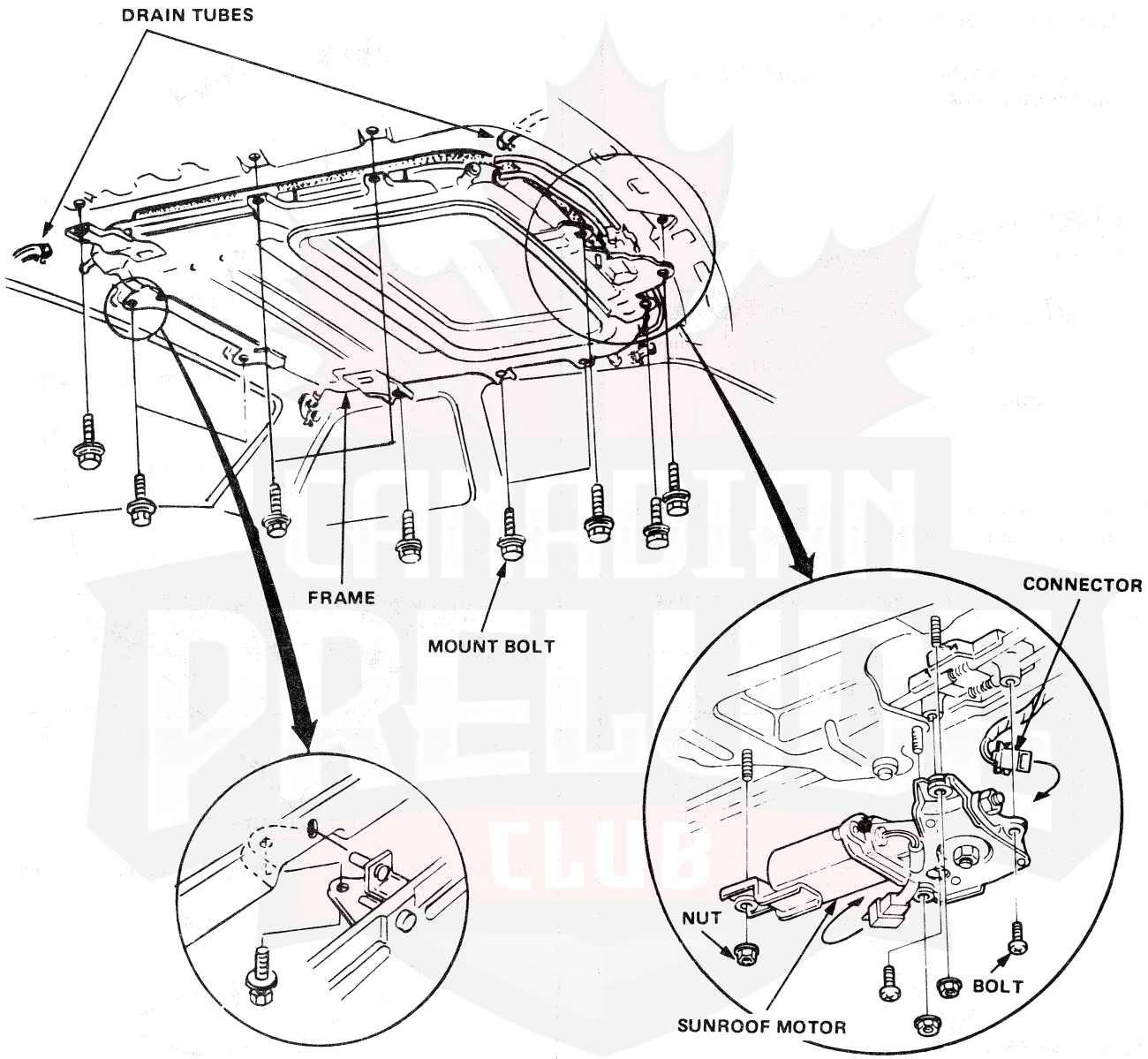
6. The sunshade may now be pulled out.

   NOTE: The sunshade may be bent slightly to ease removal.

Sunroof

Motor, Drain Tube and Frame Replacement

1. Remove the headliner (page 22-25).
2. Remove the sunroof motor by removing the two bolts and three nuts from the bottom of the motor mount plate.
3. Disconnect the wire harness at the connector, and remove the motor.

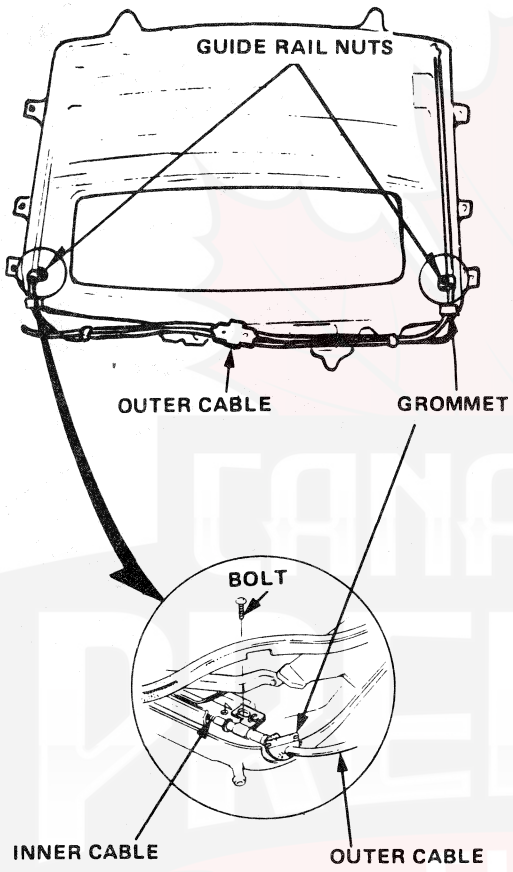


4. Slide back the drain tube clamps and remove the drain tubes.
5. Remove the 11 mounting bolts from the sunroof frame, and remove the frame from the car.
6. To install, insert the frame's rear pins into the body holes, then install parts in the reverse order of removal.

Cable Replacement

With the sun roof out of the car, remove the guide rail mounting nuts, lift off the guide rails, and remove the cables,with the rear mounts attached.

NOTE: Fill the groove in each grommet with sealant and apply molybdenum grease to the inner cable.

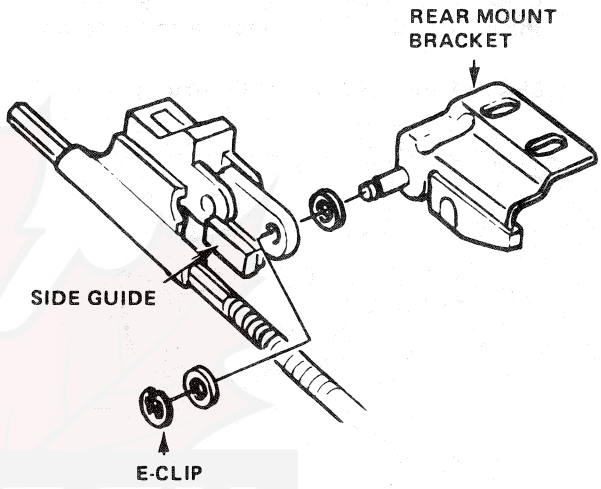


Rear Mount Bracket Disassembly

1. Remove the side guides from the rear mount brackets.

   NOTE: Replace the guides with new ones whenever they are disassembled.

2. Pry the E-clip off the pin, and remove the rear mount bracket from the cable.

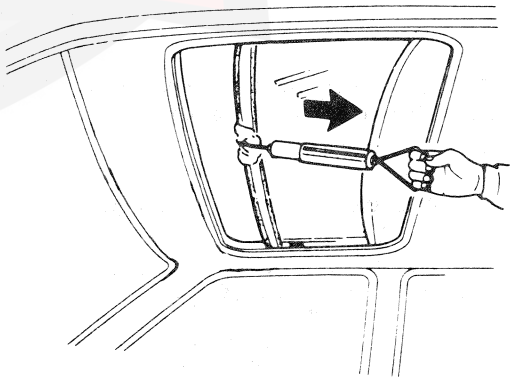


Closing Drag Check (Motor Removed)

Before installing the sunroof motor, measure effort required to close sliding panel using a spring scale as shown.

CAUTION: When using the spring scale, protect the leading edge of the sunroof with a shop rag.

If load is over 98N (10 kg, 22 lb), check side clearance and glass height adjustment (page 22-27).



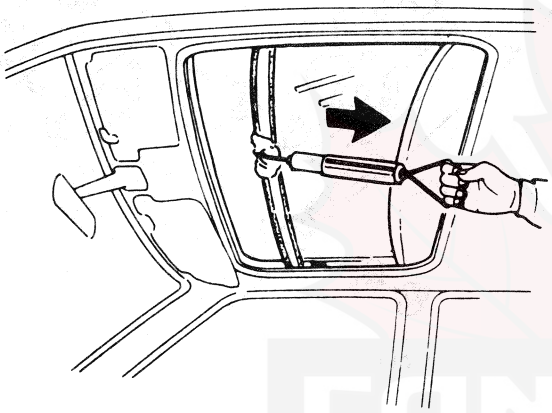
Closing Drag: Less than 98 N (10 kg, 22 lb)

Closing Force Check (Motor Installed)

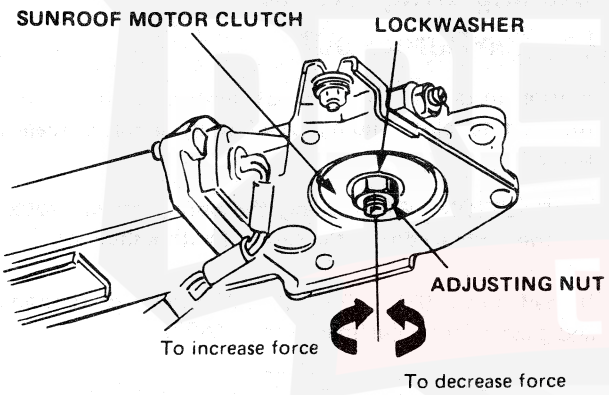
1. After installing all removed parts, have a helper hold the switch to close the sunroof while you measure force required to stop it. Attach spring scale as shown. Read force as soon as glass stops moving, then immediately release the switch and spring scale.

   CAUTION: When using the spring scale, protect the leading edge of the sunroof with a shop rag.

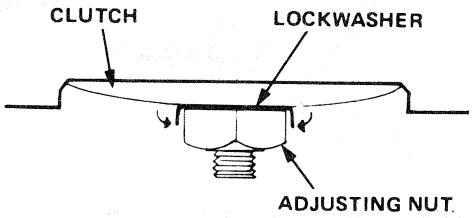
   Closing Force: 196–245 N (20–30 kg, 44–66 lb)



2. If force is not within specification, adjust by turning sunroof motor clutch adjusting nut.

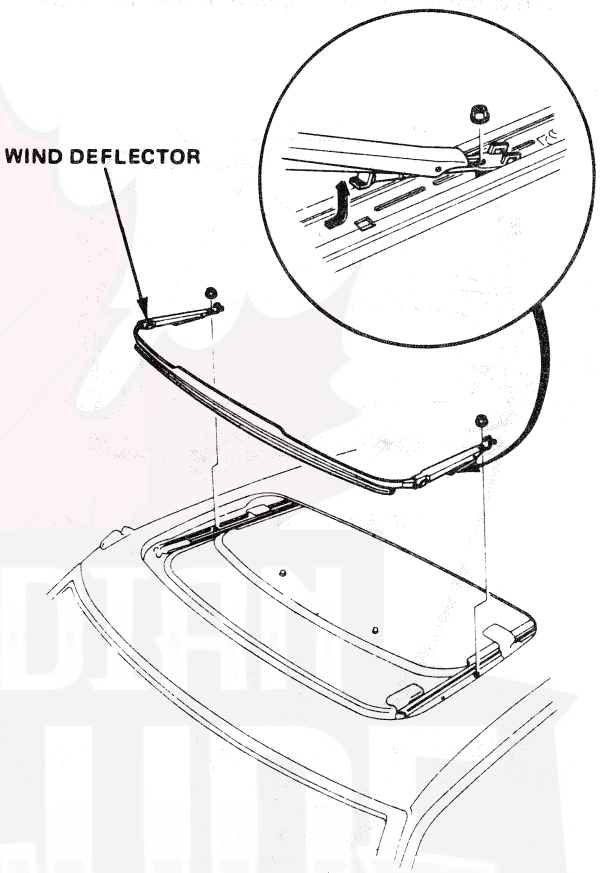


3. After adjusting, install a new lockwasher and bend it against flat on the adjusting nut.



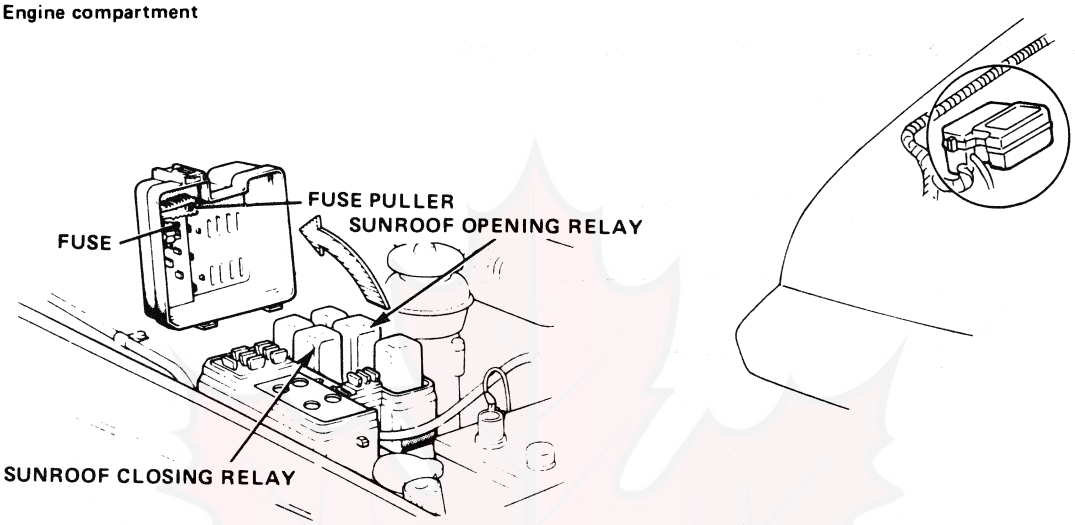
Wind Deflector Installation

Installation is done in the reverse order of removal. When installing, make sure to insert the deflector ends tightly into the guide rails and arrange the deflector and rails in parallel.



Relays and Fuse Location

Engine compartment



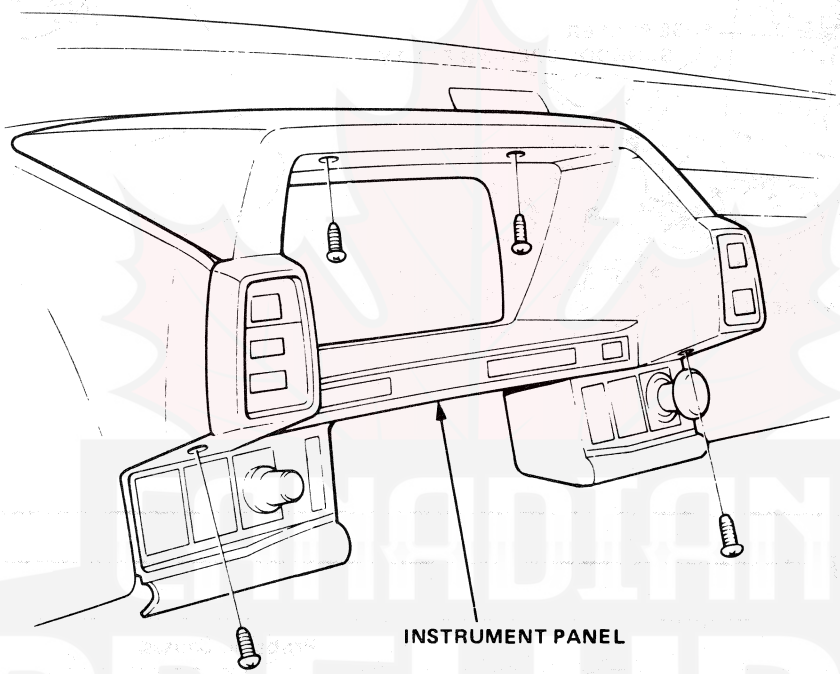
Troubleshooting

Symptom	Probable Causes
Water leak	1. Gap between glass weatherstrip and roof panel. 2. Deflective or improperly installed glass weatherstrip. 3. Clogged drain tube. 4. Gap between glass weatherstrip and body.
Wind noise	1. Excessive clearance between glass weatherstrip and roof panel.
Deflector noise	1. Improper clearance between deflector blade and roof panel. 2. Insufficient deflector extension. 3. Deformed deflector.
Motor noise	1. Loose motor. 2. Worn gear or bearing. 3. Outer cable deformed.
Sunroof does not move, but motor turns	1. Foreign matter stuck between guide rail and sliding panel. 2. Interference between parts. 3. Outer cable loose. 4. Outer cable not attached properly. 5. Clutch out of adjustment.
Sunroof does not move and motor does not turn (Sliding panel can be moved with sunroof wrench)	1. Blown fuse. 2. Faulty switch. 3. Battery run down. 4. Defective motor.

Instrument Panel

Removal

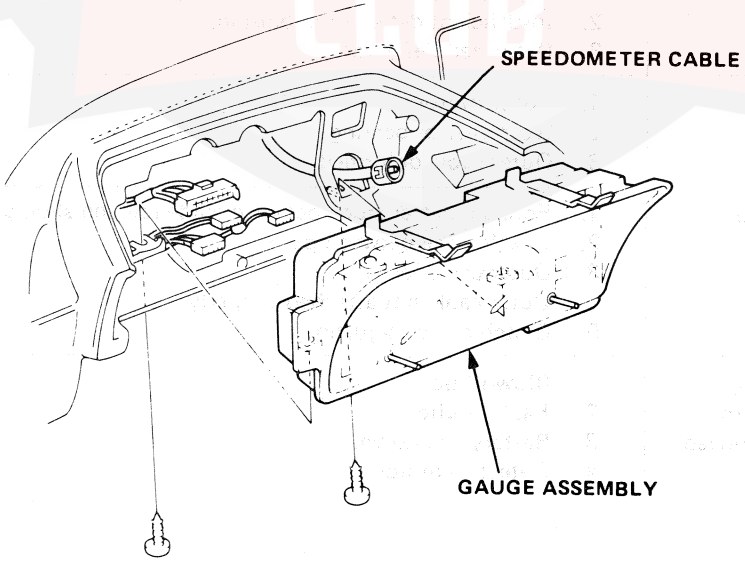
1. Lower the steering column, and remove the dashboard lower panel (page 22-39).
2. Remove the four screws.
3. Pull the instrument panel out, then disconnect the wire connectors.
4. Remove the panel.



5. Remove the two screws, then lift the gauge assembly so you can reach the wire connectors.

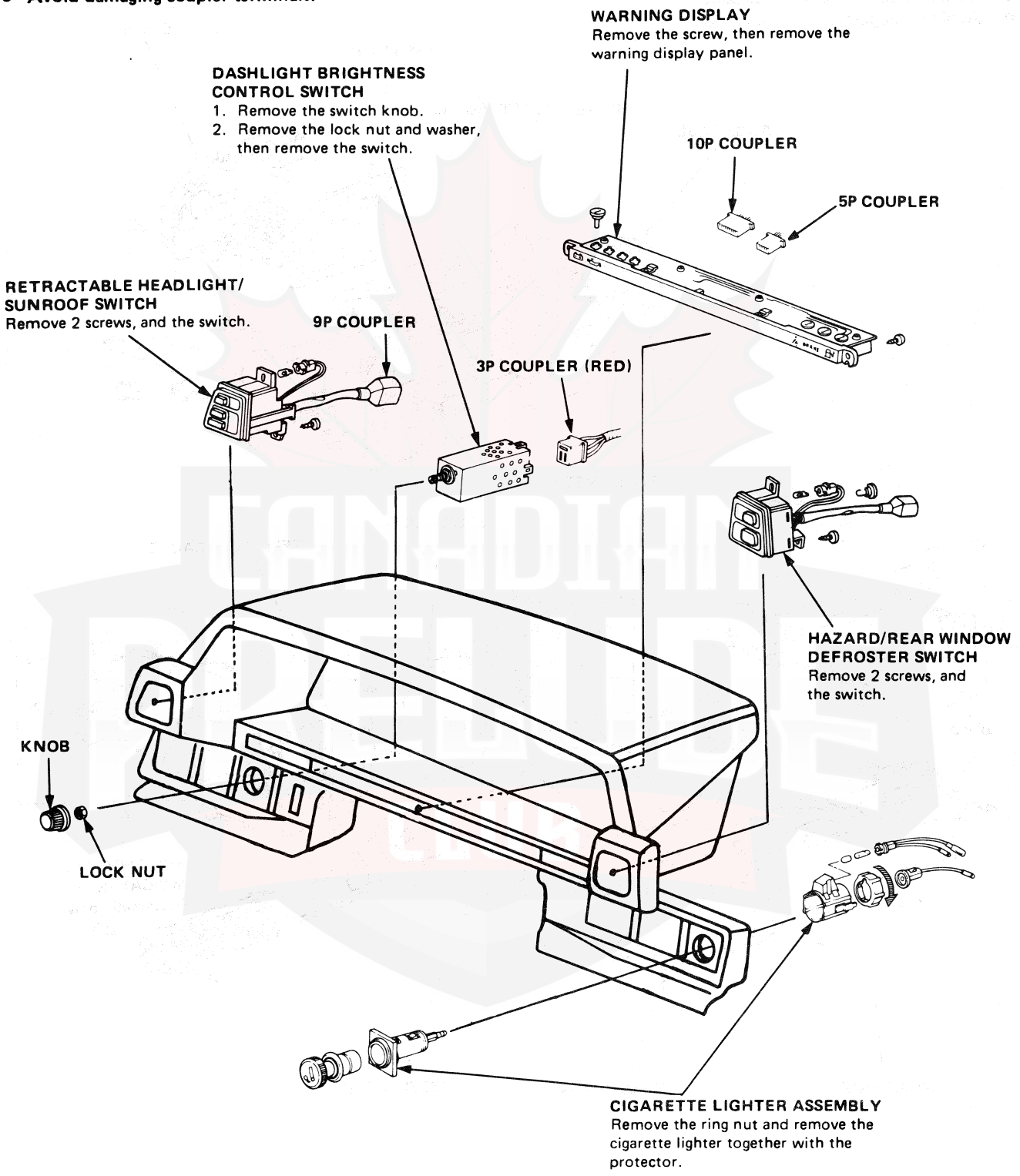
   CAUTION: Do not pull on the wires to disconnect connectors.

6. Disconnect the speedometer cable and wire connectors, then remove the gauge assembly.



Replacement

CAUTION:
- **Do not touch the printed circuits.**
- **Avoid damaging coupler terminals.**



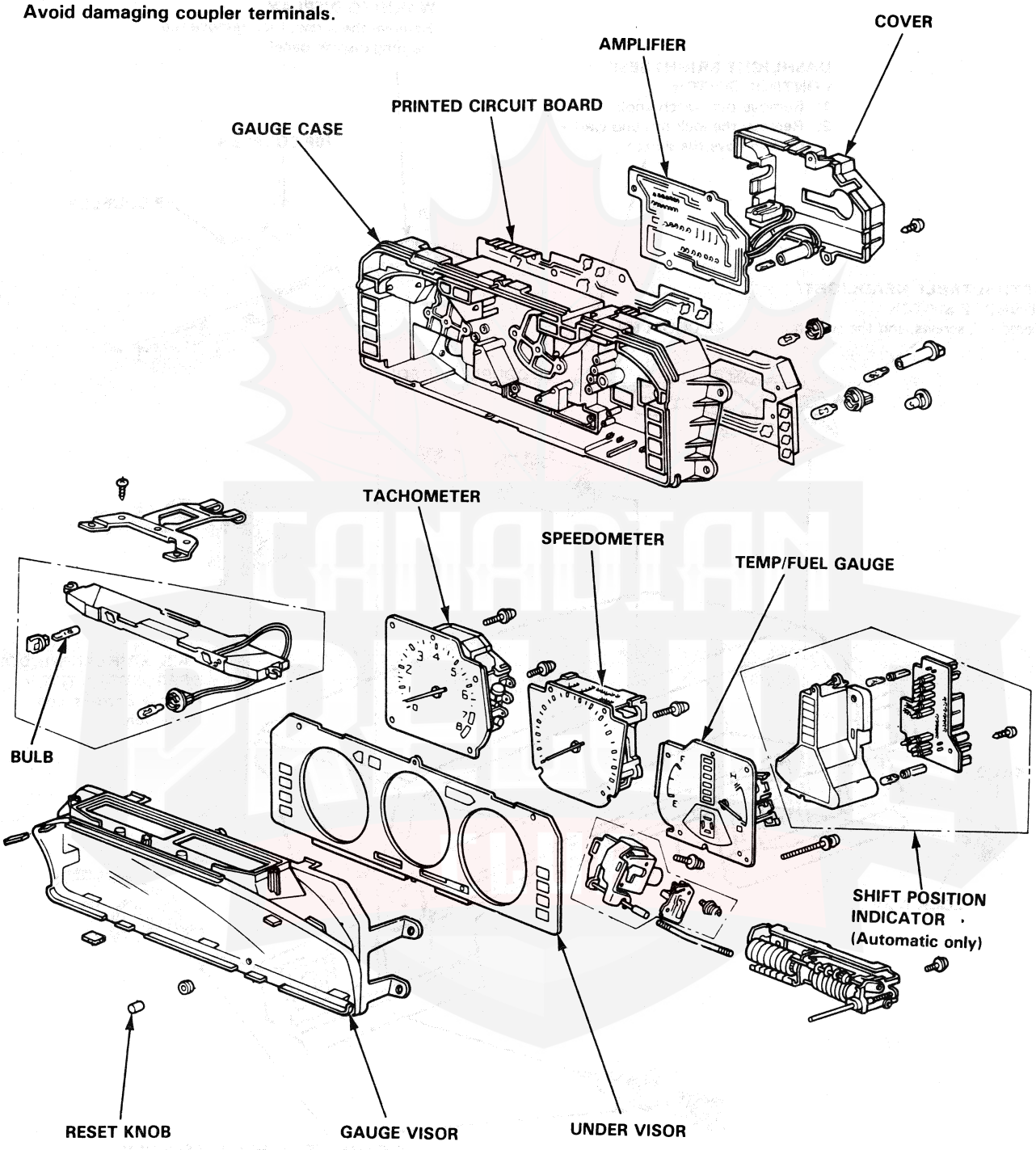
Gauges

Overhaul

DX:

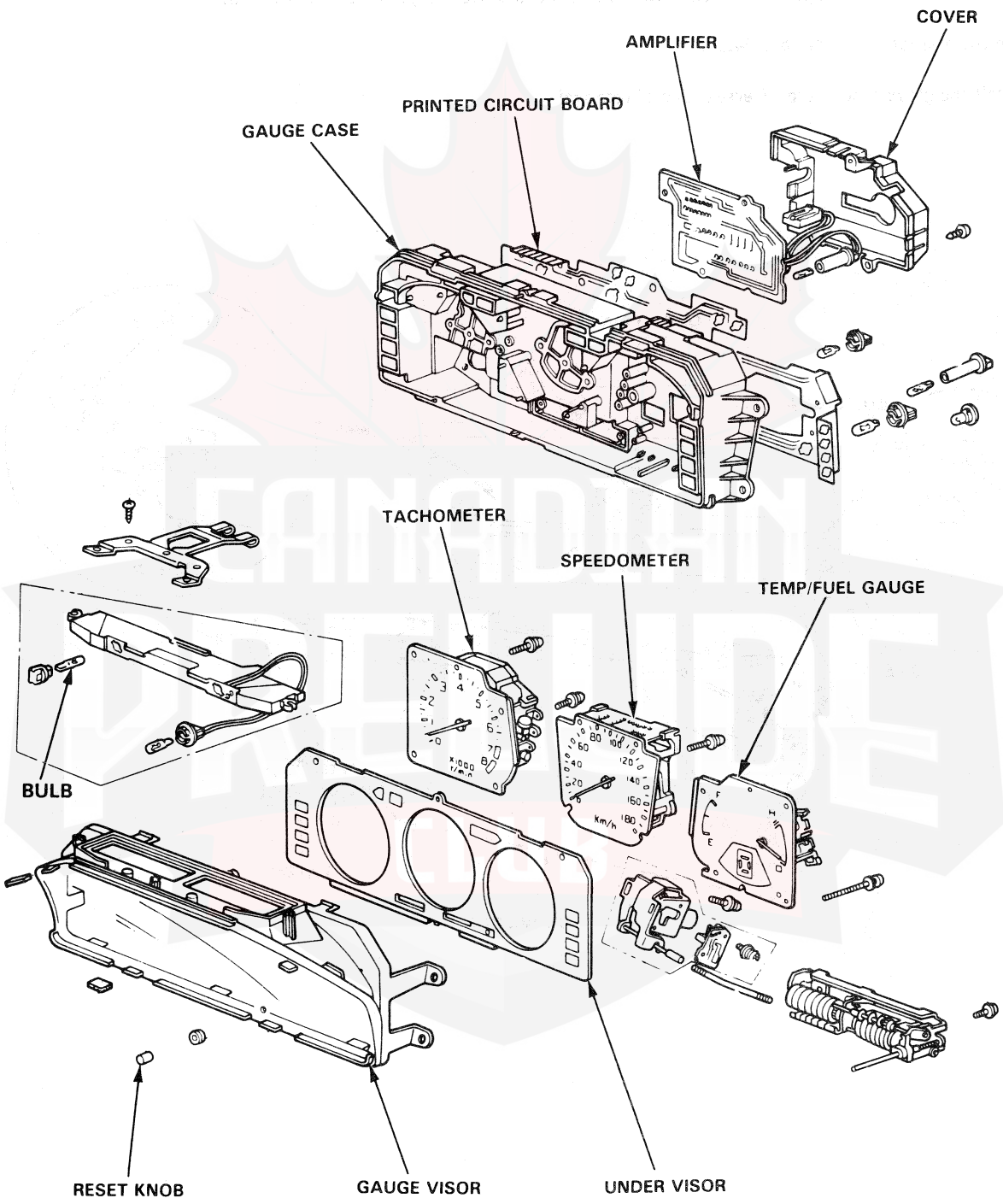
CAUTION:

- Do not touch the printed circuits.
- Avoid damaging coupler terminals.



Si:

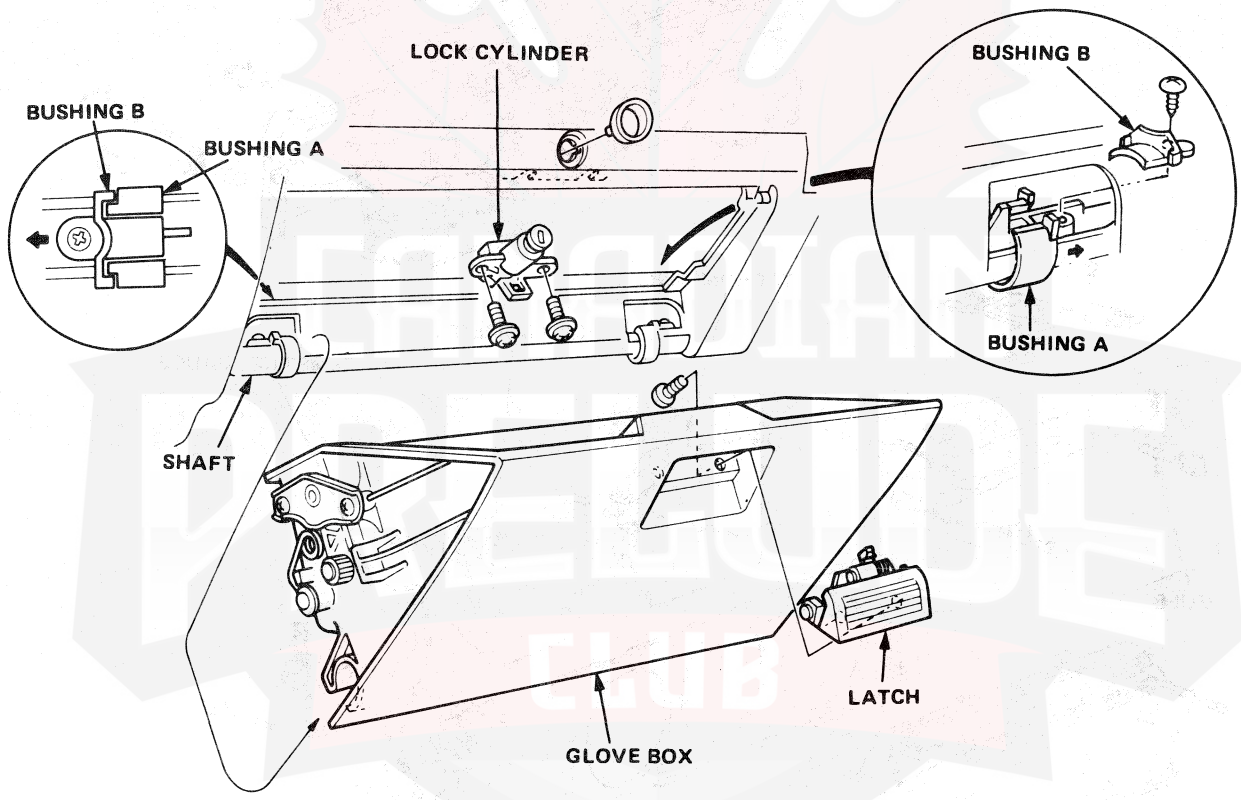
NOTE: Avoid damaging terminals and printed circuit.



Glove Box

Replacement

1. Remove the glove box trim panel (page 22-39).
2. From under the glove box remove the screw attaching bushing B at each lower corner; lift the bushings off the shaft.
3. Then slide bushing A, one on each side, to the outside and lift the glove box off the shaft.
4. Remove the lock cylinder and latch.
5. Install the glove box in the reverse order of removal.

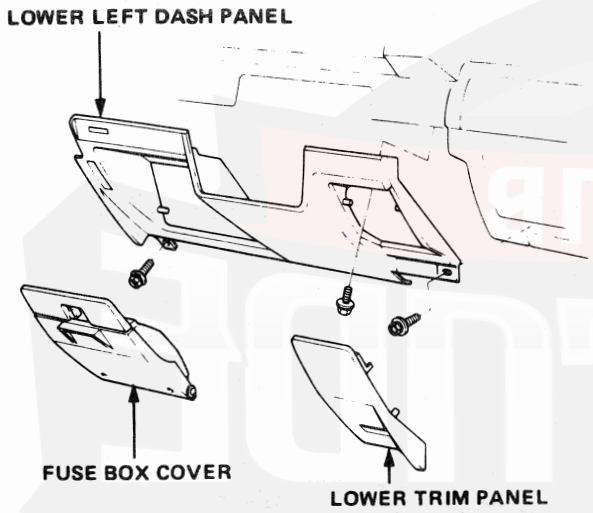


Dashboard

Replacement

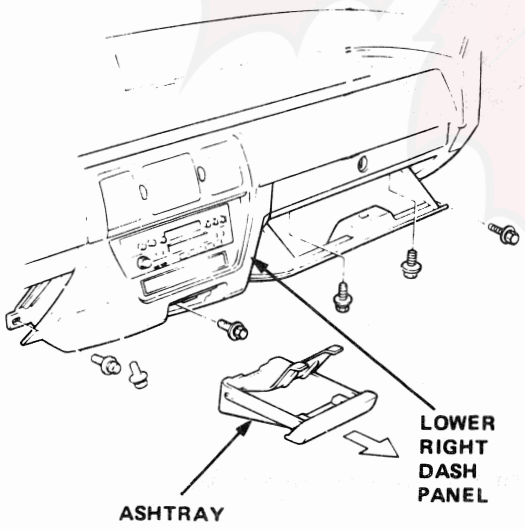
1. Remove the fuse box cover and lower trim panel, and then remove the lower left dashboard panel by removing the 4 bolts.

   NOTE: Be careful not to disturb wire connections.



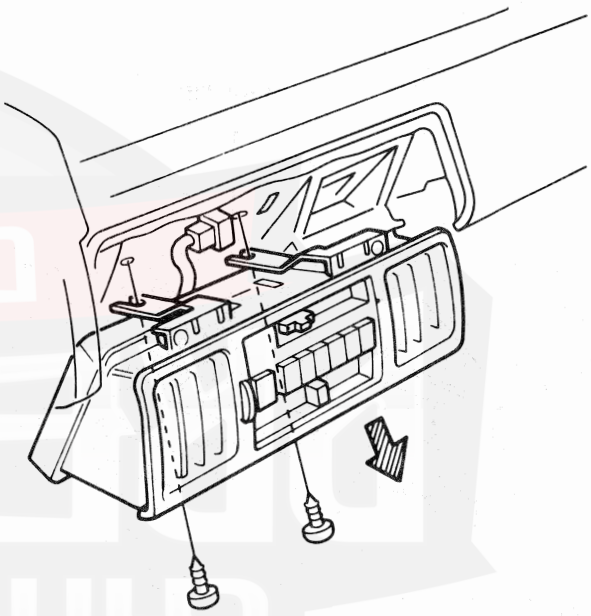
2. Open the glove box and remove the ashtray.

3. Remove the bolts from the lower right dash panel. Then, disconnect the wiring for the glove box light, ashtray light, radio and antenna, and remove the panel with the radio still in it.



4. Remove the heater control panel by removing the 2 screws.

5. Remove the cable mounting screws to remove the cable, and disconnect the wire harness.



6. Remove the instrument panel (page 22-34).

7. Remove the clock.

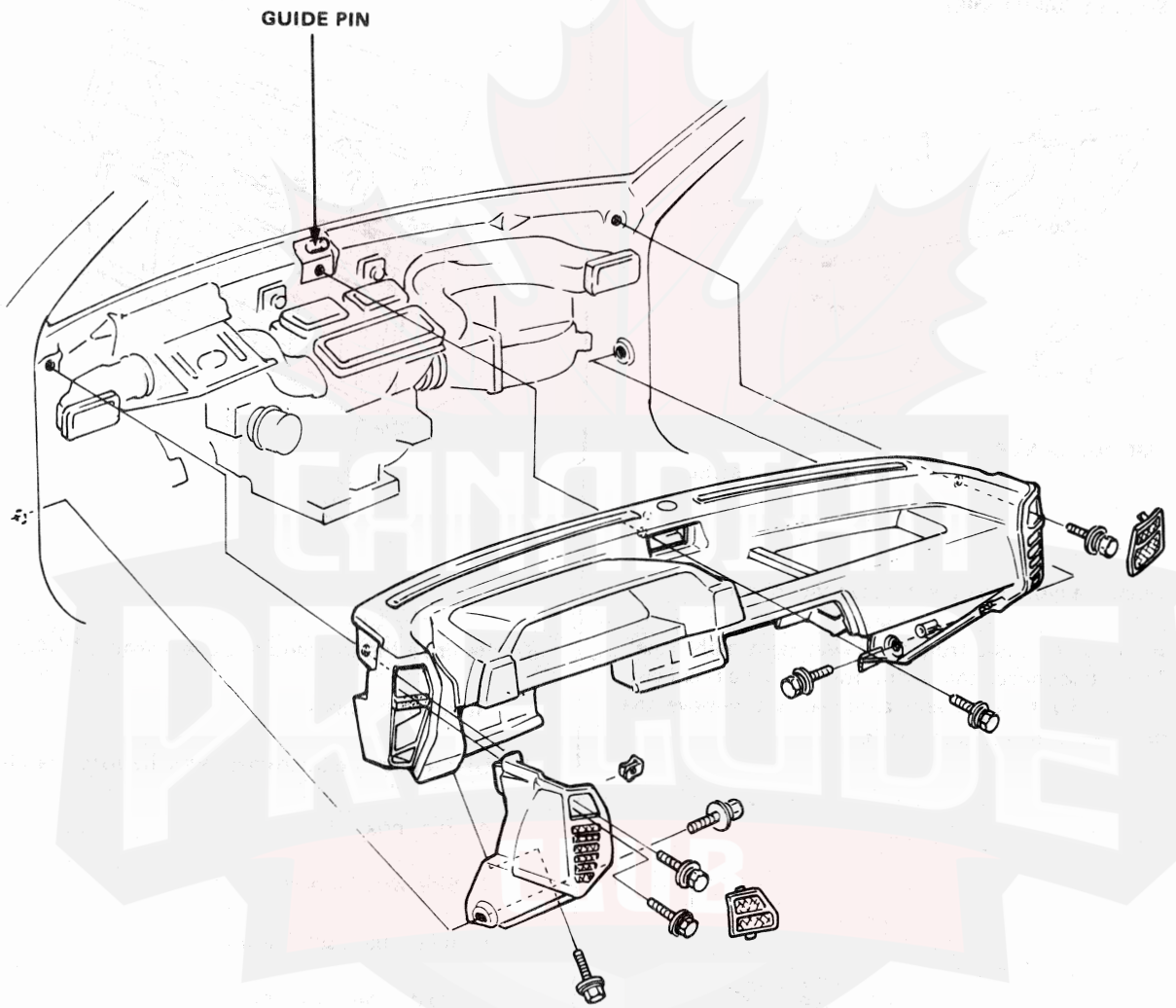
8. Disconnect the instrument wire harness from the:

   - Fuse box.
   - Side wire harness.
   - Instrument sub harness.
   - Heater wire harness.
   - Interior light timer unit.
   - Chime.

(cont'd)

Replacement (cont'd)

9. Remove the 9 dashboard mounting bolts.
10. Lift the dashboard as you pull so it will slide off the guide pin at the middle; hold it from underneath so it won't fall when it comes off the pin.



11. Install the dashboard in the reverse order of removal.

CAUTION:

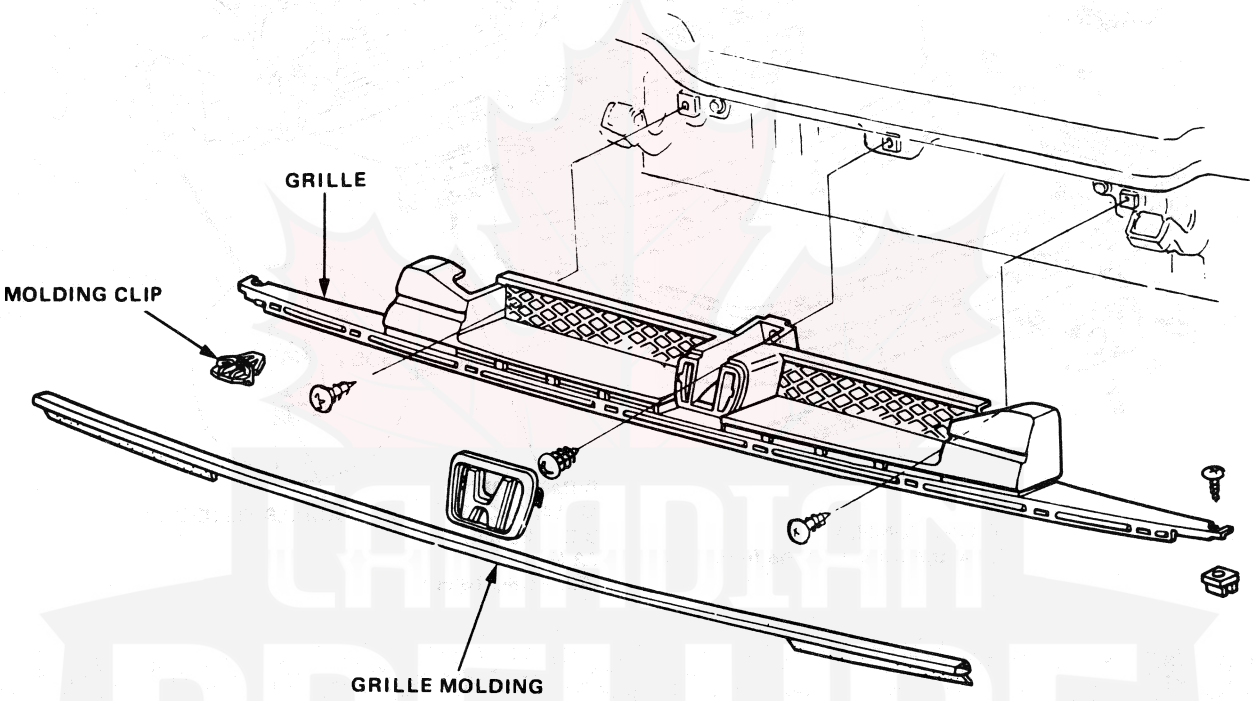
- **Make sure the dashboard fits onto the guide pin correctly.**
- **Before tightening the dashboard bolts, make sure the instrument wire harness is not pinched.**

Grille and Rear Molding

Replacement

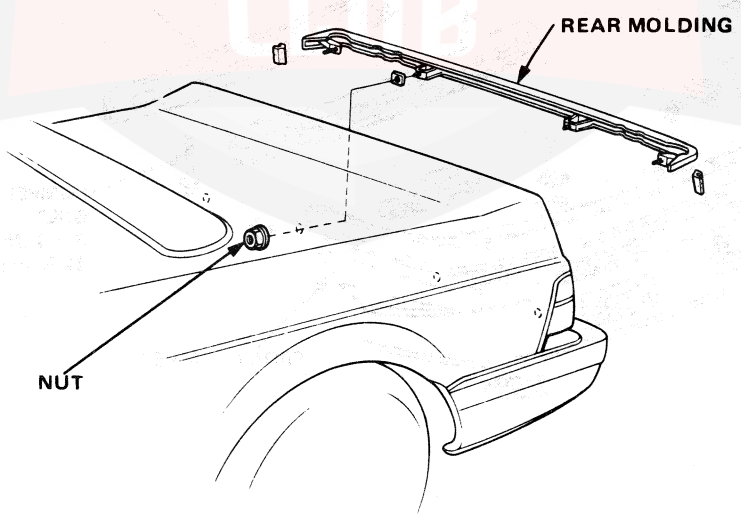
1. Raise the headlights, and remove the 2 screws on both sides.
2. Remove the 3 screws on the grille front.
3. Remove the grille molding by sliding it to the side.

   NOTE: Before re-installation, make sure the molding clips are installed in the grille.



4. Remove the rear molding by removing the 4 nuts on the inside of the trunk.

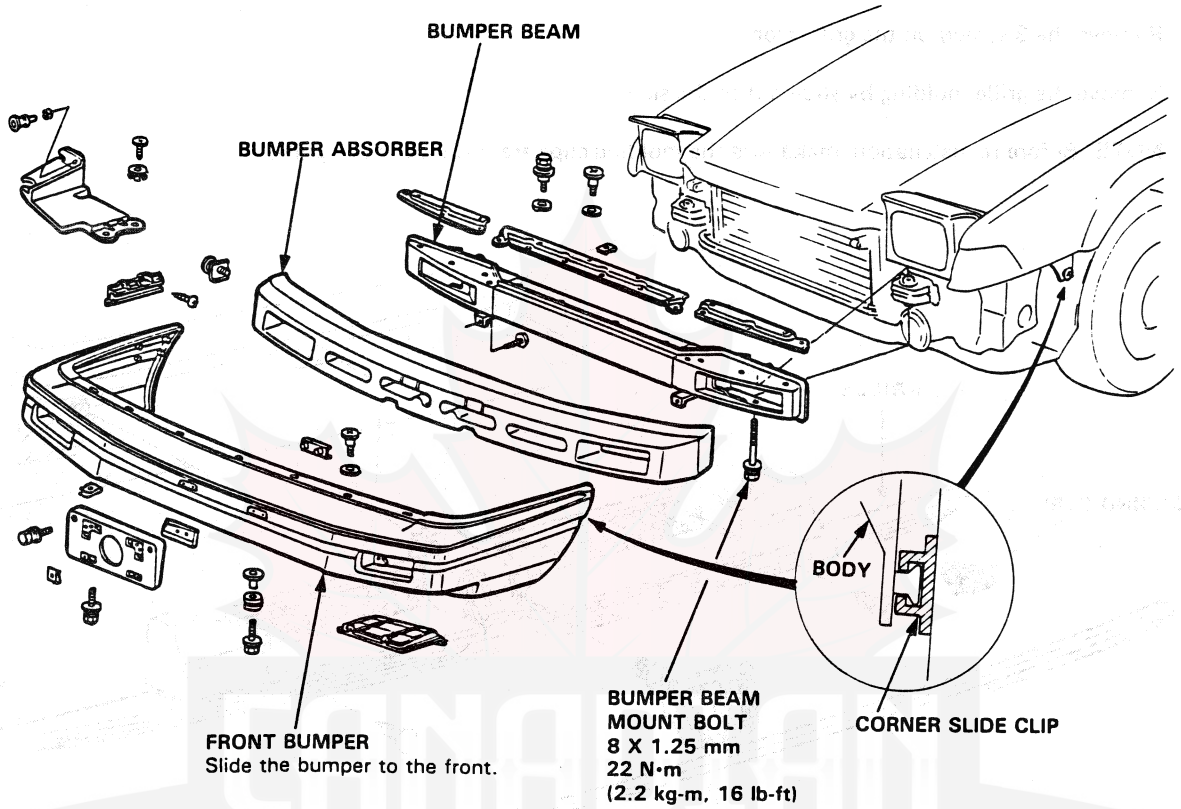
   NOTE: You must remove the trunk side garnish (page 22-21) to remove the rear molding's outer nuts.



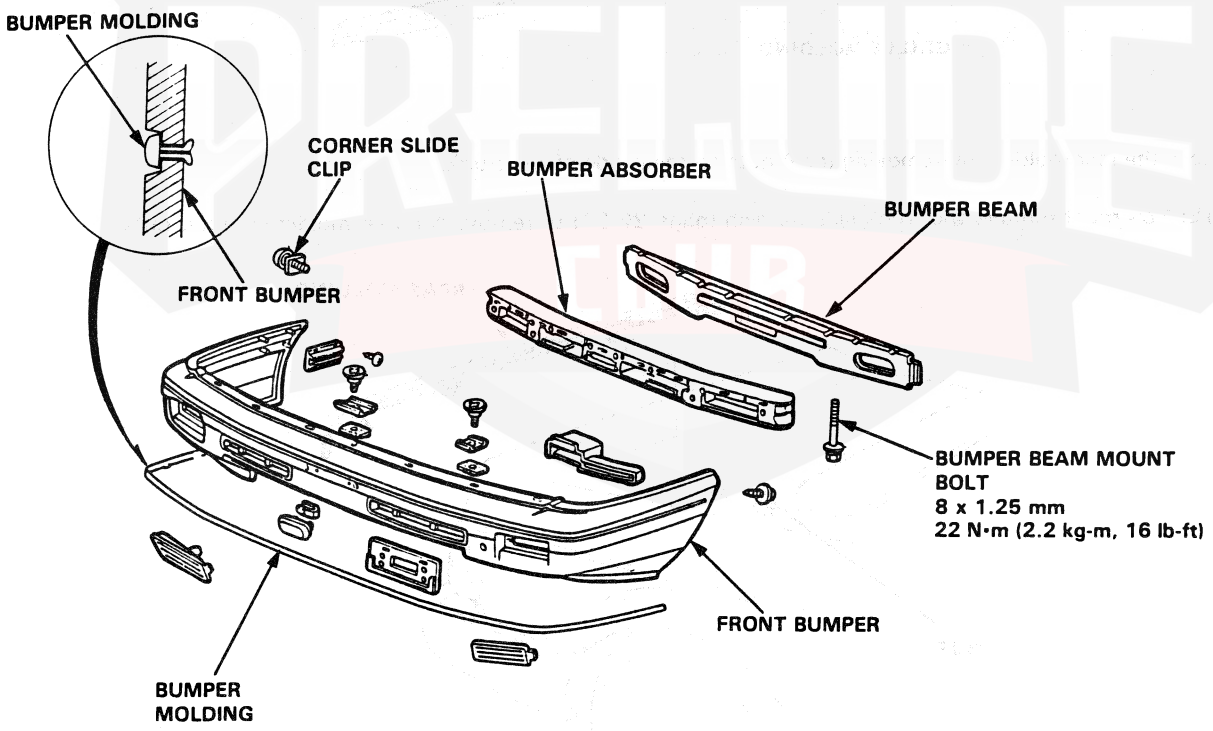
Front Bumper

Replacement

Si:



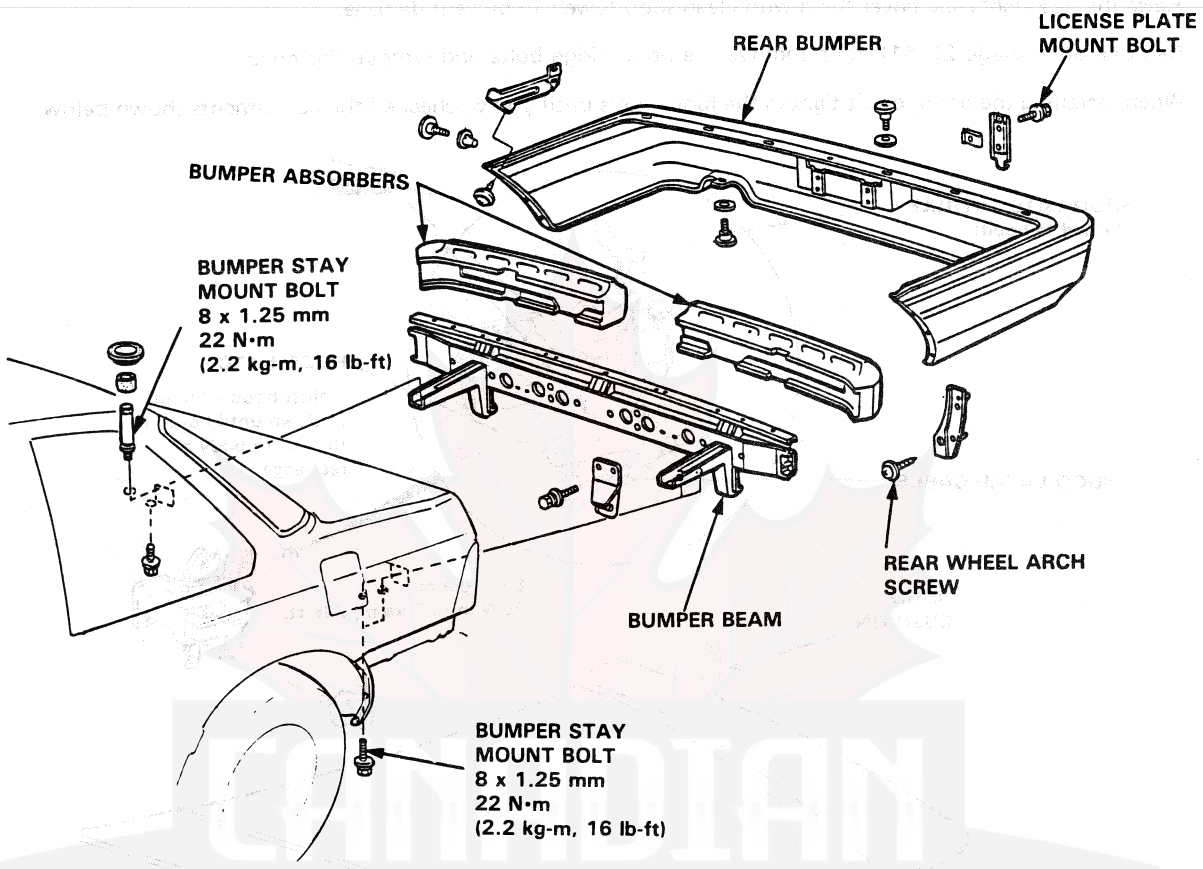
Dx:



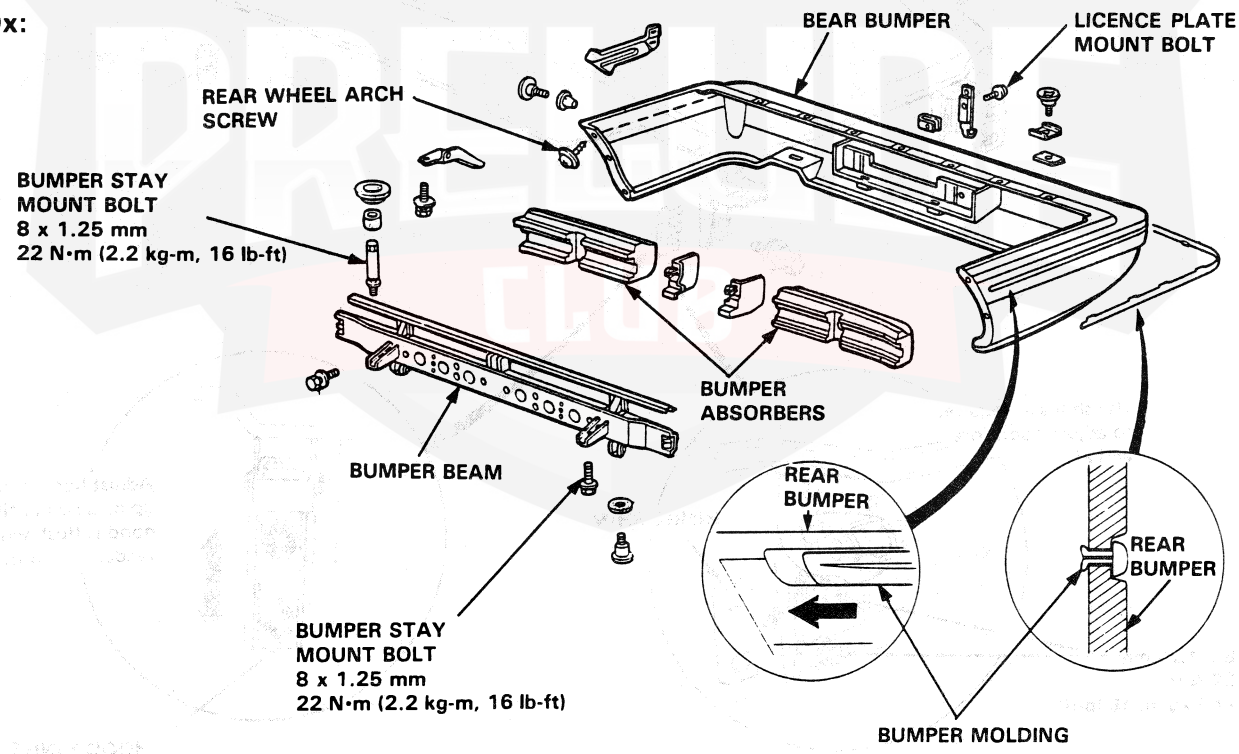
Rear Bumper

Replacement

Si:



Dx:

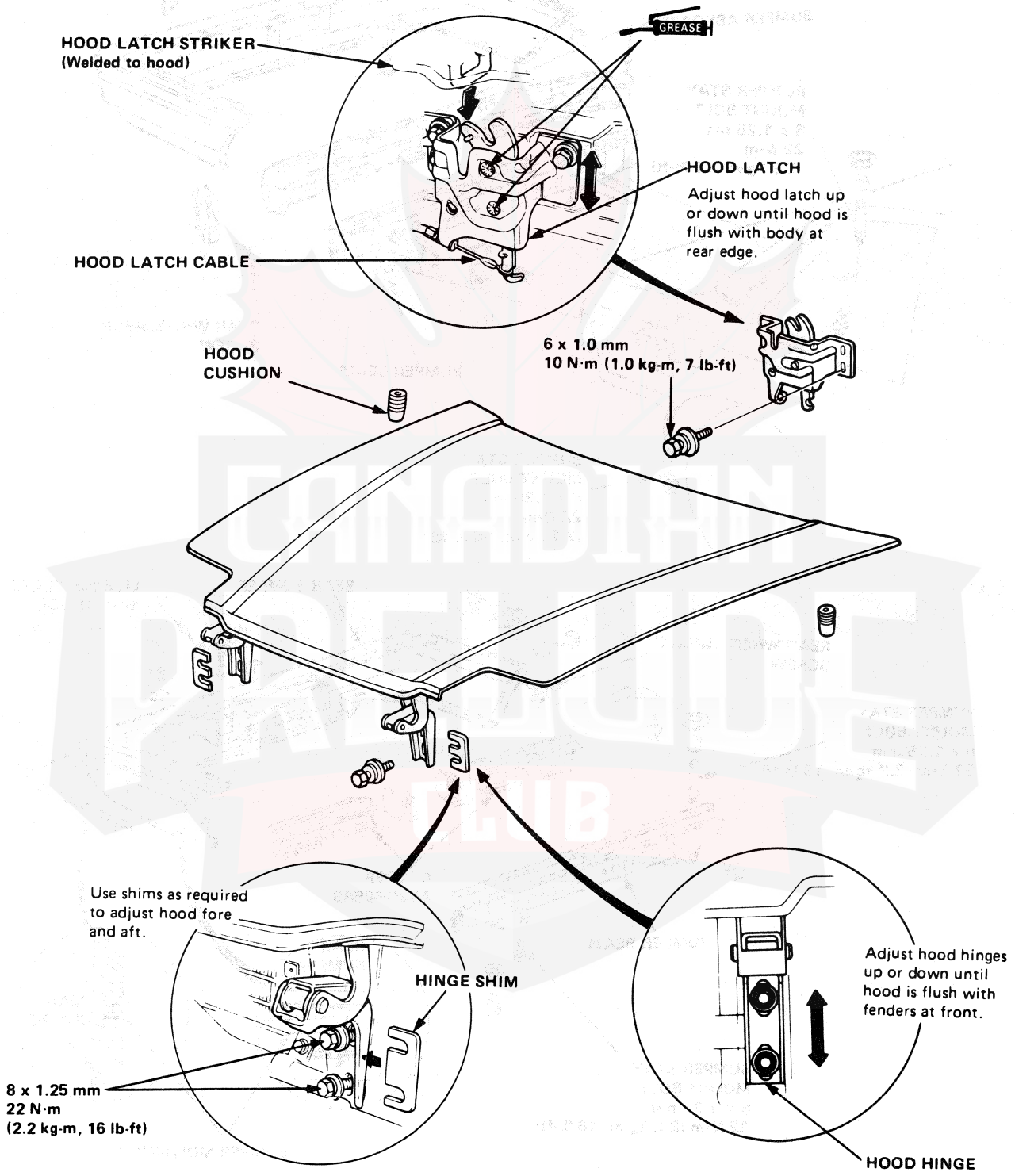


NOTE: Use new rear wheel arch clips when reinstalling the bumper.

Hood

Replacement

1. Raise the headlights and cover them with clean shop towels to prevent damage.
2. Remove grille (page 22-41), then remove the hood hinge bolts and remove the hood.
3. When installing the hood, don't tighten the hinge bolts until you've checked the adjustments shown below.



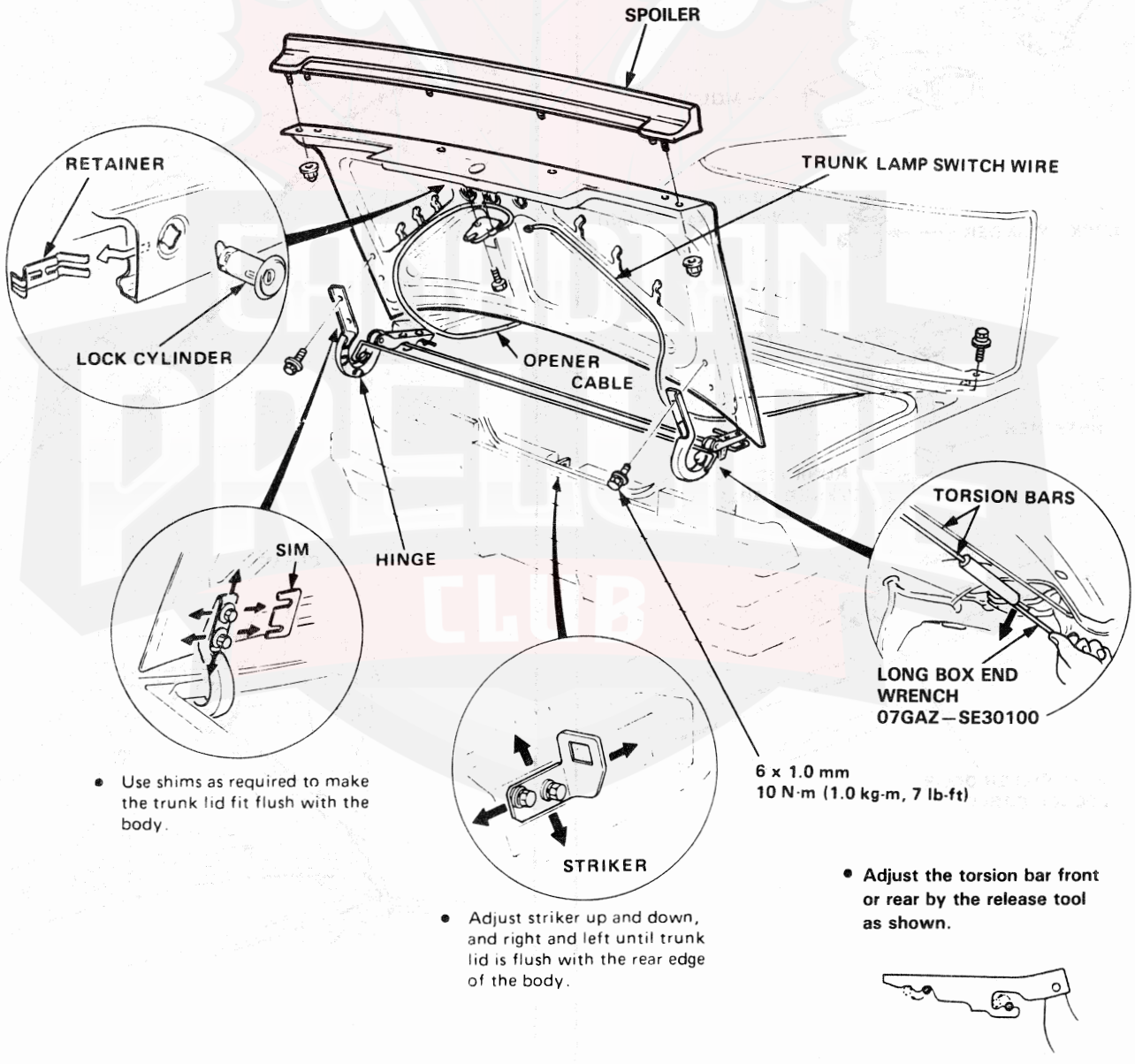
Trunk Lid

Replacement

1. Remove the trunk lid hinge bolts, then lift off the lid.
2. Remove the torsion bars by hand.

   CAUTION: The torsion bars are under spring tension.

   NOTE: Use a long box end wrench, as shown, to help lever the bars out of their mounts.
3. Remove the latch and lock cylinder, then disconnect the wire harness and cable.
4. Remove the rear shelf (page 22-21).
5. Remove the hinge bracket mounting bolts, then remove the hinges from the trunk.
6. Before tightening the hinge bolts, check the adjustments shown below:

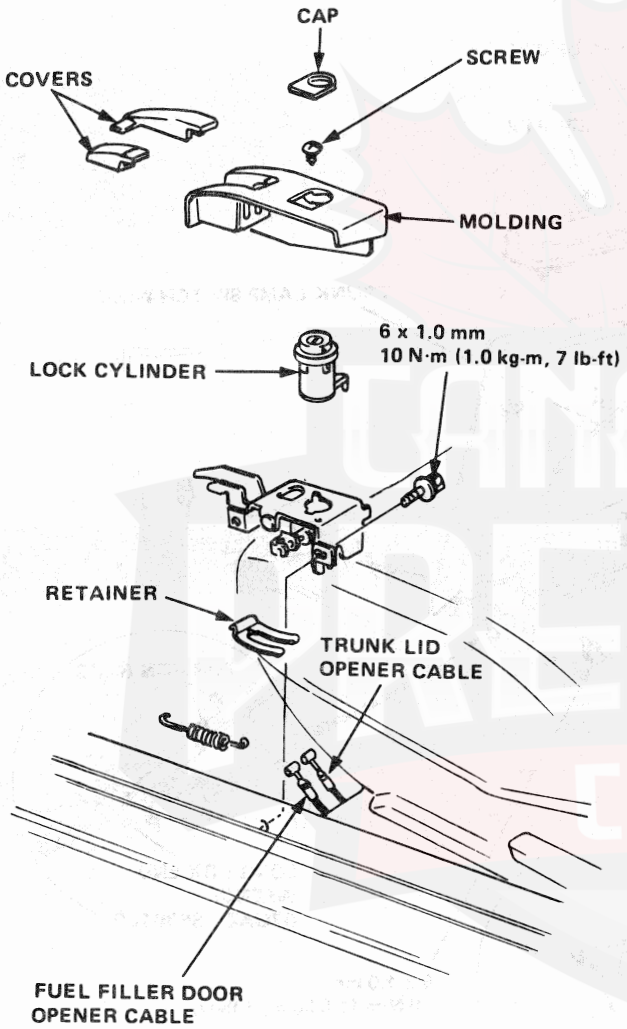


- Use shims as required to make the trunk lid fit flush with the body.
- Adjust striker up and down, and right and left until trunk lid is flush with the rear edge of the body.
- **Adjust the torsion bar front or rear by the release tool as shown.**

Trunk Lid Opener

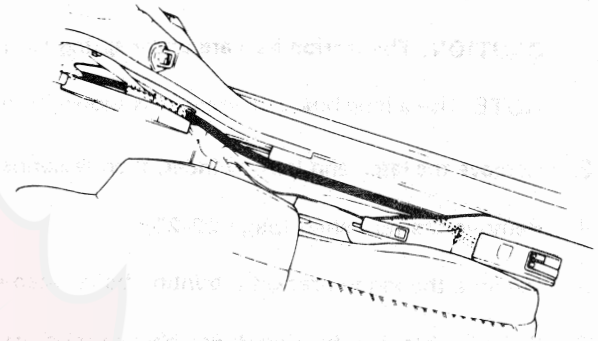
Replacement

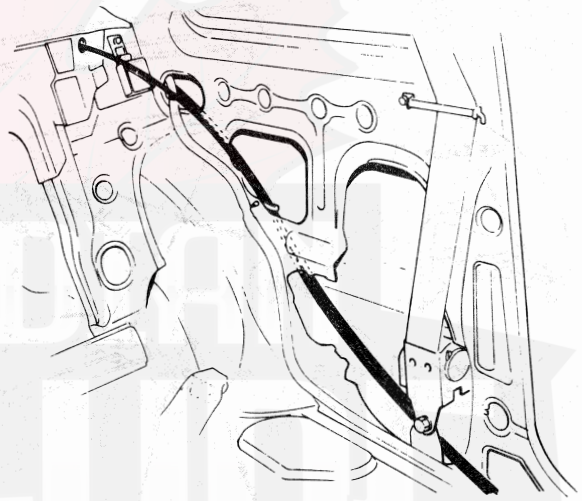
1. Lift up the opener slightly, then pry the cover off the handle.
2. Pry out the cap in the top of the molding, then remove the screw under it and remove the molding.
3. Remove the opener by removing two bolts in the door sill, and disconnecting the cable.
4. Remove the retainer, then remove the lock cylinder.

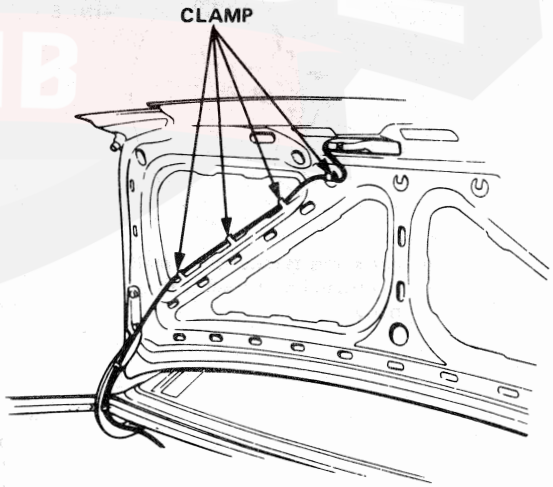


Opener Cable Routing

Route the cable as shown below.





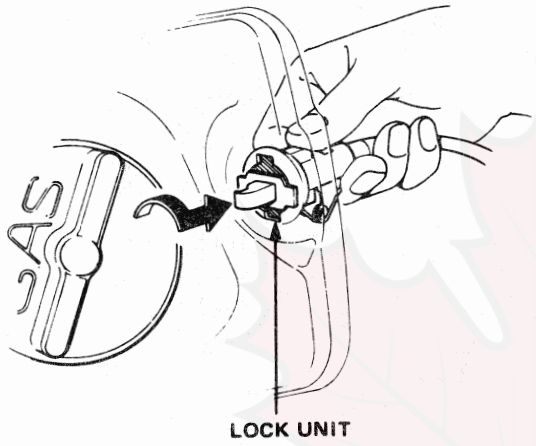


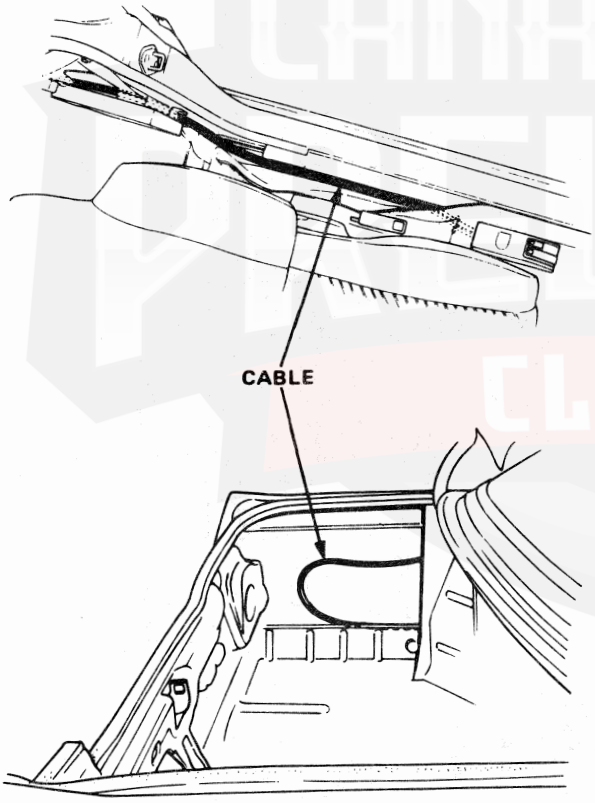
Fuel Door Opener, Rear Spoiler

Fuel Door Opener Replacement

1. Remove the opener and cable, using the same procedure described for removing the trunk lid opener (page 22-46).

2. Remove the trunk side garnish, and turn the lock unit in the arrow direction shown to remove it.

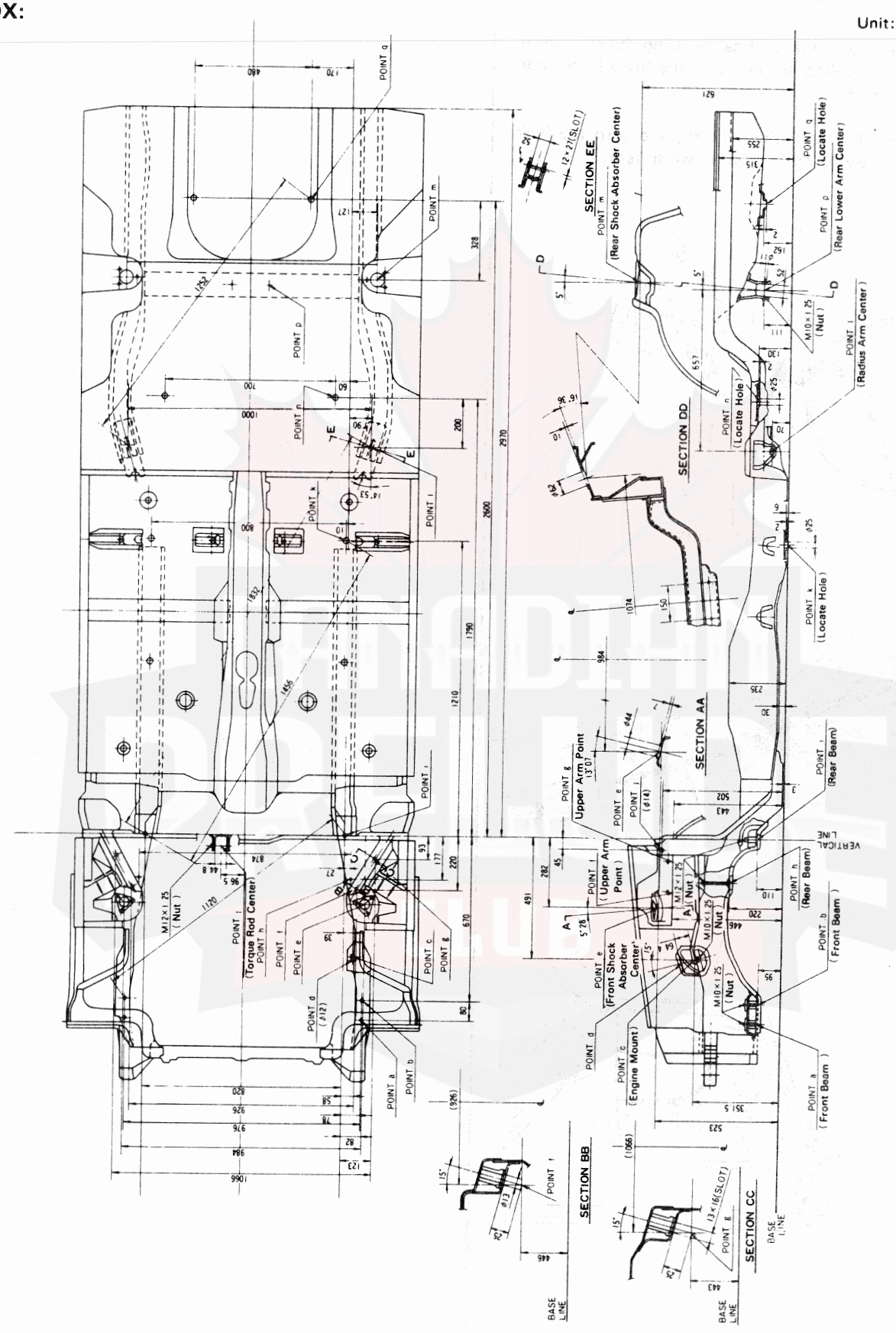




Frame Repair Chart

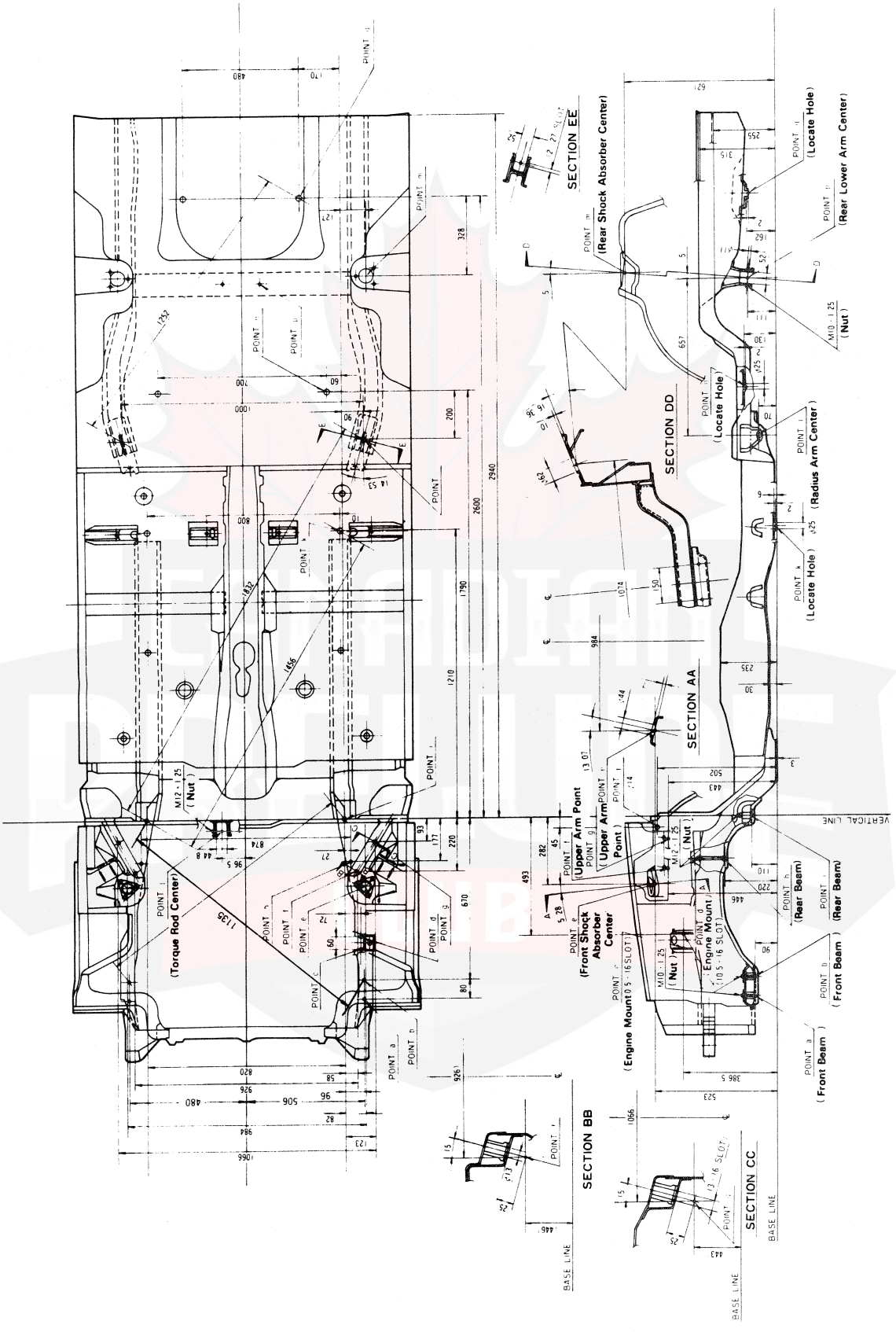
DX:

Unit: mm

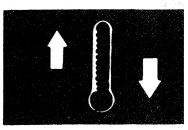


Si:

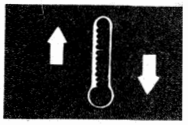
Unit: mm



Heater and Air Conditioner

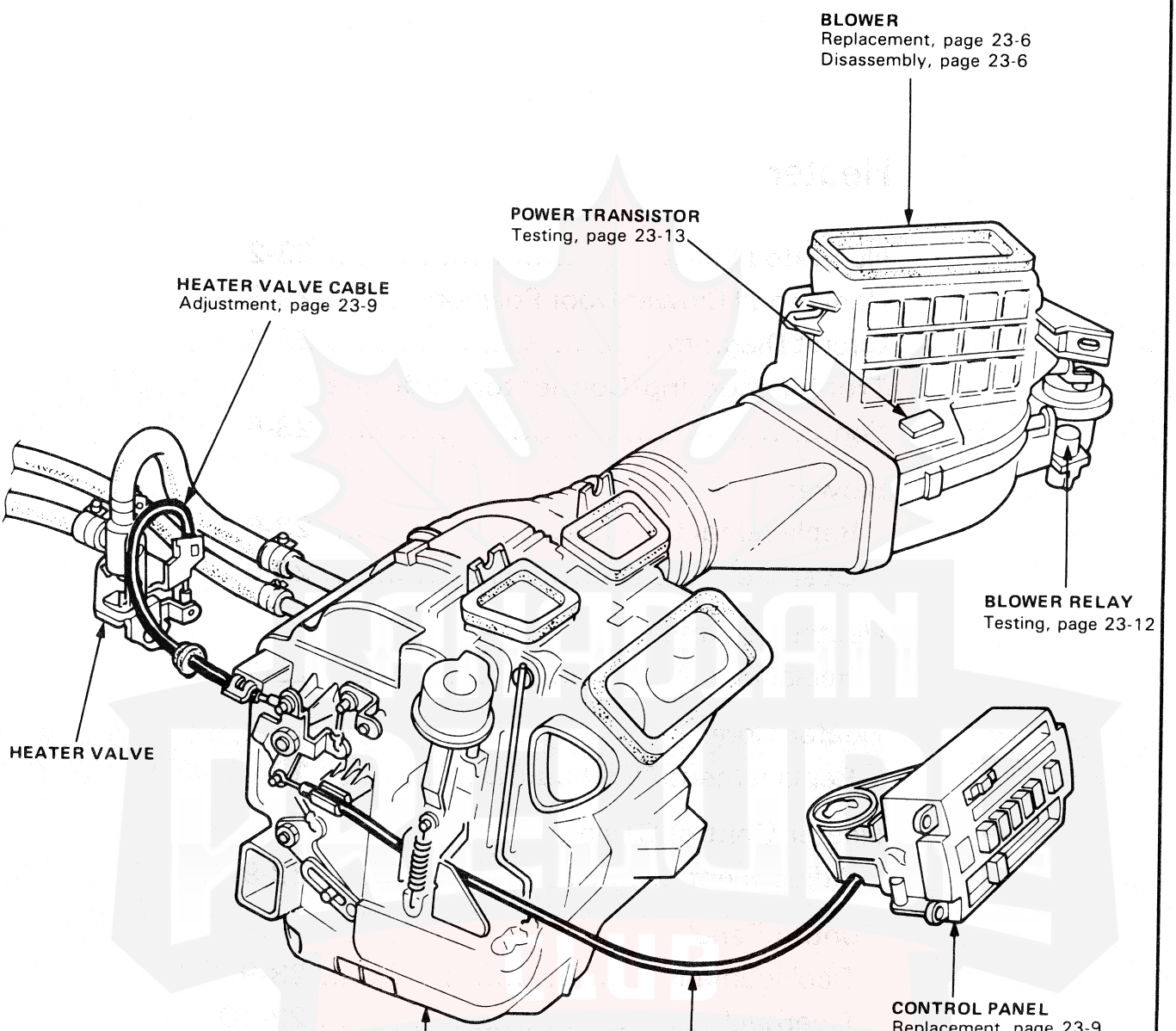


Heater



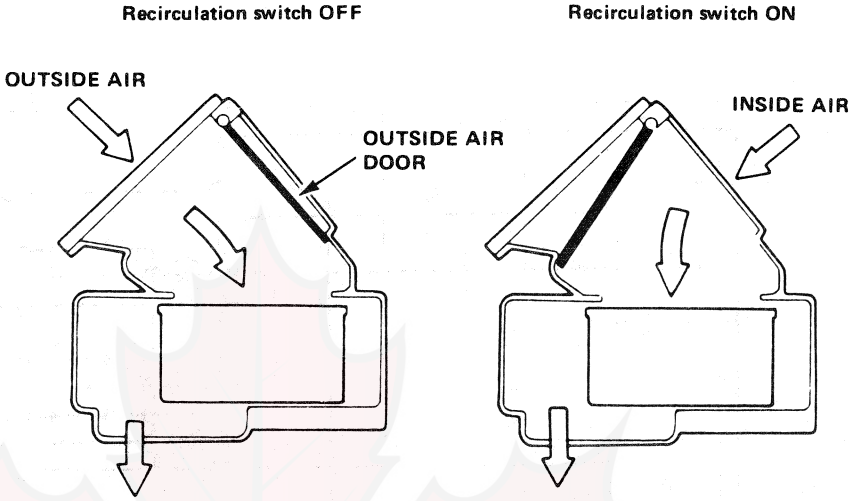
Heater

Index



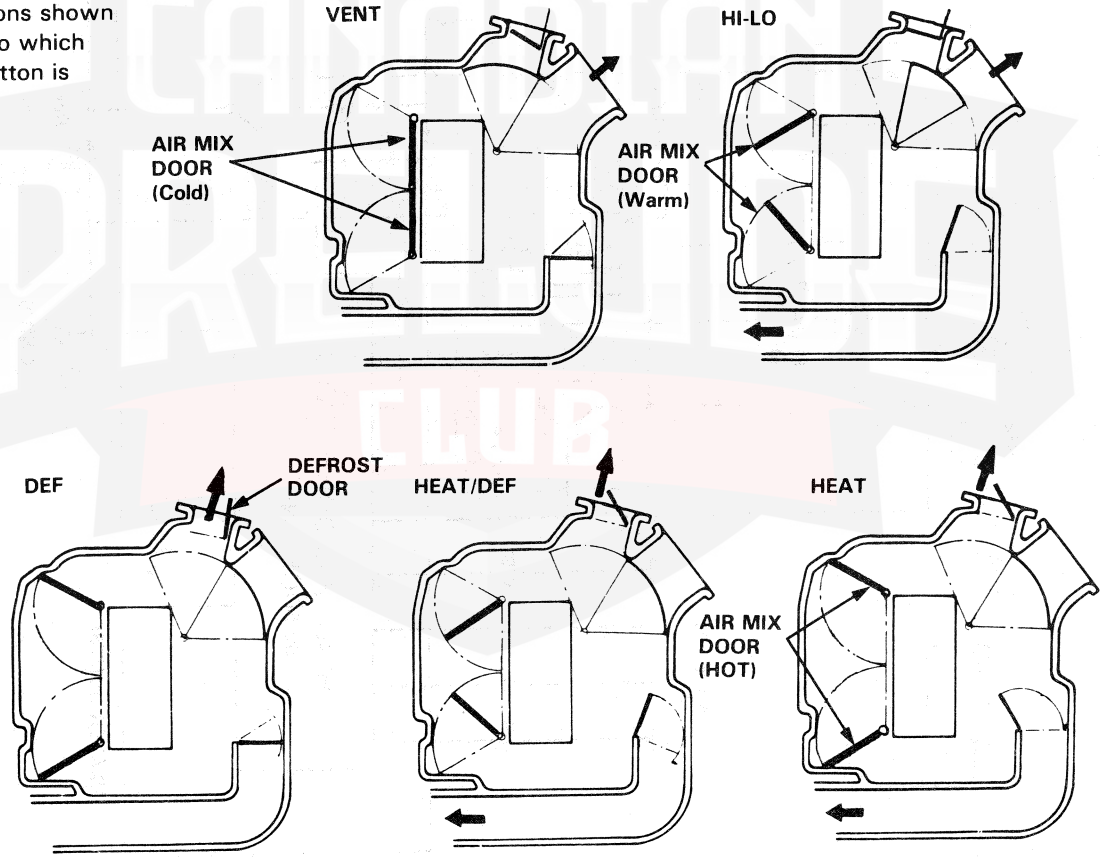
Heater and Blower Door Positions

Blower



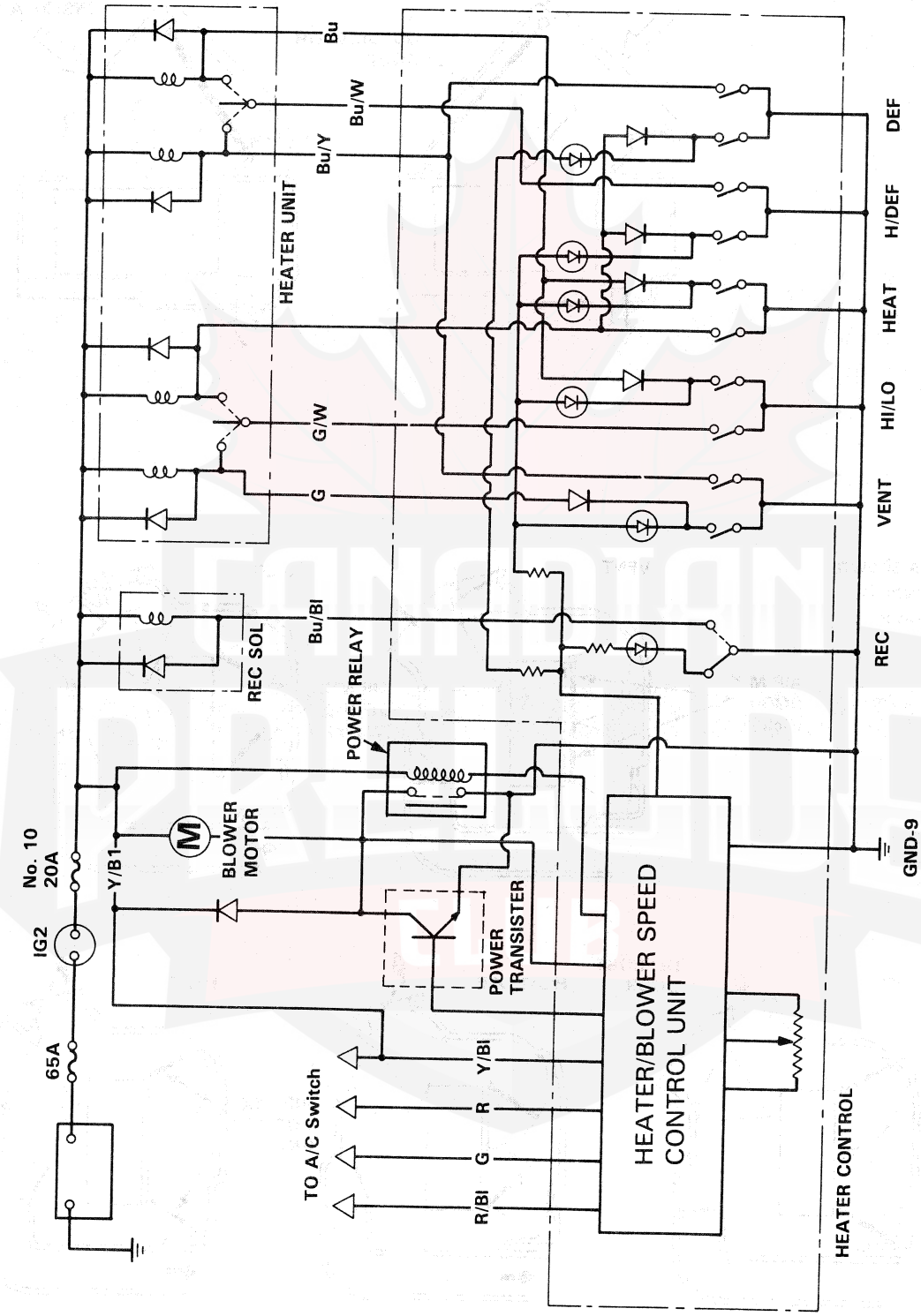
Heater

Door positions shown according to which function button is pushed.



NOTE: This diagram shows the air mix doors in the most appropriate position for each heater control position. The position of the air mix door is controlled by the TEMP lever and is independent of the heater control position.

Circuit Diagram



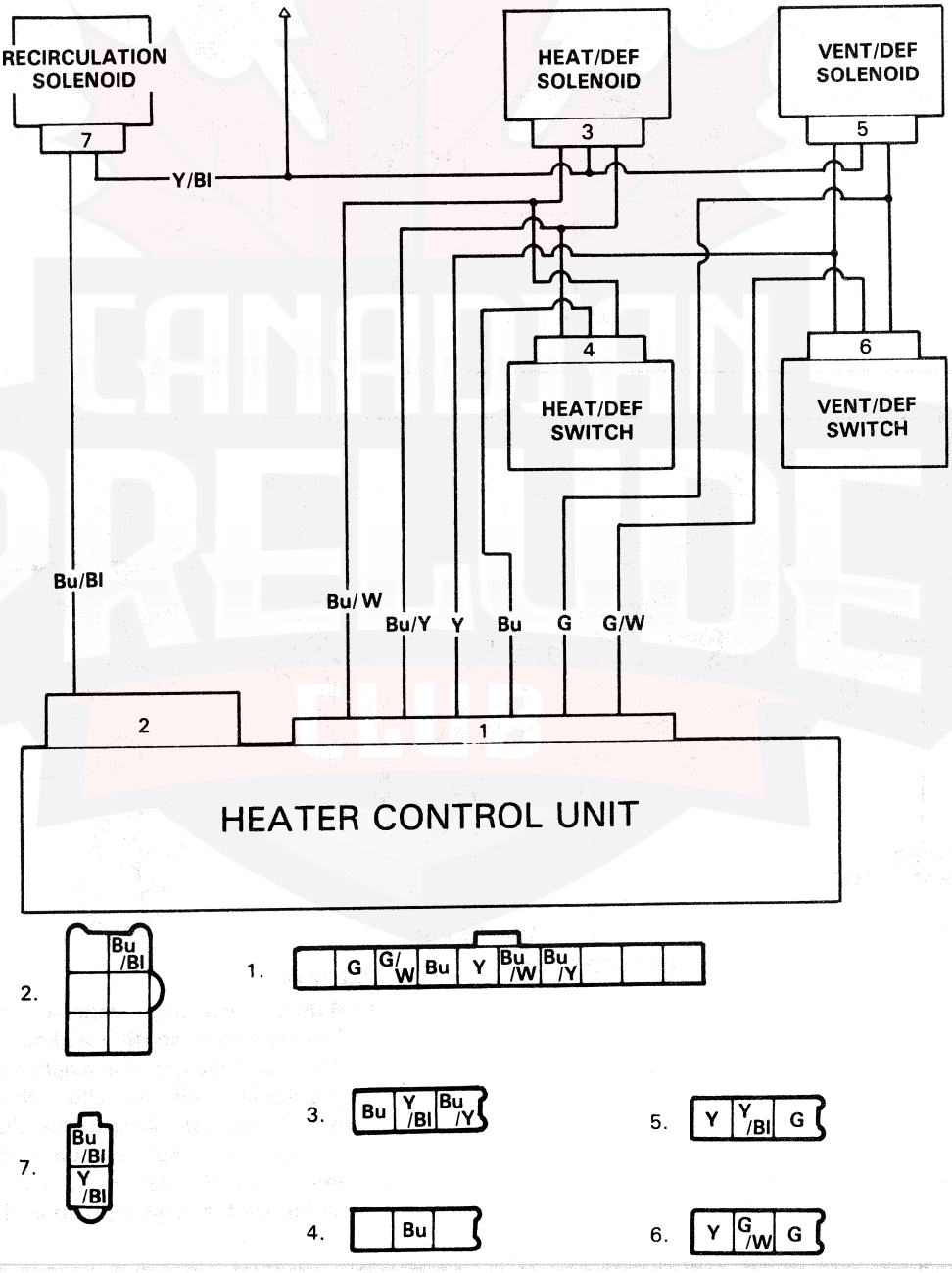
Troublshooting/Connector Information

1. Control panel switch Test. page 23-10

2. Heater unit/Blower unit Test:

   - HEAT/DEF,, VENT/DEF Solenoid. page 23-11
   - Diaphragm. page 23-12
   - Vent/Heat/Defrost Switches. page 23-12
   - Recirculation, solenoid. page 23-11
   - Blower relay. page 23-12

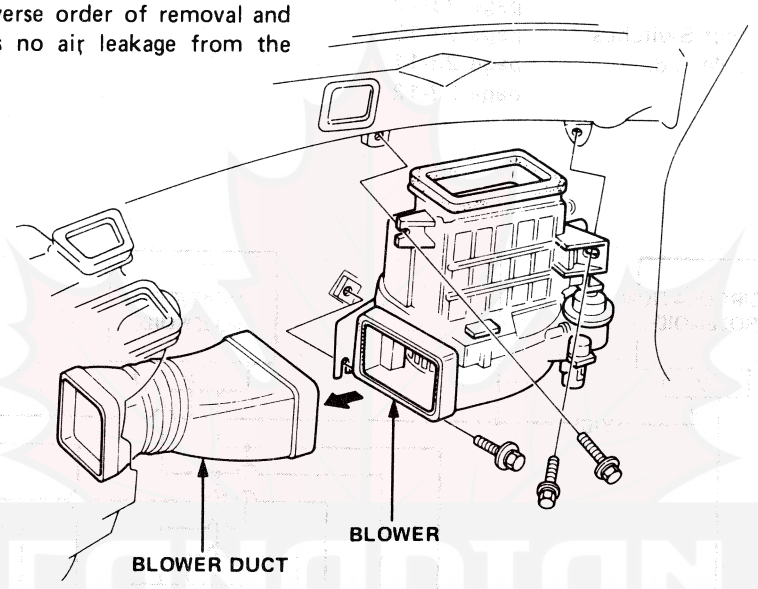
3. Wire harness.



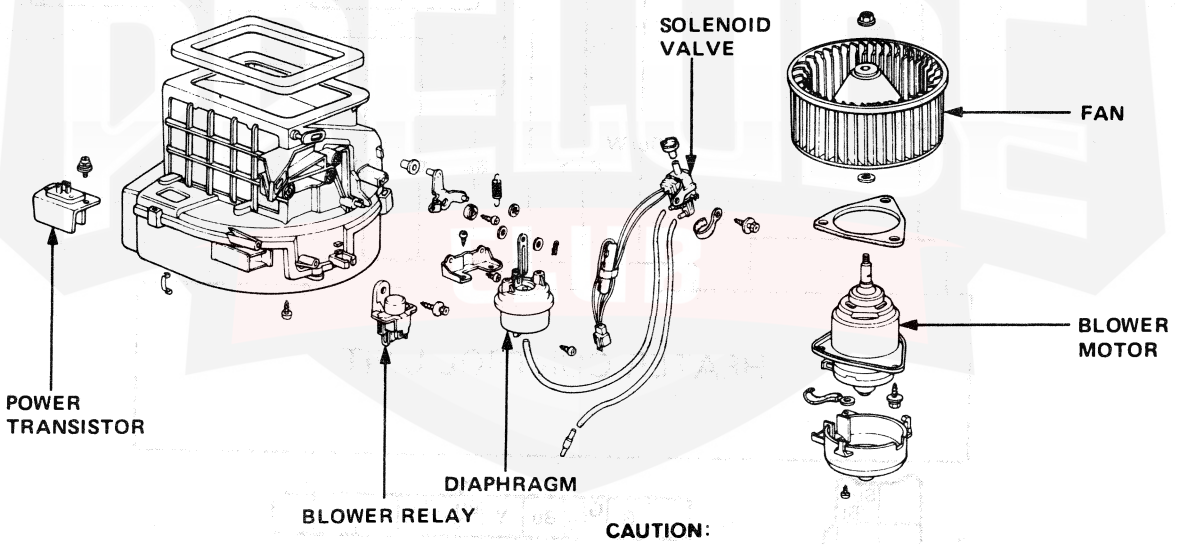
Blower

Replacement

1. Remove the glove box.
2. Remove the blower duct. If the car has air conditioning, the evaporator does not have to be removed.
3. Disconnect the wire connector and vacuum hose from the blower.
4. Remove the three mounting bolts from the blower.
5. Remove the blower.
6. Install the blower in reverse order of removal and make sure that there is no air leakage from the mating surfaces.



Overhaul



CAUTION:

- Before reassembly, make sure the air door and linkage move smoothly without binding.
- When re-attaching the diaphragm, make sure its positioning will not allow the air door to be pulled too far. Attach the diaphragm and all linkage, then apply vacuum and watch the door movement. If necessary, loosen the holding screw and move the diaphragm up or down.

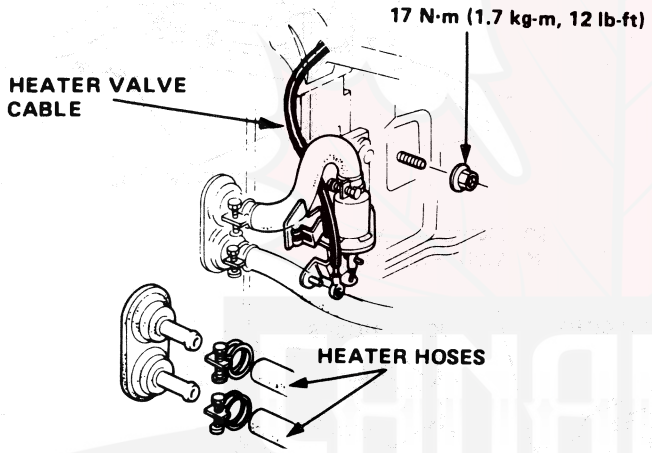
Heater Assembly

Replacement

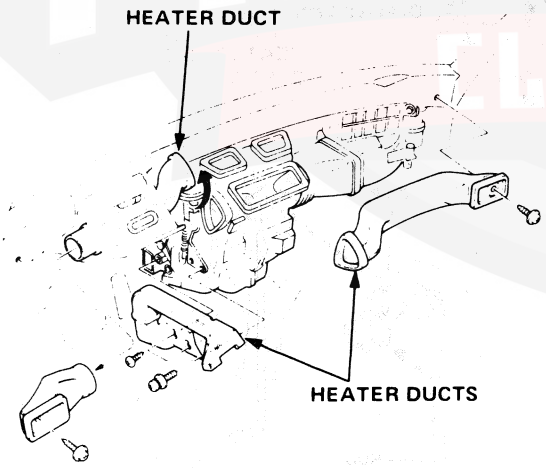
NOTE: For replacement of the heater core only, see page 23-8.

1. Drain coolant at the radiator.
2. Disconnect the heater hoses at the firewall.

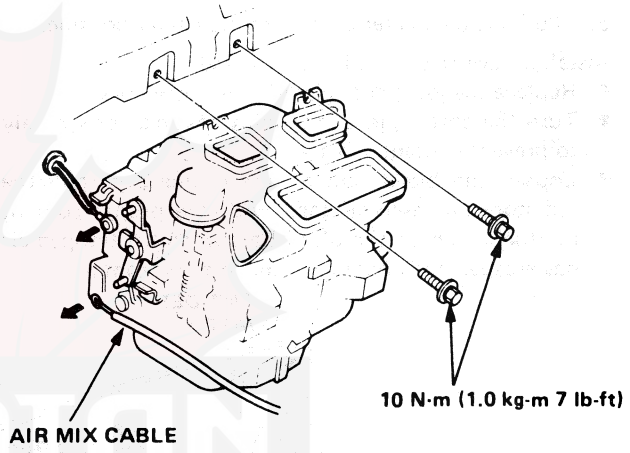
   NOTE: Coolant will run out when the hoses are disconnected; drain it into a clean drip pan.
3. Disconnect the heater valve cable from the heater valve.
4. Remove the heater lower mounting nut.



5. Remove the dashboard.
6. Remove the heater ducts.



7. Disconnect the air mix cable from the heater.
8. Disconnect the heater sub harness from the heater wire harness.
9. Disconnect the vacuum hose at the tube joint.
10. Remove the heater mounting bolts (2), then pull the heater away from the body and remove it.



Install in reverse order of removal, and:

- Apply a sealant to the grommets.
- Do not interchange the inlet and outlet hoses. Make sure that 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 trapped air has escaped and coolant begins to flow from it.
- Connect all cables so they are properly adjusted (see pages 23-9, 10).

Heater Core

Replacement/Overhaul

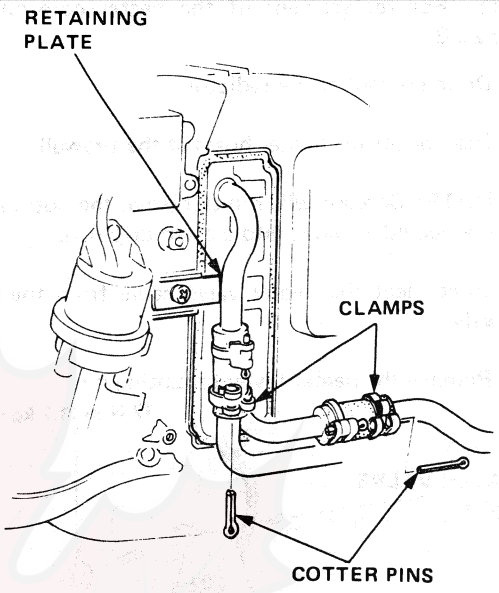
Heater Core Replacement

NOTE: The heater core can be removed without removing the heater.

1. Drain coolant at the radiator.
2. Remove the heater pipe cover and heater pipe clamp.
3. Remove the heater core retaining plate.
4. Pull out the cotter pin of the joint hose clamp and separate the heater pipes.

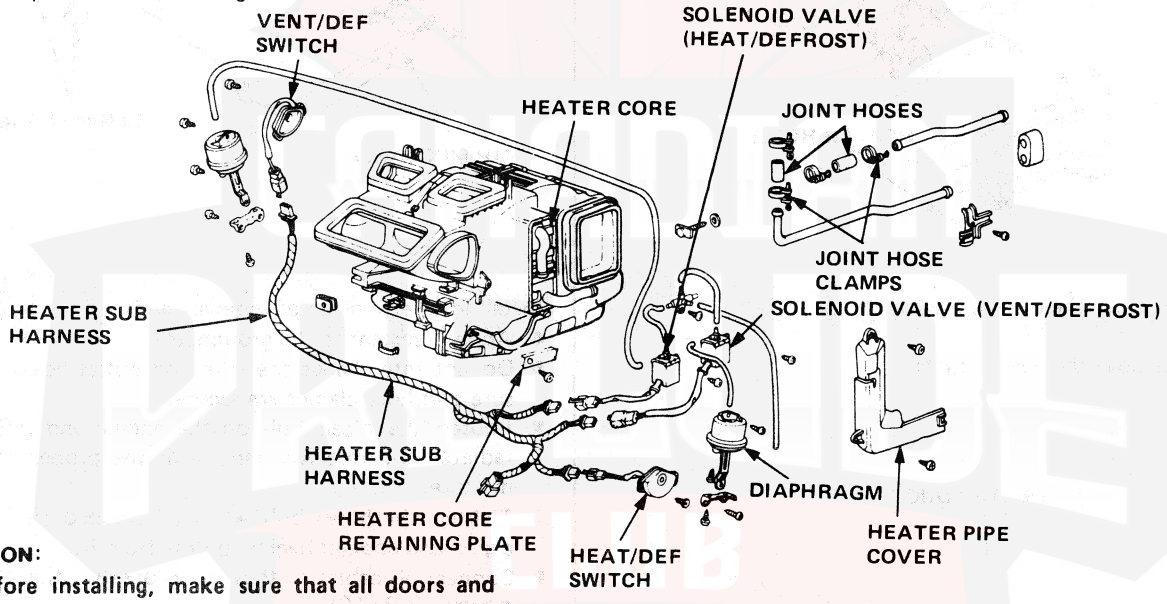
   NOTE: Coolant will run out when the heater pipes are disconnected; drain it into a clean drip pan.

5. Pull out the heater core from the heater housing.



Install in reverse order of removal, and:

- Replace the joint hose clamps with new ones.
- Turn the cotter pin of the joint hose clamps securely to prevent coolant leakage.
- Loosen the bleed bolt on the engine and refill the radiator and reservoir tank with the proper coolant mixture. Tighten the bleed bolt when the trapped air has escaped and coolant begins to flow from it.

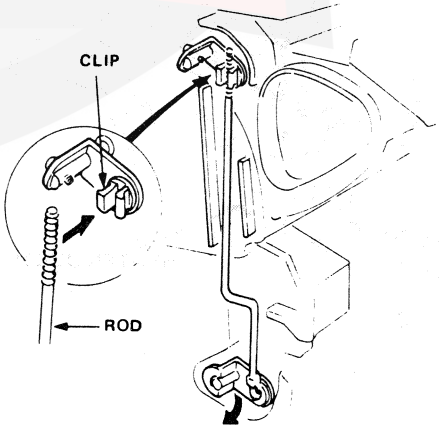


CAUTION:

- **Before installing, make sure that all doors and links move smoothly.**
- **When re-attaching the diaphragm, make sure its positioning will not allow the air doors to be pulled too far. Attach the diaphragm and all linkages, then apply vacuum and watch the door move. If necessary, loosen the holding screw and move the diaphragm up or down.**

Defroster Shutter Adjustment

1. Move the ROOM/DEF door to DEF position by using hand vacuum pump.
2. Open the defroster shutter fully.
3. Insert the control rod into the clip.

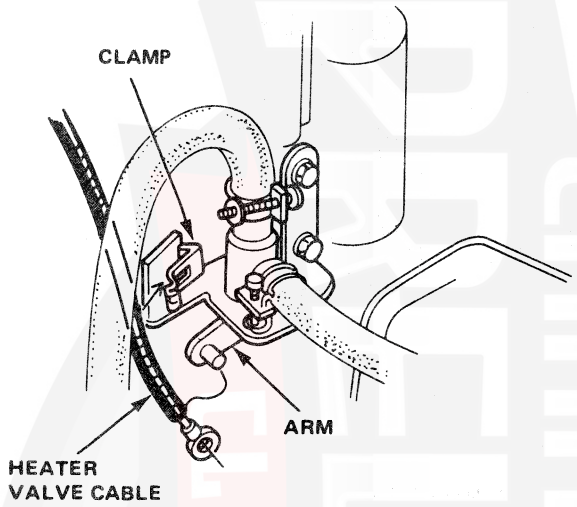


Heater Control Cable

Adjustment

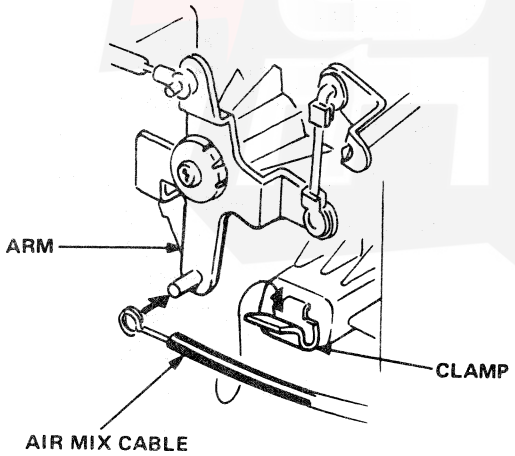
Heater Valve Cable

1. Slide temperature control lever to COLD.
2. Close the heater valve fully, then connect the end of the heater valve cable to the valve arm, and secure the cable housing with the clamp as shown.



Air Mix Cable

1. Slide temperature control lever to HOT.
2. Open air mix door in front of heater core, then connect end of cable to arm. Gently slide cable housing back from end – enough to take up any slack in the cable, but not enough to make dashboard lever move – then snap housing into clamp.

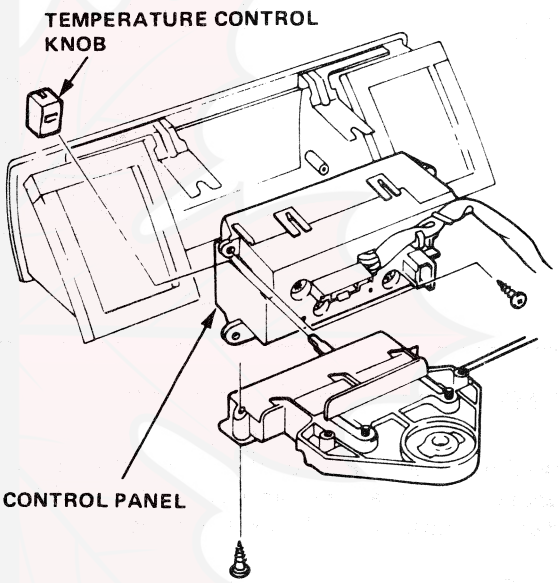


NOTE: Heater valve cable should be adjusted if the air mix cable has been disconnected.

Control Panel

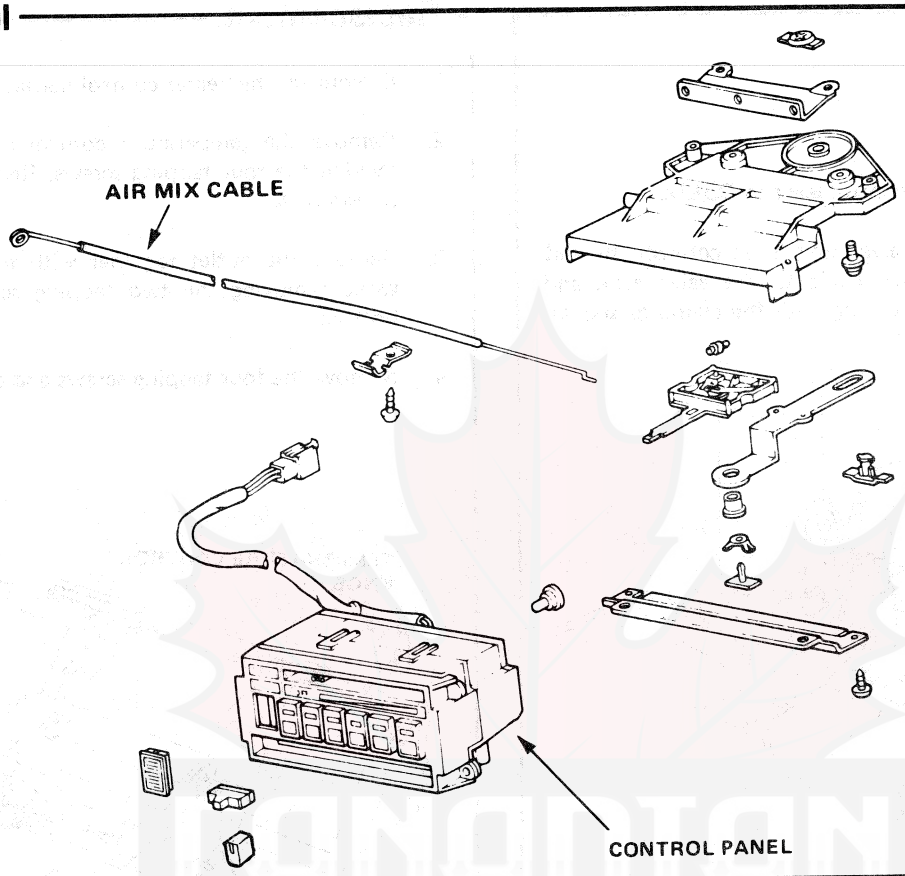
Replacement

1. Disconnect the heater control harness.
2. Remove the temperature control assembly by removing the four tapping screws. Remove the lower screws first.
3. Remove the outlet together with the control unit while removing the two tapping screws from the bottom.
4. Remove the four tapping screws and control unit.



Heater Control Panel

Overhaul



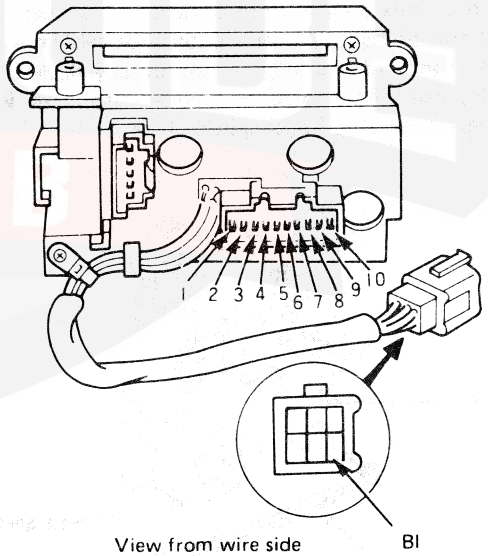
Test

Using the chart below for the pin location, check for continuity between the pin marked "○" and BI lead when the respective mode switch is pushed in.

NOTE:

- Connect the ohmmeter positive probe to the black lead of the connector.
- For the recirculation switch only, there is continuity when the switch is **not** pushed in.

	1	2	3	4	5	6	7	8	9	10
VENT		○					○			
HI-LO			○	○						
HEAT				○	○					
H/DEF					○	○				
					○		○			
REC								○		



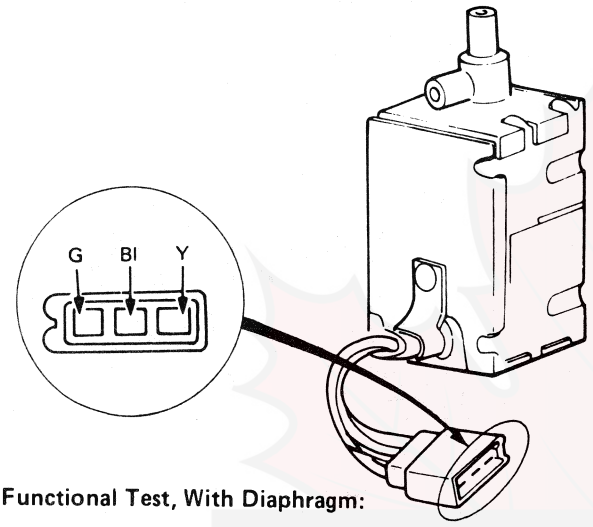
Test

Solenoid Valve Test

HEAT/DEF., VENT/DEF. Solenoid

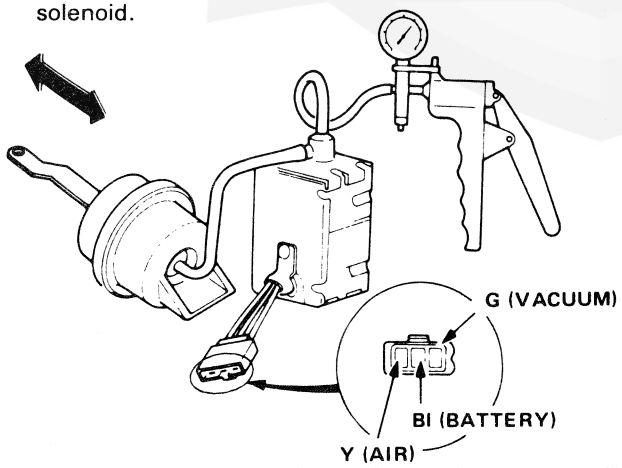
Continuity Test:

Check for continuity between the G and BI, BI and Y and Y and G terminals.



Functional Test, With Diaphragm:

1. Connect the diaphragm to the solenoid.
2. Draw vacuum.
3. Connect a lead from the battery positive terminal to the BI terminal of the solenoid and another lead from the battery negative terminal to the G terminal of the solenoid. The arm of the diaphragm should retract. If the arm remains steady, replace the solenoid.
4. Disconnect the battery. The arm should remain steady. If the arm moves, replace the solenoid.
5. Connect the battery positive lead to the BI terminal, and the negative lead to the Y terminal of the solenoid. The arm of the diaphragm should be released. If the arm remains retracted, replace the solenoid.

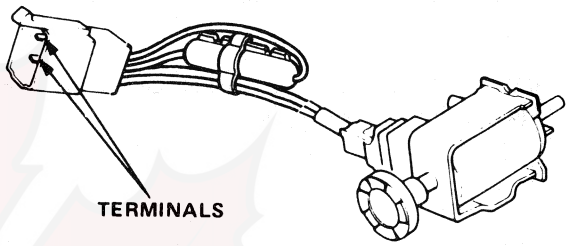


Recirculation Solenoid

Continuity Test:

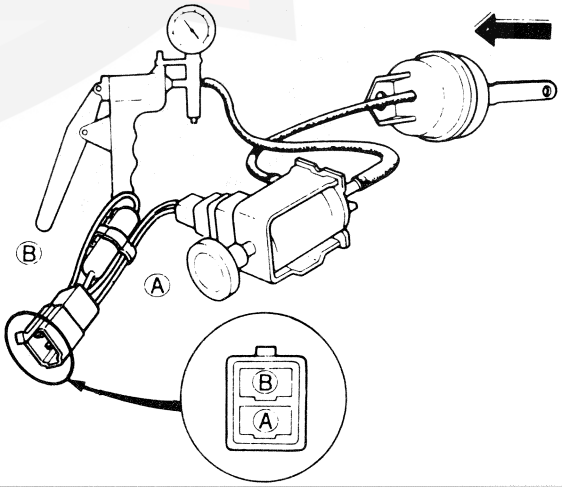
Check for continuity between the terminals.

Make sure the fuse is in good condition.



Functional Test, With Diaphragm:

1. Connect the diaphragm.
2. Draw vacuum.
3. Connect a lead from the battery positive terminal to the A terminal of the solenoid and another lead from the battery negative terminal to the B terminal of the solenoid. The arm of the diaphragm should retract. If the arm remains steady, replace the solenoid.
4. Disconnect the battery leads. The arm should be released. If the arm remains retracted, replace the solenoid.

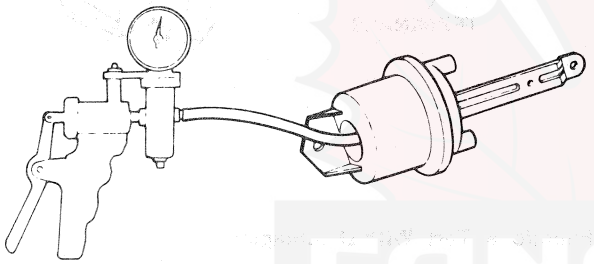


Test

Diaphragm Test

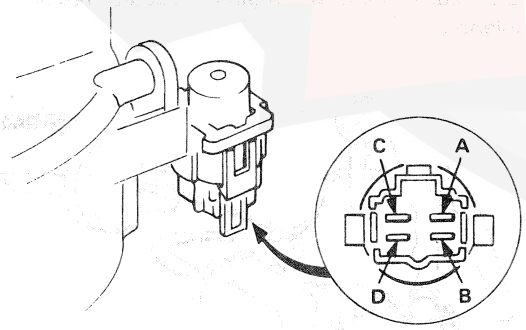
1. Connect a vacuum pump to the diaphragm as shown.
2. Draw vacuum. Vacuum should remain steady, and the linkage rod should move in.
   - If the diaphragm won't hold vacuum, or the rod doesn't move in, replace the diaphragm.
3. Release the diaphragm. The rod should return.
   - If the rod does not return fully, replace the diaphragm.

CAUTION: Don't move the linkage rod by hand. The diaphragm may be damaged.



Relay Test

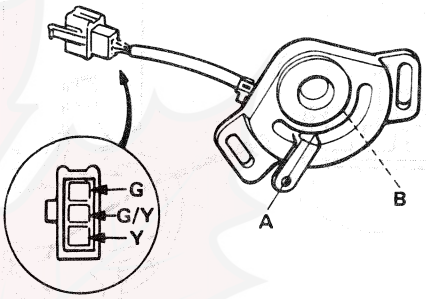
When the A terminal is connected to the battery positive terminal, and B terminal to the battery negative terminal, there should be continuity between the C and D terminals.
There should be no continuity with the battery disconnected.



Vent/heat/Defrost Switches

Check for continuity according to the table below.

	G	G/Y	Y
A		○——	——○
Neutral			
B	○——		——○



View from wire side

Power Transistor Test

NOTE: The power transistor cannot be tested with ordinary circuit testers. If the blower motor does not operate and you feel that the problem may be the power transistor, test as described below.

1. Check the blower motor and its wire harness.

   – If they are not OK, repair or replace as necessary, then retest.

   – If they are OK, go to step 2.

2. Disconnect the wire harness from the power transistor. Pull out the LG/BI lead from the connector and connect a 1.2–3.4 watt bulb as shown. Then, reconnect the wire harness to the transistor.

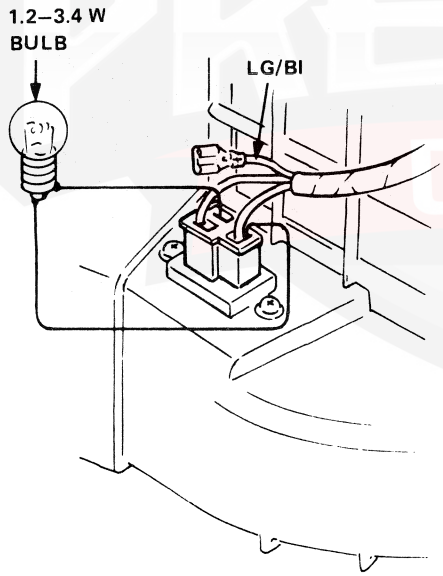
3. Turn the ignition on.

   – If the blower motor now operates, the controller is faulty. Replace it and retest.

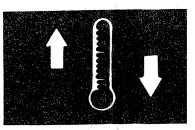
   – If the blower motor still does not operate, the power transistor is faulty. Replace it and retest.

CAUTION:

- **To avoid a loose or disconnected terminal, be careful not to damage the locking tab when disconnecting and connecting the terminal.**
- **Insulate the LG/BI lead terminal from the body until the testing is completed.**

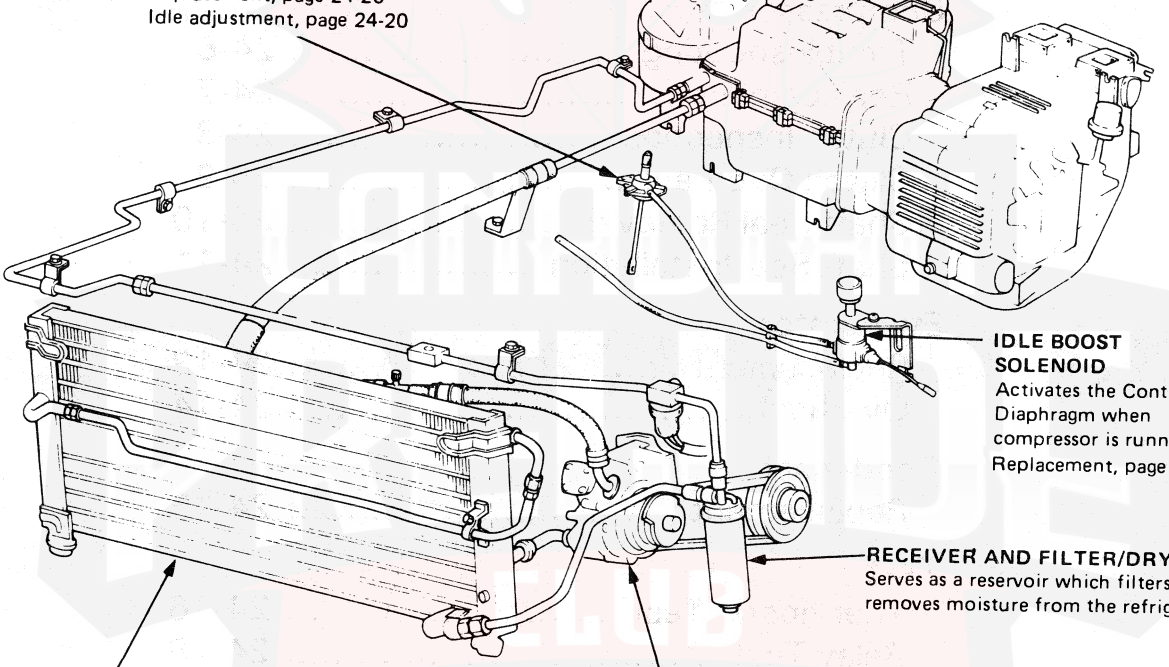


Air Conditioner



Air Conditioner

System Index



HEATER AND AIR CONDITIONING CONTROL PANEL
Activates compressor and controls heater and air conditioner air mix.
Removal, page 23-9

EVAPORATOR
As refrigerant circulates, heat is absorbed from the surrounding passenger compartment air.
Replacement, page 24-13
Overhaul, page 24-14

A/C CONTROL SWITCH
Test, page 24-16

BLOWER
Forces air thru the evaporator.
Removal, page 23-4

IDLE BOOST DIAPHRAGM
Increases the idle speed to compensate for RPM drop due to compressor load.
Replacement, page 24-20
Idle adjustment, page 24-20

IDLE BOOST SOLENOID
Activates the Control Diaphragm when compressor is running.
Replacement, page 24-20

RECEIVER AND FILTER/DRYER
Serves as a reservoir which filters and removes moisture from the refrigerant.

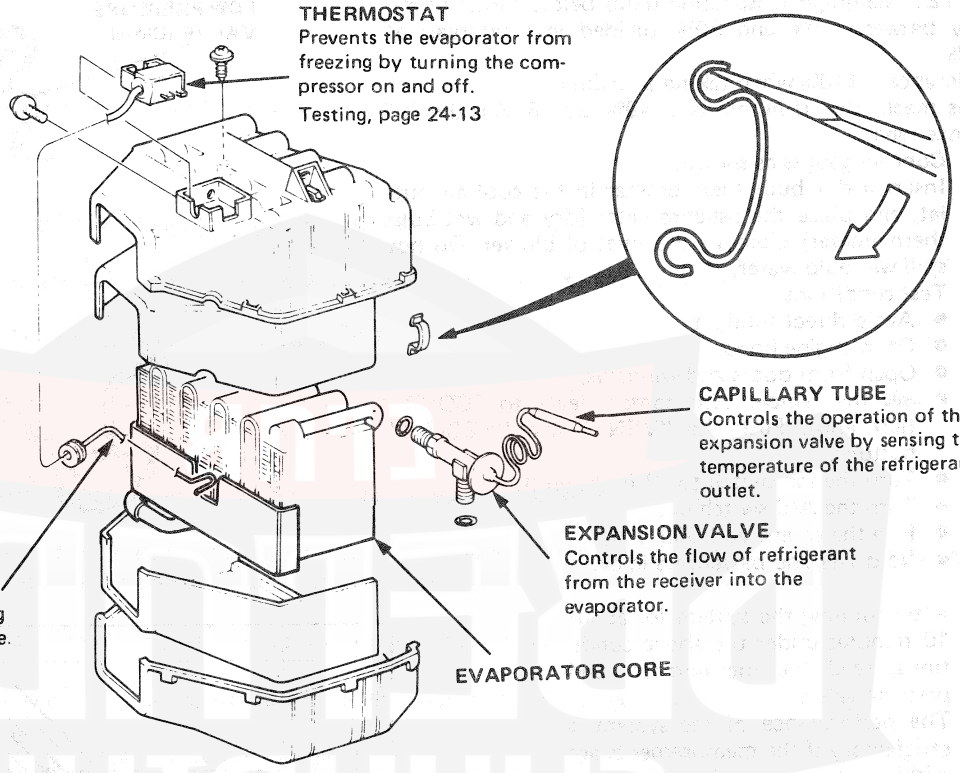
CONDENSER
Dissipates the heat which was absorbed by the refrigerant.
Replacement, page 24-15

COMPRESSOR
Compresses the refrigerant and then forces it thru the condenser.
Compressor troubleshooting, page 24-6
Compressor replacement, page 24-7

COMPRESSOR CLUTCH
Overhaul, page 24-9
Relay test, page 24-16

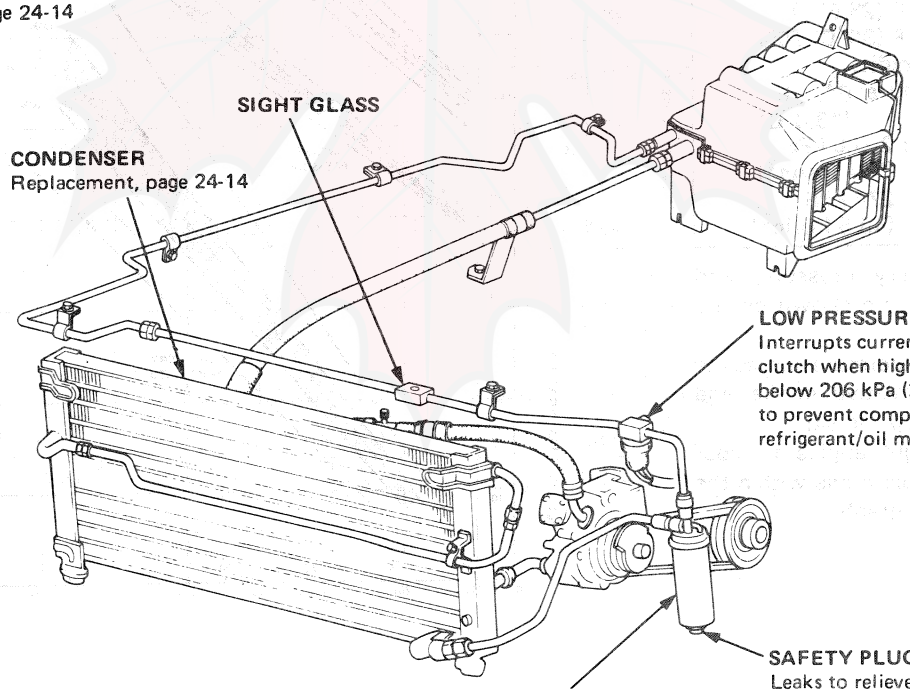
Evaporator

Replacement, page 24-10
Overhaul, page 24-11



Condenser

CHARGING and TESTING VALVES
System charging, page 24-16
Pressure testing, page 24-14



Compressor

Troubleshooting

TEST RESULTS	RELATED SYMPTOMS	PROBABLE CASE	REMEDY
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 195 kPa (2 kg/cm^2, 28 psi) quickly, and then falls gradually.	Air in system.	Evacuate system; then recharge. Evacuation: page 24-18. Recharging: page 24-19.
	Pressure does not return to normal when condenser is cooled by water.	Excessive refrigerant in system.	Discharge refrigerant as required.
	Reduced air flow through condenser	• Clogged condenser or radiator fins. • Radiator and air conditioner fans not working properly.	• Clean. • Check voltage and fan rpm.
	Line to condenser is excessively hot.	Restricted flow of refrigerant in system.	Repair.
Discharge pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot.	Insufficient refrigenrant in system.	Charge system.
	High and low pressures are balanced soon after stopping compressor.	• Faulty compressor discharge or inlet valve. • Faulty compressor seal.	Replace compressor.
	Outlet of expansion valve is not frosted; low pressure gauge indicates vacuum.	• Leaking thermostat. • Frozen expansion valve. • Faulty expansion valve.	Repair or replace.
Suction (low) pressure abnormally low	Excessive bubbles in sight glass; condenser is not heated.	Insufficient regrigerant.	Check for leaks. Charge as required.
	Expansion valve is not frosted and low pressure line is not cool Low pressure gauge indicates vacuum.	• Leaking thermostat. • Frozen expansion valve. • Faulty expansion valve.	Replace expansion valve.
	Outlet temperature is low; no air flow.	Frozen evaporator.	Run the fan with compressor off.
	Expansion valve frosted.	Clogged expansion valve.	Clean or replace.
	Low pressure hose is cooler than expansion valve outlet and evaporator.	Collapsed or restricted low pressure hose.	Clean, repair or replace.
Suction (low) pressure abnormally high	Low pressure hose and check joint are cooler than around evaporator.	• Expansion valve open too long. • Loose thermostat (poor contact).	Repair or replace.
	Suction pressure is lowered when condenser is cooled by water (High pressure side also heated).	Excessive refregerant in system.	Discharge refrigerant as necessary.
	High and low pressures are balanced too early when compressor is stopped.	• Faulty gasket. • Faulty high pressure valve. • Foreign particle stuck in high pressure valve.	Replace compressor.

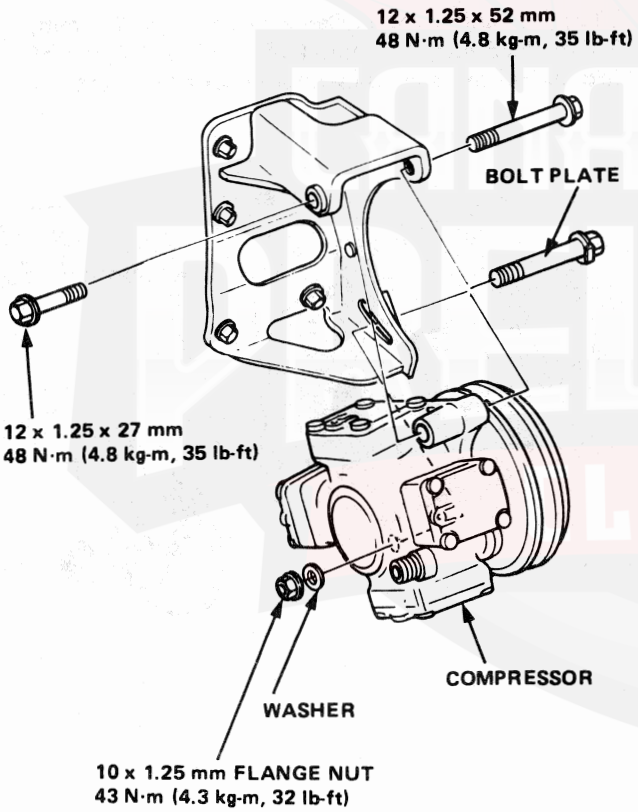
NOTE: Test Results would be obtained from conducting a pressure test (page 24-17).

Replacement

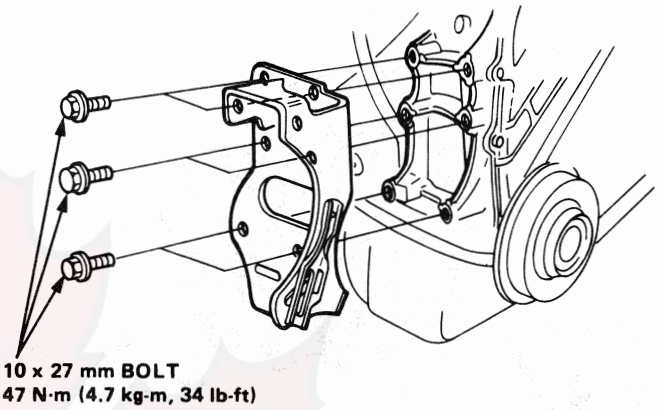
1. Run the engine at idle speed and turn on the air conditioner for a few minutes.
2. Shut the engine off and disconnect the battery negative terminal.
3. Disconnect the compressor clutch lead.
4. Discharge the refrigerant very slowly from the system.
5. On a car with power steering, loosen the steering pump adjusting and mounting bolts.
6. Lift the power steering belt off the pulley.
7. Remove the power steering oil pump.
8. Disconnect the suction and discharge hoses from the compressor.

   CAUTION: Cap the open fittings immediately to keep moisture and dirt out of the system.

9. Loosen the compressor adjusting/mounting bolts and nut, then lift the belt off the pulley.
10. Remove the air conditioner cooling fan motor along with the motor mounting frame.
11. Remove the mounting bolts and compressor, and set the compressor on the engine support beam.



12. Remove the compressor bracket.



13. Remove the compressor from the engine compartment.

Install the compressor in reverse order of removal and;

- If a new compressor is installed, drain 30 cm^3 (1 fl oz) of refrigerant oil through the suction fitting on the compressor.
- Adjust the belt.

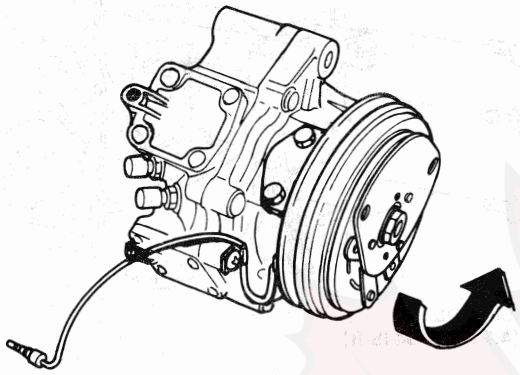
  BELT TENSION: 10—12 mm (3/8—1/2 in) deflection when 98 N (10 kg, 22 lb) force is applied between the pulleys.
- Charge the system.
- Test the performance.

  CAUTION: Do not loosen the cylinder cover bolts on the compressor.

Compressor

Clutch Inspection

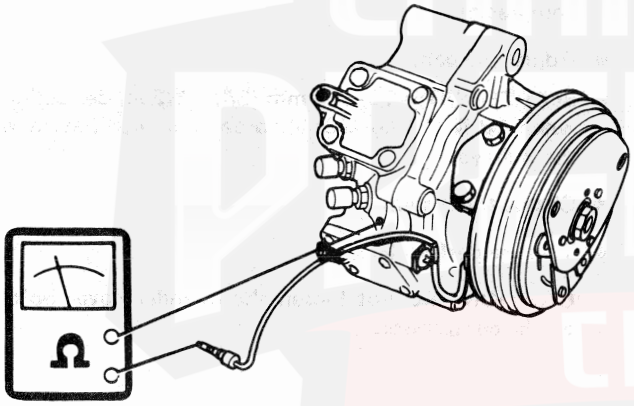
Check pulley bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play and drag.



Check the resistance of coil.

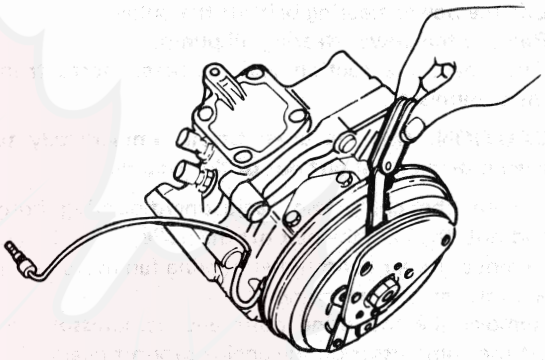
Coil Resistance:
3.0 ± 0.3Ω at 20°C (68°F)

If the resistance is not within specifications, replace the clutch coil with a new one.

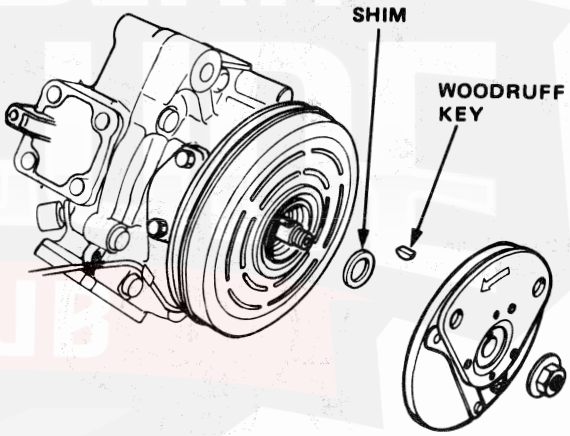


Measure the clearance between the pulley and pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required.

Pulley-to-Pressure Plate Clearance:
0.3—0.6 mm (0.012—0.024 in)



NOTE: The shims are available in six sizes: 0.1 mm, 1.0 mm, 1.25 mm, 1.5 mm, 1.75 mm and 2.0 mm of thickness. 0.1 mm shim is used for minor adjustment.

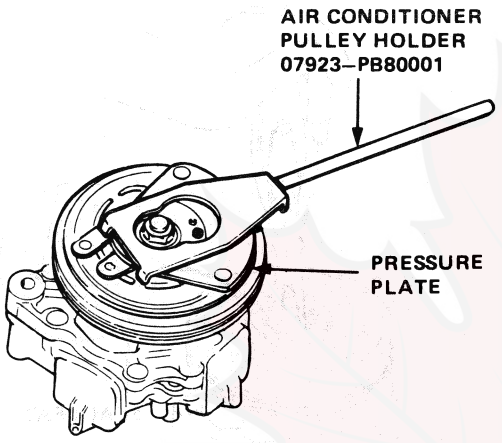


Clutch Overhaul

1. Remove the nut while holding the pressure plate with the tool shown.

   CAUTION: Be careful not to compress the spring excessively.

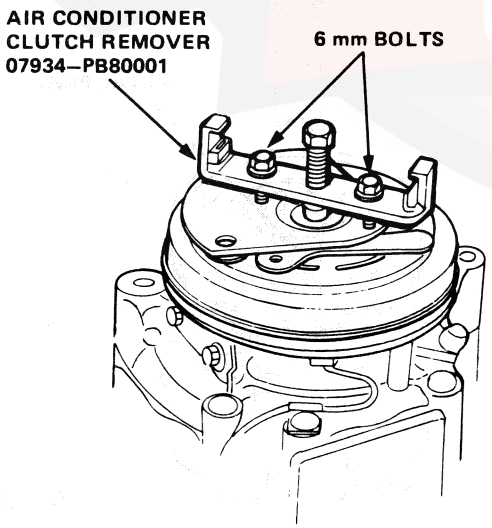
   Use the tool to hold the pressure plate.



2. Install the clutch remover tool and two 6 mm bolts on the pressure plate, and remove it by screwing in the center bolt.

   CAUTION: Use only the special tool to remove the pressure plate. If it is not used the clutch damage may result.

   NOTE: Tighten the 6 mm bolts equally, so the tool is installed parallel to the pressure plate.

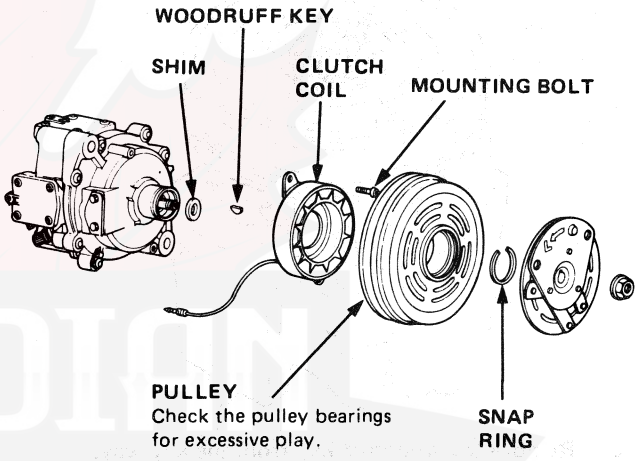


3. Use snap ring pliers to take off the snap ring, then remove the pulley from the shaft with a 2 or 3 jaw puller.

   CAUTION: When removing the snap ring, be careful not to damage the aluminum compressor snout.

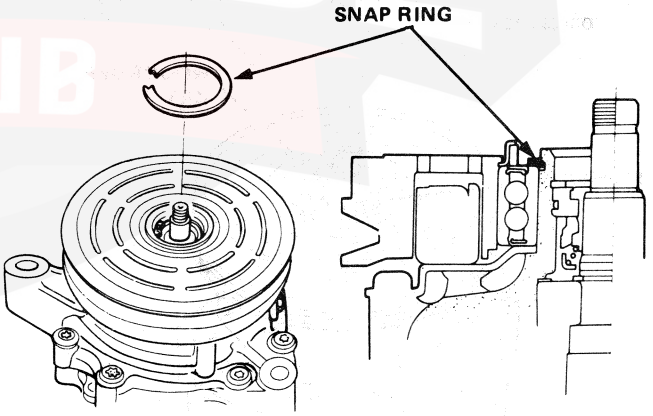
4. Unscrew the clutch coil mounting bolt by using a TORX DRIVER BIT (07703–0010200), then remove the clutch coil.

   NOTE: It's not necessary to remove the clutch wire clamp; just pry it up enough to remove the wire.



Assemble the clutch in the reverse order of disassembly, and also:

- Install the snap ring with its chamfered side facing out.
- When installing the snap ring, be careful not to damage the alminum compressor snout.



- Tighten the hub nut to specified torque.

  TORQUE: 4.0–4.5 kg-m (32–35 ft-lb)

- Recheck the pulley-to-pressure plate clearance and adjust if necessary.

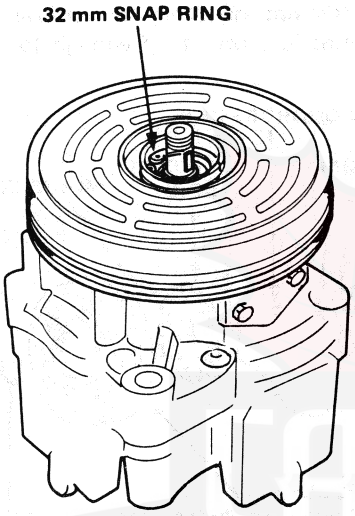
Shaft Seal Removal

NOTE: Make sure that the suction and discharge joints are plugged with the caps.

1. Remove the pressure plate (page 24-9).

   NOTE: Removal of the clutch pulley and coil is not necessary.

2. Remove the 32 mm snap ring.

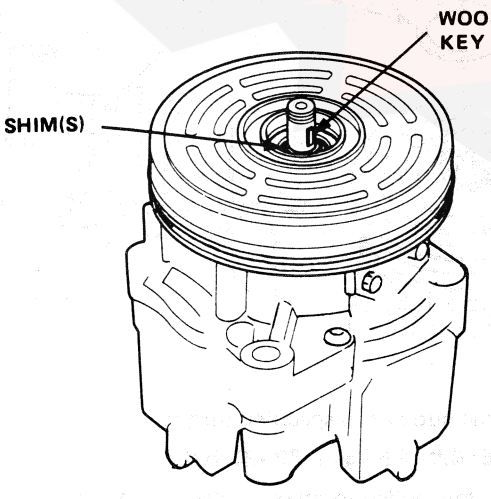


3. Remove the woodruff key from the key way.

   NOTE: If the woodruff key is to be reused, be careful not to damage it the key.

4. Remove the shim(s).

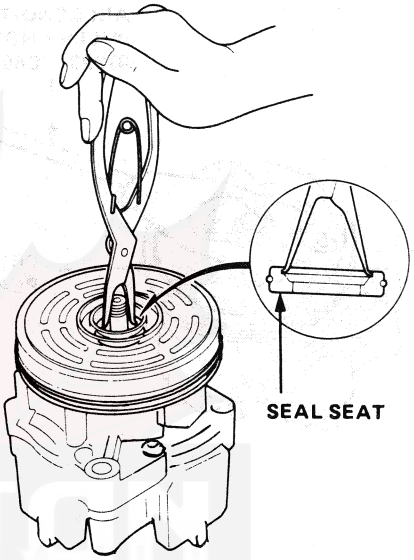
   NOTE: After removing, place shim(s) safely in a parts rack.



5. Hook the tip of the special tool (ends of pliers should be bent outward as shown) on the slot of the seal seat.

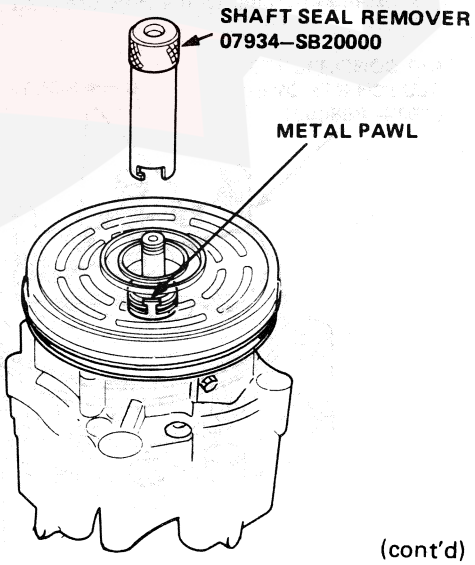
6. Pull out the seal seat.

   CAUTION: Move the tool in parallel with the compressor shaft. Do not damage the compressor.



7. Insert the shaft seal remover into the compressor aligning the cutout of the remover with the metal pawl of the seal case.

8. Rotate the Shaft Seal Remover clockwise or counterclockwise to make sure that the cutout is engaged with the metal pawl.



(cont'd)

9. Press the remover until bottoms, then turn it counterclockwise as far as it will go.

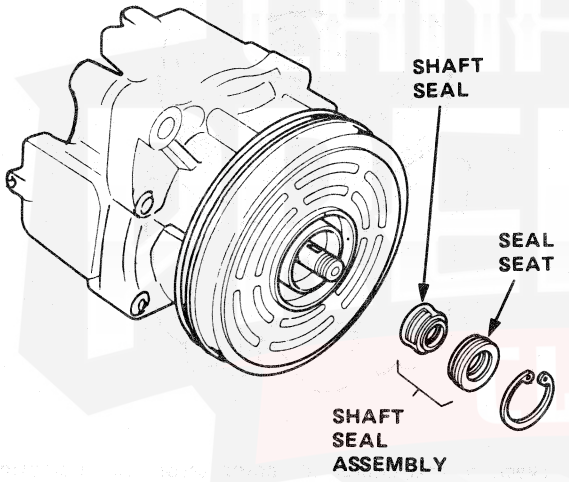
10. Withdraw the remover.

11. 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 refrigerator oil from the compressor. Refill the same amount of the oil if the oil is spilled out.**

NOTE: Install the shaft seal assembly after the cleaning solvent is dried out.



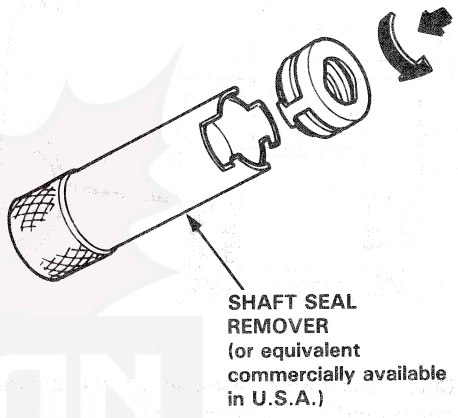
Shaft Seal Installation

1. Clean the new shaft seal thoroughly with cleaning solvent.

2. Lubricate the shaft seal with refrigerant oil (SUNISO 5GS or equivalent) and install it on the shaft seal remover.

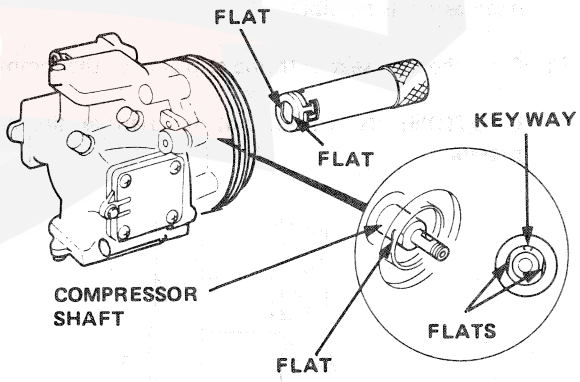
NOTE:

- Use only clean refrigerant oil.
- Do not touch the sealing surfaces of the shaft seal after lubricating.



3. Liberally lubricate the compressor shaft with refrigerant oil.

4. Install the shaft seal onto the compressor shaft aligning the seal case flats with the shaft flats.



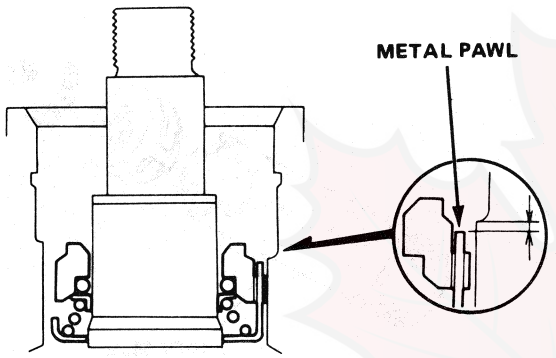
(cont'd)

Shaft Seal Installation (cont'd)

5. Press the remover until bottoms, then turn it counterclockwise as far as it will go.
   NOTE: The remover will go lower when the flats are aligned.

6. Turn the remover clockwise, then pull out.

7. Make sure that the metal pawl of the seal case is at least 0.5 mm (0.02 in) below the compressor shoulder as shown.



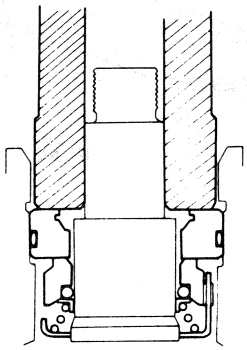
8. Check the inside diameter of the compressor for score marks or foreign particles.

9. 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 seat after lubricating.

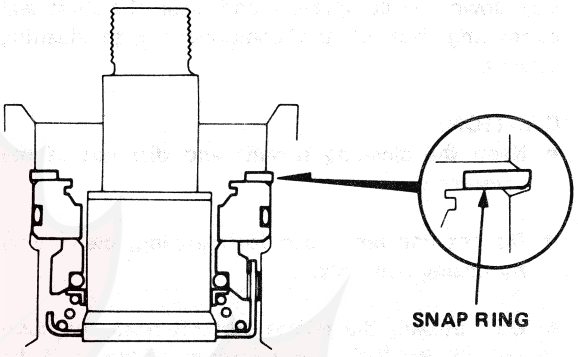
10. First slide the seal seat into the compressor by hand as far as possible.

11. Press the seal seat with the grip side of the remover.

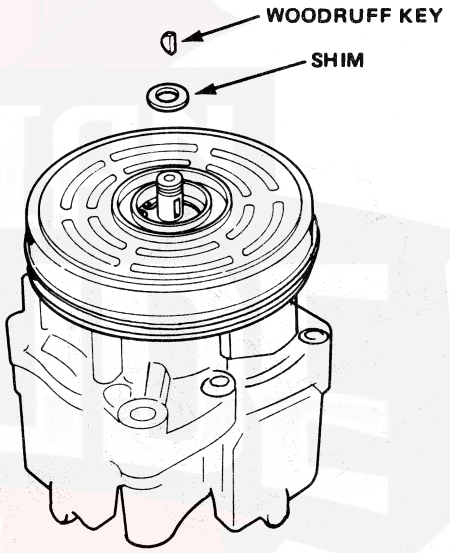
    CAUTION: Be careful not to damage the compressor.



12. Install the 32 mm snap ring with its chamfered edge inside.
13. Press the snap ring with the grip side of the remover.



14. Install the shim(s) and woodruff key.



15. Evacuate and charge the compressor, then perform the leak test.

16. 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, [0.3—0.6 mm (0.012—0.024 in)] shims must be added or removed as required.

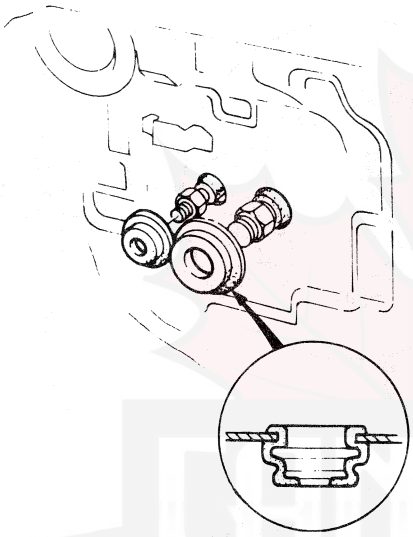
Evaporator

Replacement

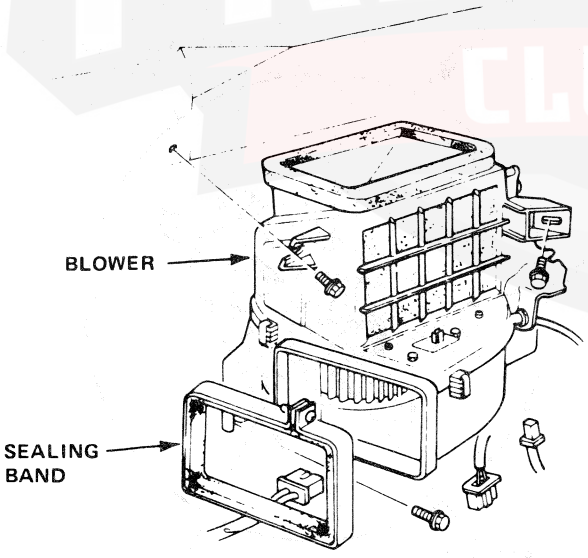
1. Disconnect the battery negative terminal.
2. Discharge the refrigerant.
3. Disconnect the receiver line and suction hose from the evaporator.

   CAUTION: Cap the open fittings immediately to keep moisture and dirt out of the system.

4. Remove the grommets.

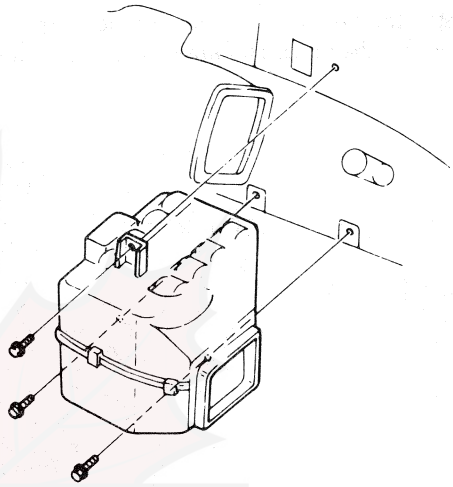


5. Remove both lower dash panels.
6. Disconnect the vacuum line and wire harness from the blower.
7. Remove the sealing band from between the blower and evaporator.
8. Remove the blower.



9. Remove the evaporator.

   NOTE: Carefully disconnect the wire harness from the thermostat.



Install the evaporator in the reverse of removal, and:

- If a new evaporator is installed, add 30 cm^3 (1 fl oz) of refrigerant oil to it before charging.
- Don't forget to align the joint and tighten the sealing band securely to prevent air leaking.
- Charge the system.
- Test the performance.

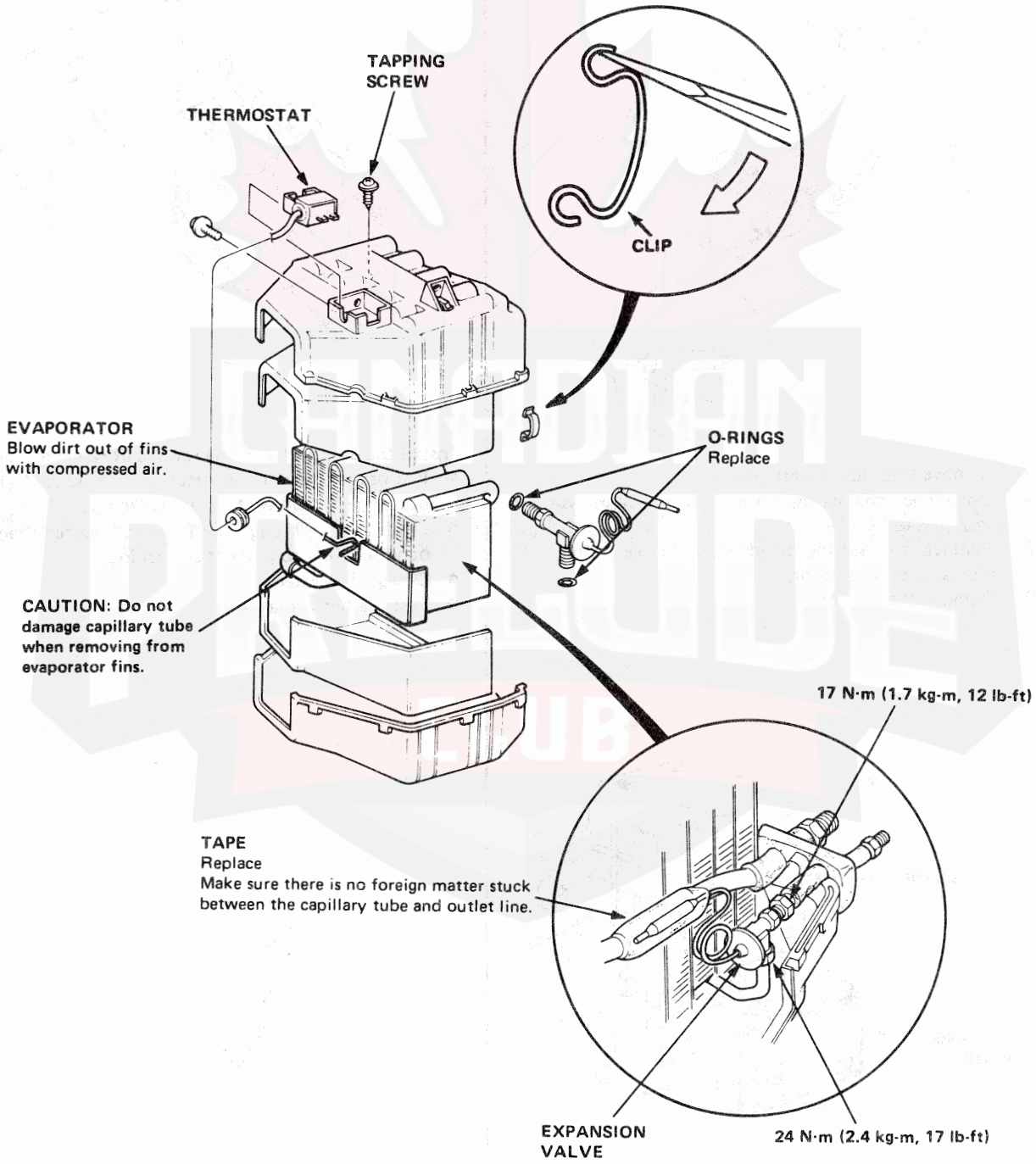
Evaporator

Overhaul

1. Remove the self-tapping screws and clips from the housing.
2. Carefully separate the housings as required to obtain access to the capillary tube in the housings.
3. Pull out the capillary tube of the thermostat from the evaporator fins.
4. Separate the housings and remove the evaporator covers.
5. Remove the expansion valve, if necessary.

Assemble the evaporator in the reverse of disassembly, and:

- Install the expansion cover capillary tube against the suction line, and wrap it with tape.
- Reinstall the thermostat capillary tube in its original location.
- Reassemble the upper and lower housings with the clips, make sure there are no gaps between them.



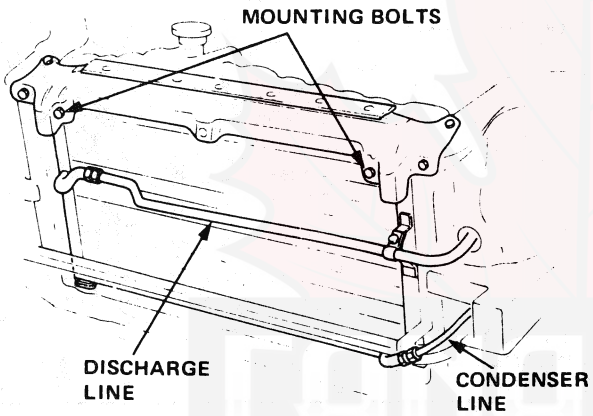
Condenser

Replacement

1. Disconnect the battery negative terminal.
2. Discharge the refrigerant.
3. Remove the front grille.
4. Disconnect the condenser line and discharge line from the condenser.

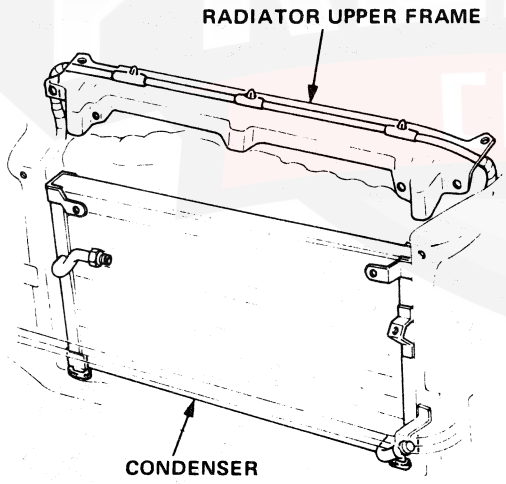
CAUTION:
- **Cap the open fittings immediately to keep moisture and dirt out of the system.**
- **Be careful not to damage the condenser fins and tubes.**

5. Remove the condenser mounting bolts.



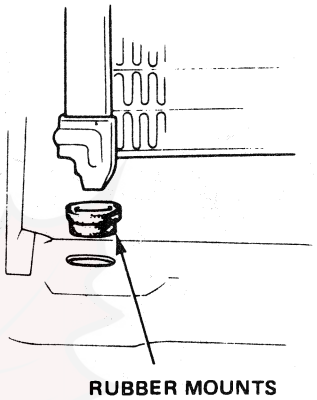
6. Remove the radiator upper frame mounting bolts and move the upper frame slightly.

CAUTION: Move the upper frame only as much as required to obtain access to the condenser for its removal, because the upper frame has the air conditioner wire harness attached to it.



7. Remove the condenser by pulling it upward.

Install the condenser in the reverse of removal, and:
- If a new condenser is installed, add 10 cm^3 (1/3 fl oz) of refrigerant oil to it.
- Insert the condenser legs into the rubber mounts.



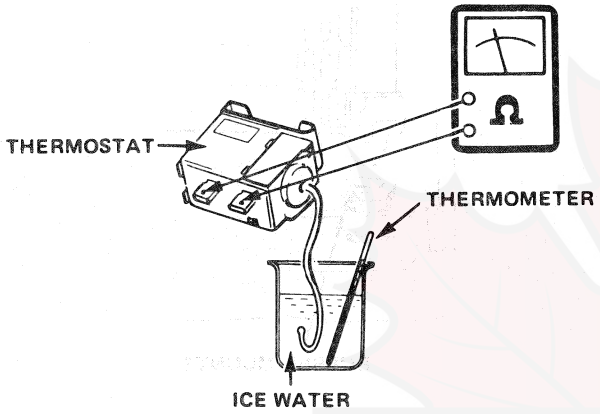
- Apply an anti-rust material to the upper frame mounting bolt areas.
- Charge the system.
- Test the performance.

Thermostat Test

Dip the thermostat capillary tube into a pan filled with ice water, and check for continuity.

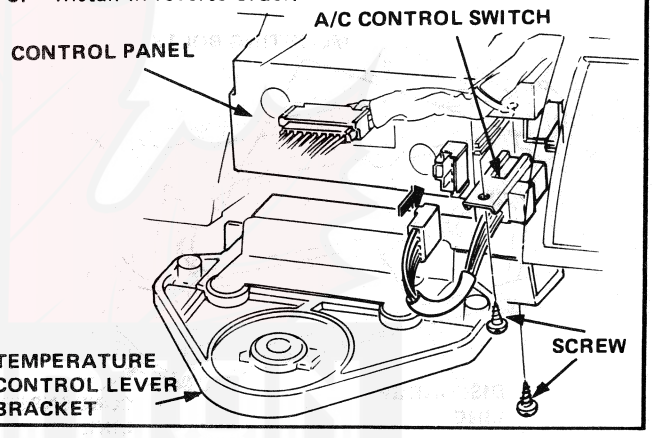
Cut-off . . . . . 1.5–0.5°C (35–33°F)
Cut-in . . . . . 3.0–5.0°C (37–41°F)

If cut-off or cut-in temperature is too low or too high, replace the thermostat.



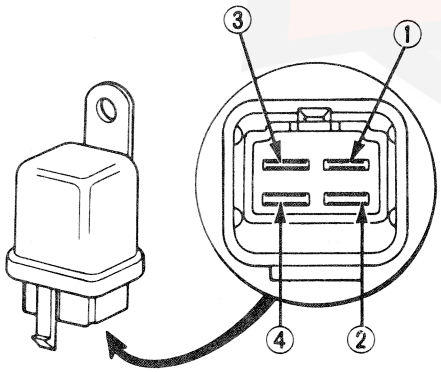
A/C Control Switch Replacement

1. Remove the right lower dash panel.
2. Remove the radio.
3. Pry the knob off the heater temperature control.
4. Remove screws from the control lever bracket and remove the control lever bracket from the control panel.
5. Remove the screw, and disconnect the A/C switch wire coupler, then remove the A/C control switch.
6. Install in reverse order.



Clutch Relay Test

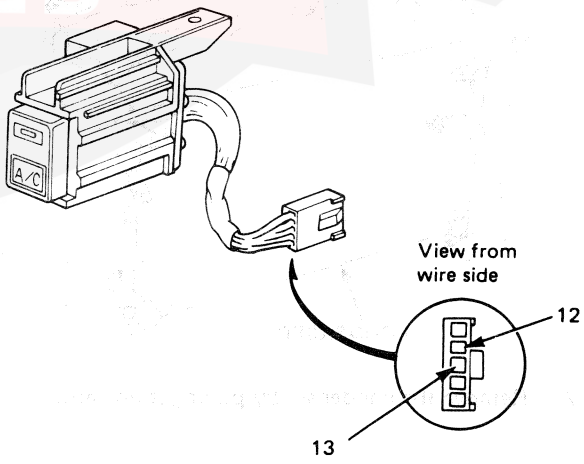
1. Check for continuity between the terminals 3 and 4. There should be no continuity.
2. Connect a 12 V battery across the terminals 1 and 2.
   There should be continuity between the terminals 3 and 4.



A/C Control Switch Test

There should be continuity between No. 12 and No. 13 terminals when the switch is pushed in. There should be no continuity when the switch button is released (off).

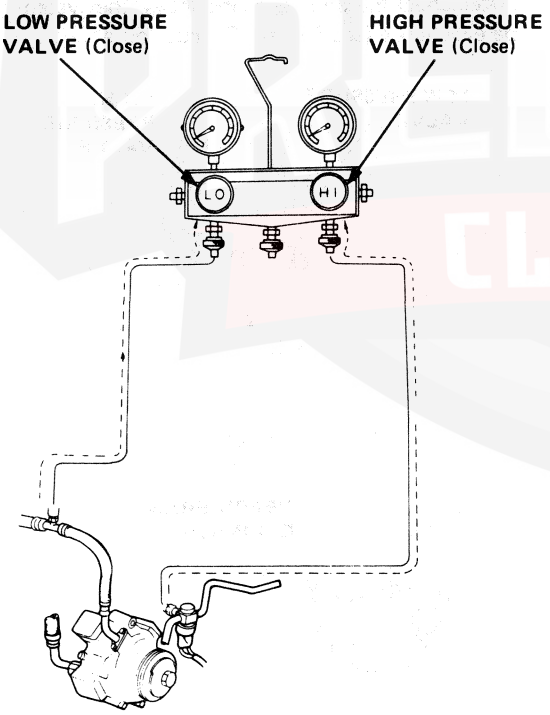
NOTE: The A/C switch contains an LED circuit and cannot be tested with ordinary circuit testers. If there is any abnormality in the LED, see Electrical section to determine the cause of the trouble.



Pressure Test

1. Connect the gauges as shown.
2. Close both high and low pressure valves.
3. Test with the hood up, doors and windows open, temperature lever on COLD (left end), VENT button on and fan maximum high speed.
4. Leave the air conditioner on about 10 min. The sight glass should be free of bubbles.

   NOTE: Run the engine at 1,500 rpm.
5. See the chart on page 24-4 to determine the correct high pressure reading for your area.
   Low pressure reading: about 196 kPa (2.0 kg/cm^2, 28 psi).
   If the readings are not correct, refer to the trouble-shooting chart on page 24-6.



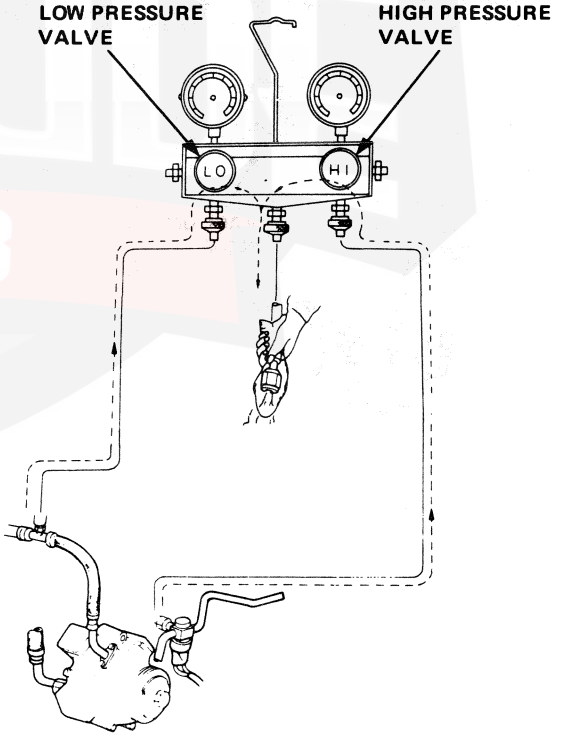
Discharge Procedure

WARNING

- **Keep away from open flames. The refrigerant, although nonflammable, will produce a poisonous gas if burned.**
- **Work in a well-ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small enclosed area.**

1. Connect the gauges as shown.
2. Disconnect the center hose of the gauge set and place the free end in a shop towel.
3. Slowly open the high side manifold valve slightly to let refrigerant flow from the center hose only. Do not open the valve too wide. Check the shop towel to make sure no oil is being discharged with the refrigerant.

   CAUTION: If refrigerant is allowed to escape too fast, compressor oil will be drawn out of the system.
4. After the high pressure gauge reading has dropped below 1,000 kPa (10.0 kg/cm^2, 142 psi), open the low side valve to discharge both high and low sides of the system.
5. Note the gauge readings and, as system pressure drops, gradually open both high and low side valves fully until both gauges indicate 0 kPa (0 kg/cm^2 0 psi).

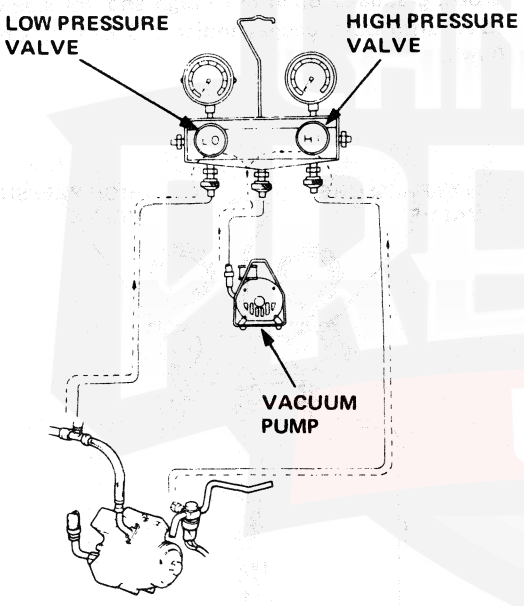


System Evacuation

NOTE: When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a vacuum pump. (If the system has been open for several days, the receiver-dryer should be replaced).

1. Attach a gauge set and pump as shown, connecting the center charging hose to the pump inlet.
2. Start the pump, then open both gauge valves. Run the pump for about 15 minutes. Close the valves and stop the pump. The low gauge should indicate above 700 mm Hg (27 in-hg) and remain steady with the valves closed.

   NOTE: If low pressure does not reach more than 700 mm Hg (27 in-hg) in 15 minutes, there is probably a leak in the system. Check for leaks, and repair (see Leak Test below).
3. If there are no leaks, open the valves and continue pumping for at least another 15 minutes, then close both valves, stop the pump and disconnect it from the center charging hose.

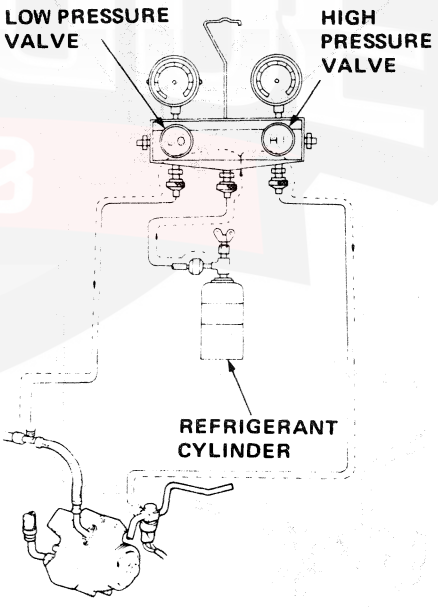


Leak Test

WARNING When handling refrigerant (R-12):

- **Always wear eye protection.**
- **Do not let refrigerant get on your skin or in your eyes. If it does:**
  - **Do not rub your eyes or skin.**
  - **Splash large quantities of cool water in your eyes or on your skin.**
  - **Rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.**
- **Keep refrigerant containers (cans of R-12) stored below 40°C (100°F).**
- **Keep away from open flame. Refrigerant, although non-flammable, will produce poisonous gas if burned.**
- **Work in well ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small, enclosed area.**

1. Attach a refrigerant supply and gauge set as shown, with all valves closed. Then open the refrigerant supply valve on the can.
2. Loosen the center charging hose fitting at the gauge to purge any air from the hose, until it hisses for a few seconds, then tighten it again.
3. Open both gauge valves to charge the system to about 100 kPa (1.0 kg/cm^2, 14 psi), then close the supply valve.
4. Check the system for leaks using a leak detector.
5. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), release any charge in the system according to the Discharge Procedure on the previous page.
6. After checking and repairing leaks, the system must be evacuated (see System Evacuation above).



System Charging

WARNING **Always wear eye protection when charging the system.**

The A/C system may be charged with refrigerant by either Vapor or Liquid method:

CAUTION: If you overcharge the system, the compressor will be damaged.

VAPOR CHARGING, through the low side:

1. Connect a gauge set and refrigerant can (right side up) as shown, with the gauge valves closed. Purge air from the charging hose by opening the refrigerant valve, then, loosening the center connector at the gauge, letting it hiss for a few seconds, and tightening it.
2. Open the low gauge valve [adjust it as necessary so pressure does not exceed 415 kPa (4.15 kg/cm^2, 60 psi) while charging].
3. Start the engine and switch the air conditioner fan on high.

   NOTE: Run the engine below 1,500 rpm.
4. Keep the refrigerant can right side-up. Charge the system with 750—850 g (26—30 oz) of refrigerant until sight glass is free of any bubbles, indicating a full charge.
5. When fully charged, close the gauge valves, then the valve on the can. Slowly disconnect the refrigerant hose from the center gauge connection to allow excess refrigerant to escape. Quickly remove the gauges from the system to minimize refrigerant loss.

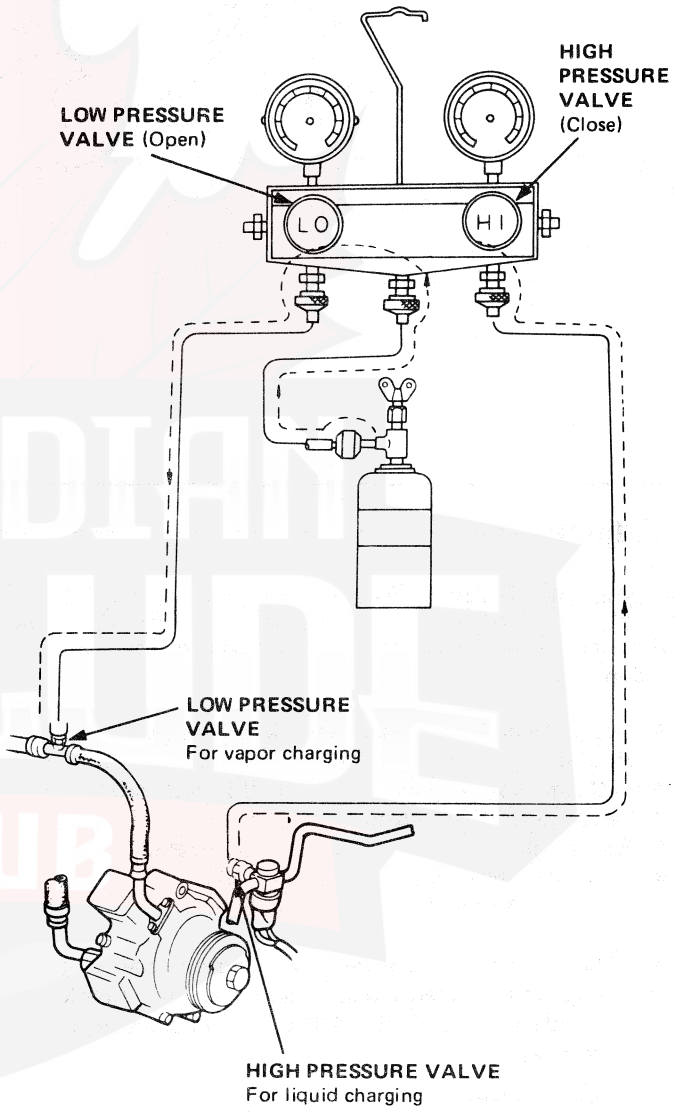
LIQUID CHARGE through the high pressure side:

Following the charging station manufacturer's instructions, charge the system with 750—850 g (26—30 oz) of refrigerant.

WARNING **Do not use disposable cans to charge through the high pressure side of the system. System pressure could transfer into the can causing it to explode. Use only the bulk supply of refrigerant from the charging station.**

CAUTION: If you run the engine during liquid charge, the compressor will be damaged.

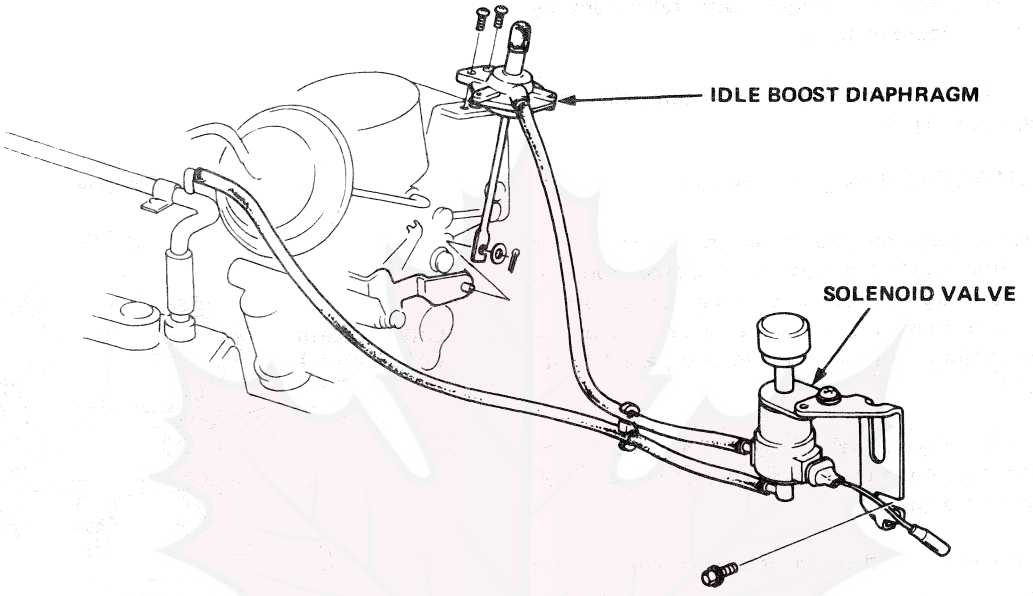
Vapor Charging



Idle Boost

Diaphrgm and Solenoid

Carbureted Engine:



Adjustment

Carbureted Engine:

After charging, check the idle speed with the air conditioner on:

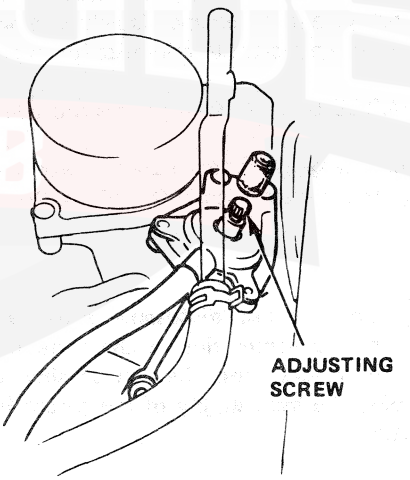
- Apply the parking brake and block the wheels.
- Headlights . . . . . OFF
- A/C temperature lever . . . . . COLD (left end)
- Vent and RECIRC buttons . . . ON
- Fan switch . . . . . HI (right end)
- Gearshift – Manual . . . . . Neutral
  Automatic . . . . . In Drive

1. Start the engine and warm it up to normal operating temperature (when radiator fan comes on). Check the idle speed with the A/C OFF, and adjust it, if necessary.

   IDLE SPEED:
   Manual – 800 ± 50 rpm
   Automatic – 800 ± 50 rpm (in gear)

2. Turn the fan on HI, and check the idle speed again; it should be the same as with the fan OFF; if not, adjust it by turning the adjusting screw..

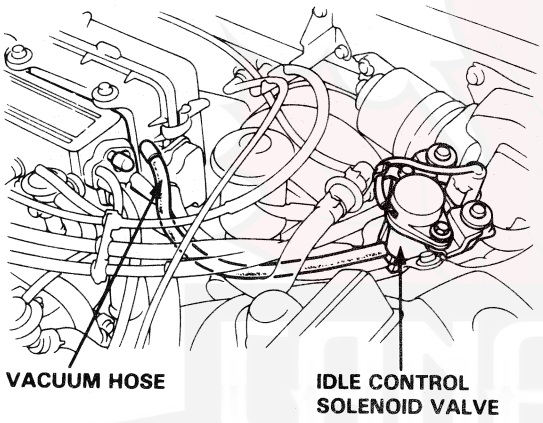
3. Turn the fan switch OFF and ON several times and make sure the idle speed does not change.



Idle Speed Adjustment

Fuel-Injected Engine:

1. Start the engine and warm it up to normal operating temperature (the cooling fan goes on twice).
2. Connect a tachometer.
3. Disconnect the vacuum hose between the idle control solenoid valve and intake manifold.
4. Cap the end of the hose and intake manifold.

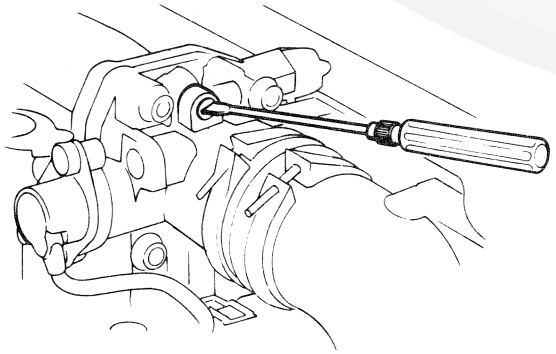


5. Adjust the idle speed with headlights, heater blower, rear window defroster, cooling fan and air conditioner off.

Idle Speed should be:

Manual	750 ± 50 rpm
Automatic	750 ± 50 rpm (in ''N'' or ''P'')

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

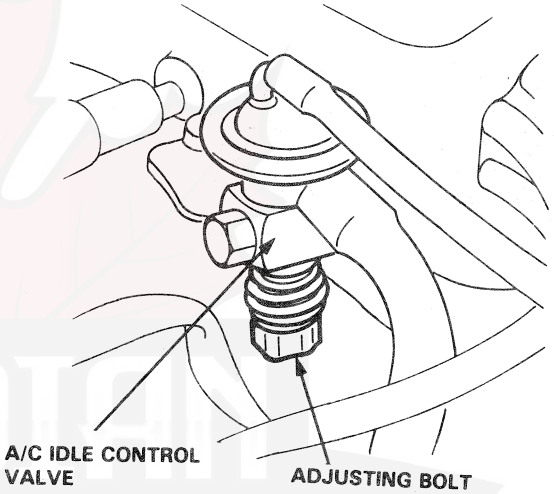


6. Check the idle speed with heater fan switch at HI (right end) and air conditioner on.

Idle Speed should be:

Manual	750 ± 50 rpm
Automatic	750 ± 50 rpm (in ''N'' or ''P'')

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



7. After adjustment, connect the idle control solenoid valve vacuum hose.
8. On Automatic Transmission model, after adjusting the idle speed, check that it remains within the specified limit when shifted in gear (D_3 or D_4).

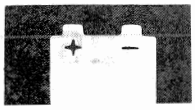
Idle speed should remain
750 ± 50 rpm (in dive)

9. Check the idle speed with headlights, heater blower, rear window defroster, and cooling fan on but air conditioner off.
It should be the same as normal idle speed.

NOTE: If the idle speed is not within specifications, see Troubleshooting on page 11-30.

Electrical

Engine Electrical



Engine Electrical

Illustrated Index

Before Troubleshooting:

- Check the main fuse and the fuse box.
- Check the battery for damage, state of charge, and clean and tight connections.

  CAUTION:
  - **Do not quick-charge a battery unless the battery ground cable has been disconnected, or you will damage the alternator diodes.**
  - **Do not attempt to crank the engine with the ground cable disconnected, or you will severely damage the wiring.**

- Check the alternator belt tension.

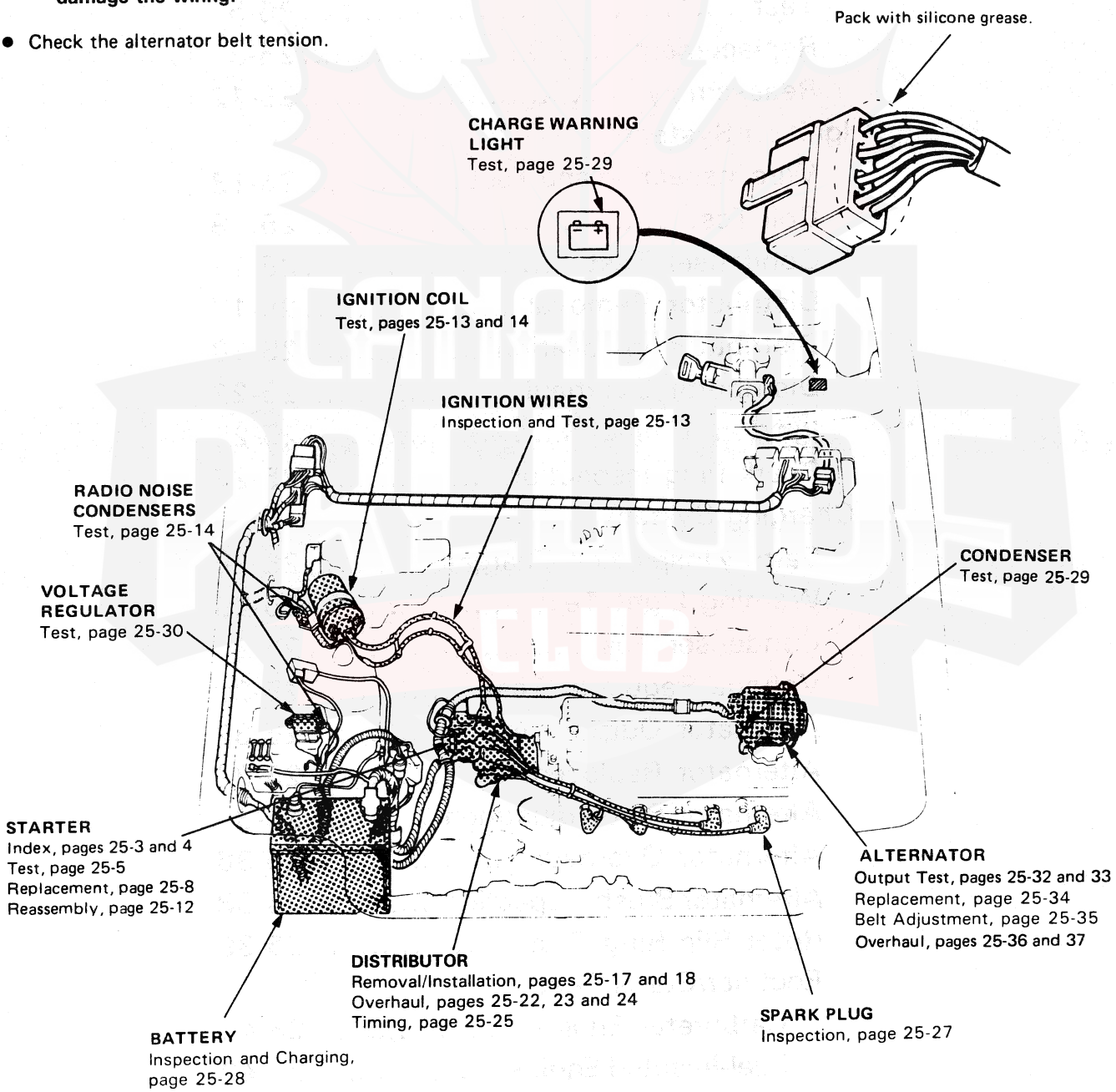
While you're working:

- Make sure connectors are clean, and have no loose pins or receptacles.

  CAUTION: Do not pull on the wires when disconnecting a connector; pull only on the connector housings.

- When connecting a connector, push it until it clicks into place.

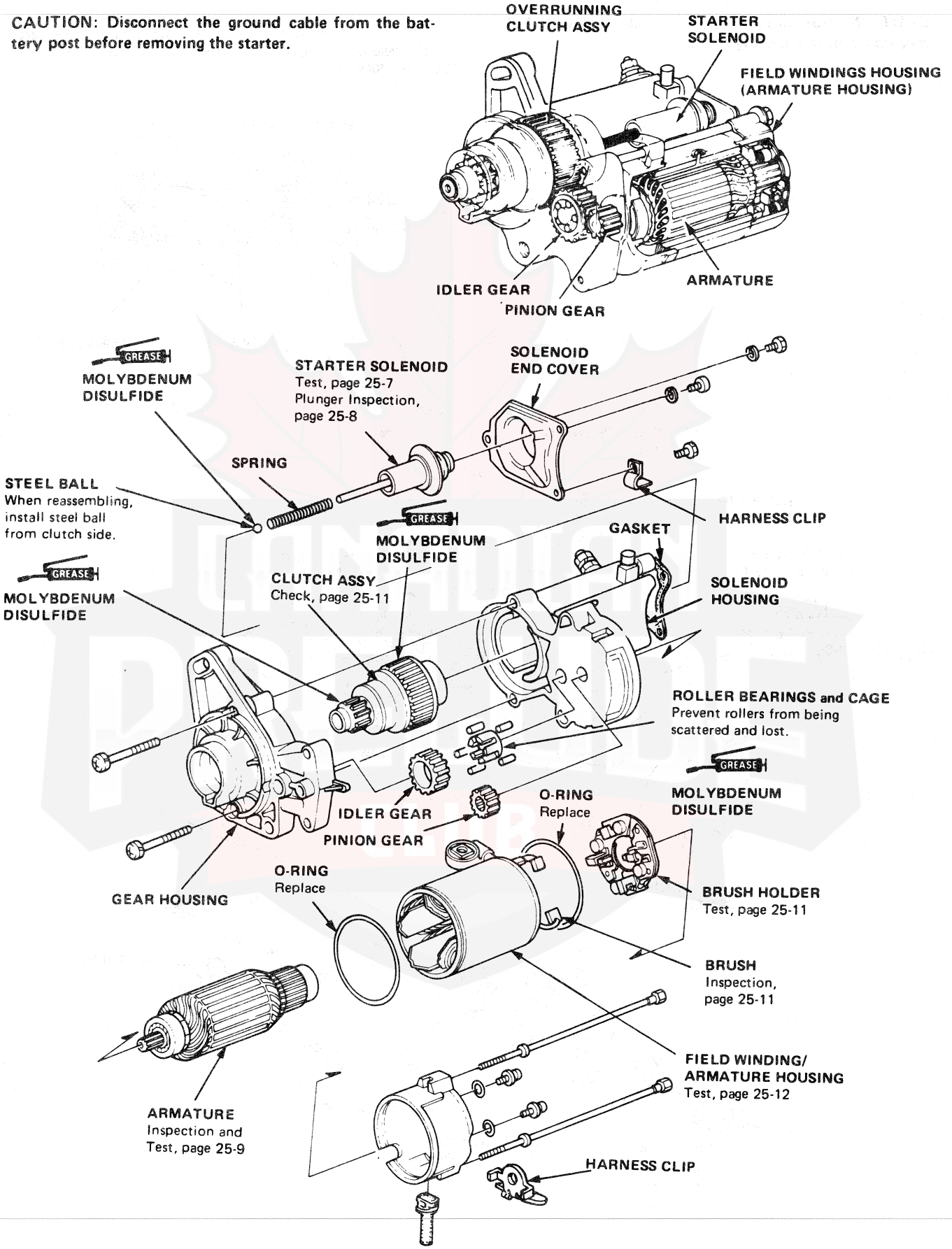
- Make sure multiple pin connectors are packed with silicone grease.



Starter

Illustrated Index (Gear Reduction 1.4 kw, ND)

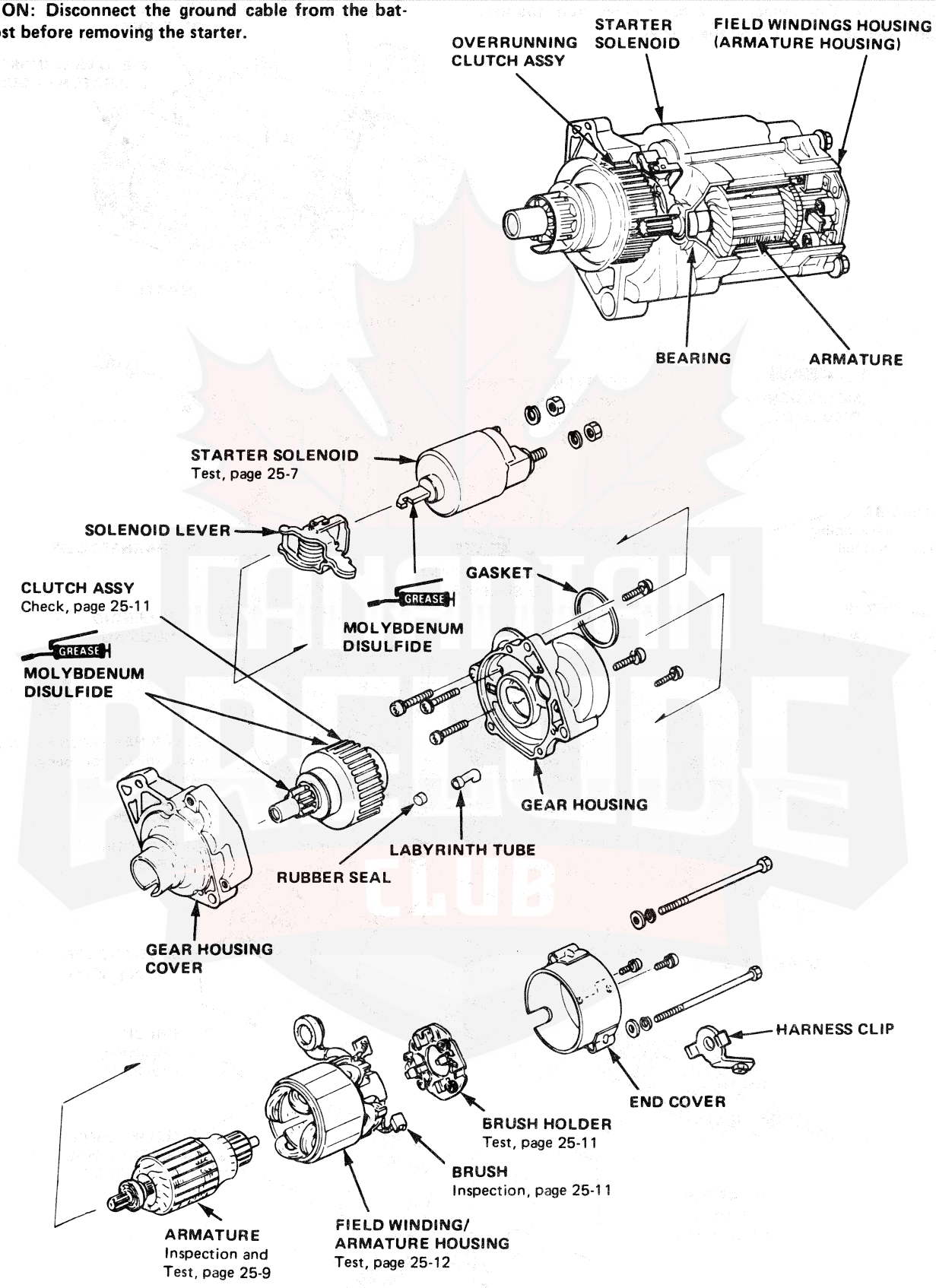
CAUTION: Disconnect the ground cable from the battery post before removing the starter.



Starter

Illustrated Index (Gear Reduction 1.4 kw, Mitsuba)

CAUTION: Disconnect the ground cable from the battery post before removing the starter.



Test

NOTE: The air temperature must be between 15 and 38°C (59 and 100°F) before testing.

Recommended Procedure:

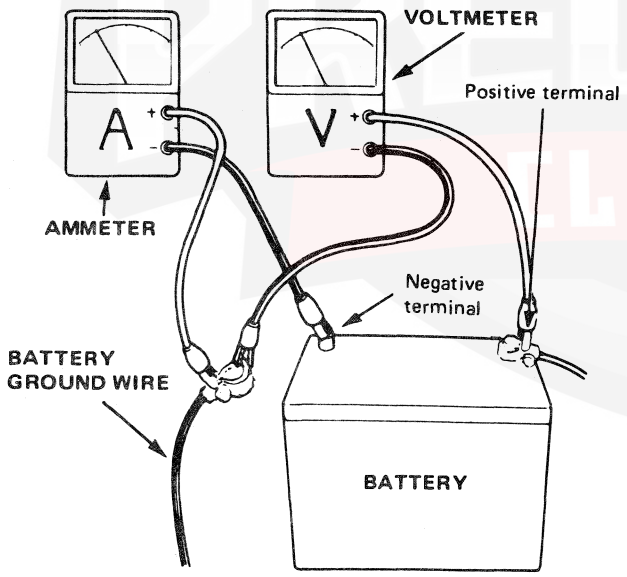
Use a starter system tester.
Connect and operate the equipment in accordance with manufacturer's instructions.
Test and troubleshoot as described starting with step 2.

Alternate Procedure:

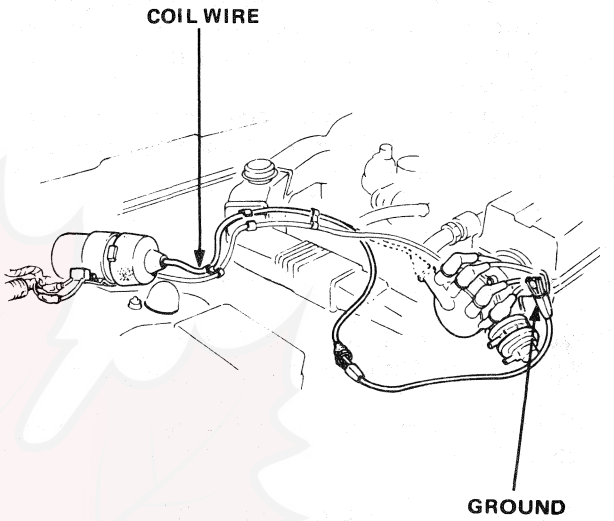
Use the following equipment:

- Ammeter, 0–400 A
- Voltmeter, 0–20 volts (accurate within 0.1 volt)
- Tachometer 0–1200 rpm

1. Hook up voltmeter and ammeter as shown.



2. Disconnect the coil wire from the distributor, and ground it.



3. Check the starter engagement.
Turn the ignition switch to III. The starter should crank the engine.

- If the starter does not crank the engine, check the battery, the battery positive cable and ground, and the cable 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 (black/white wire) from the starter. Connect the 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 (see pages 25-7 through 25-12).
  - If the starter cranks the engine, check for an open wire in the black/white wire circuit between the starter and ignition switch, and connectors. Check the ignition switch. On cars with automatic transmission, check the NEUTRAL/BACK-UP switch and connectors.

(cont'd)

Test (cont'd)

4. 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. See page 25-11.

5. Check cranking voltage and current draw.

   Voltage should be no less than 8 volts.
   Current should be no greater than 350 amperes.

   If voltage is too low, or current draw too high, check for:

   - Battery fully charged (see page 25-28).
   - Open circuit in starter armature commutator segments (see page 25-10).
   - Starter armature dragging.
   - Shorted armature winding (see page 25-10).
   - Excessive drag in engine.

6. Check cranking rpm.

   Engine speed during cranking should be approximately 400 rpm.

   If cranking rpm is too low, check for:

   - Loose battery or starter terminals.
   - Excessively worn starter brushes (see page 25-11).
   - Open circuit in commutator segments (see page 25-10).
   - Dirty or damaged helical spline on drive gear.
   - Defective drive gear overrunning clutch (see page 25-11).

7. Check the starter disengagement:

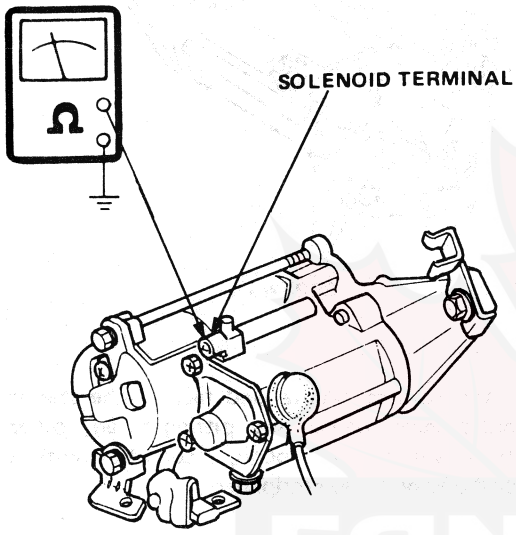
   Turn the ignition switch to III and release to II. The starter drive gear should disengage from the flywheel ring gear.
   If the drive gear hangs up on the flywheel ring gear, check:

   - Solenoid plunger and switch for malfunction.
   - Drive gear assembly for dirty or damaged overrunning clutch (see page 25-11).

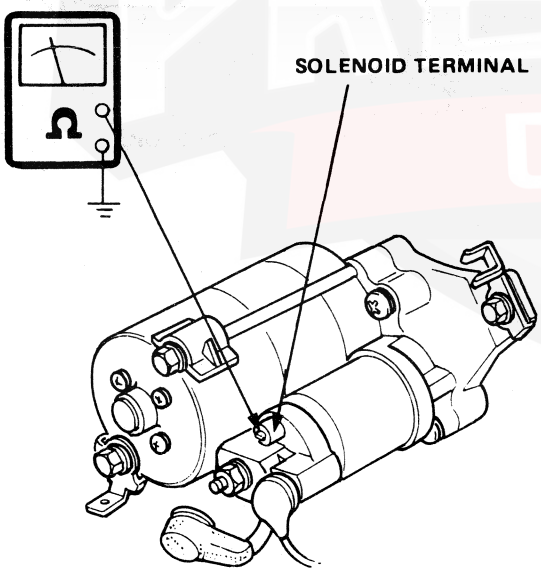
Solenoid Test

1. Check pull-in coil for continuity between the solenoid terminal and any convenient ground. Coil is OK if there is continuity.

Nippon Denso:

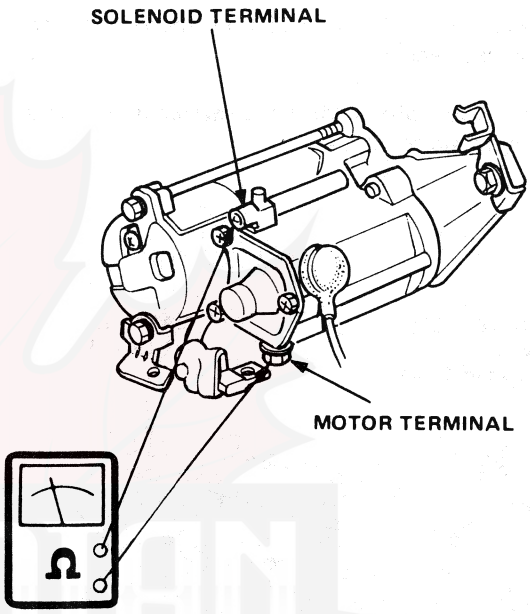


Mitsuba:

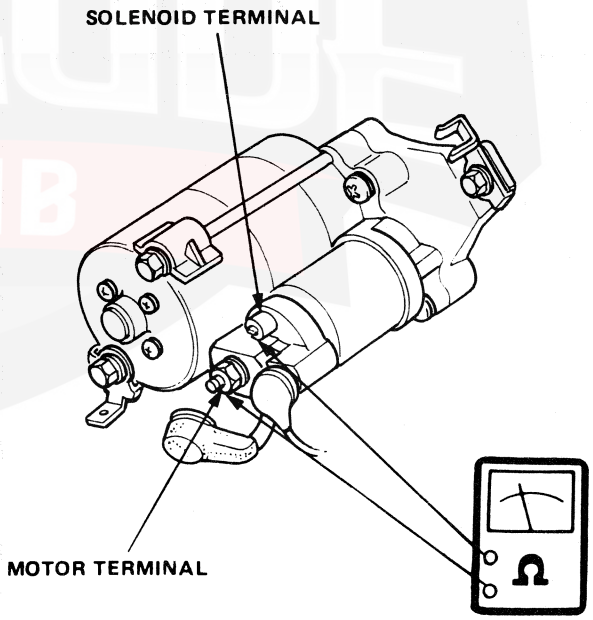


2. Check hold-in coil for continuity between the solenoid terminal and the motor terminal on the solenoid. Coil is OK if there is continuity.

Nippon Denso:



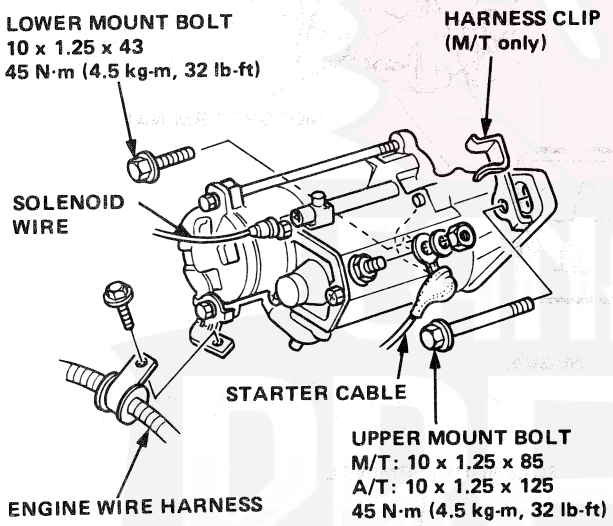
Mitsuba:



Starter

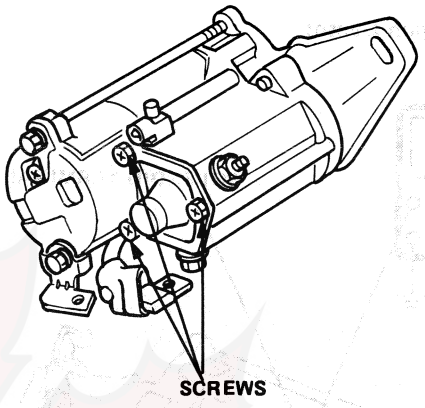
Replacement

1. Disconnect both cables from the battery.
2. Disconnect the starter cable from the terminal on the starter motor.
3. Remove the engine wire harness from the harness clip on the starter motor (M/T only).
4. Disconnect the solenoid wire from the terminal on the starter solenoid.
5. Remove two bolts holding the starter motor, and remove the starter motor.

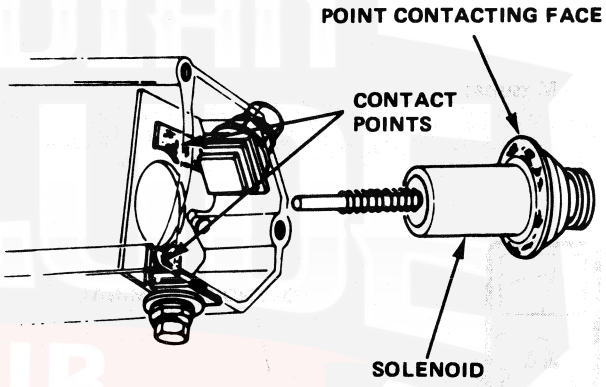


Solenoid Plunger Inspection (ND)

1. Remove three screws from the solenoid end cover.

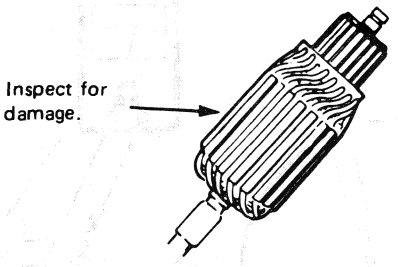


2. Check the contact points, and face of the starter solenoid plunger for burning, pitting or any other defects. If surfaces are rough, recondition with a strip of #500 or #600 sandpaper.



Armature Inspection and Test

1. Inspect the armature for wear or damage due to contact with the field coil magnets.

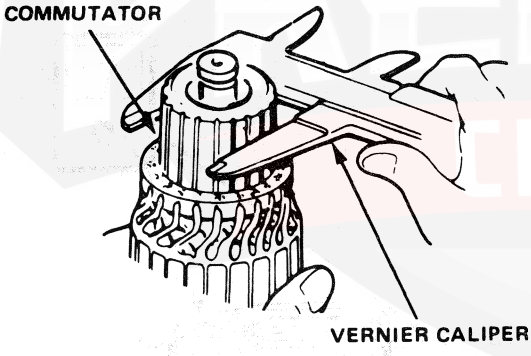


2. A dirty or burnt surface may be resurfaced with emery cloth or lathe within the following specifications.

Commutator Service Limits

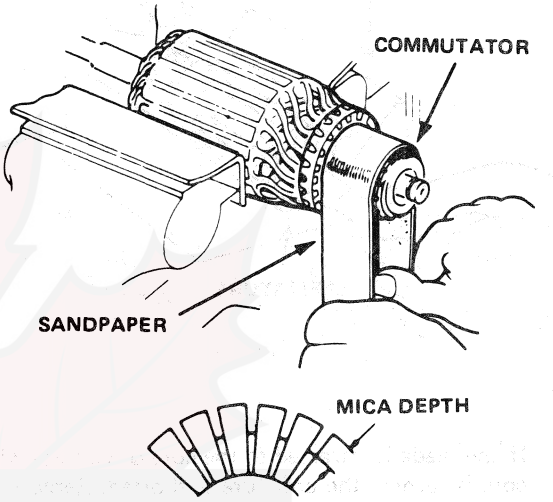
Runout: Less than 0.05 mm (0.002 in.)

Diameter:
ND: Not less than 29 mm (1.14 in.)
Mitsuba: Not less than 27.5 mm (1.08 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 as shown.



Commutator Mica Depth

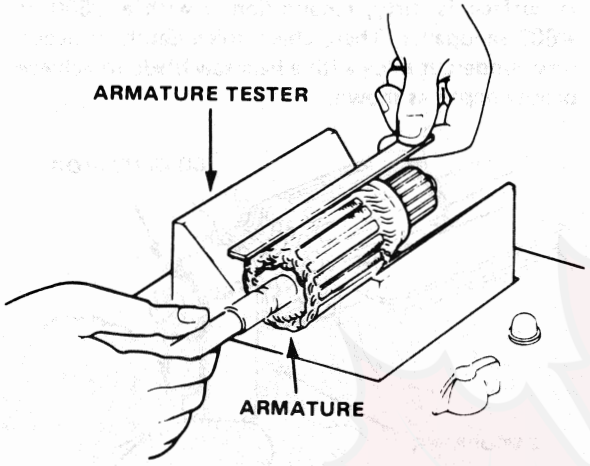
Standard (New):
ND: 0.5–0.8 mm (0.020–0.031 in.)
Mitsuba: 0.4–0.5 mm (0.016–0.020 in.)

Service Limit:
ND: 0.2 mm (0.008 in.)
Mitsuba: 0.15 mm (0.006 in.)

(cont'd)

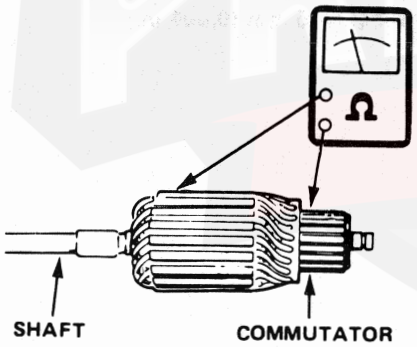
Armature Inspection and Test (cont'd)

5. Place the armature on an armature tester. Hold a hacksaw blade on the armature core.

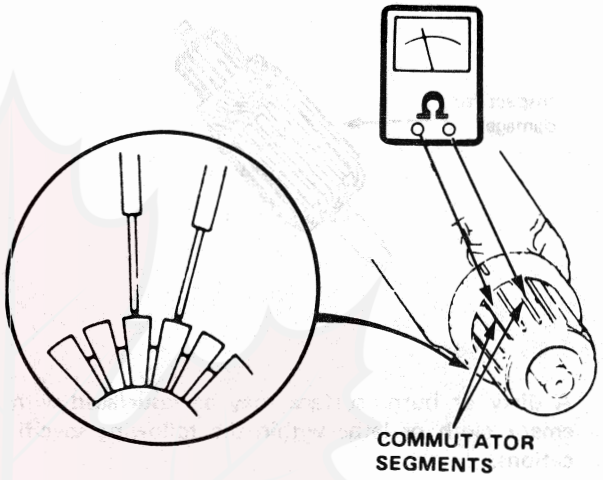


If the blade is attracted to the core or vibrates while core is turned, the armature is shorted. Replace the armature.

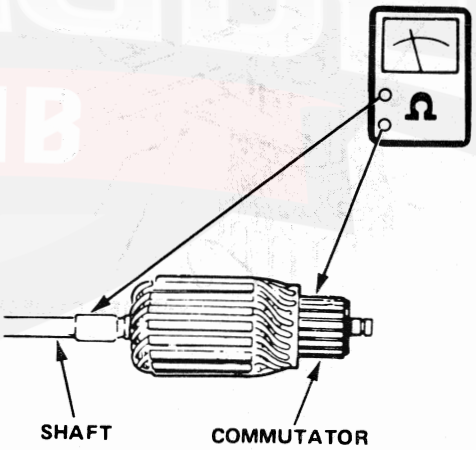
6. With an ohmmeter, check that no continuity exists between the commutator and armature coil core. If continuity exists, replace the armature.



7. Check for continuity between each segment of the commutator. If an open circuit exists between any segment, replace the armature.



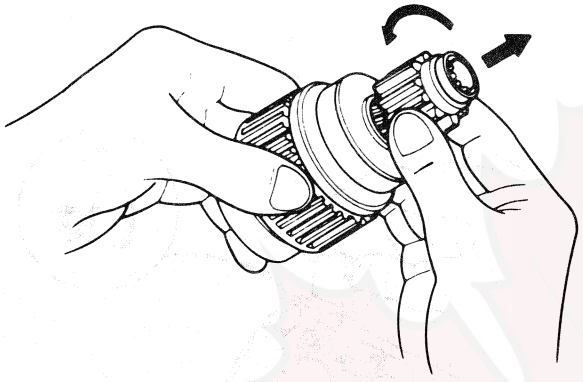
8. Check to see if there is any continuity between the commutator and armature shaft. If there is continuity, replace the armature.



Overrunning Clutch Check

Move the overrunning clutch along the shaft.

If it doesn't move freely, or if the clutch slips when the armature is rotated while holding the drive gear, replace the clutch assembly.



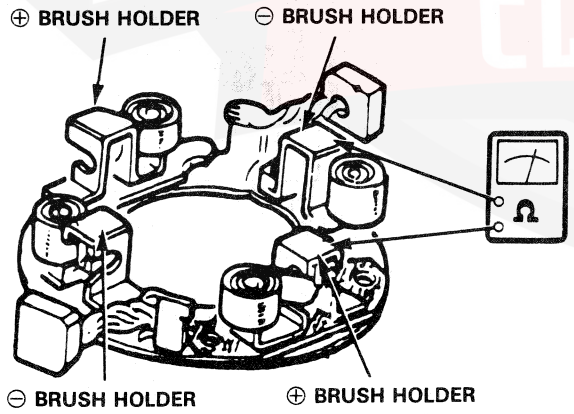
If the gear is worn or damaged, replace the overruning clutch assembly; the gear is not available separately.

NOTE: Check condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

Brush Holder Test

With an ohmmeter, check that no continuity exists between the positive (+) and negative (−) brush holder.

If continuity exists, replace the brush holder assembly.



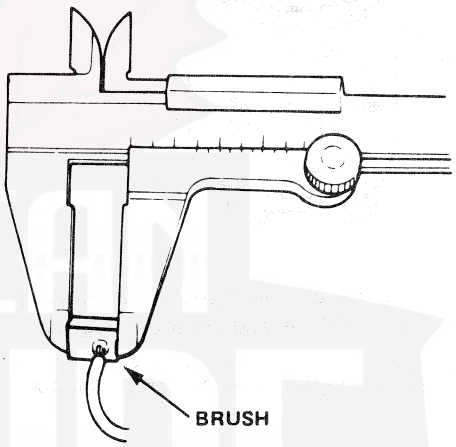
Brush Inspection

Measure brush length. If not within service limit, replace the armature housing and brush holder assembly.

Standard (New):
ND: 14.5–15.5 mm (0.57–0.61 in.)
Mitsuba: 14.3–14.7 mm (0.57–0.58 in.)

Service Limit:
ND: 8.5 mm (0.33 in.)
Mitsuba: 9.3 mm (0.37 in.)

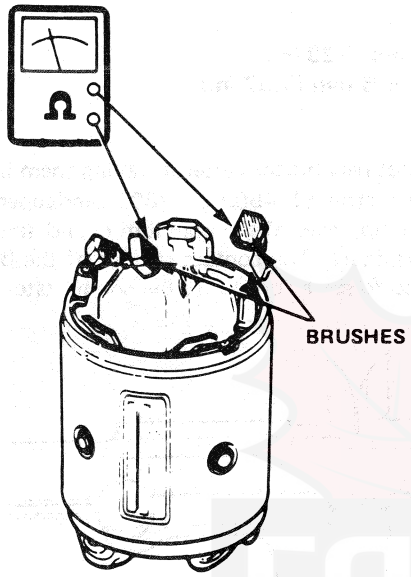
NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to same contour as the commutator.



Starter Field Winding Test

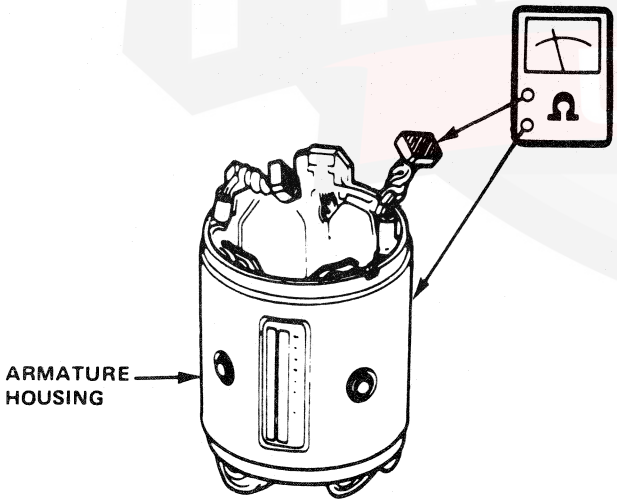
1. Using an ohmmeter, check that continuity exists between the brushes.

   If no continuity, replace the armature housing.



2. With an ohmmeter, check that no continuity exists between the field coil and armature housing.

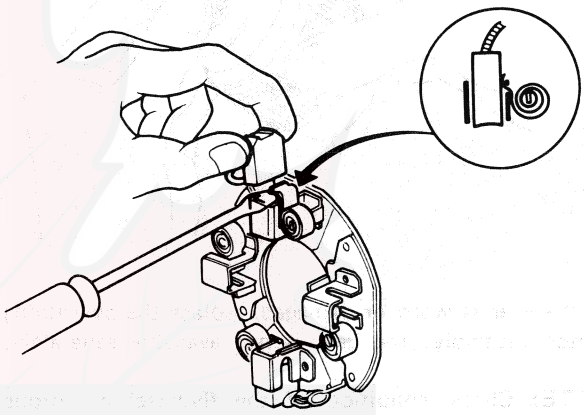
   If continuity exists, replace the armature housing.



Starter Reassembly

Reassemble the starter in the reverse order of disassembly.

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.

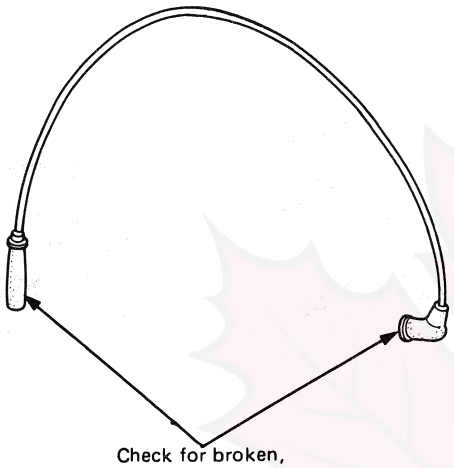


2. Install the armature in the housing. Next pry back each brush spring again and push the brush down until it seats against the commutator, then release the spring against the end of the brush.

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.

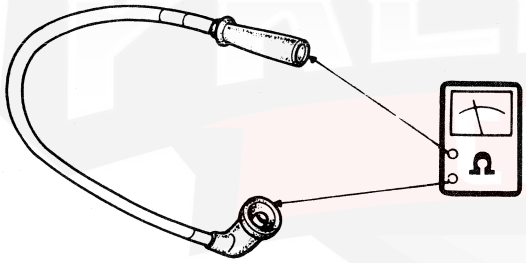
1. Check condition of the wire terminals. If any terminal is corroded, clean it, and if it is broken or distorted, replace the wire.



Check for broken, corroded, or bent terminals.

2. Connect ohmmeter probes and measure resistance.

   Ignition Wire Resistance: 25,000 ohms maximum.



   If resistance exceeds 25,000 ohms, replace the ignition wire.

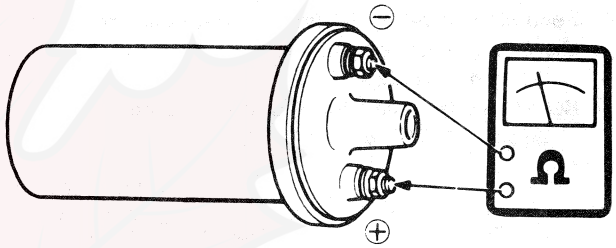
Ignition Coil Test

Carbureted Engine:

1. With the ignition switch OFF, connect ohmmeter probes across the positive and negative primary winding terminals of the ignition coil, and measure resistance.

   Primary Winding Resistance:
   1.06 to 1.24 ohms at 20°C (70°F)

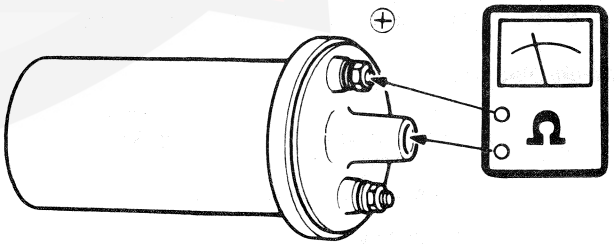
   NOTE: Resistance will vary with coil temperature.



2. Turn the ignition switch OFF. Connect ohmmeter probes to the secondary winding terminal and primary winding positive terminal, and measure resistance.

   Secondary Winding Resistance:
   7,400 to 11,000 ohms at 20°C (70°F)

   NOTE: Resistance will vary with coil temperature. Replace the coil if resistance reading is outside limits.



(cont'd)

Ignition Coil Test (cont'd)

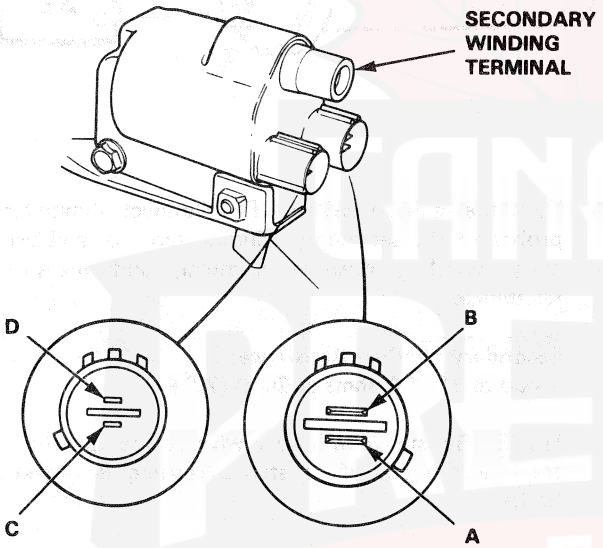
Fuel-Injected Engine:

1. With the ignition switch OFF, disconnect the primary connectors and the coil wire.

2. Using an ohmmeter, check the resistance between the terminals. Replace the coil if the resistance is not within specifications.

   NOTE: Resistance will vary with the coil temperature. Resistances are for 20°C (70°F)

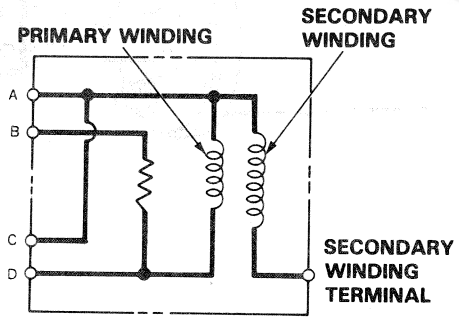
   Primary Winding Resistance (between the A and D terminals):
   1.2–1.5 ohms
   Secondary Winding Resistance (between the A and secondary winding terminals):
   11,074–11,526 ohms
   Resistance between the B and D terminals:
   Approx. 2,200 ohms



PRIMARY WINDING TERMINALS

3. Check for continuity between the A and C terminals. Replace the coil if there is no continuity.

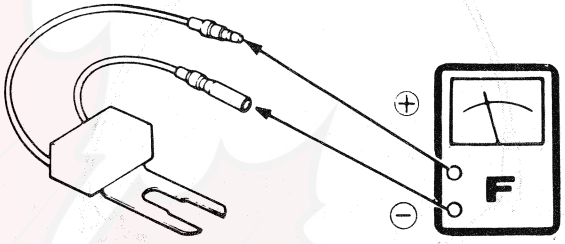
Circuit Diagram



Radio Noise Condenser Capacity Test

Use a commercially available condenser tester.

Condenser Capacity: 0.47 ± 0.09 microfarads (μF)

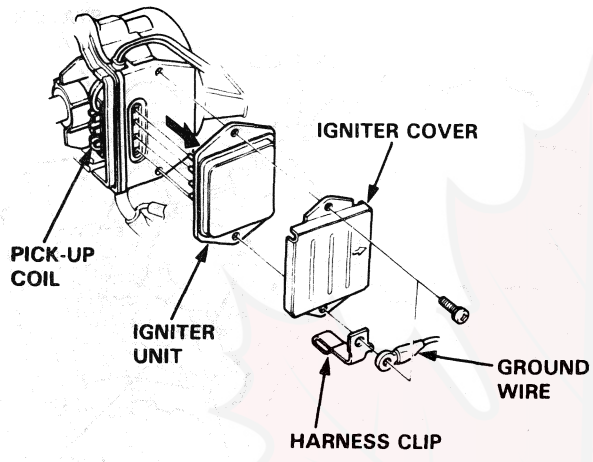


NOTE: The radio noise condensers are intended to reduce ignition noise; however, condenser failure may cause the engine to stop running.

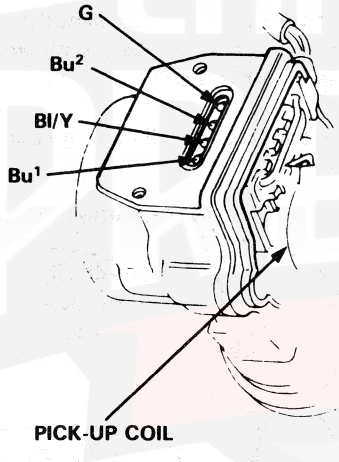
Igniter Unit Test

Toyo Denso:

1. Remove the igniter cover and pull out the igniter unit.



2. Check for voltage between the Bu^1 terminal and body ground, then the BI/Y terminal and body ground, with the ignition switch ON.
   There should be battery voltage.

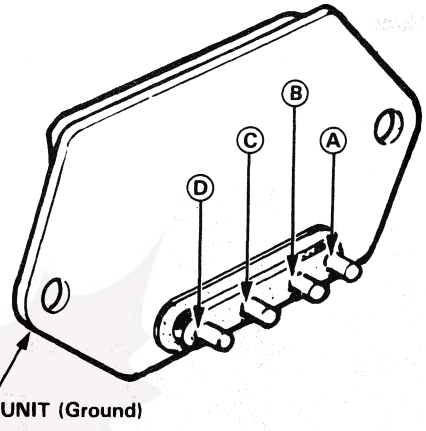


3. Measure resistance between the G and Bu^2 terminals on the pick-up coil. Replace the pick-up coil if the resistance is not within specifications.

   NOTE: Resistance will vary with the coil temperature.

   Pick-up Coil Resistance:
   Approx. 750 ohms at 20°C (70°F)

4. Check for continuity in both directions between Ⓐ and Ⓑ terminals on the igniter output. (RX100 scale).
   There should be continuity in only one direction.



5. Connect ohmmeter positive probe to Ⓓ terminal, and negative probe to the igniter unit (ground), then measure resistance on the igniter input.

   NOTE: Resistance will vary with the unit temperature.

   Igniter Input Resistance:
   50,000 ohms or more at 20°C (70°F)

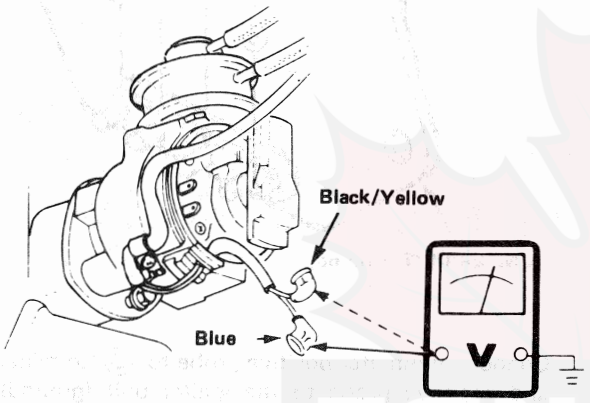
   NOTE: When installing the igniter, pack silicone grease in the connector housing.

(cont'd)

Igniter Unit Test (cont'd)

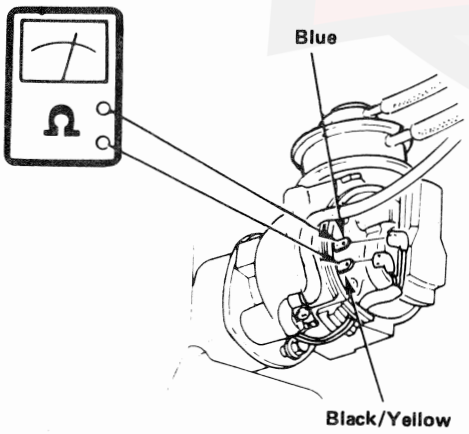
1. Disconnect the lead wires from the igniter unit. Check voltage between the blue wire and body ground, then the black/yellow wire and body ground, with the ignition switch ON. There should be battery voltage.

Hitachi:



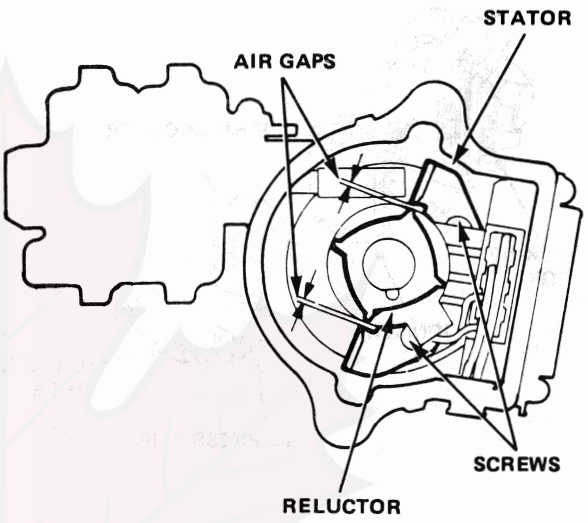
2. With the lead wires disconnected, check continuity between the igniter unit terminals using an ohmmeter. (R x 100 scale)
There should be no continuity with a positive probe to the black/yellow wire terminal and a negative probe to the blue wire terminal.
There should be continuity with a positive probe to the blue wire terminal and a negative probe to the black/yellow wire terminal.

Hitachi:

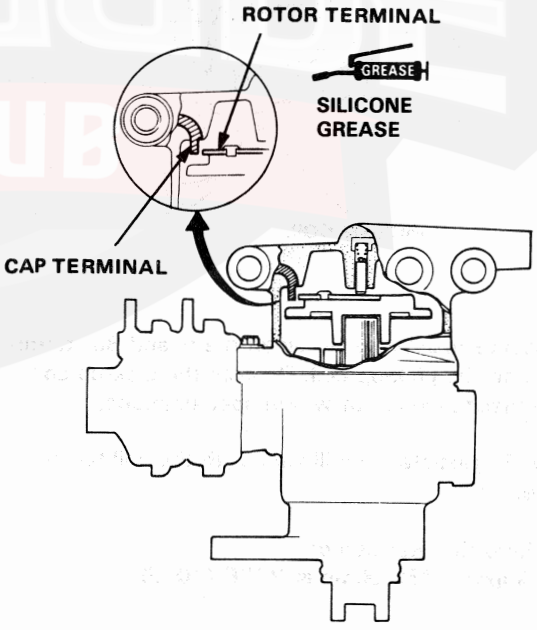


Distributor Top End Inspection

1. Check to be sure that the air gaps are equal.
2. If necessary, back off the screws and move the stator as required to adjust.



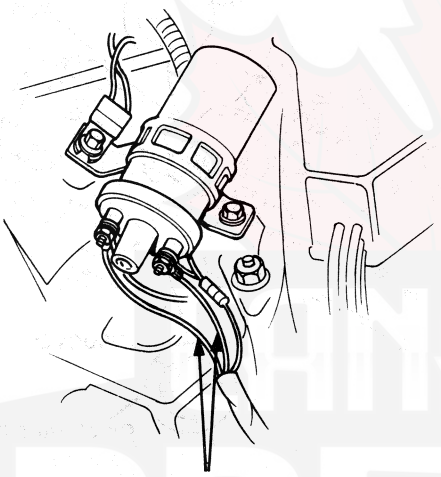
3. Check for rough or pitted rotor and cap terminals.
4. Scrape or file off the carbon deposits.
Smooth the rotor terminal with an oil stone or #600 sandpaper if rough.
5. Apply a thin coat of silicone grease to the tip of the rotor.

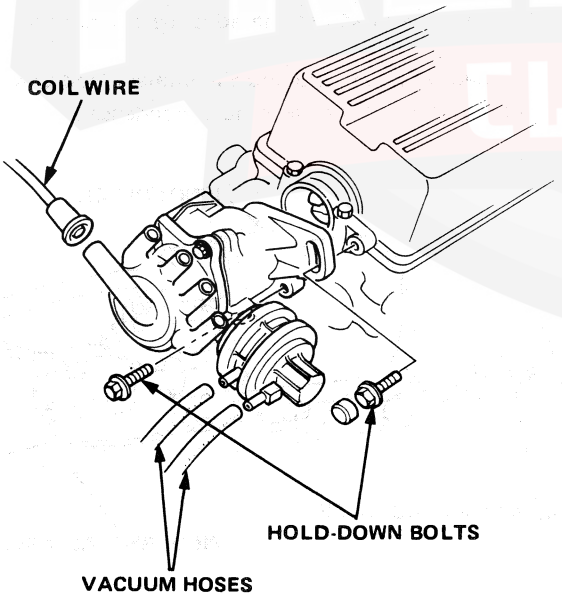


Distributor Removal

Carbureted Engine:

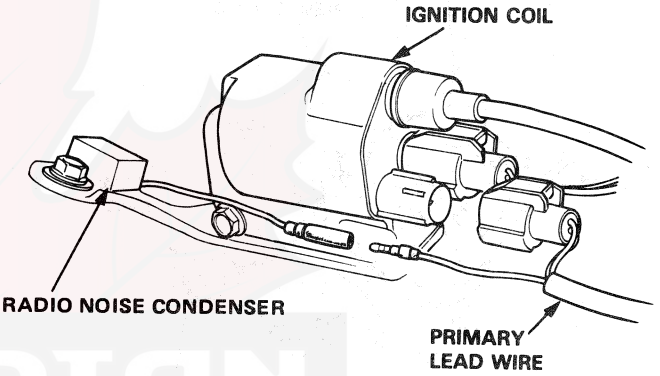
1. Disconnect the spark plug wires.
2. Disconnect the hoses from the advance diaphragm.
3. Disconnect the coil wire and the primary lead wires from the ignition coil.
4. Remove the distributor hold-down bolts and remove the distributor from the cylinder head.



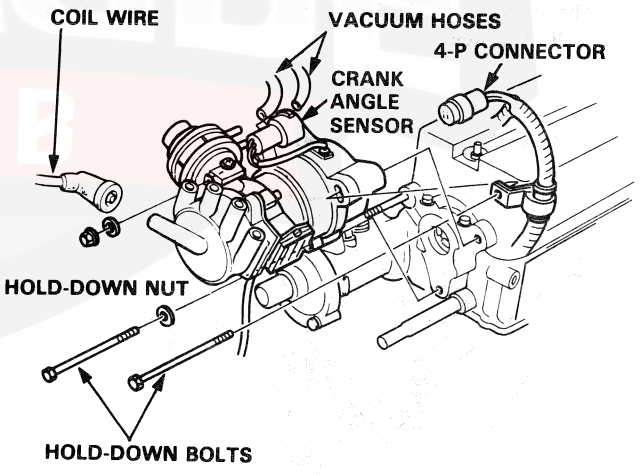


Fuel-Injected Engine:

1. Disconnect the spark plug wires.
2. Disconnect the hoses from the advance diaphragm.
3. Disconnect the coil wire and the primary lead from the ignition coil and radio noise condenser.



4. Disconnect the 4-P connector from the crank angle sensor on the distributor.



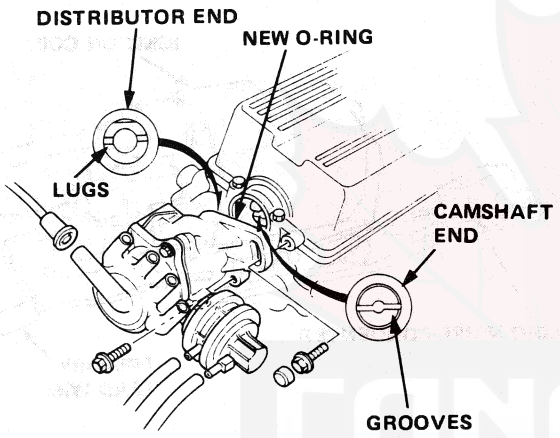
5. Remove the distributor hold-down bolts and nut, then remove the distributor from the cylinder head.

Distributor Installation

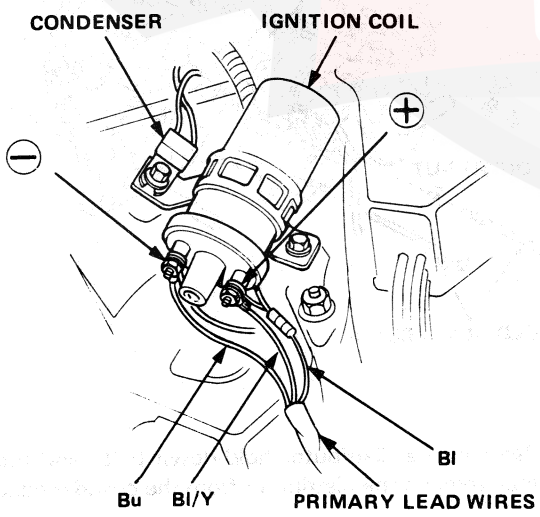
Carbureted Engine:

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

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



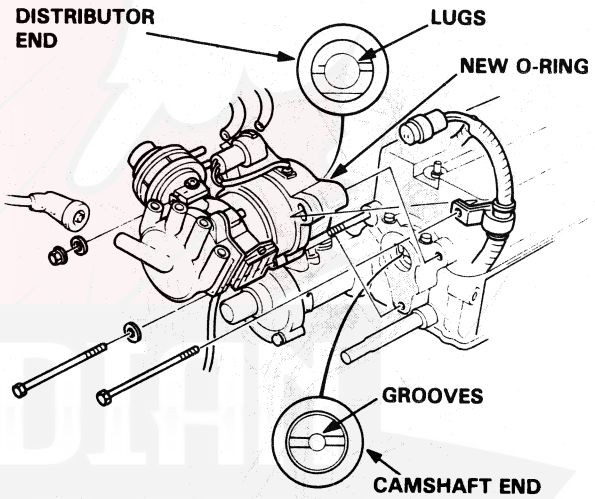
3. Install the adjusting bolts and tighten temporarily. Final tightening should be done after the timing has been adjusted.
4. Connect the hoses to the advance diaphragm, and the primary lead wires and coil wire to the ignition coil as shown.



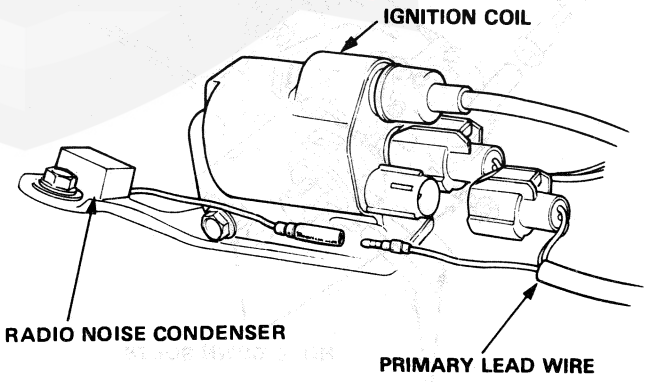
Fuel-Injected Engine:

1. Coat a new O-ring with engine oil, then install it on the distributor housing.
2. Slip the distributor into position.

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

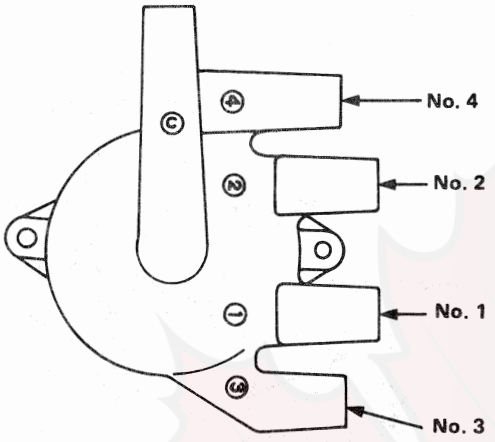


3. Install the adjusting bolts and tighten temporarily. Final tightening should be done after the timing has been adjusted.
4. Connect the hoses to the advance diaphragm.
5. Connect the coil wire and the primary lead wire to the ignition coil and radio noise condenser.

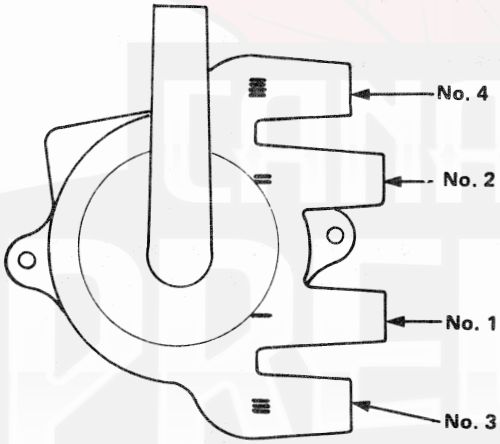


6. Connect the plug wires as shown.

Hitachi:



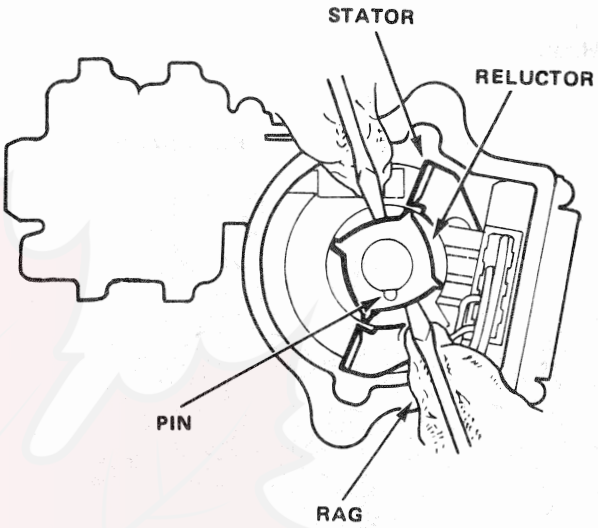
Toyo Denso:



7. Set the timing with a timing light as shown on page 25-25.

Reluctor Replacement

1. Carefully pry up the reluctor by using two screwdrivers as shown. Do not damage the reluctor and stator.



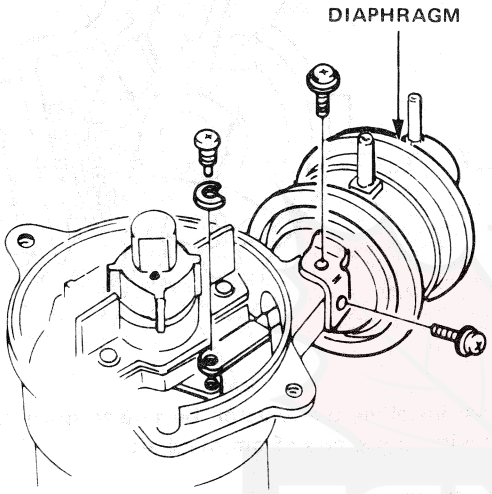
2. When installing the reluctor, be sure to drive in the pin with its gap away from the shaft.

NOTE: The number or letter manufacturing code on the reluctor must always face up.

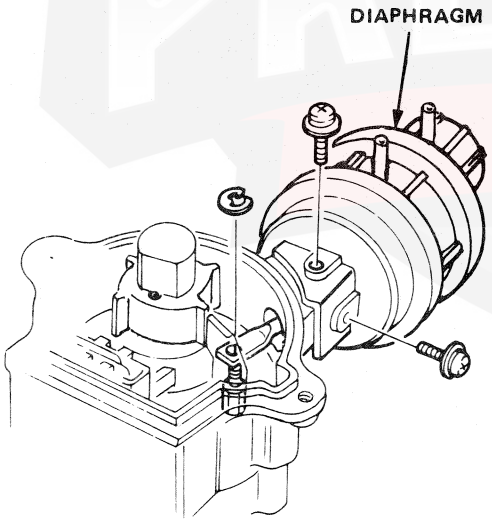
Advance Diaphragm Replacement

1. Remove the advance diaphragm mount screws.
2. Disconnect the diaphragm arm then pull the diaphragm out of the distributor.

Hitachi:

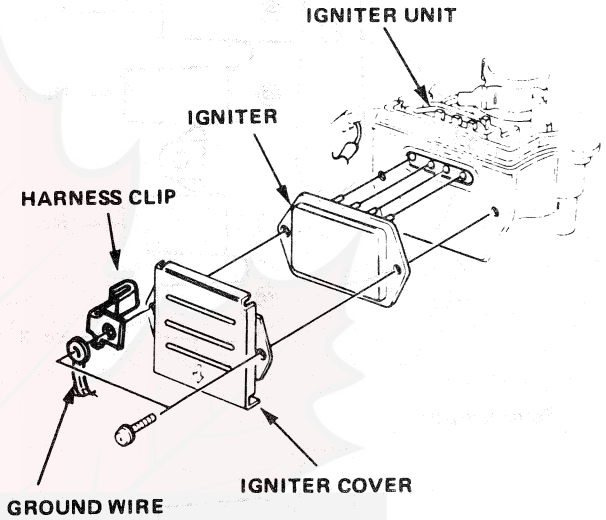


Toyo Denso:

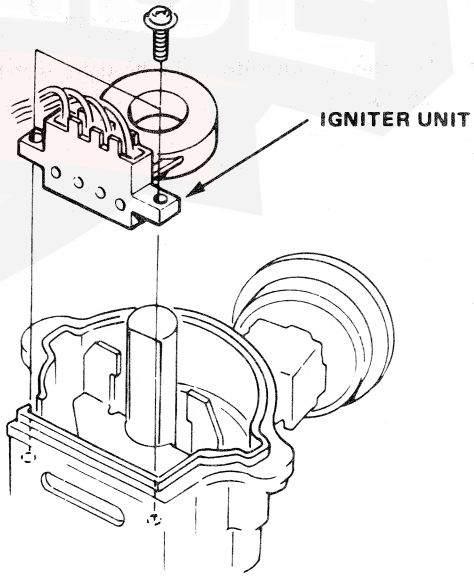


Igniter Unit Replacement (Toyo Denso)

1 Remove the igniter cover and pull out the igniter.



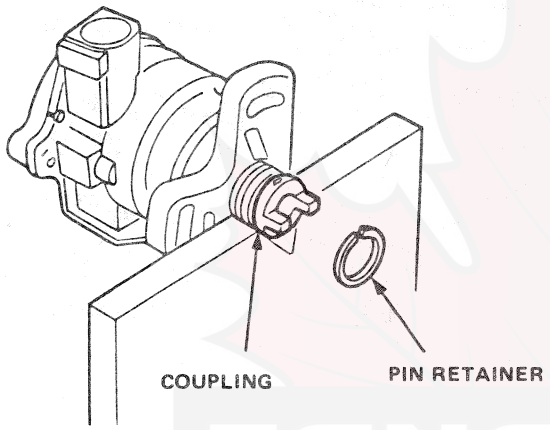
2. Remove the reluctor (see page 25-19) and pull the igniter unit out from the rotor shaft by removing the screws.



Distributor Shaft Removal/Installation

Removal

1. Slide off the pin retainer being careful not to stretch it.
2. Remove the roll pin.



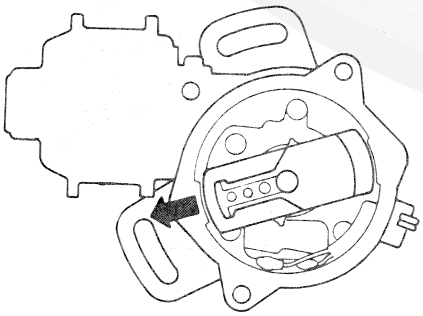
3. Remove the shaft and coupling from the housing and replace parts as necessary.

Installation

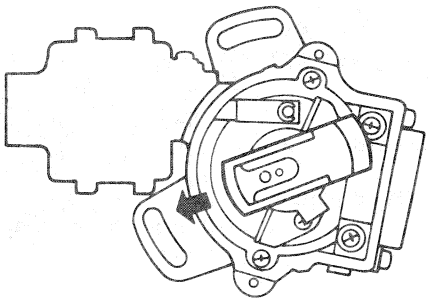
Install the distributor shaft in the reverse order of removal.

1. Install the rotor, then turn it so that it faces in the direction shown (toward the No. 1 cylinder mark on the cap).

Hitachi:

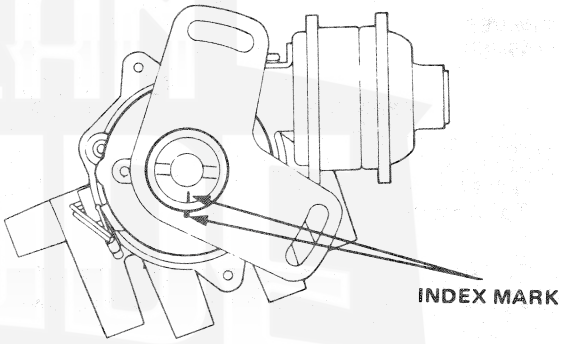


Toyo Denso:

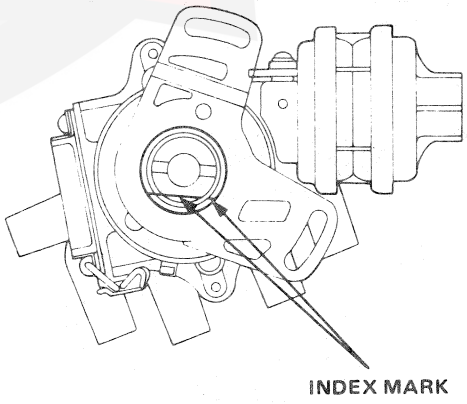


2. Set the thrust washer and coupling on the shaft.
3. Check that the rotor is still pointing toward No. 1 cylinder, then align the index mark on the housing with the index mark on the coupling.
   Now, drive in a new pin and secure it with the pin retainer.

Hitachi:

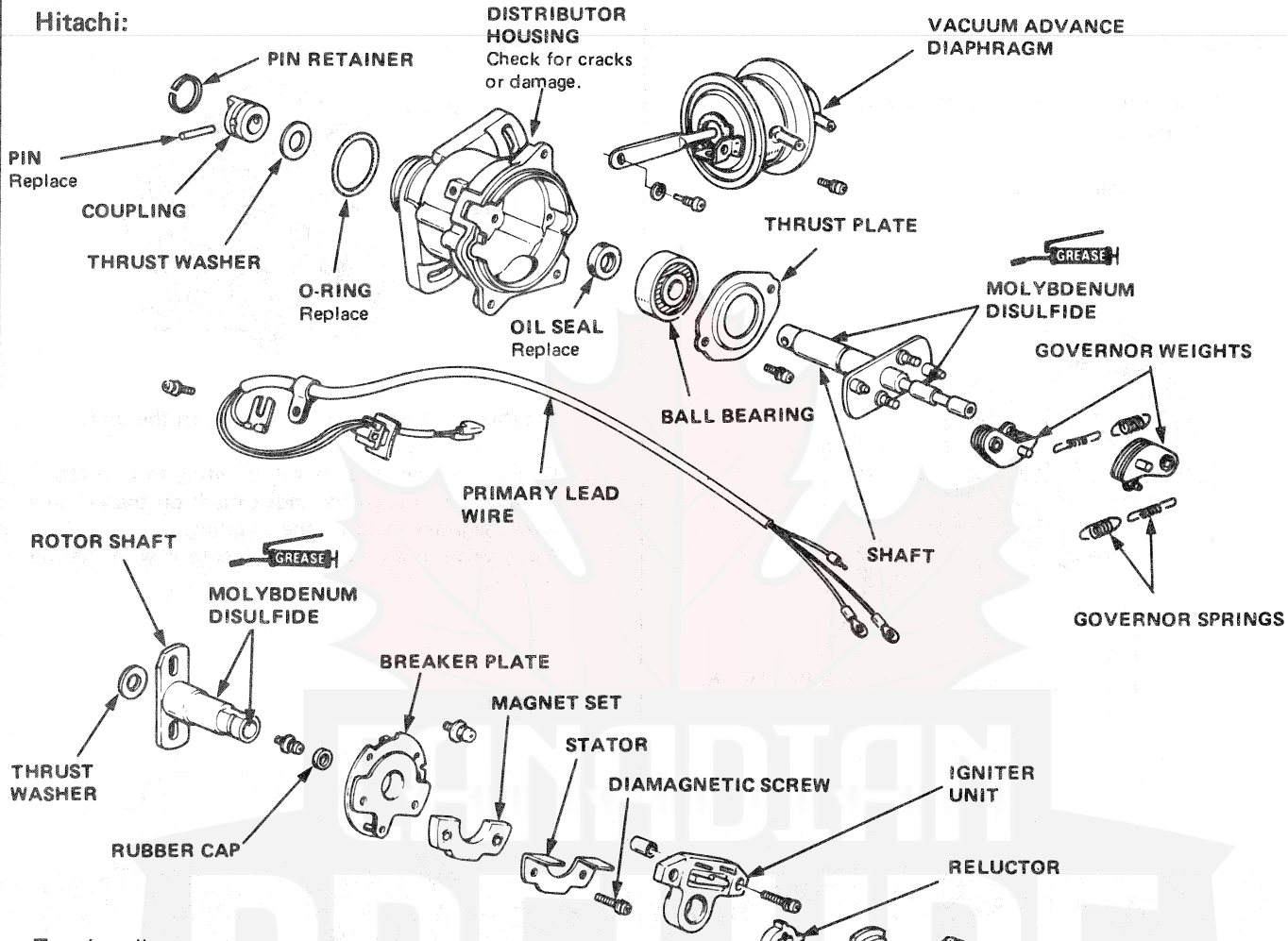


Toyo Denso:



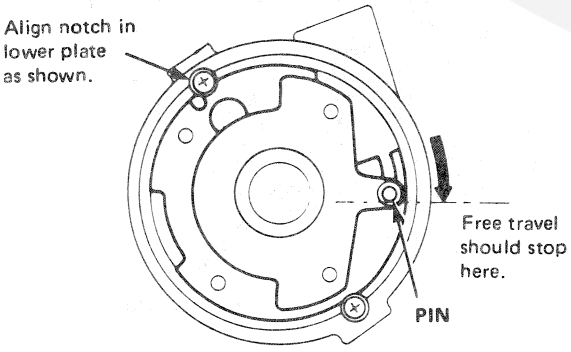
Distributor Overhaul (Carbureted Engine)

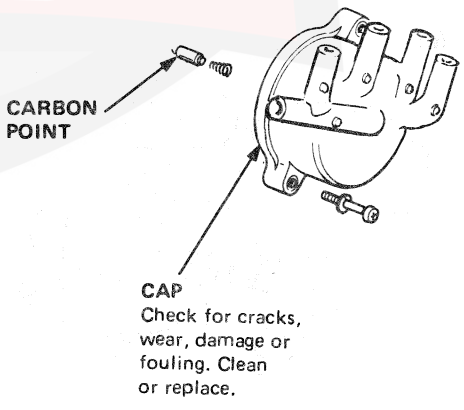
Hitachi:

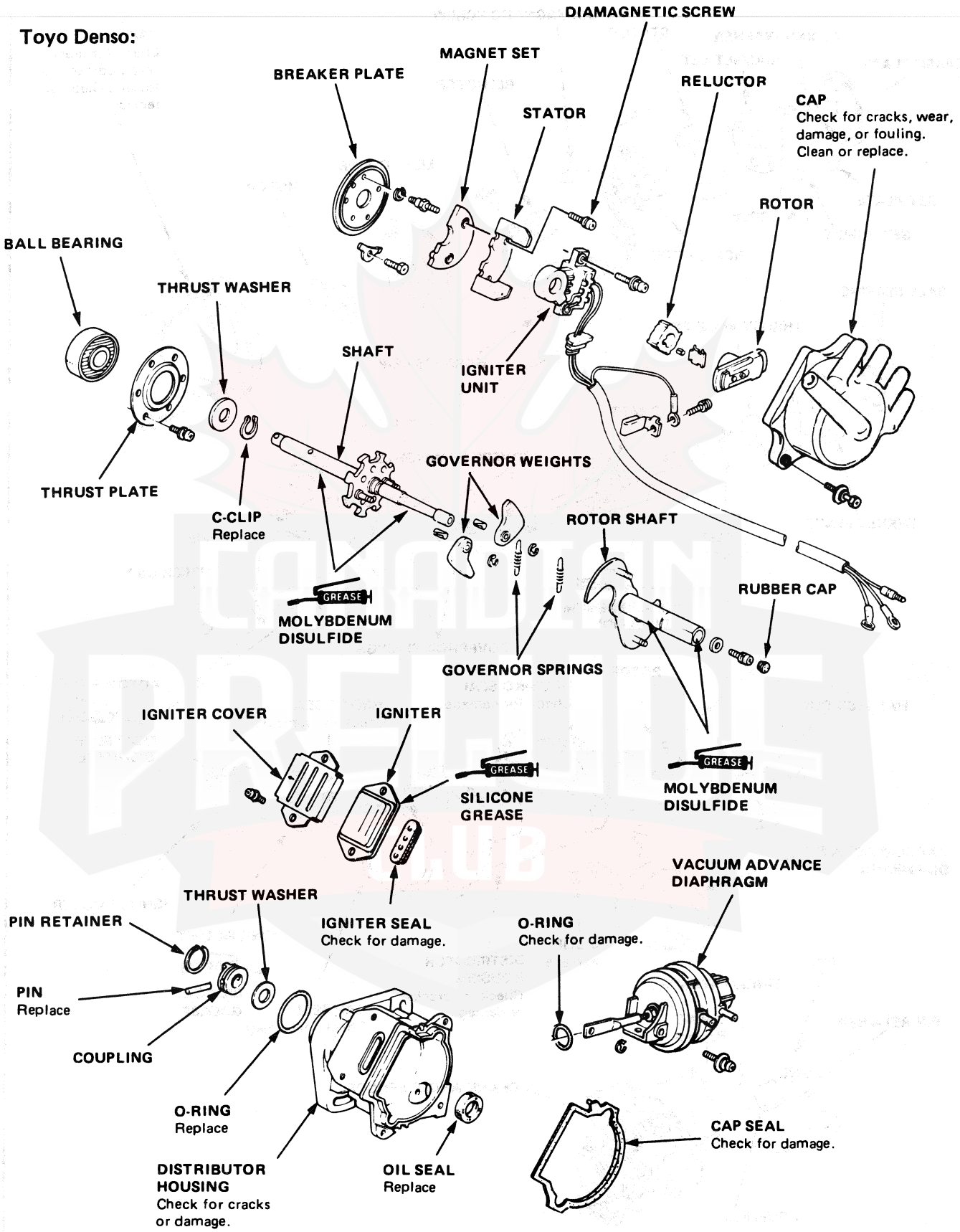


To reinstall:

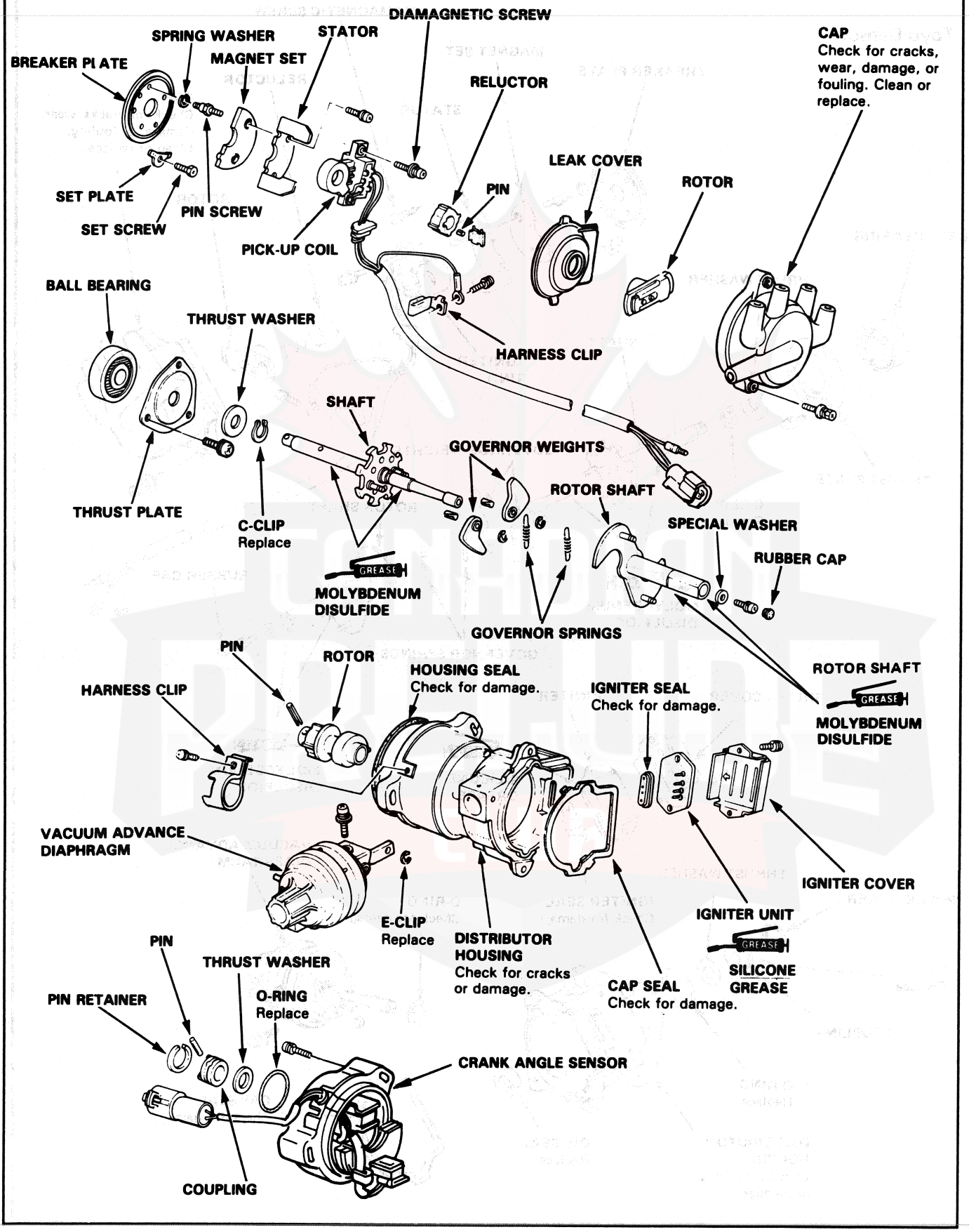
1. Align the breaker plate in the distributor housing as shown before tightening the hold-down screws.
2. Check that the upper plate moves freely. Be sure the diaphragm arm attachment pin does not rotate past the end of the slot in the lower plate. If it does, adjust the range of free travel by forcibly rotating the plate past its limit in the opposite direction, then recheck.







Distributor Overhaul (Fuel-Injected Engine)



Ignition Timing Inspection and Setting

1. Remove the rubber cap from the inspection window of the cylinder block.

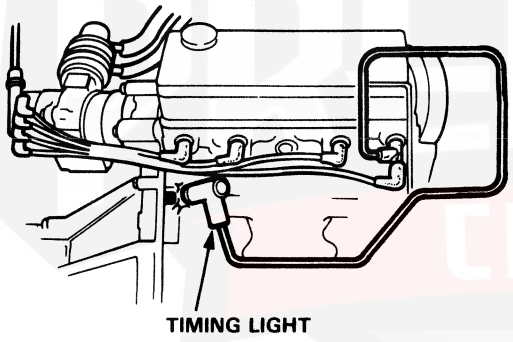
2. Start the engine and allow it to warm up (cooling fan comes on).

3. Disconnect the vacuum hoses from the vacuum advance diaphragm and, while the engine idles, check each hose for vacuum.
   - The inside hose (#2 for Carbureted engine) should have vacuum.
   - The outside hose (#15 for Fuel-Injected engine) or #28 for Carbureted engine) should not have vacuum.

   After checking for vacuum, plug the hoses.

   If vacuum is not as specified, see Timing Control System (see section 12).

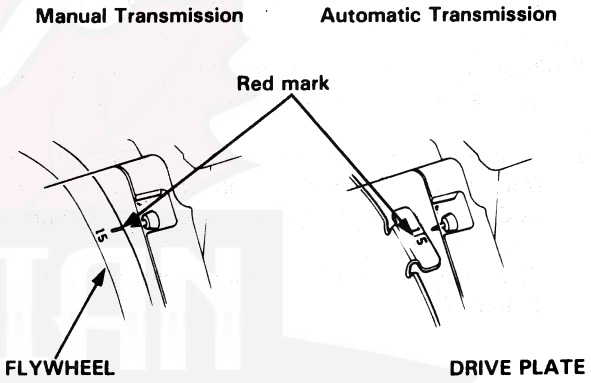
4. Connect an advance tester to the engine, while the engine idles, point a timing light toward the flywheel (for M/T), or the drive plate (for A/T).



5. Adjust ignition timing, if necessary, to the following specifications.

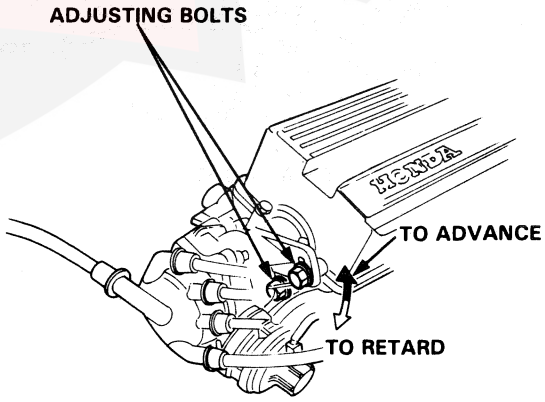
Ignition Timing
Carbureted engine:
- **Manual Transmission:20° ± 2° BTDC (Red) at 800 ± 50 rpm in neutral.**
- **Automatic Transmission: 12°±2° BTDC (Red) at 800 ± 50 rpm in gear.**

Fuel-Injected engine:
- **All models: 15° ± 2° BTDC (Red) at 750 ± 50 rpm in neutral.**



6. Loosen the distributor adjusting bolts (and nut for Fuel-Injected engine), and turn the distributor housing counterclockwise to advance the timing, or clockwise to retard the timing.

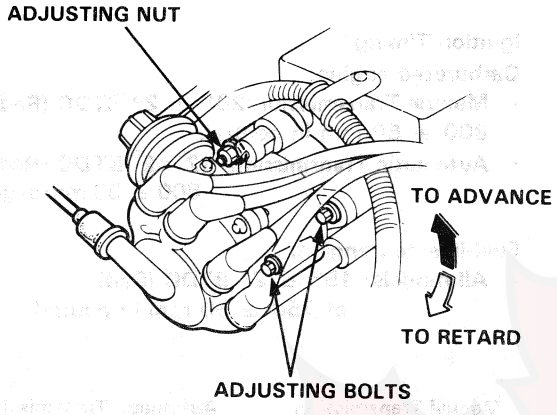
Carbureted engine:



(cont'd)

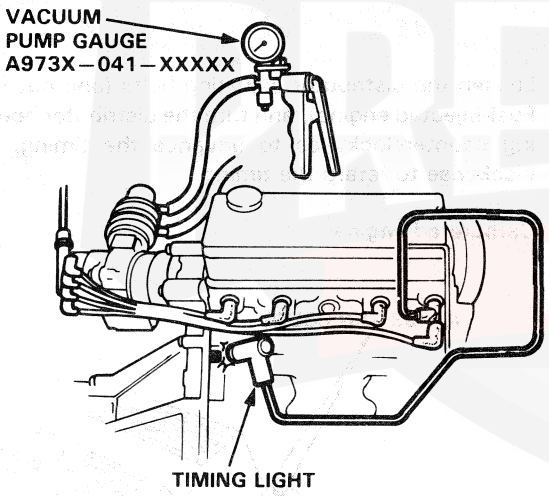
Timing Inspection and Setting (cont'd)

Fuel-Injected Engine:

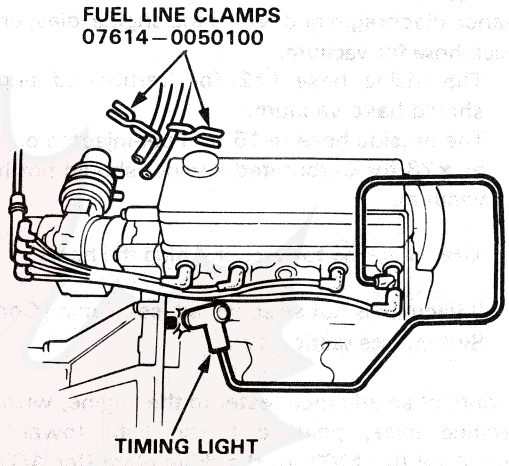


7. Tighten the adjusting bolts (and nut for Fuel-Injected engine), recheck the timing.

8. Disconnect the outside vacuum hose (#15 or #25) from the diaphragm and apply vacuum (more than 500 mmHg, 20 in.Hg), to the outside diaphragm with a vacuum pump.
   The timing mark (Red) should advance by an additional 4°.



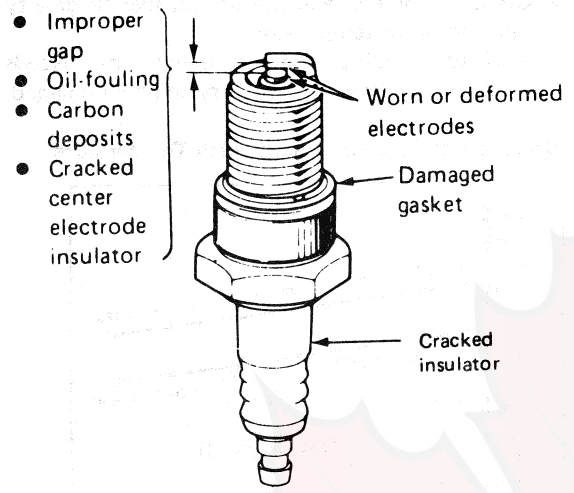
9. Disconnect the vacuum hoses from the vacuum advance diaphragm and pinch the end of the hoses using fuel line clamps (07614—0050100).
   The timing should be 4°BTDC.



10. If advance is not as specified, check the advance diaphragm and the distributor advance mechanism.

Spark Plug Inspection

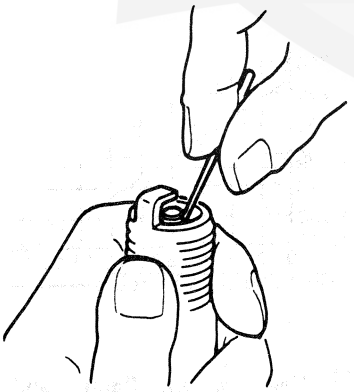
1. Inspect the electrodes and ceramic insulator for:



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 mixure
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too low
- Excessive idling/low speed running
- Faulty automatic choke (Carbureted engine)
- Clogged air cleaner element
- Deteriorated ignition coil, or ignition wires

2. Clean the electrodes with a spark plug cleaning machine, or with a wire brush. Clean between the outer shell and center insulator with a stiff wire as shown. Clean plug threads with a wire brush.

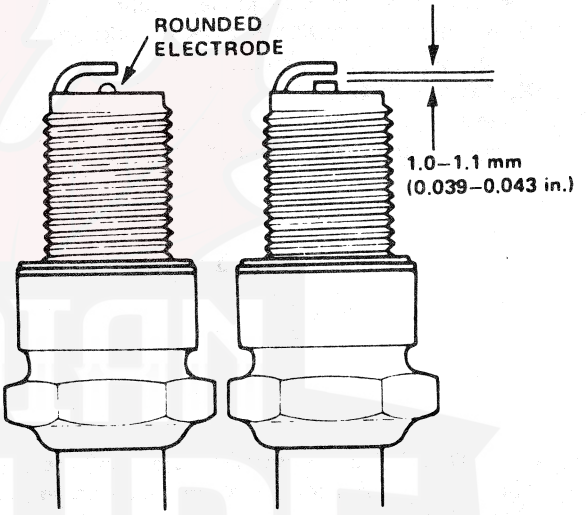


3. Replace the plug if the center electrode is rounded as shown below.

Standard plug:

Carbureted Engine:
BPR6EY-11 (NGK), W20EXR-U11 (ND)

Fuel-Injected Engine:
BPR5EY-11 (NGK), W16EXR-U11 (ND)
(for all normal driving)
BPR6EY-11 (NGK), W20EXR-U11 (ND)
(for hot climates or continuous high speed driving)



4. Adjust the gap with a suitable gapping tool.

Electrode Gap: 1.0–1.1 mm (0.039–0.043 in.)

5. Screw the plugs into the cyinder 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.

Battery Inspection and Charging

Inspection

1. Check the battery case for loose parts, cracked case or top. Inspect cells for sulfation. Replace if damaged or sulfated.

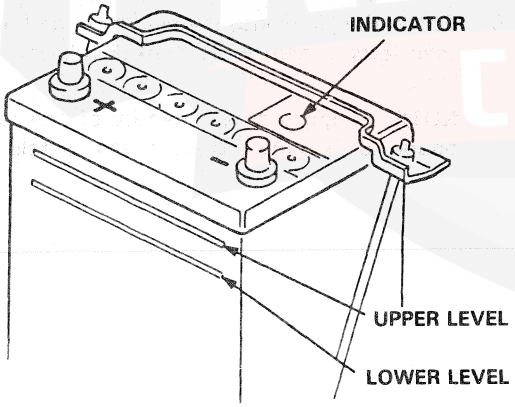
2. Check the battery electrolyte level.

   Check the electrolyte level using the UPPER and LOWER marks on the side of the case, or indicator on the top. If the level is at or below the LOWER mark, or indicator is red, add electrolyte:

   YUASA, MATSUSHITA or FURUKAWA:
   Peel off the strip of tape over the caps, then remove the caps and add electrolyte until the level rises to the UPPER mark or indicator turns blue (see NOTE in step 3).

   DELCO or HONDA:
   Electrolyte cannot be added because these batteries are permanently sealed.

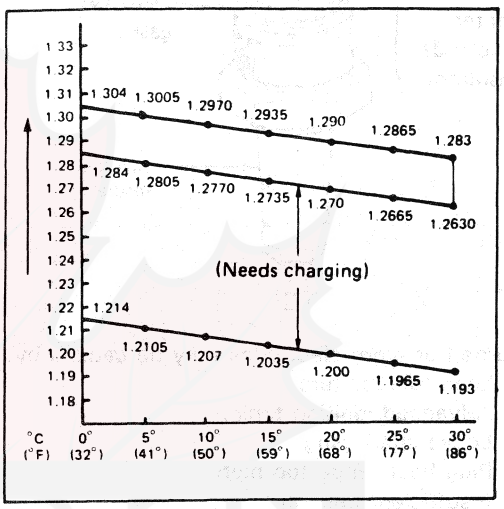
CAUTION: Battery electrolyte is a sulphuric acid solution. Do not allow it to contact painted surfaces, clothing or skin. If it does, rinse with water immediately to minimize the damage.
Do not overfill the battery.



3. Check the electrolyte specific gravity.

   - Use a hydrometer and the correct specific gravity range for your temperature.
     – If the reading is at, or below, the "Needs charging" level, the battery must be charged.

Variation of Specific Gravity with Temperature

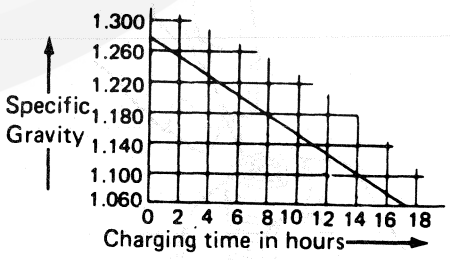


NOTE: On a sealed battery, check the specific gravity of the electrolyte by looking at the indicator on the top of the battery. Charge the battery if the indicator is white. Follow the indicator description on the battery for other conditions.

Charging

4. Charge at 10% of the ampere-hour rating until the battery specific gravity is at least 1.250.

SLOW CHARGE PROCEDURE

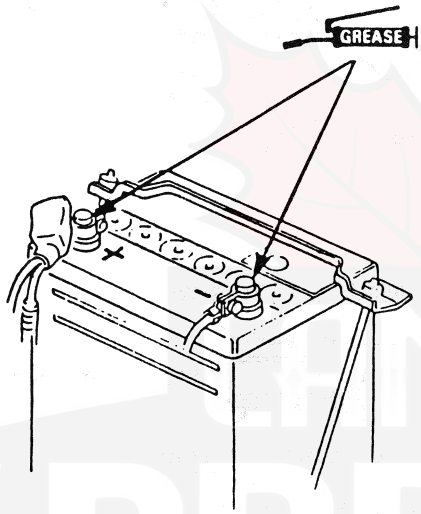


WARNING Keep sparks, flames and cigarettes away while charging battery.

5. Keep the battery and terminals clean. If necessary, brush with baking-soda solution and flush with clean, lukewarm water. Check for loose terminal clamps.

6. If clamps become corroded inside, clean out with a wire brush or coarse emery cloth.

   NOTE: Coat terminals lightly with petroleum jelly to retard corrosion. Baking soda may be mixed with the jelly for additional protection against acid build-up.



Charge Warning Light Test

NOTE: Before testing, check the wire harness connections and alternator belt tension.

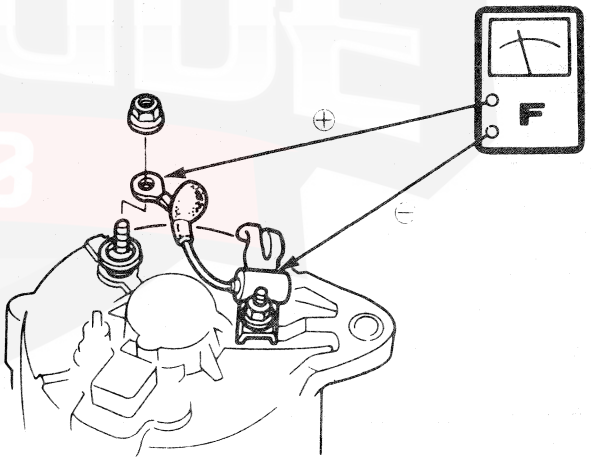
1. Turn the ignition switch on. The charge warning light should come on.
   If it does not come on, unplug the voltage regulator connector and short the pin of the white/blue wire to ground (located inside the alternator on fuel-injected cars).

   - If the warning light still does not come on, check the fuse, connectors (main wire harness, engine wire harness, dashboard wire harness and warning light panel) and related wires for an open circuit. Check the bulb, and replace it if burned out.

2. Start the engine and let it idle. The charge warning light should go off. If it stays on all the time, check the "alternator sensor" fuse (located in the under-hood fuse box), and its wires. If the fuse and wires are OK, check alternator output.

Condenser Capacity Test

Disconnect the condenser terminal and short it out to any convenient ground to discharge the remaining energy. Then, check for capacity, using a condenser tester.

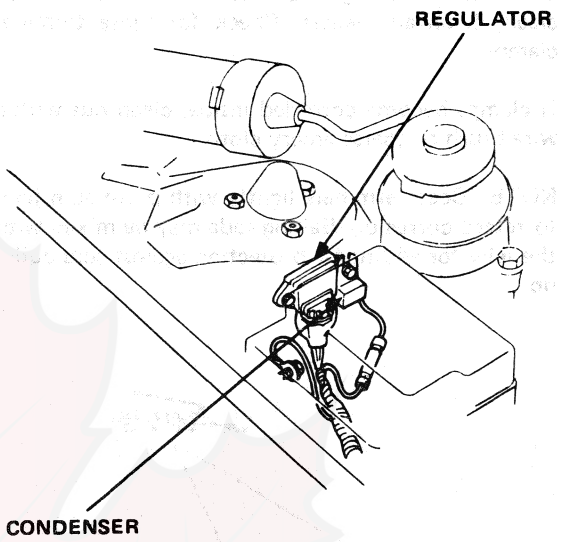


Condenser capacity: 0.5 μF ± 0.1 μF

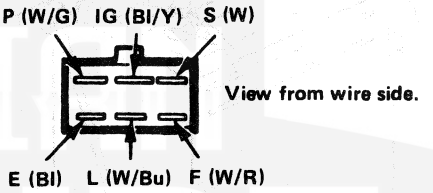
Voltage Regulator Test

Carbureted Engine Only:

1. Remove the regulator with the condenser, but leave the 6-P connector connected.



2. Measure voltages between the E (ground; black) and each terminal.



IG SW position / Terminal	OFF, ACC	ON (Engine stopped)	ON (Engine idling)	1000 rpm	2000 rpm	3000 rpm
S	Battery voltage	←	Charging voltage: 14.5–15.1 V (13.8–14.4 V at 60°C, 140°F)	←	←	←
IG	0 V	Battery voltage	Charging voltage: 14.5–15.1 V (13.8–14.4 V at 60°C, 140°F)	←	←	←
P	0 V	←	7.5 V approx.	←	←	←
F	Battery voltage	9–11 V	5–7.5 V	9 V approx.	11 V approx.	12 V approx.
L	0 V	←	Charging voltage: 14.5–15.1 V (13.8–14.4 V at 60°C, 140°F)	←	←	←

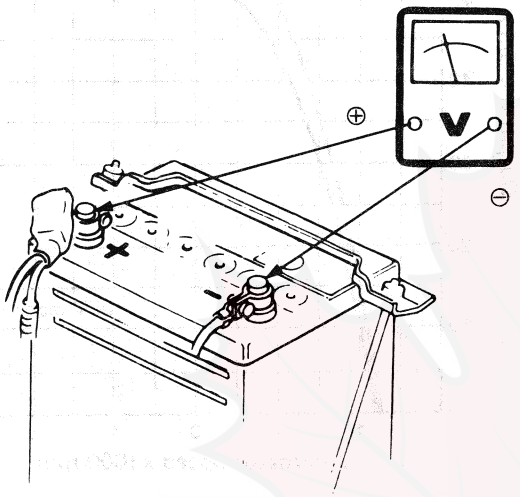
3. Check for loose harness coupler, broken wires or blown fuse if the measurements do not fall within the limits shown above.

4. If the voltage at the terminal F is out of the specification, replace the regulator and retest.

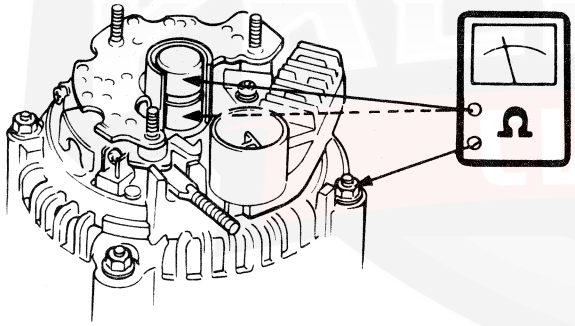
Alternator and Regulator Test

Fuel-Injected Engine:

1. Check the alternator belt tension, and adjust or replace the belt as necessary.
2. Start the engine and take the voltage reading at the battery under no load.



- If the reading is 13.9—15.1 volts, check the alternator output.
- If the reading is more than 15.1 volts, remove the rear end cover and brush holder, and check for continuity between each slip ring and ground.

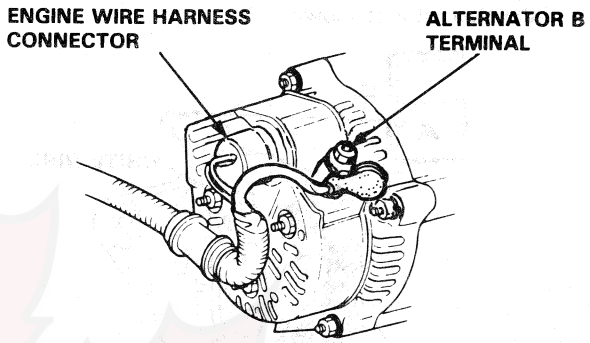


— If either slip ring or both are grounded, the rotor coil is poorly insulated and calls for replacement.

— If there is no continuity between each slip ring and ground, replace the voltage regulator.

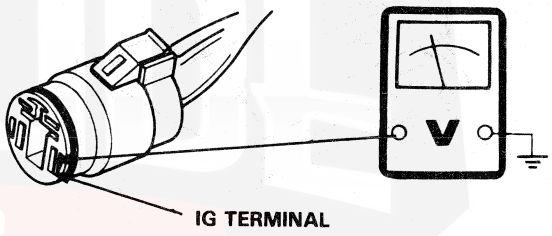
- If the reading is about 12 volts, go on to the step 3.

3. With the engine off, check the alternator B terminal and engine wire harness connector for secure connection.



- If loose or not connected securely, repair and repeat step 2.
- If OK, go on to the step 4.

4. Stop the engine and disconnect the engine wire harness connector from the alternator. Take the voltage reading between the connector IG terminal and ground.



- If there is no battery voltage, check the IG terminal wire (black/yellow) and No. 4 fuse (10A).
- If there is battery voltage, go on to the step 5.

5. Check the rectifier and stator.

- If OK, replace the voltage regulator.
- If not OK, repair or replace either the rectifier or stator and go back to step 2.

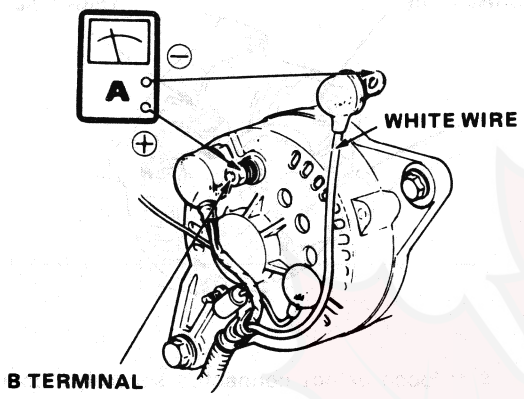
Charging

Alternator Output Test

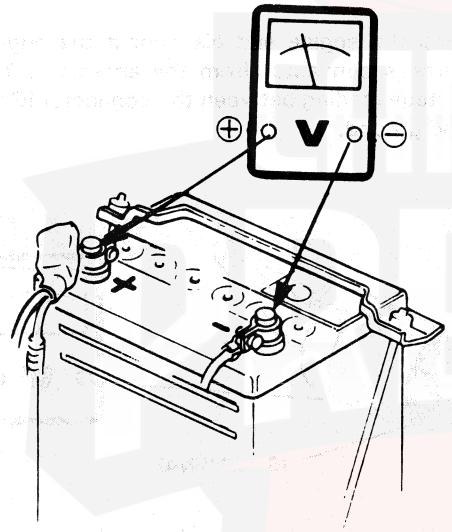
Carbureted Engine:

1. With the engine off, disconnect the white wire from terminal B on the alternator.

2. Hook up an ammeter (60 amp capacity or higher) at the alternator as shown.



3. Hook up a voltmeter at the battery as shown.

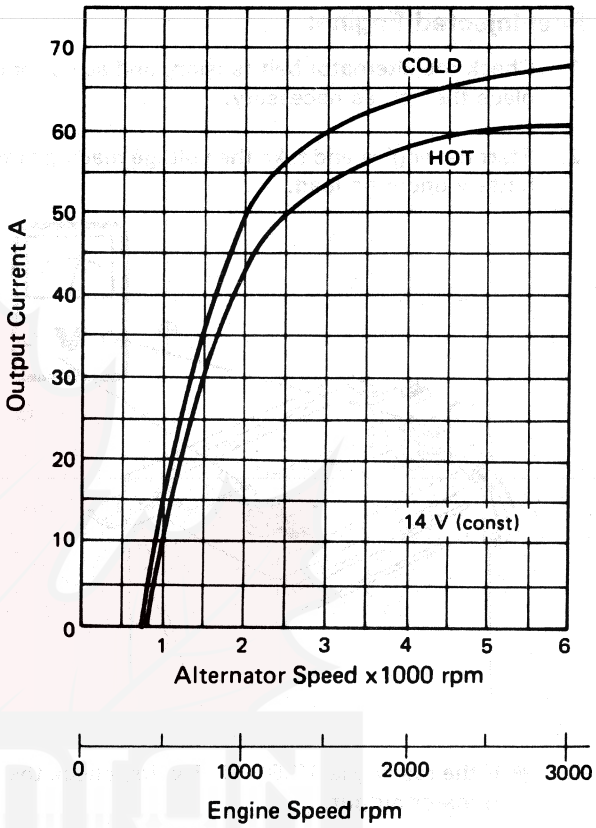


4. Start the engine.

   CAUTION: Don't let the voltage reading at the battery exceed 19 volts. If it does, shut the engine off, and then replace the voltage regulator.

5. Turn on the:
   - Headlight switch (high beam).
   - Rear window defroster switch.
   - Heater blower switch (HI).

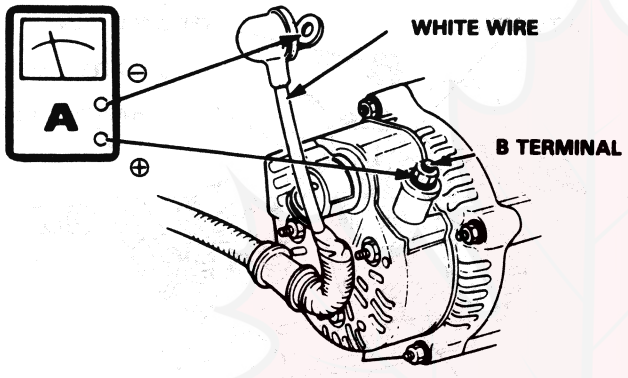
6. Check alternator output:
   If it is within the output curve shown, the alternator is OK.
   If it's not, test the regulator.



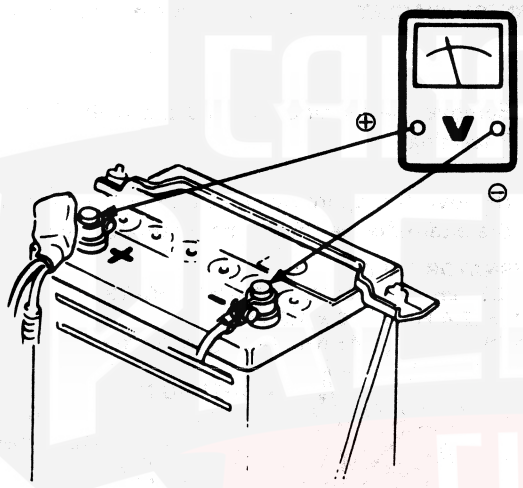
Fuel-Injected Engine:

1. With the engine off, disconnect the white wire from terminal B on the alternator.

2. Hook up an ammeter (60 amp capacity or higher) at the alternator as shown.



3. Hook up a voltmeter at the battery as shown.

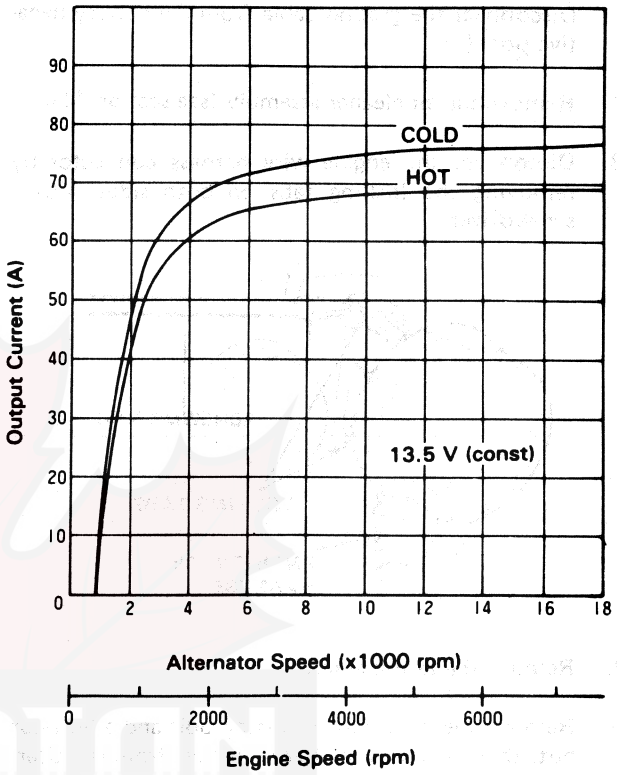


4. Start the engine.

   CAUTION: Don't let the voltage reading at the battery exceed 19 volts. If it does, shut the engine off, and then check the voltage regulator and rotor coil.

5. Turn on:
   - Headlight switch (high beam).
   - Rear window defroster switch.
   - Heater fan switch (III).

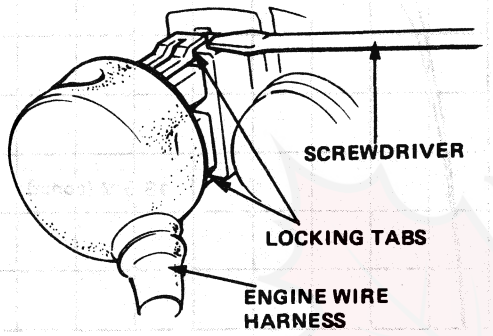
6. Check the alternator output:
   If it's within the output curve shown, the alternator is OK.
   If it's not, this is an indication that the stator coil is open. Repair or replace the alternator as necessary.



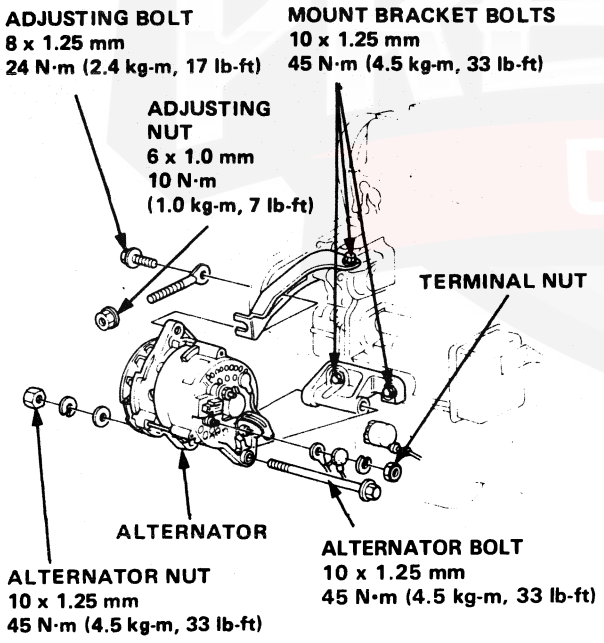
Alternator Replacement

Carbureted Engine:

1. Disconnect the ground cable from the battery negative post (−).
2. Remove the air cleaner assembly (see section 11).
3. Disconnect the engine wire harness connector by removing the locking tabs on both sides with a screwdriver.



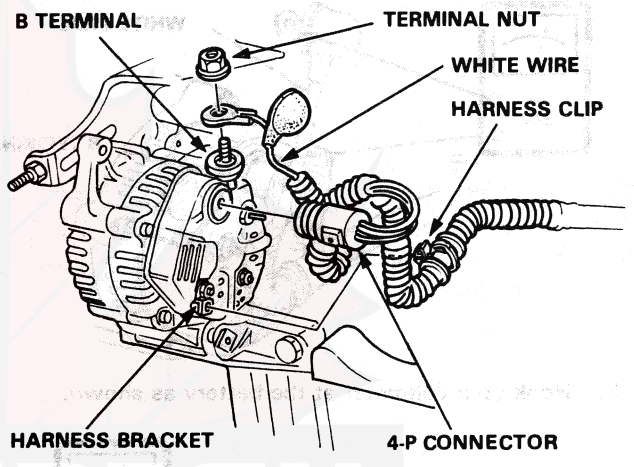
4. Remove the terminal nut.
5. Remove the alternator adjusting bolt and alternator nut, then remove the alternator belt from the alternator pulley.
6. Remove the alternator bolt and the alternator.
7. If necessary, remove the mount bracket bolts and the upper and lower mount brackets.



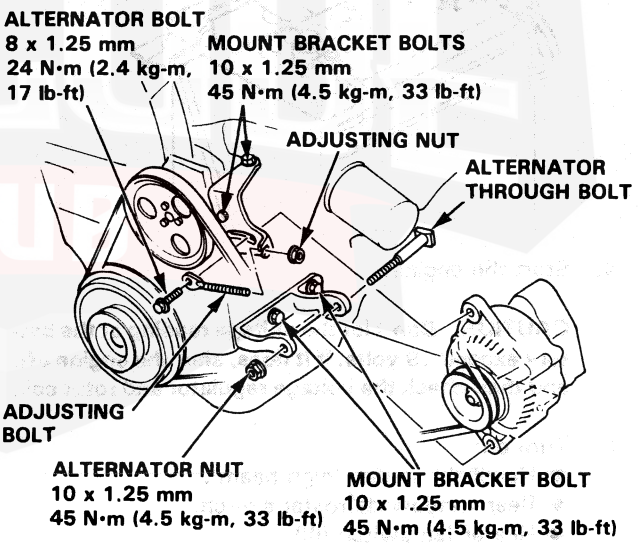
8. Adjust the alternator belt tension after installing.

Fuel-Injected Engine:

1. Disconnect the ground cable from the battery negative post (−).
2. Remove the air cleaner assembly (see section 11).
3. Disconnect the 4-P connector from the alternator, and remove the clip from the harness bracket.



4. Remove the terminal nut and the white wire from B terminal.
5. Remove the alternator bolt and nut, then remove the alternator belt from the alternator pulley.



6. Remove the alternator through bolt, then the alternator.
7. If necessary, remove the mount bracket bolts, and the upper and lower mount brackets.
8. Adjust the alternator belt tension after installing.

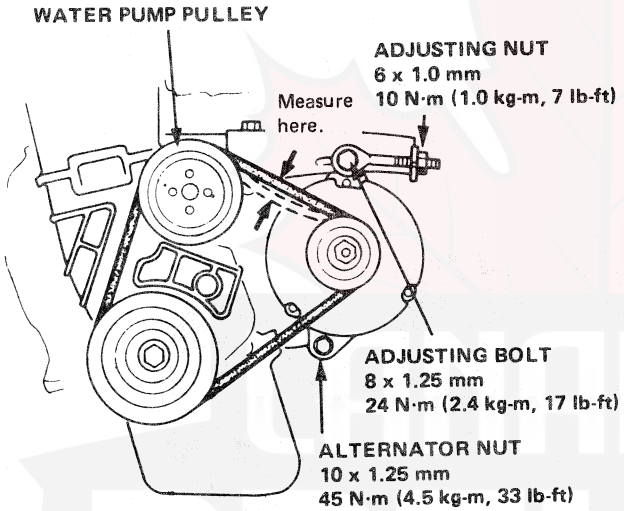
Alternator Belt Adjustment

Carbureted Engine:

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

   Deflection: 7–10 mm (0.28–0.39 in.)

   NOTE: On a brand-new belt, the deflection should be 6 mm (0.24 in.) when first measured.



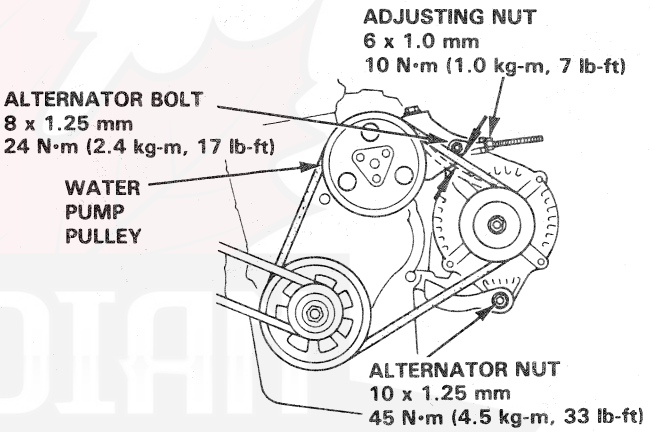
2. Loosen the alternator adjusting bolt and nut.
3. Move the alternator to obtain the proper belt tension and retighten the bolt and nut.
4. Recheck the deflection of the belt.

Fuel-Injected Engine:

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

   Deflection: 6–9 mm (0.24–0.35 in.)

   NOTE: On a brand-new belt, the deflection should be 4–6 mm (0.16–0.24 in.) when first measured.



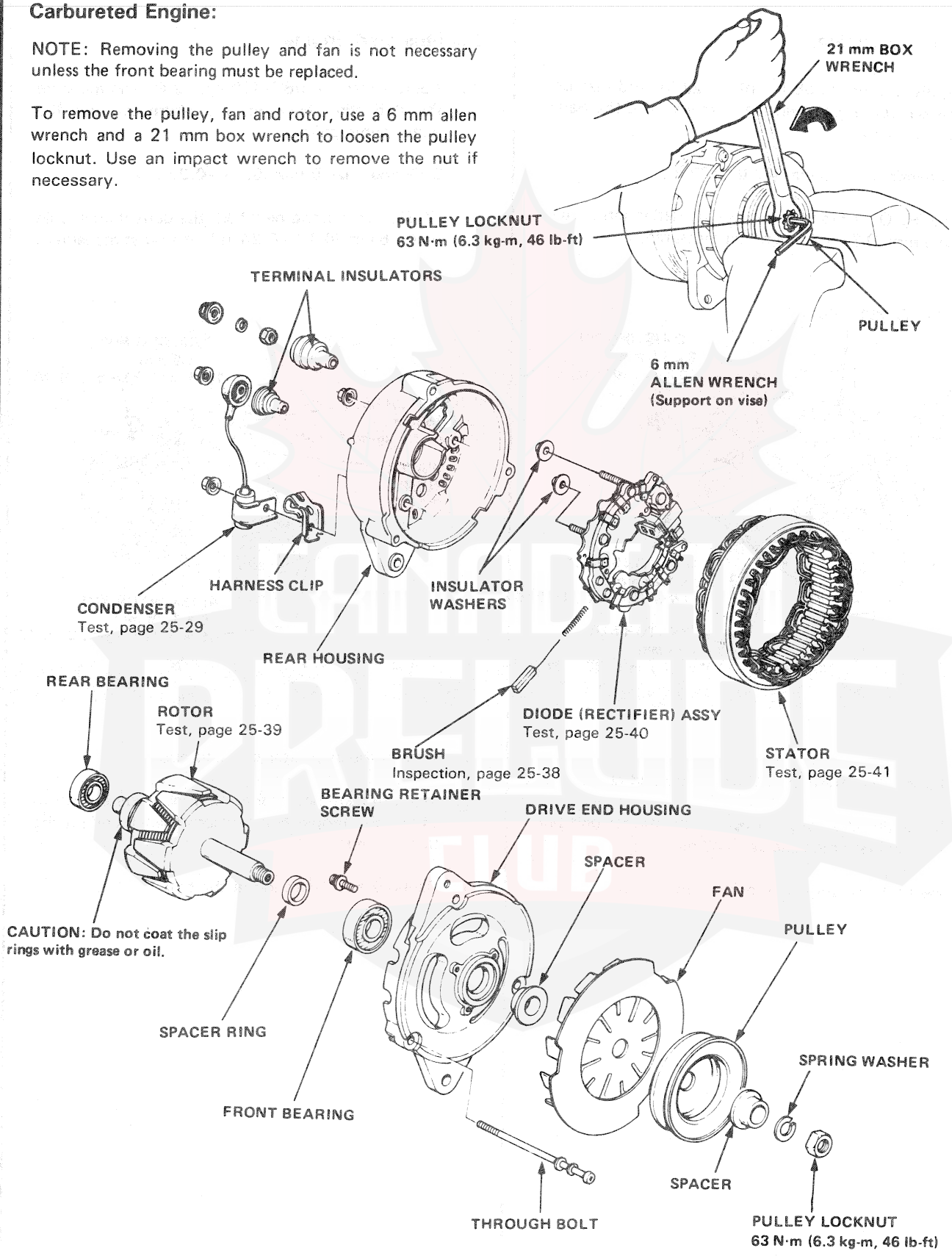
2. Loosen the alternator bolt and nut.
3. Move the alternator by turning the adjusting nut to obtain the proper belt tension, then retighten the bolt and nut.
4. Recheck the deflection of the belt.

Alternator Overhaul

Carbureted Engine:

NOTE: Removing the pulley and fan is not necessary unless the front bearing must be replaced.

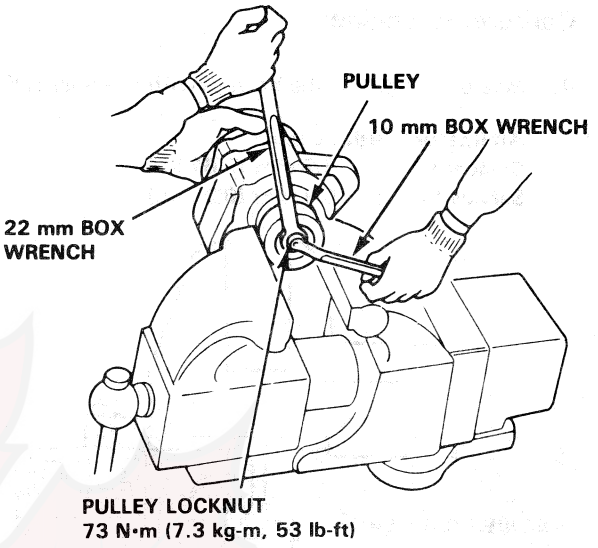
To remove the pulley, fan and rotor, use a 6 mm allen wrench and a 21 mm box wrench to loosen the pulley locknut. Use an impact wrench to remove the nut if necessary.

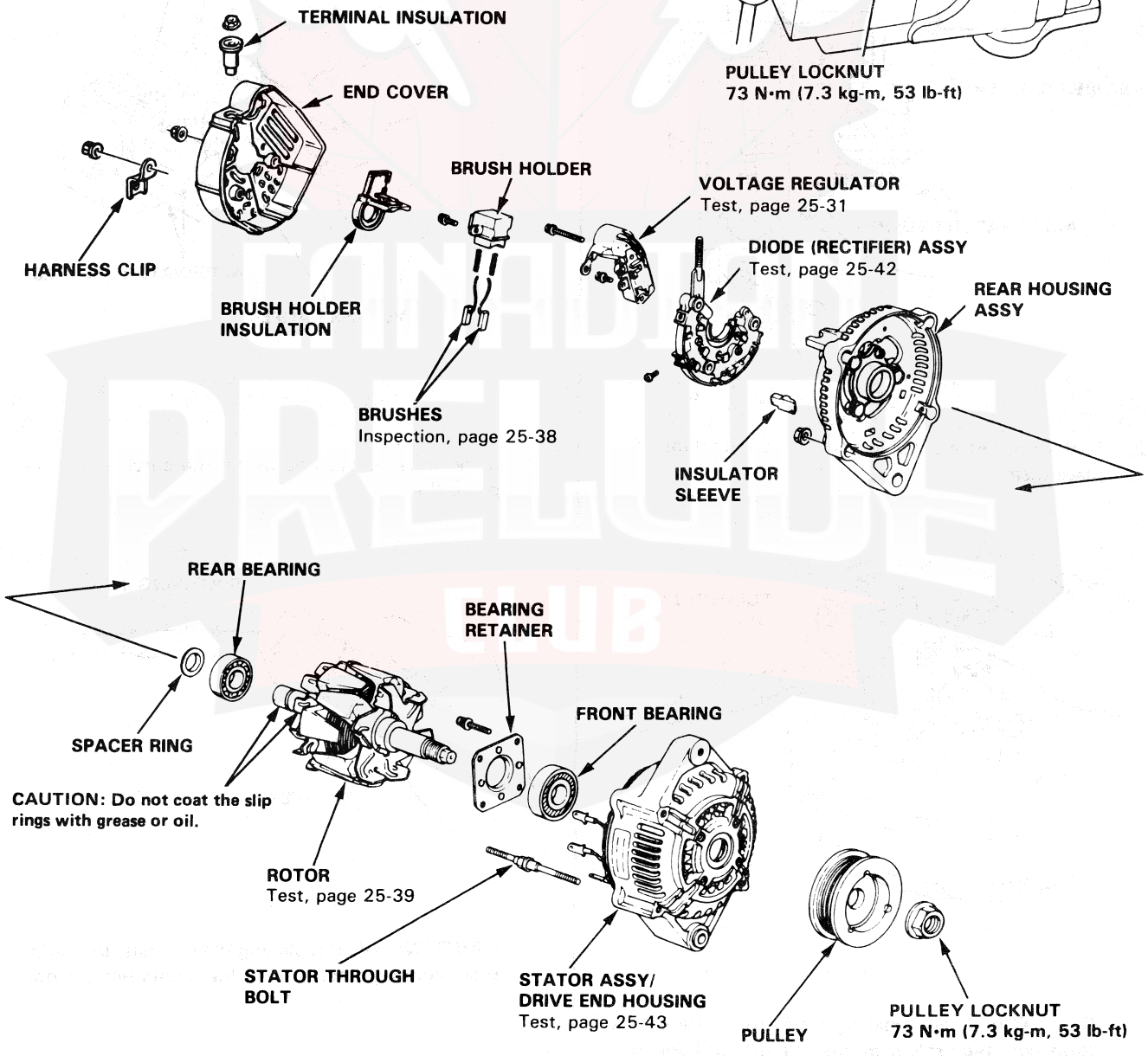


Fuel-Injected Engine:

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.



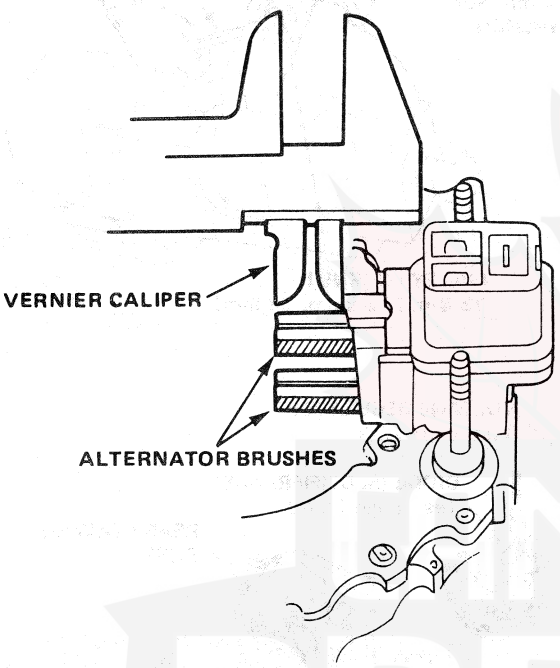


Alternator Brush Inspection

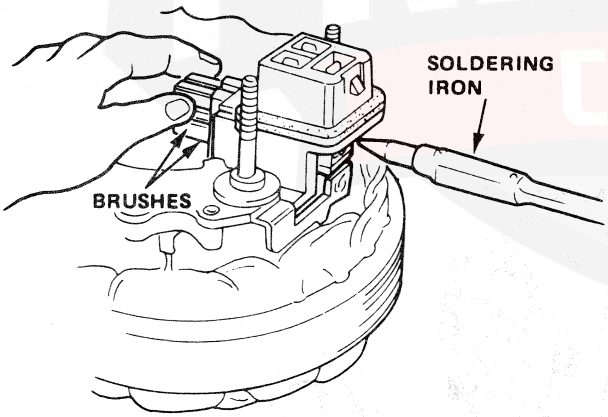
Carbureted Engine:

1. 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.)



2. If the brushes are not within the service limit, replace them.



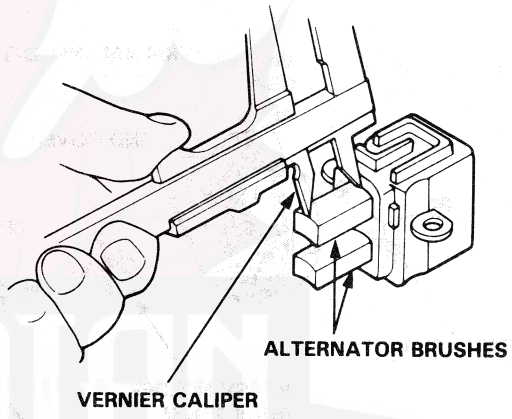
CAUTION: When replacing the brushes, use only a rosin core type solder or solder joints will corrode.

Fuel-Injected Engine:

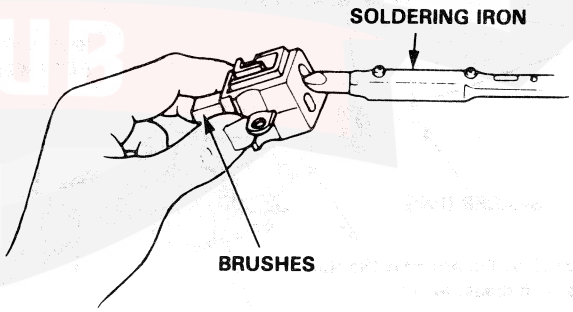
1. Remove the end cover, then take out the brush holder by removing its 2 screws.

2. Measure length of the brushes with a vernier caliper.

Alternator Brush Length
Standard: 10.5 mm (0.41 in.)
Service Limit: 5.5 mm (0.22 in.)



3. If the brushes are not within the service limit, replace them.

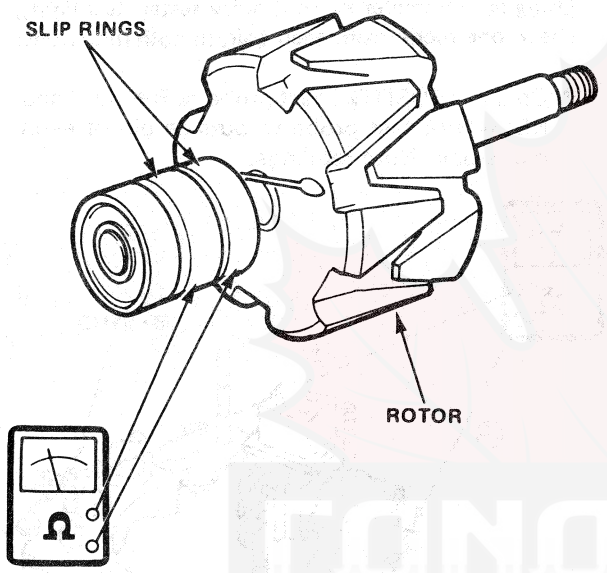


CAUTION: When replacing the brushes, use only a rosin core type solder or solder joints will corrode.

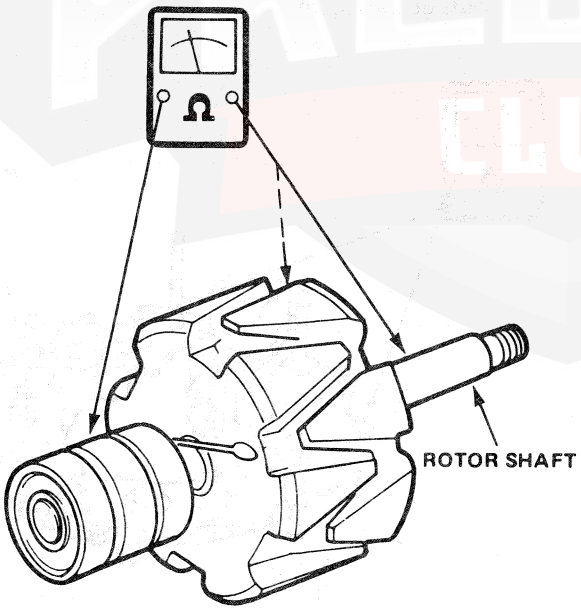
Rotor Slip Ring Test

Carbureted Engine:

1. Check that there is continuity between the slip rings.



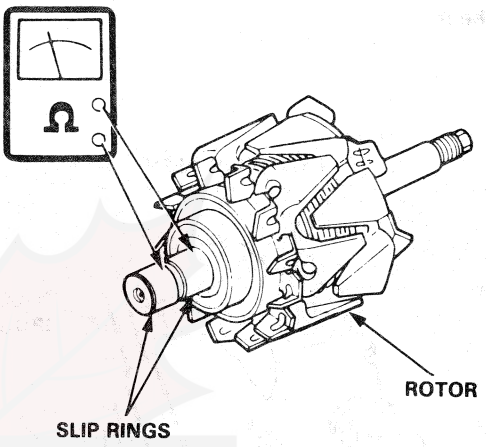
2. Check that there is no continuity between the slip rings and the rotor or rotor shaft.



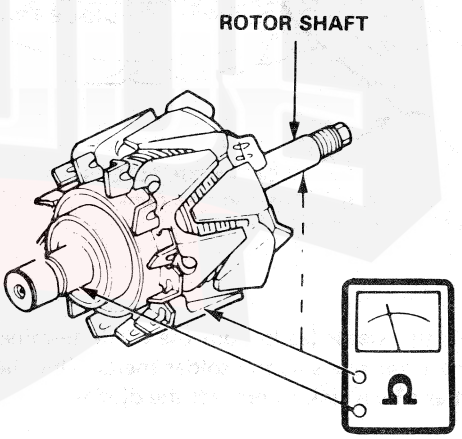
3. If the rotor fails either continuity check, replace it.

Fuel-Injected Engine:

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.



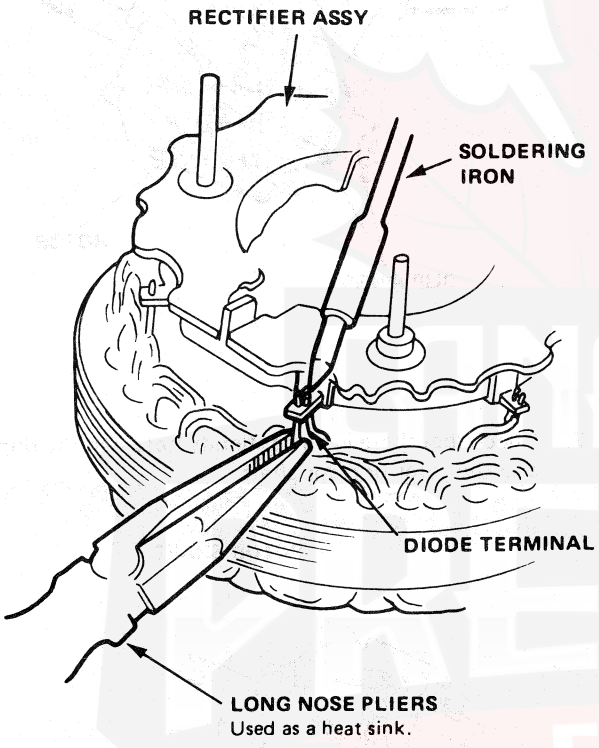
3. If the rotor fails either continuity check, replace it.

Rectifier/Stator Test (Carbureted Engine)

NOTE: To test the rectifier or stator, you must separate them by unsoldering the connecting wires.

1. Unsolder wires from stator using as little heat as possible.

   CAUTION: Use only as much heat as required to melt solder. Diodes will be damaged by excessive heat.



2. Pull the stator leads from the diode terminals with long nose pliers as the solder melts. The pliers also act as a heat sink to protect the diodes.

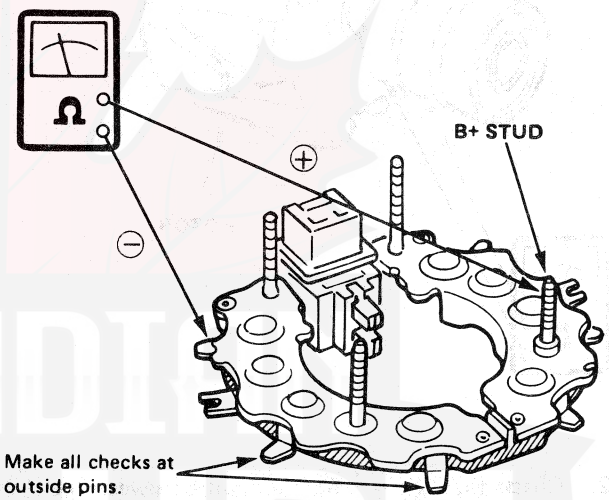
   NOTE: When resoldering, be sure there is a good bond between each wire and terminal. Use only a rosin core solder or solder joints will corrode.

Rectifier Test:

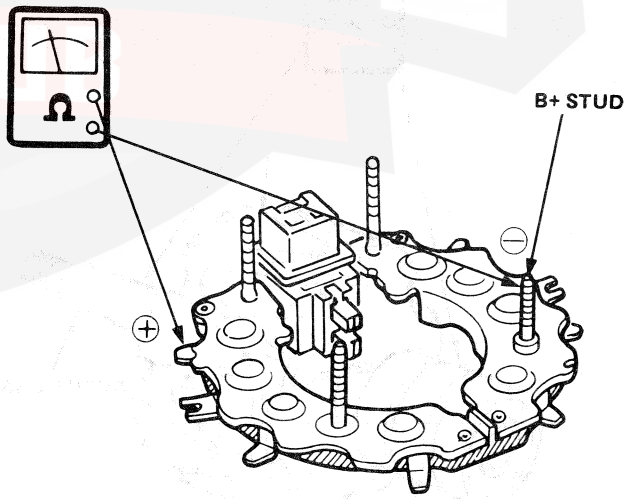
NOTE: The diodes are designed to pass current in one direction and block current in the opposite direction. Since the alternator rectifier is made up of six diodes (3 pairs), each diode must be tested for continuity in both directions; a total of 12 checks.

3. Using an ohmmeter or continuity tester (test light), check one diode from each pair, in both directions:

   - Connect POSITIVE test probe to B+ stud and NEGATIVE test probe to outside pin of each diode pair. Note readings.

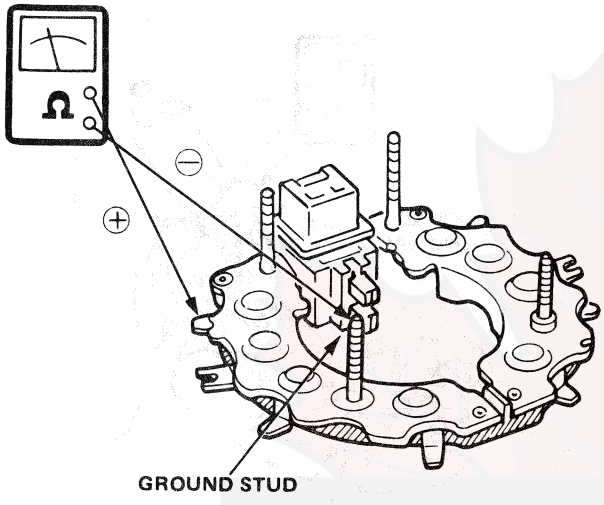


   - Reverse probe position and check the diodes at outside pins again.

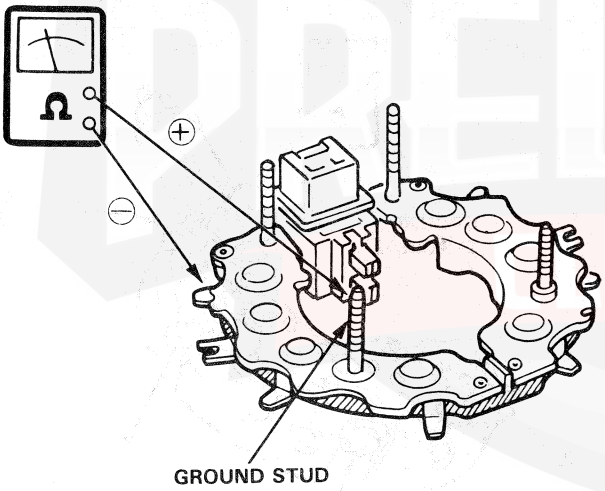


4. Check the other diode from each pair, in both directions:

   - Connect NEGATIVE test probe to ground stud and POSITIVE probe to outside pin of each diode pair.



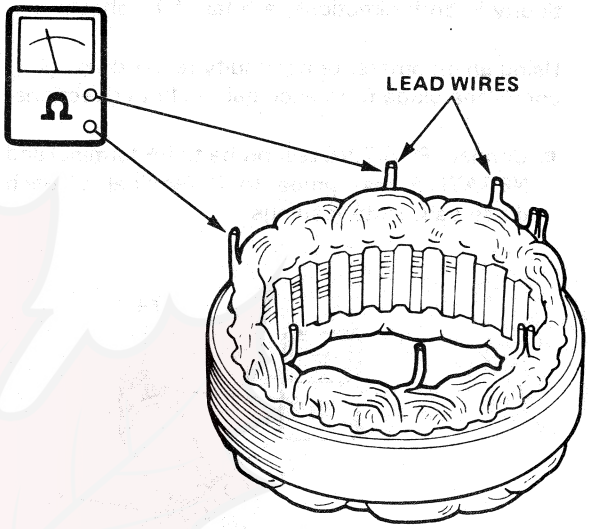
   - Reverse probe positions and check the diodes at outside pins again.



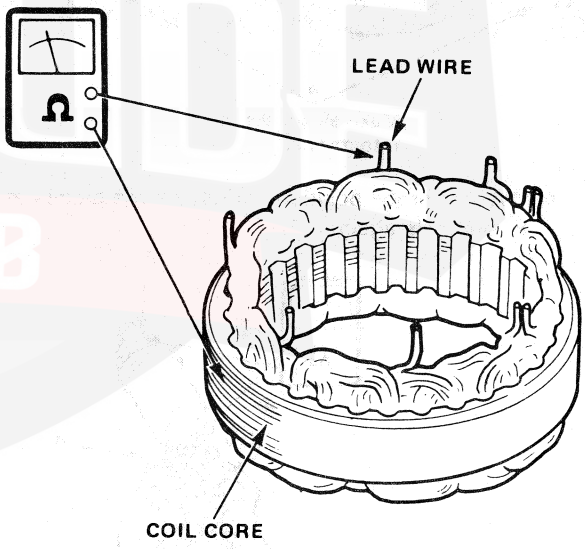
5. If any of the 12 checks shows continuity in both directions, or no continuity in both directions, the diode is defective and the rectifier assembly must be replaced. (Diodes are not available separately.)

Stator Test:

6. Check that there is continuity between each pair of lead wires.



7. Check that there is no continuity between each lead wire and the coil core.



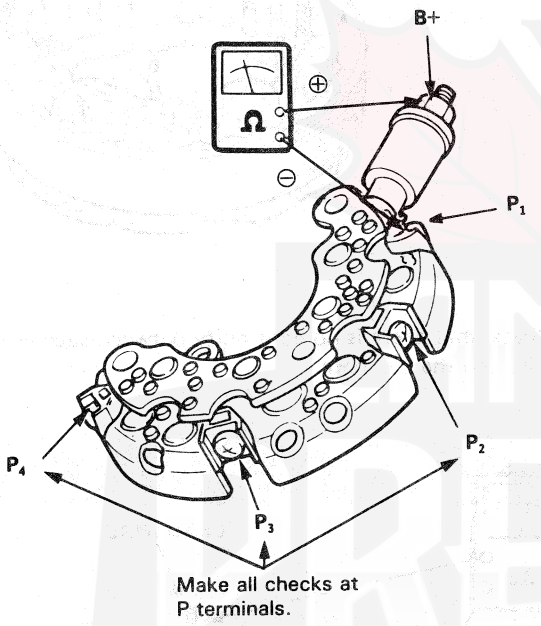
8. If the coil fails either continuity check, replace the stator.

Rectifier Test (Fuel-Injected Engine)

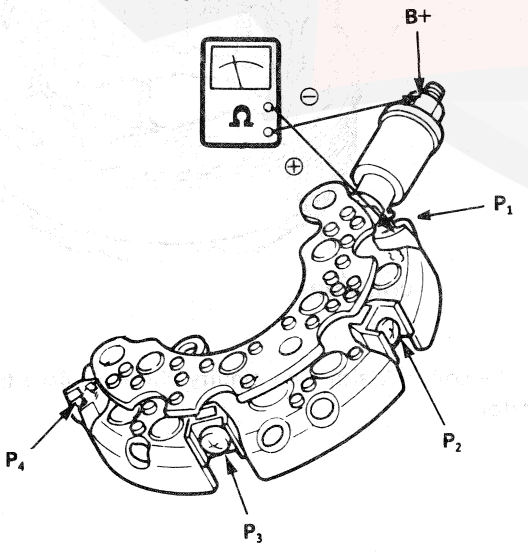
NOTE: The diodes are designed to pass current in one direction and block current in the opposite direction.
Since the alternator rectifier is made up of eight diodes (4 pairs), each diode must be tested for continuity in both directions; a total of 16 checks.

1. Using an ohmmeter or continuity tester (test light), check one diode from each pair, in both directions:

   - Connect POSITIVE test probe to B+ terminal and NEGATIVE test probe to P terminal of each diode pair. Note readings.

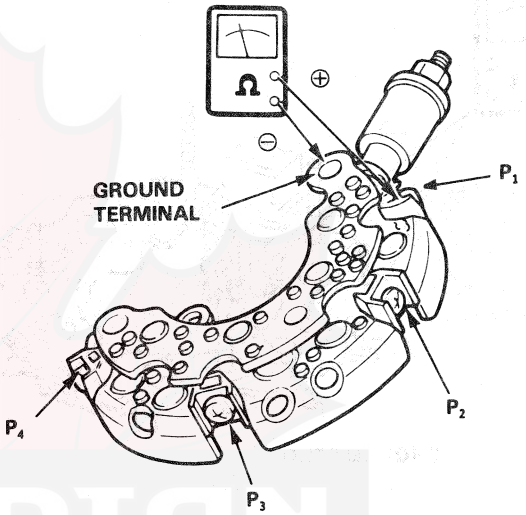


   - Reverse probe position and check the diodes at P terminals again.

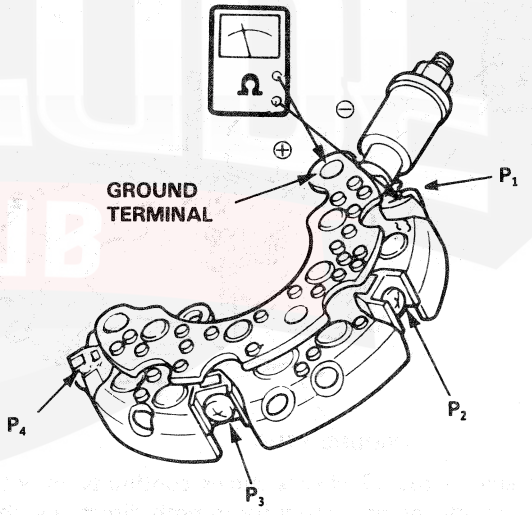


2. Check the other diode from each pair, in both directions:

   - Connect NEGATIVE test probe to ground terminal and POSITIVE probe to P terminal of each diode pair.



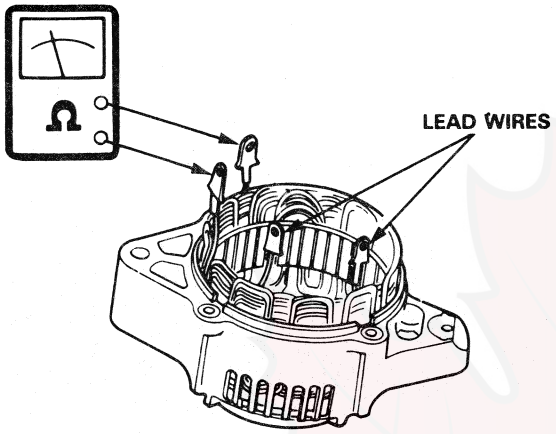
   - Reverse probe position and check the diodes at P terminals again.



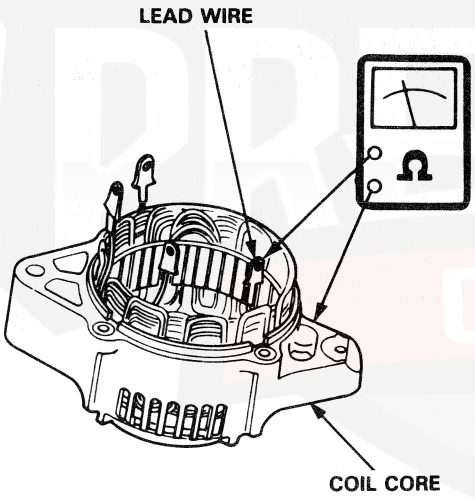
3. If any of the 16 checks shows continuity in both directions, or no continuity in both directions, the diode is defective and the rectifier assembly must be replaced. (Diodes are not available separately.)

Stator Test (Fuel-Injected Engine)

1. Check that there is continuity between each pair of lead wires.



2. Check that there is no continuity between each lead wire and the coil core.

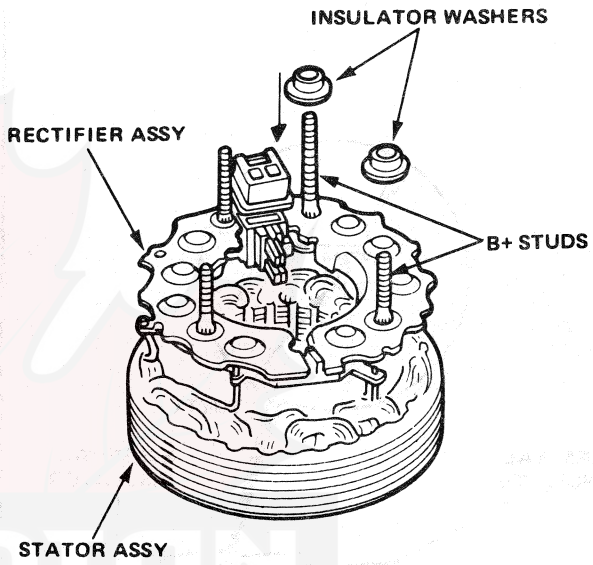


3. If the coil fails either continuity check, replace the stator.

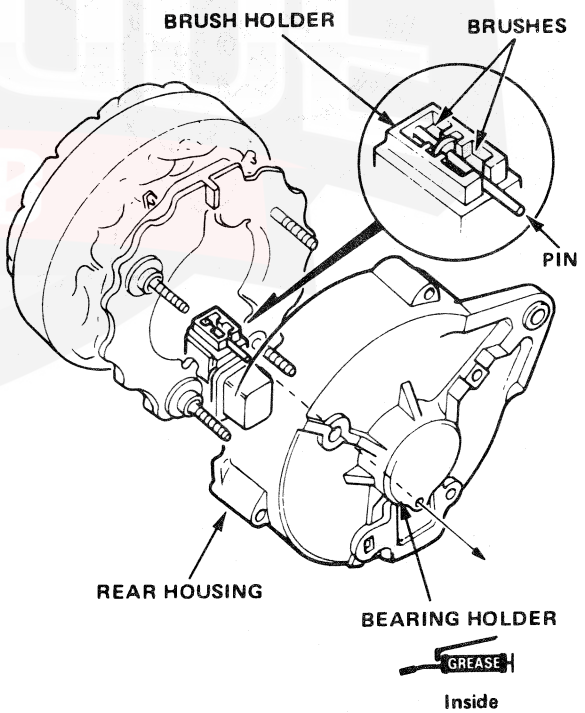
Alternator Reassembly

Reassemble the alternator in the reverse order of disassembly.

1. Install the insulator washers to the B+ studs of the rectifier assembly as shown.



2. Push the brushes down in the holder and insert a pin as shown to hold them in place.
   Apply grease to the bearing holder, inside of the rear housing.
   Then assemble the stator and rectifier assembly and the rear housing.

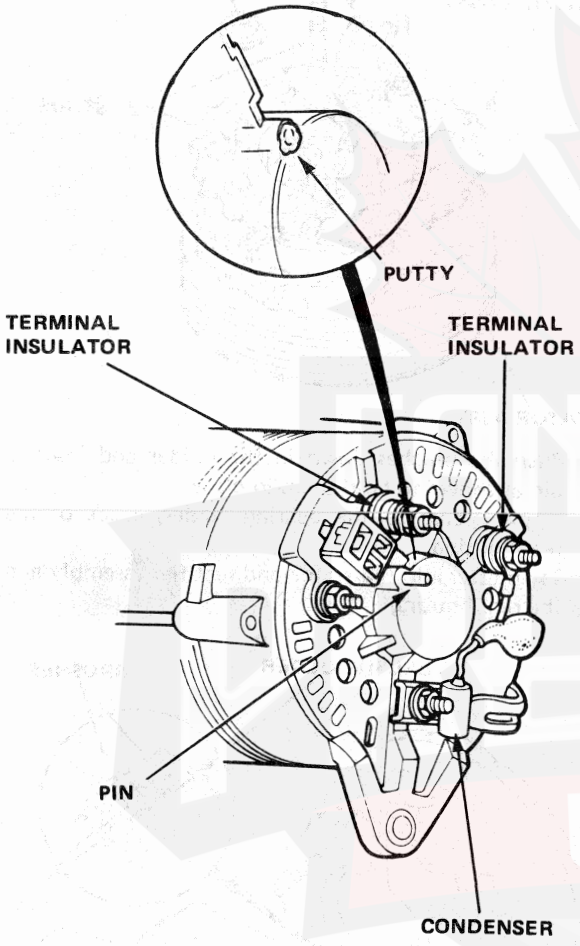


(cont'd)

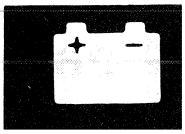
Alternator Reassembly (cont'd)

3. Install the condenser and the terminal insulators with flange nuts.

4. Install the rotor assembly in the rear housing. Remove the pin that is holding the brushes and plug the hole of the rear housing with putty.



Body Electrical



Body Electrical

Illustrated Index

Before troubleshooting:

Check the main fuse and fuse box.

Check the battery for damage, state of charge and clean and tight connections.

CAUTION:

- **Do not quick-charge a battery unless the battery ground has been disconnected, or you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the ground cable disconnected or you will severely damage the wiring.**

Check the alternator belt tension.

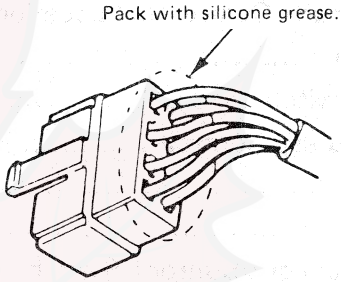
While you're working:

Make sure connectors are clean, and have no loose pins or receptacles.

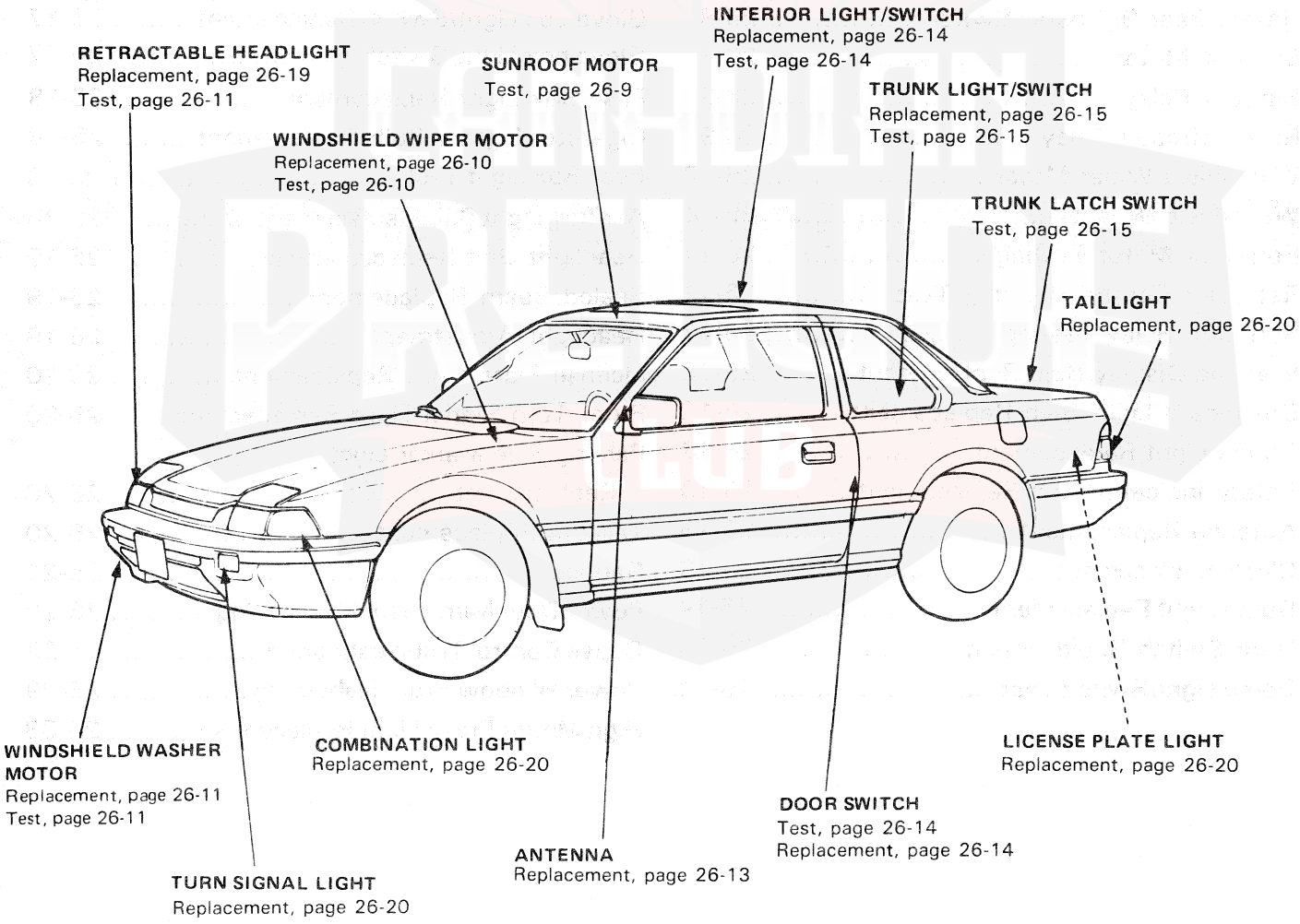
CAUTION: Do not pull on the wires when disconnecting a connector; pull only on the connector housing.

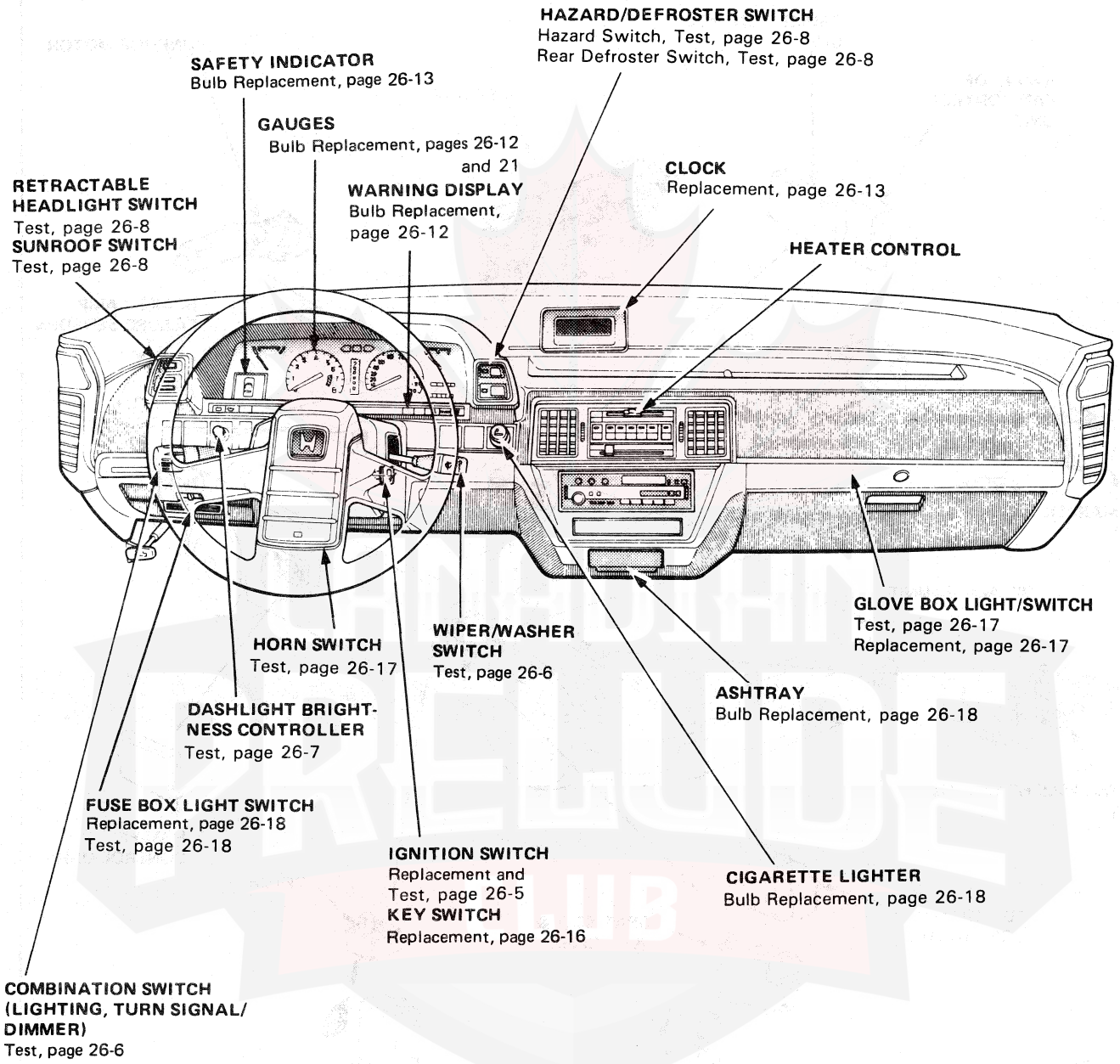
When connecting a connector, push it until it clicks into place.

Make sure multiple pin connectors are packed with silicone grease.

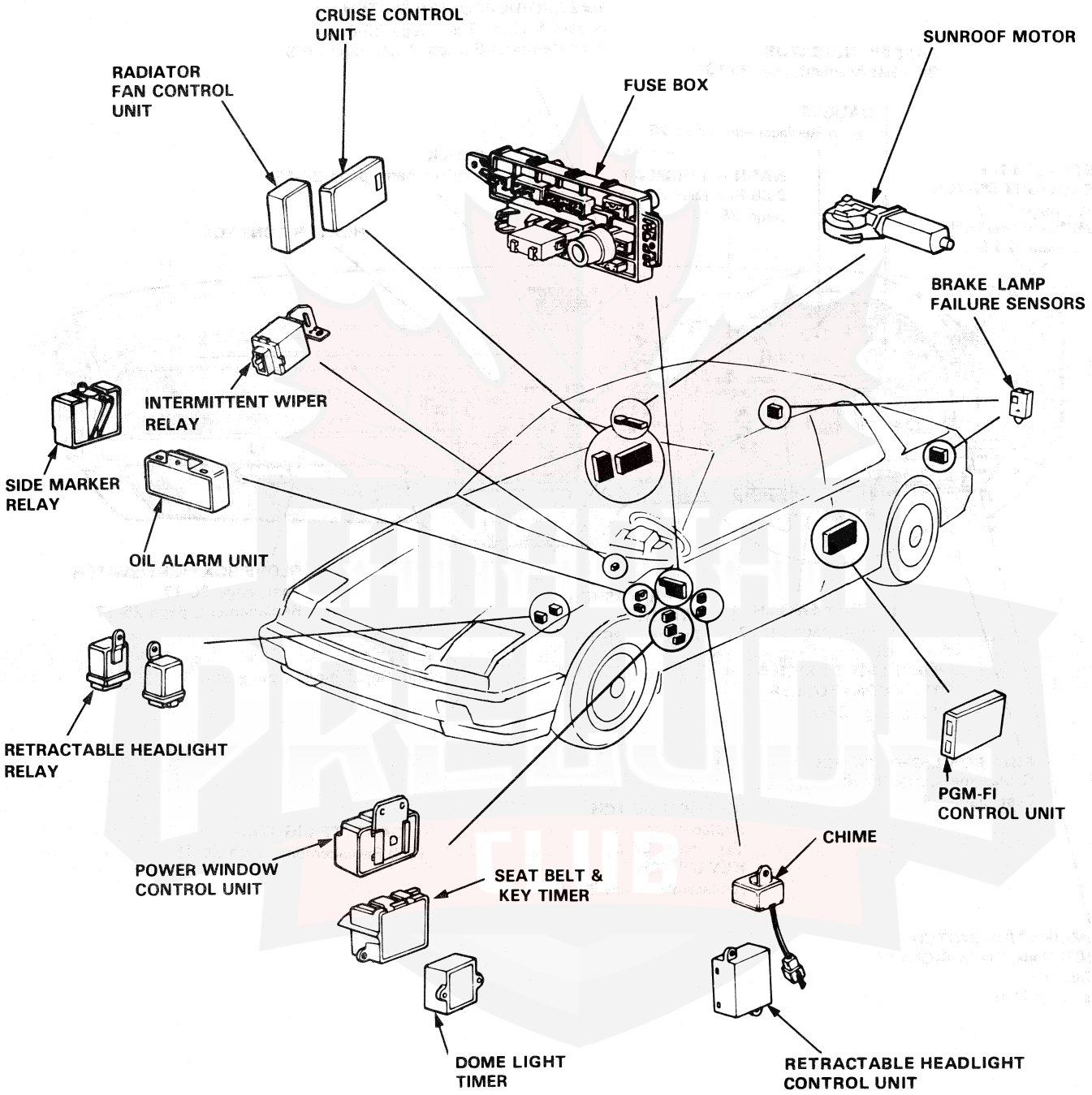


Illustrated Index



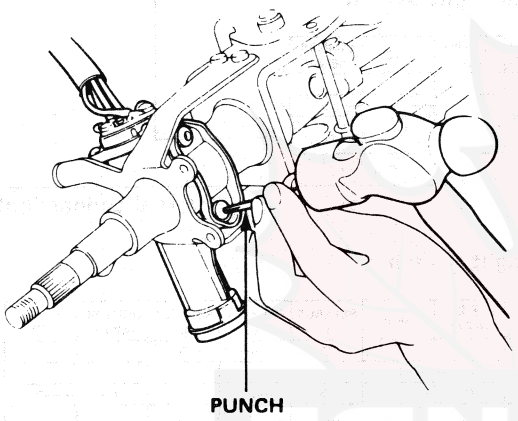


Relay, Amplifier and Control Unit Location



Ignition Switch Replacement (Steering Lock)

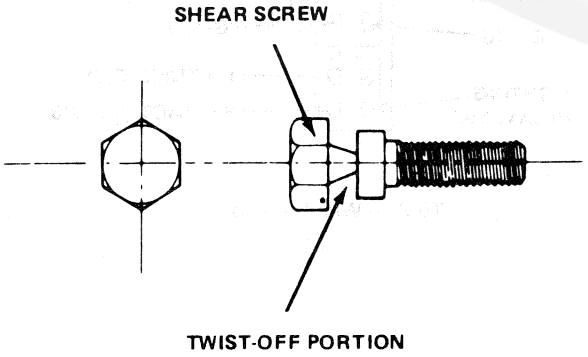
1. Remove the steering column covers.
2. Disconnect the ignition switch connector.
3. Center punch each of the 2 shear screws and drill their heads off with a 3/8 in. drill bit.



4. Install the new ignition switch without the key inserted.
5. Hand tighten the new shear screws.

   NOTE: Make sure the projection of the ignition switch is aligned with the hole of the steering column.

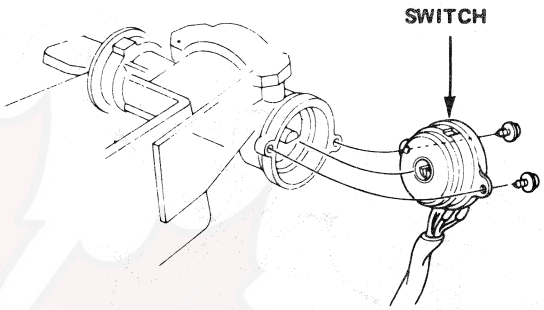
6. Insert the ignition key and check for proper operation of the steering wheel lock.
7. Tighten the shear screws until the hex heads twist off.



Ignition Switch (Electrical)

NOTE: The mechanical part of the switch does not have to be removed to replace the electrical part.

1. Remove the steering column lower cover.
2. Disconnect the ignition switch connector.
3. Insert the key and turn it to 0.
4. Remove two screws and replace the base of the switch.

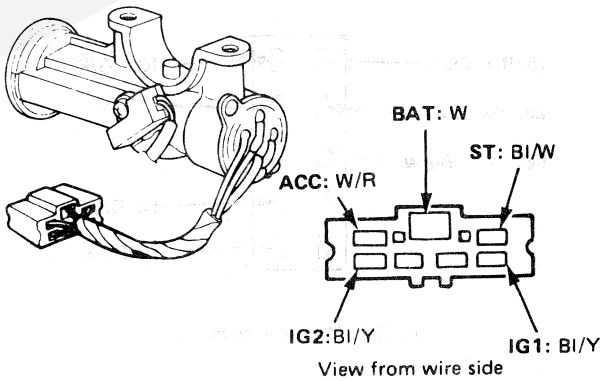


NOTE: Make sure the recess of the switch is aligned with the projection of the lock when installing.

Ignition Switch Test

Check for continuity according to the table.

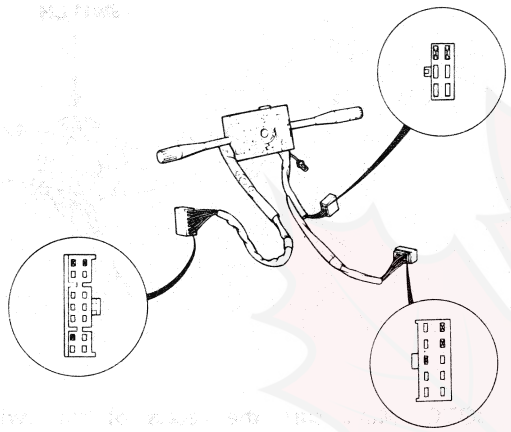
Terminal / Position	ACC	BAT	IG1	IG2	ST
0					
I	○	○			
II	○	○	○	○	
III		○	○		○
Wire Color	W/R	W	Bl/Y	Bl/Y	Bl/W



Combination Switch Test

Check for continuity between the terminals in each switch position according to the table.

CAUTION:
- **Make sure the wire leads aren't being pulled when you move the lever.**
- **Check that the lever works freely without binding.**

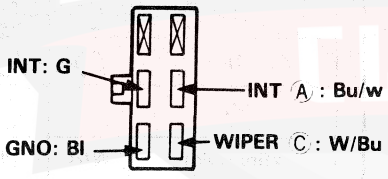


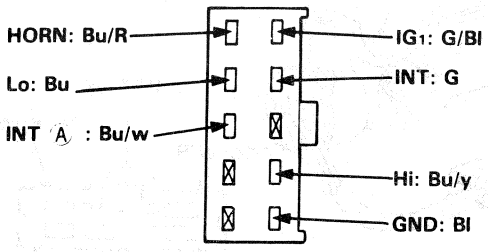
Front Wiper Switch

Terminal Position	IG-1	INT	A INT	LO	HI	GND	MIST
OFF			○	○			OFF
					○	○	ON
INT	○	○	○				OFF
	○	○			○	○	ON
LO				○		○	OFF
					○	○	ON
HI					○	○	OFF
					○	○	ON
Wire Color	G/Bl	G	Bu/W	Bu	Bu/y	Bl	

Front Washer Switch

Terminal Position	WASHER MOTOR	IG1
OFF		
ON	○	○
Wire Color	Bl/y	G/Bl





To Side Wire Harness

Dimmer Switch

Terminal Position	GND	DIMMER RELAY
HIGH	○	○
LOW		
Wire Color	Bl	Bu

(Internal connection)

Passing Light Switch

Terminal Position	LIGHTING RELAY	GND	DIMMER RELAY
OFF			
ON	○	○	○
Wire Color	Bu/R	Bl	Bu

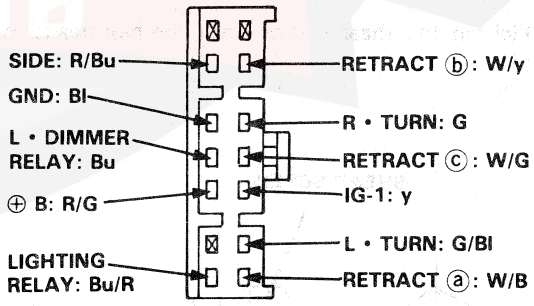
(Internal connection)

Headlight Switch

Terminal Position	⊕ B (SIDE)	SIDE	RETRACT c	RETRACT a	RETRACT b	LIGHTING RELAY	GND
OFF			○		○		
0	○	○					
0	○	○	○	○		○	○
Wire Color	R/G	R/Bl	W/G	W/Bl	W/y	Bu/R	Bl

Turn Signal Switch

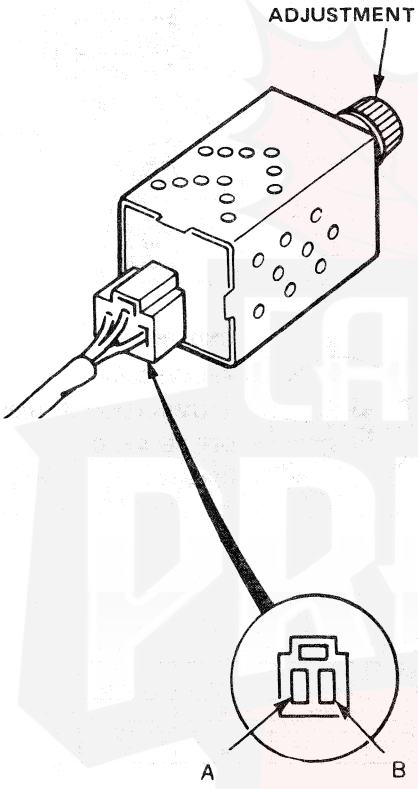
Terminal Position		⊕ G1	(DIODE)		R TURN	L TURN
OFF				○		
ON	R	○	▷|	○	○	
	L			○		○
Wire Color		Y			G	G/B1



To Side Wire Harness

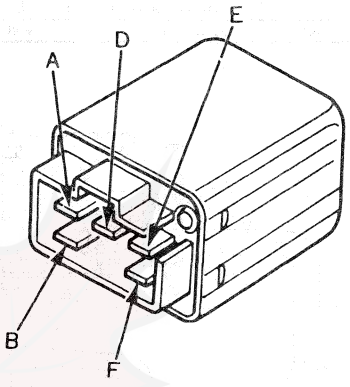
Dashlight Brightness Controller Test

1. Turn the lighting switch on, with the connector plugged in.
2. Connect the voltmeter positive probe to the terminal A (R lead) and negative probe to the terminal B (Bl lead).
3. Turn the controller adjustment knob.
4. The controller is normal if the voltage varies, as the knob is turned.



Dimmer Relay Test

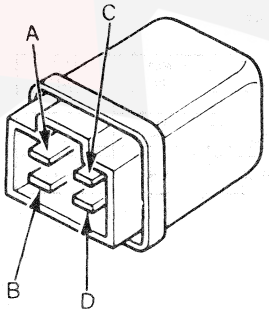
There should be no continuity between the B and D terminals and continuity between the A and D terminals, when the battery positive cable is connected to the E terminal and negative cable to the F terminal.
There should be continuity between the B and D terminals and no continuity between the A and D terminals with the battery disconnected.



NOTE: This relay is located in the relay box, in the engine compartment.

Lighting Relay Test

There should be continuity between the A and B terminals, when applying battery voltage to the C (positive) and D (negative) terminals. There should be no continuity when the battery is disconnected.

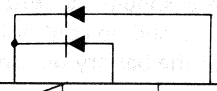


NOTE: This relay is located in the relay box, in the engine compartment.

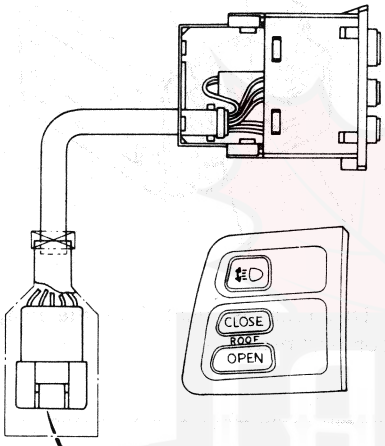
Retractable Headlight/Sunroof Switch Test

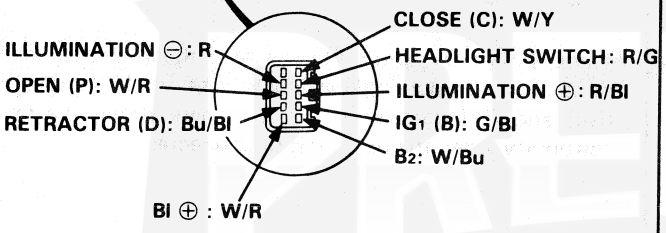
Check for continuity according to the table felow

Retractable Headlight Switch



Terminal / Position	LIGHTING Switch	RETRACTOR (D)		⊕ B_1	⊕ B_2
OFF	○		○	○	○
ON		○	○	○	○
Wire Color	R/G	Bu/Bl		W/R	W/Bu





Sun Roof Switch

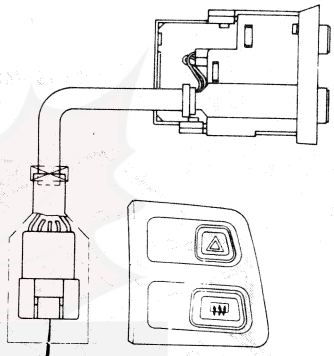
Terminal / Position	IG-I (B)	OPEN (P)	CLOSE (C)
OFF			
OPEN	○	○	
CLOSE	○		○
Wire Color	G/Bl	W/R	W/Y

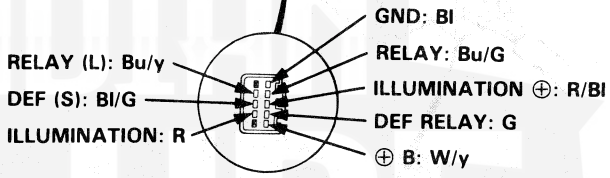
Hazard/Rear Defroster Switch Test

Check for continuity according to the table below

Hazard Switch

Terminal / Position	⊕ B	DEF (S)		RELAY (L)	RELAY (R)
OFF		○			○
		○		○	
ON		○		○	
	○	○			○
Wire Color	W/y			Bu/y	Bu/G



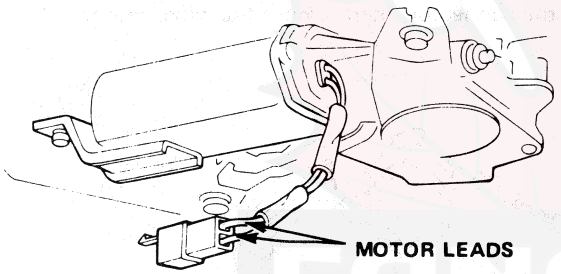


Rear Defroster Switch

Terminal / Position	DEF (S)		GND	DEF RELAY (B)
OFF	○		○	
ON	○		○	○
Wire Color	Bl/g		Bl	G

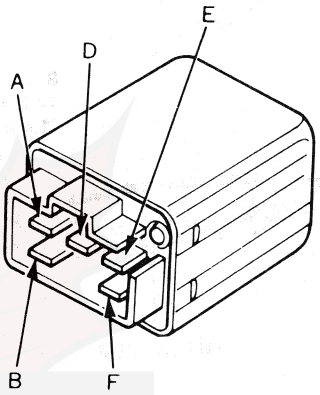
Sunroof Motor Test

Check motor operation by connecting a wire from the battery positive terminal to one of the motor leads, and a battery ground to the other. Reverse the wires to be sure the motor will run in both directions.



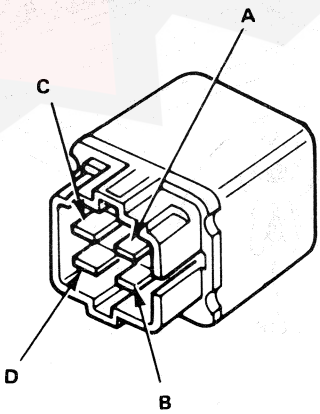
Sunroof Relay Test

There should be no continuity between the B and D terminals and continuity between the A and D terminals, when the battery positive cable is connected to the E terminal and negative cable to the F terminal.
There should be continuity between the B and D terminals and no continuity between the A and D terminals with the battery disconnected.



Rear Defroster Relay Test

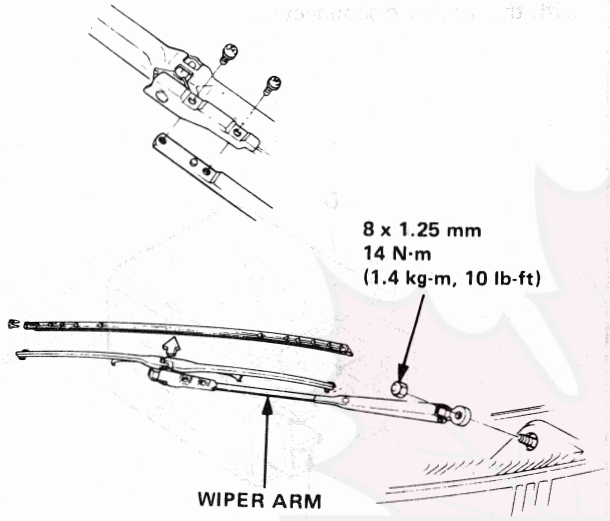
There should be continuity between terminals C and D when the battery positive cable is connected to terminal A and the negative cable is connected to terminal B. There should be no continuity when the battery is disconnected.



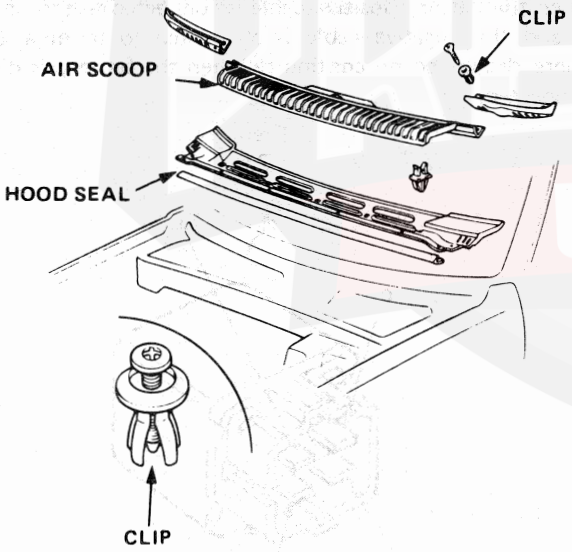
Windshield Wiper Motor

Replacement

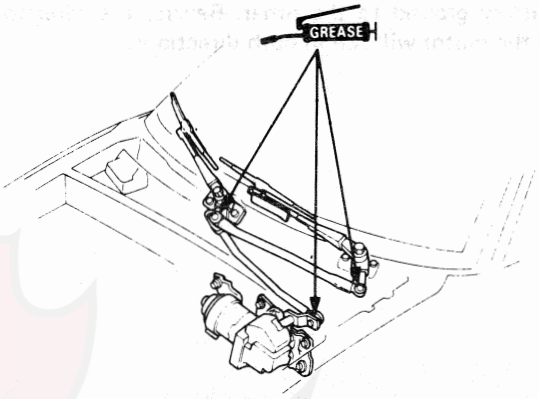
1. Remove the nut, raise the arm, and remove the wiper arm.



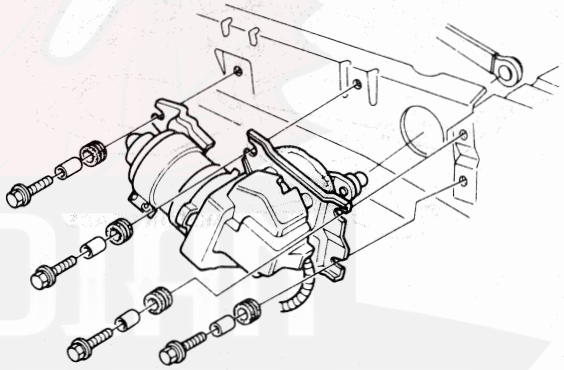
2. Remove the scoop and hood seal.



3. Disconnect the joint to the motor and remove the linkage.

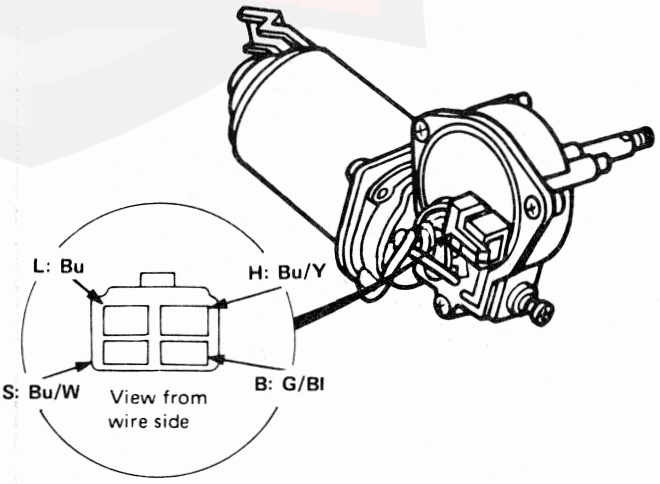


4. Remove four motor mounting bolts, and disconnect the connector, then remove the wiper motor.



Test

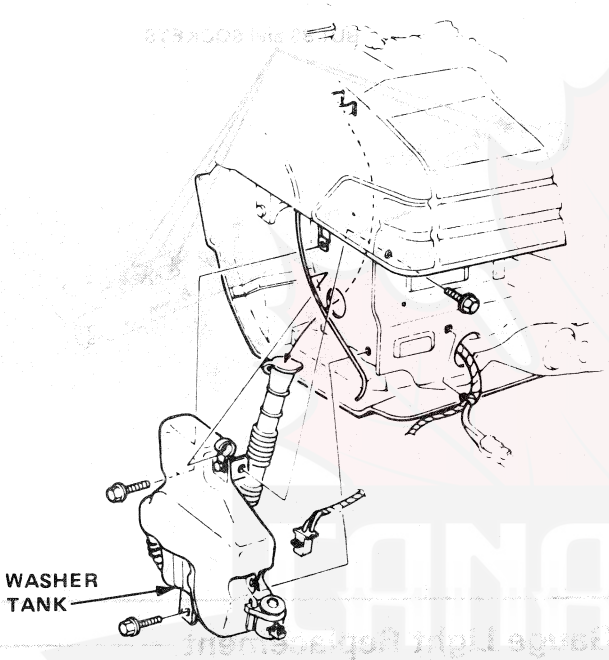
1. Test the motor low speed by applying battery voltabe: Positive to the G/Bl lead and negative to the Bu lead.
2. Test the motor high speed by applying battery voltage: Positive to the G/Bl lead and negative to the Bu/Y lead.
3. If the motor fails to run smoothly, replace the motor assembly.



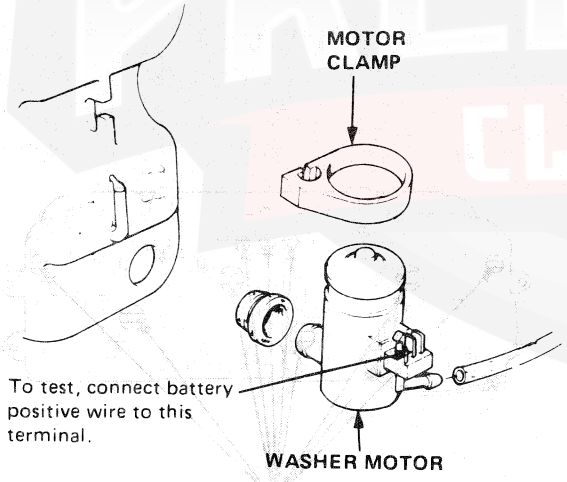
Windshield Washer

Replacement

1. Remove the front bumper.
2. Remove the electrical connector and filler tube, then remove the washer tank by removing the three bolts.



3. Remove the motor clamp, and remove the washer motor from the washer tank.



Test

Test the motor speed by applying battery voltage to its terminals.

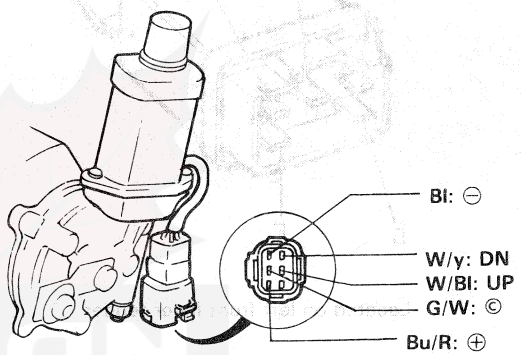
NOTE: Connect the battery positive cable to the left side terminal of the motor.

Retractor Motor Testing

1. Test the retractor motor by applying battery voltage to the Bu/R (positive) and Bl (negative) leads.
2. Connect ohmmeter probes to the R/Bl and G/W leads, and the R/W and G/W leads.
3. Rotate the motor by hand.
4. Ohmmeter needle should indicate continuity and no continuity repeatedly.

CAUTION: Before installing the motor, remove 15A fuse.

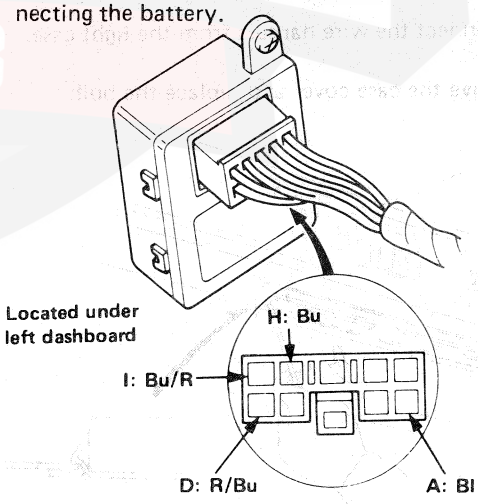
NOTE: Install the cap correctly.



View from terminal side

Retractor Control Warning Test

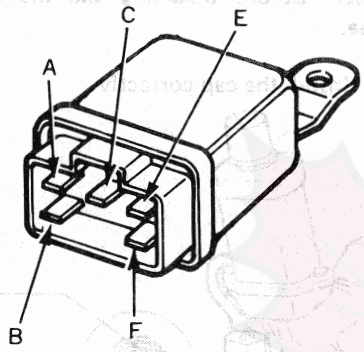
1. Disconnect the retractor relays from the wire harness.
2. Connect the battery positive cable to H terminal of the control unit, and negative cable to A terminal.
3. Check for voltage between the D (positive) and A (negative) terminals. There should be battery voltage at approximately 2.5–5.5 seconds after connecting the battery.



NOTE: For right warning circuit check, move the battery positive cable to I terminal and perform the same procedure as for the left circuit.

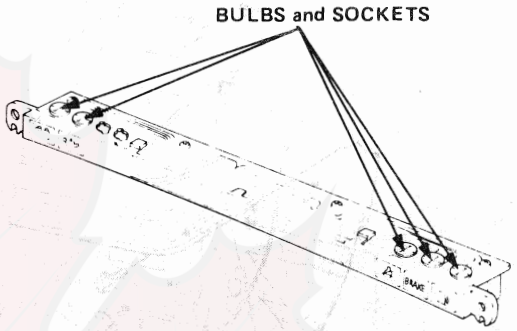
Retractor Relay Testing

There should be no continuity between the C and B terminals and continuity between the C and A terminals, when the battery positive cable is connected to the E terminal and negative cable to the F terminal.
There should be continuity between the C and B terminals and no continuity between the C and A terminals with the battery disconnected.



Located on left front inner fender

Warning Display Bulb Replacement



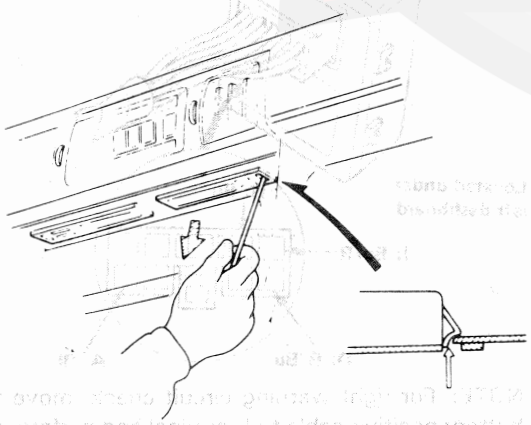
Dashboard Light Bulb Replacement

1. Use a flat screwdriver to depress the spring-loaded projection in the hole in the case cover, and lower it in this condition.

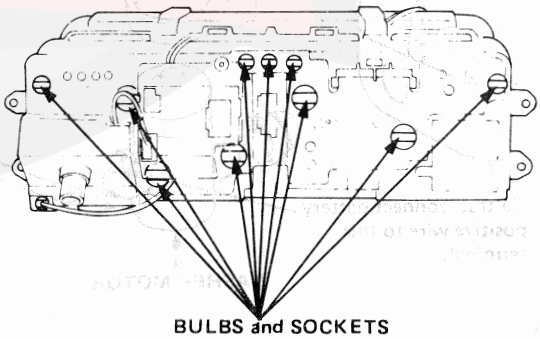
NOTE: Be careful not to use too much force, as the case cover breaks easily.

2. Disconnect the wire harness from the light case.

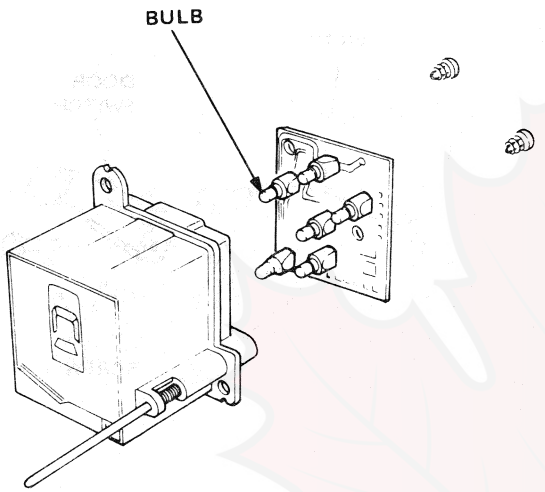
3. Remove the case cover and replace the bulb.



Gauge Light Replacement

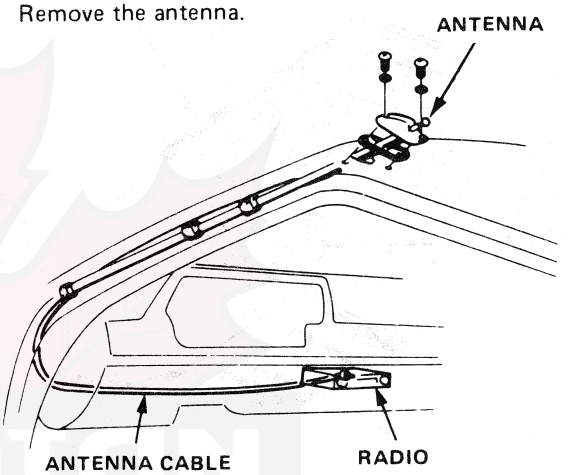


Safety Indicator Bulb Replacement



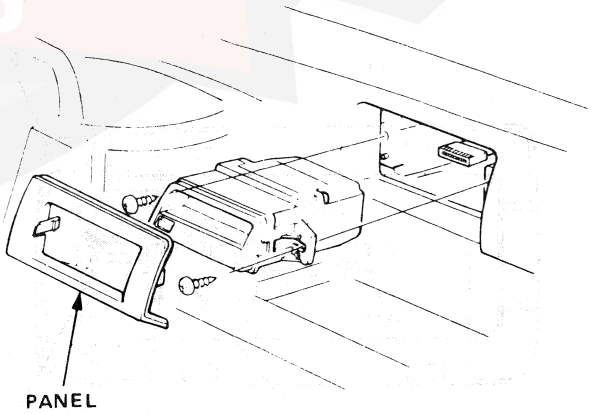
Antenna Replacement

1. Remove the radio and disconnect the antenna cable from the radio.
2. Remove the two antenna mounting screws.
3. Tie a piece of string or wire to the antenna cable plug before pulling antenna cable out, (leave the string in the pillar then use it to install the new antenna).
4. Remove the antenna.



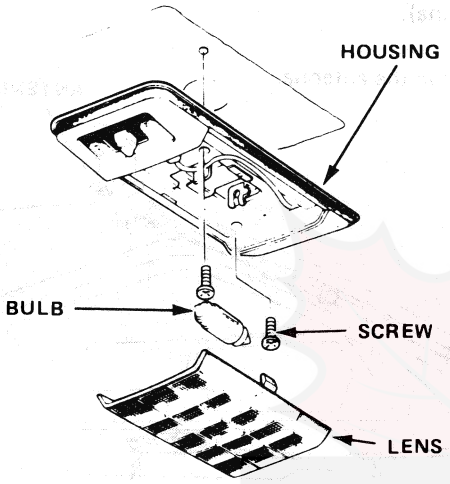
Clock Replacement

1. Pry off the dashboard trim panel with a screwdriver.
2. Remove the two clock mounting screws, disconnect the clock connector then remove the clock.



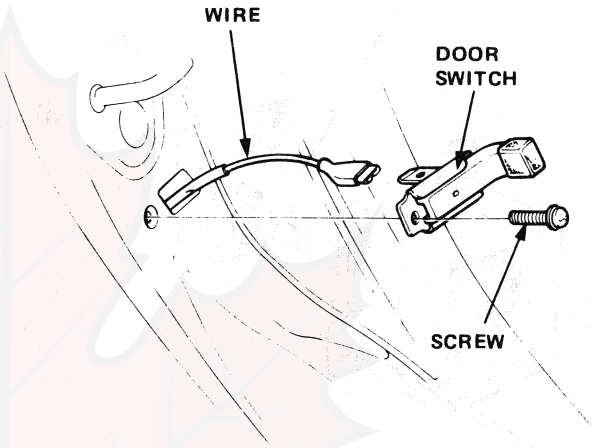
Dome Light Replacement

1. Dome light switch OFF.
2. Pry off the lens.
3. Remove the bulb and replace if necessary.
4. Remove the two screws from the dome light and remove the housing.



Door Switch Replacement

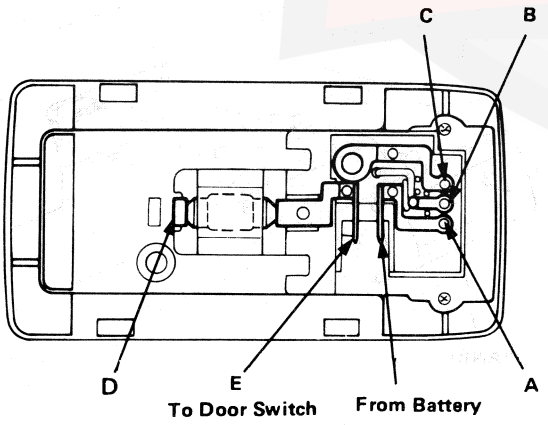
1. Remove the screws and pull out the door switch.
2. Disconnect the switch wire, then remove the door switch.



Dome Light/Switch Test

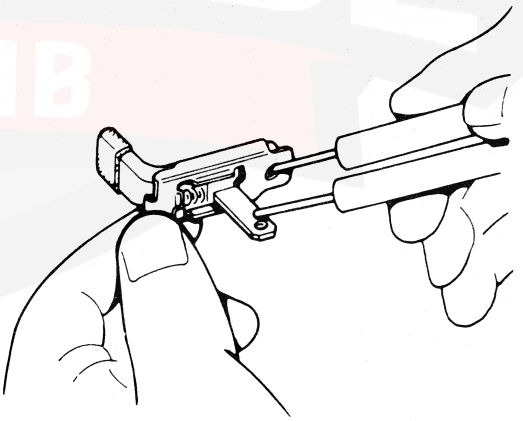
Check for continuity according to the table.

TERMINAL / POSITION	A	B	C	D		E
OFF				○	⏚	○
MID.	○	○		○	⏚	○
ON		○	○	○	⏚	○

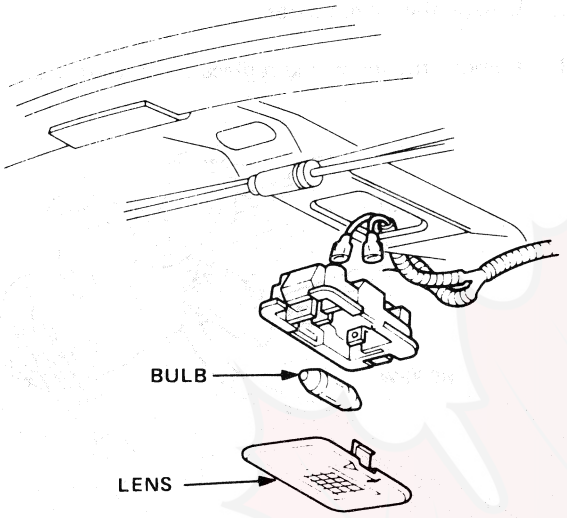


Door Switch Test

There should be no continuity when the switch is pulled (door is closed), and continuity when the switch is released (door is open).



Trunk Light/Switch Replacement

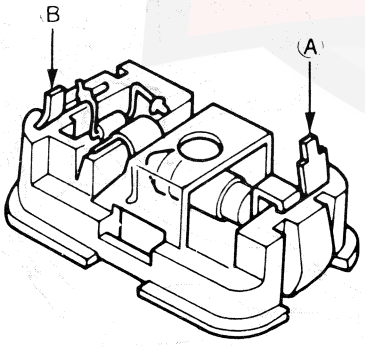


To replace bulb only, remove lens from outside.

Trunk Light/Switch Test

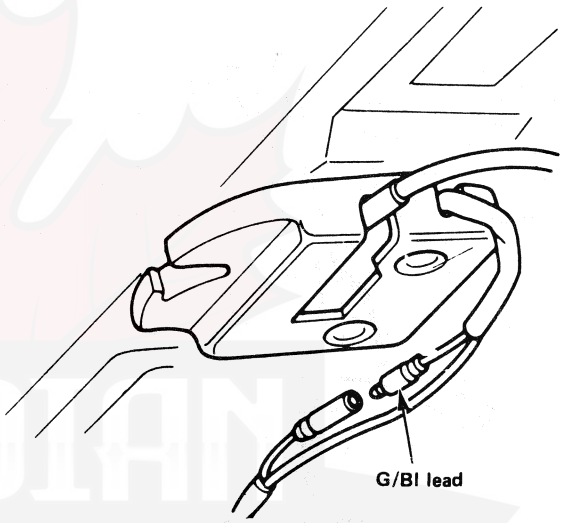
Light Test

Check the trunk light for continuity between the terminals A and B. Reverse the leads and recheck it. Continuity should exist in one direction only. Replace the trunk light if there is continuity in both directions or no continuity.



Trunk Latch Switch Test

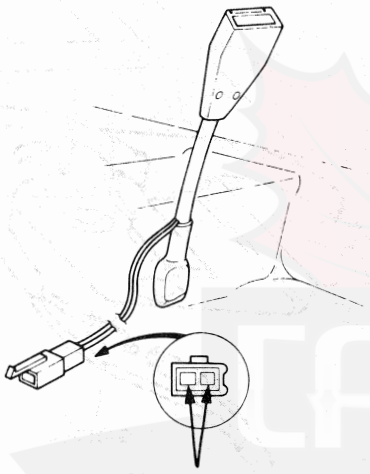
There should be continuity between the G/Bl lead and ground when the trunk lid is open, and no continuity when the trunk lid is closed.



Seat Belt Switch

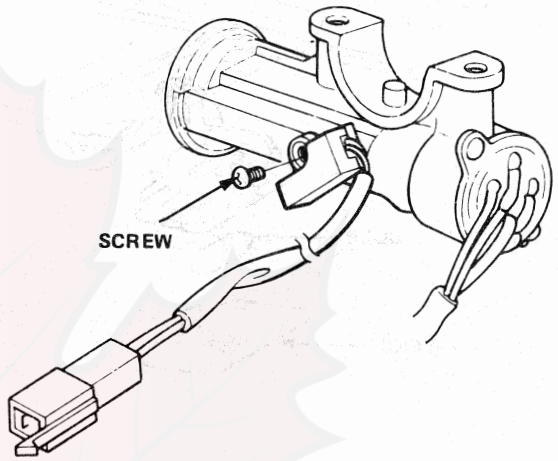
Check for continuity.

- There should be continuity when the seat belt is not buckled.
- There should be no continuity when the seat belt is buckled.



Key Switch Replacement

1. Remove the ignition switch assembly page 26-5.
2. Untape the switch wires.
3. Remove the screw and replace the key switch.

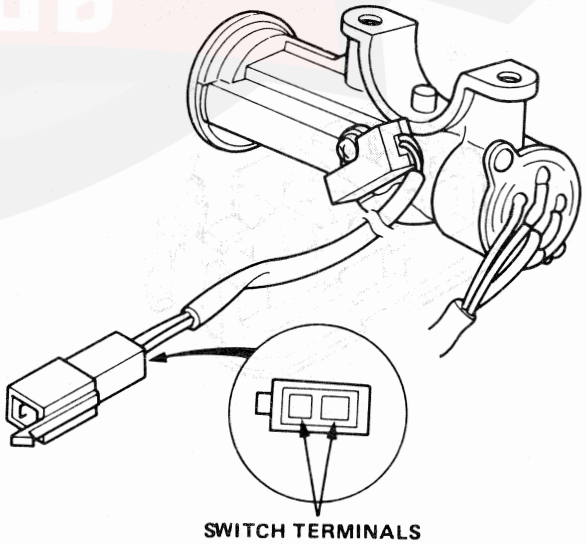


NOTE: Hold the switch wires using tape.

Key Switch Test

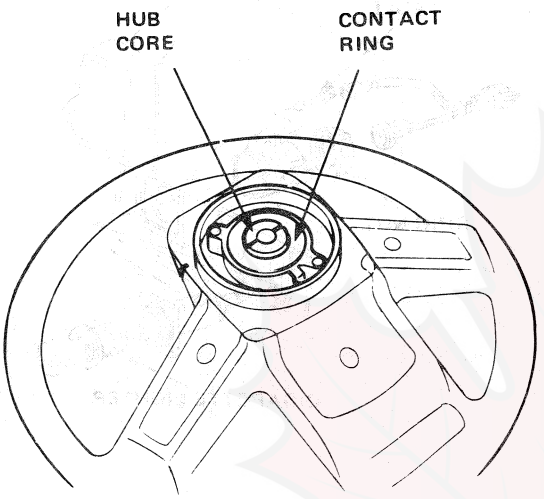
Check for continuity.

- Turn the ignition switch on, then turn to LOCK position. There should be continuity when the ignition key is inserted.
- There should be no continuity when the ignition key is removed.



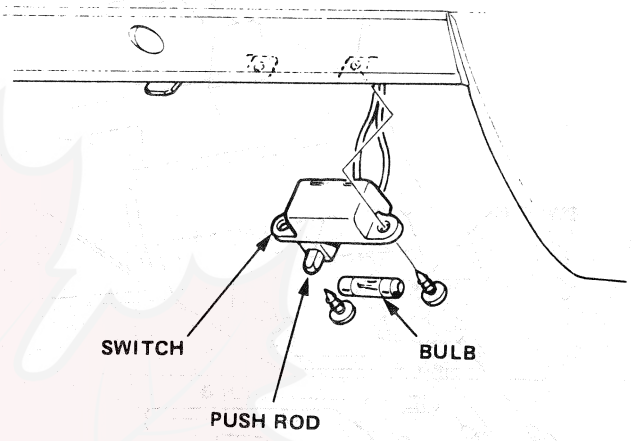
Horn Switch Test

Use an ohmmeter.
There should be continuity between the contact ring and hub core when the horn switch is depressed, and no continuity when released.



Glove box Light/ Switch Replacement

1. Open the glove box.
2. Remove the screws and switch.

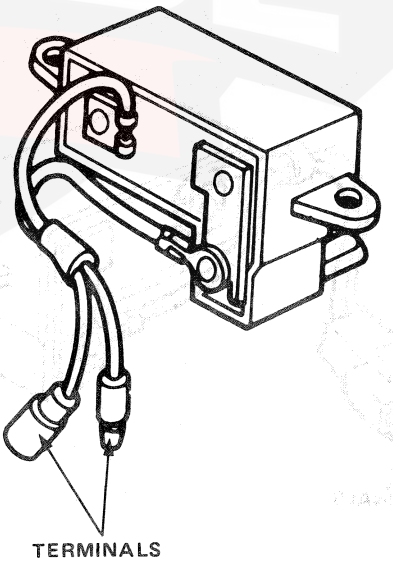


3. Replace the bulb if necessary.

Glove box Light/Switch Test

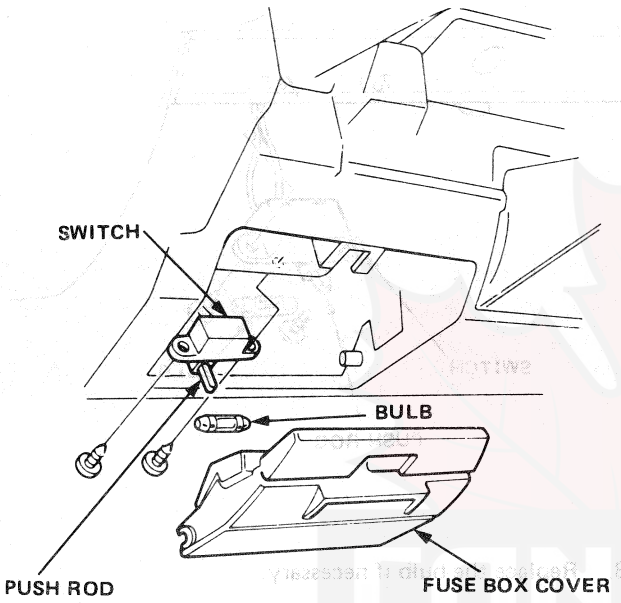
There should be no continuity between the switch terminals when the rod is pushed, and continuity when released.

NOTE: Test the switch with the bulb installed.

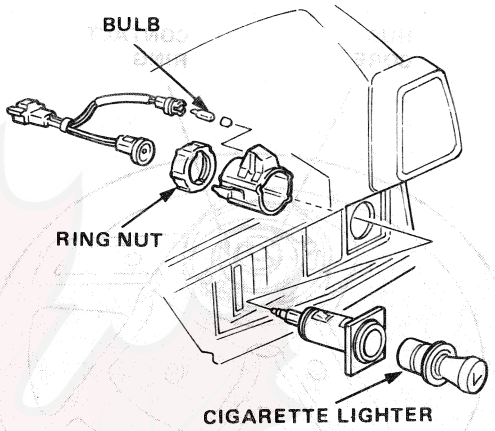


Fuse Box Light Replacement

1. Remove the fuse box cover.
2. Disconnect the switch wires and remove the screws and switch.
3. Replace the bulb if necessary.



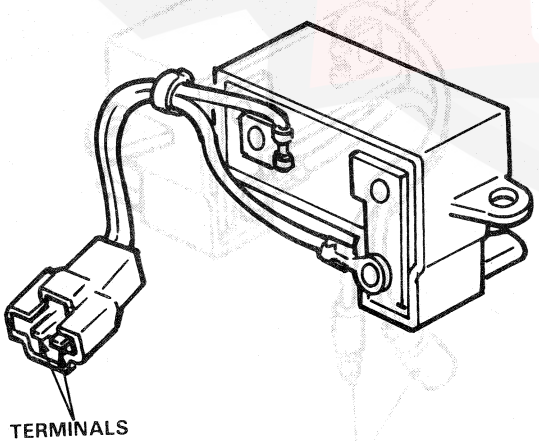
Cigarette Lighter Bulb Replacement



Fuse Box Light Test

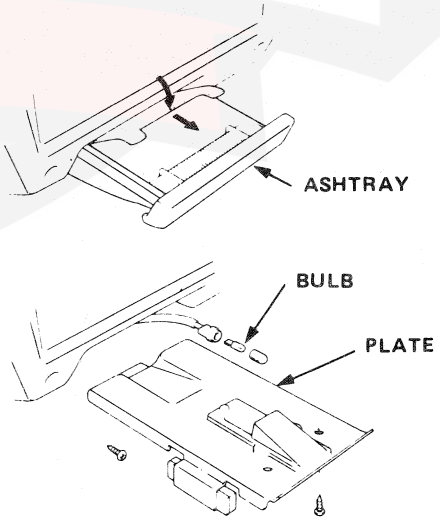
There should be no continuity between the switch terminals when the rod is pushed, and continuity when released.

NOTE: Test the switch with the bulb installed.



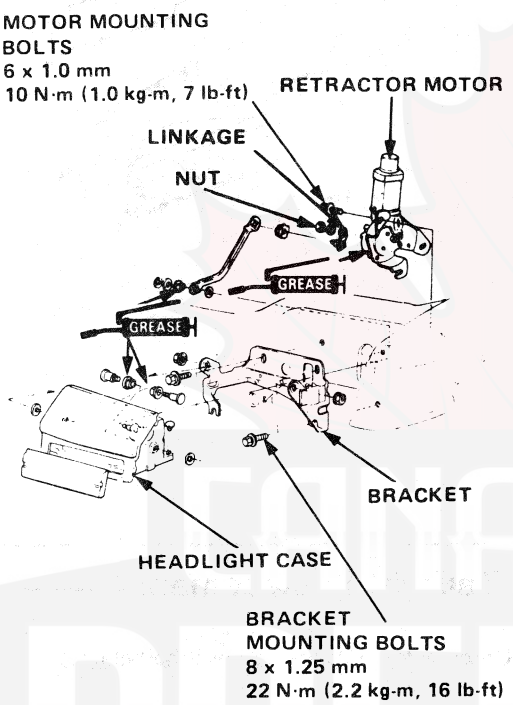
Ashtray Light Bulb Replacement

1. Remove the ashtray.
2. Remove the three screws and plate.
3. Turn the socket 90° counterclockwise and remove the bulb.



Headlight Unit Replacement

1. Open the hood.
2. Remove the linkage nut and separate the retractor motor and linkage.
3. Disconnect the wire harness from the headlight.
4. Remove the headlight case with the bracket by removing the four mounting bolts.



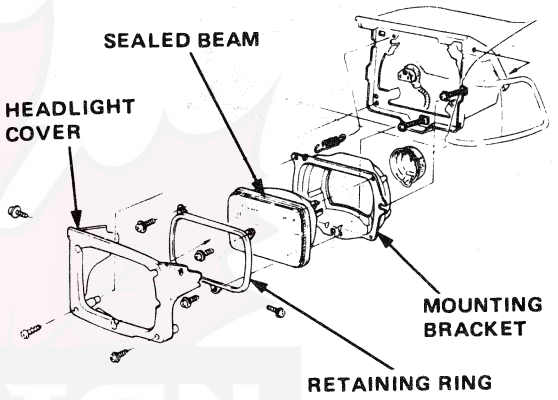
5. Disconnect the wire harness from the retractor motor.
6. Remove the retractor motor by removing the three mounting bolts.

Install the headlight in the reverse order of removal, and:

- Align the cut-out of the link hole with the cut-out of the retractor motor shaft.
- Check that the headlight case fits flush with the hood and front fender. Loosen the four bracket mounting bolts, if necessary.
- Make sure there is no interference between the wire harness and the linkage.

Sealed Beam Replacement

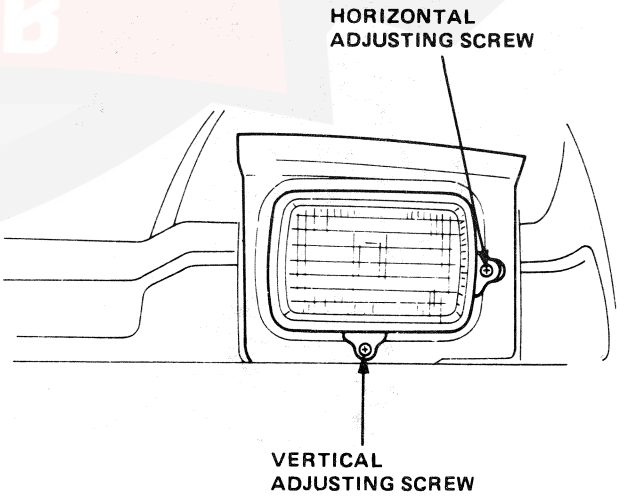
1. Raise the headlight.
2. Pull out the boot and disconnect the wire harness from the headlight.
3. Remove the headlight cover by removing the four cover mounting screws.
4. Remove the headlight from the mounting bracket by removing the retaining ring.



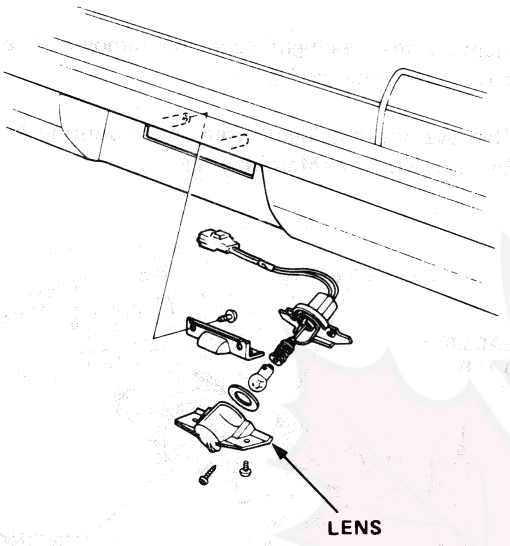
NOTE: The sealed beam can be removed without removing the mounting bracket.

Headlight Adjustment

Adjust the headlights to local requirements.

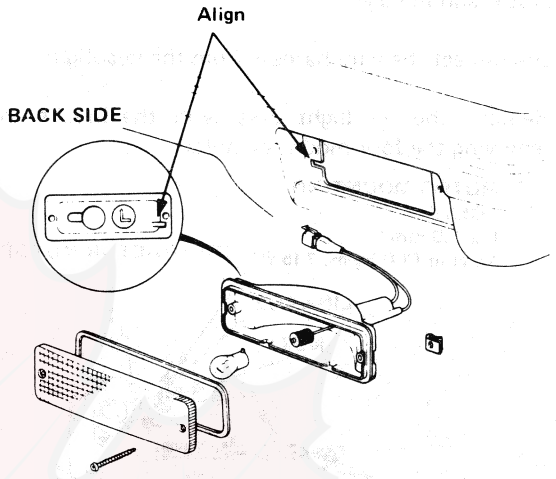


License Plate Light Replacement

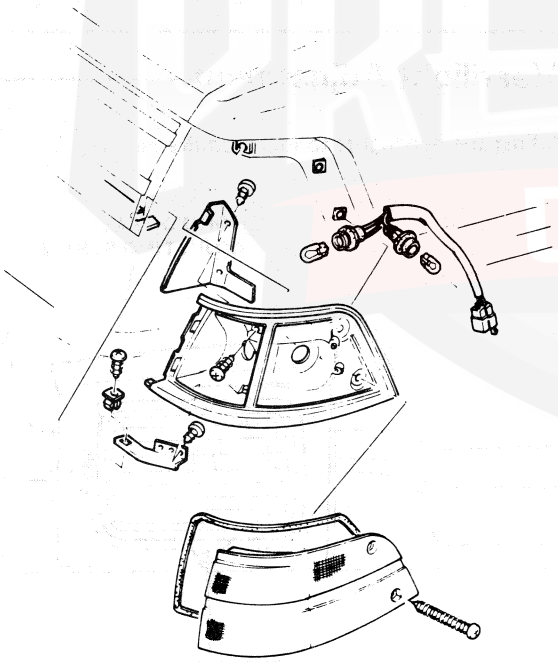


To replace bulb only, remove lens from outside.

Front Turn Signal Light Replacement

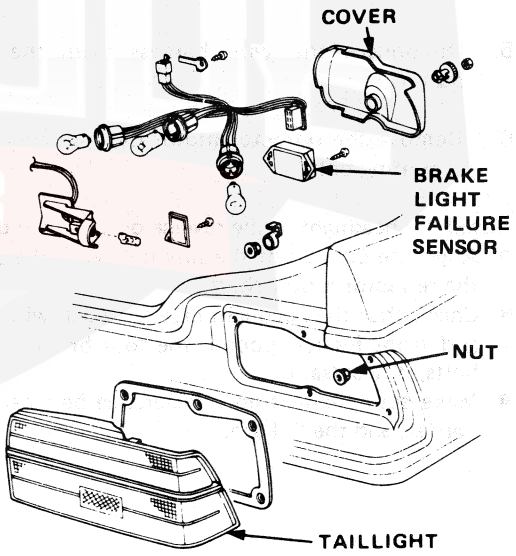


Parking/Side Marker Light Replacement

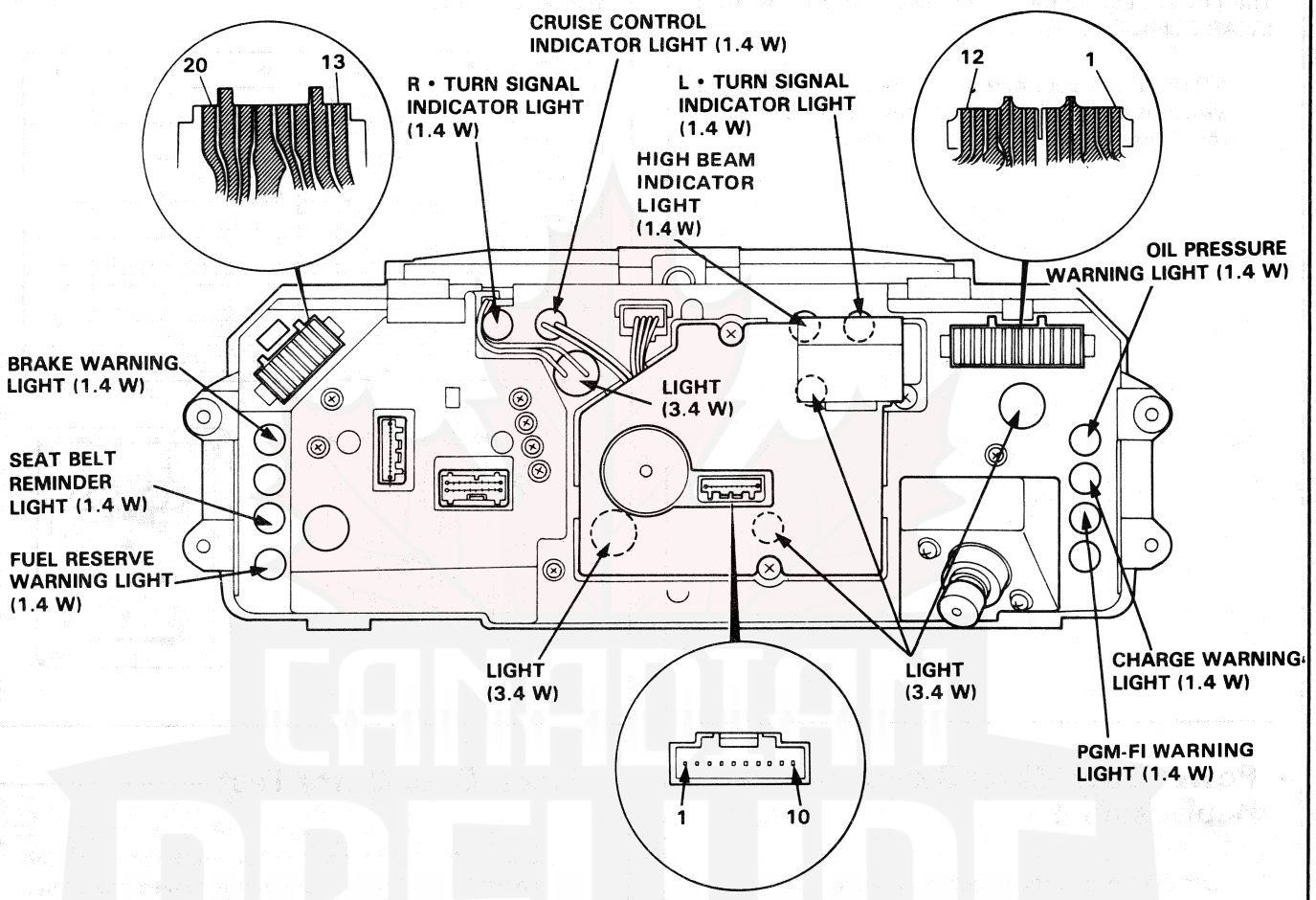


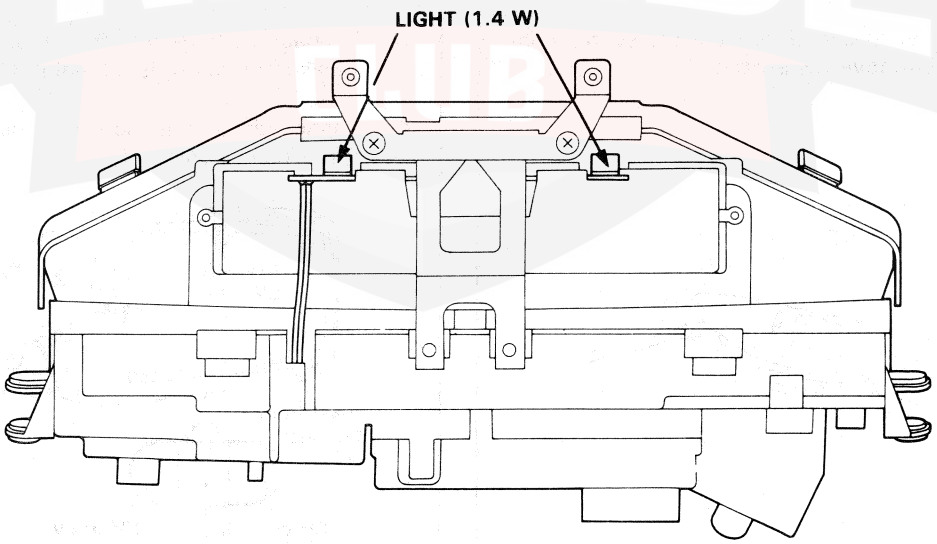
Taillight Replacement

Unscrew the nuts and remove the taillight.



Remove the cover to replace the bulb.





Power Door Mirror Troubleshooting

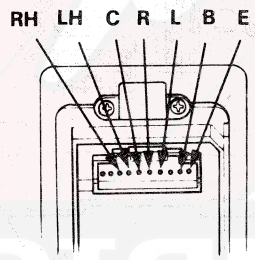
The power door mirror system uses No.9 (10A) fuse (REAR DEFROSTER ⊕IG2).

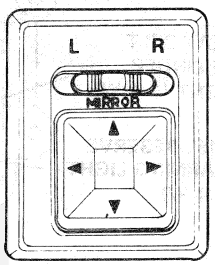
NOTE: If the door mirror does not work when the switch is operated, check the fuse, switch, and mirror. If they are good, check the wires.

Power Door Mirror Switch Test

Check for continuity between terminals according to the table below.

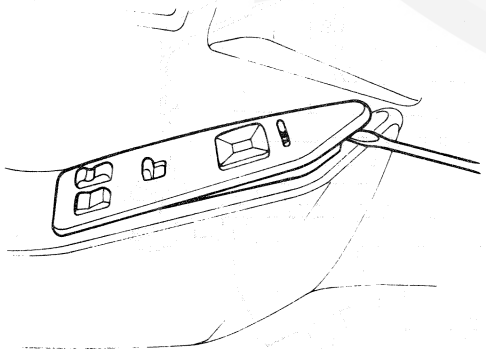
Position		B	E	C	LH	L	RH	R
L	UP	○	○	○	○	○		
	DOWN	○	○	○	○	○		
	LEFT	○	○	○	○	○		
	RIGHT	○	○	○	○	○		
R	UP	○	○	○			○	○
	DOWN	○	○	○			○	○
	LEFT	○	○	○			○	
	RIGHT	○	○	○			○	○





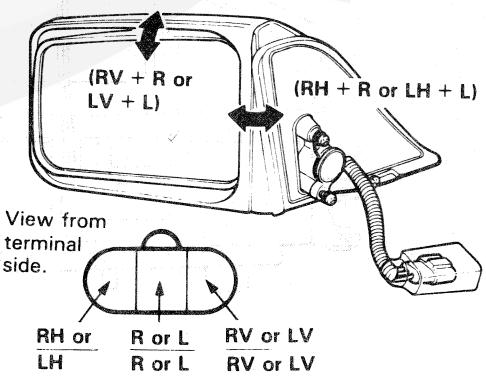
Power Door Mirror Switch Replacement

1. Lift the front of the switch using a screwdriver.
2. Clear the tab of the switch rear end from the door panel.
3. Pull up the switch and disconnect the switch connector, then remove the switch.



Power Door Mirror Test

1. Connect the battery to the RH or LH and R or L terminals. The mirror is normal if it moves smoothly.
2. Change the connection and make sure that the mirror moves smoothly.
3. Connect the battery to the RV or LV and R or L terminals. The mirror is normal if it moves smoothly.
4. Change the connection and make sure that the mirror moves smoothly.



Cruise Control Troubleshooting

NOTE: Before you try to diagnose or repair the problem, check:

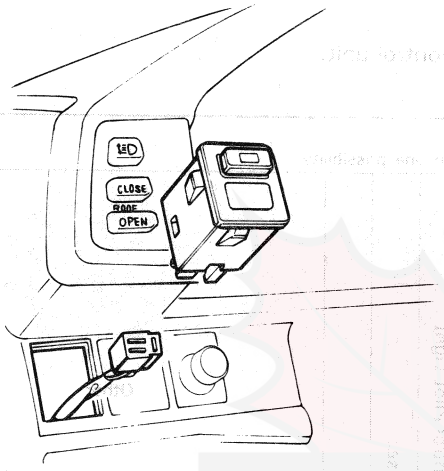
- Throttle cable free play.
- For a full-system check, based on control unit inputs, please see page 26-28.
- Actuator cable free play.
- Throttle linkage operation.
- Wire harness connectors.
- Vacuum lines.

If all possible sources of malfunction check OK, replace the control unit.

Symptom	Possible Cause of Malfunction NOTE: Check in the order numbered, if more than one possibility.												
	Fuse	Wire Harness	Main Switch	Set Switch	Resume Switch	Ignition Pulse	Brake Switch	Clutch Switch (M/T)	Neutral/Back-Up Switch (A/T)	Cruise Control Pilot Light	Speed Pulser	Actuator	Other
Cruise control can't be set.	2	1	4	3	9	10	5	11	6		8	7	
Cruise control can be set, but the pilot light doesn't go on.	3	2								1			
Cruise control can be set, but, after overriding the system, it won't return to set speed when you push the resume switch.		1			2							3	
Cruise control can be set, but you can't reduce the car's speed by pushing the set switch.				1								2	
Cruise control can be set, but the car won't accelerate when you hold the resume switch.					1							2	
Set speed won't cancel when you step on the brakes.		1					2						
Set speed won't cancel when you push the clutch pedal or shift to N, P or R position.		1						2	3				
Set speed can't be cancelled by turning off the main switch, or by using other cancelling mechanisms.		1	4					2	3				
Car won't hold a steady speed even on a flat road with the cruise control set.												○	Check the throttle and actuator cables for free play.
Overshooting and/or undershooting are excessive when you're trying to set the cruise control												○	Adjust the throttle and actuator cable free play.
Won't hold set speed.												○	Replace or repair the vacuum line and clean the actuator filter and tube.

Cruise Control Main Switch Replacement

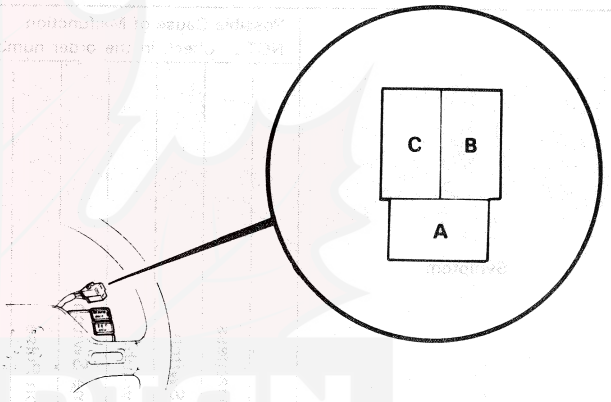
1. Disconnect the wire harness from behind the instrument panel.
2. Release the switch pawl and remove the switch.



Cruise Set/Resume Switch Test

Check switch continuity.

Position \ Terminal		A	B	C
SET SWITCH	ON	○		○
	OFF			
RESUME SWITCH	ON	○	○	
	OFF			
Wire Color		L/R	LG/Bl	LG/R

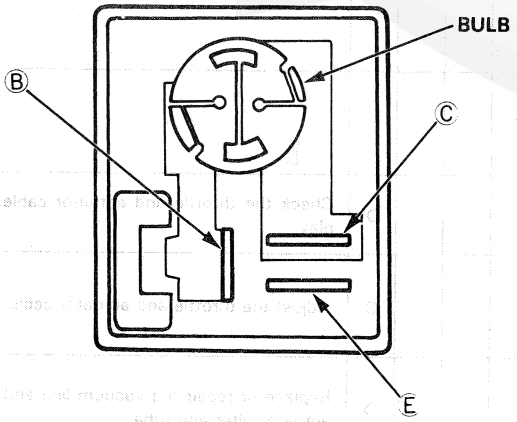


Cruise Control Main Switch Test

Using an ohmmeter, check for continuity and resistance according to the table.

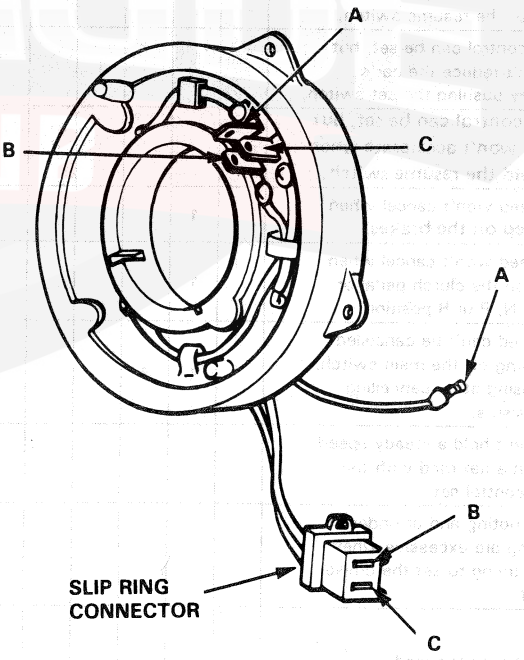
Position \ Terminal	B	C		E
OFF		○	○	○
ON	○	○	○	○

RESISTANCE: (Across terminals C and E) 20Ω



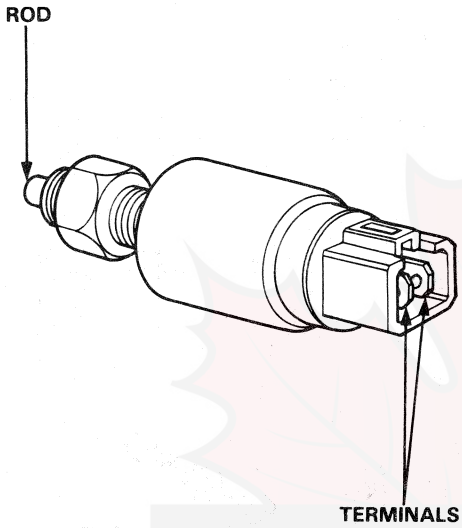
Slip Ring Test

As you turn the slip ring, the ohmmeter should indicate continuity between terminals with the same letters.



Clutch Switch Test

There should be continuity between the terminals when the rod is pushed in, and no continuity when the rod is out.

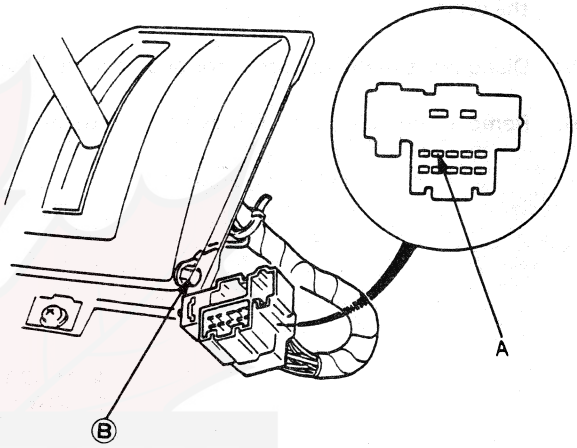


Neutral/Back-up Switch Test

On automatic transmission cars only, check the switch for continuity.

D4, D3 and 2 position: There should be continuity between the A and B terminals.

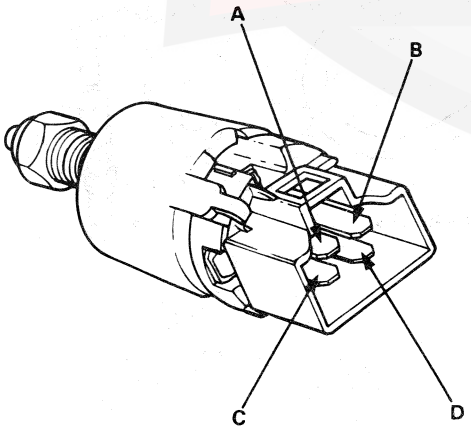
P, R and N positions: There should be no continuity.



Brake Light Switch Test

There should be continuity between the A and D terminals, and no continuity between the B and C terminals, when the rod is pushed in.

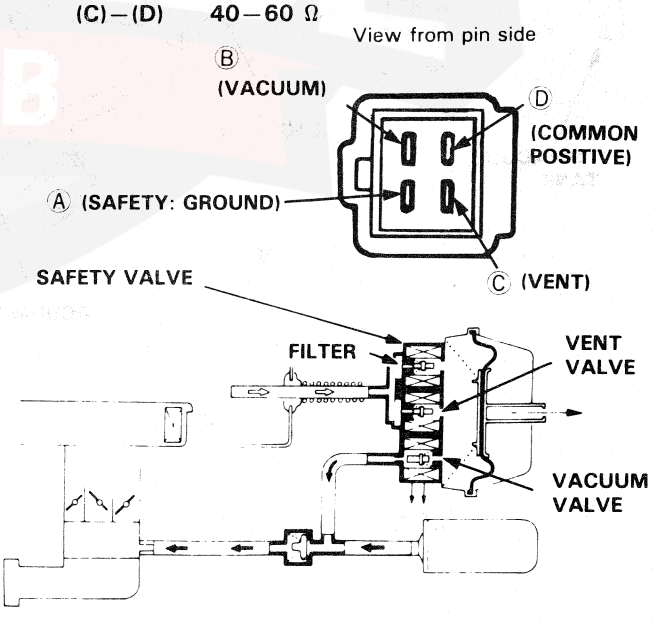
There should be no continuity between the A and D terminals, and continuity between the B and C terminals, when the switch is free.



Cruise Actuator Solenoid Test

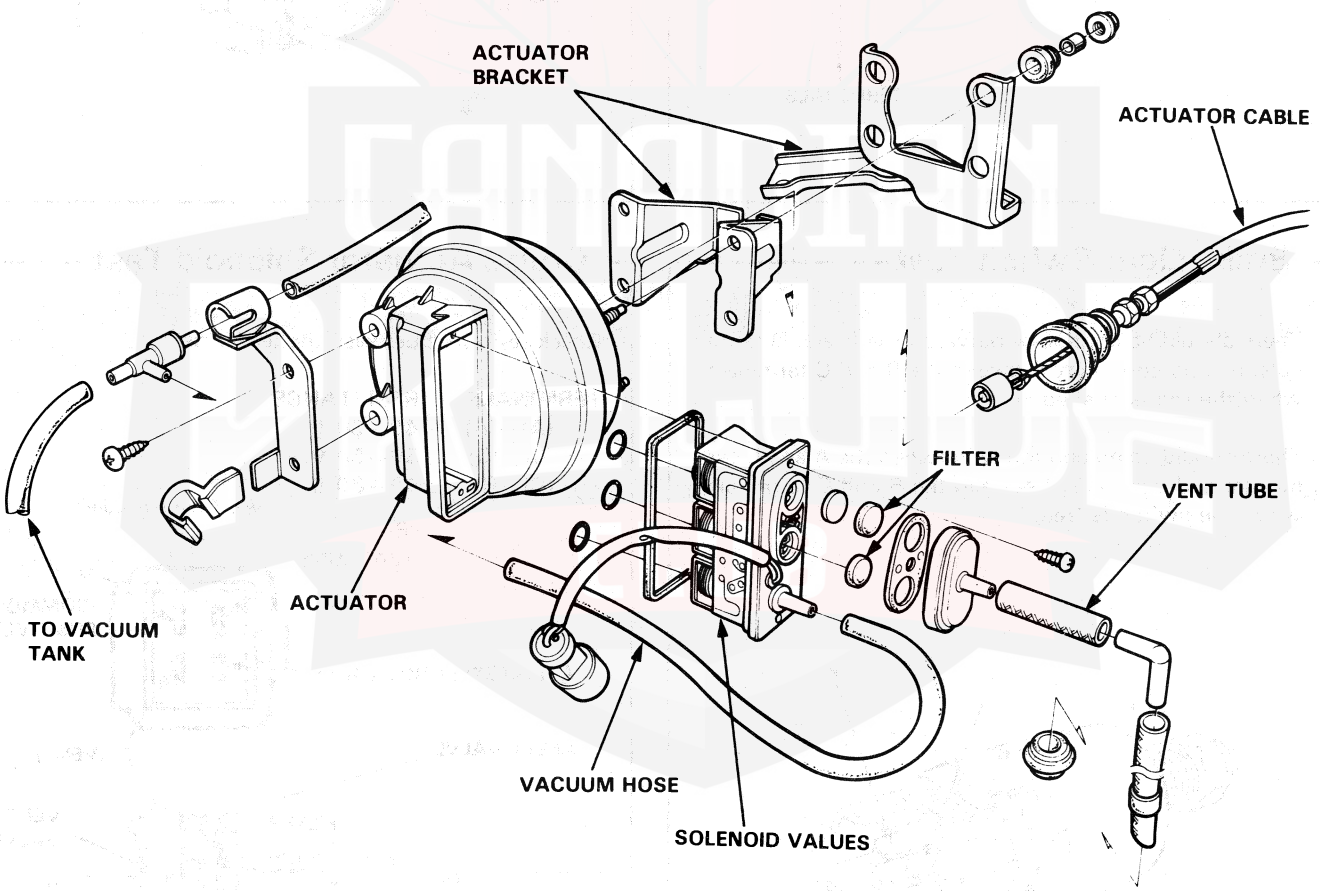
Check resistance between the terminals.

TERMINALS	RESISTANCE
(A)—(D)	40—60 Ω
(B)—(D)	30—50 Ω
(C)—(D)	40—60 Ω



Actuator/Cable Replacement

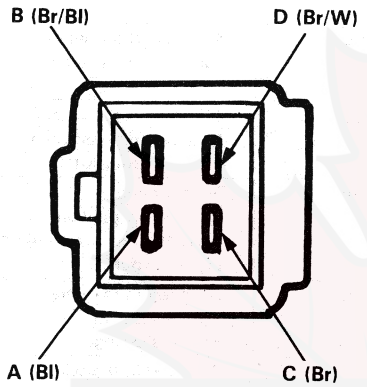
1. Pull back the boot and loosen the locknut, then disconnect the cable from the bracket.
2. Disconnect the cable end from the actuator rod.
3. Disconnect the actuator cable from the actuator center arm.
4. Turn the grommet 90° in the firewall, and remove the cable.
5. Disconnect the wire connector and vacuum hose.
6. Remove the bolts, then remove the actuator.



Cruise Control Actuator Inspection

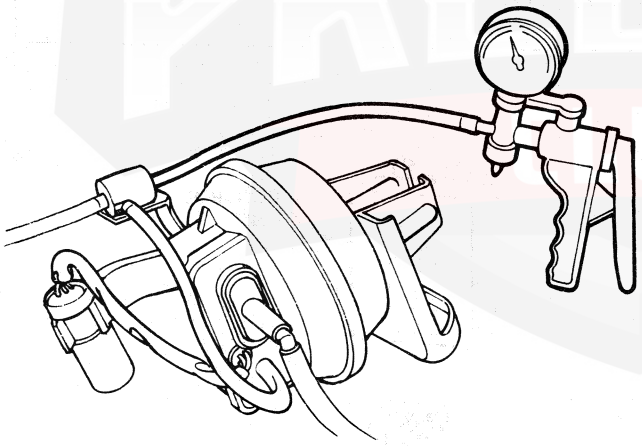
Disconnect the actuator cable from the actuator and then disconnect the actuator connector.

Make sure the control unit connector is disconnected. Then connect a lead from the battery (12 V) positive terminal to terminal D, and another lead from the negative terminal to terminals A, B and C.



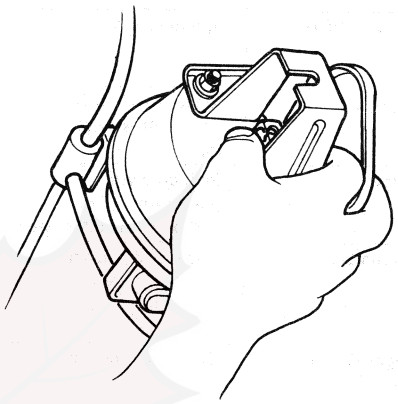
As viewed from pin side

Connect the hand vacuum pump to the actuator and draw vacuum



The actuator rod should be pulled in completely. If the rod is pulled in only part-way or not at all, check the vacuum line for leaks then recheck the actuator.

With voltage and vacuum still applied, try to pull the actuator rod out by hand.
It should not be able to be pulled. If it can be, it is defective.

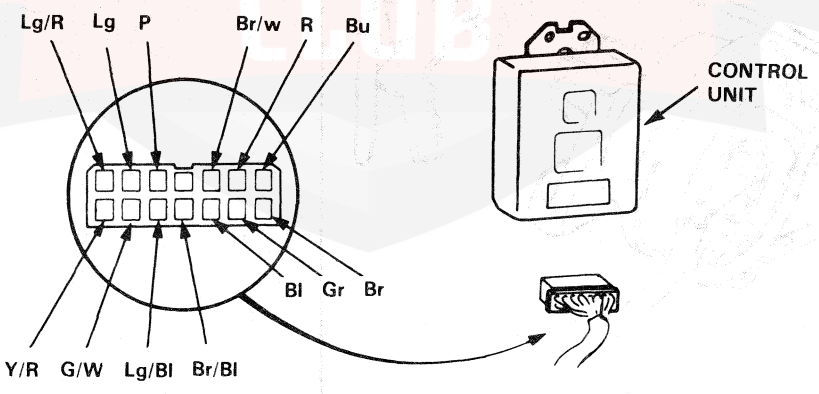


Clean the vent tube and the actuator filter then disconnect the battery negative terminal from the terminals (A) and (B).
The actuator rod should return.
If actuator rod does not return, the solenoid valve is defective.

Control Unit Input Test

NOTE: Control unit connector disconnected.

No.	Wire	Test condition	Test: desired result	Possible cause
1	Black	Ignition switch OFF	Check for resistance to ground: should be 0 ohm.	Poor ground. An open in the Bl wire.
2	Brown/White	Ignition switch OFF	Check for resistance to Brown wire: should be 40–60 ohms.	An open or short in the wire. Faulty actuator.
3	Brown/White	Ignition switch OFF	Check for resistance to Black wire: should be 40–60 ohms.	An open or short in the wire. Faulty actuator.
4	Brown/White	Ignition switch OFF	Check for resistance to Brown/Black wire: should be 30–50 ohms.	An open or short in the wire. Faulty actuator.
5	Light Blue	Ignition switch ON and main switch ON	Check for voltage to ground: should be 12 volts.	An open in the wire. Faulty main switch.
6	Gray	Ignition switch ON, main switch ON and brake pedal released.	Check for voltage to ground should be 12 volts.	An open in the wire. Misadjusted brake switch. Faulty brake switch.
7	Green/White	Brake pedal pushed.	Check for voltage to ground: should be 12 volts.	Poor ground. An open in the wire. Misadjusted brake switch or faulty brake switch.
8	Light Green/Red	Set switch pushed.	Check for voltage to ground: should be 12 volts.	An open in the wire. Faulty set switch. Faulty slip ring.
9	Light Green/Black	Resume switch pushed	Check for voltage to ground: should be 12 volts.	An open in the wire. Faulty resume switch. Faulty slip ring.
10	Pink	Clutch released (M/T) or selector in D3, D4 or 2 (A/T).	Check for resistance to ground: should be 0 ohm.	An open in the wire. Poor ground. Clutch switch misadjusted.
11	Red	Ignition switch ON and ground the red wire	Check the pilot light: the pilot light should go on.	Faulty bulb. An open in the wire.
12	Blue	Start the engine	Check for voltage to ground: should be system voltage.	Faulty ignition system. An open in the wire.
13	Yellow/Red	Ignition switch ON and main switch ON. Raise the front of the car and rotate one wheel slowly.	Check for voltage between Light Green ⊕ and Yellow/Red ⊖ terminals: should be 0–12–0–12V repeatedly.	An open or short in the wire. Faulty speedometer.



View from wire side

Power Window Troubleshooting

The power window system uses a 35 A main fuse and 15A AUXILIARY Fuse Holder No.1 (front left door), No.2 (front right door).

1. No power windows work:
   - Check 45 A main fuse and the 15 A (No. 15, 16) fuses.
   - Check main relay.

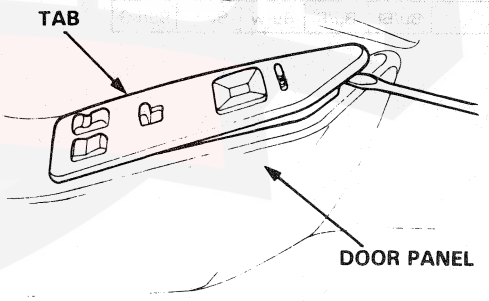
2. Driver's door power window doesn't work:
   - Check No. 15 fuse.
   - Check left front switch.
   - Check left front motor.
   - Check control unit, see page 26-32.

3. One passenger door power window doesn't work:
   - Check 15 A fuse.
   - Check passenger door switch.
   - Check motor.
   - Check wire harness.

Power Window Switch Replacement

NOTE: Before you replace a defective switch, disassemble it, clean the contacts and retest it. Sometimes dirt on the contacts can affect switch operation.

1. Lift the front of the switch using a screwdriver.
2. Pull the switch forward to clear the tab at the rear from the door panel.
3. Pull up the switch and disconnect the connector, then remove the switch.

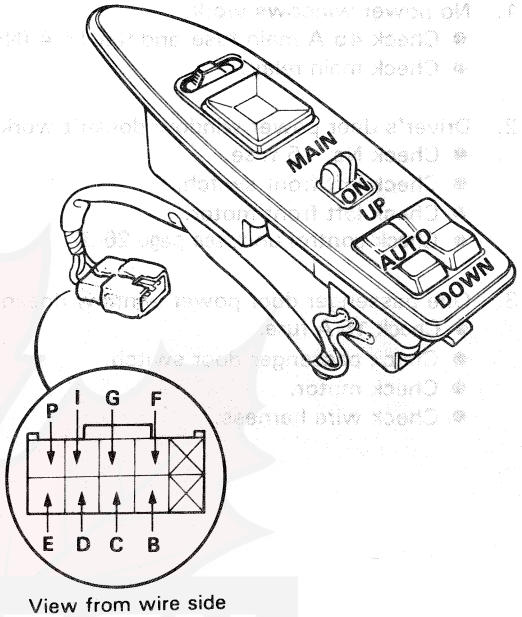


Driver's door shown, passenger door is similar installation.

Power Window Switch Test

Driver's Door Main Switch

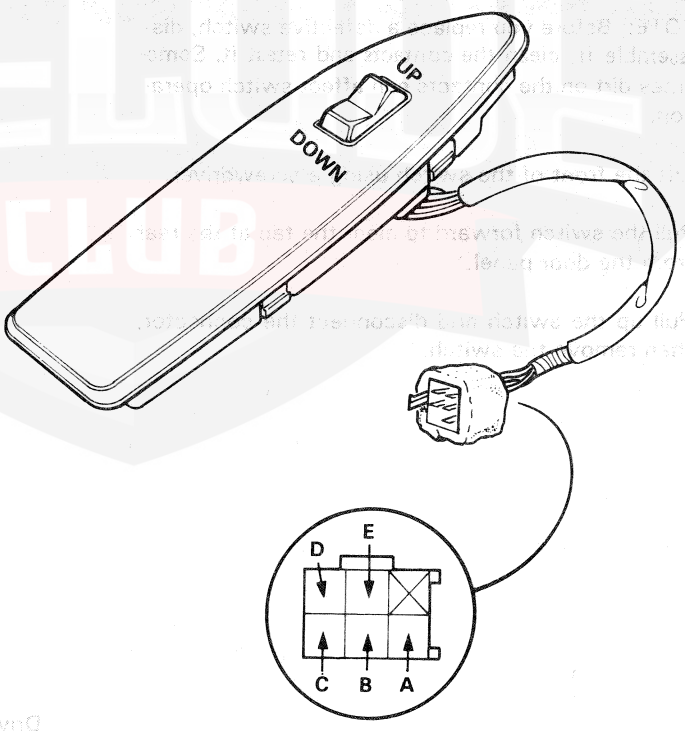
		Left				Right				MAIN Switch
		B	C	D	E	F	G	P'	I	P
UP		○—○				○—○				
								○—○		
OFF							○—○	○—○		
DOWN						○—○			○—○	
							○—○			
DOWN (AUTO)			○—○	○—○	○—○					
MAIN Switch	ON							○—○		○—○
	OFF									
Color		Bl/y	W/y	Bu/G	R/G	Bu/Bl	Bu/y	Bl	Bu/G	Bl



View from wire side

Passenger Door Switch

		A	B	C	D	E
UP		○—○				
				○—○		○—○
OFF				○—○		○—○
			○—○		○—○	
DOWN		○—○		○—○		
			○—○		○—○	
Color		Bu/Bl	Bu/R	Bu/w	Bu/y	Bu/LG

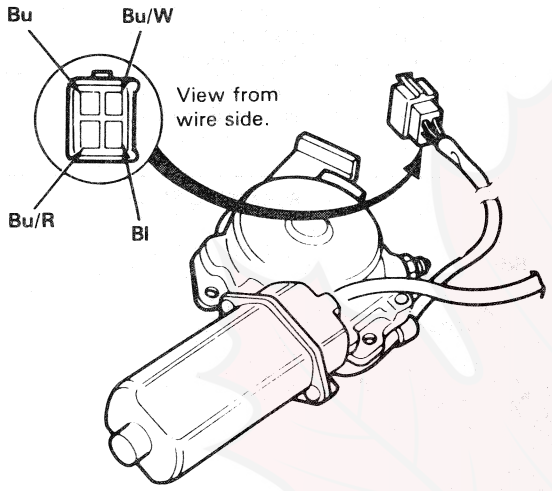


View from wire side

Power Window Motor Test

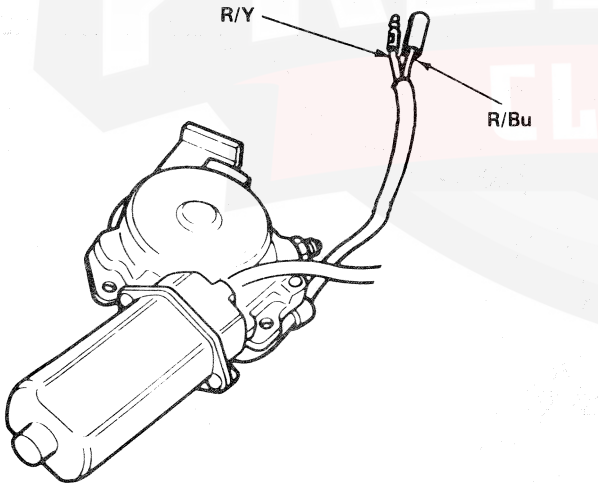
Driver's Door:

For the driver's door, connect a battery positive lead to the Bu/R and a ground lead to the Bu/W. Then reverse the leads to be sure that the motor will run in both directions.



Passenger's Door:

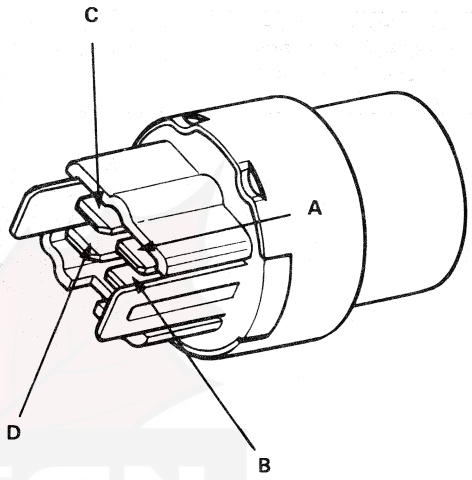
For the passenger door, connect a battery positive lead to one wire and a ground lead to the other wire. Then reverse the leads to be sure that the motor will run in both directions.



Power Window Relay Test

There should be continuity between the A and B terminals, when the battery is connected to the C (positive) and D (negative) terminals.

There should be no continuity when the battery is disconnected.

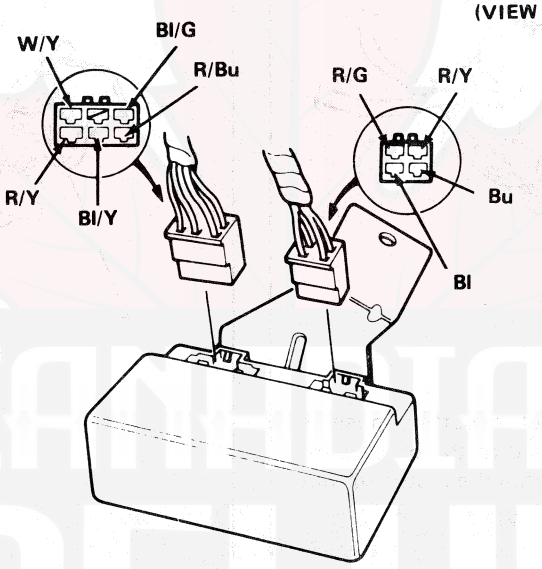


Power Window Control Unit Input Test

Input Test: The unit couplers are disconnected and ignition switch ON.

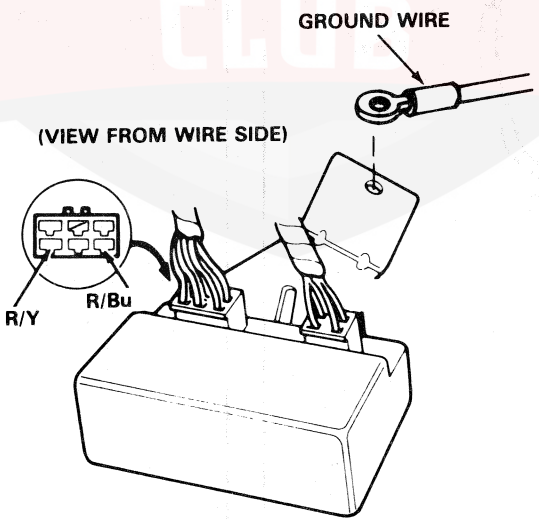
No.	Wire: test condition	Test: desired result	Actual result: possible cause
1	Black (Bl)	Check for resistance to ground: should be 0 ohm	• If there is resistance: the ground is poor. • If there is no continuity: There is an open in the Bl wire. • If resistance is 0 ohm: proceed to No.2.
2	White/Yellow (W/Y)	Check for voltage to ground: should be 12 volts.	• If not: There is an open in the W/Y wire, or the main relay is faulty. • If there is 12 volts: proceed to No.3.
3	Black/Yellow (Bl/Y) UP, Black/Green (Bl/G) DOWN, Red/Green (R/G) DOWN-AUTO	Check for voltage to ground: should be 12 volts.	• If not: There is an open in each wire. • If there is 12 volts: The control unit is faulty.

(VIEW FROM WIRE SIDE)



Output Test: The control unit couplers are reconnected and the control unit ground wire is disconnected with ignition switch ON.

Wire: test condition	Test: desired result	Actual result: possible cause
DOWN-AUTO R/Bu:	Check for voltage to ground terminal: should be 12 volts.	If not: the control unit is faulty.

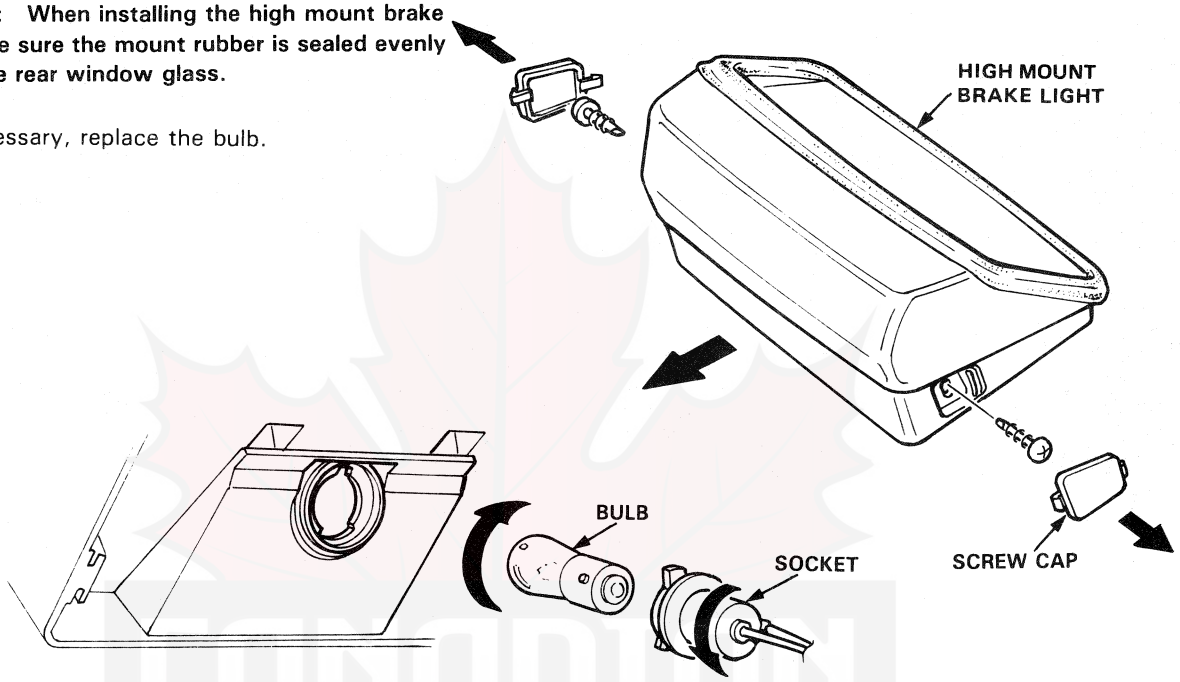


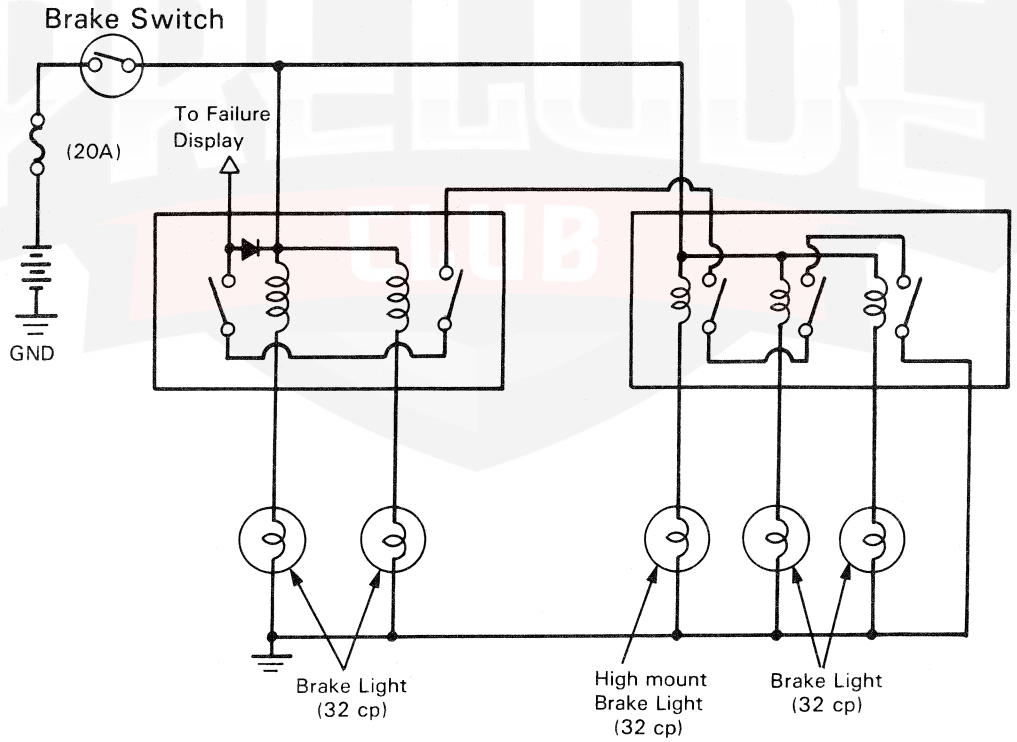
High Mount Brake Light Replacement

1. Remove the 2 screw covers and screws, then remove the high mount brake light on the rear shelf.

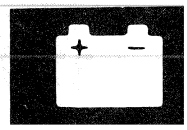
CAUTION: When installing the high mount brake light, make sure the mount rubber is sealed evenly around the rear window glass.

2. If necessary, replace the bulb.





Harness, Fuses, and Wiring Diagram



Harness, Fuses, and Wiring Diagram

Troubleshooting Precautions

Before troubleshooting

- Check the main fuse and the fuse box.
- Check the battery for damage, state of charge, and clean and tight connections.

CAUTION:

- **Do not quick-charge a battery unless the battery ground cable has been disconnected, or you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the ground cable disconnected or you will severely damage the wiring.**

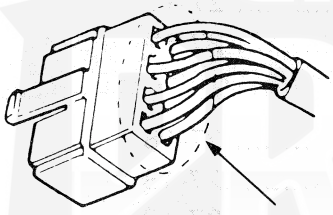
- Check the alternator belt tension.

While you're working:

- Make sure connectors are clean, and have no loose pins or receptacles.

CAUTION: Do not pull on the wires when disconnecting a connector; pull only on the connector housings.

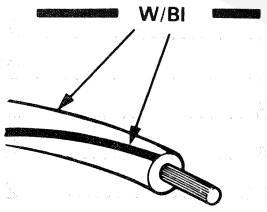
- When connecting a connector, push it until it clicks into place.
- Make sure multiple pin connectors are packed with silicone grease.



Pack with silicone grease

Wire Color Code

W — White
Y — Yellow
Bl — Black
Bu — Blue
G — Green
R — Red
O — Orenge
Lb — Light Blue
Lg — Light Green
P — Pink
Br — Brown
Gr — Gray



Wire insulator has one color or one color with another color stripe. The second color is the stripe.

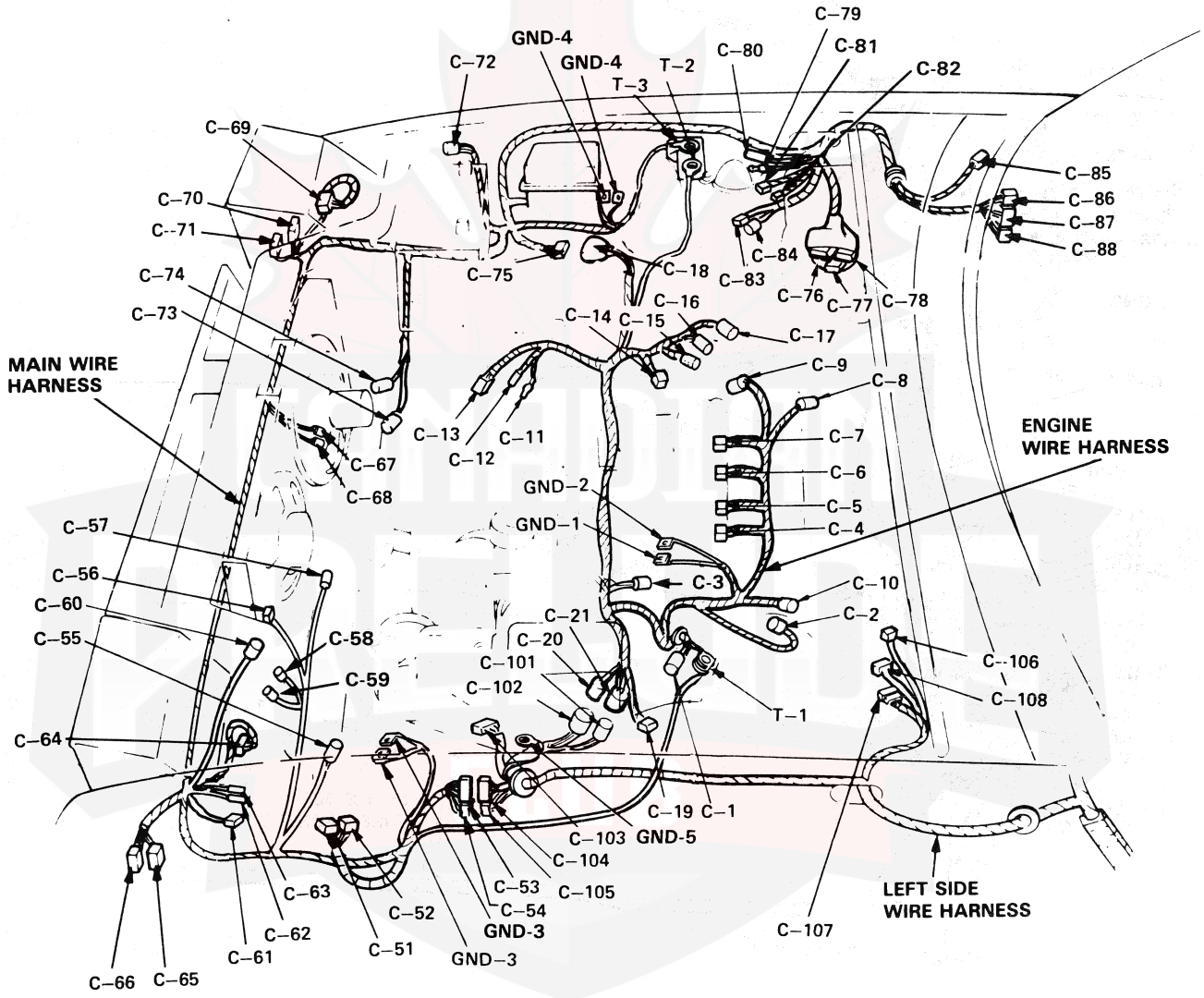
How to Identify Connectors

Identification numbers have been assigned to all connectors. The number is preceded by the letter "C" for connectors, "GND" for ground terminals or "T" for nonground terminals.

LOCATION / HARNESS	ENGINE COMPARTMENT	DASHBOARD	OTHERS (FLOOR, DOOR, TRUNK, ROOF)
Engine wire harness	C-1 thru. C-21 T-1, T-2 and T-3 GND-1 and 2		
A/C wire harness	C-31 thru. C-37 GND-2		
Carburetor wire harness	C-41 thru. C-48		
Main wire harness	C-51 thru. C-85 T-3 and T-4 GND-3 and GND-4	C-86 thru. C-92	
Left side wire harness	(Fuel-Injected Engine) C-101 thru. C-108 GND-5	C-123 thru. C-137	C-109 thru. C-122 GND-6
	(Carbureted Engine) C-101 thru. C-104 GND-5	C-105 thru. C-113	C-114 thru. C-123 GND-6
Heater wire harness	(Fuel-Injected Engine) C-152 thru. C-172 C-176 thru. C-187 GND-7 and GND-8		C-173 thru. C-175 C-188 thru. C-191
	(Carbureted Engine) C-152 thru. C-154 C-156 thru. C-176 GND-7 and GND-8		C-155, C-177 thru. C-180
Dashboard wire harness A		C-201 thru. C-244 GND-11	
Trunk wire harness			C-251 thru. C-257 GND-12
Door wire harness		C-301 thru. C-306	C-307 thru. C-317
Fuel unit wire harness			C-711 and C-712
Sunroof wire harness		C-736	C-737
Dashboard wire harness B		C-741 thru. C-747	
Heater control panel wire harness		C-751 and C-752	
Rear defroster ground wire			C-761 GND-13
Rear Tray wire harness			Fuel-Injected Engine: C-192 thru. C-201 Carbureted Engine: C-181 thru. C-191 GND-9 and GND-10
Dome light wire harness		C-736	C-737

Wire Harness Routing

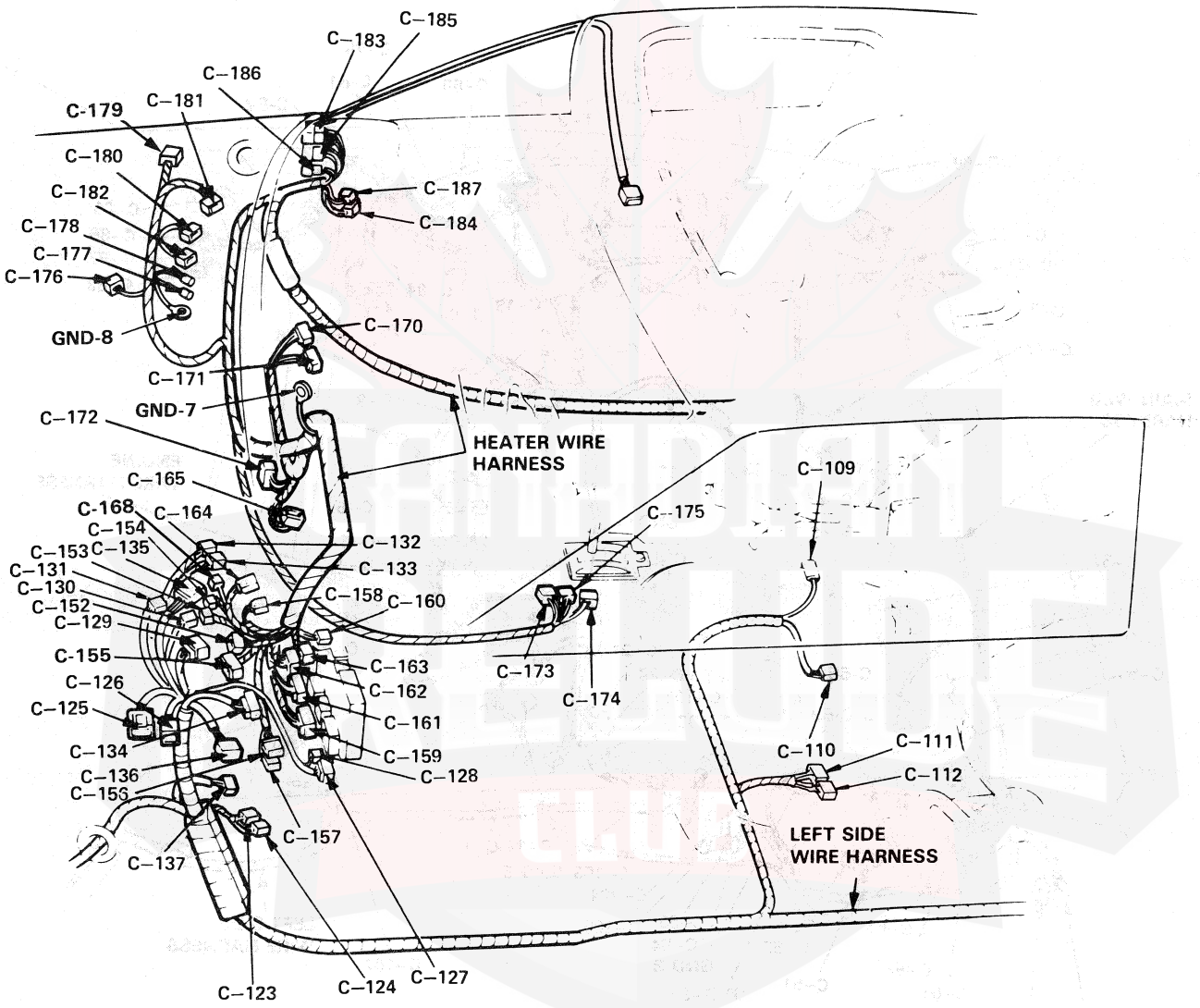
Fuel-Injected Engine:

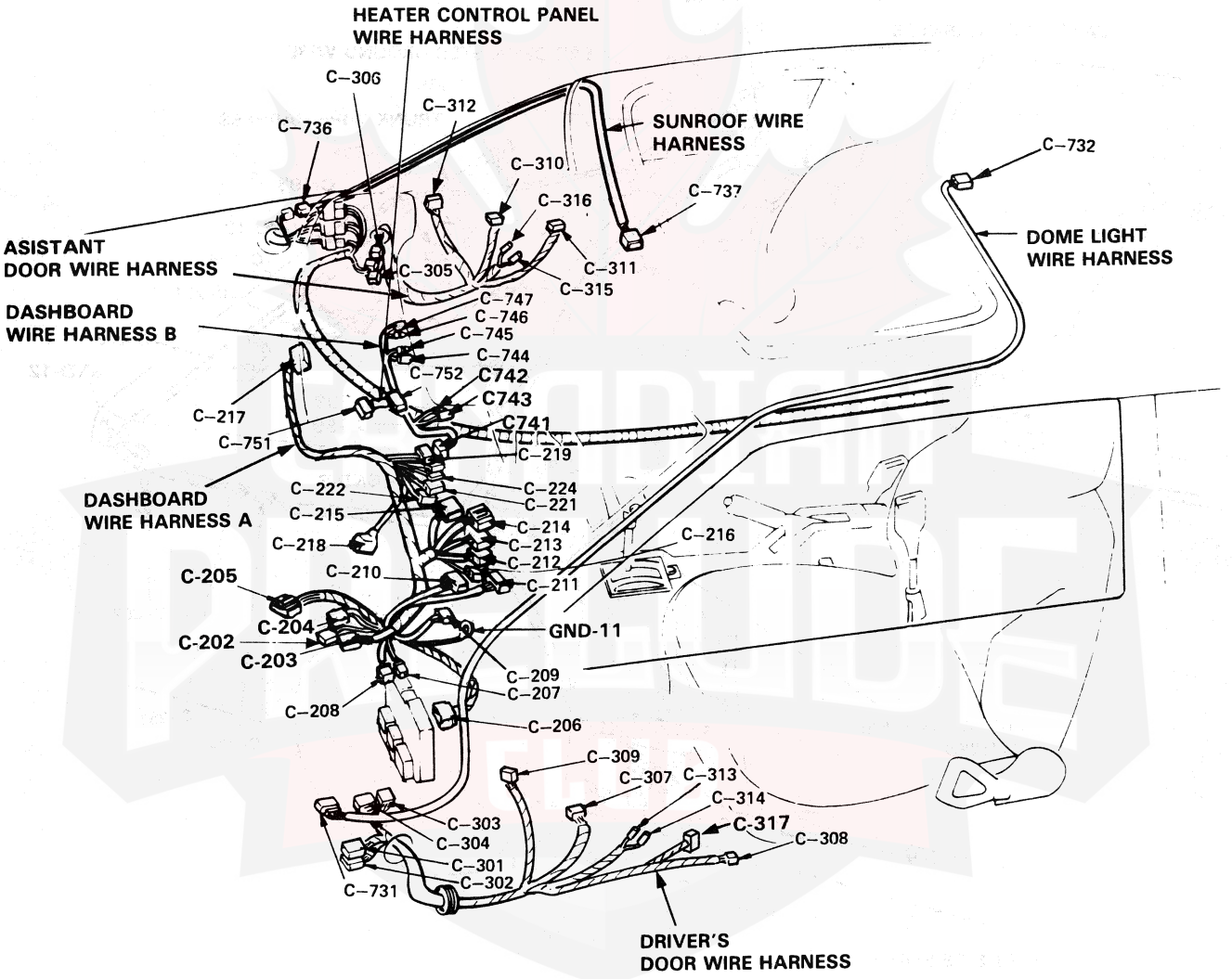


(cont'd)

Wire Harness Routing (cont'd)

Fuel-Injected Engine:





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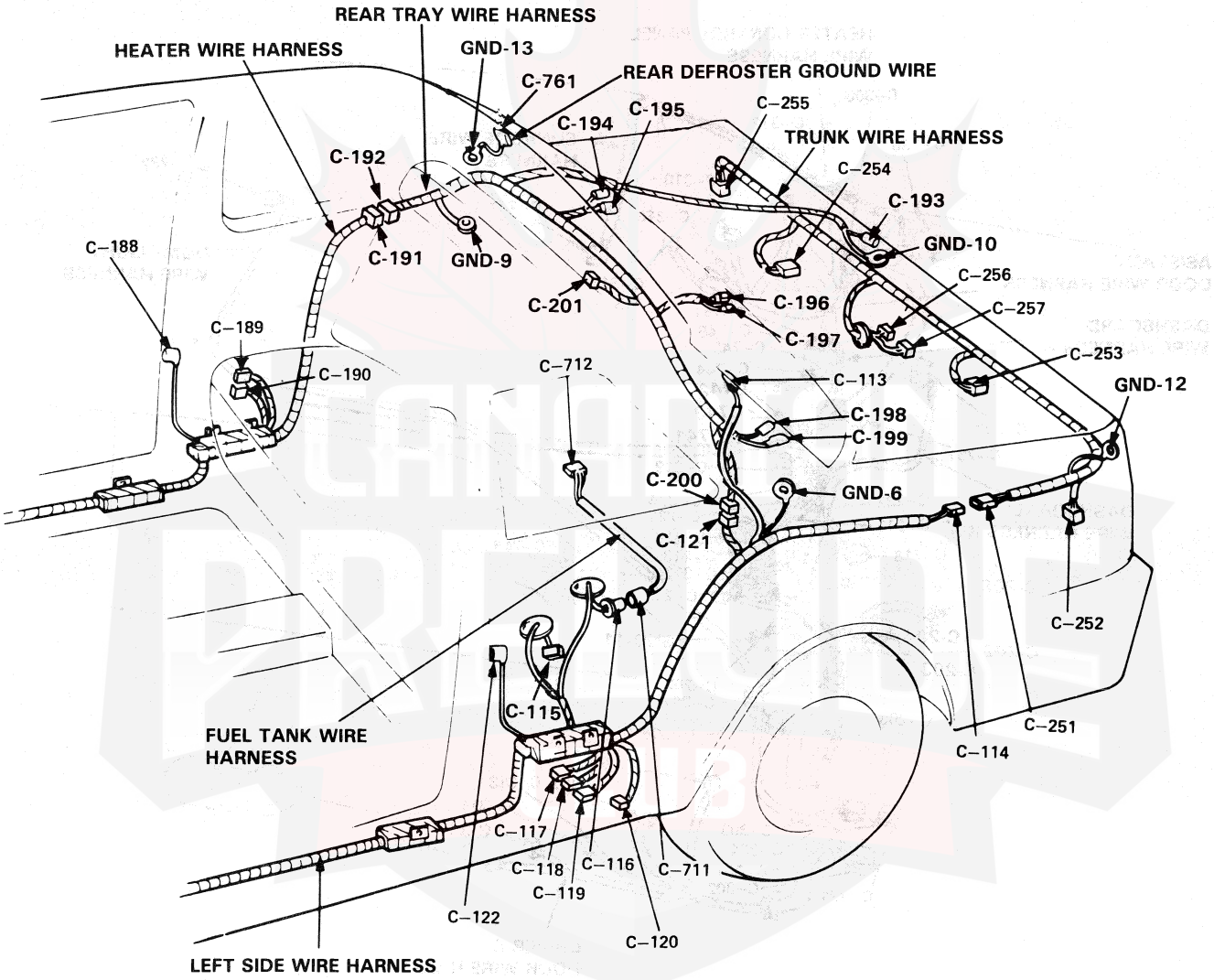
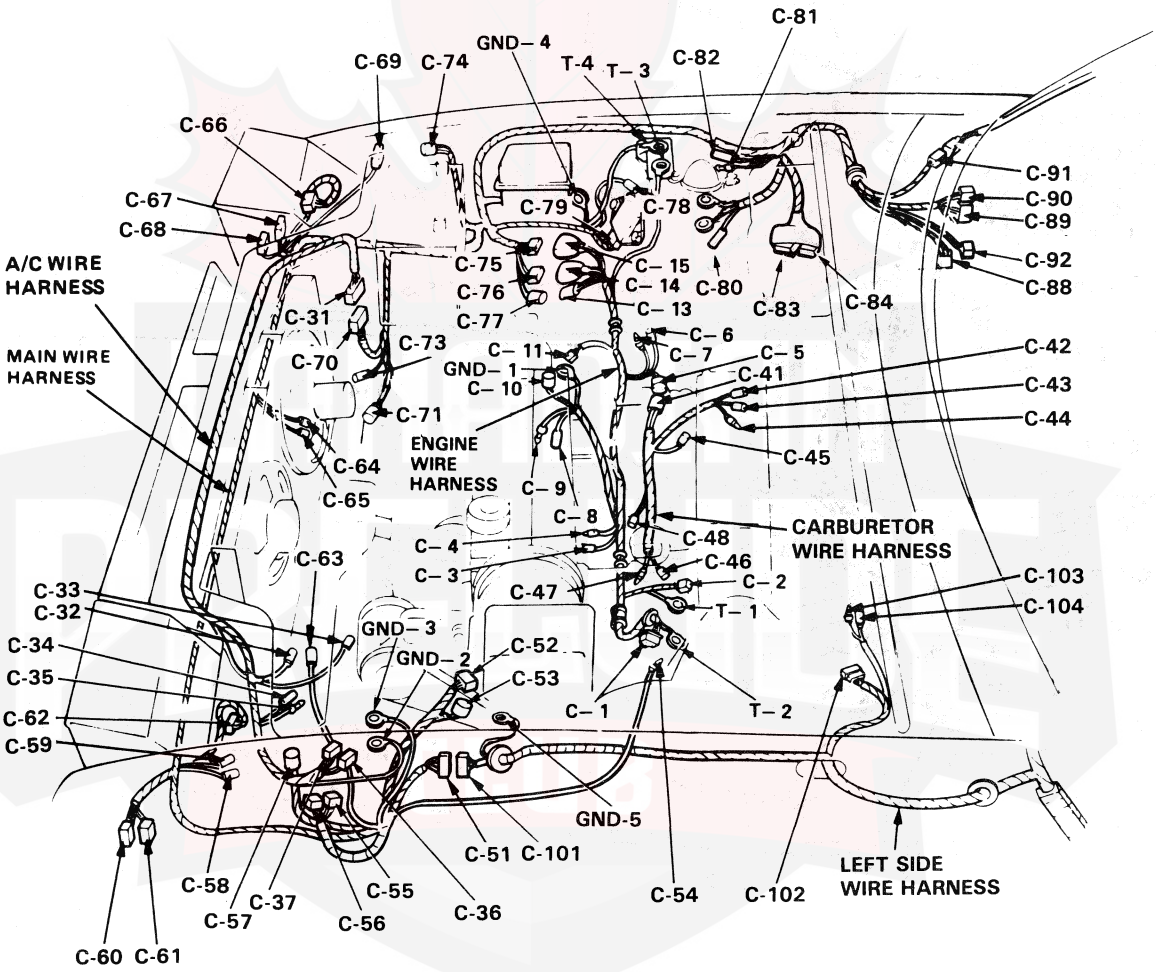
Wire Harness Routing (cont'd)

Fuel-Injected Engine:



Wire Harness Routing

Carbureted Engine:



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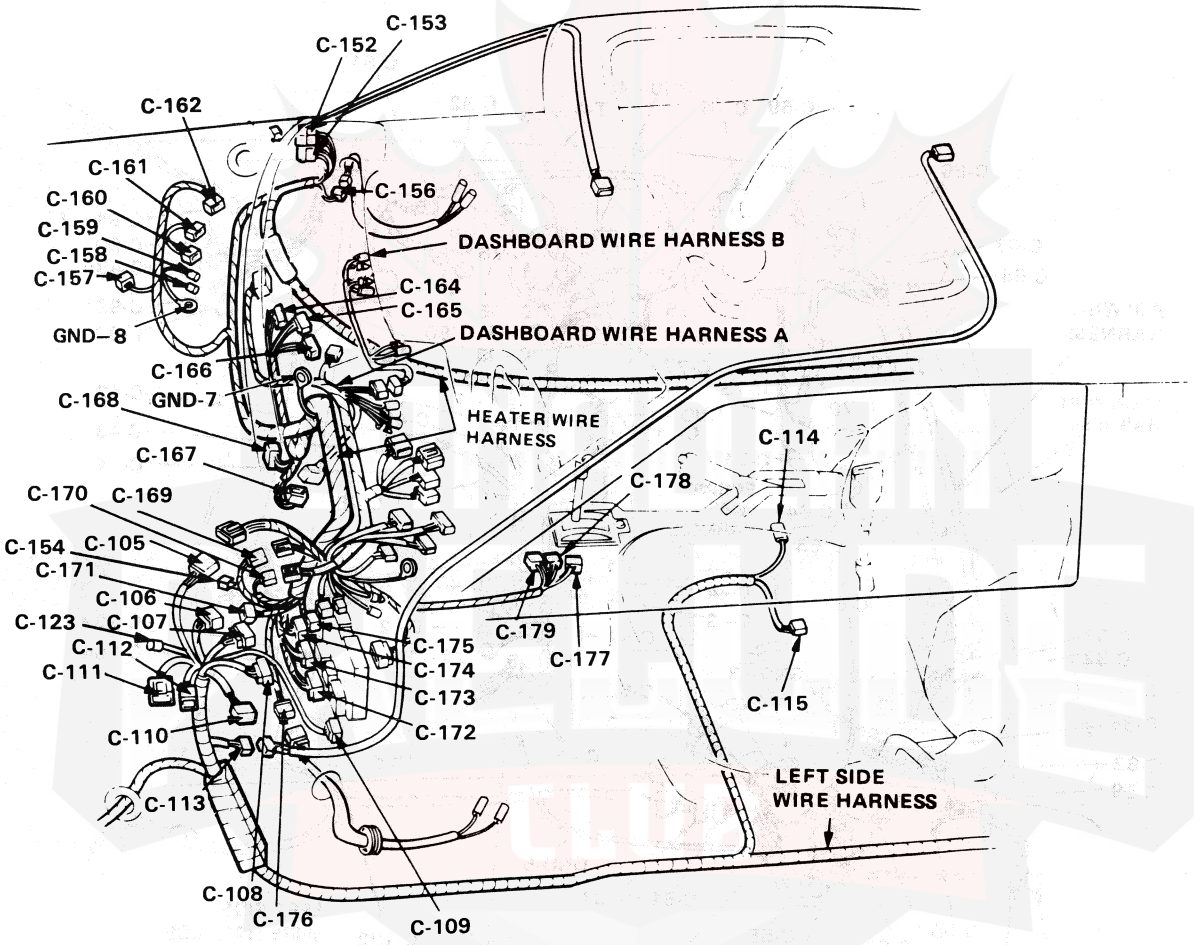
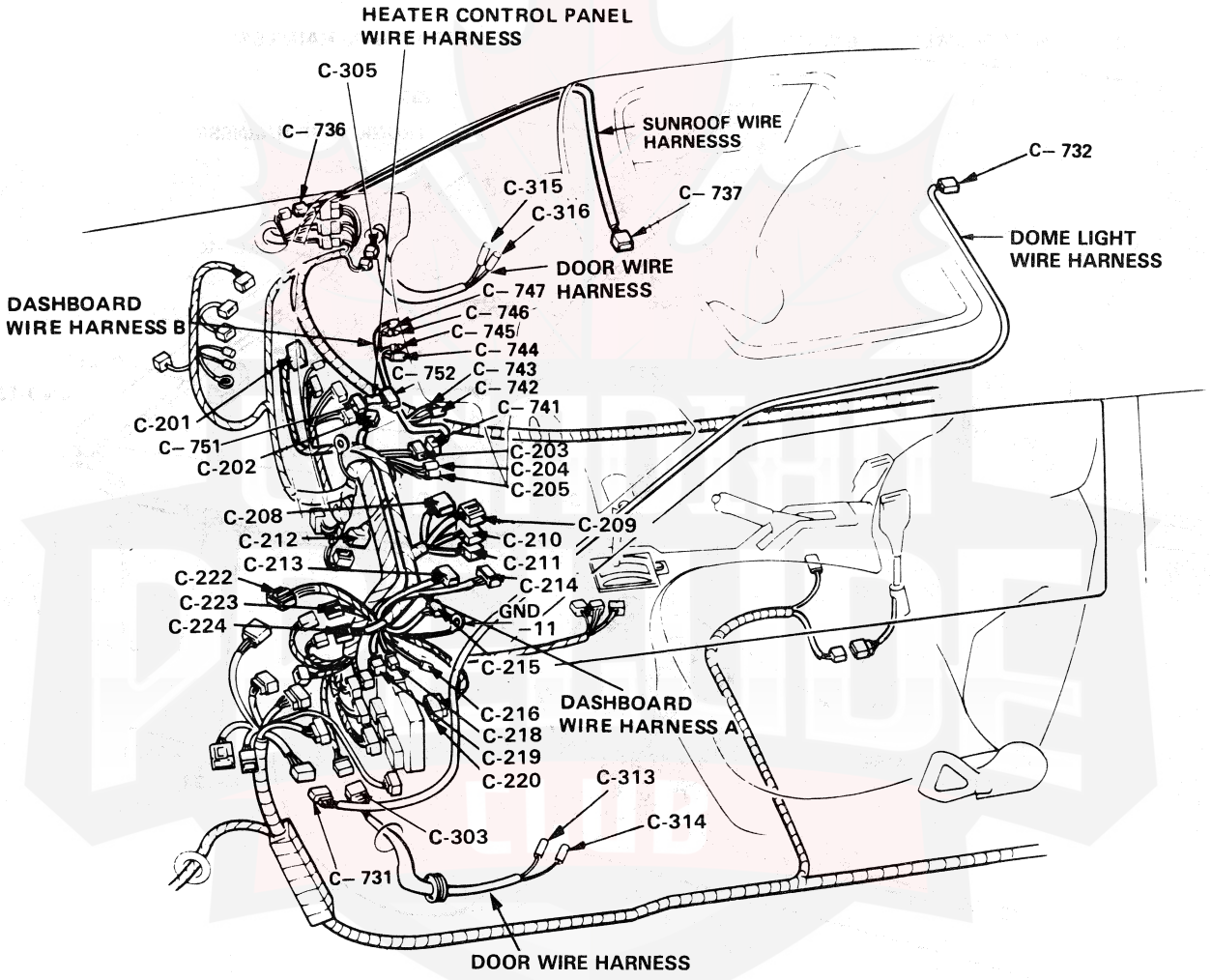
Wire Harness Routing (cont'd)

Carbureted Engine:





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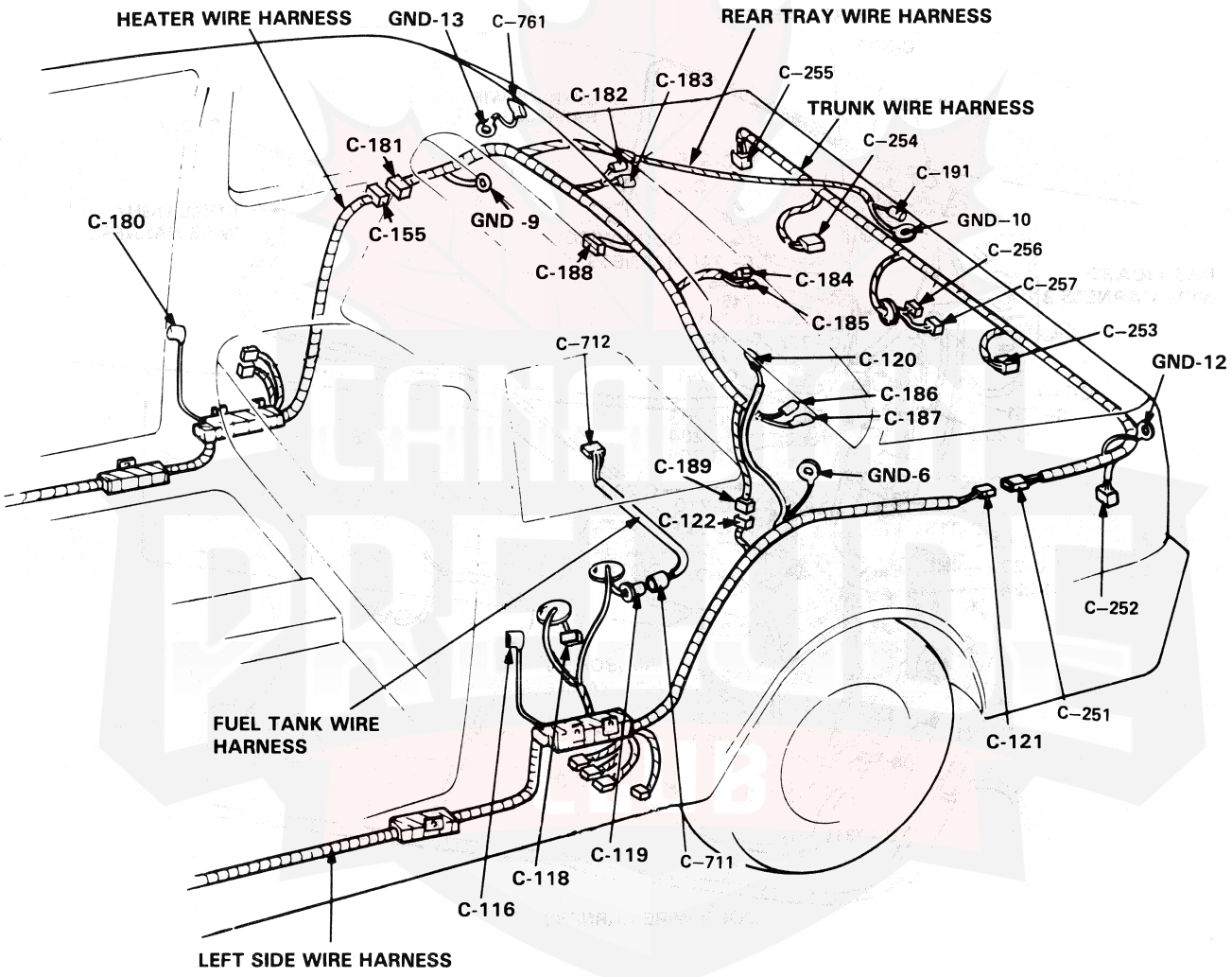
Harness, Fuses, and Wiring Diagram

Wire Harness Routing (cont'd)

Carbureted Engine:



Connector Directory

Fuel-Injected Engine:

Engine Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-1	4	Center engine compartment	To Alternator
C-2		Center engine compartment	To Oil pressure switch
C-3		Center engine compartment	To Starter motor
C-4	2	Center engine compartment	To No. 1 Injector
C-5	2	Center engine compartment	To No. 2 Injector
C-6	2	Center engine compartment	To No. 3 Injector
C-7	2	Center engine compartment	To No. 4 Injector
C-8	3	Center engine compartment	To EGR valve lift sensor
C-9	3	Center engine compartment	To Throttle angle sensor
C-10	2	Center engine compartment	To Intake air temperature sensor
C-11		Center engine compartment	To Back-up light switch } M/T only
C-12		Center engine compartment	To Back-up light switch }
C-13	1	Center engine compartment	To Oxygen sensor
C-14	4	Center engine compartment	To Crank angle sensor
C-15		Center engine compartment	To Temp. unit
C-16	2	Center engine compartment	To Thermosensor
C-17	2	Center engine compartment	To Thermoswitch
C-18	8	Right center engine compartment	To Main wire harness (C-75)
C-19	6	Left center engine compartment	To Resistor
C-20	14	Left center engine compartment	To Left side wire harness (C-102)
C-21	8	Left center engine compartment	To Left side wire harness (C-101)
T-1		Right center engine compartment	To Main fuse box
T-2		Right center engine compartment	To Alternator
GND-1		Center engine compartment	To Engine ground
GND-2		Center engine compartment	To Engine ground

Main Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-51	6	Left front engine compartment	To Left headlight retractor motor relay
C-52	6	Left front engine compartment	To Right headlight retractor motor relay
C-53	4	Left front engine compartment	To Left side wire harness (C-104)
C-54	8	Left front engine compartment	To Left side wire harness (C-105)
C-55	6	Left front engine compartment	To Left headlight retractor motor
C-56	2	Left front engine compartment	To A/C noise condenser
C-57	2	Left front engine compartment	To A/C condenser fan motor

(cont'd)

Connector Directory (cont'd)

Main Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-58		Left front engine compartment	To A/C Pressure switch
C-59		Left front engine compartment	To A/C Pressure switch
C-60	1	Left front engine compartment	To A/C Compressor clutch
C-61	2	Left front engine compartment	To Washer motor
C-62		Under front bamper, Left	To Left horn
C-63		Under front bamper, Left	To Left horn
C-64	3	Left front engine compartment	To Left headlight
C-65	3	Left front engine compartment	To Left side marker light
C-66	2	Left front engine compartment	To Left front turn signal
C-67		Under front bumper, Right	To Right horn
C-68		Under front bumper, Right	To Right horn
C-69	3	Right front engine compartment	To Right headlight
C-70	3	Right front engine compartment	To Right side marker light
C-71	2	Right front engine compartment	To Right front turn signal
C-72	6	Right front engine compartment	To Right headlight retractable motor
C-73	2	Right front engine compartment	To Cooling fan motor
C-74	2	Right front engine compartment	To Cooling fan switch
C-75	8	Right front engine compartment	To Engine wire harness (C-18)
C-76	6	Right rear engine compartment	To Control box
C-77	3	Right rear engine compartment	To Manifold air pressure sensor
C-78	2	Right rear engine compartment	To EGR valve lift sensor
C-79		Right rear engine compartment	To Condenser
C-80		Right rear engine compartment	To Condenser
C-81	4	Right rear engine compartment	To A/C Diode
C-82	4	Right rear engine compartment	To A/C Compressor clutch relay
C-83	1	Right rear engine compartment	To Ignition coil
C-84	2	Right rear engine compartment	To Ignition coil
C-85	2	Right rear engine compartment	To Sunroof wire harness (C-736)
C-86	7	Right under dash	To Heater wrie harness (C-183)
C-87	20	Right under dash	To Heater wrie harness (C-186)
C-88	24	Right under dash	To Heater wrie harness (C-185)
T-3		Center engine compartment	To Alternator
GND-3		Left front engine compartment	To Body ground
GND-4		Right front engine compartment	To Body ground

Left Side Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-101	8	Left center engine compartment	To Engine wire harness (C-21)
C-102	14	Left center engine compartment	To Engine wire harness (C-20)
C-103	4	Left center engine compartment	To Cruise control actuator
C-104	4	Left center engine compartment	To Main wire harness (C-53)
C-105	8	Left center engine compartment	To Main wire harness (C-54)
C-106	2	Left rear engine compartment	To Brake fluid level switch
C-107	6	Left rear engine compartment	To Windshield wiper motor
C-108	2	Left rear engine compartment	To Air control solenoid valve
C-109		Center floor	To Parking brake switch
C-110	2	Center floor	To Seat belt switch
C-111	4	Left floor	To Power window control unit
C-112	6	Left floor	To Power window control unit
C-113		Rear left window	To Rear window defroster
C-114	8	Left front trunk	To Rear wire harness (C-251)
C-115	2	Fuel tank area	To Fuel pump
C-116	3	Fuel tank area	To Fuel unit wire harness (C-711)
C-117	16	Left floor	To PGM-FI control unit
C-118	20	Left floor	To PGM-FI control unit
C-119	17	Left floor	To PGM-FI control unit
C-120	3	Left floor	To Atomospheric sensor
C-121	1	Rear shelf	To Rear tray wire harness (C-200)
C-122		Left door	To Left door switch
C-123	4	Left under dash	To Door wire harness (C-301)
C-124	6	Left under dash	To Door wire harness (C-302)
C-125	6	Left under dash	To Seat belt timer unit
C-126	5	Left under dash	To Key light timer unit
C-127	4	Left under dash	To Brake light switch
C-128	2	Left under dash	To Clutch switch
C-129	14	Left under dash	To Heater wire harness (C-152)
C-130	24	Left under dash	To Heater wire harness (C-154)
C-131	4	Left under dash	To Heater wire harness (C-153)
C-132	10	Left under dash	To Combination switch
C-133	2	Left under dash	To Combination switch
C-134	14	Left under dash	To Fuse box
C-135	14	Left under dash	To Dashboard wire harness (C-205)
C-136	8	Left under dash	To Side marker control unit
C-137	2	Left under dash	To Dome light wire harness (C-731)
GND-5		Left center engine compartment	To Body ground
GND-6		Left trunk	To Body ground

(cont'd)

Connector Directory (cont'd)

Heater Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-152	14	Left under dash	To Left side wire harness (C-129)
C-153	4	Left under dash	To Left side wire harness (C-131)
C-154	24	Left under dash	To Left side wire harness (C-130)
C-155	8	Left under dash	To PGA-FI Main relay
C-156	8	Left under dash	To Door wire harness (C-303)
C-157	4	Left under dash	To Door wire harness (C-304)
C-158	10	Left under dash	To Dashboard wire harness (C-204)
C-159	6	Left under dash	To Fuse box
C-160	4	Left under dash	To Oil alarm flasher unit
C-161	10	Left under dash	To Fuse box
C-162	18	Left under dash	To Fuse box
C-163	7	Left under dash	To Fuse box
C-164	18	Left under dash	To Dashboard wire harness (C-202)
C-165	13	Left under dash	To Dashboard wire harness (C-218)
C-168	2	Left under dash	To Combination switch
C-170	10	Center under dash	To Heater control wire harness (C-751)
C-171	6	Center under dash	To Heater control panel
C-172	9	Center under dash	To Heater unit
C-173	2	Center floor	To A/T Position switch
C-174	10	Center floor	To A/T Position switch
C-175	2	Center floor	To A/T Position switch
C-176	3	Right under dash	To Power transistor
C-177		Right under dash	To Thermostat
C-178		Right under dash	To Thermostat
C-179	4	Right under dash	To Relay
C-180	2	Right under dash	To Recirculation solenoid
C-181	6	Right under dash	To A/C Delay control unit
C-182	2	Right under dash	To Blower motor
C-183	7	Right under dash	To Main wire harness (C-86)
C-184	10	Right under dash	To Door wire harness (C-305)
C-185	24	Right under dash	To Main wire harness (C-87)
C-186	20	Right under dash	To Main wire harness (C-88)
C-187	4	Right under dash	To Door wire harness (C-306)
C-188		Right door	To Right door switch
C-189	8	Right floor	To Radiator fan timer
C-190	13	Right floor	To Cruise control unit
C-191	6	Right rear luggage area	To Rear tray wire harness (C-192)
GND-7		Center under dash	To Body ground
GND-8		Right under dash	To Body ground

Rear Tray Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-192	6	Right rear luggage area	To Heater wire harness (C-191)
C-193		Trunk	To Trunk light switch
C-194		Trunk	To Rear speaker
C-195		Trunk	To Rear speaker
C-196		Trunk	To Trunk light
C-197		Trunk	To Trunk light
C-198		Trunk	To Rear speaker
C-199		Trunk	To Rear speaker
C-200	1	Rear shelf	To Left side wire harness (C-121)
C-201	2	Center rear shelf	To High mount brake light
GND-9		Right upper trunk	To Body ground
GND-10		Trunk lid	To Body ground

Dashboard Wire Harness A

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-202	18	Left under dash	To Heater wire harness (C-164)
C-203	2	Left under dash	To Chime
C-204	10	Left under dash	To Heater wire harness (C-158)
C-205	14	Left under dash	To Left side wire harness (C-135)
C-206	18	Left under dash	To Fuse box
C-207	2	Left under dash	To Fuse box light
C-208	13	Left under dash	To Retractable headlight control unit
C-209	3	Gauge area	To Illumination controller
C-210	3	Gauge area	To Cruise control main switch
C-211	10	Gauge area	To Retractable headlight/sunroof switch
C-212	12	Gauge area	To Gauge
C-213	8	Gauge area	To Gauge
C-214	10	Gauge area	To Shift position indicator (A/T)
C-215	16	Gauge area	To Safety indicator
C-216	10	Gauge area	To Gauge
C-217	6	Center under dash	To Clock
C-218	13	Center under dash	To Heater wire harness (C-165)
C-219	3	Center under dash	To Dashboard wire harness B (C-741)
C-221	3	Center under dash	To Cigarette lighter
C-222	1	Center under dash	To Cigarette lighter
C-224	10	Center under dash	To Hazard/rear defroster switch
GND-11		Left under dash	To Body ground

(cont'd)

Connector Directory (cont'd)

Trunk Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-251	8	Left trunk	To Left side wire harness (C-114)
C-252	8	Left trunk	To Left taillight
C-253	2	Center trunk	To Left back-up light
C-254	2	Center trunk	To Right back-up light
C-255	8	Right trunk	To Right taillight
C-256	2	Under rear bumper	To Licence plate light
C-257	2	Under rear bumper	To Licence plate light
GND-12		Left trunk	To Body ground

Door Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-301	4	Left under dash	To Left side wire harness (C-123)
C-302	6	Left under dash	To Left side wire harness (C-124)
C-303	8	Left under dash	To Heater wire harness (C-156)
C-304	4	Left under dash	To Heater wire harness (C-157)
C-305	10	Right under dash	To Heater wire harness (C-184)
C-306	4	Right under dash	To Heater wire harness (C-187)
C-307	10	Left door	To Power window switch
C-308	4	Left door	To Power window motor
C-309	3	Left door	To Power mirror
C-310	6	Right door	To Power window switch
C-311	2	Right door	To Power window motor
C-312	3	Right door	To Power mirror
C-313		Left door	To Speaker
C-314		Left door	To Speaker
C-315		Right door	To Speaker
C-316		Right door	To Speaker
C-317	10	Left door	To Power mirror switch

Fuel Unit Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-711	3	Left fuel tank	To Left side wire harness (C-116)
C-712	3	Left fuel tank	To Fuel unit

Dome Light wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-731	2	Left fuse box	To Left side wire harness (C-137)
C-732	3	Center roof	To Dome light

Sunroof Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-736	2	Right under dashboard	To Main wire harness (C-85)
C-737		Front center roof	To Sunroof motor

Dashborad Wire Harness B

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-741	3	Center dashboard	To Dashboard wire harness (C-219)
C-742		Center dashboard	To Radio light
C-743		Center dashboard	To Radio light
C-744	2	Center dashboard	To Ashtray light
C-745	2	Center dashboard	To Glove box light
C-746		Center dashboard	To Radio light
C-747		Center dashboard	To Radio light

Heater Control Panel Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-751	10	Center dashboard	To Heater wire harness (C-170)
C-752	10	Center dashboard	To Heater control panel

Rear Defroster Ground Wire

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-761		Right rear window	To Rear window defroster
GND-13		Right rear window	To Body ground

(cont'd)

Connector Directory (cont'd)

Carbureted Engine:

Engine Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION	REMARKS
C1	3	Center engine compartment	To Alternator	
C2	2	Center engine compartment	To Thermosensor	
C3		Center engine compartment	To Automatic choke	
C4		Center engine compartment	To Temperature gauge sender unit	
C5	5	Center engine compartment	To Carburetor wire harness (C41)	
C6		Center engine compartment	To Back-up light switch	M/T only
C7		Center engine compartment	To Back-up light switch	M/T only
C8		Center engine compartment	To Temperature sensor	
C9		Center engine compartment	To Temperature sensor	
C10	2	Center engine compartment	To Frequency solenoid	
C11		Center engine compartment	To Starter motor	
C13	4	Right front engine compartment	To Main wire harness (C77)	
C14	6	Right front engine compartment	To Main wire harness (C76)	
C15	8	Right front engine compartment	To Main wire harness (C75)	
T1		Center engine compartment	To Oil pressure sender	
T2		Center engine compartment	To Alternator	
T3		Center engine compartment	To Junction box	
GND-1		Center engine compartment	To Engine ground	

A/C Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION	REMARKS
C31	6	Right front engine compartment	To Main wire harness (C70)	
C32	2	Left front engine compartment	To Condenser fan motor	
C33		Left rear engine compartment	To Compressor clutch	
C34		Left front engine compartment	To Pressure switch protector	
C35		Left front engine compartment	To Pressure switch protector	
C36	4	Left front engine compartment	To Air conditioner diode	
C37	4	Left front engine compartment	To Compressor clutch relay	
GND-2		Left front engine compartment	To Body ground	

Carburetor Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION	REMARKS
C41	5	Center engine compartment	To Engine wire harness (C5)	
C42		Under air cleaner	To Inner vent solenoid valve	
C43		Under air cleaner	To Main air jet solenoid valve	
C44		Under air cleaner	To Main air jet solenoid valve	
C45		Under air cleaner	To Air vent cut-off solenoid valve	
C46		Under air cleaner	To Primary slow mixture cut-off solenoid valve	
C47		Under air cleaner	To Primary slow mixture cut-off solenoid valve	
C48		Under air cleaner	To Auxiliary slow mixture cut-off solenoid valve	

Main Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION	REMARKS
C51	8	Left middle engine compartment	To Left side wire harness (C-101)	
C52	4	Left middle engine compartment	To No. 2 control box	
C53	2	Left middle engine compartment	To Frequency solenoid valve	
C54		Left middle engine compartment	To A/C solenoid valve	
C55	6	Left front engine compartment	To Retractor relay	
C56	6	Left front engine compartment	To Retractor relay	
C57	5	Left front engine compartment	To Left headlight retractor motor	
C58		Left front engine compartment	To Horn	
C59		Left front engine compartment	To Horn	
C60	2	Left front engine compartment	To Left turn signal	
C61	3	Left front engine compartment	To Left side marker light	
C62	3	Left front engine compartment	To Left headlight	
C63		Left front engine compartment	To Oxygen sensor	
C64		Under front bumper	To Horn	
C65		Under front bumper	To Horn	
C66	3	Right front engine compartment	To Right headlight	
C67	3	Right front engine compartment	To Right side marker light	
C68	2	Right front engine compartment	To Right turn signal	
C69	2	Right front engine compartment	To Washer motor	
C70	6	Right front engine compartment	To A/C wire harness (C-31)	
C71	2	Right front engine compartment	To Cooling fan motor	
C73	2	Right front engine compartment	To Cooling fan switch	
C74	6	Right front engine compartment	To Right headlight retractor motor	
C75	8	Right middle engine compartment	To Engine wire harness (C-15)	
C76	6	Right middle engine compartment	To Engine wire harness (C-14)	
C77	4	Right middle engine compartment	To Engien wire harness (C-13)	
C78		Right middle engine compartment	To Condenser	
C79	6	Right middle engine compartment	To IC. regulator	
C80		Right middle engine compartment	To Ignition coil	
C81		Right rear engine compartment	To Radio noise condenser	
C82		Right rear engine compartment	To Radio noise condenser	
C83	4	Right rear engine compartment	To Emission control box	
C84	6	Right rear engine compartment	To Emission control box	
C88	12	Right kick panel	To Emission control unit	
C89	7	Right kick panel	To Heater wire harness (C-153)	
C90	24	Right kick panel	To Heater wire harness (C-152)	
C91	2	Right kick panel	To Sunroof wire harness (C-736)	
C92	16	Right kick panel	To Emission control unit	
T4		Right middle engine compartment	To Junction box	
GND3		Left front engine compartment	To Body ground	
GND4		Right front engine compartment	To Body ground	

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Connector Directory (cont'd)

Left Side Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION	REMARKS
C101	8	Left front engine compartment	To Main wire harness (C-51)	
C102	6	Left rear engine compartment	To Wiper motor	
C103	2	Left rear engine compartment	To Brake fluid level switch	
C104	2	Left rear engine compartment	To Air leak solenoid valve	
C105	14	Behind fuse box	To Dashboard wire harness A (C-222)	
C106	10	Behind fuse box	To Combination switch	
C107	2	Behind fuse box	To Ignition key switch	
C108	14	Behind fuse box	To Fuse box	
C109	2	Behind fuse box	To Stop light switch	
C110	5	Left fuse box	To Dome light timer	
C111	8	Behind fuse box	To Side marker control unit	
C112	6	Left fuse box	To Seat belt timer	
C113	2	Left fuse box	To Dome light wire harness (C-731)	
C114		Under driver's seat	To Parking brake switch	
C115	2	Under driver's seat	To Seat belt switch	
C116		Left door area	To Left door switch	
C118	2	Left fuel tank	To Fuel pump	
C119	3	Left fuel tank	To Fuel unit wire harness (C-711)	
C120		Rear left window	To Rear window defroster	
C121	8	Left front trunk room	To Trunk wire harness (C-251)	
C122		Rear shelf	To Rear tray wire harness (C-189)	
C123		Behind fuse box	To Heater wire harness (C-154)	
GND5		Left front engine compartment	To Body ground	
GND6		Left trunk room	To Body ground	

Heater wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION	REMARKS
C152	24	Under right dashboard	To Main wire harness (C-90)	
C153	7	Under right dashboard	To Main wire harness (C-89)	
C154		Left under dashboard	To Left side wire harness (C-123)	
C155	6	Right rear luggage area	To Rear tray wire harness (C-181)	
C156	3	Under right dashboard	To Door wire harness (C-305)	
C157	2	Under right dashboard	To Blower motor	
C158		Right heater unit	To Air conditioner thermostat	
C159		Right heater unit	To Air conditioner thermostat	
C160	3	Under right dashboard	To Power transistor	
C161	4	Under right dashboard	To Power relay	
C162	2	Under right dashboard	To Recirculation solenoid valve	
C164	16	Center dashboard	To Radio	
C165	6	Center dashboard	To Heater control panel	
C166	10	Center dashboard	To Heater control panel wire harness (C-751)	
C167	4	Left heater unit	To Dashboard wire harness A (C-212)	
C168	9	Left heater unit	To Heater solenoid valve	
C169	18	Behind fuse box	To Dashboard wire harness A (C-223)	
C170	10	Behind fuse box	To Dashboard wire harness A (C-224)	A/T only
C171	4	Upper fuse box	To Oil warning unit	
C172	7	Behind fuse box	To Fuse box	
C173	18	Behind fuse box	To Fuse box	
C174	10	Behind fuse box	To Fuse box	
C175	6	Behind fuse box	To Fuse box	A/T only
C176	3	Left under dashboard	To Door wire harness (C-303)	

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION	REMARKS
C177	2	Center console	To A/T selector light	A/T only
C178	2	Center console	To Neutral safety switch	A/T only
C179	10	Center console	To Shift position indicator	A/T only
C180		Right door area	To Right door switch	
GND7		Right under dashboard	To Body ground	
GND8		Center dashboard	To Body ground	

Dashboard Wire Harness A

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION	REMARKS
C201	6	Center dashboard	To Clock	
C202	10	Behind right gauge panel	To Hazard/rear defroster switch	
C203	3	Center dashboard	To Dashboard wire harness B (C-741)	
C204		Center dashboard	To Cigarette lighter	
C205		Center dashboard	To Cigarette lighter light	
C208	5	Behind gauges	To Speed sensor	
C209	14	Behind gauges	To Safety indicator	
C210	10	Behind gauges	To A/T indicator	
C211	12	Behind gauges	To Combination meter	
C212	4	Center dashboard	To Heater wire harness (C-167)	
C213	10	Behind right gauge panel	To Headlight/sunroof switch	
C214	10	Behind warning light	To Warning light	
C215	3	Behind warning light	To Dashlight brightness controller	
C216	2	Behind fuse box	To Fuse box light	
C218	2	Left kick panel	To Key-onwarning chime	
C219	13	Under left dashboard	To Retractable headlight control unit	
C220	18	Behind fuse box	To Fuse box	
C222	14	Behind fuse box	To Left side wire harness (C-105)	
C223	18	Behind fuse box	To Heater wire harness (C-169)	
C224	10	Behind fuse box	To Heater wire harness (C-170)	
GND11		Under left dashboard	To Body ground	

Rear Tray Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION	REMARKS
C181	6	Right rear luggage area	To Heater wire harness (C-155)	
C182		Right front trunk room	To Rear right speaker	
C183		Right front trunk room	To Rear right speaker	
C184		Right front trunk room	To Trunk room light	
C185		Right front trunk room	To Trunk room light	
C186		Left front trunk room	To Rear left speaker	
C187		Left front trunk room	To Rear left speaker	
C188	2	Center rear shelf	To High mount brake light	
C189		Rear shelf	To Left side wire harness (C-122)	
C191		Trunk	To Trunk light switch	
GND9		Right upper trunk	To Body ground	
GND10		Trunk lid	To Body ground	

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Connector Directory (cont'd)

Trunk Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-251	8	Left trank	To Left side wire harness (C-121)
C-252	8	Left trunk	To Left taillight
C-253	2	Center trunk	To Left back-up light
C-254	2	Center trunk	To Right back-up light
C-255	8	Right trunk	To Right taillight
C-256	2	Under rear bumper	To Licence plate light
C-257	2	Under rear bumper	To Licence plate light
GND-12		Left trunk	To Body ground

Door Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-303	3	Left under dash	To Heater wire harness (C-176)
C-305	3	Right under dash	To Heater wire harness (C-156)
C-313		Left door	To Speaker
C-314		Left door	To Speaker
C-315		Right door	To Speaker
C-316		Right door	To Speaker

Fuel Unit Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-711	3	Left fuel tank	To Left side wire harness (C-119)
C-712	3	Left fuel tank	To Fuel unit

Dome Light Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-731	2	Left fuse box	To Left side wire harness (C-113)
C-732	3	Center roof	To Dome light

Sunroof Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-736	2	Right under dashboard	To Main wire harness (C-91)
C-737	2	Front center roof	To Sunroof motor

Dashborad Wire Harness B

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-741	3	Center dashboard	To Dashboard wire harness A (C-203)
C-742		Center dashboard	To Radio light
C-743		Center dashboard	To Radio light
C-744	2	Center dashboard	To Ashtray light
C-745	2	Center dashboard	To Glove box light
C-746		Center dashboard	To Radio light
C-747		Center dashboard	To Radio light

Heater Control Panel Wire Harness

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-751	10	Center dashboard	To Heater wire harness (C-166)
C-752	10	Center dashboard	To Heater control panel

Rear Defroster Ground Wire

CONNECTOR TERMINAL NUMBER	NUMBER OF PINS	LOCATION	DESTINATION
C-761		Right rear window	To Rear window defroster
GND-13		Right rear window	To Body ground