

1990 Honda Civic EX

1989-90 AUTOMATIC TRANSMISSIONS S5 Electronic Controls & Overhaul

1989-90 AUTOMATIC TRANSMISSIONS

S5 Electronic Controls & Overhaul

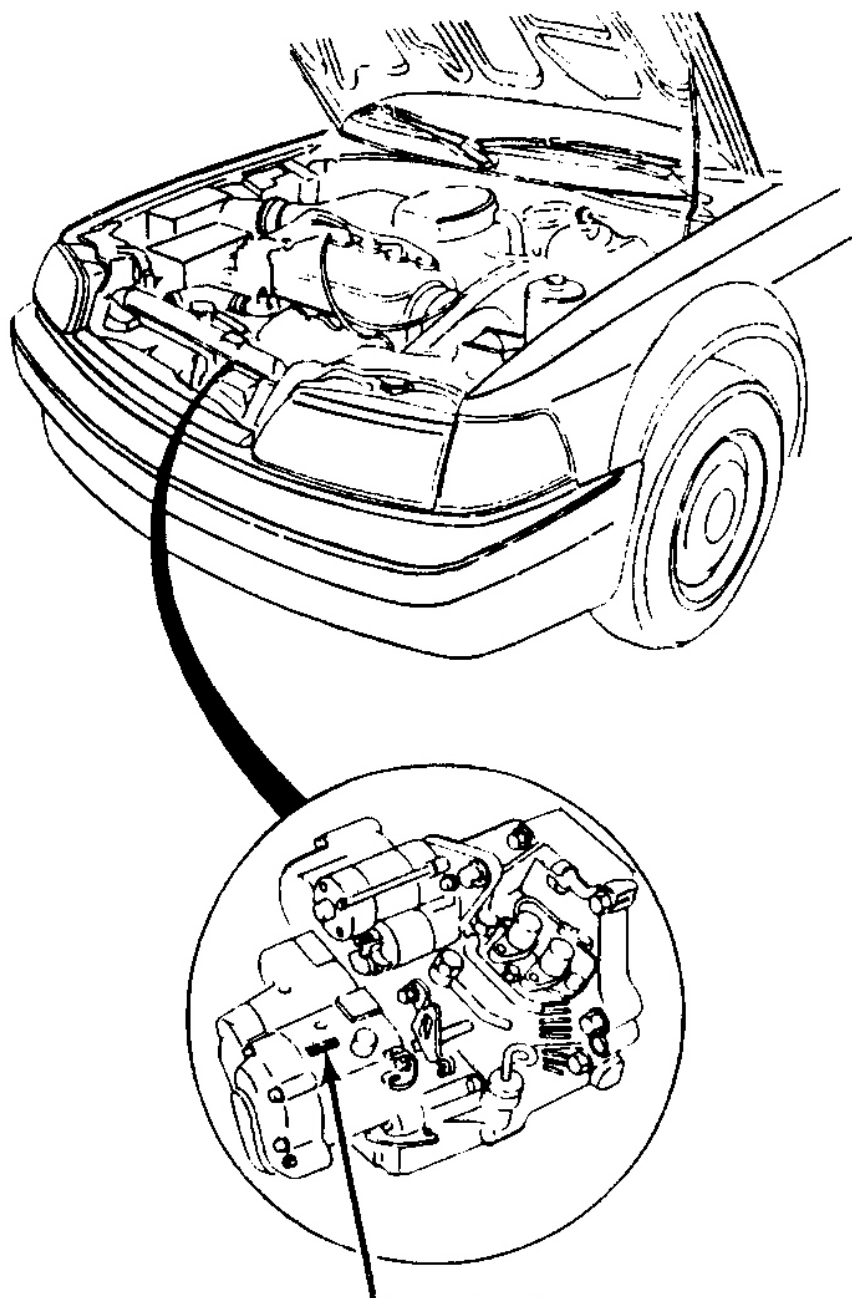
APPLICATION

TRANSAXLE APPLICATION

Application	Transaxle Model
Civic Wagon 4WD	S5

IDENTIFICATION

Transaxle identification is stamped on a metal pad on top of transaxle. See **Fig. 1**.



Transmission Number **96E26264**

Fig. 1: Transaxle Identification Number
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DESCRIPTION

INTRODUCTION

Transaxle consists of a 3-element torque converter and triple shaft transaxle which provides 4 speeds forward and one speed reverse. Transaxle has 3 parallel shafts, mainshaft, countershaft and subshaft. Mainshaft is in line with the engine. Valve assembly includes main, secondary, servo regulator and lock-up valve bodies. Electronic control system consists of an Automatic Transaxle Control Unit (ATCU), sensors and 4 solenoid valves. Shifting and lock-up are electronically controlled for optimal driving under all conditions. See **SELECTOR SOLENOID APPLICATION** table for detailed operation of shift solenoids. Input from various sensors located throughout vehicle determine which lock-up mechanism should be applied by the Electronic Control Unit (ECU).

SELECTOR SOLENOID APPLICATION

Selector Position	Solenoid "A"	Solenoid "B"
1st ("D", "S")	OFF	ON
2nd ("D", "S")	ON	ON
3rd ("D", "S")	ON	OFF
4th ("D", "S" W/"S" On)	OFF	OFF
1st ("2")	OFF	ON
2nd ("2")	ON	ON

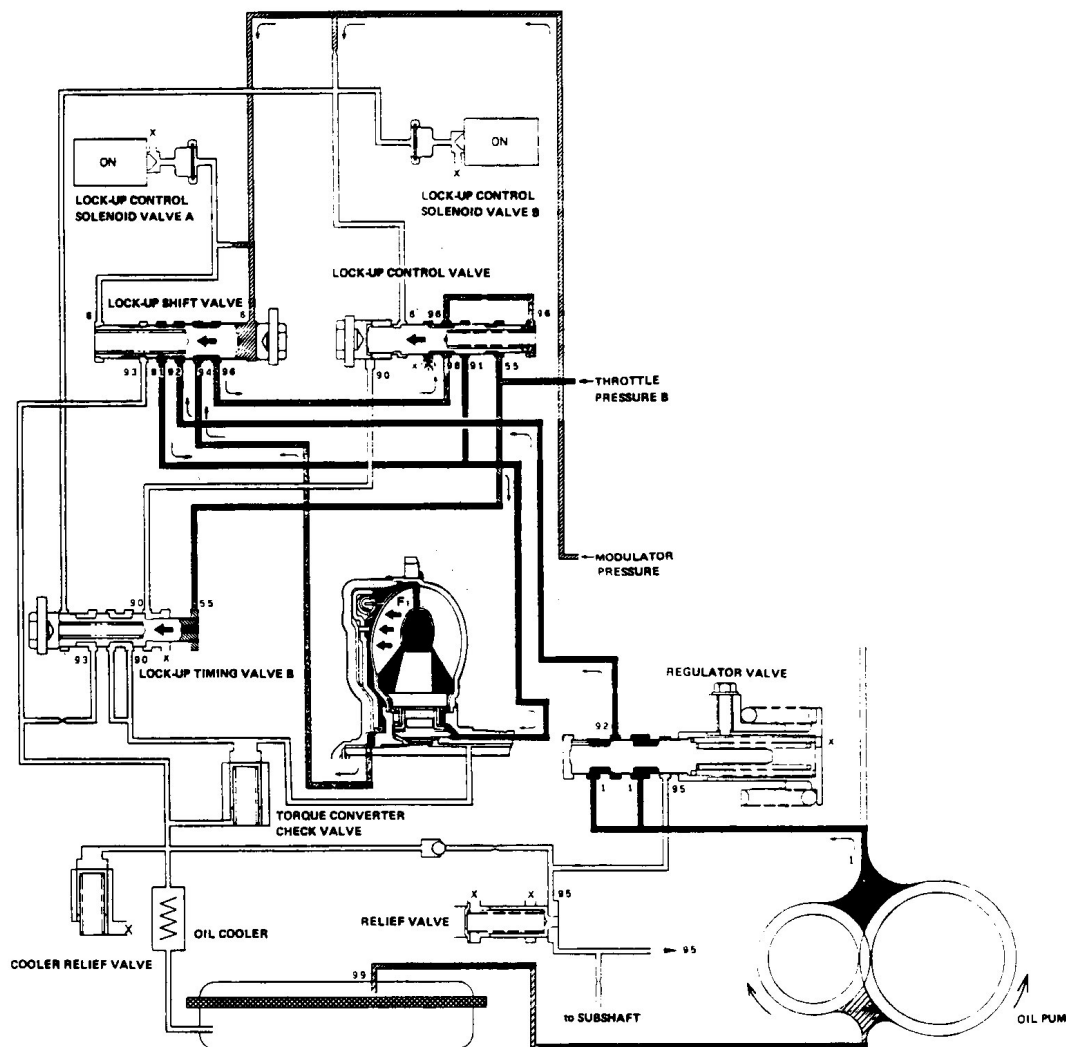
CONVERTER LOCK-UP CLUTCH

In "S" or "D" gears pressurized fluid from torque converter is directed to lock-up piston which locks transaxle mainshaft to engine crank-shaft. Lock-up is controlled by engine speed, hydraulic pressure and ECU to provide optimal performance. Lock-up shift valve body controls range of lock-up according to lock-up control valves "A" and "B" and throttle valve "B". See **CONVERTER LOCK-UP SOLENOID APPLICATION** table.

When lock-up control solenoid valves "A" and "B" activate, modular pressure changes. ATCU controls lock-up control solenoid valves "A" and "B" which are mounted on torque converter housing. See **Fig. 2**.

CONVERTER LOCK-UP SOLENOID APPLICATION

Solenoid Condition	Solenoid "A"	Solenoid "B"
OFF	OFF	OFF
Slight On	ON	OFF
Half On	ON	ON
Full On	ON	ON
Deceleration	ON	Cycling



NOTE: When used, "left" or "right" indicates direction on the flow chart.

G96F26265

Fig. 2: Identifying Lock-Up Clutch Hydraulic Flow
Courtesy of AMERICAN HONDA MOTOR CO., INC.

GEAR SHIFT SELECTOR

Gear selector is not mechanically linked to transaxle. It controls electrical switches which are connected to the ATCU. ATCU controls operation within selected range.

"P" Park

Front wheels locked, parking pawl engaged with parking gear on countershaft. All clutches released, starting in "P" is possible through use of slide type neutral safety switch.

"R" Reverse

Reverse selector engaged with countershaft reverse gear and 4th gear clutch locked.

"N" Neutral

All clutches released, starting is possible in "N" through use of slide type neutral safety switch.

"D" Drive

General driving, starts in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshifts through 3rd, 2nd and 1st on deceleration to stop. Lock-up mechanism comes into operation in "D".

"S" Drive

For rapid acceleration at highway speeds and general driving. Starts in 1st, shifts automatically to 2nd, then 3rd ("S4" switch: OFF) and then 4th ("S4" switch: ON) depending on vehicle speed and throttle position. Downshifts through 2nd to 1st on deceleration to stop.

"2" Second

For engine braking or better traction starting off on loose or slippery surface.

- Low switch: OFF stays in 2nd gear.
- Low switch: ON and below 30 MPH in 1st gear.
- Low switch: ON and above 30 MPH in 2nd gear.

LUBRICATION & ADJUSTMENTS

See appropriate SERVICING article.

ON-VEHICLE SERVICE

DRIVE AXLE SHAFT

See appropriate FWD AXLE SHAFTS article in DRIVELINE/AXLES.

TROUBLE SHOOTING

SYMPTOM DIAGNOSIS

NOTE: When attempting to diagnose possible transaxle malfunction, always verify that electrical operation is functioning properly before checking hydraulic operation.

SYMPTOM DIAGNOSIS (1989)

Problem Or Symptom	(1) Possible Cause Reference No.
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Engine runs, but car does not move in any gear.	1, 3, 4, 5, 7, 8, 9, 39
Car moves in "2", but not in "S" or "D".	8, 10, 11, 12
Car moves in "S" or "D", but not in "2".	8, 10, 11, 12, 58, 60
Car moves in "S", "D" or "2", but not in "R".	5, 8, 15, 20, 34, 57
Poor acceleration, engine races when starting off in "S".	
Stall RPM high in "S" "D" & "2".	1, 3, 4, 8, 44, 47
Stall RPM high in "S" & "D".	8, 10, 12
Stall RPM high in "2".	8, 12, 60
Stall RPM normal.	16
Stall RPM low.	17, 18, 35, 50, 51
Excessive idle vibration.	3, 35, 39, 50, 51
Shift-up speed too fast or slow.	57
Jumps from 1st to 3rd in "S".	57
Jumps from 1st to 4th in "D".	54, 57
Shift-up point too early or late.	
1st to 2nd, 2nd to 3rd, 3rd to 4th	57
1st to 2nd	22, 53, 57
2nd to 3rd	23, 54, 57
3rd to 4th	24, 53, 57
Harsh upshift from 1st to 2nd.	14, 19, 23
Harsh upshift from 2nd to 3rd.	19, 24, 26, 33
Harsh upshift from 3rd to 4th.	19, 25, 34, 35
Harsh downshift from 2nd to 1st.	19, 23, 26, 40
Harsh downshift from 3rd to 2nd.	19, 24, 30, 41
Harsh downshift from 4th to 3rd.	19, 25, 42
Engine races when shifting from 2nd to 3rd.	19, 24, 26, 27, 31, 33
Engine races when shifting from 3rd to 4th (shift point okay).	19, 25, 30, 34
Excessive shock when shifting from 2nd to 3rd.	19, 24, 29, 41, 48
Excessive shock when shifting from 3rd to 4th (shift point okay).	19, 30, 42, 48
Car creeps forward in "N" (shift cable adjusted properly).	12, 14, 16, 33, 36, 37, 38
Excessive time lag from "N" to "S/D" (shift cable adjusted properly).	12, 28
Excessive time lag from "N" to "R" (shift cable adjusted properly).	5, 21, 34
Abnormal noise in all gears, "N" & "P".	3, 6, 43
Engine accelerates up to 31 MPH, but not more.	16
Vibration in all gears.	39
Hard to shift.	8, 45
Car has only 4th gear.	57
Transaxle has no parking.	8, 45
Stall RPM is high, but clutch pressure okay in all positions.	47
Harsh lock-up clutch disengagement.	
Engine stalls easily.	18, 19, 49, 50, 51, 52, 55,

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	56, 57
No power sound in low/middle speed.	18, 19, 49, 50, 51, 52, 55, 56, 57
Noise/vibration in low/middle speed.	18, 19, 49, 50, 51, 52, 55, 56, 57
Excessive shock while shifting.	18, 19, 49, 50, 51, 52, 55, 56, 57
Lock-up clutch hunts ON-OFF.	
Tachometer needle swings large arc while driving.	18, 19, 51, 55, 56, 57
Car shakes back and forth while driving.	18, 19, 51, 55, 56, 57
Lock-up clutch does not engage.	18, 19, 47, 50, 51, 55, 57
(1) Reference No. corresponds with No. in <u>TROUBLE SHOOTING SYMPTOM CAUSE (1989)</u> table.	

TROUBLE SHOOTING SYMPTOM CAUSE (1989)

Reference No.	Possible Cause
1	ATF level too low
2	ATF level too high
3	Oil pump seized, gear damaged, foreign matter stuck in gear
4	Regulator valve stuck or spring weak/damaged
5	Servo shaft stuck
6	3rd gears worn/damaged
7	Mainshaft damaged
8	Control cable misadjusted, cut or damaged
9	Final gear worn/damaged
10	Countershaft & one way clutch seized/damaged
11	1st gears worn/damaged
12	1st clutch faulty, clutch piston stuck, foreign material stuck in clutch check valve, clutch "O" ring worn/damaged, clutch disc worn, clutch feed pipe/"O" ring worn/damaged
13	2nd gears worn/damaged
14	2nd clutch faulty, clutch piston stuck, foreign material stuck in clutch check valve, clutch "O" ring worn/damaged, clutch disc worn, clutch seal ring seized/damaged
15	Reverse gears worn/damaged
16	Torque converter one-way clutch seized
17	Engine throttle cable misadjusted
18	Transmission throttle cable misadjusted
19	Throttle valve "B" faulty
20	1-2 shift valve faulty
21	2-3 shift valve faulty
22	3-4 shift valve faulty

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23	2nd accumulator faulty
24	3rd accumulator faulty
25	4th accumulator faulty
26	2nd orifice control valve faulty
27	Foreign material in main orifice
28	Foreign material in 1st orifice
29	Foreign material in 2nd orifice
30	Orifice control valve faulty
31	Foreign material in 3rd orifice
32	Foreign material in 4th orifice
33	3rd clutch faulty, clutch piston stuck, foreign material stuck in clutch check valve, clutch "O" ring worn/damaged, clutch disc worn, clutch feed pipe/"O" ring worn/damaged
34	4th clutch faulty, clutch piston stuck, foreign material stuck in clutch check valve, clutch "O" ring worn/damaged, clutch disc worn, clutch feed pipe/"O" ring worn/damaged
35	Engine power low
36	Needle bearing seized
37	Washers/collars seized
38	Clutch clearance incorrect
39	Drive plate faulty or transmission assembly improperly installed
40	2nd check ball stuck
41	3rd check ball stuck
42	4th check ball stuck
43	Mainshaft/countershaft ball bearing damaged
44	Oil filter clogged
45	Body/case wire cable joint damaged
46	Modulator valve faulty
47	Torque converter check valve faulty
48	Foreign material in separator orifice
49	Lock-up timing valve "B" faulty
50	Lock-up shift valve faulty
51	Lock-up piston in torque converter faulty
52	Lock-up control valve faulty
53	Shift control solenoid valve "A" faulty
54	Shift control solenoid valve "B" faulty
55	Lock-up control solenoid valve "A" faulty
56	Lock-up control solenoid valve "B" faulty
57	Control unit system faulty
58	Subshaft 1st gear & 4th gear worn/damaged
59	Servo control valve faulty
60	1st hold clutch faulty, clutch piston stuck, foreign material stuck in clutch

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	check valve, clutch "O" ring worn/damaged, clutch disc worn, clutch feed pipe/"O" ring worn/damaged
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SYMPTOM DIAGNOSIS (1990)

Problem Or Symptom	(1) Possible Cause Reference No.
Engine runs, but car does not move in any gear.	1, 2, 3, 6, 7, 8, 39, 44
Car moves in "2", but not in "S" or "D".	7, 9, 10, 11
Car moves in "S" or "D", but not in "2".	7, 12, 13
Car moves in "S", "D" or "2", but not in "R".	4, 7, 14, 23, 36, 59
Poor acceleration, engine races when starting off in "S".	
Stall RPM high in "S" "D" & "2".	1, 2, 3, 7, 44, 47
Stall RPM high in "S" & "D".	7, 9, 11
Stall RPM high in "2".	7, 13
Stall RPM normal.	16
Stall RPM low.	17, 35, 50, 51
Excessive idle vibration.	2, 35, 39, 50, 51
No upshift.	57, 46
Jumps from 1st to 3rd in "S".	57
Jumps from 1st to 4th in "D".	54, 57
Shift-up point to early or late.	
1st to 2nd, 2nd to 3rd, 3rd to 4th	57
1st to 2nd	23, 53, 57
2nd to 3rd	24, 54, 57
3rd to 4th	25, 53, 57
Harsh upshift from 1st to 2nd.	13, 18, 19, 20, 23, 29
Harsh upshift from 2nd to 3rd.	18, 19, 21, 23, 24, 26, 29, 30, 33
Harsh upshift from 3rd to 4th.	18, 19, 22, 24, 25, 30, 31, 32, 34
Harsh downshift from 2nd to 1st.	18, 19, 20, 23, 26, 29, 40, 62
Harsh downshift from 3rd to 2nd.	18, 19, 21, 23, 24, 31, 41, 61
Harsh downshift from 4th to 3rd.	18, 19, 22, 24, 25, 32, 42, 58, 60
Engine races when shifting from 2nd to 3rd (shift point okay).	18, 19, 21, 23, 24, 26, 27, 31, 33
Engine races when shifting from 3rd to 4th (shift point okay).	18, 19, 22, 24, 25, 27, 30, 32, 34
Excessive shock when shifting from 2nd to 3rd (shift point okay).	18, 19, 23, 24, 29, 41, 48
Excessive shock when shifting from 3rd to 4th (shift point okay).	18, 19, 24, 25, 30, 31, 42, 48
Car creeps forward in "N" (shift cable adjusted properly).	11, 13, 33, 34, 36, 37, 38
Excessive time lag from "N" to "S/D" (shift cable adjusted properly).	11, 28

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Excessive time lag from "N" to "R" (shift cable adjusted properly).	4, 20, 34, 59
Abnormal noise in all gears, "N" & "P".	2, 5, 43
Engine accelerates up to 31 MPH, but not more.	16
Vibration in all gears.	39
Hard to shift.	7, 45
Car has only 4th gear.	57
Transaxle has no parking.	7, 45
Stall RPM is high, but clutch pressure okay in all positions.	47
Harsh lock-up clutch disengagement.	
Engine stalls easily.	18, 19, 49, 50, 51, 52, 55, 56, 57
No power sound in low/middle speed.	18, 19, 49, 50, 51, 52, 55, 56, 57
Noise/vibration in low/middle speed.	18, 19, 49, 50, 51, 52, 55, 56, 57
Excessive shock while shifting.	18, 19, 49, 50, 51, 52, 55, 56, 57
Lock-up clutch hunts ON-OFF.	
Tachometer needle swings large arc while driving.	18, 19, 51, 55, 56, 57
Car shacks back and forth while driving.	18, 19, 51, 55, 56, 57
Lock-up clutch does not engage.	18, 19, 47, 49, 50, 51, 55, 57
(1) Reference No. corresponds with No. in <u>TROUBLE SHOOTING SYMPTOM CAUSE (1990)</u> table.	

TROUBLE SHOOTING SYMPTOM CAUSE (1990)

Reference No.	Possible Cause
1	ATF level too low
2	Oil pump seized, gear damaged, foreign matter stuck in gear
3	Regulator valve stuck or spring weak/damaged
4	Servo shaft stuck
5	3rd gears worn/damaged
6	Mainshaft damaged
7	Shift cable misadjusted or cut; end pin disconnected
8	Final gear worn/damaged
9	Countershaft & one-way clutch seized/damaged
10	1st gears worn/damaged
11	1st clutch faulty, clutch piston stuck, foreign matter stuck in clutch check valve, clutch "O" ring worn/damaged, clutch disc worn, clutch feed pipe/"O" ring worn/damaged
12	2nd gears worn/damaged
13	2nd clutch faulty, clutch piston stuck, foreign matter stuck in clutch check valve, clutch "O" ring worn/damaged, clutch disc worn, clutch seal ring

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	seized/damaged
14	Reverse gears worn/damaged
15	ATF level too high
16	Torque converter one-way clutch seized
17	Engine throttle cable misadjusted
18	Intake manifold vacuum tube broken
19	Vacuum modulator valve (throttle valve "B") faulty
20	1-2 shift valve faulty
21	2-3 shift valve faulty
22	3-4 shift valve faulty
23	2nd accumulator faulty
24	3rd accumulator faulty
25	4th accumulator faulty
26	2nd orifice control valve faulty
27	Foreign material in main orifice
28	Foreign material in 1st orifice
29	Foreign material in 2nd orifice
30	3rd orifice control valve faulty
31	Foreign material in 3rd orifice
32	Foreign material in 4th orifice
33	3rd clutch faulty, clutch piston stuck, foreign matter stuck in clutch check valve, clutch "O" ring worn/damaged, clutch disc worn, clutch feed pipe/"O" ring worn/damaged
34	4th clutch faulty, clutch piston stuck, foreign matter stuck in clutch check valve, clutch "O" ring worn/damaged, clutch disc worn, clutch feed pipe/"O" ring worn/damaged
35	Engine power low
36	Needle bearing seized
37	Thrust washers seized
38	Clutch clearance incorrect
39	Drive plate faulty or transmission assembly improperly installed
40	2nd check ball stuck
41	3rd check ball stuck
42	4th check ball stuck
43	Mainshaft/countershaft ball bearing damaged
44	Oil filter clogged
45	Body/case shift cable joint damaged
46	Modulator valve faulty
47	Torque converter check valve faulty
48	Foreign material in separator orifice
49	Lock-up timing valve "B" faulty
50	Lock-up shift valve faulty

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51	Lock-up piston in torque converter faulty
52	Lock-up control valve faulty
53	Shift control solenoid valve "A" faulty
54	Shift control solenoid valve "B" faulty
55	Lock-up control solenoid valve "A" faulty
56	Lock-up control solenoid valve "A" faulty
57	Automatic transmission control unit faulty
58	4th exhaust valve faulty
59	Servo control valve faulty
60	4-3 kickdown valve faulty
61	3-2 kickdown valve faulty
62	2-1 orifice control valve faulty

LED TROUBLE SHOOTING (1989)

Problem or Symptom	Probable Cause
"S4" light is not on for 2 seconds after ignition is first turned on	Normal operation
LOW light is not on for 2 seconds after ignition is first turned on	Normal operation
Does not change during "S4" mode	Check "S4" switch signal
Does not change during LOW mode	Check LOW switch signal
Lock-up clutch does not engage during duty operation (ON-OFF)	Check A/C signal while operating A/C
Lock-up clutch does not engage	Check A/C signal while operating A/C
Fails to shift from 2nd to 1st gear when shifted up to "S" or "D" range from releasing brake pedal with shift lever in "N"	Check brake light switch signal

PERFORMANCE TESTS**ROAD TEST****"D" & "S" Range**

1. Warm engine to operating temperature. Apply parking brake and block rear wheels. Shift transaxle selector to "D" while depressing brake pedal.
2. Depress accelerator and release abruptly. Engine should not stall. Check that shift points occur at proper speeds. See the **TRANSAXLE SHIFT POINT TEST** table.
3. Check for abnormal noise and clutch slippage. Apply parking brake and block rear wheels. Shift selector to "S" while depressing brake pedal. Depress and release accelerator pedal and release abruptly. Engine should not stall.

TRANSAXLE SHIFT POINT TEST

Condition	MPH
Upshift "D"	
1/12 throttle Coasting down-hill from stop	
1st-2nd	9-11

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2nd-3rd	17-21
3rd-4th	27-31
Lock-Up Clutch ON	13-16
1/2 throttle Acceleration from a stop	
1st-2nd	21-24
2nd-3rd	38-44
3rd-4th	59-65
Lock-Up Clutch ON	67-70
Full-throttle Acceleration from a stop	
1st-2nd	34-39
2nd-3rd	63-68
3rd-4th	94-99
Lock-Up Clutch ON	88-91
"S" (With "S" Switch In Operation)	
1/12 throttle Coasting down-hill from stop	
1st-2nd	12-15
2nd-3rd	20-24
3rd-4th	30-40
Lock-Up Clutch ON	24-26
7/16 throttle Acceleration from a stop	
1st-2nd	20-24
2nd-3rd	38-45
3rd-4th	59-65
Lock-Up Clutch ON	70-72
Full-throttle Acceleration from a stop	
1st-2nd	31-39
2nd-3rd	63-68
3rd-4th	94-99
Lock-Up Clutch ON	89-91
"2" (With LOW Switch Off)	
1/12 throttle Coasting down-hill from stop	
1st-2nd	8-11
7/16 throttle Acceleration from a stop	
1st-2nd	15-19
Full-throttle Acceleration from a stop	
1st-2nd	31-36
Downshift "D"	
1/12 throttle Coasting down-hill from stop	
Lock-Up Clutch OFF	10-13
4th-3rd	17-21
3rd-1st	5-9
7/16 throttle Acceleration from a stop	

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Lock-Up Clutch ON	50-53
Full-throttle Acceleration from a stop	
Lock-Up Clutch OFF	86-88
4th-3rd	81-87
3rd-2nd	53-59
2nd-1st	26-31
Downshift "S" (With "S" Switch In Operation)	
1/12 throttle Coasting down-hill from stop	
Lock-Up Clutch OFF	23-25
4th-3rd	17-21
3rd-1st	5-9
7/16 throttle Acceleration from a stop	
Lock-Up Clutch ON	57-60
Full-throttle Acceleration from a stop	
Lock-Up Clutch OFF	86-88
4th-3rd	81-87
3rd-2nd	53-59
2nd-1st	28-34
Downshift "2" (With LOW Switch Off)	
1/12 throttle Coasting down-hill from stop	
2nd-1st	4-8
Full-throttle Acceleration from a stop	
2nd-1st	27-34

"2" (2nd Gear) Range

Accelerate from stop at full throttle. Check that no abnormal noise or clutch slippage occurs. Upshifts and downshifts should not occur with gear selector in this range.

"R" (Reverse) Range

Accelerate from stop at full throttle. Check that no abnormal noise or clutch slippage occurs.

"P" (Park) Range

Park vehicle on incline (about 16 degrees). Apply parking brake and shift selector in "P". Release brake and check for vehicle movement. Movement should not occur.

HYDRAULIC PRESSURE TEST

CAUTION: Prior to testing, ensure that transaxle fluid level is correct. Before installing pressure gauge test equipment, ensure that correct inspection hole is used for corresponding pressure measurement. Incorrect

diagnosis could result if not performed properly. See **Fig. 3**.

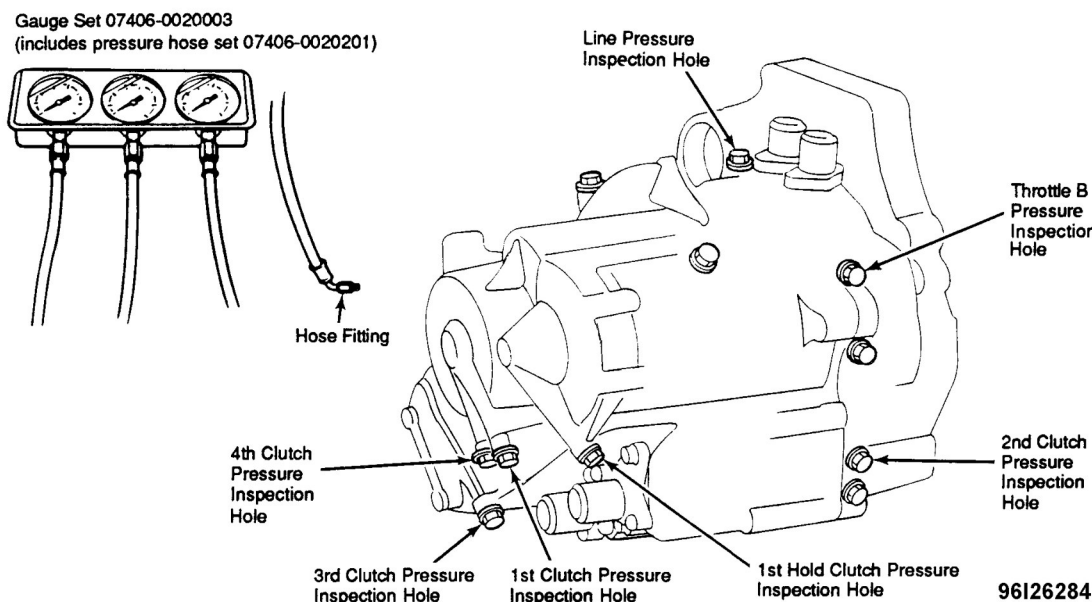


Fig. 3: Transaxle Pressure Inspection Hole Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

1. With engine off, attach hoses from pressure testing Gauge Set (07406-0020003) or equivalent to transaxle. Tighten hose fittings to 12 ft. lbs. (18 N.m). **DO NOT** reuse aluminum washers.
2. Make line pressure measurement after setting parking brake securely and running engine at 2000 RPM.
3. When making clutch pressure measurement, set parking brake and block rear wheels. Raise front of vehicle and support safely. Run engine at 2000 RPM.
4. When making throttle B pressure measurement, set parking brake and block rear wheels. Run engine at 1000 RPM. Disconnect throttle control cable from throttle lever and set control lever in full throttle position.
5. When making low/high pressure test, raise car and support with safety stands. See **Fig. 4**. Remove cable end of throttle control cable lever. Warm engine to operating temperature (cooling fan comes on). With engine idling move selector lever to "D3". Slowly increase RPM until pressure registers. Record pressure. Repeat this step for each clutch. Move throttle linkage to 1/2 throttle travel, increase RPM until pressure is indicated on appropriate gauge. Record highest pressure. Repeat this step for each clutch being inspected.

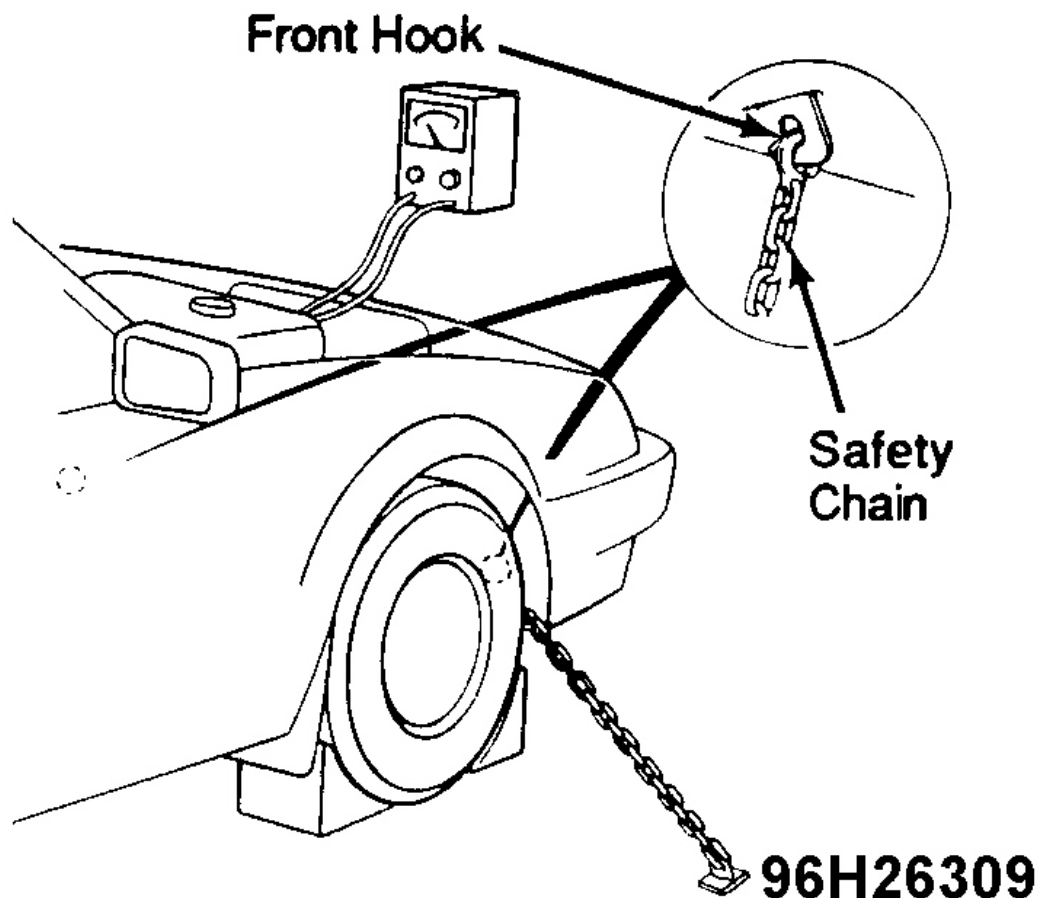


Fig. 4: Securing Vehicle for Stall Test

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CAUTION: DO NOT shift from "D" or "S" to "2" (LOW switch OFF) at speeds over 62 MPH, damage may occur to transaxle.

CAUTION: DO NOT shift from "D" or "S" to "2" (LOW switch ON) at speeds over 55 MPH, damage may occur to transaxle.

LINE PRESSURE MEASUREMENT

Selector Position	Symptom	Probable Cause	Standard - psi (kPa)	Limit - psi (kPa)
"N" or "P"	No, or Low line pressure	Torque converter oil pump pressure regulator, torque	114-121 (758-834)	107 (735)

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converter check
valve, oil pump**CLUTCH PRESSURE MEASUREMENT**

Application	Selector Position	Symptom	Probable Cause	Standard - psi (kPa)	Limit - psi (kPa)
1st Clutch	"S" or "D"	No, or Low 1st pressure	1st Clutch	114-121 (785-834)	107 (737)
1st Hold Clutch	"2" With "S4" in Operation	No, or Low 1st Hold pressure	1st Hold Clutch	114-121 (785-834)	107 (737)
2nd Clutch	"2" With "S4" Off	No, or Low 2nd pressure	2nd Clutch	114-121 (785-834)	107 (737)
2nd Clutch	"S" or "D"	No, or Low 2nd pressure	2nd Clutch	71 (490) Throttle Fully Closed	107 (737) Fully Closed
3rd Clutch	"S" With "S4" Off	No, or Low 3rd pressure	3rd Clutch	71 (490) Throttle Fully Closed	107 (737) Fully Closed
4th Clutch	"S" With "S4" in Operation	No, or Low 4th pressure	4th Clutch	121 (834) (785-834)	107 (737)
4th Clutch	"R"	No, or Low 4th pressure	Servo Valve or 4th Clutch	114-121 (785-834)	107 (737)

THROTTLE "B" PRESSURE MEASUREMENT

Selector Position	Symptom	Probable Cause	Standard - psi (kPa)	Limit - psi (kPa)
"S" or "D"	No, or Low Throttle "B" pressure	Throttle Valve "B"	114-121 (490-834)	107 (737)

LOW/HIGH PRESSURE MEASUREMENT

Application	Selector Position	Symptom	Probable Cause	Standard - psi (kPa)	Limit - psi (kPa)
2nd Clutch	"S" or "D"	No, or Low 2nd pressure	2nd Clutch	71-121 (490-834) Variable With RPM	64-107 (441-737) Variable With RPM
3rd Clutch	"S" With "S4" Off	No, or Low 3rd pressure	3rd Clutch	71-121 (490-834) Variable With RPM	64-107 (441-737) Variable With RPM
4th Clutch	"S" With "S4" in	No, or Low 4th pressure	4th Clutch	71-121 (490-834) Variable With RPM	64-107 (441-737) Variable With RPM

STALL SPEED TEST

CAUTION: DO NOT test stall speed for longer than 10 seconds at a time. DO NOT shift selector while raising engine RPM. Ensure that pressure testing equipment is removed before performing stall speed test. Failure to adhere to this caution may result in transaxle damage.

1. Apply parking brake and block front wheels. Connect safety chains to both front hooks and attach, with minimum slack, to a strong stationary object. See **Fig. 3**.
2. Connect tachometer and start engine. Run engine until normal operating temperature is reached and place selector in "2". Fully depress brake pedal and accelerator for 6 to 8 seconds and note engine RPM.
3. Allow 2 minutes for transaxle to return to normal operating temperature and repeat procedure with selector in "D", "S" and "R". Ensure stall speed is within specification. See **STALL SPEED SPECIFICATIONS** table. To identify probable cause of problem, see **STALL SPEED DIAGNOSIS** table.

STALL SPEED SPECIFICATIONS

Application	RPM
Stall Speed	2750
Service Unit Range	2300-2900

STALL SPEED DIAGNOSIS

Trouble Symptom	Probable Cause
Stall RPM high in "D", "S", "2" & "R"	Low fluid level or oil pump output, Clogged oil strainer, Pressure regulator valve stuck closed, Slipping clutch
Stall RPM high in "R"	Slippage of 4th clutch
Stall RPM high in "2"	Slippage of 2nd clutch
Stall RPM high in "D" & "S"	Slippage of 1st clutch or 1st gear one-way clutch
Stall RPM low in "D", "S", "2" & "R"	Engine output low, Torque converter one-way clutch slipping

SELF-DIAGNOSTIC SYSTEM

RETRIEVING DIAGNOSTIC TROUBLE CODES

ATCU has a built-in self-diagnosis function. If a problem within the system is present, "S3" indicator light and LED display (on control unit) will blink. The ATCU is located under drivers seat. See **Fig. 19**. Counting number of blinks will give fault codes. When ignition is turned on, "S3" indicator light will come on for about 2 seconds, regardless of whether there is a fault or not. This will verify proper operation of "S3" bulb. Indicator light will also come on when in "S3" mode. **DO NOT** confuse these with a system fault. If a system fault is present, "S3" indicator light will come on and blink. "S3" indicator light will continue to blink until ignition is turned off. When ignition is turned on again, "S3" indicator light will not blink original fault code. Check LED on control unit for a stored code. See **DIAGNOSTIC TROUBLE CODE DEFINITIONS**. If no LED code is stored, check alternator sense fuse in relay box under hood and for open circuit in White/Yellow (1989) and White/Green (1990) wire between alternator sense fuse (10-amp 1989), hazard fuse (10-amp 1990) and ATCU terminal B12.

DIAGNOSTIC TROUBLE CODE DEFINITIONS

DIAGNOSTIC TROUBLE CODE DEFINITIONS

Number Of LED Blinks ⁽¹⁾	"S ₃ " Indicator Light	Symptom	Probable Cause
1	Blinks	Lock-up clutch won't engage or disengage, frequent engine stalls low light does not blink	Disconnected lock-up control solenoid valve "A" coupler, short/open in valve "A" wire or faulty lock-up control solenoid valve "A"
2	Blinks	Lock-up clutch does not engage, low light does not blink	Disconnected lock-up control solenoid valve "B" coupler, short/open in valve "B" wire or faulty lock-up control solenoid valve "B"
3 ⁽²⁾	Blinks or OFF	Lock-up clutch does not engage, low light does not blink	Disconnected TPS coupler, short/open in TPS wire or faulty TPS sensor.
4	Blinks	Lock-up clutch does not engage, low light does not blink	Disconnected speed sensor coupler, short/open in speed sensor wire or faulty speed sensor
5	Blinks	Will only perform 2-4 shift and lock-up clutch will not engage low light does not blink	Shorted shift position console switch wire or faulty shift position console switch
6 ⁽²⁾	OFF	Will only perform 2-4 shift, lock-up clutch does not engage or engages and disengages alternately, low light does not blink	Disconnected shift position console switch coupler, open in shift position console switch wire or faulty shift position console switch position console switch
7	Blinks	Fails to shift between 1-4, 2-4, or 2-3 gears only or fails to shift (stuck in 4th gear), low light does not blink	Disconnected shift control solenoid valve "A" coupler, short/open in shift control solenoid valve "A" wire or faulty shift control solenoid valve "A"
8	Blinks	Fails to shift (stuck in 1st or 4th gear), low light does not blink	Disconnected shift control solenoid valve "B" coupler, short/open in shift control solenoid valve "B" wire or faulty shift control solenoid valve "B"
9	Blinks	Lock-up clutch does not engage, low light does not blink	Disconnected A/T speed sensor coupler, short/open in A/T SPEED sensor wire or faulty A/T speed sensor
10	Blinks	Lock-up clutch does not engage, low light does not blink	Disconnected coolant temp. sensor coupler, short/open in coolant temp. sensor wire or

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			faulty coolant temp. sensor
11 (2)	OFF	Lock-up clutch does not engage, low light does not blink	Disconnected ignition coil coupler, short/open in ignition coil wire or faulty ignition coil

(1) If LED display blinks 12 or more times, the control unit is faulty.

(2) If symptoms for Codes 3, 6, or 11 are as described and LED is not blinking, it is necessary to recreate the symptom by test driving, and checking LED with ignition still ON.

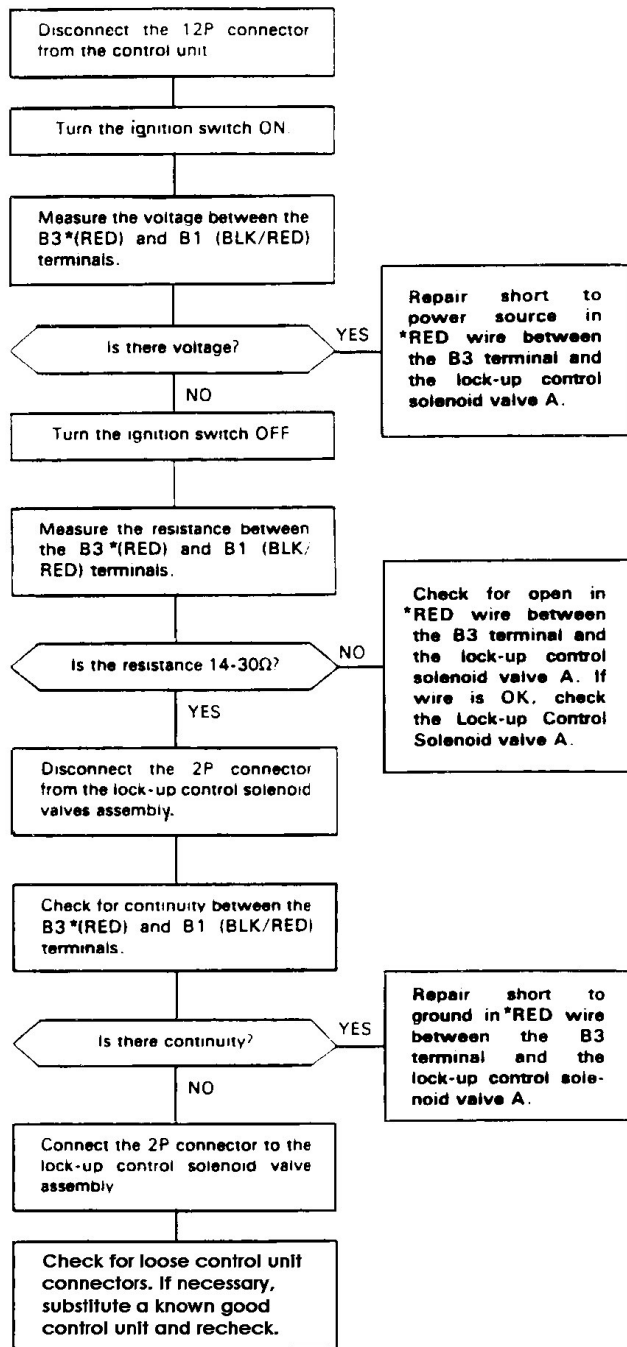
CLEARING DIAGNOSTIC TROUBLE CODES

To clear stored codes, disconnect alternator sense fuse (10-amp 1989) and hazard fuse (10-amp 1990) for more than 10 seconds to reset LED display memory.

DIAGNOSTIC TESTS

NOTE: In the following fault code diagnostic flow charts, connectors are identified as 2P, 12P, 18P, etc. This refers to the numbers of terminal pins, 2-pin, 12-pin, 18-pin for applicable circuit.

LED BLINKS 1 TIME

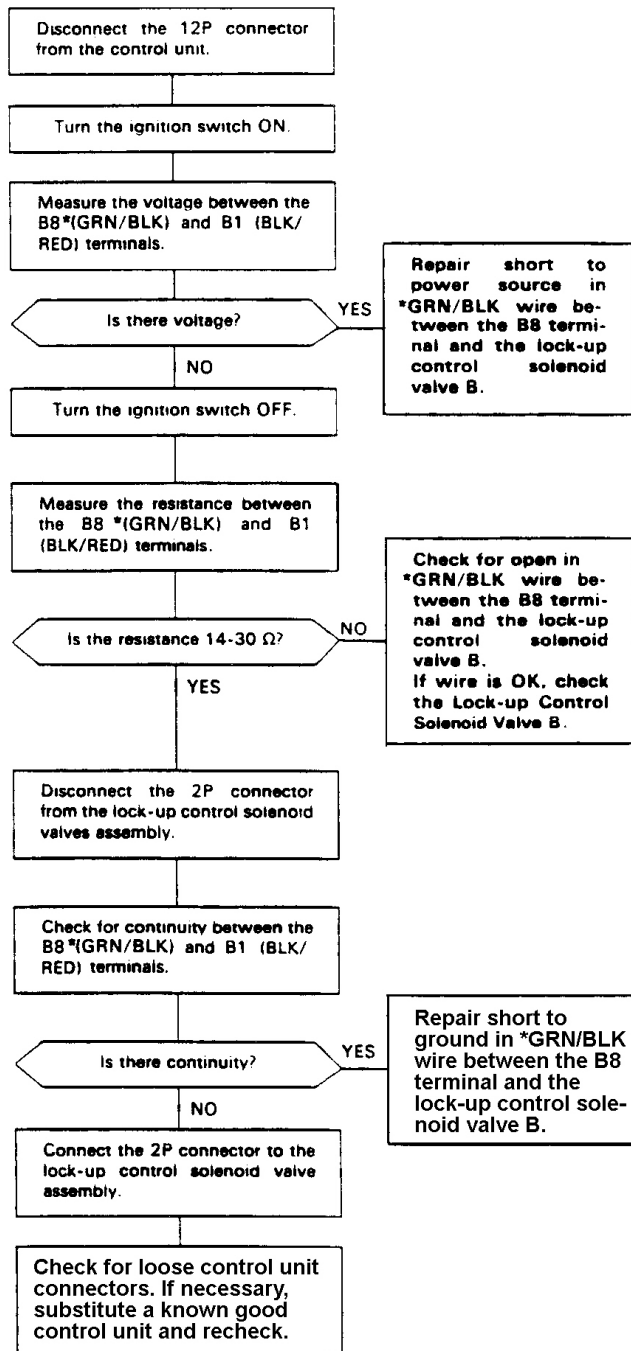


* B3 RED/WHITE 1989
B3 RED 1990

96D26271

Fig. 5: Flow Chart - LED Blinks 1 Time
Courtesy of AMERICAN HONDA MOTOR CO., INC.

LED BLINKS 2 TIMES

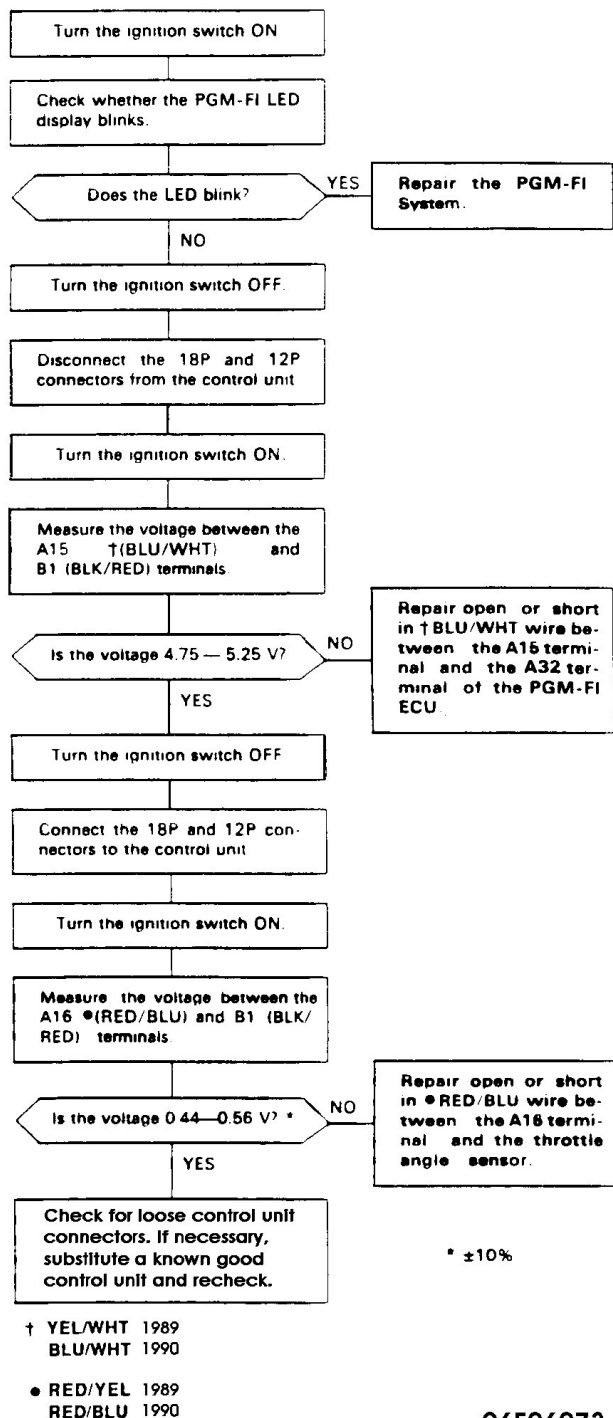


* (WHT/BLK) 1988-89
GRN/BLK 1990

96E26272

Fig. 6: Flow Chart - LED Blinks 2 Times
Courtesy of AMERICAN HONDA MOTOR CO., INC.

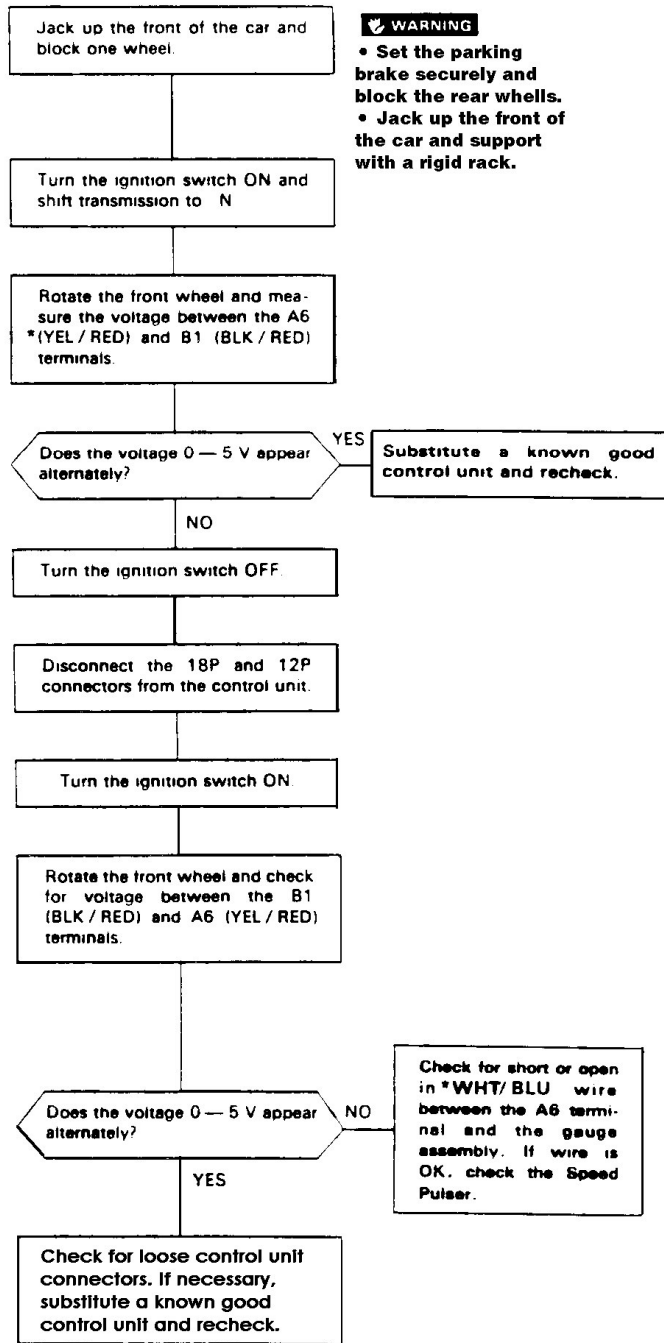
LED BLINKS 3 TIMES



96F26273

Fig. 7: Flow Chart - LED Blinks 3 Times
Courtesy of AMERICAN HONDA MOTOR CO., INC.

LED BLINKS 4 TIMES

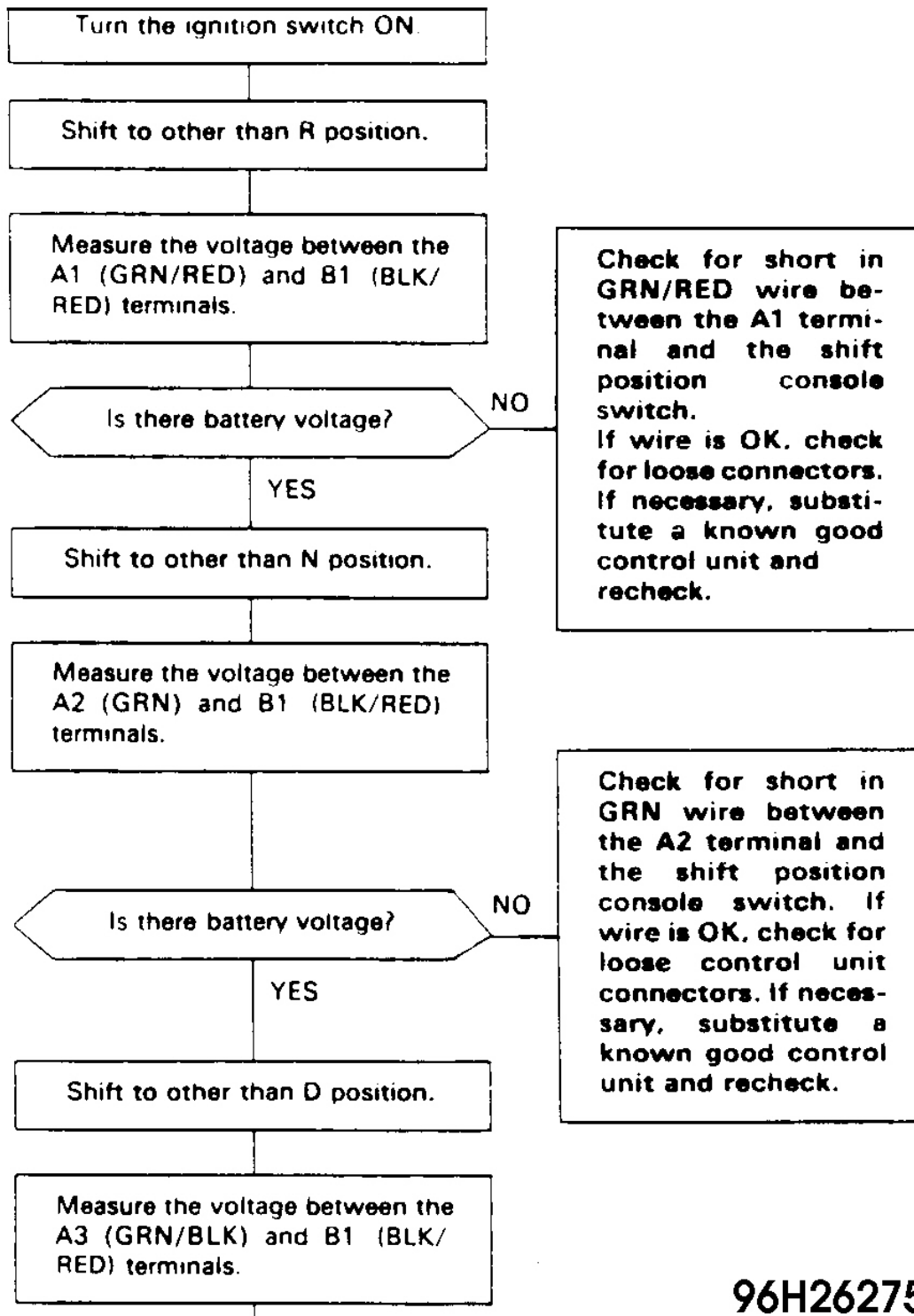


* WHT/BLU 1989
YEL/RED 1990

96G26274

Fig. 8: Flow Chart - LED Blinks 4 Times
Courtesy of AMERICAN HONDA MOTOR CO., INC.

LED BLINKS 5 TIMES



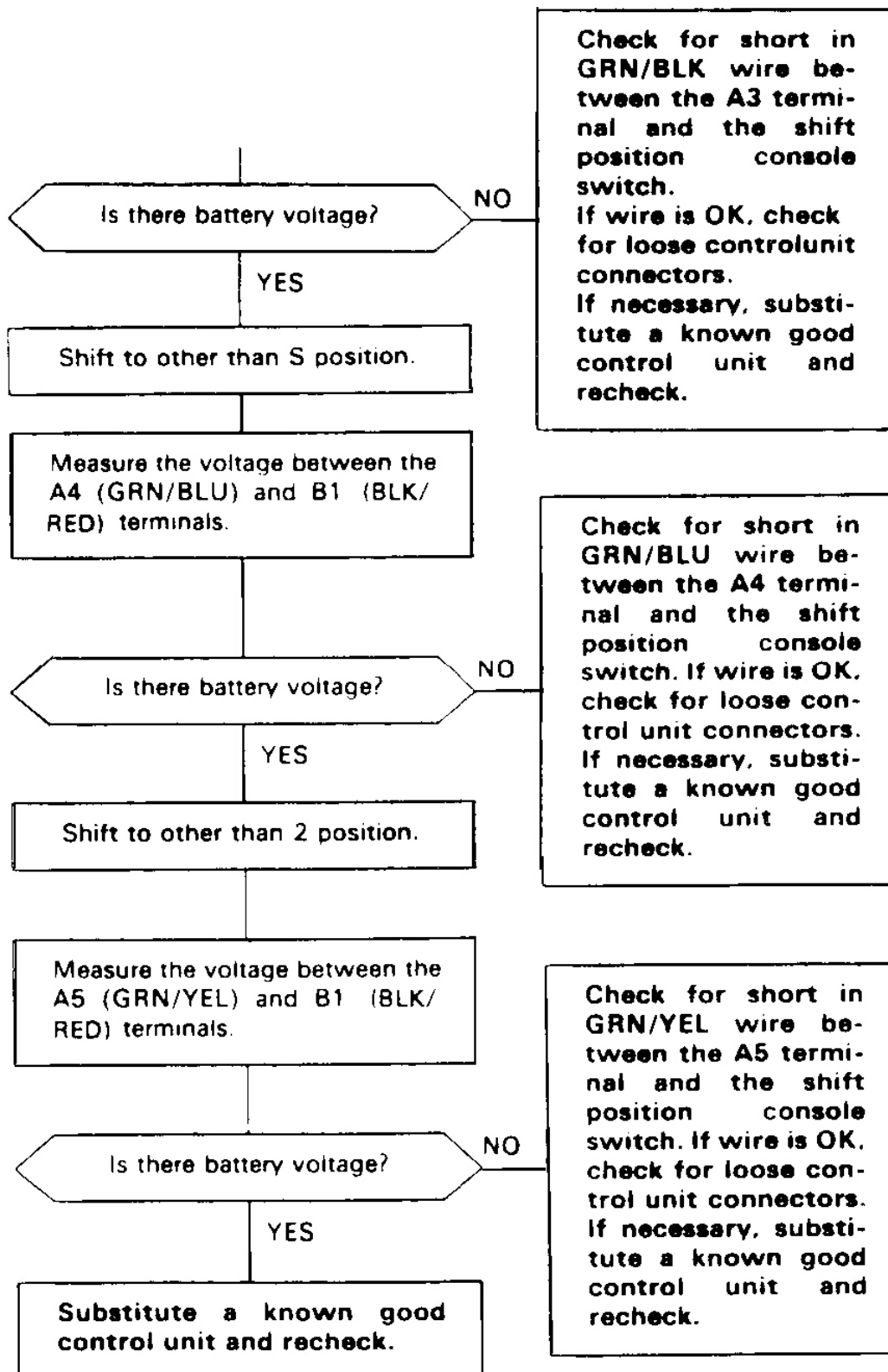
96H26275

Fig. 9: Flow Chart - LED Blinks 5 Times (1 of 2)

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Courtesy of AMERICAN HONDA MOTOR CO., INC.

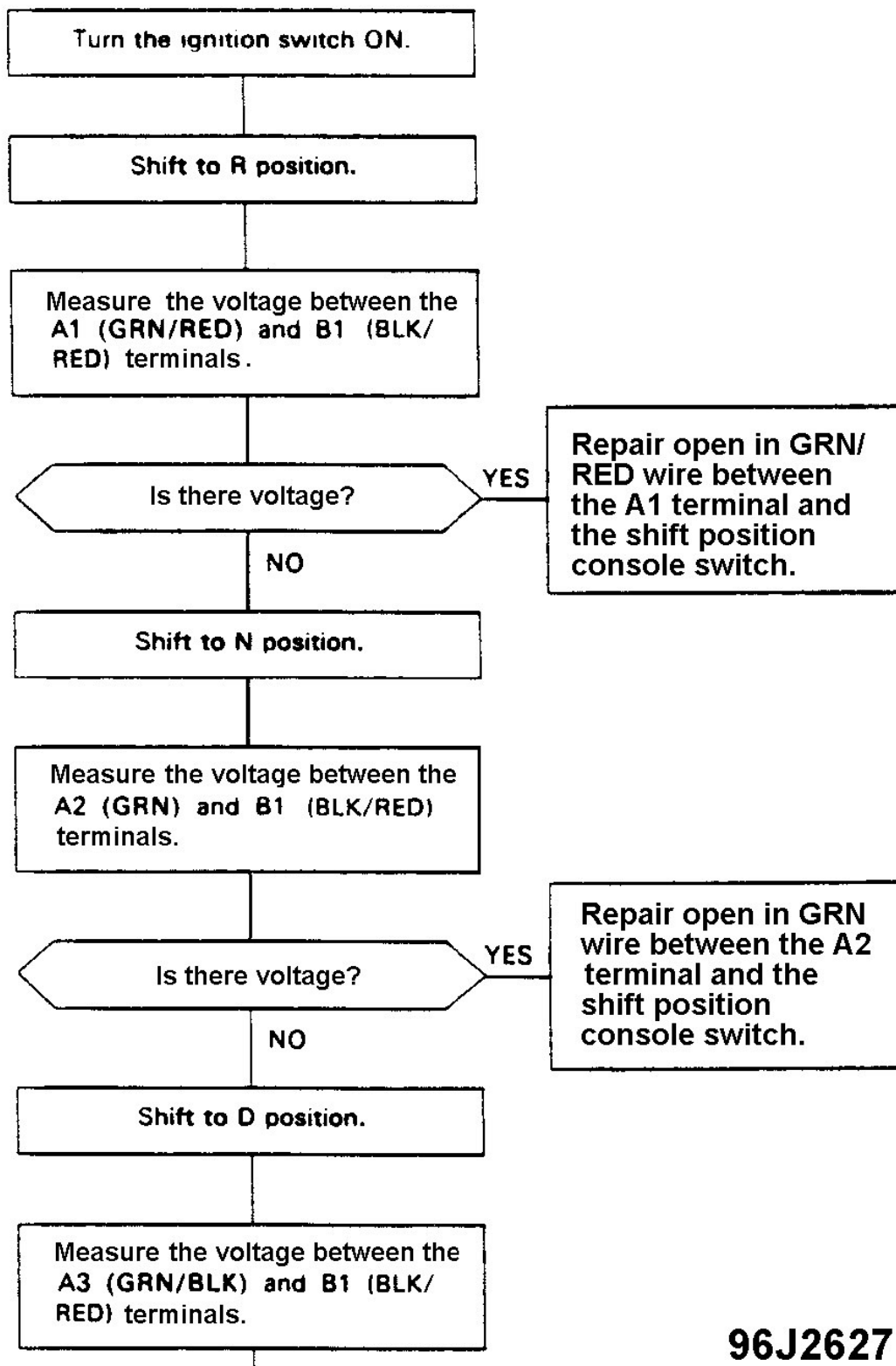


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Fig. 10: Flow Chart - LED Blinks 5 Times (2 of 2)

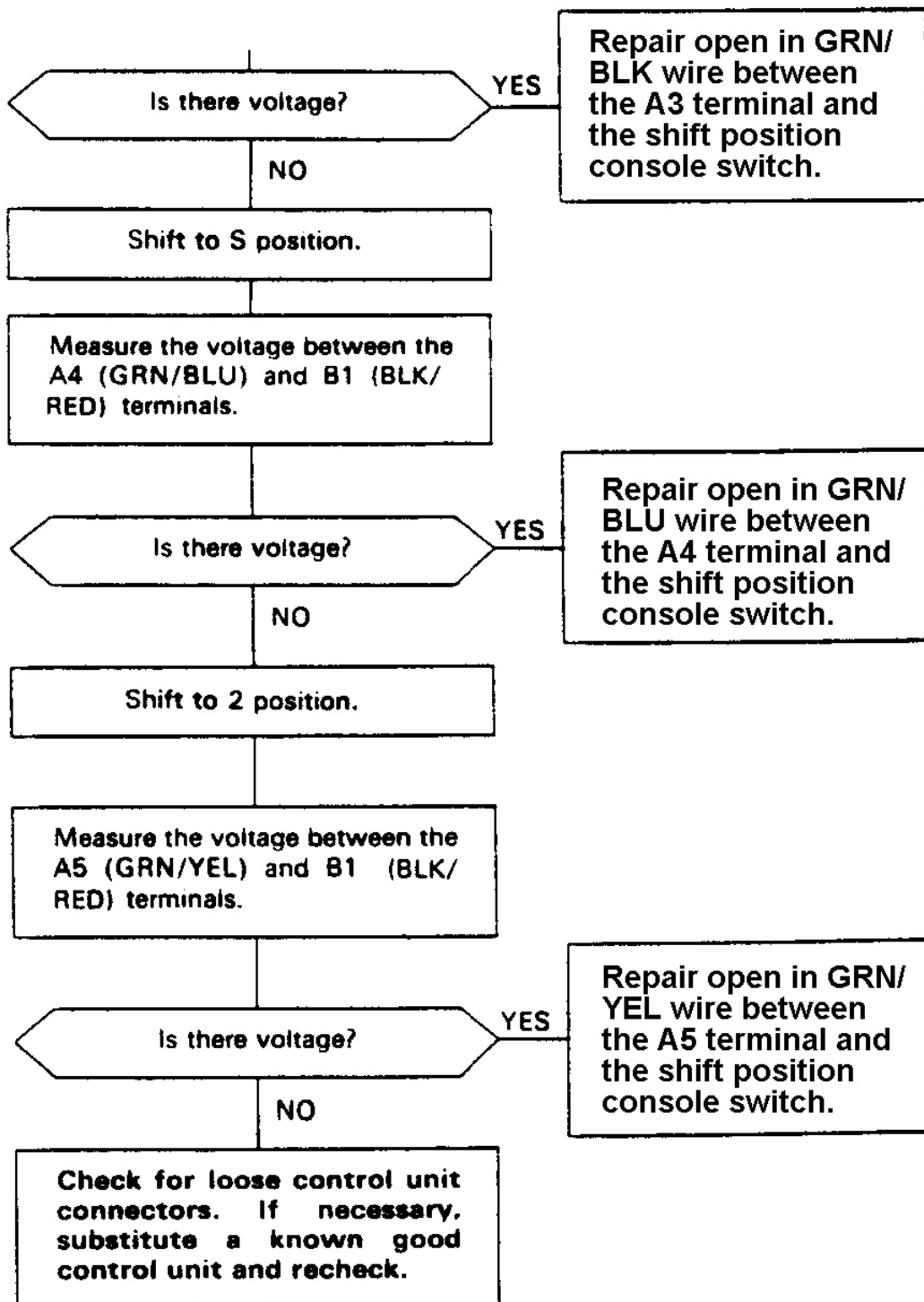
Courtesy of AMERICAN HONDA MOTOR CO., INC.

LED BLINKS 6 TIMES



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Fig. 11: Flow Chart - LED Blinks 6 Times (1 of 2)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

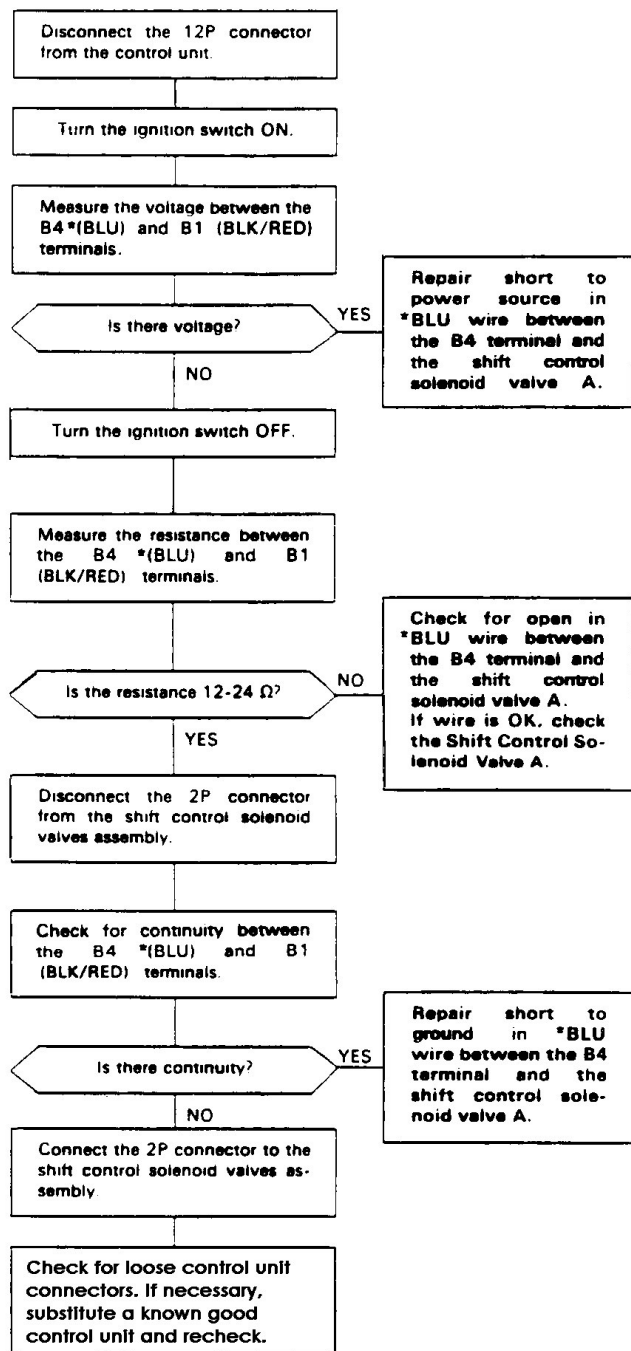


G96A26278

Fig. 12: Flow Chart - LED Blinks 6 Times (2 of 2)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

LED BLINKS 7 TIMES



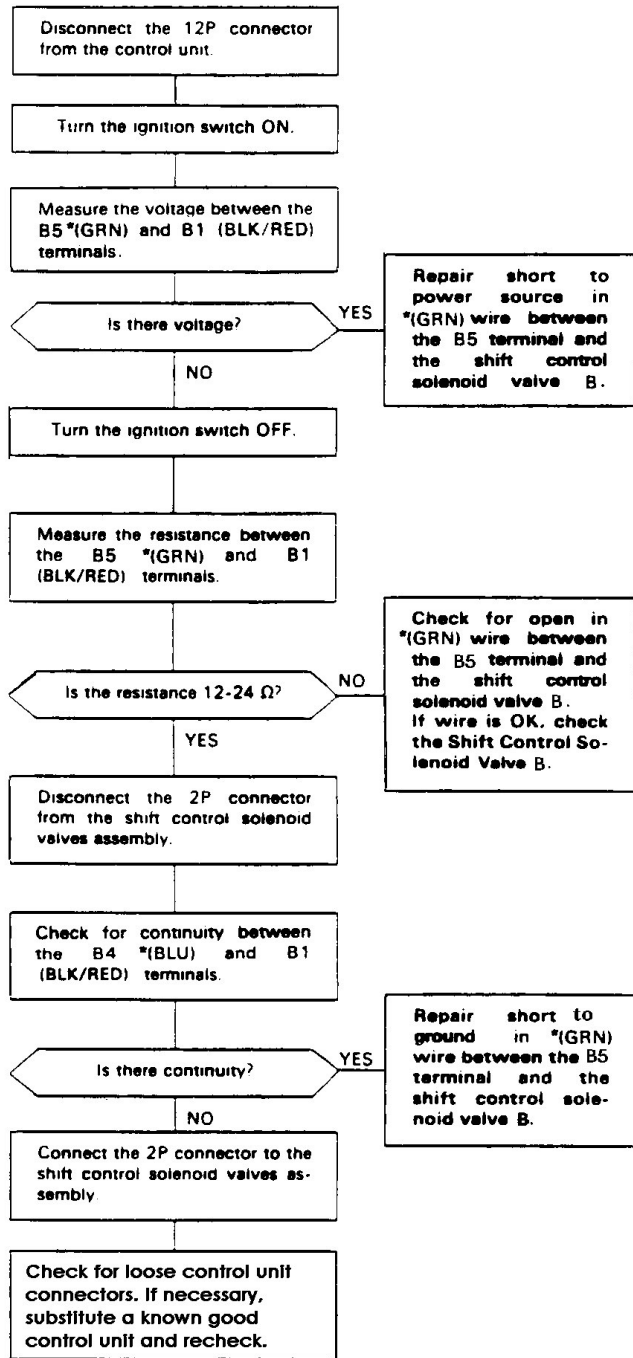
* (BLU/YEL) 1988-89
(BLU) 1990

96B26279

Fig. 13: Flow Chart - LED Blinks 7 Times

Courtesy of AMERICAN HONDA MOTOR CO., INC.

LED BLINKS 8 TIMES



*(GRN/WHT) 1988-89
(GRN) 1990

96E26280

Fig. 14: Flow Chart - LED Blinks 8 Times

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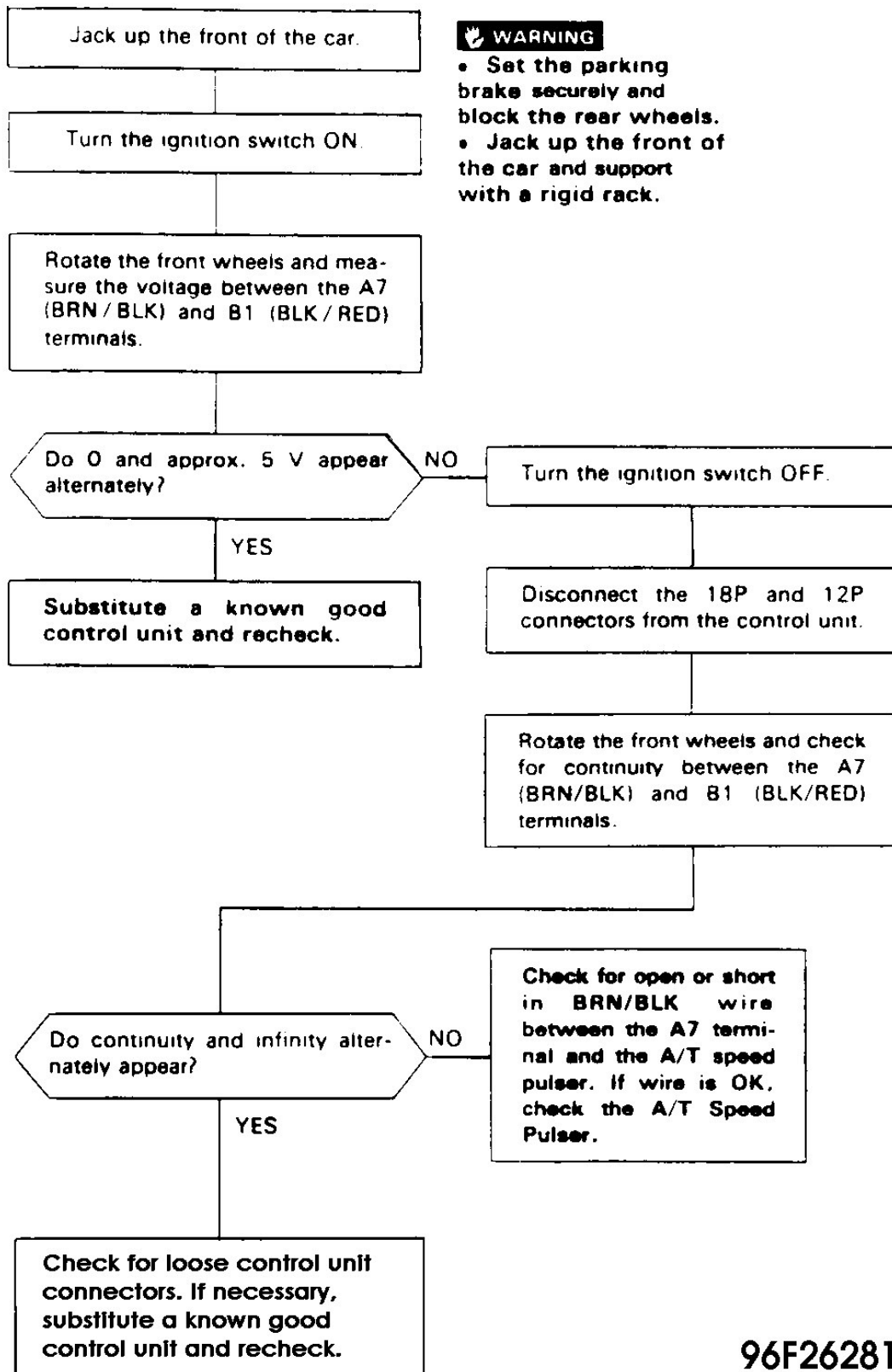
1989-90 AUTOMATIC TRANSMISSIONS S5 Electronic Controls & Overhaul

Courtesy of AMERICAN HONDA MOTOR CO., INC.

LED BLINKS 9 TIMES

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1989-90 AUTOMATIC TRANSMISSIONS S5 Electronic Controls & Overhaul



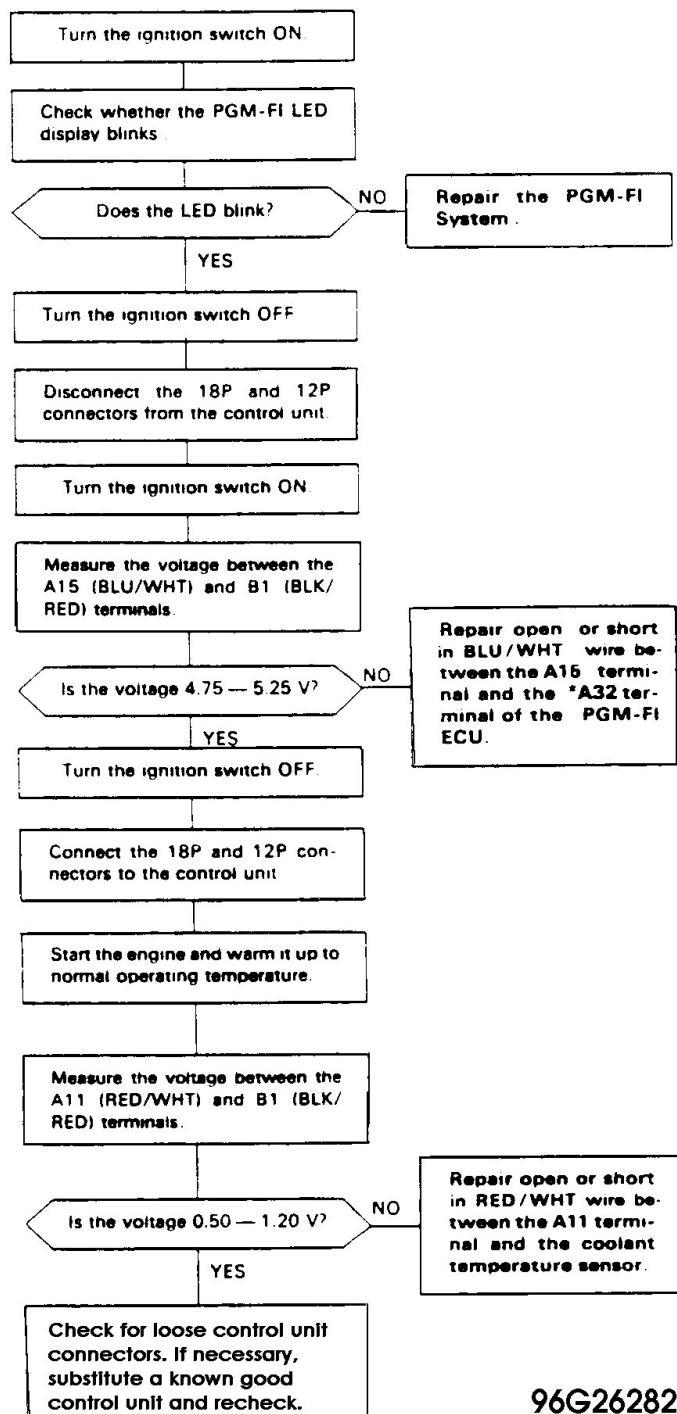
WARNING

- Set the parking brake securely and block the rear wheels.
- Jack up the front of the car and support with a rigid rack.

96F26281

Fig. 15: Flow Chart - LED Blinks 9 Times

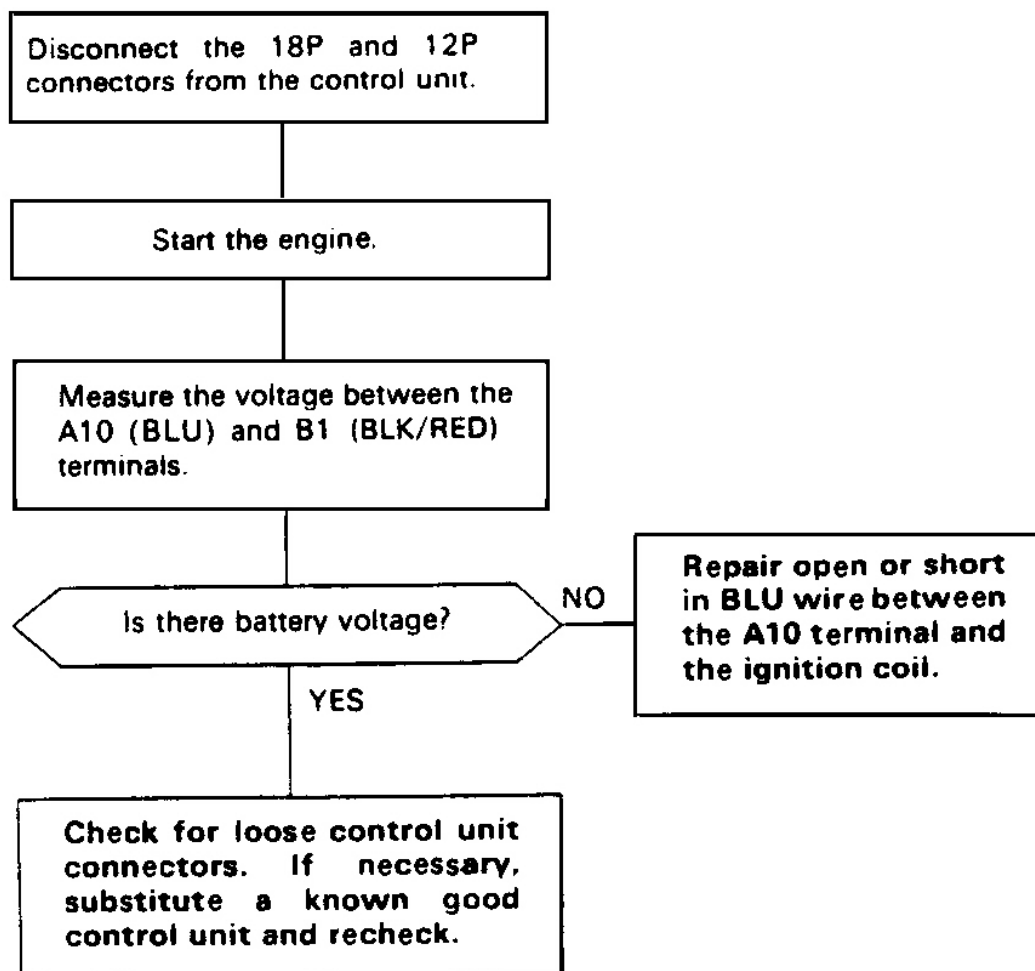
Courtesy of AMERICAN HONDA MOTOR CO., INC.

LED BLINKS 10 TIMES

96G26282

Fig. 16: Flow Chart - LED Blinks 10 Times

Courtesy of AMERICAN HONDA MOTOR CO., INC.

LED BLINKS 11 TIMES

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Fig. 17: Flow Chart - LED Blinks 11 Times

Courtesy of AMERICAN HONDA MOTOR CO., INC.

SYMPTOM TESTS**FAILS TO SHIFT FROM 2ND TO 1ST ON RELEASING BRAKE PEDAL WHEN STOPPED IN "D" OR "S"**

1. Depress brake pedal and check that brake light comes on. If lights do not come on, repair brake light

circuit. See **Fig. 18**. If brake lights come on, go to next step.

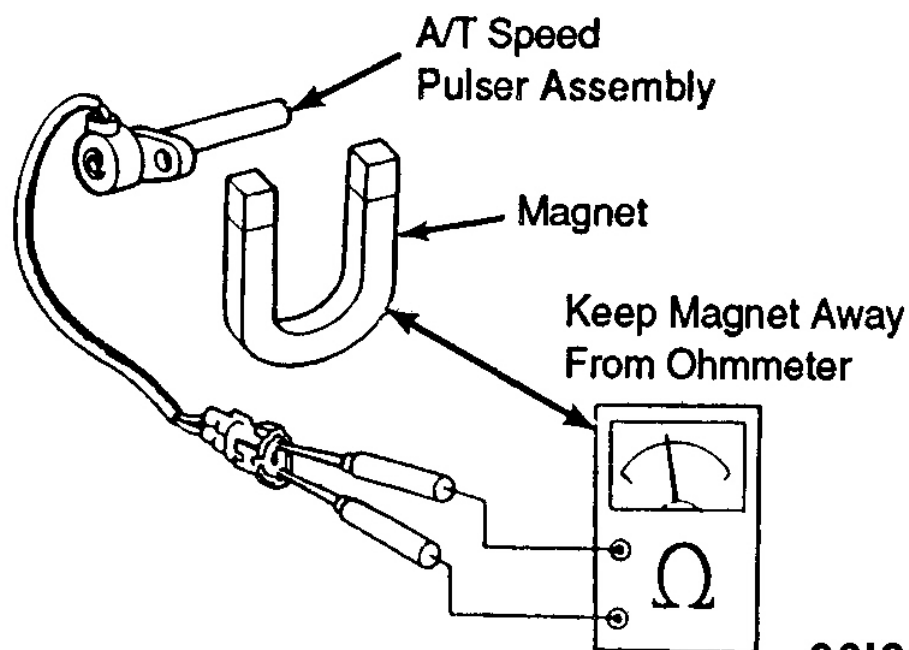
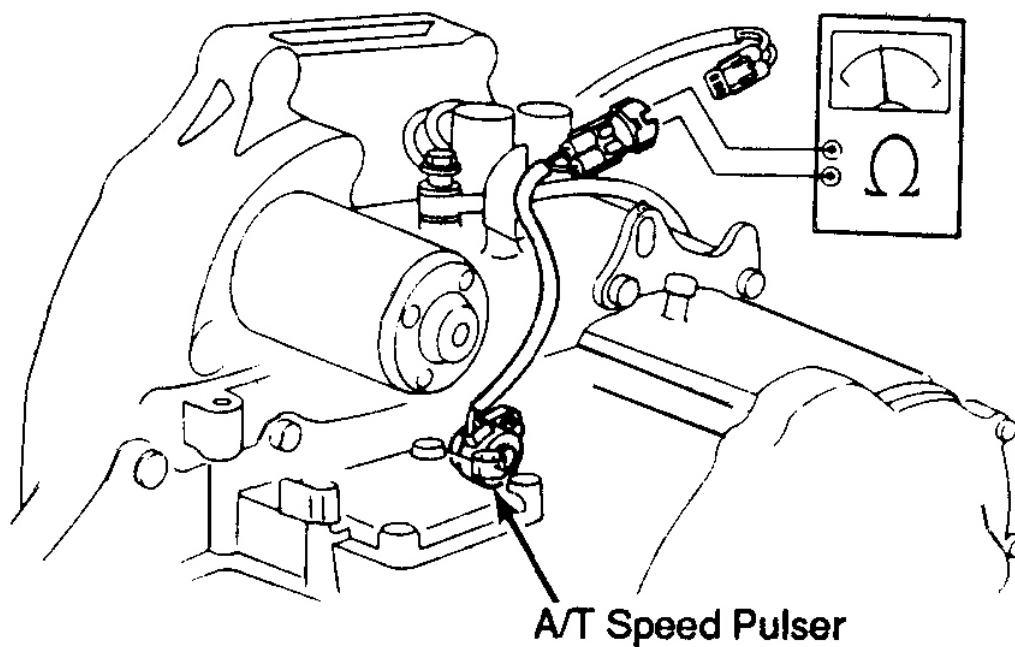
2. Disconnect 18-pin and 12-pin connectors from control unit. Depress brake pedal. Measure voltage between terminals A12 (Green/White) and B1 (Black/Red). If there is no battery voltage, repair open in Green/White wire between terminal A12 and brake light switch. If there is battery voltage, check for loose control unit connector. If necessary substitute a known good control unit and recheck.

LOW INDICATOR LIGHT DOES NOT COME ON WITH IGNITION SWITCH ON (IT SHOULD COME ON FOR ABOUT 2 SECONDS)

1. Disconnect 12-pin connector from control unit. Check for continuity between terminal B1 (Black/Red) and body ground, and between terminal B6 (Black/Red) and body ground. See **Fig. 18**. If there is no continuity, repair open in Black/Red wire between terminal B1 (1989) and body ground G401 and/or between terminal B6 and body ground G401, terminal B1 (1990) and body ground G101 and/or between terminal B6 and body ground G101. If there is continuity, go to next step.
2. Turn ignition switch on. Measure voltage between terminals B2 (Black/Yellow) and B1 (Black/Red) and between terminals B7 (Black/Yellow) and B1. If there is no voltage repair open or short in Black/Yellow wire between terminal B2/B7 and dash fuse box. If there is battery voltage, go to next step.
3. Turn ignition switch to OFF position. Measure resistance between terminals B10 (Red/Yellow) and B1 (Black/Red). If resistance is not more than 100 ohms repair short in Red/Yellow wire between terminal B11 and gauge assembly. If resistance is more than 100 ohms, go to next step.
4. Connect 12-pin connector to control unit. Turn ignition switch on. Ensure that voltage is available for 2 seconds between terminals B11 (1989) and B10 (1990) (Red/Yellow) and B1 (Black/Red). If voltage is more than 6-12 volts, check for open or short in Yellow/Red wire between the terminal B11 and gauge assembly. If wire is okay, check the Low Indicator Light Bulb and Safety Indicator Circuit. If voltage is within 6-12 volts, check for loose control unit. If necessary, substitute a known good control unit and recheck.

"S4" INDICATOR LIGHT DOES NOT COME ON WITH IGNITION SWITCH ON (IT SHOULD COME ON FOR ABOUT 2 SECONDS)

1. Disconnect 12-pin connector from control unit. Check for continuity between terminal B1 (Black/Red) and body ground and between terminal B6 (Black/Red) and body ground. See **Fig. 18**. If there is no continuity, repair open in Black/Red wire between terminal B1 (1989) and body ground G401 and/or between terminal B6 and body ground G401, terminal B1 (1990) and body ground G101 and/or between terminal B6 and body ground G101. If there is continuity, go to next step.
2. Turn ignition switch on. Measure voltage between terminals B2 (Black/Yellow) and B1 (Black/Red) and between terminals B7 (Black/Yellow) and B1. If there is no battery voltage, repair open or short in Black/Yellow wire between terminal B2/B7 and dash fuse box. If there is battery voltage, go to next step.
3. Turn ignition switch to OFF position. Measure resistance between terminals B11 (Yellow/Red) and B1 (Black/Red). If resistance is not more than 100 ohms, repair short in Yellow/Red wire between terminal B11 and gauge assembly. If resistance is more than 100 ohms, go to next step.
4. Connect 12-pin connector to control unit. Turn ignition switch on. Ensure that voltage is available for 2 seconds between terminals B11 (Yellow/Red) and B1 (Black/Red). If voltage is 6-12 volts, check for open or short in Yellow/Red wire between terminal B11 and gauge assembly. If wire is okay check "S4" Indicator Light Bulb and Safety Indicator circuit. If voltage is not 6-12 volts, check for loose control unit connectors. If necessary substitute a known good control unit and recheck.



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Fig. 18: Testing A/T Speed Pulser

Courtesy of AMERICAN HONDA MOTOR CO., INC.

"S4" WILL NOT ENGAGE

1. Disconnect the 18-pin and 12-pin connector from control unit. Check for continuity between the terminals A13 (Green) and B1 (Black/Red). See **Fig. 18**. If there is continuity, check for short in Green wire between terminal A13 and the "S4" switch. If wire is okay, check the "S4" switch. If there is no continuity, go to next step.
2. Check for continuity between terminals A13 (Green) and B1 (Black/Red) while pressing "S4" switch. If there is no continuity, check for open in Green wire between terminal A13 and "S4" switch. If wire is okay, check the "S4" switch. Check for loose control unit connectors. If necessary substitute a known good control unit and recheck.

CIRCUIT TESTS

A/C SIGNAL INSPECTION

1. Push A/C switch. If A/C compressor clutch does not engage, see appropriate A/C-HEATER SYSTEMS article in AIR CONDITIONING & HEATING. If A/C compressor clutch engages, disconnect 12-pin and 18-pin connector from control unit. See **Fig. 18**.
2. Start engine, measure voltage between terminals A9 (Yellow) and B1 (Black/Red), (A/C compressor off).
3. If there is no voltage repair open in Yellow wire between terminal A9 and A/C clutch relay. If there is voltage, A/C signal is okay.

BRAKE LIGHT SIGNAL INSPECTION

1. Check that Brake lights come on with brake pedal pushed down. If brake lights do not come on, repair faulty brake light circuit. If brake lights do come on, See **Fig. 18**.
2. Disconnect the 12-pin and 18-pin connector from control unit. Measure the voltage between terminals A12 (Green/White) and B1 (Black/Red) with brake pedal pushed.
3. If there is no battery voltage, repair open in Green/White wire between terminal A12 and brake light switch. If there is battery voltage brake light signal is okay.

LOW SWITCH SIGNAL INSPECTION

1. Ensure LOW indicator light comes on with the ignition switch on. (It should come on for about 2 seconds). If Low indicator light is off, see **LOW INDICATOR LIGHT DOES NOT COME ON WITH IGNITION SWITCH ON (IT SHOULD COME ON FOR ABOUT 2 SECONDS)**. See **Fig. 18**.
2. If Low indicator light is on, shift to "2" position and push Low hold switch. If Low indicator light comes on, check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.
3. If Low indicator light is off, turn ignition switch off. Disconnect 12-pin and 18-pin connector. Check for continuity between terminals A8 (Yellow) and B1 (Black/Red). If there is continuity repair short to ground in Yellow wire between the terminal A8 and Low hold switch.
4. If there is no continuity, push Low hold switch. If there is still no continuity check for open in Yellow wire between terminal A8 and Low hold switch.
5. If there is continuity, check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

COMPONENT TESTS

Prior to starting any testing or diagnostics on transaxle, ensure that basic electrical connections are okay and transaxle fluid level is correct.

A/T SPEED PULSER

1. Disconnect speed pulser connector. Connect an ohmmeter across connector terminals. With front end raised, rotate front wheels. A pulse signal should be evident as speed pulser circuit makes and breaks continuity.
2. With speed pulser removed, it may be checked by passing a magnet next to pulser. The circuit should have continuity with magnet close to pulser, and circuit should be open when magnet is pulled away from pulser. See **Fig. 20**.

LOW SWITCH CONTINUITY

POSITION	TERMINAL	B	A	C	D		E
PRESS		○	○		○	Ⓜ	○
RELEASE					○	Ⓜ	○

96G26266

Fig. 19: LOW Switch Continuity

Courtesy of AMERICAN HONDA MOTOR CO., INC.

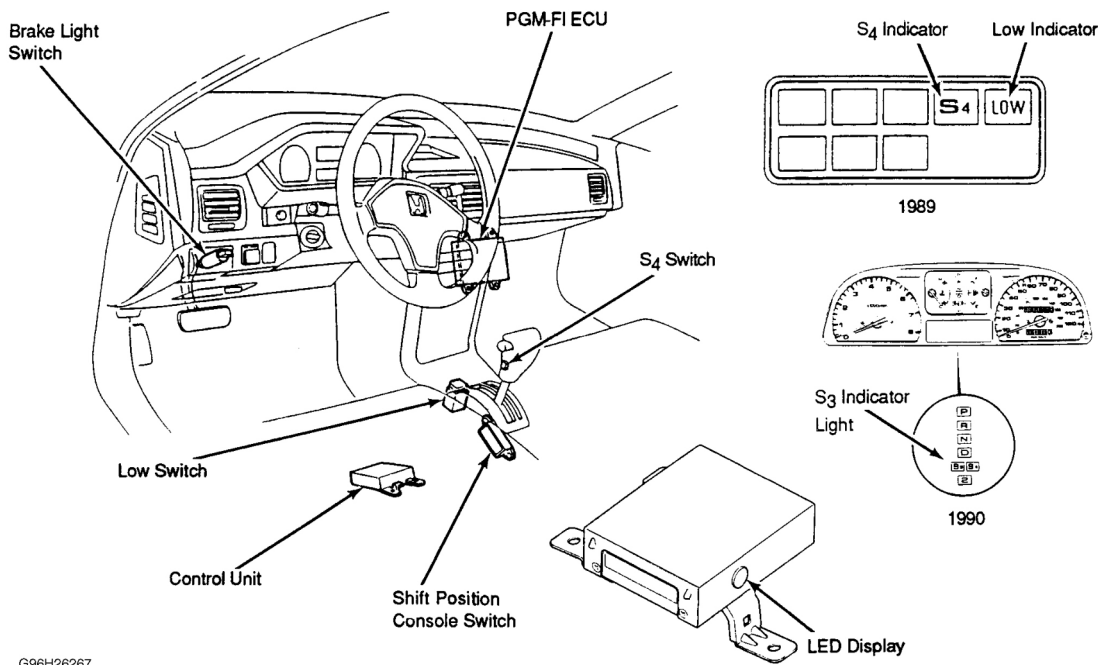


Fig. 20: Self-Diagnostic Indicator Lights
Courtesy of AMERICAN HONDA MOTOR CO., INC.

LOCK-UP CONTROL SOLENOID VALVES "A" & "B"

1. The solenoid valves are serviced and replaced as an assembly. Disconnect solenoid electrical connector. Measure resistance between individual connector contacts and ground. Resistance should be 14-30 ohms.
2. Replace solenoid assembly if either resistance value is beyond specification. Test solenoid operation by connecting 12 volts to connector terminals. A clicking sound should be heard each time a connection is made.
3. If a solenoid does not operate, check continuity between solenoid connector and ground. Replace solenoid assembly if continuity exists between ATCU terminals B3 or B8 and body ground.

LOW 1ST SWITCH

Remove console, disconnect switch connector and remove Low switch. Check for continuity between terminals by pressing and releasing switch button according to illustration. See **Fig. 19**. Replace switch if there is no continuity.

SHIFT CONTROL SOLENOIDS "A" & "B"

1. Disconnect solenoid electrical connector. Measure resistance between individual connector contacts and ground. Resistance should be 12-14 ohms.
2. Replace solenoid assembly if either resistance value is beyond specification. Test solenoid operation by connecting 12 volts to connector terminals. A clicking sound should be heard each time a connection is made.

"S4" SWITCH

Remove center console and disconnect switch connector. Check for continuity between "A" and "B" terminals when switch is pressed. Replace switch if there is no continuity.

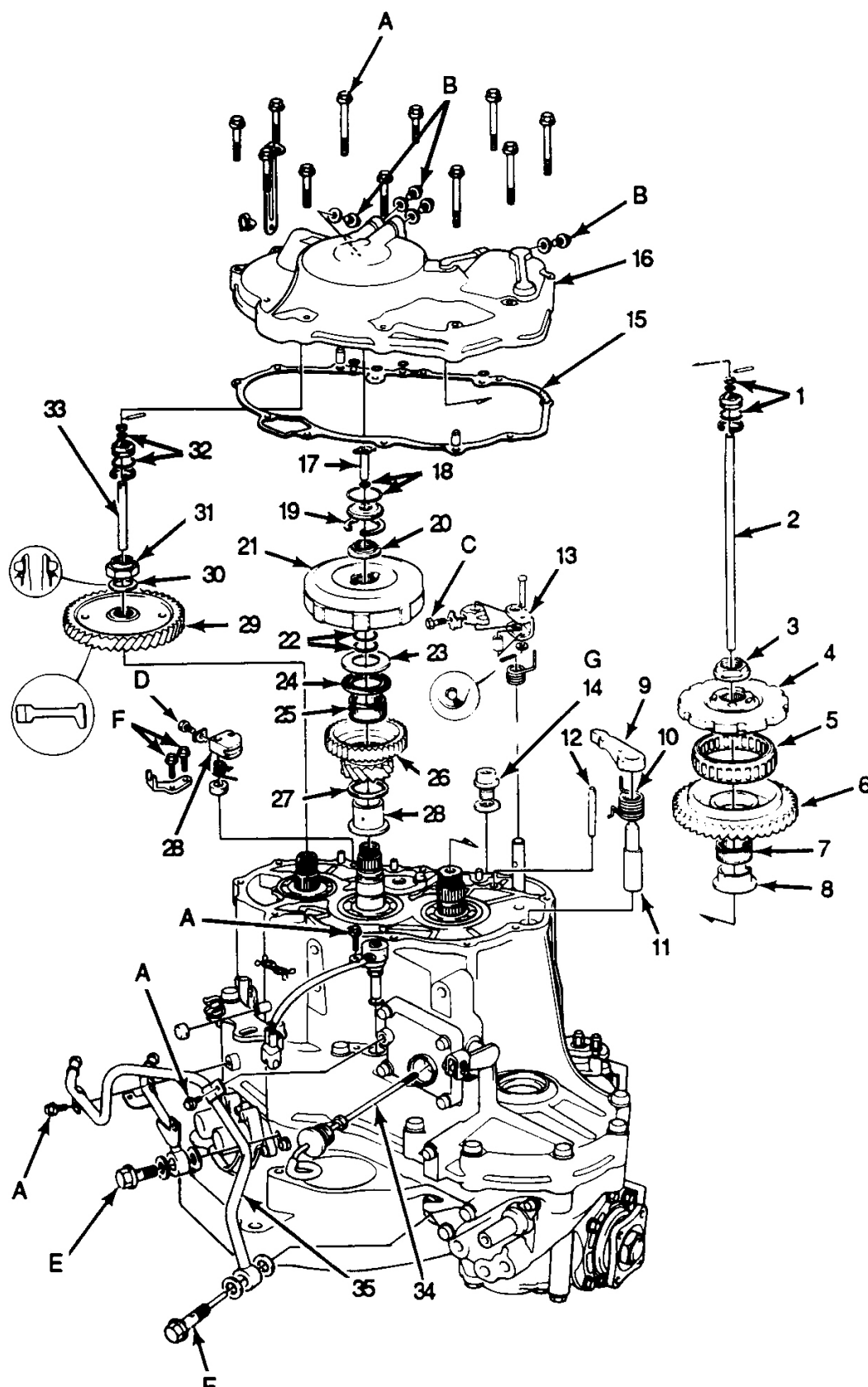
REMOVAL & INSTALLATION

For transaxle removal procedures, see appropriate REMOVAL & INSTALLATION article.

TRANSAXLE DISASSEMBLY

For transaxle disassembly, See **Fig. 21**. Remove right side cover, transaxle cover, shift control solenoid valve, ATF cooler pipes and level gauge. Install Mainshaft Holder (07923-6890202), remove mainshaft lock nut and 1st clutch assembly and 1st gear. Remove countershaft lock nut. Install puller and remove parking gear and countershaft 1st gear. Remove parking brake assembly. Lock subshaft 1st gear, remove lock nut and remove 1st gear with puller. Remove change cover, disconnect central shaft from change lever. Align central shaft groove with spring pin. Use Housing Puller (07HAL-PK40100). Install puller over countershaft using 4 bolts and tighten securely. Screw puller bolt against end of countershaft until housing is broken loose. Refer to individual component under **COMPONENT DISASSEMBLY & REASSEMBLY** for further information. See **Fig. 21** and **Fig. 22** .

NOTE: When viewing **Fig. 21**, refer to **FIGURE 21 LEGEND** and **FIGURE 21 TORQUE SPECIFICATIONS** tables.



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Fig. 21: Exploded View Of Right Side Cover Disassembly (See Appropriate Table For Legend)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FIGURE 21 LEGEND

Number	Description
1	"O" Ring
2	Clutch Feed Pipe
3	Countershaft Lock Nut
4	Parking Gear
5	One-Way Clutch
6	Countershaft 1st Gear
7	Needle Bearing
8	Collar
9	Parking Brake Pawl
10	Parking Pawl Spring
11	Parking Pawl Shaft
12	Stop Pin
13	Parking Brake Lever
14	Drain Plug
15	Gasket
16	Right Side Cover
17	Clutch Feed Pipe
18	"O" Ring
19	Snap Ring
20	Mainshaft Lock Nut
21	1st Clutch Assembly
22	"O" Ring
23	Thrust Washer
24	Thrust Needle Bearing
25	Needle Bearing
26	Main 1st Gear
27	Thrust Washer
28	Main 1st Gear Collar
29	Subshaft 1st Gear
30	Spring Washer
31	Subshaft Lock Nut
32	"O" Ring
33	Clutch Feed Pipe
34	ATF Level Gauge
35	ATF Cooler Pipe

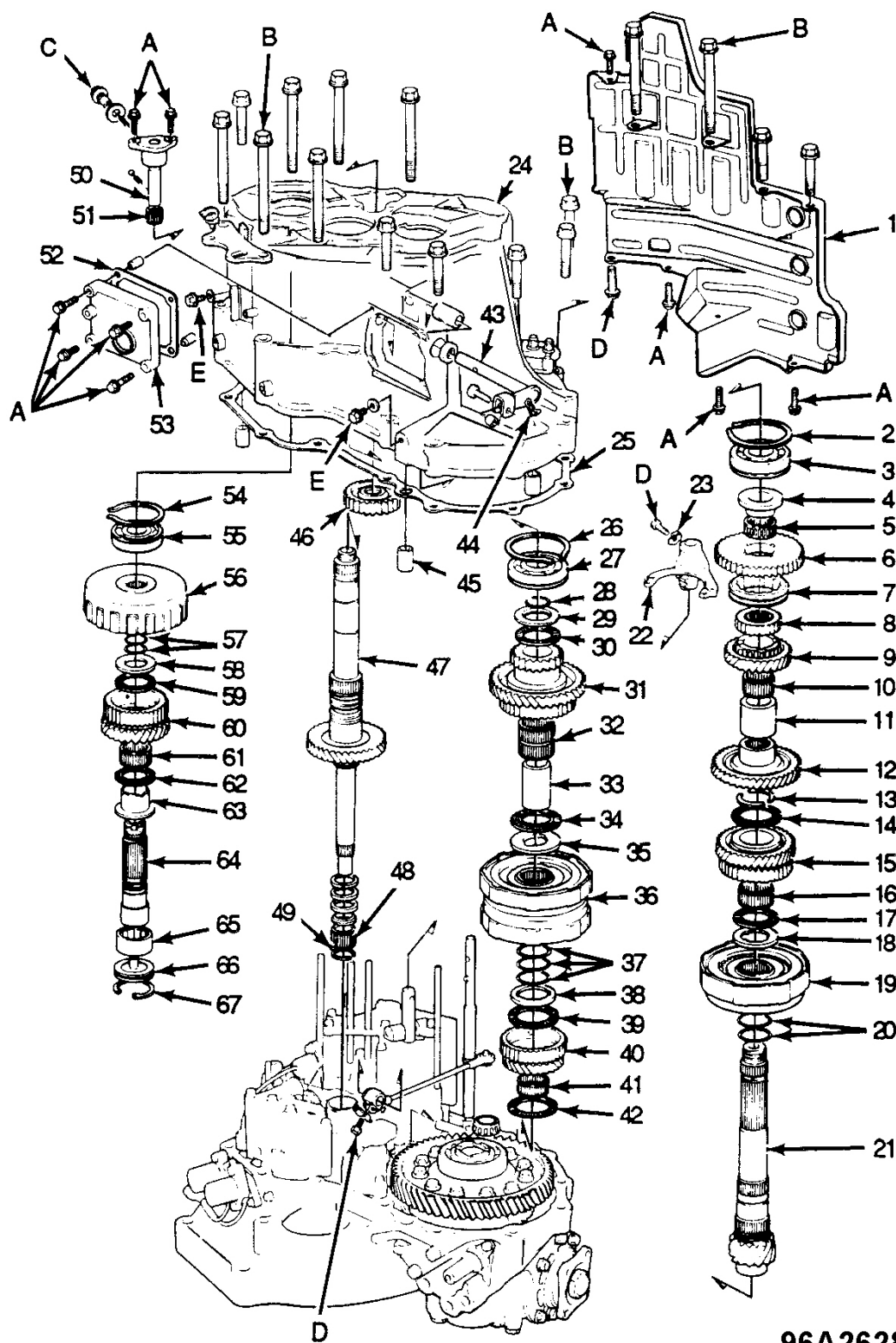
FIGURE 21 TORQUE SPECIFICATIONS

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Letter	Fastener Description	Ft. Lbs (N.m)
A	6 mm	9 (12)
B	24 mm	145 (200)
C	24 mm LH Threads	116 (160)
D	24 mm	116 (160)
E	10 mm	40 (55)
F	12 mm Joint Bolts	21 (29)
G	18 mm Drain Bolt	36 (50)

NOTE: When viewing Fig. 22, refer to FIGURE 22 LEGEND and FIGURE 22 TORQUE SPECIFICATIONS tables.



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Fig. 22: Exploded View Of Housing, Mainshaft, Countershaft & Subshaft (See Appropriate Table For Legend)

Courtesy of AMERICAN HONDA MOTOR CO., INC.

FIGURE 22 LEGEND

Item No.	Description
1	Transaxle Cover
2	Snap Ring
3	Ball Bearing
4	Countershaft Reverse Gear Collar
5	Needle Bearing
6	Countershaft Reverse Gear
7	Reverse Selector
8	Reverse Selector Hub
9	Countershaft 4th Gear
10	Needle Bearing
11	Collar
12	Countershaft 2nd Gear
13	Cotter Washer
14	Thrust Needle Bearing
15	Countershaft 3rd Gear
16	Needle Bearing
17	Thrust Needle Bearing
18	Thrust Washer
19	3rd Clutch Assembly
20	"O" Ring
21	Countershaft
22	Reverse Shaft Fork
23	Lock Washer
24	Transaxle Housing
25	Gasket
26	Snap Ring
27	Ball Bearing
28	Snap Ring
29	Thrust Washer
30	Thrust Needle Bearing
31	Mainshaft 4th/Reverse Gear
32	Needle Bearing
33	Collar
34	Thrust Needle Bearing
35	Thrust Washer
36	2nd/4th Clutch Assembly

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37	"O" Rings
38	Thrust Washer
39	Thrust Needle Bearing
40	Mainshaft 2nd Gear
41	Needle Bearing
42	Thrust Needle Bearing
43	Change Lever
44	Special Pin
45	Dowel Pin
46	Reverse Idler Gear
47	Mainshaft
48	Needle Bearing
49	Snap Ring
50	Reverse Idler Shaft
51	Needle Bearing
52	Change Cover Gasket
53	Change Cover
54	Snap Ring
55	Ball Bearing
56	1st Hold Clutch Assembly
57	"O" Rings
58	Thrust Washer
59	Thrust Needle Bearing
60	Subshaft 4th Gear
61	Needle Bearing
62	Thrust Needle Bearing
63	Subshaft 4th Gear Collar
64	Subshaft
65	Needle Bearing
66	Guide Plate
67	Snap Ring

FIGURE 22 TORQUE SPECIFICATIONS

Letter	Fastener Description	Ft. Lbs. (N.m)
A	6 mm	9 (12)
B	24 mm	145 (200)
C	24 mm LH Threads	116 (160)
D	24 mm	116 (160)
E	10 mm	40 (55)
F	12 mm Joint Bolts	21 (29)
G	18 mm Drain Bolt	36 (50)

COMPONENT DISASSEMBLY & REASSEMBLY

ONE-WAY CLUTCH/PARKING GEAR

Disassembly

Separate countershaft 1st gear from parking gear by turning parking gear in clockwise direction. Remove one-way clutch by prying up using screwdriver.

CAUTION: DO NOT pry on 3 copper friction strips. If strip is broken or damaged, clutch will not operate properly.

Cleaning & Inspection

Inspect parking gear and countershaft 1st gear for wear or scoring. Inspect one-way clutch for damage or faulty movement.

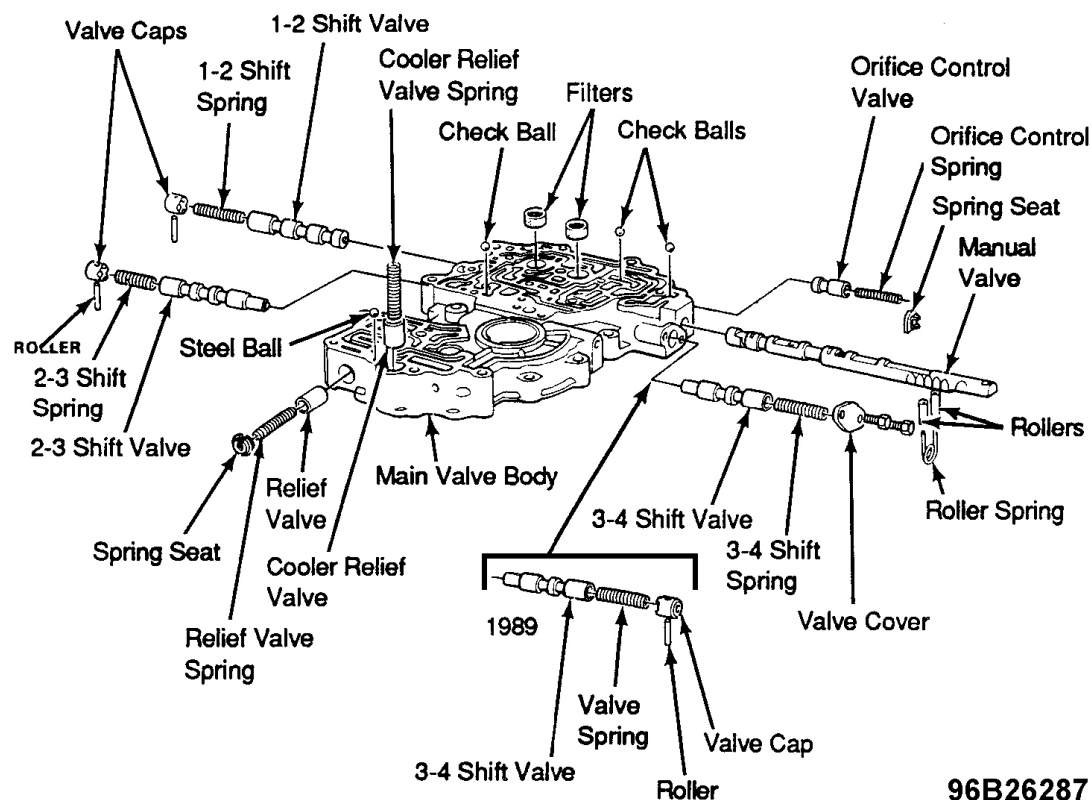
Reassembly

After parts are assembled, hold countershaft 1st gear and turn parking gear in clockwise direction to ensure that it rotates freely.

MAIN VALVE BODY

Disassembly

Accumulator cover is spring loaded. To prevent possibility of stripping threads from converter housing, press down on accumulator cover while removing bolts in a crisscross pattern. Follow this procedure for installation as well. **DO NOT** use a magnet to remove steel balls. Balls may become magnetized and result in improper transaxle operation. Note installed position of all valves and springs for reassembly reference. See **Fig. 23**.



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Fig. 23: Exploded View of Main Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Cleaning & Inspection

1. Thoroughly clean all parts in solvent or carburetor cleaner. Dry using compressed air and blow out all passages. Replace valve body as an assembly if any parts are worn or damaged.
2. Check that all valves move freely. If valves do not move freely polish off burrs or rough areas using ATF soaked No. 600 abrasive paper. Rewash entire valve body and parts thoroughly if polishing was needed.
3. Ensure that all springs meet specifications. See **SPRING FREE LENGTH** table. Coat all parts in ATF before reassembly.

SPRING FREE LENGTH

Application	Free Length: In. (mm)
1-2 Shift	1.59 (40.4)
2-3 Shift	1.41 (35.8)
2nd Accumulator	3.48 (88.4)
2nd Orifice Control Valve	1.52 (38.5)
3-4 Shift	2.35 (59.7)
3-4 Shift Ball 1	.44 (11.3)
3rd Accumulator	3.15 (80.0)

1990 Honda Civic EX**1989-90 AUTOMATIC TRANSMISSIONS S5 Electronic Controls & Overhaul**

3rd Accumulator ⁽¹⁾	3.06 (77.6)
4-2 Kickdown Valve	1.68 (42.7)
4-2 Kickdown Valve 1	1.61 (45.3)
4-3 Kickdown Valve	1.68 (42.7)
4th Accumulator	3.08 (78.3)
4th Exhaust Valve	1.46 (37.0)
Cooler Relief Valve	1.43 (36.4)
CPC Valve	1.24 (31.6)
Low Accumulator A	2.81 (71.3)
Low Accumulator B	2.34 (59.5)
L/C Control Springs A, B and C 1	1.50 (38.0)
L/C Control	1.65 (42.0)
L/C Shift Valve	2.01 (51.0)
L/C Timing Valve B	1.60 (40.7)
Modulator Valve Springs A and B	1.30 (33.0)
Regulator Valve Spring A	3.41 (86.5)
Regulator Valve Spring B	1.73 (44.0)
Relief Valve	2.05 (52.0)
Servo Control Valve	1.88 (47.8)
Servo Orifice Control Valve	1.41 (35.9)
Servo Return Springs A and B	1.59 (40.3)
Stator Reaction	1.19 (30.3)
Throttle Control Valve B	1.63 (41.3)
Throttle Control Valve B Adjuster	1.18 (30.0)
Torque Converter Check Valve	1.43 (36.4)
(1) 1989 models only.	

NOTE: Before using No. 600 abrasive paper, ensure that it has been soaked in ATF for about 30 minutes.

Reassembly

1. Install 3-4 shift valve and shift valve spring with cap. Secure in place using roller (or roll pin). Install 1-2 and 2-3 shift valves in main valve body in same manner as for 3-4 shift valve.
2. Install manual valve, rollers (6 x 16 mm) and spring. Set relief spring in relief valve and install in main valve body.
3. Install spring using screwdriver, and install check valve cap with cutout (slot) aligned with screwdriver.
4. Install orifice control valve in main valve body in same manner described in step 3.

NOTE: 1990 3-4 shift valve is secured in place with valve cover. Torque 2 bolts to 71 INCH lbs. (8 N.m).

OIL PUMP

Cleaning & Inspection

1. Install pump gears and shaft in main valve body. Install oil pump shaft and measure side clearance of drive and driven gears.
2. Standard pump side (radial) drive gear clearance should be .0094-.0105" (.240-.266 mm). Driven gear (radius) clearance should be .0025-.0035" (.063-.0088 mm). Inspect teeth for wear or damage.
3. Measure thrust clearance of driven gear-to-valve body. Standard clearance should be .001-.002" (.03-.05 mm). Service limit is .0028" (.07 mm).

SECONDARY VALVE BODY

Disassembly

Note installed position of all valves and springs for reassembly reference. See **Fig. 24**.

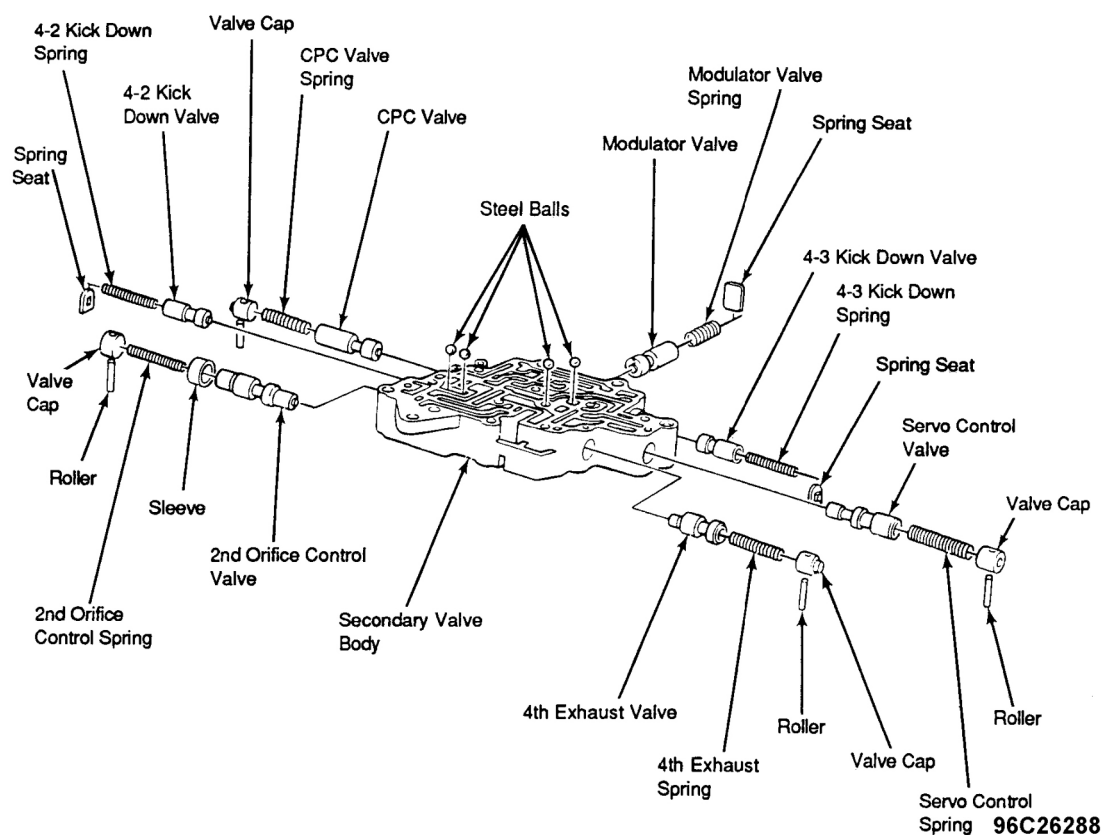


Fig. 24: Exploded View of Secondary Valve Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Cleaning & Inspection

1. Thoroughly clean all parts in solvent or carburetor cleaner. Dry using compressed air and blow out all passages. Replace valve body as an assembly if any parts are worn or damaged.
2. Check that all valves move freely. If valves do not move freely polish off burrs or rough areas using ATF soaked No. 600 abrasive paper. Rewash entire valve body and parts thoroughly if polishing was needed.
3. Make sure all springs are the correct specifications. Refer to the **SPRING FREE LENGTH** table. Coat all parts in ATF before reassembly.

Reassembly

For reassembly reference, refer to exploded view of valve body assembly. See **Fig. 24**.

REGULATOR VALVE BODY

Disassembly

Secure retainer in place while removing lock bolt. When bolt is removed, release retainer slowly. See **Fig. 25**.

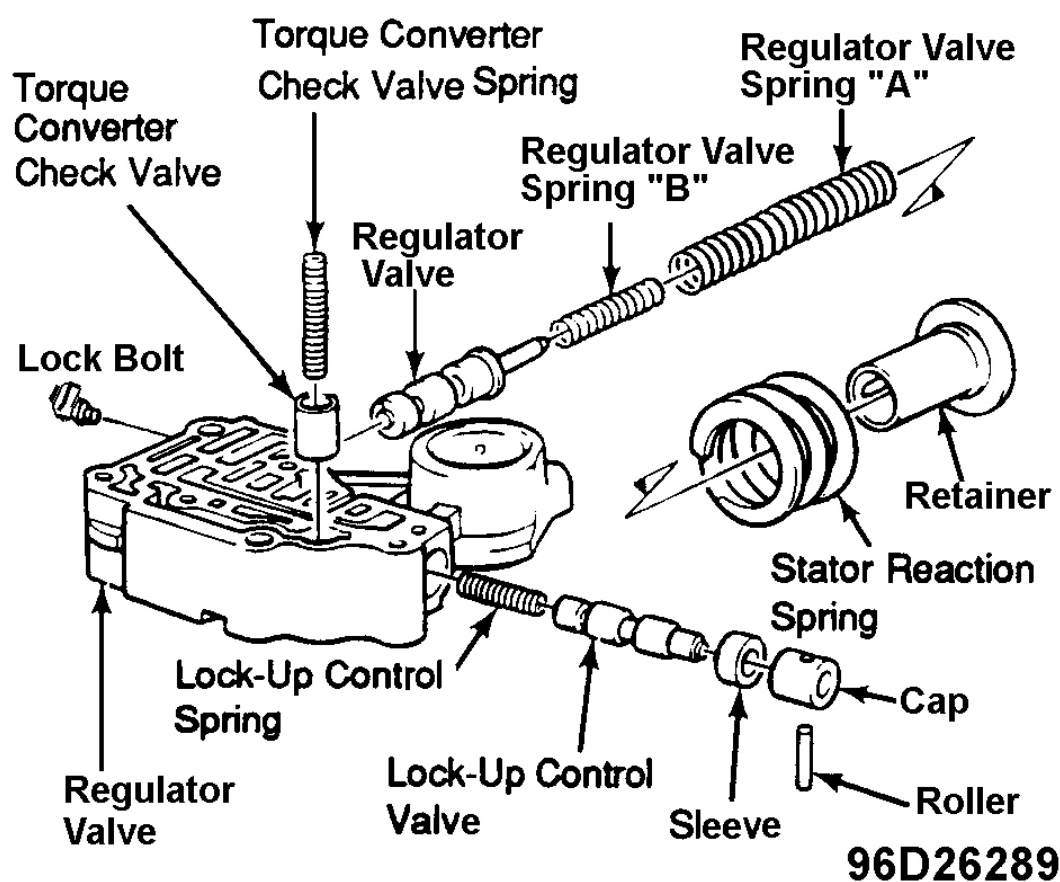


Fig. 25: Exploded View of Regulator Valve Body

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Cleaning & Inspection

1. Thoroughly clean all parts in solvent or carburetor cleaner. Dry using compressed air and blow out all passages. Replace valve body as an assembly if any parts are worn or damaged.
2. Ensure all valves move freely. If valves do not move freely polish off burrs or rough areas using ATF soaked No. 600 abrasive paper. Rewash entire valve body and parts thoroughly if polishing was needed.
3. Make sure all springs are the correct specifications. See **SPRING FREE LENGTH** table. Coat all parts in ATF before reassembly.

Reassembly

Install regulator valve and regulator inner and outer spring. Install reaction spring, spring seat and retainer. Align hole in retainer with hole in valve body. Press retainer into valve body and torque lock bolt to 106 INCH lbs. (12 N.m). Install lock-up control valve and secure in place with roller and cap.

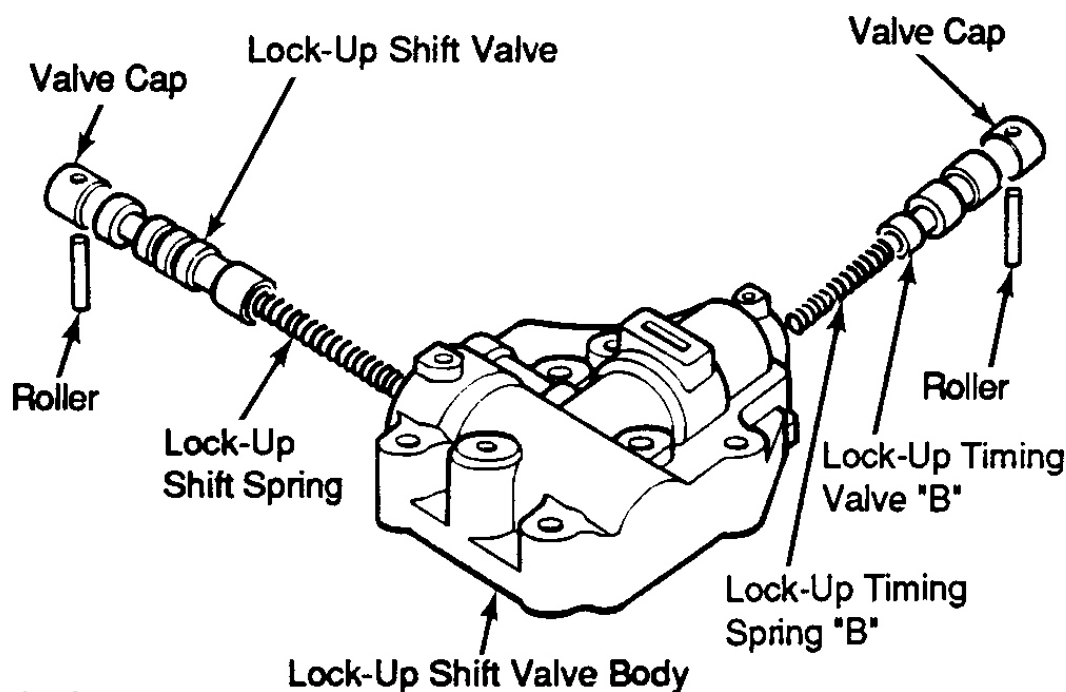
LOCK-UP SHIFT VALVE BODY

Disassembly & Reassembly

For disassembly and reassembly reference, refer to exploded view of lock-up shift valve body assembly. See **Fig. 26**.

Cleaning & Inspection

1. Thoroughly clean all parts in solvent or carburetor cleaner. Dry using compressed air and blow out all passages. Replace valve body as an assembly if any parts are worn or damaged.
2. Ensure all valves move freely. If valves do not move freely, polish off burrs or rough areas using ATF soaked No. 600 abrasive paper. Rewash entire valve body and parts thoroughly if polishing was needed.
3. Make sure all springs measure to specifications. See **SPRING FREE LENGTH** table. Coat all parts in ATF before reassembly.



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Fig. 26: Exploded View of Lock-Up Shift Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

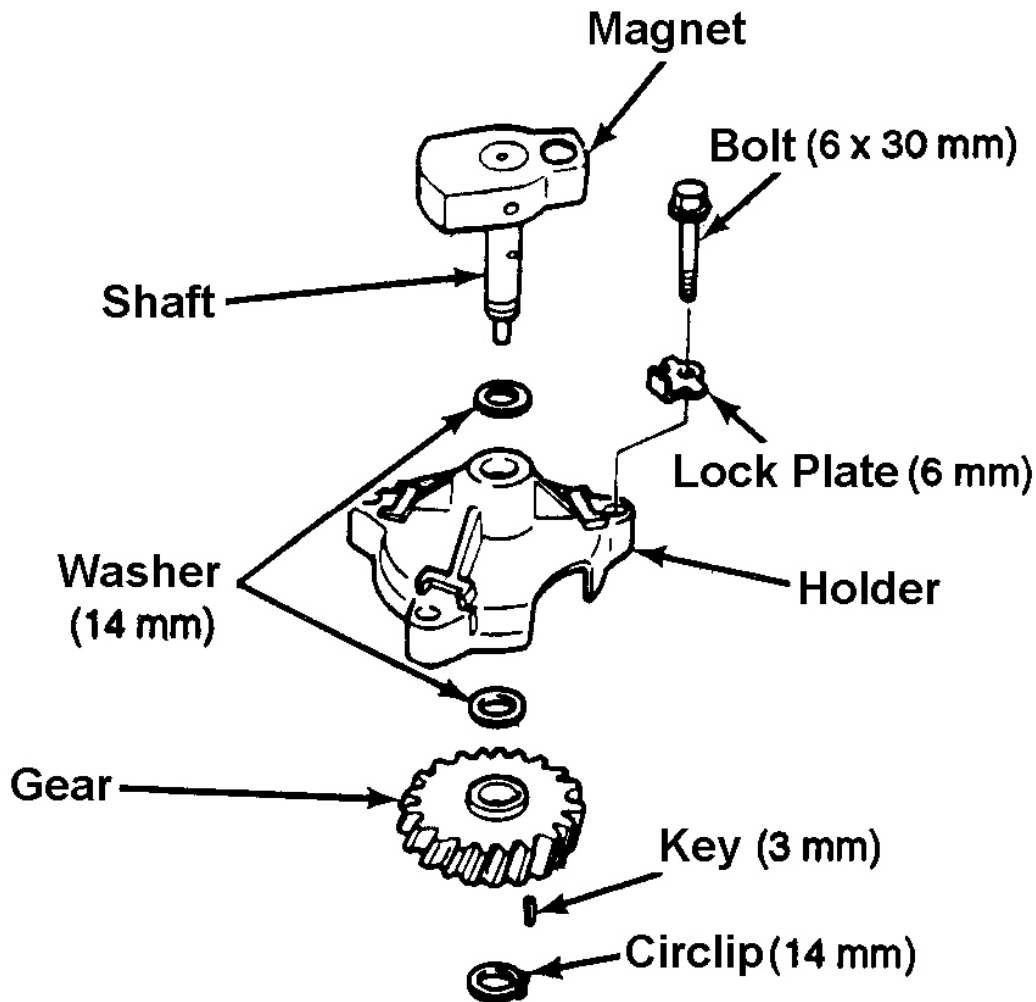
A/T SPEED PULSER ROTOR

Disassembly

For disassembly reference, refer to exploded view of A/T Speed Pulser Rotor Assembly. See **Fig. 27**.

Cleaning & Inspection

Thoroughly clean all parts in solvent or carburetor cleaner. Dry using compressed air, blow out all passages. Inspect for wear or damage, replace gear and shaft if worn or damaged.



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Fig. 27: Exploded View of A/T Speed Pulser Rotor
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

SERVO VALVE BODY

Disassembly & Reassembly

For disassembly and reassembly reference, refer to exploded view of servo valve body assembly. See **Fig. 28**.

Cleaning & Inspection

1. Thoroughly clean all parts in solvent or carburetor cleaner. Dry using compressed air and blow out all passages. Replace valve body as an assembly if any parts are worn or damaged.

2. Ensure all valves move freely. If valves do not move freely polish off burrs or rough areas using ATF soaked No. 600 abrasive paper. Rewash entire valve body and parts thoroughly if polishing was needed.
3. Make sure all spring meet specifications. See **SPRING FREE LENGTH** table. Coat all parts in ATF before reassembly.

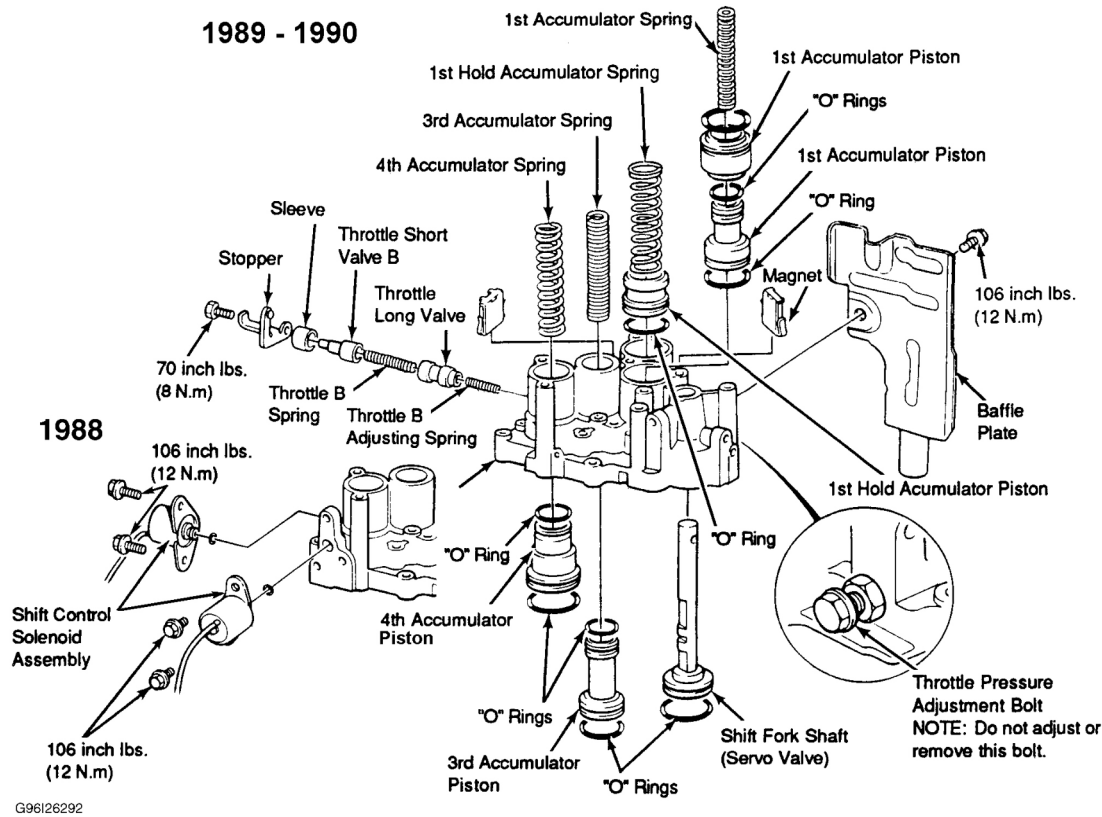


Fig. 28: Exploded View of Servo Valve Body
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

MAINSHAFT & COUNTERSHAFT

Disassembly

For disassembly reference, refer to exploded view of mainshaft and countershaft assembly. See **Fig. 15** and **Fig. 16**.

Cleaning & Inspection

1. Check all splines for excessive wear or damage. Also check bearing surfaces for scoring, scratches or excessive wear. Replace metal seal rings.
2. Check needle bearings for galling and rough movement. Replace all "O" rings.

Reassembly

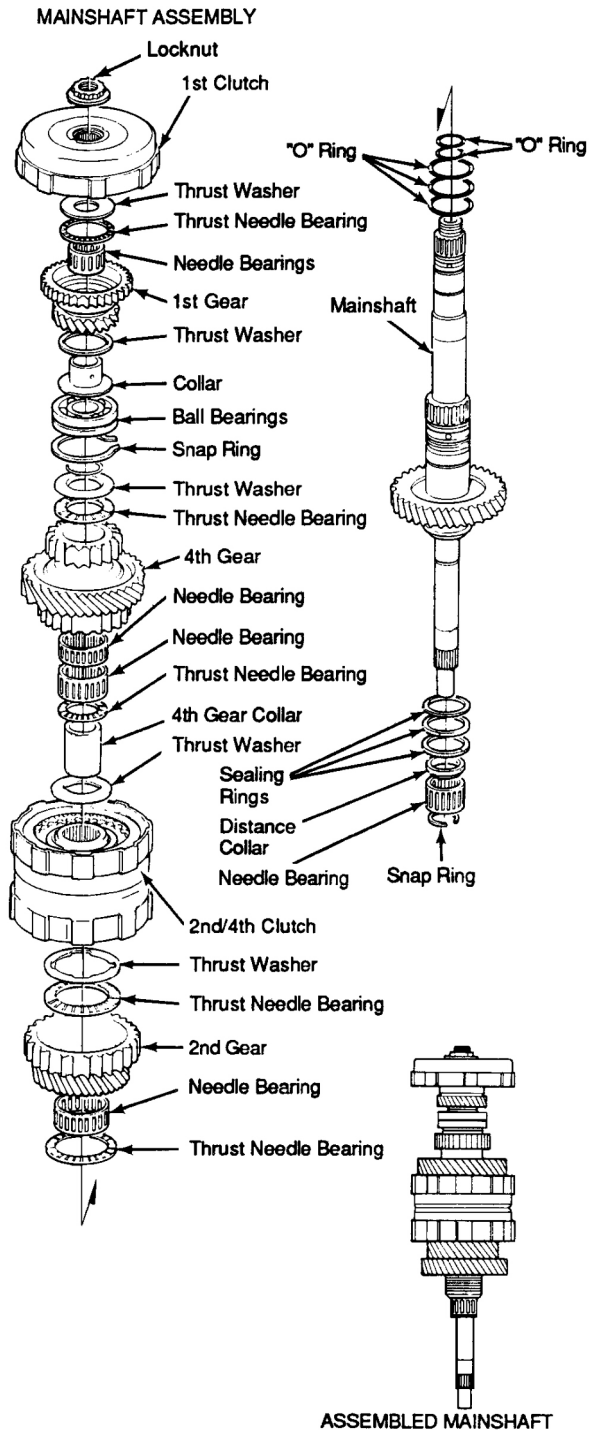
Lubricate all parts with ATF prior to reassembly. Install thrust needle bearings with unrolled edge of bearing retainer facing washer.

COUNTERSHAFT/MAINSHAFT CLEARANCE MEASUREMENTS

1. Remove both mainshaft and countershaft bearing from mission housing. Assemble mainshaft and countershaft, including bearings. See **Fig. 29** and **Fig. 30**.

NOTE: Countershaft lock nut has LEFT-HAND threads.

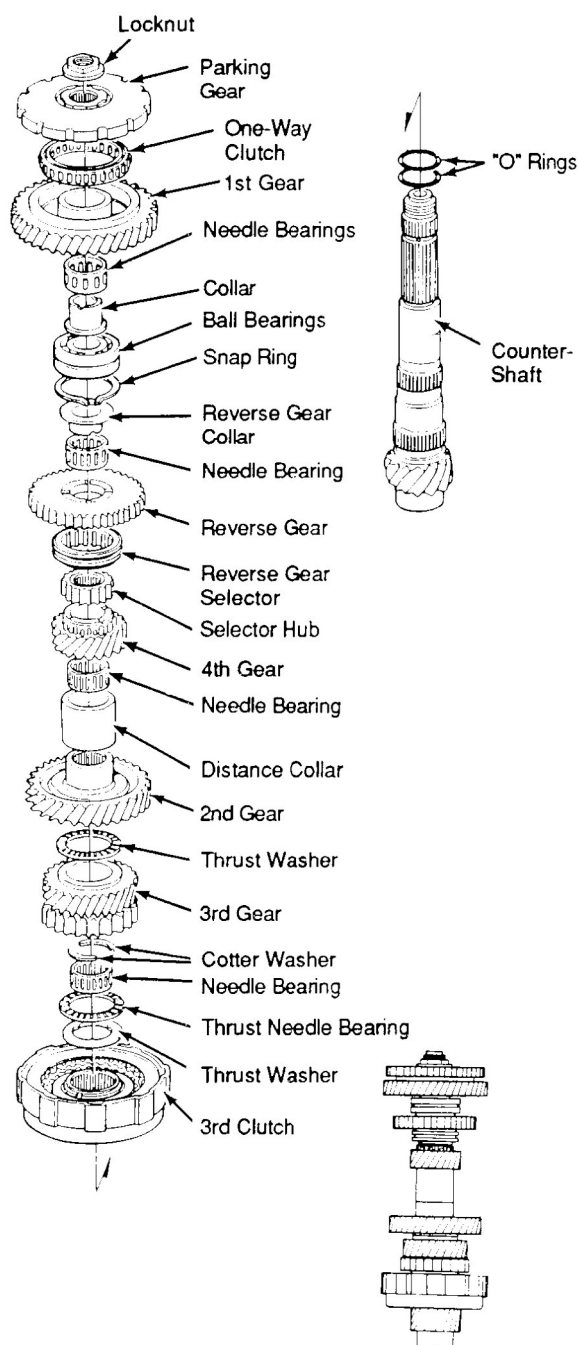
2. Torque mainshaft and countershaft lock nuts to 22 ft. lbs. (30 N.m). Measure clearance between shoulder on selector hub and shoulder on 4th gear countershaft.
3. Standard clearance on countershaft should be .003-.006" (.07-.15 mm). See **Fig. 31**. If clearance exceeds limit, measure thickness of spacer collar and select replacement which gives correct clearance. Replacement collars are available in sizes from 1.535-1.545" (38.99-39.24 mm), in increments of .004" (.10 mm).
4. Ensure that all measurements are correct before changing thrust washers. Recheck after making adjustments.
5. On mainshaft, measure clearance between shoulder of 2nd gear and main 3rd gear in the same manner as previously described. See **Fig. 31**. Standard (new) mainshaft 2nd gear clearance should be .003-.006" (.07-.15 mm).
6. If clearance exceeds service limit, measure thickness of 2nd clutch thrust washer (36 mm ID) and select replacement which gives correct clearance. Replacement washers are available in sizes from .137-.138" (3.47-3.5 mm) in increments of .001 (.03 mm).



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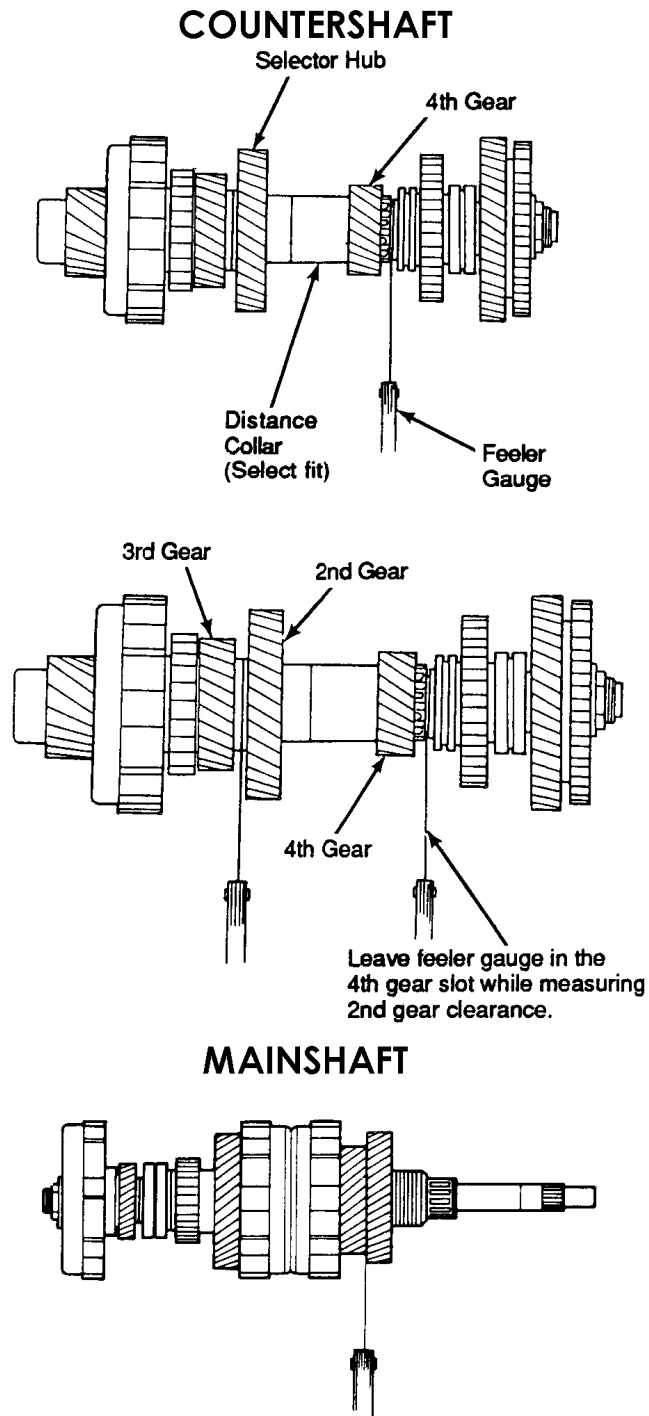
Fig. 29: Exploded View of Mainshaft
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

COUNTERSHAFT ASSEMBLY



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Fig. 30: Exploded View of Countershaft
 Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 31: Measuring Countershaft & Mainshaft Clearance
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

SUBSHAFT

Disassembly

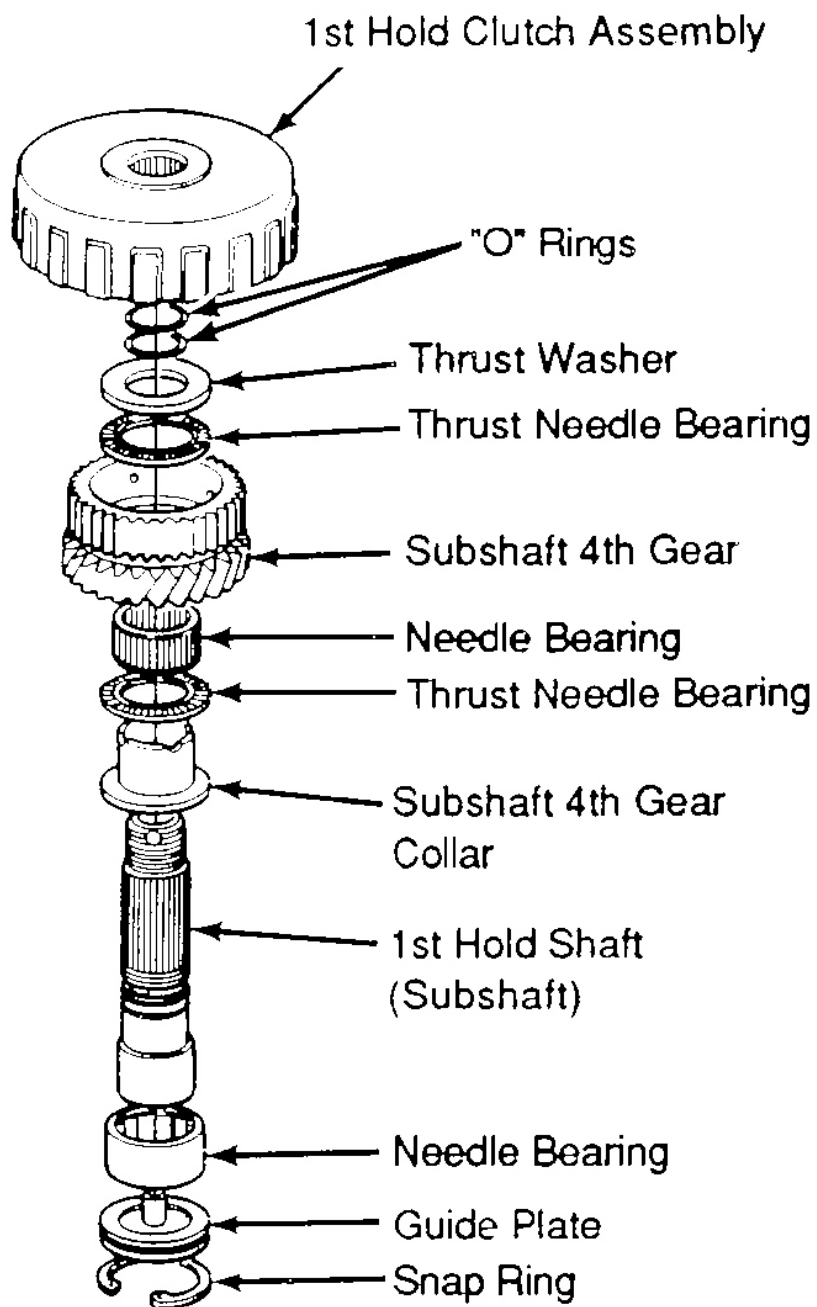
For disassembly reference, refer to exploded view of subshaft assembly. See **Fig. 32**.

Cleaning & Inspection

1. Check all splines for excessive wear or damage. Also check bearing surfaces for scoring, scratches or excessive wear. Replace metal seal rings.
2. Check needle bearings for galling and rough movement. Replace all "O" rings.

Reassembly

Lubricate all parts with ATF prior to reassembly. Install thrust needle bearings with unrolled edge of bearing retainer facing washer.



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Fig. 32: Exploded View of Subshaft

Courtesy of AMERICAN HONDA MOTOR CO., INC.

CLUTCH

Disassembly

1. On 1st, 2nd, 3rd and 4th clutch, remove snap ring, end plate, clutch discs and plates. Remove clutch piston plate. Using Spring Compressor (07HAE-PL50100), compress clutch return spring. See **Fig. 33**.

CAUTION: If either end of compressor attachment is set over an area of retainer which is unsupported by spring, retainer may be damaged.

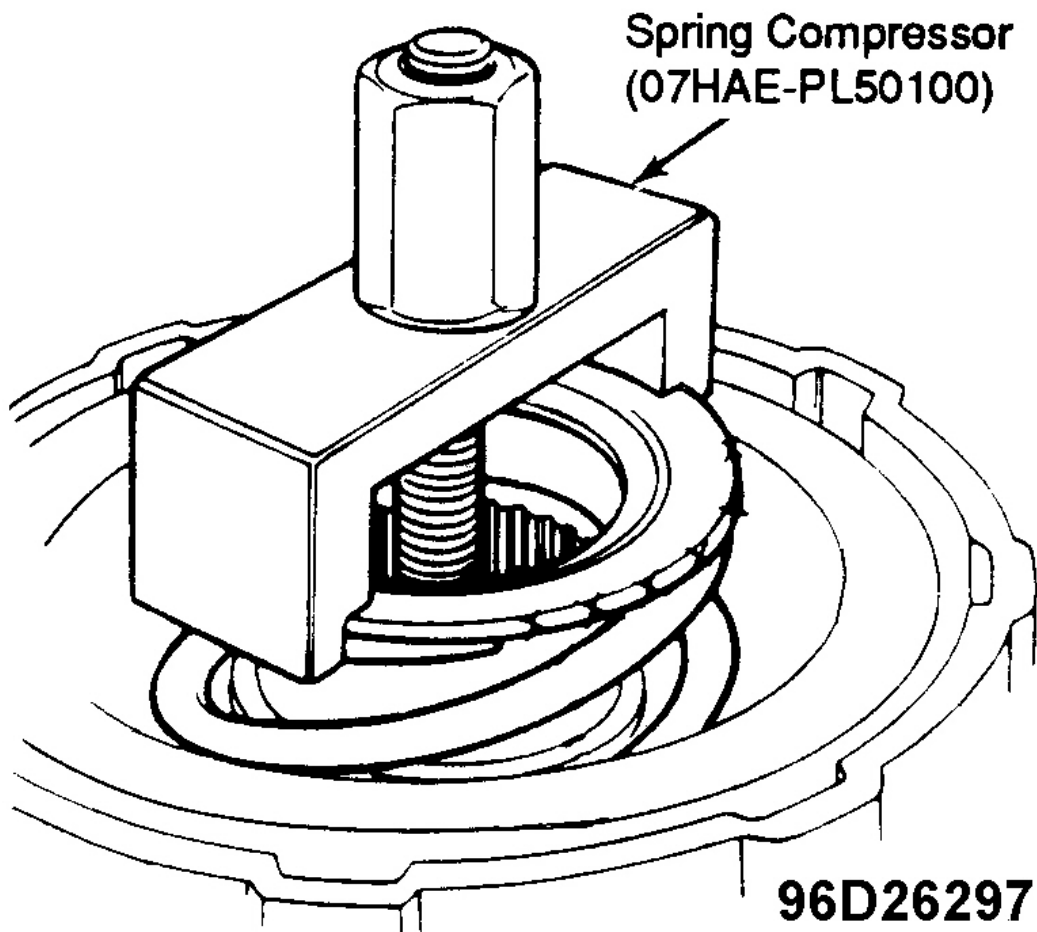


Fig. 33: Positioning Clutch Spring Compressor
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. On 1st and 3rd clutch, assemble spring compressor on clutch drum and compress clutch return spring. Follow same procedure for 2nd and 4th clutch.
3. Remove snap ring, spring compressor, spring retainer and spring. With clutch drum wrapped in shop towel, apply compressed air to oil passage to remove piston. Place finger tip on other end while applying

air pressure.

Cleaning & Inspection

Clean all parts thoroughly using solvent and dry using compressed air. Ensure that all passages are blown out. Lubricate all parts with ATF before reassembly. Use new "O" ring on clutch pistons.

CAUTION: Before installing plates and discs, ensure that inside of clutch drum is free of dirt or other foreign matter. DO NOT pinch "O" ring by forcing piston installation.

Reassembly

1. Make sure that clutch discs are thoroughly soaked in ATF for a minimum of 30 minutes before installation. During reassembly ensure that piston plate and spring washer are installed correctly. See **Fig. 34**.

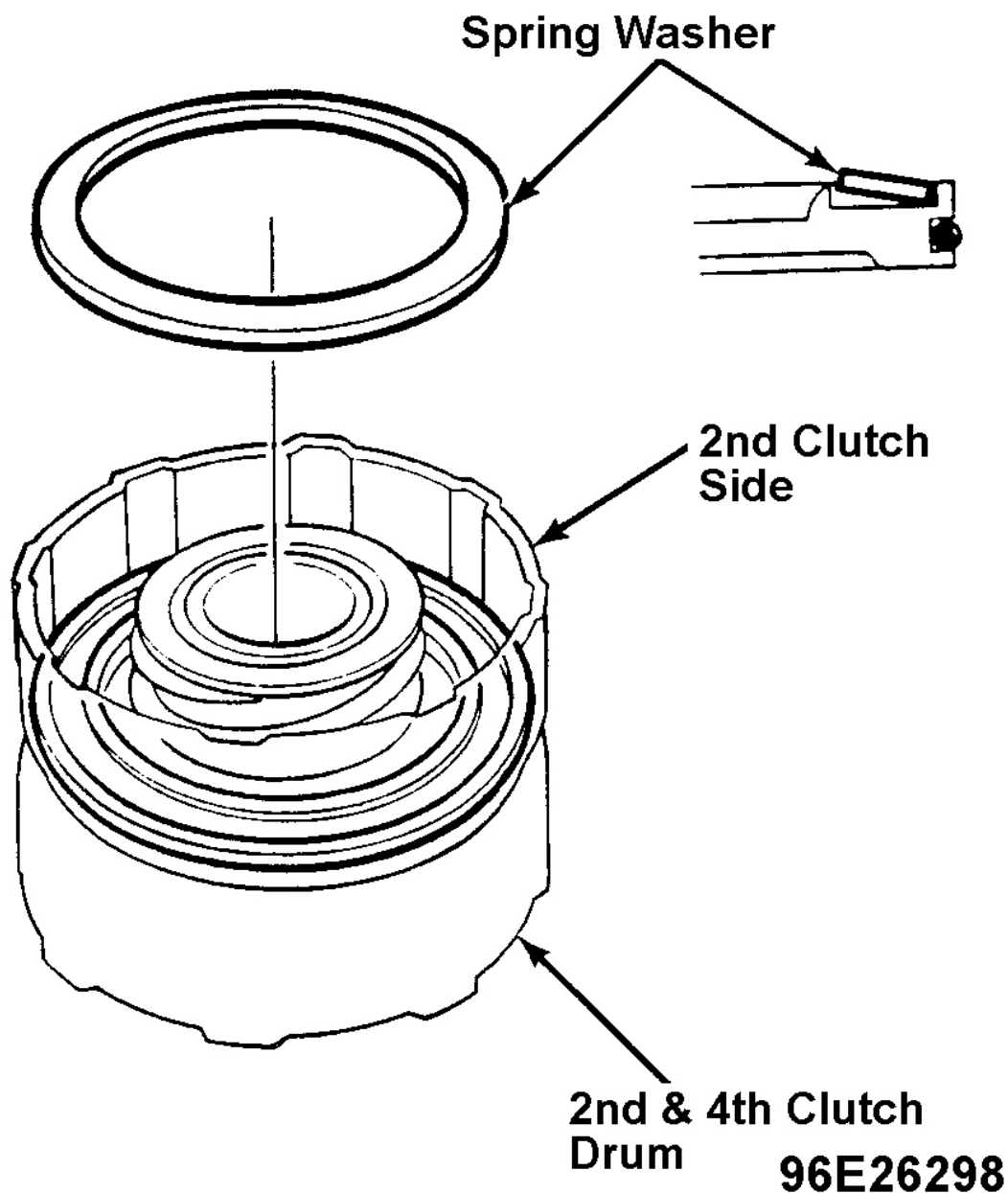


Fig. 34: Installing Spring Washer

Courtesy of AMERICAN HONDA MOTOR CO., INC.

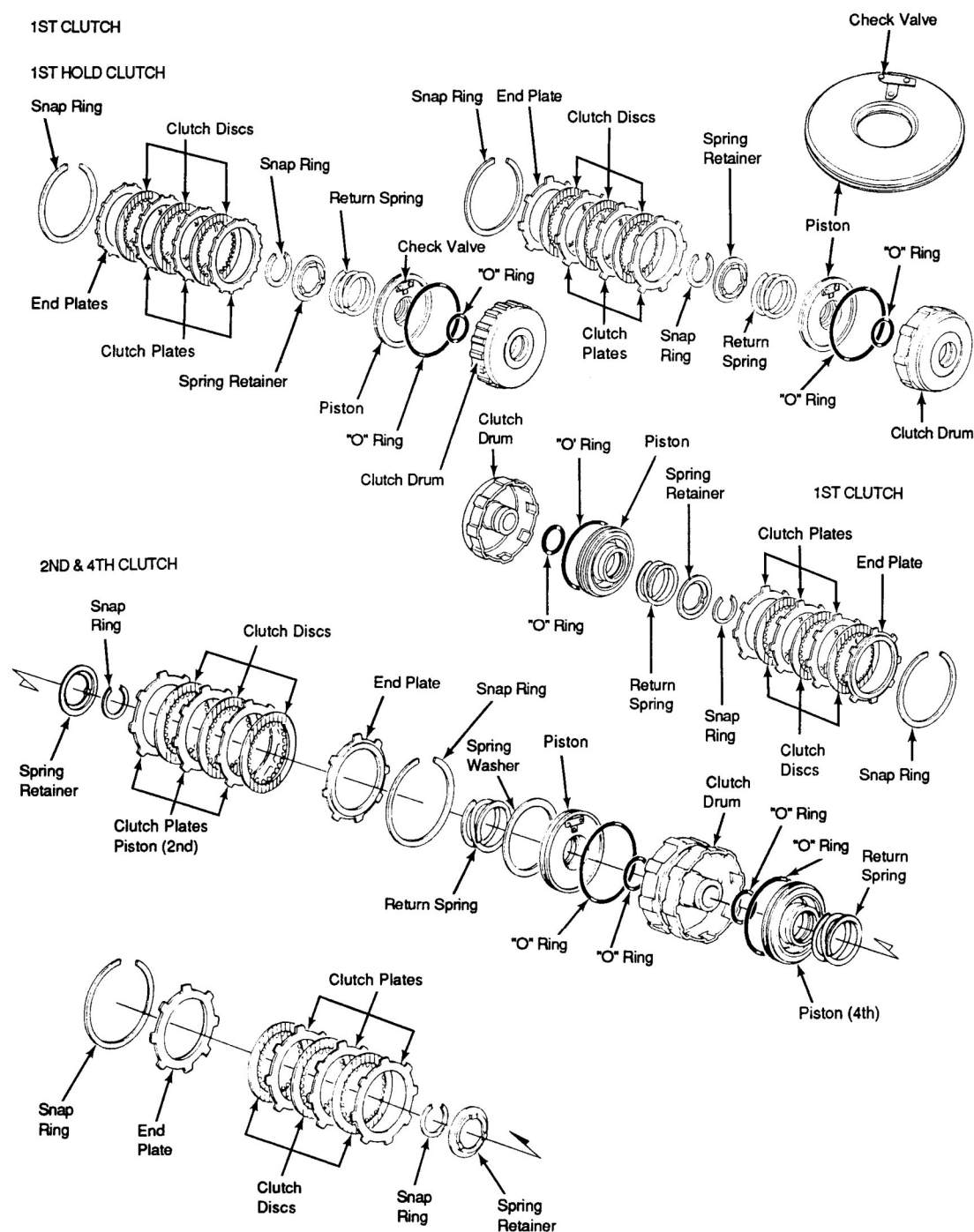
2. Reverse disassembly to continue with reassembly. Starting with clutch plate, alternately install clutch plates and discs.
3. Install clutch end plate with flat side toward disc. Install 125 mm snap ring. Check engagement by blowing air into oil passage in clutch drum hub. Remove air pressure and check that clutch releases. See **Fig. 35**.

4. Using bent feeler gauge, carefully measure clearance between clutch end plate and top disc. **DO NOT** damage disc. See **END PLATE-TO-TOP DISC CLEARANCE** table.

END PLATE-TO-TOP DISC CLEARANCE

Gear Position	Service Limit - In. (mm)
1st	.026-.033 (.65-.85)
2nd	.026-.031 (.65-.80)
3rd	.016-.024 (.40-.60)
4th	.016-.024 (.40-.60)
1st Hold	.026-.033 (.65-.85)

5. If end plate-to-top disc clearance is not within service limits, select a new clutch end plate. Clutch end plates are available in sizes from .09-.11" (2.4-2.7 mm) in increments of .004" (.10 mm).



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Fig. 35: Exploded View of S-5 Clutch Assemblies
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SHIFT CONTROL SOLENOID (1989 S-5 ONLY)

Disassembly

1. Remove mounting bolts, connector and rubber seal. Pull harness and connector of shift control solenoid valve assembly toward inside of housing.
2. Remove shift control solenoid valve "A" from servo valve body, then remove shift control valve "B" from main valve body.

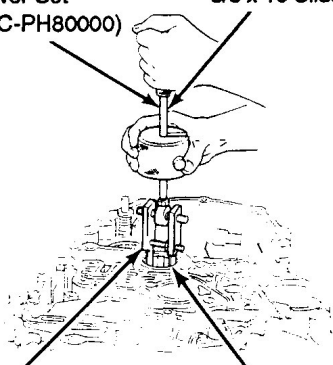
NOTE: Shift control solenoid valves and harness are removed as an assembly and should not be separated. See Shift Control Solenoids "A" & "B" under COMPONENT TESTS.

BEARINGS

For removal and replacement reference, refer to sequences for removing and installing of bearings in the figure. See Fig. 36.

CANADA:
Adjustable Bearing
Remover Set
(07JAC-PH80000)

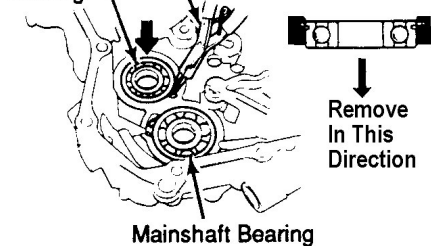
Commercially Available
3/8 x 16 Slide Hammer



USA:
Adjustable Bearing
Remover (25-40 mm)
07736-A01000A

Countershaft
Needle Bearing

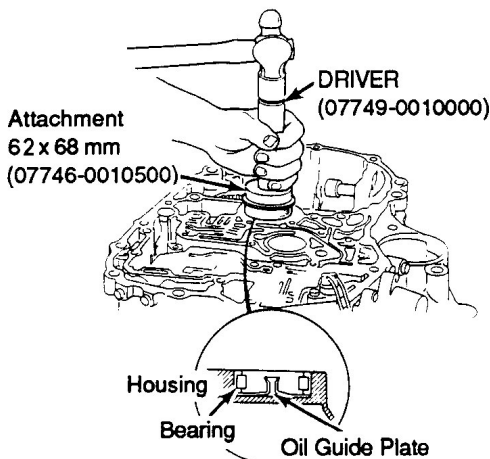
Countershaft
Bearing



Mainshaft Bearing

Remove
In This
Direction

G96I26300



Install In This
Direction

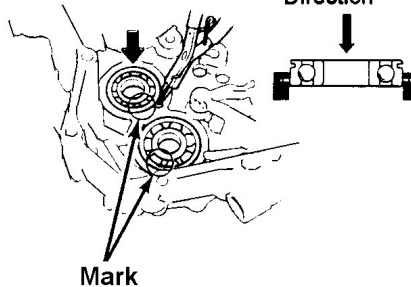


Fig. 36: Removing & Installing Torque Converter, Transaxle & Transfer Case Housing Bearings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REVERSE IDLER GEAR

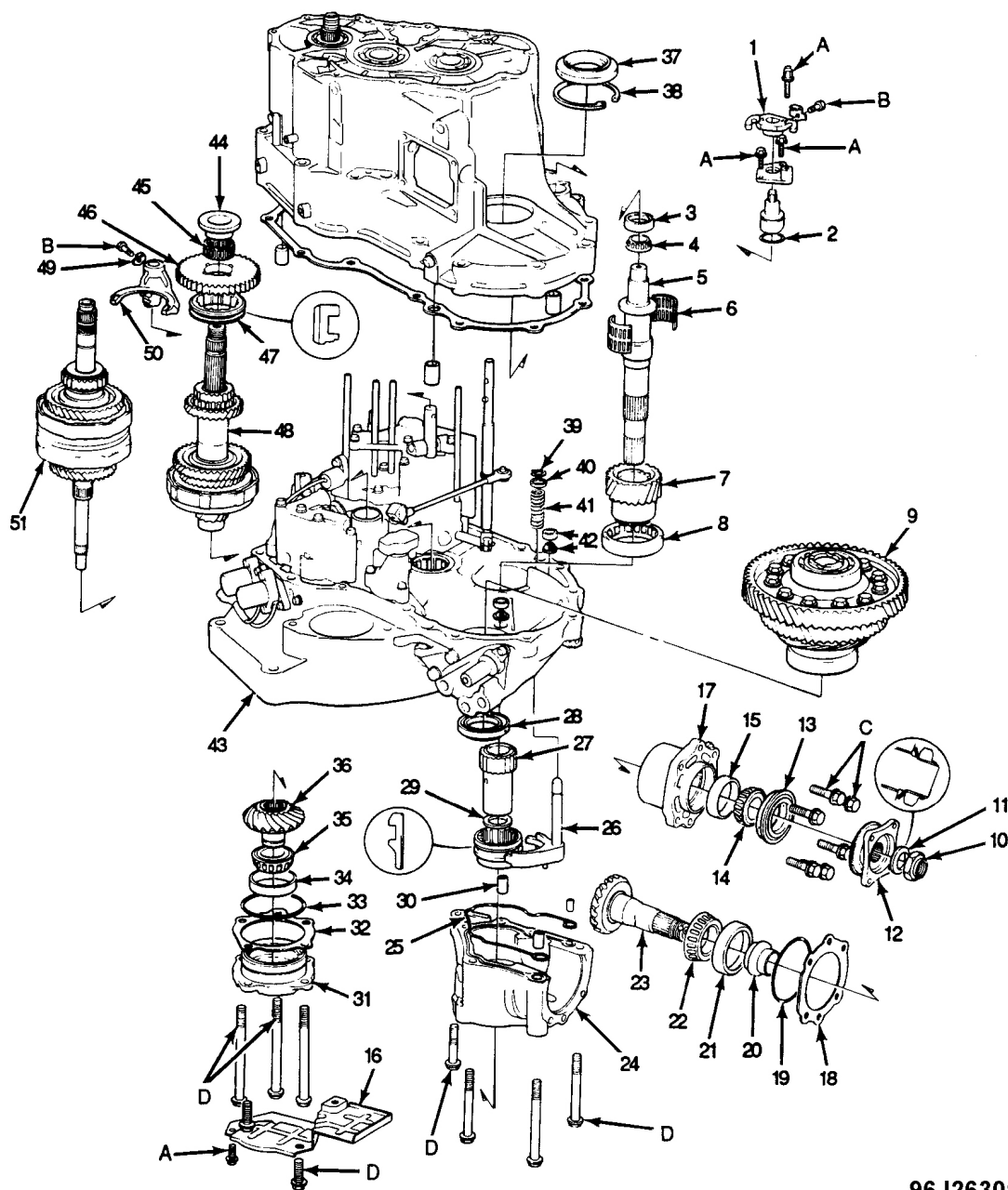
Install reverse idler gear with chamfered side facing torque converter housing. Always use new washer when reinstalling.

TRANSFER CASE

Disassembly (Transfer Case)

1. Hold companion with Flange Holder (07926-5090000) and remove lock nut with 32 mm socket.
2. Remove driven gear from transfer rear cover by tapping driven gear shaft. Use gear puller to remove inner driven gear bearing from driven gear shaft.
3. Pry oil seal off from transfer rear cover, remove inner and outer driven gear bearing races.
4. Remove left side cover protector, left side cover and transfer thrust shim. Remove transfer case. Use bearing puller to remove drive gear bearing and transfer drive gear. See **Fig. 37**.

NOTE: When viewing **Fig. 37**, refer to **FIGURE 37 LEGEND** and **FIGURE 37 TORQUE SPECIFICATIONS** tables.



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Fig. 37: Exploded View Of Transfer Case Assembly (See Appropriate Table For Legend)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

FIGURE 37 LEGEND

Item No.	Description
1	Disengagement Lever (4WD-2WD)
2	"O" Ring
3	Bearing Outer Race

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4	Bearing Inner Race
5	Transfer Shaft
6	Needle Bearing
7	Transfer Shaft Driven Gear
8	Needle Bearing
9	Front Differential Assembly
10	Driven Shaft Lock Nut
11	Spring Washer
12	Companion Flange
13	Oil Seal
14	Bearing Outer Race
15	Bearing Inner Race
16	Left Side Cover Protector
17	Transfer Rear Cover
18	Driven Gear Thrust Shim
19	"O" Ring
20	Transfer Spacer
21	Bearing Outer Race
22	Bearing Inner Race
23	Driven Gear Shaft
24	Transfer Housing
25	Special Seal
26	Disengagement Ford (4WD-2WD)
27	Transfer Distance Collar
28	Oil Seal
29	Driven Gear Thrust Shim
30	Disengagement Sleeve (4WD-2WD)
31	Transfer Left Side Cover
32	Transfer Thrust Shim
33	"O" Ring
34	Bearing Outer Race
35	Bearing Inner Race
36	Transfer Drive Gear
37	Oil Seal
38	Snap Ring
39	Snap Ring
40	Spring Retainer
41	Return Spring
42	Oil Filter
43	Torque Converter Housing
44	Countershaft Reverse Gear Collar
45	

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	Needle Bearing
46	Countershaft Reverse Gear
47	Reverse Selector Sleeve
48	Countershaft
49	Lock Washer
50	Reverse Selector Fork
51	Mainshaft

FIGURE 37 TORQUE SPECIFICATIONS

Letter	Fastener Description	Ft. Lbs. (N.m)
A	6 mm	9 (12)
B	24 mm	145 (200)
C	24 mm LH Threads	116 (160)
D	24 mm	116 (160)
E	10 mm	40 (55)
F	12 mm Joint Bolts	21 (29)
G	18 mm Drain Bolt	36 (50)

Cleaning & Inspection

Check all splines for excessive wear or damage. Check bearing surfaces for scarring, scratches or excessive wear. Replace thrust shims and all "O" rings. Clean all surfaces with solvent and dry with compressed air. See **Fig. 38**.

Driven Gear Preload

1. Press inner and outer gear bearing races into transfer rear cover using Driver (07749-0010000) and Attachment (07746-0010500 or 07746-0010400). Coat races with clean oil.
2. Assemble Driven Gear Dummy Attachment Bolt (07JAJ-PH8020A) and Threaded Shaft (07973-SD909A). Slide inner driven gear onto threaded shaft. Install Driven Gear Dummy Attachment into rear cover. Install inner and outer driven gear bearing and Collar A (07973-SD9060A). See **Fig. 38**.
3. Hold threaded shaft end to prevent it from turning and torque lock nut to 89 INCH lbs. (10 N.m). Before measuring preload, turn threaded shaft several times to seat bearings. Measure driven pinion preload. Standard should be 4.4-7.1 INCH lbs. (.50-.80 N.m). If preload exceeds standards, readjust by tightening lock nut. **DO NOT** over torque lock nut.

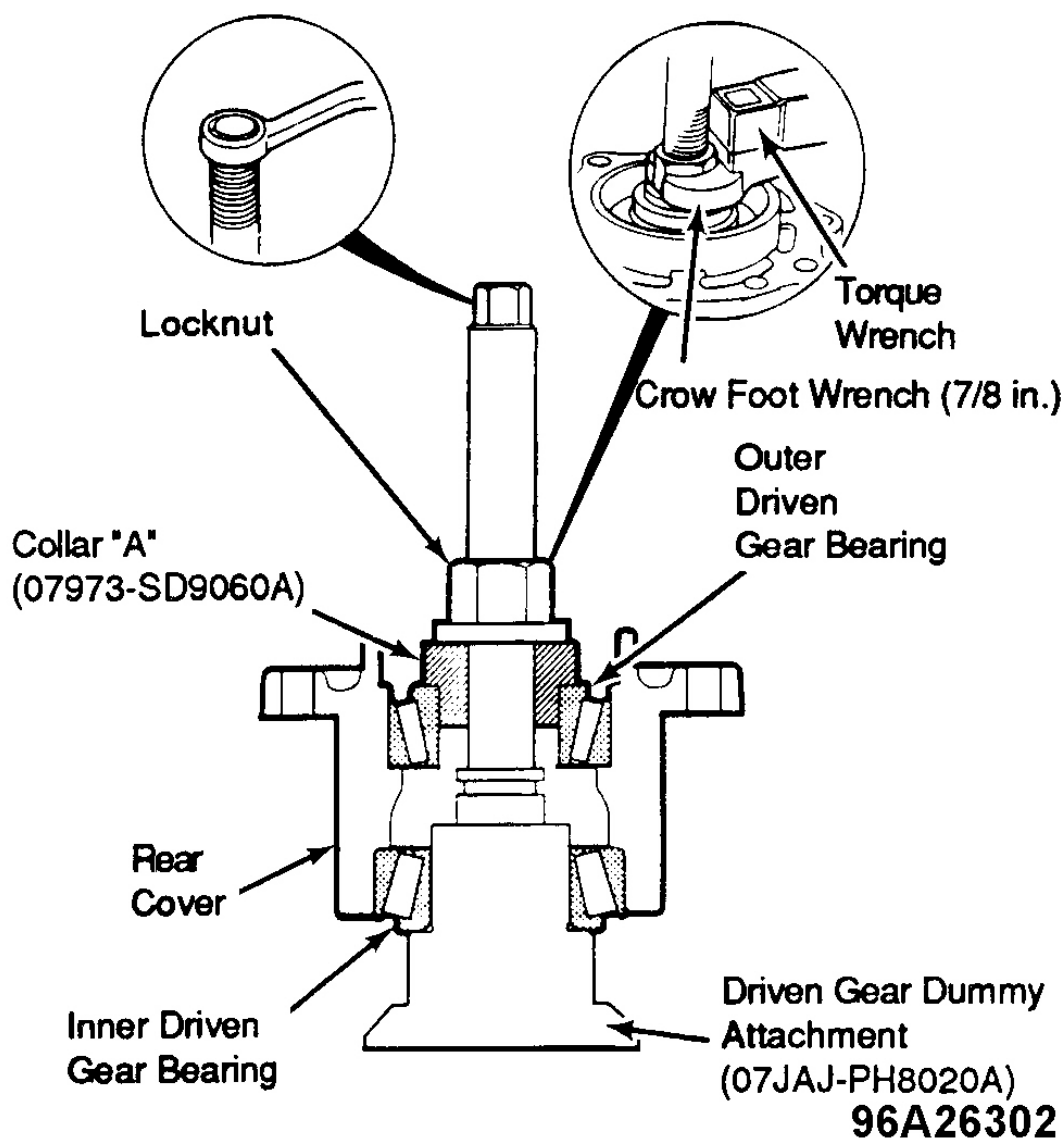


Fig. 38: Checking Driven Gear Preload

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Thrust Shim Selection

1. Insert dummy shaft-driven gear-rear cover assembly into transfer housing. Ensure preload is properly adjusted before selecting thrust shims.
2. Remove drive gear bearing with a bearing puller and step plate adapter. Lubricate drive gear and install it on Drive Gear Gauge (07973-SD90500). Slide bearing and gauge into transfer shaft. **DO NOT** install drive gear thrust washer. Pull threaded shaft-driven gear-rear cover assembly out slightly to allow gear gauge to seal.

3. Install left side cover without bolts. Measure clearance between transfer rear cover and transfer case with a feeler gauge. Record clearance. Clearance should be taken while pressing dummy shaft all the way in. Driven gear thrust shims are available in thicknesses ranging from .020-.051" (.50-1.30 mm) in .002" (.05 mm) increments.

NOTE: **Correct rear cover shim thickness is determined by recording clearance between transfer rear cover and transfer case, then adding or subtracting machining tolerance etched into driven gear.**

4. To determine left side cover shim thickness measure clearance between transfer left side cover and transfer case with a feeler gauge. Clearance should be measured while pressing left side cover against transfer case. Correct shim thickness is determined by recording clearance between transfer case and left side cover, then adding or subtracting machining tolerance which is etched on drive gear. Transfer gear thrust shims are available in thicknesses ranging from .013-.052" (.30-1.33 mm) in increments of .002" (.05 mm).
5. Press drive gear bearing on drive gear. Install 2 1.75 mm Dummy Shim (29415-PH8000) onto transfer shaft. Slide drive gear onto transfer shaft. Place correct shim on left side cover and install cover on transfer case without bolts. Measure clearance between left side cover and transfer shaft while pushing against left side cover and record clearance.
6. Subtract recorded clearance from 3.5 mm (2 dummy shims) to obtain correct shim thickness. Drive gear thrust shims are available in thicknesses from .019-.078" (.48-1.99 mm) in increments of .002" (.05 mm). Remove dummy shims and install left side cover.

NOTE: **After thrust shim selection check for proper backlash and tooth contact pattern.**

Driven Gear Reassembly

1. Remove Driven Gear Dummy Attachment (07JAJ-PH8020A), Threaded Shaft (07973-5090A) and Collar "A" (07973-SD9060A) from transfer rear cover. Install outer driven gear bearing in transfer rear cover and press oil seal into transfer rear cover. Coat main and side sealing lips of oil seal with grease.
2. Press inner driven gear bearing onto driven gear.
3. Install driven gear, new transfer spacer companion flange, spring washer and 22 mm lock nut. Ensure that spring washer is installed with dished side toward companion shaft. Temporarily install driven gear assembly and mounting bolts in transfer case. Measure preload by torquing lock nut to 88.5 ft. lbs. (120 N.m).
4. Remove driven gear assembly from transfer case and measure preload after rotating companion flange several times to assure normal bearing contact. Preload torque should be: 1989 models, 4.4-7.1 INCH lbs. (.5-.8 N.m); 1990 models, 7.1-9.7 INCH lbs. (.8-1.1 N.m).

NOTE: **If preload exceeds 9.7 INCH lbs. (1.1 N.m), replace transfer spacer with new one and readjust. DO NOT attempt to adjust preload by loosening lock nut.**

5. If preload is less than 4.3 INCH lbs. (.5 N.m), adjust by tightening lock nut in small amounts. Replace transfer spacer with a new one if preload exceeds limits when lock nut is torqued to 170 ft. lbs. (230

N.m).

TRANSFER CASE REASSEMBLY

DRIVEN - DRIVE GEAR REASSEMBLY

NOTE: Ensure mating surfaces are dry and clean before applying liquid gasket. Apply liquid gasket evenly. To prevent leakage apply liquid gasket to inner threads of bolt hole. Allow liquid gasket to set for 20 minutes before installing parts. Wait at least 30 minutes before filling with oil.

1. Apply Liquid Gasket (08718-550000 OE) to torque converter housing mating surface of transfer case and install special seal.
2. Install transfer case on torque converter housing. Torque bolts to 33 ft. lbs. (45 N.m).
3. Install transfer case thrust shim, drive gear (coated with oil), "O" ring, drive gear thrust shim in and on transfer case and shaft. Torque L. side cover bolts 33 ft. lbs. (45 N.m).
4. Install driven gear thrust shim, driven gear assembly and driven gear assembly bolts to transfer case. Torque bolts in crisscross pattern to 19 ft. lbs. (26 N.m).
5. Rotate companion flange several times to assure normal bearing contact. Set disengagement lever in 2WD. Measure preload with torque wrench. The total bearing preload should be 6.2-8.85 INCH lbs. (.70-1.00 N.m) greater than preload on step 4, Driven Gear Reassembly. See **Fig. 39**.
6. If preload exceed specifications correct it by replacing transfer thrust shim.

NOTE: If total bearing preload is less than specification reduce size of transfer thrust shim. If total bearing preload is more than specification, increase the size of transfer thrust shim.

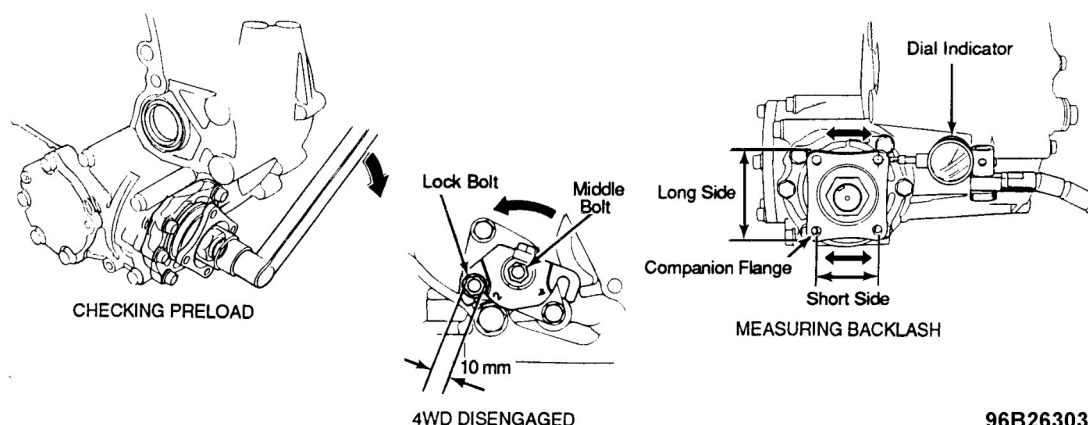
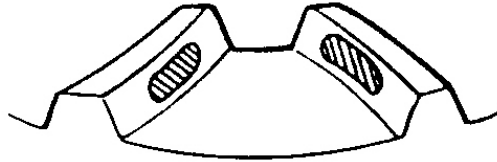
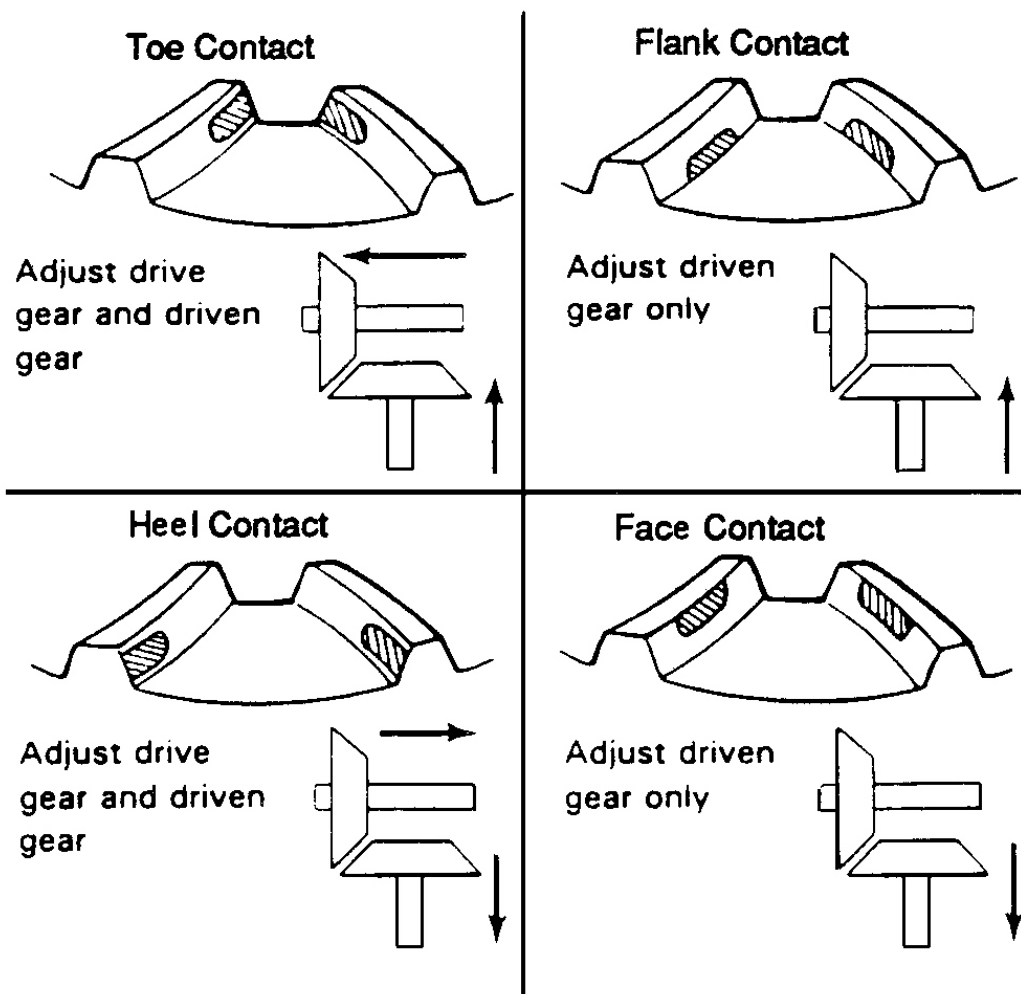


Fig. 39: Measuring Total Bearing Preload & Backlash
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CORRECT TOOTH CONTACT**IMPROPER TOOTH CONTACT**

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Fig. 40: Identifying & Adjusting Gear Backlash
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. After preload has been adjusted properly measure gear backlash. Place disengagement lever in 2WD. See

Fig. 40. Torque lock bolt to 10 ft. lbs. (14 N.m). Using a dial indicator measure backlash at top of companion flange, rotate companion flange 180 degrees and measure again. Backlash should be .004-.006" (.09-.14 mm). If backlash exceeds specification, correct by changing driven gear thrust shim.

8. Check for proper tooth contact after backlash has been completed. Remove driven gear assembly from transfer case and paint driven gear teeth evenly with Prussian Blue. Reinstall driven gear assembly in transfer case and torque bolts to 19 ft. lbs. (26 N.m). With disengagement lever in 2WD, rotate companion flange one full turn in both directions. Remove driven gear assembly from transfer case and note tooth impression. See **Fig. 40**.

NOTE: Compare tooth impression and follow appropriate adjustment instructions. Continue check and adjustment procedure until tooth contact is correct.

9. If the pattern shows toe contact, use a thicker drive gear thrust shim and increase thickness of transfer shim an equal amount.
10. If pattern shows heel contact, it indicates too much backlash. To correct, reduce thickness of drive gear thrust shim. The thickness of transfer thrust shim must also be reduced by the amount by which drive gear thrust shim thickness is reduced. See **Fig. 38**.

NOTE: Driven gear thrust shim will have to be changed also to compensate for change in backlash. See **Fig. 38**.

11. To correct face contact, use a thicker driven gear thrust shim to move driven gear away from drive gear, backlash should remain within the limits. If backlash cannot be held within limits make correction in same manner as for HEEL CONTACT. See **Fig. 26**.
12. If the pattern shows flank contact, move the driven gear in toward the drive gear by using a thinner shim for the driven gear. The backlash must remain within the limits. If the backlash exceeds the limits, make correction in the same manner as for TOE CONTACT. See **Fig. 40**.
13. When gear tooth contact is correct, remove transfer case. Install the new special seal, apply liquid gasket to the mating surfaces of the torque converter and transfer housing. Use Liquid Gasket (08718-550000 OE).

NOTE: Ensure mating surfaces are clean and dry before applying liquid gasket. Apply liquid gasket evenly, being careful to cover all the mating surface. To prevent leakage, apply liquid gasket to inner threads of bolt holes. Do not install parts until 20 minutes or more have elapsed since applying gasket. Wait at least 30 minutes before filling with oil.

14. Stake lock nut into driven gear shaft. Install thrust shim and "O" ring on driven gear assembly, then install assembly in transfer case. Slide drive gear thrust shim and drive gear onto transfer shaft.

NOTE: Coat "O" ring with oil. Apply liquid gasket (08718-550000 OE) to threads of left side cover attaching bolts. Measure total bearing preload after assembly.

15. Place transfer thrust shim and "O" ring (74.5 x 2.5 mm) on left side cover and install cover on transfer

case. Tighten left side cover attaching bolts, and then install left side cover protector.

TRANSAXLE REASSEMBLY

1. Install differential assembly. Install needle bearing on transfer shaft. Replace and install screen filter into torque converter housing. Seat countershaft guide plate and needle bearing into torque converter housing.

NOTE: **Ensure that oil pump drum gear is installed with chamfered side facing down.**

2. Install main separator plate and dowel pin on torque converter housing. Install oil pump gear and shaft.
3. Install assembled main valve body on torque converter housing and loosely tighten 4 bolts in sequence. See **Fig. 41**. Once all bolts have been loosely tightened, torque all bolts in sequence to 106 INCH lbs. (12 N.m). See **Fig. 41**.
4. Ensure that pump drive gear rotates smoothly in normal operating direction and pump shaft moves smoothly in axial and in normal operating direction. See **Fig. 41**. Install shift control solenoid valve "A" and "B" onto torque converter. Torque mounting bolts to 106 INCH lbs. (12 N.m). Thread harness through opening in torque converter opening.
5. Install stator shaft and stop pin into main valve body and install assembled control shaft into torque housing. Place assembled accumulator body on main valve body and torque bolts to 106 INCH lbs. (12 N.m).
6. Install A/T speed pulser on torque converter and torque bolts to 106 INCH lbs. (12 N.m). Install secondary separator plate, 2 dowel pins and assembled secondary valve body. Install servo separator plate on secondary valve body. Install throttle control shaft and long clutch feed pipe into secondary valve body.

NOTE: **On 1989 models, install shift control solenoid valve assembly onto servo body.**

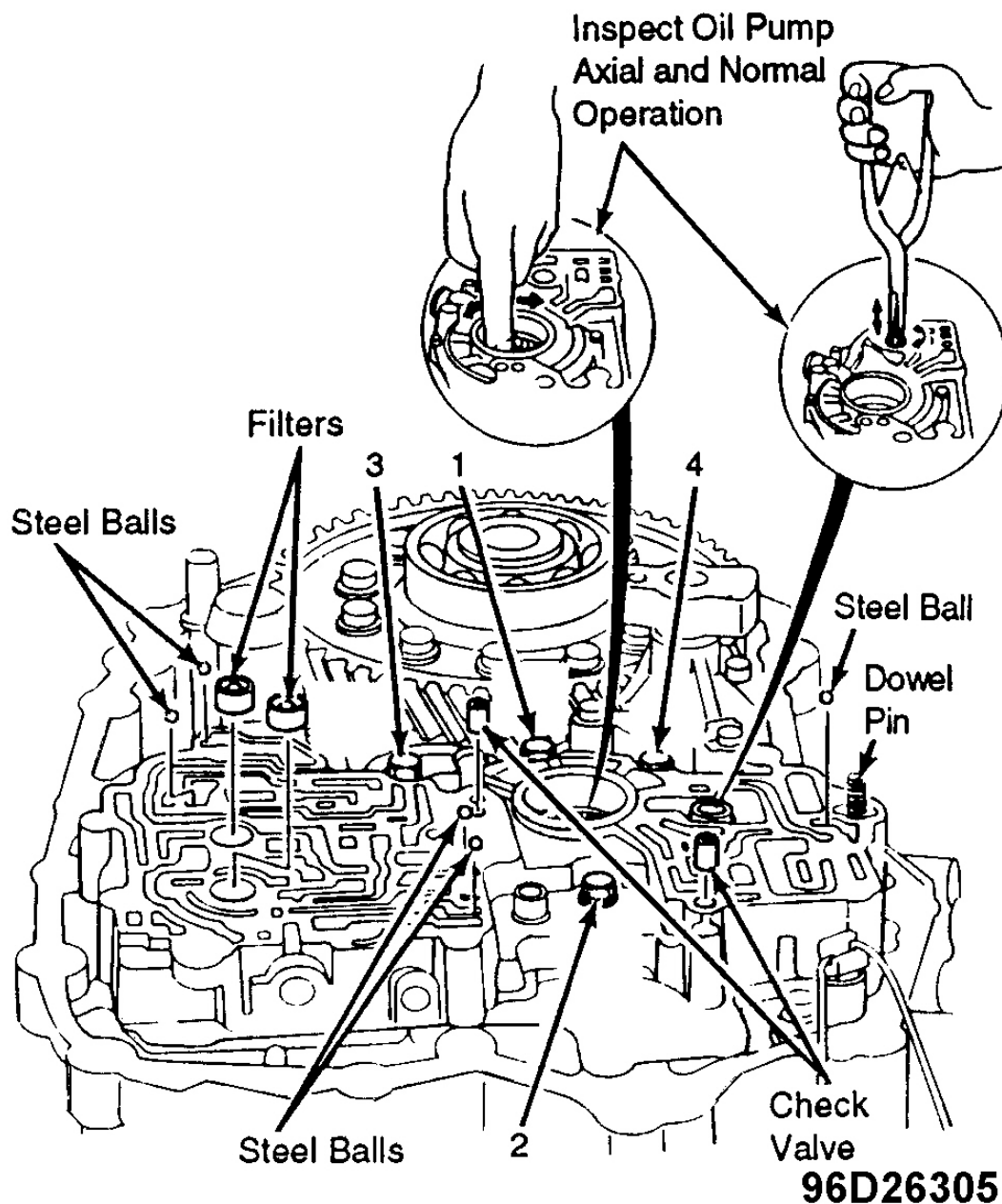


Fig. 41: Checking Oil Pump Free Play & Main Valve Body Bolt Tightening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install shift fork shaft into assembled servo valve. Install transaxle magnets in servo body. Install 1st accumulator pistons "A" and "B" with springs on servo body. Press down on accumulator cover while installing cover bolts to prevent stripping threads. Torque 6 bolts to 106 INCH lbs. (12 N.m).
8. Install assembled regulator body. Torque check valve spring retainer bolt to 106 INCH lbs. (12 N.m).
9. Install lock-up valve separator plate and lock-up valve body. Torque 6 bolts to 106 INCH lbs. (12 N.m).

Install baffle plate to servo body and torque plate bolt to 106 INCH lbs. (12 N.m). Install 3 short clutch feed pipes into servo body.

10. Set assembled countershaft, mainshaft and subshaft in place as an assembly. **DO NOT** tap on shaft with hammer to drive in place.
11. Install distance collar, needle bearing, counter 4th gear reverse selector hub and reverse selector. Install reverse gear selector with flat face up. Install reverse shift fork over servo valve stem. Align hole in stem with hole in fork. Torque bolt to 10 ft. lbs. (14 N.m), bend lock tab against bolt head. See **Fig. 42**.
12. Install countershaft reverse gear, needle bearing and countershaft reverse collar on countershaft.
13. Install transaxle housing and transaxle cover onto torque converter housing, and transaxle hook between bolts No. 3 and 7. Torque housing bolts to 41 ft. lbs. (55 N.m). See **Fig. 43**.
14. Install distance collar and thrust washer on mainshaft. Install spring and parking brake lever on central shaft. Torque parking lever bolt to 10 ft. lbs. (14 N.m), bend lock tab against bolt head.

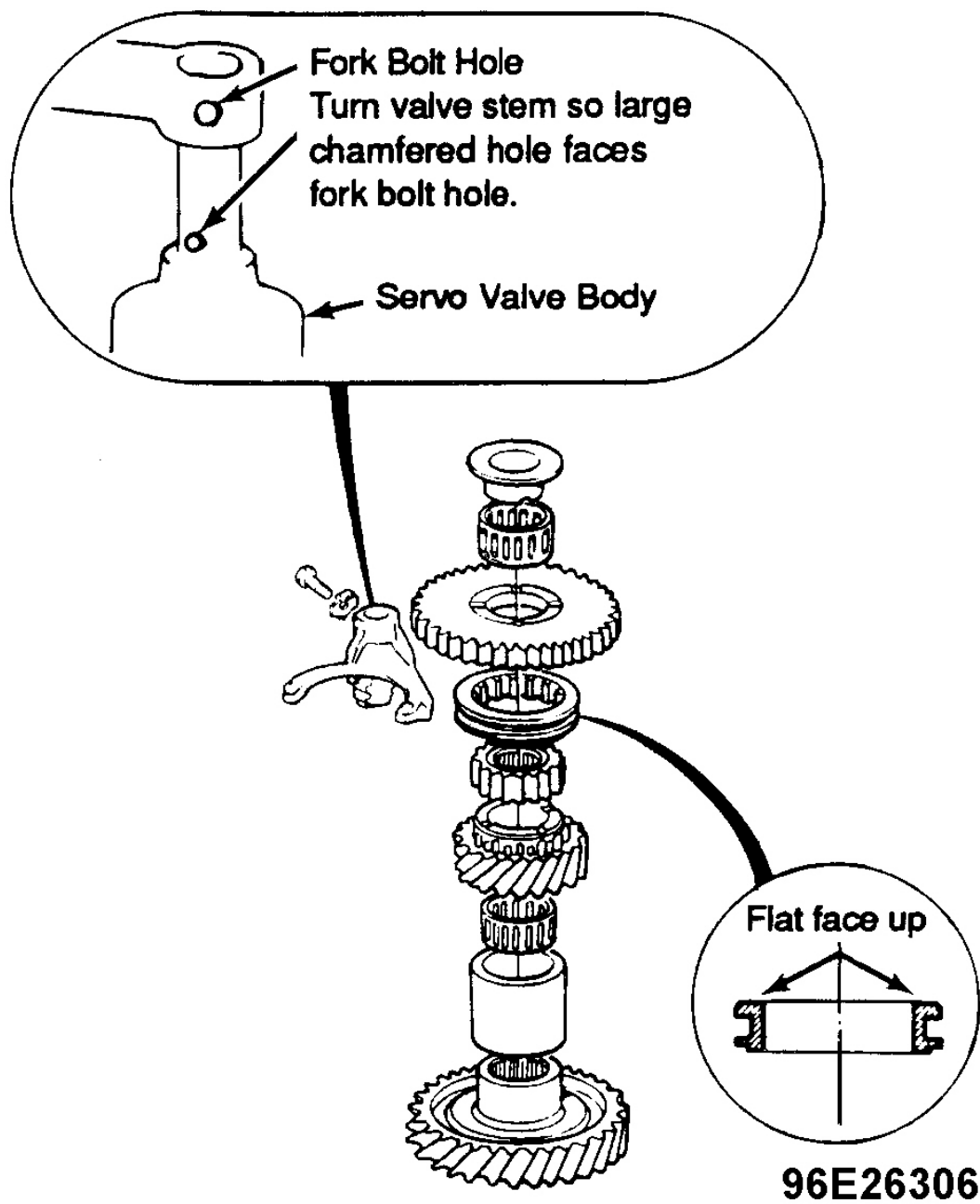
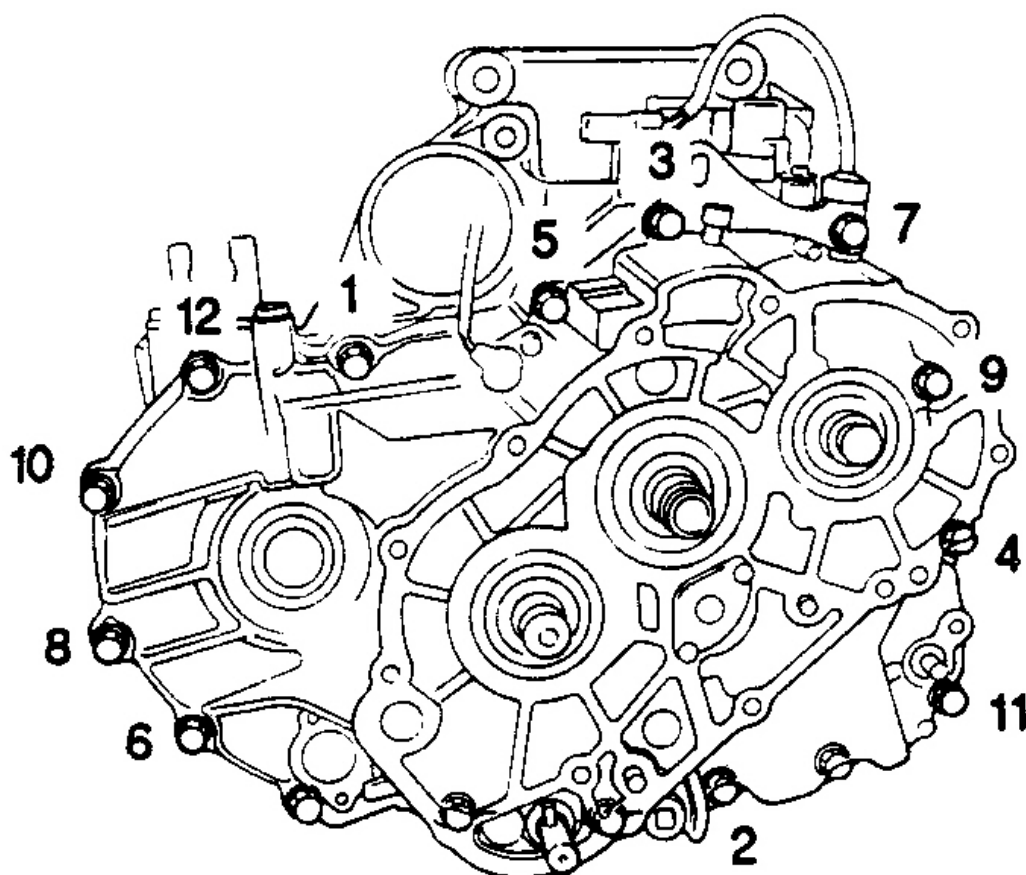


Fig. 42: Exploded View of Fork & Stem Alignment
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 43: Transaxle Housing Bolt Tightening Sequence
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Install collar, needle bearing, countershaft 1st gear one-way clutch and parking gear on countershaft.
16. Install parking pawl shaft with spring and parking brake pawl and stop pin into transaxle housing.

NOTE: One end of parking pawl release spring fits into hole in parking pawl, the other end into hole in transaxle housing. The release spring should put clockwise tension on pawl, forcing it away from parking gear.

17. Install lock nut on countershaft. Install subshaft 1st gear, spring washer and lock nut on subshaft.
18. Install main 1st gear, needle bearing, thrust needle bearing, thrust washer, 2 "O" rings, 1st clutch assembly and left hand thread lock nut.
19. Shift to park and install Mainshaft Holder (07923-6890202). Torque new countershaft lock nut to 103 ft. lbs. (140 N.m). Loosen and re-torque to same torque. Stake lock nut flange at two places into gear

grooves using a .14" (3.5 mm) punch. See **Fig. 44**.

20. Torque new subshaft lock nut to 70 ft. lbs. (95 N.m), loosen and re-torque to same torque. Stake lock nut.
21. Torque new mainshaft left hand thread lock nut to 70 ft. lbs. (95 N.m) loosen and re-torque to same torque. Stake lock nut flange into 1st clutch groove. See **Fig. 44**.

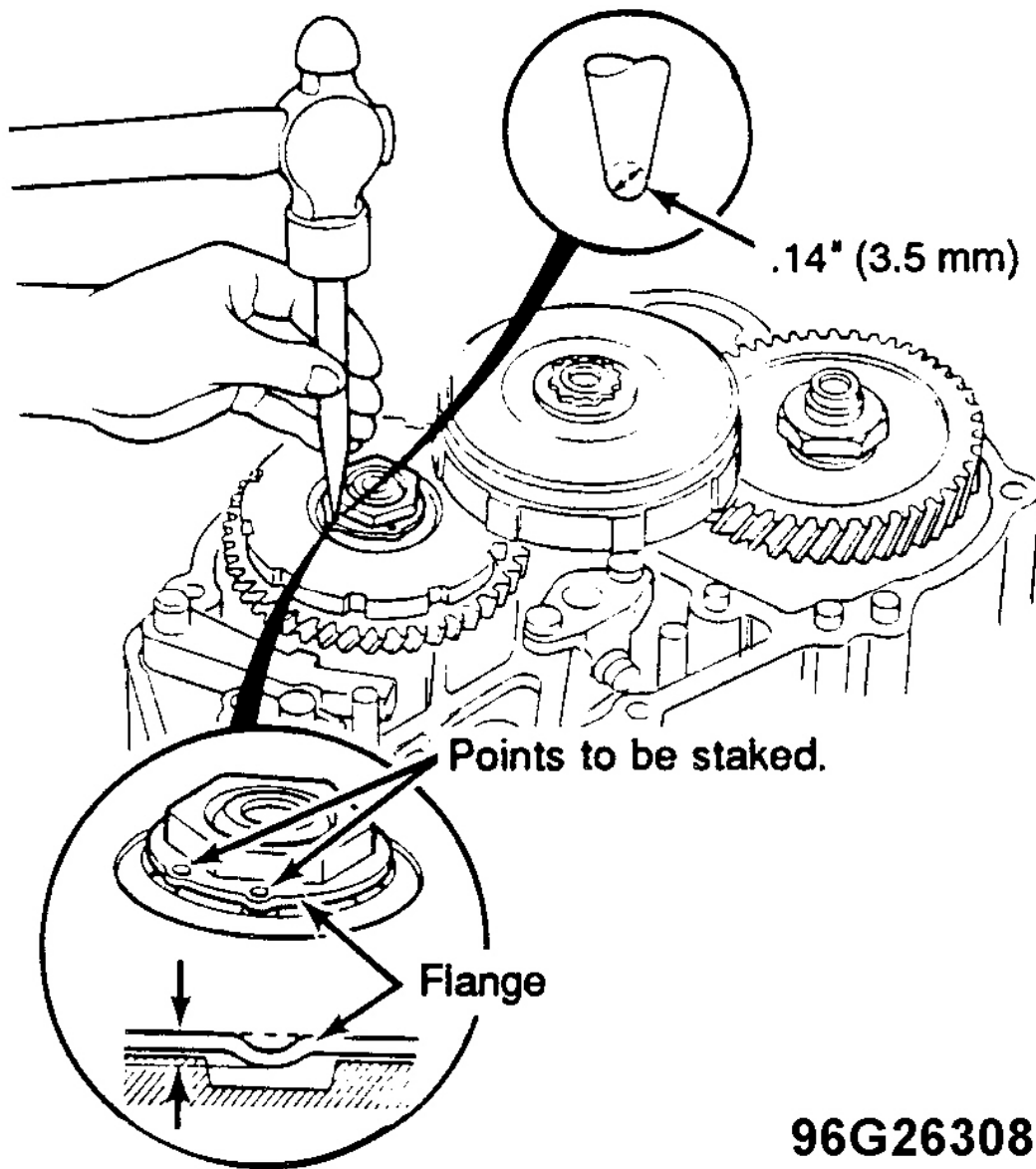


Fig. 44: Staking Lock Nut Flange

Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Install bushing, spring and throttle control lever. Torque throttle control lever bolt to 71 INCH lbs. (8

N.m). Torque throttle control bracket bolts to 20 ft. lbs. (27 N.m).

23. Place right side gasket and 2 dowel pins on transaxle housing. Assemble 3 clutch pipes into right side cover. Ensure that clutch feed pipes are aligned with mainshaft, countershaft subshaft, and cover. Install cover and torque bolts to 106 INCH lbs. (12 N.m). Install shift control solenoid valve assembly.
24. Install pressure inspection port holes bolts and torque to 13 ft. lbs. (18 N.m). Install transaxle cover and torque bolts to 106 INCH lbs. (12 N.m).
25. Install ATF pipes to torque converter. Torque vented bolts to 21 ft. lbs. (29 N.m). Torque ATF pipe bracket bolt to 106 INCH lbs. (12 N.m). Torque drain plug bolt to 30 ft. lbs. (40 N.m).
26. Install change lever and connect it to control shaft bracket, torque bracket bolt to 10 ft. lbs. (14 N.m). Install change cover on transaxle housing and torque bolts to 106 INCH lbs. (12 N.m). Insert ATF level gauge into change cover. Install shift cable bracket, torque bolts to 26 ft. lbs. (35 N.m).
27. Install A/T speed pulser. Torque bolt to 106 INCH lbs. (12 N.m).
28. Install torque converter with new "O" ring. When disassembling or reassembling torque converter, ensure that bolts are tightened (or loosened) in crisscross pattern. Torque bolts to 55 ft. lbs. (75 N.m).
29. Install speed sensor assembly into torque converter housing. Torque retaining clamp bolt to 106 INCH lbs. (12 N.m).

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

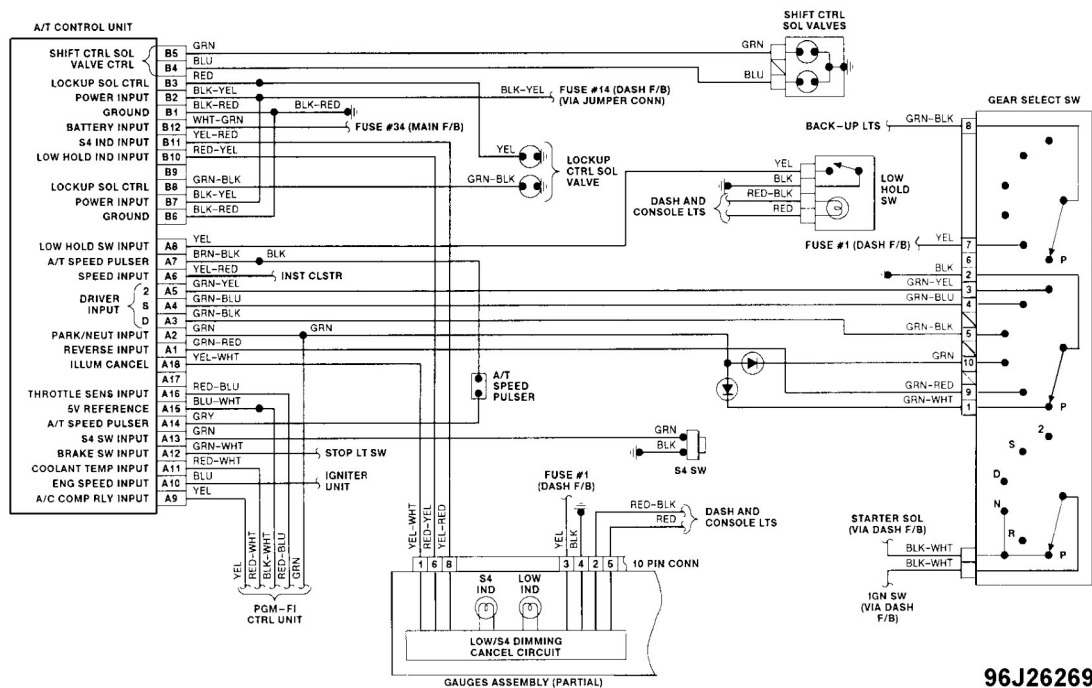
Application	Ft. Lbs. (N.m)
ATF Cooler Pipes Vented Bolts	21 (29)
Countershaft Lock Nut Bolts	103 (140)
Disengagement Lever Lock Bolts	10 (14)
Drain Plug Bolt	30 (40)
Driven Gear Assembly Bolts	19 (26)
Driven Gear Lock Nut	89 (120)
Left Side Cover Bolt	33 (45)
Main Valve Body Bolts	10 (14)
Mainshaft Lock Nut Bolts	103 (140)
Parking Brake Lever Bolts	10 (14)
Pressure Inspection Port Bolts	13 (18)
Reverse Selector Fork Bolts	10 (14)
Subshaft Lock Nut	70 (95)
Throttle Control Bracket Bolts	20 (27)
Transfer Case Bolts	33 (45)
Transaxle Housing Bolts	41 (55)
INCH Lbs. (N.m)	
A/T Speed Pulser Assembly Bolts	106 (12)
ATF Cooler Pipe Bracket Bolts	106 (12)
Accumulator Cover Bolts	106 (12)
Baffle Plate Bolts	106 (12)

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Change Cover Bolts	106 (12)
Lock-Up Valve Body Bolts	106 (12)
Main Valve Body Bolts	106 (12)
Regulator Valve Body Retainer Bolt	106 (12)
Right Side Cover Bolts	106 (12)
Servo Valve Body Bolts	106 (12)
Shift Control Solenoid Valve Assembly Bolts	106 (12)
Speed Sensor Assembly Bolts	106 (12)
Throttle Control Bracket	106 (12)
Throttle Control Lever Bolt	71 (8)
Transaxle Cover Bolts	106 (12)
2nd Accumulator Body Bolts	106 (12)
2WD/4WD Disengagement Lever Bolt	106 (12)

WIRING DIAGRAMS



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Fig. 45: Transaxle Wiring Schematic (1989 Honda Civic)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

1990 Honda Civic EX

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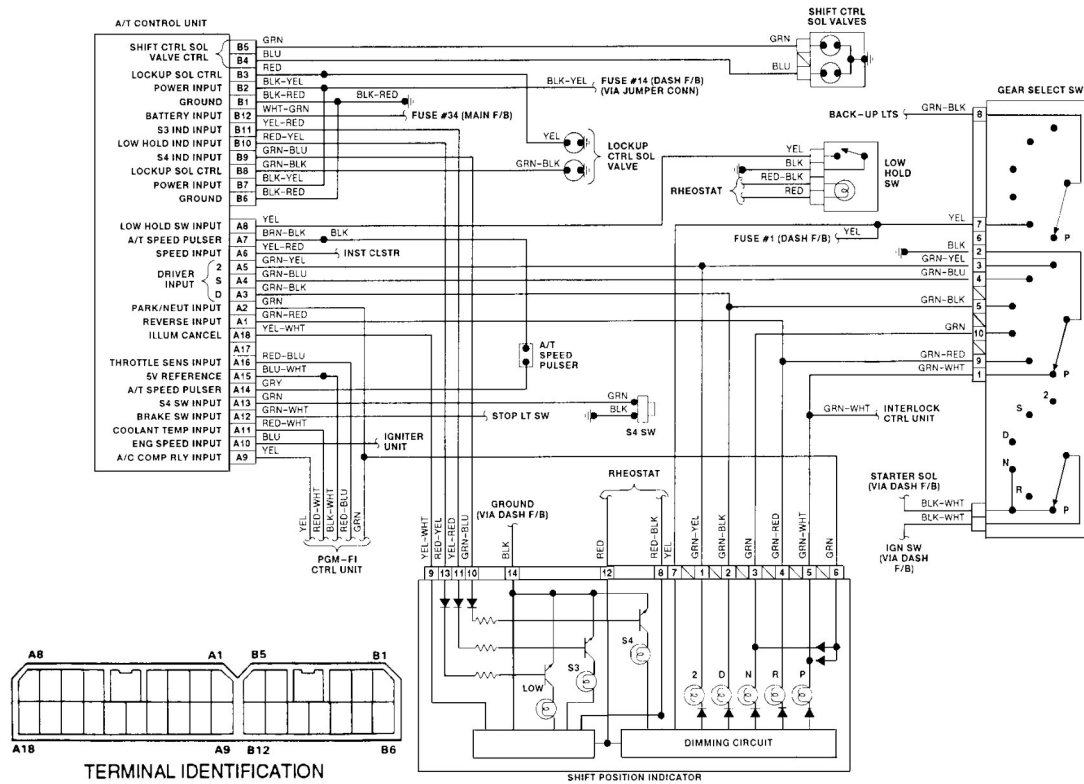


Fig. 46: Transaxle Wiring Schematic (1990 Honda Civic)
 Courtesy of AMERICAN HONDA MOTOR CO., INC.