



# **INTRODUCTION**

## **AISIN WARNER 50-42LE**

*Published  
July, 2004*

The Aisin Warner 50-42LE transmission first appeared in the Volvo 850, in model year 1992. Saab and Daewoo also implemented the 50-42LE in some of their models. This manual was produced using a 1995 model Volvo transmission for the photos. There are a few subtle differences between the Volvo, Saab and Daewoo versions and these differences are mentioned in the rebuilding process. Overall, the transmissions in all of these vehicle applications operate exactly the same. This manual will cover much needed information for diagnosis, service, repair and rebuild, including electrical information and hydraulic passage identification.

*We wish to thank Lory's transmission parts  
for supplying the transmission to make  
this book possible*

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## AISIN WARNER 50-42LE

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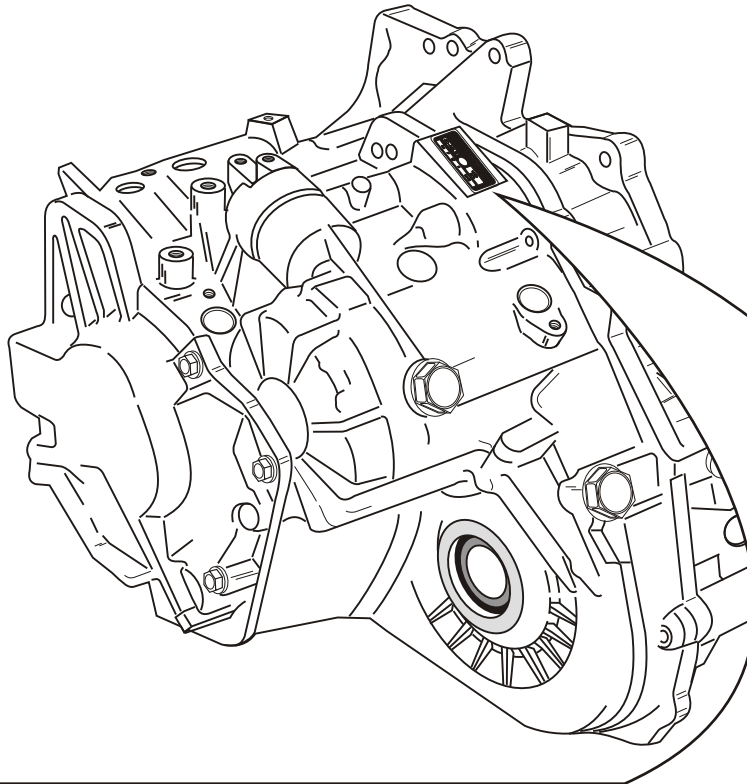
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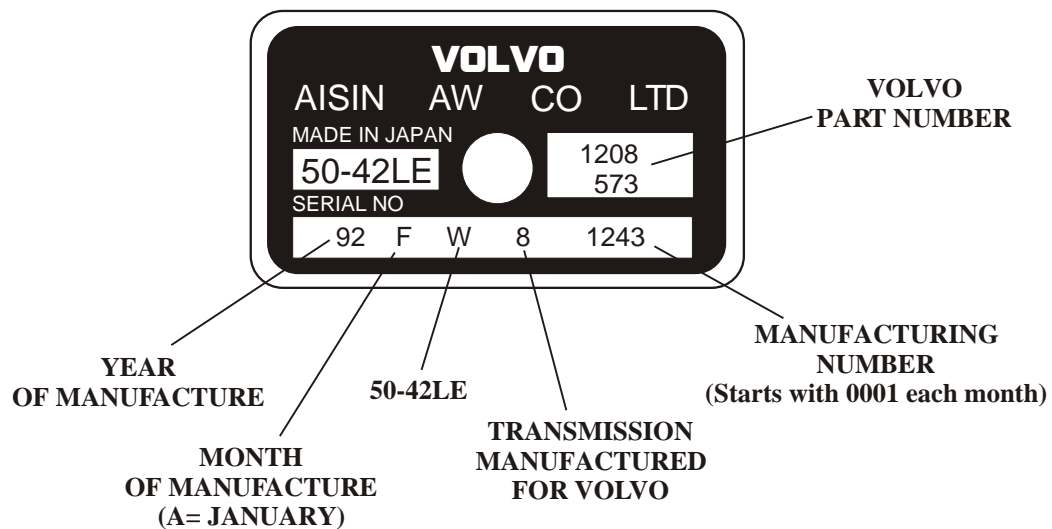
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## TRANSMISSION IDENTIFICATION



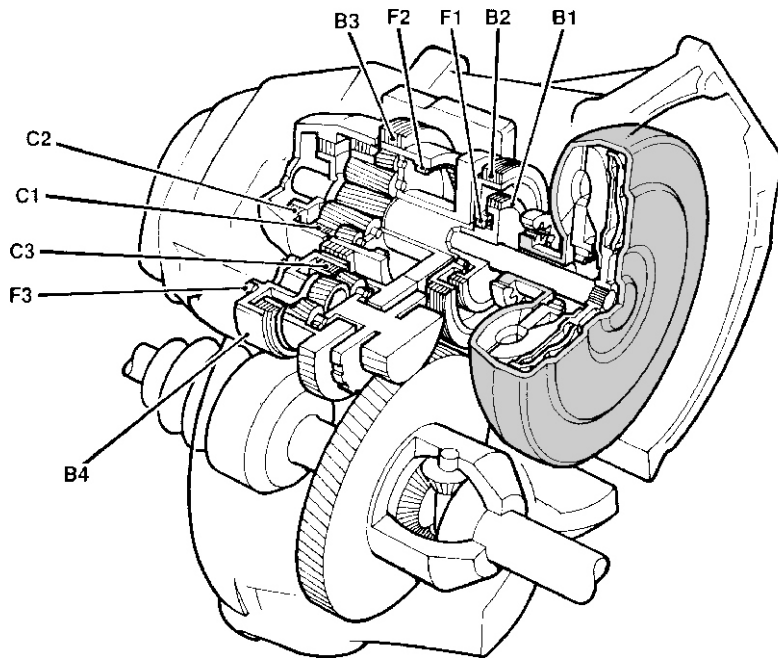
### I.D. TAG



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Figure 1

## CLUTCH/BAND AND SOLENOID APPLICATION CHART



S1 = SHIFT SOLENOID "A"  
S2 = SHIFT SOLENOID "B"

C1 = FORWARD CLUTCH  
C2 = DIRECT CLUTCH  
C3 = UNDERDRIVE CLUTCH

B1 = OVERRUN CLUTCH  
B2 = INTERMEDIATE CLUTCH  
B3 = LOW & REVERSE CLUTCH  
B4 = UNDERDRIVE BRAKE BAND

F1 = INTERMEDIATE SPRAG  
F2 = LOW SPRAG  
F3 = UNDERDRIVE SPRAG

SHIFT POSITION		S1	S2	C1	C2	C3	B1	B2	B3	B4	F1	F2	F3
P	PARK	OFF	ON							ON			
R	UNDER 4 MPH REVERSE	OFF	ON		ON				ON	ON			
	REVERSE INHIBIT VSS OVER 4 MPH	ON	ON		ON					ON			
N	NEUTRAL	OFF	ON							ON			
D	FIRST	OFF	ON	ON						ON			ON
	SECOND	ON	ON	ON			ON	ON		ON	ON		ON
	THIRD	ON	OFF	ON		ON	ON	ON			ON		
	FOURTH	OFF	OFF	ON	ON	ON		ON					
3	FIRST	OFF	ON	ON						ON		ON	ON
	SECOND	ON	ON	ON			ON	ON		ON	ON		ON
	THIRD	ON	OFF	ON		ON	ON	ON			ON		
*2	SECOND	ON	ON	ON			ON	ON		ON	ON		ON
	THIRD	ON	OFF	ON		ON	ON	ON			ON		
1	FIRST	OFF	ON	ON					ON	ON		ON	ON
	SECOND	ON	ON	ON			ON	ON		ON	ON		ON

**\*SAAB ONLY**

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Figure 2

## SPECIFICATIONS

### GEAR RATIOS:

GEAR	VOLVO	DAEWOO
1st Gear	3.61 : 1	3.900 : 1
2nd Gear	2.06 : 1	2.228 : 1
3rd Gear	1.37 : 1	1.477 : 1
4th Gear	0.98 : 1	1.062 : 1
Reverse	3.95 : 1	4.271 : 1

### FLUID TYPE :

ATF - Type.....Dexron II E

ATF - Type.....Volvo part number 1381166-6

### FLUID CAPACITY:

Dry Fill.....5.1 liters (5.4 US qts)

Torque converter.....2.5 liters (2.6 US qts)

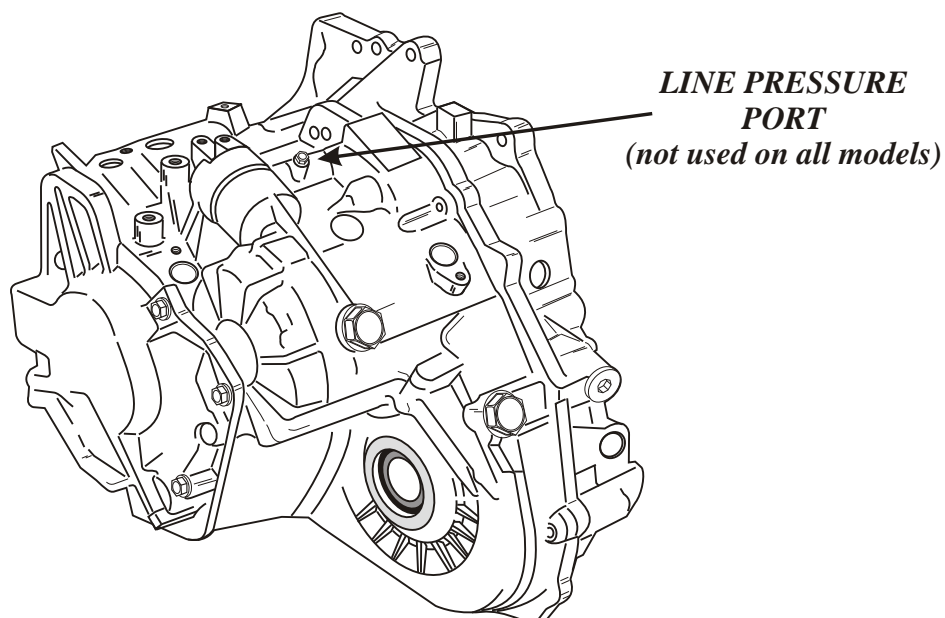
### LINE PRESSURE SPECIFICATIONS:

Base line pressure in Drive.....57-65 psi.

Stall line pressure in Drive.....150-190psi.

Base line pressure in Reverse.....85-100psi.

Stall line pressure in Reverse.....280-290psi.



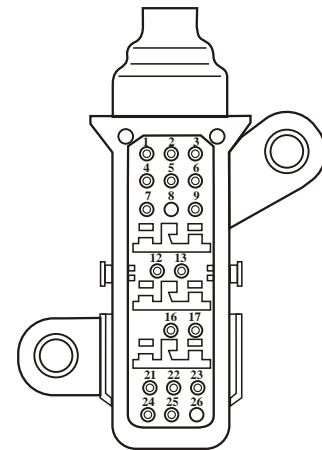
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Figure 3

## COMPONENT RESISTANCE CHARTS VOLVO

COMPONENT	OHMS	TERMINALS
SOLENOID 1	11-15	21 & GND
SOLENOID 2	11-15	22 & GND
LOCK UP SOLENOID	11-15	23 & GND
STH SOLENOID (Line Pressure )	2-6	24 & 25
OIL TEMP SENSOR	900 @ 68°F (20°C) 75 @ 212°F (100°C)	12 & 13
TURBINE SENSOR	300-600	16 & 17
OUTPUT SENSOR	300-600	NOT ROUTED THRU CONNECTOR

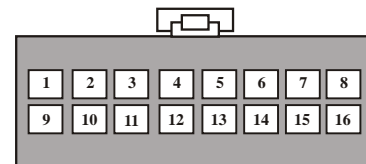
### VOLVO CONNECTOR NUMBER 3/71



## SAAB

COMPONENT	OHMS	TERMINALS
SOLENOID 1	11-15	1 & GND
SOLENOID 2	11-15	9 & GND
LOCK UP SOLENOID	11-15	10 & GND
ST SOLENOID (Line Pressure )	2-6	11 & 3
OIL TEMP SENSOR	900 @ 68°F (20°C) 75 @ 212°F (100°C)	12 & 4
TURBINE SENSOR	300-600	5 & 13
OUTPUT SENSOR	300-600	14 & 6

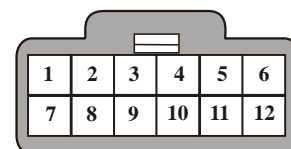
### SAAB CONNECTOR NUMBER H16-3



## DAEWOO

COMPONENT	OHMS	TERMINALS
SOLENOID 1	11-15	6 & GND
SOLENOID 2	11-15	12 & GND
LOCK UP SOLENOID	11-15	11 & GND
STH SOLENOID (Line Pressure )	2-6	4 & 10
OIL TEMP SENSOR	900 @ 68°F (20°C) 75 @ 212°F (100°C)	3 & 9
TURBINE SENSOR	300-600	5 & 13
OUTPUT SENSOR	300-600	14 & 6

### DAEWOO CONNECTOR NUMBER C110



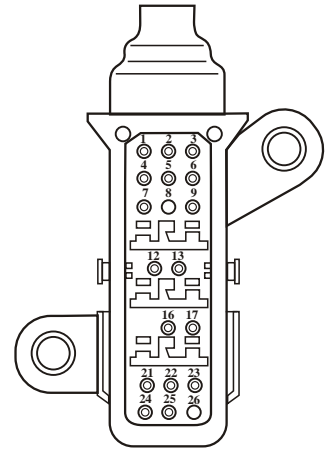
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## TRANSMISSION RANGE SWITCH OR GEAR POSITION SENSOR CHECK

<b>VOLVO</b>	<b>PIN/SWITCH COMBINATIONS</b>			
<b>RANGE</b>	<b>PIN 1 (A)</b>	<b>PIN 2 (B)</b>	<b>PIN 3 (C)</b>	<b>PIN 4 (PA)</b>
<b>PARK</b>	<i>CLOSED</i>	<i>OPEN</i>	<i>OPEN</i>	<i>CLOSED</i>
<b>REVERSE</b>	<i>CLOSED</i>	<i>CLOSED</i>	<i>OPEN</i>	<i>OPEN</i>
<b>NEUTRAL</b>	<i>OPEN</i>	<i>CLOSED</i>	<i>OPEN</i>	<i>CLOSED</i>
<b>D</b>	<i>OPEN</i>	<i>CLOSED</i>	<i>CLOSED</i>	<i>OPEN</i>
<b>3</b>	<i>CLOSED</i>	<i>CLOSED</i>	<i>CLOSED</i>	<i>CLOSED</i>
<b>L</b>	<i>CLOSED</i>	<i>OPEN</i>	<i>CLOSED</i>	<i>OPEN</i>

CONNECT POSITIVE LEAD TO THE SPECIFIED PIN  
AND THE GROUND LEAD TO THE CASE.  
*OPEN* = O.L. *CLOSED* = CONTINUITY

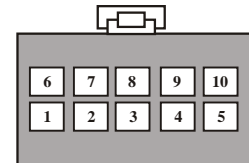
### VOLVO CONNECTOR NUMBER 3/71



<b>SAAB</b>	<b>PIN/SWITCH COMBINATIONS</b>			
<b>RANGE</b>	<b>PIN 1 (A)</b>	<b>PIN 3 (B)</b>	<b>PIN 2 (C)</b>	<b>PIN 4 (PA)</b>
<b>PARK</b>	<i>CLOSED</i>	<i>OPEN</i>	<i>OPEN</i>	<i>CLOSED</i>
<b>REVERSE</b>	<i>CLOSED</i>	<i>CLOSED</i>	<i>OPEN</i>	<i>OPEN</i>
<b>NEUTRAL</b>	<i>OPEN</i>	<i>CLOSED</i>	<i>OPEN</i>	<i>CLOSED</i>
<b>D</b>	<i>OPEN</i>	<i>CLOSED</i>	<i>CLOSED</i>	<i>OPEN</i>
<b>3</b>	<i>CLOSED</i>	<i>CLOSED</i>	<i>CLOSED</i>	<i>CLOSED</i>
<b>2</b>	<i>CLOSED</i>	<i>OPEN</i>	<i>CLOSED</i>	<i>OPEN</i>
<b>1</b>	<i>OPEN</i>	<i>OPEN</i>	<i>CLOSED</i>	<i>CLOSED</i>

CONNECT POSITIVE LEAD TO THE PIN 8  
AND THE GROUND LEAD TO THE SPECIFIED PIN  
*OPEN* = O.L. *CLOSED* = CONTINUITY

### SAAB CONNECTOR NUMBER H10-1

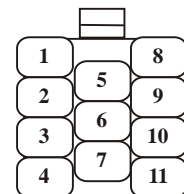


## DAEWOO

<b>RANGE</b>	<b>PIN 4</b>	<b>PIN 8</b>	<b>PIN 9</b>	<b>PIN 10</b>	<b>PIN 11</b>	<b>PIN 1</b>	<b>PIN 2</b>
<b>PARK</b>	●	●					
<b>REVERSE</b>	●		●				
<b>NEUTRAL</b>	●			●			
<b>D</b>	●				●		
<b>3</b>	●					●	
<b>L</b>	●						●

CONNECT POSITIVE LEAD TO PIN 4  
AND THE GROUND LEAD TO THE SPECIFIED PIN.  
CONTINUITY MUST BE PRESENT BETWEEN THE  
PINS CONNECTED IN THE CHART ABOVE.

### DAEWOO CONNECTOR



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Figure 5



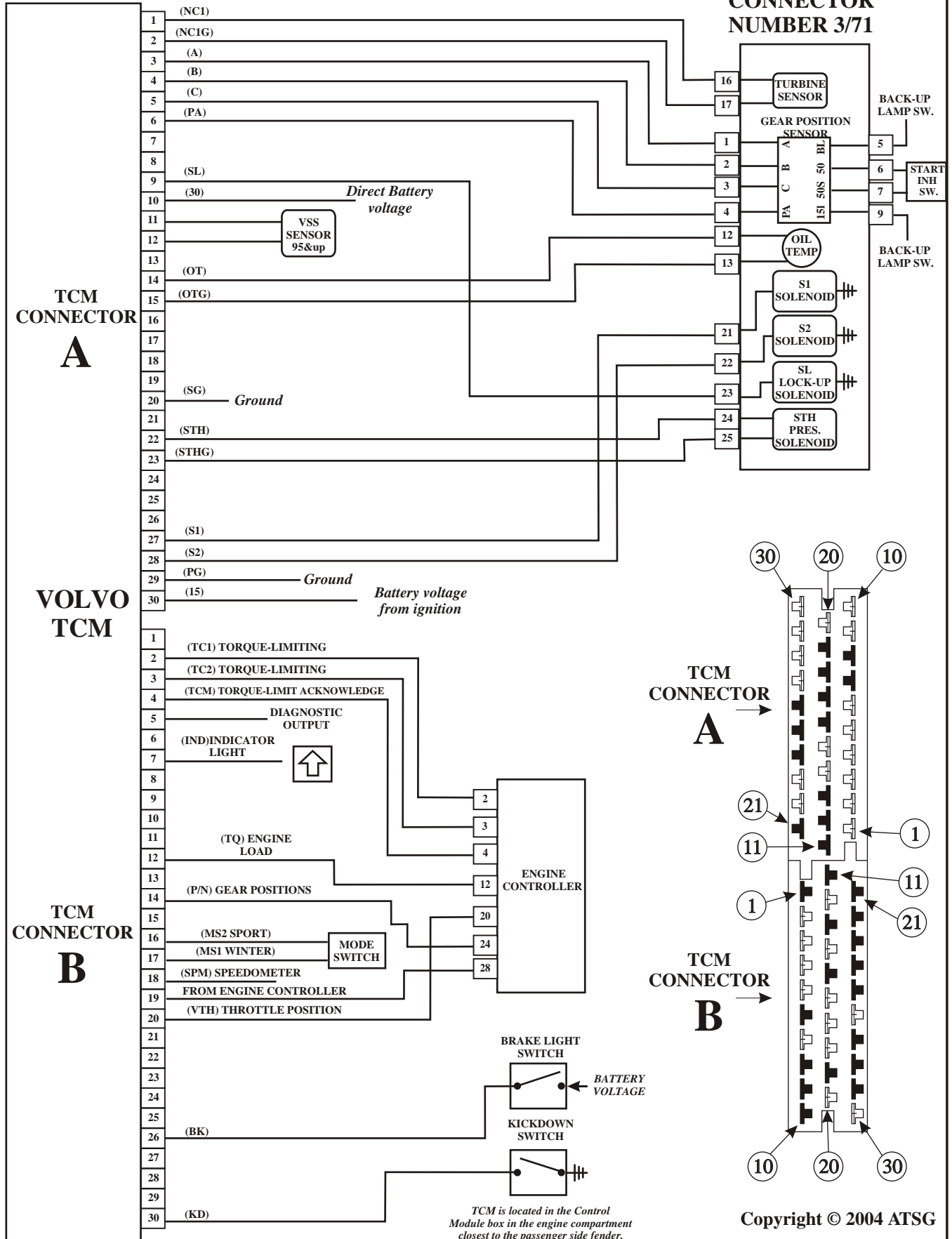
## VOLVO TCM WIRE SCHEMATIC

**CONNECTOR  
NUMBER 3/71**

**TCM  
CONNECTOR  
A**

**VOLVO  
TCM**

**TCM  
CONNECTOR  
B**



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Figure 6

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## SAAB TCM WIRE SCHEMATIC

### SAAB TCM CONNECTOR

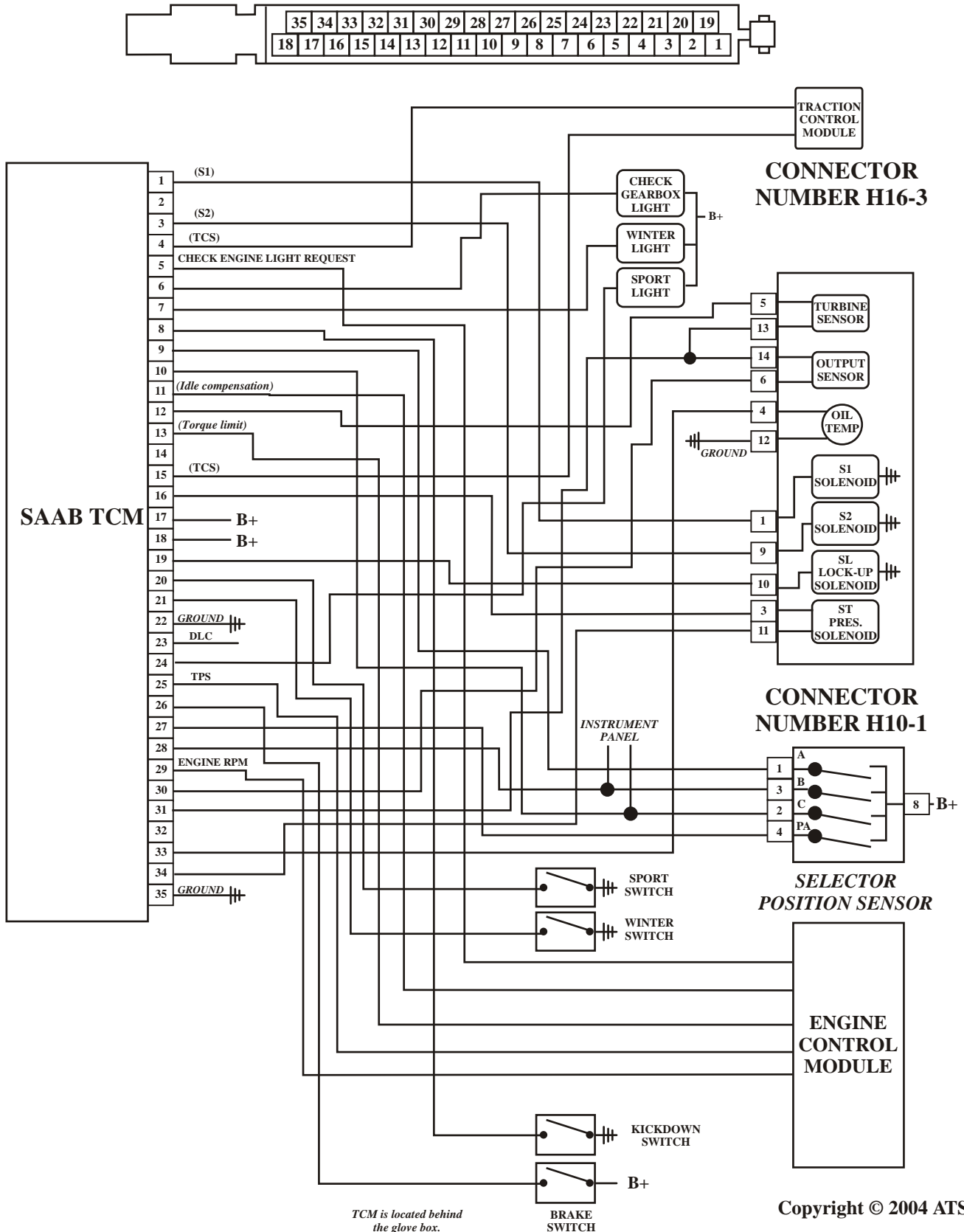

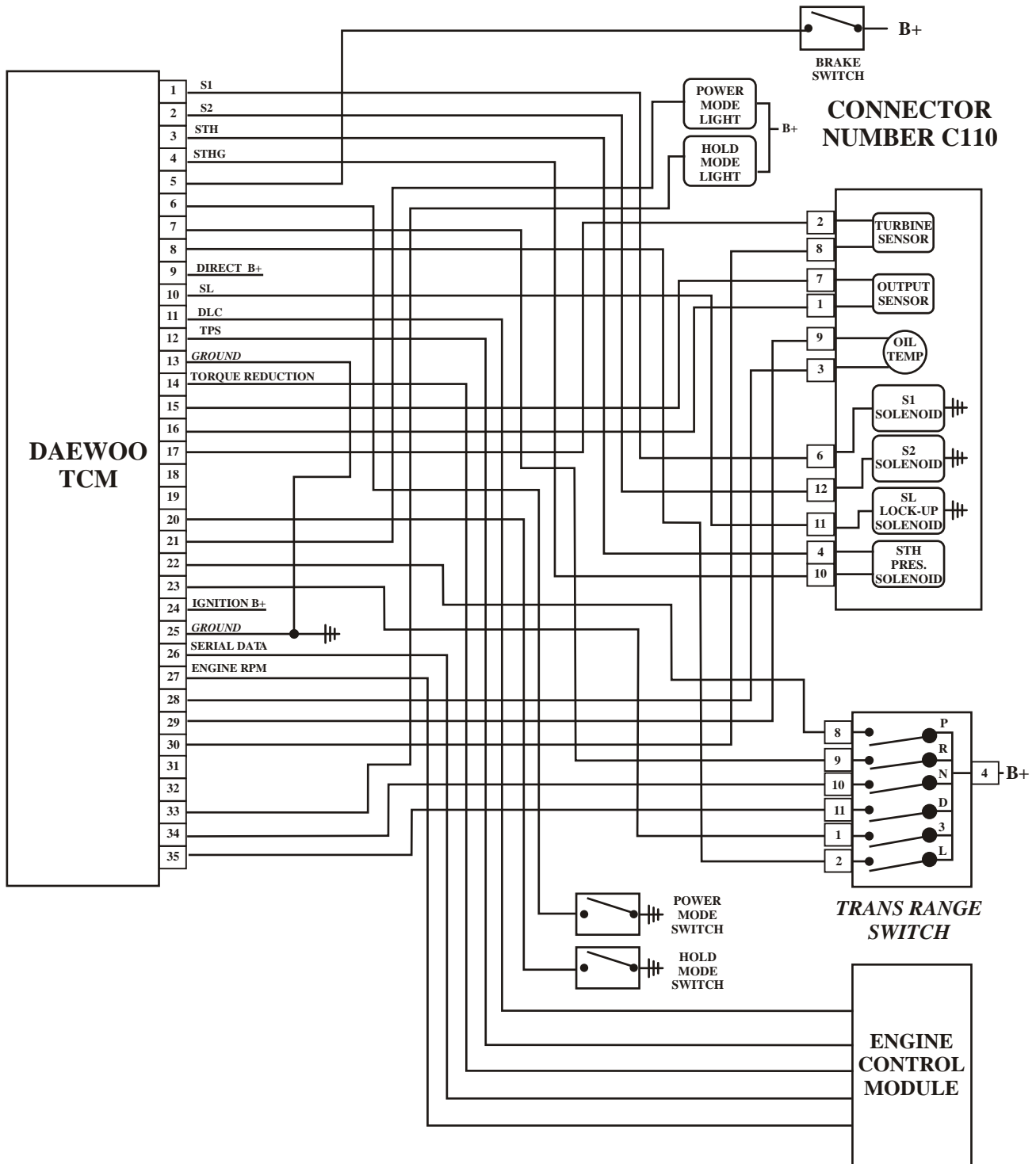


Figure 7  
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## DAEWOO TCM WIRE SCHEMATIC

### DAEWOO TCM CONNECTOR

1	2		3	4					5	6		7	8	
9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
24	25		26	27	28	29		30	31	32	33		34	35



TCM is located below dash near steering column.

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Figure 8



# Technical Service Information

## VOLVO "850" 50-40LE

### DIAGNOSTIC TROUBLE CODE RETRIEVAL

#### 1992-1995 MODELS ONLY

#### TROUBLE CODE RETRIEVAL

Faults are recorded in the Transmission Control Module (TCM) memory, in the form of Diagnostic Trouble Codes (DTC). Codes can be displayed manually using the LED Indicator on the Volvo diagnostic unit. The diagnostic unit is located at the right front of the engine compartment, as shown in Figure 9. The diagnostic unit is equipped with an LED Indicator, Function Selector Cable and Activation Button, as shown in Figure 10. Diagnostic unit output socket number 1 is used to retrieve TCM diagnostic codes, as shown in Figure 10. Use the following procedure to retrieve (DTC's).

- (1) Turn the ignition switch to the "OFF" position.
- (2) Remove the Function Selector Cable from it's storage cavity, and install it into diagnostic unit output socket number 1, as shown in Figure 10.
- (3) Turn the ignition switch to the "ON" position.
- (4) Depress the Activation Button and keep depressed for more than one second, but not more than three seconds. Refer to Figure 10.
- (5) Observe the LED Indicator on the diagnostic unit, and count the number of flashes to determine the *first* Diagnostic Trouble Code stored in the TCM memory. All codes contain three digits (Example: 2-1-3). Since all codes have three digits, each code requires three series of flashes on the LED Indicator. Example is shown in Figure 10.
- (6) Since only one DTC can be retrieved with one push of the button, depress the Activation Button again to determine if any additional DTC's have been stored in the TCM memory.
- (7) Read and record all Diagnostic Trouble Codes, pushing the activation button as many times as necessary, until the first code returns to the display.

**Note:** The Transmission Control Module is capable of storing a maximum of five DTC's, so these faults must be corrected and their DTC's cleared before any additional DTC's can be displayed. Refer to Figure 11 for a Diagnostic Trouble Code description and interpretation.

#### CLEARING TROUBLE CODES

All Diagnostic Trouble Codes must be displayed at least once *before* it is possible to clear the codes from the TCM memory. Only after the first DTC has returned to the display, will it be possible to clear the codes. Use the following procedure:

- (1) Ensure that the Function Selector Cable is still located in diagnostic unit output socket number 1, as shown in Figure 10, and the ignition switch is in the "ON" position.
- (2) Depress the activation button, and hold down for at least ten seconds, and watch for LED indicator response. The LED indicator should go out three seconds after the button is released.  
  
Depress the activation button, and hold down for at least an additional ten seconds, and watch for LED indicator response. The LED indicator should go out when the button is released.
- (4) Ensure that the Diagnostic Trouble Codes have been cleared by pressing once on the activation button again for more than one second, but less than three seconds, and observe LED indicator. If the code 1-1-1 is displayed on the LED indicator, the DTC's have been cleared.

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## DIAGNOSTIC UNIT LOCATION

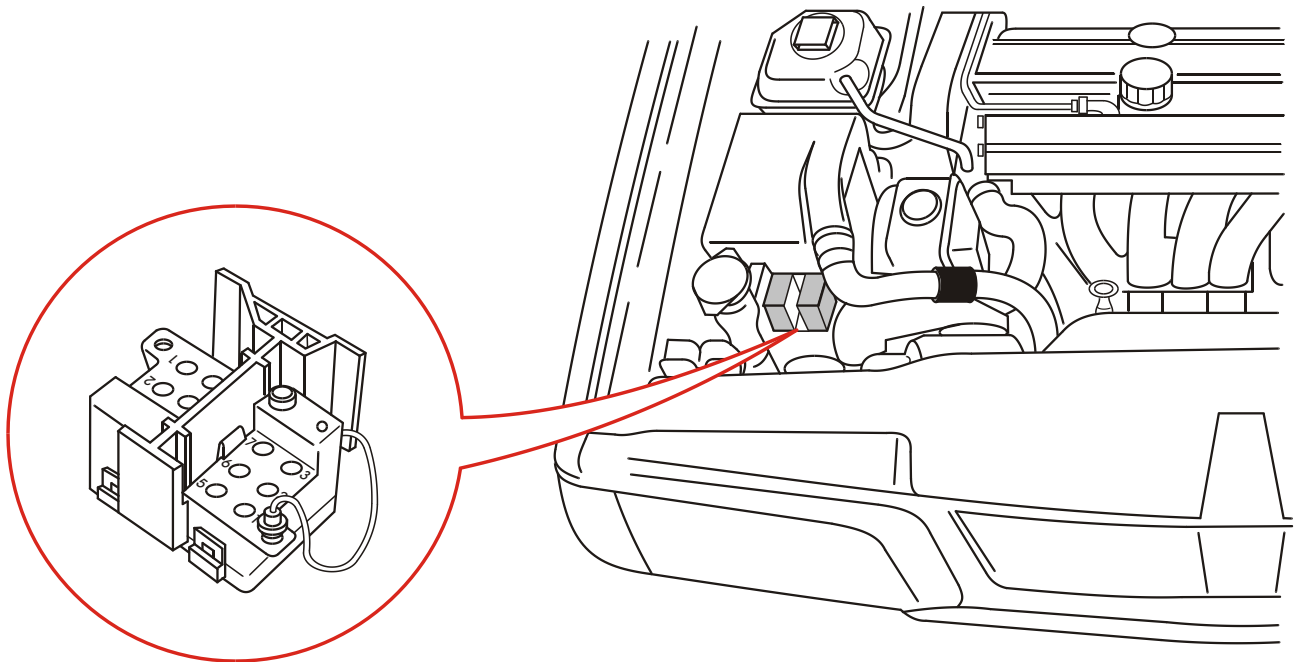
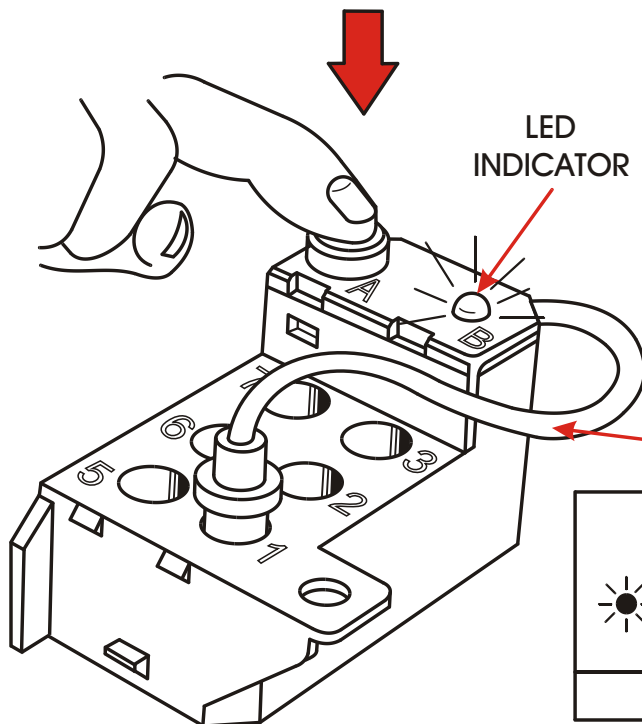
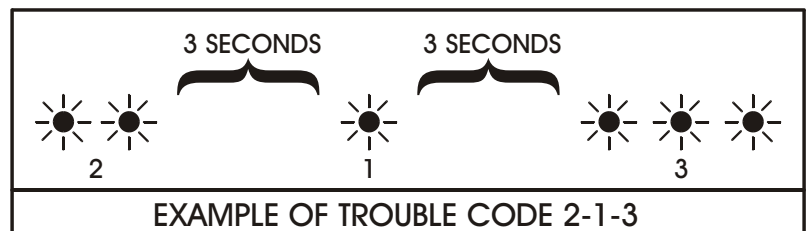


Figure 9

## RETRIEVING TROUBLE CODES



*Once the Function Selector Cable has been inserted in correct socket, depress button once and keep depressed for more than one second, but not more than three seconds. Diagnostic Trouble Codes are read by observing and counting LED flashes to determine the Diagnostic Trouble Code.*



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Figure 10



DTC	DESCRIPTION	WARNING LAMP **
1-1-1	NO FAULTS RECORDED	NO
1-1-2	SHORT CIRCUIT TO BATTERY VOLTAGE IN SHIFT SOLENOID S1 CIRCUIT	YES
1-1-3	FAULT IN TRANSMISSION CONTROL MODULE	YES
1-1-4	BREAK IN MODE SELECTOR CIRCUIT	NO
1-2-1	SHORT CIRCUIT TO GROUND IN SHIFT SOLENOID S1 CIRCUIT	YES
1-2-2	BREAK (OPEN) IN SHIFT SOLENOID S1 CIRCUIT	YES
1-2-3	SHORT CIRCUIT TO BATTERY VOLTAGE IN EPC SOLENOID CIRCUIT	YES
1-2-4	SHORT CIRCUIT TO GROUND IN MODE SELECTOR CIRCUIT	NO
1-3-1	BREAK OR SHORT CIRCUIT TO GROUND IN EPC SOLENOID CIRCUIT	YES
1-3-2	FAULT IN TRANSMISSION CONTROL MODULE	YES
1-3-4	INCORRECT LOAD SIGNAL	NO
1-4-1	SHORT CIRCUIT IN TRANSMISSION TEMPERATURE SENSOR CIRCUIT	NO
1-4-2	BREAK (OPEN) IN TRANSMISSION TEMPERATURE SENSOR CIRCUIT	NO
1-4-3	SHORT CIRCUIT TO GROUND IN KICKDOWN SWITCH CIRCUIT	NO
2-1-1	FAULT IN TRANSMISSION CONTROL MODULE	YES
2-1-2	SHORT CIRCUIT TO BATTERY VOLTAGE IN SHIFT SOLENOID S2 CIRCUIT	YES
2-1-3	THROTTLE POSITION SENSOR SIGNAL TOO HIGH	YES
2-2-1	SHORT CIRCUIT TO GROUND IN SHIFT SOLENOID S2 CIRCUIT	YES
2-2-2	BREAK (OPEN) IN SHIFT SOLENOID S2 CIRCUIT	YES
2-2-3	THROTTLE POSITION SENSOR SIGNAL TOO LOW	YES
2-3-1	IRREGULAR THROTTLE POSITION SENSOR SIGNAL	YES
2-3-2	SPEEDOMETER SIGNAL ABSENT	YES
2-3-3	INCORRECT SPEEDOMETER SIGNAL	YES
2-3-5	HIGH TRANSMISSION OIL TEMPERATURE	YES *
2-4-5	BREAK OR SHORT IN TORQUE LIMITING CIRCUIT	YES
3-1-1	RPM SIGNAL ABSENT	YES
3-1-2	RPM SIGNAL FAULTY	YES
3-1-3	INCORRECT SIGNAL FROM GEAR POSITION SENSOR	YES
3-2-2	INCORRECT GEAR RATIO	YES
3-2-3	LOCK-UP SLIPS OR IS NOT ENGAGED	YES
3-3-1	SHORT CIRCUIT TO BATTERY VOLTAGE IN LOCK-UP SOLENOID CIRCUIT	NO
3-3-2	BREAK (OPEN) IN LOCK-UP SOLENOID CIRCUIT	NO
3-3-3	SHORT CIRCUIT TO GROUND IN LOCK-UP SOLENOID CIRCUIT	NO

\*\* When a fault occurs the code is stored and the "WARNING" lamp in the instrument panel comes on. If the fault is intermittent and ceases, the warning lamp will go out, but the DTC will remain.

\*Only for as long as the temperature remains high.

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Figure 11

## VOLVO 96 & UP OBD-II CODE DEFINITIONS

### OBD-II CONNECTOR



**OBD-II**  
*Connector Location:*  
*In front of shifter*  
*or in front of console*  
*by gas pedal*

VOLVO DTC	OBD-II DTC	CODE DESCRIPTION
1-2-1	P0750	SHORT CIRCUIT TO GROUND IN SHIFT SOLENOID S1 CIRCUIT
1-2-2	P0750	BREAK (OPEN) IN SHIFT SOLENOID S1 CIRCUIT
1-2-3	P0745	SHORT CIRCUIT TO BATTERY VOLTAGE IN EPC SOLENOID CIRCUIT
1-3-2	P0745	FAULT IN TRANSMISSION CONTROL MODULE (STH SHORT CIRCUIT)
2-2-1	P0755	SHORT CIRCUIT TO GROUND IN SHIFT SOLENOID S2 CIRCUIT
2-2-2	P0755	BREAK (OPEN) IN SHIFT SOLENOID S2 CIRCUIT
2-1-3	P0120	THROTTLE POSITION SENSOR SIGNAL TOO HIGH
2-2-3	P0120	THROTTLE POSITION SENSOR SIGNAL TOO LOW
2-3-2	P0500	SPEEDOMETER SIGNAL ABSENT
3-1-1	P0715	RPM SIGNAL ABSENT
3-1-3	P0705	INCORRECT SIGNAL FROM GEAR POSITION SENSOR
3-2-1	P0731	INCORRECT 1st GEAR RATIO
3-2-2	P0732	INCORRECT 2nd GEAR RATIO
3-2-3	P0733	INCORRECT 3rd GEAR RATIO
3-2-4	P0734	INCORRECT 4th GEAR RATIO

**NOTE:** Codes may be retrieved in OBD-II Generic mode

Figure 12

## SAAB OBD-II CODE DEFINITIONS

### OBD-II CONNECTOR



**OBD-II**  
*Connector Location:*  
*Below dash at*  
*base of steering column*

OBD-II DTC	CODE DESCRIPTION
P0705	GEAR SELECTOR POSITION SENSOR, SIGNAL INCORRECT
P1500	BATTERY VOLTAGE TOO LOW OR TO HIGH
P1785/6	TPS SIGNAL FROM ENGINE / TCS INCORRECT
P1787/8	TPS SIGNAL FROM ENGINE / TCS SHORT
P1789	DRIVE SIGNAL TO ENGINE MANAGEMENT SHORT OR OPEN
P1790	KICKDOWN SWITCH SHORT TO GROUND
P1812	OIL TEMPERATURE SHORT TO GROUND
P1813	OIL TEMPERATURE SHORT TO B+ OR OPEN
P1813	OIL TEMPERATURE SHORT TO B+ OR OPEN
P1817	TURBINE SHAFT SPEED SENSOR NO SIGNAL
P1822	OUTPUT SHAFT SPEED SENSOR NO SIGNAL
P1830	GEAR RATIO ERROR (SLIP CODE)
P1831	DOWNSHIFTING MECHANICAL FAULT
P1832	SHIFTING TIME MECHANICAL FAULT
P1832	SHIFTING TIME MECHANICAL FAULT
P1842	TORQUE LIMIT SIGNAL TO ECM SHORT OR OPEN
P1847	PRESSURE CONTROL SOLENOID CIRCUIT (ST) SHORT OR OPEN
P1848	PRESSURE CONTROL SOLENOID CIRCUIT (ST) SHORT TO B+
P1849	PRESSURE CONTROL SOLENOID (ST) SHORT
P1852	SOLENOID S1 SHORT TO GROUND
P1853	SOLENOID S1 SHORT TO B+ OR OPEN
P1857	SOLENOID S2 SHORT TO GROUND
P1858	SOLENOID S2 SHORT TO B+ OR OPEN
P1862	SOLENOID SL SHORT TO GROUND
P1863	SOLENOID SL SHORT TO B+ OR OPEN

**NOTE:** Codes may be retrieved in OBD-II Generic mode

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Figure 13

## DAEWOO OBD-II CODE DEFINITIONS

### OBD-II CONNECTOR



**OBD-II**  
*Connector Location:*  
*Below dash at the*  
*right of steering column*

OBD-II DTC	CODE DESCRIPTION
P0604	INTERNAL CONTROL MODULE FAILURE (RAM FAILURE)
P0705	TRANS RANGE SENSOR CIRCUIT MALFUNCTION
P0712	TRANS FLUID TEMP SENSOR CIRCUIT - LOW INPUT
P0713	TRANS FLUID TEMP SENSOR CIRCUIT - HIGH INPUT
P0717	TURBINE SPEED SENSOR CIRCUIT - NO SIGNAL
P0722	OUTPUT SPEED SENSOR CIRCUIT - NO SIGNAL
P0727	ENGINE SPEED SENSOR CIRCUIT - NO SIGNAL
P0741	TORQUE CONVERTER CLUTCH (SL) STUCK OFF
P0742	TORQUE CONVERTER CLUTCH (SL) STUCK ON
P0743	TORQUE CONVERTER CLUTCH (SL) CIRCUIT ELECTRICAL
P0748	PRESSURE CONTROL SOLENOID (STH) CIRCUIT ELECTRICAL
P0751	S1 SOLENOID PERFORMANCE
P0753	S1 SOLENOID CIRCUIT ELECTRICAL
P0756	S2 SOLENOID PERFORMANCE
P0758	S2 SOLENOID CIRCUIT ELECTRICAL
P1701	ENGINE COOLANT TEMP SIGNAL MALFUNCTION
P1702	TORQUE CONTROL SIGNAL MALFUNCTION
P1790	INTERNAL CONTROL MODULE FAILURE (CHECK SUM FAILURE)
P1791	THROTTLE POSITION SENSOR SIGNAL MALFUNCTION

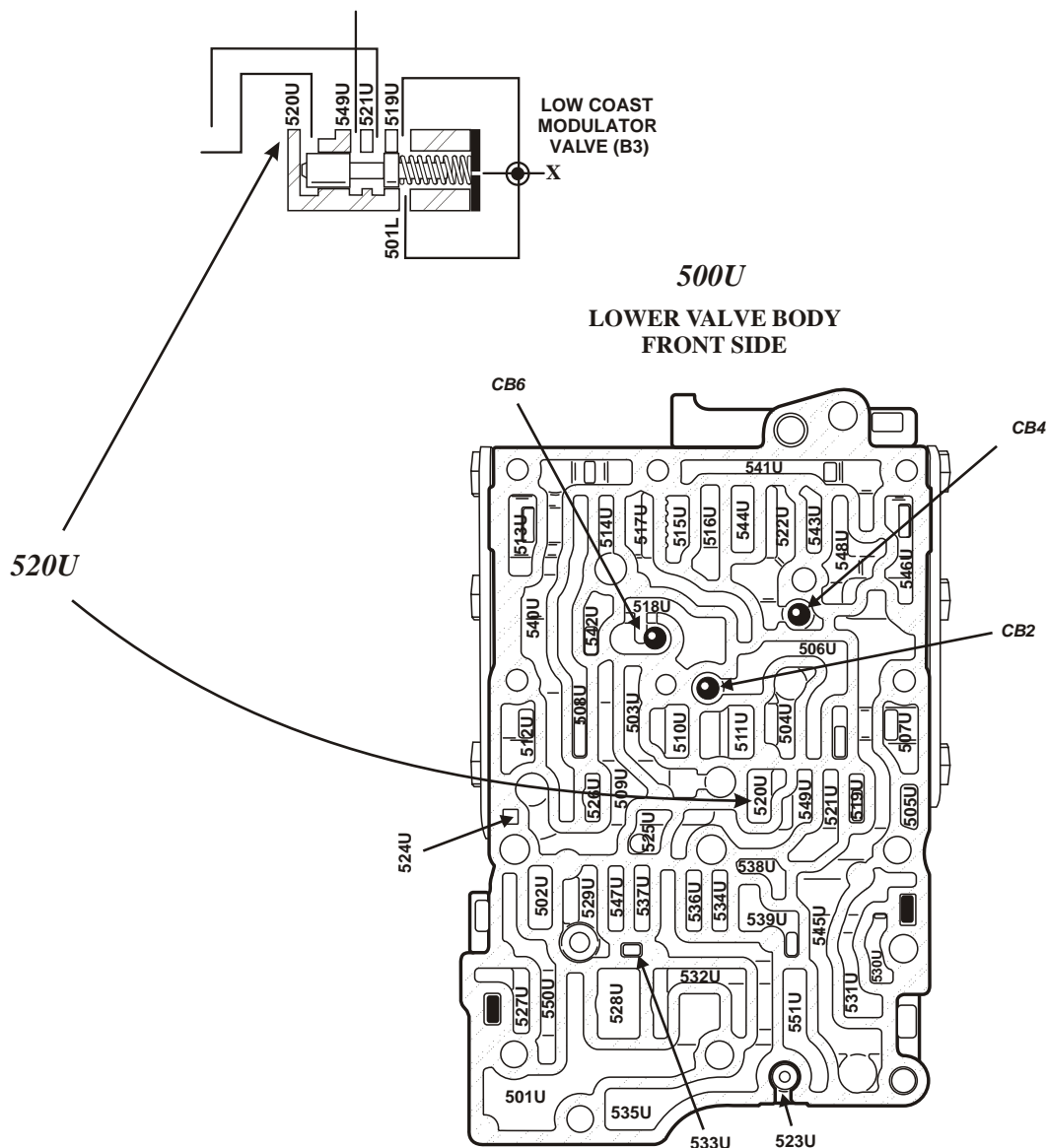
**NOTE:** Codes may be retrieved in OBD-II Generic mode

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Figure 14

## VALVE BODY MAPPING AND PASSAGE IDENTIFICATION

## ***PARTIAL HYDRAULIC SCHEMATIC FOR THE LOW COAST MODULATOR VALVE***



## HOW TO USE THIS MANUAL:

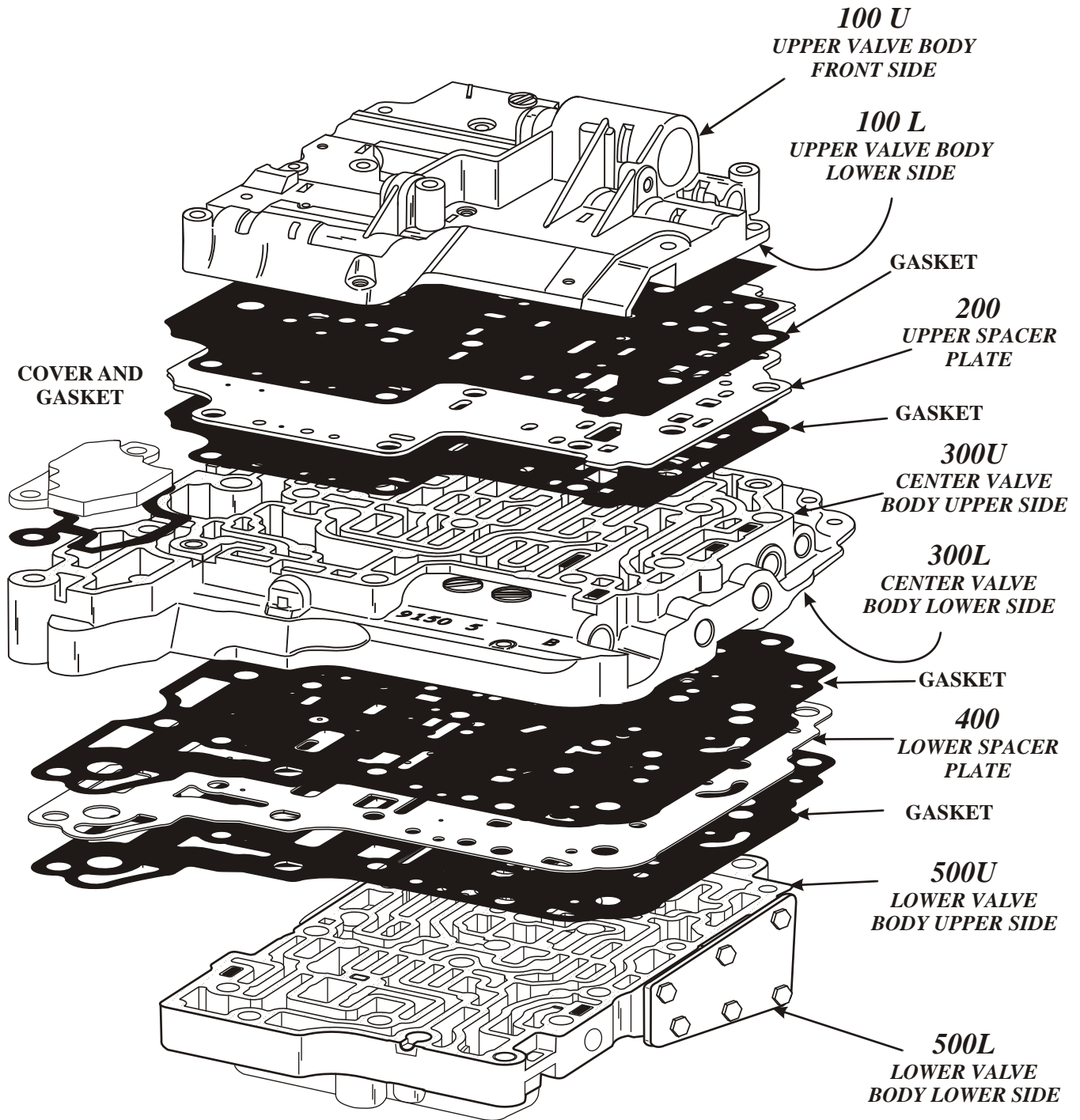
All castings and spacer plates have been numbered so they can be identified in the Valve Body Mapping oil circuit diagram. **Example:** 520U passage is located in the Lower Valve Body Upper side (500U series). This passage can now be located in the partial oil circuit diagram and matched up to the passage in the Lower Valve Body Upper side as shown above.

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Figure 15



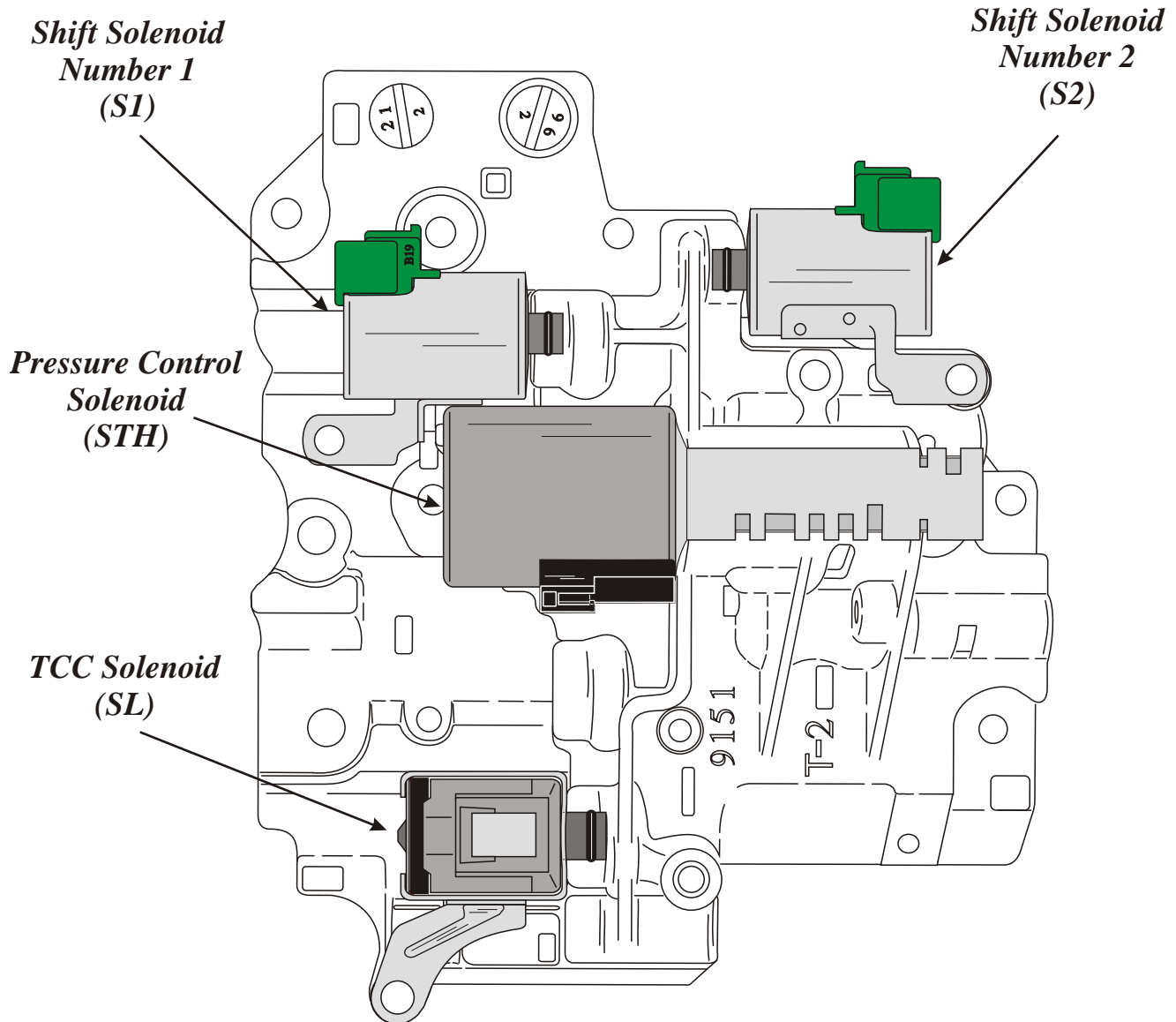
## 50-40 SERIES VALVE BODY COMPONENTS FOR PASSAGE I.D.



Copyright © 2004 ATSG

Figure 16

## 50-40 SERIES SOLENOID LOCATION AND I.D.

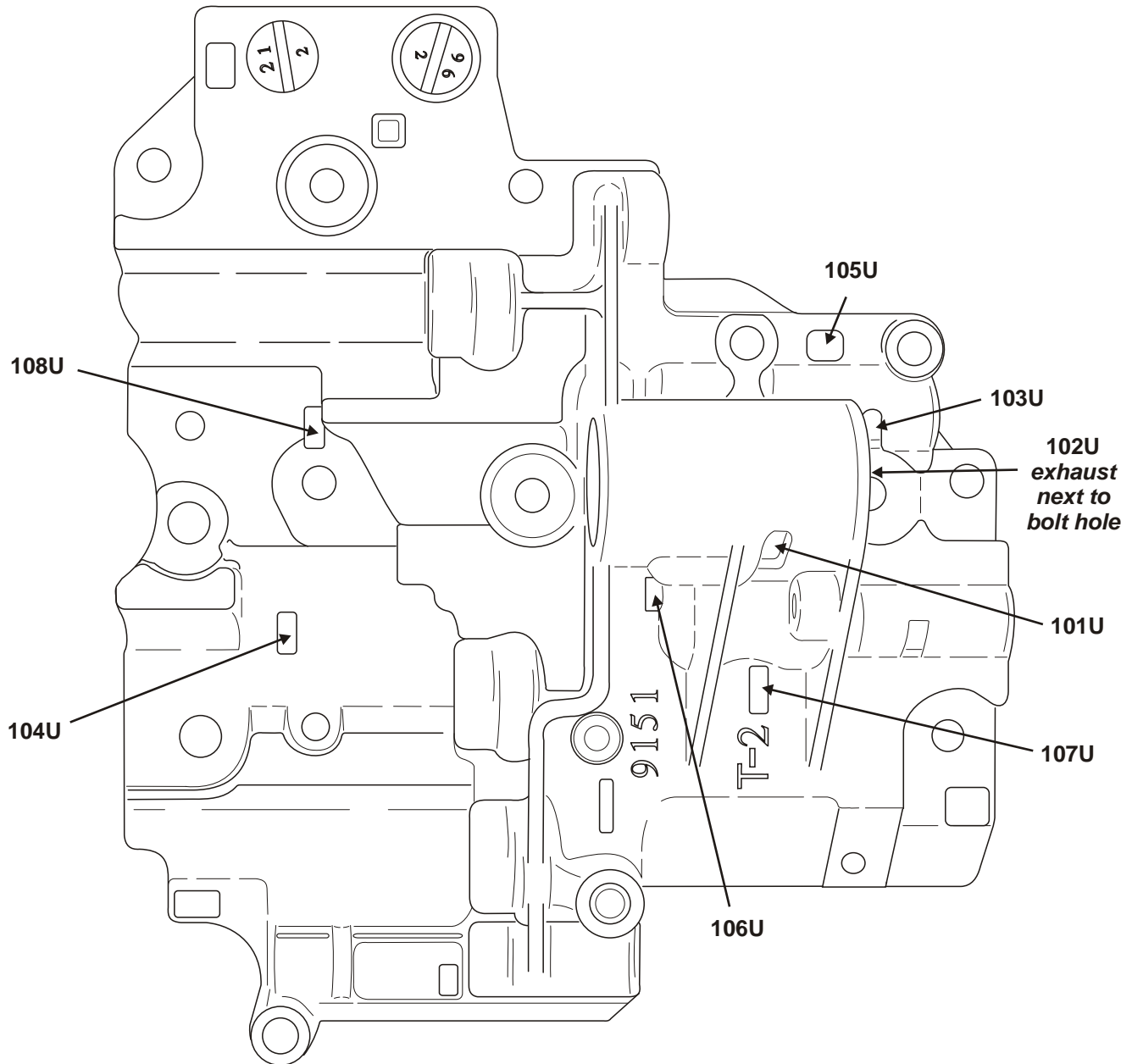


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Figure 17

## 100 U

### UPPER VALVE BODY FRONT SIDE

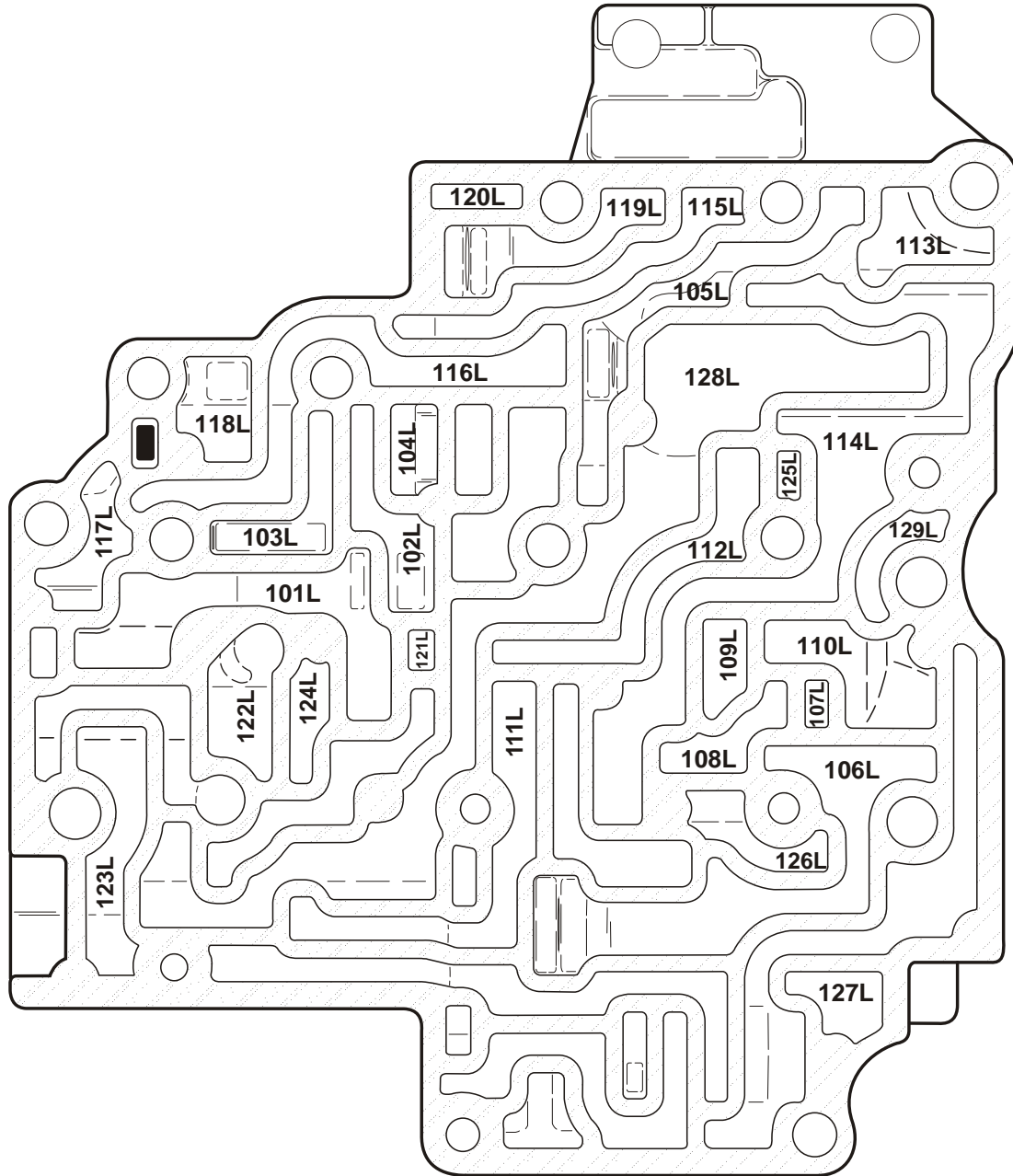


Copyright © 2004 ATSG

Figure 18

## *100 L*

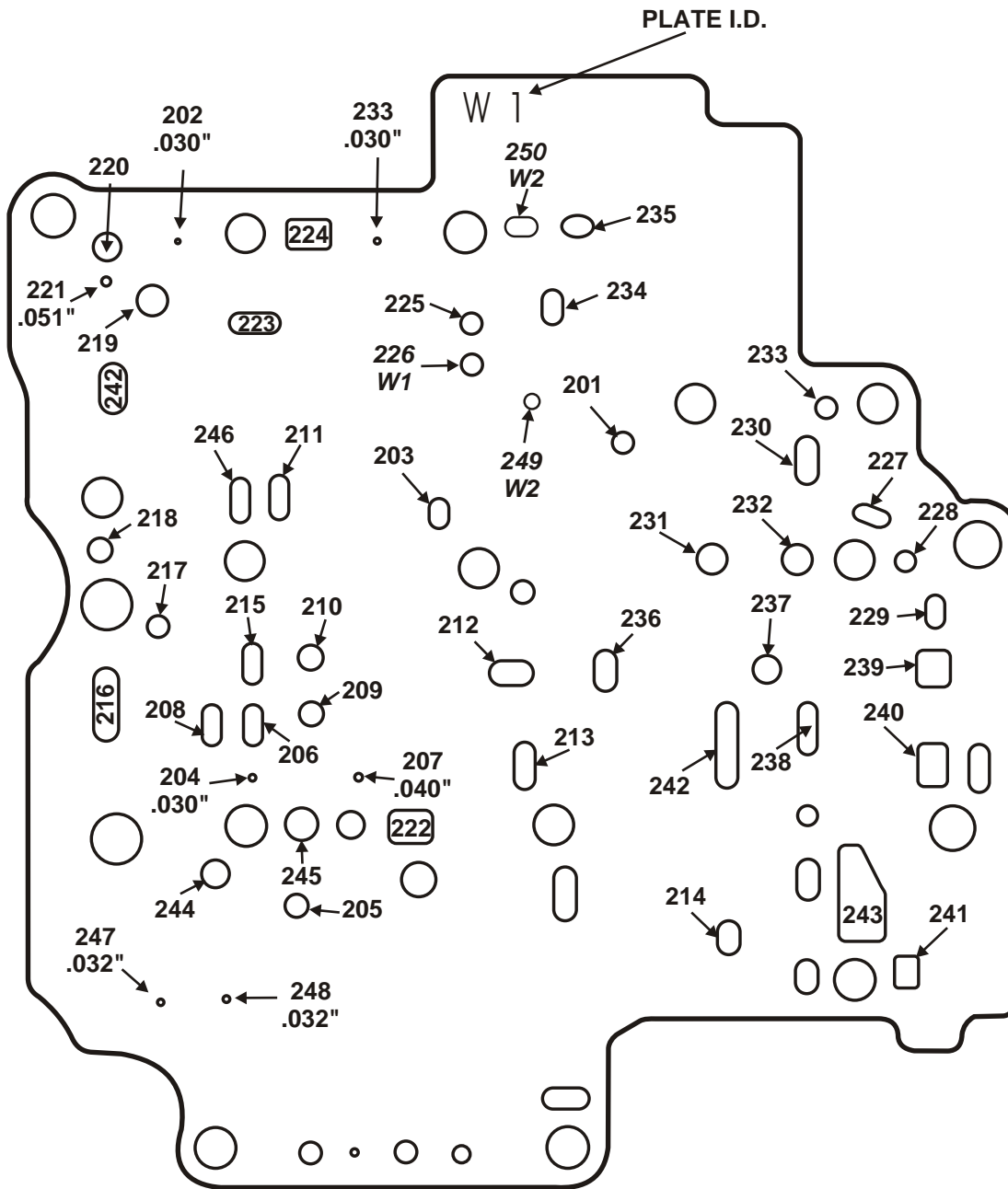
### UPPER VALVE BODY LOWER SIDE



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Figure 19

## 200 UPPER SPACER PLATE



W1 & W2 are two different spacer plate configurations

**226**  
**W1** = *This hole used on W1 spacer plates only*

**249**  
**W2** = *This hole used on W2 spacer plates only*

**250**  
**W2** = *This hole used on W2 spacer plates only*

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Figure 20



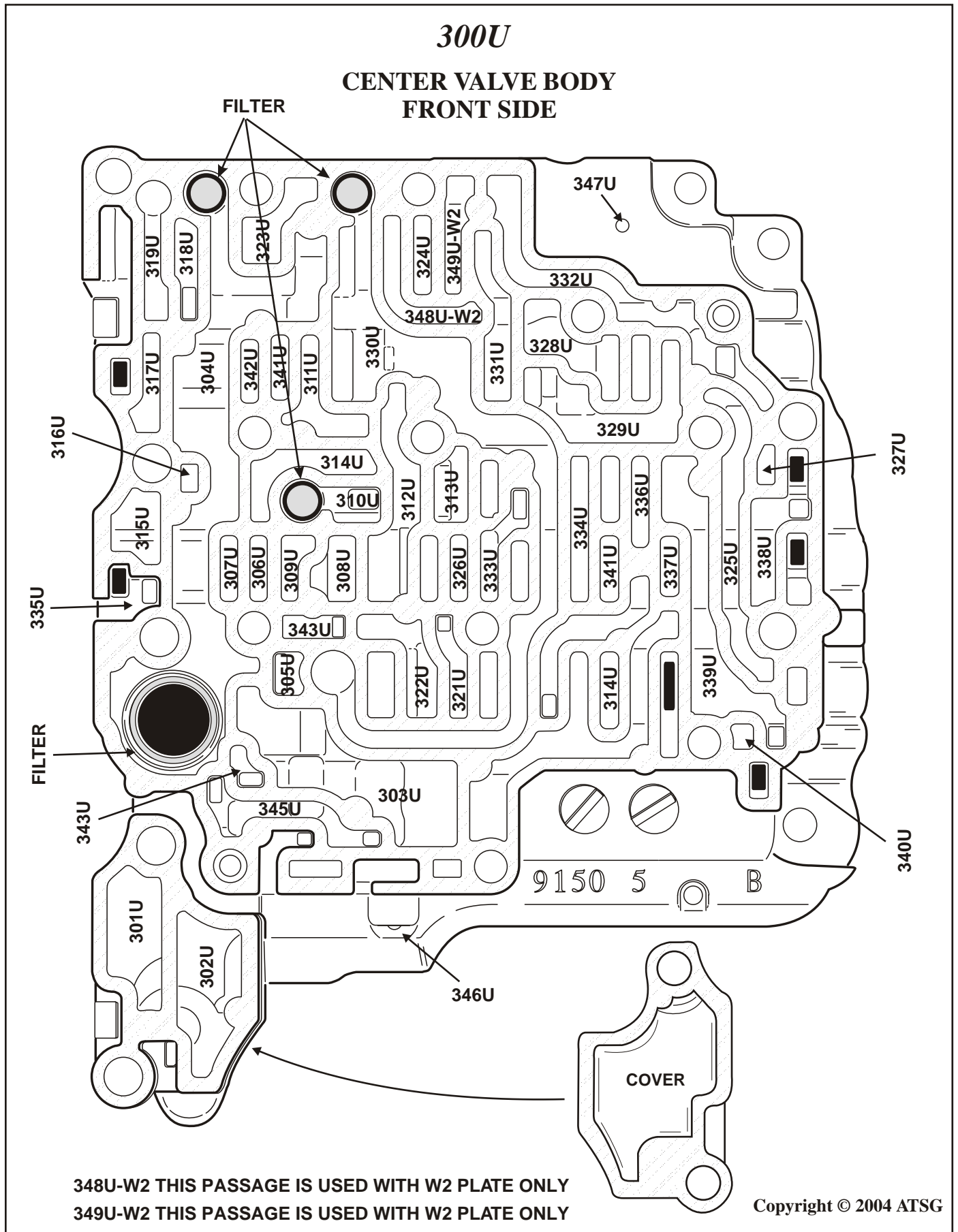


Figure 21

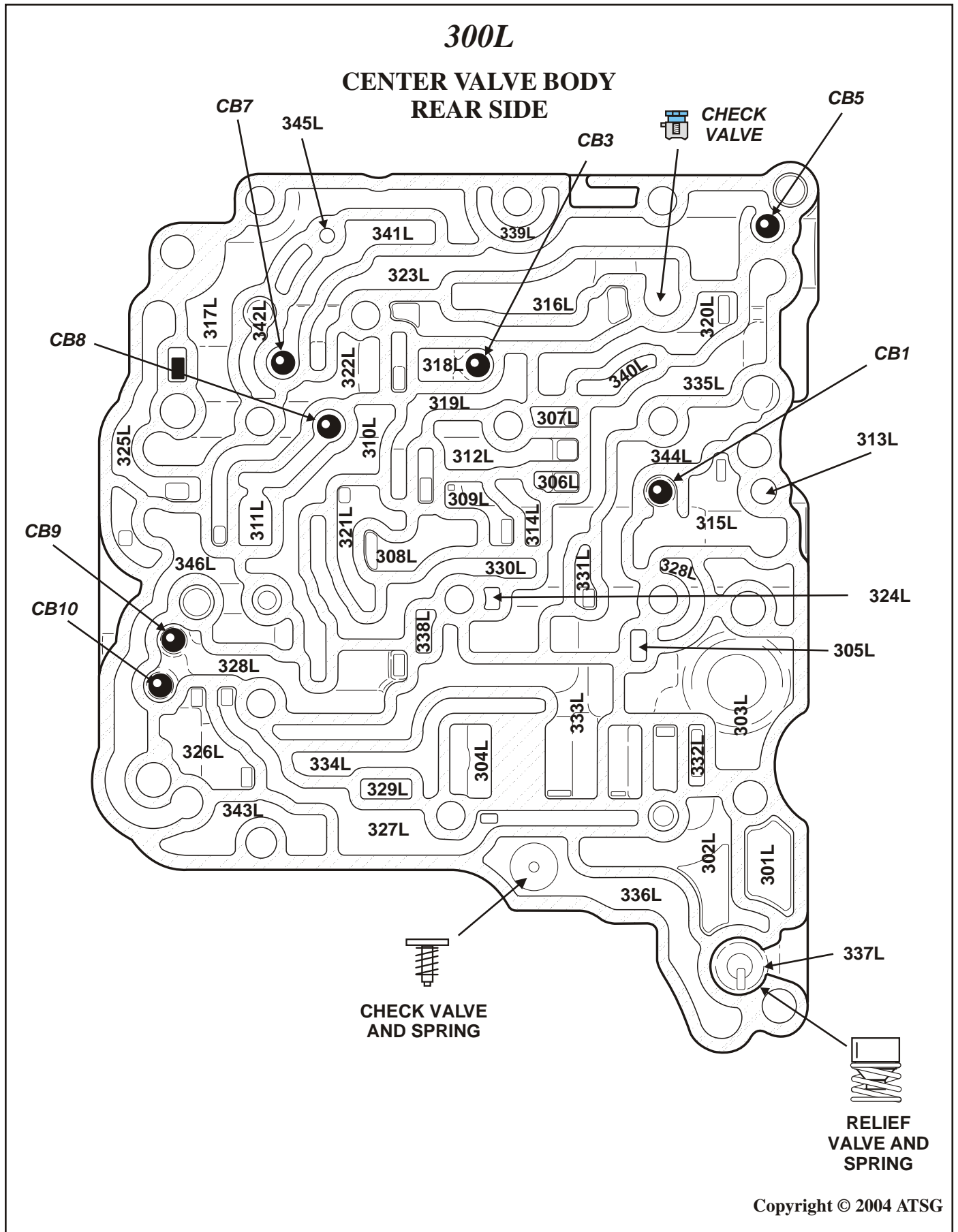
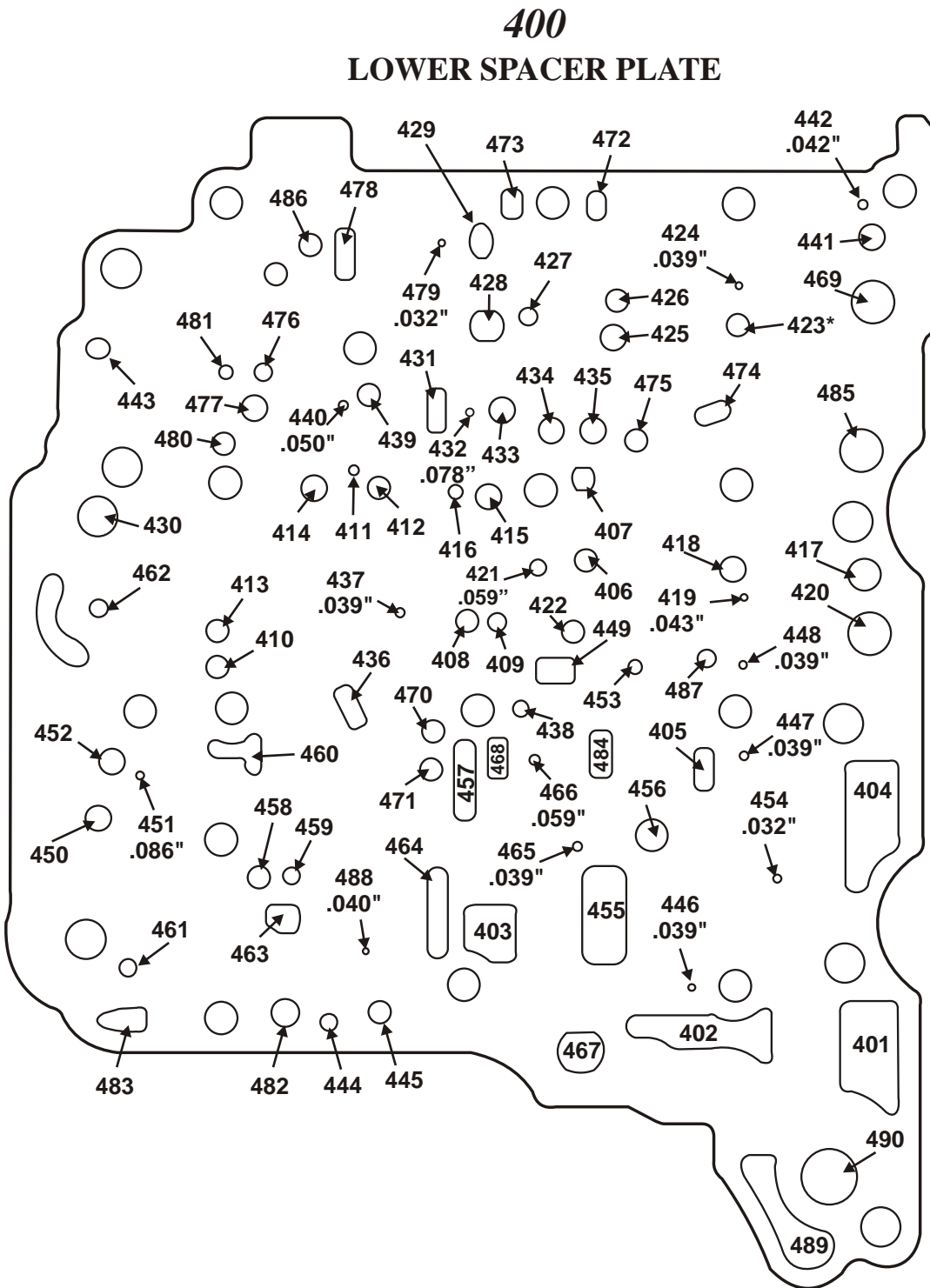


Figure 22



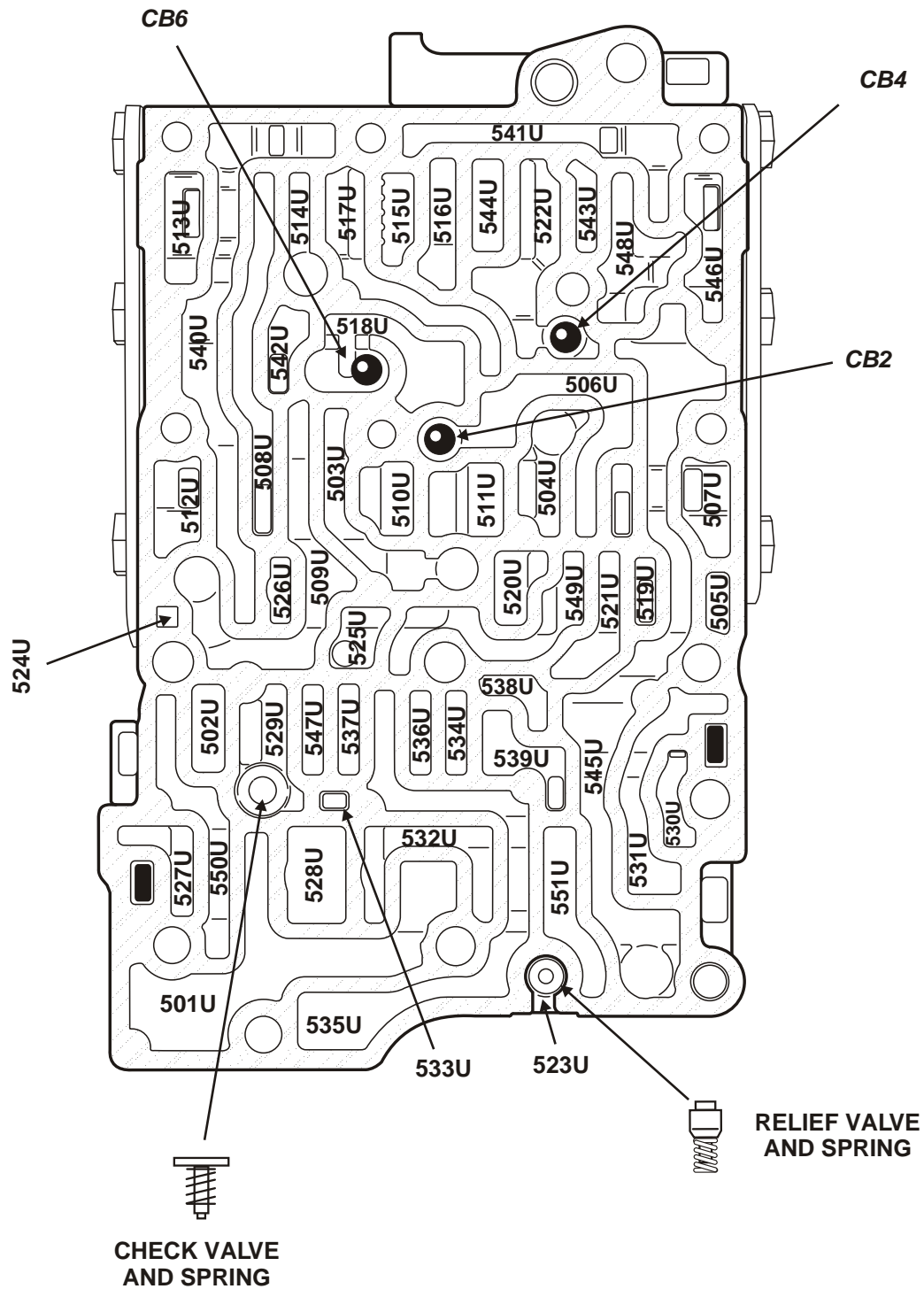
423\* = USED ON CHECK VALVE VERSIONS ONLY

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Figure 23

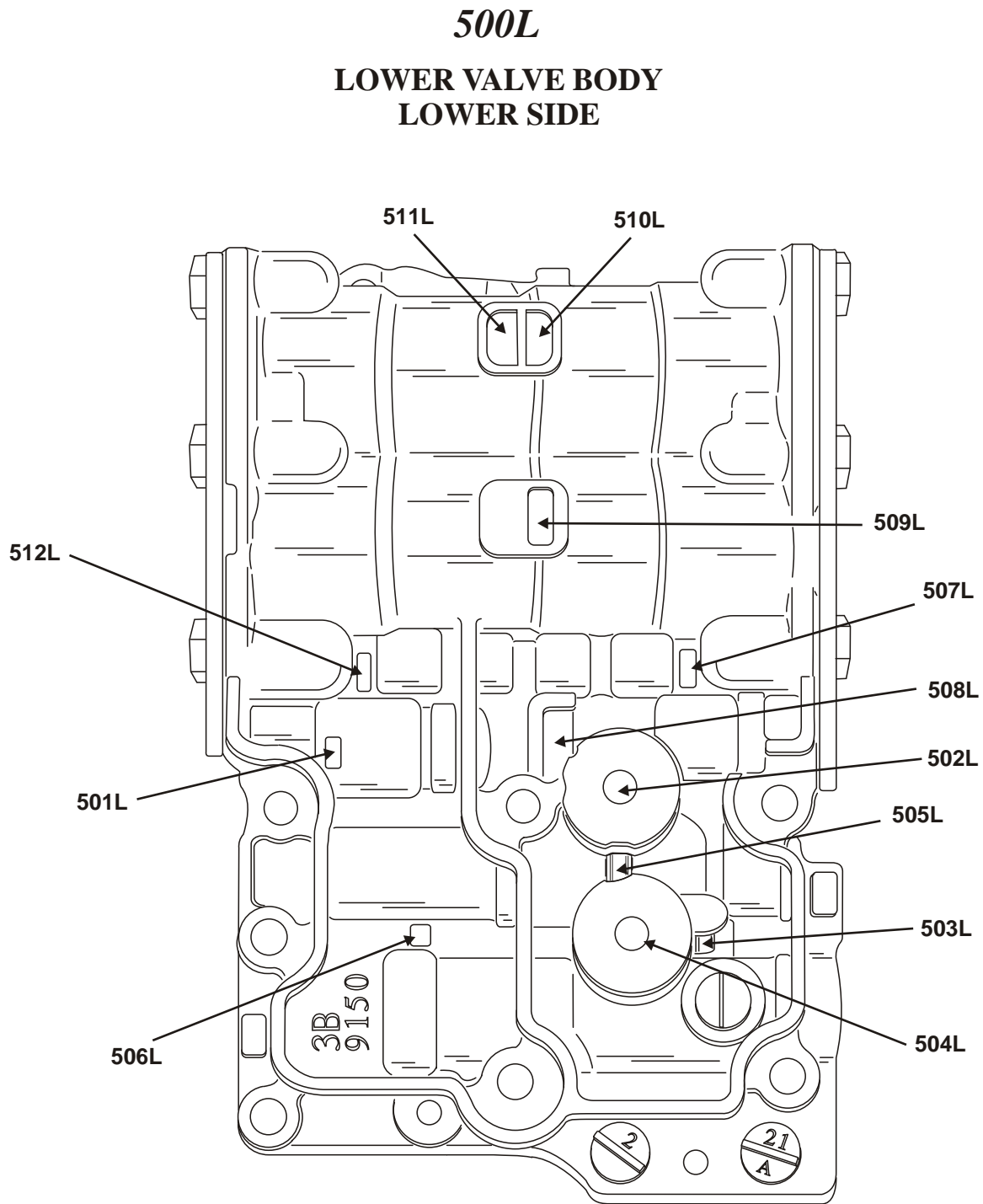
## 500U

### LOWER VALVE BODY FRONT SIDE



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Figure 24

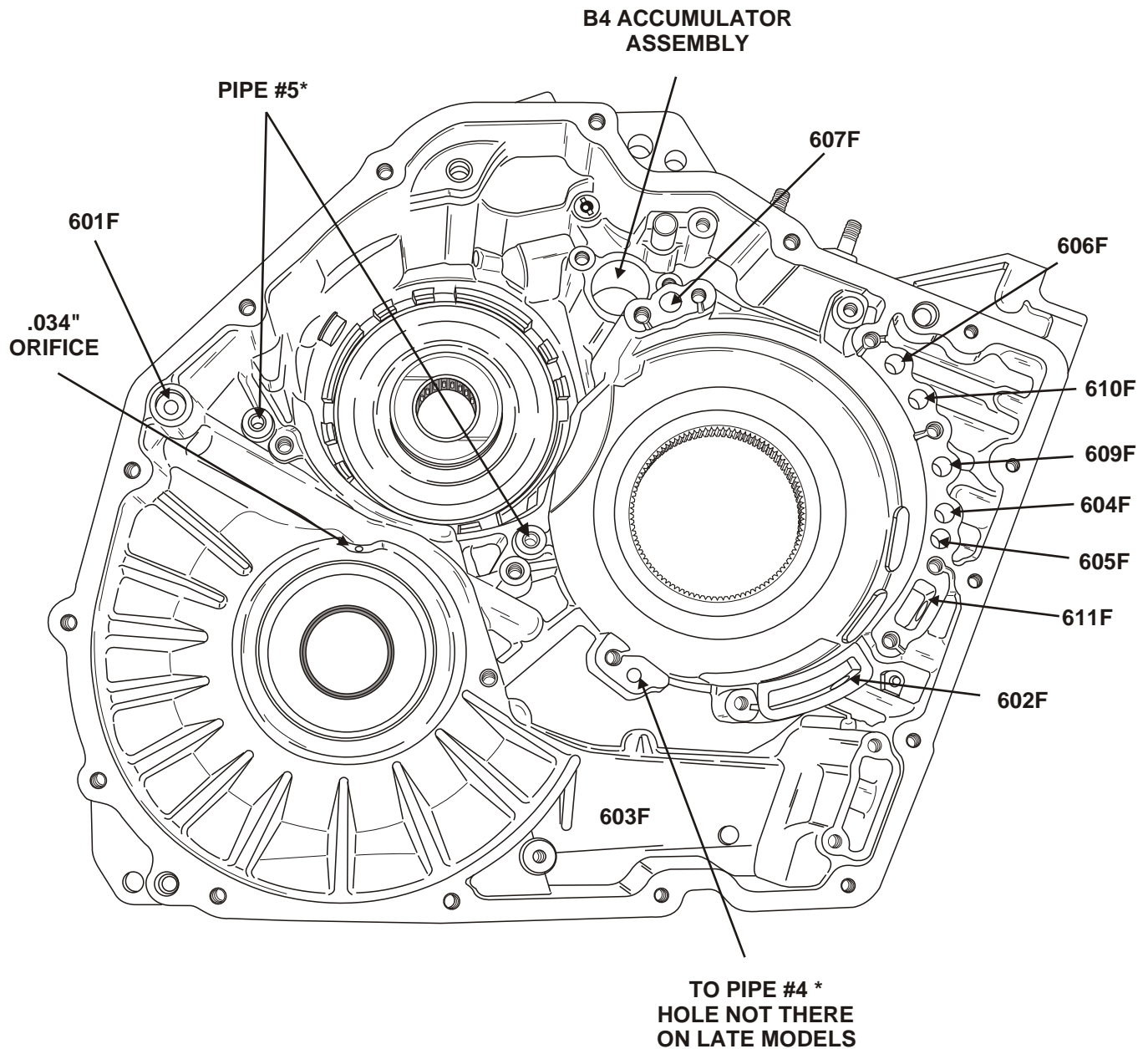


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Figure 25

## 600F

### MID-CASE FRONT SIDE



PIPE #4 IS ONLY USED ON EARLY MODELS WITH LINE PRESSURE TAP  
 PIPE #5 IS ONLY USED ON EARLY MODELS WITH LINE PRESSURE TAP

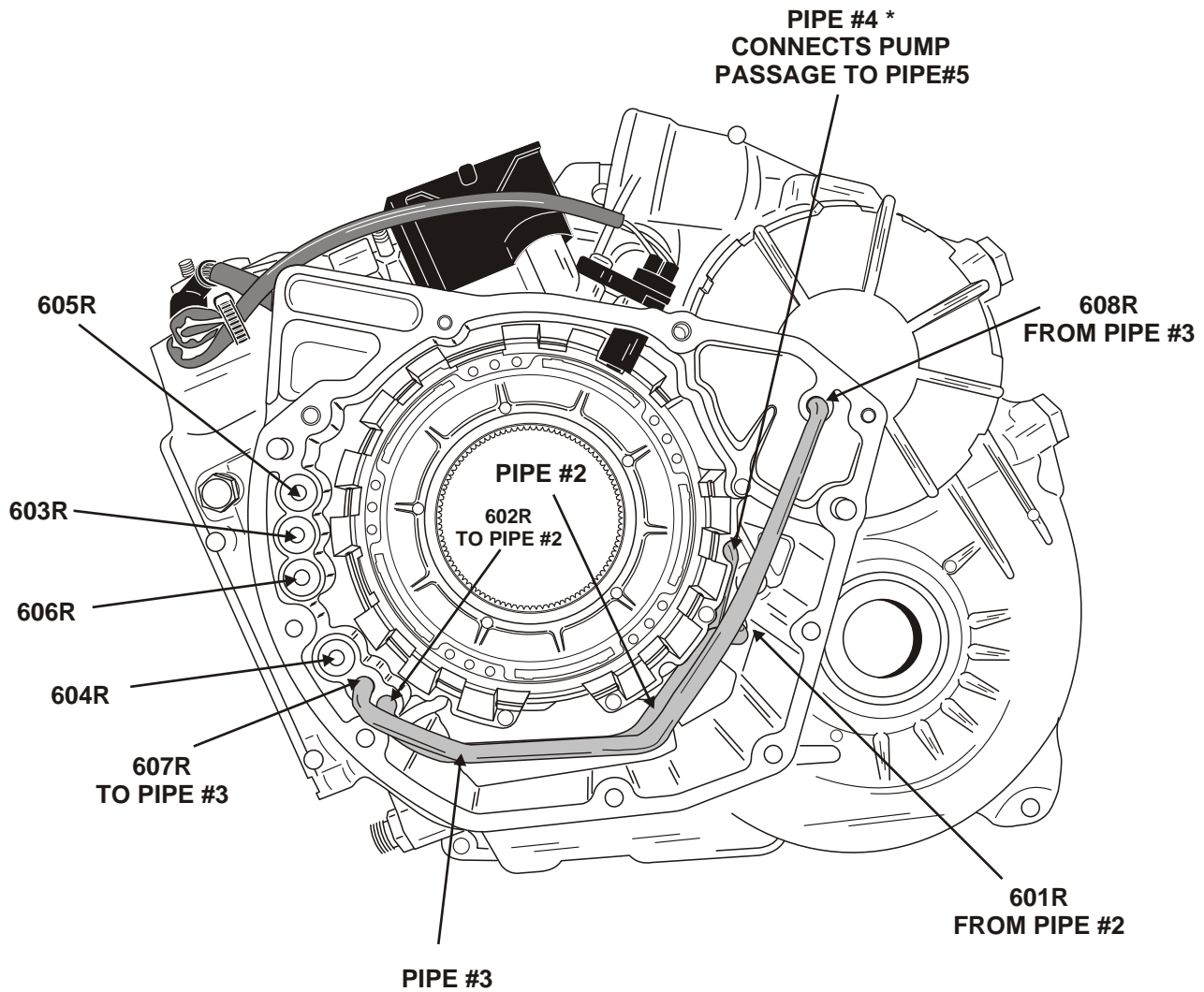
Copyright © 2004 ATSG

Figure 26



## 600R

### MID-CASE REAR SIDE



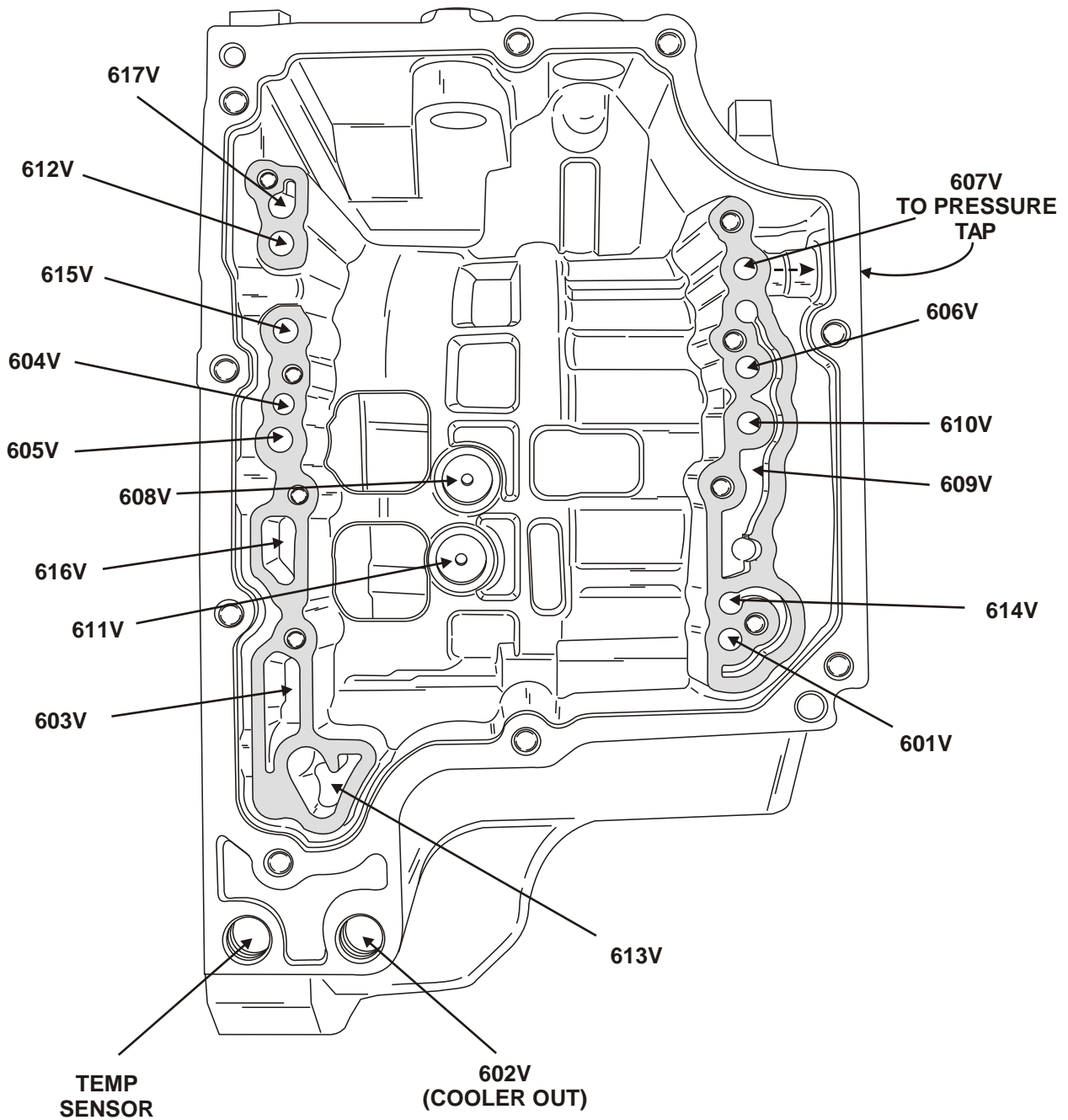
PIPE #4 AND 5 ARE USED FOR EARLY MODELS  
WITH LINE PRESSURE TEST PORT ONLY

Copyright © 2004 ATSG

Figure 27



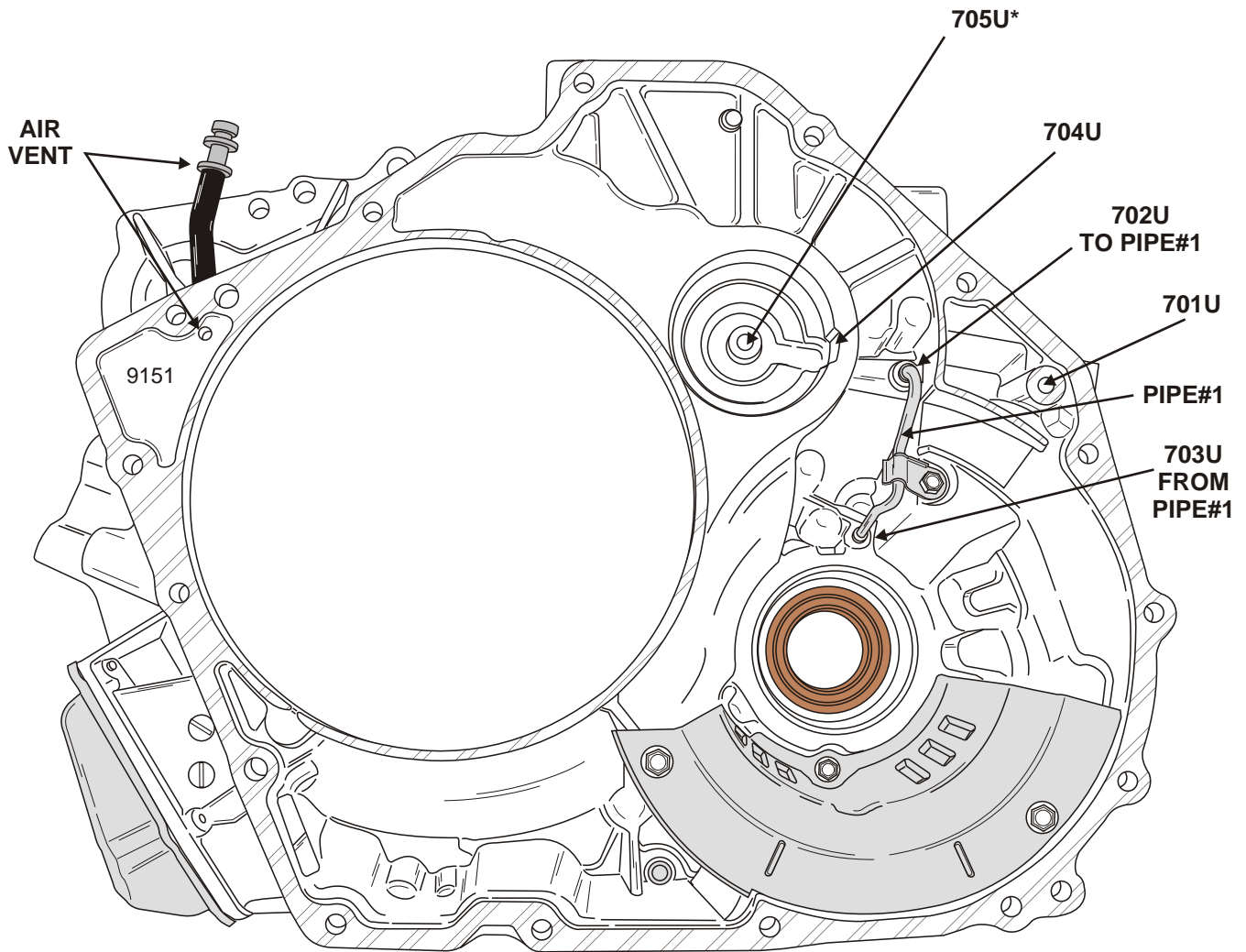
## 600V MID-CASE VALVE BODY SIDE



Copyright © 2004 ATSG

Figure 28

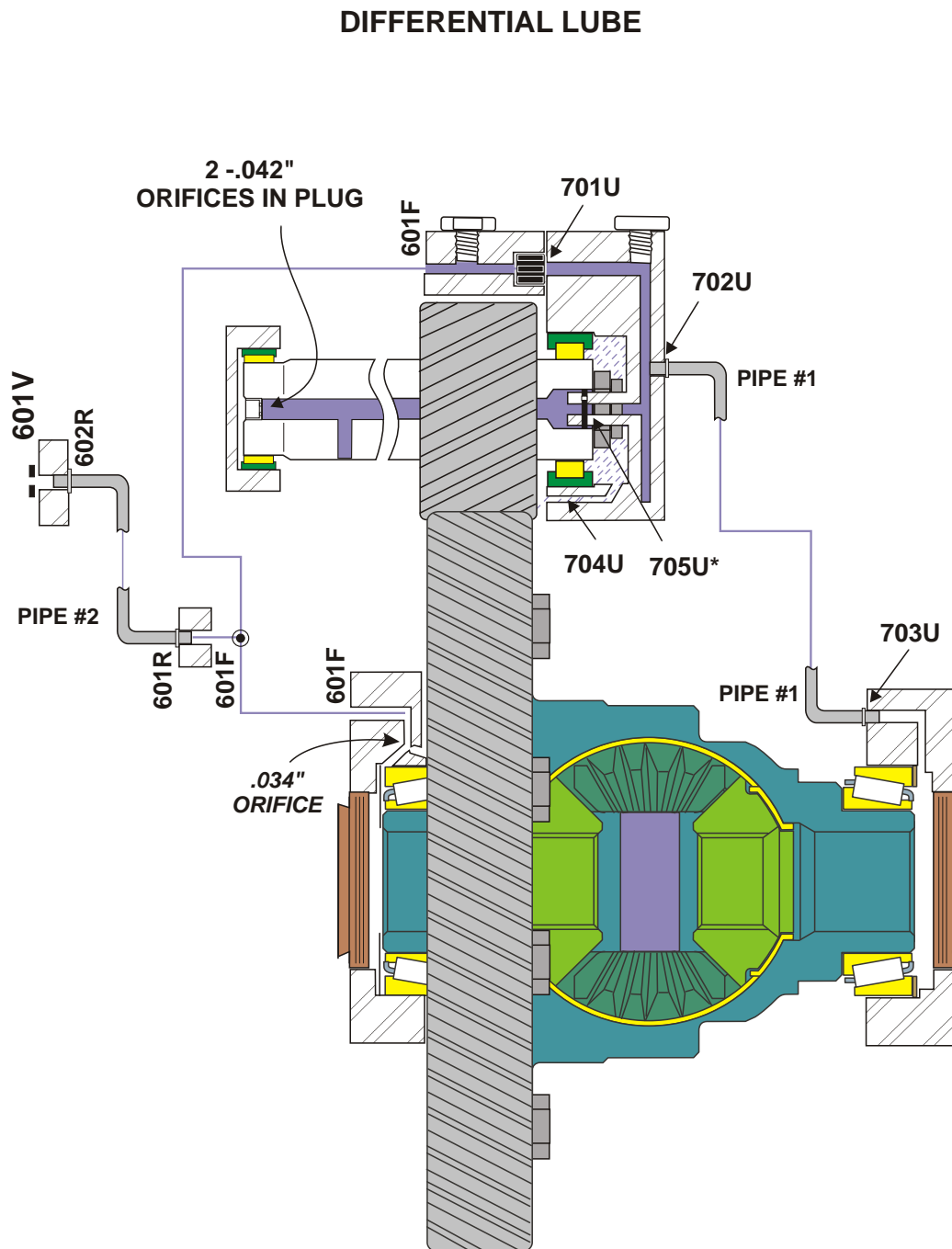
## 700U BELLHOUSING REAR VIEW



**705U\* THERE IS A SEALING RING IN THIS LOCATION THAT HAS A .055" GAP THAT PROVIDES A CONTROLLED LEAK INTO THE BEARING**

Copyright © 2004 ATSG

Figure 29



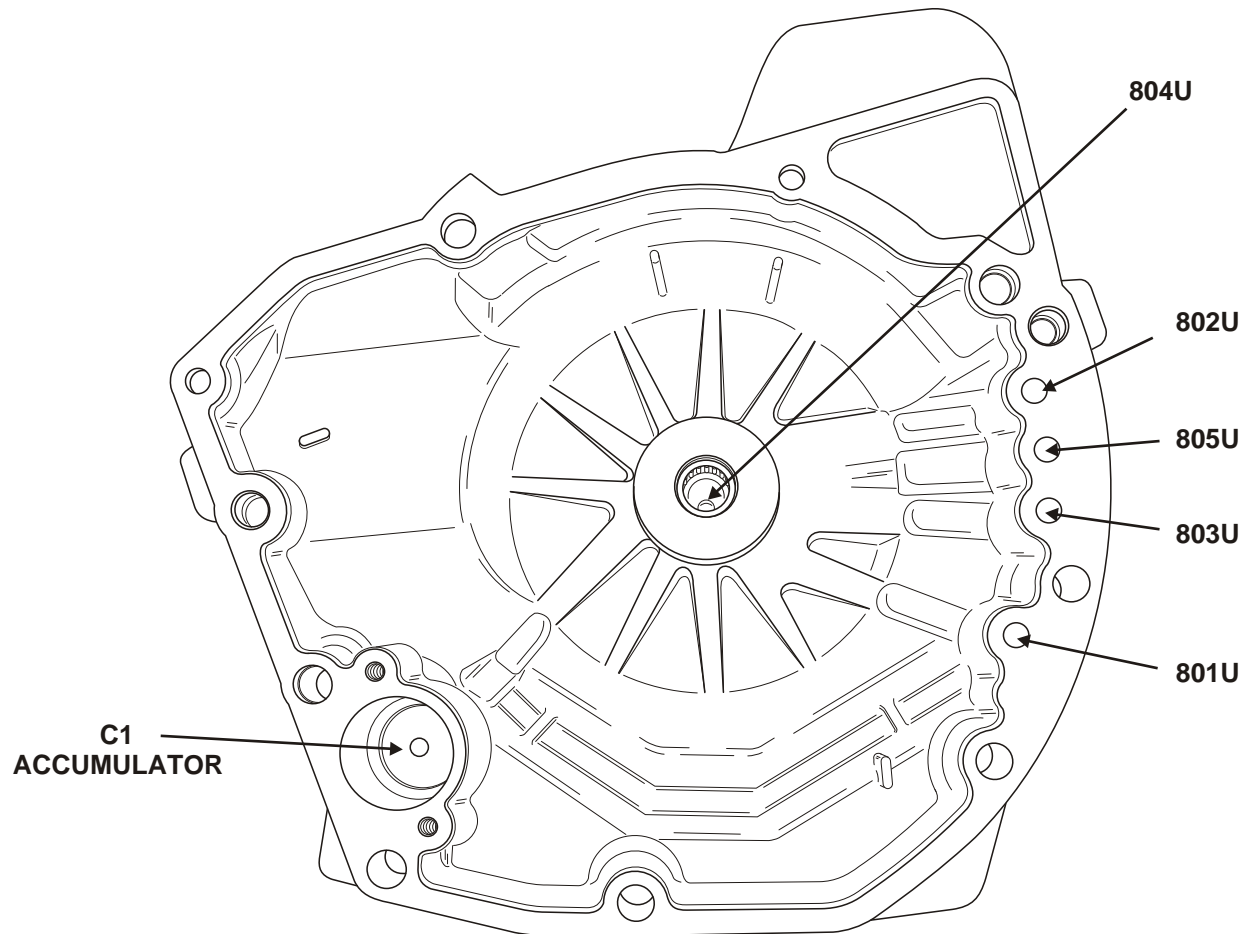
**705U\* THERE IS A SEALING RING IN THIS LOCATION THAT HAS A .055" GAP THAT PROVIDES A CONTROLLED LEAK INTO THE BEARING**

Copyright © 2004 ATSG

Figure 30

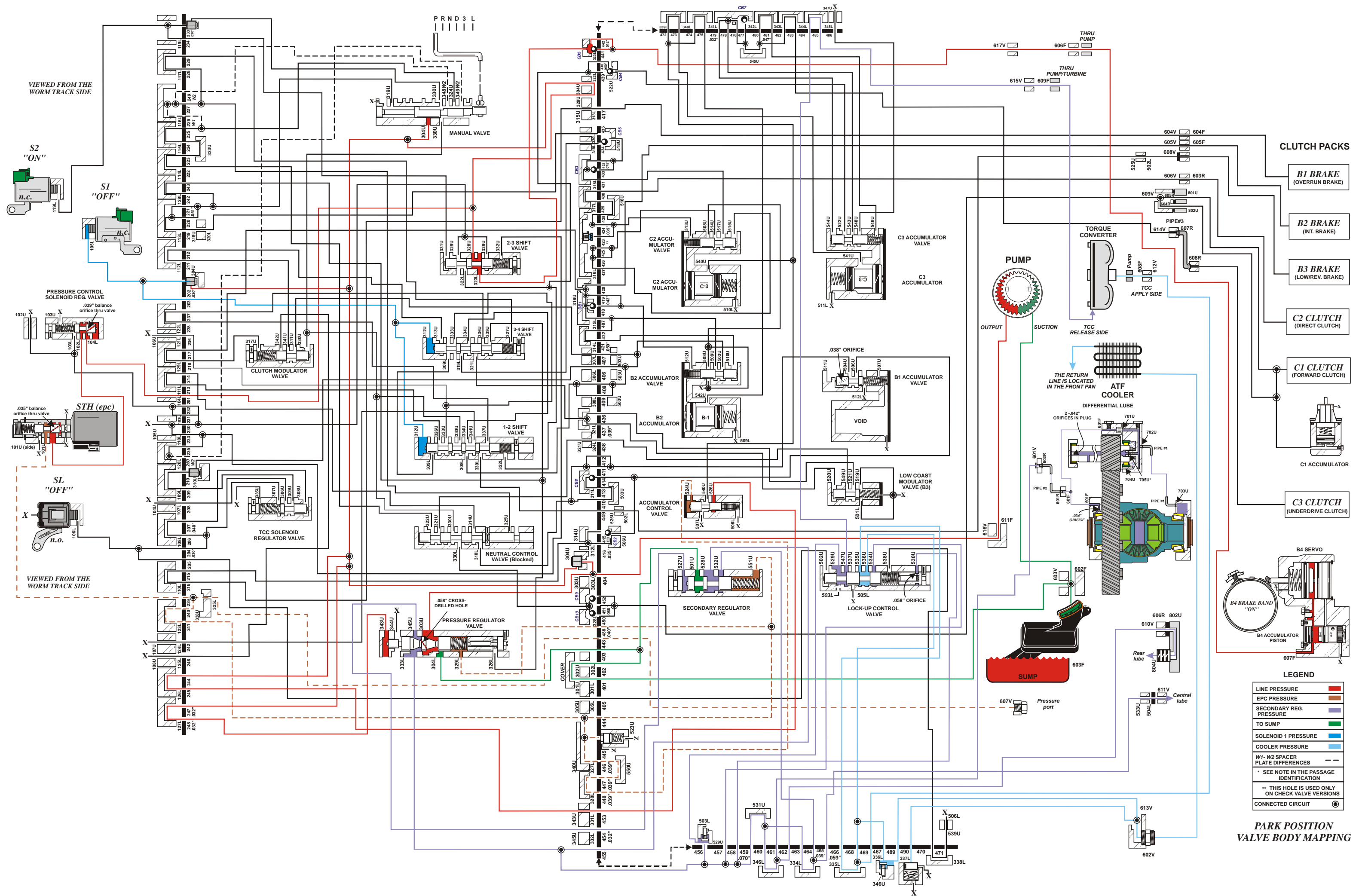
**800U**

**REAR COVER  
FRONT VIEW**

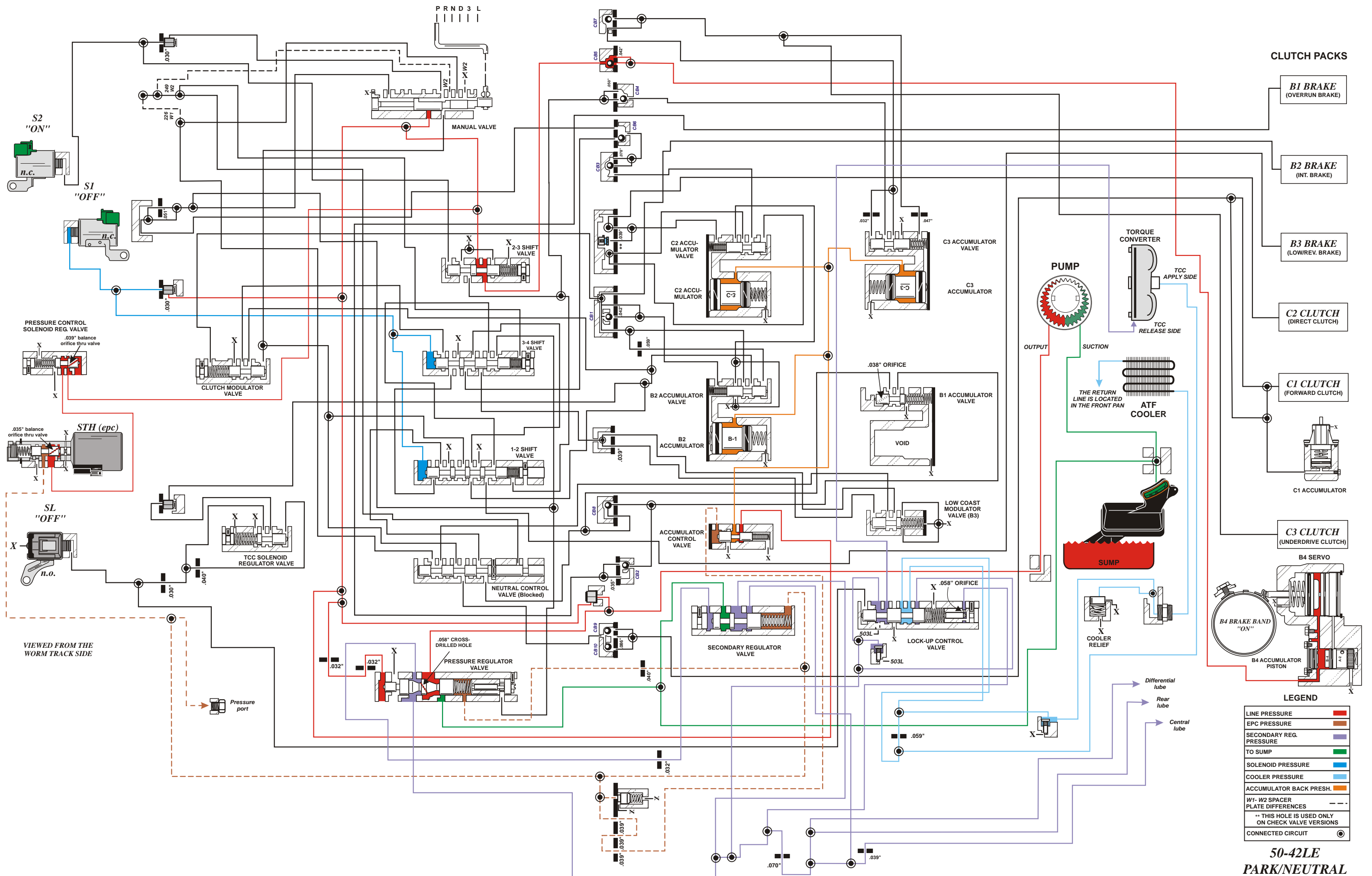


Copyright © 2004 ATSG

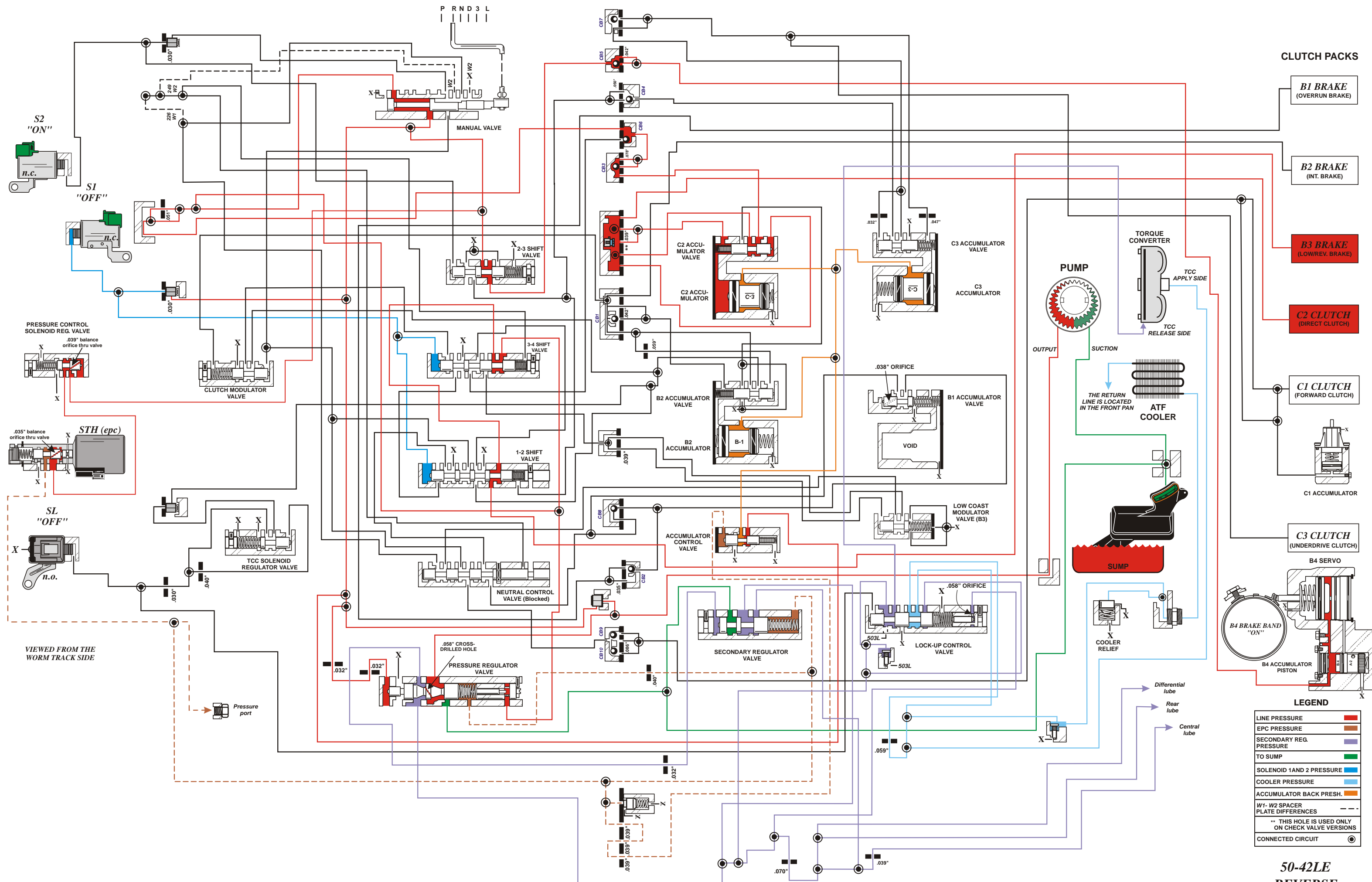
Figure 31



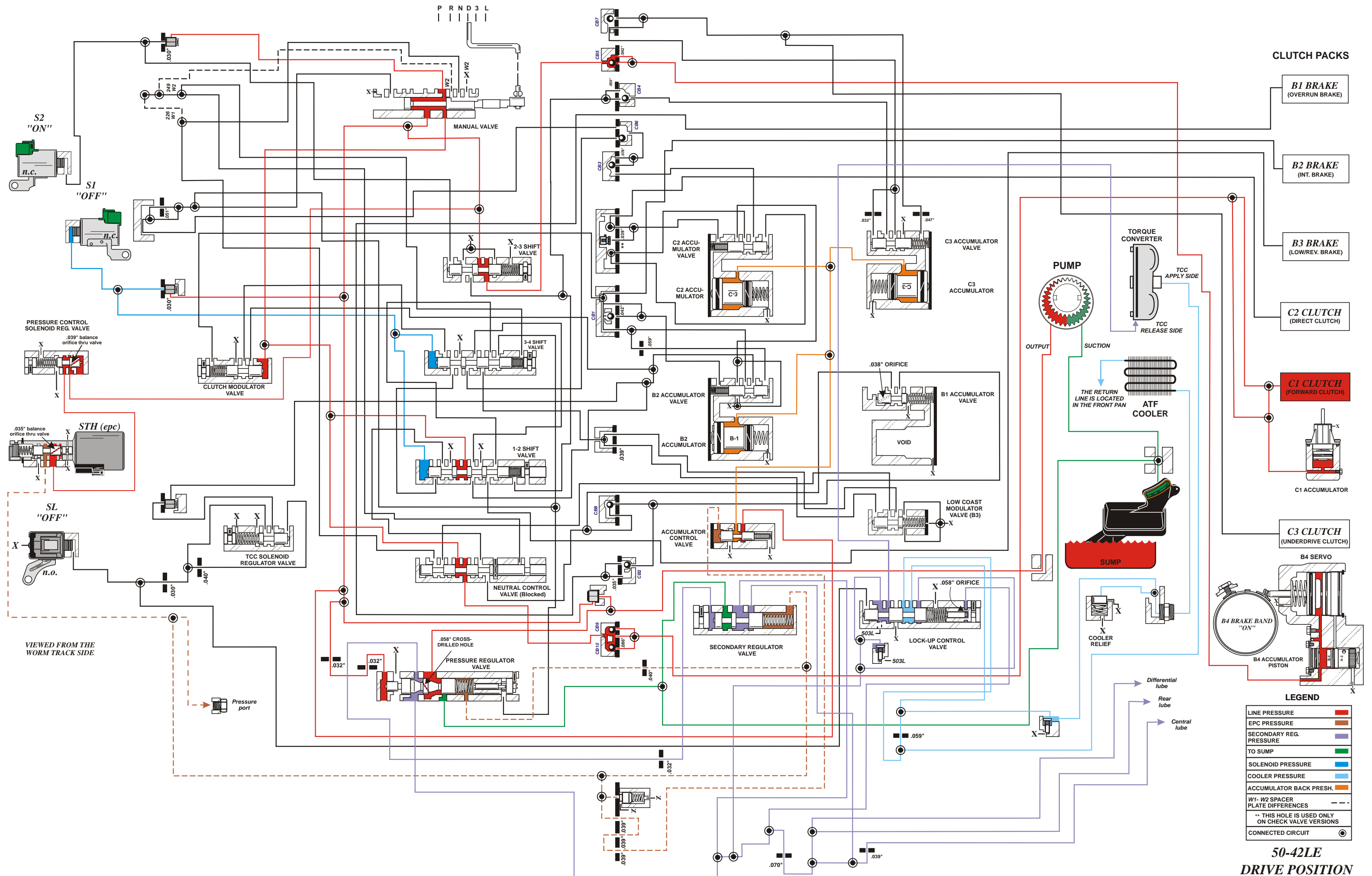




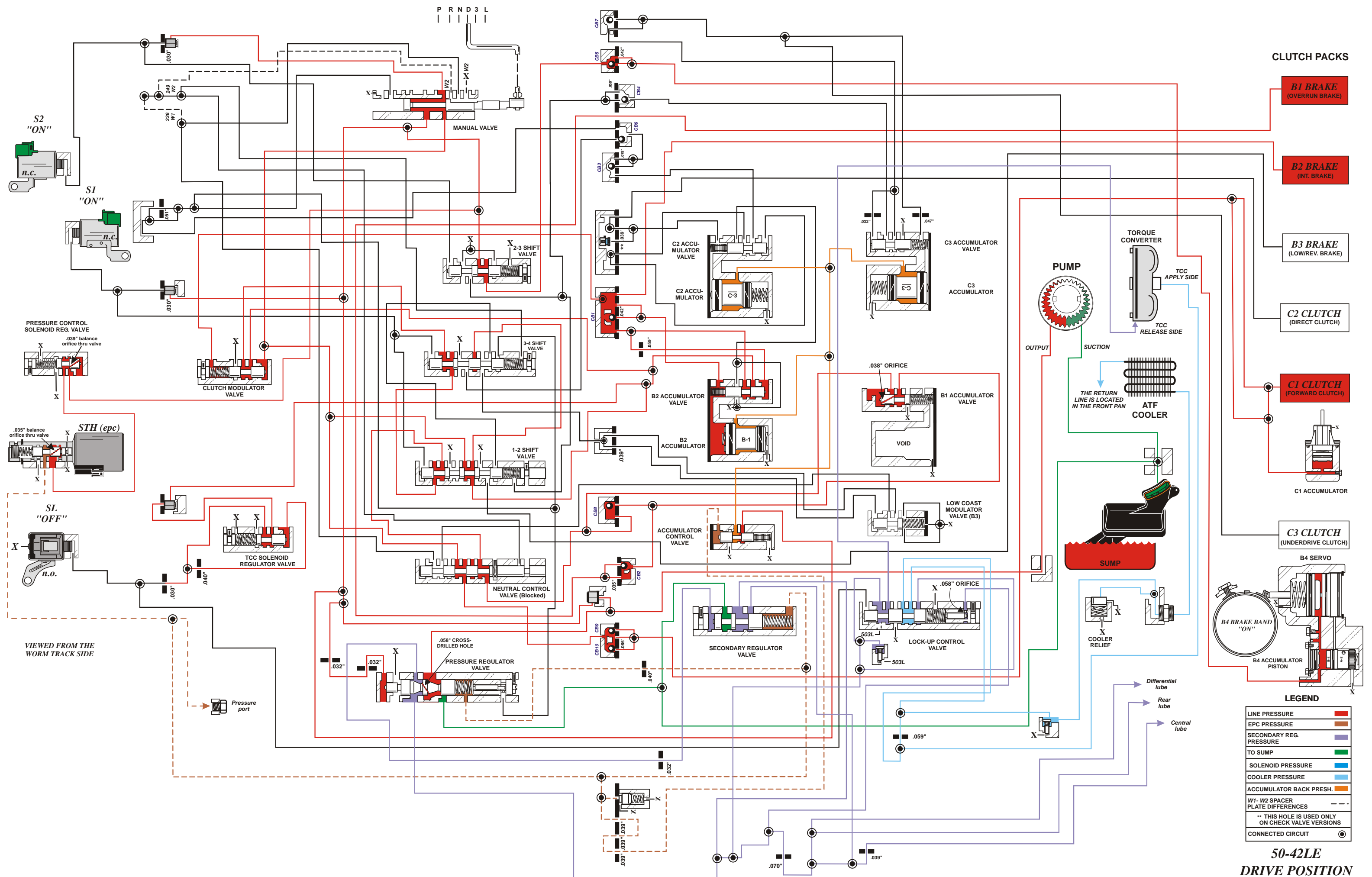
**50-42LE  
PARK/NEUTRAL  
POSITION**



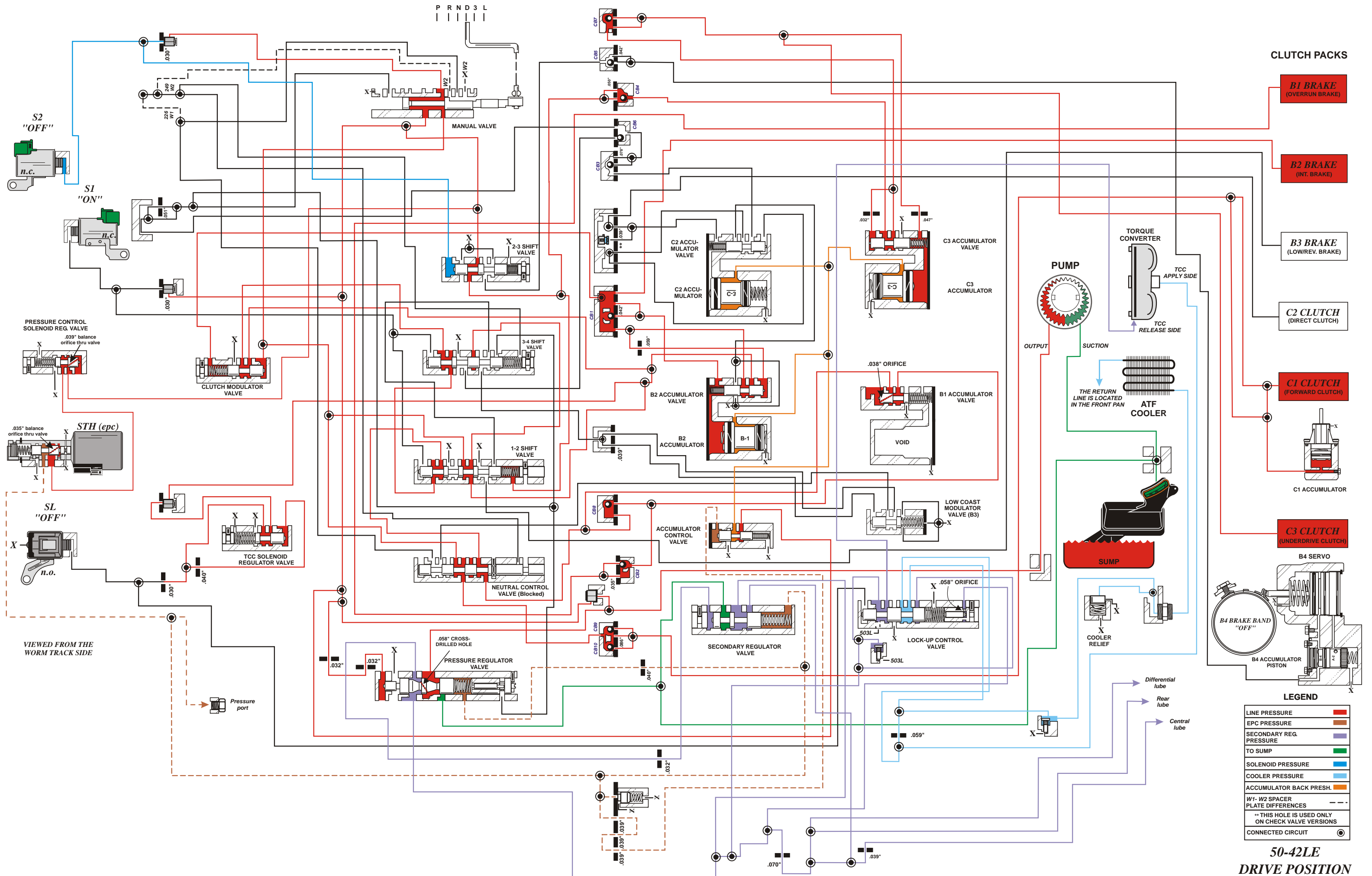




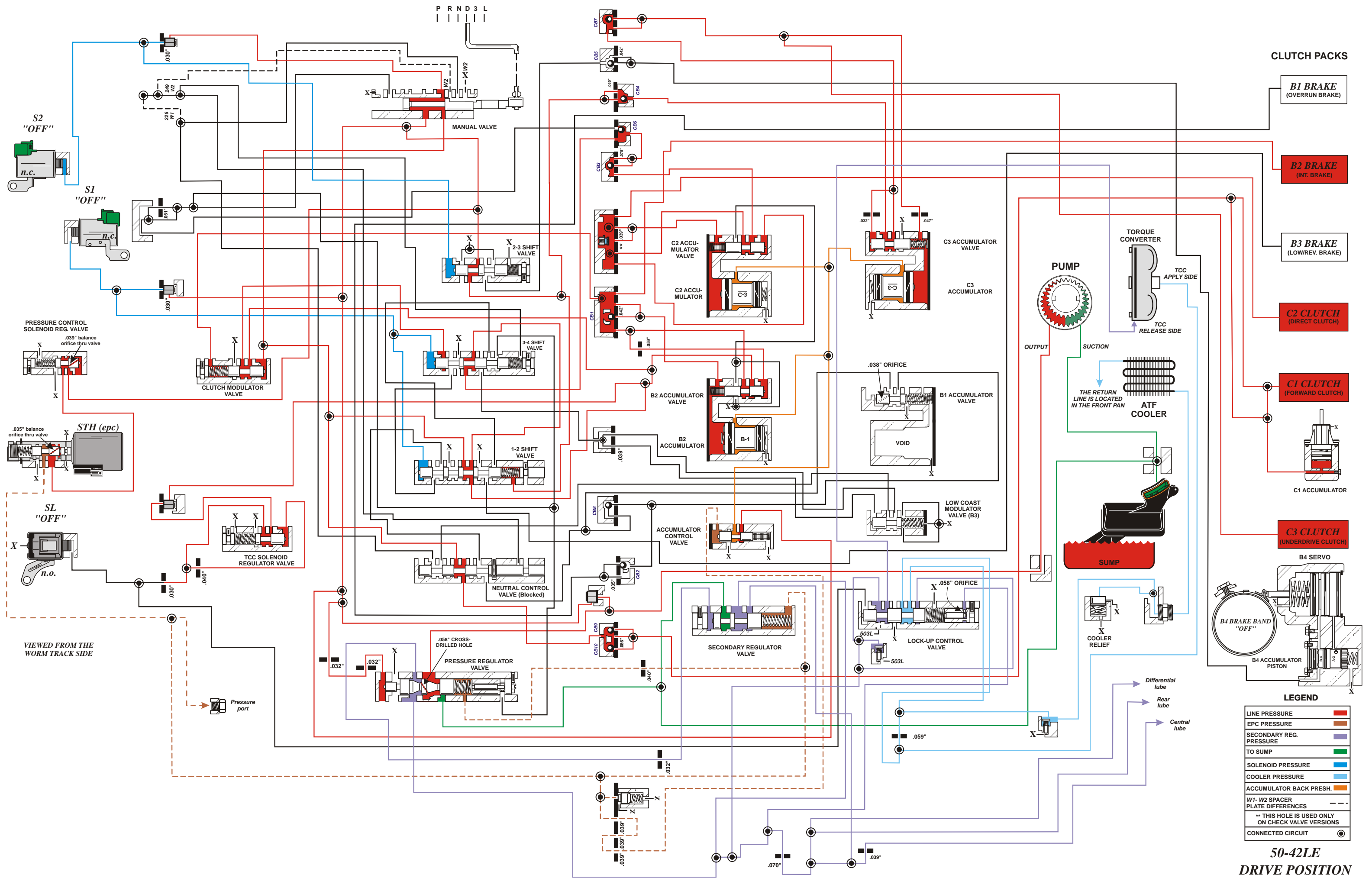
**50-42LE**  
**DRIVE POSITION**  
**1st GEAR**



**50-42LE**  
**DRIVE POSITION**  
**2nd GEAR**

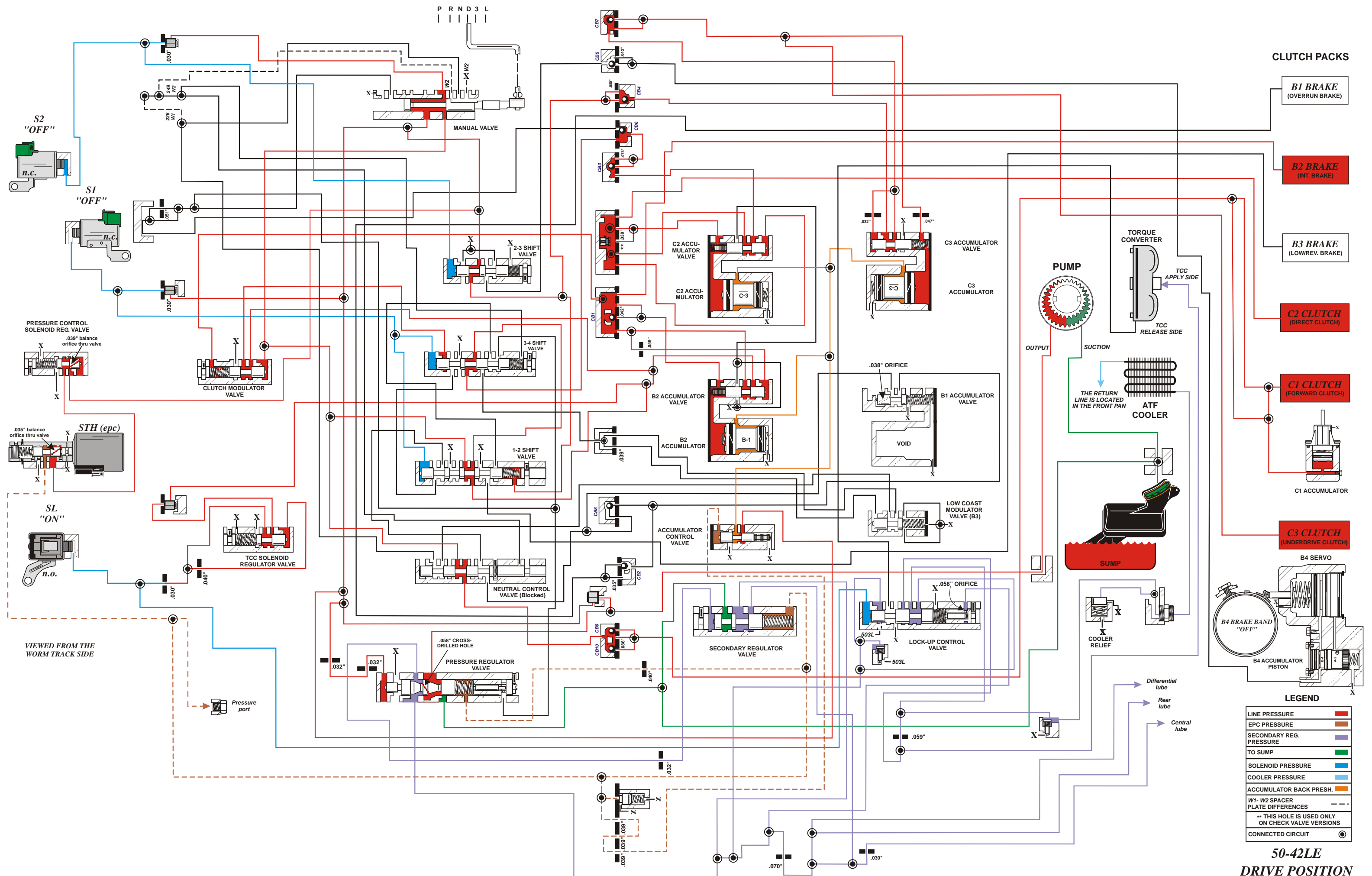


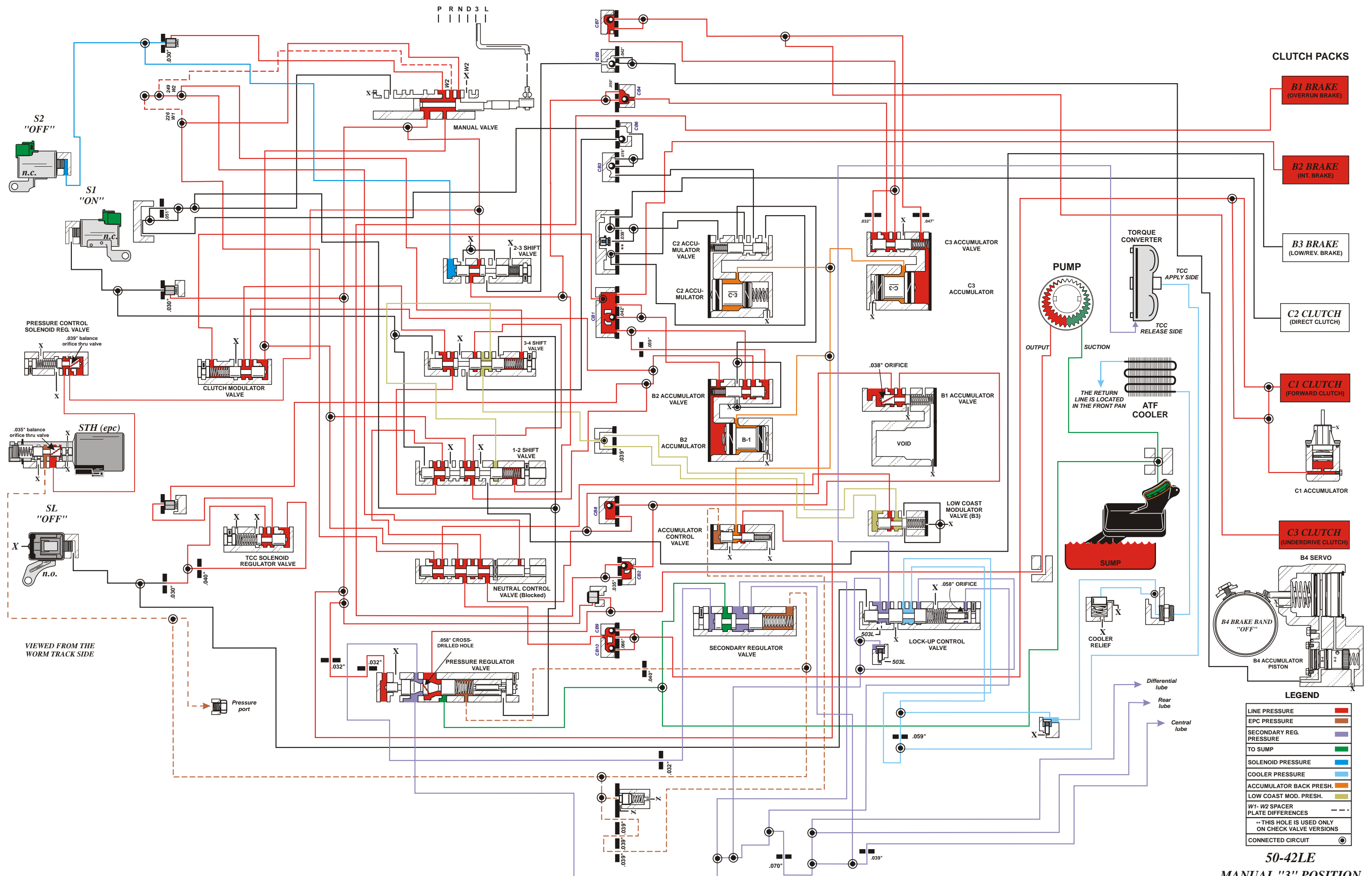
50-42LE  
DRIVE POSITION  
3rd GEAR

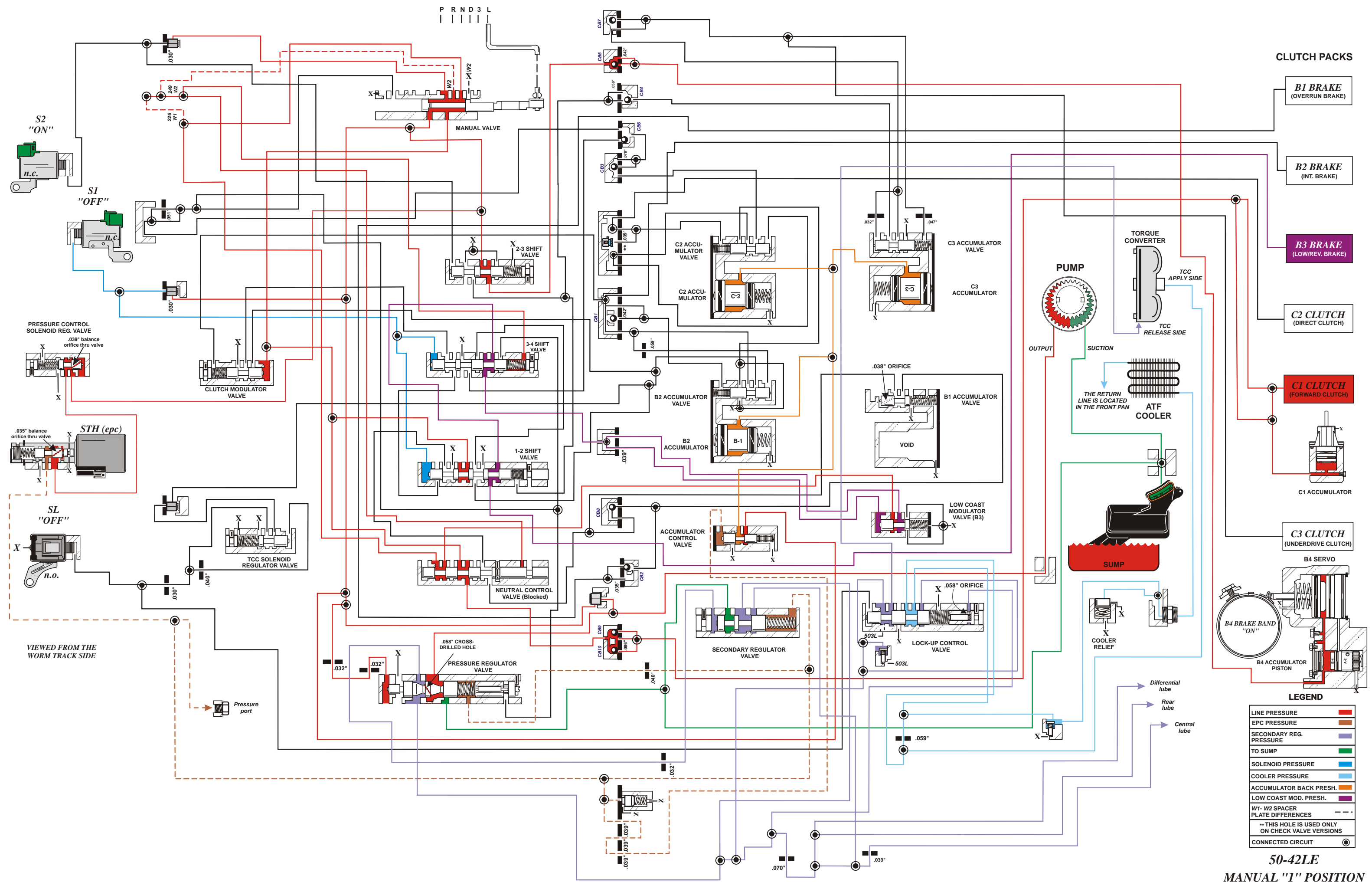


**50-42LE**  
**DRIVE POSITION**  
**4th GEAR**









LEGEND	
LINE PRESSURE	Red line
EPC PRESSURE	Orange line
SECONDARY REG. PRESSURE	Purple line
TO SUMP	Green line
SOLENOID PRESSURE	Blue line
COOLER PRESSURE	Light blue line
ACCUMULATOR BACK PRES.	Dark orange line
LOW COAST MOD. PRES.	Dark purple line
W1- W2 SPACER PLATE DIFFERENCES	Dashed line
THIS HOLE IS USED ONLY ON CHECK VALVE VERSIONS	Circle with dot
CONNECTED CIRCUIT	Circle with cross

50-42LE  
MANUAL "1" POSITION  
1st GEAR



## TRANSMISSION DISASSEMBLY

1. Place the transmission on a suitable work bench.
  2. Remove the 8, 12 mm headed pump to case retaining bolts as shown in Figure 42 .
  3. Using a suitable pump puller, remove the pump from the bellhousing as shown in Figure 43 and set it aside for further disassembly.
  4. Once the pump is removed, remove the B2-Second Coast Brake Hub assembly as shown in Figure 44.
  5. Remove the 5, 12 mm headed bellhousing to main case bolts as shown in Figure 45.
- NOTE:** See Figure 45 for bolt lengths.

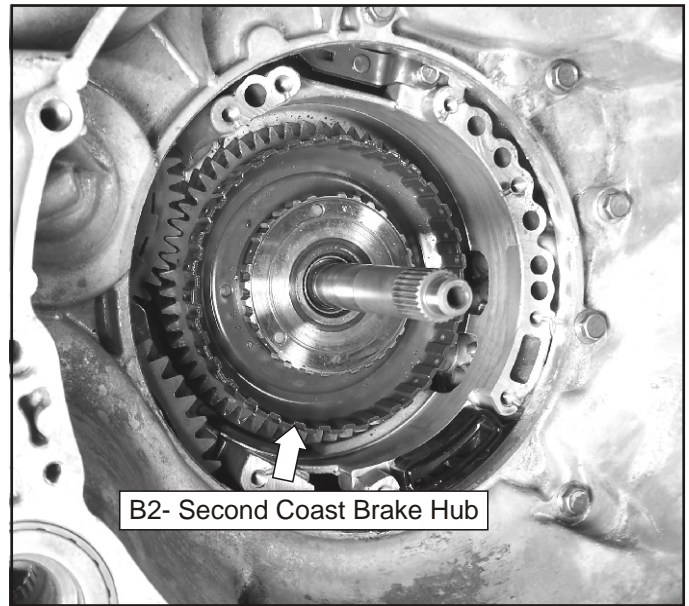


Figure 44

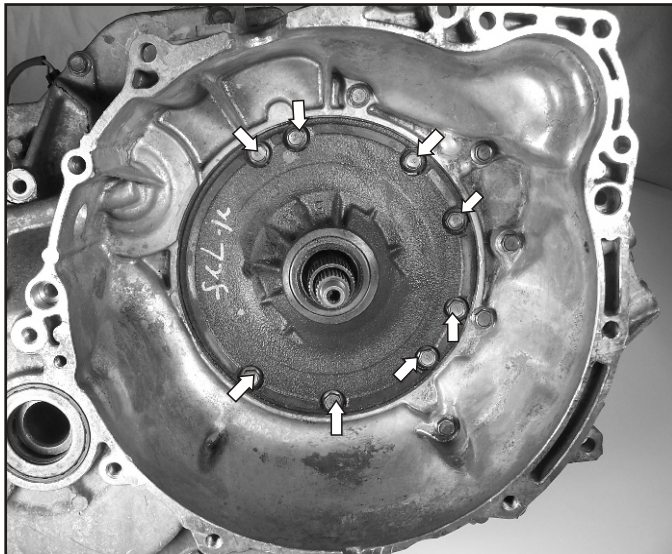
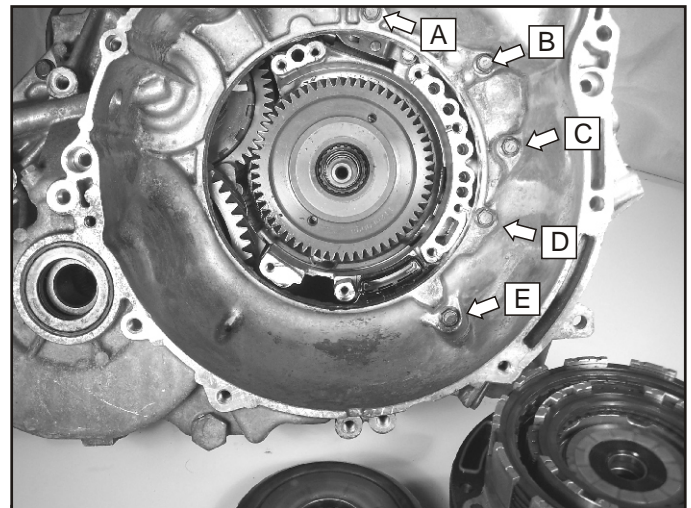


Figure 42



### Bolt lengths

- 8 Pump to case retaining bolts 28mm long
- 5 bellhousing to case retaining bolts
  - A = 30mm long
  - B = 35mm long
  - C = 35mm long
  - D = 30mm long
  - E = 45mm long

Figure 45

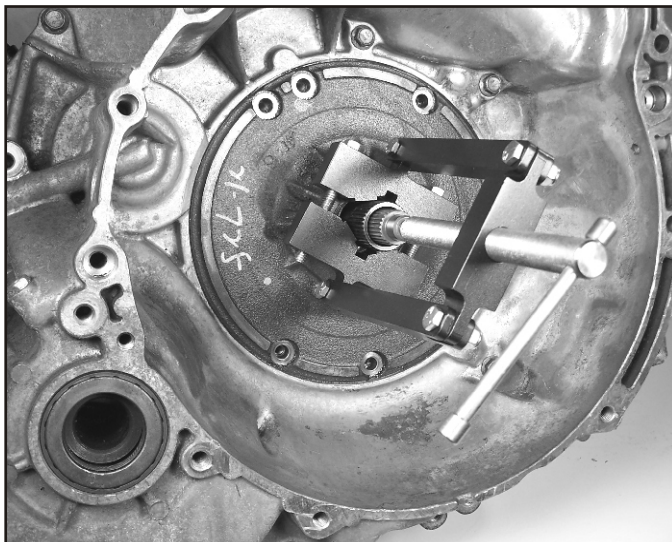


Figure 43

Continued on Page 45

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## TRANSMISSION DISASSEMBLY CONTINUED

6. Remove the 6 , 12mm headed bellhousing to main case bolts as shown in figure 46. **Note: Bolts are 30mm long.**
7. Stand the transmission up on its back cover and remove the remaining 5, 12mm headed bellhousing to main case bolts as shown in Figure 47. **Note: Bolts are 30mm long.**
8. Using a rubber mallet, tap the bellhousing evenly in the direction of the arrows shown in Figure 48 and set it off to the side.
9. Remove the differential carrier shown in Figure 49.

Continued on Page 46

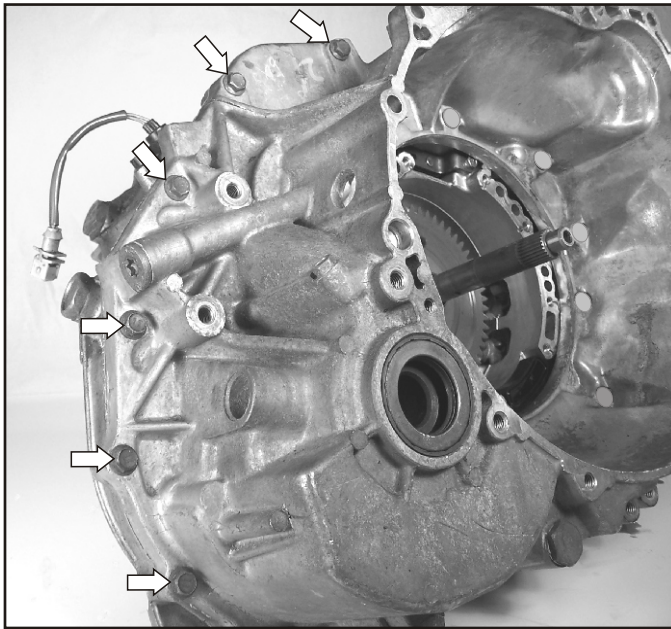


Figure 46

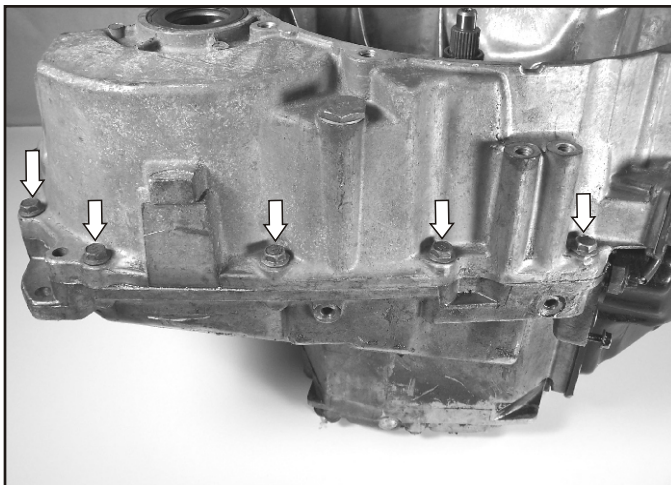


Figure 47

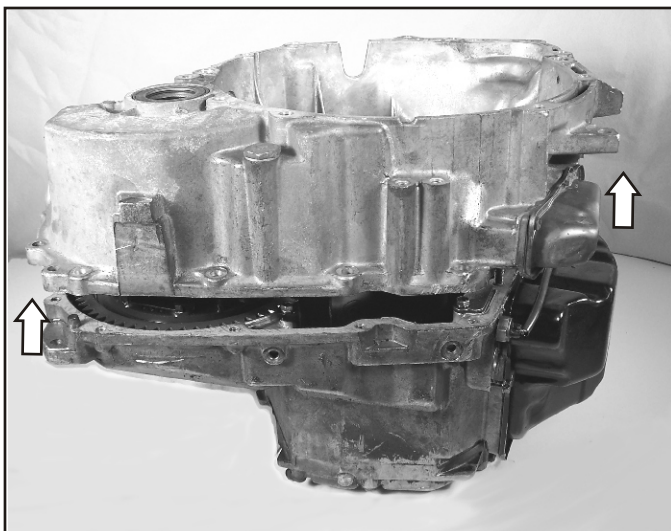
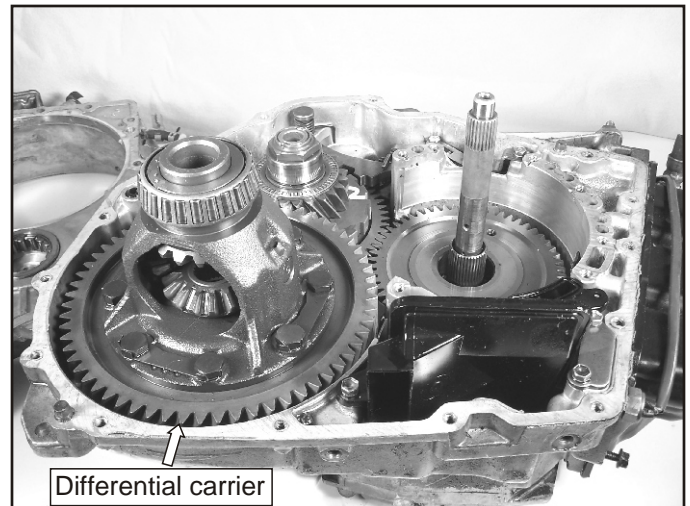


Figure 48



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Figure 49



## TRANSMISSION DISASSEMBLY CONTINUED

10. Remove the 10 mm headed filter retaining bolt, shown in Figure 50, and discard the filter.  
**Note: The bolt length is 13mm.**
11. Remove the 27 torx headed output shaft speed sensor bolt and remove the sensor as shown in Figure 51. **Note: The bolt length is 13mm long.**
12. Remove the 2, 10mm headed oil deflector plate retaining bolts and the 2, 10mm headed case plate retaining bolts as shown in Figure 52. **Note the bolt lengths are 13mm long.**
13. Remove the 2, 10mm headed detent spring retaining bolts, detent spring and park rod guide as shown in Figure 53. Refer to Figure 54 to see this assembly removed from the Case. **Note the bolt lengths are 15.5mm long.**

Continued on Page 47

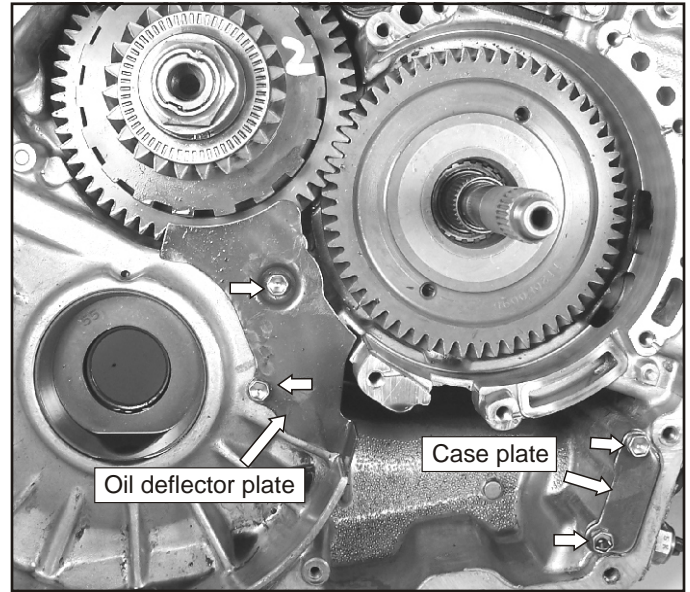


Figure 52

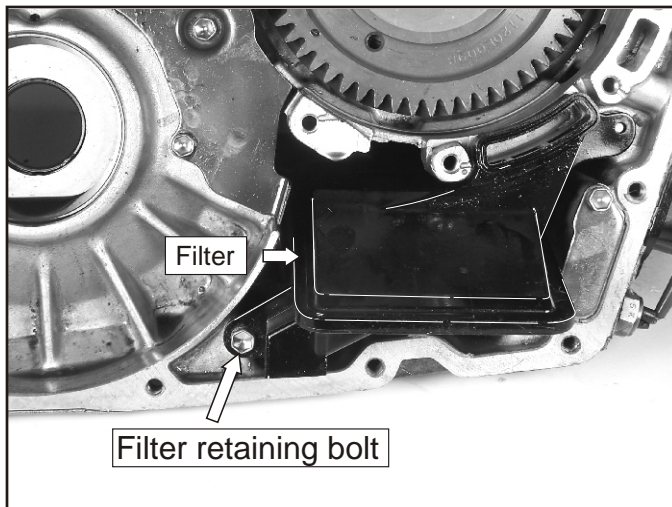


Figure 50

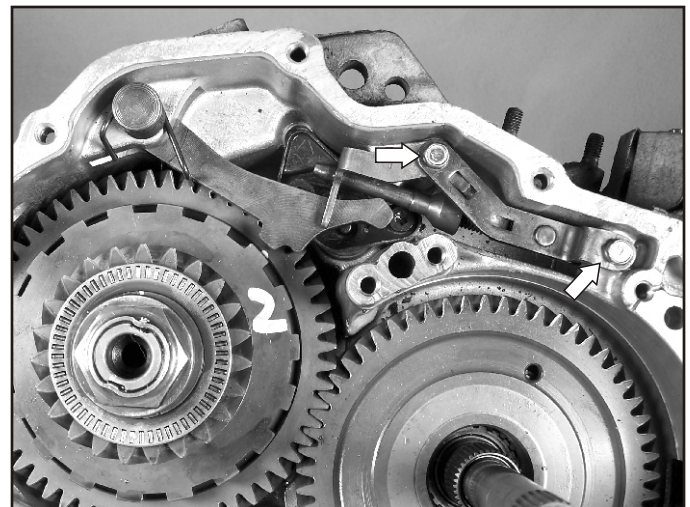


Figure 53

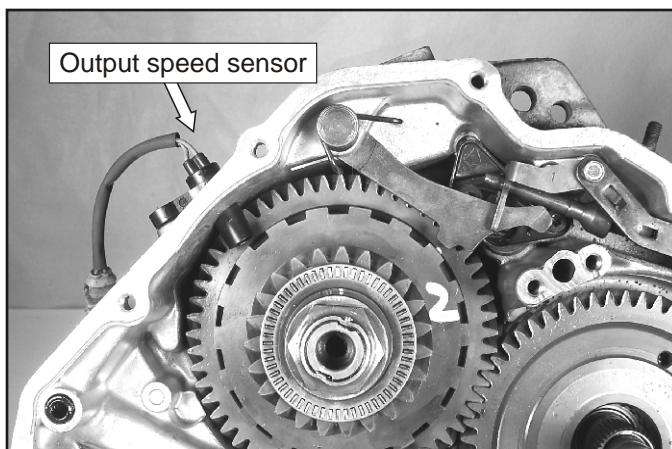


Figure 51

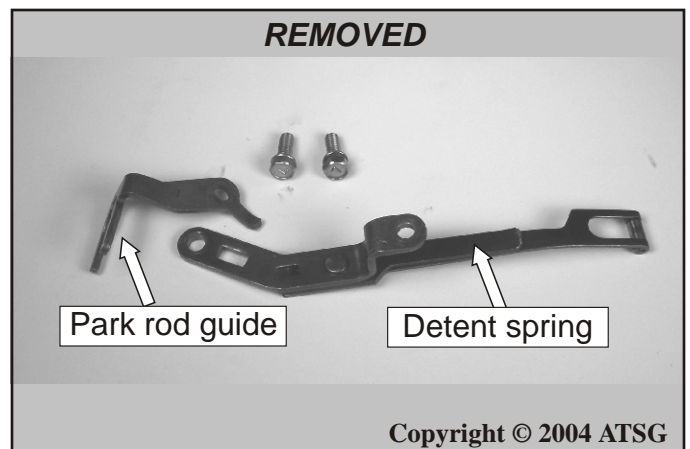


Figure 54



## TRANSMISSION DISASSEMBLY CONTINUED

14. Remove the park pawl pin and return spring. Remove the park pawl as shown in Figure 55. Refer to Figure 56 to see this assembly removed from the case.
15. Remove the two B4 accumulator retaining plate bolts and plate, using a 30 torx bit, as shown in Figure 57. The bolt on the left anchors the sleeve and parking rod return spring, as shown in the close-up in Figure 58. *Note: The bolt on the left is 22mm long. The bolt on the right is 13.5mm long. CAUTION: B4 accumulator is spring loaded in your direction.*
16. Remove the B4 accumulator cap, as shown in Figure 59.

Continued on Page 48

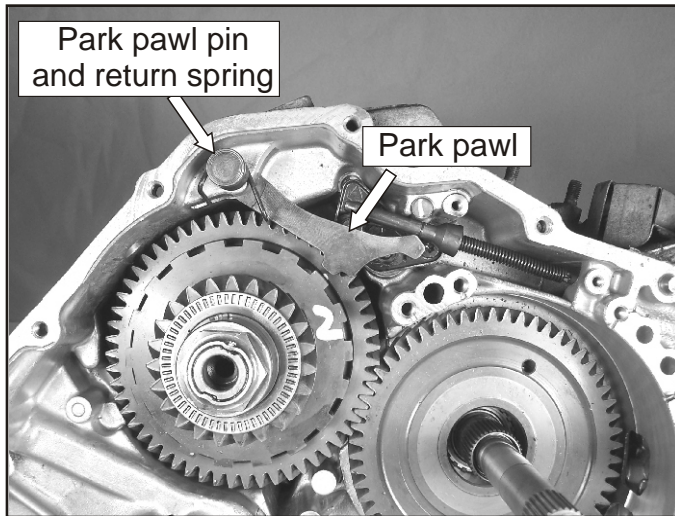


Figure 55

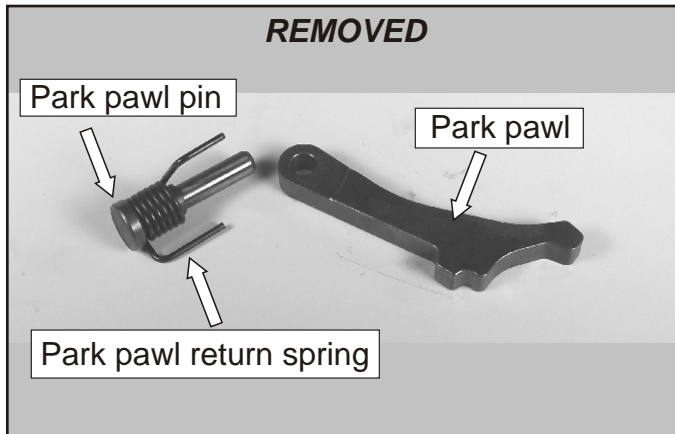


Figure 56

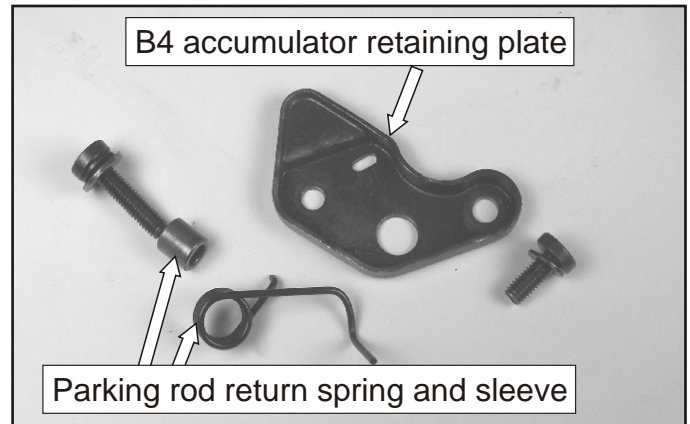


Figure 58

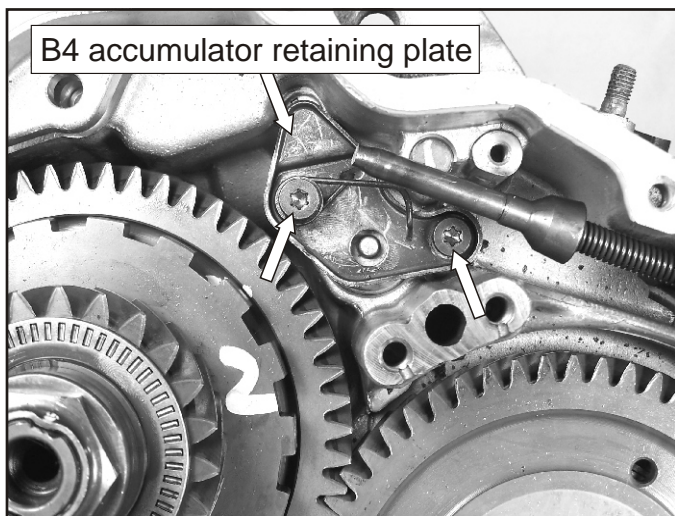


Figure 57



Figure 59

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## TRANSMISSION DISASSEMBLY CONTINUED

17. Remove the B4 accumulator piston and spring as shown in Figure 60.  
Refer to Figure 61 to see this assembly removed from the case.
18. Remove the park lock pin from the case.  
Remove the Underdrive planetary thrust washer and bearing as shown in Figure 62 and Figure 63.
19. Remove the Underdrive planetary geartrain, by pulling it straight forward, and set it aside for later disassembly, as shown in Figure 64.

Continued on Page 49

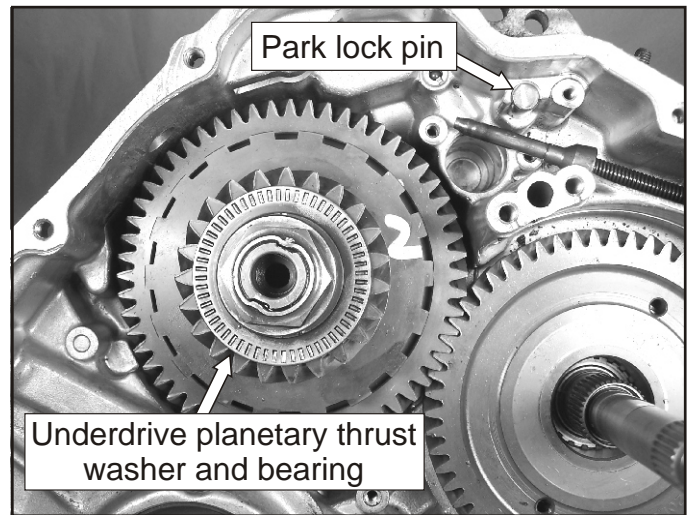


Figure 62



Figure 60



Figure 63

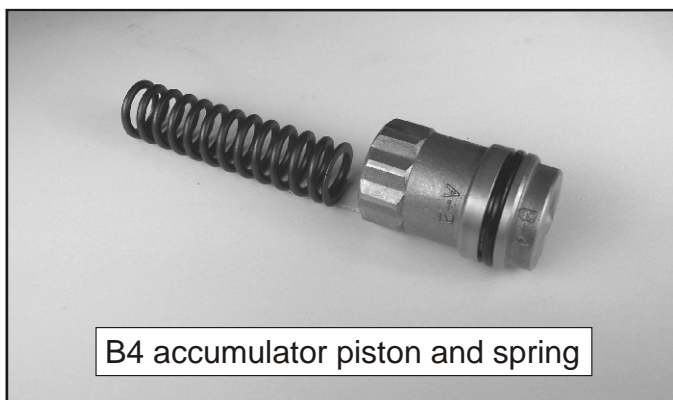


Figure 61

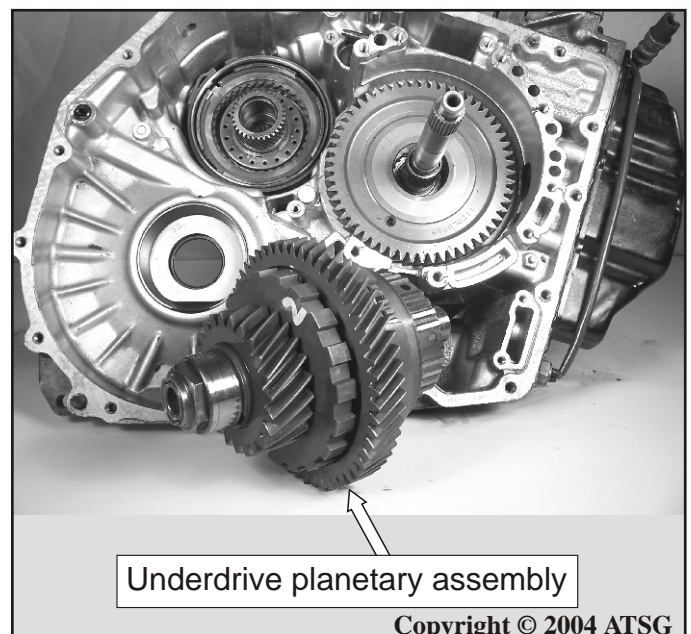


Figure 64



## TRANSMISSION DISASSEMBLY CONTINUED

14. Remove the Underdrive clutch drum by grasping the sun gear and turning it counter clockwise while pulling it forward as shown in Figure 65.
15. Place the Underdrive drum on the bench and remove the bearing from the rear of the drum as shown in Figure 66.
16. Grasp the B4 Underdrive Brake Band, in the area of the arrow as shown in Figure 67, and pull it forward to remove it from the case.
17. Remove the snap ring and pull the F3 freewheel forward as shown in Figure 68.
18. Remove the Anti-rattle clip as shown in Figure 69.

Continued on Page 50

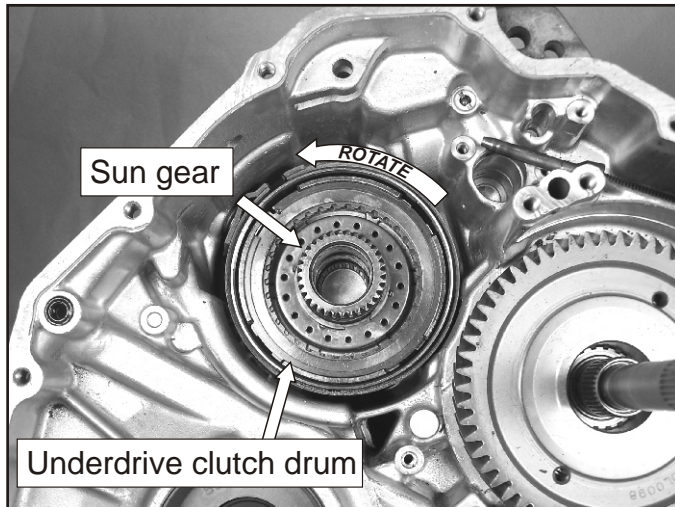


Figure 65

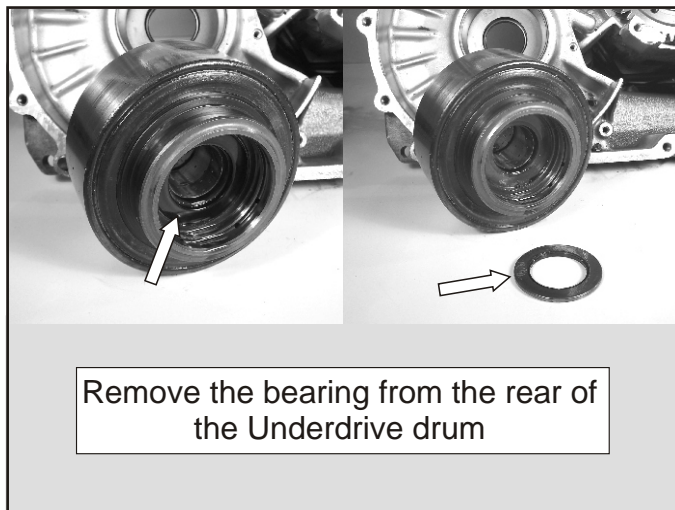


Figure 66

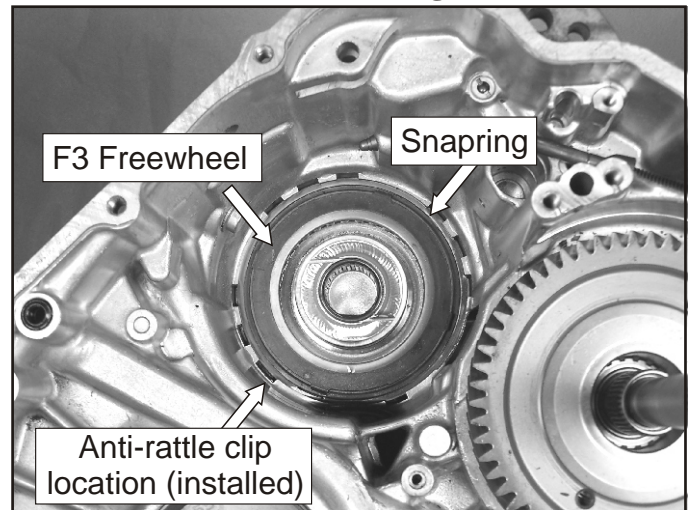


Figure 68

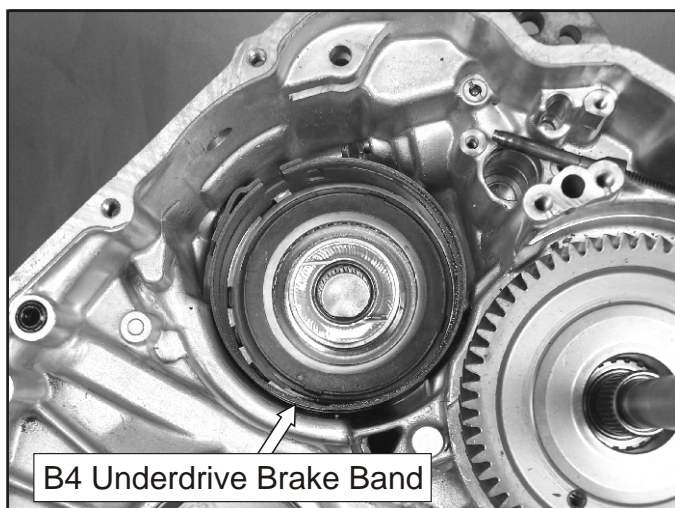


Figure 67

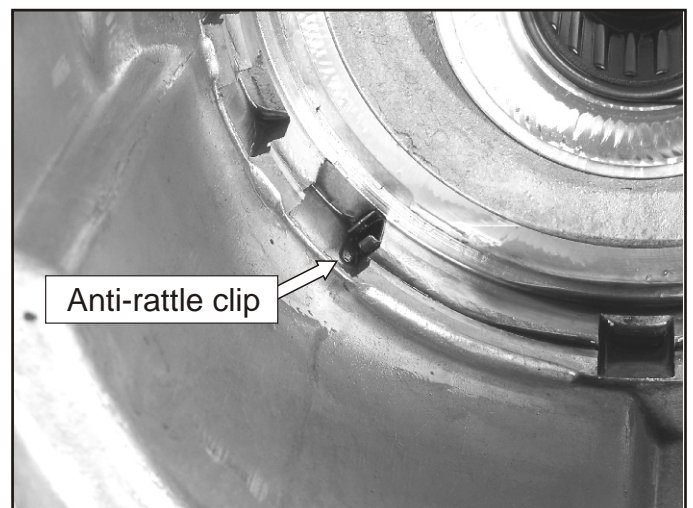


Figure 69

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## TRANSMISSION DISASSEMBLY CONTINUED

19. Remove the two 10mm headed bolts that are identified with an "A", shown in Figure 70.  
**Note: the bolt lengths are 16mm.**
20. Remove the remaining seven 12 mm headed bolts as shown in Figure 70. **Note: the bolt lengths are as follows: B= 25mm, C= 48mm and D= 45mm.** Using a hammer gently tap the rear cover off of the case.
21. Remove the 27 torx headed turbine sensor bolt and sensor. **Note: the bolt length is 13mm.** Remove the C1-C2 drum thrust bearing and washer. Remove the C1-C2 drum as shown in Figure 71. Refer to Figure 72 to see a closeup of the C1-C2 washer and bearing.
22. Remove the C2 hub and sun gear assembly as shown in Figure 73.
23. Refer to Figure 74 for a view of the C2 hub with the front and rear bearings.

Continued on Page 51

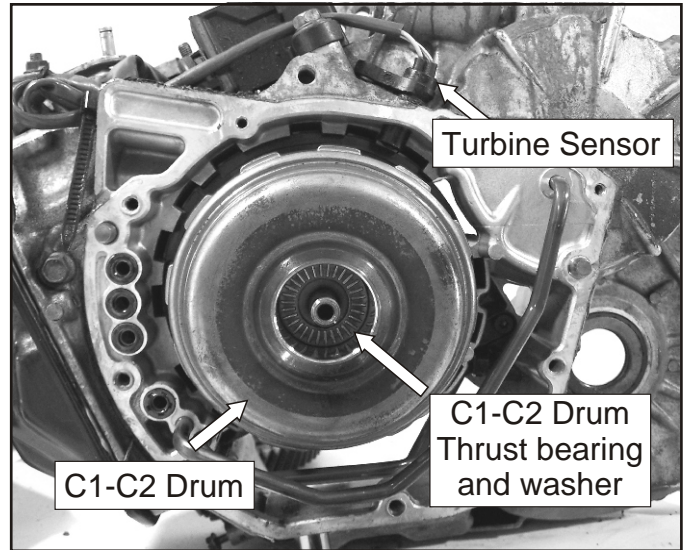


Figure 71

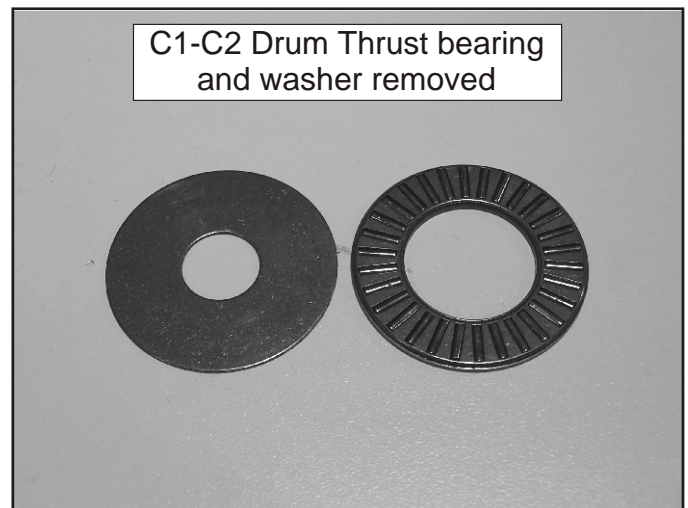


Figure 72

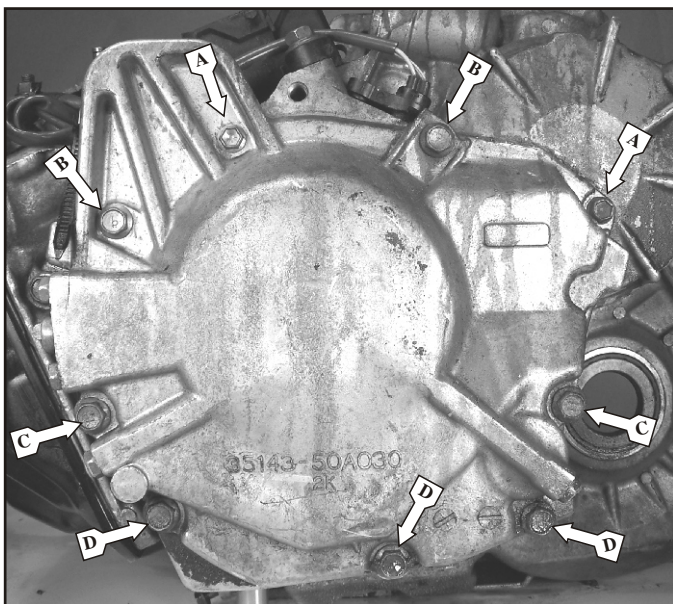


Figure 70

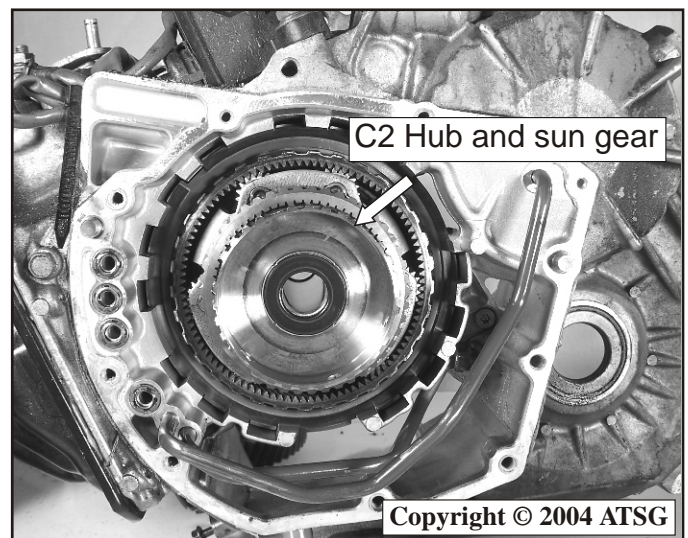


Figure 73



## TRANSMISSION DISASSEMBLY CONTINUED

24. Refer to Figure 74 for the bearing placements on the C2 hub. Remove the C1 hub as shown in Figure 75.
25. Remove the front and rear bearings from the C1 hub as shown in Figure 76.
26. Remove the rear planetary thrust washer and planetary assembly as shown in Figure 77.
27. Remove the rear ring gear bearing as shown in Figure 78.

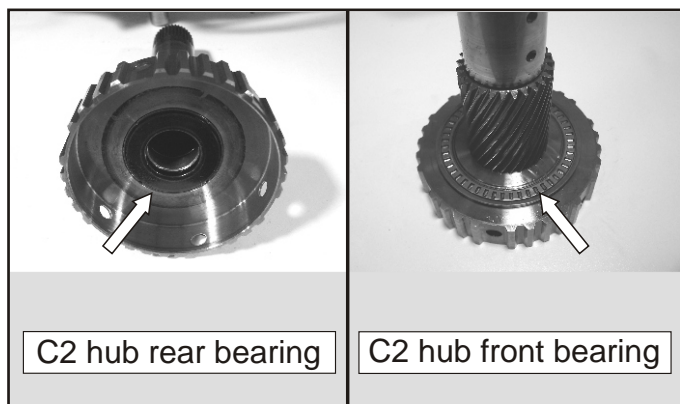


Figure 74

Continued on Page 52

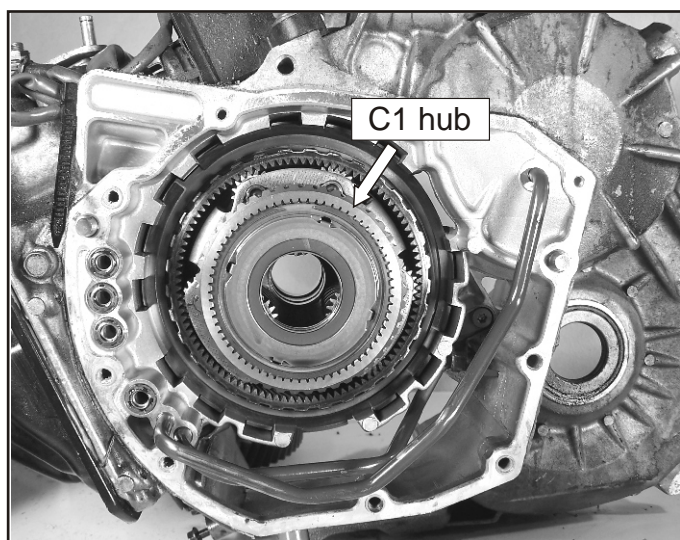


Figure 75

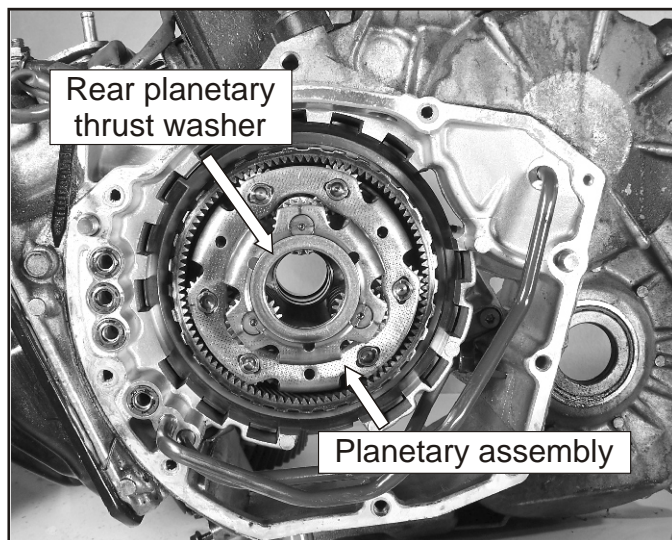


Figure 77

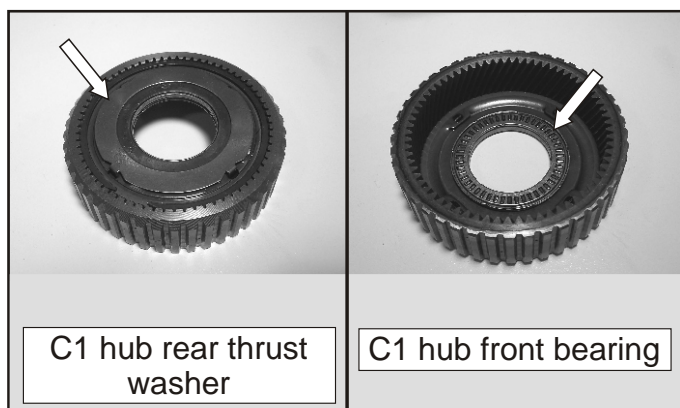


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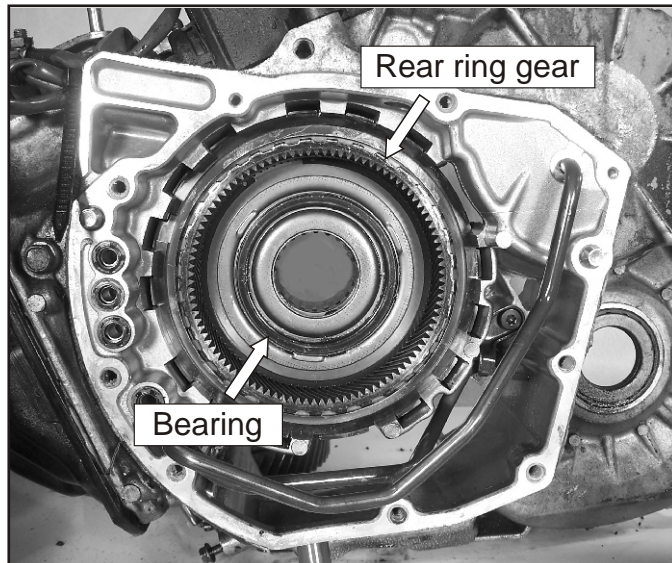


Figure 78

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## TRANSMISSION DISASSEMBLY CONTINUED

28. Remove the snap ring retaining the B3 brake in the case. Pull the ring gear forward to remove the B3 brake assembly, as shown in Figure 79.
29. Place the ring gear on the bench and remove the B3 brake frictions and steels up off of the ring gear as shown in Figure 80.
30. Turn the ring gear over and remove the inner thrust washer and bearing shown in Figure 81.
31. Remove the B3 brake lower pressure plate from the case as shown in Figure 82.
32. Remove the retaining snap ring and B3 piston return spring as shown in Figure 83.

Continued on Page 53

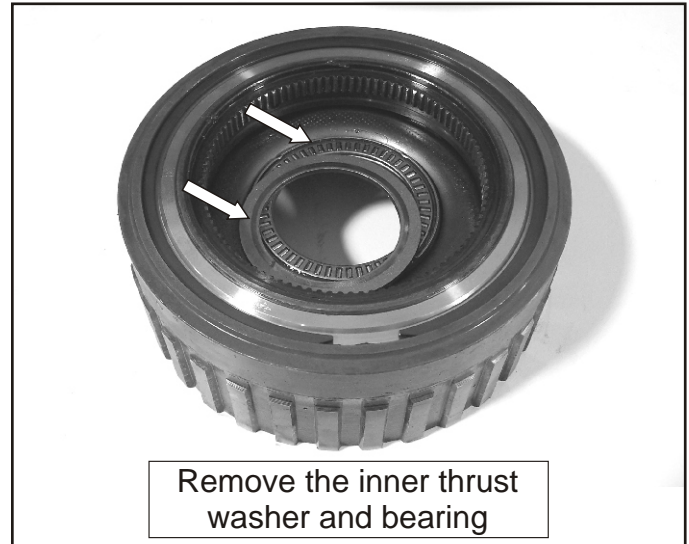


Figure 81

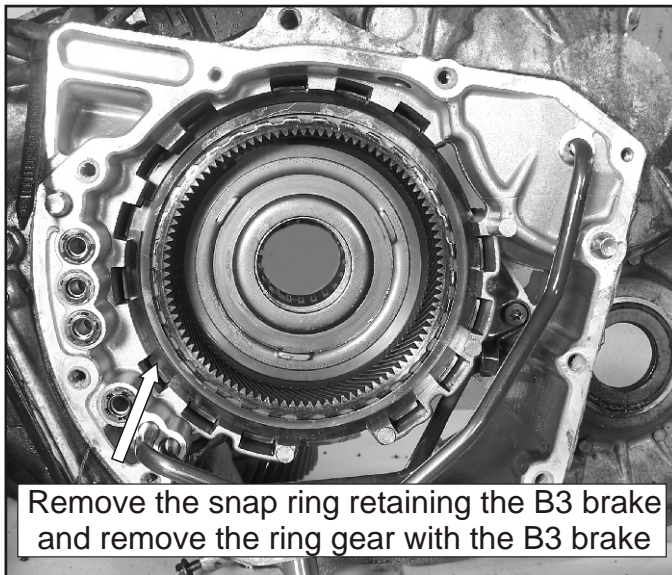


Figure 79

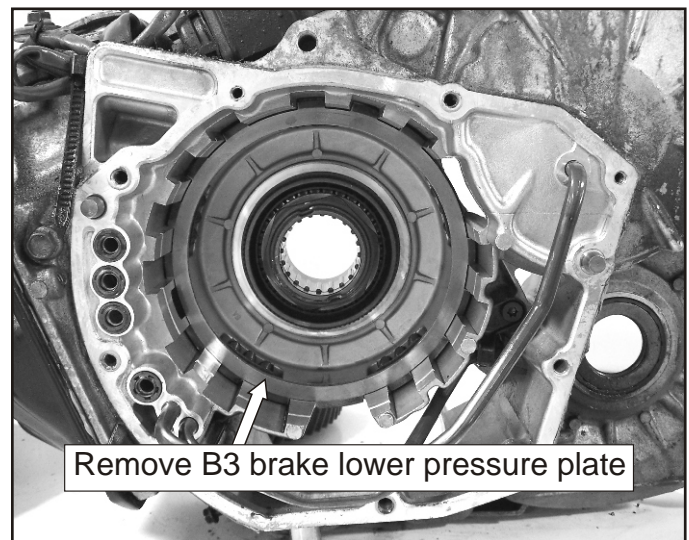


Figure 82

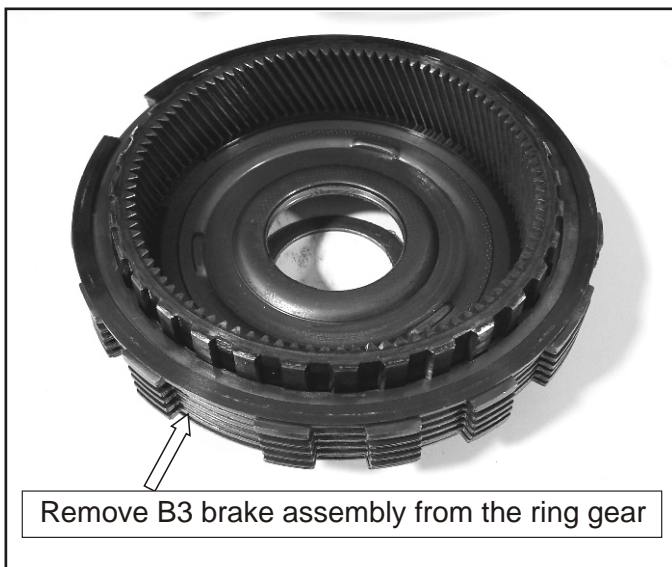


Figure 80

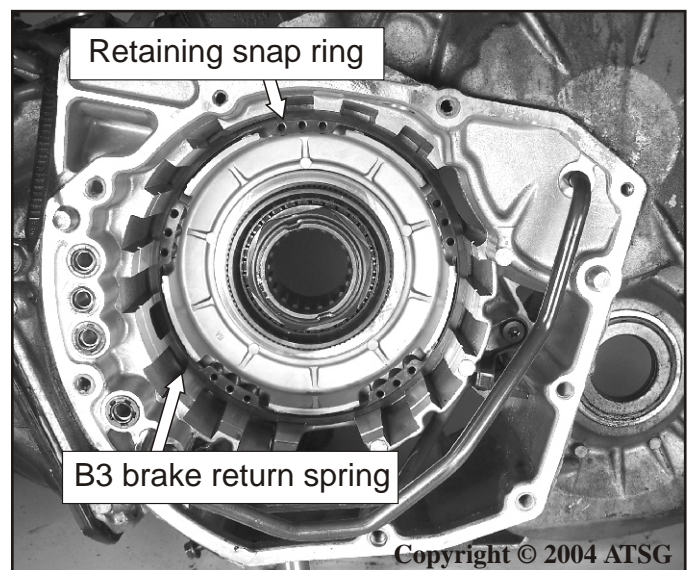


Figure 83



## TRANSMISSION DISASSEMBLY CONTINUED

33. Remove the B3 piston from the case as shown in Figure 84.
34. Remove the snap ring retaining the Counter drive gear into the case as shown in Figure 85. Refer to Figure 86 to see the Counter drive gear removed from the case.
35. Turn the transaxle to the side and remove the temperature sensor with a 19mm wrench.
36. Using a 40 torx bit, remove the 9 pan retaining bolts as shown in Figure 87. **Note: the bolts are 15mm long.**
37. Remove the four solenoid connectors shown in Figure 88 and move the internal wire harness away from the valve body retaining bolts. **Note: The wire colors are listed below each solenoid.**

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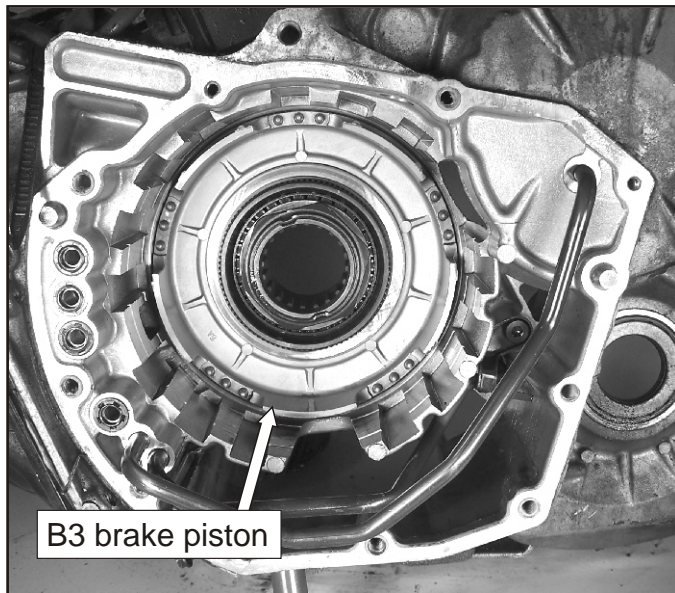


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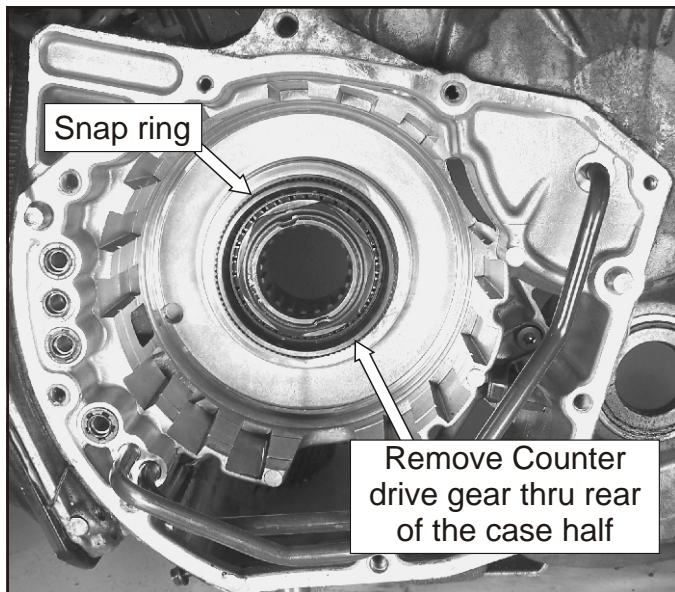


Figure 85

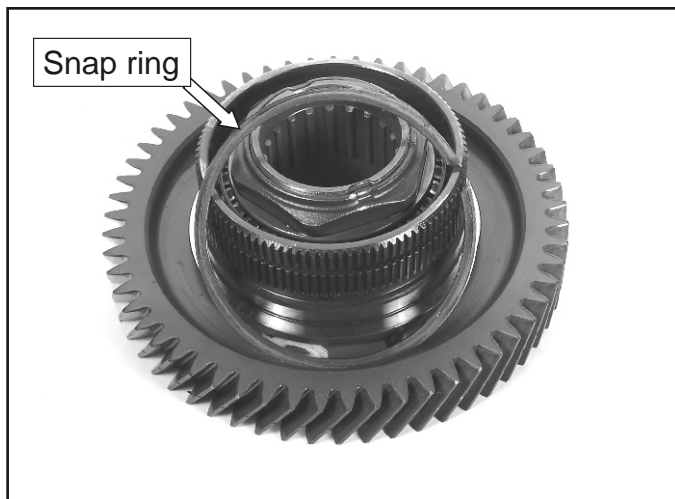


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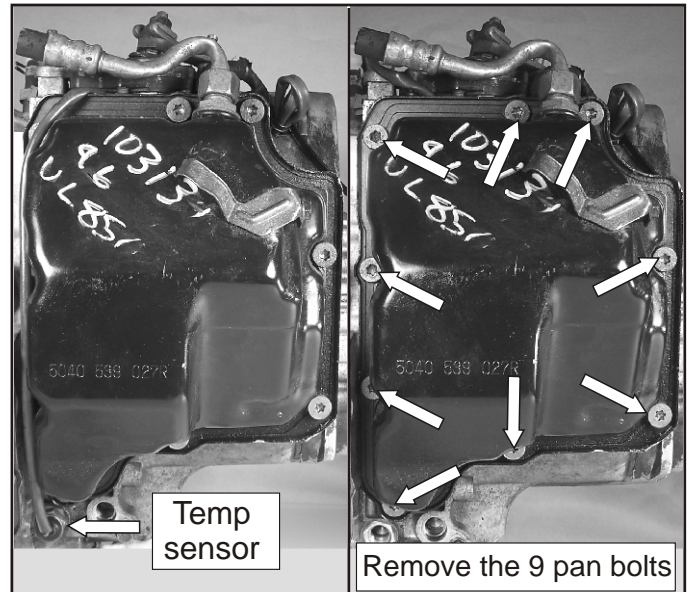


Figure 87

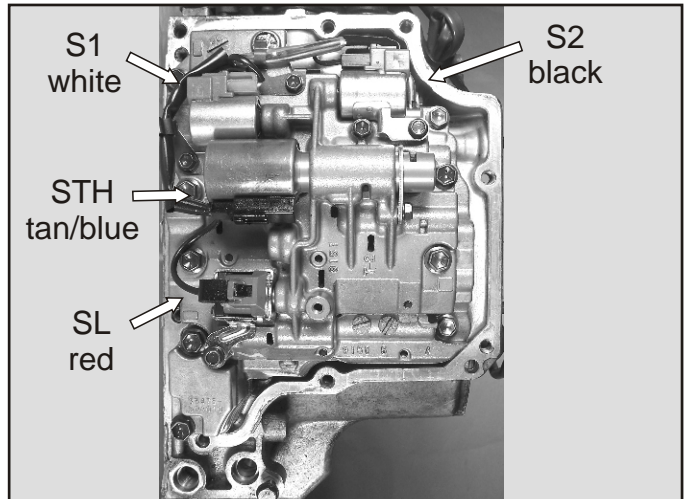


Figure 88

## TRANSMISSION DISASSEMBLY CONTINUED

38. Remove the 10 mm headed valve body to case retaining bolts as shown in Figure 89. **Note:** *bolt lengths are as follows, A = 16mm long, 50mm long and C = 55mm long.*
39. Remove the 13mm headed nut retaining the manual lever and remove the lever. Remove the two 17mm headed transmission range switch to case retaining bolts. **Note:** *the bolt lengths are as follows, A = 21mm long and B = 32mm long.* Remove the two 14mm headed connector retaining bolts. **Note :** *the bolt lengths are 20 mm long.* See Figure 90.
40. Lift the transmission range switch up off of the manual shaft and remove the internal wire harness to case connector retainer, as shown in Figure 91. Once the retainer is removed push the internal wire harness thru the case and set the entire assembly to the side.
41. Refer to Figure 92 for a close- up view of the internal wire harness to case retainer.

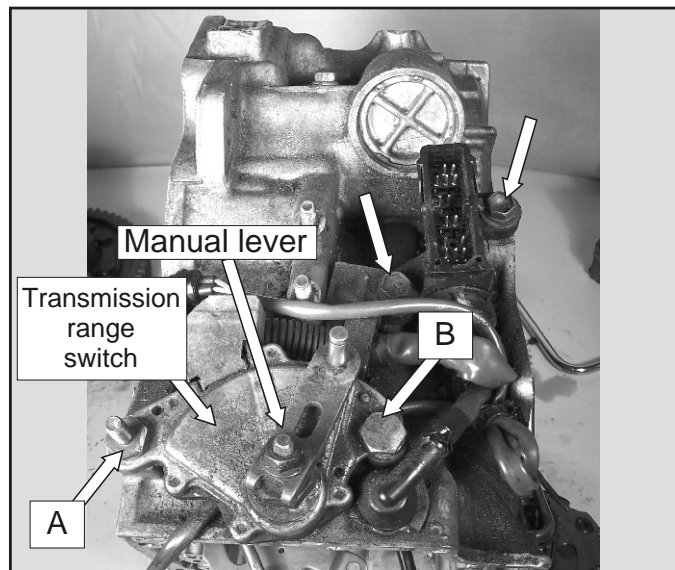


Figure 90

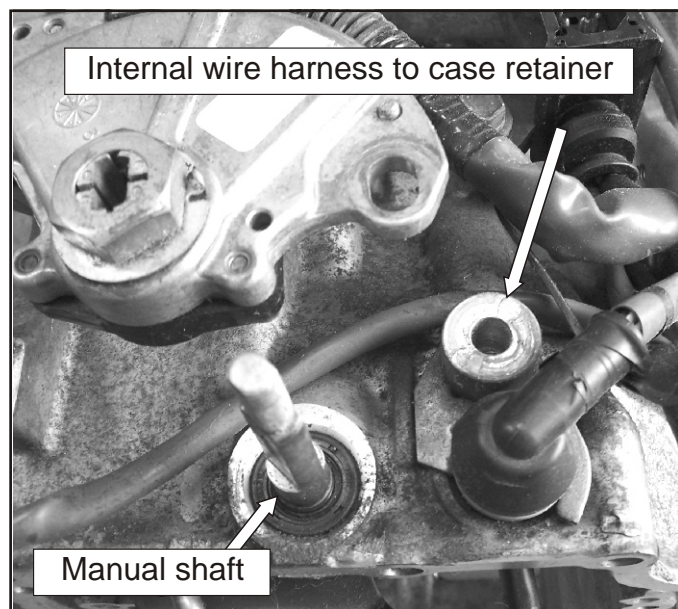


Figure 91

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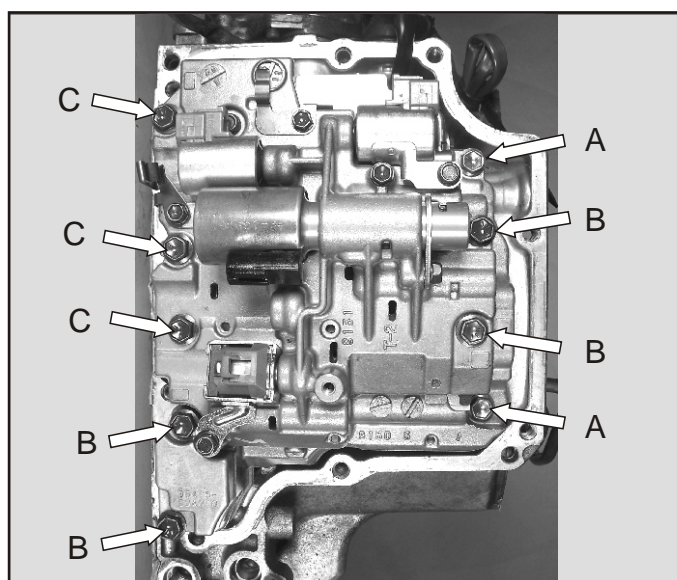


Figure 89

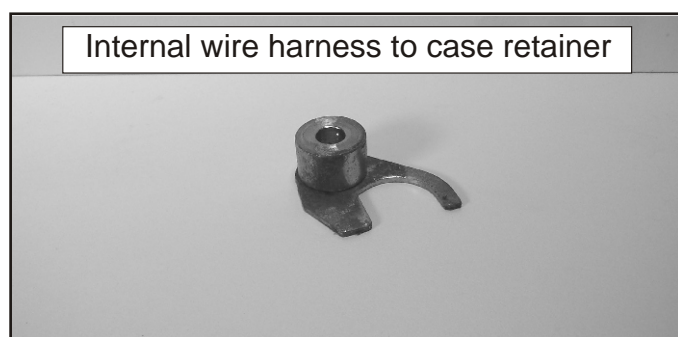


Figure 92



## TRANSMISSION DISASSEMBLY CONTINUED

42. Rotate the Manual shaft until the tab on the park rod aligns with the slot in the in the manual shaft. Lift the park rod up and pull it forward to remove it from the case as shown in Figure 93.
43. Push the manual shaft down thru the case to remove it as shown in Figure 94.
44. Refer to Figure 95 to view the manual shaft and the park rod removed from the case.
45. Remove the snap ring retaining the B4 servo assembly into the case, as shown in Figure 96.
46. Refer to Figure 97, to view the B4 servo and it's related parts.

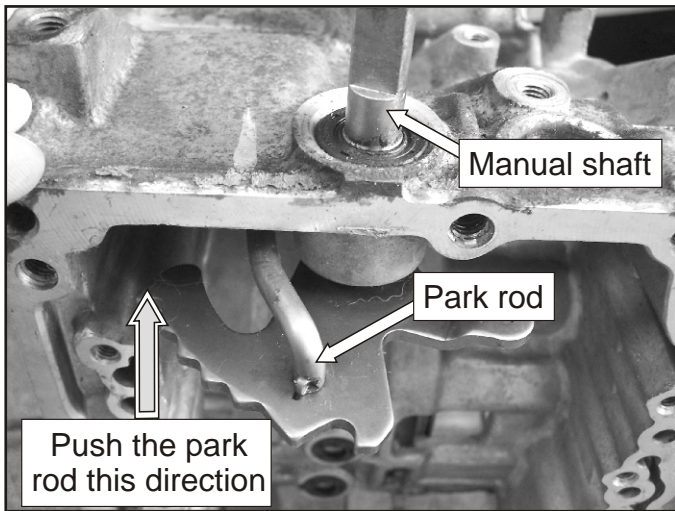


Figure 93

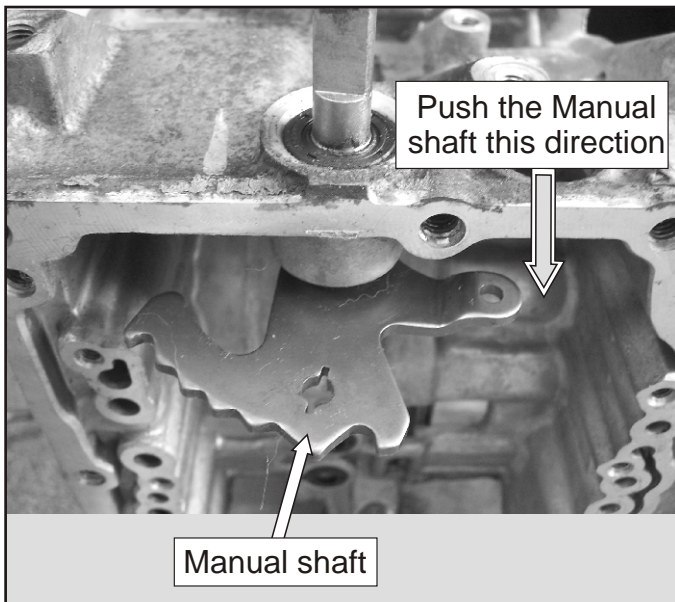


Figure 94



Figure 96

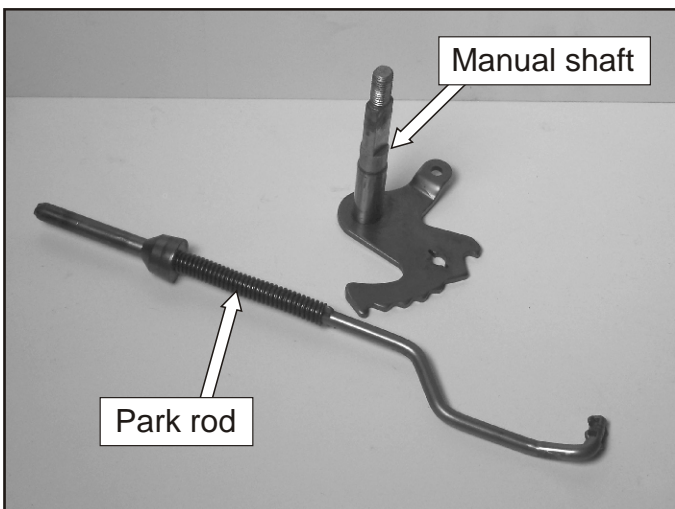


Figure 95



Figure 97

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## SUB-ASSEMBLIES "PUMP"

47. Remove the snap ring and B2 clutch assembly as shown in Figure 98.
48. Remove the snap ring and pressure plate above the B1 clutch as shown in Figure 99. **Caution:** *The pressure plate is spring loaded in the direction facing you.*
49. Remove the return spring assembly as shown in Figure 100.
50. Remove the remaining B1 clutch assembly as shown in Figure 101.
51. Remove the pump to B2 second coast brake hub thrust washer as shown in Figure 102.

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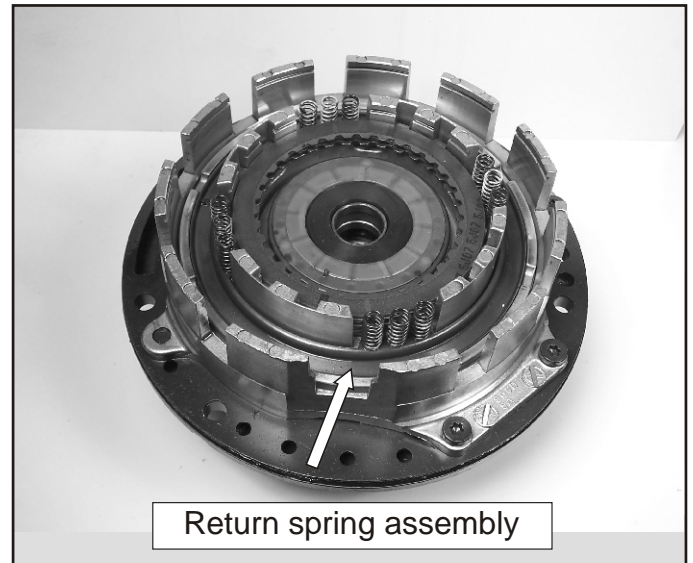


Figure 100

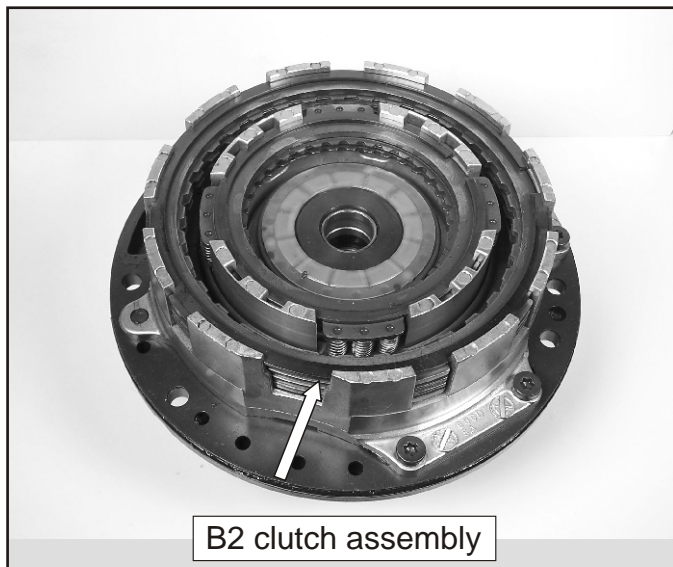


Figure 98

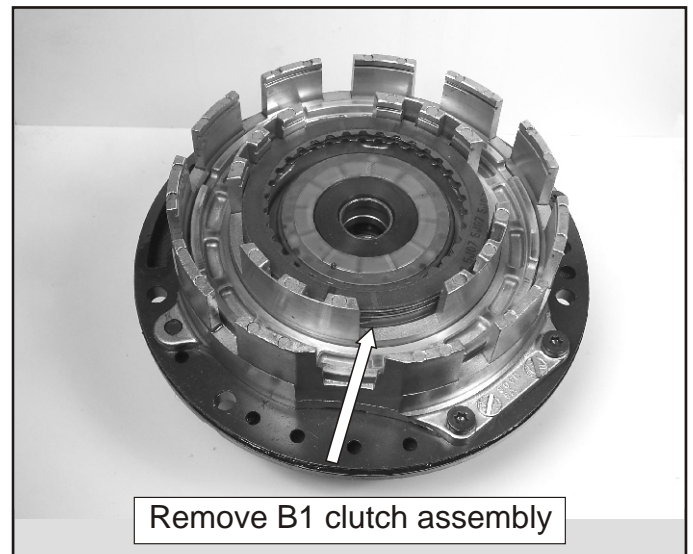


Figure 101

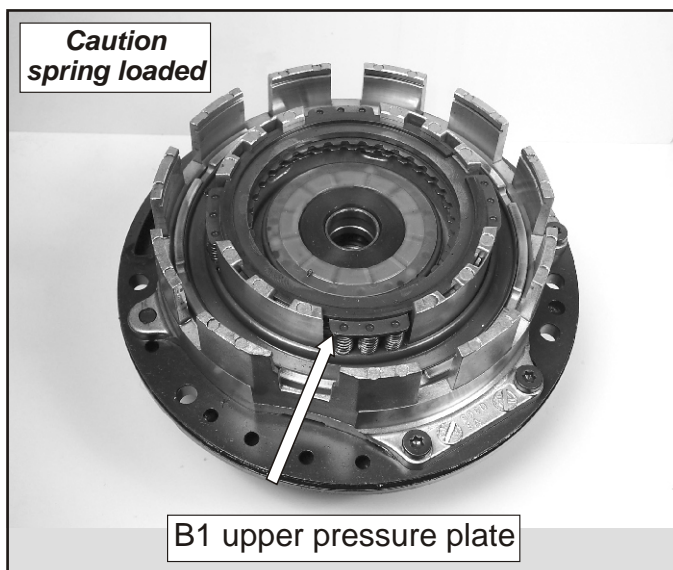


Figure 99



Figure 102

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## SUB-ASSEMBLIES "PUMP" CONTINUED

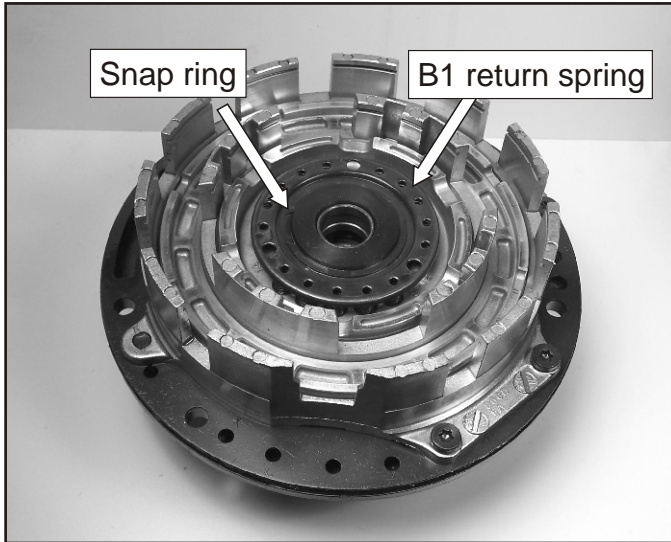


Figure 103

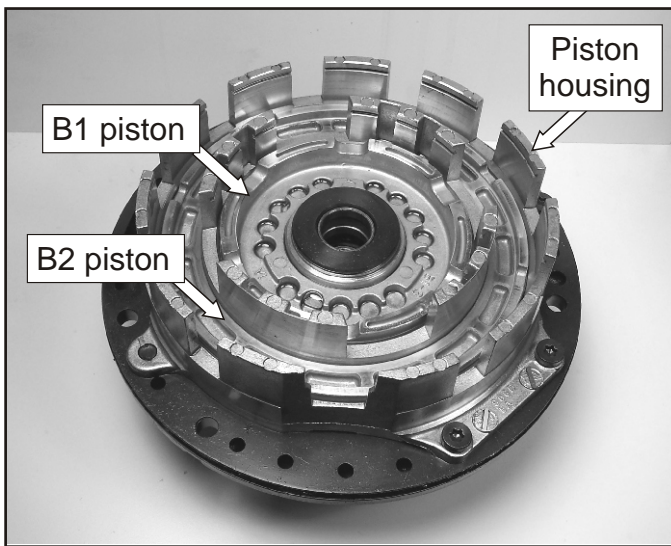


Figure 104

52. Using a suitable press, remove the snap ring and B1 return spring assembly, as shown in Figure 103.
53. Refer to Figure 104 for piston identification.
54. Apply compressed air to the passage shown in Figure 105 and remove the B2 piston. **Caution:** *Using compressed air may cause the piston to jump out of the housing.*
55. Apply compressed air to the passage shown in Figure 106 and remove the B1 piston.
56. Using a 30 torx bit, remove the 14 bolts that retain the piston housing to the pump. **Note:** *The bolt length for the smaller diameter bolt is 16mm long. The remaining bolts are 13mm long.* Inspect stator bushings and replace as necessary. See Figure 107.

**Continued on Page 58**

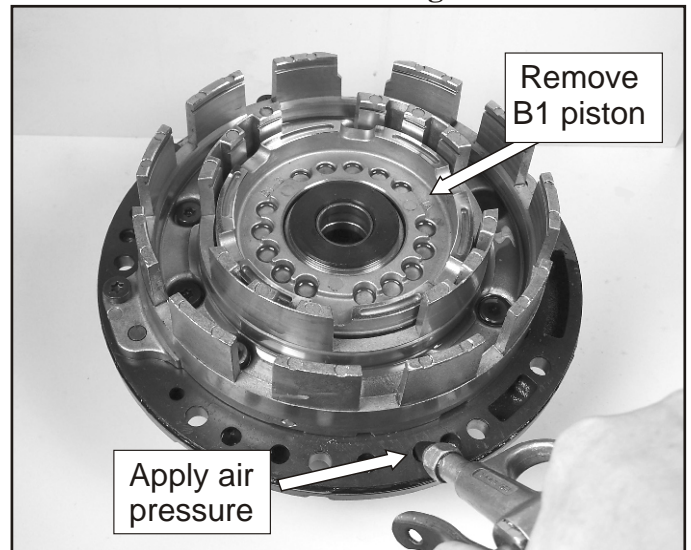


Figure 106

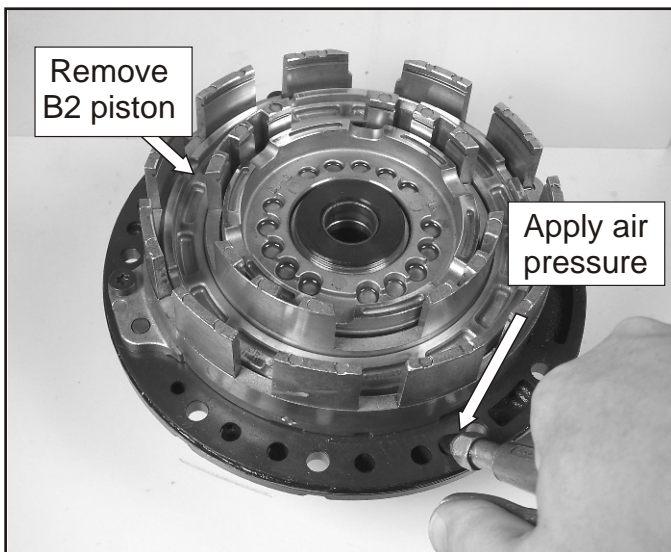


Figure 105

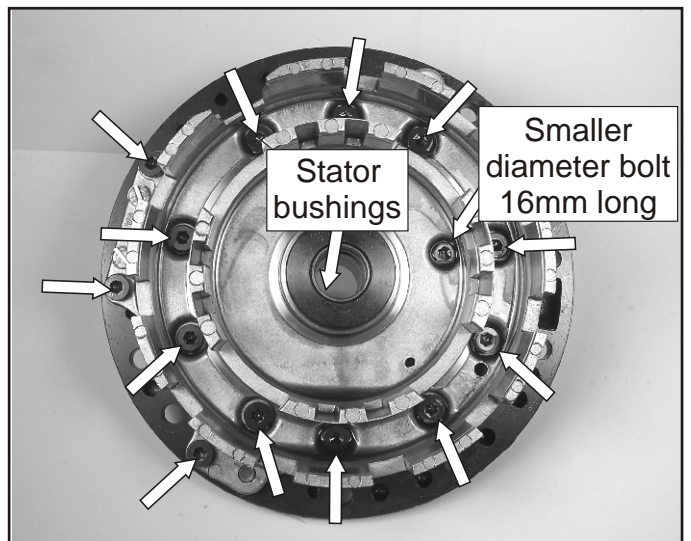


Figure 107



## ***SUB-ASSEMBLIES*** ***"PUMP" CONTINUED***

57. Remove the pump plate as shown, in Figure 108, and check for wear or scoring.
58. Using a straight edge, check the pump gear to pump face clearance, as shown in Figure 109. Clearance must be between .001"-.003." The maximum clearance is .004." Using a feeler gage check the outer pump gear to pump body clearance. Clearance must be between .003" and .006." The maximum is .008."
59. Inspect the outer pump gear and the torque converter lug area for wear, as shown in Figure 110.
60. Inspect the pump body for wear, and remove the pump o-ring as shown in Figure 111.
61. Check the pump bushing for wear and replace the front seal, as shown in Figure 112.

**Continued on Page 59**

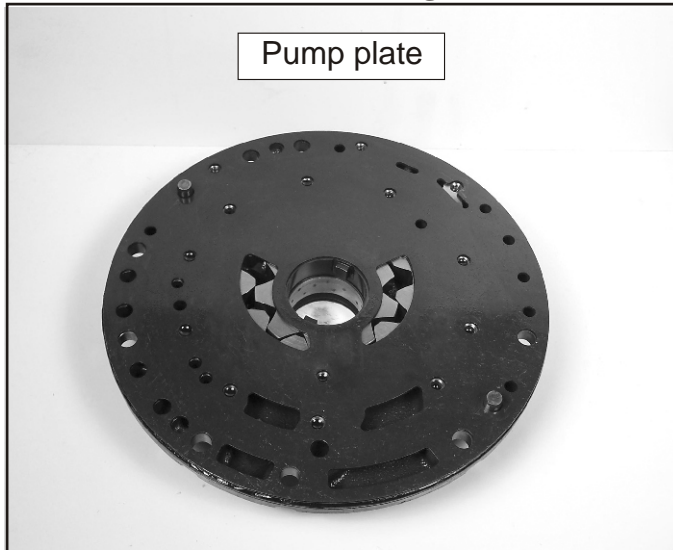


Figure 108

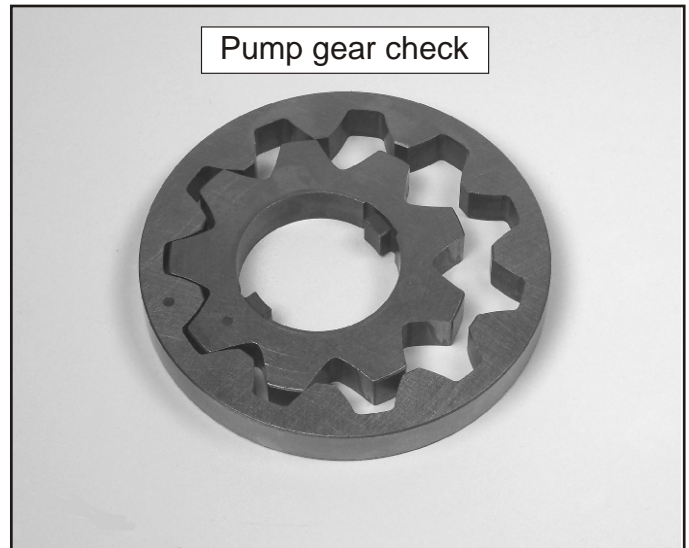


Figure 110

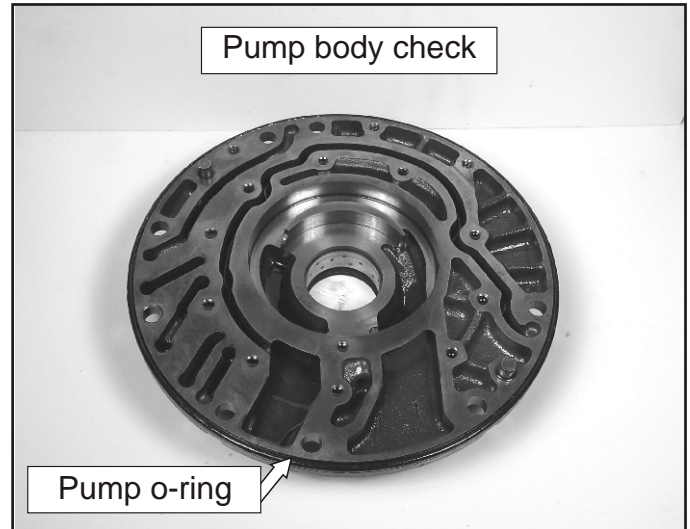


Figure 111

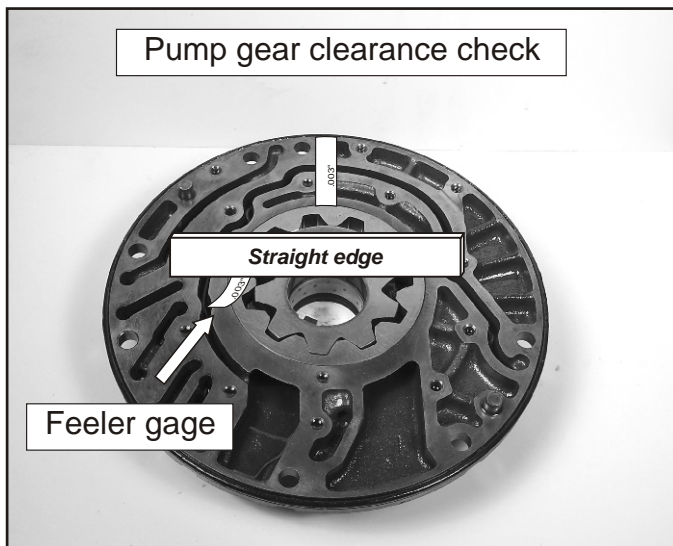


Figure 109

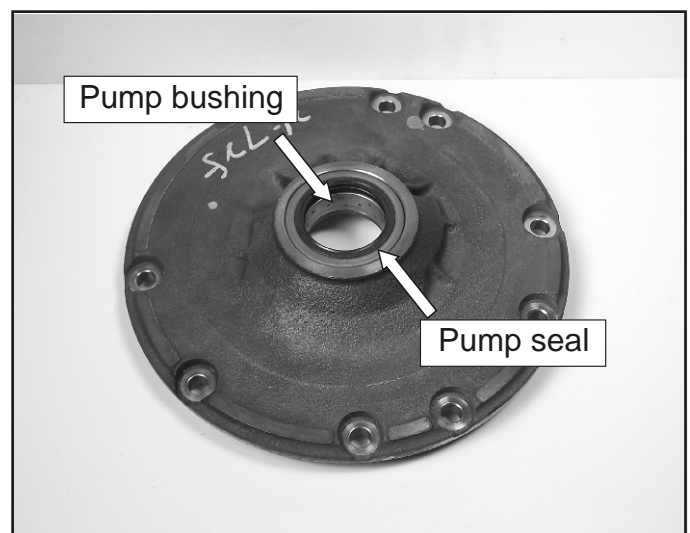


Figure 112

## ***SUB-ASSEMBLIES*** ***"PUMP" CONTINUED***

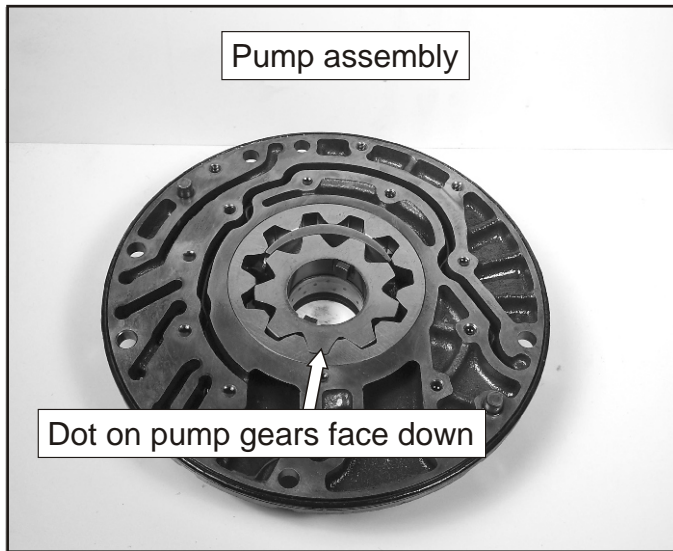


Figure 113

62. Assemble the pump gears into the pump body with the dot on the pump gears facing down, as shown in Figure 113. Lubricate the gears with a small amount of ATF.
62. Assemble the pump plate on over the two alignment pins shown in Figure 114.
63. Assemble the piston housing / stator shaft thru the pump body over the alignment pins as shown in Figure 115. Using a 30 torx bit, install the thirteen 13mm long retaining bolts and torque to 89-124 in.lb. Torque the 16mm long bolt to 53-62 in.lb.
64. Replace the inner and outer B1 and B2 piston o-rings as shown in Figure 116.
65. Lubricate the piston o-rings and install the pistons into the housing shown in Figure 117.

**Continued on Page 60**

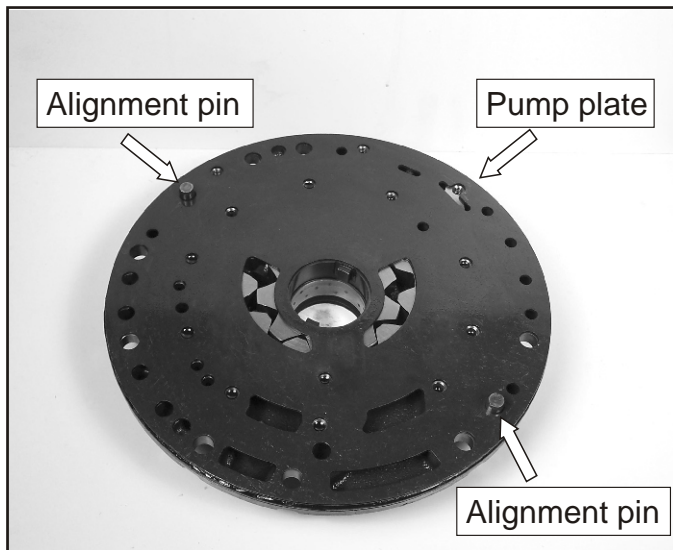


Figure 114

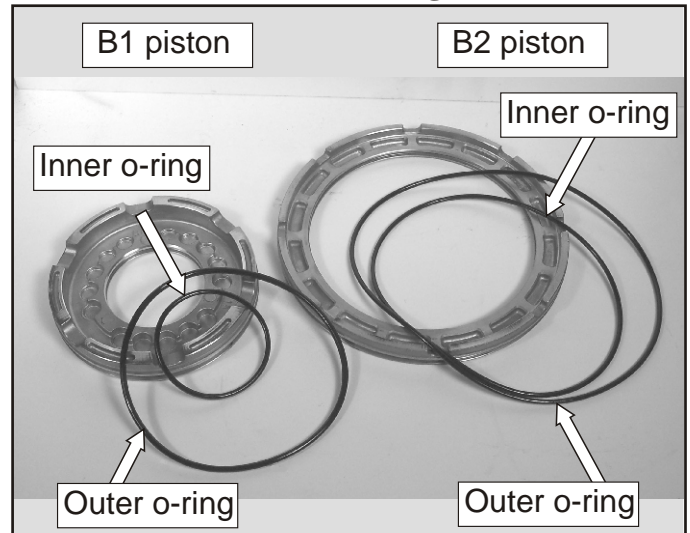


Figure 116

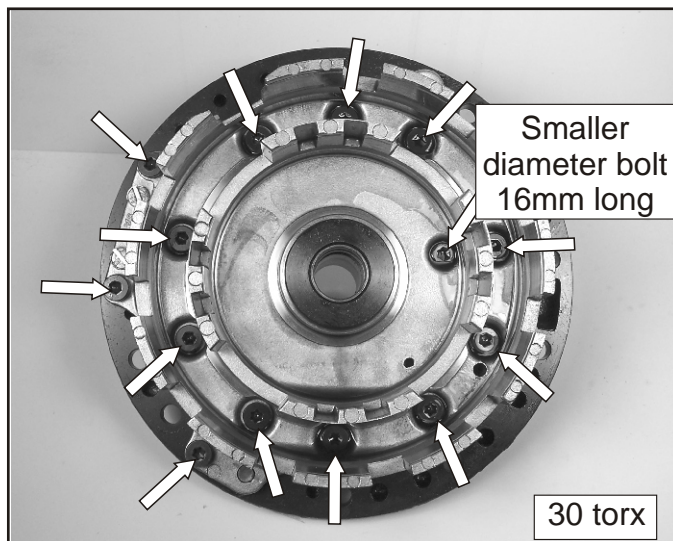


Figure 115

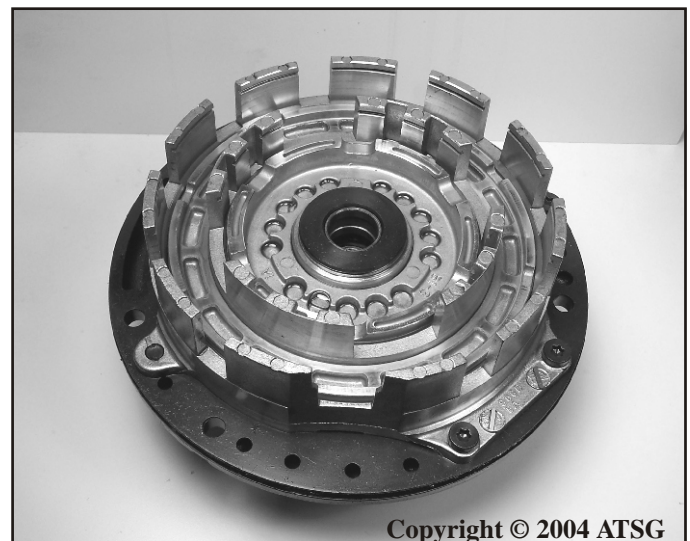


Figure 117



## *SUB-ASSEMBLIES* *"PUMP" CONTINUED*

66. Using a suitable press, depress the B1 return spring and assemble the retaining snap ring, as shown in Figure 118.
67. Assemble the B2 second coast brake hub thrust washer as shown in Figure 119.
68. Assemble the two B1 steel plates and two B1 clutch plates into the housing as shown in Figure 121. Refer to the exploded view in Figure 120 for assembly purposes.
69. Assemble the return spring assembly into the housing as shown in Figure 122.

Continued on Page 61

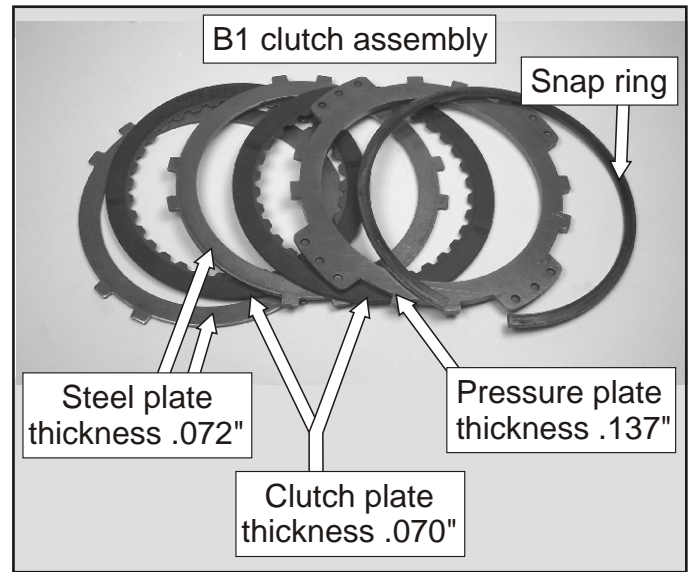


Figure 120

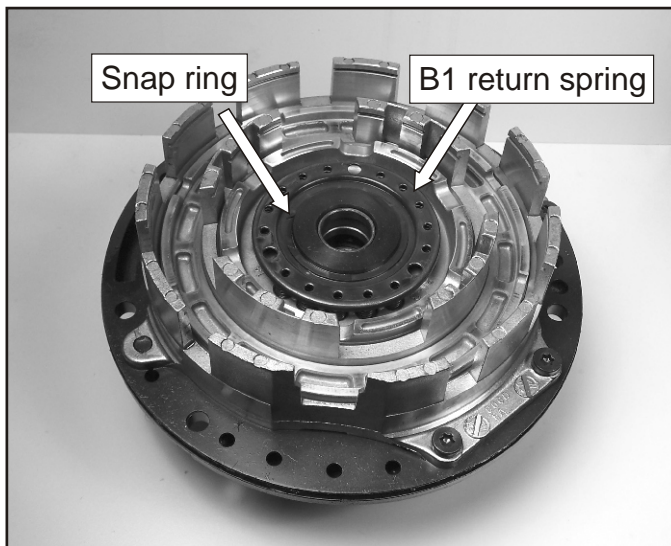


Figure 118

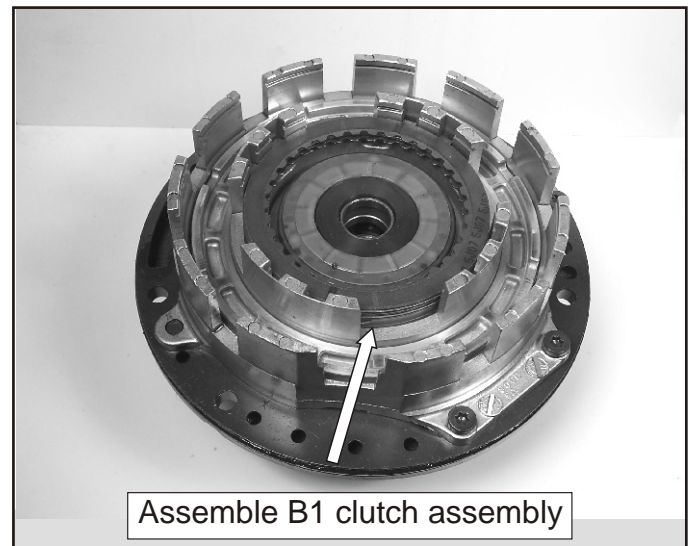


Figure 121

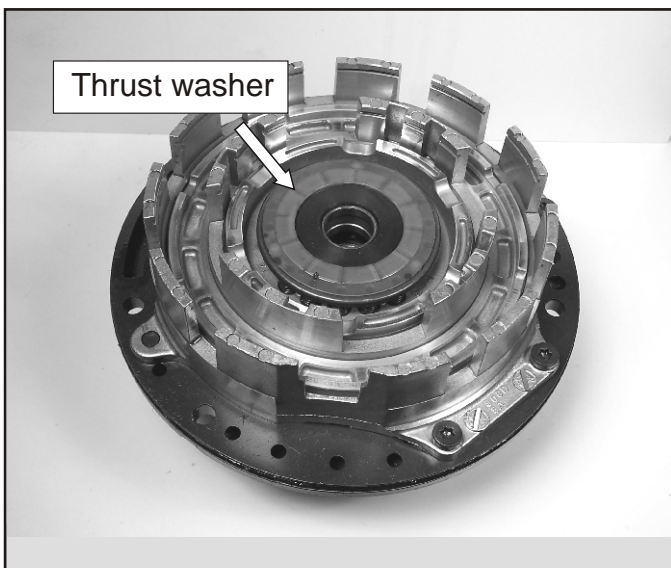


Figure 119

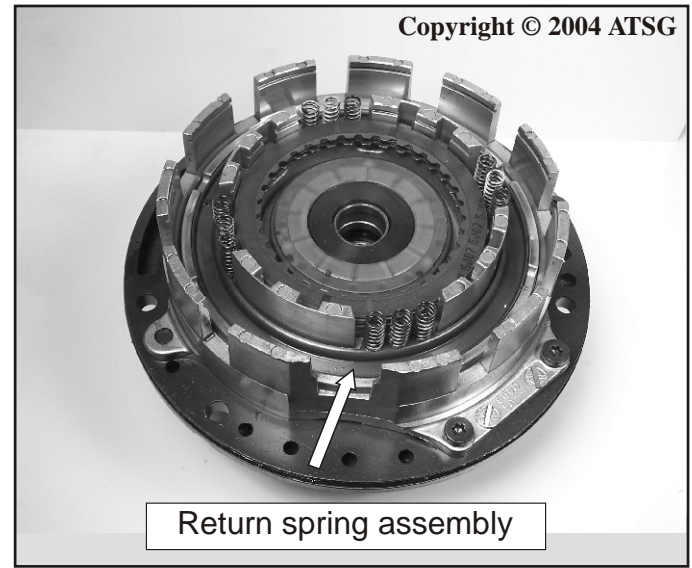


Figure 122

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## ***SUB-ASSEMBLIES "PUMP" CONTINUED***

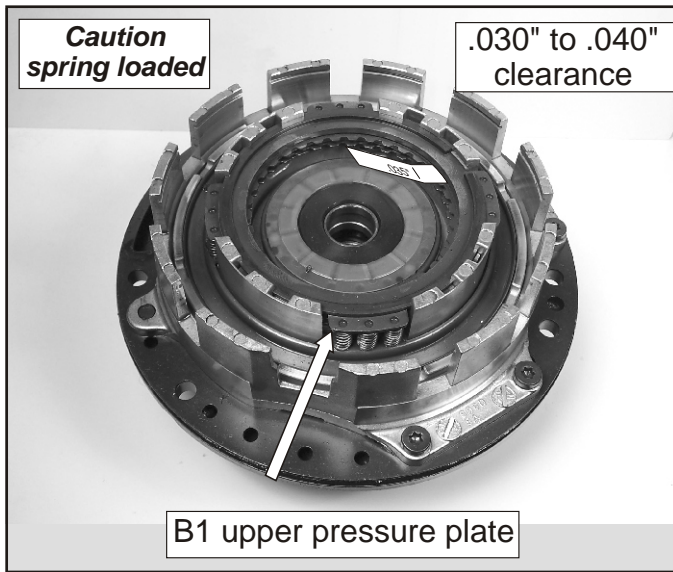


Figure 123

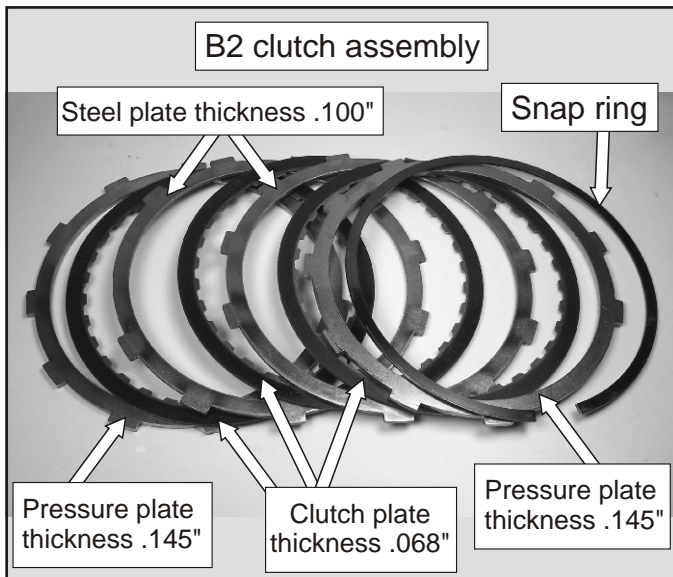


Figure 124

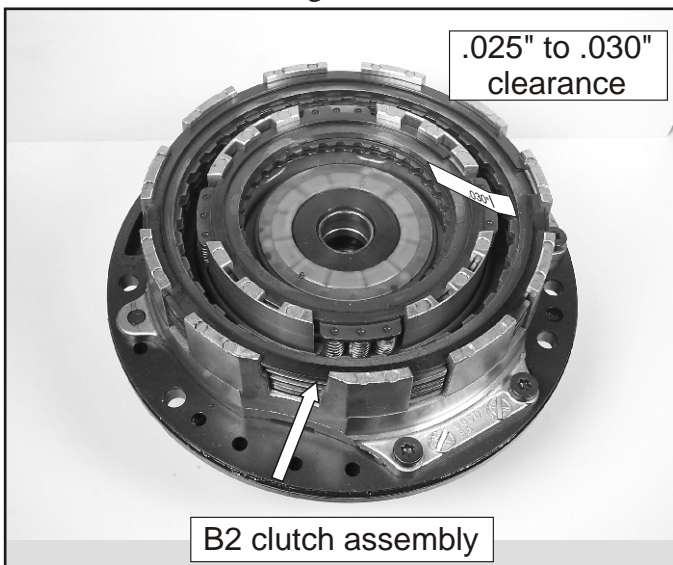


Figure 125

70. Assemble the B1 upper pressure plate on top of the spring retainer as shown in Figure 123. Press it down and assemble the retaining snap ring. Check B1 clutch clearance using a feeler gage. Clearance should be between .030\"- .040\".
71. Assemble the B2 clutch assembly into the housing starting with the .145\" thick pressure plate, as shown in Figure 124, ending with the snap ring. Check the clearance between the top pressure plate and the top B2 clutch plate. The clearance should be between .025\"- .030\".
72. Using a rubber tip blow gun, air check the B1 and B2 clutch assemblies, thru the two ports, as shown in Figure 126.
73. Install pump o-ring as shown in Figure 127.

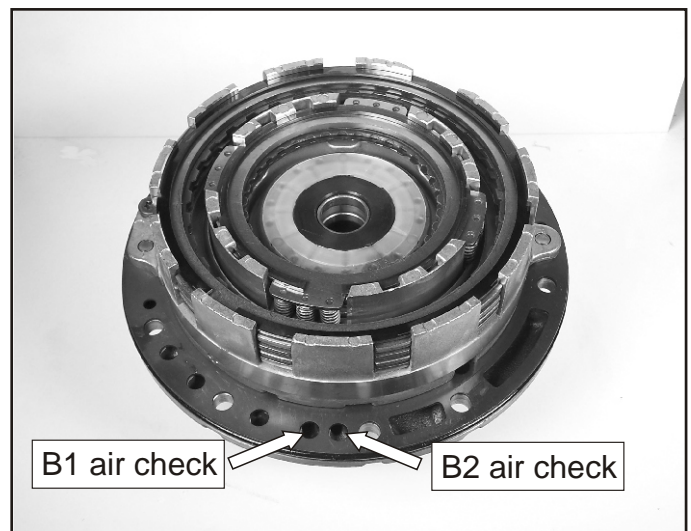


Figure 126

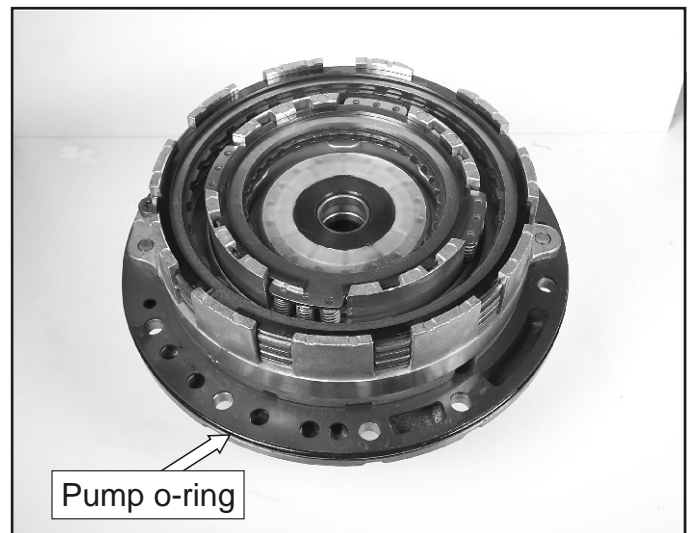


Figure 127



## ***SUB-ASSEMBLIES*** ***"B2 COAST BRAKE HUB AND SPRAG"***

74. Remove the inner race rotating it clockwise as shown in Figure 128.
75. Turn the inner race upside down to check for wear in the area where the sprag rides. Replace as necessary. See Figure 129.
76. Remove the sprag and end bearings from the outer race, as shown in Figure 130, and check for wear in the area where the sprag rides. Replace as necessary.
78. Inspect the sprag elements for wear as shown in Figure 131. Replace as necessary.
79. Refer to Figure 132 for a view of the complete assembly disassembled.

**Continued on Page 63**

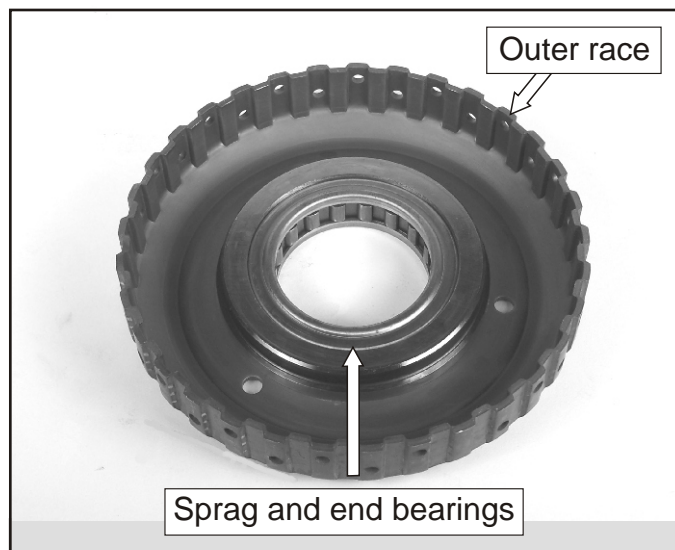


Figure 130

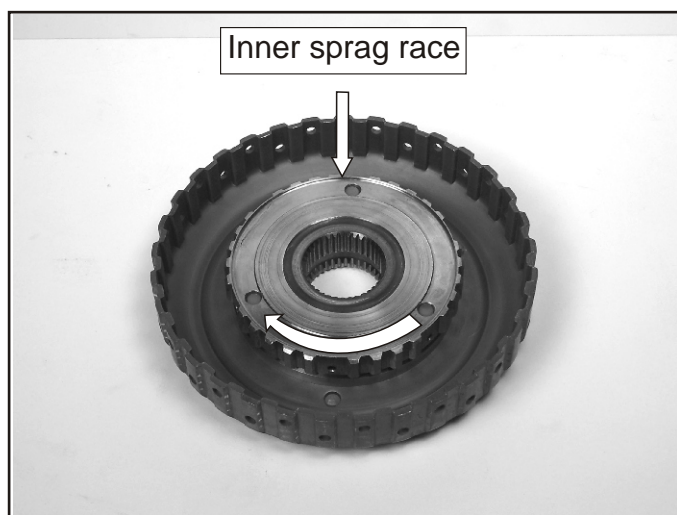


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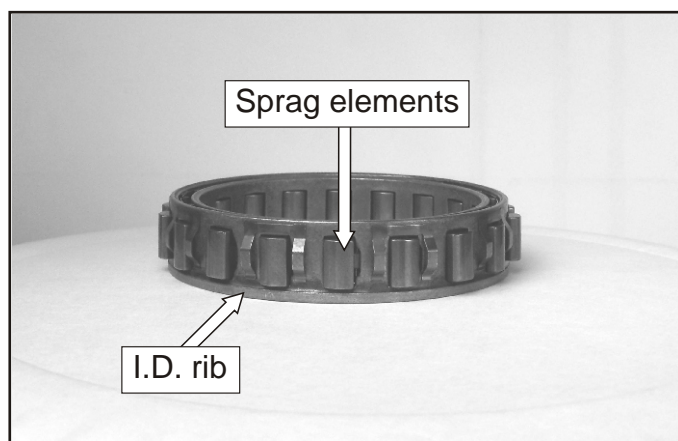


Figure 131

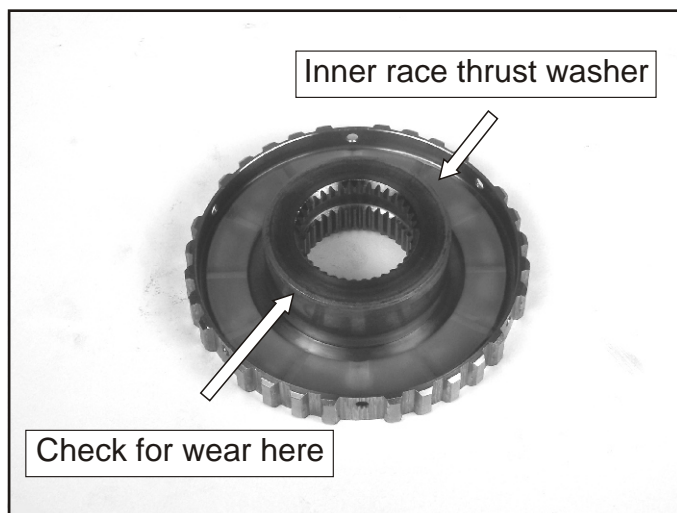


Figure 129

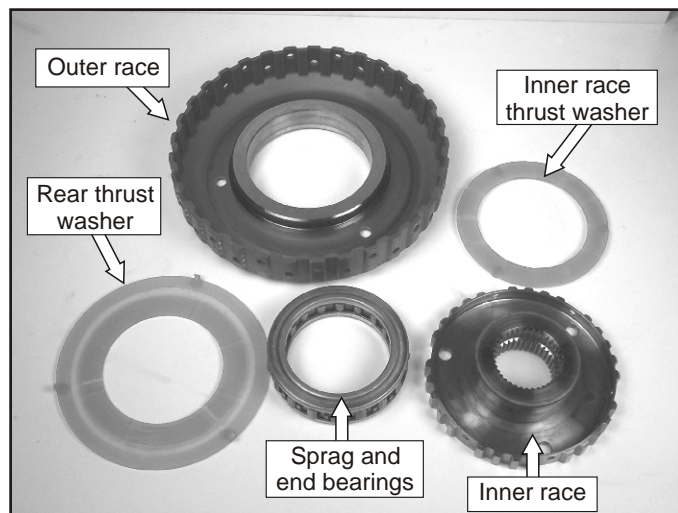


Figure 132

## SUB-ASSEMBLIES

### "B2 COAST BRAKE HUB AND SPRAG Contd."

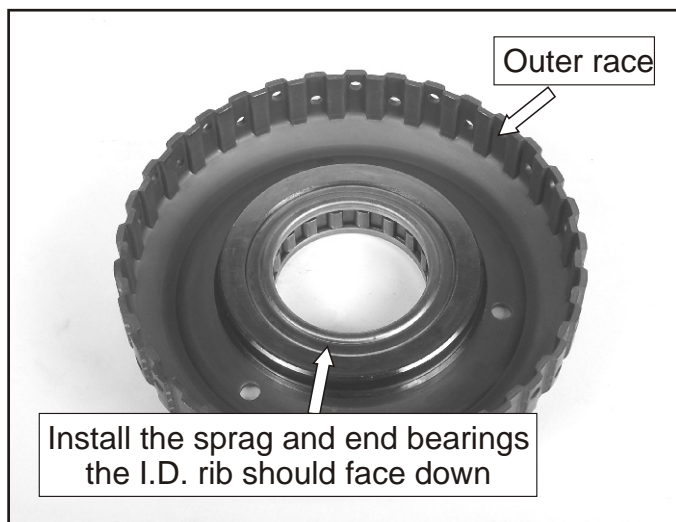


Figure 133

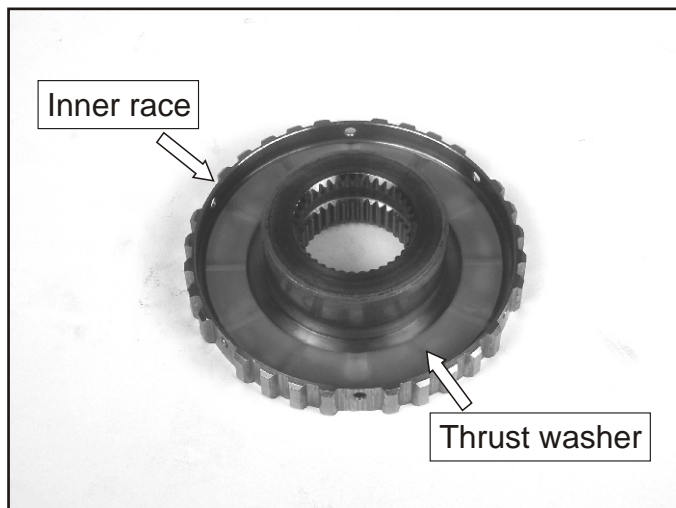


Figure 134

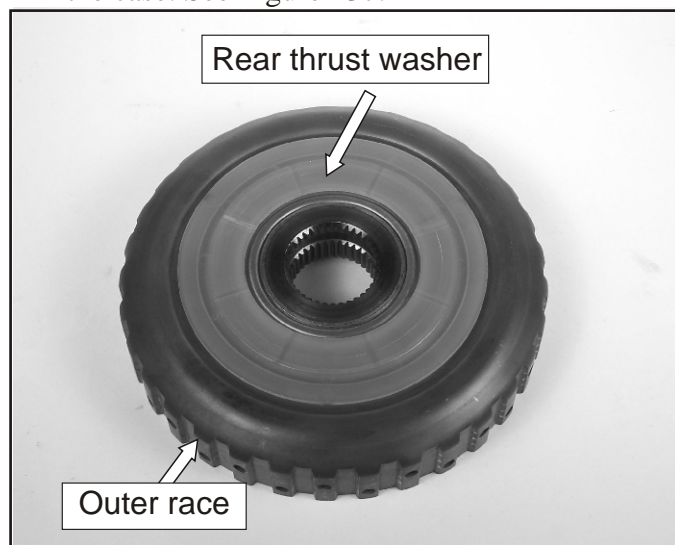


Figure 136

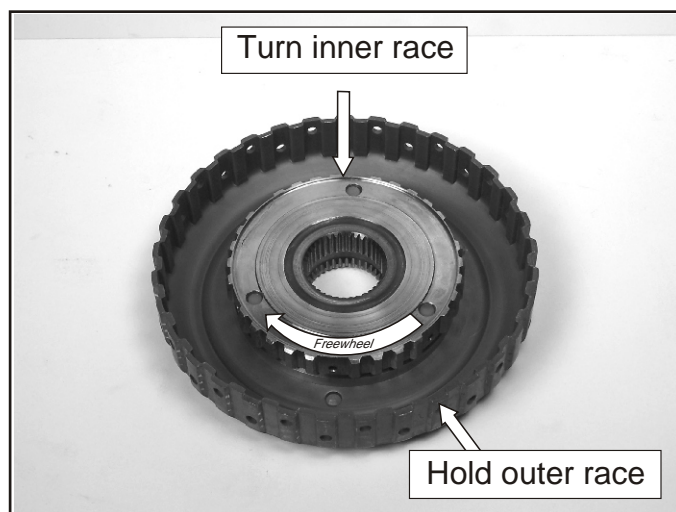


Figure 135



Figure 137

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## ***SUB-ASSEMBLIES*** ***"C3 UNDERDRIVE CLUTCH DRUM"***

85. Remove the snap ring and the C3 clutch assembly from the C3 drum as shown below in Figure 138.
86. Remove the snap ring, C3 return spring assy. and C3 piston as shown in Figure 139.
87. Inspect the bushing in the front of the C3 drum and replace as necessary. See Figure 140.
88. Turn the C3 drum over and inspect the rear bushing in the drum. Inspect the sprag race as shown in Figure 141. Replace as necessary.
89. Inspect the check ball assembly for debris and replace the inner and outer o-rings on the C3 piston. See Figure 142.

**Continued on Page 65**

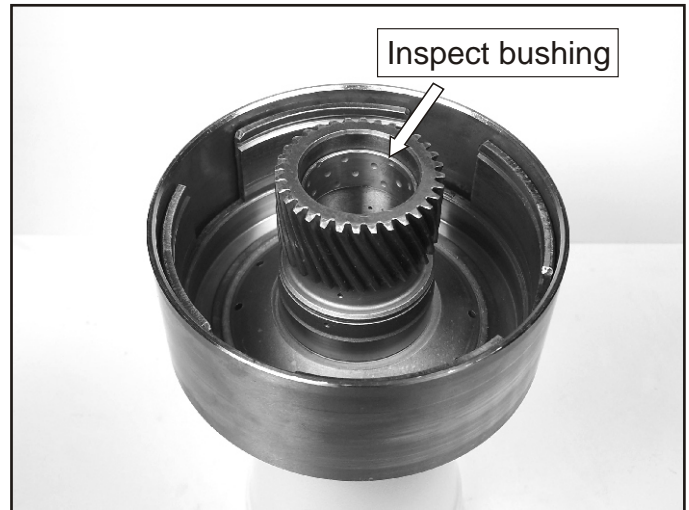


Figure 140

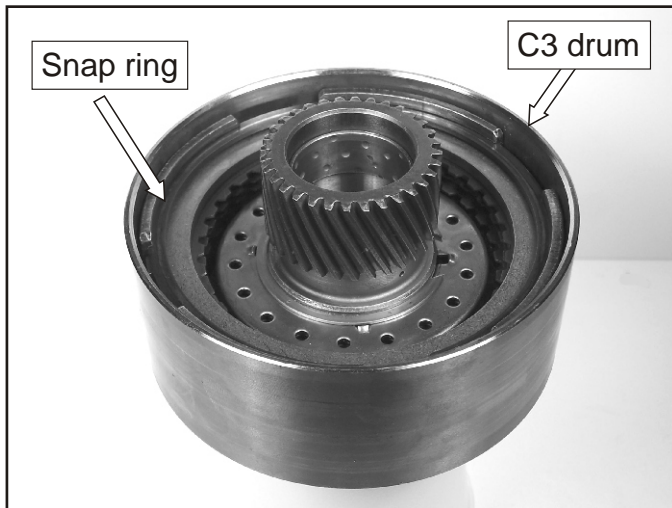


Figure 138

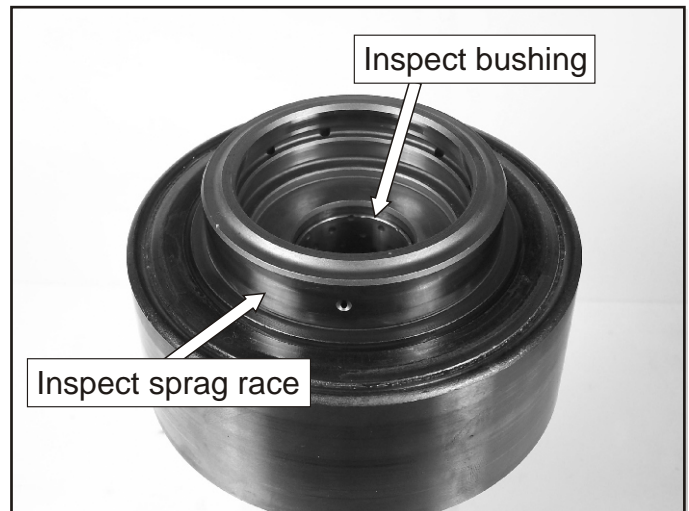


Figure 141

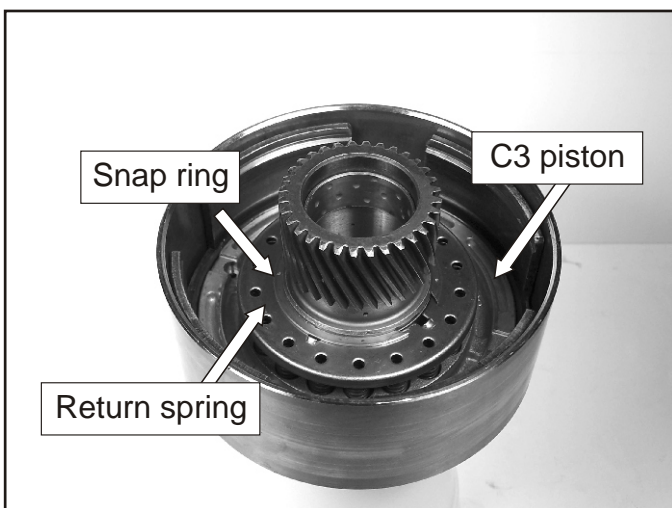


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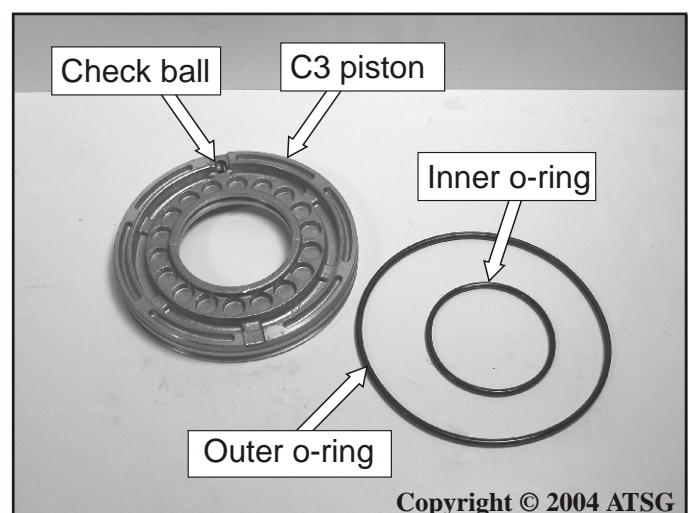


Figure 142

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## SUB-ASSEMBLIES

### "C3 UNDERDRIVE CLUTCH DRUM Contd."

90. Lubricate the inside of the C3 drum in the areas shown in Figure 143.
91. Install the C3 piston into the C3 drum as shown in Figure 144.
92. Install the return spring into the C3 piston and install the retaining snap ring as shown in Figure 145.
93. Install the C3 clutch assembly into the C3 drum as shown in Figure 147, using Figure 146 as a guide. Install the .020" bottom steel first, then install the cushion plate in the direction shown in Figure 146. Install the remaining clutch plates, steel plates, pressure plate and snap ring. Using a feeler gage check clutch clearance between the pressure plate and the top clutch plate. The clearance should be .032" - .038."

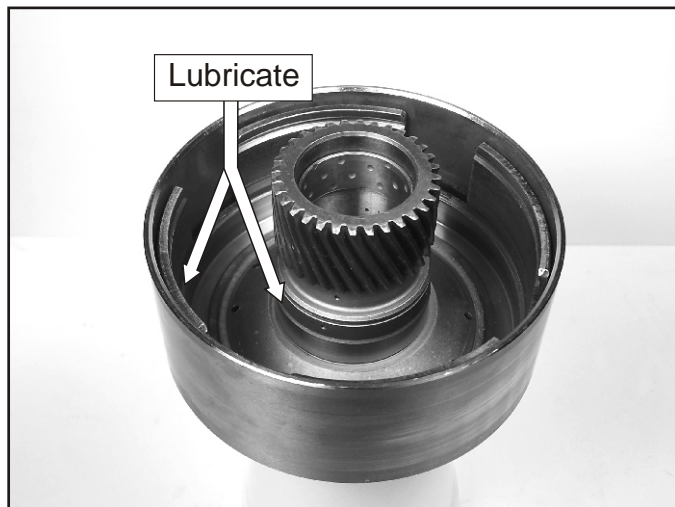


Figure 143

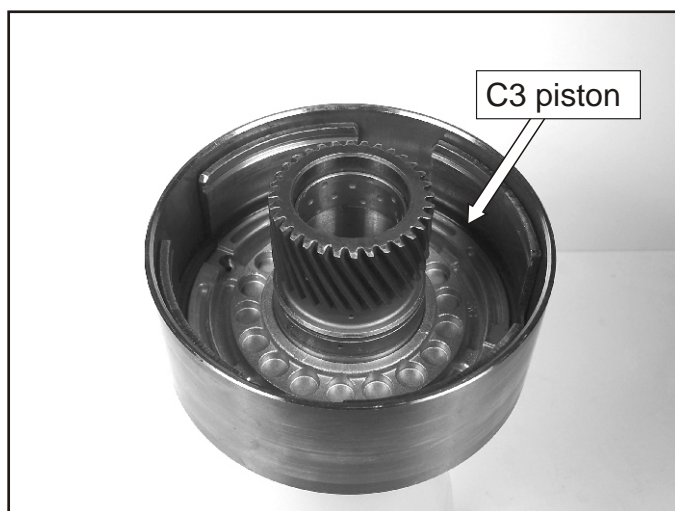


Figure 144

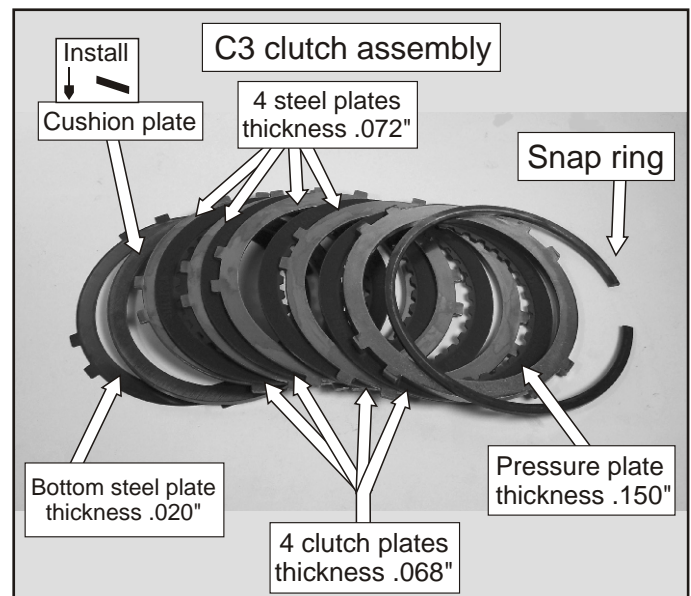


Figure 146

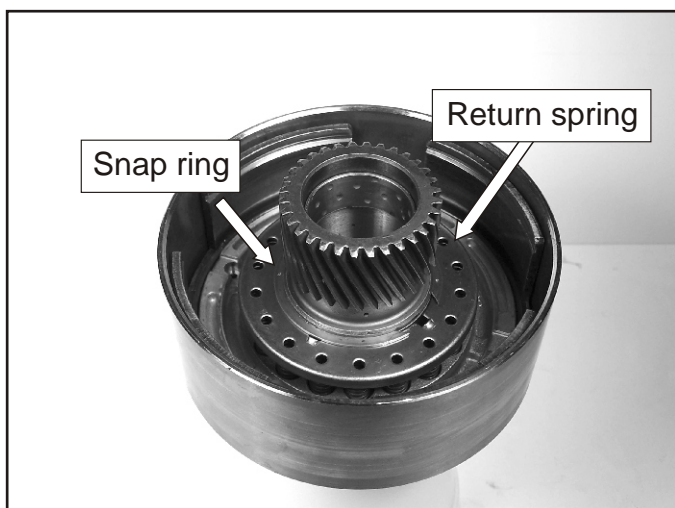


Figure 145



Figure 147



## *SUB-ASSEMBLIES* *"F3 UNDER DRIVE SPRAG"*

94. Remove the retainer from the top of the outer sprag race as shown in Figure 148.
95. Remove the F3 sprag and end bearings from the outer race as shown in Figure 149.
96. Inspect the end bearings for wear as shown in Figure 150. Replace as necessary.
97. Inspect the sprag elements for wear as shown in Figure 151, and replace as necessary.
98. Inspect the area where the sprag rides, in the outer race, for wear or scoring. Replace as necessary. See Figure 152.

**Continued on Page 67**

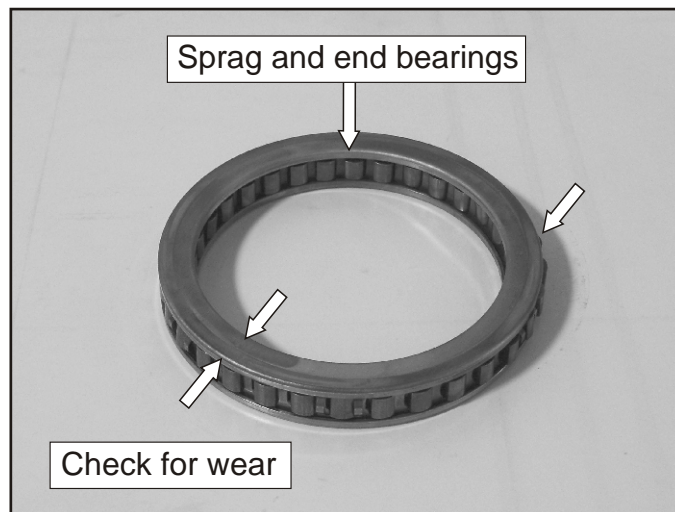


Figure 150

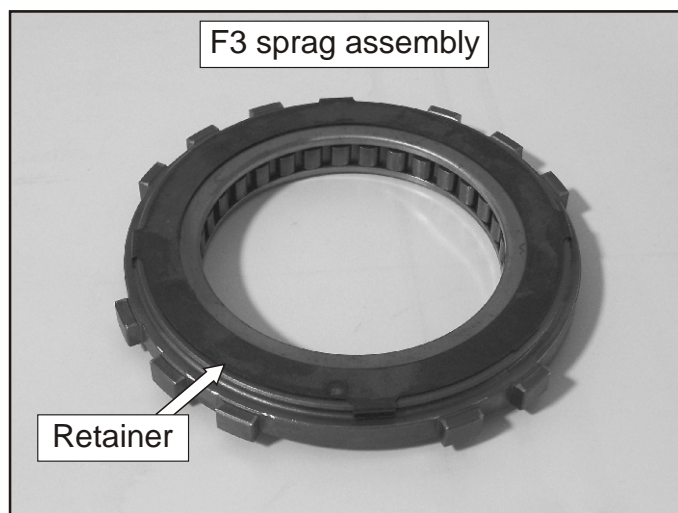


Figure 148

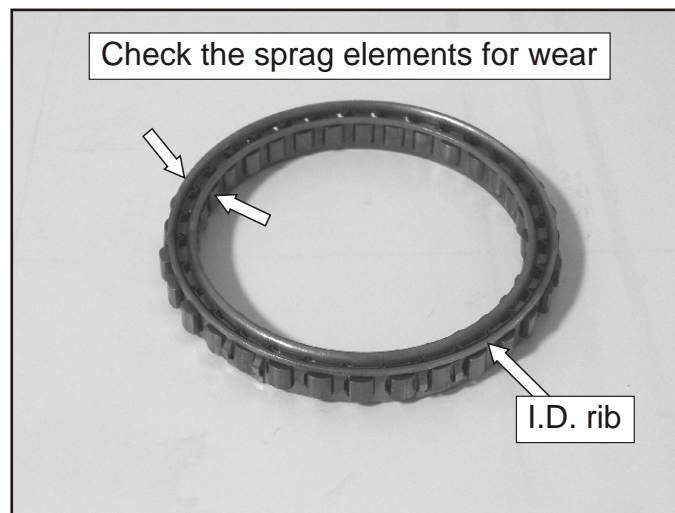


Figure 151

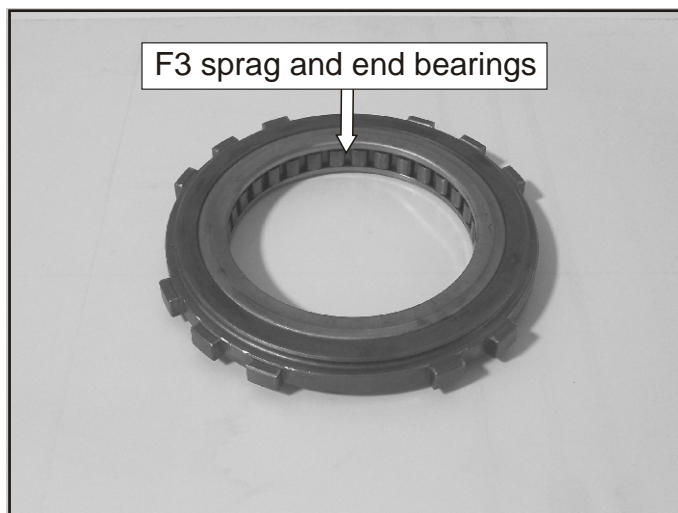


Figure 149

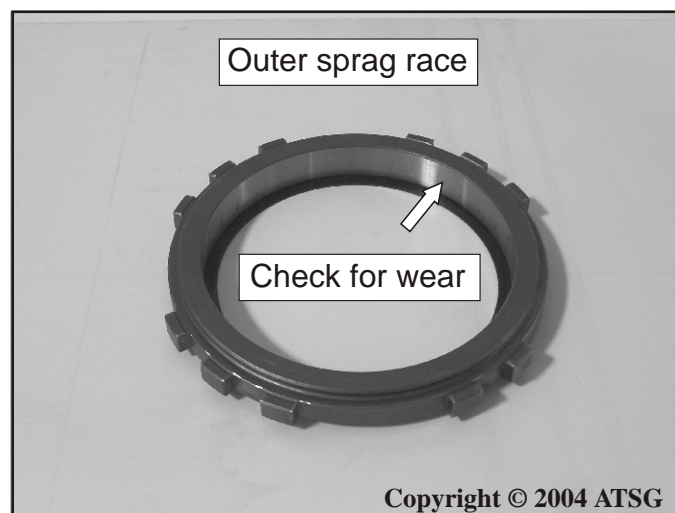


Figure 152

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## SUB-ASSEMBLIES

### "F3 UNDERDRIVE SPRAG"

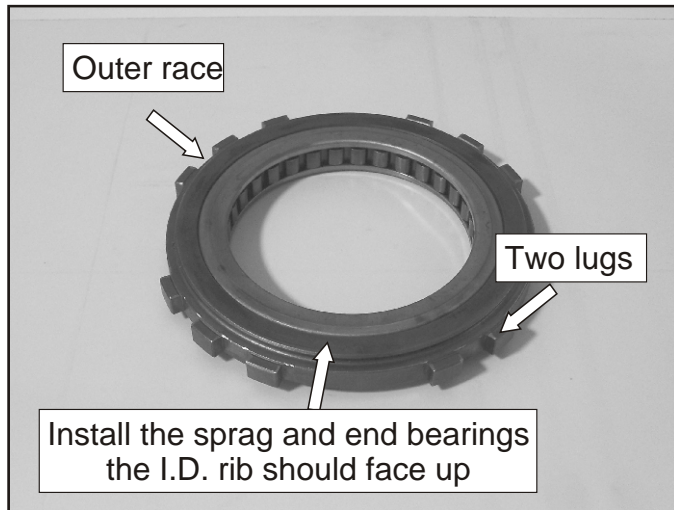


Figure 153

99. Install the F3 sprag and end bearings into the outer race as shown in. Refer to Figure 151 for the orientation of the I.D. rib. Ensure that the two lugs on the outer race are in the 5 o'clock position, as shown in Figure 153.
100. Snap the retainer back into the groove shown in Figure 154.
101. Assemble the F3 sprag onto the C3 drum and verify the proper rotation. Rotate the outer race while holding the C3 drum. The outer race should freewheel in the counter clockwise direction, as shown in Figure 155.

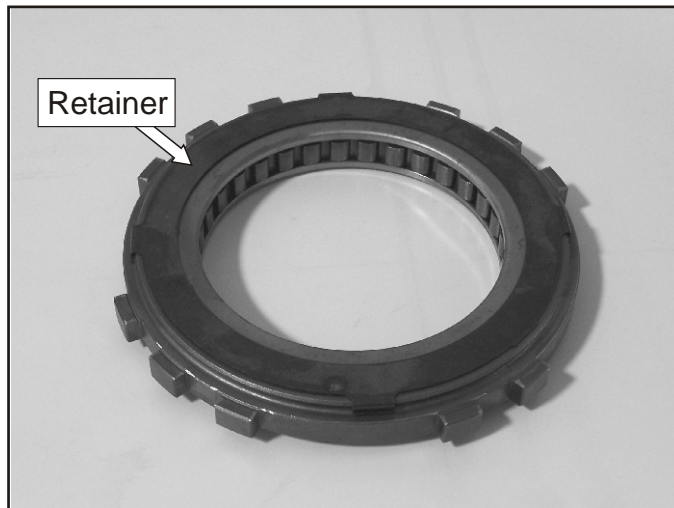


Figure 154

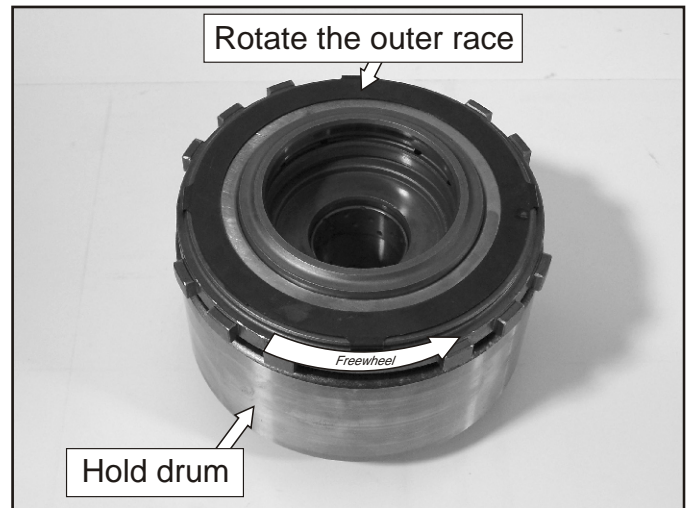


Figure 155



## **SUB-ASSEMBLIES** **"UNDERDRIVE PLANETARY AND** **DIFFERENTIAL PINION GEAR ASSY."**

102. Using a hammer and punch, remove the stakes from the lock nut. Place the park gear into a vice and remove the lock nut with a 36mm socket. See Figure 156.
103. Compress the two tabs inward and pull the ring gear rearward to remove it from the back of the counter driven gear. Refer to Figures 157 and 158.
104. Support the counter driven gear in a suitable press and push the C3 underdrive planetary thru the counter driven gear. See Figure 159.
105. Refer to Figure 160 for a view of the complete assembly dis-assembled and for assembly purposes.

**Continued on Page 69**

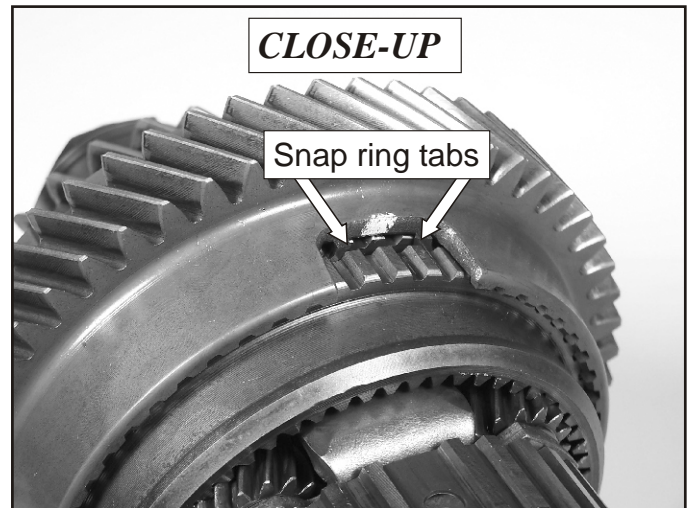


Figure 158

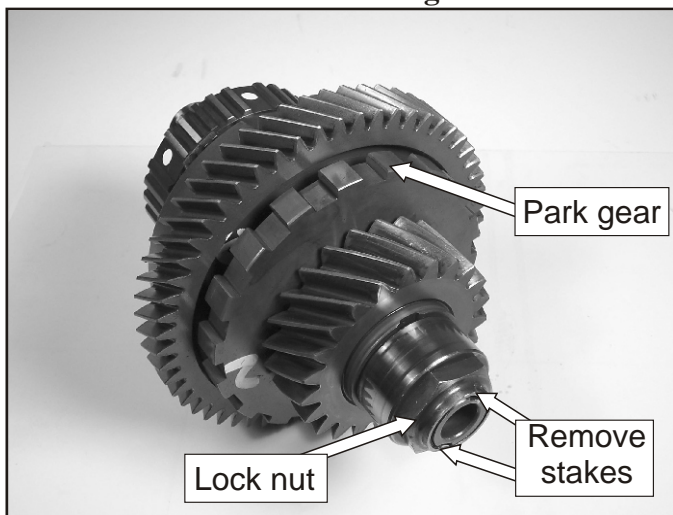


Figure 156

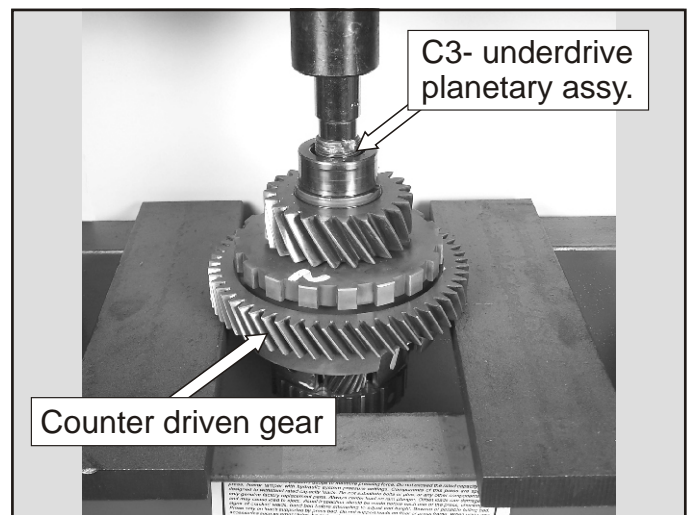


Figure 159

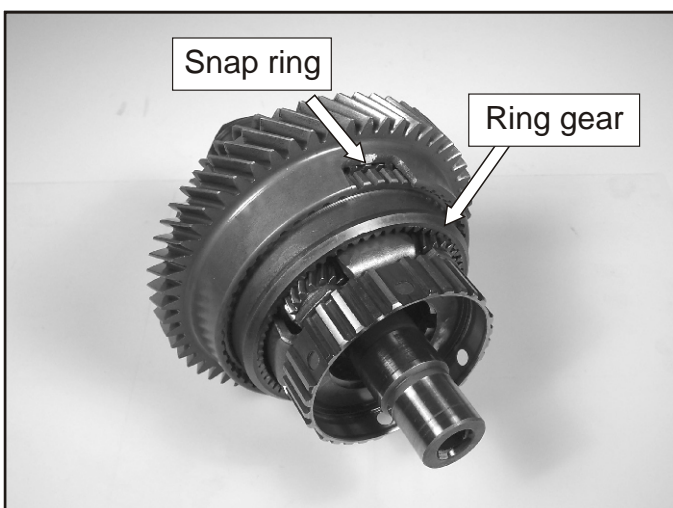


Figure 157

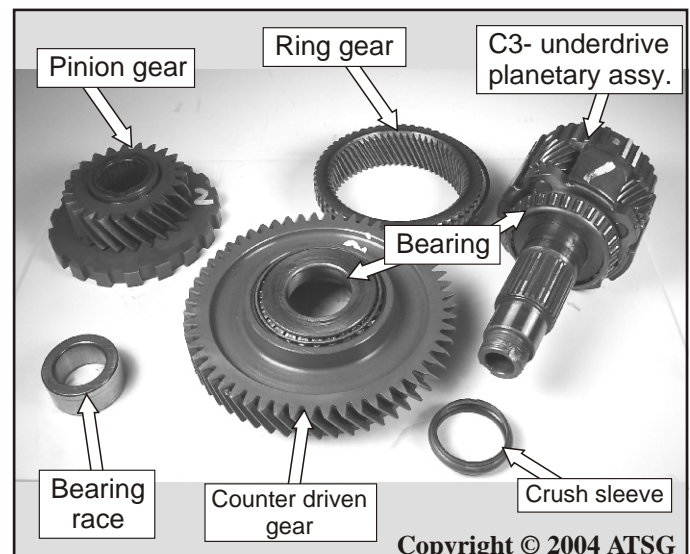


Figure 160

## SUB-ASSEMBLIES

### "UNDERDRIVE PLANETARY AND DIFFERENTIAL PINION GEAR ASSY. Contd."

106. Inspect the C3 underdrive planetary pinions and check the planetary washers for wear, replace as necessary. See Figure 161.
107. Inspect the inner planetary bearing as shown in Figure 162.
108. Inspect the rear tapered bearing as shown in Figure 163 and replace as necessary. **Note: To remove the bearing assy., remove the cage and individual rollers. Remove the race with a two jaw bearing puller. Press a new bearing onto the planetary shaft.**
109. Install a new crush sleeve onto the shaft. See Figure 164.
110. Inspect the counter driven gear races and front bearing as shown in Figure 165, and replace as necessary.

**Continued on Page 70**

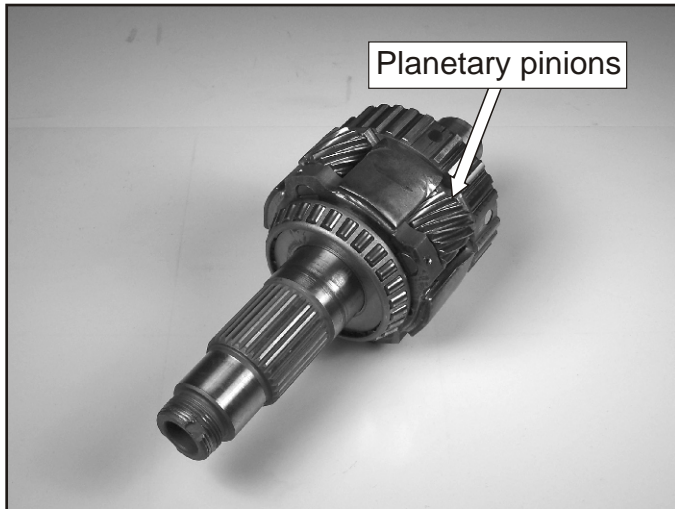


Figure 161

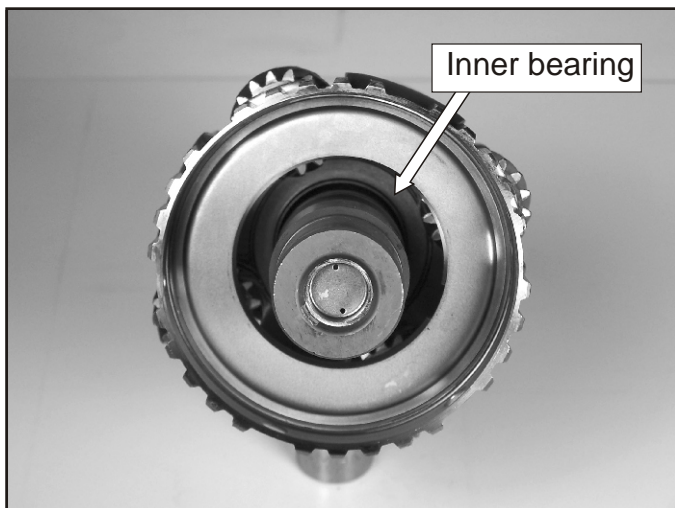


Figure 162

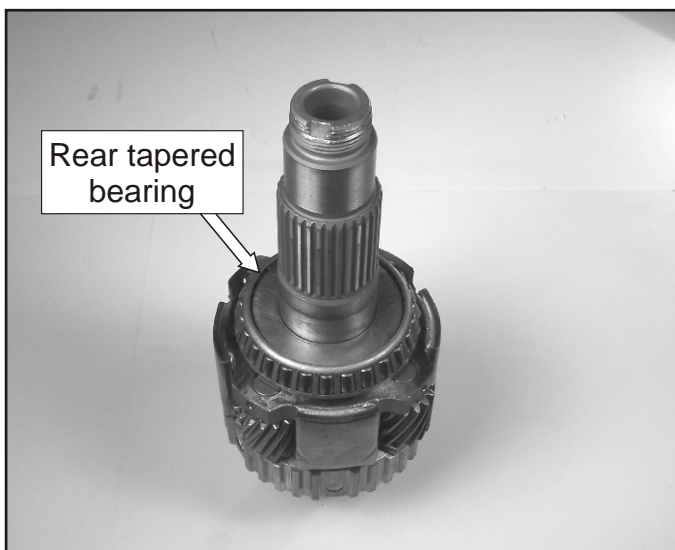


Figure 163

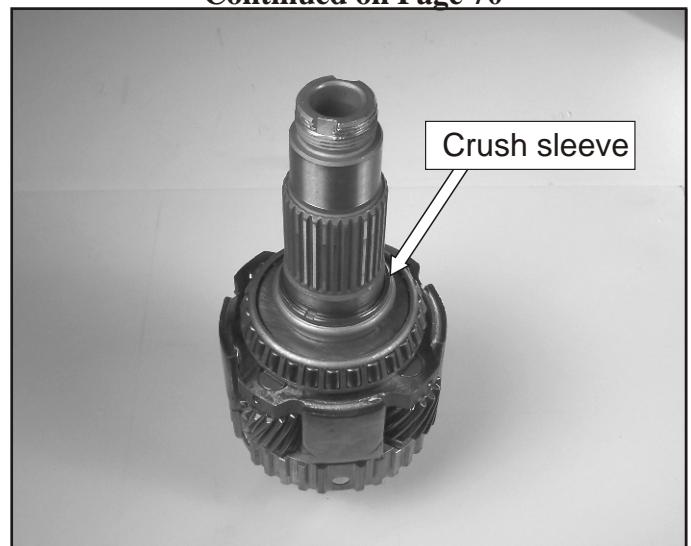


Figure 164

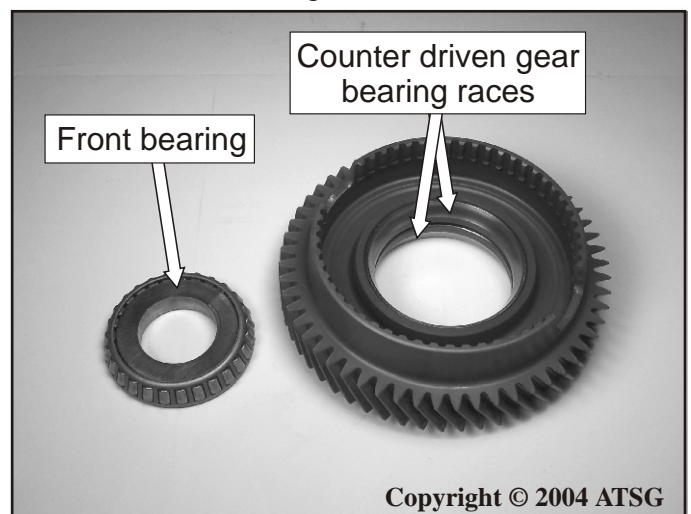


Figure 165

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## ***SUB-ASSEMBLIES*** ***"UNDERDRIVE PLANETARY AND*** ***DIFFERENTIAL PINION GEAR ASSY."***

111. Install the counter driven gear onto the C3 planetary shaft as shown in Figure 166.
112. Using a suitable press, install the front tapered bearing as shown in Figure 167.
113. Install the pinion gear as shown in Figure 168.
114. Using a suitable press, install the bearing race as shown in Figure 169.
115. Assemble the park gear into a vise or suitable holding fixture and snug down a new lock nut with a 36mm socket. See Figure 170. ***Note:*** ***Do not tighten until the next step!***



Figure 168

**Continued on Page 71**

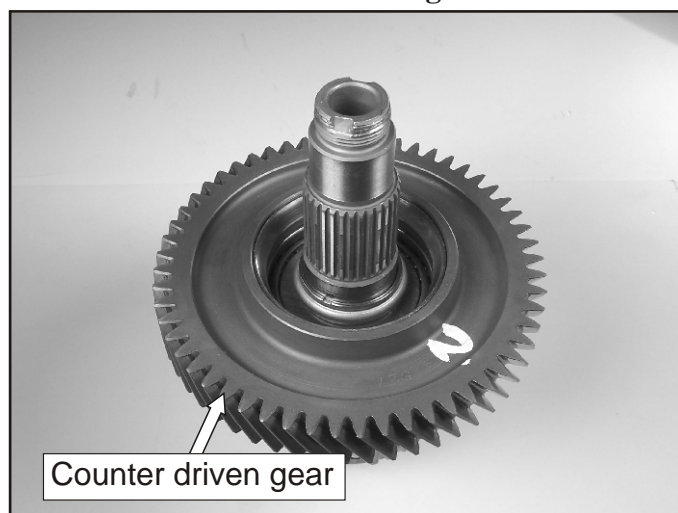


Figure 166

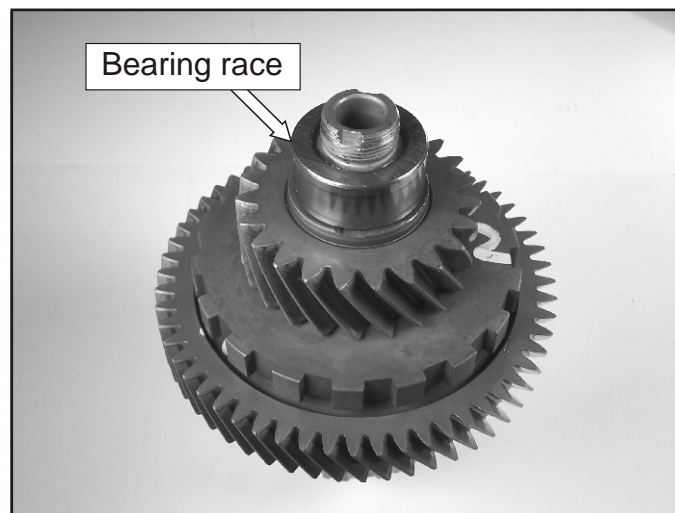


Figure 169

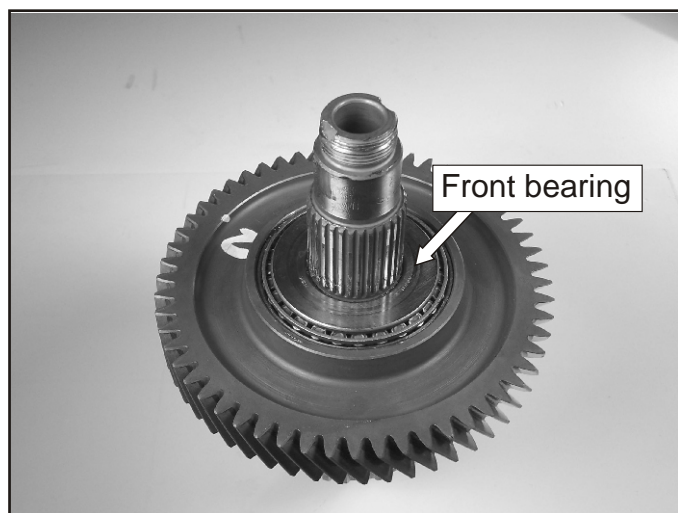


Figure 167



Figure 170

## SUB-ASSEMBLIES

### "UNDERDRIVE PLANETARY AND DIFFERENTIAL PINION GEAR ASSY. Contd."

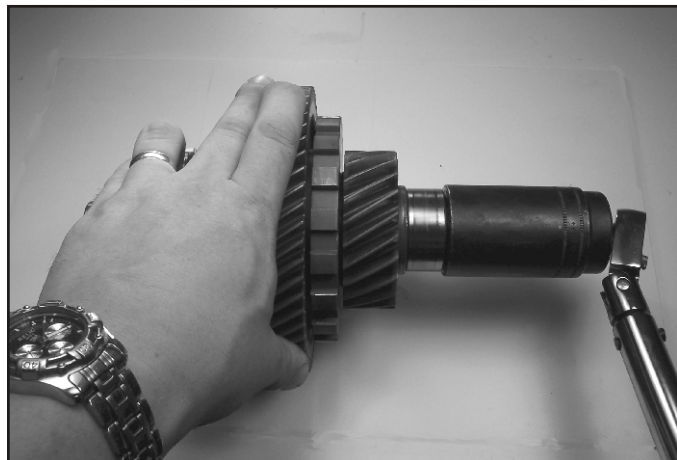


Figure 171

116. Tighten the lock nut until the turning torque is between 5-12 in.lb. See Figure 171. **Note:** To check turning torque, hold the counter driven gear with the left hand and check the turning torque with an inch pound torque wrench with the right hand.

117. Using a punch, stake the nut on both sides of the shaft, as shown in Figure 172.

118. Using needle nose pliers, compress the tabs of the snap ring towards the ring gear and push it into the back of the counter driven gear shown in Figure 173.

119. Push the ring gear into the counter driven gear until it snaps into its groove. See Figure 174 and the close-up in Figure 175.

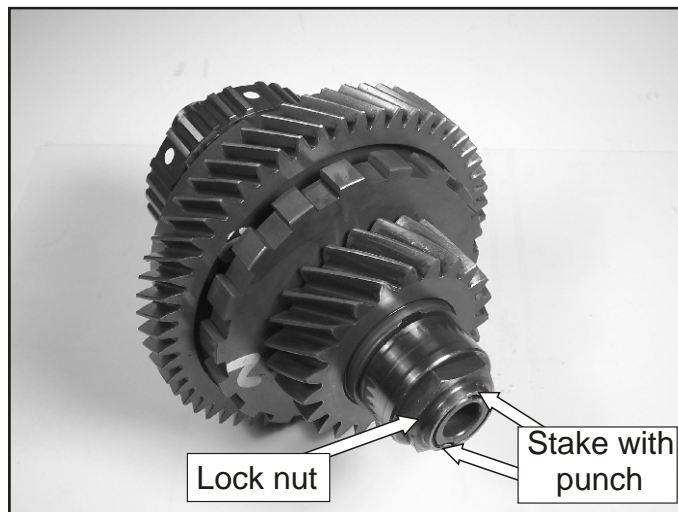


Figure 172

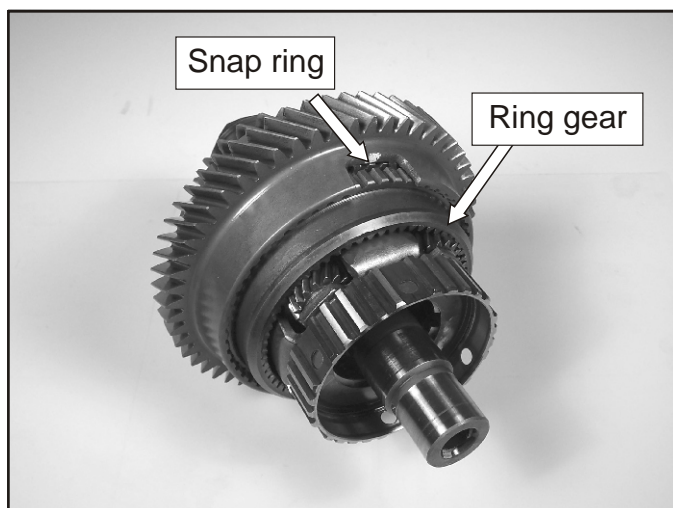


Figure 174

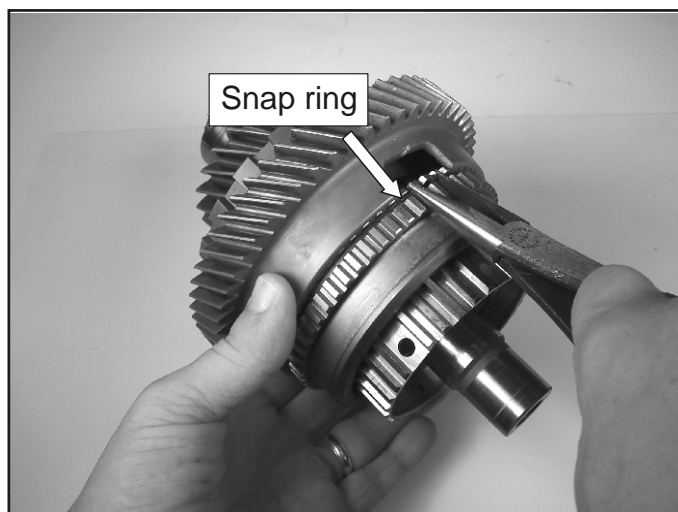


Figure 173

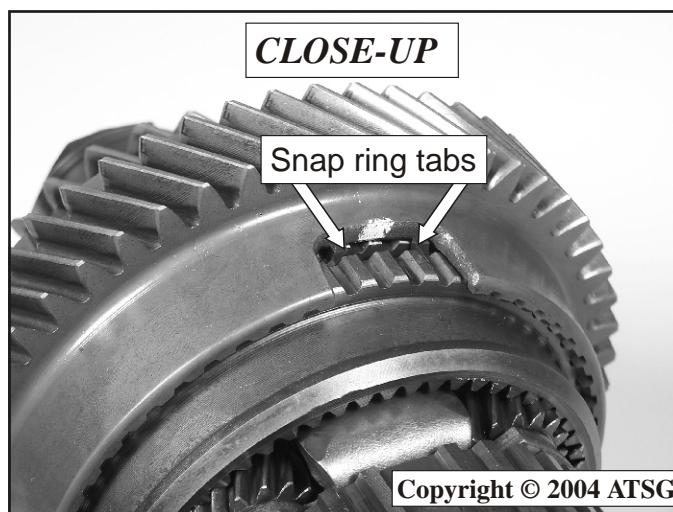


Figure 175



## ***SUB-ASSEMBLIES*** ***F2 FREEWHEEL (LOW SPRAG)***

120. Remove the inner race from the F2 freewheel assembly as shown in Figure 176.
121. Remove the snap ring and upper end bearing as shown in Figure 177.
122. Lift the sprag and lower end bearing from the outer race as shown in Figure 178.
123. Remove the thrust washer from the outer race. See Figure 179.
124. See Figure 180 for a view of the complete assy. dis-assembled.

**Continued on Page 73**

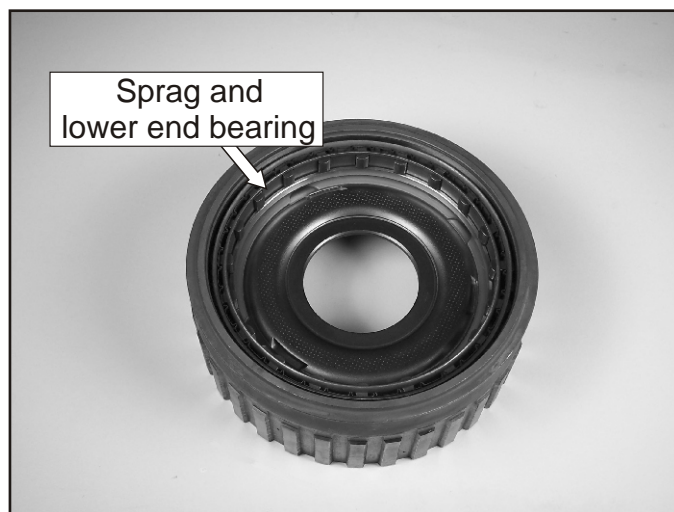


Figure 178

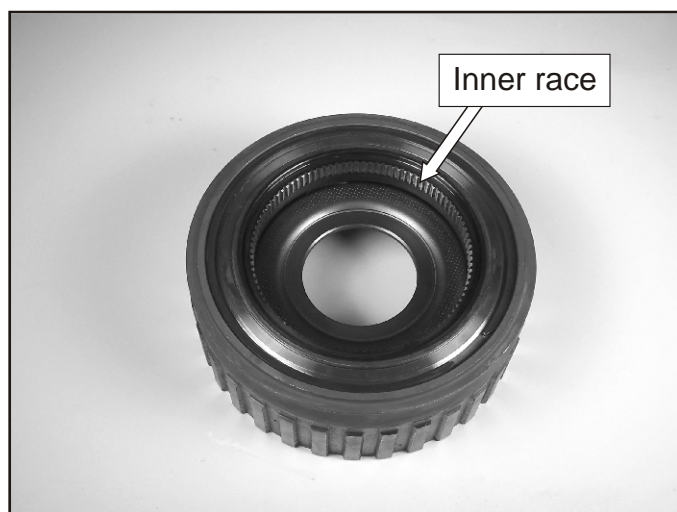


Figure 176

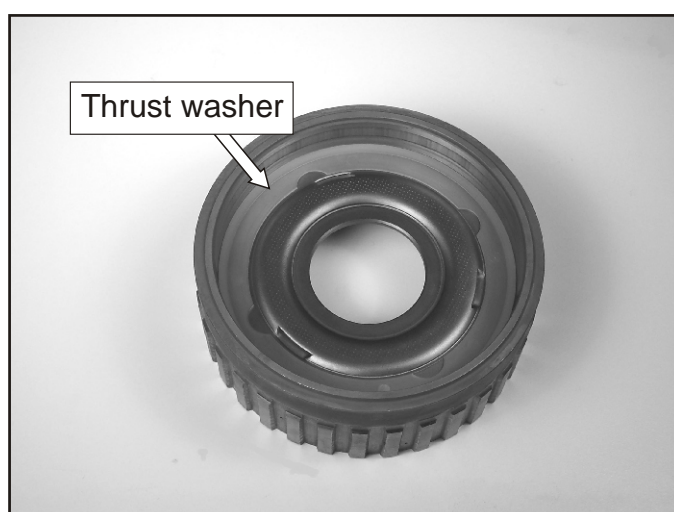


Figure 179

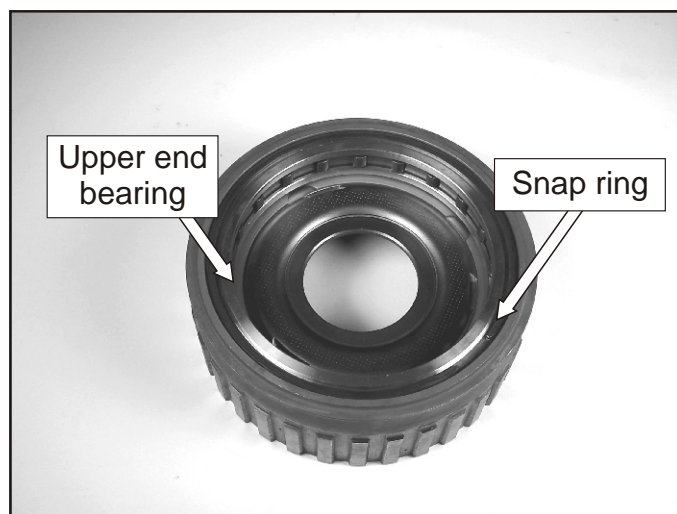


Figure 177

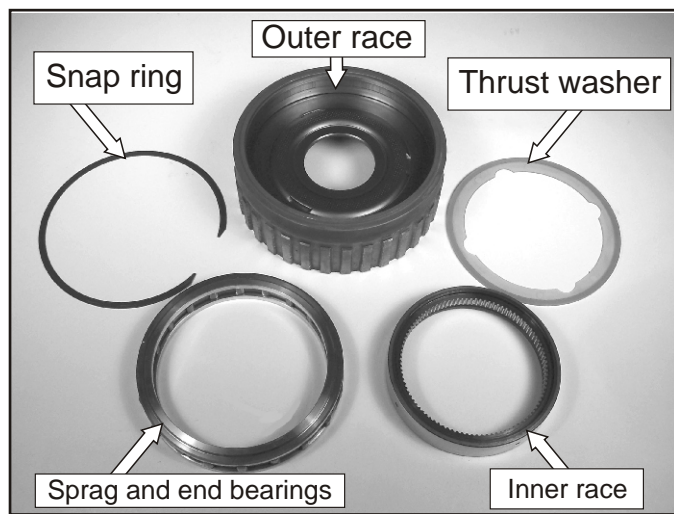


Figure 180



## SUB-ASSEMBLIES

### F2 FREEWHEEL (LOW SPRAG) Contd.

125. Inspect the outer race for wear or scoring, in the area where the sprag rides and replace as necessary. See Figure 181.
126. Assemble the thrust washer and the lower end bearing as shown in Figure 182.
127. Inspect the sprag elements and replace as necessary. See Figure 183.
128. Assemble the sprag, using Figure 183 for assy. purposes. **Note: I.D. rib faces up.** Assemble the upper end bearing and snap ring as shown in Figure 184.
129. Inspect the inner race for wear, and assemble the inner race into the F2 freewheel assembly and check for proper rotation. **Note: The inner race freewheels counter clockwise and locks clockwise when holding the outer race.** See Figure 185.

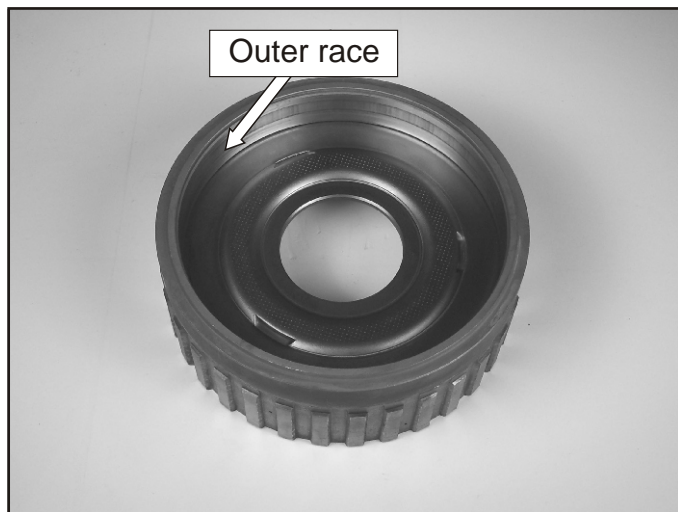


Figure 181

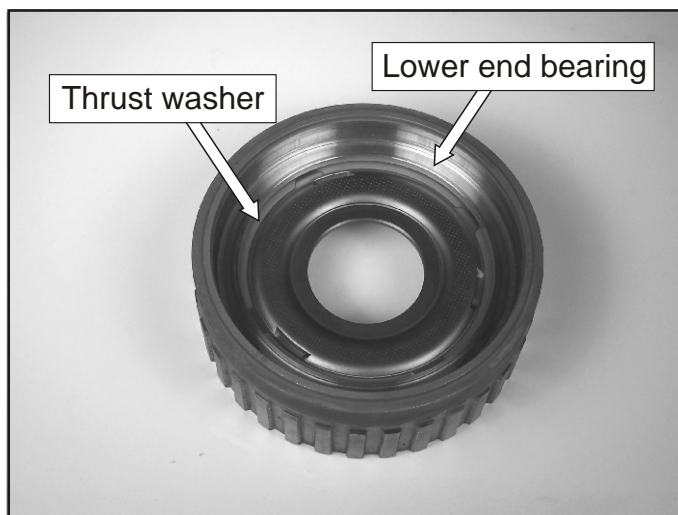


Figure 182

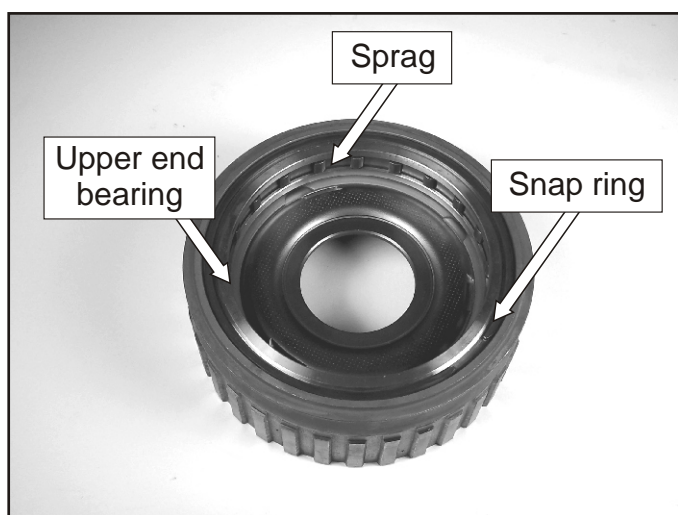


Figure 184

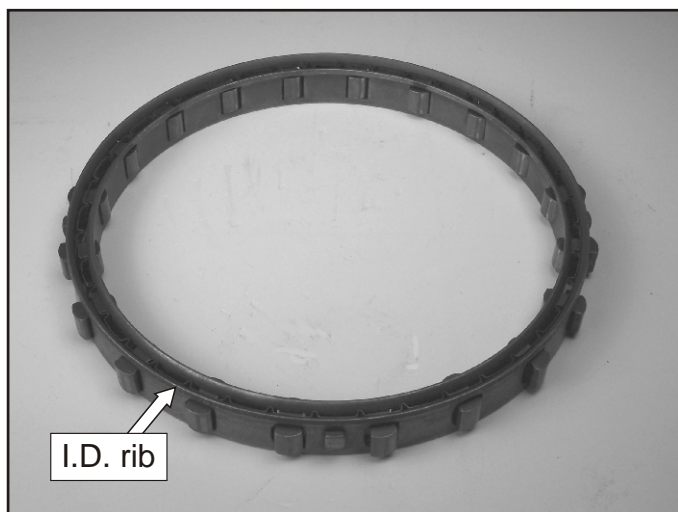


Figure 183

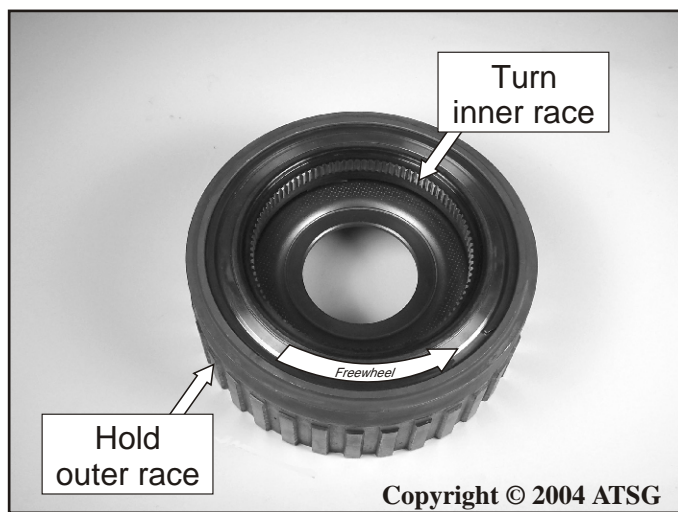


Figure 185

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## *SUB-ASSEMBLIES* *"COUNTER DRIVE GEAR"*

130. Using a hammer and punch remove the stakes on the lock nut. Place the Counter drive gear in a suitable holding fixture or vice and remove the 60mm nut. See Figure 186.
131. Remove the bearing race using a suitable two jaw puller. This will remove the front bearing along with the race. See Figure 187.
132. Remove the crush sleeve shown in Figure 188.
133. Using a suitable two jaw bearing puller, remove the rear bearing shown in Figure 189.
134. Refer to Figure 190 for a view of the complete assembly dis-assembled.

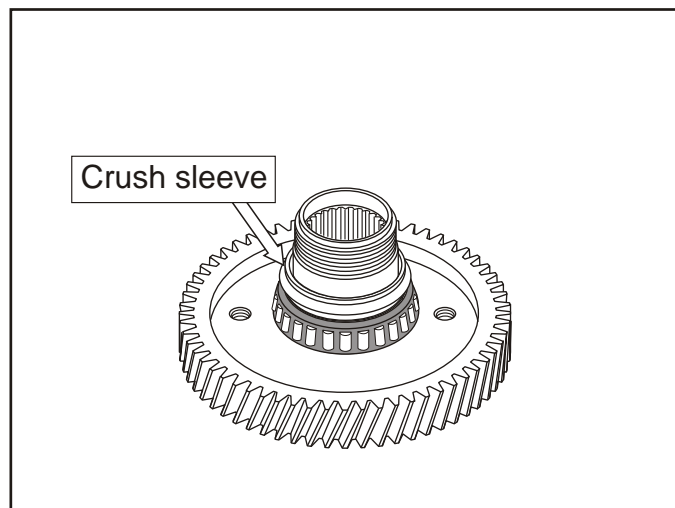


Figure 188

**Continued on Page 75**

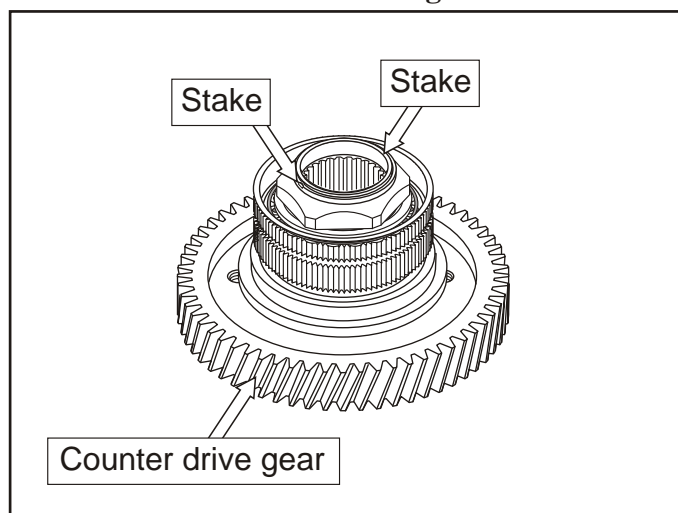


Figure 186

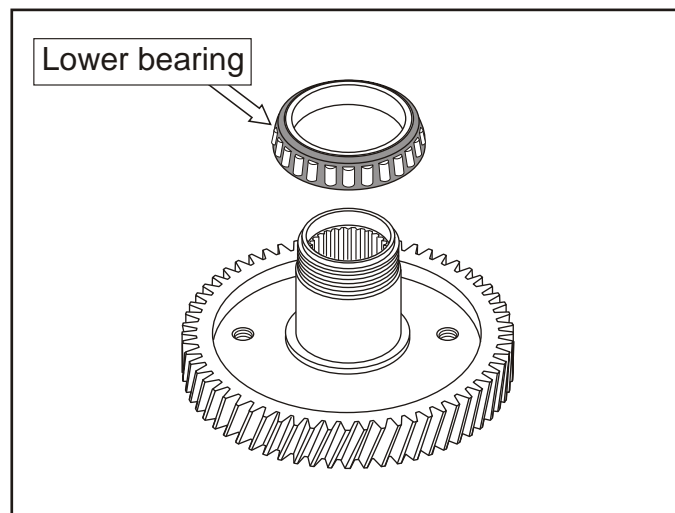


Figure 189

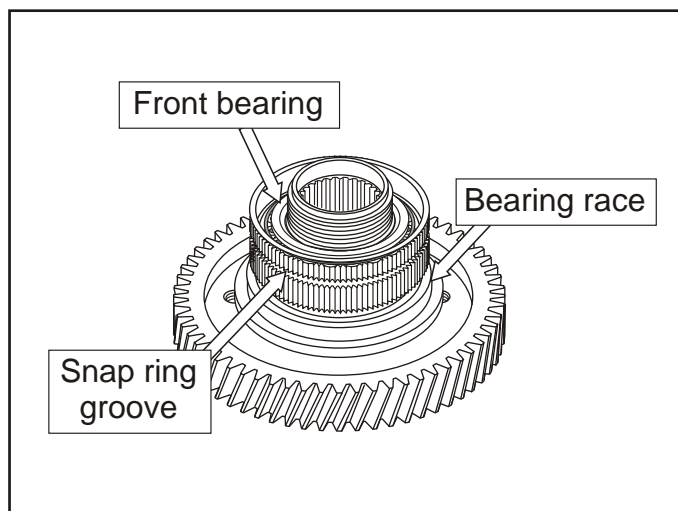
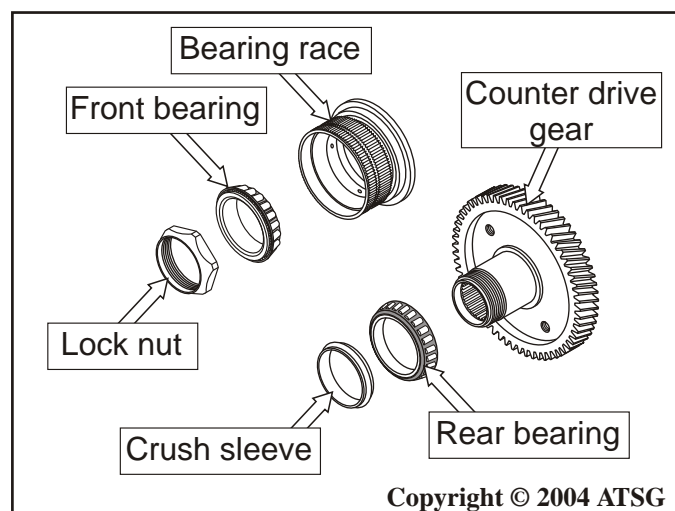


Figure 187



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Figure 190

## SUB-ASSEMBLIES

### "COUNTER DRIVE GEAR Contd."

135. Press the rear bearing onto the counter drive gear and place a new crush sleeve on the top of the rear bearing as shown in Figure 191.
136. Assemble the bearing race on top of the rear bearing as shown in Figure 192.
137. Press the Front bearing onto the counter drive gear shaft as shown in Figure 193.
138. Place a new lock nut on to the counter drive gear and snug it down. See Figure 194.
139. Place the counter drive gear into a suitable holding fixture or vice and tighten the lock nut down until turning torque is approximately 3-7 in.lb. See Figure 195. Refer to Figure 186 and stake the lock nut in two places.

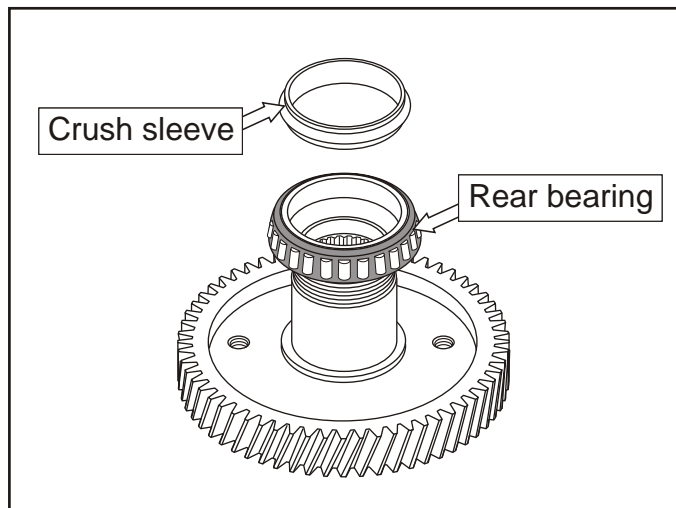


Figure 191

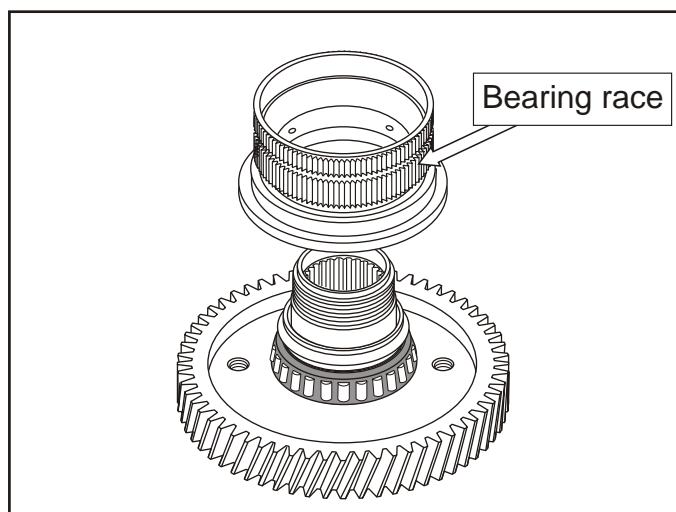


Figure 192

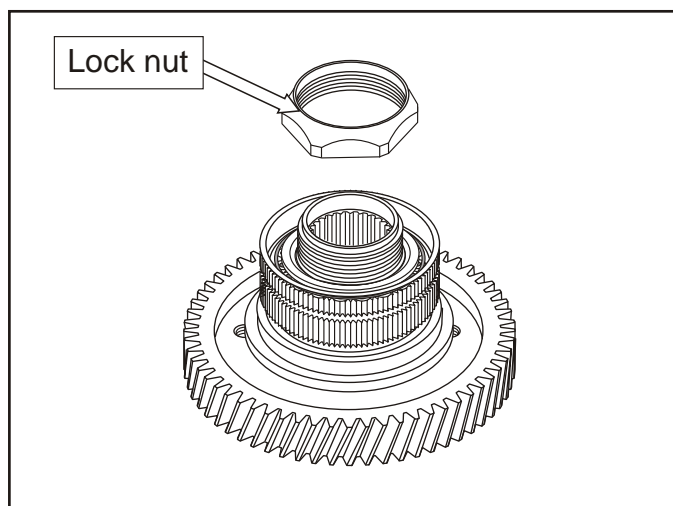


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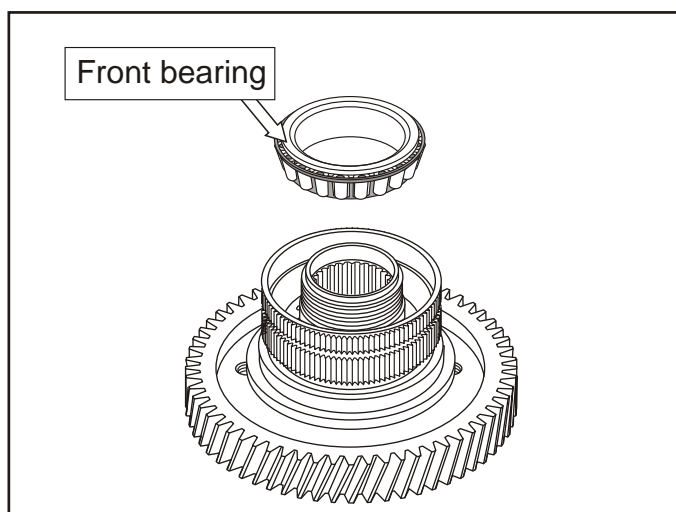


Figure 193

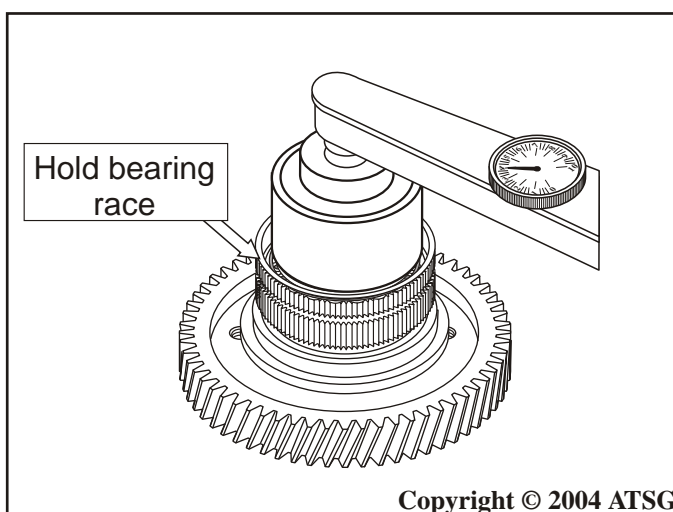


Figure 195

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## *SUB-ASSEMBLIES* *"C1 / C2 DRUM"*

140. Remove the snap ring and C1 clutch assembly as shown in Figure 196.
141. Remove the snap ring and C2 clutch assembly as shown in Figure 197.
142. Using a suitable press, remove the snap ring and return spring as shown in Figure 198.
143. Remove the C1 and C2 pistons from the drum as shown in Figure 199.
144. Refer to Figure 200 for a view of the complete assembly dis-assembled.

**Continued on Page 77**

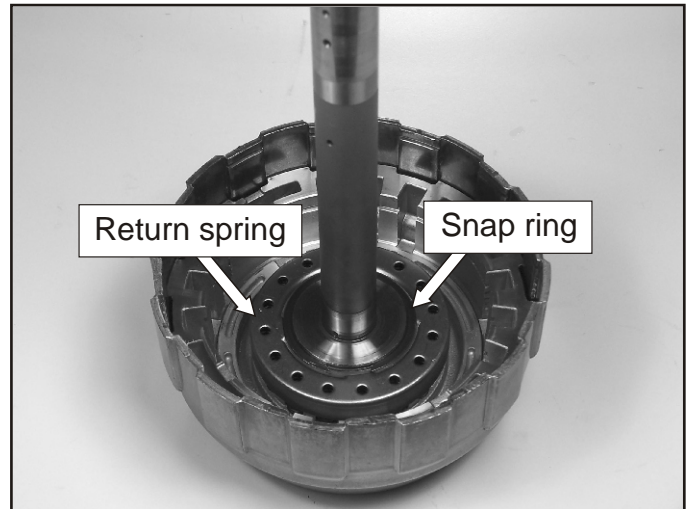


Figure 198

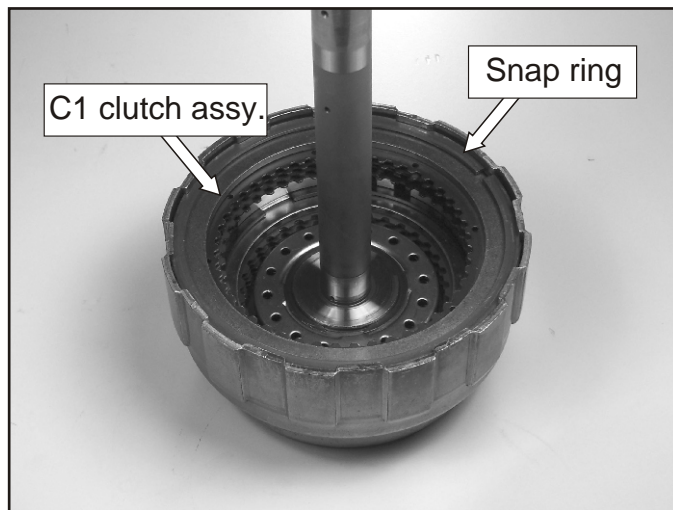


Figure 196

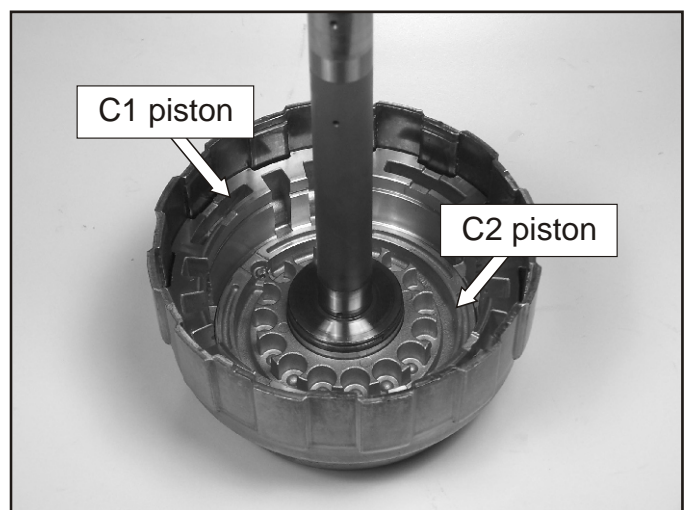


Figure 199

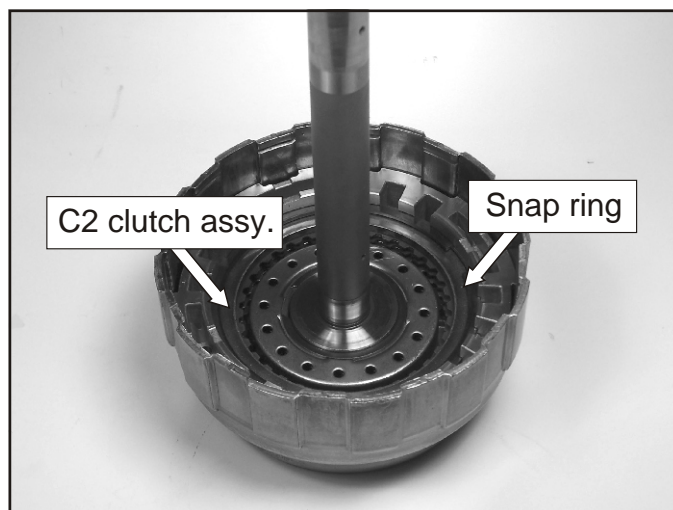


Figure 197

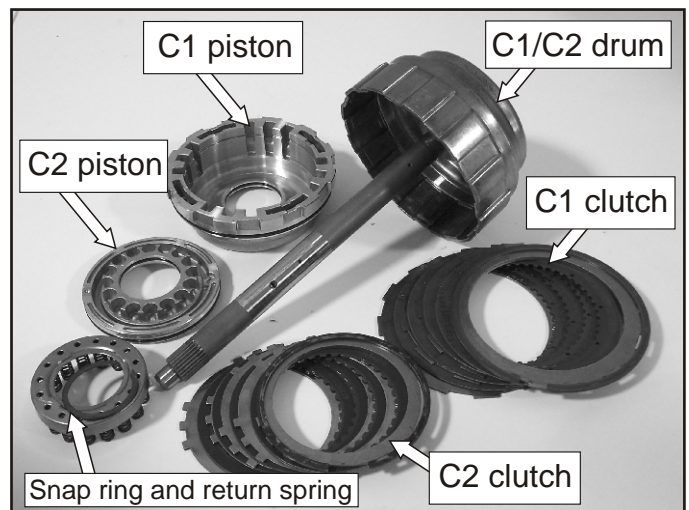


Figure 200

## ***SUB-ASSEMBLIES*** ***"C1 / C2 DRUM Contd."***

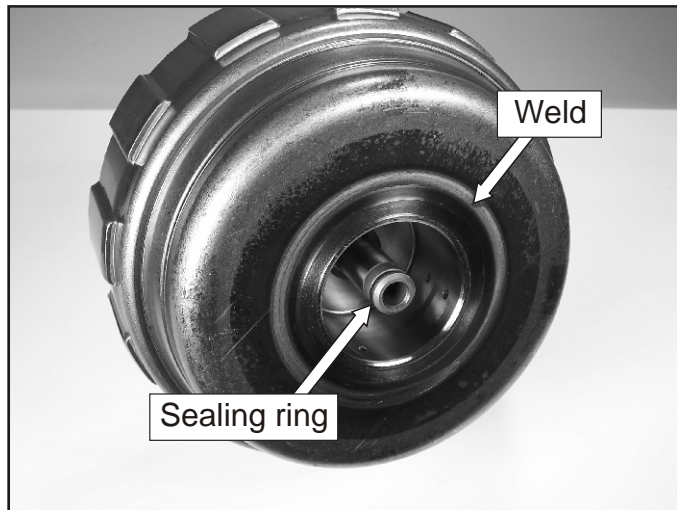


Figure 201

145. Inspect the rear of the C1/C2 drum where the weld is to ensure there are no visible cracks. Replace the sealing ring shown in Figure 201.  
***Note: This drum is notorious for cracking.***
146. Inspect the check ball in the C1 piston for debris and replace the inner and outer piston o-rings as shown in Figure 202.
147. Lubricate the inner and outer o-rings, and the area where they ride in the drum, and install the C1 piston. See Figure 203.
148. Inspect the check ball in the C2 piston for debris and replace the inner and outer piston o-rings as shown in Figure 204.
149. Lubricate the inner and outer o-rings, and the area where they ride in the drum, and install the C2 piston. See Figure 205.

**Continued on Page 78**

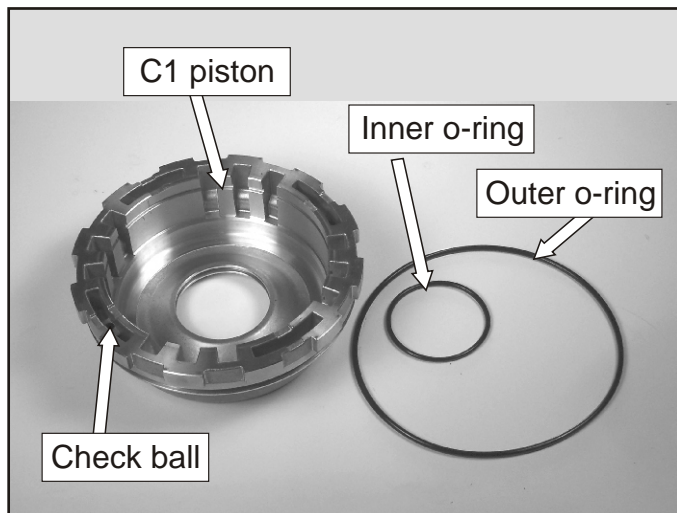


Figure 202

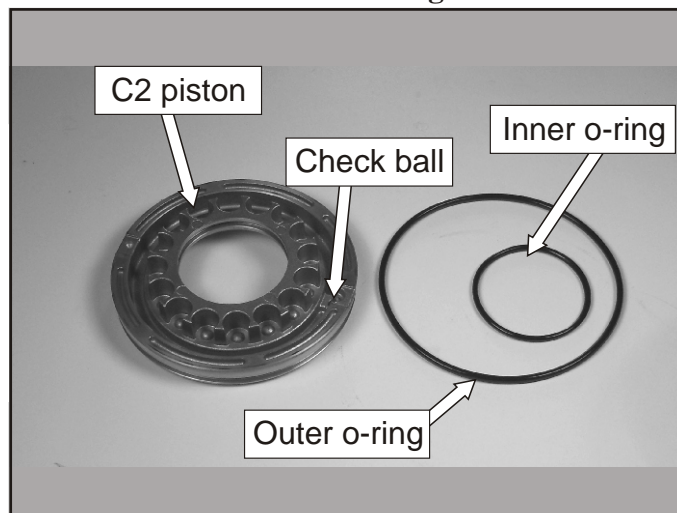


Figure 204

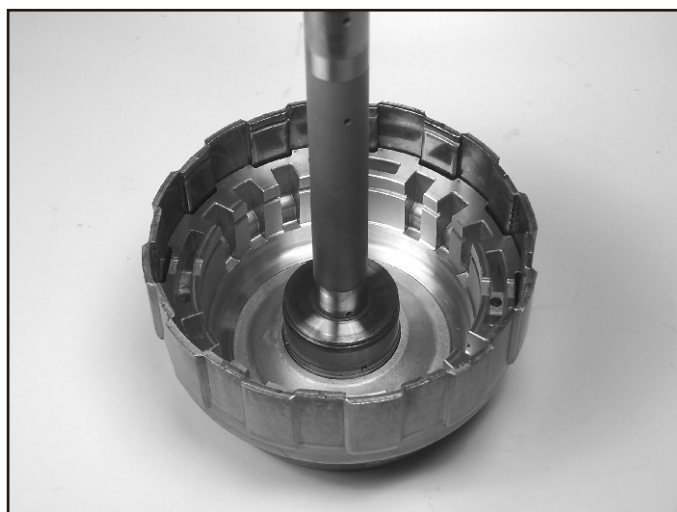


Figure 203



Figure 205

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## SUB-ASSEMBLIES "C1 / C2 DRUM Contd."

150. Install the return spring and snap ring as shown in Figure 206.
151. Install the C2 clutch assembly into the drum as shown in Figure 208. Use Figure 207 as an assembly guide. Install a .072" steel plate into drum first, then install the remaining C2 clutch plates and steels ending with the pressure plate and snap ring. Clutch clearance should be between .025" to .035."
152. Install the C1 clutch assembly into the drum as shown in Figure 210. Use Figure 209 as an assembly guide. Install a .072" steel plate into drum first, then install the remaining C1 clutch plates and steels ending with the pressure plate and snap ring. Clutch clearance should be between .035" to .045."

**Note: The C1 and C2 clutch plates are slightly waved.**

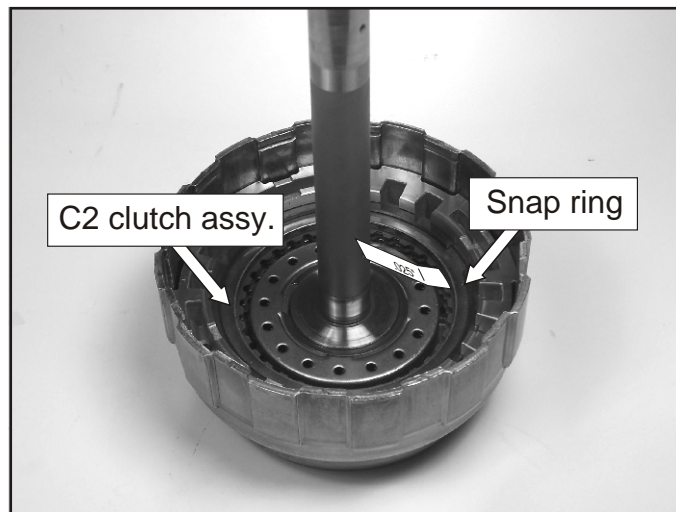


Figure 208

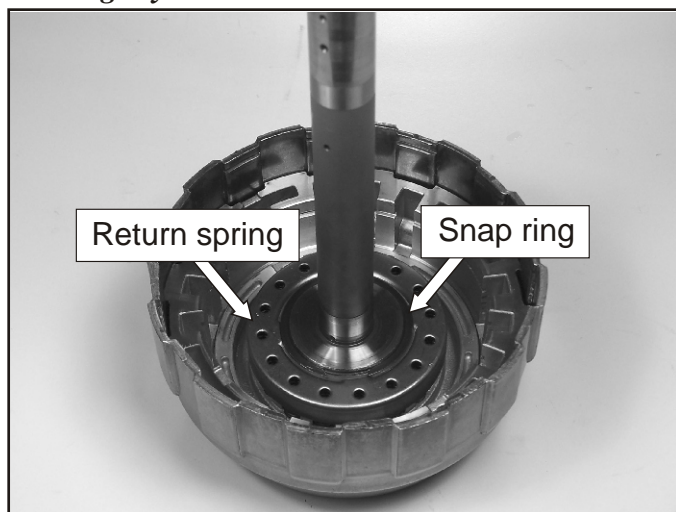


Figure 206

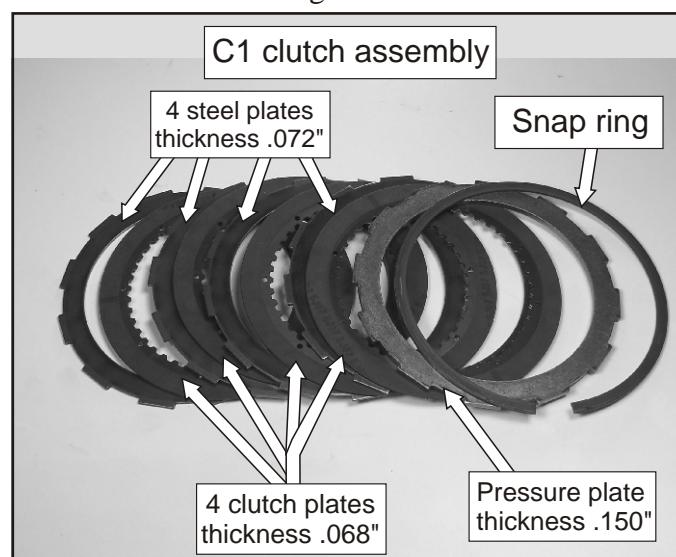


Figure 209

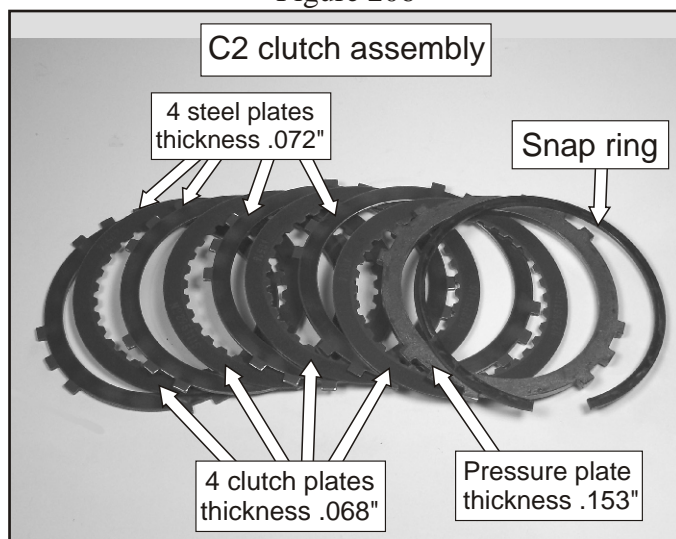


Figure 207

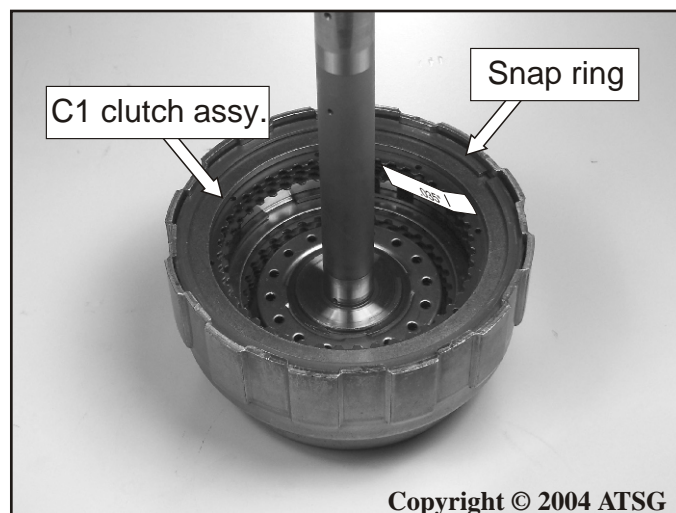


Figure 210

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## SUB-ASSEMBLIES

### "REAR COVER"

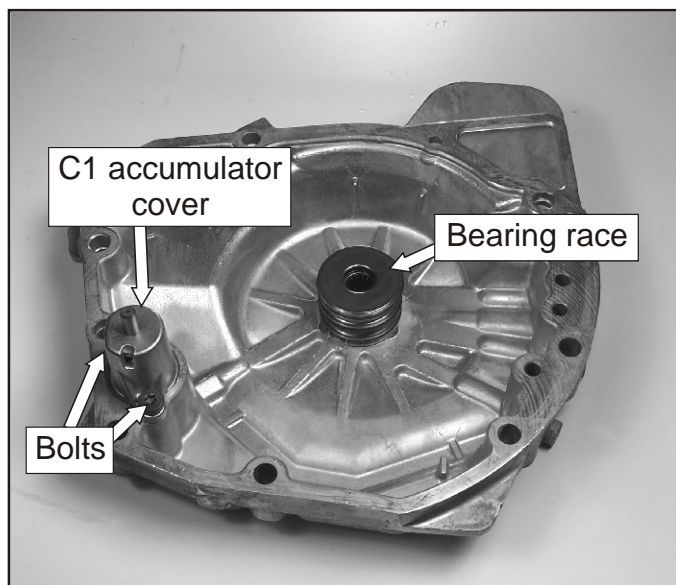


Figure 211

153. Remove the bearing race and the two 30 torx bolts retaining the C1 accumulator cover.  
**Caution: The cover is spring loaded. Note: The bolt lengths are 14mm.** Once the cover is off, remove the spring and piston from the cover. See Figure 211.

154. See Figure 212 for a view of the accumulator assembly completely dis-assembled.

155. Inspect the needle bearing in the rear cover and replace the three sealing rings as shown in Figure 213. **Note: The early design rear cover has an aluminum sleeve which requires steel sealing rings. ATSG recommends the late design, which is the steel sleeve.**

156. Lubricate the rear cover shown in Figure 214, replace the C1 accumulator piston o-ring and install it into the rear cover. See Figure 215.

**Continued on Page 80**

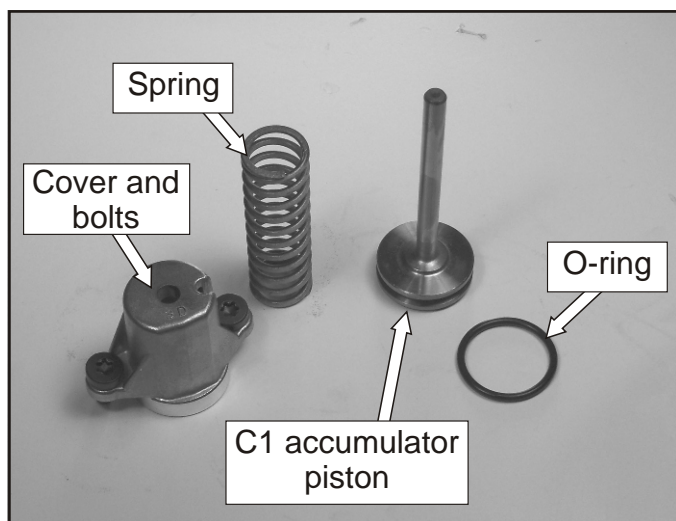


Figure 212

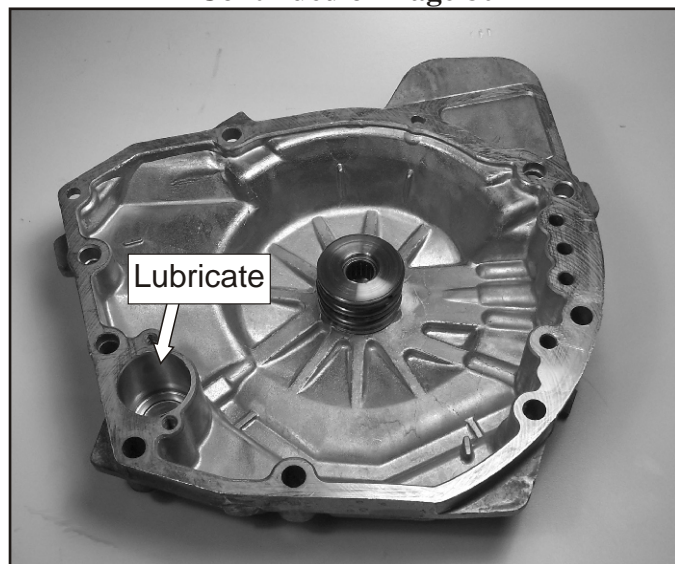


Figure 214

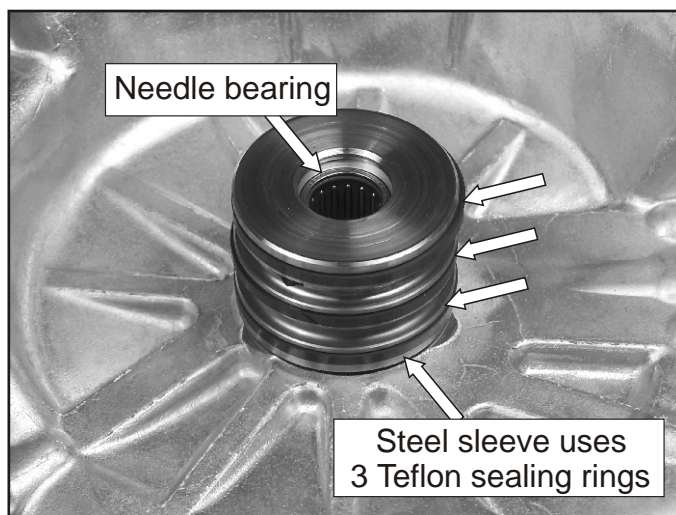


Figure 213

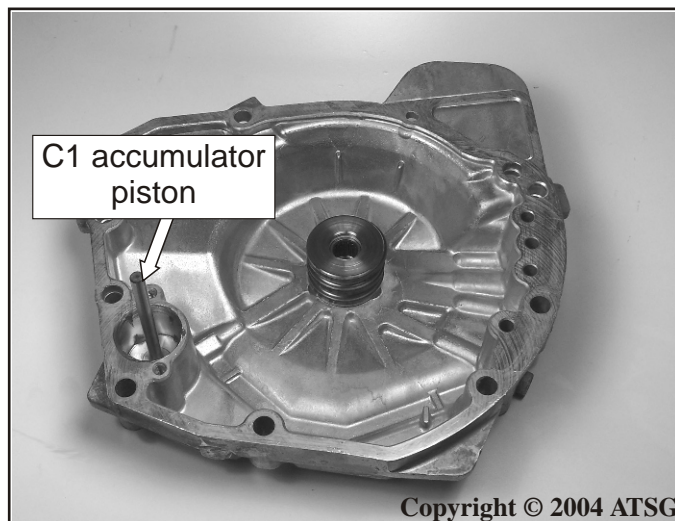


Figure 215

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## ***SUB-ASSEMBLIES*** ***"REAR COVER Contd."***

157. Install the C1 accumulator spring over the accumulator piston as shown in Figure 216.
158. Assemble the C1 accumulator cover into the rear cover and torque the 30 torx bit bolts to 70-100 in. lb. See Figure 217.
159. Install the Bearing race, using some assembly grease. See Figure 218.
160. Place the C1 / C2 drum onto the rear cover and air check the clutches using 80-100psi. of air pressure. See Figure 219. Refer to Figure 220 to identify the air check ports.

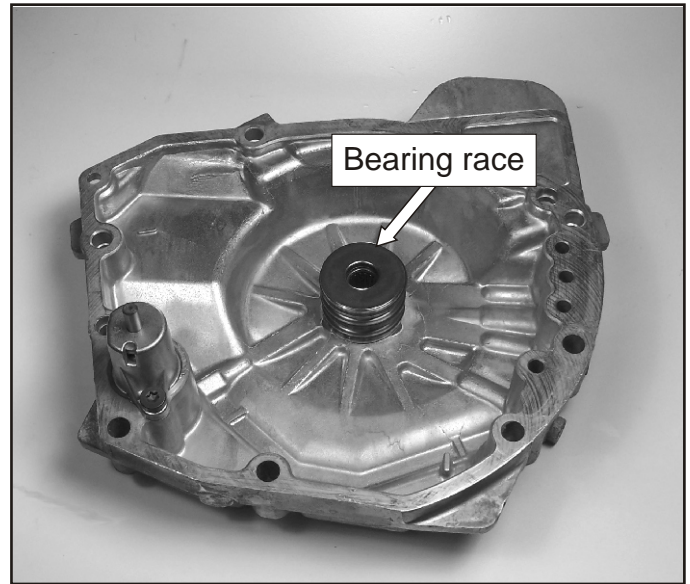


Figure 218

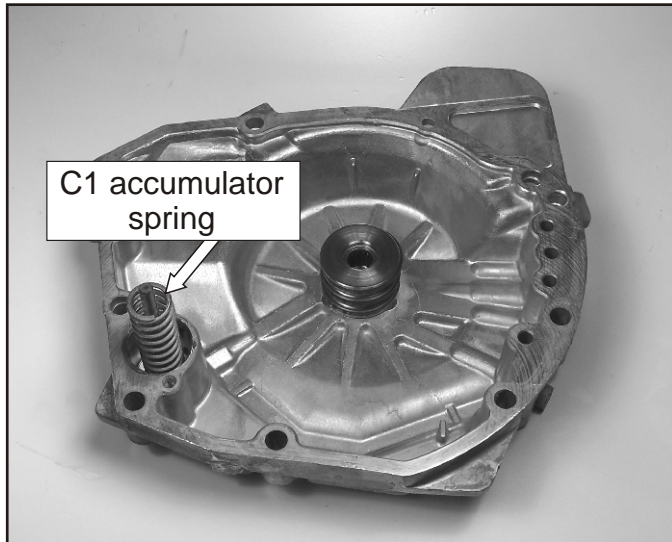


Figure 216

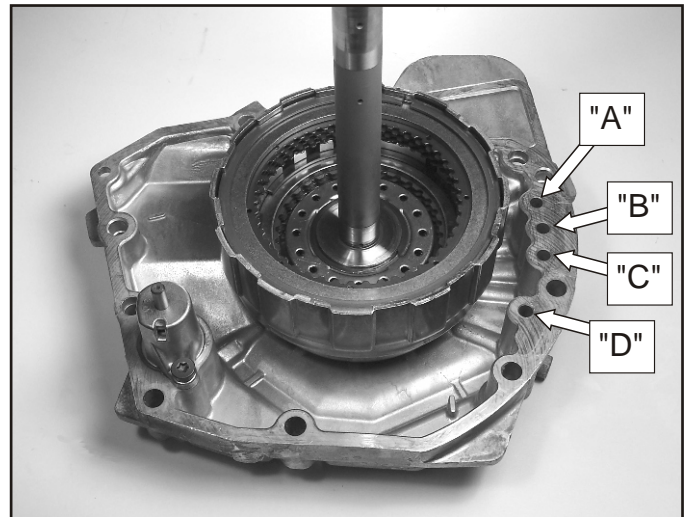


Figure 219

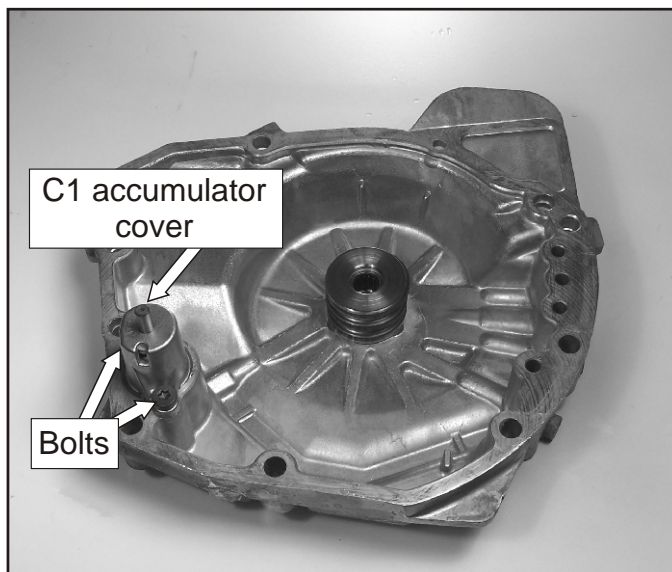


Figure 217

### **C1/C2 AIR CHECKS**

- "A"= C1 clutch
- "B"= C2 clutch
- "C"= lube
- "D"= C1 clutch

***Note: When air checking the C1 clutch thru the D port, you must cover the A port and vice-versa. The C1 accumulator will stroke when the C1 clutch is applied.***

Figure 220



## ***SUB-ASSEMBLIES*** **VALVE BODY EXPLODED VIEWS AND IDENTIFICATION OF COMPONENTS**

*Refer to Figure 221 for Solenoid identification and locations on the valve body.*

*Refer to Figure 222 for valve identification and locations in the "Upper" valve body.*

*Refer to Figure 223 for valve identification and locations in the "Center" valve body, "Front" side.*

*Refer to Figure 224 for valve identification and locations in the "Center" valve body, "Rear" side.*

*Refer to Figure 225 for valve identification and locations in the "Lower" valve body, "Front" side.*

*Refer to Figure 226 for valve identification and locations in the "Lower" valve body, "Rear" side.*

*Refer to Figure 227 for illustrations of the typical spacer plates.*

*Refer to Figure 228 for the check valve and check ball locations in the "Lower" valve body.*

*Refer to Figure 229 for the screen locations in the "Center" valve body, "Upper" valve body side.*

*Refer to Figure 230 for the check valve and check ball locations in the "Center" valve body, "Lower" valve body side.*

*Refer to Figure 231 for bolt identification and locations for the "Lower" valve body.*



## SOLENOID IDENTIFICATION AND BOLT LOCATIONS

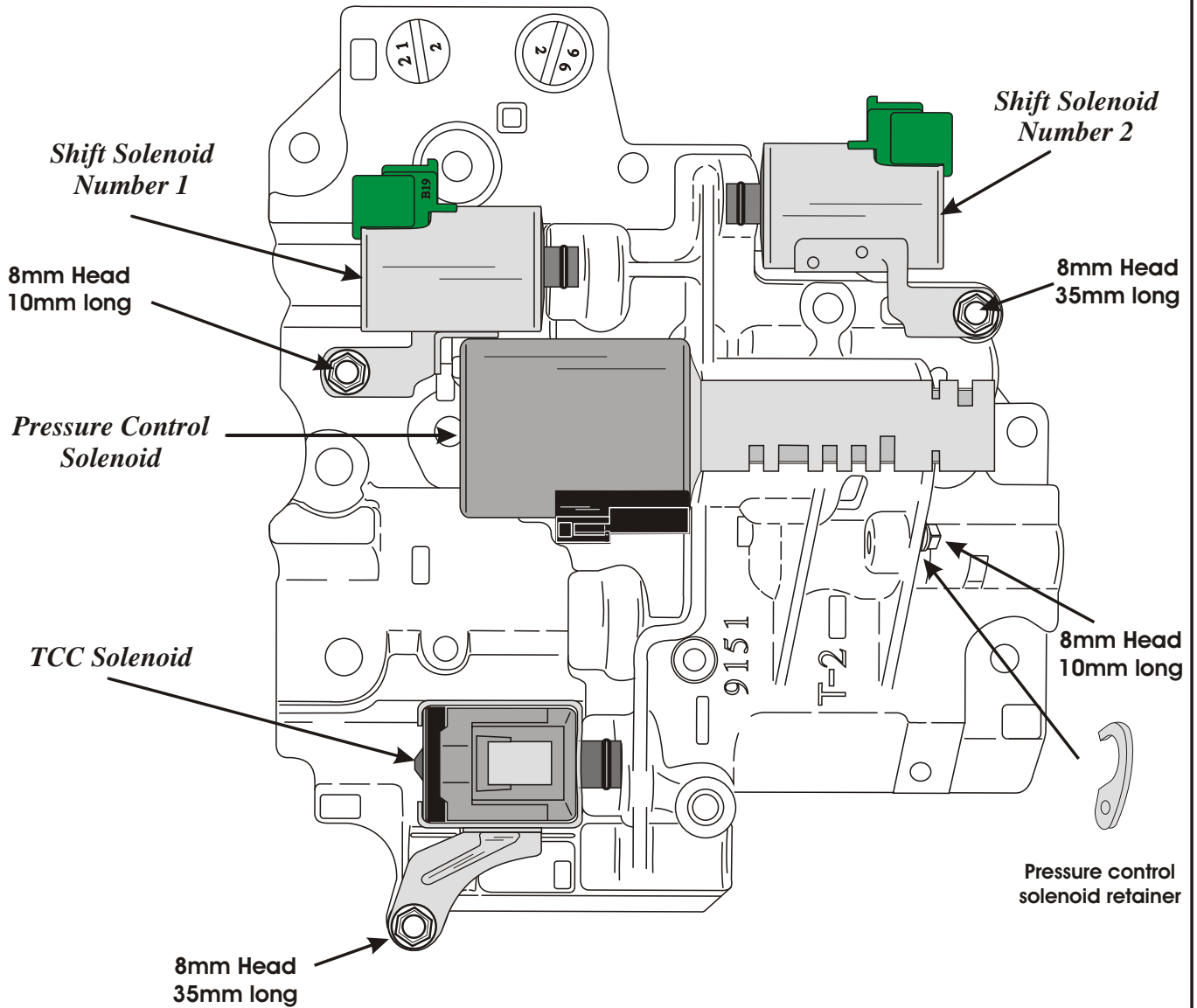
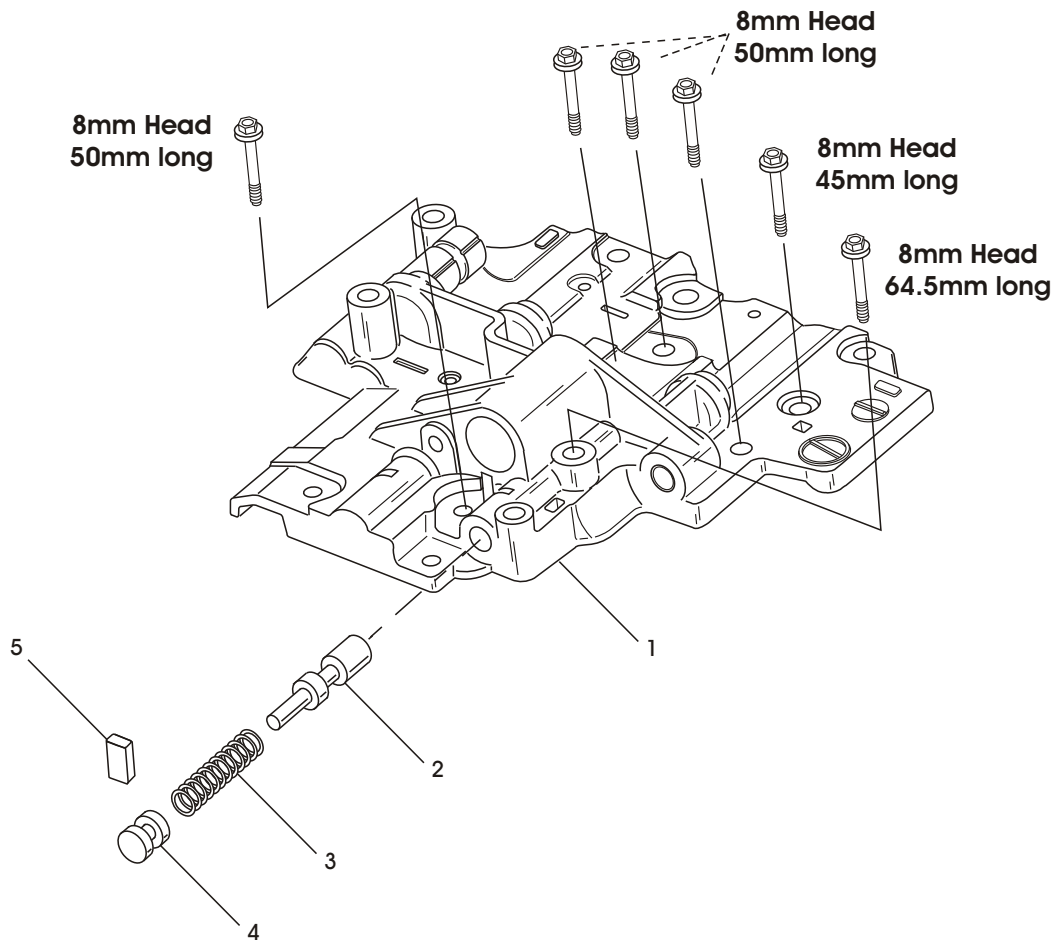


Figure 221

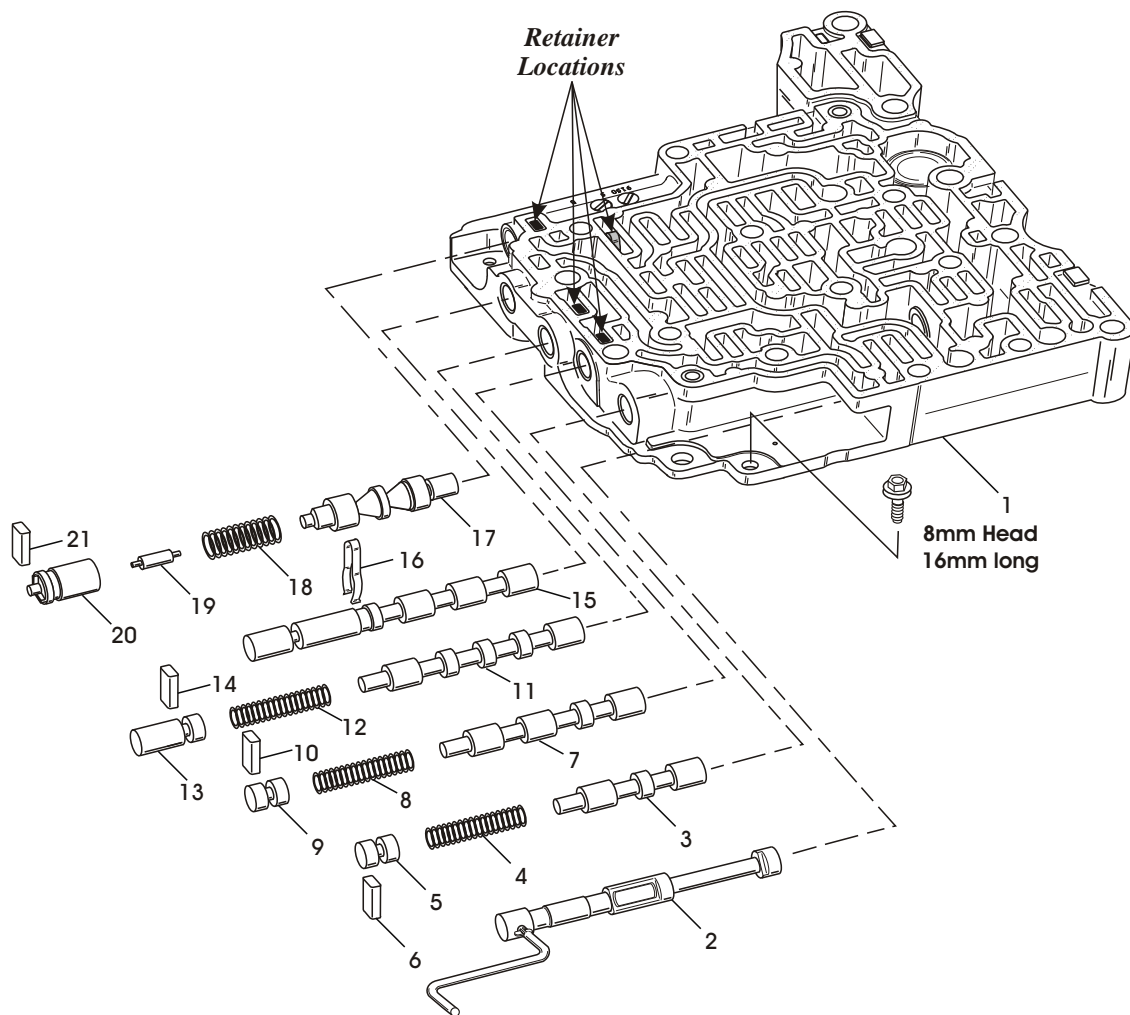
## UPPER VALVE BODY VALVE IDENTIFICATION AND BOLT LOCATIONS



1. UPPER VALVE BODY CASTING
2. PRESSURE CONTROL SOLENOID REGULATOR VALVE
3. PRESSURE CONTROL SOLENOID REGULATOR VALVE SPRING
4. PRESSURE CONTROL SOLENOID REGULATOR VALVE BORE PLUG
5. PRESSURE CONTROL SOLENOID REGULATOR VALVE BORE PLUG RETAINER

Figure 222

## CENTER VALVE BODY "FRONT" SIDE VALVE IDENTIFICATION AND LOCATIONS



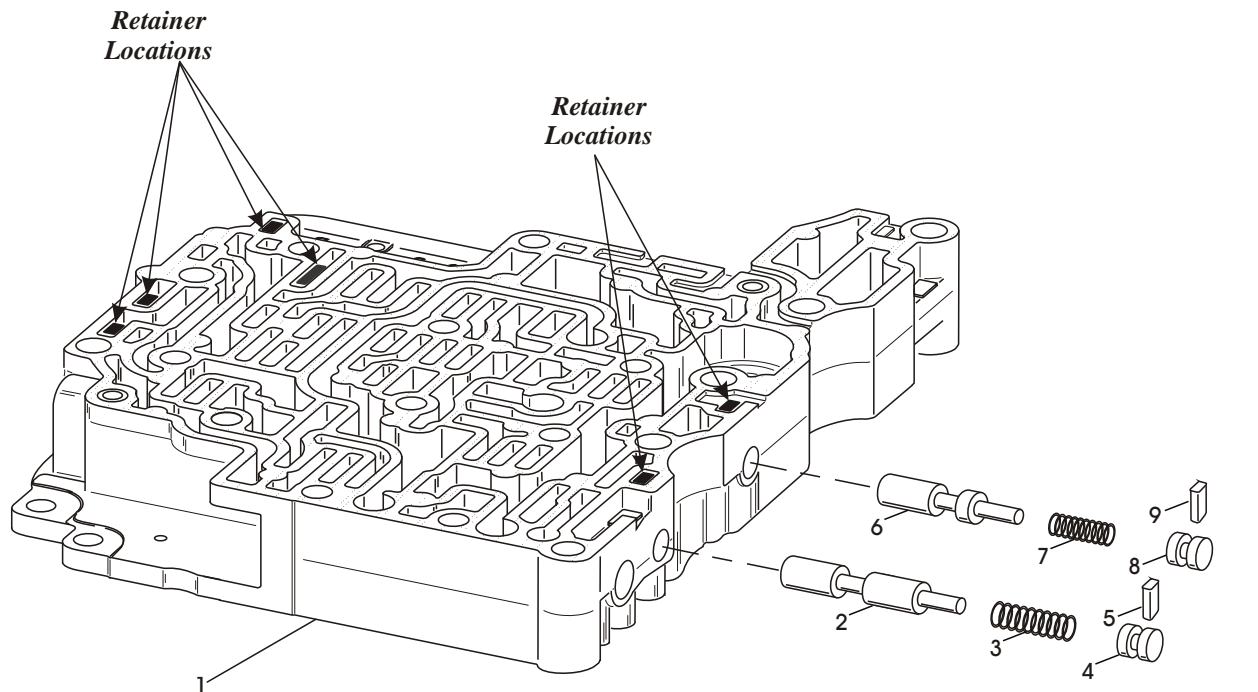
1. CENTER VALVE BODY CASTING
2. MANUAL VALVE
3. 2-3 SHIFT VALVE
4. 2-3 SHIFT VALVE SPRING
5. 2-3 SHIFT VALVE BORE PLUG
6. 2-3 SHIFT VALVE RETAINER
7. 3-4 SHIFT VALVE
8. 3-4 SHIFT VALVE SPRING
9. 3-4 SHIFT VALVE BORE PLUG
10. 3-4 SHIFT VALVE RETAINER
11. 1-2 SHIFT VALVE

12. 1-2 SHIFT VALVE SPRING
13. 1-2 SHIFT VALVE BORE PLUG
14. 1-2 SHIFT VALVE RETAINER
15. NEUTRAL CONTROL VALVE
16. NEUTRAL CONTROL VALVE RETAINER
17. PRIMARY REGULATOR VALVE
18. PRIMARY REGULATOR VALVE SPRING
19. PLUNGER
20. PLUNGER SLEEVE
21. PLUNGER SLEEVE RETAINER

Figure 223



## CENTER VALVE BODY "REAR" SIDE VALVE IDENTIFICATION AND LOCATIONS

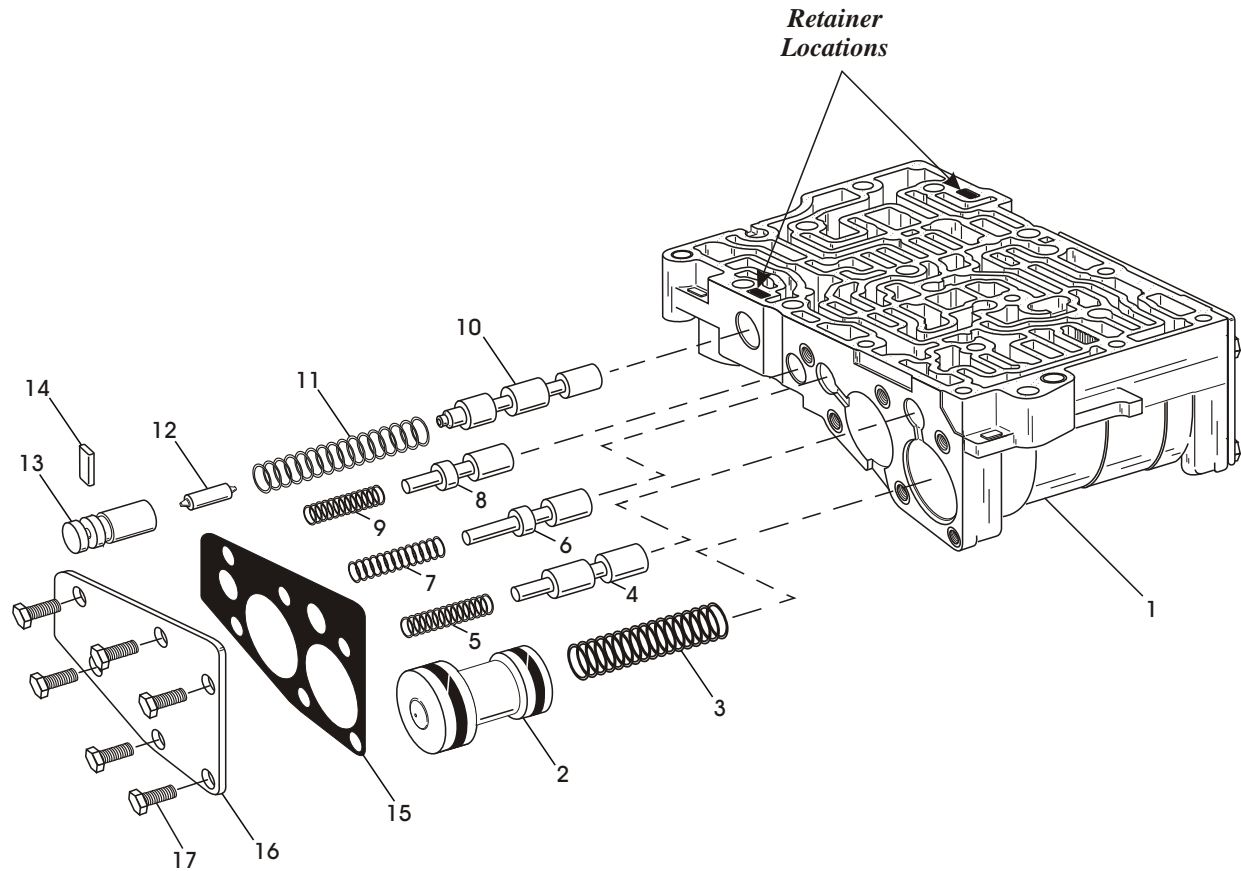


1. CENTER VALVE BODY CASTING
2. CLUTCH MODULATOR VALVE
3. CLUTCH MODULATOR VALVE SPRING
4. CLUTCH MODULATOR VALVE BORE PLUG
5. CLUTCH MODULATOR VALVE RETAINER

6. TCC SOLENOID REGULATOR VALVE
7. TCC SOLENOID REGULATOR VALVE SPRING
8. TCC SOLENOID REGULATOR VALVE BORE PLUG
9. TCC SOLENOID REGULATOR VALVE RETAINER

Figure 224

## LOWER VALVE BODY "FRONT" SIDE VALVE IDENTIFICATION AND LOCATIONS

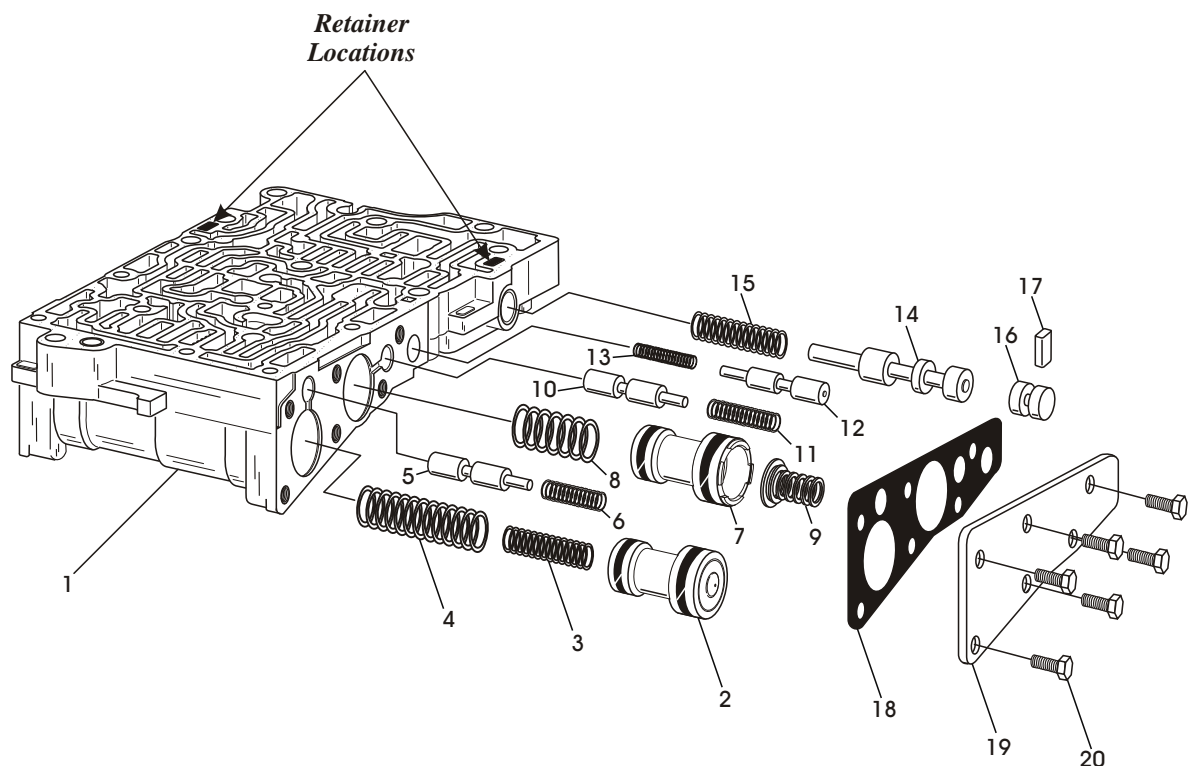


- 1. LOWER VALVE BODY
- 2. C3 ACCUMULATOR PISTON
- 3. C3 ACCUMULATOR PISTON SPRING
- 4. C3 ACCUMULATOR VALVE
- 5. C3 ACCUMULATOR VALVE SPRING
- 6. B1 ACCUMULATOR VALVE
- 7. B1 ACCUMULATOR VALVE SPRING
- 8. LOW COAST MODULATOR VALVE (B3)

- 9. LOW COAST MODULATOR VALVE SPRING (B3)
- 10. LOCK-UP CONTROL VALVE
- 11. LOCK-UP CONTROL VALVE SPRING
- 12. PLUNGER
- 13. PLUNGER SLEEVE
- 14. LOCK-UP CONTROL VALVE RETAINER
- 15. COVER PLATE GASKET
- 16. COVER PLATE
- 17. COVER PLATE BOLTS (7)

Figure 225

## LOWER VALVE BODY "REAR" SIDE VALVE IDENTIFICATION AND LOCATIONS



1. LOWER VALVE BODY
2. C2 ACCUMULATOR PISTON
3. C2 ACCUMULATOR SPRING (INNER)
4. C2 ACCUMULATOR SPRING (OUTER)
5. C2 ACCUMULATOR VALVE
6. C2 ACCUMULATOR VALVE SPRING
7. B2 ACCUMULATOR PISTON
8. B2 ACCUMULATOR SPRING (INBOARD)
9. B2 ACCUMULATOR SPRING (OUTBOARD)
10. B2 ACCUMULATOR VALVE

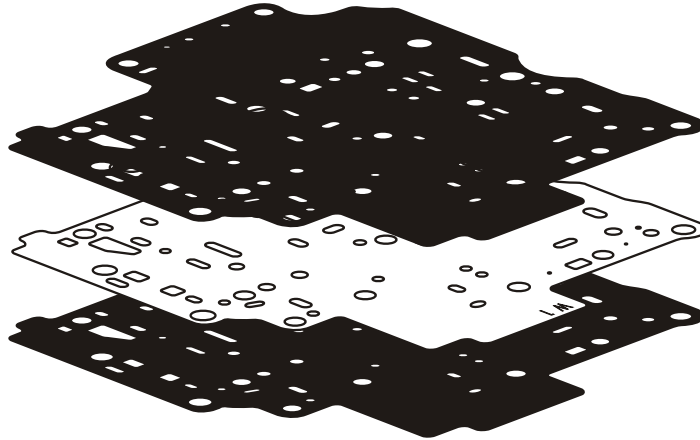
11. B2 ACCUMULATOR SPRING
12. ACCUMULATOR CONTROL VALVE
13. ACCUMULATOR CONTROL VALVE SPRING
14. SECONDARY REGULATOR VALVE
15. SECONDARY REGULATOR VALVE SPRING
16. SECONDARY REGULATOR VALVE BORE PLUG
17. SECONDARY REGULATOR VALVE RETAINER
18. COVER PLATE GASKET
19. COVER PLATE
20. COVER PLATE BOLTS (7)

Figure 226



## "TYPICAL" SPACER PLATES AND GASKETS

*CENTER VALVE BODY  
TO UPPER VALVE BODY  
SPACER PLATE AND GASKETS*



*LOWER VALVE BODY  
TO CASE SPACER PLATE AND GASKETS*

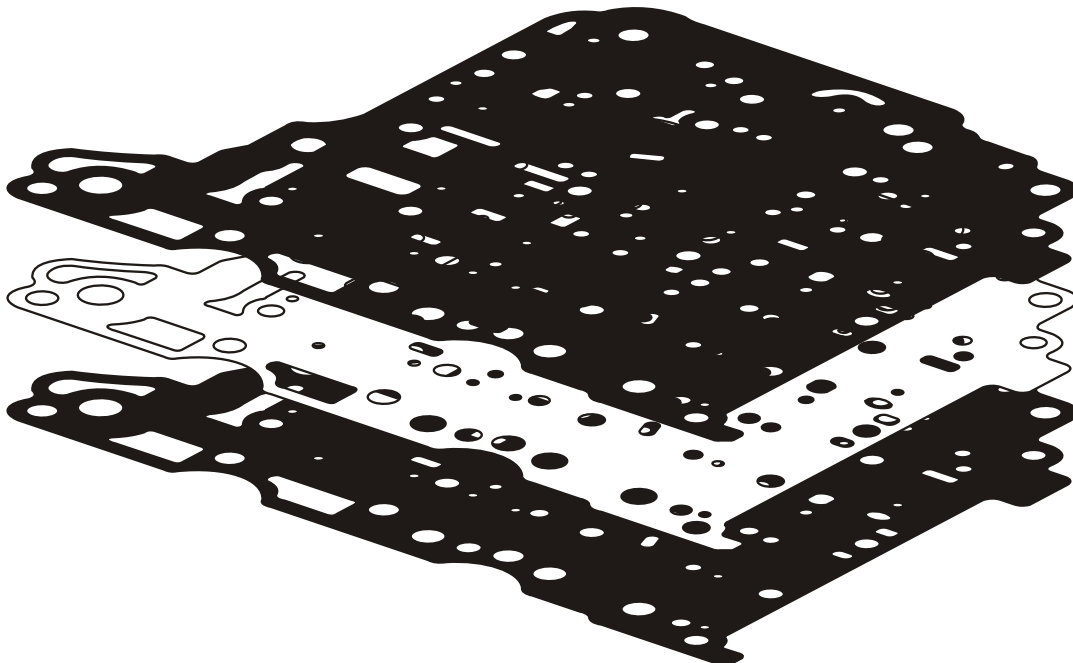


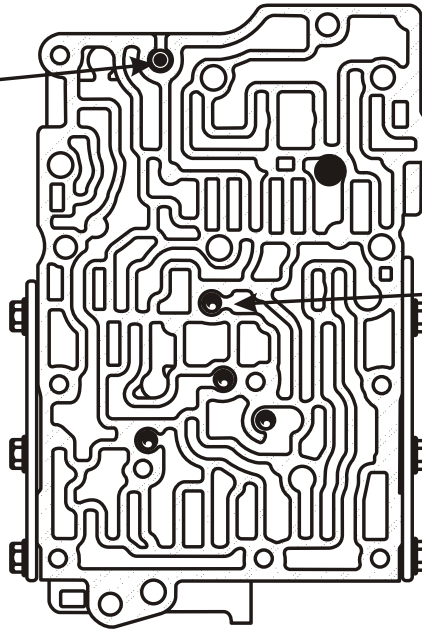
Figure 227

## "LOWER" VALVE BODY

PRESSURE RELIEF  
VALVE AND SPRING



CHECK VALVE  
AND SPRING



NOT USED ON  
ALL MODELS

**REQUIRES THREE OR FOUR  
RUBBER CHECKBALLS  
5.0mm (.197") IN DIAMETER**

Figure 228

## VOLVO/SAAB AW50-42LE

### "CENTER" VALVE BODY, "UPPER" VALVE BODY SIDE



LARGE  
FILTER  
SCREEN



3 SMALL  
FILTER  
SCREENS

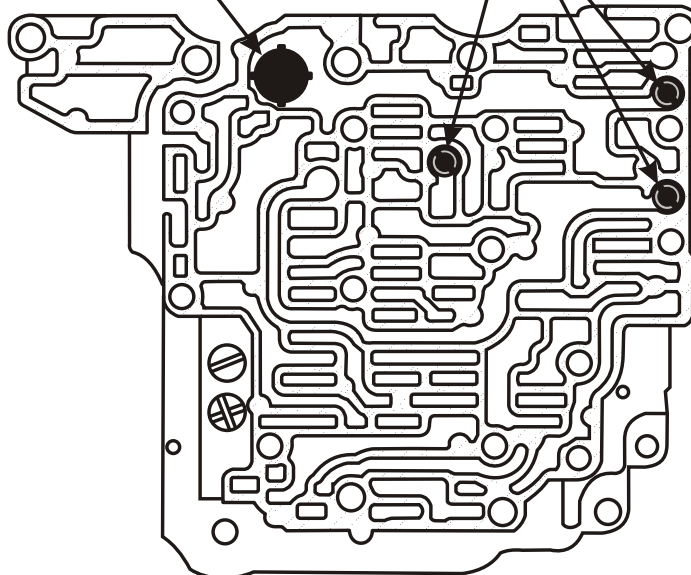


Figure 229

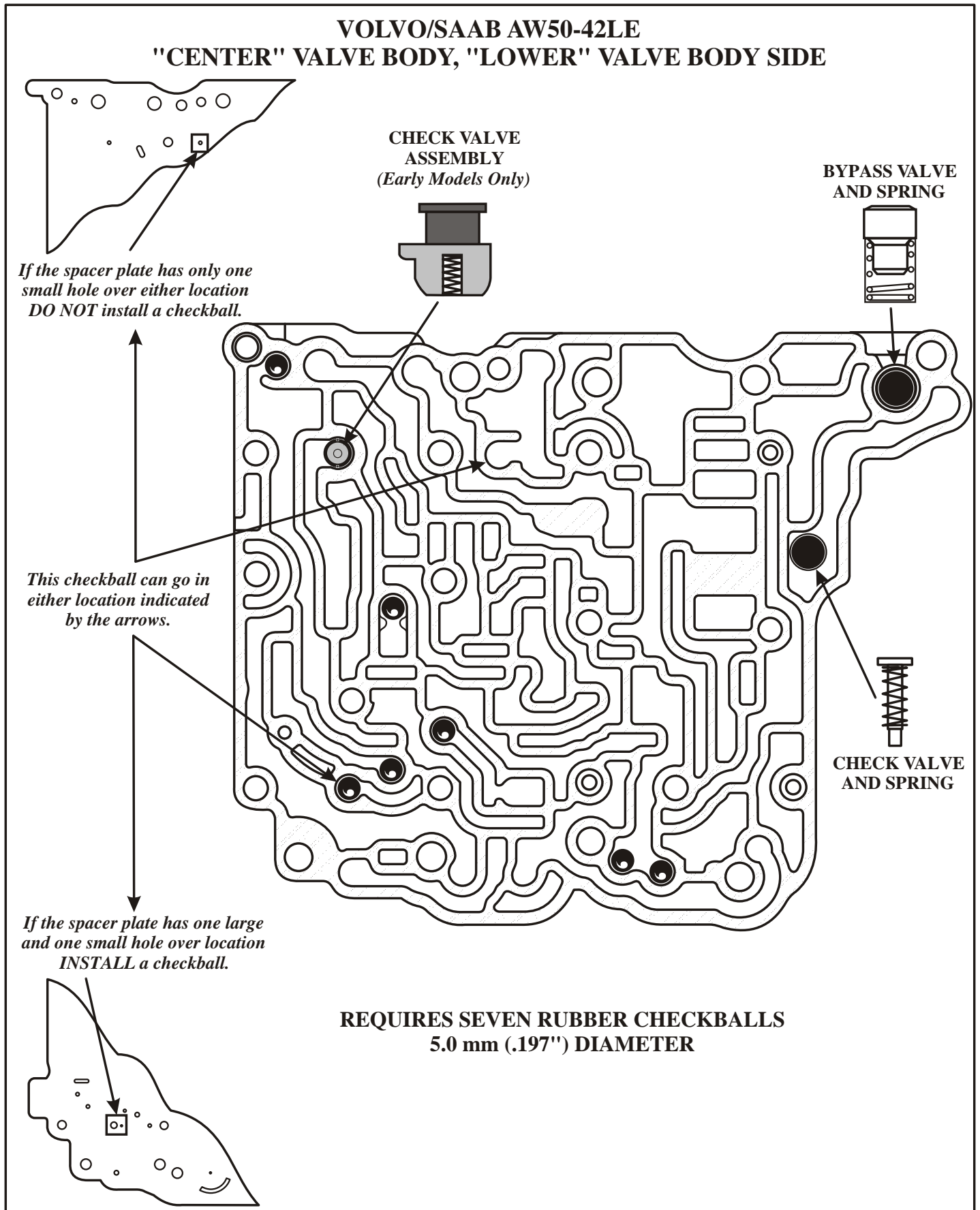


Figure 230



## LOWER VALVE BODY LOWER SIDE BOLT LOCATIONS

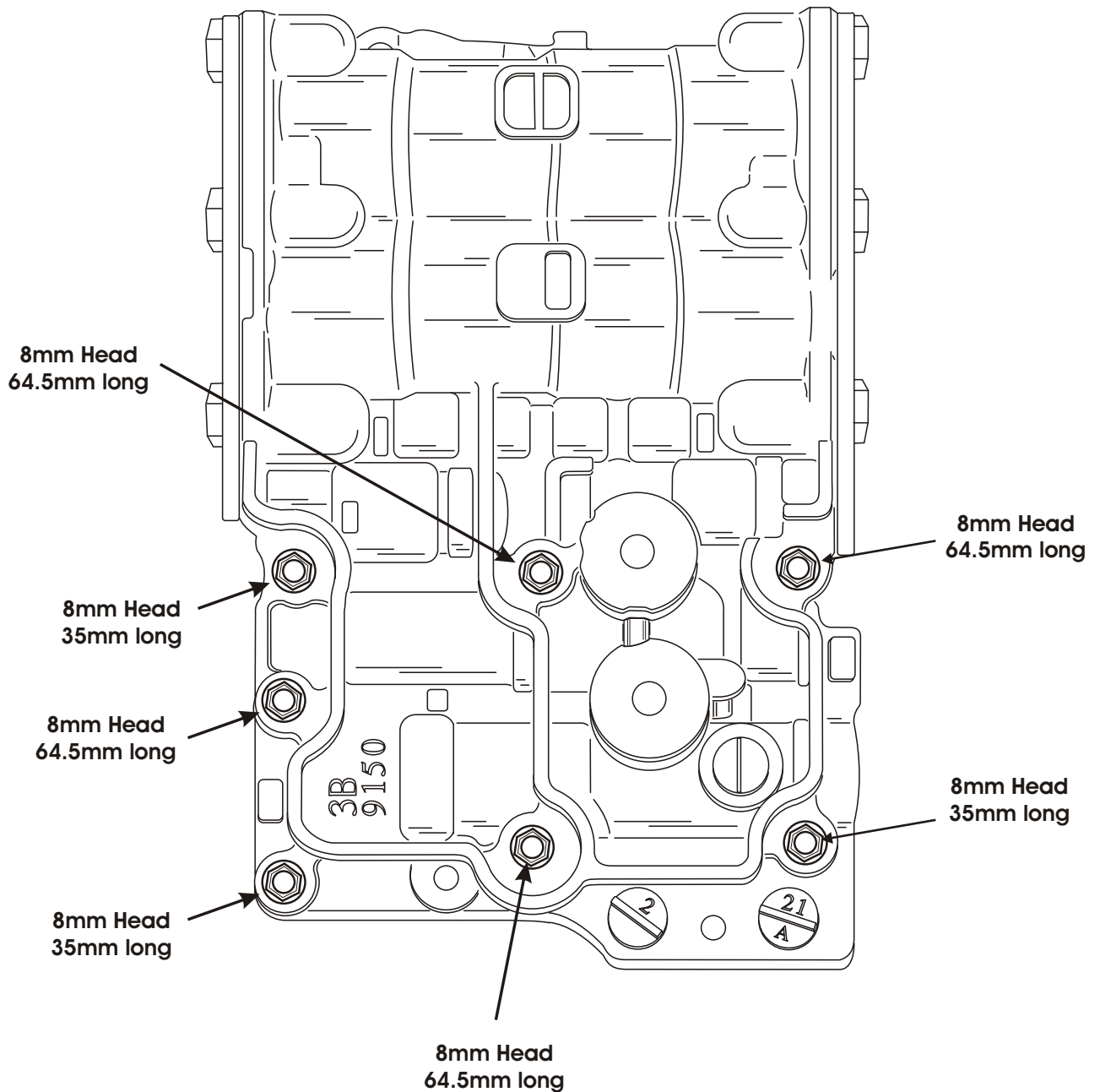


Figure 231

## TRANSMISSION REASSEMBLY

161. Refer to Figure 232 to see a view of the completed counter drive gear assembly.
162. Assemble the counter drive gear thru the rear of the mid case and assemble the snap ring with the taper facing up. Replace the axle seal as shown in Figure 233.
163. Lubricate the inside of the mid case where the B3 brake piston rides, replace the inner and outer o-rings, and assemble the piston into the case as shown in Figure 234.
164. Assemble the B3 return spring into the case over the B3 piston and install the retaining snap ring as shown in Figure 235.
165. Install the B3 brake lower pressure plate as shown in Figure 236.

Continued on Page 93

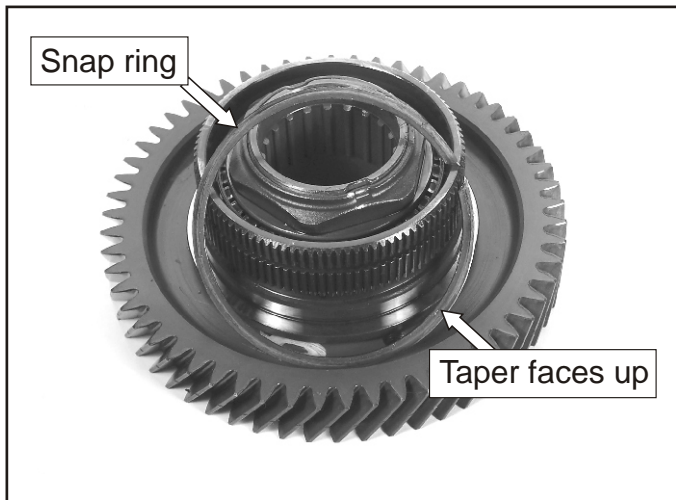


Figure 232

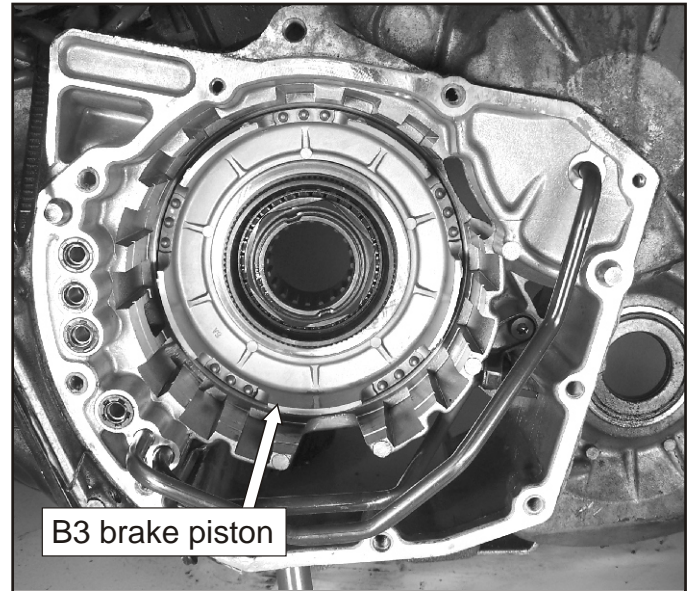


Figure 234

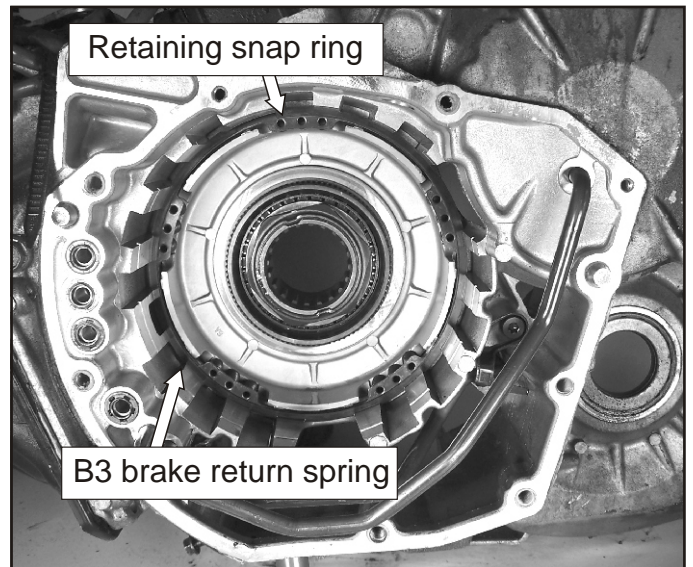


Figure 235

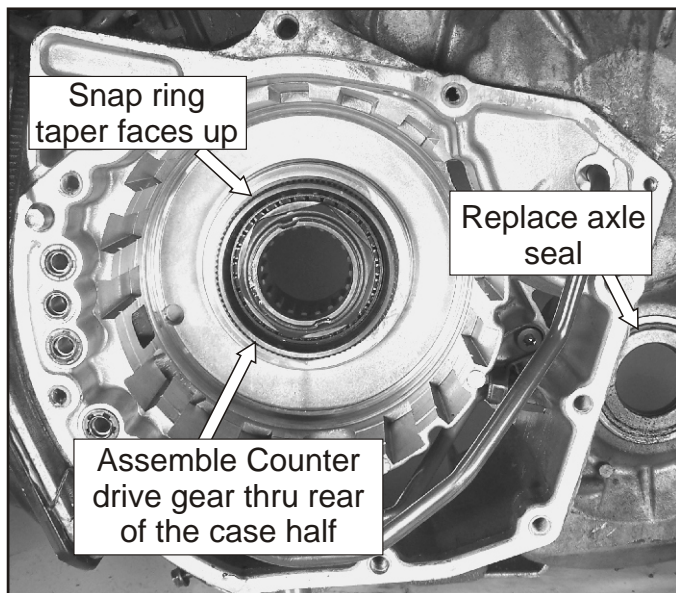


Figure 233

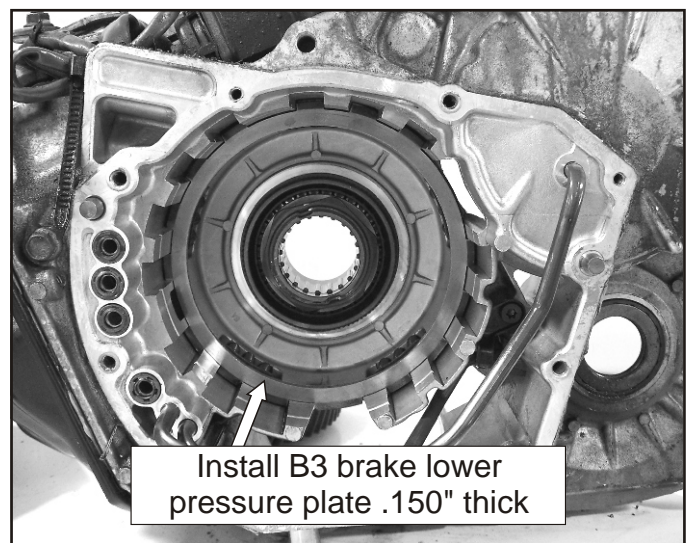


Figure 236



## TRANSMISSION REASSEMBLY CONTINUED

166. Assemble the inner thrust washer and bearing into the rear ring gear assembly with assembly lube to hold them in place. See Figure 237.
167. Assemble the rear ring gear into the case half over the splines of the counter drive gear as shown in Figure 238.
168. Install the B3 brake assembly into the case half starting with a .070" clutch plate and ending with the .150" pressure plate and the snap ring. Check the clutch clearance using a feeler gage as shown in Figure 240. Clutch clearance should be between .040"-.050."Refer to Figure 239 as an assembly guide for the B3 brake. Install the rear ring gear internal bearing black side up.
169. Inspect the planetary pinion washers as shown in Figure 241. Replace as necessary.

**Continued on Page 94**

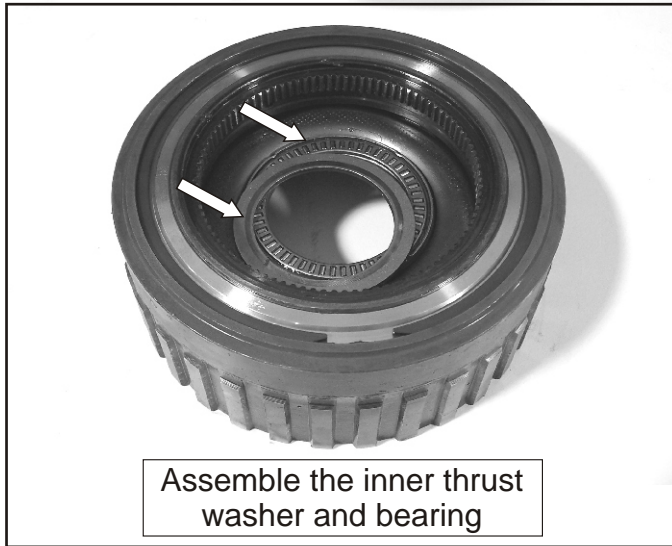


Figure 237

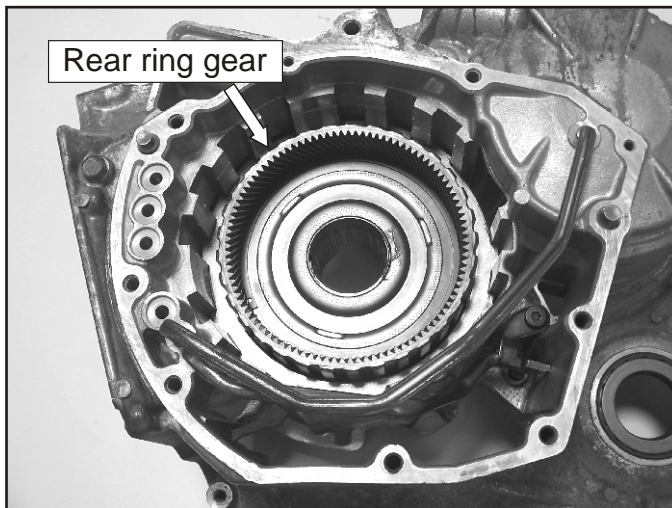


Figure 238

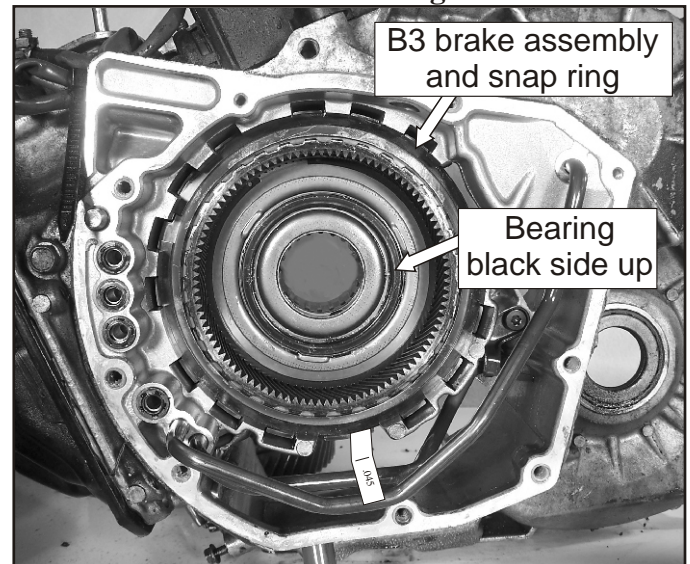


Figure 240

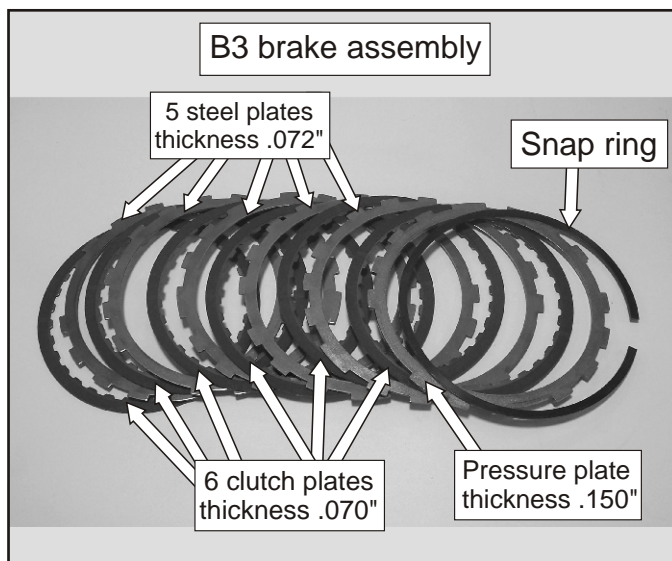


Figure 239



Figure 241



## TRANSMISSION REASSEMBLY CONTINUED

170. Inspect the bushings in the planetary as shown in Figure 242. Replace as necessary.
171. Install the planetary assembly into the rear ring gear as shown in Figure 243. Install the rear planetary thrust washer.
172. Install the C1 hub rear thrust washer and the C1 hub front bearing with assembly lube to hold them in place. See Figure 244.
173. Install the C2 hub rear and front bearing with assembly lube to hold them in place as shown in Figure 245.
174. Index the C2 hub into the C2 clutch plates as shown in Figure 246.

**Continued on Page 95**

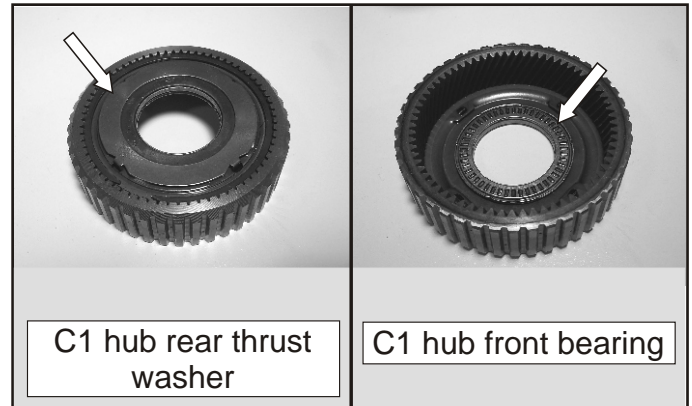


Figure 244

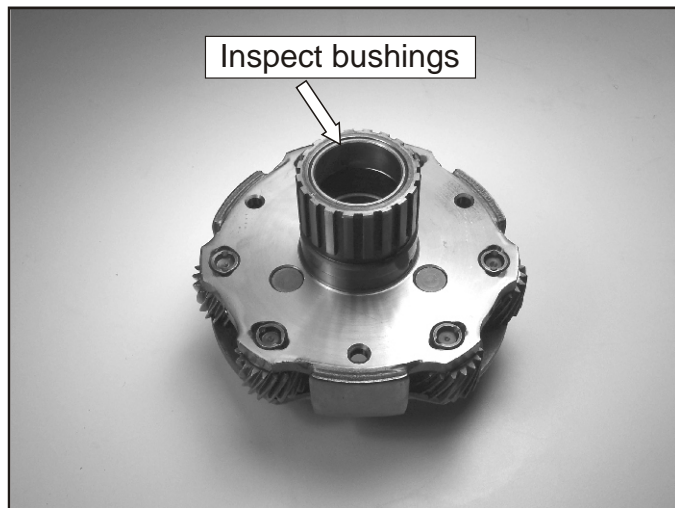


Figure 242

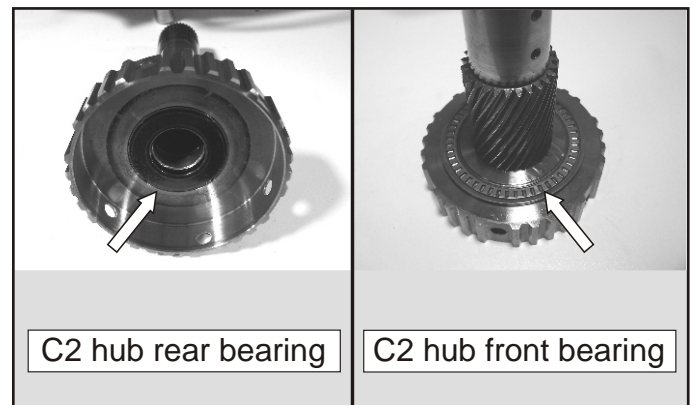


Figure 245

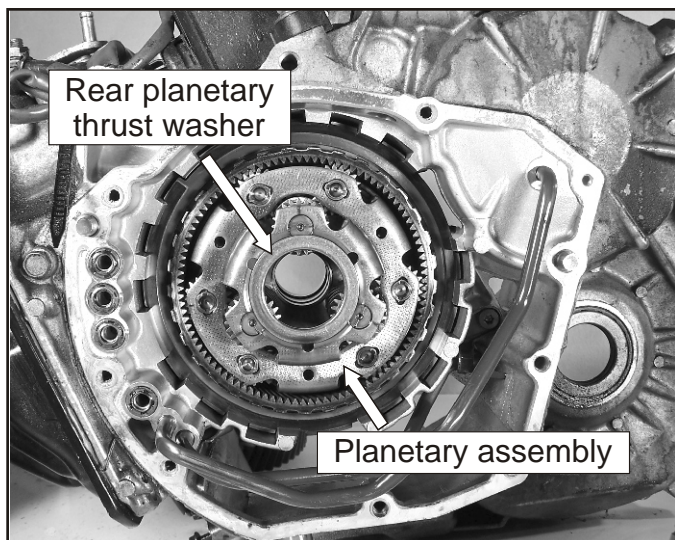


Figure 243

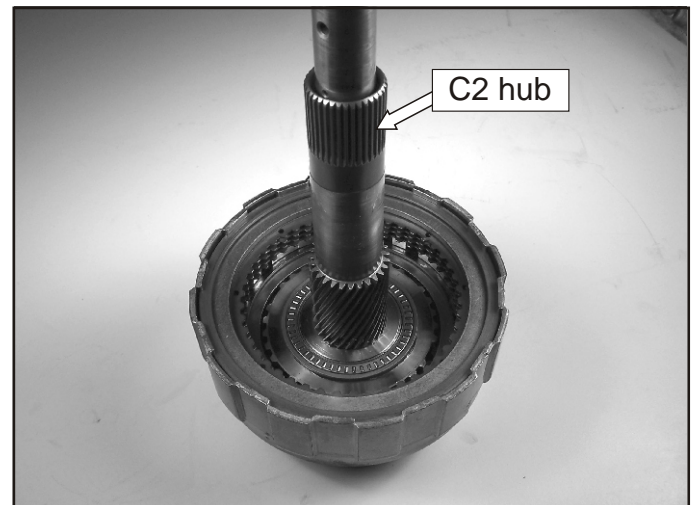


Figure 246

## TRANSMISSION REASSEMBLY CONTINUED

175. Index the C1 hub into the C1 clutches shown in Figure 247.
176. Carefully, take the C1/C2 drum and slide it into the planetary assembly turning it slightly.  
**Note: Do this with the case half standing up on the bench.** Install the C1/C2 thrust washer and bearing into the rear of the drum.  
Apply a thin coat of sealant to the surface where the rear cover mating surface is. Replace the four rubber seals in the case half. See Figure 248.
177. Refer to Figure 249 for a close up view of the C1/C2 thrust bearing and race.
178. Assemble the rear cover onto the case half and install and torque the bolts into the correct locations using the chart listed below. See Figure 250.

**A= 16mm long. Torque to 70-100 in.lb.**  
**B= 25mm long. Torque to 15-22 ft.lb.**  
**C= 48mm long. Torque to 15-22ft.lb.**  
**D= 45mm long. Torque to 15-22 ft.lb.**

Continued on Page 96

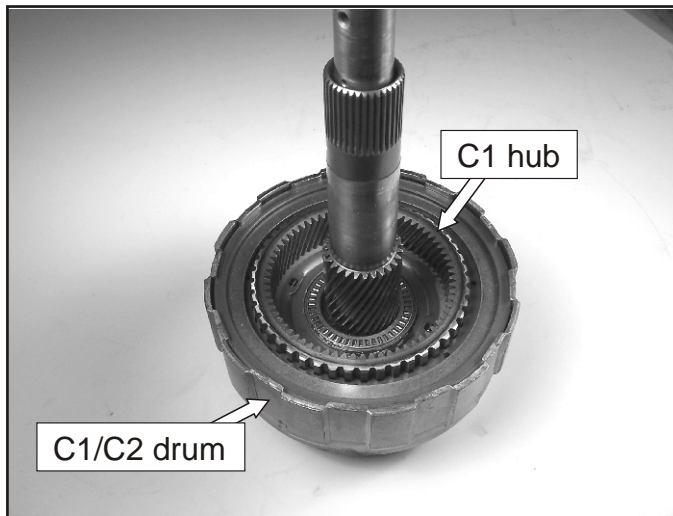


Figure 247

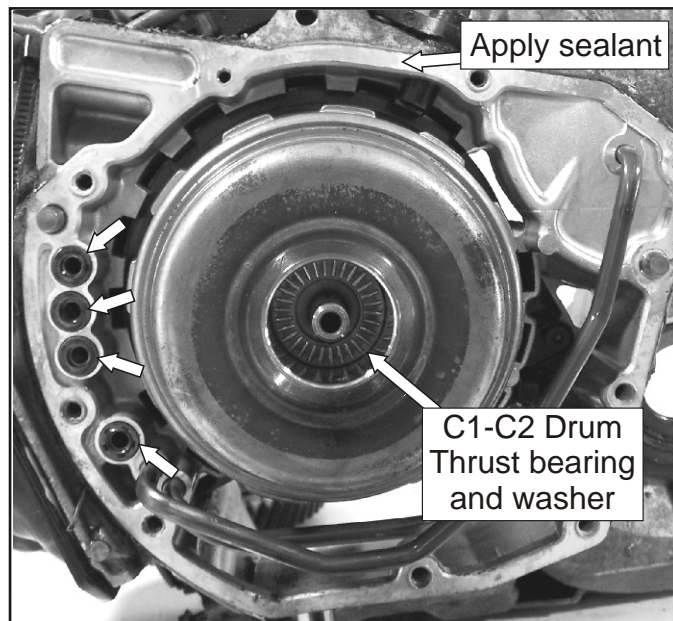


Figure 248



Figure 249

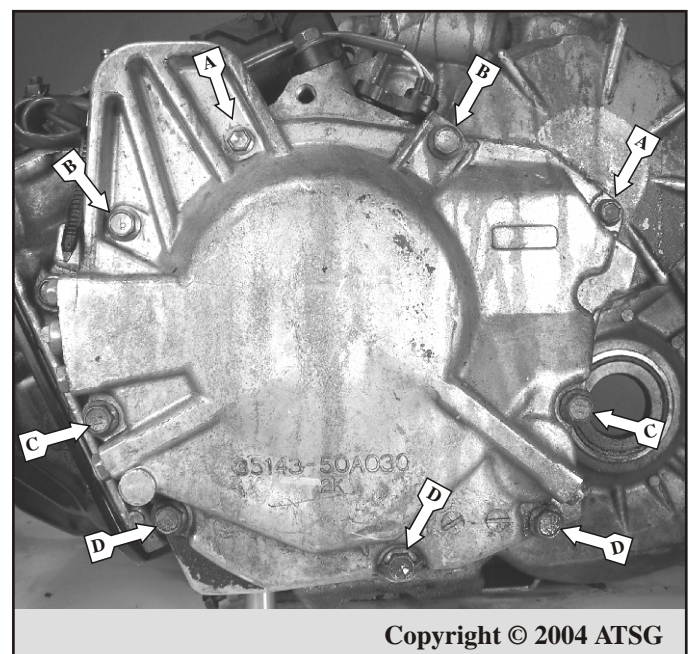


Figure 250



## TRANSMISSION REASSEMBLY CONTINUED

179. Turn the case over to where it is resting on the rear cover, and replace the two C3 underdrive sealing rings as shown in Figure 251.
180. Install the anti-rattle clip into the case half as shown in Figure 252.
181. Install the F3 freewheel and snap ring into the case. Install a new rubber seal into the case. See Figure 253.
182. Replace the o-rings on the cap and B4 servo assembly as shown in Figure 254.
183. Lubricate and install the servo piston, cap and retaining snap ring. See Figure 255.

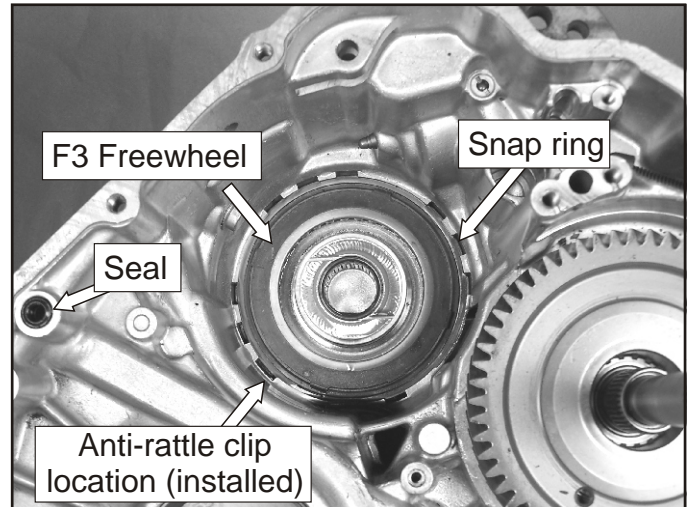


Figure 253

Continued on Page 97

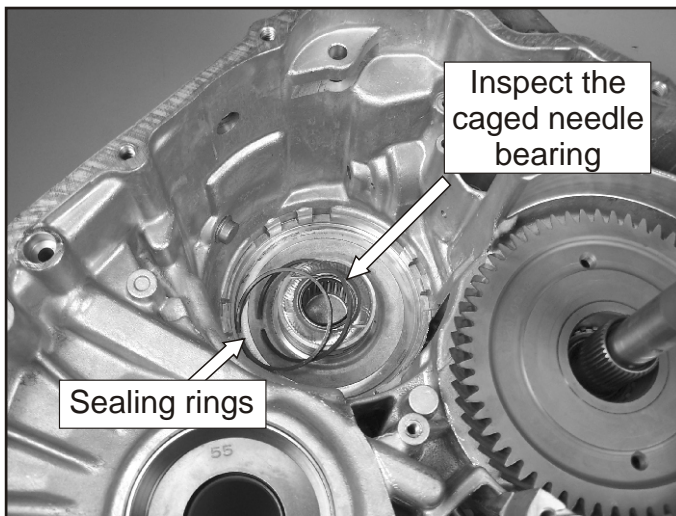


Figure 251

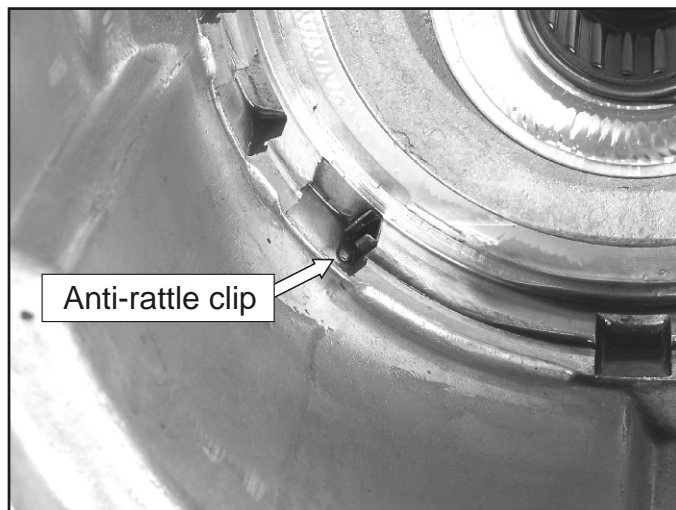


Figure 252

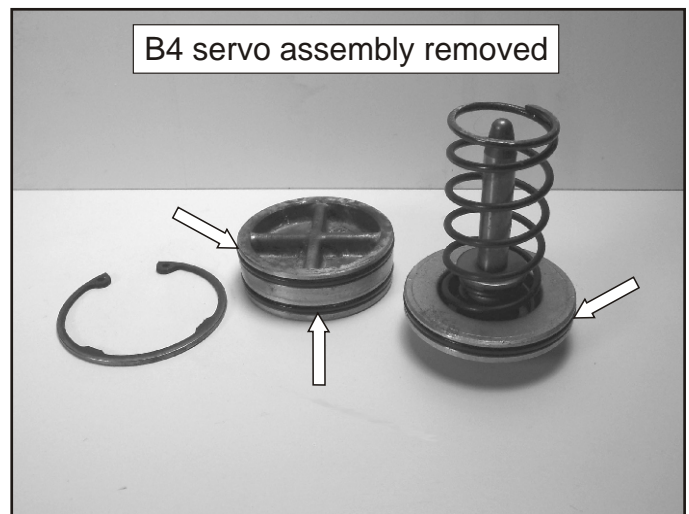


Figure 254

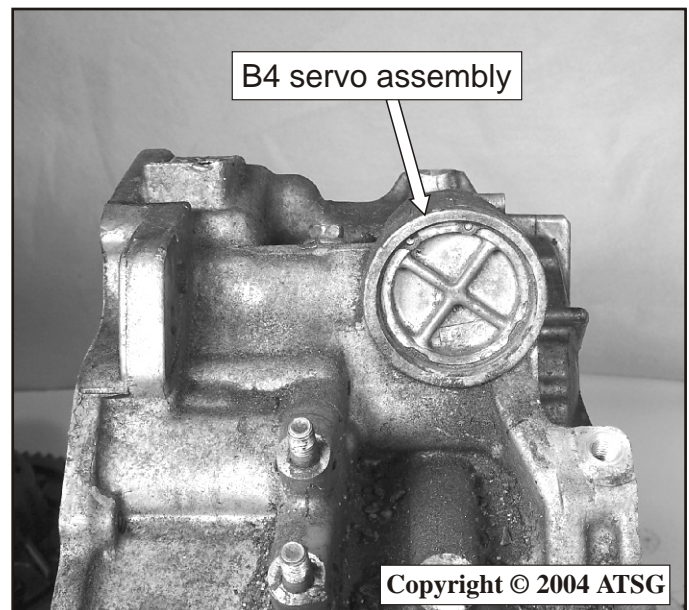


Figure 255



## TRANSMISSION REASSEMBLY CONTINUED

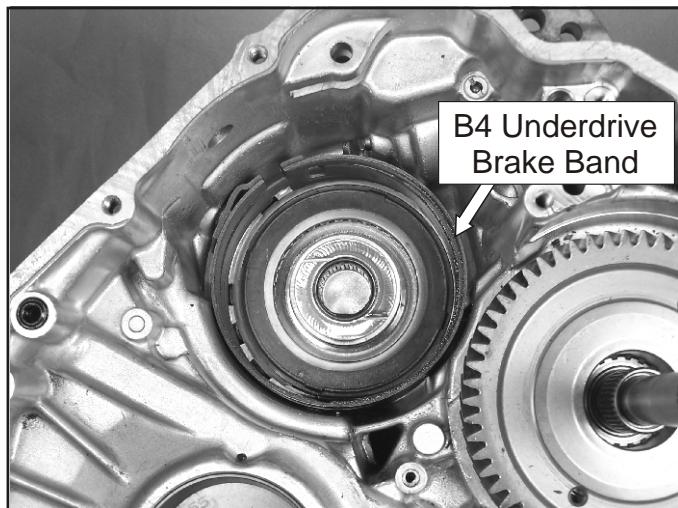


Figure 256

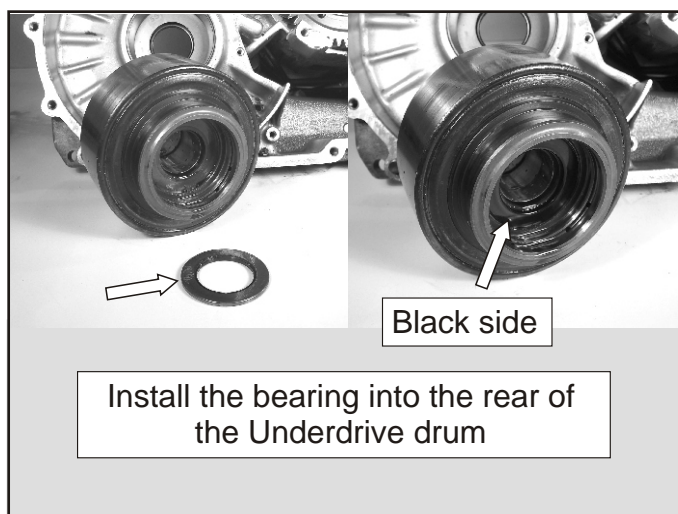


Figure 257

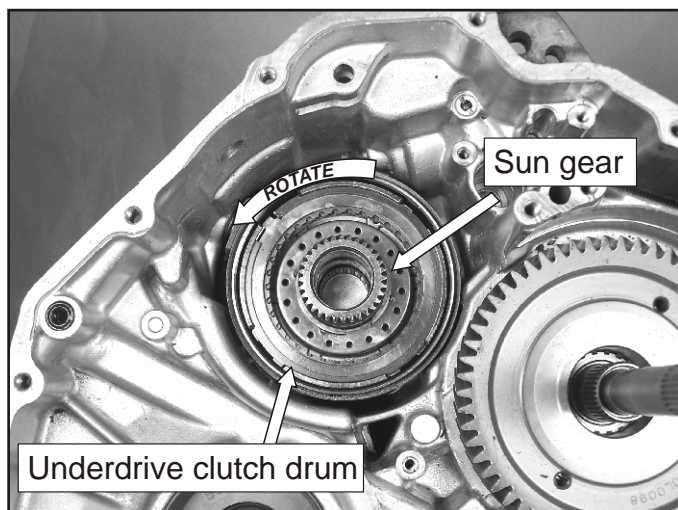


Figure 258

184. Install the B4 underdrive brake band as shown in Figure 256.
185. Install the bearing into the rear of the C3 underdrive drum with the black side facing out. See Figure 257.
186. Grasp the underdrive clutch drum by the sun gear and install it into the F3 freewheel and over the sealing rings by turning it counter-clockwise. See Figure 258.
187. Grasp the underdrive planetary assembly by the pinion gear and assemble it into the underdrive clutch, by turning it to the left and right to index it into the underdrive clutches. See Figure 259.
188. Install the underdrive planetary thrust washer and bearing as shown in Figure 260.

Continued on Page 98

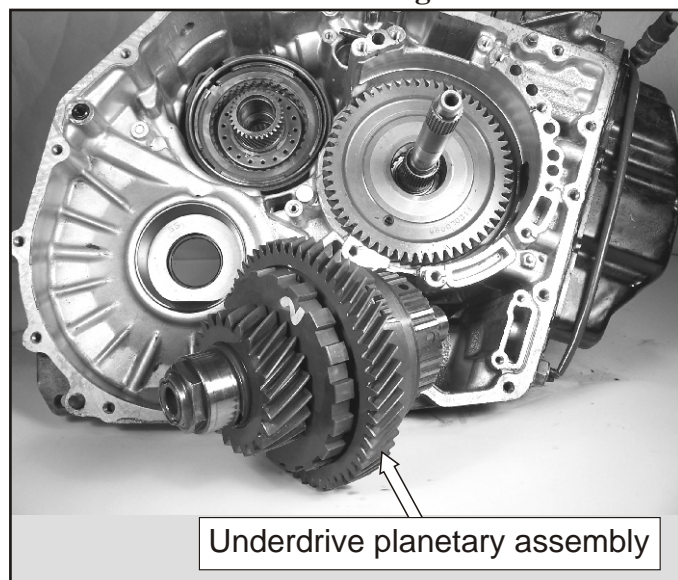


Figure 259



Figure 260

## TRANSMISSION REASSEMBLY CONTINUED

189. Install a new linkage seal and assemble the manual shaft into the case as shown below in Figure 262. Use Figure 261 as an assembly guide.
190. Slide the parking rod into the case and rotate the manual shaft until the slot lines up with the park rod. See Figure 263.
191. Install new o-rings on the B4 accumulator cap and piston as shown in Figure 264.
192. Lubricate and install the B4 accumulator piston and spring (spring first). Install the park lock pin into the case. See Figure 265.

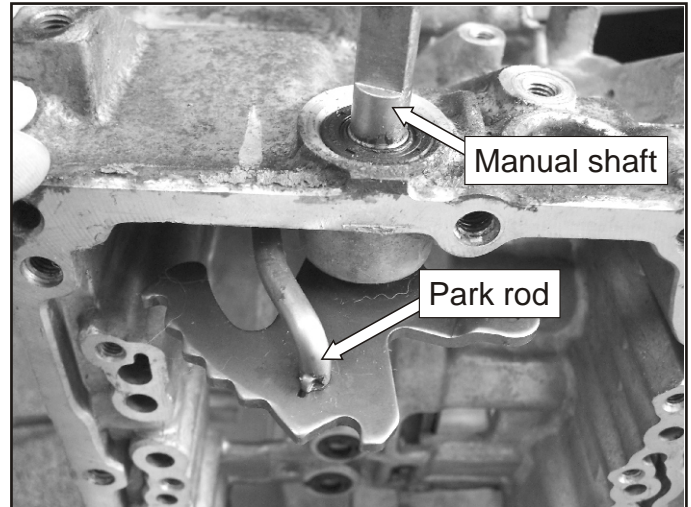


Figure 263

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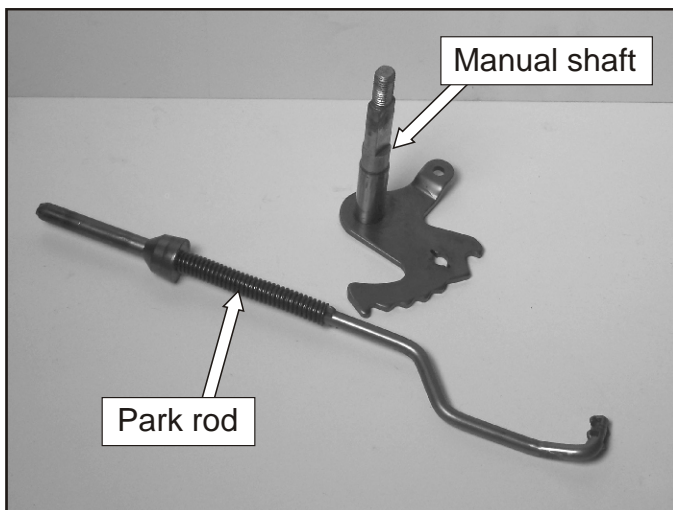


Figure 261

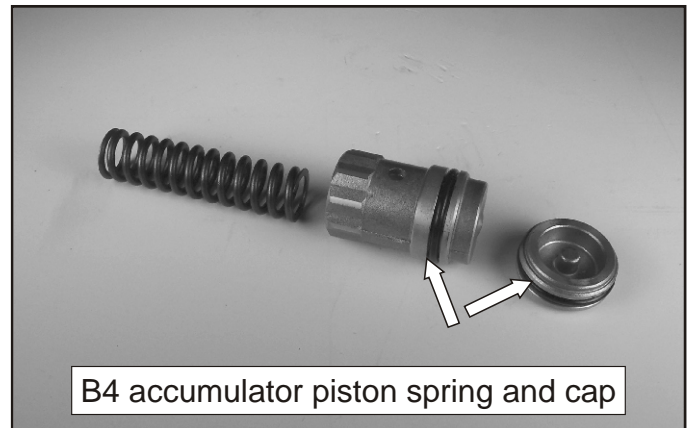


Figure 264

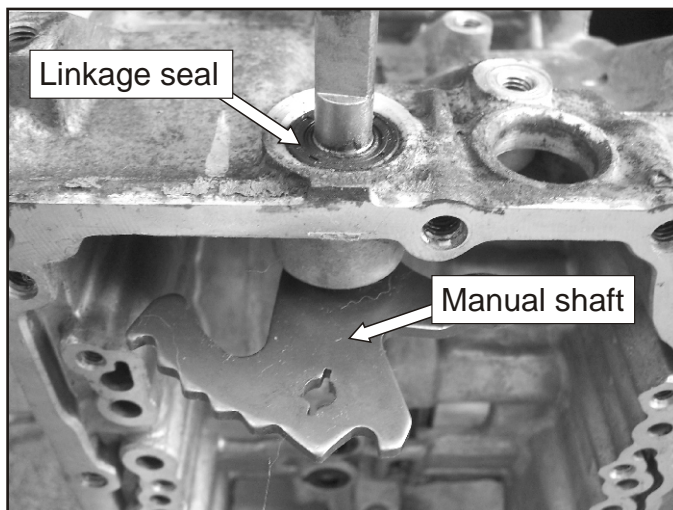


Figure 262

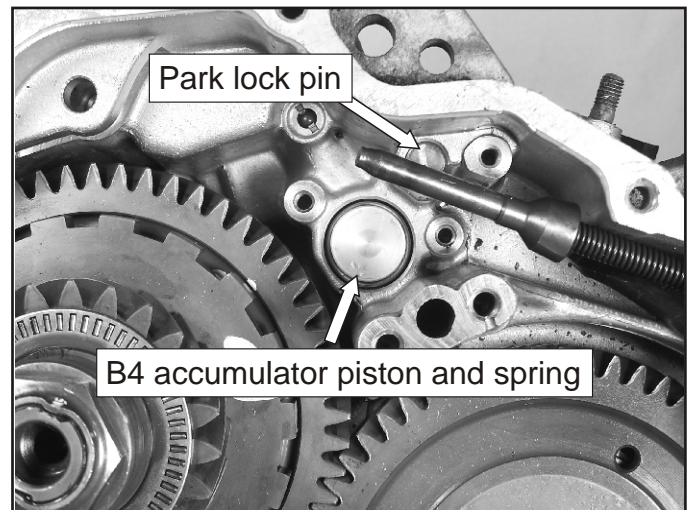


Figure 265



## TRANSMISSION REASSEMBLY CONTINUED

193. Lubricate the o-ring on the B4 accumulator cap and install it into the case. See Figure 266.
194. Install the B4 accumulator retaining plate, parking rod return spring, sleeve and bolts as shown in Figure 268. Use Figure 267 as an assembly guide. **Caution: the B4 accumulator piston is spring loaded. Tighten down the bolts evenly so the cap does not get cocked.** **Note: The bolt on the left is 22mm long and the bolt on the right is 13.5mm long. Torque both bolts to 71-106 in.lb.**
195. Assemble the park pawl, return spring and park pawl pin into the case as shown in Figure 270. Use Figure 269 as an assembly guide.

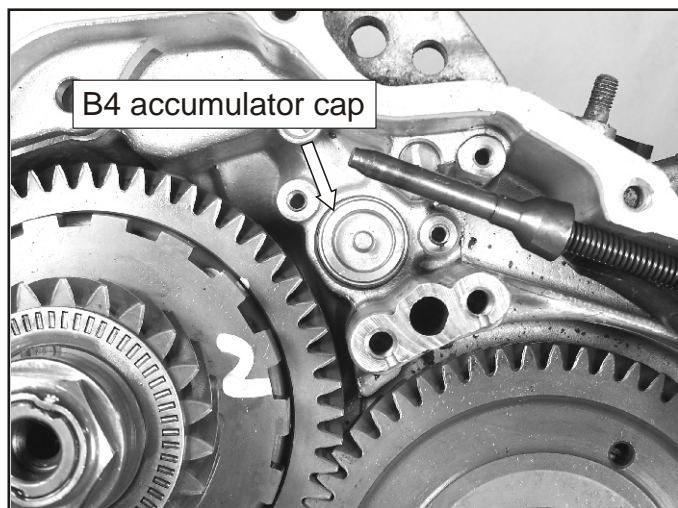


Figure 266

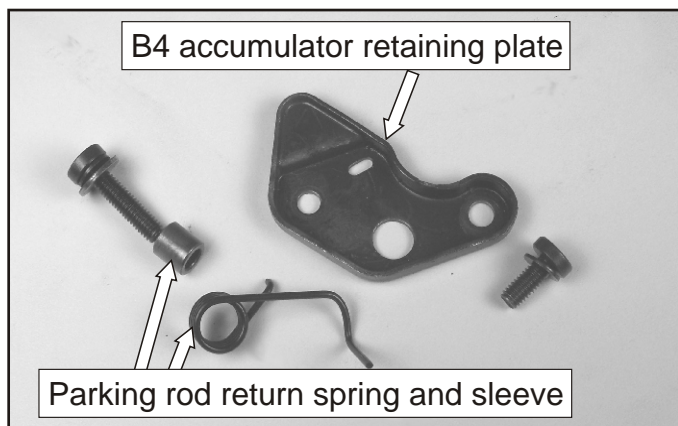


Figure 267

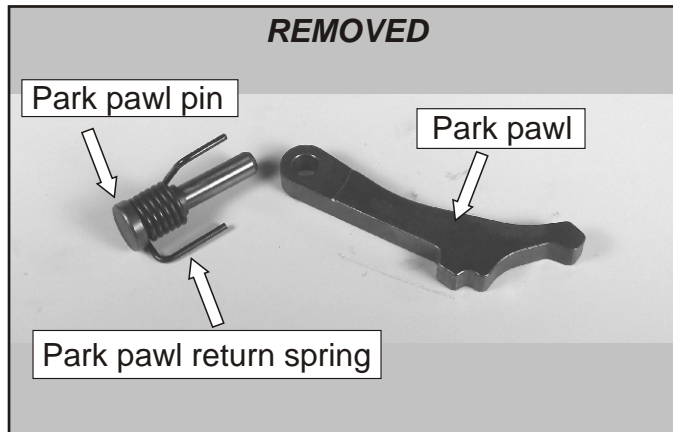


Figure 269

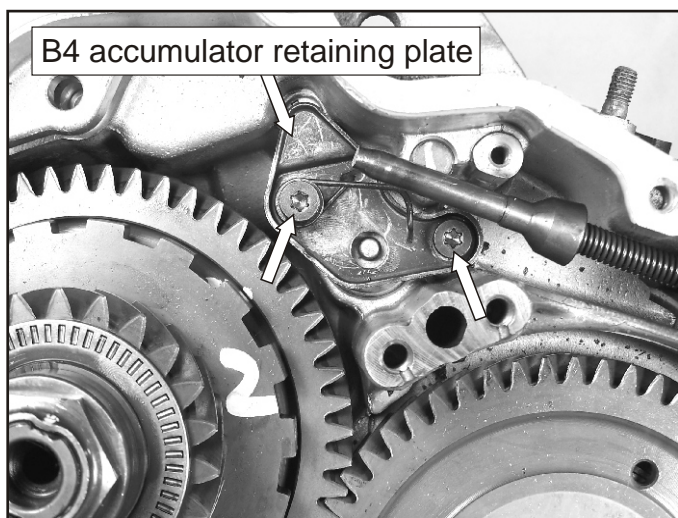


Figure 268

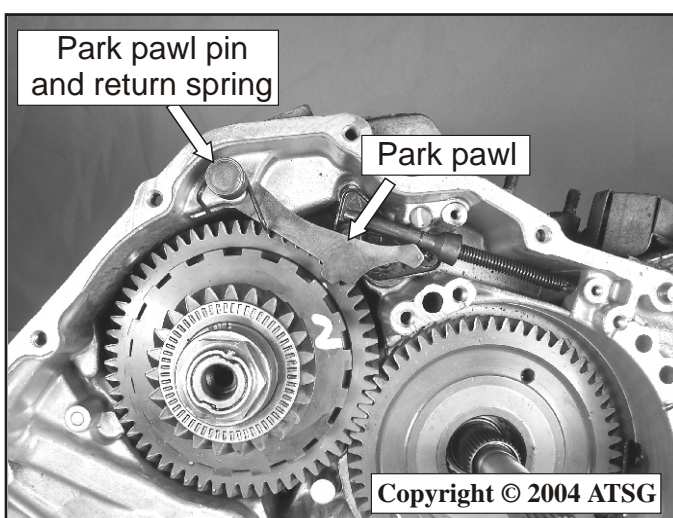


Figure 270



## TRANSMISSION REASSEMBLY CONTINUED

196. Install the detent spring and park rod guide as shown in Figure 272. Use Figure 271 as an assembly guide. Install the two retaining bolts and torque to 71-106 in. lb. **Note: the bolt lengths are 15.5mm long.**
197. Install the oil deflector plate, case plate and the four retaining bolts. Torque to 71-106ft.lb. See Figure 273. **Note: the bolt lengths are 13mm long.**
198. Install a new gasket on both sides of the filter as shown in Figure 274.
199. Install the new filter onto the case as shown in Figure 275. Install the filter retaining bolt and torque to 71-106 in. lb. **Note the bolt length is 13mm long.**

Continued on Page 101

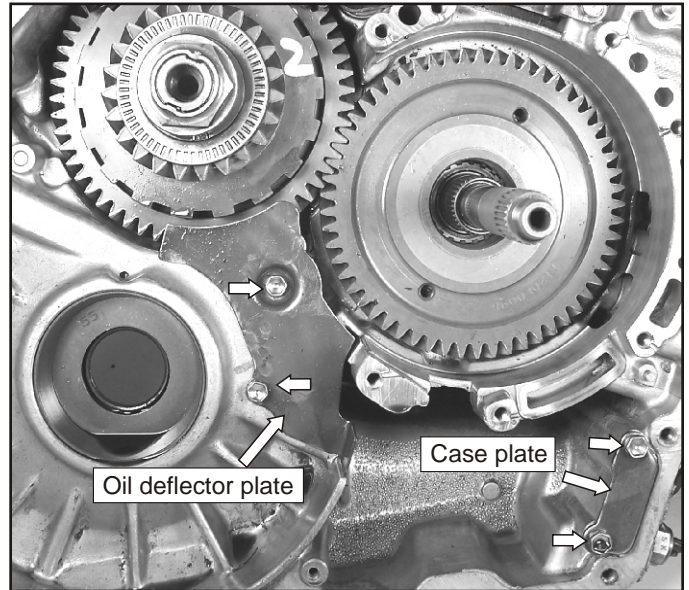


Figure 273

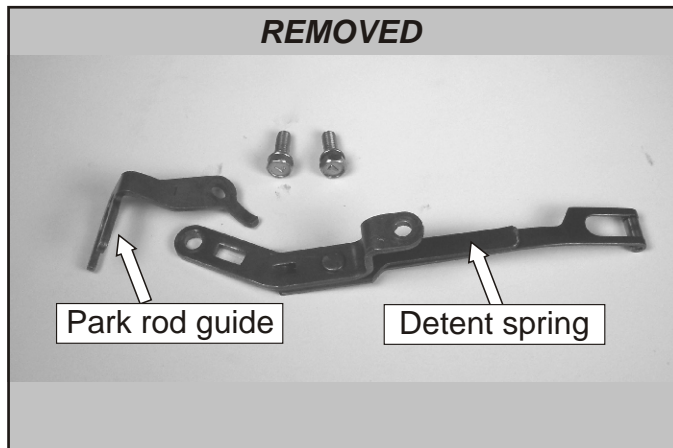


Figure 271

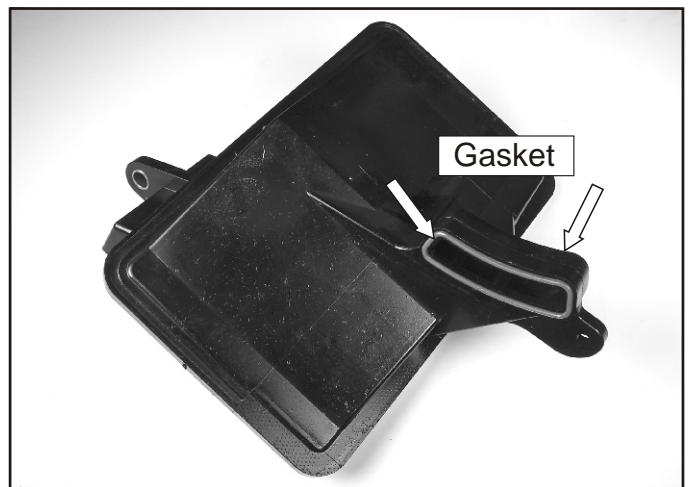


Figure 274

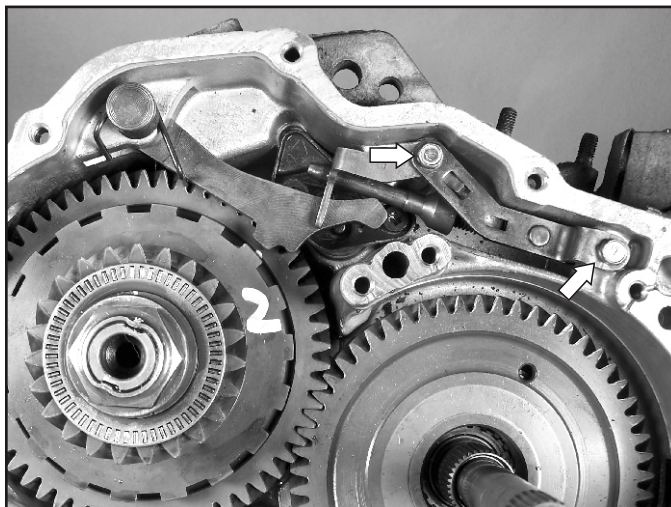


Figure 272

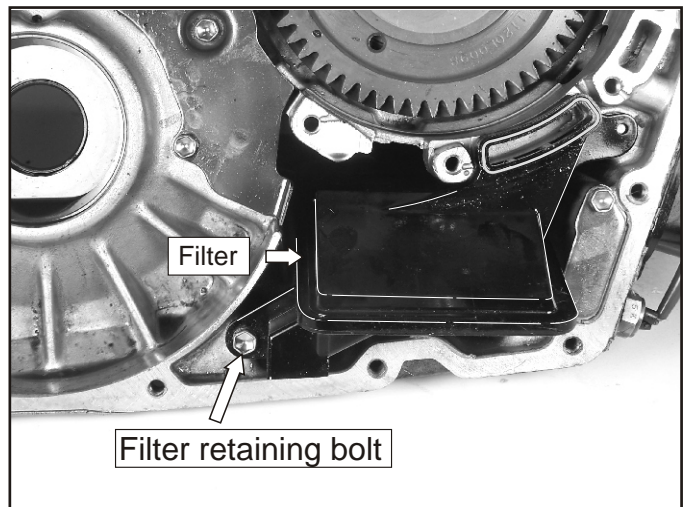


Figure 275

## TRANSMISSION REASSEMBLY CONTINUED

200. Inspect the bearing race shown in Figure 276. Replace as necessary. Install new seal in case.  
**Note:** Below the bearing race is the selective shim which sets the pre-load for the differential bearings.
201. Inspect the lower differential bearing as shown in Figure 277. Replace as necessary.
202. Inspect the upper differential bearing and the spider gear assembly as shown in Figure 278. Replace as necessary.
203. Lubricate bearings and install the differential assembly into the case half as shown below in Figure 279.
204. Remove the four 10mm headed bolts retaining the side cover, reseal and re-install the bolts. Remove the three 10mm headed oil deflector retaining bolts as shown in Figure 280.

Continued on Page 102

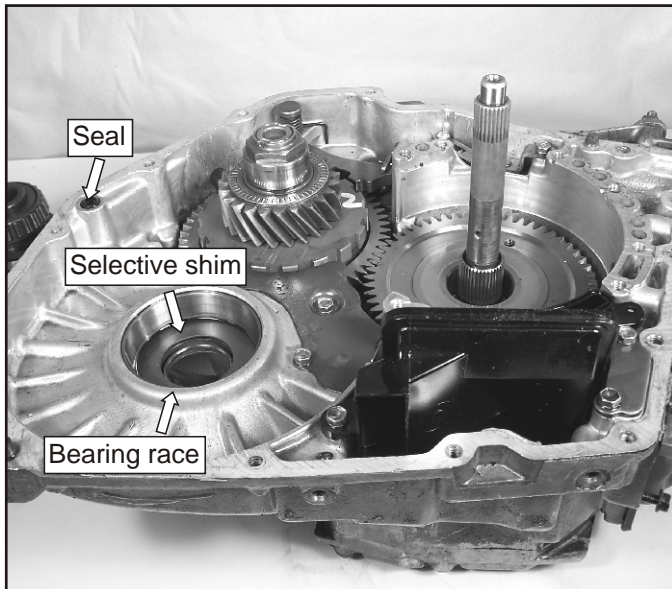


Figure 276

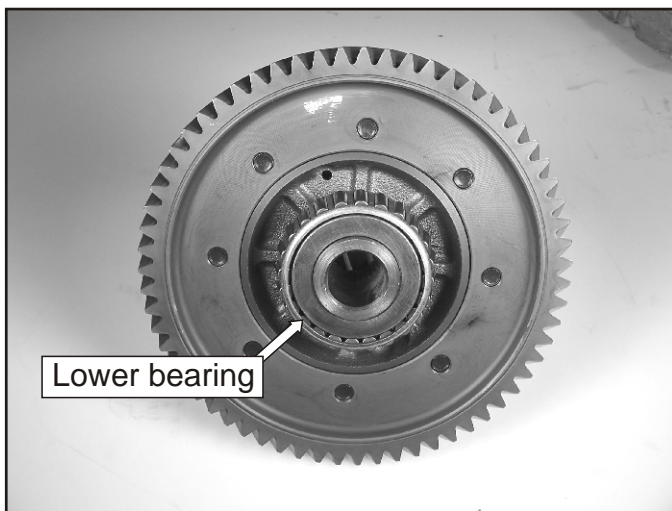


Figure 277

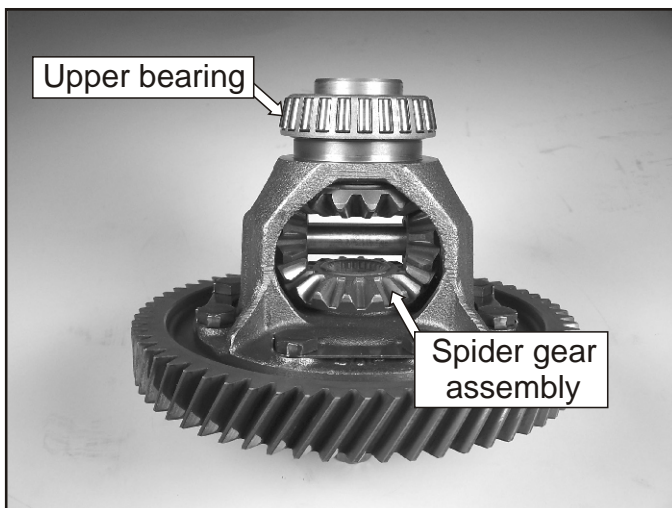


Figure 278

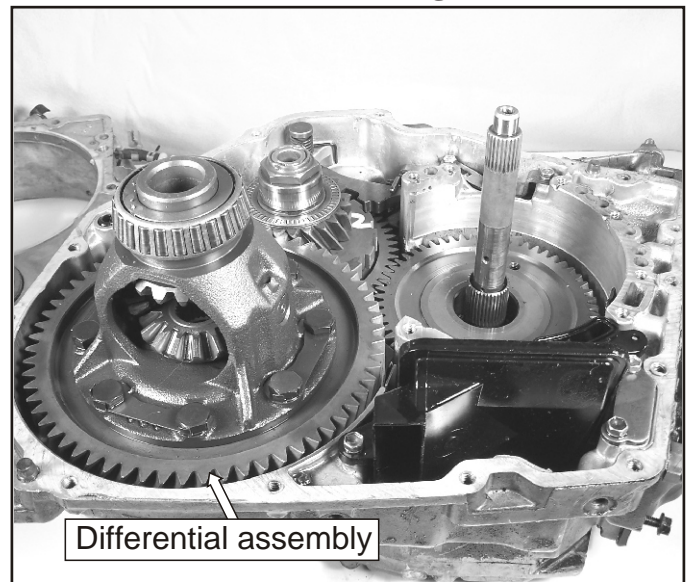


Figure 279

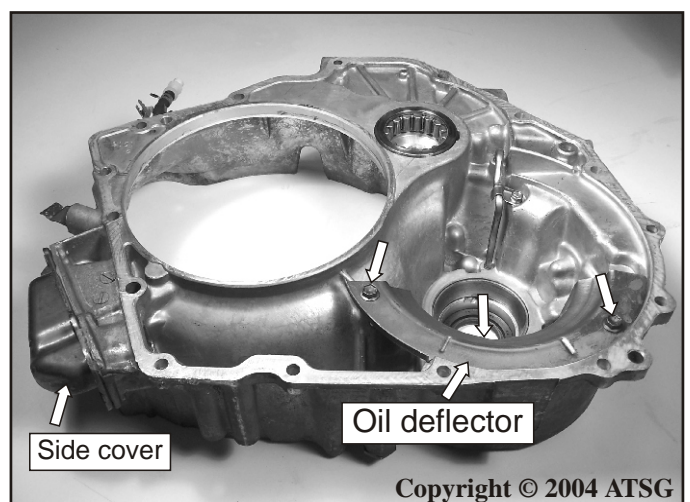


Figure 280

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## TRANSMISSION REASSEMBLY CONTINUED

205. Turn the oil deflector upside down and clean the three magnets. See Figure 281.
206. Install the oil deflector back into the case.  
Apply a small amount of loctite to the three 12mm long retaining bolts and torque to 71-106 in.lb. See Figure 282.
207. Inspect the upper bearing race and the roller bearing as shown in Figure 283. Replace as necessary.
208. Replace the sealing ring shown in Figure 284.  
*Note: There is a .055" gap in between the sealing ring ends, this is normal.*
209. Replace the axle seal as shown in Figure 285.

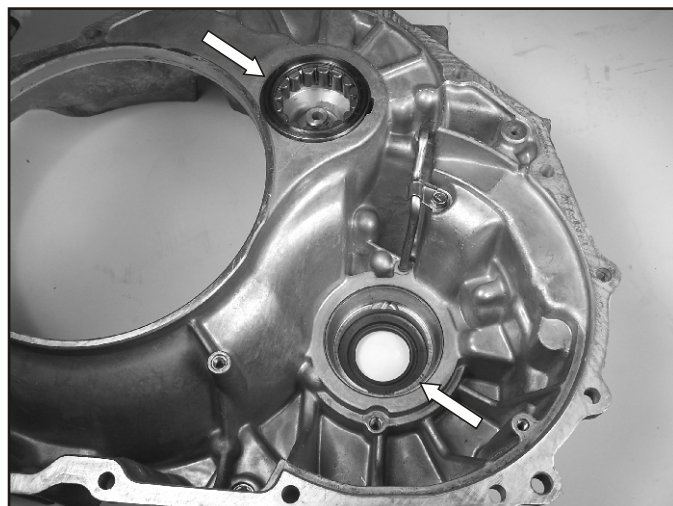


Figure 283

Continued on Page 103

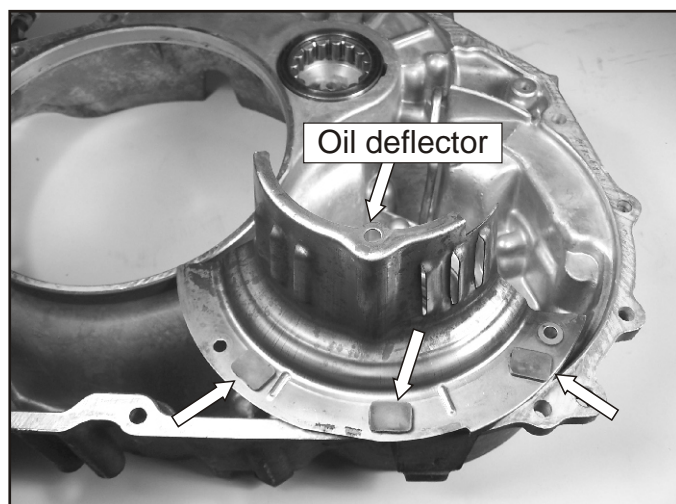


Figure 281

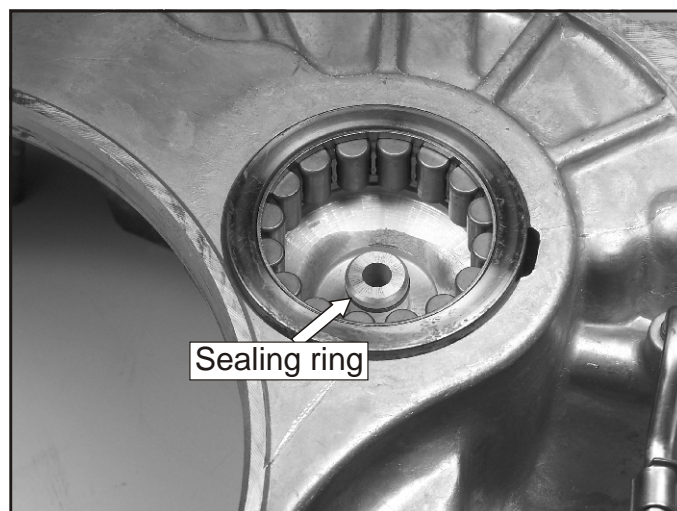


Figure 284

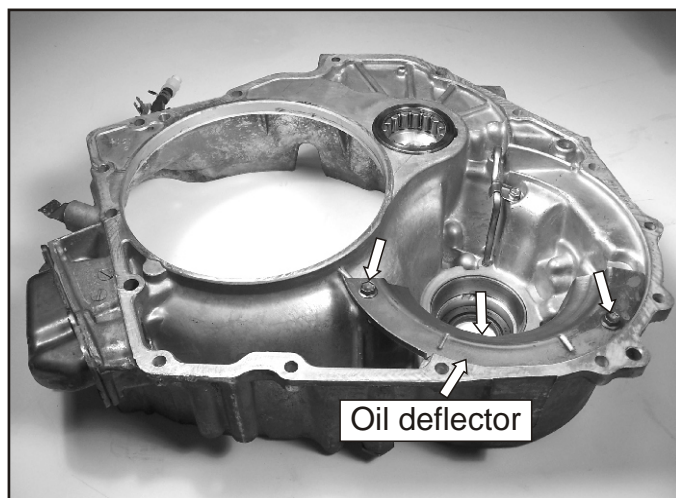


Figure 282

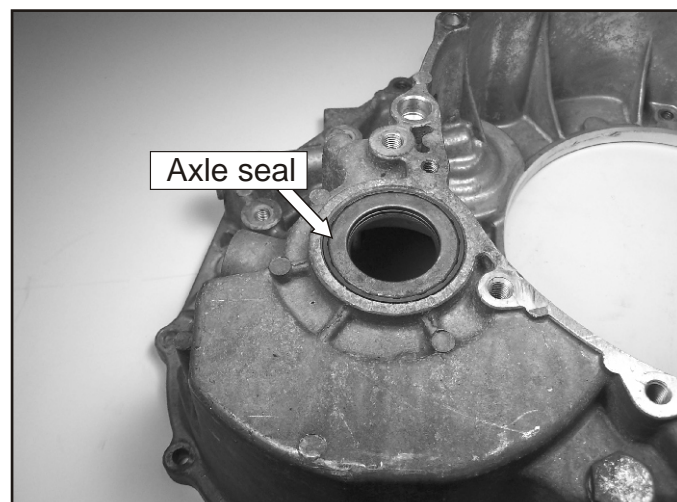


Figure 285



## TRANSMISSION REASSEMBLY CONTINUED

210. Apply a thin coat of sealant between the case half and the bell housing and assemble the bell housing onto the case half. See Figure 286.
211. Install the five bolts shown in Figure 287.  
**Note: The bolt lengths are 30mm long.**  
Torque to 17-26 ft.lb.
212. Install the six bolts shown in Figure 288.  
**Note: The bolt lengths are 30mm long.**  
Torque to 17-26 ft.lb.
213. Install the five bolts as shown in Figure 289.  
Refer to the chart for the correct bolt lengths and torque the bolts to 17-26 ft.lb.

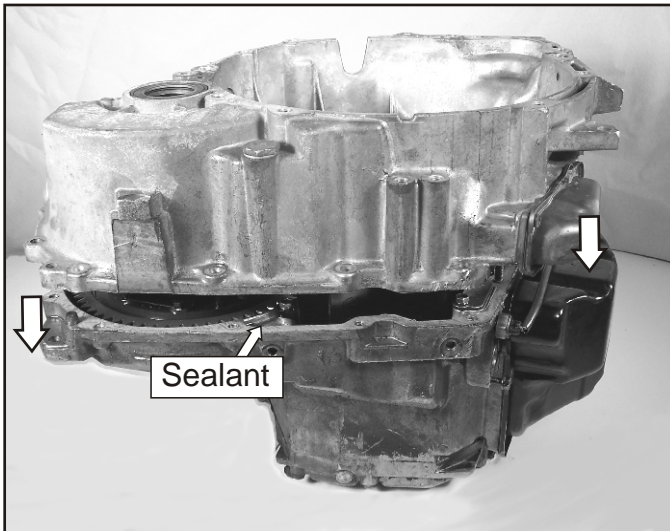


Figure 286

Continued on Page 104

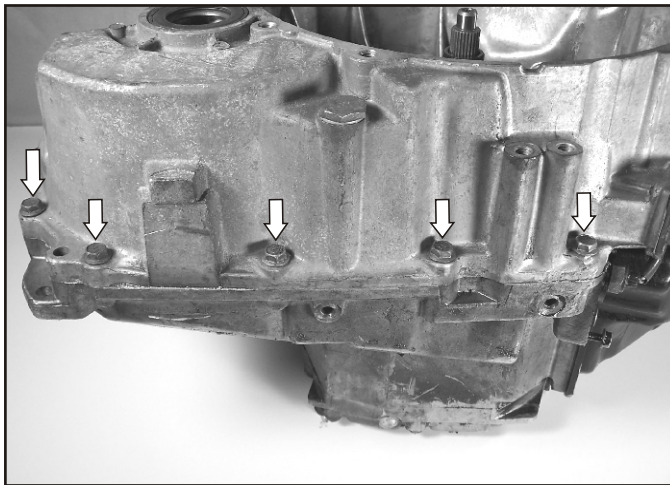


Figure 287

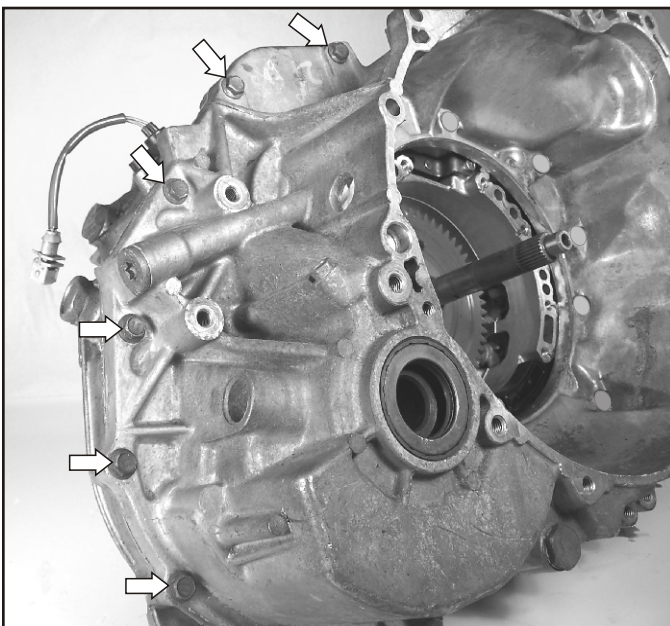
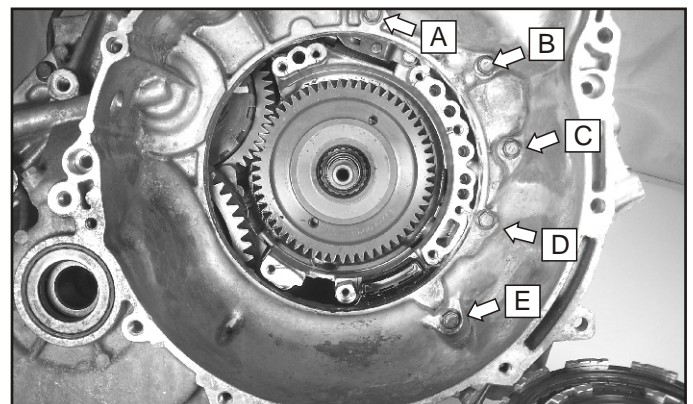


Figure 288



### Bolt lengths

- 5 bellhousing to case retaining bolts
- A = 30mm long
  - B = 35mm long
  - C = 35mm long
  - D = 30mm long
  - E = 45mm long

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Figure 289

## TRANSMISSION REASSEMBLY CONTINUED

214. Stand the transmission horizontally on the bench as shown in Figure 290.
215. Ensure that the B2 second coast brake hub is fully indexed into the clutch plates on the back of the pump as shown in Figure 291. Lubricate the pump o-ring.
216. Install the pump assembly into the case and gently tap it into the case. Once the pump is seated into the case, install the eight pump to case retaining bolts and torque to 15-22ft.lb.  
**Note: The bolt lengths are 28mm long. See Figure 292.**
217. Turn the transmission to the side and air check each clutch and brake to ensure proper apply. Install two new apply seals. See Figure 293.

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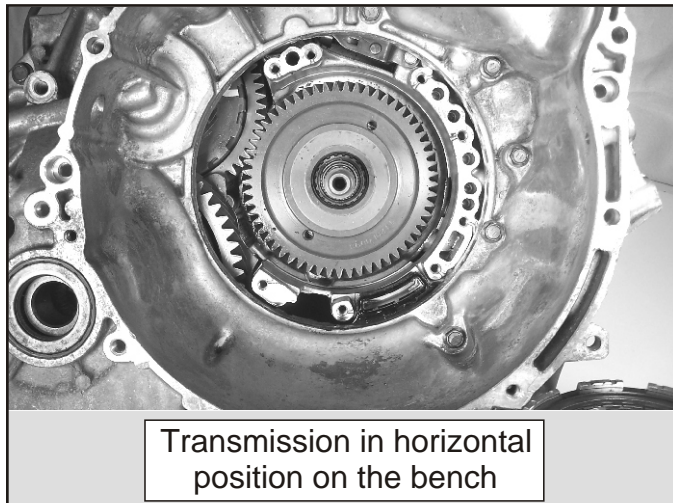


Figure 290

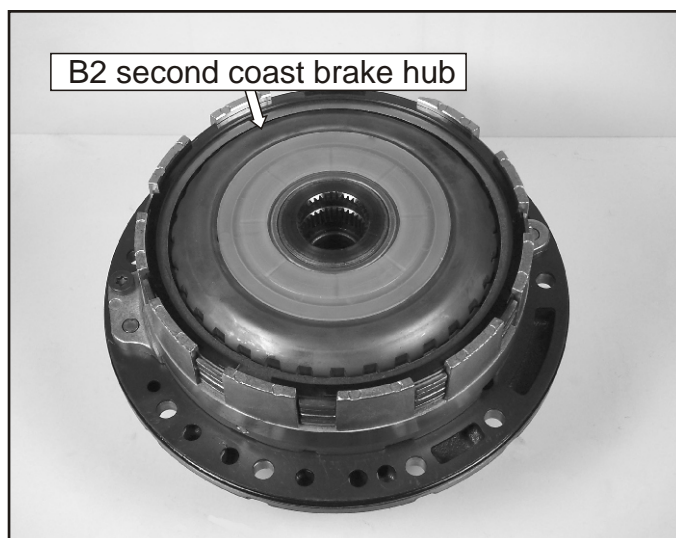


Figure 291

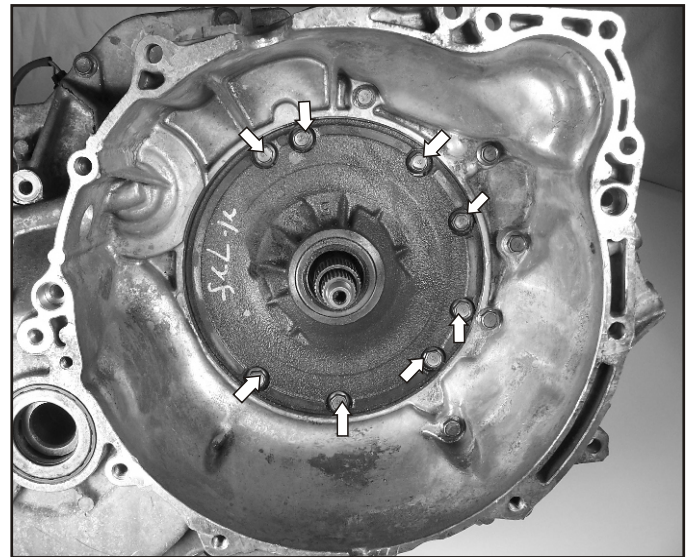


Figure 292

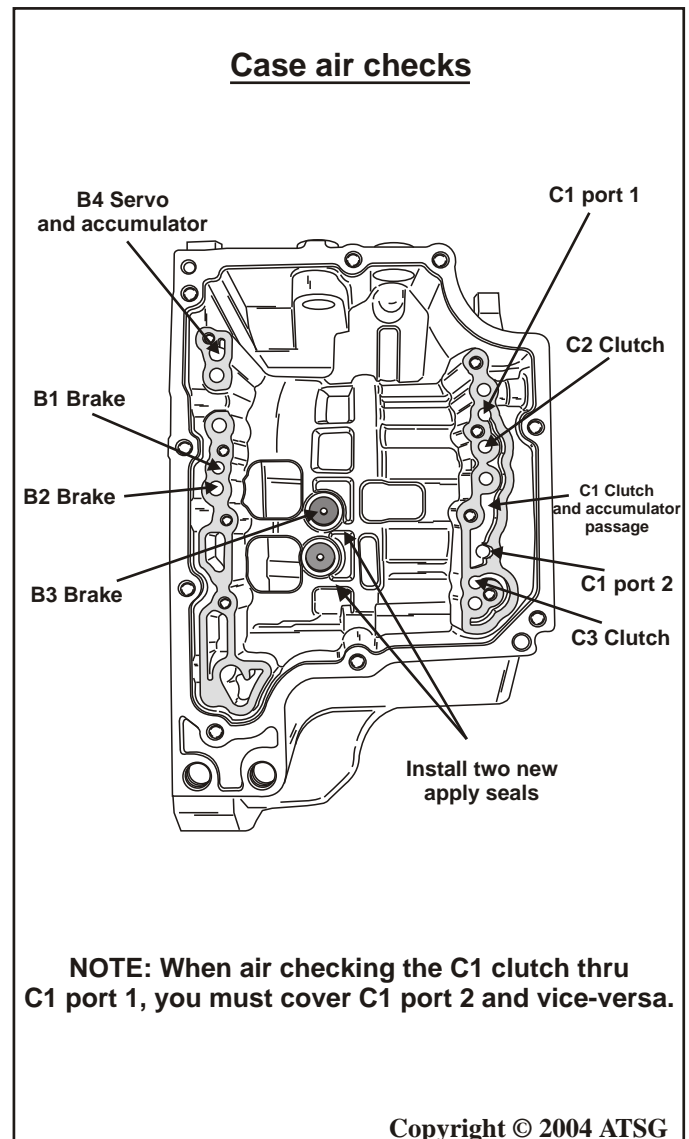


Figure 293



## TRANSMISSION REASSEMBLY CONTINUED

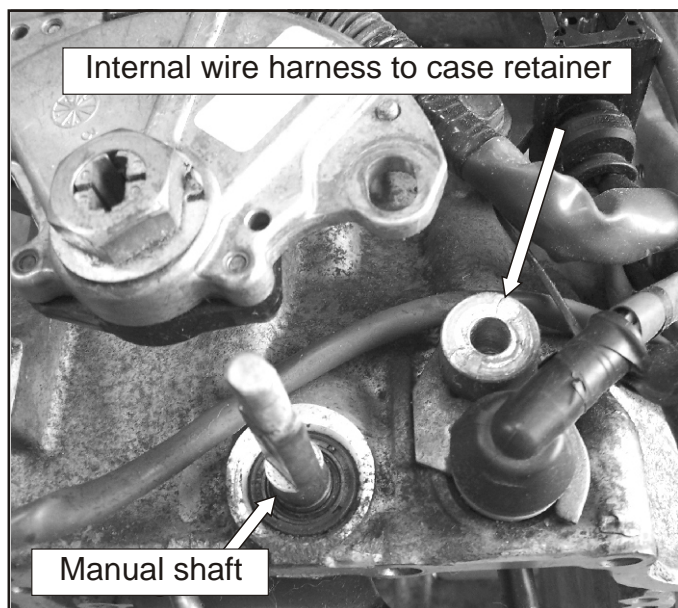


Figure 294

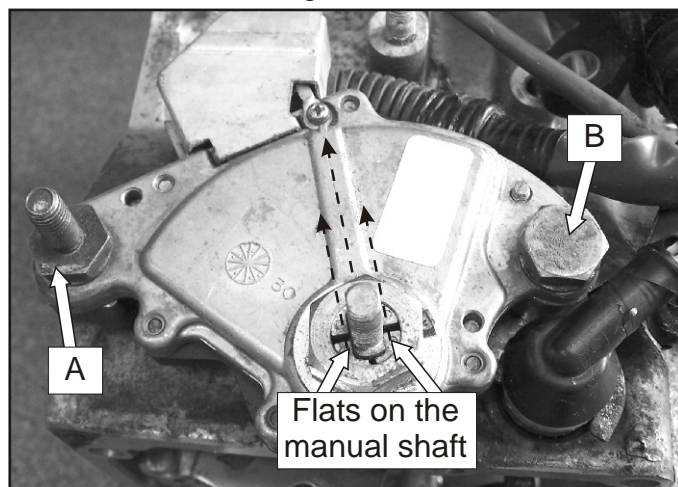


Figure 295

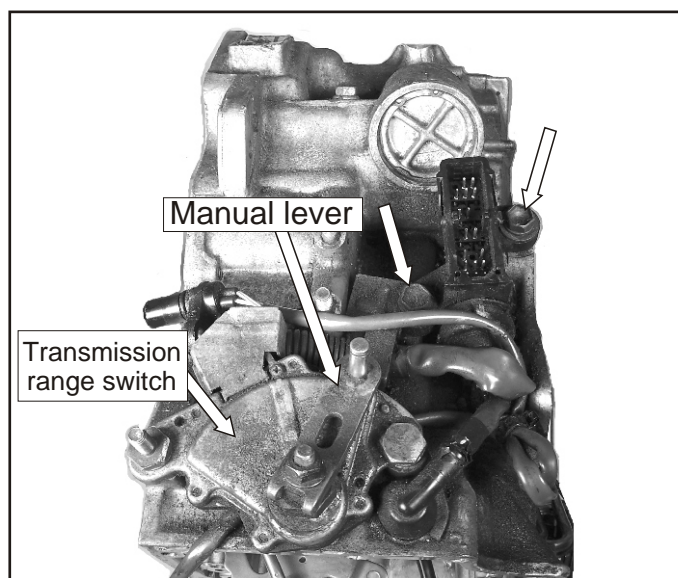


Figure 296

218. Install a new o-ring on the plastic part of the wiring harness, install it back thru the case, and place the retainer in the groove as shown in Figure 294.
219. Install the transmission range switch over the manual shaft and align the flats on the shaft with the dotted line on the transmission range switch as shown in Figure 295. Torque bolts A and B to 14-22ft.lb. **Note: the bolt lengths are as follows, A = 21mm long and B = 32mm long.**
220. Install the two connector retaining bolts and torque to 14-22 ft.lb. **Note: the bolt lengths are 20mm long.** Install the manual lever and the retaining nut and torque to 7-10 ft.lb. See Figure 296.
221. Install the valve body on to the case and align the manual valve link into the manual shaft as shown in Figure 297.

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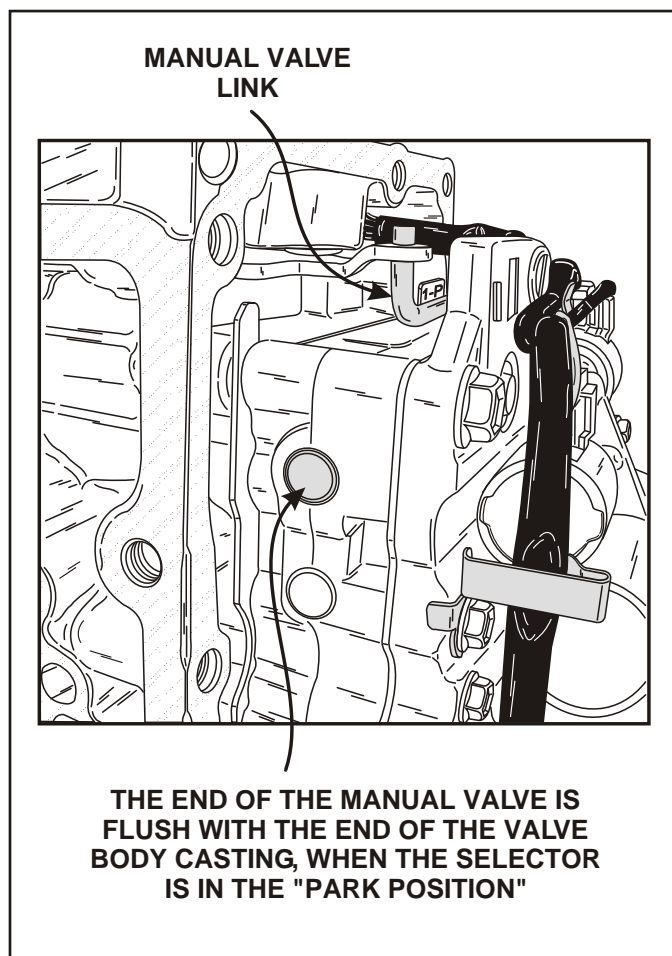


Figure 297



## TRANSMISSION REASSEMBLY CONTINUED

222. Install the 10 mm headed valve body to case retaining bolts as shown in Figure 298. Torque to 7-11 ft.lb. **Note: bolt lengths are as follows, A = 16mm long, 50mm long and C = 55mm long.**
223. Install the four solenoid connectors shown in Figure 299. **Note: The internal wire colors are listed below each solenoid.**
224. Apply a thin coat of sealant to the case half and install the side pan. Install the nine pan bolts and torque to 7-11ft.lb. **Note: the bolt lengths are 15mm long.** Install the temperature sensor. See Figure 300.

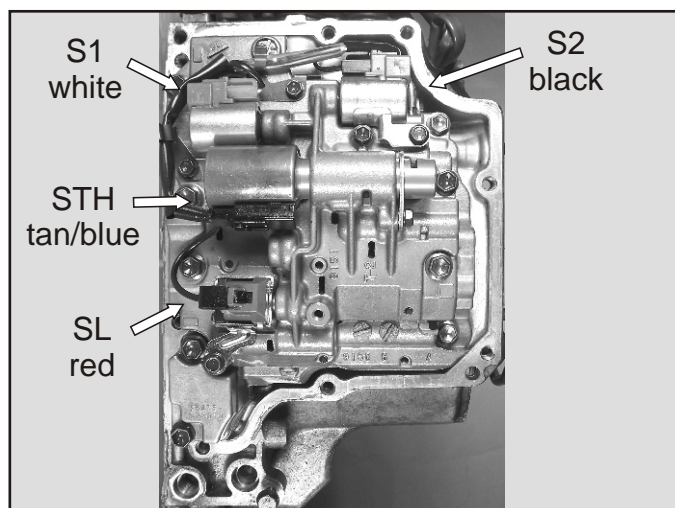


Figure 299

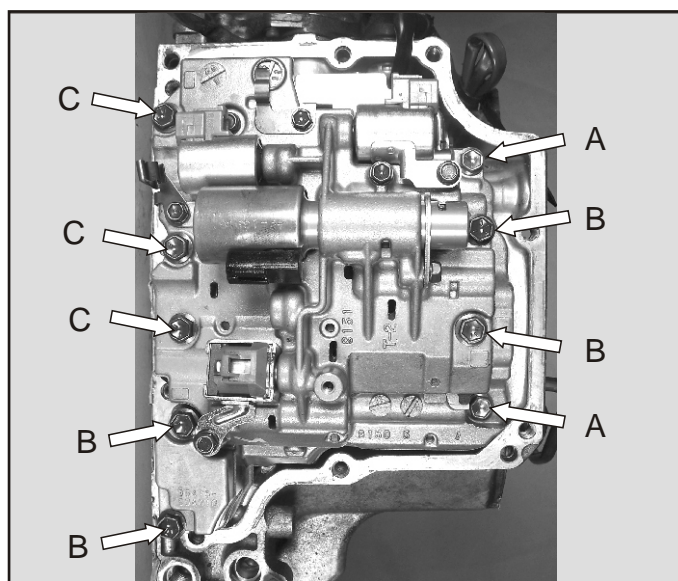


Figure 298

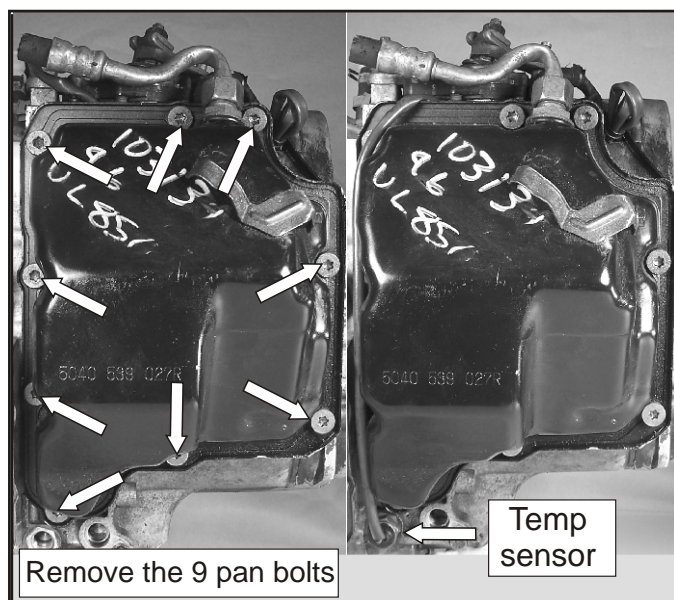


Figure 300