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Chassis and Paint Codes

U.S.Model

Vehicle Identification Number

JHM ED835*MS000001

Manufacturer, Make and Type of Vehicle
JHM: HONDA MOTOR CO., LTD., HONDA, Passenger car

Line/Body and Engine type
ED8: CIVIC CRX 1500
ED9: CIVIC CRX 1600

Transmission and Body Type
3: 5-speed manual/2-Door Coupe
4: 4-speed automatic/2-Door Coupe

Vehicle Grade
5: DX (Std. CRX)
6: HF, Si

Check Digit

Model Year
M: 1991

Factory
S: Suzuka Factory

Serial Number

Transmission Number

L3-2000001

Transmission Type
L3: Manual 5-speed
ML4A: Automatic

Serial Number
L3: 2000001~
ML4A: 6000001~

Paint Code

Paint Code	Color
B-53P	Celestial Blue Pearl
NH-538	Frost White
R-63	Rio Red
NH-526M	Flint Black Metallic
R-72P	Torino Red Pearl
BG-28P	Tahitian Green Pearl

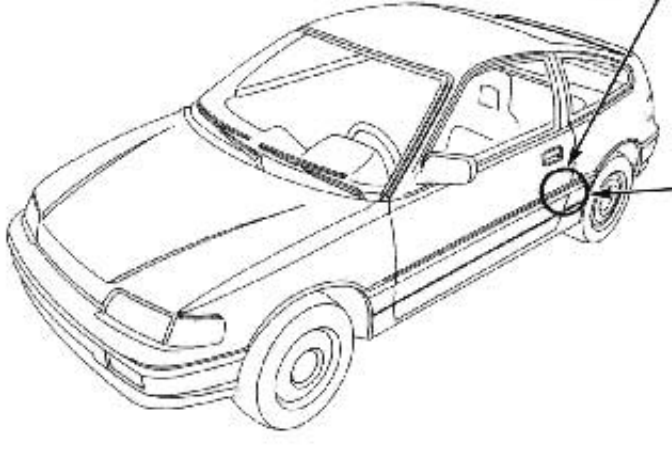
Engine Number

D15B2-4000001

Engine Type
D15B2: 1500 Dual-point Fuel injected 93 HP Engine
D15B6: 1500 Multi-point Fuel injected 62 HP Engine
D16A6: 1600 Multi-point Fuel injected 105 HP Engine

Emission Group
40: California
43: 49 ST
49: HF High Altitude

Serial Number



Canada Model

Vehicle Identification Number

JHM ED8 35 * MS800001

Manufacturer, Make and Type of Vehicle
JHM: HONDA MOTOR CO., LTD., HONDA, Passenger car

Line/Body and Engine type
ED8: CIVIC CRX 1500
ED9: CIVIC CRX 1600

Transmission and Body Type
3: 5-speed manual/2-Door Coupe
4: 4-speed automatic/2-Door Coupe

Vehicle Grade
5: DX (Std. CRX)
6: Si

Check Digit

Model Year
M: 1991

Factory
S: Suzuka Factory

Serial Number

Transmission Number

L3-2000001

Transmission Type
L3: Manual 5-speed
ML4A: Automatic

Serial Number
L3: 2000001~
ML4A: 6000001~

Paint Code

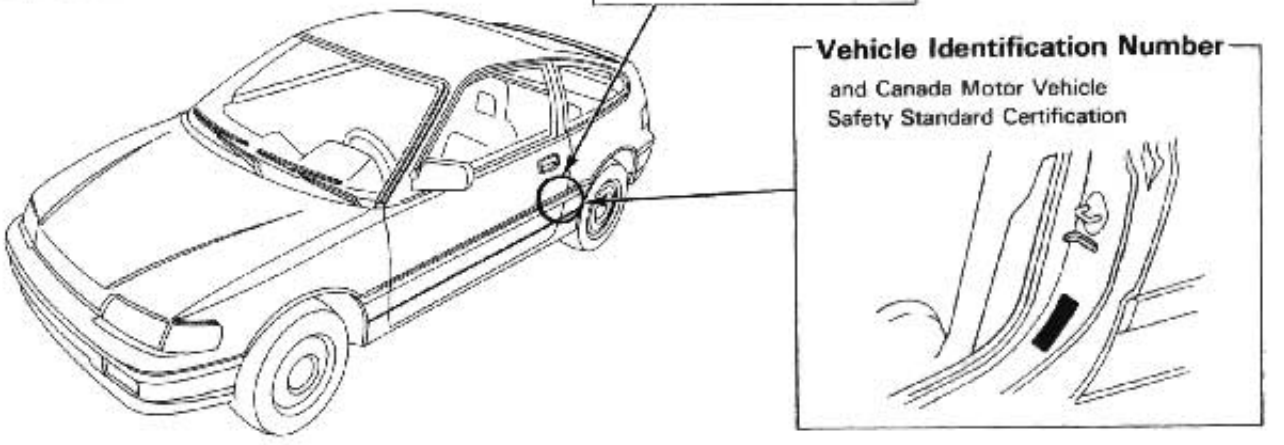
Paint Code	Color
B-53P	Celestial Blue Pearl
NH-512Z	Polar White Z
R-63	Rio Red
NH-526M	Flint Black Metallic

Engine Number

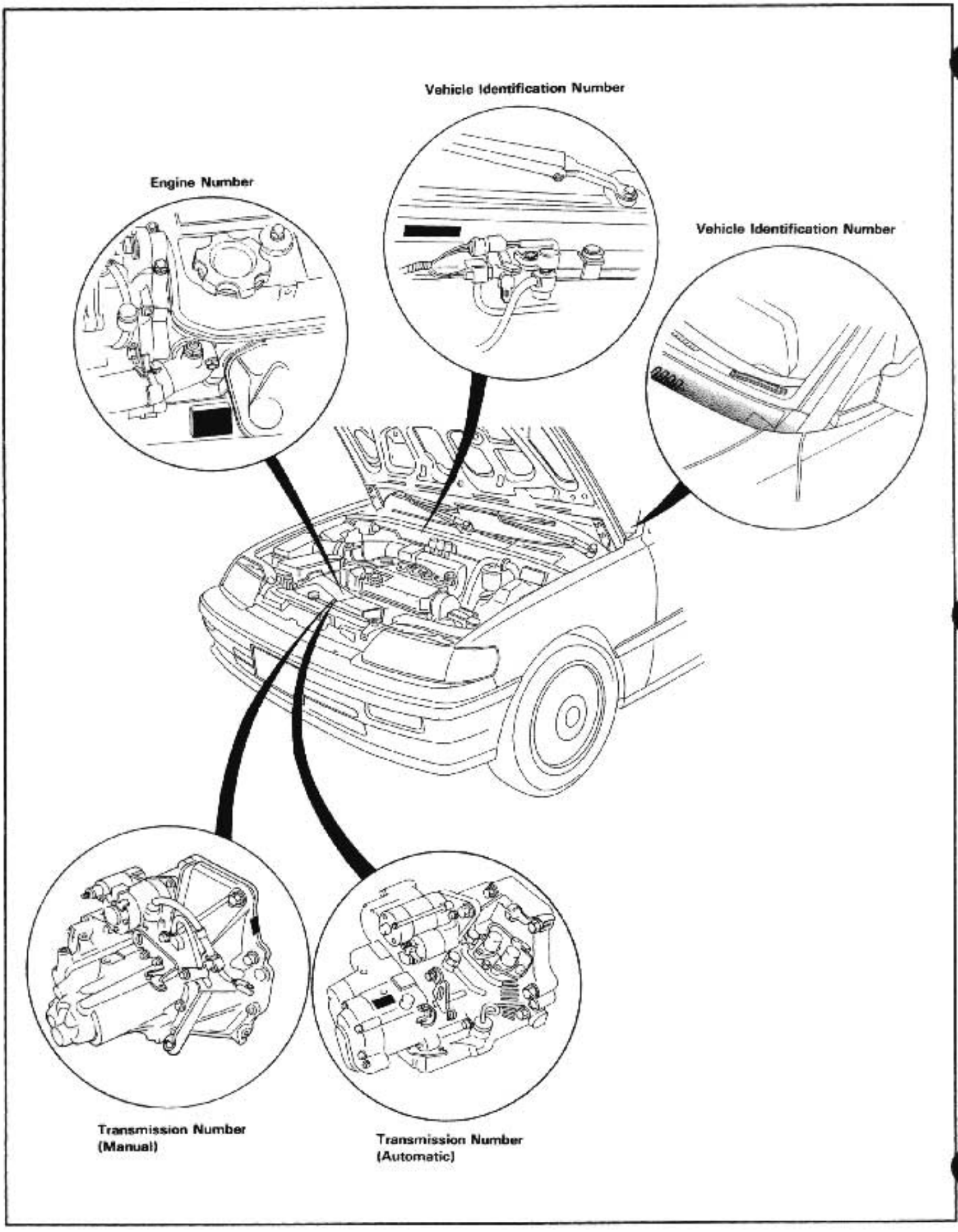
D15B2-4700001

Engine Type
D15B2: 1500 Dual-point Fuel injected 93 HP Engine
D16A6: 1600 Multi-point Fuel injected 105 HP Engine

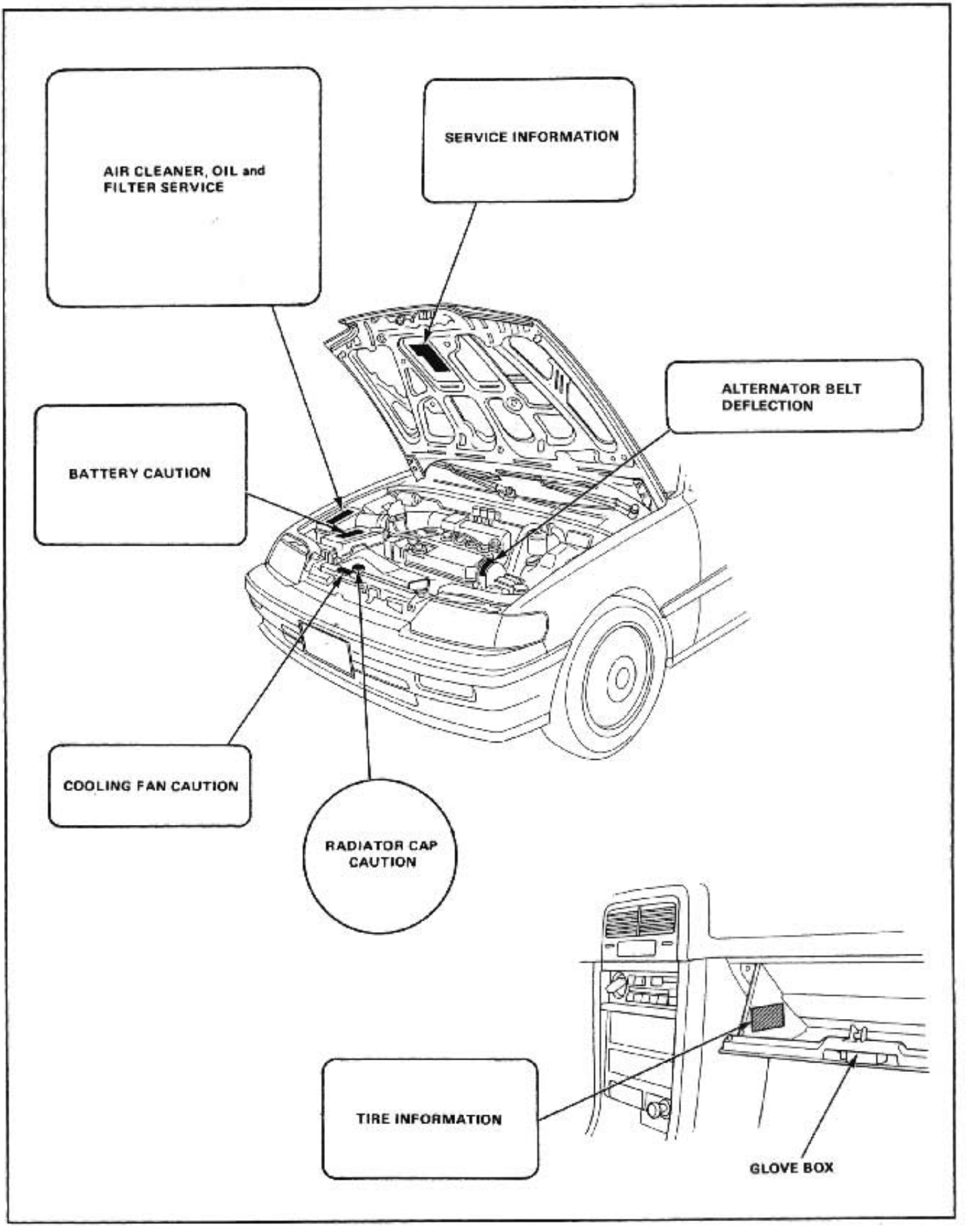
Serial Number



Identification Number Locations



Label Locations



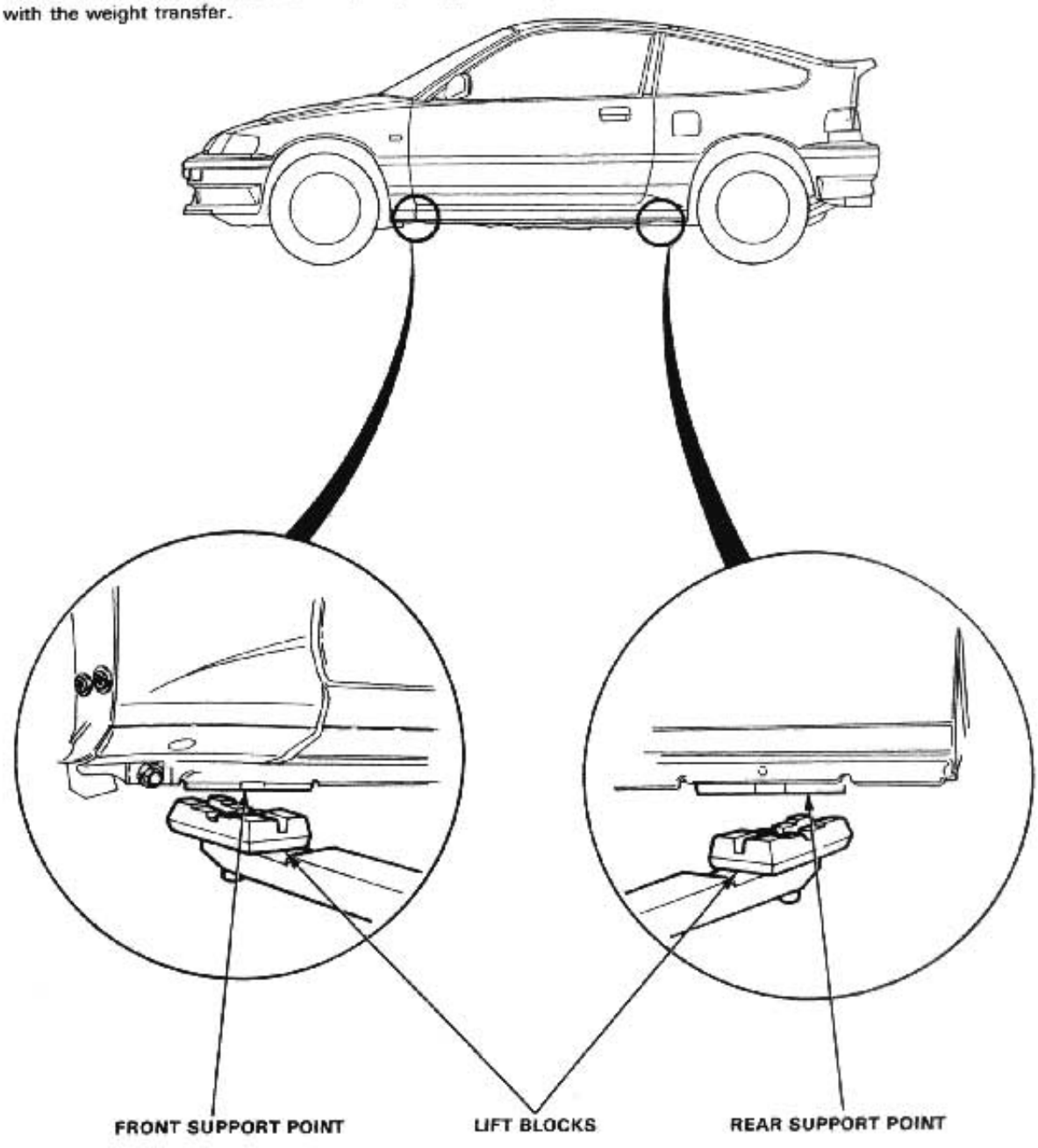
Lift and Support Points

Hoist

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.

⚠WARNING When heavy rear components such as suspension, fuel tank, spare tire and hatch are to be removed, place additional weight in the luggage area before hoisting. When substantial weight is removed from the rear of the car, the center of gravity may change and can cause the car to tip forward on the hoist.

NOTE: Since each tire/wheel assembly weighs approximately 30 lbs (14 kg), placing the front wheels in the trunk will assist with the weight transfer.



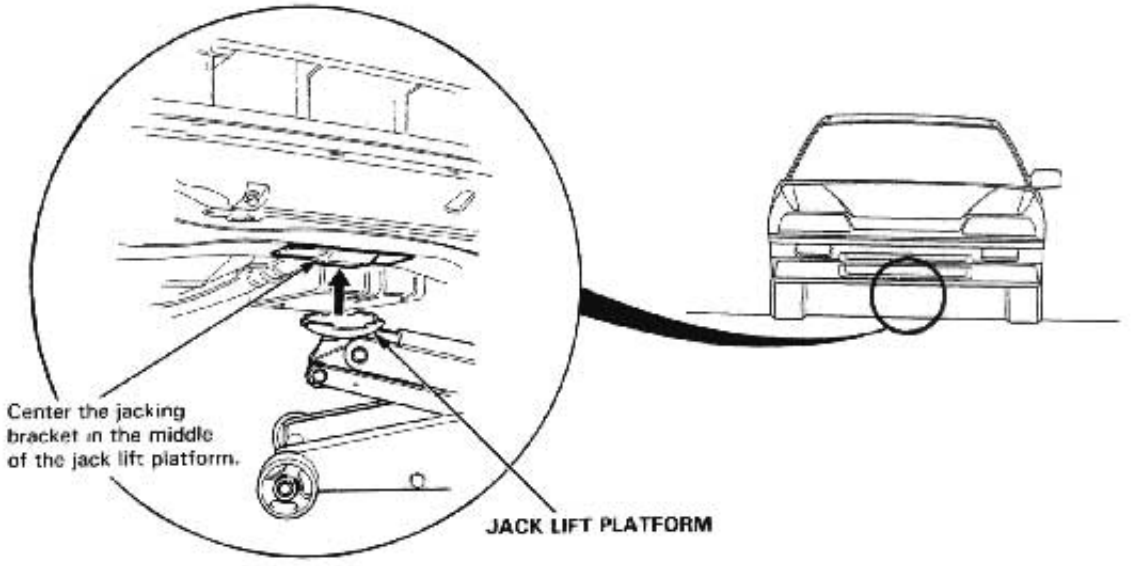
Floor Jack

1. Set the parking brake and block the wheels that are not being lifted.
2. When lifting the rear of the car, put the gearshift 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 the stands.

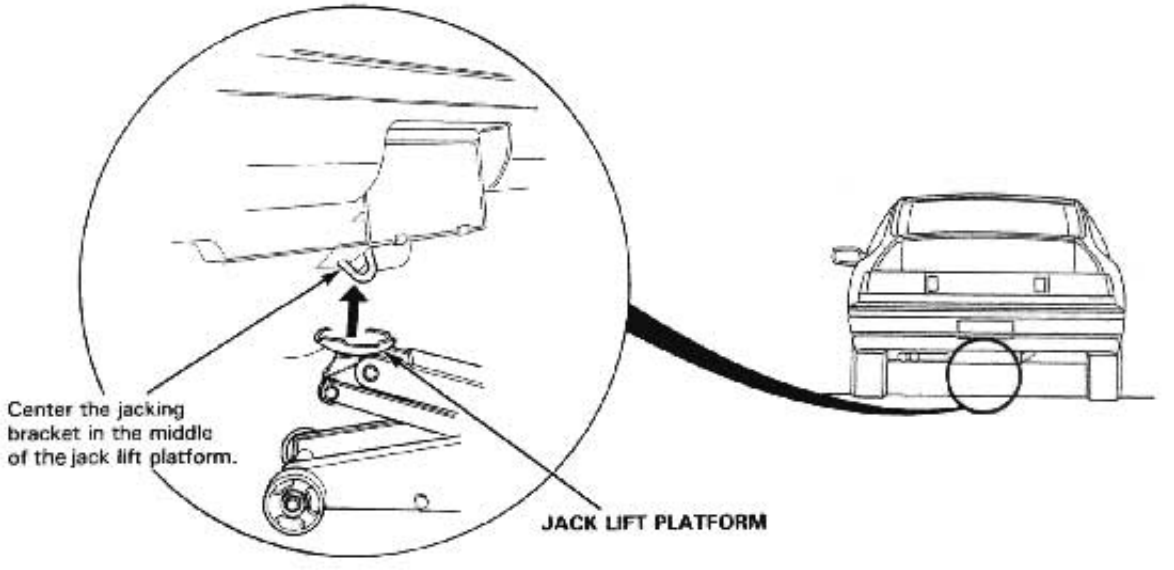
⚠WARNING

- **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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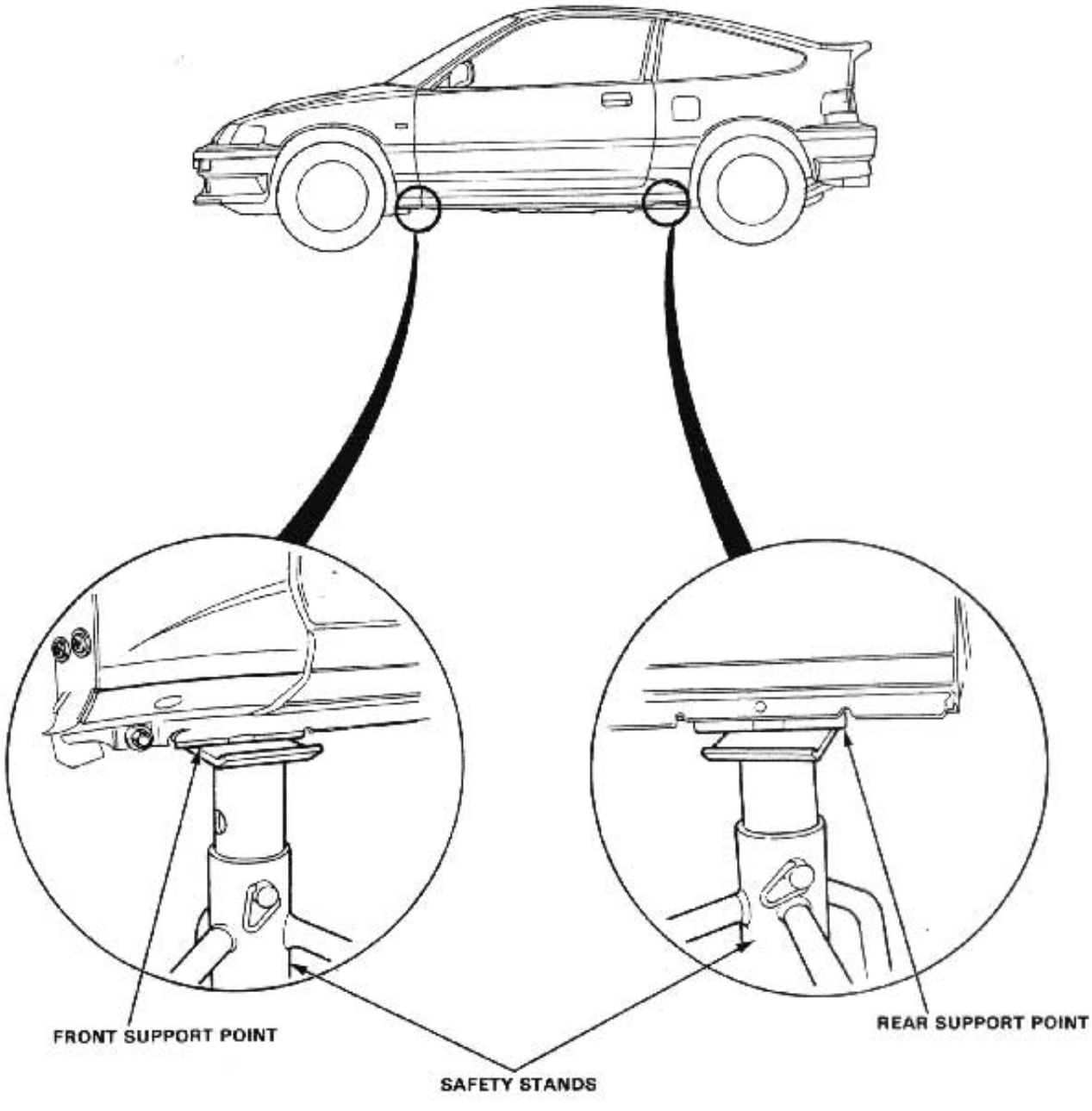
Safety Stands



Towing

If towing is necessary, we recommend the following:
Flat Bed Equipment—Entire car is winched on a flat bed vehicle. This is the best way of transporting the car.
Wheel Lift Type—Tow with the front wheels off the ground.

⚠WARNING Never use tow chains or rope to tow a car: your ability to safely control the car may be adversely affected.

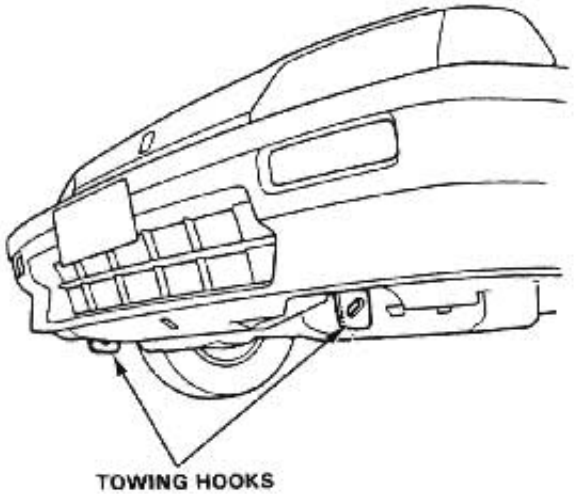
If the car can only be towed with the front wheels on the ground:

make sure the transmission is full of fluid (See section 14) and tow with the transmission in neutral (N) and the ignition key in the I position.

CAUTION: To avoid serious damage on automatic transmission cars, first start the engine and shift to D_4, then to N and shut the engine off. If the engine does not run or the transmission cannot be shifted while the engine is running, the car must be transported on flat bed equipment.

Check local regulations for towing.

CAUTION:
- **Do not exceed 35 mph (55 km/h) or tow for distances of more than 50 miles (80 km).**
- **If a Sling Type tow is used, the tow truck driver should position wood spacer blocks between the car's frame and the chains and lift straps to avoid damaging the bumper and the body.**
- **Do not use the bumpers to lift the car or to support the car's weight while towing.**
- **If possible, tow the car with the front wheels off the ground.**



TOWING HOOKS

Specifications

specs

Standards and Service Limits

Cylinder Head/Valve Train — Section 6

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	250 rpm and wide-open throttle		Nominal Minimum Maximum variation	1,275 kPa (13.0 kg/cm², 185 psi) 932 kPa (9.5 kg/cm², 135 psi) 196 kPa (2 kg/cm², 28 psi)
Cylinder head	Warpage Height		— 94.95—95.05	0.05 (0.002) —
Camshaft	End play Oil clearance Runout Cam lobe height	 IN Std M/T, A/T and Si HF EX Std M/T and Si Std A/T HF	0.05—0.15 (0.002—0.006) 0.050—0.089 (0.002—0.004) 0.03 (0.001) max. 36.603 (1.4411) 43.349 (1.7067) 36.747 (1.4467) 36.750 (1.4468) 37.567 (1.4790)	0.5 (0.02) 0.15 (0.006) 0.06 (0.002) — — — — —
Valve	Valve clearance	IN Std and Si HF EX Std and Si HF	0.17—0.22 (0.007—0.009) 0.12—0.17 (0.05—0.07) 0.22—0.27 (0.009—0.011) 0.17—0.22 (0.07—0.009)	— — — —
	Valve stem O.D.	IN EX	5.48—5.49 (0.2157—0.2161) 5.45—5.46 (0.2147—0.2150)	5.45 (0.2147) 5.42 (0.2134)
	Stem-to-guide clearance	IN EX	0.02—0.05 (0.001—0.002) 0.05—0.08 (0.002—0.003)	0.08 (0.003) 0.12 (0.005)
	Stem installed height	IN EX	46.985—47.455 (1.8498—1.8683) 48.965—49.435 (1.9278—1.9463)	47.705 (1.8781) 49.685 (1.9561)
Valve seat	Width	IN EX	0.85—1.15 (0.033—0.045) 1.25—1.55 (0.049—0.061)	1.6 (0.06) 2.0 (0.08)
Valve spring	Free length	IN Std and Si HF EX Std and Si HF	48.58 (1.9126) 51.46 (2.026) 49.19 (1.9366) 56.28 (2.2157)	47.64 (1.8756) 50.53 (1.9894) 48.32 (1.9024) 55.24 (2.1748)
	Squareness	IN/EX Std and Si HF	— —	1.70/1.72 (0.067/0.068) 1.80/1.97 (0.071/0.078)
Valve guide	I.D.	IN and EX	5.51—5.53 (0.2169—0.2177)	5.55 (0.2185)
Rocker arm	Arm-to-shaft clearance	IN EX	0.017—0.050 (0.0007—0.0020) 0.018—0.054 (0.0007—0.0021)	0.08 (0.003) 0.08 (0.003)

Engine Block — Section 7

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface Bore diameter Bore taper Reboring limit		0.07 (0.0028) max. 75.00—75.02 (2.9526—2.9535) — —	0.10 (0.004) 75.07 (2.9555) 0.05 (0.002) 0.5 (0.02)
Piston	Skirt O.D. At 16 mm (0.63 in) from bottom of skirt Clearance in cylinder Piston-to-ring clearance	Std and Si HF Top 2nd	74.98—74.99 (2.9520—2.9524) 74.977—74.995 (2.9518—2.9526) 0.01—0.04 (0.0004—0.0016) 0.03—0.06 (0.0012—0.0024) 0.030—0.055 (0.0012—0.0022)	74.97 (2.9517) — 0.05 (0.002) 0.13 (0.005) 0.13 (0.005)
Piston ring	Ring end gap	Top 2nd Si Std and HF Oil	0.15—0.30 (0.006—0.012) 0.30—0.45 (0.012—0.018) 0.15—0.30 (0.006—0.012) 0.20—0.80 (0.008—0.031)	0.6 (0.02) 0.6 (0.02) 0.6 (0.02) 0.9 (0.04)
Connecting rod	Pin-to-rod interference Large end bore diameter End play installed on crankshaft	 Std Si HF 	0.014—0.040 (0.0006—0.0016) Nominal 45.0 (1.77) Nominal 48.0 (1.89) Nominal 41.0 (1.61) 0.15—0.30 (0.006—0.012)	— — — 0.40 (0.016)
Crankshaft	Main journal diameter Taper/out-of-round, main journal Rod journal diameter Taper/out-of-round, rod journal End play Runout	Std and HF Si Std HF Si 	44.976—45.000 (1.7707—1.7718) 54.976—55.000 (2.1644—2.1654) 0.0025 (0.0001) max. 41.976—42.000 (1.6525—1.6535) 37.976—38.000 (1.4951—1.4961) 44.976—45.000 (1.7707—1.7717) 0.0025 (0.0001) max. 0.10—0.35 (0.004—0.014) 0.015 (0.0006) max.	— — 0.010 (0.0004) — — — 0.010 (0.0004) 0.45 (0.018) 0.03 (0.002)
Bearings	Main bearing-to-journal oil clearance 1.5 ℓ (No.1, 5 journals) (No.2, 3, 4 journals) 1.6 ℓ (No.1, 5 journals) (No.2, 4 journals) (No. 3 journal) Rod bearing-to-journal oil clearance	 	 0.018—0.036 (0.0007—0.0014) 0.024—0.042 (0.0009—0.0017) 0.018—0.036 (0.0007—0.0014) 0.024—0.042 (0.0009—0.0017) 0.030—0.048 (0.0012—0.0019) 0.020—0.038 (0.0008—0.0015)	 — — — — — 0.05 (0.002)

Unit: mm (in.)

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		44 ℓ (11.6 US gal, 9.7 Imp gal) @6,250 rpm	
	Inner-to-outer rotor radial clearance Pump body-to-rotor radial clearance Pump body-to rotor side clearance		0.04—0.14 (0.002—0.006) 0.10—0.175 (0.004—0.007) 0.03—0.08 (0.001—0.003)	0.2 (0.008) 0.2 (0.008) 0.15 (0.006)
Relief valve	Pressure setting 80°C (176°F)	Idle	69 kPa (0.7 kg/cm², 10 psi) min.	
		3,000 rpm	343 kPa (3.5 kg/cm², 50 psi)min.	

Cooling — Section 10

	MEASUREMENT	STANDARD (NEW)
Radiator	Capacity (includes heater) ℓ (U.S.qt.,Imp.qt.) (includes reservoir tank 0.4 (0.42, 0.35))	Std: M/T 5.5 (5.8, 4.8) A/T 5.4 (5.7, 4.8) Si: 5.4 (5.7, 4.8) HF: 5.3 (5.7, 47)
Radiator cap	Pressure cap opening pressure	74—103 kPa (0.75—1.05 kg/cm², 11—15 psi)
Thermostat	Starts to open Full open Valve lift at full open	76 — 80°C(169—176°F) 90°C (194°F) 8 (0.31) min.
Water pump	Pulley ratio (crankshaft) Capacity: ℓ per min @rpm	1 : 1 85 (22.4 U.S. gal., 18.7 Imp. gal.)@4,000 rpm
Cooling fan	Thermoswitch "ON" temperature Thermoswitch "OFF" temperature	88.5°—91.5°C (191°—197°F) Subtract 5 ± 1.5 °C (9 ±2.7°F) from actual "ON" temperature.

Fuel and Emissions — Section 11

	MEASUREMENT	STANDARD (NEW)
Fuel pump	Delivery pressure Displacement Relief valve opening pressure	250 kPa (2.55 kg/cm², 36psi 230 cc (7.8 US oz, 8.1 Imp oz)/minutes in 10 seconds min. 441—588 kPa (4.5—6.0 kg/cm², 64—85 psi)
Pressure regulator	Pressure with the regulator vacuum hose disconnected	240—279 kPa (2.45—2.85 kg/cm², 35—41 psi)
Fuel Tank	Capacity	Std and Si: 45ℓ (11.9 U.S. gal., 9.9 Imp. gal.) HF: 40ℓ (10.6 U.S. gal., 8.8 Imp. gal.)

Standards and Service Limits (cont'd)

Fuel and Emissions — Section 11

MEASUREMENT			STANDARD (NEW)			
Fast idle (rpm)			Manual 1,000–2,000 Automatic 1,000–2,000			
Idle speed (rpm)	with headlights and cooling fan off	U.S.A.	model	HF	Std	Si
			Manual	● 800 ± 50 ○ 650 ± 50	750 ± 50	750 ± 50
			Automatic (in "N" or "P")		750 ± 50	
		CANADA	model	Std	Si	
			Manual	800 ± 50	780 ± 50	
			Automatic (in "N" or "P")	800 ± 50	780 ± 50	
Idle CO			0.1% max			

○: 49 ST models ●: except 49 ST models

Clutch — Section 12

MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height Stroke Pedal play Disengagement height	213 (8.39) to floor 140–150 (5.5–5.9) 15–20 (0.59–0.79) 70 (2.76) min. to floor	— — — —
Clutch release arm	Free play at arm	3.0–4.0 (0.12–0.16)	Adjustable
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch disc	Rivet head depth Surface runout Thickness	1.3 (0.05) min. 0.8 (0.03) max. 8.1–8.8 (0.32–0.35)	0.2 (0.008) 1.0 (0.04) 5.7 (0.224)
Clutch release bearing holder	I.D. Holder-to-guide sleeve clearance	31.00–31.15 (1.220–1.226) 0.050–0.239 (0.002–0.009)	31.2 (1.228) 0.28 (0.011)
Clutch cover	Unevenness of diaphragm spring Pressure disc surface runout	0.8 (0.03) max. 0.03 (0.001) max.	1.0 (0.04) 0.15 (0.006)

Manual Transmission — Section 13

MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)	1.8 (1.9, 1.6) at oil change 1.9 (2.0, 1.7) at assembly	
Mainshaft	End play Diameter of needle bearing contact area Diameter of third gear contact area Diameter of 4th, 5th gear contact area Diameter of ball bearing contact area Runout	0.11–0.18 (0.004–0.007) 25.977–25.990 (1.0227–1.0232) 33.984–34.000 (1.3380–1.3386) 26.980–26.993 (1.0622–1.0627) 21.987–22.000 (0.8656–0.8661) 0.02 (0.0008) max.	Adjust with a shim 25.92 (1.020) 33.93 (1.336) 26.93 (1.060) 21.93 (0.863) 0.05 (0.002)
Mainshaft third and fourth gears	I.D. End play 3rd 4th Thickness 3rd 4th	39.009–39.025 (1.5358–1.5364) 0.06–0.21 (0.0024–0.0083) 0.06–0.19 (0.0024–0.0075) 30.22–30.27 (1.1898–1.1917) 30.12–30.17 (1.1858–1.1878)	39.07 (1.538) 0.33 (0.013) 0.31 (0.012) 30.15 (1.187) 30.06 (1.183)
Mainshaft fifth gear	I.D. End play Thickness	37.009–37.025 (1.4570–1.4577) 0.06–0.19 (0.0024–0.0075) 28.42–28.47 (1.1189–1.1209)	37.07 (1.459) 0.31 (0.012) 28.35 (1.116)
Countershaft	End play Diameter of needle bearing contact area Diameter of ball bearing contact area Diameter of low gear contact area Runout	0.17–0.38 (0.0067–0.0150) 30.000–30.015 (1.1811–1.817) 24.980–24.993 (0.9835–0.9840) 35.984–36.000 (1.4167–1.4173) 0.02 (0.0008) max.	0.53 (0.021) 29.95 (1.179) 24.93 (0.981) 35.93 (1.415) 0.05 (0.002)
Countershaft low gear	I.D. End play Thickness	41.009–41.025 (1.6145–1.6152) 0.03–0.10 (0.0012–0.0039) 29.41–29.44 (1.1579–1.1591)	41.07 (1.617) 0.22 (0.009) 29.36 (1.156)
Countershaft Second gear	I.D. End play Thickness	44.009–44.025 (1.7326–1.7333) 0.03–0.11 (0.0012–0.0043) 29.92–29.97, (1.1780–1.1799)	44.07 (1.735) 0.23 (0.009) 29.85 (1.175)

Unit : mm (in)

Manual Transmission — Section 13

MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Spacer collar (Countershaft second gear)	I.D.	32.975—32.985 (1.2982—1.2986)	33.03 (1.300)
	O.D.	38.989—39.000 (1.5350—1.5354)	38.93 (1.533)
	Length	30.03—30.06 (1.1823—1.1835)	30.01 (1.181)
Spacer collar (Mainshaft fourth and fifth gears)	I.D.	27.002—27.012 (1.0631—1.0635)	27.06 (1.065)
	O.D. 4th	33.989—34.000 (1.3381—1.3386)	33.93 (1.336)
	5th	31.989—32.000 (1.2594—1.2598)	31.93 (1.257)
	Length 4th	27.43—27.46 (1.0799—1.0811)	27.41 (1.079)
	5th	23.53—23.56 (0.9264—0.9276)	23.51 (0.926)
Reverse idler gear	I.D.	15.016—15.043 (0.5911—0.5922)	15.08 (0.594)
	Gear-to-reverse gear shaft clearance	0.032—0.077 (0.0013—0.0030)	0.14 (0.006)
Synchro ring	Ring-to-gear clearance (ring pushed against gear)	0.73—1.18 (0.029—0.046)	0.4 (0.016)
Shift fork	Shift fork finger thickness	6.4—6.5 (0.252—0.255)	—
	Fork-to-synchro sleeve	0.25—0.45 (0.0098—0.0177)	0.8 (0.03)
Reverse shift fork	Shift fork pawl groove width	12.7—13.0 (0.500—0.512)	—
	Fork-to-reverse idler gear clearance	0.5—1.1 (0.020—0.043)	1.8 (0.071)
	L groove width	7.05—7.25 (0.278—0.285)	—
	Fork-to-fork shaft clearance	0.05—0.35 (0.002—0.014)	0.5 (0.02)
Shift arm A	Diameter of shift rod contact area	13.005—13.130 (0.5120—0.5169)	—
	Shift arm A-to-Shift rod Clearance	0.005—0.230 (0.0002—0.0091)	0.35 (0.0138)
Shift arm B	Diameter of shift arm shaft contact area	13.973—14.000 (0.5501—0.5512)	—
	Shift arm B-to-shift arm shaft clearance	0.013—0.070 (0.0005—0.0028)	0.16 (0.0063)
	shift arm B-to-shift piece clearance	0.2—0.5 (0.0079—0.0197)	0.62 (0.0244)
	Shift piece diameter of shift fork shaft contact area	12.9—13.0 (0.5079—0.5118)	12.78 (0.5031)

Automatic Transmission — Section 14

MEASUREMENT			STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)		2.4 (2.5, 2.1) at oil change 5.4 (5.7, 4.8) at assembly	
Hydraulic pressure	Line pressure at 2,000 rpm		785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	736 kPa (7.5 kg/cm², 107 psi)
	2nd, 3rd, 4th clutch pressure at 2,000 rpm in D₃ or D₄		412 kPa (4.2 kg/cm², 60 psi) Throttle control lever full closed ↓ 785—834 kPa (8.0—8.5kg/cm², 114—121 psi) Throttle control lever opened 1/4 or more	363 kPa (3.7 kg/cm², 53 psi) (closed) ↓ 736 kPa (7.5 kg/cm² 107 psi) (1/4 opened)
	2nd clutch pressure at 2,000 rpm in 2		785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	736 kPa (7.5 kg/cm² 107 psi)
	1st clutch pressure at 2,000 rpm in D₃ or D₄			
	Governor pressure at 37.5 mph (60 km/h)		206—216 kPa (2.10—2.20 kg/cm², 30—31 psi)	201kPa (2.05 kg/cm² 29 psi)
	Throttle pressure B	Full closed	0	—
		Full opened	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	736 kPa (7.5 kg/cm², 107 psi)
	Throttle pressure A	Full closed	0—4.9 kPa (0—0.05 kg/cm², 0—0.7 psi)	—
		Full opened	505—520 kPa (5.15—5.30 kg/cm², 73—75 psi)	500 kPa (5.1 kg/cm², 73 psi)
Stall speed			2,300—2,900 rpm	—
Clutch	Clutch initial clearance	1st	0.65—0.85 (0.026—0.033)	—
		2nd	0.65—0.85 (0.026—0.033)	—
		3rd, 4th	0.40—0.60 (0.016—0.024)	—
	Clutch return spring free length	1st	31.0 (1.22)	29.0 (1.14)
		except 1st	30.5 (1.20)	28.5 (1.12)
	Clutch disc thickness		1.88—2.00 (0.074—0.079)	Until grooves worn out

(cont'd)

Standards and Service Limits (cont'd)

Automatic Transmission (cont'd) — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch (cont'd)	Clutch plate thickness 1st	1.56—1.65 (0.061—0.065)	Discoloration
	except 1st	1.95—2.05 (0.077—0.081)	
	Clutch end plate thickness Mark 1	2.3—2.4 (0.091—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)	
	Mark 11	2.0—2.1 (0.079—0.083)	
	Mark 12	2.1—2.2 (0.083—0.087)	
	Mark 13	2.2—2.3 (0.087—0.091)	Discoloration
Transmission	Diameter of needle bearing contact area on main and stator shaft	19.980—19.993 (0.7866—0.7871)	Wear or damage
	Diameter of needle bearing contact area on mainshaft 2nd gear	35.975—35.991 (1.4163—1.4169)	
	Diameter of needle bearing contact area on mainshaft 4th gear collar	31.975—31.991 (1.2588—1.2594)	
	Diameter of needle bearing contact area on mainshaft 1st gear collar	27.975—27.995 (1.1014—1.1022)	
	Diameter of needle bearing contact area on countershaft (L side)	36.004—36.017 (1.4175—1.4180)	
	Diameter of needle bearing contact area on countershaft 3rd gear	31.975—31.991 (1.2589—1.2595)	
	Diameter of needle bearing contact area on countershaft 4th gear	27.980—27.993 (1.1016—1.1021)	
	Diameter of needle bearing contact area on countershaft reverse gear collar	29.980—29.993 (1.1803—1.1808)	
	Diameter of needle bearing contact area on countershaft 1st gear collar	29.980—29.993 (1.1803—1.1808)	
	Diameter of needle bearing contact area on reverse idle gear	13.990—14.000 (0.5508—0.5512)	
	Mainshaft 2nd gear I.D.	41.000—41.016 (1.6142—1.6148)	
	Mainshaft 1st gear I.D.	33.000—33.016 (1.2992—1.2998)	
	Mainshaft 4th gear I.D.	38.000—38.016 (1.4961—1.4967)	
	Countershaft 4th gear I.D.	33.000—33.016 (1.2992—1.2998)	
	Countershaft 3rd gear I.D.	38.000—38.016 (1.4961—1.4967)	
	Countershaft 1st gear I.D.	35.000—35.016 (1.3780—1.3786)	
	Countershaft reverse gear I.D.	36.000—36.016 (1.4173—1.4179)	
	Reverse idle gear I.D.	18.007—18.020 (0.7089—0.7094)	
	Reverse idler shaft holder I.D.	14.416—14.434 (0.5676—0.5683)	Wear or damage
	Mainshaft 4th gear end play	0.10—0.22 (0.0039—0.0087)	—
	Mainshaft 2nd gear end play	0.07—0.15 (0.0028—0.0059)	—
	Mainshaft 1st gear end play	0.08—0.24 (0.0031—0.0094)	—
	Countershaft 4th gear end play	0.07—0.15 (0.0028—0.0059)	—
	Countershaft 3rd gear end play	0.07—0.15 (0.0028—0.0059)	—
	Countershaft 1st gear end play	0.10—0.45 (0.0039—0.0177)	—
	Reverse idler gear end play	0.05—0.18 (0.0020—0.0071)	—
	Countershaft reverse gear play	0.10—0.45 (0.0039—0.0177)	—
	Selector hub O.D.	51.87—51.90 (2.0421—2.0433)	Wear or damage
	Thrust washer thickness		
	Mainshaft 2nd gear A	3.47—3.50 (0.1366—0.1378)	Wear or damage
	B	3.52—3.55 (0.1386—0.1398)	
	C	3.57—3.60 (0.1406—0.1417)	
	D	3.62—3.65 (0.1425—0.1437)	
	E	3.67—3.70 (0.1445—0.1457)	
	F	3.72—3.75 (0.1465—0.1476)	
	G	3.77—3.80 (0.1484—0.1496)	
	H	3.82—3.85 (0.1504—0.1516)	
	I	3.87—3.90 (0.1524—0.1535)	
	Mainshaft L side bearing	2.95—3.05 (0.1161—0.1201)	
	Mainshaft 4th gear	4.45—4.55 (0.1752—0.1791)	
	Mainshaft R side 1st gear	2.43—2.50 (0.0957—0.0984)	
	Mainshaft L side 1st gear	1.45—1.50 (0.0571—0.0591)	
	Countershaft 3rd gear A	2.97—3.00 (0.1169—0.1181)	
	B	3.02—3.05 (0.1189—0.1201)	
	C	3.07—3.10 (0.1209—0.1220)	
	D	3.12—3.15 (0.1228—0.1240)	
	E	3.17—3.20 (0.1248—0.1260)	
	F	3.22—3.25 (0.1268—0.1280)	
	G	3.27—3.30 (0.1287—0.1299)	
	H	3.32—3.35 (0.1307—0.1319)	
	I	3.37—3.40 (0.1327—0.1339)	Wear or damage

Unit : mm (in)

Automatic Transmission – Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission	Countershaft distance collar length	38.97–39.00 (1.5342–1.5354)	—
		39.02–39.05 (1.5362–1.5374)	—
		39.07–39.10 (1.5382–1.5394)	—
		39.12–39.15 (1.5402–1.5413)	—
		39.17–39.20 (1.5421–1.5433)	—
		39.22–39.25 (1.5441–1.5453)	—
		39.27–39.30 (1.5461–1.5472)	—
	Mainshaft 4th gear collar length	40.00–40.05 (1.5748–1.5768)	—
	Mainshaft 1st gear collar length	25.00–25.15 (0.9843–0.9902)	—
	Mainshaft 1st gear collar flange thickness	2.5–2.6 (0.098–0.102)	Wear or damage
	Countershaft reverse gear collar length	14.50–14.55 (0.5709–0.5728)	—
	Countershaft reverse gear collar flange thickness	2.45–2.55 (0.0965–0.1004)	Wear or damage
	Countershaft 1st gear collar length	14.50–14.55 (0.5709–0.5728)	—
	Countershaft 1st gear collar flange thickness	2.45–2.55 (0.0965–0.1004)	Wear or damage
	Diameter of countershaft one-way clutch contact area	74.414–74.440 (2.9297–2.9307)	Wear or damage
	Diameter of parking gear one-way clutch contact area	57.755–57.768 (2.2738–2.2743)	Wear or damage
	Mainshaft feed pipe A O.D. (at 15 mm from end)	8.97–8.98 (0.353–0.354)	8.95 (0.3524)
	Mainshaft feed pipe B O.D. (at 12 mm from end)	5.97–5.98 (0.2351–0.2354)	5.95 (0.2343)
	Countershaft feed pipe O.D. (at 20 mm from end)	7.97–7.98 (0.3138–0.3142)	7.95 (0.3130)
	Mainshaft sealing ring 32 mm thickness	1.980–1.995 (0.0780–0.0785)	1.800 (0.0709)
	Mainshaft bushing I.D.	6.018–6.030 (0.2369–0.2374)	6.045 (0.2380)
	Mainshaft bushing I.D.	9.000–9.015 (0.3543–0.3549)	9.030 (0.3555)
	Countershaft bushing I.D.	8.000–8.015 (0.3150–0.3156)	8.030 (0.3161)
	Mainshaft sealing ring groove width	2.025–2.060 (0.0797–0.0811)	2.080 (0.0819)
	Stator shaft distance collar 20 mm I.D.	26.000–26.013 (1.0236–1.0241)	26.030 (1.0248)
Regulator valve body	Sealing ring contact area diameter	32.000–32.025 (1.2598–1.2608)	32.050 (1.2618)
Shifting device and parking brake control	Reverse shift fork thickness	5.90–6.00 (0.2323–0.2362)	5.40 (0.2126)
	Parking brake ratchet pawl	—	Wear or other defect
	Parking gear	—	Wear or other defect
	Throttle cam stopper	18.5–18.6 (0.728–0.732)	—
Servo body	Shift fork shaft bore I.D. A	14.000–14.005 (0.5512–0.5514)	—
	B	14.006–14.010 (0.5514–0.5516)	—
	C	14.011–14.015 (0.5516–0.5518)	—
	Shift fork shaft valve bore I.D.	37.000–37.039 (1.4567–1.4582)	37.045 (1.4585)
Valve body	Oil pump gear side clearance	0.03–0.05 (0.0012–0.0020)	0.07 (0.0028)
	Oil pump gear-to-body clearance	Drive: 0.240–0.266 (0.0094–0.0105)	—
		Driven: 0.063–0.088 (0.0025–0.0035)	—
	Stator camshaft needle bearing bore I.D. (R side)	26.000–26.013 (1.0236–1.0241)	Wear or damage
	Stator camshaft needle bearing contact and I.D. (Stator side)	24.000–24.021 (0.9449–0.9457)	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 (cont'd) — Section 14

	MEASUREMENT	STANDARD (NEW)			
Springs		Wire Diameter	O.D.	Free Length	No. of Coils
	Regulator valve spring A	1.58 x 2.00 (0.06 x 0.08)	14.7 (0.58)	86.5 (3.41)	20.9
	Regulator valve spring B	1.8 (0.07)	9.6 (0.38)	44 (1.73)	7.5
	Stator reaction spring	6 (0.24)	38.4 (1.51)	30.3 (1.20)	2
	Modulator spring	1.2 (0.05)	9.4 (0.37)	{ 27.2 (1.07) / 26.3 (1.04) }	8
	Torque converter check valve spring	1.1 (0.04)	8.4 (0.33)	36.4 (1.43)	12
	Cooler releaf valve spring	1.1 (0.04)	8.4 (0.33)	36.4 (1.43)	12
	Releaf valve spring	1.0 (0.04)	8.4 (0.33)	52 (2.05)	23
	Governer spring A 2 pieces	1.0 (0.04)	18.8 (0.74)	38.1 (1.50)	4
	Governer spring B	0.9 (0.04)	11.8 (0.46)	27.8 (1.09)	6
	2nd orifice control spring	0.8 (0.03)	6.6 (0.26)	43.8 (1.72)	27.6
	Servo orifice control spring	0.9 (0.04)	6.1 (0.24)	35.9 (1.41)	20
	Throttle spring A	1.0 (0.04)	8.5 (0.33)	22.2 (0.87) / 22.1 (0.87)	6 / 5.5
	Throttle adjust spring B	0.8 (0.03)	6.2 (0.24)	30 (1.18)	8
	Throttle adjust spring A	0.8 (0.03)	6.2 (0.24)	27 (1.06)	8.5
	Throttle spring B	1.6 (0.06)	8.5 (0.33)	41.3 (1.63)	13.9
	1—2 shift spring 2 pieces	0.5 (0.02)	4.4 (0.17)	47.2 (1.86)	38
	1—2 shift ball spring Main	0.45 (0.02)	4.5 (0.18)	12.7 (0.50)	11
	Secondary	0.45 (0.02)	4.5 (0.18)	12.7 (0.50)	11
	2—3 shift spring	0.9 (0.04)	7.6 (0.23)	44.6 (1.76)	20.7
	2—3 shift ball spring 2 piece	0.4 (0.02)	4.5 (0.18)	14.4 (0.57)	8.2
	3—4 shift spring 2 piece	0.9 (0.04)	9.6 (0.38)	32.5 (1.28)	10
	3—4 shift ball spring	0.5 (0.02)	4.5 (0.18)	11.3 (0.44)	7
	1st accumulator spring A	2.34 x 2.9 (0.09 x 0.1)	21.5 (0.85)	66.7 (2.63)	10.2
	1st accumulator spring B	2.8 (0.11)	13.1 (0.52)	40 (1.57)	8.8
	4th accumulator spring	3.2 (0.13)	18.6 (0.73)	78.3 (3.08)	10
	2nd accumulator spring	3.8 (0.15)	20.2 (0.80)	75.2 (2.96)	10.6
	3rd accumulator spring	2.7 (0.10)	15.5 (0.61)	80.0 (3.15)	14.8
	L/C shift spring	0.9 (0.04)	8.1 (0.32)	44.5 (1.75)	18.3
	L/C timing spring B	1.0 (0.04)	6.6 (0.26)	57.0 (2.24)	32
	L/C control valve spring 3 pieces	0.7 (0.03)	6.6 (0.26)	32.5 (1.28)	14
	CPC valve spring 2 pieces	1.4 (0.06)	9.4 (0.37)	31.6 (1.24)	10.9
	Shift timing valve spring	0.9 (0.04)	8.6 (0.34)	42.9 (1.69)	21.4
	Kick down valve spring	0.9 (0.04)	10.1 (0.40)	40.8 (1.61)	14.5
	Reverse control spring	0.7 (0.03)	7.6 (0.30)	37.2 (1.46)	15.3
	L/C cut spring	0.7 (0.03)	7.6 (0.30)	29 (1.14)	18
	3—2 timing valve spring	1.2 (0.05)	7.7 (0.30)	45.1 (1.78)	19.8
	1st accumulator oneway ball spring	0.29 (0.01)	4.0 (0.16)	14 (0.55)	13
	4th exhaust spring	0.9 (0.04)	6.1 (0.24)	43.7 (1.72)	20.3
	Servo control valve spring	1.1 (0.04)	6.6 (0.26)	44 (1.73)	20
	Reverse timing spring	0.7 (0.03)	5.6 (0.22)	43.8 (1.72)	21.7

Unit: mm (in.)

Differential — Section 15

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Ring gear	Backlash	M/T	0.072—0.130 (0.0028—0.0051)	0.18 (0.007)
		A/T	0.086—0.143 (0.0034—0.0056)	0.25 (0.01)
Differential carrier	Pinionshaft bore diameter		18.000—18.018 (0.7087—0.7094)	—
	Carrier-to-pinionshaft clearance		0.017—0.047 (0.0007—0.0019)	0.095 (0.004)
	Driveshaft bore diameter	M/T	26.025—26.045 (1.0246—1.0254)	—
		A/T	26.005—26.025 (1.0238—1.0246)	—
	Carrier-to-driveshaft clearance		0.045—0.086 (0.0017—0.0034)	0.14 (0.006)
	Carrier-to-intermediate shaft clearance		0.075—0.111 (0.0030—0.0044)	0.16 (0.006)
	Side clearance		0.10 (0.004) max.	—
Differential pinion gear	Backlash		0.05—0.15 (0.002—0.006)	Adjust with a washer
	Pinion gear bore diameter		18.042—18.066 (0.7103—0.7113)	—
	Pinion gear to pinionshaft clearance		0.059—0.095 (0.0023—0.0037)	0.15 (0.006)
	Diameter of ball bearing contact area		35.002—35.018 (1.3780—1.3787)	—

Driveshaft — Section 16

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Driveshaft	Right boot:as installed	481.5—486.5 (19.0—19.2)	—
	Left boot:as installed with dynamic damper	774.5—779.5 (30.5—30.7)	—
	without dynamic damper	773.5—778.5 (30.5—30.6)	—

Steering — Section 17

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Steering wheel	Play	10 (0.39) max.	—
	Starting load N (kg, lb)	15 (1.5, 3.3) max.	
Gearbox	Pinion starting torque N·m (kg-m, lb-ft)	○0.49—1.67 (0.05—0.17, 0.36—1.23) ●0.39—1.37 (0.04—0.14, 0.29—1.01)	
	The angle of rack-guide-screw loosened locked position	○40°—60° ●10°—15°	
Rack end	Pivoting resistance N·m (kg-m, lb-ft)	0.49—1.96 (0.05—0.2, 0.36—1.45)	

○: Normal ratio (except Si), ●: Variable ratio (Si)

(cont'd)

Standards and Service Limits (cont'd)

Suspension — Section 18

	MEASUREMENT		STANDARD (NEW)		SERVICE LIMIT
Wheel alignment			Front	Rear	
	Total toe		0 ±2 (0±0.08)	IN2 [illegible] (0.08 [illegible])	
	Camber		0°00' ± 1°	−0°26' ±1°	
	Caster		2°59' ± 1°		
	Side slip		0 ±3 (0 ± 0.12)		
	Wheel turning angle (MAX.)	Inward wheel	41°30' ± 2°		
		Outward wheel	33°30' ± 2°		
Wheel	Rim runout	Steel	0—1.0 (0—0.039)		2.0 (0.08)
		Aluminum	0—0.7 (0—0.028)		1.5 (0.06)
	Pitch-circle diameter		100 (3.94)		
	Offset		45 (1.77)		
Wheel bearing	End play	Front	0		0.05 (0.002)
		Rear	0		0.05 (0.002)

Brake — Section 19

	MEASUREMENT			STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke 200N (20 kg, 44 lbs)			To be locked when pulled 6—10 notches	
Foot brake pedal	Pedal height			153 (6.0) from floor	—
	Free play			1—5 (0.04—0.20)	5 (0.20)
Master cylinder	Piston-to-push rod clearance			0—0.4 (0—0.016)	—
Disc brake	Disc thickness	Front	Si	19.0 (0.75)	17.0 (0.67)
			Std	21.0 (0.83)	19.0 (0.75)
			HF	17.0 (0.67)	15.0 (0.59)
		Rear		10.0 (0.39)	8.0 (0.32)
	Disc runout			—	0.1 (0.004)
	Pad thickness	Front	Std and Si	10.0 (0.39)	3.0 (0.121)
			HF	9.5 (0.37)	3.0 (0.12)
		Rear		8.0 (0.32)	1.6 (0.06)
Brake drum	I.D.			180 (7.09)	181 (7.13)
	Lining thickness			4.5 (0.18)	2.0 (0.08)

Air Conditioner — Section 22

	MEASUREMENT	STANDARD (NEW)
Compressor belt	Deflection midway betwwen pulley/load	9—11 (0.35—0.43)/98N (10 kg, 22 lb) for used belt 7—9 (0.28—0.35)/98 N(10kg, 22 lb) for new belt

Unit: mm (in.)

Electrical — Section 23

	MEASUREMENT	STANDARD (NEW)
Ignition coil	Rated voltage	12 Volts
	Primary winding resistance	0.6—0.8 ohms
	Secondary winding resistance	9,760—14,640 ohms
Ignition wire	Resistance	25,000 ohms max.
Spark plug	Type	See Section 23
	Gap	1.0—1.1 (0.039—0.043)
Ignition timing	At idling — Std	18°(Red) BTDC
	Si	18°(Red) BTDC
	HF	49 ST: 14°(Red) BTDC California and Hi ALT: 14°(Red) BTDC
Battery	Lighting capacity (20-hour ratio) Starting capacity (5-second ratio)	47 Ampere Hours 9.2 V min. at 300 Ampere draw
Alternator belt	Deflection midway between pulleys/load	9—11 (0.35—0.43)/98 N (10 kg, 22 lb) for used belt 7—9 (0.28—0.35/98 N (10kg, 22 lb) for new belt

Alternator		ND		MITSUBISHI	
	Output	13.5V / 60A			
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT
	Coil resistance (rotor)	2.8—3.0 ohm	±0.1 ohm	3.4—3.8 ohm	±0.2 ohm
	Slip ring O.D.	32.6 (1.28)	32.1 (1.26)	22.7 (0.89)	22.2 (0.87)
	Brush length	13.5 (0.53)	4.5 (0.18)	22 (0.87)	8 (0.31)
	Brush spring tension	300—500g (10.6—17.6 oz)	—	300—450g (10.6—15.9 oz)	—

Starting motor		HITACHI 0.8 kw		ND 0.8 kw		ND 1.0 kw, 1.2 kw		MITSUBA 1.0 kw, 1.4 kw	
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT
	Mica depth	0.5—0.8 (0.020 −0.031)	0.2 (0.008)	0.5—0.8 (0.020 −0.031)	0.2 (0.008)	0.5—0.8 (0.020 −0.031)	0.2 (0.008)	0.4—0.5 (0.016 −0.020)	0.15 (0.006)
	Commutator	0—0.1 (0.004)	0.4 (0.016)	0.05 (0.002)	0.4 (0.016)	0—0.02 (0.0008)	0.05 (0.002)	0—0.02 (0.0008)	0.05 (0.002)
	Commutator O.D.	40.0 (1.57)	39.0 (1.54)	28.0 (1.10)	27.0 (1.06)	29.9—30.0 (1.18)	29.0 (1.14)	28.0—28.1 (1.10—1.11)	27.5 (1.08)
	Brush length	14.5—15.5 (0.57—0.61)	11.0 (0.43)	15.5—16.5 (0.61—0.65)	10.0 (0.39)	12.5—13.5 (0.49—0.53)	8.5 (0.33)	14.3—14.7 (0.56—0.58)	9.3 (0.37)
	Spring Pressure (new)	15.7 N (1.6 kg, 3.5 lb)	—	15.7 N (1.6 kg, 3.5 lb)	—	18.1—23.9 N (1.85—2.44 kg, 4.1—5.4 lb)	—	20.1—26.5 N (2.05—2.7 kg, 4.5—6.0 lb)	—

Design Specifications

	ITEMS		METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length		3,772 mm	148.5 in.	
	Overall Width		1,675 mm	65.9 in.	
	Overall Height		1,272 mm	50.1 in.	
	Wheelbase		2,300 mm	90.6 in.	
	Track F/R		1,450/1,456 mm	57.1/57.3 in.	
	Ground Clearance		150 mm	5.9 in	
	Seating Capacity (F/R)		Two (2/0)		
	Overhang F/R		764/690 mm	30.1/27.2 in.	Includes bumper
WEIGHTS	Gross Vehicle Weight Rating (MVSS)				
		USA HF	1,111 kg	2,450 lb.	
		Std, Si	1,202 kg	2,650 lb.	
		CANADA Std, Si	1,200 kg	2,645 lb.	
ENGINE	Type		Water cooled, 4-cycle S.O.H.C.		
	Cylinder Arrangement		4-cylinder in-line, transverse		
	Bore and Stroke	HF and Std	75.0 x 84.5 mm	2.952 x 3.326 in.	
		Si	75 x 90 mm	2.952 x 3.543 in.	
	Displacement	HF and Std	1,493 cm³ (cc)	91 cu in.	
		Si	1,590 cm³ (cc)	97 cu in.	
	Compression Ratio		9.6 : 1 (HF), 9.2 : 1 (Std), 9.1 : 1 (Si)		
	Valve Train		4 valves per cylinder, single overhead camshaft (Std and Si)		
			2 valves per cylinder, single overhead camshaft (HF)		
	Lubrication System		Pressure feed		
	Fuel Required		Unleaded grade gasoline with pump octane number of 86 (91 R.O.N.) or higher		
	Engine dry weight	Std	94.2 kg	207.7 lb	Except radiator, transmission
		Si	99.3 kg	218.9 lb	
		HF	88.6 kg	95.3 lb.	
STARTER	Type	0.8kW	Direct		
		1.0 kW, 1.2 kW, 1.4 kW	Gear reduction		
	Normal output		0.8kW, 1.0 kW, 1.2 kW, 1.4 kW		
	Normal voltage		12 V		
	Hour rating		30 seconds		
	Direction of rotation		Clockwise as viewed from gear end		
	Weight	0.8 kW HITACHI, ND	4.4 kg	9.7 lb.	
		1.0 kW MITSUBA	3.4 kg	7.5 lb.	
		ND	3.85 kg	8.5 lb.	
		1.2 kW ND	3.85 kg	8.5 lb.	
		1.4 kW MITSUBA	3.7 kg	8.2 lb.	

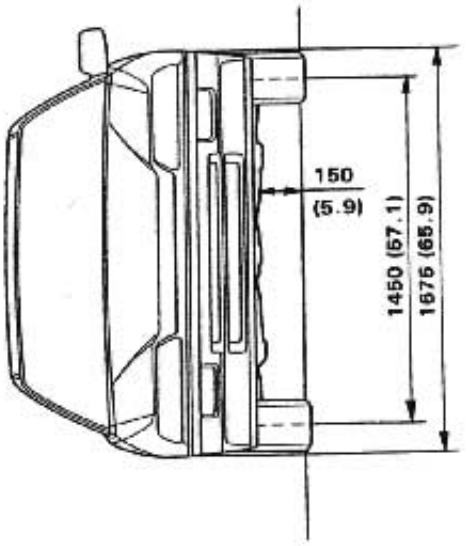
	ITEMS		METRIC		ENGLISH		NOTES
TRANSMISSION	Clutch Transmission	M/T A/T M/T A/T	Single plate dry, diaphragm spring. Torque converter 5 speed forward, synchro mesh, 1 speed reverse. 4 speed forward, with lock-up clutch, 1 speed reverse.				
			M/T (HF)	M/T (Std and Si)	A/T		
	Primary Reduction Gear	 I II III IV V Reverse	1.000 3.250 1.650 1.033 0.823 0.694 3.153	1.000 3.250 1.894 1.259 0.937 0.771 3.153	1.000 2.706 1.560 1.027 0.780 — 1.954		
	Final Reduction	M/T HF Std Si A/T	Single helical gear, 2.954 (49 ST), 3.250 (California) Single helical gear, 3.888 Single helical gear, 4.250 Single helical gear, 3.933				
	Clutch Facing Area		160 cm²		24.8 sq. in.		
AIR CONDITIONER	Compressor		MATSUSHITA	SANDEN	MATSUSHITA	SANDEN	
	Cooling Capacity –Conditions: Compressor rpm Outside Air Temperature Outside Air Humidity Condenser Air Temperature Condenser Air Velocity Blower Capacity		3,850 Kcal/h 1,800 rpm | 2,700 rpm 27.0°C 50% 35°C 4.5 m/sec. 440 m³/h		— 81°F 95°F 14.8 ft/sec. 15,118 cu. ft/h	—	
	Compressor	Type No. of vanes Displacement Max. rpm Lubricant/capacity	Vane rotary type 3 130 cc/rev 7,500 rpm 130 cc	Scroll rotary type — 69.5 cc/rev 12,000 rpm 120 cc	Vane rotary type 3 7.93 cu in/rev — 4.4 US oz	Scroll rotary type — 4.24 cu in/rev — 4.1 US oz	
	Receiver Dryer	With desiccant	Includes fusible safety plug.				
	Condenser		Corrugated fin type				
	Evaporator		Corrugated fin type				
	Blower	Type Motor input Speed control Max. capacity	Sirocco fan 170 W (12V) 4 speeds 390 m³/h		13,773 cu ft/h		
	Temp. Control		Air-mix type				
	Comp. Clutch	Type Power consumption	Dry, single plate, V-belt 32 W max. 12V				
	Refrigerant	Type Quantity	R-12 900±50 kg		31.7±1.8 oz		
STEERING SYSTEM	Type Overall Ratio Turn, lock-to-lock Steering Wheel Dia	 Manual/Variable Manual/Variable	Rack and pinion 18.6 : 1/19.8 (18—20.4) : 1 3.8/4.1 377/370 mm		14.8/14.6 in		
SUSPENSION SYSTEM	Type, Front/Rear Shock Absorber	 Front/Rear (Std and HF) Front and Rear (Si)	Independent by double wishbones coil springs Telescopic, hydraulic/Telescopic, Nitrogen gas-filled Telescopic, Nitrogen gas-filled				
WHEEL ALIGNMENT	Wheel alignment Camber Caster Toe-in Kingpin Inclination	 Front Rear Front Rear	0°00' ± 1° –0°26' ± 1° 2°59' ± 1° 0±2 2±2 7°34'		0±0.08 0.08±0.08		—

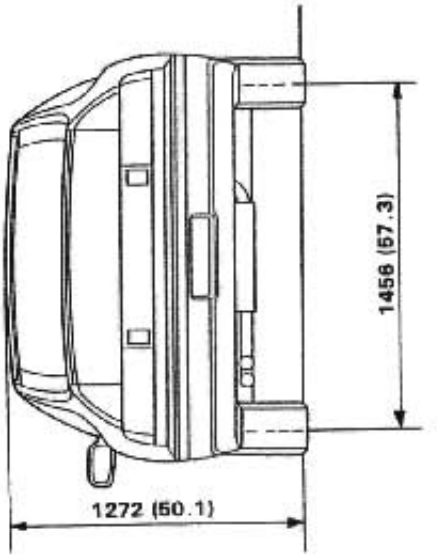
Design Specifications (cont'd)

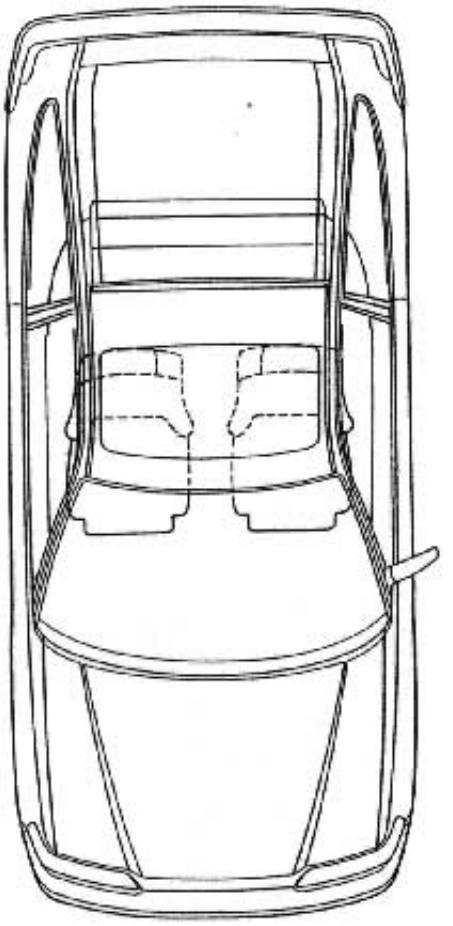
	ITEMS	METRIC	ENGLISH	NOTES
BRAKE SYSTEM	Type, Front	Power assisted self-adjusting ventilated disc		
	Type, Rear	Drum		
	Lining Surface Area: Front HF/Std and Si	36.7/45.5 cm²	5.69/7.05 sq. in.	Front: Pad
	Rear	50.2 cm²	7.78 sq. in.	
	Effective Disc Dia Front HF/Std and Si	231/242 mm	9.09/9.53 in.	
	Effective Drum Dia Rear	180 mm	7.08 in.	
	Parking Brake Kind and Type	Mechanical actuating, rear two wheel brakes		
TIRES	Front/Rear HF	P165/70R13		
	Std	P175/70R13		
	Si	185/60R14 82H		
	Spare	T105/80D13		
ELECTRICAL	Battery	12V—47 AH		
	Starter	12V—0.8 kW, 1.0 kW, 1.2 kW, 1.4 kW		
	Alternator	12 V—60 amps		
	Fuses In the dash fuse box	10A, 15A, 30A		
	In the main fuse box	10A, 15A, 20A, 40A, 50A, 60A		
	Headlights High/Low	12V—65/55W		
	Front Turn Signal Lights	12V—45 CP		(SAE 3497)
	Rear Turn Signal Lights	12V—32 CP		(SAE 1156)
	Stop/Taillights	12V—32/2 CP		(SAE 2057)
	High Mount Brake Lights	12V—21 CP		
	Side Marker Lights Front	12V—5W		
	Rear	12V—3 CP		(SAE 168)
	Back-up Lights	12V—32 CP		(SAE 1156)
	License Plate Lights	12V—8W		
	Gauge Lights	12V—3.4W, 3.0W, 1.4W		
	Indicator Lights	12V—1.4W		
	Warning Lights	12V—1.4W		
	Dome Light	12V—5W		
	Trunk Light	12V—3.4W		
	Illumination and Pilot Lights	12V—1.4W		
		0.91W, 0.84W, LED		
	Heater Illumination Lights	12V—1.12W, 1.4W		

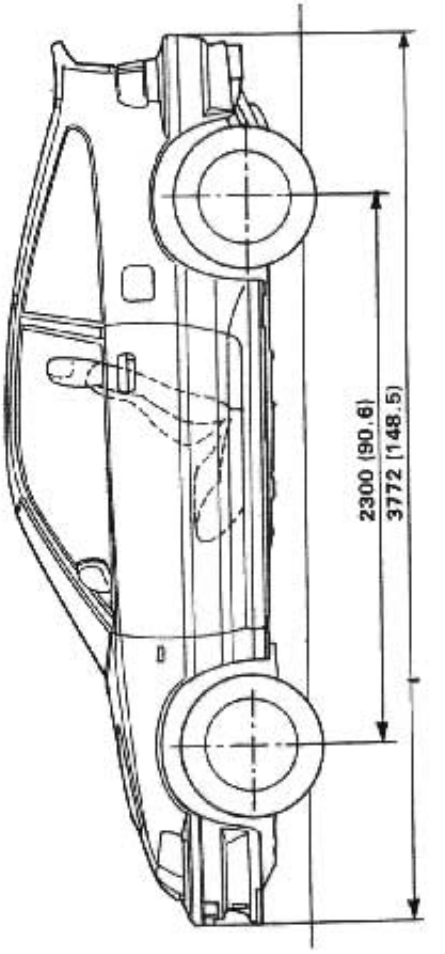
Body Specifications

Unit: mm (in.)









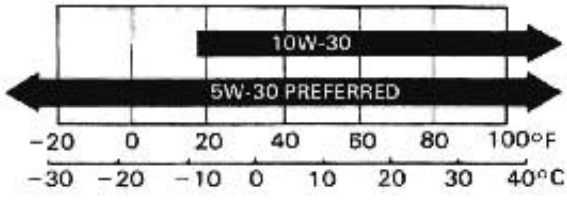
Maintenance

Lubrication Points

For the details of lubrication points and types of lubricants to be applied, refer to the Illustrated Index and various work procedures (such as Assembly/Reassembly, Replacement, Overhaul, Installation, etc.) contained in each section.

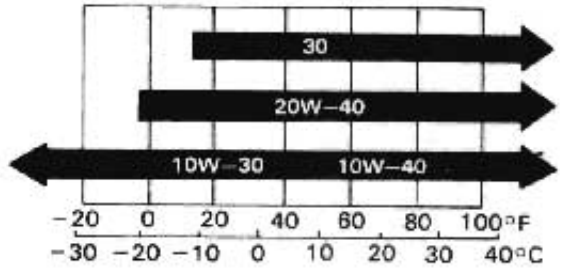
No.	LUBRICATION POINT		LUBRICANT
1	Engine		API Service Grade: Use "Energy Conserving II" SG grade oil. 5W-30 preferred. SAE Viscosity: See chart below.
2	Transmission	Manual	API Service Grade: Use SF or SG grade oil. 10W-30 or 10W-40 preferred. SAE Viscosity: See chart below.
		Automatic	DEXRON® II Automatic transmission fluid
3	Brake Line		Brake fluid DOT 3 or DOT 4
4	Shift lever pivot (Manual transmission)		Silicone grease with molybdenum disulfide
5	Tilt steering (Standard for some types)		Multi-purpose Grease
6	Steering ball joints		
7	Suspension ball joints		
8	Steering boots		
9	Steering gearbox		
10	Steering column bushings		
11	Select lever (Automatic transmission)		
12	Pedal linkage		
13	Brake master cylinder pushrod		
14	Tailgate hinges		
15	Door hinges upper and lower		
16	Door opening detents		
17	Fuel filler lid		
18	Engine hood hinges		
19	Engine hood latch		
20	Rear brake shoe linkage		
21	Caliper	Piston seal Dust seal Caliper pin Piston	Silicone Grease

Recommended Engine Oil
API Service Grade: Use "Energy Conserving II" SG grade oil.
5W-30 preferred.

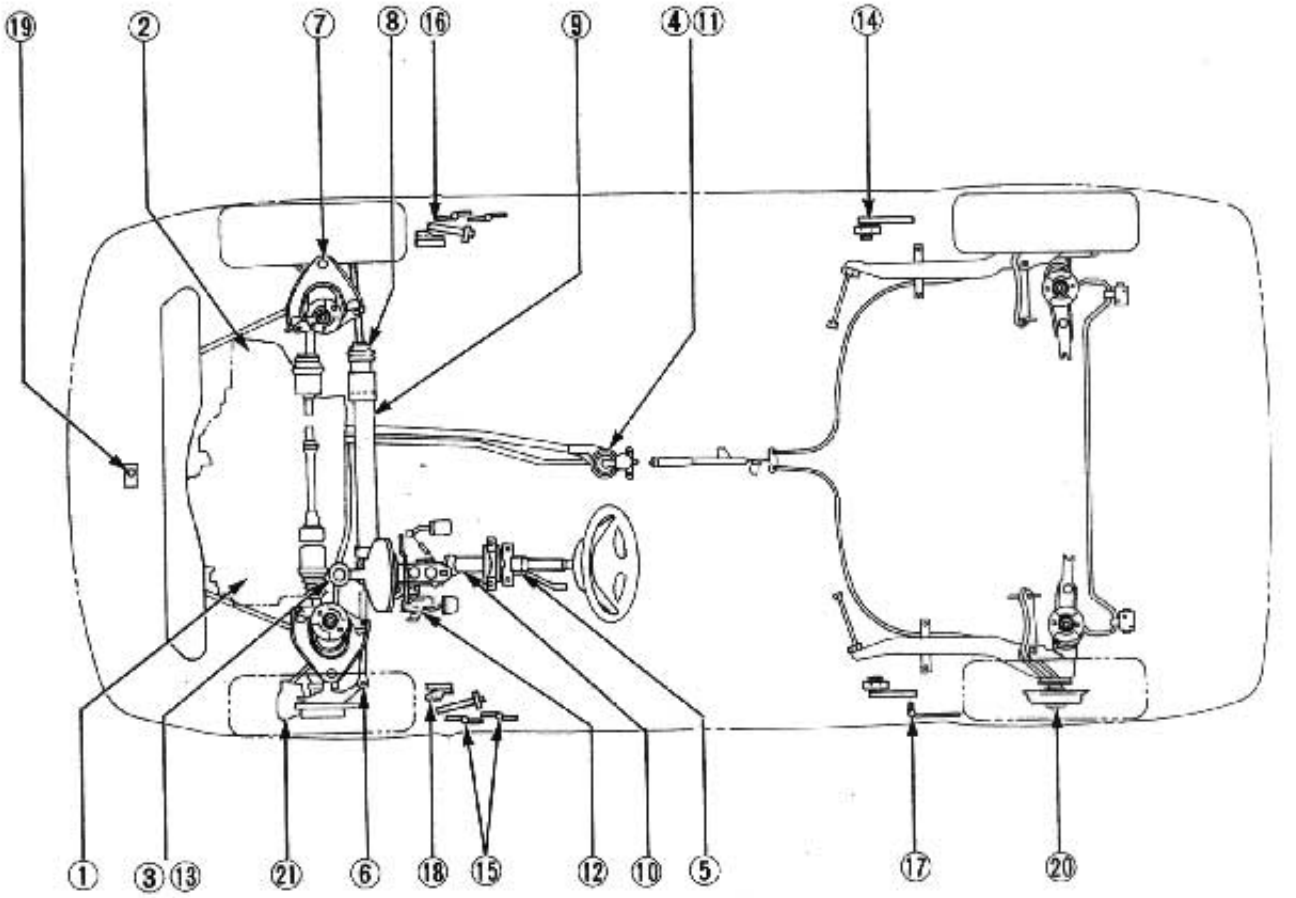


Engine oil viscosity for ambient temperature ranges

Recommended Manual Transmission Oil
API Service Grade: Use SF or SG grade oil.
10W-30 or 10W-40 preferred.



Transmission oil viscosity for ambient temperature ranges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Maintenance Schedule

The maintenance listed below must be performed at mileage (km) intervals shown to ensure safe and efficient operating conditions and proper emission levels. This checklist 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.
I=Inspect.
After inspection, clean, adjust, repair or replace if necessary.

MAINTENANCE ITEM	MAINTENANCE INTERVAL						NOTE	SECTION and PAGE
Service at the interval listed x 1,000 miles (or km) or after that number of months, whichever comes first.	×1,000 miles	15	30	45	60	75	90	
	×1,000 km	24	48	72	96	120	144	
	months	12	24	36	48	60	72	
☆■Engine oil	Replace every 7,500 miles(12,000km) or 6 months						3.5ℓ (3.7 US qt) at oil/filter change	8-4
☆Engine oil filter								8-5
Manual transmission oil		R		R		R	1.8ℓ (1.9 US qt)	13-3
Automatic transmission fluid		R		R		R	2.4ℓ (2.5 US qt) DEXRON ®II A.T.F.	14-35
☆Rear brake discs, calipers and pads (Si)	I	I	I	I	I	I	Minimum thickness: Disc 8 mm (0.31 in.) Pad 3.0 mm (0.12 in.)	19-28 19-27
Rear brake drums, wheel cylinders and linings (Std and HF)		I		I		I	Minimum thickness: 2 mm (0.08 in.)	19-36
Parking brake	I	I		I		I	Fully engaged: 6-10 clicks	19-4
Front brake pads	Inspect every 7,500 miles(12,000km) or 6 months						Minimum thickness: Pad 3.0mm(0.12 in)	19-8
☆Front brake discs and calipers	I	I	I	I	I	I	Minimum thickness: DX: 19 mm (0.75 in.) Si: 17 mm (0.67 in) HF: 15 mm (0.59 in)	19-11
Suspension mounting bolts	I	I	I	I	I	I	Check tightness of bolts.	18-8,20
Exhaust pipe and muffler	I	I	I	I	I	I	Check condition and tightness.	9-7,8,9
Fuel filter and hoses				R			The rubber fuel hoses need periodic replacement since they are subject to cracks and deterioration during a long period of use.	11-5,8
Fuel line connections		I*1		I		I		11-5,8
Steering operation, tie rod ends, steering gear box and boots	I	I		I		I	Check rack grease and steering linkage. Check the boot for damage or leaking grease.	17-8,9
Front wheel alignment	I	I	I	I	I	I		18-4,5,6

■:Check oil and coolant level at each fuel stop.
☆:Under severe driving conditions, service these items twice as often (See below).
*1 For cars sold in California, this service is recommended only; for other areas, it is required.

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
A B • • •	Engine oil and oil filter	R	Every 3,750 miles (6,000 km) or 3 months
A B • D E	Brake discs, calipers and rear brake pads	I	Every 7,500 miles (12,000 km) or 6 months
A B C • E	Clutch release-arm travel	I	Every 3,750 miles (6,000 km) or 3 months

MAINTENANCE ITEM		MAINTENANCE INTERVAL						NOTE	SECTION and PAGE
Service at the interval listed x 1,000 miles (or km) or after that number of months, whichever comes first.	×1,000 miles	15	30	45	60	75	90		
	×1,000 km	24	48	72	96	120	144		
	months	12	24	36	48	60	72		
Brake hoses and lines		I	I	I	I	I	I		19-40
Brake fluid			R		R		R	Use only DOT 3 or DOT 4 fluid Check that brake fluid level is between the upper and lower marks on the reservoir.	19-12
☆Clutch release arm travel		Inspect every 7,500 miles (12,000 km) or 6 months						Free play at arm: 3.0—4.0 mm (0.12—0.16 in.)	12-4,5
Cooling system hoses and connections			I		I		I		10-2,3
■Radiator coolant				R		R*2		Cooling system capacity DX: M/T: 4.5ℓ(4.8 U.S.qt., 4.0 Imp.qt.) A/T: 4.4ℓ(4.7 U.S.qt., 3.9 Imp.qt.) Si: 4.4ℓ(4.7 U.S.qt., 3.9 Imp.qt.) HF: 4.2ℓ(4.4 U.S.qt., 3.7 Imp.qt.) Check specific gravity for freezing point.	10-4
Alternator drive belt			I*1		I		I	9—11mm(0.35—0.43 in.) @98 N(10 kg, 22 lbs.) tension.	23-73
Timing belt							R		6-28
Water pump							I		10-8
Positive crankcase ventilation valve					I			If clicking sound is heard as you pinch the PCV hose between the PCV valve and intake manifold, Valve is OK.	11-141
Distributor cap and rotor					I				23-59
Ignition wiring					I			Maximum resistance 25,000 ohms	23-62
Spark plugs			R		R		R	NGK: BCPR6E-11 or BCPR6EY-N11 (except HF) BCPR5E-11 or BCPR5EY-N11 (HF) ND: Q20PR-U11 (except HF), Q16PR-U11 (HF) CHAMPION: RC9YCN4 (except HF) Gap: 1.0—1.1 mm (0.039-0.043 in.)	23-66
Valve clearance (engine cold)		I	I	I	I	I	I	Intake: DX, Si: 0.17—0.22 mm (0.007—0.009 in) HF: 0.12—0.17 mm (0.005—0.007 in.) Exhaust: DX, Si: 0.22—0.27 mm (0.009—0.011 in.) HF: 0.17—0.22 mm (0.007—0.009 in.)	6-30
Air cleaner element			R		R		R		11-5,8
Evaporative emission control system					I			Disconnect upper hose at purge control diaphragm valve and connect vacuum gauge to hose. Start engine and let idle. Vacuum should not appear.	11-143
E.G.R.system (cold)*4					I			See Emission Section	11-136

(cont'd)

■:Check oil and coolant level at each fuel stop.

*1 Tension adjustment only.

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

R=Replace.

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

Maintenance Schedule

MAINTENANCE ITEM		MAINTENANCE INTERVAL						NOTE	SECTION and PAGE
Service at the interval listed x 1,000 miles (or km) or after that number of months, whichever comes first	×1,000 miles	15	30	45	60	75	90		
	×1,000 km	24	48	72	96	120	144		
	months	12	24	36	48	60	72		
Warm up the engine to normal operating temperature.									
Ignition timing and control system					I			Red mark at idle. DX (M/T, A/T), Si: 18°(BTDC) HF: 14°(BTDC)	23-58
Idle speed					I			DX: 750 ± 50 rpm Si: 750 ±50 rpm HF: 49 ST 600 ± 50 rpm California and HiALT. 650 ± 50 rpm	11-90,91
Idle CO					I			Check with propane enrichment or CO meter.	11-133
E.G.R.system**					I			See Emission Section	11-136
Catalytic converter heat shield					I			Check condition and tightness	11-134

I=Inspec. After inspection, clean, adjust, repair or replace if necessary.

Engine

Engine Removal/Installation

⚠WARNING

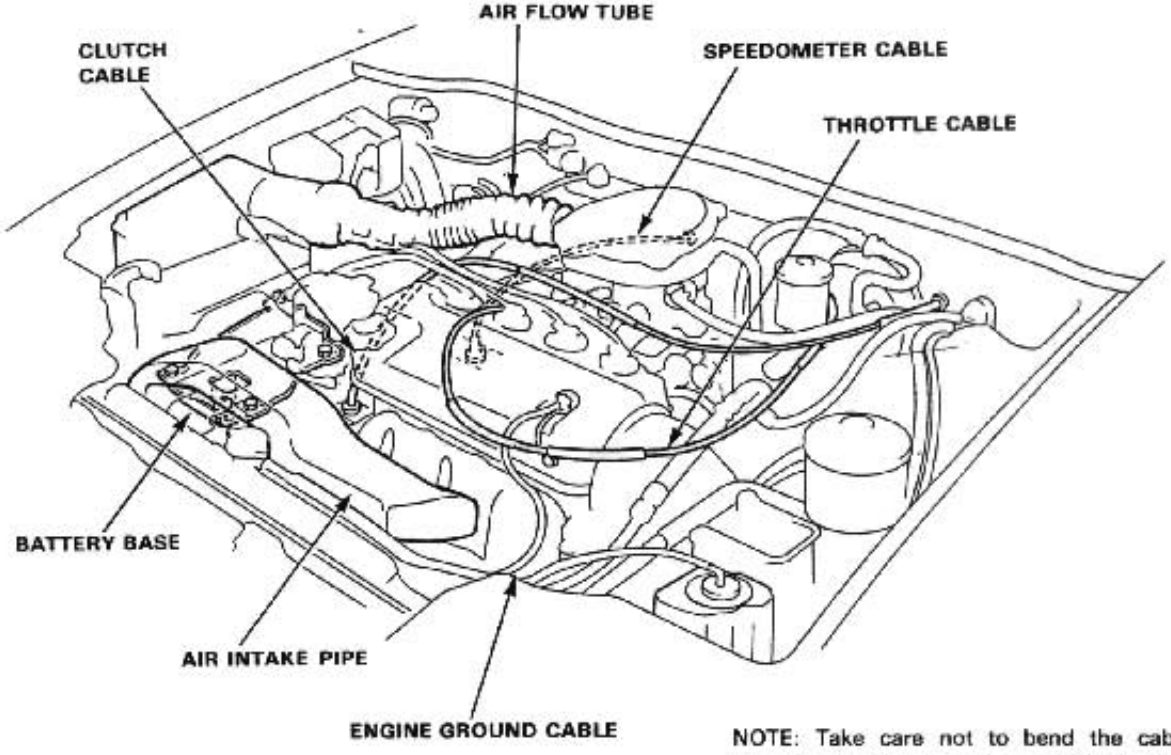
- **Make sure jacks and safety stands are placed properly and hoist brackets are attached to correct positions on the engine. (See Section 1).**
- **Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.**

CAUTION: Use fender covers to avoid damaging painted surfaces.

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

   CAUTION: Use care when storing the hood to avoid damaging the paint.
3. Drain the engine oil. Reistall the drain plug with a new washer.
4. Drain the coolant from the radiator into a clean pan so it may be re-used. Remove the radiator cap to speed draining.

   ⚠WARNING Use care when removing radiator cap to avoid scalding by hot coolant or steam.
5. Drain transmission oil/fluid. Use a 3/8" drive ratchet wrench to remove the drain plug. Reinstall the drain plug with a new washer.
6. Remove the air flow tube and air intake pipe.
7. Remove the battery base.

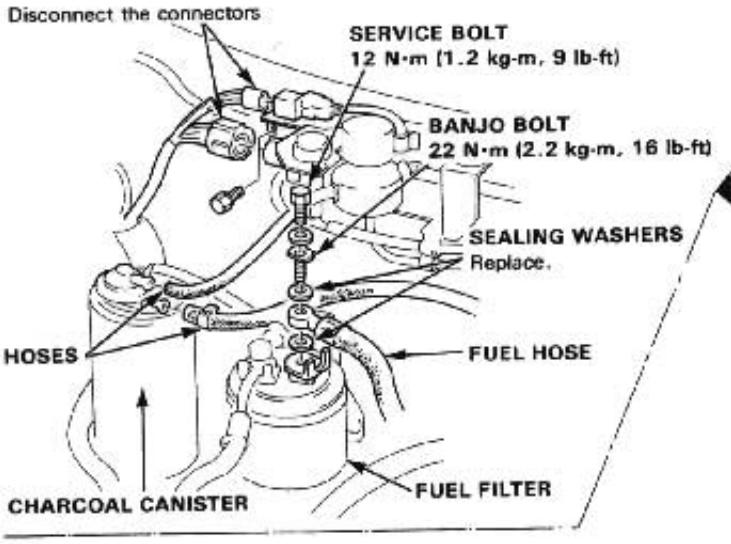


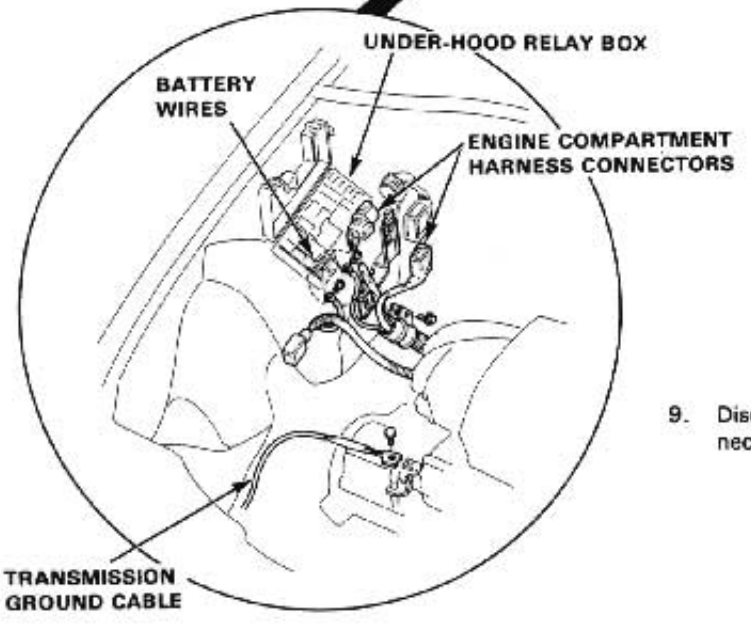
NOTE: Take care not to bend the cable when removing it. Always replace a kinked cable with a new one.

8. Relieve fuel pressure by slowly loosening the service bolt on the fuel filter about one turn. (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 any fuel line, the fuel pressure should be relieved as described above.**
- **Place a shop towel over the fuel filter to prevent pressurized fuel from spraying over the engine.**





9. Disconnect the engine compartment harness connectors, battery wires and transmission ground cable.

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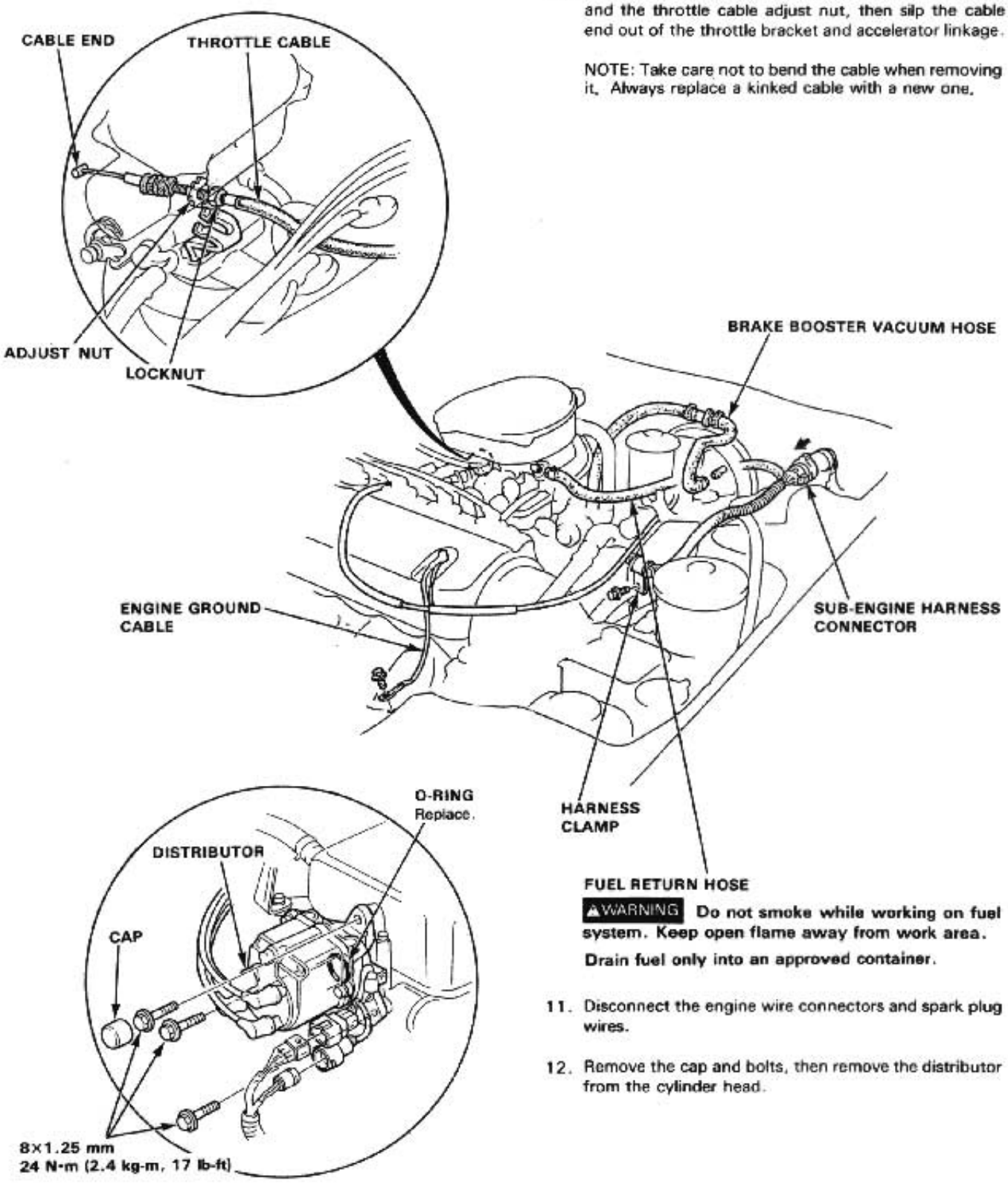
10. Remove the throttle cable by loosening the lock nut and the throttle cable adjust nut, then slip the cable end out of the throttle bracket and accelerator linkage.

NOTE: Take care not to bend the cable when removing it. Always replace a kinked cable with a new one.



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

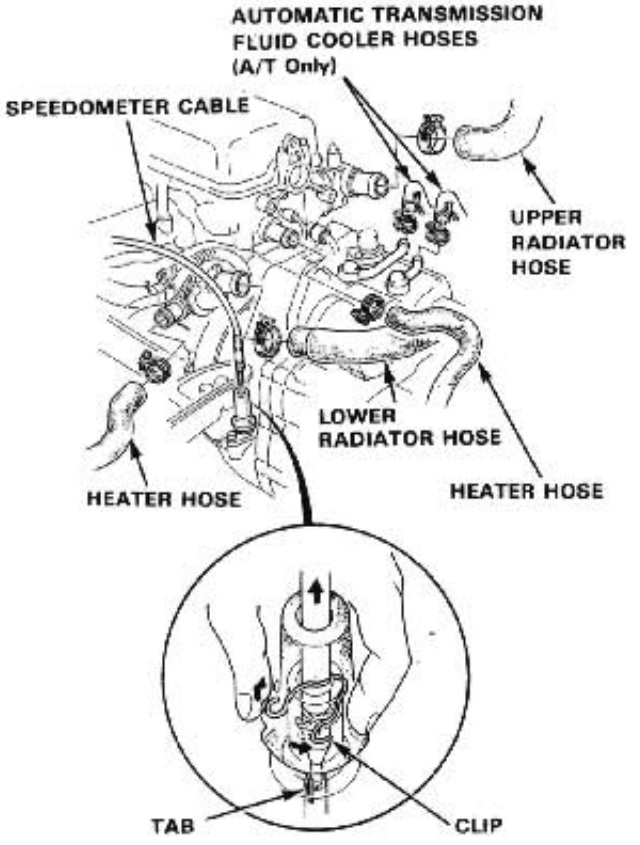
11. Disconnect the engine wire connectors and spark plug wires.

12. Remove the cap and bolts, then remove the distributor from the cylinder head.

13. Disconnect the radiator hoses and heater hoses.

14. Disconnect the transmission fluid cooler hoses.

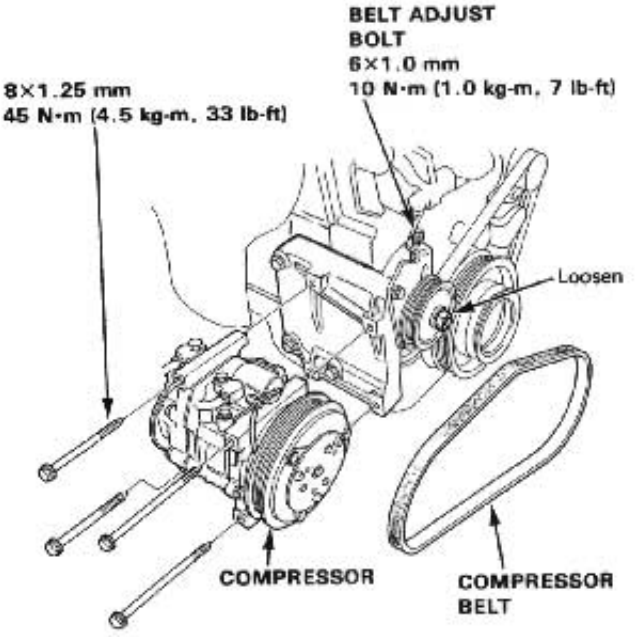
15. Remove the speedometer cable.



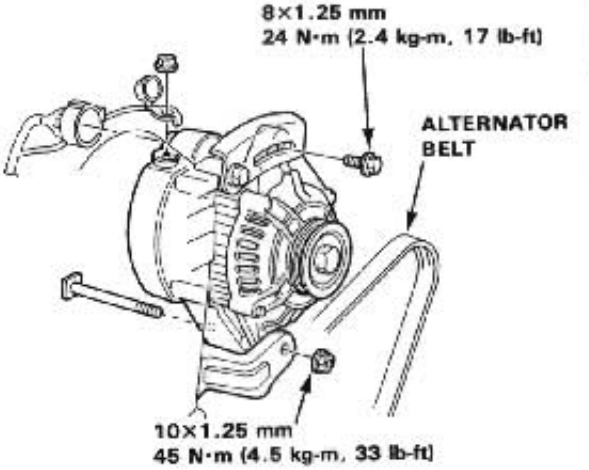
CAUTION: Do not remove the holder because the speedometer gear may fall into the transmission housing.

16. On Cars with A/C:
    - Loosen the belt adjust bolt and idle pulley nut.
    - Remove the compressor mount bolts, then lift the compressor out of the bracket with hoses attached, and wire it up to the front beam.

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



17. Remove the alternator:
    - Disconnect the alternator wire harness connectors.
    - Remove the adjust bolt and remove the belt.
    - Remove the belt alternator mount bolt and remove the alternator.



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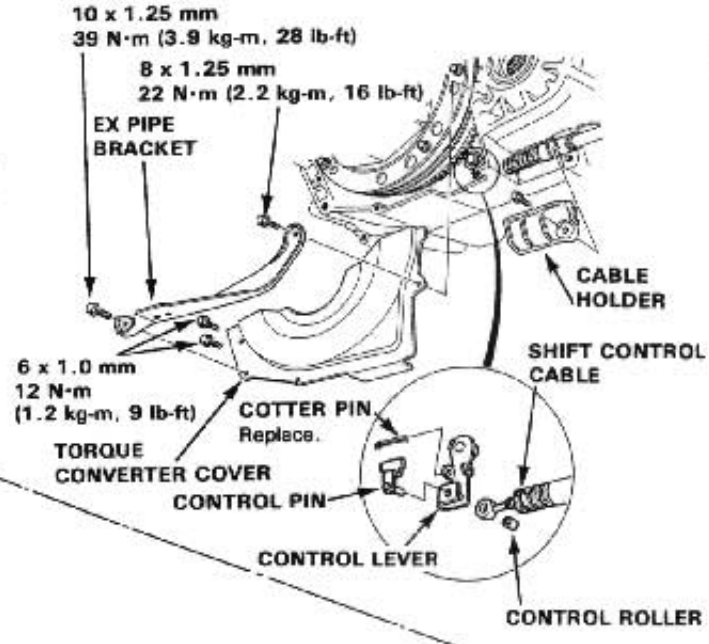
(On Automatic Cars:)

18. Remove the exhaust pipe A and bracket, torque converter cover and cable holder.

19. Remove the shift control cable by removing the cotter pin, control pin and control lever roller from the control lever.

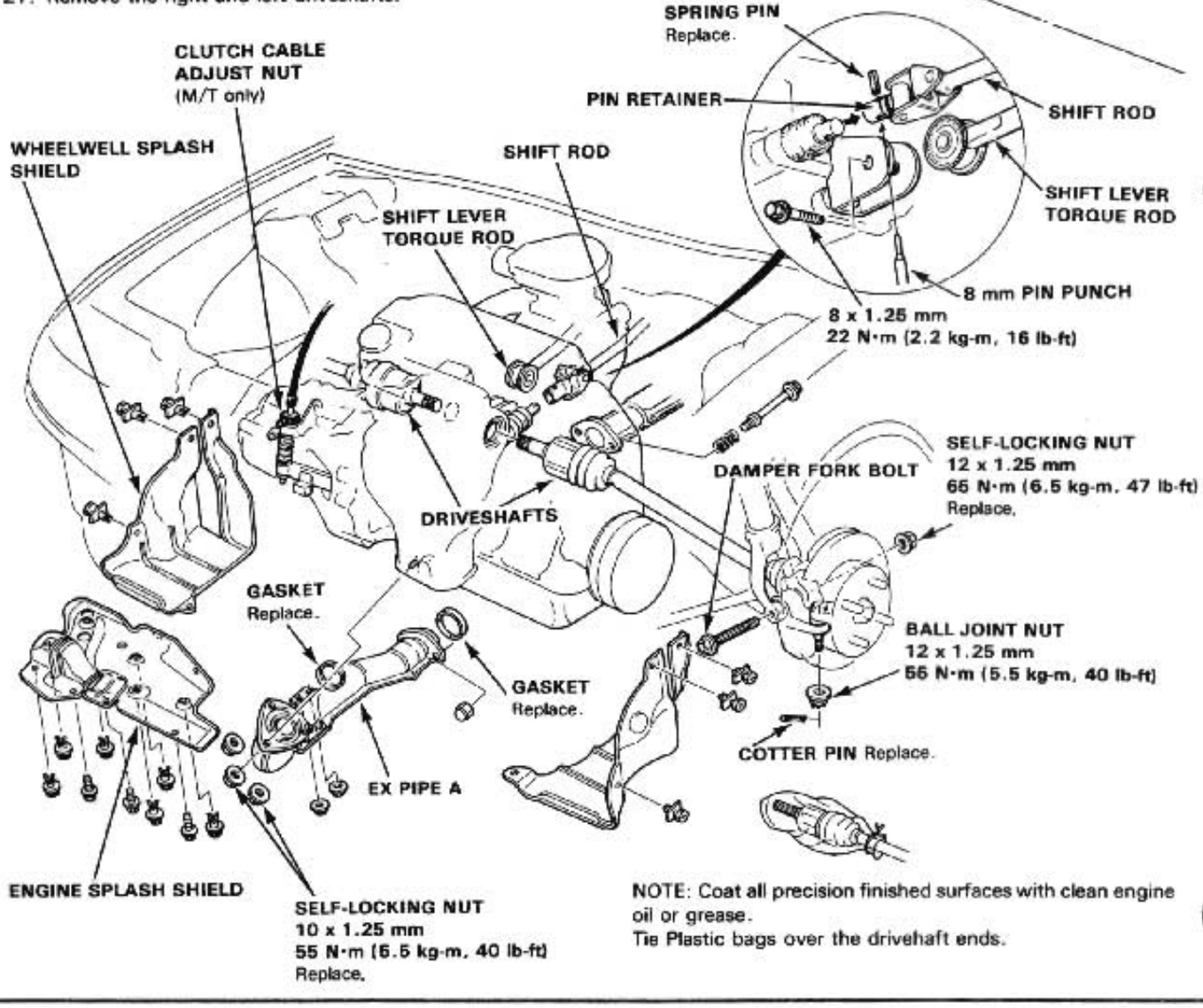
NOTE:
- Take care not to bend the cable when removing it. Always replace a kinked cable with a new one.
- On reassembly, check the cable adjustment (Section 16).



20. Remove the shift lever torque rod, shift rod and clutch cable (M/T).

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

21. Remove the right and left driveshafts.



NOTE: Coat all precision finished surfaces with clean engine oil or grease.
Tie Plastic bags over the driveshaft ends.

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

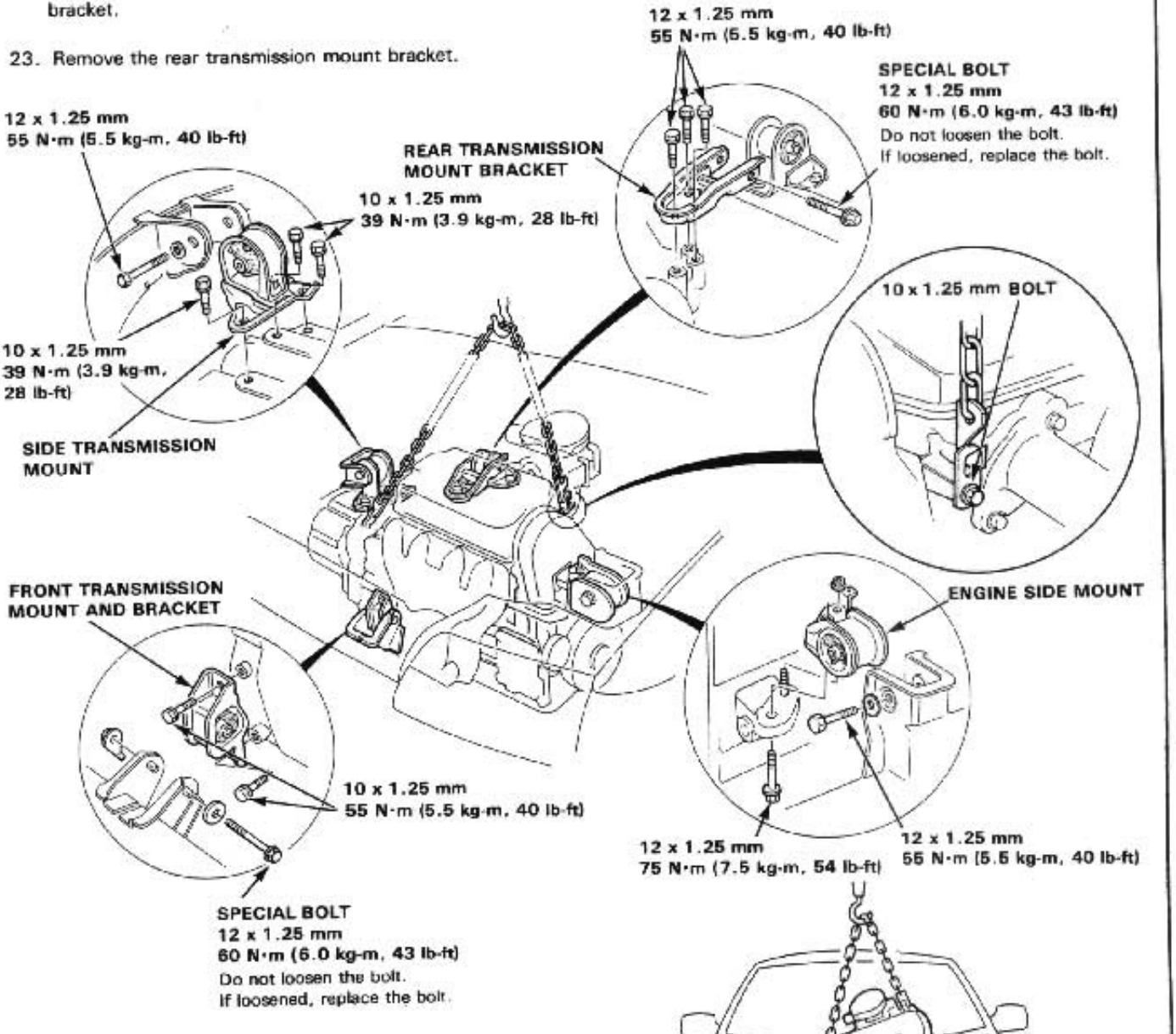
NOTE:
To attach rear engine chain, remove the plastic radiator hose bracket and hook chain to top of clutch cable bracket.

23. Remove the rear transmission mount bracket.

24. Remove the bolts from the front transmission mount.

25. Remove the bolts from the engine side mount.

26. Remove the bolts from the side transmission mount.



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

28. Slowly raise the engine approximately 6" and stop. Check once again that all wires and hoses have been disconnected from the engine/transaxle.

29. Raise the engine/transaxle all the way and remove it from the car.

(cont'd)

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

- Torque engine mount bolts in sequence shown.

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

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

CAUTION: Use new spring clips on installation.

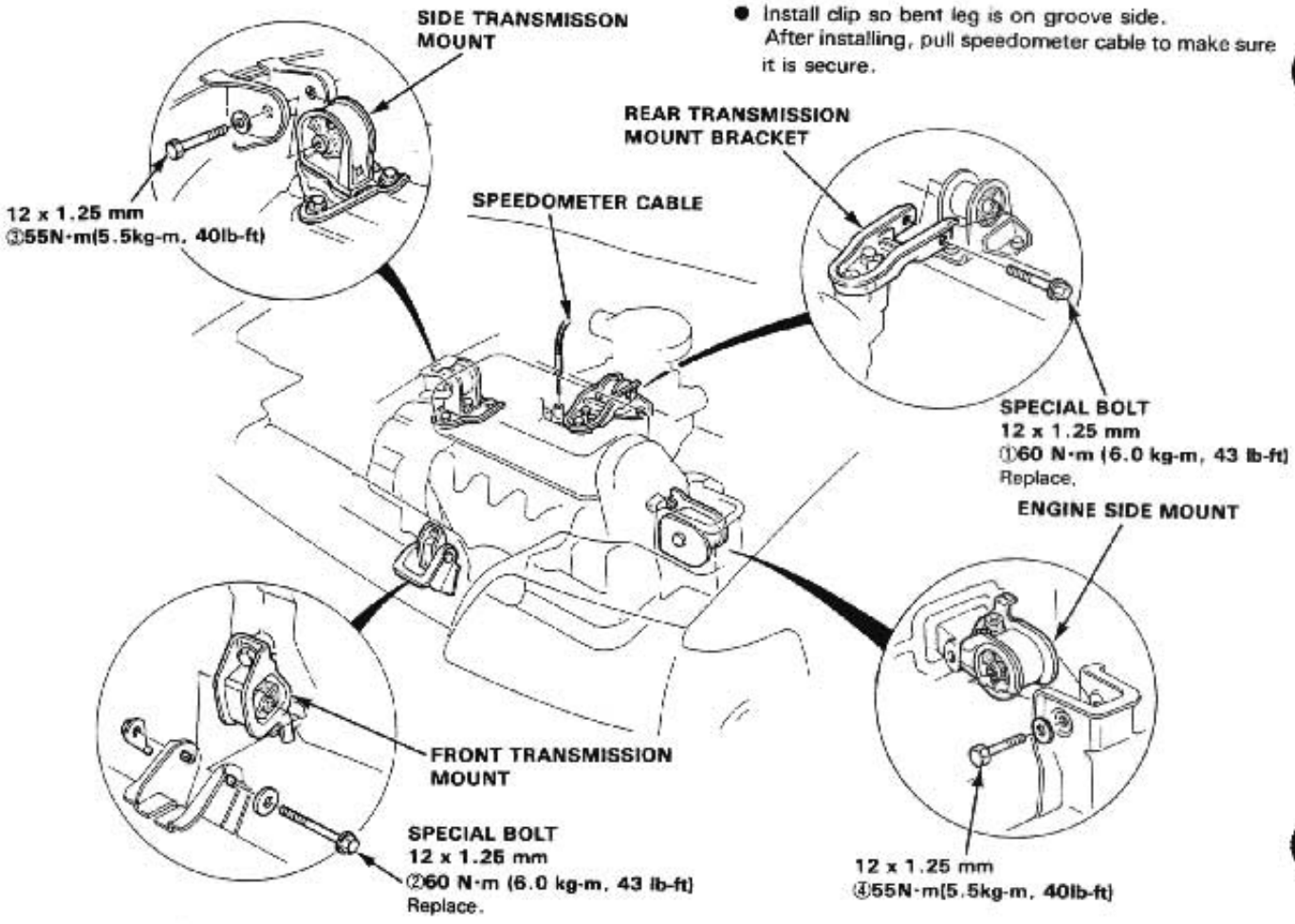
- Inspection for fuel leakage.
  - After assembing fuel line parts, turn on the ignition switch (do not operate the starter) so that the fuel pump is operated for approximately two seconds and the fuel is pressurized. Repeat this operation two or three times and check whether any fuel leakage has occurred at any point in the fuel line.
- Bleed air from the cooling system at the bleed bolt with the heater valve open.
- Adjust the throttle cable. (See Section 11).
- Adjust the alternator belt tension.
- Check the clutch pedal free play.
- Check that the transmission shifts into gear smoothly.
- Reinstall the A/C compressor and A/C wiring.
- Clean battery posts and cable terminals with sandpaper, assemble, then apply grease to prevent corrosion.
- Check the ignition timing. (See Section 23).
- Charge the system and test performance. (See Section 21).

ENGINE MOUNT TORQUE SEQUENCE

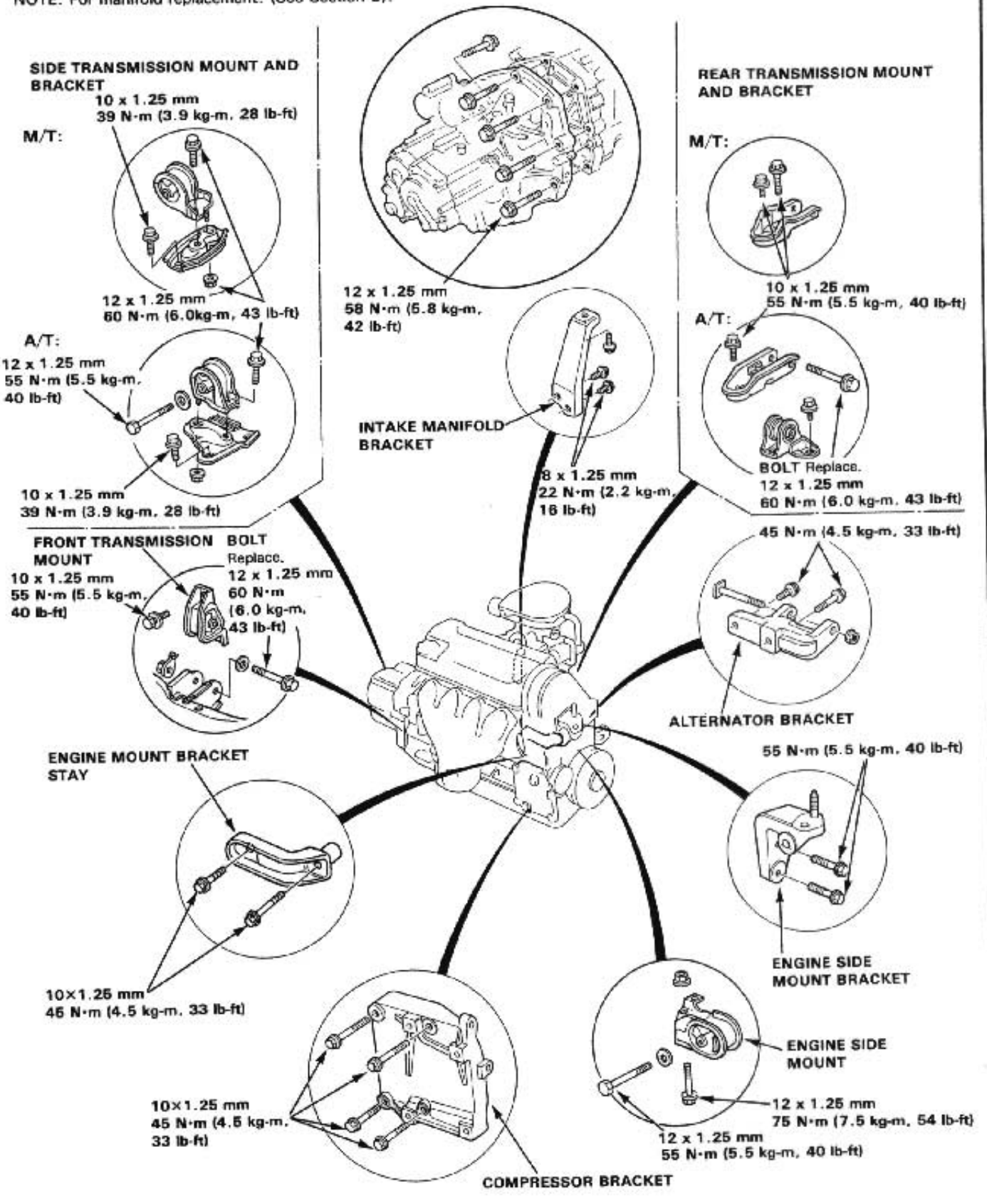
NOTE: Check the mount and bracket for damage.

Speedometer cable installation:

- Align tab on cable end with slot in holder (page5-5).
- Install clip so bent leg is on groove side. After installing, pull speedometer cable to make sure it is secure.



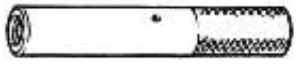
NOTE: For manifold replacement. (See Section 9).



Cylinder Head/Valve Train

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07HAD—PJ70200	Valve Guide Seal Installer	1	6-20
②	07HAH—PJ70100	Valve Guide Reamer, 5.5 mm	1	6-19
③	07742—0010100	Valve Guide Driver	1	6-19



①

②

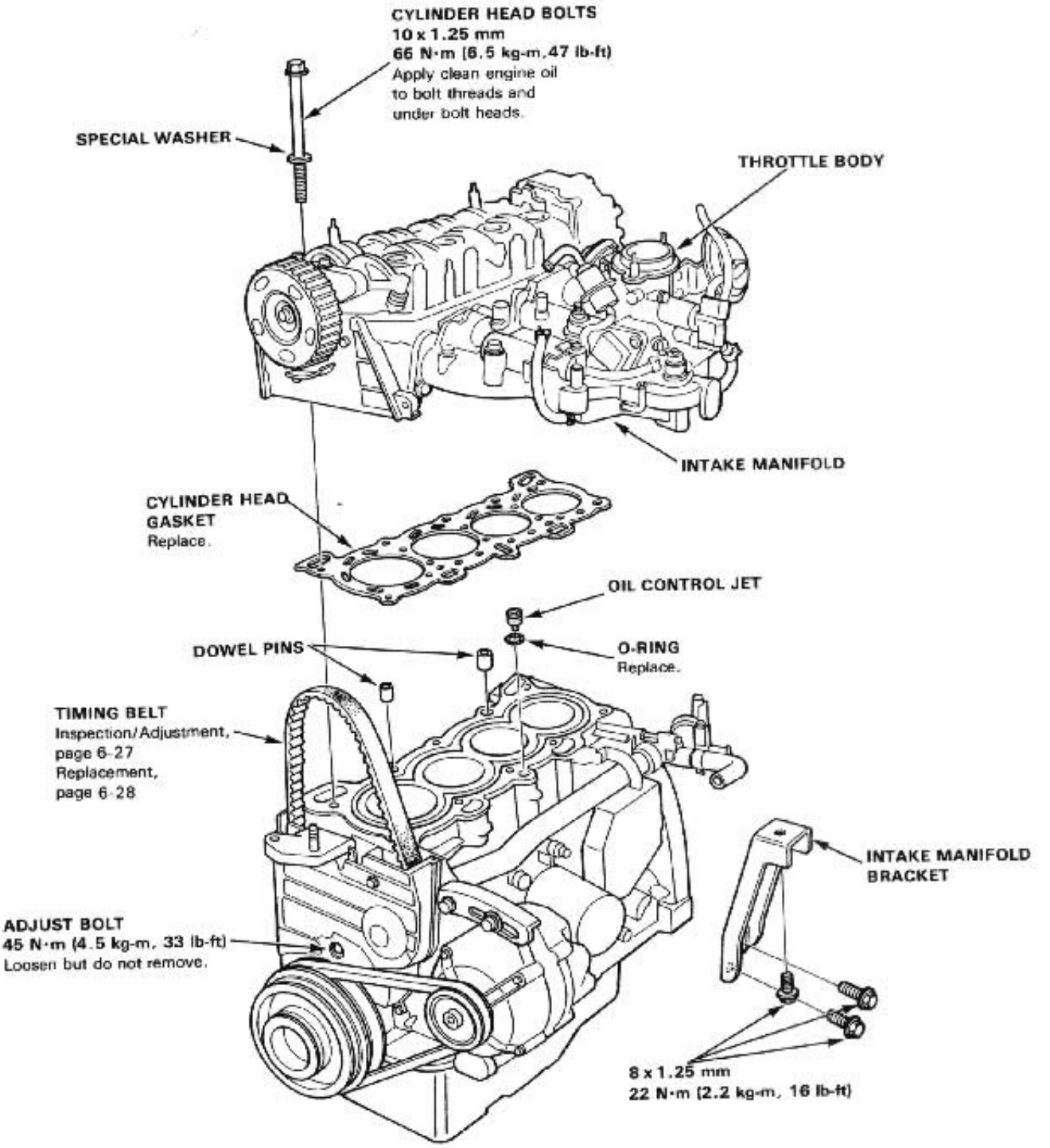
③

Cylinder Head/Valve Train

Illustrated Index

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

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



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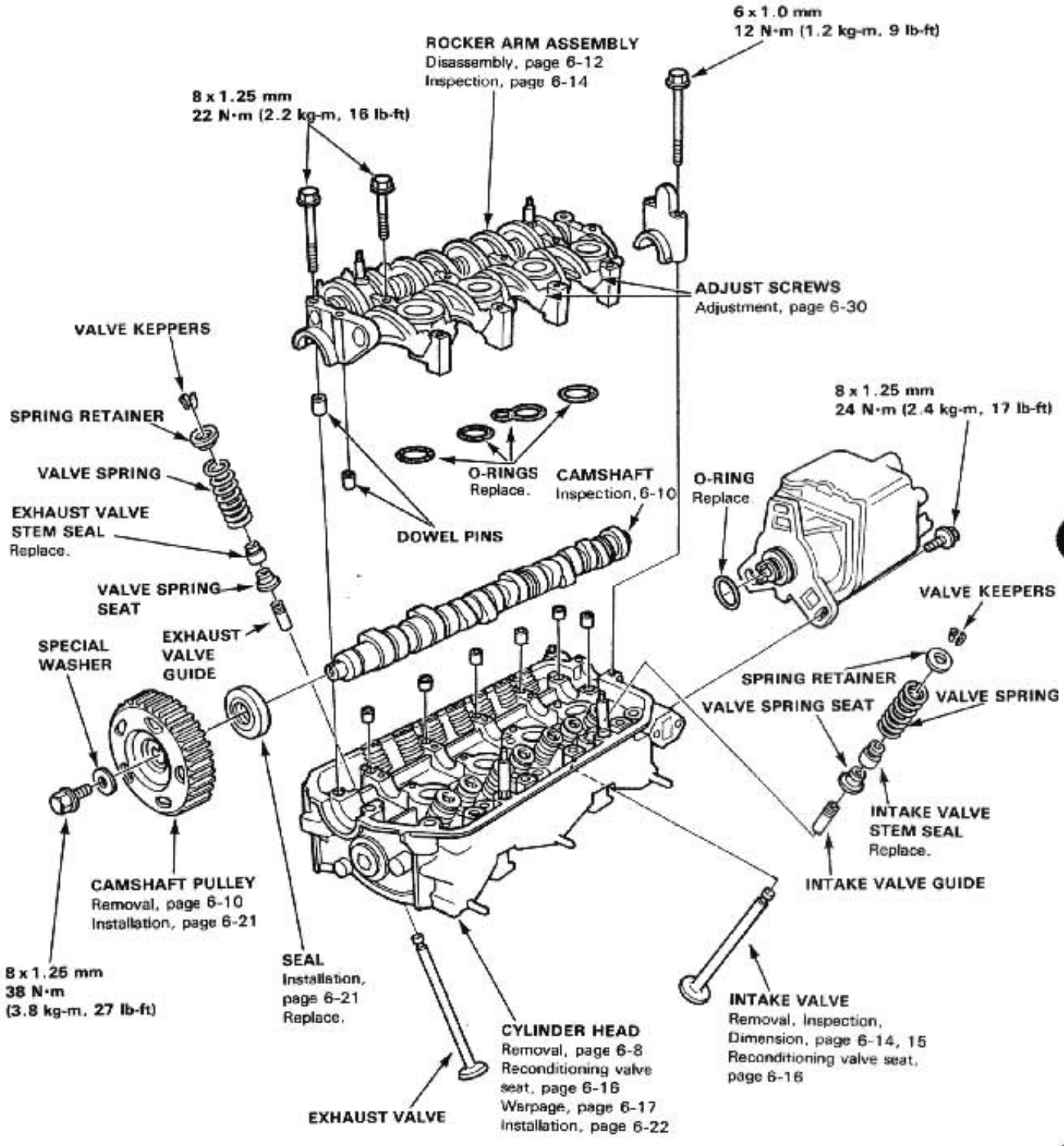
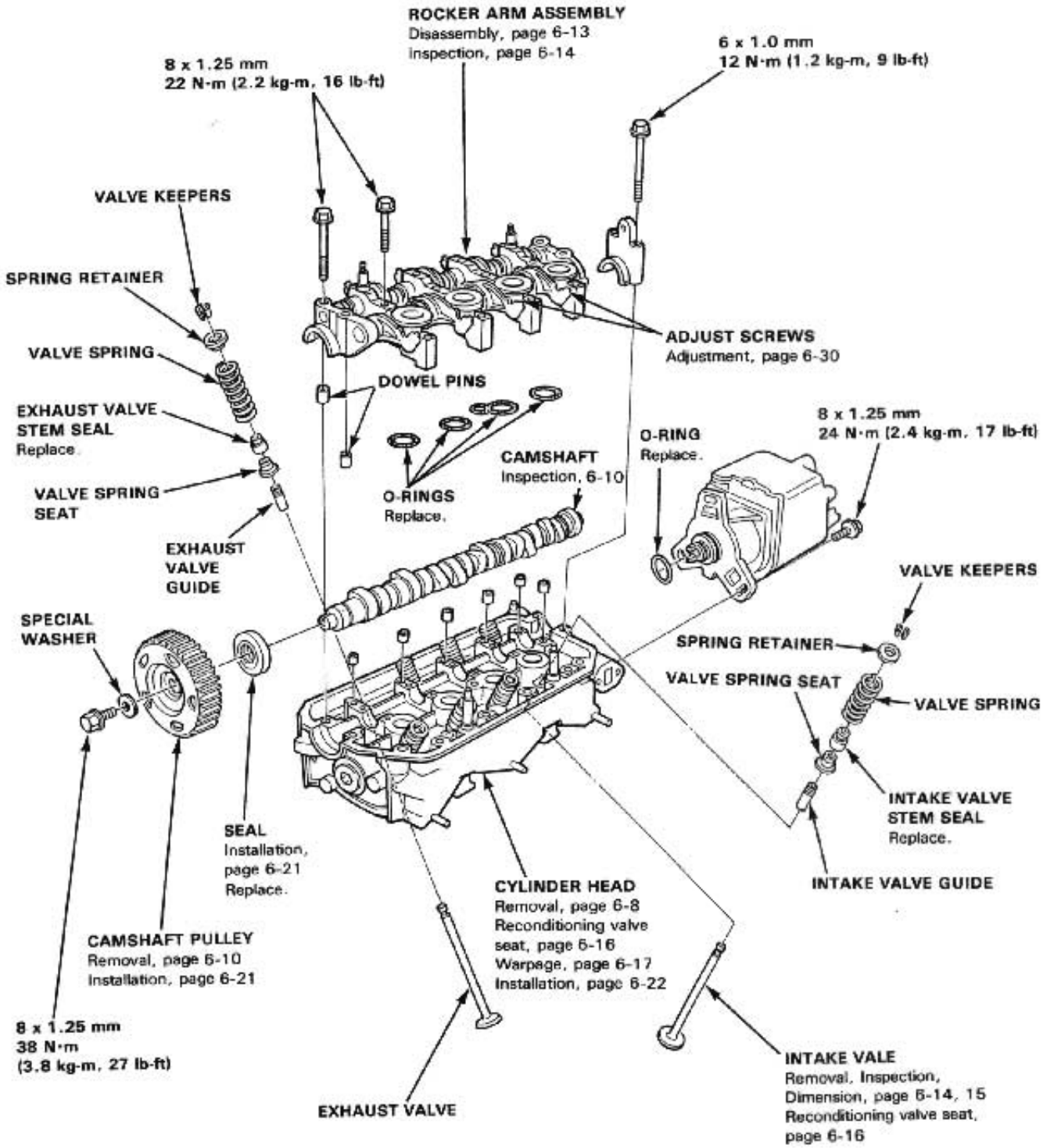
Illustrated Index (cont'd)

DX and Si:



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

HF:



Valve Seals

Replacement

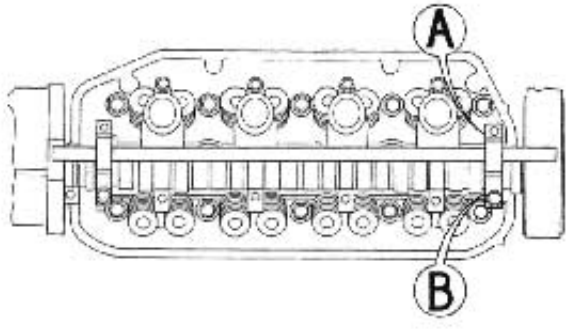
NOTE: Cylinder head removal is not required in this procedure.

The procedure is shown below when using the in-car valve spring compressor.

⚠WARNING When using this tool, as with any tool, always use approved eye protection. Properly using the right tool for each job helps increase production while safeguarding tools, equipment and the user.

1. Turn the crankshaft so that the No. 1 and the No. 4 pistons are in the TDC.
2. Remove the valve cover and the rocker arm assembly.

   NOTE: When removing or installing the rocker arm assembly, do not remove the cam holder bolts. The bolts will keep the holders, springs and rocker arms on the shaft.
3. Remove the fuel injectors and the wire harness.
4. Using the 8 mm bolts supplied with the tool, mount the two uprights to the cylinder head at the end of the cam holder location. The uprights fit over the camshaft as shown.
5. Insert the cross shaft through top hole location of the two uprights.

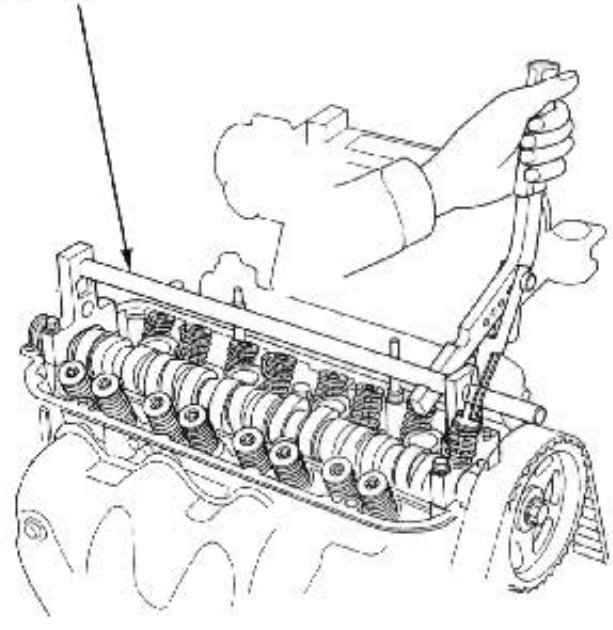


Intake Valve:

6. Select the 7/8 in. diameter long compressor attachment and fasten the attachment to the No. 4 hole of the lever arm with the speed pin supplied.
7. Position the piston at TDC and insert an air adaptor into the spark plug hole. Pump air into the cylinder to keep the valve closed while compressing springs and removal of the valve keepers.
8. Position the lever arm under the cross shaft so the lever is perpendicular to the shaft and the compressor attachment rests on top of the retainer for the spring being compressed. Use the front position slot on the lever as shown.

   CAUTION: Use caution when removing or installing the valve keepers to prevent the keepers from falling into the oil gallerys. A shop rag can easily be placed over these passages.

IN-CAR SPRING COMPRESSOR
YA-8845



9. Using a downward motion on the lever arm, compress the valve spring and remove the keepers from the valve stem. Slowly release pressure and the spring.

10. Replace the valve seals at each cylinder (page 6-14).

11. Install the valve seals (page 6-20).

12. Install the springs, the retainers and the keepers in reverse order of removal.

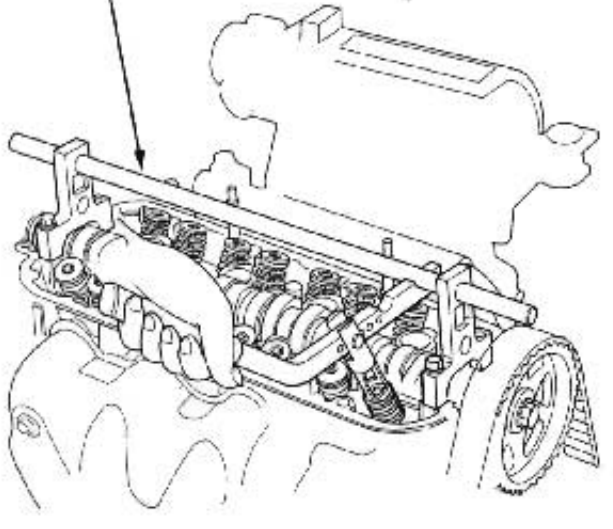
Exhaust Valve:

13. Select the 7/8 in. diameter short compressor attachment and fasten the attachment to the No. 4 hole of the lever arm with the speed pin supplied.

14. Position the lever arm under the cross shaft so the lever is perpendicular to the shaft and the compressor attachment rests on top of the retainer for the spring being compressed. Use the front position slot on the lever as shown.

CAUTION: Use caution when removing or installing the valve keepers to prevent the keepers from falling into the oil passages. A shop rag can easily be placed over these passages.

IN-CAR SPRING COMPRESSOR YA-8845



15. Using a downward motion on the lever arm, compress the valve spring and remove the keepers from the valve stem. Slowly release pressure and the spring.

16. Replace the valve seals at each cylinder (page 6-14).

17. Install the valve seals (page 6-20).

18. Install the springs, the retainers and the keepers in reverse order of removal.

19. Repeat steps 6 to 18.

Cylinder Head

Removal (engine removal not required)

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

NOTE:
- Inspect the timing belt before removing the cylinder head.
- Turn the crankshaft pulley so that the No.1 cylinder is at top-dead-center (page 6-26).
- Mark all emissions hoses before disconnecting them.

1. Disconnect the negative terminal from the battery.
2. Drain the cooling system (See Section 10).
3. Remove the brake booster vacuum hose from the brake booster.
4. Remove the engine secondary ground cable from the valve cover.
5. Remove the air intake pipe and the air chamber.
6. Relieve fuel pressure (See Section 11).

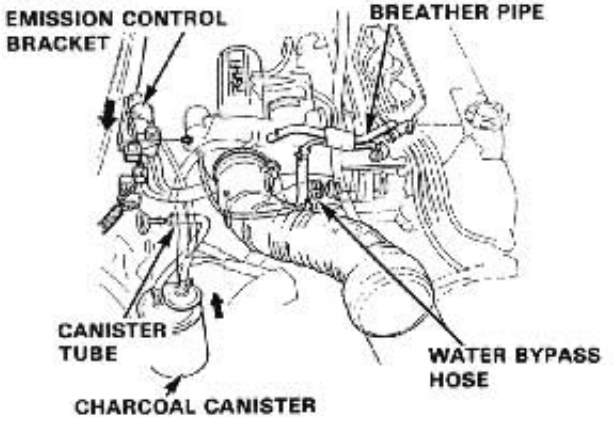
⚠WARNING Do not smoke while working on fuel system, keep open flame or spark away from work area. Drain fuel only into an approved container.

7. Disconnect the fuel hose and fuel return hose.
8. Remove the air intake pipe and air cleaner pipe joint.
9. Disconnect the throttle cable at the throttle body (See Section 5).
10. Disconnect the throttle control cable at the throttle body (A/T only).

NOTE: Take care not to bend the cable when removing it. Always replace a kinked cable with a new one.

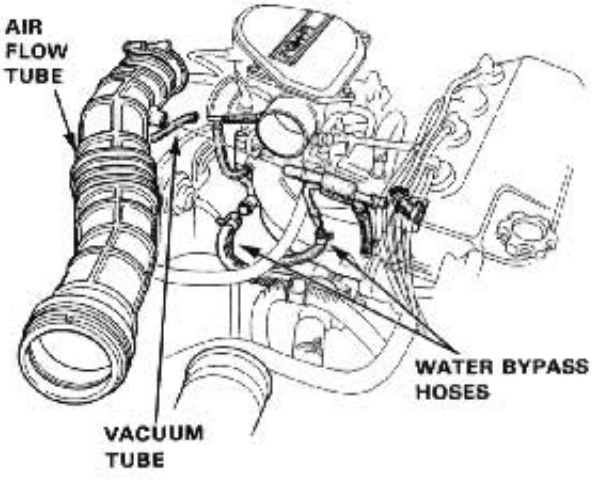
11. Disconnect the charcoal canister hose at the throttle valve.
12. Disconnect the engine wire connectors from the cylinder head and the intake manifold.
    - 14 P connector (from main wire harness)
    - EACV connector
    - Intake air temperature sensor connector
    - Throttle angle sensor connector
    - Injector connectors
    - Ignition coil connector (from distributor)
    - TDC/CRANK sensor connector (from distributor)
    - Coolant temperature gauge sender connector
    - Coolant temperature sensor connector
    - Oxgen sensor connector.

Si and HF:

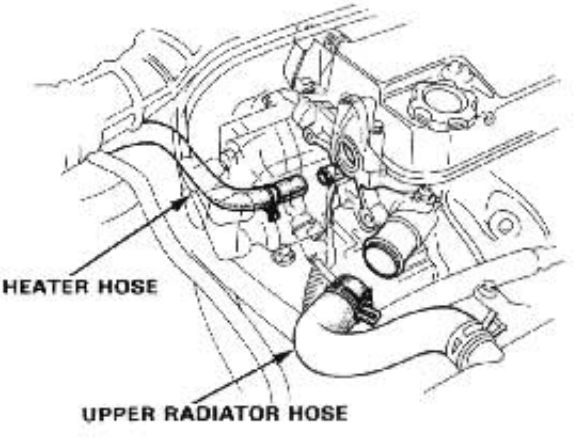


13. Disconnect the vacuum hoses and the water bypass hoses from intake manifold and the throttle body.

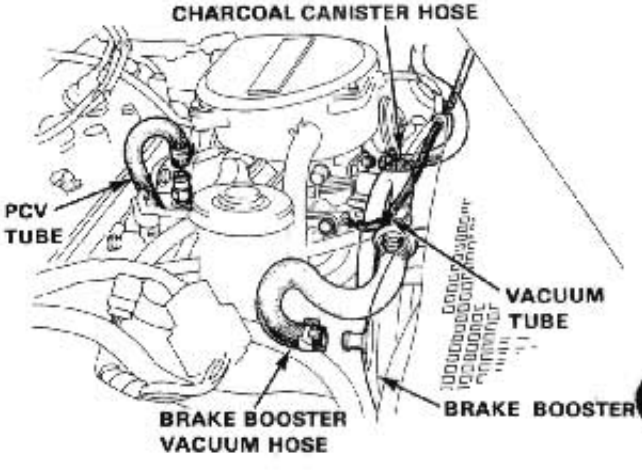
DX:

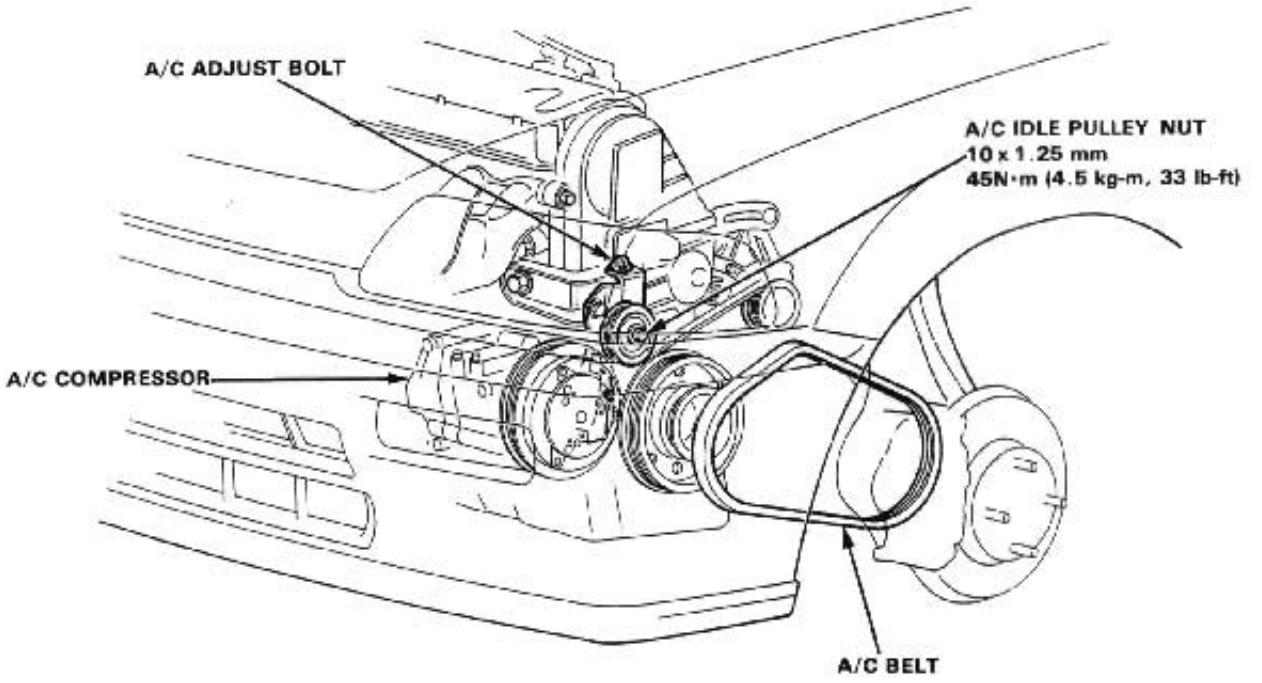


14. Remove the upper radiator hose and the heater hose from the cylinder head.

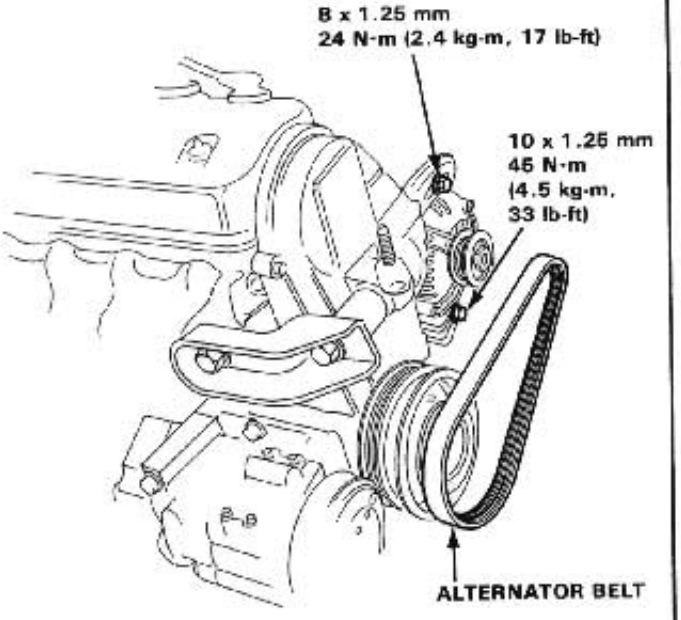


15. Remove the PCV hose, charcoal canister hose and vacuum hose from intake manifold, and remove the vacuum hose from the brake master power booster.



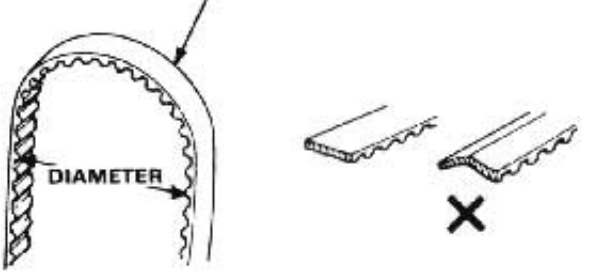


16. Loosen the air conditioning (A/C) idle pulley and remove the A/C belt.
17. Remove the alternator belt.



18. Remove the intake manifold bracket (page 6-3).
19. Remove the exhaust manifold bracket, then remove the exhaust pipe A (Section 5).
20. Remove the exhaust manifold shroud, then remove the exhaust manifold.
21. Remove the distributor and valve cover.
22. Remove the timing belt upper cover.
23. Loosen the timing belt adjust bolt, then remove the timing belt from the camshaft pulley.

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



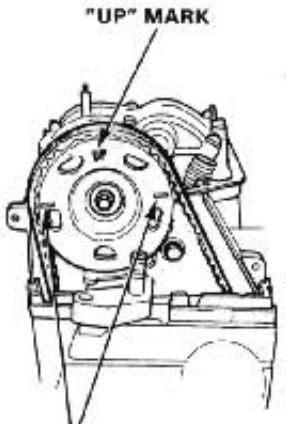
24. Remove the cylinder head.
25. Remove the intake manifold from the cylinder head.

Camshaft Pulley

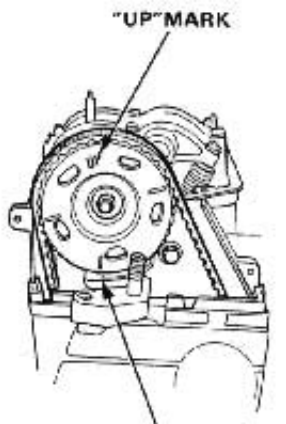
Removal

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

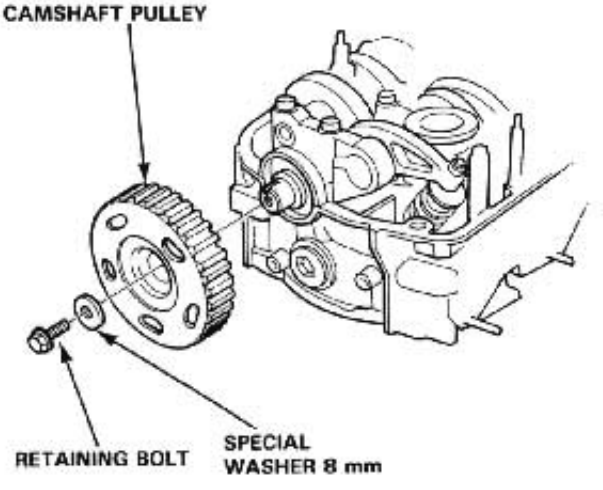
DX and HF:



Si:



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



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

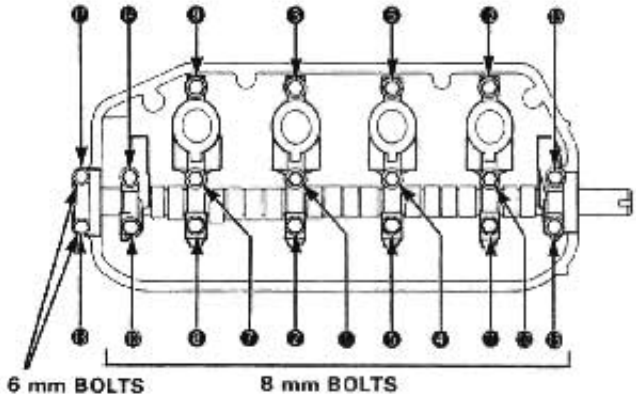
Camshaft

Inspection

NOTE:
- Do not rotate the camshaft during inspection.
- Remove the rocker arms and rocker shafts.

1. Put the camshaft and the cam holders on the cylinder head, then tighten the bolts to the specified torque.

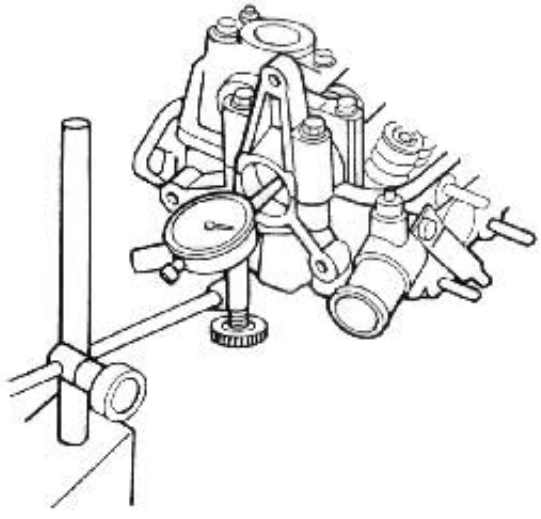
Specified torque:
8 mm bolts: 22 N·m (2.2 kg-m, 16 lb-ft)
6 mm bolts: 12 N·m (1.2 kg-m, 9 lb-ft)



2. Seat the camshaft by pushing it toward distributor end of cylinder head.

3. Zero the dial indicator against end of distributor drive, then push the camshaft back and forth, and read the 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.)



4. Remove the bolts, then remove the cam holders from the cylinder head.

   — Lift the camshaft out of the cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.

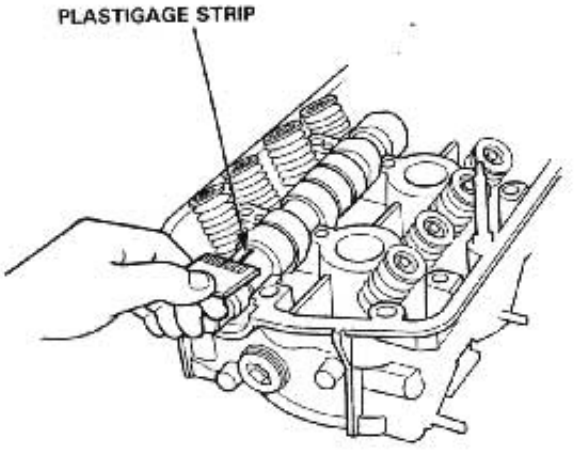
   — Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.

   — Insert plastigage strip across each journal.

5. Put the camshaft on the cylinder head, install the cam holders, then tighten the bolts to the specified torque.

6. Measure the widest portion of plastigage on each journal.

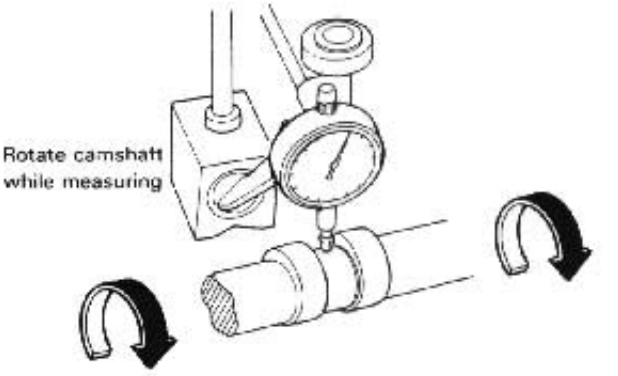
   Camshaft Bearing Radial Clearance:
   Standard (New): 0.050—0.089 mm (0.002—0.004 in.)
   Service Limit: 0.15 mm (0.006 in.)



7. 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 the total runout with the camshaft supported on V-blocks.

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



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

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

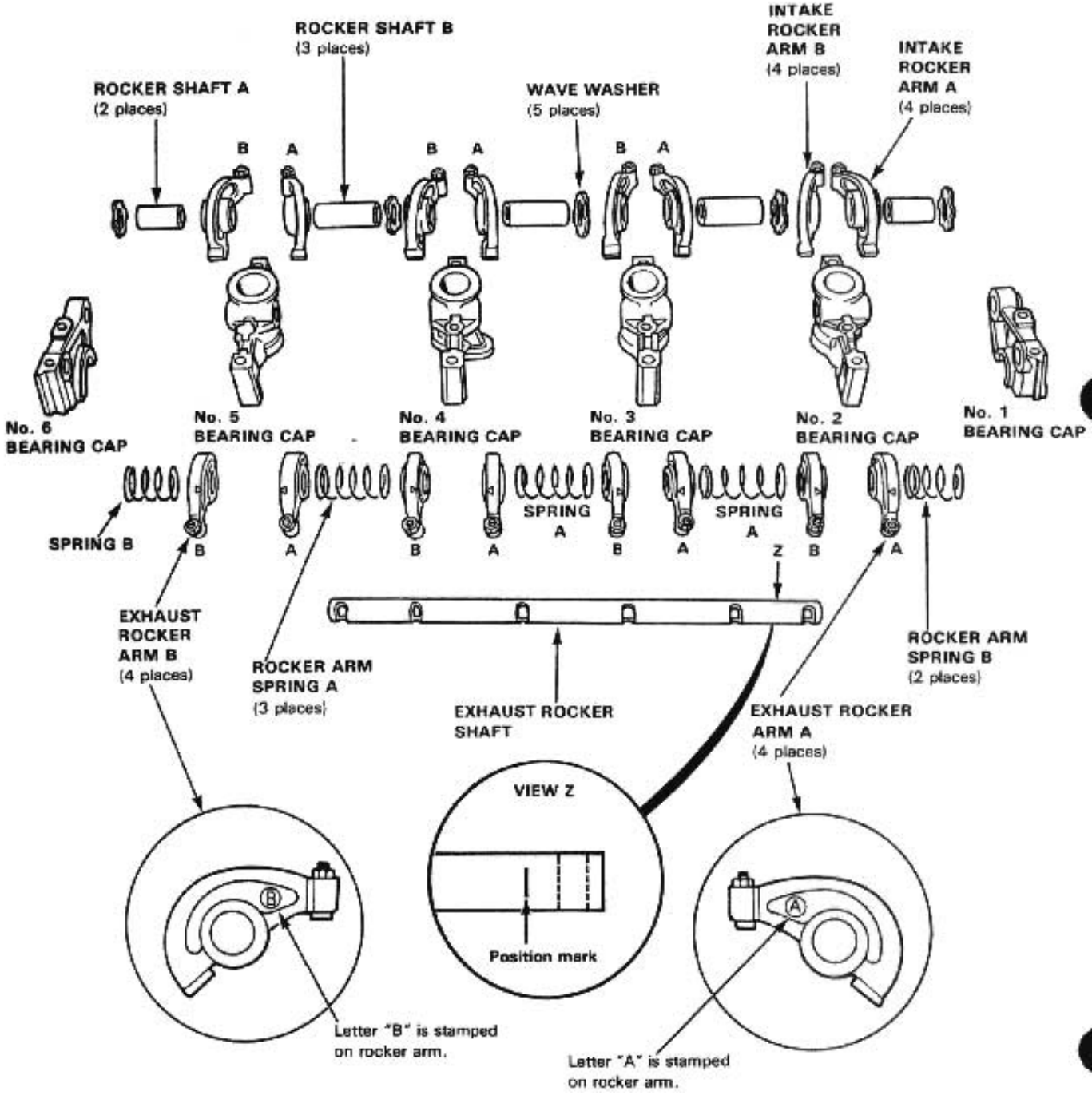
Rocker Arms

Overhaul

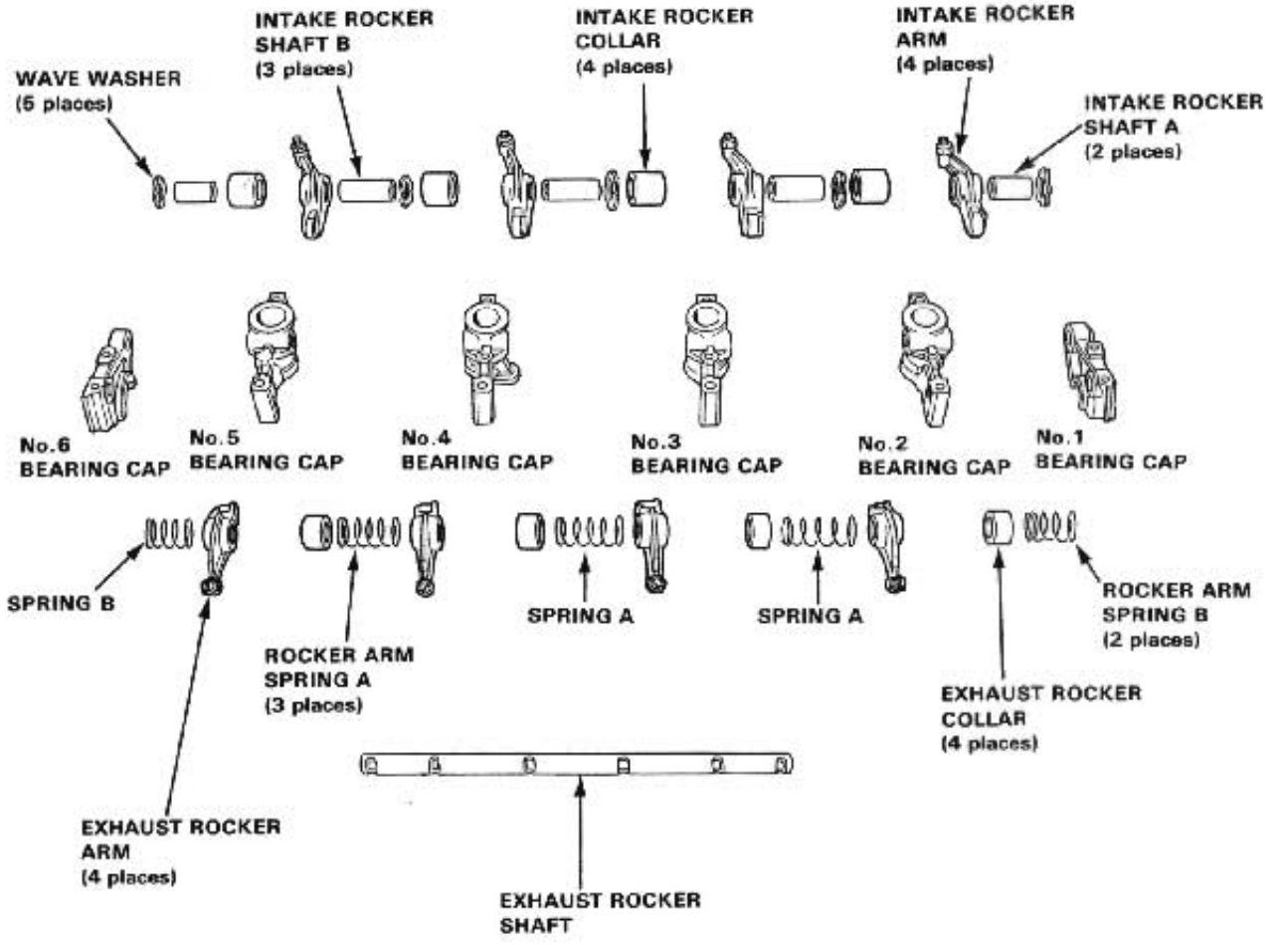
NOTE:

- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (page 6-14).
- Rocker arms must be installed in the same position if reused.
- When removing or installing rocker arm assembly, do not remove bearing cap bolts. The bolts will keep the holders, springs and rocker arms on the shaft.
- Install a exhaust rocker shaft with its oil holes downwards.

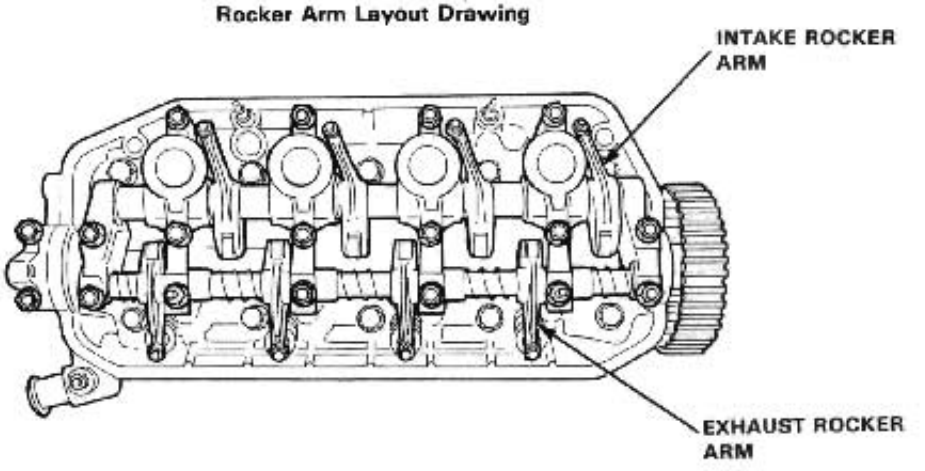
DX and Si:



HF:



Rocker Arm Layout Drawing

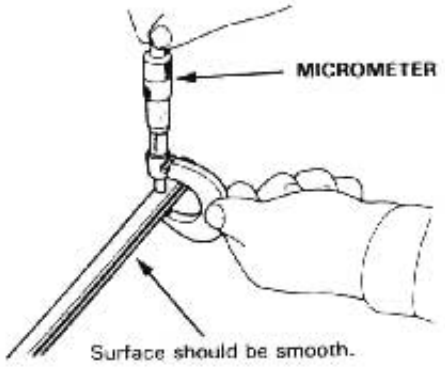


Rocker Arms

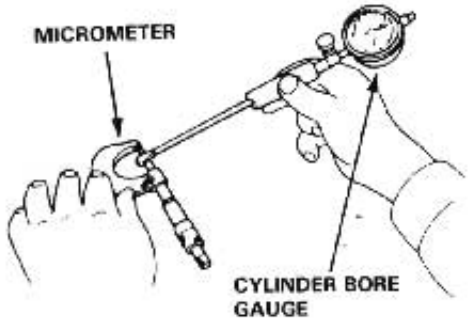
Clearance

Measure both the intake rocker shaft and exhaust rocker shaft.

1. Measure 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.)

Inspect rocker arm face for wear.

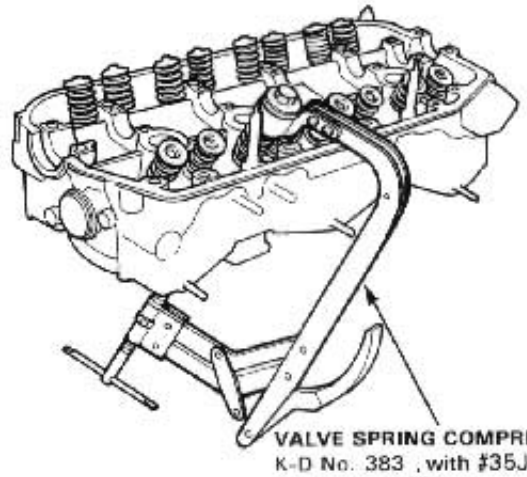
Repeat for all rockers. If over limit, replace rocker shaft and all over-tolerance rocker arms.

Valves and Valve Seals

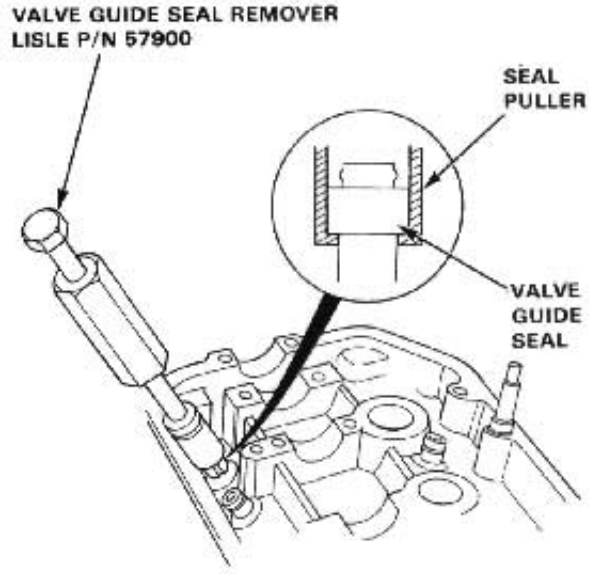
Replacement

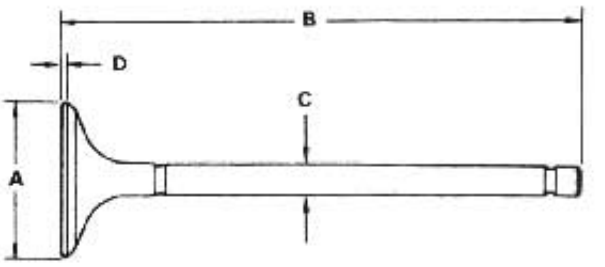
NOTE: Identify valves and valve springs as they are removed so that each item can be reinstalled in its original position.

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.



3. Install the special Tool as shown.
4. Remove the valve guide seal.





Intake Valve Dimensions

A Standard (New): 28.9—29.1 mm (1.138—1.146 in.)
B Standard (New): 114.82—115.12 mm (4.521—4.532 in.)
C Standard (New): 5.48—5.49 mm (0.2157—0.2161 in.)
C Service Limit: 5.45 mm (0.215 in.)
D Standard (New): 0.85—1.15 mm (0.033—0.045 in.)
D Service Limit: 0.65 mm (0.026 in.)

Exhaust Valve Dimensions

A Standard (New): 24.9—25.1 mm (0.980—0.988 in.)
B Standard (New): 118.60—118.90 mm (4.669—4.681 in.)
C Standard (New): 5.45—5.46 mm (0.2146—0.2150 in.)
C Service Limit: 5.42 mm (0.213 in.)
D Standard (New): 1.05—1.35 mm (0.041—0.053 in.)
D Service Limit: 0.95 mm (0.037 in.)

Valve Seats

Reconditioning

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

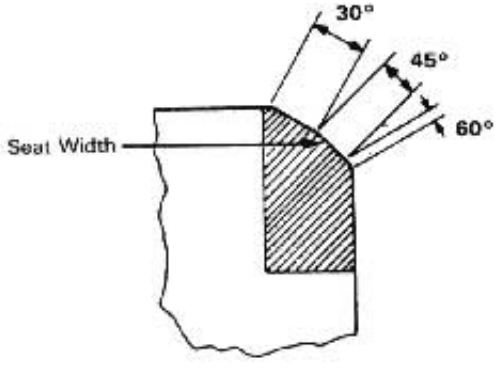
   NOTE: If guides are worn, replace them(page 6-17) before cutting valve seats.

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

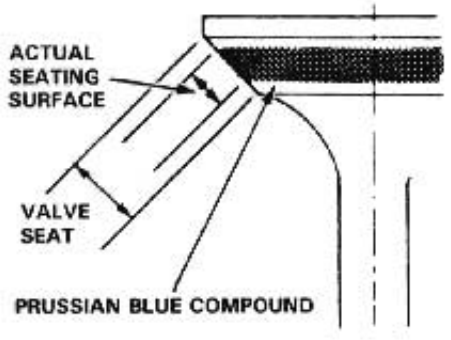
3. Bevel the upper edge of seat with the 30° cutter and the lower edge of seat with the 60° cutter. Check width of seat and adjust accordingly.

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

   Valve Seat Width:
   Standard:
   Intake : 0.85—1.15 mm (0.033—0.045 in.)
   Exhaust: 1.25—1.55 mm (0.049—0.061 in.)
   Service Limit:
   Intake : 1.6 mm (0.06 in.)
   Exhaust: 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° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
   - If it is too low (closer to valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

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

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

   Intake Valve Stem Installed Height:
   Standard (New): 46.985—47.455 mm (1.8498—1.8680 in.)
   Service Limit: 47.705mm (1.8863 in.)
   Exhaust Valve Stem Installed Height:
   Standard (New): 48.965—49.435 mm (1.9278—1.9463 in.)
   Service Limit: 49.685mm (1.9561 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.

Valves

Valve Movement

1. Measure the valve movement with a dial indicator, while rocking the stem in the direction of normal thrust (Wobble Method).

Intake Valve Movement
Standard (New): 0.04–0.10 mm (0.0016–0.004 in.)
Service Limit: 0.16 mm (0.006 in.)
Exhaust Valve Movement.
Standard (New): 0.10–0.16 mm (0.004–0.006 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): 0.05–0.08 mm (0.002–0.003 in.)
Service Limit: 0.12 mm (0.005 in.)

Cylinder Head

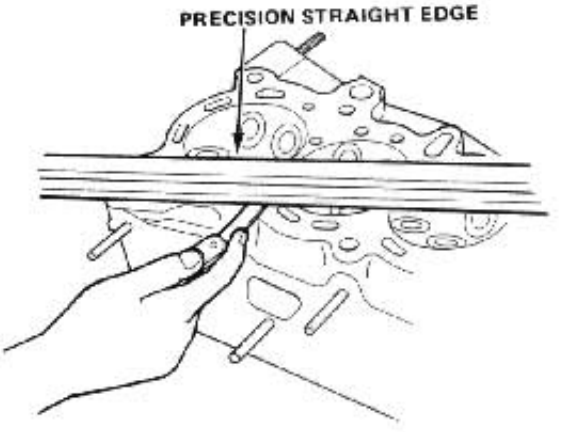
Warpage

NOTE: If camshaft bearing clearances are not within specification, the head cannot be resurfaced (page 6-10).

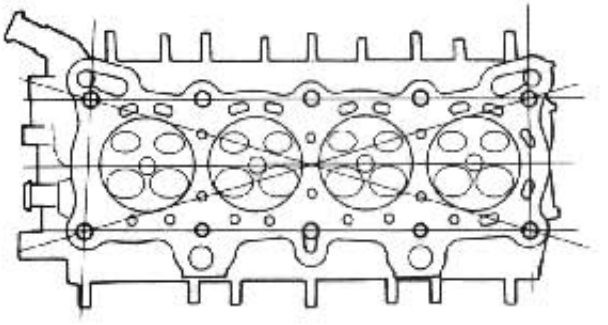
- **Check cam bearing clearances before resurfacing a head.**

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 new cylinder head height of 95 mm (3.74 in.).



Measure along edges, and 3 ways across center.

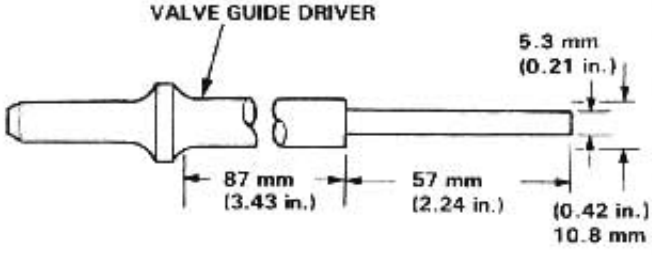


Cylinder Head Height:
Standard (New): 94.95–95.05 mm (3.7382–3.7421 in.)
Service Limit: 94.8 mm (3.73 in.)

Valve Guides

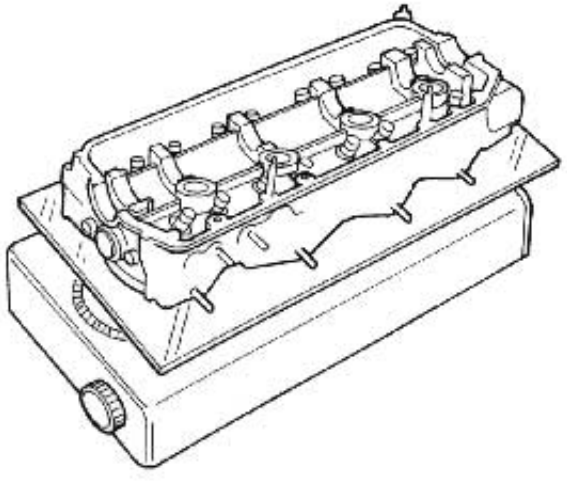
Replacement

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 a special tool and a conventional hammer. See tool number 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.

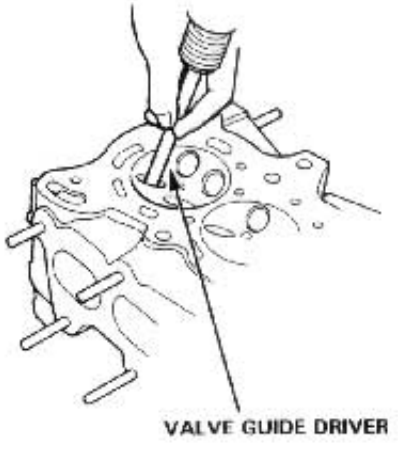
3. Use a hot plate or oven to evenly heat the cylinder head to 150°C (300°F). Check temperature with a cooking thermometer.



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 an air hammer.**
- **Hold an air hammer directly in line with the valve guide to prevent damaging the driver.**



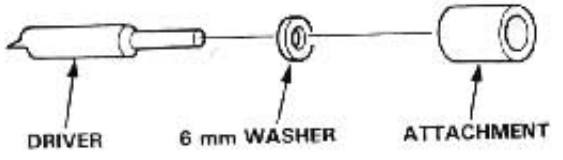
5. Turn the head over and drive out the guide toward the camshaft side of head.

   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.

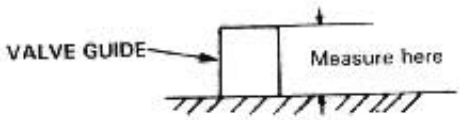
6. Remove the new guide(s) from the refrigerator, one at a time, as you need them.

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. 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 sixteen guides (Std and Si) or eight guides (HF) to do, you may have to reheat the head one or two more times.

Installed Guide Height
Intake: 16.2 mm (0.64 in.)
Exhaust: 16.2 mm (0.64 in.)



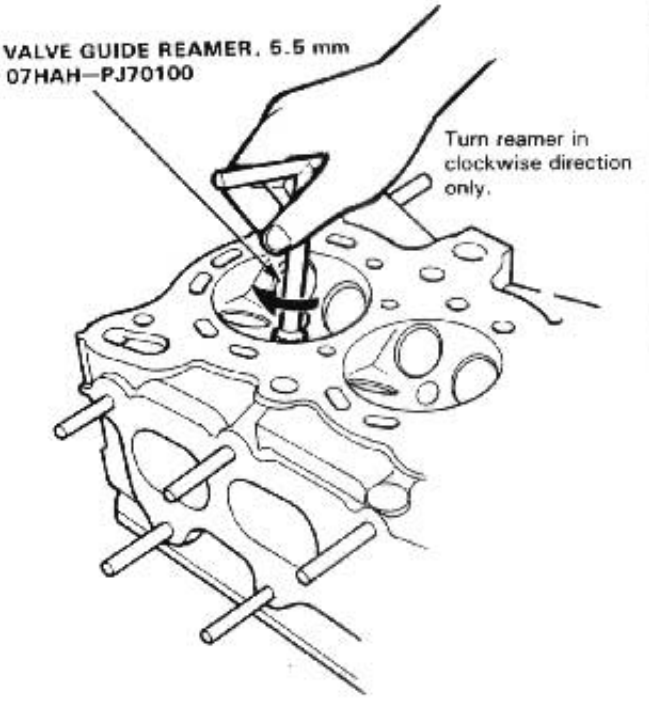
NOTE: Valve guide replacement can be performed with the special tool below.

Removal and Installation
VALVE GUIDE DRIVER
07742—0010100

Reaming

NOTE: For new valve guides only.

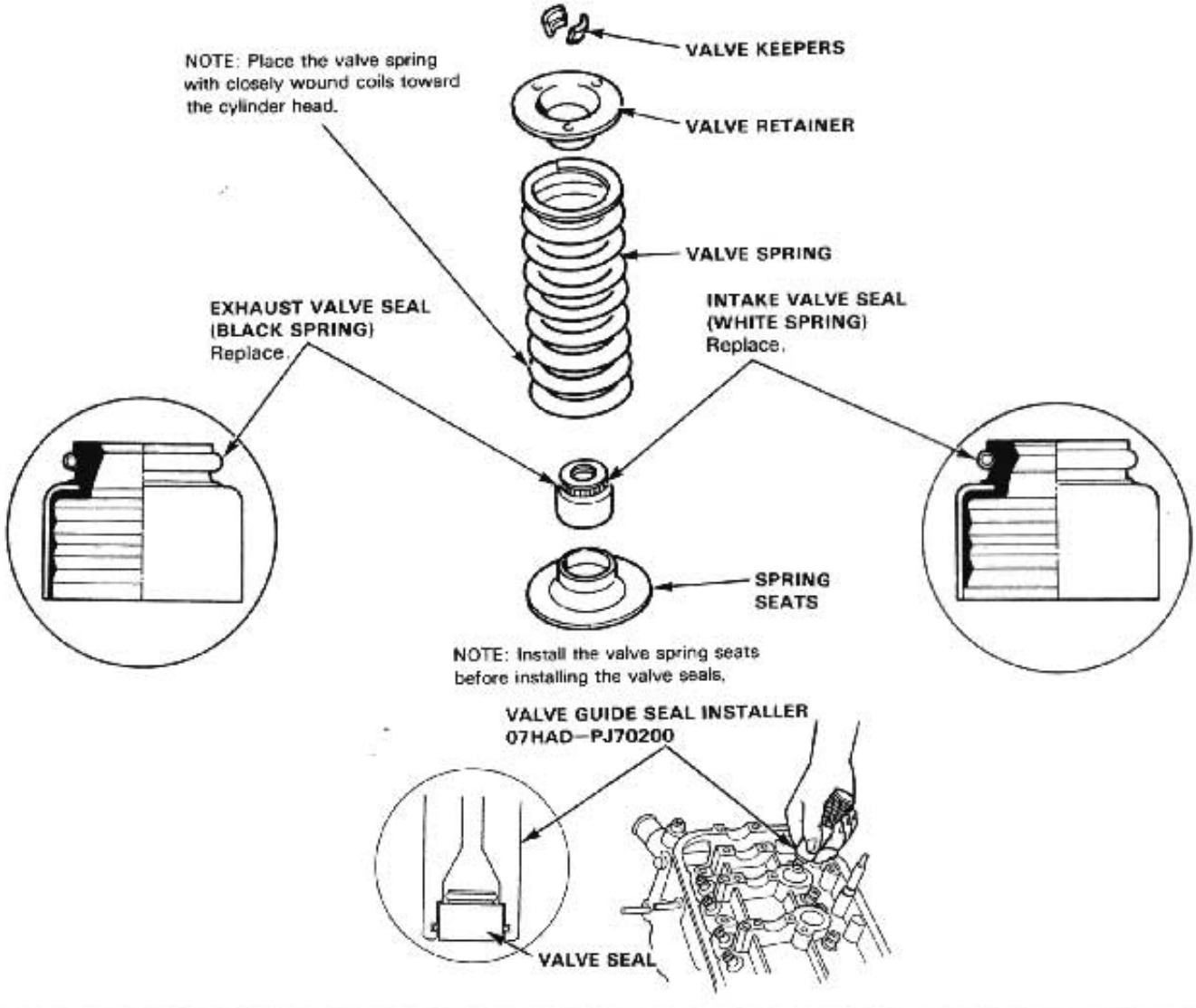
1. Coat reamer and valve guide with cutting oil.
2. Rotate reamer clockwise the full length of the valve guide bore.



3. Continue to rotate reamer clockwise while removing.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check clearance with valve (page 6-17).

Valve Spring and Valve Seal Installation Sequence

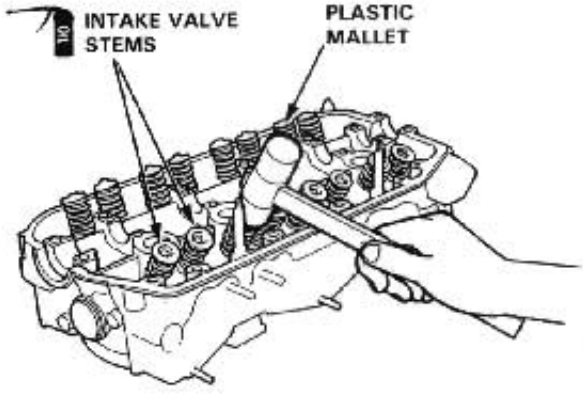
NOTE: Exhaust and intake valve seals are NOT interchangeable.



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

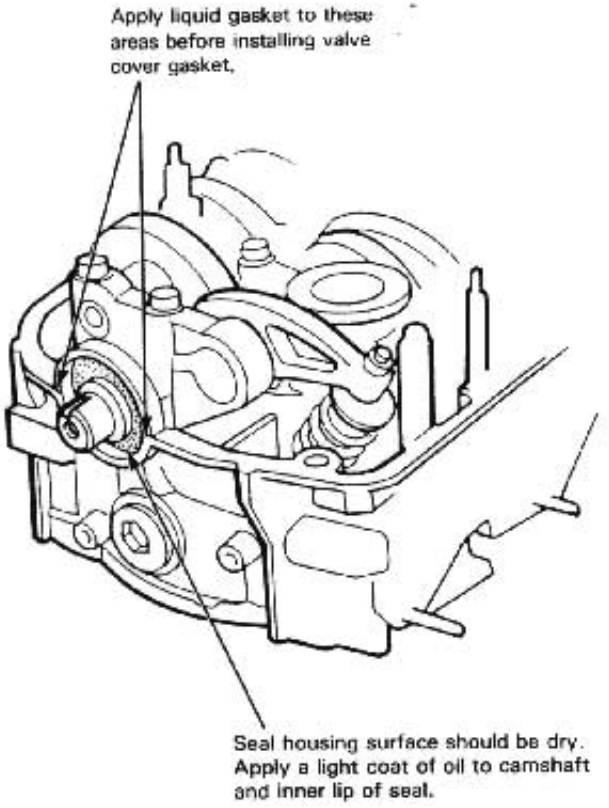
CAUTION:

- **Make sure that all rockers are in alignment with valves when torquing rocker assembly bolts.**
- **Valve locknuts should be loosened and adjust screws backed off before installation.**
- **To prevent rocker arm assembly from coming apart, leave bearing cap holding bolts in the holes.**

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.

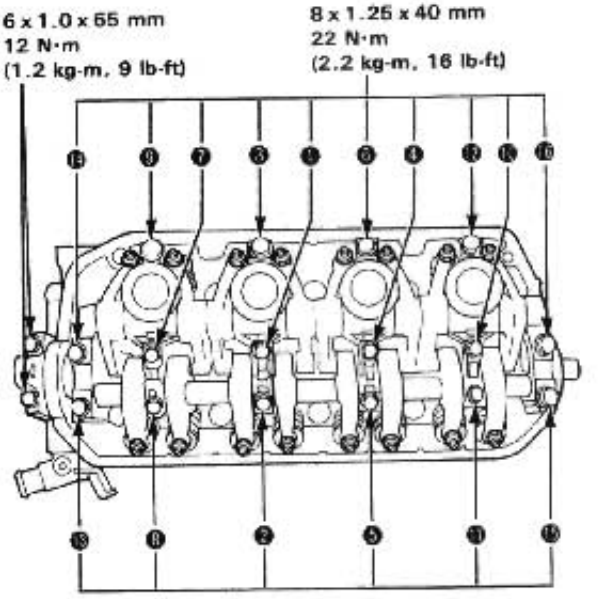
Lubricate cam lobes after reassembly.

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

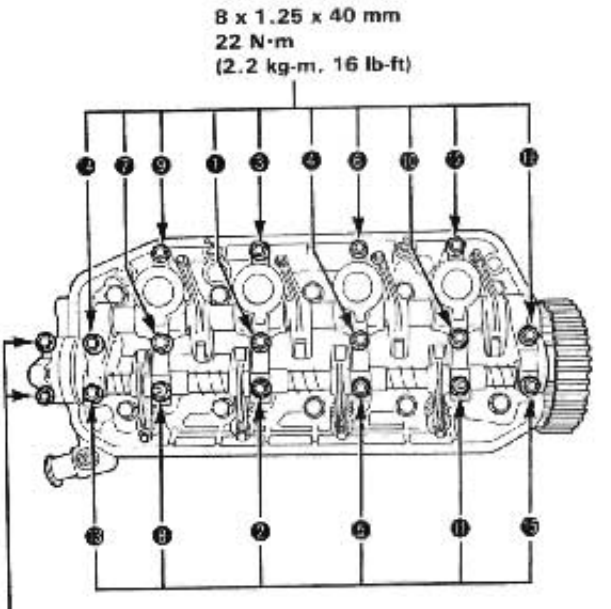


6. Tighten each bolt two turns at a time in the sequence shown below to ensure that the rockers do not bind on the valves.

DX and Si:



HF:

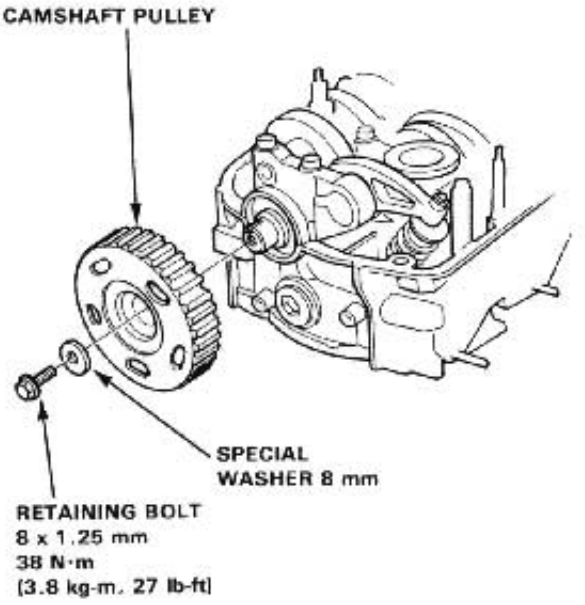


(cont'd)

Camshaft/Rocker Arms and Camshaft Seal/Pulley

Installation (cont'd)

7. Push camshaft pulley onto camshaft, then tighten retaining bolt to torque shown.



Cylinder Head

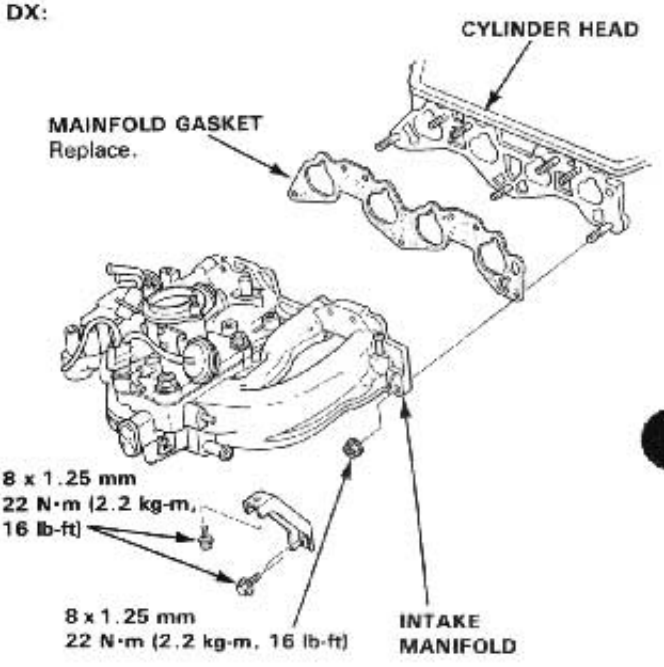
Installation

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

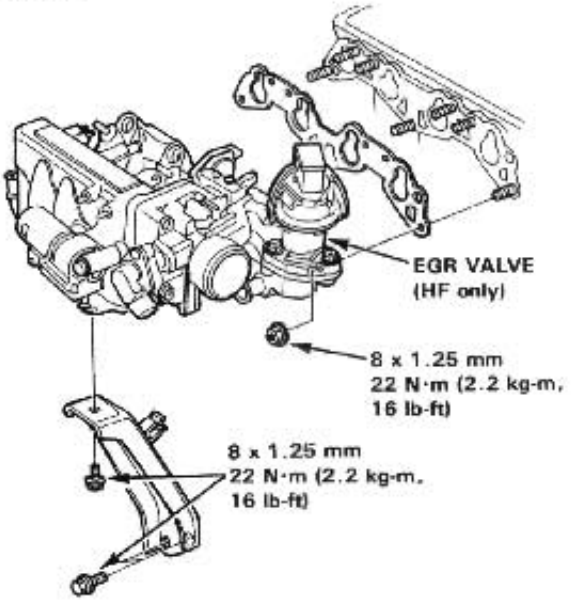
   - Always use a new head gasket.
   - Cylinder head and engine block surface must be clean.
   - "UP" mark on timing belt pulley should be at the top.

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

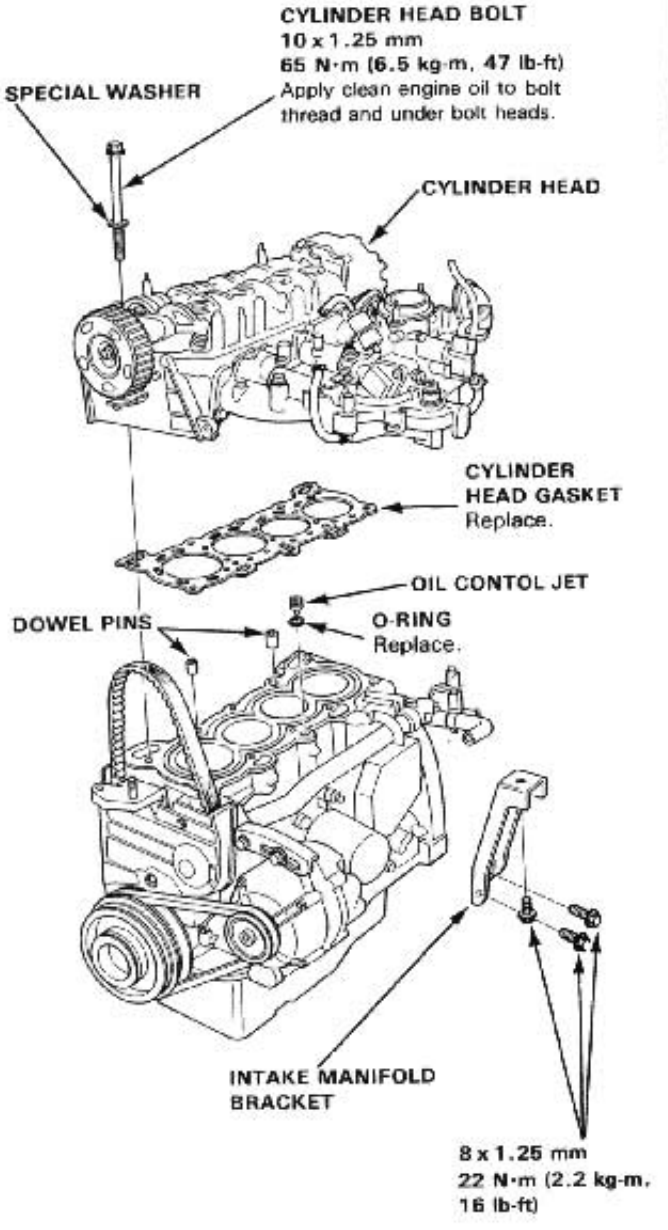
DX:



HF and Si:

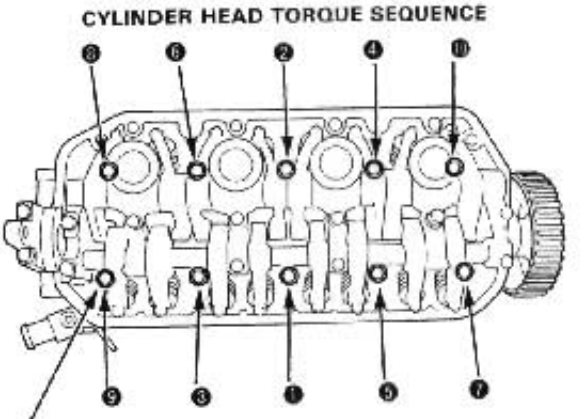


3. Cylinder head dowel pins and oil control jet must be aligned.



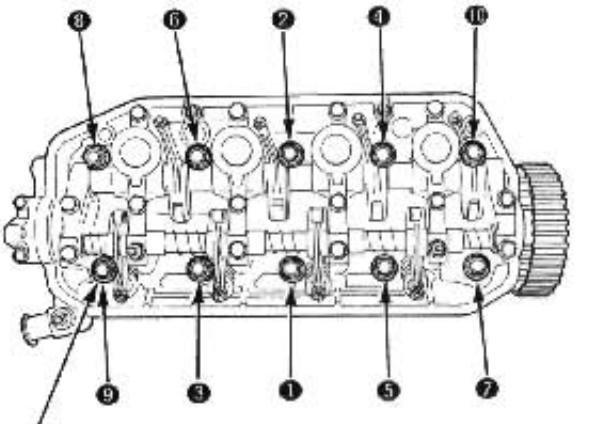
4. Install the bolts that secure the intake manifold to its bracket but do not tighten them yet.
5. Position the cam correctly (page 6-26).
6. Tighten cylinder head bolts in two steps.
   In the first step tighten all bolts and nuts, in sequence, to about 30 N·m (3.0 kg-m, 22 lb-ft); in the final step tighten, in same sequence, to 65 N·m (6.5 kg-m, 47 lb-ft).

DX and Si:



CYLINDER HEAD BOLT
10 x 1.25 mm
65 N·m (6.5 kg-m, 47 lb-ft)

HF:



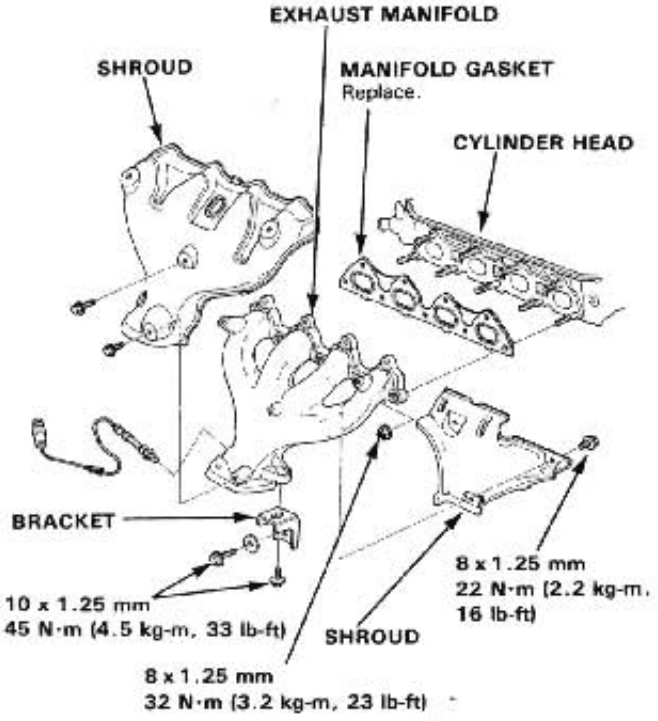
CYLINDER HEAD BOLT
10 x 1.25 mm
65 N·m (6.5 kg-m, 47 lb-ft)

(cont'd)

Installation (cont'd)

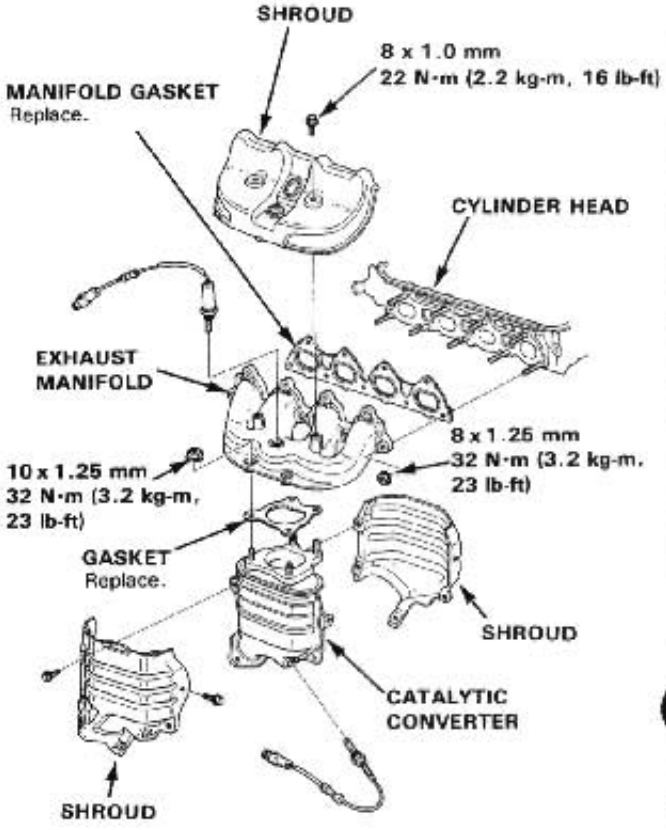
DX and Si:

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



HF:

8. Install the catalytic converter to exhaust manifold, then install the exhaust manifold assembly.



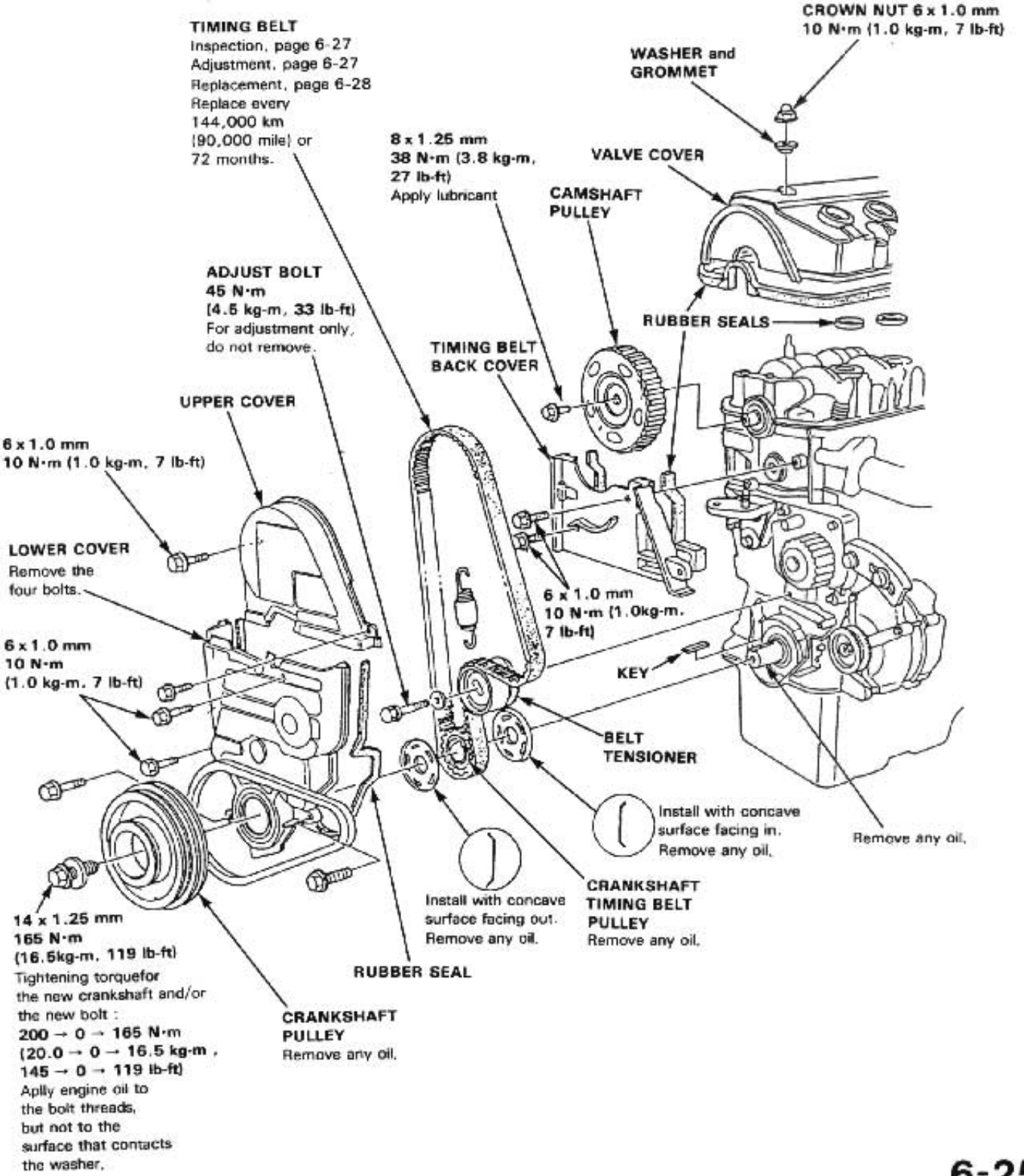
9. Install the exhaust pipe A on the exhaust manifold. Tighten the bolts for the intake manifold bracket.
10. Install the exhaust pipe A on its bracket.
11. After the installation, check that the tubes, hoses and connectors are installed correctly.
12. Adjust the valve timing (page 6-26).

Timing Belt

Illustrated Index

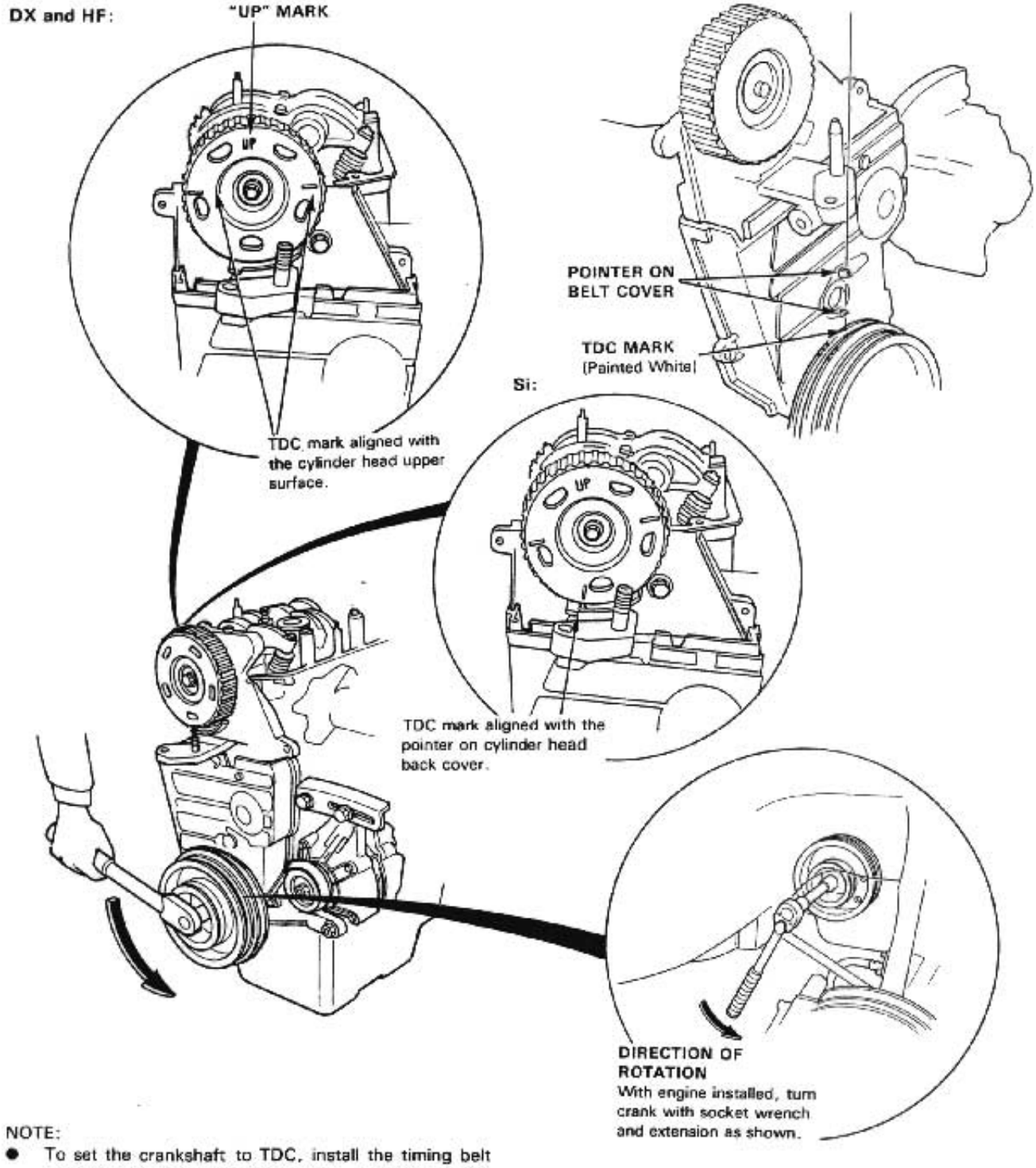
NOTE:

- Refer to next page for positioning crank and pulley before installing belt.
- Before removing, mark direction of rotation.
- When installing the new crankshaft and/or the new bolt :
  ①tighten the crankshaft pulley bolt to 200 N·m (20.0 kg-m, 145 lb-ft),
  ②loosen it bolt,
  ③retighten it to 165 N·m (16.5 kg-m, 119 lb-ft).



Positioning Crankshaft Before Installing Timing Belt

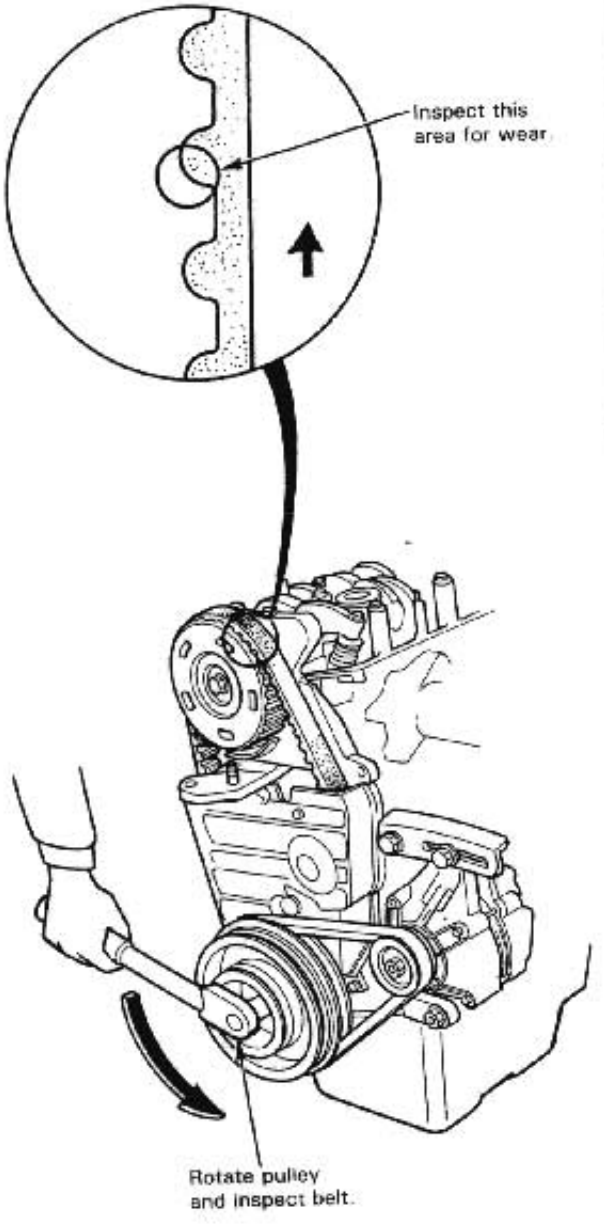
NOTE:
- Install the timing belt with the No. 1 piston at TDC (Top Dead Center) on the compression stroke.
- If pulley bolt broke loose while turning crank, retorque it to 165 N·m (16.5 kg-m, 119 lb-ft).



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

Inspection

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

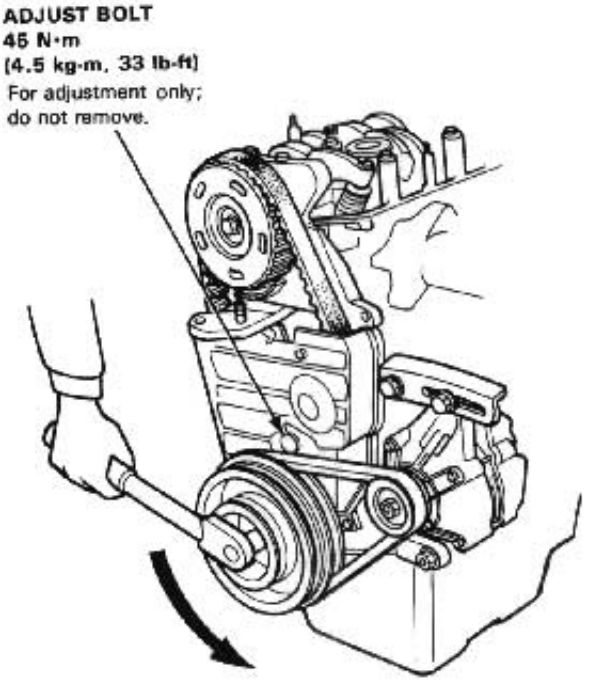


Tension Adjustment

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

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

1. Set the No. 1 piston at TDC.



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

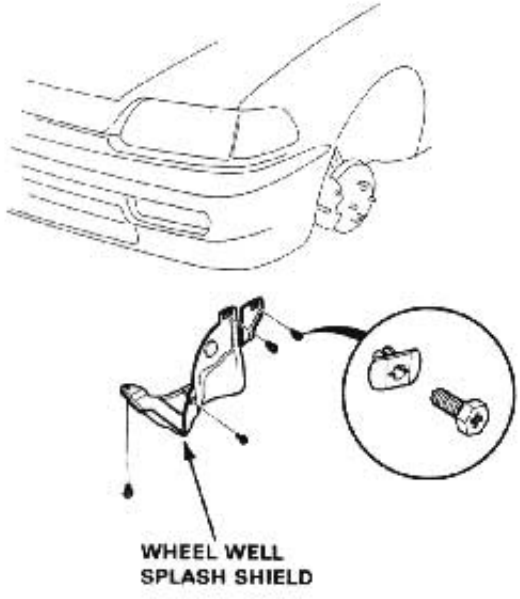
   NOTE: Put transmission in gear and set parking brake before retorquing pulley bolt.

Timing Belt

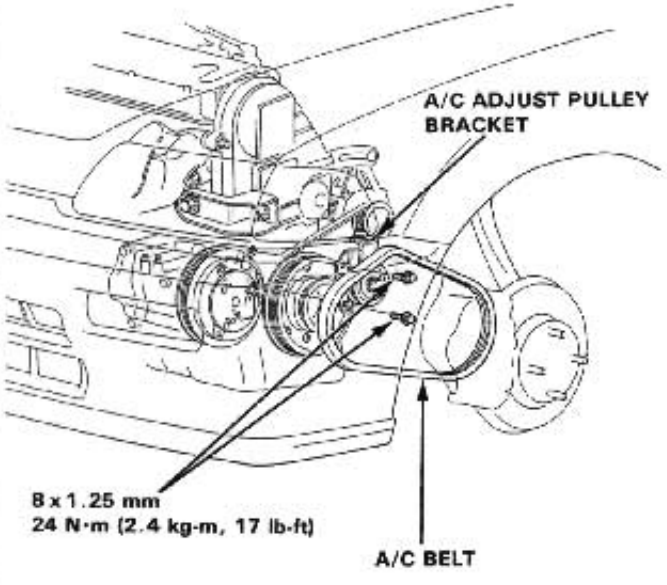
Replacement

NOTE: Inspect the water pump after removing timing belt.

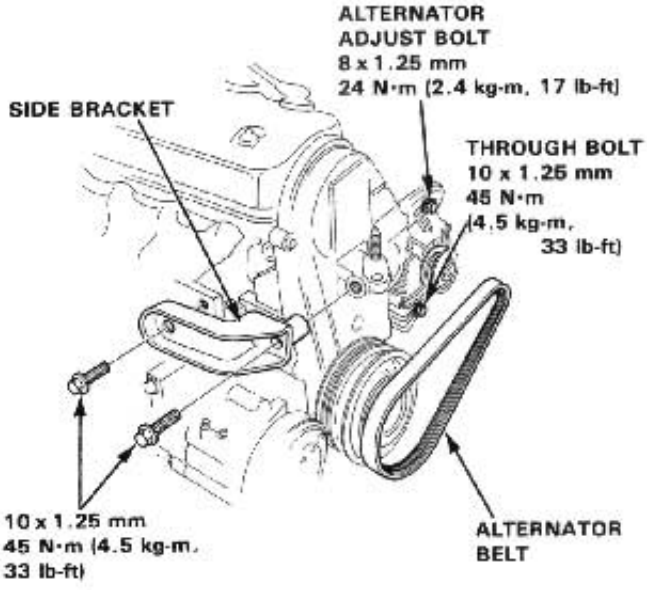
1. Remove the wheel well splash shield.



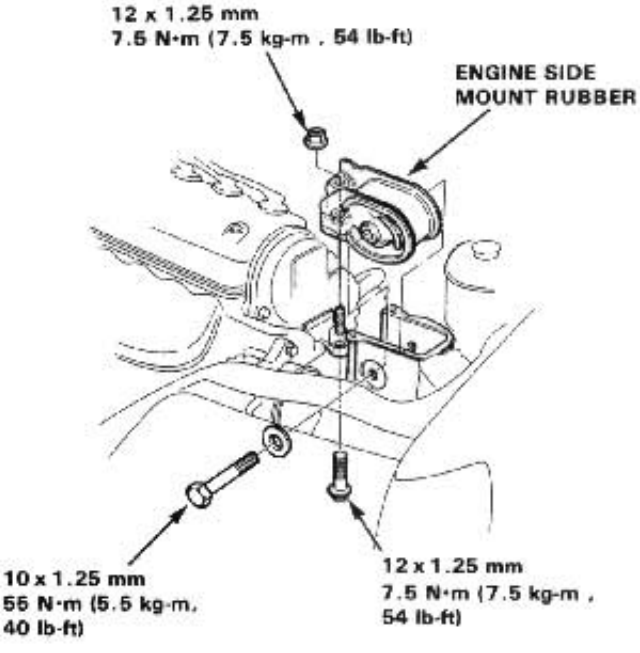
2. Remove the A/C compressor adjust pulley with bracket and the belt (with A/C).



3. Remove the side bracket.
4. Loosen the alternator adjust bolt and through bolt, then remove the belt.



5. After installation, adjust the tension of each belt. See Section 23 for alternator belt tension adjustment. See Section 22 for A/C compressor belt tension adjustment.
6. Remove the engine support bolts and nut, then remove the side mount rubber.



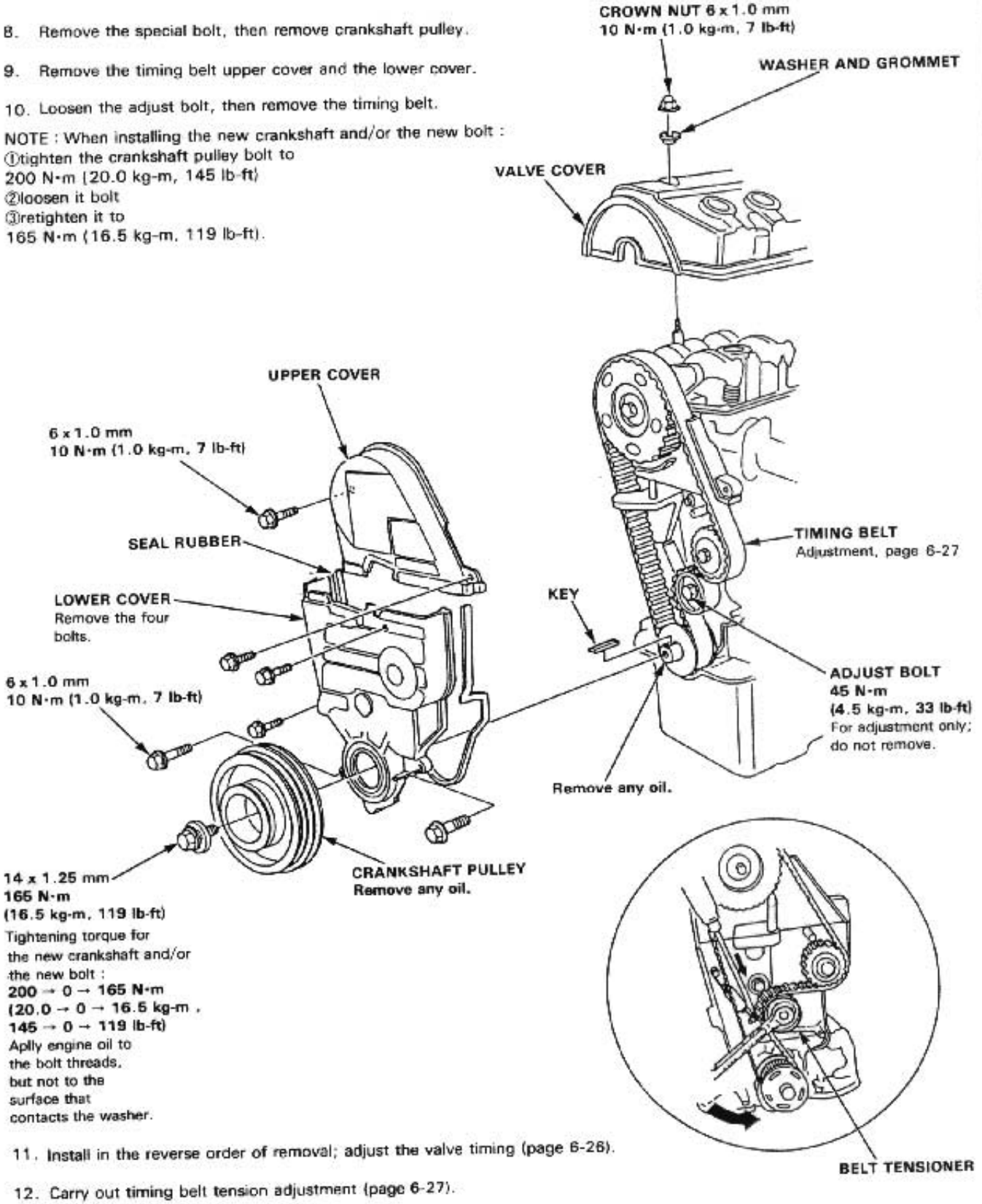
7. Remove the valve cover.

8. Remove the special bolt, then remove crankshaft pulley.

9. Remove the timing belt upper cover and the lower cover.

10. Loosen the adjust bolt, then remove the timing belt.

NOTE : When installing the new crankshaft and/or the new bolt :
①tighten the crankshaft pulley bolt to
200 N·m (20.0 kg-m, 145 lb-ft)
②loosen it bolt
③retighten it to
165 N·m (16.5 kg-m, 119 lb-ft).



11. Install in the reverse order of removal; adjust the valve timing (page 6-26).

12. Carry out timing belt tension adjustment (page 6-27).

Adjustment

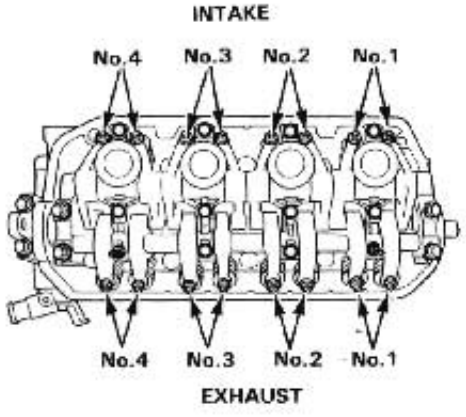
CAUTION : Do not tighten the locknuts, for the rocker arms are made of aluminium (DX and Si only).

NOTE:

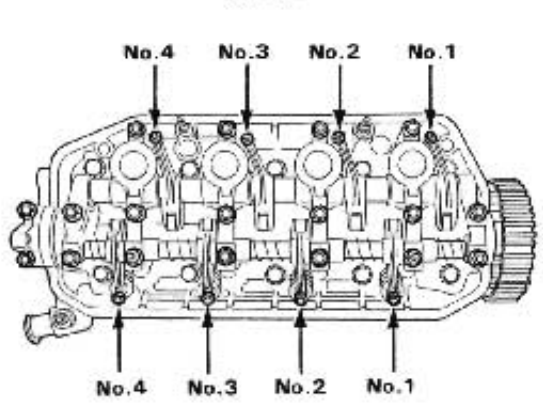
- Valves should be adjusted cold when the cylinder head temperature is less than 38°C (100°F).
  Adjustment is the same for intake and exhaust valves.
- If pulley bolt broke loose while turning crank, retorque it to 165 N·m (16.5 kg-m, 119 lb-ft).

1. Remove valve cover.

DX and Si:



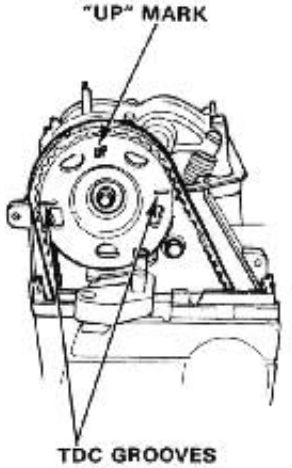
HF:



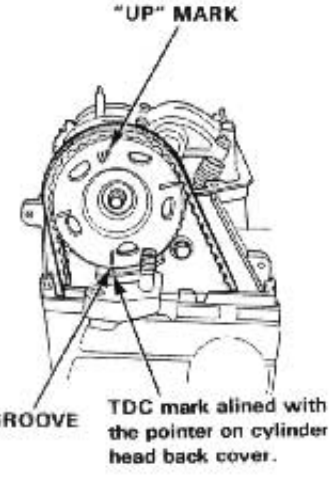
2. Set No. 1 piston at TDC. "UP" mark on the pulley should be at top. The distributor rotor must be pointing towards No.1 plug wire.

Number 1 piston at TDC

DX and HF:



Si:



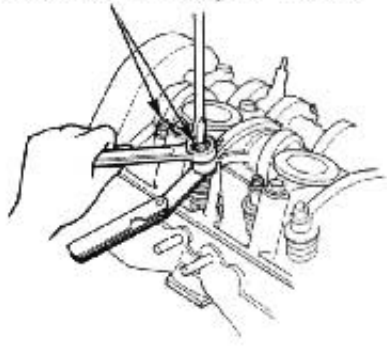
3. Adjust valves on No.1 cylinder.

DX and Si:
Intake: 0.17—0.22 mm (0.007—0.009 in.)
Exhaust: 0.22—0.27 mm (0.009—0.011 in.)

HF:
Intake: 0.12—0.17 mm (0.005—0.007 in.)
Exhaust: 0.17—0.22 mm (0.007—0.009 in.)

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

INTAKE and EXHAUST VALVE LOCKNUTS 7 x 0.75 mm
DX and Si: 14 N·m (1.4 kg-m, 10 lb-ft)
HF: 20 N·m (2.0 kg-m, 14 lb-ft)

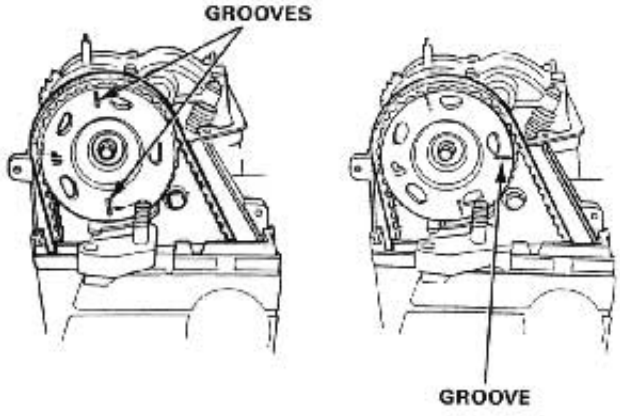


CAUTION: Do not over thighten the locknuts, for the rocker arms are made of aluminium (DX and Si).

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

Number 3 piston at TDC

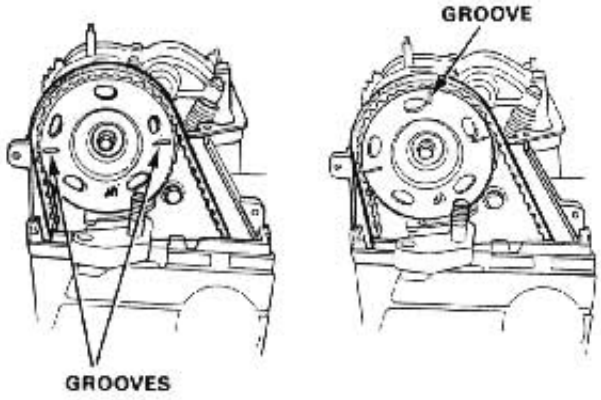
DX and HF: **Si:**



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

Number 4 piston at TDC

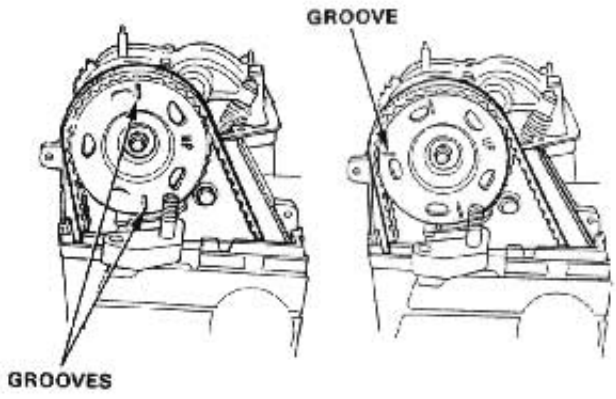
DX and HF: **Si:**



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

Number 2 piston at TDC

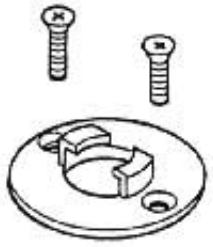
DX and HF: **Si:**



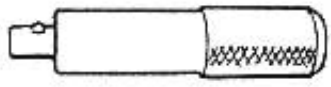
Engine Block

Special Tools

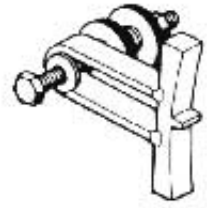
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07JGF—001010A	Piston Base Head Attachment (HF)	1	7-13, 7-14
②	07749—0010000	Driver	1	7-18, 7-21
③	07924—PD20003	Ring Gear Holder	1	7-6
④	07948—SB00101	Driver Attachment (except Si)	1	7-18, 7-21
⑤	07948—SB00800	Driver Attachment (Si)	1	7-18, 7-21
⑥	07973—PE00200	Pilot Collar (except HF)	1	7-13, 7-14
⑦	07973—PE00310	Piston Pin Driver Shaft (except HF)	1	7-13, 7-14
⑧	07973—PE00320	Piston Pin Driver Head (except HF)	1	7-13, 7-14
⑨	07973—PE00400	Piston Pin Base Insert	1	7-13, 7-14
⑩	07973—SB00100	Piston Base Head (except HF)	1	7-13, 7-14
⑪	07973—6340200	Pilot Collar (HF)	1	7-13, 7-14
⑫	07973—6570101	Piston Base Head (HF)	1	7-13, 7-14
⑬	07973—6570210	Piston Pin Driver Head (HF)	1	7-13, 7-14
⑭	07973—6570300	Piston Pin Driver Shaft (HF)	1	7-13, 7-14
⑲	07973—6570400	Piston Pin Base Insert	1	7-13, 7-14
⑯	07973—6570500	Piston Base	1	7-13
⑰	07973—6570600	Piston Base Spring	1	7-13
⑱	07947—6790100	Seal Driver	1	7-21



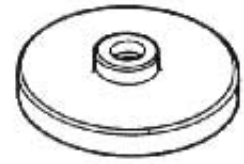
①



②

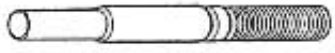


③



④ ⑤

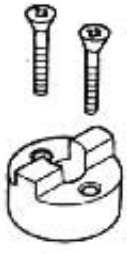
⑤ ⑪



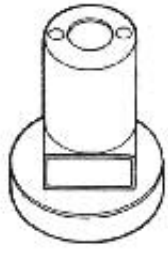
⑦ ⑭

⑧ ⑬

⑨ ⑲



⑯ ⑰



⑮

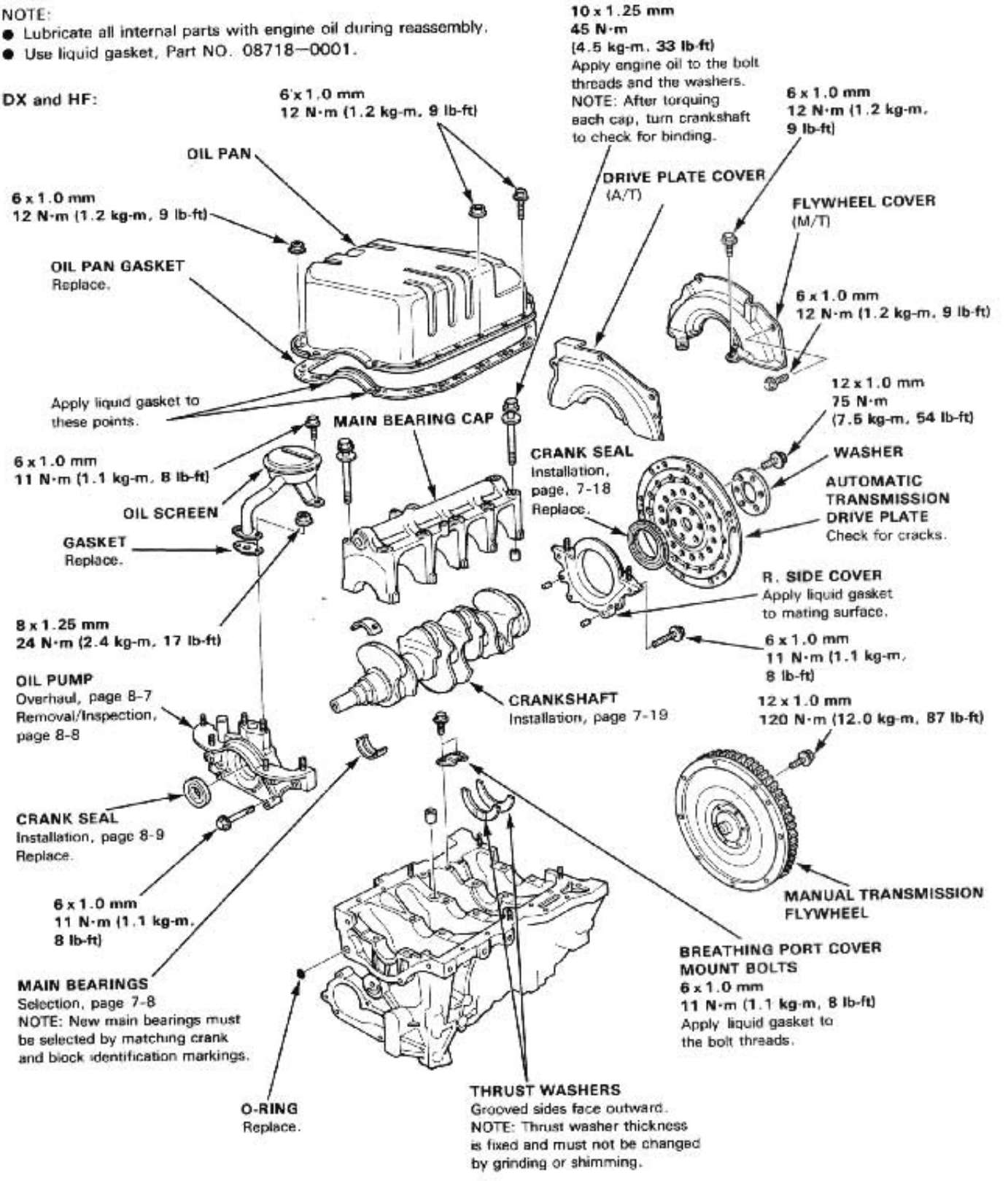
⑰

⑱

Engine Block

Illustrated Index

NOTE:
- Lubricate all internal parts with engine oil during reassembly.
- Use liquid gasket, Part NO. 08718—0001.

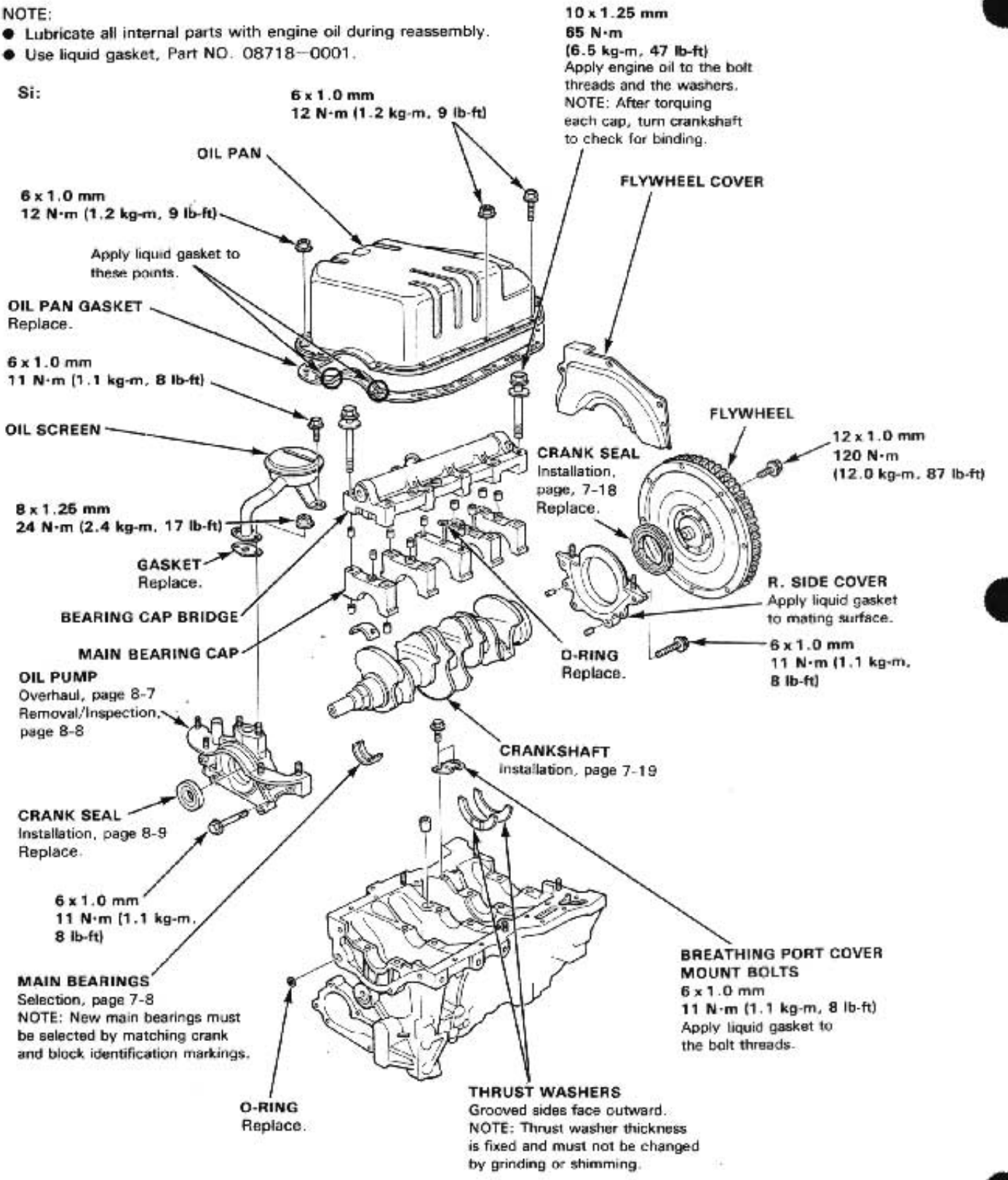


(cont'd)

Engine Block

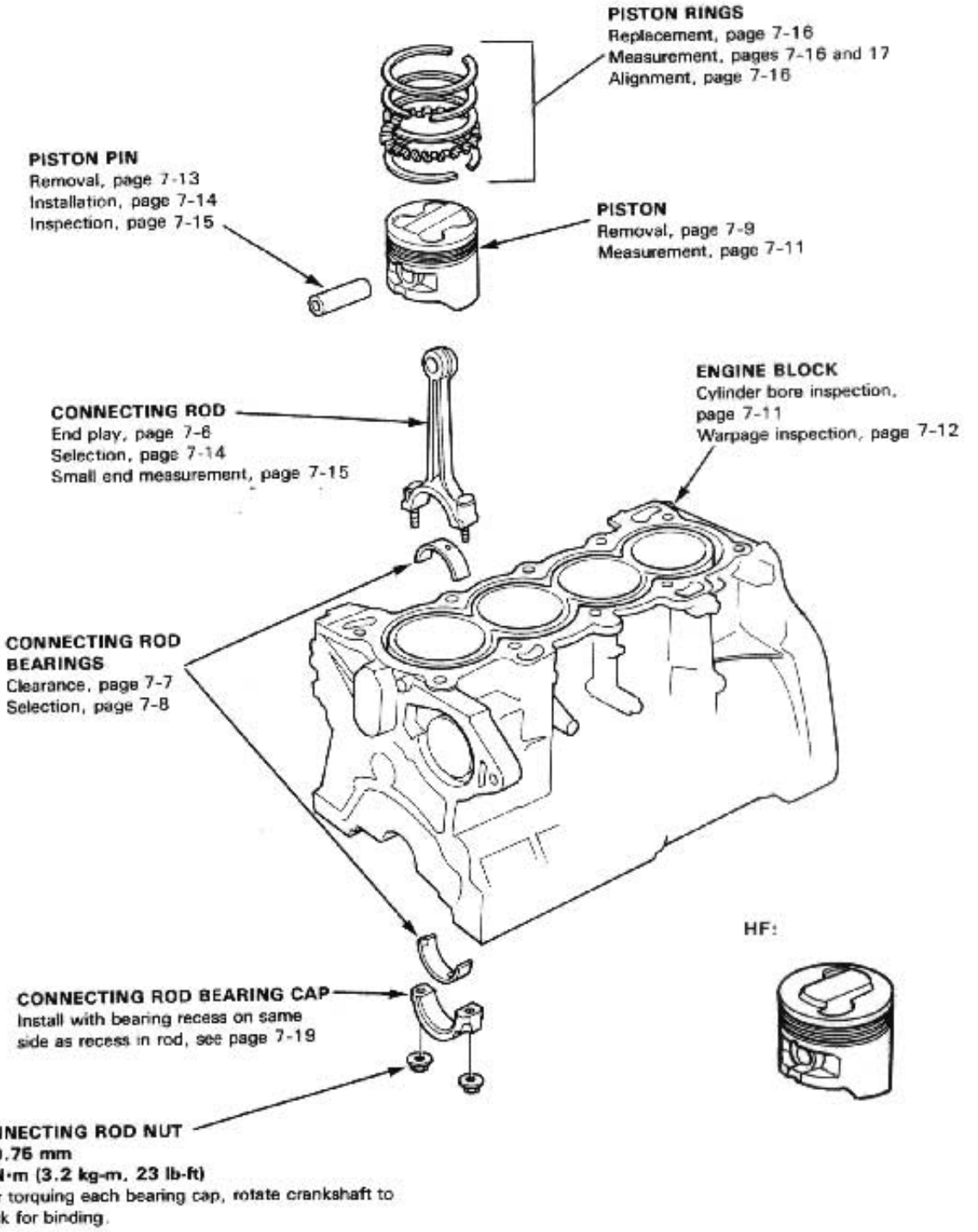
Illustrated Index (cont'd)

NOTE:
- Lubricate all internal parts with engine oil during reassembly.
- Use liquid gasket, Part NO. 08718—0001.



NOTE: New rod bearings must be selected by matching connecting rod and crankshaft identification markings (page 7-8).

DX and Si:

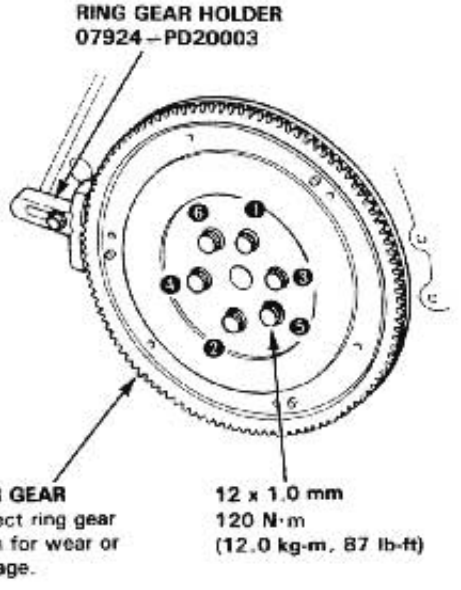


Flywheel and Drive Plate

Replacement

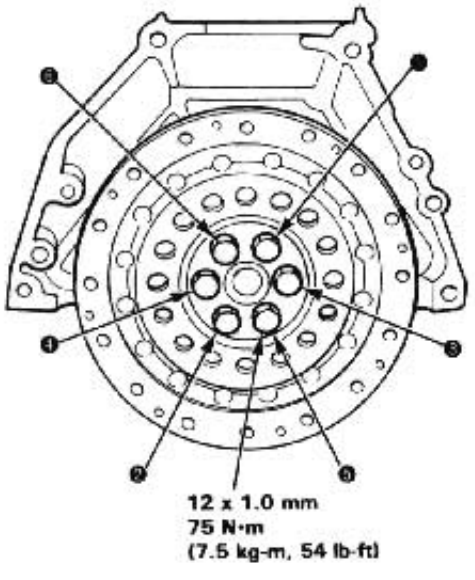
Manual Transmission:

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



Automatic Transmission:

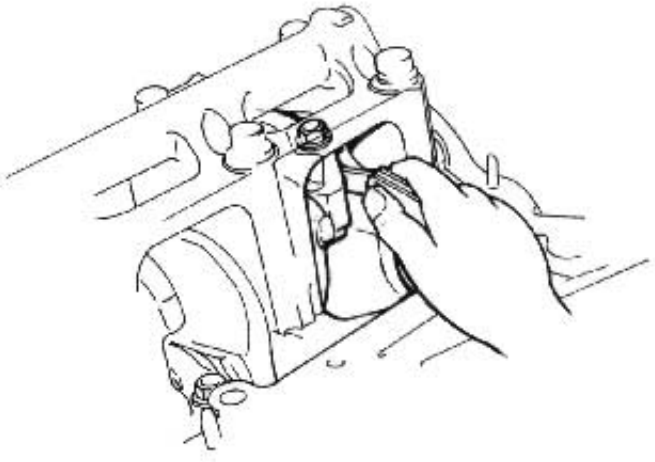
Remove the six drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



Connecting Rod and Crankshaft

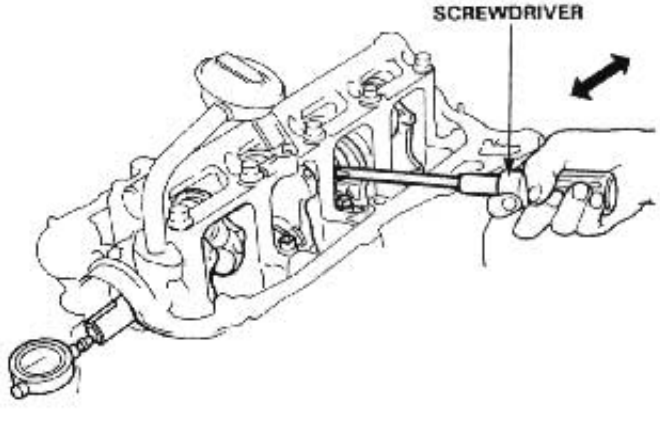
End Play

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 7-8 and 7-18).

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



Crankshaft End Play:
Standard (New): 0.10—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.

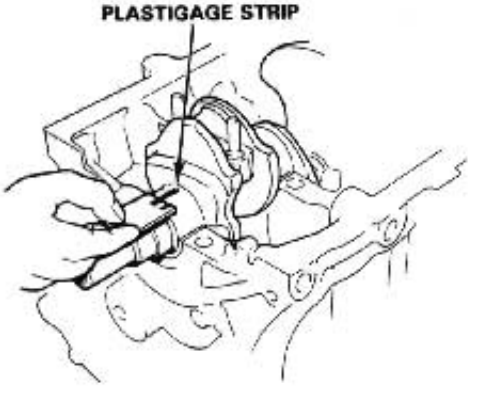
NOTE: Thrust washer thickness is fixed and must not be changed either by grinding or shimming. Thrust washers are installed with grooved sides outward.

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, then torque the bolts.
   DX and HF: 45 N·m (4.5 kg-m, 33 lb-ft)
   Si: 65 N·m (6.5 kg-m, 47 lb-ft)
5. Remove the caps and bearings again, and measure the widest part of the plastigage.

   Main Bearing Clearance:
   No.1, 5 Journals:
   0.018—0.036 mm (0.0007—0.0014 in.)
   No.2, 3 (except Si), 4 Journals:
   0.024—0.042 mm (0.0010—0.0017 in.)
   No.3 (Si) Journal
   0.030—0.048 mm (0.0012—0.0019 in.)
   Service Limit: 0.05 mm (0.002 in.)



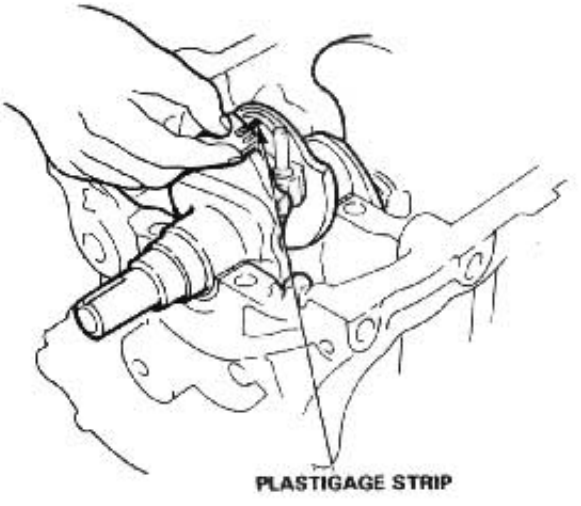
6. If the plastigage measures too wide or too narrow, loosen the main caps and spin the top half of the bearing out of the block, then install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance.
   CAUTION: Do not file, shim, or scrape 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.
   32 N·m (3.2 kg-m, 23 lb-ft)
   NOTE: Do not rotate the crank during inspection.
5. Remove the rod cap and bearing half and measure the widest part of the plastigage.

   Connecting Rod Bearing Clearance:
   Standard (New): 0.020—0.038 mm (0.0008—0.0015 in.)
   Service Limit: 0.05 mm (0.002 in.)



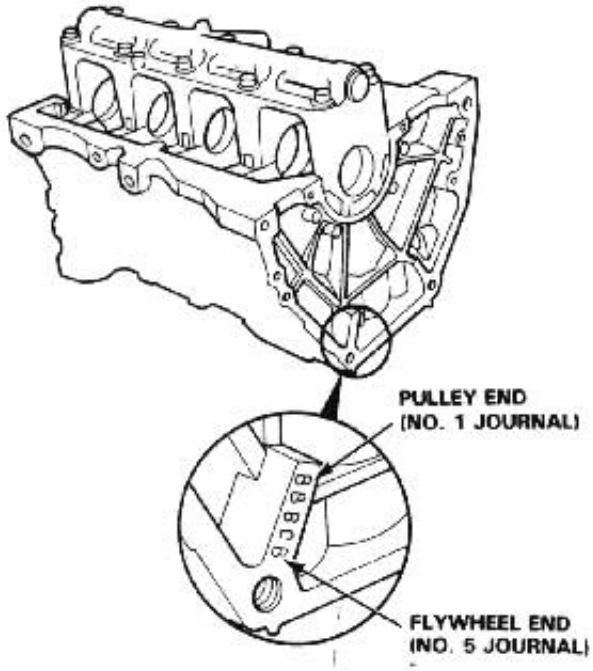
6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code (select color as shown on next page), and recheck the clearance.
   CAUTION: Do not file, shim, or scrape the bearing or the caps to adjust clearance.
7.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

Main Bearings

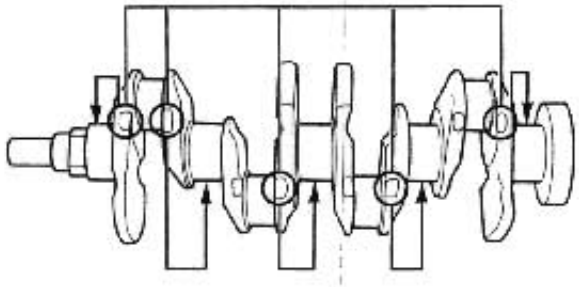
Selection

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	B	C	D

→ Smaller bearing (thicker)

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

1 2 3 4

Smaller main journal

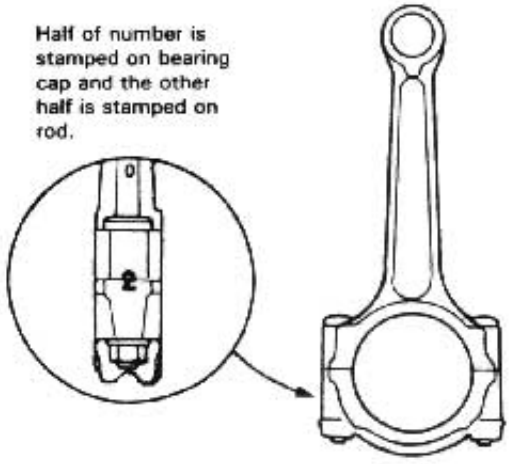
Smaller bearing (thicker)

Rod Bearings

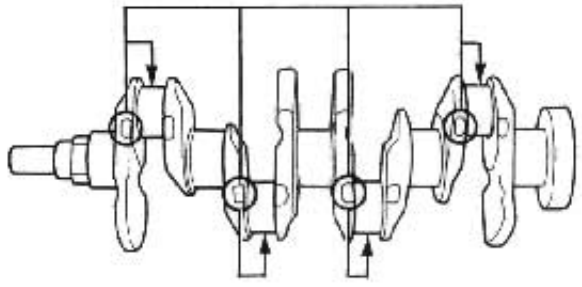
Selection

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	2	3	4

→ Smaller bearing (thicker)

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

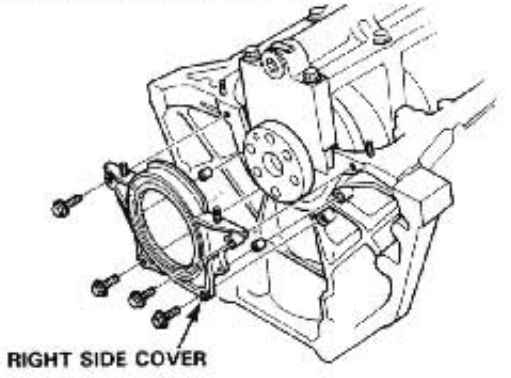
A B C D

Smaller rod journal

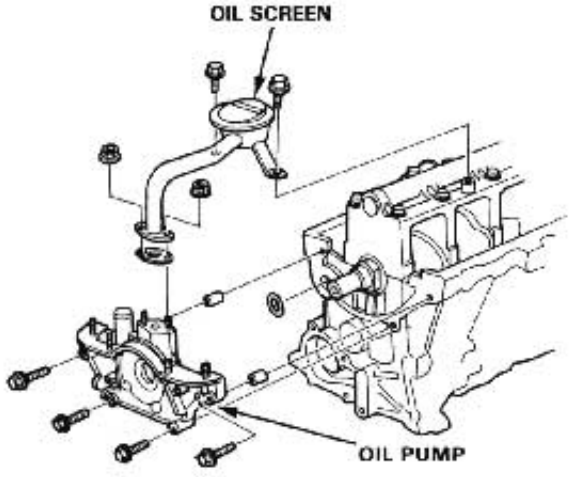
Smaller bearing (thicker)

Removal

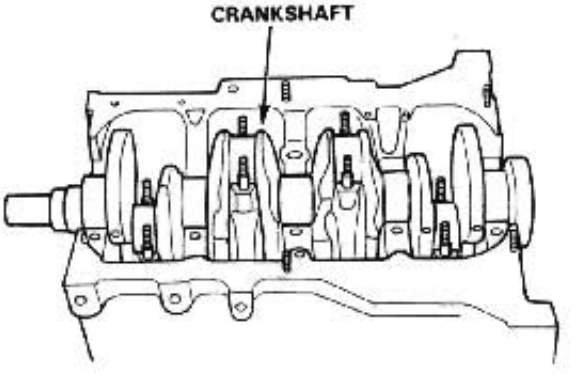
1. Remove the right side cover.



2. Remove the oil screen.

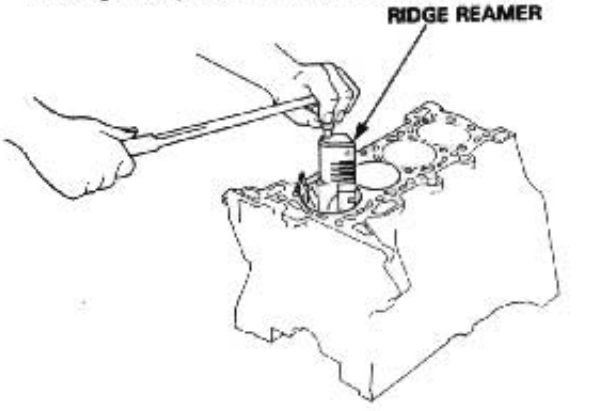


3. Remove the oil pump.
4. Turn the crankshaft so No. 2 and 3 crankpins are at the bottom.
5. Remove the bearing cap bridge (Si).
6. Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.
7. Lift the crankshaft out of engine, being careful not to damage journals.

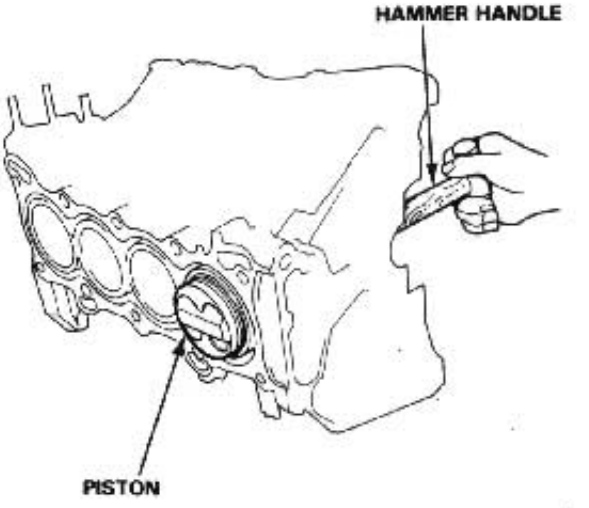


8. Remove upper bearing halves from connecting rods and set aside with their respective caps.
9. Reinstall main cap and bearings on engine in proper order.
10. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer. Follow reamer manufacturer's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

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



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



12. Reinstall the rod bearings and caps after removing each piston/connecting rod assembly.
13. 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.

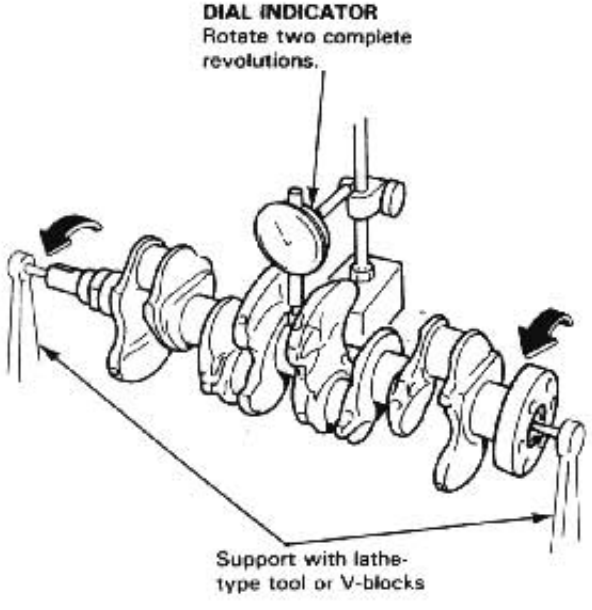
Inspection

- 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.

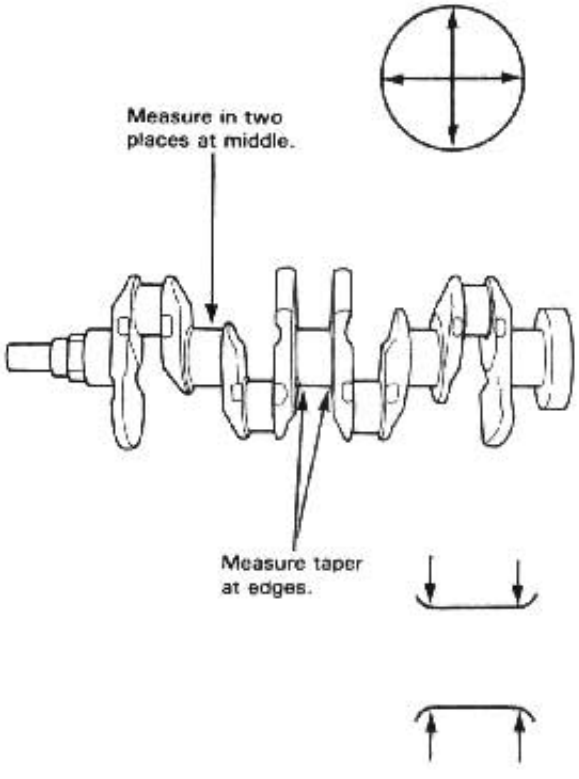
Crankshaft Total Indicated Runout:
Standard (New): 0.03 mm (0.0012 in.)
Service Limit: 0.06 mm (0.0024 in.)



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 limlit.

Journal Out-of-Round:
Standard (New): 0.0025 mm (0.0001 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.

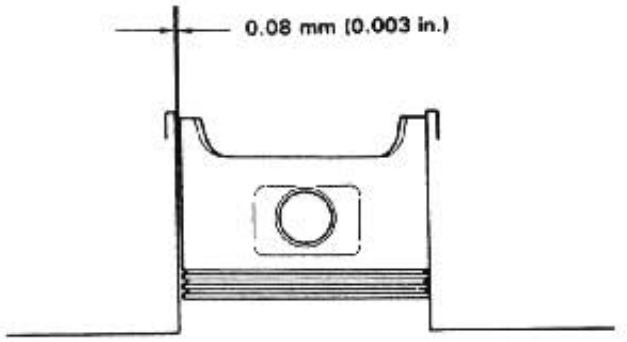
Journal Taper:
Standard (New): 0.0025 mm (0.0001 in.)
Service Limit: 0.010 mm (0.0004 in.)

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 7-12 and piston diameter.

   Piston-to-Cylinder Clearance:
   Standard (New): 0.01—0.04 mm (0.0004—0.0016 in.)
   Service Limit: 0.05 mm (0.002 in.)

Piston

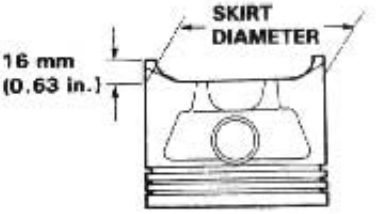
Inspection

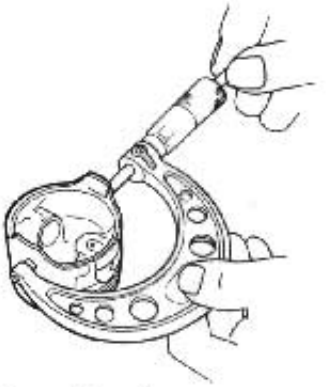
1. Check the piston for distortion or cracks.

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

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

   Piston Diameter:
   Standard (New): 74.98—74.99 mm (2.9520—2.9524 in.)
   Service Limit: 74.97 mm (2.9516 in.)





   Oversize Piston Diameter
   0.25: 75.23—75.24 mm (2.9618—2.9622 in.)
   0.50: 75.48—75.49 mm (2.9716—2.9720 in.)

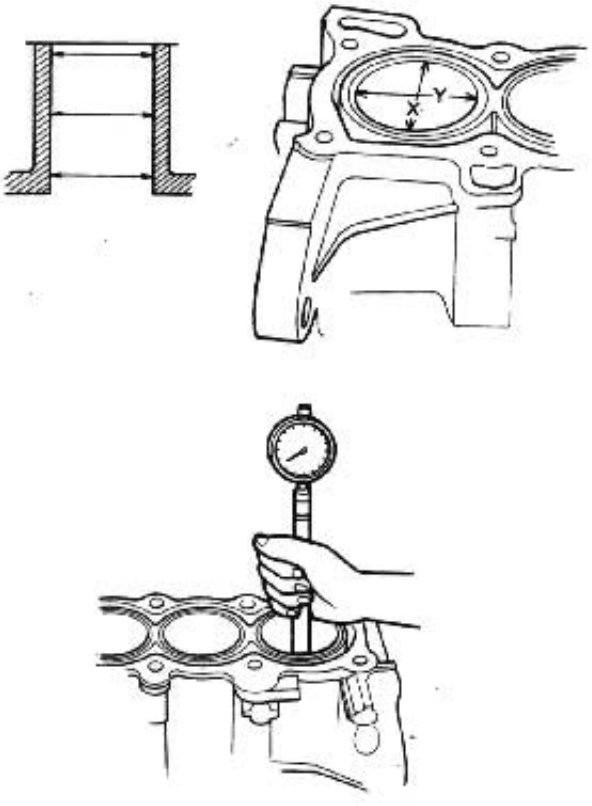
3. Check the piston pin-to-piston clearance. Coat the piston pin with engine oil.
   It should then be possible to push the piston pin into the piston hole with thumb pressure.

   Piston Pin-to-Piston Clearance:
   Service limit: 0.010—0.022 mm (0.0004—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 Size
Standard (New): 75.00—75.02 mm (2.9528—2.9535 in.)
Service Limit: 75.07 mm (2.9555 in.)

Oversize
0.25: 75.25—75.27 mm (2.9626—2.9634 in.)
0.50: 75.50—75. 52 mm (2.9724—2.9732 in.)

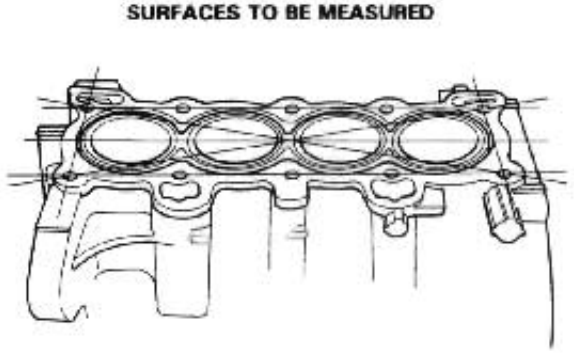
Bore Taper
Limit: (Difference between first and third measurement) 0.05 mm (0.002 in.)

- 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 7-11) after reboring.

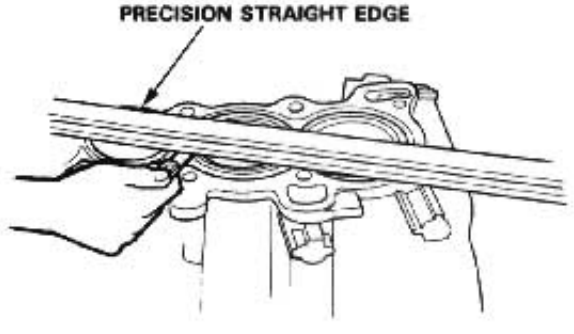
NOTE: Scored or scratched cylinder bores must be honed.

Reboring Limit: 0.5 mm (0.02 in.)

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



Engine Block Warpage:
Standard (New): 0.07 mm (0.0028 in.)
Service Limit: 0.10 mm (0.004 in.)



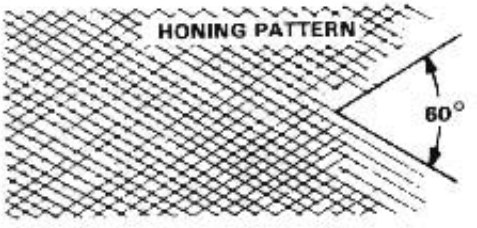
Piston Pins

Bore Honing

1. Measure cylinder bores as shown on page 7-12. 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.

NOTE:
- Use only a rigid hone with 400 grit or finer stone such as Sunnen, Ammco, or equivalent.
- Do not use stones that are worn or broken.

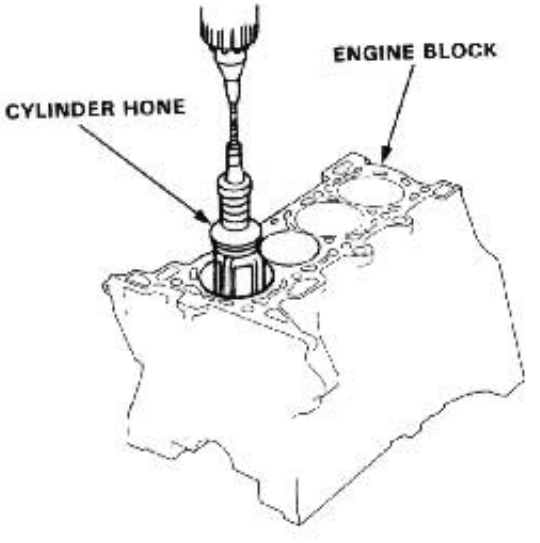


3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.

NOTE: Never use solvent, it will only redistribute the grit on the cylinder walls.

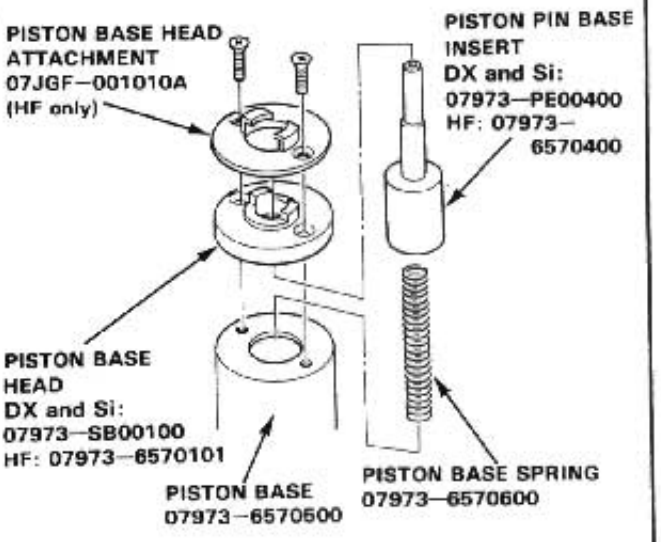
4. If scoring or scratches are still present in cylinder bores after honing to service limit, rebore the engine block.

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

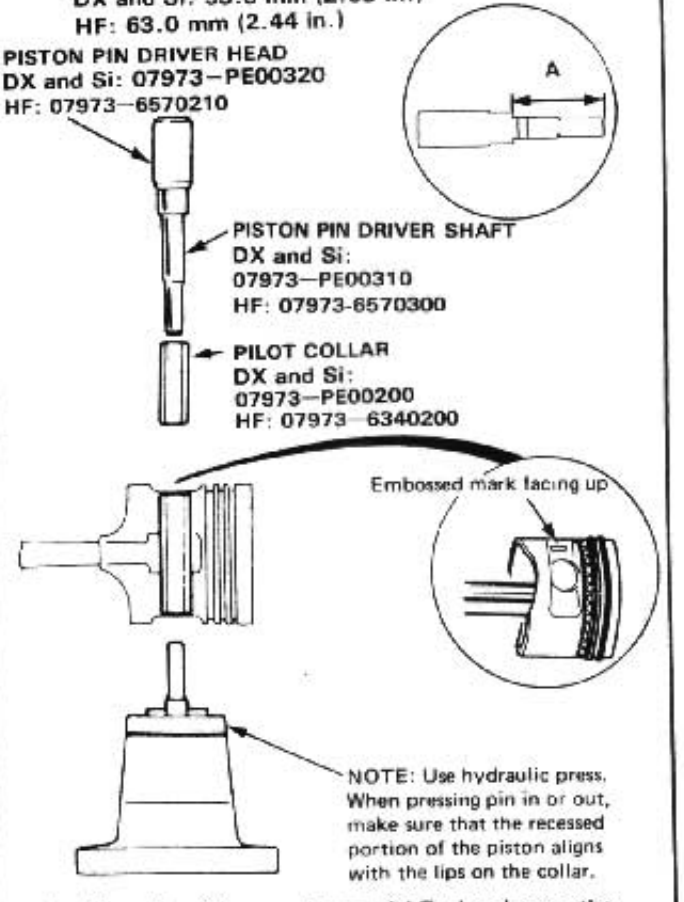


Removal

1. Assemble the special Tool as shown.



2. Adjust the length A of piston pin driver.
   DX and Si: 53.0 mm (2.09 in.)
   HF: 63.0 mm (2.44 in.)



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

Connecting Rods

Selection

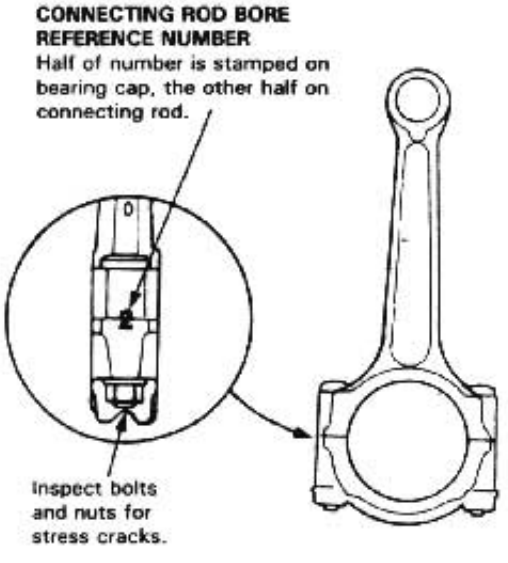
Each rod is sorted into one of four tolerance ranges (from 0 to 0.024 mm, in 0.006 mm increments) depending on the size of it's big end bore. It's then stamped with a number 1, 2, 3, or 4 indicating that tolerance. You may find any combination of 1, 2, 3 or 4 in any engine.

Normal Bore Size:

HF: 41 mm (1.6142 in.)
DX: 45 mm (1.7717 in.)
Si: 48 mm (1.8898 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.

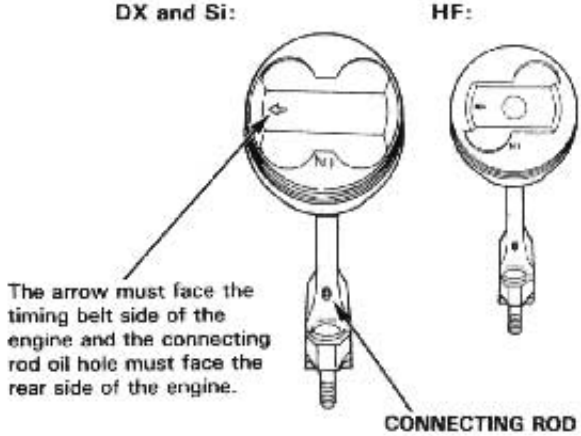


Piston Pins

Installation

1. Use a hydraulic press for installation.

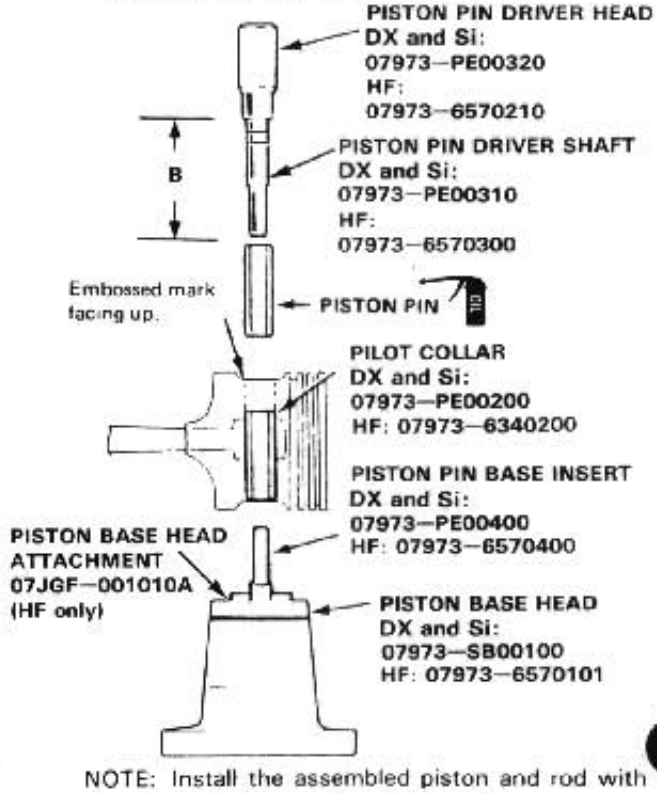
   - When pressing pin in or out, be sure you position the recessed flat on the piston against the lugs on the base attachment.



2. Adjust the length B of piston pin driver.

   DX and Si:
   53.0 mm (2.09 in.)
   HF: 62 mm (2.44 in.)

   - When pressing the center-narrowed piston pin into the piston using a piston pin driver, the piston pin may not be in the center of the piston.
     In that case, if necessary, re-adjust the piston pin until it seats in the center of the piston.



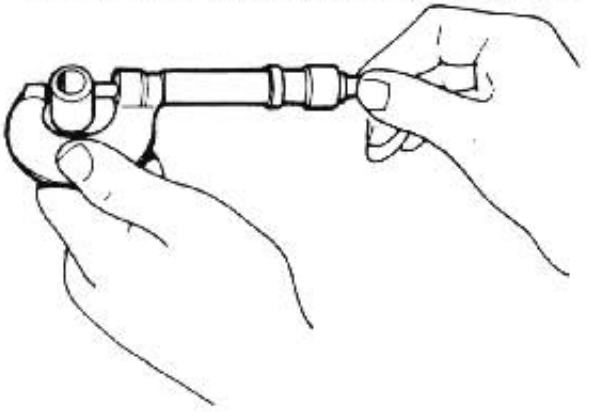
NOTE: Install the assembled piston and rod with the oil hole facing the rear of the engine.

Inspection

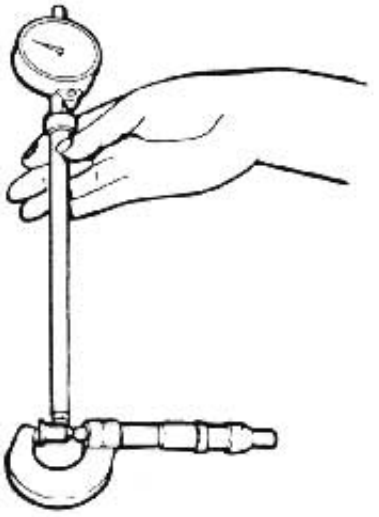
1. Measure the diameter of the piston pin.

Piston Pin Diameter:
Standard (New):
DX and Si: **18.994—19.000 mm (0.7478—0.7480 in.)**
HF: **16.994—17.000 mm (0.6691—0.6693 in.)**
Oversize:
DX and Si: **18.997—19.003 mm (0.7479—0.7481 in.)**
HF: **16.997—17.003 mm (0.6692—0.6694 in.)**

NOTE: All replacement piston pins are oversize.



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

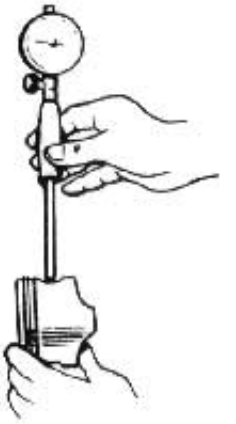


3. Measure the piston pin-to-piston clearance.

NOTE: Check the piston for distortion or cracks.

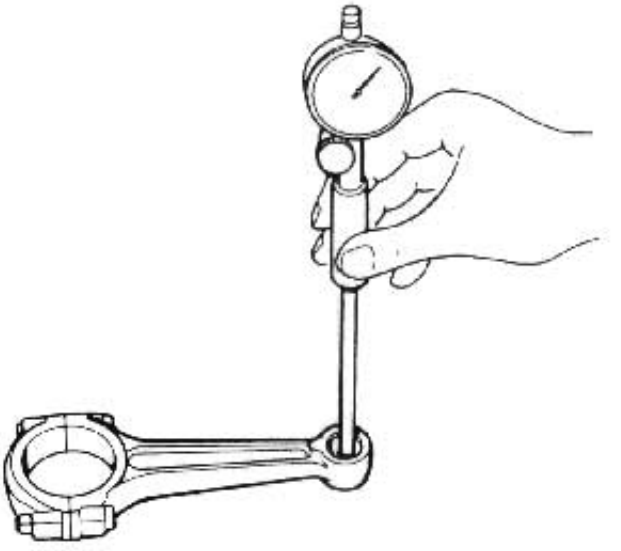
If the piston pin clearance is greater than 0.022 mm (0.0009 in.), re-measure using an oversize piston pin.

Piston Pin-to-Piston Clearance:
Service Limit: 0.010—0.022 mm (0.0004—0.0009 in.)



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

Piston Pin-to-Connecting Rod Interference:
Standard (New): 0.014—0.040 mm (0.0006—0.0016 in.)



Piston Rings

End Gap

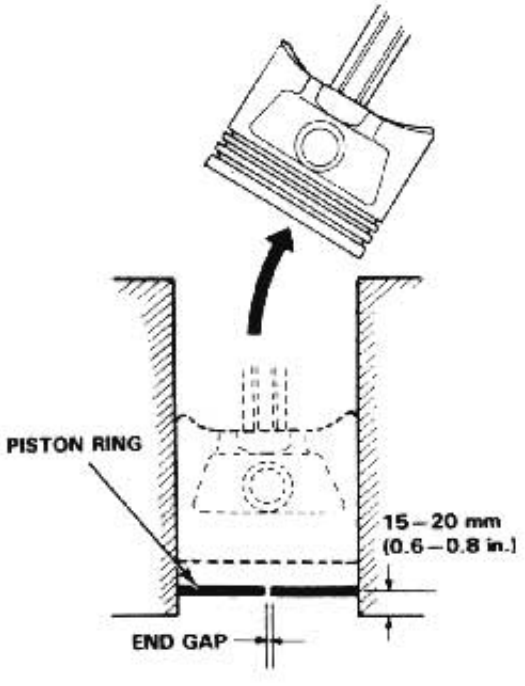
1. Using a piston, push a new ring into the cylinder bore 15–20 mm (0.6–0.8 in.) from the bottom.
2. Measure the piston ring end-gap with a feeler gauge:
   - If the gap is too small, check to see if you have the proper rings for your engine.
   - If the gap is too large, re-check the cylinder bore diameter against the wear limits on page 7-12. If the bore is over limit, the engine block must be rebored.

Piston Ring End-Gap:

Top Ring
Standard (New): 0.015–0.35 mm (0.006–0.014 in.)
Service Limit: 0.6 mm (0.02 in.)

Second Ring
except Si:
Standard (New): 0.15–0.35 mm (0.006–0.014 in.)
Si:
Standard (New): 0.30–0.45 mm (0.012–0.0018 in.)
Service Limit: 0.6 mm (0.02 in.)

Oil Ring
Standard (New): 0.2–0.8 mm (0.008–0.031 in.)
Service Limit: 0.9 mm (0.04 in.)



Replacement

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

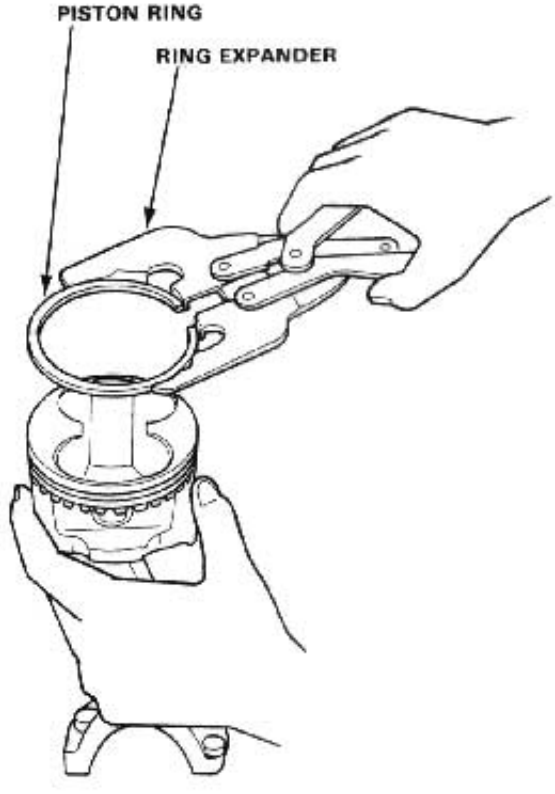
NOTE:
- Use a squared-off broken ring or ring groove cleaner with blade to fit piston grooves.
- Top ring groove is 1.2 mm (HF: 1.0 mm) wide.
- Second ring groove is 1.5 mm (HF: 1.2 mm) wide.
- Oil ring groove is 2.8 mm wide.
- File down blade if necessary.

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 7-17).

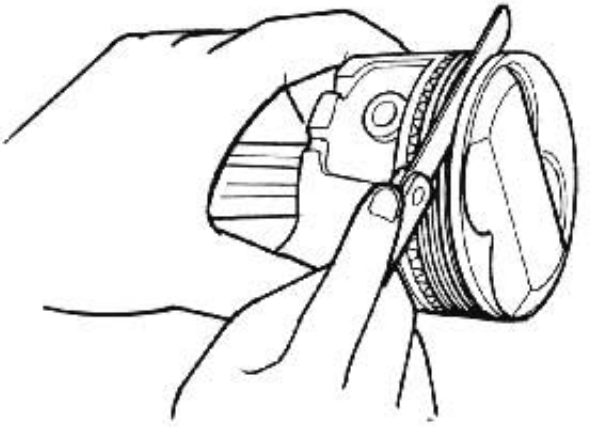
NOTE: Do not re-use old piston rings.



Land Clearances

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

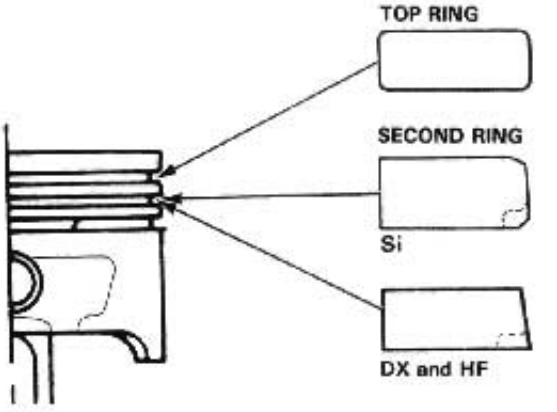
Top Ring Clearance:
Standard (New): 0.03—0.06 mm (0.0012—0.0024 in.)
Service Limit: 0.13 mm (0.005 in.)
Second Ring Clearance:
Standard (New): 0.03—0.055 mm (0.0012—0.0022 in.)
Service Limit: 0.13 mm (0.005 in.)



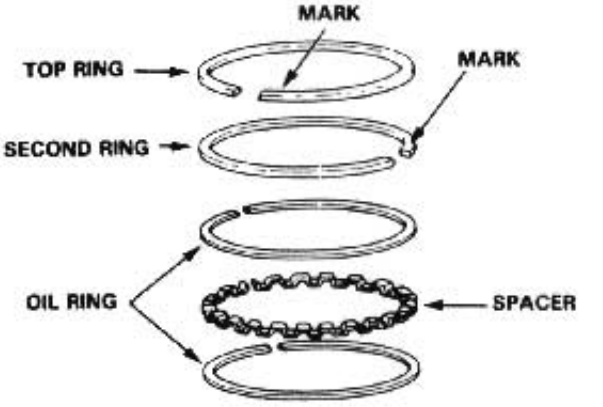
Alignment

1. Install the rings as shown on page 7-16.

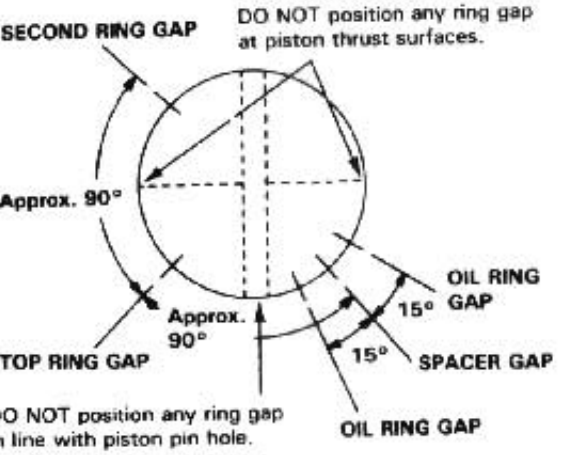
   Identify top and second rings by the chamfer on the edge, and make sure they are in proper grooves on piston.



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:



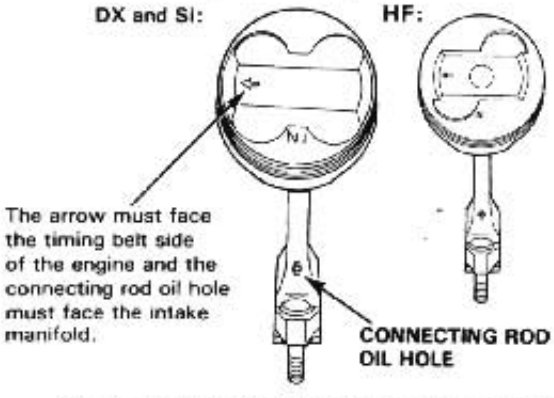
Pistons

Installation

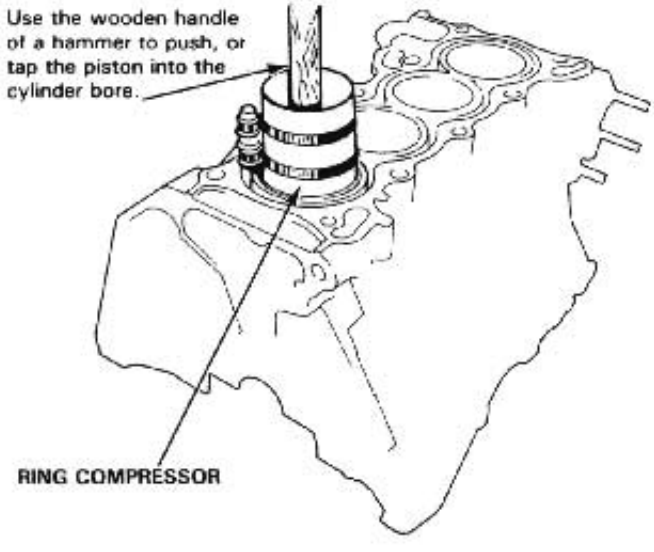
Before installing the piston, apply a coat of engine oil to the ring grooves and cylinder bores.

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.
     32 N·m (3.2 kg-m, 23 lb-ft)

2. If the crankshaft is not installed:
   - Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder and drive it in using the wooden handle of a hammer.
   - Position all pistons at top dead center.



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



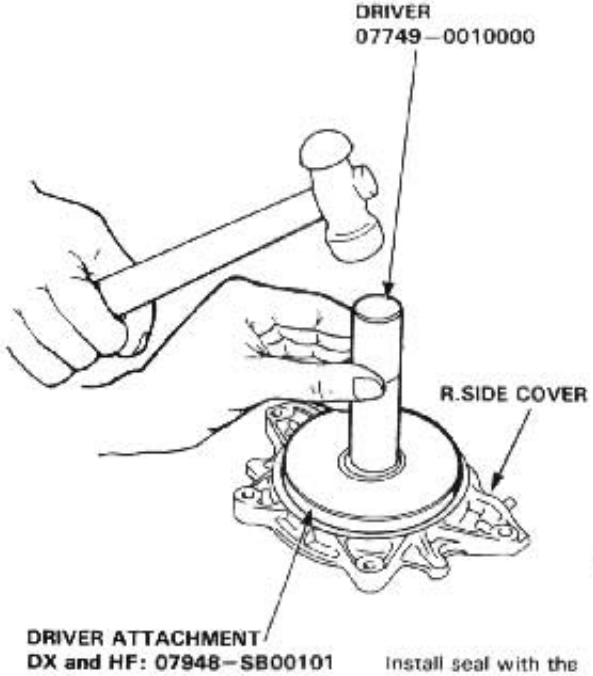
Oil Seal

Installation

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

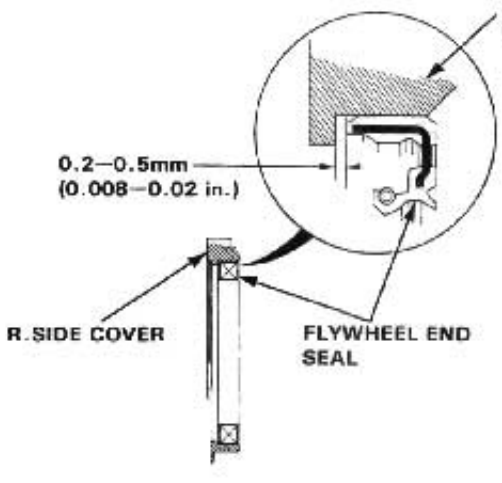
1. Drive in flywheel end seal against R. side cover.

   NOTE: Drive in flywheel end seal squarely.



2. Confirm clearance is equal all the way around, with a feeler gauge.

   Clearance: 0.2—0.5 mm (0.008—0.02 in.)

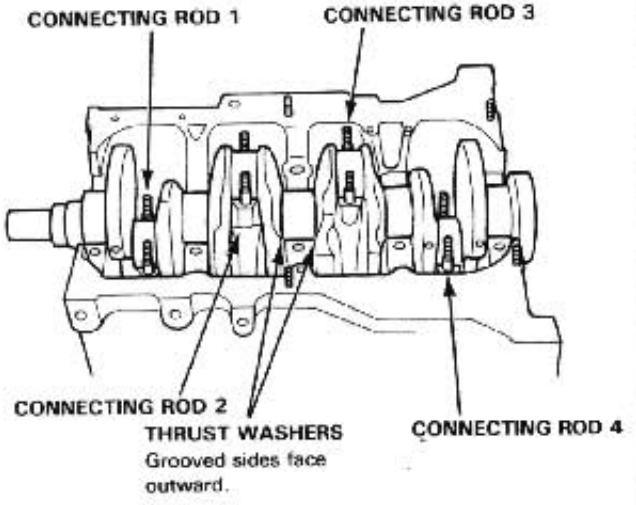


NOTE: Refer to page 8-9 for steps on the oil pump side oil seal.

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. Torque the connecting rod capnuts.

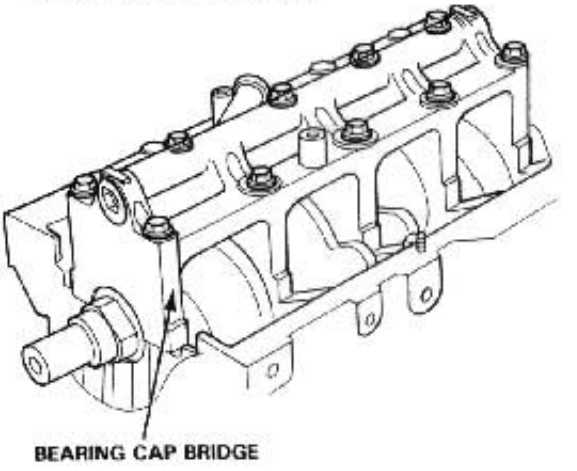
   32 N·m (3.2 kg-m, 23 lb-ft)

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

6. Install the thrust washers, main bearing halves caps and cap bridge, check clearance with plastigage (page 7-7), then torque the bolts.

   DX and HF: 45 N·m (4.5 kg-m, 33 lb-ft)
   Si: 65 N·m (6.5 kg-m, 47 lb-ft)

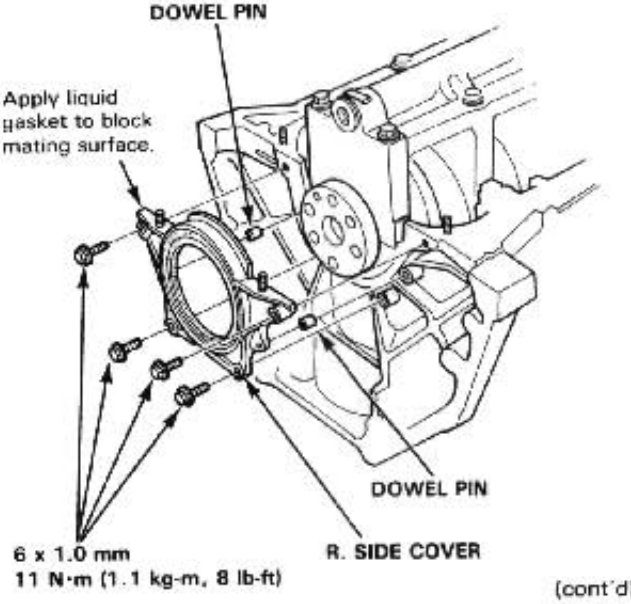
   Oil thrust washer surfaces.



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

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

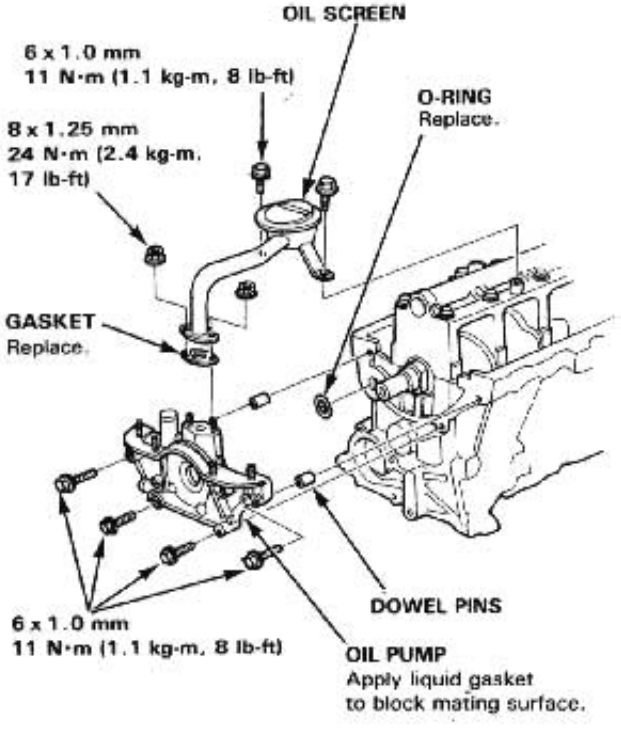
R.SIDE COVER SIDE:



(cont'd)

Installation (cont'd)

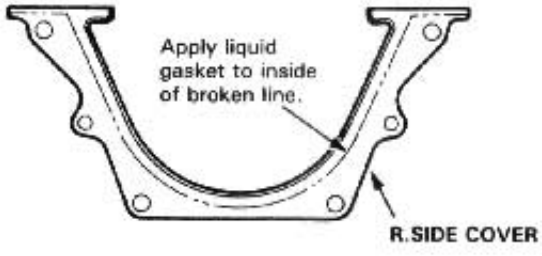
OIL PUMP SIDE:



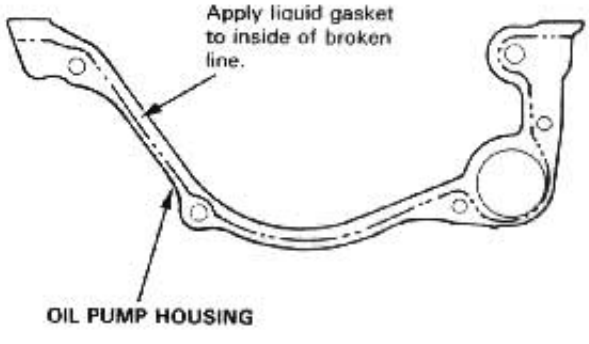
NOTE:

- Use liquid gasket, Part NO. 08718—0001.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket by starting with an even bead, centered between edges of the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.

R.SIDE COVER SIDE:



OIL PUMP SIDE:



- Do not install the parts if 20 minutes or more have elapsed since applying liquid gasket. Instead reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

8. Install the oil screen.
9. Install the oil pan.

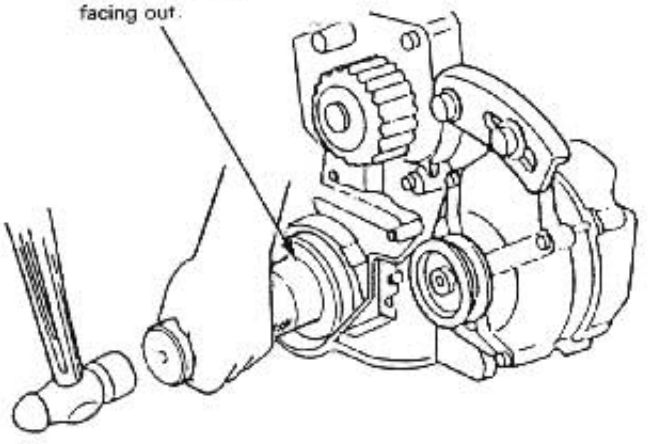
Oil Seal

Installation (engine removal not required)

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

1. Using the special tool, drive in the timing pulley-end seal until the driver bottoms against the oil pump. When the seal is in place, clean any excess grease off the crankshaft and check that the oil seal lip is not distorted.

SEAL DRIVER
07947-6790100
Install seal with the part number side facing out.

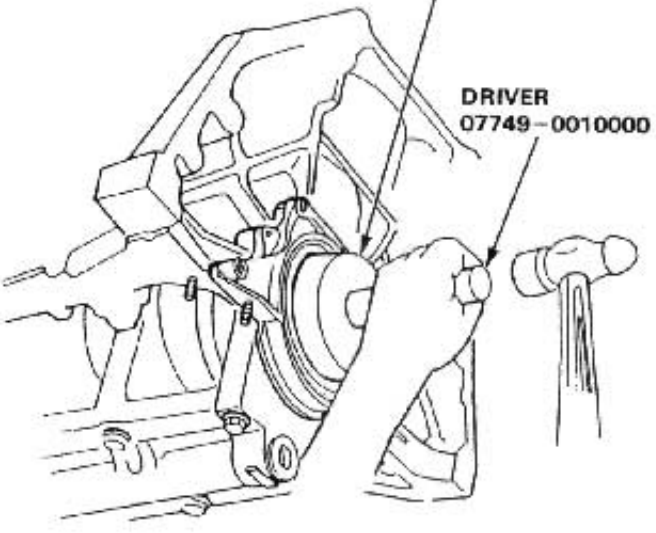


2. Using the special tool, drive in the flywheel-end seal until the driver bottoms against block.

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

DRIVER ATTACHMENT
DX: 07948-SB00101
Si : 07948-SB00800
Install seal with the part number side facing out.

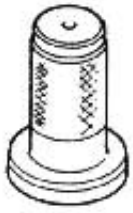
DRIVER
07749-0010000



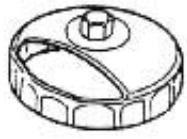
Engine Lubrication

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07HAD—PJ70100	Seal Driver	1	8-8
②	07912—6110001	Oil Filter Socket	1	8-5



①

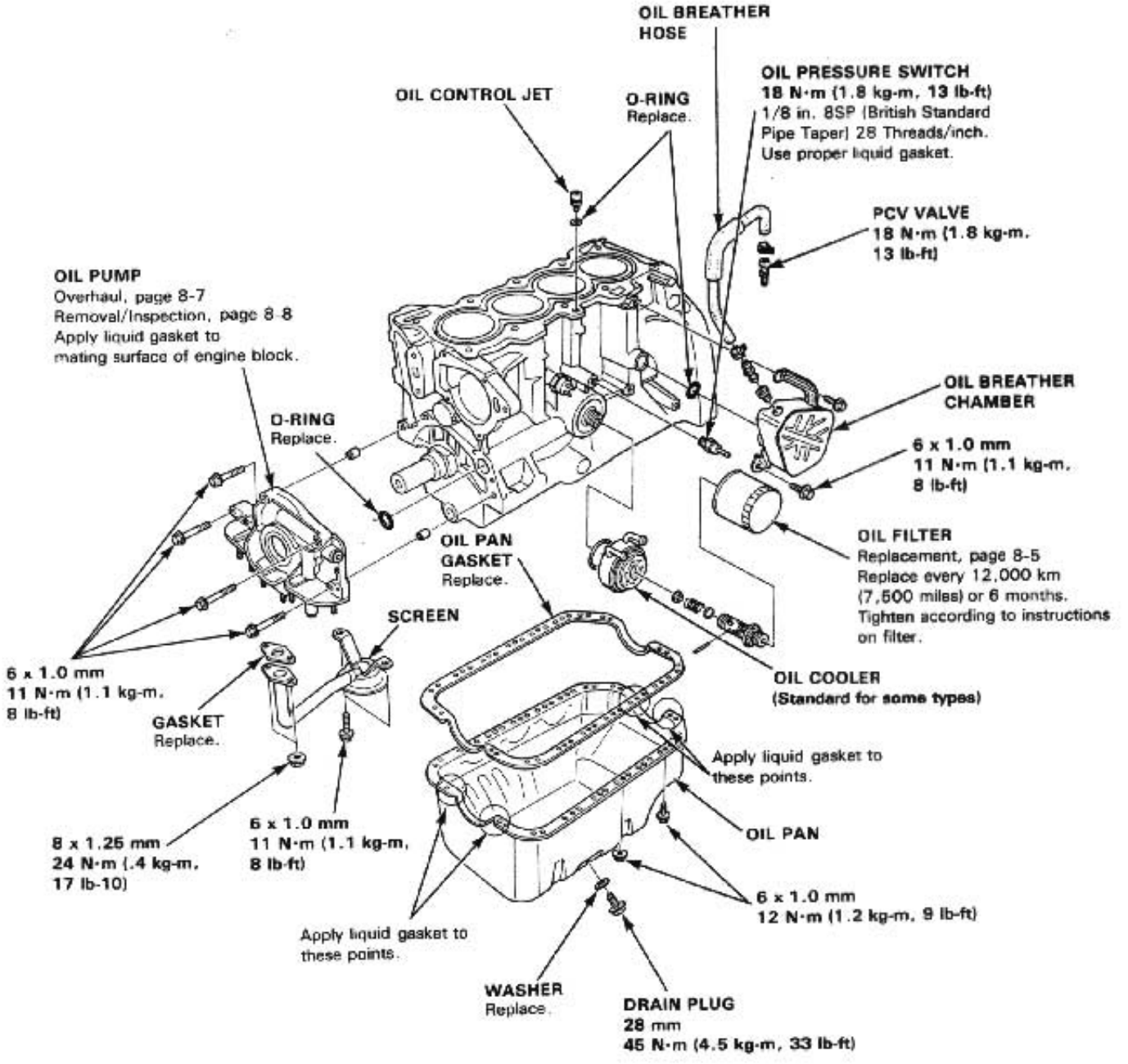


②

Engine Lubrication

Illustrated Index

NOTE:
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part NO. 08718—0001.

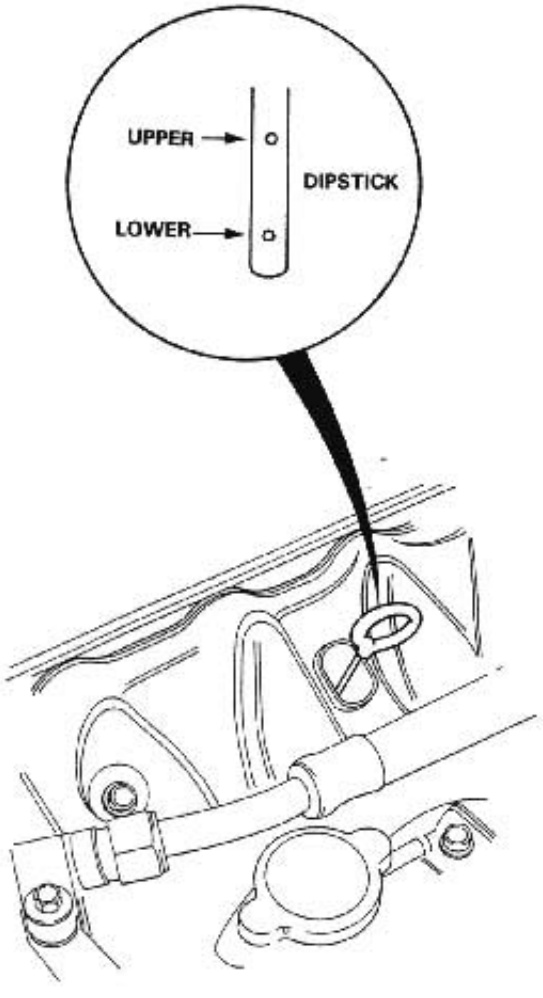


Oil Level

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.

   CAUTION: Insert the dipstick carefully to avoid bending it.

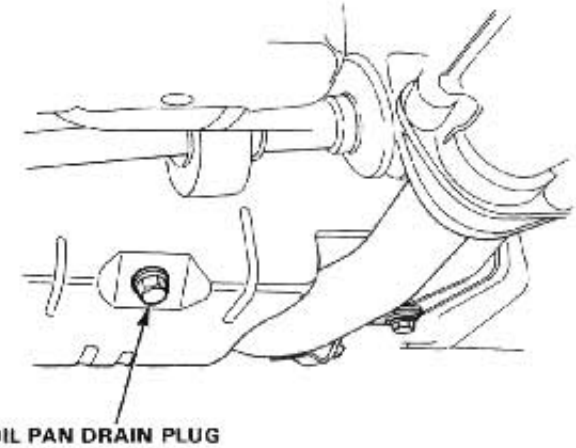


Engine Oil

Replacement

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

   NOTE: Remove the filler cap to speed draining.

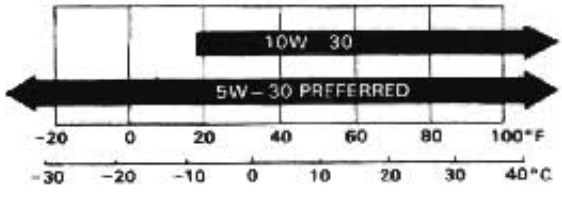


OIL PAN DRAIN PLUG
45 N·m (4.5 kg-m, 33 lb-ft)

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

Requirement	API Service Grade: Use "Energy Conserving II "SG grade oil. 5W-30 preferred.
Capcity	3.5 ℓ (3.7 US qt, 3.1 Imp qt) at change, including filter. 4.0 ℓ (4.2 US qt, 3.5 Imp qt) after engine overhaul.
Change	Every 7,500miles (12.000km) or 6 months.

Engine Oil Viscosity for Outside Temperature Ranges.



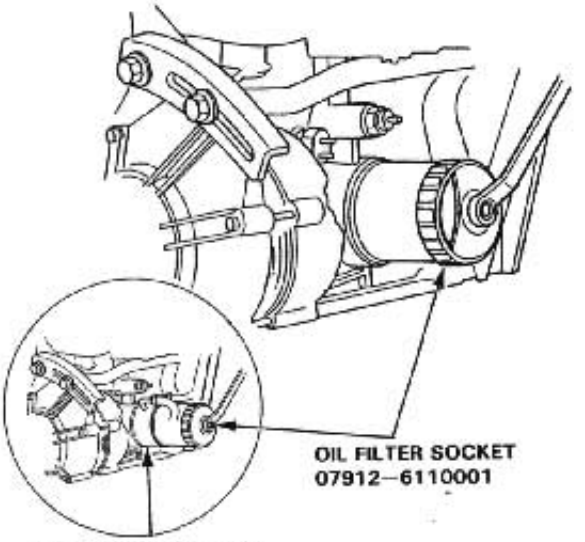
NOTE: Oil filter should be replaced at each oil change.

Oil Filter

Replacement

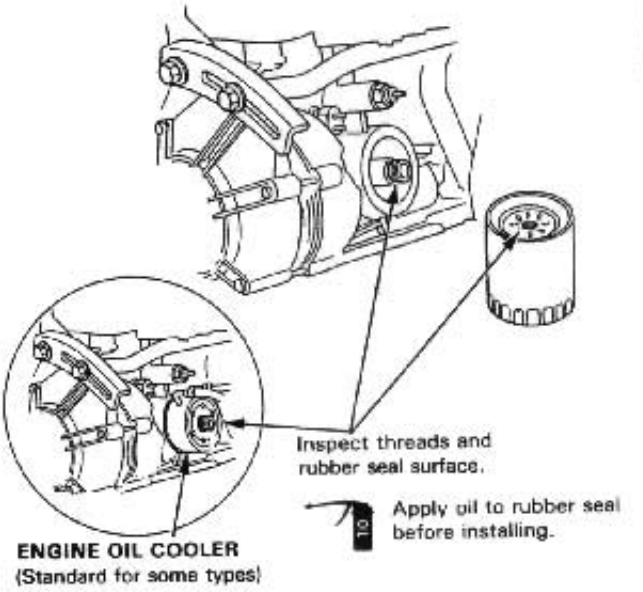
CAUTION: After the engine has been run, the exhaust pipes will be hot; be careful when working around the exhaust manifold.

1. Remove the oil filter with the special tool as shown.
2. Inspect the threads and rubber seal on the new filter. Wipe off seat on engine block, then apply a light coat of oil to the rubber seal.



3. Install the oil filter by hand.
4. After the rubber seal is seated, tighten the oil filter clockwise with the special tool.
   NOTE: Use only filters with a built-in bypass system.

   CAUTION: Installation other than the above procedure could result in serious engine defects due to oil leakage.



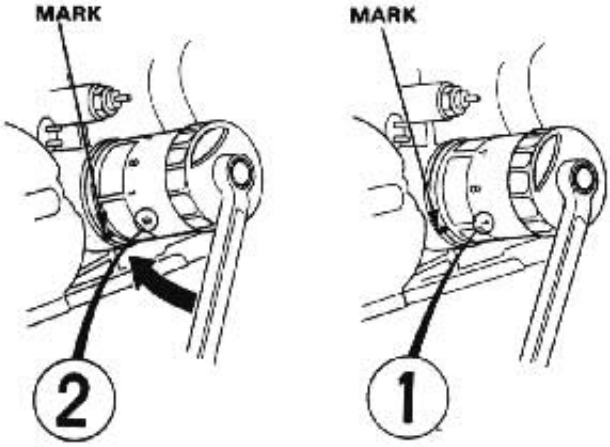
(cont'd)

Oil Filter

Replacement (cont'd)

Eight numbers (1 to 8) are printed on the surface of the filter.
The following explains the procedure for tightening filters using these numbers.

1) Make a mark on the cylinder block under the number that shows at the bottom of the filter when the rubber seal is seated.
2) Tighten the filter by turning it clockwise seven numbers from the marked point. For example, if a mark is made under the number 2 when the rubber seal is seated, the filter should be tightened untill the number 1 comes up to the marked point.



Number when rubber seal is seated.

Number after tightening.

Number when rubber seal is seated	1	2	3	4	5	6	7	8
Number after tightening	8	1	2	3	4	5	6	7

5. After installation, fill the engine with oil up to the specified level run the engine for more than 3 minutes, then check for oil leakage.

Oil Pressure

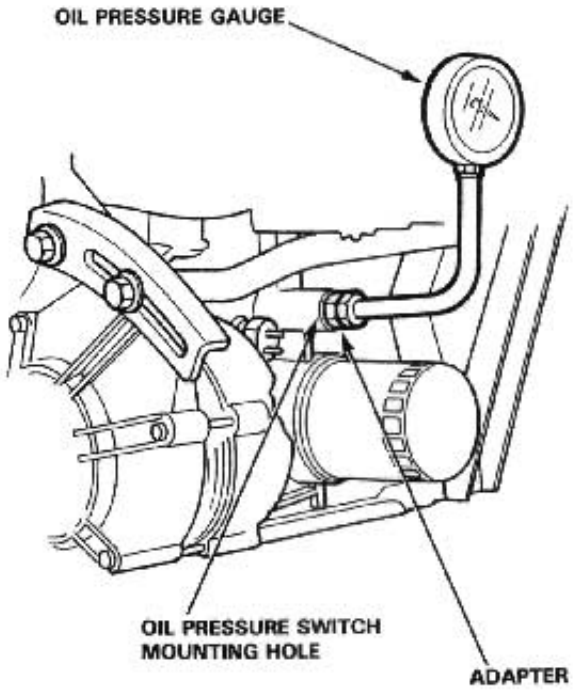
Test

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 switch 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: **69 kPa (0.7 kg/cm², 10 psi) minimum**
At 3,000 rpm: **343 kPa (3.5 kg/cm², 20 psi) minimum**

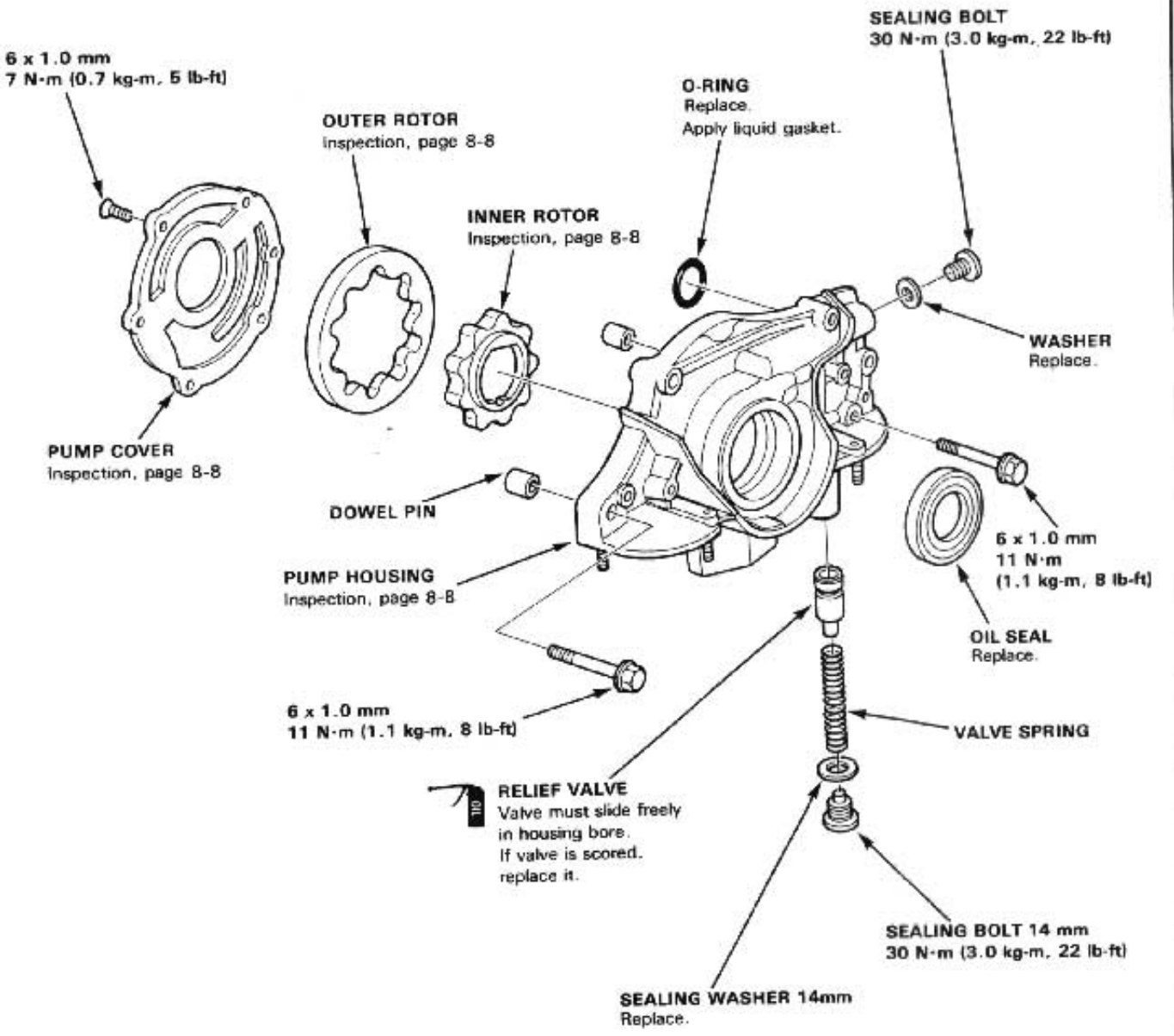
- If oil pressure is within specifications, replace oil pressure sender and recheck.
- If oil pressure is NOT within specifications, inspect the oil pump (page 8-8).



Oil Pump

Overhaul

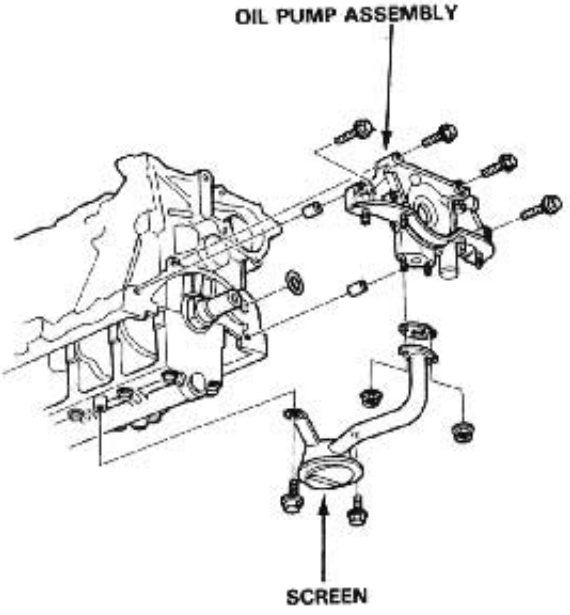
NOTE:
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part NO. 08718—0001.



Oil Pump

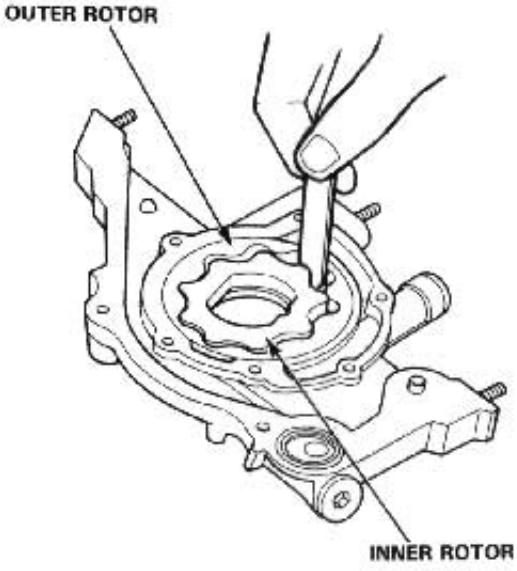
Removal/Inspection

1. Drain the engine oil.
2. Turn the crankshaft and align the white groove on the crankshaft pulley with the pointer on the timing belt cover.
3. Remove the valve cover and timing belt upper cover.
4. Remove and the alternator belt.
5. Remove the crankshaft pulley and remove the timing belt lower cover.
6. Remove the timing belt and drive pulley.
7. Remove the oil pan.
8. Remove the oil screen.
9. Remove the mount bolts and the oil pump assembly.



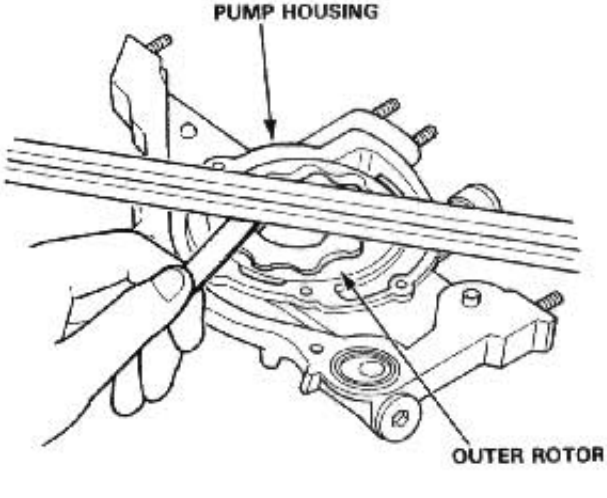
10. Remove the screws from the pump housing, then separate the housing and cover.
11. Check the radial clearance on the pump rotor.

Inner Rotor-to-Outer Rotor Radial Clearance
Standard (New): 0.04—0.14 mm
0.02—0.06 mm
Service Limit: 0.2 mm (0.008 in.)



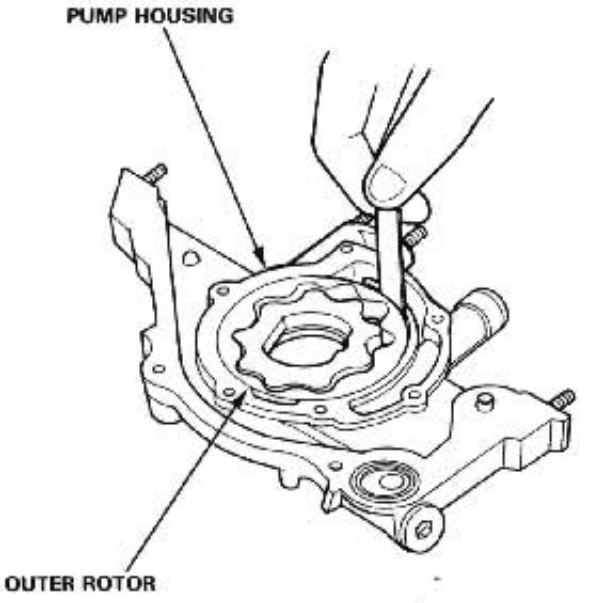
12. Check the axial clearance on the pump rotor.

Housing-to-Rotor Axial Clearance
Standard (New): 0.03—0.08 mm
(0.001—0.003 in.)
Service Limit: 0.15 mm (0.006 in.)



13. Check the radial clearance between the housing and the outer rotor.

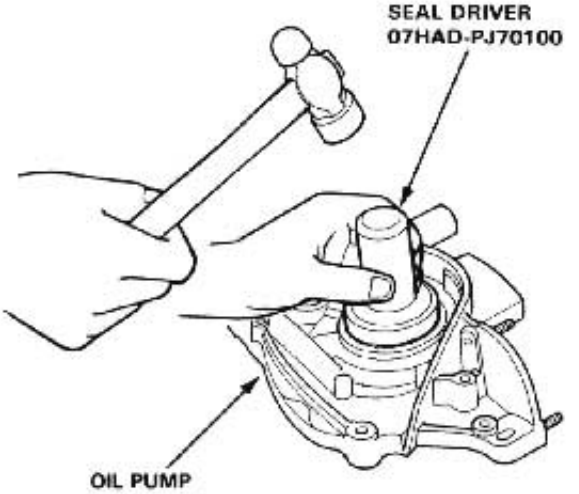
Housing-to-Rotor Radial Clearance
Standard (New): 0.10—0.175 mm (0.004—0.007 in.)
Service Limit: 0.20 mm (0.008 in.)



14. Inspect both rotors and pump housing for scoring or other damage. Replace parts as necessary.

15. Remove the old oil seal from the oil pump.

16. Gently tap in the new oil seal until the tool bottoms on the pump.



17. Reassemble the oil pump, applying locking fluid to the pump housing screws.

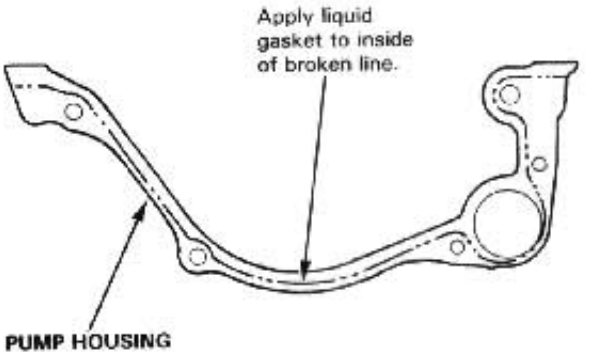
18. Check that the oil pump turns freely.

19. Apply a light coat of oil to the seal lip.

20. Install the two dowel pins and new O-ring on the cylinder block.

21. Apply liquid gasket to the cylinder block mating surface of the oil pump.

NOTE:
- Use liquid gasket, Part NO. 08718—0001.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, in a narrow bead centered on the mating surface.
- To prevent leakage of oil, apply sealant to the inner threads of the bolt holes.



- Do not install the parts if 20 minutes or more have elapsed since applying liquid gasket. Instead reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

(cont'd)

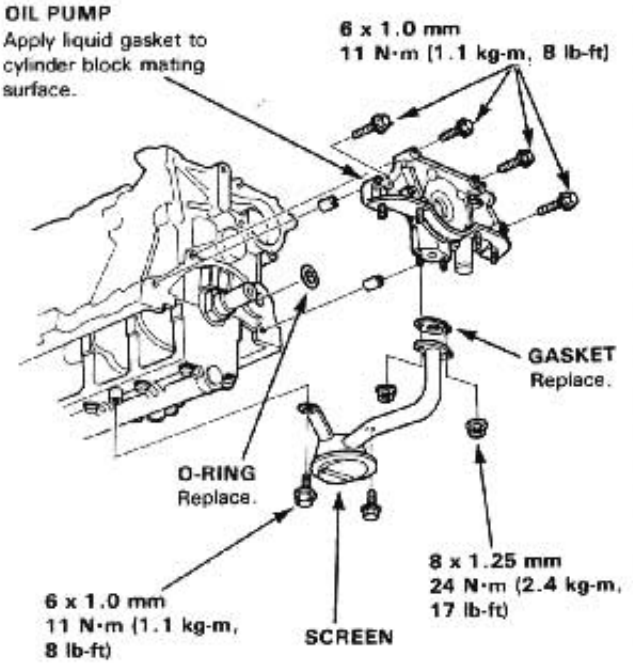
Oil Pump

Removal/Inspection (cont'd)

22. Install the oil pump on the cylinder block.

23. Install the oil screen.

24. Install the oil pan.

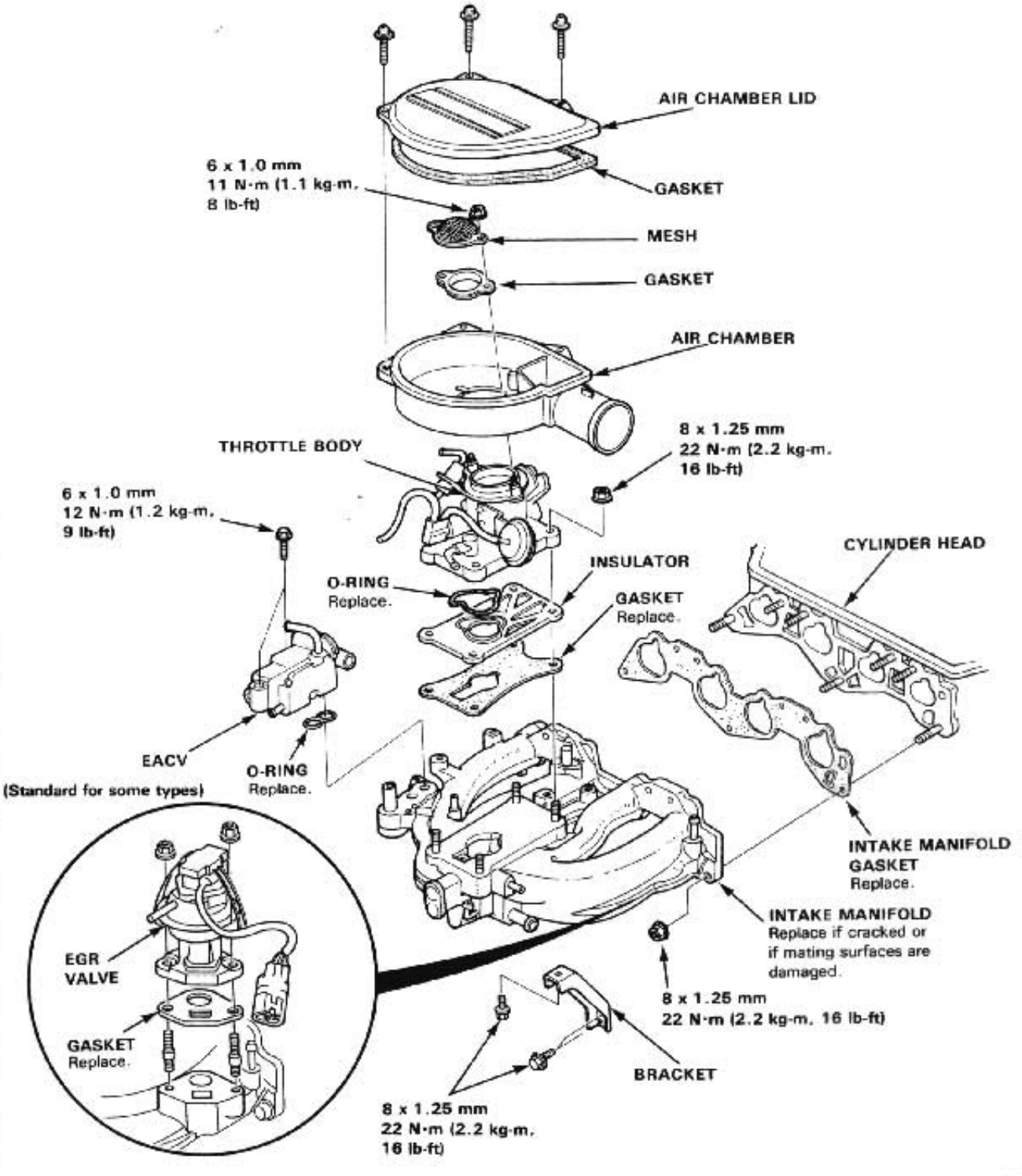


Intake Manifold/Exhaust System

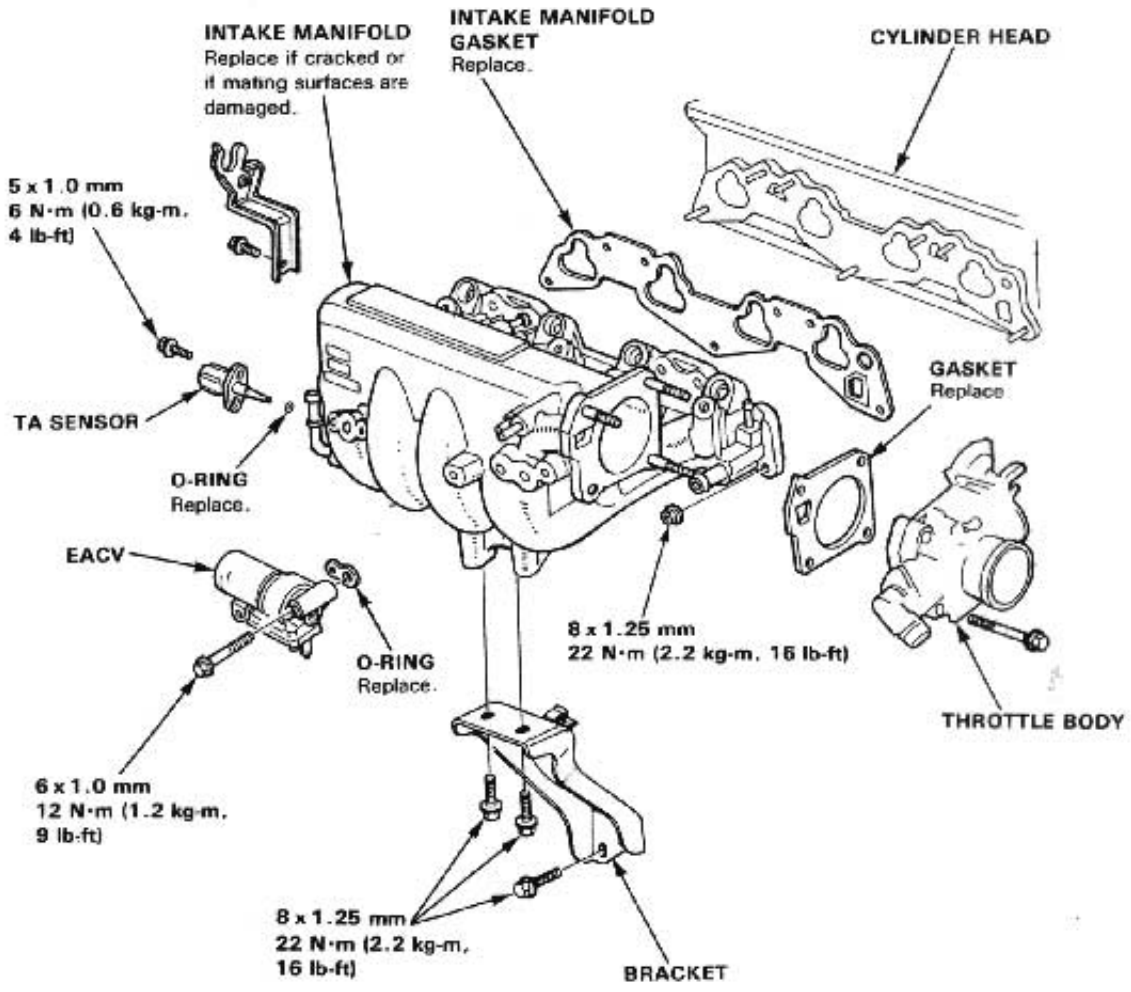
Intake Manifold

Replacement

DX:



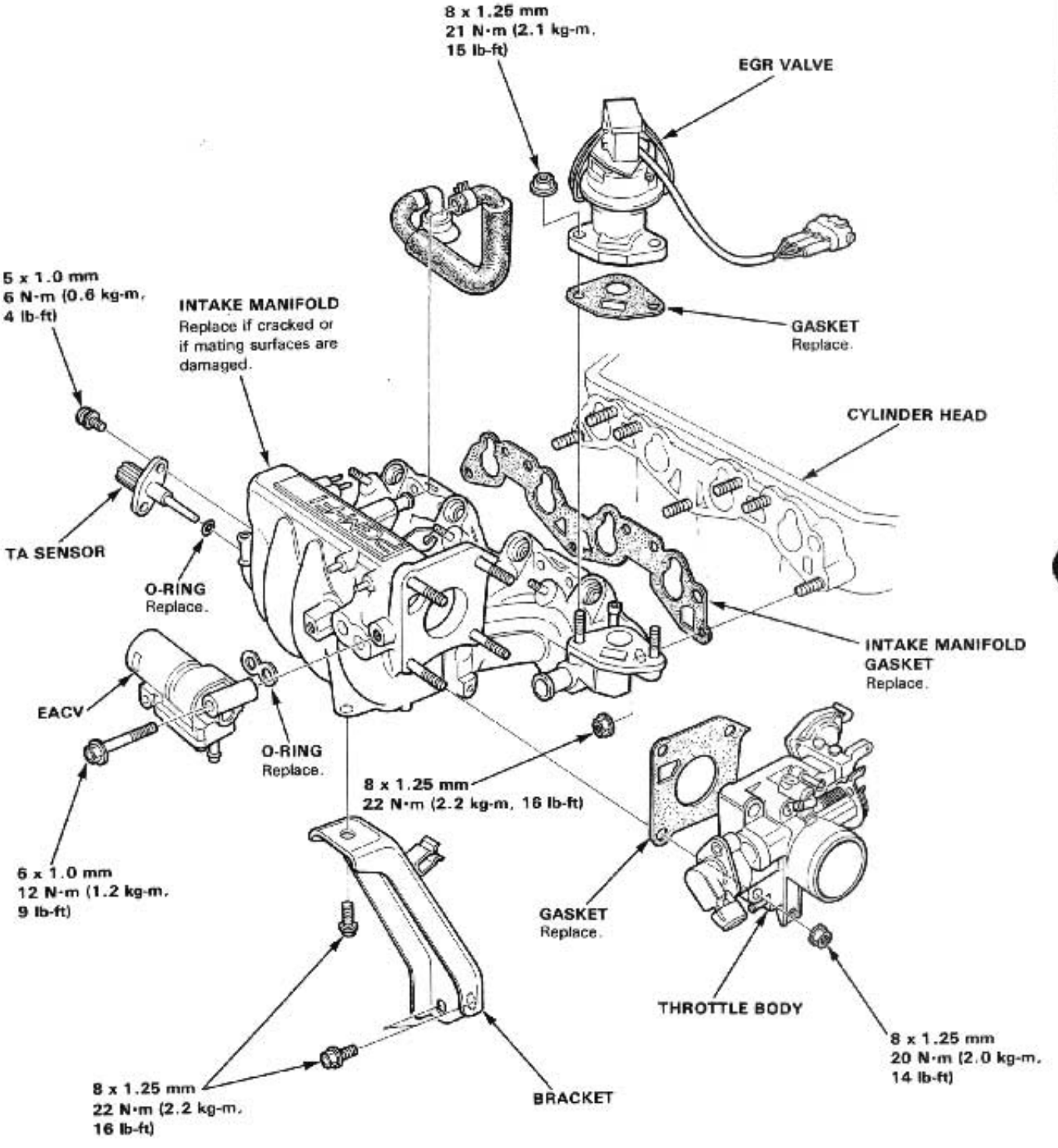
Si:


INTAKE MANIFOLD
Replace if cracked or if mating surfaces are damaged.
INTAKE MANIFOLD GASKET
Replace.
CYLINDER HEAD
5 x 1.0 mm
6 N·m (0.6 kg-m, 4 lb-ft)
TA SENSOR
O-RING
Replace.
GASKET
Replace
EACV
O-RING
Replace.
8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)
THROTTLE BODY
6 x 1.0 mm
12 N·m (1.2 kg-m, 9 lb-ft)
8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)
BRACKET

Intake Manifold

Replacement (cont'd)

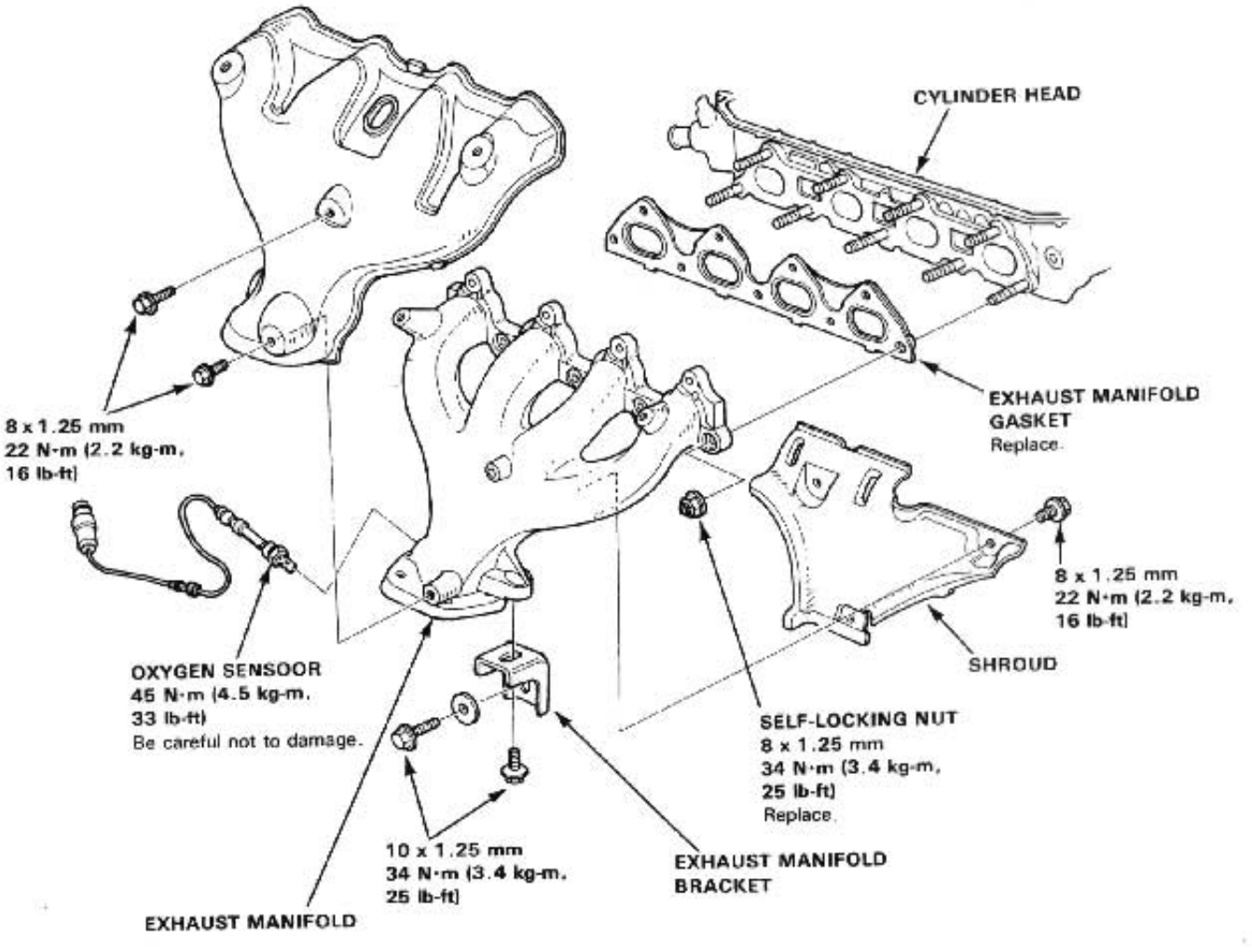
HF:



Exhaust Manifold

Replacement

DX: and Si:



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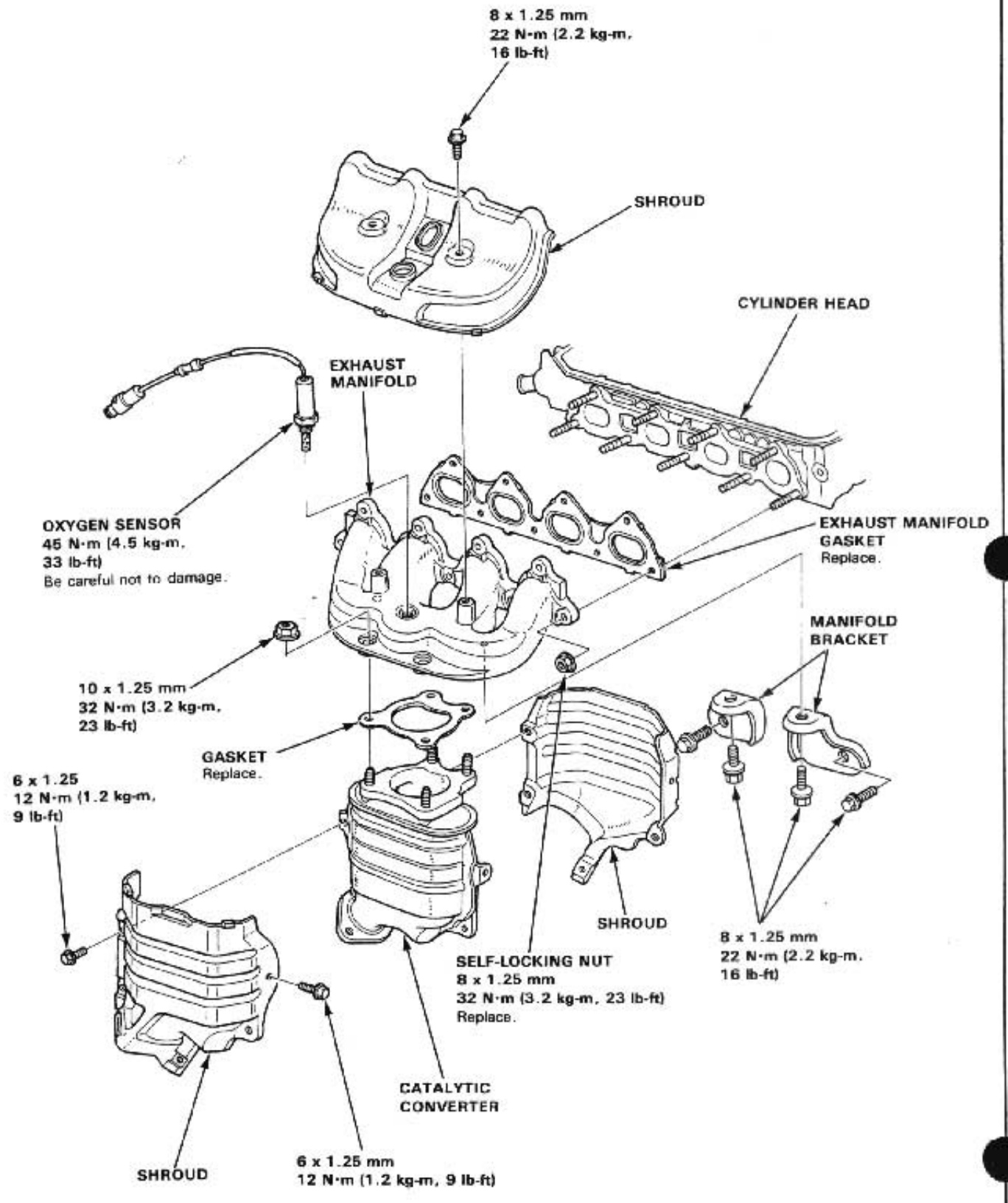
Exhaust Manifold

Replacement (cont'd)

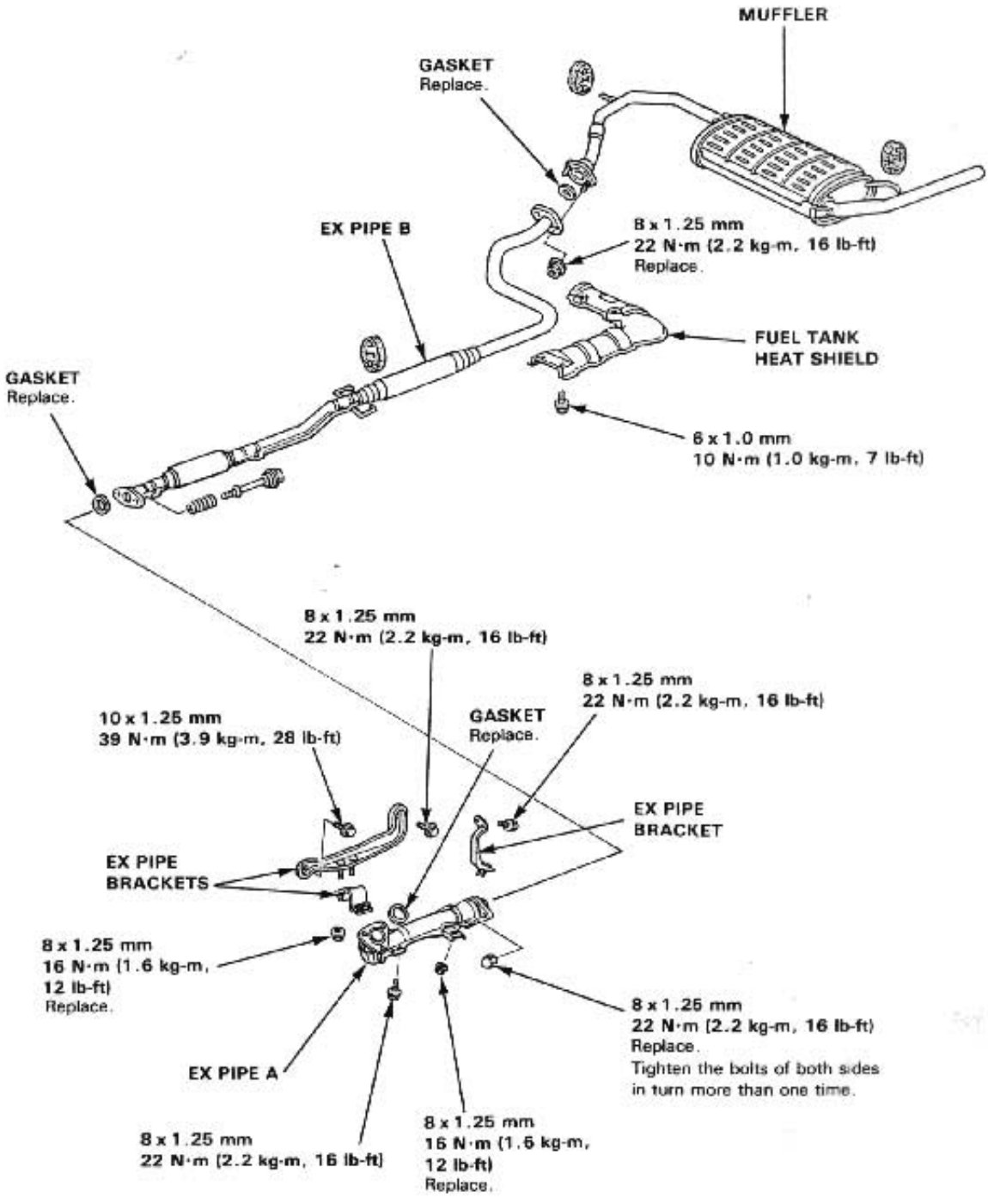
HF:



Exhaust Pipe and Muffler

Replacement

HF:

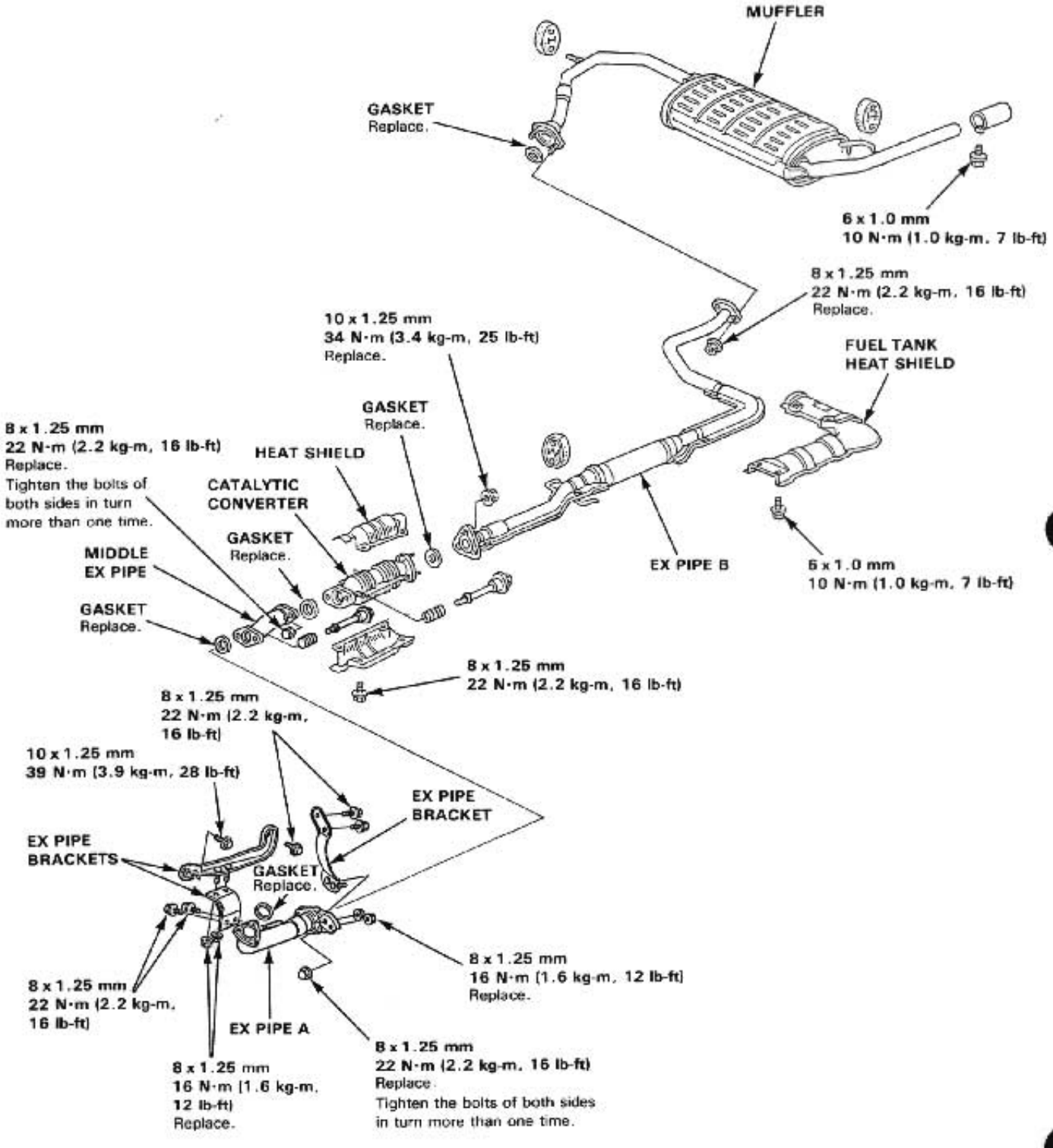


(cont'd)

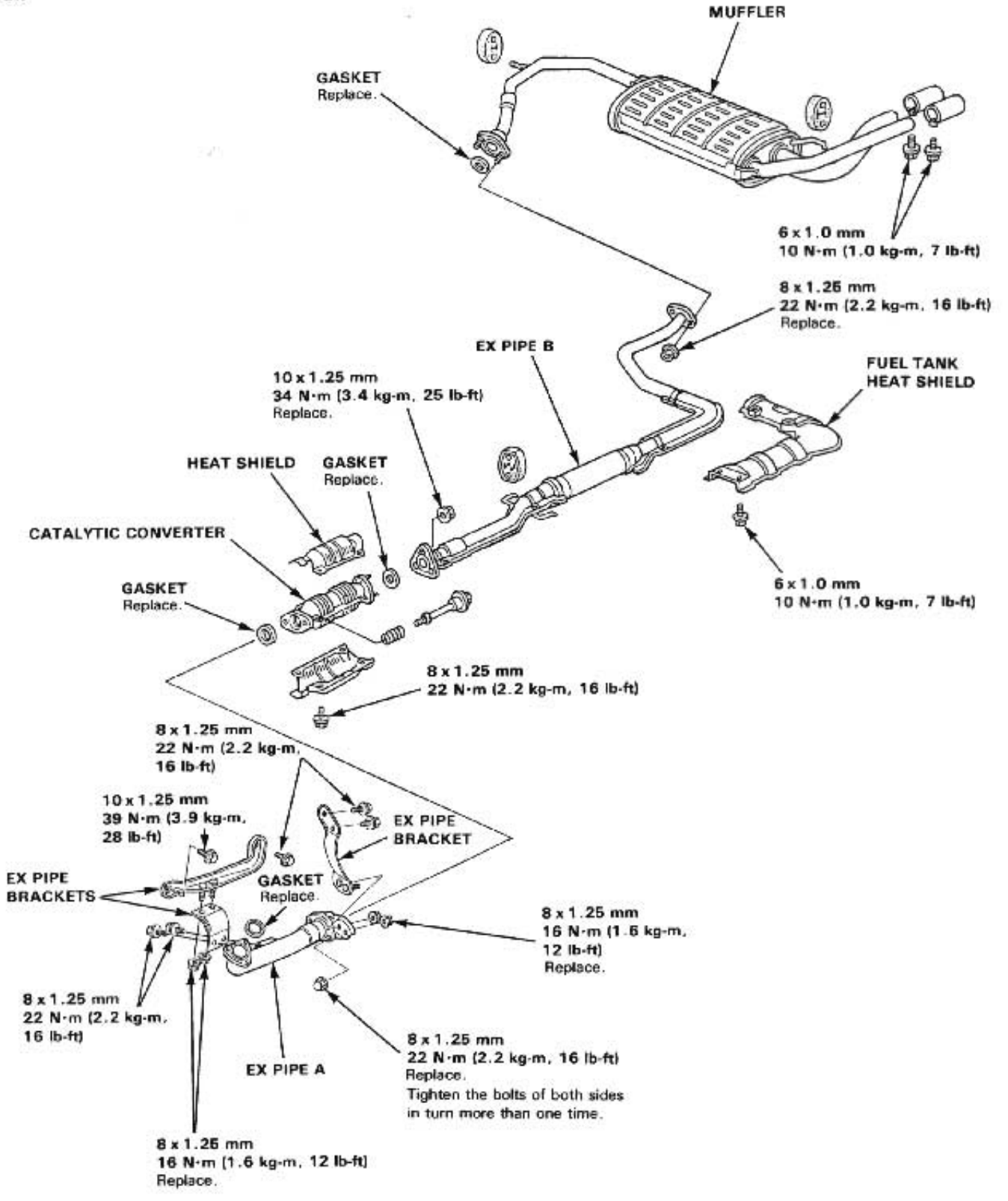
Exhaust Pipe and Muffler

Replacement (cont'd)

DX:



Si:


MUFFLER
GASKET
Replace.
6 x 1.0 mm
10 N·m (1.0 kg-m, 7 lb-ft)
8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)
Replace.
EX PIPE B
FUEL TANK
HEAT SHIELD
10 x 1.25 mm
34 N·m (3.4 kg-m, 25 lb-ft)
Replace.
HEAT SHIELD
GASKET
Replace.
CATALYTIC CONVERTER
GASKET
Replace.
6 x 1.0 mm
10 N·m (1.0 kg-m, 7 lb-ft)
8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)
8 x 1.25 mm
22 N·m (2.2 kg-m,
16 lb-ft)
10 x 1.25 mm
39 N·m (3.9 kg-m,
28 lb-ft)
EX PIPE
BRACKET
EX PIPE
BRACKETS
GASKET
Replace.
8 x 1.25 mm
16 N·m (1.6 kg-m,
12 lb-ft)
Replace.
8 x 1.25 mm
22 N·m (2.2 kg-m,
16 lb-ft)
EX PIPE A
8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)
Replace.
Tighten the bolts of both sides
in turn more than one time.
8 x 1.25 mm
16 N·m (1.6 kg-m, 12 lb-ft)
Replace.

Cooling

Radiator

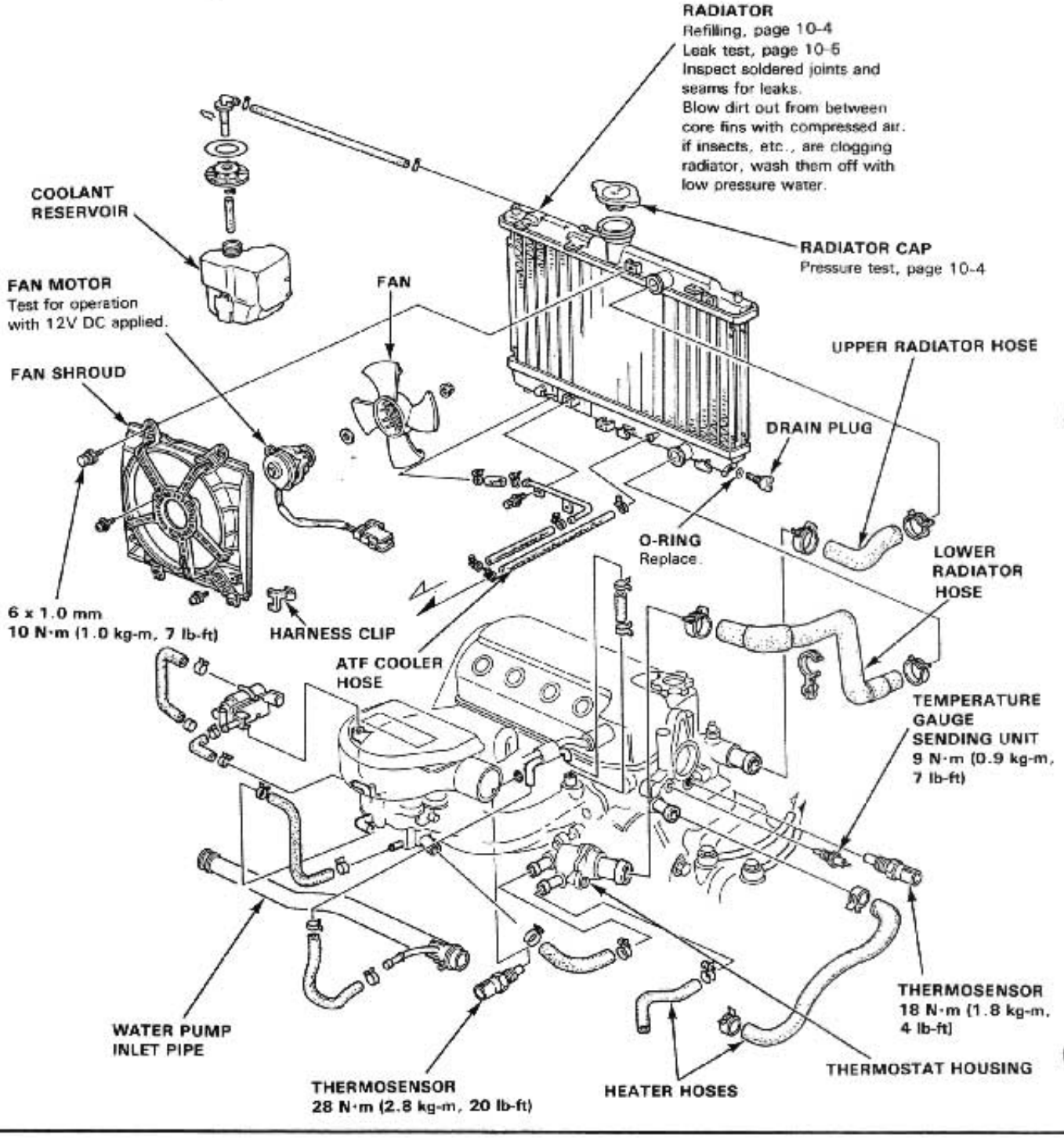
Replacement

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

Total Cooling System Capacity (Including heater and reservoir 0.4ℓ):
DX:
M/T :5.5 ℓ (5.8 US qt, 4.8 Imp qt)
A/T :5.4ℓ (5.7 US qt, 4.8 Imp qt)

CAUTION: When supplying coolant, be sure to shut the relay box lid and not to let coolant spill on the electrical parts or the painted portion. If any coolant spills, 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 when reassembling.



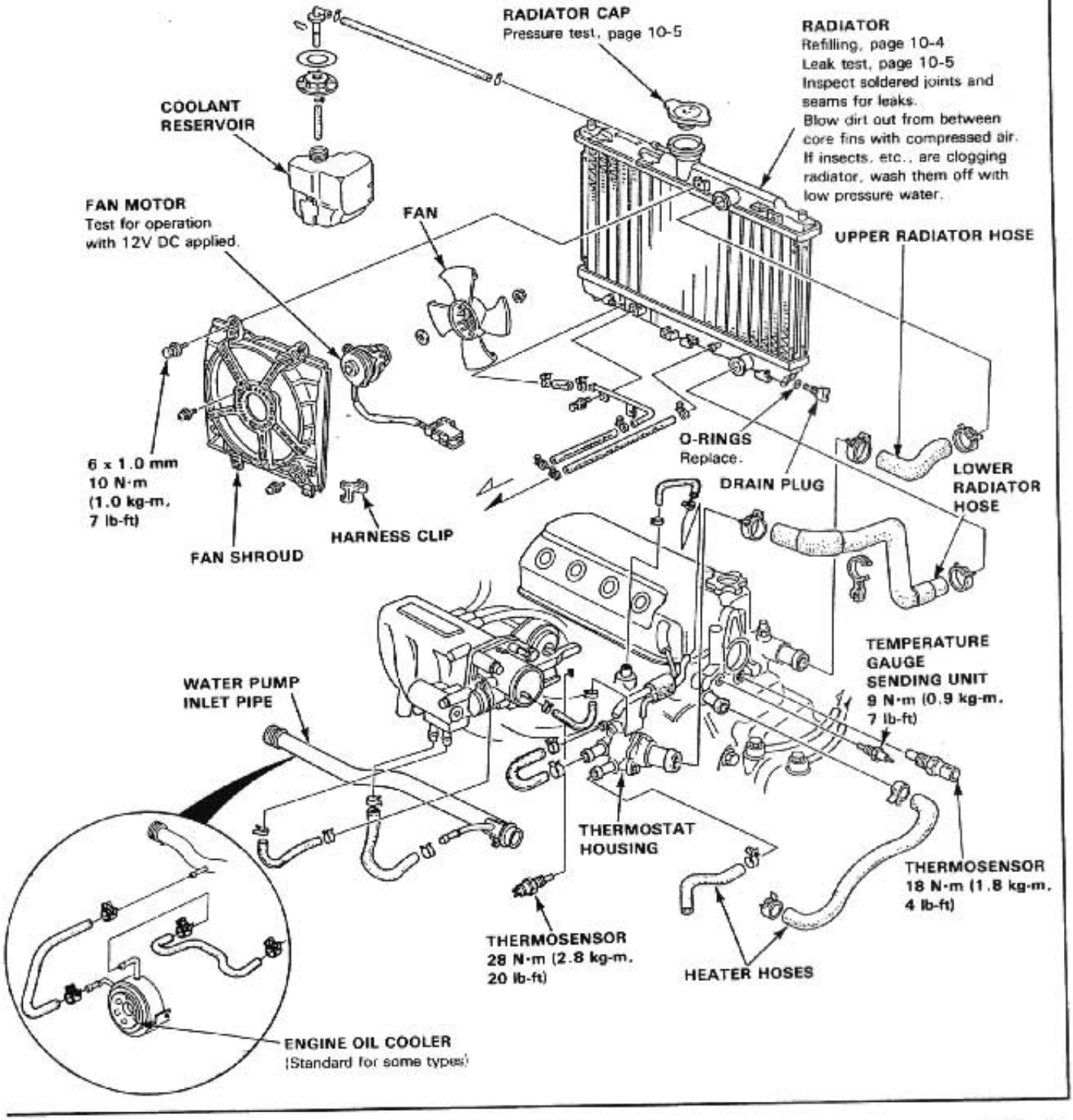
⚠WARNING System is under high pressure when engine is hot. To avoid danger of releasing scalding coolant, remove cap only when engine is cool.

Total Cooling System Capacity (Including heater and reservoir 0.4ℓ):

Si :5.4 ℓ (5.7 US qt, 4.8 Imp qt)
HF :5.2 ℓ (5.5 US qt, 4.6 Imp qt)

CAUTION: When supplying coolant, be sure to shut the relay box lid and not to let coolant spill on the electrical parts or the painted portion. If any coolant spills, 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 when reassembling.



Refilling and Bleeding

CAUTION: When supplying coolant, be sure to shut the relay box lid and not to let coolant spill on the electrical parts or the painted portion. If any coolant spills, rinse it off immediately.

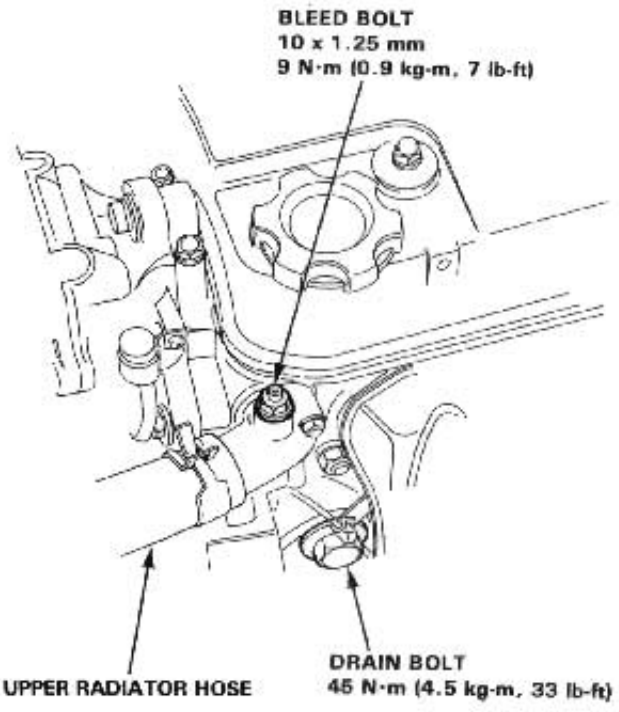
1. Set the heater temperature lever to maximum heat.
2. When the radiator is cool, remove the radiator cap and drain plug, and drain the radiator.
3. Reinstall the radiator drain plug and tighten it securely.
4. Remove, drain and reinstall the reservoir. Fill the reservoir halfway to the MAX mark with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

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

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

Radiator Coolant Refill Capacity:
(Including reservoir 0.4 liters)
DX:
M/T :4.5 ℓ (4.8 US qt, 4.0 Imp qt)
A/T :4.4 ℓ (4.7 US qt, 3.9 Imp qt)
Si :4.4 ℓ (4.7 US qt, 3.9 Imp qt)
HF :4.2 ℓ (4.4 US qt, 3.7 Imp qt)

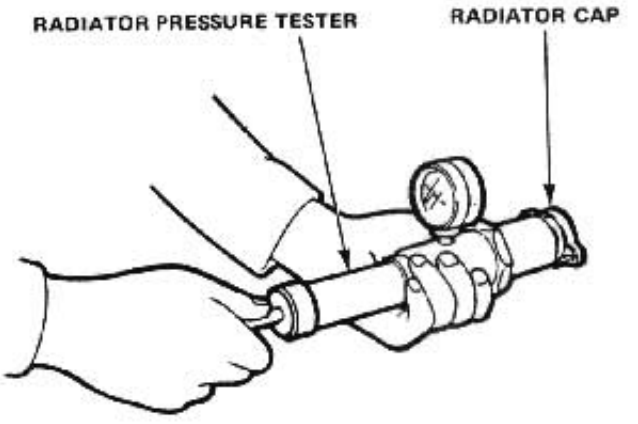
6. Loosen the air bleed bolt in the water outlet, then fill the radiator to the bottom of the filler neck with the coolant mixture. Tighten the bleed bolt as soon as coolant starts to run out in a steady stream without bubbles.



7. With the radiator cap off, start the engine and let it run until warmed up (fan goes on at least twice). 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

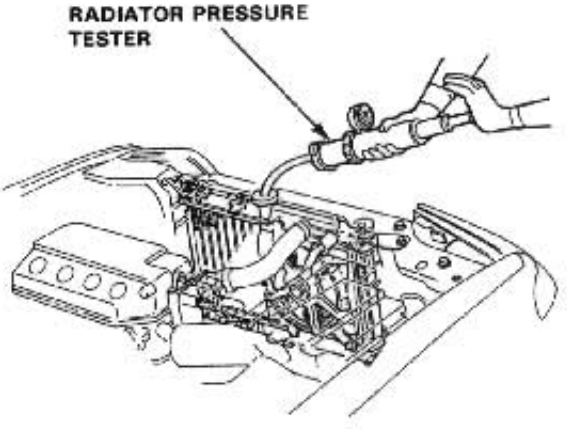
1. Remove the radiator cap, wet its seal with coolant, then install it on the pressure tester.
2. Apply a pressure of 74–103 kPa (0.75–1.05 kg/cm², 11–15 psi).
3. Check for a drop in pressure.



Radiator Testing

1. Wait until the engine is cool, then carefully remove the radiator 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 radiator cap.

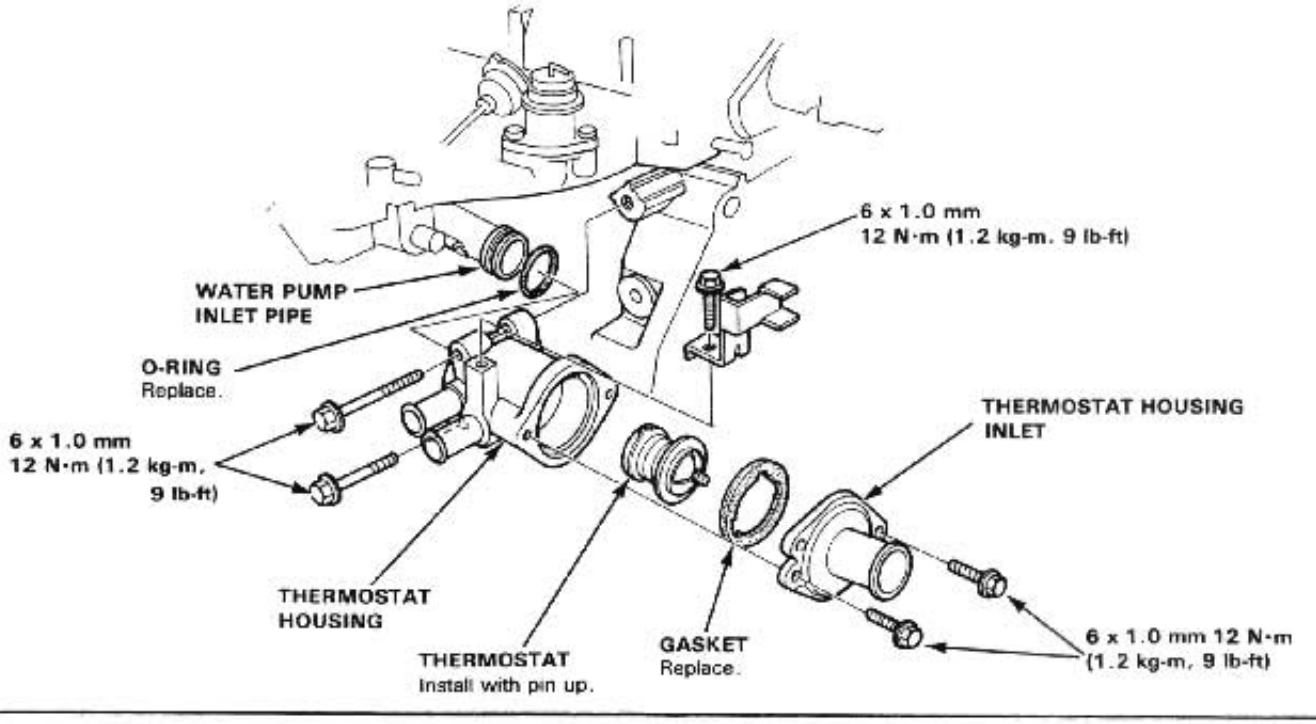
   NOTE: Check for engine oil in coolant and/or coolant in engine oil.



Thermostat

Replacement

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



Testing

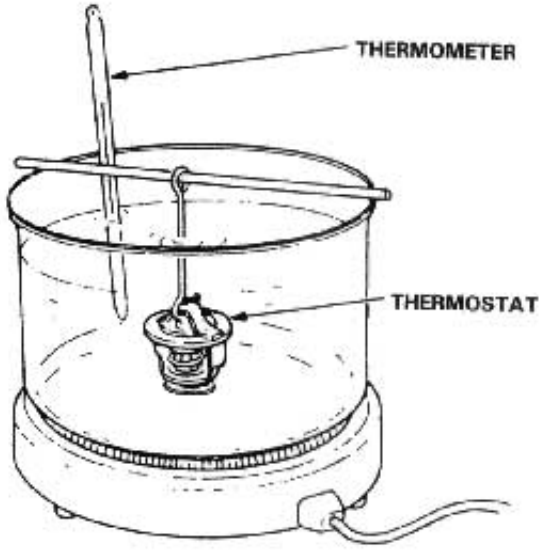
Replace thermostat if it is open at room temperature.

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 which it is fully open.

   CAUTION: Do not let thermometer touch bottom of hot container.
3. Measure lift height of thermostat when fully open.

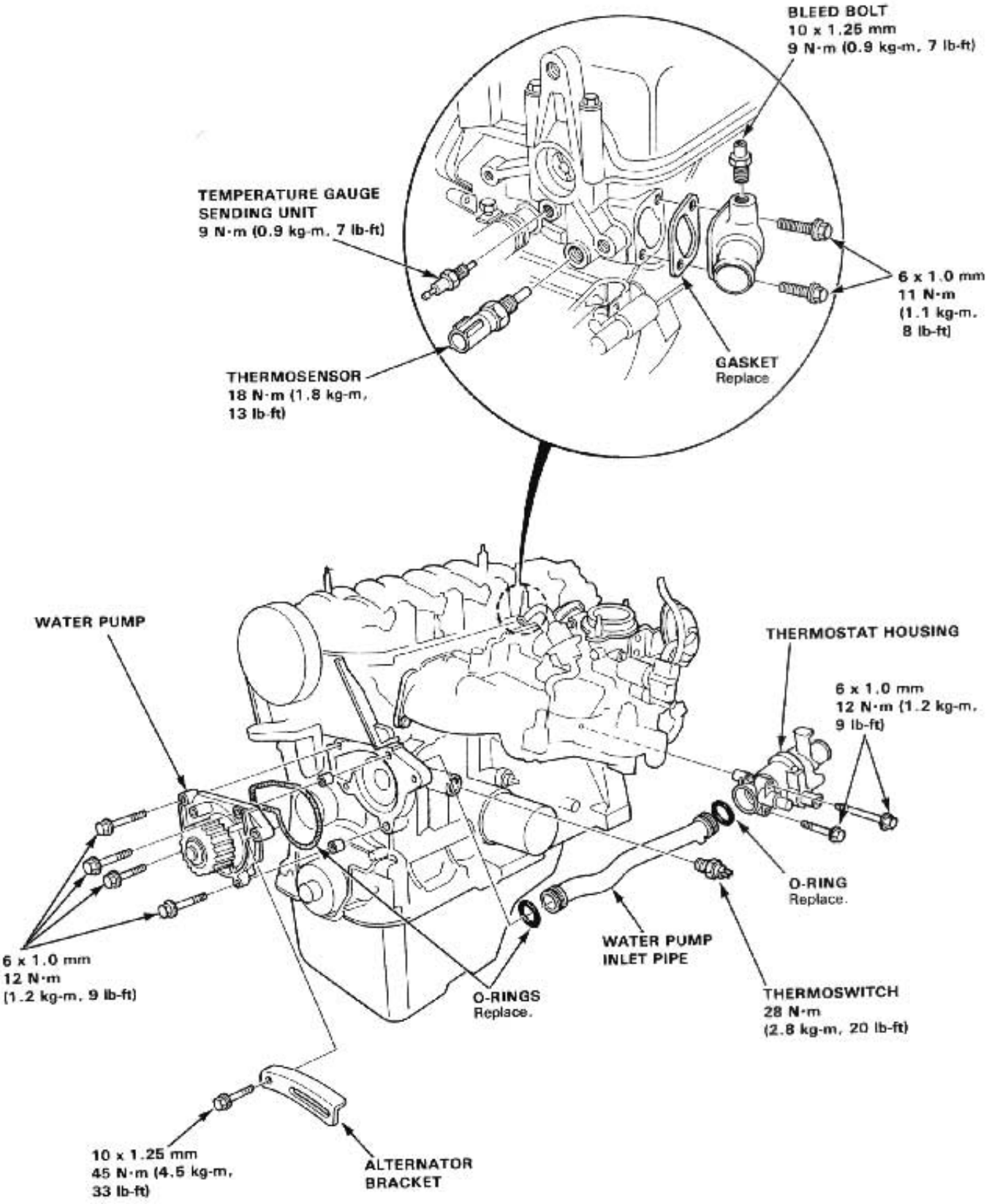
STANDARD THERMOSTAT
Lift height: 8 mm (0.31 in.)
Starts opening: 78°C ± 2°C (172°F ± 3°F)
Fully open: 90°C (194°F)



Water Pump

Illustrated Index

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

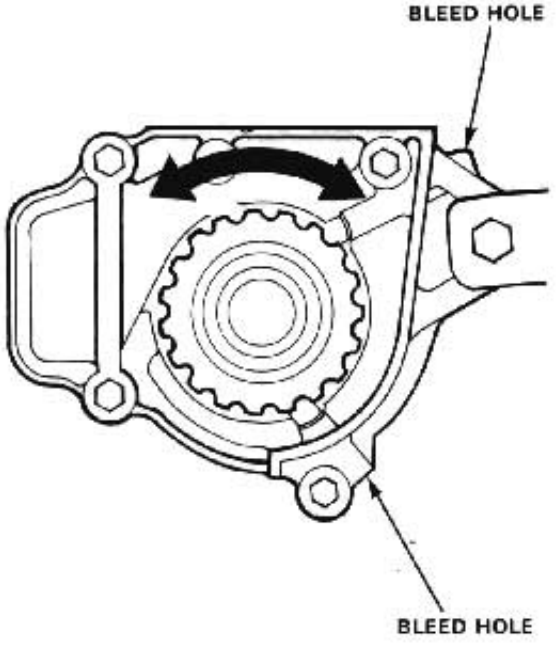


Water Pump

Inspection

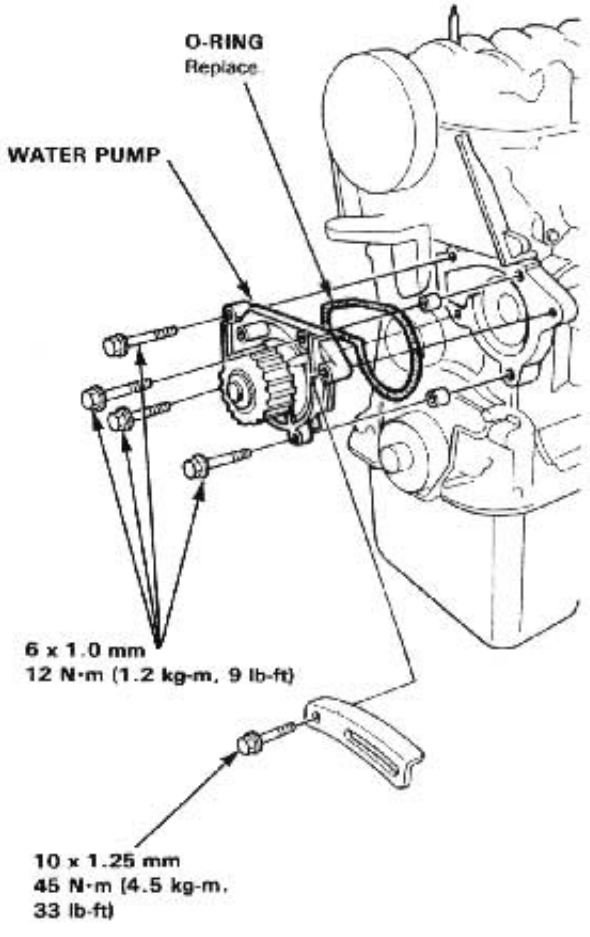
1. Remove the timing belt (page 6-25).
2. Check the water pump pulley turns freely.
3. Check the signs of seal leakage.

   NOTE: Small amount of "weeping" from the bleed hole is normal.



Replacement

1. Remove the timing belt (page 6-27).
2. Remove the water pump by removing five bolts.



3. Install the water pump in the reverse order of removal.

Fuel and Emissions

PGM-FI Control System

Idle Control System

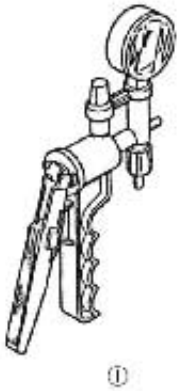
Fuel Supply System

Air Intake System

Emission Control System

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	A973X—041—XXXXX	Vacuum Pump/Gauge	1	11-42
②	KS—AHM—32—003	Digital Multimeter	1	11-27
③	07GMJ—ML80100	Test Harness	1	11-139
④	07JAZ—001000A	Vacuum/Pressure Gauge 0—4 in. Hg	1	11-119
⑤	07406—0040001	Fuel Pressure Gauge	1	11-94
⑥	07999—PD6000A	Test Harness	1	11-27



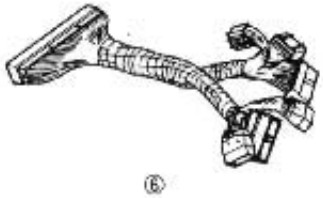
①

②

③

④

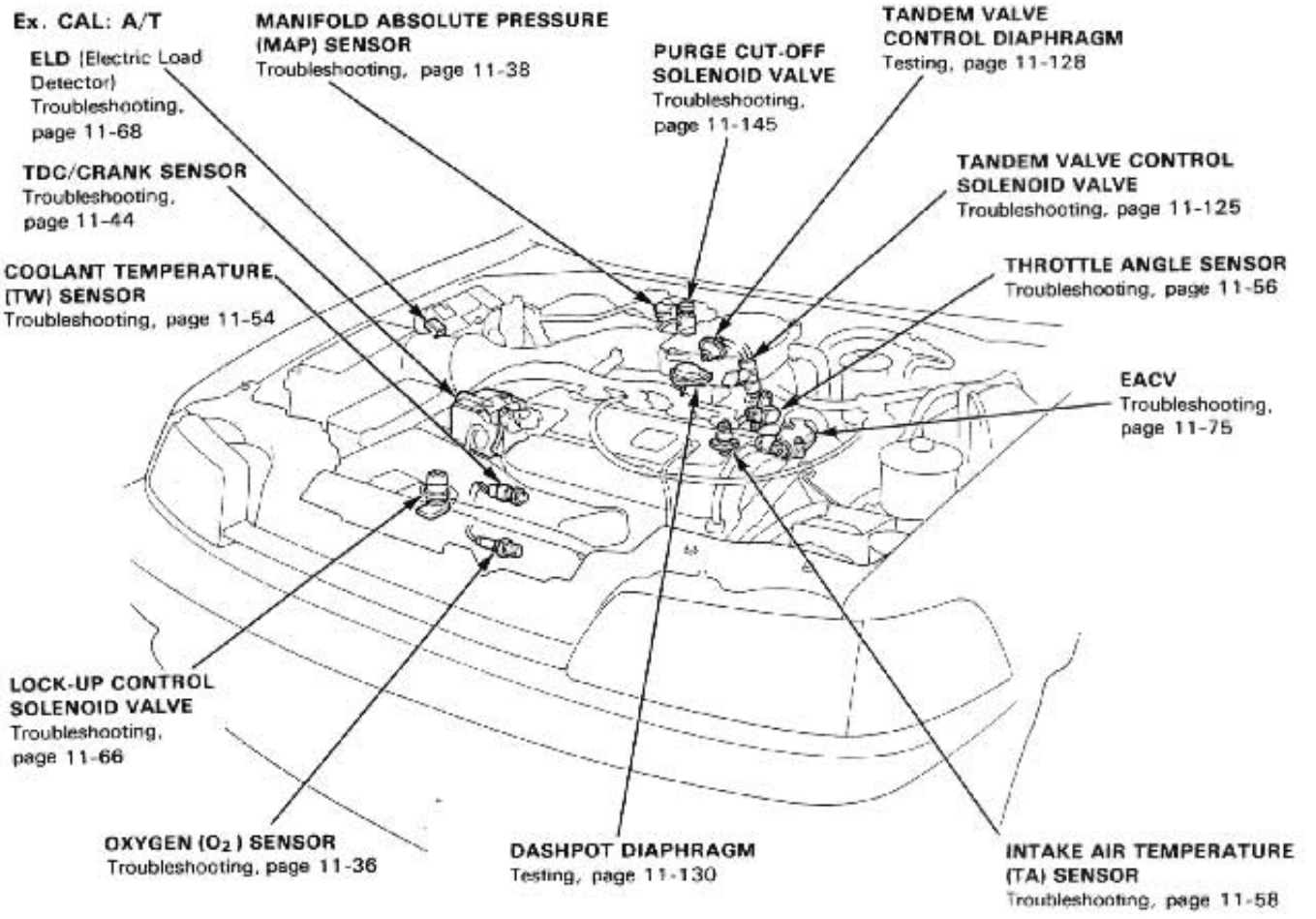
⑤

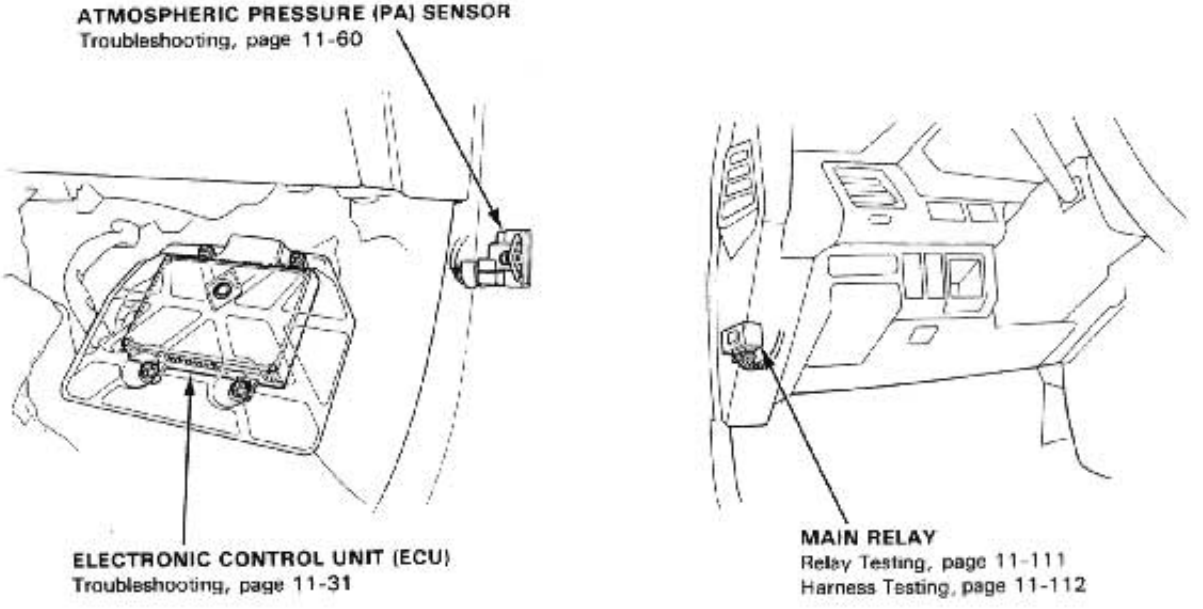


⑥

Component Locations

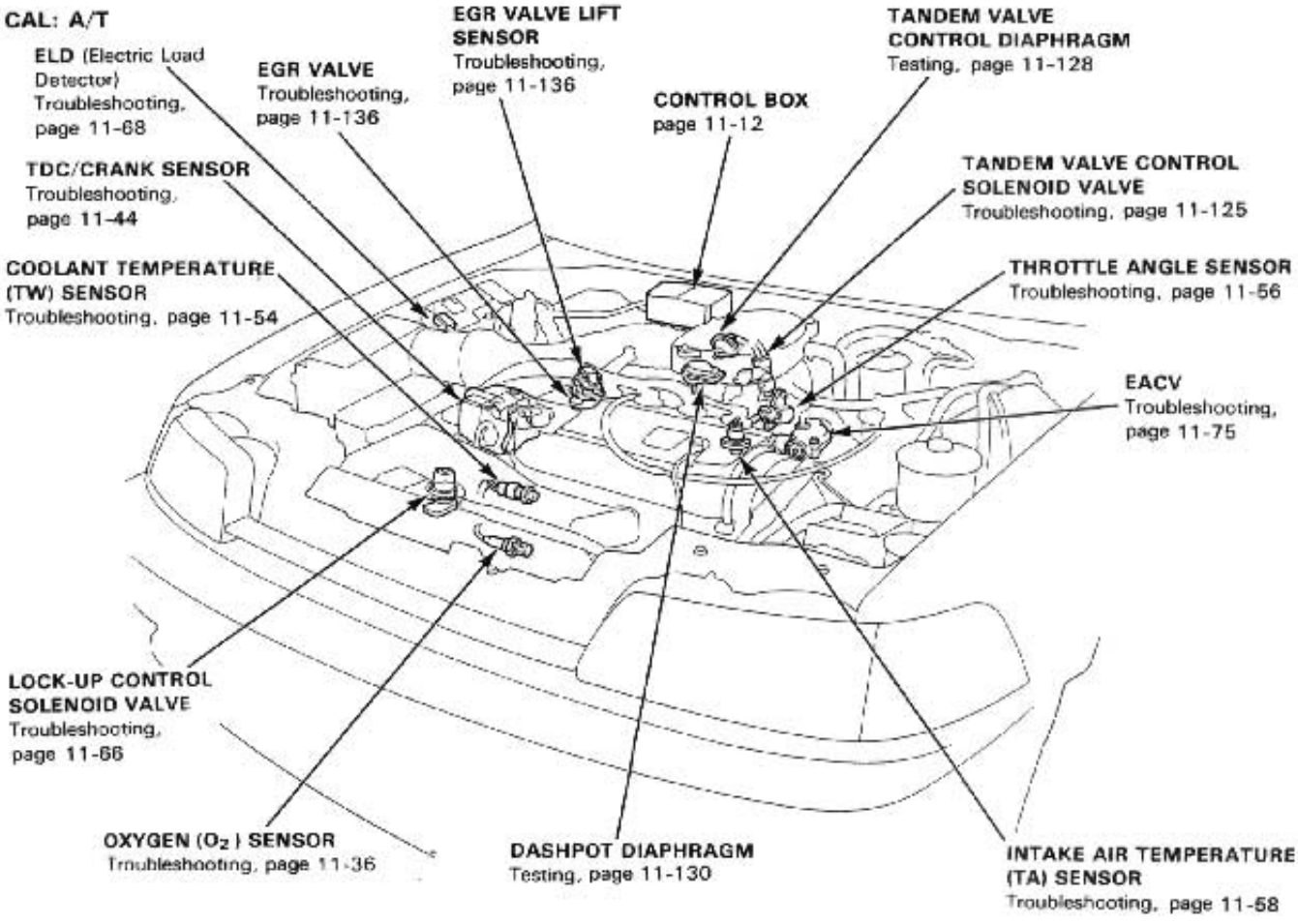
Index [Std.]

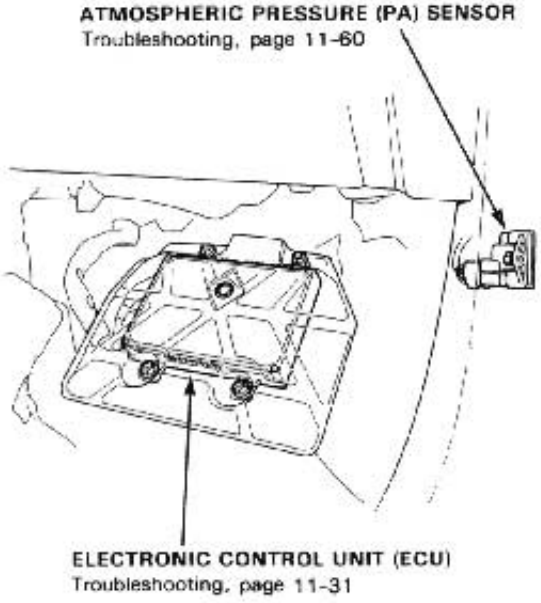


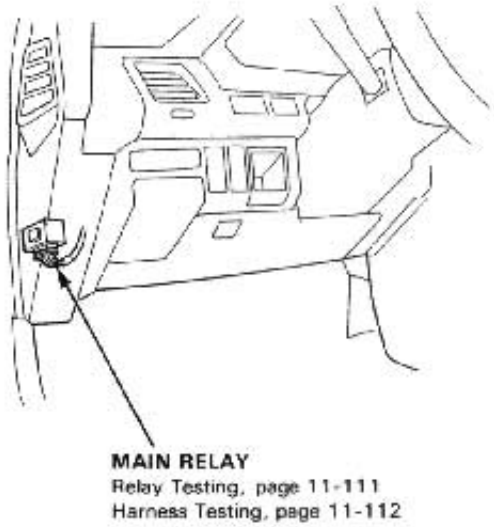


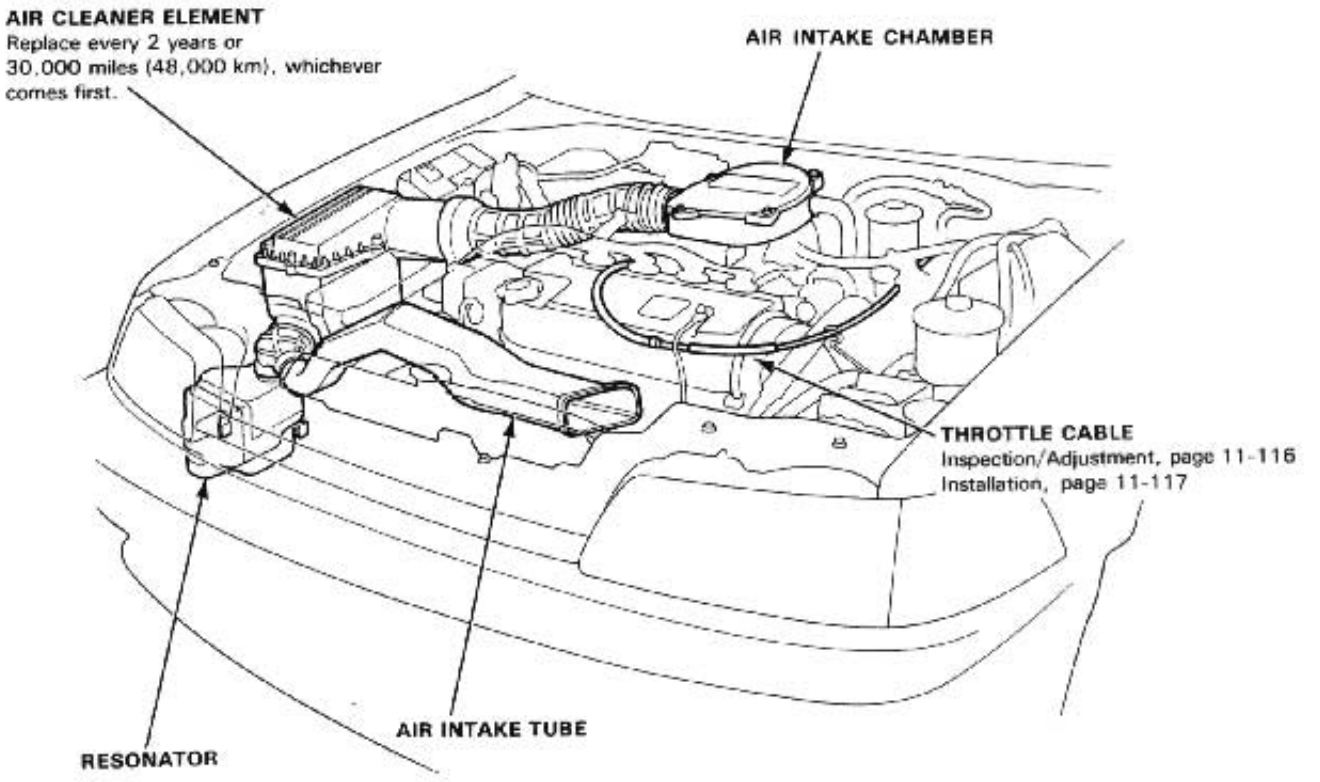
Component Locations

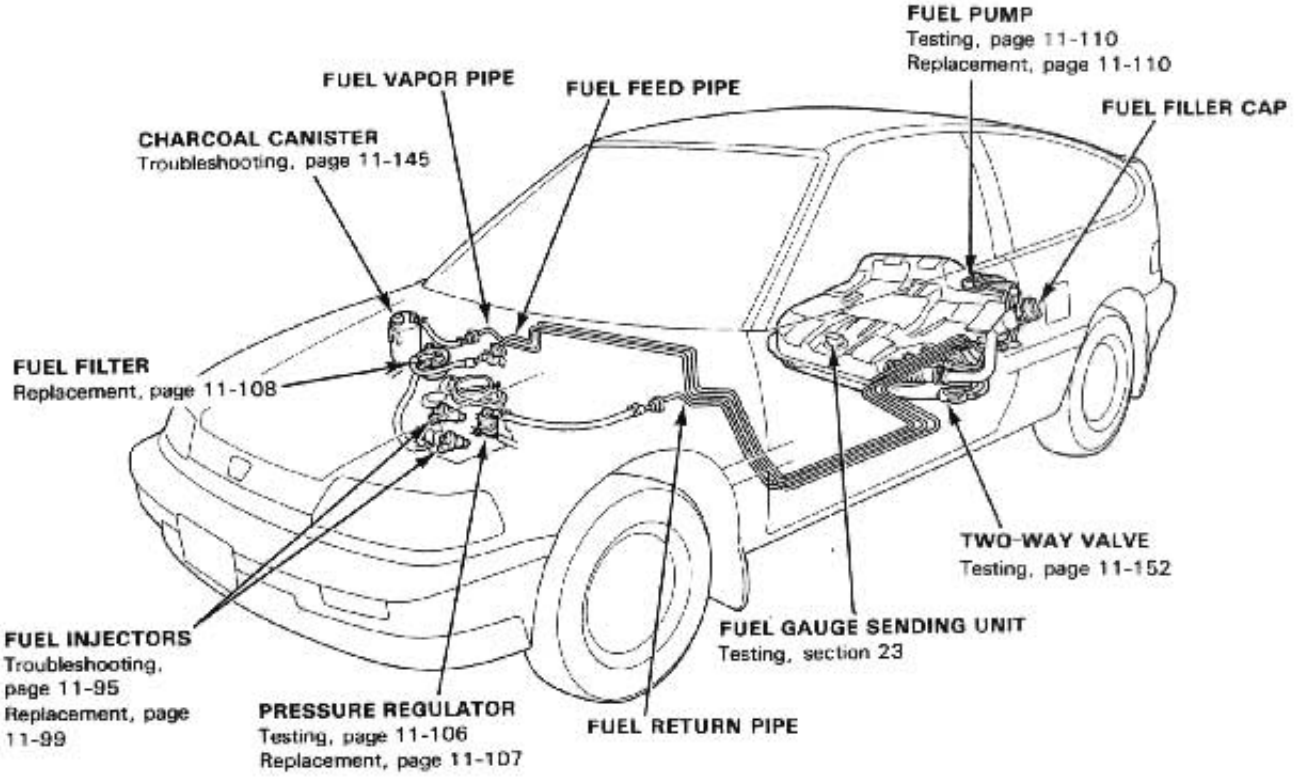
Index [Std.]





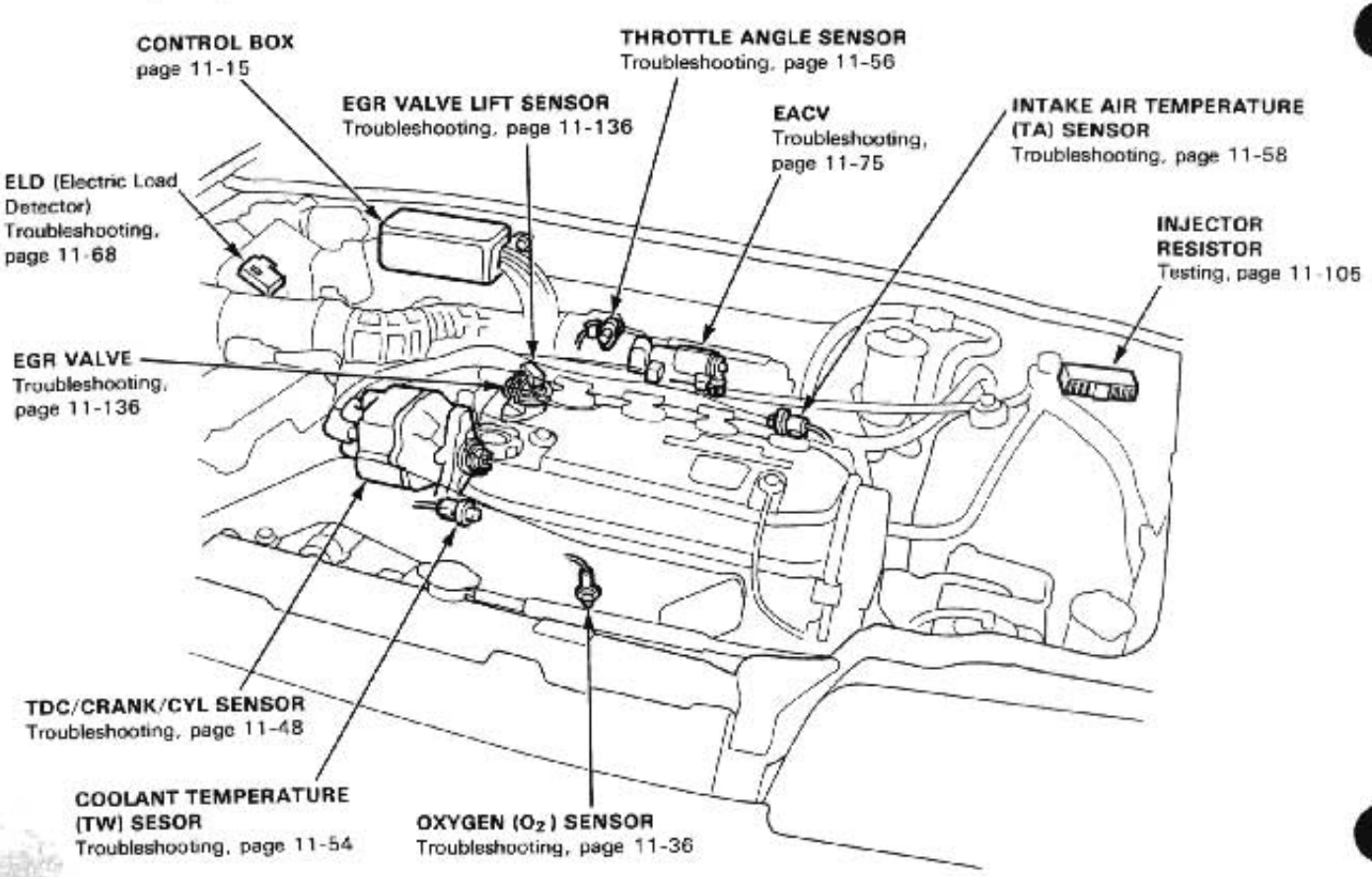


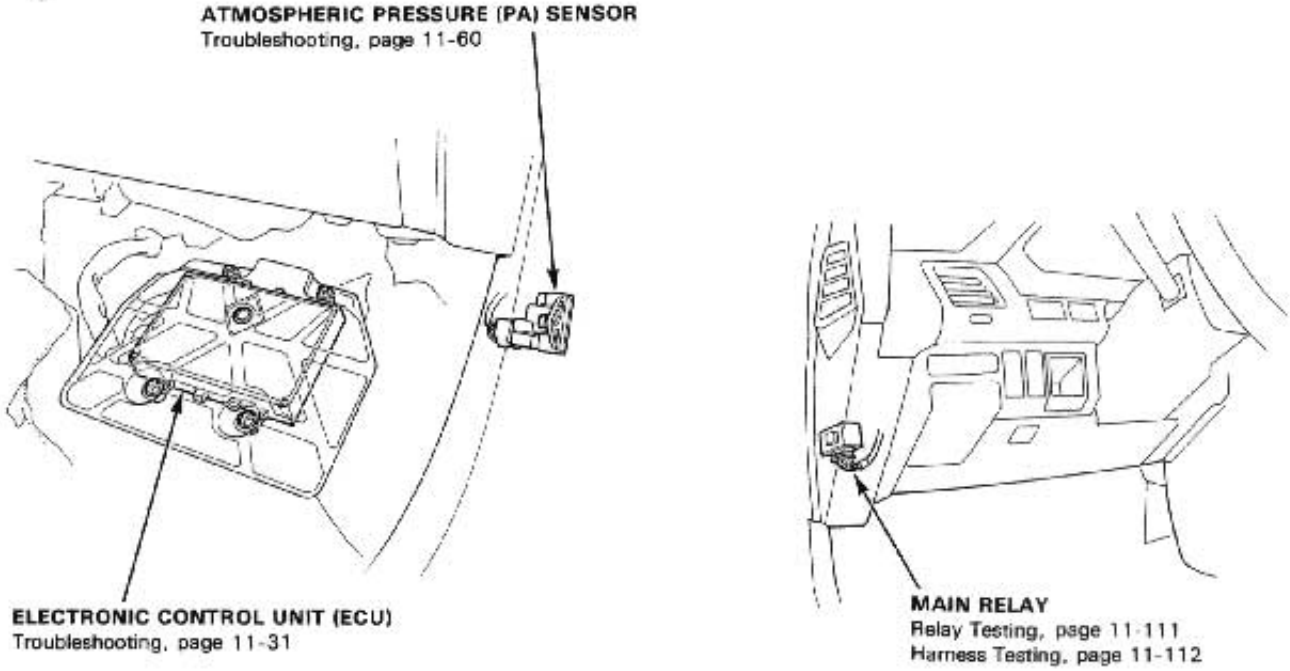

AIR CLEANER ELEMENT
Replace every 2 years or 30,000 miles (48,000 km), whichever comes first.
AIR INTAKE CHAMBER
THROTTLE CABLE
Inspection/Adjustment, page 11-116
Installation, page 11-117
RESONATOR
AIR INTAKE TUBE

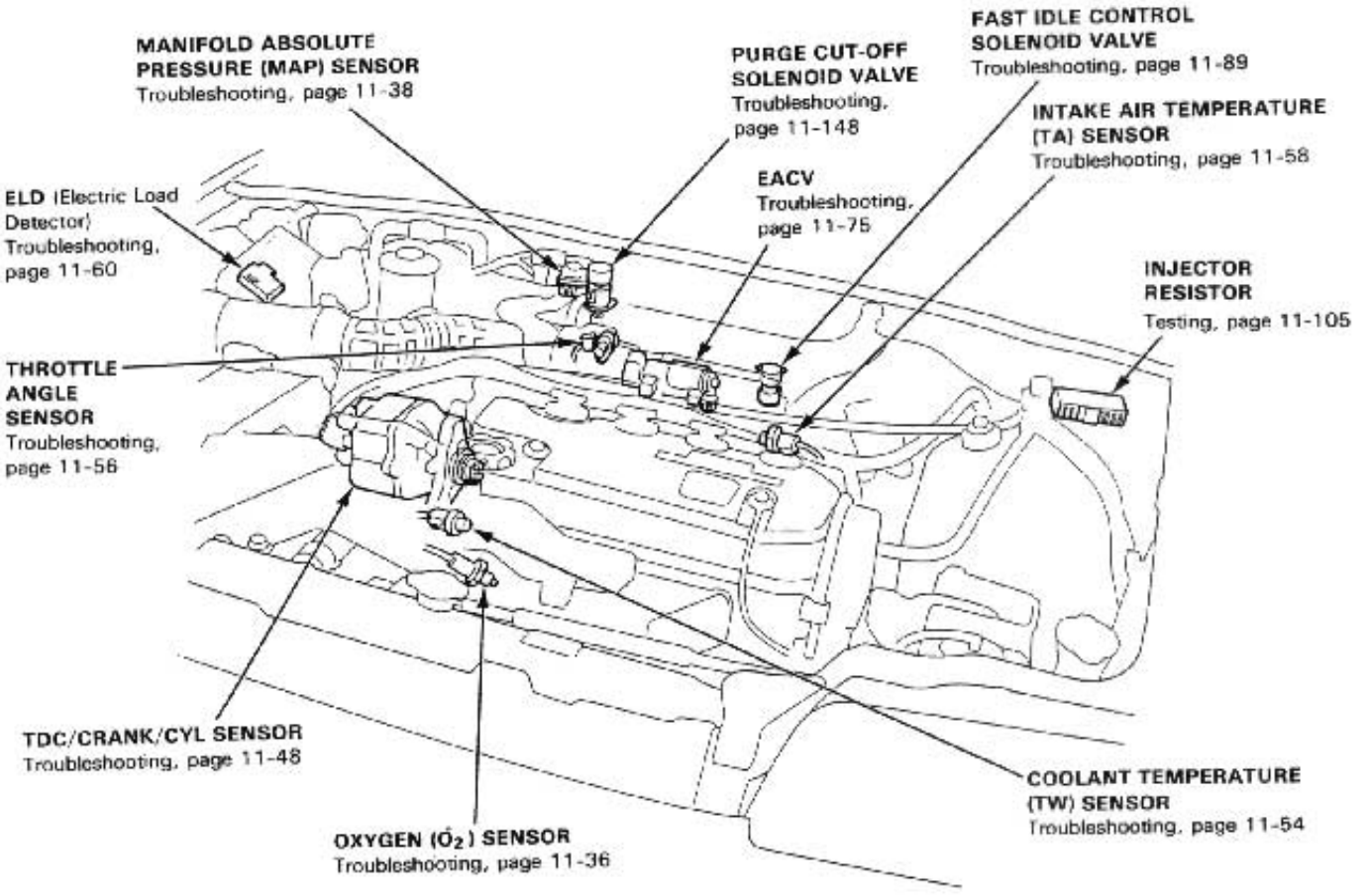

FUEL PUMP
Testing, page 11-110
Replacement, page 11-110
FUEL VAPOR PIPE
FUEL FEED PIPE
FUEL FILLER CAP
CHARCOAL CANISTER
Troubleshooting, page 11-145
FUEL FILTER
Replacement, page 11-108
TWO-WAY VALVE
Testing, page 11-152
FUEL GAUGE SENDING UNIT
Testing, section 23
FUEL INJECTORS
Troubleshooting, page 11-95
Replacement, page 11-99
PRESSURE REGULATOR
Testing, page 11-106
Replacement, page 11-107
FUEL RETURN PIPE

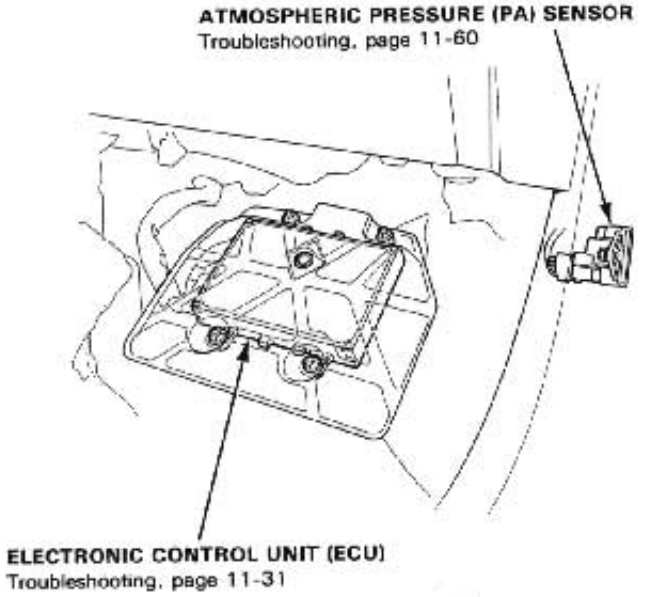
Component Locations

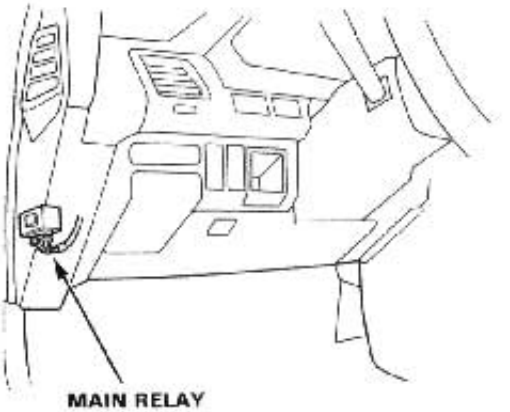
Index [HF]





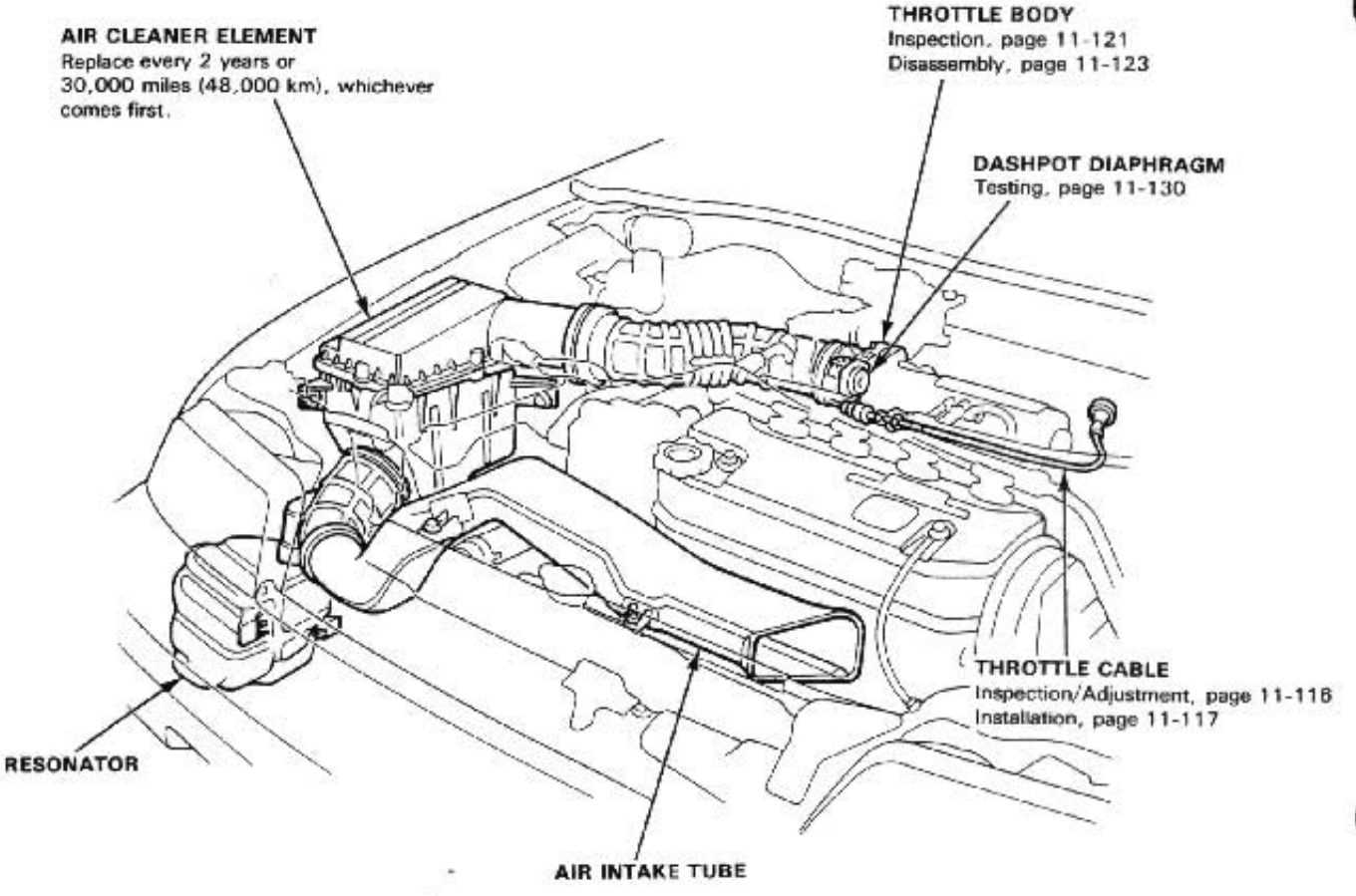

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
Troubleshooting, page 11-38
PURGE CUT-OFF SOLENOID VALVE
Troubleshooting, page 11-148
FAST IDLE CONTROL SOLENOID VALVE
Troubleshooting, page 11-89
INTAKE AIR TEMPERATURE (TA) SENSOR
Troubleshooting, page 11-58
EACV
Troubleshooting, page 11-75
ELD (Electric Load Detector)
Troubleshooting, page 11-60
INJECTOR RESISTOR
Testing, page 11-105
THROTTLE ANGLE SENSOR
Troubleshooting, page 11-56
TDC/CRANK/CYL SENSOR
Troubleshooting, page 11-48
COOLANT TEMPERATURE (TW) SENSOR
Troubleshooting, page 11-54
OXYGEN (O_2) SENSOR
Troubleshooting, page 11-36

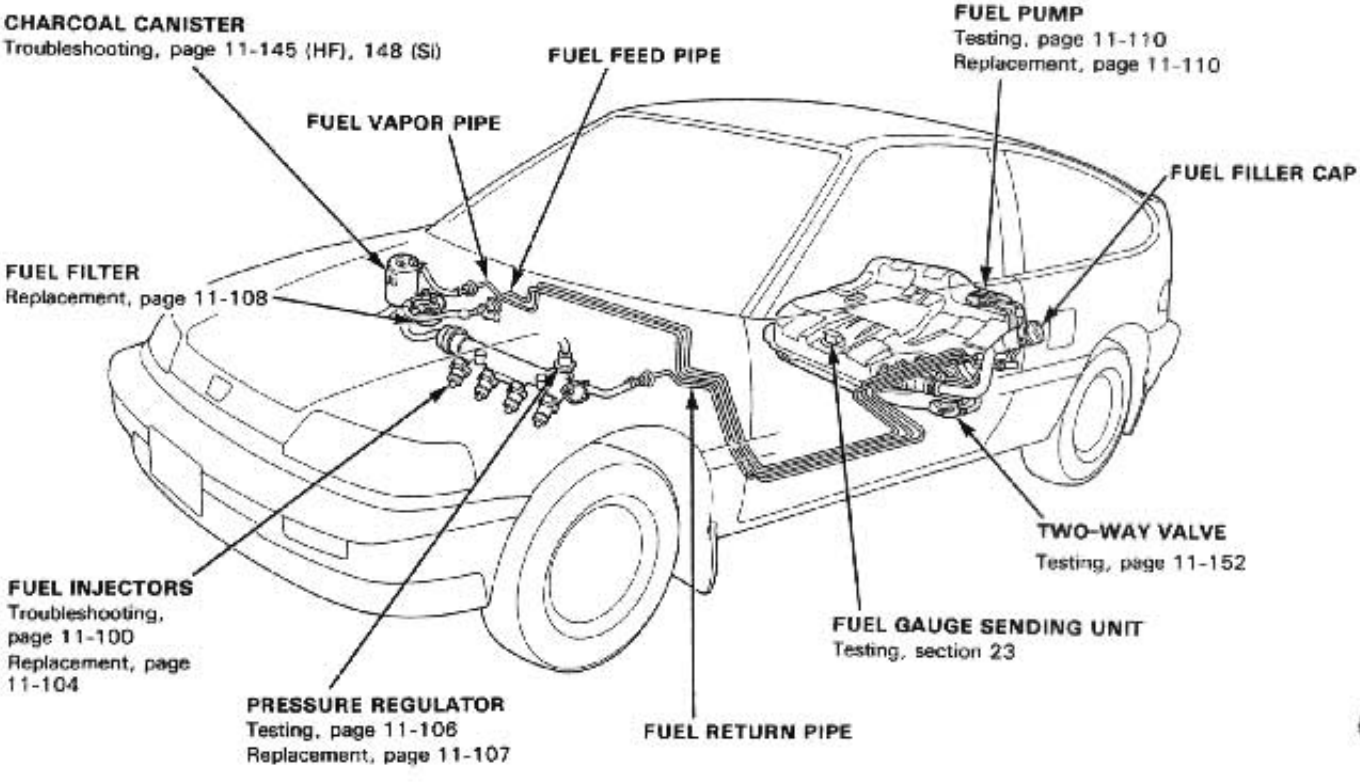

ATMOSPHERIC PRESSURE (PA) SENSOR
Troubleshooting, page 11-60
ELECTRONIC CONTROL UNIT (ECU)
Troubleshooting, page 11-31


MAIN RELAY
Relay Testing, page 11-111
Harness Testing, page 11-112

Component Locations

Index [HF and Si]

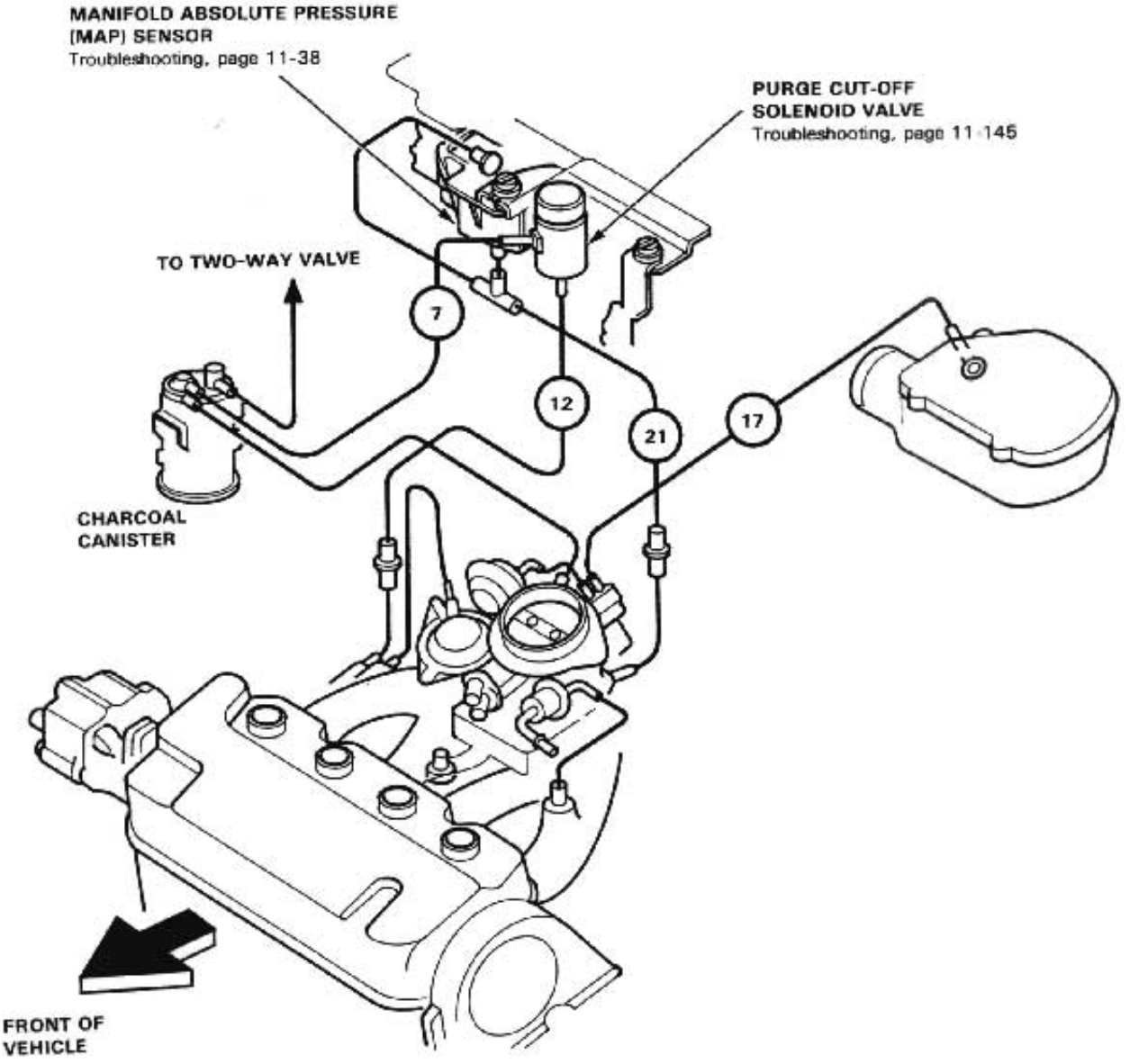




System Description

Vacuum Connections [Std.]

Ex. CAL: A/T

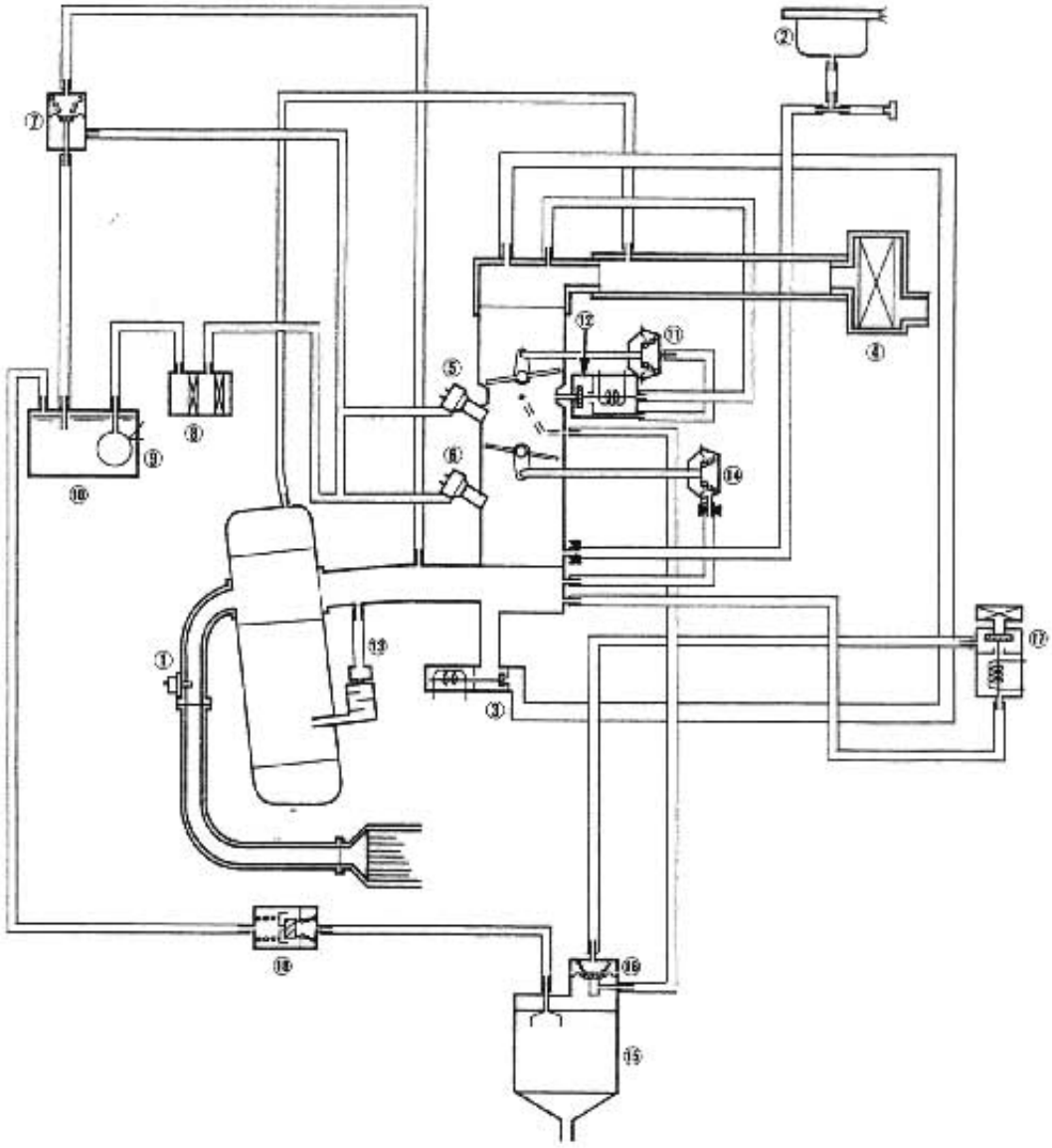


(cont'd)

System Description

Vacuum Connections [Std.] (cont'd)

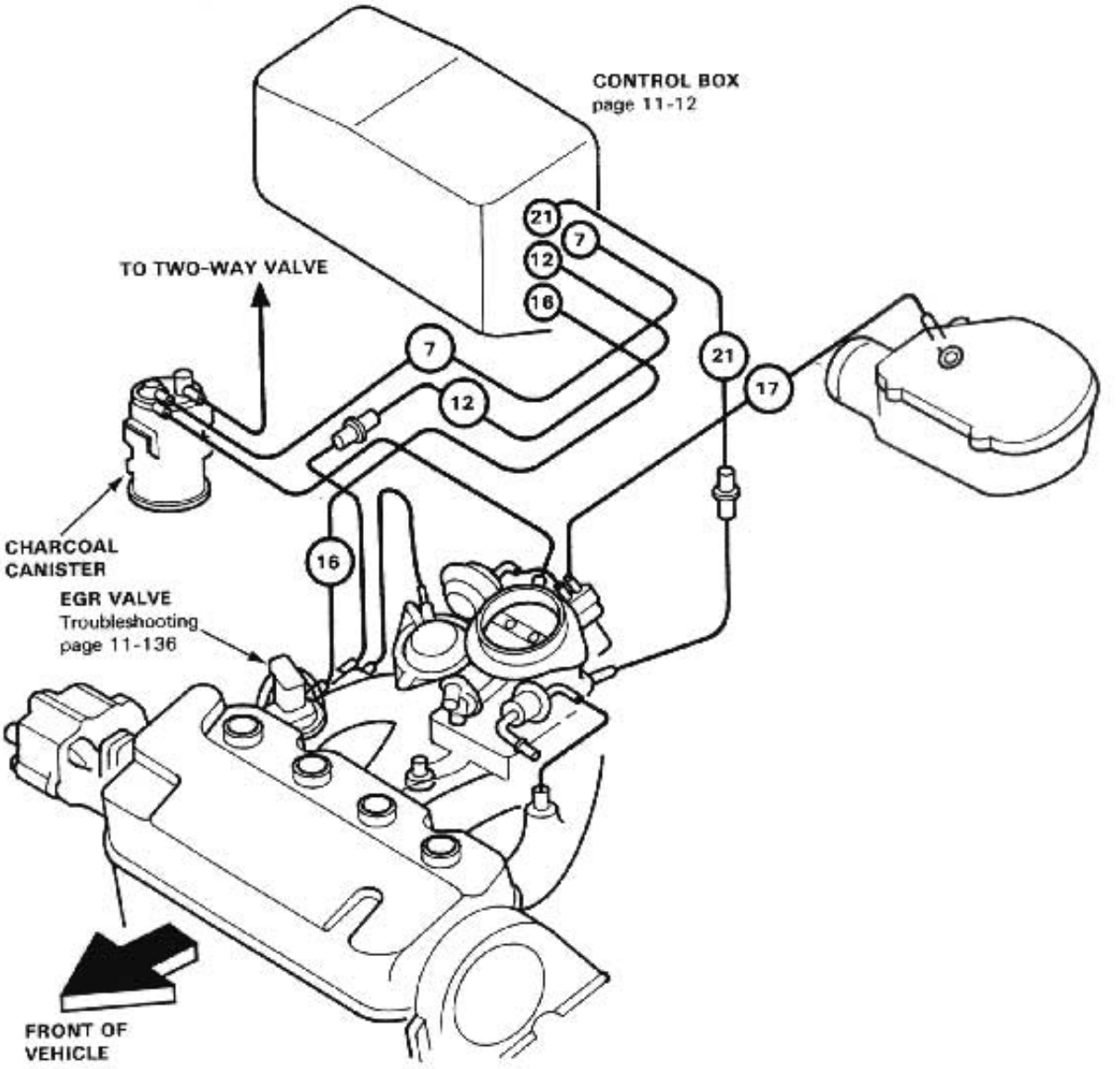
Ex. CAL: A/T



① OXYGEN (O_2) SENSOR
② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
③ ELECTRONIC AIR CONTROL VALVE (EACV)
④ AIR CLEANER
⑤ MAIN INJECTOR
⑥ AUX. INJECTOR
⑦ PRESSURE REGULATOR
⑧ FUEL FILTER
⑨ FUEL PUMP
⑩ FUEL TANK
⑪ TANDEM VALVE CONTROL DIAPHRAGM
⑫ TANDEM VALVE CONTROL SOLENOID VALVE
⑬ PCV VALVE
⑭ DASHPOT DIAPHRAGM
⑮ CHARCOAL CANISTER
⑯ PURGE CONTROL DIAPHRAGM VALVE
⑰ PURGE CUT-OFF SOLENOID VALVE
⑱ TWO-WAY VALVE

Vacuum Connections [Std.]

CAL: A/T

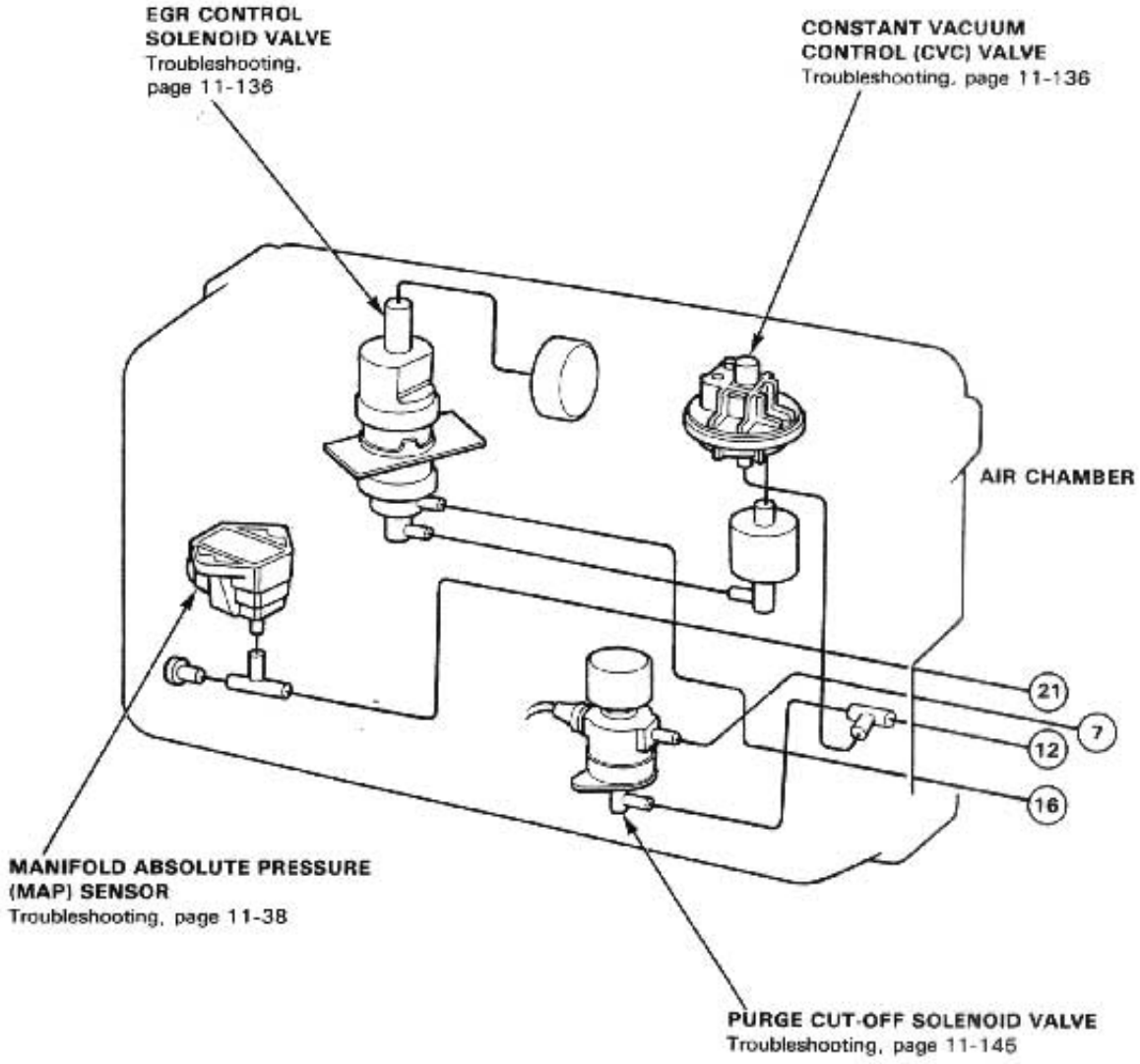


(cont'd)

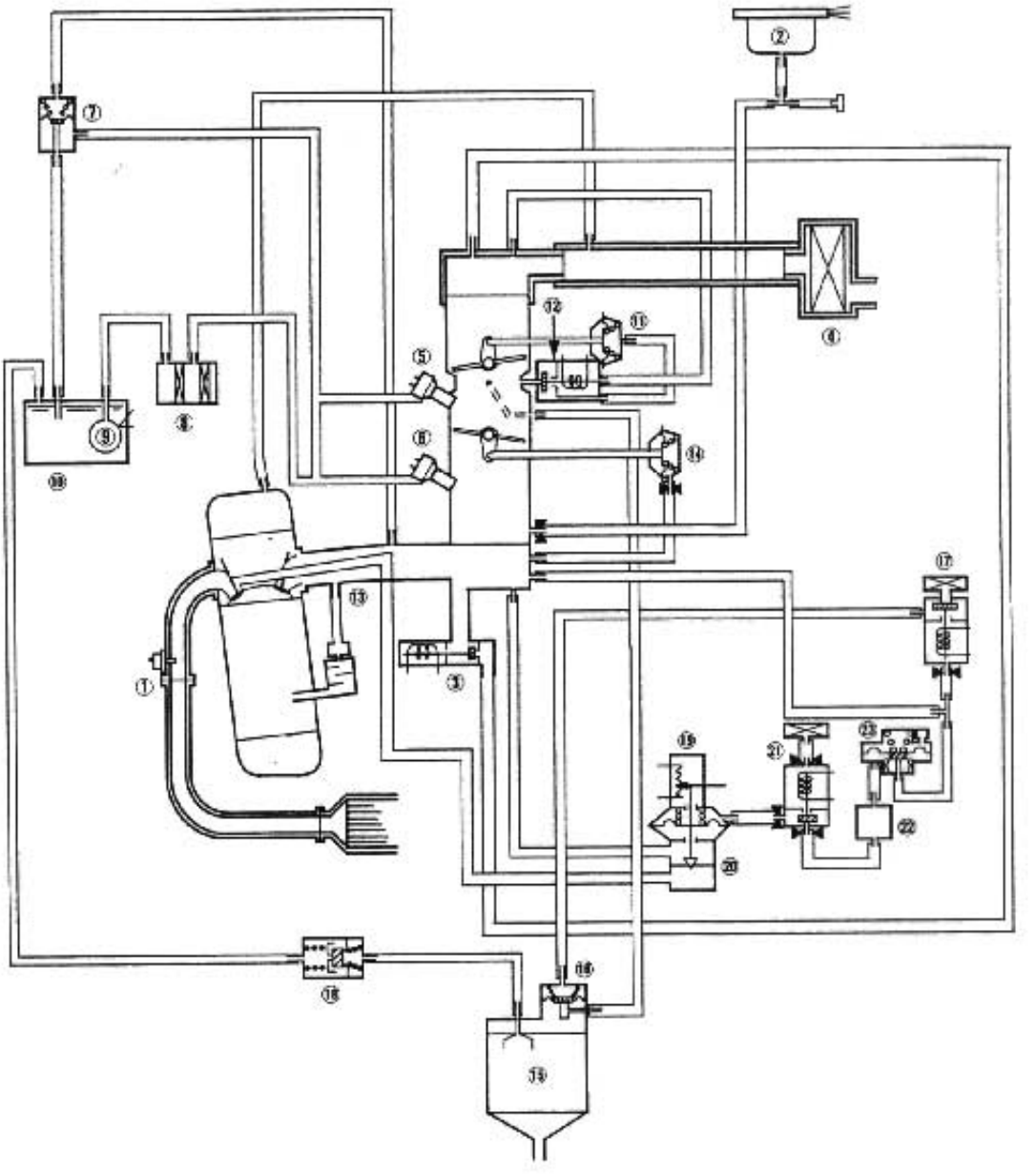
System Description

Vacuum Connections [Std.] (cont'd)

Control Box
CAL: A/T

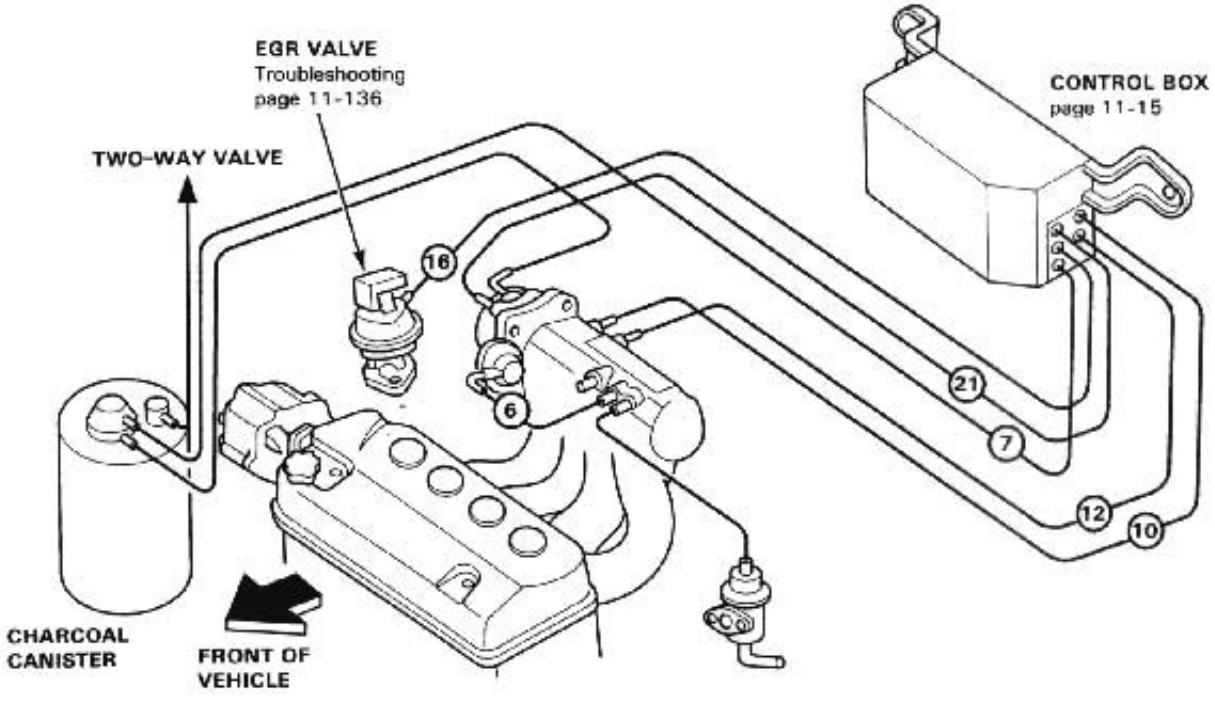


CAL: A/T

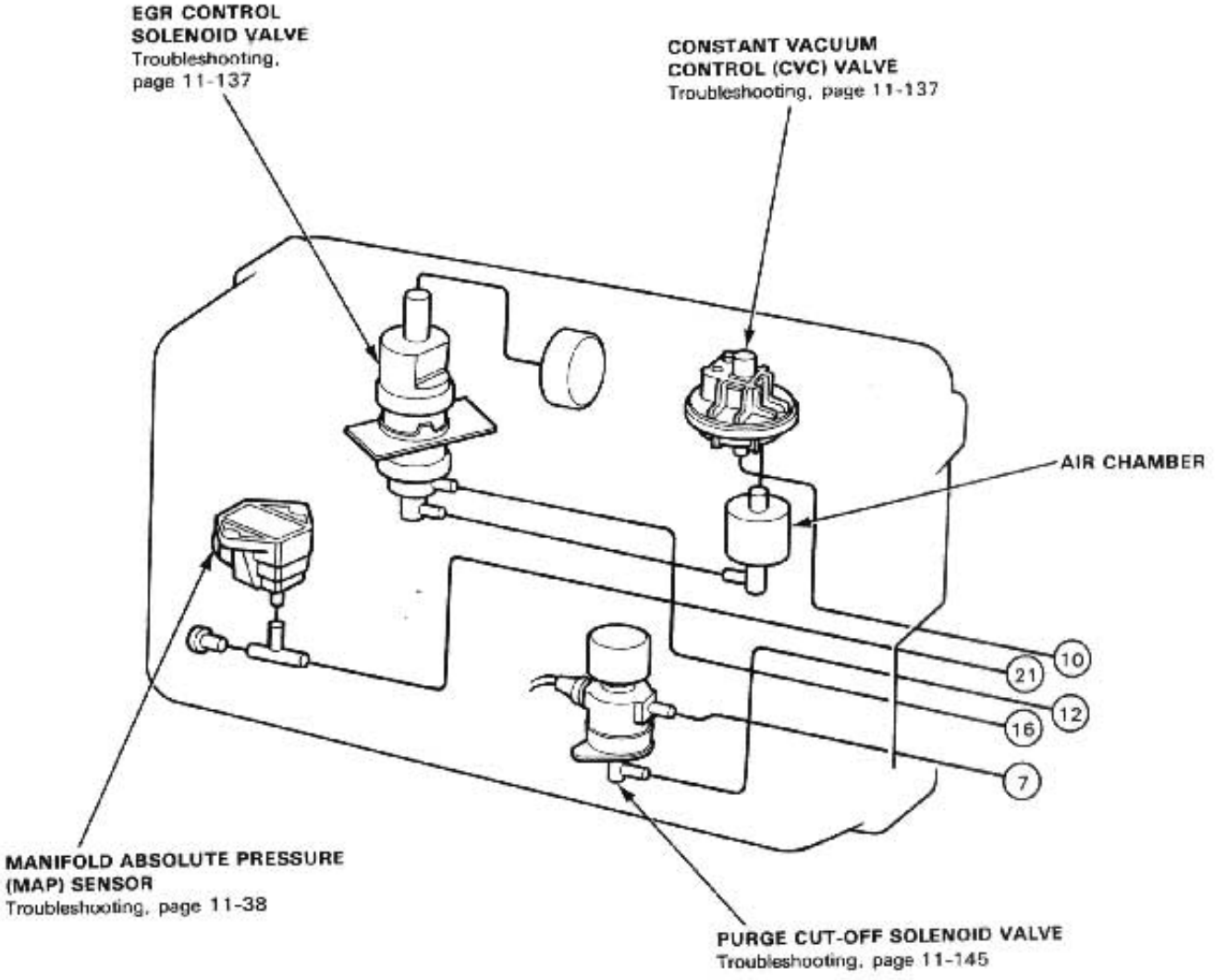


① OXYGEN (O_2) SENSOR
② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
③ ELECTRONIC AIR CONTROL VALVE (EACV)
④ AIR CLEANER
⑤ MAIN INJECTOR
⑥ AUX. INJECTOR
⑦ PRESSURE REGULATOR
⑧ FUEL FILTER
⑨ FUEL PUMP
⑩ FUEL TANK
⑪ TANDEM VALVE CONTROL DIAPHRAGM
⑫ TANDEM VALVE CONTROL SOLENOID VALVE
⑬ PCV VALVE
⑭ DASHPOT DIAPHRAGM
⑮ CHARCOAL CANISTER
⑯ PURGE CONTROL DIAPHRAGM VALVE
⑰ PURGE CUT-OFF SOLENOID VALVE
⑱ TWO-WAY VALVE
⑲ EGR VALVE LIFT SENSOR
⑳ EGR VALVE
㉑ EGR CONTROL SOLENOID VALVE
㉒ AIR CHAMBER
㉓ CONSTANT VACUUM CONTROL (CVC) VALVE

Vacuum Connections [HF]

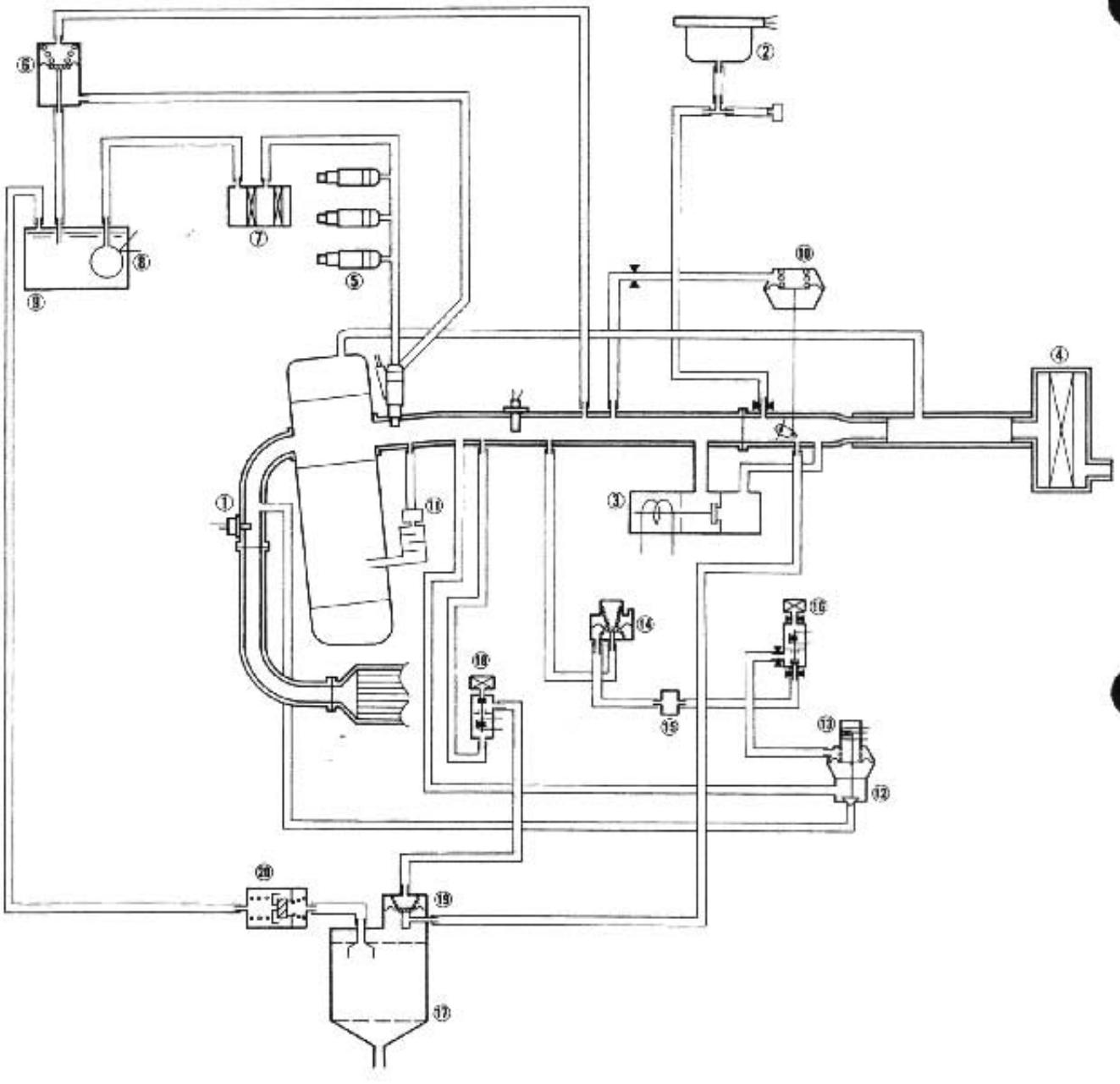


Control Box

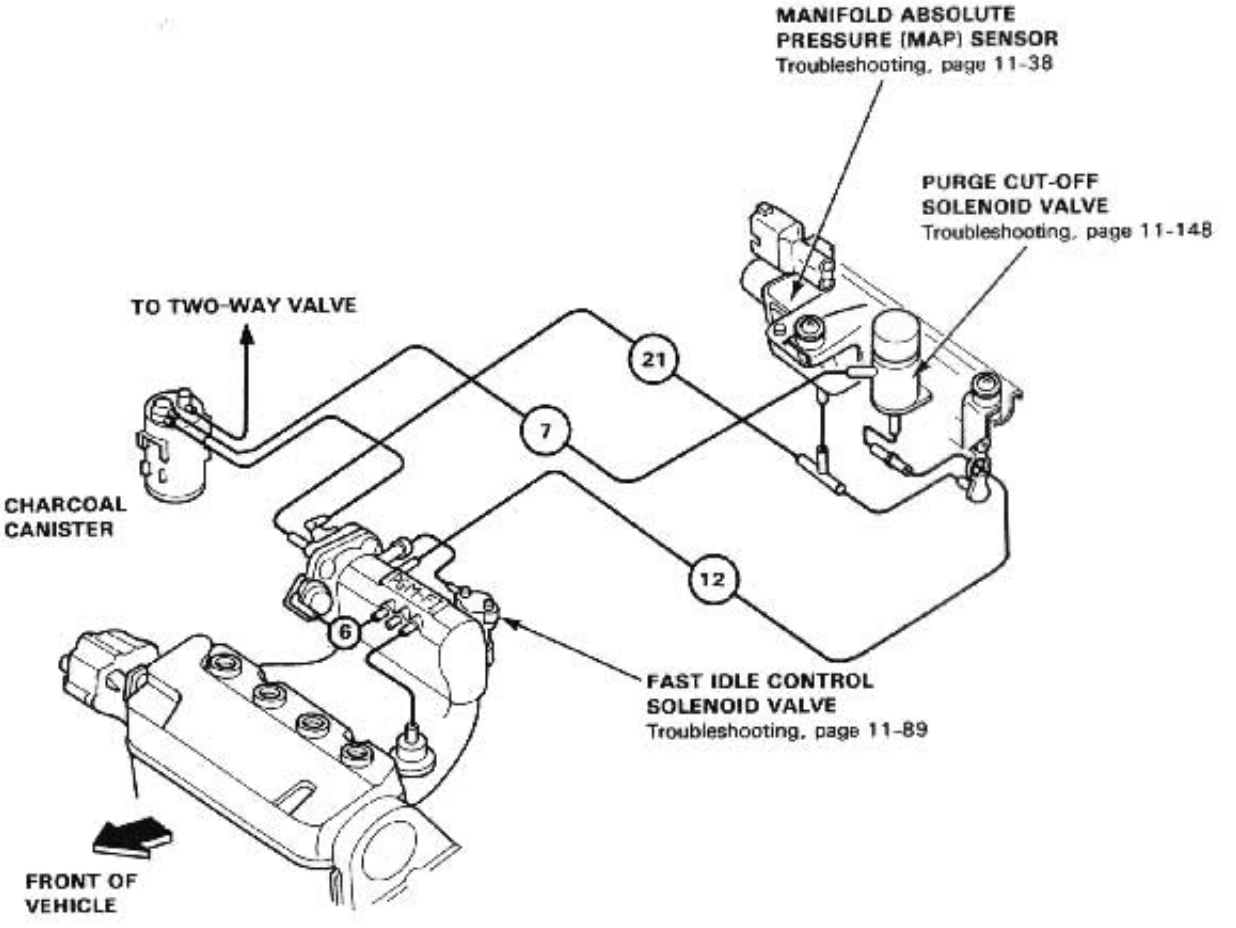


(cont'd)

Vacuum Connections [HF] (cont'd)

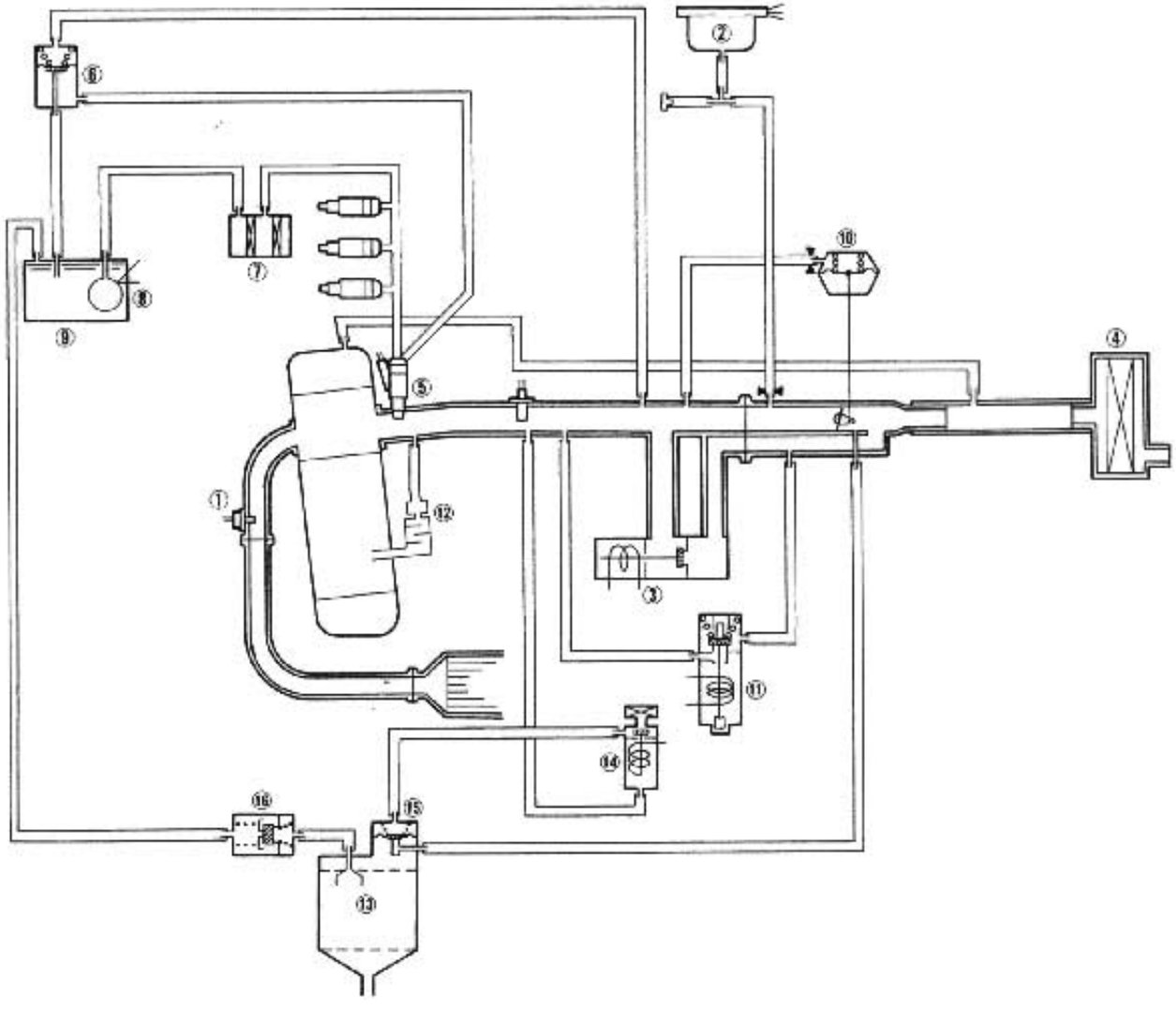


① OXYGEN (O_2) SENSOR
② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
③ ELECTRONIC AIR CONTROL VALVE (EACV)
④ AIR CLEANER
⑤ FUEL INJECTOR
⑥ PRESSURE REGULATOR
⑦ FUEL FILTER
⑧ FUEL PUMP
⑨ FUEL TANK
⑩ DASHPOT DIAPHRAGM
⑪ PCV VALVE
⑫ EGR VALVE
⑬ EGR VALVE LIFT SENSOR
⑭ CONSTANT VACUUM CONTROL (CVC) VALVE
⑮ AIR CHAMBER
⑯ EGR CONTROL SOLENOID VALVE
⑰ CHARCOAL CANISTER
⑱ PURGE CUT-OFF SOLENOID VALVE
⑲ PURGE CONTROL DIAPHRAGM VALVE
⑳ TWO-WAY VALVE


MANIFOLD ABSOLUTE
PRESSURE (MAP) SENSOR
Troubleshooting, page 11-38
PURGE CUT-OFF
SOLENOID VALVE
Troubleshooting, page 11-148
TO TWO-WAY VALVE
21
7
CHARCOAL
CANISTER
12
6
FAST IDLE CONTROL
SOLENOID VALVE
Troubleshooting, page 11-89
FRONT OF
VEHICLE

(cont'd)

Vacuum Connections [Si] (cont'd)

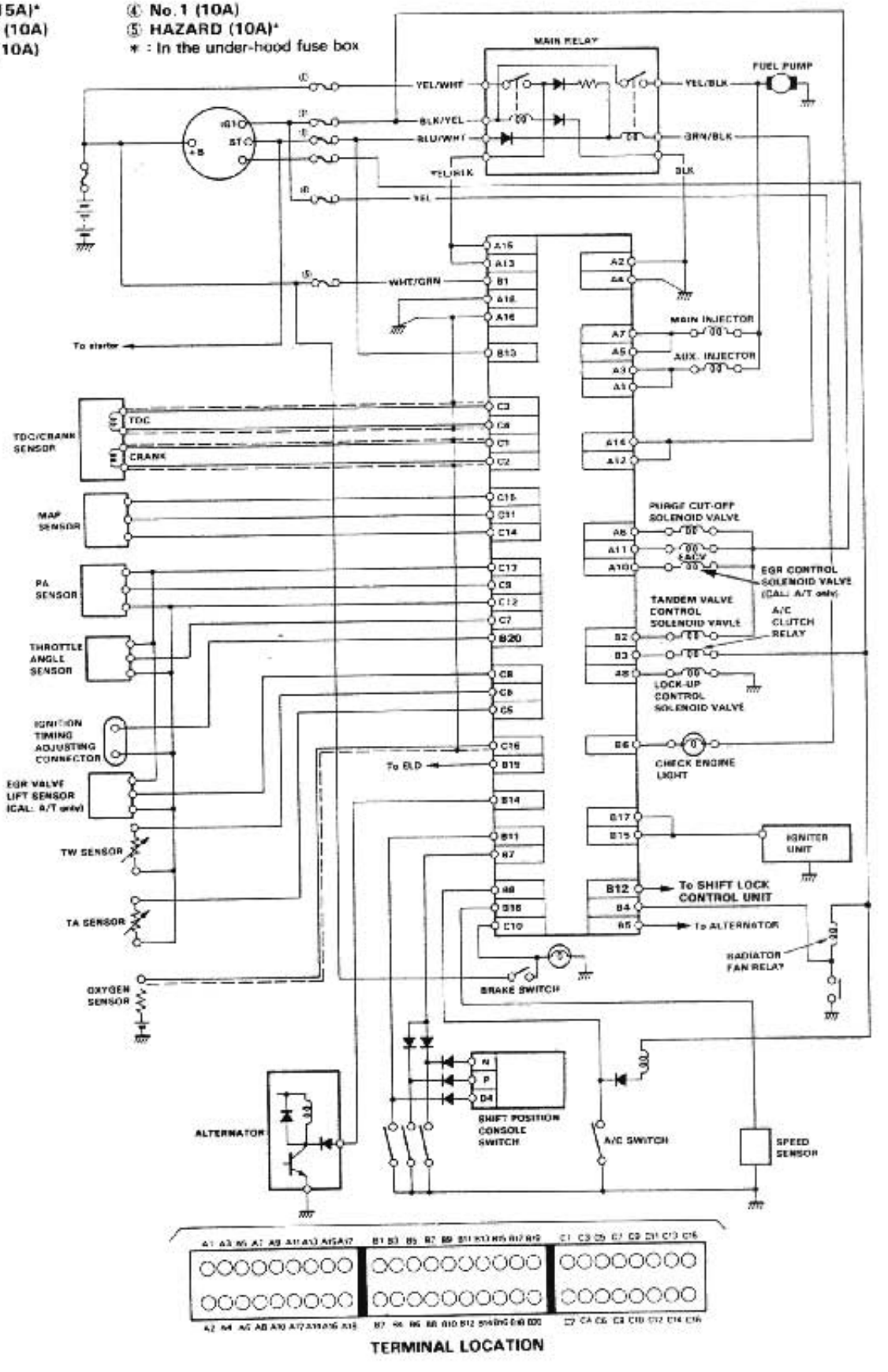


① OXYGEN (O_2) SENSOR
② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
③ ELECTRONIC AIR CONTROL VALVE (EACV)
④ AIR CLEANER
⑤ FUEL INJECTOR
⑥ PRESSURE REGULATOR
⑦ FUEL FILTER
⑧ FUEL PUMP
⑨ FUEL TANK
⑩ DASHPOT DIAPHRAGM
⑪ FAST IDLE CONTROL SOLENOID VALVE
⑫ PCV VALVE
⑬ CHARCOAL CANISTER
⑭ PURGE CUT-OFF SOLENOID VALVE
⑮ PURGE CONTROL DIAPHRAGM VALVE
⑯ TWO-WAY VALVE

Electrical Connections [Std.]

FUSES

① ECU (15A)*
② No. 14 (10A)
③ No. 2 (10A)
④ No. 1 (10A)
⑤ HAZARD (10A)*
* : In the under-hood fuse box



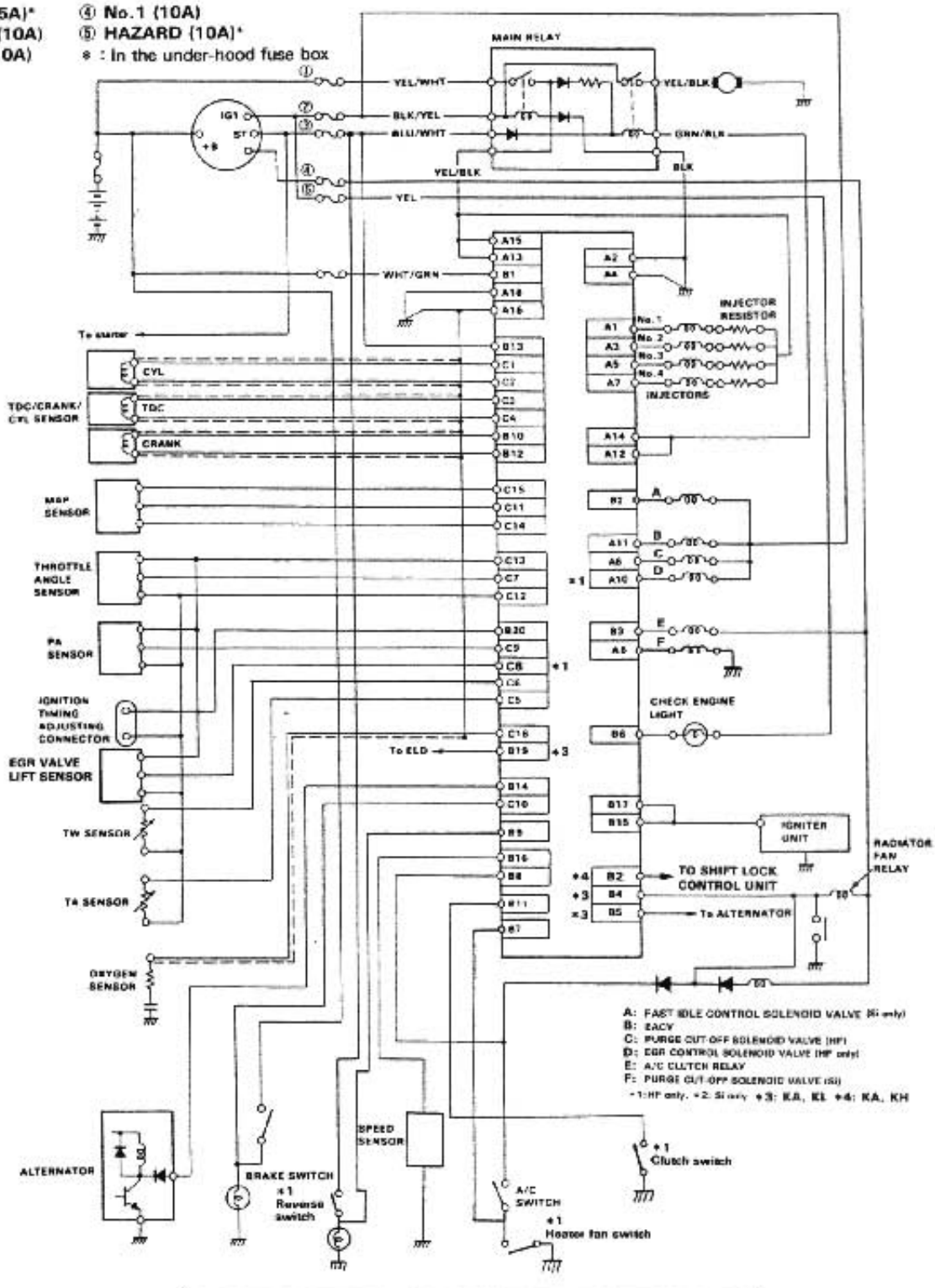
TERMINAL LOCATION

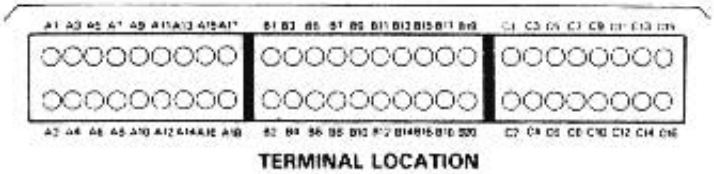
System Description

Electrical Connections [HF and Si]

FUSES

① ECU (15A)*
② No.14 (10A)
③ No.2 (10A)
④ No.1 (10A)
⑤ HAZARD (10A)*
* : In the under-hood fuse box





TERMINAL LOCATION

BLANK

Troubleshooting

Troubleshooting Guide [Std.]

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

PAGE / SYSTEM / SYMPTOM		PGM-FI							
		ECU	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	TDC/CRANK SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR	ATMOSPHERIC PRESSURE SENSOR
		31	36	38	44	54	56	58	60
CHECK ENGINE LIGHT TURNS ON		or	CHECK	CHECK	CHECK	CHECK	CHECK	CHECK	CHECK
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		0 or *	1	3 or 5	4 or 8	6	7	10	13
ENGINE WON'T START		3							
DIFFICULT TO START ENGINE WHEN COLD		BU		3		1			
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	BU				3			
	ROUGH IDLE	BU		3					
	WHEN WARM RPM TOO HIGH	BU				3			
	WHEN WARM RPM TOO LOW	BU							
FREQUENT STALLING	WHILE WARMING UP	BU		3					
	AFTER WARMING UP	BU							
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	BU							
	FAILS EMISSION TEST	BU	3	2					
	LOSS OF POWER	BU		3			2		

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

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

PGM-FI				IDLE CONTROL		FUEL SUPPLY			EMISSION CONTROL	
IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR	LOCK-UP CONTROL SOLENOID VALVE	ELECTRIC LOAD DETECTOR	ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	OTHER FUEL SUPPLY	AIR INTAKE	EGR CONTROL SYSTEM (CAL: A/T only)	OTHER EMISSION CONTROLS
62	64	66	68	75	71	95	92	114	136	132
CHECK	CHECK	CHECK		CHECK		CHECK			CHECK	
15	17	19	20	14		16			12	
						2	1			
				2						
				1	2					
				1		2			3	
				2	1					
			2	1		3				
2				1						
				1		2	3		3	
				3		1	2		3	
							1			
						3	1			

Troubleshooting

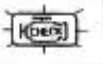
Troubleshooting Guide [HF and Si]

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

PAGE / SYSTEM / SYMPTOM		PGM-FI							
		ECU	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	TDC/CRANK/CYL SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR	ATMOSPHERIC PRESSURE SENSOR
		31	36	38	48	54	56	58	60
CHECK ENGINE LIGHT TURNS ON		▭ or ▭	CHECK	CHECK	CHECK	CHECK	CHECK	CHECK	CHECK
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		⓪ or ✱	①	③ or ⑤	④ or ⑧ or ⑨	⑥	⑦	⑩	⑬
ENGINE WON'T START		③							
DIFFICULT TO START ENGINE WHEN COLD		(BU)		③		①			
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	(BU)				②			
	ROUGH IDLE	(BU)		③					
	WHEN WARM RPM TOO HIGH	(BU)				③			
	WHEN WARM RPM TOO LOW	(BU)							
FREQUENT STALLING	WHILE WARMING UP	(BU)							
	AFTER WARMING UP	(BU)							
POOR PERFORM-ANCE	MISFIRE OR ROUGH RUNNING	(BU)							
	FAILS EMISSION TEST	(BU)	③	②					
	LOSS OF POWER	(BU)		③			②		

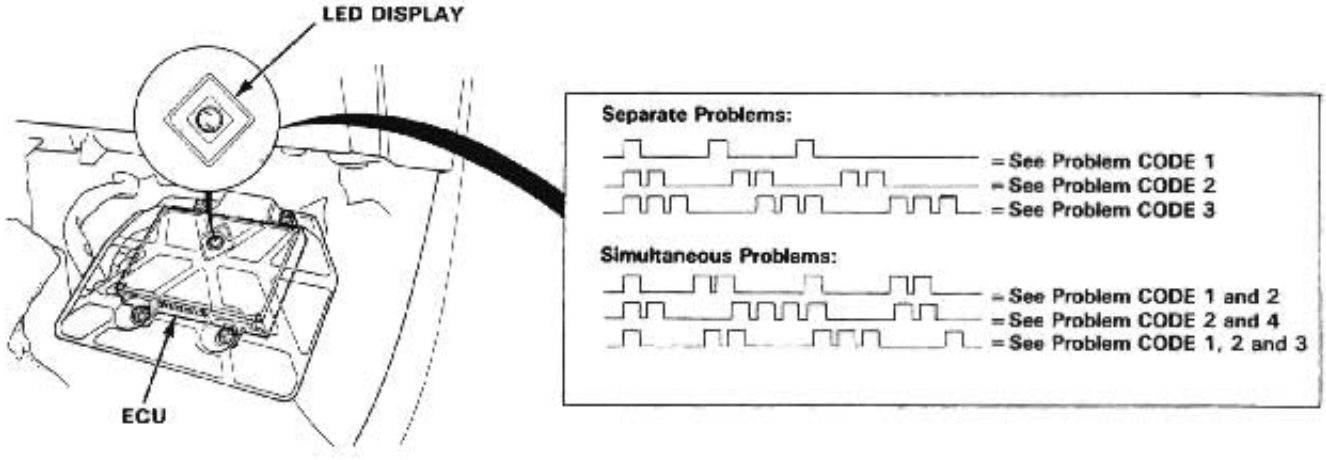
* If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

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

PGM-FI			IDLE CONTROL		FUEL SUPPLY			EMISSION CONTROL	
IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR	ELECTRIC LOAD DETECTOR	ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	OTHER FUEL SUPPLY	AIR INTAKE	EGR CONTROL SYSTEM (HF only)	OTHER EMISSION CONTROLS
62	64	68	75	71	100	92	114	136	132
									
15	17	20	14		16			12	
					②	①			
					②				
			①	②					
			①		②			③	
			②	①					
		③	①		②				
			①	②		③			
			①	②		③		③	
			②		①			③	
					①				
						①			

Self-diagnostic Procedure

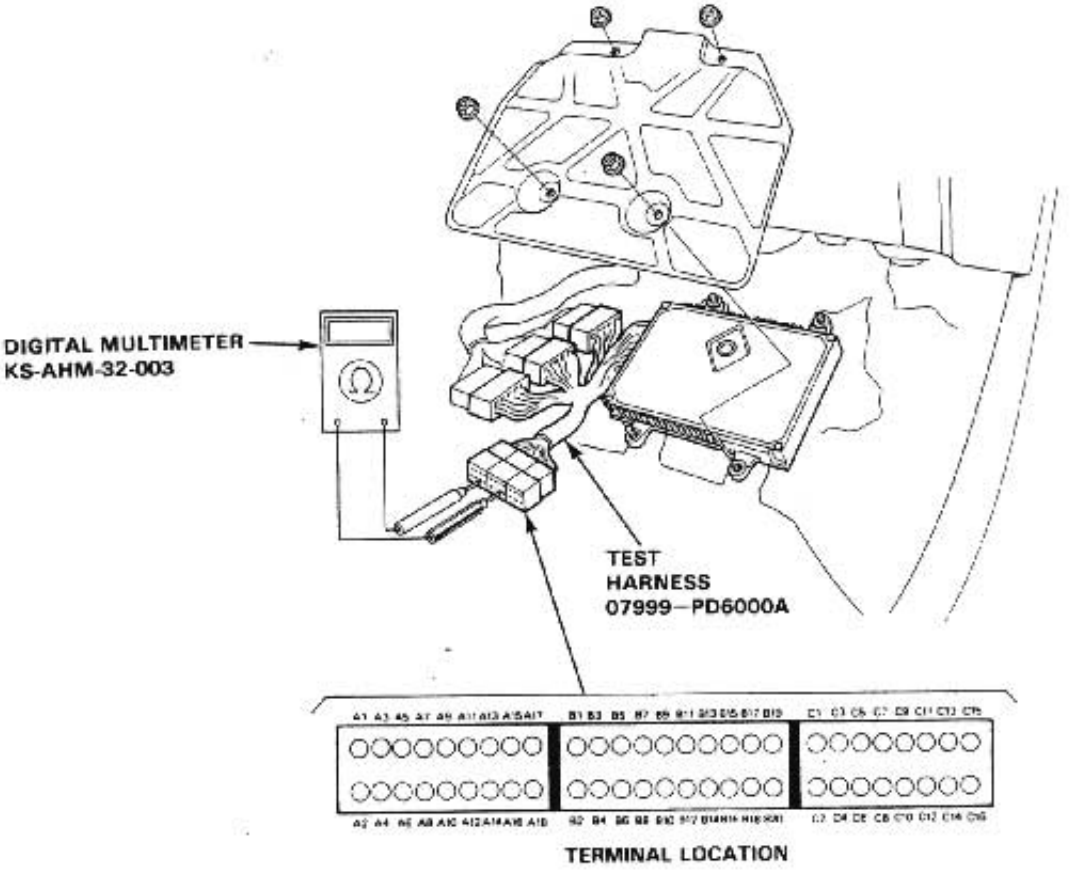
When the Check Engine light has been reported on, turn the ignition on, pull down the passenger's side carpet from under the dashboard and observe the LED on the top of the ECU. The LED indicates a system failure code by blinking frequency.



SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
0	ECU	11-31
1	OXYGEN CONTENT	11-36
3	MANIFOLD ABSOLUTE PRESSURE	11-38
5		11-42
4	CRANK ANGLE	11-44, 48
6	COOLANT TEMPERATURE	11-54
7	THROTTLE ANGLE	11-56
8	TDC POSITION	11-46, 50
9	No.1 CYLINDER POSITION (HF and Si)	11-52
10	INTAKE AIR TEMPERATURE	11-58
12	EXHAUST GAS RECIRCULATION SYSTEM (HF and Std. CAL: A/T)	11-136
13	ATMOSPHERIC PRESSURE	11-60
14	ELECTRONIC AIR CONTROL	11-75
15	IGNITION OUTPUT SIGNAL	11-62
16	FUEL INJECTOR	11-95, 100
17	VEHICLE SPEED SENSOR	11-64
19	LOCK-UP CONTROL SOLENOID VALVE	11-66
20	ELECTRIC LOAD	11-68

If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.
The Check Engine light and ECU LED may come on, indicating a system problem, when , in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.
If the Check Engine light is on and LED stays on, replace the ECU.

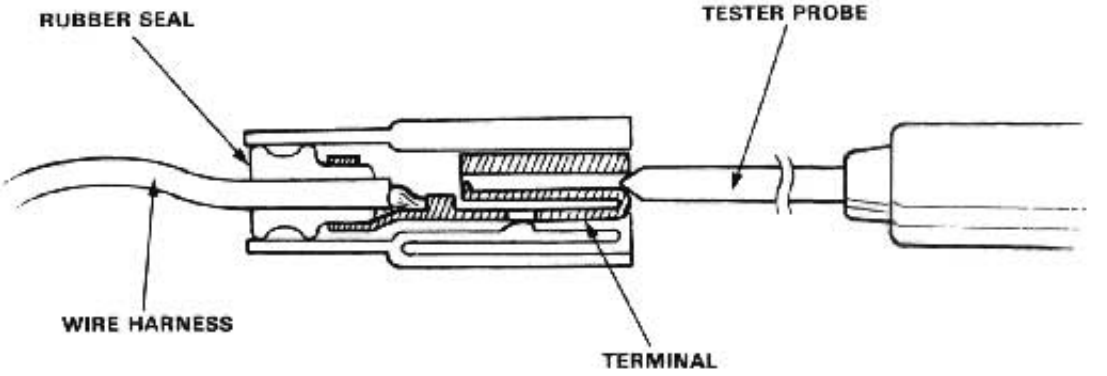
If the inspection for a particular failure code requires the test harness, remove the right door sill molding, the small cover on the right kick panel, and pull the carpet back to expose the ECU. Unbolt the ECU bracket. Connect the test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.



TERMINAL LOCATION

CAUTION:

- **Puncturing the insulation on a wire can cause poor or intermittent electrical connections.**
- **For testing at connectors other than the test harness, bring the tester probe into contact with the terminal from the connector side of wire harness connectors in the engine compartment. For female connectors, just touch lightly with the tester probe and do not insert the probe.**



How to Read Flowcharts

A flowchart is designed to be used from start to final repair. It's like a map showing you the shortest distance. But beware: if you go off the "map" anywhere but a "stop" symbol, you can easily get lost.

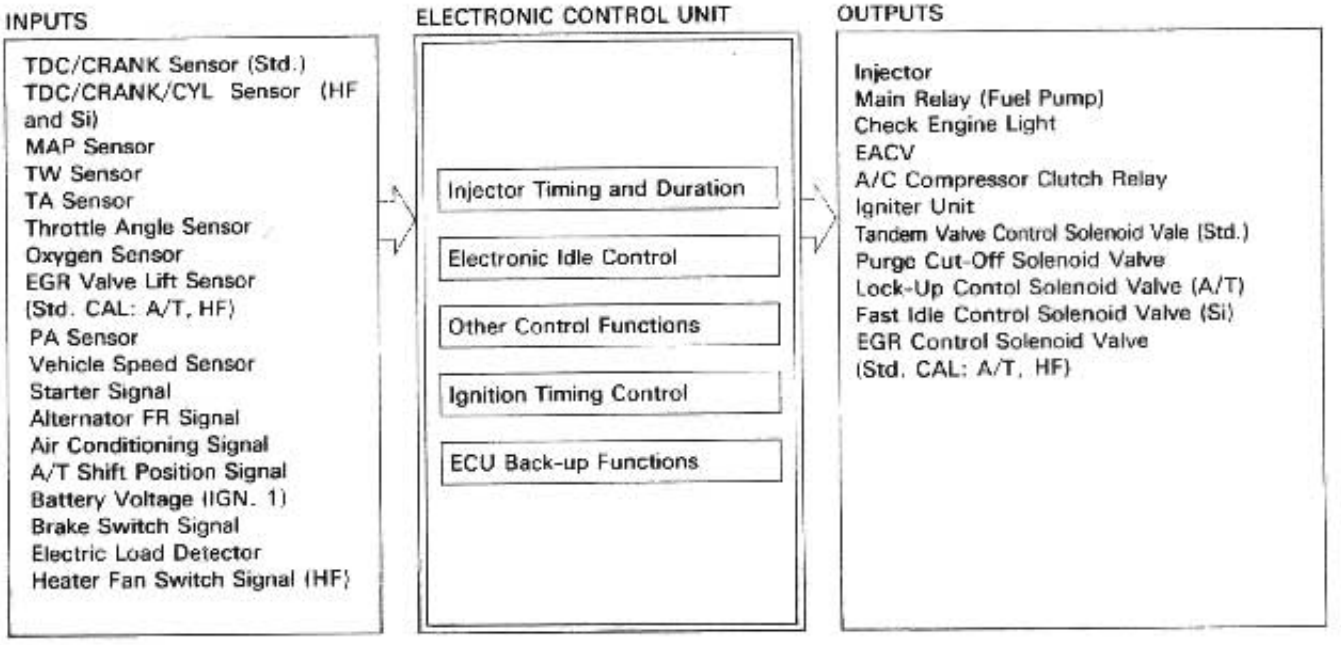
START (bold type)	Describes the conditions or situation to start a troubleshooting flowchart.
ACTION	Asks you to do something; perform a test, set up a condition, etc.
DECISION	Asks you about the result of an action, then sends you in the appropriate troubleshooting direction.
STOP (bold type)	The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flow to confirm your repair.

NOTE:

- The term "Intermittent Failure" is used several times in these charts. It simply means a system may have had a failure, but it checks out OK through all your tests. You may need to road test the car to reproduce the failure or if the problem was a loose connection, you may have unknowingly solved it while doing the tests. In any event, if the Check Engine light does not come on, check for poor connections or loose wires at all connectors related to the circuit that you are troubleshooting.
- Most of the troubleshooting flowcharts have you reset the ECU and try to duplicate the problem code. If the problem is intermittent and you can't duplicate the code, do not continue through the flowchart. To do so will only result in confusion and, possibly a needlessly replaced ECU.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground. In simple electronics, this usually means something won't work at all. In complex electronics (like ECUs), this can sometimes mean something works, but not the way it's supposed to.
- If the electrical readings are not as specified when using the test harness, check the test harness connections before proceeding.

PGM-FI Control System

System Description



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 Air Control

Electronic Air Control Valve (EACV)

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 current to the EACV to maintain correct idle speed.

Ignition Timing Control

The ECU contains memories for basic ignition timing at various engine speeds and manifold pressures. Ignition timing is also adjusted for coolant temperature.

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 two 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 to improve fuel economy at speeds over 1,300 rpm (Std.), 1,100 rpm (HF) or 950 rpm (Si).
   - Fuel cut-off action also takes place when engine speed exceeds 6,800 rpm (Std.), 5,500 rpm (HF) or 7,000 rpm (Si) regardless of the position of the throttle valve to protect the engine from over-revving.

(cont'd)

System Description (cont'd)

4. A/C Compressor Clutch Relay
   When the ECU receives a demand for cooling from the air conditioning system (A/C switch), it delays the compressor from being energized to assure smooth transition to the A/C mode.

5. Purge Cut-off Solenid Valve
   Std.
   When the coolant temperature is below 80°C (176°F), the ECU supplies ground to the purge cut-off solenoid valve which cuts vacuum to the purge control valve.
   HF
   When the coolant temperature is below 40°C (104°F), the ECU supplies ground to the purge cut-off solenoid valve which cuts vacuum to the purge control valve.
   Si
   When the coolant temperature is below 57°C (135°F), the ECU supplies voltage to the purge cut-off solenoid valve which cuts vacuum to the purge control valve.

6. Tandem Valve Control Solenoid Valve (Std.).
   Depending on coolant temperature and engine speed, the ECU supplies ground to the tandem valve control solenoid valve which opens the tandem valve. The opening and closing of the tandem valve maintains good atomization of the fuel injected by the main fuel injector.

7. Lock-up Control Solenoid Valve (A/T).
   The speed and throttle angle sensor inputs to the ECU are used to send an on/off voltage signal to the lock-up control solenoid valve for precise timing of the torque converter lock-up system.

8. Alternator Control
   The system controls the voltage generated by the alternator in accordance with the electric load and drive mode, and reduces the engine load to improve the fuel economy.

9. EGR Control Solenoid Valve (EGR CSV) (Std. CAL: A/T, HF)
   When the EGR is required for control of oxides of nitrogen (NOx) emissions, the ECU supplies ground to the EGR CSV which supplies regulated vacuum to the EGR valve.

10. Fast Idle Control Solenoid Valve (Si)
    When the coolant temperature is extremely low, the ECU supplies ground to the fast idle control solenoid valve which supplies addtional bypassed air.

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 injectors are controlled by a back-up circuit independent of the system in order to permit minimal driving.

3. Self-diagnosis Function (Check Engine light, LED indicator)
   When an abnormality occurs in a signal from a sensor, the ECU lights the Check Engine light, stores the failue code in erasable memory and indicates the code with the LED on the ECU anytime the ignition is on. When the ignition is initially turned on, the ECU supplies ground for the Check Engine light for two seconds.

BLANK

(cont'd)

Troubleshooting Flowchart — ECU

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

Is oil pressure light on ? NO → **Inspect No. 1 fuse.**

YES

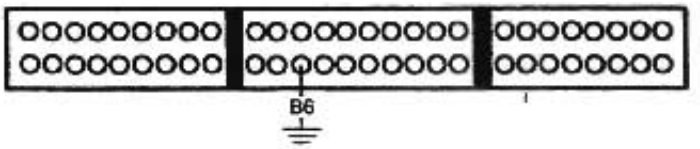
Turn the ignition switch OFF.

Inspect No. 1 fuse. → Is No. 1 fuse OK ? NO → **Replace fuse.**

YES → **Repair open in YEL wire between No. 1 fuse and gauge assembly.**

Connect the ECU test harness between the ECU and connector (page 11-27).

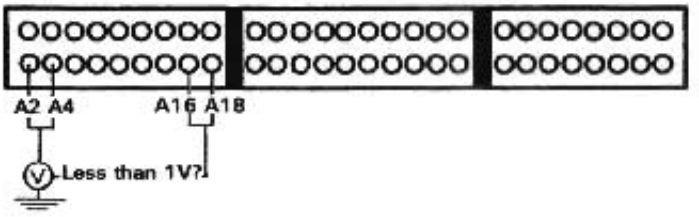
Connect B6 terminal to body ground.



Turn the ignition switch ON.

Is Check Engine light on? NO →
- **Replace light bulb.**
- **Repair open in GRN/ORN wire between ECU (B6) and gauge assembly.**

YES

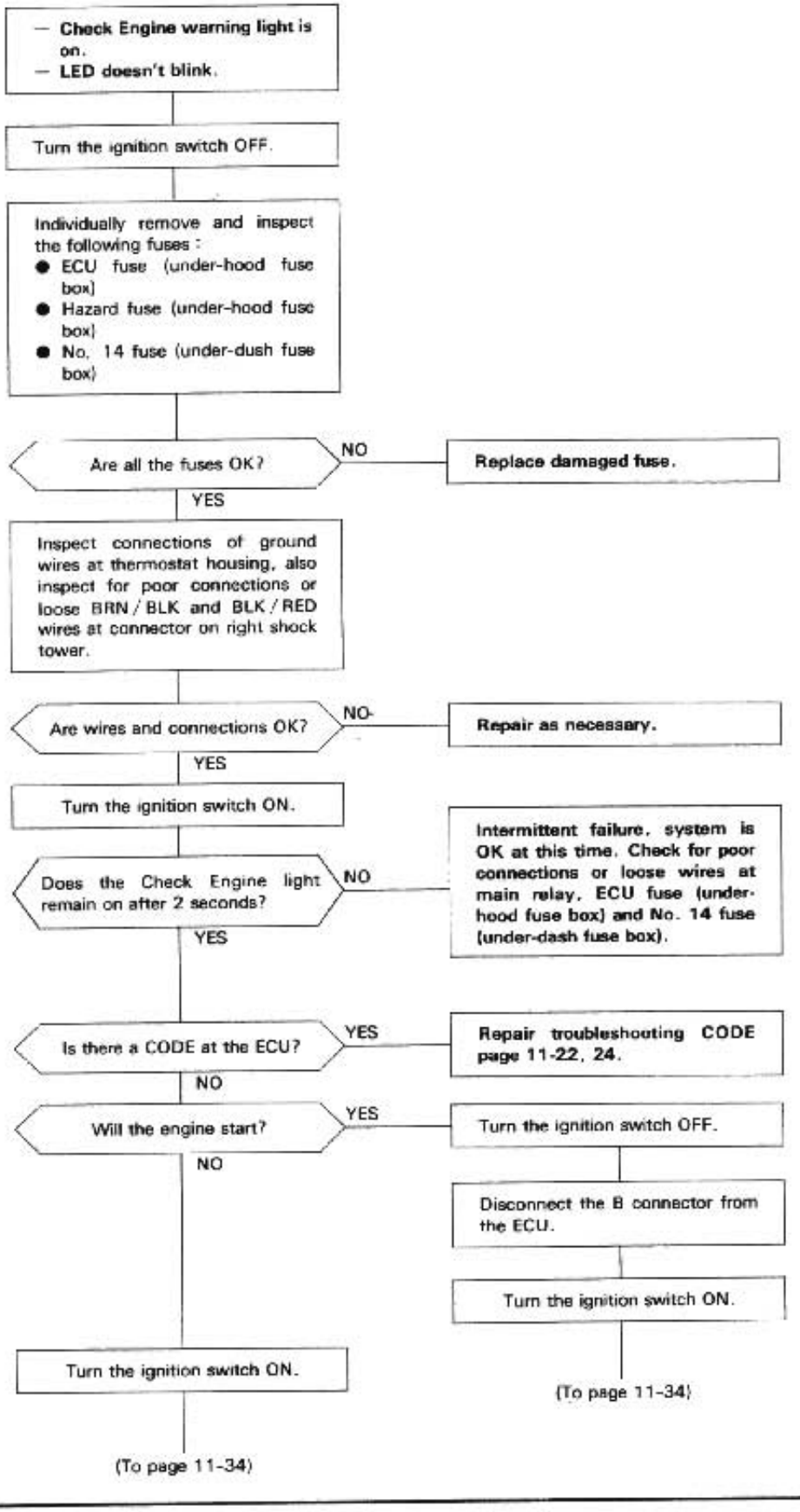


Measure voltage between body ground and the following terminals individually to: ●A2, ●A4, ●A16, ●A18

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

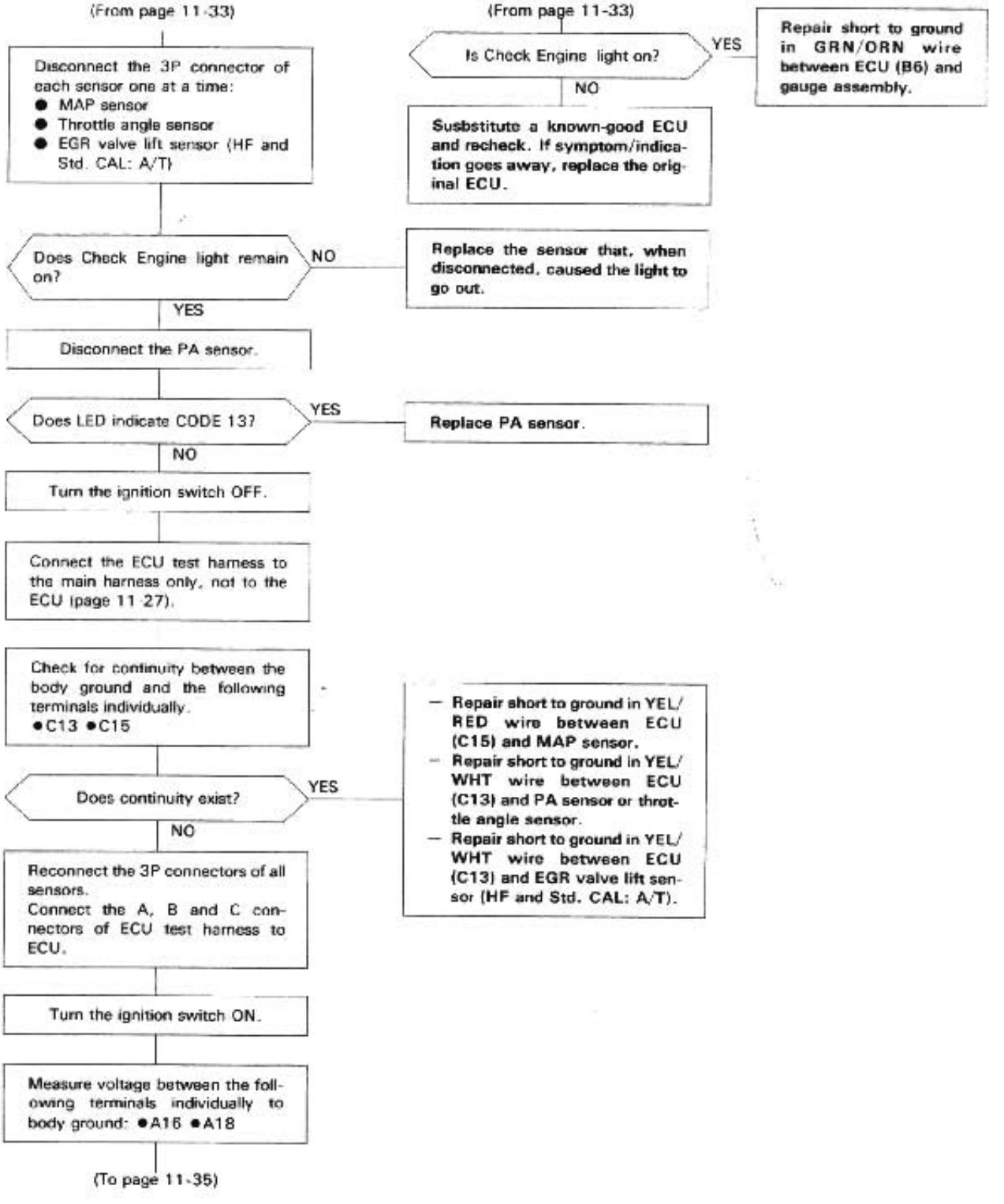
YES

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


— Check Engine warning light is on.
— LED doesn't blink.
Turn the ignition switch OFF.
Individually remove and inspect the following fuses :
● ECU fuse (under-hood fuse box)
● Hazard fuse (under-hood fuse box)
● No. 14 fuse (under-dush fuse box)
Are all the fuses OK?
NO
Replace damaged fuse.
YES
Inspect connections of ground wires at thermostat housing, also inspect for poor connections or loose BRN / BLK and BLK / RED wires at connector on right shock tower.
Are wires and connections OK?
NO
Repair as necessary.
YES
Turn the ignition switch ON.
Does the Check Engine light remain on after 2 seconds?
NO
Intermittent failure, system is OK at this time. Check for poor connections or loose wires at main relay, ECU fuse (under-hood fuse box) and No. 14 fuse (under-dash fuse box).
YES
Is there a CODE at the ECU?
YES
Repair troubleshooting CODE page 11-22, 24.
NO
Will the engine start?
YES
Turn the ignition switch OFF.
NO
Disconnect the B connector from the ECU.
Turn the ignition switch ON.
Turn the ignition switch ON.
(To page 11-34)
(To page 11-34)

(cont'd)

Troubleshooting Flow Chart — ECU (cont'd)



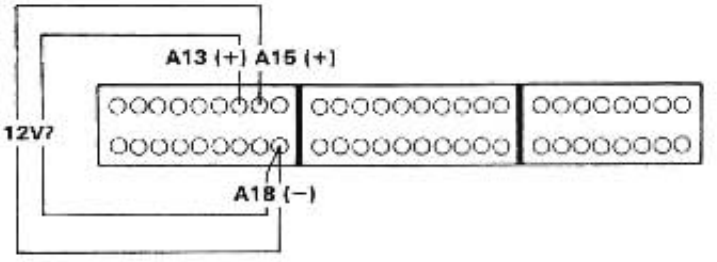
(From page 11-34)

Is there less than 1V?

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

YES

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



Is there battery voltage?

NO →
- Repair open in YEL/BLK wire between ECU (A13, A15) and main relay
- Check main relay and wiring connectors at main relay (pages 11-111 and 11-112).

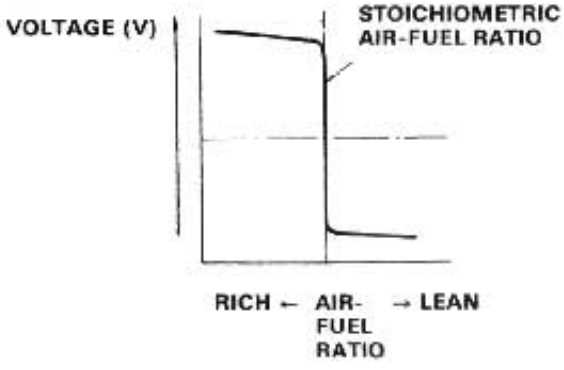
YES

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

Troubleshooting Flowchart —— Oxygen Sensor

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

The oxygen sensor, detects 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 installed on the exhaust manifold.



- **Check Engine light has been reported on.**
- **LED indicates CODE 1.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Inspect pressure regulator (page 11-106)

Is it normal ?

NO → **Replace the pressure regulator (page 11-106).**

YES

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

Si

Hold engine at 1,500 rpm for 15 minutes.
NOTE: Do not close throttle completely during this time.

Is Check Engine light on and does LED indicate CODE 1?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at the thermostat housing, O_2 sensor and C210 (round connector located at the right shock tower).**

YES

(To page 11-37)

HF and Std.

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

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

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

(From page 11-36)

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

Are connections and wires OK?

NO → **Repair as necessary.**

YES

Disconnect engine wire harness from O_2 sensor.

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

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

Was voltage above 0.6V at 4,000 rpm? Was voltage below 0.4 V during closed throttle deceleration from 4,000 rpm?

NO → **Replace O_2 sensor.**

YES

Stop engine.

Reconnect O_2 sensor.

Connect the ECU test harness between the ECU and connector (page 11-27).

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

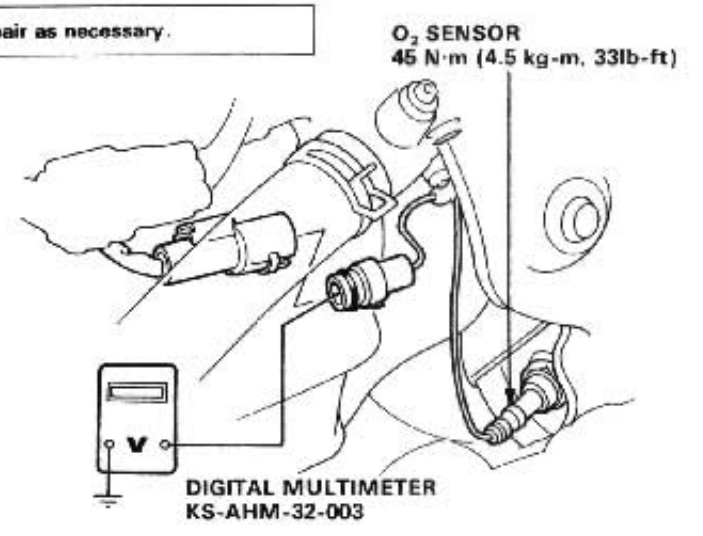
Restart and warm up engine to normal operating temperature, then hold engine rpm at 4,000 rpm for 10 seconds then release throttle completely while watching the voltmeter.

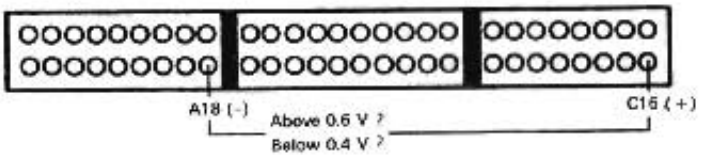
Was voltage above 0.6V at 4,000 rpm? Was voltage below 0.4 V during closed throttle deceleration from 4,000 rpm?

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

YES

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



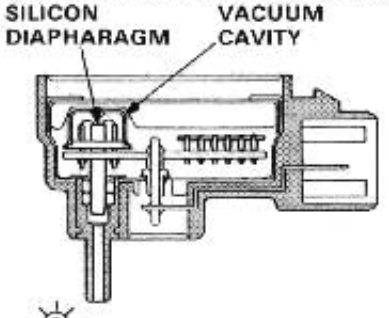


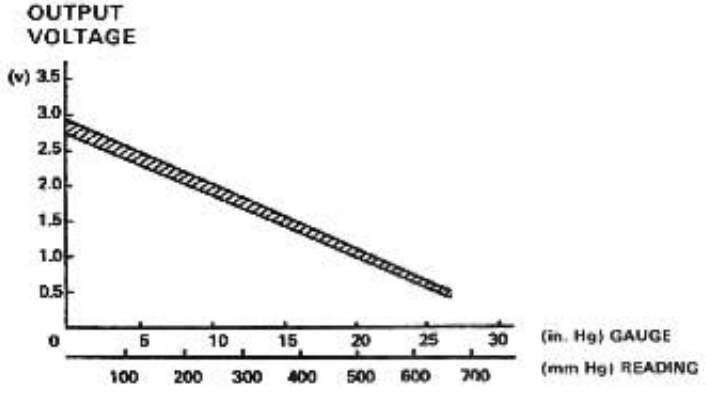
Troubleshooting Flowchart — MAP Sensor

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

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

The MAP sensor converts manifold absolute pressure into electrical signals and inputs the ECU.





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

↓

Turn the ignition switch OFF.

↓

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

↓

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

↓

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

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

YES ↓

Turn the ignition switch OFF.

↓

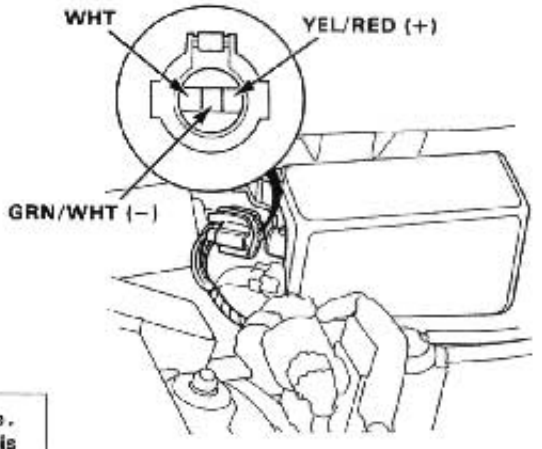
Disconnect the 3P connector from the MAP sensor.

↓

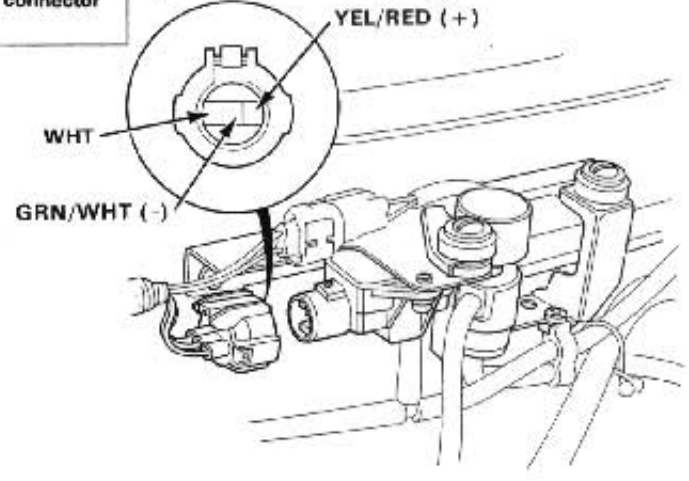
Turn the ignition switch ON.

(To page 11-39)

(Std. CAL: A/T and HF)



(Ex. Std. CAL: A/T and Si)



(From page 11-38)

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

Is there approx. 5V?

YES

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

Is there approx. 5V?

NO

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

YES

NO

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

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

Is there approx. 5V?

NO

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

YES

Turn the ignition switch OFF.

Reconnect the 3P connector to the MAP sensor.

Connect the ECU test harness between the ECU and connector (page 11-27).

Turn the ignition switch ON.

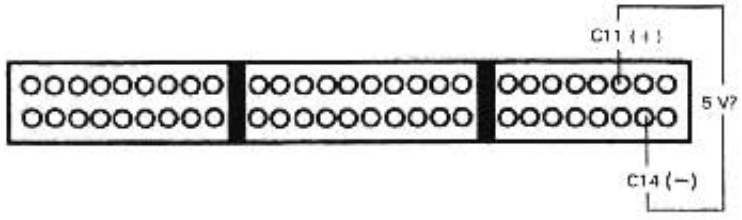
(To page 11-40)

(cont'd)

Troubleshooting Flowchart — MAP Sensor (cont'd)

(From page 11-39)

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



Is there approx. 3 V ?

NO → **Replace MAP sensor.**

YES

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

BLANK

Troubleshooting Flowchart — MAP Sensor (cont'd)

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

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Start the engine.

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

NO

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

YES

Stop engine.

Connect vacuum pump to #21 hose and apply vacuum.

Does it hold vacuum?

NO

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

Does it hold vacuum?

NO

Replace MAP sensor.

YES

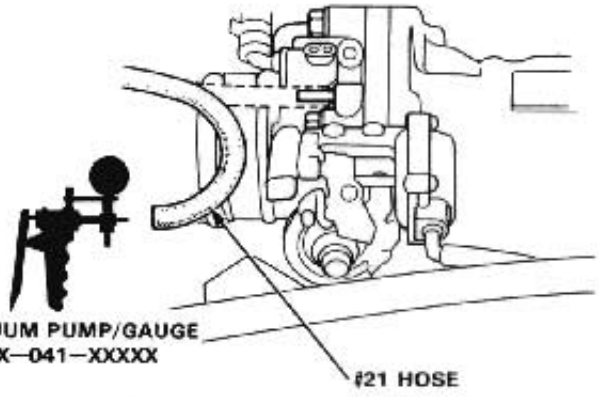
Replace #21 hose.

YES

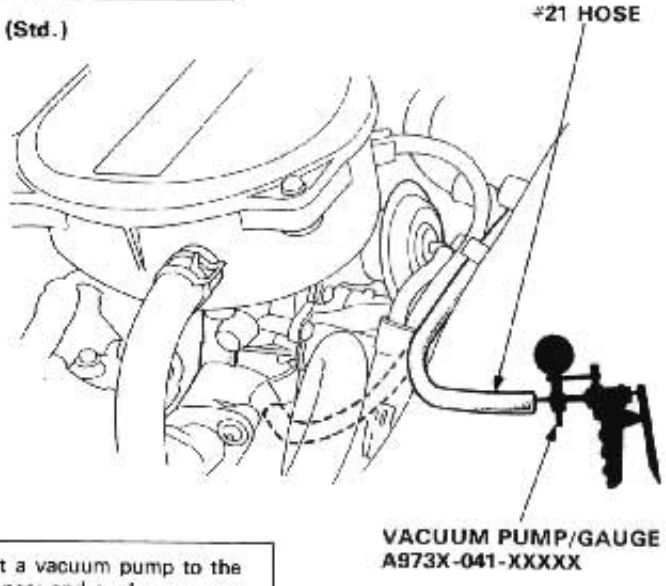
Disconnect #21 hose from the throttle body and connect a T-fitting from a vacuum gauge between the throttle body and MAP sensor.

(To page 11-43)

(HF and Si)



(Std.)



(From page 11-42)

Start engine.

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

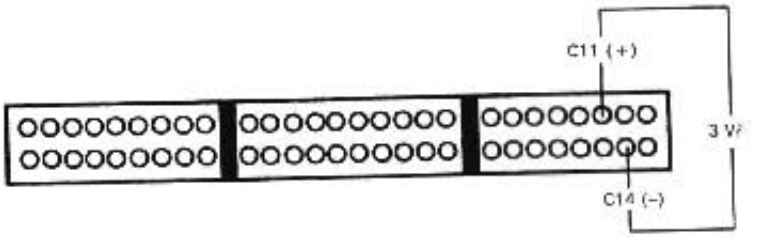
YES

Stop engine.

Connect the ECU test harness between the ECU and connector (page 11-27).

Turn the ignition switch ON.

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



Is there approx. 3 V? NO → **Replace the MAP sensor.**

YES

Start the engine and allow it to idle.

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

YES

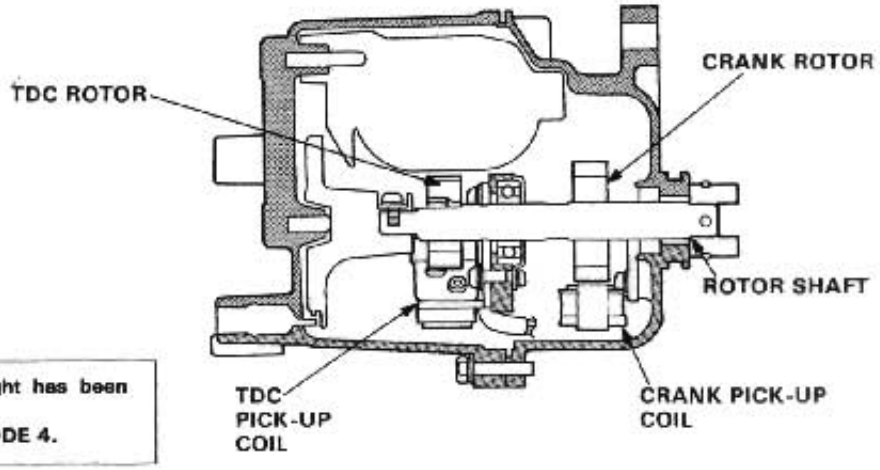
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Troubleshooting Flowchart —— TDC/CRANK Sensor [Std.]

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

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

The CRANK sensor determines timing for fuel injection and ignition of each cylinder and also detects engine RPM. The TDC sensor determines ignition timing at start-up (cranking) and when crank angle signal is abnormal.



- **Check Engine light has been reported on.**
- **LED indicates CODE 4.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Start engine.

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

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at the distributor connector and C210 (round connector located at the right shock tower).**

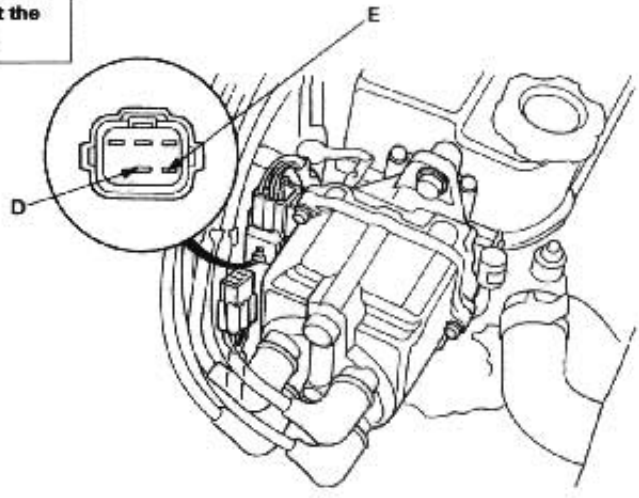
YES

Stop engine.

Disconnect 6P connector from the TDC/CRANK sensor.

Measure resistance between D terminal and E terminal.

(To page 11-45)



(From page 11-44)

Is there 350–550 Ω ?

NO → **Replace the CRANK sensor (section 23).**

YES

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

Does continuity exist ?

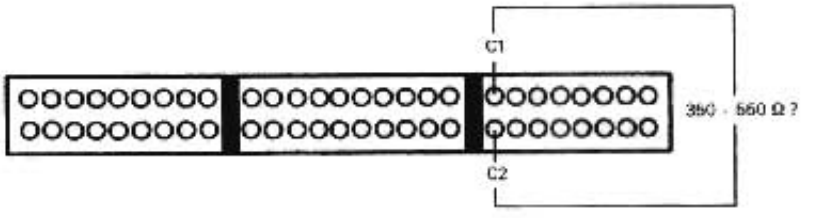
YES → **Replace the CRANK sensor (section 23).**

NO

Reconnect the connector.

Connect the ECU test harness only to the main wire harness, not to the ECU (page 11-27).

Measure resistance between C1 terminal and C2 terminal



Is there 350–550 Ω ?

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

YES

Check for continuity to body ground on C1 terminal.

Does continuity exist?

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

NO

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

(cont'd)

Troubleshooting Flowchart — TDC/CRANK sensor [Std.] (cont'd)

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

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Start engine.

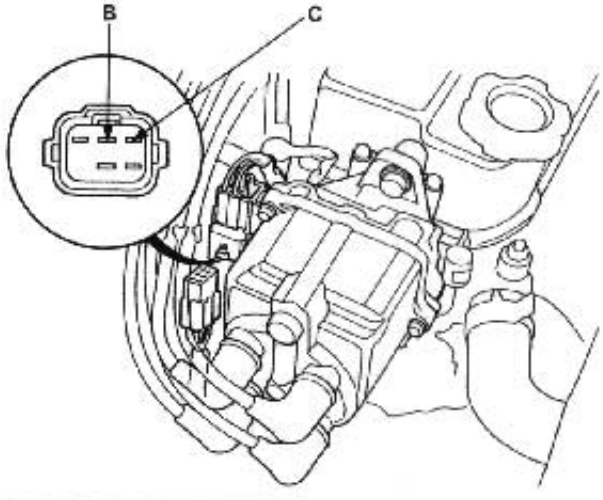
Is Check Engine light on and does LED indicate CODE 8?

NO — **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at distributor connector and C210 (round connector located at the right shock tower).

YES

Stop engine.

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



Measure resistance between B terminal and C terminal.

Is there 350—550 Ω ?

NO — **Replace the TDC sensor (section 23).**

YES

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

Does continuity exist ?

YES — **Replace the TDC sensor (section 23).**

NO

Reconnect the connector.

(To page 11-47)

(From page 11-46)

Connect the ECU test harness only to the main wire harness, not to the ECU (page 11-27).

Measure resistance between C3 terminal and C4 terminal.

Is there 350 — 550 Ω ?

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

YES

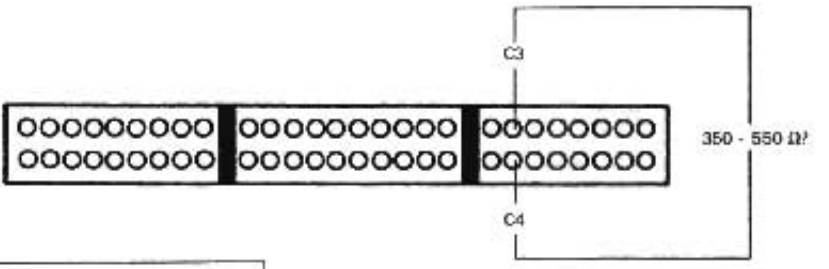
Check for continuity to body ground on C3 terminal.

Does continuity exist?

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

NO

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



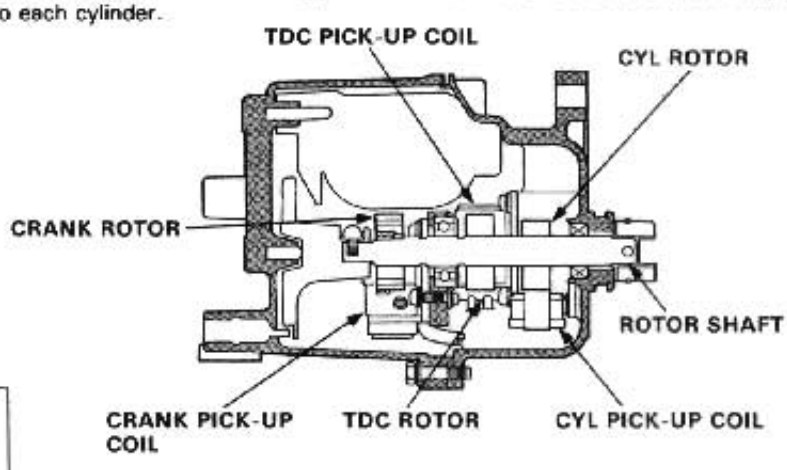
Troubleshooting Flowchart — TDC/CRANK/CYL Sensor [HF and Si]

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

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

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

The CRANK sensor determines timing for fuel injection and ignition of each cylinder and also detects engine RPM. The TDC sensor determines ignition timing at start-up (cranking) and when crank angle is abnormal. The CYL sensor detects the position of No.1 cylinder for sequential fuel injection to each cylinder.



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

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Start engine.

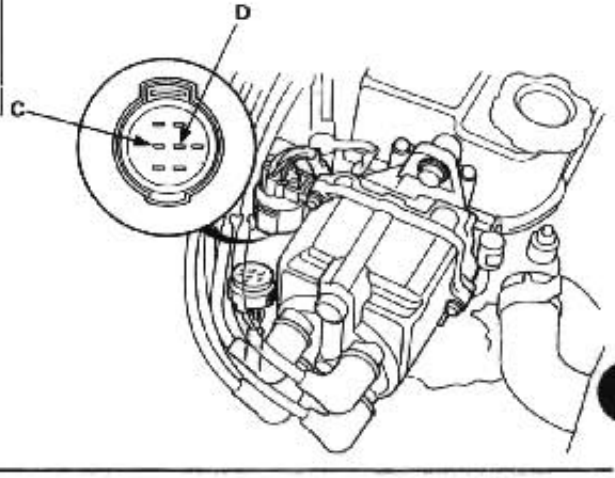
Is Check Engine light on and does LED indicate CODE 4?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at the distributor connector and C210 (round connector located at the right shock tower).**

YES

Stop engine.

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



(To page 11-49)

(From page 11-48)

Measure resistance between C terminal and D terminal.

Is there 350–550 Ω ?

NO → **Replace the distributor assembly (section 23).**

YES

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

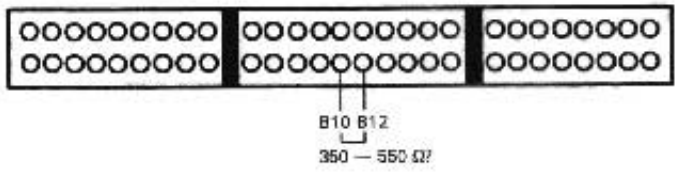
Does continuity exist ?

YES → **Replace the distributor assembly (section 23).**

NO

Reconnect the connector.

Connect the ECU test harness only to the main wire harness, not to the ECU (page 11-27).



Measure resistance between B10 terminal and B12 terminal.

Is there 350–550 Ω ?

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

YES

Check for continuity to body ground on B10 terminal.

Does continuity exist?

YES → **Repair short in ORN wire between ECU (B10) and distributor connector.**

NO

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

(cont'd)

Troubleshooting Flowchart — TDC/CRANK/CYL sensor [HF and Si] (cont'd)—

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

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Start engine.

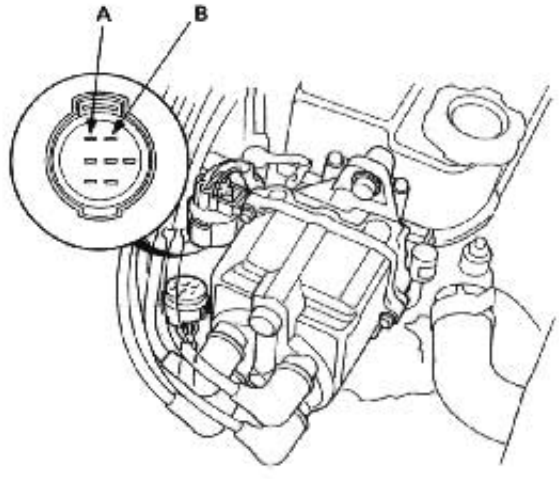
Is Check Engine light on and does LED indicate CODE 8?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at distributor connector and C210 (round connector located at the right shock tower).**

YES

Stop engine.

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



Measure resistance between A terminal and B terminal.

Is there 350—550 Ω ?

NO → **Replace the distributor assembly (section 23).**

YES

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

Does continuity exist ?

YES → **Replace the distributor assembly (section 23).**

NO

Reconnect the connector.

(To page 11-51)

(From page 11-50)

Connect the ECU test harness only to the main wire harness, not to the ECU (page 11-27).

Measure resistance between C3 terminal and C4 terminal.

Is there 350 — 550 Ω ?

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

YES

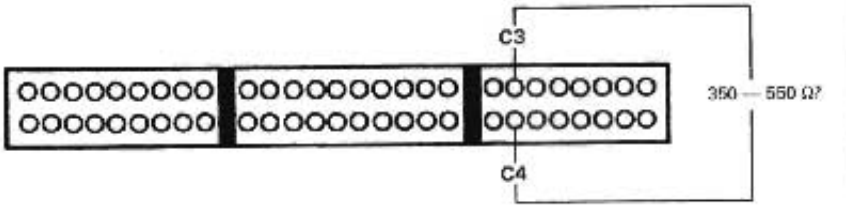
Check for continuity to body ground on C3 terminal.

Does continuity exist?

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

NO

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



Troubleshooting Flowchart — TDC/CRANK/CYL Sensor [HF and Si] (cont'd)

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

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

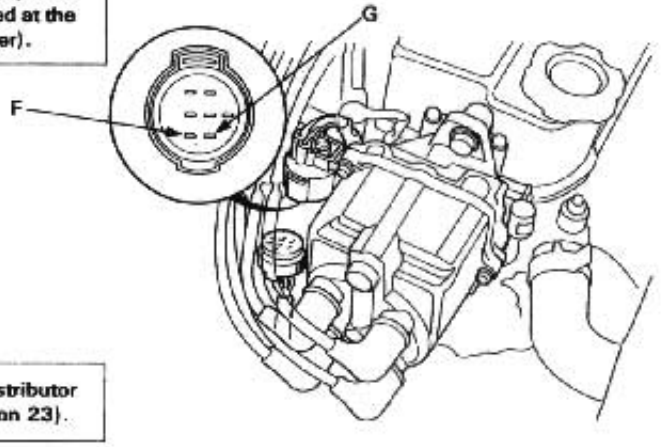
Start engine.

Is Check Engine light on and does LED indicate CODE 9? — NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connection or loose wires at the distributor connector and C210 (round connector located at the right shock tower).**

YES

Stop engine.

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



Measure resistance between F terminal and G terminal.

Is there 350—550 Ω ? — NO → **Replace the distributor assembly (section 23).**

YES

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

Does continuity exist ? — YES → **Replace the distributor assembly (section 23).**

NO

Reconnect the connector

(To page 11-53)

(From page 11-52)

Connect the ECU test harness only to the main wire harness, not to the ECU (page 11-27).

Measure resistance between C1 terminal and C2 terminal.

Is there 350 — 550 Ω ?

NO

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

YES

Check for continuity to body ground on C1 terminal.

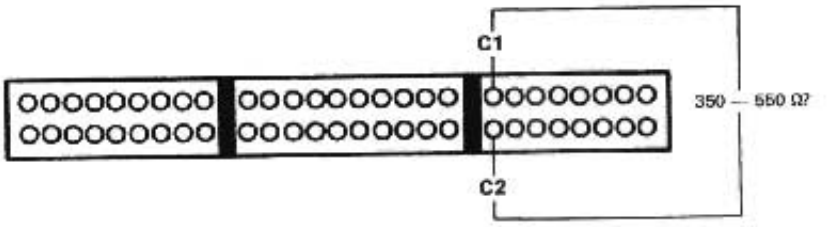
Does continuity exist?

YES

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

NO

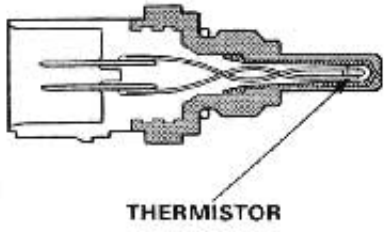
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

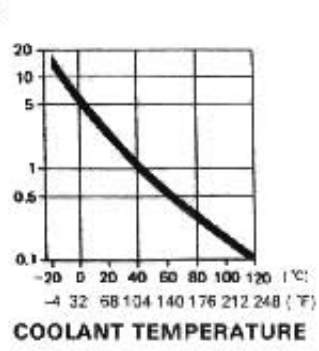


Troubleshooting Flowchart — TW Sensor

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

The TW sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the coolant temperature increases as shown below.





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

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Turn the ignition switch ON.

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

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at TW sensor, C210 and C212 (Si) (round connector and square connector located at the right shock tower).

YES

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

Turn the ignition switch OFF.

Disconnect the 2P connector from the TW sensor.

Measure resistance between the 2 terminals on the TW sensor.

Is there 200—400 Ω ?

NO → **Replace TW sensor.**

YES

(To page 11-55)

(From page 11-54)

Turn the ignition switch ON.

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

Is there approx. 5V ?

NO

Repair open or short in RED/WHT wire between ECU (C6) and TW sensor.
If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace original ECU.

YES

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

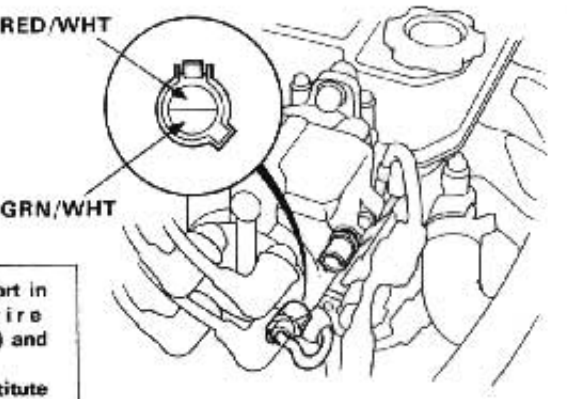
Is there approx. 5V ?

NO

Repair open in GRN/WHT wire between ECU (C12) and TW sensor.

YES

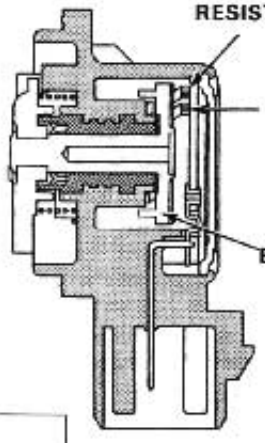
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

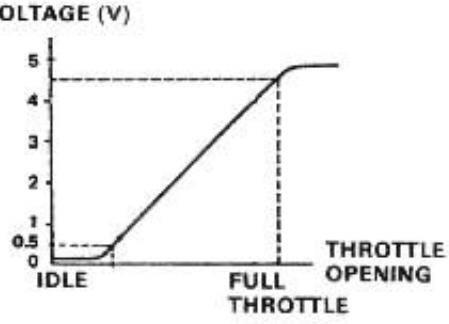


Troubleshooting Flowchart — Throttle Angle Sensor

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

The throttle angle sensor is a potentiometer. It is connected to the throttle valve shaft. As the throttle angle changes, the throttle angle sensor varies the voltage signal to the ECU.





- **Engine is running.**
- **Check Engine light has been reported on.**
- **LED indicates CODE 7.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Start engine.

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

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at throttle angle sensor and C210 (round connector located at the right shock tower).

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the throttle angle sensor.

Turn the ignition switch ON.

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

Is there approx. 5V ?

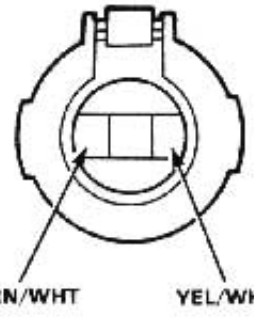
NO → Measure voltage between YEL/WHT (+) terminal and body ground.

YES

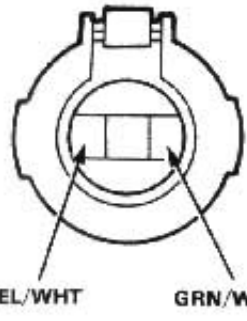
(To page 11-57)

(To page 11-57)

(Std.)



(HF and Si)



(From page 11-56)

Turn the ignition switch OFF.

Reconnect the 3P connector.

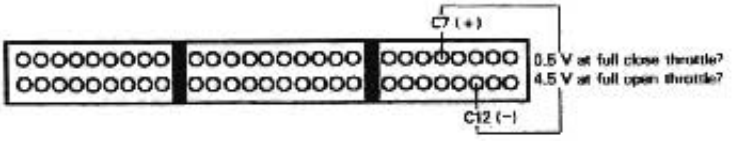
Connect the ECU test harness between the ECU and connector (page 11-27).

Turn the ignition switch ON.

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

Apply 20 in. Hg to the diaphragm.

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



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

NO

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

YES

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

(From page 11-56)

Is there approx. 5V ?

YES

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

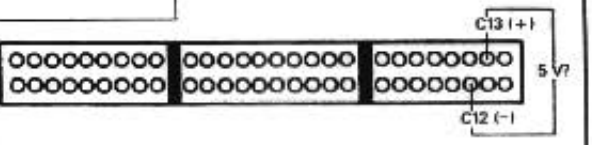
NO

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 11-27).

Turn the ignition switch ON.

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



Is there approx. 5V ?

YES

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

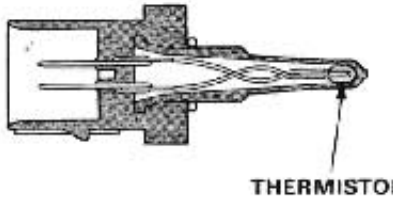
NO

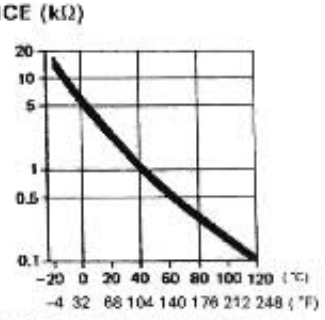
Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

Troubleshooting Flowchart —— TA Sensor

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

The TA sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the intake air temperature increases as shown below.





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

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Turn the ignition switch ON.

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

NO → **Intermittent failure. system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at TA sensor, C210 and C212 (Si) (round connector and square connector located at right shock tower).**

YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the TA sensor.

Measure resistance between the 2 terminals on the TA sensor.

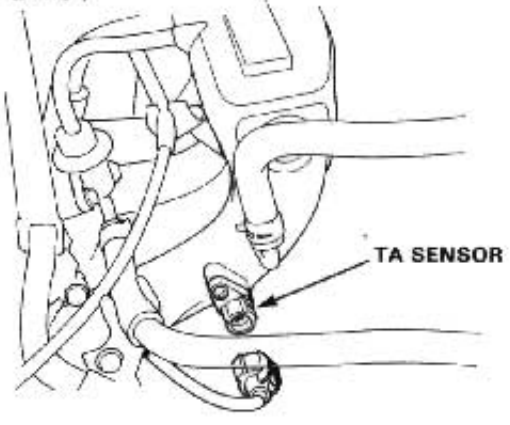
Is there 1–4 kΩ ?

NO → **Replace TA sensor.**

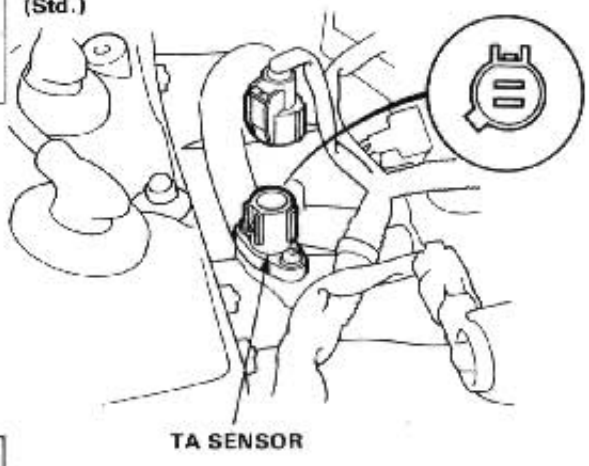
YES

(To page 11-59)

(HF and Si)



(Std.)



(From page 11-58)

Turn the ignition switch ON.

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

Is there approx. 5 V ?

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

YES

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

Is there approx. 5 V ?

NO → **Repair open in GRN/WHT wire between ECU (C12) and TA sensor.**

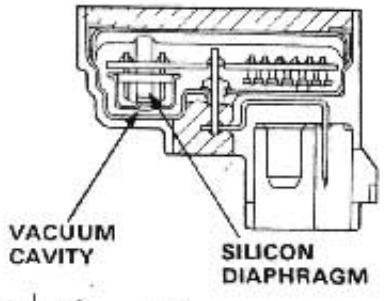
YES

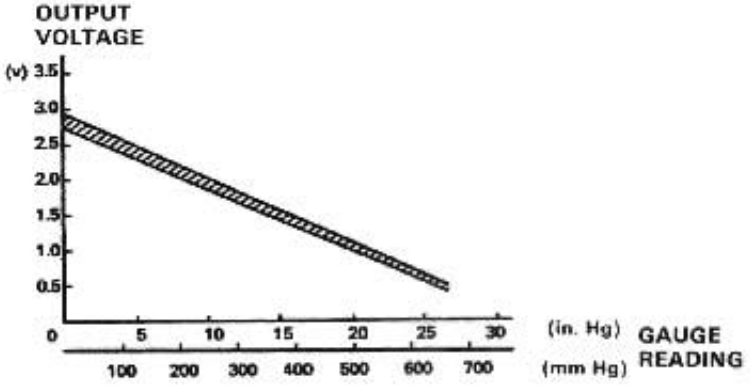
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Troubleshooting Flowchart — PA Sensor

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

The PA sensor converts atmospheric pressure into electrical signals and inputs the ECU.





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

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Turn the ignition switch ON.

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

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

YES

Turn the ignition switch OFF.

Disconnect the main wire harness from PA sensor.

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

Is there approx. 5V?

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

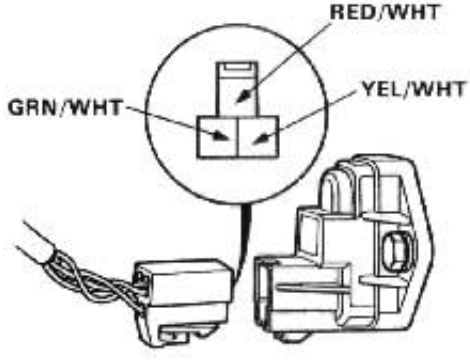
NO → **Repair open in YEL/WHT wire between ECU (C13) and the sensor. If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available replace the original ECU.**

Is there approx. 5V?

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

YES

(To page 11-61)



(From page 11-60)

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

Is there approx. 5V?

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

YES

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Substitute a known-good PA sensor.

Turn the ignition switch ON.

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

NO → **Replace the original PA sensor.**

YES

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

Troubleshooting Flowchart — Ignition Output Signal

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

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

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Start engine.

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

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at the distributor connector and C211 (square connector located at the right shock tower).

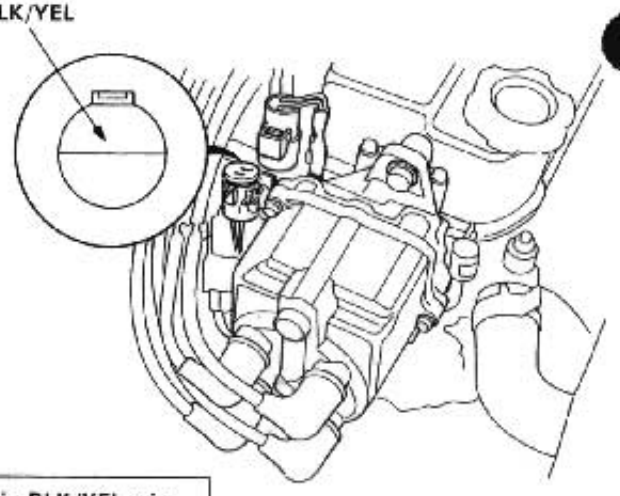
YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the distributor.

Turn the ignition switch ON.

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



Is there battery voltage ?

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

YES

Turn the ignition switch OFF.

Reconnect the 2P connector.

(To page 11-63)

(From page 11-62)

Connect the ECU test harness to the main harness only

Turn the ignition switch ON

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

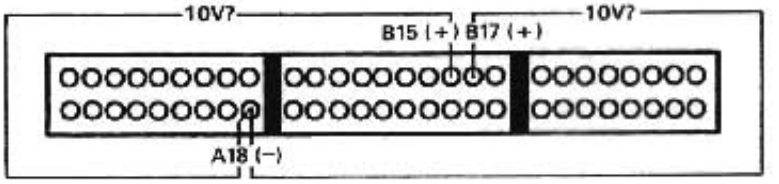
Is there approx. 10 volts?

NO

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

YES

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



Troubleshooting Flowchart — Vehicle Speed Sensor

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

The signal generated by the speed sensor, which produces 4 pulses (switch closures to ground) for each revolution of the speedometer cable.

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

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Road test necessary.
In 2nd gear accelerate to 3,500 rpm and decelerate to 1,500 rpm with throttle fully closed.

Is Check Engine light on and does LED indicate CODE 17?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C405 and C710.**

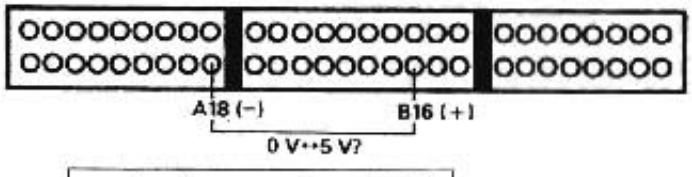
YES

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

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

Connect the ECU test harness between the ECU and connector (page 11-27).

Turn the ignition switch ON.



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

Does voltage pulse 0V and 5V ?

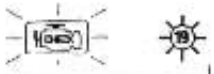
NO →
- **Repair open or short in YEL/RED wire between ECU (B16) and the speed sensor.**
- **Faulty speed sensor.**
- **Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.**

YES

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

BLANK

Troubleshooting Flowchart —— Lock-up Control Solenoid Valve [A/T Only]



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

- **Check Engine light has been reported on.**
- **LED indicates CODE 19.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Drive vehicle.

Is Check Engine light on and does LED indicate CODE 19?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at lock-up solenoid valve and C313 (round connector located at the left shock tower).

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 11-27). Disconnect "A" connector from the ECU only, not the main wire harness.

Disconnect the 2P connector from the lock-up control solenoid valve.

Check for continuity between A8 and body ground.

Does continuity exist?

YES → **Repair short in YEL wire between ECU (A8) and the 2P connector.**

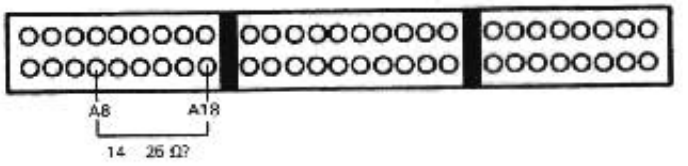
NO

Reconnect the 2P connector

(To page 11-67)

(From page 11-66)

Measure resistance between A8 terminal and A18 terminal.



Is there 14 — 25 Ω ?

NO

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

Does continuity exist ?

YES

Faulty lock-up control solenoid valve.

NO

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

YES

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

Troubleshooting Flowchart — Electric Load Detector

Self-diagnosis LED indicates code 20: A problem in the Electric Load Detector circuit.

Check Engine light is off.
- LED indicates CODE 20.

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Start engine and keep engine rpm at idle.

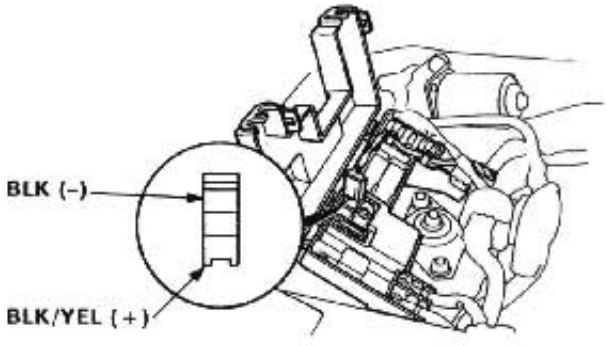
Does LED indicate CODE 20? — NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at main fuse box connector C214.**

YES

Turn the ignition switch OFF.

Open the under-hood fuse box lid.

Disconnect the 3P connector from the electric load detector.



Turn the ignition switch ON.

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

Is there battery voltage ? — NO → Measure voltage between BLK/YEL (+) terminal and body ground.

YES

Turn the ignition switch OFF.

Is there battery voltage ? — YES → **Repair open in BLK wire between the 3P connector and G201.**

NO → **Repair open in BLK/YEL wire between No. 14 fuse and the 3P connector.**

Connect the ECU test harness between the ECU and connector (page 11-27). Disconnect "B" connector from the ECU only, not the main wire harness.

(To page 11-69)

(From page 11-68)

Connect GRN/RED terminal of the 3P connector to body ground.

Check for continuity in GRN/RED wire between ECU (B19) and body ground.

Does continuity exist ?

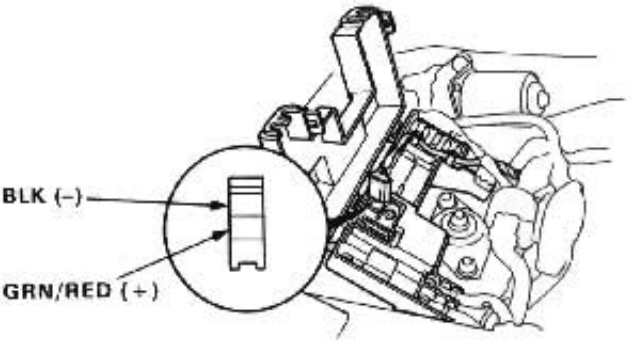
NO

Repair open in GRN/RED wire between ECU (B19) and the 3P connector.

YES

Disconnect GRN/RED terminal of the 3P connector from body ground.

Connect "B" connector to the ECU.



Turn the ignition switch ON.

Measure voltage between GRN/RED (+) terminal and BLK (–) terminal of the 3P connector.

Is there 4.5 — 5 V ?

NO

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

YES

Measure voltage between B19 (+) terminal and A18 (–) terminal.

Connect the 3P connector to the electric load detector.

Is there 4.5 — 5 V ?

YES

Repair short in GRN/RED wire between ECU (B19) and the 3P connector.

NO

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

(To page 11-70)

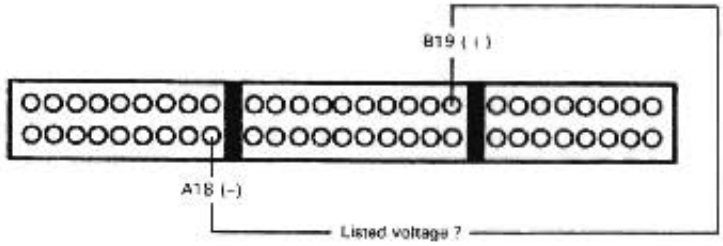
(cont'd)

Troubleshooting Flowchart — Electric Load Detector (cont'd)

(From page 11-69)

Under the conditions listed in the chart to the right, measure voltage between B19 (+) terminal and A18 (–) terminal.

Condition	Voltage
Headlight switch, first position (•)	2.5 - 3.5 V
Headlight switch, second position (●)	1.5 - 2.5 V



Is the voltage listed in the chart available ?

NO → **Faulty electric load detector.**

YES

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

Idle Control System

System Troubleshooting Guide

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- If the idle speed is out of specification and LED does not blink CODE 14, go to inspection described on page 11-74.

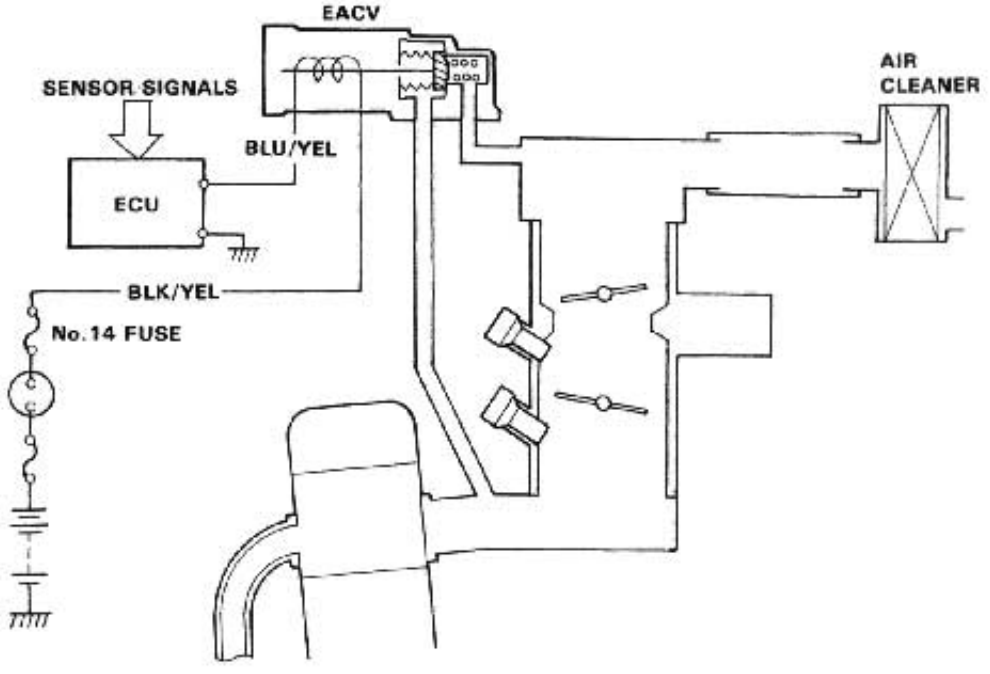
PAGE / SUB SYSTEM / SYMPTOM		IDLE ADJUSTING SCREW	EACV	AIR CONDITIONING SIGNAL	ALTERNATOR FR SIGNAL	A/T SHIFT POSITION SIGNAL (Automatic)	BRAKE SWITCH SIGNAL	STARTER SWITCH SIGNAL	HEATER FAN SWITCH SIGNAL (HF)	FAST IDLE CONTROL (Si)	HOSES AND CONNECTIONS
		90, 91	75	78	80	82	84	86	87	88	*
ENGINE WON'T START			②								①
DIFFICULT TO START ENGINE WHEN COLD		②	①								
WHEN COLD FAST IDLE OUT OF SPEC (1,000—2,000 rpm)		②	①								
ROUGH IDLE			②								①
WHEN WARM RPM TOO HIGH		③	②								①
WHEN WARM RPM TOO LOW	Idle speed is below specified rpm (no load)	②	①		③						
	Idle speed does not increase after initial start up.		①					②			
	On models with automatic transmission, the idle speed drops in gear		②			①					
	Idle speeds drops when air conditioner in ON		②	①							
FREQUENT STALLING	WHILE WARMING UP		①								
	AFTER WARMING UP	②	①								
FAILS EMISSION TEST											①

Idle Control System

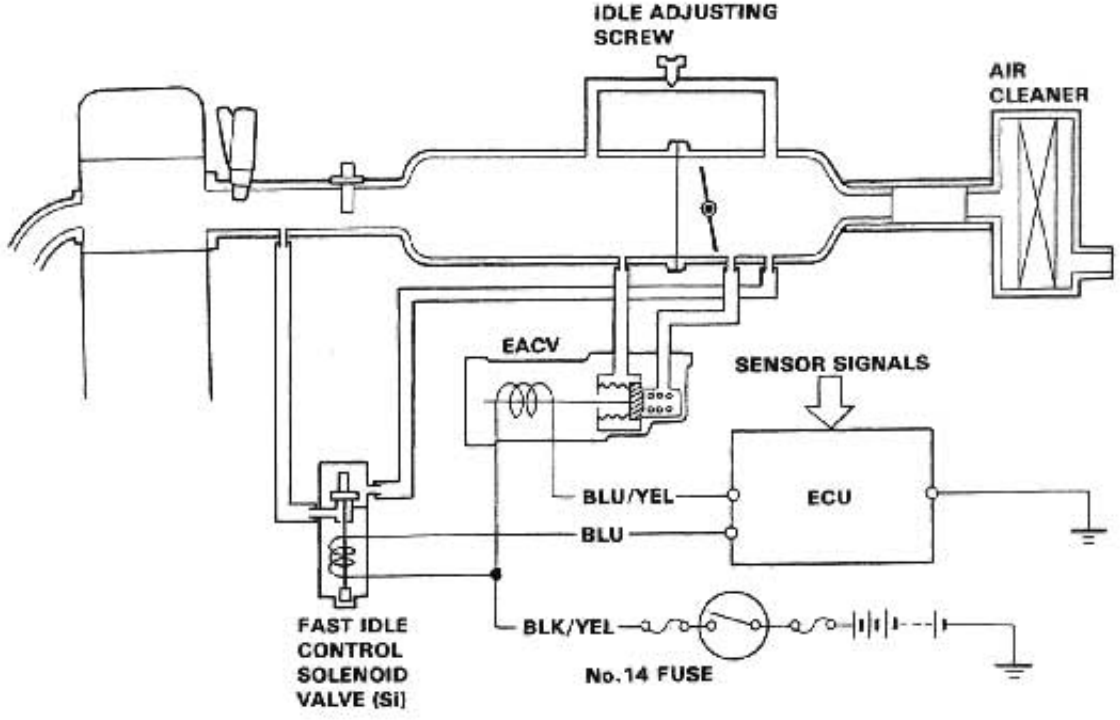
System Description

The idle speed of the engine is controlled by the Electronic Air Control Valve (EACV).
The valve changes the amount of air bypassing into the intake manifold in response to electric current sent from the ECU.
When the EACV is activated, the valve opens to maintain the proper idle speed.

Std.

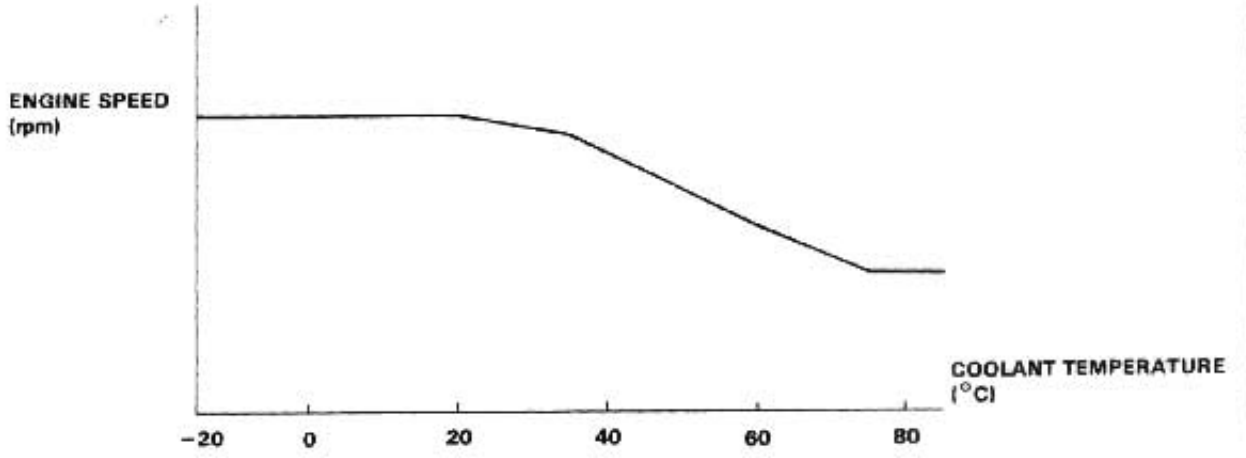


HF and Si



1. After the engine starts, the EACV opens for a certain time. The amount of air is increased to raise the idle speed about 150—300 (Std.), 150—250 (HF), 300—500 (Si) rpm.

2. When the coolant temperature is low, the EACV is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the coolant temperature.



1. When the idle speed is out of specification and LED does not blink CODE 14, check the following items:
   - Adjust the idle speed (page 11-90, 91)
   - Air conditioning signal (page 11-78)
   - Alternator FR signal (page 11-80)
   - A/T shift position signal (page 11-82)
   - Brake switch signal (page 11-84)
   - Starter switch signal (page 11-86)
   - Fast idle control (SI) (page 11-88)
   - Hoses and connections
   - EACV and its mounting O-rings.
   - Heater fan switch signal (HF) (page 11-87)

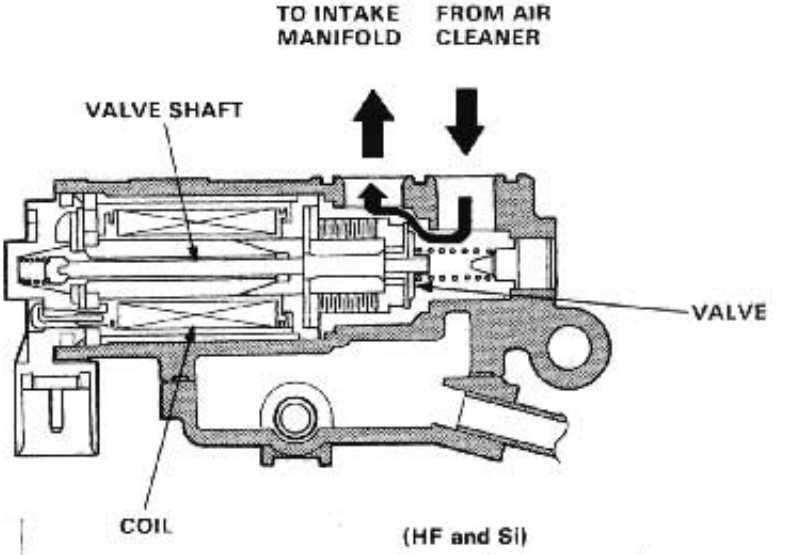
2. If the above items are normal, substitute a known-good EACV and readjust the idle speed (page 11-90, 91).

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

Troubleshooting Flowchart —— EACV

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

The EACV changes the amount of air bypassing the throttle body in response to a current signal from the ECU in order to maintain the proper idle speed.



—Engine is running.
—Check Engine light has been reported on.
—LED indicates CODE 14.

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Start engine.

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

NO → **Intermittent failure, system is OK at this time (test driving may be necessary). Check for poor connections or loose wires at EACV and at C313.**

YES

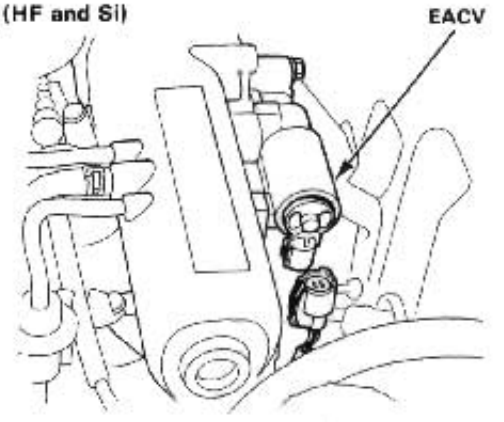
Stop engine.

Disconnect the 2P connector from the EACV.

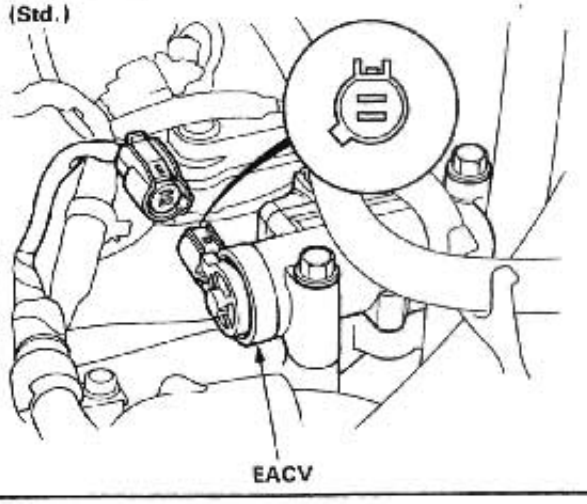
Measure resistance between the 2 terminals on the EACV.

(To page 11-76)

(HF and Si)



(Std.)



(cont'd)

Troubleshooting Flowchart — EACV (cont'd)

(From page 11-75)

Is there 8—15Ω ?
NO → **Replace EACV.**
YES

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

Does continuity exist ?
YES → **Replace EACV.**
NO

Turn the ignition switch ON.

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

Is there battery voltage ?
YES → Disconnect the "A" connector from the ECU.
NO

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

Is there battery voltage ?
YES → **Repair short in BLU/YEL wire between ECU (A11) and EACV.**
NO

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

Is there battery voltage ?
NO → **Repair open in BLK/YEL wire between the EACV and No.14 fuse.**
YES

Turn the ignition switch OFF.

Reconnect the 2P connector to EACV.

Connect the ECU test harness "A" connector to the main wire harness only, not the ECU (page 11-27).

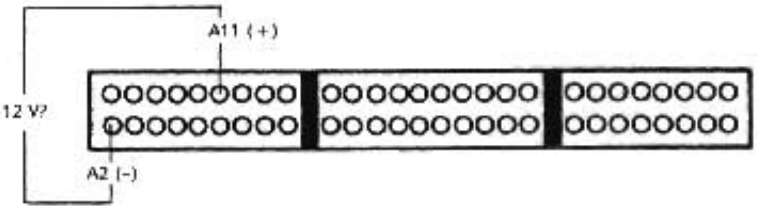
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

(To page 11-77)

(From page 11-76)

Turn the ignition switch ON.

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

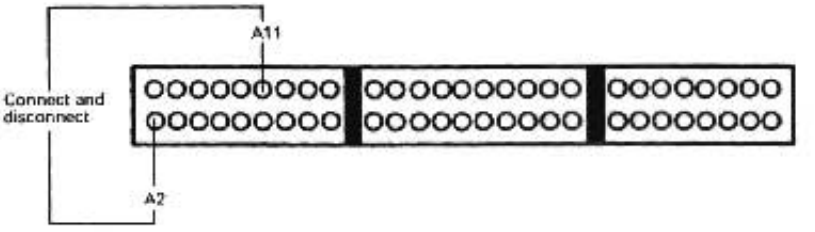


Is there battery voltage ?

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

YES

Connect and disconnect A11 terminal to A2 terminal.



Does EACV click when the connector is connected and disconnected ?

NO → **Replace EACV.**

YES

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

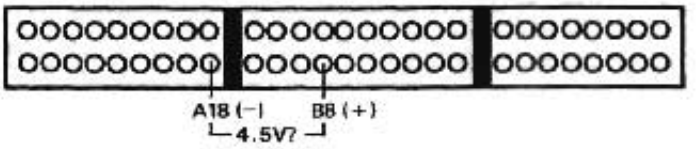
Troubleshooting Flowchart — Air Conditioning Signal

This signals the PGM-FI ECU when there is a demand for cooling from the air conditioning circuits.

Inspection of Air Conditioning Signal.

Connect the ECU test harness between the ECU and connector (page 11-27). Disconnect "B" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.



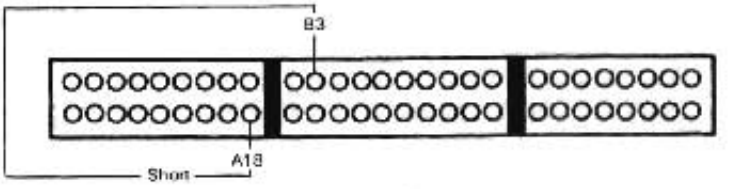
Measure voltage between B8 (+) terminal and A18 (−) terminal.

Is there approx. 4.5V?

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

YES

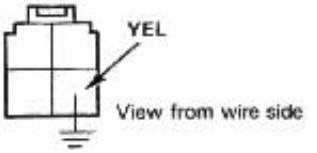
Reconnect "B" connector to the main wire harness.



Momentarily connect B3 terminal to A18 terminal several times.

Is there a clicking noise from the A/C compressor clutch?

NO — Connect the YEL terminal of the 4P connector on the A/C clutch relay to body ground.



YES

Start engine.

Blower switch ON.

(To page 11-79)

Is there a clicking noise from the A/C compressor clutch?

NO — **See Air conditioner inspection (section 22).**

YES

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

(From page 11-78)

A/C switch ON.

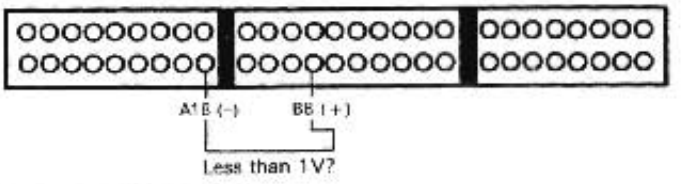
Does A/C operate ?

NO

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

YES

Air conditioning signal is OK.



Is voltage less than 1V?

NO

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

YES

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

Troubleshooting Flowchart — Alternator FR Signal

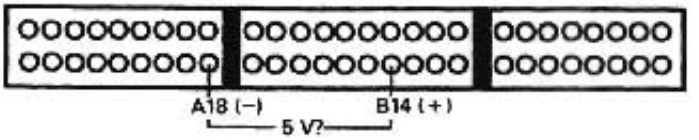
This signals the PGM-FI ECU when the alternator is charging.

Inspection of Alternator FR signal.

Connect the ECU test harness between the ECU and connector (page 11-27). Disconnect "B" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.

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



Is there approx. 5V ?

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

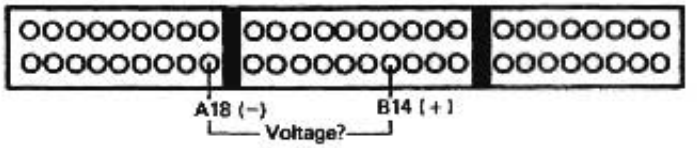
YES

Turn the ignition switch OFF.

Reconnect "B" connector to the main wire harness.

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

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



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

NO → Stop engine.

YES

Alternator FR signal is OK.

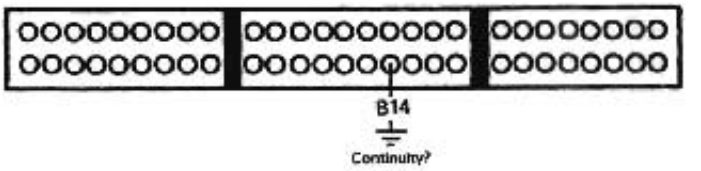
(To page 11-81)

(From page 11-80)

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

Disconnect the negative battery cable from the battery.

Check for continuity between B14 terminal and body ground.



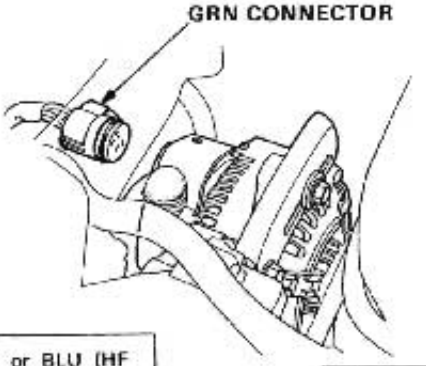
Does continuity exist ?

YES

Disconnect GRN connector from the alternator.

NO

Disconnect GRN connector from the alternator.



Connect YEL (Std.) or BLU (HF and Si) wire to body ground.

Check for continuity between B14 terminal and body ground.

Does continuity exist ?

NO

See Alternator Inspection (section 23).

YES

Check for continuity between B14 terminal and body ground.

Does continuity exist ?

YES

NO

—Repair short in BLU wire between ECU (B14) and C210 or YEL wire between C101 and alternator (Std.)
—Repair short in BLU wire between ECU (B14) and alternator (HF and Si).

—Repair open in BLU wire between ECU (B14) and C210 connector, or YEL wire between C101 connector and alternator (Std.).
—Repair open in BLU wire between ECU (B14) and alternator (HF and Si).

See Alternator Inspection (section 23).

Troubleshooting Flowchart — A/T Shift Position Signal

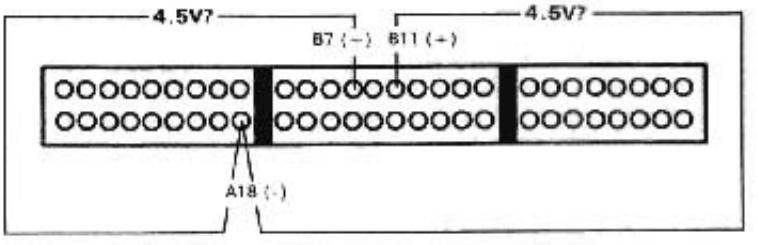
This signals the PGM-FI ECU when the transmission is in Neutral , Park or D4.

Inspection of A/T Shift Position Signal

Connect the ECU test harness between the ECU and connector (page 11-27). Disconnect "B" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.

Measure voltage individually between B7 (+), B11 (+) terminals and A18 (–) terminal.



Is there approx. 4.5V?

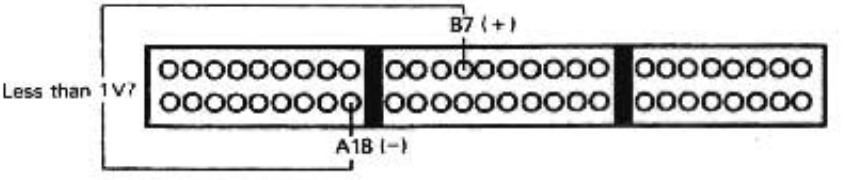
NO

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

YES

Reconnect "B" connector to the main wire harness.

Measure voltage between B7 (–) terminal and A18 (–) terminal in Neutral position.



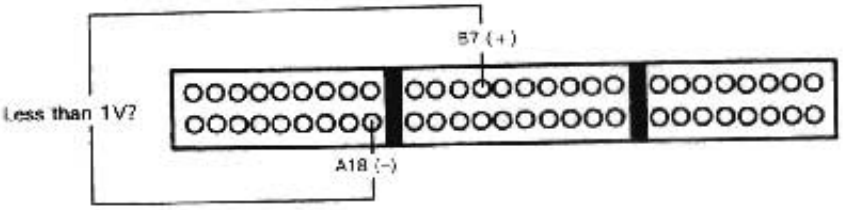
Is voltage less than 1V?

NO

- **Repair open in GRN wire between ECU (B7) and shift position console switch.**
- **See shift position console switch inspection (section 23).**

YES

Measure voltage between B7 (+) terminal and A18 (–) terminal in Park position.



(To page 11-83)

(From page 11-82)

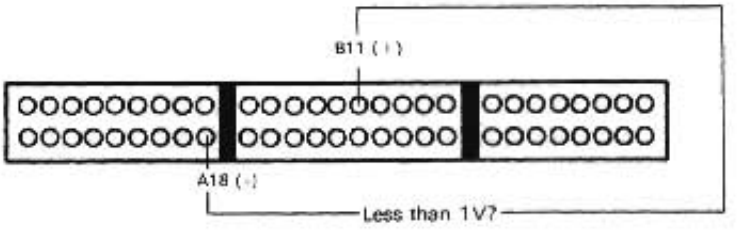
Is voltage less than 1V?

NO

See shift position console switch inspection (section 23).

YES

Measure voltage between B11 (–) terminal and A18 (–) terminal in D4 position.



Is voltage less than 1V?

NO

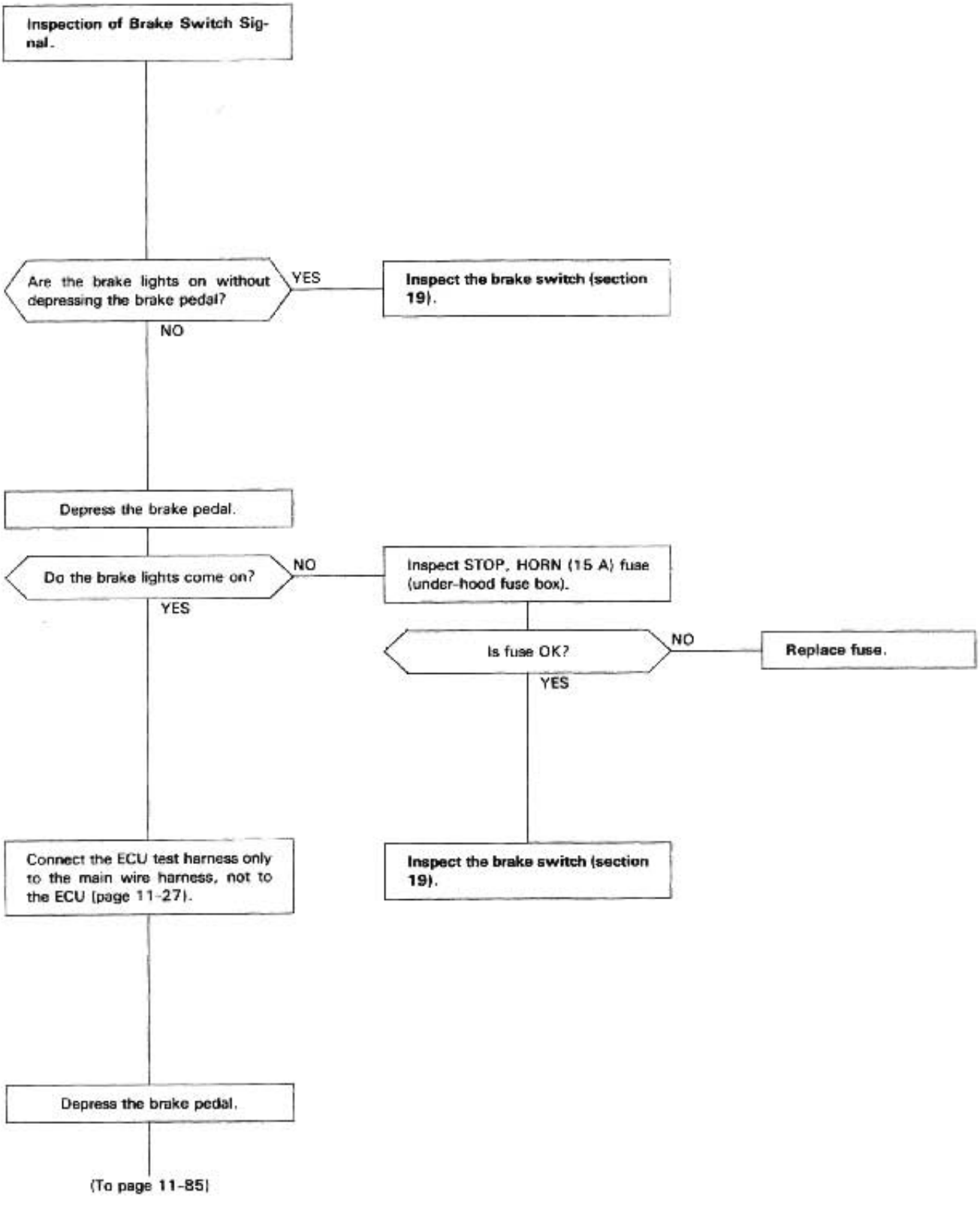
- Repair open in GRN/BLK wire between ECU (B11) and shift position console switch.
- See shift position console switch inspection (section 23).

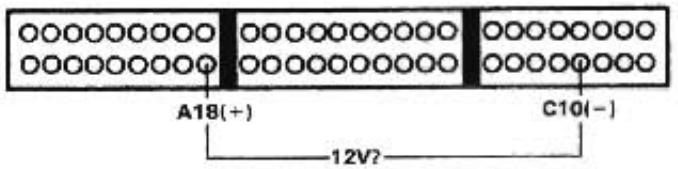
YES

A/T shift position signal is OK.

Troubleshooting Flowchart — Brake Switch Signal

This signals the PGM-FI ECU when the brake pedal is depressed.





(From page 11-84)

Measure voltage between C10 (+) terminal and A18 (−) terminal.

Is there battery voltage?

NO

Repair open in GRN/WHT wire between the brake switch and ECU (C10).

YES

Brake switch signal is OK.

Troubleshooting Flowchart — Starter Switch Signal

This signals the PGM-FI ECU when the engine is cranking.

Inspection of Starter Switch Signal.

Connect the ECU test harness between the ECU and connector (page 11-27).

Measure voltage between B13 (+) terminal and A18 (–) terminal with ignition switch in the start position.

Is there battery voltage ?

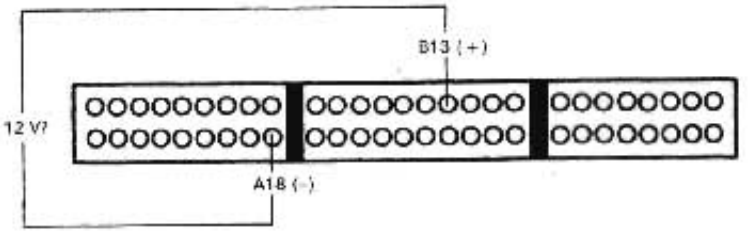
NO → Inspect No. 2 fuse.

Is No. 2 fuse OK ?

NO → **Replace fuse.**

YES → **Repair open in BLU/WHT wire between ECU (B13) and No. 2 fuse.**

YES → **Starter switch signal is OK.**



Troubleshooting Flowchart —— Heater Fan Switch Signal [HF Only]

This signals the PGM-FI ECU when the heater fan switch is ON.

Inspection of Heater Fan Switch Signal.

Connect the ECU test harness between the ECU and connector (page 11-27).

Turn the ignition switch ON.

Measure voltage between B7 (+) terminal and A18 (–) terminal with the heater fan switch OFF.

Is there approx. 5V?

NO

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

Is there approx. 5V?

YES

Repair short in GRN wire between ECU (B7) and heater fan switch.

NO

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

YES

Turn the heater fan switch ON.

Measure voltage between B7 (+) terminal and A18 (–) terminal.

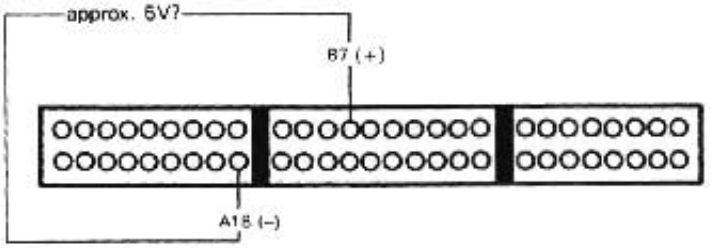
Is voltage below 1 V ?

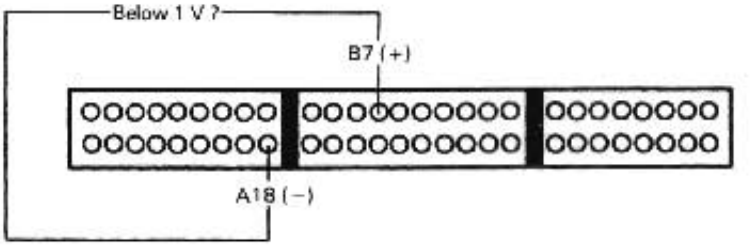
NO

Repair open in GRN wire between ECU(B7) and the heater fan switch.

YES

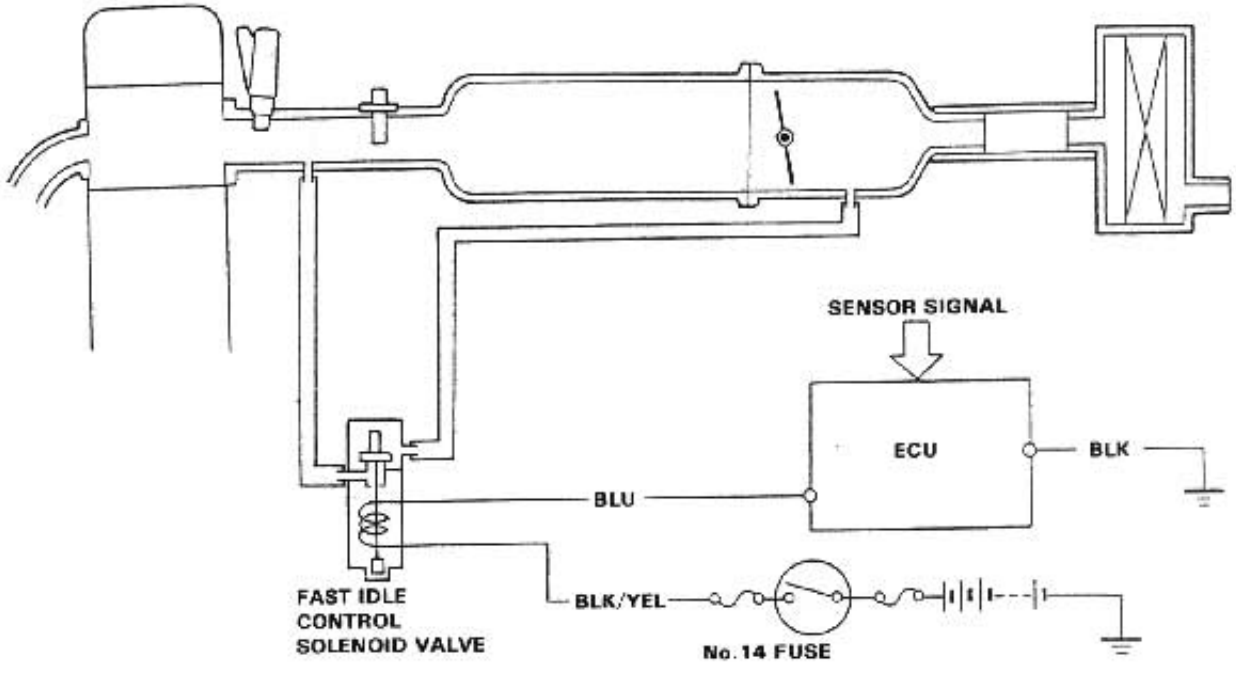
Heater fan switch signal is OK.

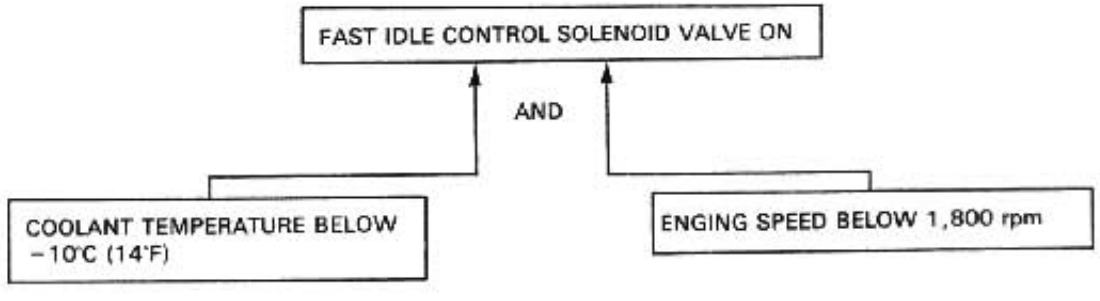




Fast Idle Control [Si]

Description
The fast idle control solenoid valve is employed to increase the air flow rate for fast idling at extremely low ambient temperature.





Troubleshooting Flowchart

Inspection of Fast Idle Control Solenoid Valve.

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

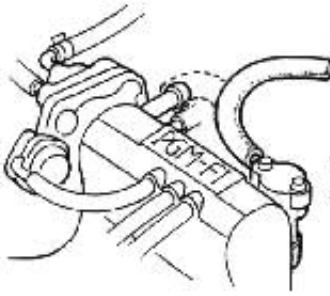
Disconnect the upper vacuum hose from the fast idle control solenoid valve and connect a vacuum gauge to the valve.

Is there any vacuum? — YES → Disconnect the 2P connector from the solenoid valve.

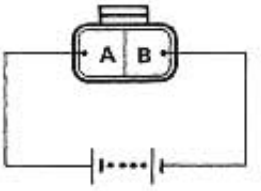
NO → Turn the ignition switch OFF

Disconnect the 2P connector from the solenoid valve. → Is there any vacuum? — YES → **Replace the fast idle control solenoid valve.**

NO → **Repair short to grounnd at BLU wire between ECU (B2) and the 2P connector. If wire is OK, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.**



VACUUM PUMP/GAUGE A973X– 041– XXXXX



Connect battery positive to terminal A and battery negative to terminal B of the solenoid valve.

Start engine.

Is there manifold vacuum? — NO → **Replace the fast idle control solenoid valve.**

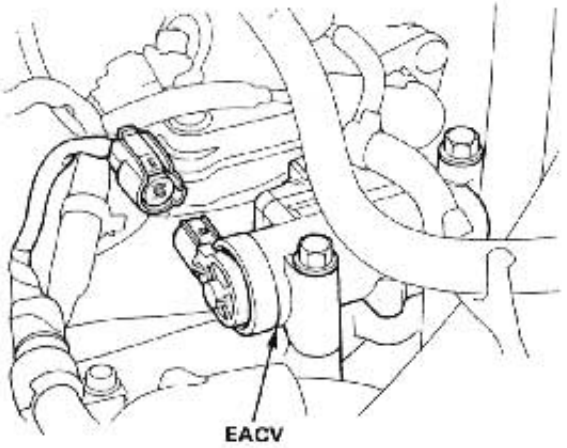
YES → **Fast Idle control Solenoid Valve is OK.**

Idle Control System

Idle Speed Setting [Std.]

Inspection/Adjustment

1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. Connect a tachometer.
3. Disconnect the 2P connector from the EACV.



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

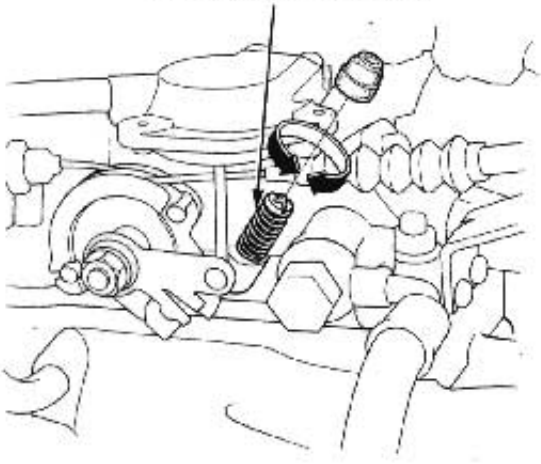
Idle speed should be:

Manual	625±50 rpm
Automatic	625±50 rpm (in N or P)

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

NOTE: If the idle speed is excessively high, check the throttle control system (page 11-130).

IDLE ADJUSTING SCREW



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

Idle speed should be:
USA:

Manual	750±50 rpm
Automatic	750±50 rpm (in N or P)

CANADA:

Manual	800±50 rpm
Automatic	800±50 rpm (in N or P)

8. Idle the engine for one minute with headlights (Hi) and rear defogger ON and check the idle speed.
If applicable, with Automatic transmission models, idle the engine for one minute in gear (except N or P) and check the idle speed.

Idle speed should be: USA: 810±50 rpm
CANADA: 800±50 rpm

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

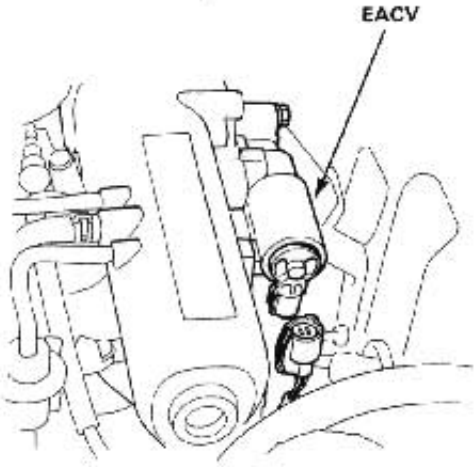
Idle speed should be: USA: 810±50 rpm
CANADA: 800±50 rpm

NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 11-71.

Idle Speed Setting [HF and Si]

Inspection/Adjustment

1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. Connect a tachometer.
3. Disconnect the 2P connector from the EACV.



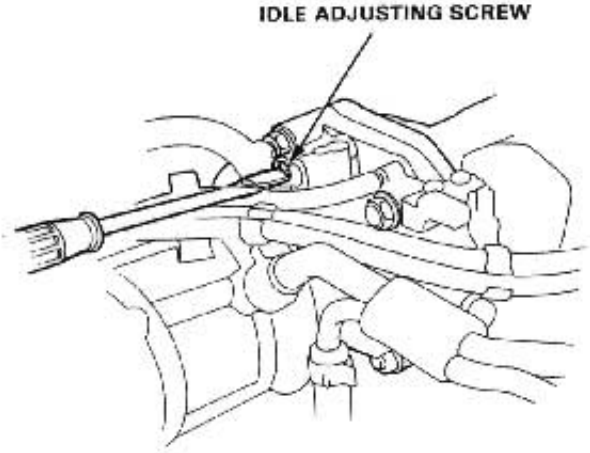
4. Check idling in no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

Idle speed should be:

HF	500 ± 50 rpm
Si	550 ±50 rpm

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

NOTE: If the idle speed is excessively high, check the throttle control system (page 11-130).



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

Idle speed should be:

USA:

HF	49 ST	600 ± 50 rpm
	CAL and HI ALT	650 ±50 rpm
Si	750 ± 50 rpm	

CANADA:
780±50 rpm

8. Idle the engine for one minute with headlights (Hi) and rear defogger ON and check the idle speed.

Idle speed should be:

USA:

HF	49 ST	650 ± 50 rpm
	CAL and HI ALT	750 ± 50 rpm
Si	780 ± 50 rpm	

CANADA:
780±50 rpm

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

Idle speed should be:

USA:

HF	750 ± 50 rpm
Si	810 ± 50 rpm

CANADA:
810±50 rpm

NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 11-71.

Fuel Supply System

System Troubleshooting Guide

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

Std.

SYMPTOM \ PAGE / SUB SYSTEM		FUEL INJECTOR	PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	MAIN RELAY	CONTAMI-NATED FUEL
		95	106	108	109	111	*
ENGINE WON'T START		③		③	①	②	
DIFFICULT TO START ENGINE WHEN COLD		②	③	①			
ROUGH IDLE		①	②				③
FREQUENT STALLING	WHILE WARM-ING UP	①		②	③		
	AFTER WARM-ING UP	①	③	③	②		③
POOR PERFORMANCE	MISFIRE OR ROUGH RUN-NING	①	②				③
	FAILS EMISSION TEST	①	②				
	LOSS OF POWER	③		①	③		②

HF and Si

SYMPTOM \ PAGE / SUB SYSTEM		FUEL INJECTOR	INJECTOR RESISTOR	PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	MAIN RELAY	CONTAMI-NATED FUEL
		100	105	106	108	109	111	*
ENGINE WON'T START			③		③	①	②	
DIFFICULT TO START ENGINE WHEN COLD		③			②	①		
ROUGH IDLE		①		②				③
FREQUENT STALLING	WHILE WARM-ING UP	①			②	③		
	AFTER WARM-ING UP	①		③	③	②		
POOR PERFORMANCE	MISFIRE OR ROUGH RUN-NING	①		②				③
	FAILS EMISSION TEST	①		②				
	LOSS OF POWER				①	③		②

* Fuel with dirt, water or a high percentage of alcohol is considered contaminated.

System Description

The Std. fuel supply system consists of a fuel tank, in-tank high pressure fuel pump, main relay, fuel filter, pressure regulator, main and aux. injectors. In the HF and Si system, there are four injectors and an injector resistor.
This system delivers pressure regulated fuel to the injectors and cuts the fuel delivery when the engine is not running.

Fuel Pressure

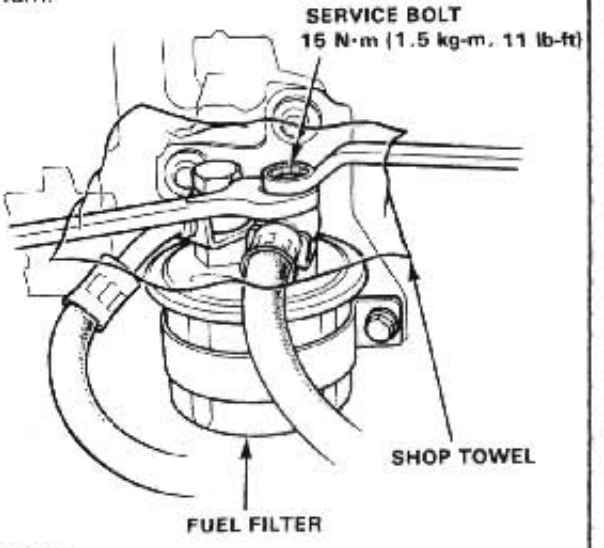
Relieving

⚠WARNING

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

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

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



NOTE:

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

(cont'd)

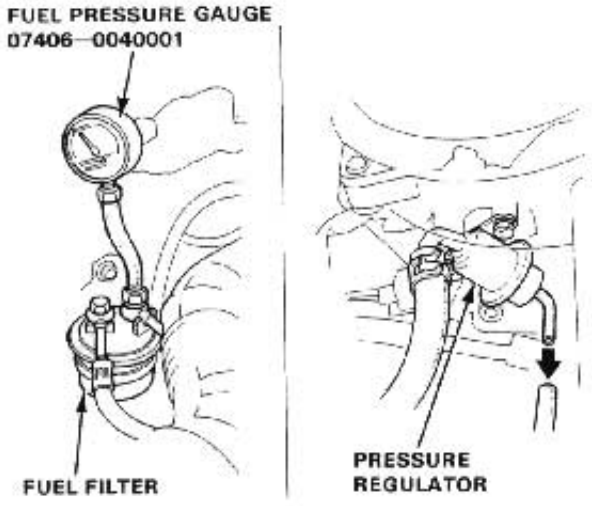
Fuel Pressure (cont'd)

Inspection

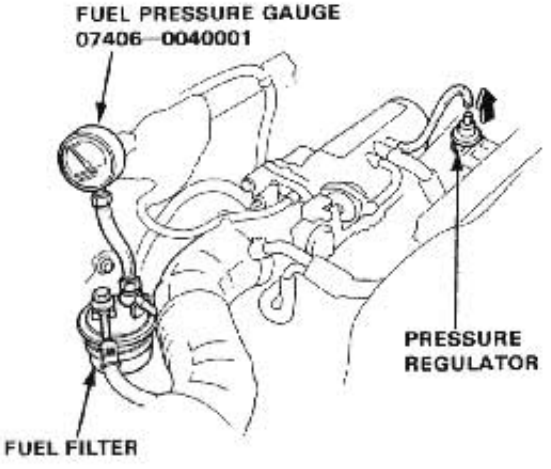
1. Relieve fuel pressure (page 11-93).
2. Remove the service bolt on the top of the fuel filter while holding the banjo bolt with another wrench and attach the fuel pressure gauge.
3. Start the engine. Measure the fuel pressure with the engine idling and vacuum hose of the pressure regulator disconnected.

   Pressure should be:
   275—324 kPa (2.8—3.3 kg/cm², 40—50 psi)

(Std.)



(HF and Si)



- If the fuel pressure is not as specified, first check the fuel pump (page 11-110). If the pump is OK, check the following:

— If the pressure is higher than specified, inspect for:
  - Pinched or clogged fuel return hose or piping.
  - Faulty pressure regulator (page 11-106).

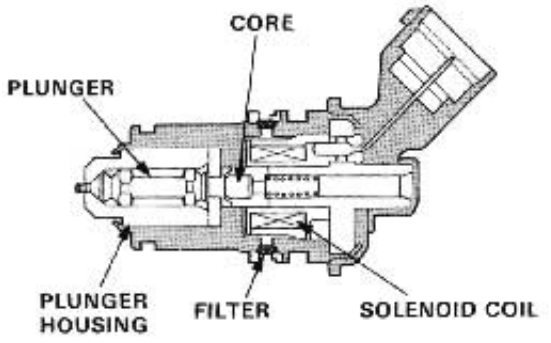
— If the pressure is lower than specified, inspect for:
  - Clogged fuel filter.
  - Faulty Pressure regulator (page 11-106).
  - Leakage in the fuel line.

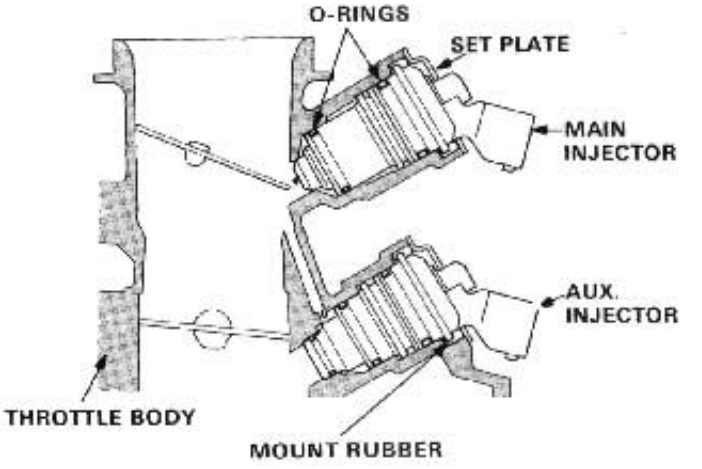
Fuel Injectors [Std.]

Troubleshooting Flowchart

Self-diagnosis LED indicates code 16: A problem in the fuel injector circuit.

The injectors are 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. 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 two O-rings and a mount rubber. This also reduces operating noise.





- Check Engine light has been reported on.
- LED indicates CODE 16.

↓

Turn the ignition switch OFF.

↓

Check for loose wires or connectors at:
- C101 and C102 (right shock tower)
- C122 (left shock tower)
- G101 (thermostat housing)

↓

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

↓ YES

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

↓

Start engine and hold at 2000 rpm for 1 minute.

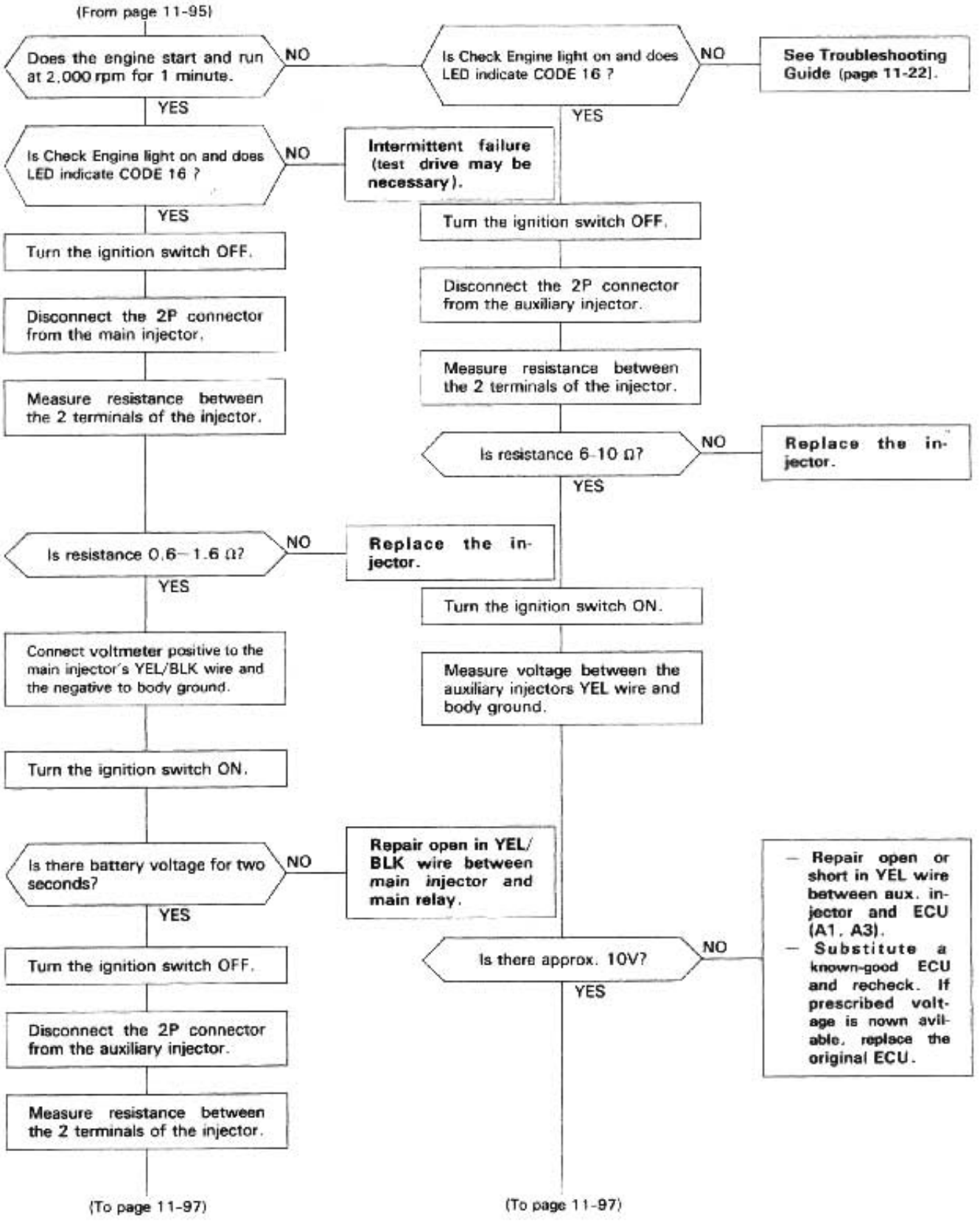
↓

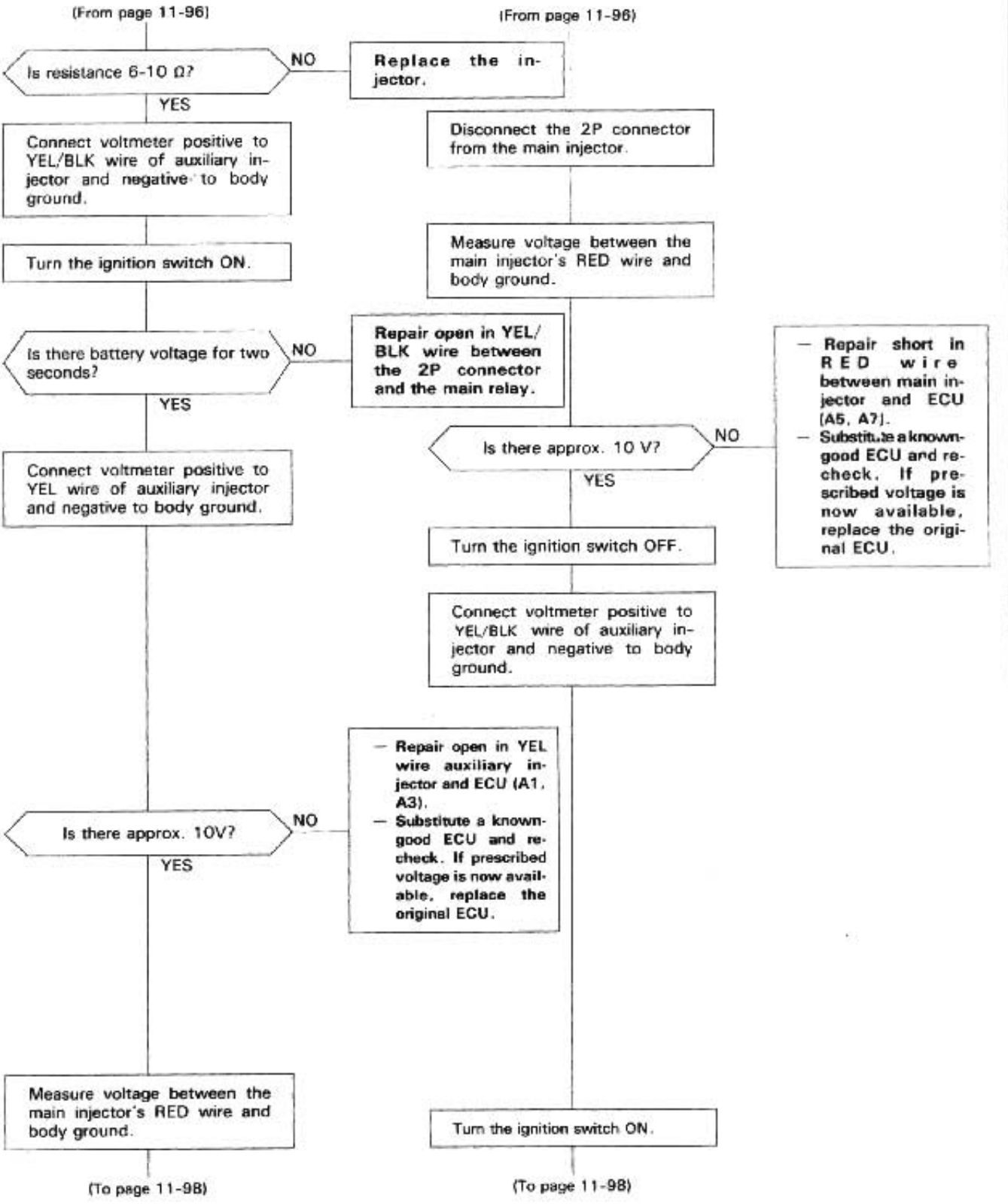
(To page 11-96)

NOTE: If engine will not start, continue cranking for at least 15 seconds to reproduce CODE on ECU.

(cont'd)

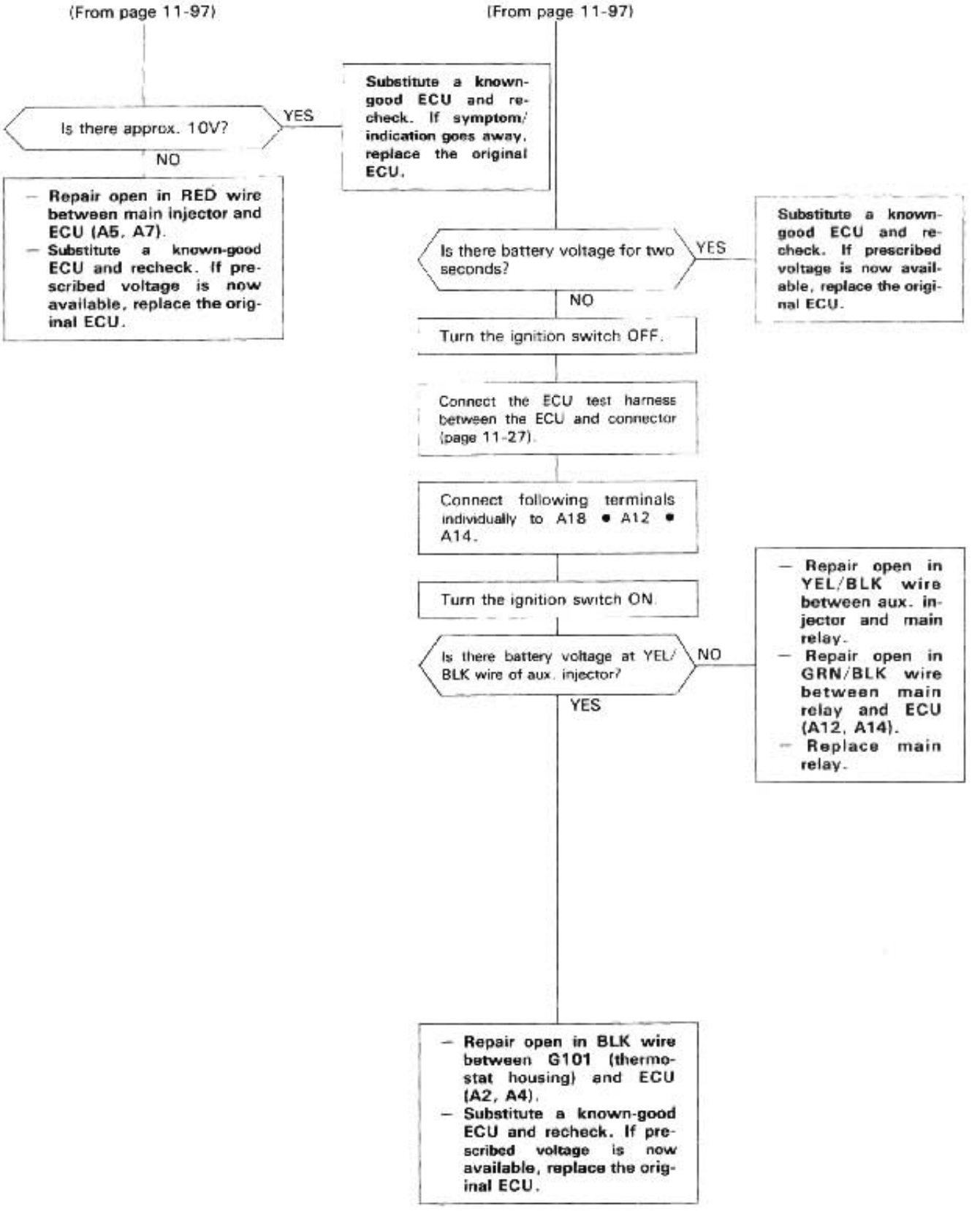
Fuel Injectors [Std.] (cont'd)




(From page 11-96)
Is resistance 6-10 Ω?
NO
Replace the injector.
YES
Connect voltmeter positive to YEL/BLK wire of auxiliary injector and negative to body ground.
Turn the ignition switch ON.
Is there battery voltage for two seconds?
NO
Repair open in YEL/BLK wire between the 2P connector and the main relay.
YES
Connect voltmeter positive to YEL wire of auxiliary injector and negative to body ground.
Is there approx. 10V?
NO
– Repair open in YEL wire auxiliary injector and ECU (A1, A3).
– Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.
YES
Measure voltage between the main injector's RED wire and body ground.
(To page 11-98)
(From page 11-96)
Disconnect the 2P connector from the main injector.
Measure voltage between the main injector's RED wire and body ground.
Is there approx. 10 V?
NO
– Repair short in RED wire between main injector and ECU (A5, A7).
– Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.
YES
Turn the ignition switch OFF.
Connect voltmeter positive to YEL/BLK wire of auxiliary injector and negative to body ground.
Turn the ignition switch ON.
(To page 11-98)

(cont'd)

Fuel Injectors [Std.] (cont'd)



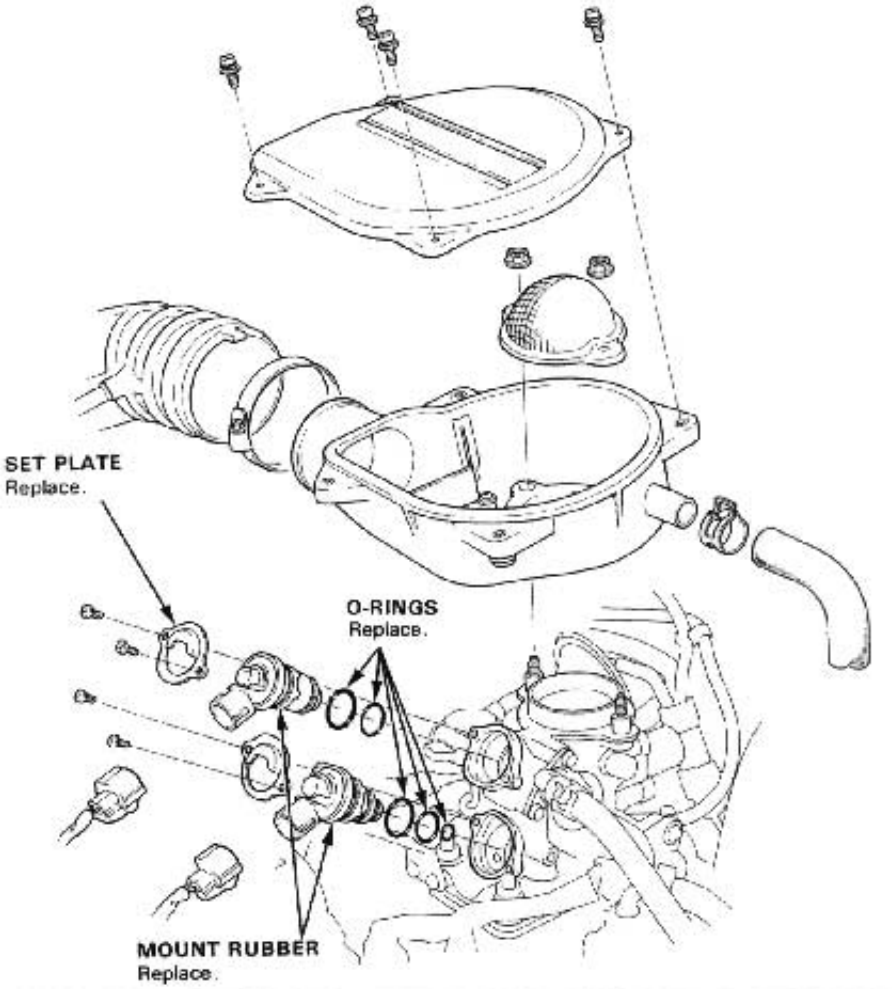
Replacement

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

1. Relieve fuel pressure (page 11-93).
2. Remove the air intake chamber.
3. Disconnect the 2P connector from the injector.
4. Loosen the screws, then remove the injector from the throttle body.

   NOTE: Place a rag or shop towel over the throttle body.
5. Coat new O-rings with clean engine oil and put them on the injector.
6. Insert the injector into the throttle body.

   NOTE: After the injector is inserted, be sure that it turns smoothly about 30°.
7. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approx. 2 seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.



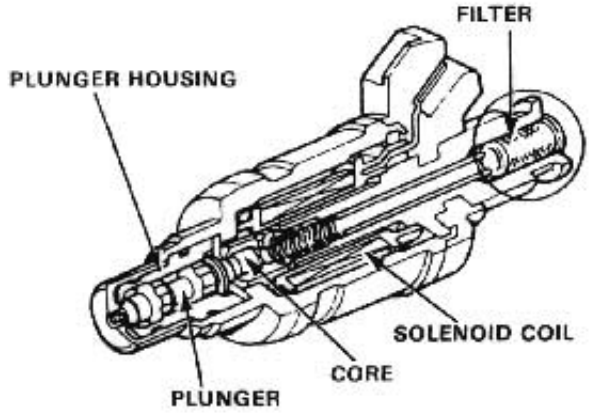
Fuel Supply System

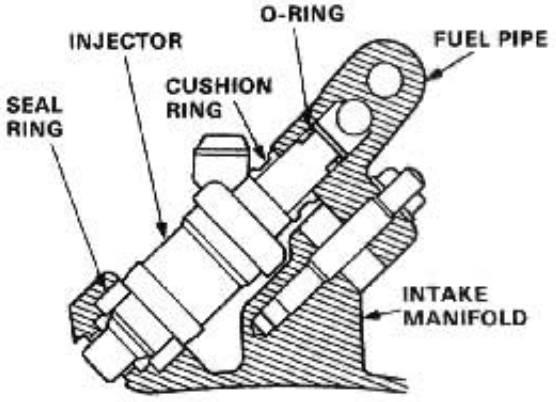
Fuel Injectors [HF and Si]

Troubleshooting Flowchart

Self-diagnosis LED indicates code 16: A problem in the fuel injector circuit.

The injectors are 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.





- **Check Engine light has been reported on.**
- **LED indicates CODE 16.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the under-hood fuse box for 10 seconds to reset ECU.

Turn the ignition switch to START position.

Does the engine start ?

NO

YES

Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at injectors, injector resistor and C313 (round connector on left shock tower).

Is Check Engine light on and does LED indicate CODE 16?

NO

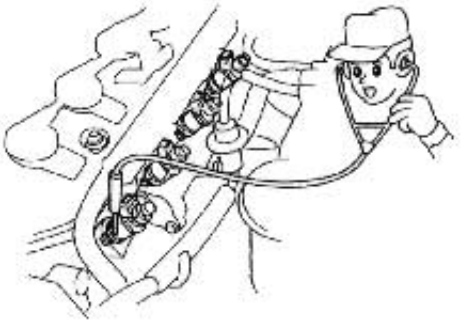
YES

(To page 11-101)

(To page 11-101)

(From page 11-100)

Check the clicking sound of each injector by means of a stethoscope when the engine is idling.



Do the injectors click ?

YES

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

NO

Turn the ignition switch OFF.

Disconnect the 2P connector from the injector that does not click.

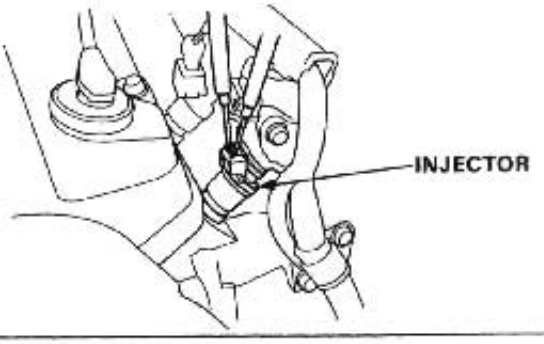
Measure resistance between the 2 terminals of the injector.

(From page 11-100)

Turn the ignition switch OFF.

Disconnect the 2P connector from each injector.

Measure resistance between the 2 terminals of the injector.



Is there 1.5—2.5Ω ?

NO

Replace the injector.

YES

Turn the ignition switch ON.

(To page 11-102)

(cont'd)

Fuel Injectors [HF and Si] (cont'd)

(From page 11-101)

Measure voltage between RED/BLK (+) terminal on the 2P connector and body ground.

Is there battery voltage ?

NO

YES

Measure voltage between the following terminals,
- No. 1 injector: RED/BLK (+) terminal and BRN (–) terminal.
- No. 2 injector: RED/BLK (+) terminal and RED (–) terminal.
- No. 3 injector: RED/BLK (+) terminal and LT BLU (–) terminal
- No. 4 injector: RED/BLK (+) terminal and YEL (–) terminal

Is there battery voltage ?

YES

NO

Reconnect the 2P connector to the injector.

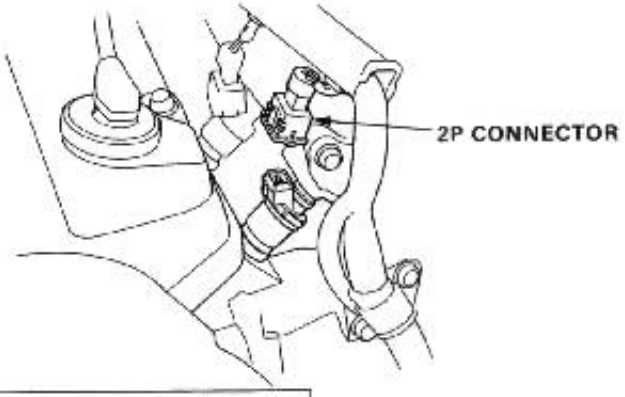
Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 11-27).

Turn the ignition switch ON

Measure voltage between A2 (–) terminal and following terminals,
- No.1 injector: A1 (+) terminal.
- No.2 injector: A3 (+) terminal.
- No.3 injector: A5 (+) terminal.
- No.4 injector: A7 (+) terminal.

(To page 11-103)



Turn the ignition switch OFF.

Disconnect 6P connector on the injector resistor.

Turn the ignition switch ON.

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

Is there battery voltage ?

NO

Repair open in the YEL/BLK wire between the injector resistor and the main relay.

YES

—Replace the injector resistor.
—Repair open RED/BLK wire between 2P connector and resistor.

Disconnect C451 (17P) connector from the ECU.

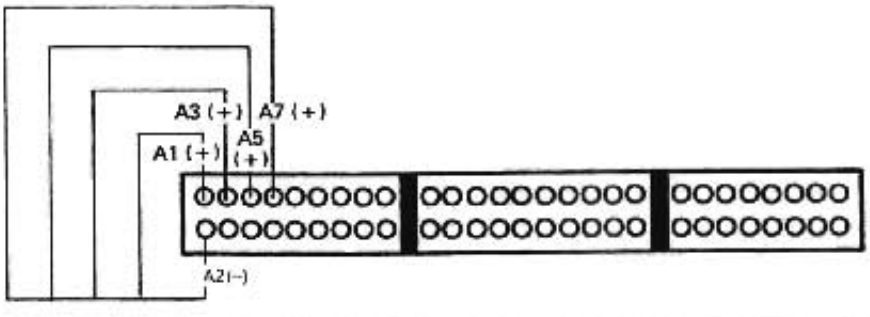
Is there battery voltage ?

YES

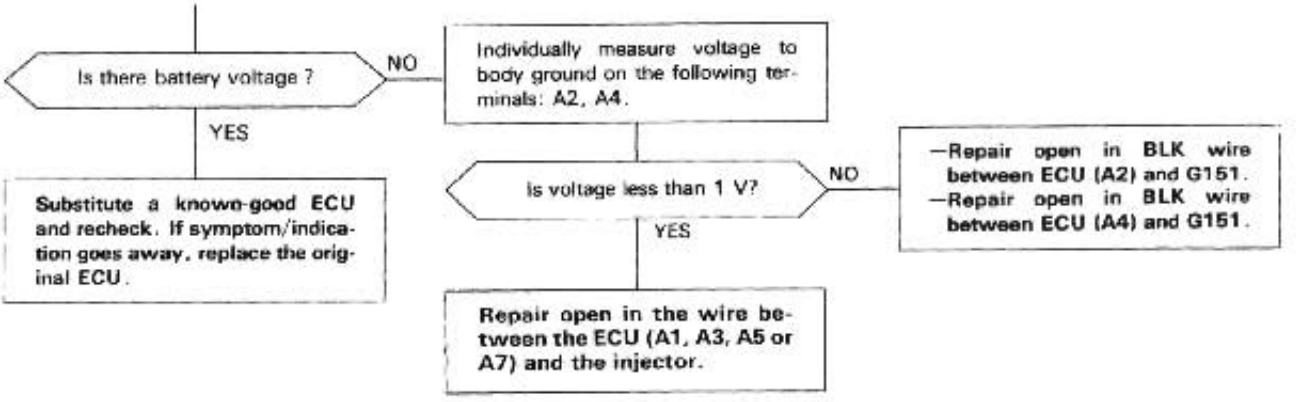
Repair short in the wire between the ECU (A1, A3, A5 or A7) and the injector.

NO

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



(From page 11-102)



Fuel Injectors [HF and Si]

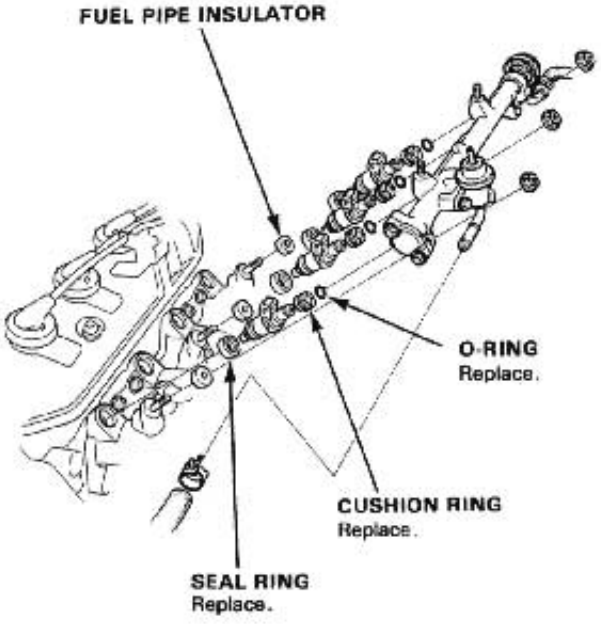
Replacement

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

1. Relieve fuel pressure (page 11-93).
2. Disconnect the connectors from the injectors.
3. Disconnect the vacuum hose and fuel return hose from the pressure regulator.

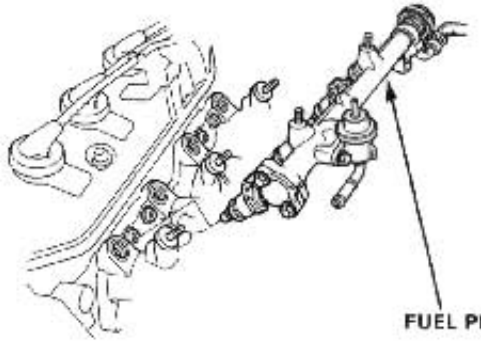
   NOTE: Place a rag or shop towel over the hoses before disconnecting them.

4. Loosen the retainer nuts on the fuel pipe and harness holder.
5. Disconnect the fuel pipe.
6. Remove the injectors from the intake manifold.

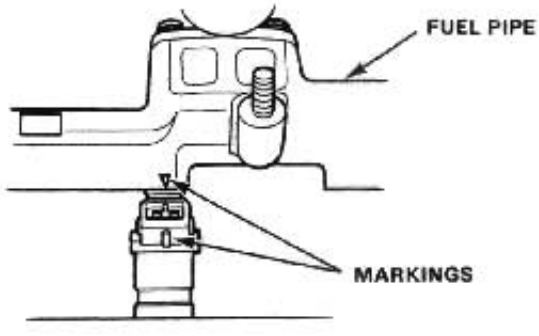


7. Slide new cushion rings onto the injectors.
8. Coat new O-rings with clean engine oil and put them on the injectors.
9. Insert the injectors into the fuel pipe first.
10. Coat new seal rings with clean engine oil and press them into the intake manifold.
11. Install the injectors and fuel pipe assembly in the manifold.

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



12. Align the center line on the connector with the mark on the fuel pipe.

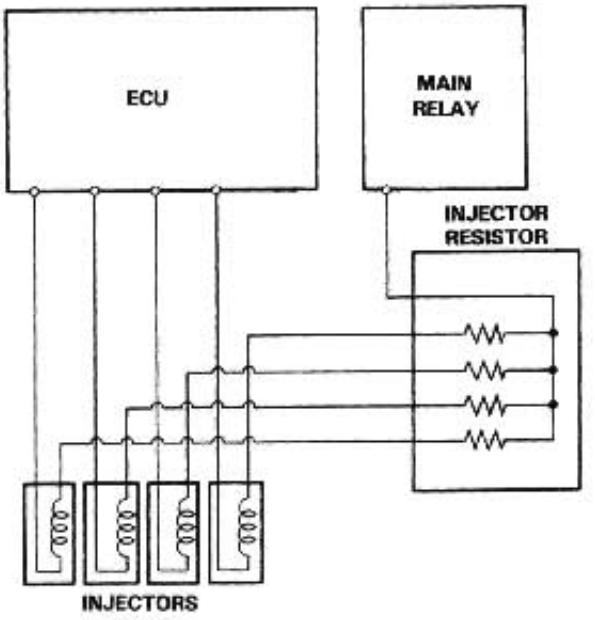


13. Install and tighten the retainer nuts.
14. Connect the vacuum hose and fuel return hose to the pressure regulator.
15. Install the connectors on the injectors.
16. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure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

Injector Resistor [HF and Si]

Description

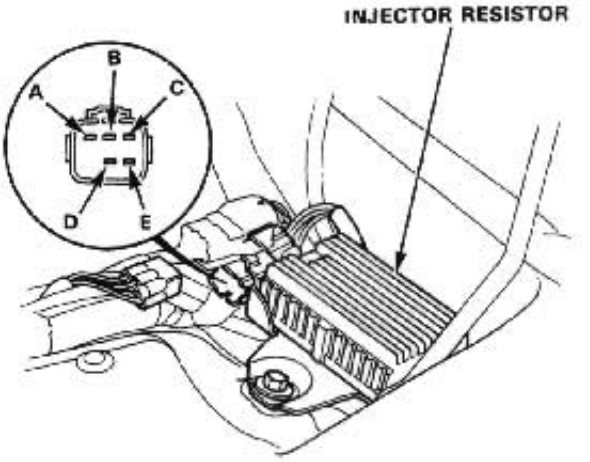
The resistor lowers the current supplied to the injectors to prevent damage to the injector coils. This allows a faster response time of the injectors.

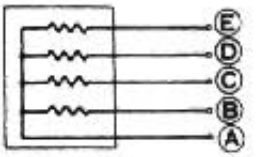


Testing

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

   Resistance should be: 5–7 Ω





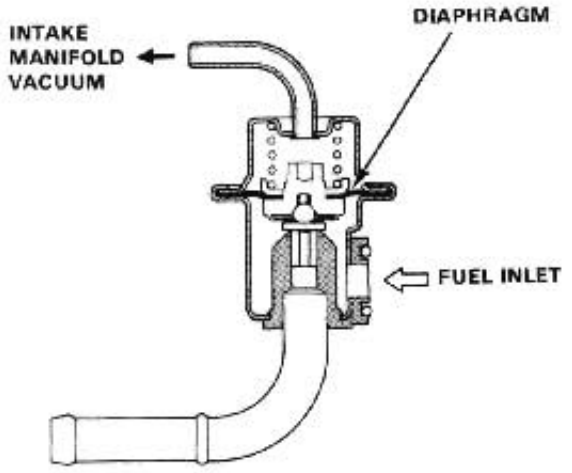
- Replace the resistor with a new one if any of the resistances are outside of the specification.

Pressure Regulator

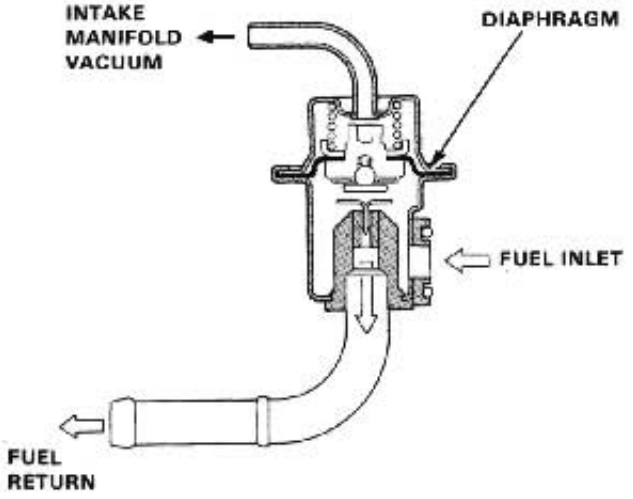
Description

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.

CLOSE



OPEN



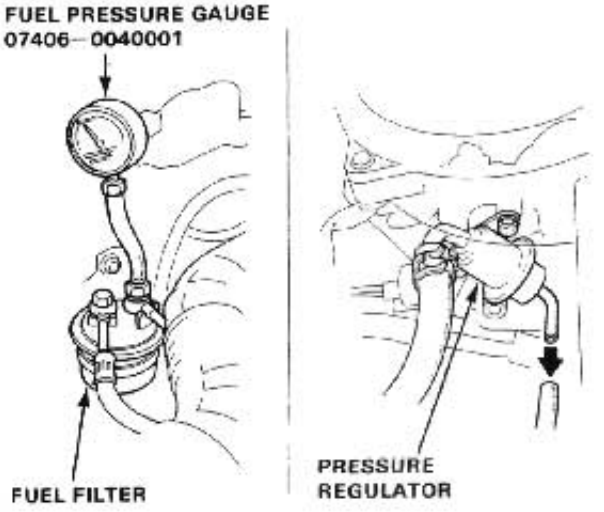
Testing

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

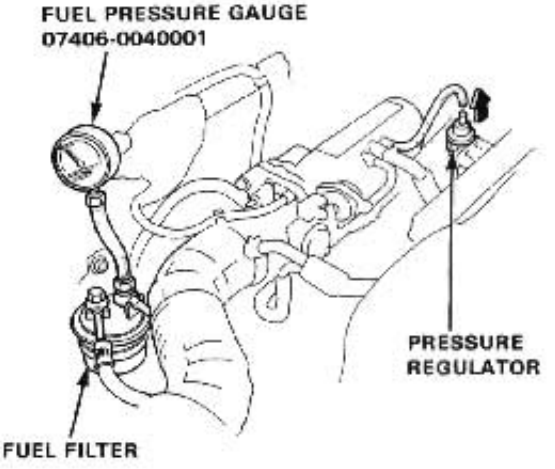
1. Attach a pressure gauge to the service port of the fuel filter (page 11-93).

   Pressure should be:
   275—324 kPa (2.8—3.3 kg/cm², 40—50 psi)
   (with the regulator vacuum hose disconnected)

(Std.)



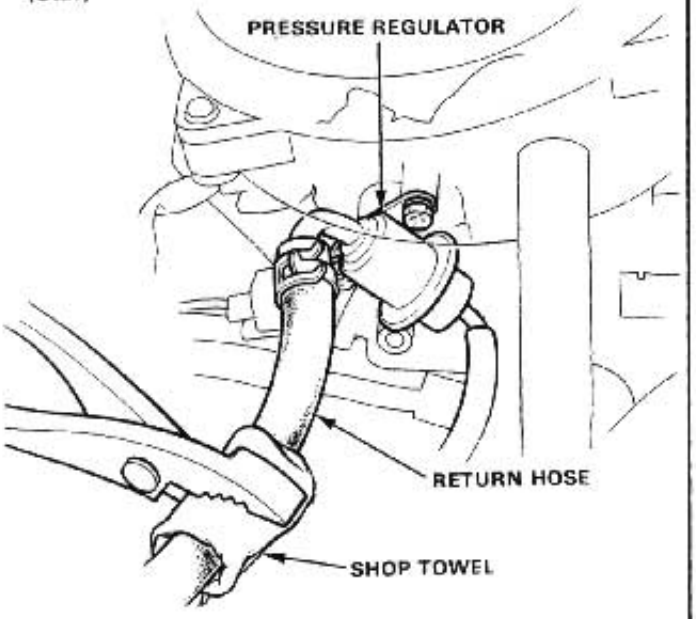
(HF and Si)



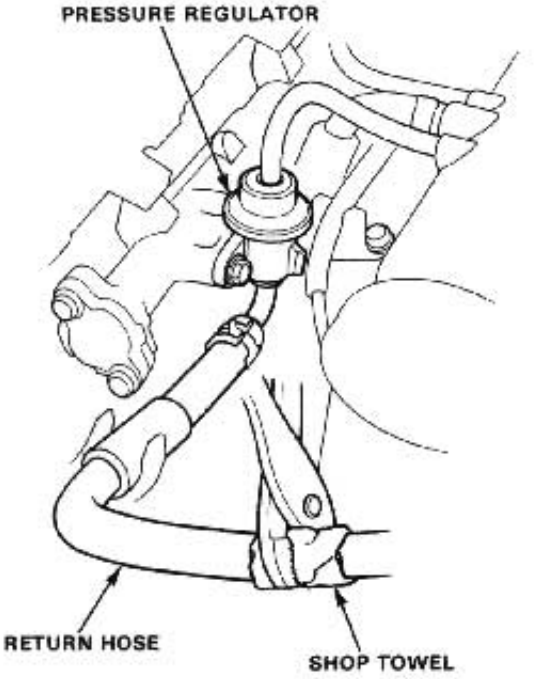
2. Check that the fuel pressure rises when the vacuum hose from the regulator is disconnected.

   - If the fuel pressure did not rise, check whether it rises when the return hose is lightly pinched.

(Std.)



(HF and Si)



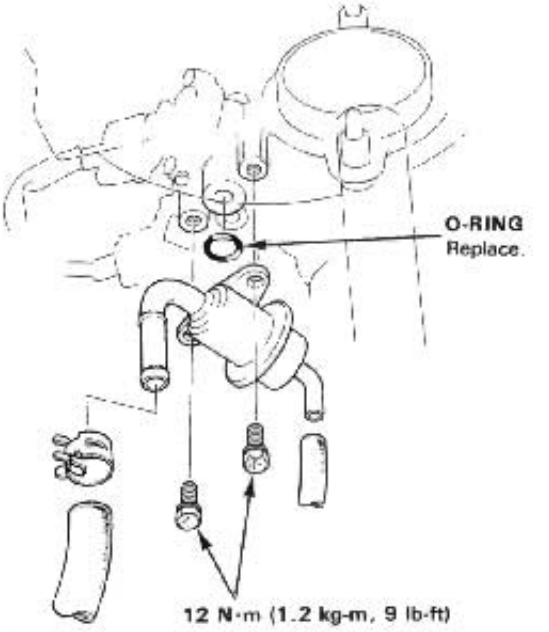
— If the pressure does not rise, replace the regulator and retest.

Replacement

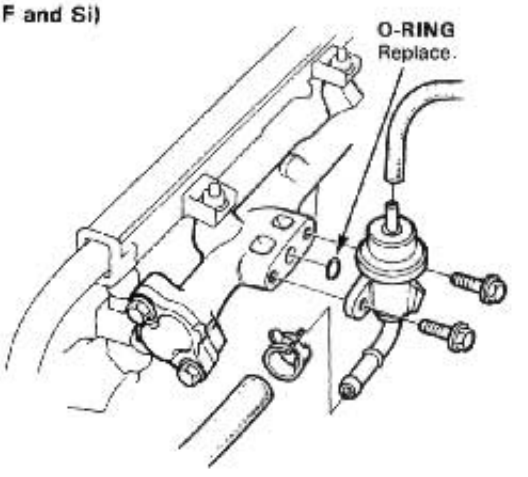
⚠WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Place a shop towel under pressure regulator, then relieve fuel pressure (page 11-93).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.

(Std.)



(HF and Si)



NOTE:

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

Fuel Supply System

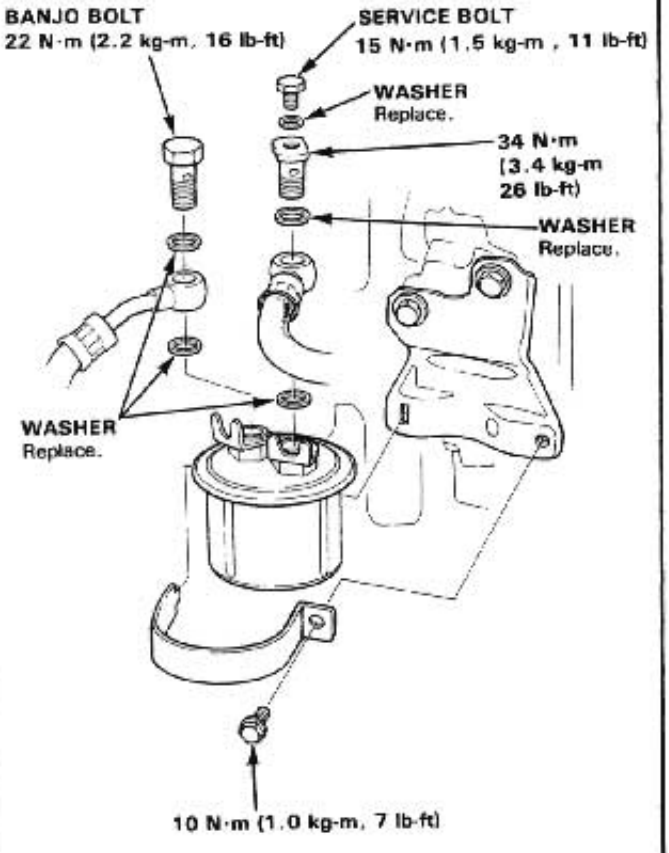
Fuel Filter

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 (275—324 kpa, 2.8—3.3 kg/cm², 40—50 psi with the pressure regulator vacuum hose disconnected) after making sure that the fuel pump and the pressure regulator are OK.

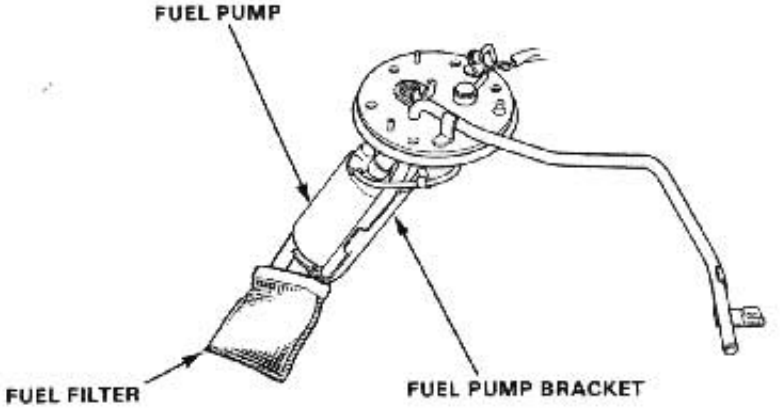
1. Place a shop towel under and around the fuel filter.
2. Relieve fuel pressure (page 11-93).
3. Remove the 12 mm banjo bolt and the fuel feed pipe from the filter.
4. Remove the fuel filter clamp and fuel filter.
5. When assembling, use new washers, as shown.

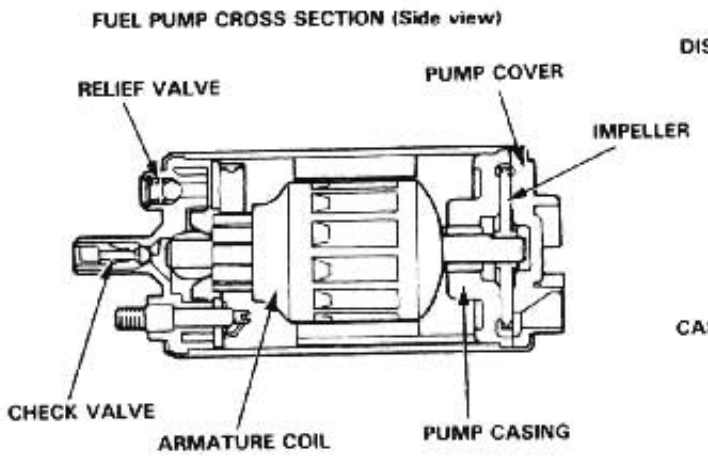


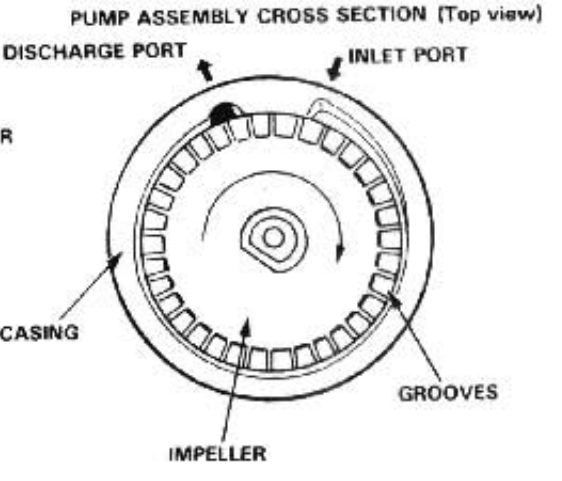
Fuel Pump

Description

Because of its compact impeller design, the fuel pump is installed inside the fuel tank, thereby saving space and simplifying the fuel line system.







The fuel pump is comprised of a DC motor, a circumference flow pump, a relief valve for protecting the fuel line systems, a check valve for retaining residual pressure, an inlet port, and a discharge port. The pump assembly consists of the impeller (driven by the motor), the pump casing (which forms the pumping chamber), and the pump cover.

OPERATION

(1) When the engine is started, the main relay actuates the pump, and the motor turns together with the impeller. Differential pressure is generated by the numerous grooves around the impeller.

(2) Fuel entering the inlet port flows inside the motor from the pumping chamber and is forced through the discharge port via the check valve.
If fuel flow is obstructed at the discharge side of the fuel line, the relief valve will open to bypass the fuel to the inlet port and prevent excessive fuel pressure.

(3) When the engine stops, the pump stops automatically. However, a check valve closes by spring action to retain the residual pressure in the line, helping the engine to restart more easily.

(cont'd)

Fuel Pump (cont'd)

Testing

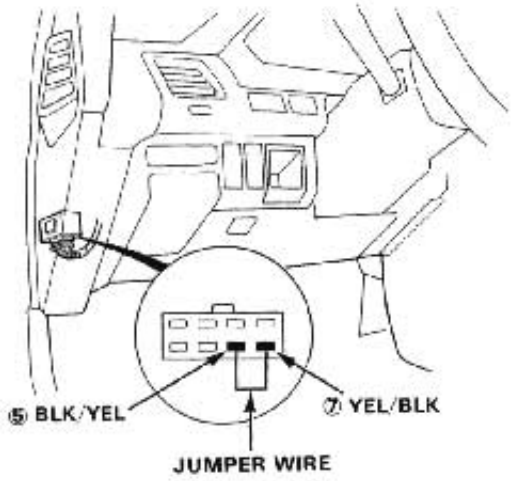
⚠WARNING Do not smoke during the test. Keep open flame away from your work area.

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; when it is ON, you will hear some noise if you hold your ear to the fuel filler port with the fuel filler cap removed. The fuel pump should run for two seconds, when ignition switch is first turned on. If the pump does not make noise, check as follows:

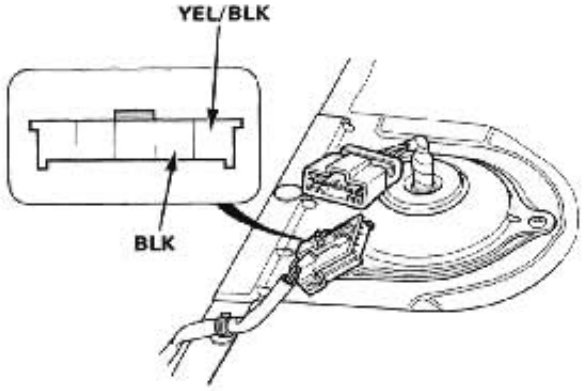
1. Remove the rear seat.
2. Disconnect the 5P connector.

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

3. Connect the BLK/YEL ⑤ wire and YEL/BLK ⑦ wire with a jumper wire.



4. Check that battery voltage is available at the fuel pump connector when the ignition switch is turned ON (positive probe to the YEL/BLK wire, negative probe to the BLK wire).

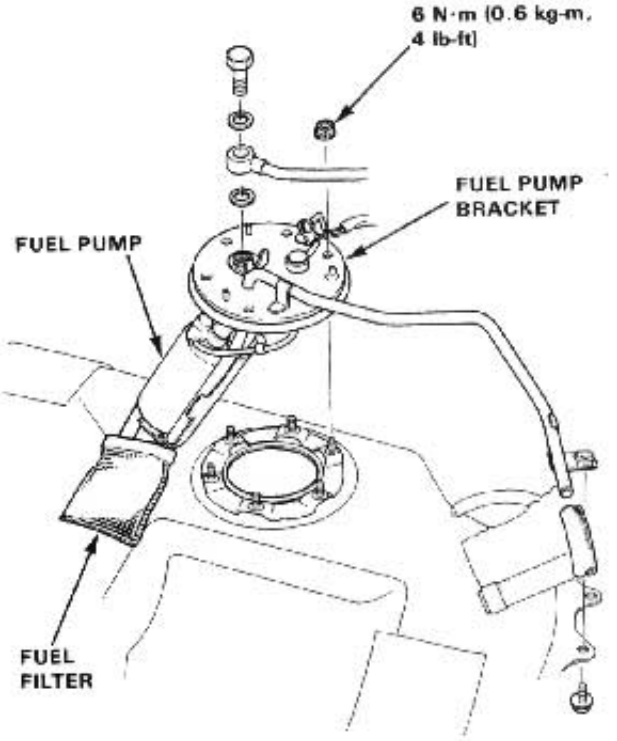


- If battery voltage is available, replace the fuel pump.
- If there is no voltage, check the main relay and wire harness (page 11-100).

Replacement

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

1. Remove the fuel tank (page 11-113).
2. Remove the fuel pump mounting nuts.
3. Remove the fuel pump from the fuel tank.

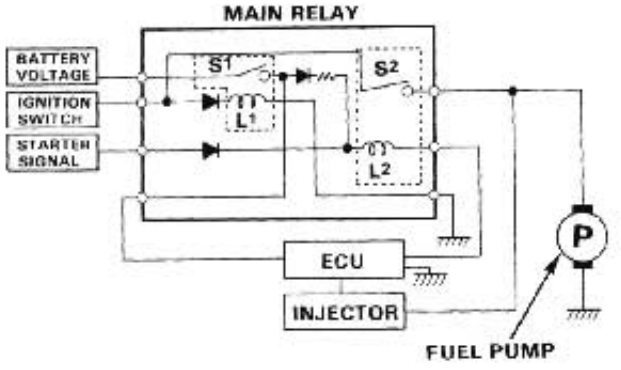


Main Relay

Description

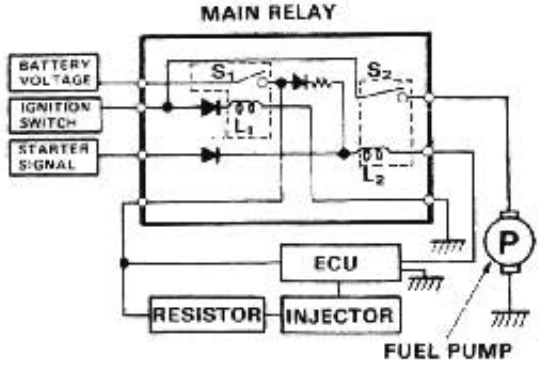
Std.

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, and power to the second relay.
The second relay is energized for 2 seconds when the ignition is switched on before starting, and when the engine is running, to supply power to the injectors and fuel pump.



HF and Si

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.

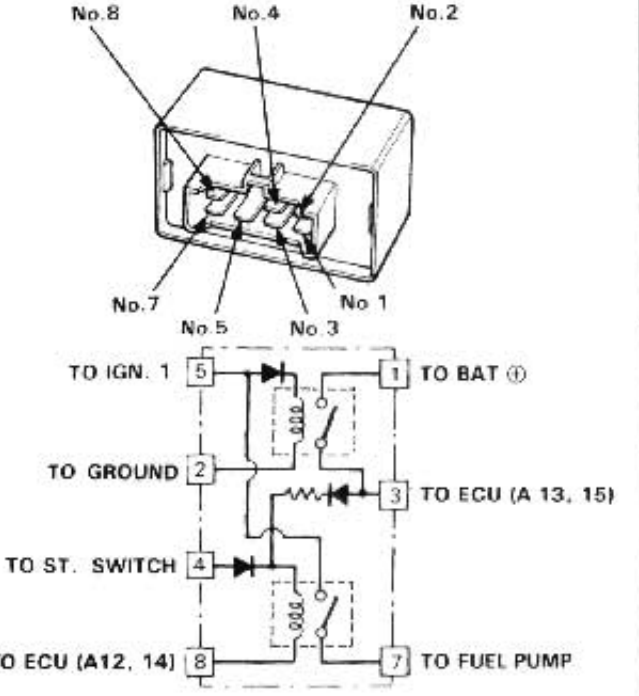


Relay Testing

1. Remove the main relay.

2. Attach the battery positive terminal to the No. 4 terminal and the battery negative terminal to the No. 8 terminal of the main relay. Then check for continuity between the No. 5 terminal and No. 7 terminal of the main relay.

   - If there is continuity, go on to step 3.
   - If there is no continuity, replace the relay and retest.



3. Attach the battery positive terminal to the No. 5 terminal and the battery negative terminal to the No. 2 terminal of the main relay. Then check that there is continuity between the No. 1 terminal and No. 3 terminal of the main relay.

   - If there is continuity, go on to step 4.
   - If there is no continuity, replace the relay and retest.

4. Attach the battery positive terminal to the No. 3 terminal and battery negative terminal to the No. 8 terminal of the main relay. Then check that there is continuity between the No. 5 terminal and No. 7 terminal of the main relay.

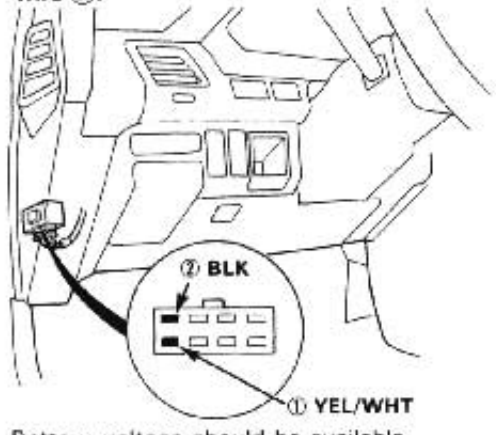
   - If there is continuity, the relay is OK;
     If the fuel pump still does not work, go to Harness Testing in the next column.
   - If there is no continuity, replace the relay and retest.

(cont'd)

Main Relay (cont'd)

Harness Testing

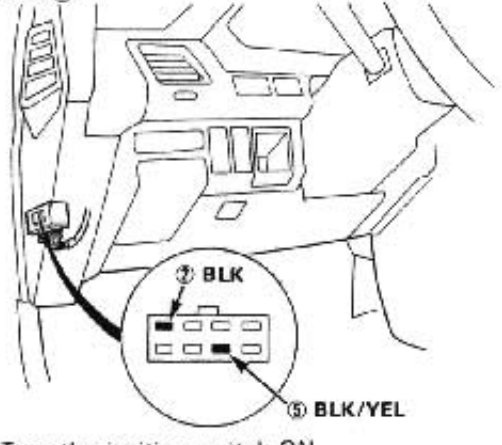
1. Keep the ignition switch in the OFF position.
2. Disconnect the main relay connector.
3. Check for continuity between the BLK wire ② in the connector and body ground.
   - If there is continuity, go on to step 4.
   - If there is no continuity, repair open in BLK wire.
4. Attach the positive probe of voltmeter to the YEL/WHT wire ① and the negative probe to the BLK wire ②.



Battery voltage should be available.

- If there is no voltage, check the wiring between the battery and the main relay as well as ECU fuse (15A) in the main fuse box.

5. Attach the positive probe of voltmeter to the BLK/YEL wire ⑤ and the negative probe to the BLK wire ②.

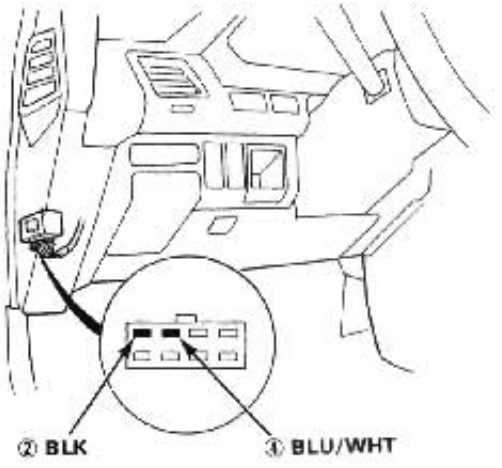


6. Turn the ignition switch ON.

   Battery voltage should be available.

   - If there is no voltage, check No.14 fuse and the wiring from the ignition switch to the fuse box and the wiring from the fuse box to the main relay.

7. Attach the positive probe of voltmeter to the BLU/WHT wire ④ and the negative probe to the BLK wire ②.

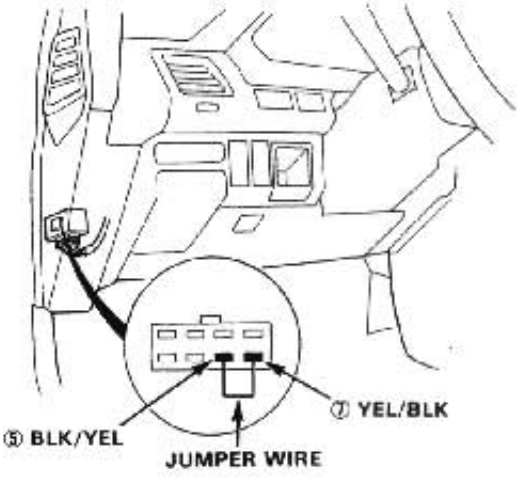


8. Turn the ignition switch to START position.

   Approximately 10 volts should be available.

   - If there is no voltage, check the No.2 (10A) fuse and the wiring between the ignition switch and fuse box and from the fuse box to the main relay.

9. Connect a jumper wire between the BLK/YEL wire ⑤ and YEL/BLK wire ⑦.



10. Turn the ignition switch ON.

    The fuel pump should work.

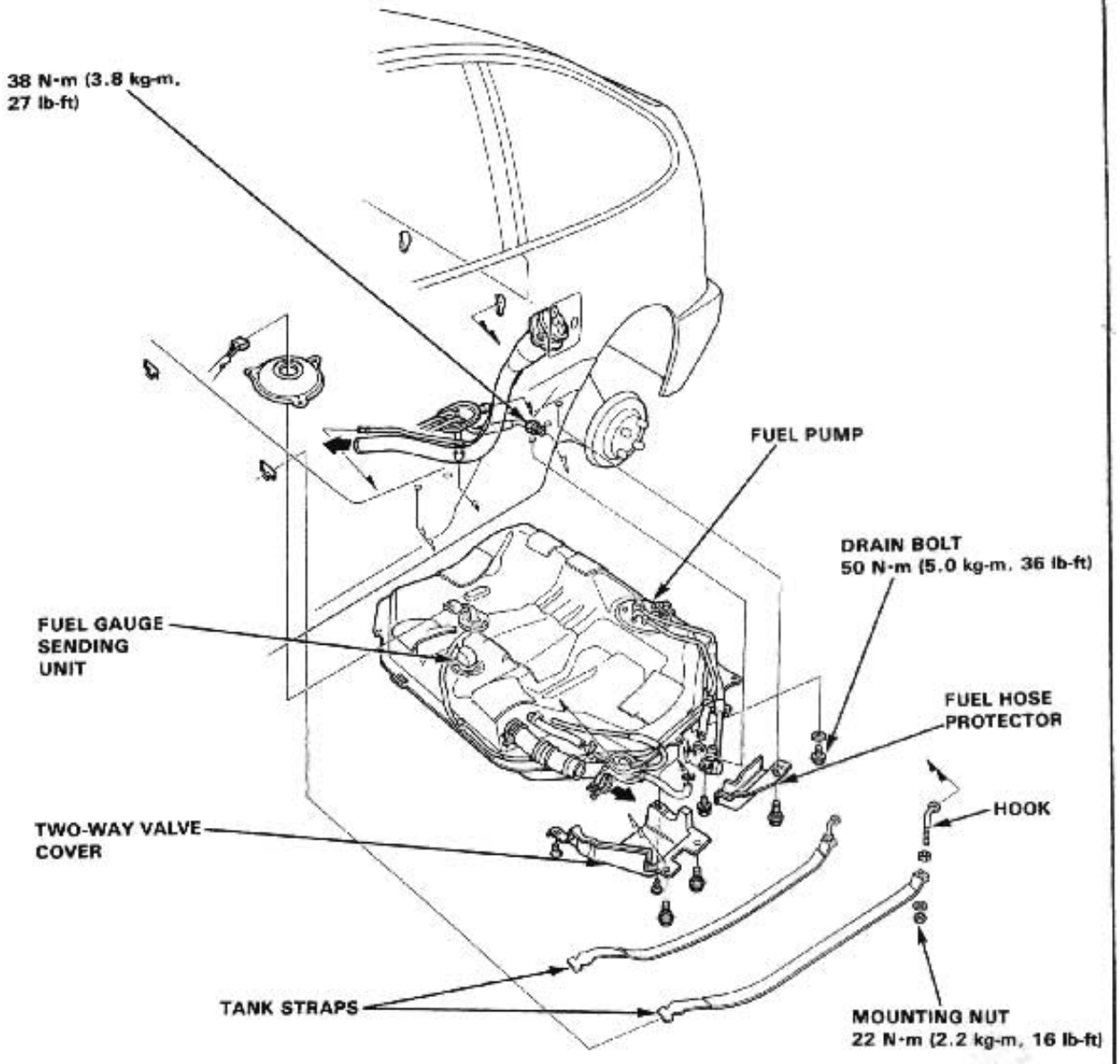
    - If the fuel pump does not work, check the wiring between the main relay and fuel pump, and the wiring from the fuel pump to the ground (BLK wire).

Fuel Tank

Replacement

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

1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Remove the rear seat and disconnect the 5P connector.
4. Remove the two-way valve cover and fuel hose protector.
5. Disconnect the hoses.
   CAUTION:
   - **When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.**
   - **Clean the flared joint of high pressure hoses thoroughly before reconnecting 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 stick 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 reverse order of removal.



Air Intake System

System Troubleshooting Guide

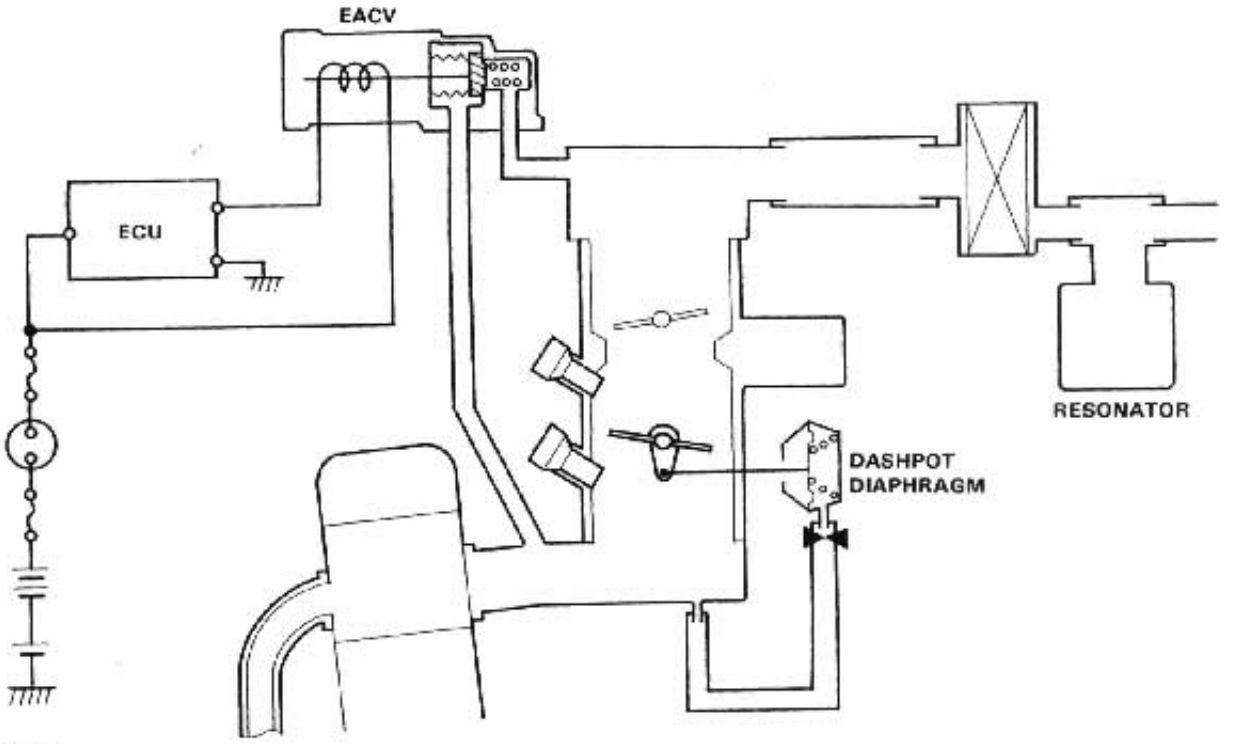
NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows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

PAGE / SUB SYSTEM / SYMPTOM	THROTTLE CABLE	THROTTLE BODY	TANDEM CONTROL SYSTEM (Std.)	THROTTLE CONTROL SYSTEM
	116	118,121	124	129
DIFFICULT TO START ENGINE WHEN COLD			①	
WHEN COLD FAST IDLE OUT OF SPEC	③	②		①
WHEN WARM RPM TOO HIGH	③	②		①
WHEN WARM RPM TOO LOW		①		
FREQUENT STALLING WHILE WARMING UP	③	②	①	
LOSS OF POWER	③	②	①	

System Description

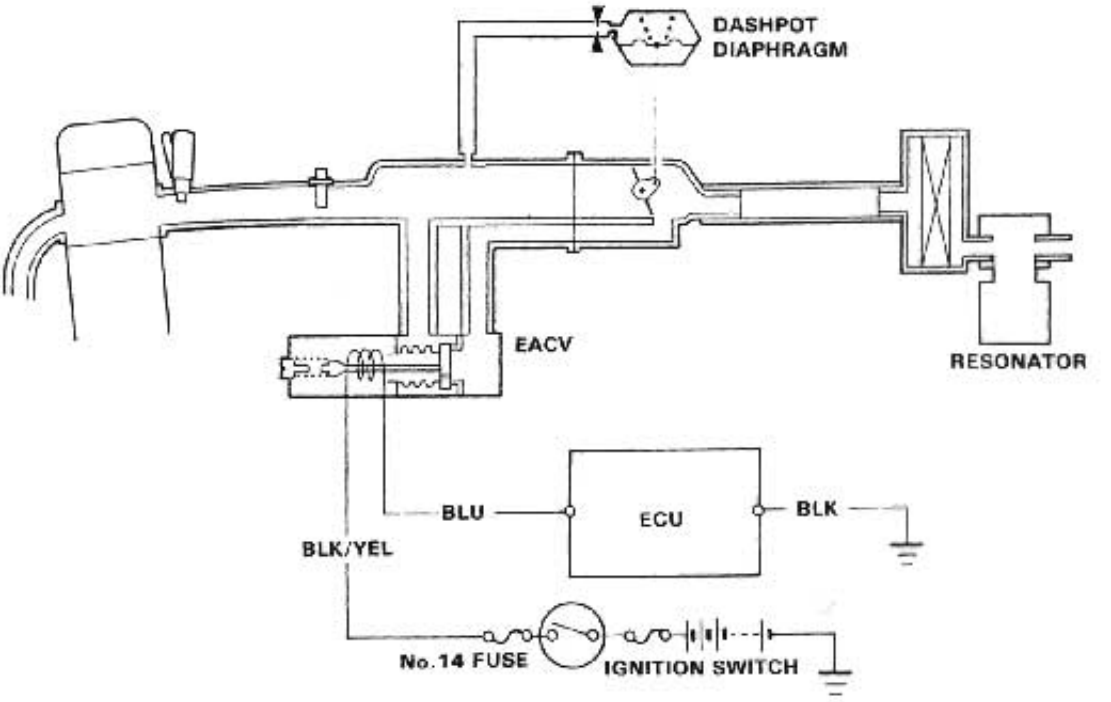
Std.:

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



HF and Si

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

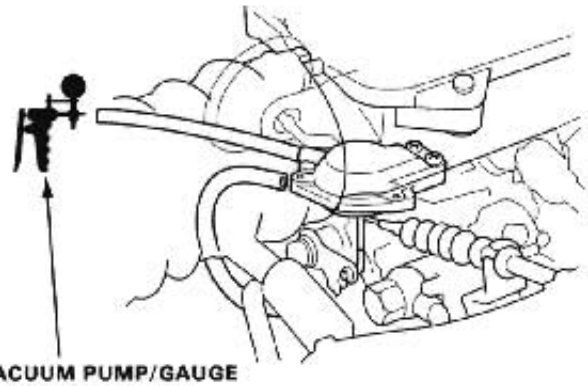


Throttle Cable

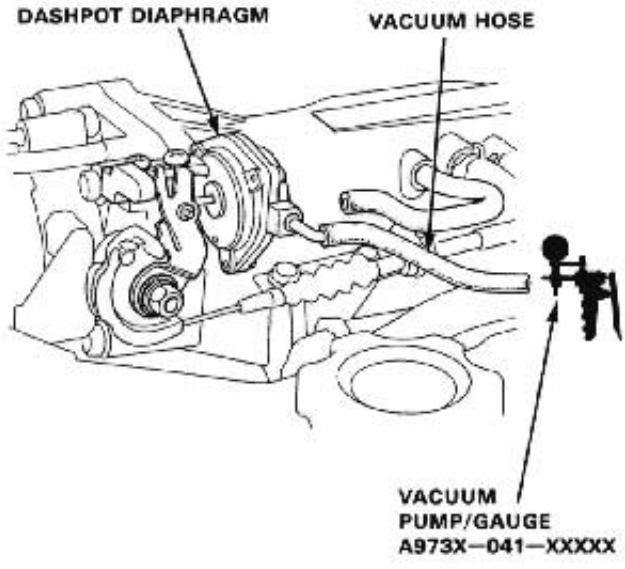
Inspection/Adjustment

1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Disconnect #6 hose from the dashpot diaphragm and connect a vacuum pump to the diaphragm. Apply vacuum.

(Std.)

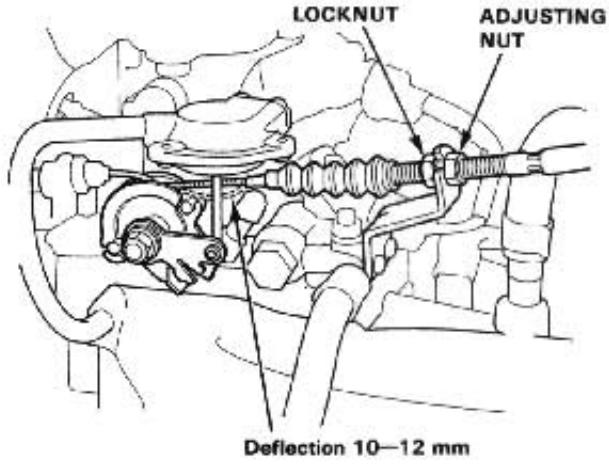


(HF and Si)

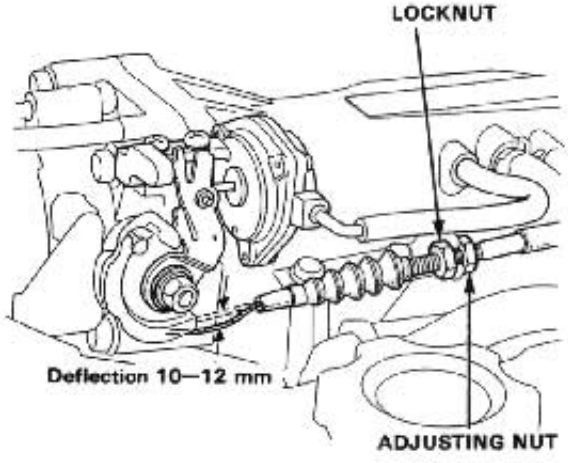


4. Check cable free play at the throttle linkage. Cable deflection should be 10—12 mm (0.39—0.47 in.)

(Std.)



(HF and Si)

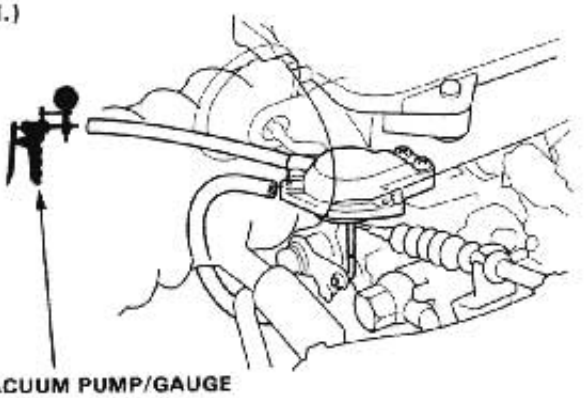


5. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
6. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure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

Installation

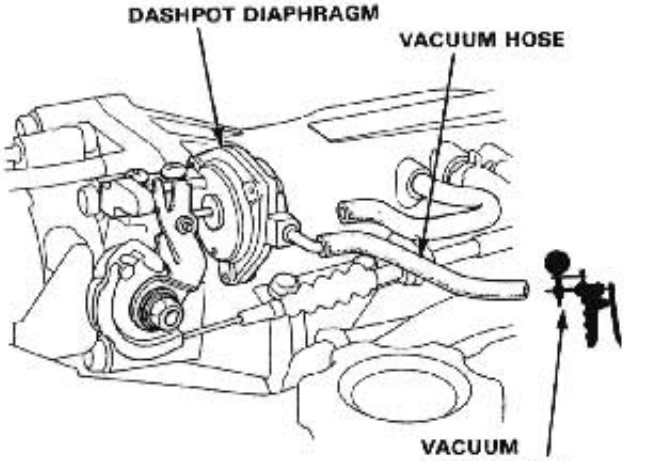
1. Fully open the throttle valve, then install the throttle cable in the throttle linkage and install the cable housing in the cable bracket.
2. Warm up the engine to normal operating temperature (the cooling fan comes on).
3. Disconnect #6 hose from the dashpot diaphragm and connect a vacuum pump to the diaphragm. Apply vacuum.

(Std.)

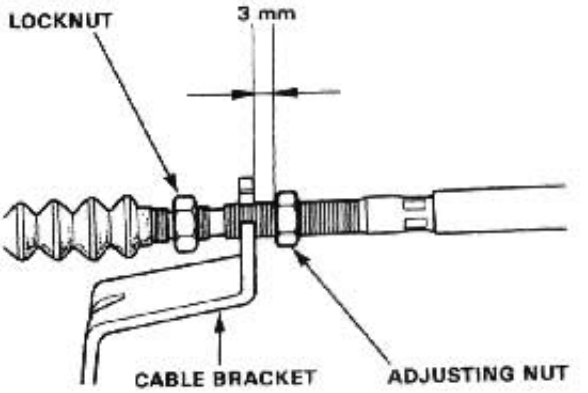


VACUUM PUMP/GAUGE A973X–041–XXXXX

(HF and Si)



4. Hold the cable sheath, removing all slack from the cable.
5. Turn the adjusting nut until it is 3 mm away from the cable bracket.
6. Tighten the locknut.

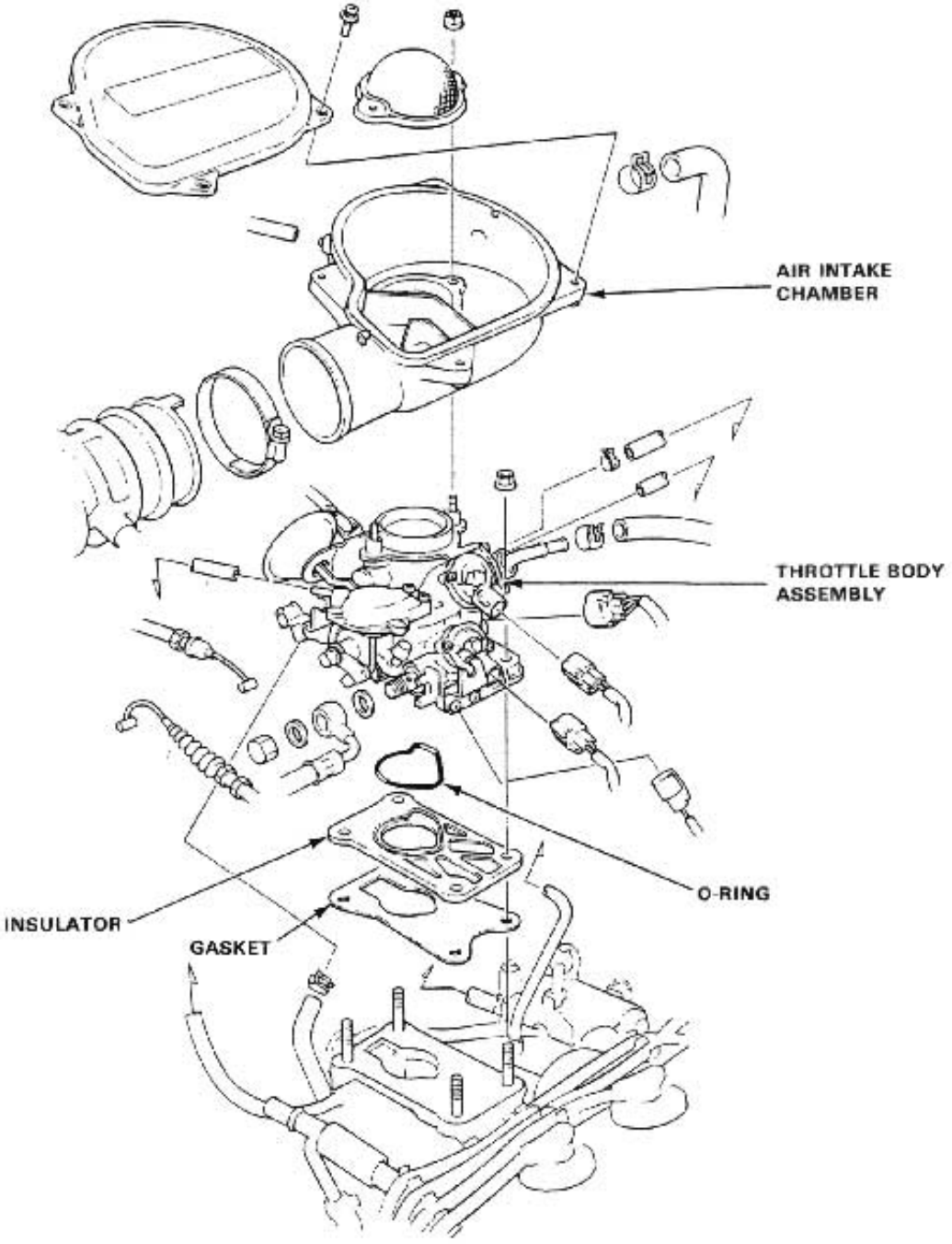


7. Disconnect the vacuum pump and connect the #6 vacuum hose.

Throttle Body [Std.]

Description

The throttle body is of the signal-barrel down-draft type. The idle adjusting screw, which opens the throttle valve, and the canister purge port are located on the bottom of throttle body.

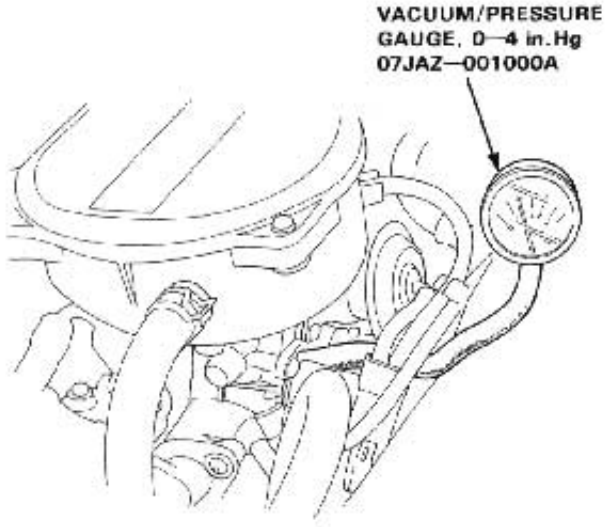


Inspection

CAUTION: Do not adjust the throttle stop screw since it cannot be reset.

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

2. Disconnect the vacuum hose (to the canister) from the throttle body and connect a vacuum gauge to the throttle body.



3. Allow the engine to idle and check that the gauge indicates little or no vacuum.

   - If there is measurable vacuum, check the throttle control system (page 11-130).

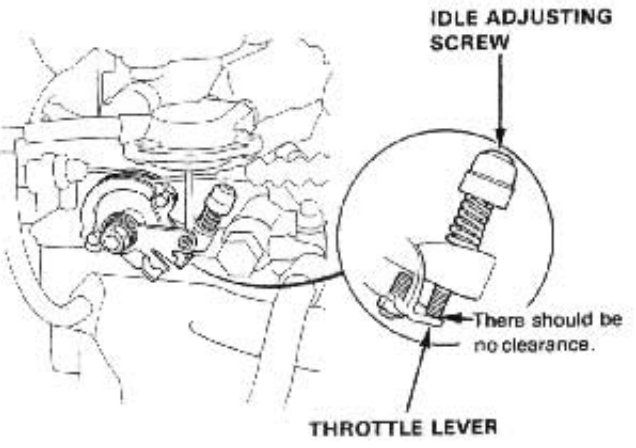
4. Check that vacuum increases when the throttle is opened slightly from idle.

   - If there is no increase in vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.

5. Stop the engine and check that the throttle cable operates smoothly without binding or sticking.

   - If there are any abnormalities in the above steps, check for:

   — Excessive wear or play in the throttle valve shaft.
   — Sticky or binding throttle lever at full close position.
   — Clearance between idle adjusting screw and throttle lever at full close position.

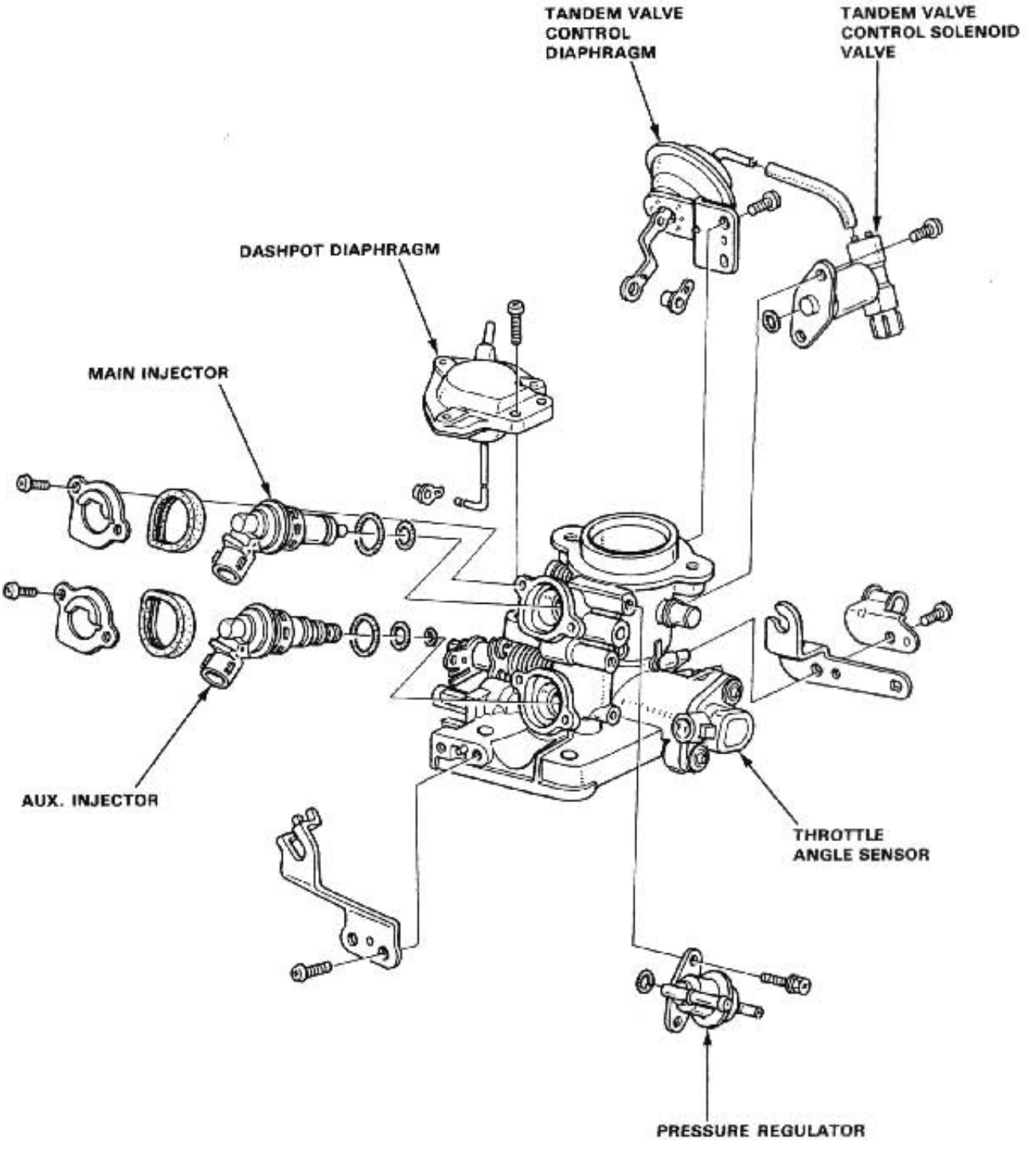


Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

(cont'd)

Throttle Body [Std.] (cont'd)

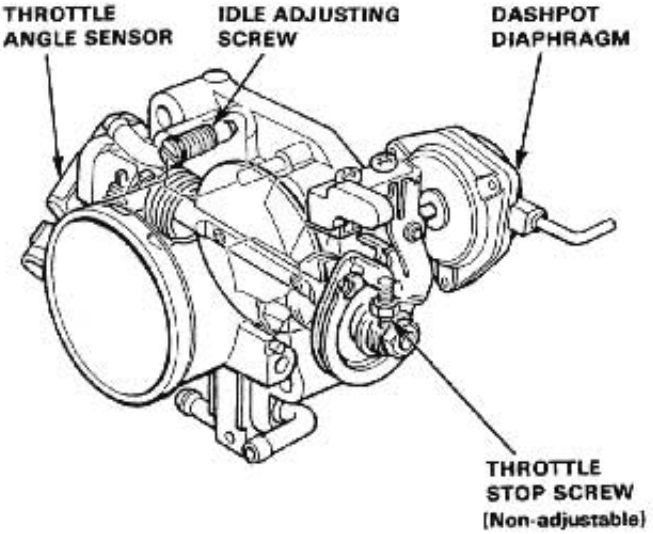
Disassembly



Throttle Body [HF and Si]

Description

The throttle body is of the single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant 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.

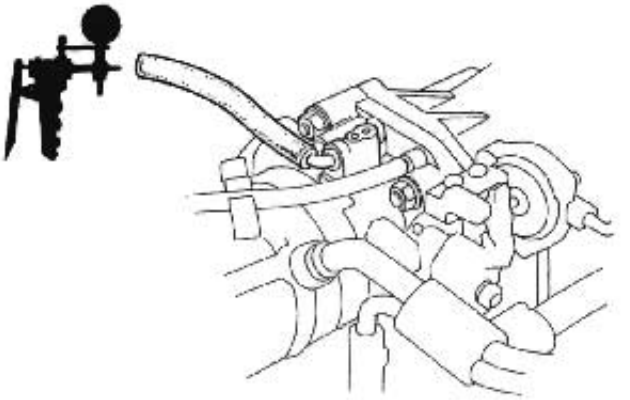


Inspection

CAUTION: Do not adjust the throttle stop screw since it cannot be reset.

1. Start the engine and allow to reach normal operating temperature (cooling fan comes on).
2. Disconnect the vacuum hose (to the canister) from the top of the throttle body; connect a vacuum gauge to the throttle body.

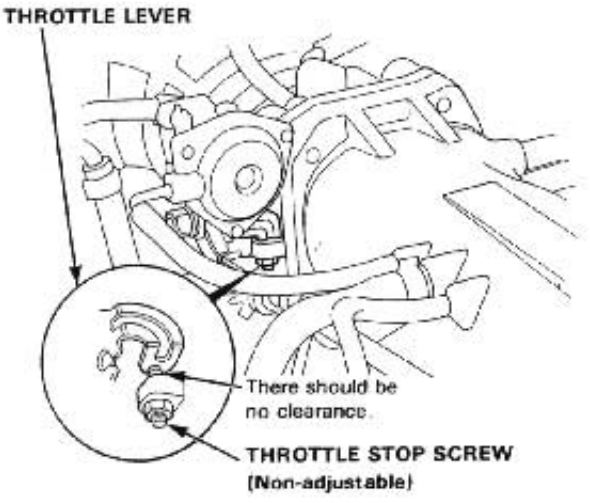
VACUUM PUMP/GAUGE
A973X—041—XXXXX



3. Allow the engine to idle and check that the gauge indicates no vacuum.
   - If there is vacuum, check the throttle control system (page 11-130).
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 throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.
5. Stop the engine and check that the throttle cable operates smoothly without binding or sticking.
   - If there are any abnormalities in the above steps, check for:
     - Excessive wear or play in the throttle valve shaft.
     - Sticky or binding throttle lever at full close position.
     - Clearance between throttle stop screw and throttle lever at full close position.

(cont'd)

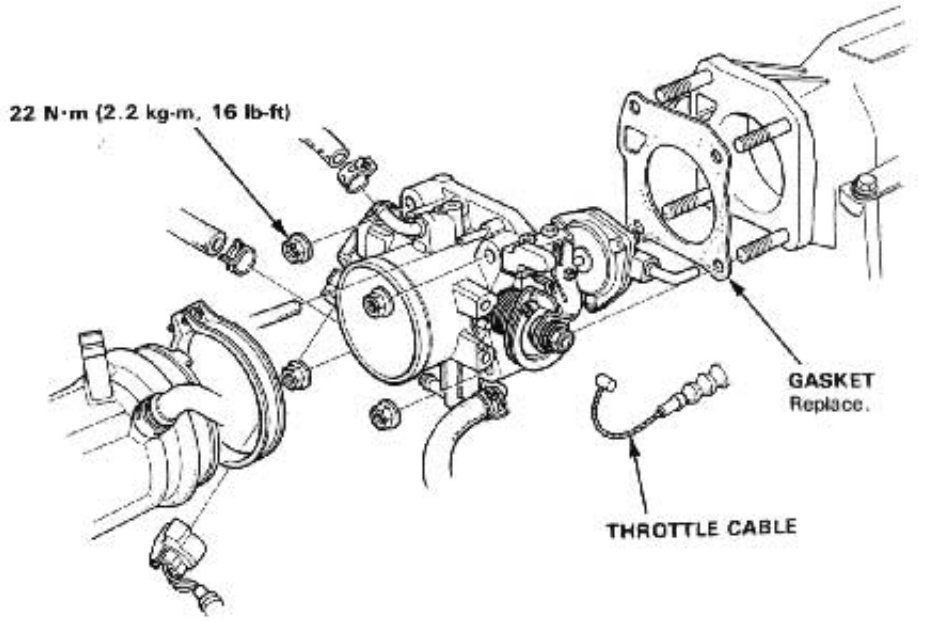
Throttle Body [HF and Si] (cont'd)



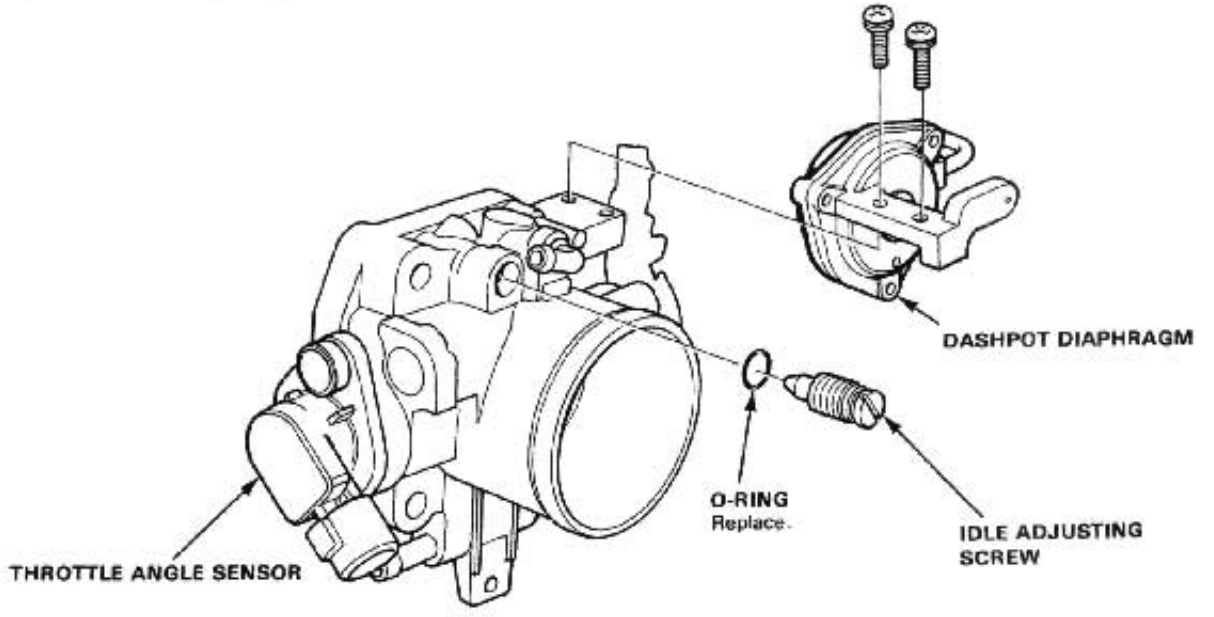
Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

Throttle Body [HF and Si]

Disassembly



CAUTION:
- The throttle stop screw in non-adjustable.
- After reassembly, adjust the throttle cable (page 11-116).



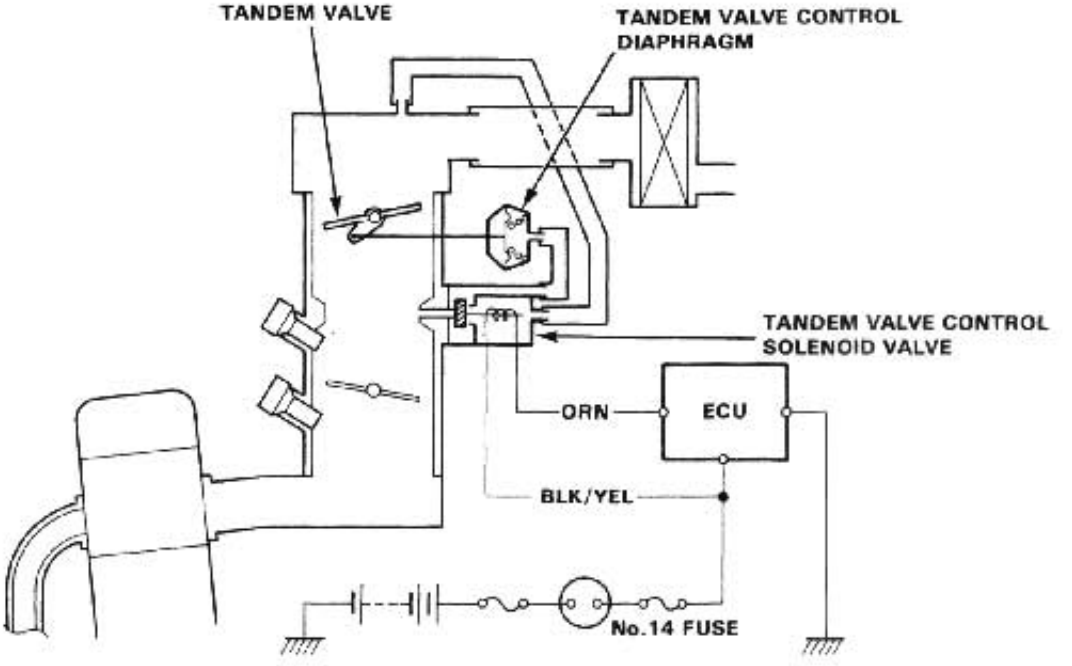
Tandem Control System [Std.]

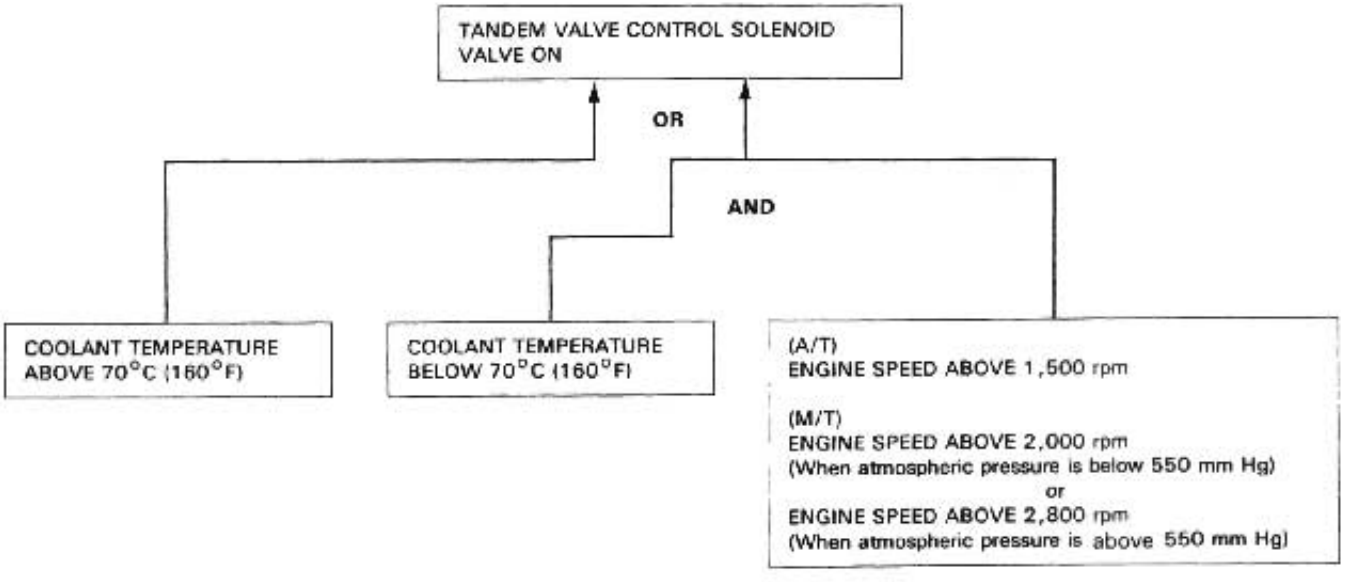
Description

The tandem valve is employed to improve atomization of fuel which is injected by the main fuel injector in response to various engine operating conditions.

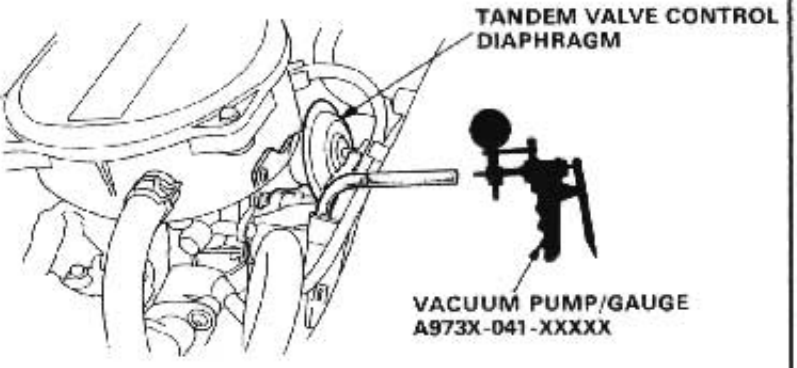
When the tandem valve control solenoid valve is de-activated, venturi vacuum is not applied to the diaphragm chamber of the tandem valve control diaphragm, so the tandem valve is nearly closed. The narrow clearance between the tandem valve and inner wall of the throttle body generates a rapid air flow which promotes atomization of the injected fuel from the main fuel injector.

When the tandem valve control solenoid valve is activated, venturi vacuum is applied on the tandem valve control diaphragm and the tandem valve is opened in response to venturi vacuum which represents the air flow rate through the venturi.
Therefore good atomization of the injected fuel is provided regardless of air flow rate.





Troubleshooting Flowchart



Inspection of Tandem Control System

Disconnect the vacuum hose from the tandem valve control diaphragm and connect a vacuum gauge to the hose.

Start engine and allow to idle.
NOTE: Coolant temperature must be below 70°C (160°F).

Is there vacuum ?

YES → Disconnect the 2P connector from the tandem valve control solenoid valve.

Is there vacuum ?

YES → **Replace the solenoid valve.**

NO → Turn the ignition switch OFF.

Disconnect "B" connector from ECU.

Check for continuity to ground on the ORN wire.

Is there continuity to ground ?

YES → **Repair short to ground at ORN wire between ECU (B2) and the 2P connector.**

NO → **Substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.**

NO → Raise engine speed to,
- Manual: 3,000 rpm
- Automatic: 2,000 rpm

Is there vacuum ?

NO → Disconnect the 2P connector from the tandem valve control solenoid valve.

YES

(To page 11-126)

(To page 11-126)

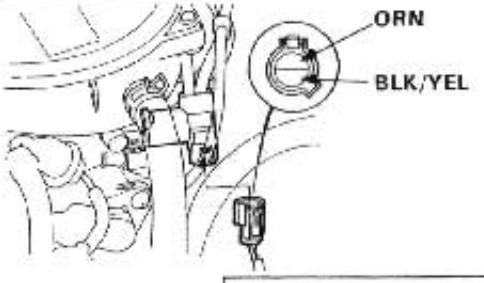
(cont'd)

Tandem Control System [Std.] (cont'd)

(From page 11-125)

(From page 11-125)

Measure voltage between BLK/YEL (+) terminal and ORN (–) terminal at 3,000 rpm.



Is there battery voltage ?

YES → **Remove the solenoid valve from the throttle body and check the port for blockage. If the port is OK, replace the solenoid valve.**

NO

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

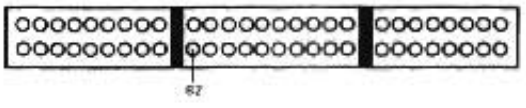
Is there battery voltage ?

NO → **Repair open in BLK/YEL wire between the 2P connector and No. 14 fuse.**

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 11-27).



Check for continuity of ORN wire between ECU (B2) and the 2P connector.

Does continuity exist ?

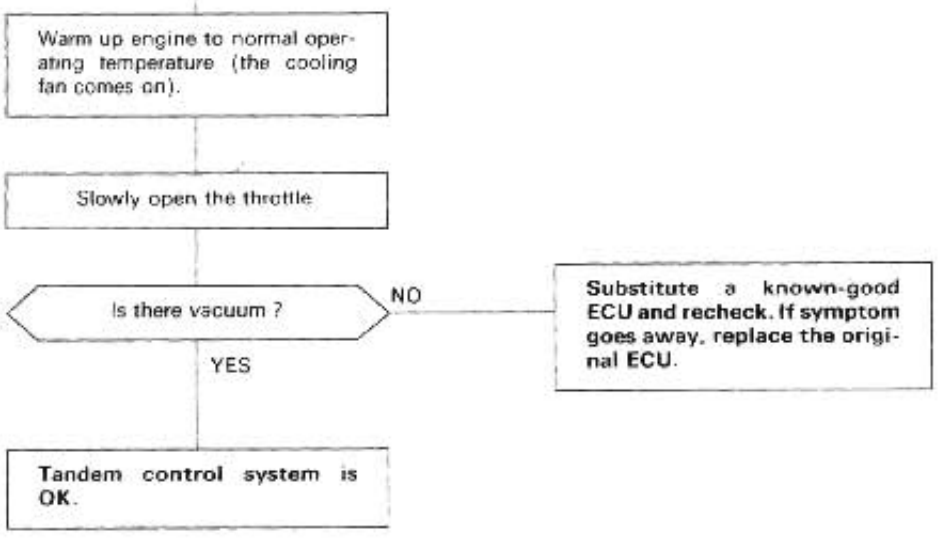
NO → **Repair open in ORN wire between ECU (B2) and the 2P connector.**

YES

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

(To page 11-127)

(From page 11-126)

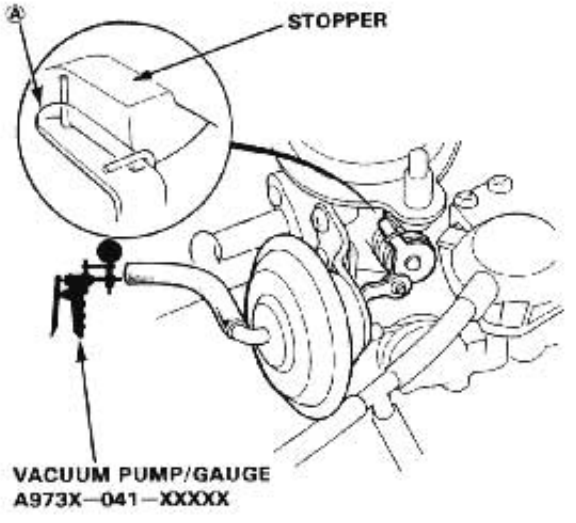


(cont'd)

Tandem Control System [Std.] (cont'd)

Tandem Valve Control Diaphragm Testing

1. Check the tandem valve shaft for binding or sticking.
2. Check the bypass valve for smooth movement.
   - If any fault is found, clean the linkage and shafts with carburetor cleaner.
3. Disconnect the vacuum hose from the tandem valve control diaphragm and connect a vacuum pump to the diaphragm.
4. Apply vacuum and check that Ⓐ of the tandem valve is in close contact with the stopper when the tandem valve is fully open.



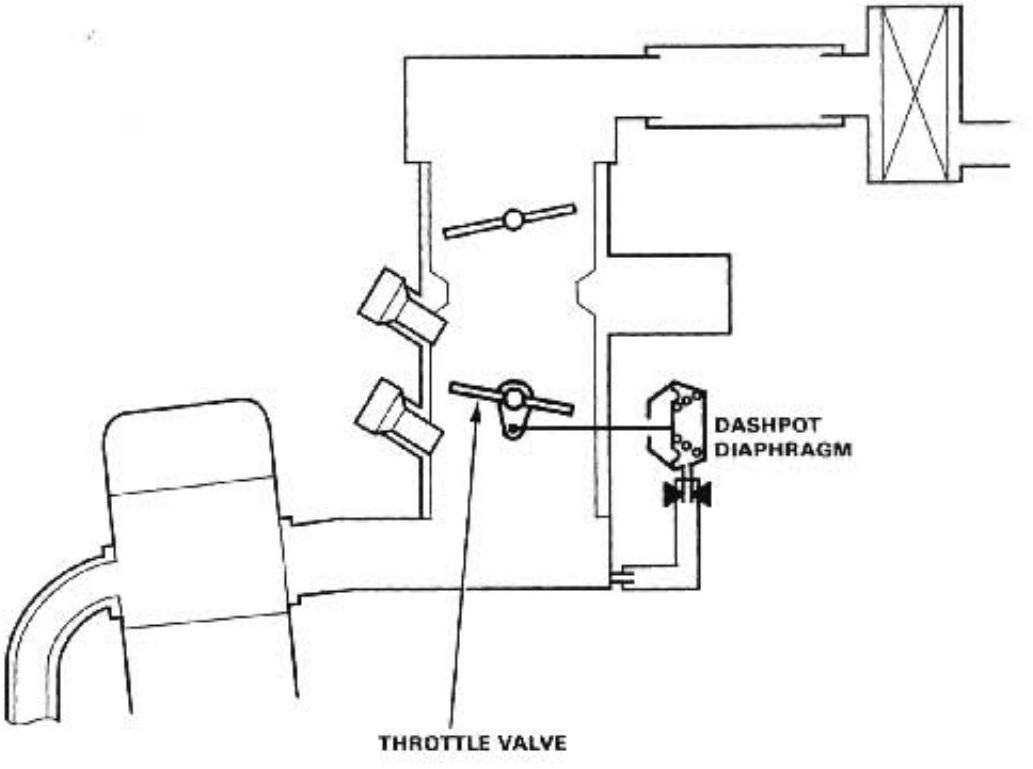
   - If any fault is found, replace the tandem valve control diaphragm.

Throttle Control System [Std. and HF]

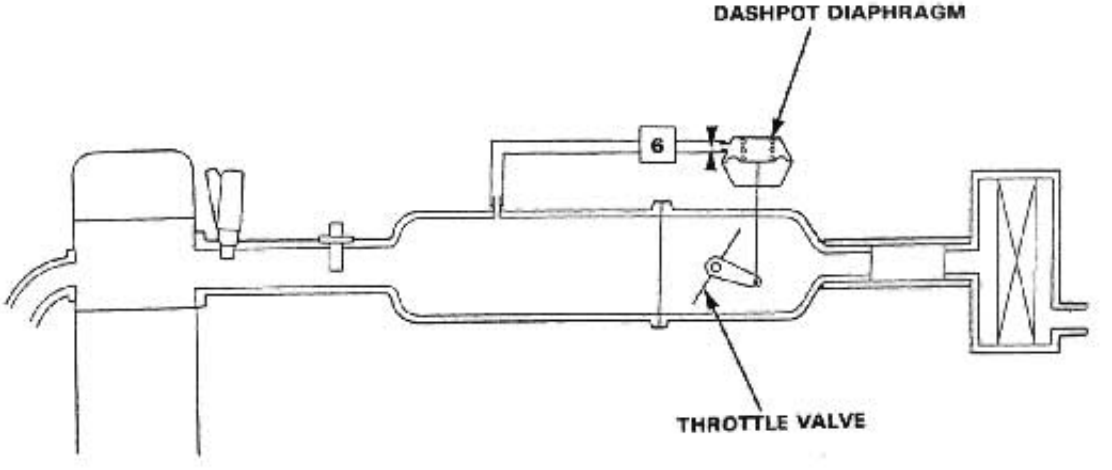
Description

The dashpot diaphragm functions as a cranking opener.
When the engine is at idle, intake manifold vacuum is applied on the dashpot diaphragm, pulling up the diaphragm rod so that the throttle valve is in the idle position.
When cranking with the starter, the spring in the dashpot diaphragm pushes the throttle valve open a certain amount to assist starting.

(Std.)



(HF and Si)



Throttle Control System

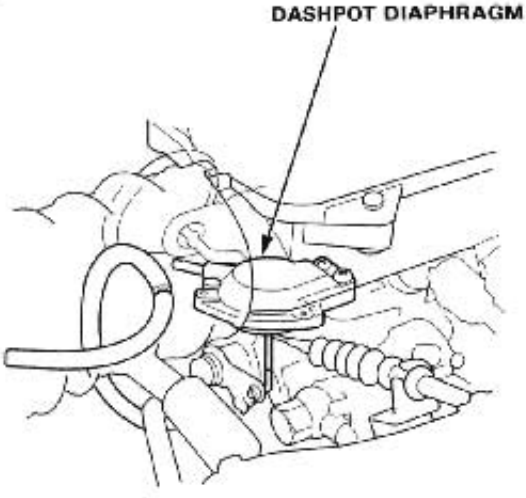
Testing

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

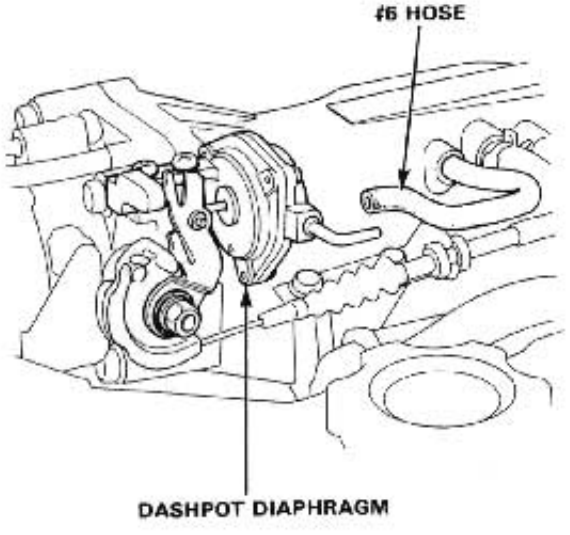
Engine speed should be:

Manual	2,500±500 rpm
Automatic	2,500±500 rpm

(Std.)

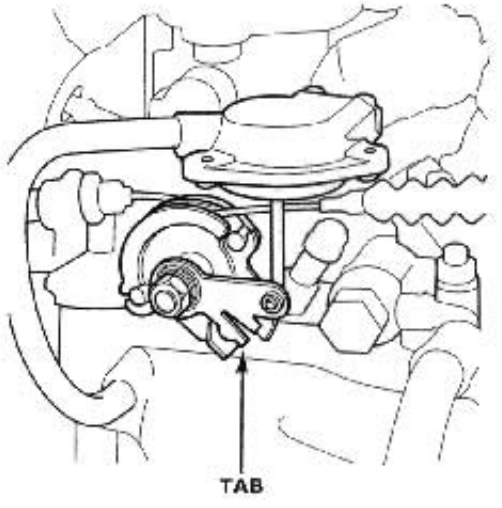


(HF and Si)

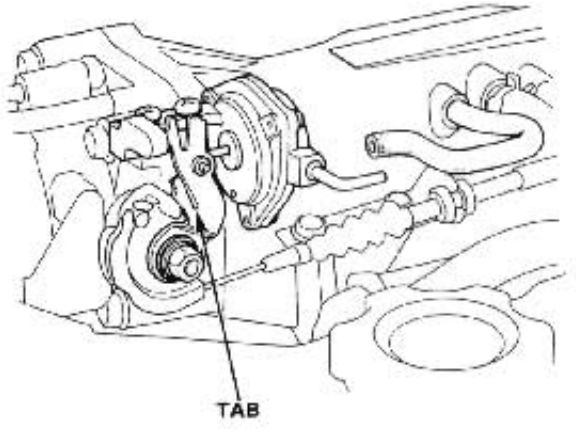


- If the engine speed is excessively high, adjust the engine speed by bending TAB.

(Std.)



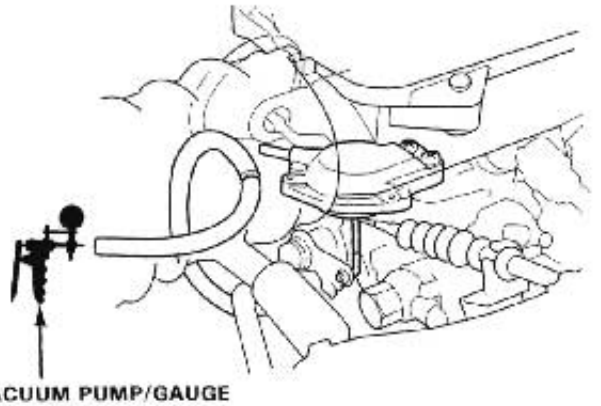
(HF and Si)



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

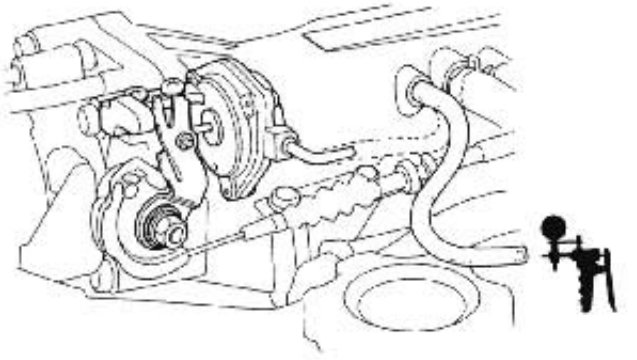
  There should be vacuum.

(Std.)



VACUUM PUMP/GAUGE
A973X—041—XXXXX

(HF and Si)



  - If there is no vacuum, check the #6 vacuum hose for proper connection, cracks, blockage or disconnected hose and replace the 3-way joint (Std.)
  - If there is vacuum, replace the dashpot diaphragm and retest.

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

   Idle speed should be within specification (page 11-90 or 91).

Emission Control System

System Troubleshooting Guide

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

Ex. HF and Std. CAL: A/T

PAGE / SUB SYSTEM / SYMPTOM		CATALYTIC CONVERTER	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
		134	141	143
ROUGH IDLE			①	
POOR PERFORMANCE	FAILS EMISSION TEST	①		②
	LOSS OF POWER	①		

HF and Std. CAL: A/T

PAGE / SUB SYSTEM / SYMPTOM		CATALYTIC CONVERTER	EGR SYSTEM	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
		134	136	141	143
ROUGH IDLE			①	②	
FREQUENT STALLING	WHILE WARMING UP		①		
	AFTER WARMING UP		①		
POOR PERFORMANCE	FAILS EMISSION TEST	①		②	
	LOSS OF POWER	①			

System Description

The emission control system includes a three-way catalytic converter, exhaust gas recirculation (EGR) system (Std. CAL: A/T and HF only), crankcase ventilation system and evaporative control system.
The emission control system is designed to meet federal and state emission standards.

Tailpipe Emission

Inspection

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

1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect a tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 11-90 or 91).
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.

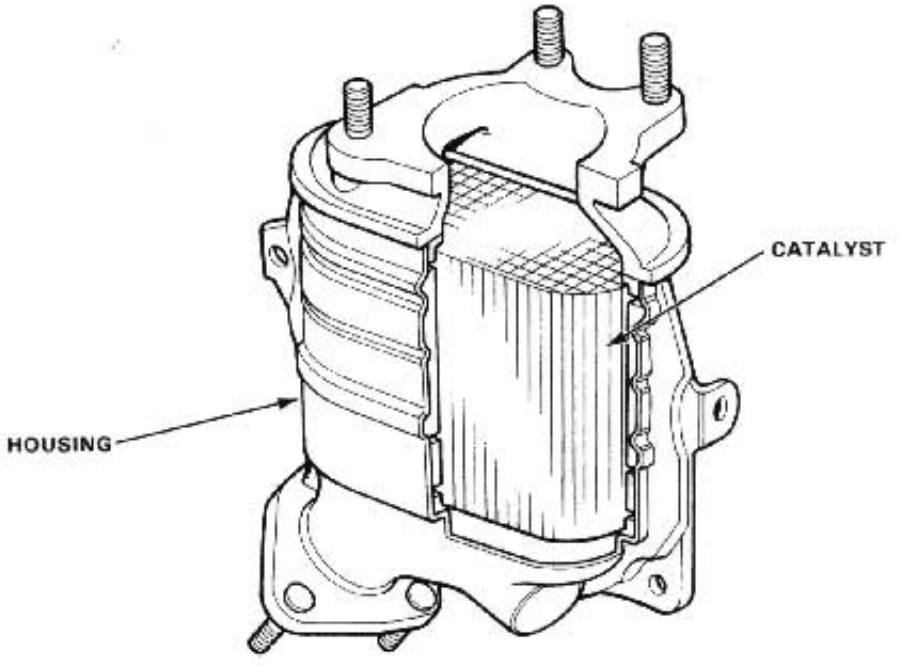
Emission Control System

Catalytic Converter

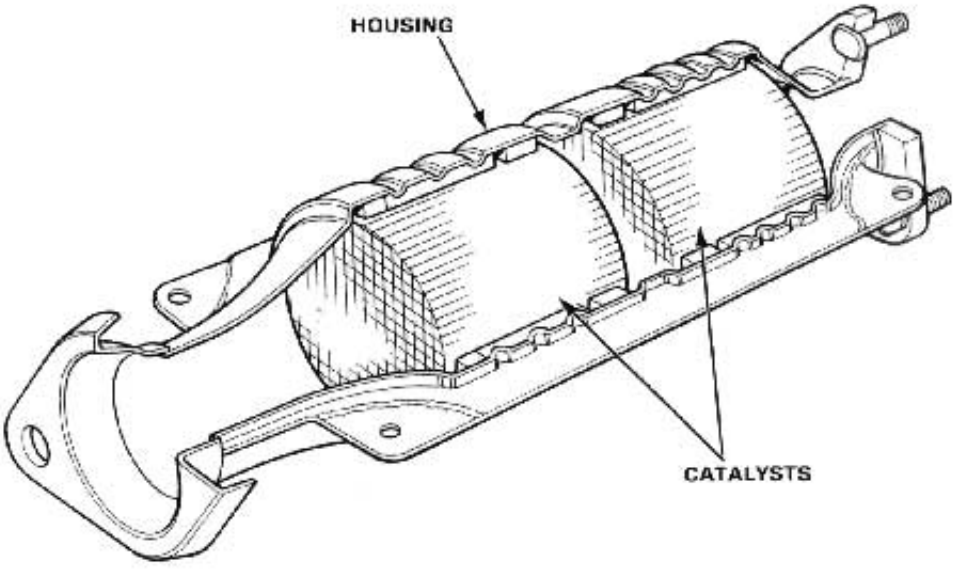
Description

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.

HF:



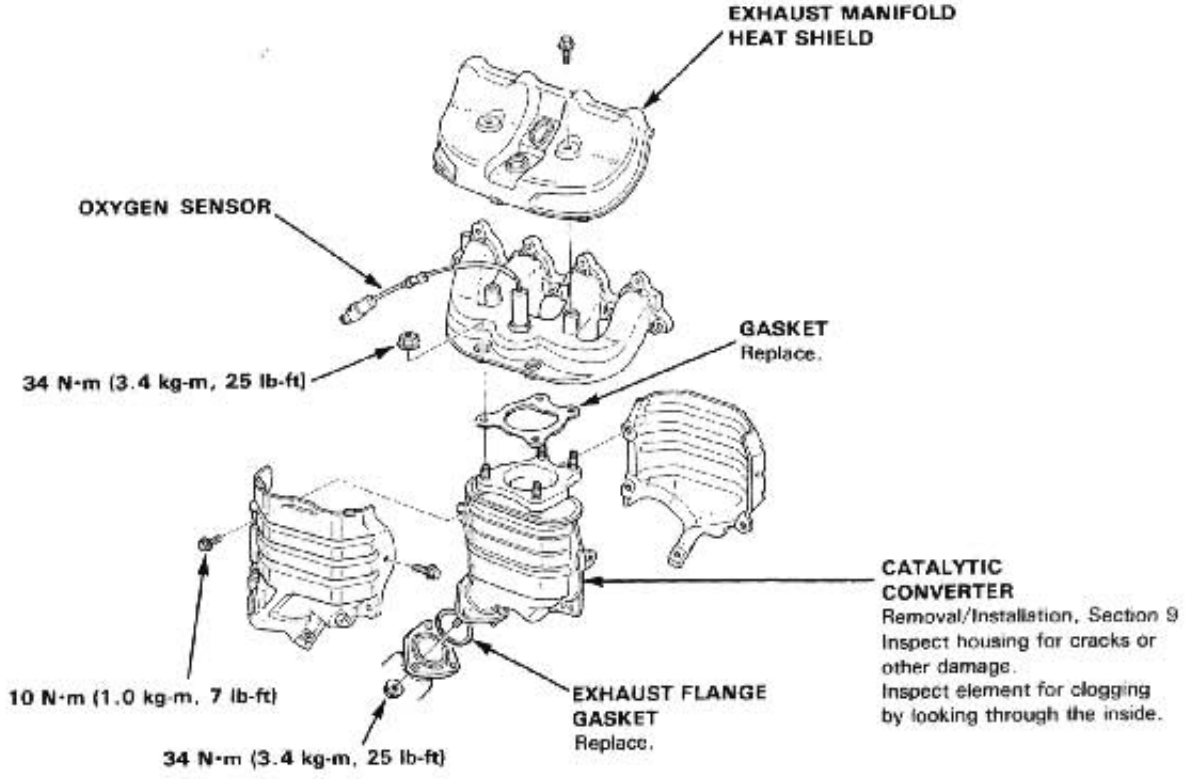
Except HF:



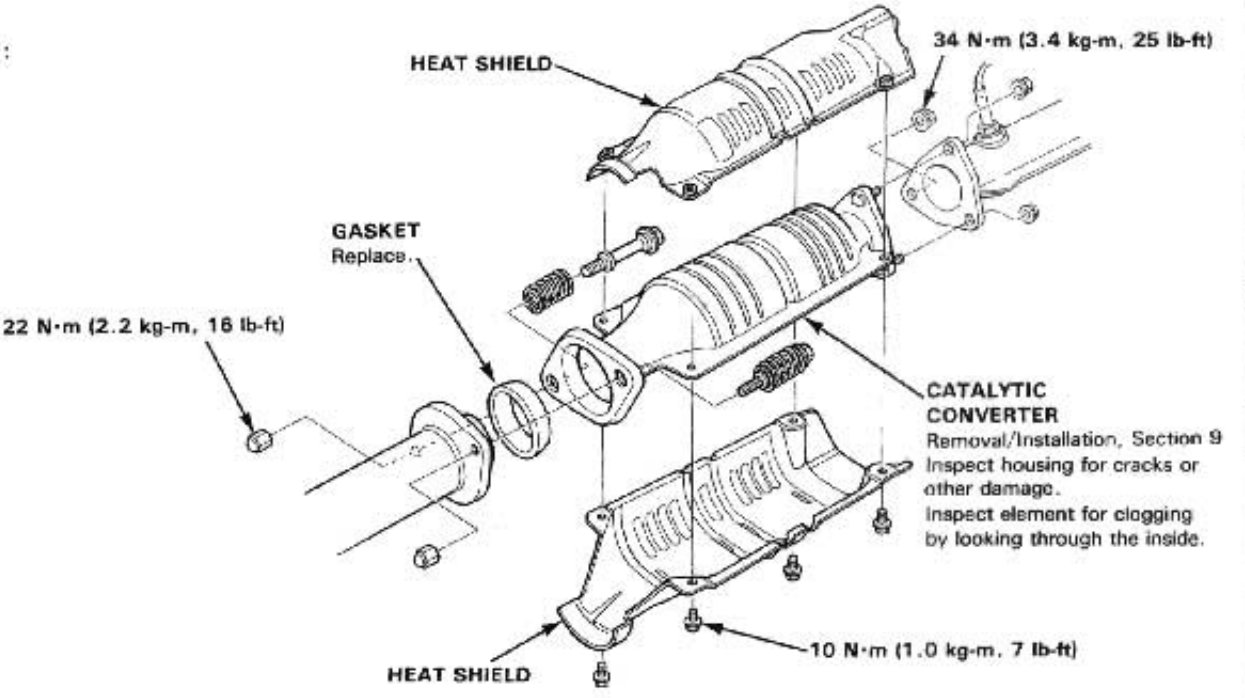
Inspection

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.

HF:



Except HF:



Emission Control System

Exhaust Gas Recirculation System [Std. CAL: A/T and HF]

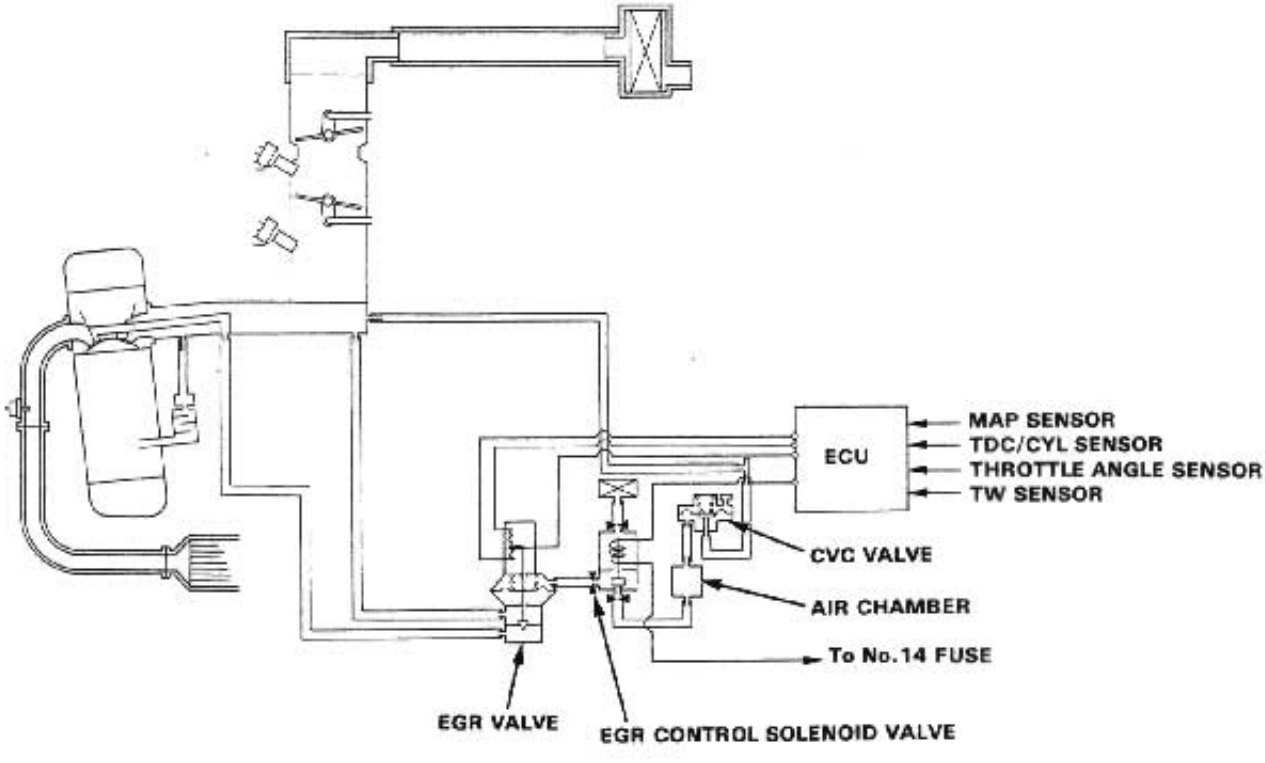
Troubleshooting Flowchart

Self-diagnosis indicates code 12: Most likely a problem in the Exhaust Gas Recirculation (EGR) system.

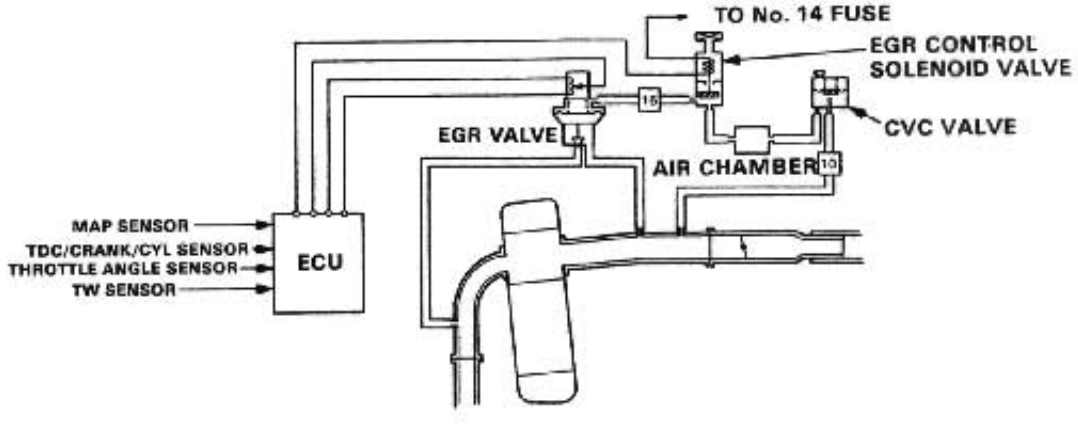
The EGR System is designed to reduce oxides of nitrogen emissions (NOx) by recirculating exhaust gas through the EGR valve and the intake manifold into the combustion chambers. It is composed of the EGR valve, CVC valve, EGR control Solenoid valve, PGM-FI ECU and various sensors.

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 signals sent from the other sensors. If there is any difference between the two, the ECU cuts current to the EGR control solenoid valve to reduce vacuum applied to the EGR valve.

(Std. CAL: A/T)



(HF)



- **Check Engine light has been reported on.**
- **LED indicates CODE 12.**

Verify that all connectors between the EGR valve lift sensor and the ECU are securely connected.

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

Disconnect #16 hose from EGR valve.

Connect a vacuum pump to EGR valve and apply vacuum.

Does EGR valve hold vacuum ? Did engine stall ?

NO → **Replace EGR valve.**

YES

Std. CAL (A/T):
Disconnect #12 hose from the joint and connect a vacuum gauge.
HF:
Disconnect #10 hose from the intake manifold and connect a vacuum gauge to the port.

Restart engine and check for vacuum.

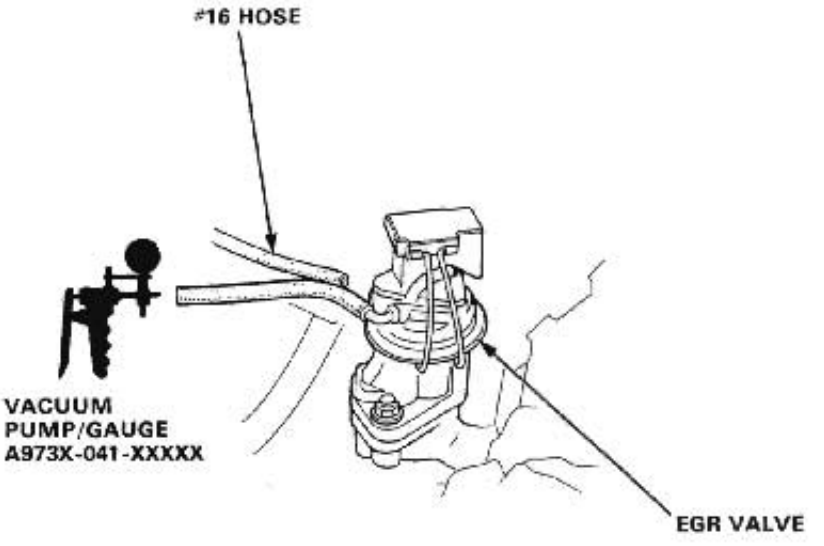
Is there manifold vacuum?

NO → **Check vacuum hoses, pipes and connecting.**

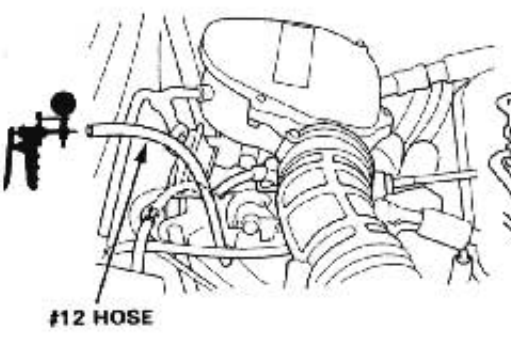
YES

Reconnect hose.

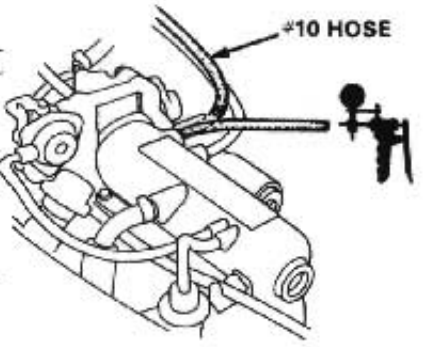
(To page 138)



(Std. CAL: A/T)



(HF)

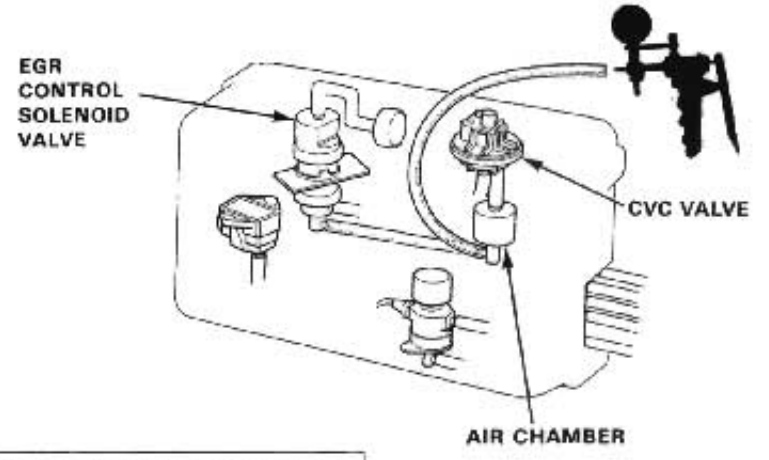


(cont'd)

Exhaust GAS Recirculation System [Std. CAL: A/T and HF] (cont'd)

(From page 11-137)

Disconnect the #16 hose from the EGR valve, vacuum gauge to the # 16 vacuum hose and check for vacuum.



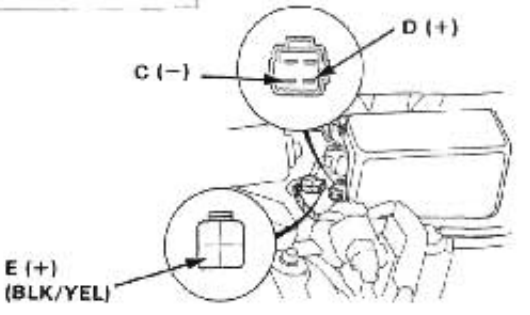
Is there vacuum ?

YES → **Check for a short in RED wire between ECU [A10] and EGR control solenoid valve. If wire is OK, replace the solenoid valve.**

NO

Turn the ignition switch OFF.

Disconnect the 4P connector from the control box.



Connect the battery positive terminal to D terminal and the negative terminal to C terminal.

Restart engine and check for vacuum.

Is there approx. 8"?

NO → Remove the control box cover, disconnect the vacuum hose between the air chamber and EGR control solenoid valve from the air chamber, and connect vacuum gauge to the air chamber and check for vacuum.

YES

Measure voltage between E: BLK/YEL (+) terminal on the main wire harness and body ground.

(To page 11-139)

Is there approx. 8"?

NO → **Inspect hose routing of EGR system. If OK, replace CVC valve.**

YES

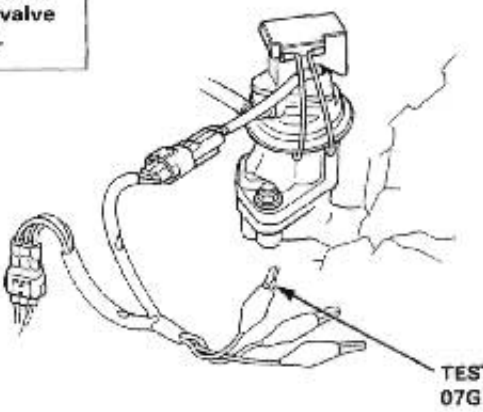
Replace EGR control solenoid valve.

(From page 11-138)

Is there battery voltage ?
NO → **Repair open in BLK/YEL wire between the solenoid valve and No. 14 fuse.**
YES

Turn the ignition switch OFF.

Connect the test harness between the EGR valve lift sensor and engine wire harness.



Disconnect the #16 hose to the EGR valve.

Turn the ignition switch ON.

Measure voltage between RED (+) terminal and GRN (–) terminal.

Is there approx. 5V ?
NO → Measure voltage between RED (+) terminal and body ground.

Measure voltage between RED (+) terminal and body ground.
Is there approx. 5V ?
YES → **Repair open in GRN/WHT wire between ECU (C12) and the sensor.**
NO → **Repair open in YEL/WHT wire between ECU (C13) and the sensor. If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.**

YES

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

Is there approx. 1V ?
NO → **–Replace EGR valve.**
–Repair short in YEL wire between ECU (C8) and EGR valve lift sensor.
YES

Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 11-27).

Turn the ignition switch ON.

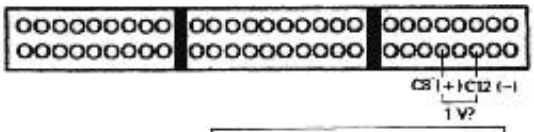
(To page 11-140)

(cont'd)

Exhaust Gas Recirculation System [Std. CAL: A/T and HF] (cont'd)

(From page 11-139)

Measure voltage between C8 (+) terminal and C12 (–) terminal.

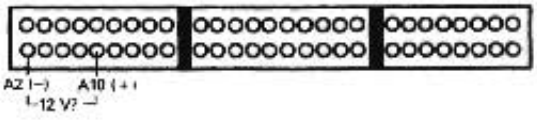


Is there approx. 1V ?

NO → **Repair open in YEL wire between ECU (C8) and the sensor.**

YES

Start the engine and allow it to idle.



Using a jumper wire, connect A10 (+) terminal and A2 (–) terminal.

Did the engine stall ?

NO → **Repair open in RED wire between ECU (A10) and EGR control solenoid valve.**

YES

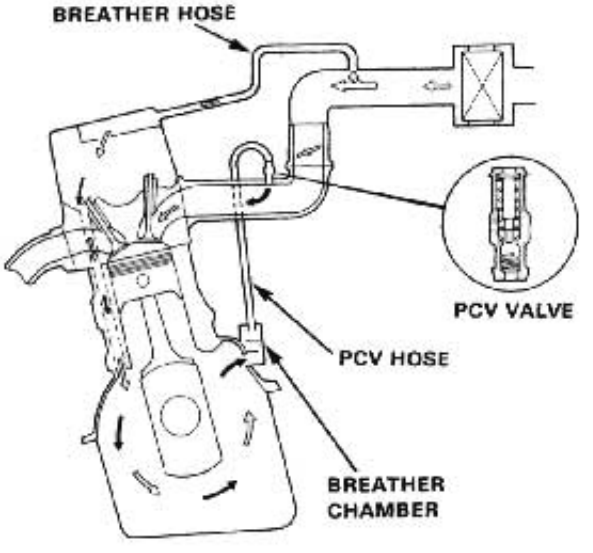
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Positive Crankcase Ventilation System

Description

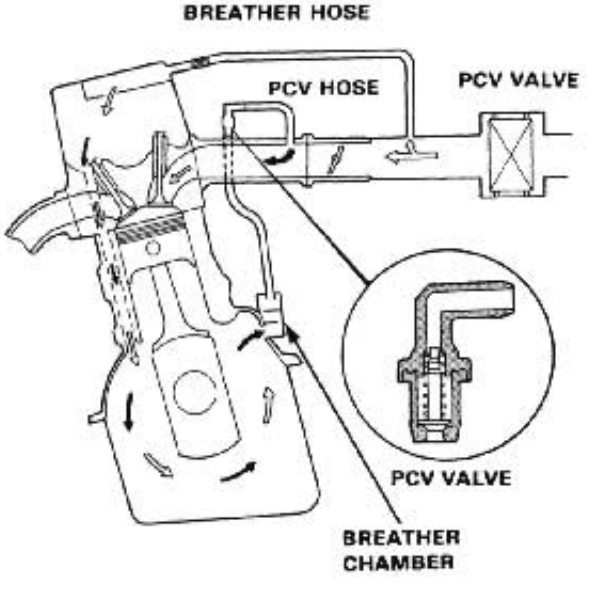
The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring-loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is drawn directly into the intake manifold.

Std. :



⬅ :BLOW-BY VAPOR
⇦ :FRESH AIR

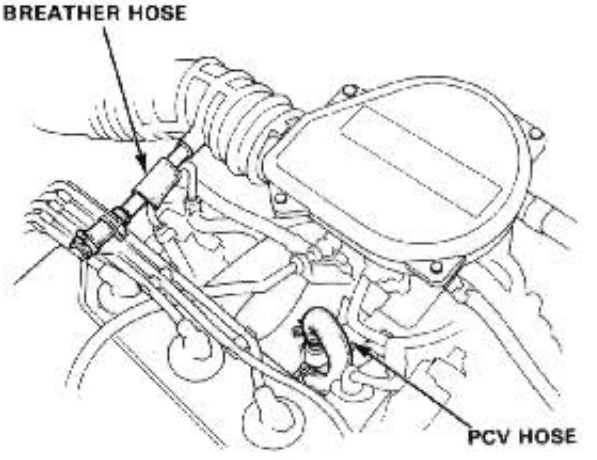
HF and Si:



⬅ :BLOW-BY VAPOR
⇦ :FRESH AIR

Inspection (Std.)

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



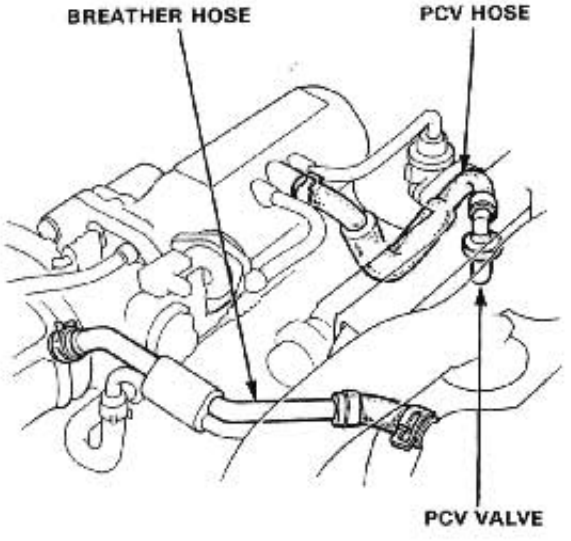
2. At idle, make sure there is a clicking sound from the PCV valve when you lightly pinch the PCV hose with your fingers or pliers.
   - If no clicking sound is heard, replace PCV valve and recheck.

(cont'd)

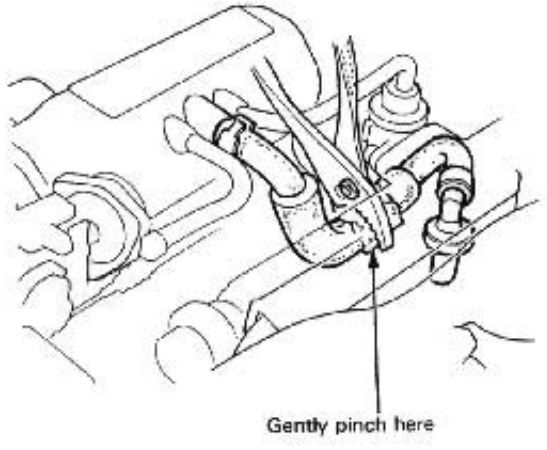
Positive Crankcase Ventilation System (cont'd)

Inspection (HF and Si)

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



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



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

Evaporative Emission Controls

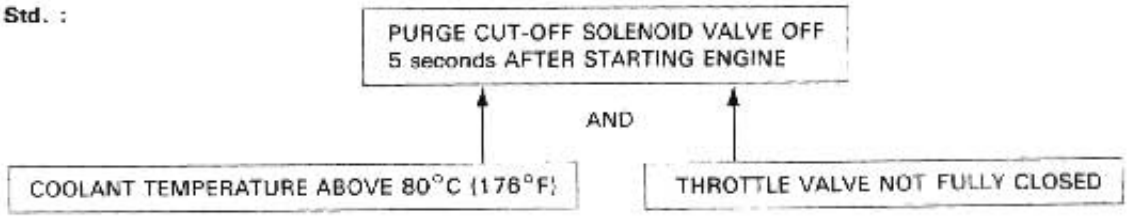
Description

The evaporative controls are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

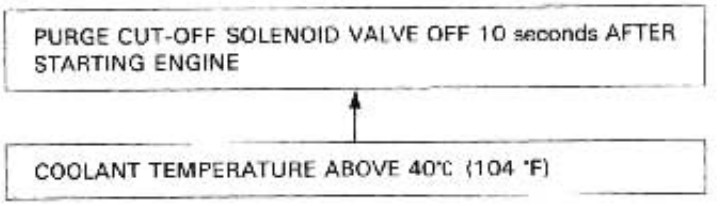
A. Charcoal Canister
A canister for the temporary storage of fuel vapor until the fuel vapor can be purged from the canister into the engine and burned.

B. Vapor Purge Control System
Canister purging is accomplished by drawing fresh air through the canister and into a port on the throttle body. The ported vacuum is controlled by the purge control diaphragm valve and the purge cut-off solenoid valve

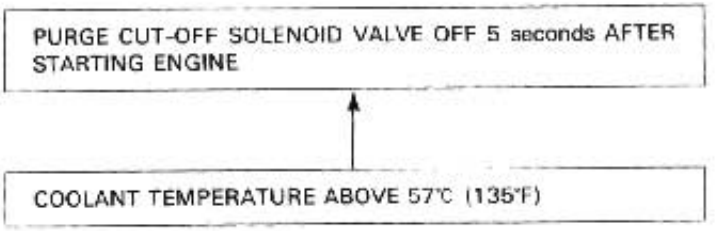
Std. :



HF:



Si:

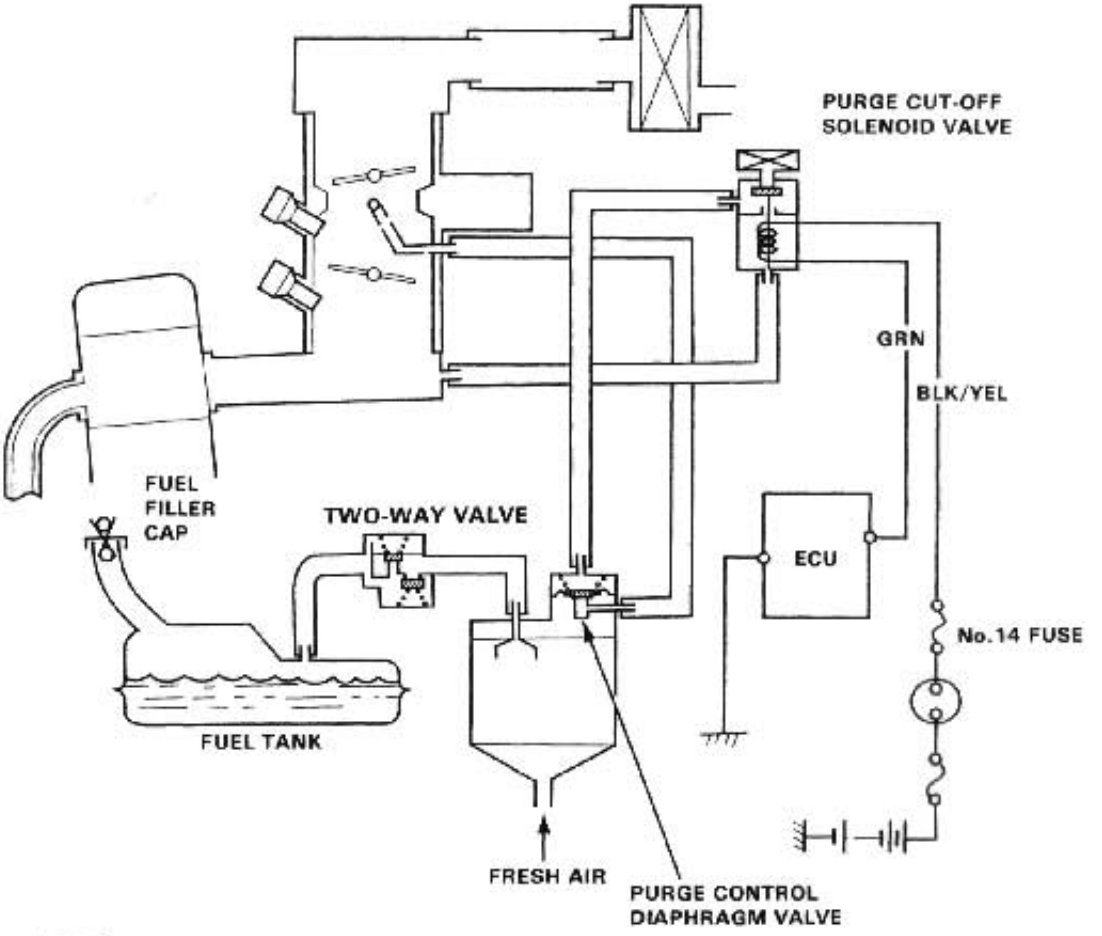


C. Fuel Tank Vapor Control System
When fuel vapor pressure in the fuel tank is higher than the set value of the two-way valve, the valve opens and regulates the flow of fuel vapor to the canister.

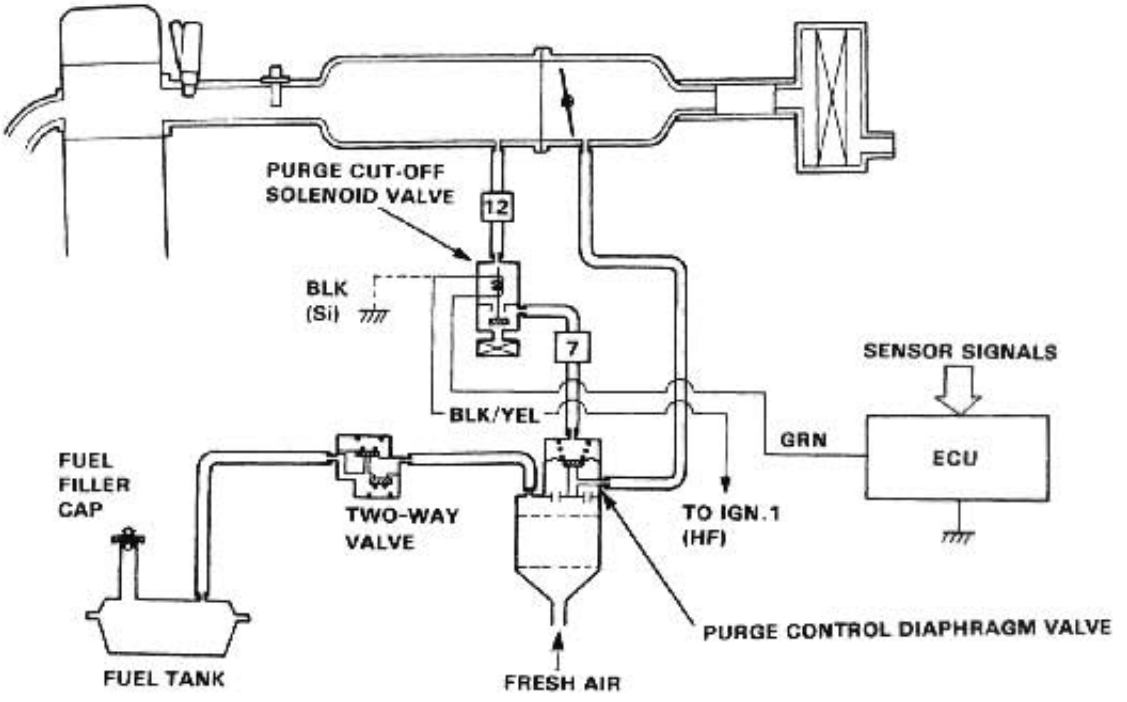
(cont'd)

Evaporative Emission Controls (cont'd)

Std:



HF and Si:



Troubleshooting Flowchart

Inspection of Evaporative Emission Controls

Disconnect #7 hose from the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.

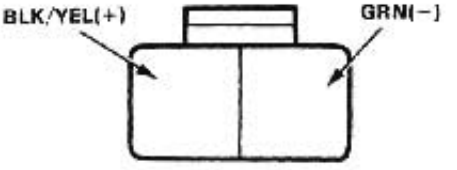
Start the engine and allow to idle.
NOTE:
- Std. : Engine coolant temperature must be below 80 °C (176°F).
- HF: Engine coolant temperature must be below 40 °C (104 °F).

Is there vacuum ?

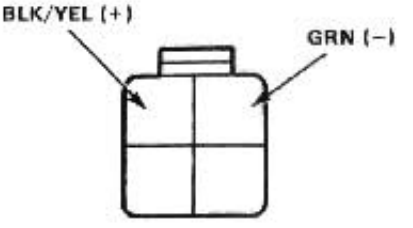
YES → Disconnect the 2P (Except HF) or 4P (HF) connector.

NO → (To page 11-146)

(Std.)



(HF)



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

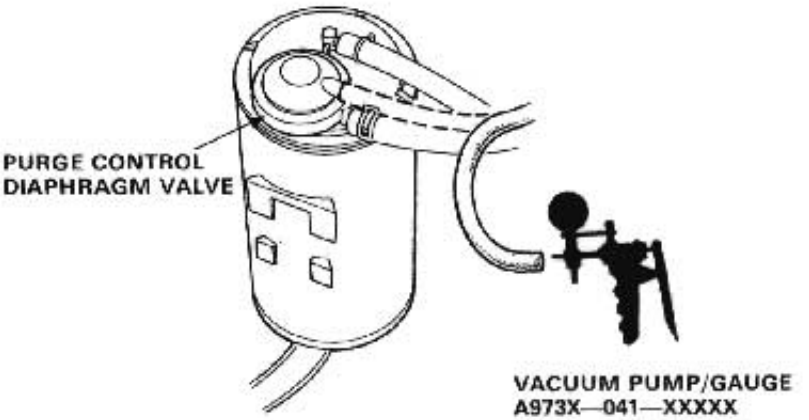
Is there battery voltage ?

YES → **Inspect #7 hose routing. If OK, replace purge cut-off solenoid valve.**

NO

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

(To page 11-146)



(cont'd)

Evaporative Emission Controls [Std. and HF] (cont'd)

(From page 11-145)

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

Check for vacuum at #7 hose 10 seconds after starting the engine. NOTE: On the Std., check with the throttle valve slightly opened.

Is there manifold vacuum?

NO → Disconnect the 2P or 4P (CAL: A/T) connector.

Is there manifold vacuum?

NO → **Inspect #7 hose routing. If OK, purge cut-off solenoid valve.**

YES

Turn the ignition switch OFF.

Disconnect "A" connector from ECU.

Check for continuity to ground on GRN wire.

(To page 11-147)

(From page 11-145)

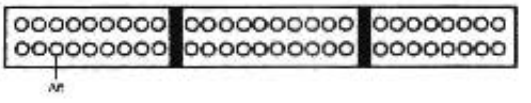
Is there battery voltage ?

NO → **Repair open in BLK/YEL wire between No. 14 fuse and the 2P or 4P (CAL: A/T) connector.**

YES

Turn the ignition switch OFF.

Connect the ECU test harness to the main wire harness only, not the ECU (page 11-27).



Check for continuity of GRN wire between ECU (A6) and the 2P or 4P connector.

Does continuity exist ?

NO → **Repair open in GRN wire between ECU (A6) and the connector.**

YES

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

Reconnect the hose.

Remove fuel filler cap.

(To page 11-147)

(From page 11-146)

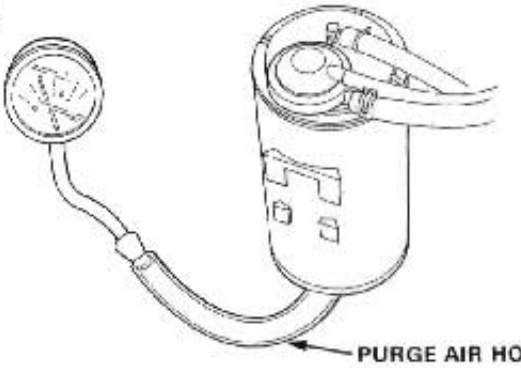
(From page 11-146)

Is there continuity to ground ? YES → **Repair short to ground in GRN wire between ECU (A6) and the connector.**

NO → **Substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.**

Connect a vacuum gauge to canister purge air hose.

VACUUM/PRESSURE GAUGE, 0—4 in. Hg
07JAZ—001000A

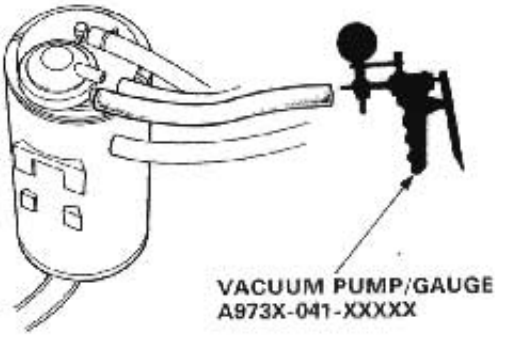


Start the engine and raise speed to 3,500 rpm.

Does vacuum appear on gauge within 1 minute ? NO → **Replace the canister.**

YES

See two-way valve test (page 11-154) to complete. Evaporative emission conrtols are OK.



Evaporative Emission Control [Si]

Troubleshooting Flowchart

Inspection of Evaporative Emission Controls

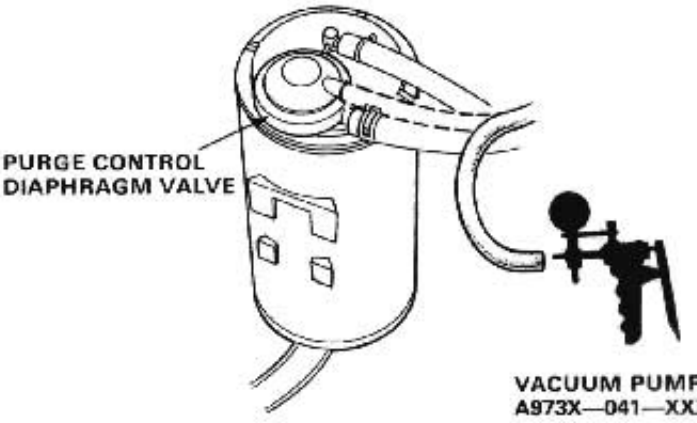
Disconnect #7 hose from the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.

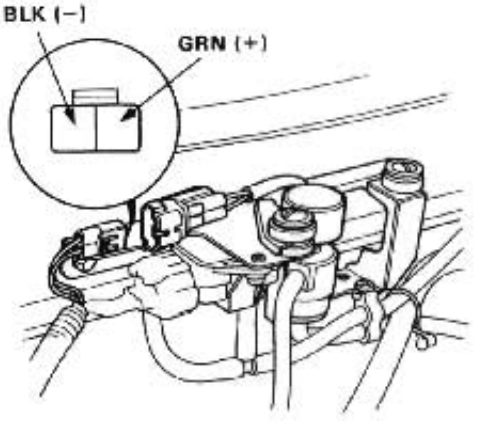
Start the engine and allow to idle. NOTE: Engine coolant temperature must be below 57 °C (135 °F).

Is there vacuum ?

YES → Disconnect the 2P connector.

NO → (To page 11-149)





Measure voltage between GRN (+) terminal and BLK (–) terminal.

Is there battery voltage ?

YES → **Replace purge cut-off solenoid valve.**

NO → Measure voltage between GRN (+) terminal and body ground.

(To page 11-149)

(From page 11-148)

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

Check for vacuum at #7 hose 5 seconds after starting the engine.

(To page 11-150)

(From page 11-148)

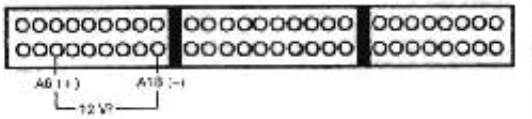
Is there battery voltage ?

YES → **Repair open in BLK wire between the 2P connector and G201.**

NO

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 11-27).



Turn the ignition switch ON.

Measure voltage between A6 (+) terminal and A18 (-) terminal.

Is there battery voltage?

YES → **Repair open in GRN wire between ECU (A6) and the 4P connector.**

Inspect for a short on GRN wire between ECU (A6) and 2P connector. If wire is OK, Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

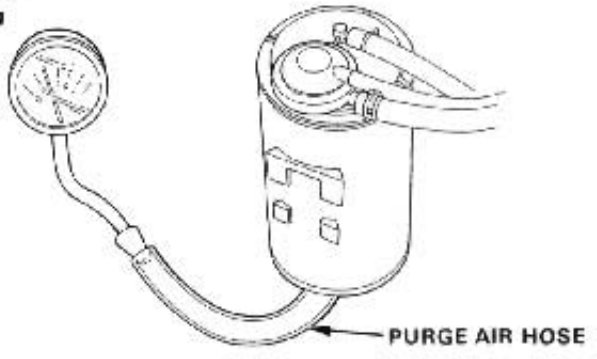
Evaprative Emission Controls [Si] (cont'd)

(From page 11-149)

Is there manifold vacuum?
- NO → Disconnect the 2P connector.
  - Is there manifold vacuum?
    - YES → Replace purge cut-off solenoid valve.
    - NO → Turn the ignition switch OFF.
      - Disconnect "A" connector from ECU.
      - Check for continuity to ground on GRN wire.
      - Is there continuity to ground ?
        - YES → **Repair short to ground in GRN wire between ECU (A6) and the 2P connector.**
        - NO → **Substitute a known good ECU and recheck. If symptom goes away, replace the original ECU.**
- YES → Remove fuel filler cap.
  - Connect a vacuum gauge to canister purge air hose.
  - Start the engine and raise speed to 3,500 rpm.

(To page 11-151)

VACUUM/PRESSURE GAUGE, 0—4 in. Hg
07JAZ—001000A



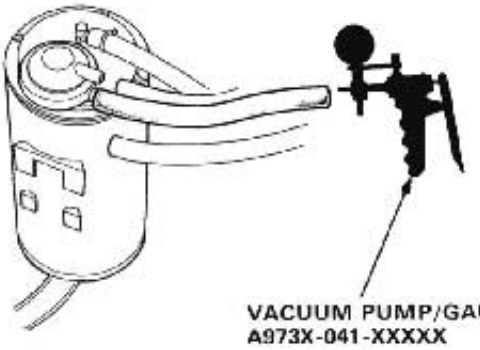
(From page 11-150)

Does vacuum appear on gauge within 1 minute ?

NO → **Replace the canister.**

YES

Evaporative emission controls are OK.



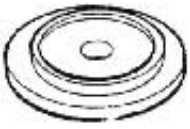
VACUUM PUMP/GAUGE
A973X-041-XXXXX

Clutch

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07JAF—PM7012A	Clutch Alignment Shaft	1	12-7, 12-11
②	07JAF—PM7011A	Clutch Alignment Disk	1	12-7, 12-11
③	07936—3710100	Handle	1	12-7, 12-11
④	07924—PD20002 or 07924—PD20003	Ring Gear Holder	1	12-7, 12-9, 12-10
⑤	07749—0010000	Driver	1	12-10
⑥	07746—0010100	Attachment 32 x 35 mm	1	12-10

①



②

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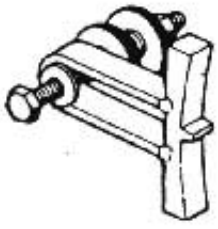


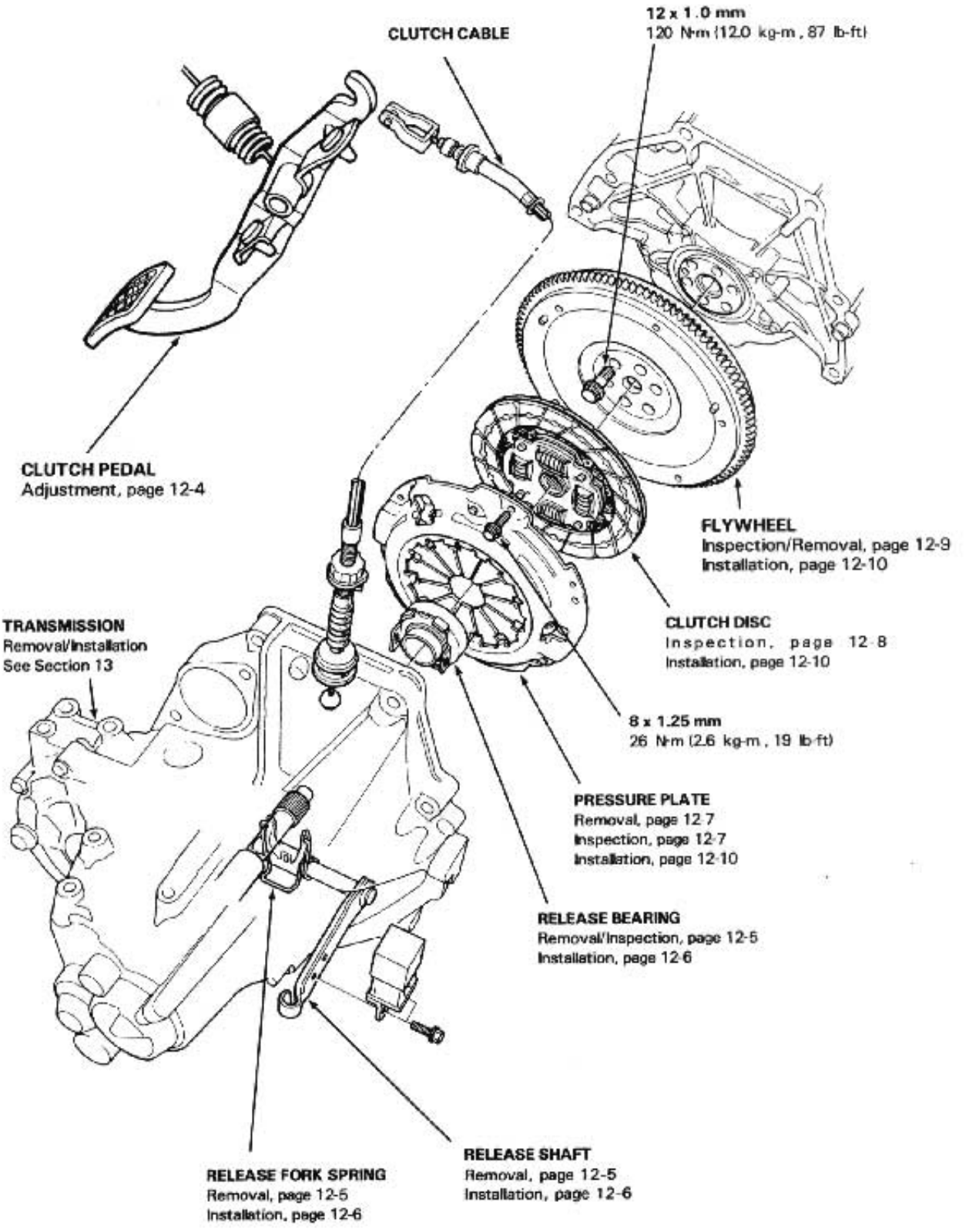
④

⑤

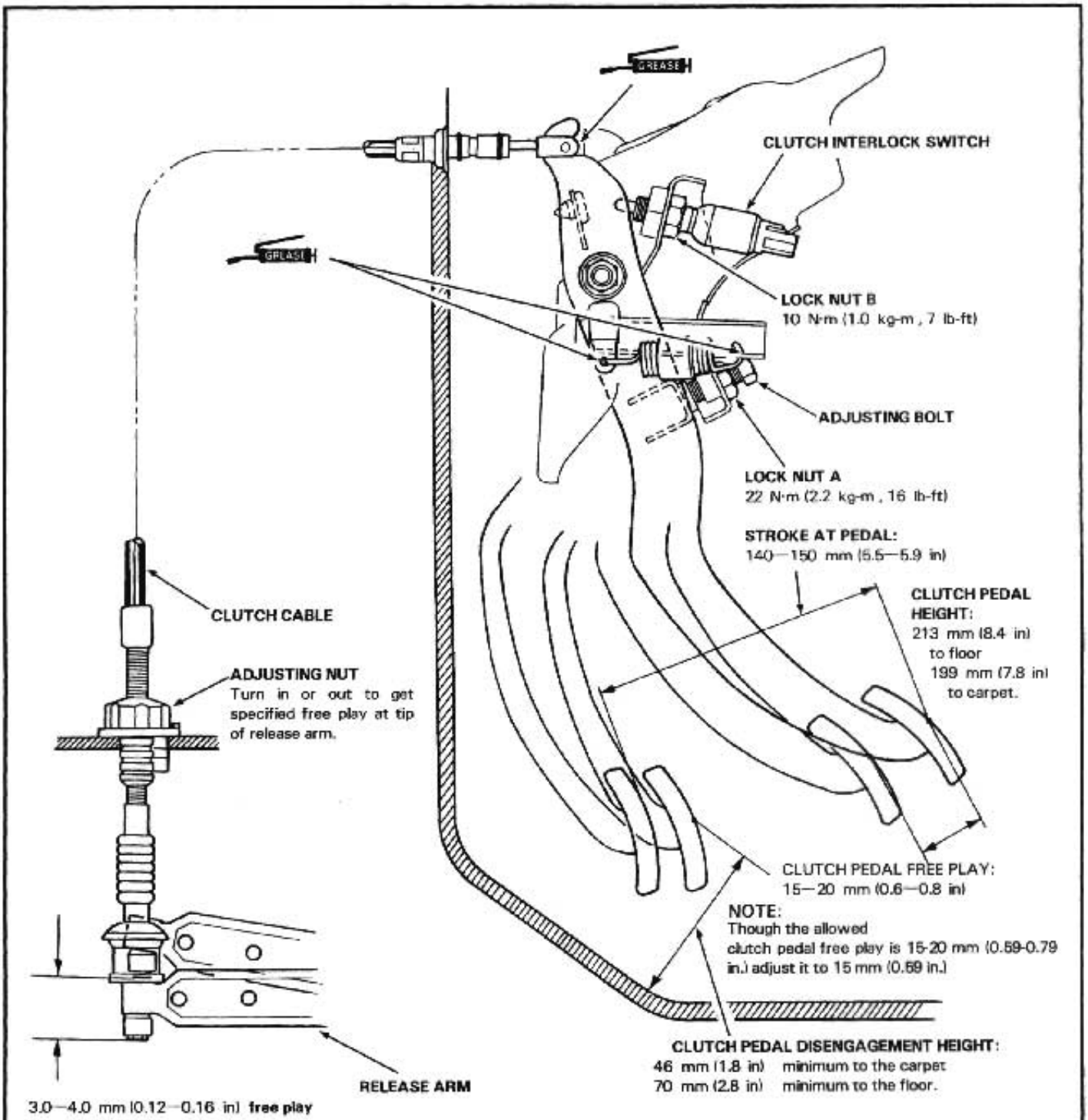
⑥

Illustrated Index

NOTE:
Whenever the transmission is removed, the release bearing sliding surface should be cleaned and greased (Molybdenum Disulfide).



Clutch Adjustment

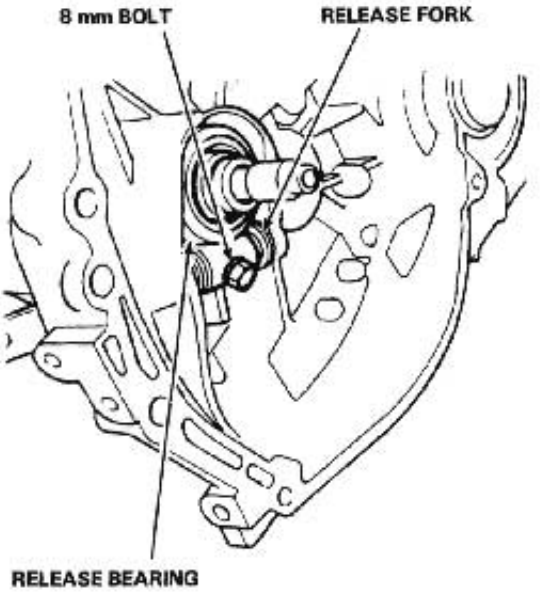


1. Measure the clutch pedal disengagement height.
2. Measure the clutch pedal free play.
3. Adjust the clutch free play by turning the adjusting nut.
4. Make sure that there is 3.0-4.0 mm (0.12-0.16 in) free play at the tip of release arm after the adjustment.
5. Turn the adjusting bolt to right or left to bring the clutch pedal stroke to the specification and tighten the lock nut A.
6. Loosen the lock nut B and clutch interlock switch.
7. Measure the clearance between the floor board and clutch pedal with the clutch pedal fully depressed.
8. Release the clutch pedal 15-20 mm (0.59-0.79 in.) from the fully depressed position and hold it there. Adjust the position of clutch interlock switch so that the engine will start with the clutch pedal in this position.
9. Thread the clutch interlock switch in further ¼-½ turn.
10. Tighten the lock nut B.

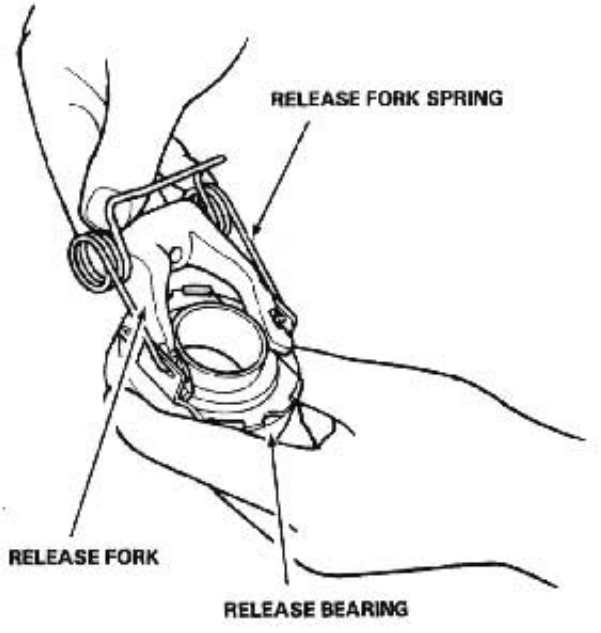
Release Bearing

Removal

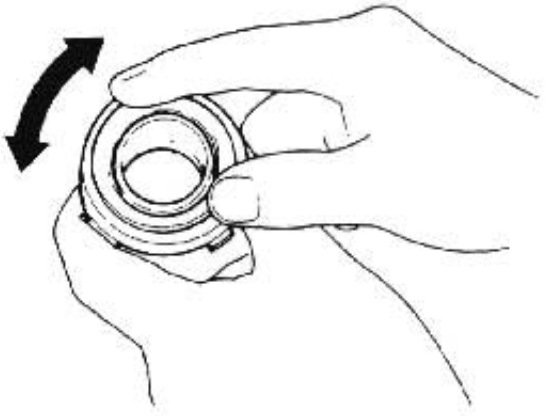
1. Remove the 8 mm special bolt.
2. Remove the release shaft and release bearing assembly.



3. Separate the release fork from the bearing by removing the release fork spring from the holes in the release bearing.



4. Check the release bearing for excessive play by spinning it by hand.



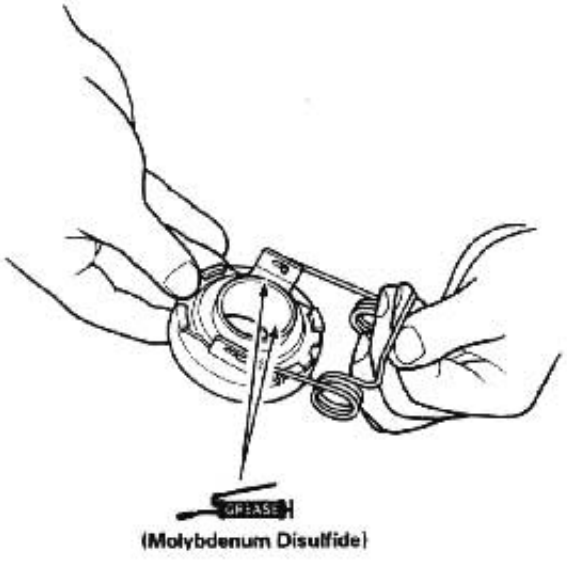
5. Replace the bearing with a new one if there is excessive play.

CAUTION:
The bearing is packed with grease. Do not wash it in solvent.

Release Bearing

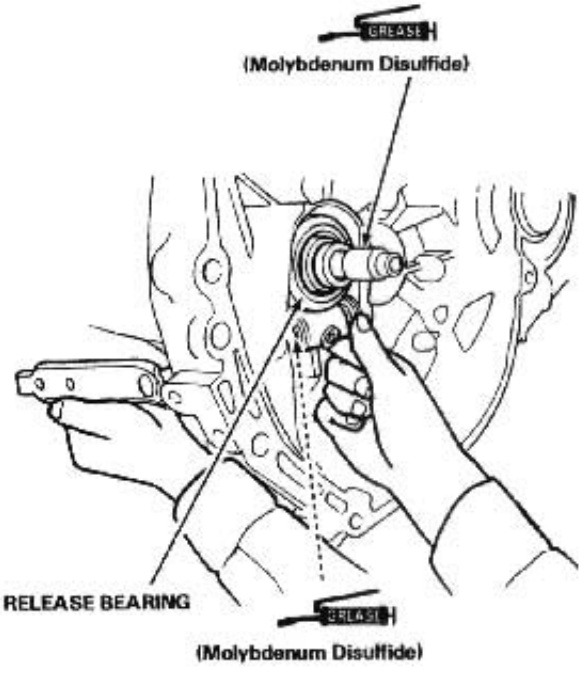
Installation

1. Install the release fork spring in the locating holes as shown.

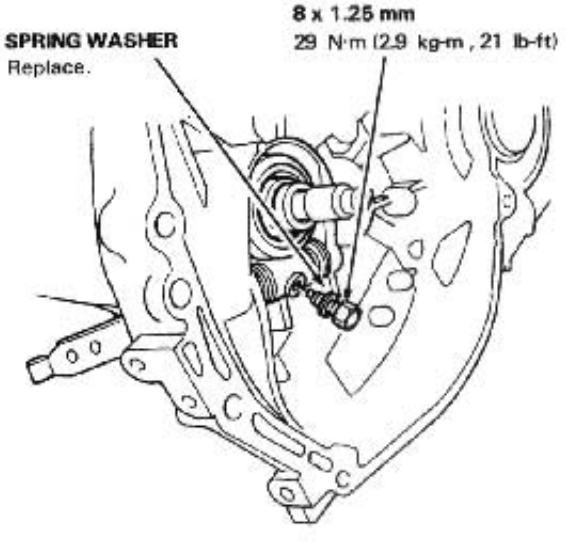


2. Align the release fork with the locating holes of the release bearing.

3. Install the release shaft and the release bearing.
NOTE: Apply molybdenum disulfide grease to the release shaft.



4. Align the release shaft and release fork, then install a new spring washer and bolt.



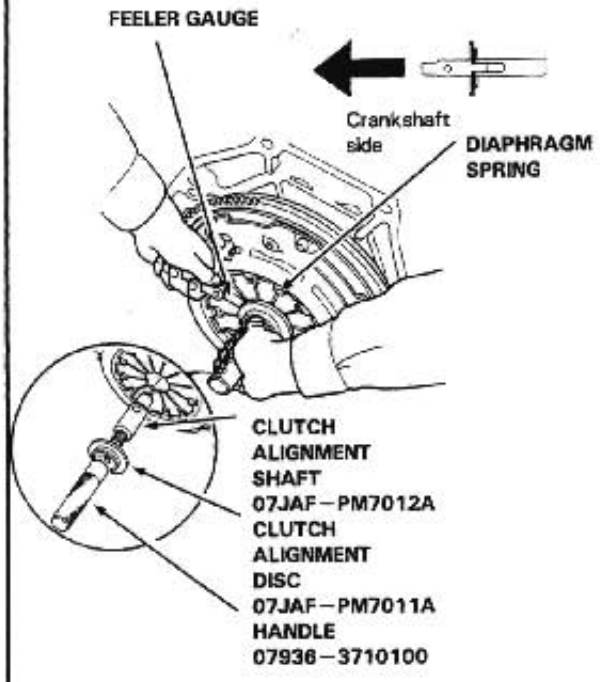
5. Move the release fork up and down to make sure the fork fits properly against the bearing, and that the bearing slides freely.

Pressure Plate

Removal/Inspection

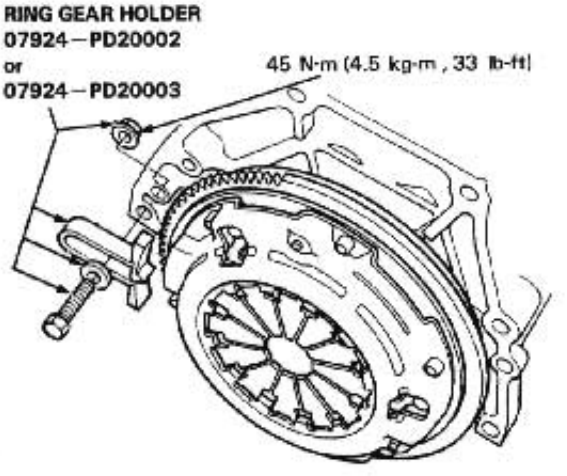
1. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.
2. Check the diaphragm spring fingers for height using the Clutch Alignment Tool Assembly and feeler gauge.

   Service Limit: 1.0 mm (0.04 in) **Max.**

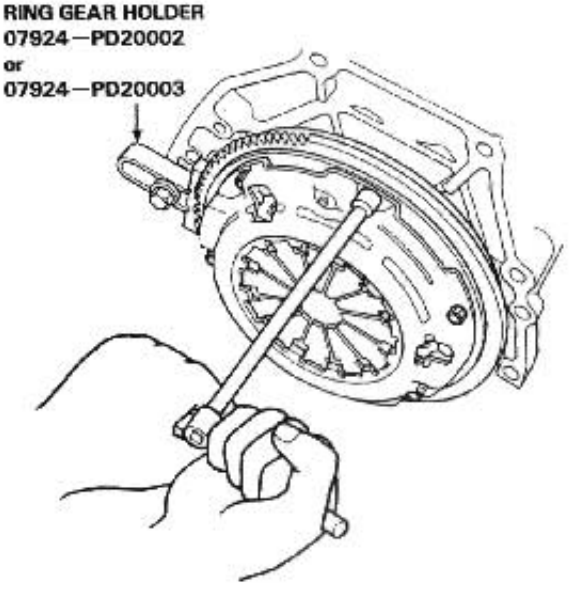


NOTE:
Install the clutch Alignment Disc with the larger side facing to the diaphragm spring.

3. Install the Ring Gear Holder.

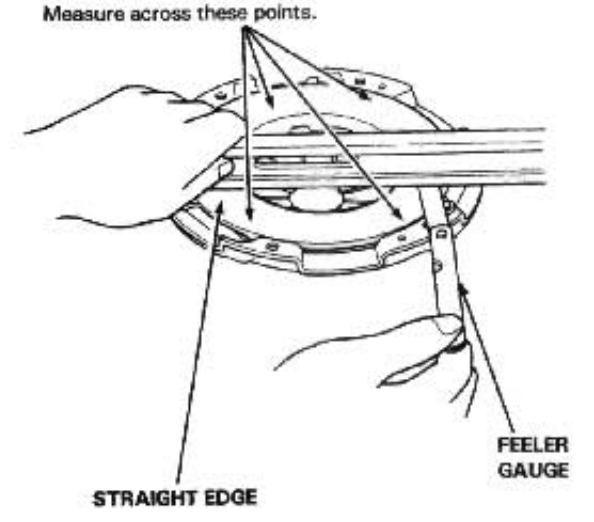


4. To prevent warping, loosen the pressure plate mounting bolts two turns at a time in a crisscross pattern using a 10 mm T-wrench, then remove the pressure plate and clutch disc.



5. Inspect the pressure plate surface for wear, cracks, or burning.
6. Inspect for warpage using a straight edge and feeler gauge.

   Service Limit: 0.15 mm (0.006 in) **Max.**

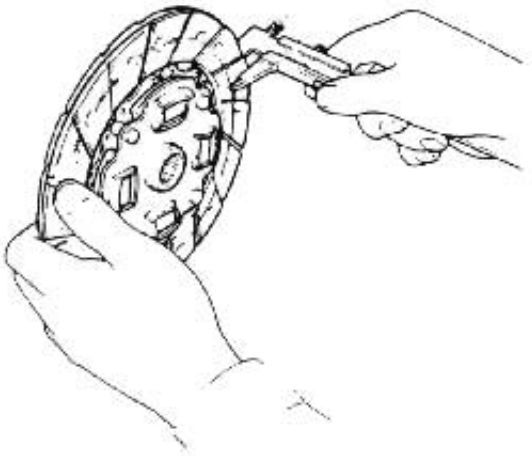


Clutch Disc

Inspection

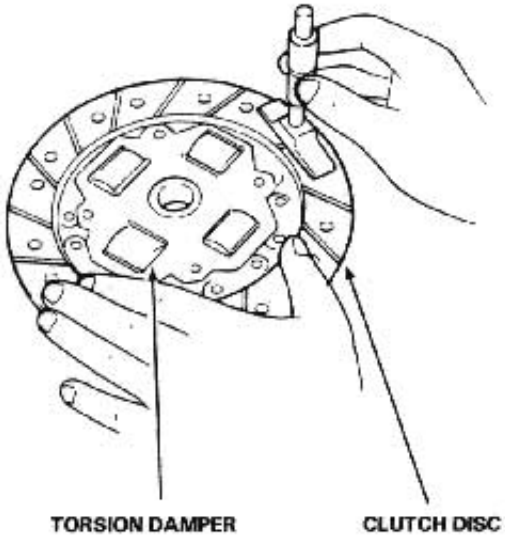
1. Inspect lining of the clutch disc for signs of slipping or oil. Replace it if it is burned black or oil soaked.
2. Measure the clutch disc thickness.

CLUTCH DISC
Clutch Disc Thickness:
Standard (New): 8.1—8.8 mm (0.32—0.35 in)
Service Limit: 5.7 mm (0.22 in)



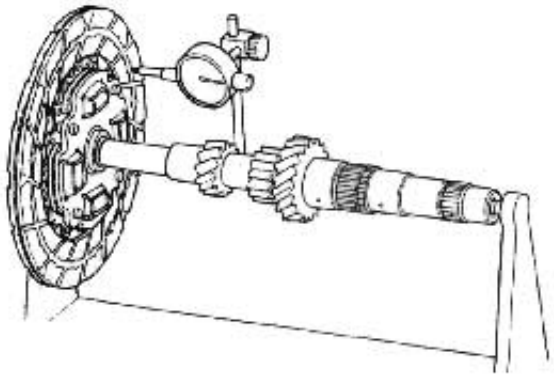
3. Check for loose rubber torsion dampers. Replace the clutch disc if any are loose.
4. Measure the depth from the lining surface to the rivets, on both sides.

Rivet Depth:
Standard (New): 1.3 mm (0.05 in) min.
Service Limit: 0.2 mm (0.01 in)



5. Measure the clutch plate runout with the mainshaft and a dial indicator.

Clutch plate runout:
Standard: 0.8 mm (0.03 in) max.
Service Limit: 1.0 mm (0.04 in)



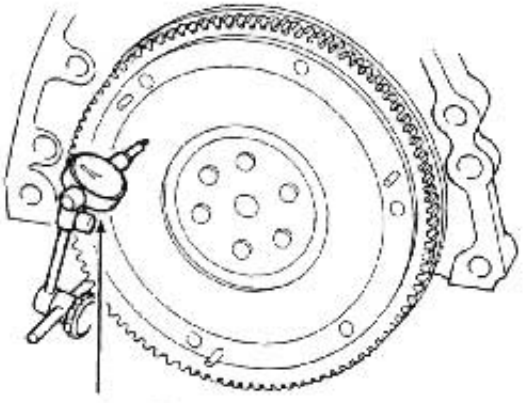
Flywheel

Inspection/Removal

1. Inspect the ring gear teeth for wear or damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks or burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push against the flywheel each time you turn it to take up the camkshaft thrust washer clearance.

   NOTE:
   The runout can be measured with engine installed.

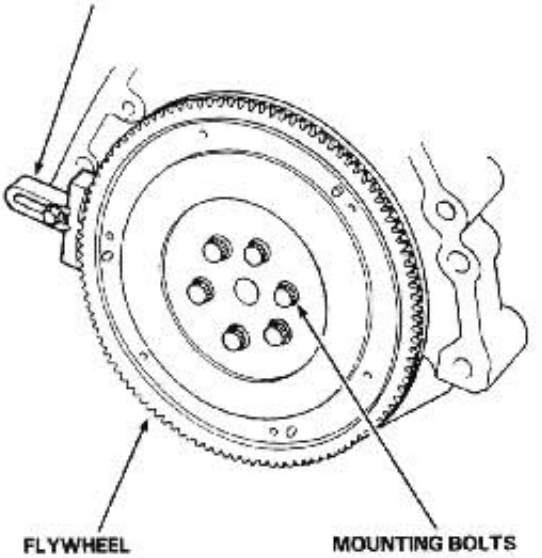
   Standard (New): 0.05 mm (0.002 in) **max.**
   Service Limit: 0.15 mm (0.006 in)



DIAL INDICATOR

4. Remove the six flywheel mounting bolts and flywheel.

RING GEAR HOLDER
07924—PD20002
or
07924—PD20003

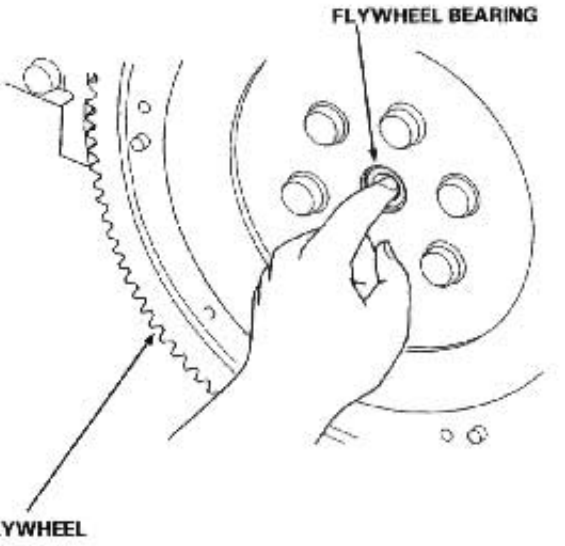


FLYWHEEL **MOUNTING BOLTS**

Flywheel Bearing

Inspection/Replacement

1. Turn the inner race of the bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the flywheel.
   Replace the bearing if the race does not turn smoothly, quietly, or fit tightly in the flywheel.



FLYWHEEL BEARING

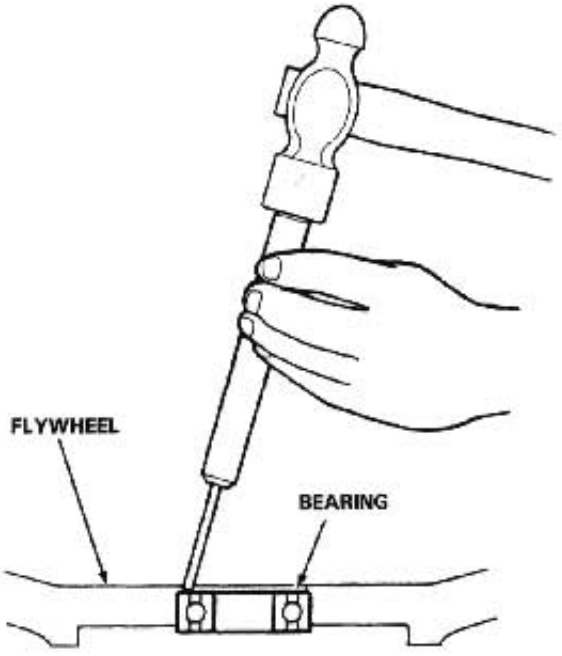
FLYWHEEL

(cont'd)

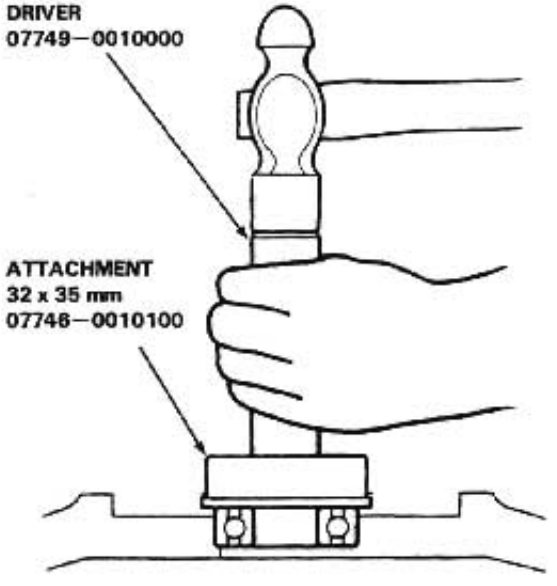
Flywheel Bearing

Inspection/Replacement (cont'd)

2. Remove the bearing from the flywheel.



3. Drive in the new bearing in the flywheel.

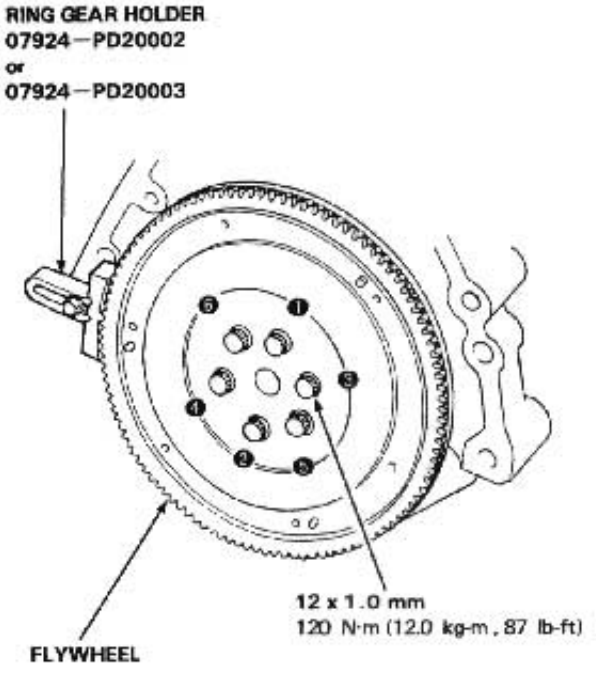


Flywheel and Clutch

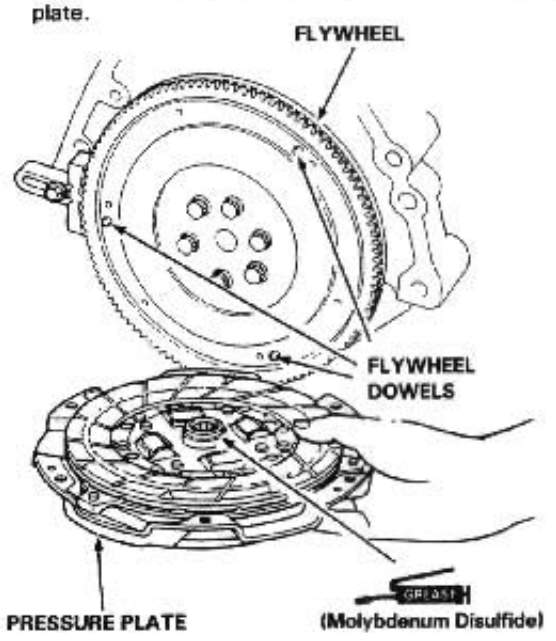
Installation

1. Align the hole in flywheel with the crankshaft dowel pin and assemble. Install the bolts only finger tight.

2. Install the Ring Gear Holder, then torque the flywheel bolts in a crisscross pattern, as shown.

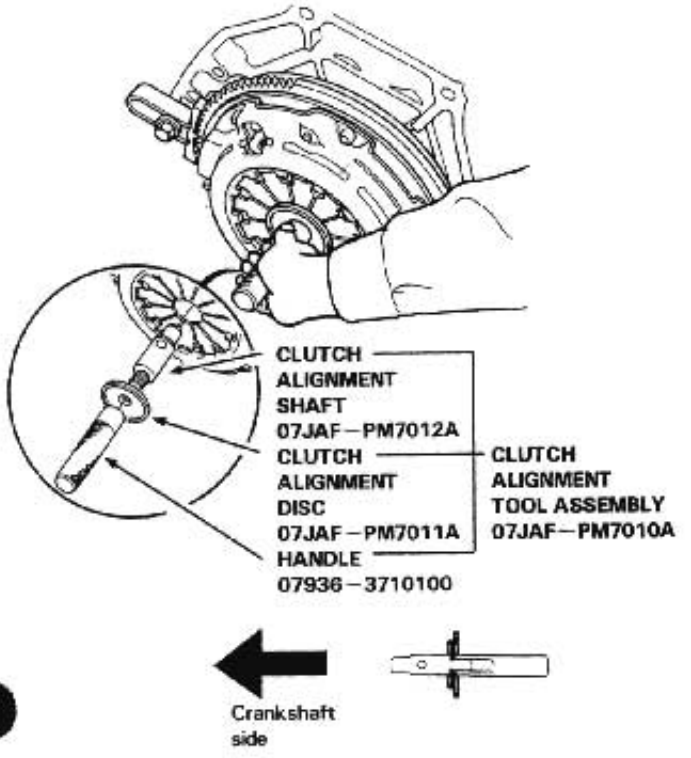


3. Install the clutch disc and pressure plate by aligning the flywheel dowels with the dowel holes in the pressure plate.



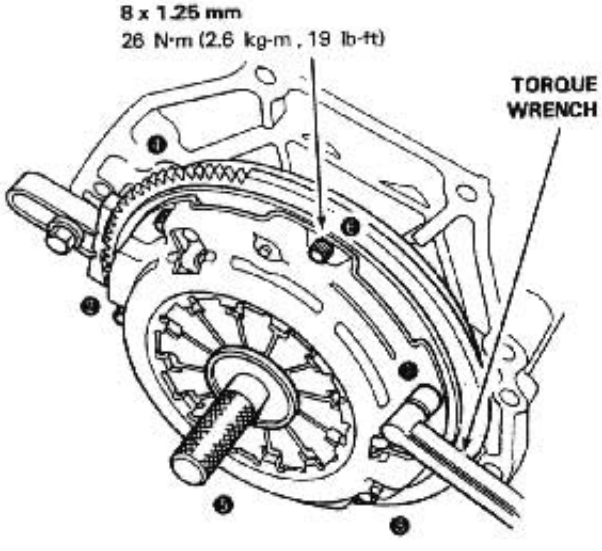
4. Install the attaching bolts finger tight.

5. Insert the Clutch Disc Alignment Tool in the splined hole in the clutch disc.



NOTE:
Install the Clutch Alignment Disc with the smaller side facing to 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.

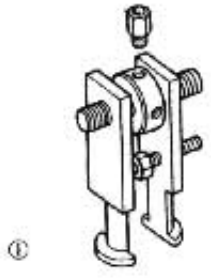


7. Remove the Alignment Tool and Ring Gear Holder.

Manual Transmission

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	☆07736-A01000A	Adjustable Bearing Remover (25-40 mm)	1	13-13
②	07749-0010000	Driver	1	13-13,13-14
③	07746-0010300	Attachment 42 x 47 mm	1	13-13,13-14
④	07746-0010400	Attachment 52 x 55 mm	1	13-14
⑤	07GAJ-PG20102	Mainshaft Clearance Inspection Tool	1	13-15
⑤-1	07GAJ-PG20110	Mainshaft Holder	1	13-15
⑤-2	07GAJ-PG20130	Mainshaft Base	1	13-15
⑤-3	07GAJ-PG20120	Collar	1	13-15



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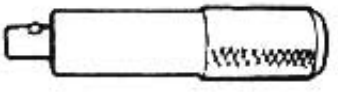

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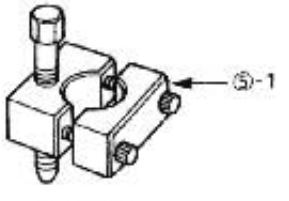
④



⑤

☆Must be used with commercially available 3/8 x 16 Thread Slide Hammer.

Oil Level Inspection

1. Check with oil at operating temperature, engine OFF, and car on level ground.
2. Remove oil filler plug and check level with finger.
3. Oil level must be up to fill hole. If it is below hole, add oil until it runs out, then reinstall plug.

Oil Change

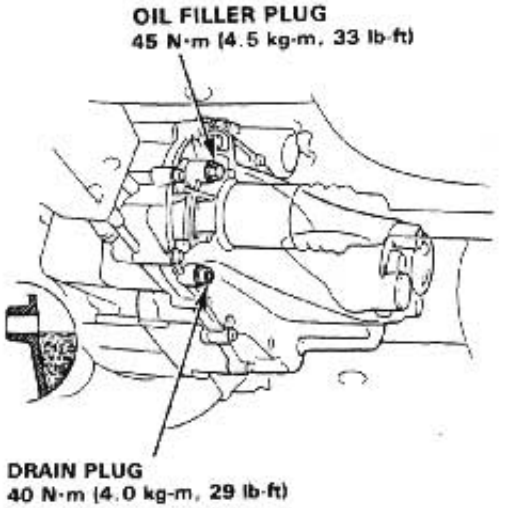
Use only SAE 10W-30 or 10W-40 oil rated SE or SF grade.

1. Drain with transmission oil at operating temperature, engine OFF, and car on level ground.
2. Remove the oil filler plug, then remove the drain plug and drain transmission.
3. Reinstall drain plug with new washer, and refill to proper level.

   NOTE: Drain plug washer should be replaced at every oil change.

Oil Capacity:

1.8ℓ (1.9 U.S. qt.) after drain.
1.9ℓ (2.0 U.S. qt.) after overhaul.



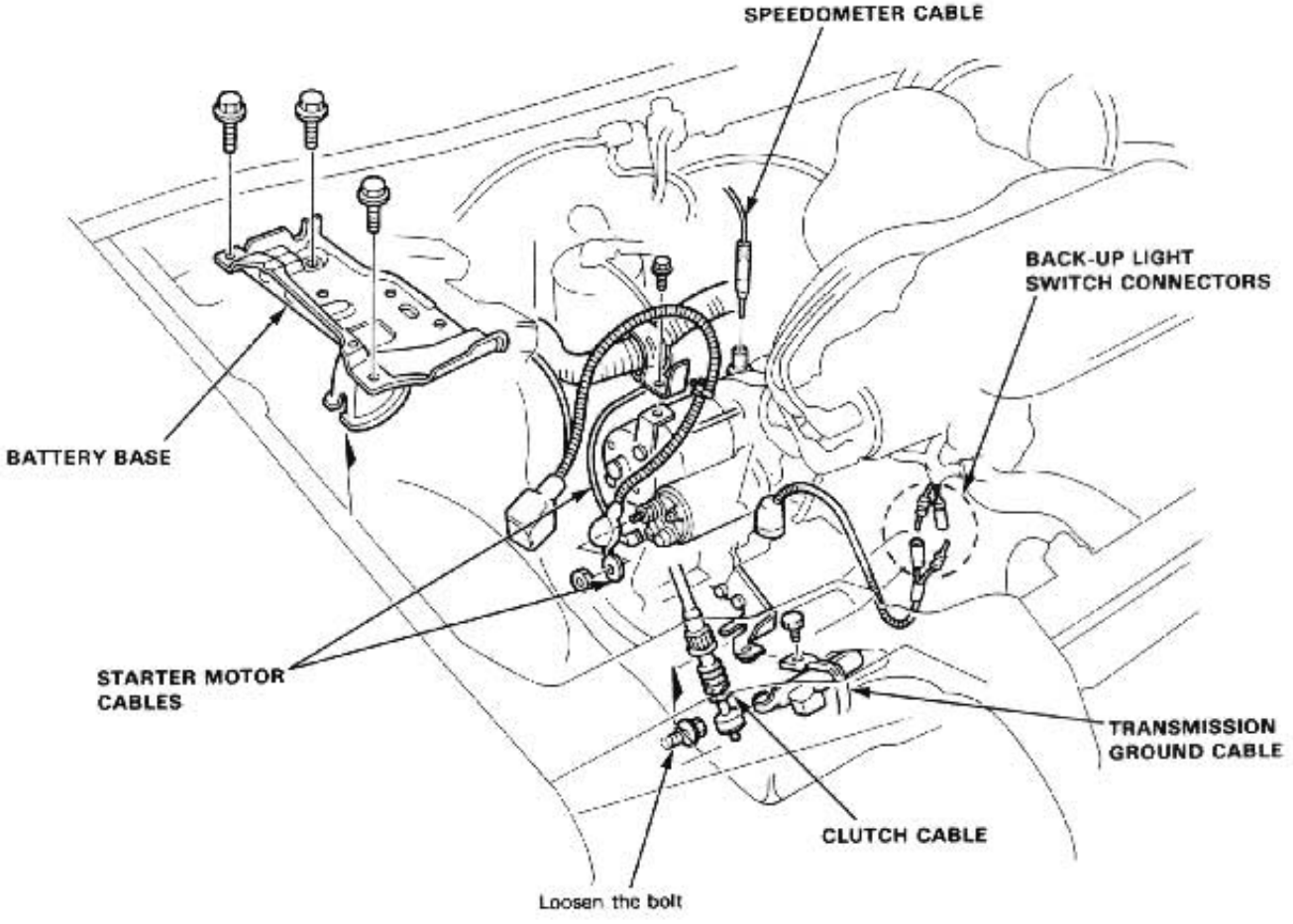
Removal

⚠ WARNING

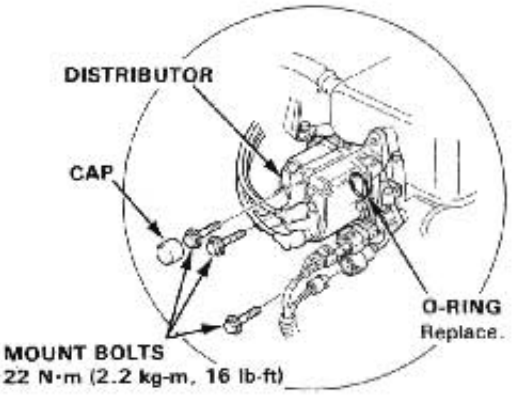
- **Make sure jacks and safety stands are placed properly (pages 1-6 thru 8), and hoist brackets are attached to correct positions on the engine (page 5-7).**
- **Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.**

CAUTION: Use fender covers to avoid damaging painted surfaces.

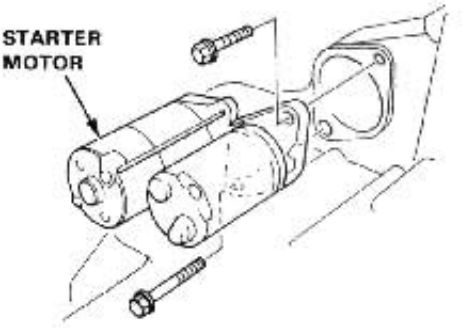
1. Disconnect the battery negative (−) and positive (+) cables from the battery.
2. Remove the 3 mount bolts and loosen the 1 bolt located at the side of the battery base. Remove the intake hose band of the throttle body.
3. Remove the air cleaner case complete with the intake hose (See Section 11).
4. Disconnect the starter motor and transmission ground cables.
5. Disconnect the speedometer cable.
   NOTE: Do not disassemble speedometer gear holder.
6. Disconnect the back-up light switch connector from the engine.
7. Disconnect the clutch cable at release arm.
8. Drain transmission fluid. Use a socket wrench to remove the drain plug. Remove the oil filler plug to speed draining. Reinstall the drain plug with a new washer.



9. Disconnect the connectors and remove the mount bolts, then remove the distributor from the cylinder head.

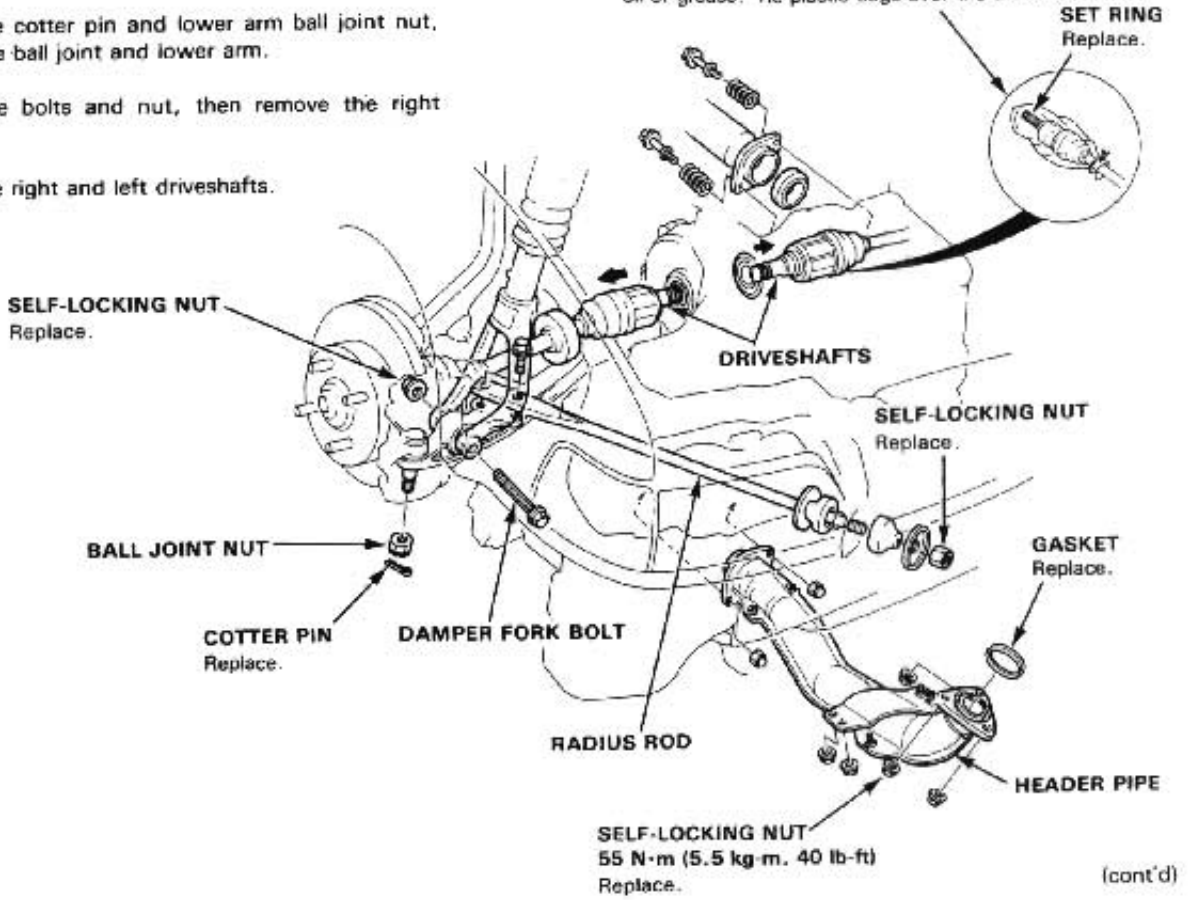


10. Remove the bolts attaching the starter motor, and remove the starter motor.



11. Remove the engine splash shield and the right wheelwell splash shield.
12. Remove the header pipe.
13. Remove the cotter pin and lower arm ball joint nut, separate the ball joint and lower arm.
14. Remove the bolts and nut, then remove the right radius rod.
15. Remove the right and left driveshafts.

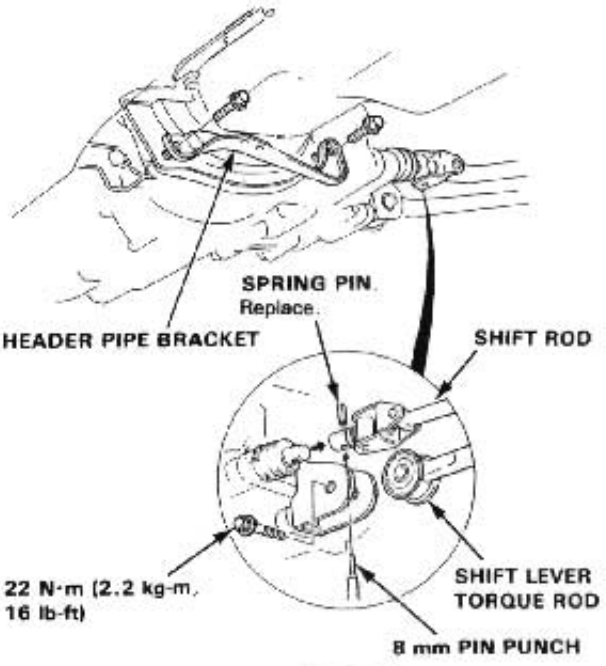
NOTE: Coat all precision finished surfaces with clean engine oil or grease. Tie plastic bags over the driveshaft ends.

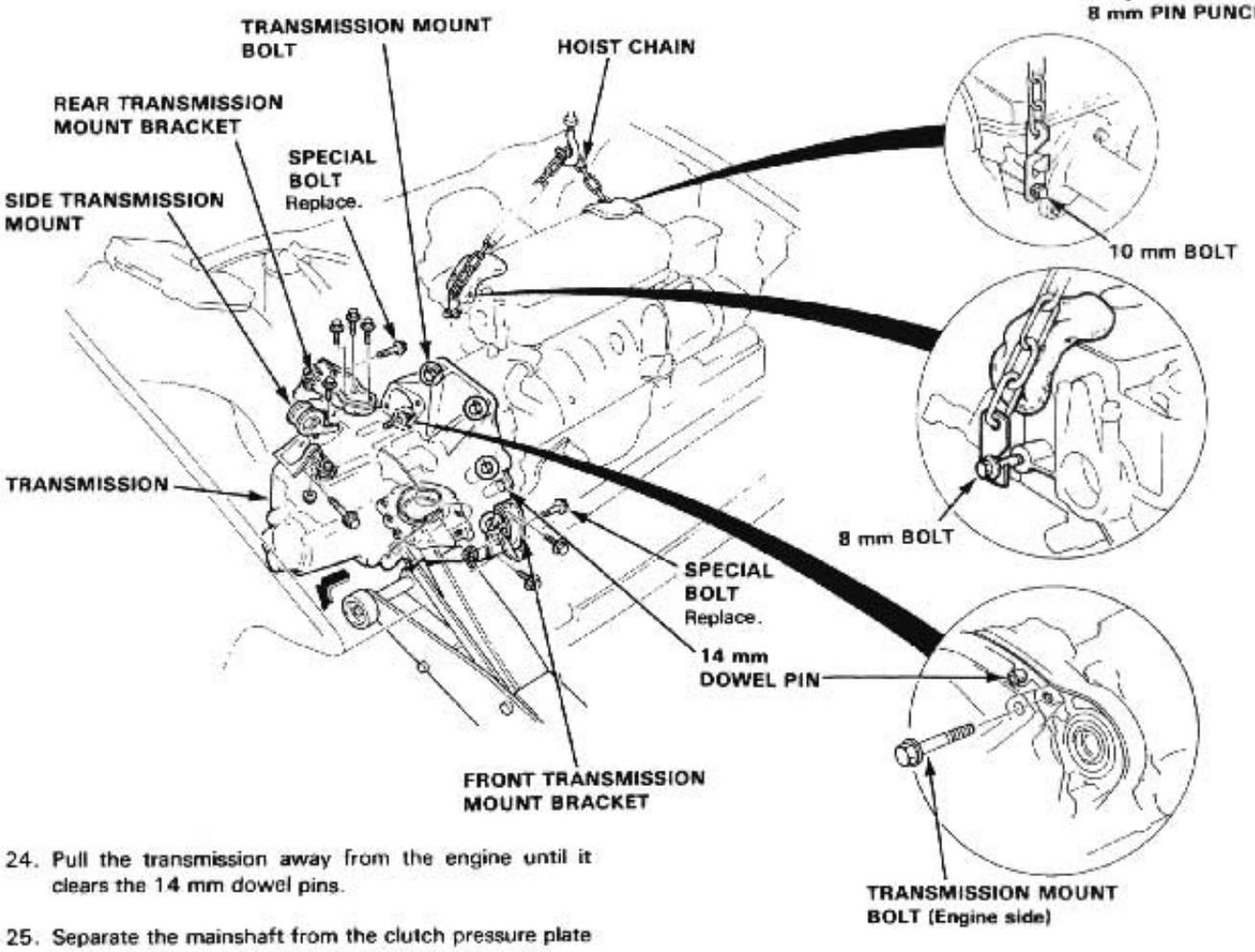


(cont'd)

Removal (cont'd)

16. Remove the header pipe bracket.
17. Remove the shift lever torque rod and shift rod from clutch housing.
18. Install the bolt at the cylinder head and attach a hoist chain to the bolt and the other end to the engine hanger plate, then lift the engine slightly to unload the mounts.
19. Place a jack under the transmission and raise the transmission just enough to take the weight off the mounts.
20. Remove the bolts from the front transmission mount.
21. Remove the rear transmission mount bracket by removing the 4 mounting bolts.
22. Remove the bolts and nut, then remove the side transmission mount.
23. Remove the 5 transmission mount bolts.



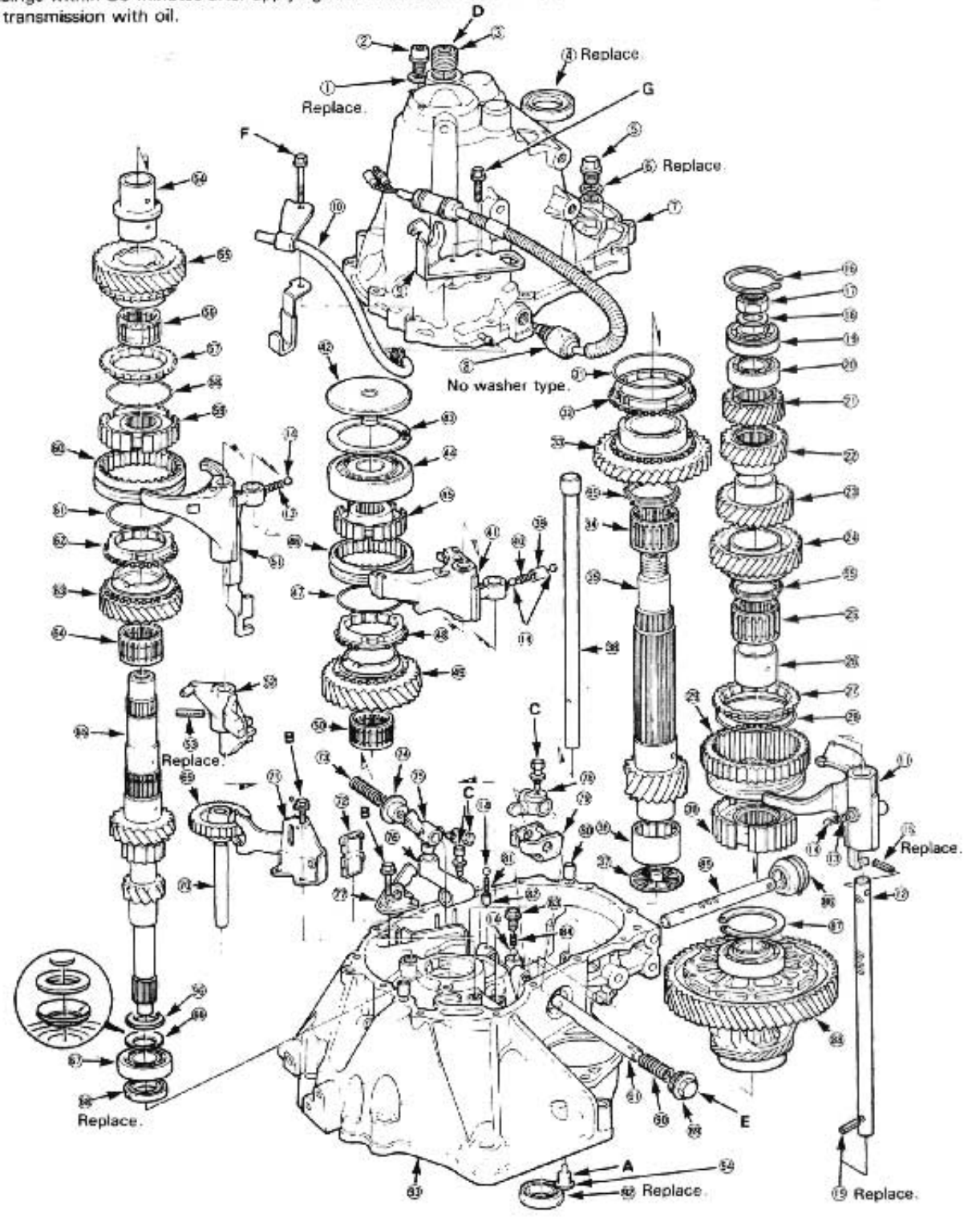


24. Pull the transmission away from the engine until it clears the 14 mm dowel pins.
25. Separate the mainshaft from the clutch pressure plate and remove the transmission by lowering the jack.

Refer to the drawing below for the transmission disassembly/reassembly.
Clean all parts thoroughly in solvent and dry with compressed air.

Lubricate all parts with oil before reassembly.

NOTE: This transmission uses no gaskets between the major housings; use P/N 08718—0001 sealant. Assemble the housings within 20 minutes after applying the sealant and allow it to cure at least 30 minutes after assembly before filling the transmission with oil.



Torque Value
A —40 N·m (4.0 kg-m, 29 lb-ft)
B —15 N·m (1.5 kg-m, 11 lb-ft)
C —29 N·m (2.9 kg-m, 21 lb-ft)
D —25 N·m (2.5 kg-m, 18 lb-ft)
E —55 N·m (5.5 kg-m, 40 lb-ft)
F —28 N·m (2.8 kg-m, 21 lb-ft)
G —26 N·m (2.6 kg-m, 19 lb-ft)

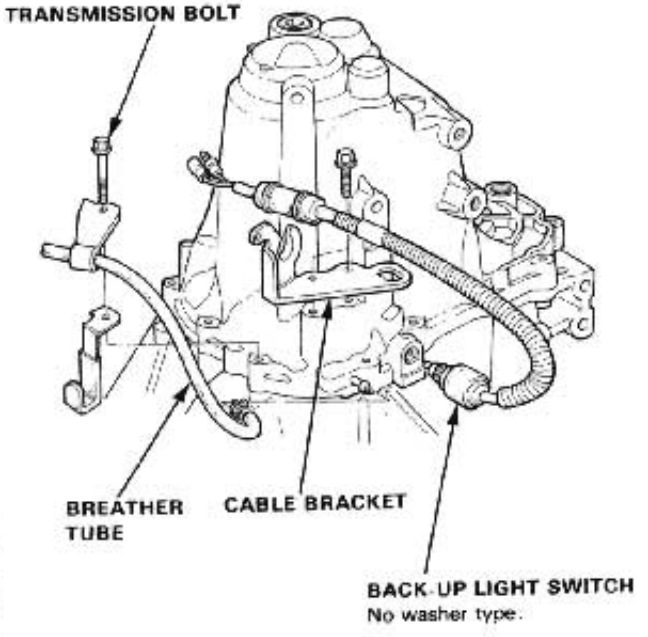
NOTE: Always clean the magnet ㉘ whenever the transmission housing is disassembled.

① **WASHER**
② **OIL DRAIN PLUG**
40 N·m (4.0 kg-m, 29 lb-ft)
③ **32 mm SEALING BOLT**
④ **OIL SEAL**
Installation, See Section 15
⑤ **OIL FILLER PLUG**
45 N·m (4.5 kg-m, 33 lb-ft)
⑥ **SEALING WASHER**
⑦ **TRANSMISSION HOUSING**
⑧ **BACK-UP LIGHT SWITCH**
25 N·m (2.5 kg-m, 18 lb-ft)
⑨ **CLUTCH CABLE BRACKET**
⑩ **BREATHER TUBE**
⑪ **1st/2nd SHIFT FORK**
⑫ **1st/2nd SHIFT FORK SHAFT**
⑬ **SHIFT FORK SPRING**
⑭ **STEEL BALL**
⑮ **SPRING PIN**
⑯ **SNAP RING**
⑰ **COUNTERSHAFT LOCKNUT**
110→0→110 N·m (11.0→0→11.0 kg-m, 80→0→80 lb-ft)
⑱ **WASHER**
⑲ **BALL BEARING**
⑳ **BALL BEARING**
㉑ **COUNTERSHAFT 5th GEAR**
㉒ **COUNTERSHAFT 4th GEAR**
㉓ **COUNTERSHAFT 3rd GEAR**
㉔ **COUNTERSHAFT 2nd GEAR**
㉕ **NEEDLE BEARING**
㉖ **DISTANCE COLLAR**
㉗ **SYNCHRO RING**
㉘ **SYNCHRO SPRING**
㉙ **REVERSE GEAR**
㉚ **SYNCHRO HUB**
㉛ **SYNCHRO SPRING**
㉜ **SYNCHRO RING**
㉝ **COUNTERSHAFT 1st GEAR**
㉞ **NEEDLE BEARING**
㉟ **COUNTERSHAFT**
Measurement, page 13-19
㊱ **NEEDLE BEARING**
㊲ **OIL GUIDE PLATE**
㊳ **5th/REVERSE SHIFT FORK SHAFT**
㊴ **ROLLER**
㊵ **5th DETENT SPRING**
㊶ **5th SHIFT FORK**
㊷ **OIL GUIDE PLATE**
㊸ **THRUST SHIM**
Selection, page 13-14
㊹ **BALL BEARING**
㊺ **SYNCHRO HUB**
㊻ **SYNCHRO SLEEVE**
㊼ **SYNCHRO SPRING**
㊽ **SYNCHRO RING**
㊾ **5th GEAR**
㊿ **NEEDLE BEARING**
(51) **3rd/4th SHIFT FORK**
(52) **SHIFT PIECE**
(53) **SPRING PIN**
(54) **SPACER COLLAR**
(55) **4th GEAR**
(56) **NEEDLE BEARING**
(57) **SYNCHRO RING**
(58) **SYNCHRO SPRING**
(59) **SYNCHRO HUB**
(60) **SYNCHRO SLEEVE**
(61) **SYNCHRO SPRING**
(62) **SYNCHRO RING**
(63) **3rd GEAR**
(64) **NEEDLE BEARING**
(65) **MAINSHAFT**
Measurement, page 13-19
(66) **SPRING WASHER**
(67) **BALL BEARING**
(68) **OIL SEAL**
Installation, page 13-14
(69) **REVERSE IDLER GEAR**
(70) **REVERSE IDLER SHAFT**
(71) **REVERSE SHIFT HOLDER**
(72) **MAGNET**
(73) **REVERSE SELECT SPRING**
(74) **REVERSE RETURN SELECT**
(75) **SHIFT ARM C**
(76) **SHIFT ARM A**
(77) **REVERSE LOCK CAM**
(78) **SHIFT ARM B**
(79) **INTERLOCK**
(80) **DOWEL PIN**
(81) **SPRING**
(82) **SPRING COLLAR**
(83) **SPRING BOLT**
(84) **SPRING**
(85) **SHIFT ROD**
(86) **BOOT**
(87) **SHIM**
Selection, See Section 15
(88) **DIFFERENTIAL ASSEMBLY**
See Section 15
(89) **28 mm PLUG**
(90) **1st/2nd SELECT SPRING**
(91) **SHIFT ARM SHAFT**
(92) **OIL SEAL**
(93) **CLUTCH HOUSING**
(94) **INTERLOCK GUIDE BOLT**
(95) **FRICTION DAMPER**
(96) **THRUST WASHER**

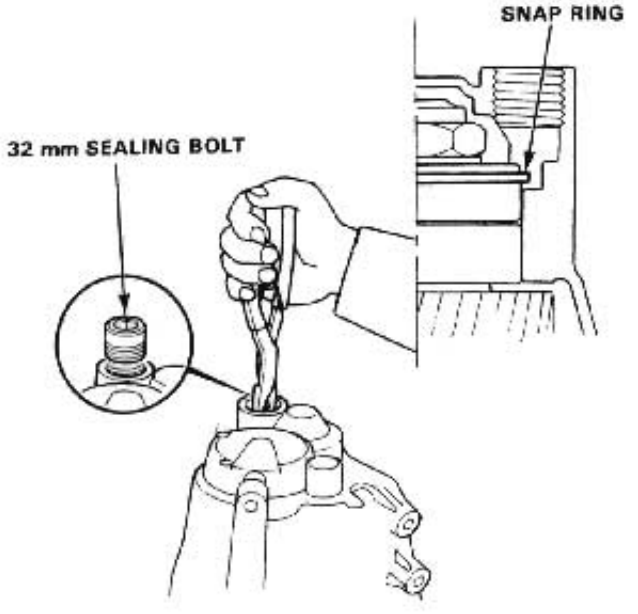
Transmission Housing

Removal

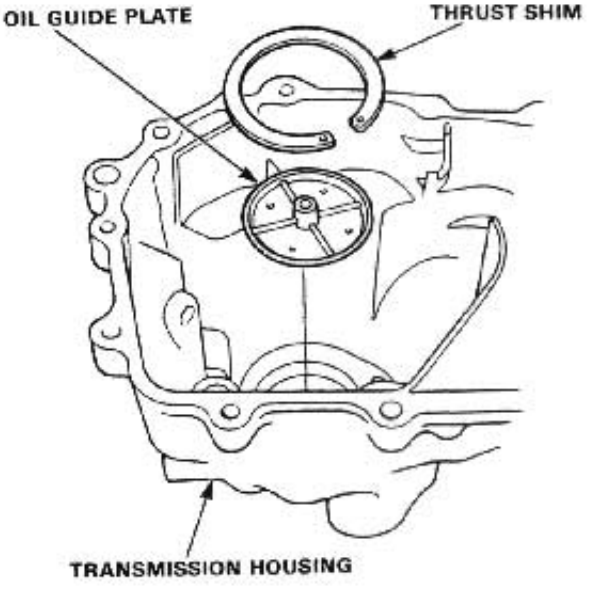
1. Remove the back-up light switch.
2. Remove the cable bracket.
3. Remove the transmission attaching bolts.
4. Disconnect the breather tube.



5. Remove the 32 mm sealing bolt.
6. Expand the snap ring on the countershaft ball bearing and remove it from the groove using snap ring pliers.



7. Separate the transmission housing from the clutch housing and remove the sealant from the mating surfaces.
8. Remove the thrust shims and oil guide plate from the transmission housing.



Reverse Shift Fork/Shift Piece

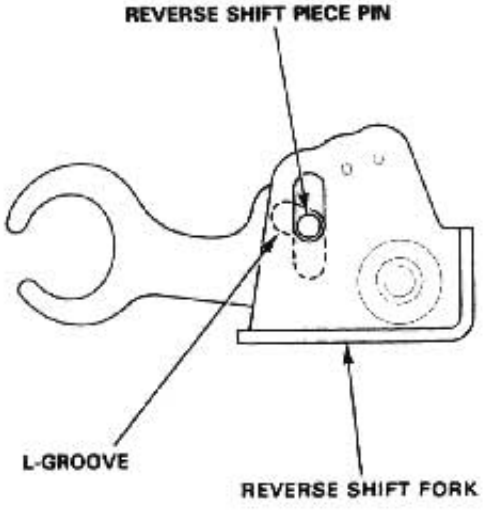
Clearance Inspection

1. Measure the clearance between the reverse shift fork and shift piece pin.

   Standard: 0.05—0.35 mm (0.002—0.014 in.)

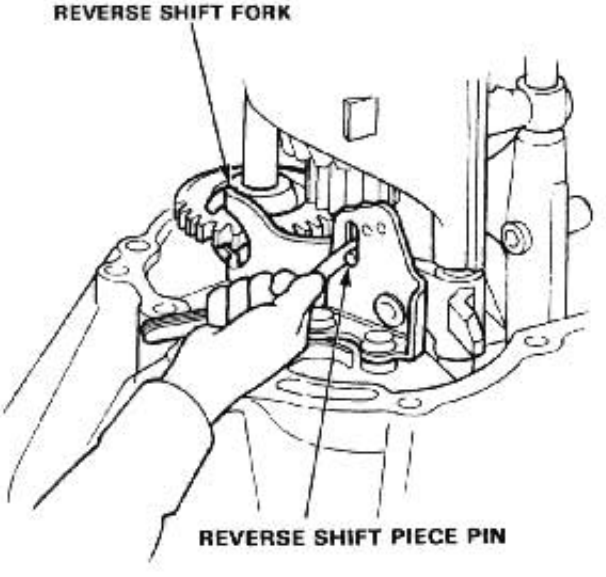
   Service Limit: 0.5 mm (0.020 in.)

2. If the clearance is outside the above limits, measure the width of the L-groove in the reverse shift fork.



   Standard: 7.05—7.25 mm (0.278—0.285 in.)

3. Replace the reverse shift fork with a new one if the width exceeds 7.25 mm (0.285 in.).



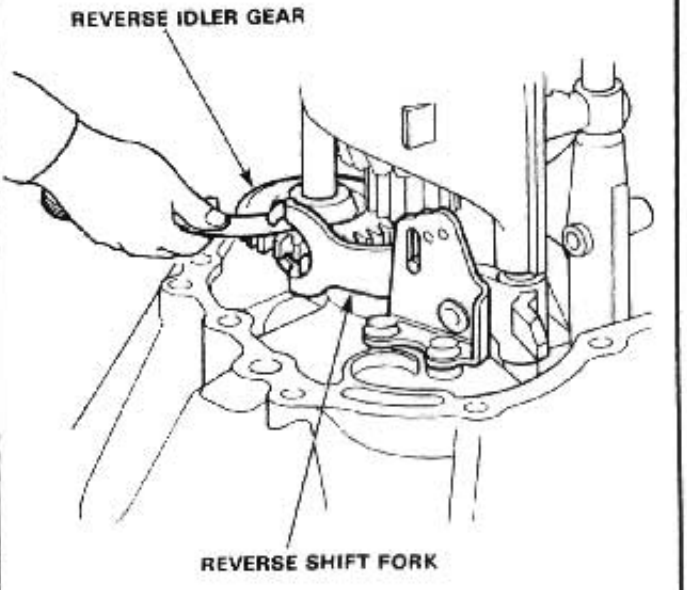
Reverse Idler Gear/ Reverse Shift Fork

Clearance Inspection

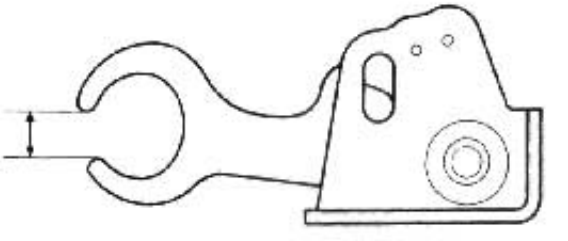
1. Measure the clearance between the reverse idler gear and reverse shift fork.

   Standard: 0.5—1.1 mm (0.020—0.043 in.)

   Service Limit: 1.8 mm (0.071 in.)



2. If the clearance exceeds 1.8 mm (0.071 in.) (service limit), measure the width of the reverse shift fork pawl groove.



   Standard: 12.7—13.0 mm (0.500—0.512 in.)

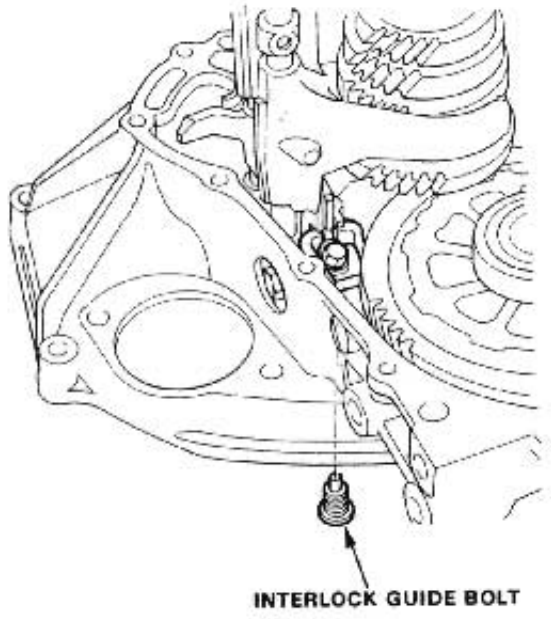
3. If the width is outside the above limits, replace the shift fork with a new one.

   NOTE: Reverse idler gear and reverse shift fork removal see page 13-8.

Mainshaft/Countershaft/Shift Fork

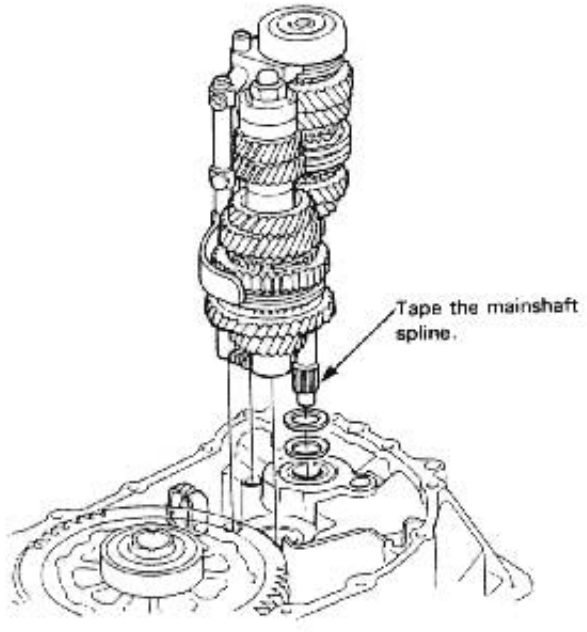
Disassembly

1. Remove the interlock guide bolt from under the clutch housing.

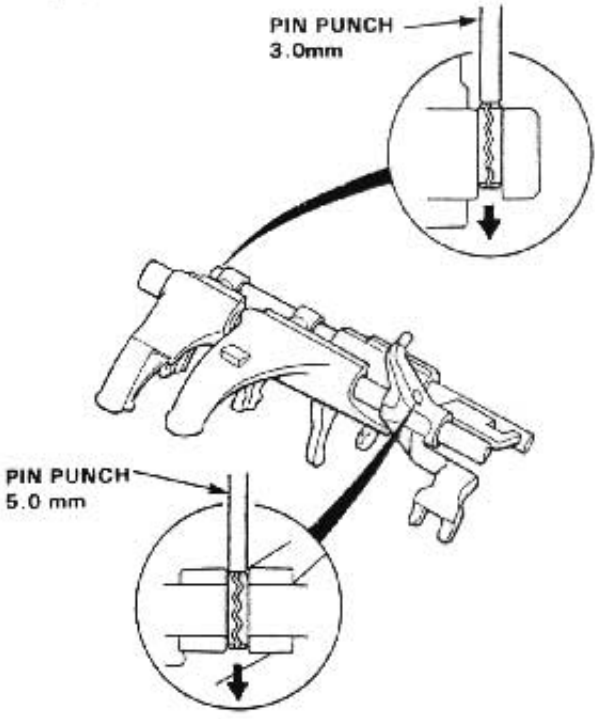


NOTE: Tape the mainshaft spline to protect it, before removing the mainshaft and countershaft assemblies.

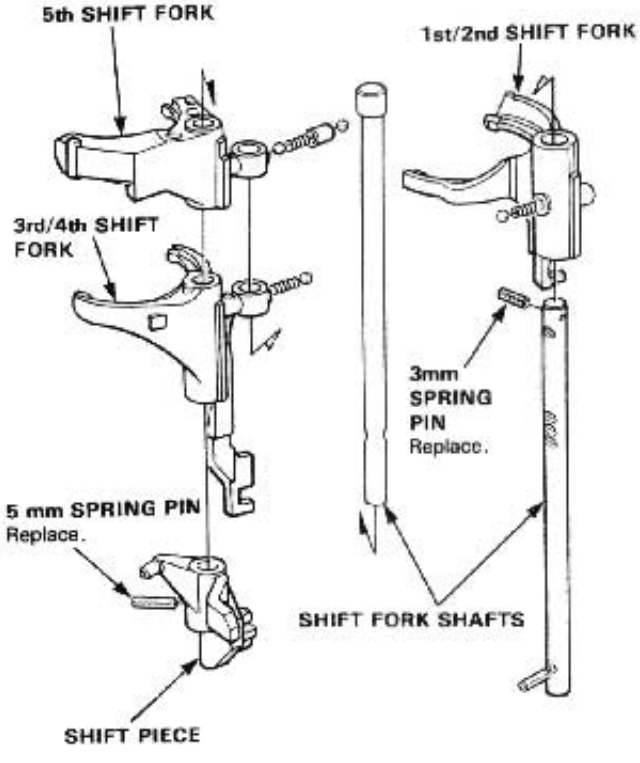
2. Remove the mainshaft assembly and countershaft assembly with the shift forks from the clutch housing.



3. Remove the shift fork shaft by removing the spring pins from the shift fork.



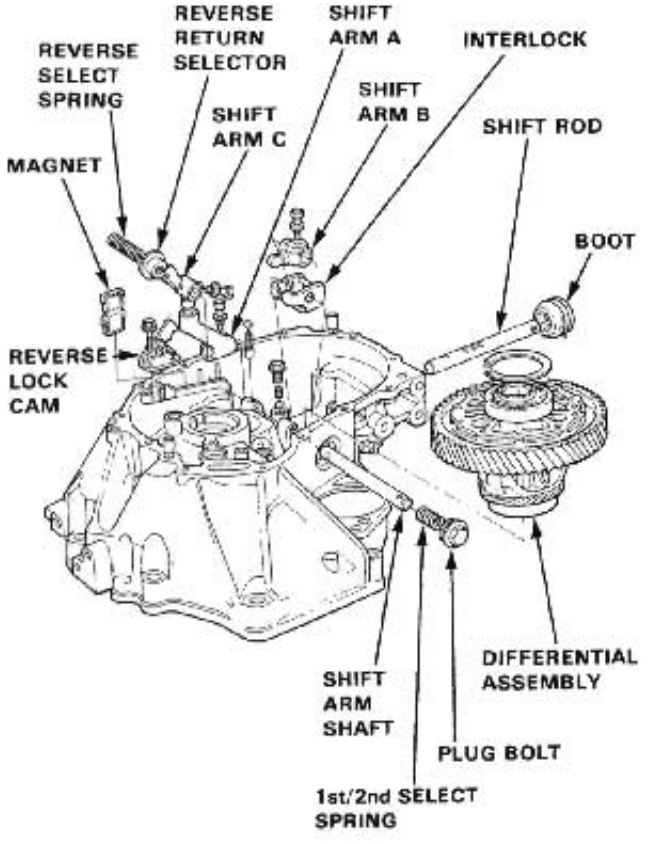
CAUTION: Do not lose the spring-loaded detent while disassembling the shift forks and shift fork shafts.



Shift Rod

Disassembly

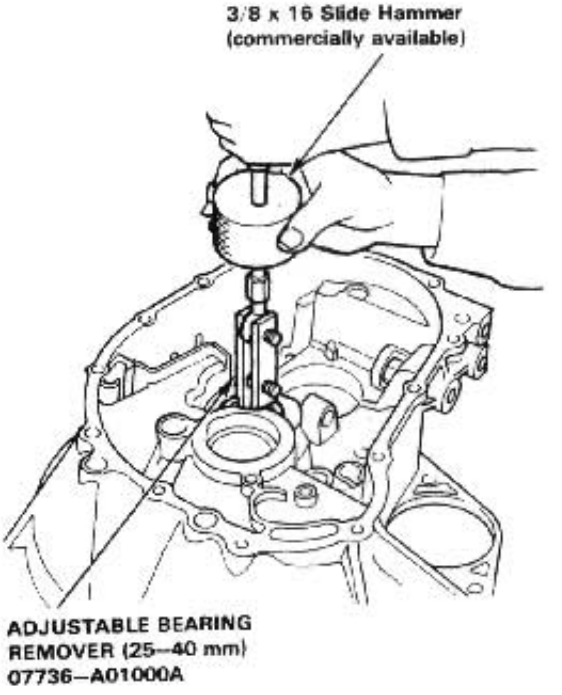
1. Remove the differential assembly.
2. Remove the plug bolt and 1st/2nd select spring.
3. Remove the shift arm B and shift arm C attaching bolts.
4. Remove the shift arm shaft, reverse select spring, reverse return selector, shift arm C, interlock, shift arm B, steel ball, spring and spring collar.
5. Remove the shift arm A attaching bolt, spring bolt, spring and steel ball.
6. Remove the shift rod and boot from the clutch housing.
7. Remove the shift arm A.



Countershaft Bearing

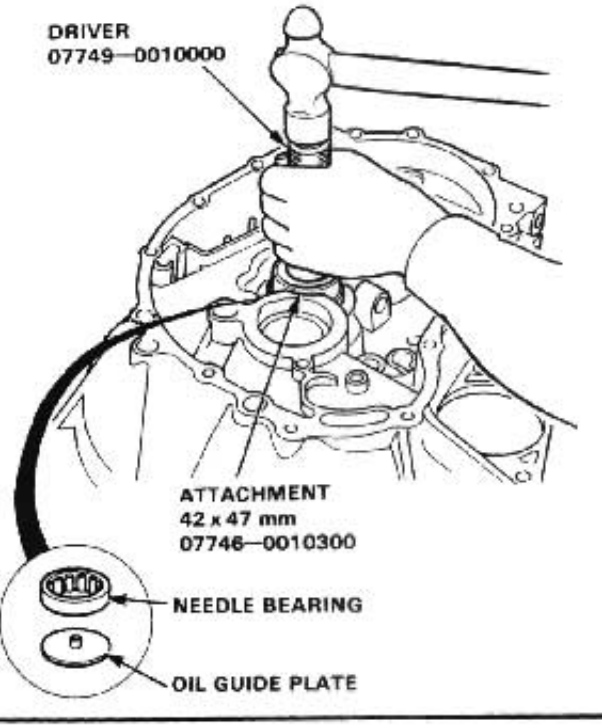
Replacement

1. Remove the needle bearing with the bearing puller.



2. Position the oil guide plate and new needle bearing in the bore of the clutch housing.
3. Drive the needle bearing in using the tools shown.

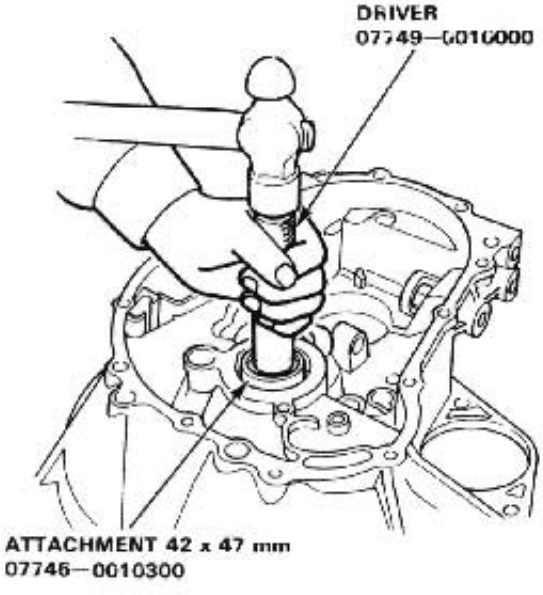
NOTE: Position the needle bearing with the oil hole facing up.



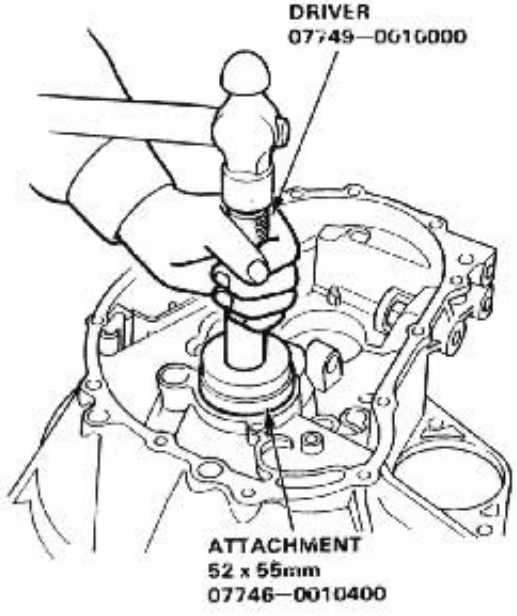
Mainshaft Bearing

Replacement

1. Remove the oil seal and bearing from the clutch housing.
2. Drive in a new oil seal from the transmission side of the clutch housing.



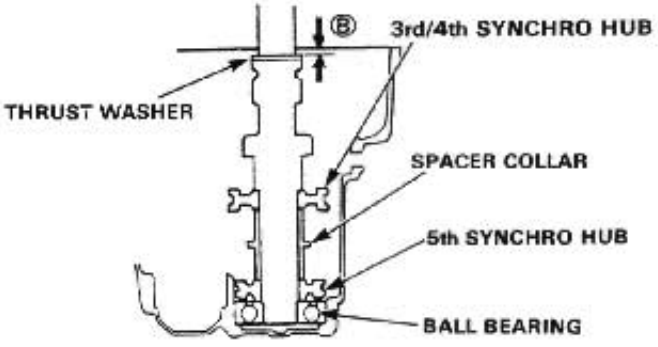
3. Drive in new bearing from the transmission side of the clutch housing.



Mainshaft Thrust Shim

Adjustment

1. Remove the thrust shim and oil guide plate from the transmission housing (page 13-10).
2. Install the 3rd/4th synchro hub, spacer collar, 5th synchro hub, ball bearing and thrust washer on the mainshaft. Install the assembly in the transmission housing.

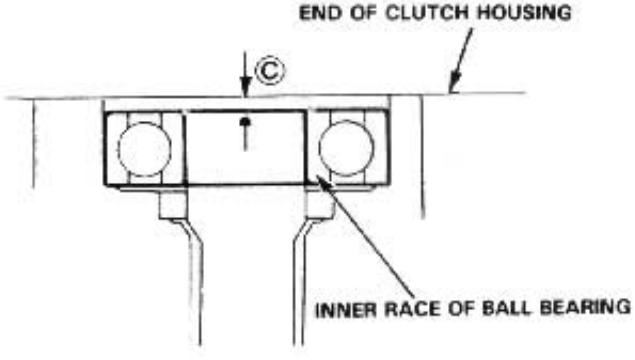


3. Measure the distance Ⓑ between the end of the transmission housing and thrust washer.

NOTE:
- Use a straight edge and feeler gauge.
- Measure at three locations and average the readings.

4. Measure the distance Ⓒ between the surfaces of the clutch housing and bearing inner race.

NOTE:
- Use a straight edge and feeler gauge.
- Measure at three locations and average the readings.



5. Select the proper shim (or shim pair) on the basis of the following calculations:

NOTE: Do not use more than two shims.

(Basic Formula)
Ⓑ + Ⓒ − 1.06 = shim thickness (MAX.)
Ⓑ + Ⓒ − 1.13 = shim thickness (MIN.)

65 mm Thrust Shim:

	PART NUMBER	THICKNESS
A	23931—PL3—A10	0.60 mm (0.0236 in)
B	23932—PL3—A10	0.63 mm (0.0248 in)
C	23933—PL3—A10	0.66 mm (0.0260 in)
D	23934—PL3—A10	0.69 mm (0.0272 in)
E	23935—PL3—A10	0.72 mm (0.0283 in)
F	23936—PL3—A10	0.75 mm (0.0295 in)
G	23937—PL3—A10	0.78 mm (0.0307 in)
H	23938—PL3—A10	0.81 mm (0.0319 in)
I	23939—PL3—A10	0.84 mm (0.0331 in)
J	23940—PL3—A10	0.87 mm (0.0343 in)
K	23941—PL3—A10	0.90 mm (0.0354 in)
L	23942—PL3—A10	0.93 mm (0.0366 in)
M	23943—PL3—A10	0.96 mm (0.0378 in)
N	23944—PL3—A10	0.99 mm (0.0390 in)
O	23945—PL3—A10	1.02 mm (0.0402 in)
P	23946—PL3—A10	1.05 mm (0.0413 in)
Q	23947—PL3—A10	1.08 mm (0.0425 in)
R	23948—PL3—A10	1.11 mm (0.0437 in)
S	23949—PL3—A10	1.14 mm (0.0449 in)
T	23950—PL3—A10	1.17 mm (0.0461 in)
U	23951—PL3—A10	1.20 mm (0.0472 in)
V	23952—PL3—A10	1.23 mm (0.0484 in)
W	23953—PL3—A10	1.26 mm (0.0496 in)
X	23954—PL3—A10	1.29 mm (0.0508 in)
Y	23955—PL3—A10	1.32 mm (0.0520 in)
Z	23956—PL3—A10	1.35 mm (0.0531 in)
AA	23957—PL3—A10	1.38 mm (0.0543 in)
AB	23958—PL3—A10	1.41 mm (0.0555 in)
AC	23959—PL3—A10	1.44 mm (0.0567 in)
AD	23960—PL3—A10	1.47 mm (0.0579 in)
AE	23961—PL3—A10	1.50 mm (0.0591 in)
AF	23962—PL3—A10	1.53 mm (0.0602 in)
AG	23963—PL3—A10	1.56 mm (0.0614 in)
AH	23964—PL3—A10	1.59 mm (0.0626 in)
AI	23965—PL3—A10	1.62 mm (0.0638 in)
AJ	23966—PL3—A10	1.65 mm (0.0650 in)
AK	23967—PL3—A10	1.68 mm (0.0661 in)
AL	23968—PL3—A10	1.71 mm (0.0673 in)
AM	23969—PL3—A10	1.74 mm (0.0685 in)
AN	23970—PL3—A10	1.77 mm (0.0697 in)
AO	23971—PL3—A10	1.80 mm (0.0709 in)

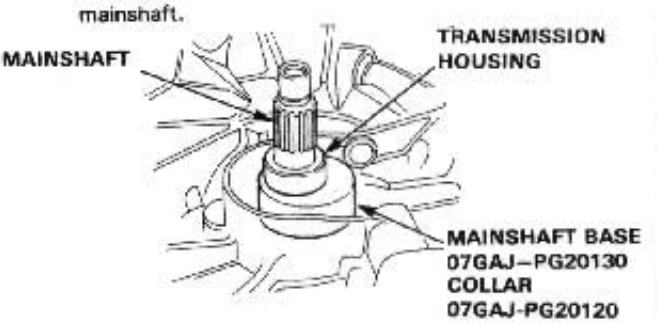
6. Check the thrust clearance in the manner described below.
   a. Install the shims selected in the transmission housing.
   b. Install the thrust washer and spring washer in the mainshaft.

   NOTE:
   - Clean the thrust washer, spring washer and shim throughly before installation.
   - Install the thrust washer, spring washer and shim properly.

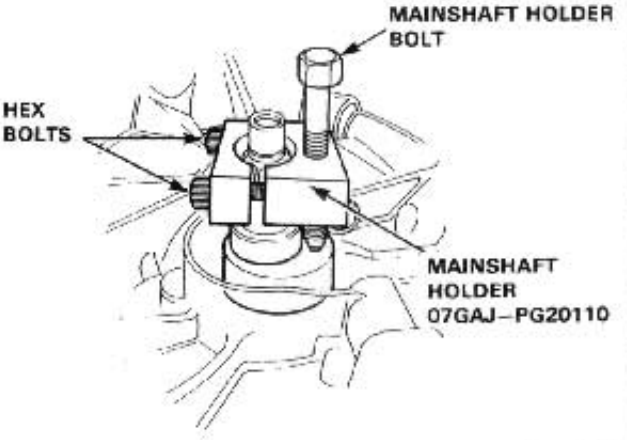
   c. Install the mainshaft in the clutch housing.
   d. Place the transmission housing over the mainshaft and onto the clutch housing.
   e. Tighten the clutch and transmission housings with several 10mm bolts.
   f. Tap the mainshaft with a plastic hammer.
7. Check the thrust clearance in the manner described below.

   CAUTION: Mesurement should be made at room temperature.

   a. Slide the mainshaft base and the collar over the mainshaft.



   b. Attach the mainshaft holder to the mainshaft as follows:
      - Back-out the mainshaft holder bolt and loosen the two hex bolts.
      - Fit the holder over the mainshaft so its lip is towards the transmission.
      - Align the mainshaft holder's lip around the groove at the inside of the mainshaft splines, then tighten the hex bolts.

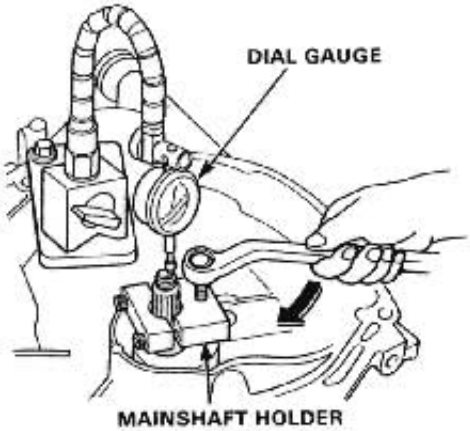


(cont'd)

Mainshaft Thrust Shim

Adjustment (cont'd)

c. Seat the mainshaft fully by tapping its end with a plastic hammer.
d. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.
e. Zero a dial gauge on the end of the mainshaft.



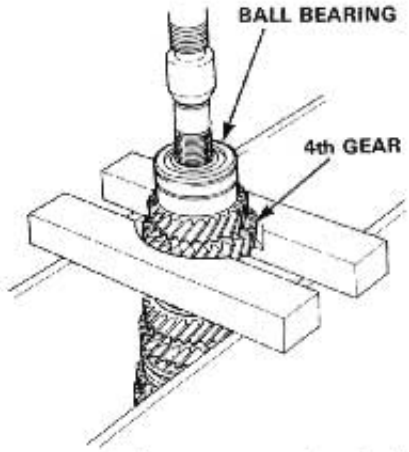
f. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft end play.
CAUTION: Turning the shaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.
g. Clearance is correct if reading is between 0.11 —0.18 mm (0.0043—0.0071 in).
If not, recheck necessary shim thickness.

Countershaft

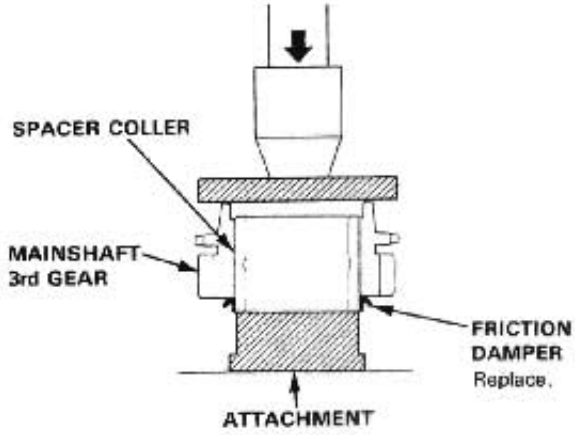
Disassembly

1. Raise the locknut tab from the groove of the shaft and remove the locknut and the spring washer.

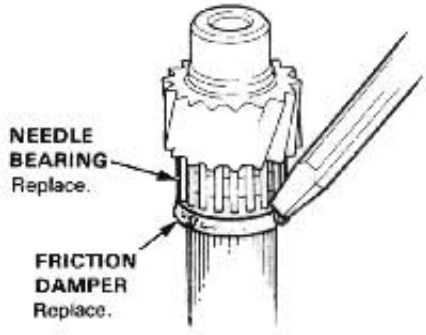
2. Support 4th gear on steel blocks as shown and press the shaft out of ball bearing.
CAUTION: Remove the ball bearing using a press and steel blocks as shown. Use of a jaw-type puller can cause damage to the gear teeth.



3. Using a press as shown, remove the friction damper (2nd gear side) from the spacer coller.

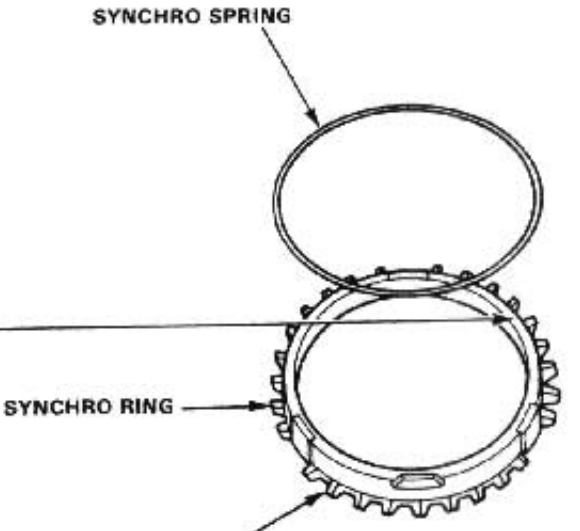


4. Remove the friction damper (1st gear side) and needle bearing from the countershaft.



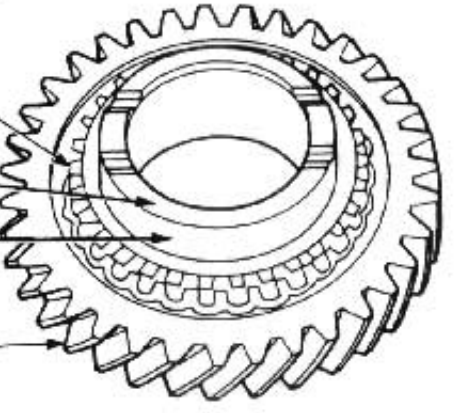
Gear and Synchro Ring

Inspection



1. Inspect the inside of synchro ring for wear.

2. Inspect the synchro ring teeth and matching teeth on gear for wear (rounded off).



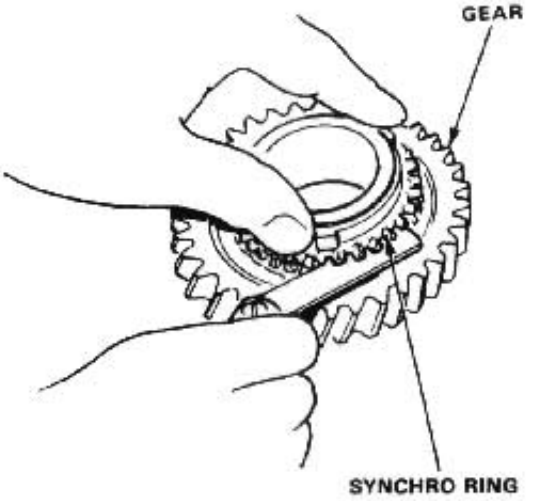
3. Inspect the gear hub thrust surface for wear.

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 or cracks.

6. Place the synchro ring on its 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 (0.0287—0.0465 in.)
Service Limit: 0.4 mm (0.016 in.)



7. Separate the synchro ring and gear, and coat them with oil.

8. Install the synchro spring on the synchro ring.

9. Put the synchro ring on its gear cone again, rotate until it stops, then set it aside for later reassembly.

Synchro Sleeves, Shift Shaft

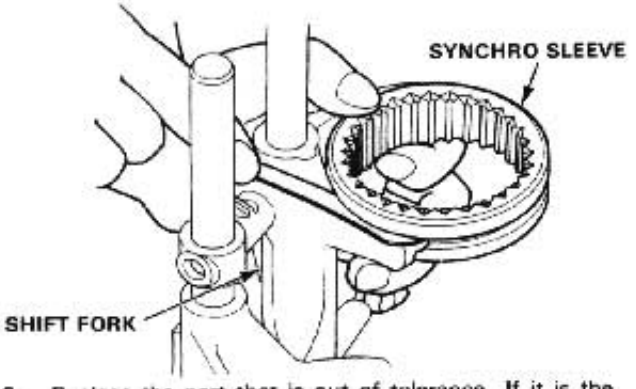
Shift Fork to Synchro Sleeve Clearance

1. Check clearance between each shift fork and its matching synchro sleeve.

   Standard: 0.25—0.45 mm (0.0098—0.0177 in.)
   Service Limit: 0.8 mm (0.0315 in.)

2. If the clearance exceeds the service limit, measure the thickness of the shift fork fingers.

   Standard: 6.4—6.5 mm (0.252—0.255 in.)



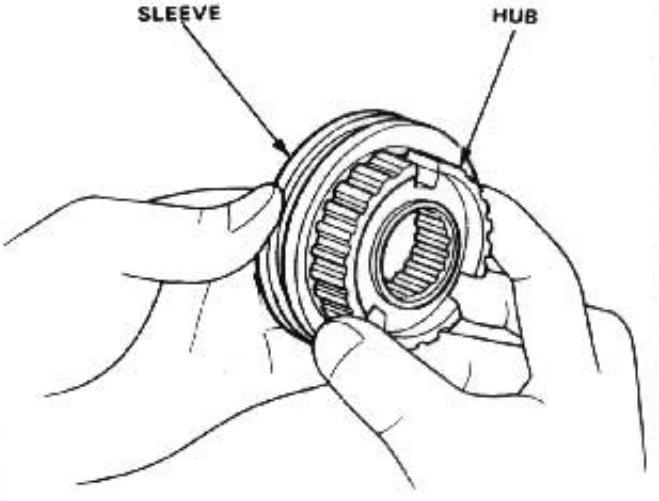
3. Replace the part that is out of tolerance. If it is the sleeve, the hub must also be replaced.

Synchro Sleeve and Hub Inspections

1. Inspect gear teeth on all synchro hubs and sleeves for rounded off corners, which indicates wear.

2. Install each hub in its mating sleeve and check for freedom of movement.

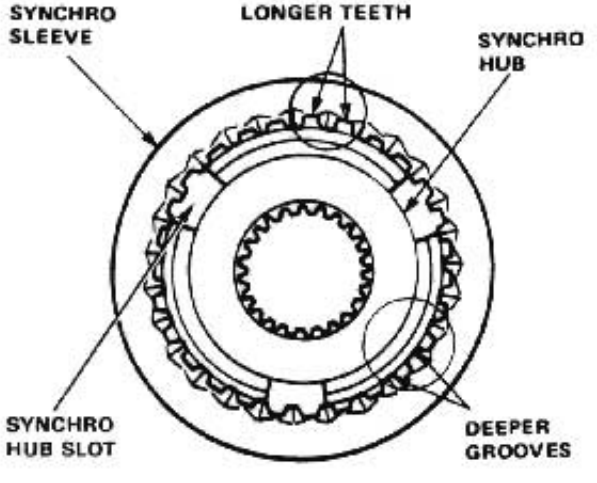
   NOTE: If replacement is required, always replace the synchro sleeve and hub as a unit.



Installing Synchro Hubs in Sleeves

Each synchro 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.

NOTE: Installing the synchro sleeve with its longer teeth in the synchro hub slots will damage the spring ring.



3rd/4th Shift Fork to Shift Arm B Clearance

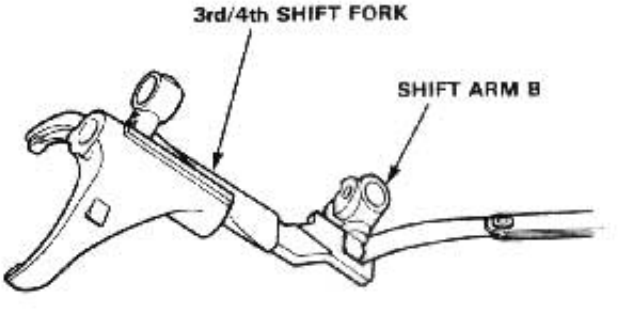
1. Measure the clearance between the 3rd/4th shift fork and shift arm B.

   Standard: 0.2—0.5 mm (0.008—0.020 in.)
   Service Limit: 0.62 mm (0.0244 in.)

2. If the clearance exceeds the service limit, measure the width of the shift arm B.

   Standard: 12.9—13.0 mm (0.508—0.512 in.)

3. Replace the shift arm B if the width is outside the standard value with a new one.

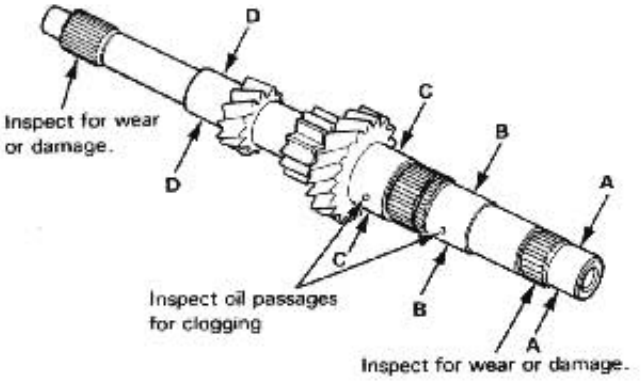


Mainshaft

Inspection

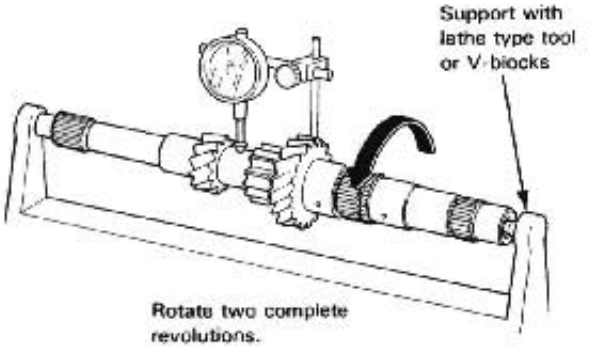
1. Measure gear and bearing O.D.s.

Standard: A: 21.987–22.000 mm (0.8656–0.8661 in.)
B: 26.980–26.993 mm (1.0622–1.0627 in.)
C: 33.984–34.000 mm (1.3380–1.3386 in.)
D: 25.977–25.990 mm (1.0227–1.0232 in.)
Service Limit: A: 21.93 mm (0.8634 in.)
B: 26.93 mm (1.0602 in.)
C: 33.93 mm (1.3358 in.)
D: 25.92 mm (1.0205 in.)



2. Inspect for runout.

Standard: 0.02 mm (0.0008 in.)
Service Limit: 0.05 mm (0.0020 in.)



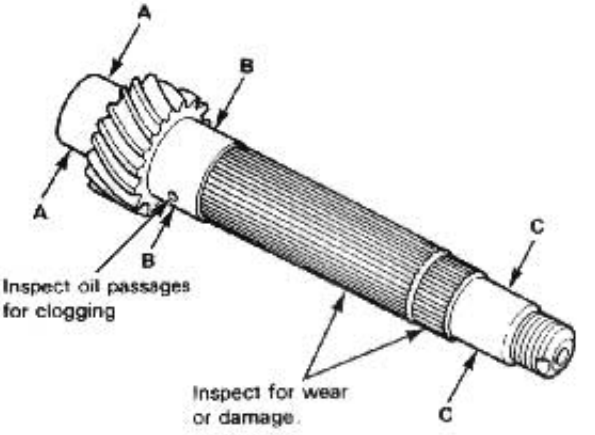
3. Replace the mainshaft if any readings are out of tolerance.

Countershaft

Inspection

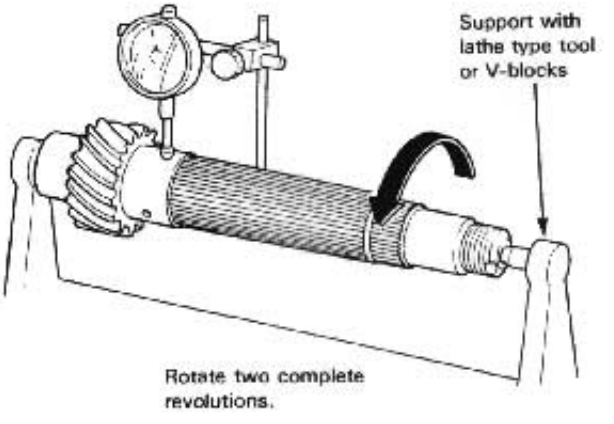
1. Measure gear and bearing O.D.s.

Standard: A: 30.000–30.015 mm (1.1811–1.1817 in.)
B: 35.984–36.000 mm (1.4167–1.4173 in.)
C: 24.980–24.993 mm (0.9835–0.9840 in.)
Service Limit: A: 29.95 mm (1.1791 in.)
B: 35.93 mm (1.4146 in.)
C: 24.93 mm (0.9815 in.)



2. Inspect for runout.

Standard: 0.02 mm (0.0008 in.)
Service Limit: 0.05 mm (0.0020 in.)



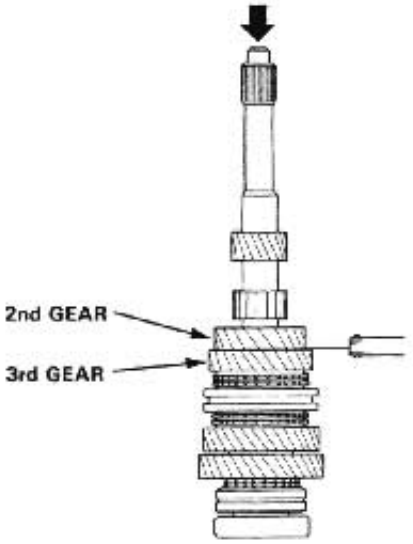
3. Replace the countershaft if any readings are out of tolerance.

Mainshaft

Clearance Inspection

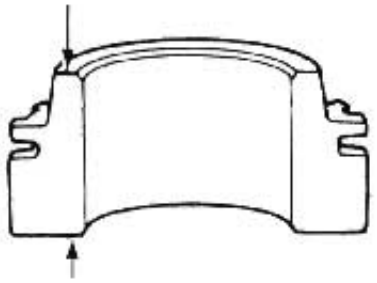
1. Assemble the bearings, synchro hub, synchro sleeve, gears, spacer collar, etc. on the mainshaft as shown below.
2. Measure the clearance: push down on the bearing race with a socket, and measure the clearance between 3rd and 2nd gears.

3rd Gear Clearance:
Standard: 0.06—0.21 mm (0.002—0.008 in.)
Service Limit: 0.33 mm (0.0129 in.)



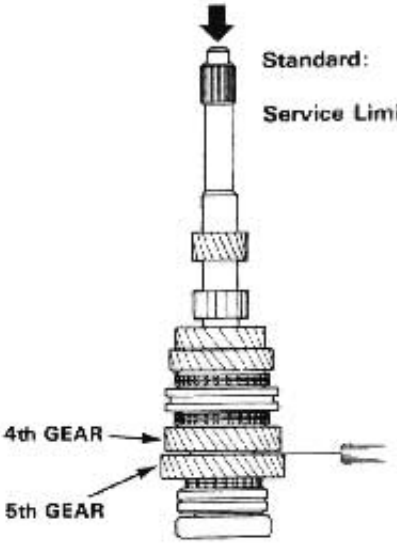
3. If the reading is outside specifications, measure the thickness of 3rd gear.

3rd Gear Thickness:
Standard: 30.22—30.27 mm (1.1898—1.1917 in.)
Service Limit: 30.15 mm (1.1870 in.)



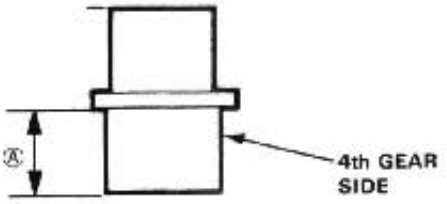
4. If the reading is within specifications, replace the third gear synchro hub.
5. If the service limit is exceeded, replace the gear.
6. Measure the clearance between 4th gear and the spacer collar.

Standard: 0.06—0.19 mm (0.002—0.007 in.)
Service Limit: 0.31 mm (0.0122 in.)



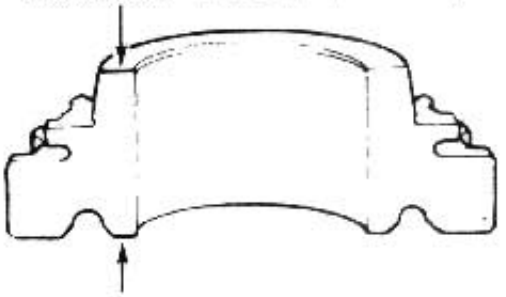
7. If the reading is out of specification measure distance Ⓐ on the spacer collar.

4th Gear Thickness:
Standard: 27.43—27.46mm (1.0799—1.0811 in)
Service Limit: 27.41 mm (1.0791 in)



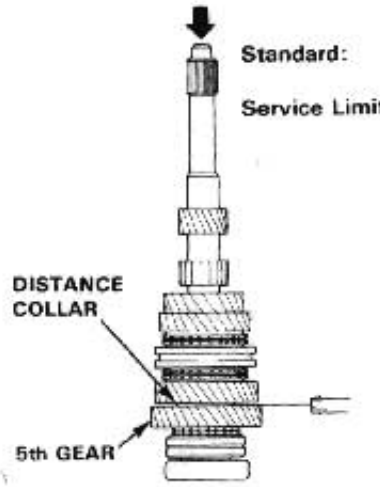
8. If distance Ⓐ is within specification, measure the thickness of 4th gear.

4th Gear Thickness:
Standard: 30.12—30.17 mm (1.1858—1.1878 in.)
Service Limit: 30.05 mm (1.1831 in.)



- Replace 4th gear if its measurement is out of specification.
- Replace 4th gear synchro hub if 4th gear is within specification.

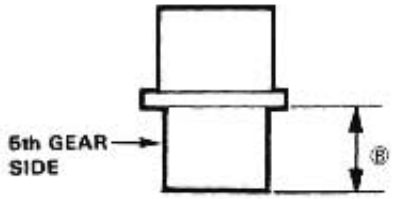
9. Measure the clearance between 5th gear and the spacer collar.



Standard: 0.06—0.19 mm (0.002—0.007 in.)
Service Limit: 0.3 mm (0.012 in.)

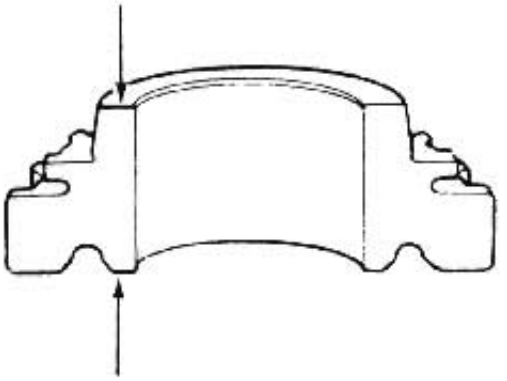
10. If the reading is out of specification measure distance Ⓑ on the spacer collar.

Standard: 23.53—23.56 mm (0.9264—0.9276 in)
Service Limit: 23.51 mm (0.9256 in)



11. If distance Ⓑ is within specification, measure the thickness of 5th gear.

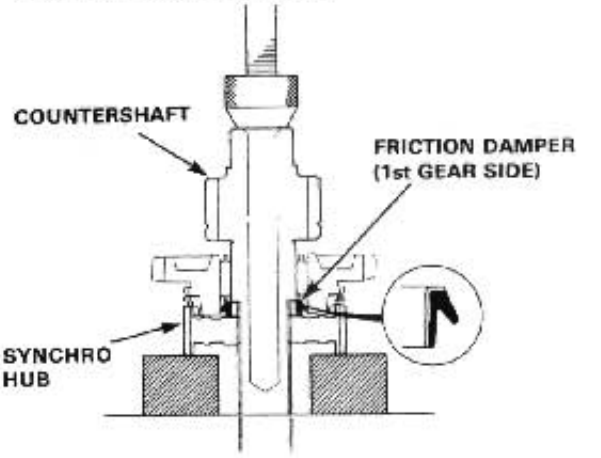
5th Gear Thickness:
Standard: 28.42—28.47 mm (1.1189—1.1209 in.)
Service Limit: 28.35 mm (1.1161 in.)



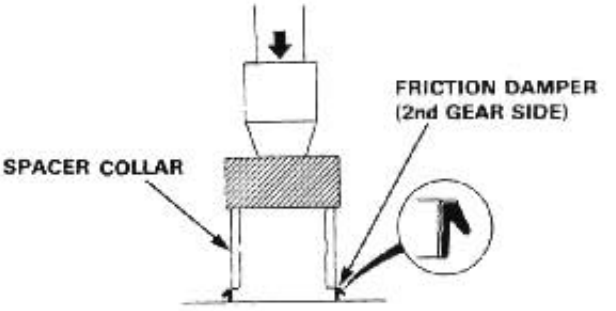
Replace 5th gear if its measurement is out of specification.
Replace 5th gear synchro hub if 5th gear is within specification.

Reassembly

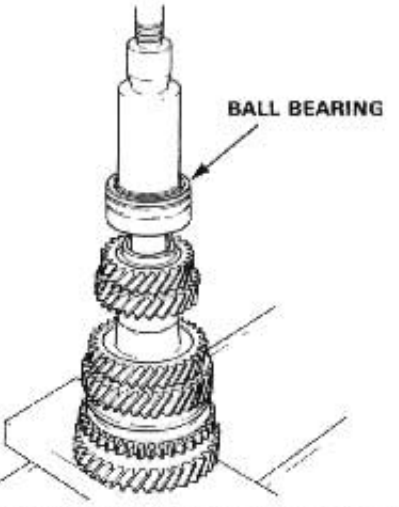
1. Using a press, install the friction damper (1st gear side) to the countershaft as shown.



2. Using a press, install the friction damper (2nd gear side) to the spacer collar.



3. Install the ball bearing using a press as shown.



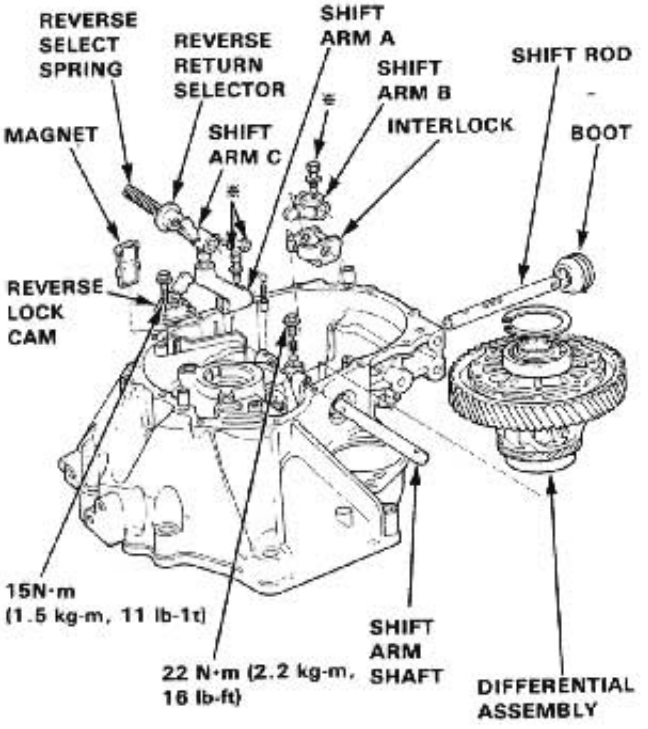
4. Install the spring washer, tighten the locknut and then stake the locknut tab into the groove.

LOCKNUT
110 → 0 → 110 N·m (11.0 → 0 → 11.0kg-m, 80 → 0 → 80 lb-ft)

Reassembly

1. Place shift arm A in the clutch housing, then push the shift rod through the shift arm.
2. Install the steel ball, spring, spring bolt and shift arm attaching bolt.
3. Install the spring collar, spring and steel ball.
4. Install shift arm B into the interlock.
5. Install the interlock assembly and shift arm C into the clutch housing. Install the shift arm shaft into the clutch housing, aligning the shift arm shaft holes and shift arm holes B and C.

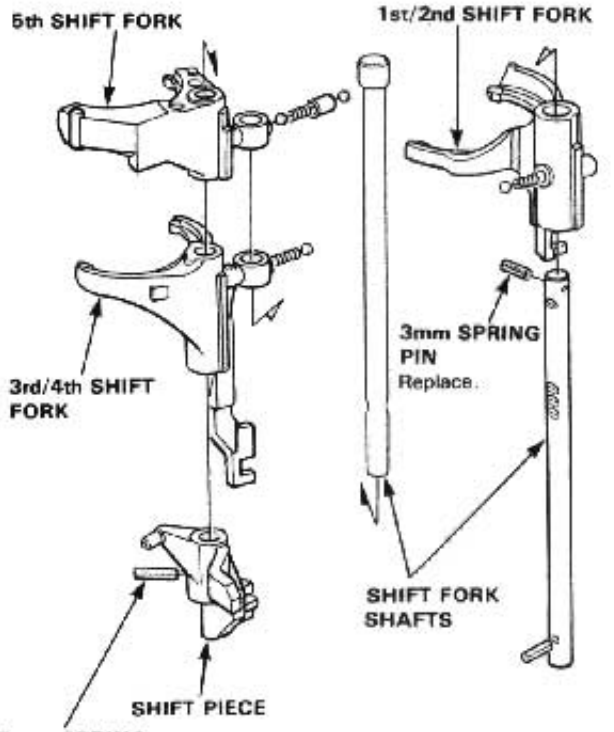
   NOTE: Do not install the 1st/2nd select spring and plug bolt yet.
6. Install the reverse lock cam and magnet.
7. Install the differential assembly.

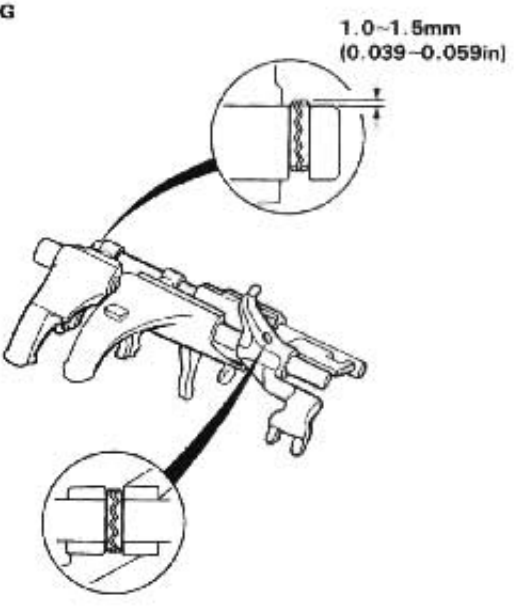


※ Torque: 29 N·m (2.9 kg-m, 21 lb-ft)

8. Insert the shift fork shaft into the shift forks and drive in the spring pins.

   NOTE: Do not lose the steel balls and spring when rsassembling.



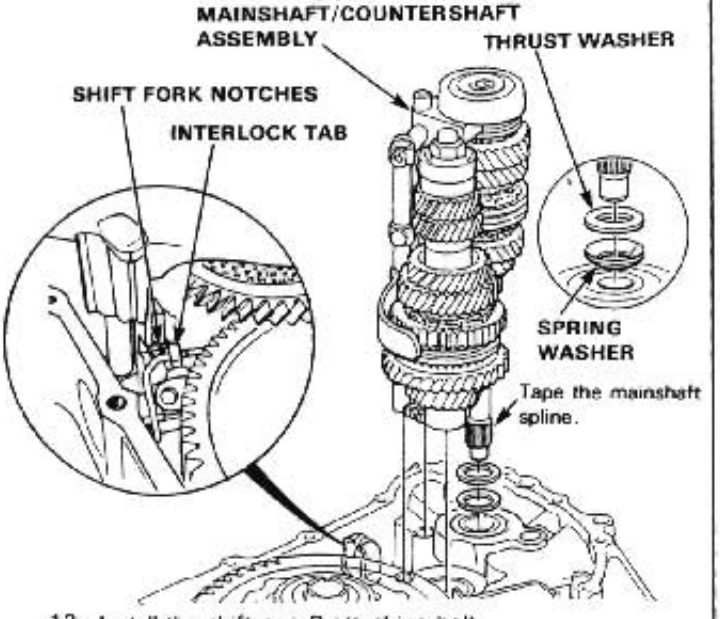


NOTE: Tape the mainshaft splines, before installation.

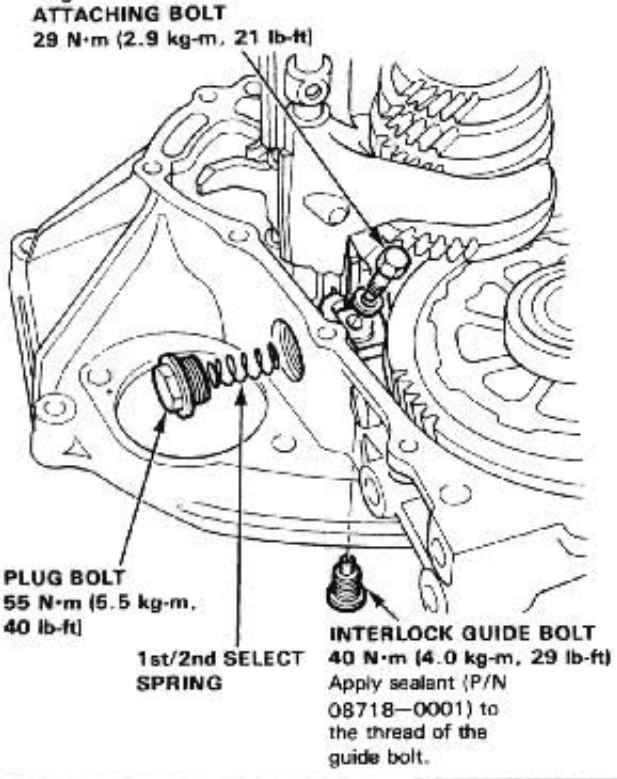
9. Install the spring washer and thrust washer with the angle against the clutch housing as shown below.
10. Insert the mainshaft and countershaft into the shift forks and install them as an assembly.

11. Evenly align the notches of the mainshaft and countershaft shift forks as shown, then install the mainshaft and countershaft into the clutch housing as an assembly.

NOTE: Fit the tab of the interlock assembly into the notches of the shift forks as you lower the mainshaft and countershaft into the clutch housing.



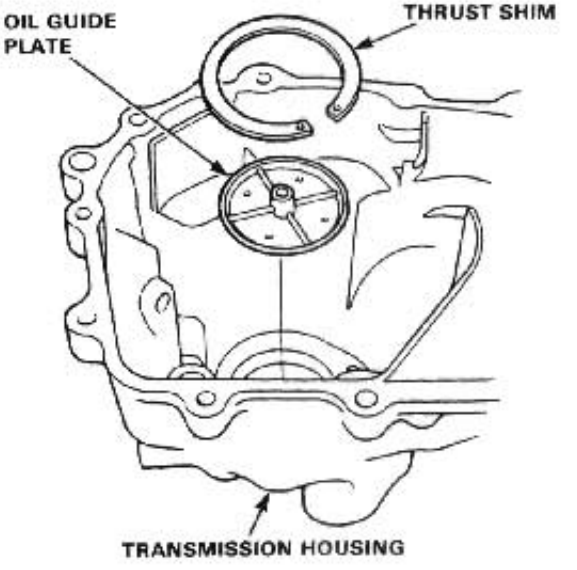
12. Install the shift arm B attaching bolt.
13. Install the 1st/2nd select spring and plug bolt.
14. Install the interlock guide bolt under the clutch housing.



15. Install the reverse idler gear and idler shaft (see page 13-8).
16. Install the reverse shift holder. (see page 13-8).

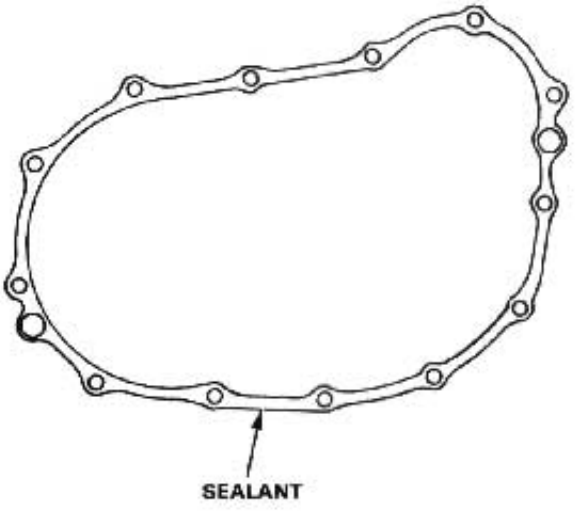
NOTE: Select the mainshaft thrust shim according to the measurements made on pages 13-14, 15.

17. Install the oil guide plate and mainshaft thrust shim into the transmission housing.



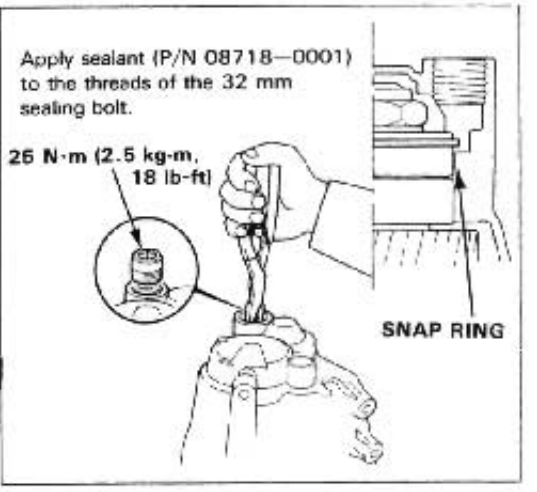
18. Apply sealant to the transmission mating surface of the clutch housing.

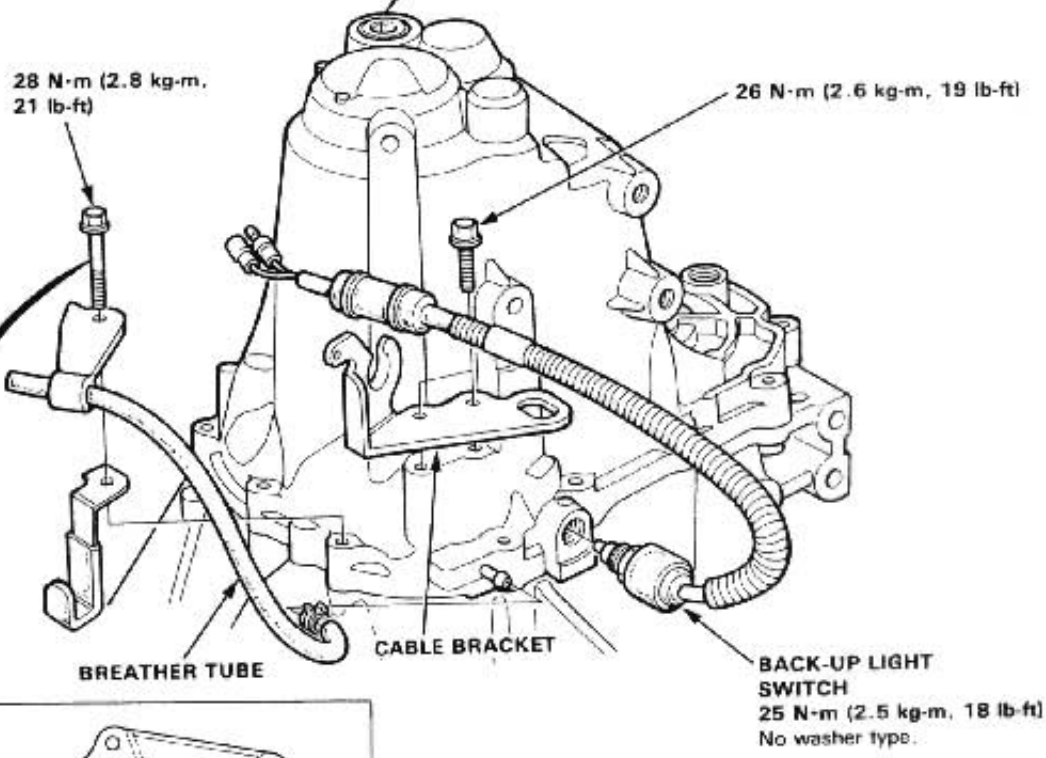
NOTE: This transmission uses no gaskets between the major housing; use Sealant, (P/N 08718—0001). Assemble the housings within 20 minutes after applying the sealant and allow it to cure for at least 30 minutes after assembly before filling it with oil.

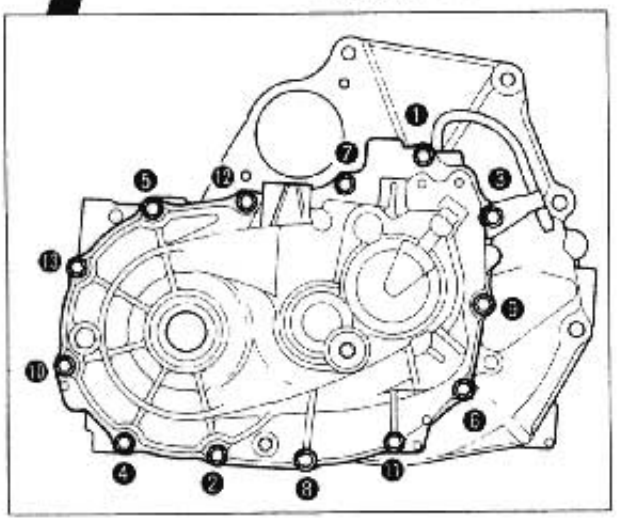


Reassembly (cont'd)

19. Install the dowel pins.
20. Place the transmission housing over the clutch housing, being careful to line up the shafts.
21. Install the snap ring to the countershaft ball bearing.
22. Install the 32 mm sealing bolt.
23. Install the transmission attaching bolts in the numbered sequence shown below.
24. Connect the breather tube.
25. Install the cable bracket.
26. Install the back-up light switch.

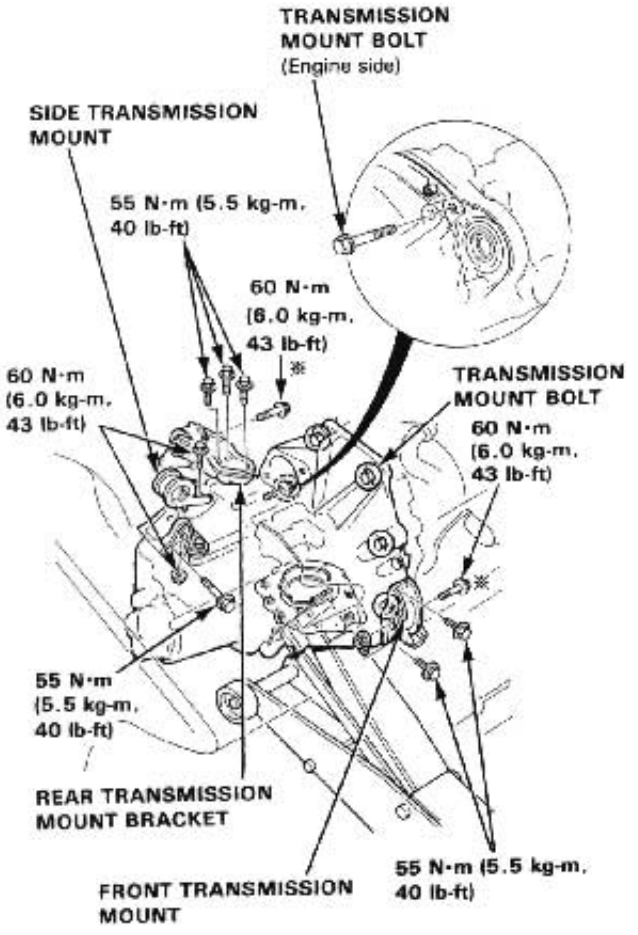






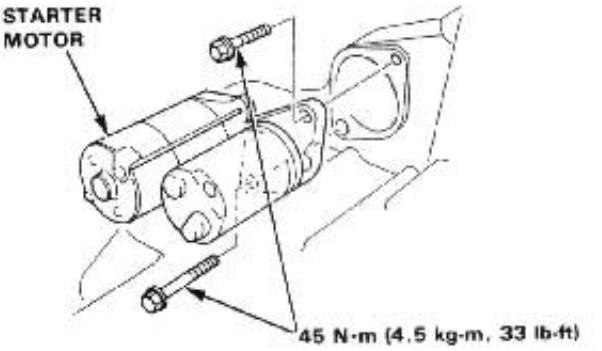
Installation

1. Place the transmission on the transmission jack, and raise to the engine level.
2. Check that the two 14 mm dowel pins are installed in the clutch housing.
3. Loosely install the transmission mount bolts, then torque in the sequence shown.
4. Secure the transmission to engine with the engine side mounting bolt (12 x 1.25 x 70 mm) and torque to 68 N·m (6.8 kg-m, 50 lb-ft).
5. Install the transmission to rear transmission mount bracket.
6. Install the transmission to front and side transmission mounts.

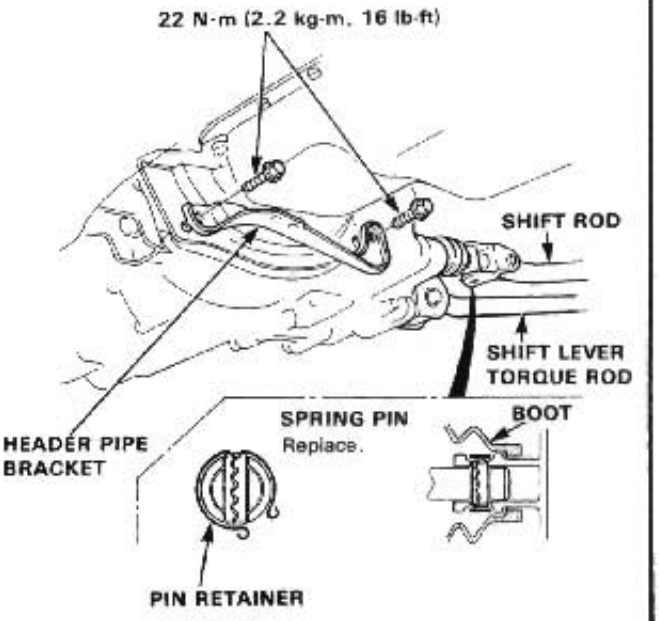


※**Special bolt: Replace.**

7. Install the starter motor.



8. Remove the transmission jack.
9. Remove the chain hoist by removing the hanger plate and 10 mm bolts.
10. Install the shift lever torque rod and shift rod.



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

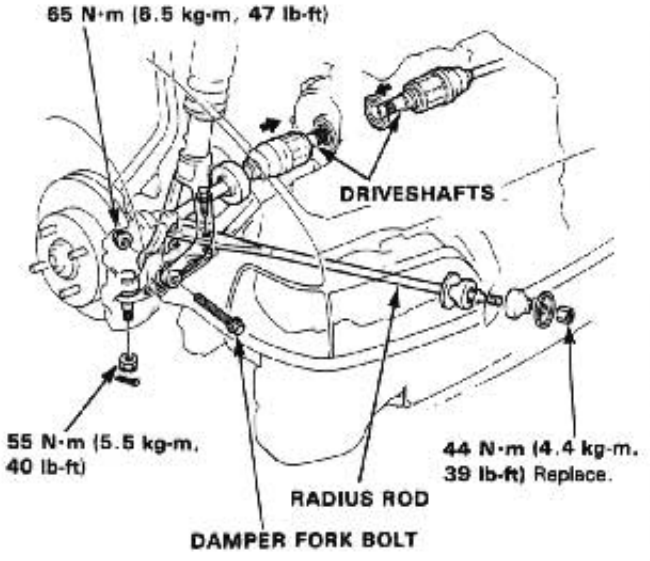
11. Install the header pipe bracket.

(cont'd)

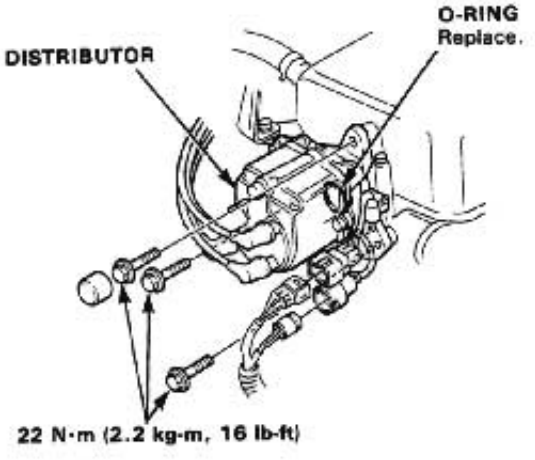
Installation (cont'd)

12. Install a new set ring on the end of each driveshaft.
13. Install the right and left driveshafts (See Section 16).

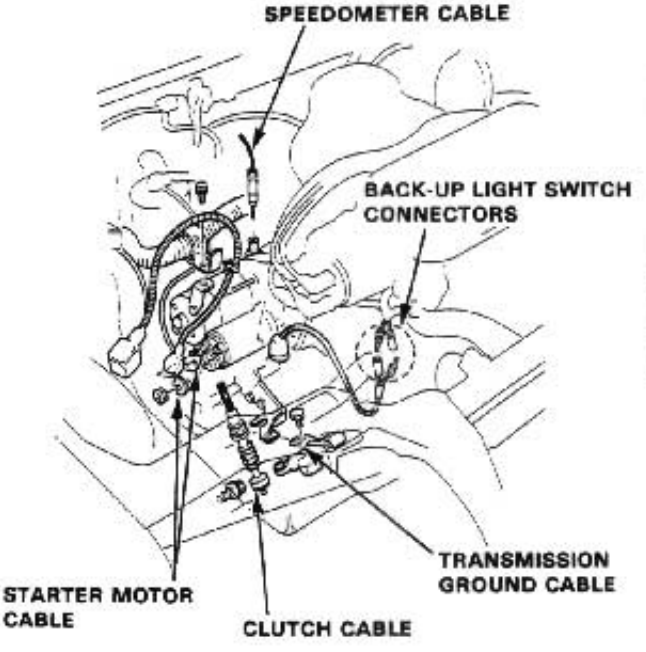
    NOTE: Turn the right steering knuckle fully outward, and slide axle into the differential until you feel its spring clip engage the side gear.



14. Install the damper fork and radius rod.
15. Install the ball joints to the lower arm.
16. Install the splash shields and exhaust header pipe.
17. Install the distributor.



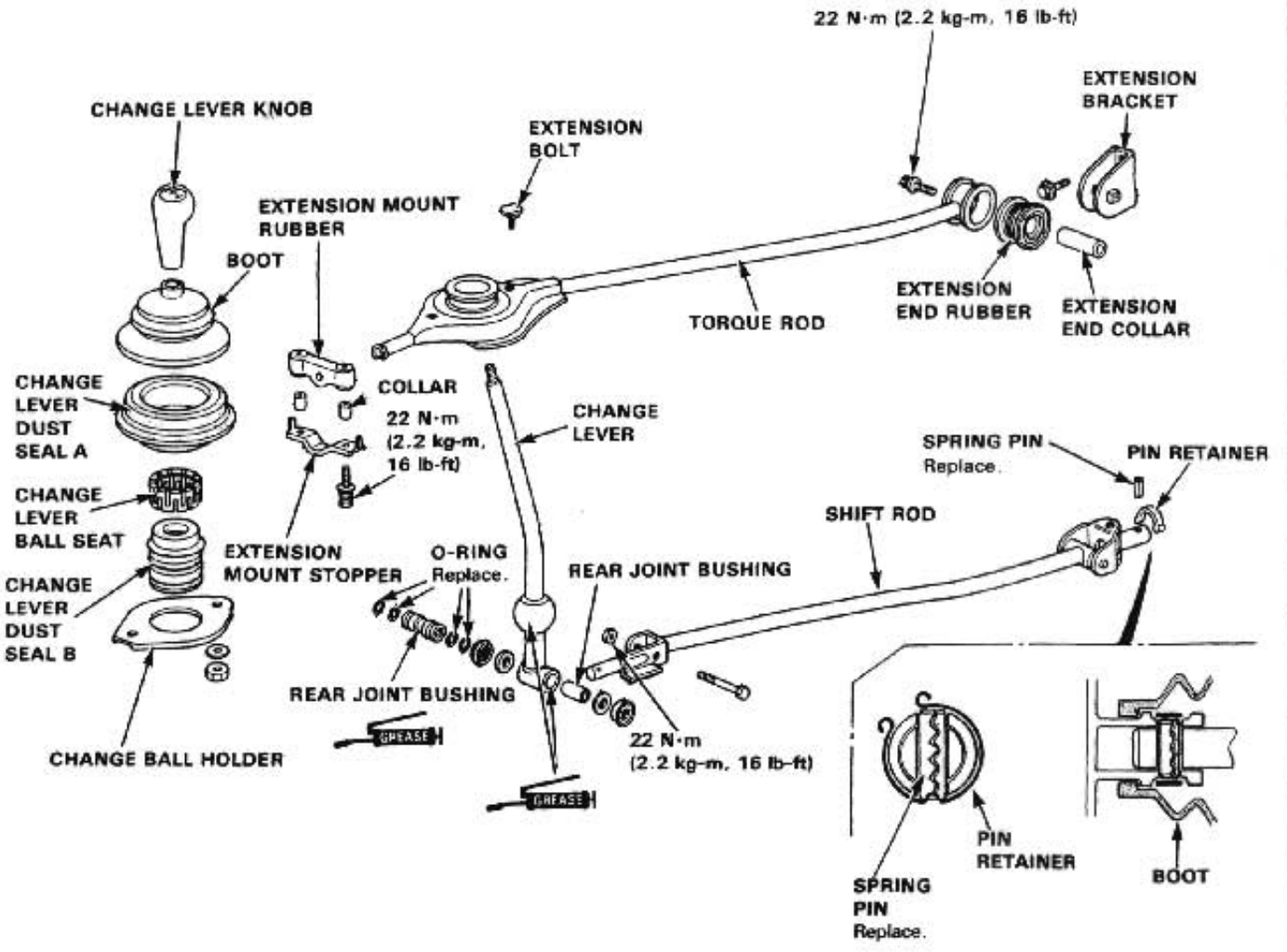
18. Connect the speedometer cable.
19. Connect the clutch cable to release arm.
20. Connect the back-up light switch connector.
21. Install the 3 bolts located at the side of the battery base, and retighten the intake hose band of the throttle body.



22. Refill the transmission with oil.
23. Connect the starter motor and transmission ground cables.
24. Connect the battery positive (+) and negative (−) cables to the battery.
25. Install the air cleaner case and intake hose.
26. Check the ignition timing (See Section 23).
27. Check the transmission for smooth operation.

Gearshift Mechanism

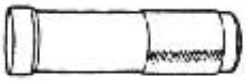
Overhaul



Manual Transmission
Differential

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07746—0030100	Driver 40 mm I.D.	1	15-4, 15-8
②	07746—0030400	Attachment 35 mm	1	15-4, 15-8
③	07749—0010000	Driver	1	15-9, 15-10
④	07947—6340500	Driver Attachment	1	15-9
⑤	07947—6110501	Oil Seal Driver Attachment	1	15-10
⑥	07947—SD90100	Oil Seal Driver Attachment	1	15-10
⑦	07JAD—PH80200	Pilot Driver 26 x 30 mm	1	15-10



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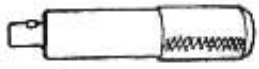

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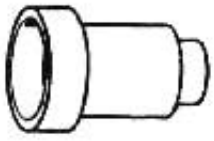


④

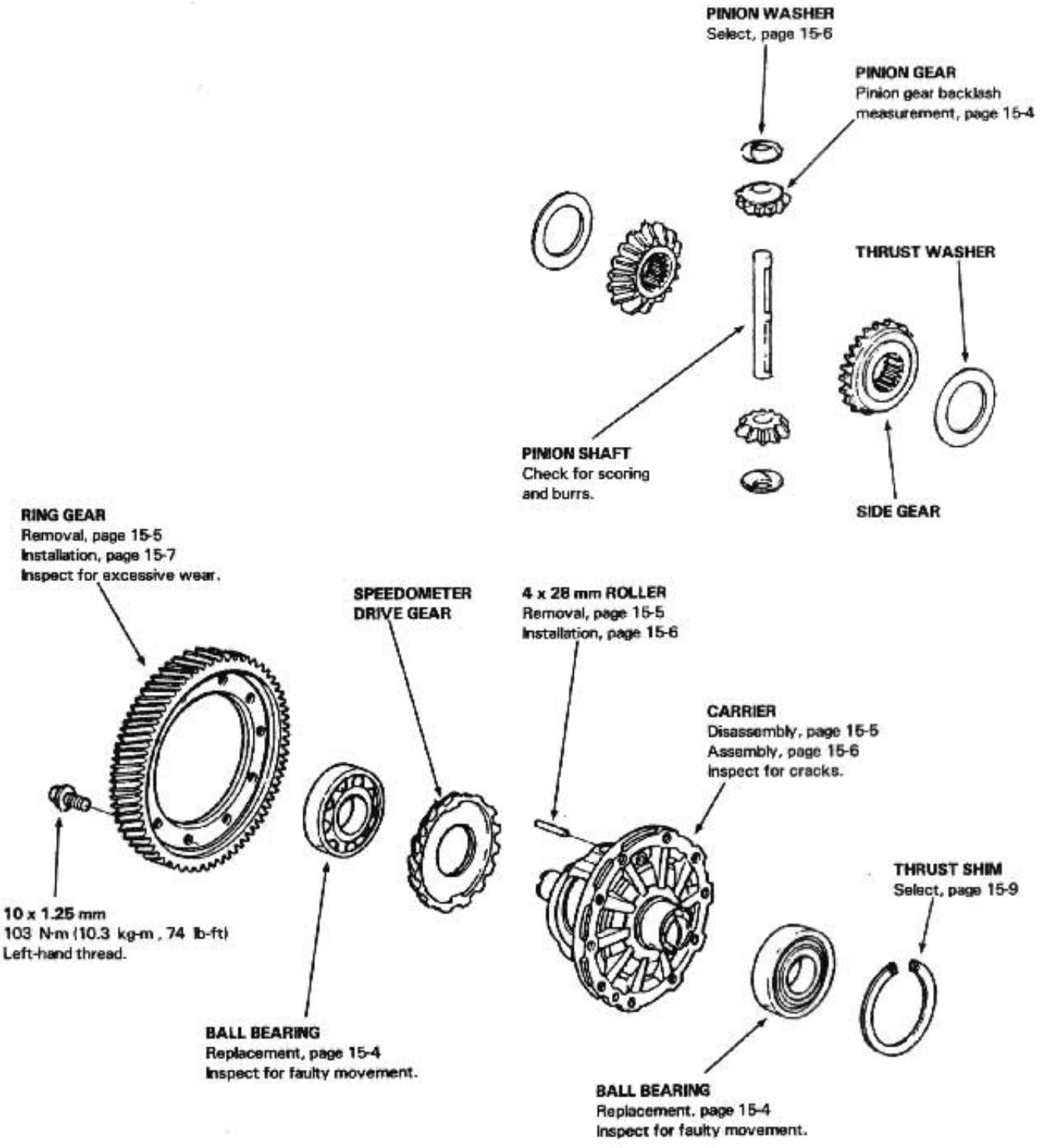
⑤

⑥

⑦

Differential

Illustrated Index

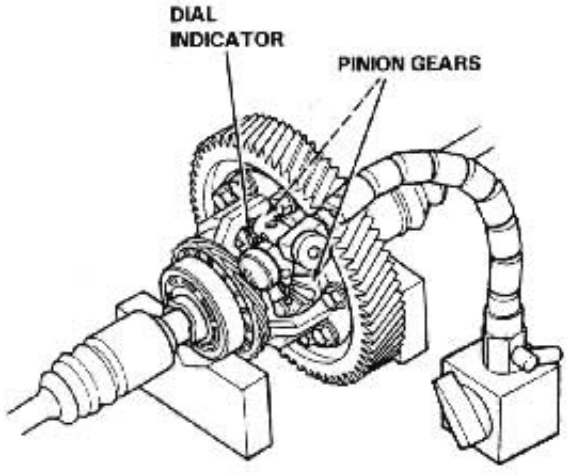


Differential

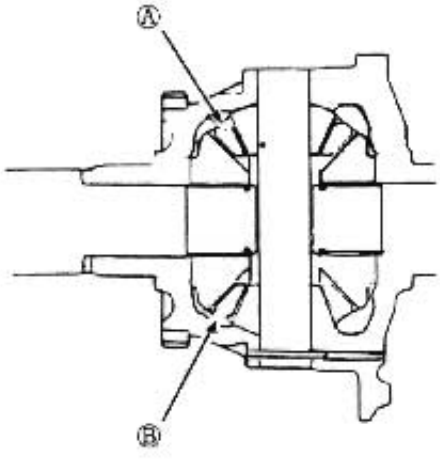
Backlash Inspection

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)



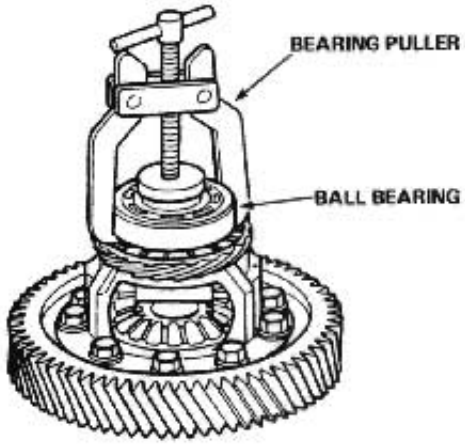
3. If out of tolerance, disassemble differential and select new thrust washers as shown on page 15-6.
4. Measure clearances in the A and B position of the drive pinion.



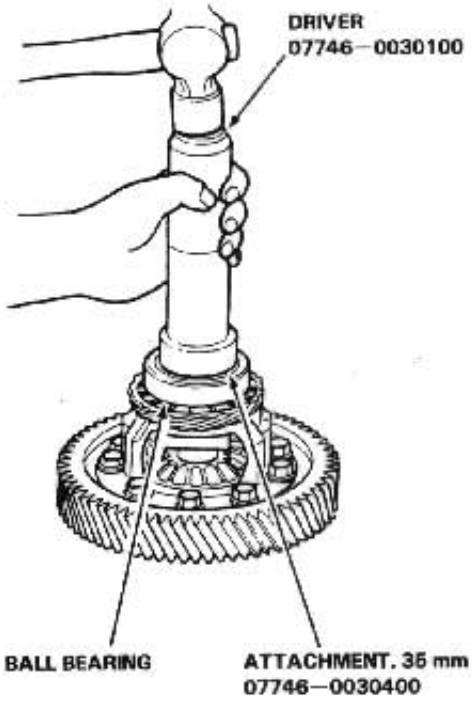
Bearing Replacement

NOTE:
Check bearings for wear and rough rotation. If bearings are OK, removal is not necessary.

1. Remove bearings using a standard bearing puller.



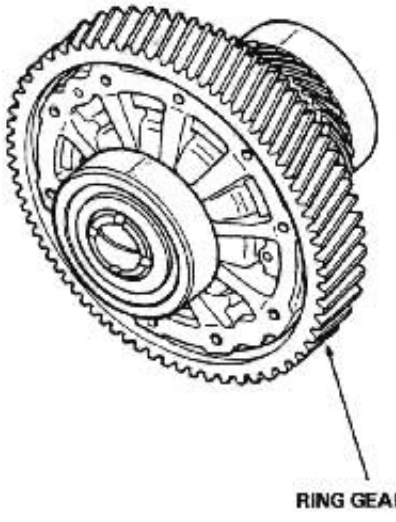
2. Install new bearings.



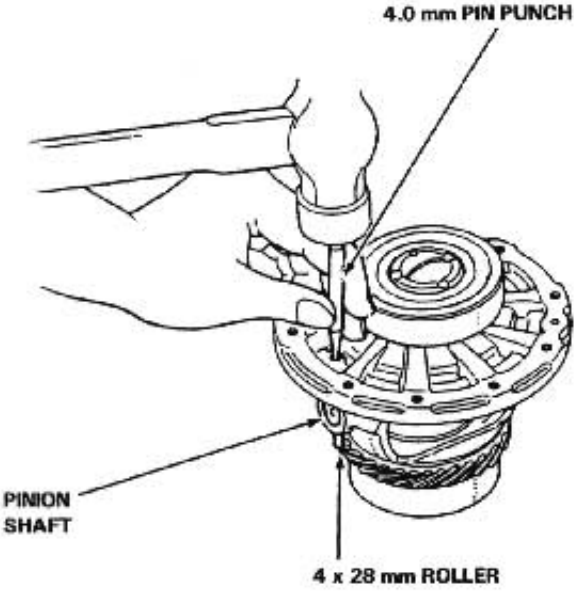
Inspection/Disassembly

1. Remove ring gear and inspect teeth for wear or damage.

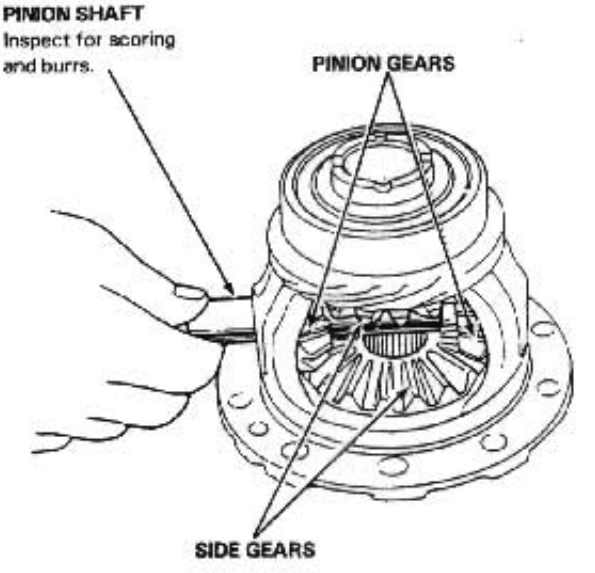
   CAUTION:
   The ring gear bolts have left-hand threads.



2. Drive out 4 x 28 mm roller with pin punch.



3. Remove pinion shaft, pinion gears, washers, side gears and thrust washsers.

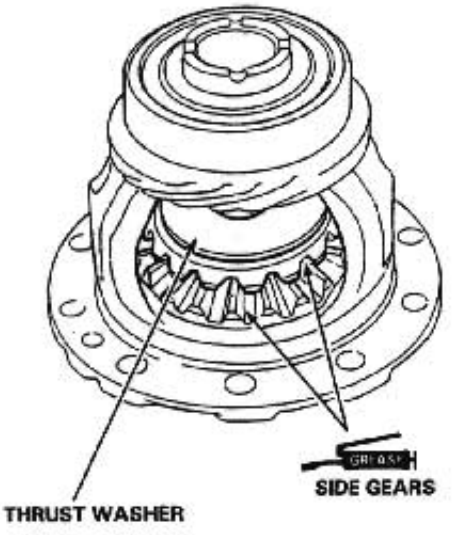


4. Wash parts thoroughly in solvent and dry with compressed air. Inspect all parts for wear or damage and replace any that are defective.

Reassembly

1. Install the side gears and thrust washers in differential carrier.

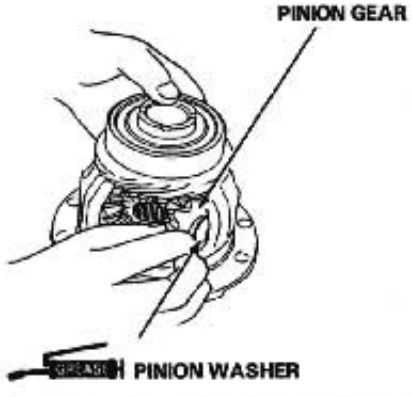
   CAUTION:
   Coat all gears with molybdenum disulfide grease on all sides.



2. Set pinion gears in place exactly opposite each other in mesh with side gears, then install a pinion washer behind each one. Washers must be of equal thickness.

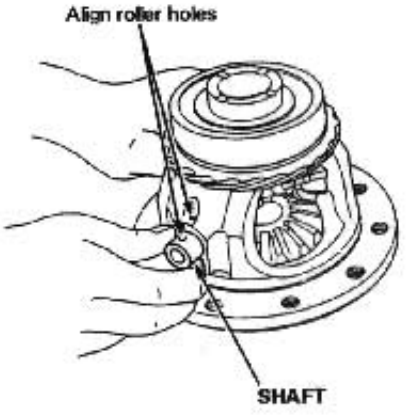
   Pinion Washers

PART NUMBER	THICKNESS
41351-689-000	0.7 mm (0.028 in.)
41352-689-000	0.8 mm (0.031 in.)
41353-689-000	0.9 mm (0.035 in.)
41354-689-000	1.0 mm (0.039 in.)
41355-PC8-000	0.75 mm (0.030 in.)
41356-PC8-000	0.85 mm (0.033 in.)
41357-PC8-000	0.95 mm (0.037 in.)

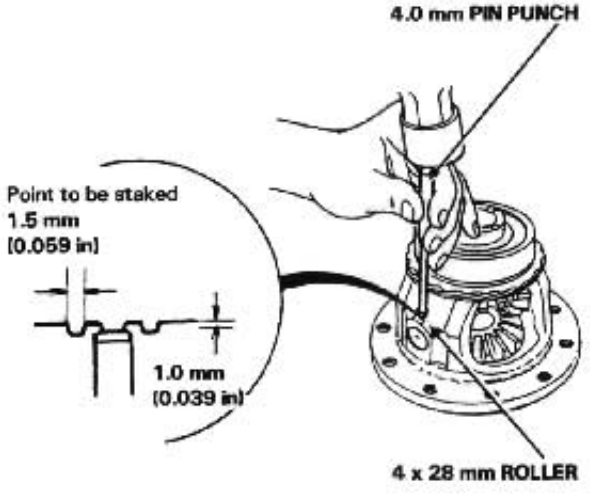


3. Rotate gears as shown until shaft holes in pinion gears line up with shaft holes in carrier.

4. Insert pinion shaft and align roller hole in one end with matching hole in carrier.



5. Drive in 4 x 28 mm roller with pin punch.
6. Stake the differential carrier at two points.



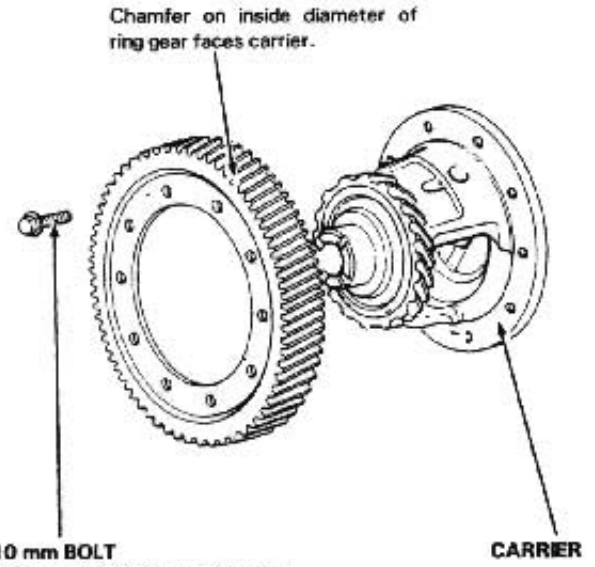
7. Check backlash of both pinion gears again.

   Standard (New): 0.05–0.15 mm (0.002–0.006 in)

   - If still out of tolerance, replace both pinion gears, then recheck backlash.
   - If still out of tolerance, replace side gears, and recheck backlash.
   - If still out of tolerance, replace carrier assembly.

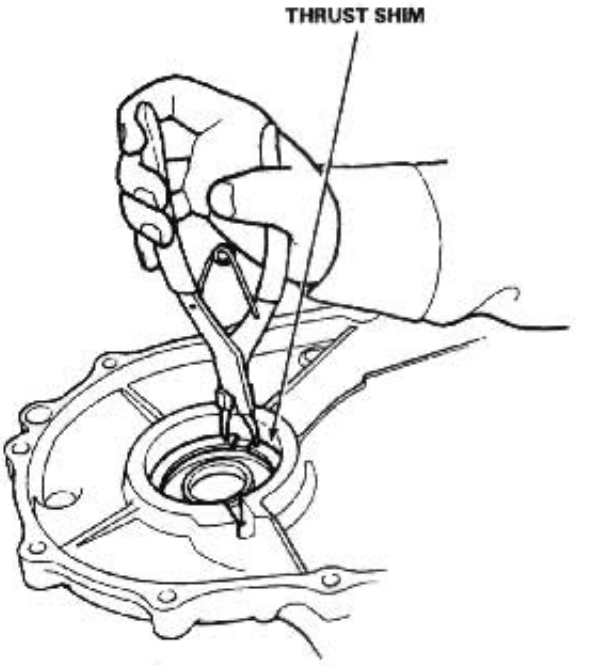
8. Install ring gear. Torque bolts to:
103 N·m (10.3 kg-m , 74 lb-ft)

CAUTION:
The ring gear bolts have left-hand threads.

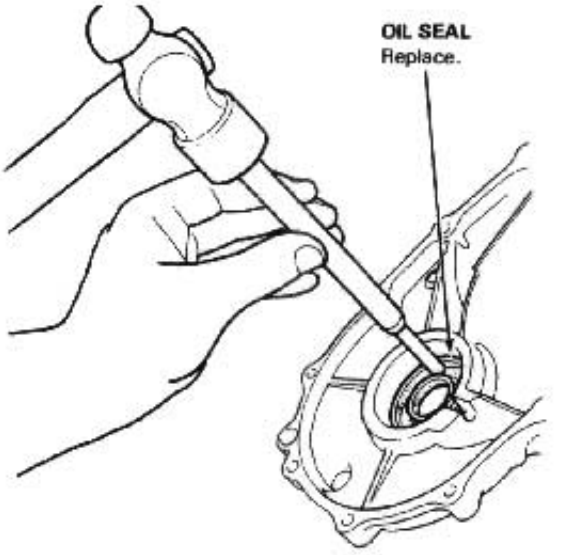


Oil Seal Removal

1. Remove the differential assembly.
2. Remove the thrust shim from the transmission housing.



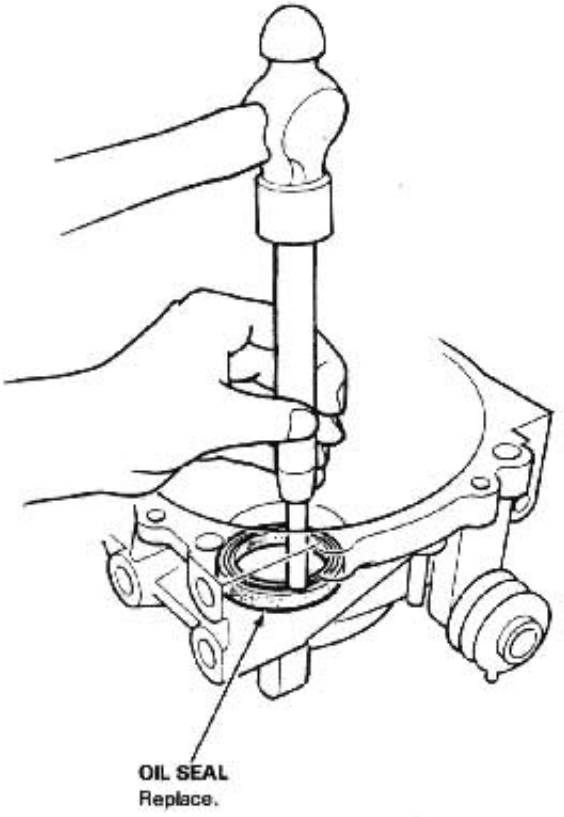
3. Remove the oil seal from the transmission housing.



(cont'd)

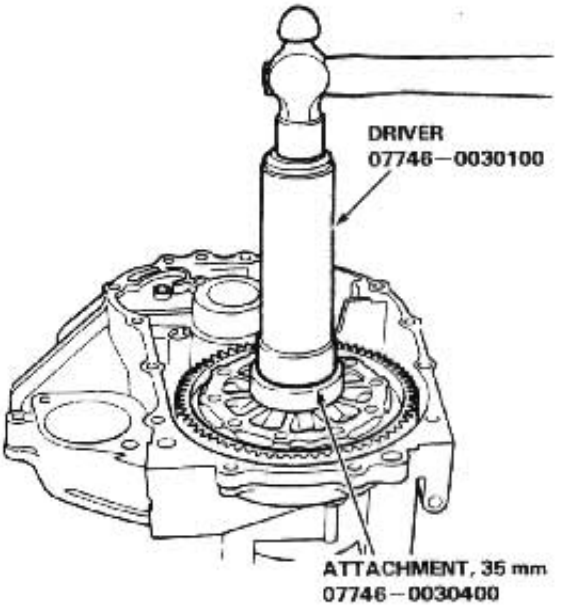
Oil Seal Removal (cont'd)

4. Remove the oil seal from the clutch housing.



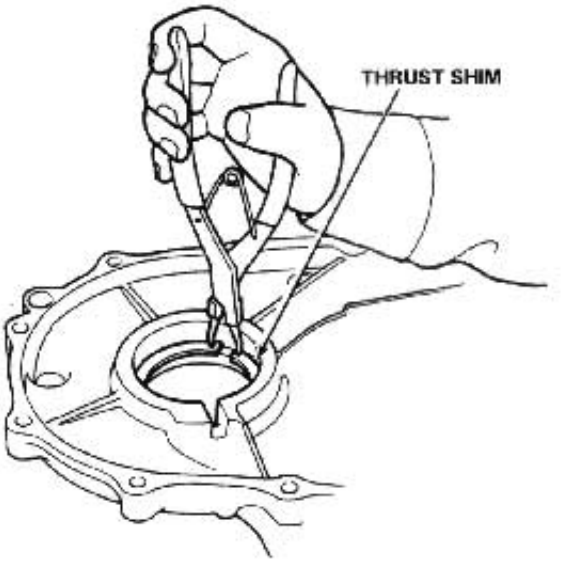
Oil Seal Installation

1. Install the differential assembly in clutch housing using driver.



2. First try a 1.00 mm (0.03937 in) thrust shim.

CAUTION:
Do not use more than two shims to adjust the bearing preload.

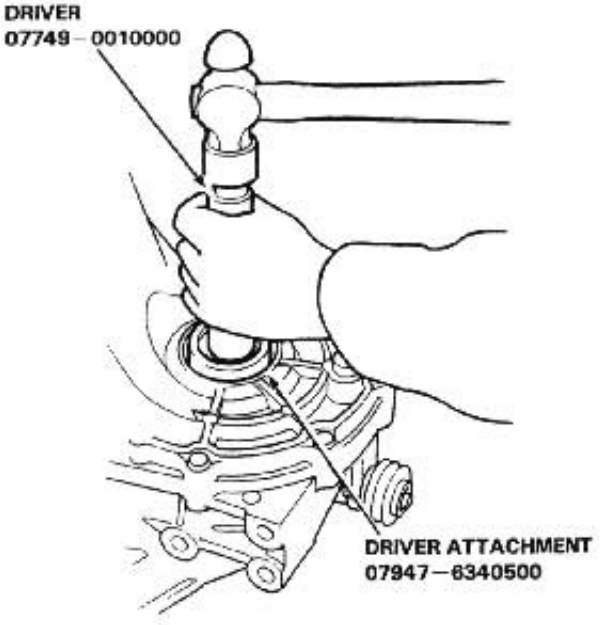


3. Install the transmission housing (see section 13).

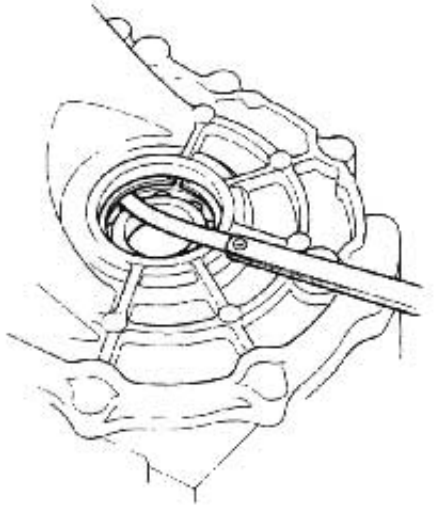
   NOTE:
   Do not apply sealant to the mating surface of the clutch housing yet.

4. Tighten the transmission bolts (see section 13).

5. Use driver and attachment to bottom differential assembly in clutch housing.



6. Measure clearance between thrust shim and outer race of bearing in transmission housing.



If out of limits, select new thrust shim from following table and install:

Side Clearance:
MAX: 0.10 mm (0.004 in)

72 mm Thrust Shim

PART NUMBER	THICKNESS
41441–PL3–A00	1.0 mm (0.03937 in.)
41442–PL3–A00	1.1 mm (0.04331 in.)
41443–PL3–A00	1.2 mm (0.04724 in.)
41444–PL3–A00	1.3 mm (0.05118 in.)
41445–PL3–A00	1.4 mm (0.05512 in.)
41446–PL3–A00	1.5 mm (0.05906 in.)
41447–PL3–A00	1.6 mm (0.06299 in.)
41448–PL3–A00	1.7 mm (0.06693 in.)
41449–PL3–A00	1.8 mm (0.07087 in.)
41450–PL3–A00	1.05 mm (0.04134 in.)
41451–PL3–A00	1.15 mm (0.04528 in.)
41452–PL3–A00	1.25 mm (0.04921 in.)
41453–PL3–A00	1.35 mm (0.05315 in.)
41454–PL3–A00	1.45 mm (0.05709 in.)
41455–PL3–A00	1.55 mm (0.06102 in.)
41456–PL3–A00	1.65 mm (0.06496 in.)
41457–PL3–A00	1.75 mm (0.06890 in.)

7. Remove the bolts and transmission housing (see section 13).

8. Replace the 1 mm (0.03937 in) shim with the one of the correct thickness selected the step 6.

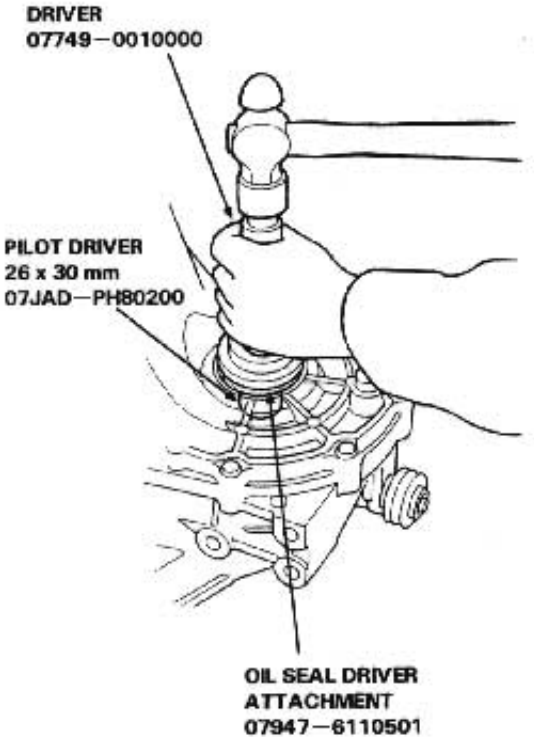
   NOTE:
   If the shim-to-bearing clearance calculated in step 6 is less than the specification, it is not necessary to replace the shim.

9. Reassemble the transmission and install the transmission housing (see section 13).

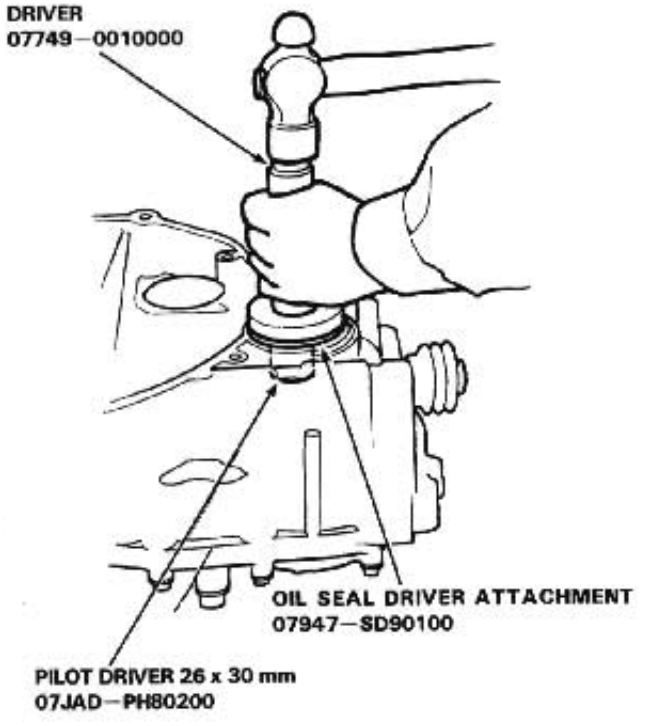
(cont'd)

Oil Seal Installation (cont'd)

10. Install the oil seal in the transmission housing.



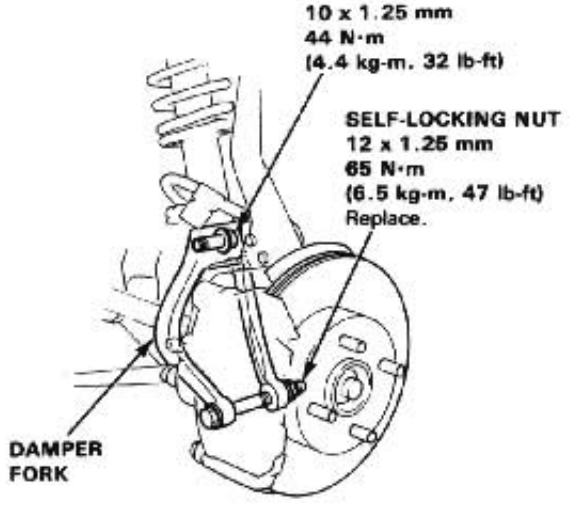
11. Install the oil seal in the clutch housing.



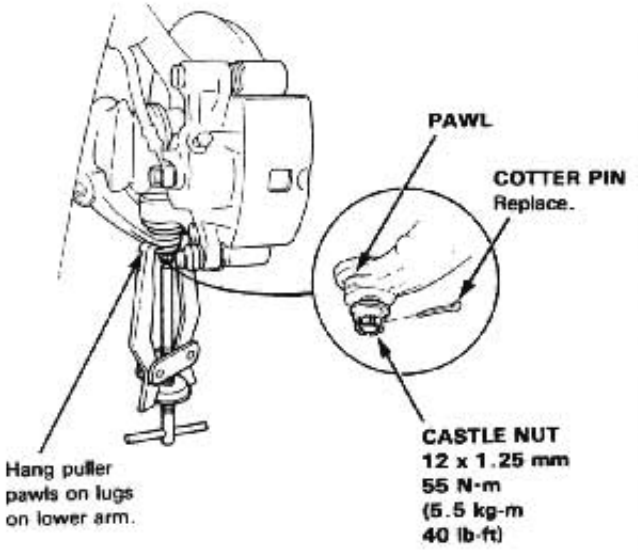
Driveshafts

Removal

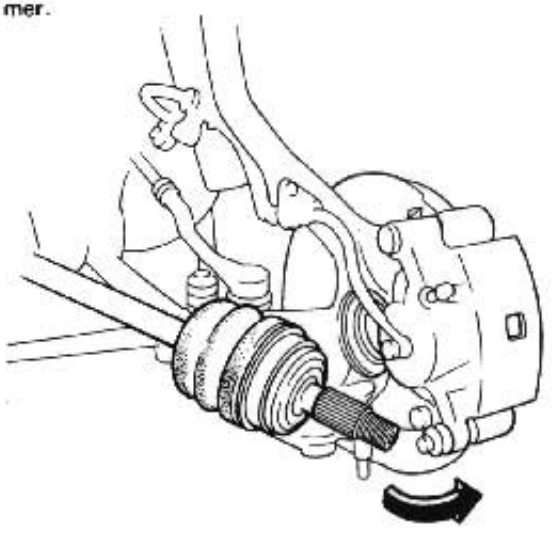
1. Loosen the front wheel lug nuts.
2. Raise the front end of the car and place safety stands in the proper locations. Remove the front wheels.
3. Drain the transmission oil.
4. Raise the locking tab on the spindle nut and remove it with a 36 mm (1-7/16 in.) socket wrench.
5. Remove the damper fork nut and damper pinch bolt. Remove the damper fork.



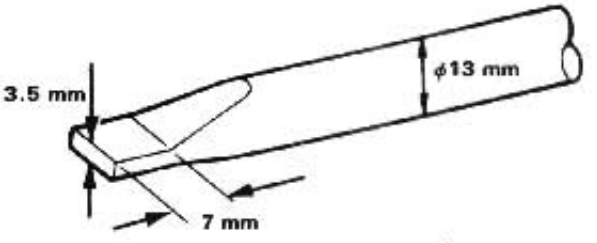
6. Remove the knuckle-to-lower arm castle nut, and separate the lower arm from the knuckle using a puller with the pawls applied to the lower arm.

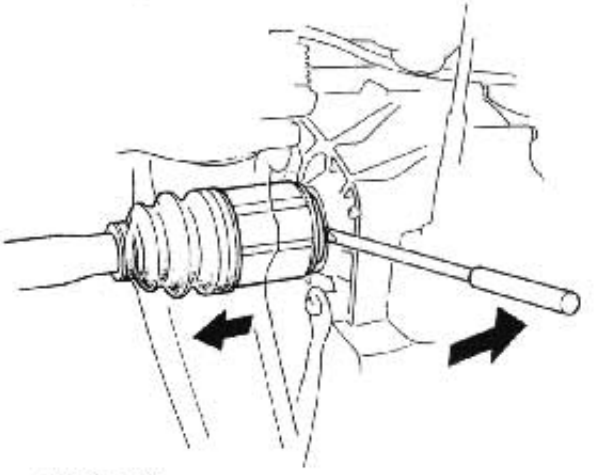


7. Pull the knuckle outward and remove the driveshaft outboard joint from the knuckle using a plastic hammer.



8. Pry the driveshaft assembly with a screwdriver as shown to force the set ring at the driveshaft end past the groove.
9. Pull the inboard joint and remove the driveshaft and CV joint out of the differential case as an assembly.





CAUTION:

- **Do not pull on the driveshaft, as the CV joint may come apart.**
- **Use care when prying out the assembly and pull it straight to avoid damaging the differential oil seal.**

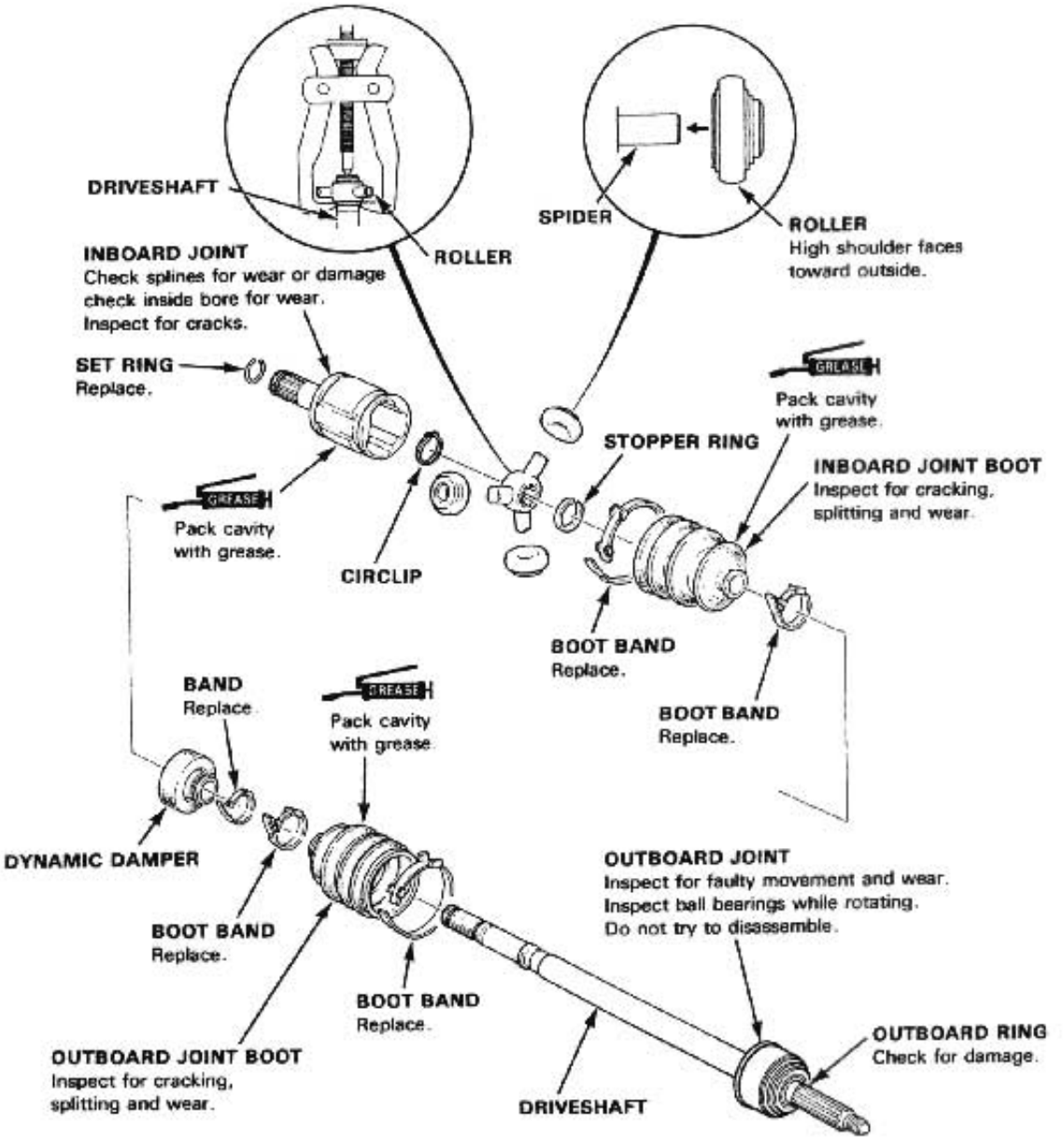
Disassembly/Inspection

NOTE:
- Mark the rollers and roller grooves during disassembly to ensure proper positioning during reassembly.
- Before disassembly, mark the spider and driveshaft so they can be reinstalled in their original positions.
- The inboard joint must be removed to replace the boots.

GREASE Thoroughly pack the inboard joint and both joint boots with high quality molybdenum disulfide grease when reassembling.

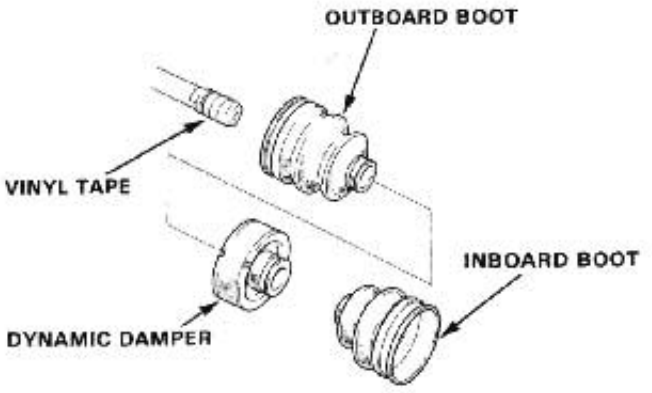
Grease Quantity:

	All others	HF model
Inboard Joint	120~130 g	100~110 g
Outboard Joint	90~100 g	70~80 g

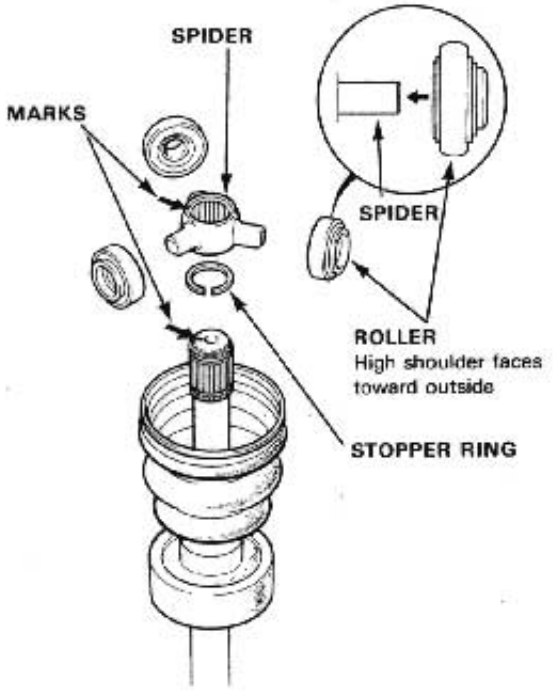


Reassembly

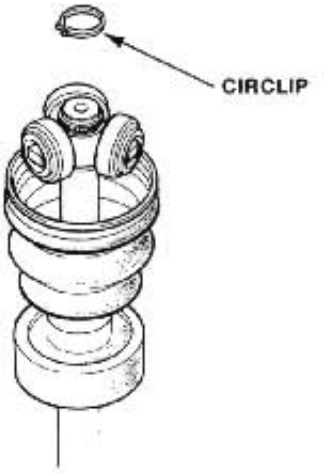
1. Wrap the splines with vinyl tape to prevent damage to the boots and dynamic damper.
2. Install the outboard boot, dynamic damper and inboard boot to the driveshaft, then remove the vinyl tape.



3. Install the stopper ring onto the driveshaft groove.
4. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.
5. Fit the rollers to the spider with their high shoulders facing outward.
   CAUTION:
   - **Reinstall the rollers to their original positions on the spider.**
   - **Hold the driveshaft assembly so the spider and roller points up, to prevent it from falling off.**



6. Fit the circlip onto the driveshaft groove.



7. Pack the outboard joint boot with molybdenum disulfide grease.

Grease Quantity:

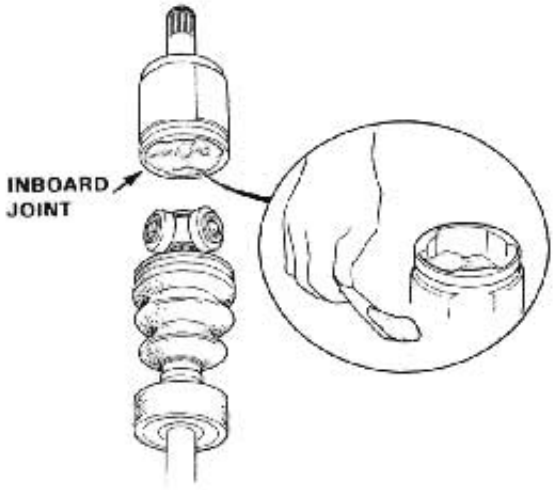
All others	90~100 g
HF model	70~80 g

8. Pack the inboard joint with molybdenum disulfide grease.
Grease Quantity:

All others	120~130 g
HF model	100~110 g

9. Fit the inboard joint onto the driveshaft.

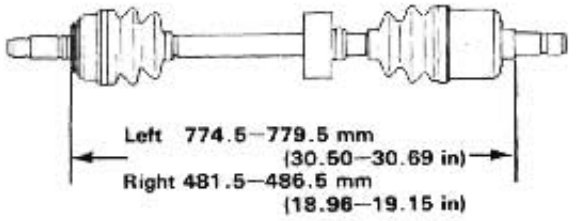
CAUTION: Hold the driveshaft assembly so the inboard joint points up, to prevent it from falling off.



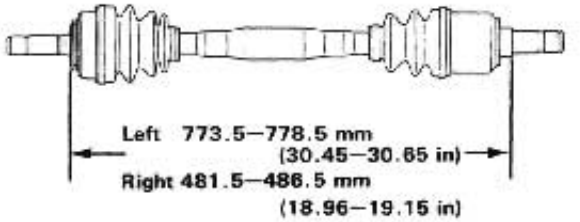
10. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and full extension.

NOTE: The ends of boots seat in the groove of the driveshaft and joint.

With dynamic damper:

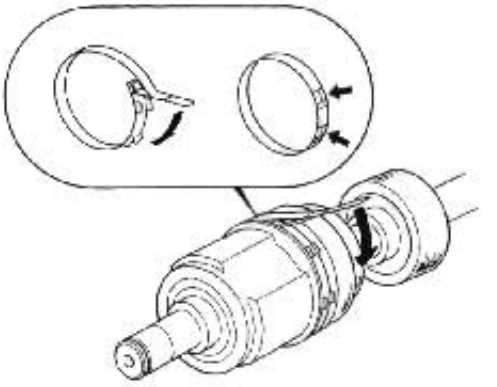


Without dynamic damper:

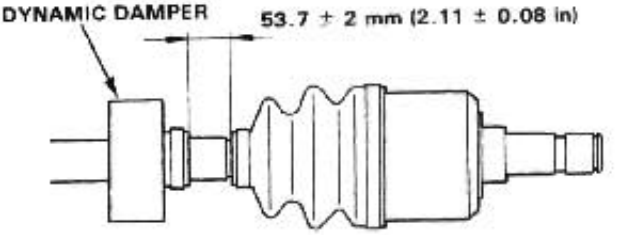


11. Install new boot bands on the boot and bend both sets of locking tabs.

12. Lightly tap on the doubled-over portions to reduce their height.



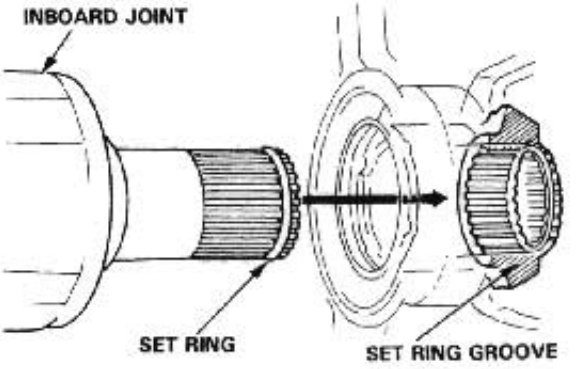
13. With dynamic damper
- Position the dynamic damper as shown below.
- Lightly tap on the doubled-over portion to reduce its height.
- Install a new dynamic damper band and bend down both sets of locking tabs.



14. Install a new set ring in the driveshaft groove.

15. Install the inboard end of the driveshaft into the differential.

CAUTION:
- **Always use a new set ring whenever the driveshaft is being installed.**
- **Make sure the driveshaft locks in the differential side gear groove, and the CV joint subaxle bottoms in the differential.**

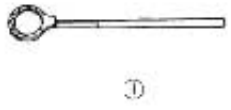


16. Refill the transmission.

Steering

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07916—SA50001	40 mm Lock Nut Wrench	1	17-4, 17-7
②	07941—6920002	Ball Joint Remover	1	17-8
③	07974—SA50800	Ball Joint Boot Clip Installation Guide	1	17-7



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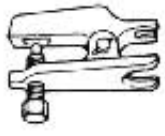


②

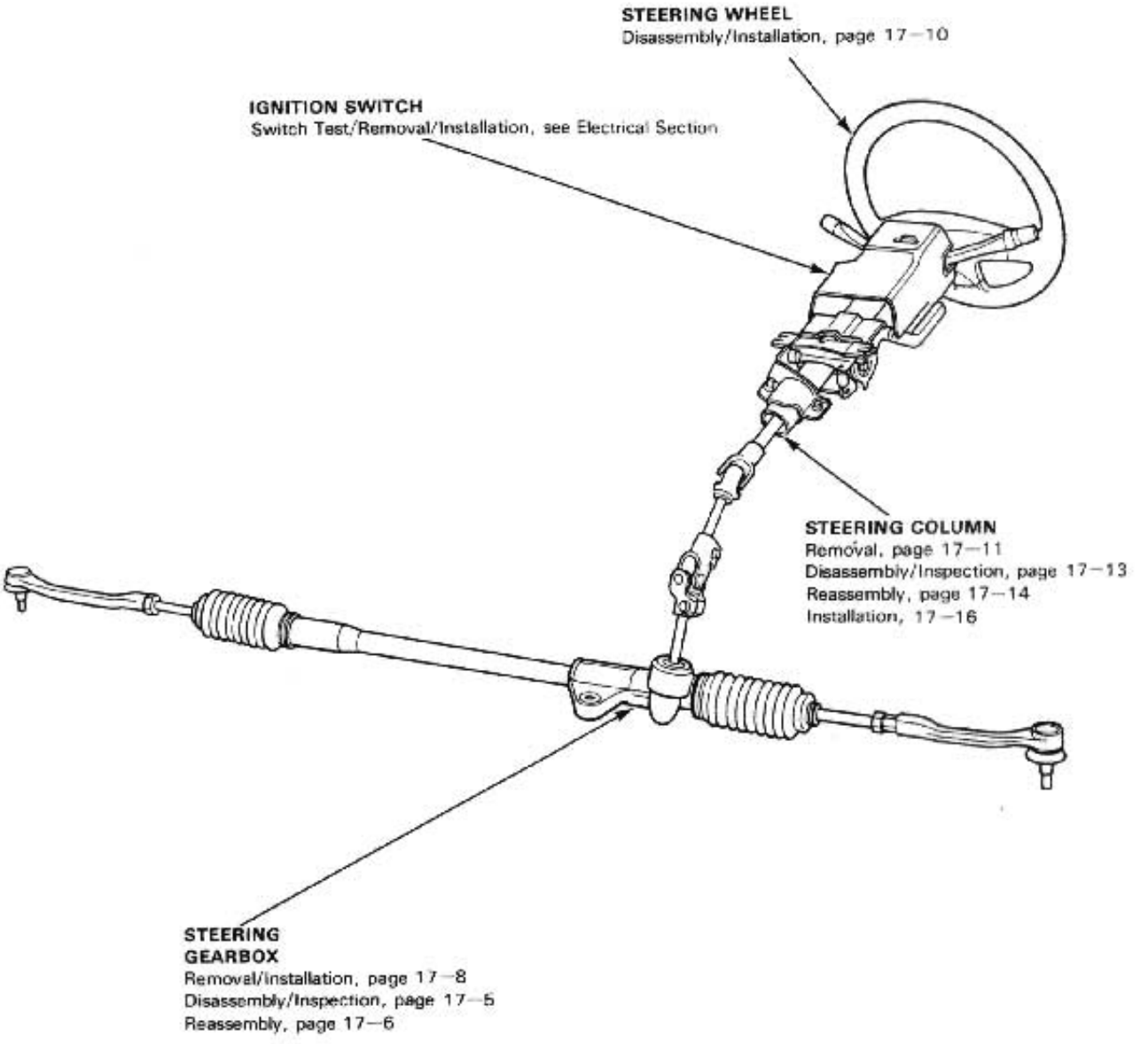
③

Component Location

Index

NOTE: The tilt steering column is shown; the conventional steering column is similar except for the tilt mechanism.

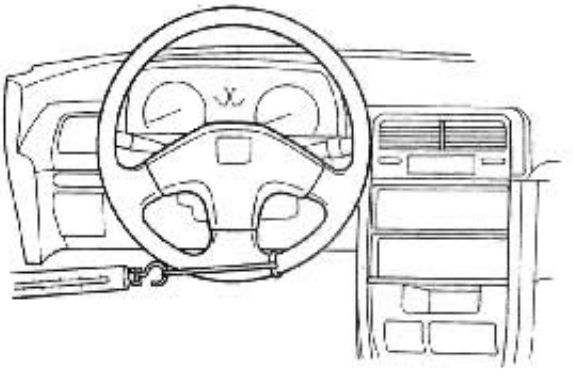
Tilt steering: Except HF Model



Inspection

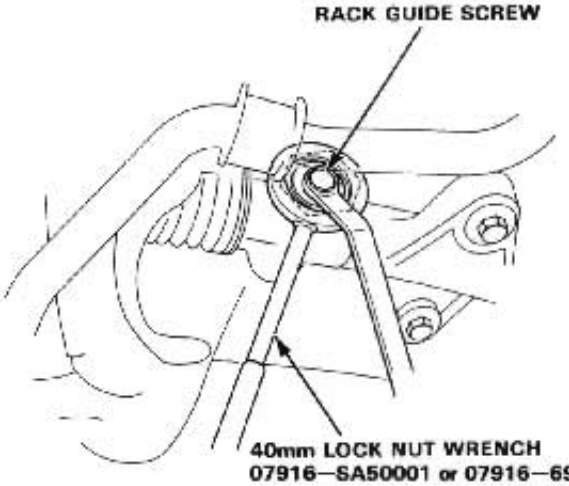
Steering Effort Check

1. Raise the front wheels off the ground.
2. Turn the steering wheel with a spring gauge and check its reading.
3. If the reading exceeds the service limit, adjust the steering gearbox as shown below.
   Service Limit: 15 N(1.5 kg, 3.3 lbs)



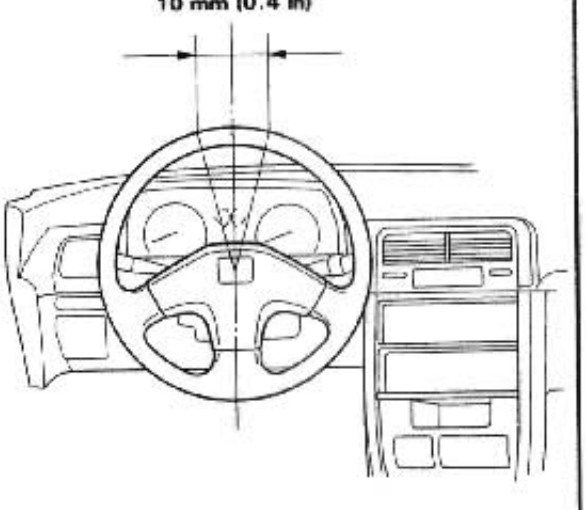
Steering Gearbox Adjustment

1. Loosen the rack screw locknut.
2. Re-tighten the rack guide screw until it compresses the spring and seats against the rack guide.
3. Back off the rack guide screw and install the locknut on the rack guide screw.
   Back the rack guide screw off about:
   Si Model 15^{+5}_{-0} **(Front wheels pointed straight ahead)**
   All Others $50^{\circ} \pm 10^{\circ}$
4. Check for tight or loose steering through the complete turning travel.
5. Recheck steering effort as shown above.



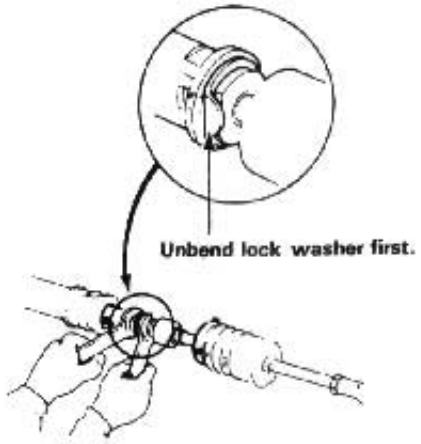
Steering Wheel Rotational Play

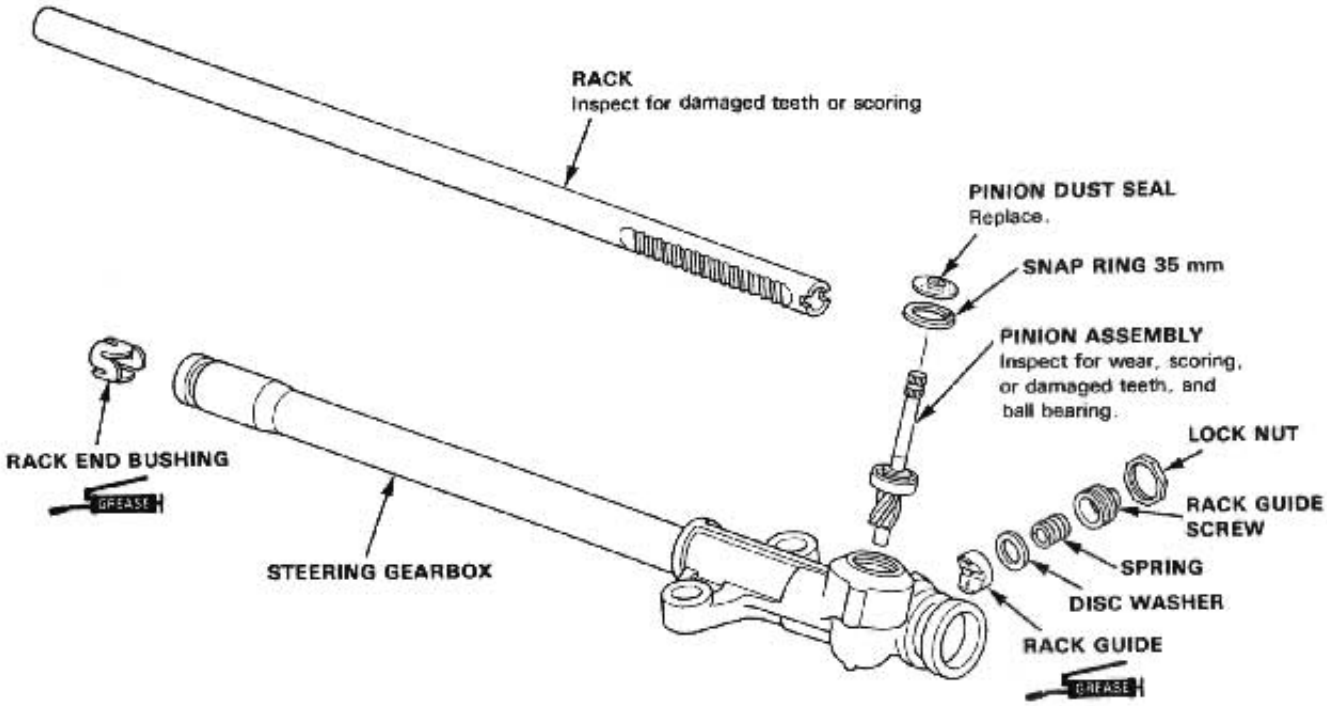
1. Place the front wheels in a straight ahead position and measure the distance the steering wheel can be turned without moving the front wheels.
2. If the play exceeds the service limit, check all steering components.
   Service Limit: 10 mm (0.4 in)



Disassembly/Inspection

1. Carefully clamp the gearbox in a vise.
2. Loosen the bands, then pull the boots away from the ends of the gearbox and unbend the tie-rod lock washers.
3. Hold the rack with a 22 mm wrench and unscrew the tie-rods with a 17 mm wrench.
4. Remove the rack guide components from the gearbox.
5. Remove the pinion boot, pinion dust seal, and 35 mm snap ring, then pull the pinion out of the gearbox.
6. Slide the rack out of the gearbox.





NOTE: The pinion assembly bearing cannot be removed. If the bearing must be replaced, replace as an assembly.

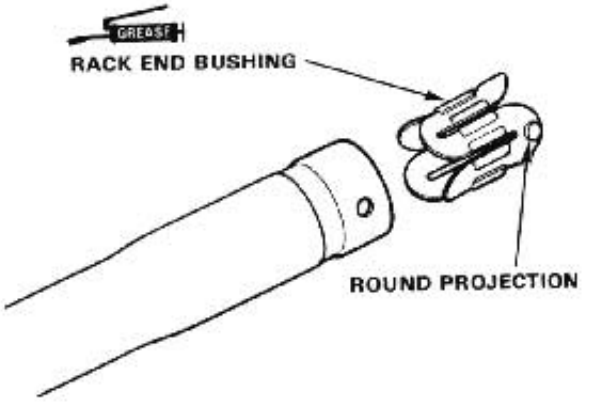
Reassembly

1. Apply a thin coat of grease to the inside surface of the rack end bushing.

Grease quantity: 1—3g

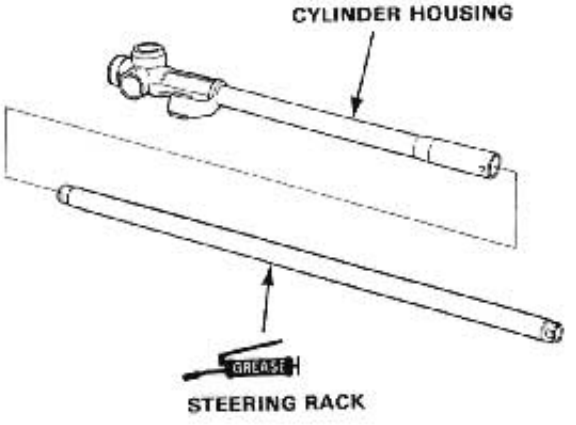
CAUTION: Do not fill the slots with grease; they must remain open to serve as air passages.

2. Install the rack end bushing by aligning the round projection on the bushing with the hole in the cylinder housing.

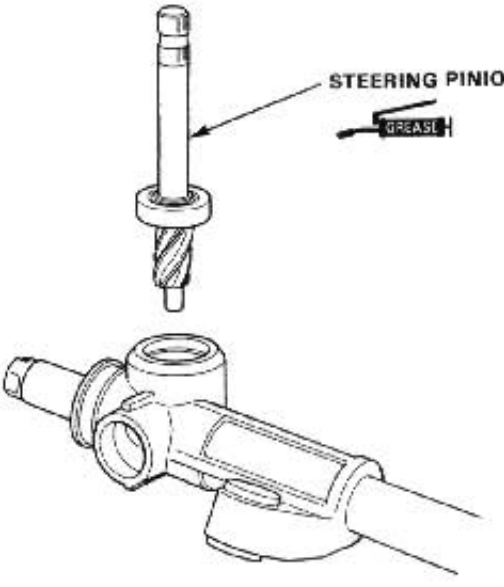


3. Apply grease to the steering rack.

4. Install the steering rack into the cylinder housing carefully to avoid damaging the steering rack sliding surface.

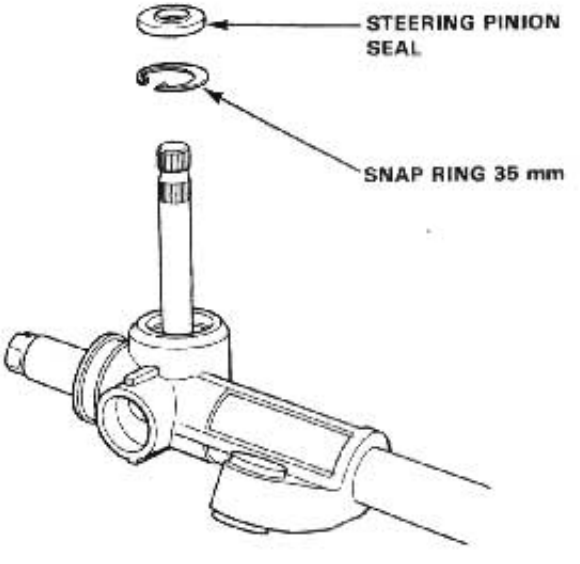


5. Install the steering pinion in the gear housing.



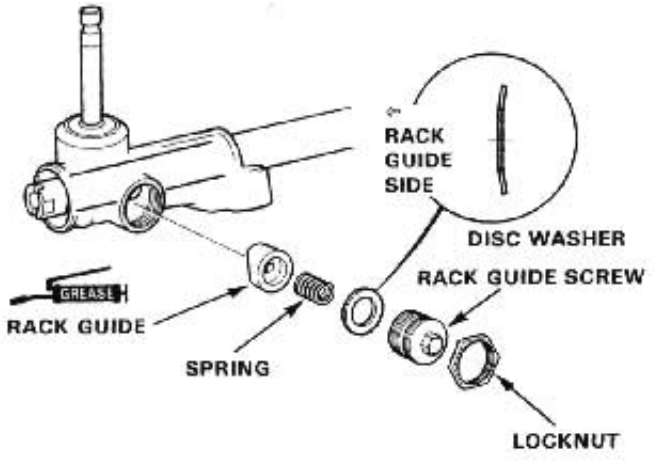
6. Install the 35 mm snap ring securely in the gear housing groove.

7. Grease the steering pinion seal, and install it on the gear housing.



8. Coat the rack guide with grease.

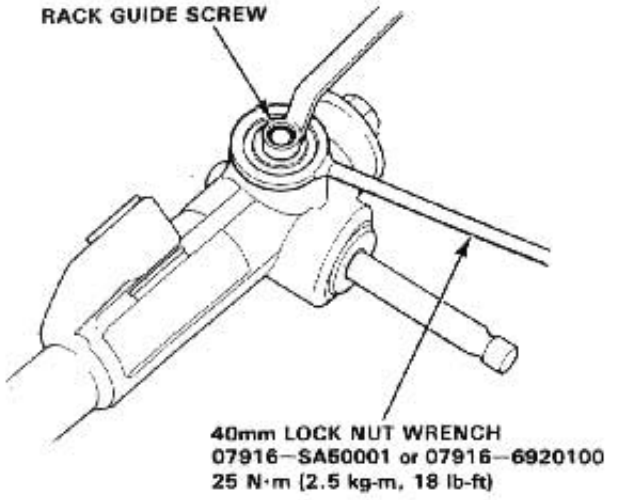
9. Install the rack guide, spring, disc washer and rack guide screw on the gear housing.



10. Tighten the rack guide screw until it compresses the spring and seats against the rack guide.

11. Back off the rack guide screw and install the locknut on the rack guide screw.
Back the rack guide screw off about:
Si Model $15^{\circ}{}^{+0}_{-5}{}^{\circ}$ **(Front wheels pointed straight ahead)**
All Others $50^{\circ} \pm 10^{\circ}$

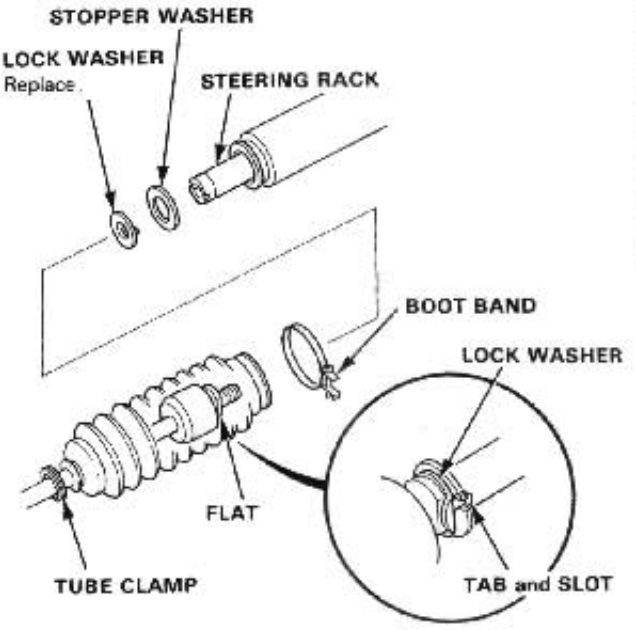
12. Tigten the locknut while holding the rack guide screw with the special tool.



13. Screw each tie-rod into the rack while holding the lock washer so its tabs are in the slots in the rack end.

NOTE: Install the stopper washer with the chamfered side facing out.

14. Tighten the tie-rod securely, then bend the lock washer back against the flat on the flange as shown.



15. Install the boots and secure with boot band and tube clamp.

16. Check that the boots are not twisted or collapsed by sliding the rack.

17. Install the tie-rod ends on the tie-rods. Do not tighten the locknuts until after tie-rod adjustment.

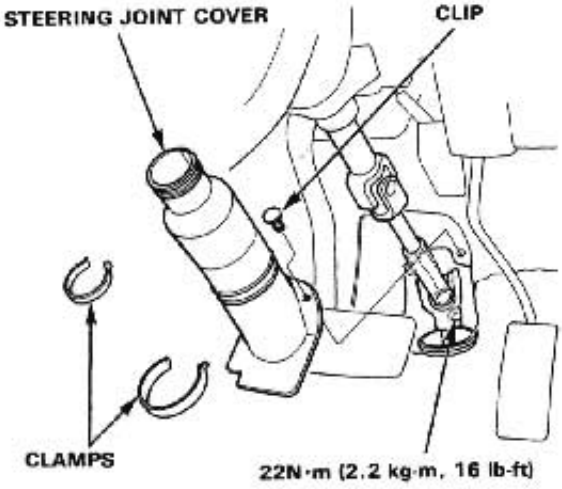
18. Fill the tie-rod boots with grease and install; replace boots that are cut or split.

19 Bleed air from the boots by gently squeezing them from the bottom up.

20. Use the special tool's bolt to adjust the depth of the tool's large end. Align the large end of the tool with the groove on the boot. Slide the clip into position over the tool.

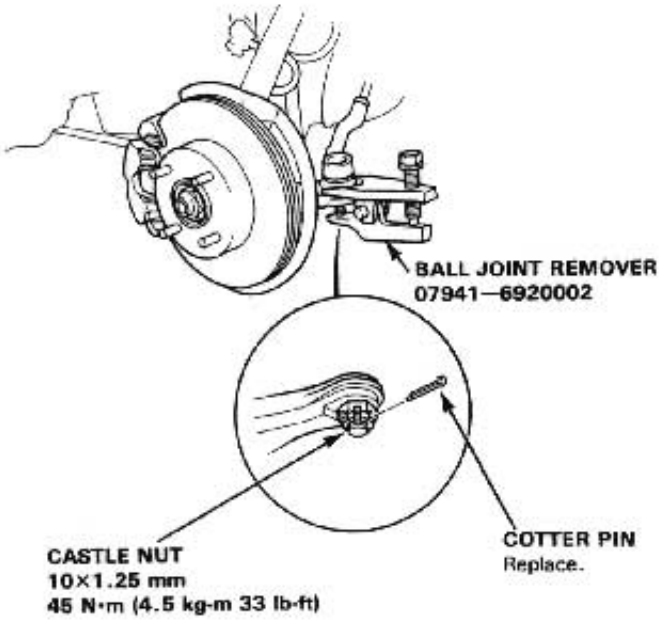
Removal/Installation

1. Remove the cover panel and steering joint cover, then disconnect the steering shaft from the gearbox.



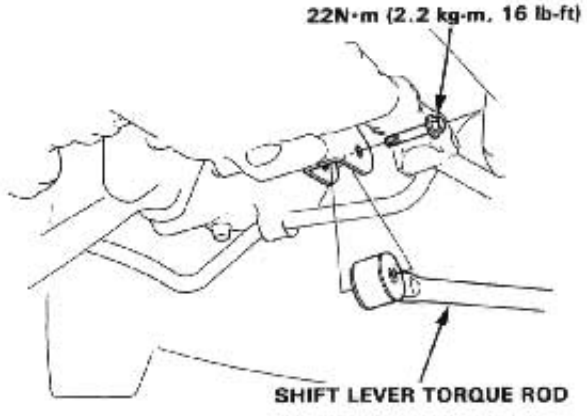
2. Raise the front of car on jack stands and place safety stands in the proper locations. Remove the front wheels.
3. Remove the cotter pins, and unscrew the tie-rod end ball joint nuts halfway.
4. Break the ball joints loose using the ball joint remover.
5. Then remove the nuts, and lift the tie-rod ends out of the steering knuckles.

CAUTION: Avoid damaging the ball joint boot.

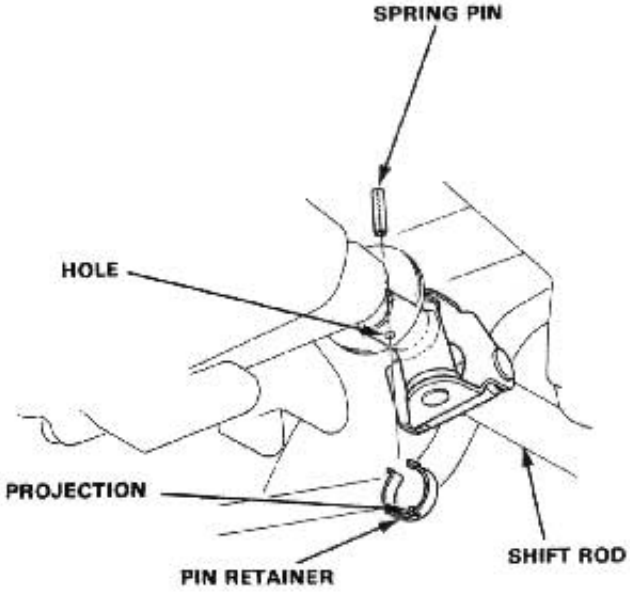


6. Manual Transmission Only:

- Disconnect the shift lever torque rod from the clutch housing.



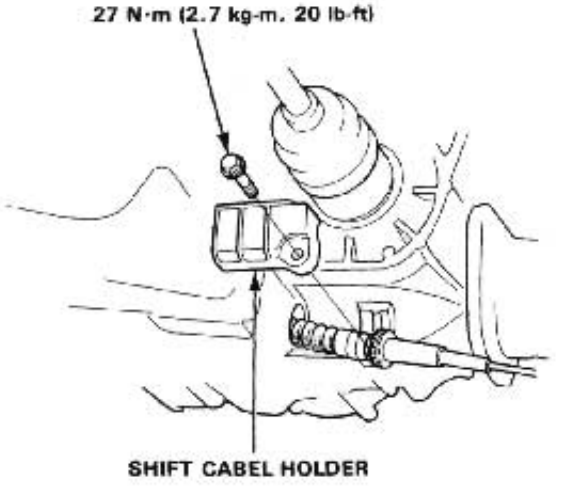
- Remove the pin retainer, drive out spring pin with punch, then disconnect the shift rod.



NOTE: On reassembly, reinstall the pin retainer after driving in pin and be sure that the projection on the pin retainer is in the hole.

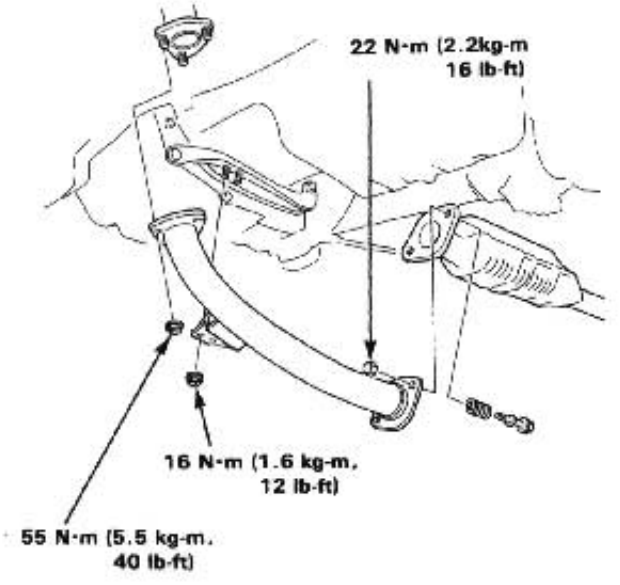
7. Automatic Transmission Only:

   Remove the shift cable holder and pull the shift cable down by hand.



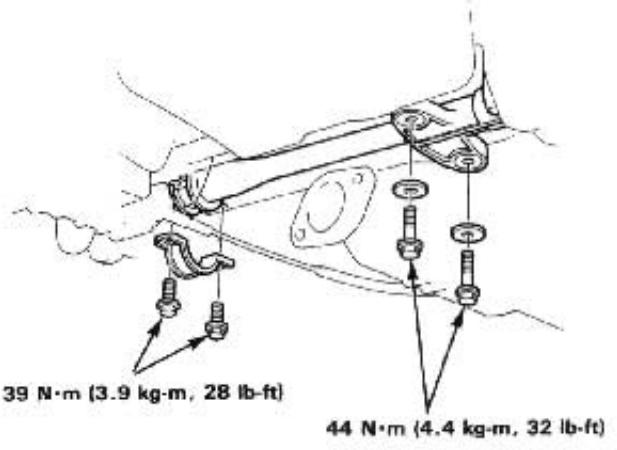
8. Remove the self-locking nuts connecting exhaust header pipe to exhaust pipe B, then separate exhaust pipe B from the header pipe.
   CAUTION: Replace the exhaust gasket and self-locking nuts when you reinstall the pipe.

9. Remove the header pipe.

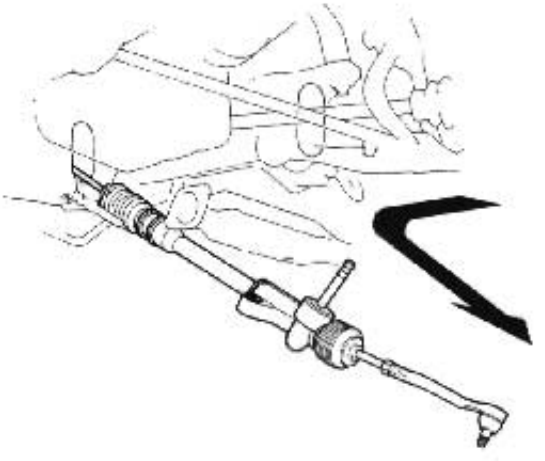


10. Remove the steering gearbox brackets.

11. Remove the steering gearbox mounting bolts.



12. Slide tie rod all the way to the right side.



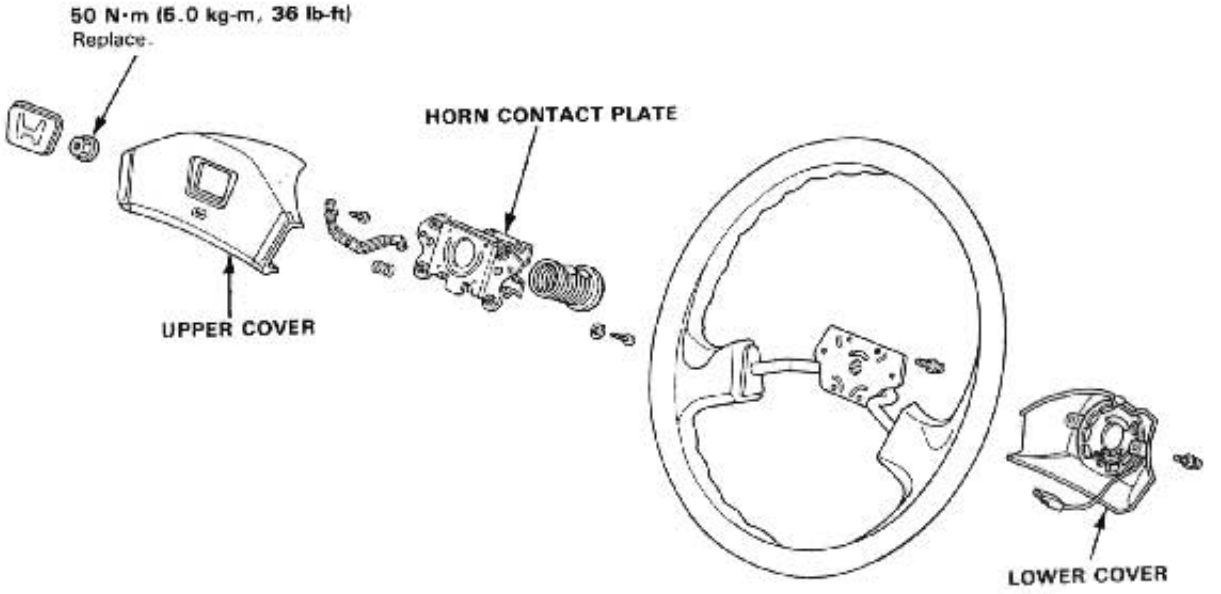
13. Slide the gearbox right so that the left tie rod clears the bottom of the rear beam, then remove the gearbox.

14. Re-install in the reverse order of removal.

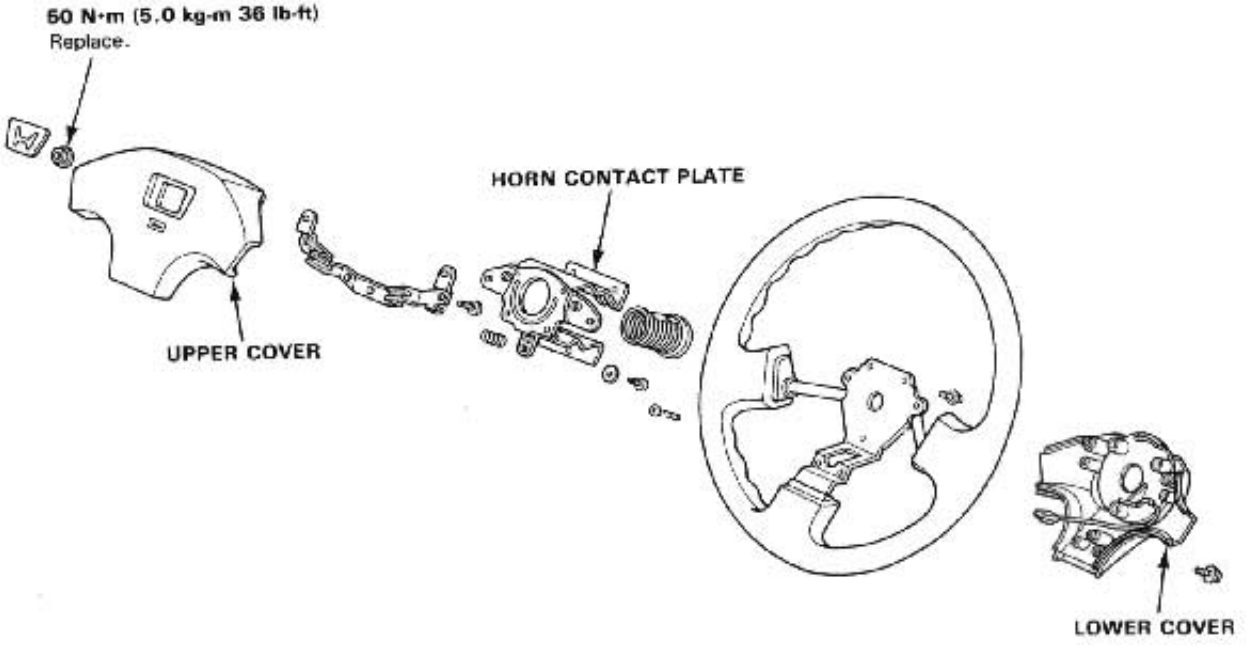
Steering Wheel

Disassembly/Reassembly

HF Model Only:



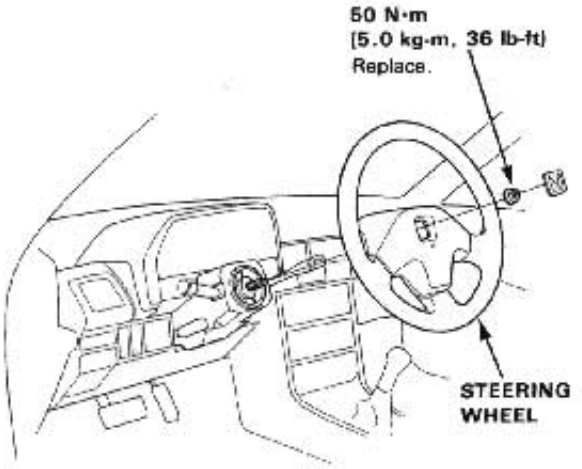
All Other Models:



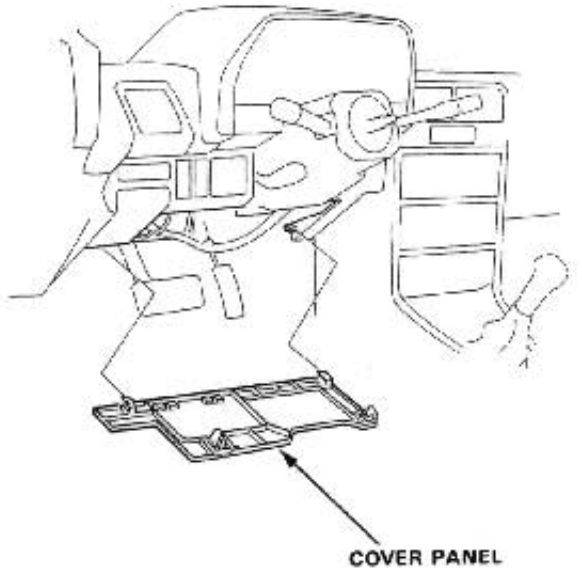
Steering Column

Removal

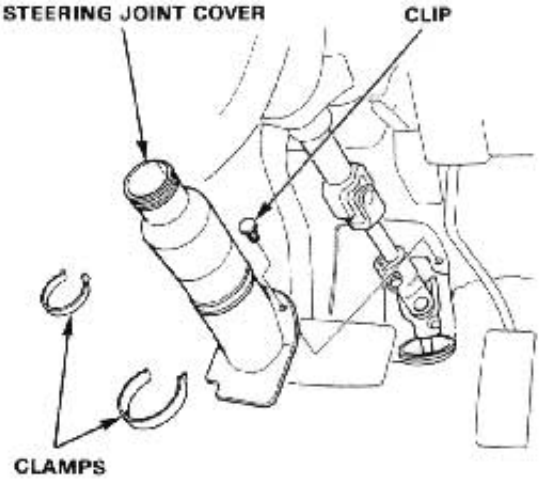
1. Remove the center pad.
2. Remove the steering shaft nut.
3. Remove the steering wheel by rocking it slightly from side-to-side as you pull steadily with both hands.



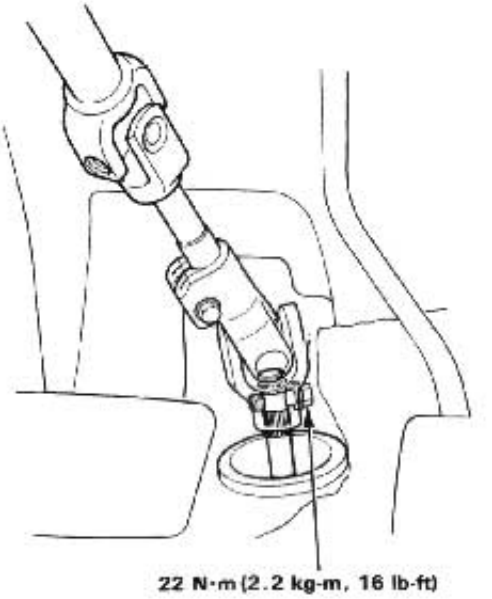
4. Remove the cover panel.



5. Remove the steering joint cover.



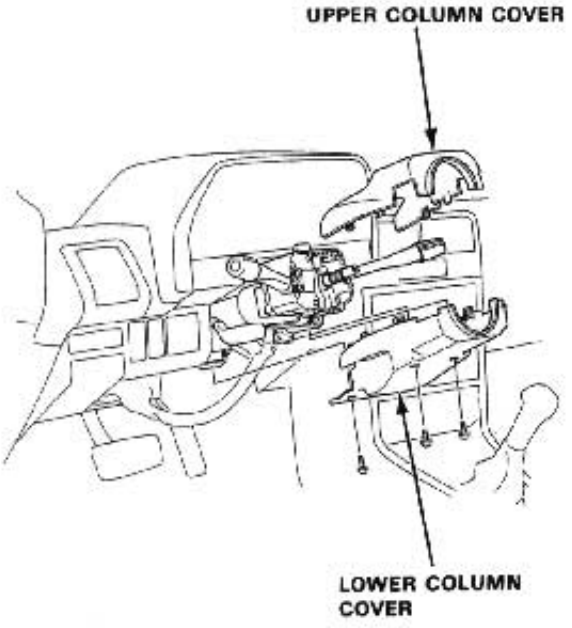
6. Remove the lower steering joint bolt.



(cont'd)

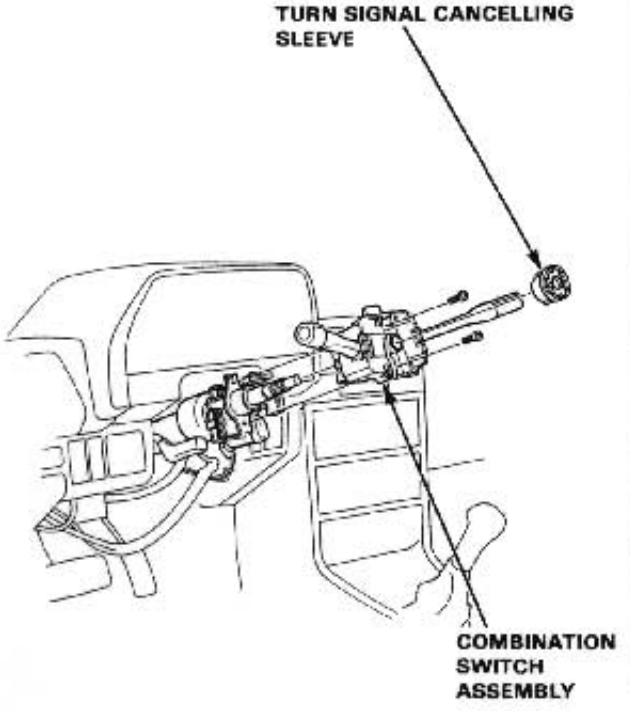
Removal (cont'd)

7. Remove the upper and lower column covers.



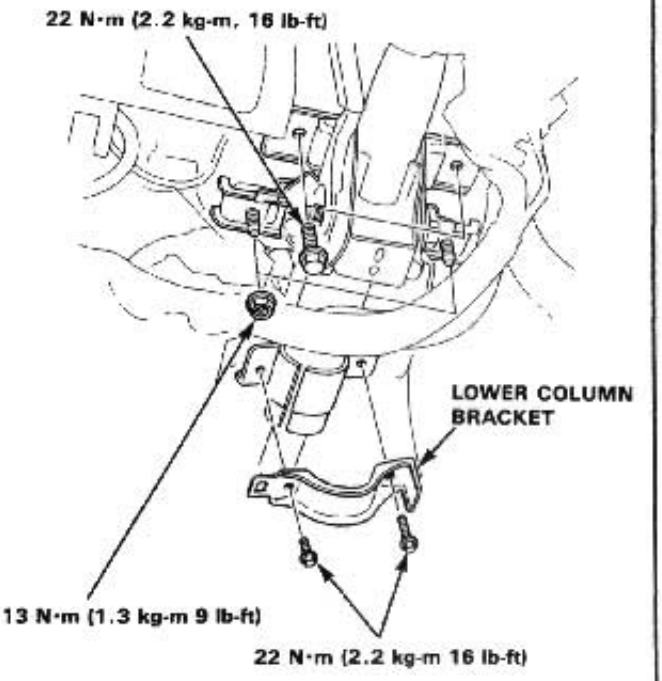
8. Disconnect each wire coupler from the combination switch.

9. Remove the turn signal cancelling sleeve and combination switch assembly.



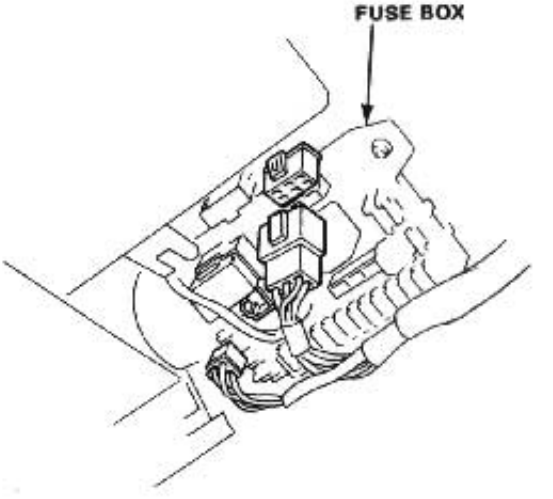
10. Remove the lower column bracket.

11. Remove the nuts attaching the bending plate guide and bending plate.



12. Disconnect each wire coupler from the fuse box at under-dash left side.

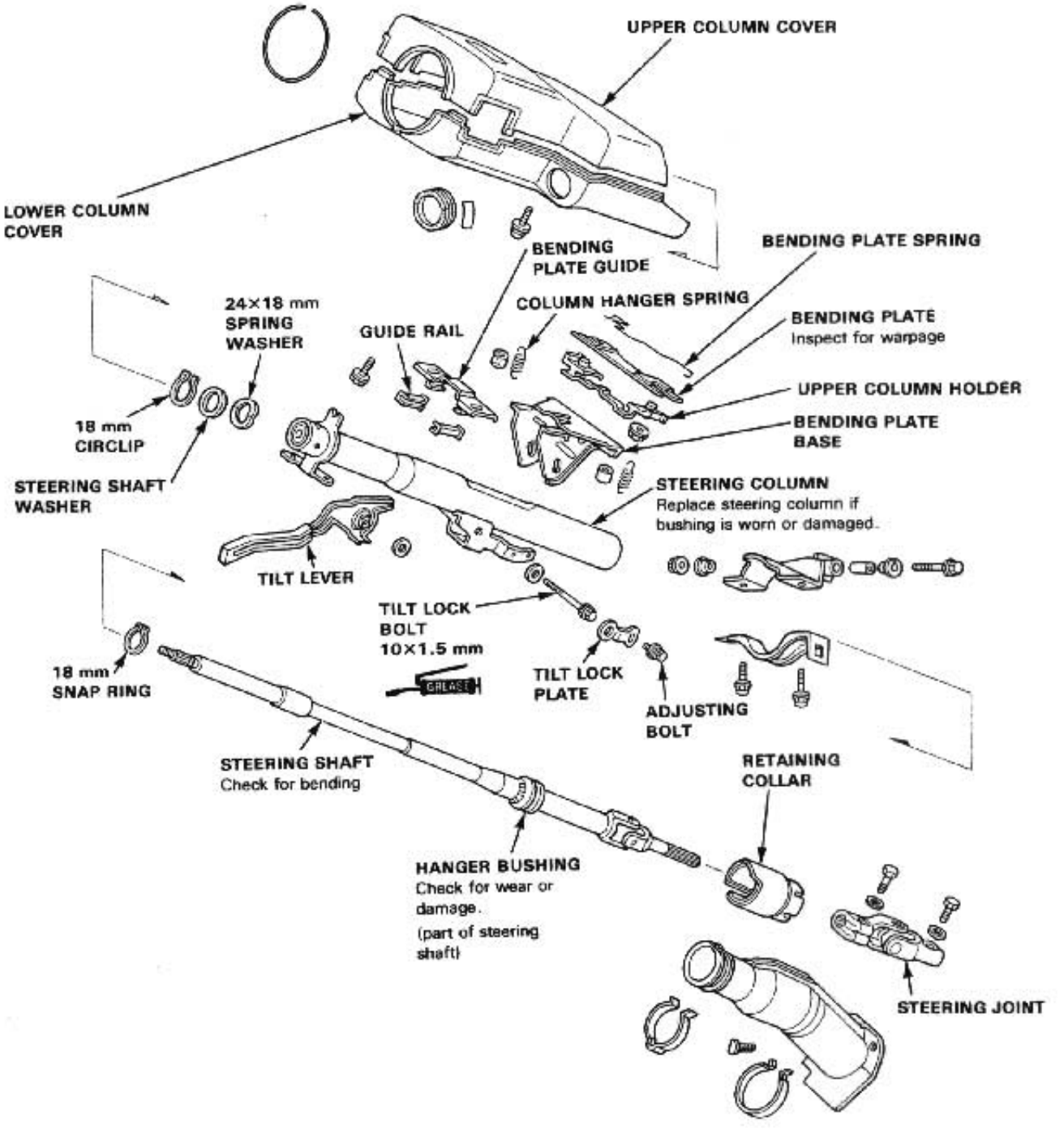
13. Remove the steering column assembly.



Disassembly/Inspection

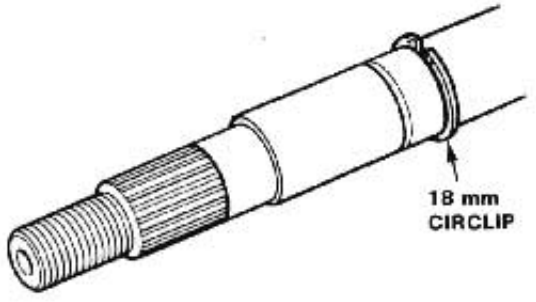
NOTE: The tilt steering column is shown; the conventional steering column is similar except for the tilt mechanism.
Tilt steering: Except HF Model

1. Remove the upper column holder, bending plate and bending plate spring.
2. Remove the tilt lock plate by removing the tilt adjusting bolt.
3. Remove the tilt lever, column hanger spring and bending plate base by removing the tilt lock bolt.
4. Position the ignition switch in "I".
5. Remove the snap ring, then remove the steering shaft from the bottom of the column.
6. Remove the retaining collar.

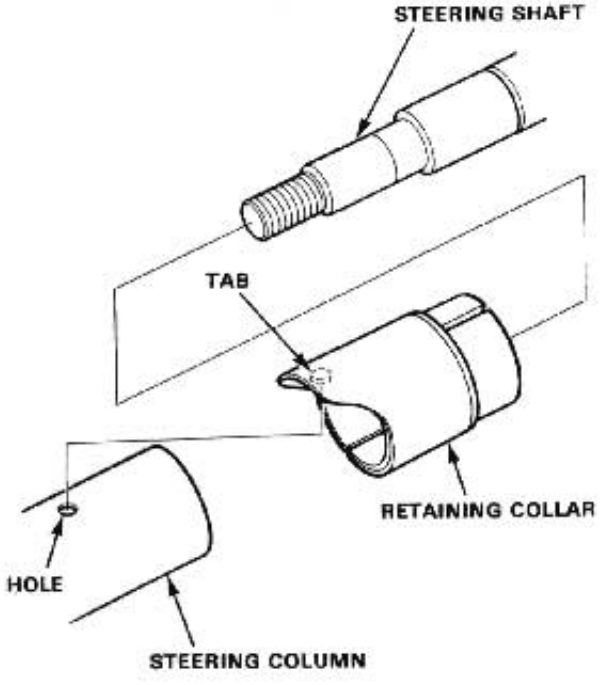


Reassembly

1. Install the circlip on the steering shaft.



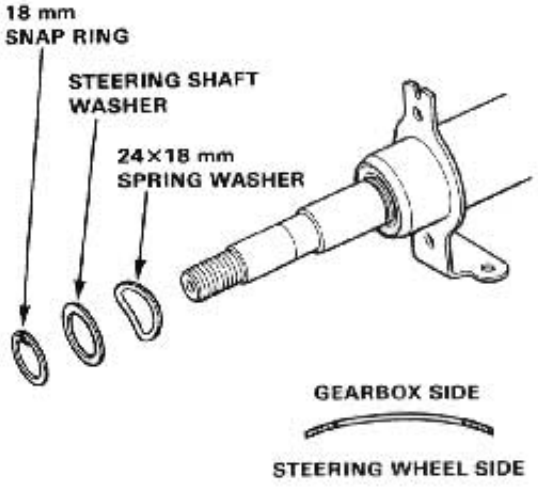
2. Install the retaining collar on the steering column aligning the hole in the column with tab on the retaining collar.



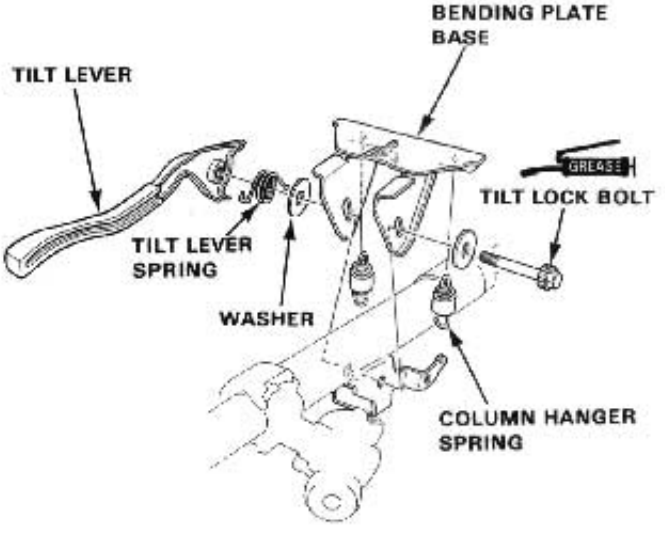
3. Insert the steering shaft into the steering column from the bottom.

4. Install the 24×18 mm spring washer and steering washer on the steering shaft and secure with the 18 mm snap ring.

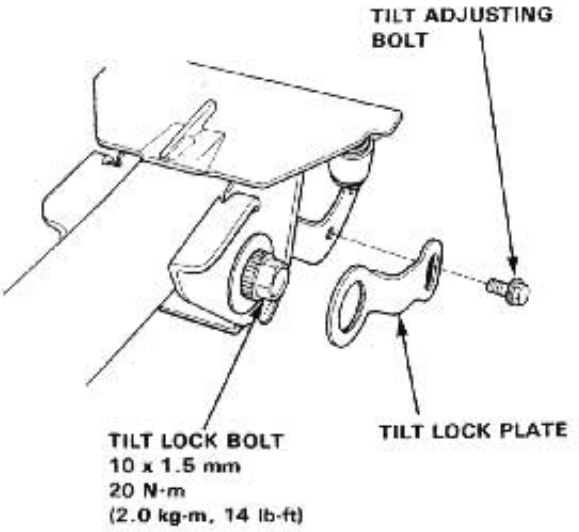
   NOTE: Install the spring washer as shown.



5. Position the bending plate guide on the steering column.
6. Loosely install the tilt lever, tilt lever spring, washers, and the bending plate guide on the steering column with the tilt lock bolt.
7. Install the column hanger springs between the bending plate base and steering column.

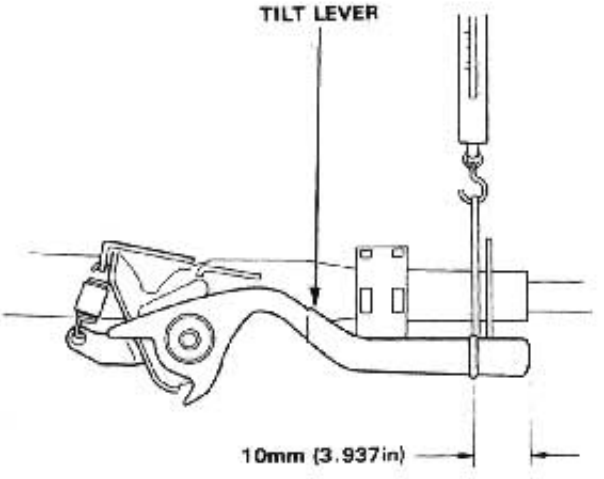


8. Tighten the tilt lock bolt to 20N·m (2.0 kg-m 14lb-ft), then position the tilt lock plate on the splined portion of the tilt lock bolt and loosely attach with the tilt adjusting bolt.

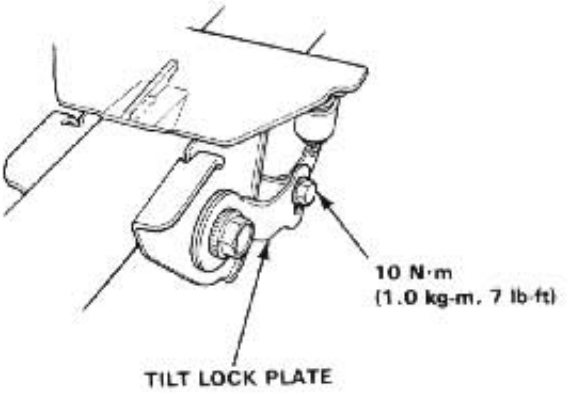


9. Attach a spring scale 10mm(3.937in) from the end of the knob. Measure the force required to move the lever.

Preload: 80N (8.0 kg, 18 lbs)



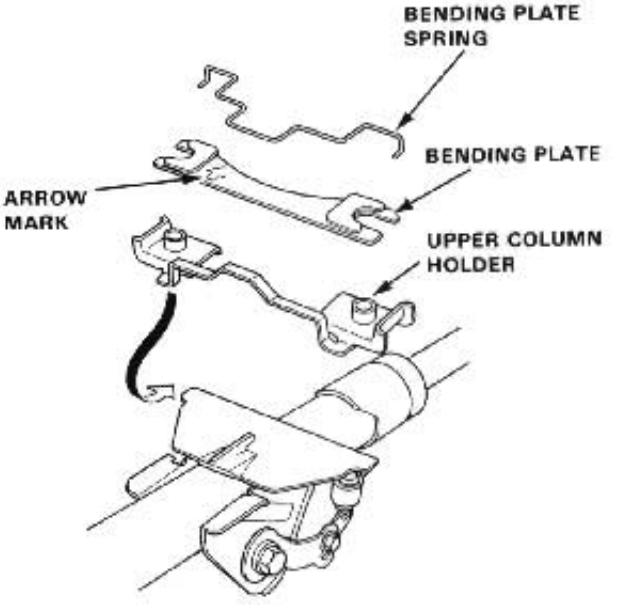
10. If the force measured is not within the specification, remove the tilt lock plate then reset it in the position where the correct force can be obtained.



11. Tighten the tilt adjusting bolt.

12. Install the upper column holder and bending plate with the bending plate spring on the bending plate base.

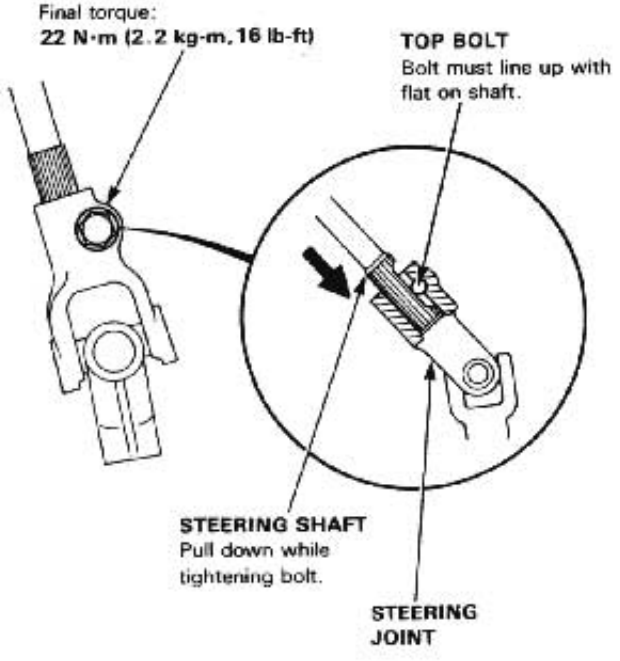
NOTE: Install the bending plate with arrow mark facing the steering gearbox.



(cont'd)

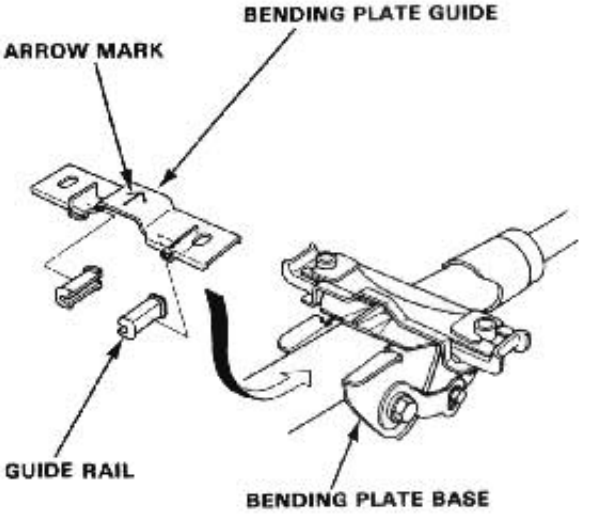
Reassembly (cont'd)

13. Slip the upper end of the steering joint onto the pinion shaft (line up the bolt hole with the groove around the shaft) and loosely install the top bolt.

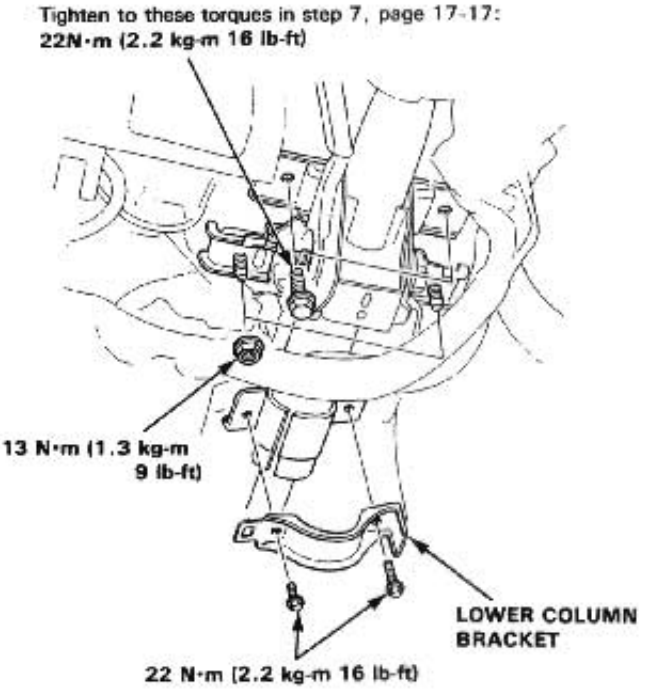


Installation

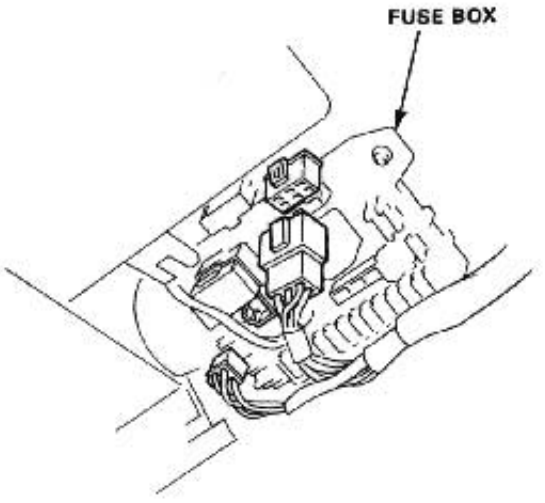
1. Set the guide rails in the bending plate guide and install the bending plate guide on the bending plate base.
NOTE: Install the bending plate guide with its arrow mark toward the gearbox.



2. Loosely install the steering column assembly with the nuts, bolts, and lower column bracket.

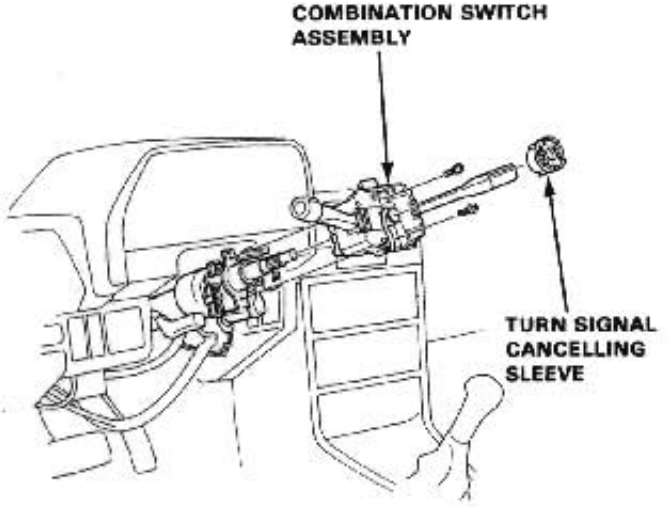


3. Connect each wire coupler to the fuse box at the under dash left side.

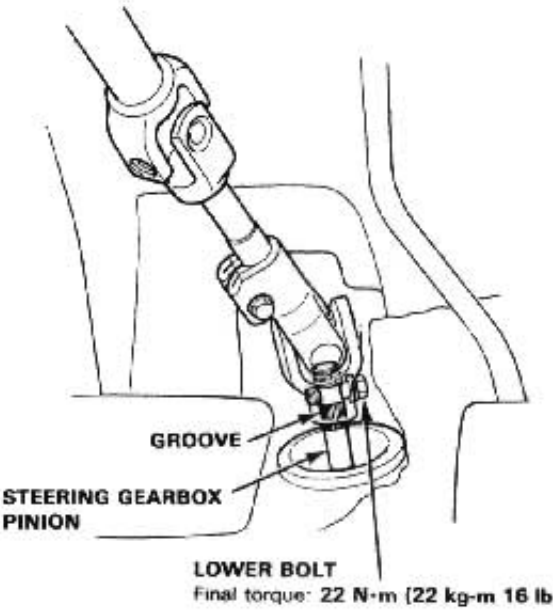


4. Install the combination switch assembly and turn signal cancelling sleeve.

5. Connect each wire coupler to the combination switch.



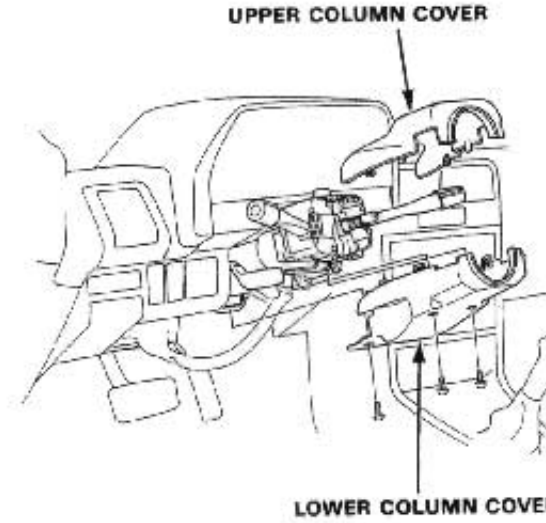
6. Loosely install the steering joint on the steering gearbox pinion.
NOTE: Be sure that the lower bolt is securely in the groove in the steering gearbox pinion.



7. Tighten the steering column mounting bolts, nuts and bracket loosely installed in step 2.

8. Tighten the lower steering joint bolts.

9. Install the upper column cover and lower column cover.



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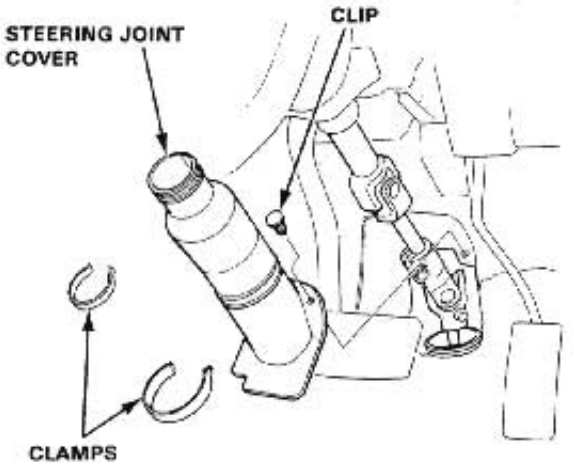
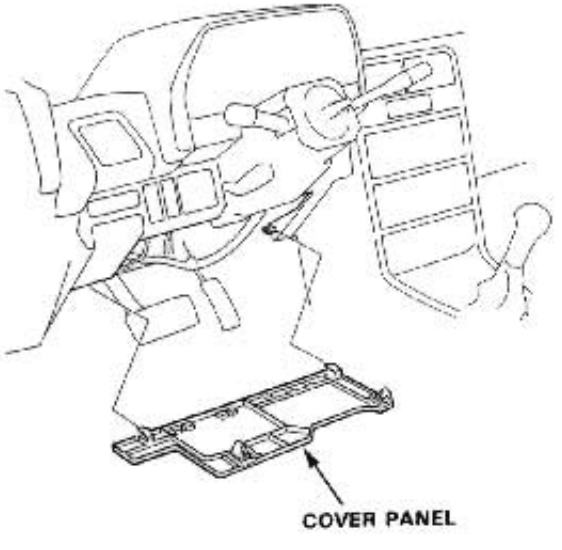
Installation (cont'd)

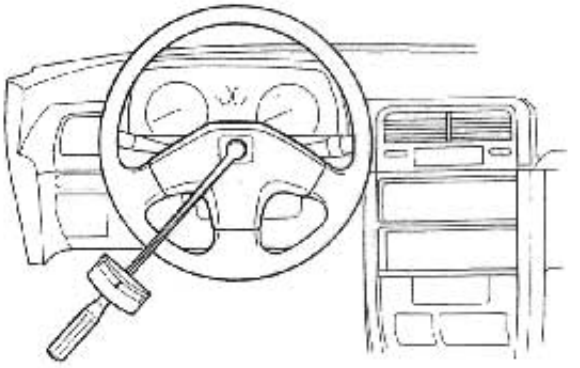
10. Install the steering joint cover with the clamps and clip.



11. Install the cover panel.



12. Install the steering wheel in a straight ahead position.
13. Tighten the steering wheel mount nut and torque to 50 N·m (5.0 kg-m, 36 lb-ft).
14. Check that the horn works properly, then install the center pad.



Brakes

Special Tools

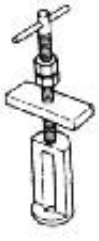
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07749—0010000	Driver	1	19-21
②	07947—6890300	Bearing Driver Attachment	1	19-21
③	07JAG—SD40100	Pushrod Adjustment Gauge	1	19-24
④	07921—0010001	Flare Nut Wrench	1	19-41
⑤	07HAE—SG00100	Brake Spring Compressor	1	19-31
⑥	07914—SA50001	Snap Ring Pliers	1	19-31

①

②

③

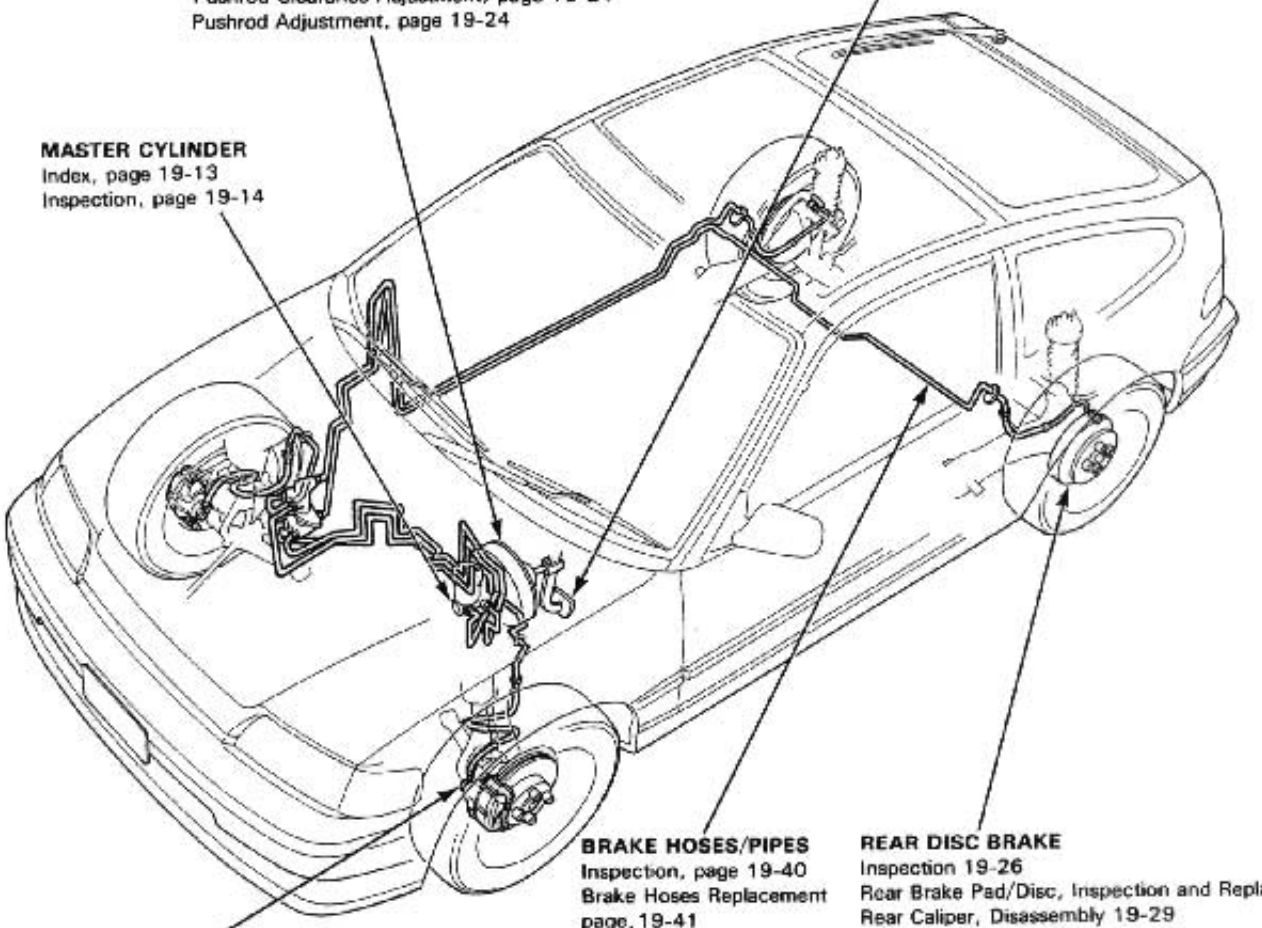
④



⑤

⑥

Illustrated Index



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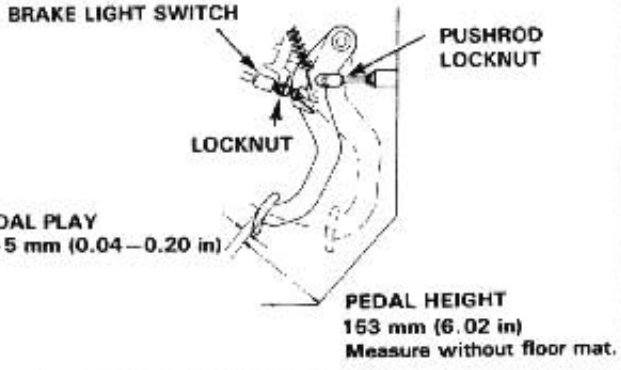
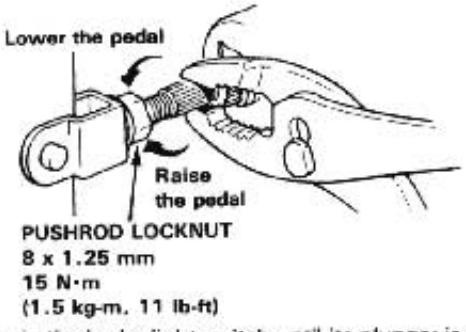
Pedal Height

Adjustment

1. Loosen the brake light switch locknut and back off the brake light switch until it is no longer touching the brake pedal.

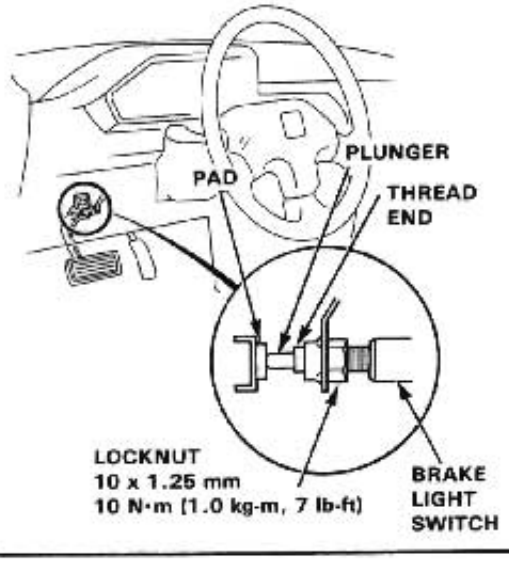


2. Loosen the pushrod locknut and screw pushrod in or out with plier until the pedal height from the floor is 153 mm (6.02 in). After adjustment, tighten the locknut firmly.



3. Screw in the brake light switch until its plunger is fully depressed (threaded end touching pad on pedal arm). Then back off switch 1/2 turn and tighten locknut firmly.

CAUTION: Check that the brake lights go off when the pedal is released.



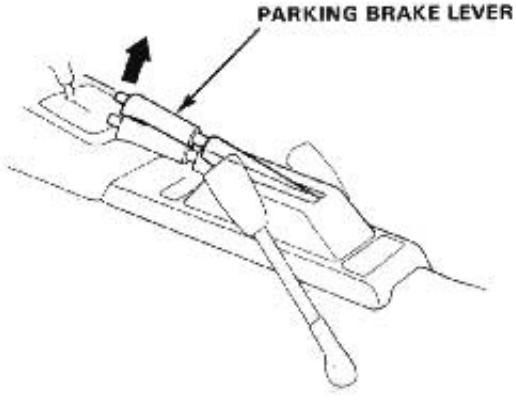
Parking Brake

Adjustment

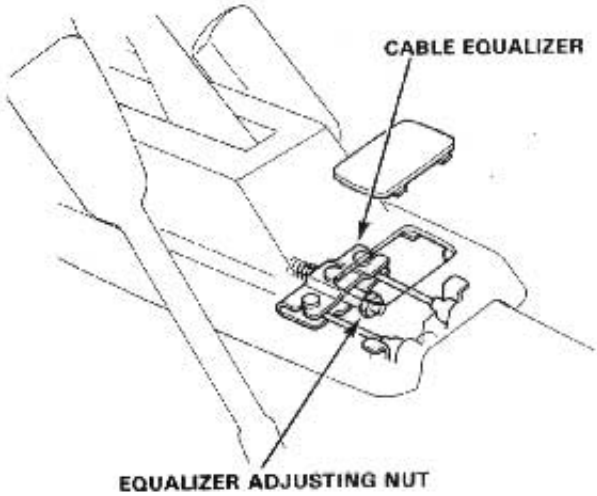
NOTE:
- Be sure the rear brakes are properly adjusted before adjusting the parking brake.
- Incorrectly adjusted rear brakes affect the parking brake adjustment.
- If rear brake adjustment is required, repair the rear adjuster first.
- If doing this adjustment after brake drum installation, start the engine and depress the brake pedal several times to set self-adjusting brakes before adjusting 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. Pull the parking brake lever up one notch.



3. Tighten the equalizer adjusting nut until rear wheels drag slightly when turned.
4. Release brake lever and check that rear wheels do not drag when turned. Readjust if necessary.
5. With the equalizer properly adjusted, the rear brakes should be fully applied when the parking brake lever is pulled up 6 to 10 clicks.



Inspection

⚠WARNING

- **Inhaled asbestos fibers have been found to cause respiratory disease and cancer.**
  Never use an air hose or dry brush to clean brake assemblies.

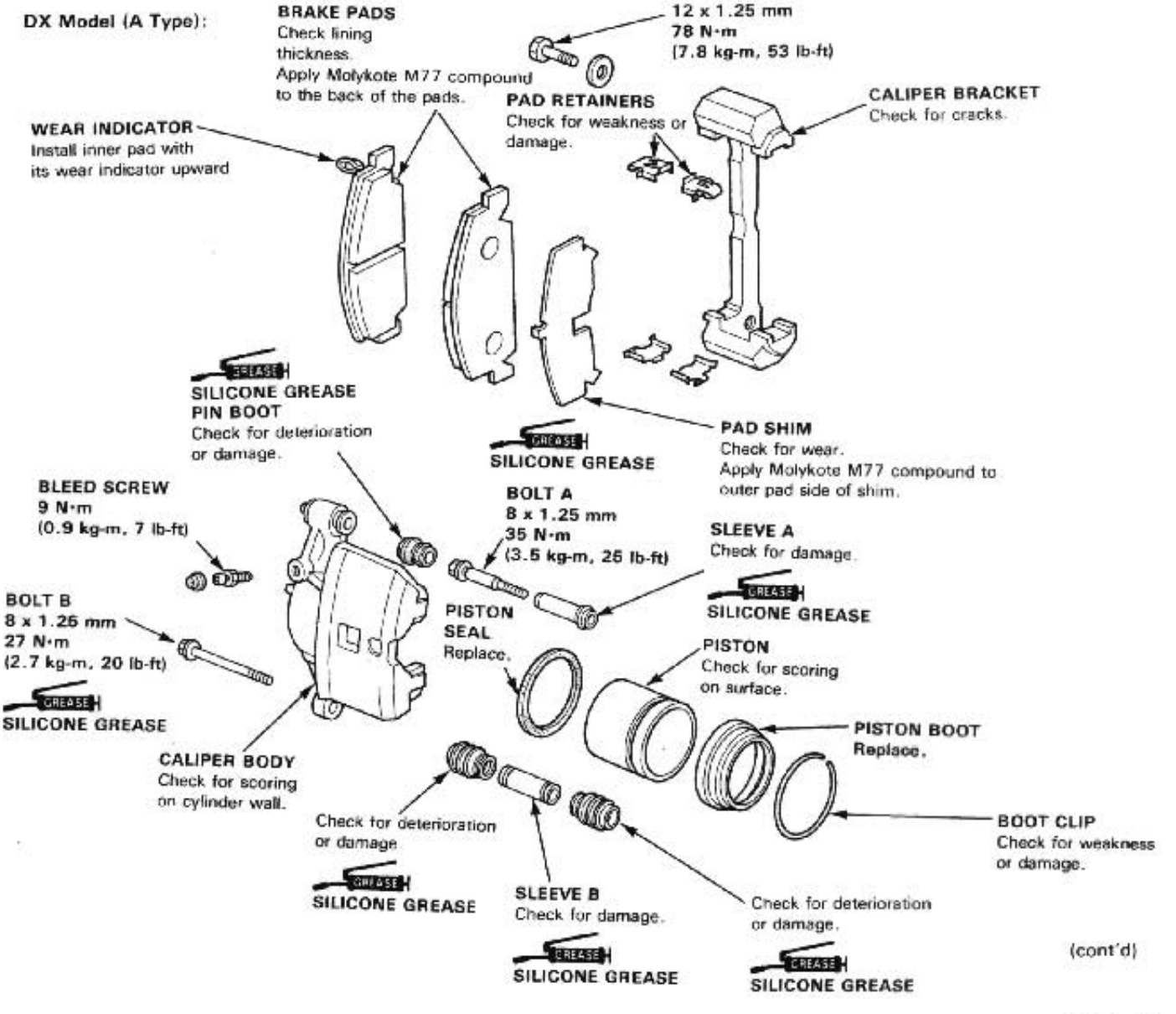
- **Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA designed to minimize the hazard cause by airborne asbestos fibers.**

CAUTION:

- **Do not spill brake fluid on the car: it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**
- **Clean all parts in brake fluid and air dry: blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid.**

NOTE:

- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.



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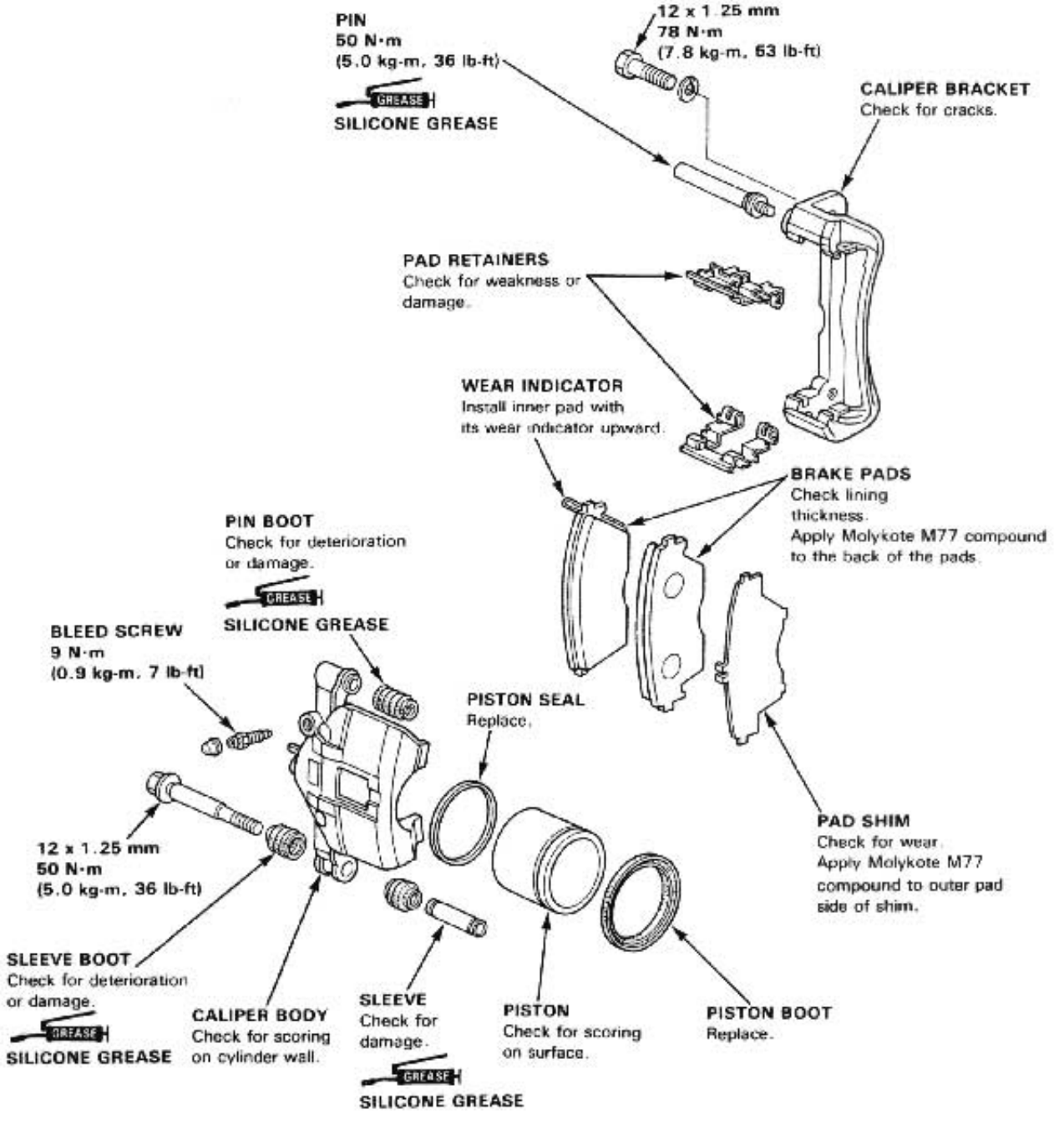
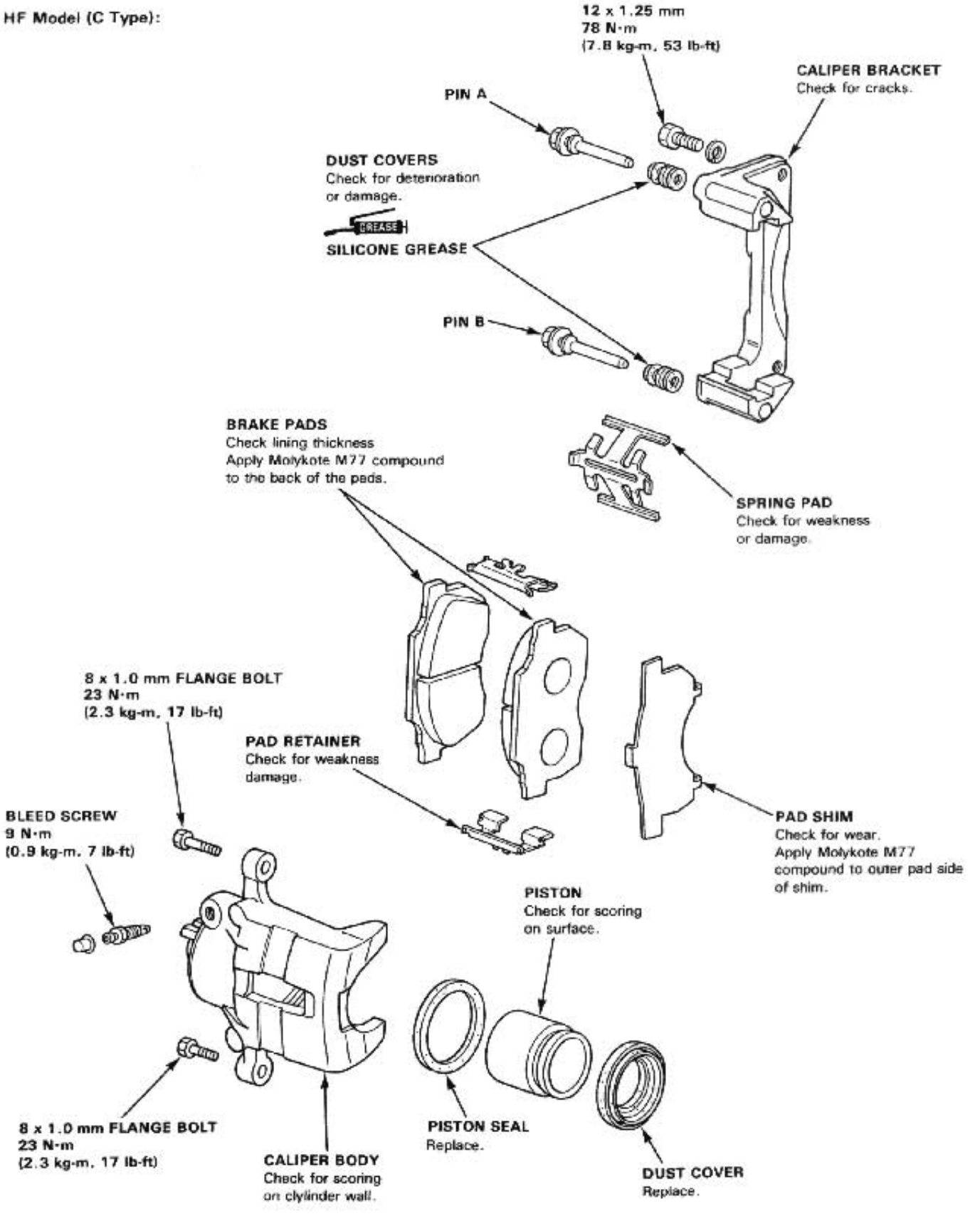
Inspection (cont'd)

SI Model (B Type):



HF Model (C Type):



Brake Pad

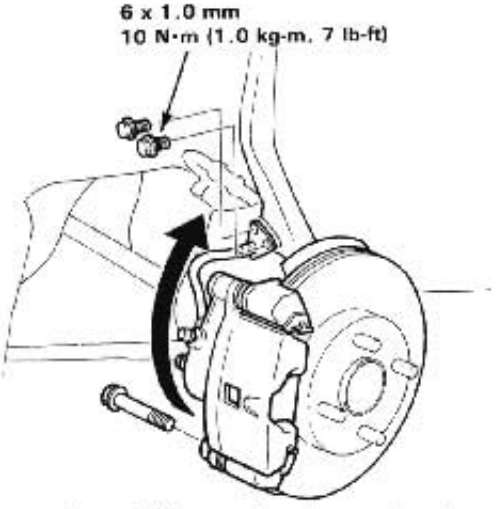
Inspection/Replacement

⚠WARNING

- **Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA designed to minimize the hazard cause by airborne asbestos fibers.**

1. Remove the front wheels and support the front of the car on safety stands.
2. Remove the brake hose clamp bolts from the knuckle.
3. Remove the caliper bolt and pivot caliper up out of the way.

NOTE: On the type C brake caliper, hold pin B with a open end wrench when removing the caliper bolt.



4. Remove the pad shims, pad retainers and pads.
5. Using a vernier caliper, meaure the thickness of each brake pad lining.

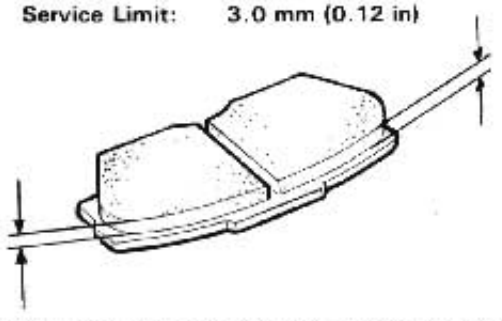
Brake Pad Thickness:

HF Model (C Type)

Standard:	**9.5 mm (0.37 in)**
Service Limit:	**3.0 mm (0.12 in)**

DX, SI Model (A, B Type)

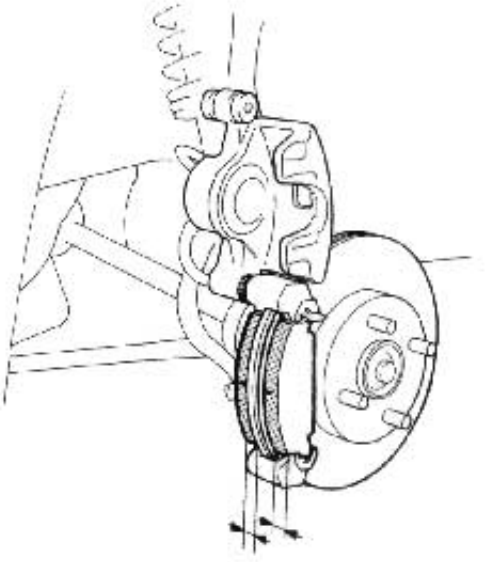
Standard:	**9.0 mm (0.35 in)**
Service Limit:	**3.0 mm (0.12 in)**



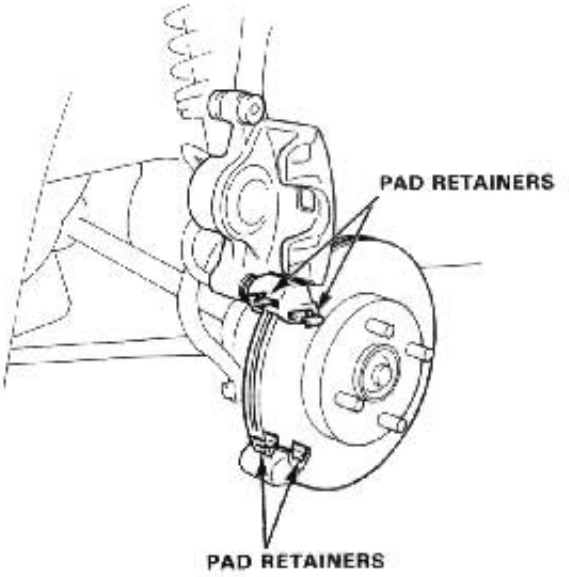
NOTE: Measurement does not include pad backing thickness.

6. If lining thickness is less than service limit, replace both pads as a set

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.



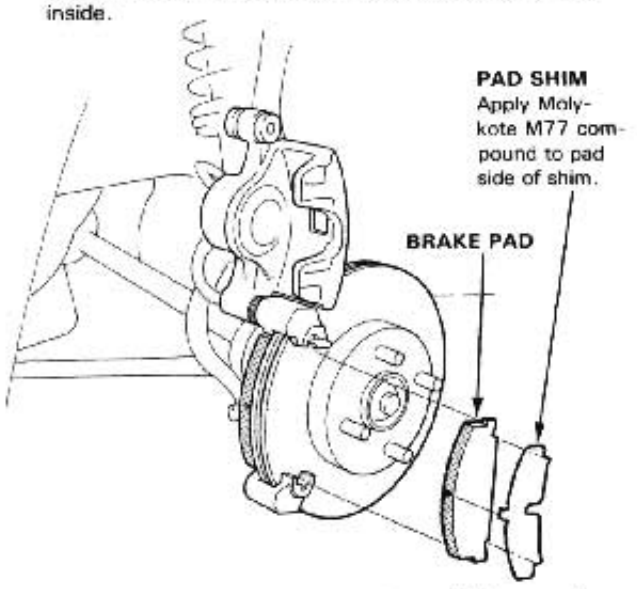
7. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
8. Install the pad retainers.



9. Apply Molykote M77 compound to the pad shim and back of the pads. (page 19-5 through 19-7)

10. Install the brake pads and pad shim.

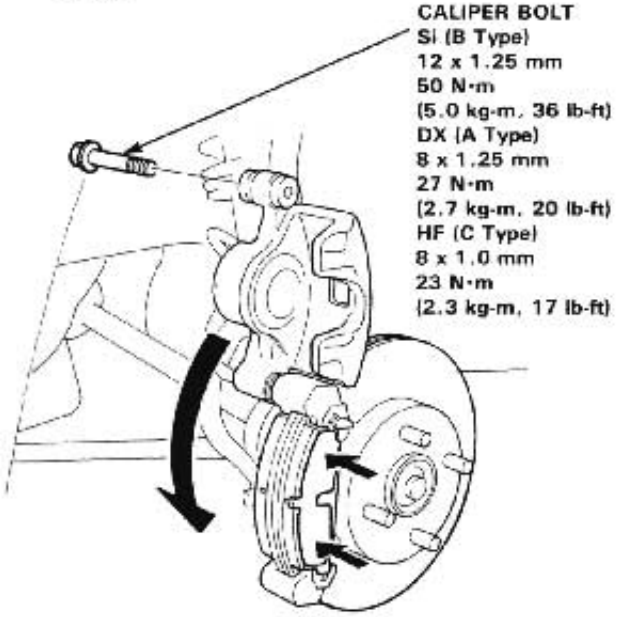
    NOTE: Install the pad with the wear indicator on the inside.



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 the specified torque.

    NOTE: Caliper bolt tightening torque varies from type to type.



13. Install the brake hose clamp bolts to the knuckle.
14. Depress the brake pedal several times to make sure the brakes work, then road-test.

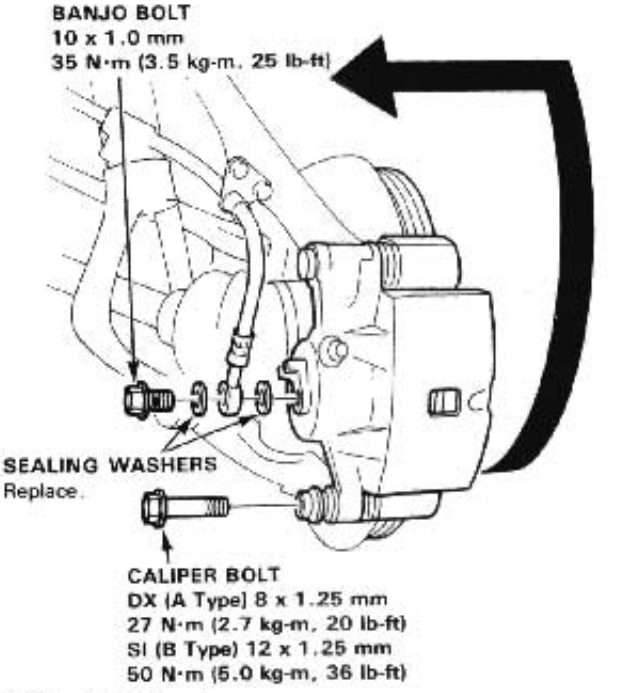
Disassembly

CAUTION:
- **Make sure all parts are clean before reassembly.**
- **Use only new replacement parts.**
- **Use only clean DOT3 or 4 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.**

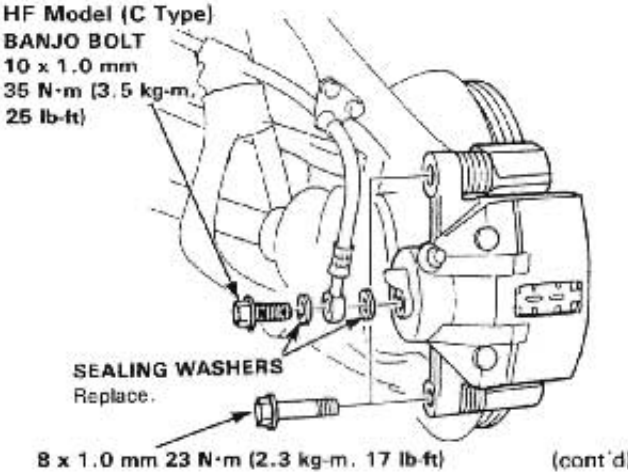
1. Remove the banjo bolt and disconnect the brake hose from the caliper.
2. Remove the caliper bolt, then remove the caliper.

   NOTE: Avoid damaging the splash guard.

DX and SI Model (A and B Type)



HF Model (C Type)



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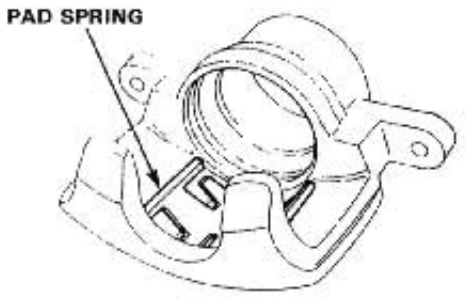
Brake Caliper

Disassembly (cont'd)

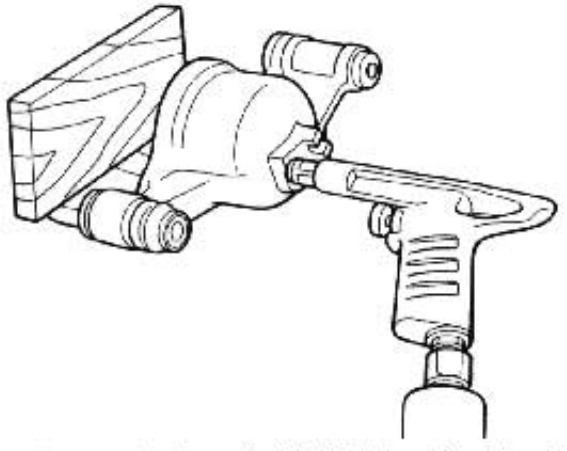
3. (HF Model only)
Remove the pad spring from the caliper body.



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.

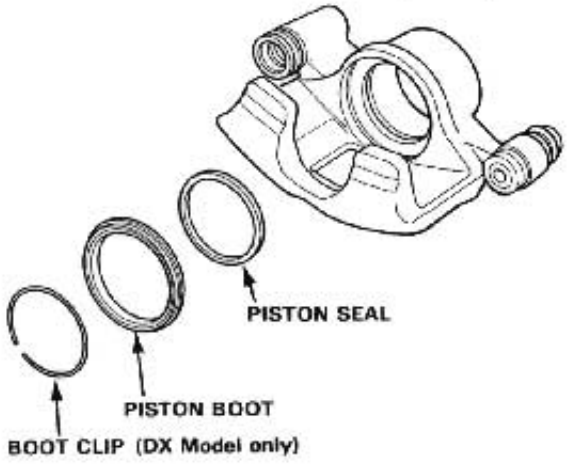
⚠WARNING

- **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 boot clip (DX Model only), piston boot and piston seal.

CAUTION: Take care not to damage the cylinder.



Reassembly

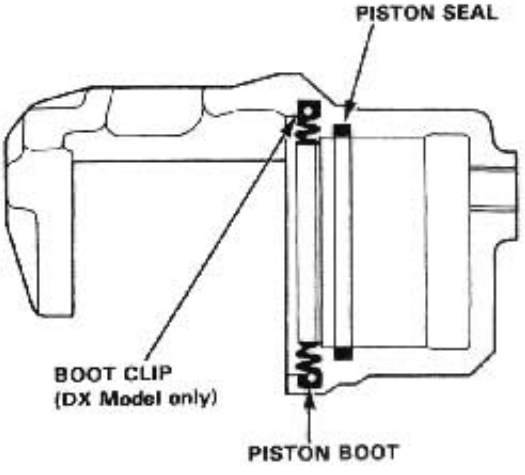
CAUTION:

- **Make sure all parts are clean before reassembly.**
- **Use only new replacement parts.**
- **Use only clean DOT3 or 4 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. Clean the piston and caliper bore with brake fluid and inspect for wear or damage.

2. Apply brake cylinder grease to a new piston seal, then install the piston seal in the cylinder groove.

3. Install the piston boot and boot clip (DX Model only).



4. Lubricate the caliper cylinder and piston with brake fluid, then install the piston in the cylinder with the dished end facing in.

5. Reinstall the caliper in the reverse order of removal.

6. Fill the brake reservoir up and bleed the brake system (page 19-12).

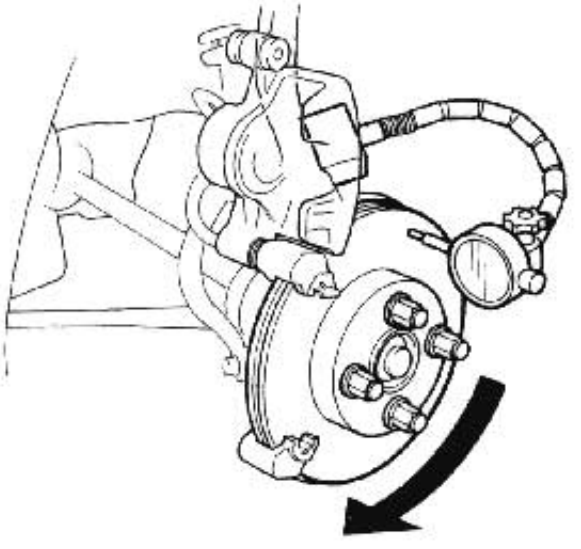
Brake Disc

Run-Out Inspection

1. Remove the front wheels, and support the front of the car on safety stands.
2. Remove the caliper pin bolt, then pivot the caliper up out of the way on the caliper pin bolt, and remove the pads and pad retainers.
3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.
4. Use the lug nuts to hold the disc securely against the hub, then mount a dial indicator as shown.

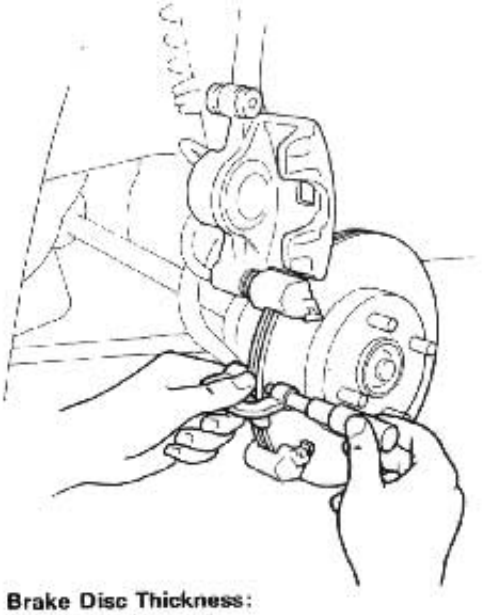
   Brake Disc Runout:
   Service Limit: 0.1 mm (0.004 in)

5. If the disc is beyond the service limit, refinish the rotor with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front brake disc lathe" offered by Snap-on Tools Co. are approved for this operation.



Thickness and Parallelism Inspection

1. Remove the front wheels, and support the front of the car on safety stands.
2. Move the caliper and pads out of the way as described in the preceding column.
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in.) in from the outer edge of the disc.



Brake Disc Thickness:

HF Model (C Type)	
Standard:	**17 mm (0.67 in)**
Max: Refinishing Limit:	**15 mm (0.59 in)**
DX Model (A Type)	
Standard:	**21 mm (0.83 in)**
Max: Refinishing Limit:	**19 mm (0.75 in)**
SI Model (B Type)	
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, refinish the rotor with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front brake disc lathe" offered by Snap-on Tools Co. are approved for this operation.

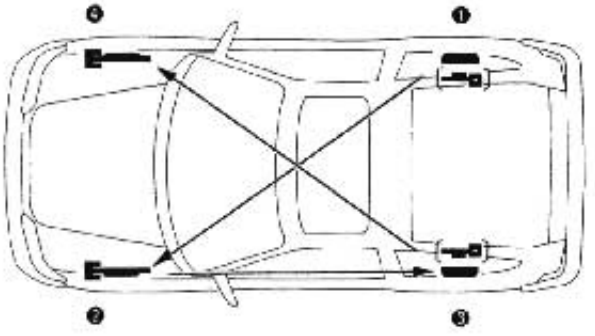
   NOTE: A new disc should be ground if its run-out is greater than 0.10 mm (0.004 in.).

Bleeding

CAUTION
- **Make sure all parts are clean before reassembly.**
- **Use only 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.**

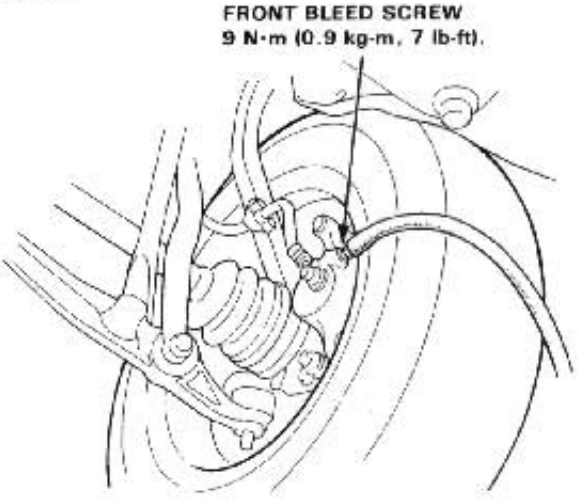
NOTE: The reservoir on the master cylinder must be full at the start of bleeding procedure, and checked after bleeding each wheel cylinder. Add fluid as required. Use only DOT 3 or 4 brake fluid.

Bleeding Sequence

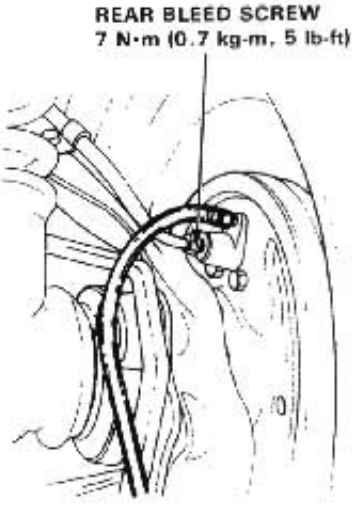


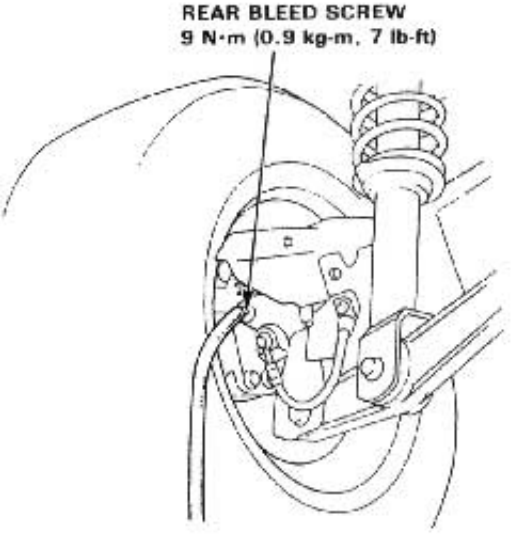
1. Have someone slowly pump the brake pedal several times, then apply steady pressure.
2. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
3. Repeat the procedure for each wheel in the sequence shown above, until air bubbles no longer appear in the fluid.
4. Check brake performance by road testing.

FRONT



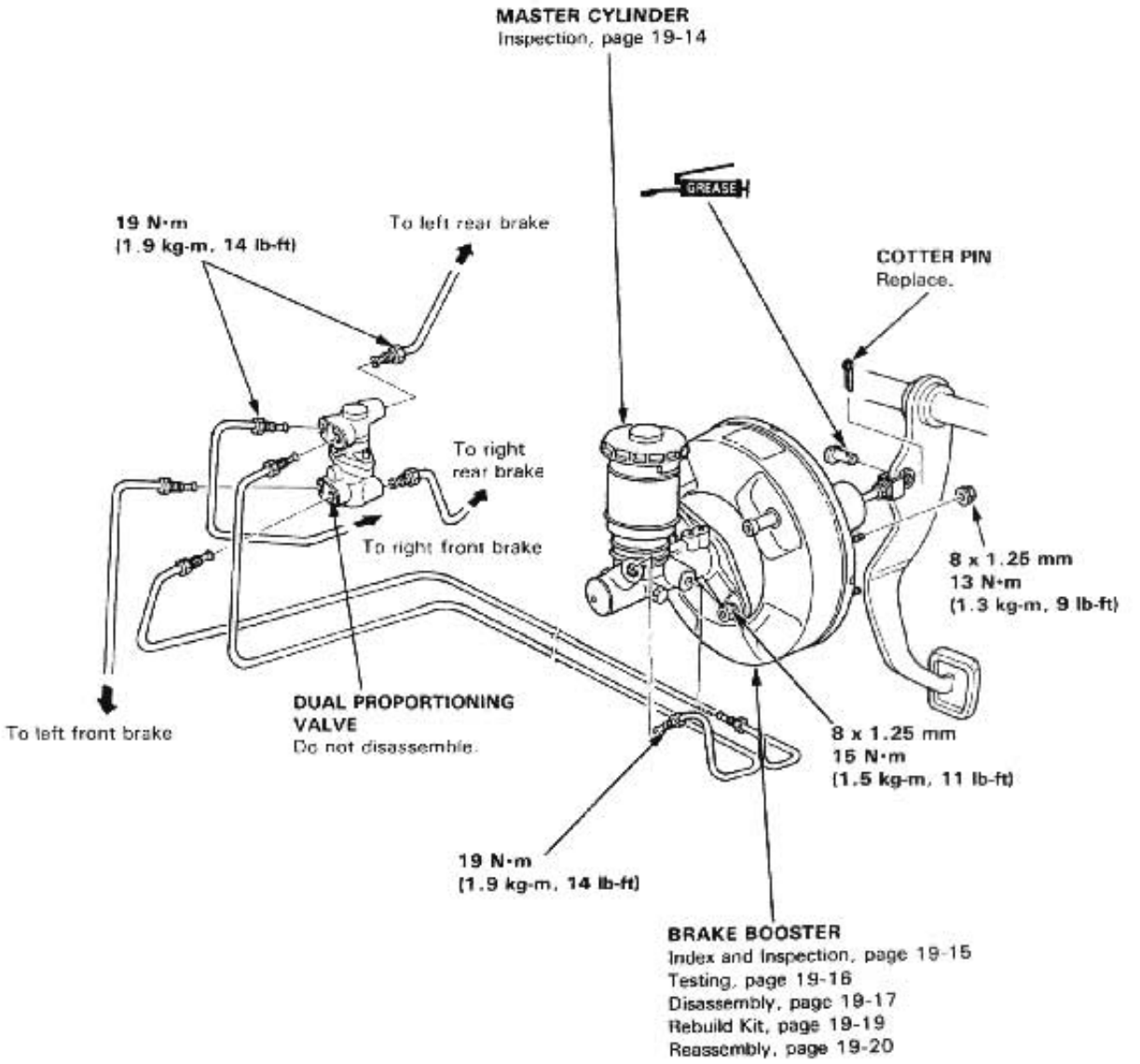
REAR





Master Cylinder/Brake Booster

Index

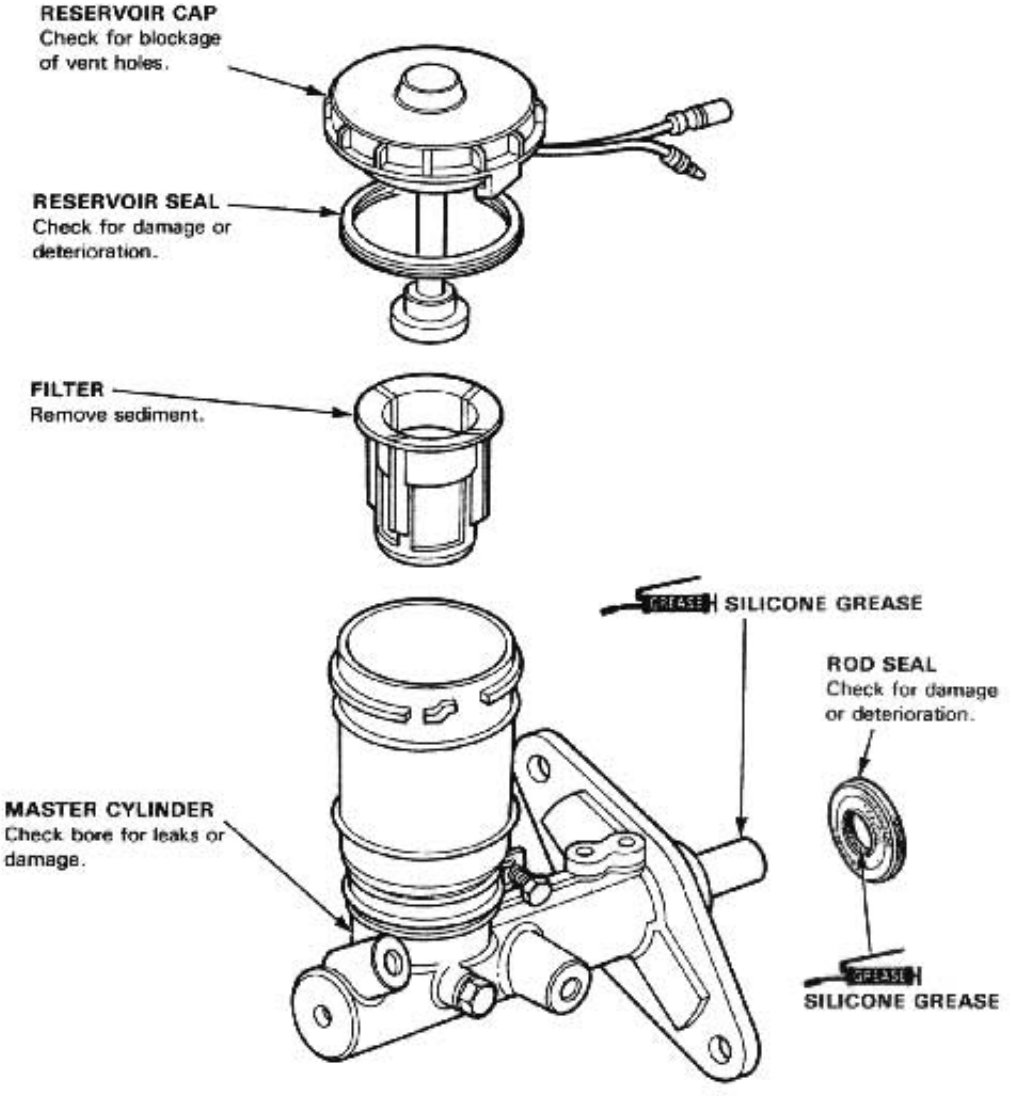


Master Cylinder

Inspection

CAUTION:

- Be careful not to bend or damage the brake pipe when removing the master cylinder.
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Do not try to disassemble the parts in the master cylinder assembly. Replace the master cylinder assembly with a new part if necessary.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid.
- When connecting the brake pipes, make sure that there is no interference between the brake pipes and other parts.

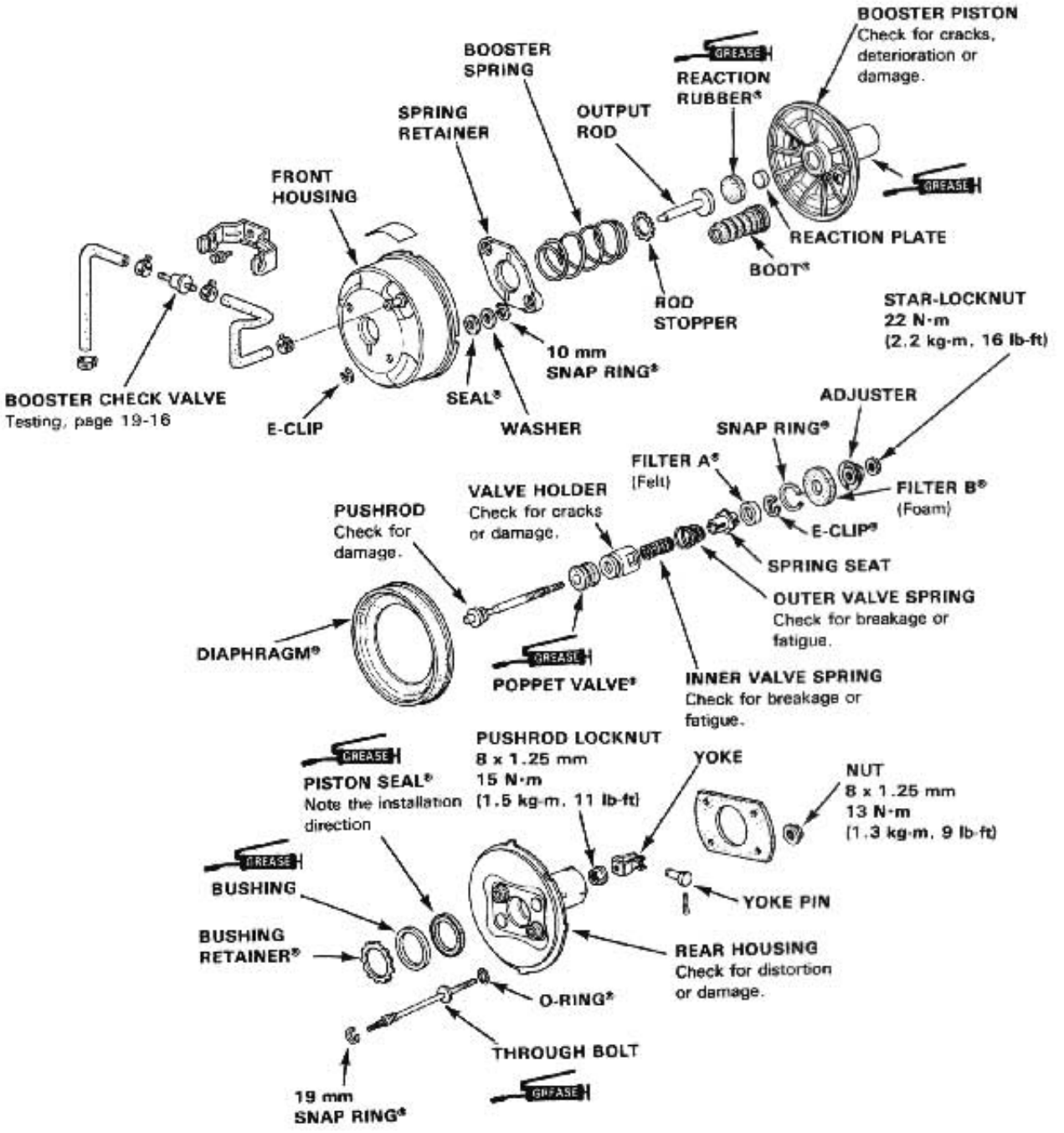


Brake Booster

Index and Inspection

Booster testing is on the 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 19-17).



Brake Booster

Testing

Functional Test

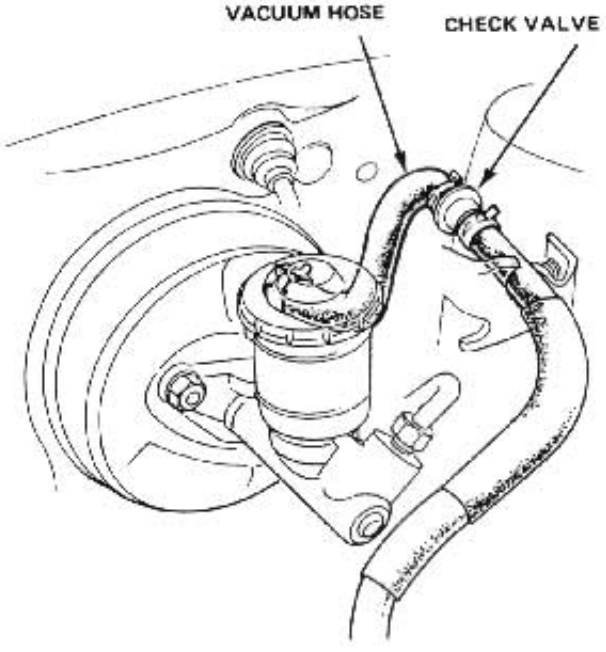
1. With the engine off, depress the brake pedal several times, then depress the pedal hard and hold that pressure for 15 seconds. If the pedal sinks, a brake line, a wheel cylinder, or the master cylinder is faulty.
2. Start the engine with the pedal depressed. If the pedal sinks slightly, the vacuum 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 off, 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

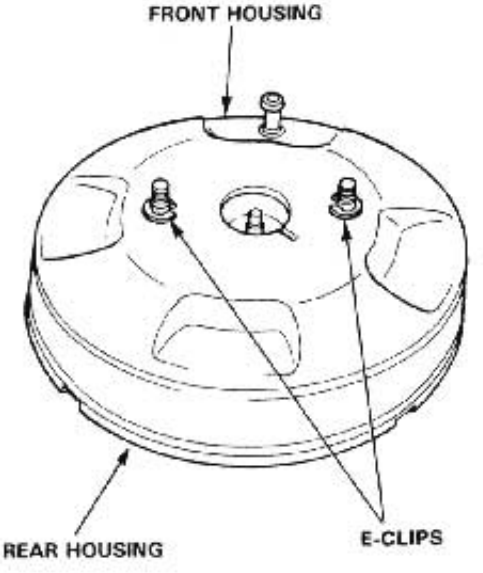
1. Disconnect the brake booster vacuum hose at the booster.
2. Start the engine and let it idle. There should be vacuum available. If no vacuum is available, the check valve is not working correctly.
   Replace the check valve and retest.



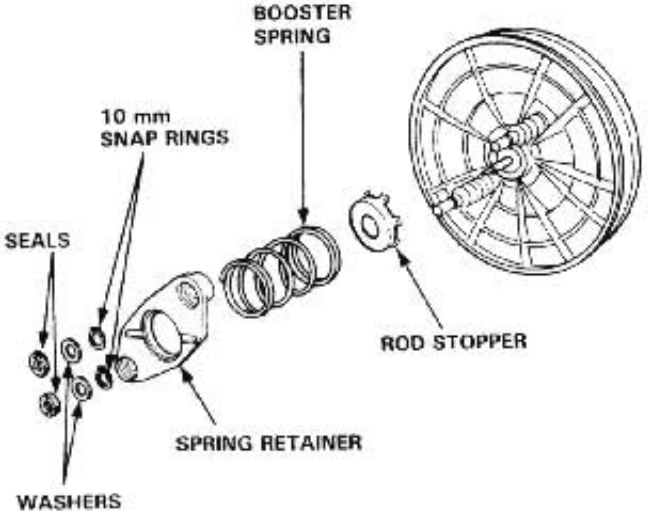
Disassembly

1. Scribe an aligning mark across the front and rear booster housings to ensure proper positioning of parts on reassembly.

2. Remove the E-clips, and separate the front booster housing and the rear booster housing.

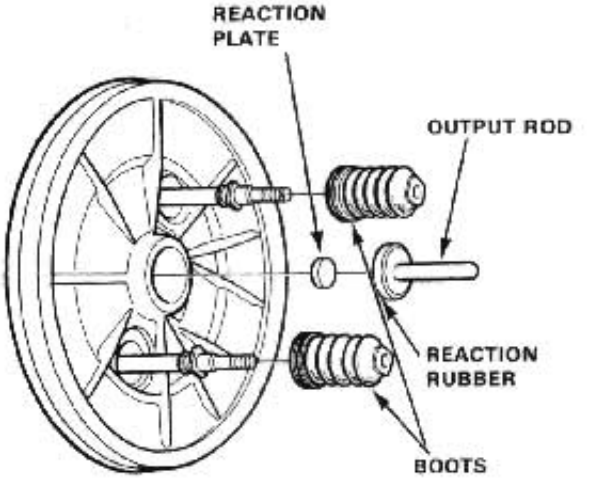


3. Remove the seals and washers from the spring retainer, then remove the spring retainer, booster spring and rod stopper by removing the 10 mm snap rings.



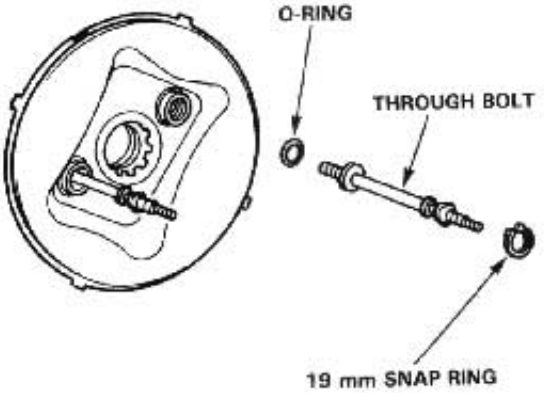
4. Remove the output rod, reaction rubber and reaction plate.

5. Remove the boots.



6. Separate the booster piston from the housing.

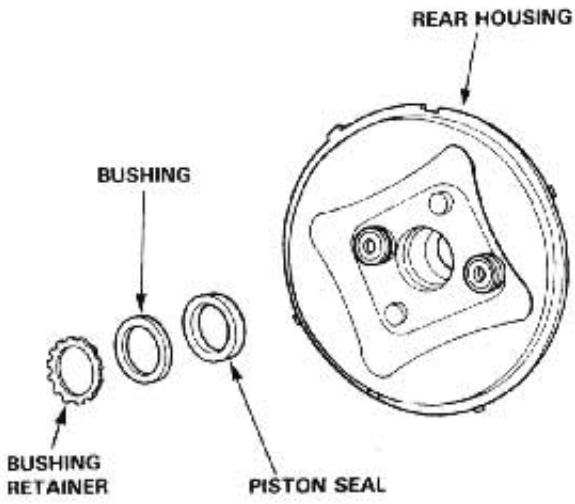
7. Remove the 19 mm snap ring and remove the through bolts with O-rings from the rear housing.



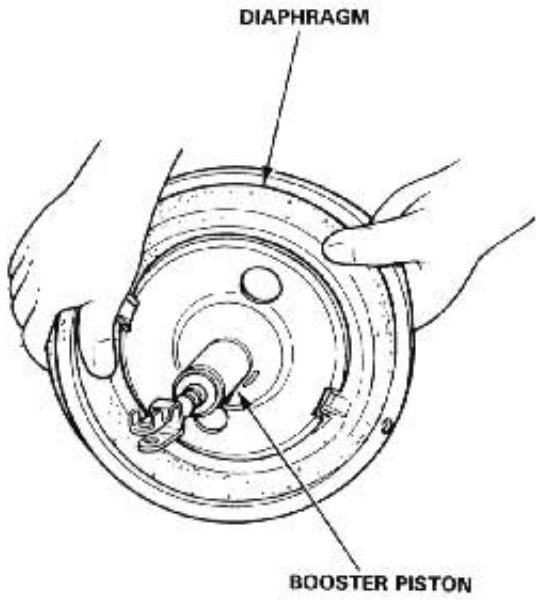
(cont'd)

Disassembly (cont'd)

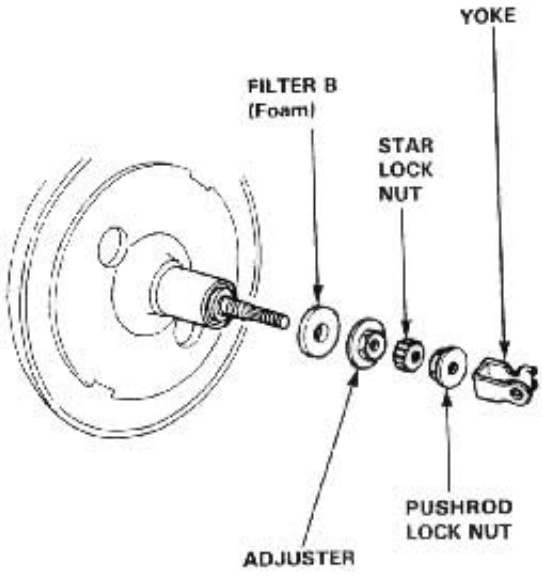
8. Remove the bushing retainer, bushing and piston seal from the rear housing.



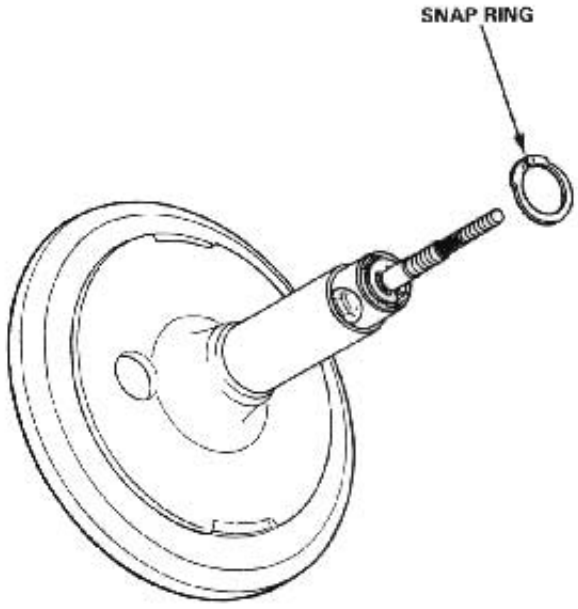
9. Remove the diaphragm from the booster piston.



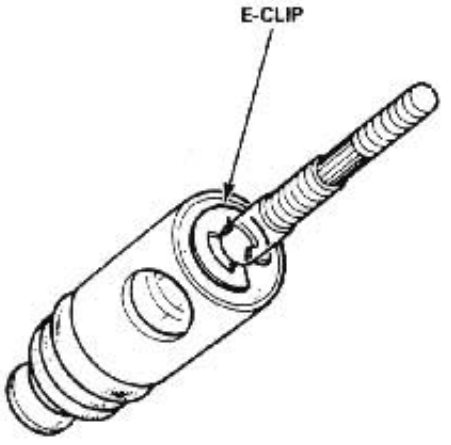
10. Remove the pushrod yoke, pushrod lock nut, star lock nut, adjuster and filter B (foam) from the booster piston



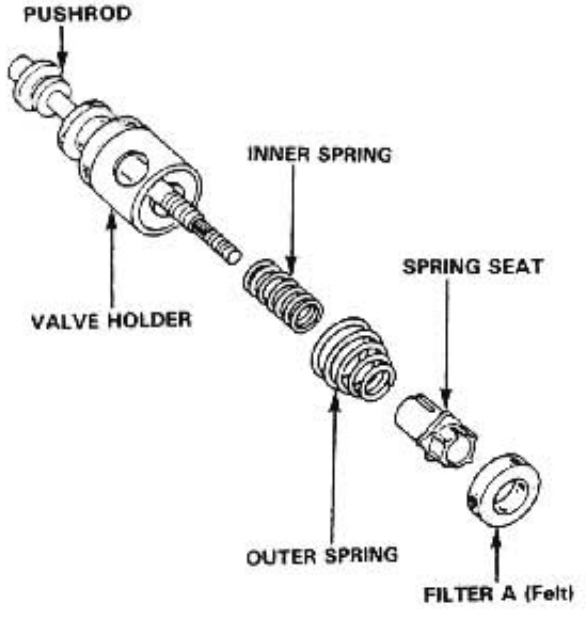
11. Remove the pushrod by removing the snap ring.



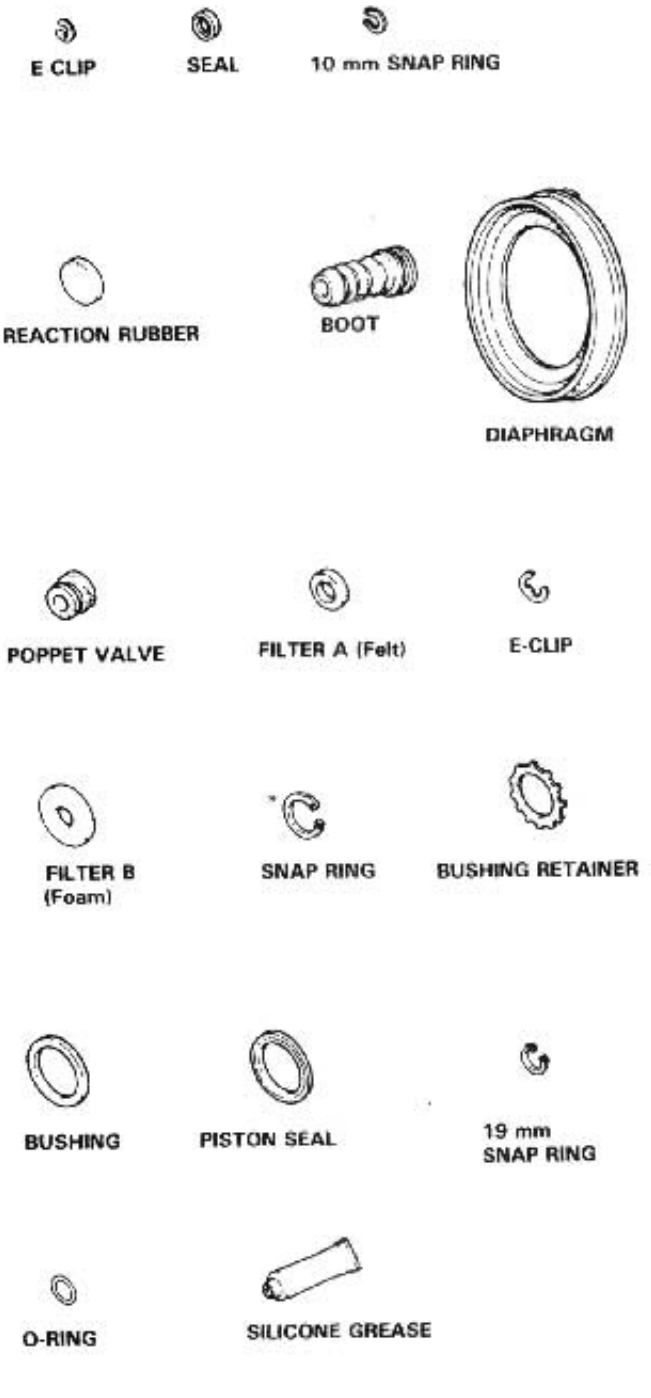
12. Remove the E-clip from the pushrod.



13. Remove the filter A (Felt), spring seat, outer valve spring, inner valve spring, valve holder, poppet valve and pushrod.



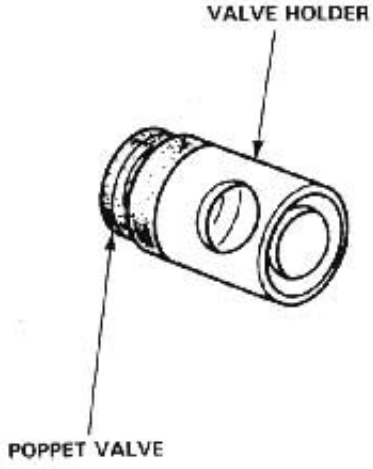
Rebuild Kit



Reassembly

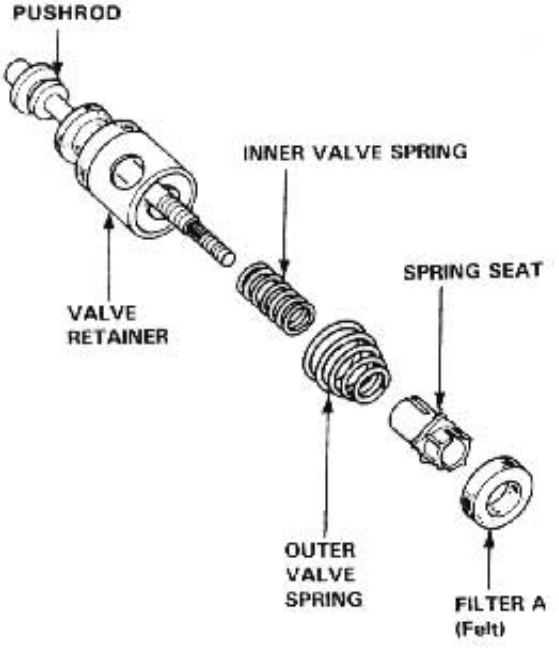
NOTE: Clean all parts before reassembly.

1. Install the poppet valve on the valve holder.

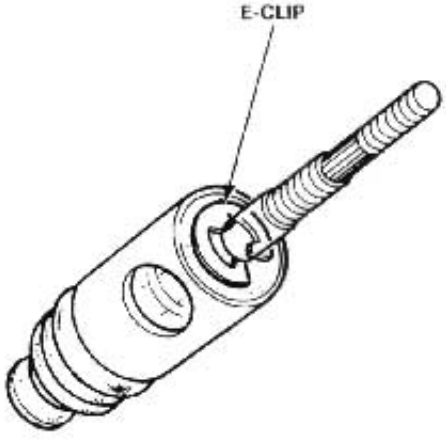


2. Install the valve holder, inner valve spring, outer valve spring and spring seat on the pushrod.

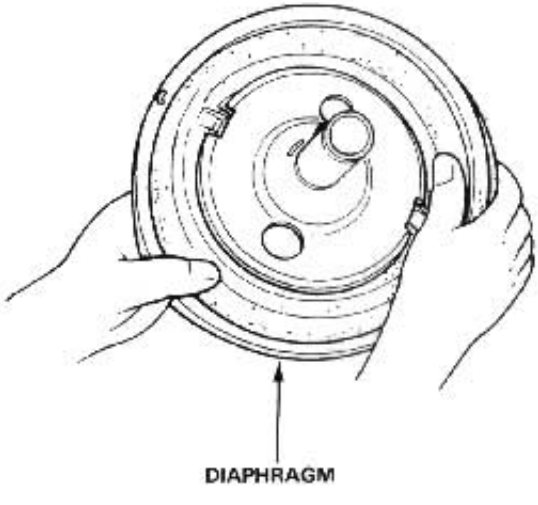
NOTE: Install the spring seat with its short end facing the filter side.



3. Install a new filter A (felt) on the pushrod and secure with a new E-clip.

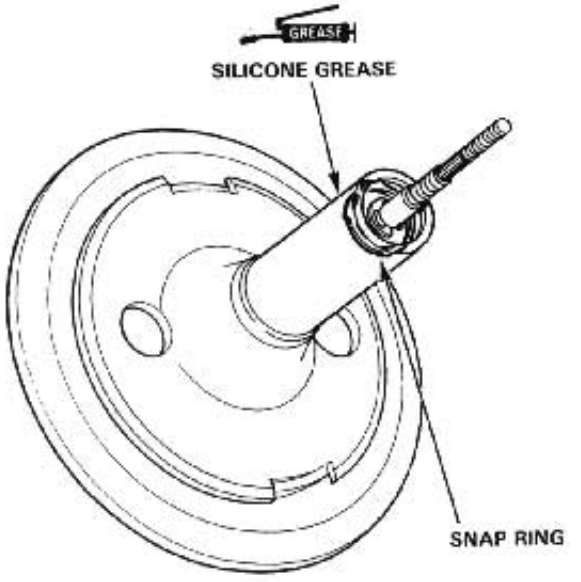


4. Install the diaphragm on the booster piston.

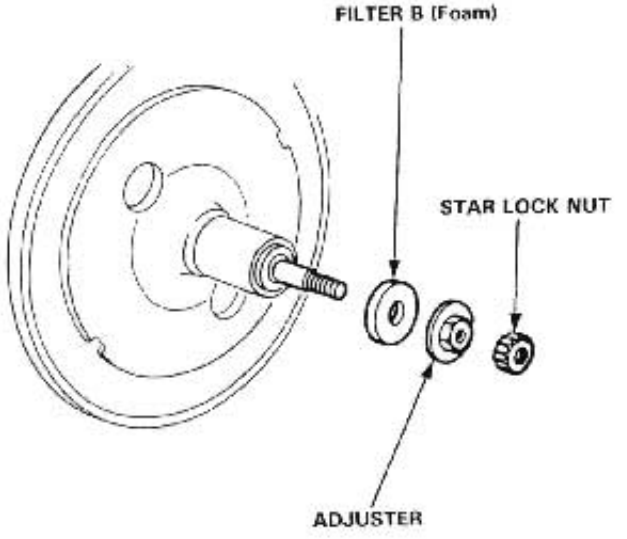


5. Apply silicone grease to the inner and outer surface of the booster piston tube.

6. Install the pushrod assembly and secure with the snap ring.

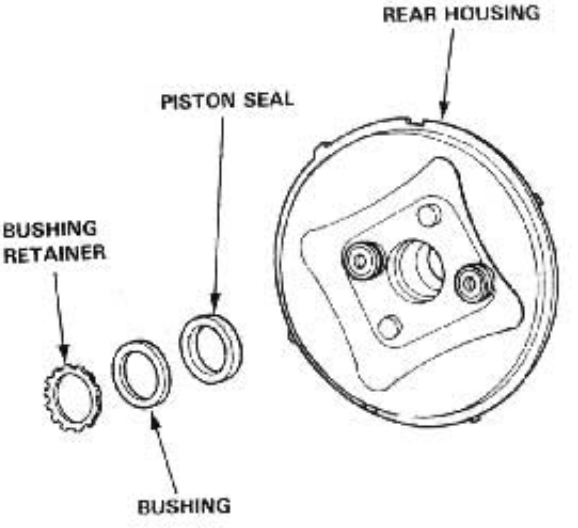


7. Install the filter B (foam) on the pushrod, then loosely install the adjuster and star lock unt.



8. Apply silicone grease to the piston seal.

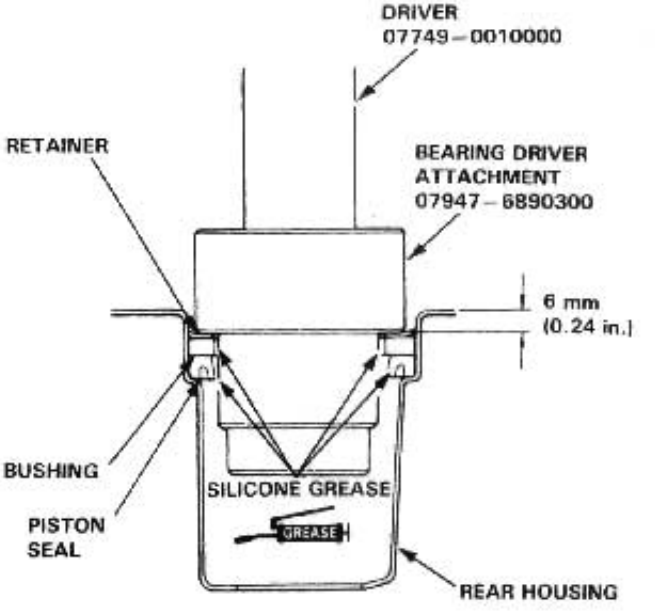
9. Position the piston seal, bushing and bushing retainer on the rear housing.



NOTE: Make sure the lip of the seal is facing in, as shown in drawing below.

10. Drive the bushing retainer in until it is 6 mm below the edge of the rear housing.

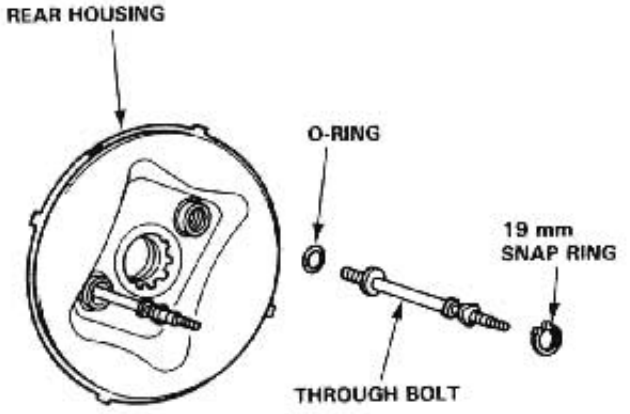
CAUTION: If you drive the retainer more than 6 mm, the piston seal may distort.



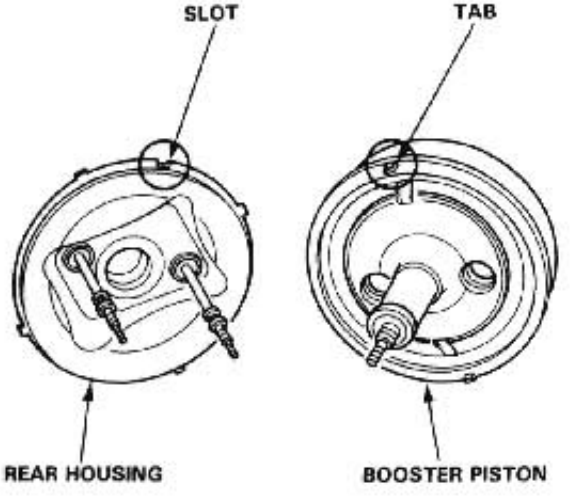
(cont'd)

Reassembly (cont'd)

11. Install the O-rings and through bolts on the rear housing and secure with 19 mm snap ring.

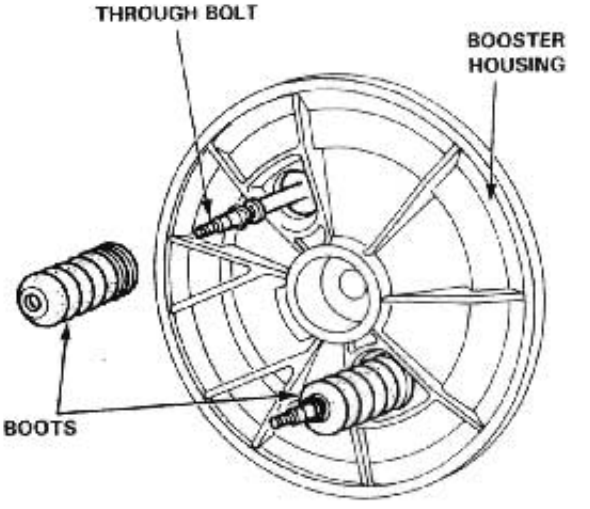


12. Install the booster piston on the rear housing aligning their tabs and slots.



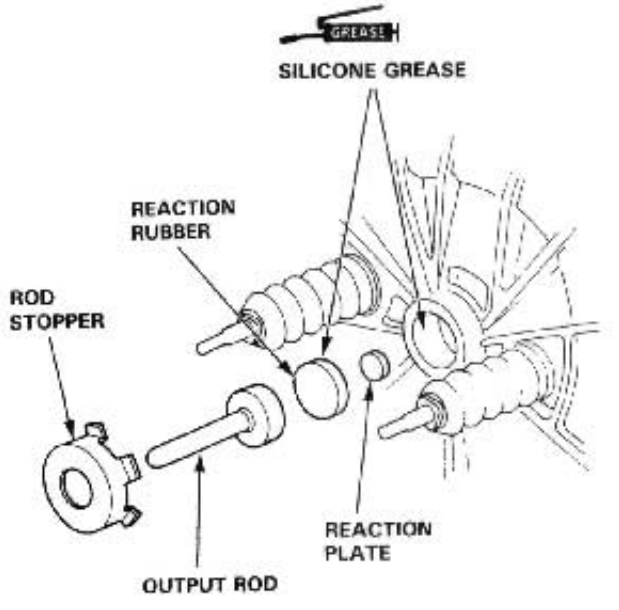
13. Install the boots on the through bolts.

NOTE: Make sure not to damage the boots when installing.

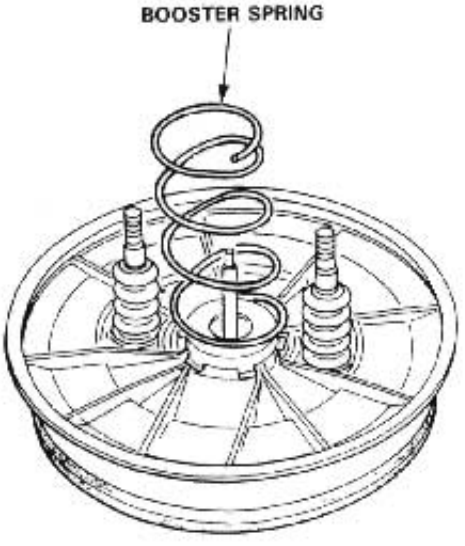


14. Apply silicone grease to the bore of the booster piston and reaction rubber.

15. Install the reaction plate, reaction rubber, output rod and rod stopper on the booster piston.

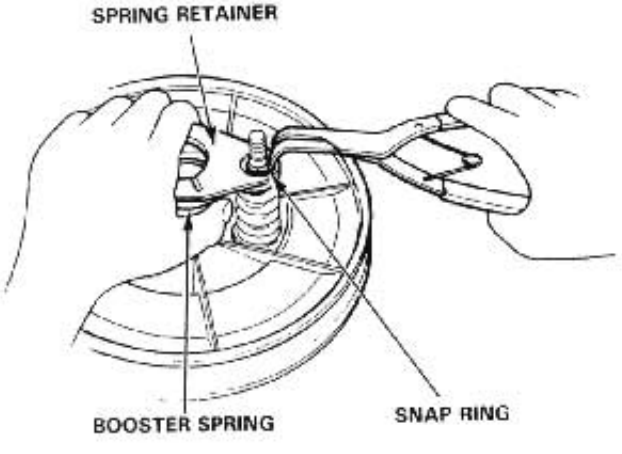


16. Install the booster spring.



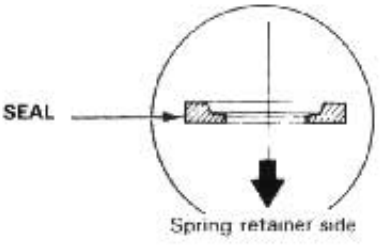
17. Install the spring retainer on the through bolts aligning the square portions of the bolts and retainer.

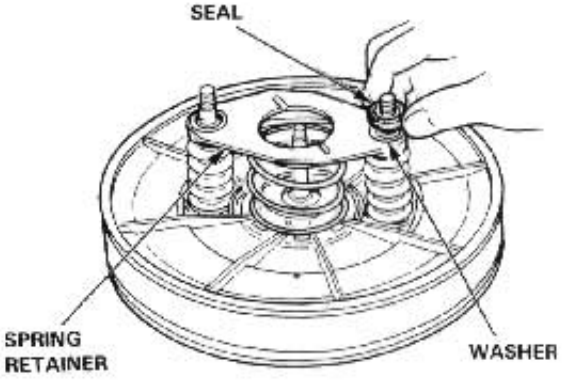
18. Compress the booster spring, then install the 10 mm snap ring on the through bolts.



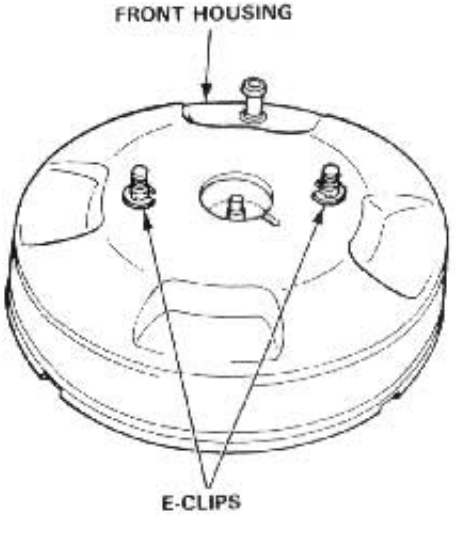
19. Install the washers and seals on the through bolts.

NOTE: Install the seals with the flat sides facing the spring retainer side as shown.



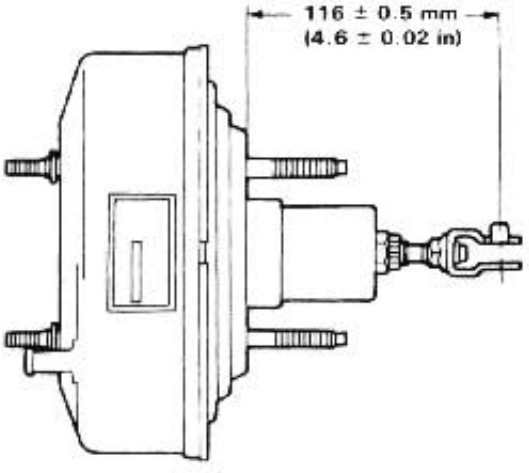


20. Install the front housing and secure with E-clips.



Pushrod Adjustment

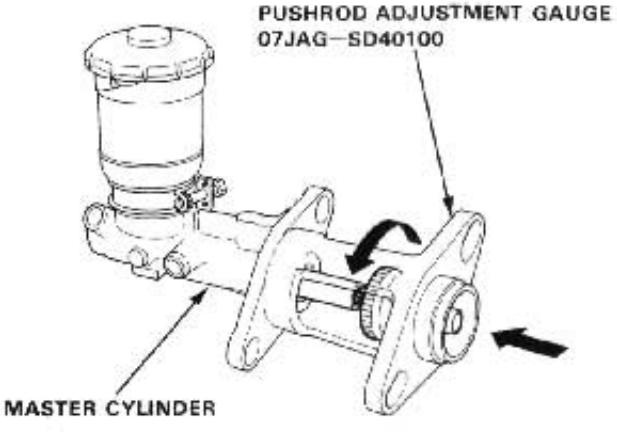
Install the locknut and pushrod yoke on the pushrod, and adjust the pushrod length as shown.



Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

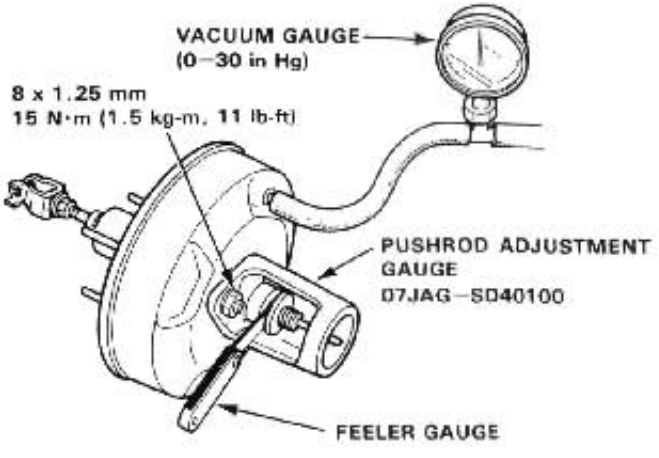
1. Using the Pushrod Adjustment Gauge , adjust bolt so the top of it is flush with end of master cylinder piston.



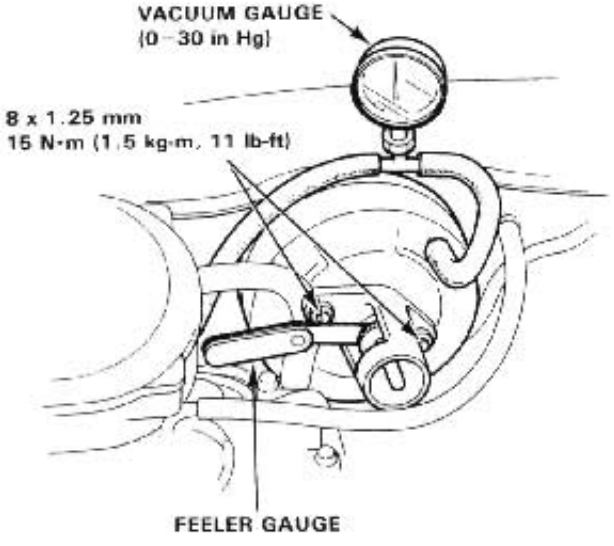
2. Install the master cylinder rod seal between the pushrod adjustment gauge and brake booster.
3. Without disturbing the adjusting bolt's position, put the gauge upside down on the booster.
4. Install the master cylinder nuts and tighten to the specified torque.
5. Connect the booster in-line with a vacuum gauge (0—30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 500 mm Hg (20 in Hg) vacuum.
6. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut.

CLEARANCE: 0—0.4 mm (0—0.016 in)

- Inspection with the booster not installed

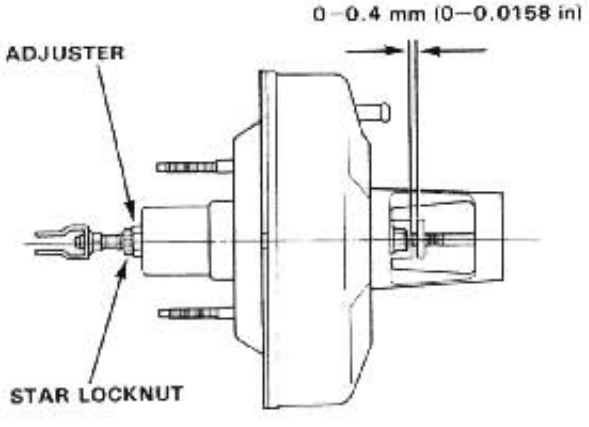


- Inspection with the booster installed in the car.



7. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust. Hold the clevis while adjusting.

8. Tighten the star locknut securely.



NOTE: If the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.4 mm. If the clearance between the gauge body and adjusting nut is 0.4 mm, the pushrod-to-piston clearance is 0 mm.

9. After adjustment, loosen the clevis end pushrod locknut and turn the pushrod to obtain the correct pedal height.

PEDAL HEIGHT FROM FLOOR:
153 mm (6.02 in)
(with floor mat removed)
The pedal should have
1 – 5 mm free play.

10. Adjust the brake light switch (page 19-4).

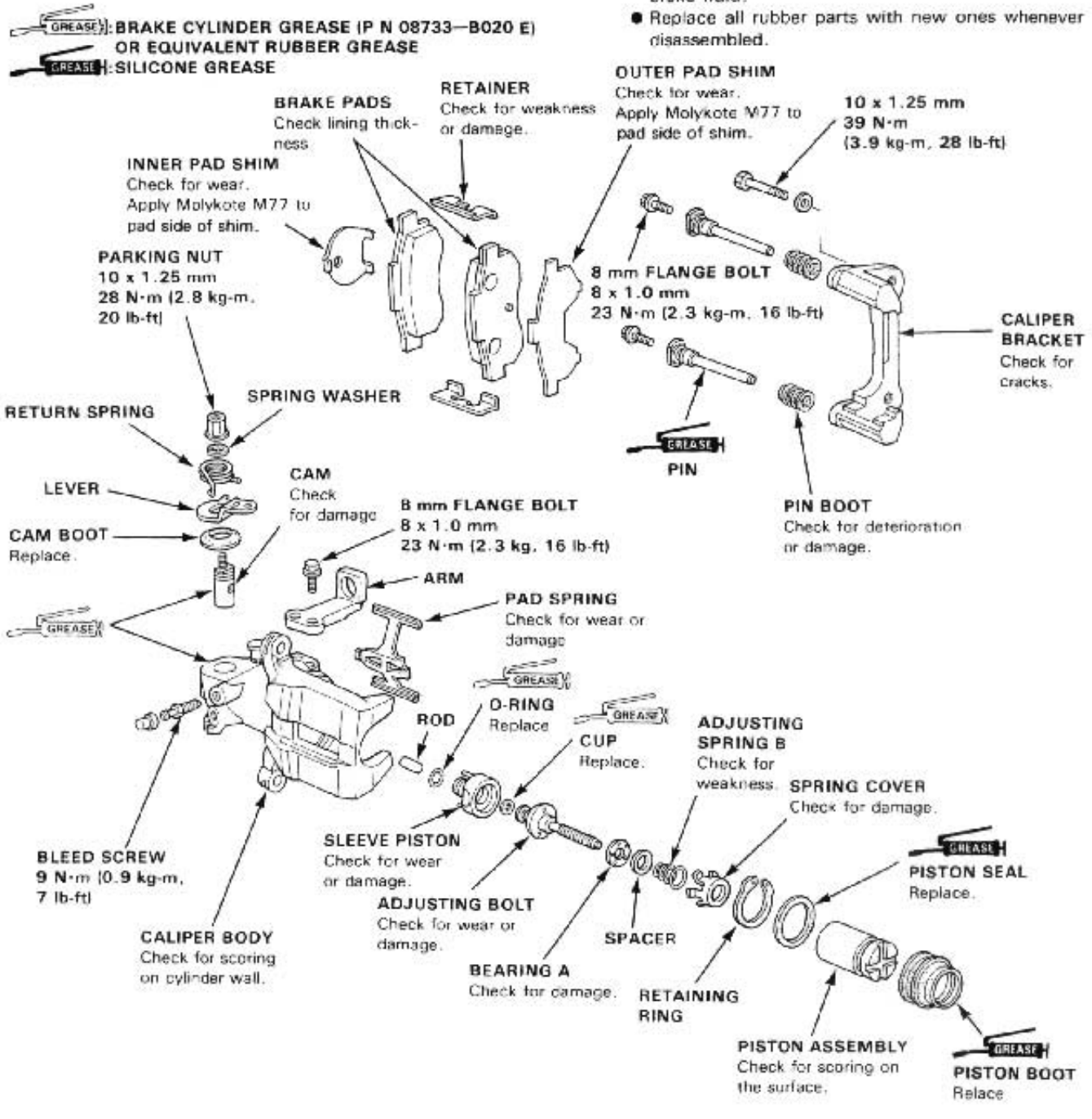
Inspection

⚠WARNING **Do not use an air hose to blow the brake assembly clean. Use an OSHA-approved vacuum cleaner, to avoid breathing brake dust.**

CAUTION:
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid.

NOTE:
- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.

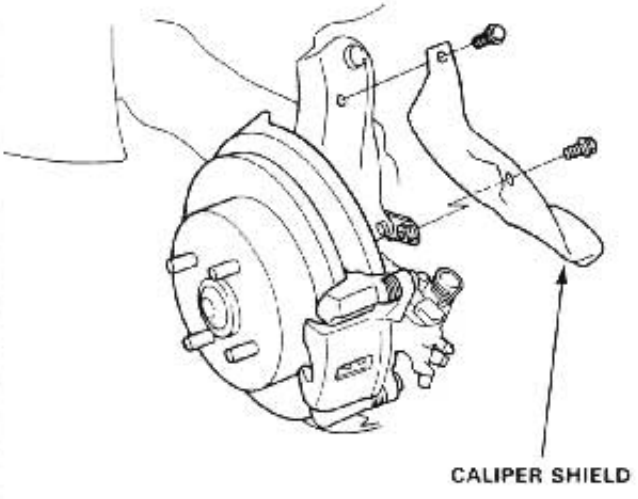
GREASE: BRAKE CYLINDER GREASE (P/N 08733—B020 E) OR EQUIVALENT RUBBER GREASE
GREASE: SILICONE GREASE



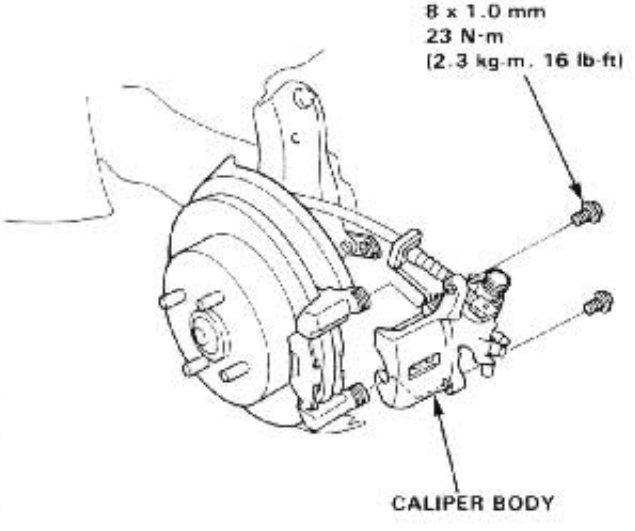
Inspection and Replacement

1. Block the front wheels, support the rear of car on safety stands, then remove the rear wheels.

2. Remove the caliper shield.

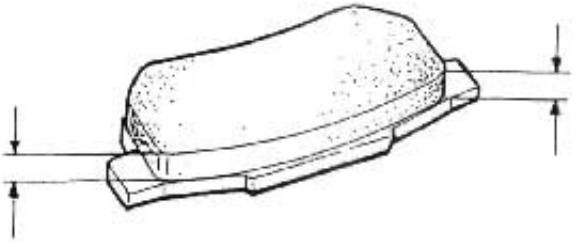


3. Remove the two caliper mounting bolts and the caliper from the bracket.

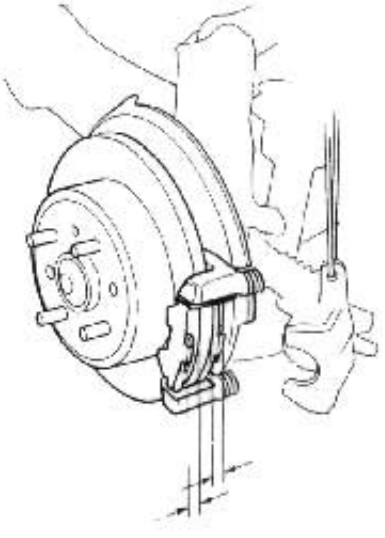


4. Remove the pads and measure the thickness of each brake pad lining using a vernier caliper.

Brake Pad Thickness:
Standard: 8.0 mm (0.31 in)
Service limit 3.0 mm (0.12 in)



5. If the lining thickness is less than service limit, replace the brake pads as a set.



(cont'd)

Inspection and Replacement (cont'd)

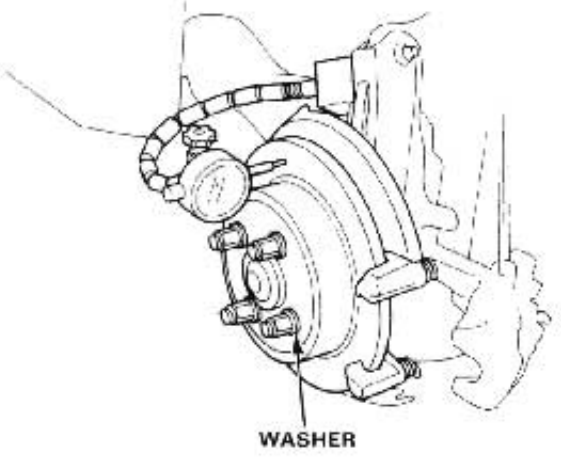
6. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.

7. Mount dial indicator as shown and measure the run-out at 10 mm (0.39 in) from the outer edge of the disc.

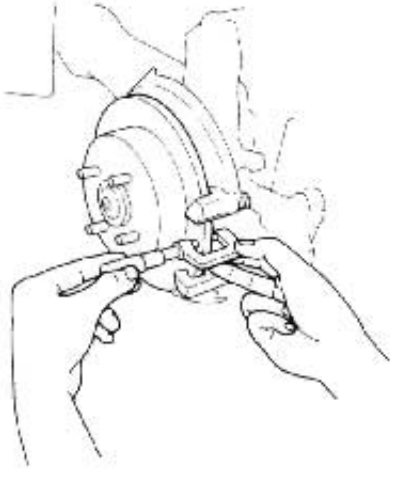
   CAUTION: Use wheel nuts and 3 mm thickness washers to hold the disc securely.

   Brake Disc Run-out:
   Service Limit: 0.15 mm (0.006 in)

8. Replace the brake disc if beyond the service limit.



9. Using a micrometer, measure the rear brake disc thickness at eight points, approximately 45 apart and 10 mm (0.39 in) from the outer edge of the disc.



10. Replace the disc if it exceeds the following service limits.

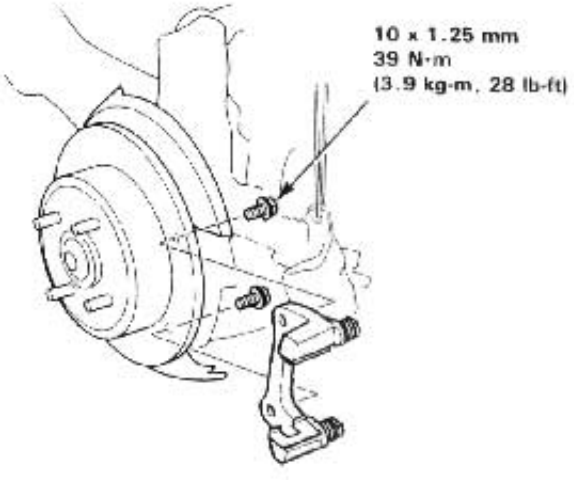
    Brake Disc Thickness:
    Standard: 10.0 mm (0.39 in)
    Service limit: 8.0 mm (0.31 in)

    Brake Disc Parallelism:
    The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in).

11. Replace the brake disc if beyond the limits.

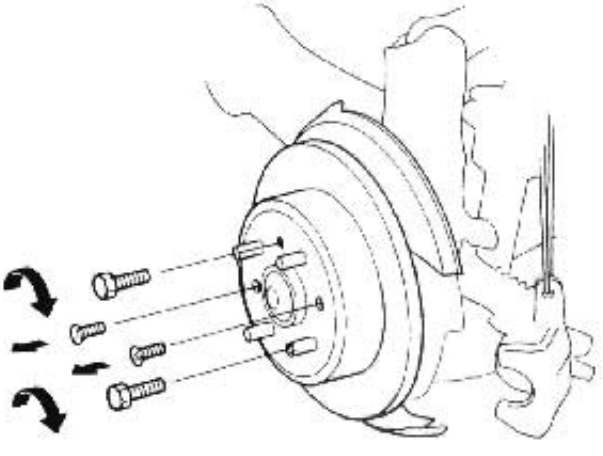
    NOTE: A new disc should be ground if its run-out is greater than 0.10 mm (0.004 in).

12. Remove the two caliper bracket mounting bolts and caliper bracket.



13. Remove the two 6 mm screws and brake disc.

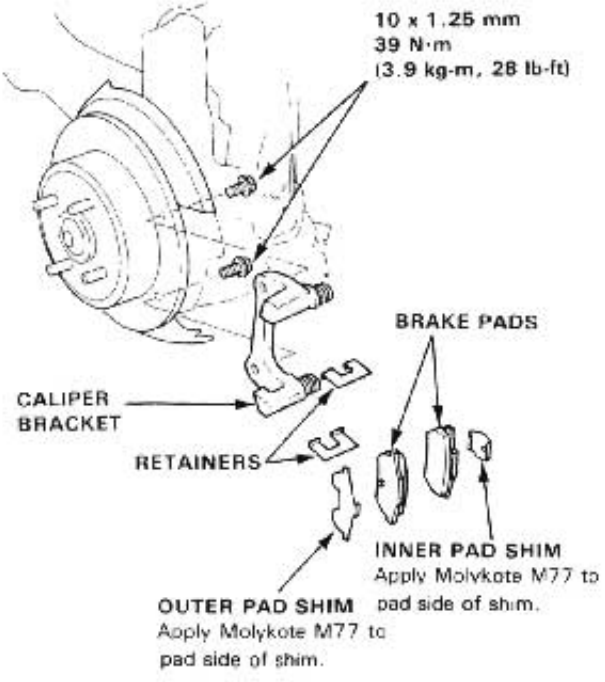
    NOTE: If the brake disc is difficult to remove, install 8 mm bolts into the threaded holes and tighten them.



14. Install the new brake disc.

15. Clean the caliper bracket and retainers, then install the caliper bracket with two bolts and retainers.

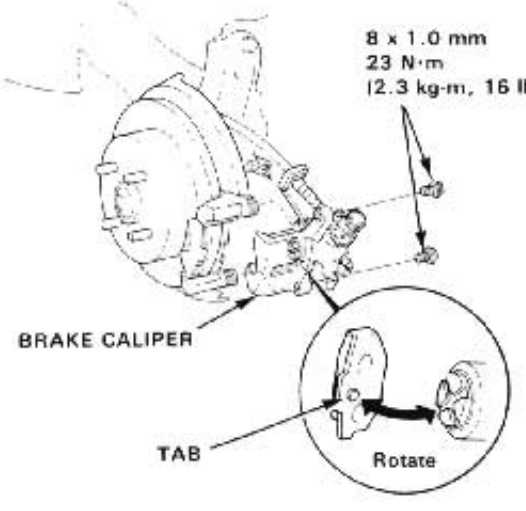
    Install the new brake pads and pad shims onto the caliper bracket.



16. Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning back the piston back.

    CAUTION: Lubricate the boot with silicone to avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.

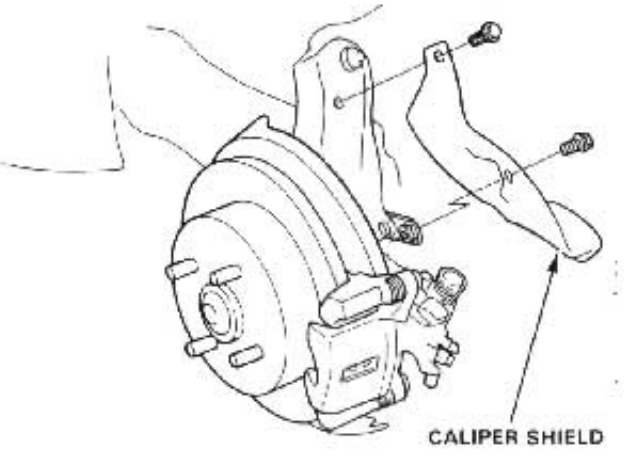
17. Install the brake caliper.



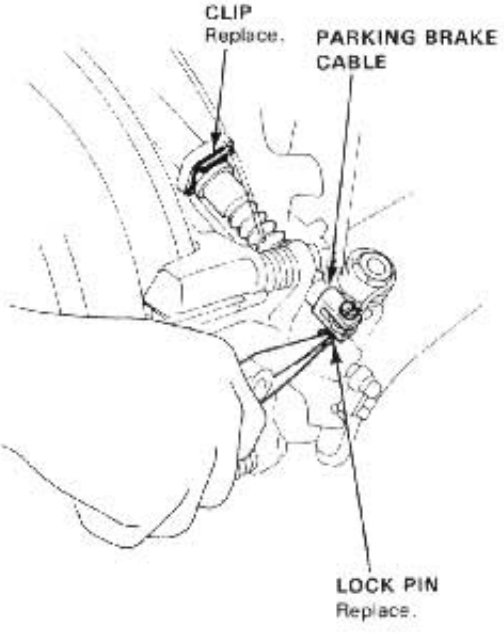
Disassembly

CAUTION:
- **Make sure all parts are clean before ressembly.**
- **Use only new replacement parts.**
- **Use only new DOT3 or 4 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 to finish. Wash spilled brake fluid off immediately with clean water.**

1 Remove the caliper shield.



2. Disconnect the parking brake cable from the lever on the caliper by removing the lock pin.



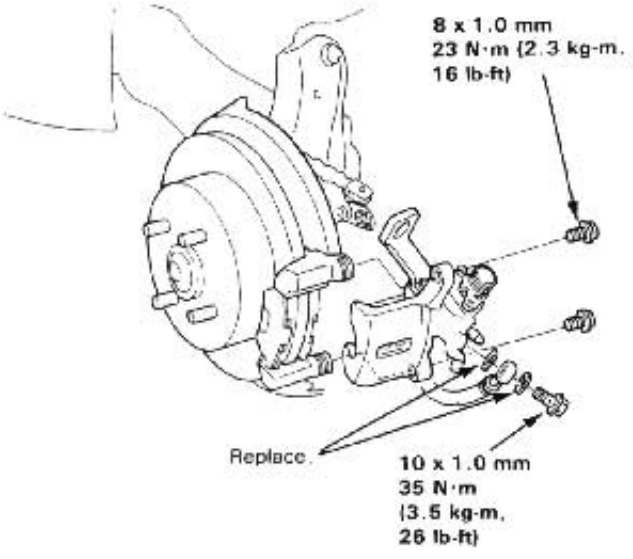
(cont'd)

Disassembly (cont'd)

3. Remove the banjo bolt and disconnect the brake hose from the caliper.

4. Remove the two caliper mounting bolts and the caliper from the bracket.

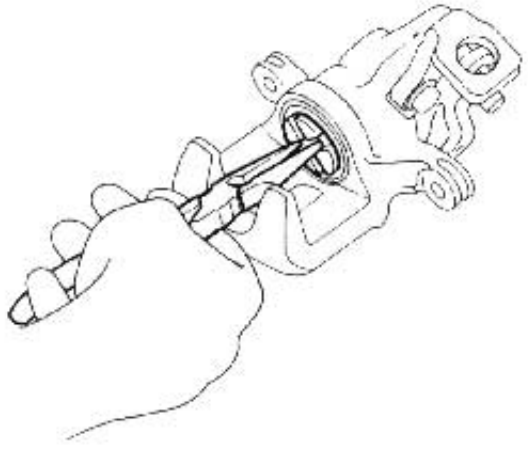
CAUTION:
- **Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.**
- **Plug the end of the brake hose to prevent brake fluid from flowing out.**



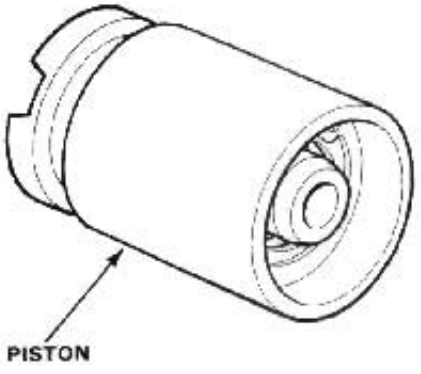
5. Remove the pad spring from the caliper

6. Remove the piston and piston boot while rotating the piston.

CAUTION: Avoid damaging the piston and piston boot.

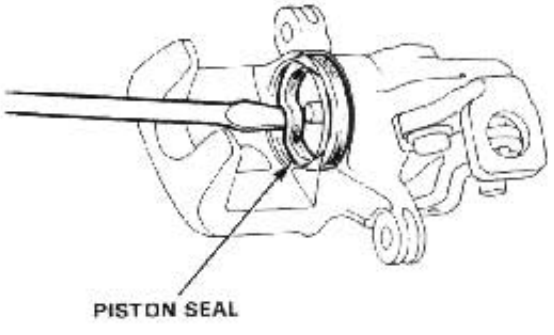


7. Check the piston for scoring, scratches or other damage. Replace the piston assembly if necessary.



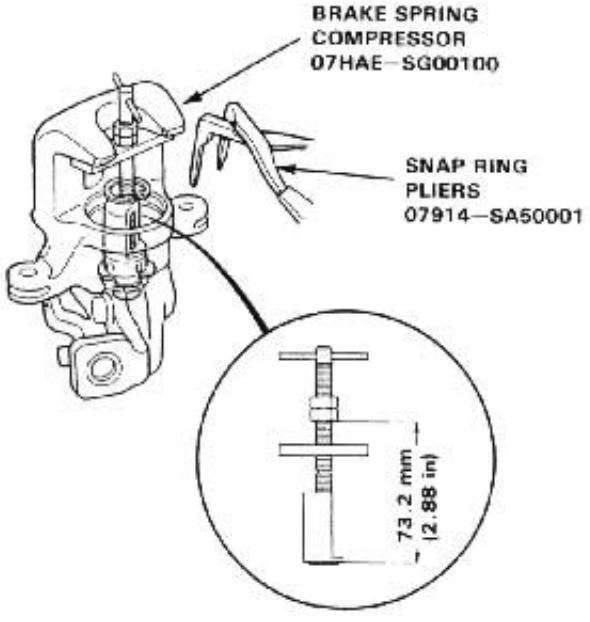
8. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.



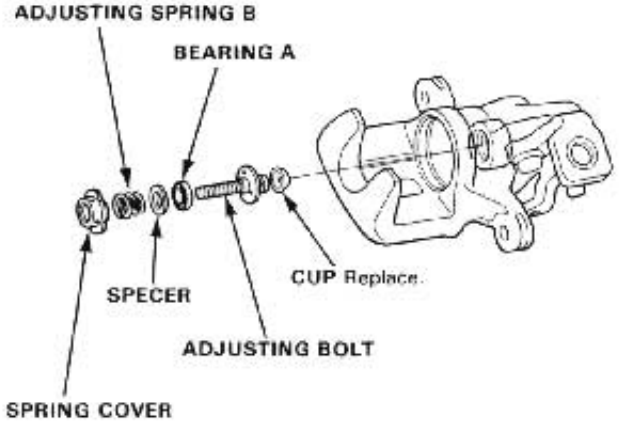
9. Install the special tool between the caliper body and spring guide as shown.

10. Compress the adjusting spring B by turning the shaft of the special tool, then remove the circlip with snap ring pliers.

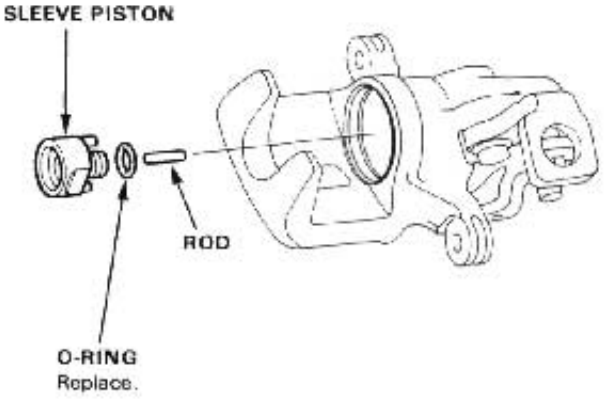


11. Remove the brake spring compressor from caliper body.

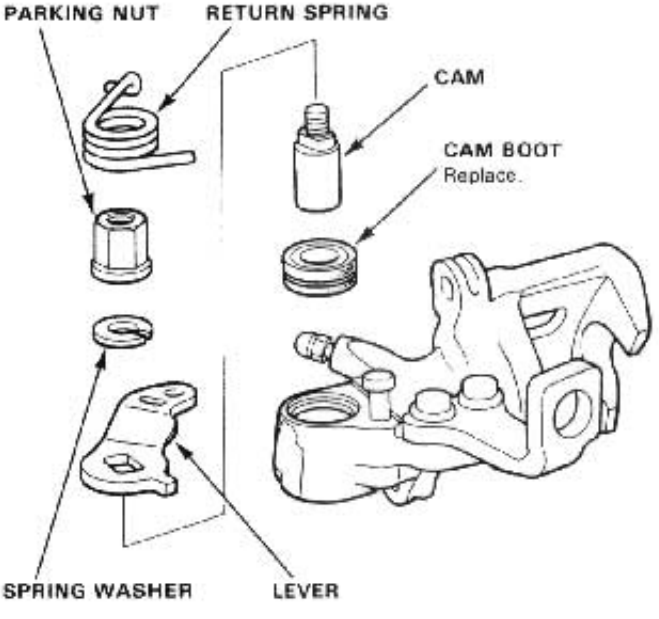
12. Remove the spring cover, adjusting spring B, spacer, bearing A, adjusting bolt and cup.



13. Remove the sleeve piston, then remove the rod from the cam.



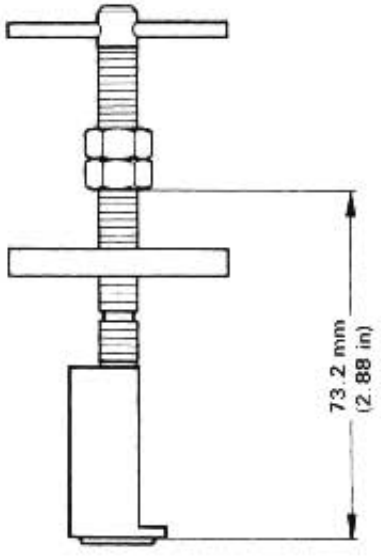
14. Remove the return spring, parking nut, spring washer, lever, cam and cam boot.



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 spilled brake fluid off immediately with clean water.**

1. Adjust the brake spring compressor (special tool) as shown.

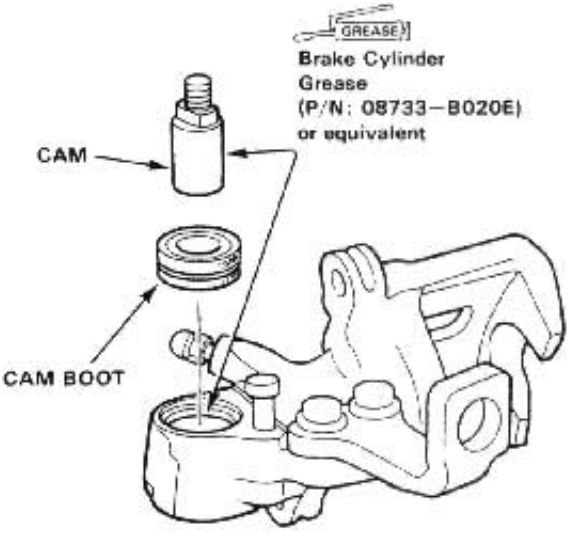


2. Pack all cavities of the needle bearing with Brake Cylinder Grease (P/N: 08733–B020E), or equivalent rubber grease.

3. Coat the new cam boot with Brake Cylinder Grease (P/N: 08733–B020E), or equivalent rubber grease and install in the caliper.

4. Install the cam with threaded end facing up.

CAUTION: Avoid damaging the cam boot since it must be installed before the cam.



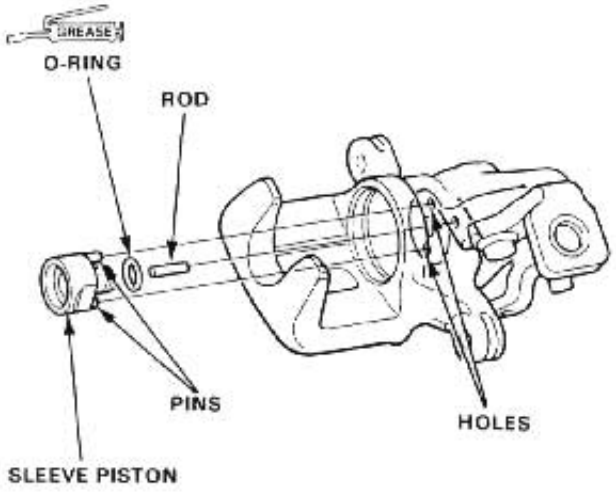
5. Install the lever, spring washer and parking nut, then tighten parking nut.

6. Install the return spring.

7. Install the rod in the cam.

8. Install a new O-ring on the sleeve piston.

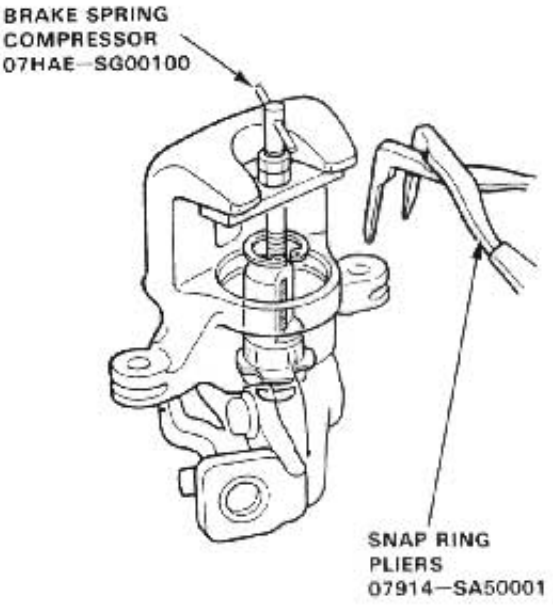
9. Install the sleeve piston so the hole in the bottom of the piston is aligned with the rod in the cam, and two pins on the piston are aligned with the holes in the caliper.



10. Install a new cup with its groove facing the bearing A side on the adjusting bolt.

11. Fit the bearing A, spacer, adjusting spring B and spring cover on the adjusting bolt, and install in the caliper cylinder.

12. Install the brake spring compressor (special tool) as shown.

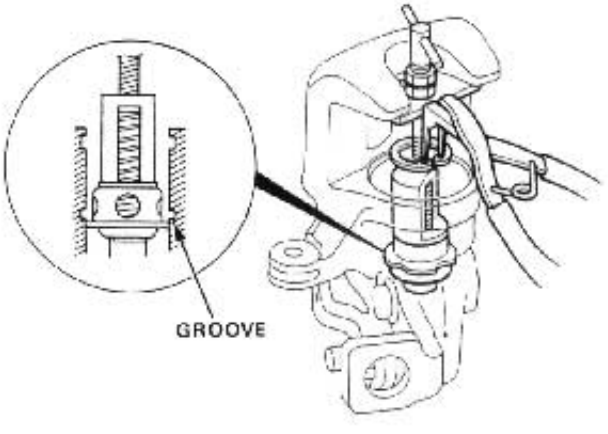


13. Compress the spring until it bottoms out.

14. Check that the flared end of the spring cover is below the circlip groove.

15. Install the circlip then remove the brake spring compressor.

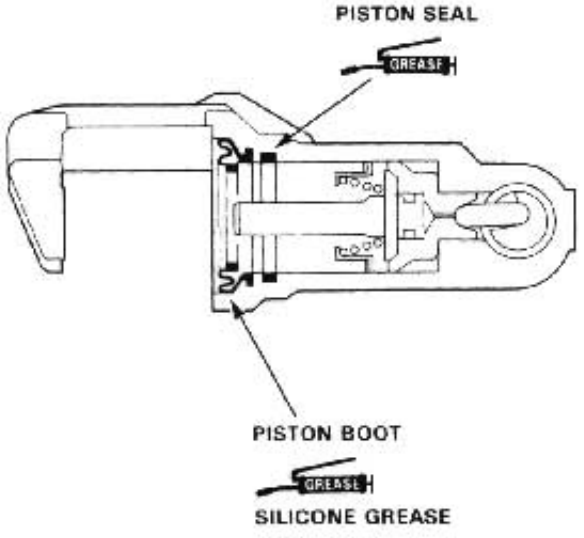
NOTE: Check that the circlip is seated in the groove properly.



(cont'd)

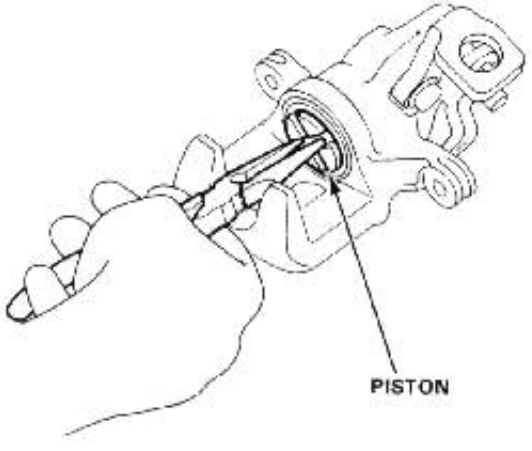
Reassembly (cont'd)

16. Coat the new piston seal and piston boot with silicone grease and install them in the caliper.



17. 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.



18. Install the brake pad retainers and brake pads.
19. Install the pad springs on the caliper.
20. Install the caliper on the caliper bracket and tighten the caliper mounting bolts.
21. Connect the brake hose to the caliper with new sealing washers and tighten the banjo bolt.
22. Connect the parking brake cable to the arm on the caliper.
23. Fill the brake reservoir up and bleed the brake system (page 19-12).
24. Operate the brake pedal several times, then adjust the parking brake lever.
25. NOTE: Before adjustments, make sure the parking brake arm on the caliper touches the pin.

    Install the caliper shield and tighten the bolts.

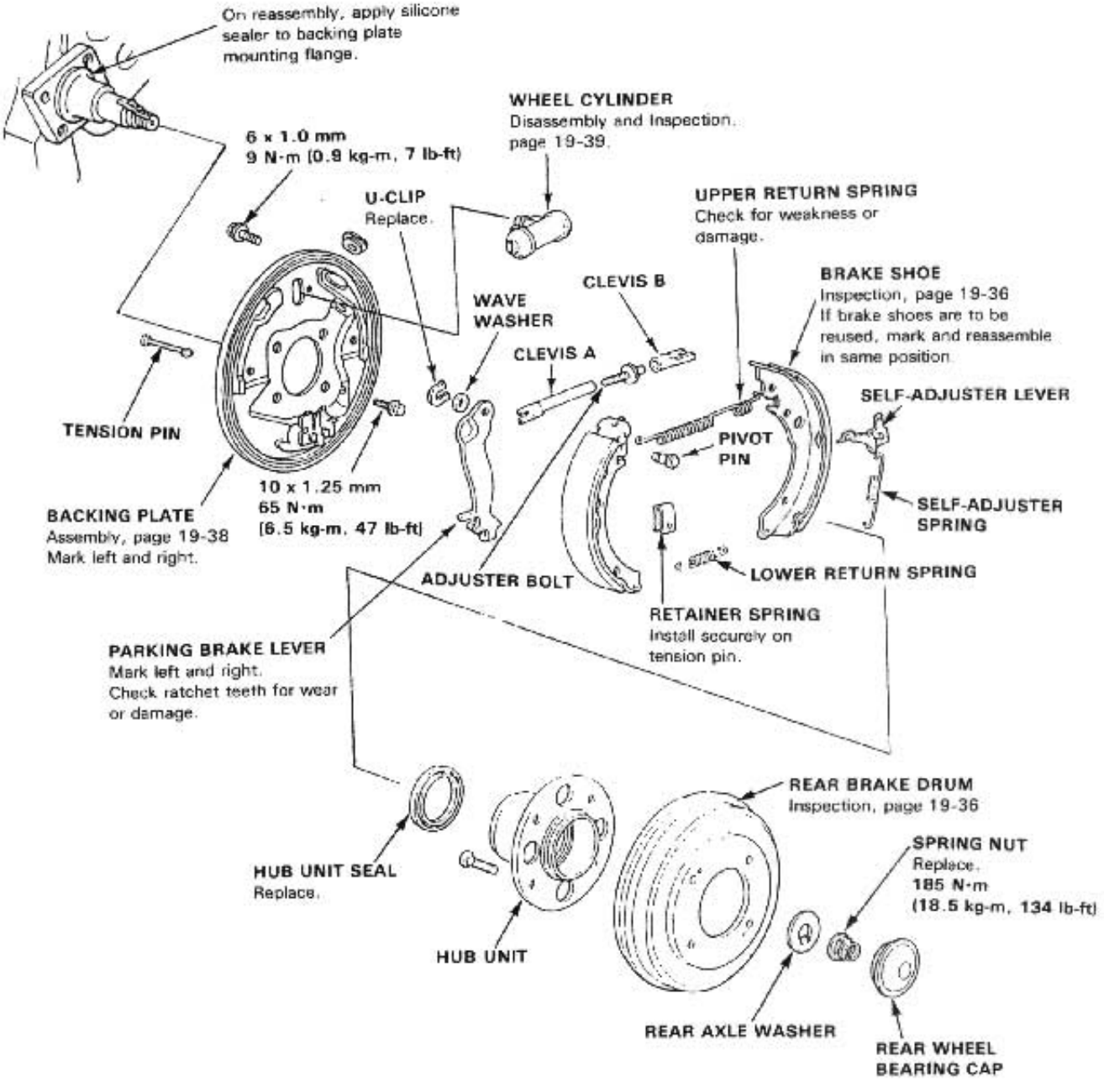
Brake Shoes

Index and Inspection

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

1. Raise the rear of the car and support with safety stands in proper locations.
2. Loosen the parking brake.
3. Remove the rear wheels and rear brake drum.

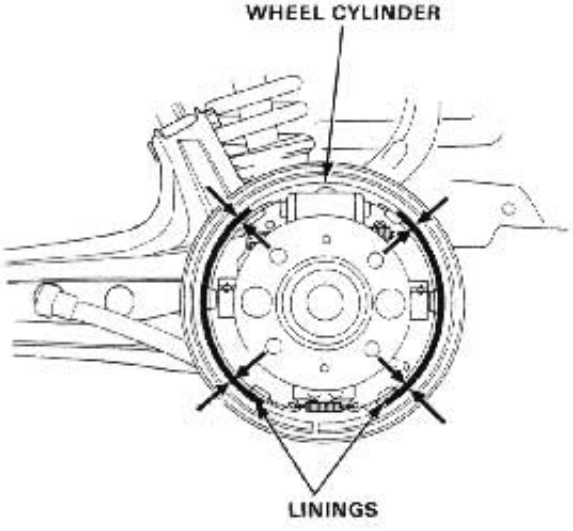
⚠WARNING Do not use an air hose to blow the brake assembly clean. Use an OSHA-approved vacuum cleaner, to avoid breathing brake lining dust.



Inspection

1. Inspect the wheel cylinders for leakage.
2. Inspect the brake linings for cracking, glazing, wear or contamination.
3. Measure the brake lining thickness.

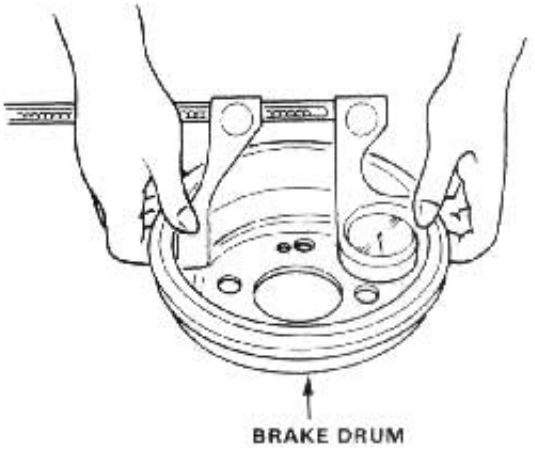
   Lining Thickness
   (Does not include brake shoe thickness)
   Standard: **4.5 mm (0.177 in.)**
   Service Limit: **2.0 mm (0.079 in.)**



4. Inspect bearings in hub unit for smooth operation. If defective, refer to Section 18.
5. Measure inside diameter of the brake drum.

   Drum Inside Diameter:
   Standard: **180 mm (7.087 in)**
   Service Limit: **181 mm (7.126 in)**

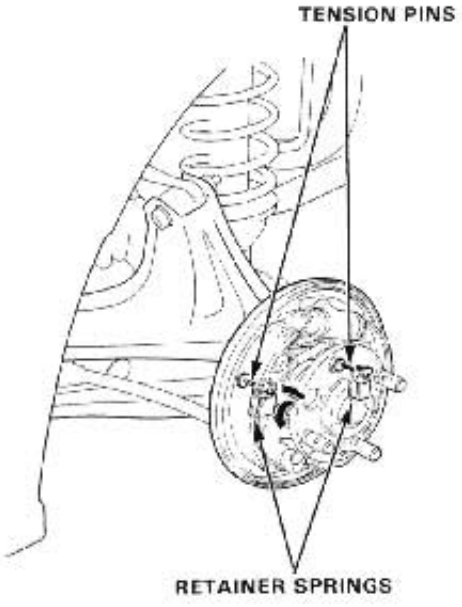
   NOTE: If the refinishing limit stamped on the drum does not match the one listed above, use the one on the drum.



6. Inspect the brake drum for scoring, groving, cracks.

Disassembly

1. Remove the tension pins by pushing the retainer spring and turning them.



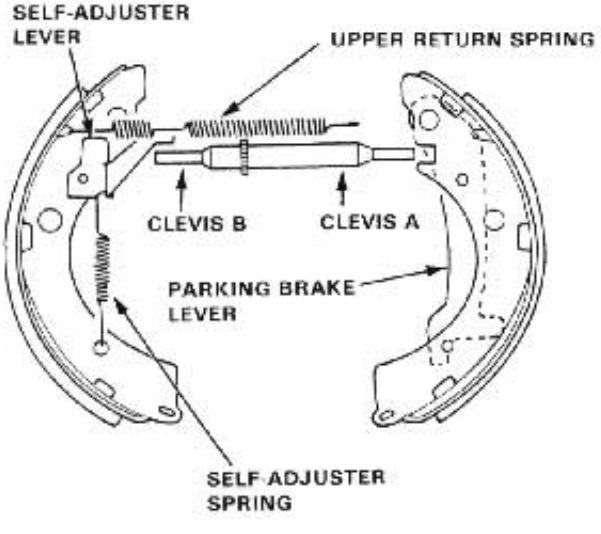
2. Lower the brake shoe assembly and remove the lower return spring.

   NOTE: Make sure not to damage the dust cover on the wheel cylinder.

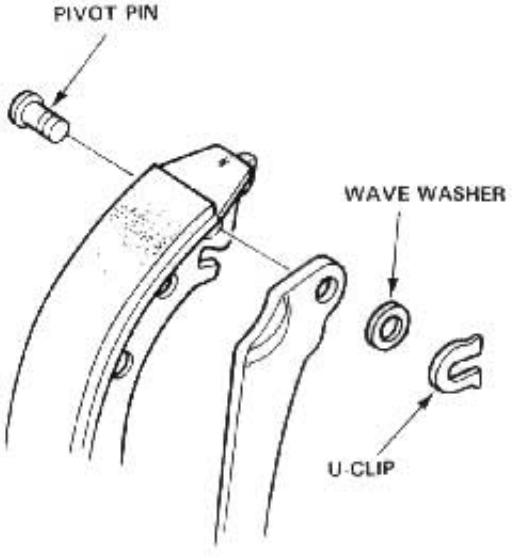
3. Remove the brake shoe assembly.

4. Disconnect the parking brake cable from the parking brake lever.

5. Remove the upper return spring, self-adjuster lever and self-adjuster spring, and separate the brake shoes.



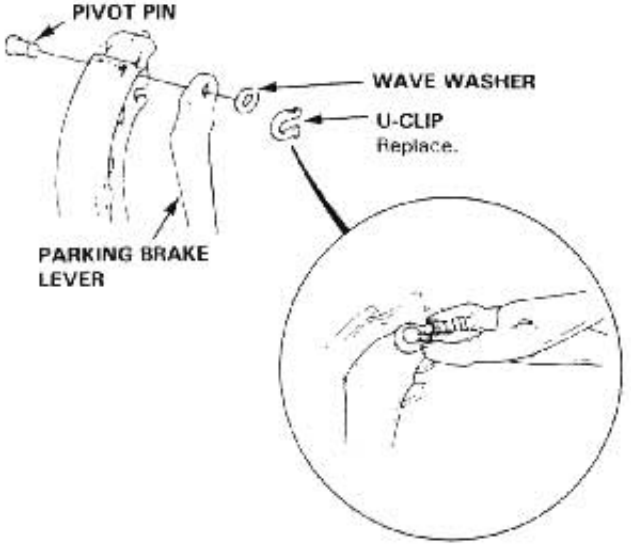
6. Remove the wave washer, parking brake lever and pivot pin from the brake shoe by removing the U-clip.



Reassembly

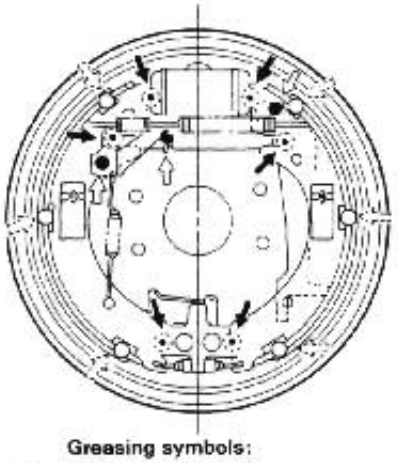
1. Apply brake cylinder grease to the sliding surface of the pivot pin, and insert the pin into the brake shoe.
2. Install the parking brake lever and wave washer on the pivot pin and secure with U-clip.

   NOTE: Pinch the U-clip securely to prevent the pivot pin from coming out of the brake shoe.



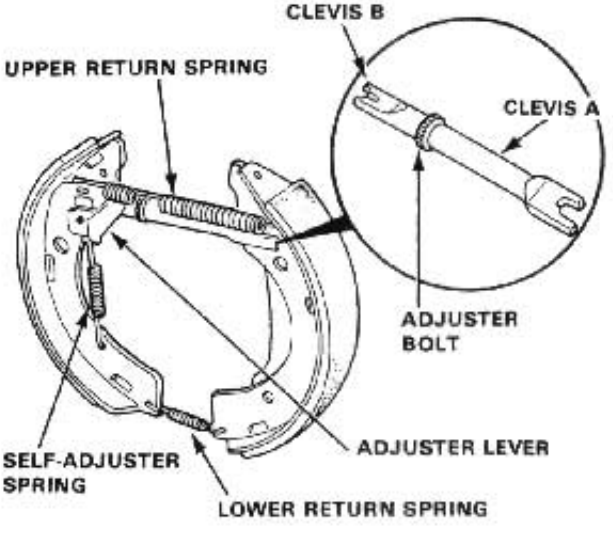
3. Connect the parking brake cable to the parking brake lever.
4. Apply grease on each sliding surface.

   CAUTION: Contaminated brake linings reduce stopping power. Keep grease or oil off the brake linings. Wipe any excess grease off the parts.



5. Clean the threaded portions of clevises A and B. Coat the threads of the clevises with grease. To shorten the clevises, turn the adjuster bolt.
6. Hook the adjuster spring to the adjuster lever first, then to the brake shoe.
7. Install the clevises and upper return spring noting the installation direction.

   NOTE: Make sure not to damage the wheel cylinder dust covers.
8. Install the lower return spring.
9. Install the tension pins and retaining springs.

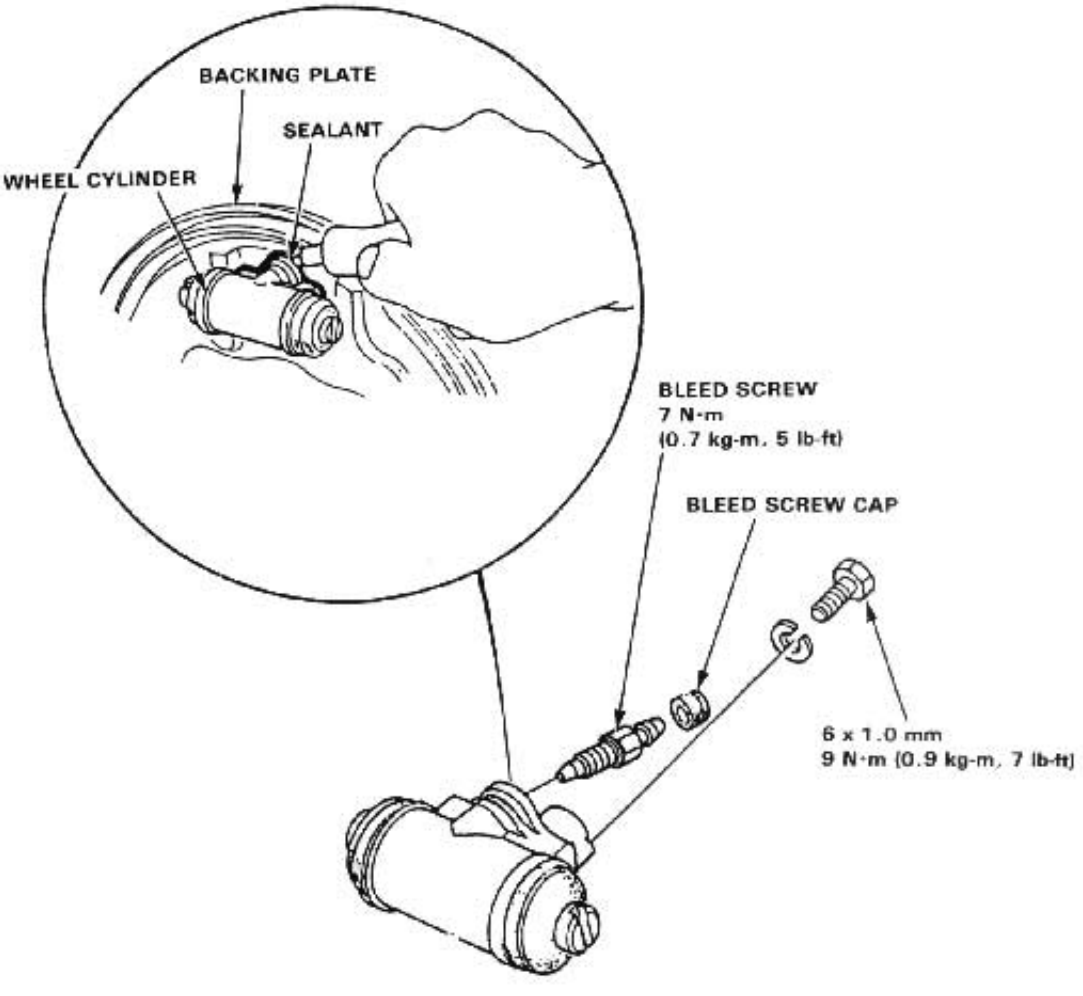


10. Install the brake drum.
11. If the wheel cylinder has been removed, bleed the brake system (page 19-12).
12. Depress the brake pedal several times to set the self adjusting brake.
13. Adjust the parking brake (page 19-4).

Wheel Cylinder

Inspection

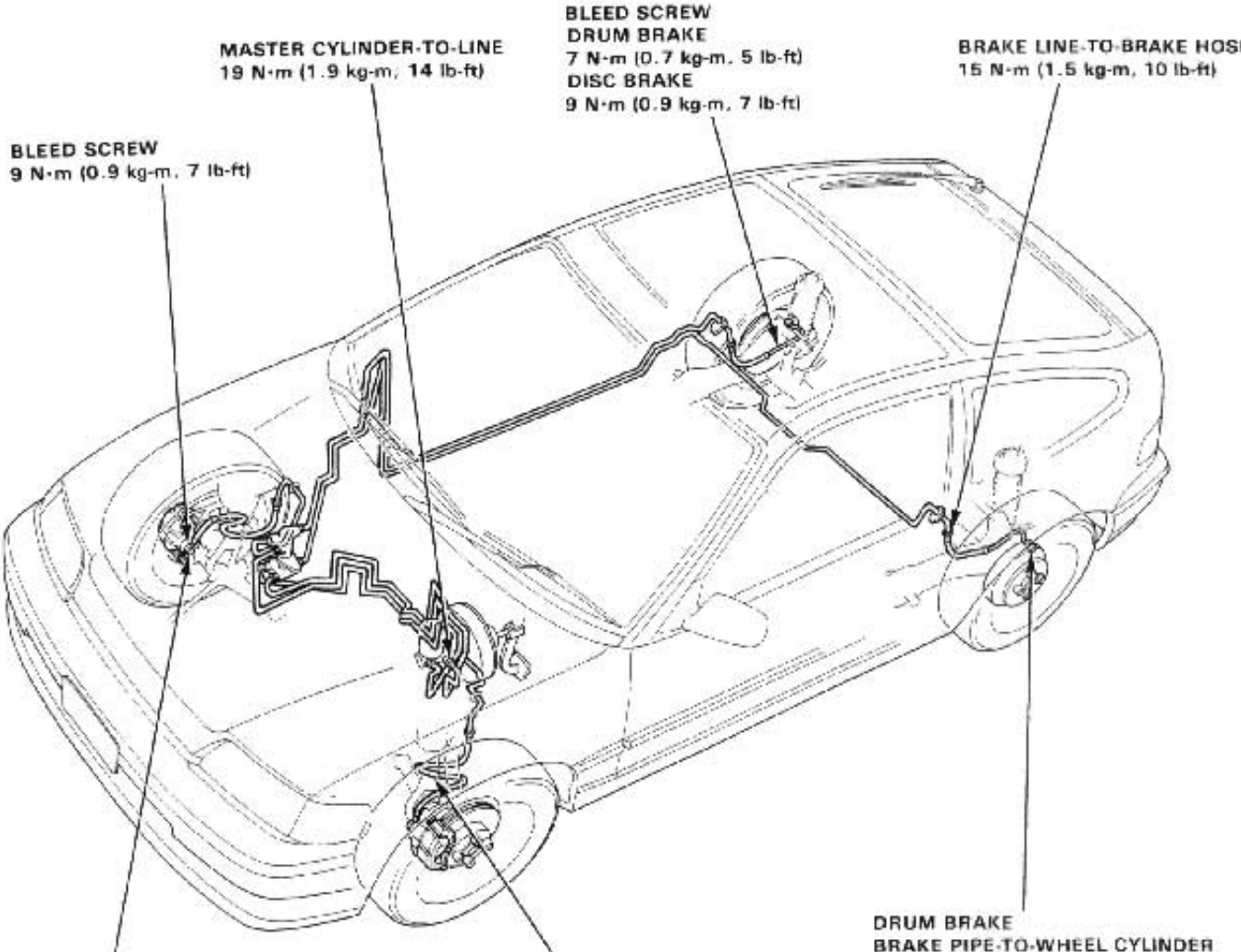
CAUTION:
- Brake fluid will damage the painted, plastic and rubber parts. Whenever handling brake fluid, protect the painted, plastic or rubber parts by covering with a rag. If fluid does get on these parts, wipe it off with a clean cloth.
- Never reuse the brake fluid once it has been drained.
- Apply sealant between the wheel cylinder and backing plate whenever the wheel cylinder has been removed.



Brake Hoses/Pipes

Inspection

1. Inspect the brake hoses for damage, leaks, interference or twisting.
2. Check the brake lines for damage, rusting or leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints or connections, and retighten if necessary.

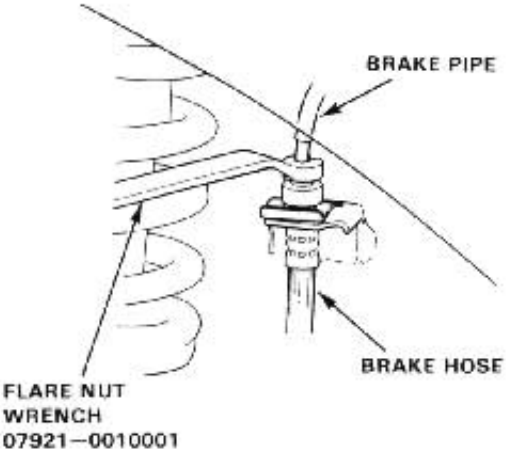


Brake Hose Replacement

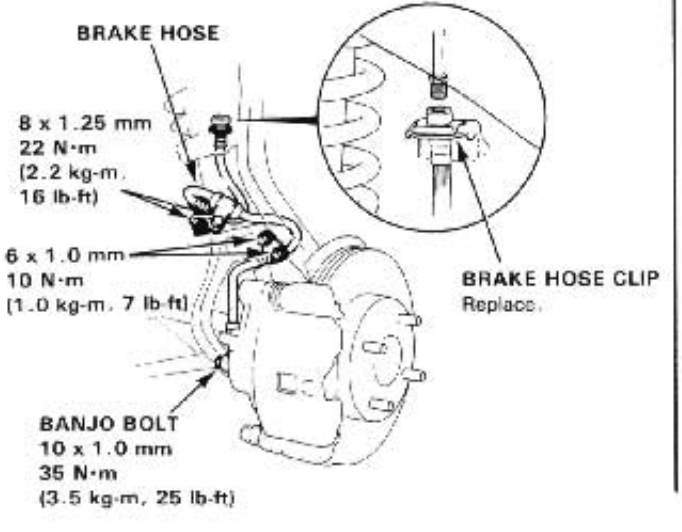
CAUTION

- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Use only clean brake fluid.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not spill brake fluid on the car, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**

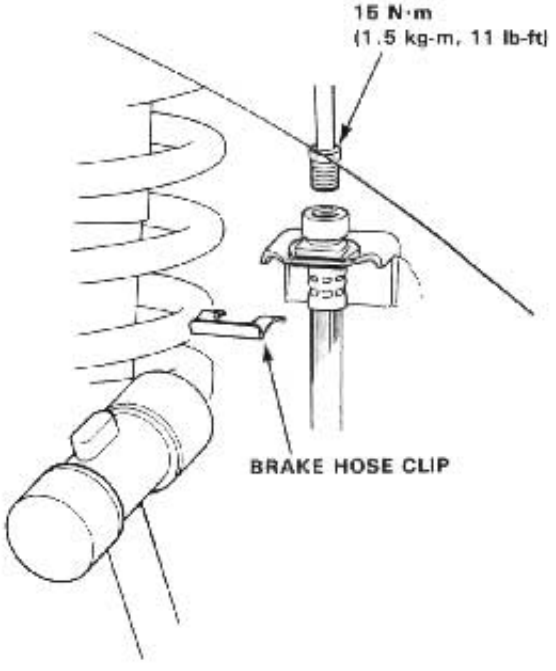
1. Replace the brake hose if the hose is twisted, cracked or if it leaks.
2. Disconnect the brake hose from the brake pipe using a 10 mm flare nut wrench.



3. Remove and discard the brake hose clip from the brake hose.
4. Remove the banjo bolt and disconnect the brake hose from the caliper.



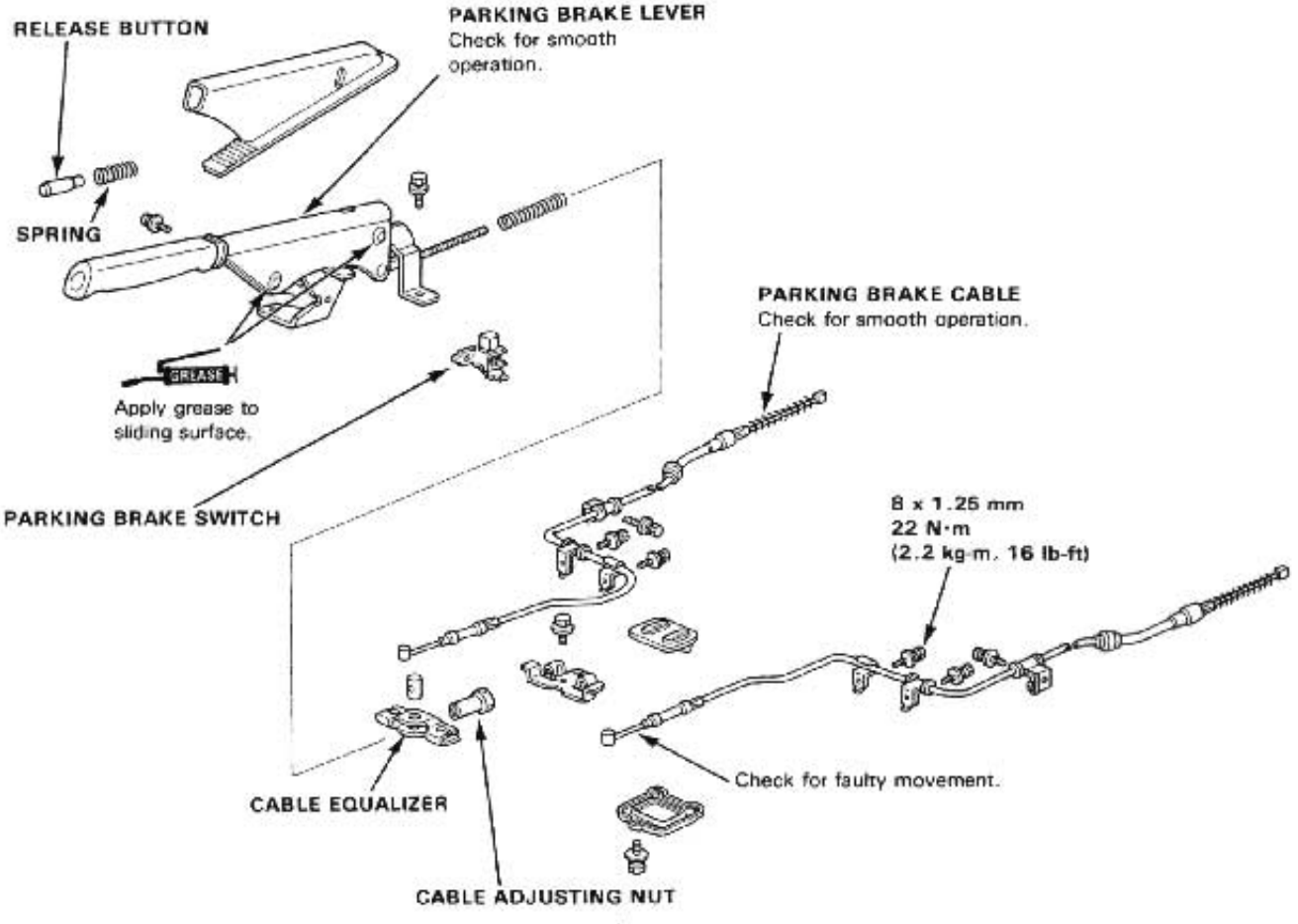
5. Install a new brake hose clip to the brake hose.
6. Connect the brake pipe to the brake hose.



7. Connect the brake hose to the caliper.
8. Install the brake hose on the knuckle and damper mounting clamp.
9. After installing the brake hose, check the hose and line joints for leaks, and tighten if necessary.

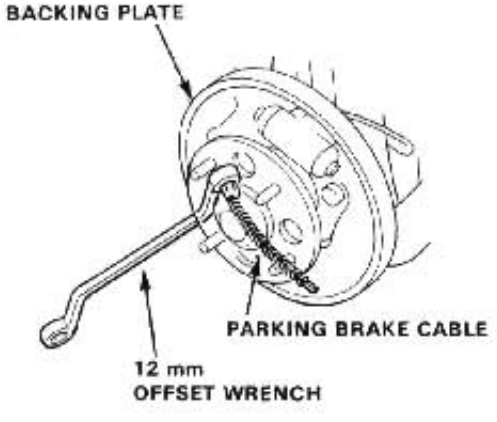
Parking Brake

Disassembly and Reassembly



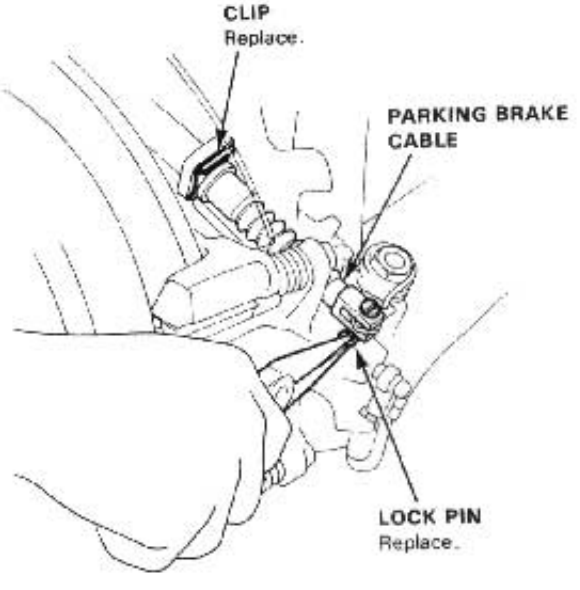
DRUM BRAKE (DX and HF Model)

Remove the parking brake cable from the backing plate using a 12 mm offset wrench as shown.



DISC BRAKE (SI Model)

Disconnect the parking brake cable from the lever on the rear caliper by removing the lock pin and pin.



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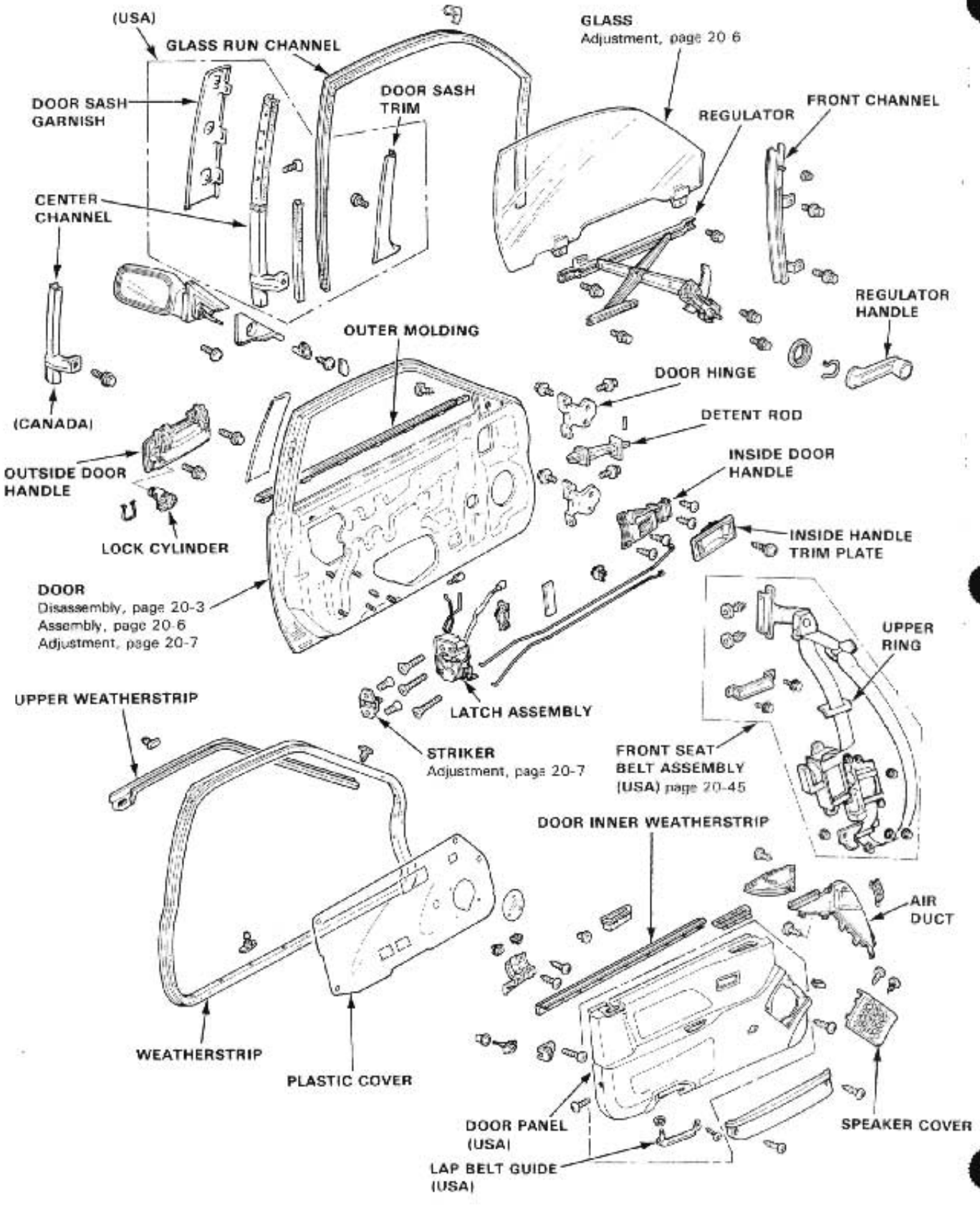
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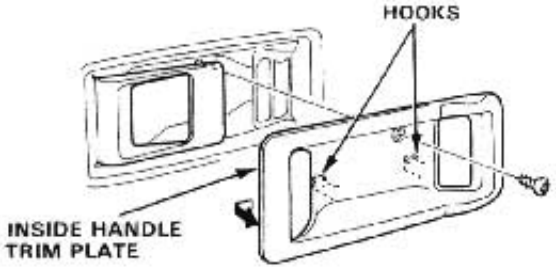
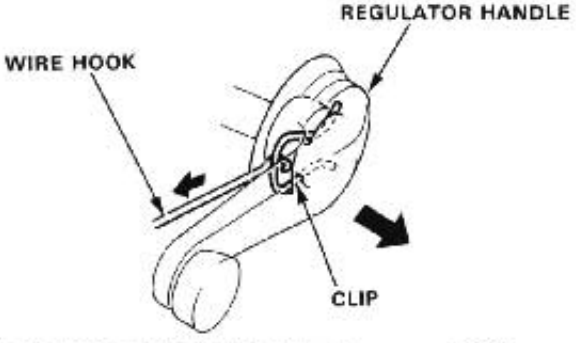
Disassembly

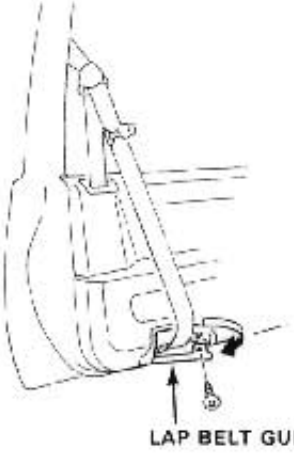
1. Remove the trim plate screw, then carefully remove the inside handle trim plate.



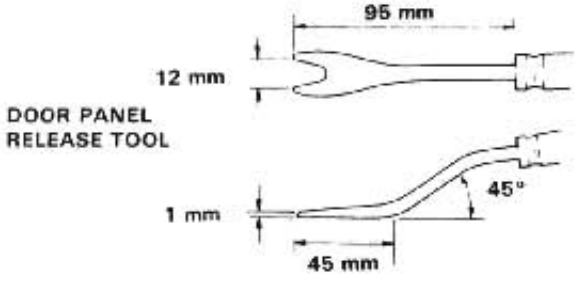
2. Remove the regulator handle by pulling the clip out with a wire hook.



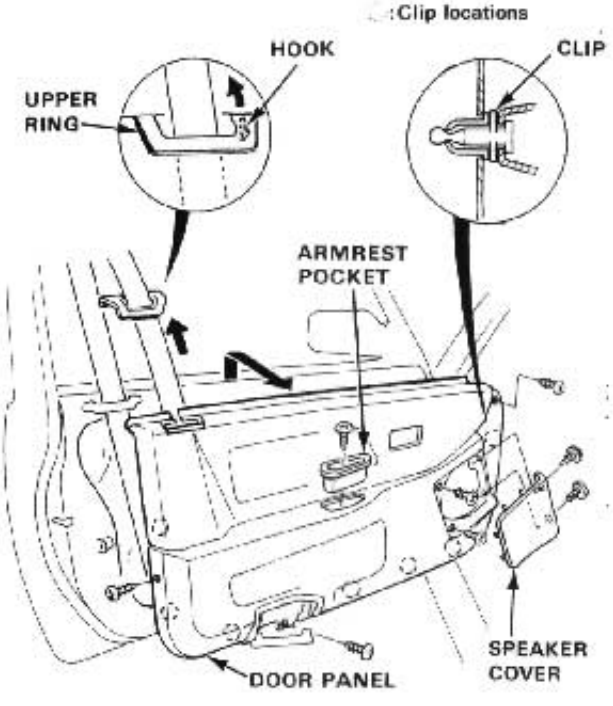
3. Remove the lap belt guide mounting screw (USA).



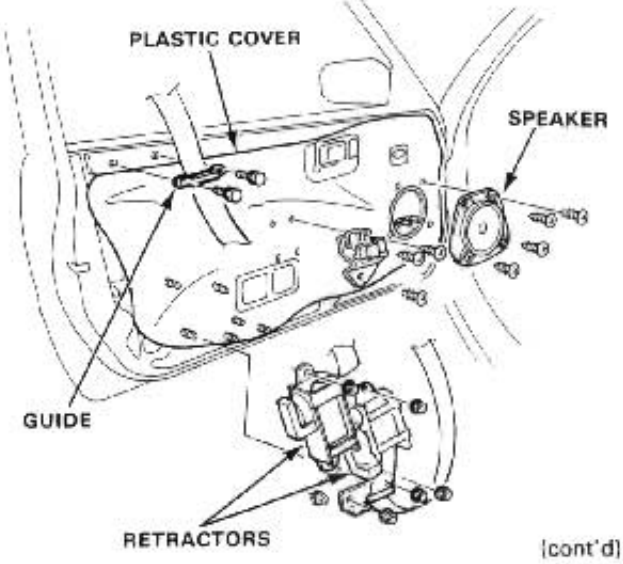
NOTE: Remove the panel with as little bending as possible to avoid creasing or breaking it.



4. Remove the screw and carefully pry up the armrest pocket. Remove the screws, then remove the speaker cover. Remove the screws and clips (see door panel release tool) attaching the door panel. Remove the door panel by pulling it upward.
   NOTE: The speaker cover has 6 hooks on its back side.
5. Pry out the upper ring with a flat tip screw driver and remove the seat belt through the slot (USA).



6. Remove the bolts and nuts, then remove the seat belt guide and retractors (USA).
7. Remove the screws, then remove the speaker and door panel bracket.
8. Carefully remove the plastic cover.

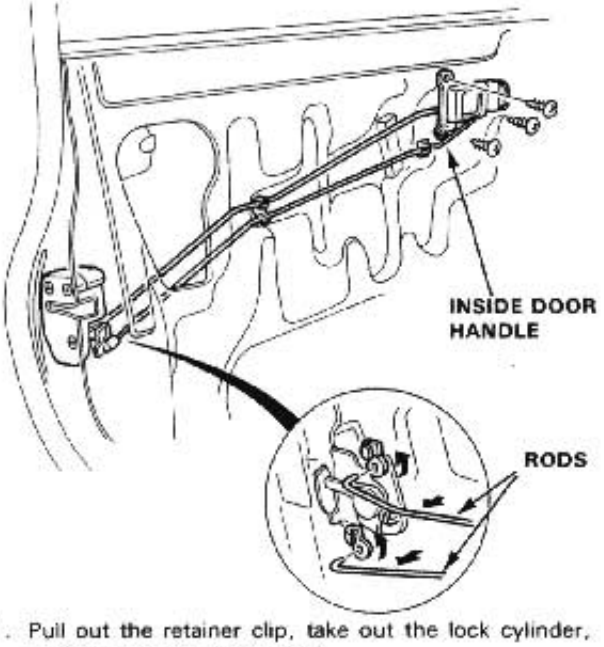


(cont'd)

Disassembly (cont'd)

9. Raise the window fully.

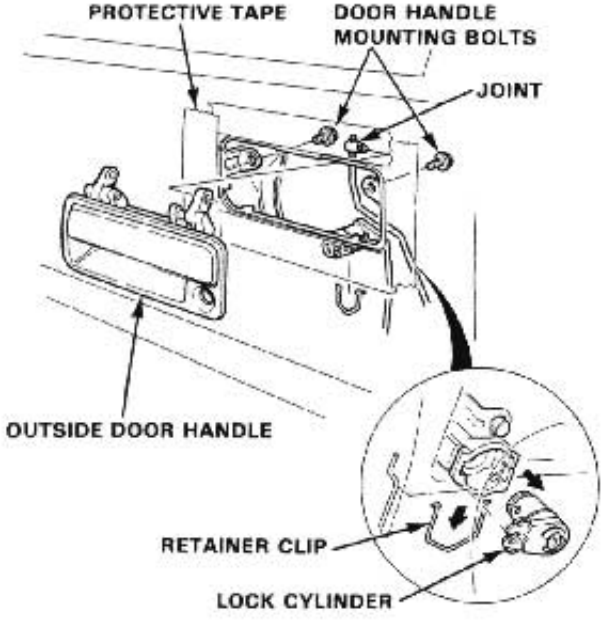
10. Remove the 3 screws, disconnect the latch rods, then remove the inside door handle.



11. Pull out the retainer clip, take out the lock cylinder, then disconnect the lock rod.

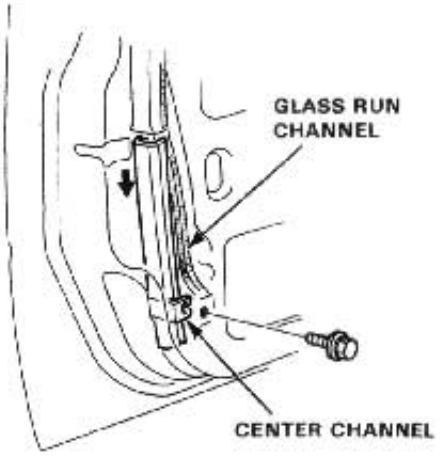
NOTE: Use protective tape around the edge of the door handle to prevent scratching the paint.

12. Remove the mounting bolts for the outside door handle.

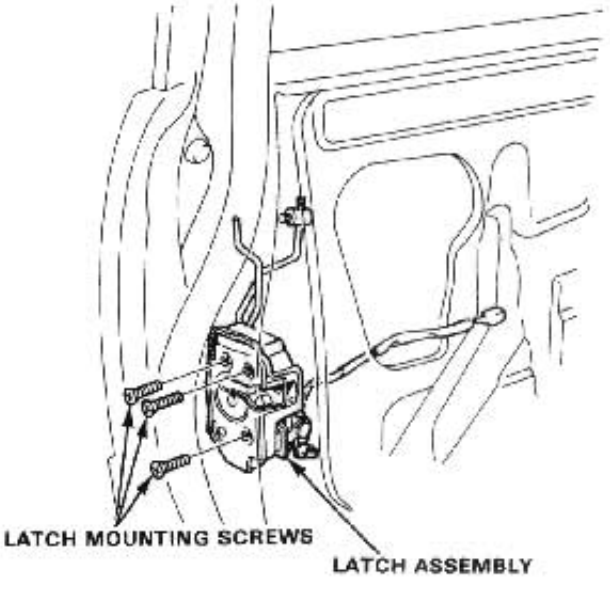


13. Pull the outside door handle out, and pry the joint off the handle with a flat-tip screwdriver. Remove the handle from the rod.

14. Remove the center channel by removing the bolt and glass run channel.



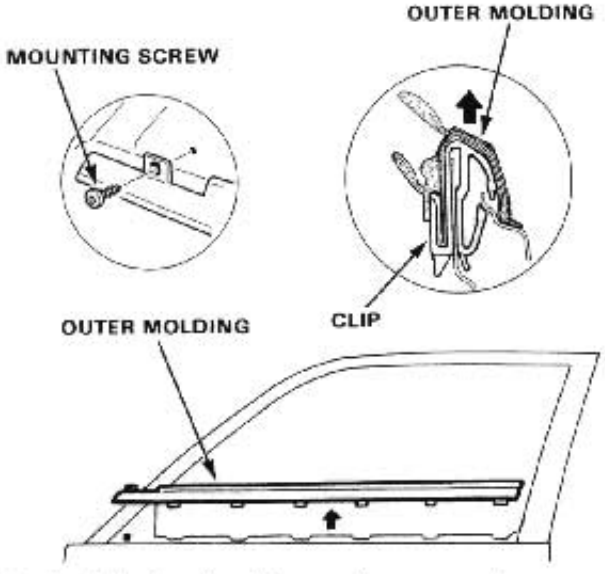
15. Remove the screws, take the door latch off the door, then push the door latch and rod inside the door.



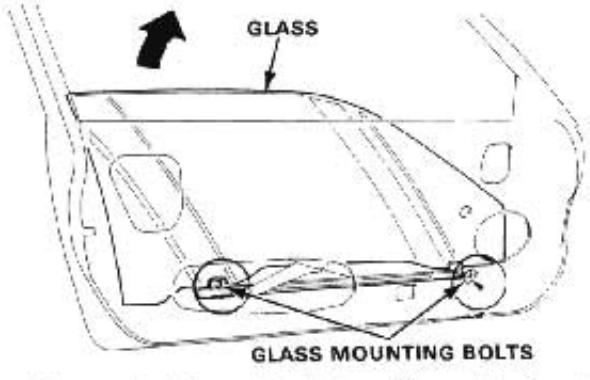
16. Lower the window fully.

17. Remove the door mirror (page 20-8).

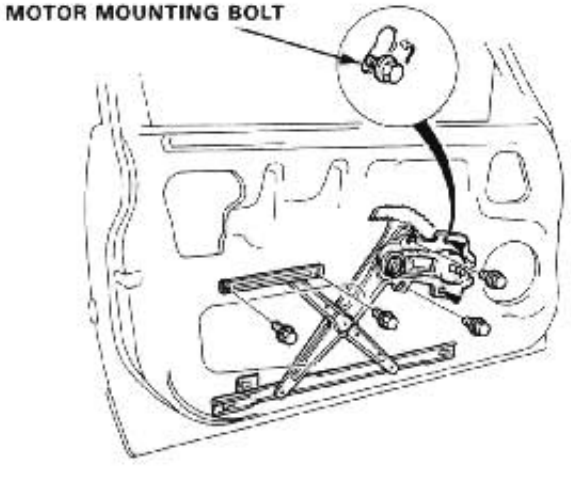
18. Remove the screw and detach the clips, then remove the outer molding.



19. Carefully raise the window until you can see its mounting bolts. Loosen the bolts and pull the door glass out through the window slot.



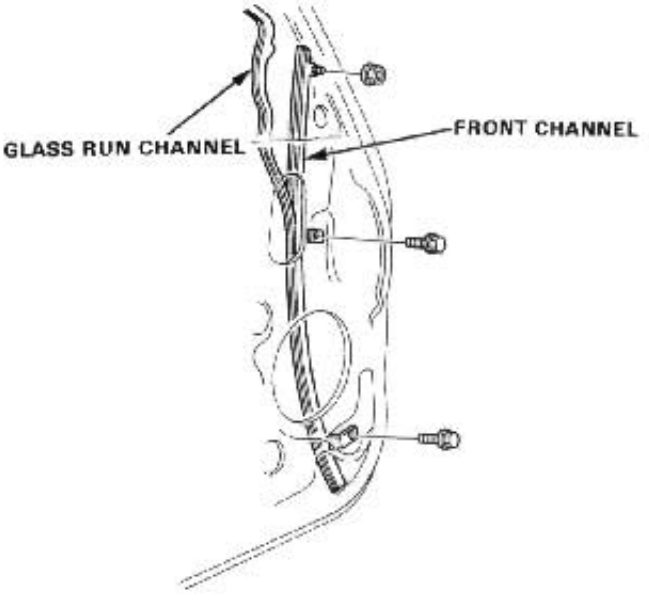
20. Remove the 4 mounting bolts and loosen the 2 motor mounting bolts, then take out the regulator assembly through the lower hole in the door



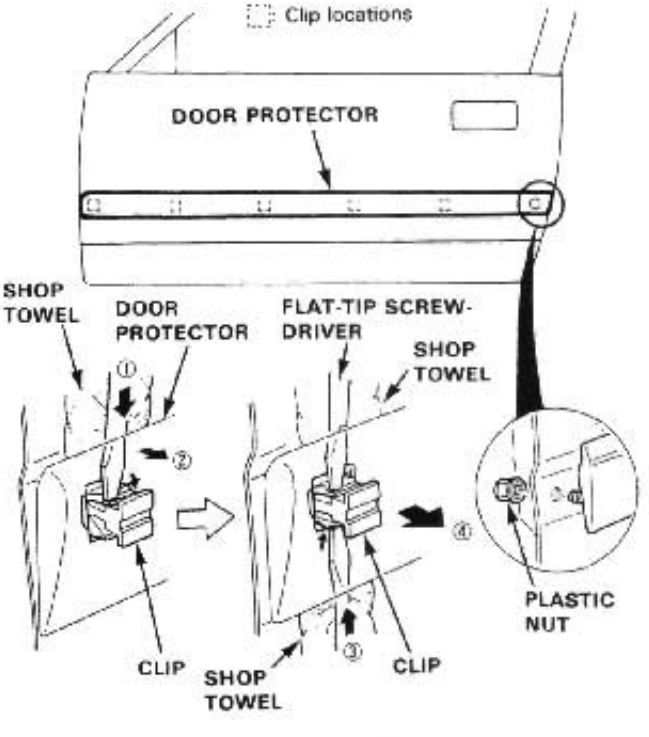
21. Remove the glass run channel.

22. Remove the front channel by removing the 2 bolts and the nut.

NOTE: Before installation, insert the glass run channel into the front channel.



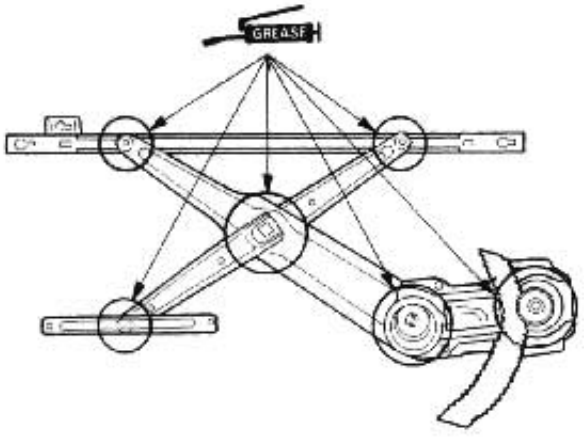
23. Remove the door protector by removing the nut and detach the clips from the inside, or outside.



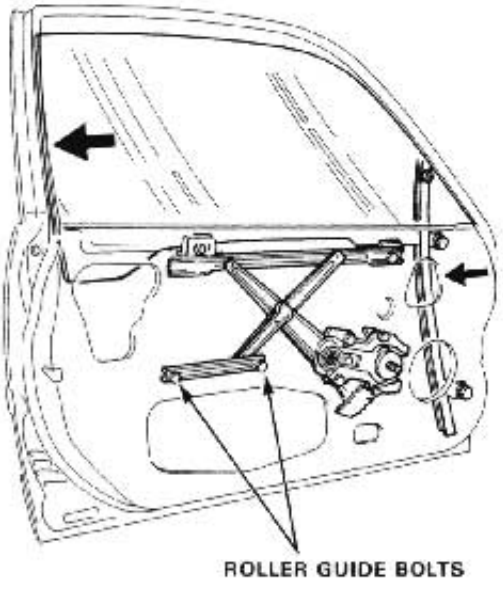
Assembly

Assemble the door in the reverse order of disassembly, and also:

1. Grease all the sliding surfaces of the window regulator where shown.

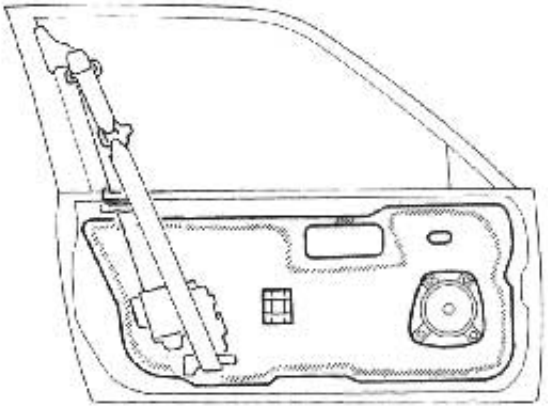


2. To adjust window fit in the door, raise the window as far up as possible and hold it against the door sash. Then, tighten the roller guide bolts or motor mounting bolts.

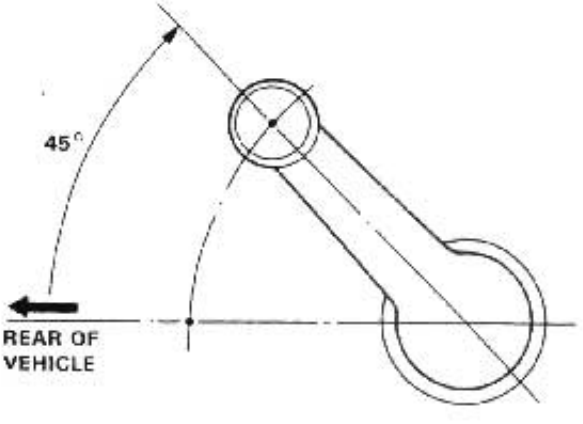


3. When reinstalling the plastic cover, apply adhesive along the edge where necessary to maintain a continuous seal and prevent air/water leaks.

   NOTE: Repair any torn section of the plastic cover.



4. Install the regulator handle so it points backward, and up at a 45 degree angle with the window closed.

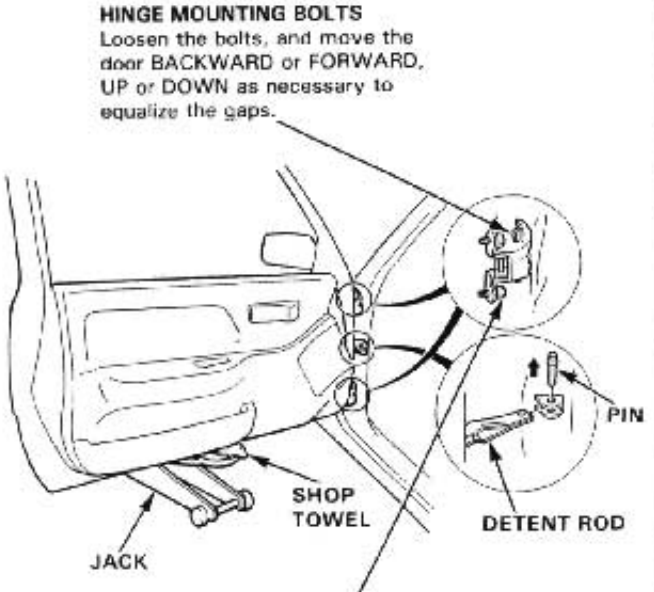


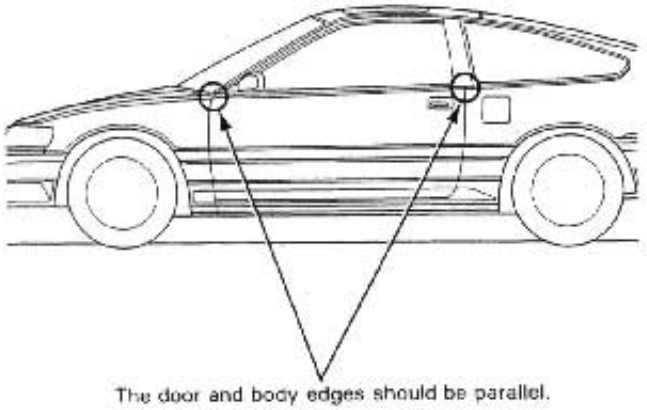
5. With the door and door glass fully, check for water and air leaks.
   NOTE: Do not use high pressure water.

Door Position Adjustment

After installing the door, check for a flush fit with the body, then check for equal gap between the front and rear, and top and bottom door edges and the body. The door and body edges should also be parallel. Adjust at the hinges as shown.

CAUTION: Place a shop towel on the jack to prevent damage to the door when the hinge bolts are loosened for adjustment.





The door and body edges should be parallel.

NOTE: Check for water and air leaks.

Door Striker Adjustment

Make sure the door latches securely without slamming. If it needs adjustment:

1. Draw a line 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.

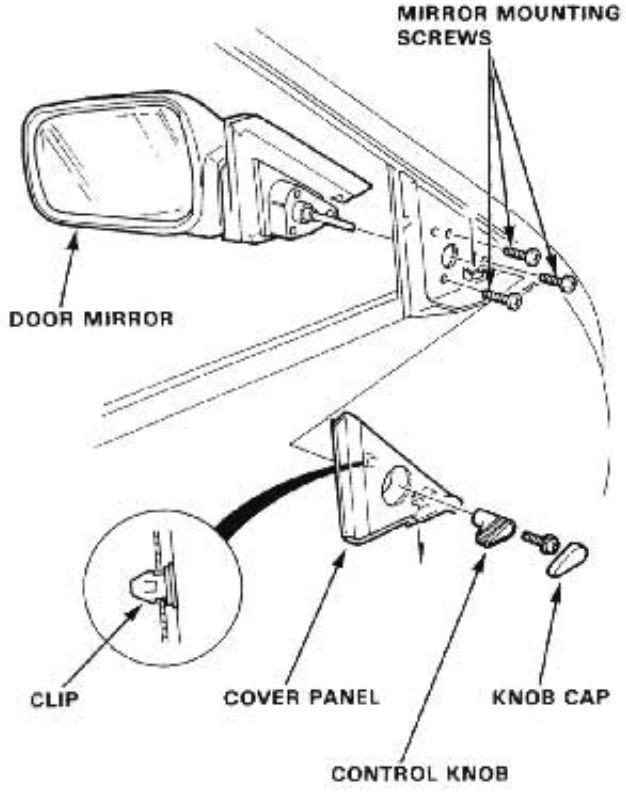
NOTE: Hold the outside handle out and push the door against the body to be sure the striker allows a flush fit.

3. If the door latches properly, tighten the screws and recheck.

Door Mirror

Removal

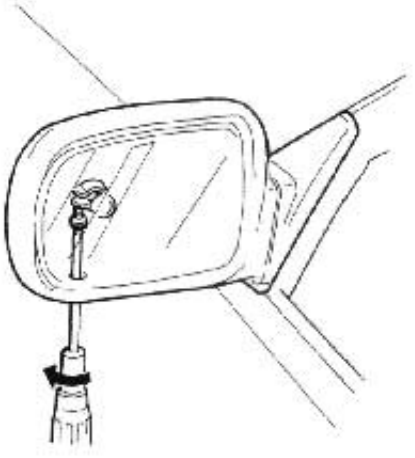
1. Remove the knob cap and screw, then remove the control knob.
2. Pry out the cover panel with a flat-tip screwdriver, then remove the cover panel.
3. Remove the mirror mounting screws while holding the mirror.



4. Install the door mirror in the reverse order of removal.
5. With the door and door glass closed fully, check for water and air leaks.
   NOTE: Do not use high pressure water.

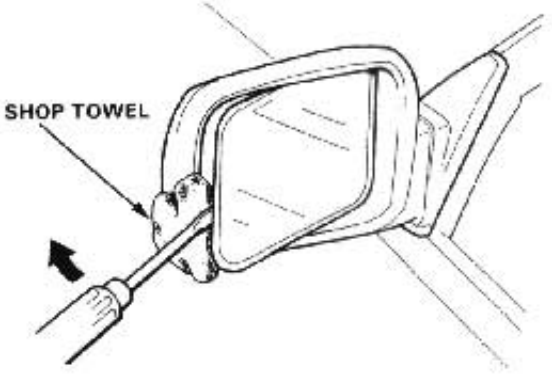
Mirror Glass Replacement

1. Insert a screwdriver in the mirror through the service hole, and loosen the glass retaining screw.

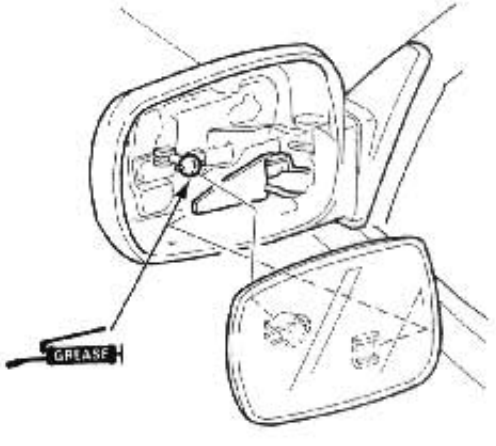


2. Carefully pry out the mirror with a flat-tip screwdriver as shown.

   CAUTION: To prevent damage to the mirror, wrap the end of the screwdriver with a shop towel.



3. Install the mirror in the reverse order of removal, and also apply grease to the location shown.



Windshield, Rear Window Glass, Lower Hatch Glass, Quarter Glass

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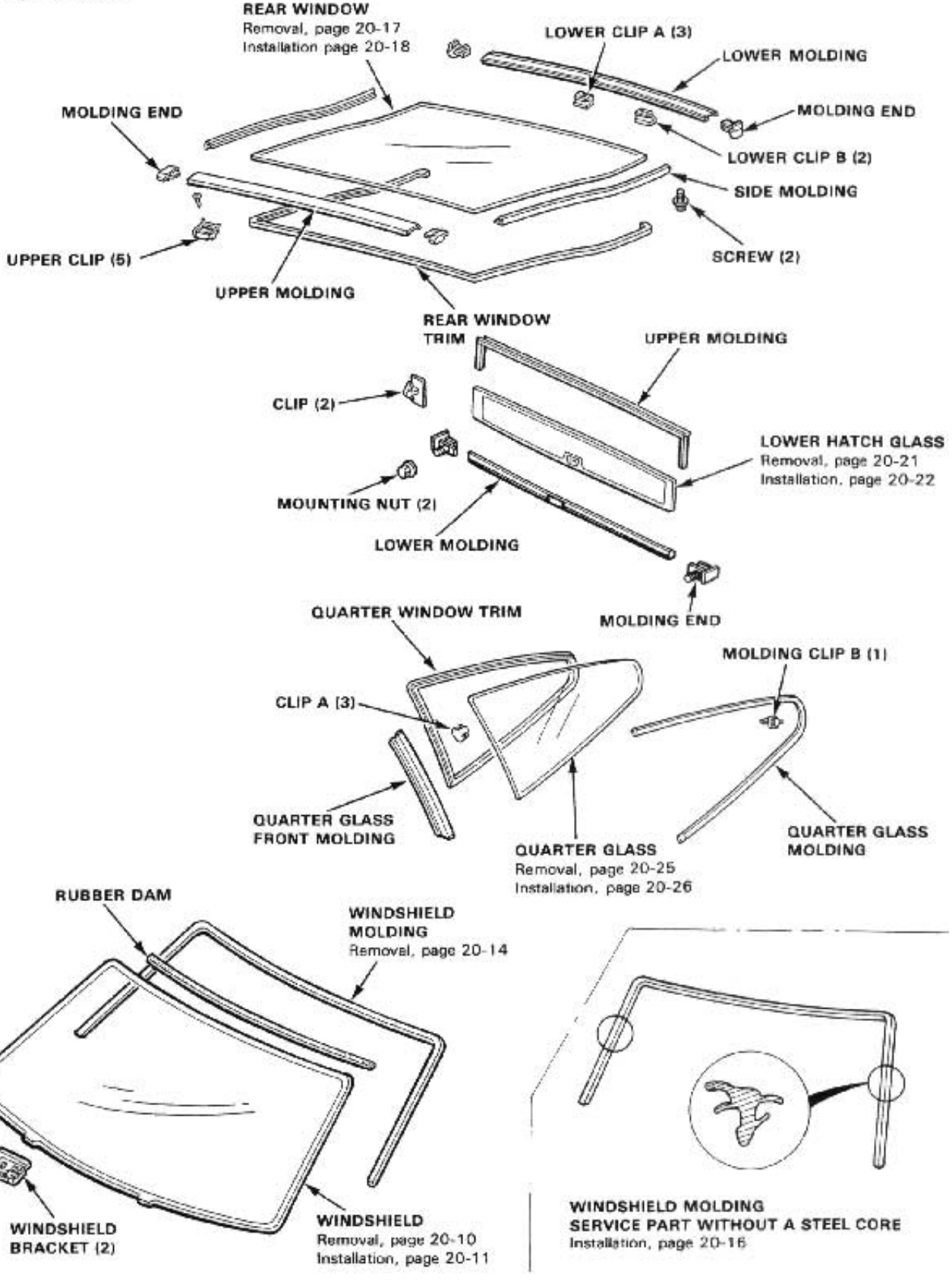
( ): Quantity of part used.



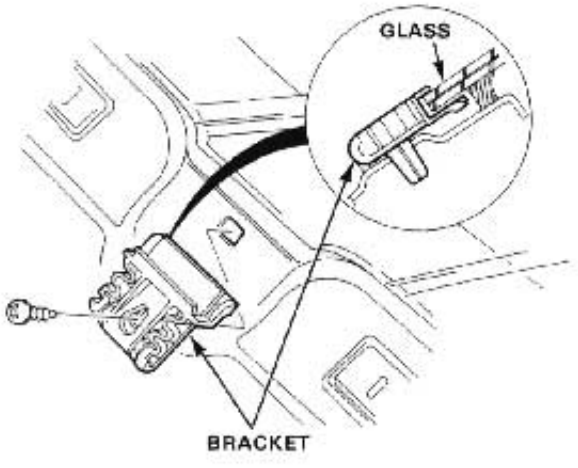
Removal

CAUTION: Wear gloves to remove and install the glass.

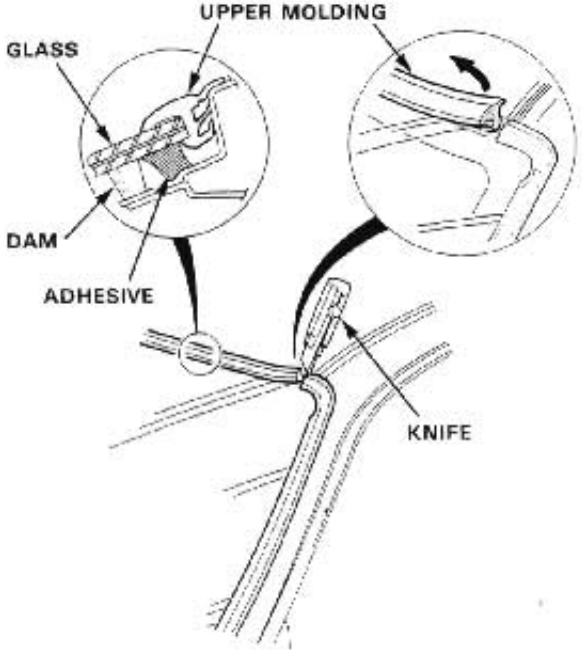
1. To remove the windshield, first remove the:
   - Rearview mirror (page 20-49).
   - Sun visors and holders.
   - Front pillar trim (page 20-41).
   - Front wiper and air scoop.
   - Lower molding.
   - Front of weatherstrip.

NOTE: Do not damage the painted surface.

2. Remove the screws, then remove the right and left glass brackets.

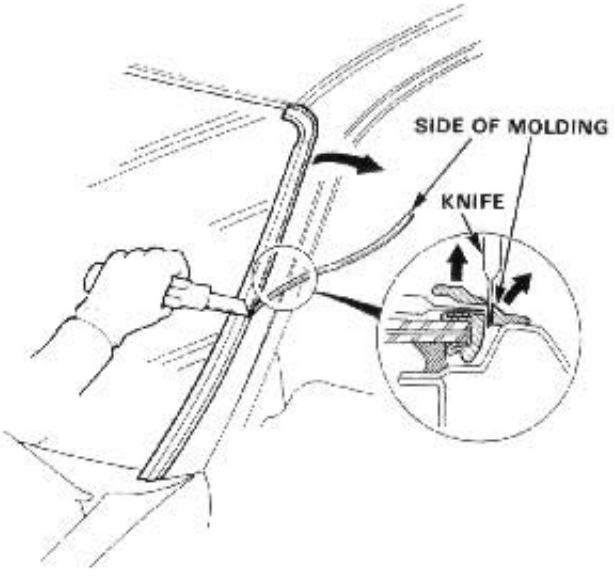


3. Cut the end of the upper molding as shown.



4. Pull away the upper molding.

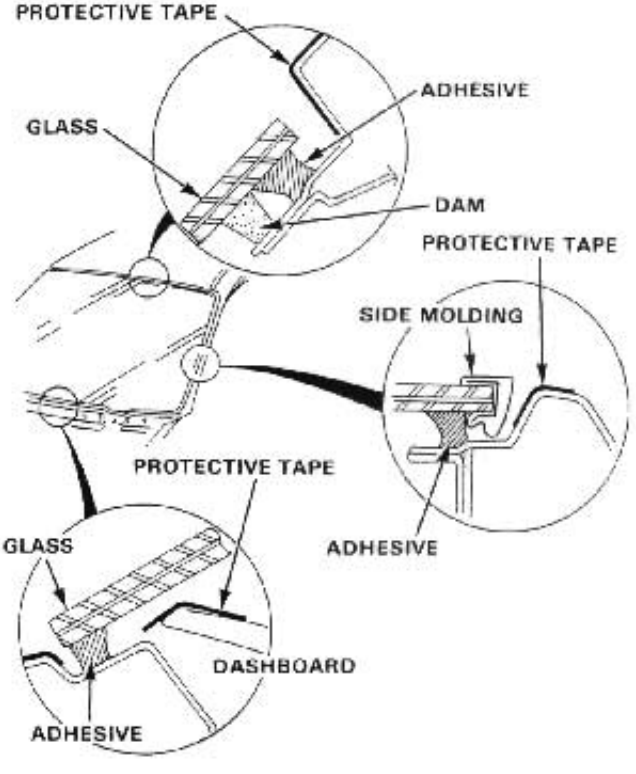
5. Cut the side rubber portion off the molding as shown (Page 20-14).



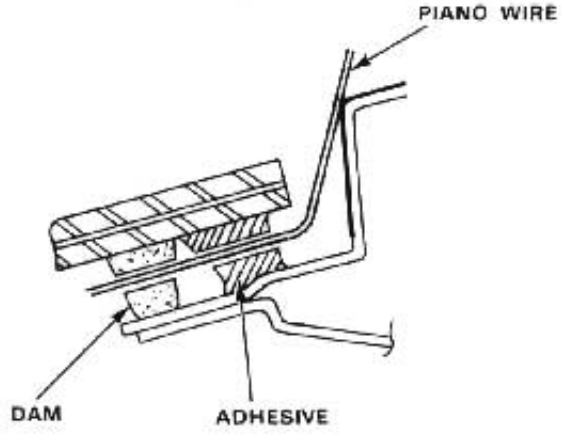
6. Lower the front of the headliner.

   CAUTION: Take care not to bend the headliner excessively.

7. Apply protective tape along the edge of the dashboard and body next to the glass as shown.

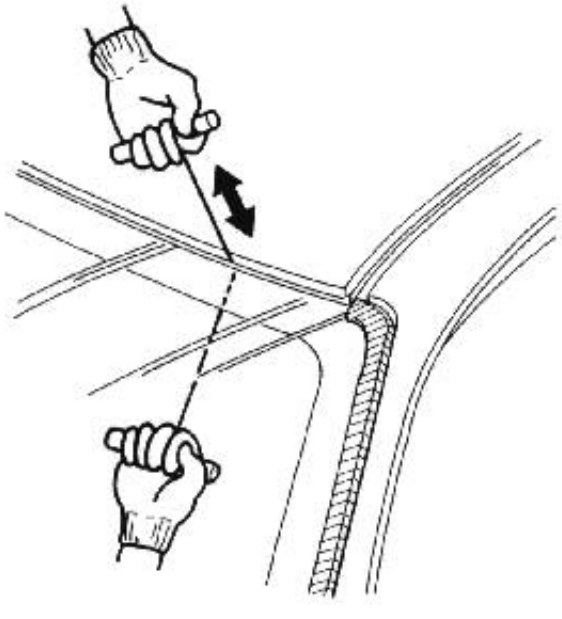


8. Using an awl, make a hole through the adhesive from inside the car. Push piano wire through the hole and wrap each end around a piece of wood.



9. With a helper on the outside, pull the wire back and forth in a sawing motion and carefully cut through the adhesive around the entire glass.

CAUTION: Hold the piano wire as close to the glass as possible to prevent damage to the body and dashboard.



10. Remove the side molding from the glass.

Installation

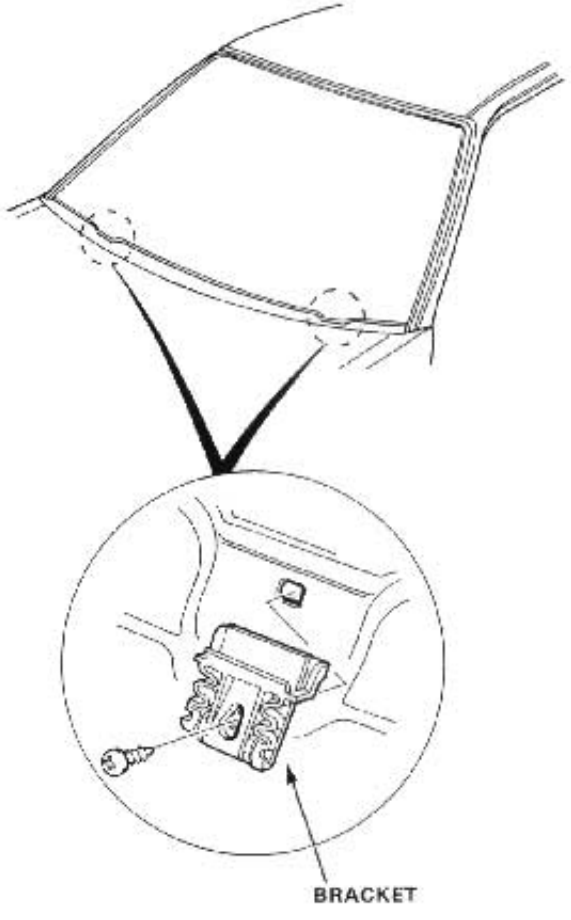
1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire glass flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Remove all traces of the rubber spacer material from the body.
   - Mask off surrounding surfaces before applying primer.

2. Clean the body bonding surface with a sponge dampened in alcohol.

   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. Install the glass brackets as shown.



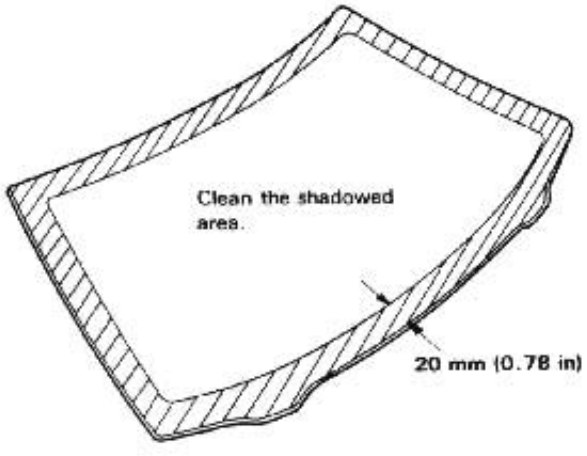
(cont'd)

Installation (cont'd)

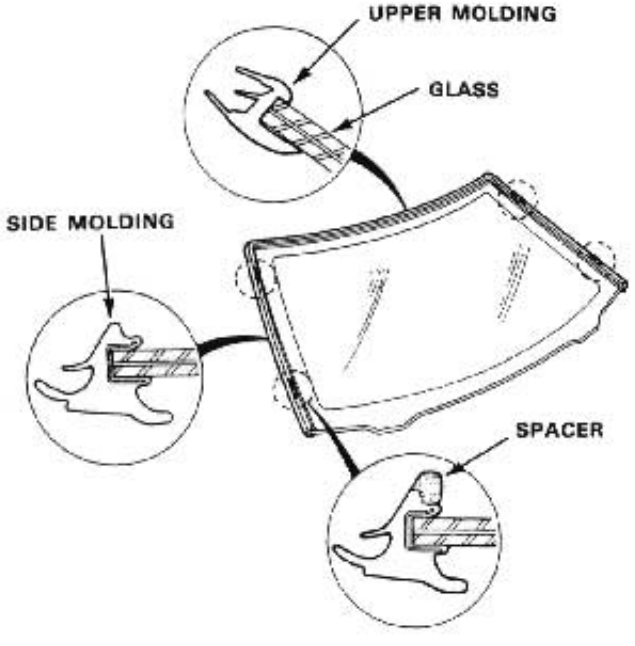
4. If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

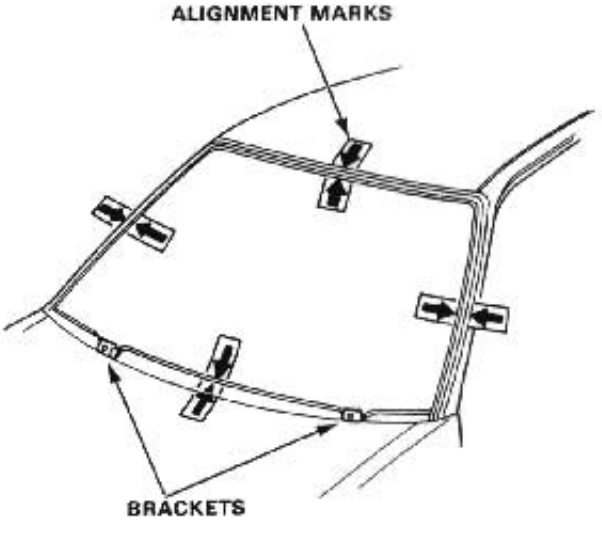
   CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.



5. Apply the windshield moldings to the glass as shown.

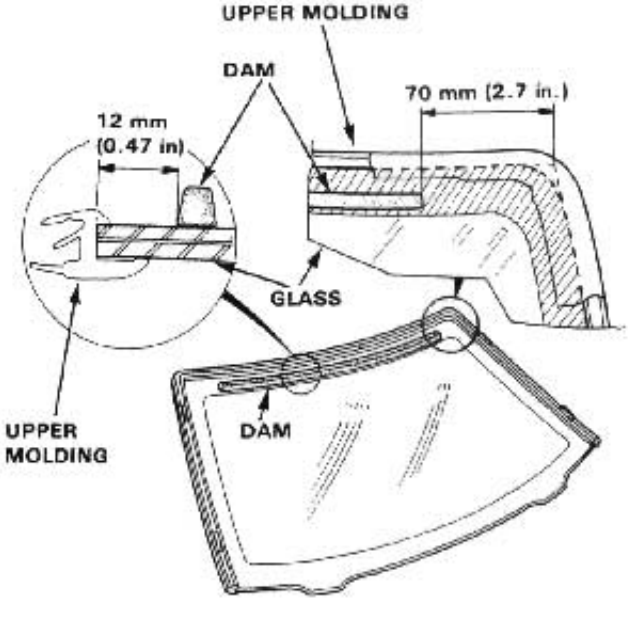


6. Set the glass upright on the spacers, and center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.



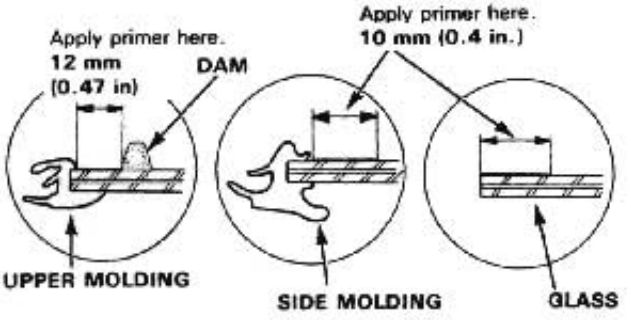
7. Center and glue the rubber dam to the inside face of the glass as shown, to contain the adhesive during installation.

   NOTE:
   - Be careful not to touch the glass where adhesive will be applied.
   - Mask off surrounding surfaces before applying primer.



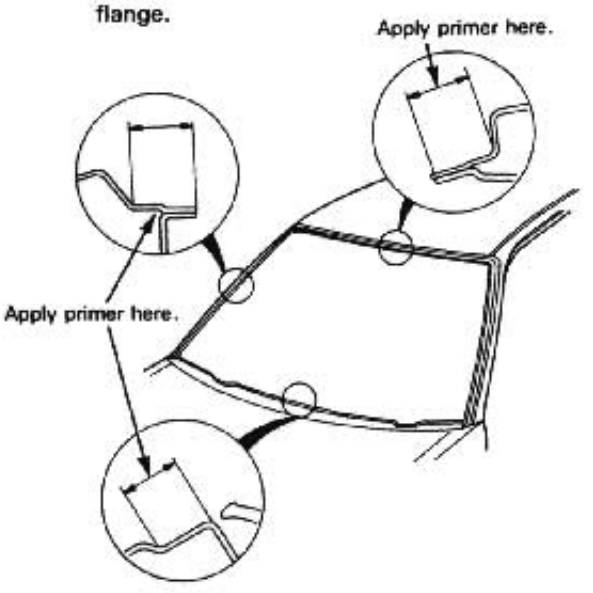
8. With a sponge, apply a light coat of glass primer around the edge of the glass, then lightly wipe it off with gauze or cheesecloth.

NOTE:
- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.



9. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

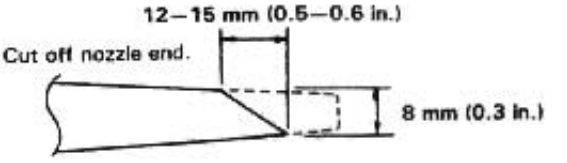
NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.
- Mask off the dashboard before painting the flange.



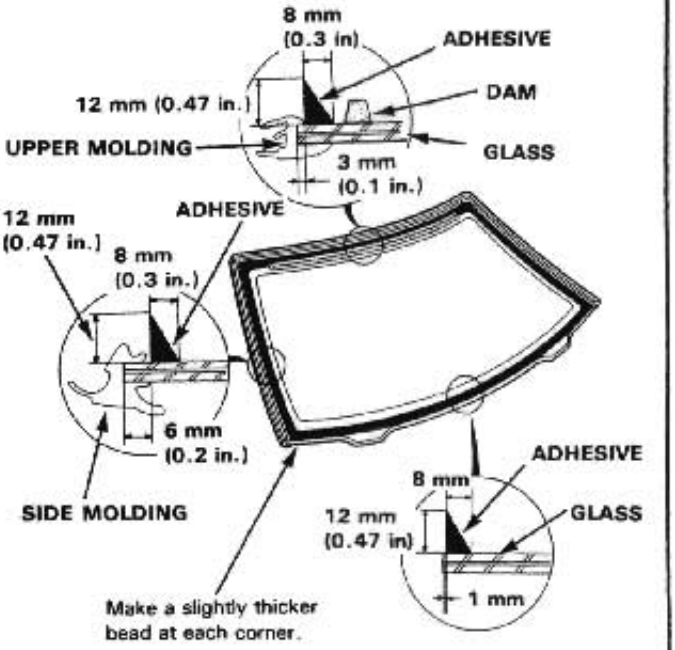
10. Thoroughly mix the adhesive and hardener together on a glass or metal plate.

NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that came with the adhesive.

11. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



12. Pack adhesive into the cartridge without air pockets, to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the glass as shown.



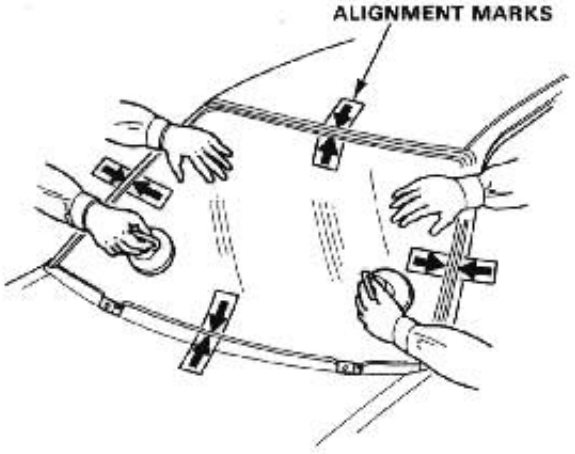
(cont'd)

Windshield

Installation (cont'd)

13. Use suction cups to hold the glass over the opening, align it with the marks made in step 6 and set it down on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

    NOTE: Do not open or close the doors until the adhesive is dry.



14. Scrape or wipe the excess adhesive off with a putty knife or gauze.

    NOTE: Use a shop towel dampened with alcohol or unleaded gasoline to remove adhesive from a painted surface or glass.

15. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

    NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

16. Reinstall all remaining removed parts.

Windshield Molding

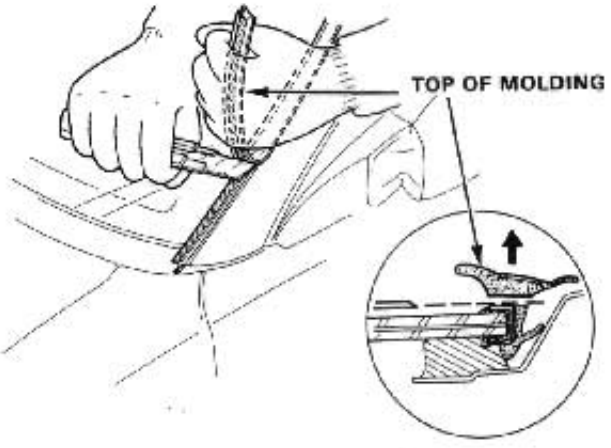
Removal

CAUTION: Wear gloves to remove and install the molding.

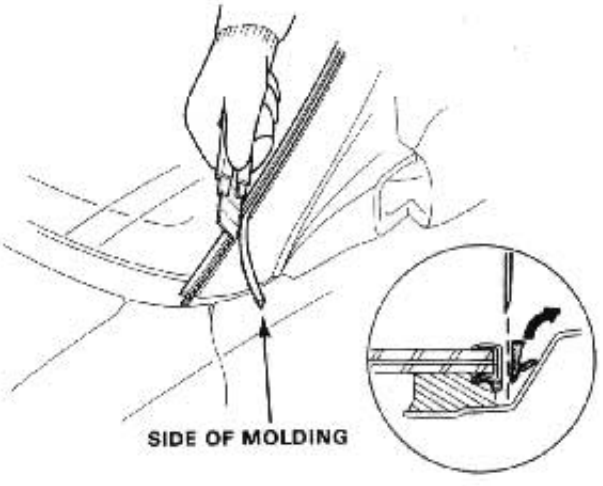
1. To remove the front windshield molding, first remove the:
   - Front wiper and air scoop
   - Lower molding.

   NOTE: Do not damage the painted surface during removal procedure.

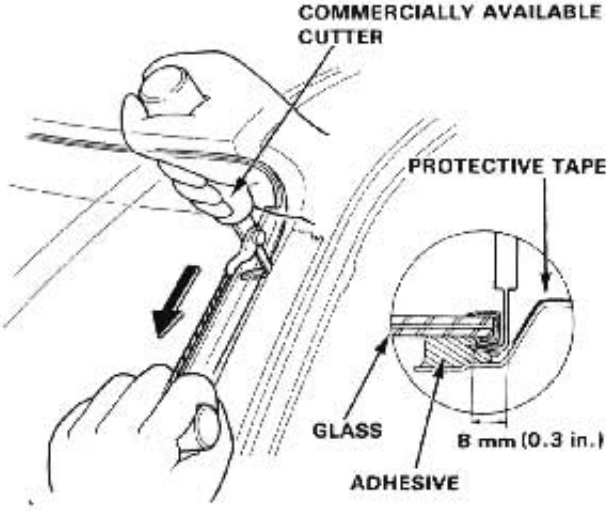
2. Cut the top rubber portion off the side of molding as shown.



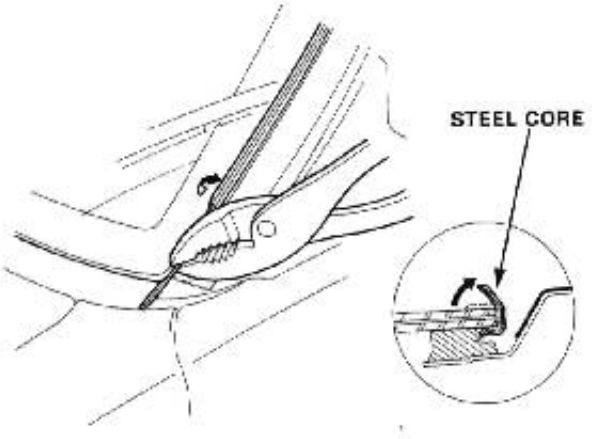
3. Cut the side rubber portion off the molding as shown.



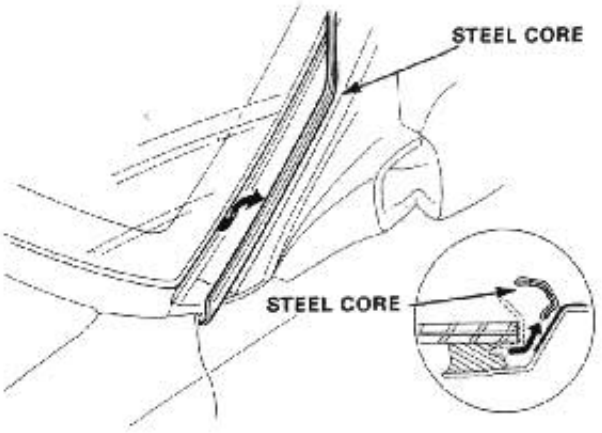
4. Apply protective tape along the edge of the body next to the glass as shown. Cut the bottom of the side molding as shown. Cut through the adhesive holding the underside of the side moldings.
NOTE:
- You will need a commercially available cutter with an L-angled blade having 8 mm of cutting surface, in order to cut only the molding adhesive without cutting the glass adhesive. The blade supplied with some cutters may need to be ground down to 8 mm.
- Windshield moldings can be cut easily with a hot-tip type L-angle bladed cutter.



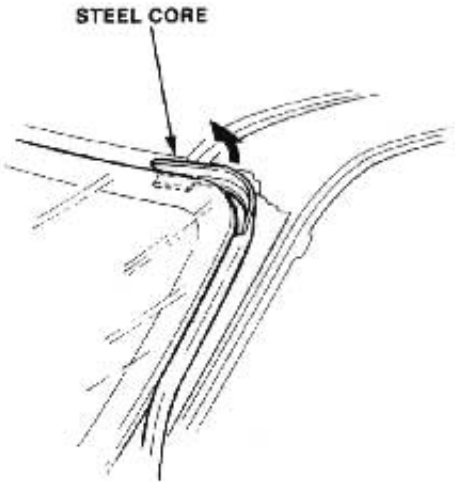
5. Carefully bend up the top side of the steel core as shown.



6. Pull the molding steel core away from the glass.
NOTE: The upper molding can be removed by simply pulling it up.



CAUTION: Remove the steel core without damaging the glass.

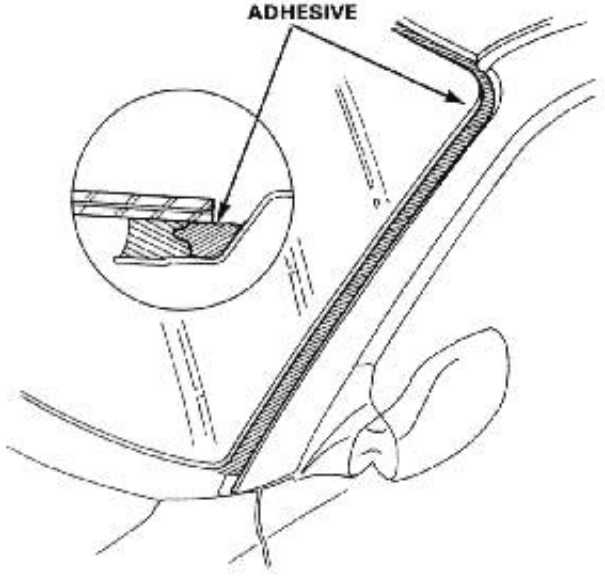


Windshield Molding

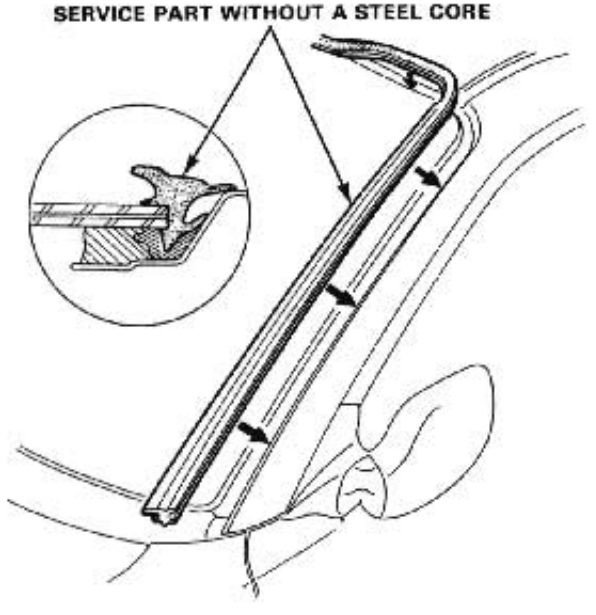
Installation

NOTE: When only replacing the molding (with the windshield remaining in place) use the replacement molding that has no steel core.

1. Apply adhesive around the glass as shown.



2. Install the coreless molding, starting at the upper corners then smoothly pushing the top and side portions into place.

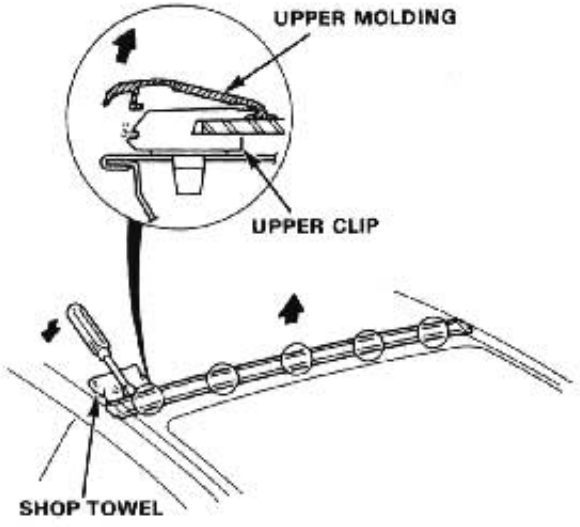


Removal

CAUTION:
- **Wear gloves to remove and install the glass.**
- **Do not damage the defroster grid lines.**

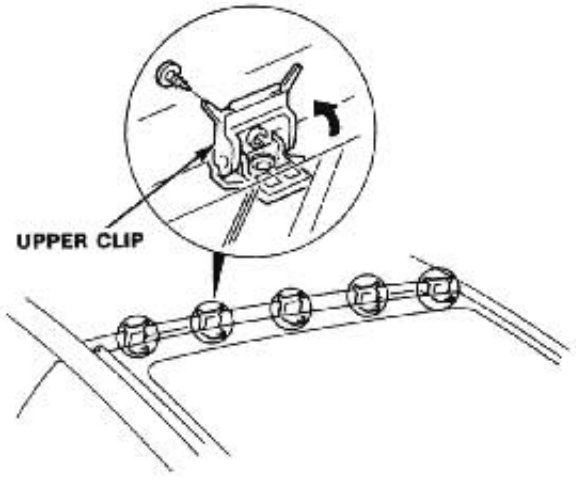
1. To remove the rear window glass, first remove the:
   - Tailgate trim panel (page 20-59).
   - Rear wiper (See section 23).
   - High mount brake light (See section 23).

2. Remove the upper molding by prying it upward.



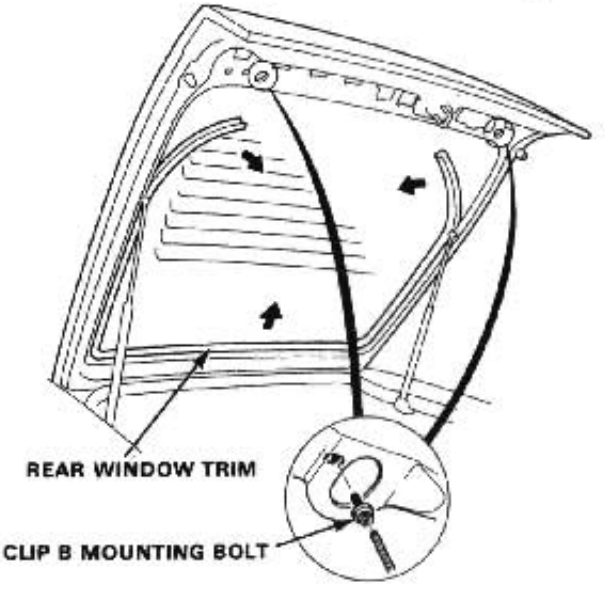
NOTE: Do not damage the painted surface.

3. Remove the screw, then raise the upper clips as shown.

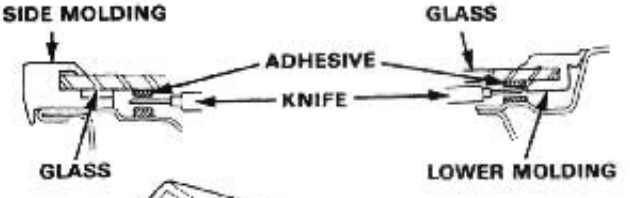


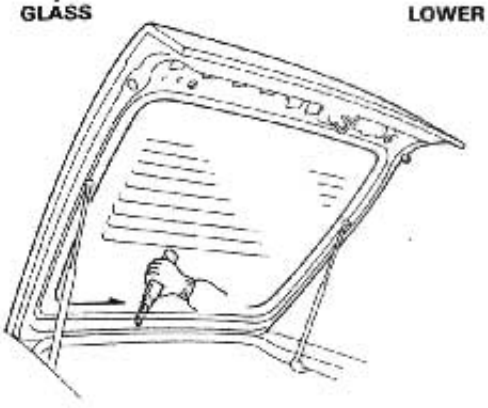
4. Remove the rear window trim, and remove the rear window lower molding clip B mounting bolts.

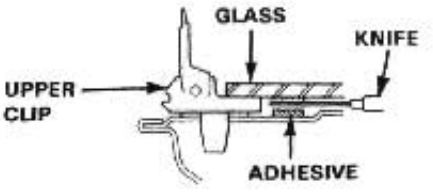
NOTE: Take care not to scratch or score the glass.



5. From inside the car, use a knife to cut through the glass adhesive all the way around the glass area.







6. Remove the rear window molding when the glass is to be reused.

Rear Window

Installation

1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire window glass flange.

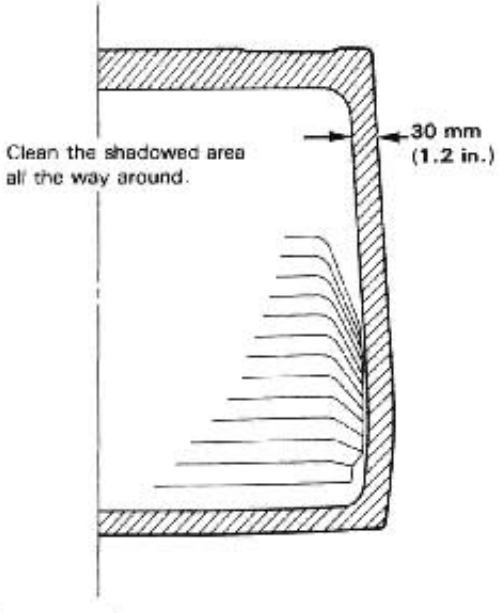
   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Remove all traces of the rubber spacer material from the body.
   - Mask off surrounding surfaces before applying primer.

2. Clean the body bonding surface with a sponge dampened in alcohol.

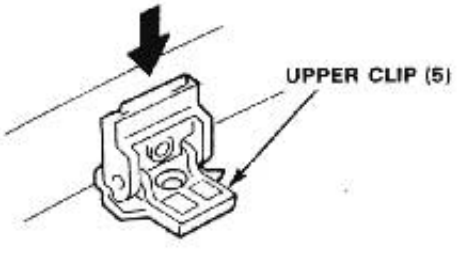
   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

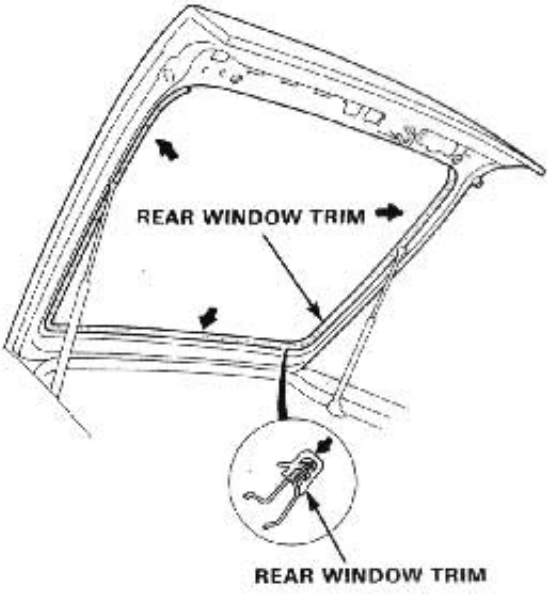
   NOTE: Make sure the bonding surface is kept free of water, oil and grease.



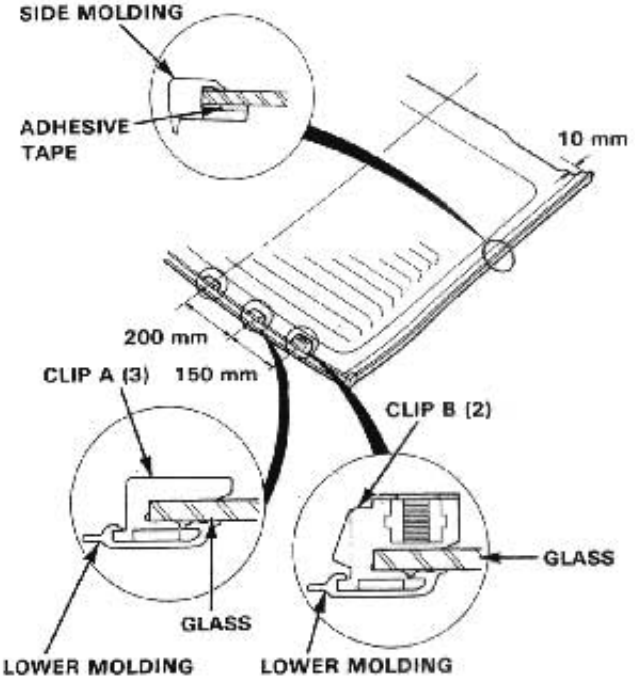
4. Install the upper clips.



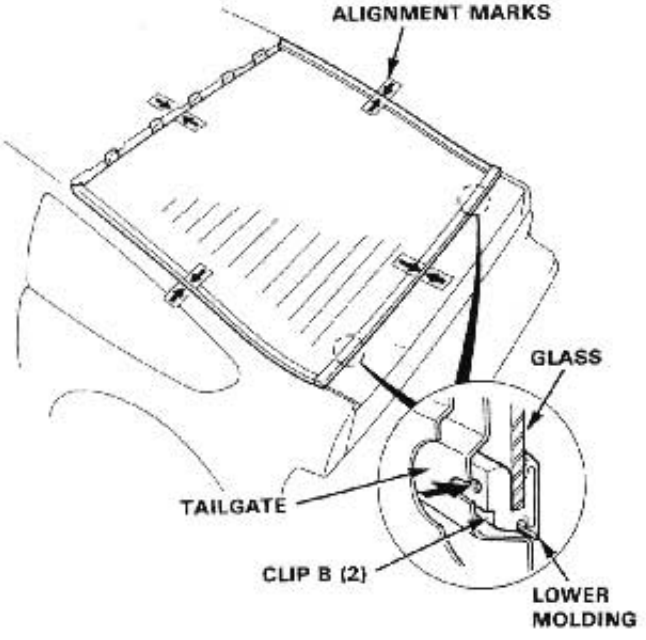
5. Install the rear window trim in the tailgate.



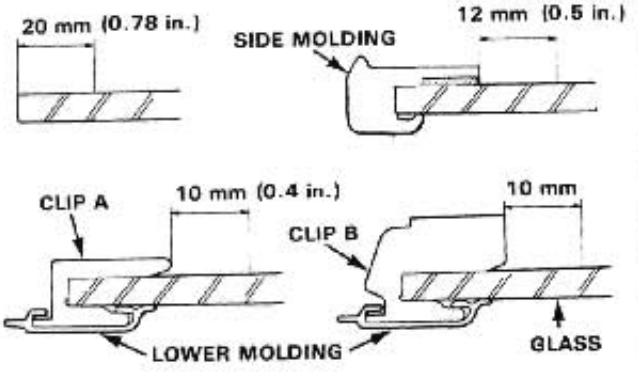
6. Adhere the side moldings, lower molding clips and lower molding to the side and lower edge of the glass as shown.



7. Set the glass upright on the tailgate, and center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.
NOTE: Check that the lower molding clip B mount holes and tailgate holes align with each other as shown.

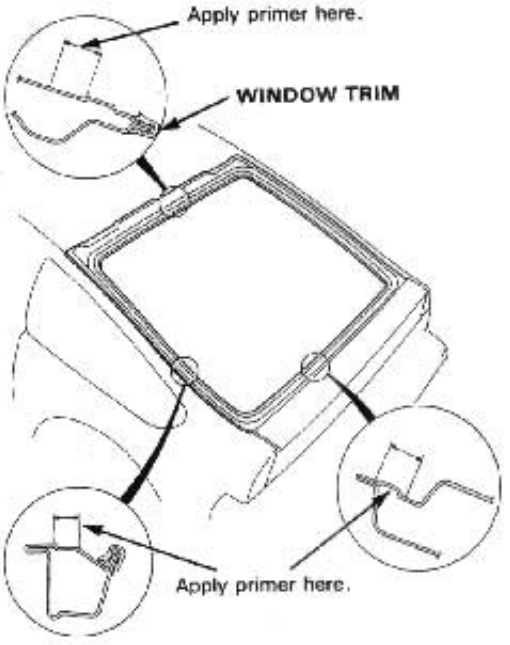


8. With a sponge, apply a light coat of glass primer around the edge of the glass as shown, then lightly wipe it off with gauze or cheesecloth.
NOTE:
- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.



9. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

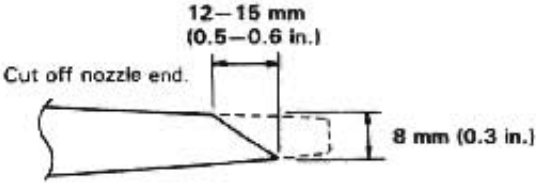
NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.



10. Thoroughly mix all the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.

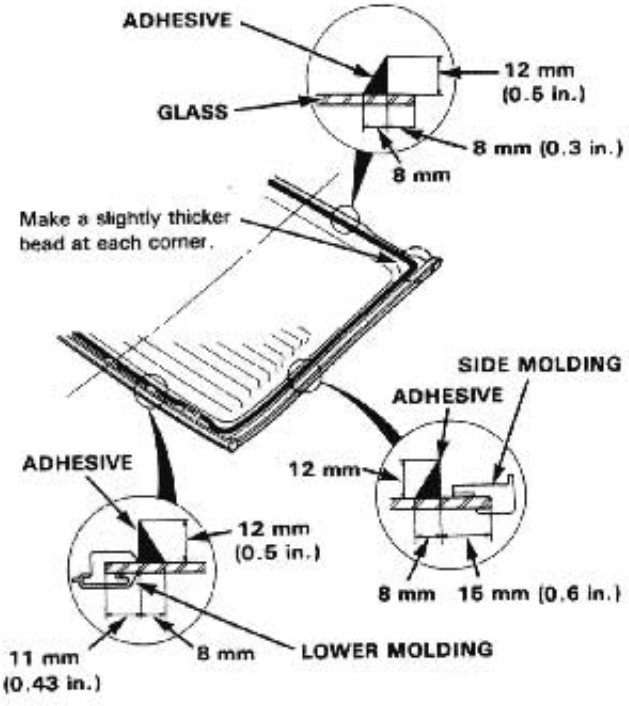
11. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



(cont'd)

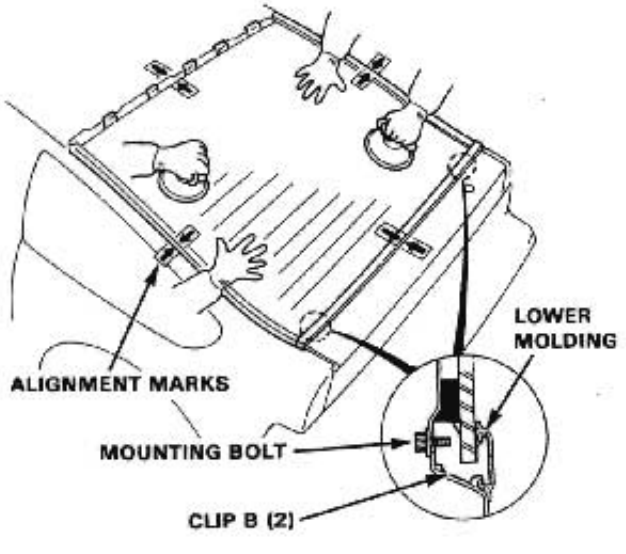
Installation (cont'd)

12. Pack adhesive into the cartridge without air pockets, to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the glass as shown.

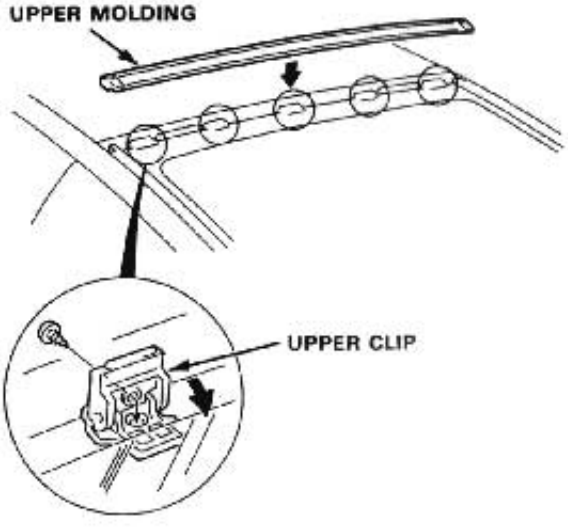


13. Use suction cups to hold the glass over the opening, then set it down on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

    NOTE: Do not open or close the doors until the adhesive is dry.



14. Fold down the upper clips and install the screws. Install the upper molding by pressing down on the upper edge as shown.



15. Scrape or wipe the excess adhesive off with a putty knife or gauze.

    NOTE: Use a shop towel dampened with alcohol or unleaded gasoline to remove adhesive from a painted surface or glass.

16. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

    NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

17. Reinstall all remaining removed parts.

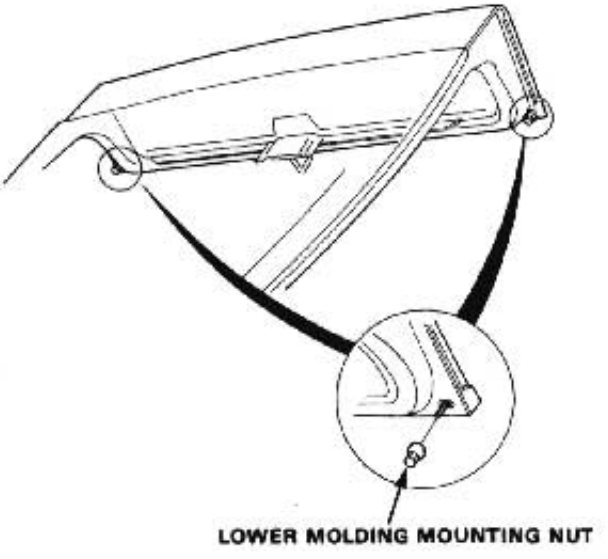
Lower Hatch Glass

Removal

CAUTION: Wear gloves to remove and install the glass.

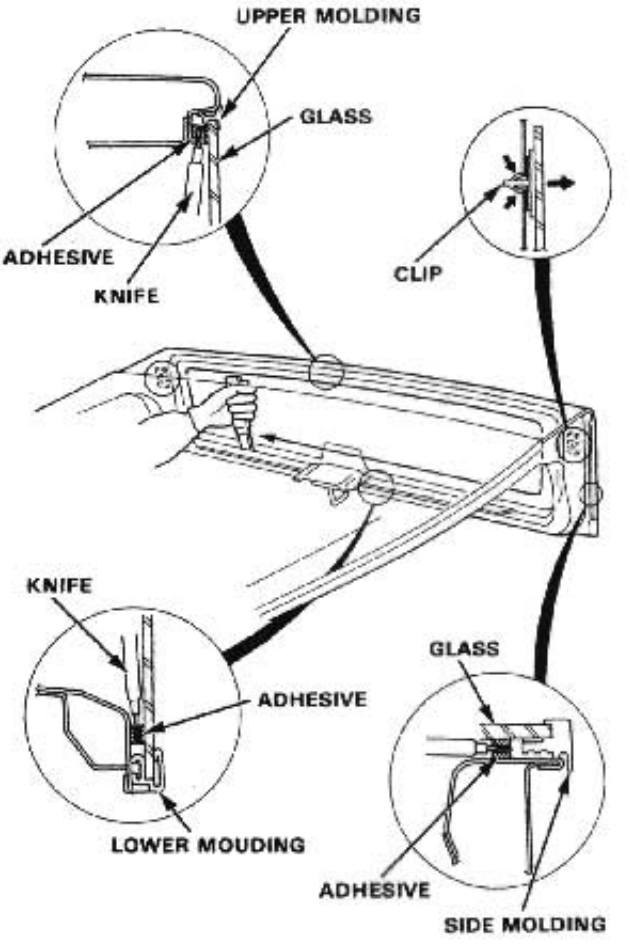
NOTE: To remove the lower hatch glass first remove the tailgate trim panel (page 20-59), and high mount brake light (See Section 23).

1. Remove the lower molding mounting nuts.



NOTE: Take care not to scratch or score the glass.

2. Detach the 2 clips and from inside the car, use a knife to cut through the glass adhesive all the way around.



3. Remove the glass.
4. Remove the lower and side molding if the glass is to be reused.
   NOTE: Do not damage the painted surface.

Lower Hatch Glass

Installation

1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire glass flange.

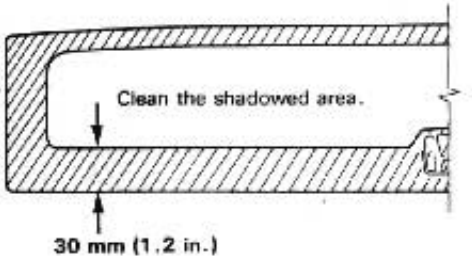
   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Remove all traces of the rubber spacer material from the body.
   - Mask off surrounding surfaces before applying primer.

2. Clean the body bonding surface with a sponge dampened in alcohol.

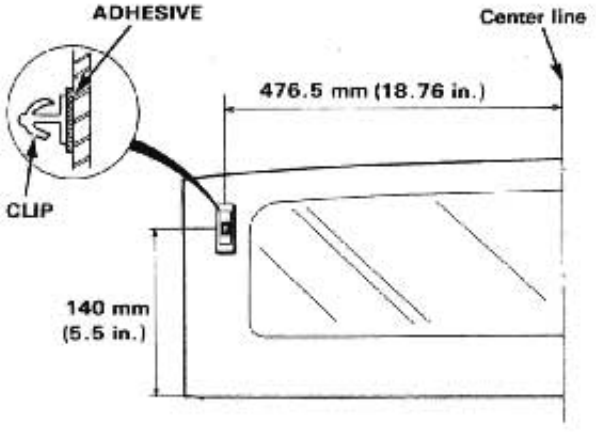
   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

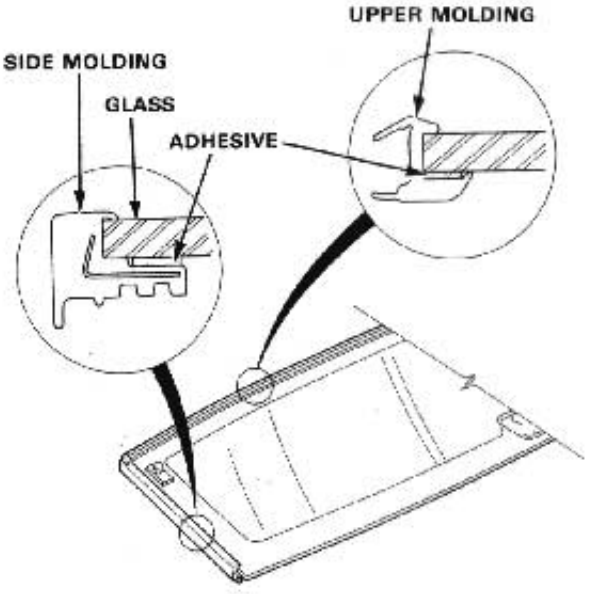
   NOTE: Make sure the bonding surface is kept free of water, oil and grease.



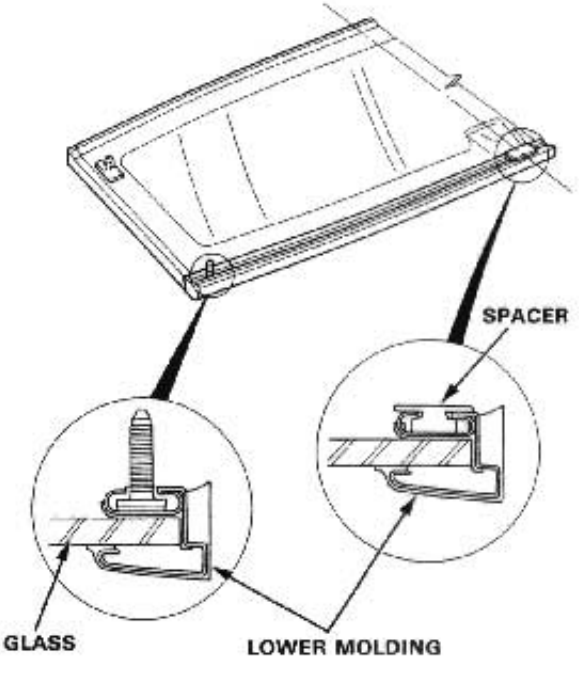
4. Glue the clips to the inside face of the glass as shown.



5. Adhere the upper and side moldings to the edge of the glass as shown.

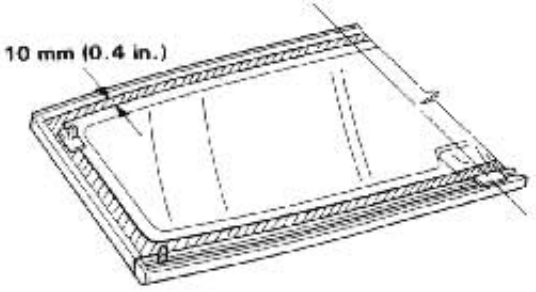


6. Install the lower molding on the glass as shown.



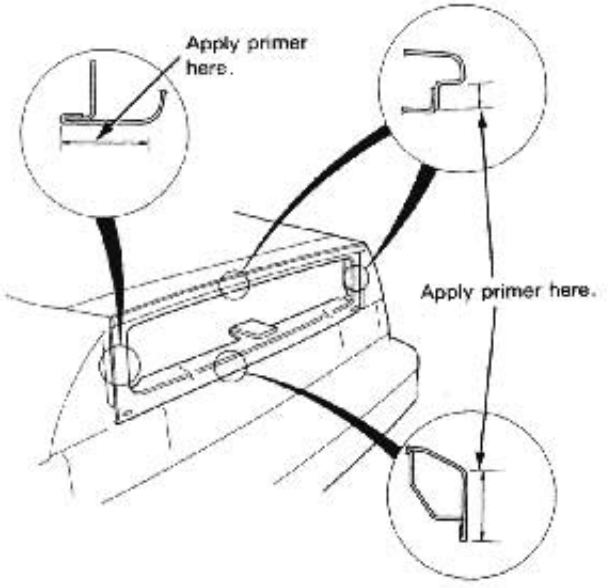
7. With a sponge, apply a light coat of glass primer around the edge of the glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:
- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.



8. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.

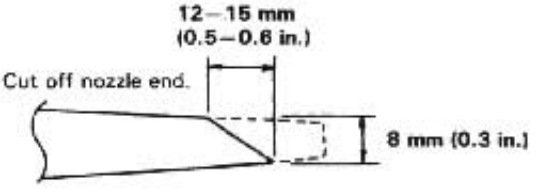


9. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE: Clean the plate with a sponge and alcohol before mixing.

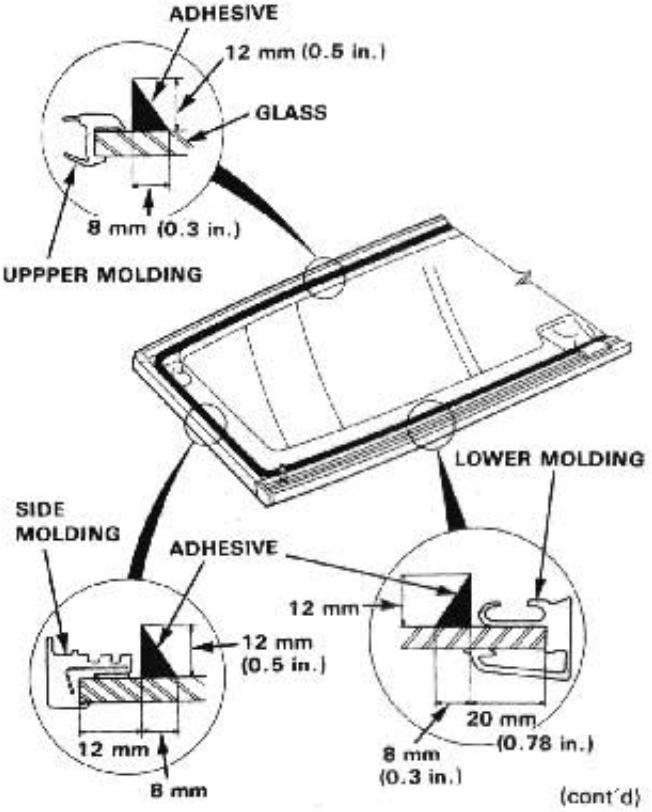
10. Follow the instructions that came with the adhesive.

11. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



12. Pack adhesive into the cartridge without air pockets, to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the glass as shown.

NOTE: Peel off the backing of dam.



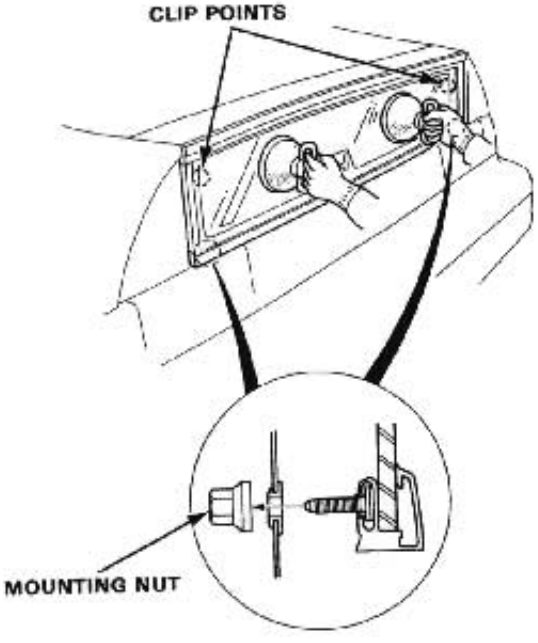
(cont'd)

Lower Hatch Glass

Installation (cont'd)

13. Use suction cups to hold the glass, then set it on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

    NOTE: Do not open or close the tailgate until the adhesive is dry.



14. Scrape or wipe the excess adhesive off with a putty knife or gauze.

    NOTE: Use a shop towel dampened with alcohol or unleaded gasoline to remove adhesive from a painted surface or glass.

15. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

    NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

16. Reinstall all remaining removed parts.

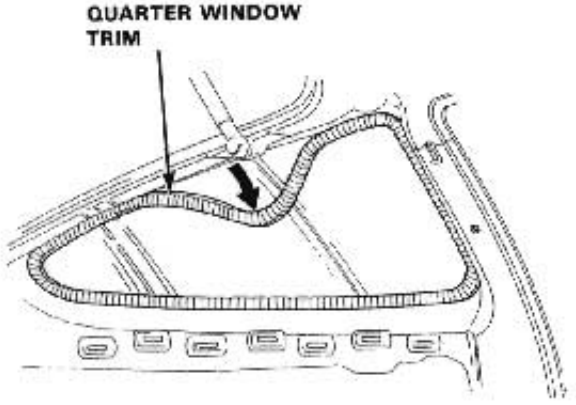
Quarter Glass

Removal

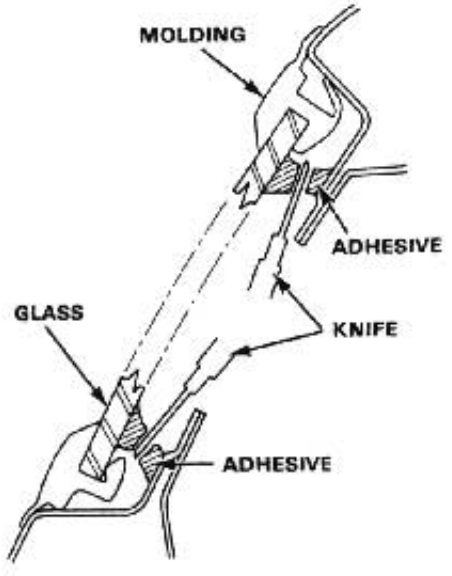
CAUTION: Wear gloves to remove and install the glass.

NOTE: To remove the quarter glass, first remove the quarter window trim panel and quarter trim panel (page 20-41).

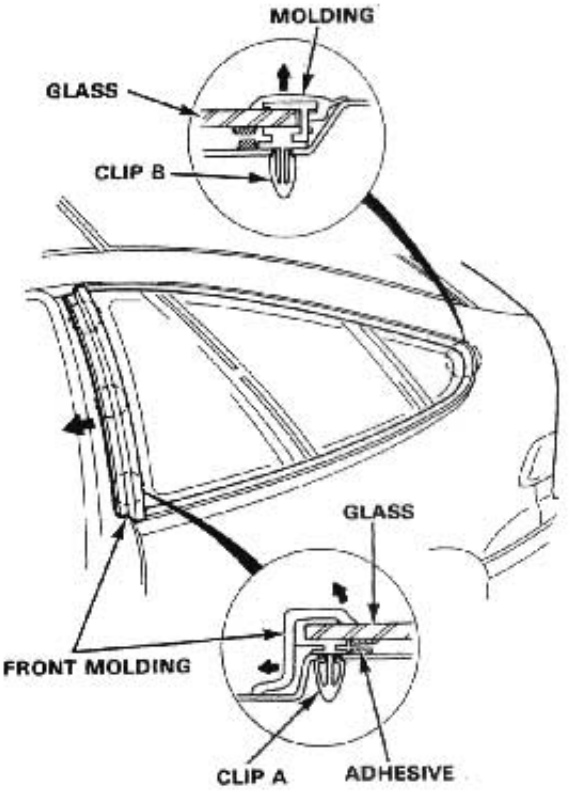
1. Remove the quarter window trim.



2. From inside the car, use a knife to cut through the glass adhesive all the way around.



3. As an assembly, pry the glass and upper and front moldings away from the car at the clip points shown.



4. Remove the quarter glass molding if the glass is to be reused.

Quarter Glass

Installation

1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire glass flange.

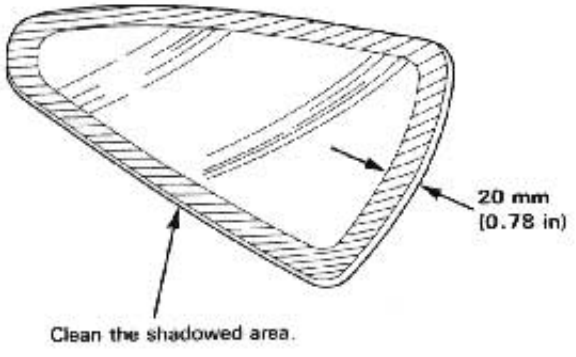
   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Remove all traces of the rubber spacer material from the body.
   - Mask off surrounding surfaces before applying primer.

2. Clean the body bonding surface with a sponge dampened in alcohol.

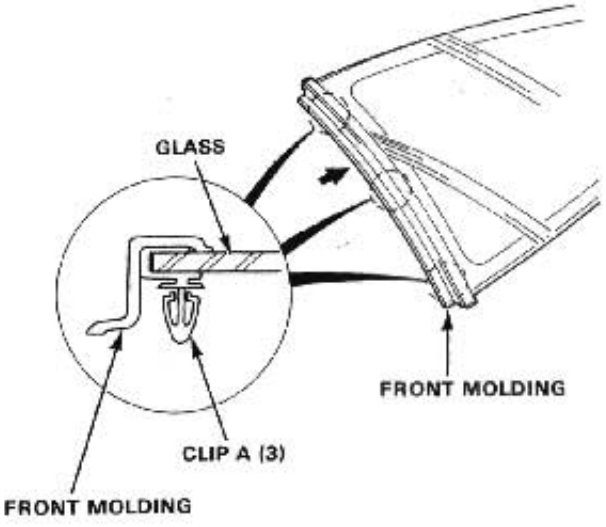
   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

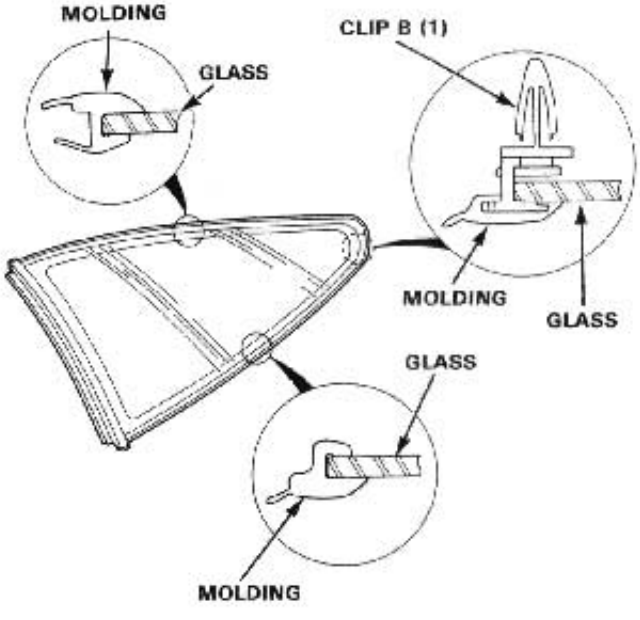
   NOTE: Make sure the bonding surface is kept free of water, oil and grease.



4. Attach the front molding and 3 clips to the front edge of the quarter glass as shown.

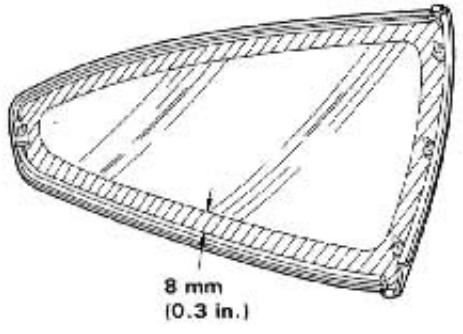


5. Install the quarter molding on the glass by using the clips shown.

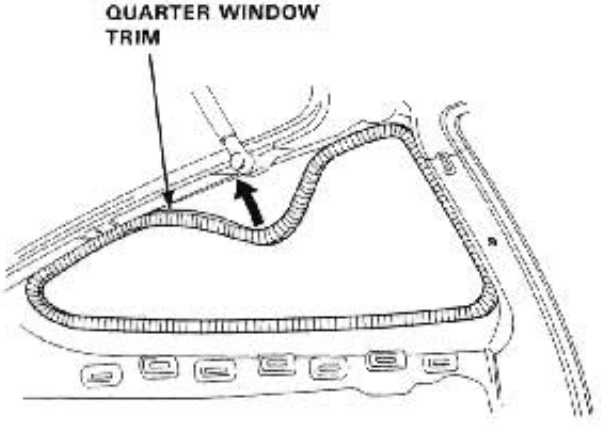


6. With a sponge, apply a light coat of glass primer around the edge of the glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:
- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

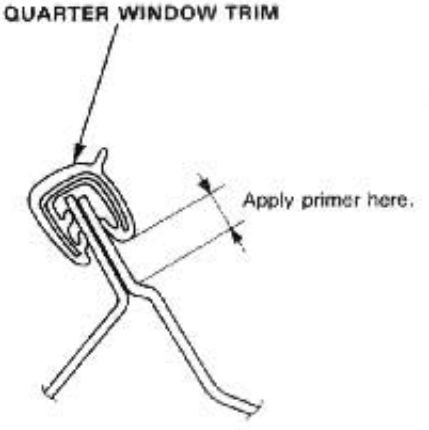


7. Install the quater window trim.



8. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

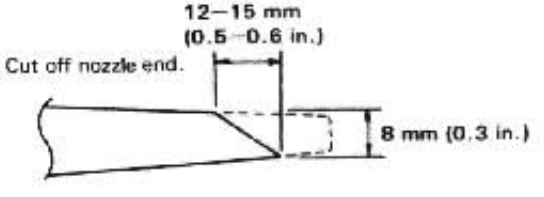
NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.



9. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.

10. Before filling a cartridge, cut off the end of the nozzle at the angle shown.

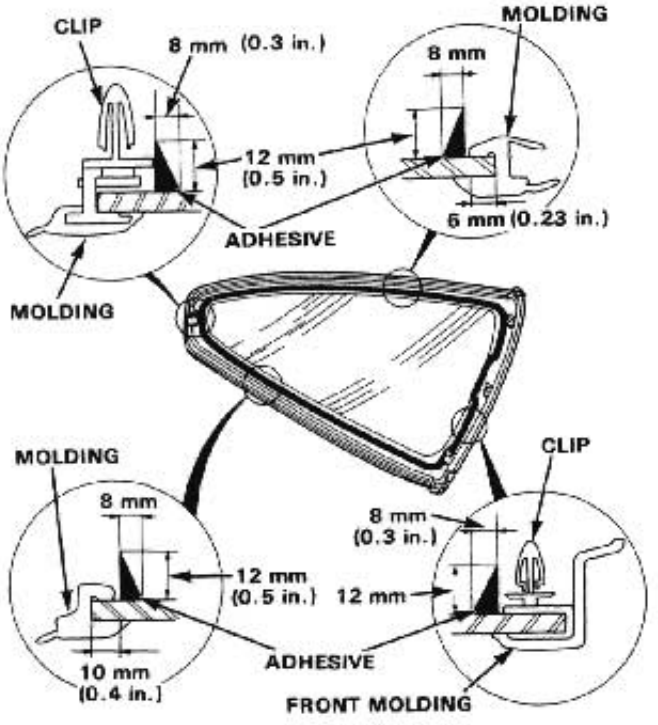


(cont'd)

Quarter Glass

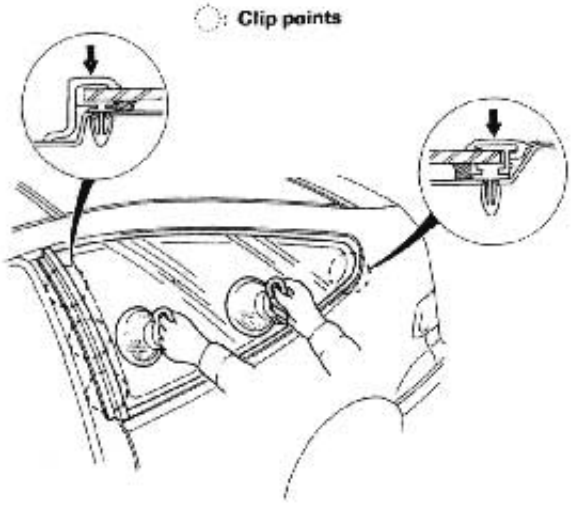
Installation (cont'd)

11. 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.



12. Use suction cups to hold the glass, then set it on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

    NOTE: Do not open or close the doors and tailgate until the adhesive is dry.



13. Scrape or wipe the excess adhesive off with a putty knife or gauze.

    NOTE: Use a shop towel dampened with alcohol or unleaded gasoline to remove adhesive from a painted surface or glass.

14. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

    NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

15. Reinstall all remaining removed parts.

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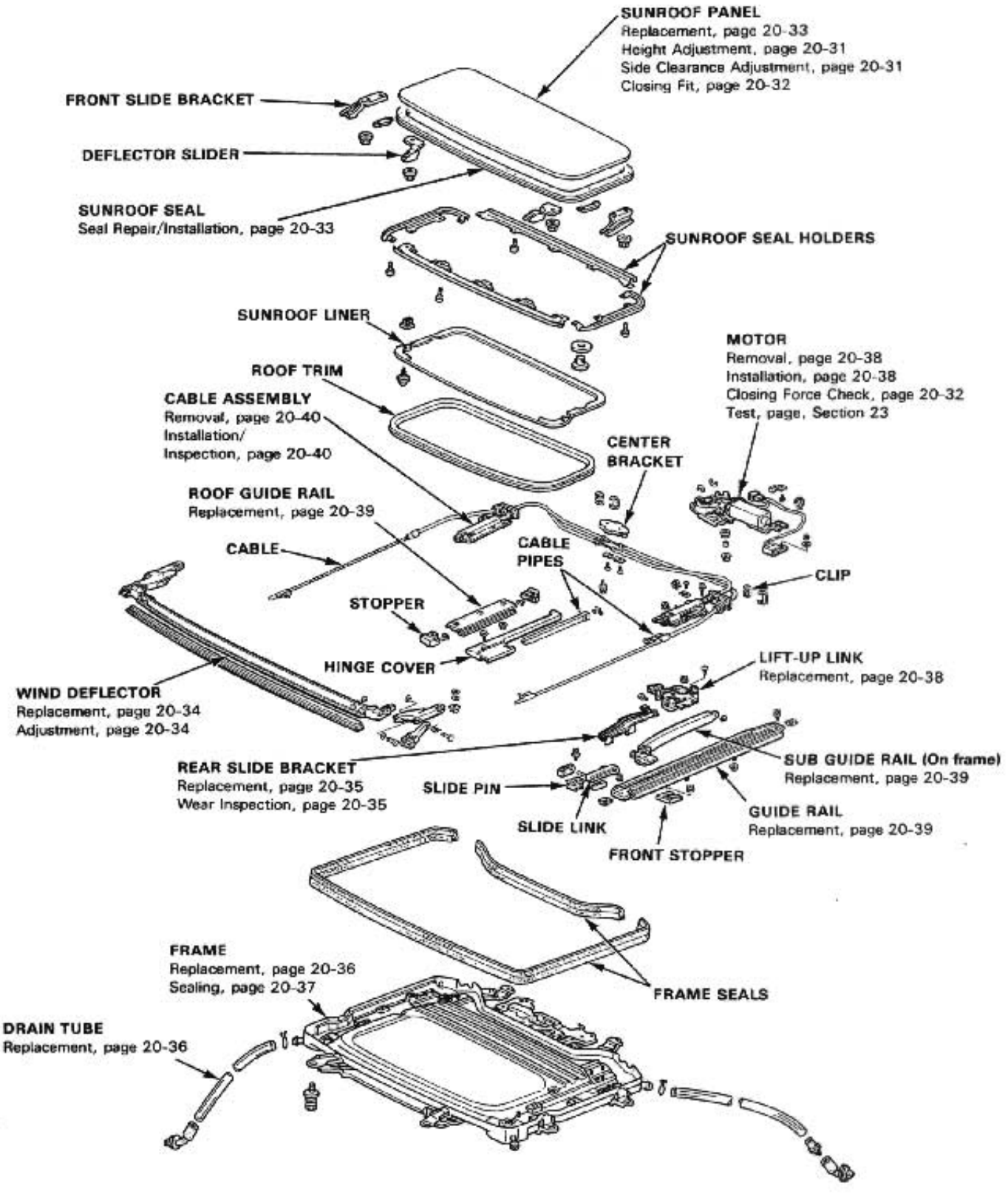
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Sunroof

Troubleshooting

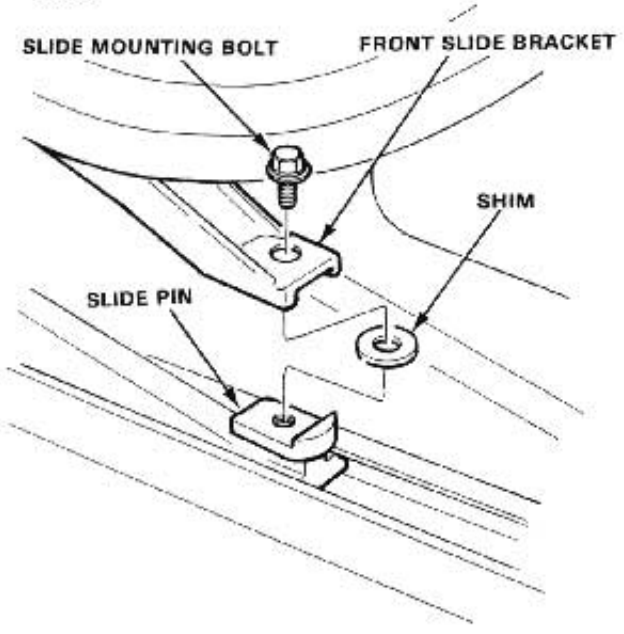
Symptom	Probable Causes
Water leak	1. Improperly installed sunroof seal and sunroof panel (page 20-33). 2. Gap between sunroof seal and roof panel (page 20-31). 3. Clogged drain tube. 4. Gap between frame seal and frame. 5. Improper sealing between cable pipe and frame (page 20-37). 6. Improper sealing between guide rail and frame (page 20-37).
Wind noise	1. Improper clearance between sunroof seal and roof panel (page 20-31). 2. Loose headliner and roof trim.
Deflector noise	1. Improper clearance between deflector blade and roof panel (page 20-34). 2. Insufficient deflector extension. 3. Deformed deflector.
Motor noise	1. Loose motor. 2. Worn gear or bearing. 3. Worn cable. 4. Deformed cable pipe.
Sunroof does not move, but motor turns.	1. Foreign matter stuck between guide rail and sub guide rail (page 20-35). 2. Interference between moving parts. 3. Cable slider loose. 4. Cable pipe loose or not attached properly. 5. Clutch out of adjustment (page 20-32). 6. Sunroof not tilting up properly.
Sunroof does not move and motor does not turn (Sunroof can be moved manually).	1. Blown fuse. 2. Faulty switch (Section 23). 3. Faulty relay (Section 23). 4. Faulty motor.
Sunroof vibrates	1. Worn rear slide bracket (page 20-35). 2. Improperly installed guide rails.
Sunroof remains tilted	1. Faulty cable slider (page 20-40). 2. Faulty limit switch (Section 23)

Height Adjustment

The roof panel should be flush with the sunroof seal.

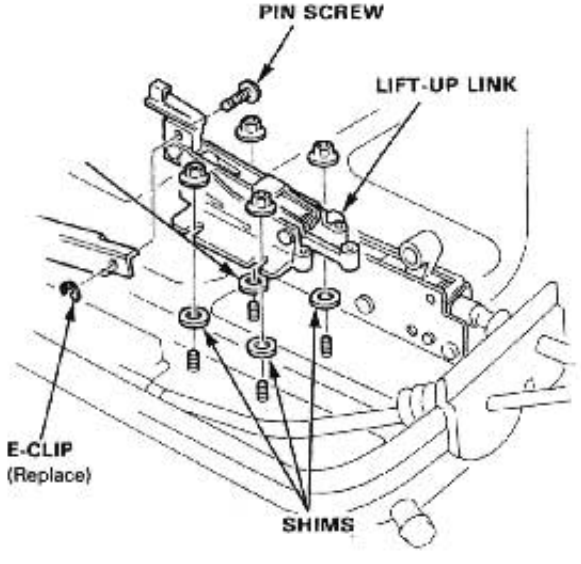
1. To adjust the front of the sunroof, remove the slide bracket mounting bolt and add or remove shims between the silde bracket and the slide pin as shown.

   NOTE: The shims should be of equal thickness on both sides.



2. To adjust the rear height, remove the lift-up link (page 20-38) and add or remove shims between the lift-up link and frame as shown.

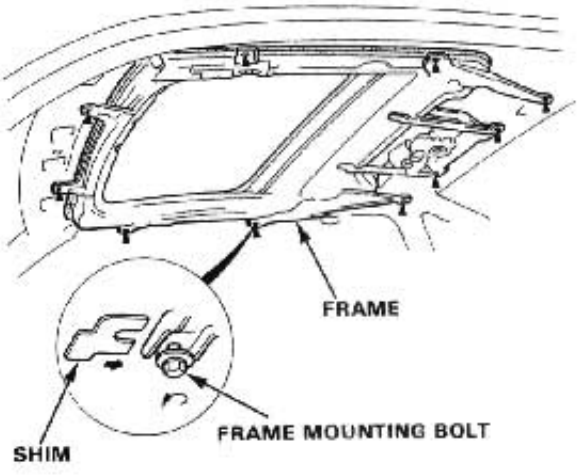
   NOTE: The shims should be of equal thickness on both sides.



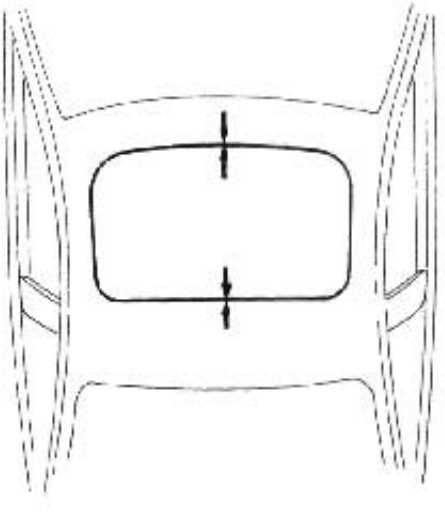
Side Clearance Adjustment

If sunroof seal fits too tightly against the roof panel on one side when closed, remove the headliner, then:

1. Loosen all frame mounting bolts.



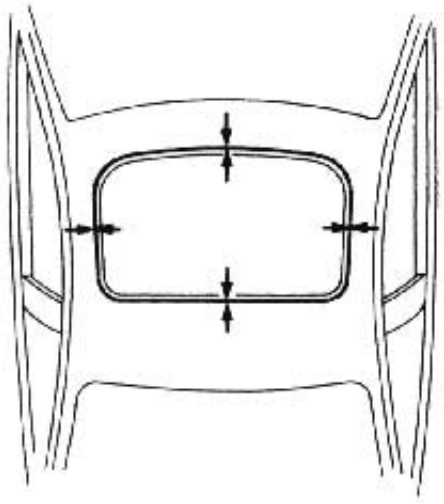
2. Side-to-side fit of sunroof seal can be adjusted by moving it right or left by hand.
3. If necessary, use shims as required to make the sunroof panel fit flush with the roof panel.



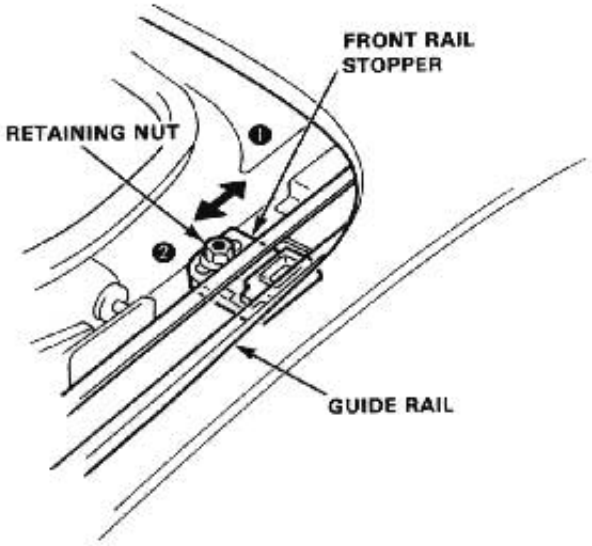
3. Tighten bolts, recheck.

Closing Fit

If the fit of the sunroof seal is too tight at the front seal when the sunroof is closed, or too tight at the rear seal when it is pulled down into the closed position, proceed as follows:



1. Open the sunroof fully.
2. Loosen the front rail stopper nuts.



3. Slide the stoppers forward or backward until the sunroof closes snugly.

   NOTE: Slide the right and left stoppers equally.

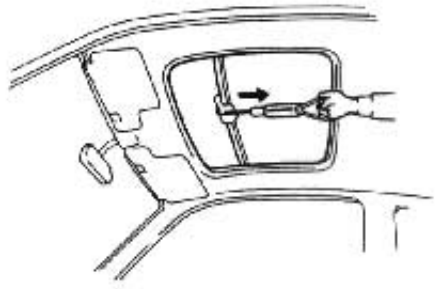
   ❶ : To increase clearance at rear seal.
   ❷ : To increase clearance at front seal.

Closing Force Check

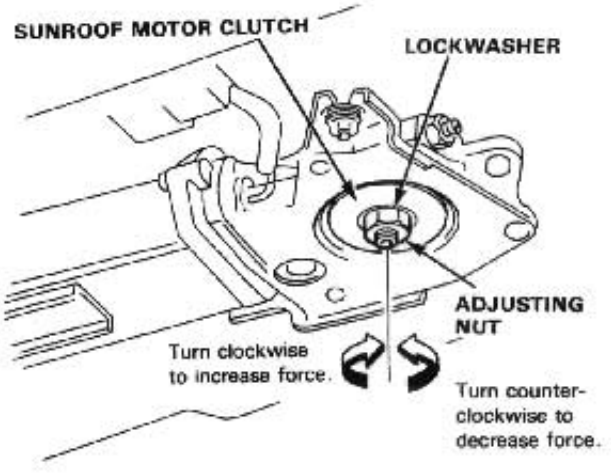
1. After installing all removed parts, have a helper hold the switch to close the sunroof while you measure force required to stop it. Attach spring scale as shown. Read force as soon as sunroof stops moving, then immediately release the switch and spring scale.

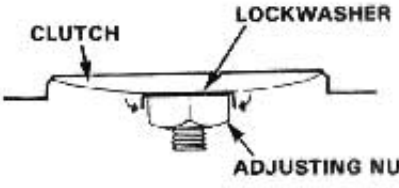
   CAUTION: When using the spring scale, protect the leading edge of the sunroof with a shop towel.

   Closing Force: 196–245 N (20–30 kg, 44–66 lb)



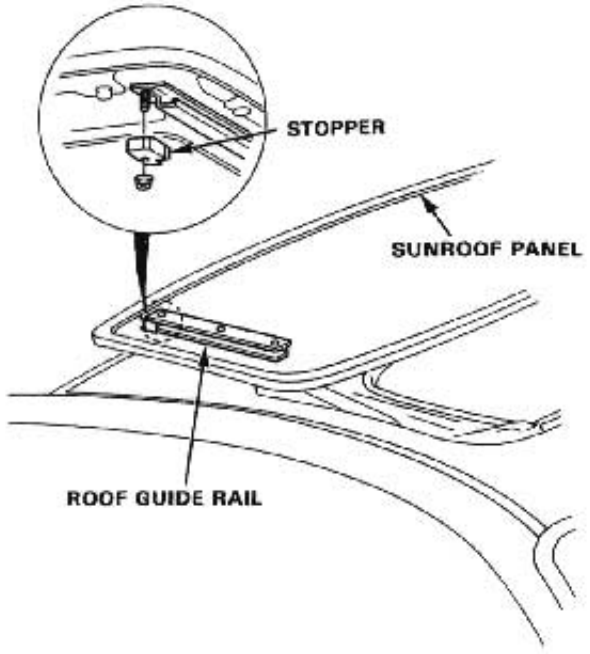
2. If force is not within specification, install a new lockwasher, adjust the tension by turning the sunroof motor clutch adjusting nut, and bend the lockwasher against the adjusting nut.





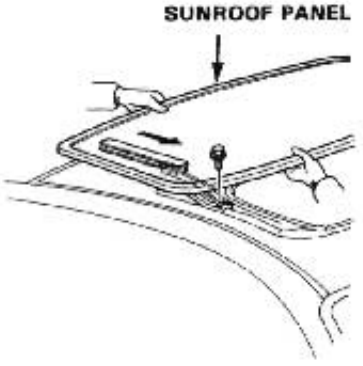
Sunroof Panel Replacement

1. Open the sunroof.
2. Remove the rear stoppers by removing the attaching nuts.



3. Remove the front mounting bolts. Remove the sunroof panel from the rear slide bracket by sliding it forward by hand.

   NOTE: Use extreme care to avoid damaging the body when removing the panel.



4. Install the sunroof panel in the reverse order of removal.

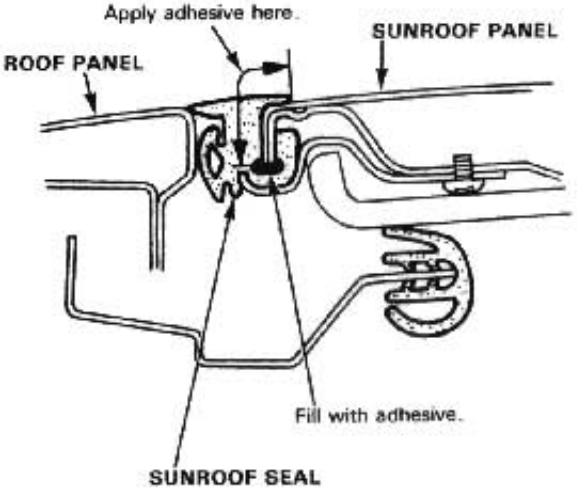
Seal Repair/Installation

If a seal is leaking, or if it is to be replaced, proceed as follows.

1. Remove the sunroof panel, remove the sunroof liner, front slide bracket and deflector slider.
2. Remove the seal holder. Carefully peel the seal off the sunroof panel.
3. Clean the seal attaching surfaces with a clean cloth dampened in alcohol.

   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

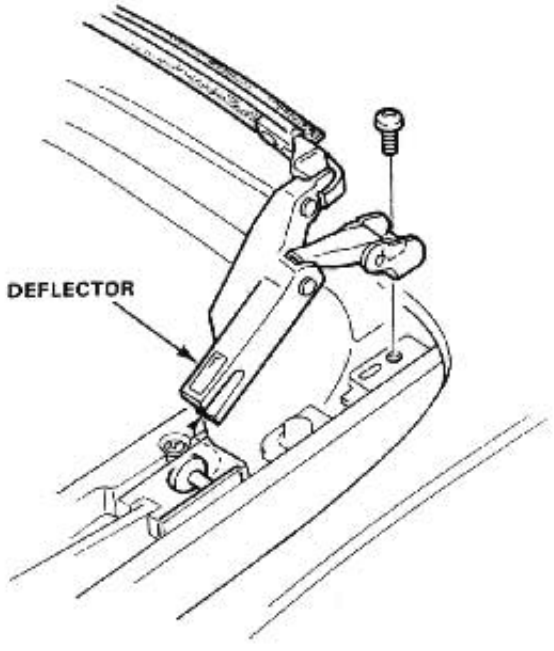
4. Fill the seal groove with adhesive. Coat the seal attaching surfaces of the sunroof panel with the same adhesive.



5. Fit the seal onto the sunroof panel evenly all the way around.
6. Wipe off excess adhesive with a clean cloth dampened with alcohol.
7. Allow the adhesive to cure for at least 4 hours after seal installation and before operating the sunroof.

Wind Deflector Replacement

1. Remove the deflector mounting screws, then remove the deflector.

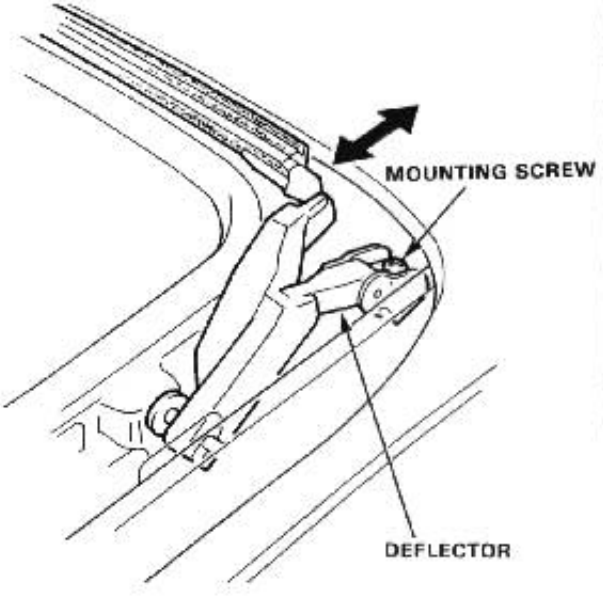


2. Install the deflector in the reverse order of removal. Adjust the deflector.

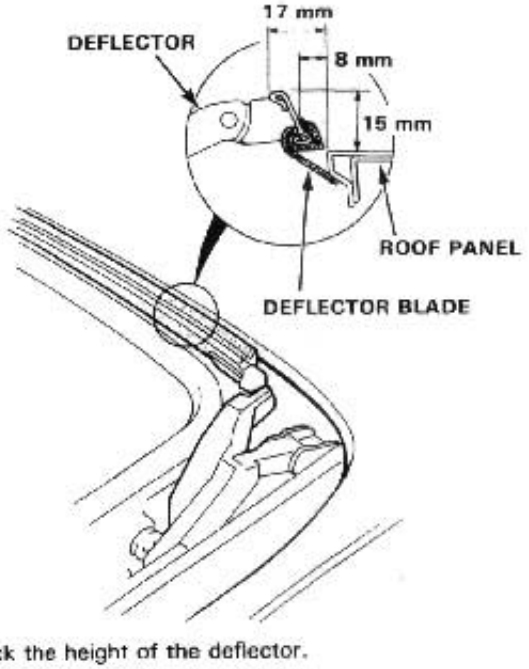
Wind Deflector Adjustment

NOTE: A gap between deflector blade and roof opening edge will cause excessive wind noise when driving at high speed with the roof open.

1. Open the sunroof fully.
2. Loosen the deflector mounting screws.



3. Adjust the deflector forward or backward so the edge of its blade touches the front edge of the roof opening evenly.

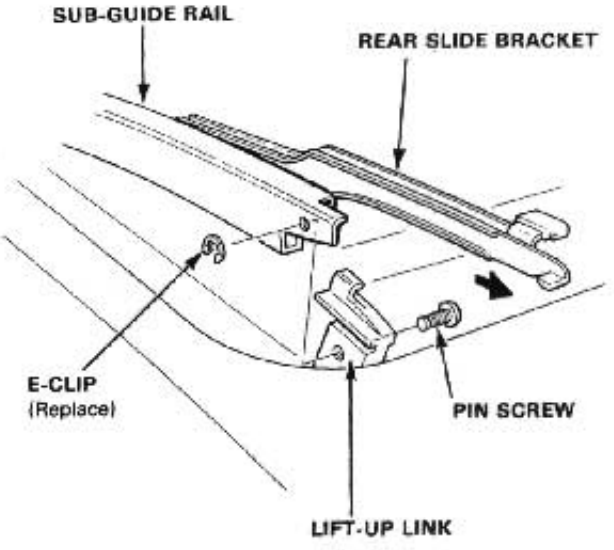


4. Check the height of the deflector.

   NOTE: The height of the deflector cannot be adjusted. If damaged or deformed, replace or repair it.

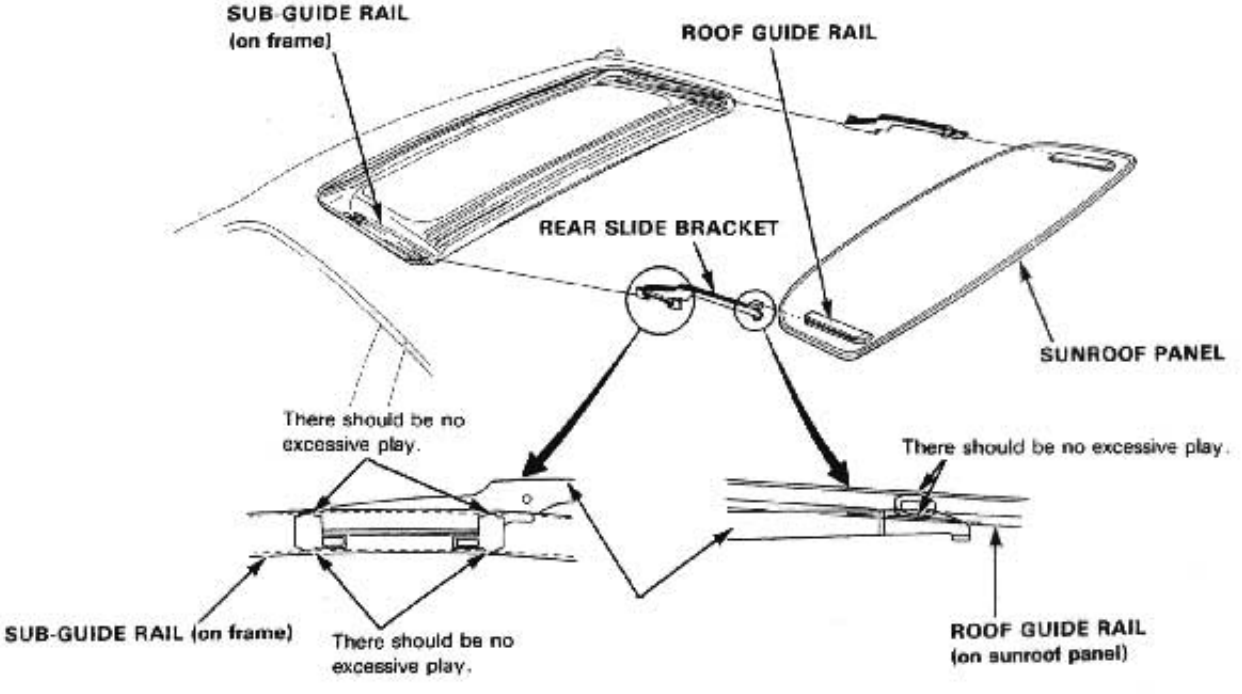
Rear Slide Bracket Replacement

1. Remove the sunroof panel (page 20-33).
2. Remove the e-clip and pin screw, then separate the lift-up link and sub-guide rail.
3. Slide the rear slide brackets off the guide rail.
4. Install the brackets in the reverse order of removal. Before installing the rear slide brackets, check that there is no excessive play between the brackets and roof guide rails (on the sunroof panel and the frame.)



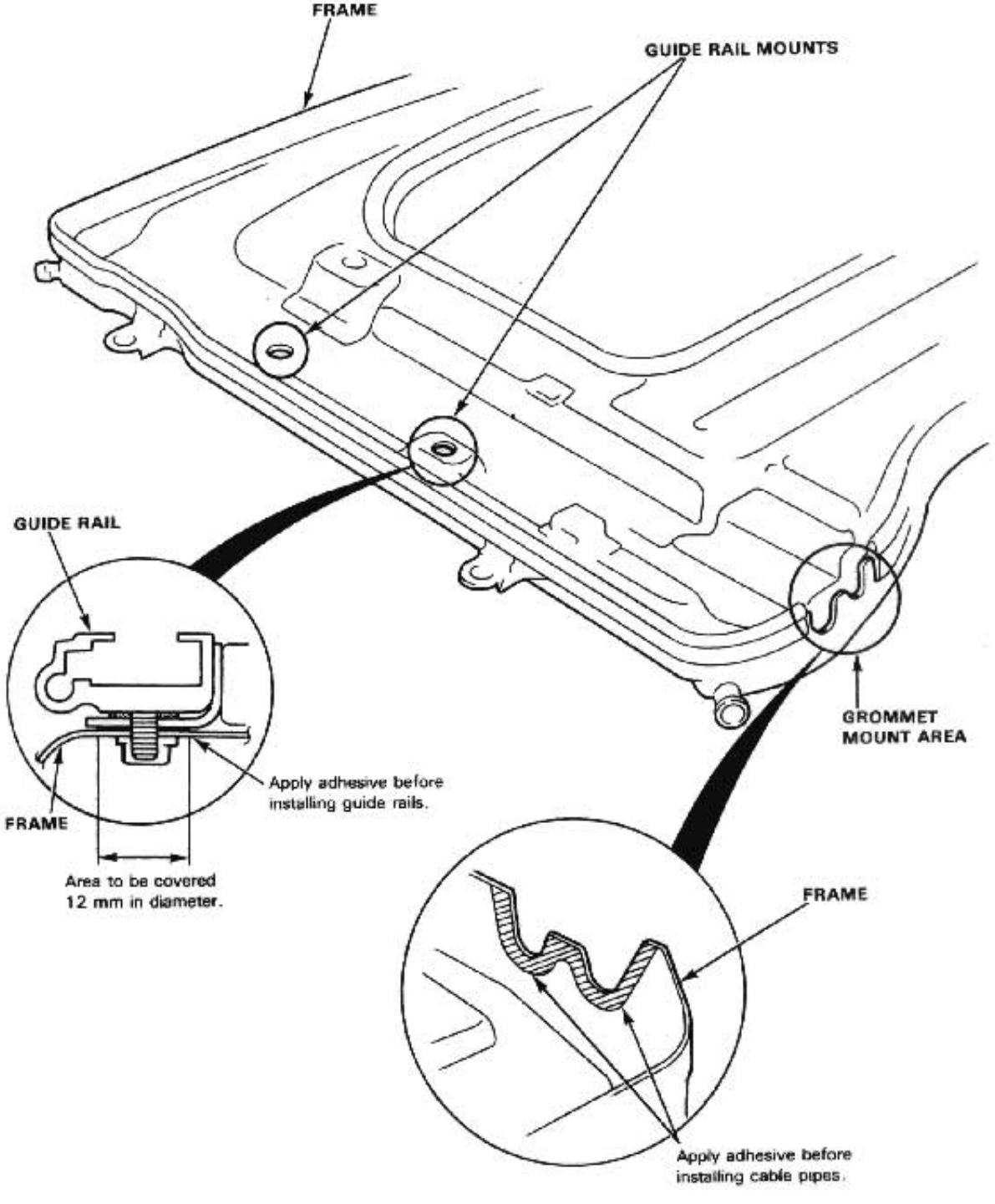
Rear Slide Bracket Wear Inspection

Remove the rear slide brackets. Check the roof guide rails (on the sunroof panel and the frame) and rear slide brackets for excessive wear on the sliding faces. Replace the rear slide brackets with new ones if worn excessively.



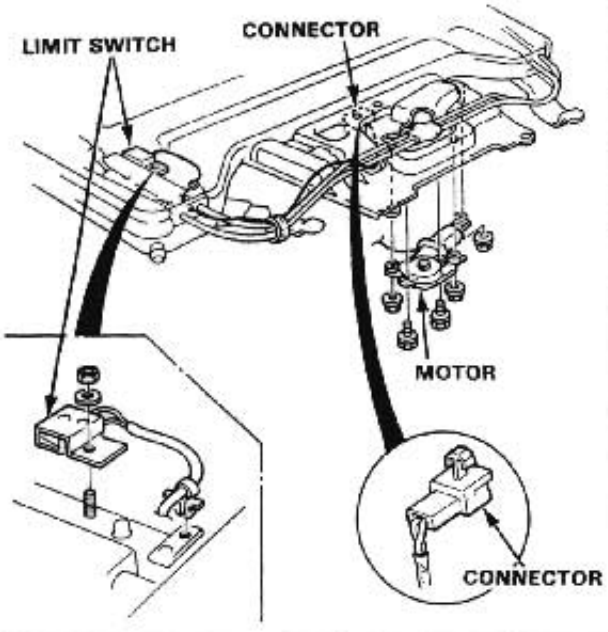
Frame Sealing

Water may leak through one or more of the 4 guide rail mounts or cable pipe grommets. Use adhesive at the points shown, to avoid leaks when the guide rails or cable pipes are reinstalled.



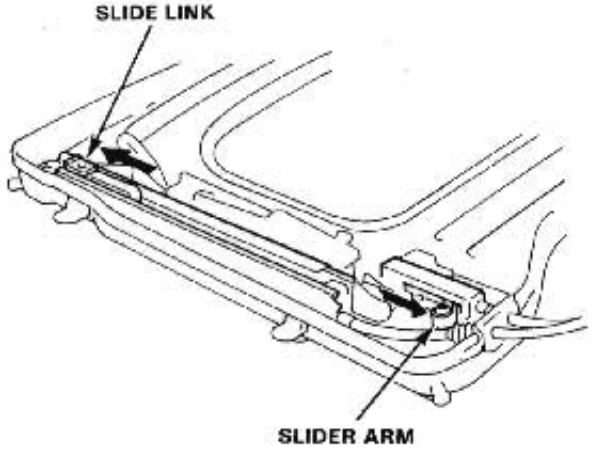
Motor Removal

1. Remove the headliner (page 20-42).
2. Disconnect the motor and the limit switch.
3. Remove the motor by removing the 2 bolts and 3 nuts.



Motor Installation

1. Check that the slide links are fully forward, and cable slider arms are fully to the rear (Sunroof completely closed).

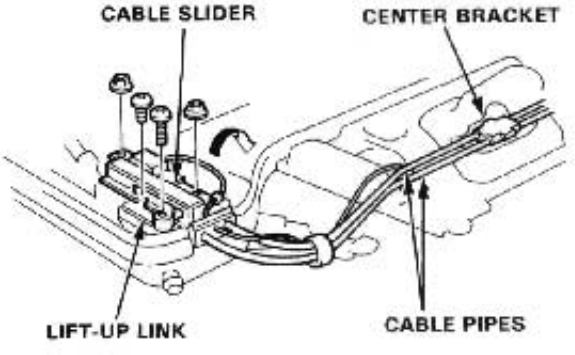


2. Check the gears for wear or damage; then install the motor.

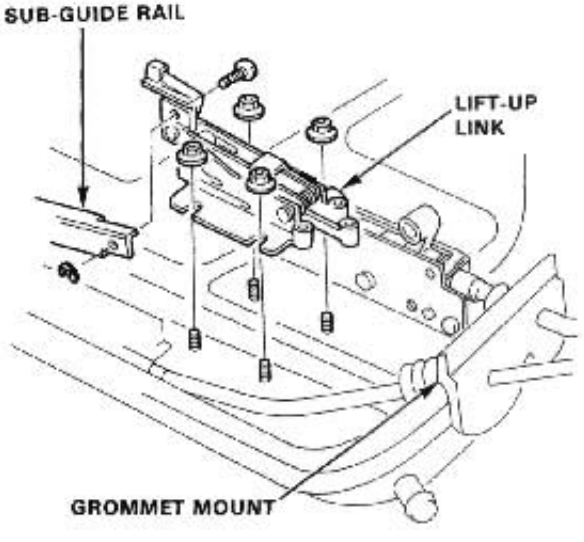
Lift-up Link Replacement

1. Remove the frame (page 20-36).
2. Remove the 2 nuts and 2 screws attaching the cable slider.
3. Raise the cable slider just enough to remove the lift-up link nuts.

   NOTE: Do not force the slider up as this will deform the cable pipes. If you encounter difficulty in raising the slider, remove the motor and center bracket.



4. Remove the lift-up link by removing the sub-guide rail (on frame) screw and the 4 link nuts.

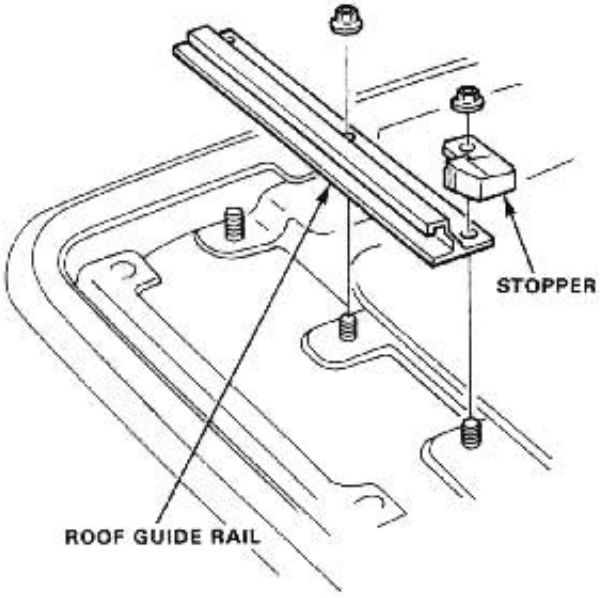


5. Install the link in the reverse order of removal. Before installing the cable pipes, apply adhesive to the grommet mount area of the frame (page 20-37).

Guide Rail Replacement

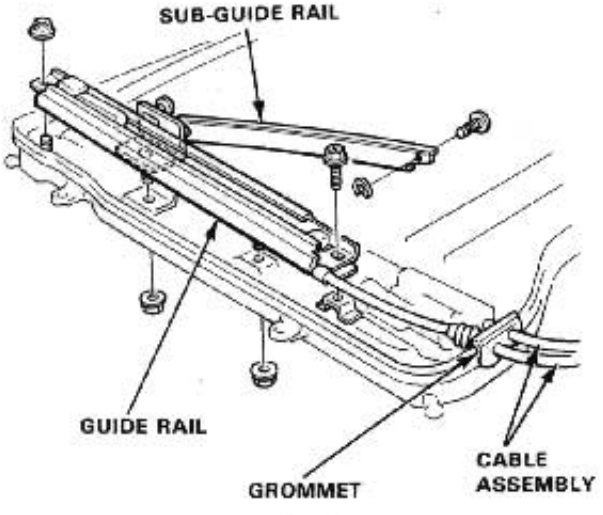
Roof Guide Rail (on Sunroof panel):

1. Remove the sunroof panel (page 20-33).
2. Remove the nuts and sub-guide rails.



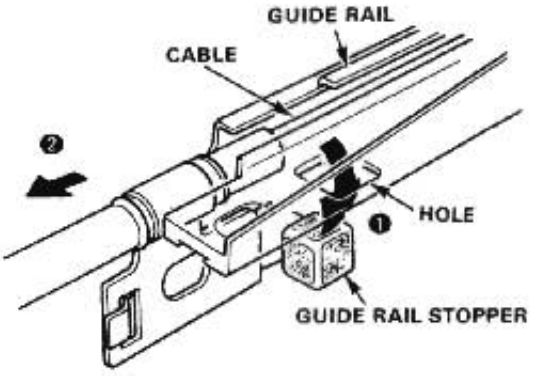
Guide Rail:

1. Remove the frame (page 20-36).
2. Remove 1 bolt and the 3 nuts attaching the guide rail.
3. Remove the sub-guide rail.



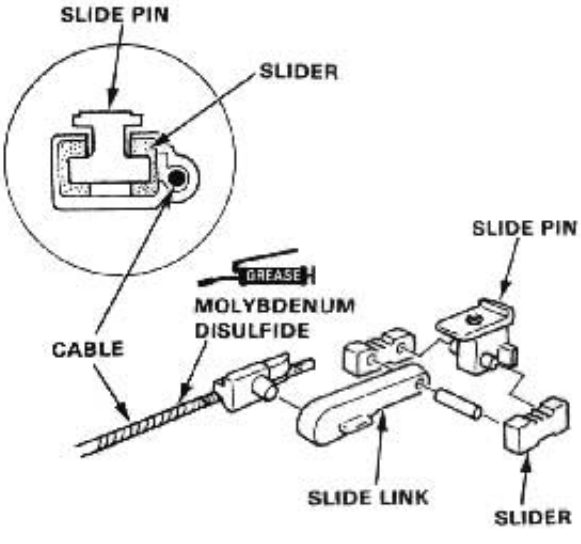
4. Pry the guide rail stopper out of the hole of the guide rail; pull out the cable.

   NOTE: Remove the guide rail slowly and carefully; it is cemented to the frame.



5. Install the guide rail in the reverse order of removal.

   - Check that the slide pin, slider and slide link are reassembled properly when installing the cable to the guide rail.

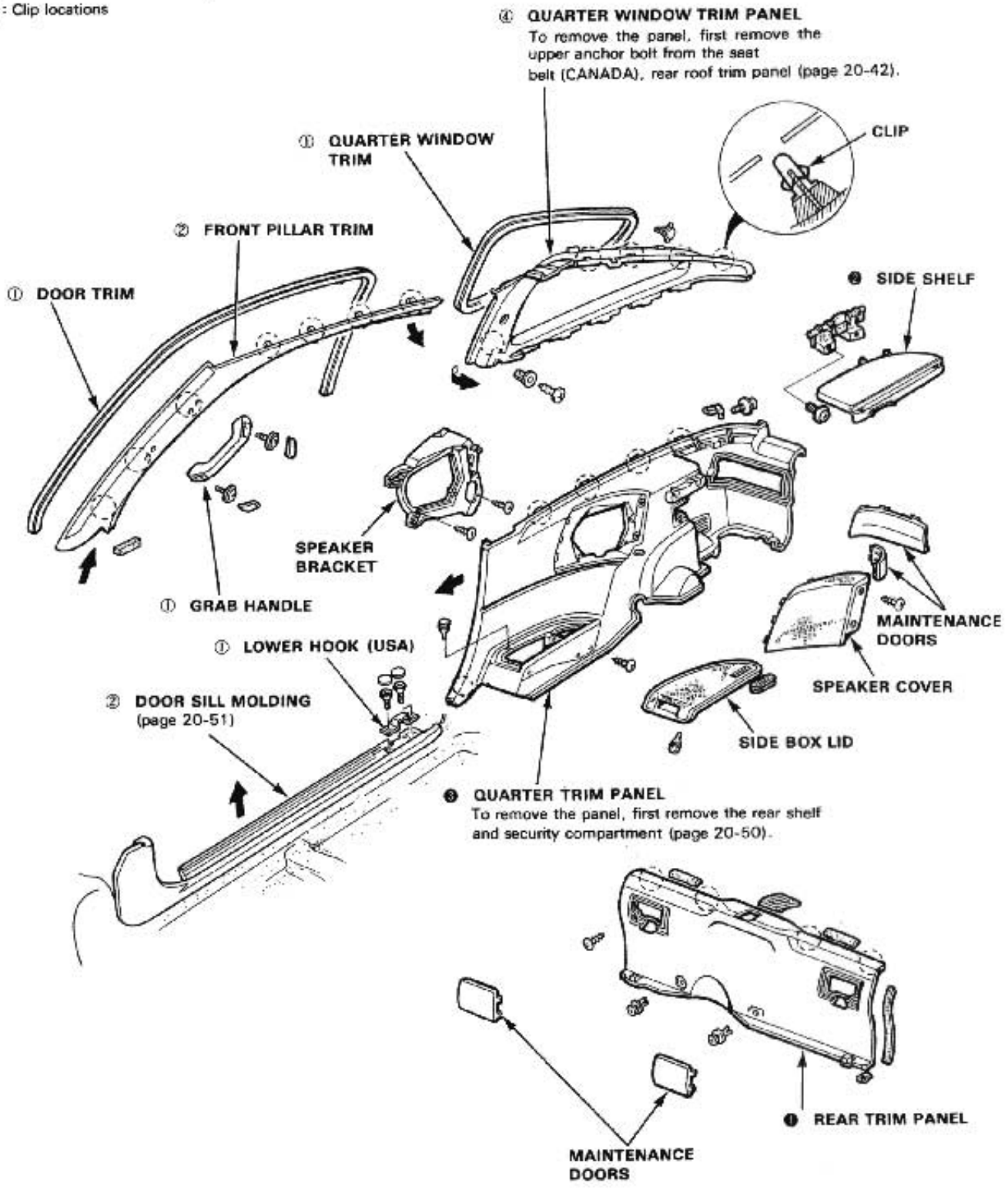


   - Before installing the cable pipes and guide rails on the frame, coat the cable pipe grommets and guide rail attaching surfaces with adhesive (page 20-37).

Replacement

Disassemble in numbered sequence.

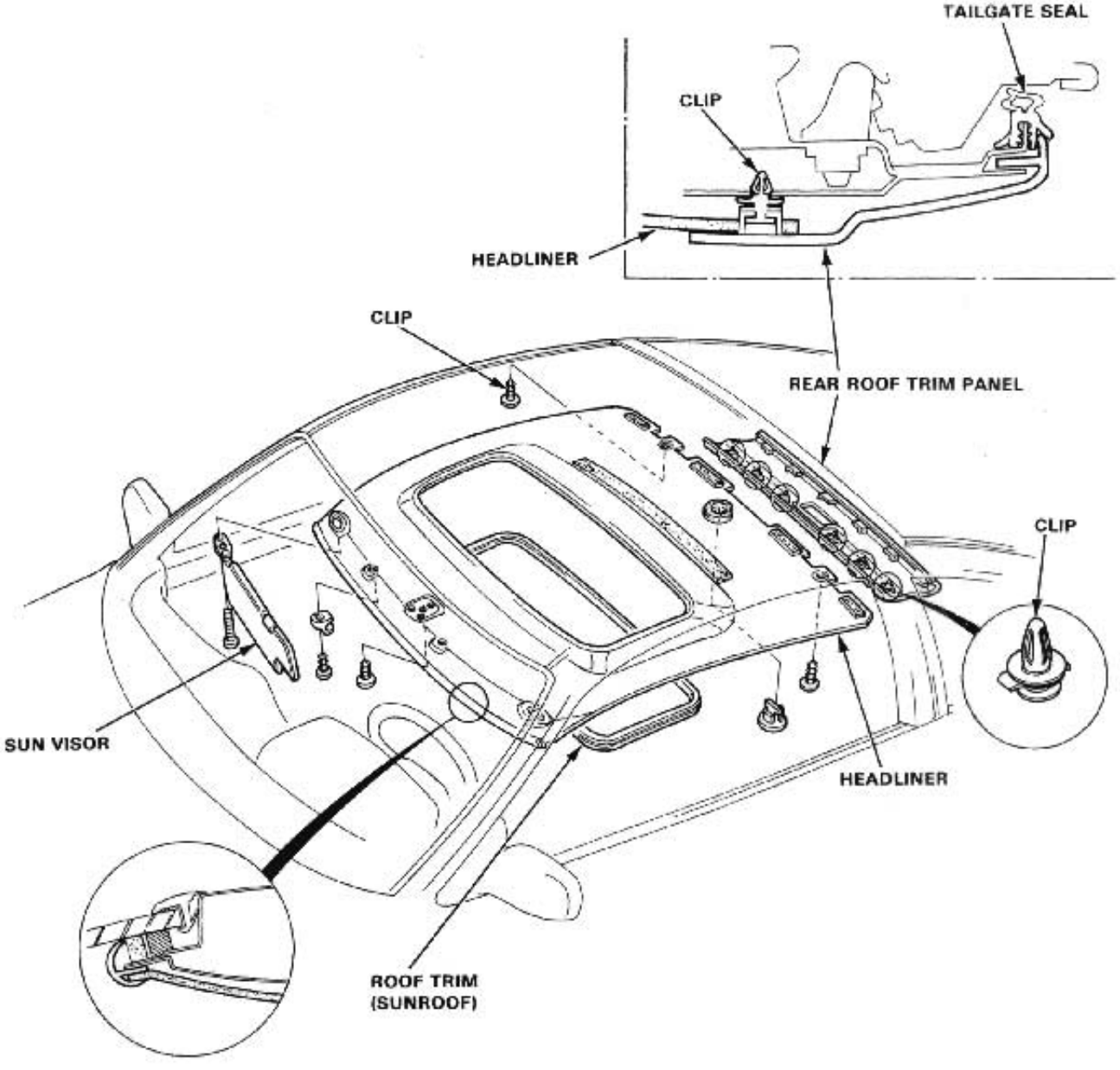
◯: Clip locations



Headliner

Replacement

1. Remove:
   - Sun visors and holders.
   - Rearview mirror assembly (page 20-49).
   - Front pillar trim (page 20-41).
   - Quarter window trim panel (page 20-41).
   - Dome light.
   - Roof trim (Sunroof model).
2. Remove the clips and rear roof trim panel, then remove the headliner.



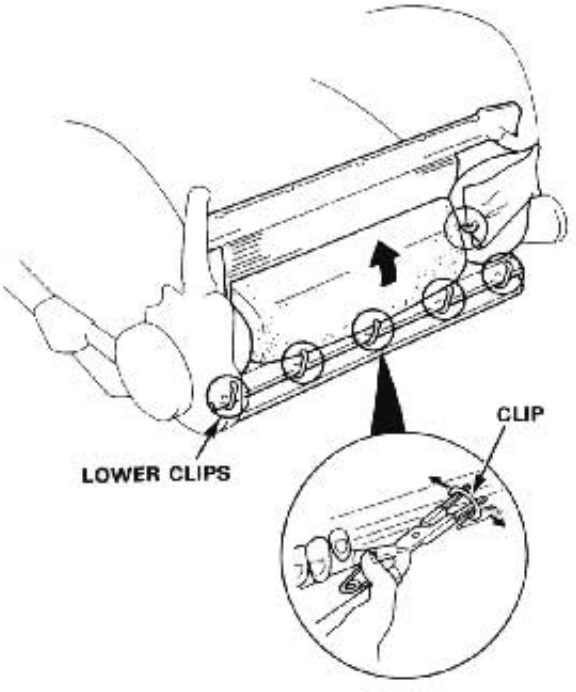
3. Assemble the headliner in the reverse order of disassembly.

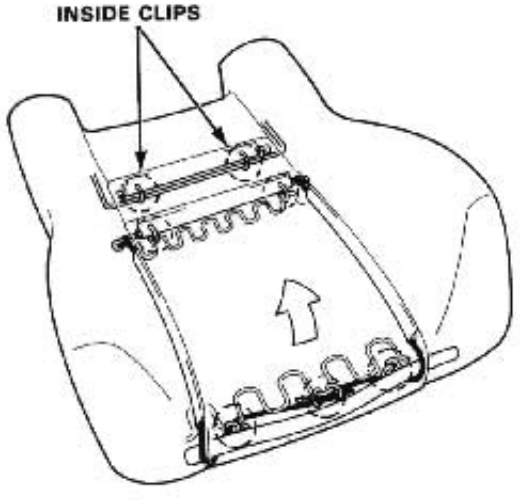
NOTE:
- When installing the headliner inside the passenger cabin, be careful not to fold or bend it. Also, be careful not to scratch the body.
- Check that the two sides of the headliner are securely attached to the trim.

Trim Cover Replacement

Seat Back:

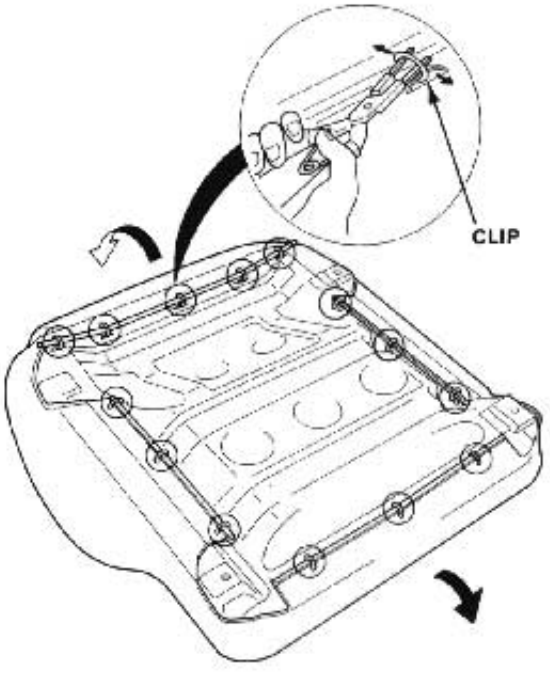
1. Separate the seat cushion and back. (page 20-43).
2. Remove the headrest and headrest guide (page 20-43).
3. Remove the lower clips.
4. Remove the inside clips, then remove the trim cover.

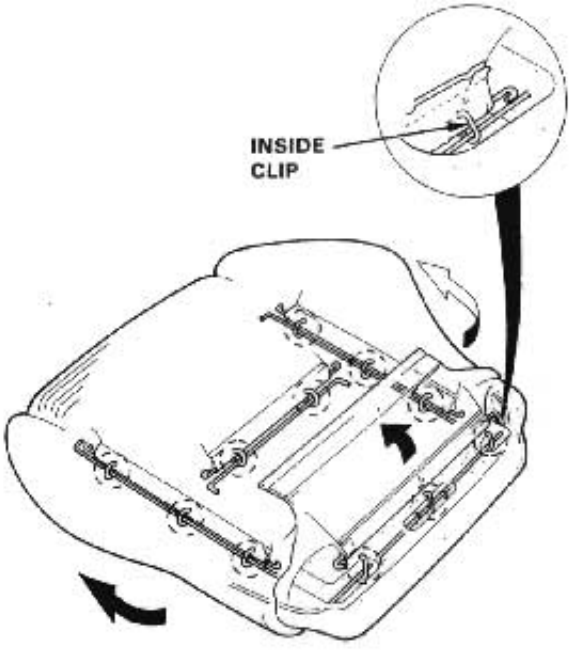




Seat Cushion:

5. Remove the 14 clips and turn over the trim cover.
6. Remove the inside clips, then remove the trim cover.



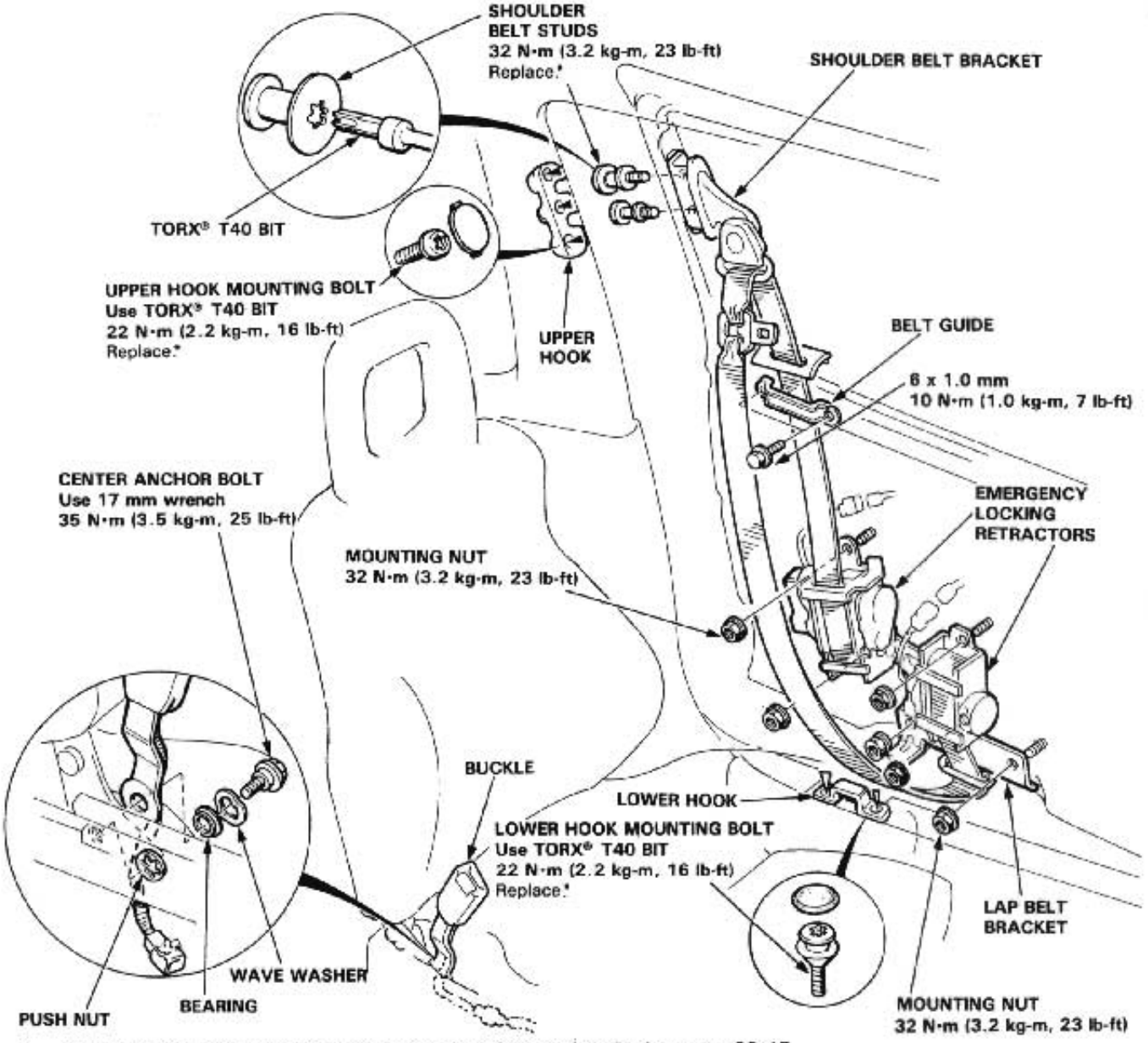


NOTE: To prevent wrinkles when installing a seat cover, make sure the material is stretched evenly over the frame before securing all the clips.

Replacement (USA)

CAUTION: Check the seat belt system for proper function (section 23); check the belt webbing for damage and replace them if necessary. Be careful not to damage them during removal and installation.

1. Remove the door panel (page 20-3).
2. Remove the shoulder belt studs and shoulder belt bracket.
3. Remove the 2 bolts and belt guide.
4. Remove the 2 nuts and lap belt bracket.
5. Remove the 4 nuts and emergency locking retractors with seat belt.



6. Check that the retractor locking mechanism functions as described on page 20-47.
7. Remove the front seat (page 20-43) and disconnect the connector, then remove the center anchor bolt.
8. Install the seat belt in the reverse order of removal.

NOTE: Before attaching the door panel, make sure there are no twists or kinks in the belt.

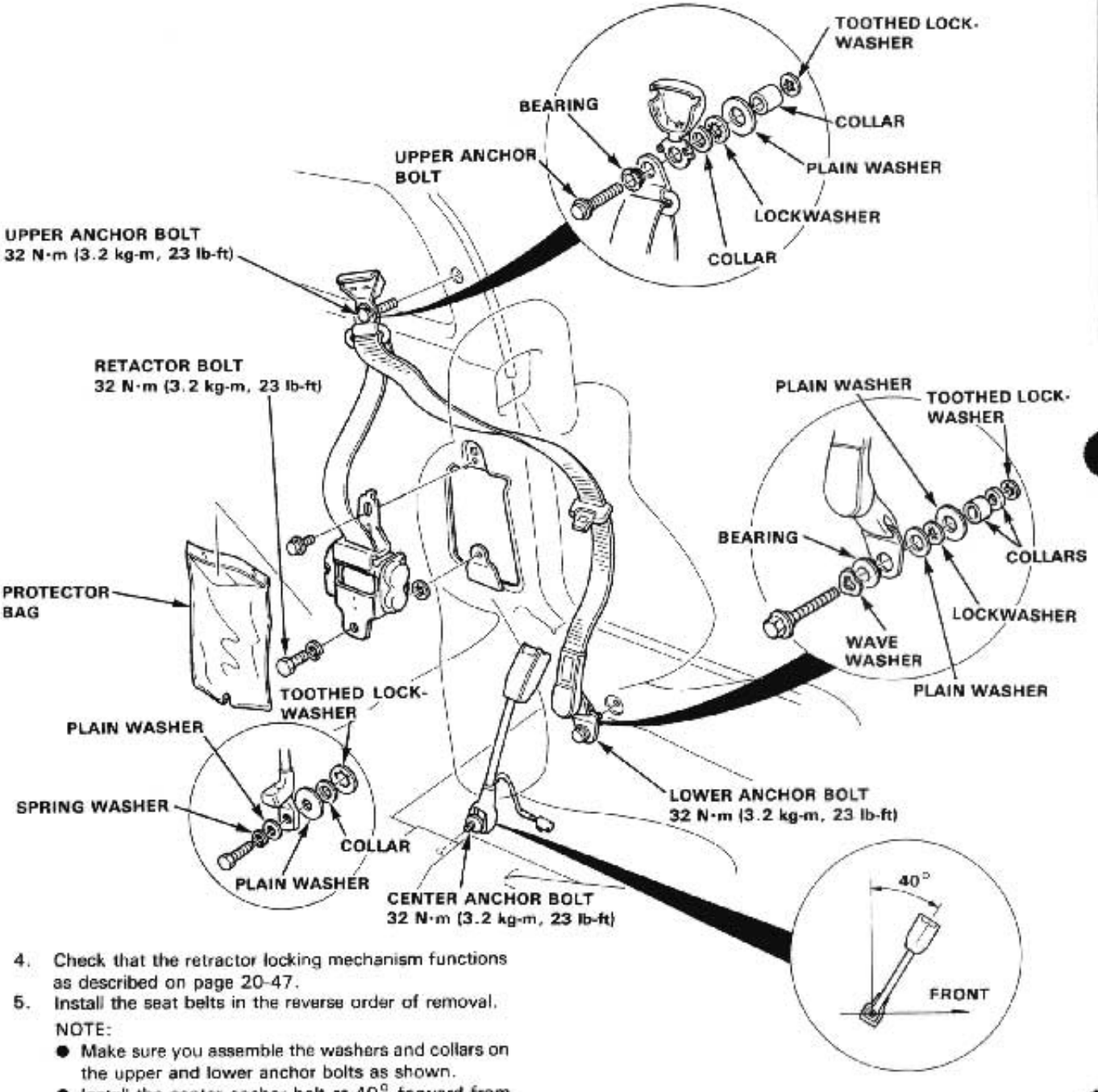
* On reassembly, replace any Torx® bolts and use liquid thread lock.

Seat Belts

Replacement (CANADA)

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 quarter trim panel.
2. Remove the upper anchor bolt, lower anchor bolt and retractor bolt with a 17 mm socket or box-end wrench.
3. Slide the front seat forward until the seat belt center anchor bolt is accessible, then remove the bolt and the center anchor.



4. Check that the retractor locking mechanism functions as described on page 20-47.
5. Install the seat belts in the reverse order of removal.

NOTE:

- Make sure you assemble the washers and collars on the upper and lower anchor bolts as shown.
- Install the center anchor bolt at 40° forward from vertical.
- Before attaching the quarter trim panel, make sure there are no twists or kinks in the belts.

Inspection

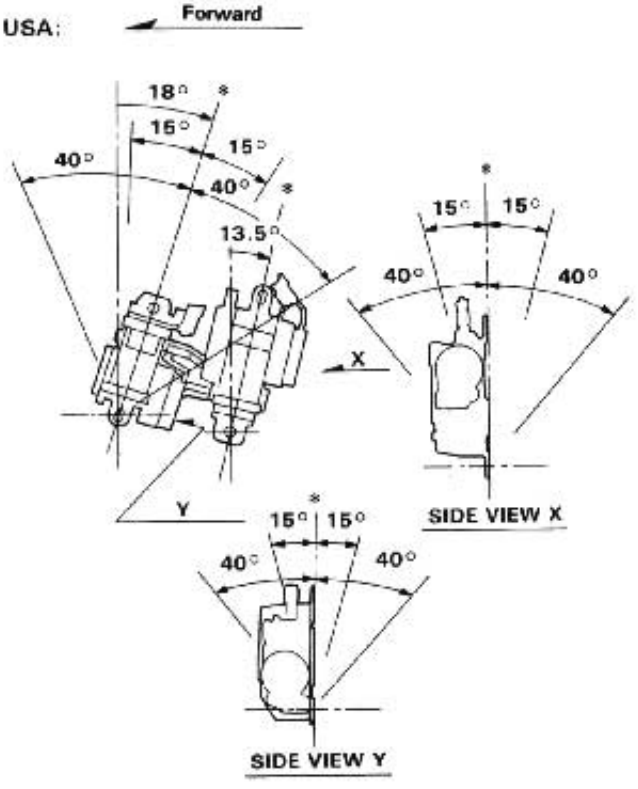
Retractor Inspection

1. With the retractor installed, check that the belt can be pulled out freely.
2. Make sure that the belt does not lock when the retractor is leaned slowly up to 15° from the mounted position. The belt should lock when the retractor is leaned over 40°.

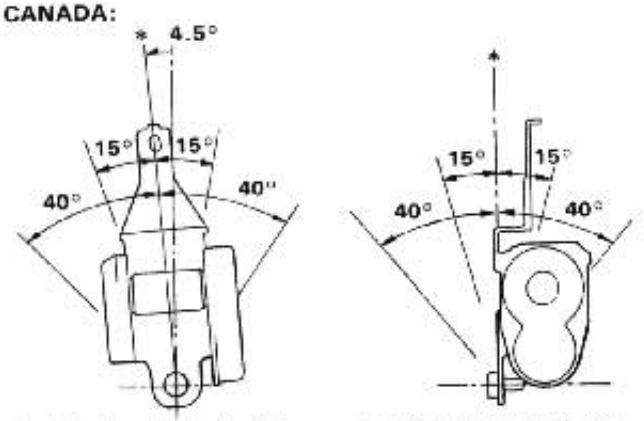
   CAUTION: Do not attempt to disassemble the retractor.

* : Mounted position

USA:



CANADA:



3. Replace the belt with a new one if there is any abnormality.

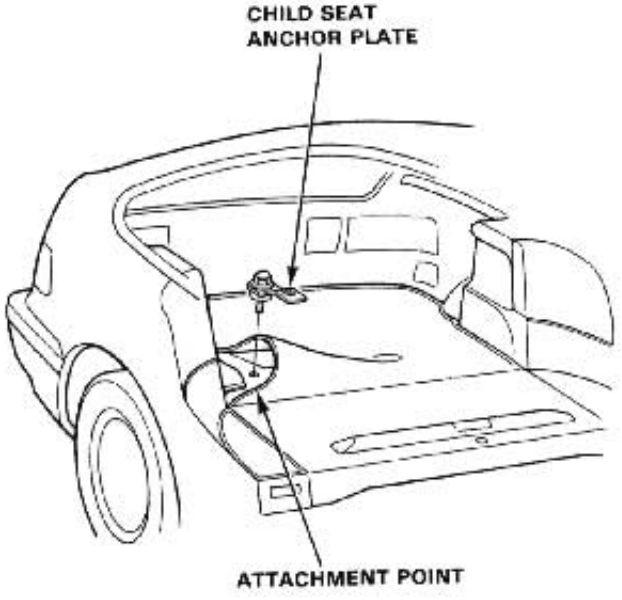
On-the-Car Belt Inspection

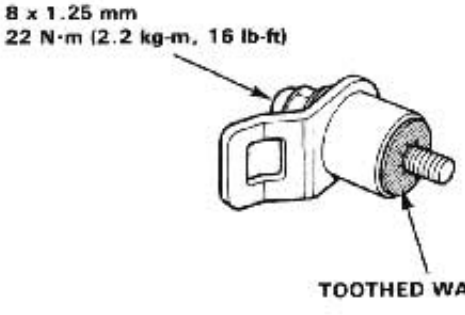
1. Check that the belt is not twisted or caught on anything.
2. After installing the anchor, check for free movement on its retaining bolt. if necessary, remove the bolt and check that the washers and other parts are not damaged or improperly installed.
3. Check the belts for damage or discoloration. Clean with a shop towel if necessary.
   CAUTION: Use only soap and water to clean.
4. Check that the belt does not lock when pulled out slowly. The belt is designed to lock only during a sudden stop or impact.
5. Make sure that the belt will retract automatically when released.
6. Replace the belt with a new one if there is any abnormality.

Child Seat Anchor Plate

Attachment point is provided for a seat mounted child restraint system which uses a top tether.
The tether attachment point is located on the floor, behind the passenger seat.
When using a child seat with a top tether, remove the plug cover from the attachment point and install the child seat anchor plate securely.

NOTE: The child seat anchor plate is factory placed in the glove box before installing it.





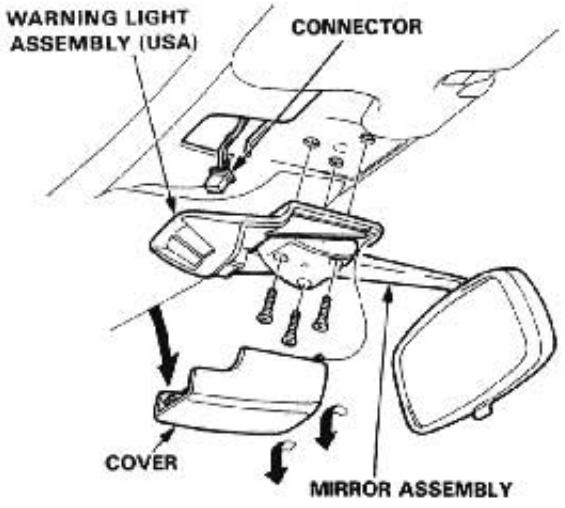
NOTE:
- Do not remove the toothed washer from the child seat anchor plate. Use the child seat anchor plate with the toothed washer attached to it.
- When installing a child seat on the seat, follow the instructions of the manufacturer of the child seat.
- The additional anchor plate can be available.

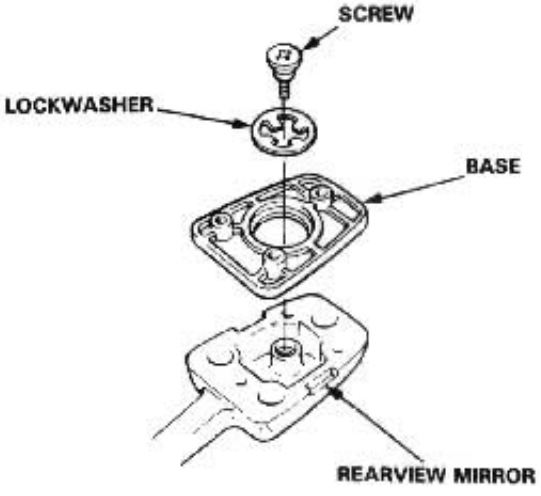
⚠WARNING Do not use anchor plate for other purpose, because it is designed exclusively for installation of a child seat.

Rearview Mirror/Console

Rearview Mirror Replacement

1. Remove the cover by pushing front side to release the rails.
2. Remove the 3 mounting screws and disconnect the connector (USA), then remove the mirror assembly with the warning light assembly.
3. Separate the mirror assembly and warning light assembly (USA).
4. Remove the base from the bracket by removing the screw.

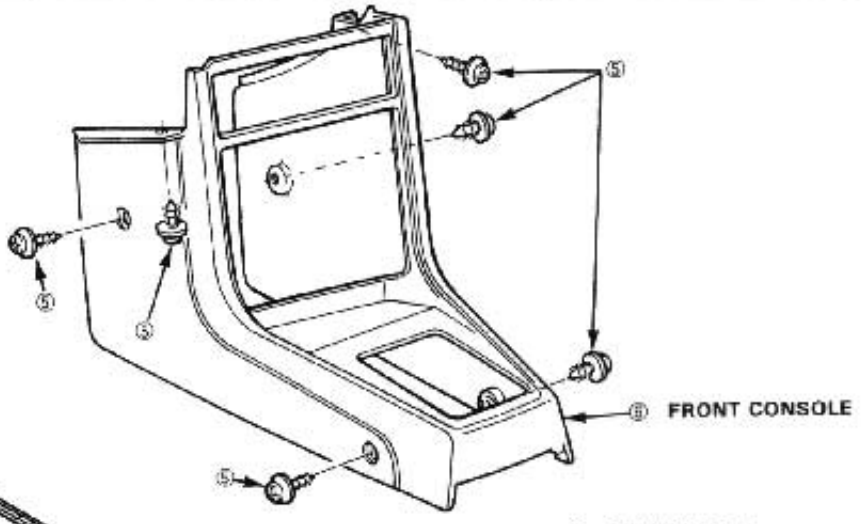


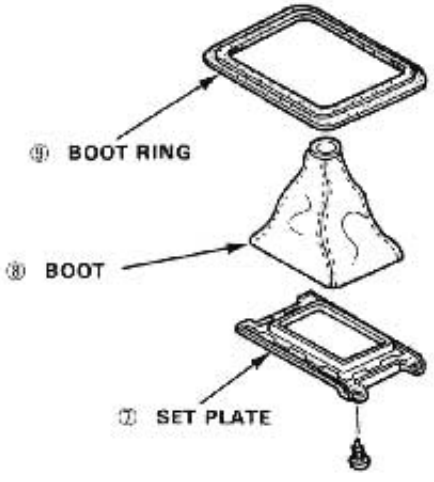


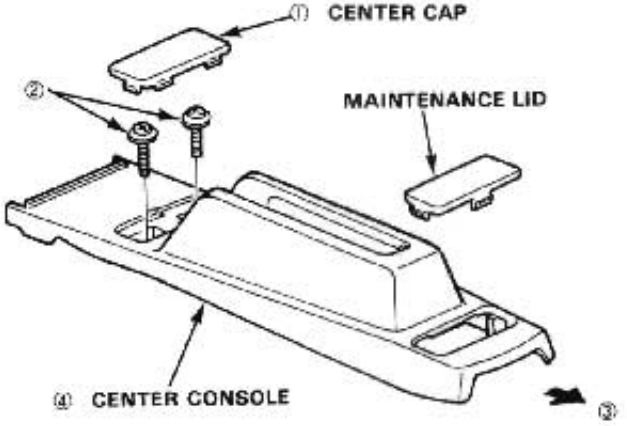
Console Replacement

Disassemble in numbered sequence.

NOTE:
- Lift up the parking brake lever.
- For manual transmission models, remove the shift lever knob.



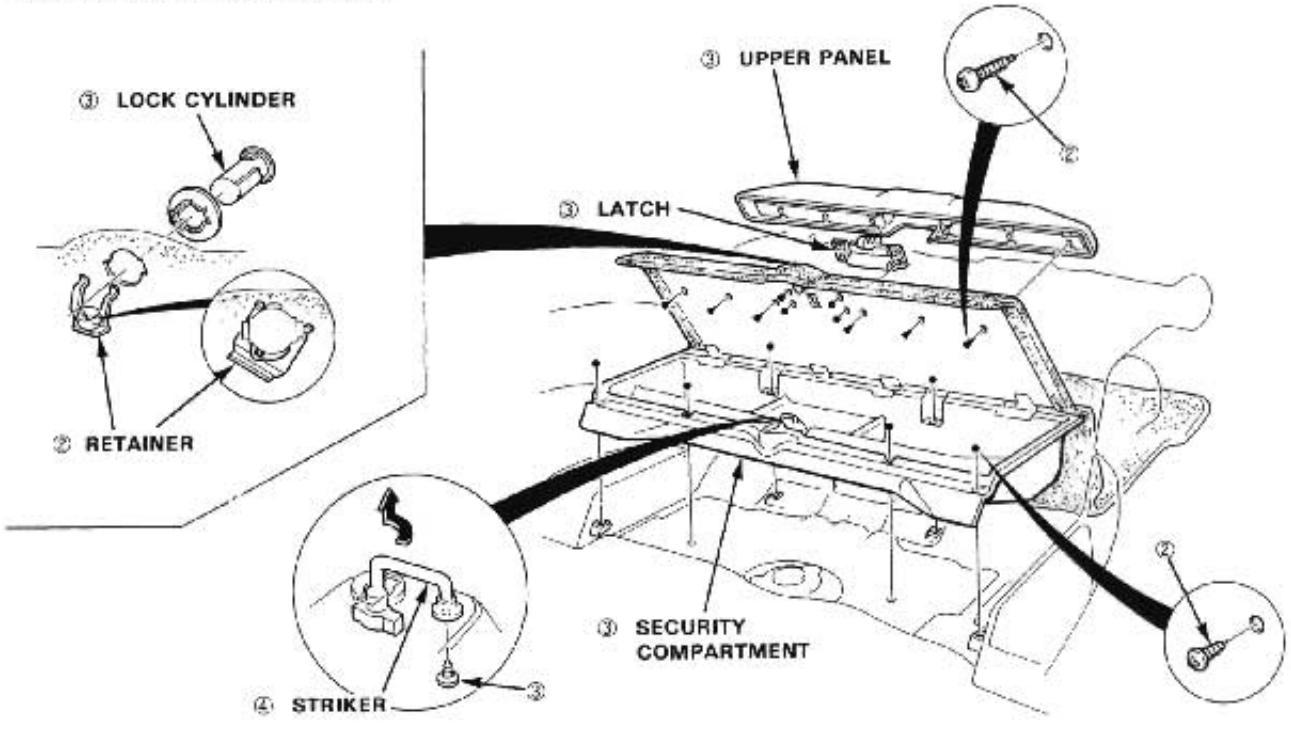




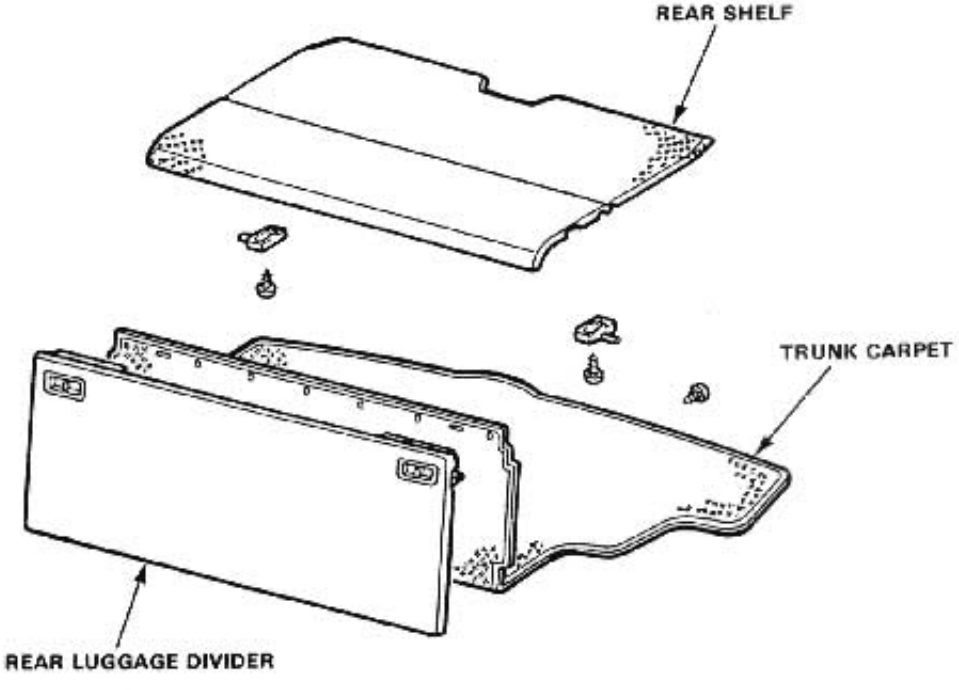
Security Compartment/Rear Shelf

Security Compartment Replacement

Disassemble in numbered sequence.



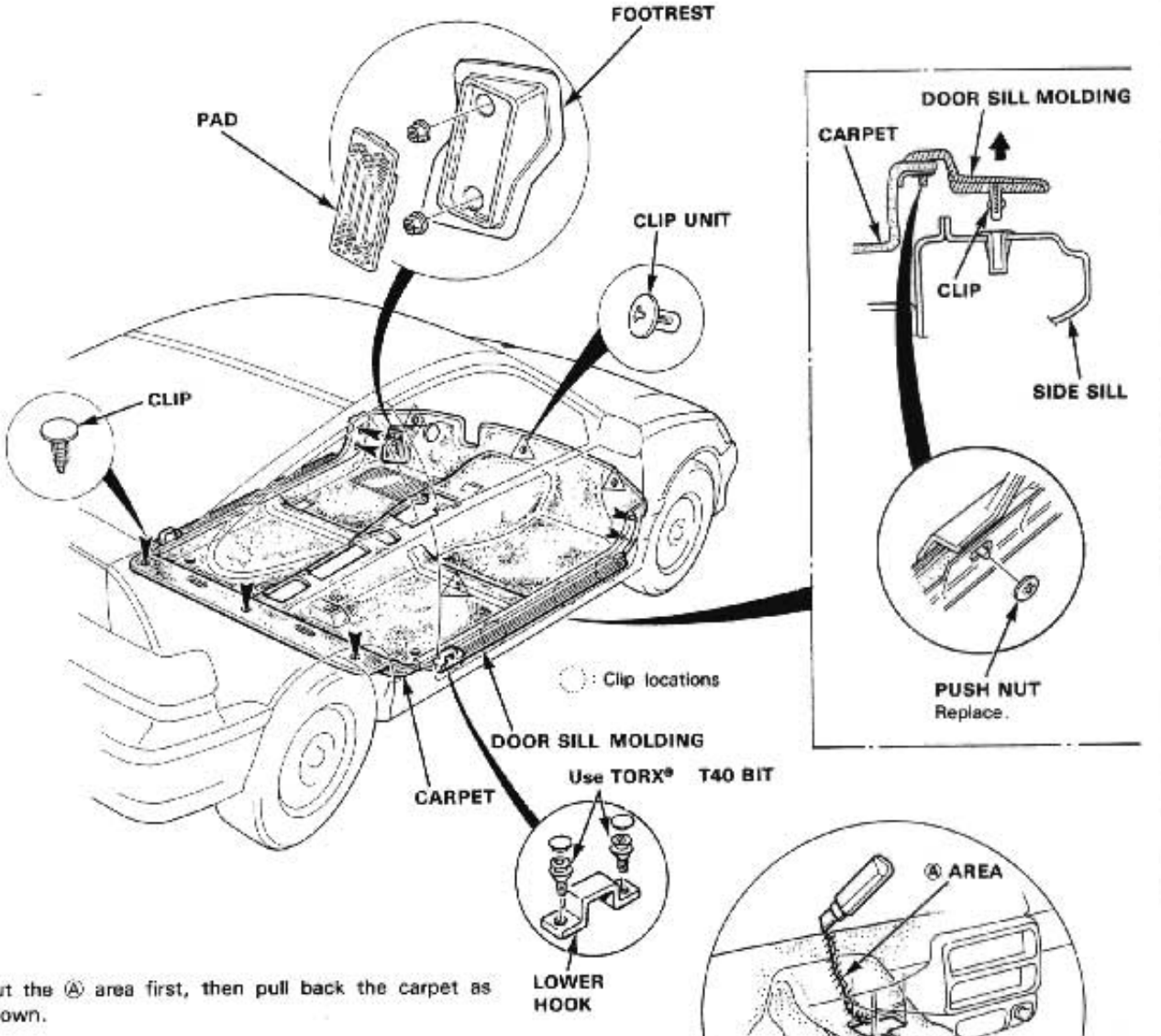
Rear Shelf Replacement (Si Model)



Carpet/Door Sill Moldings

Replacement

1. Remove:
   - Seats.
   - Security compartment.
   - Center console.
   - Hood release handle.
   - Fuel filler door and tailgate openers.
   - Seat belt lower hooks (USA).
   - Seat belt lower anchor and center anchor bolts (CANADA).
   - Front of quarter trim panel.
2. Pry out the clips and pull up the door sill moldings.
3. Remove the push nuts, then separate the door sill moldings and carpet.
4. Pry out the clips at the rear edge and under the dashboard, peel off the tape and remove the clip nuts.



5. Cut the Ⓐ area first, then pull back the carpet as shown.
6. Remove the carpet.
7. Install the carpet in the reverse order of removal.

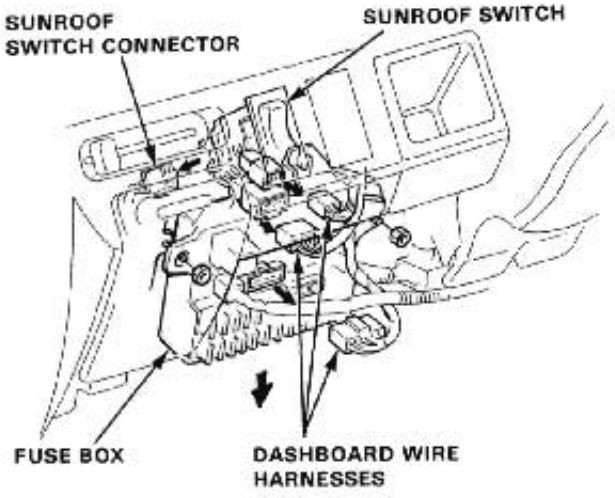
   NOTE:
   - Reattach the cut areas with tape and tie bands.

Replacement

1. To remove the dashboard, first slide the seats back fully and remove the:

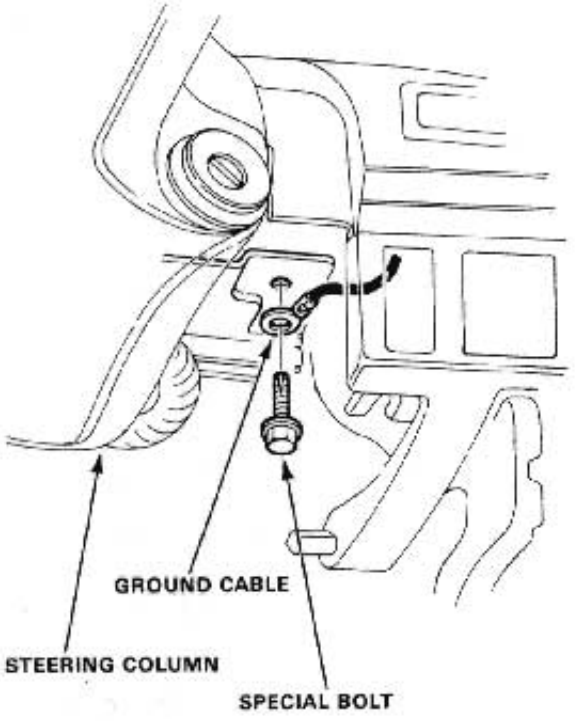
   - Front console. (page 20-49).

2. Remove the fuse lid and disconnect the wire harnesses from the connector holder, and fuse box. Disconnect the sunroof switch connector.



NOTE: Remove the fuse box mounting nuts, then lower the fuse box, if necessary.

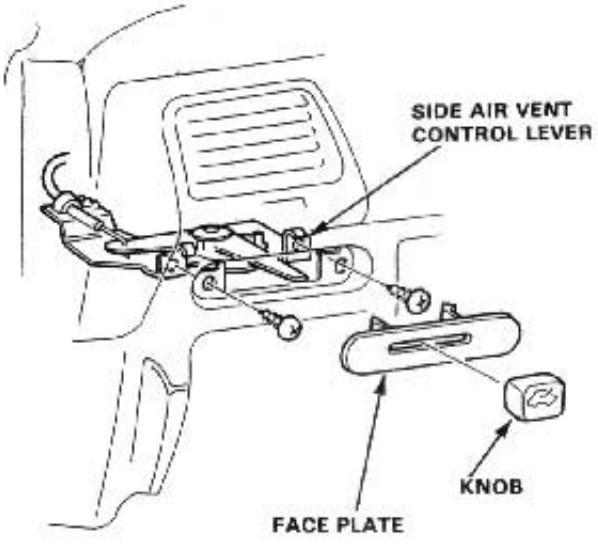
3. Disconnect the ground cable at right of steering column.



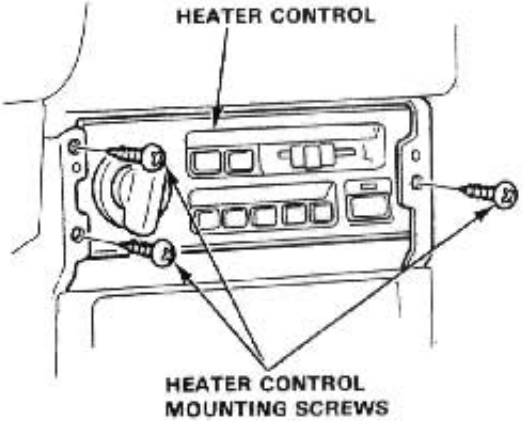
4. Remove the coin box.

5. Remove the knob, then remove the side air vent face plate.

6. Remove the 2 screws attaching the side air vent control lever.



7. Remove the 3 screws attaching the heater control to the dashboard.

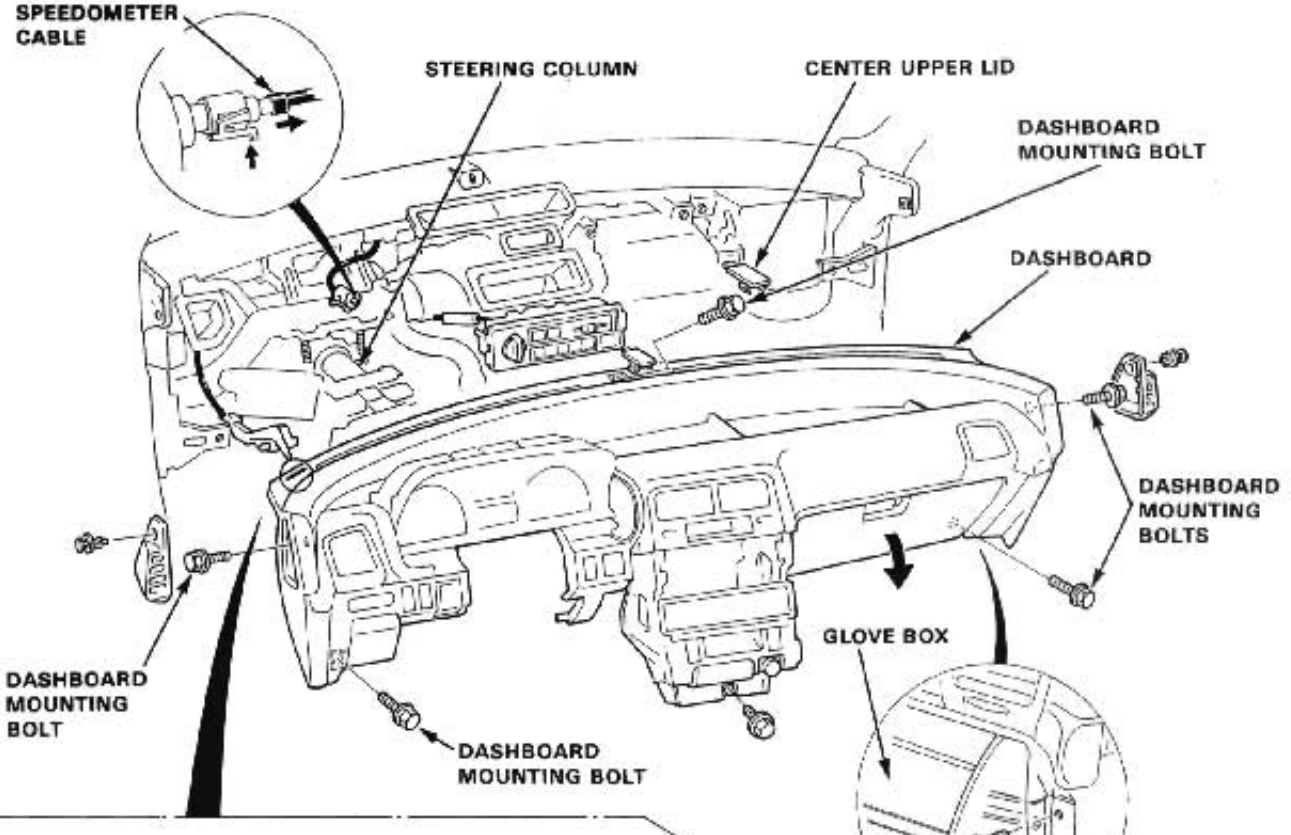


(cont'd)

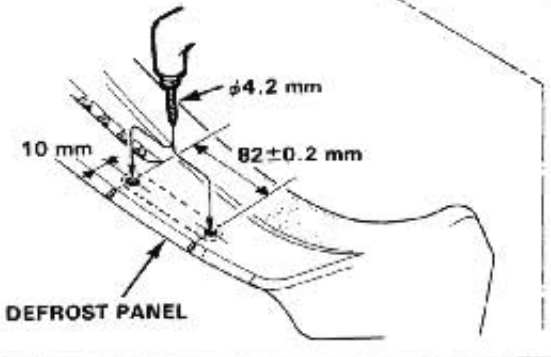
Replacement (cont'd)

8. Remove the instrument panel (page 20-52).
9. Disconnect the speedometer cable.
10. Remove the center upper lid from the top of the dashboard.
11. Remove the side defroster garnishes from both ends of the dashboard.
12. Lower the steering column (See section 17).
13. Remove the dashboard mounting bolts.
14. Lift and remove the dashboard.

Reassembly NOTE:
- Make sure the dashboard fits onto the body correctly.
- Before tightening the dashboard bolts, make sure the dashboard wires are not pinched, and that the dashboard is not interfering with the heater control cable.



In case of replacement:
Attach the vehicle Identification plate by drilling two new holes as shown.



Front Bumper

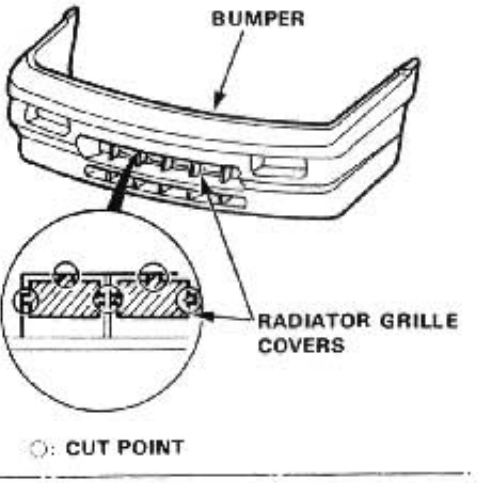
Replacement

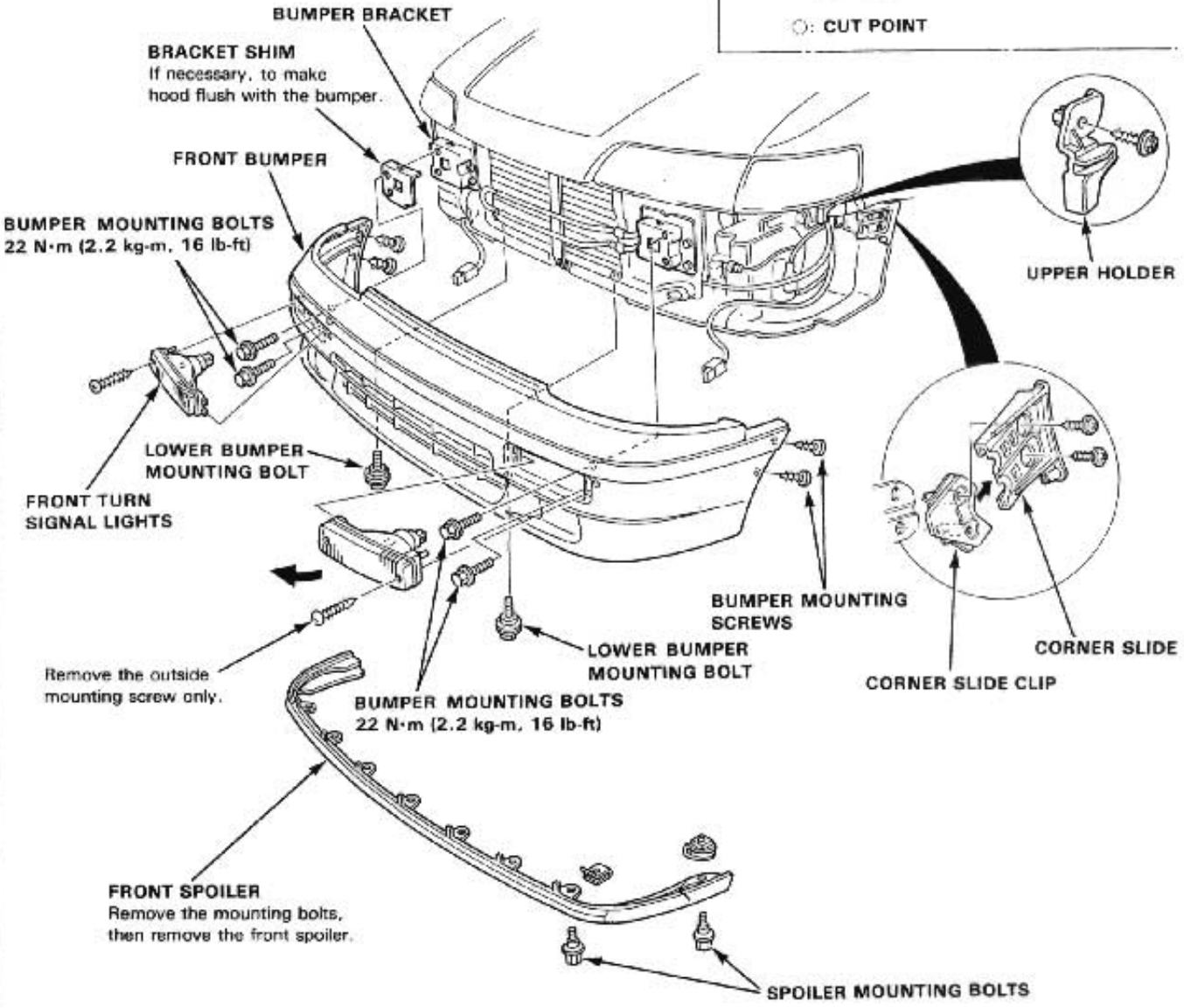
1. Remove the right and left front turn signal lights.
2. Remove the 2 bumper mounting screws on each side at the corner edge of the bumper.
3. Remove the 2 lower bumper mounting bolts and the 4 bumper mounting bolts.
4. Remove the bumper by sliding it forward.

If necessary:

5. Remove the bumper brackets by removing the bracket mounting bolts.
6. Remove the screws, then remove the corner slide and slide clip.
7. Installation sequence is essentially the reverse order of removal.

NOTE: When installing a new bumper on a car with A/C, cut off and discard the 5 radiator grille covers.





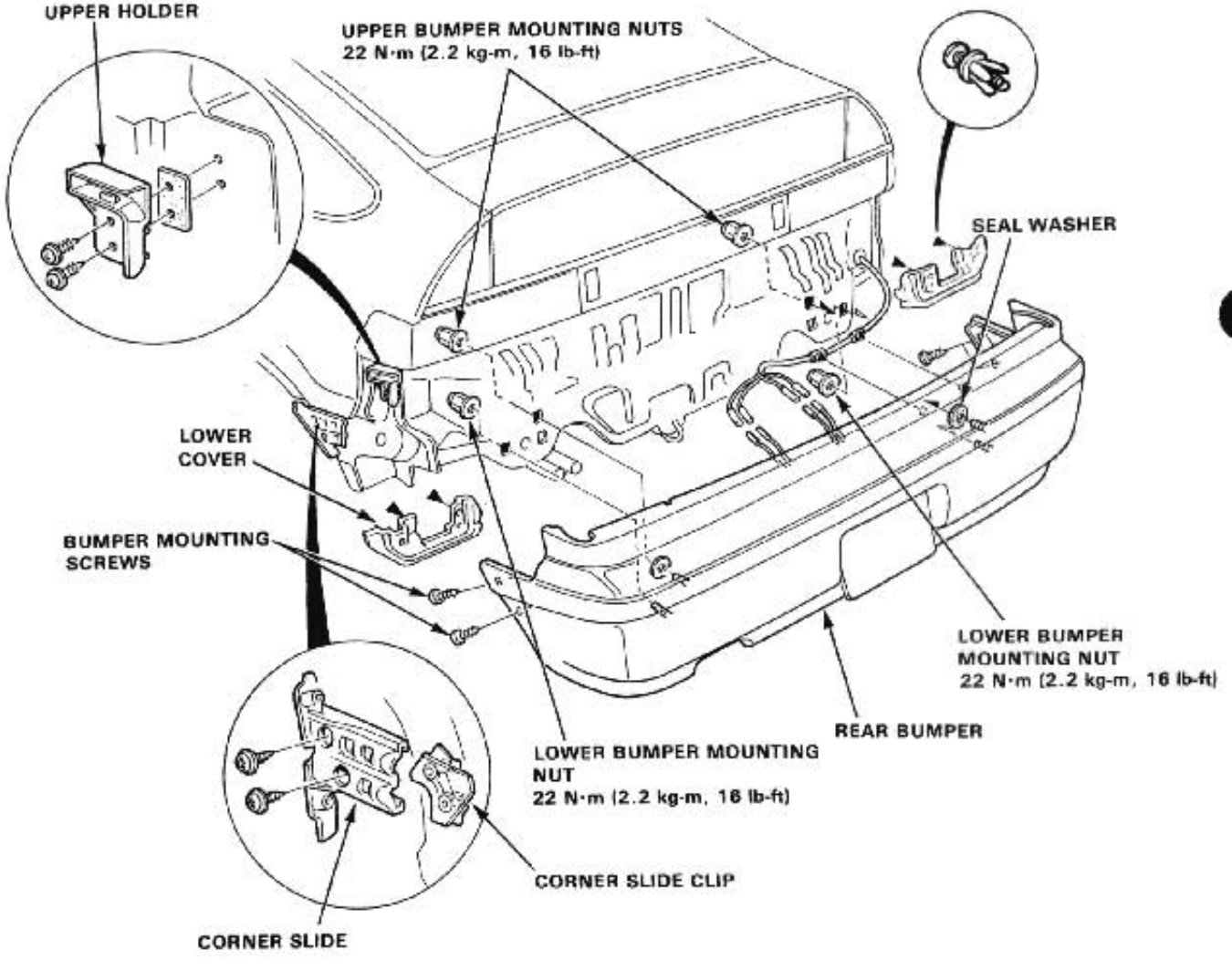
Rear Bumper

Replacement

1. Remove the 2 bumper mounting screws on each side at the corner edge of the bumper.
2. Remove the lower covers from under the trunk floor.
3. Remove the 2 lower bumper mounting nuts.
4. Remove the rear trim panel.
5. Remove the 2 upper bumper mounting nuts from the trunk area.
6. Remove the bumper by sliding it to the rear and disconnect the license light wire connectors.
   NOTE: Do not damage the threads of the bumper bolts.

If necessary:

7. Remove the screws, then remove the corner slide and slide clip.

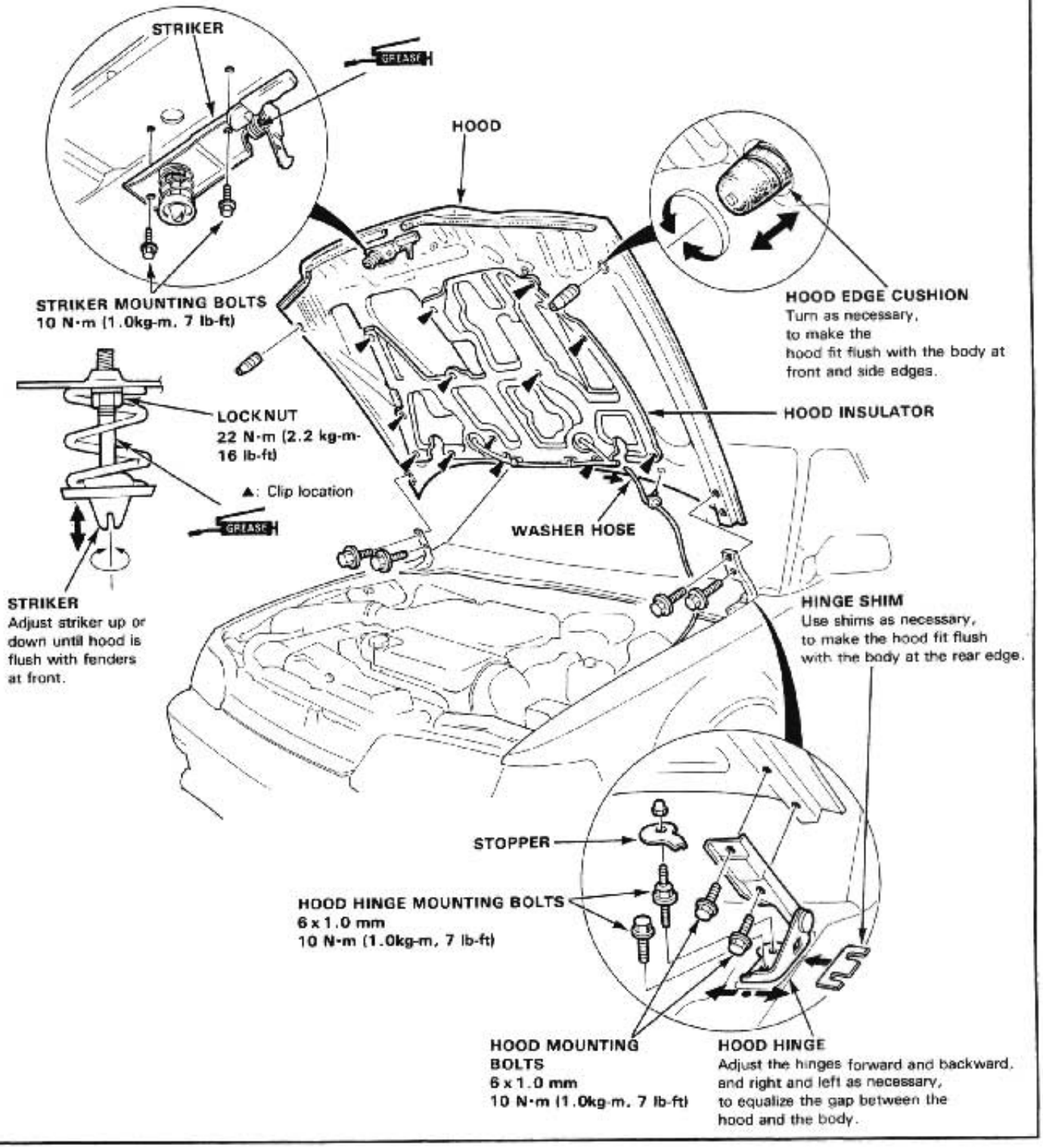


8 Installation sequence is essentially the reverse order of removal.

Hood

Replacement/Adjustment

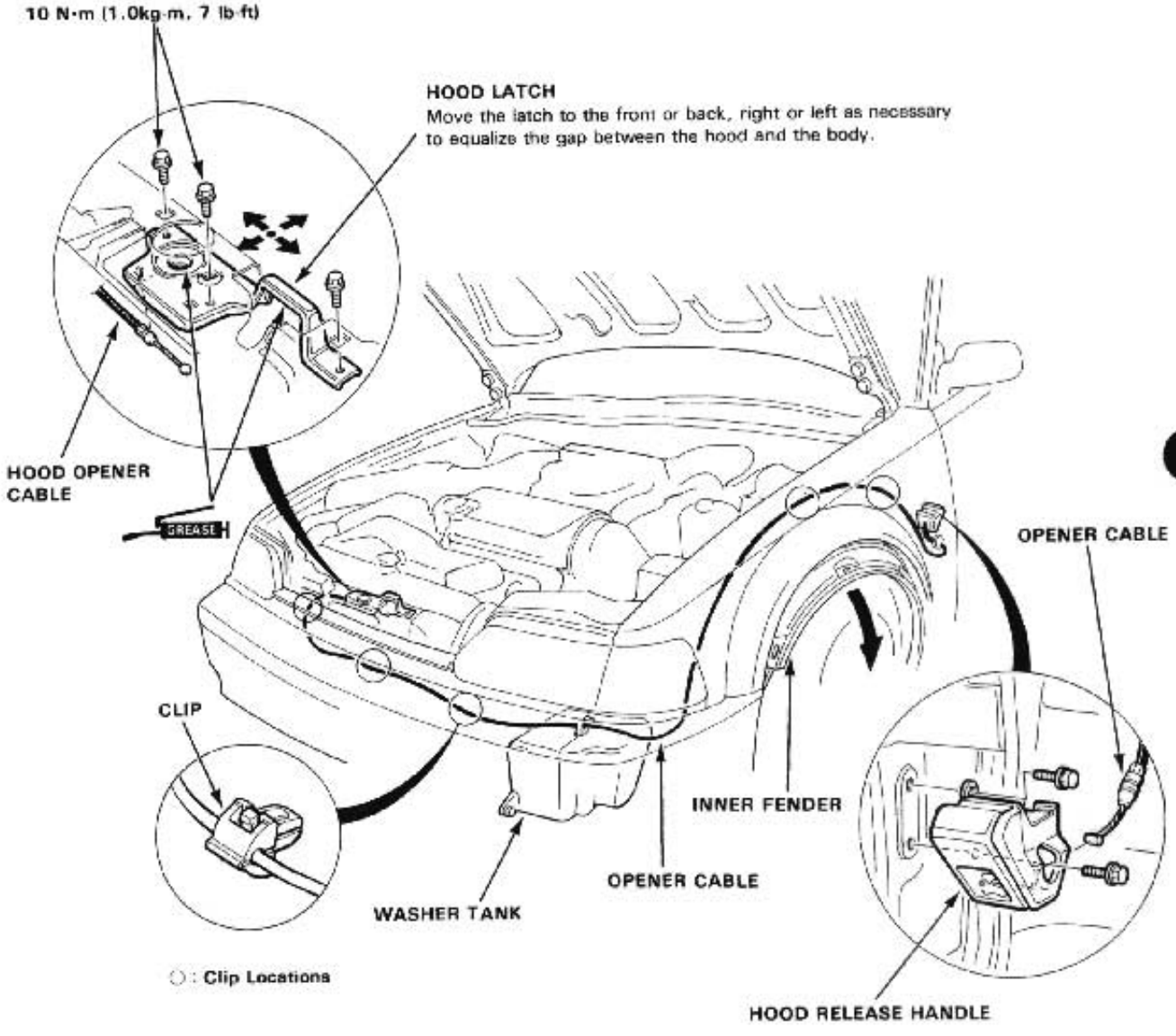
1. Pull the windshield washer hose out of the hood.
2. Hold the hood up and remove the 2 hood mounting bolts on each side, then remove the hood.
3. To remove the hood hinges, remove the front windshield wiper and air scoop.
4. When installing the hood, don't tighten the hinge bolts until you've checked the adjustments shown below.



Opener and Latch Replacement

1. Remove the bolts, then remove the hood release handle and disconnect the opener cable.
2. Remove the front bumper.
3. Remove the 3 mounting bolts, then remove the hood latch and disconnect the opener cable.
4. Remove the left side inner fender, then pull out the opener cable.

   NOTE: Before pulling out the opener cable, tie a string to the cable so you can pull it back in later.
5. After installing, adjust the hood fit to the opening.



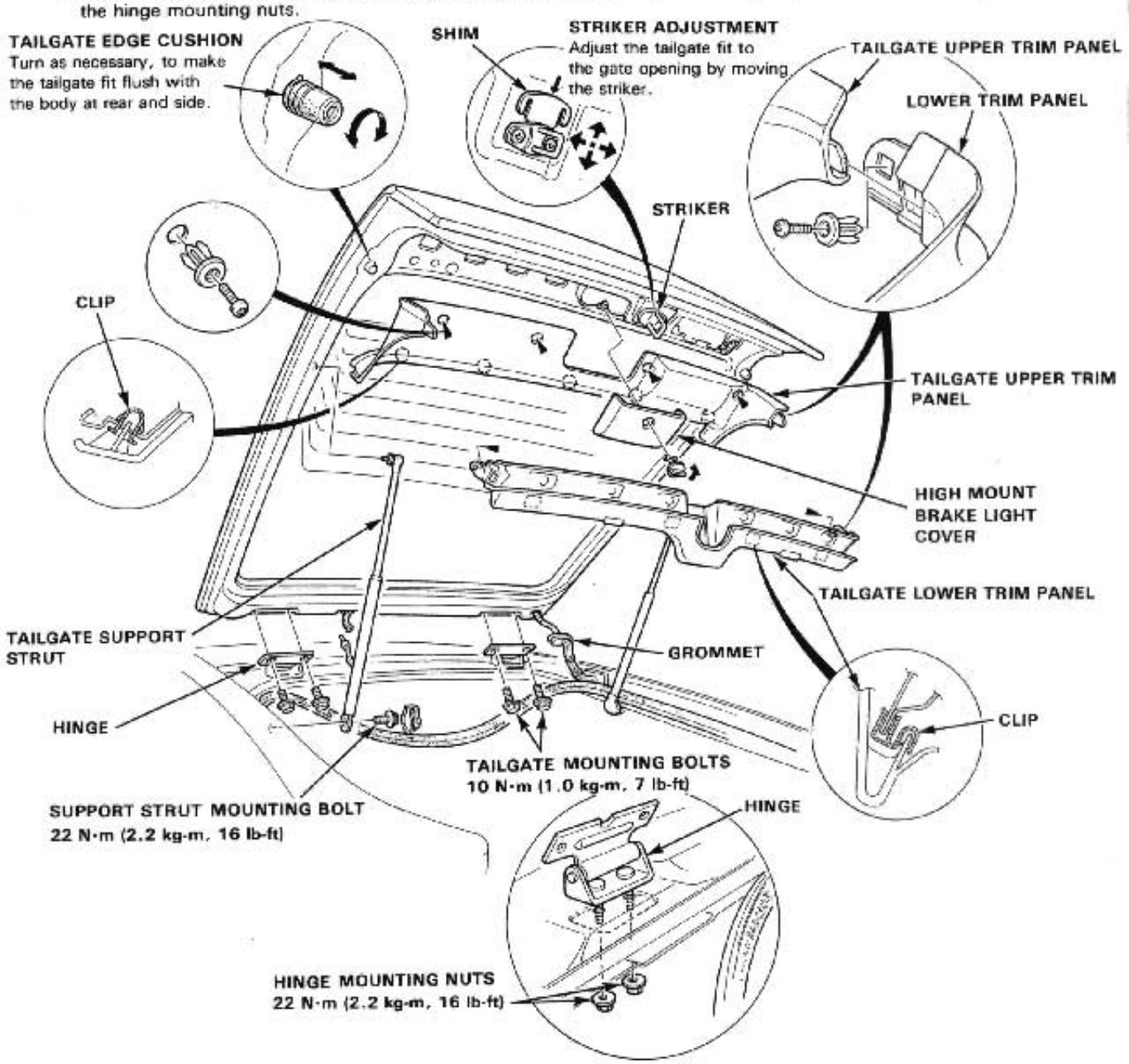
Tailgate

Replacement/Adjustment

1. Remove the screws and detach the clips, then remove the tailgate upper and lower trim panel.
2. Pull the wire harness out of the tailgate.
   NOTE: Before pulling out the wire harness, tie a string to the end of it so you can pull it back in when the tailgate is reinstalled.
3. Remove the tailgate support struts.
   NOTE: Let an assistant hold the tailgate when removing the struts.
4. Remove the tailgate by removing the tailgate mounting bolts.
   NOTE: Take care not to damage the roof panel.

If necessary:

- Lower the rear of the headliner just enough to gain access to the hinge mounting nuts, then remove the hinge by removing the hinge mounting nuts.

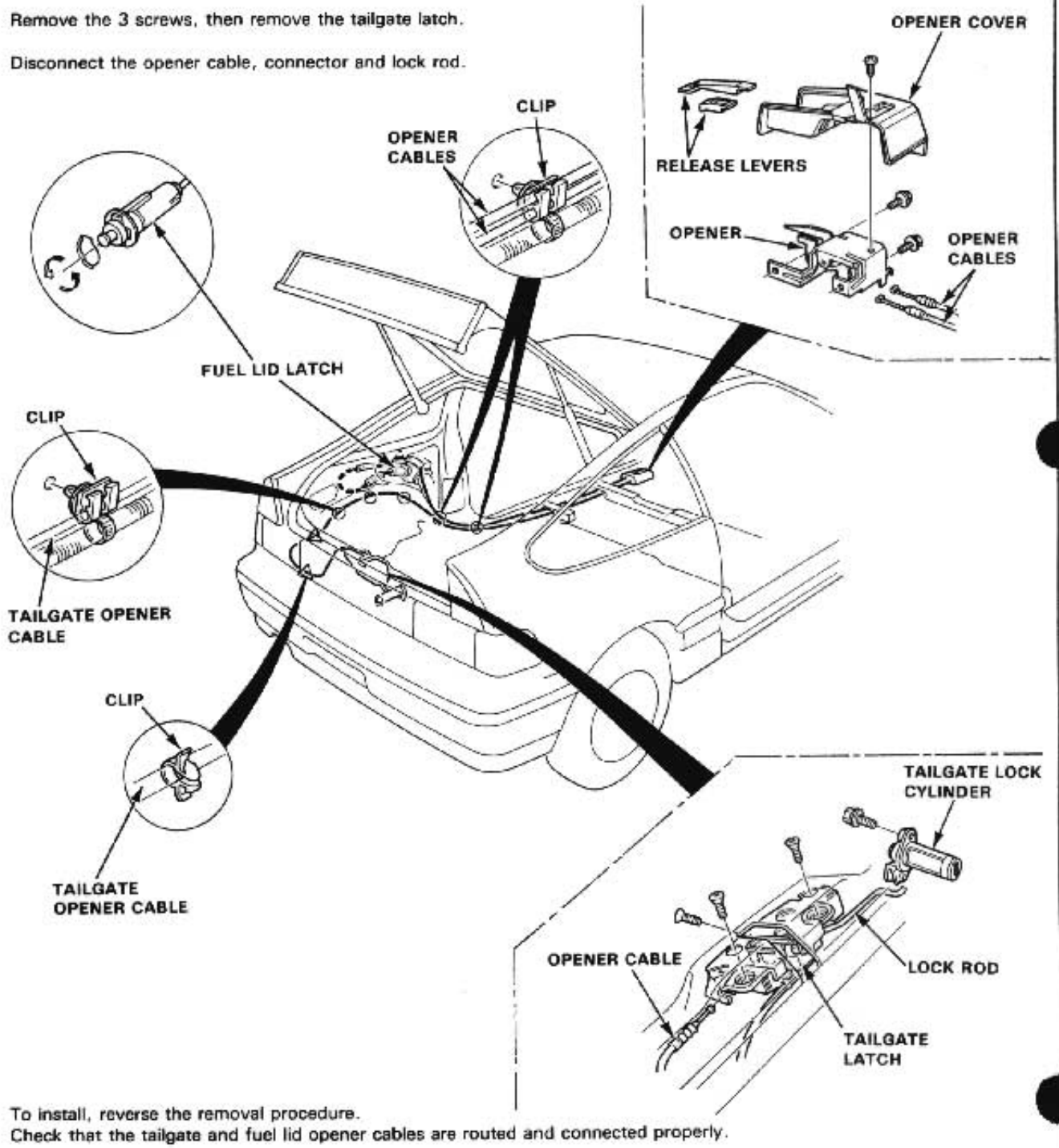


5. Installation sequence is essentially the reverse order of removal. However, observe the following:
   - Before tightening the hinge nuts, adjust the tailgate fit and striker.
   - Use care when pulling the wire harness back in to avoid damaging the body.
   - Coat the inside and outside of the grommet with sealant.

Tailgate Opener/Fuel Filler Opener

Replacement

1. To remove the opener cables, remove the following parts:
   - Left side door sill molding, left half of carpet.
   - Left quarter trim panel, and rear trim panel.
2. Remove the screw and the release levers, then remove the opener cover. Remove the opener by removing the 2 bolts.
3. Remove the fuel lid latch by turning it 90°.
4. Remove the bolt, then remove the tailgate lock cylinder.
5. Remove the 3 screws, then remove the tailgate latch.
6. Disconnect the opener cable, connector and lock rod.

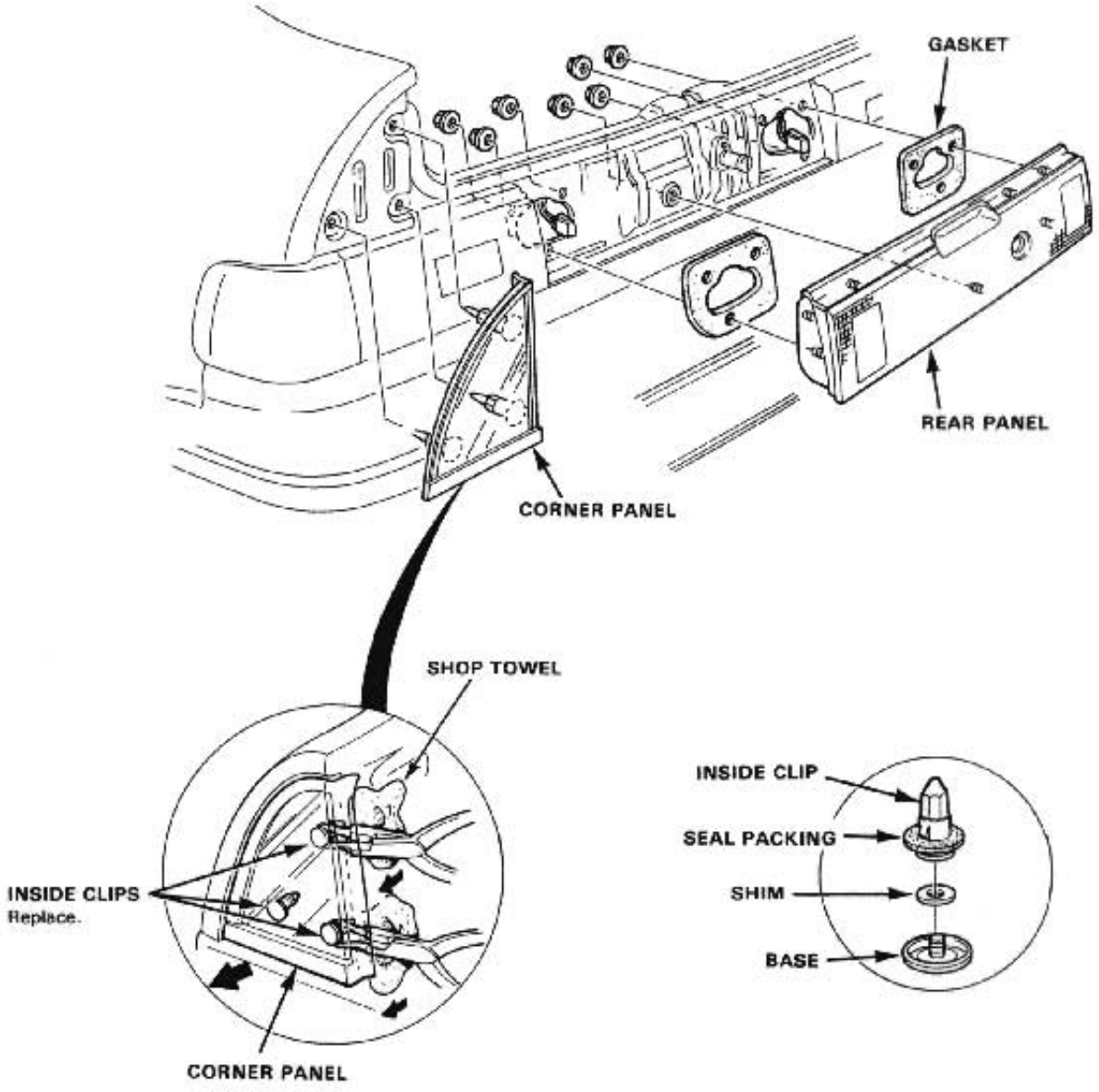


7. To install, reverse the removal procedure.
   Check that the tailgate and fuel lid opener cables are routed and connected properly.

Rear Panel/Corner Panels

Replacement

1. Remove the rear trim panel, then remove the rear panel by removing the 7 mounting nuts and disconnecting the connectors.
2. Carefully pull out the 3 inside clips, then remove the corner panels.



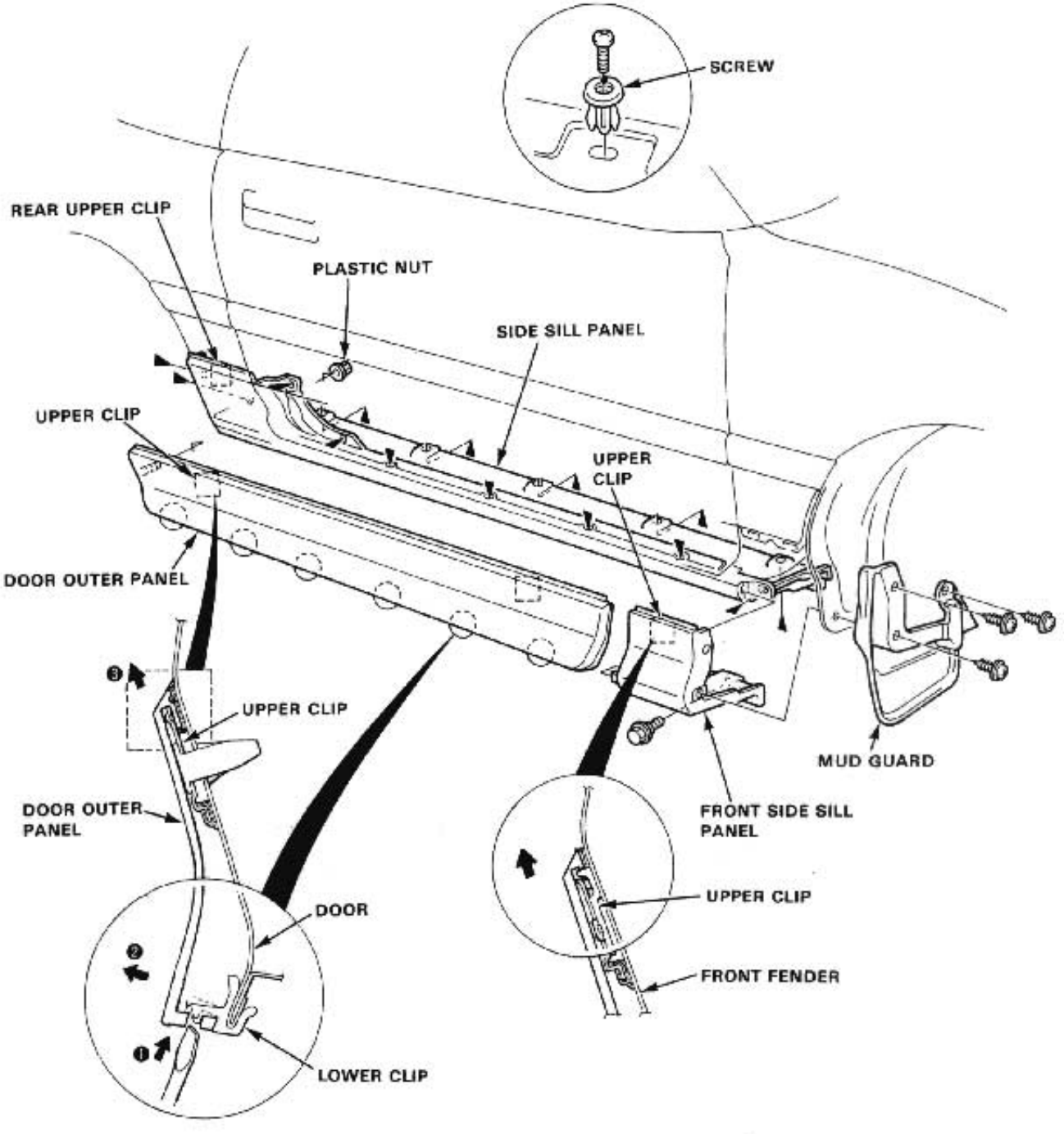
3. Install the panels in the reverse order of removal.
   NOTE: Before attaching the corner panels, install new clips and shims.

Side Panels

Replacement

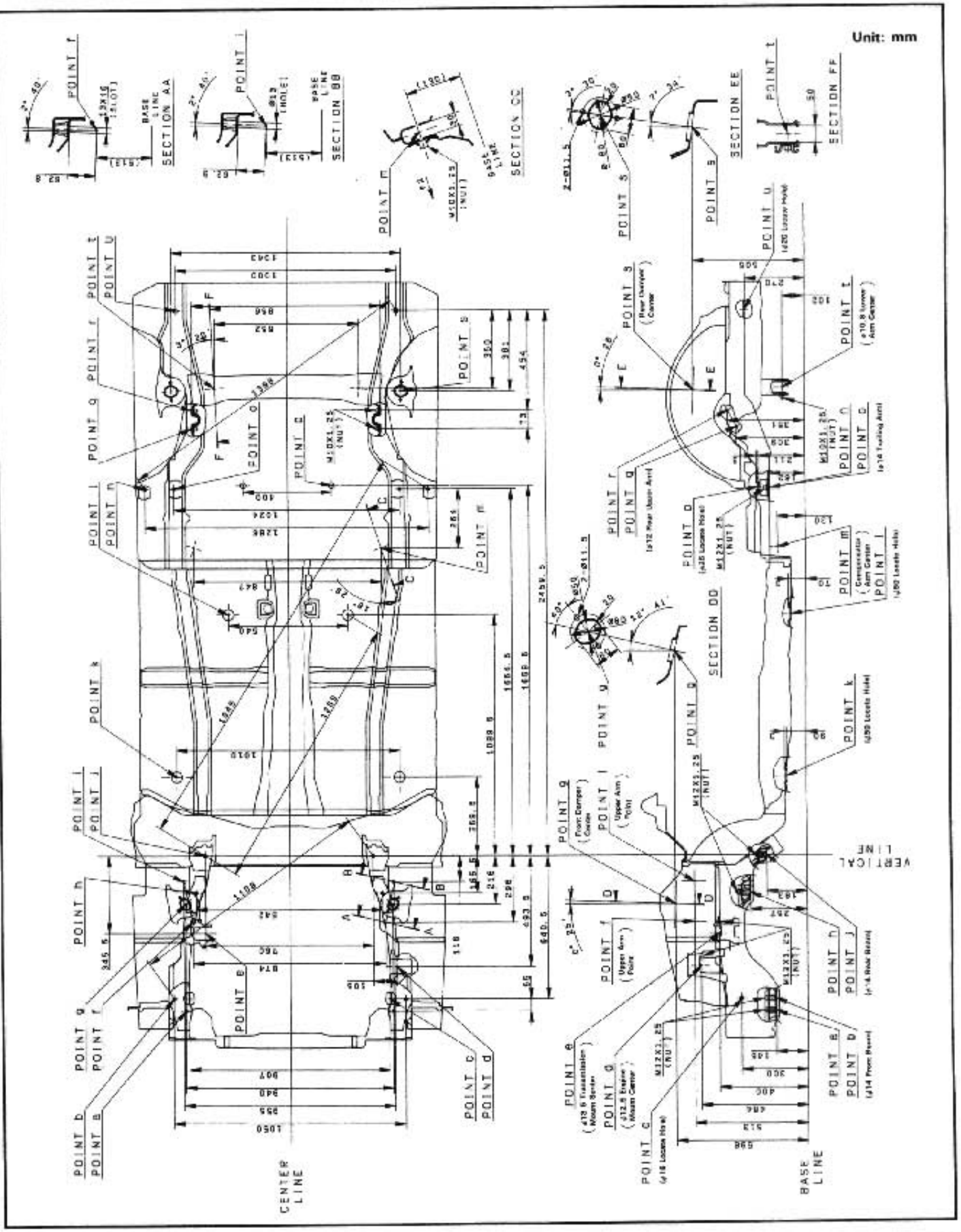
1. Remove the plastic nut and 6 lower clips with a long flat-tip screwdriver.
2. Lift the door outer panel straight up off the 2 upper clips, then remove the door outer panel.
3. Remove the bolt, screw and 1 upper clip, then remove the front side sill panel.
4. Remove the 14 screws and 1 rear upper clip, then remove the side sill panel.
   NOTE: Take care not to damage the side sill and door.

▲ : Screw location



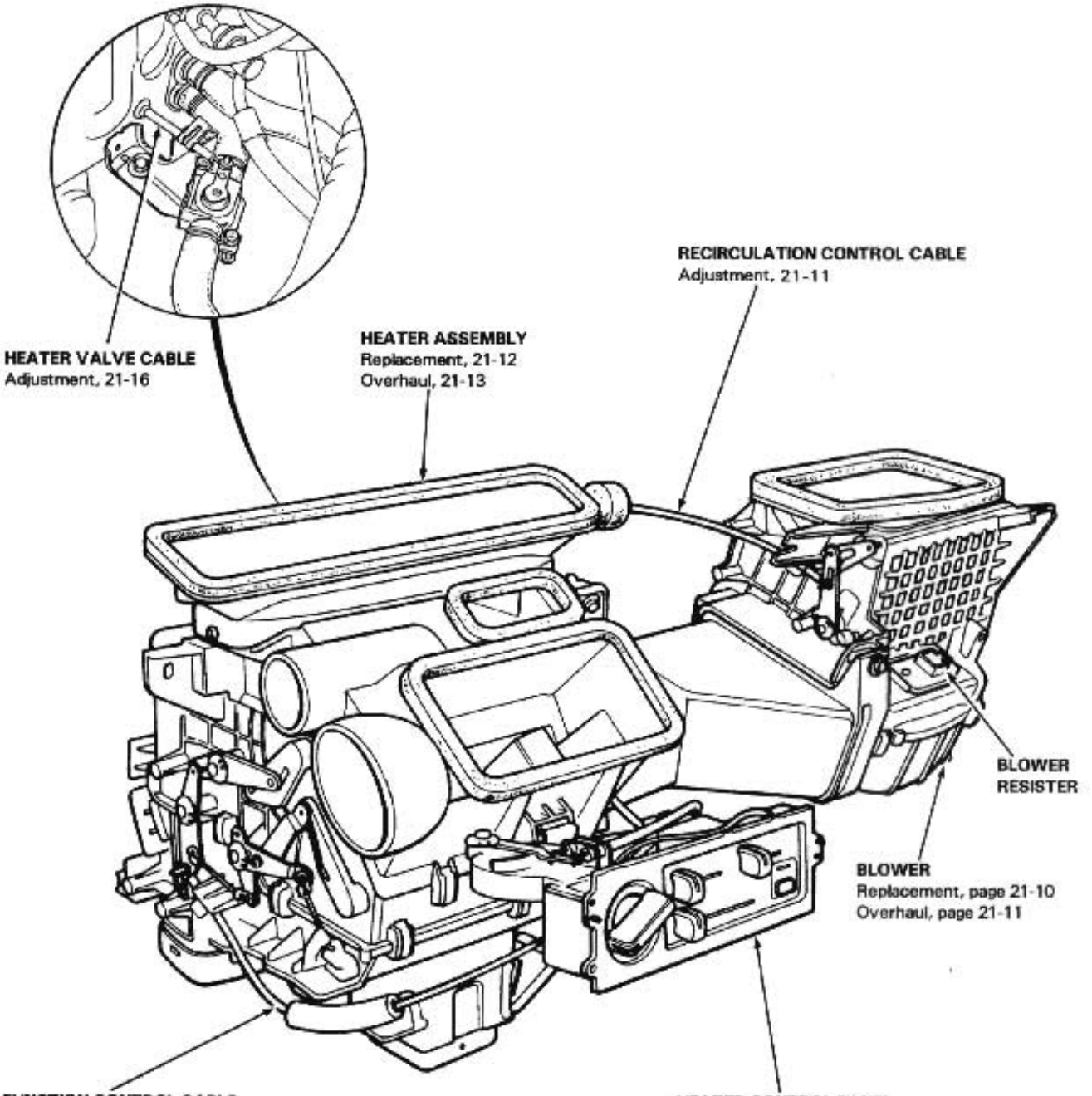
5. Install the side panel in the reverse order of removal.

Frame Repair Chart



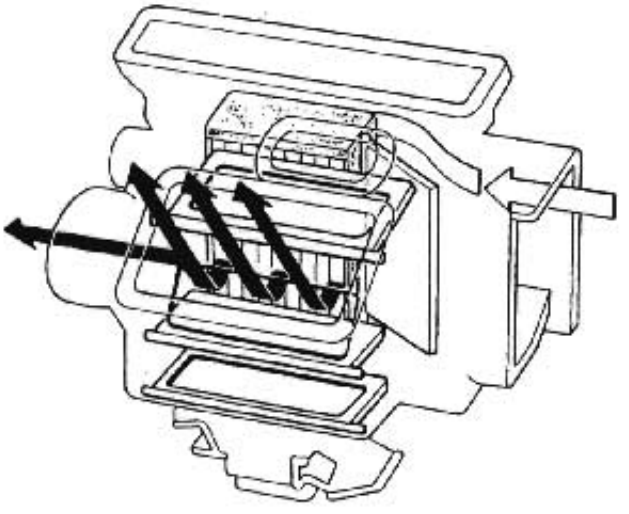
Heater

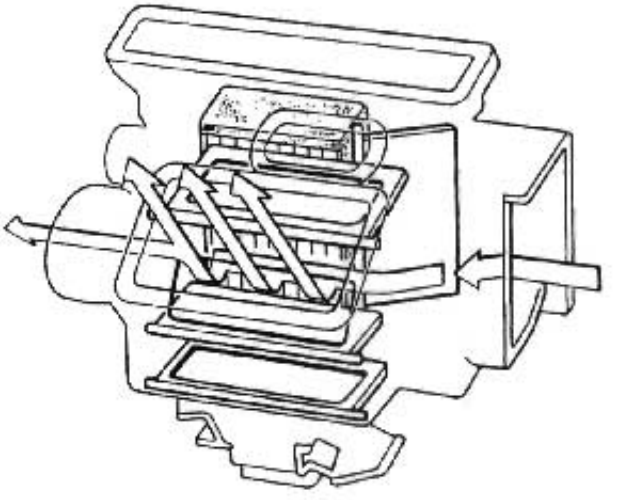
Illustrated Index



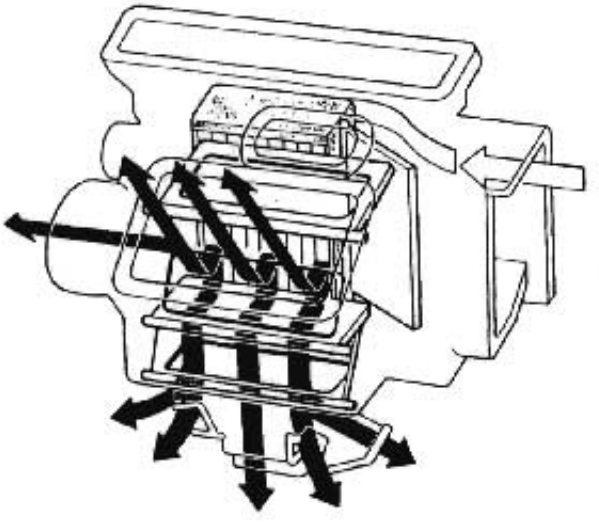
Door Position

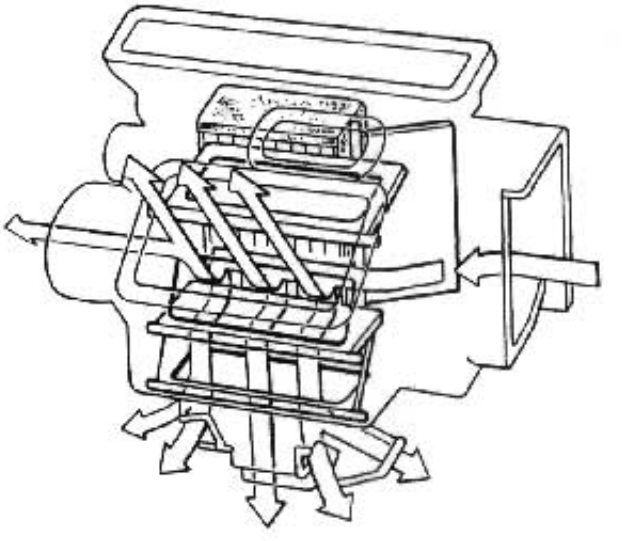
(VENT)





(HEAT/VENT)

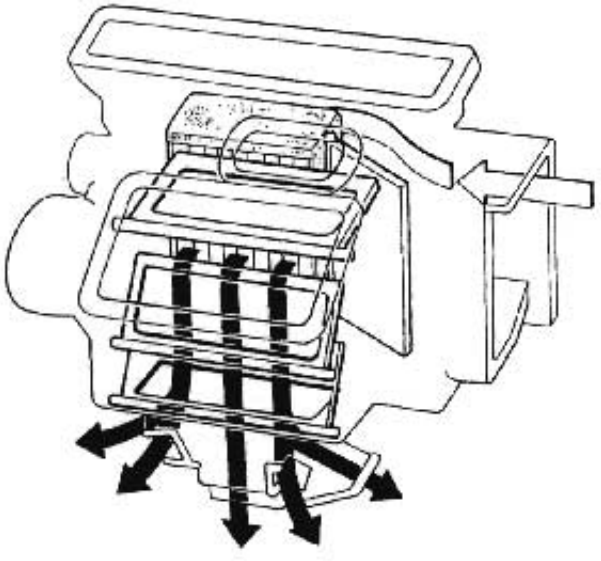


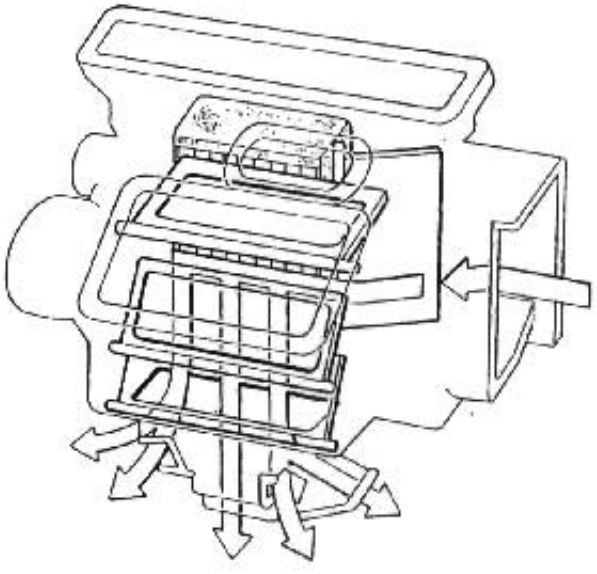


(cont'd)

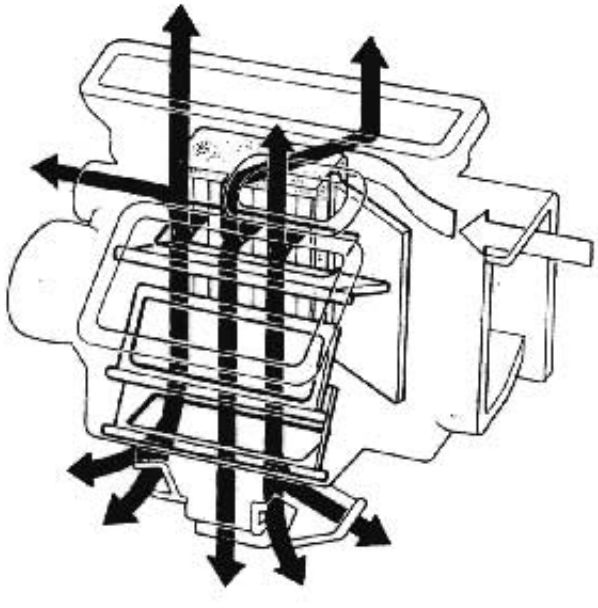
Door Position (cont'd)

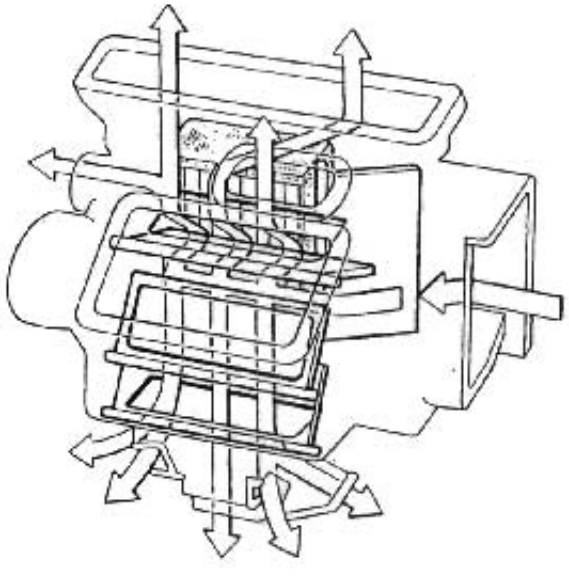
(HEAT)



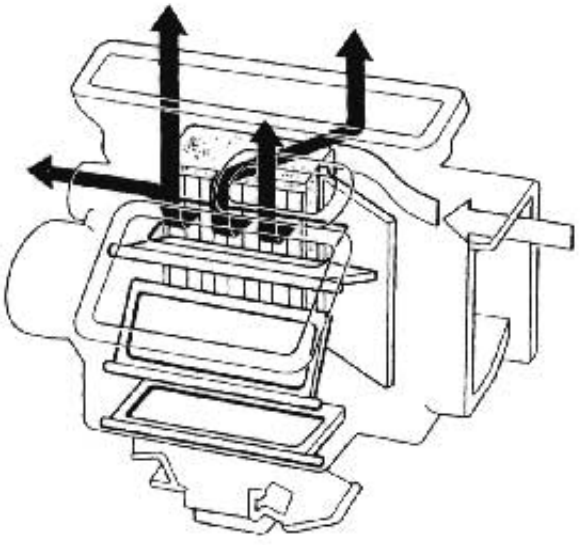


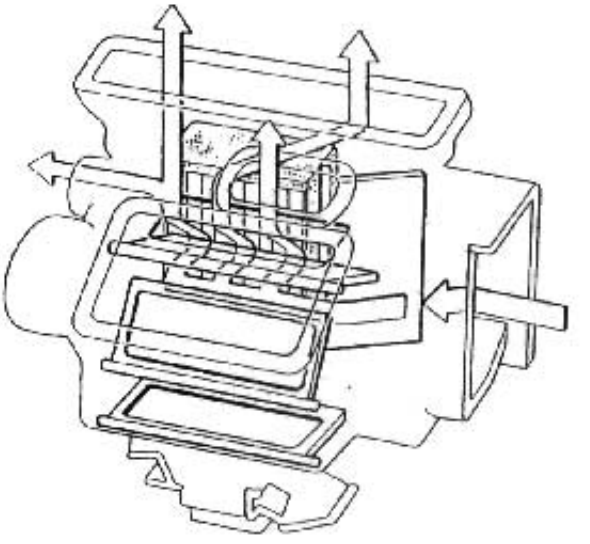
(HEAT/DEF)





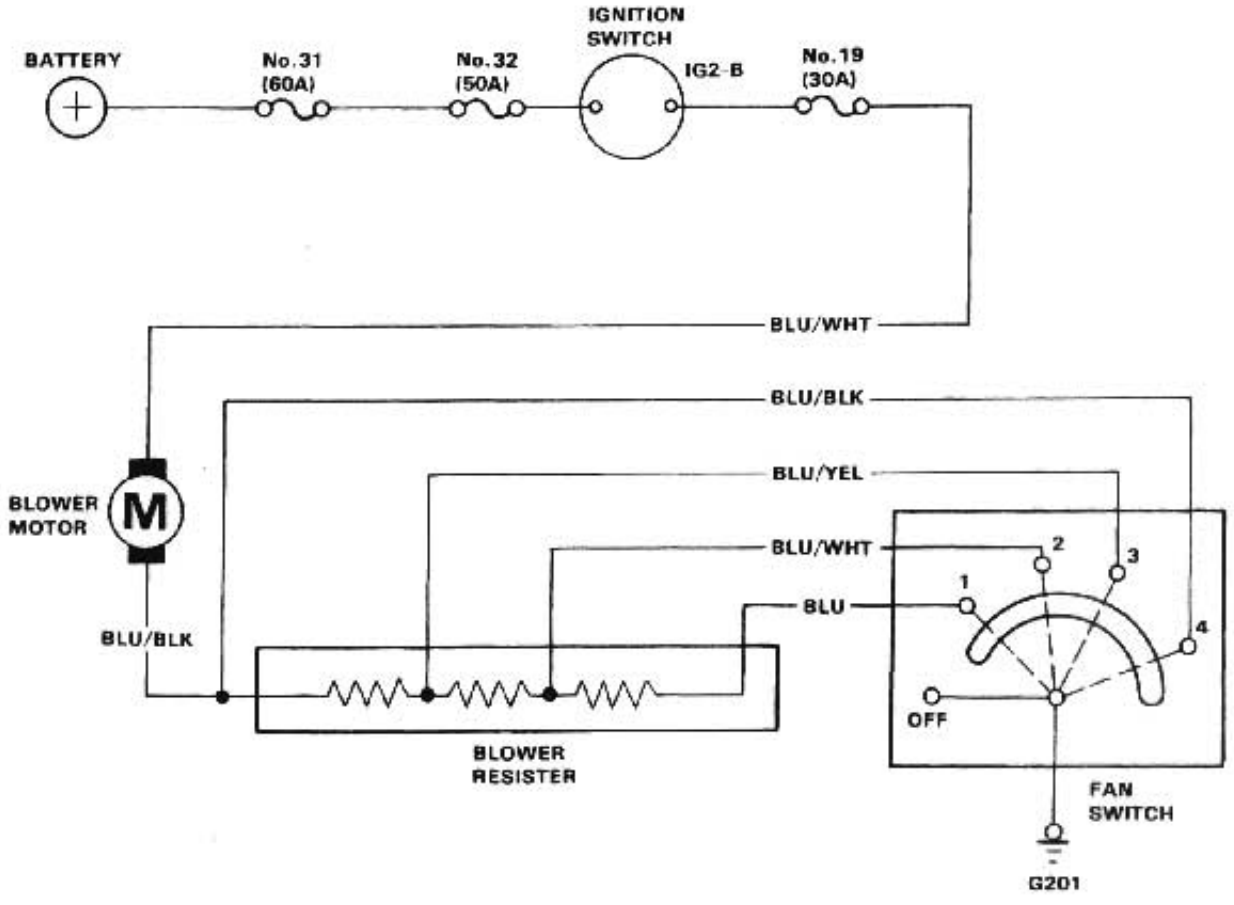
(DEF)





Heater

Circuit Diagram



Troubleshooting

Symptom Chart

SYMPTOM		REMEDY
No hot air flow	Blower motor does not run	Perform the flowchart (page 21-7)
	Blower motor runs	Check following: · Clogged heater duct · Clogged blower outlet · Clogged heater valve · Faulty air mix door · Air mix cable adjustment · Faulty thermostat (section 10)
Hot air flow is low	Blower speed does not change	Perform flow chart (page 21-9)
	Blower runs properly	Check following: · Clogged heater duct · Clogged blower outlet · Incorrect door position

Flow Chart - Blower

Blower motor does not run at all.

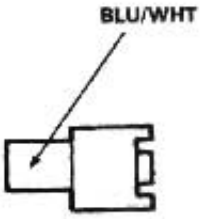
Inspect No. 19 (30A) fuse.

Is the No. 19 fuse OK ?

NO → **Replace fuse.**

YES

Disconnect the 2P connector from the blower motor.



Turn the ignition switch ON.

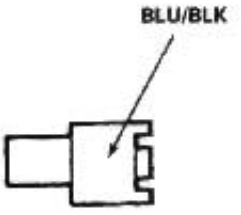
Measure voltage between BLU /WHT terminal (+) and body ground (−).

Is there battery voltage ?

NO → **Repair open in BLU/WHT wire between blower and ignition switch.**

YES

Turn the ignition switch OFF.



Reconnect the 2P connector to the blower motor.

Connect a jumper wire between the BLU/BLK terminal and body ground. Turn the ignition switch ON.

Does blower motor run ?

NO → **Replace the blower motor.**

YES

(To page 21-8)

(cont'd)

Flow Chart - Blower (cont'd)

(From page 21-7)

Turn the ignition switch OFF.

Remove the jumper wire.

Disconnect the 6P connector from the fan switch.

Connect the jumper wire between the BLU/BLK terminal and body ground.

Turn the ignition switch ON.

Does the blower motor run ?

NO → **Repair open in BLU/BLK wire between blower and fan switch.**

YES

Turn the ignition switch OFF.

Remove the jumper wire.

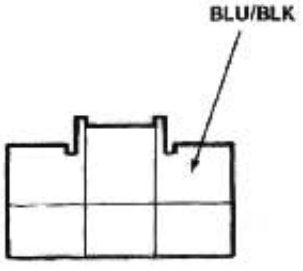
Inspect the fan switch (page 21-17).

Is the fan switch OK ?

NO → **Replace the fan switch.**

YES

Repair open in BLK wire between the fan switch and body ground or poor ground (G201).



View from wire side

Blower motor running speed does not change.

Disconnect the 4P connector from the blower resistor.

Check for continuity between the 2 and 4 terminals of the resistor.

Does continuity exist ? — NO → **Replace the resistor.**

YES

Reconnect the 4P connector to the resistor.

Disconnect the 6P connector from the fan switch.

Turn the ignition switch on.

Measure voltage between:
- BLU/YEL terminal and body ground.
- BLU/WHT terminal and body ground.
- BLU terminal and body ground.

Is there battery voltage ? — NO → **Repair open in BLU/YEL, BLU/WHT and/or BLU wire(s) between the fan switch and resistor.**

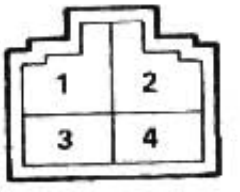
YES

Check for continuity from BLK terminal to body ground.

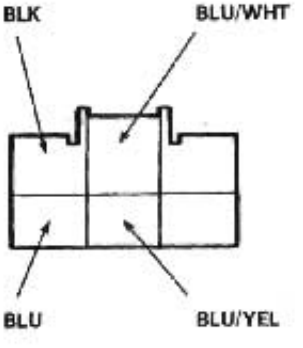
Is there continuity ? — NO → **Repair open in BLK wire between the fan switch and body ground or poor ground (G201).**

YES

Replace the fan switch.



View from terminal side

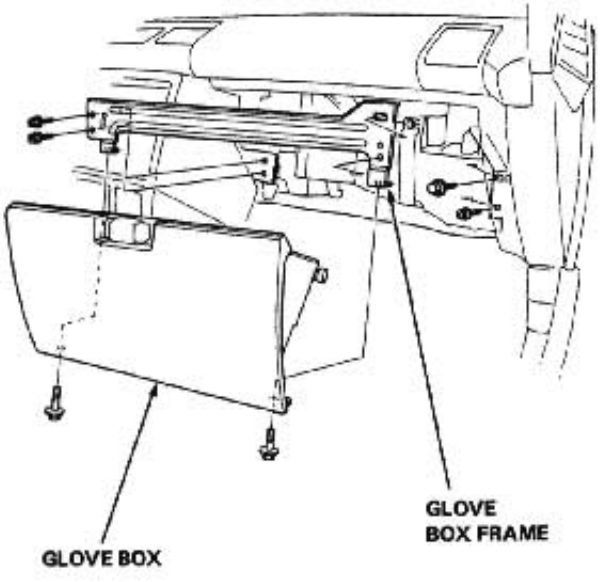


View from wire side

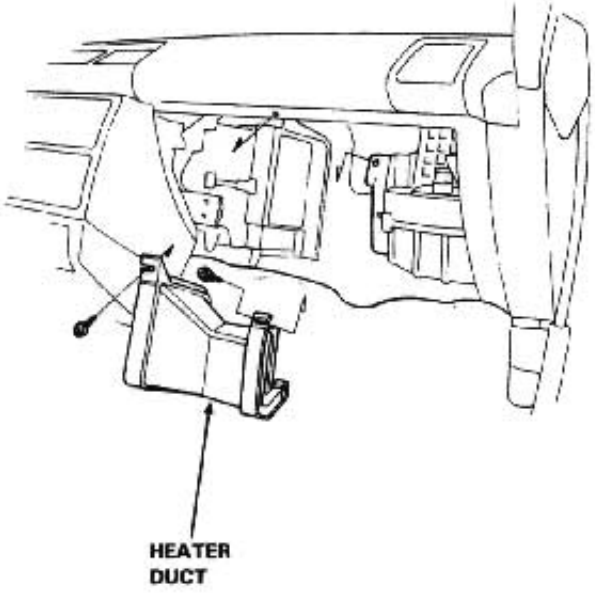
Blower

Replacement

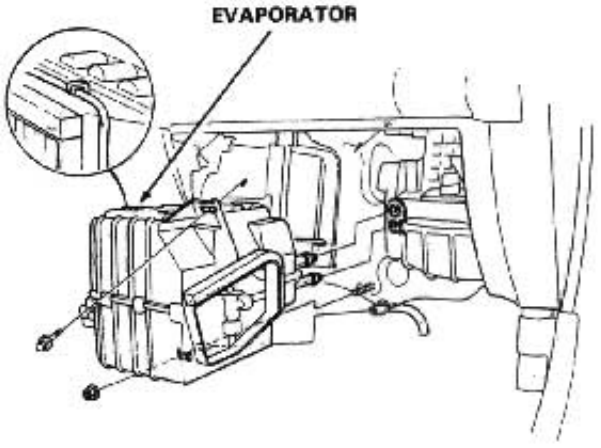
1. Disconnect the battery negative terminal.
2. Remove the glove box and glove box frame.



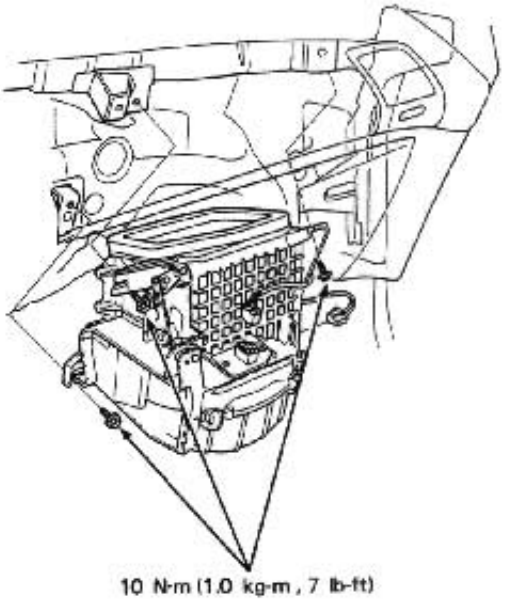
3-a Remove the tapping screws (2) and remove the heater duct.



3-b Remove the A/C band and the evaporator. (page 22-20)



4. Remove the mounting bolts (3).
5. Disconnect the connectors from the blower motor, resistor then remove the blower.



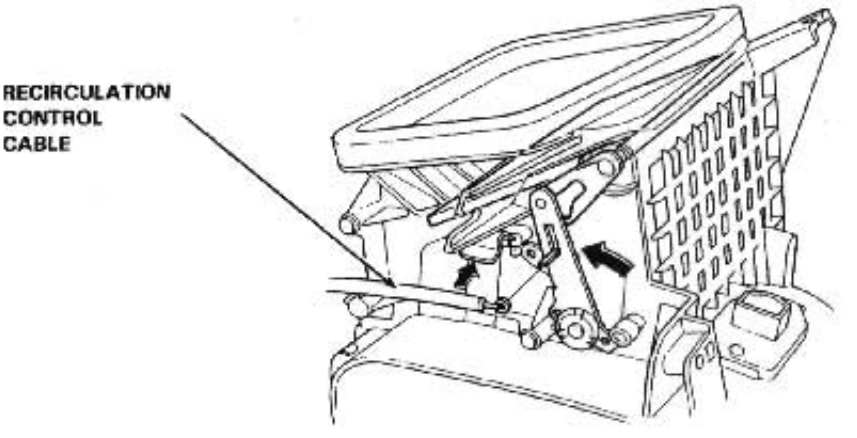
6. Install the blower in the reverse order of removal and make sure there is no air leakage.

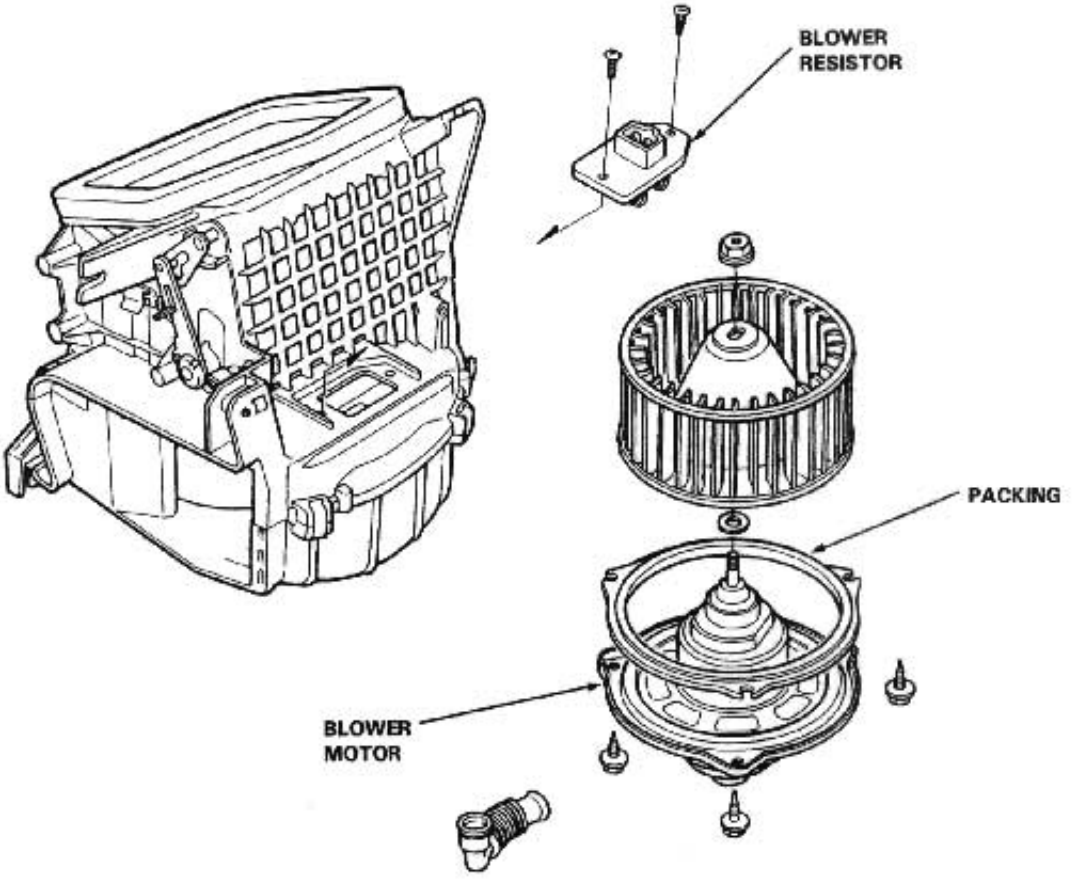
Overhaul

NOTE:

- Before reassembly, make sure that the air door and linkage move smoothly without binding.

- RECIRCULATION CONTROL CABLE ADJUSTMENT
  Slide the recirculation control lever to " RECIRC" . Then connect the control cable to the arm while holding the air doors shut.





Heater Assembly

Replacement

1. When the engine is cool, drain coolant from the radiator (Section 10).

⚠WARNING

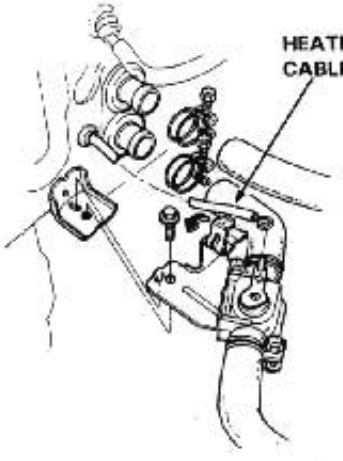
- **Do not remove the radiator cap when the engine is hot; the coolant is under pressure and could severely scald you.**
- **Keep hands away from the radiator fan. The fan may start automatically without warning and run for up to 30 minutes even after the engine is turned off.**

CAUTION:
Radiator coolant will damage paint. Qickly rinse any spilled coolant from painted surfaces.

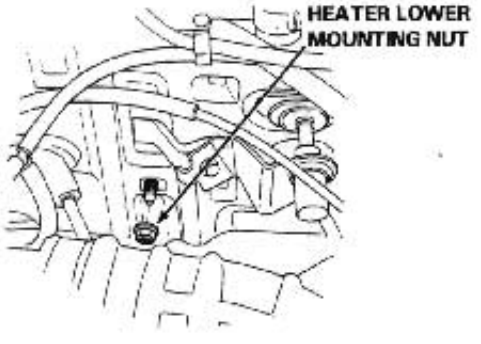
2. Disconnect the heater hoses at the heater.

NOTE:
Coolant will run out when the hoses are disconnected, drain it into a clean drip pan.

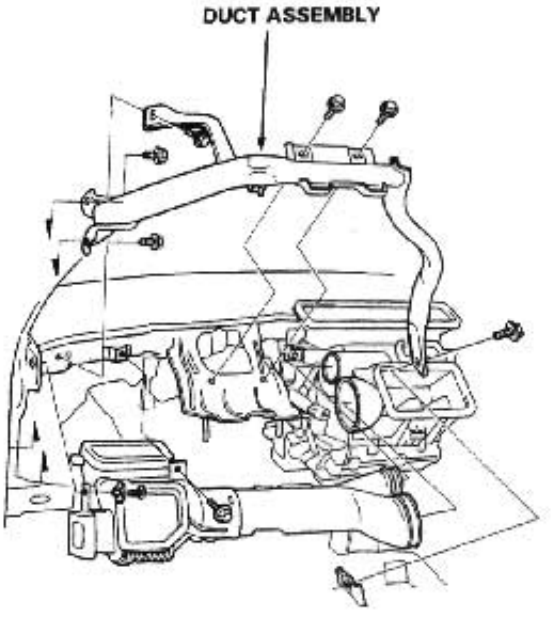
3. Disconnect the heater valve cable from the heater valve.



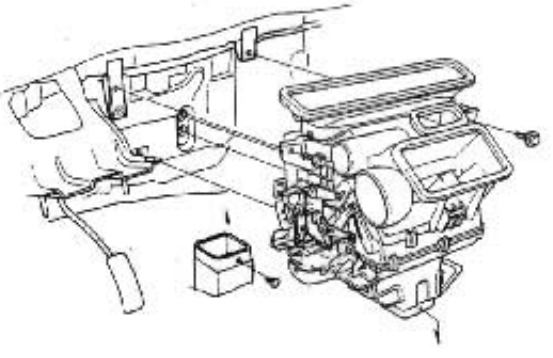
4. Remove the dashboard (Section 20).
5. Remove the heater duct (page 21-10).
6. Remove the heater lower mounting nut.



7. Remove the steering column bracket and duct assembly.



8. Remove the heater mounting bolts(2) and clip, then remove the heater assembly.

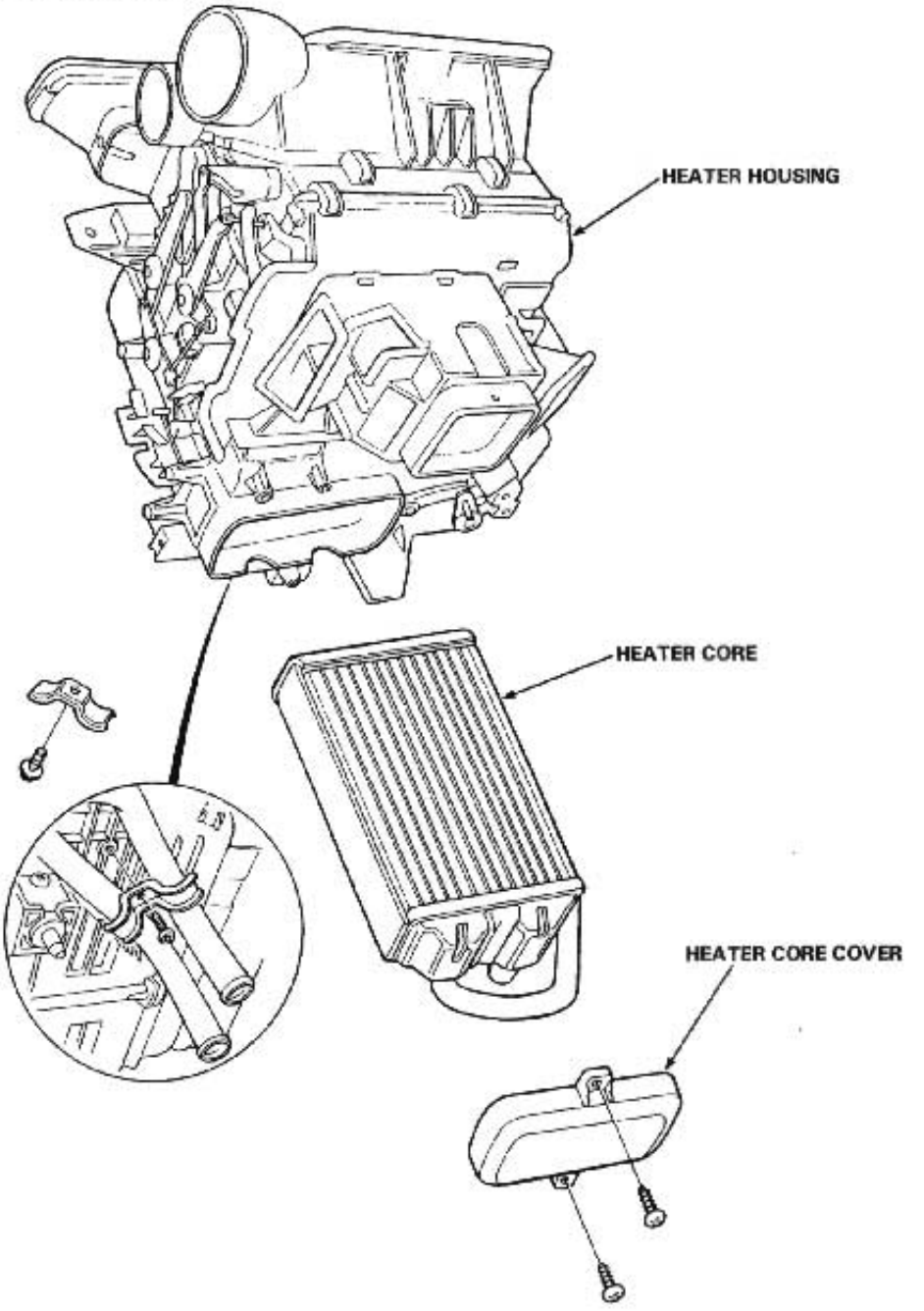


9. Install in the reverse order of removal, and:

- Apply a sealant to the grommets.
- Do not interchange the inlet and outlet hoses. Make sure that the hose clamps are secure.
- Loosen the bleed bolt on the engine and refill the radiator and reservoir tank with the proper coolant mixture.
  Tighten the bleed bolt when all the trapped air has escaped and coolant begins to flow from it.
- Connect all cables and make sure they are properly adjusted (page 21-16).

Overhaul

1. Remove the heater assembly.
2. Remove the tapping screws (2) and heater core cover.
3. Remove the tapping screw and clamp.
4. Pull out the heater core from the heater housing.

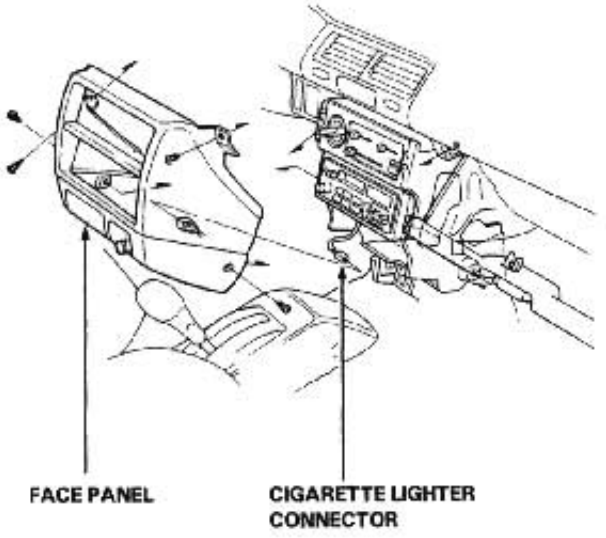


Install in the reverse order of removal and:
Loosen the bleed bolt on the engine and refill the radiator and reservoir tank with the proper coolant mixture. Tighten the bleed bolt when all the trapped air has escaped and coolant begins to flow from it.

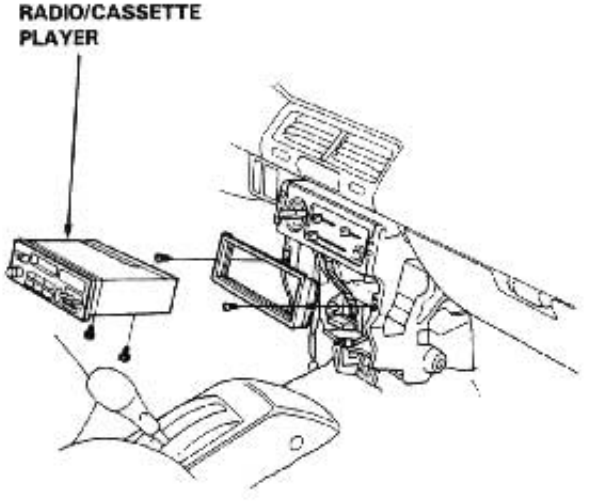
Heater Control Panel

Replacement

1. Remove the tapping screws (4) and remove the face panel and disconnect cigarette lighter connector.

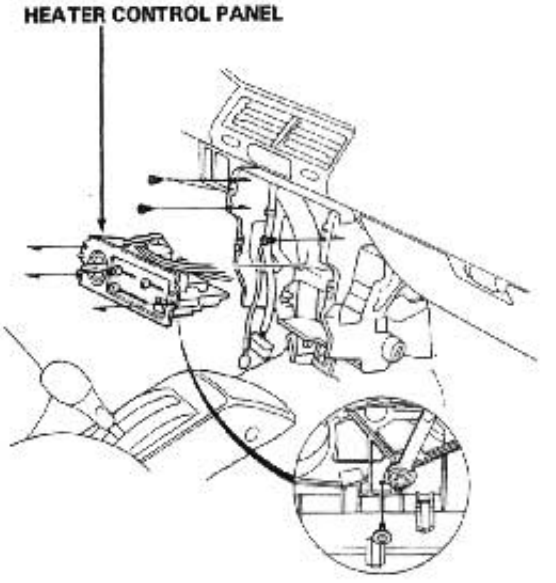


2. Remove the tapping screws (4) and remove the radio/cassette player.



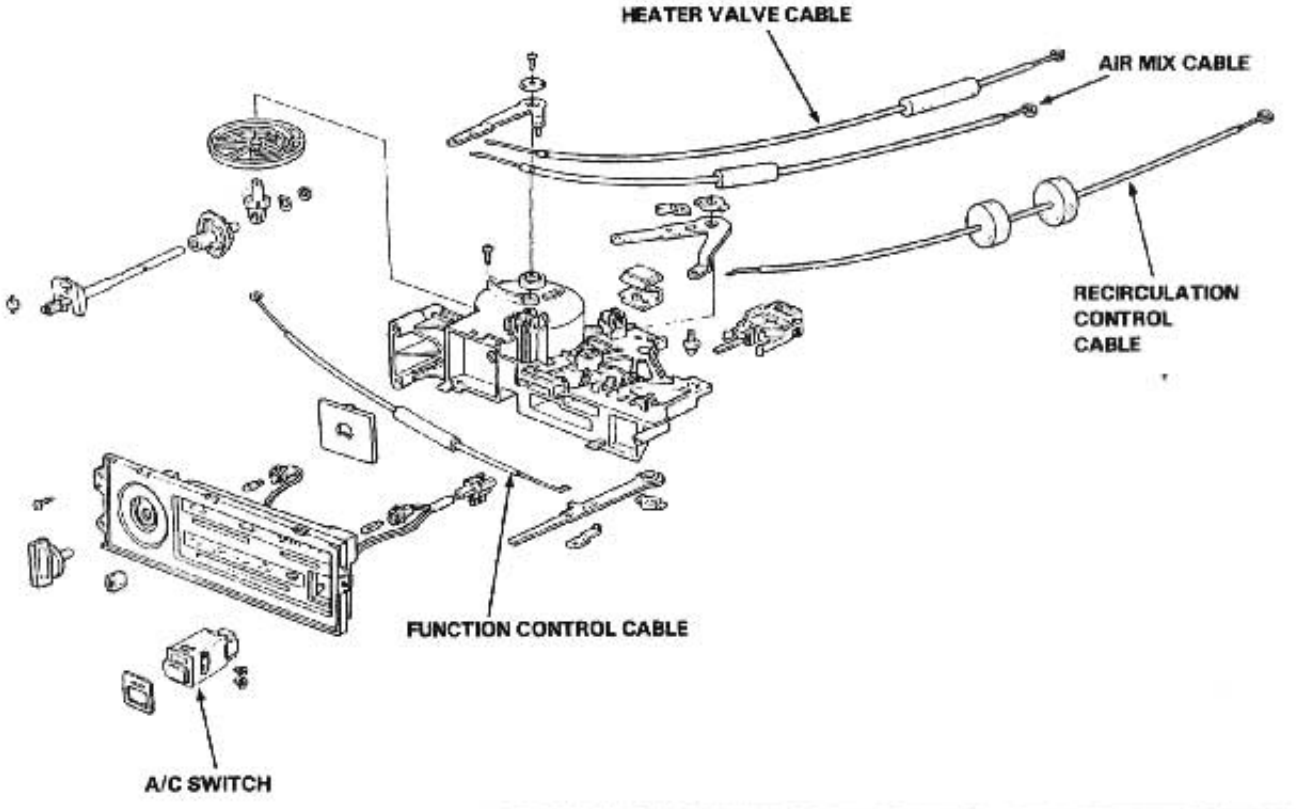
3. Disconnect the cables (4) at the heater assembly (page 21-16).

4. Remove the tapping screws (3) and pull out the heater control panel and disconnect the wire harness connectors, then remove the heater control.



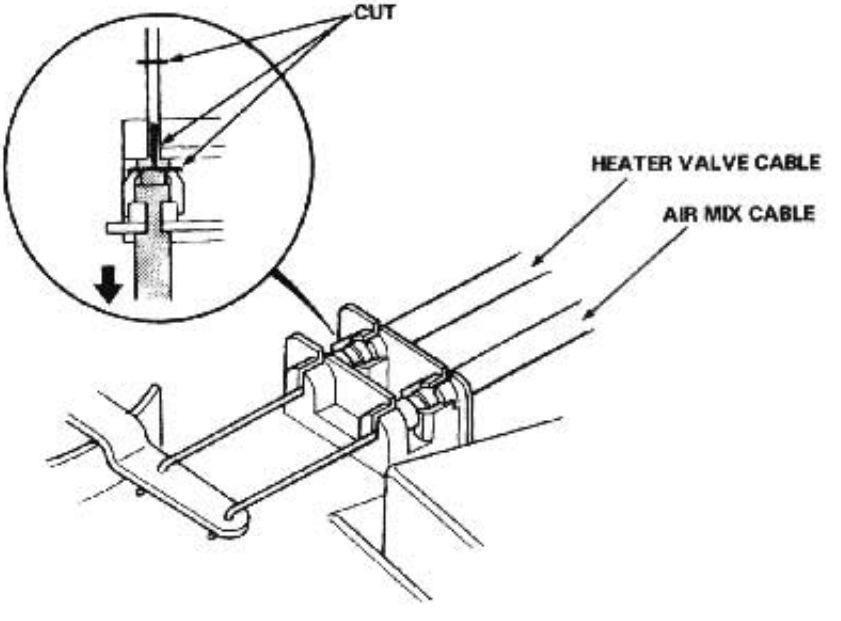
Install in the reverse order of removal and connect and make sure that it is properly adjusted (page 21-16).

Overhaul



Cable Replacement

1. Cut and pull the cable.
2. Set the new one.

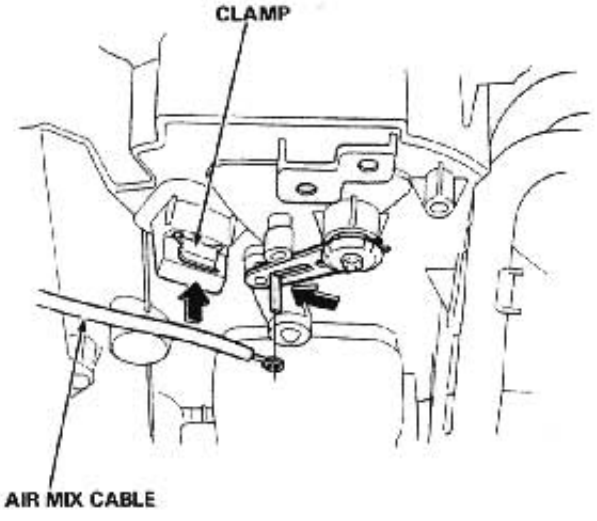


NOTE:
After assembly check that the air mix lever slides smoothly, the full stroke right to left.

Heater Control Cables

Air Mix Cable Adjustment

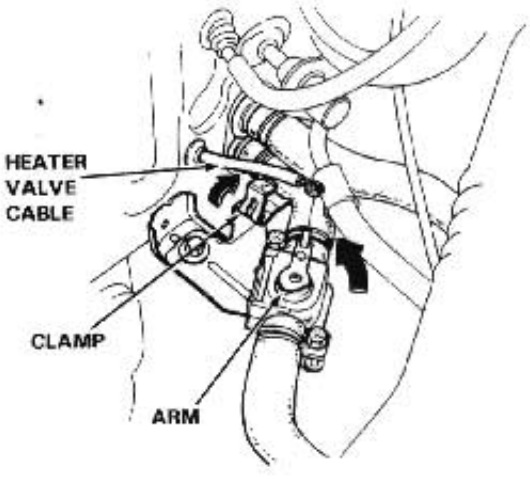
1. Slide the temperature control lever to HOT.
2. Turn the air mix door shaft arm to the left and connect the end of the cable to the arm.
3. Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make temperature control lever move, then snap the cable housing into the clamp.



NOTE:
Heater valve cable should be adjusted if the air mix cable has been disconnected.

Heater Valve Cable Adjustment

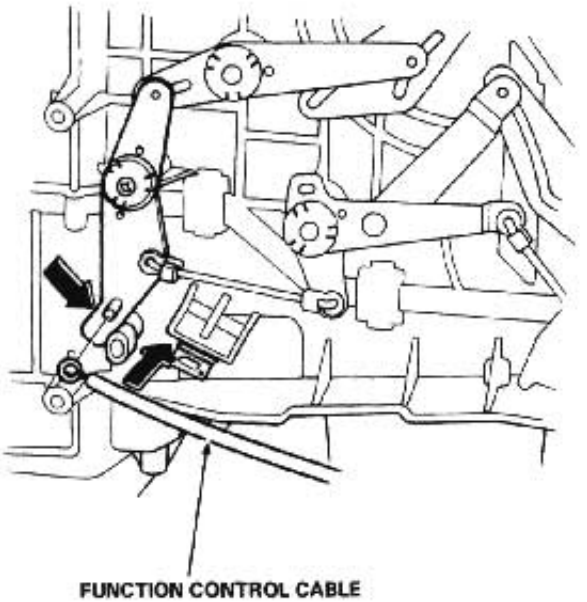
1. Slide the temperature control lever to HOT.
2. Gently slide the cable housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control lever move, then hold the cable housing and snap it in the clamp.



NOTE:
Air mix cable should be adjusted if the heater valve cable has been disconnected.

Function Control Cable Adjustment

1. Slide the function control lever to DEF.
2. Turn the function control shaft to the front and connect the end of the cable to the arm.
3. Gently slide the cable housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control lever move, then hold the cable housing and snap it in the clamp.



FUNCTION CONTROL CABLE

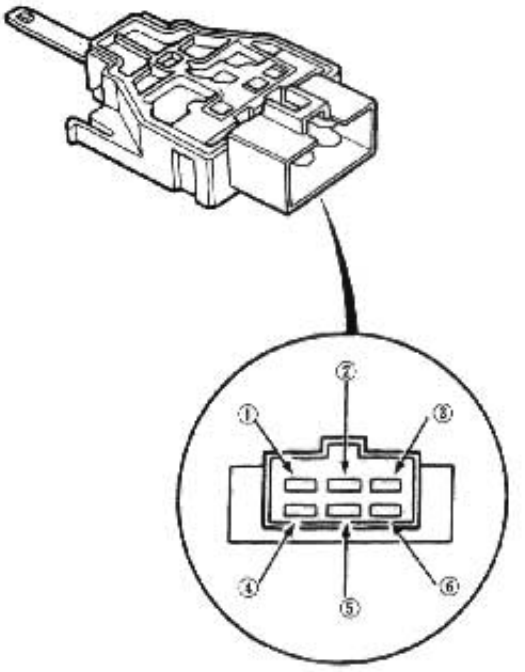
Fan Switch

Test

1. Disconnect the 6P connector from the fan switch.
2. Check for continuity between the terminals of the fan switch according to the table below.

SWITCH CONNECTION

Position \ Terminal	1	2	3	4	5	6
OFF						
1	○			○		○
2	○	○				○
3	○				○	○
4	○		○			○



Air Conditioner

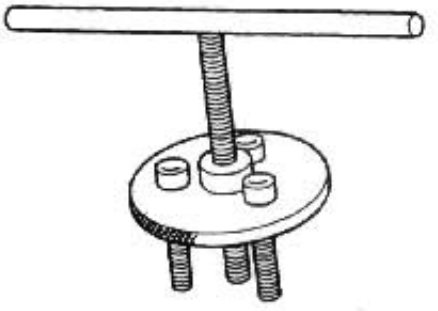
Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07HAF−SF1030A	SEAL SEAT REMOVER	1	22-32
②	07HAF−SF1040A	SEAL REMOVER/INSTALLER	1	22-32
③	07925−6920001	A/C CLUTCH HOLDER	1	22-39, 42
④	07935−805003	FLY WHEEL PULLER	1	22-39
⑤	07JAC−SH20100	A/C PULLY PULLER	1	22-40
⑥	07JAC−SH20300	SHAFT RING REMOVER	1	22-41, 44
⑦	07965−6340100	BEARING DRIVER	1	22-44
⑧	07947−6340500	DRIVER ATTACHMENT	1	22-45

①

②

⑤



④

⑤

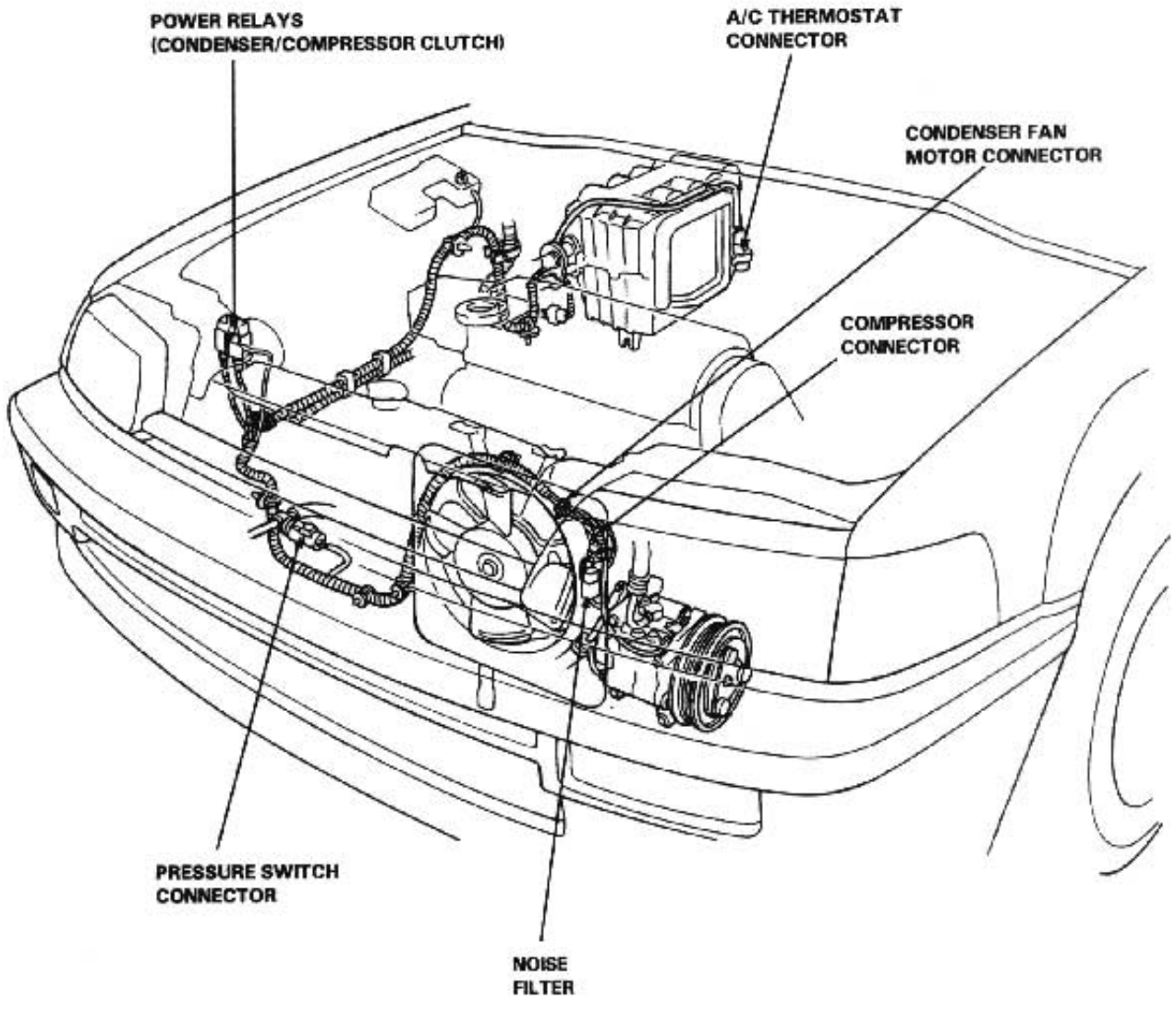
⑥

⑦

⑧

A/C HIGH SIDE ADAPTER
The A/C high side charging fitting's O.D. size is reduced from 7/16" to 3/8" to prevent you from accidentally connecting the low side hose to the high side fitting. Consequently, you'll need an adapter for the existing hose on your charging station.

Wire Harness Routing

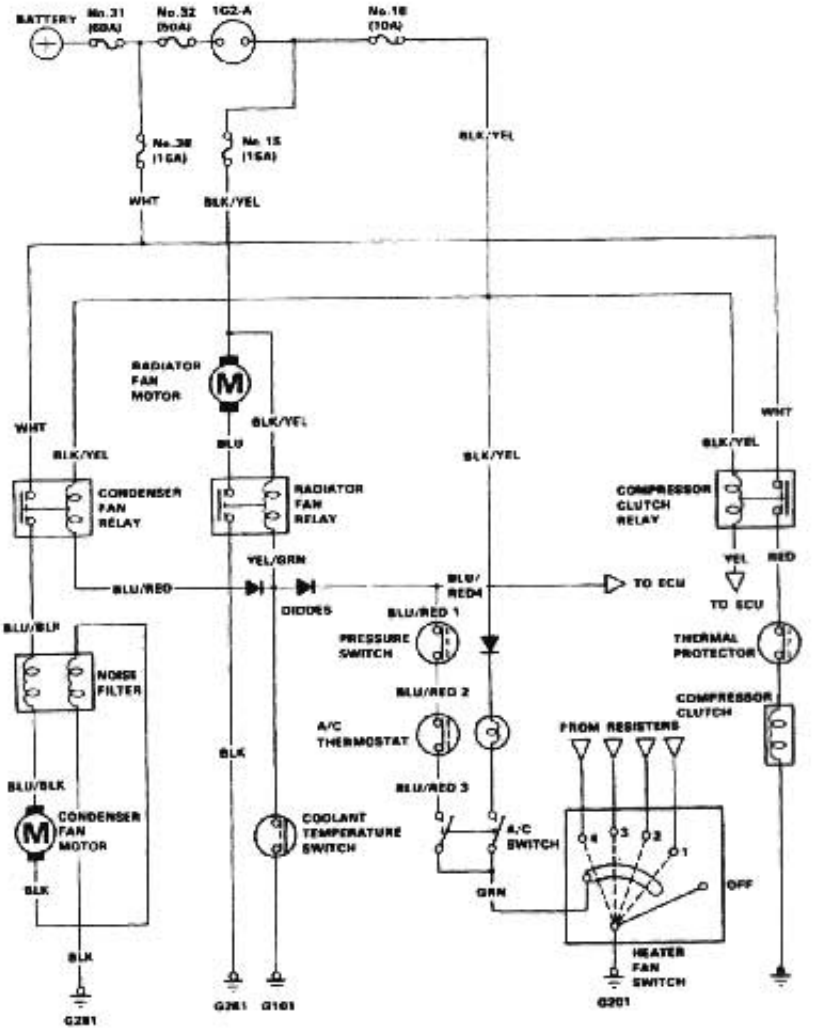


- Any abnormality must be corrected before continuting the test.
- Because of the precise measurements needed, use a voltmeter and ammeter when testing.

Before performing any troubleshooting procedures check:
- Fuses No. 15, 18, 38, 32, 31
- Grounds No. 101, 201, 281
- All electrical connections are clean and tight.

SYMPTOM	REMEDY
Compressor does not come on.	Perform the procedures in the flow chart. (page 22-6)
Only radiator fan (or condensor fan) does not run.	Perform the procedures in the flow chart. (page 22-9)
Compressor and radiator fan (or condensor fan) do not run.	Perform the procedures in the flow chart. (page 22-13)
	Discharge (high) pressure abnormally high or low.
Idle boost does not work.	See the fuel and emissions section.

Circuit Diagram



Flow Chart: Compressor

Compressor does not come on.

Inspect No. 18 and No. 38 fuses.

Are the fuses OK? — NO → **Replace the fuses.**

YES

Disconnect the 4-P connector from the compressor clutch relay.

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

Turn the ignition switch on.

Is there battery voltage? — NO → **Repair open in WHT wire between the fuse box and compressor clutch relay.**

YES

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

Is there battery voltage? — NO → **Repair open in BLK/YEL wire between the fuse box and compressor clutch relay.**

YES

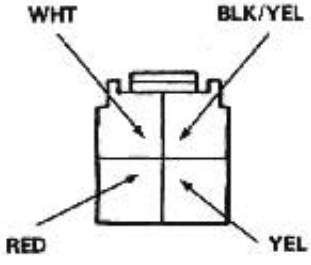
Connect the jumper wire between the WHT terminal and RED terminal.

Does the compressor clutch engage? — NO → Turn the ignition OFF and reconnect the 4-P connector to the compressor clutch relay.

YES

(To page 22-8)

(To page 22-7)



CLUTCH RELAY SOCKET
View from wire side

(From page 22-6)

Turn the ignition switch OFF and reconnect the 4-P connector to the compressor clutch relay.

Turn the ignition swith on and connect the jumper wire between the YEL terminal and body ground.

Does the compressor clutch engage?

NO → **Replace the compressor clutch relay.**

YES

Turn the ignition OFF and disconnect the PGM-FI-ECU connector and connect the PGM-FI-ECU test harness.

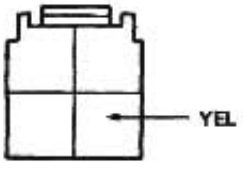
Turn the ignition switch ON and connect the jumper wire between B-3 terminal and body ground.

Does the compressor clutch engage?

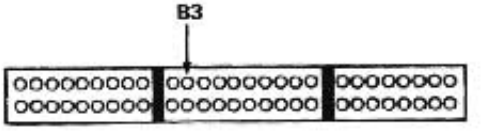
NO → **Repair open in YEL wire between the compressor clutch relay.**

YES

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



CLUTCH RELAY SOCKET
View from wire side



PGM-FI-ECU test harness

(cont'd)

Flow Chart: Compressor (cont'd)

(From page 22-6)

Disconnect the RED terminal and turn the ignition switch on.

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

Is there battery voltage?

NO → **Repair open in RED wire between the compressor clutch relay and compressor clutch connector.**

YES

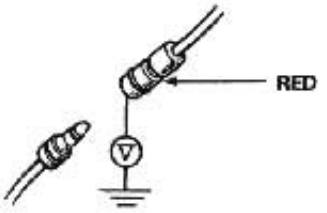
Turn the ignition switch OFF and check the thermal protector (page 22-31, 36)

Is the thermal protector OK?

NO → **Replace the thermal protector.**

YES

Replace the compressor clutch.



Flow Chart: Either Fan

Radiator fan (or condenser fan) does not run.

Turn the ignition, heater fan, A/C switches on.

Inspect the radiator (or condenser) fan motor.

Does the fan motor run?

NO — (Both not running) — (To page 10)

YES

Turn the ignition switch OFF. Inspect No. 32 or 15 fuses.

Are the fuses OK?

NO — **Replace the fuses.**

YES

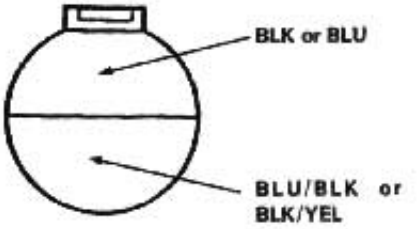
Inspect the relay of the fan motor that does not run. (See page 22-46)

Is the relay OK?

NO — **Replace the relay.**

YES

Disconnect the 2-P connector of the motor.



Turn the ignition switch ON and measure voltage between the BLU/BLK or BLK/YEL terminal (+) and BLK or BLU terminal (−).

Is there battery voltage?

NO — Check for continuity between BLK or BLU terminal and body ground.

YES

Replace the fan motor.

Is there continuity ?

NO — **Repair open in BLK or BLU wire or poor ground.**

YES

Repair open in BLK/YEL or BLU/BLK wire.

(cont'd)

Flow Chart: Either Fan (cont'd)

(From page 22-9)

Inspect fuse No. 15 (15A).

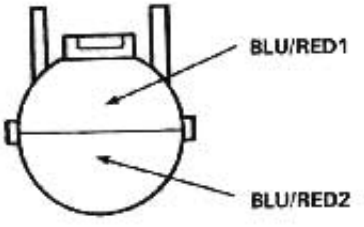
Is the fuse OK? — NO → Replace fuse.

YES

Turn the ignition switch OFF.

Disconnect the dual pressure switch.

Connect the BLU/RED1 terminal to body ground.



View from terminal side

Do both fans run? — NO → Repair open in BLU/RED wire between diode and pressure switch or faulty diode.

YES

Connect a jumper wire between the BLU/RED1 and BLU/RED2 terminals.

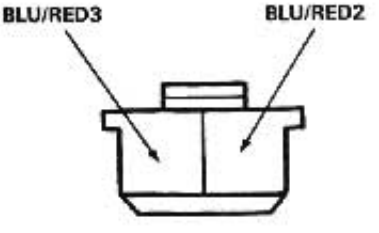
NOTE: Check A/C pressure first; may be low on refrigerant.

Do both fan motors run? — YES → Replace the dual pressure switch.

NO

Remove the jumper wire and reconnect the 2P connector to the pressure switch.

Disconnect the 2P connector from the thermostat switch.



View from wire side

Connect a jumper wire between the BLU/RED2 terminal and body ground.

(To page 22-11)

(From page 22-10)

Turn the ignition switch ON.

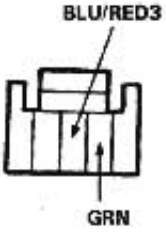
Do both fan motors run?
- NO → **Repair open in BLU/RED2 wire between the pressure switch and thermostat switch.**
- YES →

Connect a jumper wire between the BLU/RED2 and BLU/RED3 terminals of the thermostat switch connector.

Do both fan motors run?
- YES → **Replace the thermostat switch.**
- NO →

Reconnect the 2P connector to the thermostat switch. Disconnect the 5P connector from the A/C switch.

Connect the BLU/RED3 terminal to the body ground.



View from wire side

Do both fan motors run?
- NO → **Repair open in BLU/RED3 wire between the thermostat switch and A/C switch.**
- YES →

Connect the BLU/RED3 and GRN terminals with a jumper wire.

Do both fan motors run?
- YES → **Replace the A/C switch.**
- NO →

Check the heater fan switch (page 21-17).

Is the heater fan switch OK?
- NO → **Replace the heater fan switch.**
- YES →

(To page 22-12)

(cont'd)

Flow Chart: Either Fan (cont'd)

(From page 22-11)

Reconnect the 5P connector to the A/C switch and disconnect the 6P connector from the heater fan switch.

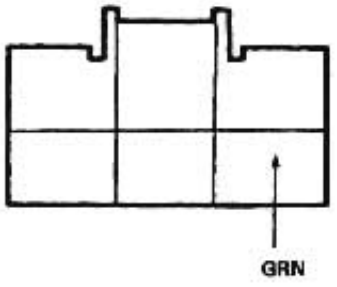
Connect a jumper wire between the GRN terminal and body ground.

Do both fans run?

NO → **Repair open in GRN wire between the heater fan switch and A/C switch.**

YES

Repair open in BLK wire between the heater fan switch and ground or poor ground (G201).



View from wire side

Flow Chart: Compressor And Either Fan

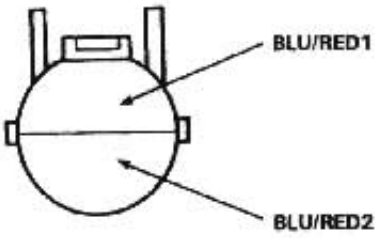
Compressor and radiator fan (or Condenser fan) do not run.

Inspect No. 38 (15A), 15 (15A) and No. 18 (10A) fuses.

Are the fuses OK? — NO → **Replace the fuse(s).**

YES

Disconnect the 2P connector from the pressure switch.



Turn the heater fan, A/C switch ON and start the engine.

Connect a jumper wire between the BLU/RED1 terminal and body ground.

Do the compressor and both fans run? — NO → **Repair open in BLU/RED1 wire between pressure switch and diodes.**

YES

Connect a jumper wire between the BLU/RED1 and 2 terminals.

NOTE: Check A/C pressure first, may be low on refrigerant.

Do the compressor and both fans run? — YES → **Replace the pressure switch.**

NO

(To page 22-14)

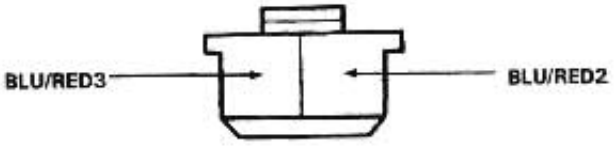
(cont'd)

Flow Chart: Compressor And Either Fan (cont'd)

(From page 22-13)

Reconnect the 2P connector to the pressure switch.

Disconnect the 2P connector from the thermostat switch.



Connect a jumper wire between the BLU/RED2 terminal and body ground.

Do the compressor and both fans run?

NO → **Repair open in BLU/RED2 wire between pressure and thermostat switches.**

YES

Connect a jumper wire between the BLU/RED2 and 3 terminals.

Do the compressor and both fans run?

YES → **Replace the thermostat switch.**

NO

Turn the ignition switch OFF.

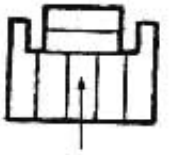
Reconnect the 2P connector to the thermostat switch.

Disconnect the 5P connector from the A/C switch.

(To page 22-15)

(From page 22-14)

Connect a jumper wire between the BLU/RED3 terminal and body ground.



BLU/RED3

Start the engine.

Do the compressor and both fans run?

NO → **Repair open in BLU/RED3 wire between the thermostat and A/C switches.**

YES

Connect a jumper wire between the BLU/RED and GRN terminals.

Do the compressor and both fans run?

YES → Inspect the A/C switch. page 22-47.

NO

Is the A/C switch OK?

NO → **Replace the A/C switch.**

YES

Reconnect the 5P connector to the A/C switch and turn A/C switch ON.

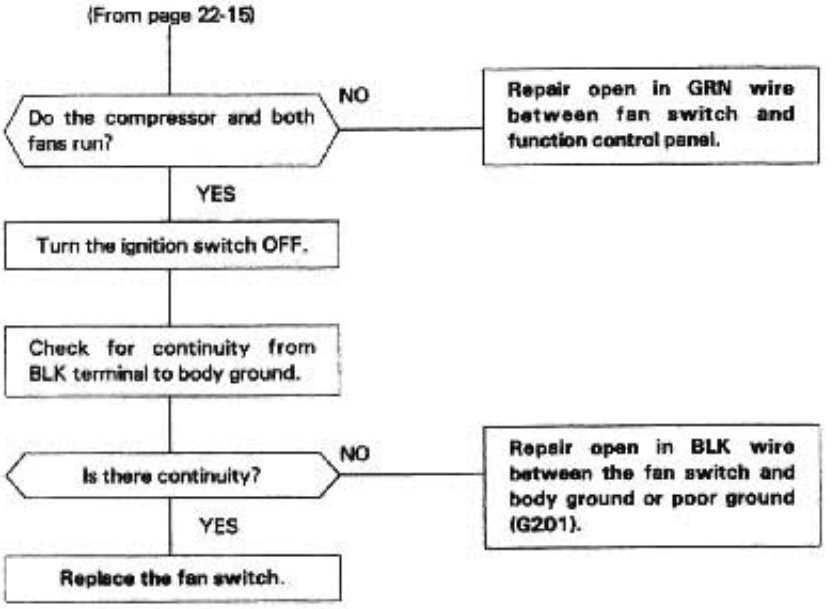
Disconnect the 6P connector from the fan switch.

Connect a jumper wire between the GRN terminal and body ground.

(To page 22-16)

(cont'd)

Flow Chart: Compressor And Either Fan (cont'd)



Air Conditioner

Service Tips

CAUTION:

1. Always disconnect the negative cable from the battery whenever replacing air conditioner parts.
2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before the lines are reconnected.
3. Before connecting any hose or line, apply a few drops of refrigerant oil to the seat of the O-ring or flare nut.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, don't let refrigerant escape too fast; it will draw the compressor oil out of the system.
6. Add refrigerant oil after replacing the following parts:

Condenser	10 cc (1/3 fl oz)
Evaporator	30 cc (1 fl oz)
Line or hose	10 cc (1/3 fl oz)
Receiver	10 cc (1/3 fl oz)
Compressor	On compressor replacement, subtract the volume of oil drained from the removed compressor from 150 cc (5 fl oz) or 120 cc (4 fl oz), and drain the calculated volume of oil

Discharge Procedure

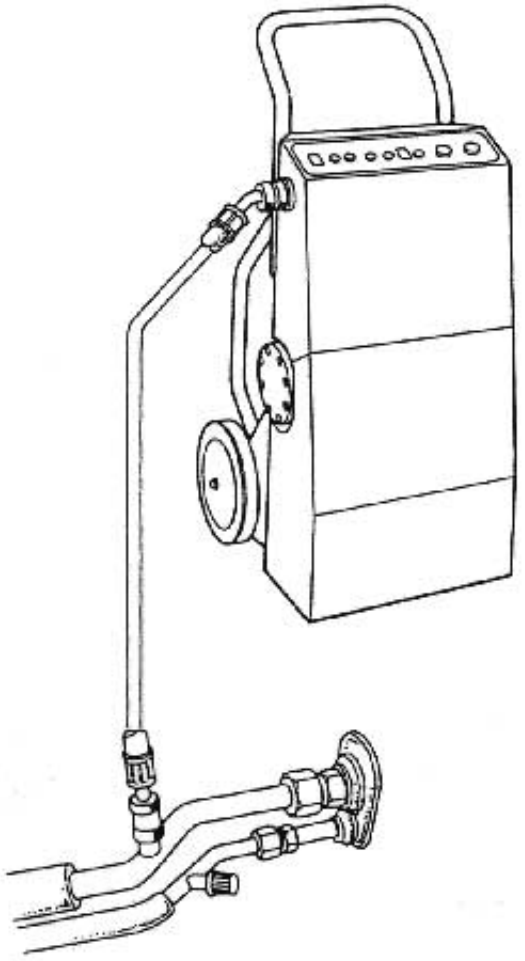
⚠WARNING

- **Keep away from open flames. The refrigerant, although onflammable, 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 Refrigerant Recovery System to the vehiecle's A/C system.
2. Operate the Refrigerant Recovery System according to the manufacturer's instructions.

NOTE: Do not vent refrigerant to the atmosohere. The chlorofluorocarbons (CFCs) used in conventional refrigerant (freon) may damage the garth's ozone layer. Always use UL listed, refrigerant recovery/recycling equipment to extract the refrigerant before you open an A/C system to make repairs. Follow the equipment manufacturer's instructions.

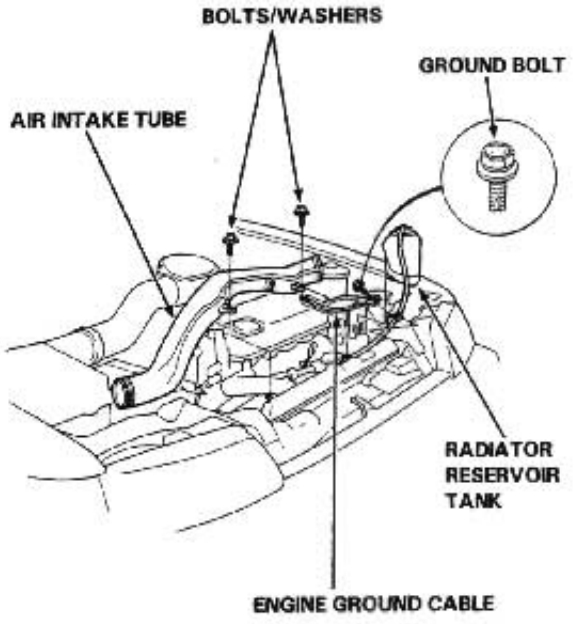
Refrigerant Recovery/Recycle System.



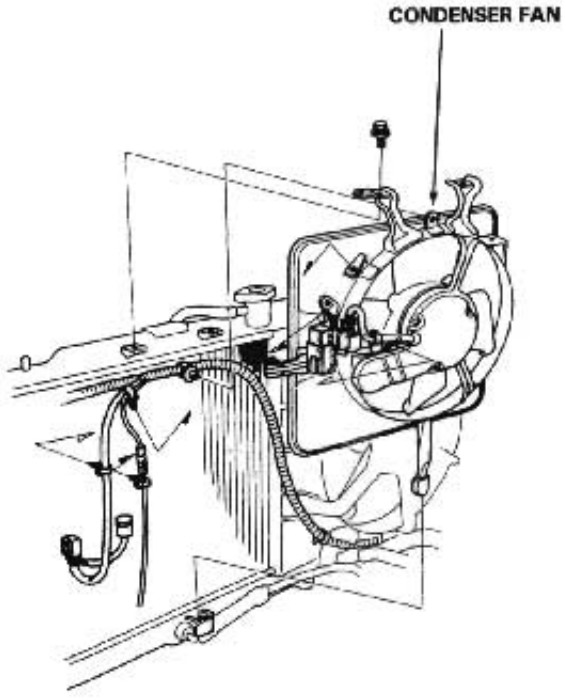
Condenser

Replacement

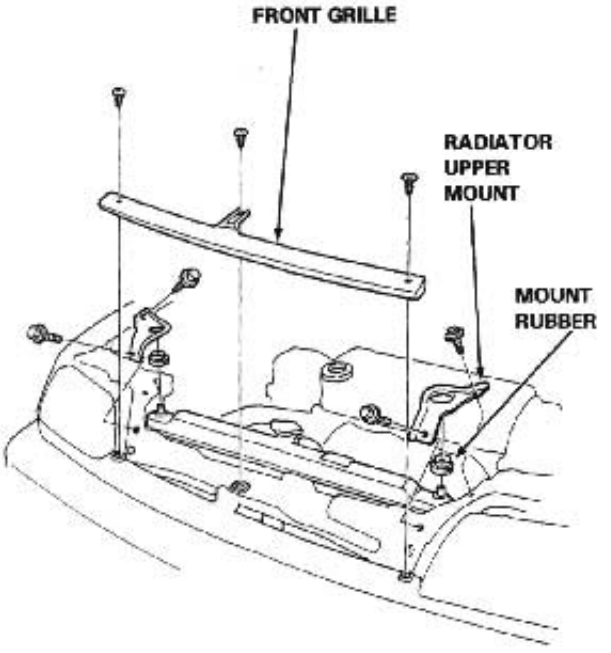
1. Discharge the refrigerant.
2. Disconnect the engine ground cable.
3. Remove the radiator reservoir tank and the air intake tube.



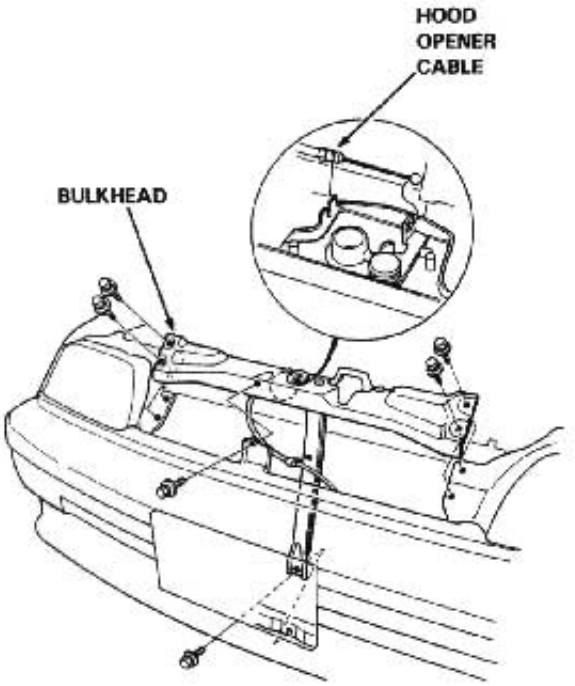
4. Remove the condenser fan with the two bolts.



5. Remove the front grille with three screws and radiator upper mounts with two bolts each.

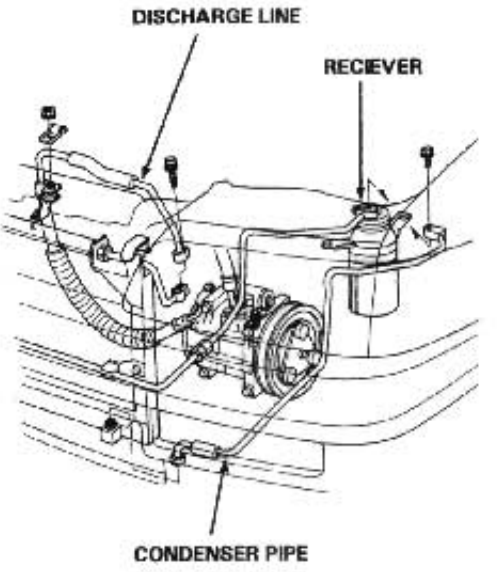


6. Remove the front bulkhead with six bolts, then remove the hood opener cable.

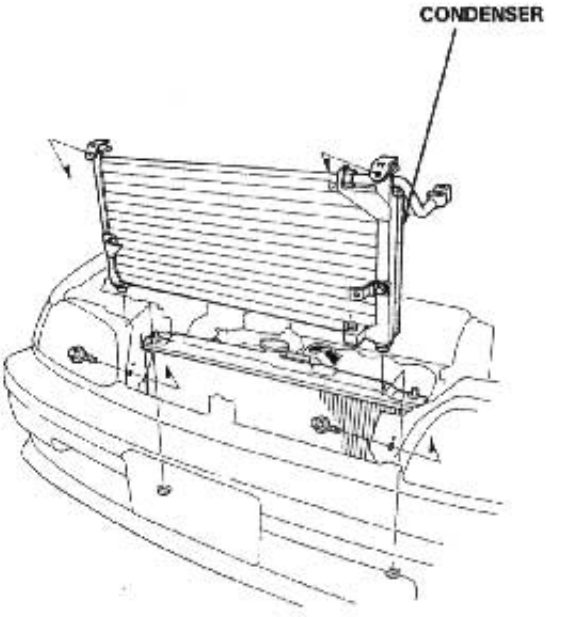


7. Disconnect the condenser pipe and discharge pipe from the condenser.

CAUTION:
Cap the open fittings immediately to keep moisture and dirt out of the system.



8. Remove the mounting bolts(2) and condenser.



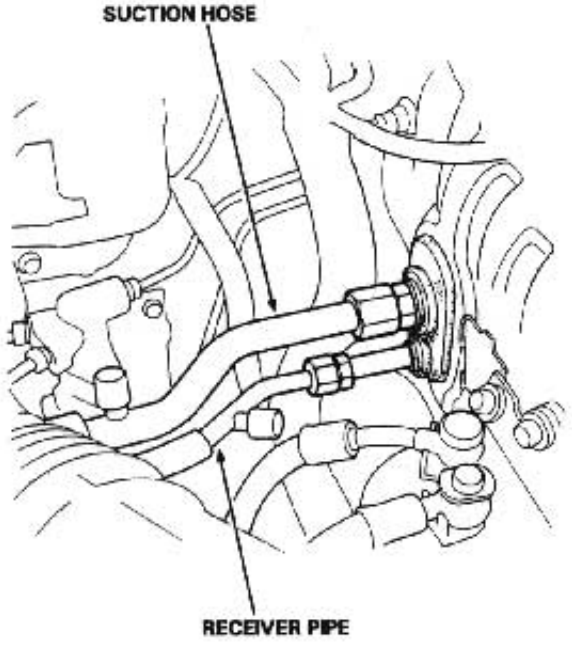
9. Install in the reverse order of removal, charge the system (page 22-49) and test performance (page 22-50).

Evaporator

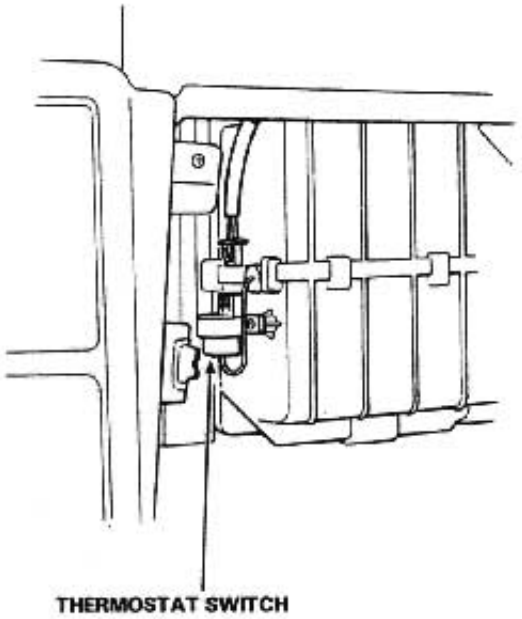
Replacement

1. Disconnect the battery negative terminal.
2. Discharge the refrigerant (page 22-18).
3. Disconnect the receiver line and suction hose from the evaporator.

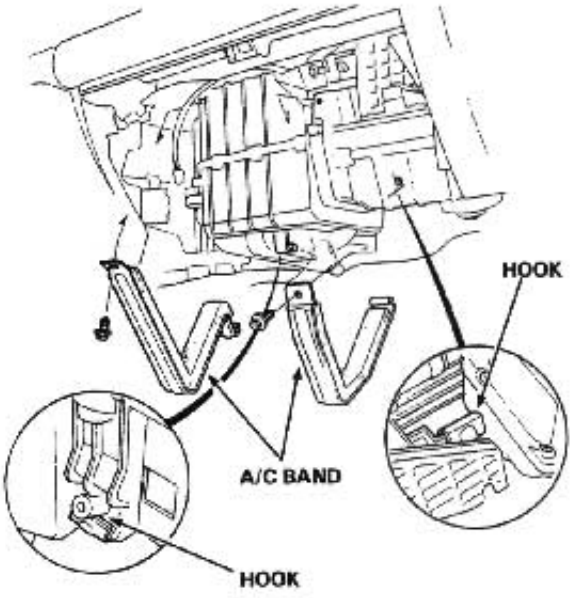
CAUTION:
Cap the open fittings immediately to keep moisture and dirt out of the system.



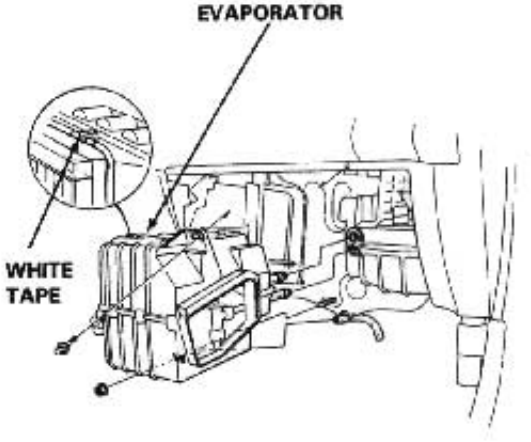
4. Remove the glove box (section 20).
5. Disconnect the connector from the thermostat switch and pull off the wire harness from the clamps.



6. Remove the tapping screws (2) and A/C bands.



7. Remove the mounting bolts (2) and evaporator.



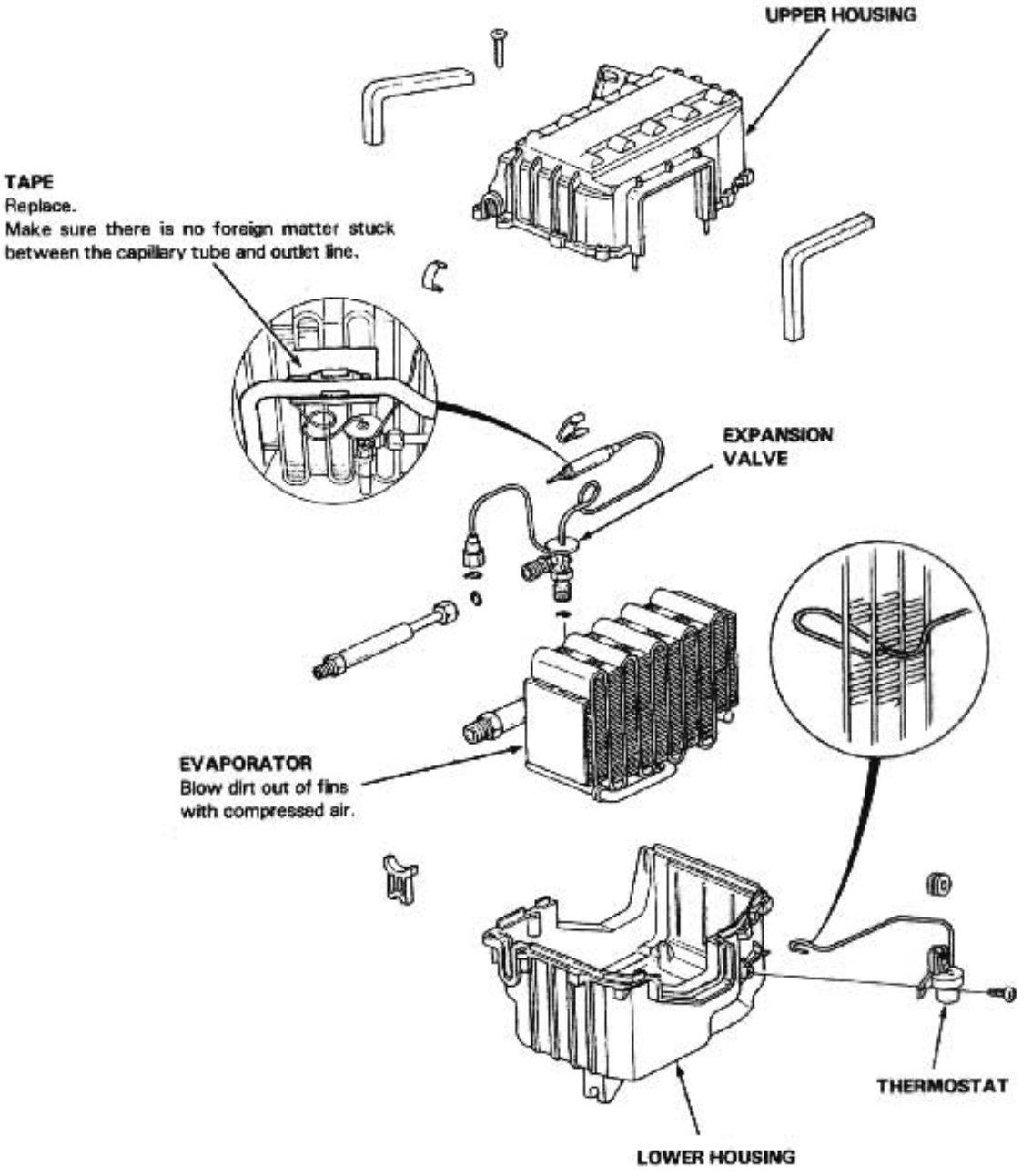
8. Install in the reverse order of removal, and:
   - Apply a sealant to the grommets.
   - Make sure that there is no air leakage.
   - Charge the system (page 22-49) and test performance (page 22-50).

Overhaul

1. Pull out the evaporator sensor from the evaporator fins.
2. Remove the tapping screws and clips from the housing.
3. Carefully separate the hosings and remove the evaporator covers.
4. Remove the expansion valve if necessary.

Assemble the evaporator in the reverse order of disassembly, and:

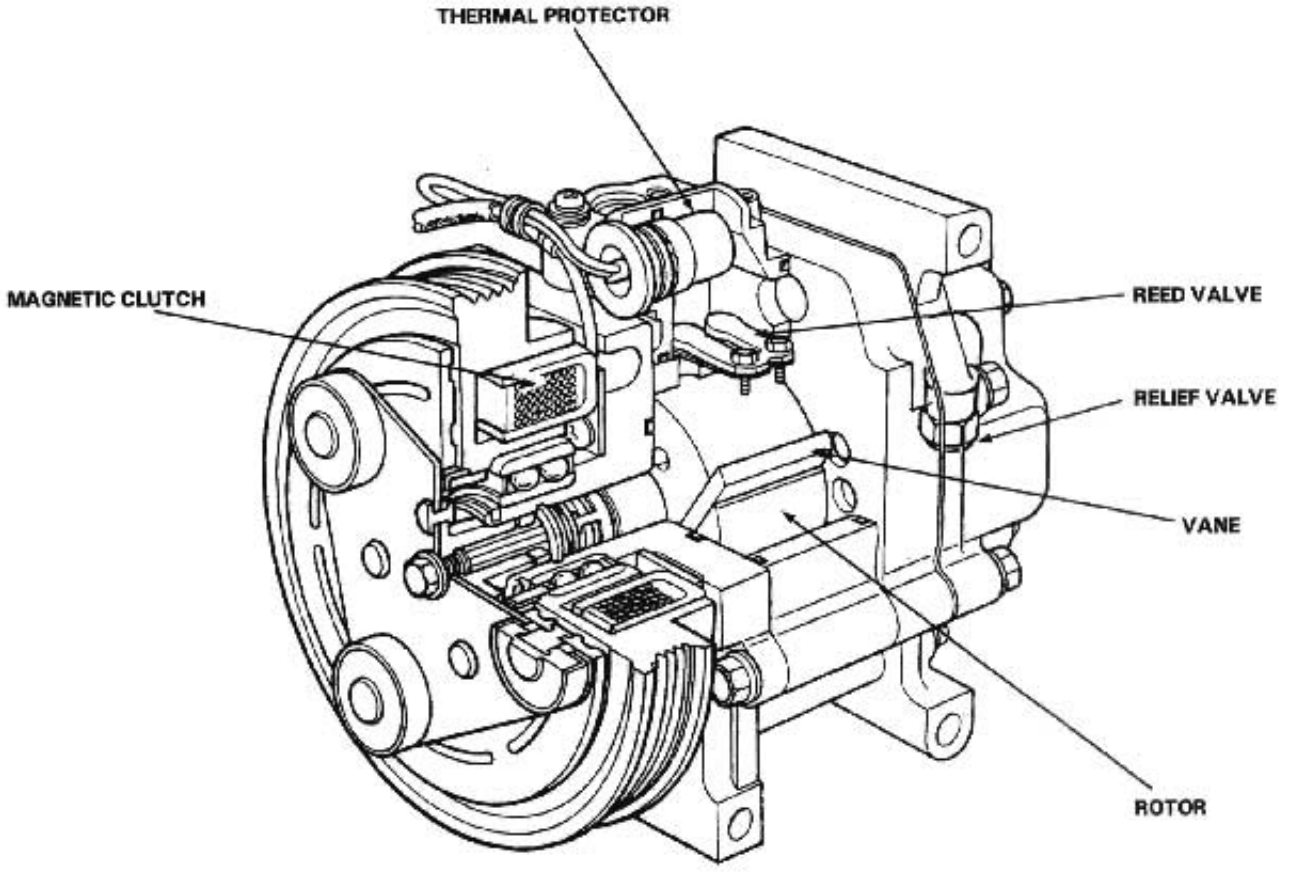
- Install the expansion valve capillary tube against the suction line, and wrap it with tape.
- Reinstall the evaporator sensor in its original location.



Compressor

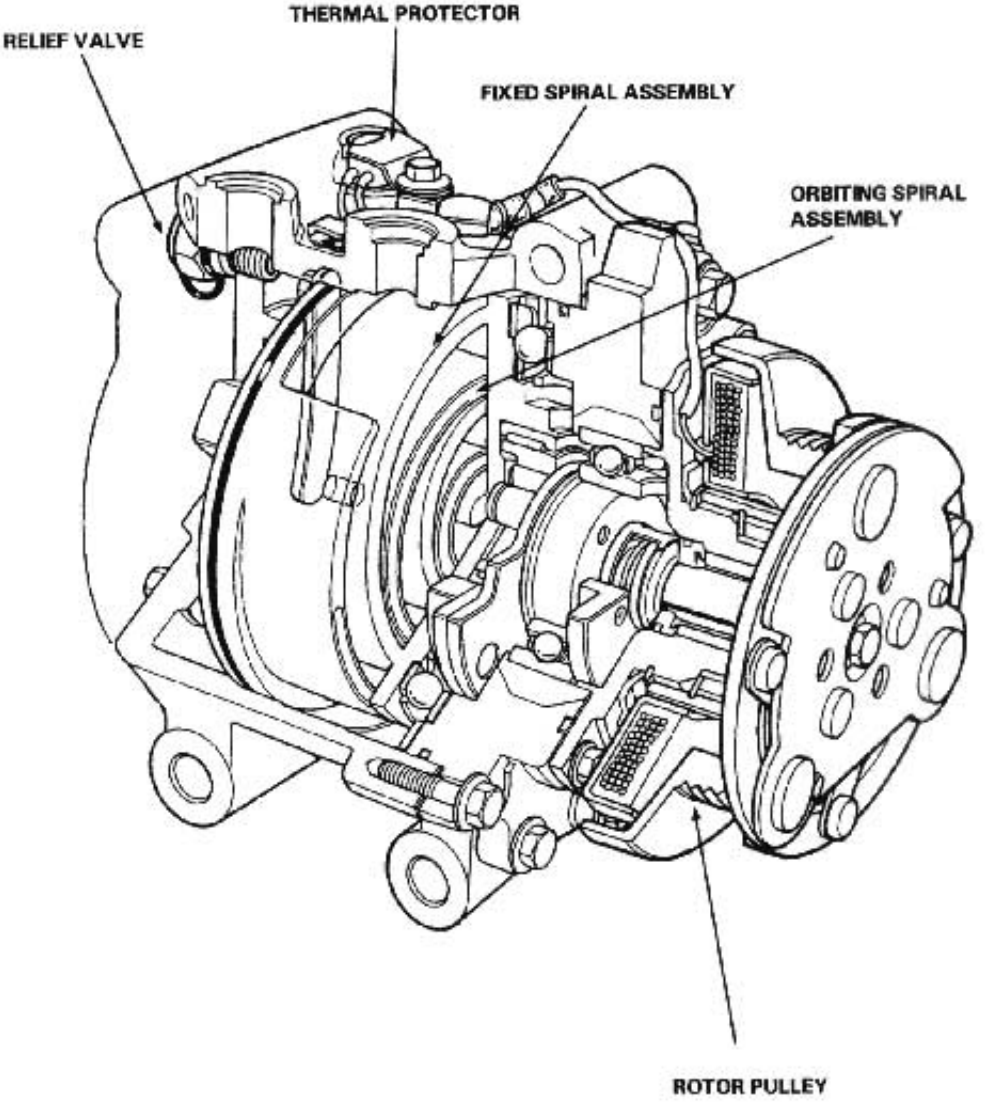
Description (Matsushita)

This compressor is a three-vane, rotary type and consists of three vanes that come out of the rotor to the cylinder wall, reed valve that prevents backflow, and magnetic clutch.
A thermal protector is installed on this compressor.



Description (Sanden)

This compressor is the spiral type. Refrigerant is compressed between a fixed spiral assembly and an orbiting spiral assembly. A thermal protector is installed on this compressor.



Compressor

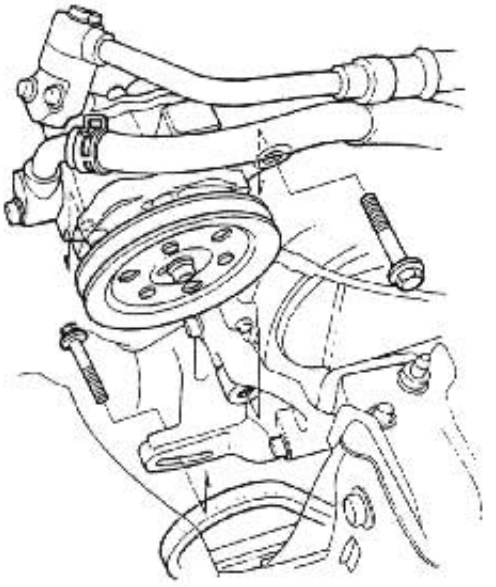
Troubleshooting

NOTE:Performance Test on page 22-50.

TEST RESULTS	RELATED SYMPTOMS	PROBABLE CAUSE	REMEDY
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 196 kPa (28 psi) quickly, and then falls gradually	Air in system	Evacuate system; then recharge Evacuation: page 22-47 Recharging: 22-49
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as required
	Reduced or no air flow through condenser.	· Clogged condenser or radiator fins · Condenser or radiator fan not working properly	· Clean · Check voltage and fan rpm
	Line to condenser is excessively hot	Restricted flow of refrigerant in system	Expansion valve
Discharge pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot	Insufficient refrigerant in system	· Charge system · Check for leak
	High and low pressures are balanced soon after stopping compressor	· Faulty compressor discharge or inlet valve · Faulty compressor seal	Replace compressor Repair
	Outlet of expansion valve is not frosted, low pressure gauge indicates vacuum	· Faulty expansion valve	Repair or Replace
Suction (low) pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot Expansion valve is not frosted and low pressure line is not cold. Low pressure gauge indicates vacuum.	Insufficient refrigerant · Frozen expansion valve · Faulty expansion valve	Check for leaks. Charge as required. Replace expansion valve
	Discharge temperature is low and the air flow from vents is restricted	Frozen evaporator	Run the fan with compressor off then check the thermostat and capillary tube.
	Expansion valve frosted	Clogged expansion valve	Clean or Replace
	Receiver dryer is cool (should be warm during operation)	Clogged receiver dryer	Replace
Suction pressure abnormally high	Low pressure hose and check joint are cooler than around evaporator	· Expansion valve open too long · Loose expansion valve	Repair or Replace
	Suction pressure is lowered when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary
	High and low pressure are equalized as soon as the compressor is stopped	· Faulty gasket · Faulty high pressure valve · Foreign particle stuck in high pressure valve	Replace compressor
Suction and discharge pressures abnormally high	Reduced air flow through condenser	· Clogged condenser or radiator fins · Condenser or radiator fan not working properly	· Clean condenser and radiator · Check volatage and fan rpm
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary.
Suction and discharge pressure abnormally low	Low pressure hose and metal end areas are cooler than evaporator	Clogged or kinked low pressure hose parts	Repair or Replace
	Temperature around expansion valve is too low compared with that around receiver–dryer.	Clogged high pressure line	Repair or Replace
Refrigerant leaks	Compressor clutch is dirty	Compressor shaft seal leaking	Replace compressor shaft seal
	Compressor bolt(s) are dirty	Leaking around bolt(s)	Replace compressor
	Compressor gasket is wet with oil	Gasket leaking	Replace compressor

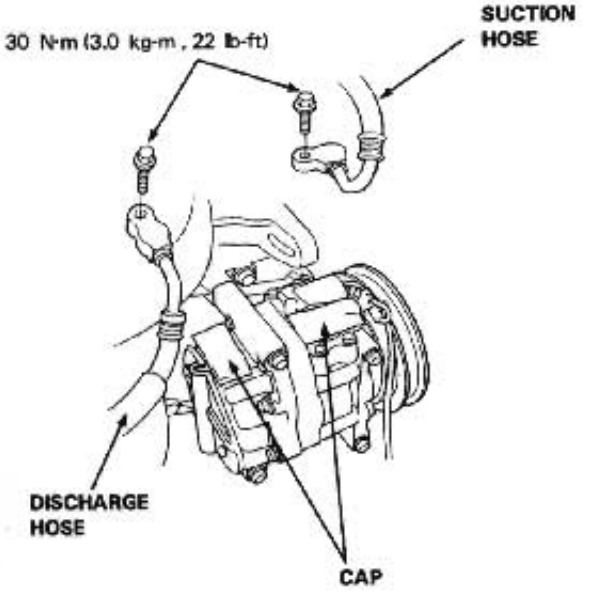
Replacement (Matsushita)

1. If the compressor is marginally operable, run the engine at idle speed and turn on the air conditioner fan a few minutes, then shut the engine off and disconnect the battery negative terminal.
2. Discharge the refrigerant very slowly from the system (page 22-18).
3. Remove the mounting bolts (2) the power steering pump belt, and the power steering pump.

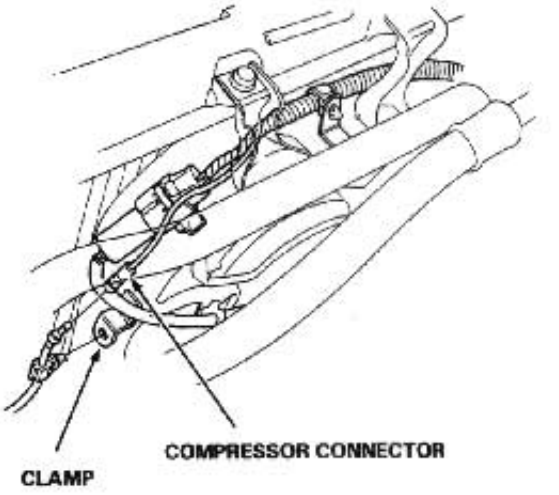


4. Disconnect the suction and discharge hoses from the compressor.

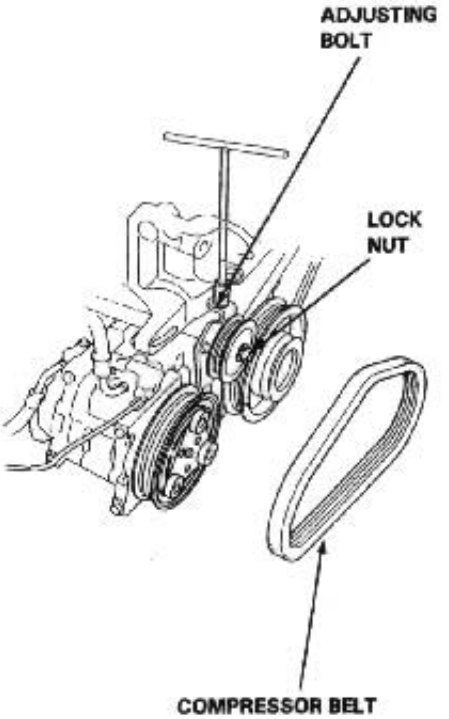
CAUTION:
Cap the open fittings immediately to keep moisture and dirt out of the system.



5. Disconnect the compressor connector and the clamp.



6. Loosen the adjusting bolt and lock nut, then remove the compressor belt.

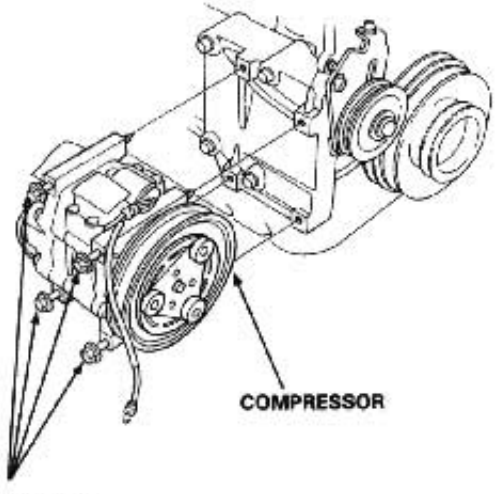


(cont'd)

Compressor (Matsushita)

Replacement (cont'd)

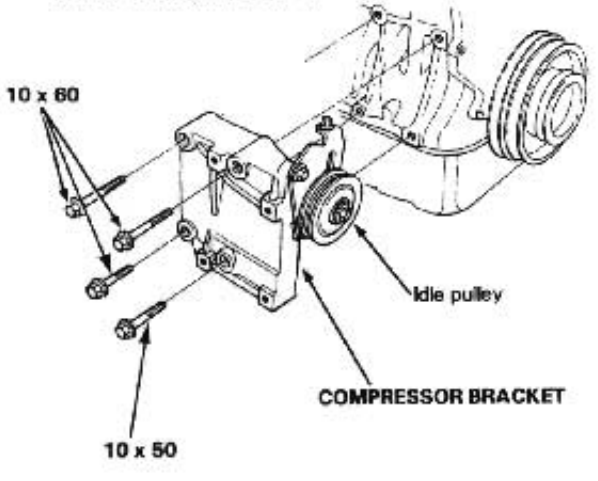
7. Remove the compressor mounting bolts (4) and compressor. Rest the compressor on the front beam.



COMPRESSOR MOUNTING BOLTS
25 N·m (2.5 kg-m, 18 lb-ft)

8. Remove the mounting bolts (4) and compressor bracket with idle pulley.

ALL TORQUE:
48 N·m (4.8 kg-m, 35 lb-ft)



9. Remove the compressor.

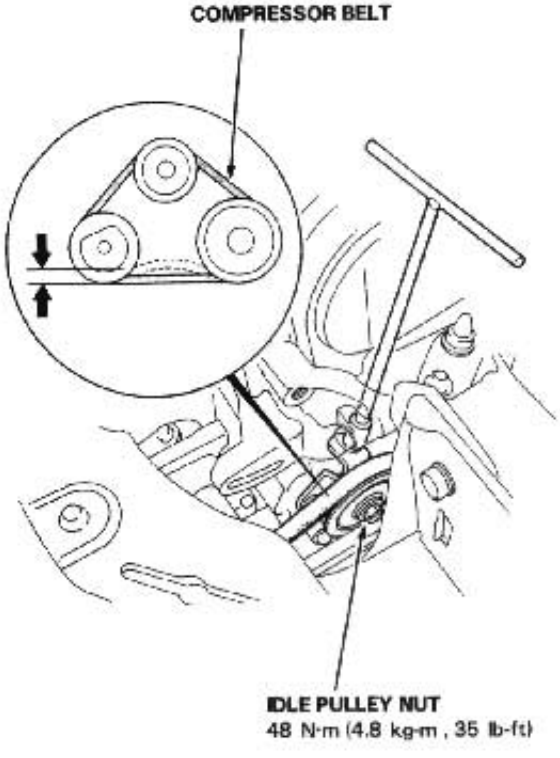
10. Install in the reverse order of removal and:

- If a new compressor is installed, calculate the amount of refrigerant to be drained through the suction fitting on the compressor:
  150 cc (5 fl oz,) minus contents of old compressor, equals amount to drain from new compressor.
- Adjust the compressor belt and the power steering belt.

NOTE:
Measure the deflection when 98 N (10 kg, 22 lb) force is applied between the pulleys.

Compressor belt Adjustment.
9—11 mm (0.4—0.4 in)

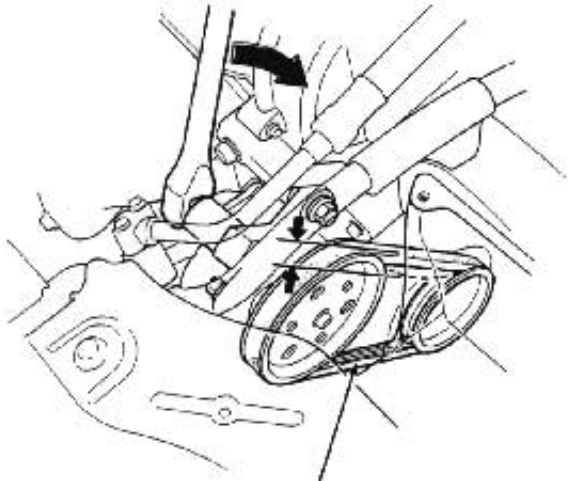
When new belt is installed:
7—9 mm (0.3—0.4 in)



- Charge the system (page 22-47).
- Test the performance (page 22-50).

11. Power steering belt adjustment.
    9—12 mm (0.4—0.5 in)

    When new belt is installed:
    7—10 mm (0.3—0.4 in)



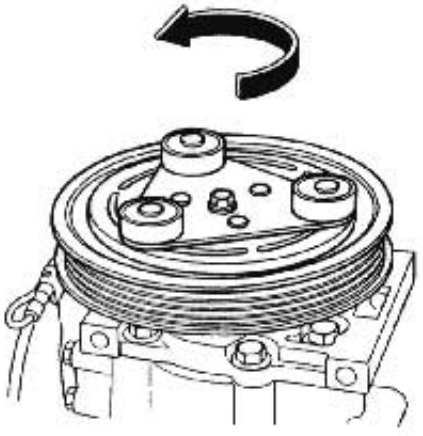
POWER STEERING BELT

Compressor (Matsushita)

Clutch Inspection

- Check pulley bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play/drag.

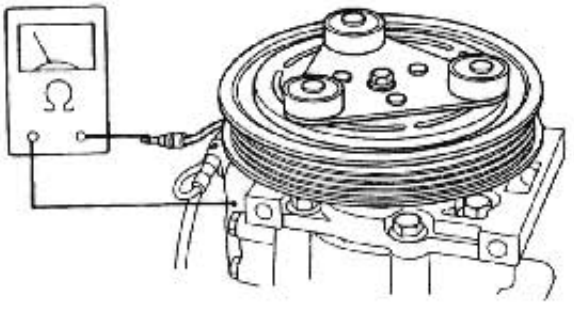
ROTOR PULLEY



- Check resistance of the field coil:

Field Coil Resistance:
3.33 ± 0.17 ohm at 20°C (68°F)

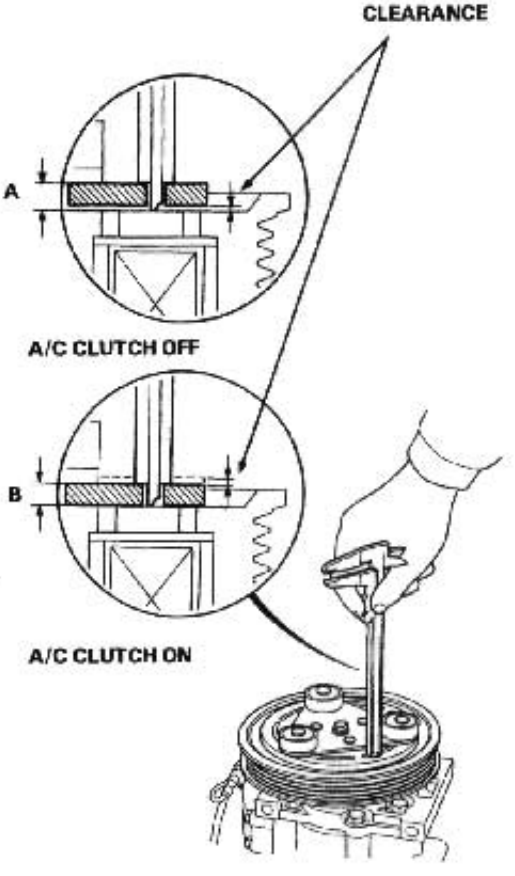
If resistance is not within specifications, replace the coil.



- Measure the clearance between the pulley and pressure plate. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required.

CLEARANCE: 0.4—0.6 mm (0.02—0.02 in)

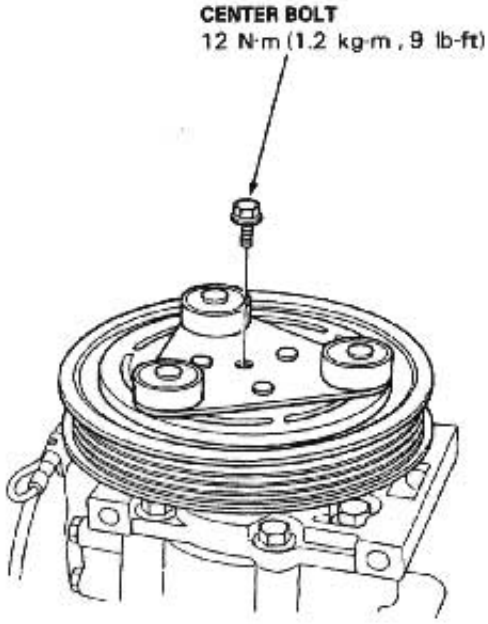
CREARANCE = A (CLUTCH OFF) — B (CLUTCH ON)



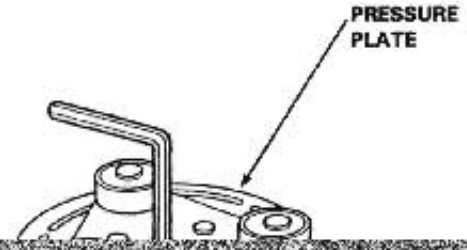
NOTE:
The shims are available in two sizes: 0.2 mm and 0.5 mm of thickness.

Clutch Overhaul

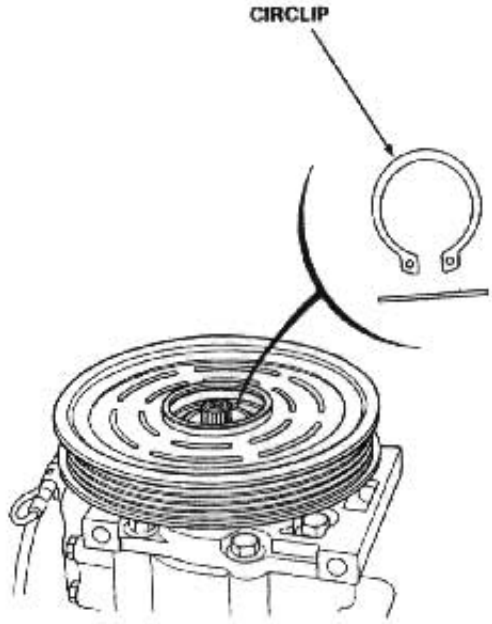
1. Remove the center bolt and washers.



2. Remove the pressure plate and shim(s) taking care not to lose the shims.



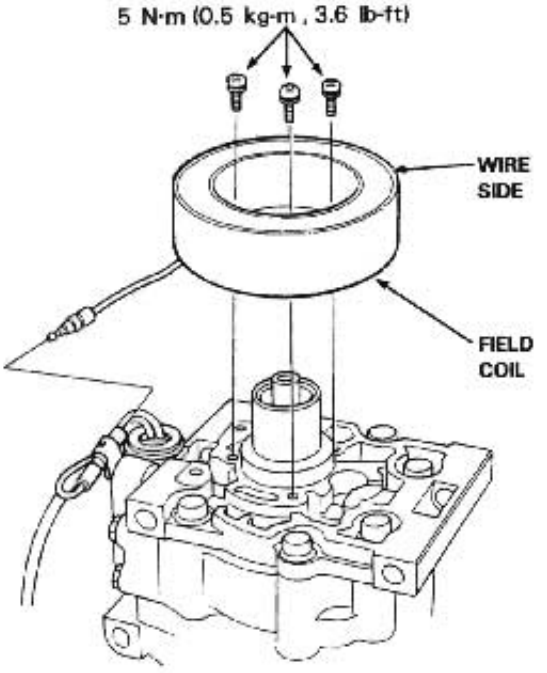
3. Use circlip pliers to remove the circlip.



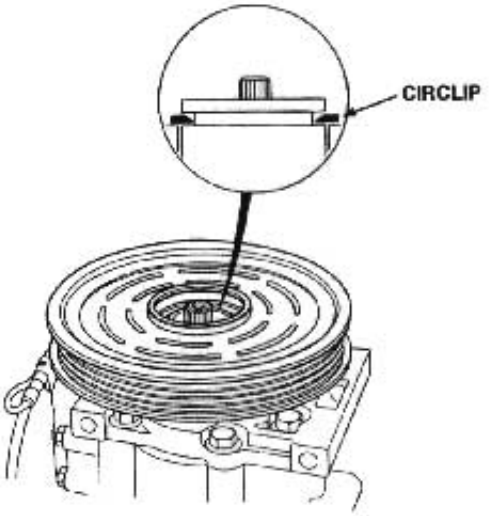
4. Remove the pulley from the shaft using a 2 or 3 jaw puller.
5. Check the pulley, replace the assembly if the pulley is damaged or deformed.

Clutch Overhaul (cont'd)

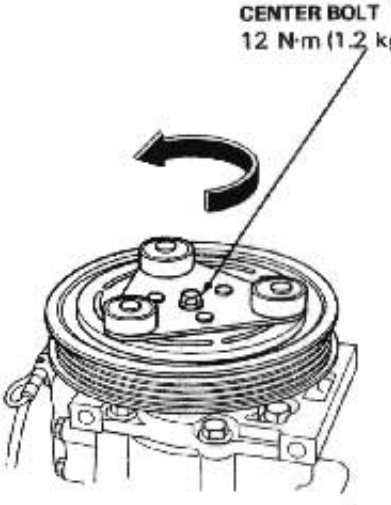
6. Disconnect the field coil connector and remove the screws (3) and field coil.



7. Install in the reverse order of removal and:
   - Install the field coil with the wire side facing up (see above).
   - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
   - Check the pulley bearings for excessive play.
   - Make sure the circlip is fitted to the groove properly.



   - Apply locking agent to the thread of the center bolt and tighten it securely.
   - Make sure that the pulley turns smoothly.

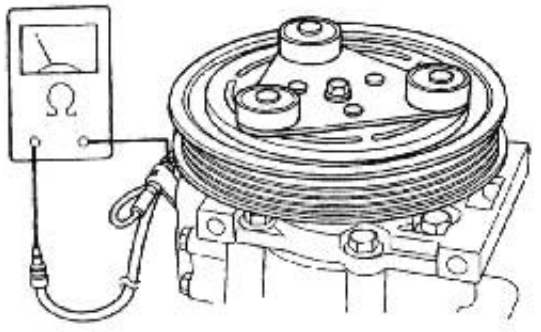


Thermal Protector Inspection

Check for continuity between the 1 and 3 terminals of the compressor connector.

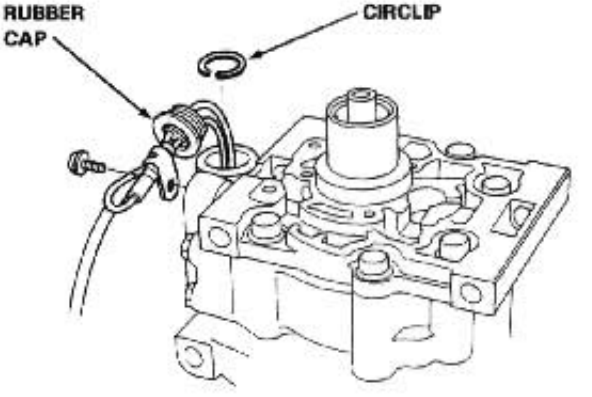
There should be continuity.

- If no continuity, replace the thermal protector.



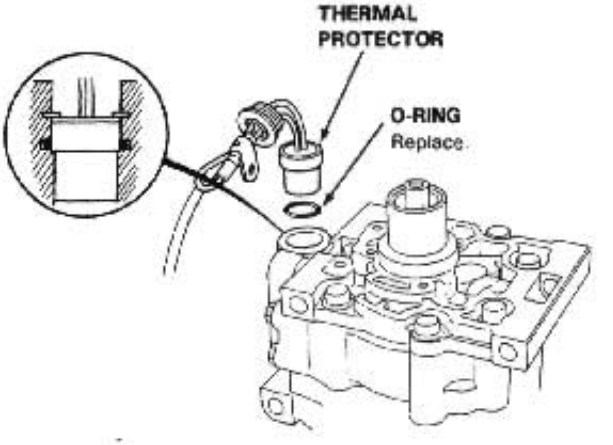
Thermal Protector Replacement

1. Remove the pressure plate and field coil (page 22-29).
2. Pull the rubber cap out from the thermal protector.
3. Remove the screws and wire clips.
4. Remove the circlip and thermal protector.



5. Install in the reverse order of removal.

NOTE:
- Replace the O-rings with new ones.
- Set the new O-rings in place as shown.



Compressor (Matsushita)

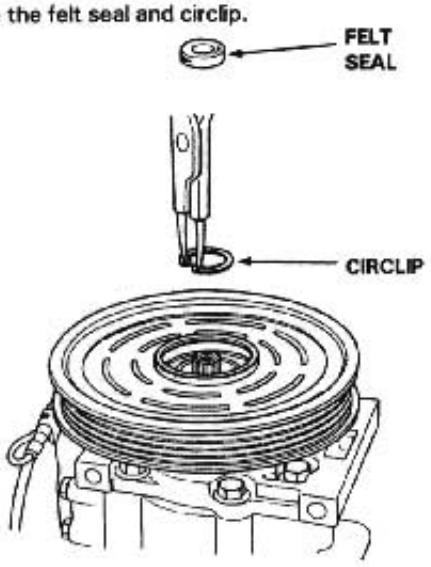
Shaft Seal Replacement

NOTE:
Make sure that the suction and discharge joints are plugged with the caps.

1. Remove the pressure plate (page 22-29).

   NOTE:
   Removal of the clutch pulley and coil is not necessary.

2. Remove the felt seal and circlip.



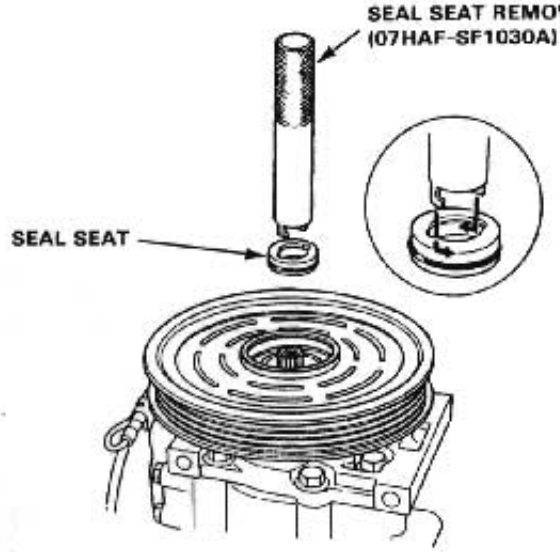
3. Remove the shim(s).

   NOTE:
   After removing, place shim(s) safely in a parts rack.

4. Insert the special tool into the compressor aligning the cutout of the remover with the groove of the seal seat.

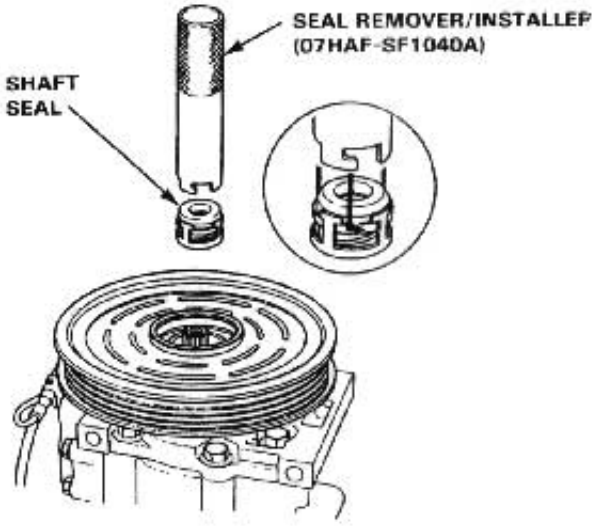
5. Rotate the special tool counterclockwise to make sure that the cutout is engaged with the seal seat.

6. Pull out the seal seat.



7. Insert the special tool into the compressor aligning the cutout of the remover with the metal pawl of the seal case.

8. Rotate the special tool counter clock wise to make sure that the cutout is engaged with the metal pawl.



9. Withdraw the remover.

10. Lay down the compressor and clean the shaft seal contacting face of the compressor with cleaning solvent.

    CAUTION:
    - **Keep the cleaning solvent and dirt out of the compressor.**
    - **Do not use any cloth for cleaning, clean only by rinsing with solvent.**
    - **Do not spill the refrigerant oil from the compressor. Refill the same amount of the oil if the oil is spilled out.**

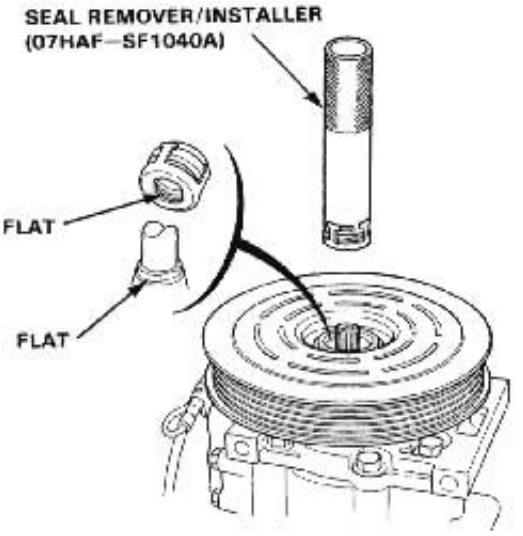
11. Clean the new shaft seal thoroughly with cleaning solvent.

12. Lubricate the shaft seal with refrigerant oil (SUNISO 5GS or equivalent) and install it on the shaft seal remover.

    NOTE:
    - Use only clean refrigerant oil.
    - Do not touch the sealing surfaces of the shaft seal after lubricating.

13. Liberally lubricate the compressor shaft with refrigerant oil.

14. Install the shaft seal onto the compressor shaft aligning the seal case flats with the shaft flats.



15. Clean the seal seat with cleaning solvent, then lubricate the seal seat with refrigerant oil (SUNISO 5GS or equivalent).

NOTE:
- Use only clean refrigerant oil.
- Do not touch the sealing surface of the seal plate after lubricated.

16. First slide the seal seat into the compressor by hand as far as possible.

17. Press the seal seat with the grip side of the remover.

18. Install the circlip with its chamfered edge inside.

19. Press the circlip with the grip side of the remover, then install the felt seal.

20. Install the shim(s).

21. Install the pressure plate. Measure the clearance between the pulley and pressure plate all the way around. If the clearance is not within the specified limits, (0.3—0.45 mm (0.012—0.018 in.)) shims must be added or removed as required.

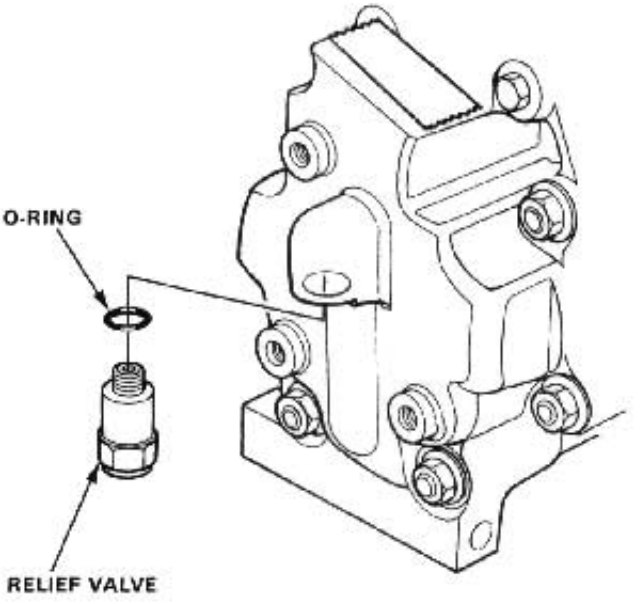
Relief Valve Replacement

REMOVAL

NOTE: Make sure the suction and discharge joints are plugged with caps.

1. Remove the relief valve and O-ring.

CAUTION:
Do not draw compressor oil. Make sure there is no foreign matter in system.



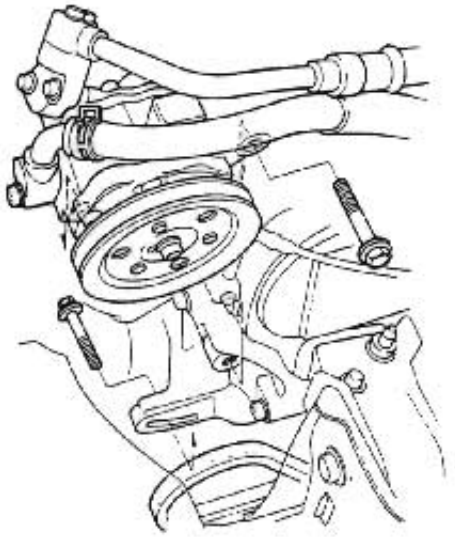
INSTALLATION

1. Clean off the mating surface.
2. Apply compressor oil to the O-ring.
3. Tighten the relief valve. Torque: 13 N·m (1.3 kg-m)
4. Check for leaks.

Compressor (Sanden)

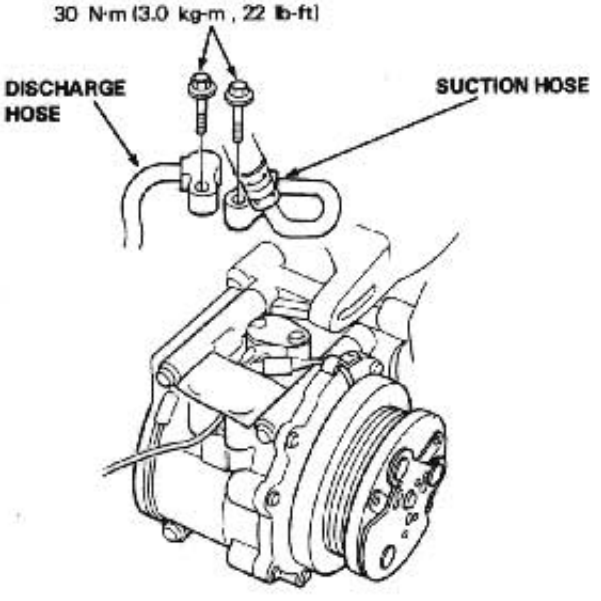
Replacement

1. If the compressor is marginally operable, run the engine at idle speed and turn on the air conditioner fan a few minutes, then shut the engine off and disconnect the battery negative terminal.
2. Discharge the refrigerant very slowly from the system (page 22-18).
3. Remove the two mounting bolts, the power steering pump belt, and the power steering pump.

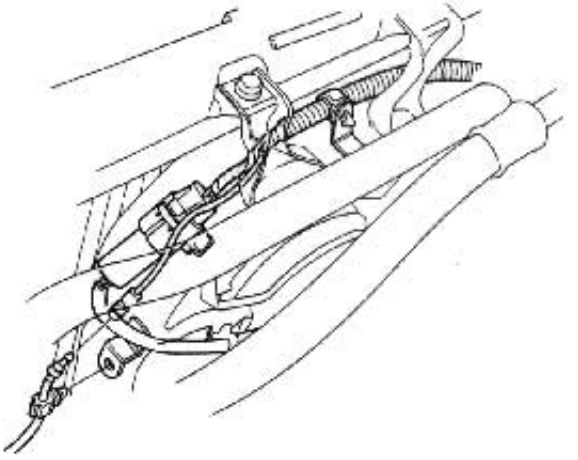


4. Disconnect the suction and discharge hoses from the compressor.

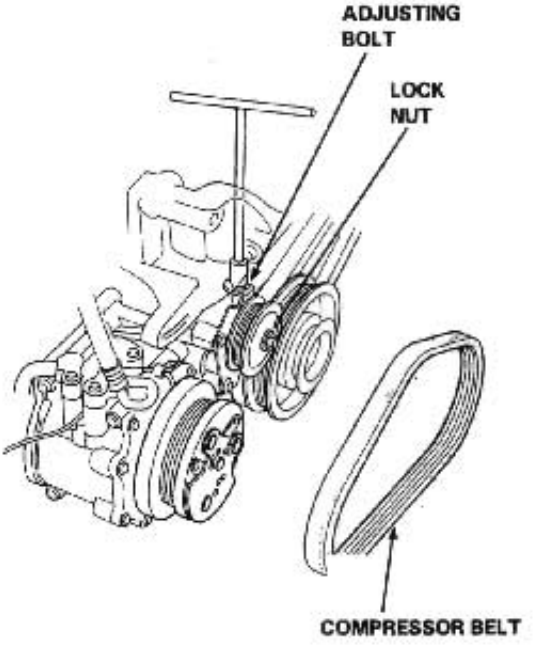
CAUTION:
Cap the open fittings immediately to keep moisture and dirt out of the system.



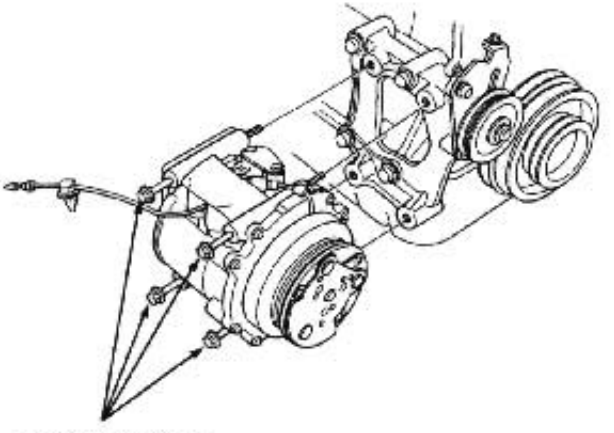
5. Disconnect the compressor connector and the clamp.



6. Loosen the lock nut and adjusting bolt, then remove the compressor belt.

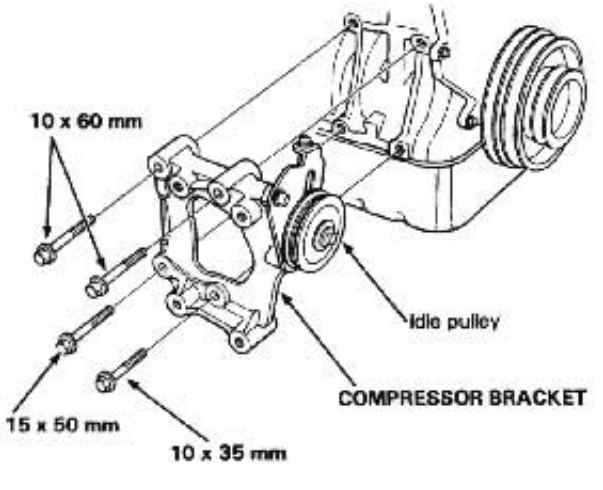


7. Remove the four compressor mounting bolts and compressor. Rest the compressor on the front beam.



MOUNTING BOLTS
25 N·m (2.5 kg-m , 18 lb-ft)

8. Remove the four mounting bolts and compressor bracket with idle pulley.



48 N·m (4.8 kg-m , 35 lb-ft)

9. Remove the compressor.

10. Install in the reverse order of removal and:

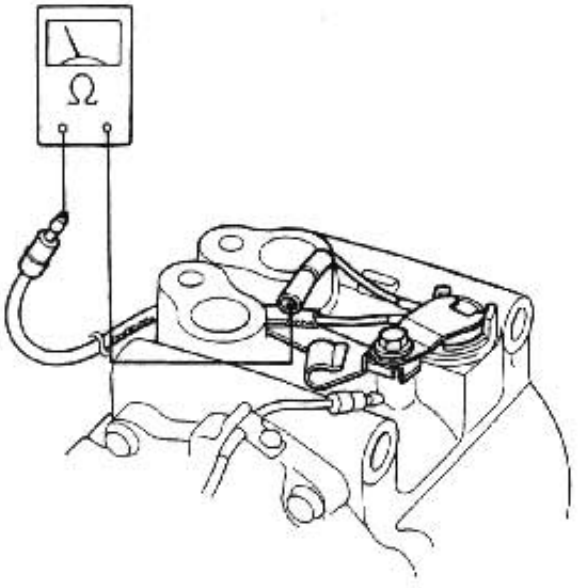
- If a new compressor is installed, calculate the refrigerant oil as below and drain through the suction fitting on the compressor:
  120 cc (4 fl oz) minus contents of old compressor, equals amount to drain from new compressor.

- Adjust the belt (page 22-26, 27)
- Charge the system (page 22-49)
- Test the performance (page 22-50)

Thermal Protector Inspection

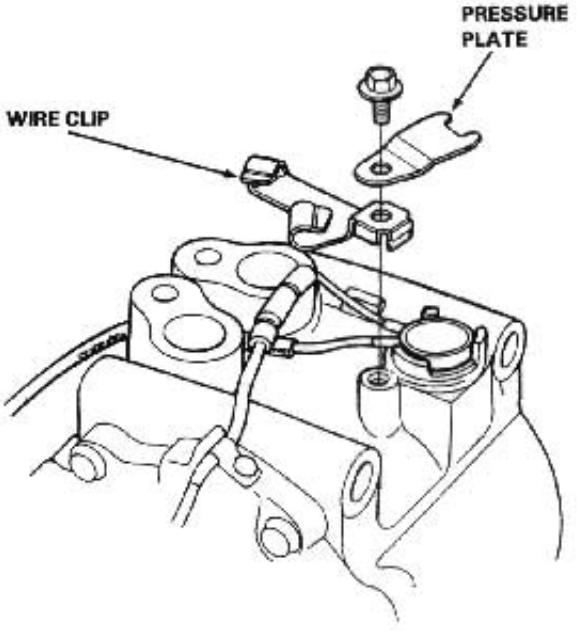
Check for continuity between A and B terminals of the thermal protector connector.
There should be continuity.

- If no continuity, replace the thermal protector.

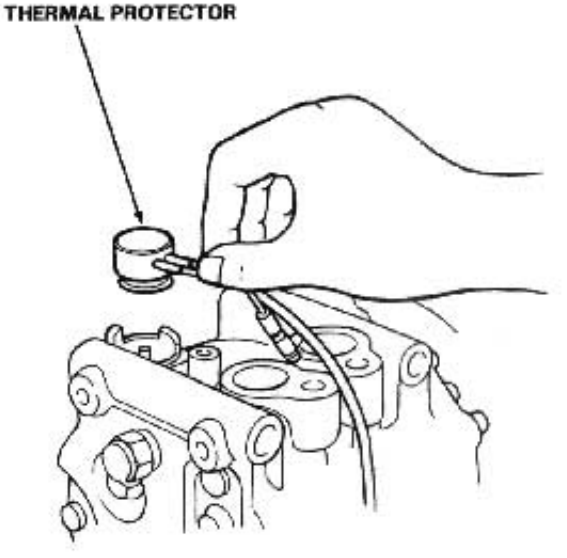


Thermal Protector Replacement

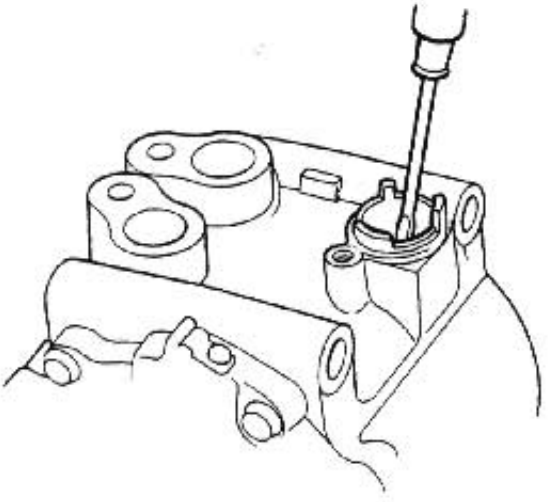
1. Remove the bolt, pressure plate and the wire clip.



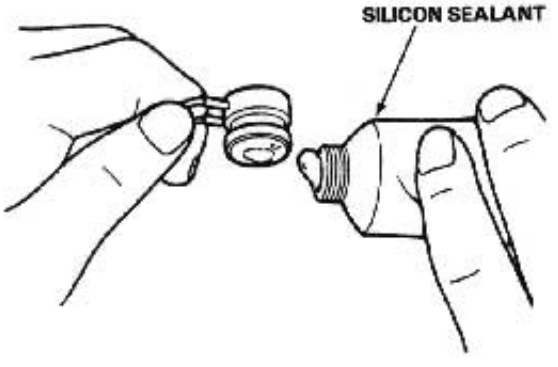
2. Disconnect the thermal protector and field coil connector, then remove the thermal protector.



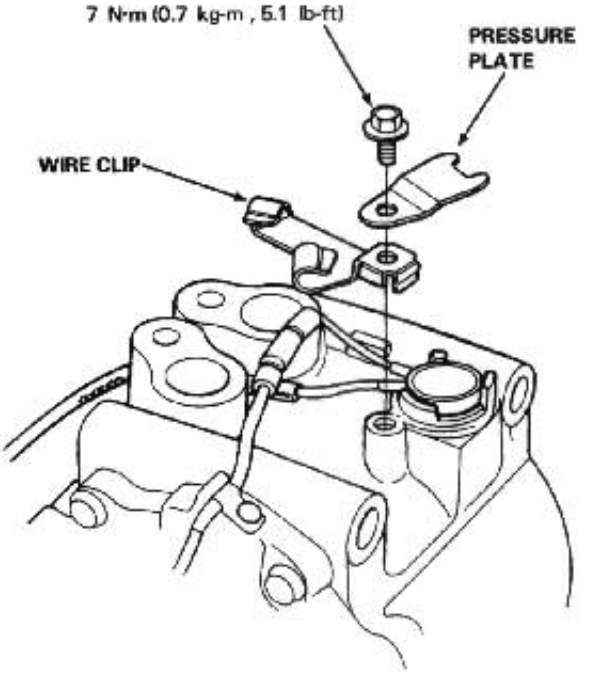
3. Remove the old silicon sealant from the cup of thermal protector.



4. Lubricate the new thermal protector with silicon sealant, then install the thermal protector into compressor.



5. Connect the thermal protector wire, then install the wire with the pressure plate and the wire clip.

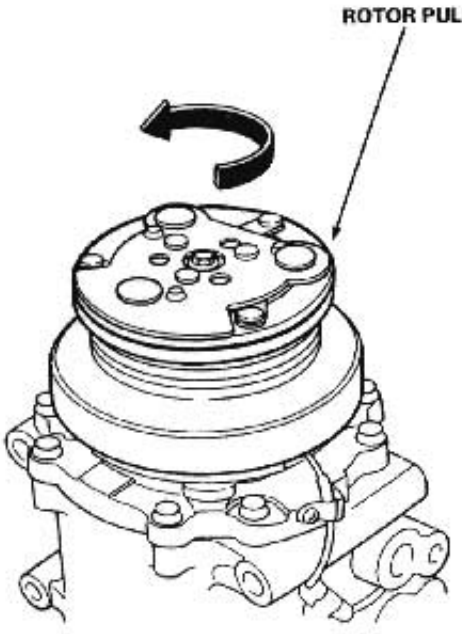


- Make sure that the thermal protector has continuity.

Compressor (Sanden)

Clutch Inspection

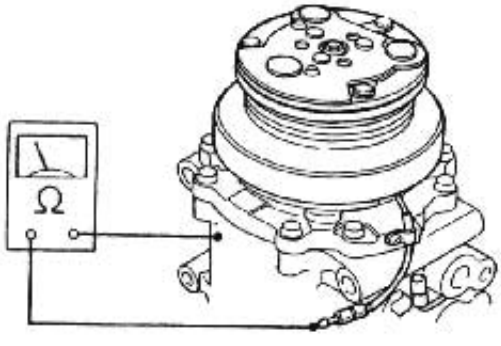
- Check pulley bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play or drag.



- Check resistance of the field coil:

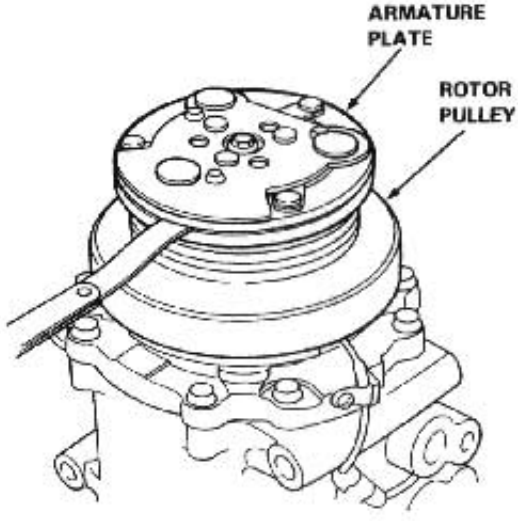
Field Coil Resistance:
3.58 ± 0.15 ohm at 20°C (68°F)

If resistance is not within specifications, replace the coil.

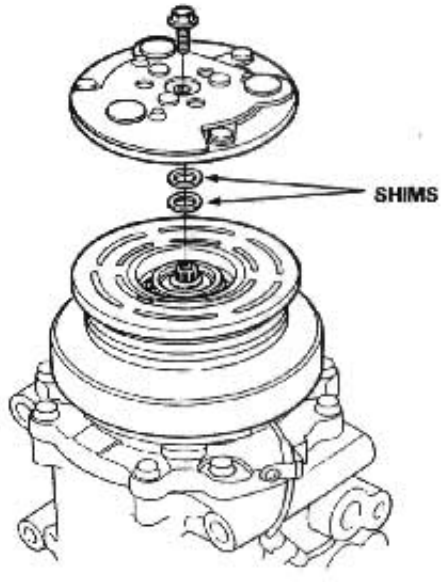


- Measure the clearance between the rotor pulley and armature plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required.

CLEARANCE: 0.35—0.65 mm (0.014—0.026 in)

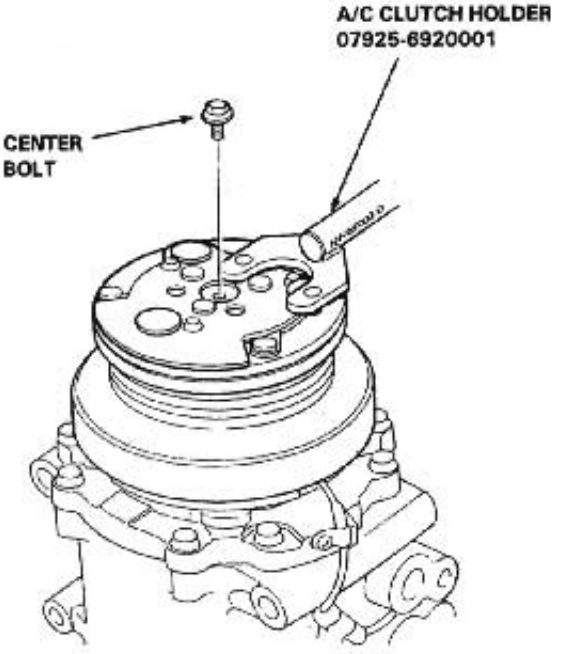


NOTE:
The shims are available in four sizes: 0.1 mm, 0.2 mm, 0.4 mm and 0.5 mm of thickness.

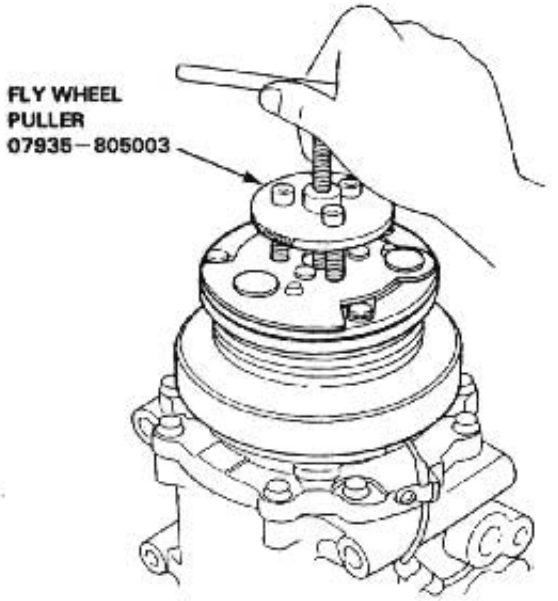


Clutch Overhaul

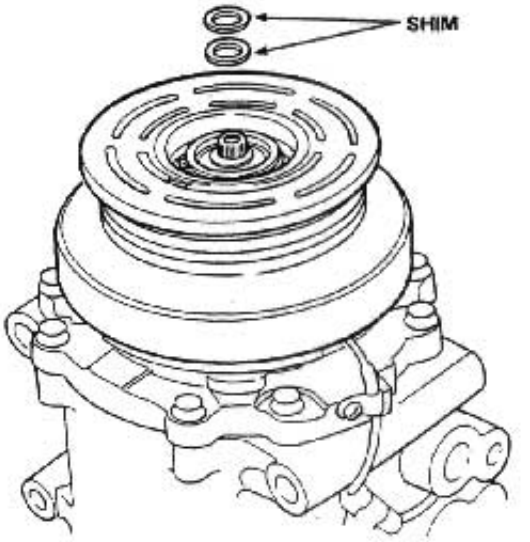
1. Use an A/C clutch holder to assist removing the center bolt.



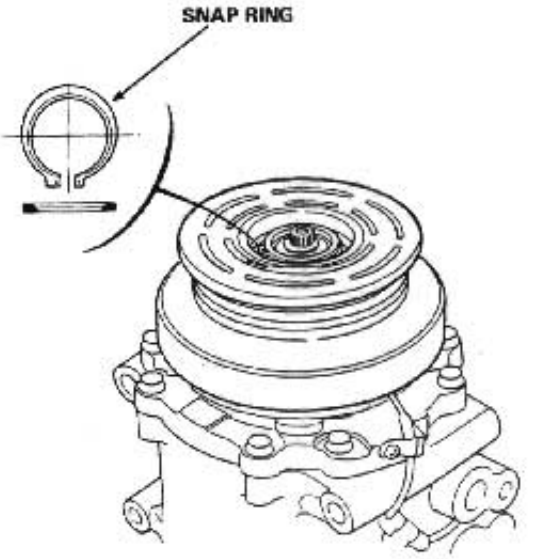
2. Remove the armature plate. (If you can't by hand, use a puller.)



3. Remove the two shims, taking care not to lose them.



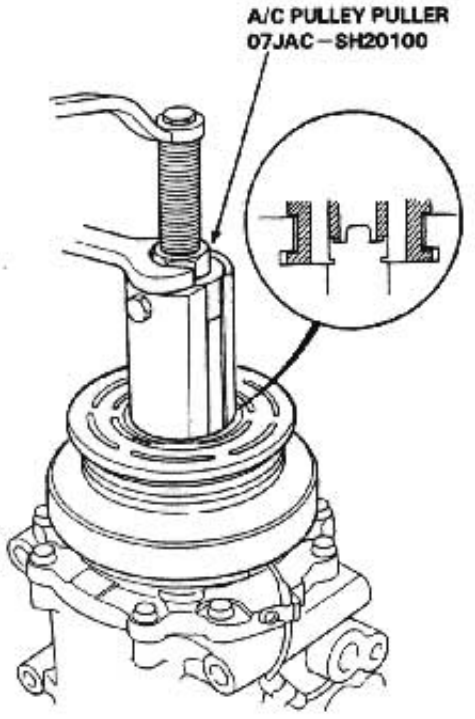
4. Use snap ring pliers to remove the snap ring.



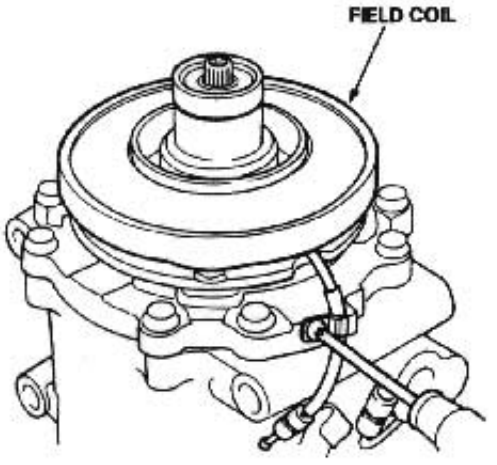
(cont'd)

Clutch Overhaul (cont'd)

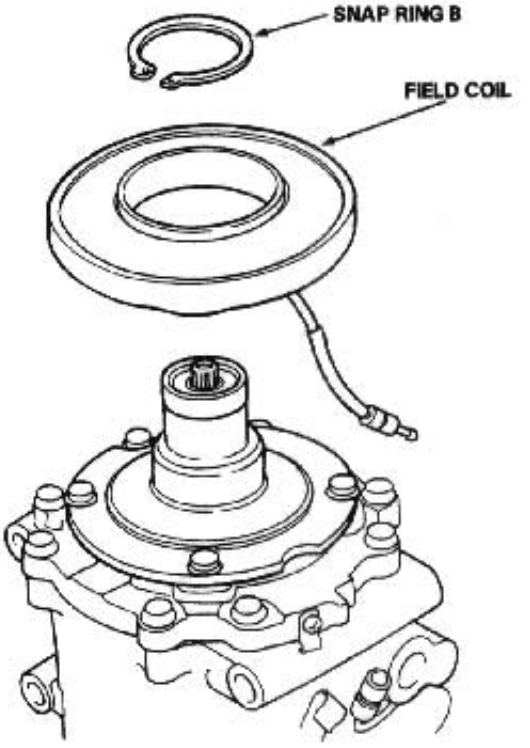
5. Remove the clutch rotor using the special tool.



6. Remove the screw and disconnect the wire.

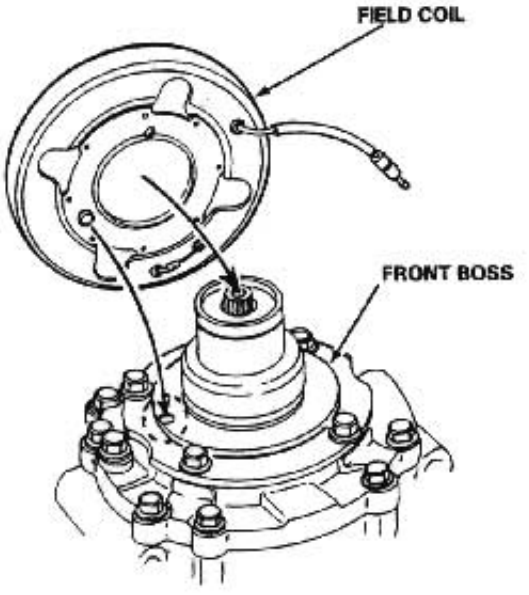


7. Remove the snap ring B using snap ring pliers and remove the field coil.

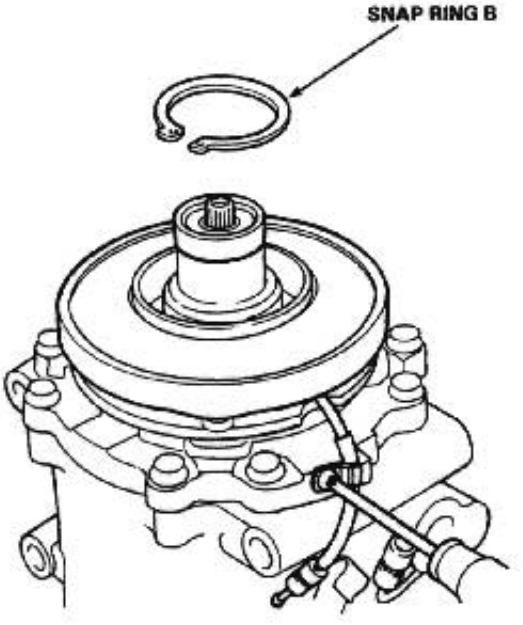


★**Installation**

8. Fit the lug of field coil on the slot of front boss.

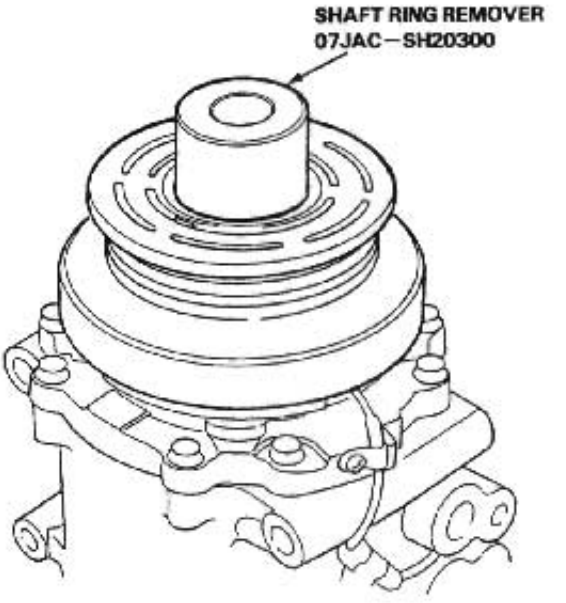


9. Install the snap ring B and wire.

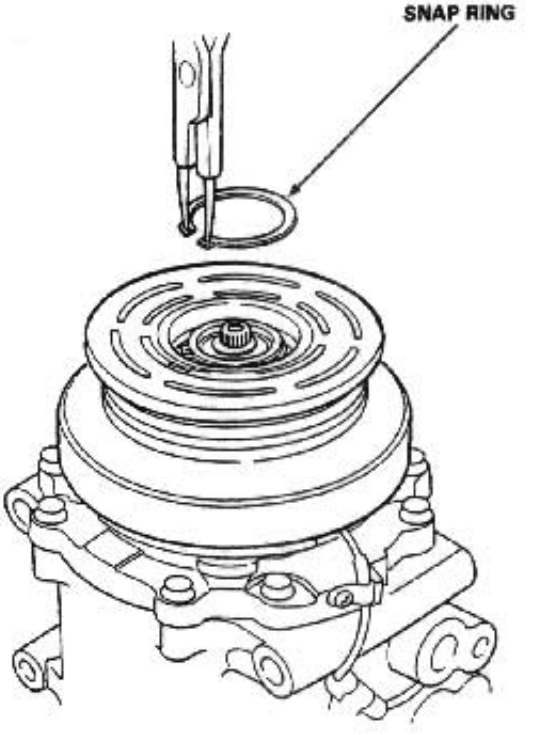


10. Press rotor pulley onto field coil with shaft ring remover.

CAUTION:
Maximum press load: 1.5 tons.



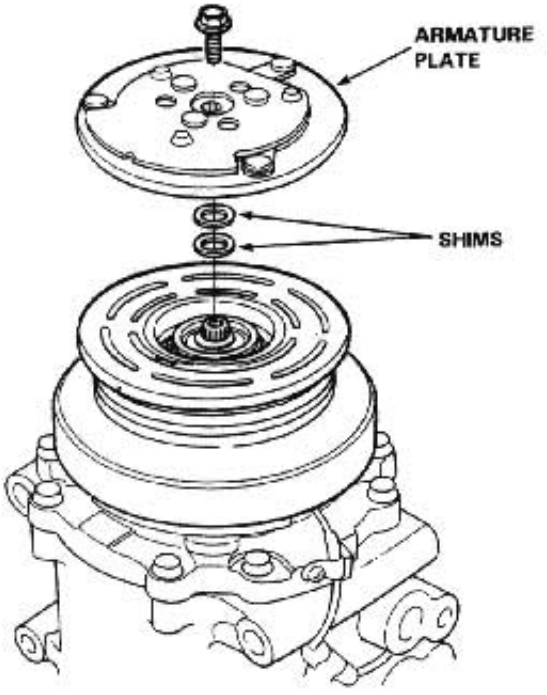
11. Secure the rotor pulley with the snap ring.



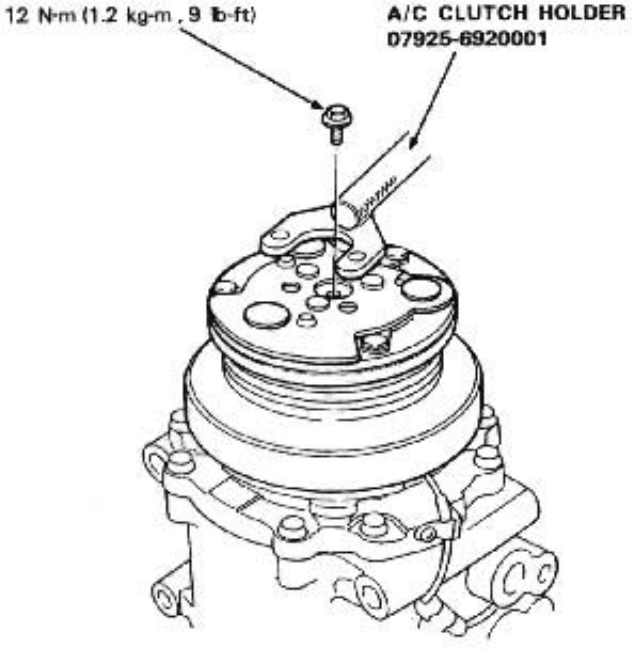
Compressor (Sanden)

Clutch Overhaul (cont'd)

12. Set the armature plate onto rotor pulley with shims(2).



13. Use A/C clutch holder to secure armature plate while tightening bolt.

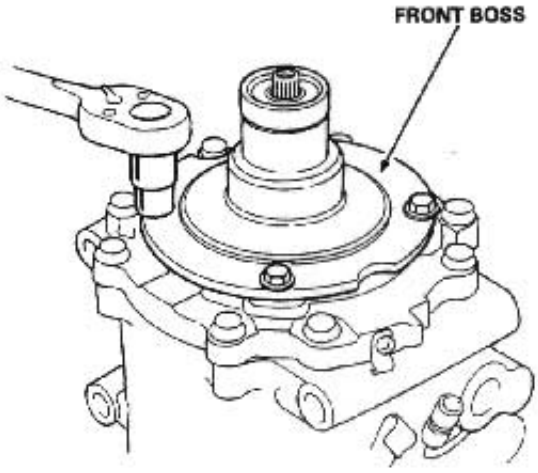


Make sure that the rotor pulley turns smoothly.

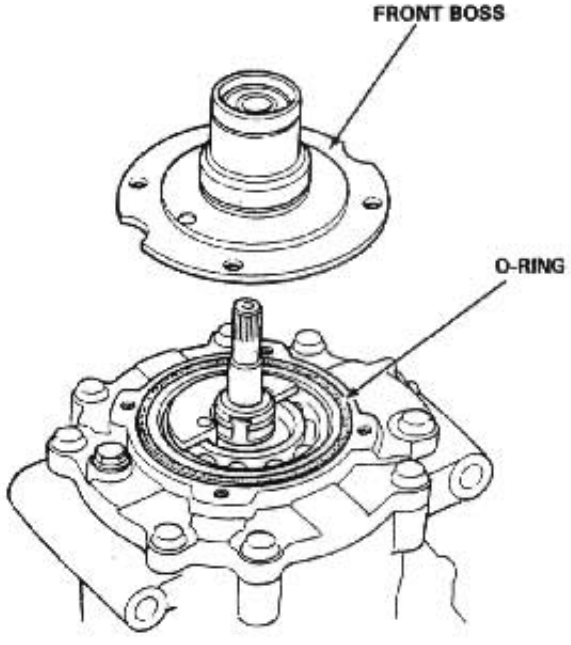
Shaft Seal Replacement

NOTE:
Make sure that the suction and discharge joints are plugged with the caps.

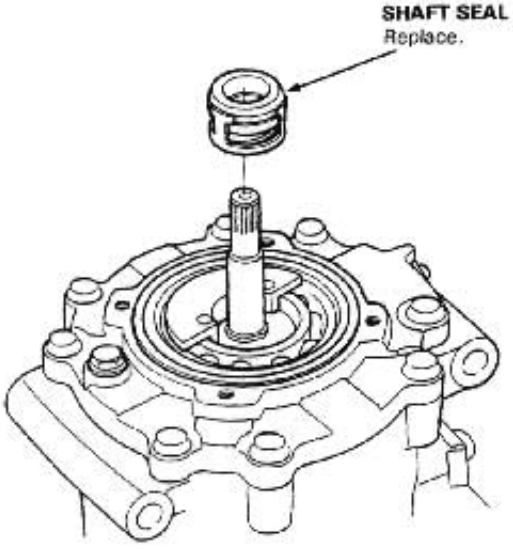
1. Remove the armature, rotor pulley and field coil, then remove the four bolts.



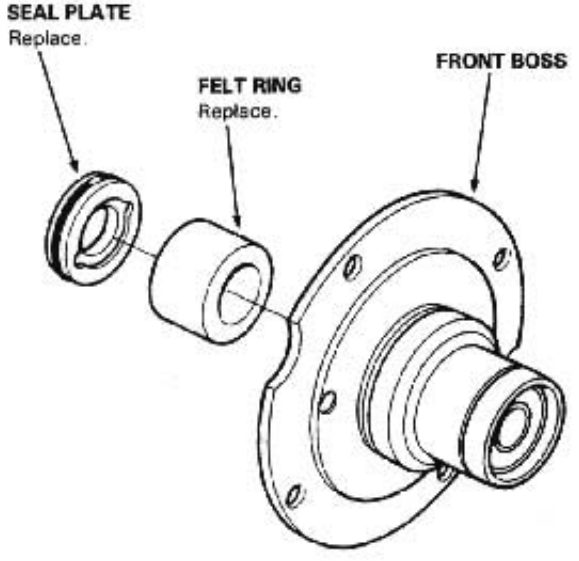
2. Remove the front boss and O-ring.



3. Remove the shaft seal.



4. Remove the felt ring and seal plate from the front boss.

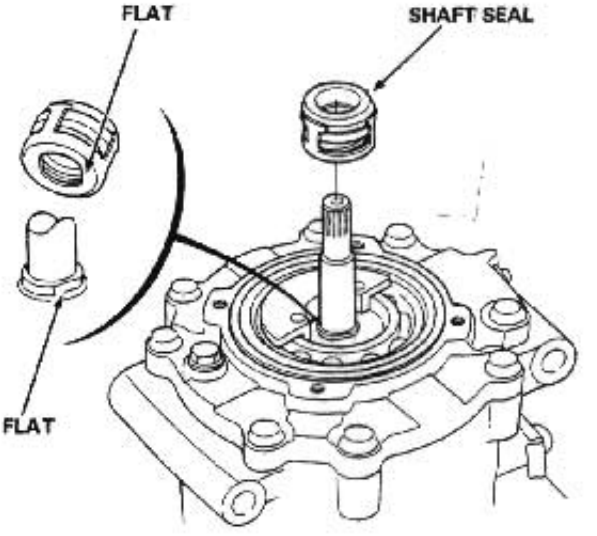


5. Clean the new shaft seal thoroughly with cleaning solvent.

6. Lubricate the shaft seal with refrigerant oil (SUNISO 5GS)

NOTE:
- Use only clean refrigerant oil.
- Do not touch the sealing surfaces of the shaft seal after Lubricating.
- Liberally lubricate the compressor shaft with refrigerant oil.

7. Install the shaft seal onto the compressor shaft aligning the seal case flats with the shaft flats.

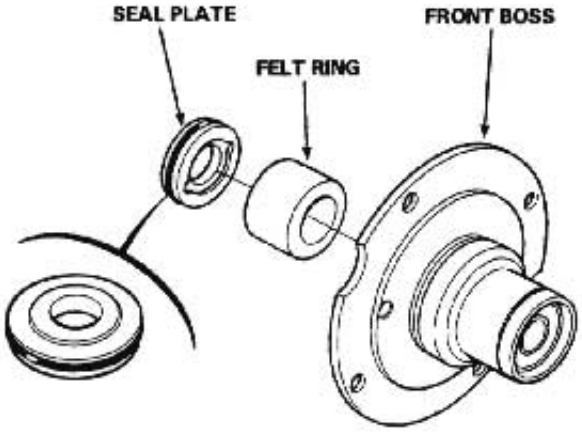


Compressor (Sanden)

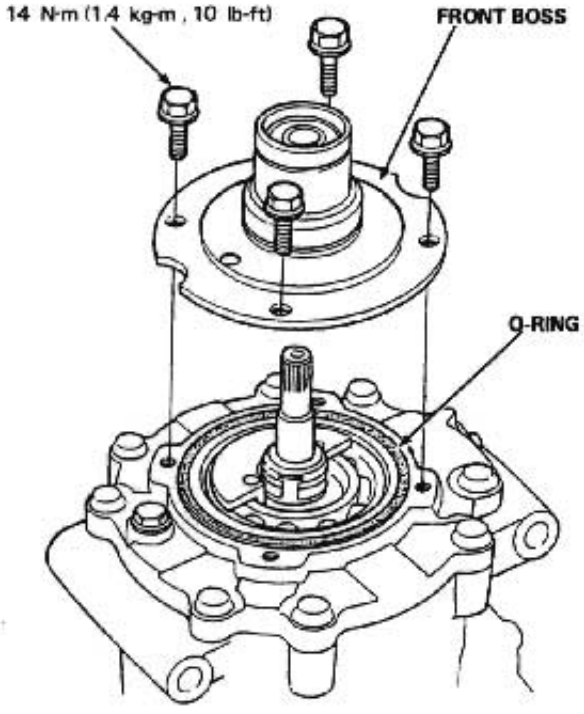
Shaft Seal Replacement (cont'd)

8. Install the felt ring and seal plate into the front boss.

   NOTE:
   - Clean the seal with cleaning solvent, then lubricate the seal seat with refrigerant oil (SUNISO 5GS).
   - Use only clean refrigerant oil.
   - Do not touch the sealing surface of the seal plate after lubricated.



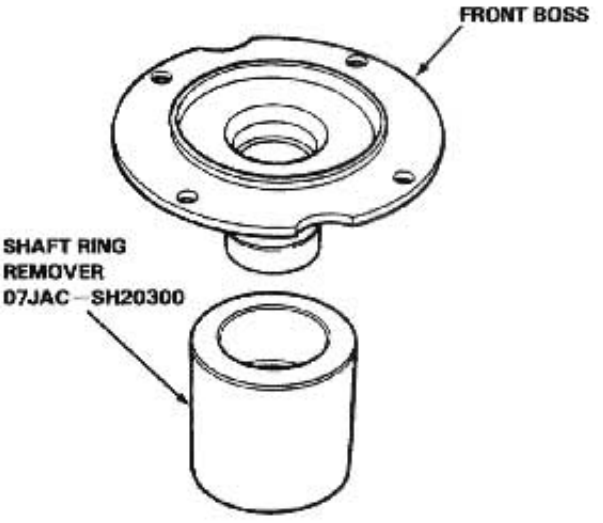
9. Set the O-ring into the front end plate and install the front boss with 4 bolts.



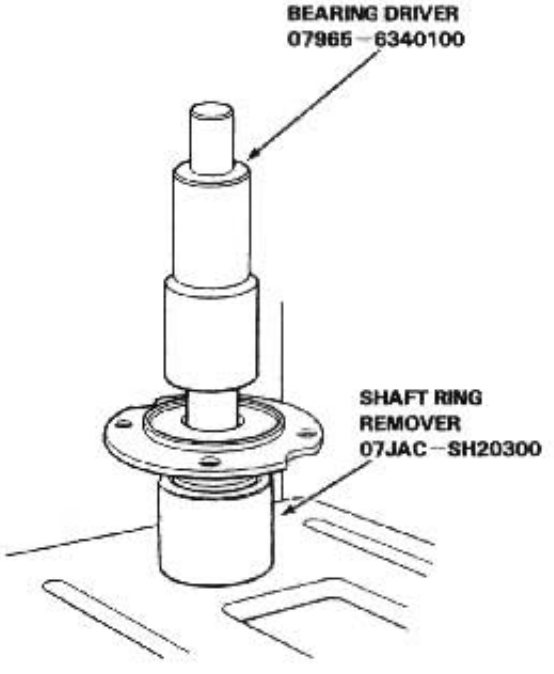
10. Install the field coil. (page, 22-41)

Shaft Bearing Replacement

1. Remove armature plate, rotor pulley and field coil.
2. Remove front boss, seal plate and felt ring.
3. Set the front boss onto shaft ring remover.



4. Use Bearing Driver with a hydraulic press to remove the bearing.

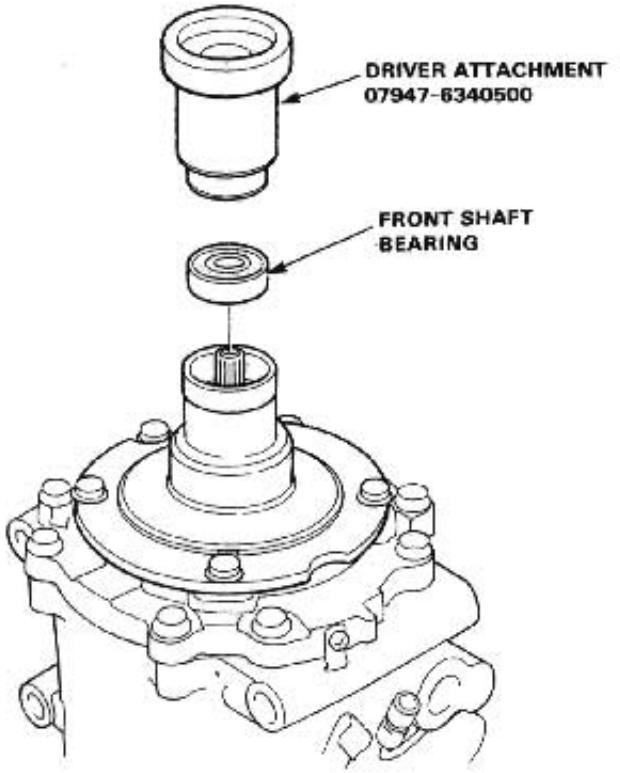


5. Install the shaft seal, seal plate and felt ring.

6. Install the front boss onto compressor.

7. Install the bearing using the driver attachment and a hydraulic press. Center the tool on the bearing before pressing. Recheck tool centering as soon as the press first contacts the attachment.

   CAUTION: Maximum press load: 0.4 tons.



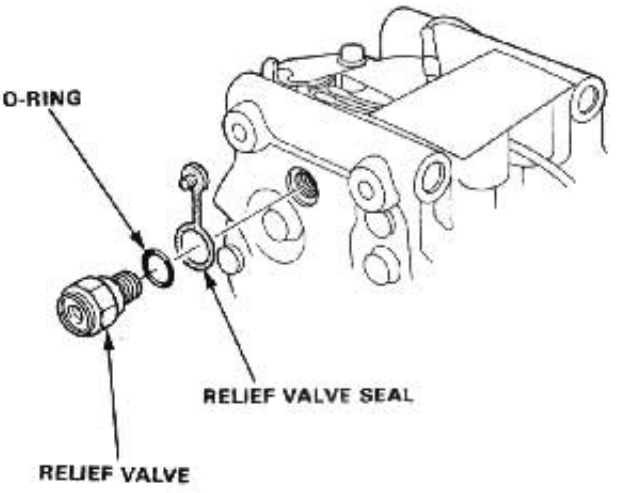
8. Install the field coil, rotor pulley and armature plate.

Relief Valve Replacement

REMOVAL

NOTE: Make sure the suction and discharge joints are plugged with caps.

1. Remove the relief valve, O-ring, relief valve seal.
   CAUTION:
   Do not draw compressor oil. Make sure there is no foreign matter in system.



INSTALLATION

1. Clean off the mating surface.
2. Apply compressor oil to the O-ring.
3. Tighten the relief valve. Torque: 10 N·m (1.0 kg-m)
4. Check for leaks, and attach the relief valve seal.

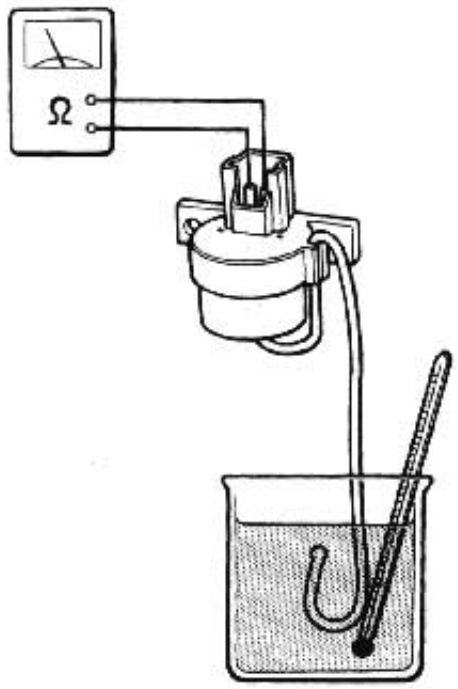
Test

Thermostat Switch

Dip the evaporator sensor into a pan filled with ice water, and check for continuity between the terminals.

Cut off 1.5 — - 0.5 °C (35 — 33 °F)
Cut in 2.5 — 5 °C (36 — 41 °F)

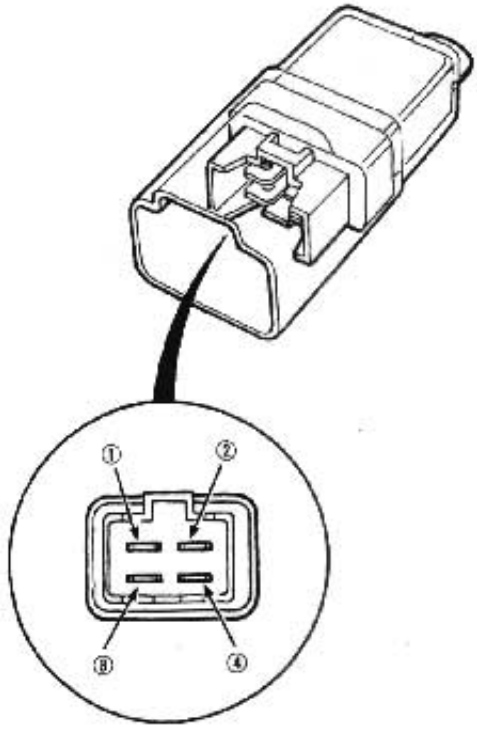
If cut off or cut in temperature is too low or too high, replace the thermo switch.

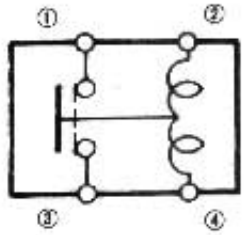


Relay

NOTE:
All A/C system relays are similar.

1. Check for continuity between terminals ② and ④.
2. Connect a 12 V battery across terminals ② and ④. There should be continuity between terminals ① and ③.



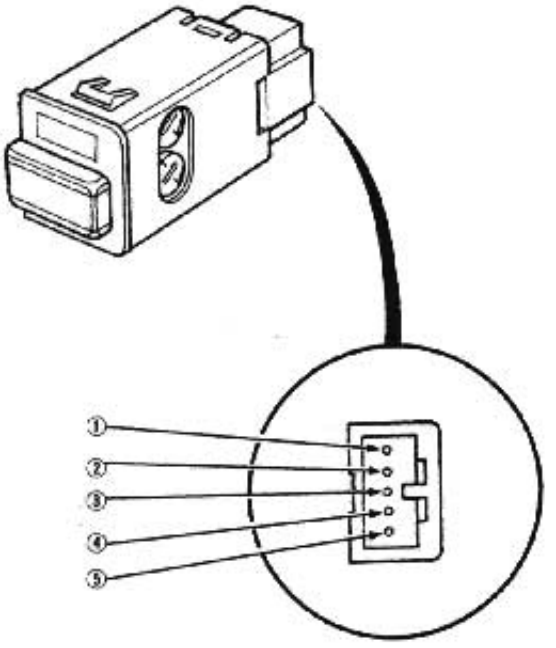


System Charging

A/C Switch

Check for continuity between the terminals according to the table.

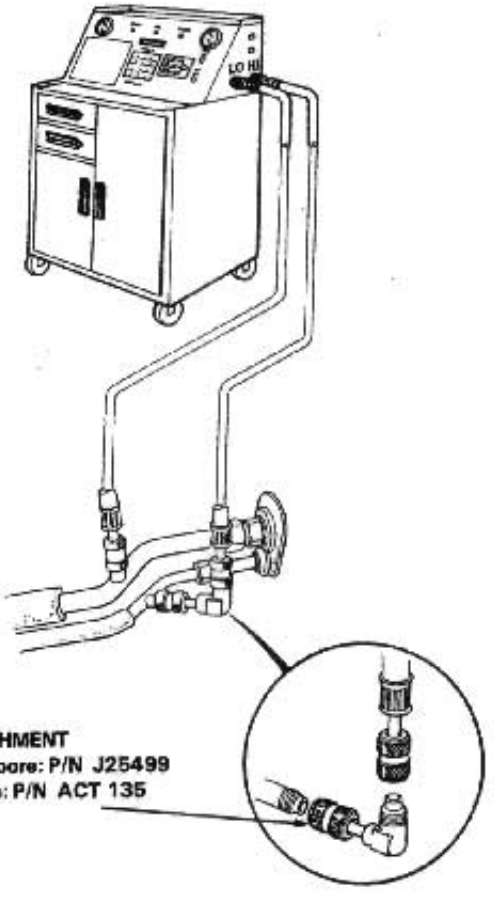
Terminal No. / Position	①	②	③	④	⑤
OFF	○—(○)—○		○—(○)—◀—○		
ON	○—(○)—○		○—(○)—◀—○		
			○—○		



System Evacuation

1. When an A/C System has been opened to the armosphere, 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).
2. Attach an Air Conditioning Service Station as shown. Follow the equipment manufacturer's instructions.

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. Partially charge the system and check for leaks, (see Leak Test below).



ATTACHMENT
Kent-Moore: P/N J25499
Snap-on: P/N ACT 135

Leak Test

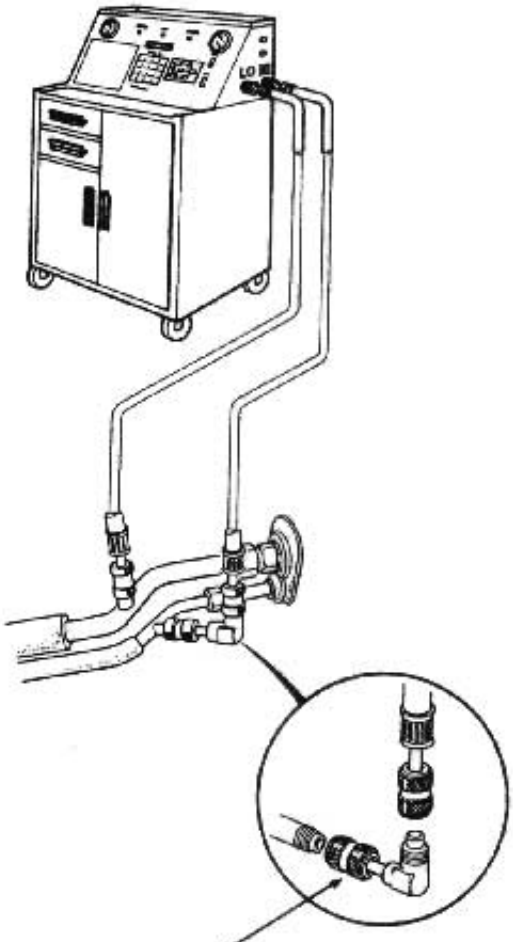
⚠WARNING

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 away from open flames. The refrigerant, although onflammable, 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.**

NOTE: Do not vent refrigerant to the atmosohere. The chlorofluorocarbons (CFCs) used in conventional refrigerant (freon) may damage the garth's ozone layer. Always use UL listed, refrigerant recovery/recycling equipment to extract the refrigerant before you open an A/C system to make repairs. Follow the equipment manufacturer's instructions.

1. Attach an Air Conditioning Service Station as shown.
2. Open high pressure valve to charge the system to about 100 kPa (14 psi), then close the supply valve.
3. Check the system for leaks using a leak detector.
4. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), discharge the system according to the Discharge Procedure on page 22-18.
5. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 22-47).



ATTACHMENT
Kent-Moore: P/N J25499
Snap-on: P/N ACT 135

Charging Procedures

Refrigerant capacity:

⚠WARNING

Always wear eye protection when charging the system.

CAUTION:
Do not overcharge the system; the compressor will be damaged.

1. Attach an Air Conditioning Service Station as shown.
2. Open the high gauge valve and charge with approximately 300 g (10.6 oz) of refrigerant.

⚠WARNING

Do not start the engine with high gauge valve open.

NOTE:
- Be sure to charge with 300 g (10.5 oz) refrigerant. If low, the vane in the compressor (if new compressor is installed) will not operate.
- Do not open the low gauge valve.

3. After charging with 300 g (10.5 oz) refrigerant, close the high gauge valve.
4. Start the engine and turn on the A/C switch and heater fan switch and turn the air mix lever to "COLD".
5. Run the engine at 1500—2000 rpm, engage the compressor clutch, and check that the low gauge pressure suddenly drops.
   (a) If the low pressure does not drop:
   Raise the engine speed to 2500 rpm and turn the A/C switch ON and OFF.
   If the low pressure does not drop, turn the ignition switch OFF and wait for 1—2 minutes, then restart the engine and raise to 2500 rpm and turn the A/C switch ON and OFF.

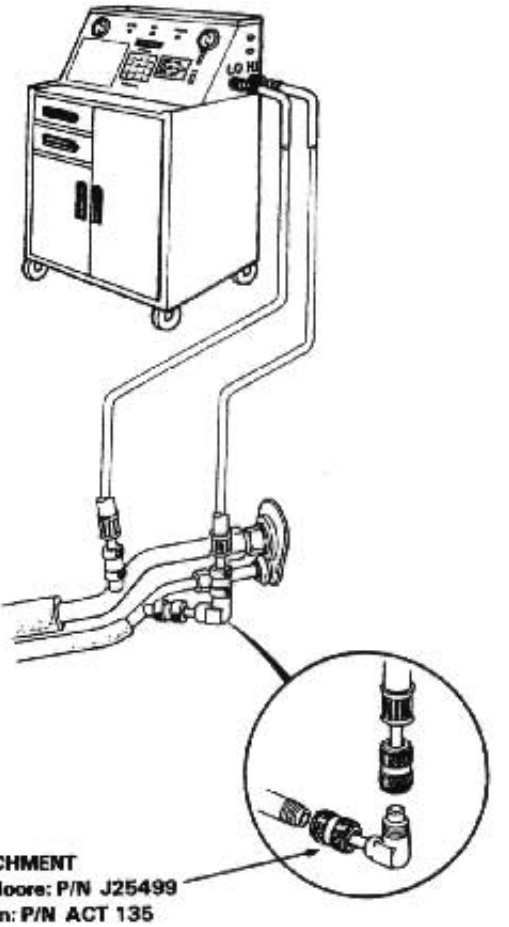
   (b) If the low pressure still does not drop, stop the engine and close the low gauge valve and recharge with additional 100 g (3.5 oz) of refrigerant.
   Repeat step (a).

   (c) If the low pressure does not drop after repeating the procedure in step (a) several times. Stop the engine and re-evacuate and repeat steps 1 thru 6.
6. Open the low gauge valve and charge refrigerant with the engine running at 2500 rpm.

⚠WARNING

Do not open the high gauge valve and keep the refrigerant can right side-up.

7. Charge the system with an additional 550—650 g (19—23 oz) of refrigerant to complete full charge.
8. When fully charged, close thegauge valves, then disconnect the hoses from the Service Station.



ATTACHMENT
Kent-Moore: P/N J25499
Snap-on: P/N ACT 135

Performance Test

The performance test will help determine if the air conditioning system is operating within specifications.

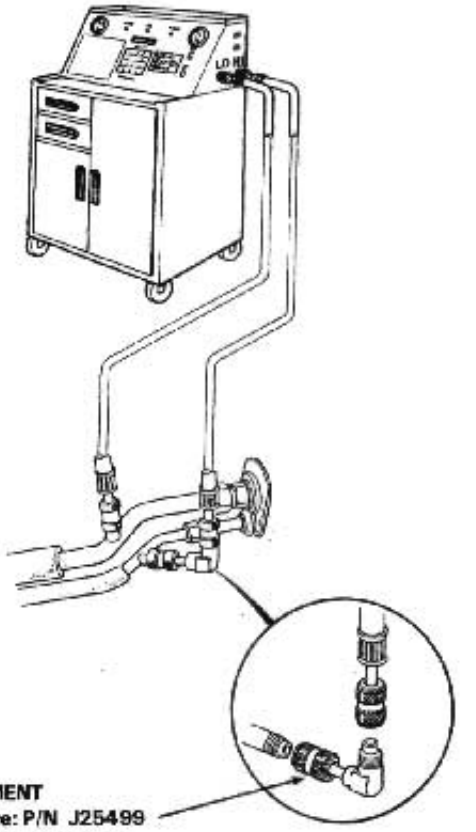
1. Connect the hoses as shown.

2. Insert a thermometer in the vent outlet. Determine the relative humidity and ambient air temperature by a portable weather station or calling the local weather station.

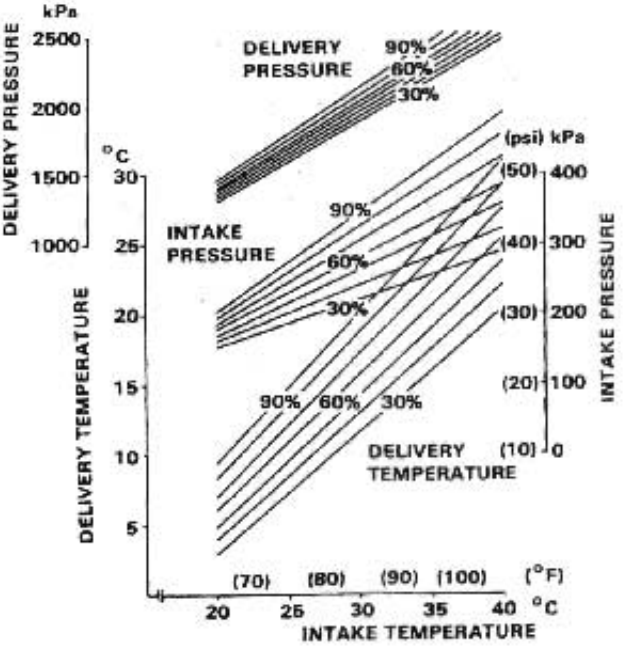
3. Test conditions:
   - Avoid direct sunlight.
   - Open engine hood.
   - Open front doors.
   - Set the temperature control dial to COLD and slide the function control lever to VENT position and recirculation control lever to INSIDE-AIR position.
   - Turn the fan switch to △.
   - Run the engine at 1,500 RPM.
   - No driver or passengers in vehicle.

4. After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the A/C gauges.

5. To complete the charts:
   - Mark the delivery temperature along the vertical line.
   - Mark the intake temperature (ambient air temperature) along the bottom line.
   - Draw a line straight up from the air temperature to the humidity.
   - Mark a point one line above and one line below the humidity level. (10% above and 10% below the humidity level)
   - From each point, draw a horizontal line across to the delivery temperature.
   - The delivery temperature should fall between the two lines.
   - Complete the low side pressure test and high side pressure test in the same way.
   - Any measurements outside the line may indicate the need for further inspection.



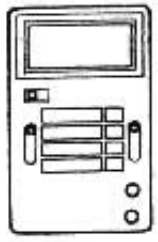
ATTACHMENT
Kent-Moore: P/N J25499
Snap-on: P/N ACT 135



Electrical

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	KS—AHm—32—003	Digital Multimeter	1	23-62
②	07920—SB20000	Fuel Sender Wrench	1	23-96



①

②

Troubleshooting

Troubleshooting Precautions

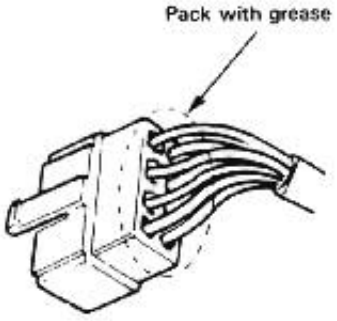
Before Troubleshooting

- Check the main fuse and the fuse box.
- Check the battery for damage, state of charge, and clean and tight connections.
- Check the alternator belt tension.

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 battery ground cable connected incompletely or you will severely damage the wiring.**

While You're Working

- Make sure connectors are clean, and have no loose pins or receptacles.
- Make sure multiple pin connectors are packed with grease (except watertight connectors).



CAUTION:
- **Do not pull the wires when disconnecting a connector, pull only the connector housings.**
- **When connecting a connector, push it until it clicks into place.**

Five-Step Troubleshooting

1. **Verify The Complaint**

   Turn on all the components in the problem circuit to check the accuracy of the customer complaint. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the problem area.

2. **Analyze The Schematic**

   Look up the schematic for the problem circuit. Determine how the circuit is supposed to work by tracing the current paths from the power feed through the circuit components to ground. If several circuits fail at the same time, the fuse or ground is a likely cause.

   Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.

3. **Isolate The Problem By Testing The Circuit**

   Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

4. **Fix The Problem**

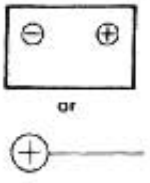
   Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

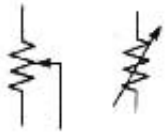
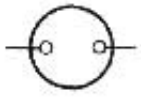
5. **Make Sure The Circuit Works**

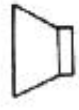
   Turn on all components in the repaired circuit in all modes to make sure you've fixed the entire problem. If the problem was a blown fuse, be sure to test all of the circuits on that fuse. Make sure no new problems turn up and the original problem does not recur.

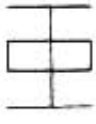
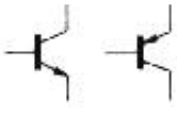
How to Use This Section

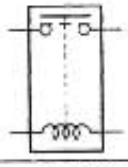
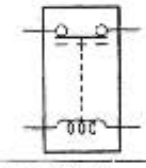
Schematic Symbols

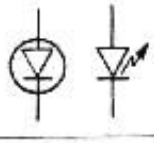
BATTERY	GROUND		FUSE	COIL, SOLENOID	CIGARETTE LIGHTER
	Ground terminal 	Component ground 			

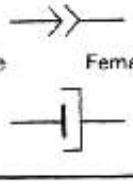
RESISTOR	VARIABLE RESISTOR	THERMISTOR	IGNITION SWITCH	BULB	HEATER
					

MOTOR	PUMP	CIRCUIT BREAKER	HORN	DIODE	SPEAKER, BUZZER
					

ANTENNA		TRANSISTOR (Tr)
Mast 	Window 	

RELAY (In normal condition)		CONDENSER
Normal open relay 	Normal closed relay 	

SWITCH (In normal condition)		LUMINOUS DIODE (LED)
Normal open switch 	Normal closed switch 	

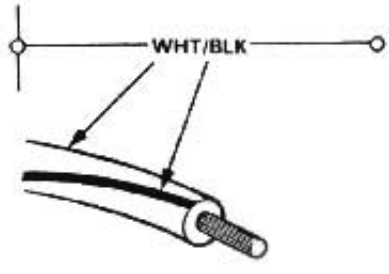
CONNECTION		CONNECTOR	REED SWITCH
Input 	Output 	Male Female 	

Wire Color Codes

The following abbreviations are used to identify wire colors in the circuit schematics.

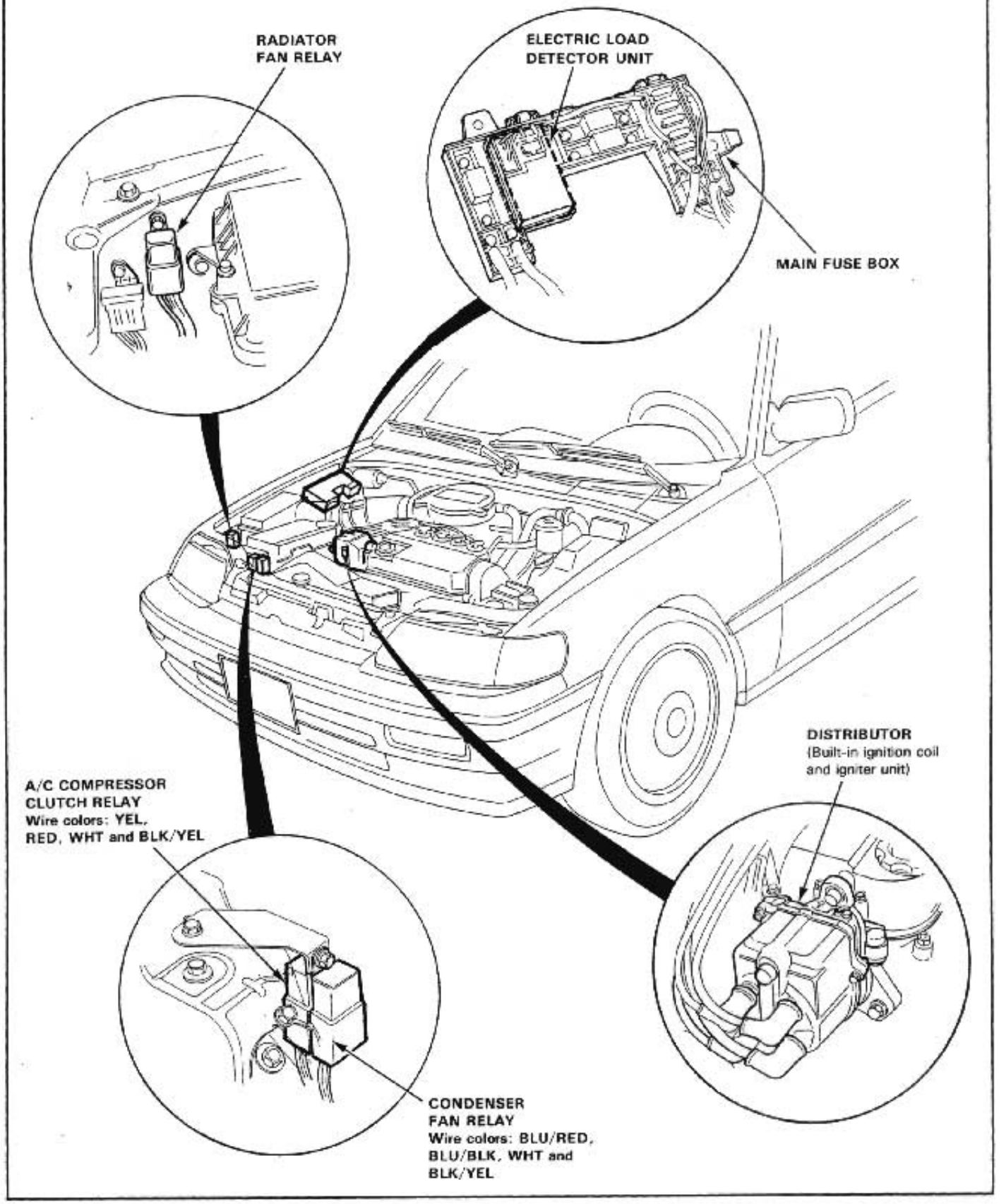
WHT	White
YEL	Yellow
BLK	Black
BLU	Blue
GRN	Green
RED	Red
ORN	Orange
PNK	Pink
BRN	Brown
GRY	Gray
LT BLU	Light Blue
LT GRN	Light Green

Wire insulator has one color or one color with another color stripe. The second color is the stripe.



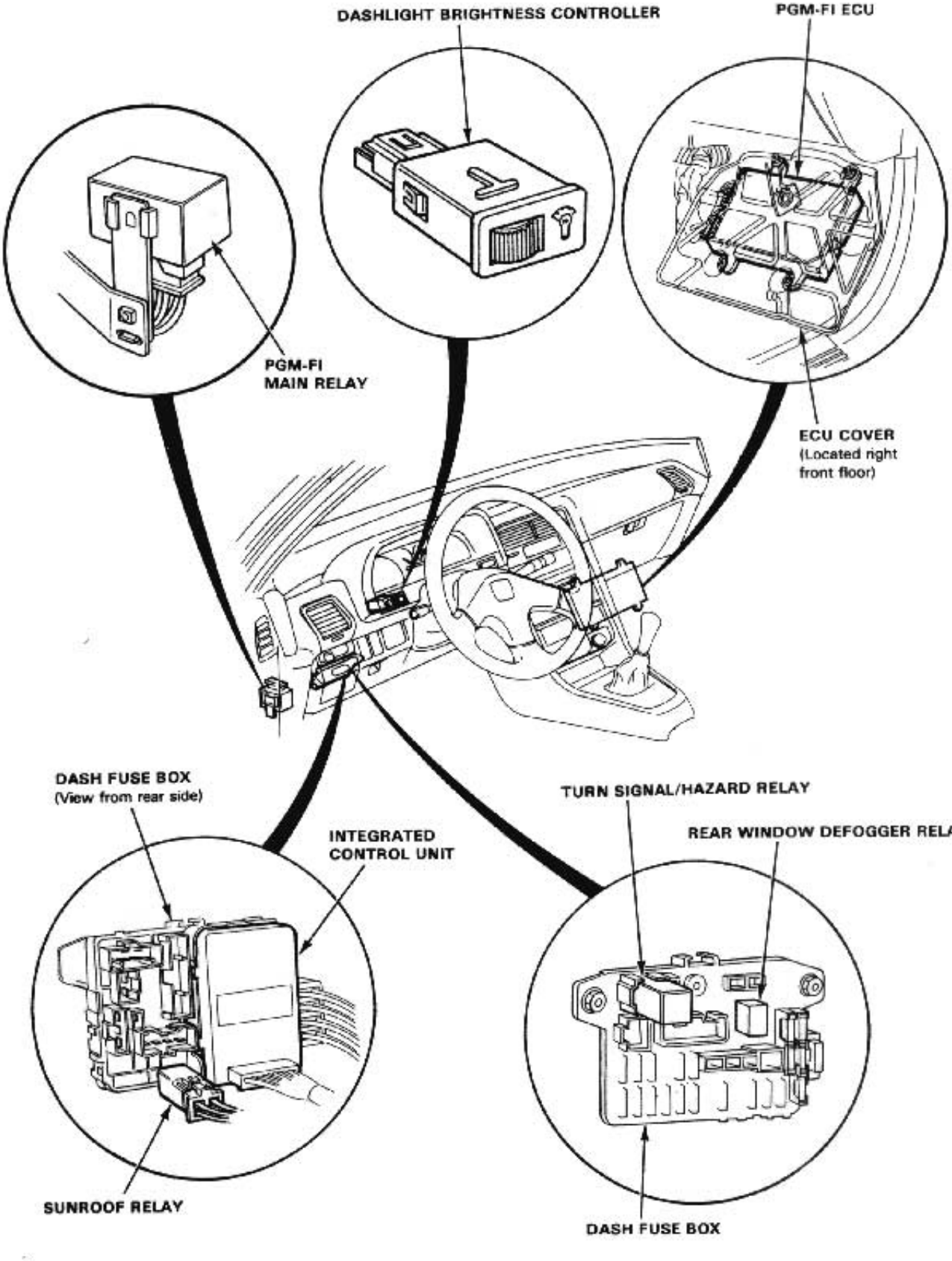
Relays and Control Unit Locations

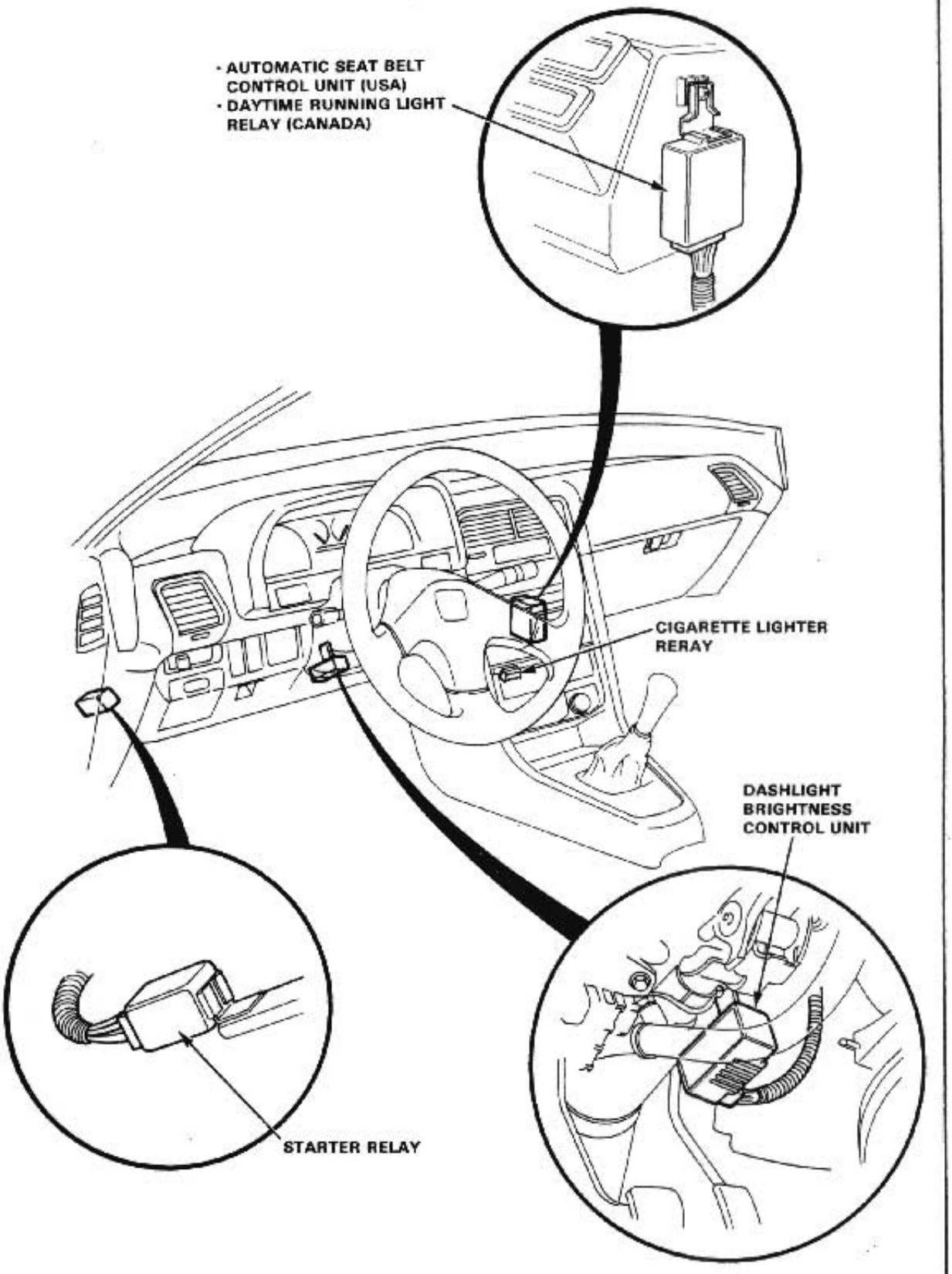
Engine Compartment



Relays and Control Unit Locations (cont'd)

Dashboard and Floor




· AUTOMATIC SEAT BELT CONTROL UNIT (USA)
· DAYTIME RUNNING LIGHT RELAY (CANADA)
CIGARETTE LIGHTER RERAY
DASHLIGHT BRIGHTNESS CONTROL UNIT
STARTER RELAY

Connector and Wire Harness Routing

How to Identify Connectors:
Identifying numbers have been assigned to all connectors. The number is preceded by the letter "C" for connectors, "G" for ground terminals or "T" for non-ground terminals.

Harness \ Location		Engine Compartment	Dashboard	Others (Floor, Door, Trunk, Roof)
Starter Cable		T1, T2 and ⊕		
Battery Ground Wire		T3 and ⊖ G1		
Engine Ground Wire		T4 G2		
Engine Wire Harness	Std	C101 thru C123 T101 and T102 G101		
	HF, Si	C151 thru C175 T151 and T152 G151		
Main Wire Harness		C201 thru C218 C301 thru C314 T201 thru T203 G201 and G301	C401 thru C431 G401	C451 thru C453 C461 and C462
A/C Wire Harness		C281 thru C291 G281	C471 thru C473	
Noise Suppressor Wires		C288 thru C290		
Fuel Tank Wires				C481 and C482
Rear Wire Harness			C501 thru C507	C511 thru C535 G511
Hatch Wires				C551 thru C554
License Plate Light Wires				C581 thru C585
Driver's Door Wires				C601 thru C606
Passenger's Door Wires				C651 thru C656
Dashboard Wire Harness			C701 thru C716 G701	
Roof Wires			C801 thru C804	C811 thru C813

Starter Cable

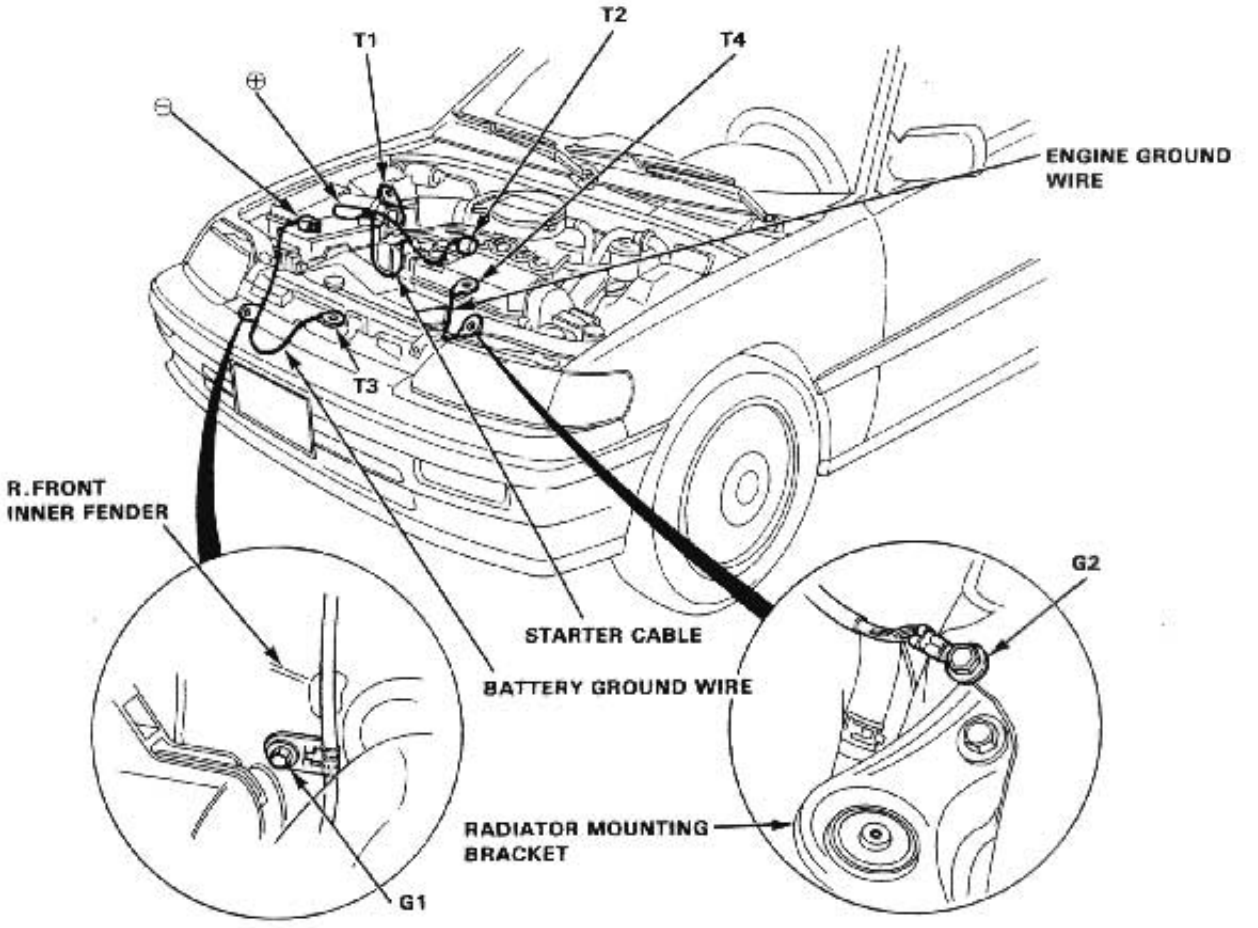
Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
T1 T2		Right center engine compartment Center engine compartment	To Main fuse box To Starter motor	
⊕		Battery	To Battery positive terminal	

Battery Ground Wire

T3		Center engine compartment	To Transmission	
G1		Right front engine compartment	To Body ground, via battery ground wire.	
⊖		Battery	To Battery negative terminal	

Engine Ground Wire

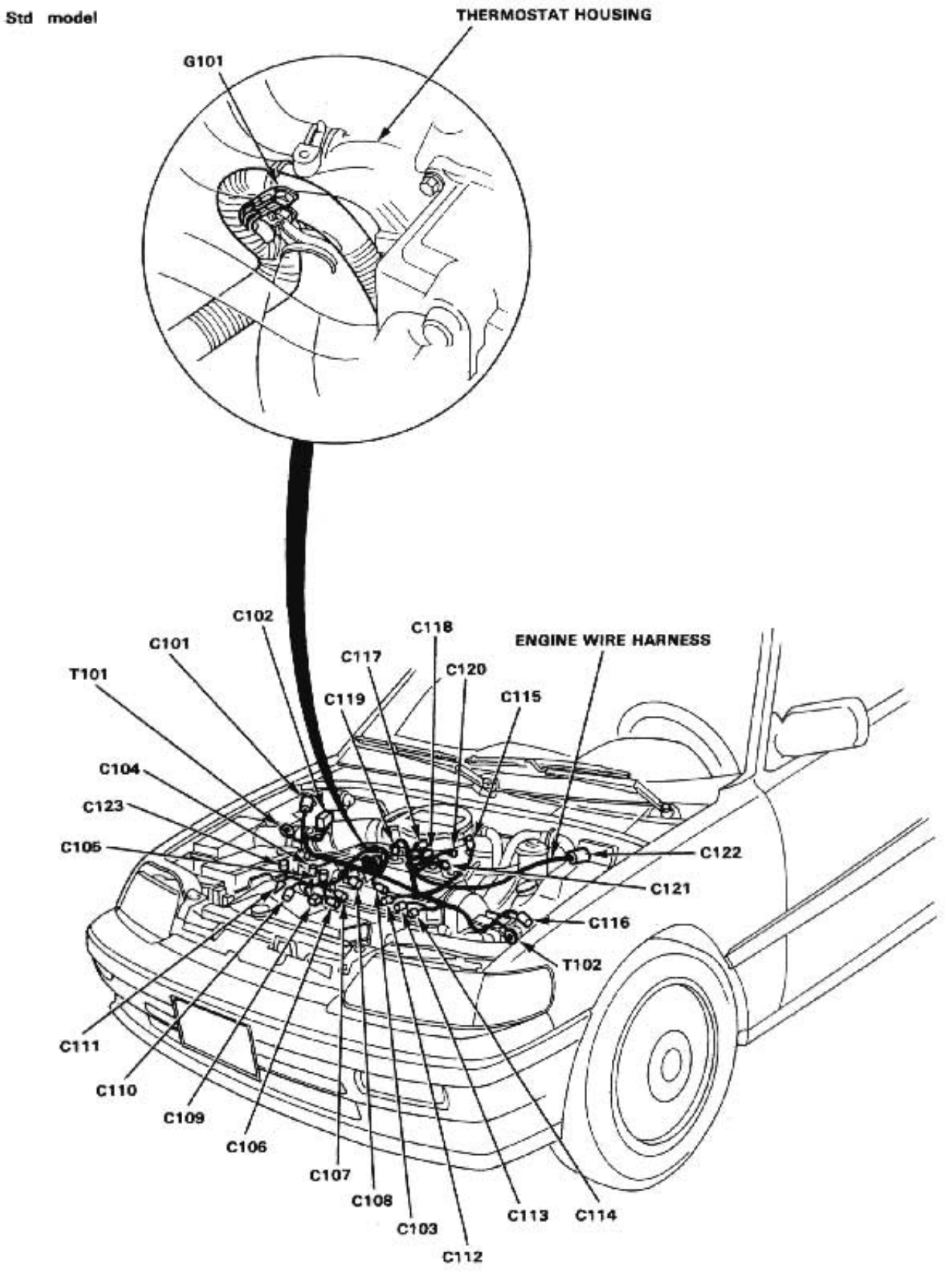
T4		Center engine compartment	To Cylinder head	
G2		Left front engine compartment	To Body ground, via engine ground wire.	



Engine Wire Harness: Std model

Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
C101	14	Right center engine compartment	To Main wire harness (C210)	
C102	8	Right center engine compartment	To Main wire harness (C211)	
C103	1	Center engine compartment	To Starter solenoid	
C104	6	Center engine compartment	To TDC/CRANK sensor	
C105	2	Center engine compartment	To Ignition coil	
C106	1	Center engine compartment	To Oxygen sensor	
C107	2	Center engine compartment	To Coolant temperature sensor (TW)	
C108	1	Center engine compartment	To Coolant temperature gauge sender	
C109	2	Center engine compartment	To Lock-up control solenoid valve	A/T only
C110	1	Center engine compartment	To Back-up light switch (IN)	M/T
C111	1	Center engine compartment	To Back-up light switch (OUT)	M/T
C112	1	Center engine compartment	To Engine oil pressure switch	
C113	1	Center engine compartment	To Coolant temperature switch (+)	
C114	1	Center engine compartment	To Coolant temperature switch (−)	
C115	2	Center engine compartment	To Tandem valve control solenoid valve	
C116	4	Center engine compartment	To Voltage regulator	
C117	2	Center engine compartment	To AUX. fuel injector	
C118	2	Center engine compartment	To Main fuel injector	
C119	2	Center engine compartment	To Intake air temperature sensor (TA)	
C120	3	Center engine compartment	To Throttle angle sensor	
C121	2	Center engine compartment	To EACV	
C122	14	Left rear engine compartment	To Main wire harness (C313)	
C123	3	Center engine compartment	To EGR valve	CALIF: A/T
T101		Right center engine compartment	To Main fuse box	
T102		Center engine compartment	To Alternator	
G101		Center engine compartment	To Engine ground, via engine harness	

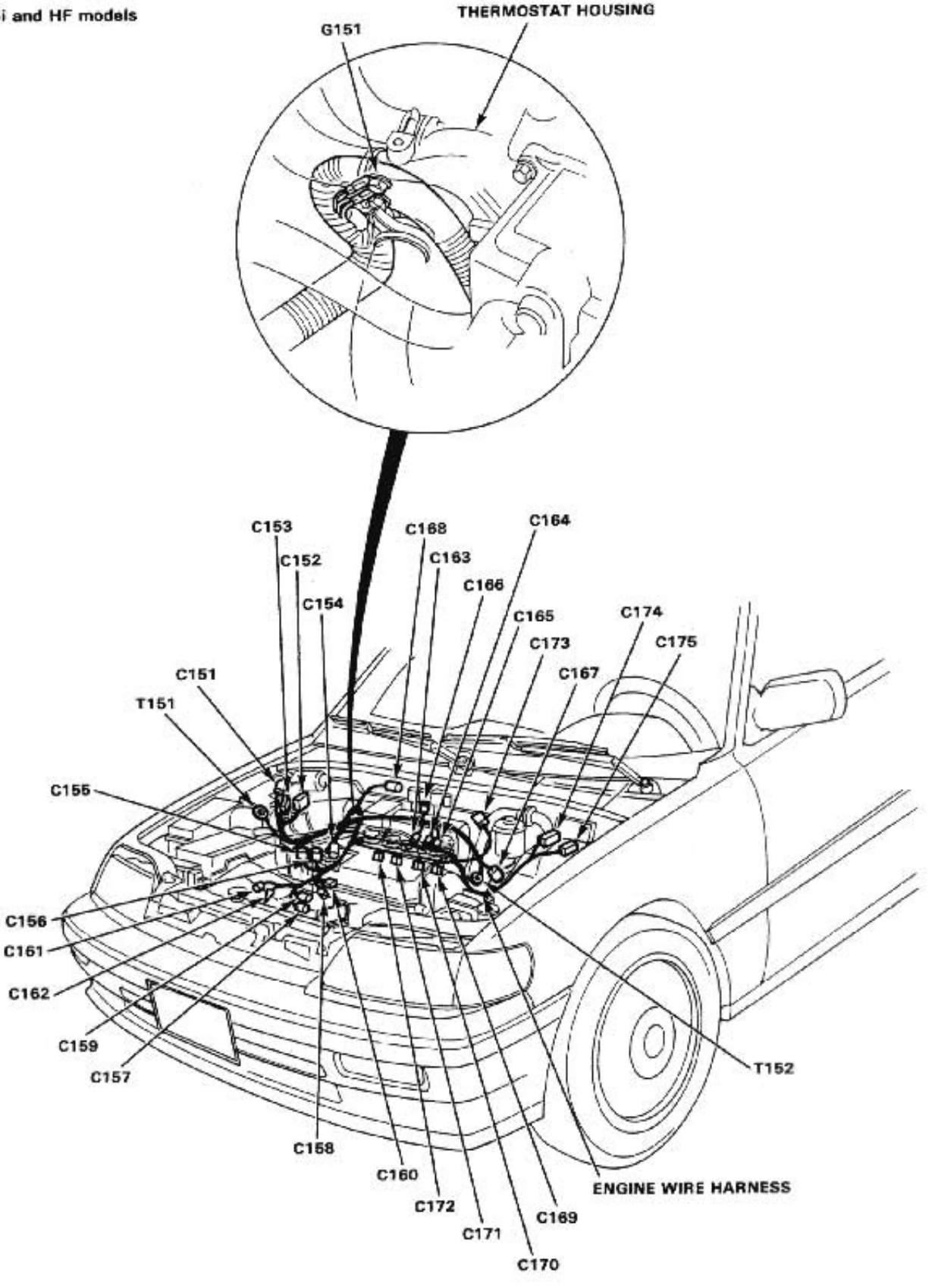
Std model


THERMOSTAT HOUSING
G101
ENGINE WIRE HARNESS
C102
C101
C118
C117
C120
T101
C119
C115
C104
C123
C105
C122
C121
C116
T102
C111
C110
C109
C106
C107
C108
C103
C112
C113
C114

Engine Wire Harness: Si and HF models

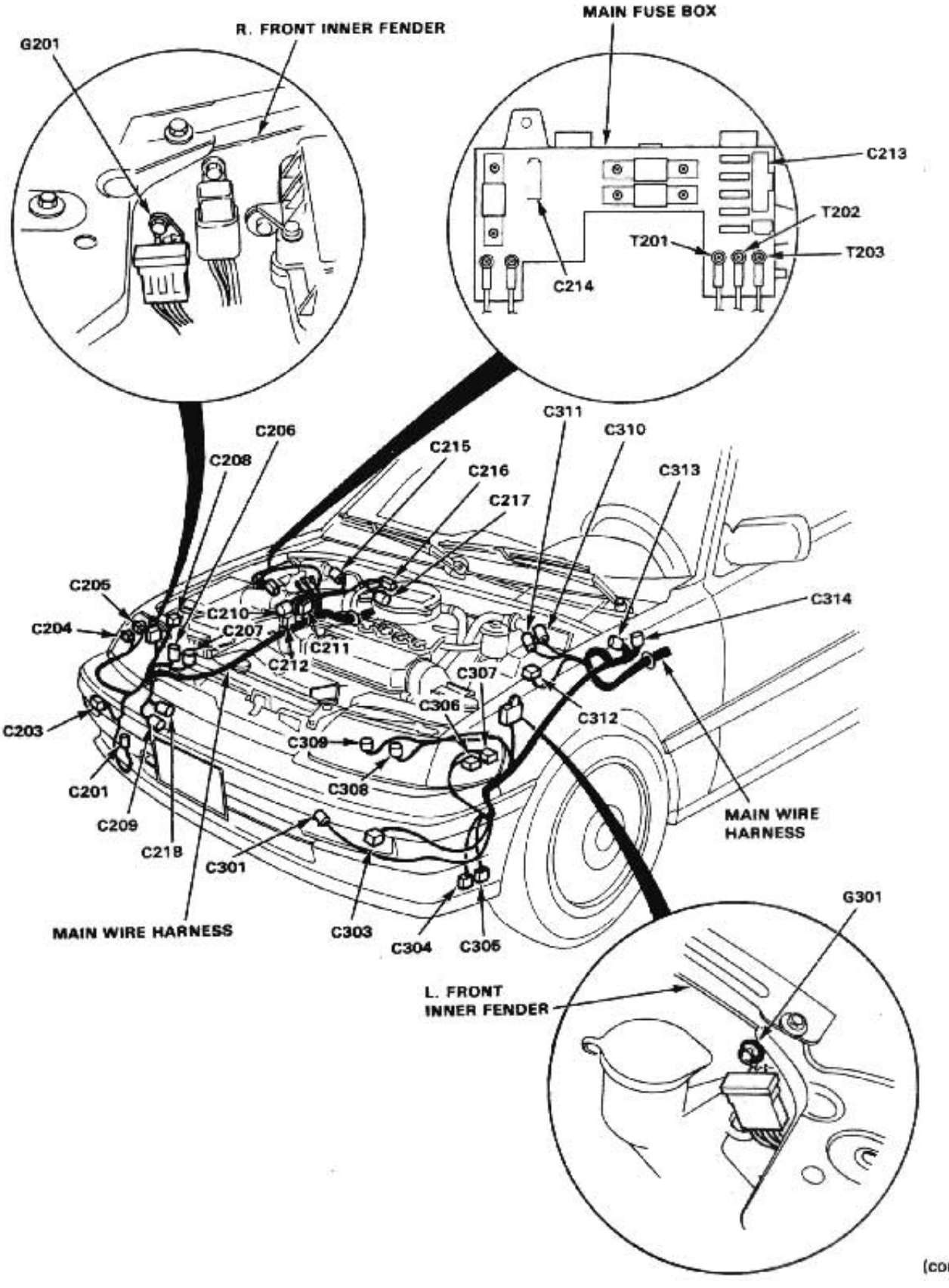
Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
C151	14	Right center engine compartment	To Main wire harness (C210)	
C152	8	Right center engine compartment	To Main wire harness (C211)	
C153	6	Right center engine compartment	To Main wire harness (C212)	
C154	1	Center engine compartment	To Starter solenoid	
C155	8	Center engine compartment	To TDC/CRANK/CYL sensor	
C156	2	Center engine compartment	To Ignition coil	
C157	1	Center engine compartment	To Oxygen sensor	
C158	2	Center engine compartment	To Coolant temperature sensor (TW)	
C159	1	Center engine compartment	To Coolant temperature gauge sensor	
C160	3	Center engine compartment	To EGR valve lift sensor	HF only
C161	1	Center engine compartment	To Back-up light switch (IN)	
C162	1	Center engine compartment	To Back-up light switch (OUT)	
C163	1	Center engine compartment	To Engine oil pressure switch	
C164	1	Center engine compartment	To Coolant temperature switch (+)	
C165	1	Center engine compartment	To Coolant temperature switch (−)	
C166	2	Center engine compartment	To EACV	
C167	4	Center engine compartment	To Voltage regulator	
C168	3	Center engine compartment	To Throttle angle sensor	
C169	2	Center engine compartment	To No.1 Fuel injector	
C170	2	Center engine compartment	To No.2 Fuel injector	
C171	2	Center engine compartment	To No.3 Fuel injector	
C172	2	Center engine compartment	To No.4 Fuel injector	
C173	2	Center engine compartment	To Intake air temperature sensor (TA)	
C174	6	Left rear engine compartment	To Fuel injector resistor	
C175	8	Left rear engine compartment	To Main wire harness (C313)	HF
C175	8	Left rear engine compartment	To Main wire harness (C314)	Si
T151		Right center engine compartment	To Main fuse box	
T152		Center engine compartment	To Alternator	
G151		Center engine compartment	To Engine ground, via engine harness	

Si and HF models



Main Wire Harness

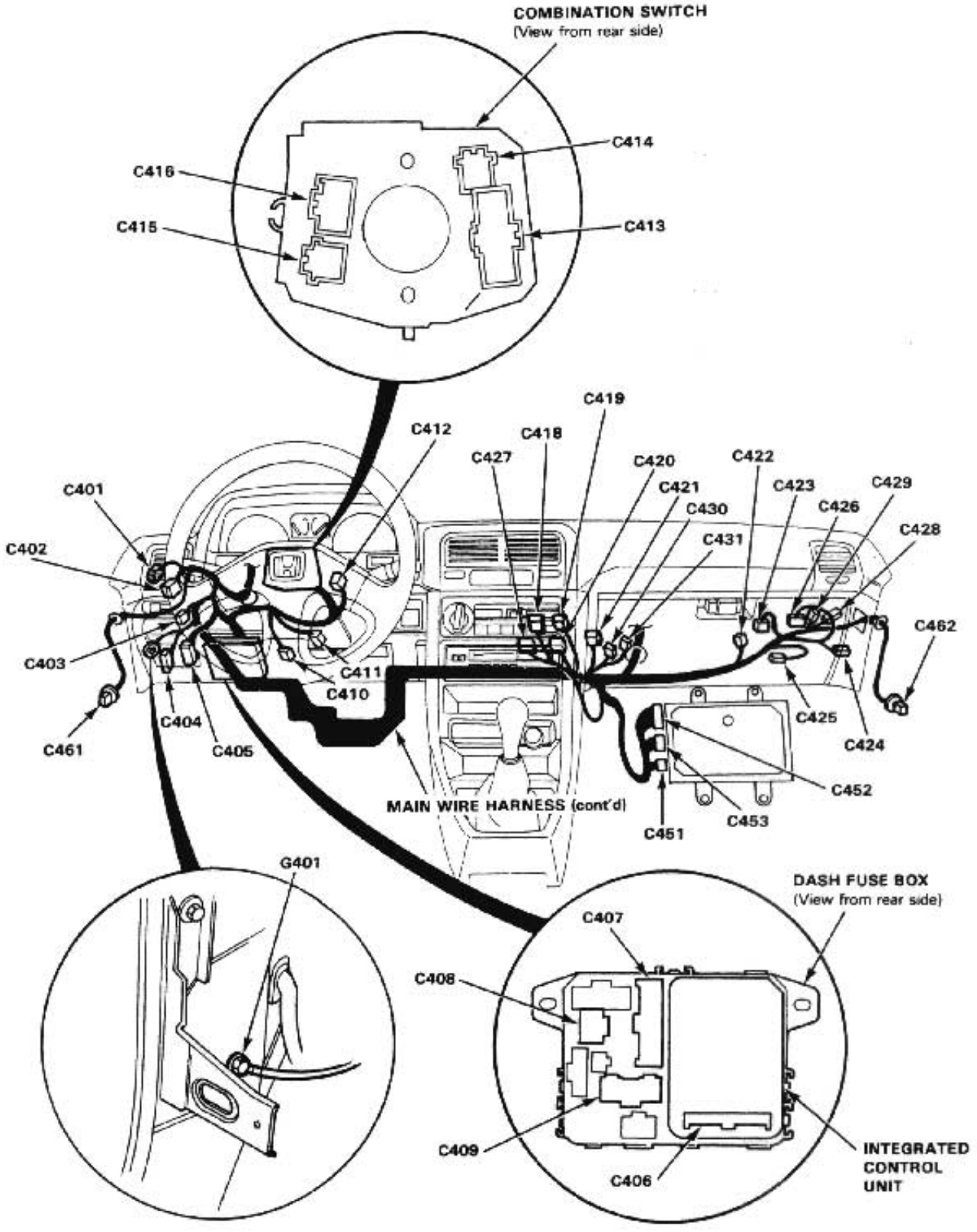
Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
C201	2	Right behind front bumper	To Right horn	
C202				
C203	2	Right behind front bumper	To Right front turn signal light	
C204	2	Right front engine compartment	To Right front marker light	
C205	2	Right front engine compartment	To Right front side marker light	
C206	2	Right front engine compartment	To Right headlight (Low)	
C207	2	Right front engine compartment	To Right headlight (High)	
C208	4	Right front engine compartment	To Radiator fan relay	
C209	2	Right front engine compartment	To Radiator fan motor	
C210	14	Right center engine compartment	To Engine wire harness (C101 or C151)	
C211	8	Right center engine compartment	To Engine wire harness (C102 or C152)	
C212	6	Right center engine compartment	To Engine wire harness (C153)	Except Std
C213	4	Right center engine compartment	To Main fuse box (C901)	
C214	3	Right center engine compartment	To Main fuse box (C902)	
C215	5	Right rear engine compartment	To Windshield wiper motor	
C216	2	Right rear engine compartment	To Purge cut-off SOL.V.	Std
C216	4	Right rear engine compartment	To EGR control/Purge cut-off SOL.V.	HF
C216	2	Right rear engine compartment	To Dashpot control/Purge cut-off SOL.V.	Si
C217	3	Right rear engine compartment	To Map sensor	
C218	3	Right center engine compartment	To Daytime running light resistor	CANADA
C301	2	Left behind front bumper	To Left horn	
C302				
C303	2	Left behind front bumper	To Left front turn signal light	
C304	2	Left behind front bumper	To Windshield washer motor	
C305	2	Left behind front bumper	To Rear window washer motor	
C306	2	Left front engine compartment	To Left front marker light	
C307	2	Left front engine compartment	To Left front side marker light	
C308	2	Left front engine compartment	To Left headlight (Low)	
C309	2	Left front engine compartment	To Left headlight (High)	
C310	1	Left rear engine compartment	To Brake fluid level switch (+)	
C311	1	Left rear engine compartment	To Brake fluid level switch (−)	
C312				
C313	14	Left rear engine compartment	To Engine wire harness (C122)	Std
C313	8	Left rear engine compartment	To Engine wire harness (C175)	HF
C314	8	Left rear engine compartment	To Engine wire harness (C175)	Si
T201		Right center engine compartment	To Main fuse box	
T202		Right center engine compartment	To Main fuse box	
T203		Right center engine compartment	To Main fuse box	
G201		Right front engine compartment	To Body ground, via main harness	
G301		Left front engine compartment	To Body ground, via main harness	


G201
R. FRONT INNER FENDER
MAIN FUSE BOX
C213
T202
T201
T203
C214
C206
C208
C215
C216
C217
C311
C310
C313
C205
C204
C210
C207
C211
C212
C314
C307
C306
C312
C203
C309
C308
C201
C209
C218
C301
MAIN WIRE HARNESS
MAIN WIRE HARNESS
C303
C304
C305
G301
L. FRONT INNER FENDER

(cont'd)

Main Wire Harness (cont'd)

Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
C401	2	Left under dash	To Roof wires (C801)	
C402	13	Left under dash	To Rear wire harness (C501)	Si, HF
C402	18	Left under dash	To Rear wire harness (C501)	Std
C403	20	Left under dash	To Jumper connector	
C404	8	Left under dash	To PGM-FI main relay	
C405	20	Left under dash	To Dashboard wire harness (C701)	USA
C405	16	Left under dash	To Dashboard wire harness	CANADA
C406	10	Left under dash	To Integrated control unit	
C407	24	Left under dash	To Dash fuse box (C972)	
C408	4	Left under dash	To Dash fuse box (C973)	
C409	7	Left under dash	To Dash fuse box (C974)	
C410	2	Left under dash	To Brake light switch	
C411	2	Left under dash	To Clutch switch	
C412	5	Left under dash	To Ignition switch	
C413	7	Left under dash	To Combination switch (Lighting)	
C414	4	Left under dash	To Combination switch (Turn signal)	
C415	6	Left under dash	To Combination switch (Rear window wiper)	
C416	8	Left under dash	To Combination switch (Windshield wiper)	
C417				
C418	13	Center under dash	To Heater control panel (Function switch)	
C419	6	Center under dash	To Heater control panel (Fan switch)	
C420	5	Center under dash	To Heater control panel (A/C switch)	
C421	8	Center under dash	To Heater mode motor	
C422	6	Right under dash	To A/C wire harness (C471)	
C423	4	Right under dash	To Heater recirculation control motor	
C424	3	Right under dash	To Atmospheric pressure sensor (PA)	
C425	2	Right under dash	To Blower motor	
C426	4	Right under dash	To Blower motor resistor	
C427	16	Center under dash	To Automatic seat belt control unit	USA only
C428	4	Right under dash	To Belt warning wire (C831)	USA only
C429	2	Right under dash	To Ignition timing adjusting connector	
C430	8	Center under dash	To Daytime running light relay	CANADA only
C431	4	Center under dash	To Daytime running light relay	CANADA only
C451	17	Right front floor	To PGM-FI ECU	
C452	20	Right front floor	To PGM-FI ECU	
C453	16	Right front floor	To PGM-FI ECU	
C461	2	Left door area	To Driver's door wires (C601)	CANADA
C461	8	Left door area	To Driver's door wires	USA
C462	2	Right door area	To Passenger's door wires (C651)	CANADA
C462	8	Right door area	To Passenger's door wires	USA
G401		Behind left kick panel	To Body ground, via main harness	

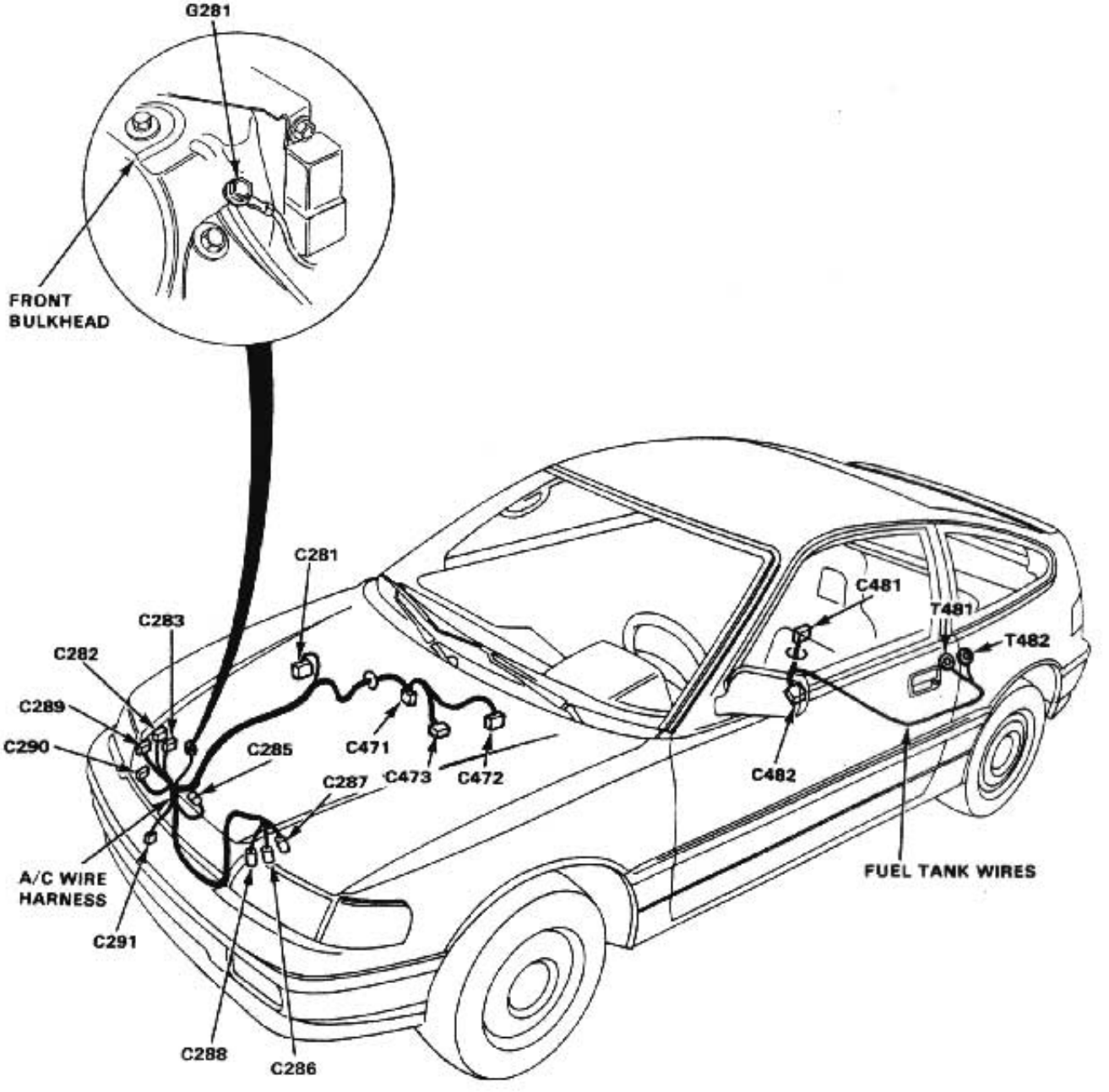

COMBINATION SWITCH
(View from rear side)
C414
C416
C415
C413
C419
C412
C418
C427
C420
C422
C401
C421
C423
C429
C430
C426
C402
C431
C428
C462
C403
C411
C410
C425
C404
C405
C424
C461
C452
MAIN WIRE HARNESS (cont'd)
C453
C451
G401
DASH FUSE BOX
(View from rear side)
C407
C408
C409
C406
INTEGRATED
CONTROL
UNIT

A/C Wire Harness

Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
C281	1	Right center engine compartment	To Main fuse box (C903)	
C282	4	Right front engine compartment	To A/C compressor clutch relay	
C283	4	Right front engine compartment	To Condenser fan relay	
C284				
C285	2	Right front engine compartment	To A/C pressure switch	
C286	4	Center front engine compartment	To Noise suppessor	
C287	1	Center front engine compartment	To A/C compressor clutch	
C288	2	Center front engine compartment	To Condenser fan relay	
C289	4	Right center engine compartment	To Cooling fan relay	CANADA
C290	2	Right center engine compartment	To Cooling fan motor	CANADA
C291	2	Right center engine compartment	To Main wire harness	CANADA
C471	6	Right under dash	To Main wire harness (C422)	
C472	2	Right under dash	To A/C thermosensor	
C473	3	Right under dash	To A/C diodes	
G281		Right front engine compartment	To Body ground, via A/C harness	

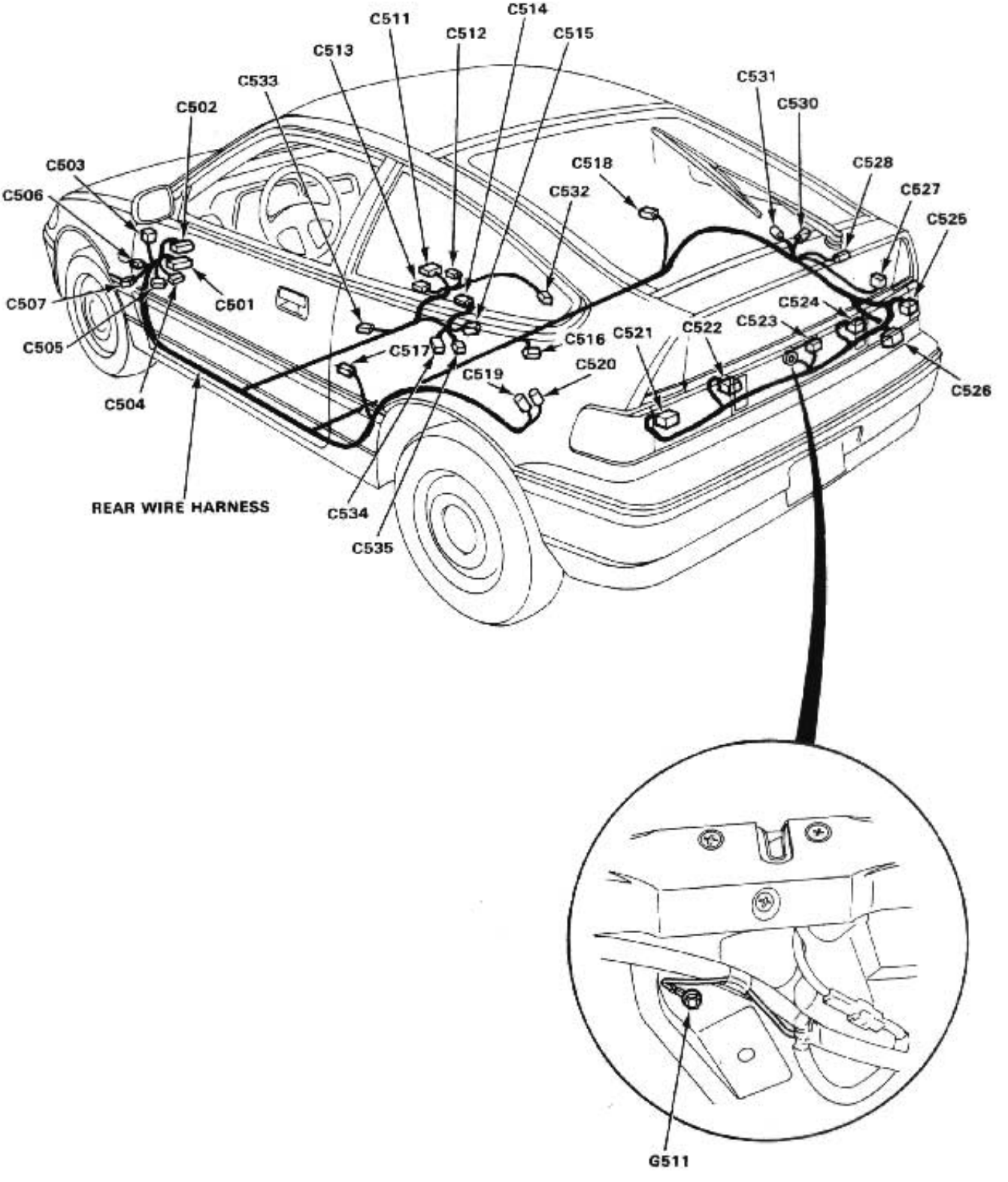
Fuel Tank wires

C481	5	Center under security compartment	To Rear wire harness (C516)	
C482	2	Fuel tank area	To Fuel gauge sending unit	
T481		Fuel tank area	To Fuel pump (+)	
T482		Fuel tank area	To Fuel pump (−)	


G281
FRONT
BULKHEAD
C281
C283
C282
C289
C290
C285
C471
C473
C472
C287
C481
T481
T482
C482
A/C WIRE
HARNESS
C291
C288
C286
FUEL TANK WIRES

Rear Wire Harness

Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
C501	13	Left under dash	To Main wire harness (C402)	Si, HF
C501	18	Left under dash	To Main wire harness (C402)	Std
C502	10	Left under dash	To Dash fuse box (C971)	
C503	4	Left under dash	To Dashboard wire harness (C703)	
C504	2	Left under dash	To Clutch interlock switch	M/T only
C505	4	Left under dash	To Starter relay	M/T only
C506	4	Left under dash	To Ignition switch	
C507	8	Left under dash	To Dashboard wire harness (C714)	A/T only
C511	10	Center floor	To Shift position console switch	A/T only
C512	2	Center floor	To Neutral safety switch	A/T only
C513	2	Center floor	To Shift position console light	A/T only
C514	1	Center floor	To Parking brake switch	
C515	2	Center floor	To Driver's seat belt switch	
C516	5	Under security compartment	To Fuel tank wires (C481)	
C517	1	Left quarter panel area	To Left door switch	
C518	1	Right quarter panel area	To Right door switch	
C519	1	Left trunk area	To Left rear speaker (+)	
C520	1	Left trunk area	To Left rear speaker (−)	
C521	4	Left rear trunk area	To Left taillight assembly	
C522	2	Left rear trunk area	To Left back-up light	
C523	2	Center trunk area	To Trunk latch switch	
C524	2	Right rear trunk area	To Right back-up light	
C525	4	Right rear trunk area	To Right taillight assembly	
C526	2	Right rear trunk area	To License plate light wires (C581)	
C527	6	Right rear trunk area	To Hatch wires (C551)	
C528	2	Right trunk area	To Trunk light	
C530	1	Right trunk area	To Right rear speaker (+)	
C531	1	Right trunk area	To Right rear speaker (−)	
C532	2	Center floor	To Passenger's seat belt switch	
C533	8	Center floor	To Interlock control unit	
C534	3	Center floor	To Shift lock solenoid	
C535	2	Center floor	To Seat belt driver's switch	CANADA only
G511		Center trunk area	To Body ground, via rear harness	

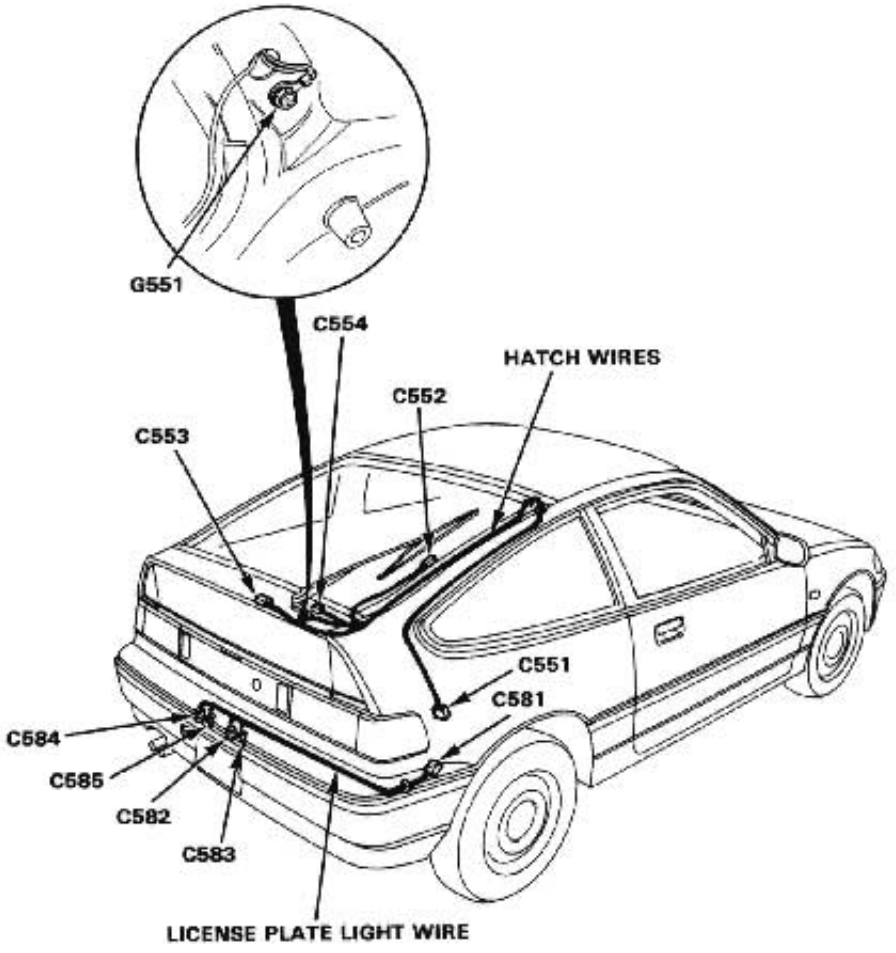

C511
C514
C512
C515
C513
C533
C531
C502
C530
C503
C518
C528
C506
C532
C527
C525
C507
C501
C524
C523
C505
C521
C522
C516
C517
C520
C519
C526
C504
REAR WIRE HARNESS
C534
C535
G511

Hatch Wires

Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
C551	6	Right rear trunk area	To Rear wire harness (C527)	
C552	1	Hatch area	To Rear window defogger (+)	
C553	2	Hatch area	To High mount brake light	
C554	4	Hatch area	To Rear window wiper motor	Si Std
G551		Hatch area	To Body ground, via hatch wires	

License Plate Light Wires

C581	2	Right rear trunk area	To Rear wire harness (C526)	
C582	1	Behind rear bumper	To Right license plate light (+)	
C583	1	Behind rear bumper	To Right license plate light (−)	
C584	1	Behind rear bumper	To Left license plate light (+)	
C585	1	Behind rear bumper	To Left license plate light (−)	

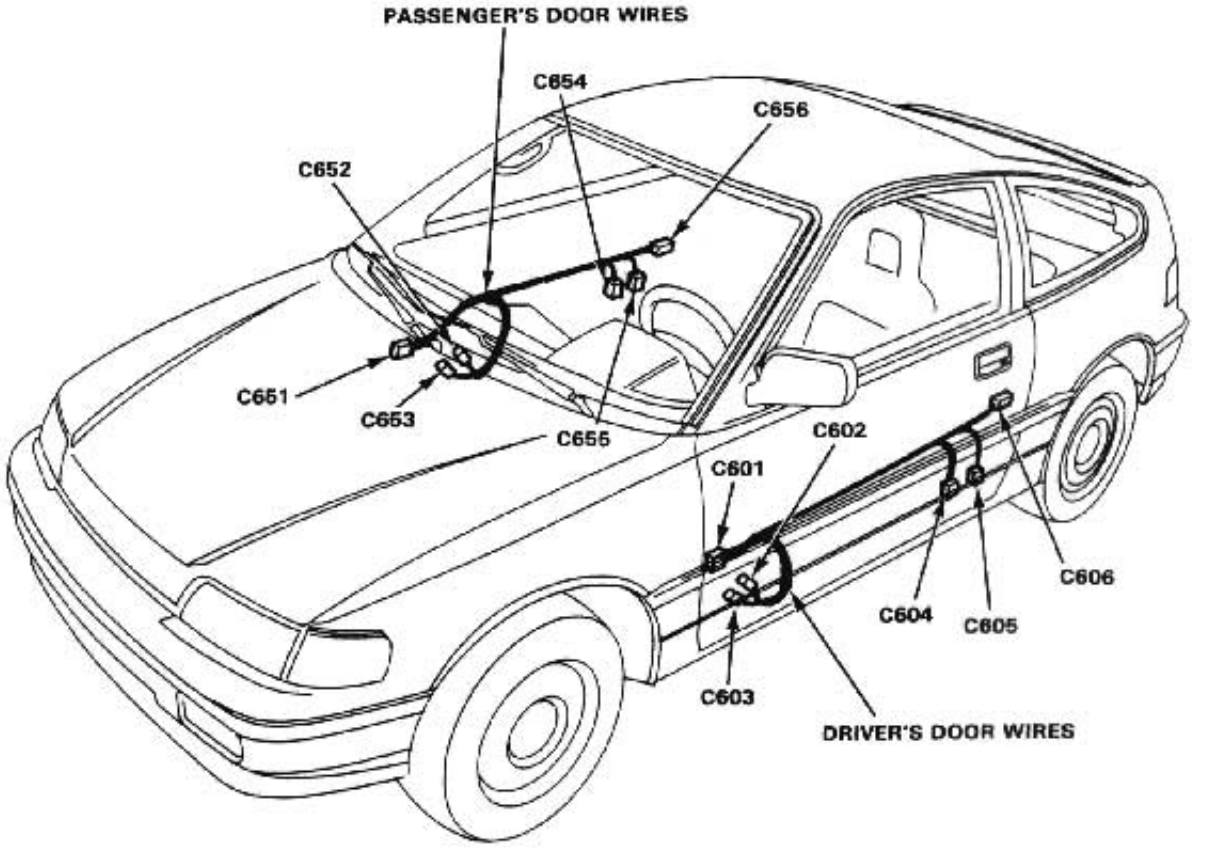


Driver's Door Wires

Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
C601	8	Left door area	To Main wire harness (C461)	
C601	2	Left door area	To Main wire harness (C461)	CANADA
C602	1	Left door area	To Left front speaker (+)	
C603	1	Left door area	To Left front speaker (−)	
C604	4	Left door area	To Driver's seat belt retractor A	Si, Std
C605	4	Left door area	To Driver's seat belt retractor B	Si, Std
C606	2	Left door area	To Left door latch switch	Si, Std

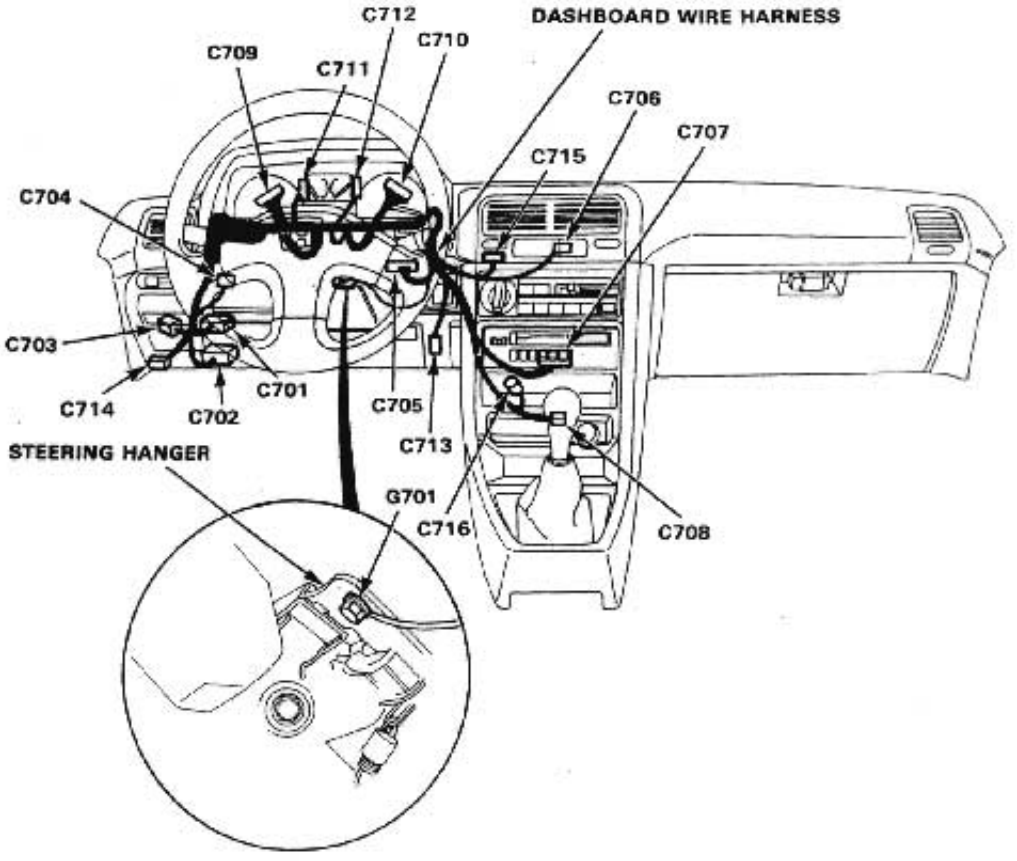
Passenger's Door Wires

C651	8	Right door area	To Main wire harness (C462)	
C651	2	Right door area	To Main wire harness (C462)	CANADA
C652	1	Right door area	To Right front speaker (+)	
C653	1	Right door area	To Right front speaker (−)	
C654	4	Right door area	To Front passenger's seat belt retractor A	Si, Std
C655	4	Right door area	To Front passenger's seat belt retractor B	Si, Std
C656	2	Right door area	To Right door latch switch	Si, Std



Dashboard Wire Harness

Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
C701	20	Left under dash	To Main wire harness (C405)	USA
C701	16	Left under dash	To Main wire harness (C405)	CANADA
C702	18	Left under dash	To Dash fuse box (C952)	
C703	4	Left under dash	To Rear wire harness (C503)	
C704	3	Left under dash	To Dashlight brightness controller	
C705	5	Left under dash	To Rear window defogger switch	
C706	4	Center under dash	To Clock	
C707	16	Center under dash	To Stereo radio cassette player	
C708	4	Center under dash	To Cigarette lighter/Light	
C709	12	Behind gauge	To Gauge assembly	
C710	8	Behind gauge	To Gauge assembly	
C711	5	Behind gauge	To Gauge assembly	
C712	14	Behind gauge	To Gauge assembly	A/T only
C713	6	Center under dash	To Dashlight brightness control unit	
C714	8	Left under dash	To Rear harness (C507)	A/T only
C715	10	Center under dash	To Hazard switch	
C716	4	Center under dash	To Cigarette lighter relay	
G701		Center under dash	To Body ground, via dashboard harness	



Roof Wires

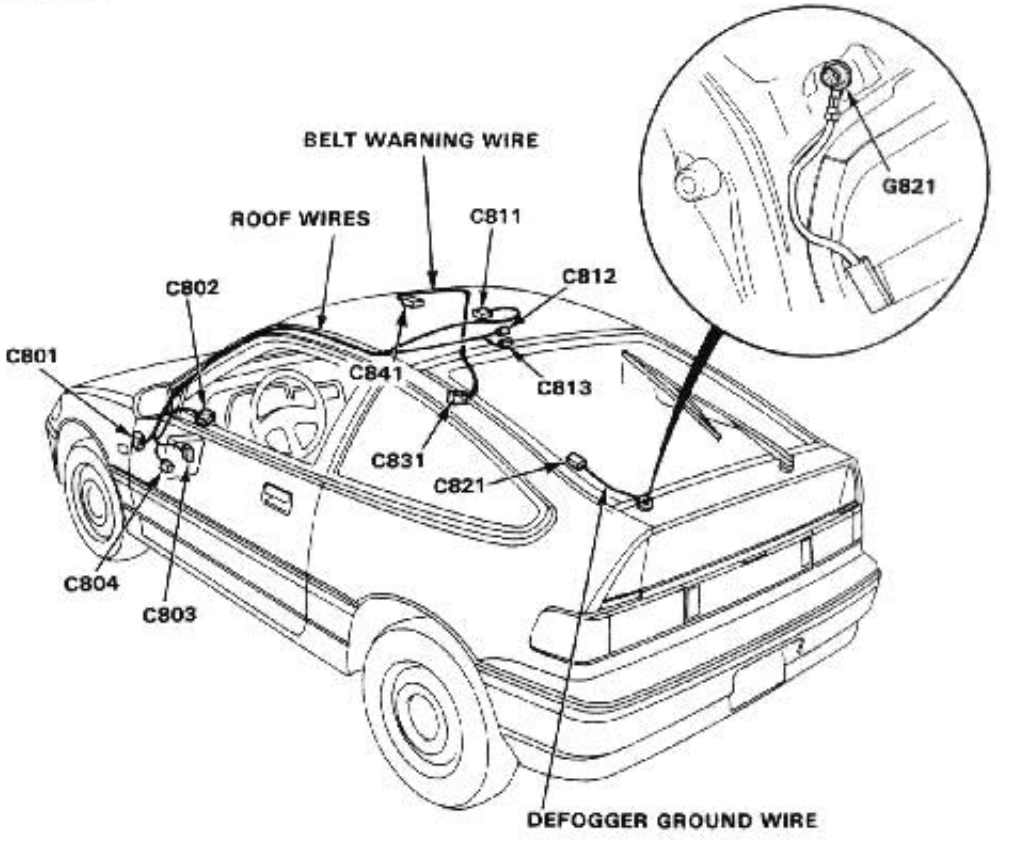
Connector and Terminal Number	Number of Pins	Location	Where the Wires Go	Remark
C801	2	Left under dash	To Main wire harness (C401)	
C802	6	Left under dash	To Sunroof switch	With sunroof
C803	3	Left under dash	To Dash fuse box (C976)	With sunroof
C804	4	Left under dash	To Sunroof relay	With sunroof
C811	4	Roof area	To Sunroof motor	With sunroof
C812	1	Roof area	To Dome light (+)	
C813	1	Roof area	To Dome light (Door switch)	

Defogger Ground Wire

C821	1	Hatch area	To Rear window defogger	
G821		Hatch area	To Body ground, via defogger ground wire	

Belt Warning Wire

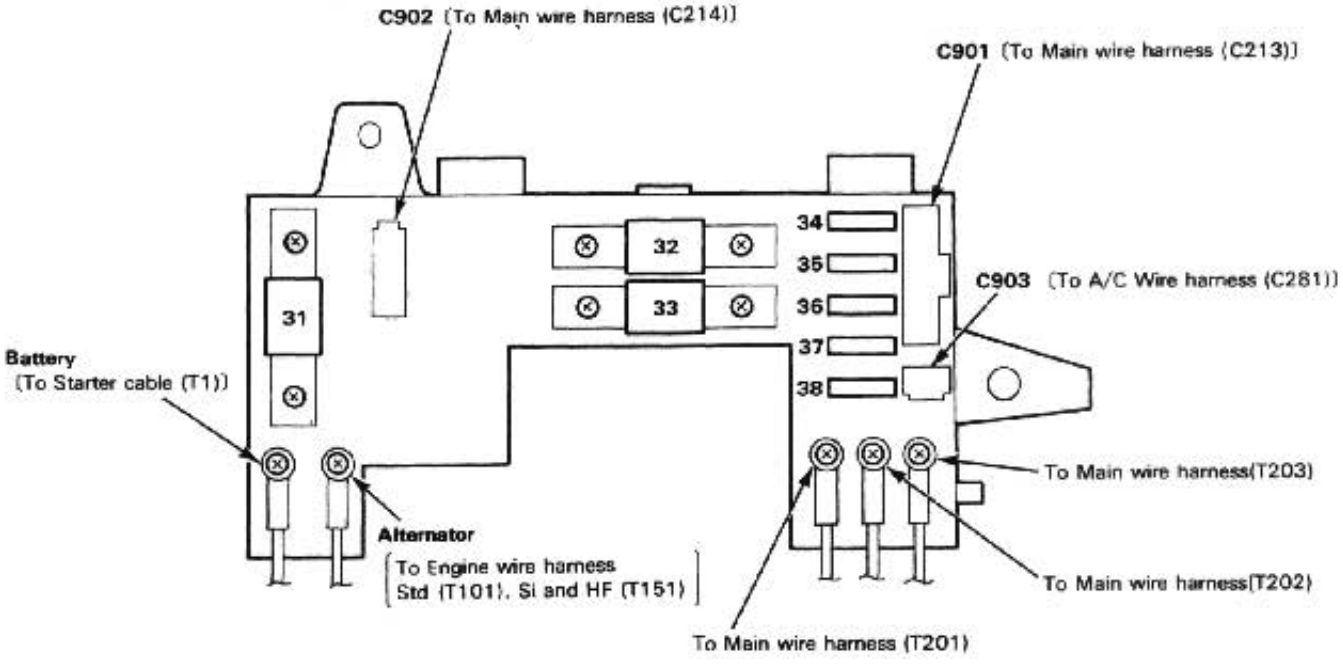
C831	4	Right under dash	To Main wire harness (C428)	USA
C841	5	Roof area	To Belt warning	USA



Fuses

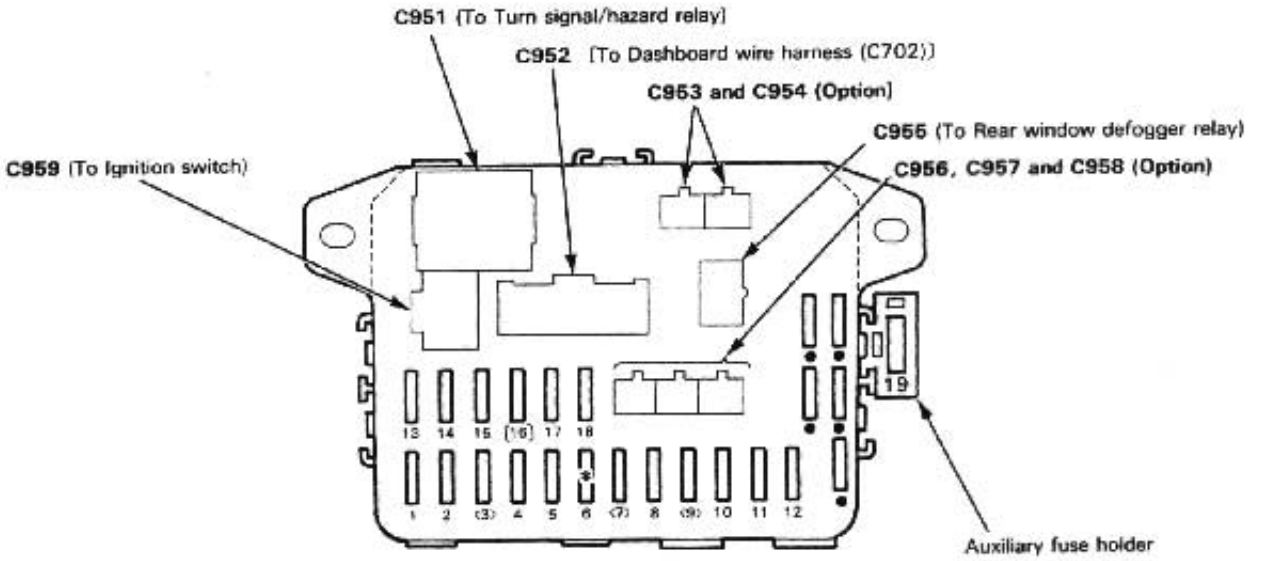
Main Fuse Box

NOTE: Main fuse box is located right side, engine compartment.

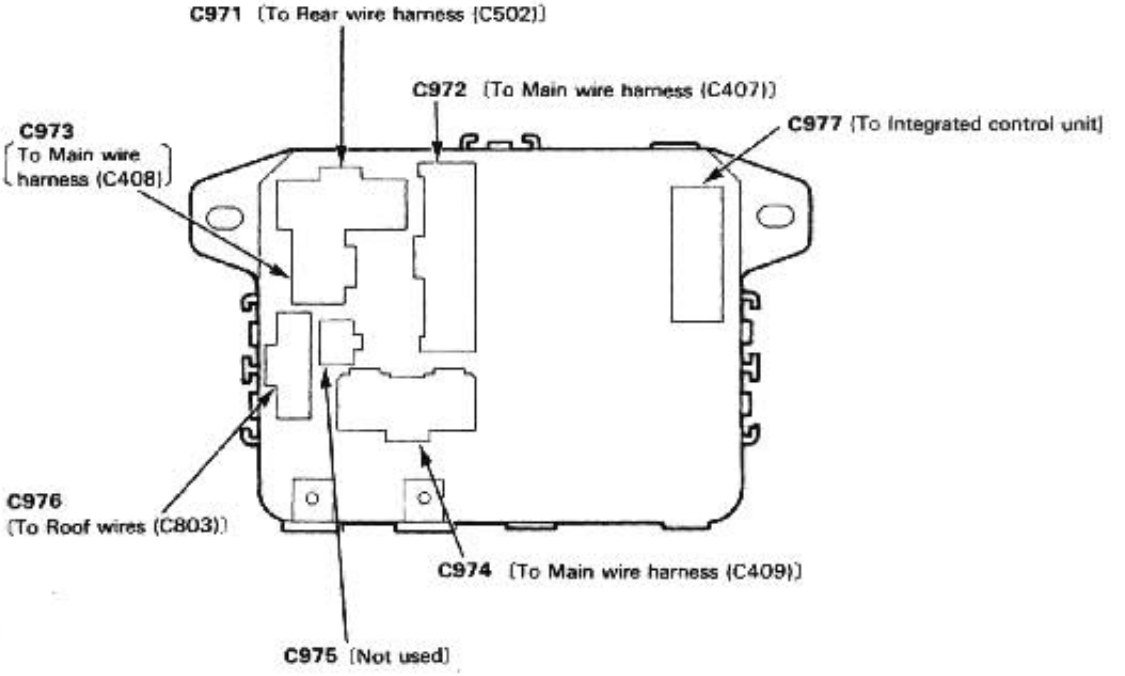


Dash Fuse Box

NOTE: Dash fuse box is located left side, under dash.

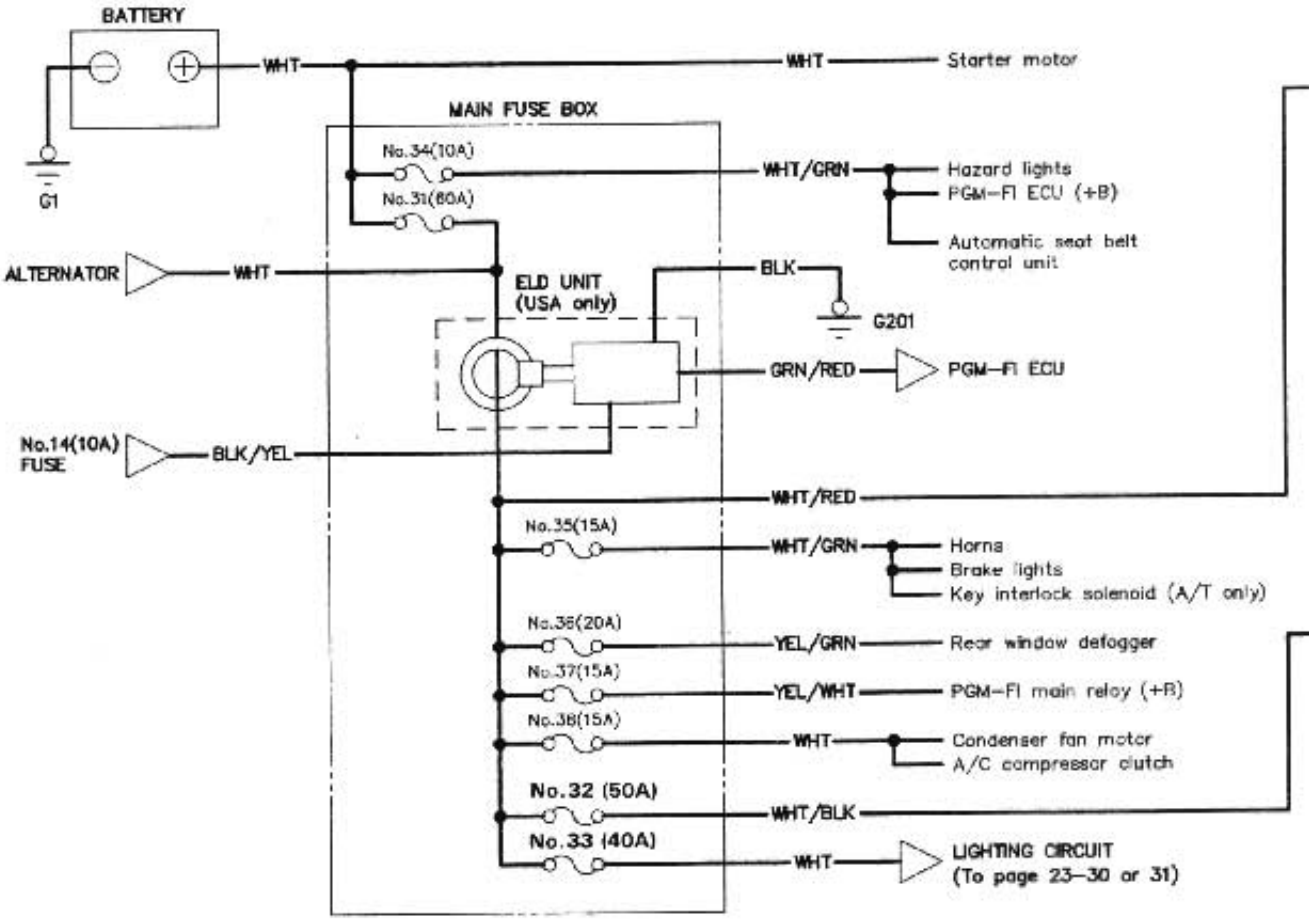


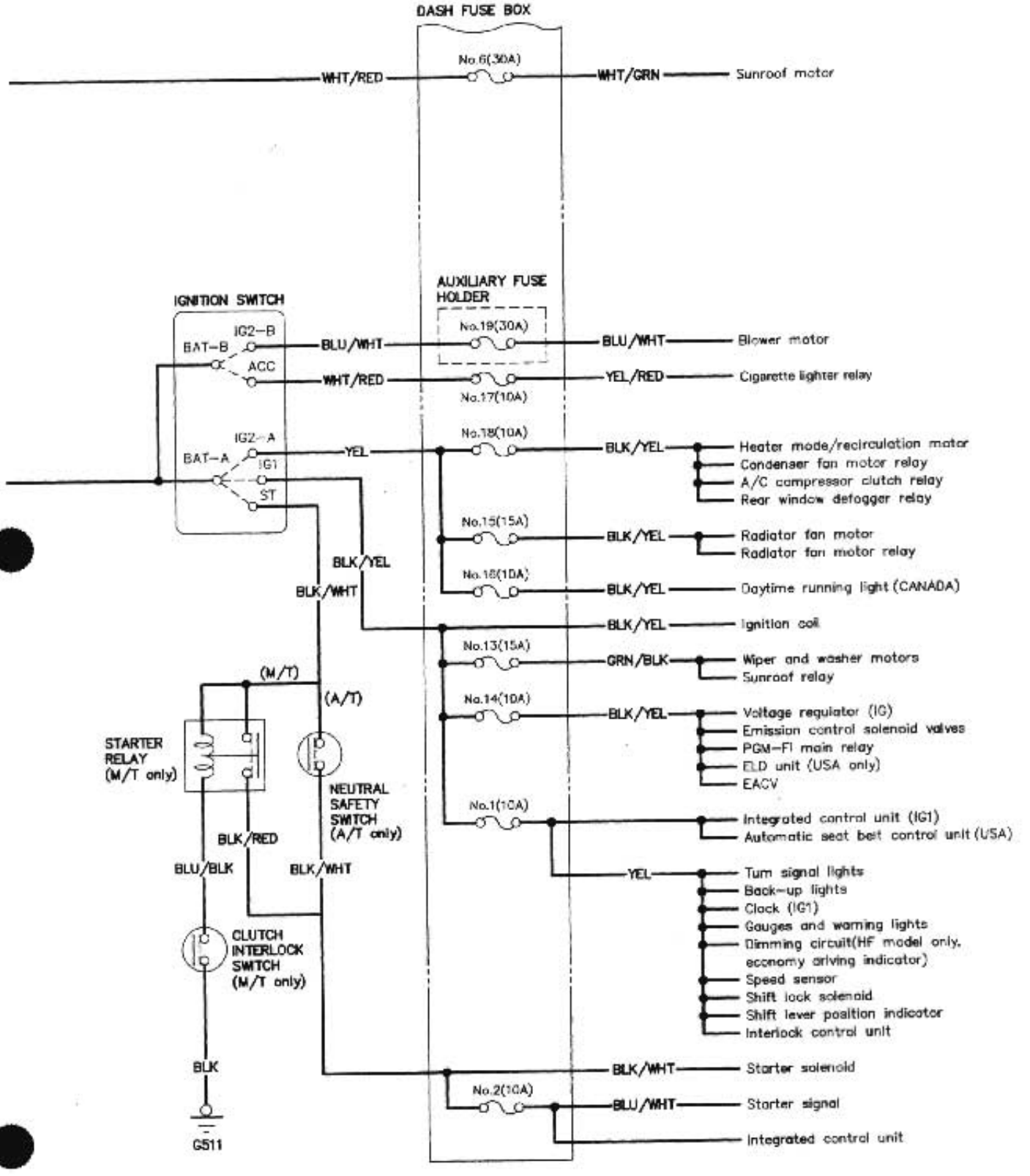
* : Si model only
◇ : Not used
● : Spare fuse
() : CANADA



Power Distribution

Circuit Identification

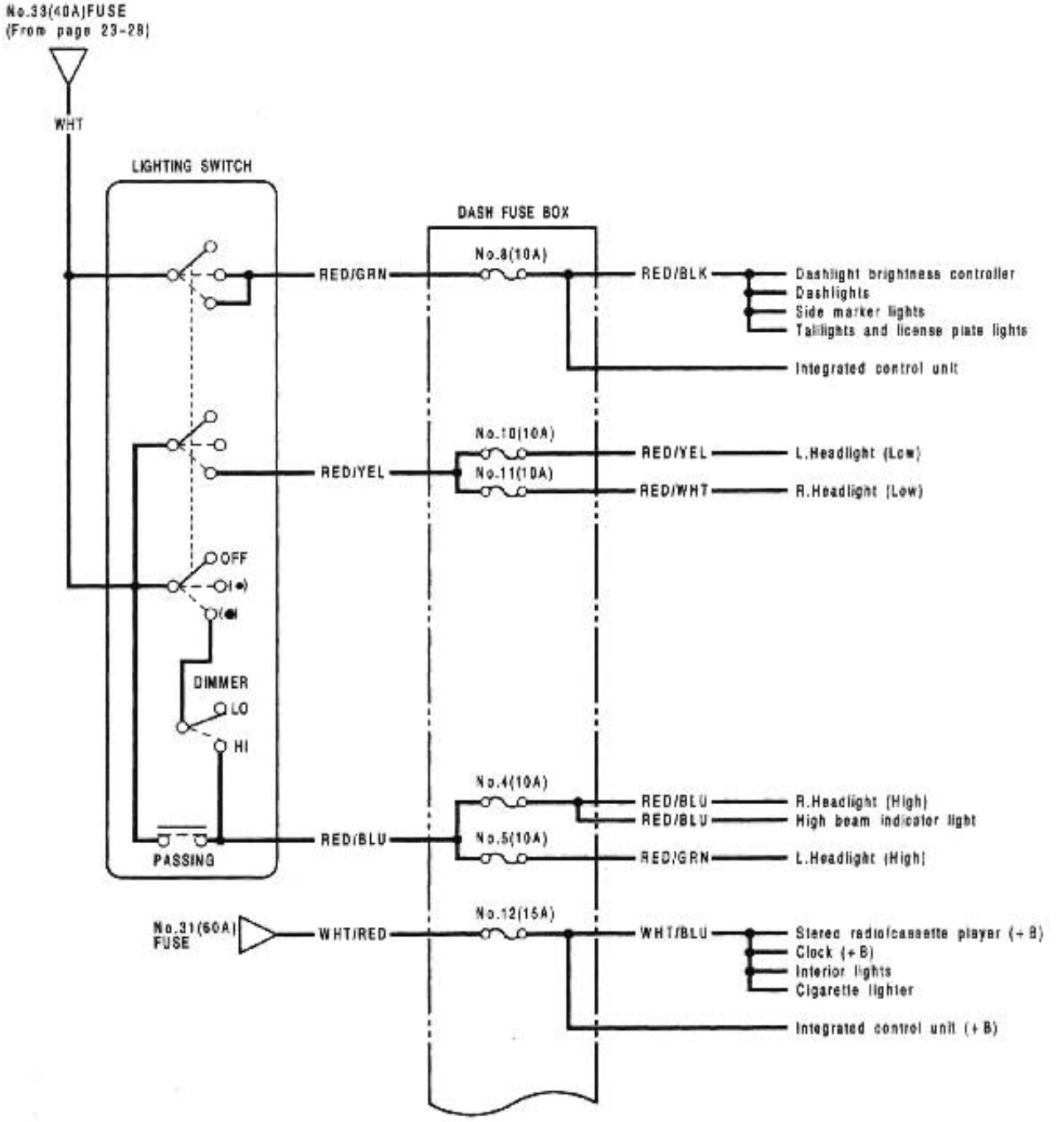



DASH FUSE BOX
No.6(30A)
WHT/RED
WHT/GRN
Sunroof motor
AUXILIARY FUSE HOLDER
IGNITION SWITCH
IG2-B
BAT-B
ACC
BAT-A
IG2-A
IG1
ST
No.19(30A)
BLU/WHT
BLU/WHT
Blower motor
WHT/RED
YEL/RED
Cigarette lighter relay
No.17(10A)
No.18(10A)
YEL
BLK/YEL
Heater mode/recirculation motor
Condenser fan motor relay
A/C compressor clutch relay
Rear window defogger relay
No.15(15A)
BLK/YEL
Radiator fan motor
Radiator fan motor relay
No.16(10A)
BLK/YEL
Daytime running light (CANADA)
BLK/YEL
BLK/WHT
BLK/YEL
Ignition coil
No.13(15A)
GRN/BLK
Wiper and washer motors
Sunroof relay
No.14(10A)
BLK/YEL
Voltage regulator (IG)
Emission control solenoid valves
PGM-FI main relay
ELD unit (USA only)
EACV
(M/T)
(A/T)
STARTER RELAY (M/T only)
NEUTRAL SAFETY SWITCH (A/T only)
No.1(10A)
Integrated control unit (IG1)
Automatic seat belt control unit (USA)
BLK/RED
BLU/BLK
BLK/WHT
YEL
Turn signal lights
Back-up lights
Clock (IG1)
Gauges and warning lights
Dimming circuit(HF model only, economy driving indicator)
Speed sensor
Shift lock solenoid
Shift lever position indicator
Interlock control unit
CLUTCH INTERLOCK SWITCH (M/T only)
BLK
BLK/WHT
Starter solenoid
No.2(10A)
BLU/WHT
Starter signal
Integrated control unit
G511

Power Distribution

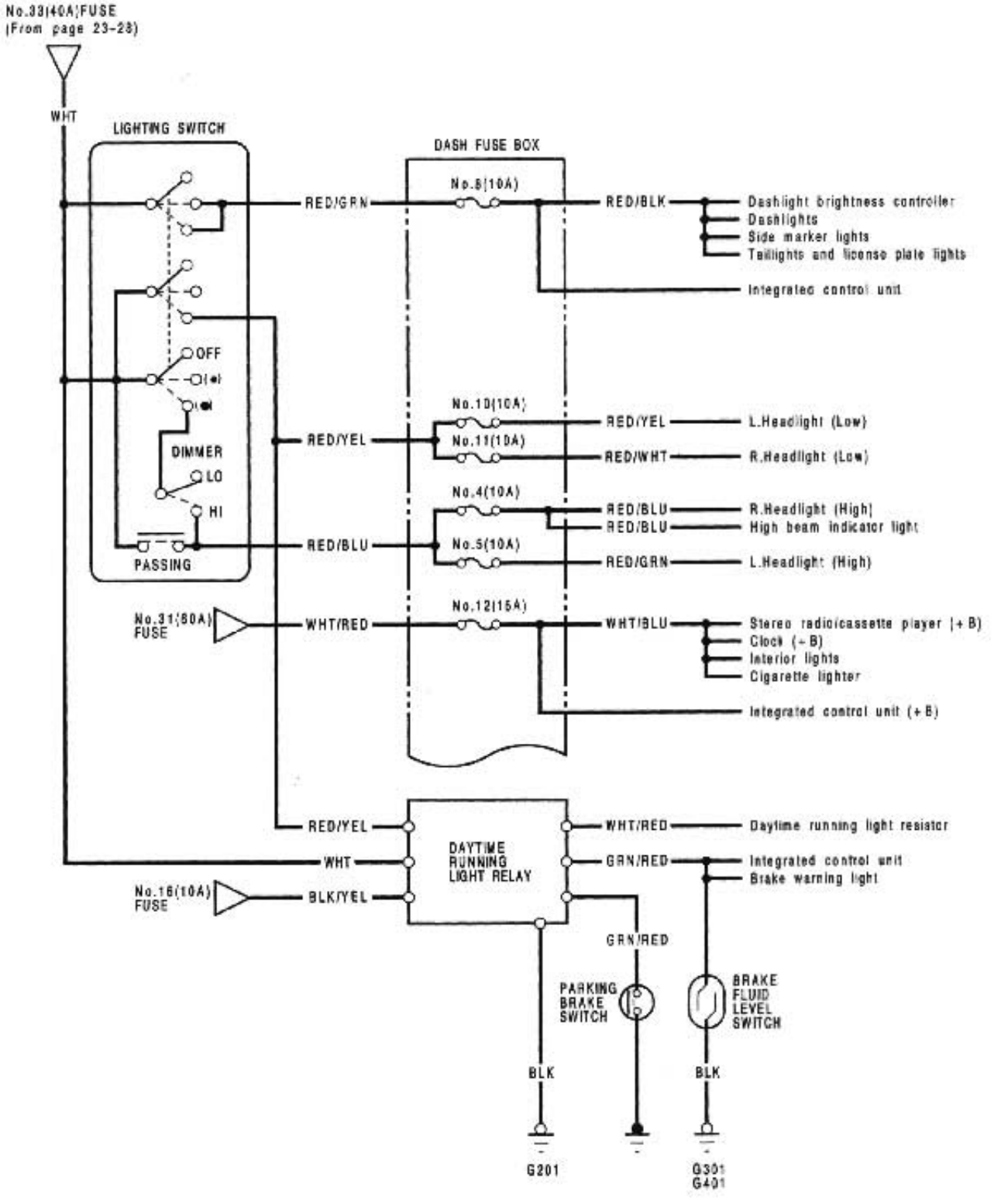
Circuit Identification

USA:



CANADA:

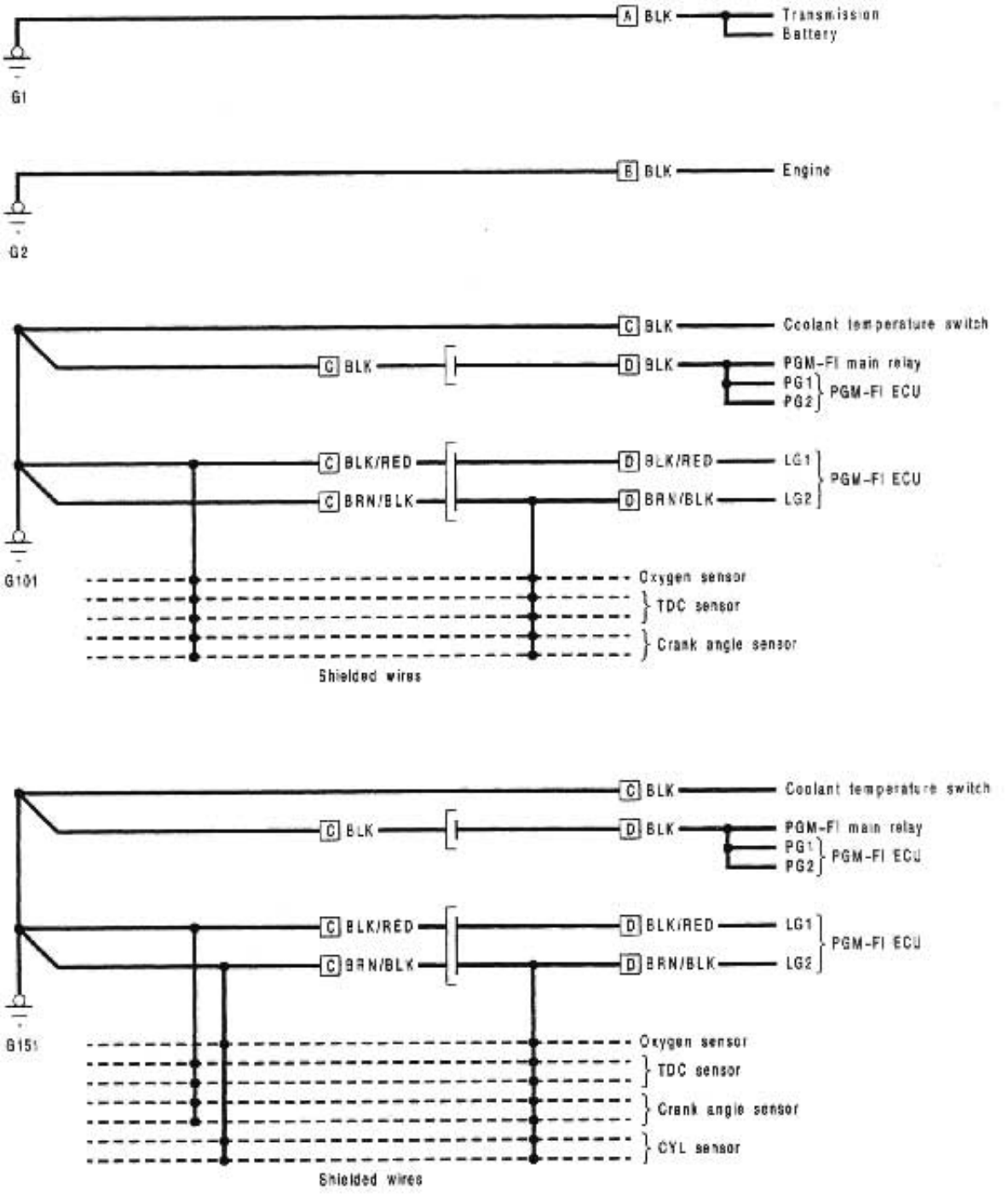
CANADA:



Ground Distribution

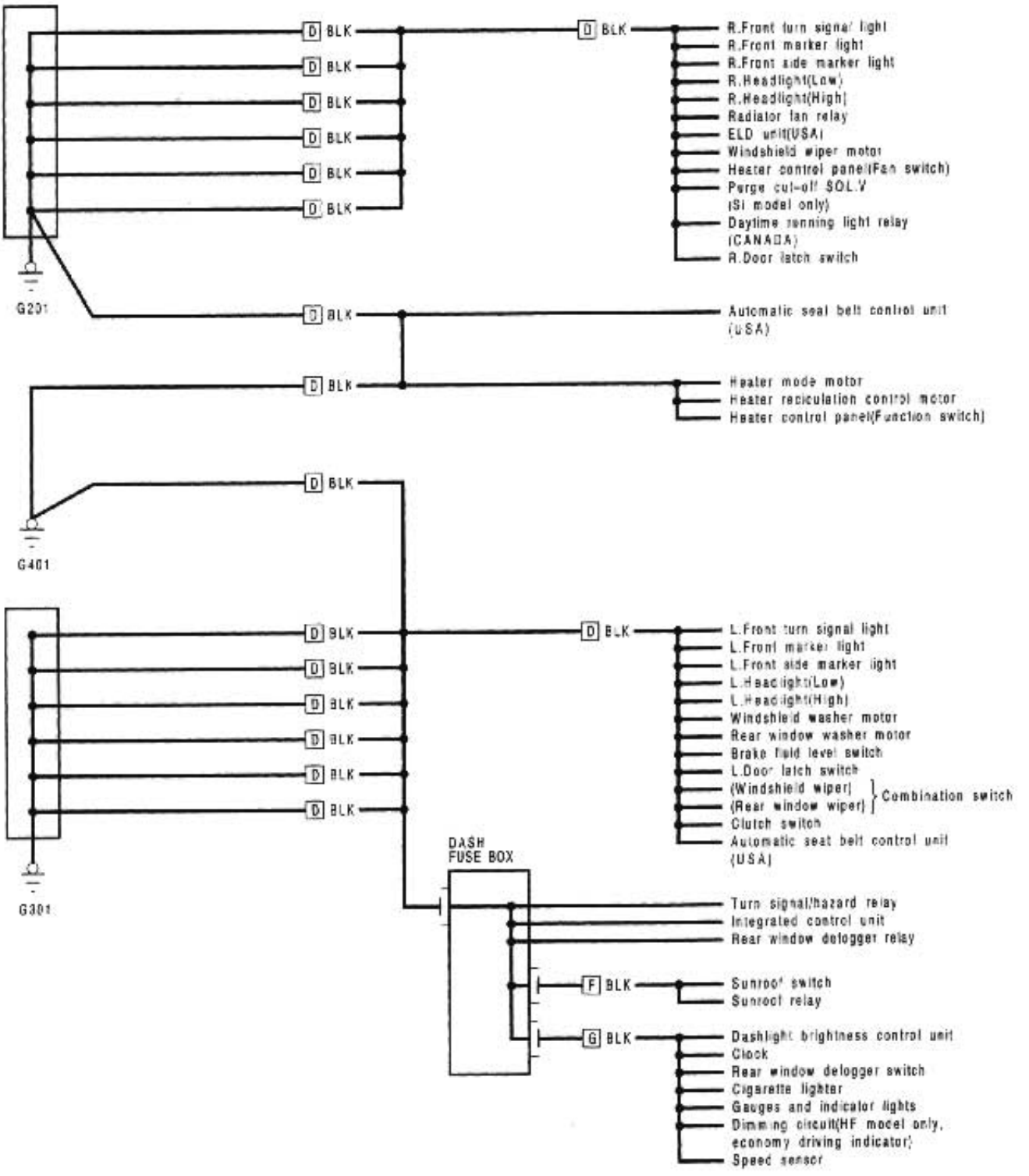
Circuit Identification

NOTE: See page 23-9,11 and 13 for illustrated ground locations.



A : Battery ground wire
B : Engine ground wire
C : Engine wire harness
D : Main wire harness

NOTE: See pages 23-15 and 17 for illustrated ground locations.



D : Main wire harness
F : Roof wires
G : Dashboard wire harness

(cont'd)

Battery

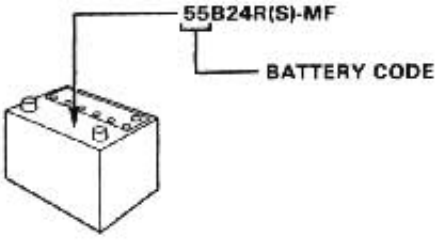
Test

⚠WARNING

- **Battery fluid (electrolyte) contains sulphric acid. It may cause severe burns if it gets on your skin or in your eyes. Wear protective clothing and a face shield.**
  - **If electrolyte gets on your skin or clothes, rinse it off with water immediately.**
  - **If electrolyte gets in your eyes, flush it out by splashing water in your eyes for at least 15 minutes; Call a physician immediately.**
- **A battery gives off hydrogen gas. If ignited, the hydrogen will explode and could crack the battery case and splatter acid on you. Keep sparks, flames, and cigarettes away from the battery.**
- **Overcharging will raise the temperature of the electrolyte. This may force electrolyte to spray out of the battery vents. Follow the charger manufacturer's instructions and charge the battery at a proper rate.**

If you're using a computerized battery tester, follow the test procedure provided with it. If you don't have a computerized tester, follow this conventional test procedure: To get accurate results, the temperature of the electrolyte must be between 21°C (70 °F) and 38°C (100 °F).

Most batteries are categorized by a 2-digit code (found on top of the battery).



Check For Damage
If the case is cracked or the posts are loose, replace the battery.

↓

Check Indicator EYE Color
If the indicator shows low electrolyte, add distilled water if possible.

↓

EYE Indicates OK

↓

Test Load Capacity (#1)
- Apply 300 amp load for 15 seconds to remove surface charge.
- Allow 15 seconds recovery period.
- Apply test load (see Test Load Chart).
- Record voltage at the end of 15 seconds.

↓

Stays above 9.6 volts; battery is OK.

EYE Indicates LOW CHARGE

↓

Drops below 9.6 volts.

↓

Charge on High Setting (40 amps)
Charge until EYE shows charge is OK; plus an additional 30 minutes to assure full charge.
NOTE: If the battery charge is very low, it may be necessary to bypass the chargers polarity protection circuitry.
If the EYE does not show charge is OK within 3 hours, the battery is no good; replace it.

↓

Test Load Capacity (#2)
- Apply 300 amp load for 10 seconds to remove surface charge.
- Allow 15 seconds recovery period.
- Apply that load (see Test Load Chart).
- Record voltage at the end of 15 seconds.

↓

Stay above 9.6 volts; battery is OK.

Drops below 9.6 volts; battery is no good.

LOAD TEST CHART

Use the test load or 1/2 the cold cranking amps (CCA) printed on the label on the top of the battery. If neither is indicated, use the information below.

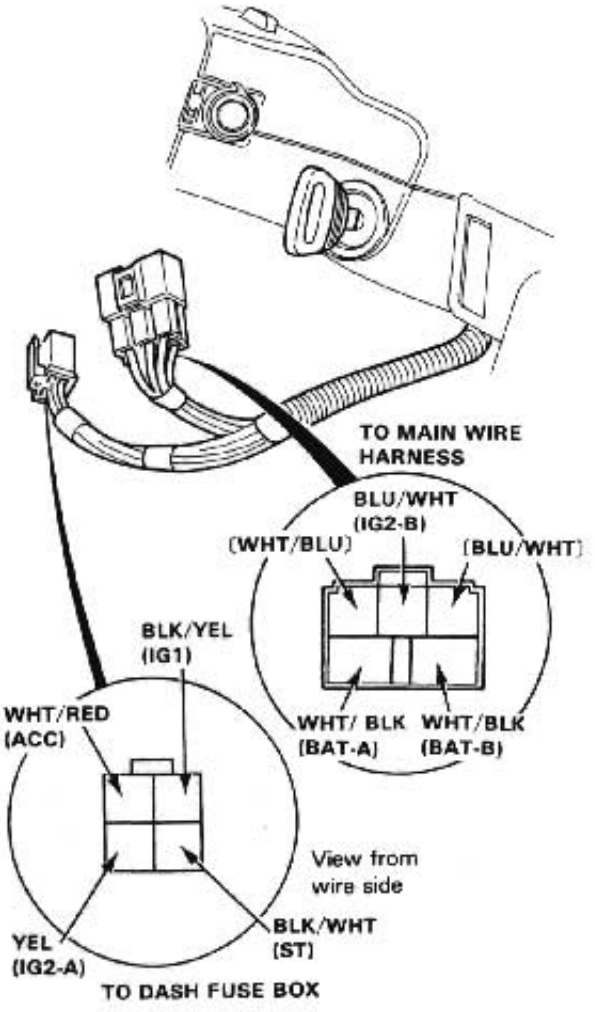
BATTERY CODE	COLD CRANKING AMPS (CCA)	LOAD (amps)
80	550	270
70	440	220
55 & NX	405	200

Ignition Switch

Test

1. Remove the dashboard lower panel.
2. Disconnect the 4-P connector from the dash fuse box and 5-P connector from the main wire harness.
3. Check for continuity between the terminals in each switch position according to the table.

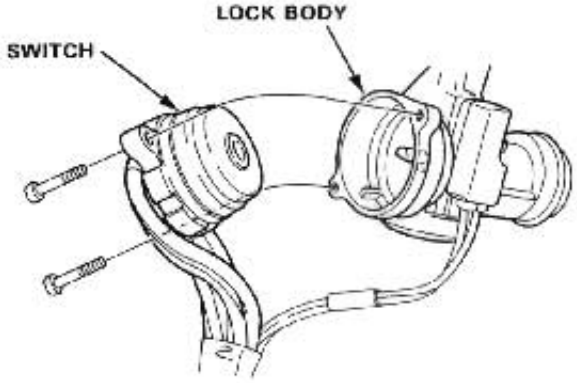
Terminal / Position	WHT/RED (ACC)	WHT/BLK (BAT-B)	BLU/WHT (IG2-B)	WHT (BAT-A)	BLK/YEL (IG1)	YEL (IG2-A)	BLK/WHT (ST)
O							
I	○—○						
II	○—○—○			○—○—○			
III				○—○		○	



NOTE: The terminals inside [ ] are not used in this test.

Electrical Switch Replacement

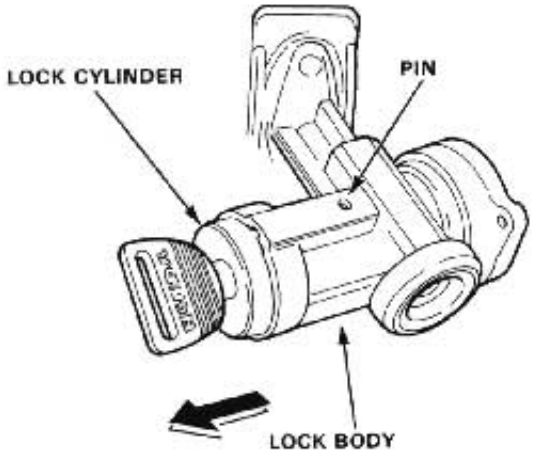
1. Remove the dashboard lower panel.
2. Remove the steering column lower cover.
3. Disconnect the 4-P connector from the dash fuse box and 5-P connector from the main wire harness.
4. Insert the key and turn it to "0."
5. Remove the 2 screws and replace the base of the switch



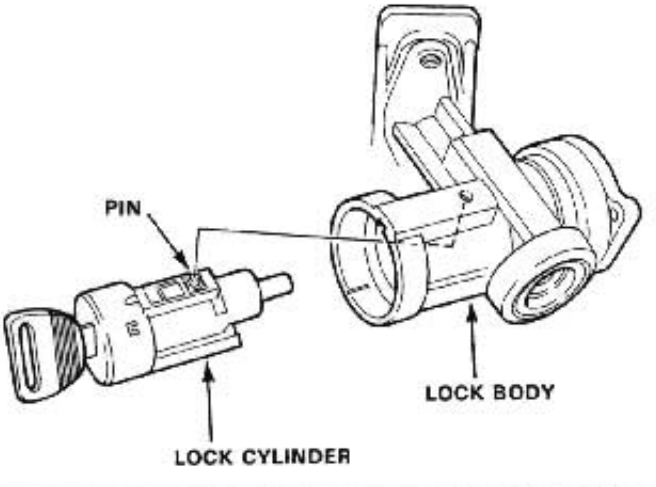
Lock Cylinder Replacement (M/T only)

NOTE:
- Replace the steering lock assembly on the car with an automatic transmission.

1. Remove the dashboard lower panel.
2. Remove the steering wheel, then remove the steering column covers.
3. Turn the ignition key to "I."
4. Push the pin in and remove the lock cylinder from the lock body.



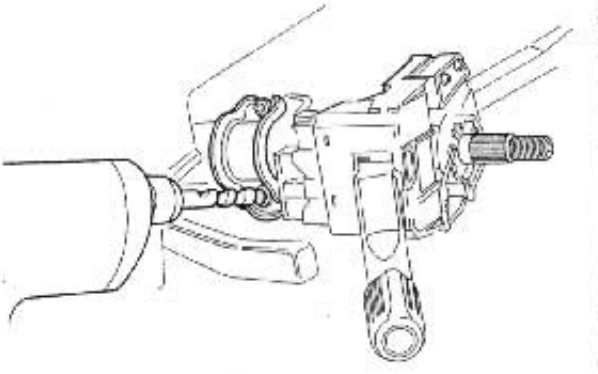
5. Turn the key to "O" and align the lock cylinder with the lock body.
6. Turn the key almost to "I" and insert the lock cylinder until the pin touches the body.
7. Turn the key to the "I", push the pin and insert the lock body cylinder into the lock until the pin clicks into place.



Steering Lock Replacement

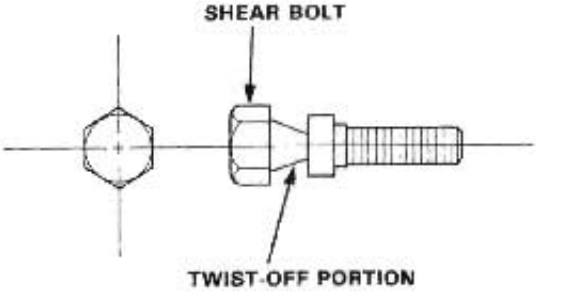
1. Remove the dashboard lower panel.
2. Remove the steering wheel, then remove the steering column covers.
3. Center punch each of the 2 shear bolts and drill their heads off with a 3/16 in. drill bit.

   CAUTION: Do not damage the switch body when removing the shear heads.
4. Remove the shear bolts from the switch body.

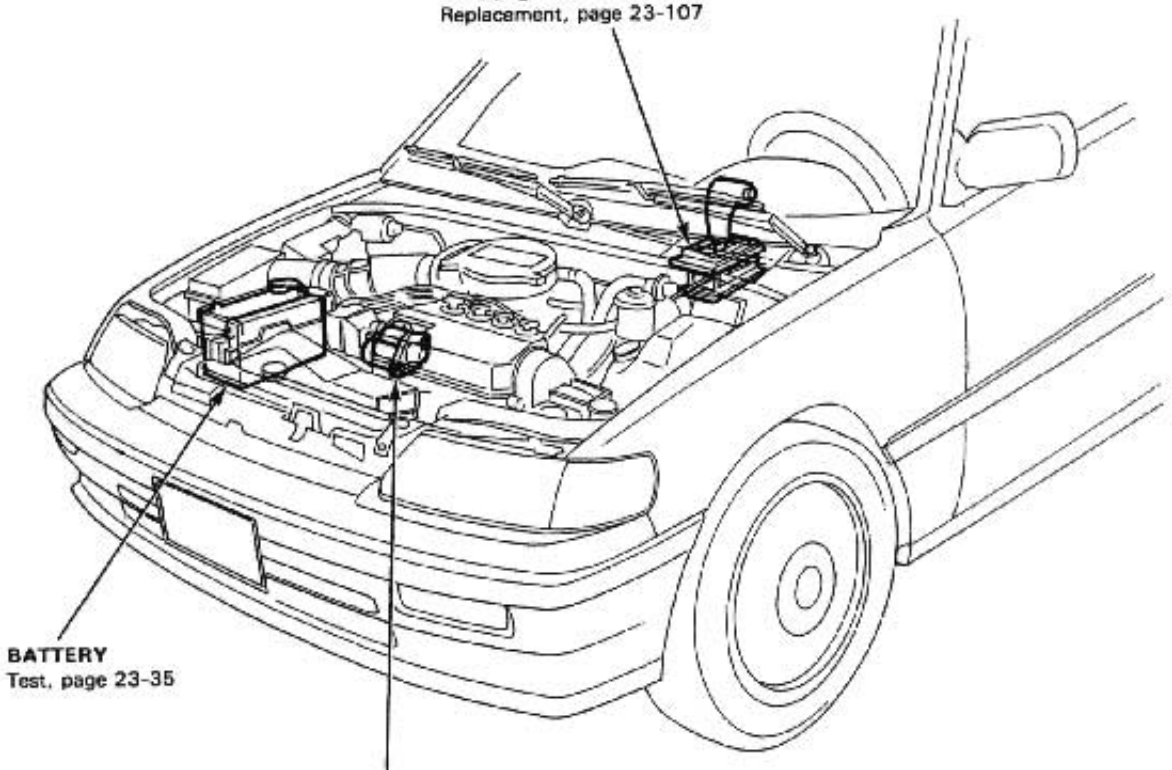


5. Install the new ignition switch without the key inserted.
6. Loosely tighten the new shear bolts.

   NOTE: Make sure the projection on the ignition switch is aligned with the hole in the steering column.
7. Insert the ignition key and check for proper operation of the steering wheel lock and that ignition key turns freely.
8. Tighten the shear bolts until the hex heads twist off.



Component Location Index



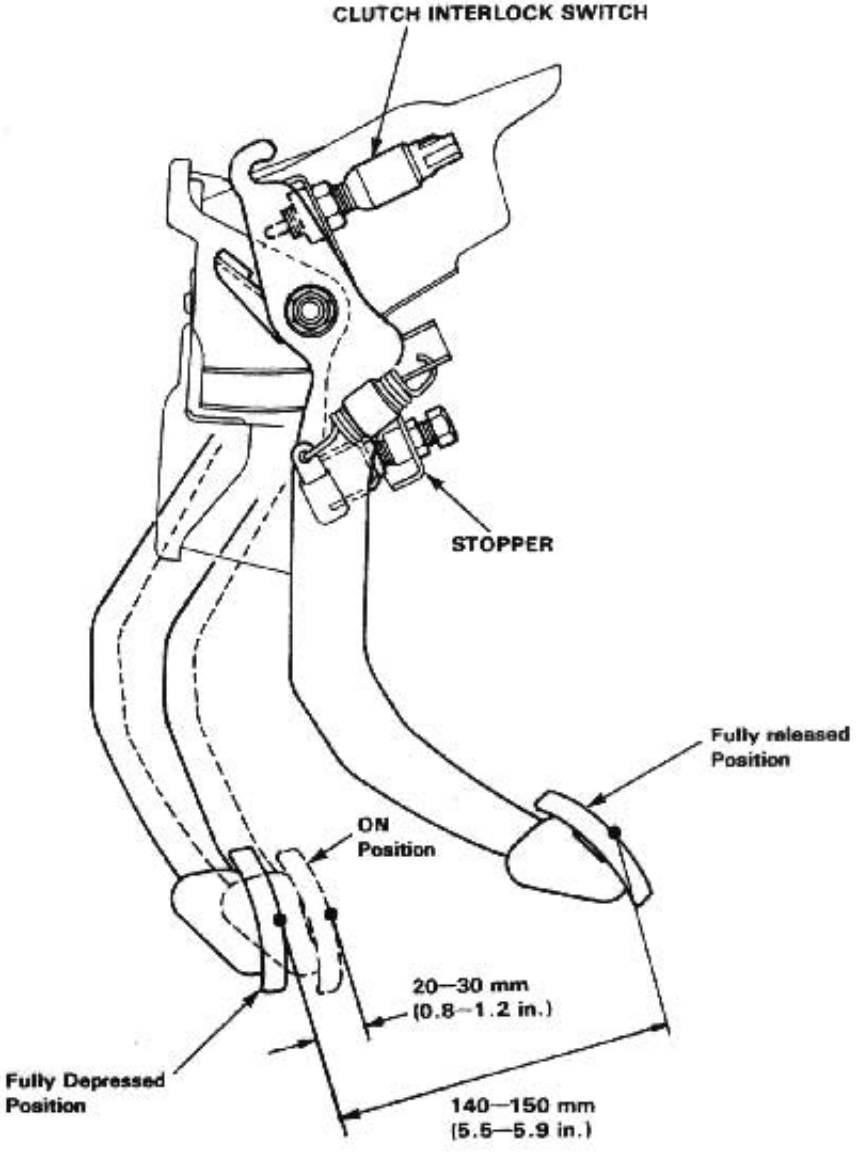
Description

Starter Interlock System (M/T only):

The starter interlock system prevents the engine from starting unless the clutch pedal is fully depressed.

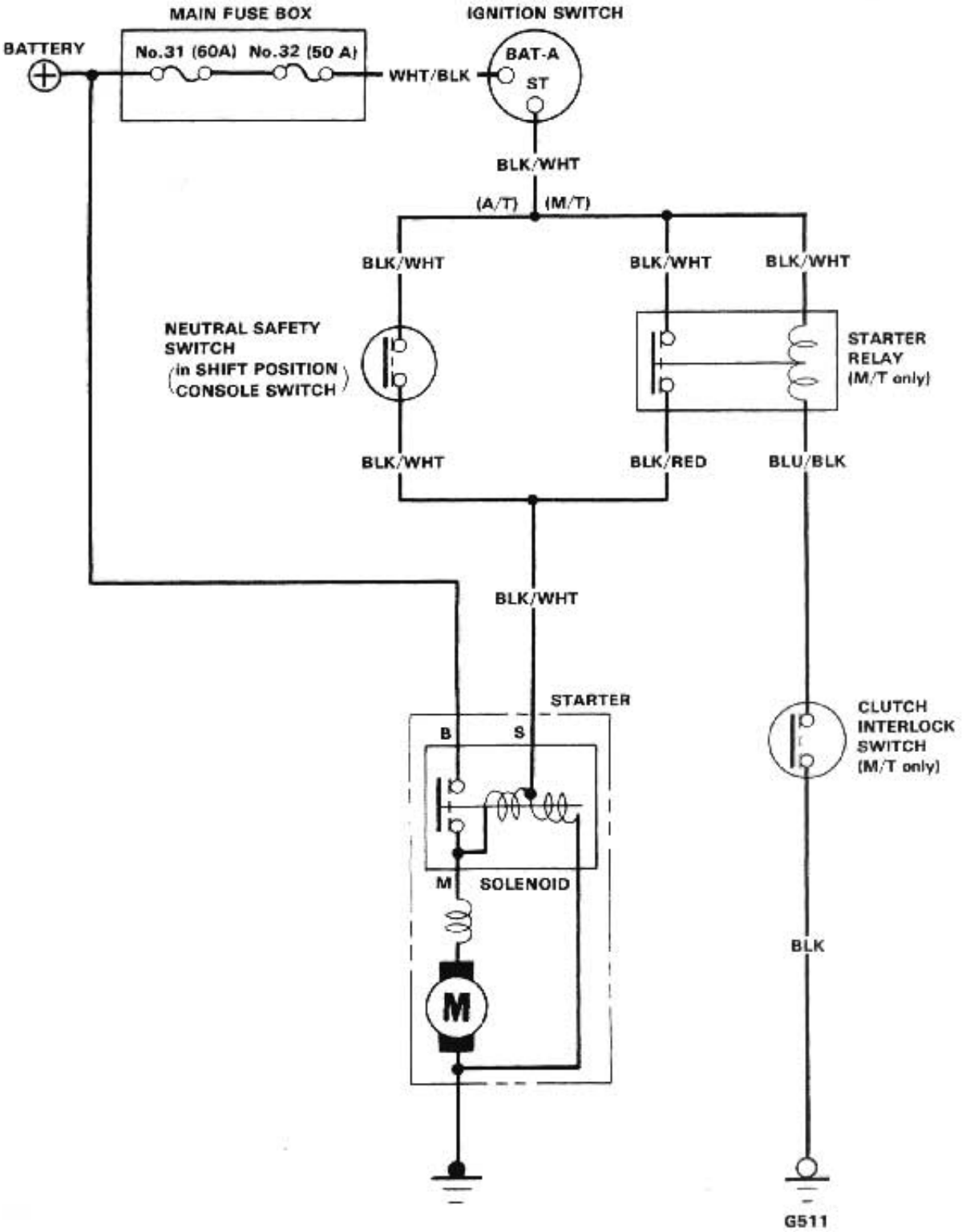
The clutch interlock switch turns on at the position where the clutch disengages: 20—30 mm (0.8—1.2 in.) from fully depressed position.

NOTE: Full stroke of clutch pedal is 140—150 mm (5.5—5.9 in.) from fully released position.



Starting System

Circuit Diagram



Starter Test

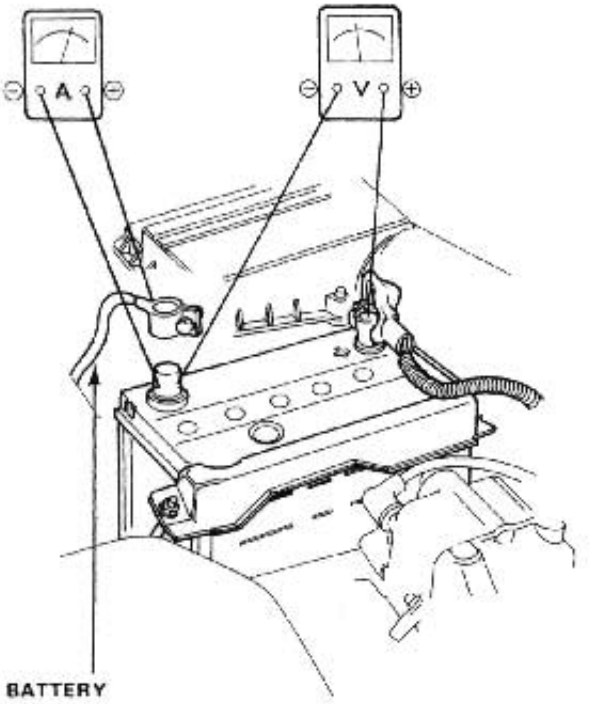
NOTE: The air temperature must be between 15 and 38°C (59 and 100°F) before testing.

Recommended Procedure:

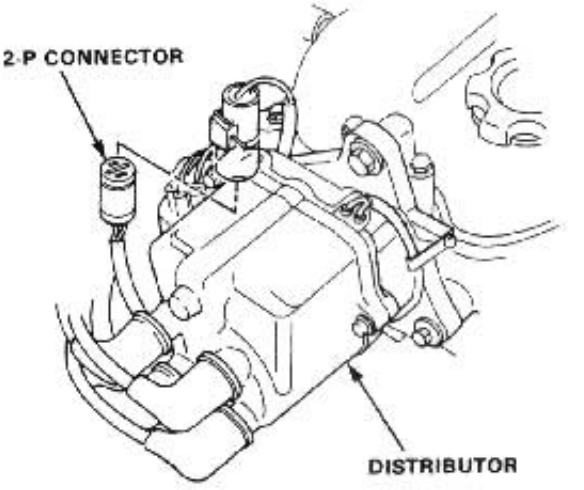
Use a starter system tester.
Connect and operate the equipment in accordance with manufacturer's instructions.
Test and troubleshoot as described.

Alternate Procedure:

- Use the following equipment:
  - Ammeter, 0–400 A
  - Voltmeter, 0–20 V (accurate within 0.1 volt)
  - Tachometer, 0–1200 rpm
- Hook up voltmeter and ammeter as shown.



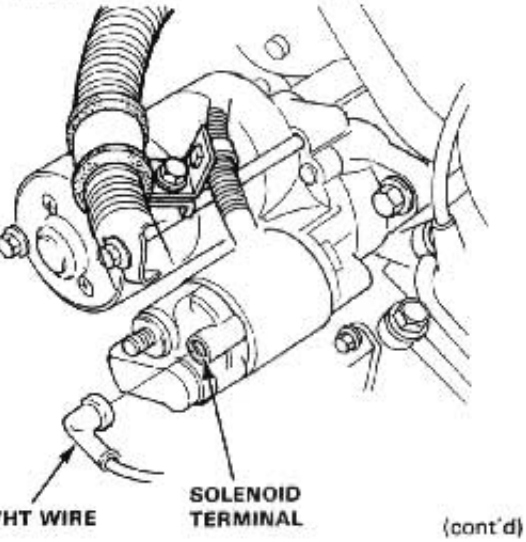
1. Disconnect the 2-P connector (ignition coil primary lead) from the distributor.



2. Check the starter engagement:
   Press the clutch pedal all the way (M/T only), and turn the ignition switch to "Start". The starter should crank the engine.

   NOTE: On cars equipped with manual transmissions, the engine will not crank unless the clutch pedal is fully depressed.

   - If the starter does not crank the engine, check the battery, battery positive wire and ground, and the wire connections for looseness or corrosion.
   - Test again.
     If the starter still does not crank the engine, bypass the ignition switch circuit as follows:
     Unplug the connector (BLK/WHT wire) from the starter. Connect a jumper wire from the battery positive (+) terminal to the solenoid terminal. The starter should crank the engine.



(cont'd)

Starter Test (cont'd)

– If the starter still does not crank the engine, remove the starter and diagnose its internal problems.

– If the starter cranks the engine, check for an open in the BLK/WHT wire circuit between the starter and ignition switch, and connectors. Check the ignition switch.
On cars with automatic transmission, check the shift position console switch (neutral safety switch) and connector.
On cars with manual transmission, check the starter relay and clutch interlock switch and connectors.

3. Check for wear or damage:
The starter should crank the engine smoothly and steadily.

If the starter engages, but cranks the engine erratically, remove the starter motor. Inspect the starter, drive gear, and flywheel ring gear for damage.
Check the drive gear overrunning clutch for binding or slipping when the armature is rotated with the drive gear held. Replace the gears if damaged.

4. Check cranking voltage and current draw.
Voltage should be no less than specified below:
0.8kw, 1.2kw and 1.4kw: 8 volts
1.0kw : 8.5 volts
Current should be no greater than specified below:
0.8 kw: 200 amperes
1.0 kw: 230 amperes
1.2 kw: 280 amperes
1.4 kw: 350 amperes

If voltage is too low, or current draw too high, check for:

- Battery fully charged.
- Open circuit in starter armature commutator segments.
- Starter armature dragging.
- Shorted armature winding.
- Excessive drag in engine.

5. Check cranking rpm:
Engine speed during cranking should be above 100 rpm.

- Loose battery or starter terminals.
- Excessively worn starter brushes.
- Open circuit in commutator segments.
- Dirty or damaged helical spline or drive gear.
- Defective drive gear overrunning clutch.

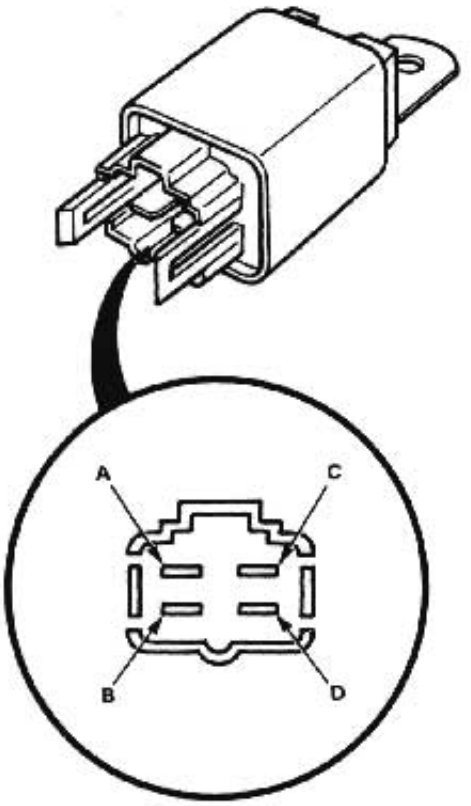
6. Check the starter disengagement:
Press the clutch pedal all the way (M/T only), and turn the ignition switch to "Start" and release to "Run." The starter drive gear should disengage from the flywheel ring gear.

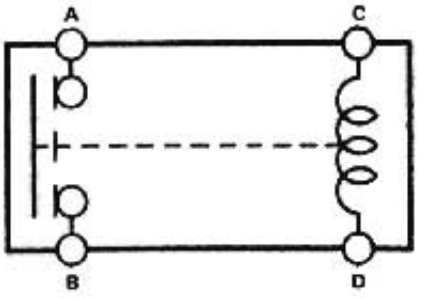
If the drive gear hangs up on the flywheel ring gear, check:

- Solenoid plunger and switch for malfunction.
- Drive gear assembly for dirty or damaged overrunning clutch.

Starter Relay Test (M/T only)

1. Remove the relay from the dash fuse box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should no continuity when the battery is disconnected.

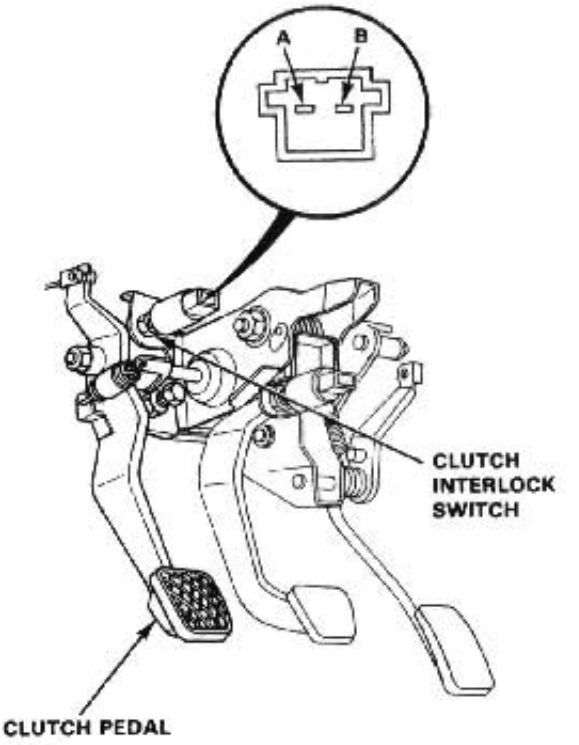




Clutch Interlock Switch (M/T only)

1. Remove the instrument lower cover then disconnected the 2-P connector from the switch.
2. Check for continuity between the terminals according to the table.

Terminal / Clutch Pedal	A	B
RELEASED		
PUSHED	○	○

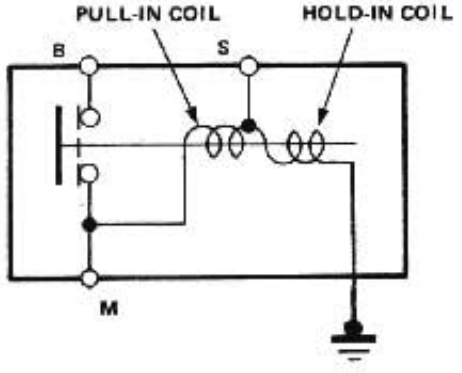


3. If necessary, replace the switch or adjust switch position (See section 12).

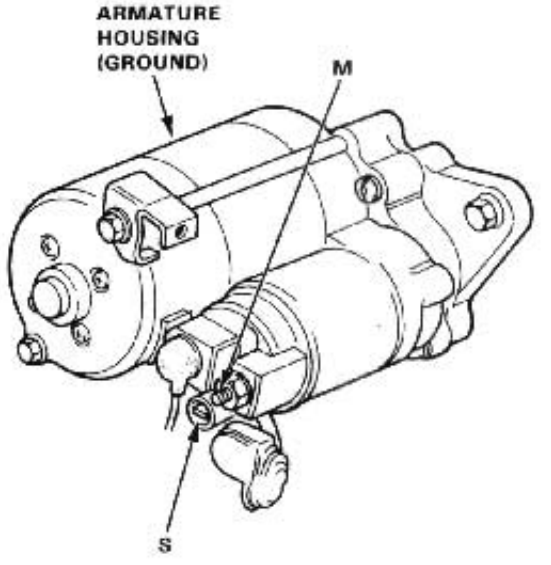
Starter Solenoid Test

1. Check the hold-in coil for continuity between the S terminal and the armature housing (ground).
   Coil is OK if there is continuity.

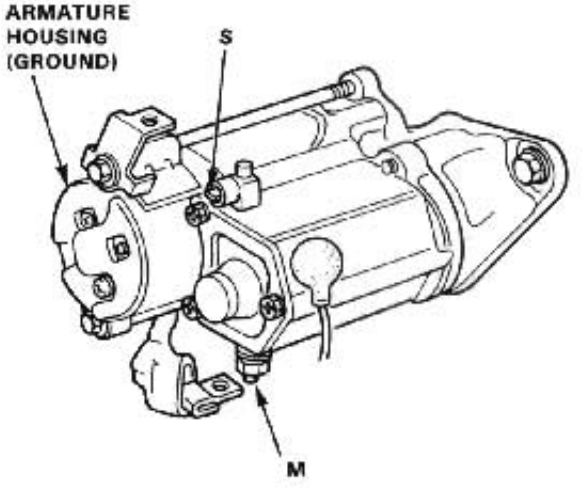
2. Check the pull-in coil for continuity between the S and M terminals.
   Coil is OK if there is continuity.



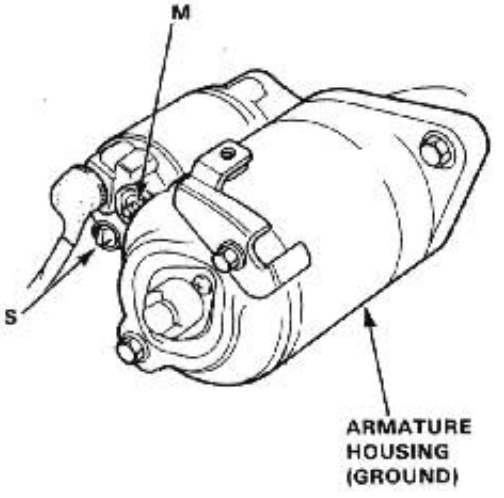
Mitsuba (1.0 kw and 1.4 kw) type:



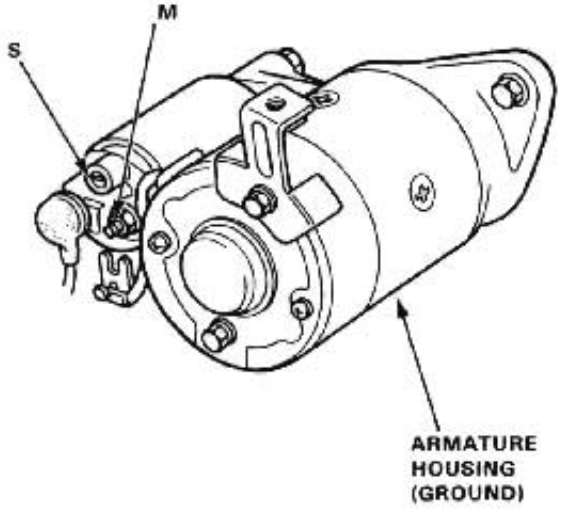
Nippon Denso (1.0 kw and 1.2 kw) type:



Nippon Denso (0.8 kw) type:

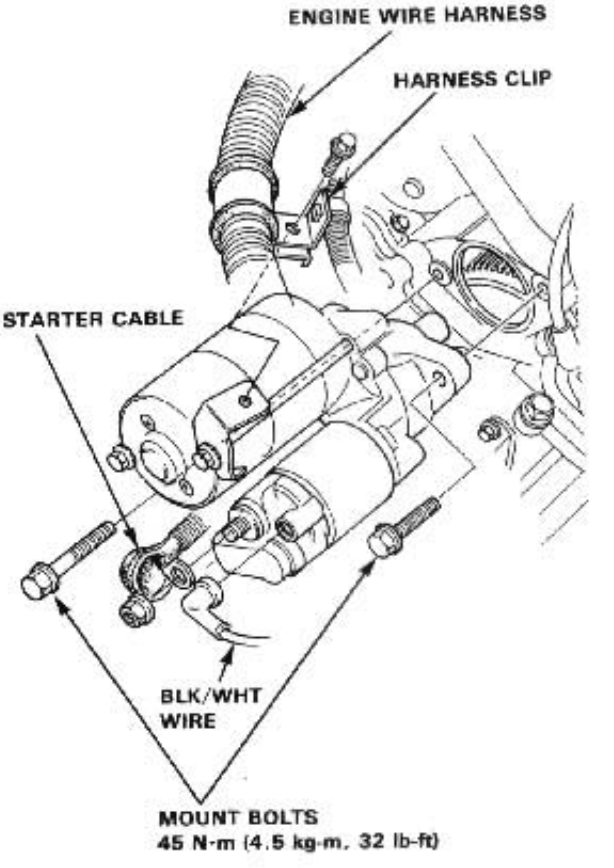


Hitachi (0.8 kw) type:



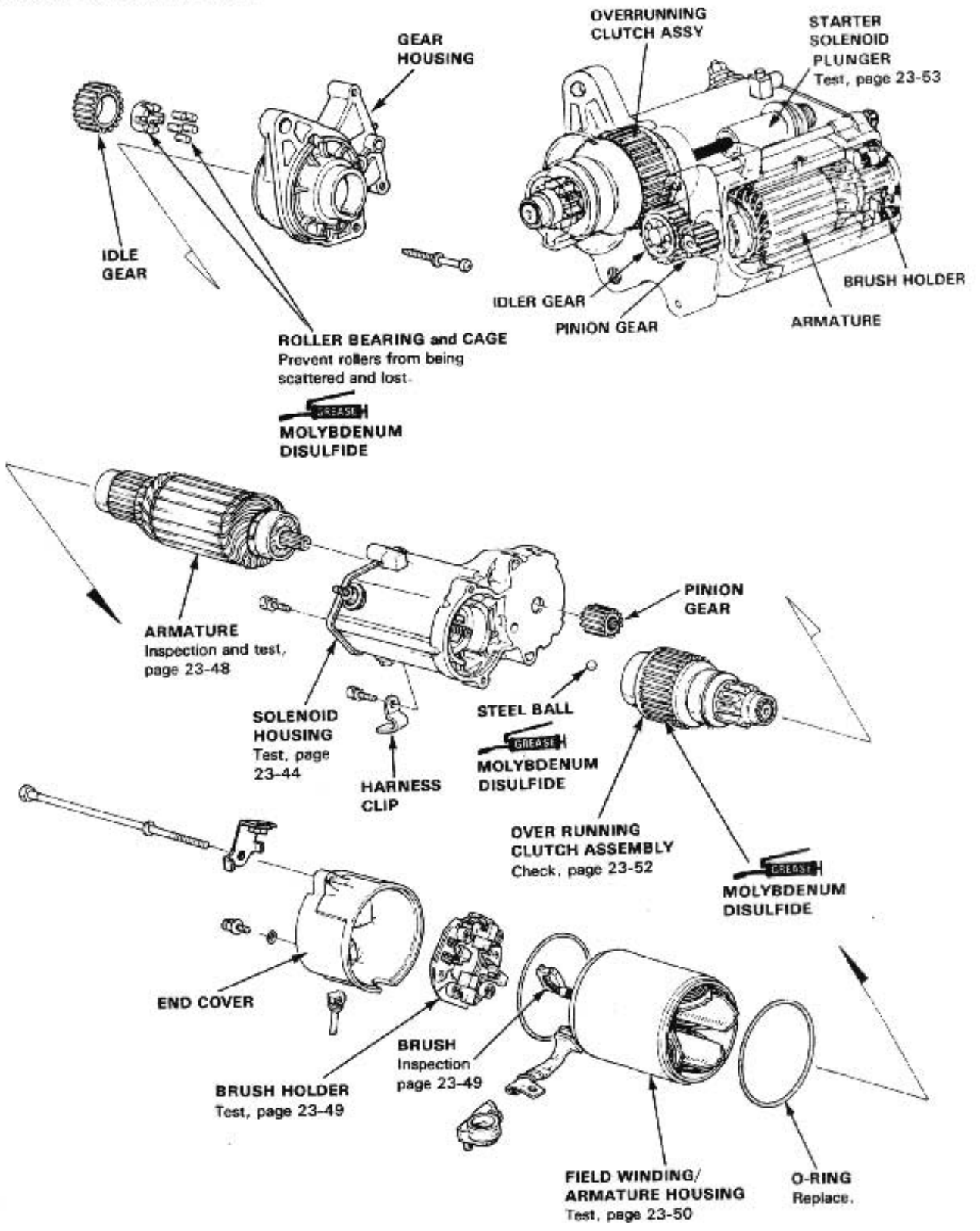
Starter Replacement

1. Disconnect the ground wire from the battery negative (−) post.
2. Remove the engine wire harness from the harness clip on the starter motor.
3. Disconnect the starter cable from the B terminal on the solenoid, and the BLK/WHT wire from the S terminal.
4. Remove the 2 bolts holding the starter, and remove the starter.



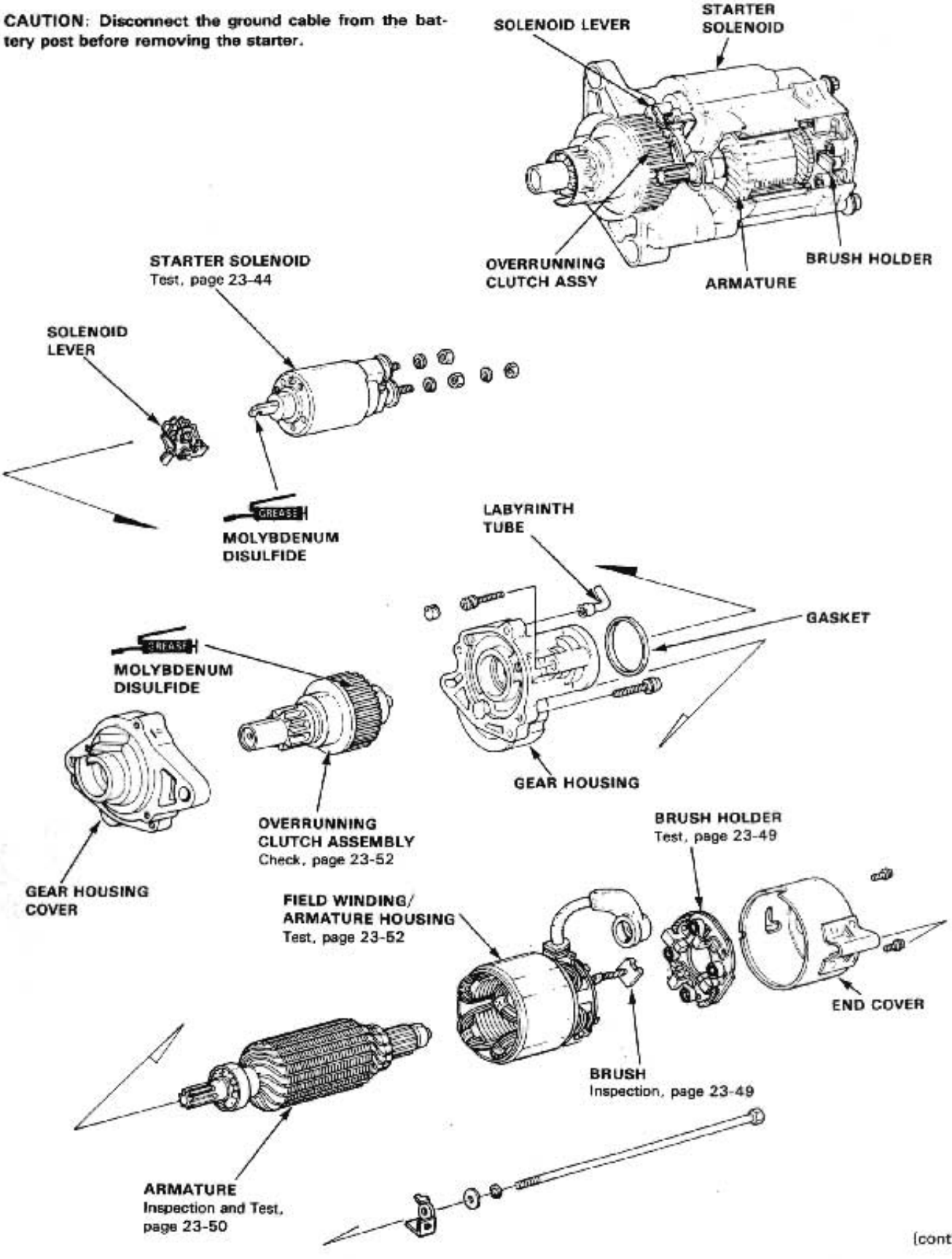
Starter Overhaul (Gear Reduction 1.0 kw and 1.2 kw, ND type)

CAUTION: Disconnect ground wire from the battery post before removing the starter.



(Gear Reduction 1.0 kw and 1.4 kw, Mitsuba type)

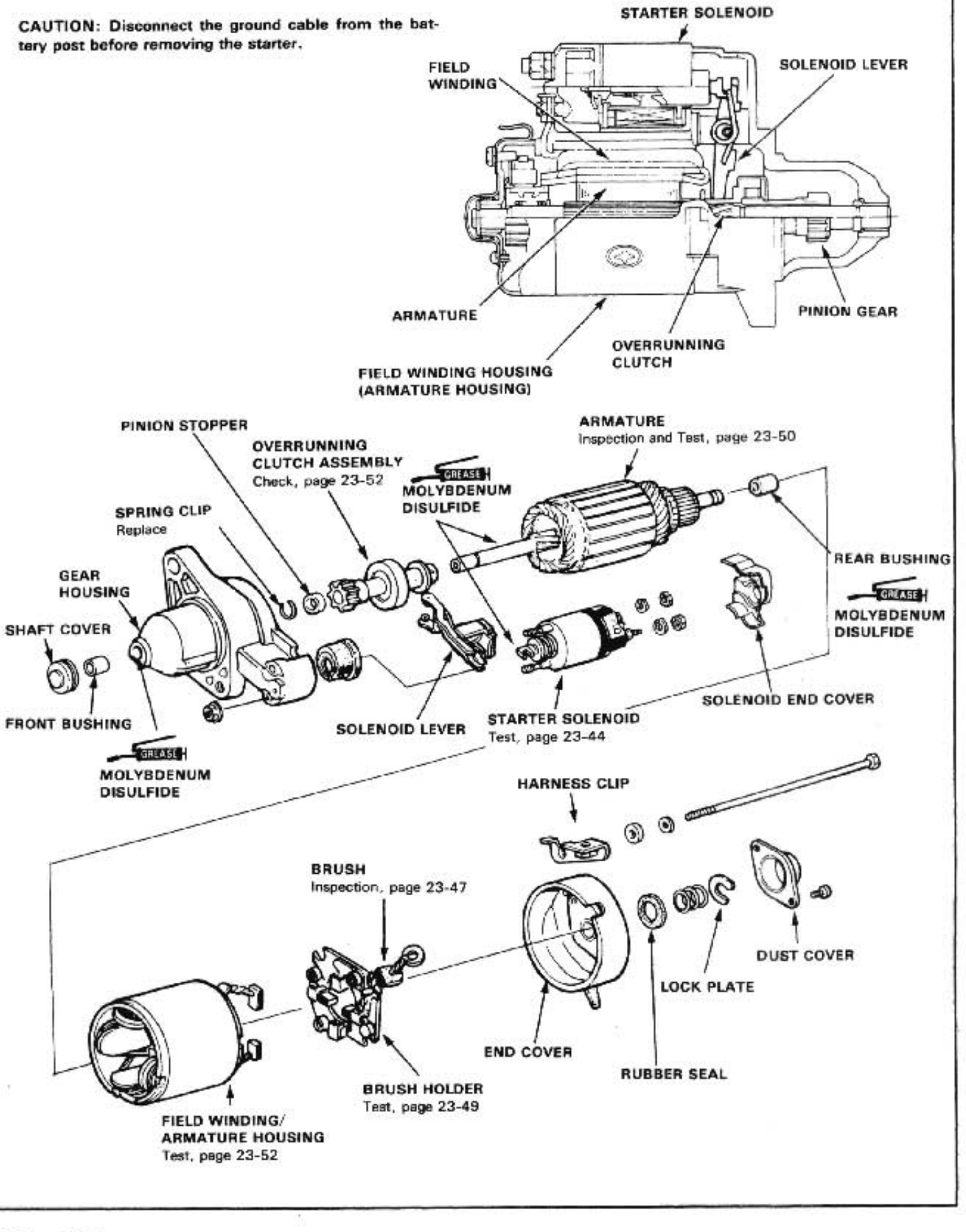
CAUTION: Disconnect the ground cable from the battery post before removing the starter.



(cont'd)

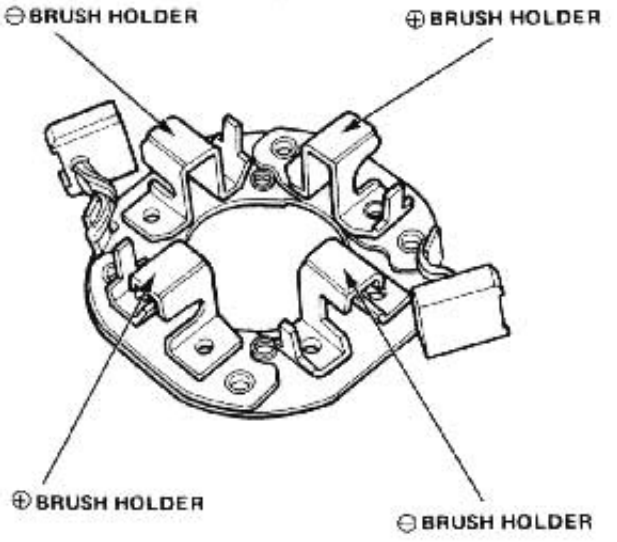
Starter Overhaul (cont'd) (Direct Drive 0.8 kw, ND type)

CAUTION: Disconnect the ground cable from the battery post before removing the starter.



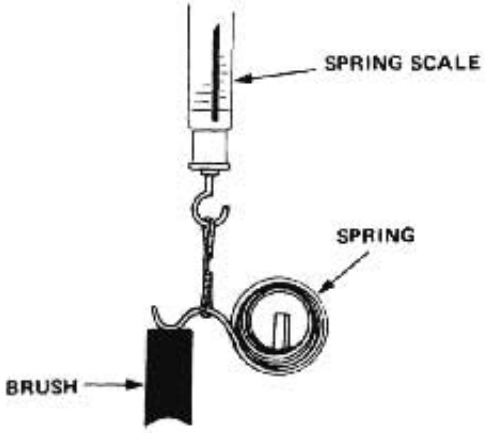
Starter Brush Holder Test

1. Check that there is no continuity between the ⊕ and ⊖ brush holders.
   If continuity exists, replace the brush holder assembly.



2. Insert the brush into the brush holder, and bring the brush into contact with commutator, then attach a spring scale to the spring. Measure the spring tension at the moment the spring lifts off the brush.

Spring Tension:
ND (1.0 kw and 1.2 kw): 18.5—24.4 N (1.85—2.44 kg, 4.1—5.41 lb)
Mitsuba (1.0 kw and 1.4 kw): 20.5—27.0 N (2.05—2.70 kg, 4.5—6.016 lb)
ND (0.8 kw) and Hitachi (0.8 kw) : 16 N (1.6 kg, 3.52 lb)

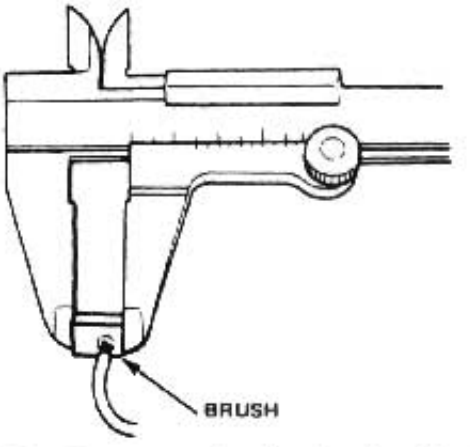


Starter Brush Inspection

Measure brush length. If not within service limit, replace the armature housing and brush holder assembly.

Brush Length

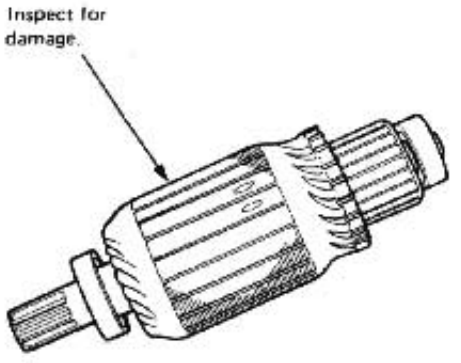
	Standard (New)	Service Limit
ND (1.0 kw and 1.2 kw)	13.0—13.5 mm (0.51—0.53 in)	8.5 mm (0.33 in)
Mitsuba (1.0 kw and 1.4 kw)	14.3—14.7 mm (0.56—0.58 in)	9.3mm (0.37in)
ND (0.8 kw)	15.5—16.5mm (0.61—0.65 in)	10.5 mm (0.41 in)
Hitachi (0.8 kw)	14.5—15.5 mm (0.57—0.61 in)	11.0 mm (0.43 in)



NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to same contour as the commutator.

Armature Inspection and Test

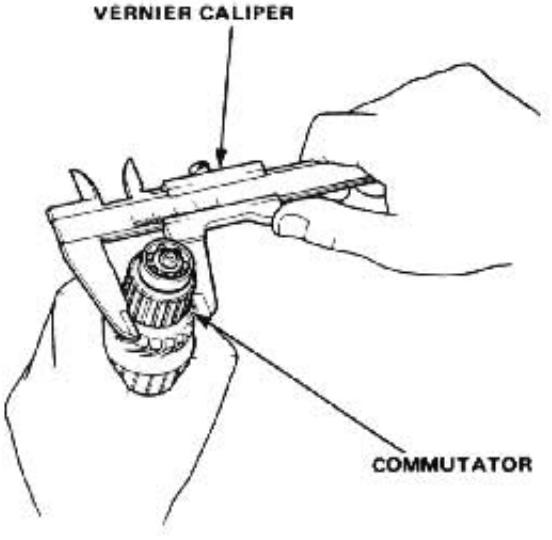
1. Inspect the armature for wear or damage due to contact with the field coil magnets.



2. A dirty or burnt commutator surface may be resurfaced with emery cloth or a lathe within the following specifications.

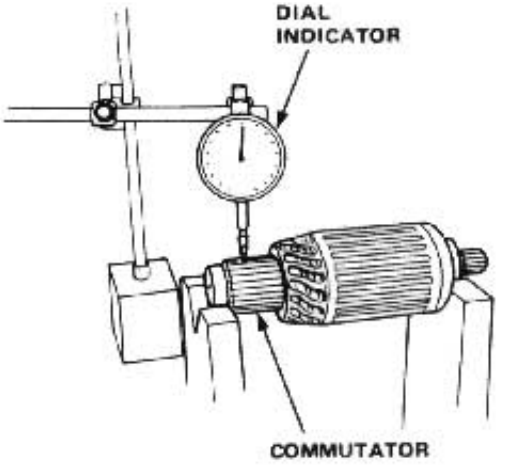
Commutator Diameter

	Standard (New)	Service Limit
ND (1.0kw and 1.2kw)	29.9 – 30.0 mm (1.177–1.181 in)	29.0 mm (1.14 in)
Mitsuba (1.0kw and 1.4kw)	28.0–28.1 mm (1.102–1.106 in)	27.5 mm (1.08 in)
ND (0.8 kw)	28.0 mm (1.102 in)	27.2 mm (1.11 in)
Hitachi (0.8 kw)	40 mm (1.57 in)	39.0 mm (1.54 in)



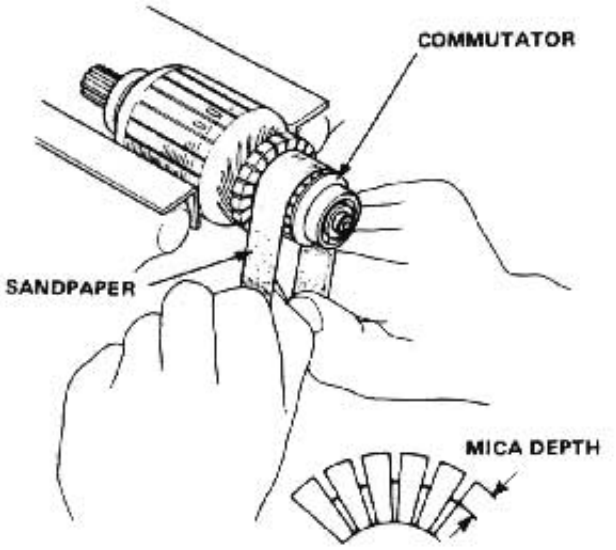
Commutator Runout

	Standard (New)	Service Limit
ND (1.0 kw and 1.2 kw) and Mitsuba (1.0 kw and 1.4 kw)	0–0.02 mm (0–0.001 in)	0.05 mm (0.002 in)
ND (0.8 kw)	0–0.05 mm (0–0.002 in)	0.4 mm (0.016 in)
Hitachi (0.8 kw)	0–0.1 mm (0–0.004 in)	0.4 mm (0.016 in)



3. If the commutator runout and diameter are within limits, check the commutator for damage or for carbon dust or brass chips between the segments.

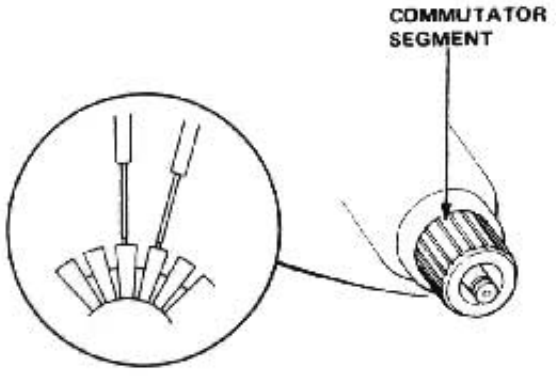
4. If surface is dirty, recondition it with a #500 or #600 sandpaper. Then, check mica depth. If necessary, undercut mica with a hacksaw blade to achieve proper depth.



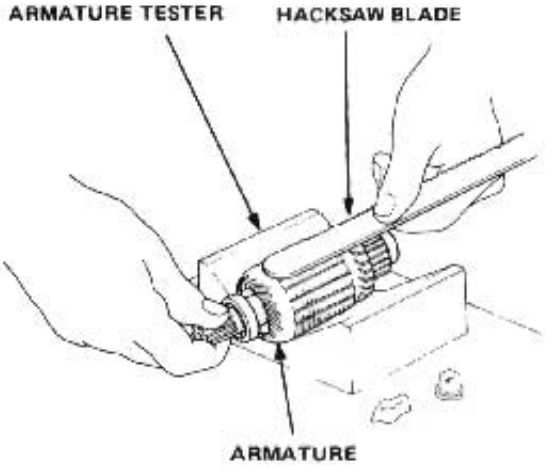
Commutator Mica Depth

	Standard (New)	Service Limit
ND (0.8 kw, 1.0 kw and 1.2 kw) and Hitachi (0.8 kW)	0.5—0.8 mm (0.020—0.031 in)	0.2mm (0.008 in)
Mitsuba (1.0 kw and 1.4 kw)	0.4—0.5mm (0.016—0.020 in)	0.15 mm (0.006 in)

5. Check for continuity between each segment of the commutator. If an open circuit exists between any segment, replace the armature.

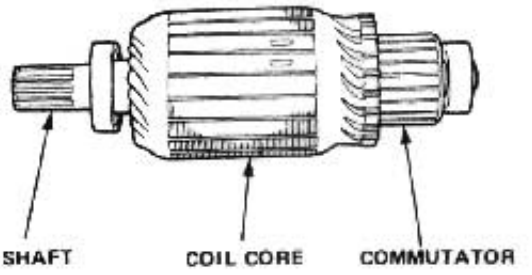


6. Place the armature on an armature tester. Hold a hacksaw blade on the armature core.



If the blade is attracted to the core or vibrates while core is turned, the armature is shorted. Replace the armature.

7. With an ohmmeter, check that no continuity exists between the commutator and armature coil core, and between the commutator and armature shaft. If continuity exists, replace the armature.



Overrunning Clutch Check

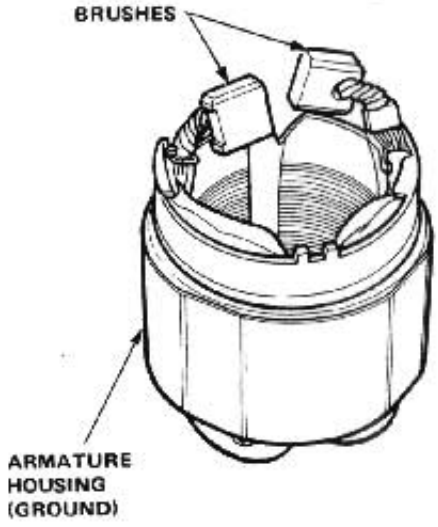
1. Check if the overrunning clutch moves along the shaft freely. If not, replace the overrunning clutch assembly.
2. Check if the overrunning clutch locks in one direction and rotates smoothly in reverse. If it does not lock in either direction or it locks in both directions, replace the overrunning clutch assembly.

3. Check if the starter drive gear is worn or damaged. If the gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.

   NOTE: Check condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

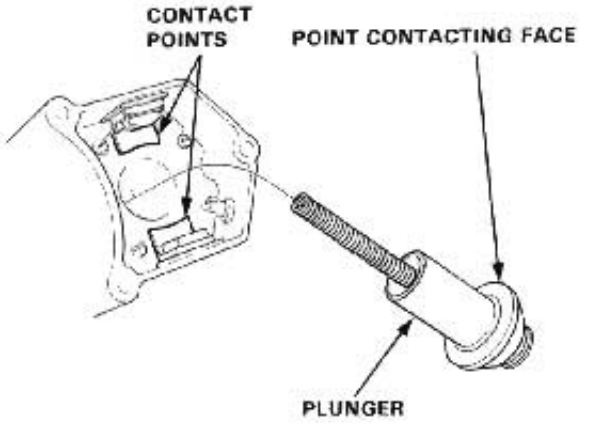
Starter Field Winding Test

1. Check for continuity between the brushes. If no continuity, replace the armature housing.
2. Check for continuity between each brush and the armature housing (ground).
   If continuity exists, replace the armature housing.



Solenoid Plunger Inspection (1.0 kw and 1.2kw, ND type)

Check the contact points, and face of the starter solenoid plunger for burning, pitting or any other defects. If surfaces are rough, recondition with a strip of #500 or #600 sand paper.

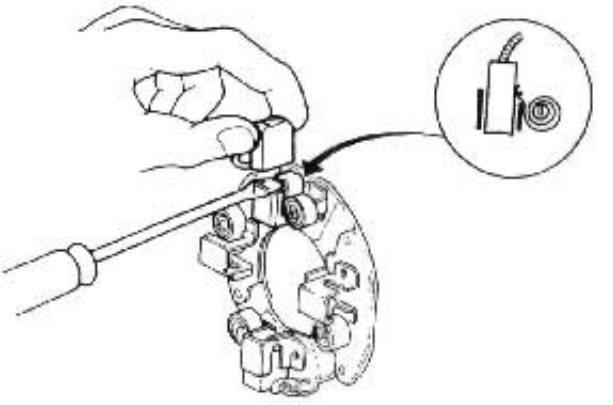


Starter Reassembly

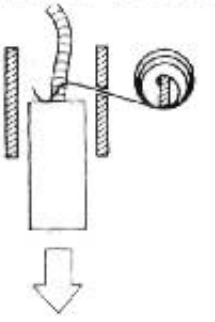
Reassemble the starter in the reverse order of disassembly.

Nippon Denso (1.0 kw and 1.2 kw) and Mitsuba (1.0 kw and 1.4 kw)type.

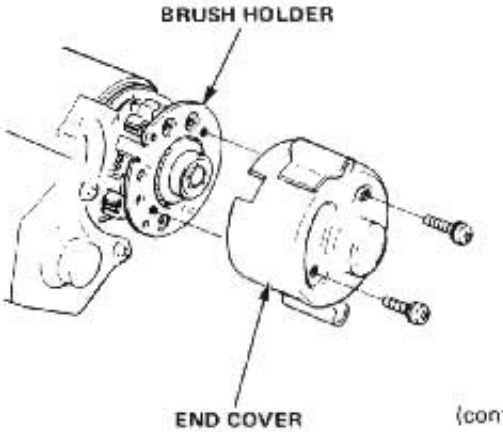
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



2. Install the armature in the housing. Next pry back each brush spring again and push the brush down until it seats against the commutator, then release the spring against the end of the brush.



3 Install the end cover on the brush holder.

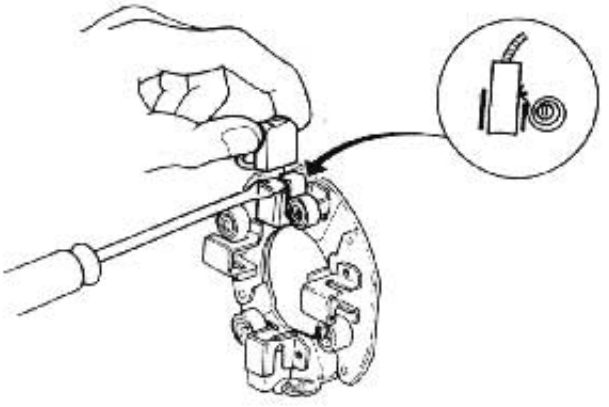


(cont'd)

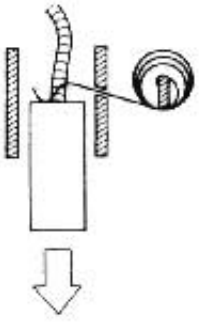
Starter Reassembly (cont'd)

Nippon Denso (0.8 kw) and Hitachi (0.8 kw) type:

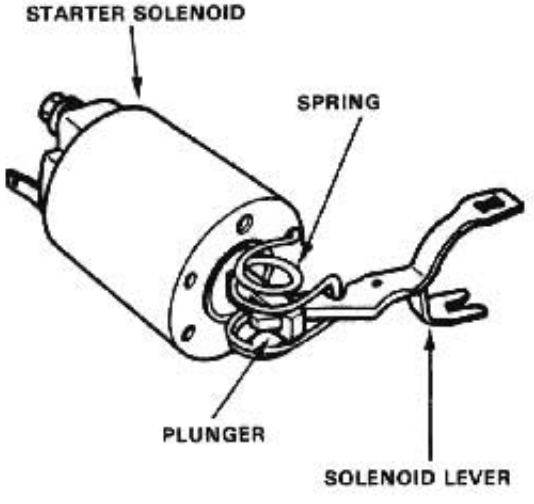
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



2. Install the armature in the housing. Next pry back each brush spring again and push the brush down until it seats against the commutator, then release the spring against the end of the brush.

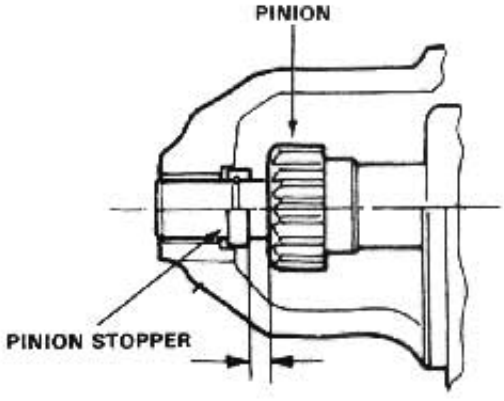


3. For Hitachi (0.8 kw), install the spring as shown.



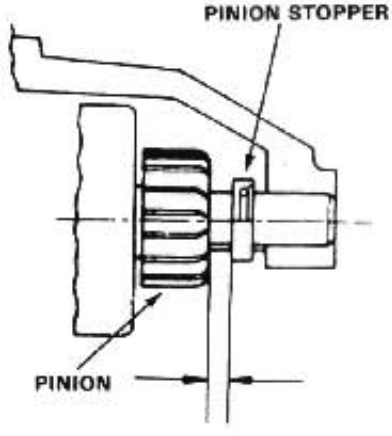
4. After assembling measure the clearance between the pinion stopper and the pinion with the clutch pushed out by the starter solenoid.

Nippon Denso (0.8 kw):



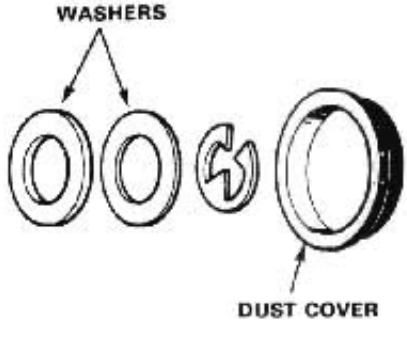
Specified Clearance: 0.1—4.0 mm (0.004—0.157 in.)

Hitachi (0.8 kw):



Specified Clearance: 0.3—2.5 mm (0.012—0.098 in.)

If out of the specifications, adjust by changing the number of washers used.



Component Location Index

IGNITION TIMING CONTROL SYSTEM
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Inspection and Setting, page 23-58

IGNITION WIRES
Inspection and Test, page 23-62

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Reassembly, page 23-62
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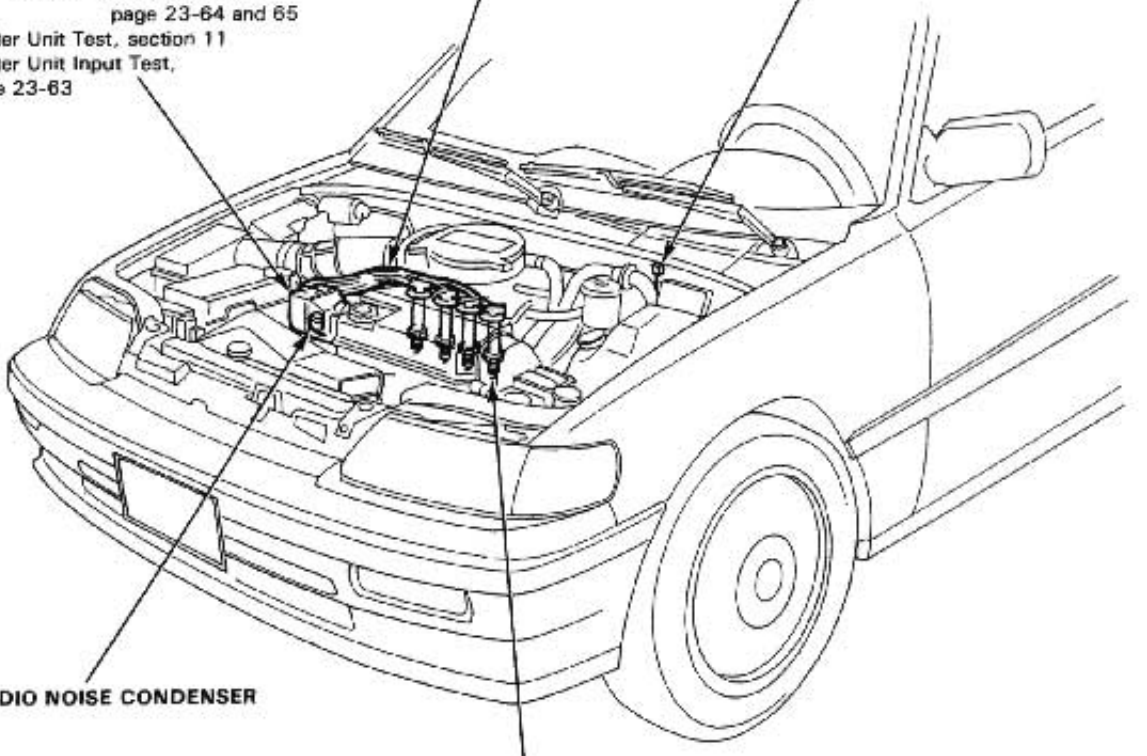
IGNITION TIMING ADJUSTING CONNECTOR



RADIO NOISE CONDENSER

SPARK PLUG
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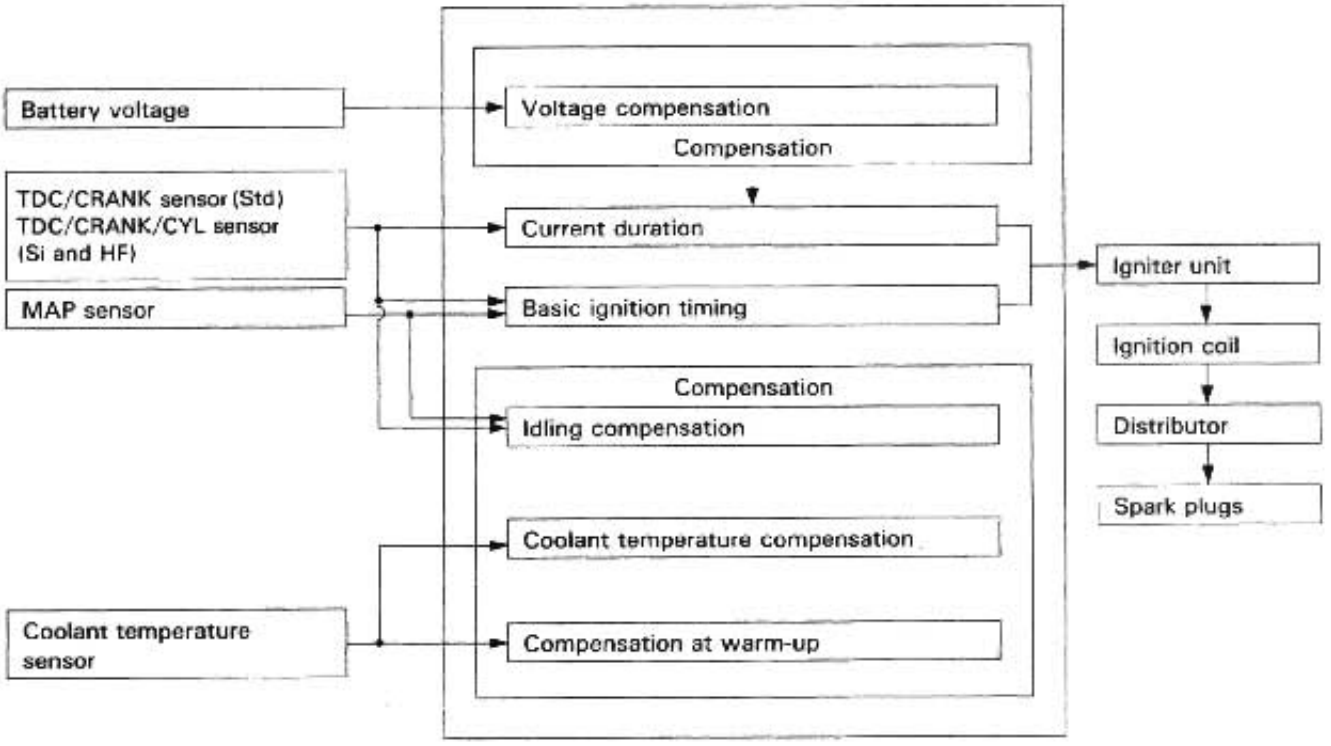
Ignition System

Description

Ignition Timing Control:
The programmed ignition (PGM-IG) employed in this engine provides optimum control of ignition timing by determining the optimum timing using a microcomputer in response to engine speed and vacuum pressure in the intake manifold, which are transmitted by signals from TDC/CRANK sensor, throttle angle sensor, coolant temperature sensor and MAP sensor. This system, not dependent on a governor or vacuum diaphragm, is capable of setting lead angles with complicated characteristics which cannot be provided by conventional governors or diaphragms.



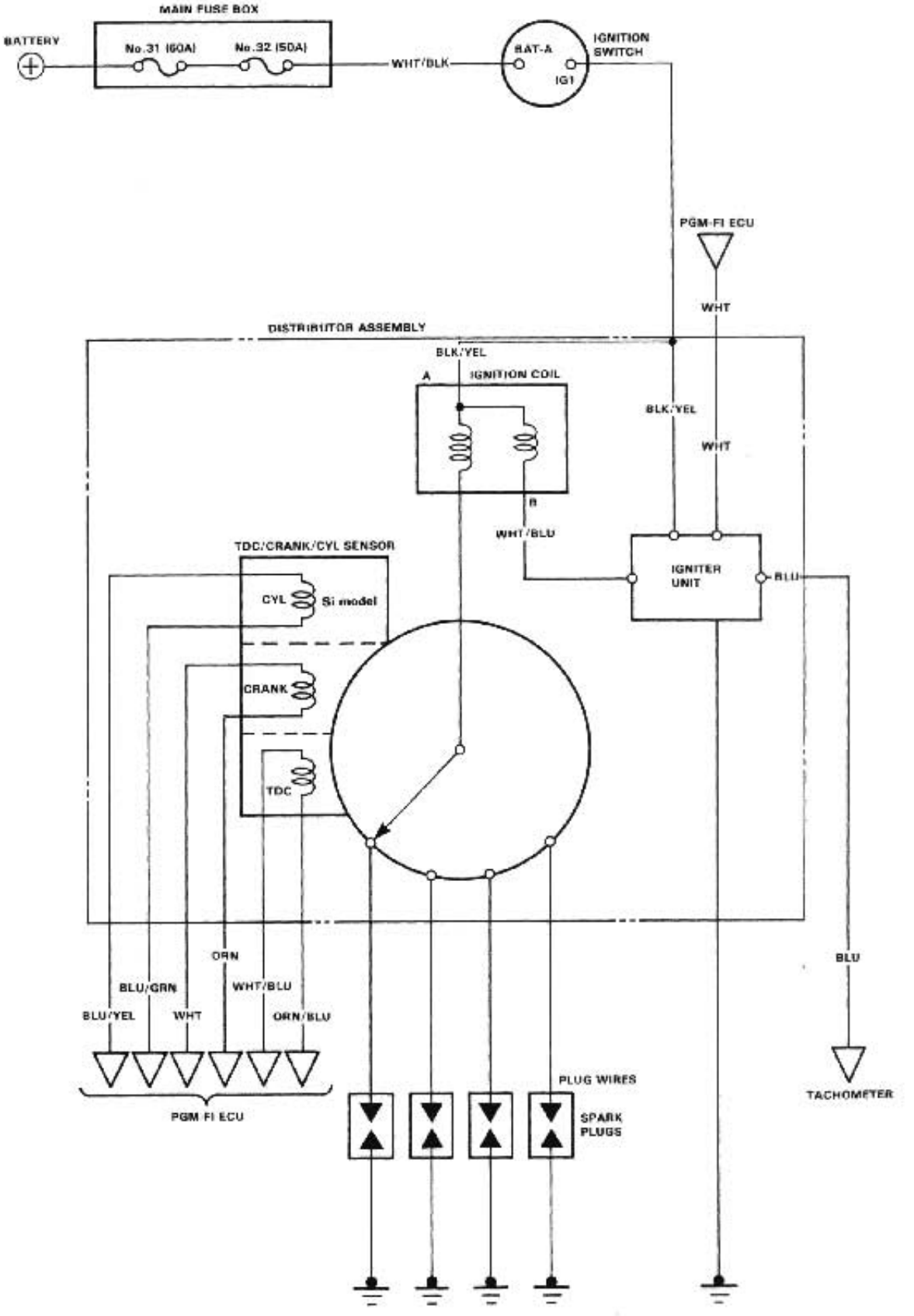
Basic Control
Determination of ignition timing/current duration:
The control unit has stored within it the optimum basic ignition timing for operating conditions based upon engine speed and intake manifold pressure. With compensation by signals from sensors, the system determines optimum timing for ambient conditions and sends voltage pulses to the igniter unit.

Compensation of ignition timing:

Compensation Item	Related Sensor and Information	Description
Idling	TDC/CRANK sensor (Std) TDC/CRANK/CYL sensor (Si and HF) MAP sensor	Ignition timing is controlled to the target speed with compensation according to the idling speed.
Compensation at warm-up	Coolant temperature sensor	Lag angle is adjusted in accordance with the warming up conditions to bring about a good balance between operating performance and exhaust gas level.
Coolant temperature compensation	Coolant temperature sensor	Compensation for lead angle at a low coolant temperature and lag angle at high coolant temperature.

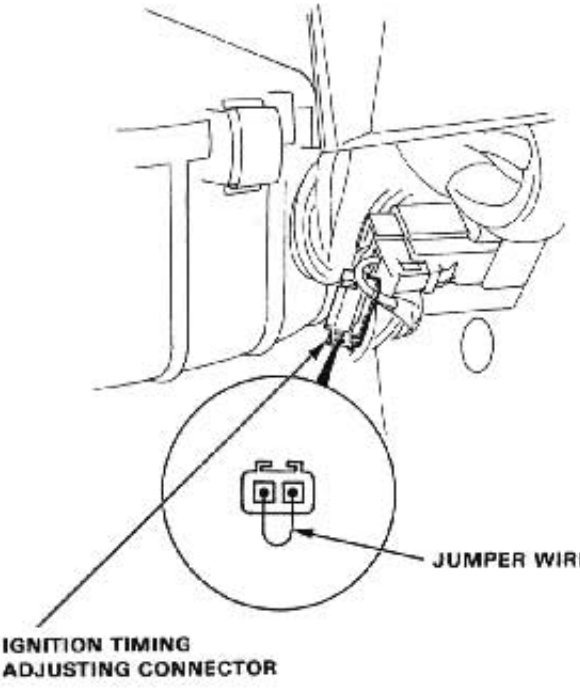
Control at Start
Ignition timing is fixed at BTDC (6°(Std), 7°(Si and HF)) for cranking. The cranking is detected by the sensor (TDC/CRANK sensor (Std), TDC/CRANK/CYL sensor (Si and HF)) (cranking revolution) and starter signal.

Circuit Diagram

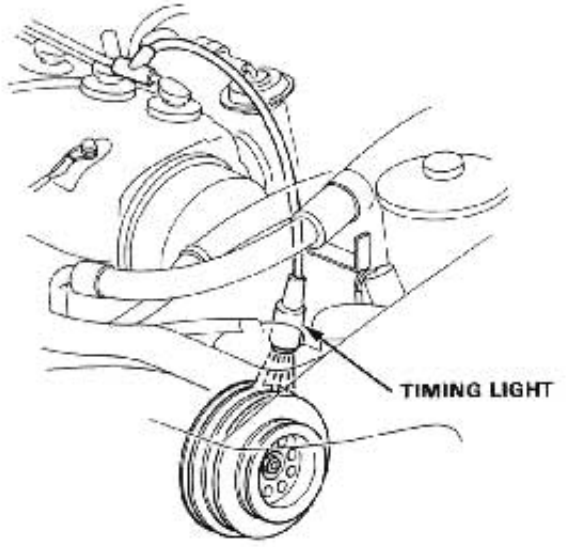


Ignition Timing Inspection and Setting

1. Start the engine and allow it to warm up (cooling fan comes on).
2. Remove the rubber cap (YEL) from the ignition timing adjusting connector located left rear engine compartment and connect the BRN and GRN/WHT terminals with a jumper wire.



3. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the timing belt cover.

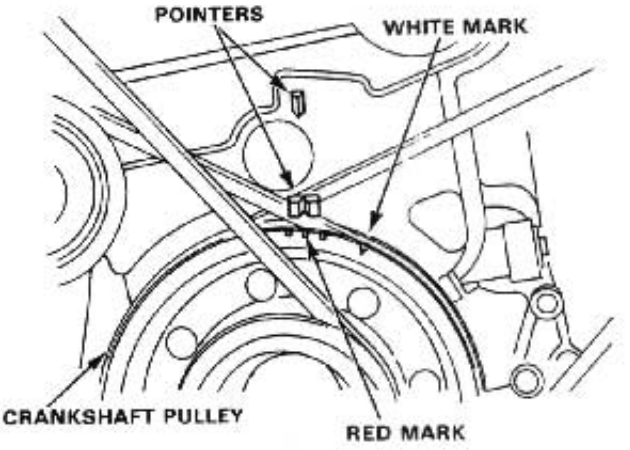


4. Adjust ignition timing, if necessary, to the following specifications:

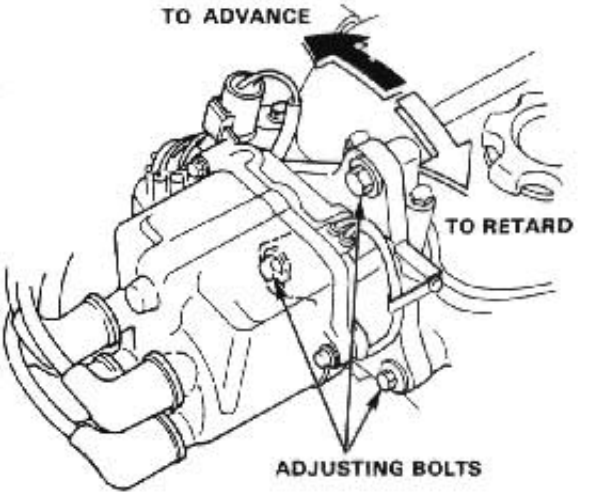
Ignition Timing

- **Std mode: 18° ± 2° BTDC (RED) at 750 ± 50 rpm in neutral**
- **Si model: 18° ± 2° BTDC (RED) at 750 ± 50 rpm in neutral**
- **HF model 49 ST: 14° ± 2° BTDC at 600 rpm ± 50 rpm in neutral**

CAL and HIALT: 14° ± 2° BTDC at 650 rpm ± 50 rpm in neutral



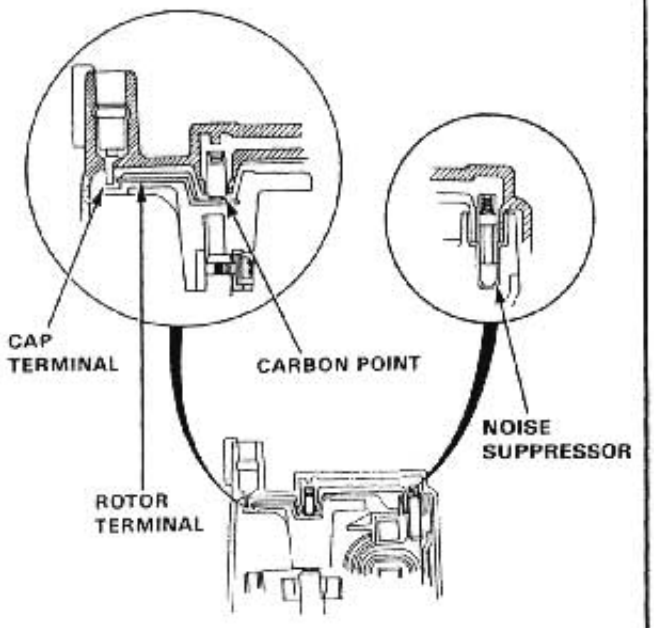
5. Adjust as necessary by loosening the distributor adjusting bolts, and turn the distributor housing counterclockwise to advance the timing, or clockwise to retard the timing.



6. Tighten the adjusting bolts and recheck the timing.
7. Remove the jumper wire and install the rubber cap to the ignition timing adjusting connector.

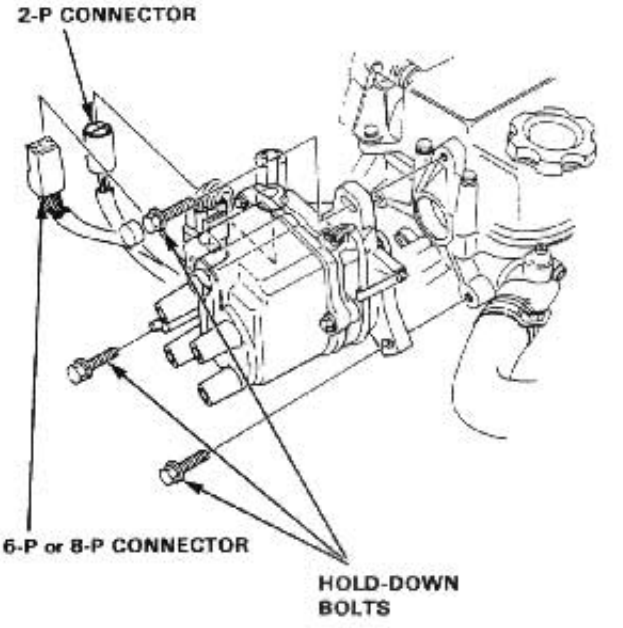
Distributor Top End Inspection

1. Check for rough or pitted rotor and cap terminals.
2. Scrape or file off the carbon deposits. Smooth the rotor terminal with an oil stone or #600 sandpaper if rough.
3. Check the distributor cap for cracks, wear and damage. If necessary, clean or replace it.



Distributor Removal

1. Disconnect the 2-P and 6-P or 8-P connectors from the distributor.
2. Disconnect the spark plug wires from the distributor cap.

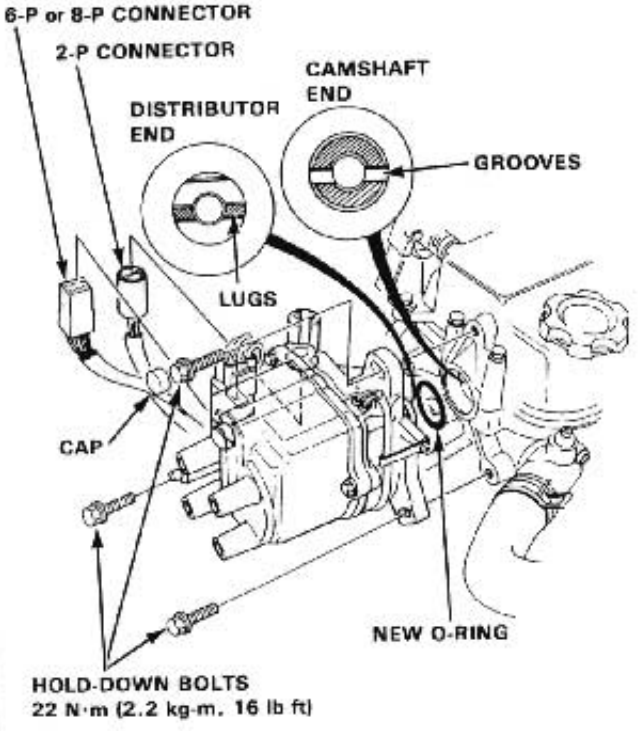


3. Remove the distributor hold-down bolts, then remove the distributor from the cylinder head.

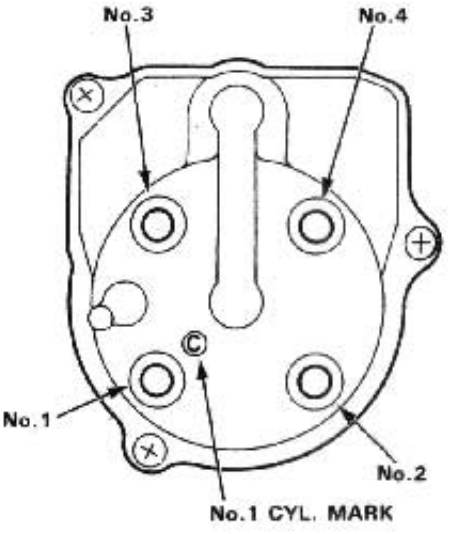
Distributor Installation

1. Coat a new O-ring with engine oil then install it.
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.

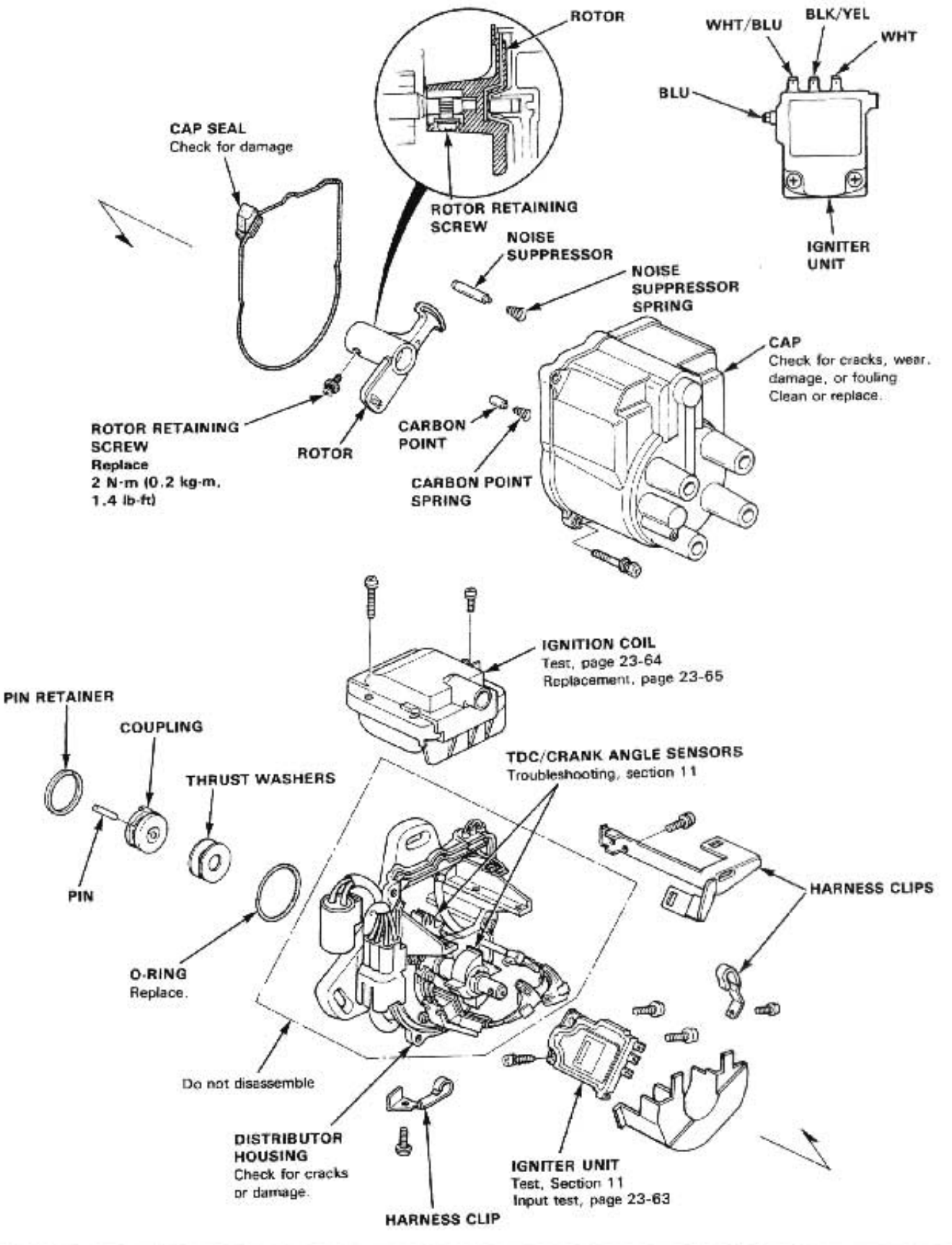


3. Install the hold-down bolts and tighten temporarily.
4. Connect the 2-P and 6-P or 8-P connectors to the distributor.
5. Connect the spark plug wires as shown.



6. Set the timing with a timing light as shown on page 23-56.
7. After adjusting, tighten the hold-down bolts, then install the cap on the bolt.

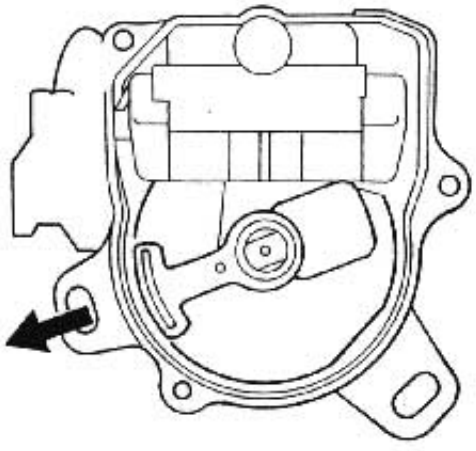
Distributor Overhaul



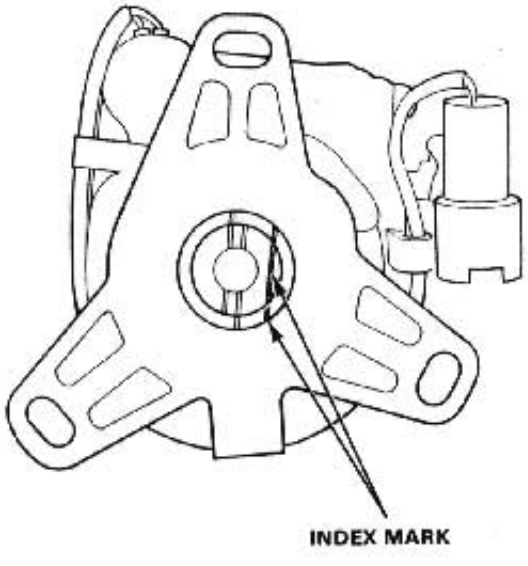
Distributor Reassembly

Reassemble the distributor in the reverse order of disassembly.

1. Install the rotor, then turn it so that it faces in the direction shown (toward the No. 1 cylinder).



2. Set the thrust washer and coupling on the shaft.
3. Check that the rotor is still pointing toward the No. 1 cylinder, then align the index mark on the housing with the index mark on the coupling.

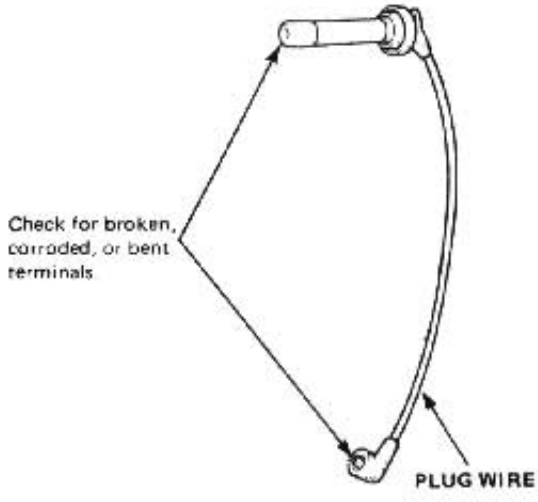


4. Drive in the pin and secure it with the pin retainer.

Ignition Wire Inspection and Test

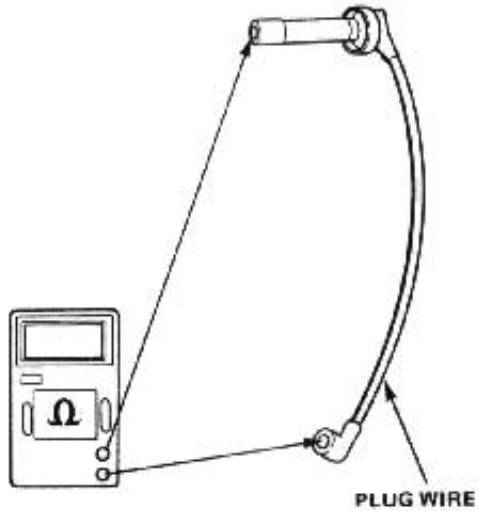
CAUTION: Carefully remove the ignition wires by pulling on the rubber boots. Do not bend the wire or the conductor may be broken.

1. Check the condition of the wire terminals. If any terminal is corroded, clean it, and if it is broken or distorted, replace the wire.



2. Connect ohmmeter probes and measure resistance.

Ignition Wire Resistance:
25,000 ohms max. at 20°C (70°F)

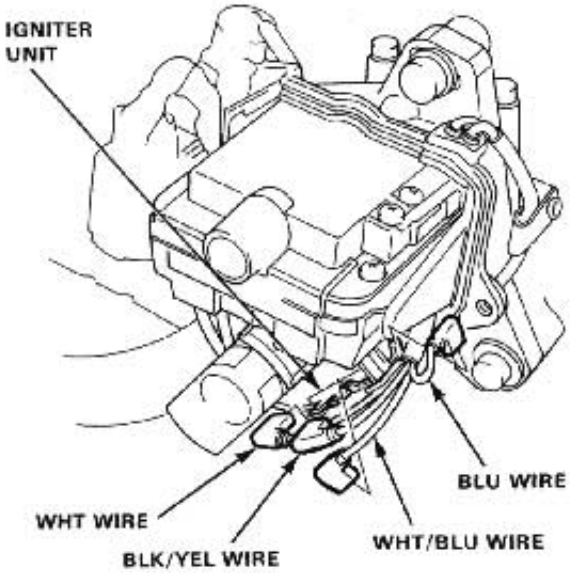


3. If resistance exceeds 25,000 ohms, replace the ignition wire.

Igniter Unit Input Test

NOTE:
- See section 11 when the self-diagnostic indicator blinks.
- Perform an input test for the igniter unit after finishing the fundamental tests for the ignition system and fuel emission system.
- Check for blown No.32 (50 A) fuse in the dash fuse box before testing.

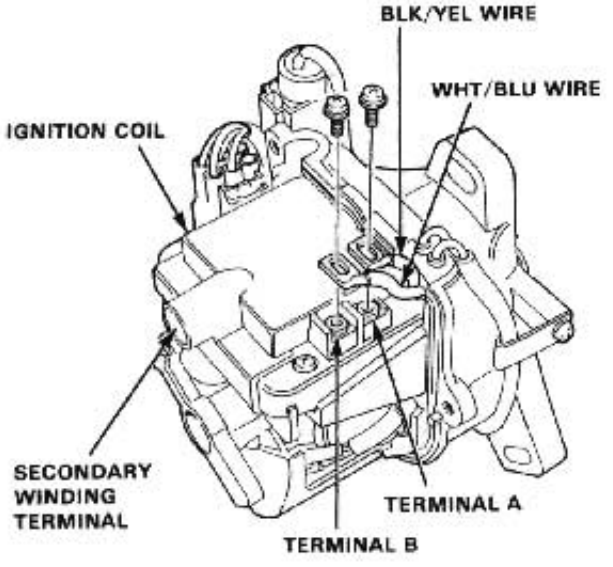
1. Remove the distributor cap, the leak cover and the rotor.
2. Disconnect the connectors from the igniter unit.



3. Check for voltage between the BLK/YEL wire and the body ground with the ignition switch on.
   There should be battery voltage.
   - If there is no voltage, check for an open in the BLK/YEL wire between the igniter unit and the ignition switch.
   - If there is battery voltage, go to step 4.
4. Check for voltage between the WHT/BLU wire and the body ground with the ignition switch on.
   There should be battery voltage.
   - If there is no voltage, check for:
     — Faulty ignition coil.
     — An open in the WHT/BLU wire between the igniter unit and the ignition coil.
   - If there is battery voltage, go to step 5.
5. Check for continuity between the WHT wire and the body ground.
   There should be continuity.
   - If there is no continuity, check for:
     — An open in the WHT wire between the igniter unit and the PGM-FI ECU.
     — Poor ground (G101 or G151).
   - If there is continuity, go to step 6.
6. Check for continuity between the BLU wire and the body ground.
   There should be continuity.
   - If there is no continuity, check for:
     — An open in the BLU wire between the igniter unit and the tachometer or the A/T control unit.
     — Poor ground (G151 or G301, G401).
   - If there is continuity, go to step 7.
7. If all continuity and voltage tests are normal, but the engine won't start, replace the igniter unit.

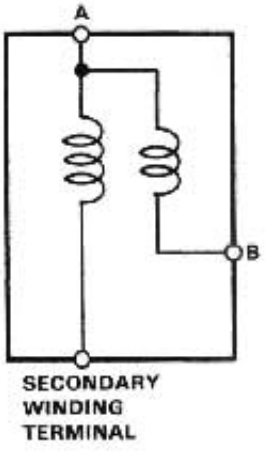
Ignition Coil Test

1. With the ignition switch OFF, remove the distributor cap.
2. Remove the 2 screws to disconnect the BLK/YEL and WHT/BLU wires from the terminals A and B respectively.



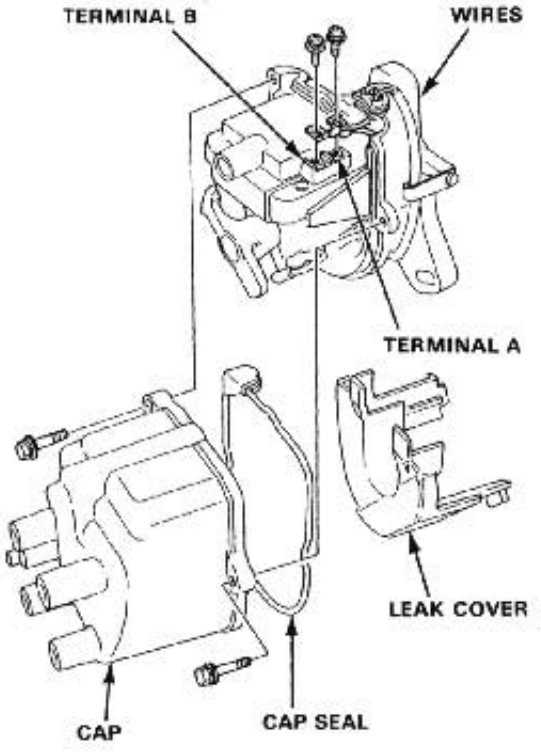
3. Using an ohmmeter, measure resistance between the terminals. Replace the coil if the resistance is not within specifications.
NOTE: Resistance will vary with the coil temperature; specifications are at 20°C (70°F)

Primary Winding Resistance (between the A and B terminals):
0.63—0.77 ohms
Secondary Winding Resistance (between the A and secondary winding terminals):
9,760—14,640 ohms

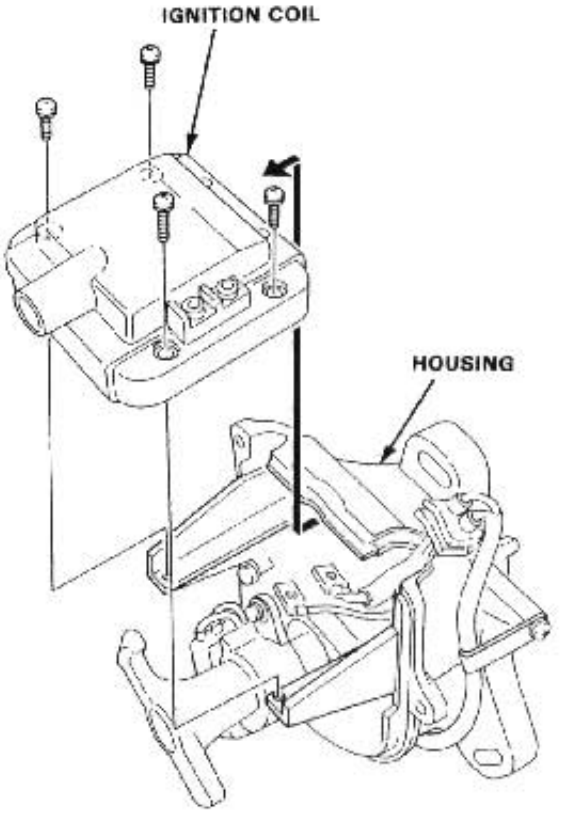


Ignition Coil Replacement

1. With ignition switch OFF, remove the distributor cap and cap seal, then remove the leak cover.
2. Remove the 2 screws to disconnect the BLK/YEL and WHT/BLU wires from the terminals A and B respectively.

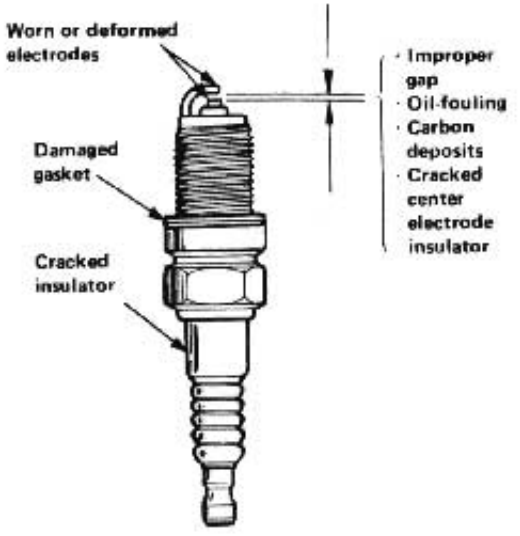


3. Remove the 4 screws and slide the ignition coil out of the distributor housing.



Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for:



Burned or worn electrodes may be caused by:
- Lean fuel mixture
- Advanced ignition timing
- Loose spark plug
- Plug heat range too high
- Insufficient cooling

Fouled plug may be caused by:
- Rich fuel mixture
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too low
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition coil or ignition wires

2. Replace the plug if the center electrode is rounded as shown below:

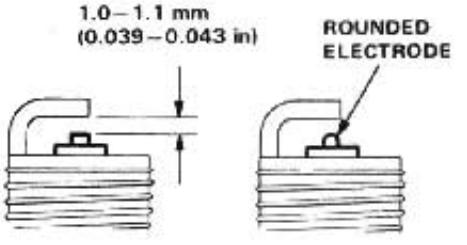
Spark Plug:

Std and Si models

BCPR6EY–N11 (NGK) BCPR6E–11 (NGK) Q20PR–U11 (ND)	For all normal driving.
BCPR7EY–N11 (NGK) BCPR7E–11 (NGK) Q22PR–U11 (ND)	For hot climates or continuous high speed driving.

HF model

BCPR5E–11 (NGK) BCPR5EY–N11 (NGK) Q16PR–U11 (ND)	For all normal driving.
BCPR6E–11 (NGK) BCPR6EY–N11 (NGK) Q20PR–U11 (ND)	For hot climates or continuous high speed driving.



3. Adjust the gap with a suitable gapping tool.

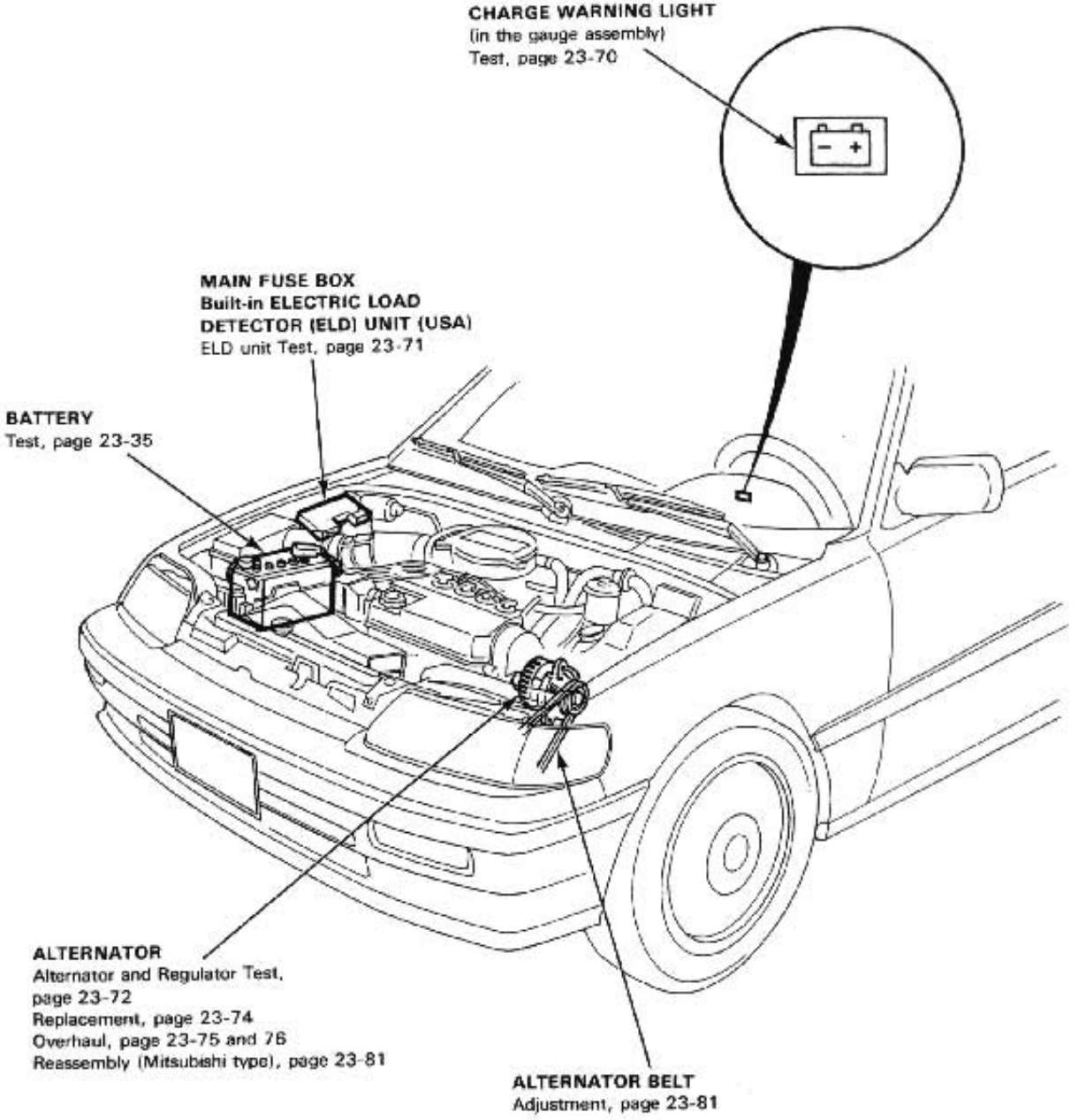
   Electrode Gap: 1.0–1.1 mm (0.039–0.043 in)

4. Screw the plugs into the cylinder head finger tight, then torque them to 18 N·m (1.8 kg-m, 13 lb-ft).

   NOTE: Apply a small quantity of anti-seize compound to the plug threads before installing.

Component Location Index

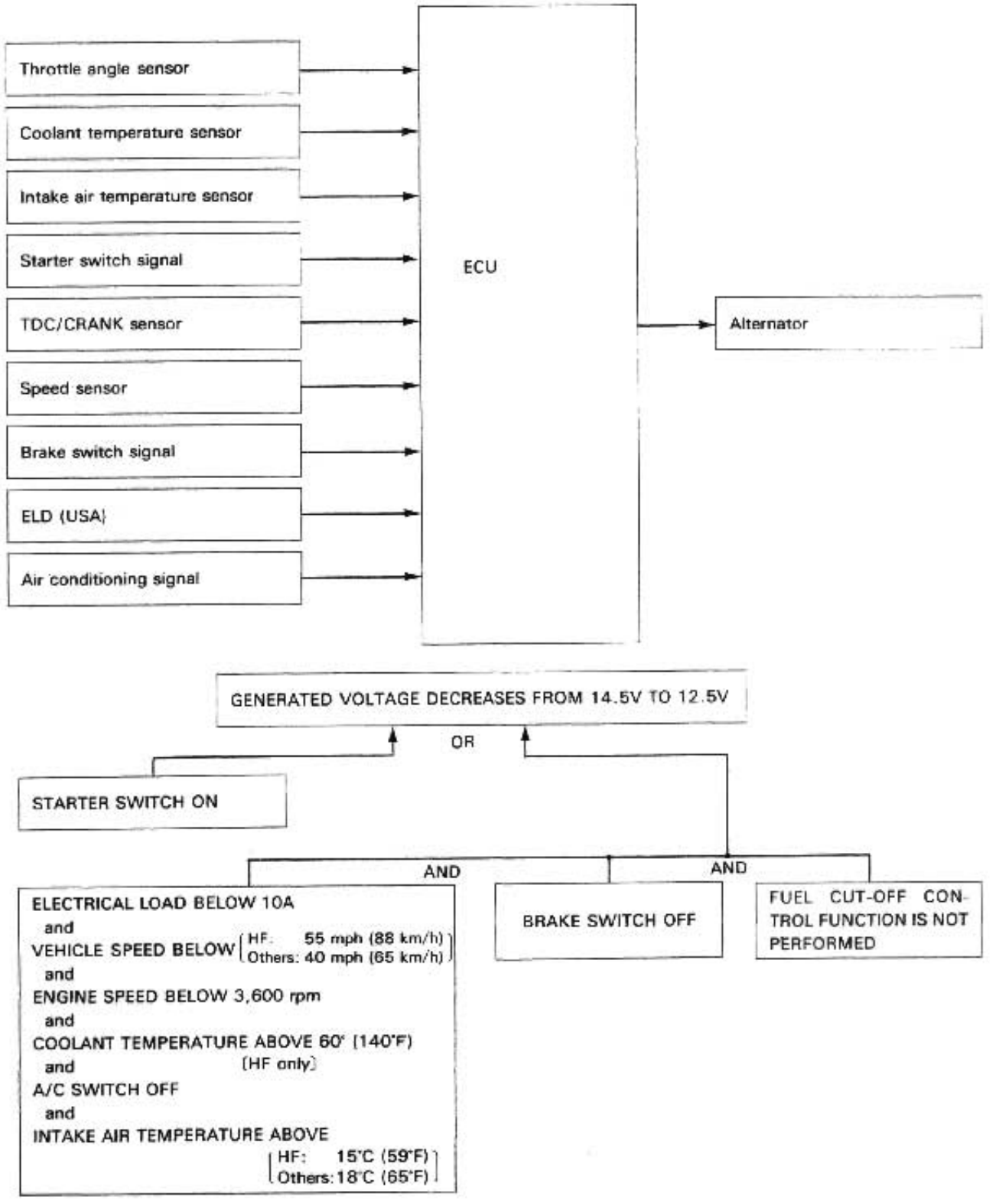
- **ALTERNATOR CONTROL SYSTEM**
  Description, page 23-68
  Troubleshooting, section 11



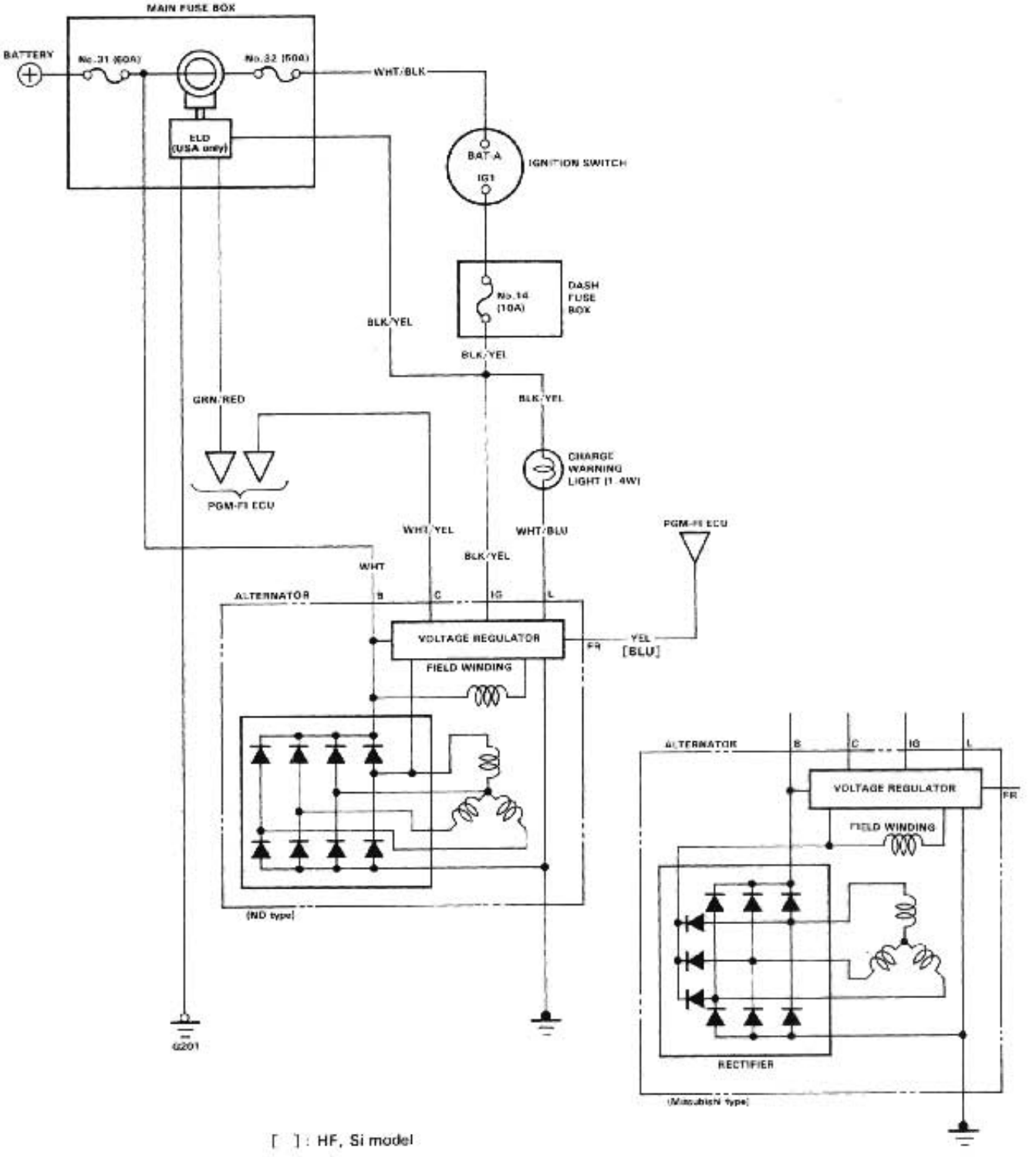
Charging System

Description

To improve the fuel economy, this system changes the voltage generated at the alternator in accordance with the driving conditions.



Circuit Diagram

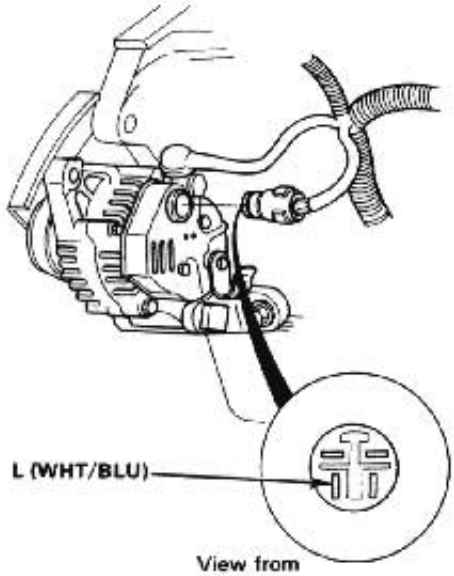


[ ] : HF, Si model

Charge Warning Light Test

NOTE:
- Before testing, check the wire harness connection and alternator belt tension.
- Check the No.14 (10 A) fuse in the dash fuse box before testing.

1. Turn the ignition switch on. The charge warning light should come on.
   If it does not come on, unplug the alternator connector and short the pin of the L (WHT/BLU) terminal to ground.



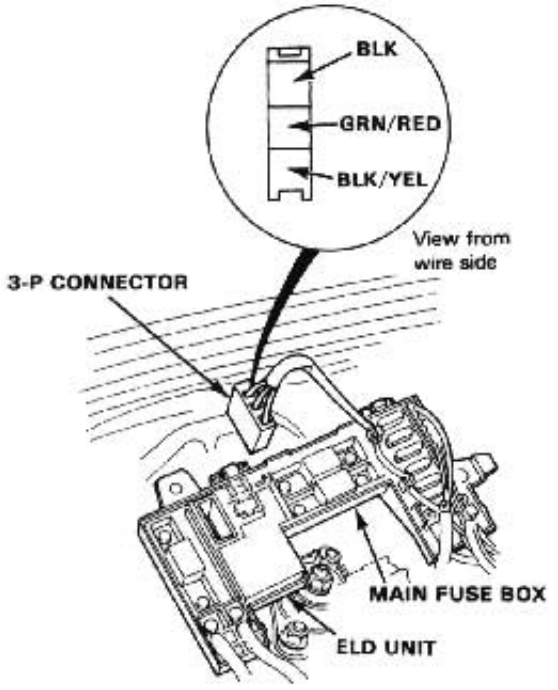
View from terminal side

- If the charge warning light still does not come on, check for:
  - Bad bulb (of the charge warning light).
  - An open in the WHT/BLU wire between the charge warning light and voltage regulator.
  - An open in the BLK/YEL wire between the charge warning light and the dash fuse box, or the dash fuse box and the ignition switch.
- If the charge warning light comes on, check the alternator and regulator (see page 23-72).

2. Start the engine and let it idle. The charge warning light should go off.
   If it stays on this time, check the alternator and regulator (see page 23-72).

ELD Unit Test (USA)

1. First make sure you have a good battery (see page 23-35). Next, check the No.14 (10 A) fuse in the dash fuse box before testing.
2. Open the main fuse box lid and disconnect the 3-P connector from the ELD unit.
   With the ignition switch ON, there should be battery voltage between the BLK/YEL (+) and BLK(−) terminals.



- If there is no voltage, check for:
  - An open in the BLK/YEL wire between the dash fuse box and main fuse box.
  - Poor ground (G201).
- If there is battery voltage, go to step 3.

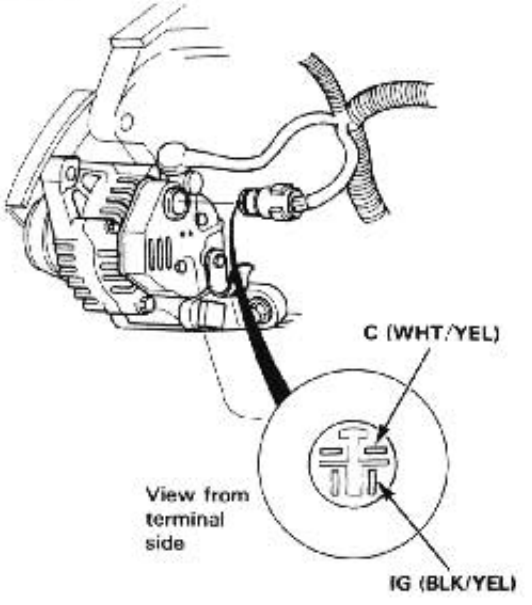
3. Check for voltage between the GRN/RED terminal and body ground with the ignition switch ON.
   There should be approximately.5V.
   - If the voltage is not as specified, check the alternator control system (see section 11).
   - If the voltage is as specified, go to step 4.
4. Connect the 3-P connector to the ELD unit.
5. Check for voltage between the GRN/RED terminal and body ground with the ignition switch ON and turn on the headlight low beam.
   There should be approximately. 2V.
   - If the voltage is not as specified, replace the main fuse box (ELD unit is not available separately).
   - If the voltage is as specified above, ELD unit is OK.

Alternator and Regulator Test

1. First make sure you have a good battery, and that the alternator belt tension, and connections at the alternator and main fuses are good. Next, check the No. 14 (10A) fuse in the dash fuse box. (If blown, the charge warning light will come on even if the system is working properly)

   Start the engine and allow it to warm up (cooling fan comes on).

2. Disconnect the alternator connector from the alternator.
   With the ignition switch on, there should be battery voltage between the IG (BLK/YEL) terminal and body ground.

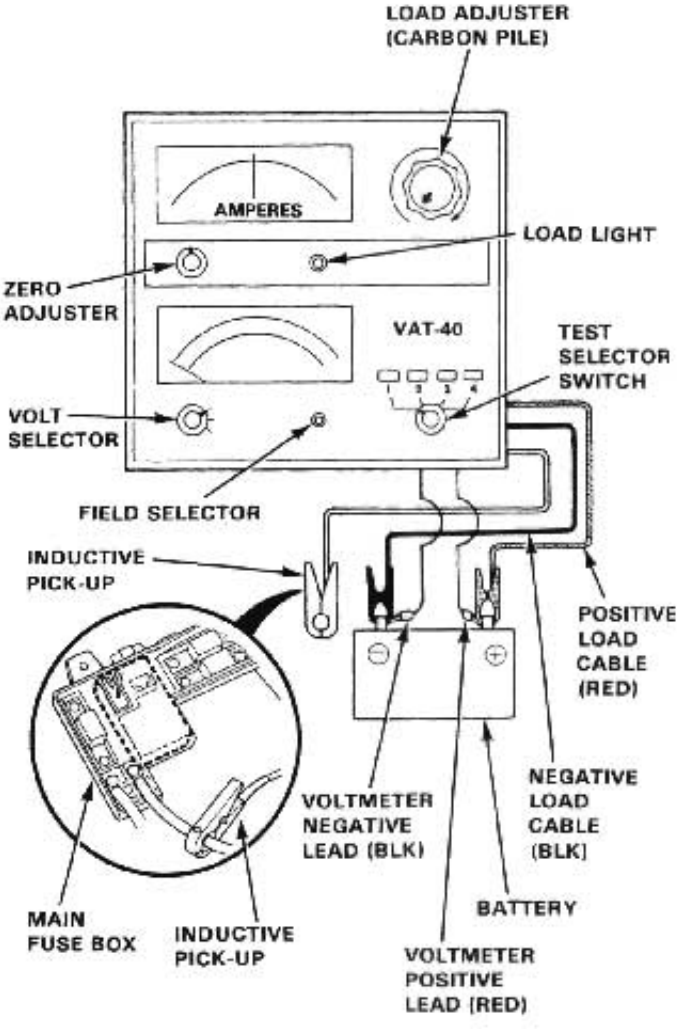


- If there is no voltage, check for an open in the BLK/YEL wire between the dash fuse box and the voltage regulator.
- If there is battery voltage,go to step 3 (USA) or step 4 (CANADA).

3. Connect the voltmeter positive probe to the battery positive (+) post and the negative probe to the C (WHT/YEL) terminal of the alternator connector.
   Start the engine and turn off all accessories.
   There should be battery voltage.

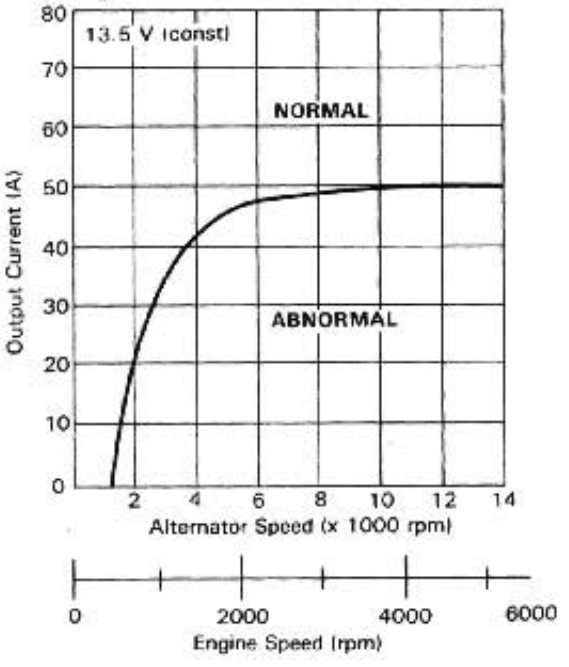
   - If there is no voltage, check for:
     - An open in the WHT/YEL wire between the voltage regulator and PGM-FI ECU.
     - Faulty PGM-FI ECU (see section 11).
   - If there is battery voltage, turn on the headlight. There should be no voltage.
     - If there is battery voltage, check for a short to ground in the WHT/YEL wire from the voltage regulator to the PGM-FI ECU or faulty PGM-FI ECU (see section 11).
     - If there is no voltage, go to step 4.

4. Following the manufacturer's instructions, connect the SUN VAT-40 (or equivalent) and turn the selector switch to the "Starting (No. 1)" position.



5. Start the engine. Turn off all accessories, move the selector switch to the "Charging" (No. 2) position, remove the inductive pick-up, and zero the ammeter.
   Reconnect the inductive pick-up to the wire from the alternator at the main fuse box, so the arrow is pointing away from the alternator.

6. Turn on the headlight and rear window defogger, then raise engine speed to 2000 rpm and hold (make sure cooling fans are off).
Apply a "load" with the carbon pile, so the voltage drops to no less than 12 volts.
Check the maximum amperage reading and compare with the chart below.



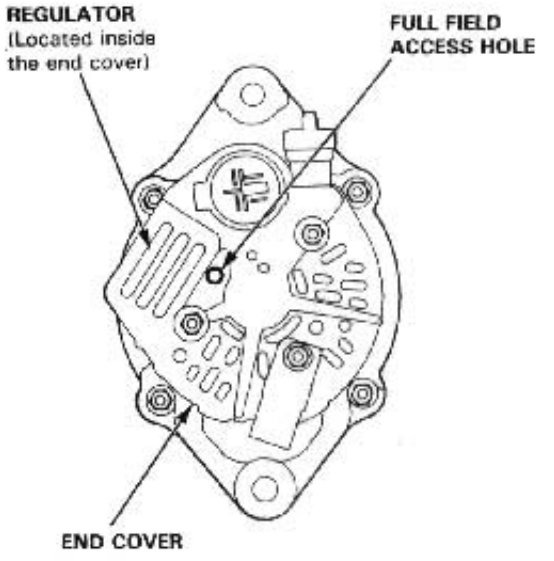
- If amperage is NORMAL specification, the system is OK: Proceed to the Charge Warning Light Test (see page 23-70).
- If amperage is ABNORMAL specification, proceed to step 7.

7. Perform full field test: Attach a probe to the VAT-40 full field test lead and insert the probe into the full field access hole at the back of the alternator. Switch the VAT-40 to the "A" (ground) position momentarily and check amperage reading.

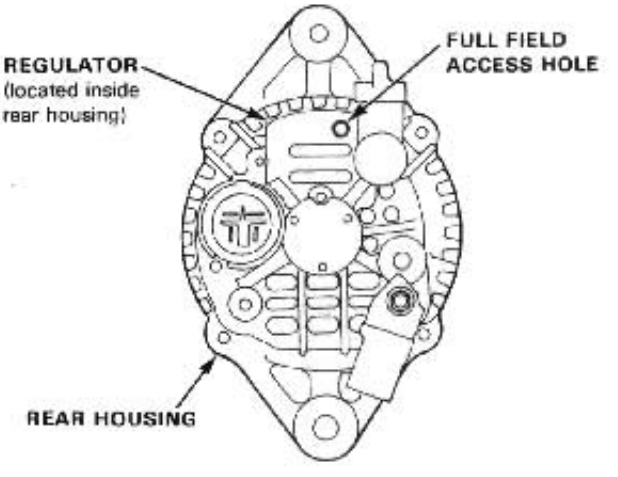
NOTE: As an alternative, use a screwdriver and an ammeter.

CAUTION: The voltage will rise quickly when the alternator is full fielded. Do not allow the voltage to exceed 18 volts or damage to the electrical system may result.

Nippon Denso type:



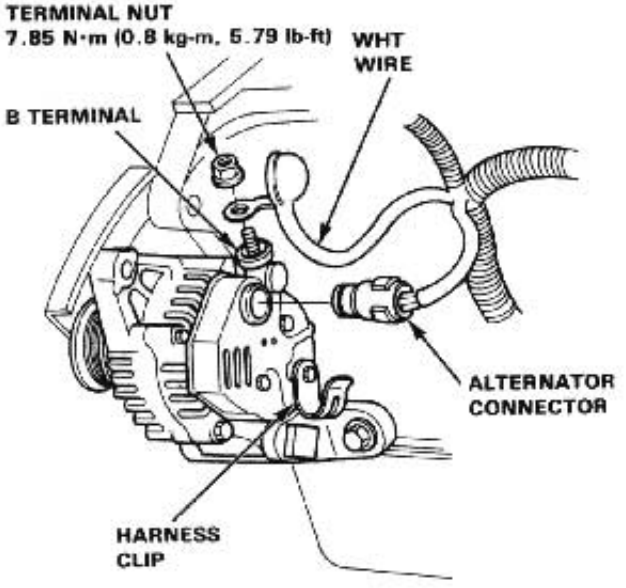
Mitsubishi type:



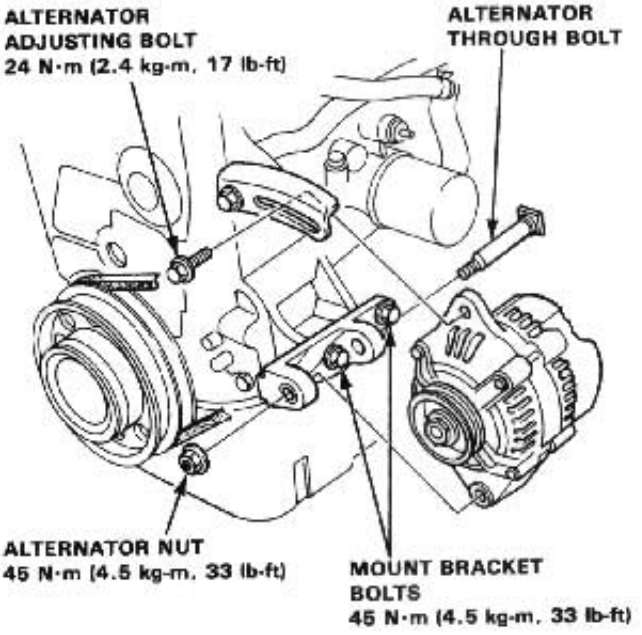
- If the amperage is not within specification, replace the alternator.
- If the amperage is within specification, replace the regulator.

Alternator Replacement

1. Disconnect the ground wire from the battery negative (−) post.
2. Disconnect the alternator connector from the alternator.
3. Remove the terminal nut and the WHT wire from the B terminal.



4. Remove the adjusting bolt and alternator nut, then remove the alternator belt from the alternator pulley.
5. Remove the alternator through bolt, then remove the alternator.

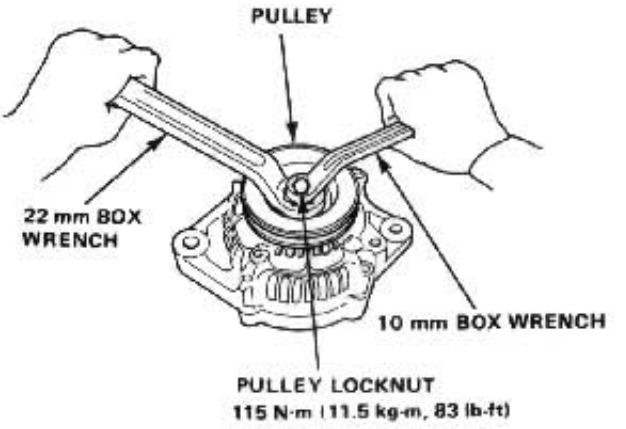


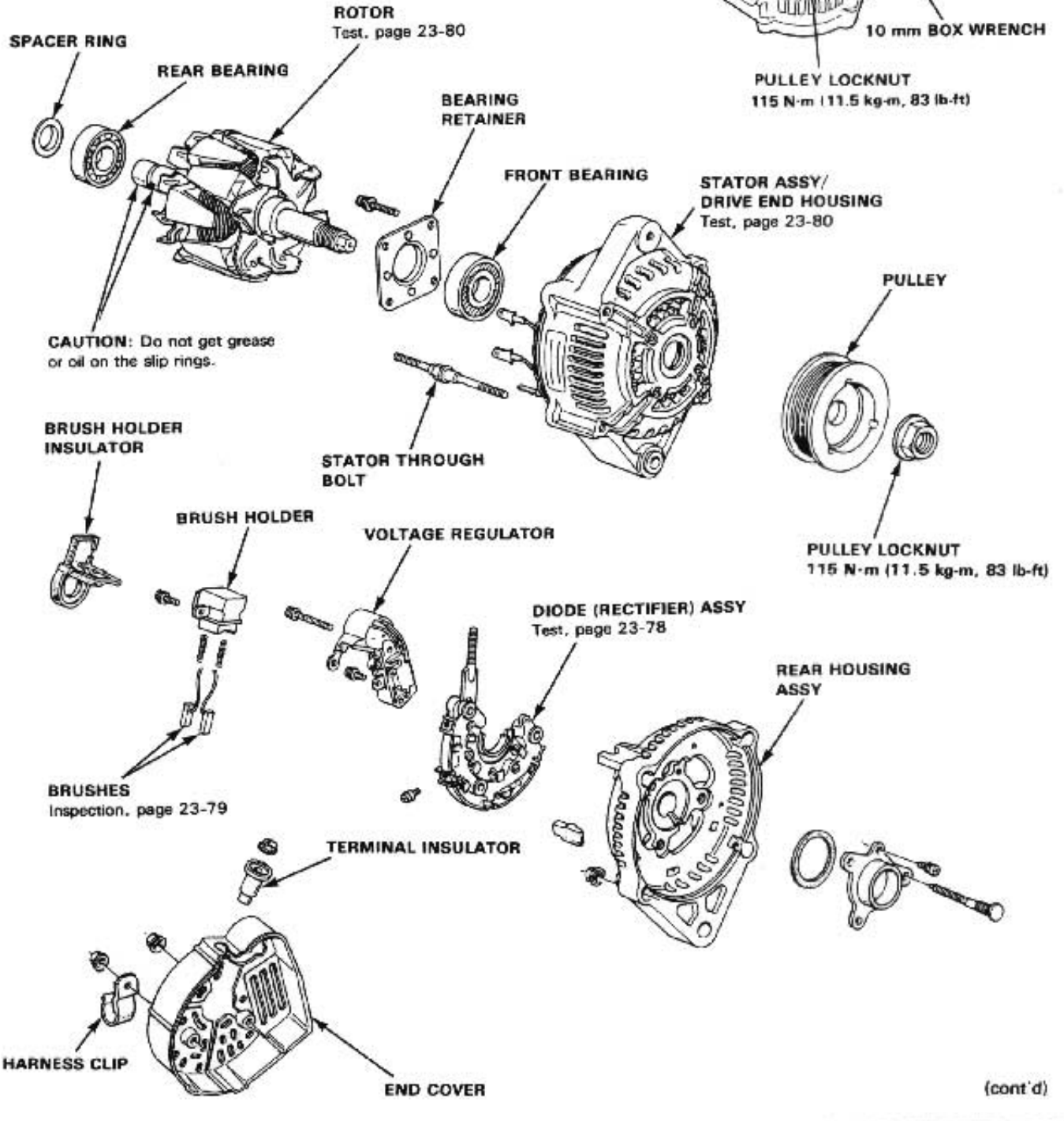
6. If necessary, remove the mount bracket bolts, and the upper and lower mount brackets.
7. adjust the alternator belt tension after installation (see page 23-81).

Alternator Overhaul (ND type)

NOTE: It is only necessary to separate the pulley, drive end housing and rotor when the front bearing needs replacement.

To remove the pulley and rotor, use 10 mm and 22 mm box wrenches to loosen the pulley locknut. Use an impact wrench to remove the nut if necessary.



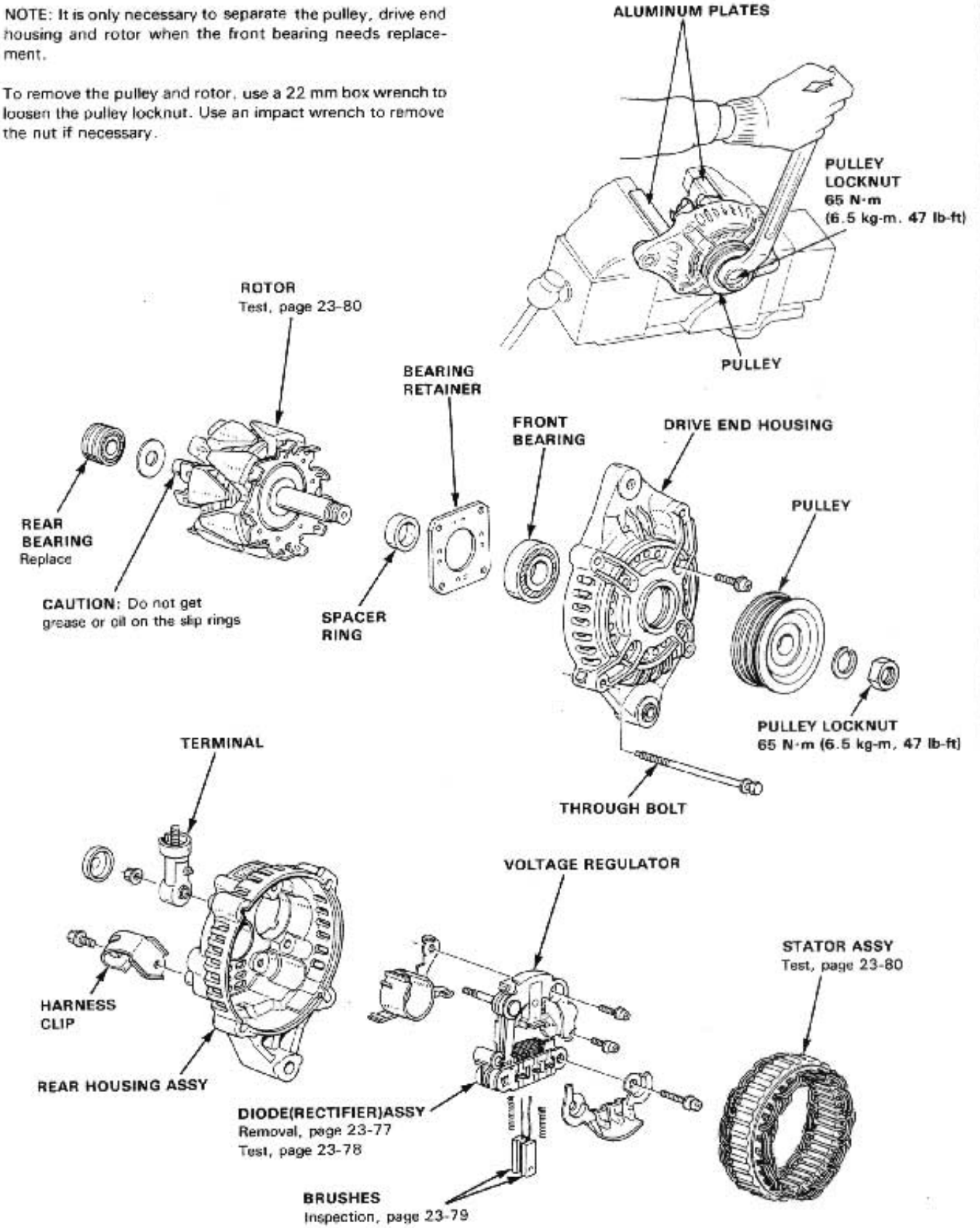


(cont'd)

Alternator Overhaul (cont'd) (Mitsubishi type)

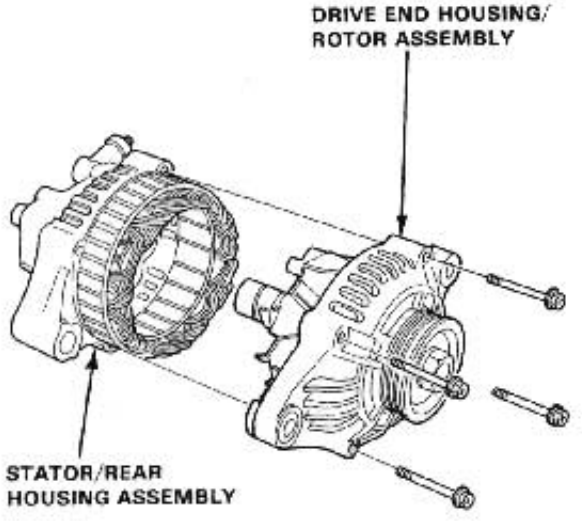
NOTE: It is only necessary to separate the pulley, drive end housing and rotor when the front bearing needs replacement.

To remove the pulley and rotor, use a 22 mm box wrench to loosen the pulley locknut. Use an impact wrench to remove the nut if necessary.

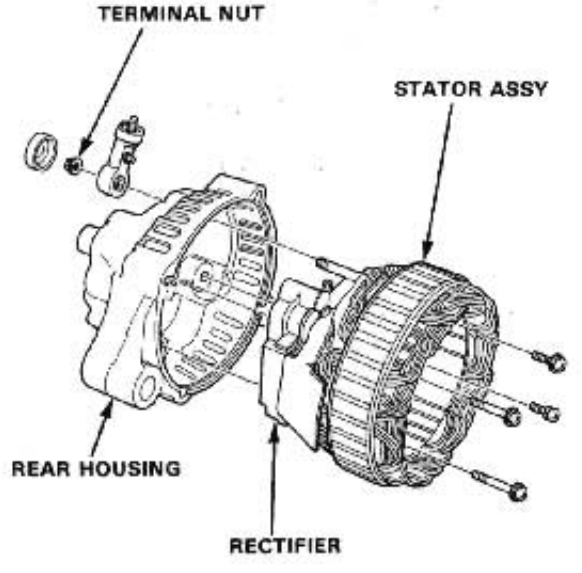


Rectifier Removal (Mitsubishi type)

1. Separate the drive end housing/rotor assembly from the stator/rear housing assembly by removing 4 bolts.

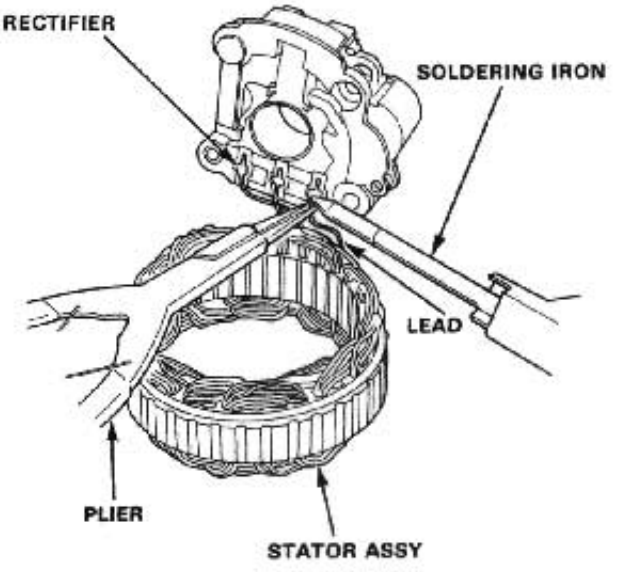


2. Separate the rear housing from the stator assembly by removing 4 screws and the terminal nut from the rear housing.



3. Unsolder the rectifier from the stator leads.

   NOTE: Pinch the stator lead with pliers to take away heat.



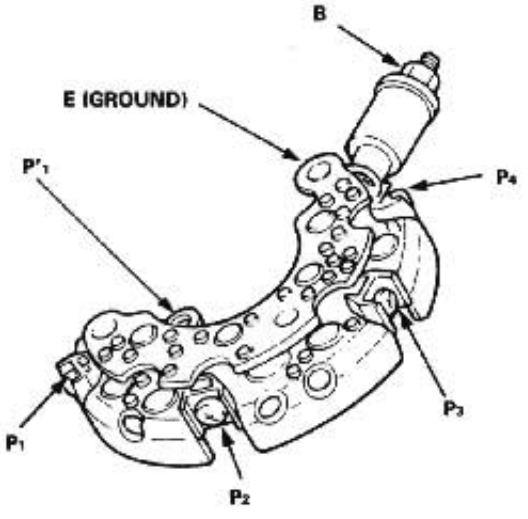
CAUTION: When installing the rectifier, use only a rosin core type solder or solder joints will corrode.

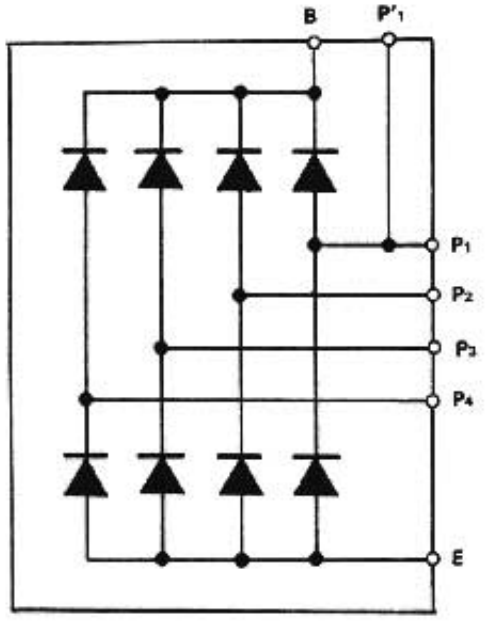
Rectifier Test

Nippon Denso type:

NOTE: The diodes are designed to pass current in one direction and block current in the opposite direction. Since the alternator rectifier is made up of eight diodes (4 pairs), each diode must be tested for continuity in both directions; a total of 16 checks.

1. Check for continuity in each direction, between the B and P (of each diode pair) terminals, and between the E (ground) and P (of each diode pair) terminals. All diodes should have continuity in only one direction.



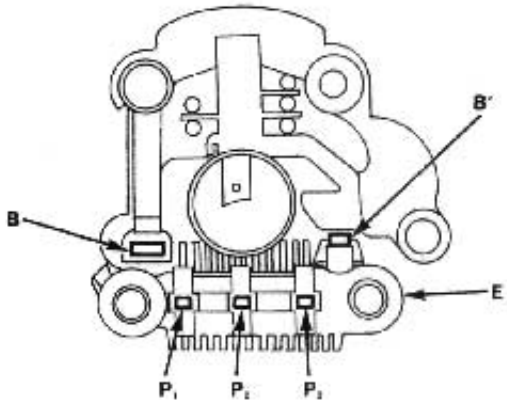


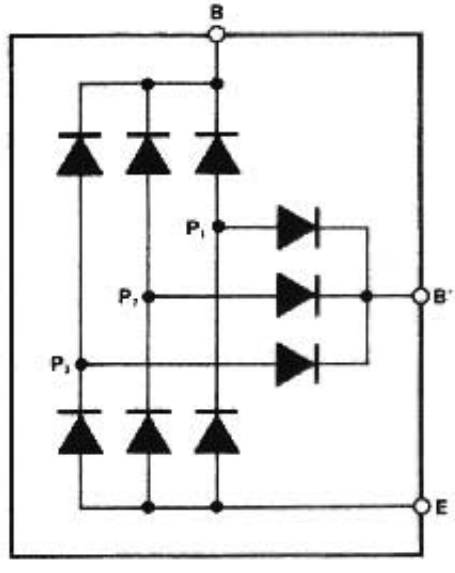
2. If any of the 8 diodes fails, replace the rectifier assembly (diodes are not available separately).

Mitsubishi type:

NOTE: The diodes are designed to pass current in one direction and block current in the opposite direction. Since the alternator rectifier is made up of nine diodes, each diode must be tested for continuity in both directions: a total of 18 checks.

1. Check for continuity in each direction, between the B and P (of each diode pair)terminals, and E (ground) and P(of each diode pair) terminals, and B' and P (of each diode pair) terminals, All diodes should have continuity in only one direction.





2. If any of the 9 diodes fails, replace the rectifier assembly (diodes are not available separately).

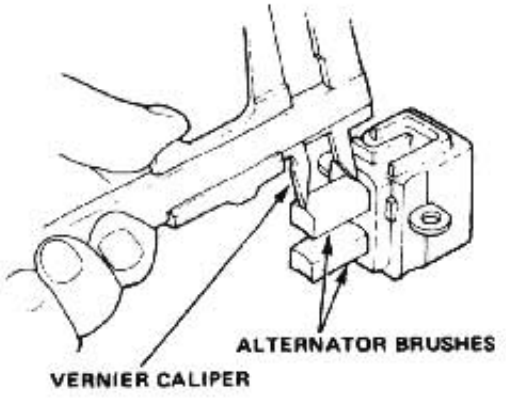
Alternator Brush Inspection

CAUTION: When replacing the brushes, use only a rosin core type solder or solder joints will corrode.

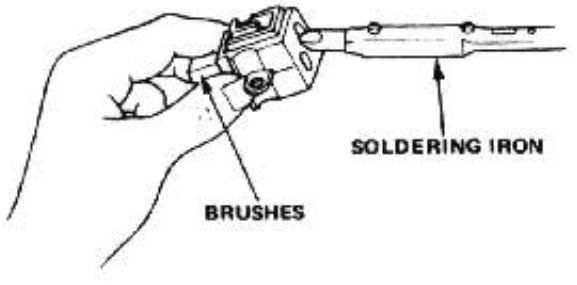
Nippon Denso type:

1. Remove the end cover, then take out the brush holder by removing its 2 screws.
2. Measure length of the brushes with a vernier caliper.

Alternator Brush Length:
Standard : 13.5 mm (0.53 in)
Service Limit: 4.5 mm (0.18 in)



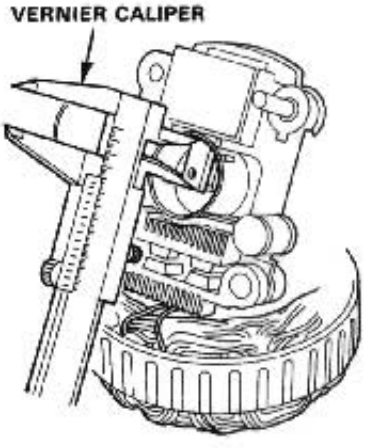
If the brushes are not within the service limit, replace them.



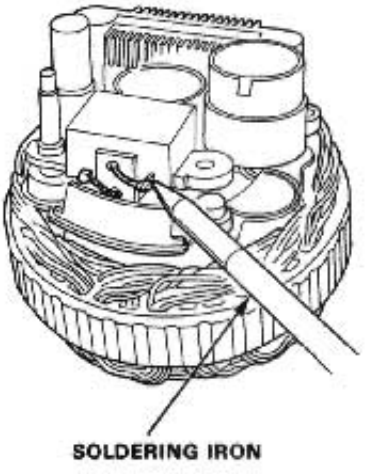
Mitsubishi type:

1. Separate the drive end housing /rotor assembly from the stator/rear housing assembly by removing 4 screws (see page 23-76).
2. Separate the rear housing from the stator assembly by removing 4 screws and the terminal nut fom the rear housing (see page 23-80).
3. Measure length of the brushes with a vernier caliper.

Alternator Brush Length:
Standard : 22.0 mm (0.90 in)
Service Limit : 8.0 mm (0.31 in)

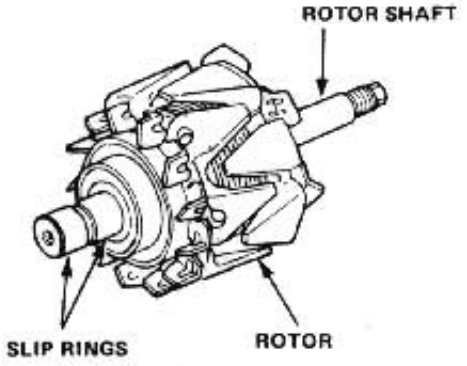


If the brushes are not within the service limit, replace them.



Rotor Slip Ring Test

1. Check that there is continuity between the slip rings.
2. Check that there is no continuity between the rings and the rotor or rotor shaft.

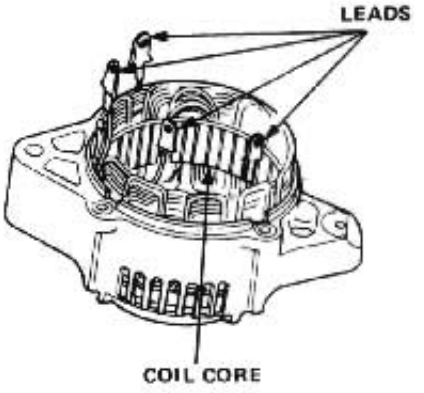


3. If the rotor fails either continuity check, replace it.

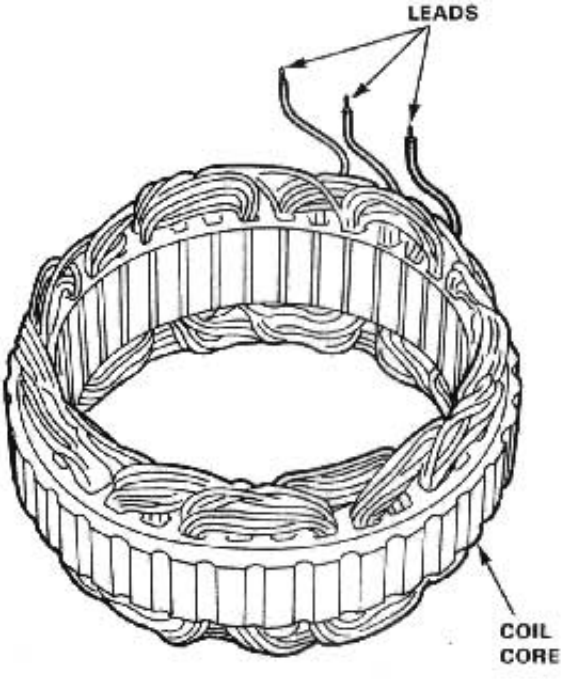
Stator Test

1. Check that there is continuity between each pair of leads.
2. Check that there is no continuity between each lead and the coil core.

Nippon Denso type:



Mitsubishi type:

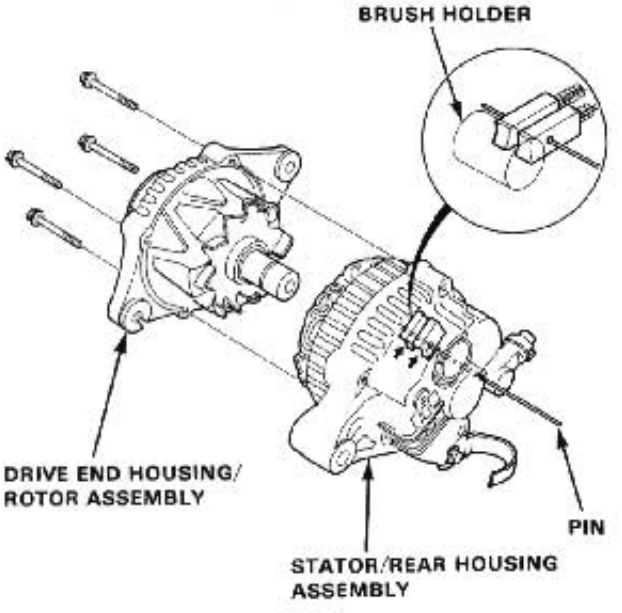


3. If the coil fails either continuity check, replace the stator.

Alternator Reassembly (Mitsubishi type)

Reassemble the alternator in the reverse order of disassembly.

1. Insert a pin into a hole on the brush holder to prevent the brushes from protruding.



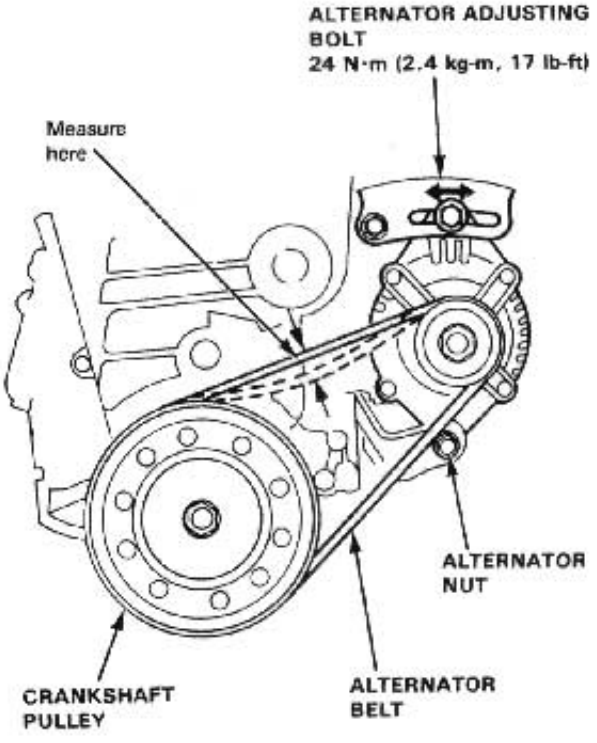
2. Set the drive end housing /rotor assembly into the stator/rear housing assembly, tighten the through bolts, then pull out the pin.

Alternator Belt Adjustment

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

   Deflection: 9—11 mm (0.35—0.43 in)

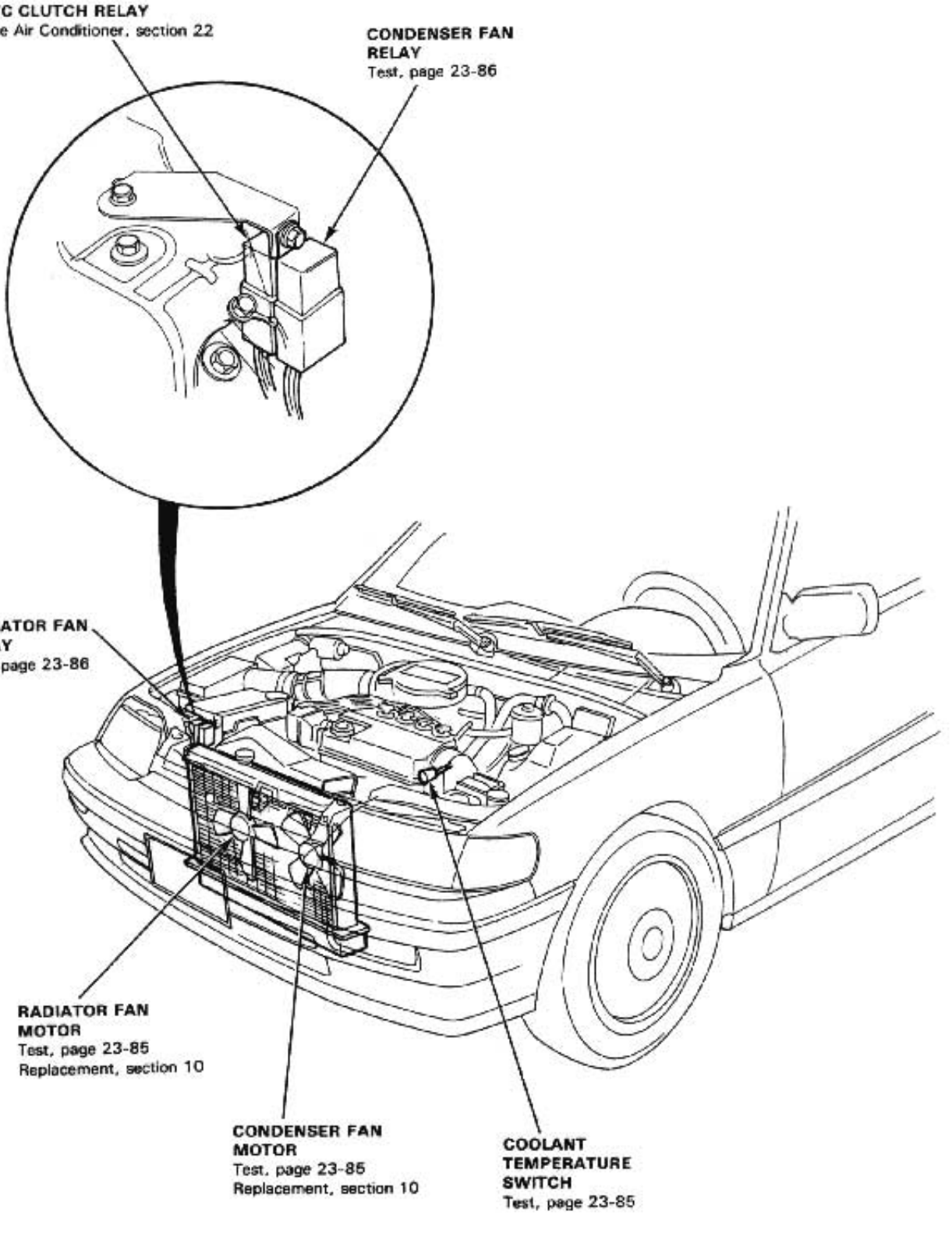
   NOTE: On a brand-new belt, the deflection should be 7 - 9 mm (0.25—0.35 in) when first measured.



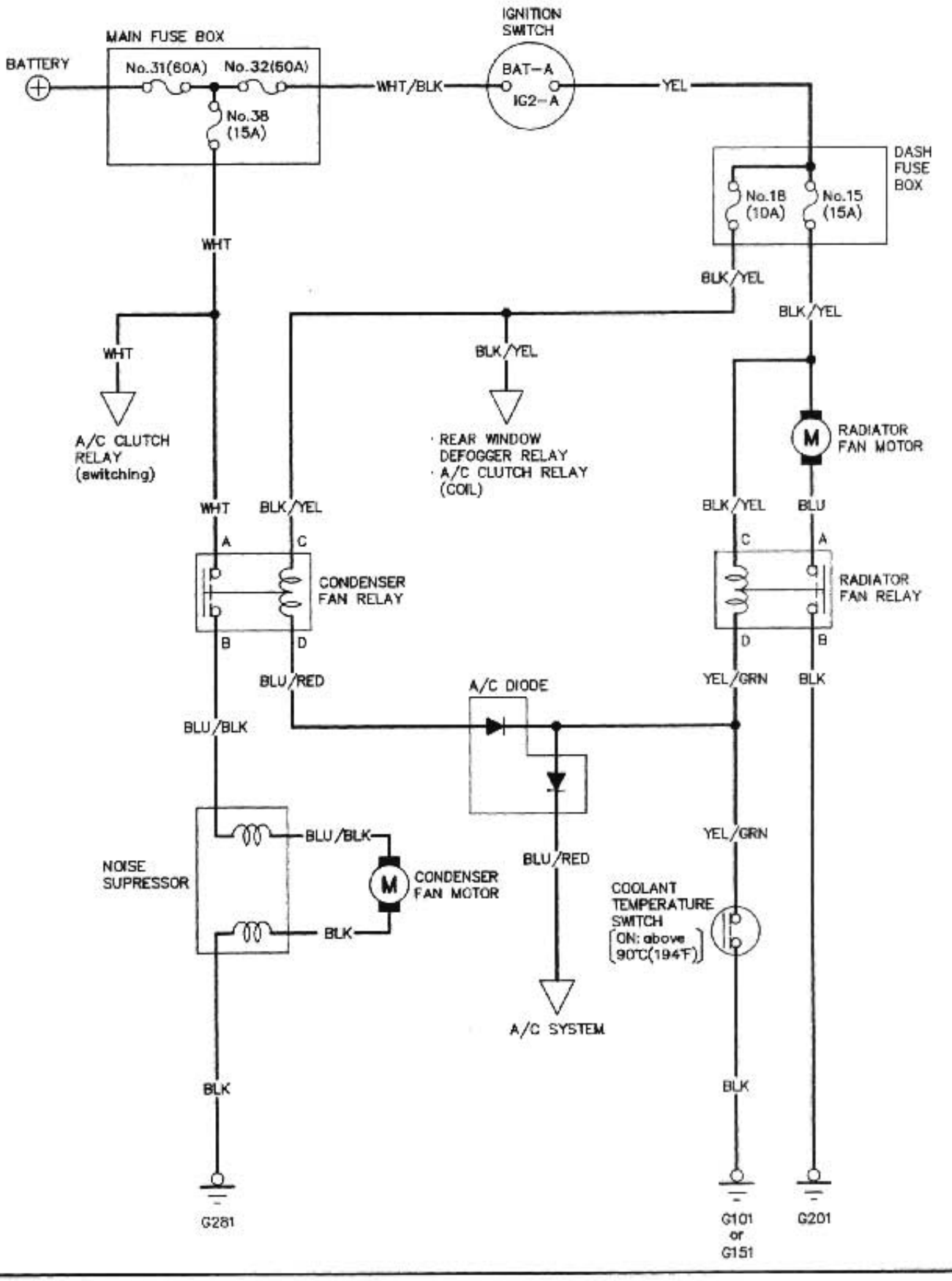
2. Loosen the alternator adjusting bolt and nut.
3. Move the alternator to obtain the proper belt tension, then retighten the adjusting bolt and nut.
4. Recheck the deflection of the belt.

Cooling Fan System

Component Location Index

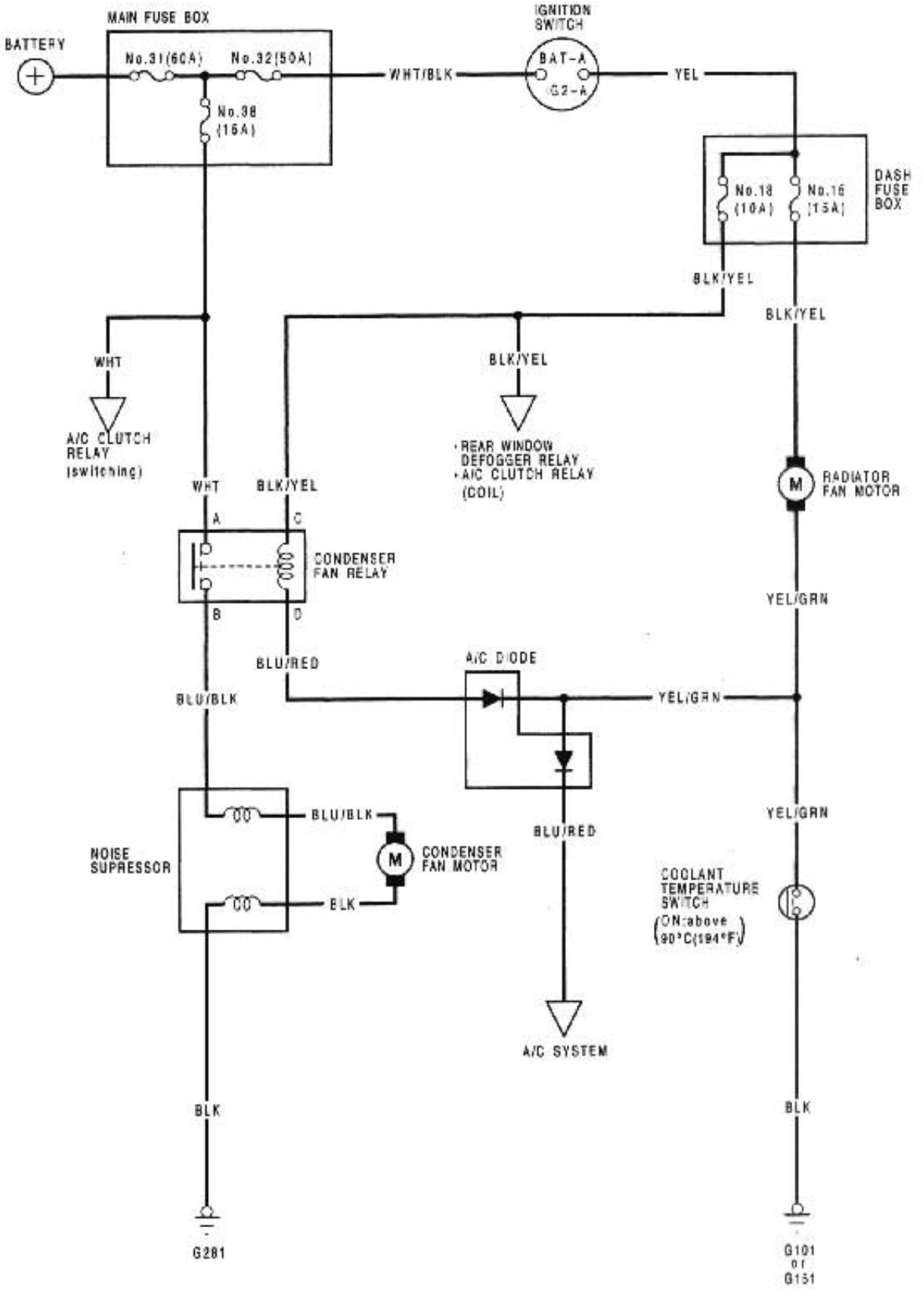


Circuit Diagram (USA)



Cooling Fan System

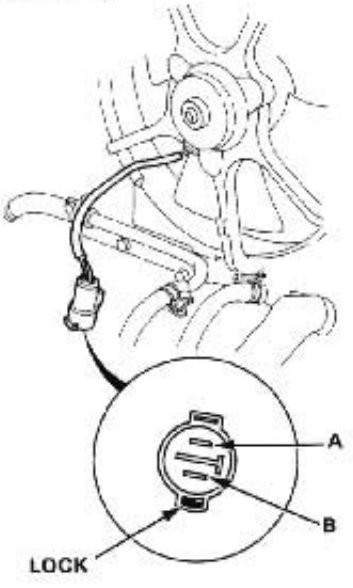
(CANADA)



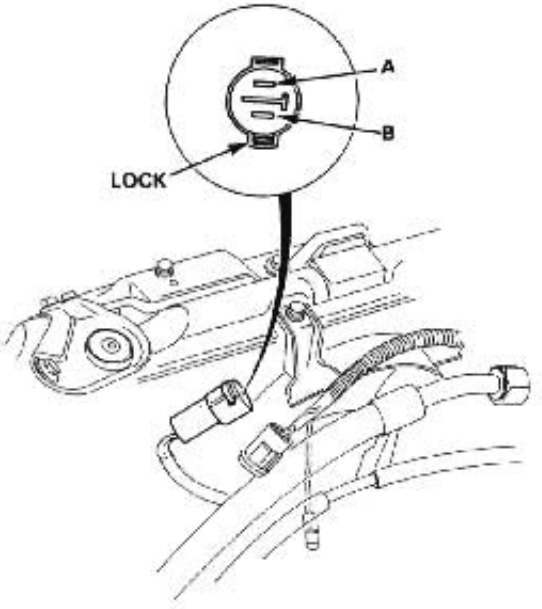
Fan Motor Test

1. Disconnect the 2-P connector from the fan motor.
2. Test motor operation by connecting battery positive to the A terminal, and negative to the B terminal.
3. If the motor fails to run smoothly, replace it.

Radiator Fan Motor:

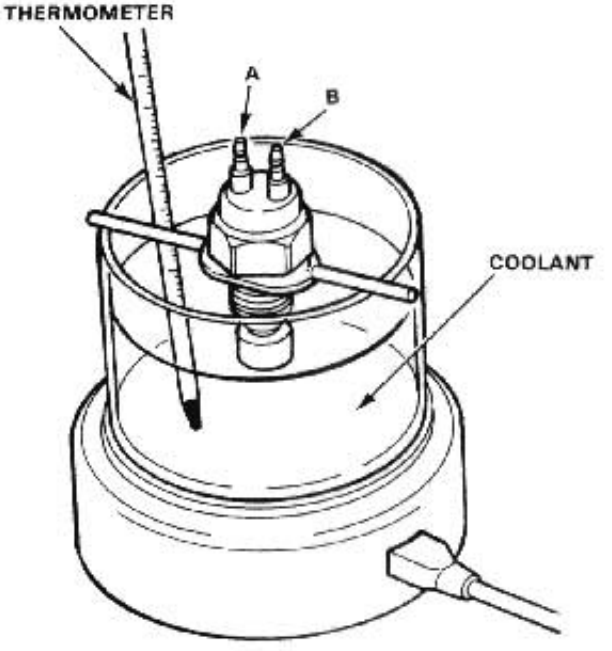


Condenser Fan Motor:



Coolant Temperature Switch Test

1. Remove the coolant temperature switch from the rear of the engine cylinder block.
2. Suspend the coolant temperature switch in a container of coolant as shown.



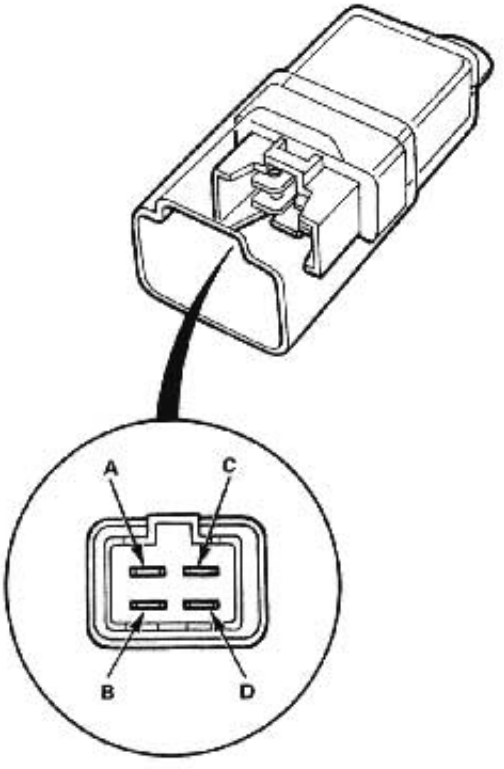
3. Heat the coolant and check coolant temperature with a thermometer (see table below).
4. Check for continuity between the A and B terminals according to the table.

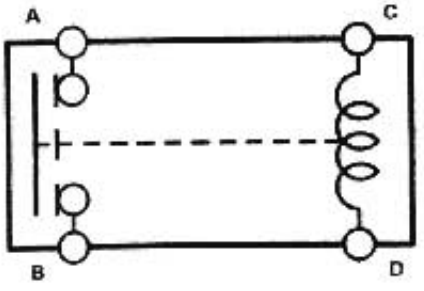
Temperature \ Terminal		A	B
Above	88.5–91.5°C (191–197°F)	○	○
Below	83.5–86.5°C (182–188°F)		

Cooling Fan System

Relay Test

1. Remove the radiator fan relay on the right front inner fender or condenser fan relay on the right front bulkhead.
2. There should be continuity between the A and B terminals when the battery in connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.

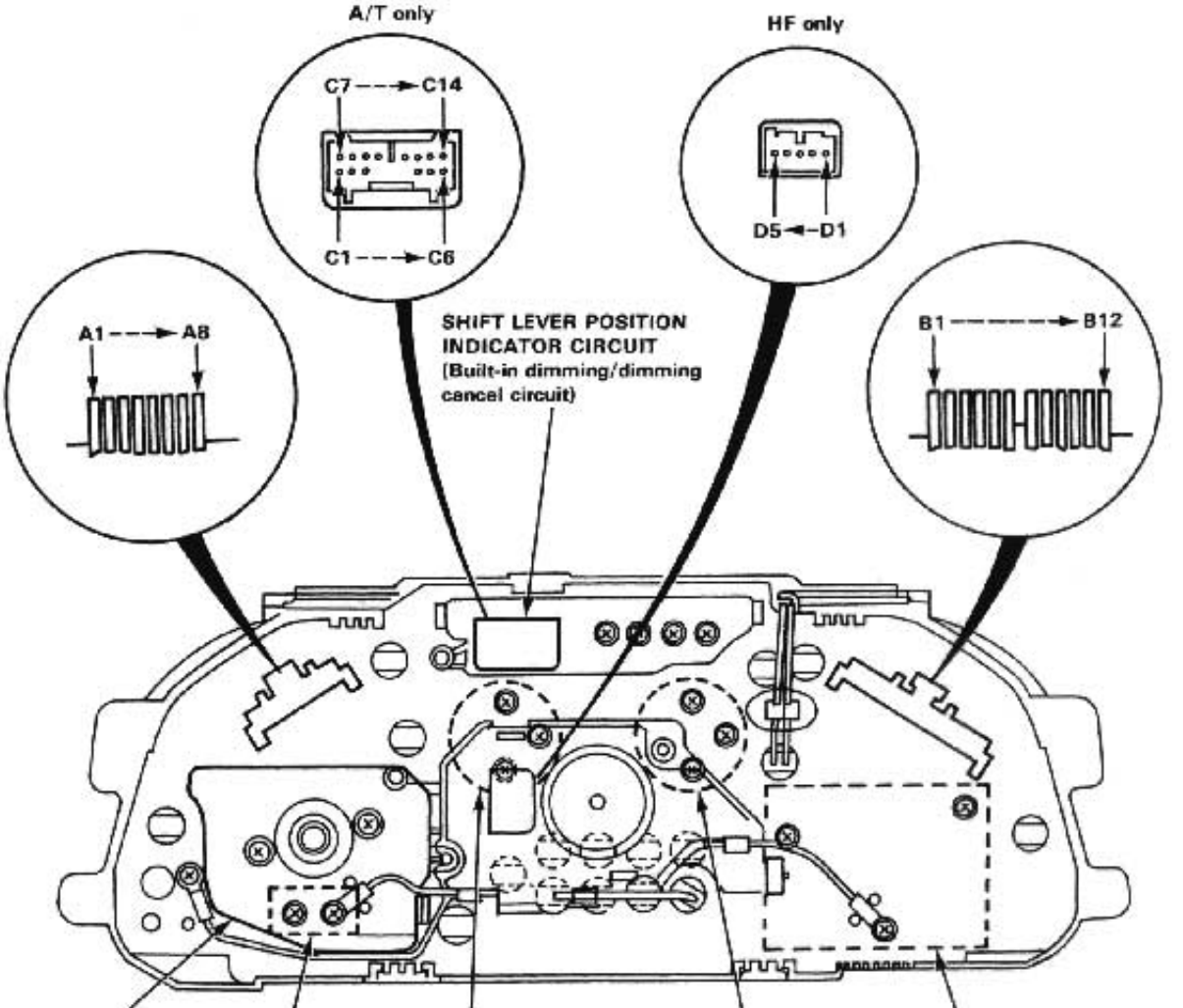




Gauge Assembly

Gauge/Indicator Location Index

- **GAUGE ASSEMBLY**
  Removal, page 23-92
  Disassembly, page 23-93



SPEEDOMETER
Indicates 60 mph [km/h] at 1,026 [637] rpm of the speedometer cable.

SPEED PULSER
Outputs 4 pulses per speedometer cable revolution
Test, page 23-92

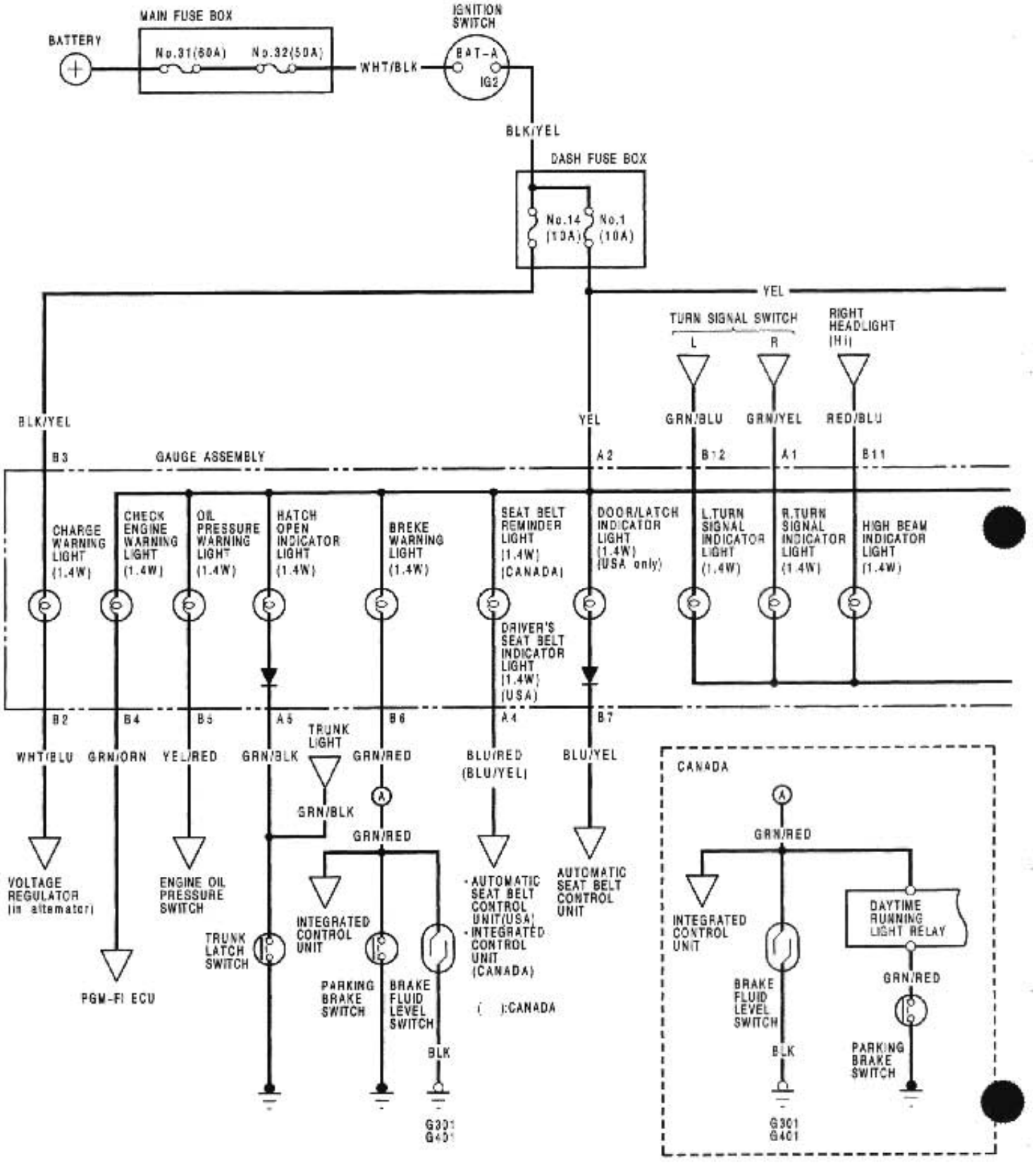
FUEL GAUGE
Description, page 23-90
Gauge Test, page 23-95
Sending Unit Test/Replacement page 23-96

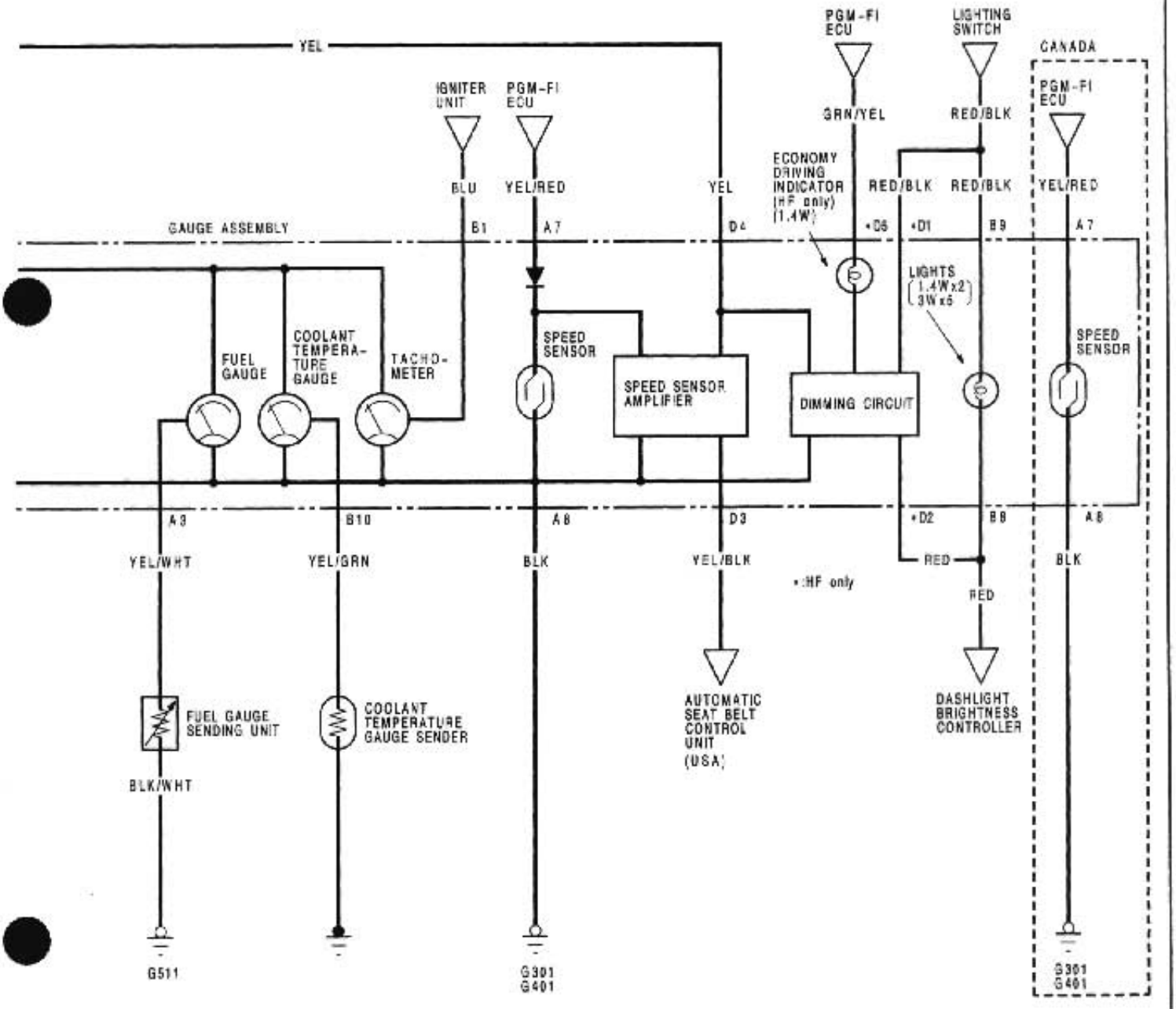
COOLANT TEMPERATURE GAUGE
Description, page 23-90
Gauge Test, page 23-94
Sender Test, page 23-94

TACHOMETER
Indicates 100 rpm at 200 pulses per minute of the igniter unit.

Gauge Assembly

Circuit Diagram



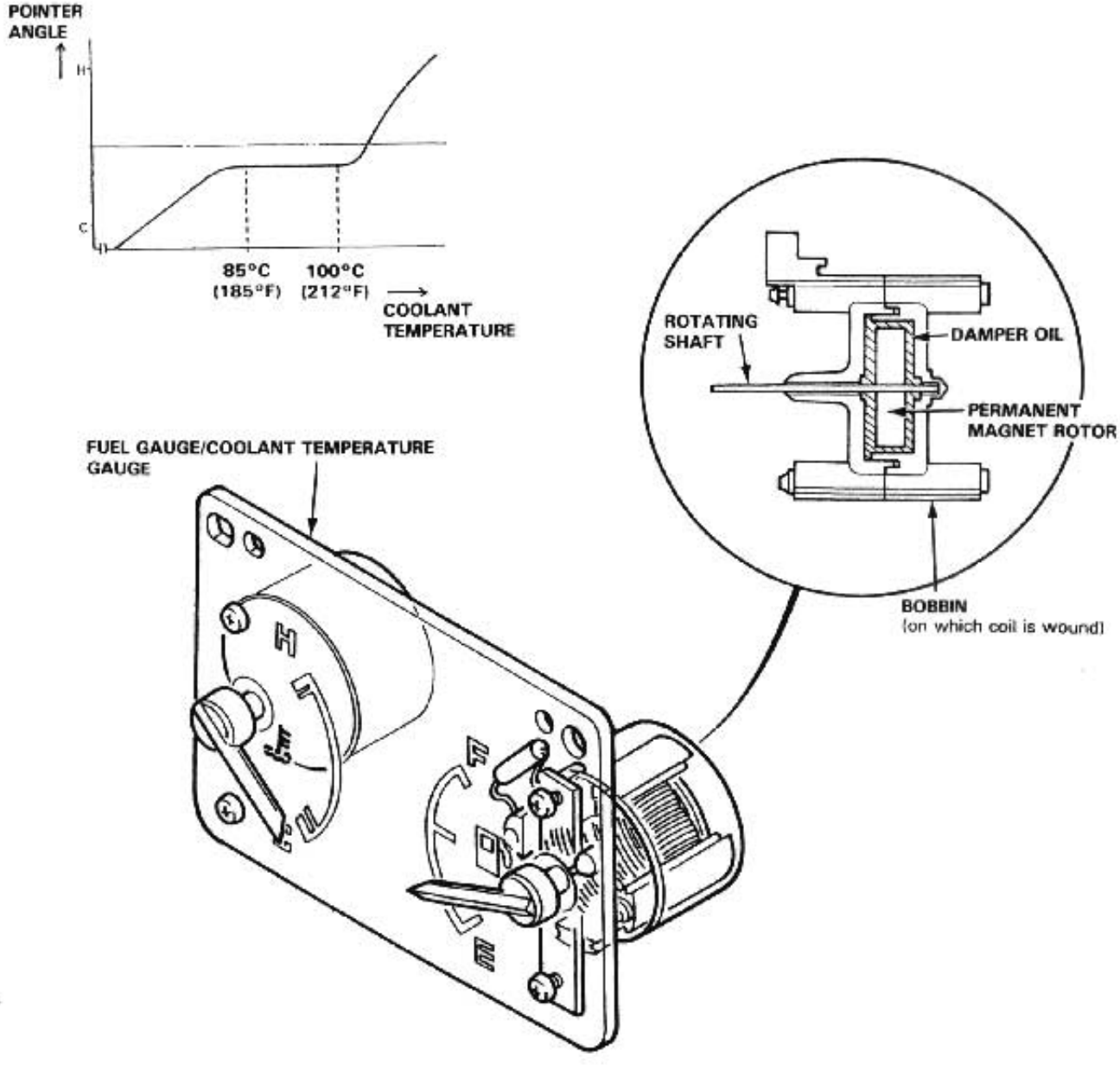

YEL
IGNITER UNIT
PGM-FI ECU
BLU
YEL/RED
YEL
PGM-FI ECU
GRN/YEL
LIGHTING SWITCH
RED/BLK
CANADA
PGM-FI ECU
YEL/RED
ECONOMY DRIVING INDICATOR (HF only) (1.4W)
RED/BLK
RED/BLK
GAUGE ASSEMBLY
B1
A7
D4
*D6
*D1
B9
A7
LIGHTS (1.4W x 2) (3W x 5)
FUEL GAUGE
COOLANT TEMPERATURE GAUGE
TACHOMETER
SPEED SENSOR
SPEED SENSOR AMPLIFIER
DIMMING CIRCUIT
SPEED SENSOR
A3
B10
A8
D3
*D2
B8
A8
YEL/WHT
YEL/GRN
BLK
YEL/BLK
RED
BLK
*:HF only
RED
FUEL GAUGE SENDING UNIT
COOLANT TEMPERATURE GAUGE SENDER
AUTOMATIC SEAT BELT CONTROL UNIT (USA)
DASHLIGHT BRIGHTNESS CONTROLLER
BLK/WHT
G511
G301
G401
G301
G401

Gauge Assembly

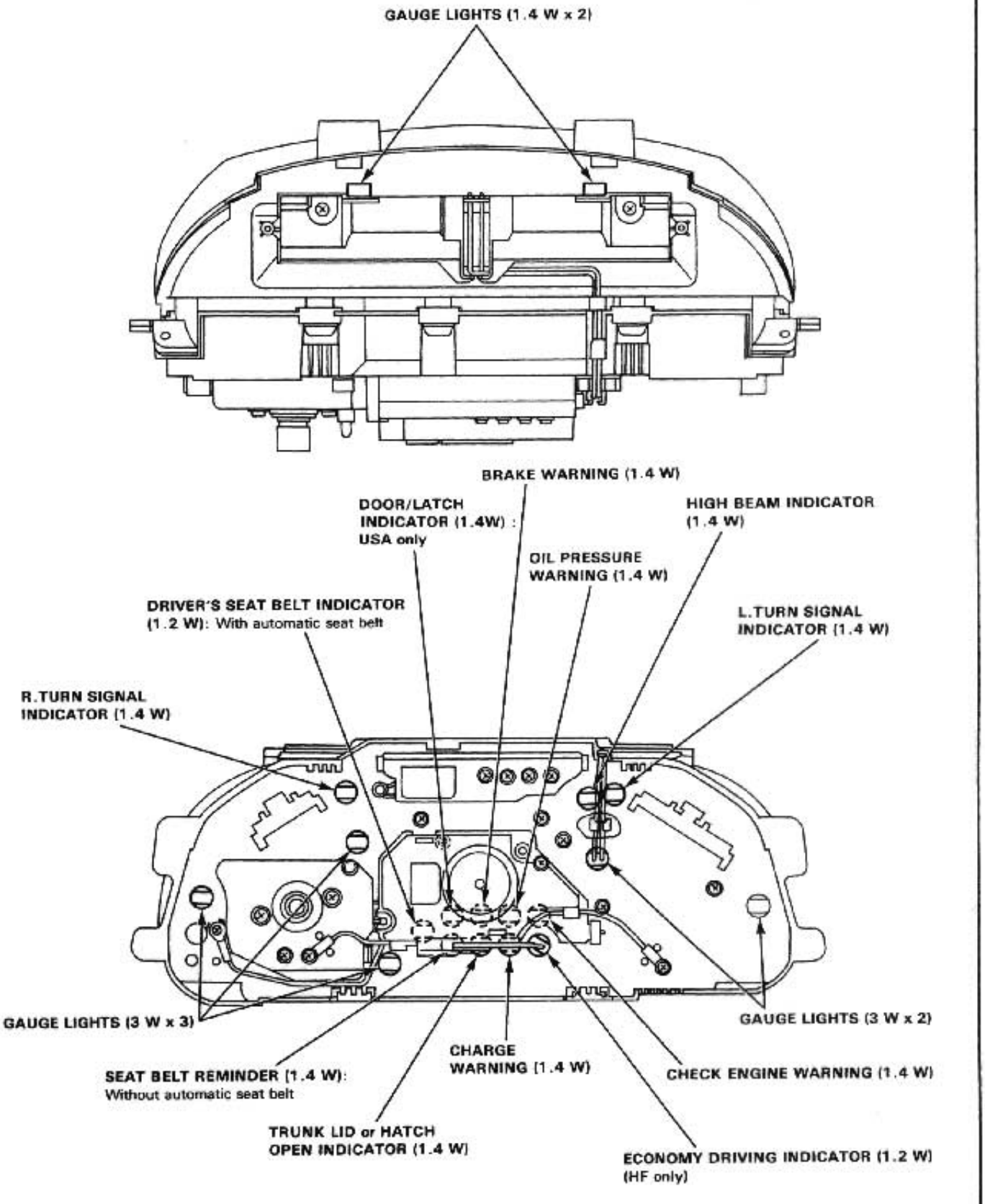
Description

Bobbin Type (Cross Coil Type) Gauge:

- A bobbin type gauge is an electromagnetic instrument in which two intersecting coils are wound around the permanent magnet rotor. By varying the resistance of the unit to vary the current which flows through the coil, the magnetic force which energizes the coil will vary, causing the rotor (pointer) to operate. A sliding resistance is employed in the fuel gauge just as in a bimetal type gauge, and a thermistor is used in the temperature gauge.
- The rotor of the fuel gauge is immersed in damper oil and its center of gravity lies roughly along the rotating shaft, hence the fuel level is indicated continuously even when the ignition switch is OFF.
- The coolant temperature gauge is a center point stable small indicating angle type which indicates the temperature of the coolant between about 85°C (185°F) and 100°C (212°F).



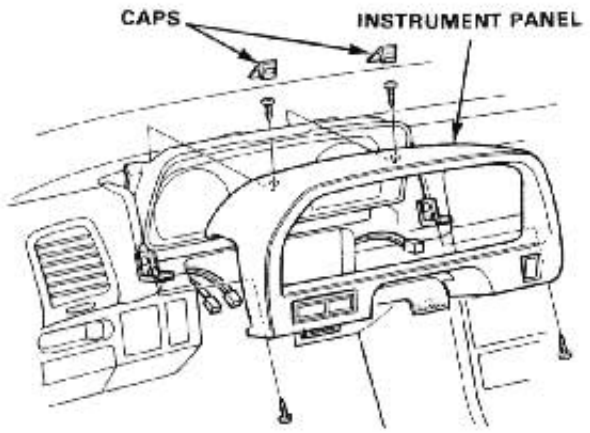
Bulb Locations (With Tachometer)



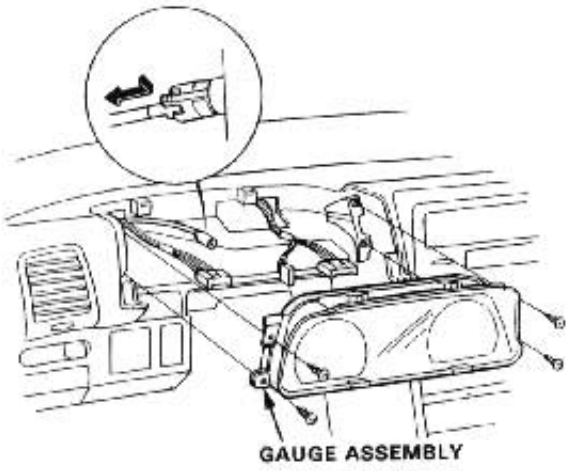
Gauge Assembly

Removal

1. Remove the caps and 4 screws, then remove the instrument panel from the dashboard.
   Disconnect the connectors from the each switches.



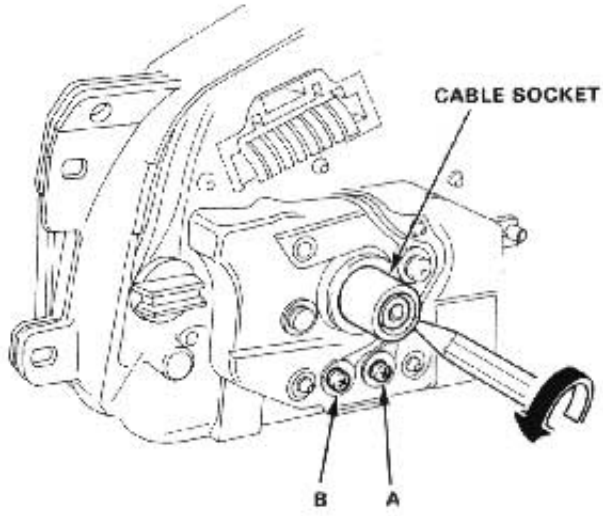
2. Remove the 4 screws, then remove the gauge assembly half-way and disconnect the speedometer cable and connectors.



Speed Pulser Test

1. Remove the gauge assembly from the dashboard, then turn it over.
2. Break the lead off a pencil tip then insert the pencil into the speedometer cable connector socket and turn it.

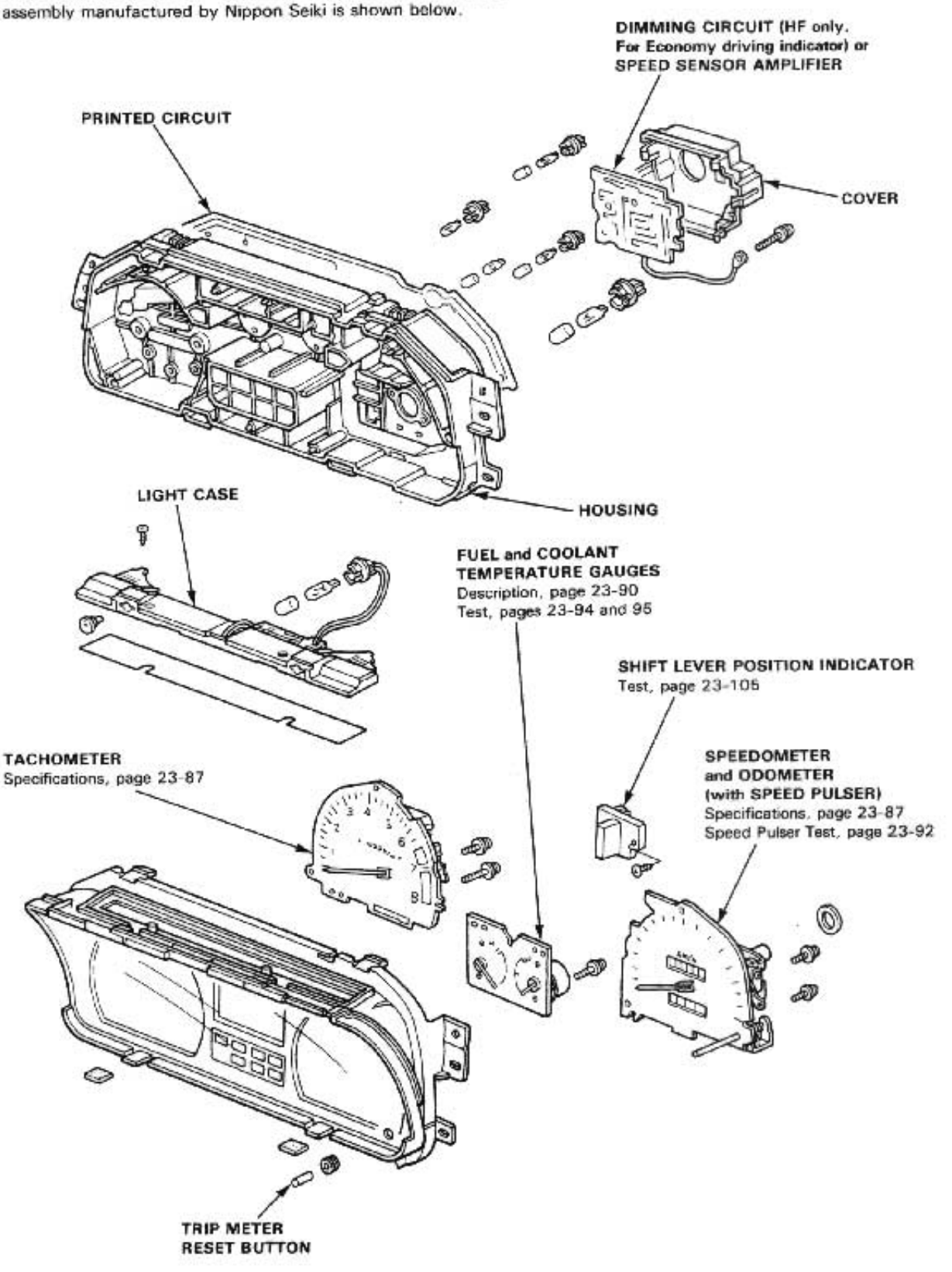
   Connect an ohmmeter between the A and B terminals. There should be continuity 4 times between the A and B terminals per revolution.



Disassembly

NOTE:

- Handle the terminals and printed circuits carefully to avoid damaging them.
- Gauge assembly manufactured by Nippon Seiki is shown below.

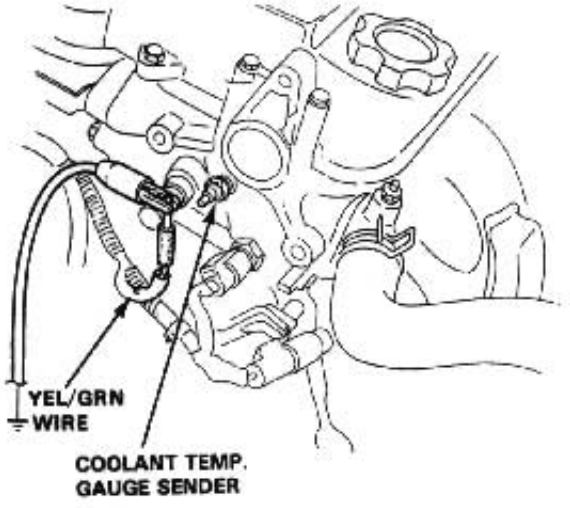


Coolant Temperature Gauge

Gauge Test

NOTE:
- Refer to page 23-89 for wiring description of the coolant temperature gauge circuit.
- Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Make sure the ignition switch is OFF, then disconnect the YEL/GRN wire from the coolant temperature gauge sender and ground it with a jumper wire.



2. Turn the ignition switch ON.
   Check that the pointer of the coolant temperature gauge starts moving toward "H" mark.

   CAUTION: Turn the ignition switch OFF before the pointer reaches "H" mark on the gauge dial. Failure to turn the ignition OFF quickly enough may cause damage to the gauge.

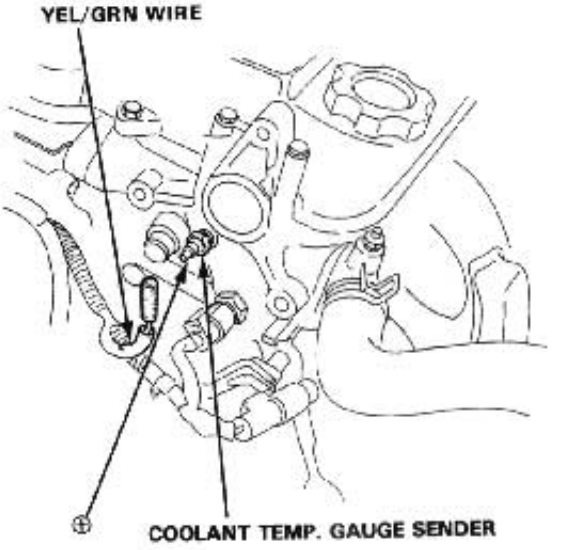
   - If the pointer of the gauge does not swing at all, check for:
     — An open in the YEL or YEL/GRN wire.

     Replace the coolant temperature gauge if the fuse and wiring are normal.

   - Inspect the gauge sender if the gauge is OK.

Sender Test

1. Disconnect the YEL/GRN wire from the sender.
2. With the engine cold, use an ohmmeter to measure resistance between the positive terminal and the engine (ground).



3. Check the temperature of the coolant.
4. Run the engine and measure the change in resistance with the engine at operating temperature (cooling fan comes on).

Temperature	56°C (133°F) ["C" mark]	85°C (185°F) – 100°C (212°F)
Resistance (Ω)	142	49 – 32

5. If obtained readings are substantially different from specifications above, replace the gauge sender.

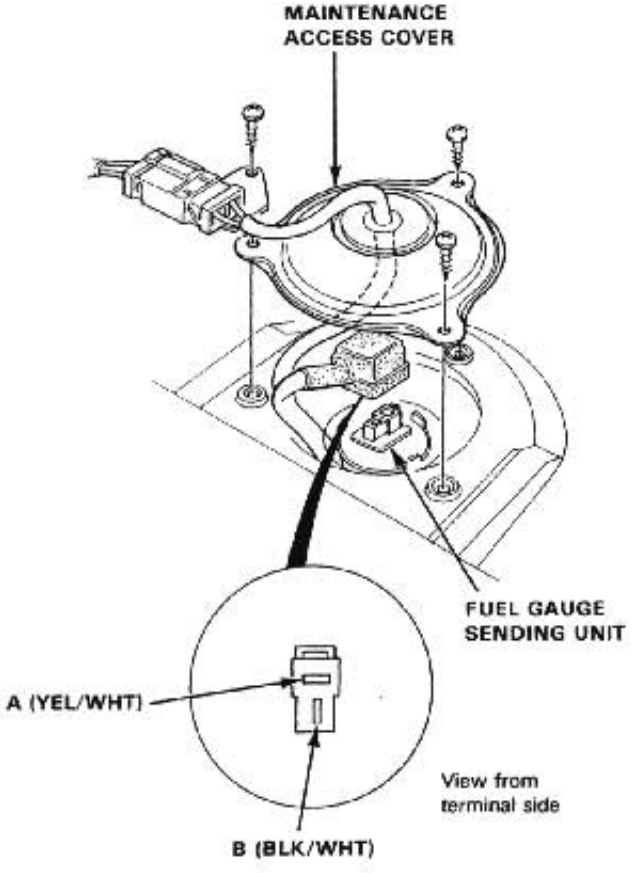
Fuel Gauge

Gauge Test

NOTE:
- Refer to page 23-89 for wiring description of the fuel gauge circuit.
- Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Remove the security compartment (see section 20), then remove the maintenance access cover.

2. Disconnect the 2-P connector from the fuel gauge sending unit.



3. Connect the voltmeter positive probe to the A (YEL/WHT) terminal and the negative probe to the B (BLK/WHT) terminal, then turn the ignition switch ON. There should be battery voltage.

   - If battery voltage, go to step 4.

   - If the voltage is not as specified, check for:
     - An open in the YEL, YEL/WHT or BLK/WHT wire.
     - Poor ground (G511 or G561).

4. Turn the ignition switch OFF. Attach a jumper wire between the A (YEL/WHT) and B (BLK/WHT) terminals.

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

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

   NOTE: The fuel gauge is a bobbin (cross coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

   - If the pointer of the fuel gauge does not swing at all, replace the gauge.

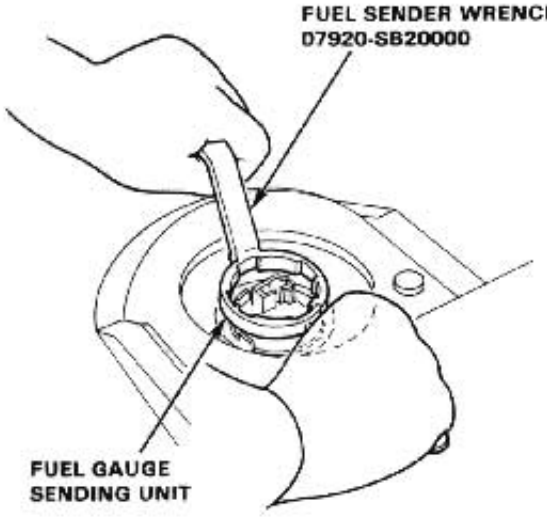
   - Inspect the fuel gauge sending unit if the gauge is OK.

Fuel Gauge

Sending Unit Test/Replacement

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

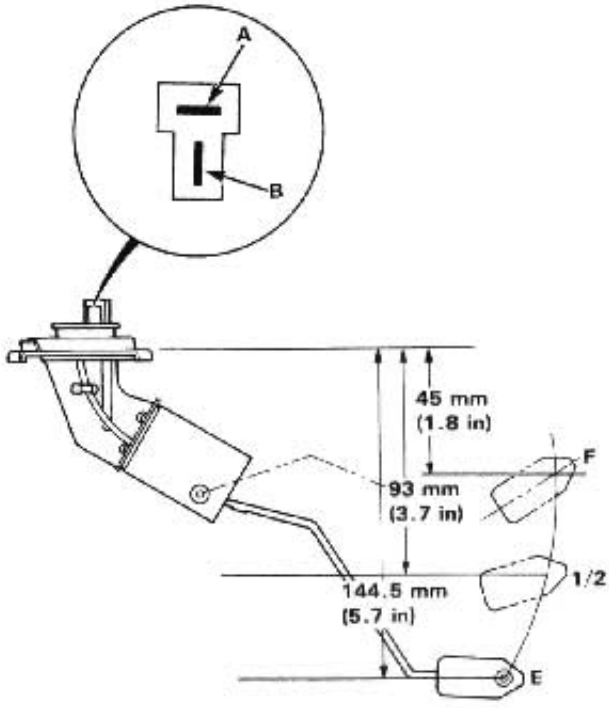
1. Remove the security compartment (see section 20), then remove the maintenance access cover.
2. Check that the ignition switch OFF, then disconnect the 2-P connector from the fuel gauge sending unit.
3. Remove the fuel gauge sending unit.



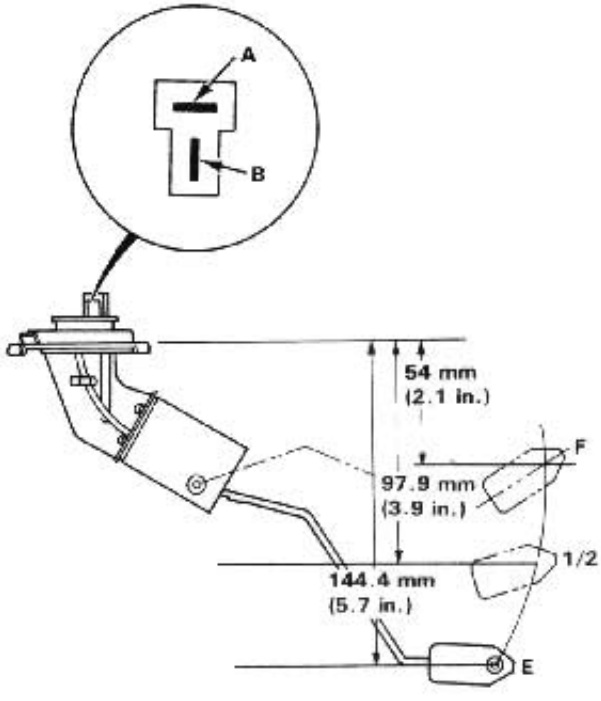
4. Measure the resistance between the A and B terminals at E (EMPTY), 1/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E	1/2	F
Resistance (Ω)	105–110	25.5–39.5	2–5

Si and Std models:



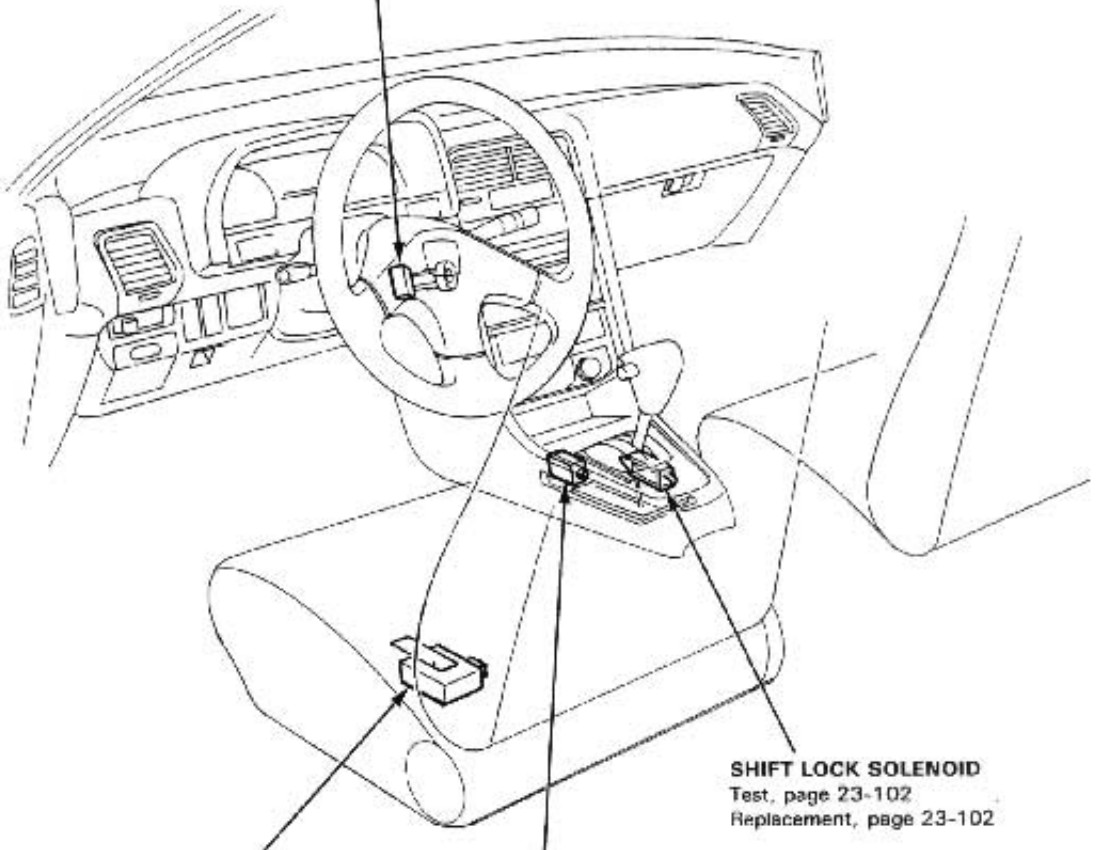
HF model:



5. If unable to obtain the above readings, replace the fuel gauge sending unit.

Component Location Index

- SHIFT LEVER POSITION INDICATOR
  See page 23-103



Interlock System

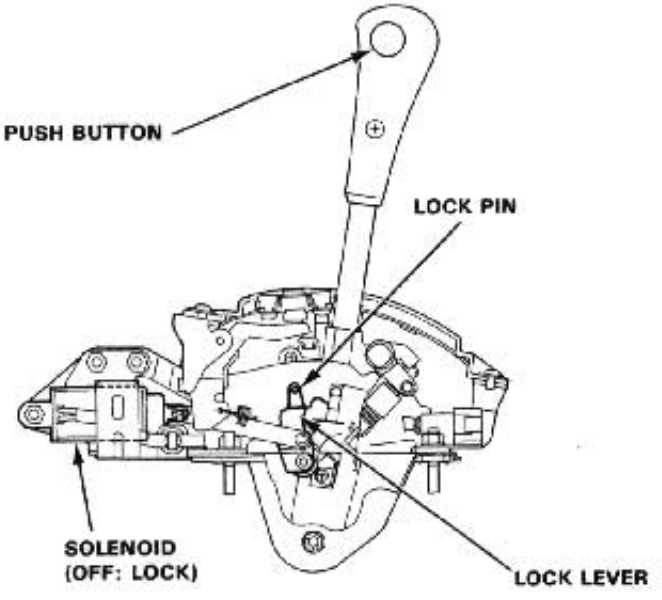
Description

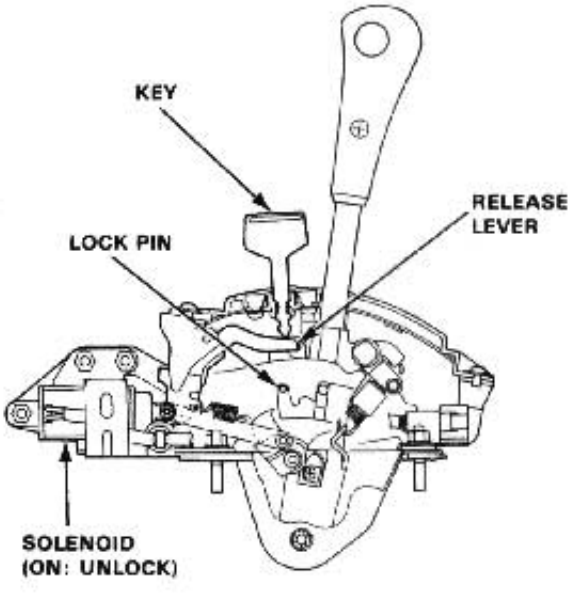
The car is equipped with the following devices to prevent inadvertent shifting:

- A/T selector with shift lock
- Key cylinder with interlocked ignition key

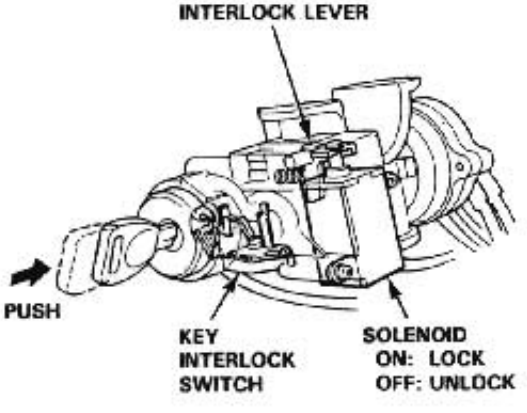
Shift Lock System:
The shift lock system prevents the shift lever from moving to "R" or "D" from the "P" position unless the brake pedal is depressed.

NOTE:
- The shift lever cannot be shifted when the brake pedal and the accelerator are stepped on at the same time.
- In case of system malfunction, the shift lever can be released by pushing a key into the release slot near the shift lever.

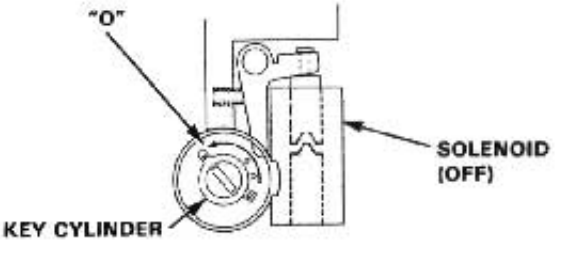




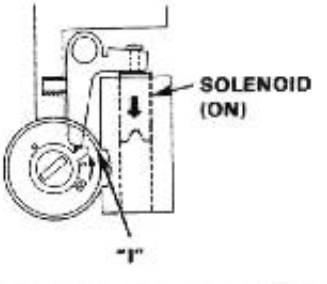
Key Interlock System:
The ignition key cannot be removed from the ignition switch unless the shift lever is in the "P" position.
If the key is inserted when the shift lever is in any position other than "P", a solenoid is activated, making it impossible for the key to be removed until the shift lever is moved to the "P" position.



The shift lever is in the "P" position.

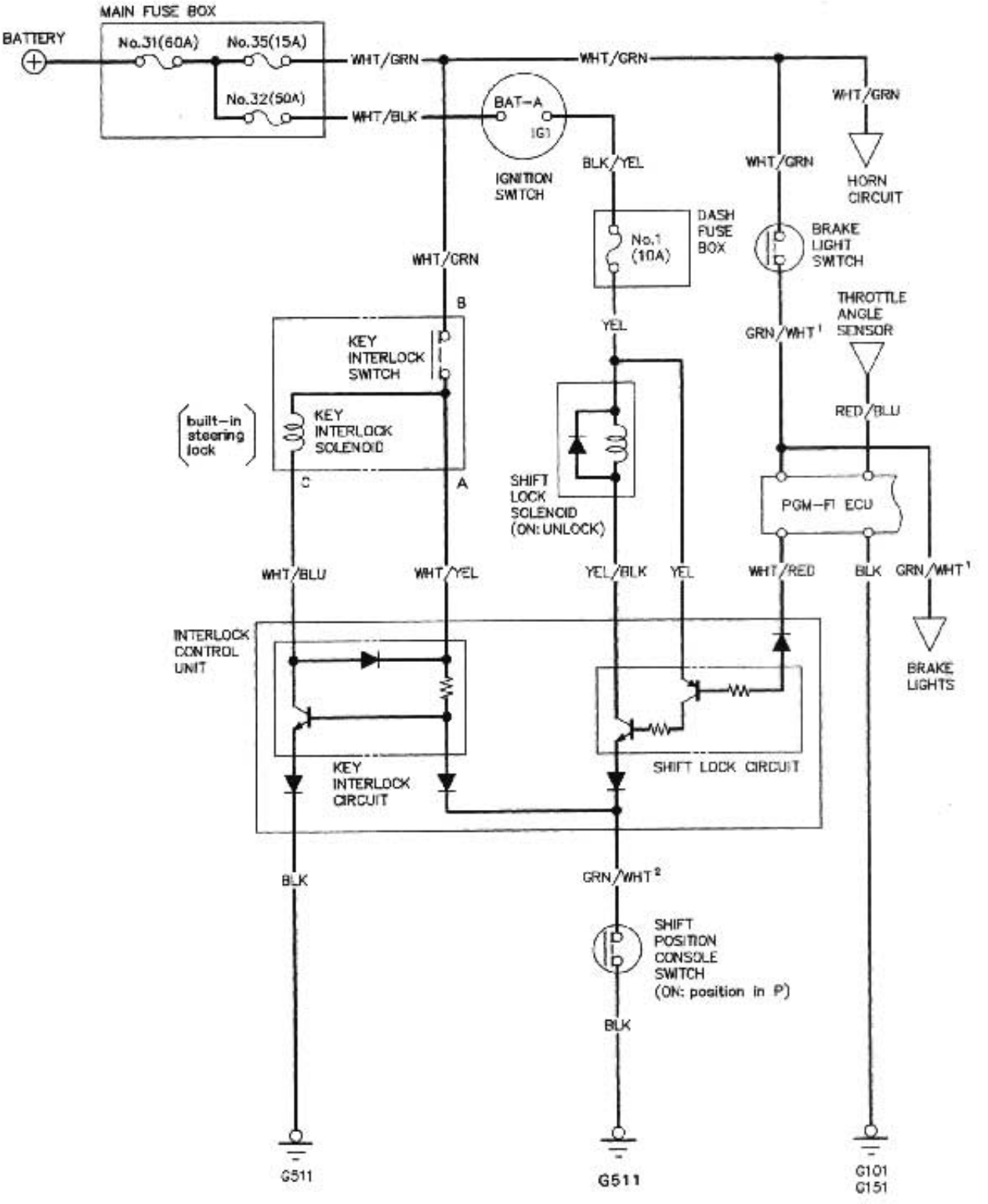


The shift lever is in any position except "P".



Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example GRN/WHT[1] and GRN/WHT[2] are not the same).

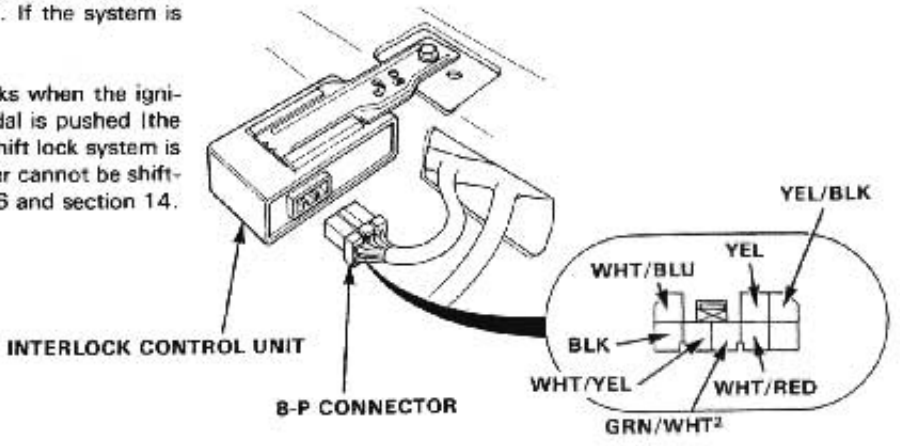


Interlock System

Control Unit Input Test

Disconnect the 8-P connector from the control unit. Make the following input tests at the harness pins. If all tests prove OK, yet the system still fails to work, substitute the control unit with a known-good one. If the system is OK, replace the control unit.

NOTE: If the shift lock solenoid clicks when the ignition switch is ON and the brake pedal is pushed (the shift lever is in the P position), the shift lock system is electronically normal. If the shift lever cannot be shifted from P position, see page 23-106 and section 14.



View from wire side

Shift Lock System:

No.	wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	WHT/RED	Ignition switch ON. Brake pedal pushed.	Check for voltage to ground: should be battery voltage.	• Blown No.35 (15 A) fuse. • Faulty brake light switch. • Faulty throttle angle sensor. • Faulty PGM-FI ECU. • An open in the wire.
		Ignition switch ON. Step on the brake pedal and the accelerator at the same time.	Check for voltage to ground: there should not be battery voltage.	
2	GRN/WHT²	Shift lever position in P.	Check for continuity to ground: should be continuity.	• Faulty shift position console switch • Poor ground (G511). • An open in the wire.
3	YEL/BLK	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No.1 (10 A) fuse. • Faulty shift lock solenoid. • An open in the wire.
4	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No.1 (10 A) fuse. • An open in the wire.

Key Interlock System:

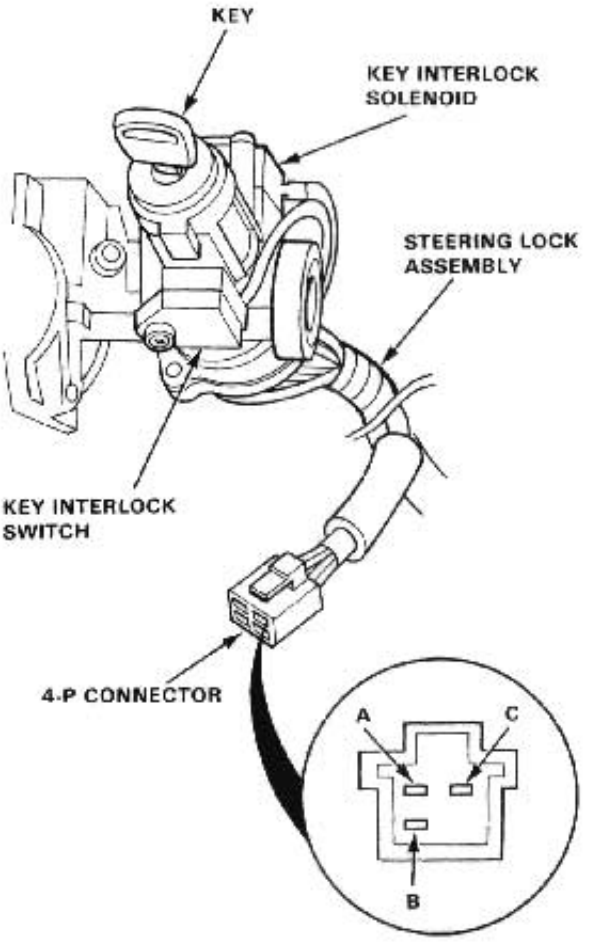
No.	wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G511). • An open in the wire.
2	GRN/WHT²	Shift lever position in P.	Check for continuity to ground: should be continuity.	• Faulty shift position console switch. • Poor ground (G511). • An open in the wire.
3	WHT/BLU WHT/YEL	Ignition switch turned to ACC (1) and the key pushed in.	Check for voltage to ground: should be battery voltage.	• Blown No.35 (20 A) fuse. • Faulty steering lock assembly (key interlock solenoid). • An open in the wire.

Key Interlock Solenoid Test

1. Remove the instrument cover panel and the knee bolster.
2. Disconnect the 4-P connector from the dashboard wire harness.
3. Check for continuity between the terminals in each switch position according to the table.

Position	Terminal	A	B		C
Ignition switch ACC (1)	Key pushed in.	○	○	∞	○
	Key released.	○		∞	○

4. Check that the key cannot be removed when the battery is connected to the B and C terminals.
   - If the key cannot be removed, the key interlock solenoid is OK.
   - If the key can be removed, replace the steering lock assembly (key interlock solenoid is not available separately).



View from terminal side

Interlock System

Shift Lock Solenoid Test/Replacement

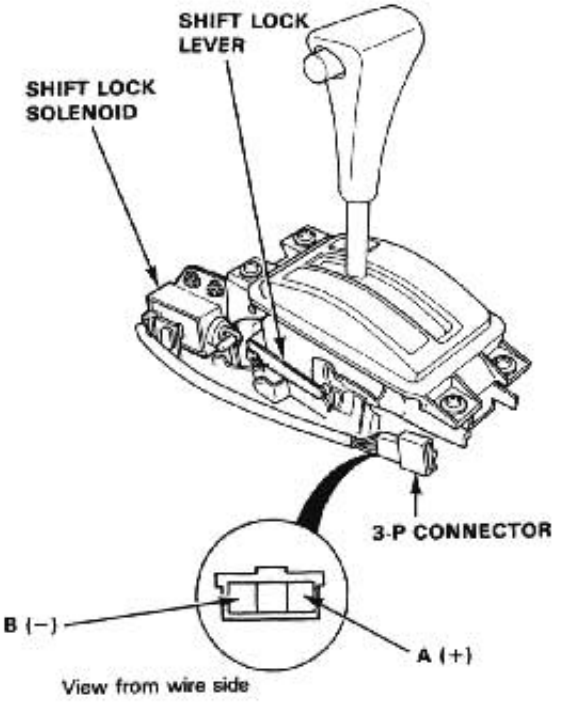
Test:

1. Remove the console, then disconnect the 3-P connector of the shift lock solenoid from the rear wire harness.

   NOTE:
   - Do not connect the battery terminals to wrong polarities because a diode is inside the solenoid.

2. Connect the battery positive to the A terminal and negative to the B terminal momentarily. Check the solenoid operation. If it does not operate, replace it.

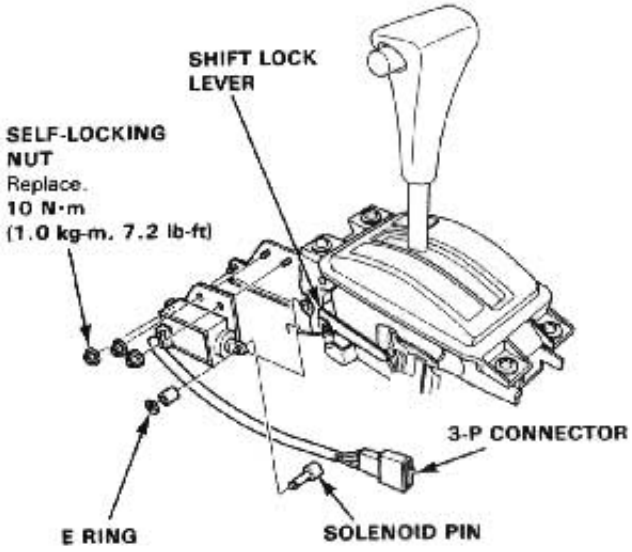
   NOTE:
   - When the shift lock solenoid is ON, check that there is clearance of approx. 2.5±0.5 mm (0.098±0.02 in.) between the top of shift lock lever and lock pin groove (see clearance check on this page).
     When the shift lock solenoid is OFF, make sure that the lock pin is blocked by the shift lock lever.
   - If not, adjust the position of shift lock solenoid.



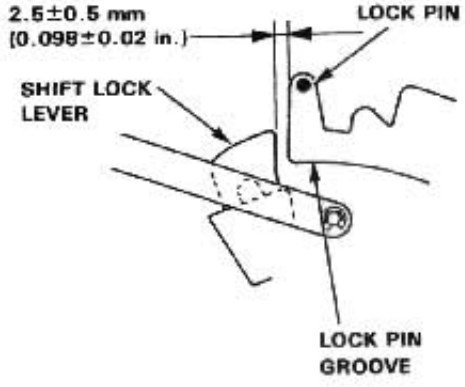
Replacement:

1. Remove the E ring and the solenoid pin.

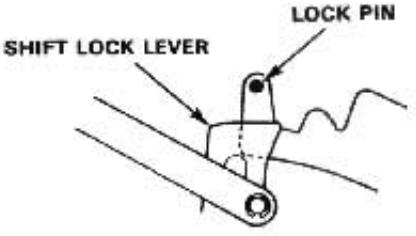
2. Remove the self-locking nuts and shift lock solenoid.



3. Install the shift lock solenoid in the reverse order of removal and adjust the position of shift lock solenoid.
   - When the shift lock solenoid is ON, check that there is a clearance of 2.5±0.5 mm (0.098±0.02 in.) between the top of shift lock lever and the lock pin groove, and tighten the self locking nuts.
     NOTE: Use brand-new self-locking nuts.



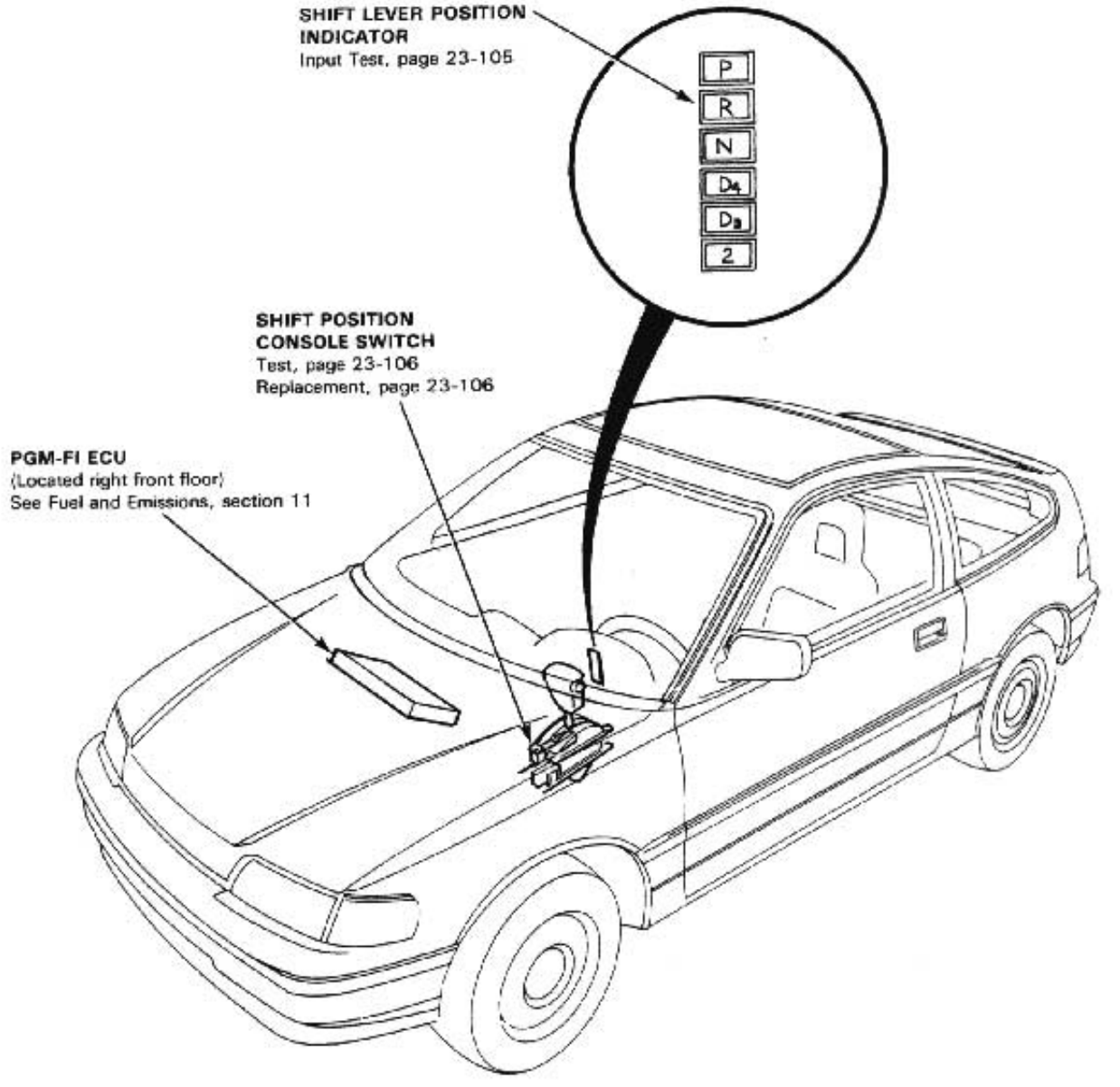
   - When the shift lock solenoid is OFF, make sure that the lock pin is blocked by the shift lock lever.
     NOTE: Test for the solenoid operation after assembling.



Shift Lever Position Indicator

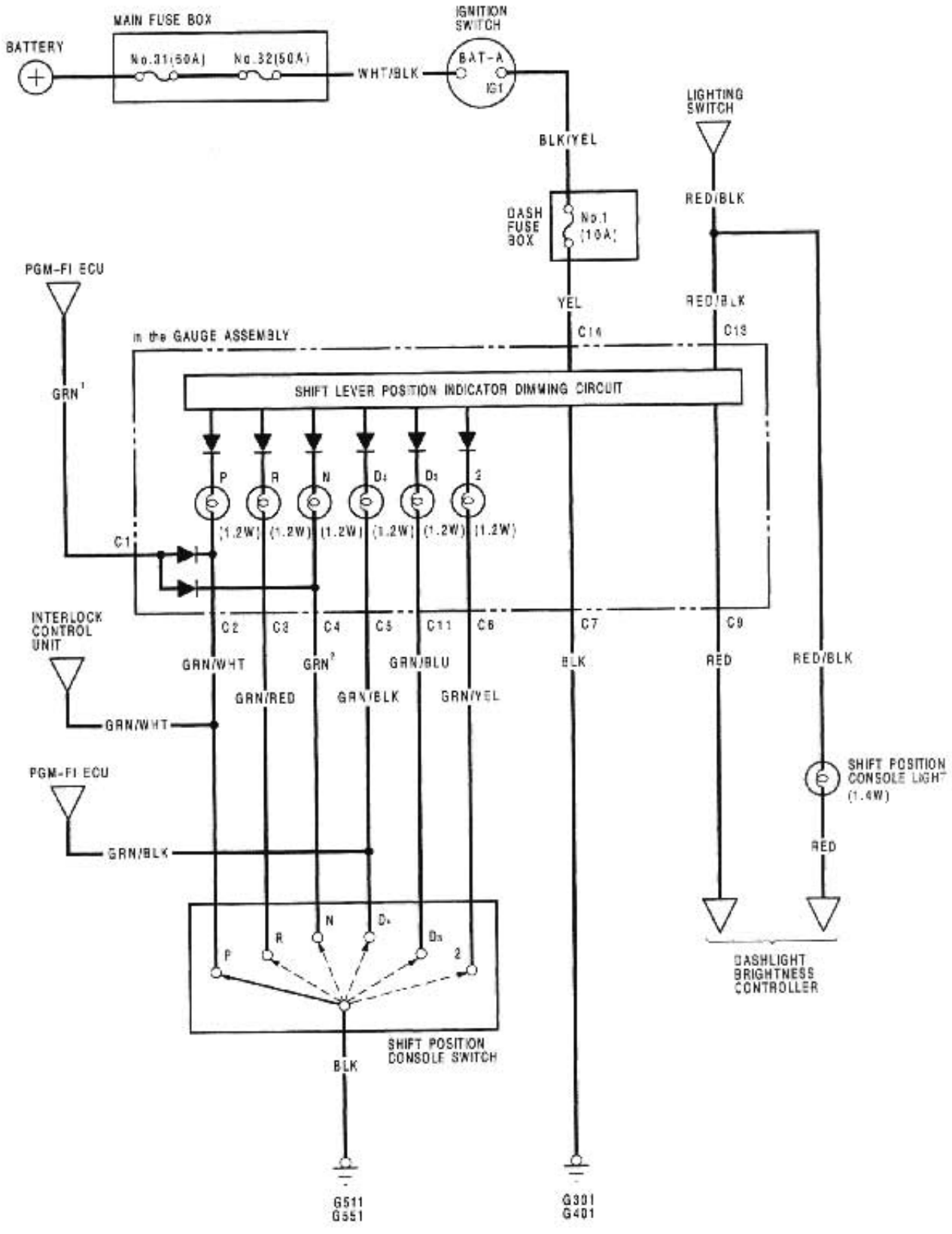
Component Location Index

- **GAUGE ASSEMBLY**
  Removal, page 23-92
  Disassembly, page 23-93
- **INTERLOCK SYSTEM**
  See page 23-97



Shift Lever Position Indicator

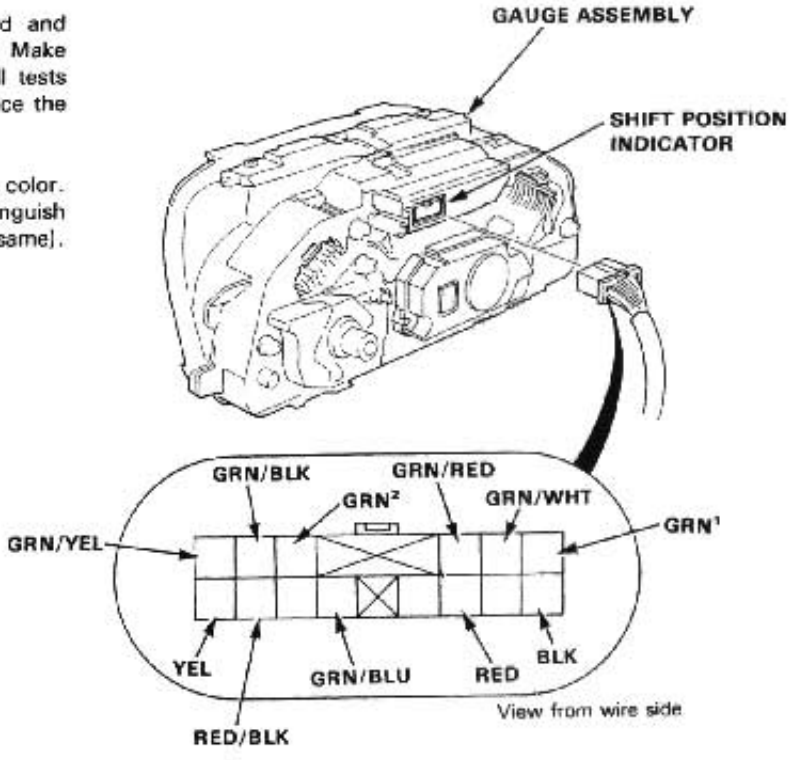
Circuit Diagram



Indicator Input Test

Remove the gauge assembly from the dashboard and disconnect the 14-P connector from the indicator. Make the following input tests at the harness pins. If all tests prove OK, yet the indicator still fails to work, replace the indicator assembly.

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example GRN^1 and GRN^2 are not the same).



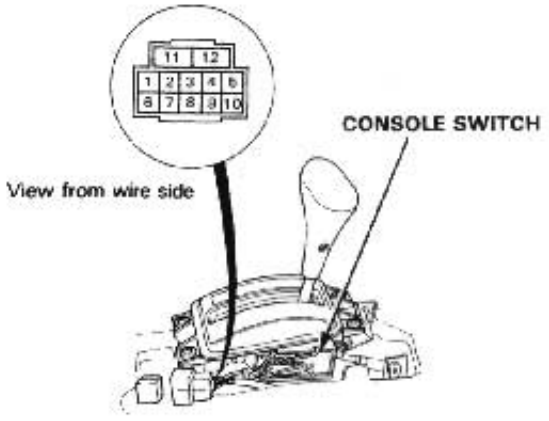
No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G301). · An open in the wire.
2	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage	· Blown No.1 (10 A) fuse. · An open in the wire.
3	GRN/WHT	Shift lever position in P.	Check for continuity to ground: should be continuity.	· Faulty shift position console switch · Poor ground (G511) · An open in the wire.
	GRN/RED	Shift lever position in R.		
	GRN^2	Shift lever position in N.		
	GRN/BLK	Shift lever position in D_4.		
	GRN/BLU	Shift lever position in D_3.		
	GRN/YEL	Shift lever position in 2.		
4	RED/BLK and RED	Lighting switch ON and dashlight brightness control dial on full bright.	Check for voltage between RED/BLK and RED terminals: should be battery voltage.	· Faulty dashlight brightness control system. · An open in the wire.
5	GRN^1	Ignition switch ON.	Check for voltage to ground: should be about 10 V.	· Faulty PGM-FI ECU. · An open in the wire.

Shift Lever Position Indicator

Shift Position Console Switch Test

1. Remove the console, then disconnect the 10-P and 2-P connectors from the console switch.
2. Check for continuity between the terminals in each position according to the table.

NOTE:
- Move the lever back and forth without touching the push button at each position, and check for continuity within a range of free play of the shift lever.
- If no continuity within a range of free play, adjust the installation position of console switch.

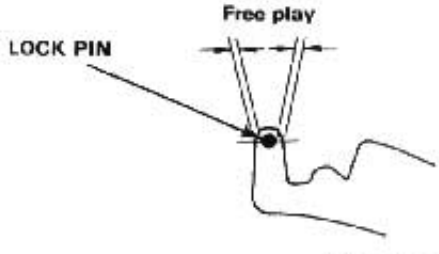


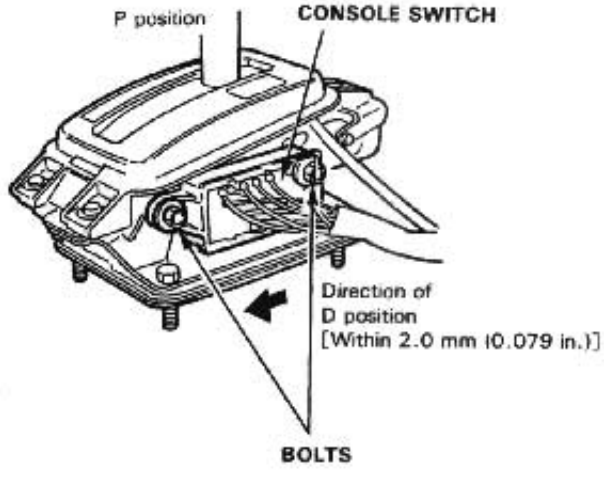
Shift Position Console Switch

Terminal / Position	7	8	9	10	5	4	6	Back up Light Switch 2	Back up Light Switch 3	Neutral Safety Switch 11	Neutral Safety Switch 12
2	○	○									
D_3	○		○								
D_4	○			○							
N	○				○					○	○
R	○					○		○	○		
P	○						○			○	○

Adjustment:
1. Shift to the "P" position, and loosen the bolts.
2. Slide the switch in the direction of D position [within 2.0 mm (0.079 in.)] so that there is continuity between No. 6 and No. 7 terminals in the range of free play of the shift lever.
3. Recheck for continuity between each of the terminals.

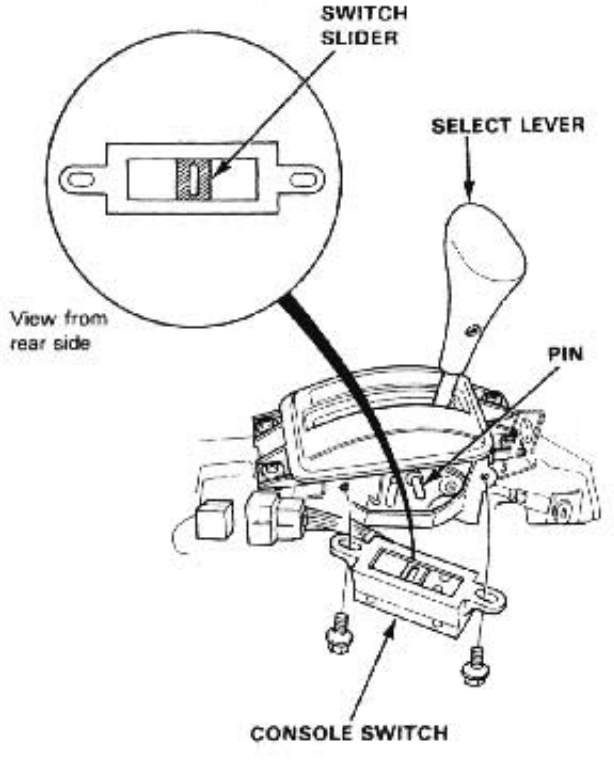
NOTE:
- If adjustment is not possible, check for damage to the shift lever detent and/or the bracket. If there is no damage, replace the console switch.
- The engine should start when the shift lever is in N position in the range of free play.





Shift Position Console Switch Replacement

1. Remove the console, then disconnect the 10-P and 2-P connectors from the console switch.
2. Remove the 2 console switch mounting bolts.



3. Position the switch slider to "Neutral" as shown above.
4. Shift the select lever to "Neutral", then slip the console switch into position.
5. Attach the switch with the 2 bolts.
6. Test the console switch with P and N position of shift lever (see page 23-107).

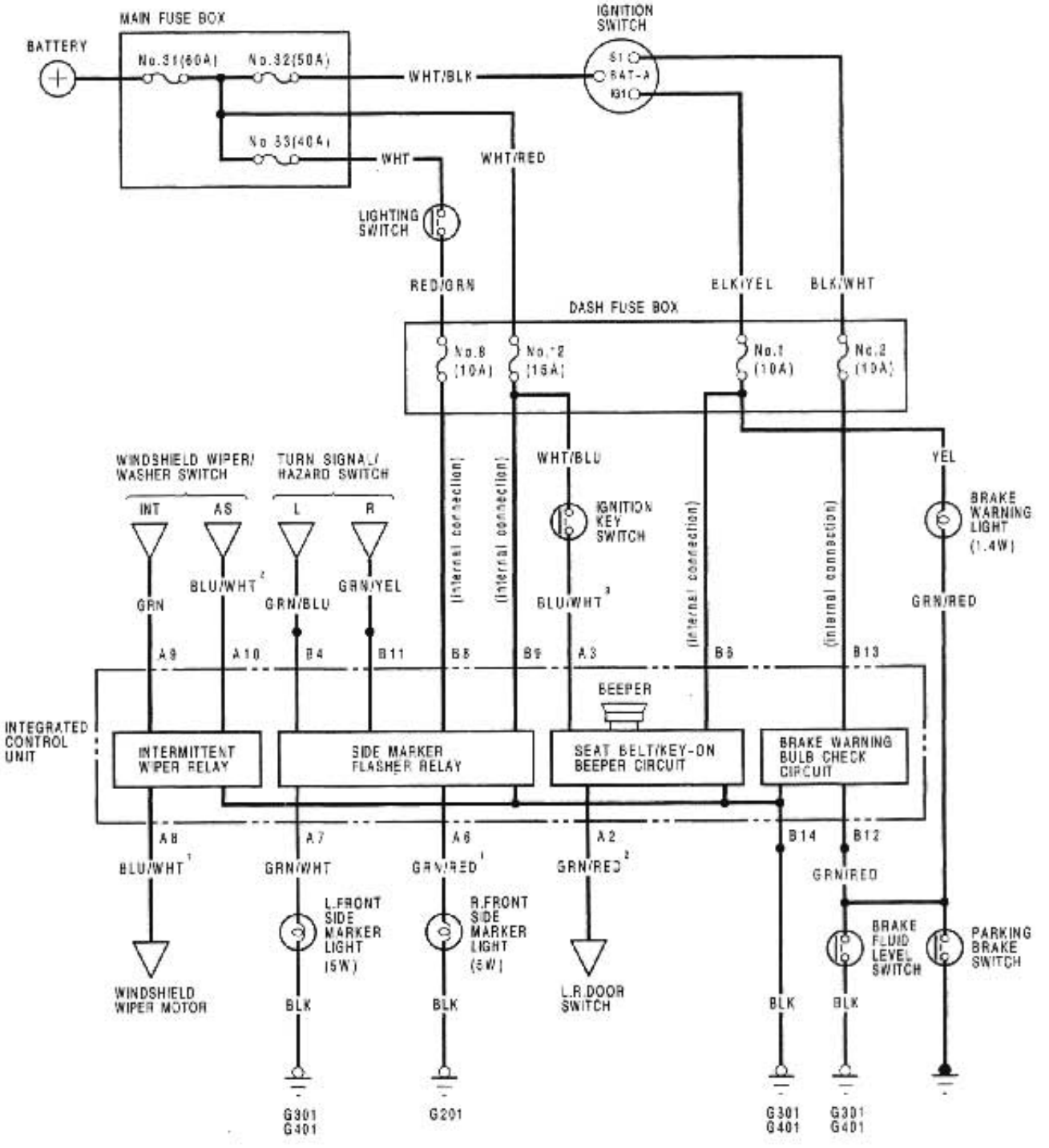
   NOTE: The engine should start when the shift lever is in the N position in the range of free play.

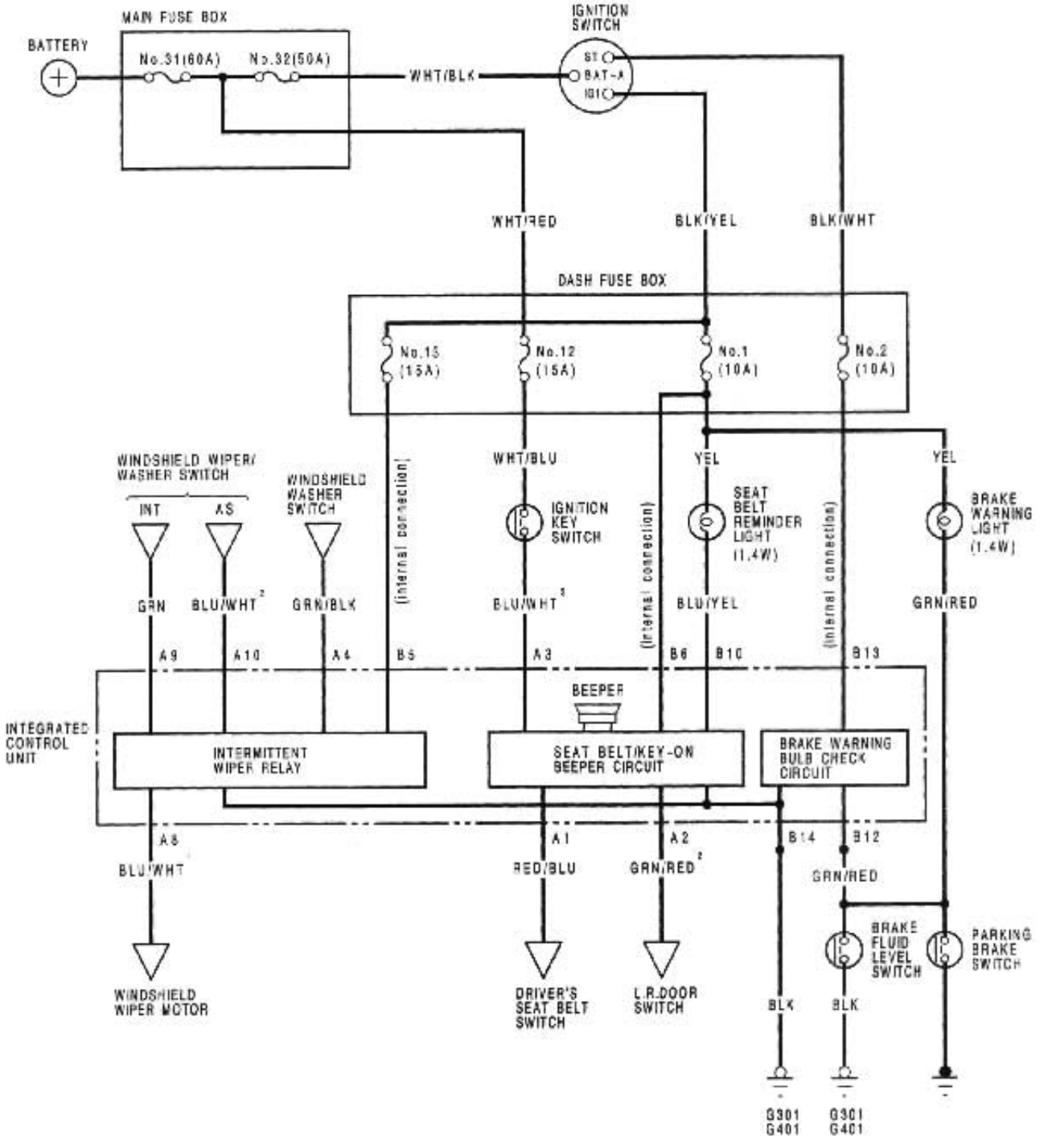
7. Connect the 10-P and 2-P connectors, clamp the harness and install the console.

Integrated Control Unit

Circuit Diagram (USA)

Description:
A multi-function control unit located under the left side of the dashboard, integrates the functions of brake warning bulb check circuit (brake warning light), seat belt and key on warning, side marker light flasher and intermittent wiper relay circuit onto one circuit board, sharing common circuit functions.
NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example GRN/RED[1] and GRN/RED[2] are not the same).




BATTERY
MAIN FUSE BOX
No.31(60A)
No.32(50A)
WHT/BLK
IGNITION SWITCH
ST
BAT-A
IG1
WHT/RED
BLK/YEL
BLK/WHT
DASH FUSE BOX
No.15 (15A)
No.12 (15A)
No.1 (10A)
No.2 (10A)
WINDSHIELD WIPER/ WASHER SWITCH
INT
AS
WINDSHIELD WASHER SWITCH
(Internal connection)
WHT/BLU
IGNITION KEY SWITCH
YEL
SEAT BELT REMINDER LIGHT (1.4W)
(Internal connection)
YEL
BRAKE WARNING LIGHT (1.4W)
GRN
BLU/WHT 2
GRN/BLK
BLU/WHT 3
BLU/YEL
GRN/RED
A9
A10
A4
B5
A3
B6
B10
B13
BEEPER
INTEGRATED CONTROL UNIT
INTERMITTENT WIPER RELAY
SEAT BELT/KEY-ON BEEPER CIRCUIT
BRAKE WARNING BULB CHECK CIRCUIT
A8
A1
A2
B14
B12
BLU/WHT
RED/BLU
GRN/RED 2
GRN/RED
BRAKE FLUID LEVEL SWITCH
PARKING BRAKE SWITCH
WINDSHIELD WIPER MOTOR
DRIVER'S SEAT BELT SWITCH
L.R.DOOR SWITCH
BLK
BLK
G301
G401
G301
G401

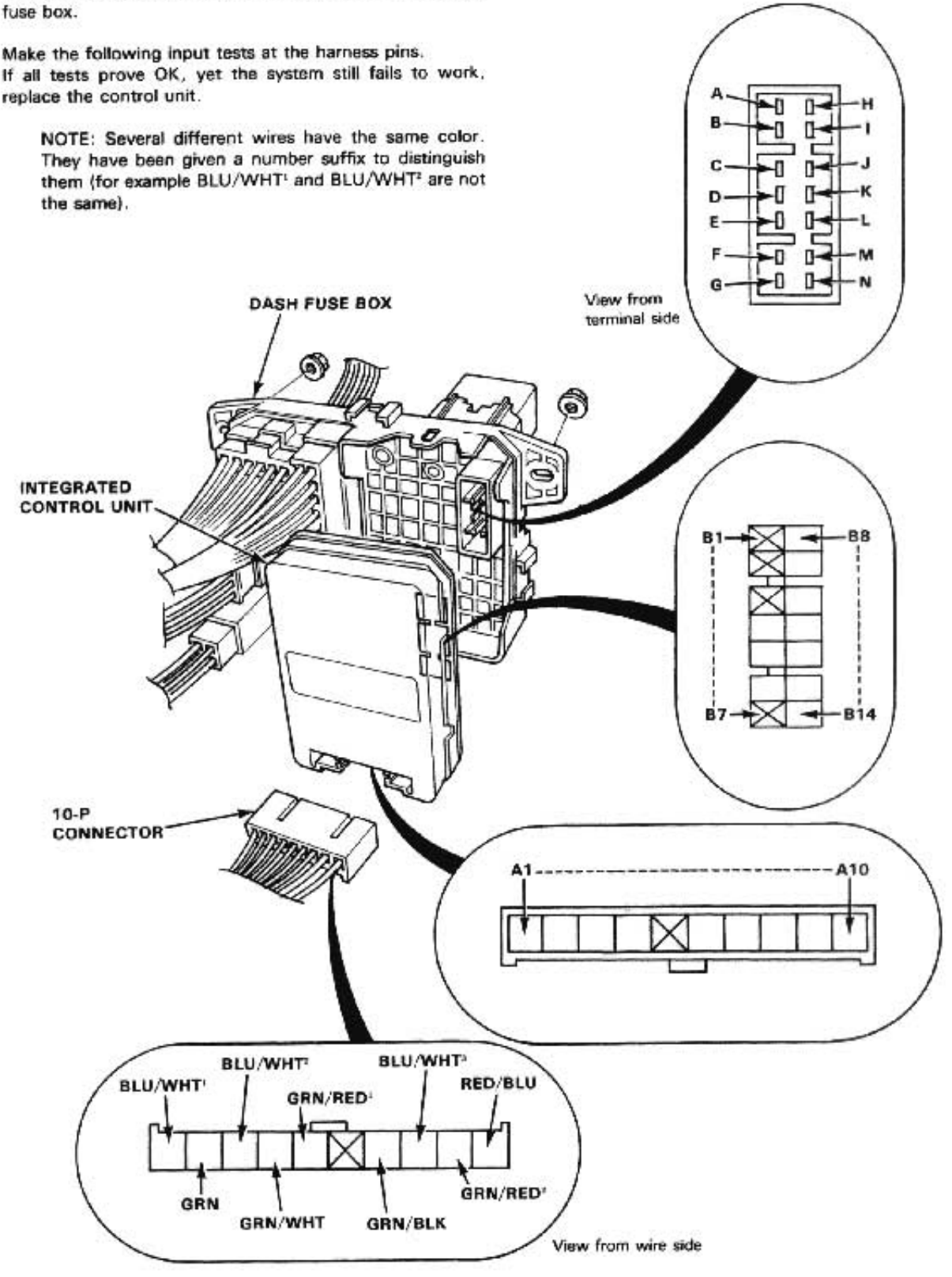
Integrated Control Unit

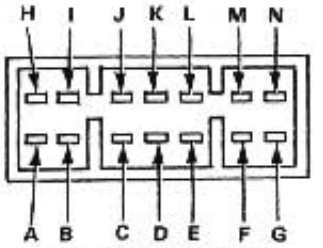
Input Test

Remove the dashboard lower panel and dash fuse box, then disconnect the 10-P connector from the integrated control unit and remove the integrated control unit from the dash fuse box.

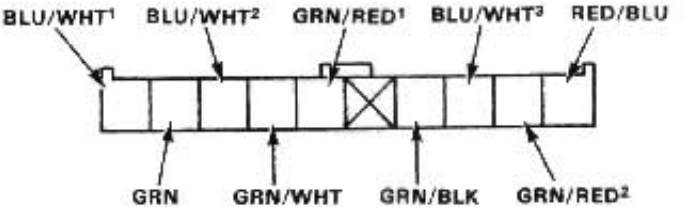
Make the following input tests at the harness pins.
If all tests prove OK, yet the system still fails to work, replace the control unit.

> NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example BLU/WHT¹ and BLU/WHT² are not the same).





View from terminal side



View from wire side

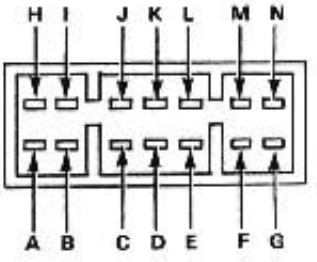
Wiper System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	G	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G301, G401).
2	BLU/WHT¹ and BLU/WHT²	Wiper switch OFF or INT and wiper blades in park position.	Check for continuity between the BLU/WHT¹ and BLU/WHT² terminals: should be continuity.	• Faulty wiper switch. • Faulty wiper motor. • An open in the wire.
3	GRN	Ignition switch ON and wiper switch INT	Check for voltage to ground: should be battery voltage.	• Blown No.13 (15 A) fuse. • Faulty wiper switch. • An open in the wire.
4	L (CANADA)	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No.13 (15 A) fuse. • An open in the wire.
5	GRN/BLK (CANADA)	Ignition switch ON and washer switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No.13 (15 A) fuse. • An open in the wire.

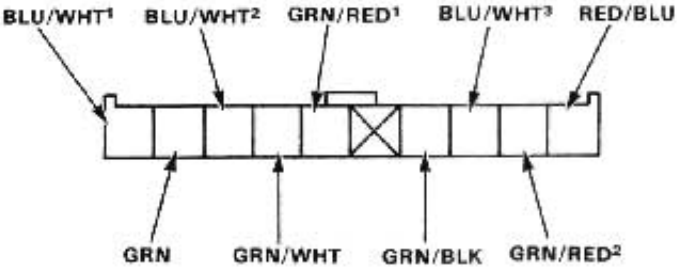
Side Marker Light Flasher System (USA):

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	G	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G301, G401). • An open in the wire.
2	B	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No.12 (15 A) fuse. • An open in the wire.
3	A	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No.8 (10 A) fuse. • Faulty lighting switch. • An open in the wire.
4	K	Ignition switch ON and turn signal switch in L.	Check for voltage to ground: should be 0-12-0-12 repeatedly.	• Blown No.1 (10 A) fuse. • Faulty turn signal system. • An open in the wire.
5	D	Ignition switch ON and turn signal switch in R.		
6	GRX/WHT	Connect the B terminal to the GRN/WHT (or GRN/RED¹) terminal.	Check marker light operation: Left (or Right) front side marker Light should come on as the battery is connected.	• Blown bulb. • Poor ground (G301, G401 (or G201)). • An open in the wire.
7	GRN/RED¹			

(cont'd)



View from terminal side



View from wire side

Seat Belt/Key-on Warning System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	G	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G301, G401). • An open in the wire.
2	C and M	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No.1 (10 A) fuse. • An open in the wire.
3	GRN/RED²	R or L door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No.12 (15 A) fuse.	• Faulty R or L door switch. • An open in the wire.
4	BLU/WHT³	Ignition switch turned from "II" to "O" position.	Check for voltage to ground: should be battery voltage.	• Faulty ignition key switch. • An open in the wire.
5	RED/BLU (CANADA)	Driver's seat belt is not buckled.	Check for continuity to ground: should be continuity.	• Faulty seat belt switch. • Poor ground (G511). • An open in the wire.

Brake Warning System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	G	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G301, G401) • An open in the wire.
2	F	Ignition switch to "III" position.	Check for voltage to ground: should be battery voltage.	• Blown No.2 (10 A) fuse. • An open in the wire.
3	E	Ignition switch ON, full brake fluid and parking brake DOWN.	Check for voltage to ground: should be battery voltage.	• Blown No.1 (10 A) fuse. • Blown brake warning light bulb. • An open in the wire.

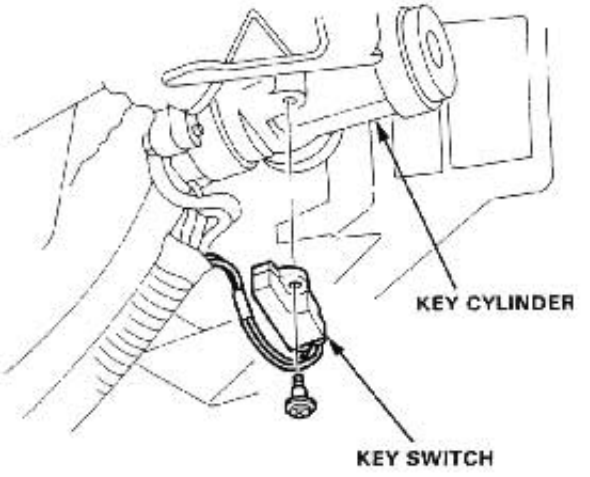
Key-on Warning System

Description

NOTE: Refer to page 23-108 or 109 for wiring description of the key-on beeper circuit, and page 23-110 for input test of the beeper circuit.
When the ignition key is turned from " II " to "0" position but not removed, voltage is applied through the No.12 (15 A) fuse in the dash fuse box or No.34 (10 A) fuse in the main fuse box and the closed ignition key switch to the key-on beeper in the integrated control unit. When you open the driver's door, the beeper circuit senses ground through the closed door switch. With voltage at the "A3" terminal and ground at the "A1 or A2" terminal, the beeper sounds.

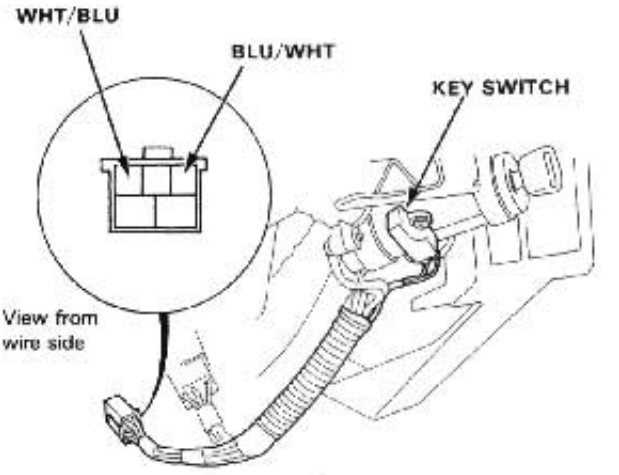
Ignition Key Switch Replacement

1. Remove the steering column lower cover, then disconnect the 5-P connector from the main wire harness.
2. Remove the key switch from the key cylinder by removing attaching screw.



Ignition Key Switch Test

1. Remove the dashboard lower panel, then disconnect the 5-P connector from the main wire harness.
2. There should be continuity between the BLU/WHT and WHT/BLU terminals when the ignition switch is turned from " II " to "0" position.
   There should be no continuity when the ignition key is removed.



Oil Pressure Warning System

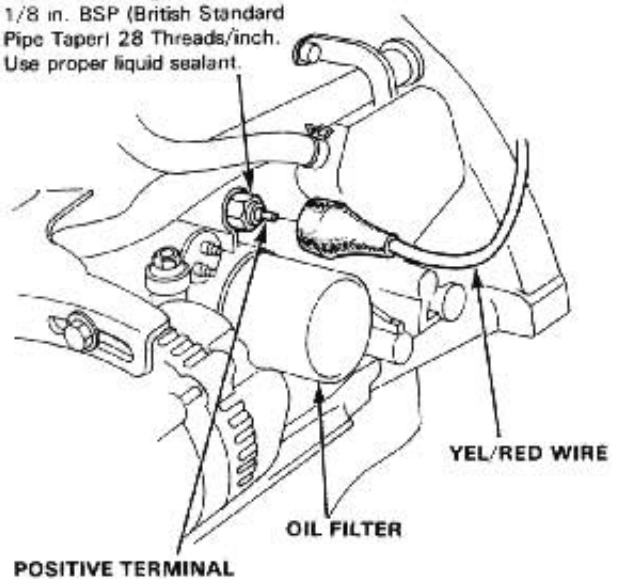
Description

NOTE: Refer to page 23-88 for wiring description of the oil pressure warning circuit.

With the engine running and normal oil pressure, the oil pressure switch is open and the oil pressure warning light does not operate. If engine oil pressure falls below 29kpa (0.3 kg/cm², 4.3 psi), the oil pressure switch is closed, current flows through the oil pressure warning light and the oil pressure switch to ground, and the oil pressure light goes on.

Oil Pressure Switch Test

1. Disconnect the YEL/RED wire from the oil pressure switch.
2. There should be continuity between the positive terminal and the engine(ground) with the engine stopped. There should be no continuity when the engine runs.



3. If the switch fails to operate, check the engine oil level, then inspect the oil pump and pressure if the oil level in correct (see section 8).

Brake Warning System

Description

NOTE: Refer to page 23-108 or 109 for wiring description of the circuit check system.

Description:
The brake warning light goes on if the parking brake is applied, if the brake fluid level is low, and as a circuit test while cranking the engine.

Parking Brake:
With the ignition switch in "Run"or "Start", and the parking brake switch closed, the brake warning light operates to remind the driver that the parking brake is applied.

NOTE: CANADA only
If the parking brake switch is OK but the brake warning system does not function, perform input test for daytime running light relay (see page 23-121).

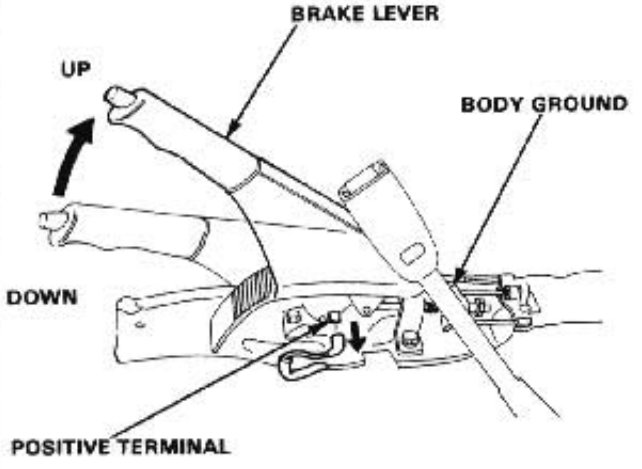
Brake Fluid Level:
With the ignition switch in "Run"or"Start", and the brake fluid level switch closed, the brake warning light operates to warn the driver of low brake fluid level in the brake master cylinder.

NOTE: Low fluid level indicates brake wear or system leaks; check brake pad wear before adding fluid.

Circuit Check:
With the ignition switch in "Start"voltage is applied through the No.2 (10A) fuse in the dash fuse box to the circuit check built into the integrated control unit. The circuit check transistor is on, and current flows through the No.1 (10A) fuse in the dash fuse box, the brake warning light and the circuit transistor to ground. The brake warning light operates. This operation tests the brake warning circuit and bulb.

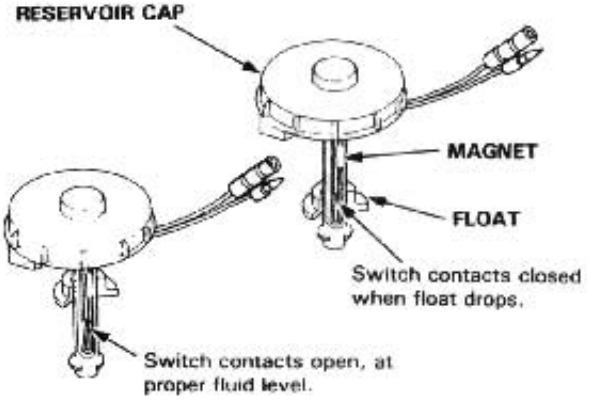
Parking Brake Switch Test

1. Remove the center console and disconnect the connector from the switch.
2. There should be continuity between the positive terminal and body ground with the brake lever up.
   There should be no continuity with the brake lever down.

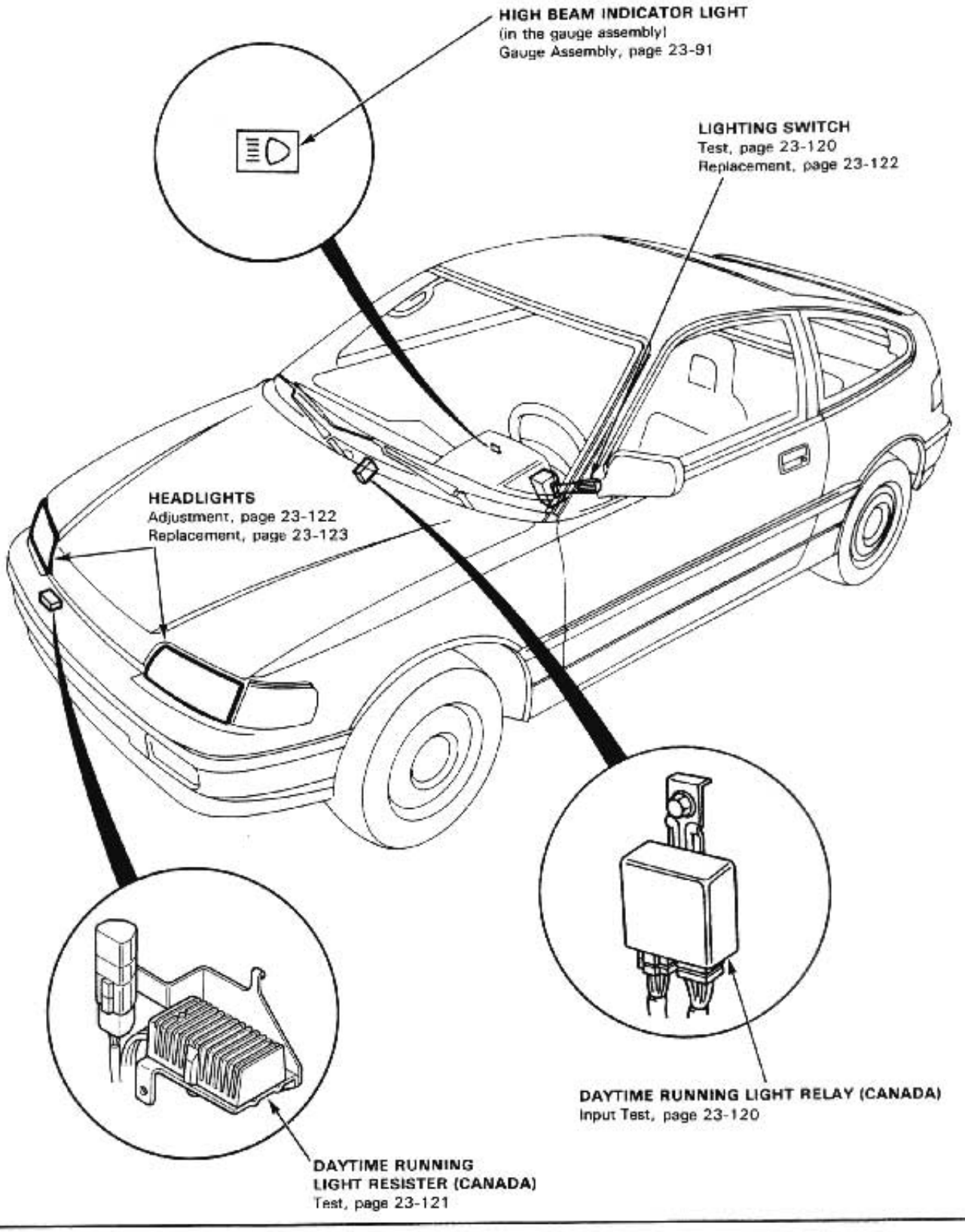


Brake Fluid Level Switch Test

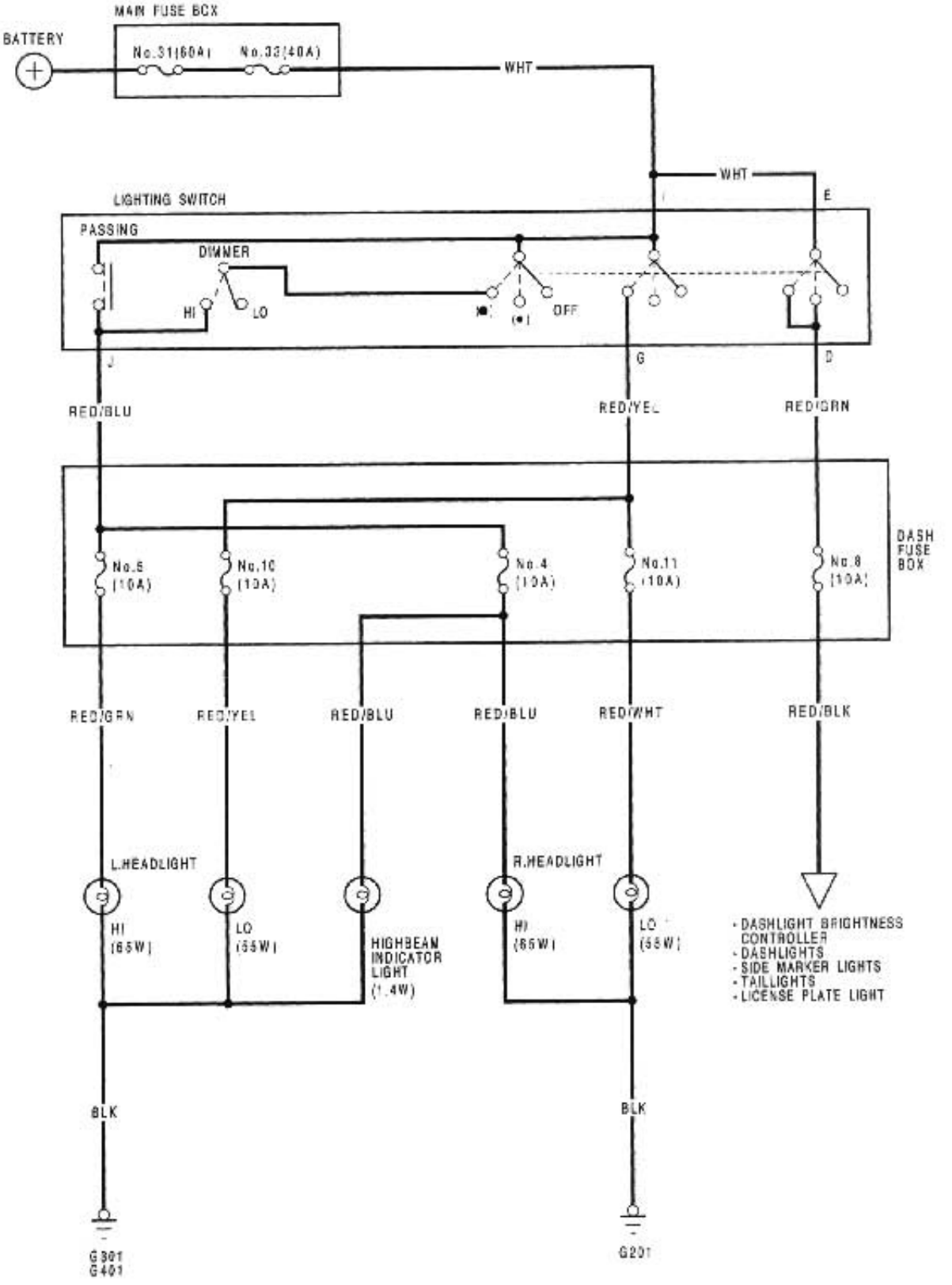
1. Remove the reservoir cap. Check that the float moves up and down freely.
   Replace the reservoir cap assembly if the float does not move freely.
2. Check for continuity between the terminals with the float up and down.
   There should be continuity with the float down and no continuity with the float up.
   Replace the reservoir cap assembly if necessary.



Component Location Index

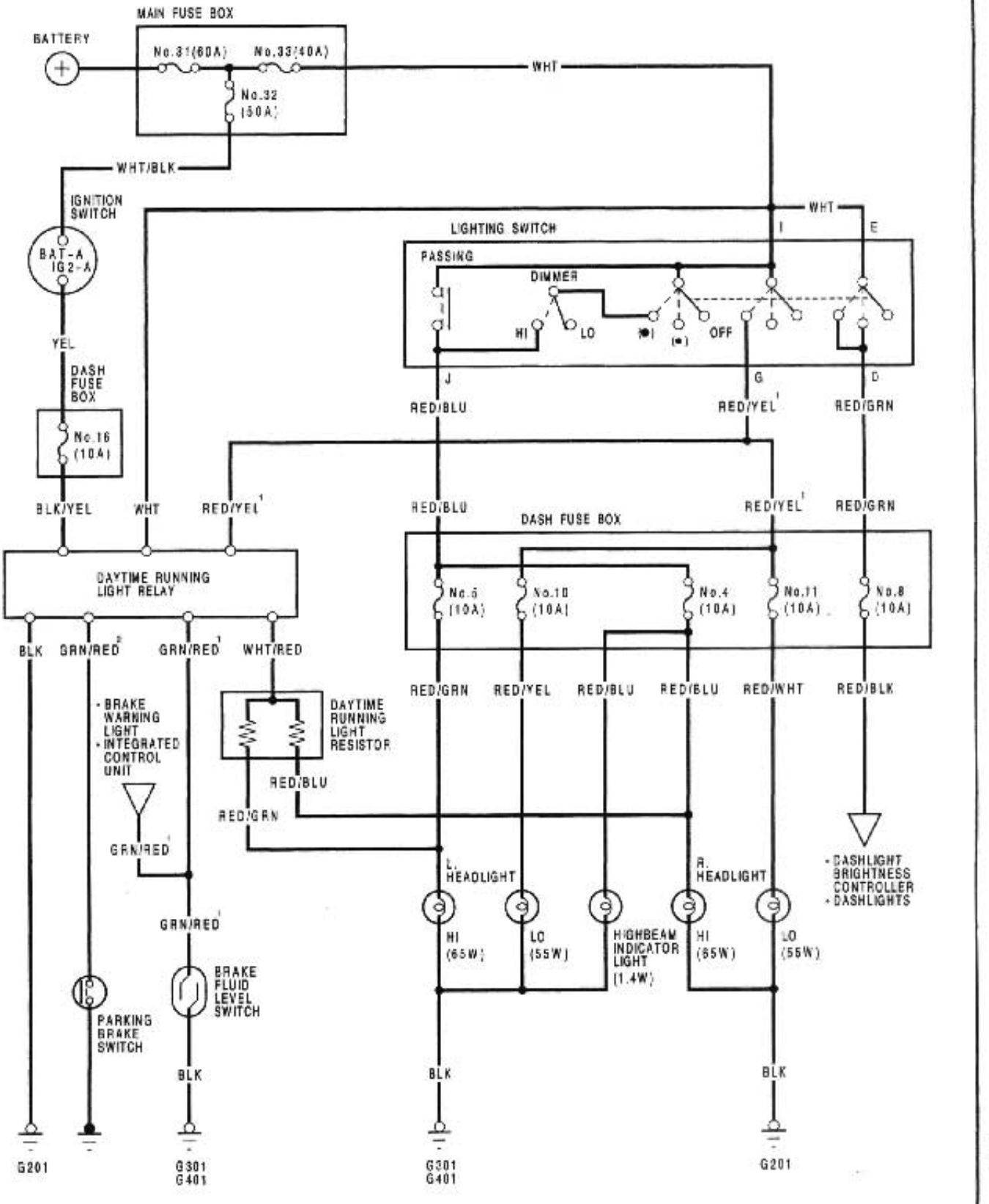


Circuit Diagram (USA)



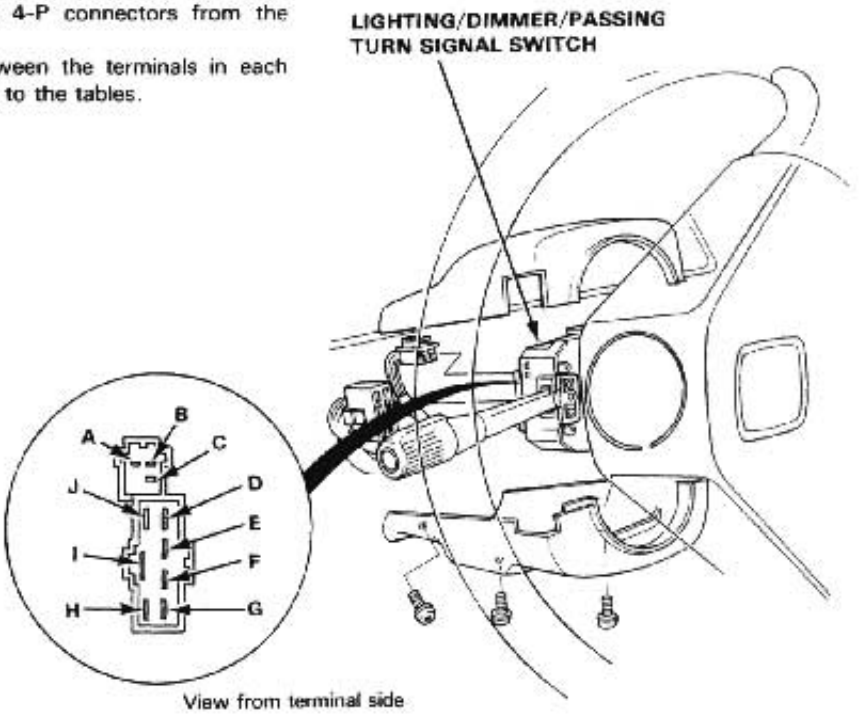
Lighting System

(CANADA)



Lighting /Turn Signal Switch Test

1. Remove the column covers.
2. Disconnect the 7-P and 4-P connectors from the switch.
3. Check for continuity between the terminals in each switch position according to the tables.



View from terminal side

Lighting/Dimmer/Passing Switch

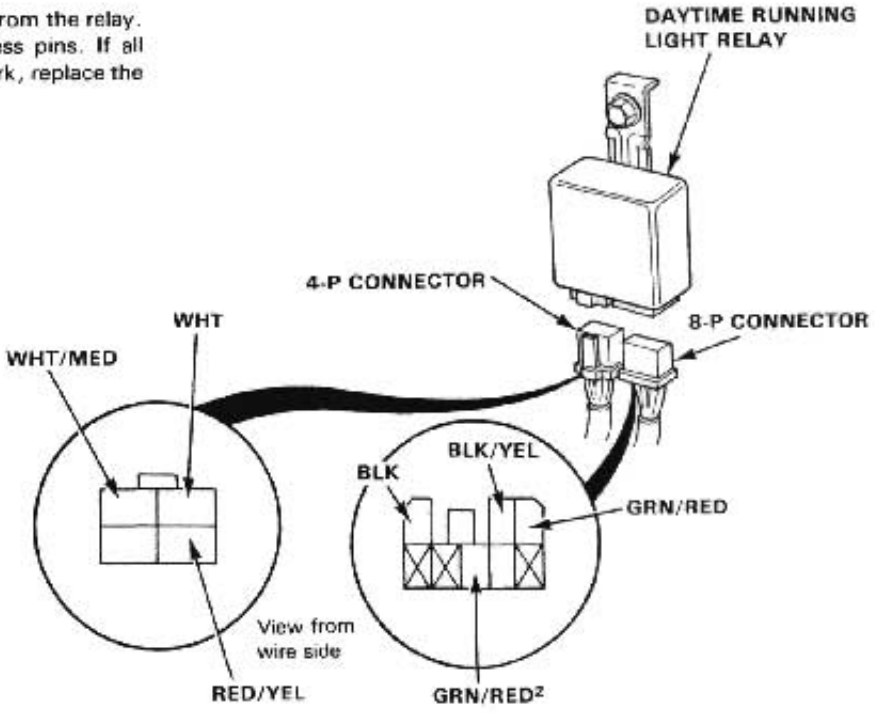
Position \ Terminal		D	E	G	I	J
Lighting switch	OFF					
	•	○	○			
	●			○	○	
Dimmer switch	LOW			○	○	
	HIGH			○	○	○
Passing switch	OFF					
	ON				○	○

Turn Signal Switch

Position \ Terminal	A	B	C
R	○		○
NEUTRAL			
L	○	○	

Daytime Running Light Relay Input Test (CANADA)

Disconnect the 4-P and the 8-P connectors from the relay. Make the following input tests at the harness pins. If all tests prove OK, yet the system still fails to work, replace the relay.

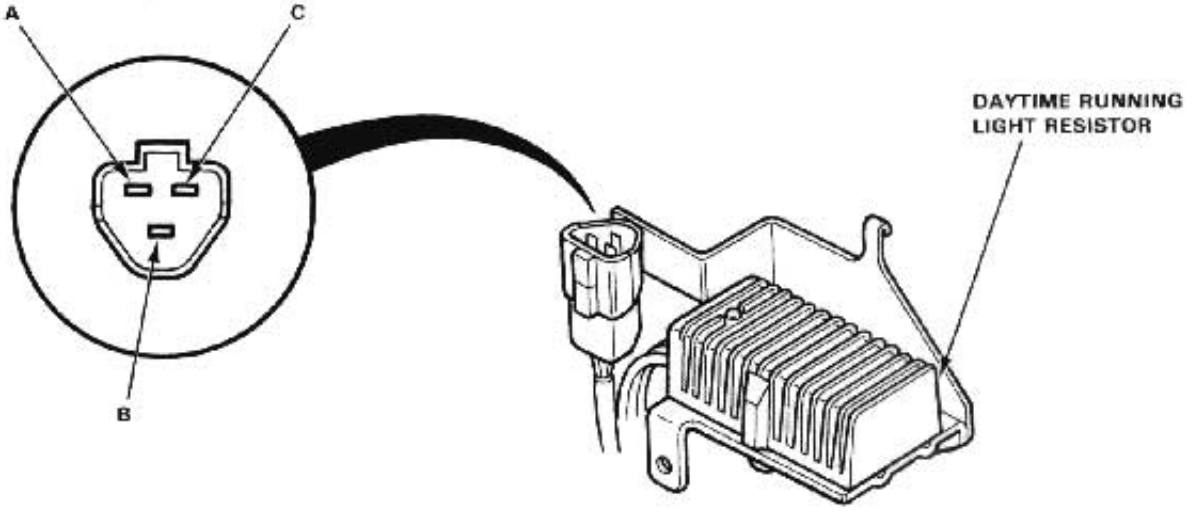


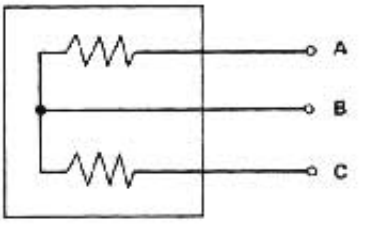
No.	wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: There should be continuity.	• Poor ground (G201) • An open in the wire.
2	BLK/YEL	Ignition switch ON.	Check for voltage to ground: There should be battery voltage.	• Blown No.16 (10 A) fuse. • An open in the wire.
3	WHT	Under all conditions.	Check for voltage to ground: There should be battery voltage.	• Blown No.33 (40 A) fuse. • An open in the wire.
4	RED/YEL	Lighting switch (●) and dimmer switch LO position.	Check for voltage to ground: There should be battery voltage.	• Blown No.33 (40 A) fuse. • An open in the wire. • Faulty lighting switch.
5	WHT/RED	Connect a jumper wire between the BLK/YEL and the WHT/RED terminals, then ignition switch ON.	Headlight (Hi) should come on.	• Blown No.16 (10 A) fuse. • An open in the wire. • Blown bulbs. • Faulty daytime running light resistor.
6	GRN/RED¹	Ignition switch ON.	Attach to ground: Brake warning light should come on.	• Blown No.1 (10 A) fuse. • An open in the wire. • Blown bulb.
7	GRN/RED²	Parking lever up	Check for continuity to ground: There should be continuity.	• Faulty parking brake switch. • An open in the wire.

Daytime Running Light Resistor Test

1. Disconnect the 3-P connector from the resistor.
2. Check for resistance between each of the resistor terminals (A and C) and the Power terminal (B).

Resistance should be: 1.5 ±0.1 Ω





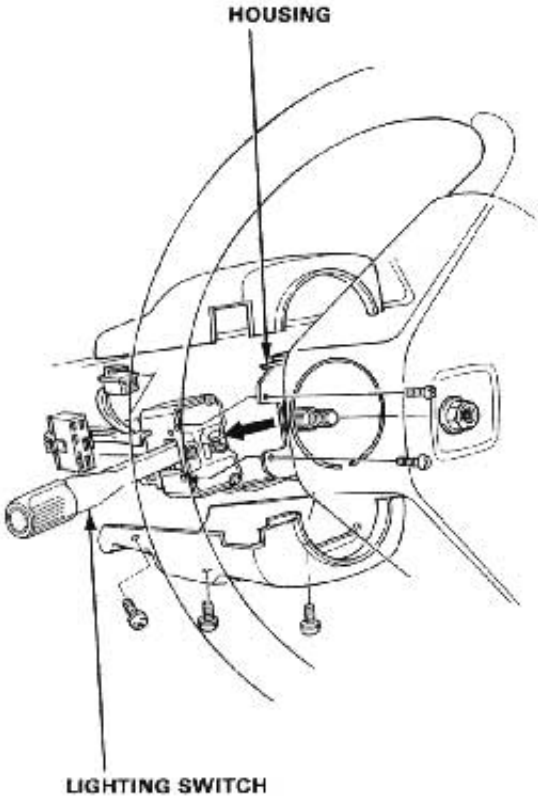
- Replace the resistor with a new one if any of the resistances are outside of the specification.

Lighting System

Lighting Switch Replacement

1. Remove the lower and upper covers from the steering column.
2. Disconnect the 7-P and 4-P connectors.
3. Remove the 2 screws and slide the lighting switch out of the housing as shown.

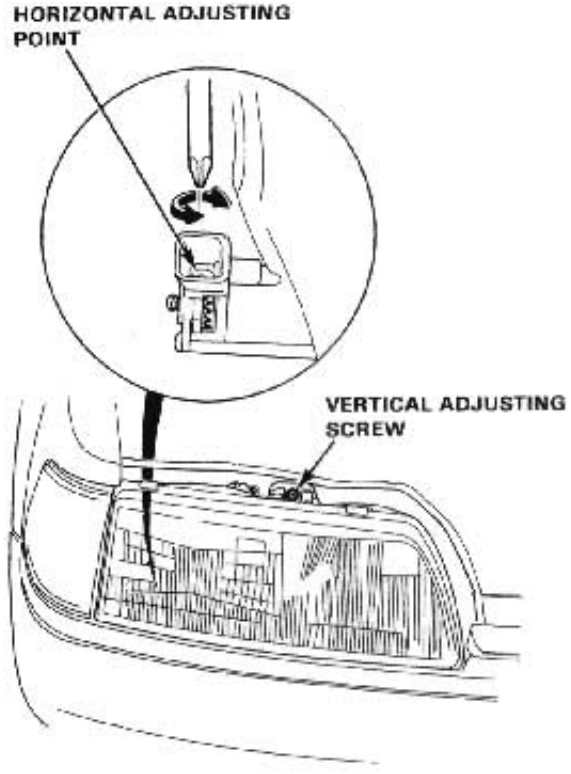
NOTE: Be careful not to damage the steering wheel cover.



Headlights

Adjustment

NOTE: Adjust the headlights to local requirements.

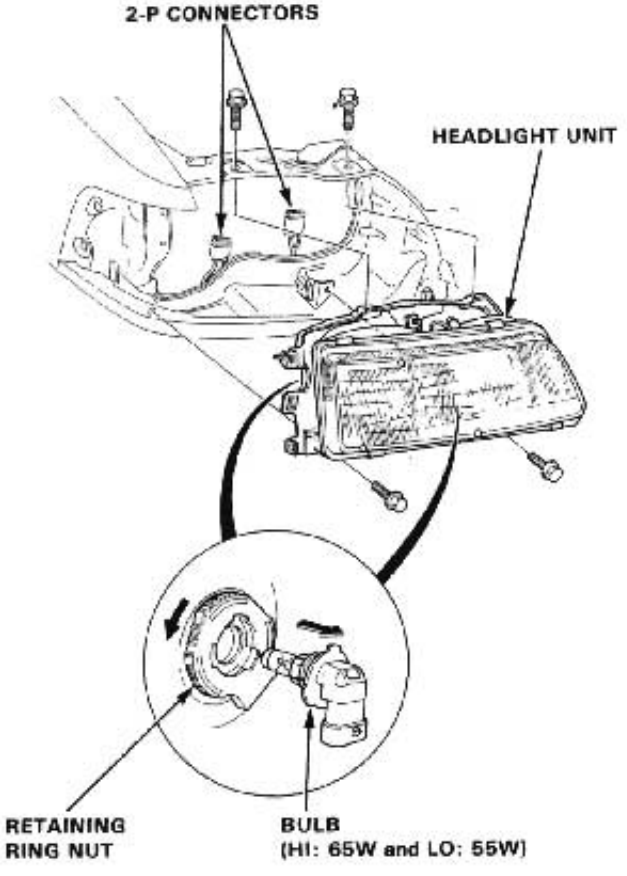


Taillight Assembly

Replacement

CAUTION:
- Halogen headlights can become very hot in use, do not touch them or the attaching hardware immediately after they have been turned off.
- Do not try to replace or clean the headlights with the lights on.

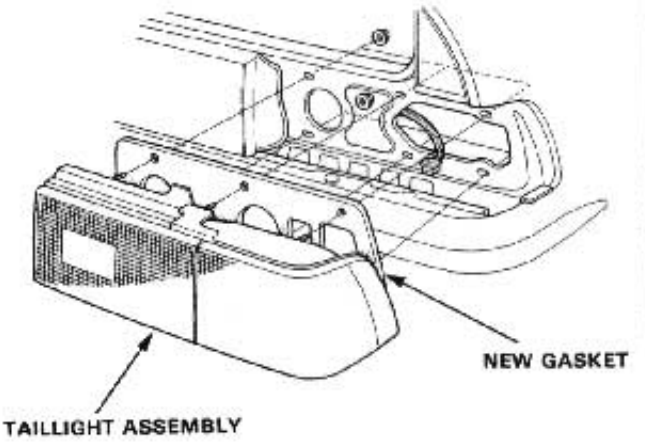
1. Disconnect the 2-P connectors from behind the bulbs.
2. Turn the retaining ring nuts to OPEN position, then remove the bulbs.
3. Remove front bumper and the 4 mount bolts, then remove the unit.



4. After installing the unit, adjust the headlights to local requirements.

Replacement

1. Open the hatch and the maintenance cover of the taillight.
2. Disconnect the 4-P connector from behind the taillight.
3. Remove the 6 mount nuts and the taillight assembly.

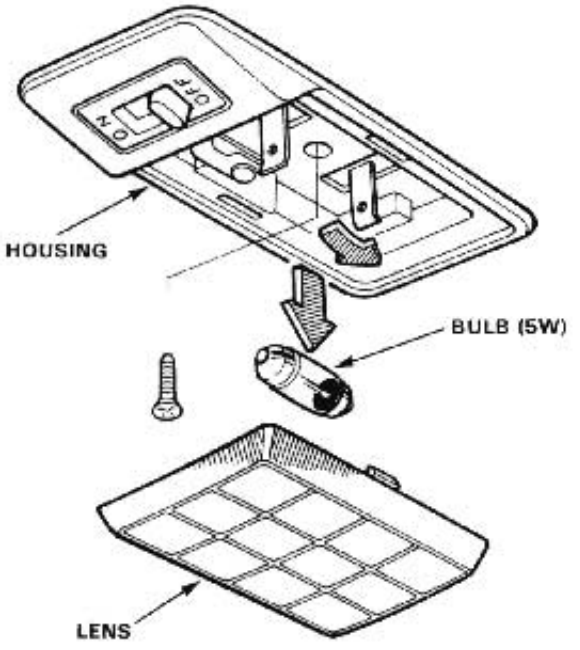


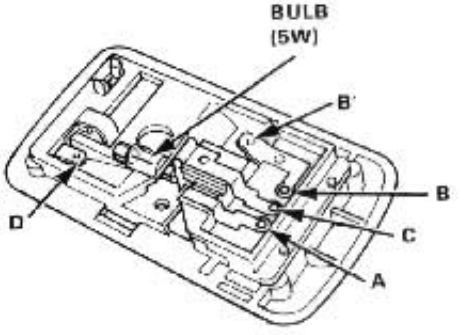
4. Inspect the gasket: replace if it is distorted or overly compressed.

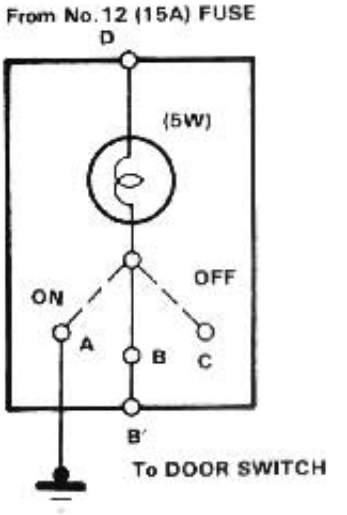
Dome Light

Test

1. Turn the light switch OFF.
2. Pry off the lens.
3. Remove the screw and the housing.
4. Disconnect the two connectors from the housing.







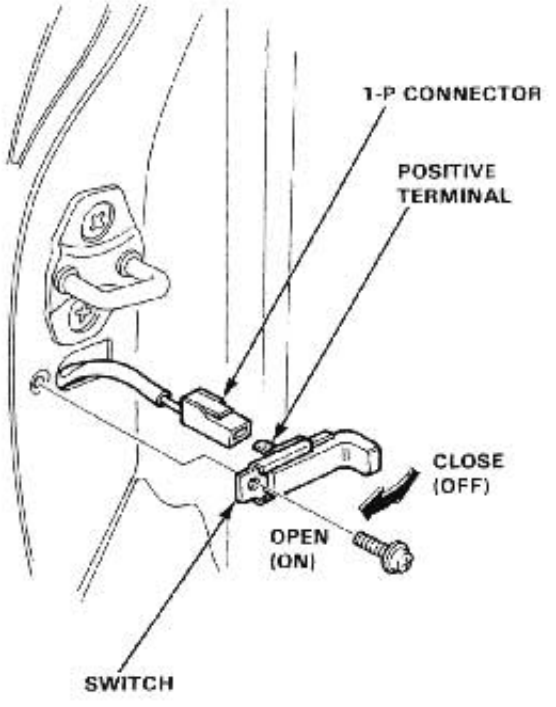
5. Remove the dome light.
6. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	A	B or B'	C		D
OFF			○	(5W)	○
MIDDLE		○	○	(B)	○
ON	○		○	(C)	○

Door Switches

Test

1. Open the door.
2. Remove the screw and pull out the door switch.
3. Disconnect the 1-P connector from the switch.

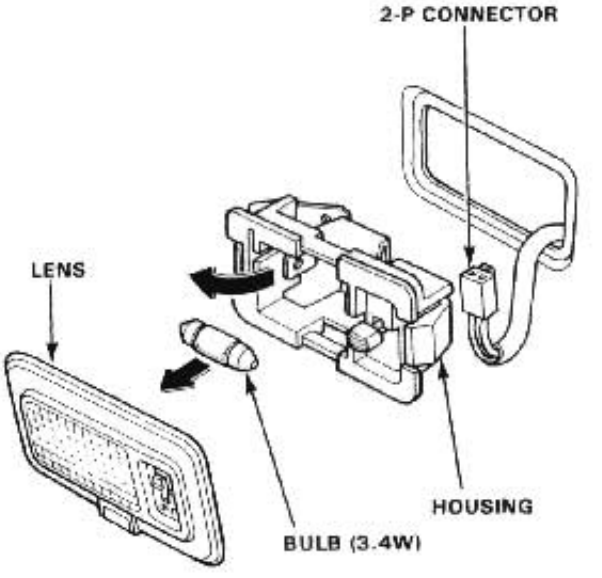


4. There should be continuity between the positive terminal and base plate (ground)with the switch released (door opened).
   There should be no continuity with the switch pushed (door closed).

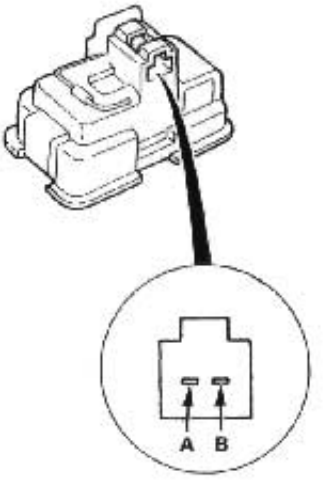
Trunk Light

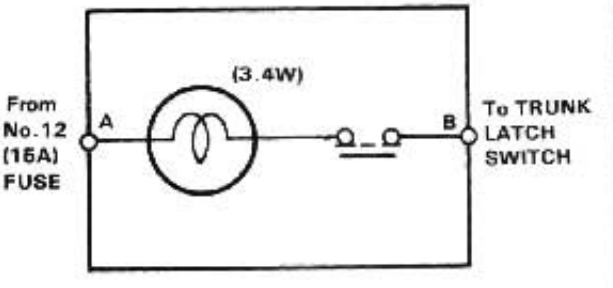
Test

1. Pry off the trunk light lens from the housing.
2. Pry off the light assembly.
3. Disconnect the 2-P connector from the housing.



4. Make sure that the bulb, is in good condition.
   Set the trunk light switch in the ON position and check for continuity between terminals.

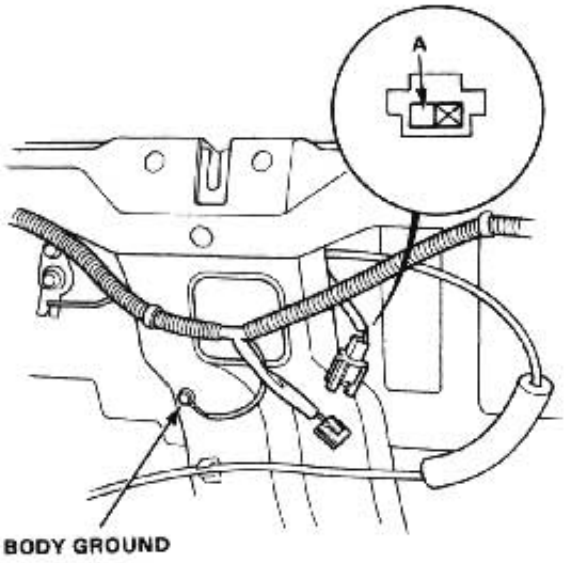




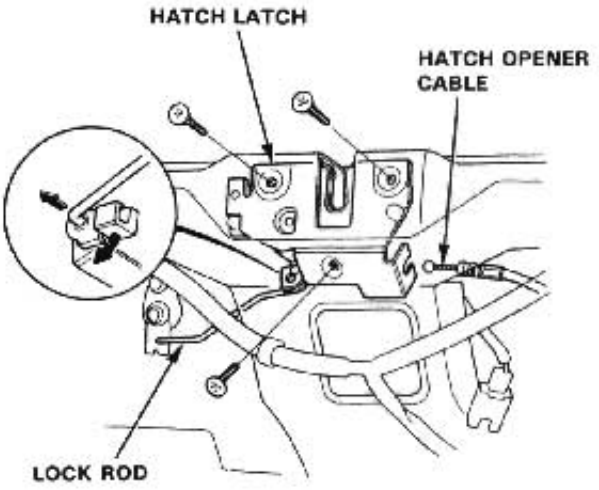
Latch Switch

Test/Replacement

1. Open the hatch and remove the rear panel lining.
2. Disconnect the 2-P connector from the hatch latch.
3. There should be continuity between the A terminal and body ground.

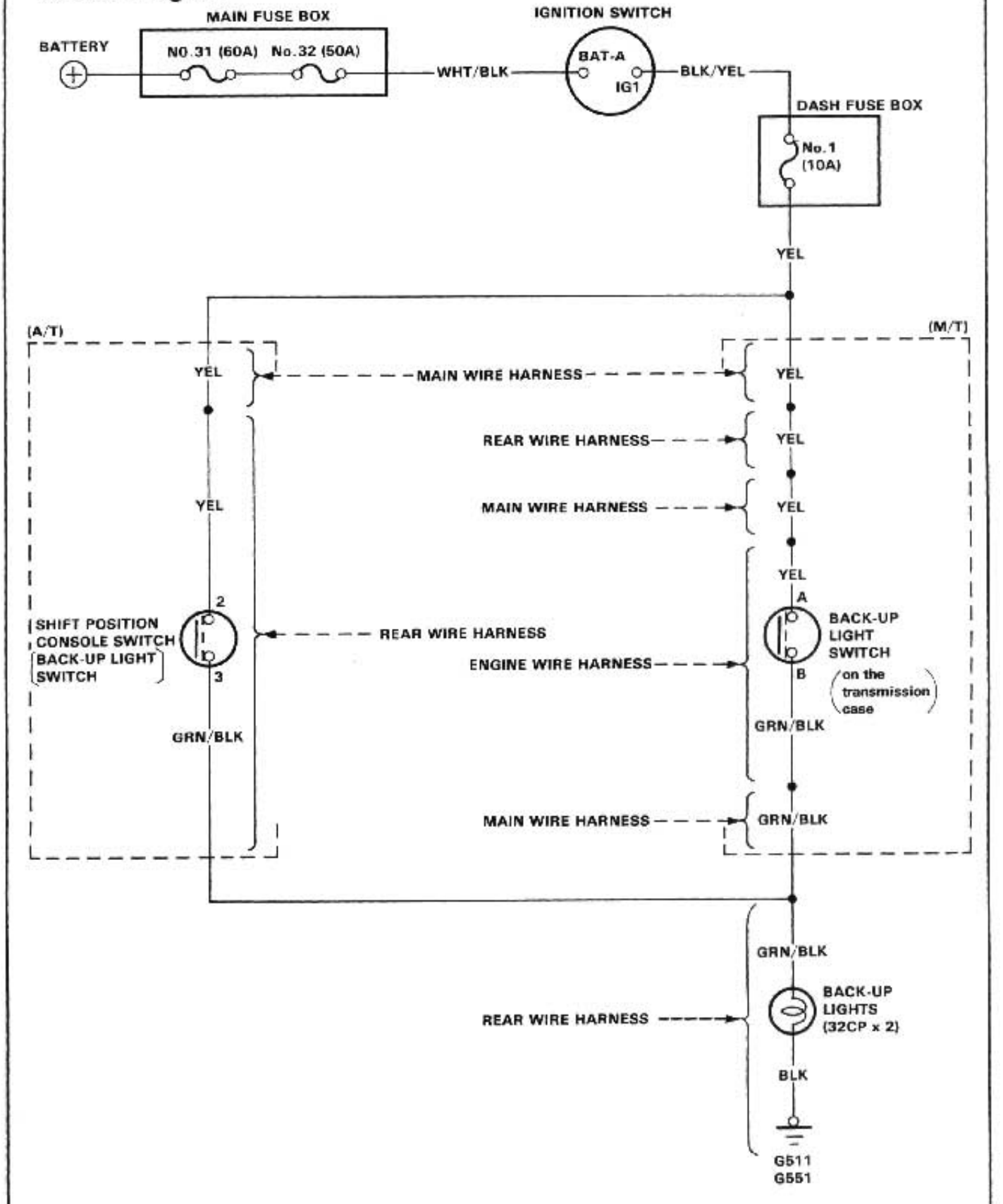


4. If necessary, remove the 3 bolts to pull out the latch from the trunk, then disconnect the lock rod from the latch.
5. Disconnect the hatch opener cable from the latch.



Back-up Lights

Circuit Diagram



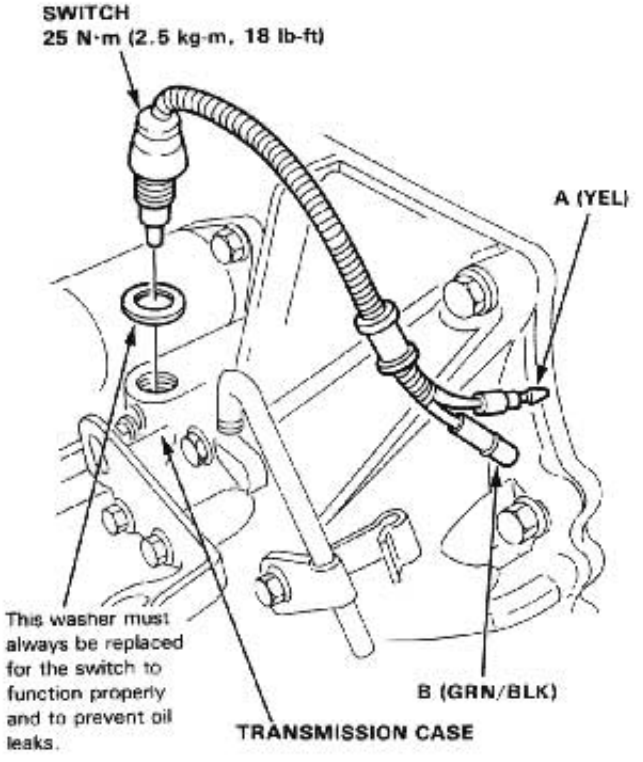
Back-Up Lights

Test

Manual Transmission:

NOTE: Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Test back-up light switch by placing the select lever in reverse and turning the ignition switch to ON.
2. If the back-up lights do not go on, check the back-up light bulbs in the taillight assembly.
3. If the fuse and bulbs are OK, disconnect the connectors from the back-up light switch.

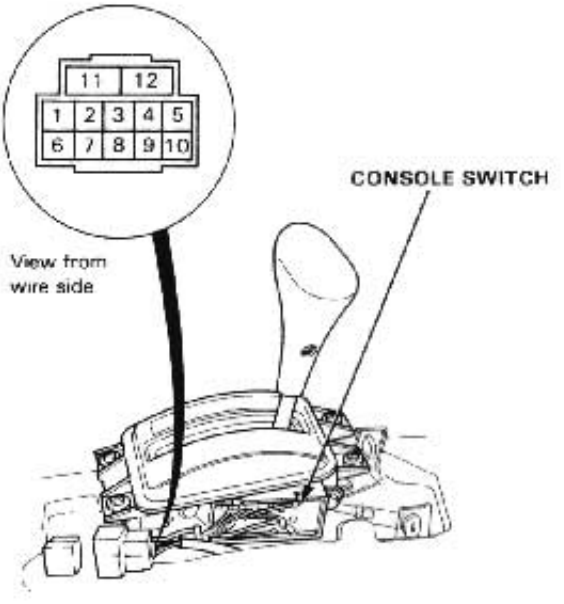


4. Check for continuity between the A and B wires with the switch installed to the transmission case. There should be continuity as the select lever engages "R".
   - If no continuity, replace the switch.
   - If there is continuity, but the back-up lights do not go on:
     - Poor ground (G511, G551).
     - An open in the YEL or GRN/BLK wire.

Automatic Transmission:

NOTE: Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Test back-up light switch by shifting the select lever to "R" and turning the ignition switch ON.
2. If the back-up lights do not go on, check the back-up light bulbs in the taillight assembly.
3. If the fuse and bulbs are OK, remove the center console, then disconnect the 10-P connector from the shift position console switch (back-up light switch).

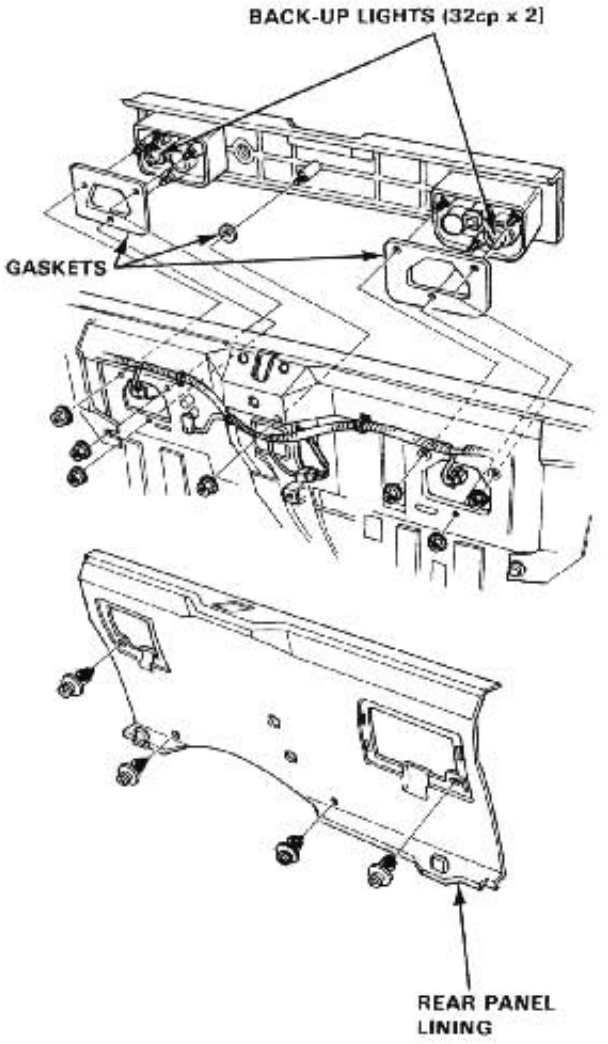


4. Check for continuity between No.2 and No.3 terminals. There should be continuity as the select lever engages "R".
   - If no continuity, replace the switch assembly (see page 23-107).
   - If there is continuity, but the back-up lights do not go on:
     - Poor ground (G511, G551).
     - An open in the YEL or GRN/BLK wire.

Brake Lights

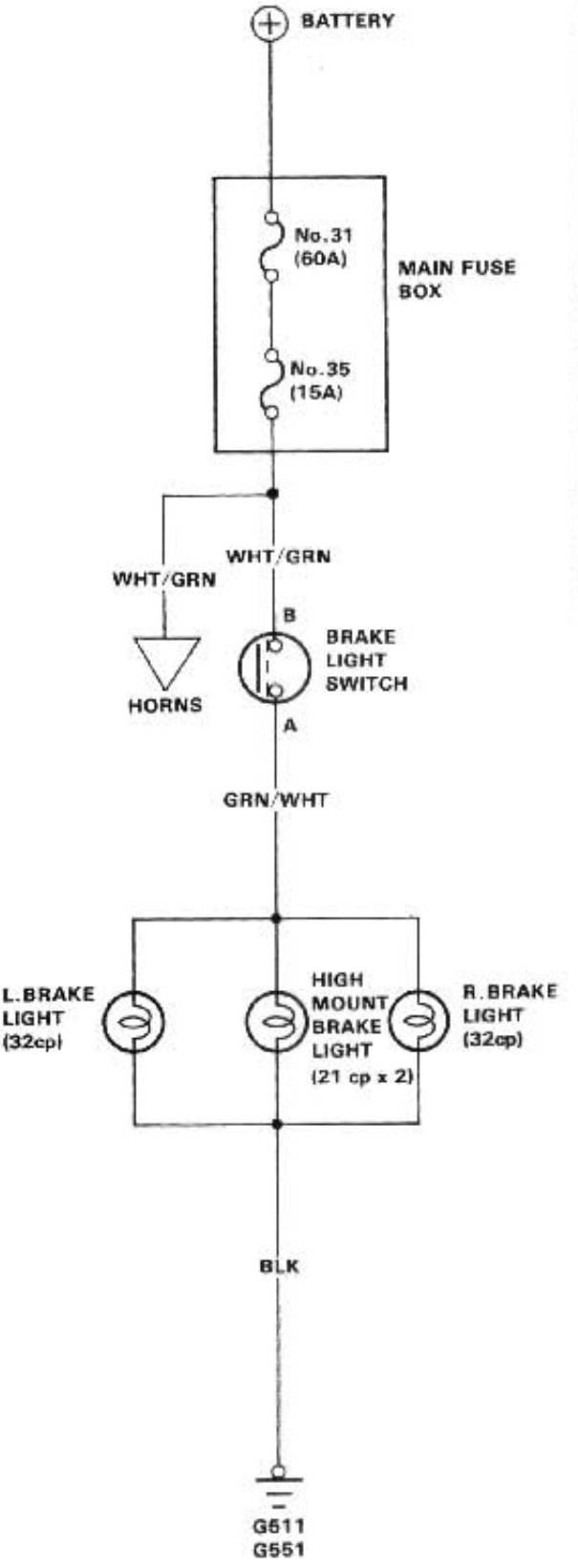
Replacement

1. Remove the rear panel lining.
2. Disconnect the 2-P connectors from behind the back-up lights.
3. Remove the 7 mount nuts and the back-up light assembly.



4. Inspect the gaskets; replace if distorted or overly compressed.

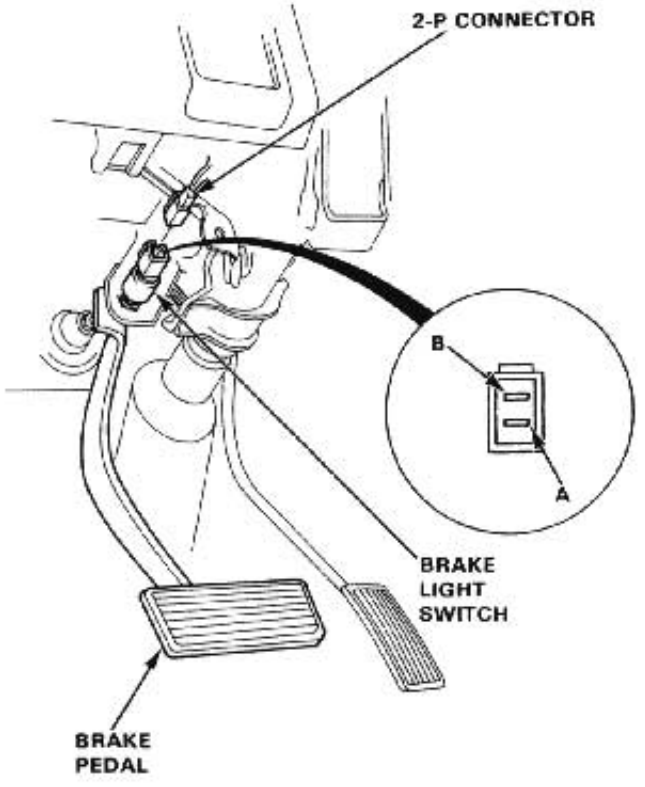
Circuit Diagram



Brake Lights

Test

1. If the brake lights do not go on, check the No.35 (15A) fuse in the main fuse box, and the brake light bulbs in the taillight assembly and the high mount brake light.
2. If the fuse and bulbs are OK, disconnect the 2-P connector from the brake light switch.

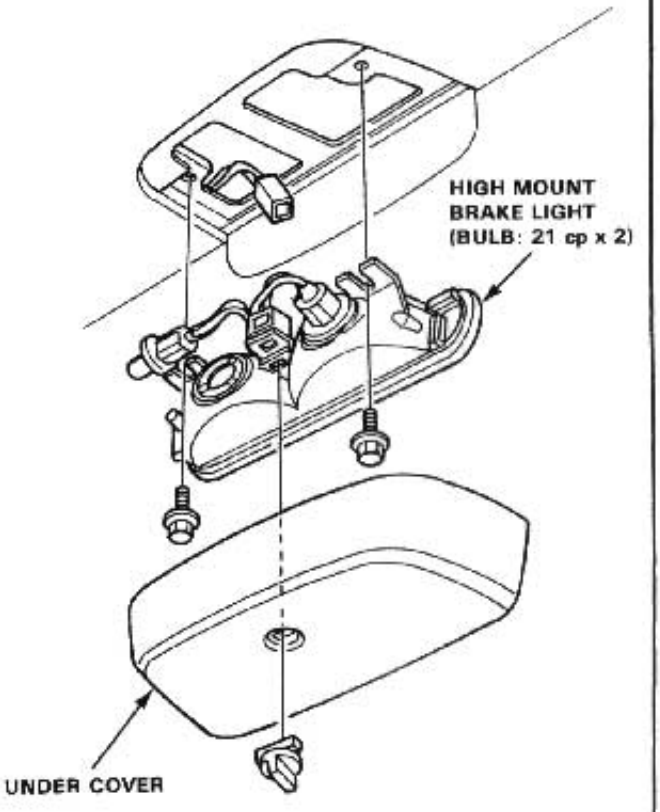


3. Check for continuity between the A and B terminals. There should be continuity with the brake pedal pushed.
   - If no continuity, replace the switch or adjust pedal height (see section 19).
   - If there is continuity, but the brake lights do not go on:
     - Poor ground (G511, G551).
     - An open in the WHT/GRN or GRN/WHT wire.

High Mount Brake Light

Replacement

1. Open the hatch.
2. Remove the under cover and 2 mount bolts, then disconnect the 2-P connector from the light assembly.

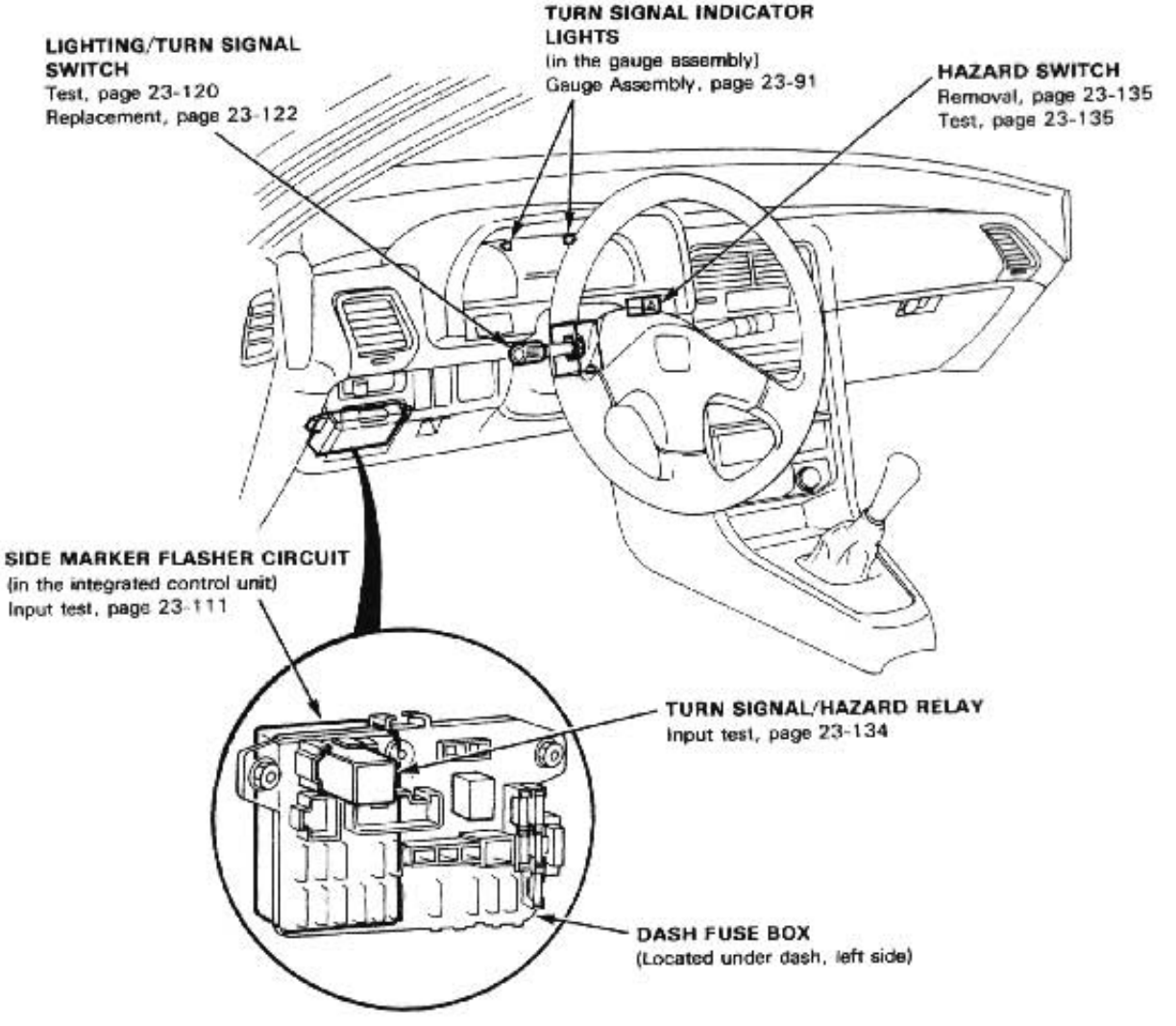


3. Turn the socket 45° counterclockwise to remove the bulb.
4. Install the high mount brake light in the reverse order of removal, and clean the rear window glass before installing.

CAUTION: When installing high mount brake light, make sure the mount rubber in sealed evenly to the rear window glass.

Side Marker/Turn Signal/Hazard Flasher System

Component Location Index



Description

Side Marker Light Flasher System:
The front side marker lights have two distinct modes of operation, one for daytime and another for night time:

Daytime mode (taillights off) — The left or right front side marker lights flash simultaneously with the front and rear turn signal lights.

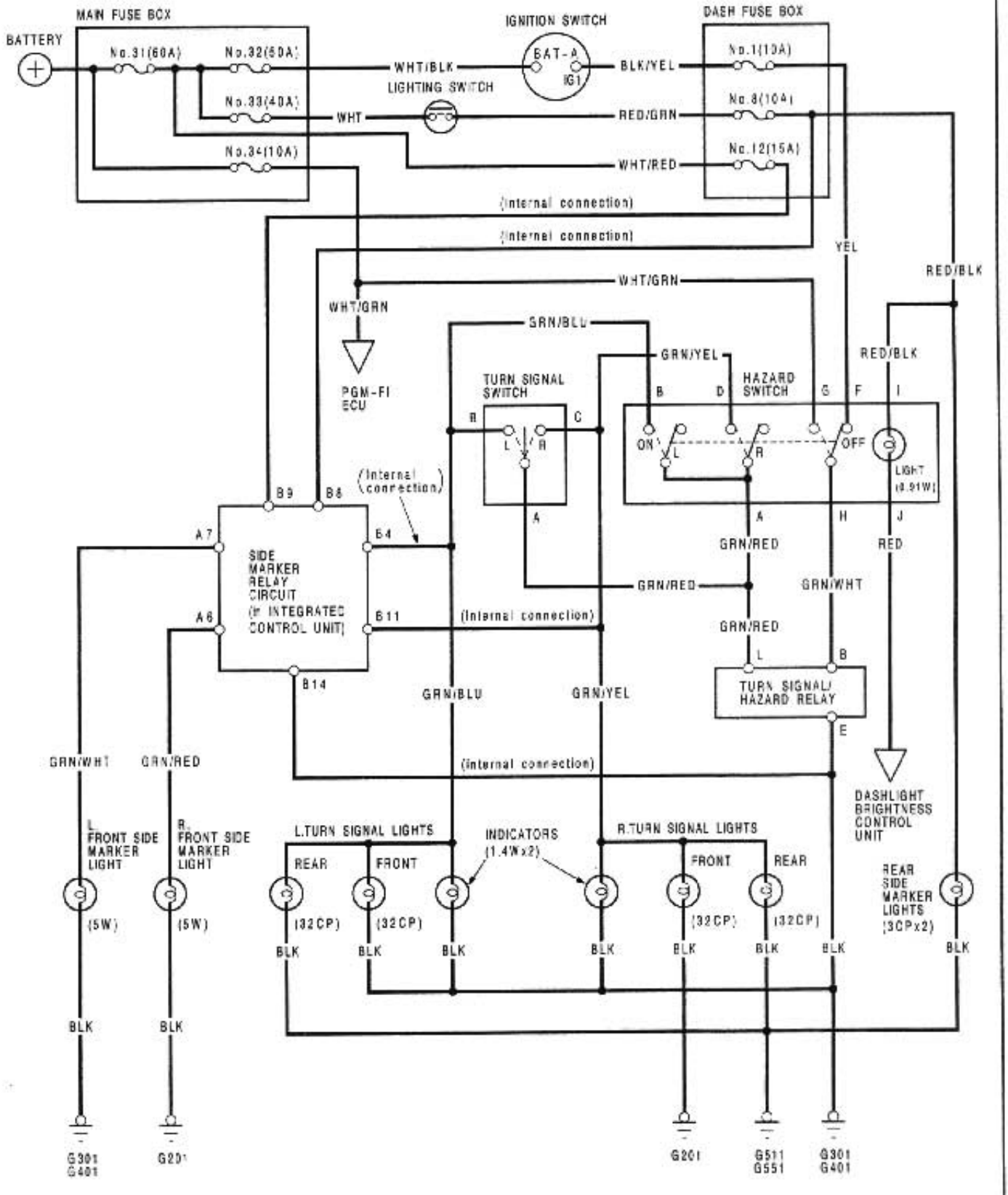
Night time mode (taillights on) — The front side marker lights are illuminated when the taillights are on and flash when the turn signals are operated. With the taillights on and the turn signals (or hazard) flashing, the front side marker lights and the turn signals flash alternately.

Failure modes:
- One or both of the front side marker lights stay on all the time (ignition and headlights off).
- One or both of the front side marker lights will not illuminate.

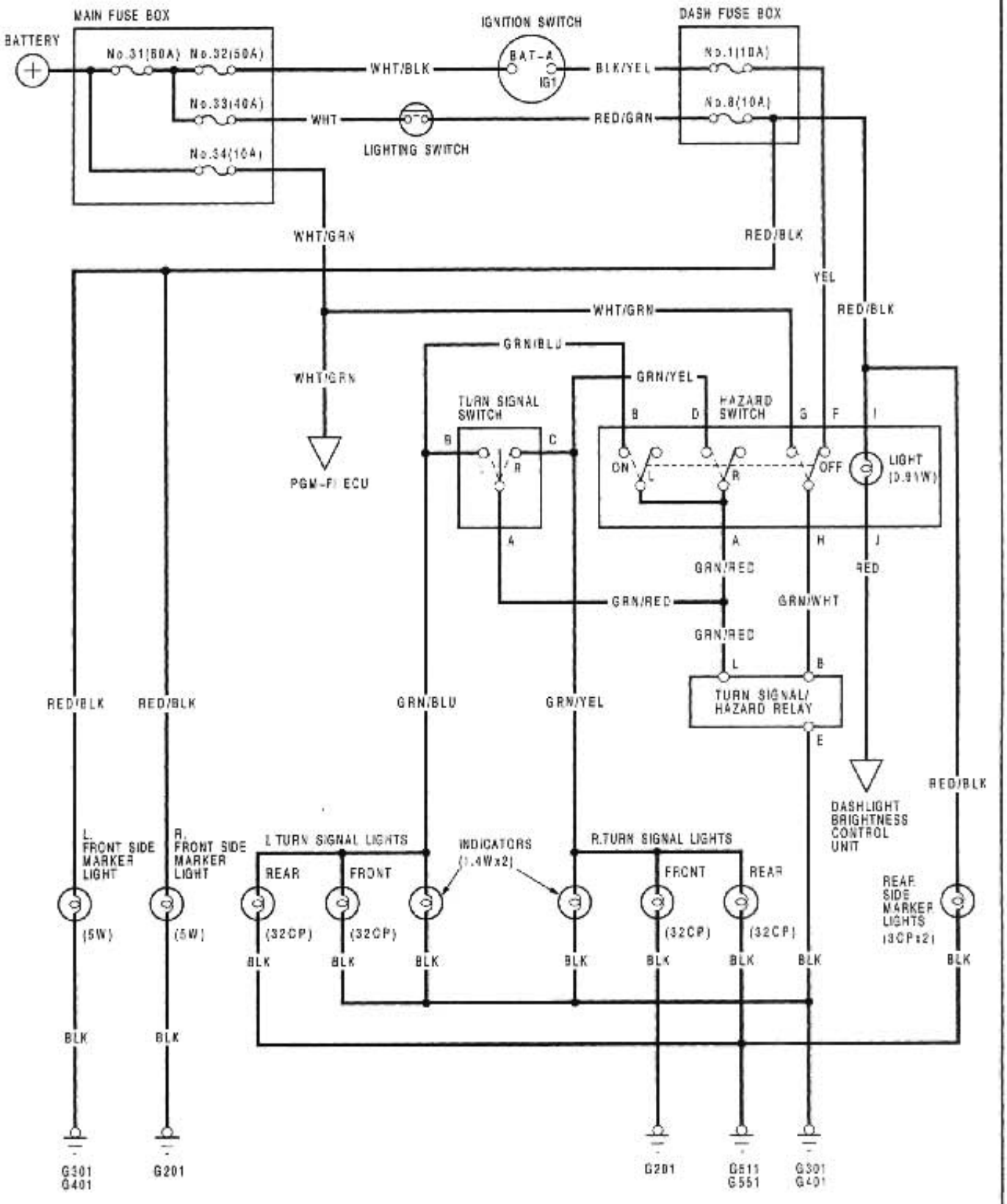
If either of these problems exists, replace the side marker relay (integrated control unit).

Side Marker/Turn Signal/Hazard Flasher System

Circuit Diagram (USA)



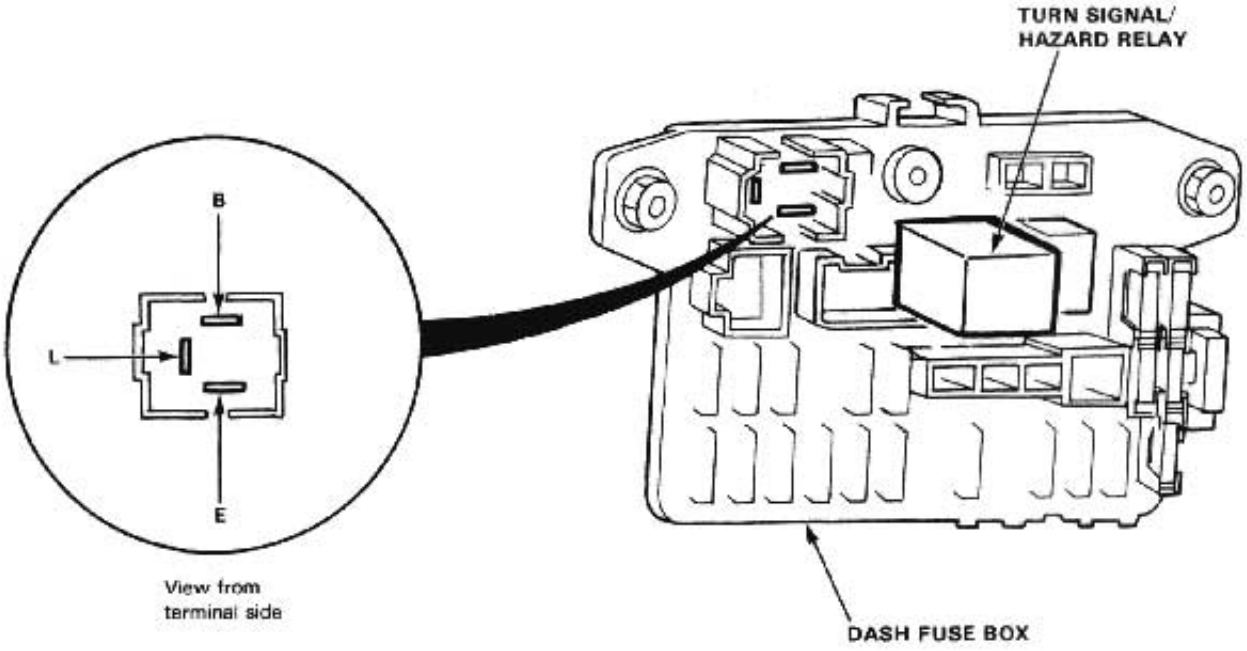
(CANADA)


MAIN FUSE BOX
BATTERY
No.31(60A)
No.32(50A)
No.33(40A)
No.34(10A)
WHT/BLK
WHT
IGNITION SWITCH
BAT-A
IG1
BLK/YEL
LIGHTING SWITCH
RED/GRN
DASH FUSE BOX
No.1(10A)
No.8(10A)
WHT/GRN
RED/BLK
YEL
GRN/BLU
GRN/YEL
PGM-FI ECU
TURN SIGNAL SWITCH
HAZARD SWITCH
ON
OFF
LIGHT (3.9W)
GRN/RED
GRN/WHT
RED
TURN SIGNAL/ HAZARD RELAY
DASHLIGHT BRIGHTNESS CONTROL UNIT
L. FRONT SIDE MARKER LIGHT
R. FRONT SIDE MARKER LIGHT
(5W)
L TURN SIGNAL LIGHTS
R.TURN SIGNAL LIGHTS
REAR
FRONT
INDICATORS (1.4Wx2)
(32CP)
REAR SIDE MARKER LIGHTS (3CPx2)
BLK
G301
G401
G201
G611
G551

Side Marker /Turn Signal/Hazard Flasher System

Turn Signal/Hazard Relay Input Test

Remove the dashboard lower panel, then remove the turn signal /hazard relay from the dash fuse box.
Make the following input tests at the relay holder pins.
If all tests prove OK, but the relay fails to work, replace the turn signal/hazard relay.



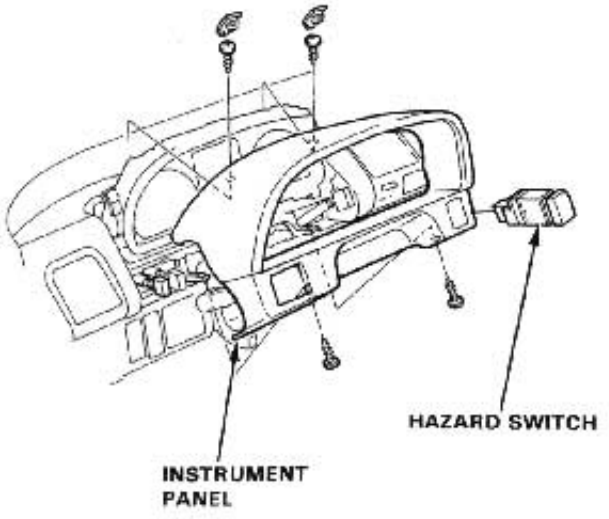
No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	E	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G301, G401) · An open in the BLK wire.
2	B	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.1 (10A) fuse. · An open in the YEL or GRN/WHT wire. · Faulty hazard switch.
3	B and L	Hazard switch ON and connect the B terminal to the L terminal.	Hazard lights should come on.	· Blown No.34 (10A) fuse. · Blown bulb. · Poor ground (G201, G511, G551). · Faulty hazard switch. · Faulty side marker relay circuit. · An open in the WHT/GRN, GRN/RED, GRN/YEL or GRN/BLU wire.
		Ignition switch ON and turn signal switch in R or L and connect the B terminal to the L terminal.	R or L side turn lights should come on.	· Faulty turn signal switch.

Hazard Switch Removal

1. Pry out the switch from the instrument panel.

   NOTE: Be careful not to damage the switch or the instrument panel when prying out the switch.

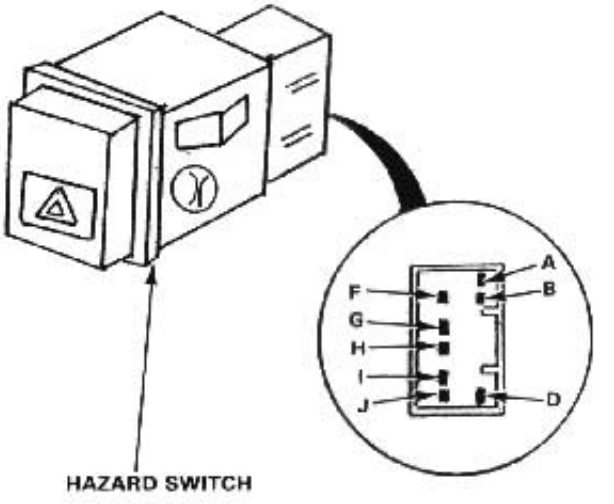
2. Disconnect the 10-P connector from the switch.

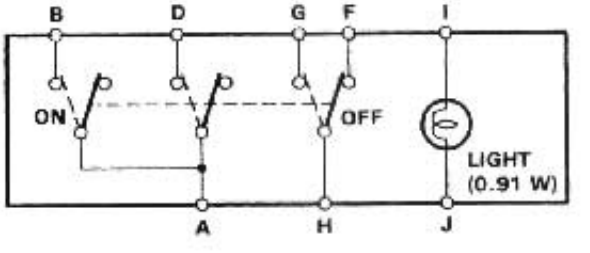


Hazard switch Test

1. Remove the hazard switch from the instrument panel.
2. Check for continuity between the terminals in each switch position according to the table.

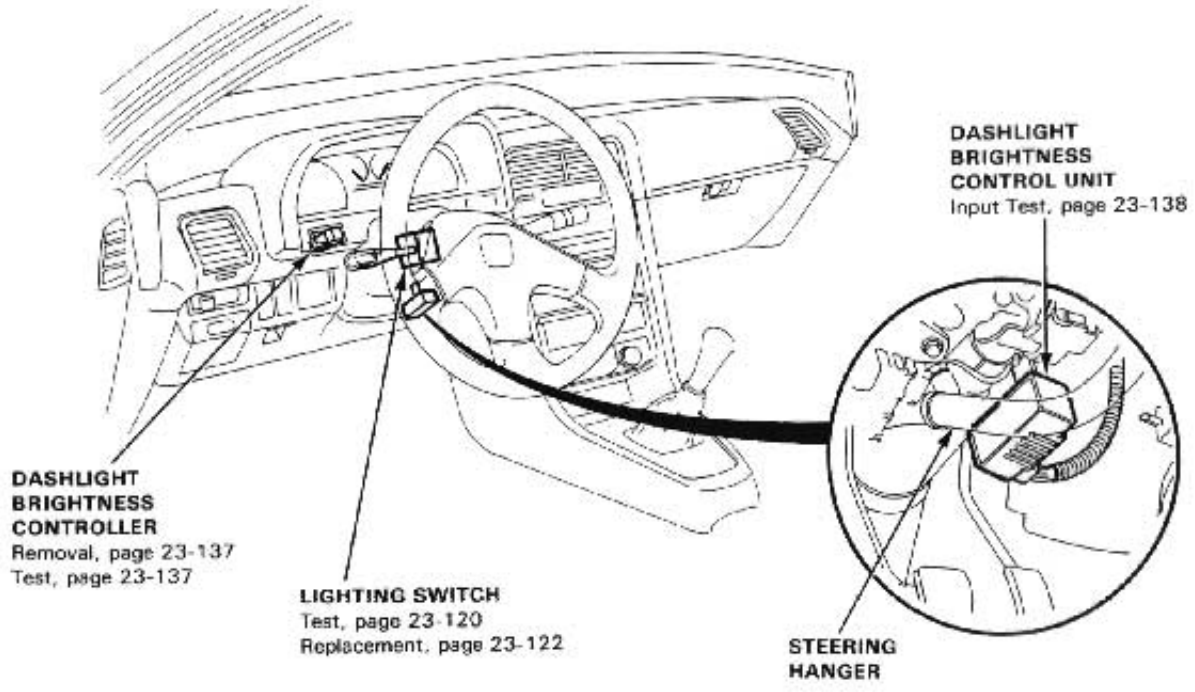
Terminal / Position	A	B	D	F	G	H	I		J
OFF				○		○	○	⌀	○
ON	○	○	○		○	○	○	⌀	○



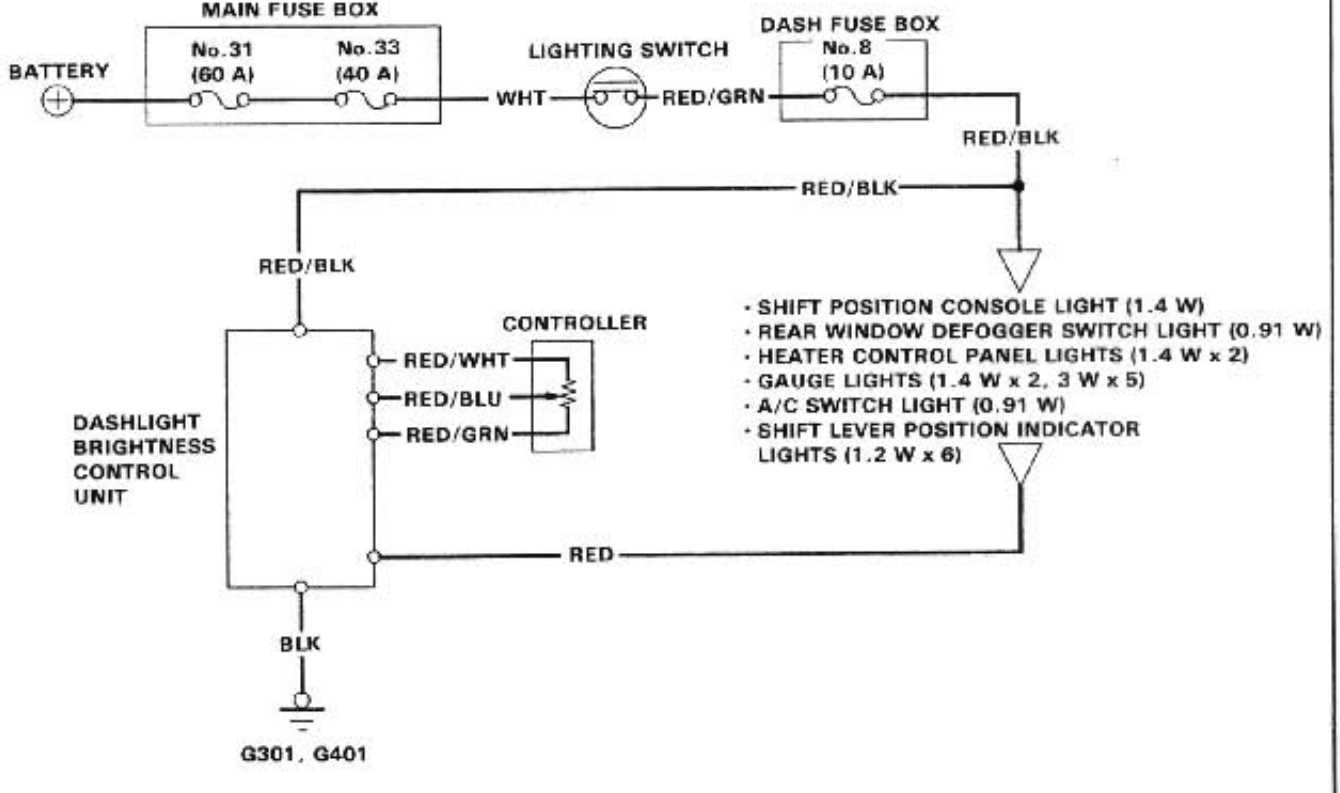


Dashlight Brightness Control

Component Location Index

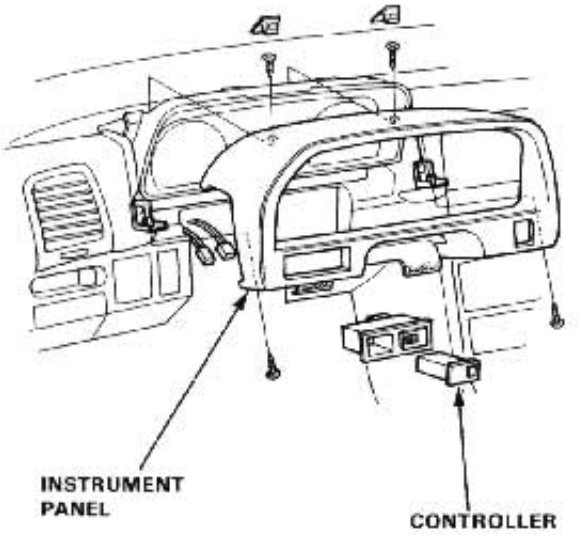


Circuit Diagram



Controller Removal

1. Remove the 4 screws and the instrument panel from the dashboard, then disconnect the connectors from the each switch.

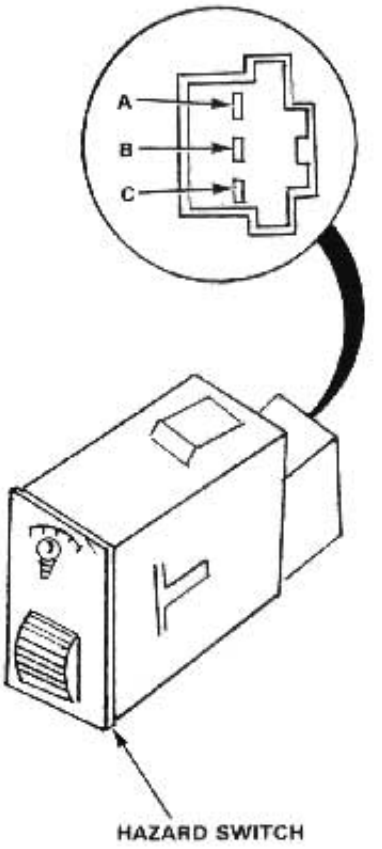


Controller Test

1. Remove the controller.
2. Measure resistance between A and C terminals.

   Resistance: Approx. 10 kΩ

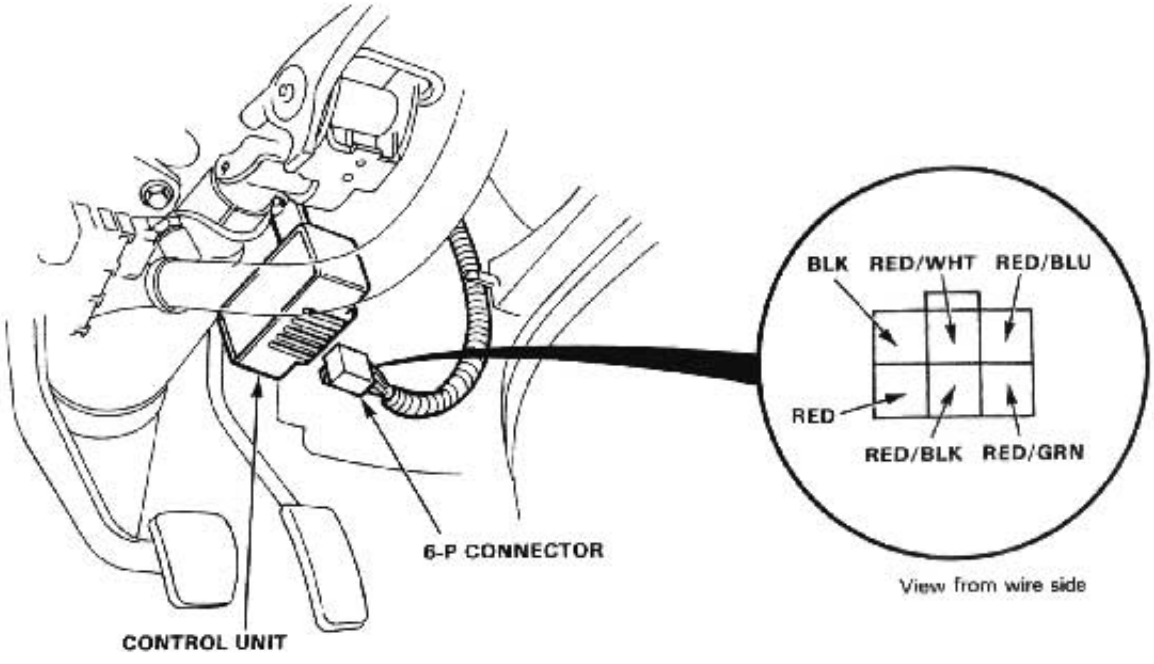
   NOTE: Resistance will vary slightly with temperature.
3. Measure resistance between A and B terminals while rotating the adjusting dial.
   Resistance should vary from 0 to 10,000 ohms as the dial is rotated.



Dashlight Brightness Control

Control Unit Input Test

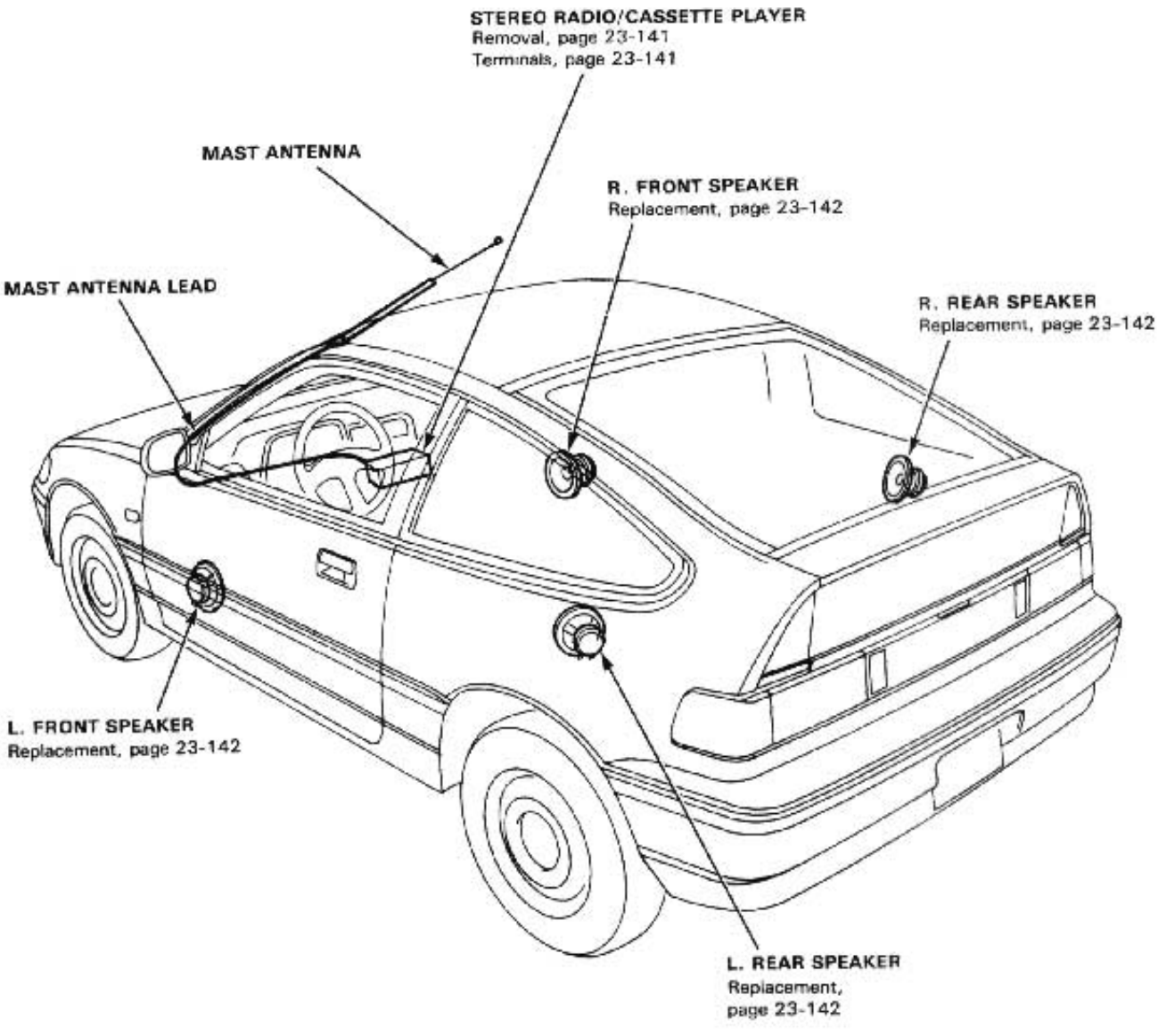
Disconnect the 6-P connector from the control unit. Make the following input tests at the harness pins. If all tests prove OK, yet the dashlights still cannot be controlled, check the connector for good connection. If OK, then replace the control unit.



No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G301, G401) · An open in the wire.
2	RED/BLK	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.8 (10 A) fuse. · Faulty lighting switch. · An open in the wire.
3	RED	Lighting switch ON.	Attach to ground: dashlights should come on full bright.	· An open in the RED/BLK or RED wire.
4	RED/GRN and RED/WHT	Adjusting dial rotated.	Check for resistance between the RED/GRN and RED/WHT wires: should have 10 kΩ at all times.	· An open in the wires. · Faulty controller.
5	RED/BLU and RED/WHT	Adjusting dial rotated.	Check for resistance between the RED/BLU and RED/WHT wires: should vary from 0 to 10,000 ohms as the dial is rotated.	· An open in the wires. · Faulty controller.

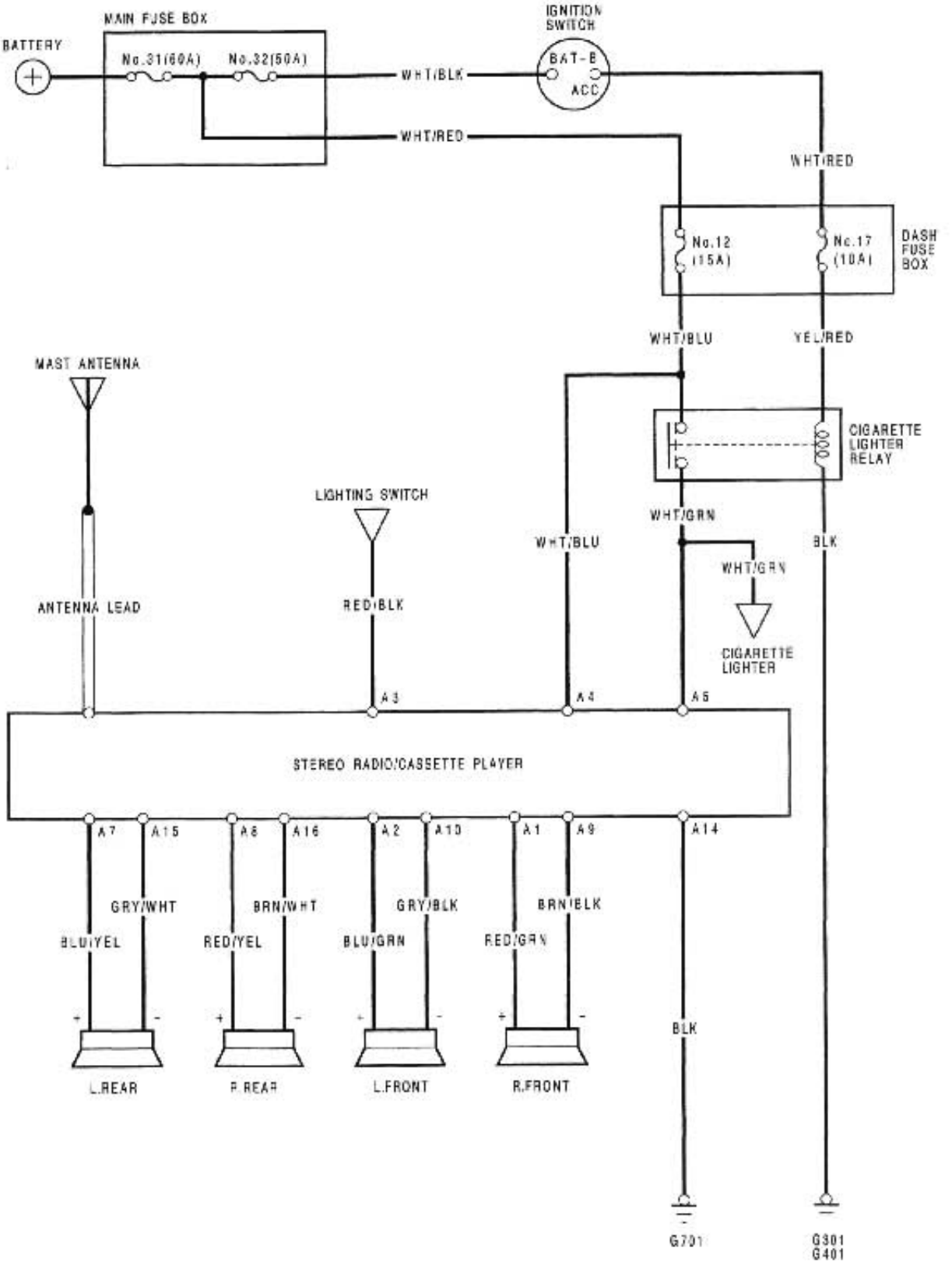
NOTE: If the fuse blows, the RED and The RED/BLK wires are connected.

Component Location Index



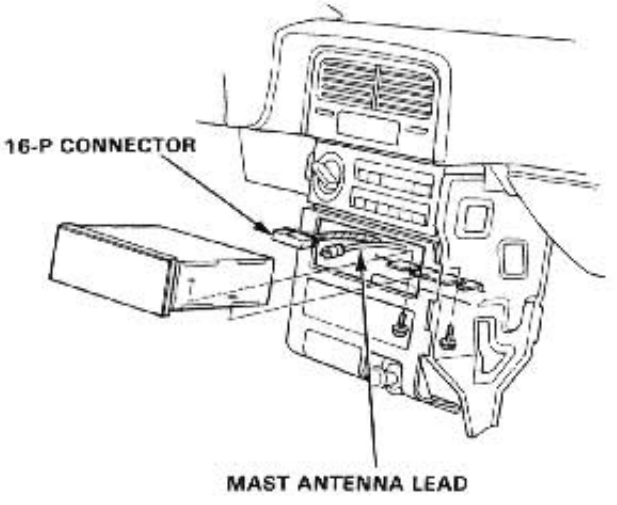
Stereo Sound System

Circuit Diagram

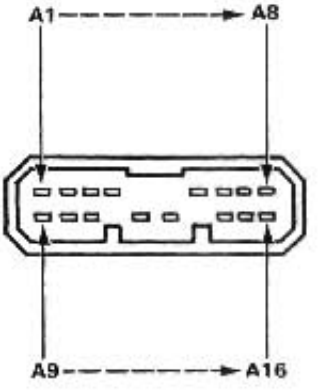


Unit Removal

1. Remove the front console.
2. Remove the 2 screws and pull the stereo radio/cassette player out of the center instrument panel, then disconnect the 16-P connector and mast antenna lead from the stereo radio/cassette player.



Unit Terminals



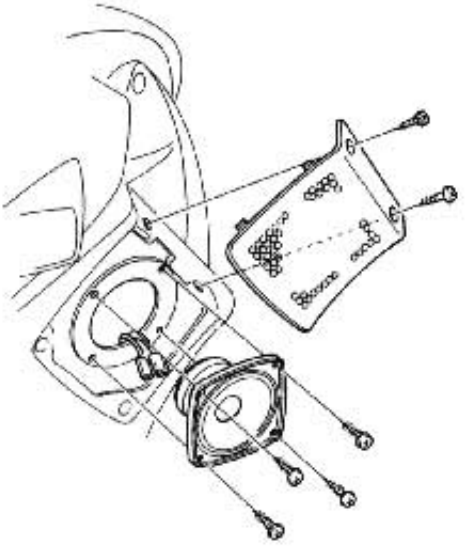
Terminal	Wire	Destination
A1	RED/GRN	Right front speaker ⊕
A2	BLU/GRN	Left front speaker ⊕
A3	RED/BLK	Light-on signal
A4	WHT/BLU	Constant power (Tuning memory)
A5	WHT/GRN	ACC (Main stereo power supply)
A6		(Not used)
A7	BLU/YEL	Left rear speaker ⊕
A8	RED/YEL	Right rear speaker ⊕
A9	BRN/BLK	Right front speaker ⊖
A10	GRY/BLK	Left front speaker ⊖
A11		(Not used)
A12		(Not used)
A13		(Not used)
A14	BLK	Ground
A15	GRY/WHT	Left rear speaker ⊖
A16	BRN/WHT	Right rear speaker ⊖

Stereo Sound System

Speaker Replacement

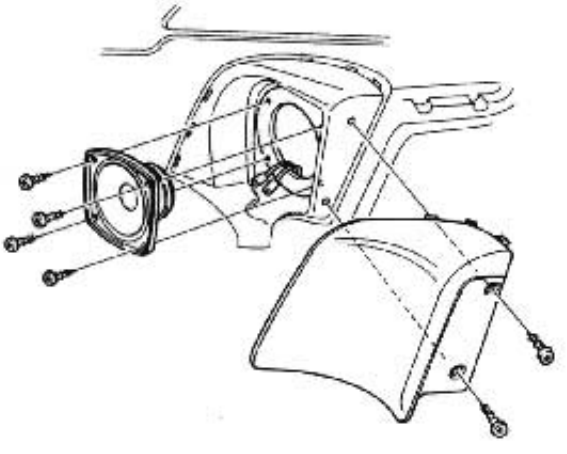
Front Speakers:

1. Remove the 2 screws on the front edge of the grille.
2. Remove the 4 screws, then disconnect the wires from the speaker.



Rear Speakers:

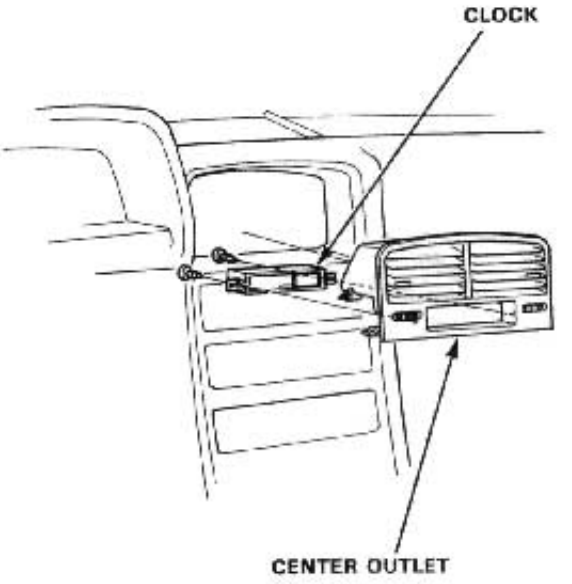
1. Remove the 2 screws on the edge of the grille.
2. Remove the 4 screws, then disconnect the wires from the speaker.



Clock

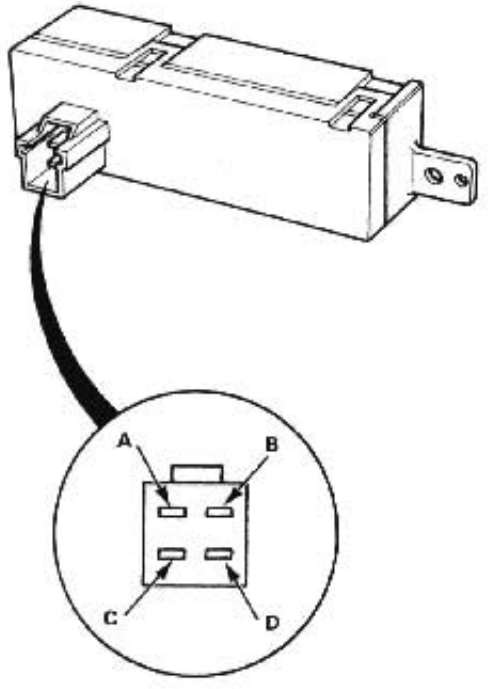
Removal

1. Remove the center outlet from the dashboard, then disconnect the 4-P connector from the clock.
2. Remove the 2 screws and clock from the center outlet.



Cigarette Lighter

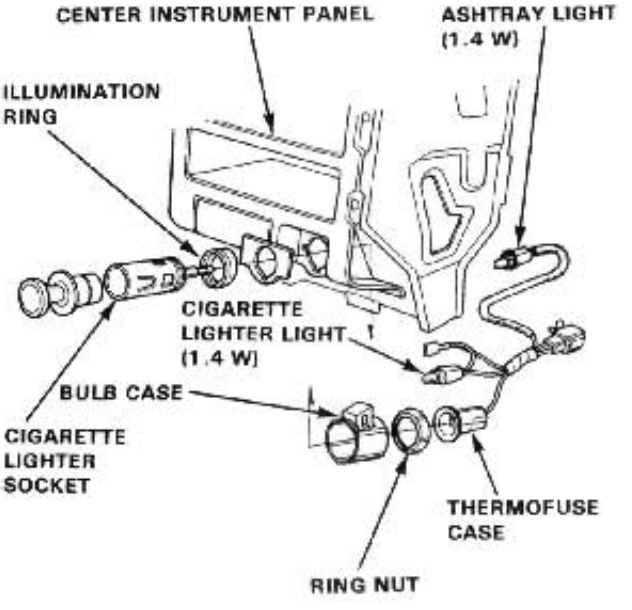
Terminals



Terminal	Wire	Destination
A	WHT/BLU	Constant power (Time memory)
B	YEL	IG1 (Main clock power supply)
C	RED/BLK	Light-on signal
D	BLK	Ground

Replacement (Si)

1. Remove the front console.
2. Remove the 6 screws and the center instrument panel with the stereo radio/cassette player, then disconnect the 16-P connector, the mast antenna lead and the 4-P connector.
3. Disconnect the thermofuse case from the socket end.
4. Remove the ring nut and separate the cigarette lighter socket from the thermal protector.

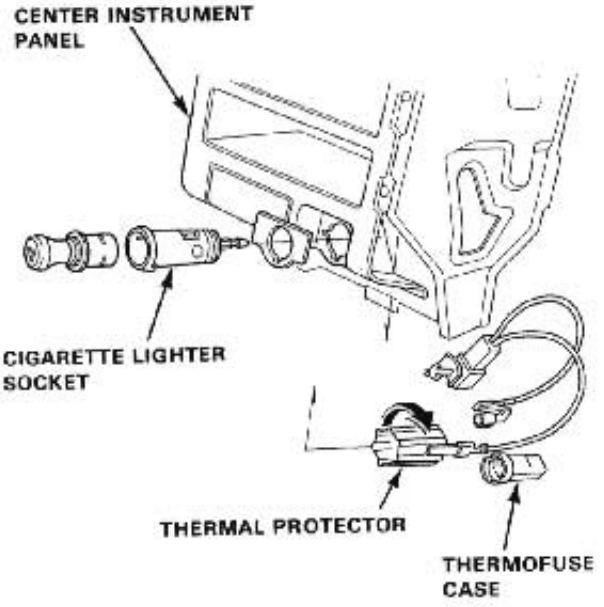


5. When installing the cigarette lighter, align each lug on the illumination ring and cigarette lighter socket with the groove in the hole, then position the bulb case on the thermal protector between the stoppers of the center panel.
6. Make sure that the ground wire, bulb socket and thermofuse case are seated to the cigarette lighter assembly.

Cigarette Lighter

Replacement

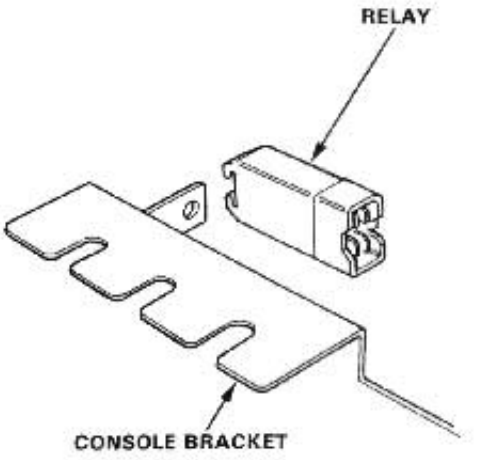
1. Remove the front console.
2. Remove the 6 screws and the center instrument panel with the stereo radio/cassette player, then disconnect the 16-P connector, the mast antenna lead and the 2-P connector from the cigarette lighter.
3. Disconnect the thermofuse case from the socket end.
4. Remove the thermal protector and separate the cigarette lighter socket.



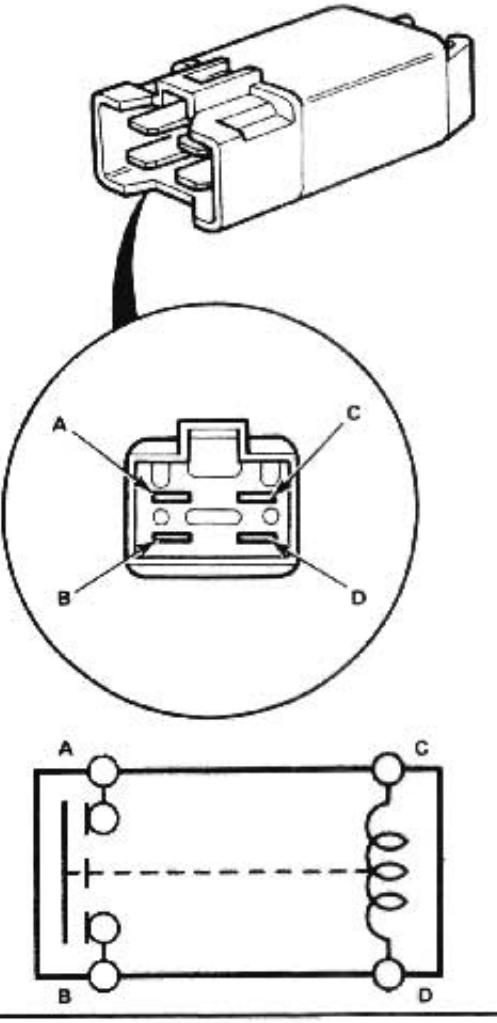
5. When installing the cigarette lighter, align the lug on the cigarette lighter socket with the groove in the hole.
6. Make sure that the ground wire, thermofuse case are seated to the cigarette lighter assembly.

Cigarette Lighter Relay Test

1. Remove the relay from the console bracket.

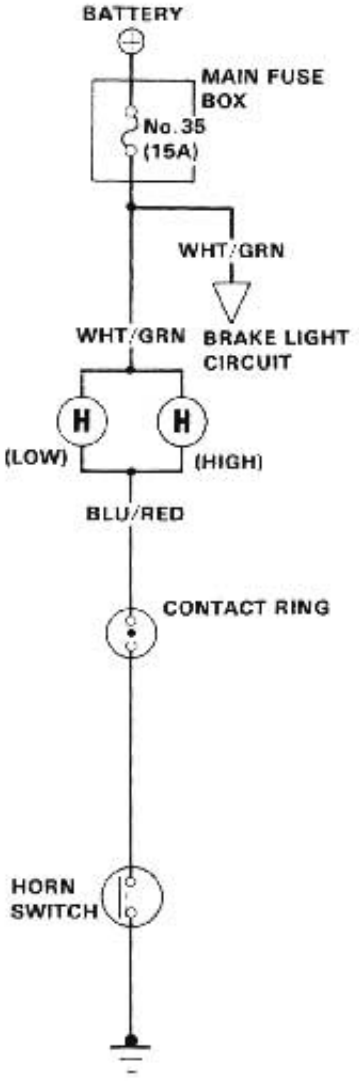


2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.



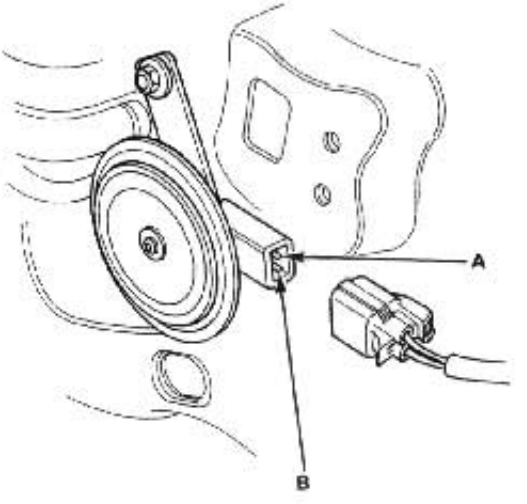
Horns

Circuit Diagram



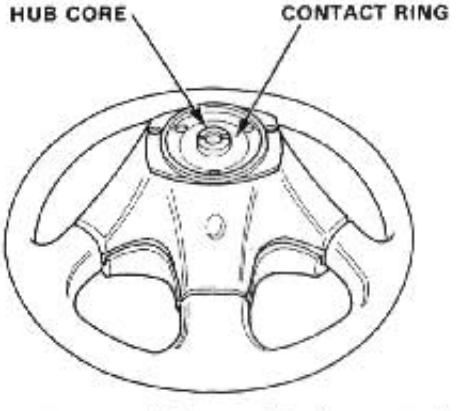
Horn Test

1. Remove the front bumper.
2. Disconnect the 2-P connector from the horn.
3. Test the horn by connecting battery voltage to the A and B terminals. The horn should sound.
4. If the horn fails to sound, replace it.



Switch Test

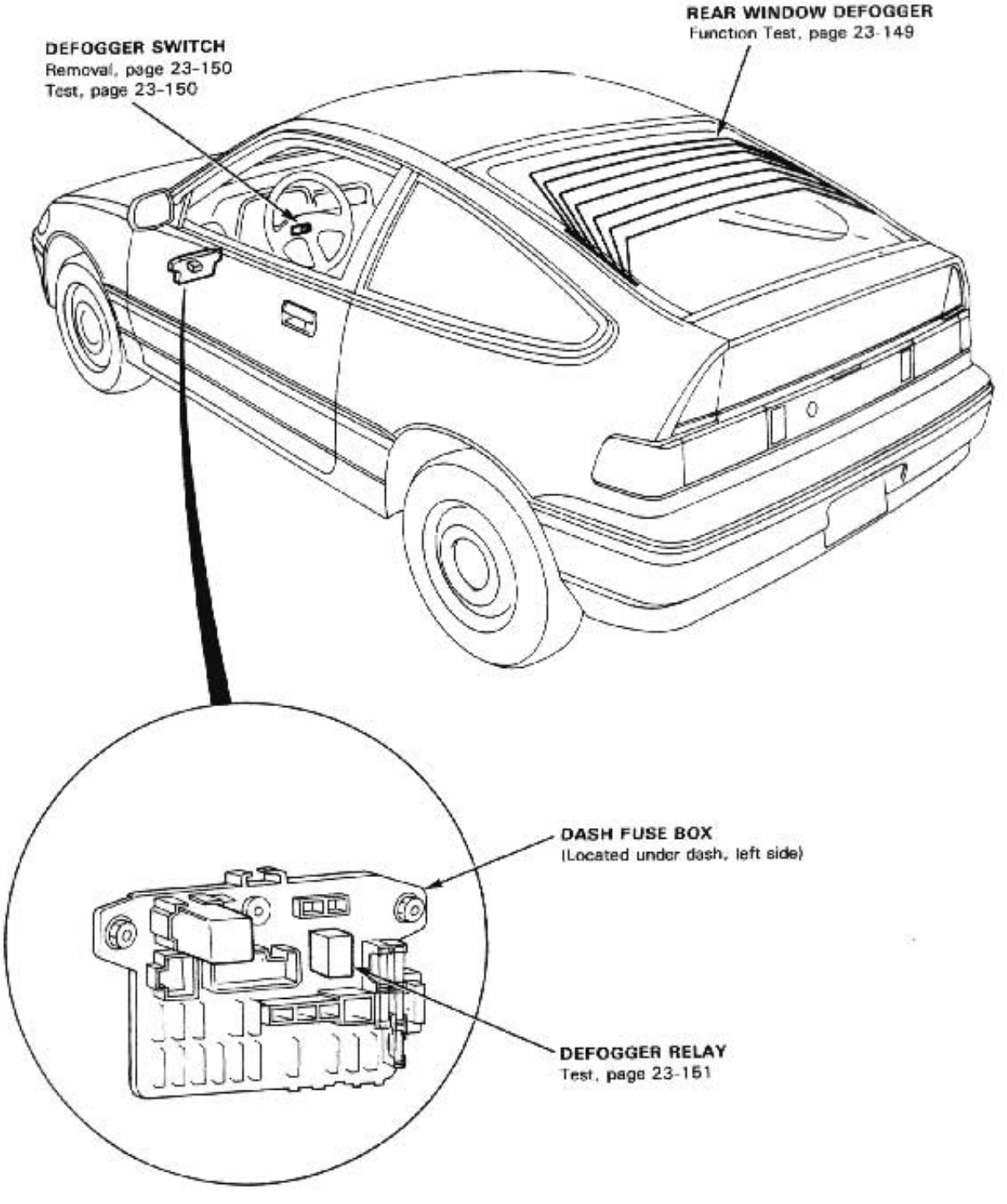
1. Remove the steering wheel, then turn it over.
2. Check for continuity between the contact ring and hub core on the steering wheel with the horn switch pressed.
   There should be continuity.



3. If there is no continuity, repair the horn switch.

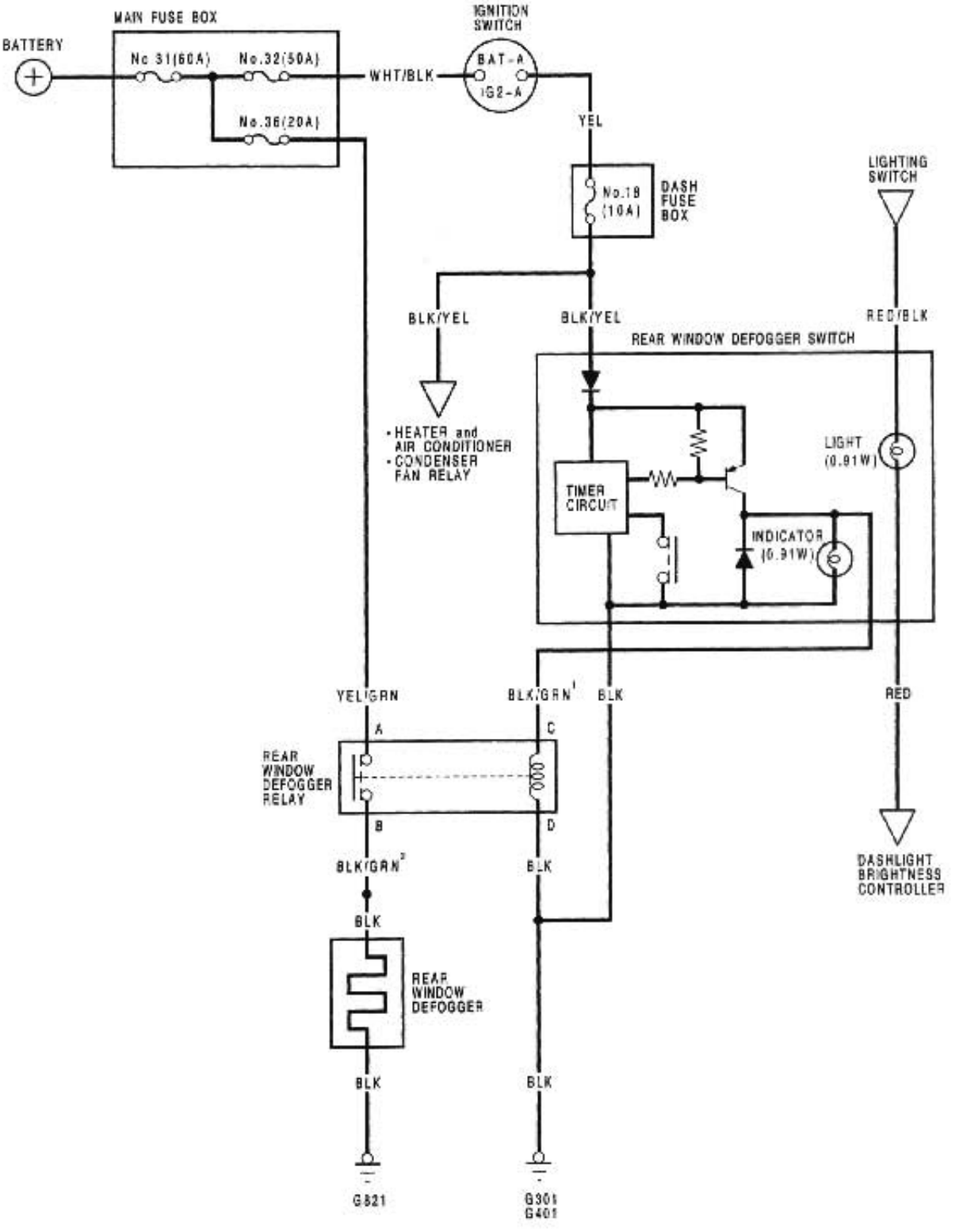
Rear Window Defogger

Component Location Index



Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example BLK/GRN[1] and BLK/GRN[2] are not the same).



Rear Window Defogger

Troubleshooting

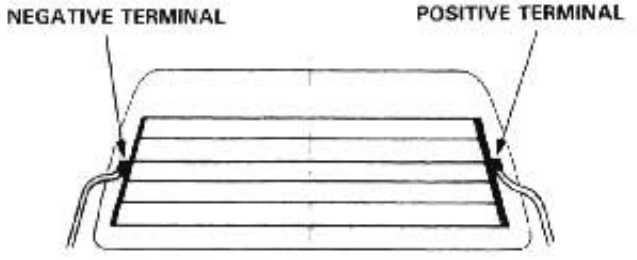
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected	Blown indicator light bulb	Blown No.18 (10 A) fuse (in the dash fuse box)	Blown No.36 (20 A) fuse (in the main fuse box)	Defogger switch input test	Function test	Defogger relay	Repair defogger wire	Poor ground	Open circuit in wires or loose or disconnected terminals
Defogger operates, but indicator light does not go on.	1								BLK/YEL or BLK
Defogger does not operate and indicator light does not go on.		1		3	2			G301, G401	BLK/YEL or BLK/GRN[1]
Defogger does not operate, but indicator light goes on.			1		2	3		G821	YEL/GRN or BLK/GRN[2] or BLK
Broken defogger wire							1		
Operation time is too long or too short. Normal operation time is about 25 minutes (USA) or about 40 minutes (CANADA).				1					

Function Test

CAUTION: Be careful not to scratch or damage the defogger wires with the tester probe end.

1. Check for voltage between the positive terminal and body ground with the ignition switch and the defogger switch ON.
   There should be battery voltage.
   - If there is no voltage, check for:
     - Faulty defogger relay.
     - An open in the BLK, BLK/GRN[2] or YEL/GRN wire.
   - If there is battery voltage, go to step 2.



2. Check for continuity between the negative terminal and body ground.
   If no continuity, check for open in the defogger ground wire.

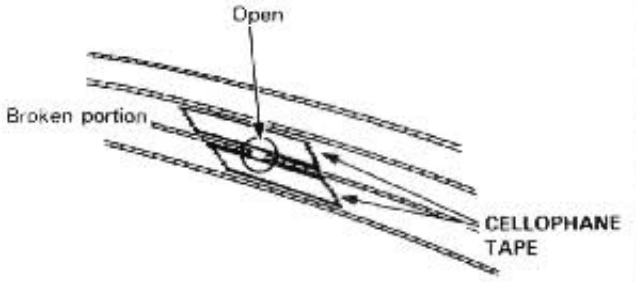
3. Lightly touch the voltmeter positive probe to the center of each defogger wire, and the negative probe to the negative terminal.
   There should be approximately 6 V with the ignition switch and the defogger switch ON.
   - If the voltage is as specified, the defogger wire is OK.
   - If there is battery voltage, the defogger wire is broken in the negative side from the center.
   - If there is no voltage, the defogger wire is broken in the positive side from the center.

Defogger Wire Repair

NOTE: Repair section must be no longer than one inch.

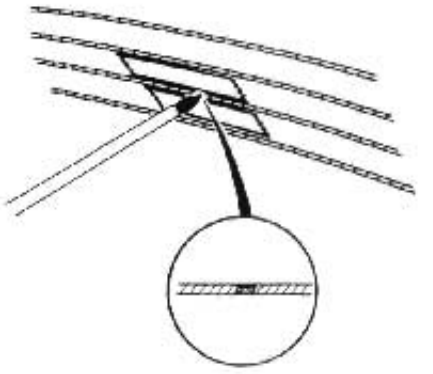
1. Lightly rub area around the break with the fine steel wool, then clean with alcohol.

2. Carefully mask above and below the broken portion defogger wire with cellophane tape



3. Using a small brush, apply heavy coat of silver conductive paint extending about 1/8 in. on both sides of the break. Allow 30 minutes to dry.

   NOTE: Throughly mix paint before use.



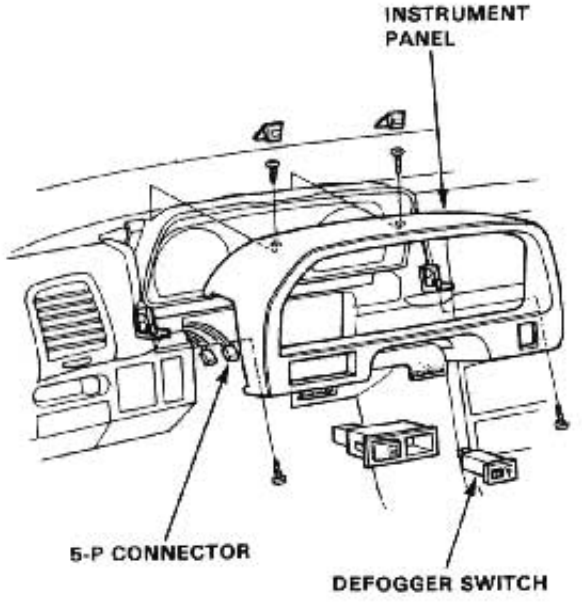
4. Check for proper operation with a voltmeter (approximately 6 V at the mid-point).

5. Apply a second coat of paint in the same manner. Dry 3 hours before removing tape.

Rear Window Defogger

Switch Removal

1. Remove the 4 screws and the instrument panel from the dashboard, then disconnect the connectors from the each switch.

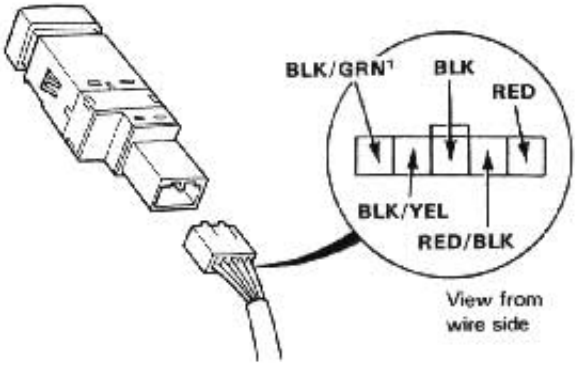


2. Turn the bulb sockets counter clock wise to remove them.

Switch Input Test

NOTE: Check for blown No. 18 (10 A) fuse in the dash fuse box before test.

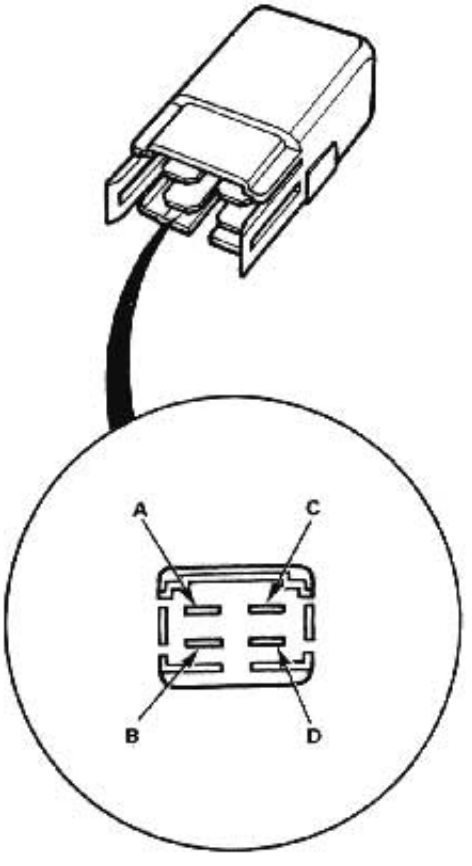
1. Remove the switch from the instrument panel.
2. Turn the ignition switch ON and check the voltage between the BLK/YEL (+) and the BLK (−) terminals. There should be battery voltage.
   - If there is no voltage, check for an open in the BLK/YEL wire.
   - If there is battery voltage, go to step 3.

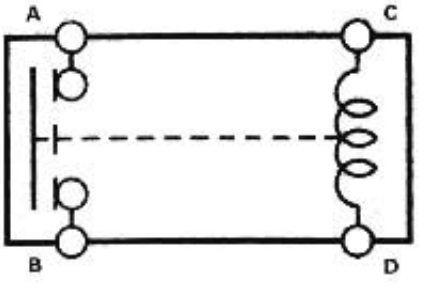


3. Connect a jumper wire between the BLK/YEL and the BLK/GRN¹ terminals.
   Turn the ignition switch ON and check that the rear window defogger operates normally.
   - If the rear window defogger operates normally, replace the defogger switch.

Relay Test

1. Remove the defogger relay from the dash fuse box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.





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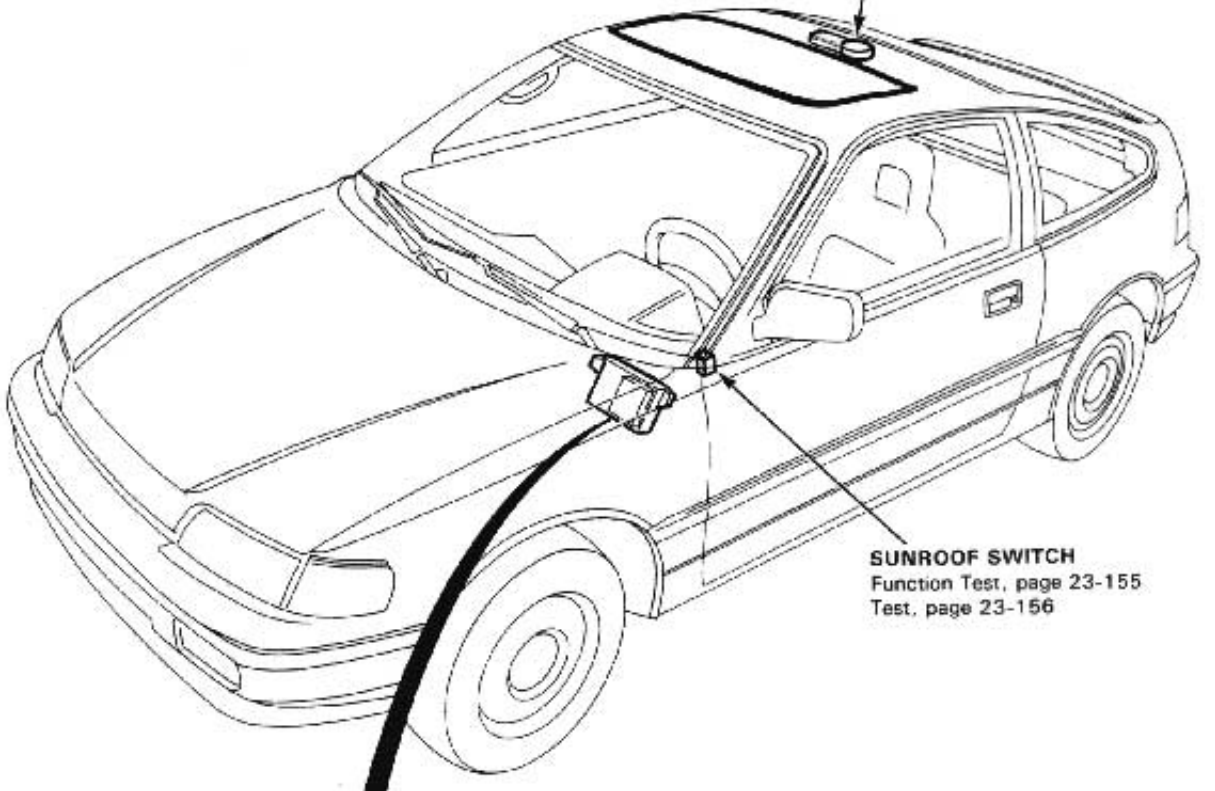
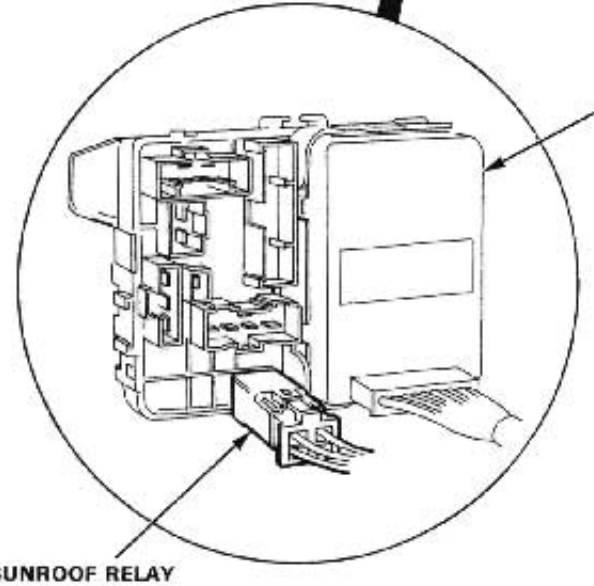
TILT-UP SWITCH
Test, page 23-156

SUNROOF MOTOR
Test, page 23-157
Replacement, Section 20



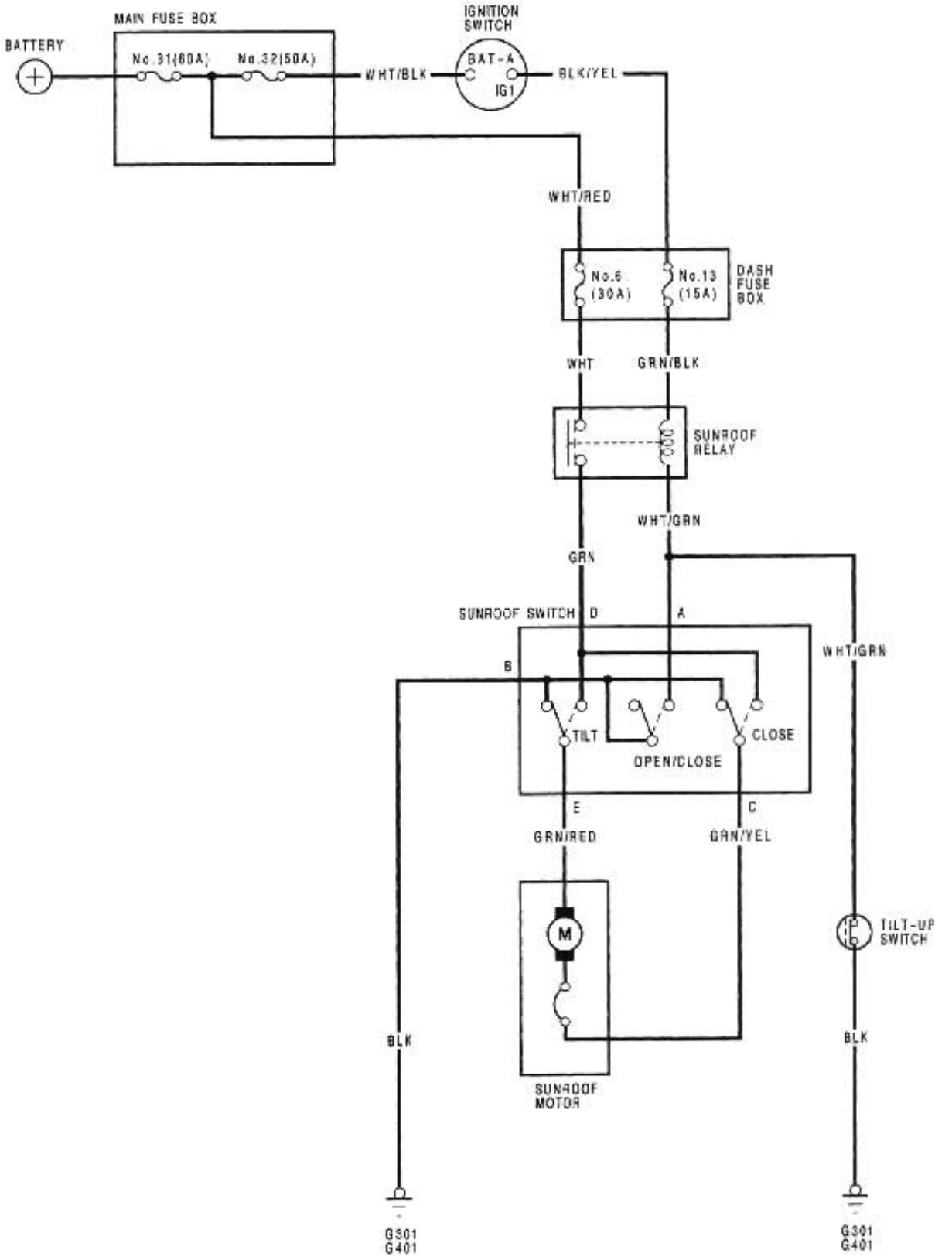
SUNROOF SWITCH
Function Test, page 23-155
Test, page 23-156



DASH FUSE BOX
(Located under dash, left side.)

SUNROOF RELAY
Test, page 23-157

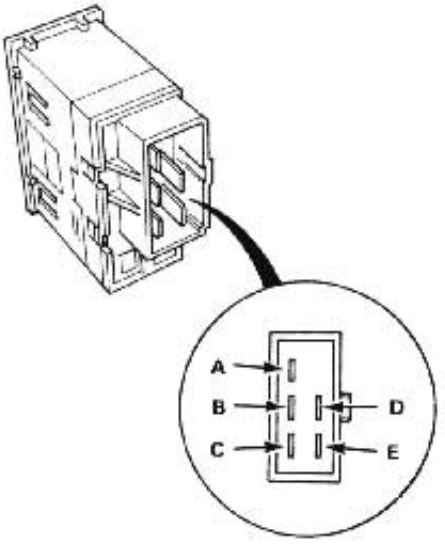
Circuit Diagram

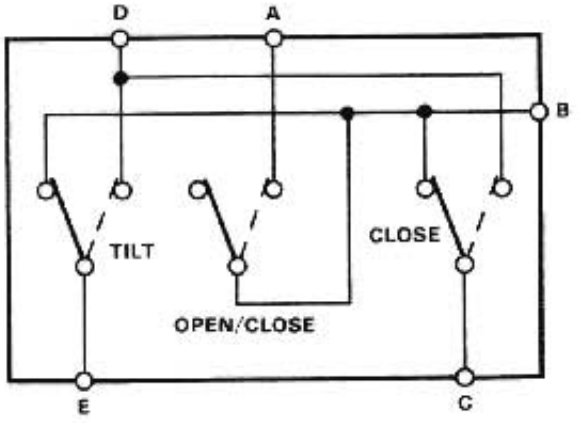


Switch test

1. Remove the dashboard lower panel.
2. Push out the switch from behind the instrument panel, then disconnect the 6-P connector to remove the switch.
3. Check for continuity between the terminals in each switch position according to the table.

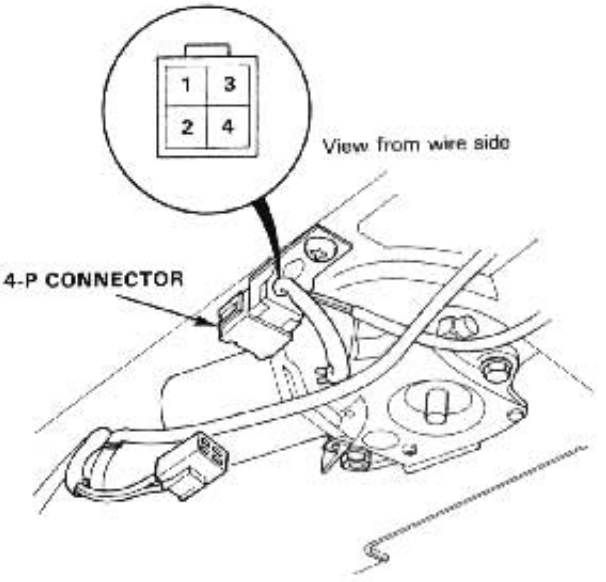
Terminal / Position	A	B	C	D	E
OFF		○	○		○
TILT		○	○	○	○
OPEN	○	○	○	○	○
CLOSE	○	○			○
			○	○	





Tilt Up Switch

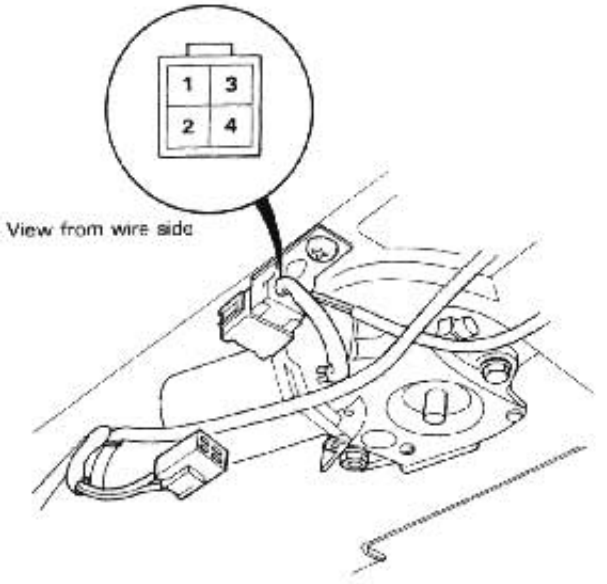
1. Remove the headliner (See section 20).
2. Disconnect the 4-P connector from the sunroof motor.
3. Check for continuity between the No.1 and No.2 terminals. There should be continuity when the sunroof is not tilted. There should be no continuity when the sunroof is the tilt-up position.



Motor Test

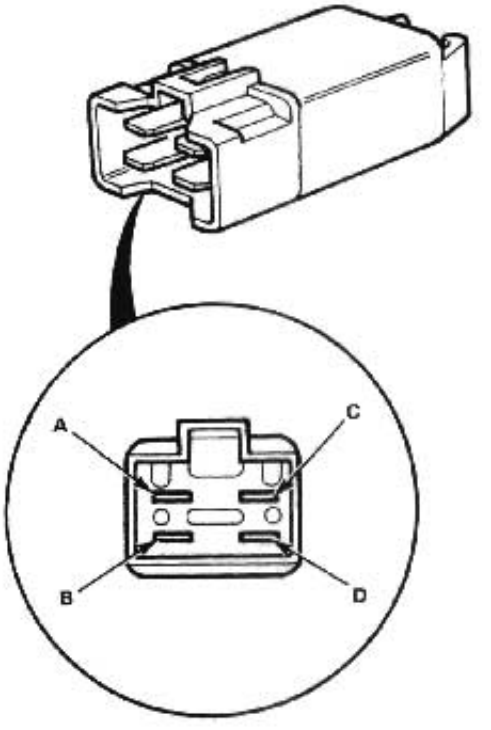
1. Remove the headliner.
2. Disconnect the 4-P connector from the sunroof motor.
3. Test motor operation by connecting battery to the No. 3 and No.4 terminals. Test the motor in each direction, by switching the leads from the battery.
4. If the motor does not run, replace it.

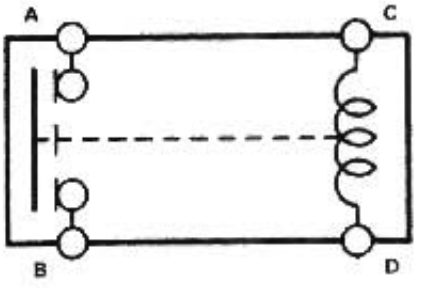
   NOTE: See Closing Force Check in section 20 for motor clutch test.



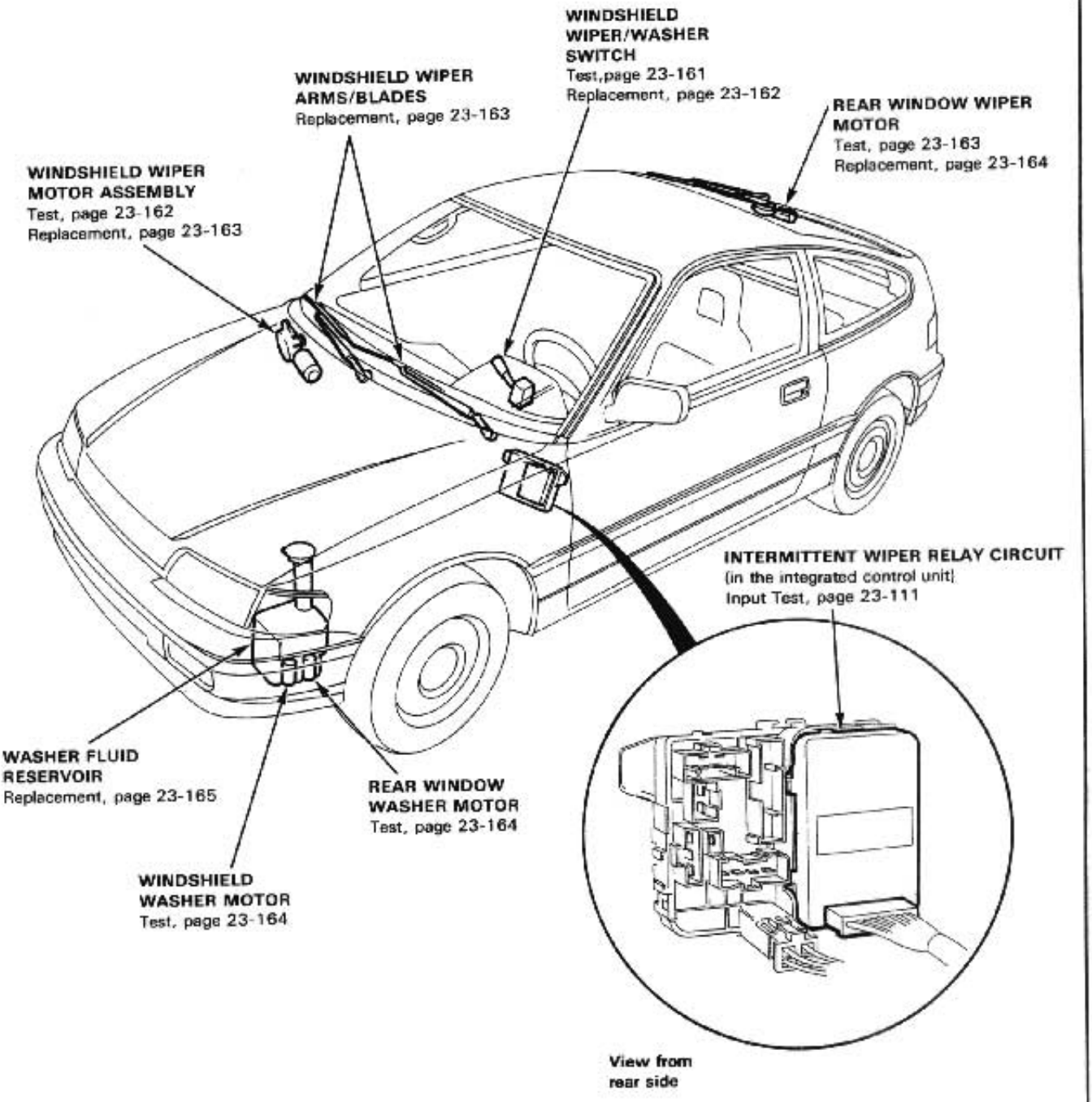
Relay Test

1. Remove the sunroof relays from the dash fuse box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.



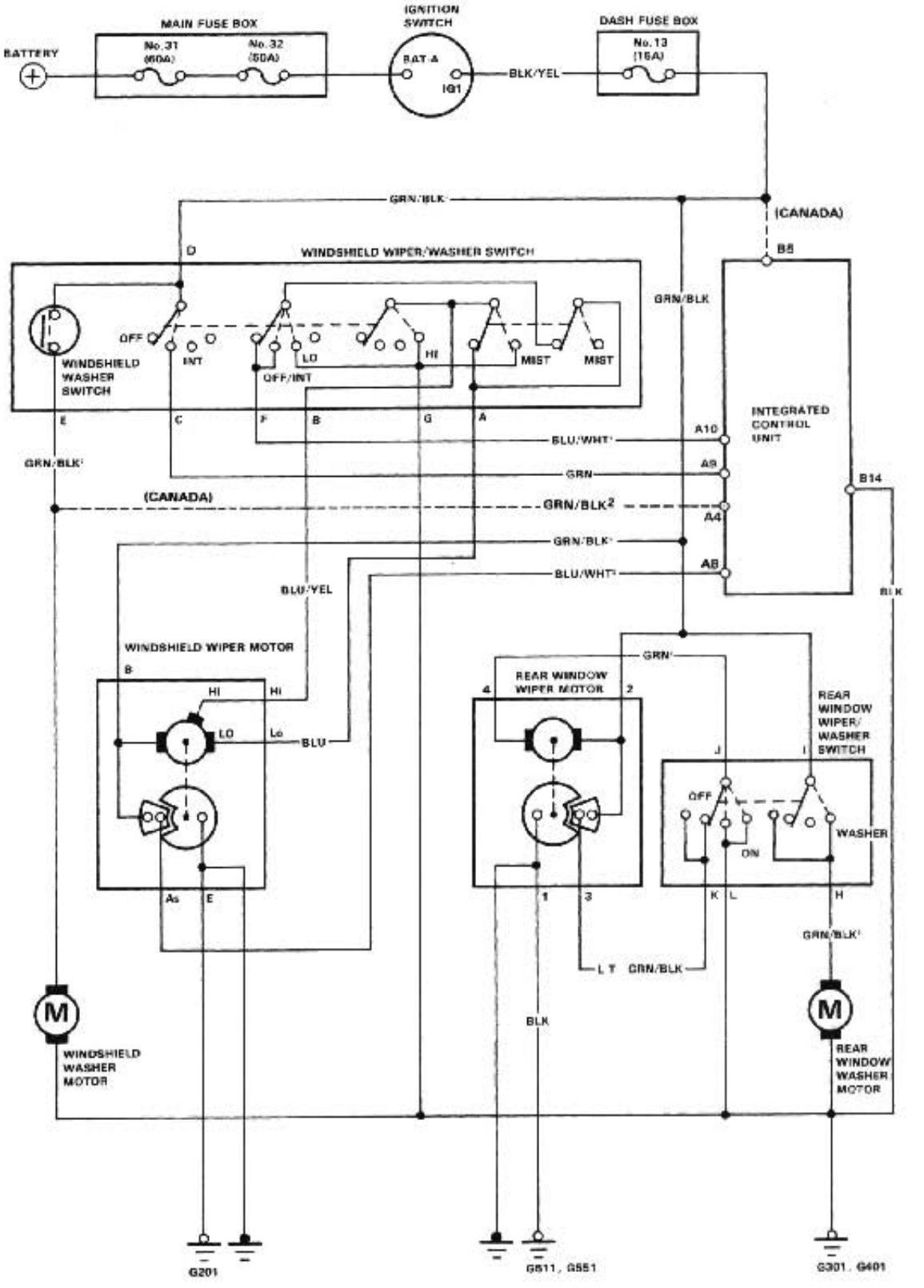


Component Location Index



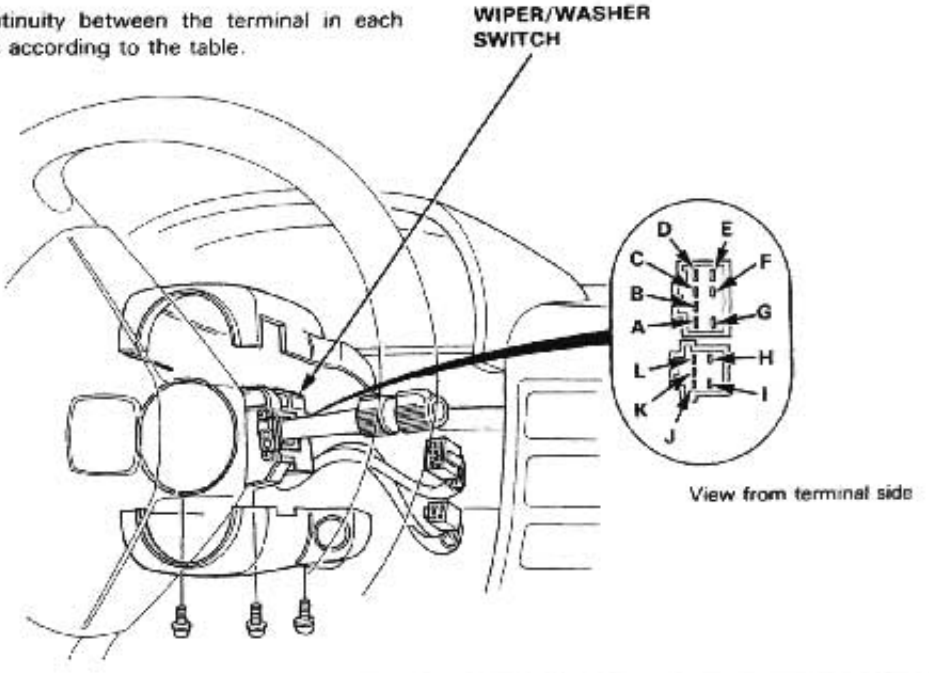
Circuit Diagram

NOTE: Serveral different wires have the same color. They have beeen given a number suffix to distinguish them (for example GRN/BLK¹ and GRN/BLK² are not the same).



Wiper/Washer Switch Test

1. Remove the steering column covers.
2. Disconnect 8-P and 6-P connectors from the switch.
3. Check for continuity between the terminal in each switch position according to the table.



View from terminal side

FRONT

Position \ Terminal	A	B	C	D	E	F	G
OFF	○					○	
INT	○		○	○		○	
LO	○						○
HI		○					○
Mist Switch"ON"		○					○
Washer Switch"ON"				○	○		

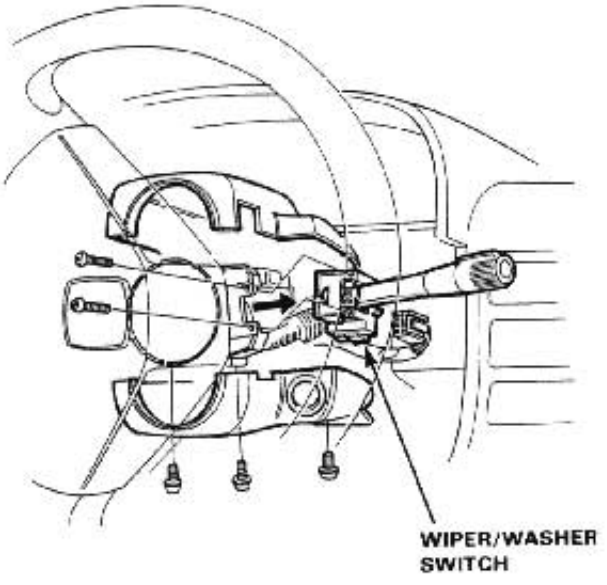
REAR

Position \ Terminal	H	I	J	K	L
Washer Switch "ON"	○	○			
OFF			○	○	
ON			○		○
Washer Switch "ON"	○	○	○		○

Wiper/Washer Switch Replacement

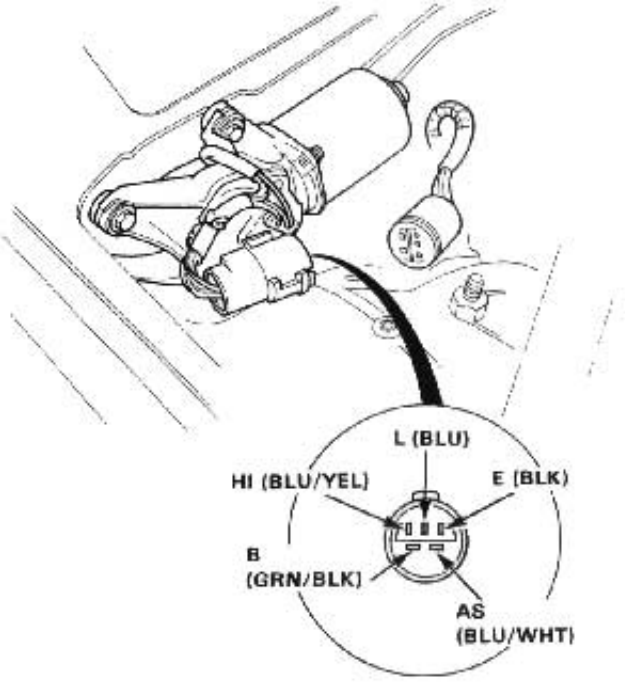
1. Remove the lower and upper covers from the steering column.
2. Disconnect the 8-P and 6-P connectors from the wiper/washer switch.
3. Remove the 2 screws and slide the wiper/washer switch out of the housing as shown.

NOTE: Be careful not to damage the steering wheel cover.



Windshield Wiper Motor Test

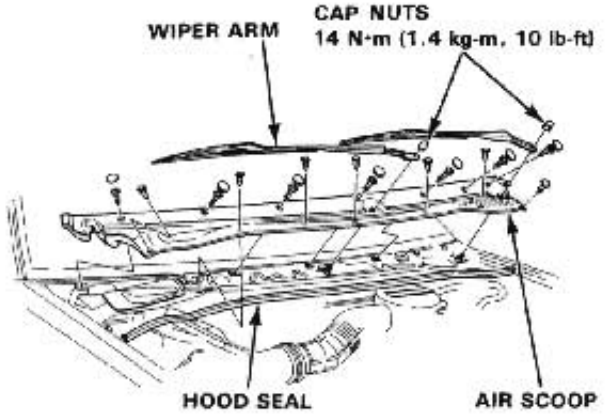
1. Disconnect the 5-P connector of the wiper motor assembly.
2. Test motor operation:
   LOW SPEED: Connect battery positive to the B (GRN/BLK) terminal and negative to the Lo (BLU) terminal.
   HIGH SPEED: Connect battery positive to the B (GRN/BLK) terminal and negative to the Hi (BLU/YEL) terminal.
3. If the motor fails to run smoothly, replace it.



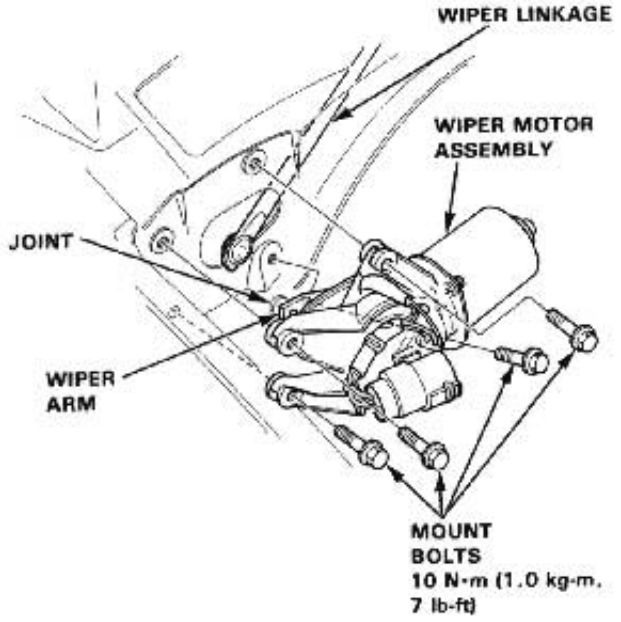
View from terminal side

Windshield Wiper Motor Replacement

1. Remove the cap nuts and the wiper arms.
2. Remove the hood seal and air scoop by prying off the trim clips and removing the screws.



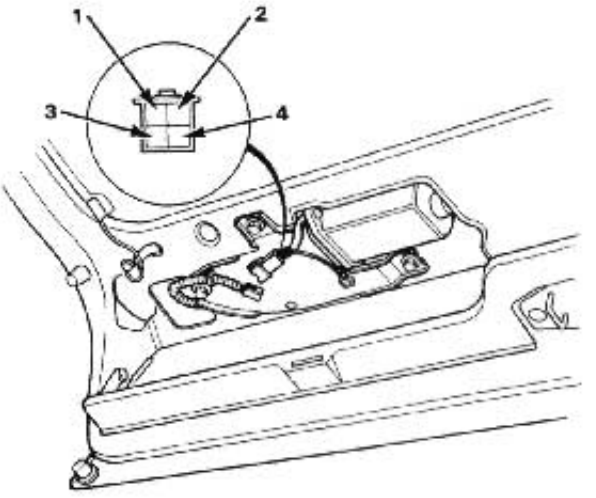
3. Pry the wiper linkage off the motor arm with a screw driver.
4. Disconnect the 5-P connector from the wiper motor assembly, then remove the 4 mount bolts and the wiper motor assembly.



5. Install the wiper motor assembly in the reverse order of removal.

Rear Window Wiper Motor Test

1. Remove the hatch trim panel.
2. Disconnect the 4-P connector.
3. Test wiper motor operation by connecting battery positive wire to the No.2 terminal and negative to the No.4 terminal.
4. If the motor fails to run smoothly, replace it.

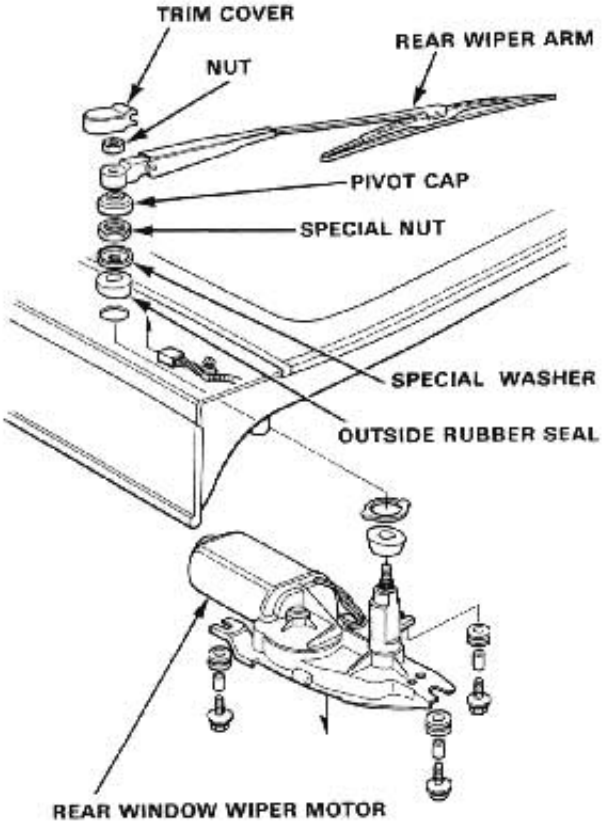


5. Check for continuity between the terminals according to the table.

Wiper Blade \ Terminal	1	2	3
At park position		○	○
At center position	○		○

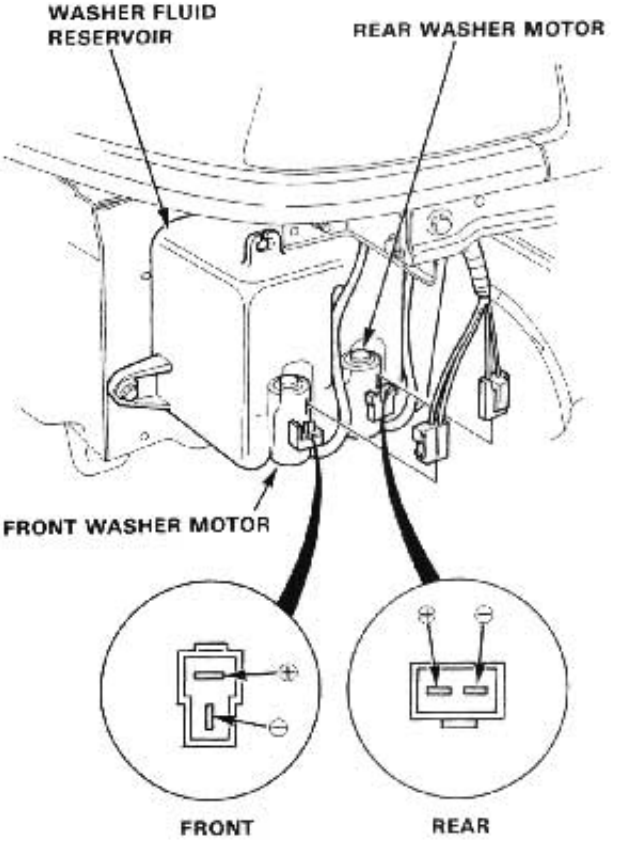
Rear Window Wiper Motor Replacement

1. Remove the hatch trim panel.
2. Remove the trim cover, nut, wiper arm, special nut, special washer and the outside rubber seal.
3. Disconnect the 4-P connector from the wiper motor.
4. Remove the 3 mount bolts and the wiper motor.



Washer Motor Test

1. Remove the front bumper and disconnect the 2-P connector from the washer motor.
2. Test either washer motor operation by connecting battery positive to the ⊕ terminal and negative to the ⊖ terminal.

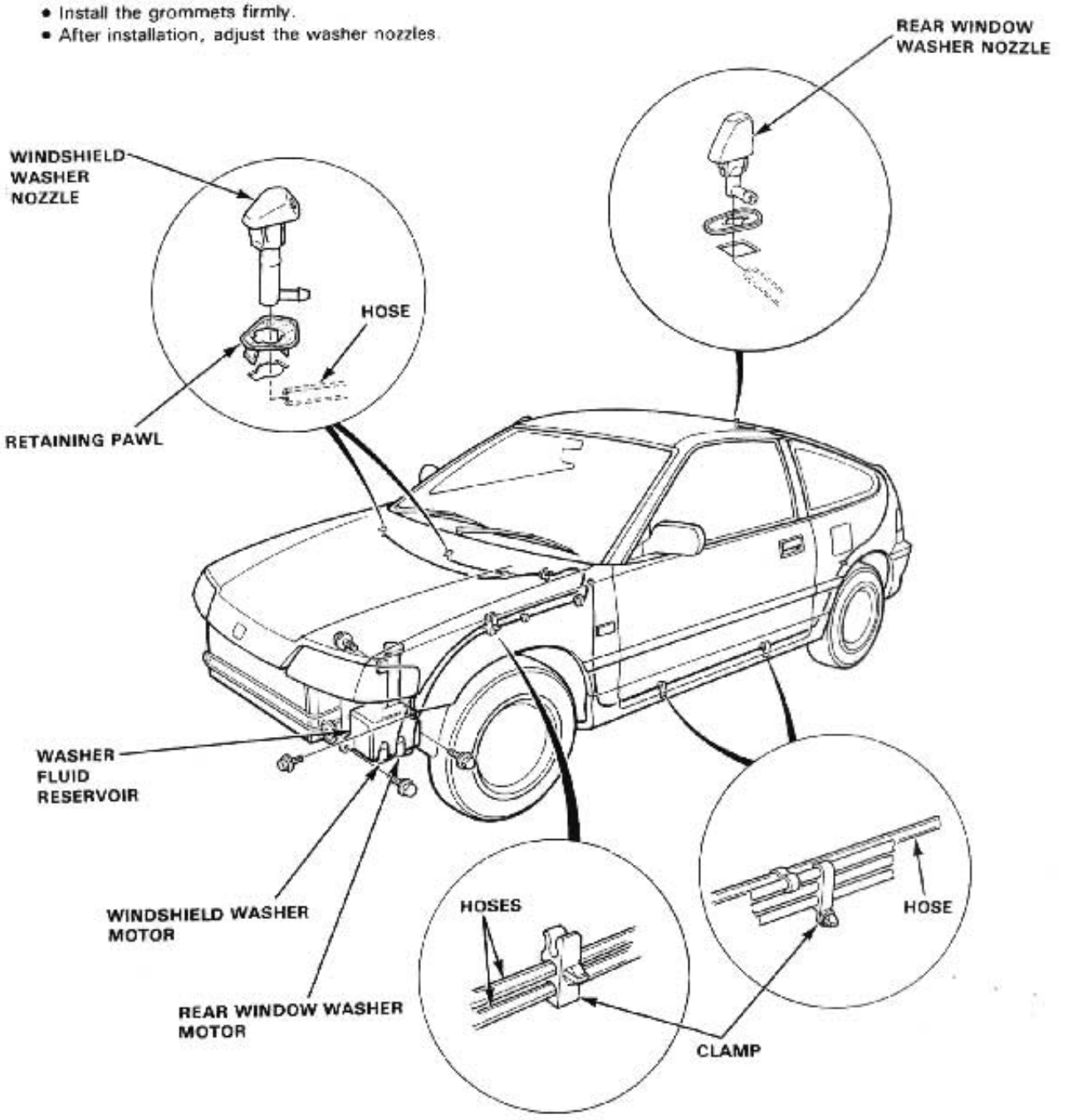


- If the motor fails to run smoothly, replace it.
- If the motor runs smoothly but little or no washer fluid is pumped, check for disconnected or blocked washer-hose, or clogged pump outlet in the motor.

Washer Replacement

1. Remove the bumper, then remove the washer reservoir by removing the 3 mount bolts.
2. Disconnect the hose and the 2-P connectors from the front and rear washer motor.
3. Remove the washer nozzles by releasing the retaining pawls and pushing them out from the underside.

NOTE:
- Clamp the hoses with the wire harness in the left front fender.
- Take care not to pinch hoses during reinstallation.
- Install the grommets firmly.
- After installation, adjust the washer nozzles.



Description

The front seats are equipped with automatic seat belts. Two seat belt retractors are installed in each door, designed to lock in the event of a sudden stop or deceleration.

When a door is opened, a switch in the door latch energizes a solenoid in each seat belt retractor, disabling the seat belt retractors and permitting free movement of the seat belt in and out of the seat belt retractors. When the door is closed, the door latch switch deactivates the solenoids, permitting the seat belt retractors to lock.

If a seat belt retractor solenoid remains energized when the door is closed, that retractor will not lock. A solenoid sensor switch in each seat belt retractor monitors the condition of the retractor solenoid, and will cause seat belt reminder lights to flash if both seat belt retractors are disabled when the door is closed.
A seat belt switch in each buckle senses whether the seat belt is buckled.

There are four warning lights in the car to show the status of the automatic seat belts:

- the DRIVER'S SEAT BELT WARNING LIGHT in the gauge assembly
- the DOOR/LATCH INDICATOR LIGHT in the gauge assembly
- the DRIVER'S SEAT BELT REMINDER LIGHT above the windshield behind the rearview mirror
- the PASSENGER'S SEAT BELT REMINDER LIGHT above the windshield behind the rearview mirror

⚠WARNING The automatic seat belt locking mechanisms may not be working if the seat belt warning lights and beeper:

- **do not function at all or**
- **come on with the seat belts latched and the doors fully closed.**

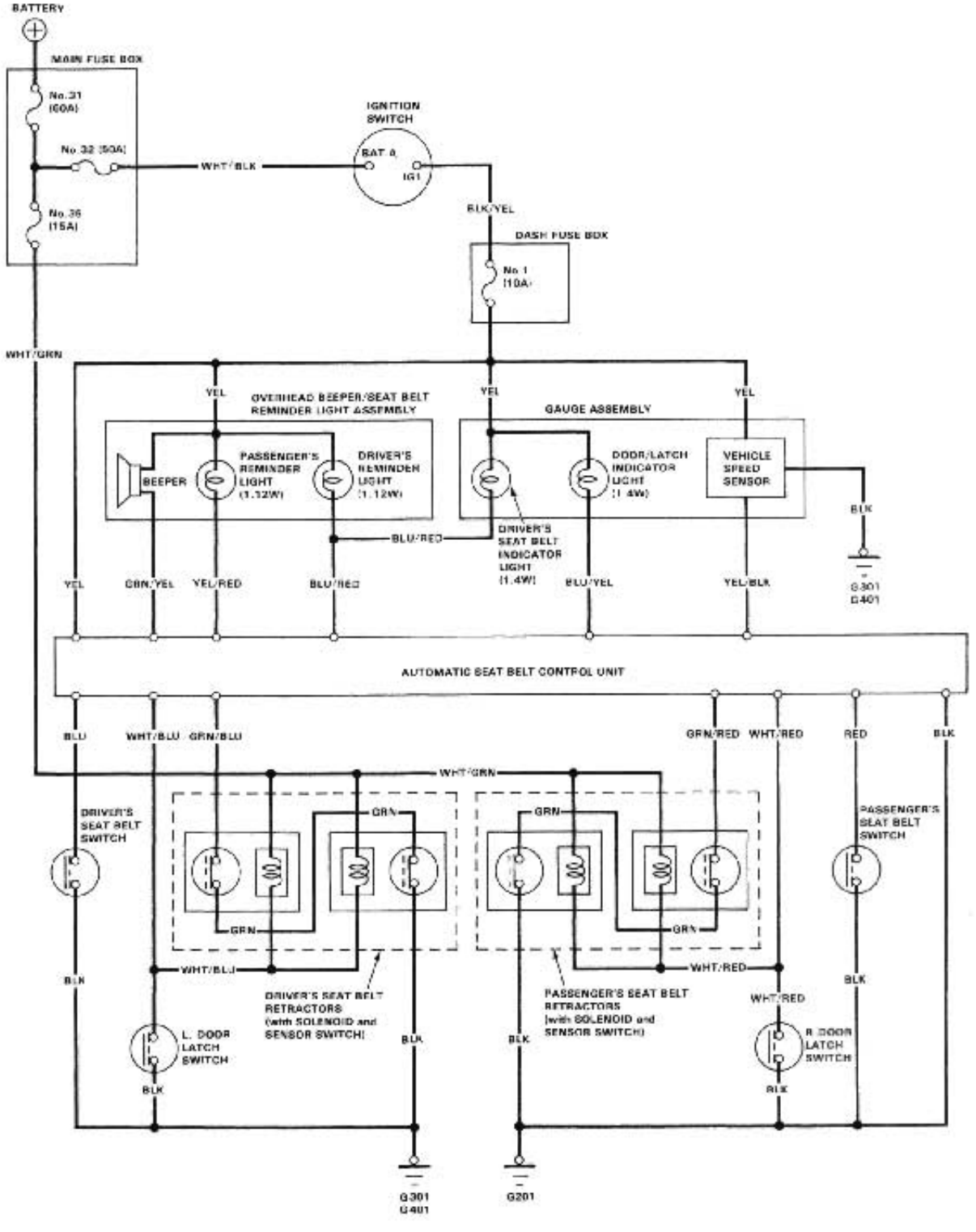
In the event of a collision, severe personal injury could result if the occupants are wearing inoperative seat belts.

Indicator Light Operation (with ignition switch ON) ☼ : flashing light ○: steady light

CONDITION	DOOR/LATCH INDICATOR LIGHT (ON DASH)	DRIVER'S SEAT BELT REMINDER LIGHTS (ON DASH and OVERHEAD)	PASSENGER'S BELT REMINDER LIGHT (OVERHEAD)	BEEPER
Driver's belt is unbuckled.	—	○	—	Beeper sounds for 5 to 8 seconds.
Passenger's belt is unbuckled.	—	—	○	
One or both doors are open or ajar.	○	—	—	
The car is driving above 10 mph with driver's door open or ajar.	○	☼	—	Beeper sounds until the door is closed
The car is driving above 10 mph with passenger's door open or ajar.	○	—	☼	

Automatic Seat Belt

Circuit Diagram



DRIVER'S AND PASSENGER'S SEAT BELT SWITCH POSITION	
SEAT BELT UNBUCKLED	– – – –
SEAD BELT BUCKLED	———

DOOR LATCH SWITCH POSITION	
DOOR OPEN	– – –
DOOR CLOSED	———

Troubleshooting

NOTE:

- The numbers inthe table show the troubleshooting sequence.
- Before troubleshooting:
  - Check the No. 1 (10A) fuse in the dash fuse box.
  - Check that the horn sounds.
  - Check that each indicator light comes on for about 2 seconds when the ignition switch is turned on. If no indicator lights come on, check for an open circuit or blown bulb.
  - Move the car to your dealer's back lot or some other quiet place where you won't be a road hazard. Drive the car between 10 and 15 MPH, lean forward against the shoulder belt and abruptly apply the brakes, not hard, just enough to dip the front end. You should feel the belt lock as the front end dips. If the shoulder belt locks, its locking mechanism is working.
    Repeat this procedure for the lap belt, pulling on the belt when abruptly applying the brakes as above. If the lap belt locks, its locking mechanism is working.

Item to be inspected / Symptom		Driver's door latch switch stuck closed	Passenger's door latch switch stuck closed	Driver's door ELR solenoid	Passenger's door ELR solenoid	Driver's ELR solenoid sensor switch	Passenger's ELR solenoid sensor switch	Driver's seat belt switch	Passenger's seat belt switch	Beeper	Automatic Seat Belt Control Unit Input Test	Poor ground: G201, 301, 401	Open circuit in WHT/BLU wire or loose or disconnected terminals	Open circuit in WHT/RED wire or loose or disconnected terminals	Short circuit between either door latch switch or automatic seat belt control unit to ground
The ELR locks while the door is open.	Driver's door	3		4							1	5	2		
	Passenger's door		3		4						1	5		2	
Door/latch indicator light comes on and the beeper sounds for 5 to 8 seconds with the belts latched.		2	3								1				4
Driver's seat belt in indicator and reminder lights come on and the beeper sounds for 5 to 8 seconds with the belts latched.						3		2			1				
Passenger's seat belt reminder light comes on and the beeper sounds for 5 to 8 seconds with the belts latched.							3		2		1				
All indicator lights come on with the belts latched.											1				
The beeper sounds with the belts latched.											1				
The beeper does not sound with the belts unlatched.										2	1				
Door/latch indicator light never comes on.											1				
Door/latch indicator light always stays on.											1				

No.	Wire	Test Conditions	Test: Desired Result	Possible Cause
6	GRN/BLU	Driver's door closed.	Check for continuity to ground: should be continuity.	Poor ground. An open circuit in the wire. Faulty driver's door solenoid sensor switch.
		Driver's door open.	Check for continuity to ground: should not be continuity.	Short to ground. Faulty driver's door solenoid sensor switch.
7	GRN/RED	Passenger's door closed.	Check for continuity to ground: should be continuity.	Poor ground. An open circuit in the wire. Faulty passenger's door solenoid sensor switch.
		Passenger's door open.	Check for continuity to ground: should not be continuity.	Short to ground. Faulty passenger's door solenoid sensor switch.
8	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	An open circuit in the wire. Blown No. 1 (10A) fuse (dash fuse box).
	BLU/YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	An open circuit in the wire. Blown No. 1 (10A) fuse (dash fuse box). Blown door/latch indicator light bulb.
9	BLU/RED	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	An open circuit in the wire. Blown No. 1 (10A) fuse (dash fuse box). Blown driver's seat belt reminder light bulbs (on dash and overhead beeper/seat belt reminder light assembly).
10	YEL/RED	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	An open circuit in the wire. Blown No. 1 (10A) fuse (dash fuse box). Blown passenger's seat belt reminder light bulbs (on dash and overhead beeper/seat belt reminder light assembly).
11	GRN/YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	An open circuit in the wire. Blown No. 1 (10A) fuse (dash fuse box). Faulty beeper.
12	YEL/BLK	Raise the front of the car, support with safety stands, block rear wheels, and set parking brake. Start engine. Select 2nd gear and accelerate slowly.	Check for voltage to ground: should be at least 7 V above 10 mph.	An open circuit in the wire. Blown No 1 (10 A) fuse (dash fuse box). Faulty speed sensor (gauge assembly).

NOTE: If all test results indicate the system is normal, and all 16-P connectors at the Automatic Seat Belt Control Unit are clean and tight, then replace Automatic Seat Belt Control Unit with a known good unit and retest.

Retractor Solenoid/Solenoid Sensor Switch Test

NOTE:
- Perform this test on each seat belt retractor (2 per door).
- The tips of test probes may need to be ground down to fit behind grommets in the connectors.

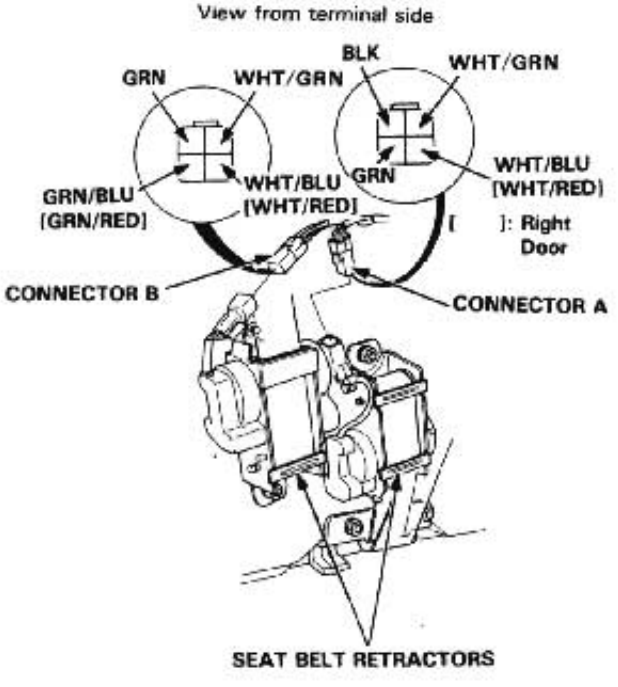
- Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Remove the door trim panel.

2. Disconnect each 4-P connector from the seat belt retractor.

3. Connect the voltmeter positive probe to the WHT/GRN terminal and negative probe to the BLK terminal of each of the connector A and B.
   There should be battery voltage.

   - If there is no voltage, check for:
     —Poor ground (G201, 301, 401)
     —An open in the BLK/YEL or BLK wire.



4. With the door open, check for continual click of the solenoid plunger whenever the each 4-P connector is alternately connected and disconnected (Retractor solenoid test).

   - If it does not click, check for faulty latch switch (see page 23-172) and an open in the WHT/BLU (left door) or WHT/RED (right door) wire.
     — If they are OK, replace the seat belt assembly.

5. Connect all 4-P connectors.

6. Check for continuity between the GRN and GRN/BLU terminals of the connector B on the left door, or between the GRN and GRN/RED terminals of the connector B on the right door when the door under test is opened and closed.
   There should be continuity when the door is closed and no continuity when the door is opened.

   - If there is abnormality, replace the seat belt assembly.

7. Check for continuity between the GRN and BLK terminals of the connector A when the under test is opened and closed.
   There should be continuity when the door is closed and no continuity when the door is opened.

   - If there is abnormality, replace the seat belt assembly.

8. Check for continuity between the GRN terminal of the connector A and GRN terminal of the connector B.
   There should be continuity.

   - If there is no continuity, repair open circuit in the GRN wire.

2. Check for voltage between the YEL terminal and body ground with the ignition switch ON. There should be battery voltage.

   - If there is no voltage, check for
     — An open in the YEL wire.

3. Connect the voltmeter positive probe to the YEL terminal and the negative probe to the BLU/RED terminal, then turn the ignition switch ON and unbuckle the driver's seat belt.

4. Connect the voltmeter positive probe to the YEL terminal and the negative probe to the YEL/RED terminal, then turn the ignition switch ON and unbuckle the front passenger's seat belt.
   There should be battery voltage in steps 3 and 4.

   - If there is no voltage, check the control unit for proper inputs (See page 23-170).
   - If there is battery voltage, replace the bulbs in the seat belt beeper/reminder light assembly.

5. Connect the voltmeter positive probe to the YEL terminal and the negative probe to the GRN/YEL terminal, then turn the ignition switch ON and unbuckle driver's or front passenger's seat belt.
   There should be continuous battery voltage for about 6 seconds.

   - If there is no voltage, check the control unit for proper inputs (See page 23-170).
   - If there is battery voltage, replace the seat belt beeper/reminder light.

Seat Belt Retractor Inspection

CAUTION: Do not attempt to disassemble the retractor.

1. Remove the door trim panel.

2. Remove the 4 mounting nuts on the seat belt retractors.

3. Make sure that the seat belt does not lock when the retractor is leaned up to more than 40° with the door opened and the 4-P connector connected.

   - If the seat belt locks, check for proper operation of the retractor solenoid/solenoid sensor switch (See page 23-173).

4. Make sure that the seat belt does not lock when the retractor is leaned up to 15° from the mounted position with the 4-P connector disconnected.
   The seat belt should lock when the retractor is leaned over 40° with the 4-P connector disconnected.

5. Replace the seat belt assembly (see body, section 20) if there is any abnormality.