MERCEDES, JAGUAR, DAIMLER/CHRYSLER "722.6" "5 Speed"

INDEX

Note: An "Update Handbook" with the familiar Green cover, is also available from ATSG and includes much more information on the valve body variations that are found in the 722.6 transmission.

Vehicle Identification Number (VIN) Designation

WDB N G 70 J X Y A 123456

- ***Manufacturer***
- ***Body (Chassis) Designation***
  F=129, H=202, J=210, K=170, L=208, N=220
- ***Body Style***
  F=Sedan, G=Sedan Long, H=Station Wagon, J=Coupe, K=Cabriolet/Roadster, M=AMG Vehicle
- ***Model Designation***
  70=S430, 75=S500
- ***Restraint System***
- ***Check Digit***
- ***Model Year***
  S=95, T=96, V=97, W=98, X=99, Y=00, 1=01, 2=02, 3=03, 4=04,
- ***Manufacturing Plant***
- ***Chassis End Number***

VIN digits 4 through 7 to Chassis Designation Conversion Chart for vehicles equipped with the 722.6 Transmission up to Model Year 2001

Model	Year	Chassis	Engine	Transmission	VIN
E55 AMG	1999	210.074	113.980 ME 2.0	722.623/24/636	
E55 AMG	2001	210.074	113.980 ME 2.0	722.6	JF74
ML320	1998-1999	163.154	112.942	722.662	
ML430	1999	163.172	113.942 ME 2.0	722.663	
ML55	2000	163	113 M 2.0	722.6	
S320	1997-1999	140.032	104.994 ME 2.1	722.605	GA32
S320	1997-1999	140.032 Long	104.994 ME 2.1	722.605	GA33
S420	1996-1999	140.032/43	104.9(7)81 ME 1.0	722.622/633	GA32
S430	1998-1999	140.0	113. ME 2.0	722.6	
S430	2000	220.170	113.941 ME 2.0	722.6	NG70
S430	2001	220.170	113.941 ME 2.8	722.632	NG70
S500 Coupe	1996-1998	140.070	119.970 ME 1.0	722.620	GA70
S500	1996-1999	140.051	119.9(7)80 ME 1.0	722.620/622	GA51
S500	2000	220.175	113.960 ME 2.0	722.6	NG75
S500	2001	220.175	113.960 ME 2.8	722.6	NG75
S600	1996-1999	140.057	120.982 ME 1.0	722.621	GA57
S600 Coupe	1996-1997	140.076	120.980/2 ME 1.0	722.621	
S600	2000	220.178	120.982 ME 1.0	722.621	NG78
S600	2001	220.178	137.970	722.628	NG78
SL320	1996-1997	126.063	104.991 HFM	722.603/5	FA63
SL500	1996-1998	129.067	119.9(7)82 ME 1.0	722.620	FA67
SL500	1999-2001	129.068	113.961 ME 2.0	722.620/624	FA68
SL600	1996-2001	129.076	120.983(1) ME 1.0	722.621/32	JH82
SLK230	1998-1999	170.447	111.973 ME 2.1	722.605	KK47
SLK230	2000	170.449	111.983 ME 2.1	722.616	KK49
SLK230	2001	170.449	111.983 ME 2.8	722.616	KK49
SLK320	2000	170.465	112.973 ME 2.0	722.618	KK65
SLK320	2001	170.465	112.973 ME 2.8	722.618	KK65
SLK430	1999	170.4	113. ME 2.0	722.6	KK65

Figure 3

722.6 TRANSMISSION SOLENOID APPLICATION CHART

From the solenoid shift chart below, you will notice that shift solenoids 1-2/4-5, 2-3 and 3-4 are toggled ***"on-to-off"*** to make there respective shifts. While in gear they remain in the ***"off"*** state. This explains why, while you are driving, whatever the gear the transmission was in at the time the computer system observed a fault, that would be the gear the transmission failsafes to. When the vehicle is brought to a stop and the ignition is cycled, the transmission will remain in second gear. ***Special Note:*** If codes are stored and repairs have been made, all codes must be cleared for the limp mode feature to be turned off.

GEAR SHIFTS	SOLENOID					
	1-2/4-5 ⅄	2-3	3-4 ★	MOD PC ⌑	SHIFT PC ◎	TCC ⌾
1ST	OFF	OFF	OFF	PWM	OFF	OFF
SHIFT	ON	OFF	OFF	PWM	PWM	OFF
2ND	OFF	OFF	OFF	PWM	OFF	*PWM
SHIFT	OFF	ON	OFF	PWM	PWM	*PWM
3RD	OFF	OFF	OFF	PWM	OFF	*PWM
SHIFT	OFF	OFF	ON	PWM	PWM	*PWM
4TH	OFF	OFF	OFF	PWM	OFF	*PWM
SHIFT	ON	OFF	OFF	PWM	PWM	*PWM
5TH	OFF	OFF	OFF	PWM	OFF	*PWM

Additional solenoid activity observed:

⅄ ***1-2/4-5 Solenoid is pulsed during ignition crank.***

★ ***3-4 Shift solenoid is pulsed continuously while in Park and during selector lever movement (Garage Shifts).***

⌑ ***a) Pulsed constantly while idling in Park or Neutral at approximately 40% Duty cycle.***
b) Voltage observed varied with throttle opening as well as during selector lever movement.

◎ ***a) Pulsed constantly while idling in Park or Neutral at approximately 33% Duty cycle.***
b) Voltage observed varied with throttle opening during each gear shift only.

⌾ **** The TCC solenoid is also Pulse Width Modulated and duty cycles to apply the clutch.***
**** The TCC is available in 2nd, 3rd, 4th and 5th gears, based on vehicle speed, throttle position and ATF temp.***

SHIFT GROUPS

By viewing the mechanical, hydraulic and electrical operation of a shift, it can be observed that a specific solenoid and a group of valves cause a clutch application change. This is described as a "Shift Group." A shift group has two phases. The transition from one gear to the next is called a "shift phase." Once the shift is complete and the transmission is in gear it is called the "stationary phase." There are a total of three shift groups with which 5 forward speeds are achieved. In a shift phase, a shift solenoid initiates the application of one group of valves to change the clutches required for that shift. During this time the other two groups remain in the stationary phase.

Figure 7

TORQUE CONVERTER CLUTCH (PWM) SOLENOID OPERATION

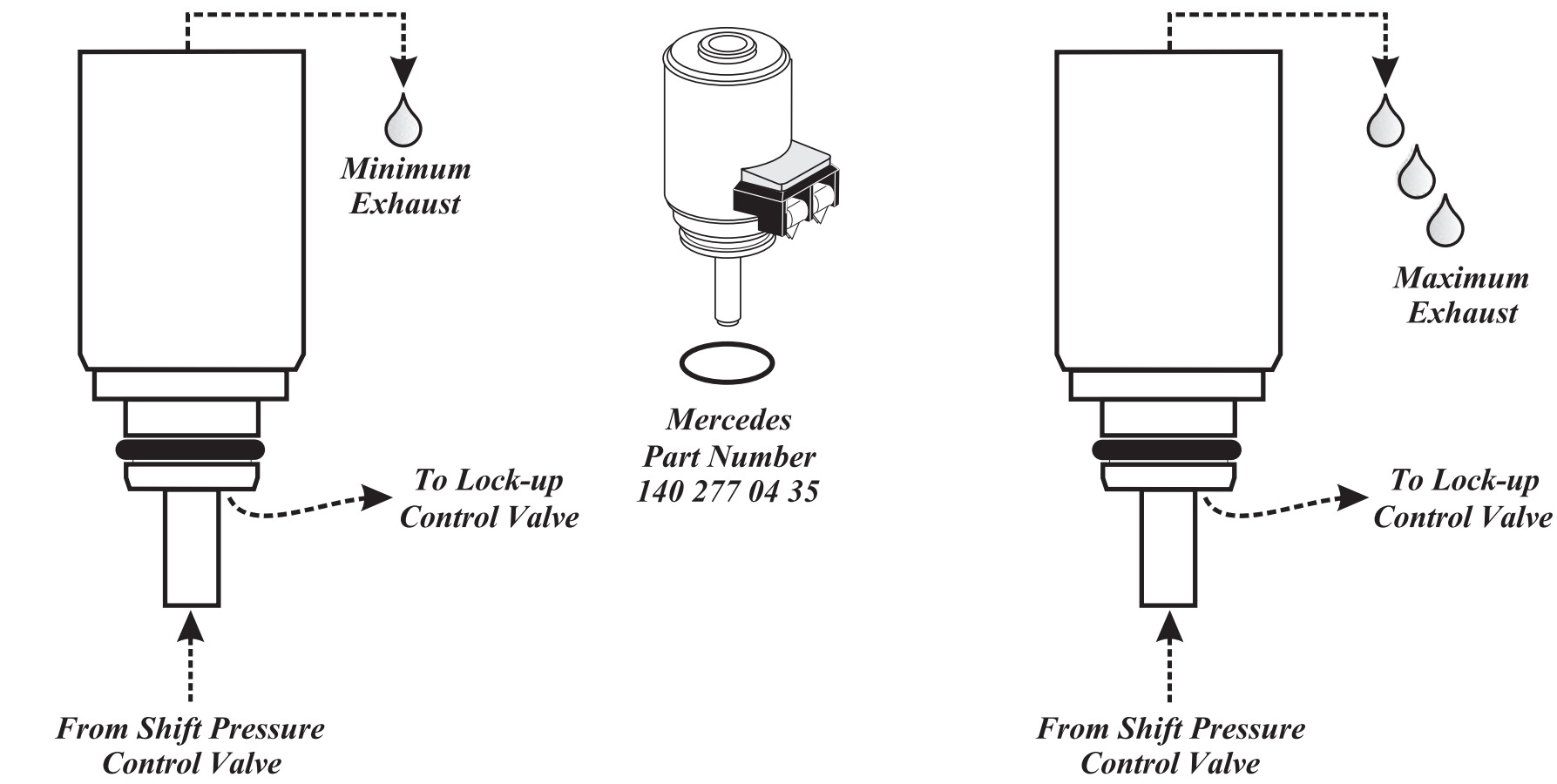


Figure 13

1-2/4-5, 2-3, AND 3-4 SHIFT SOLENOID OPERATION

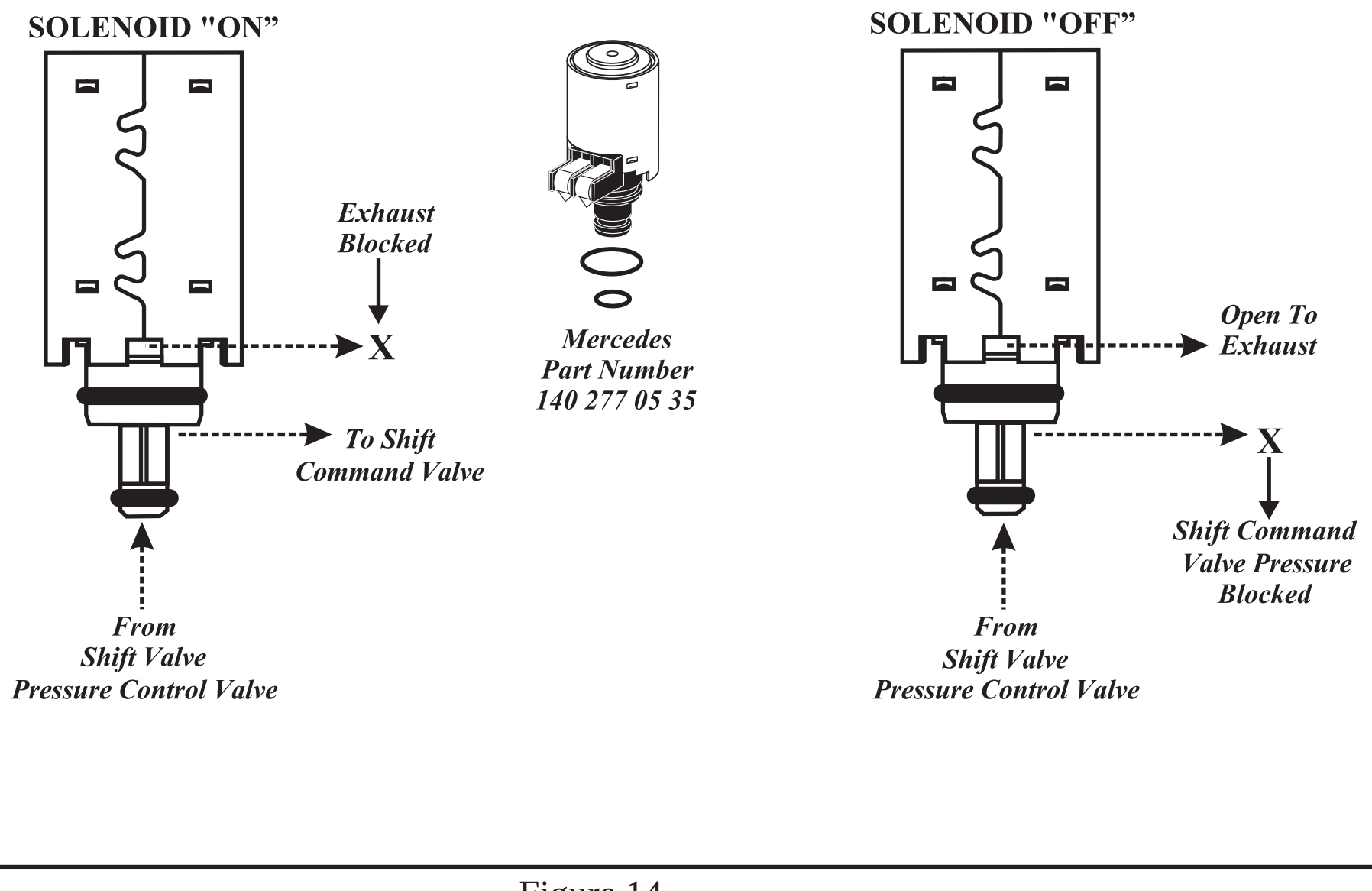
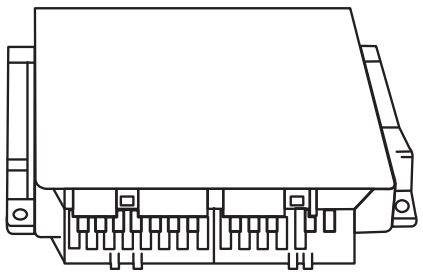


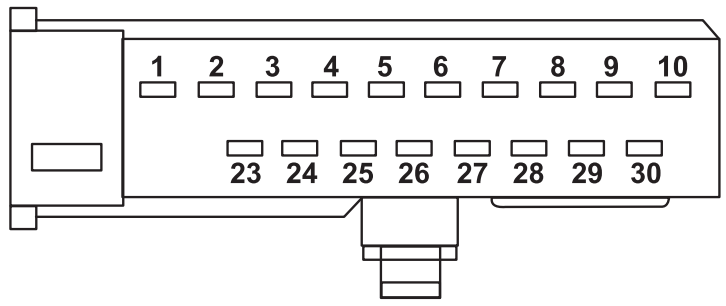
Figure 14

MERCEDES AND CHRYSLER TCM CONNECTOR AND TERMINAL IDENTIFICATION

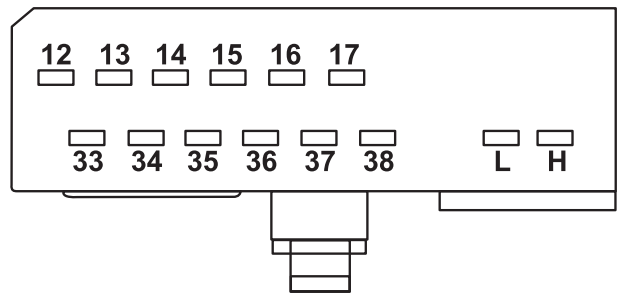
Transmission Control Module (TCM)



TCM "C1" Connector



TCM "C2" Connector



TCM		Terminal Function
Conn	Term	
C1	1	Diagnostic Output To Data Link Connector
C1	2	Kickdown Switch
C1	3	Winter/Standard Program Switch
C1	4	Reverse/Park Lock Solenoid
C1	5 & 6	Not Used
C1	7	Passenger Fuse And Relay Module Box
C1	8	Not Used
C1	9	Stop Lamp Input
C1	10	Not Used
C2	12	N2 Input Speed Sensor Signal
C2	13	Sensor 5V Voltage Supply
C2	14	1-2/4-5 Shift Solenoid Ground Signal
C2	15	3-4 Shift Solenoid Ground Signal
C2	16	2-3 Shift Solenoid Ground Signal
C2	17	TCC (PWM) Solenoid Ground Signal
C1	23 & 24	Not Used
C1	25	Transmission Range Recognition Switch (Data "A") (96-99 Only - 2000-Up They use CAN bus)
C1	26	Transmission Range Recognition Switch (Data "B") (96-99 Only - 2000-Up They use CAN bus)
C1	27	Transmission Range Recognition Switch (Data "C") (96-99 Only - 2000-Up They use CAN bus)
C1	28	Transmission Range Recognition Switch (Data "D") (96-99 Only - 2000-Up They use CAN bus)
C1	29	Transmission Control Module (TCM) Voltage Supply
C1	30	Transmission Control Module (TCM) Ground
C2	33	N2 & N3 Input Speed Sensor - TFT Sensor Ground
C2	34	TFT Temp Sensor - P/N Switch Signal
C2	35	N3 Input Speed Sensor Signal
C2	36	Modulation Pressure Control (MPC) Solenoid Ground Signal
C2	37	Shift Pressure Control (SPC) Solenoid Ground Signal
C2	38	Battery Voltage Supply to All Solenoids
C2	L	CAN Bus Data Line Low (-)
C2	H	CAN Bus Data Line High (+)

Figure 22

DAIMLER/CHRYSLER OBD-II DIAGNOSTIC TROUBLE CODES	
DTC	**DESCRIPTION**
P1638	*TCM Internal, CAN 1 RAM Performance*
P1639	*TCM Internal, CAN 2 RAM Performance*
P1644	*Incorrect Variant Configuration*
P1704	*N2 Input Speed Sensor Overspeed*
P1705	*N3 Input Speed Sensor Overspeed*
P1731	*Incorrect Gear Engaged*
P1747	*CAN Signal From TCM Failure*
P2638	*Torque Management Feedback Signal Performance*
P2767	*N3 Input Speed Sensor Circuit, No Signal*
P2783	*Torque Converter Temperature Too High*
P2784	*Input Speed Sensor N2 & N3 Correlation*
U0002	*CAN C Bus Off Performance*
U0100	*Lost Comunication With ECM/PCM*
U0103	*Lost Comunication With Electronic Gear Shift Module*
U0121	*Lost Comunication With ABS Module*
U0141	*Lost Comunication With Front Control Module*
U0155	*Lost Comunication With Instrument Cluster*
U0164	*Lost Comunication With HVAC Control Module*
U0401	*Implausible Data Recieved From ECM/PCM*
U0404	*Implausible Data Recieved From ESM*
U0415	*Implausible Data Recieved From ABS Module*
U0423	*Implausible Data Recieved From Instrument Cluster*
U0424	*Implausible Data Recieved From HVAC Control Module*
U0431	*Implausible Data Recieved From Front Control Module*
U110B	*Lost Engine Coolant Message*
U1118	*Lost Engine Message*
U1119	*Lost Front Control Module Message*
U1400	*Implausible TPS Signal Recieved*
U1401	*Implausible Engine Speed Signal Recieved*
U1402	*Implausible Engine Temperature Signal Recieved*
U1404	*Implausible Static Engine Torque Signal Recieved*
U1405	*Implausible Minimum Engine Torque Signal Recieved*
U1406	*Implausible Maximum Engine Torque Signal Recieved*
U1407	*Implausible Engine Torque Request Signal Recieved*
U1408	*Implausible Brake Signal Recieved*
U1409	*Implausible Left Front Wheel Speed Signal Recieved*
U140A	*Implausible Right Front Wheel Speed Signal Recieved*
U140B	*Implausible Left Rear Wheel Speed Signal Recieved*
U140C	*Implausible Right Rear Wheel Speed Signal Recieved*
U140D	*Implausible Wheel Speed Signals Recieved*
U140F	*Implausible Engine Variant Data*
U1410	*Implausible or Missing Front Control Module Variant Data*
U1507	*Implausible Engine Temperature Data Length Recieved*
U1509	*Implausible Engine Variant Message Data Length Recieved*
U150A	*Implausible Front Control Module Variant Message Data Length Recieved*

Figure 33

TRANSMISSION DISASSEMBLY (CONT'D)

5. Install dial indicator on transmission, as shown in Figure 42, with the plunger against flat spot on the input shaft.
6. Zero dial indicator and move the input shaft in and out to measure end-play.
7. Record measurement for assembly reference. End-play should be 0.3-0.5mm (.012"-.020").
8. Rotate transmission so that output shaft yoke is facing up, as shown in Figure 43.
   Caution: Drain pan may be required under transmission to catch fluid.
9. Place the transmission in the Park position to prepare for removal of the output shaft nut.
10. Remove the output shaft drive yoke retaining nut, using a 30 mm, 12 point socket, as shown in Figure 43.
11. Remove the output shaft drive yoke, as shown in Figure 43.
12. Remove and discard the transmission rear seal, as shown in Figure 43.
13. Remove the transmission output shaft washer, as shown in Figure 43.
    Note: Tag the washer, or tie-wrap it to the yoke since it is very similar to the geartrain end-play shim and they "must not" be interchanged.

Continued on Page 41

Input Shaft End-Play Should Be 0.3 - 0.5 mm (.012" - .020")

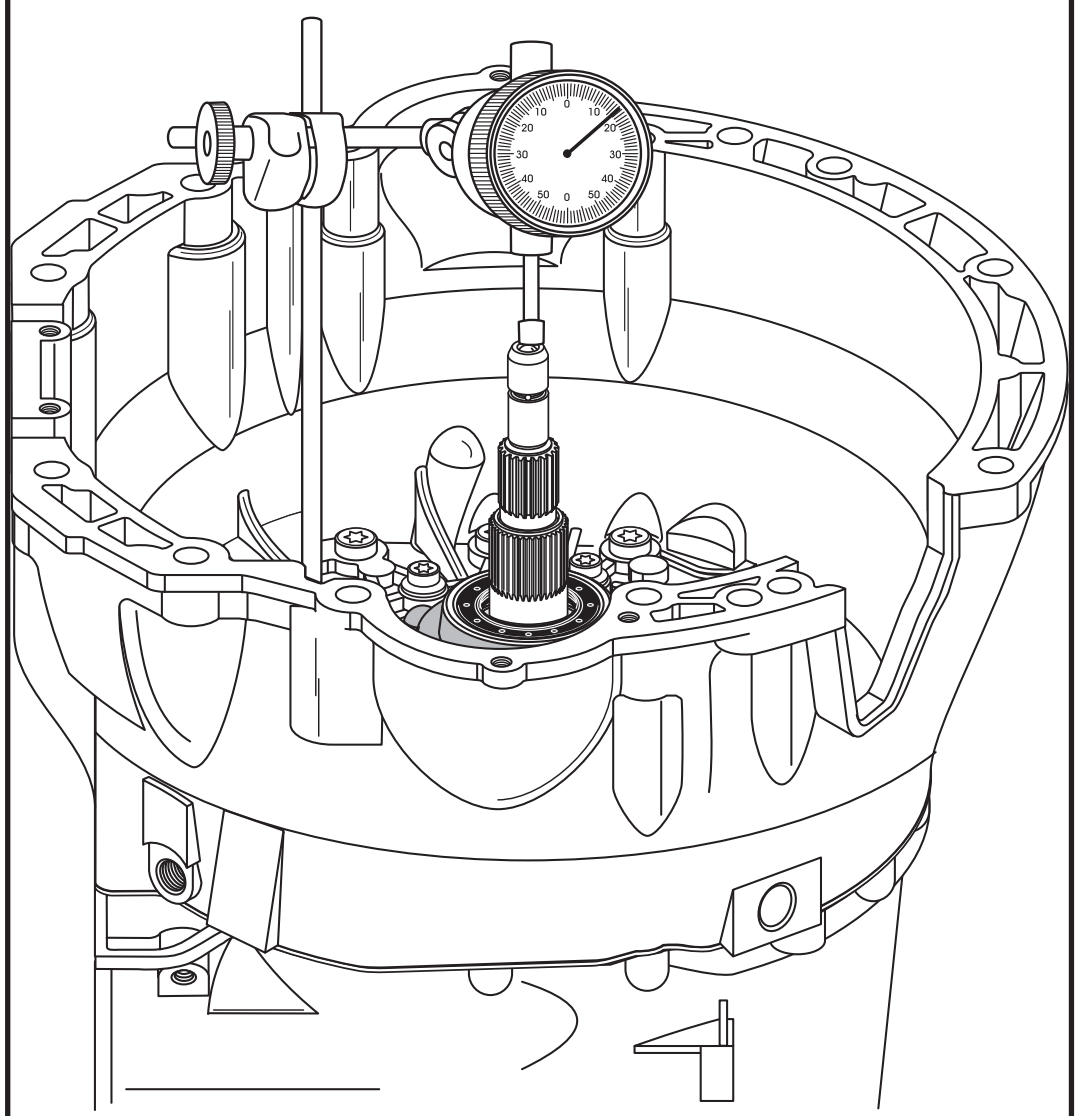
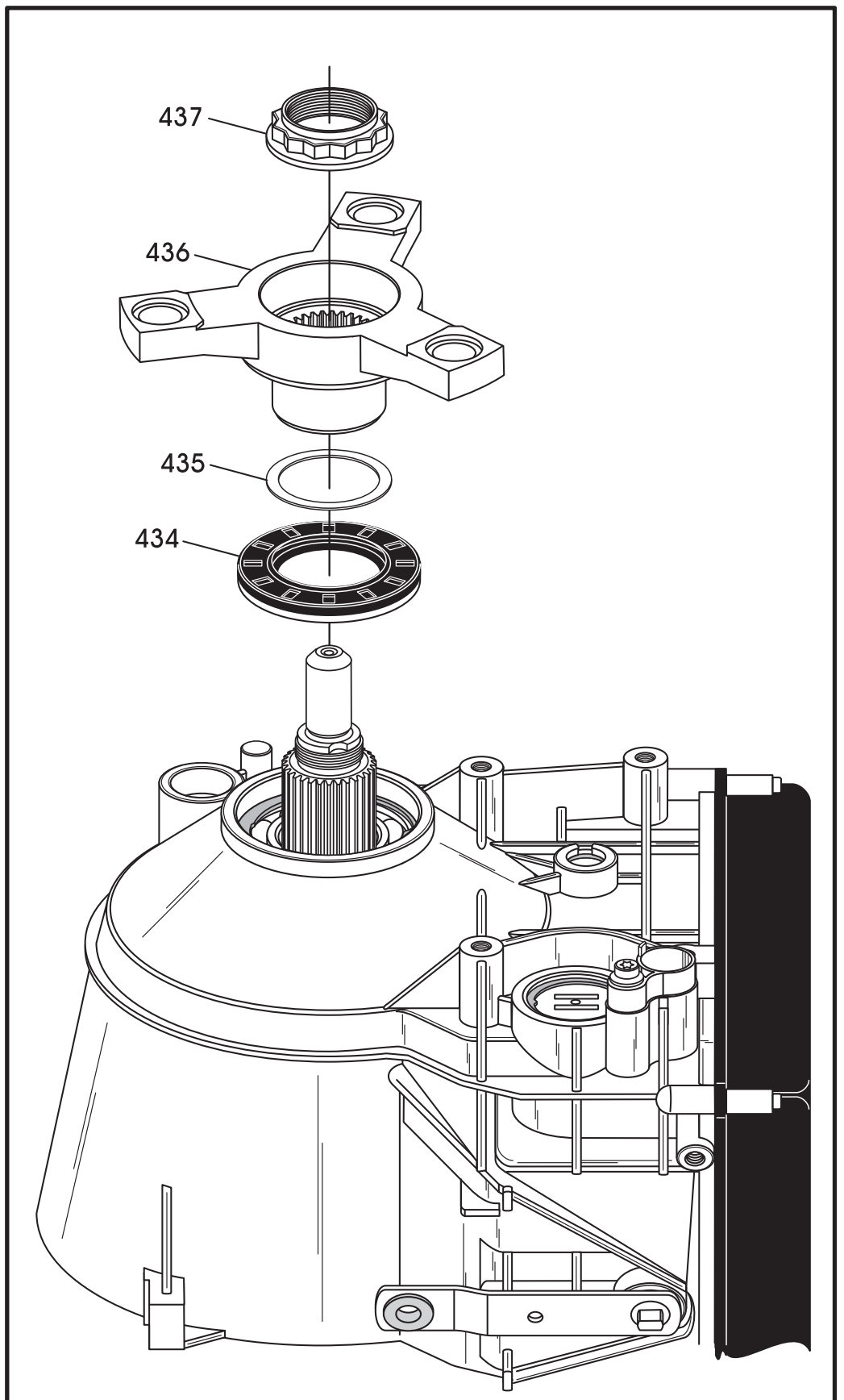
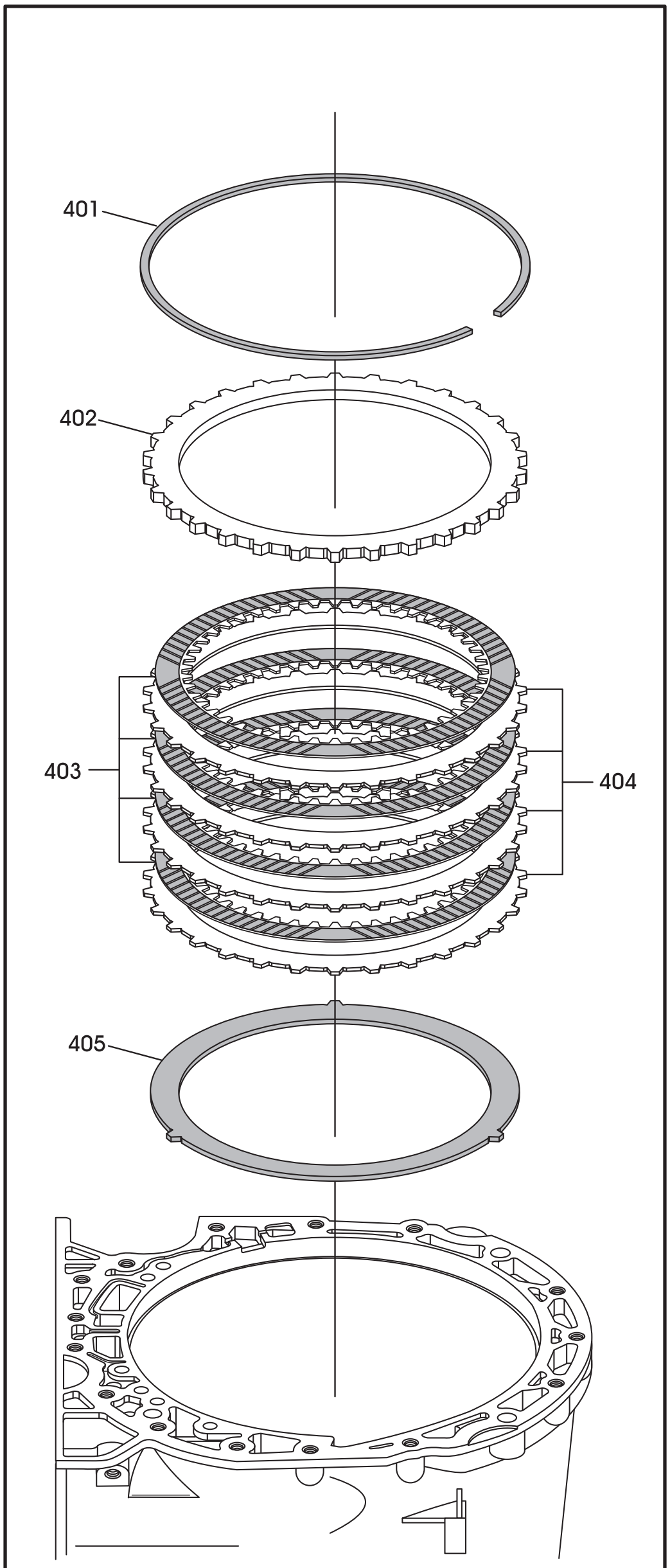


Figure 42



434 REAR TRANSMISSION SEAL.
435 OUTPUT SHAFT THRUST WASHER.
436 OUTPUT SHAFT DRIVE YOKE.
437 REAR DRIVE YOKE RETAINING NUT.

Figure 43



401 B-3 CLUTCH "*SELECTIVE*" SNAP RING.
402 B-3 CLUTCH BACKING PLATE.
403 B-3 CLUTCH FRICTION PLATES (QTY VARIES, SEE CHART).
404 B-3 CLUTCH STEEL PLATES (QTY VARIES, SEE CHART).
405 B-3 CLUTCH CUSHION PLATE.

Figure 53

TRANSMISSION DISASSEMBLY (CONT'D)

31. Remove the B-3 *selective* snap ring, as shown in Figure 53.

    Note: It is recommended that all snap rings be tagged for identification as many are very similar, but will not interchange.
32. Remove complete B-3 clutch pack, as shown in Figure 53.
33. Remove the B-2 clutch housing assembly, as shown in Figure 54, and set aside for the component rebuild section.

Continued on Page 46

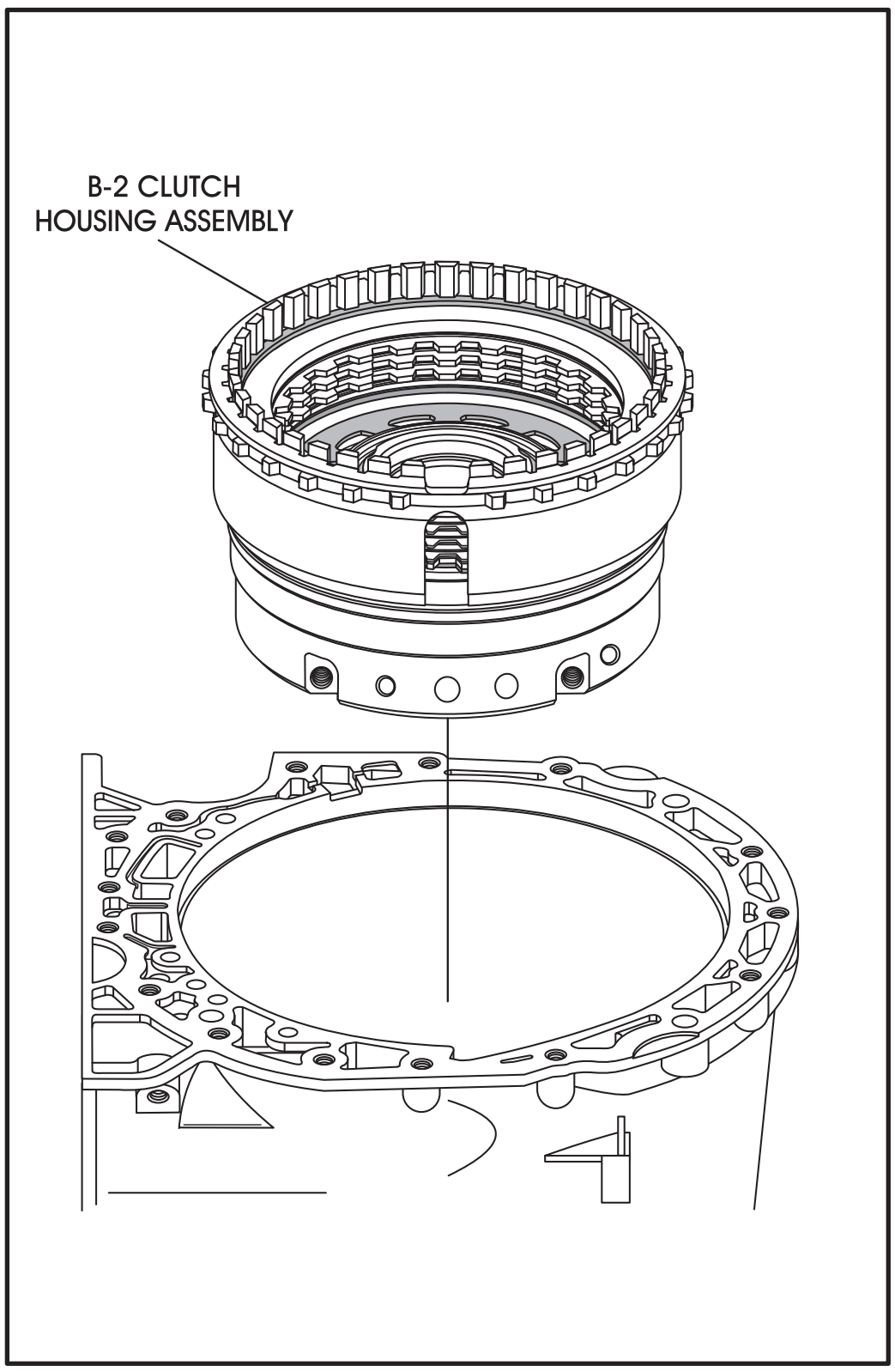
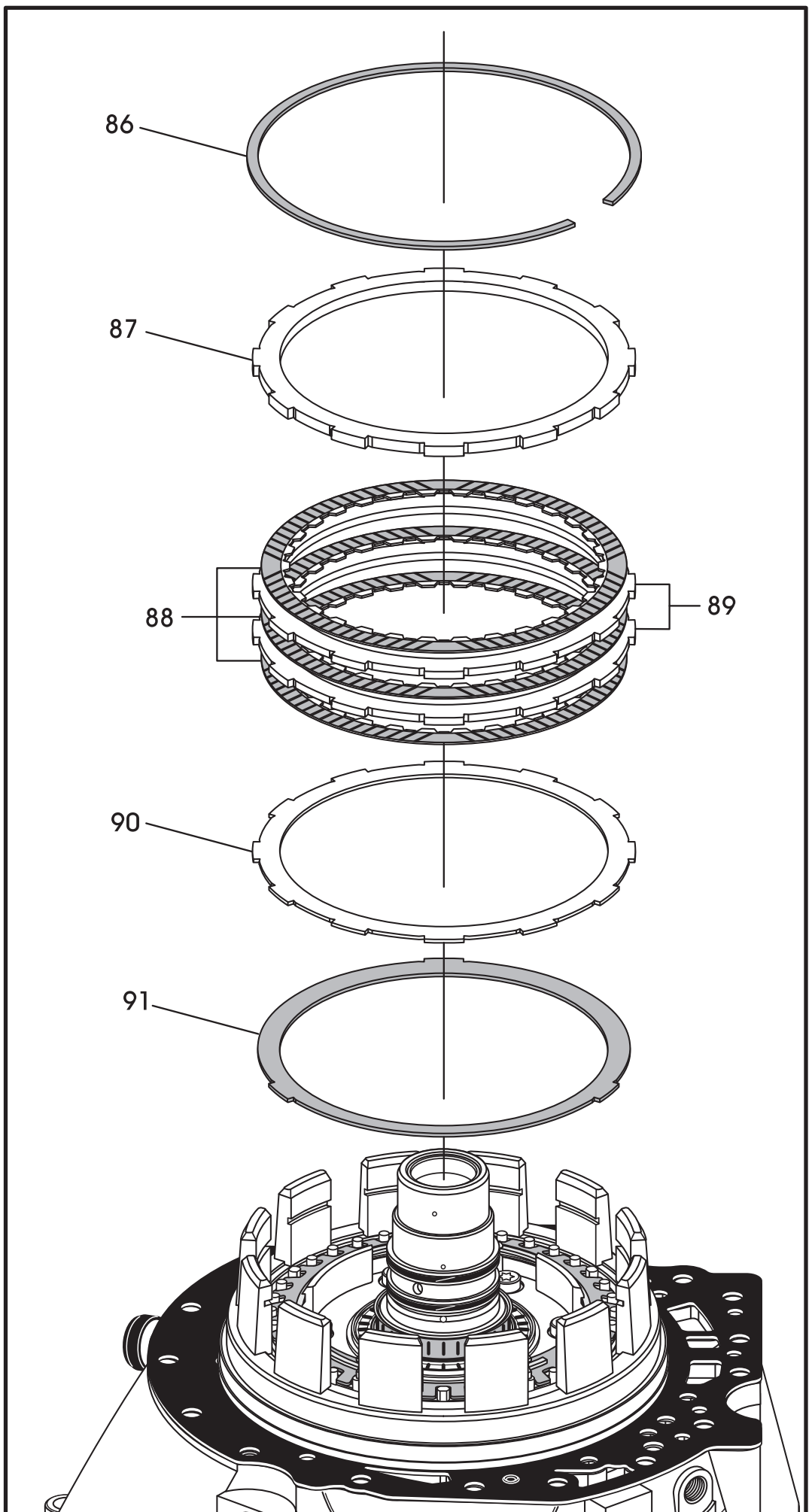


Figure 54



86 B-1 CLUTCH BACKING PLATE "*SELECTIVE*" SNAP RING.
87 B-1 CLUTCH BACKING PLATE.
88 B-1 CLUTCH FRICTION PLATES (QTY. VARIES, SEE CHART).
89 B-1 CLUTCH STEEL PLATES (QTY. VARIES, SEE CHART).
90 B-1 CLUTCH APPLY PLATE (.071").
91 B-1 CLUTCH CUSHION PLATE.

Figure 61

COMPONENT REBUILD (CONT'D)

Oil Pump And B-1 Clutch Assembly

1. Place converter housing, oil pump, B-1 clutch assembly face down on a flat work surface, as shown in Figure 61.
2. Remove the B-1 clutch *selective* snap ring, as shown in Figure 61.
   Note: It is recommended that all snap rings be tagged for identification as many are very similar, but will not interchange.
3. Remove the complete B-1 clutch, as shown in Figure 61.
4. Turn the converter housing over and remove the 11 retaining bolts, as shown in Figure 62, using a 30 Torx bit.

Continued on Page 50

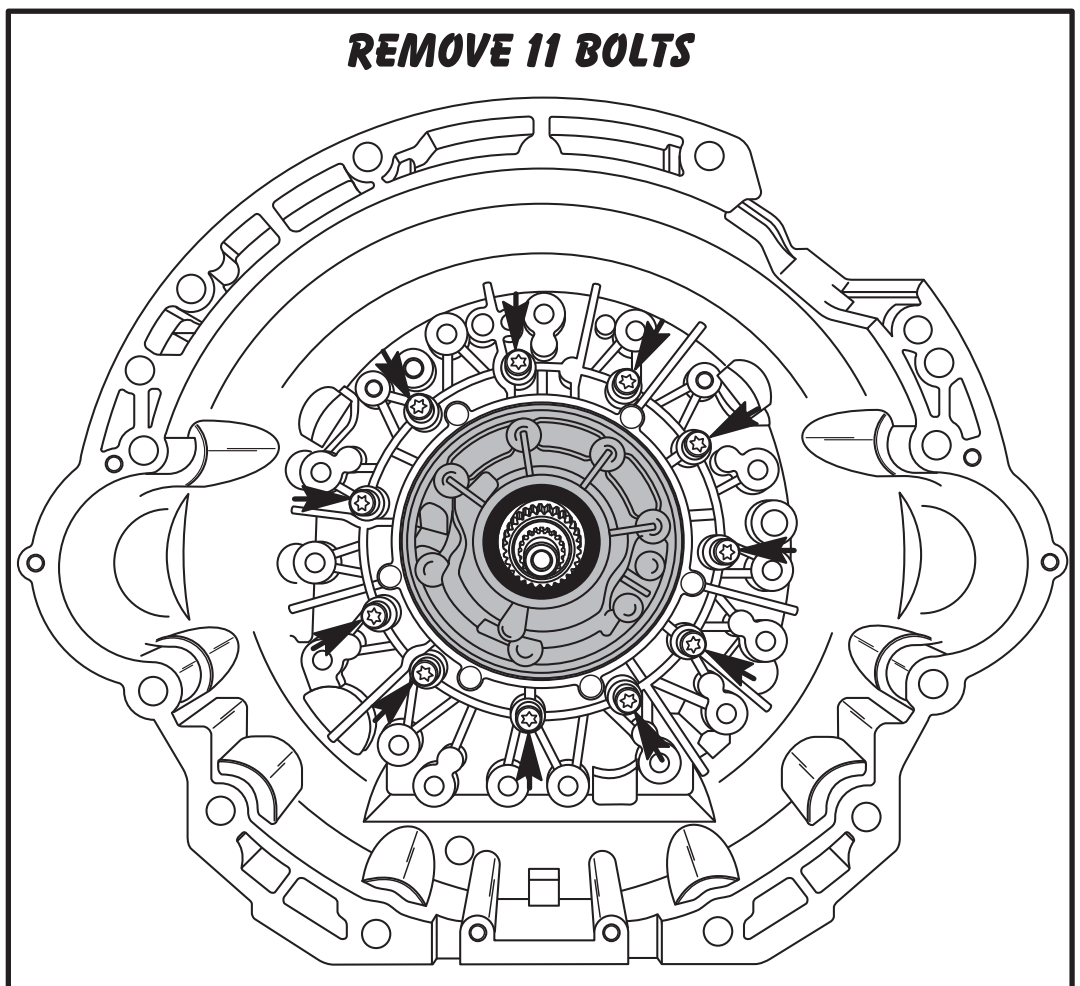


Figure 62

Oil Pump And B-1 Clutch Assembly (Cont'd)

39. Use caution when installing B-1 clutch plates.

Caution: The B-1 clutch may have 2, 3, or 4 "double-sided" friction plates depending on the model. Refer to the chart in Figure 78 for reference.

Later models may also use "single-sided" friction plates. We will cover the assembly process for both.

All friction plates should be soaked in proper fluid for 30 minutes before installation.

"Double-Sided" Clutch Plates

40. Install the B-1 clutch "dished" cushion plate in direction shown in Figure 79.
41. Install the .071" thick apply plate, as shown in Figure 79.
42. Install "double-sided" frictions beginning with a friction plate and alternating with steel plates, as shown in Figure 79.

Note: Steel plate thickness will vary depending on snap ring groove location and number of frictions required.

43. Install the B-1 clutch backing plate, as shown in Figure 79.
44. Install the B-1 clutch *selective* snap ring, as shown in Figure 79.

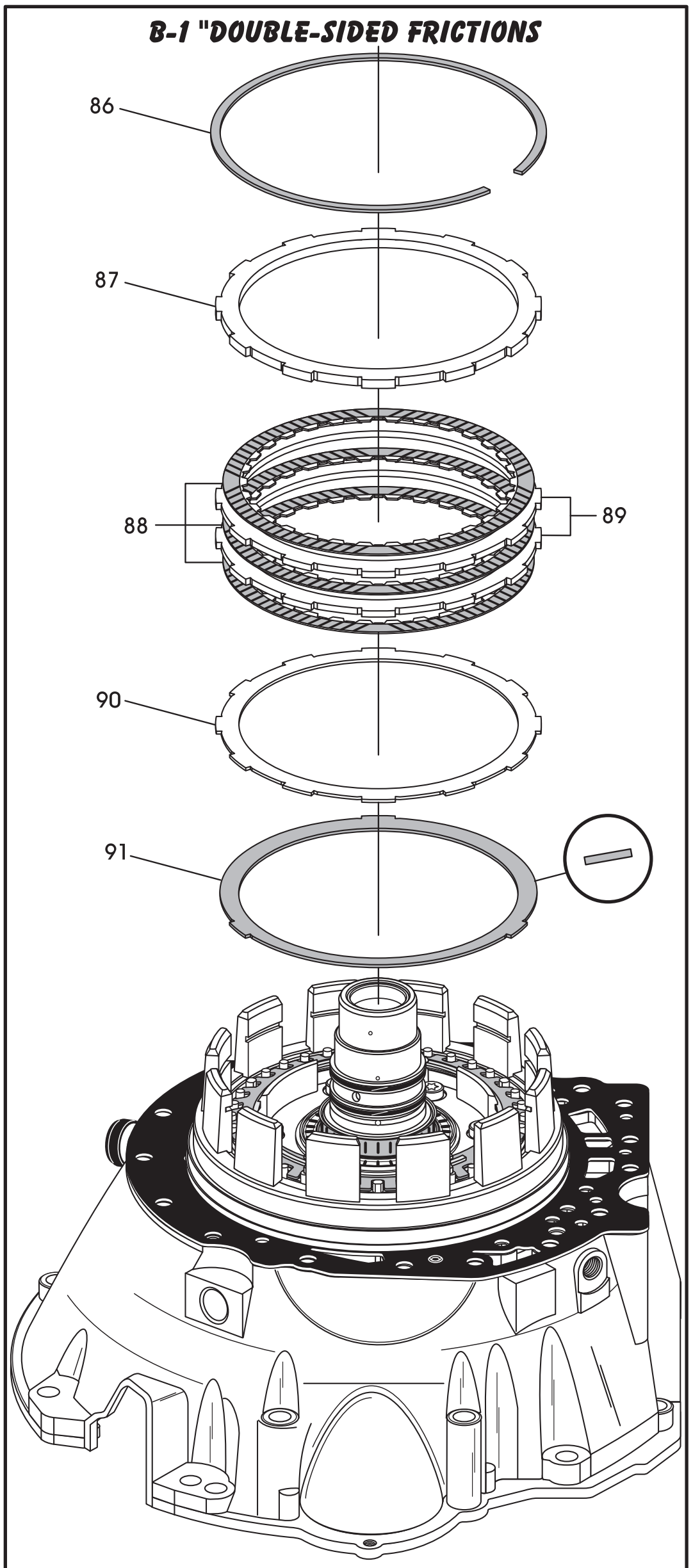
Continued on Page 58

B-1 CLUTCH QUANTITY CHART BY MODEL

TRANSMISSION MODEL	LINED PLATE	STEEL PLATE	BACK. PLATE	THIN APPLY PLATE
722.600/660	2	1	1	1
722.601/602/603/610	2	1	1	1
722.604/606/609/617	3	2	1	1
722.605/607/608/611/614 618/662/664/699	3	2	1	1
722.665	3	2	1	1
722.620/621/624/626/627 628/630/633/636/666	4	3	1	1
722.622/623/625 631/632/663/669	3	2	1	1
722.629/634/661	4	3	1	1

The number of B-1 friction plates used is model dependant and determined by the backing plate snap ring location and the thickness of the steel plates.

Figure 78



86 B-1 CLUTCH BACKING PLATE "*SELECTIVE*" SNAP RING.
87 B-1 CLUTCH BACKING PLATE.
88 B-1 CLUTCH "DOUBLE-SIDED" FRICTION PLATES (QTY. VARIES).
89 B-1 CLUTCH STEEL PLATES (QTY. VARIES).
90 B-1 CLUTCH APPLY PLATE (.071").
91 B-1 CLUTCH DISHED CUSHION PLATE.

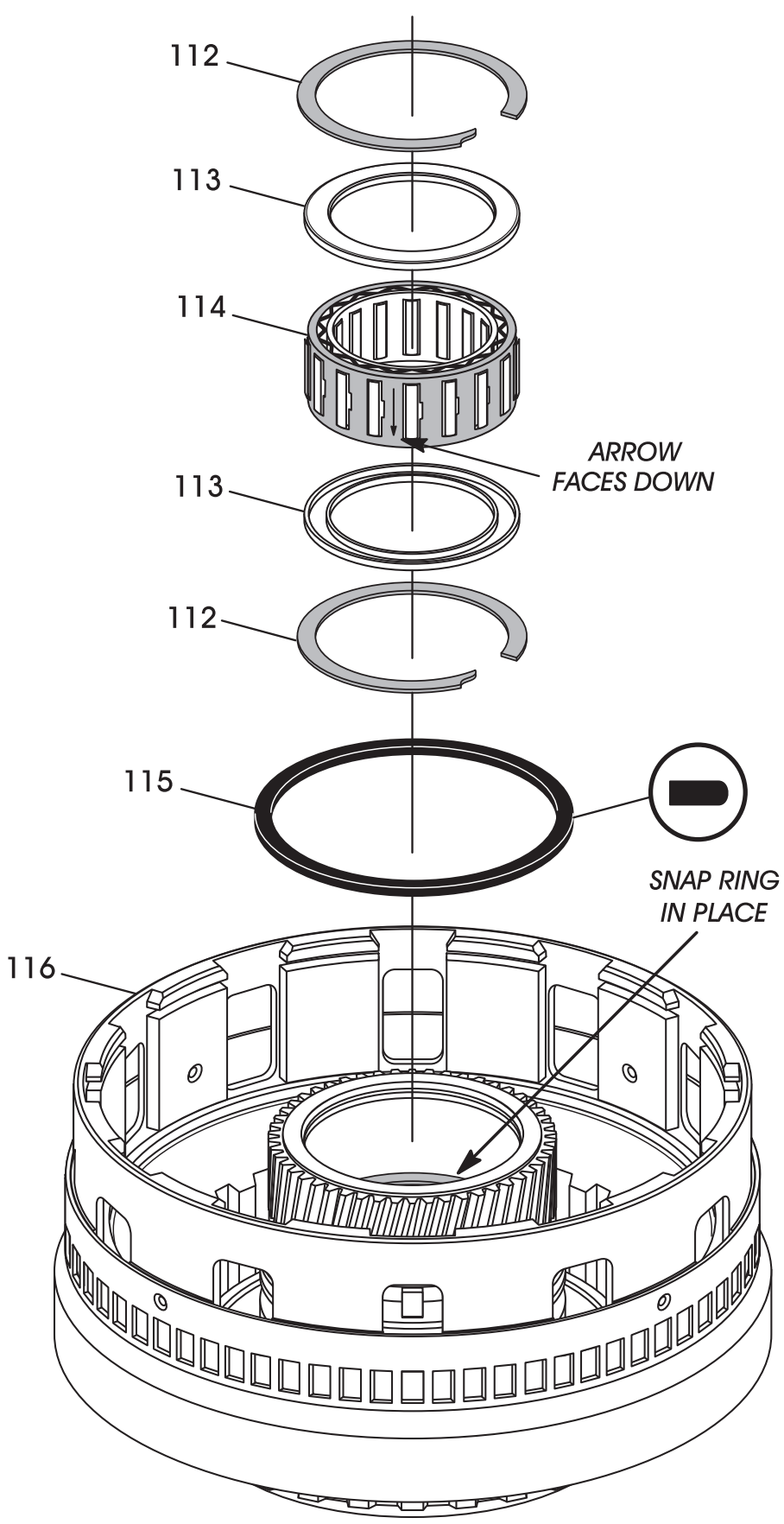
Figure 79

COMPONENT REBUILD (CONT'D)

K-1 Clutch Housing Assembly (Cont'd)

7. Install new "D" ring seal into the K-1 clutch housing, as shown in Figure 89, and lube with a small amount of Trans-Jel®.
8. Ensure that the bottom snap ring for F-1 sprag is in place, as shown in Figure 89.
9. Install the first end bearing on top of the snap ring with the lips facinng up, as shown in Figure 89.
10. Install the F-1 sprag assembly with the arrow facing down, as shown in Figure 89.
11. Install the second end bearing with the lips facing down, as shown in Figure 89.
12. Install the second snap ring on top of the end bearing, as shown in Figure 89, and ensure that it is fully seated.
13. Install the K-1 clutch housing onto the B-1 clutch housing, as shown in Figure 90.
14. The K-1 clutch housing should freewheel in counter-clockwise direction and lock in the clockwise direction, as shown in Figure 90.
15. If it does not, you have the sprag in upside down.

Continued on Page 64



112 F1 SPRAG SNAP RING (2 REQUIRED).
113 F1 SPRAG END BEARINGS (2 REQUIRED).
114 F1 SPRAG ASSEMBLY.
115 K1 CLUTCH PISTON INNER "D" RING SEAL.
116 K1 CLUTCH HOUSING ASSEMBLY.

Figure 89

K-1 DRUM AND SUN GEAR SHOULD FREEWHEEL COUNTER-CLOCKWISE AND LOCK CLOCKWISE

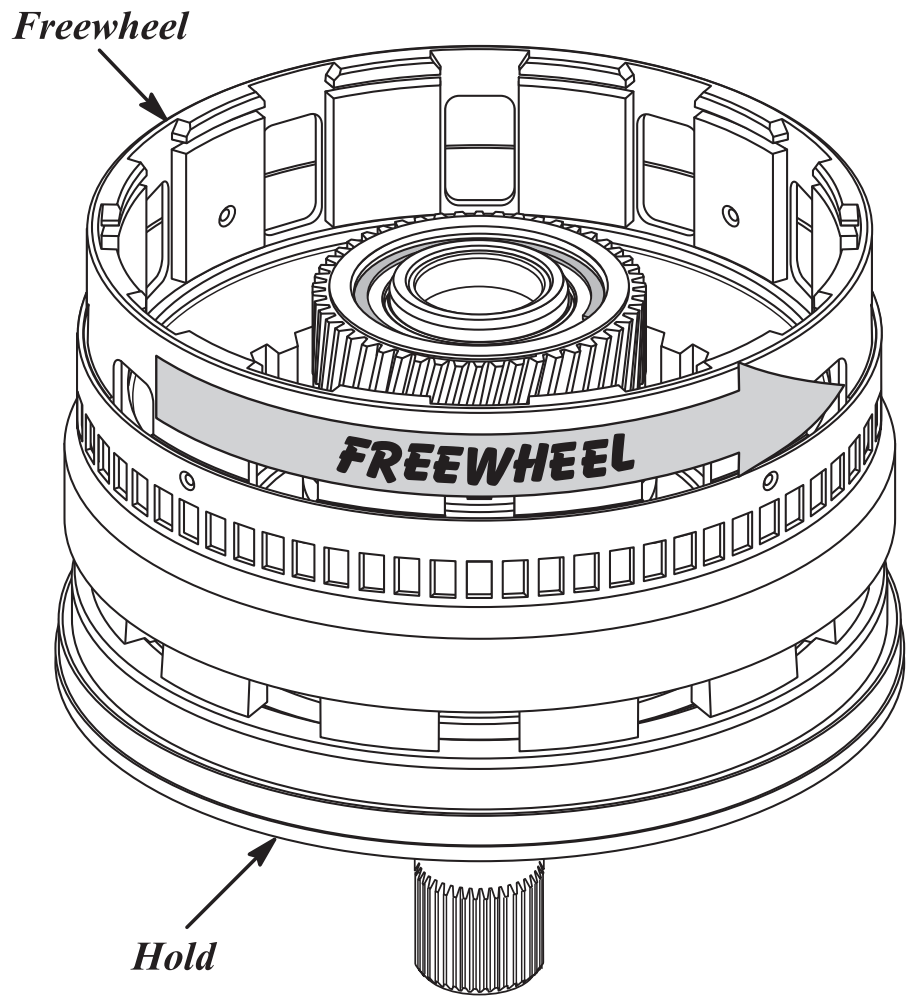


Figure 90

COMPONENT REBUILD (CONT'D)

K-2 Clutch Housing Assembly (Cont'd)

17. Use caution when installing K-2 clutch plates.

    Caution: The K-2 clutch may have 3, 4, 5, or 6 "double-sided" friction plates depending on the model. Refer to the chart in Figure 108 for reference. We have not found any of the "single-sided" frictions in the K-2 clutch. All friction plates should be soaked in proper fluid for 30 minutes before installation.

18. Install the K-2 clutch .071" thick apply plate, as shown in Figure 109.
19. Install "double-sided" clutches beginning with a friction plate and alternating with steel plates, as shown in Figure 109, until you have proper number of plates installed.

    Note: Steel plate thickness will vary depending on snap ring groove location and number of frictions required (See chart Figure 108).

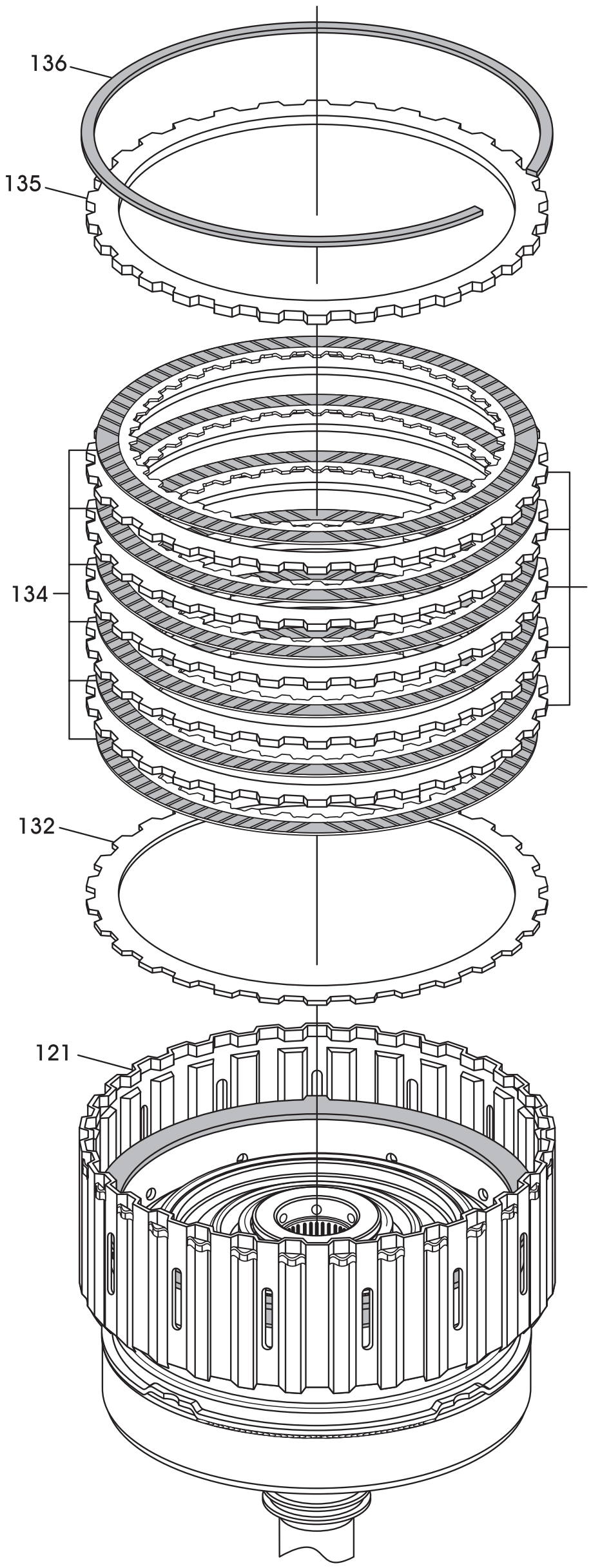
20. Install the K-2 clutch backing plate, as shown in Figure 109.
21. Install the K-2 clutch *selective* snap ring, as shown in Figure 109.

Continued on Page 74

K-2 CLUTCH QUANTITY CHART BY MODEL				
TRANSMISSION MODEL	*LINED PLATE*	*STEEL PLATE*	*BACK. PLATE*	*THIN APPLY PLATE*
722.600/660	4	3	1	1
722.601/602/603/610	3	2	1	1
722.604/606/609/617	4	3	1	1
722.605/607/608/611/614 618/662/664/699	4	3	1	1
722.665	4	3	1	1
722.620/621/624/626/627 628/630/633/636/666	6	5	1	1
722.622/623/625 631/632/663/669	5	4	1	1
722.629/634/661	5	4	1	1

The number of K-2 friction plates used is model dependant and determined by the backing plate snap ring location and the thickness of the steel plates.

Figure 108



121 K-2 CLUTCH HOUSING ASSEMBLY.
132 K-2 CLUTCH APPLY PLATE, .071" THICK.
133 K-2 CLUTCH STEEL PLATES, .110" THICK (QTY VARIES).
134 K-2 CLUTCH FRICTION PLATES (QTY VARIES - SEE CHART).
135 K-2 CLUTCH BACKING PLATE, .138" THICK.
136 K-2 CLUTCH "SELECTIVE" SNAP RING.

Figure 109

COMPONENT REBUILD (CONT'D)

Center & Rear Planetary Gearset

1. Removing the snap ring (456) from the output shaft, as shown in Figure 123, will allow you to disassemble the geartrain using Figure 123 as a guide.
2. The rear sun gear changed with the bushing being replaced with a ball bearing, as shown in Figure 124.
3. This allowed the elimination of the number 9 thrust bearing and number 10 thrust bearing race, as shown in Figure 124.
4. We will cover the assembly process for both the early and late versions.

Continued on Page 83

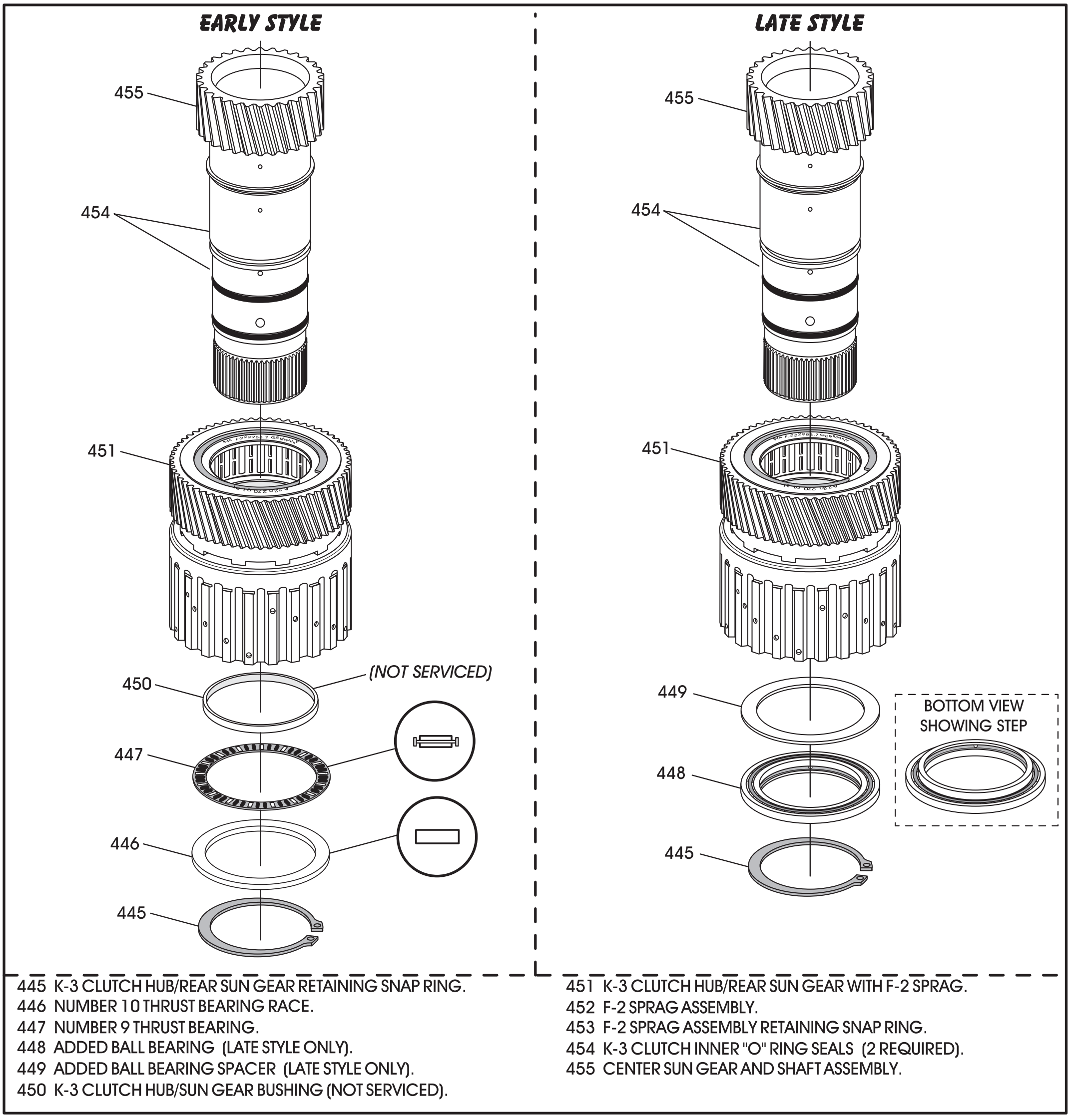
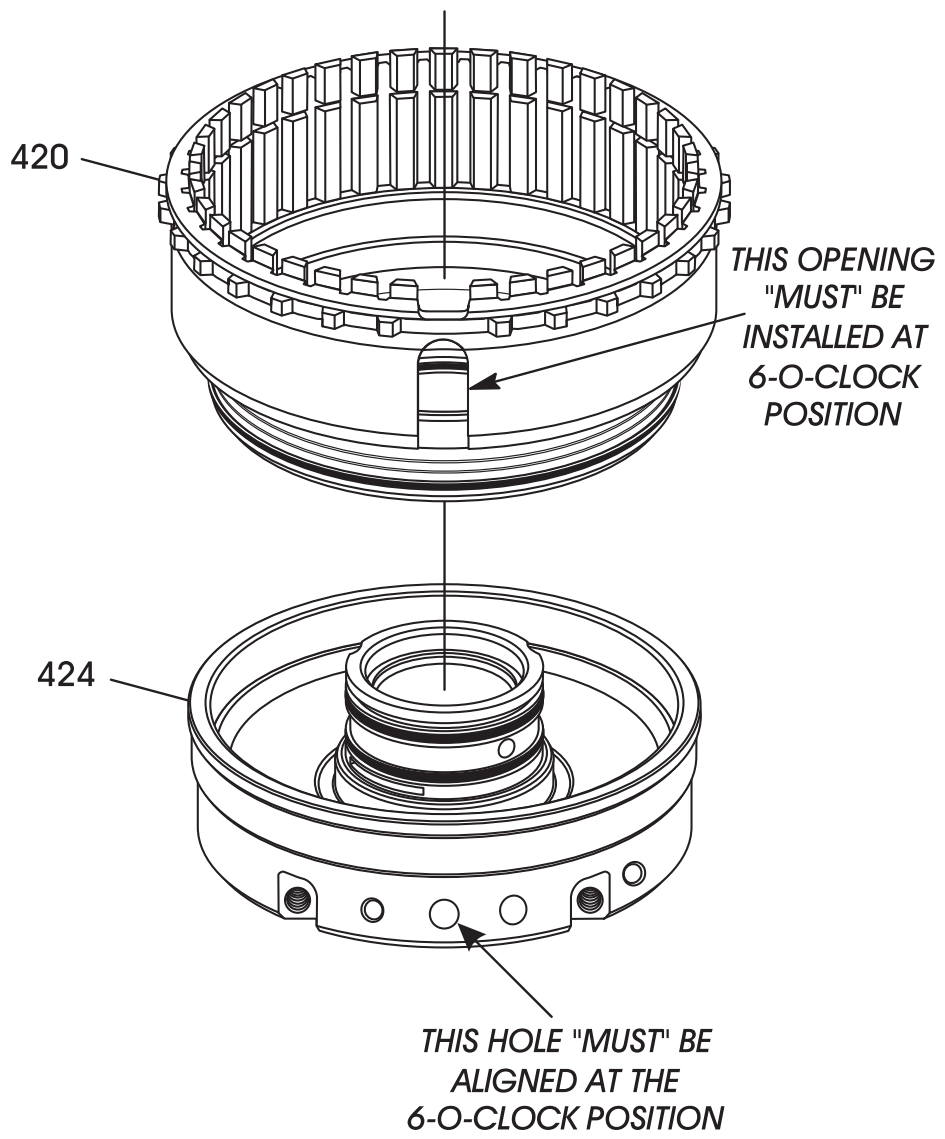


Figure 124



420 B-3 CLUTCH APPLY PISTON WITH SEALS.
424 B-2/B-3 CLUTCH PISTON HOUSING ASSEMBLY.

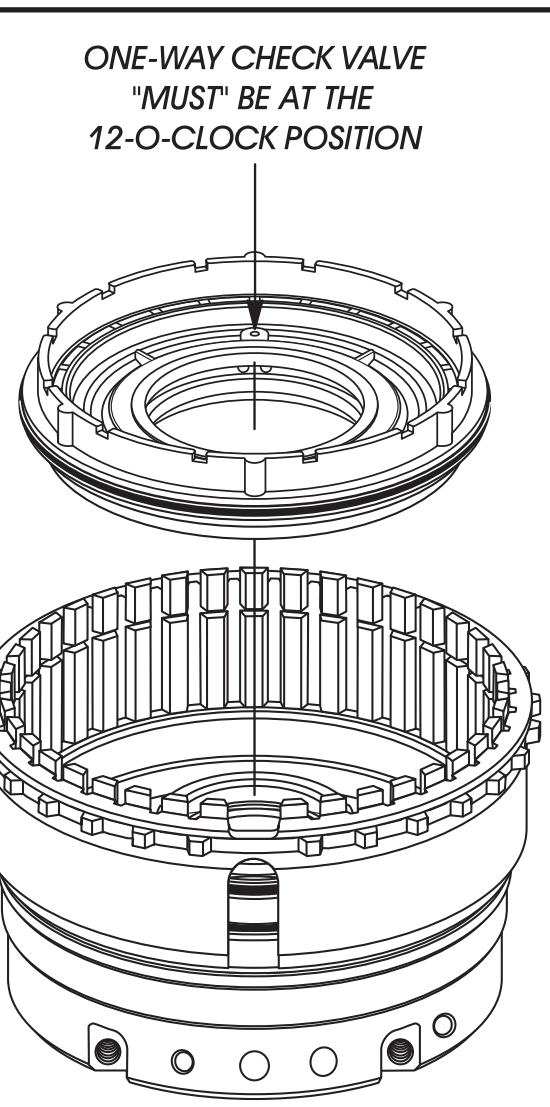
Figure 159

COMPONENT REBUILD (CONT'D)

B-2 Clutch Housing Assembly (Cont'd)

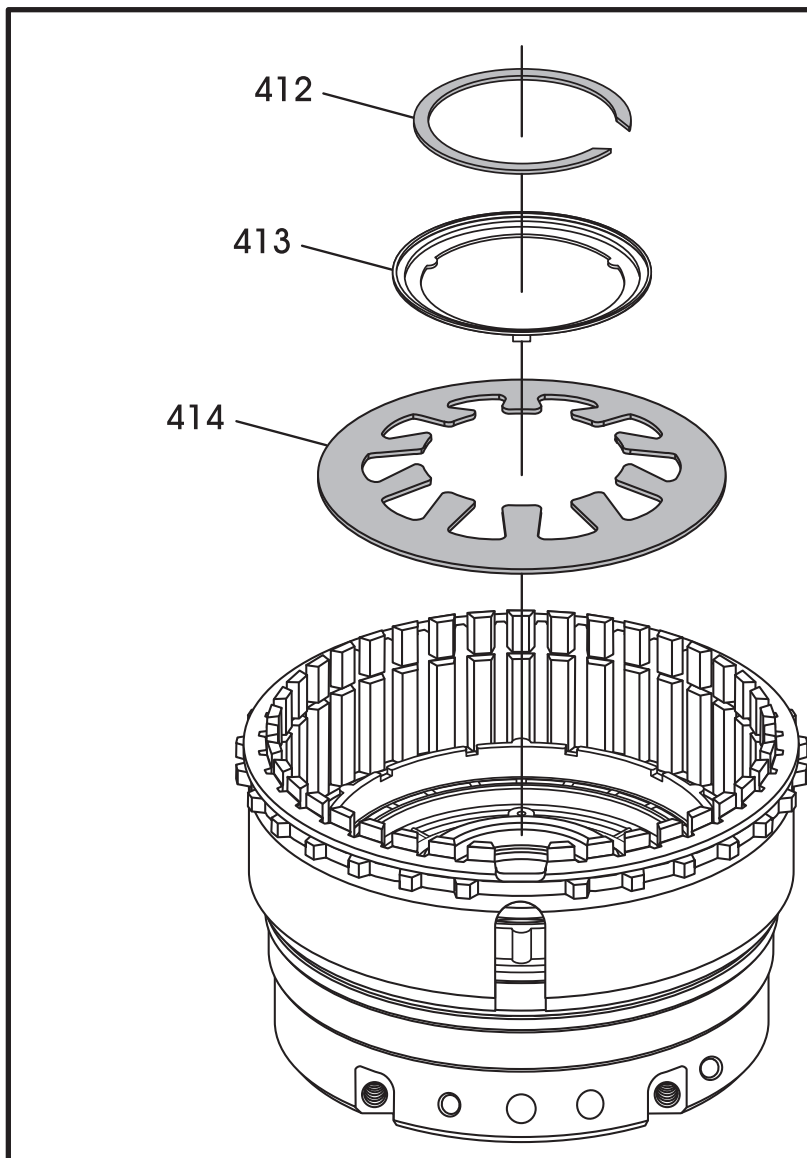
16. Place B-2/B-3 clutch piston housing assemby on a flat work surface with the hole shown in Figure 159 at ***exactly*** the 6-O-clock position.
17. Install B-3 clutch apply piston with opening at ***exactly*** the 6-O-clock position, as shown in Figure 159.
    Note: Steps 16 and 17 must be followed "exactly" as written. Align perfectly after piston is installed, if necessary.
18. Install the B-2 apply piston with B-2 piston guide installed, as shown in Figure 160.
    Note: 1-way check valve must be installed "exactly" at the 12-O-clock position and is shown in Figure 160.
19. Install the B-2/B-3 piston return spring in the direction shown in Figure 161.
20. Install B-2/B-3 piston return spring retainer, as shown in Figure 161.
21. Compress the return spring and retainer and install the snap ring, as shown in Figure 161. Everything done properly, it goes right on.

Continued on Page 100



418 B-2 CLUTCH APPLY PISTON AND B-2 PISTON GUIDE.

Figure 160



412 B-2/B-3 APPLY PISTON SPRING RETAINER SNAP RING.
413 B-2/B-3 APPLY PISTON SPRING RETAINER.
414 B-2/B-3 APPLY PISTON RETURN SPRING.

Figure 161

TRANSMISSION FINAL ASSEMBLY (CONT'D)

9. Measure B-3 clutch clearance using a feeler gauge between the selective snap ring and the backing plate, as shown in Figure 179.
10. B-3 clutch clearance is the same for all models and should be 1.0 - 1.4mm (.039" - .055"), as shown in Figure 179.
11. Change the selective snap ring as necessary to obtain the proper clutch clearance. There are 6 different snap ring thickness' available and are listed in Figure 179.
12. Install the completed center and rear planetary gearset, as shown in Figure 180, by rotating back and forth as you have 2 sets clutches to engage.
13. Slide yoke on the output shaft splines to assist in rotating the assembly, if necessary.
    Note: Ensure number 5 thrust bearing is still in place, as shown in Figure 180. The number 4 thrust bearing race was installed on the K-2 clutch housing.

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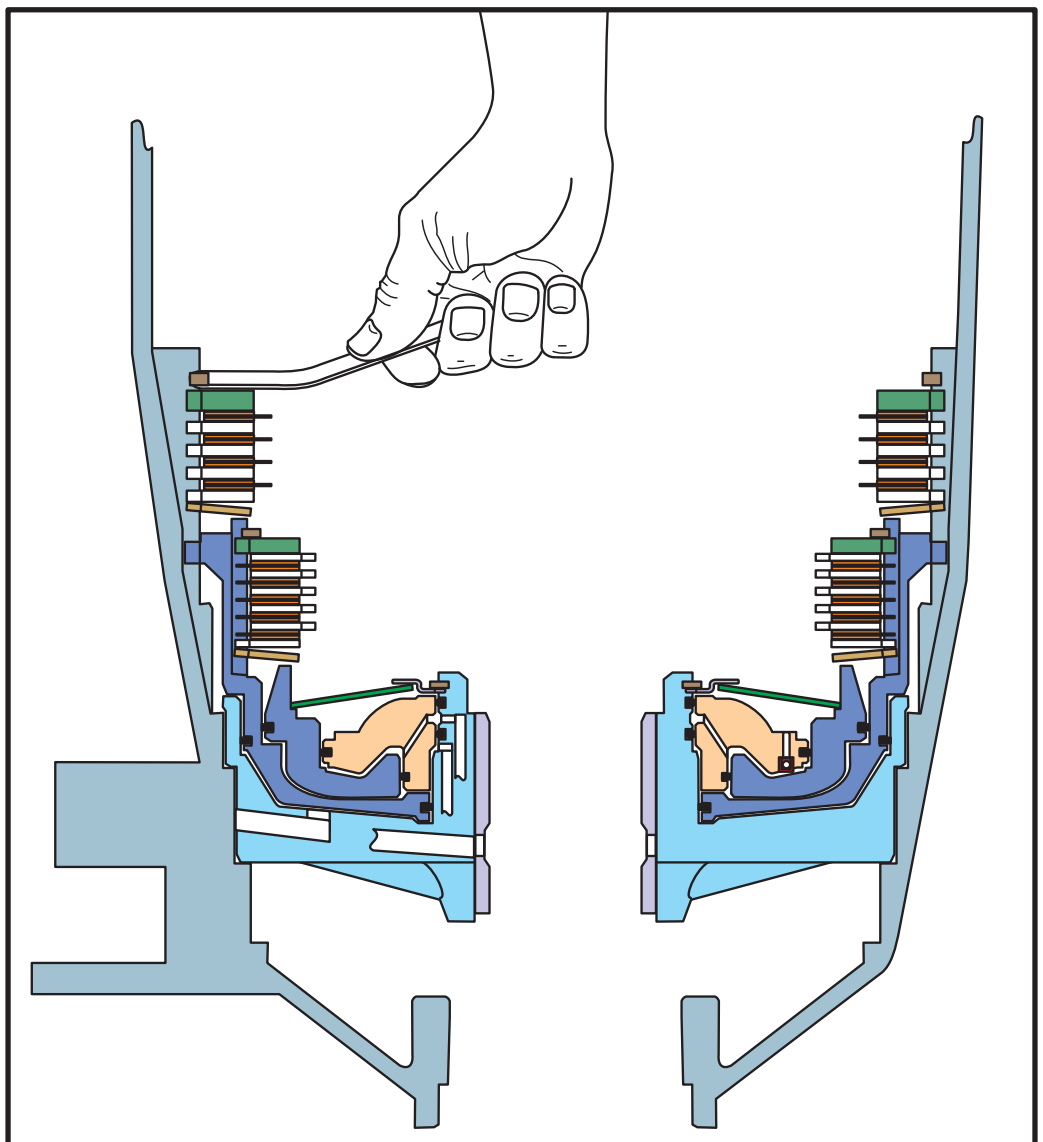
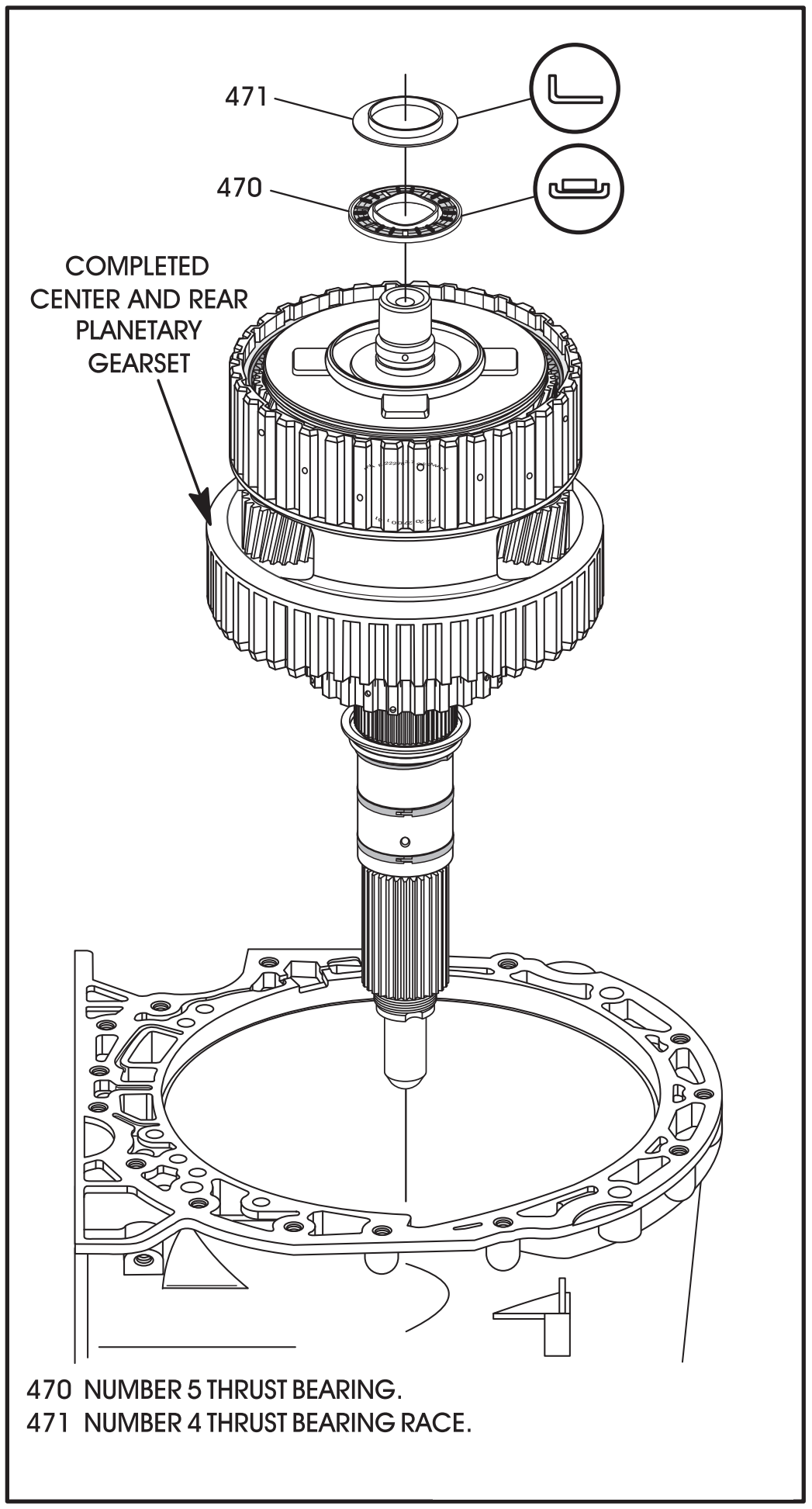


B-3 Clutch Clearance Should Be;
"All Models" 1.0 - 1.4mm (.039" - .055")

B-3 CLUTCH SELECTIVE SNAP RINGS	
THICKNESS	PART NUMBER
3.1 MM (.122")	140 994 15 35
3.4 MM (.134")	140 994 16 35
3.7 MM (.146")	140 994 17 35
4.0 MM (.157")	140 994 41 35
4.3 MM (.169")	140 994 42 35
4.6 MM (.181")	140 994 43 35

Figure 179



470 NUMBER 5 THRUST BEARING.
471 NUMBER 4 THRUST BEARING RACE.

Figure 180