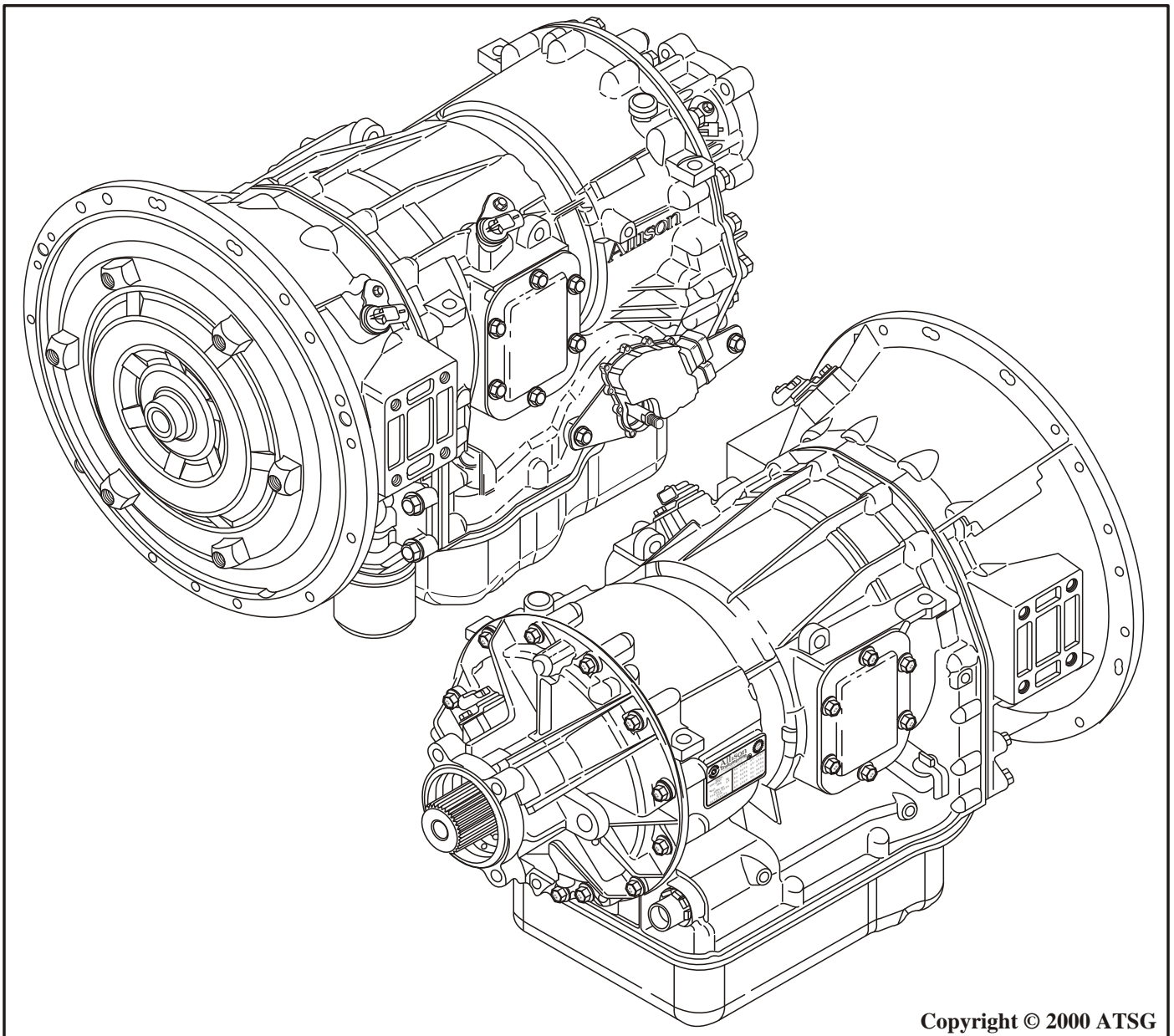




Technical Service Information

ALLISON 1000/2000 SERIES PRELIMINARY INFORMATION

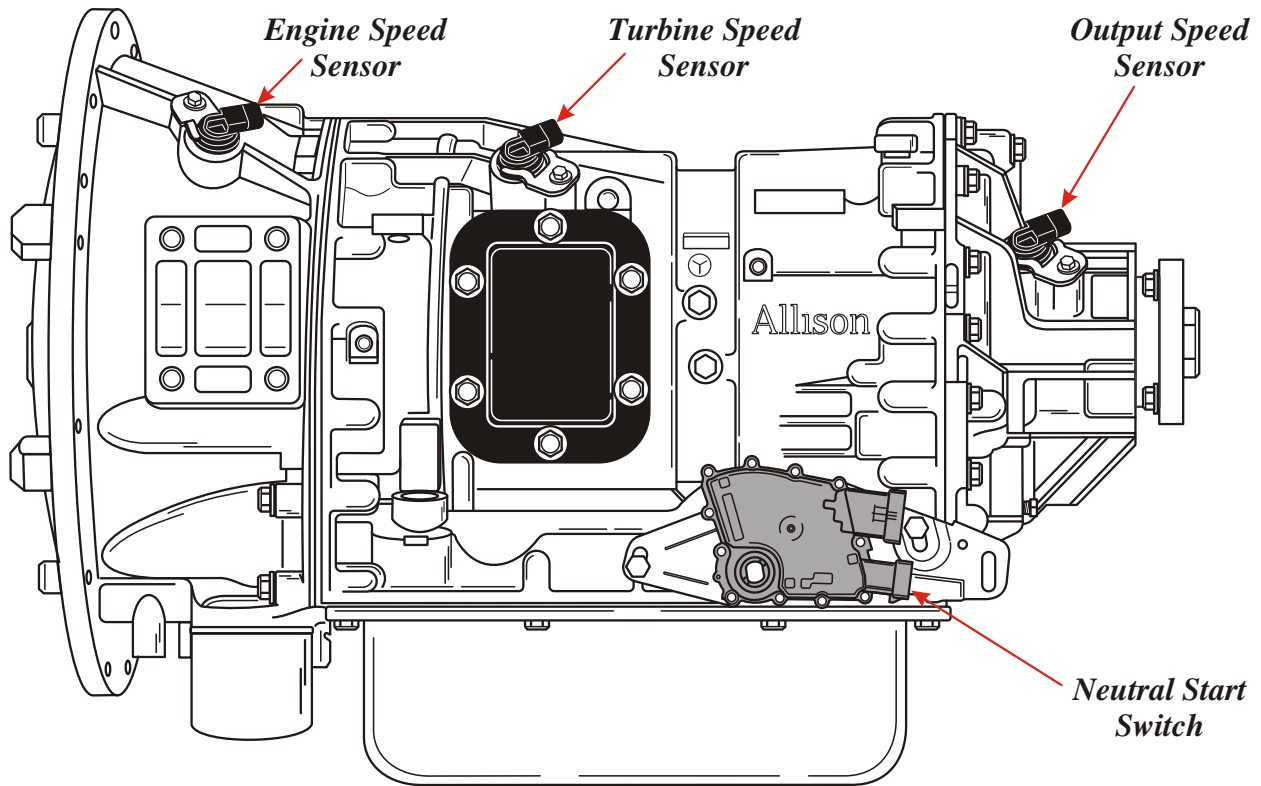
Allison Transmission has now developed a family of two new automatic transmissions, referred to as the 1000 Series and the 2000 Series, for light duty (8600-19850 GVW) and medium duty (19850-30000 GVW) commercial trucks. These two new transmissions are scheduled to start appearing in General Motors vehicles for the 2000 model year and come in two wheel drive and four wheel drive configurations, as shown in Figure 2. Both the 1000 and 2000 Series are available with an optional PTO gear. The PTO gear is driven off of the torque converter, and thus is turbine driven. Engine driven performance can be obtained by engaging the torque converter clutch during neutral PTO operation. PTO mounting provisions are in the form of a standard SAE 6 bolt pad on each side of the transmissions main case, as shown in Figure 1 and 2. General description and operation begins on Page 3 of this bulletin.



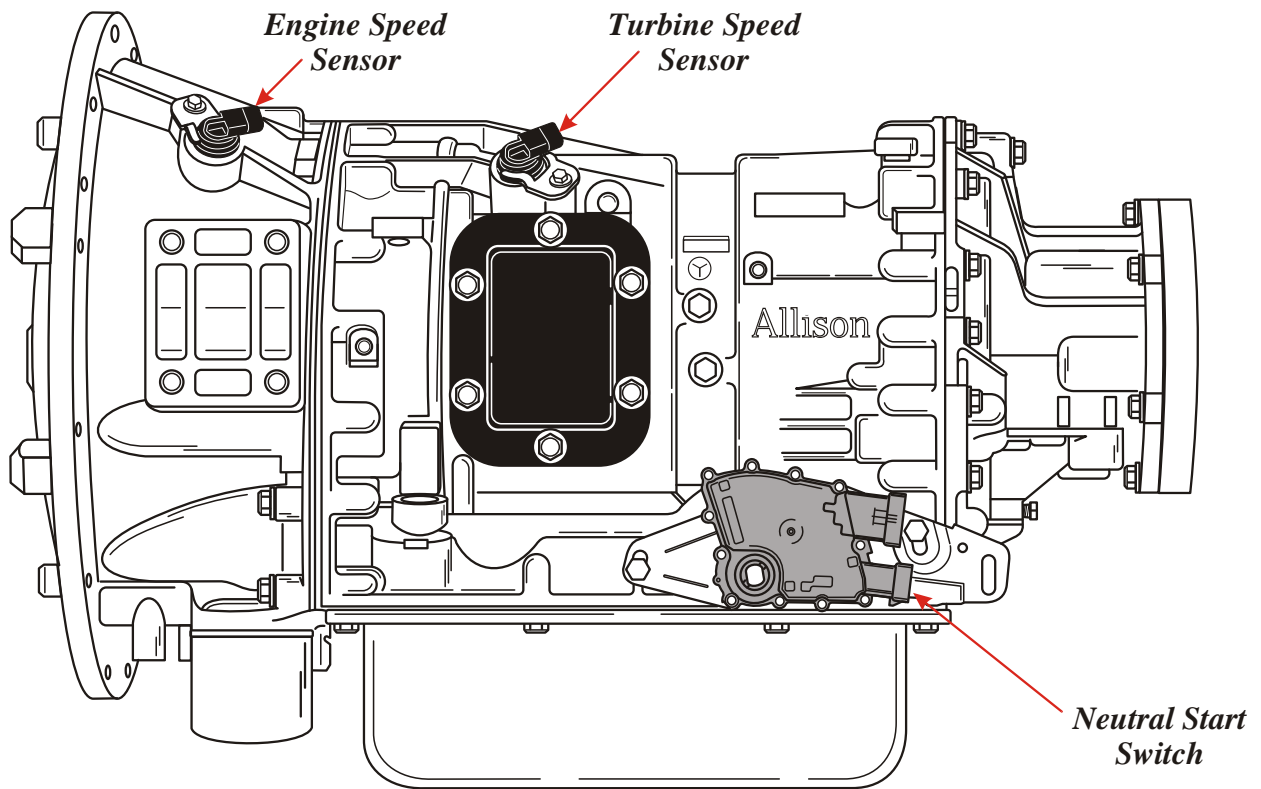
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Figure 1

ALLISON 1000/2000 SERIES



TWO WHEEL DRIVE



FOUR WHEEL DRIVE

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Figure 2

GENERAL DESCRIPTION AND OPERATION

Allison 1000/2000/2400 Series transmissions are torque converter driven fully automatic units. All models have neutral, reverse, and up to 5 forward speeds, with 5th gear being overdrive. Refer to Figure 4 for the different gears ratios available in the different models.

The torque converter housings of these units mate directly to SAE No. 2, SAE No. 3, or direct to the engine block in some cases. Flexplate drive is used for all engine to transmission torque transfer.

Several different torque converters are available to match the transmissions to a wide variety of diesel and gasoline engines. The torque converter is a single stage, three element unit, consisting of a pump, stator, and turbine, with the addition of a converter clutch to provide direct drive from the engine to the transmission. The converter clutch is applied and released electronically, and changes the direction of fluid flow in the converter as in most typical converters today.

Internally these units contain 2 rotating clutches (C1 and C2), and 3 brake clutches (C3, C4 and C5), to direct the flow of torque through the unit. All clutch packs are hydraulically applied and spring released, with automatic wear compensation, and their locations in the transmission are shown in the cut-away in Figure 4.

The Transmission Control Module (TCM) signals six different solenoids, located on the valve body, to apply and release clutches based on vehicle speed and power combinations, and the range selected by the operator.

The planetary gear train consists of three constant mesh, helical gear planetary sets, referred to as P1, P2, and P3. By the engagement of the 5 clutch packs in various combinations, the planetary gear sets react singly or together to provide 5 forward speeds, neutral, and reverse.

A common hydraulic system provides fluid for all hydraulic operations, lubrication, and cooling. The front oil pump, driven by the converter, provides the pressure needed for the hydraulic system, and comes from the common sump in the bottom pan.

A suction filter, located in the bottom pan provides general protection to the entire hydraulic system, and a spin-on filter provides full time protection for the control solenoids and multipass protection for the entire system.

The spin-on filter is located externally on the converter housing at the lower left front of the transmission.

Some 1000/2000/2400 Series transmissions are available with an optional extension housing that accommodates an OEM installed two shoe, expanding type, drum parking brake.

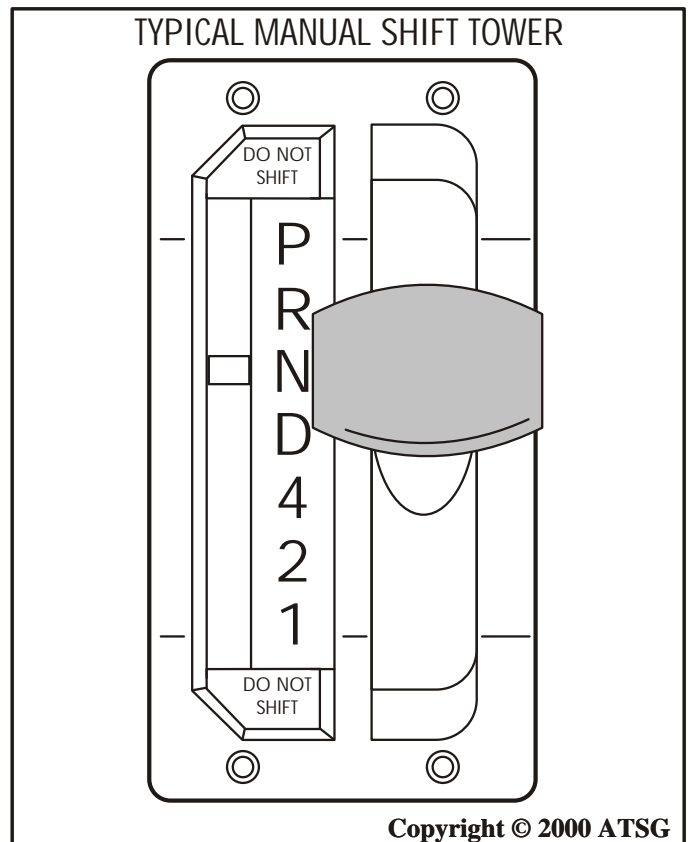
The TCM calibration determines the available forward ranges for each selector position. Although specific installations vary, typical selector positions for the 1000/2000 Series are as follows:

P - Park. Parking pawl or parking brake is engaged if available, and the transmission is in neutral. This position is not available on all shift selectors.

R - Reverse, allows the vehicle to go backwards.

N - Neutral. The TCM disables the starter switch if a range other than Neutral or Park is selected before starting the vehicle.

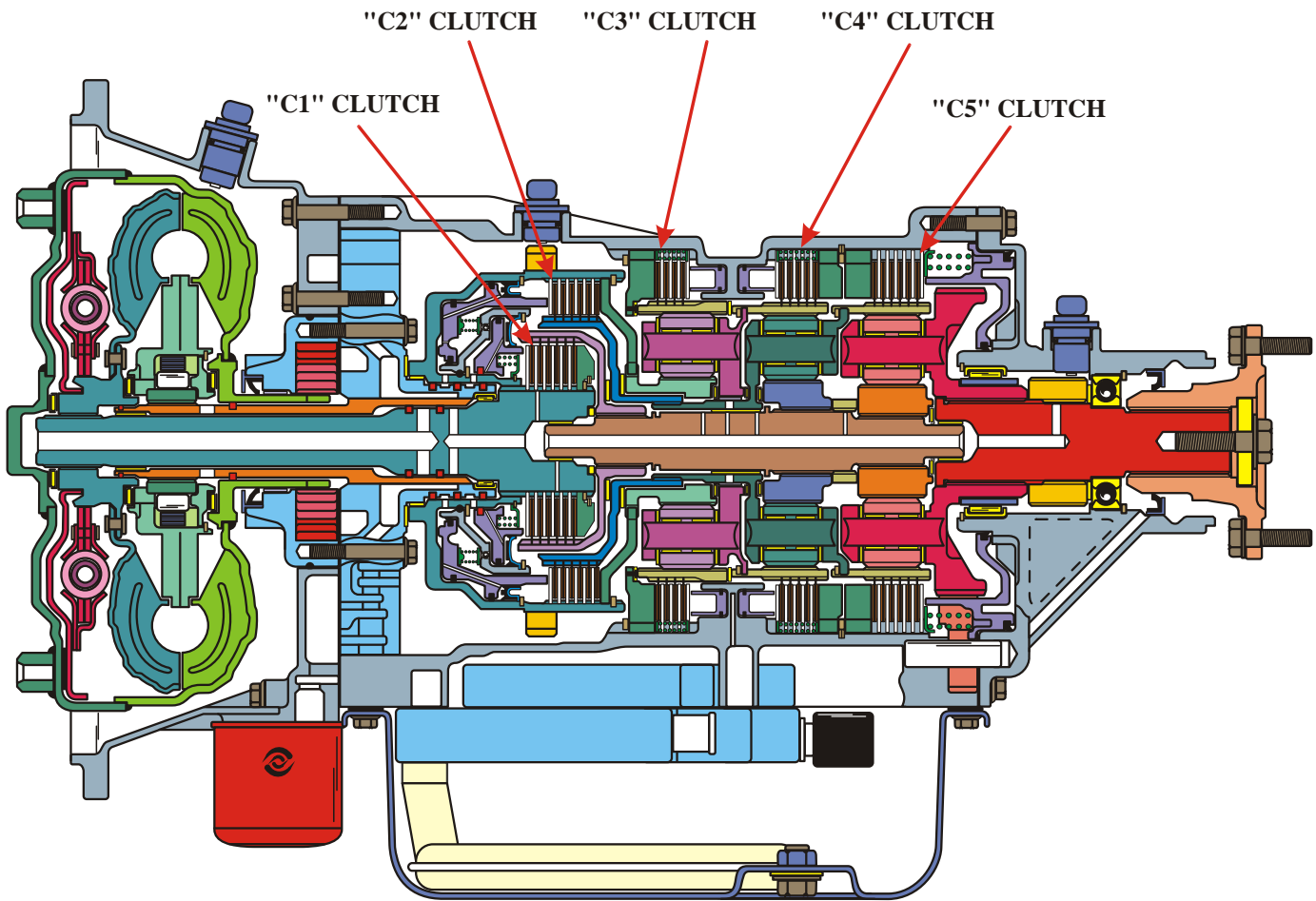
D - Drive. The highest forward range used in normal operation. Shifts to 1st gear for launch, and then will automatically upshift through the gears, as operating conditions permit, until the highest range available is attained.



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Figure 3

ALLISON 1000/2000 SERIES TRANSMISSION



Range	C1 Clut	C2 Clut	C3 Clut	C4 Clut	C5 Clut	Sol "A"	Sol "B"	Sol "C"	Sol "D"	Sol "E"	Sol "F"	Ratios	
												1000	2000
<i>Park</i>					ON	**	**	X	X	X			
<i>Reverse</i>			ON		ON	**	**		X	X		4.49	5.09
<i>Neutral</i>					ON	**	**	X	X	X			
<i>OD-1st</i>	ON				ON	**	**		X			3.10	3.51
<i>OD-2nd</i>	ON			ON		**	**				*	1.81	1.90
<i>OD-3rd</i>	ON		ON			**	**	X			*	1.41	1.44
<i>OD-4th</i>	ON	ON				**	**	X		X	*	1.00	1.00
<i>OD-5th</i>		ON	ON			**	**			X	*	0.71	0.74

X = Electrical Power Applied To Shift Solenoids.

** = Apply Solenoid "F" To Apply Converter Clutch.*

*** = Solenoids "A" and "B" are "Trim" solenoids used to control oncoming, off-going, and holding pressure to the five clutch packs.*

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Figure 4

ALLISON IDENTIFICATION TAG LOCATION

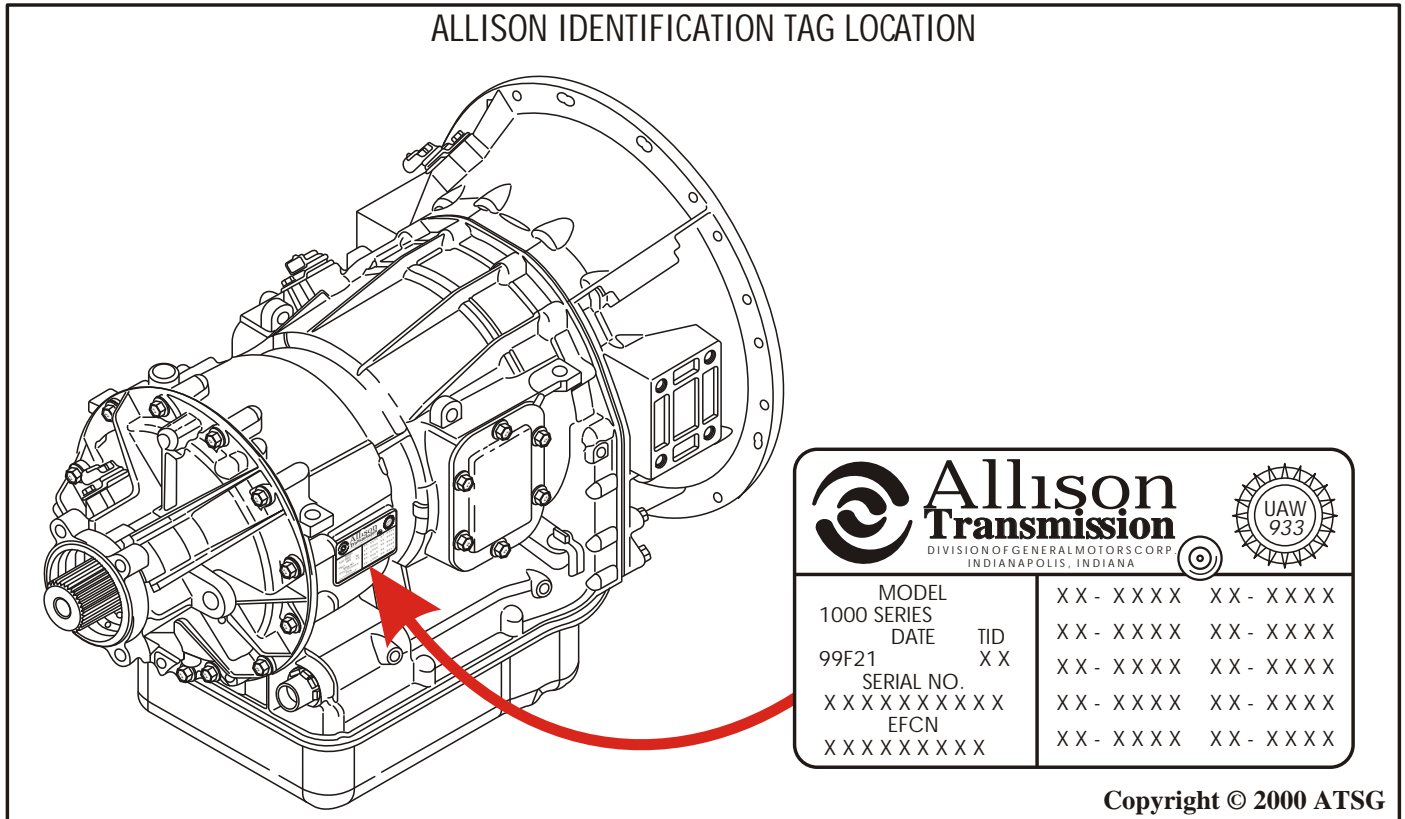


Figure 5

TRANSMISSION IDENTIFICATION TAG

Several different transmission configurations are available within the 1000/2000/2400 Series. The different models are identified as follows:

1000 Series	Heavy-duty automatic transmission with parking pawl. Maximum GVW = 19850 lb.
2000 Series	Heavy-duty automatic transmission without parking pawl. Maximum GVW = 30000 lb.
2400 Series	Heavy-duty automatic transmission with parking pawl. Maximum GVW = 26000 lb.

Each transmission is identified by a model designation, group numbers, and serial number. This information is included on the transmission identification tag located on the right rear side of the transmission case, as shown in Figure 5.

This information must be used when discussing specific service issues, or when parts replacement is necessary. The transmission identification tag also includes the date of manufacture, and also the transmission identification number used with the diagnostic systems.

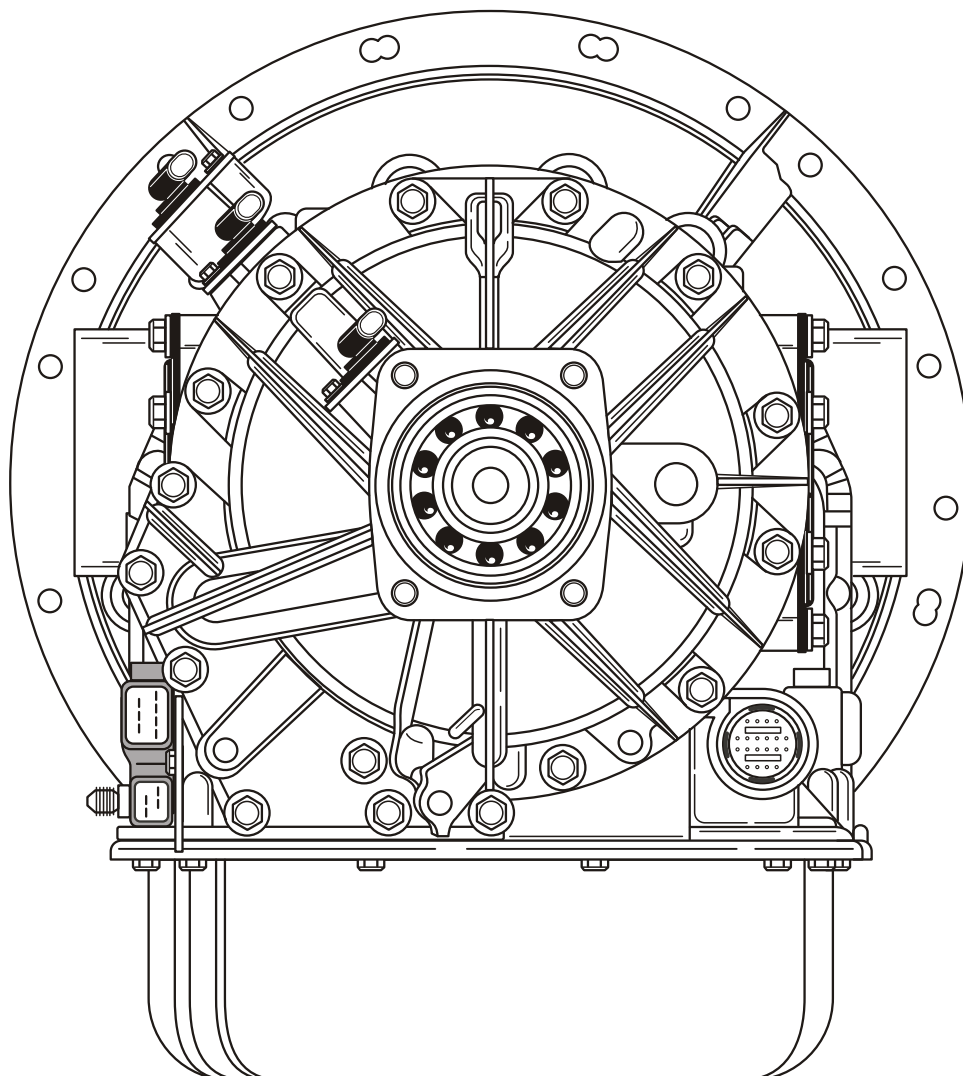
Special Note:

Allison Series 1000/2000/2400 transmissions are designed and manufactured to metric standards, and metric tools are required for service.

The cooler ports and the main line pressure tap are the only non-metric fittings on the transmission case. The output flange/yoke retaining bolt is also non-metric.

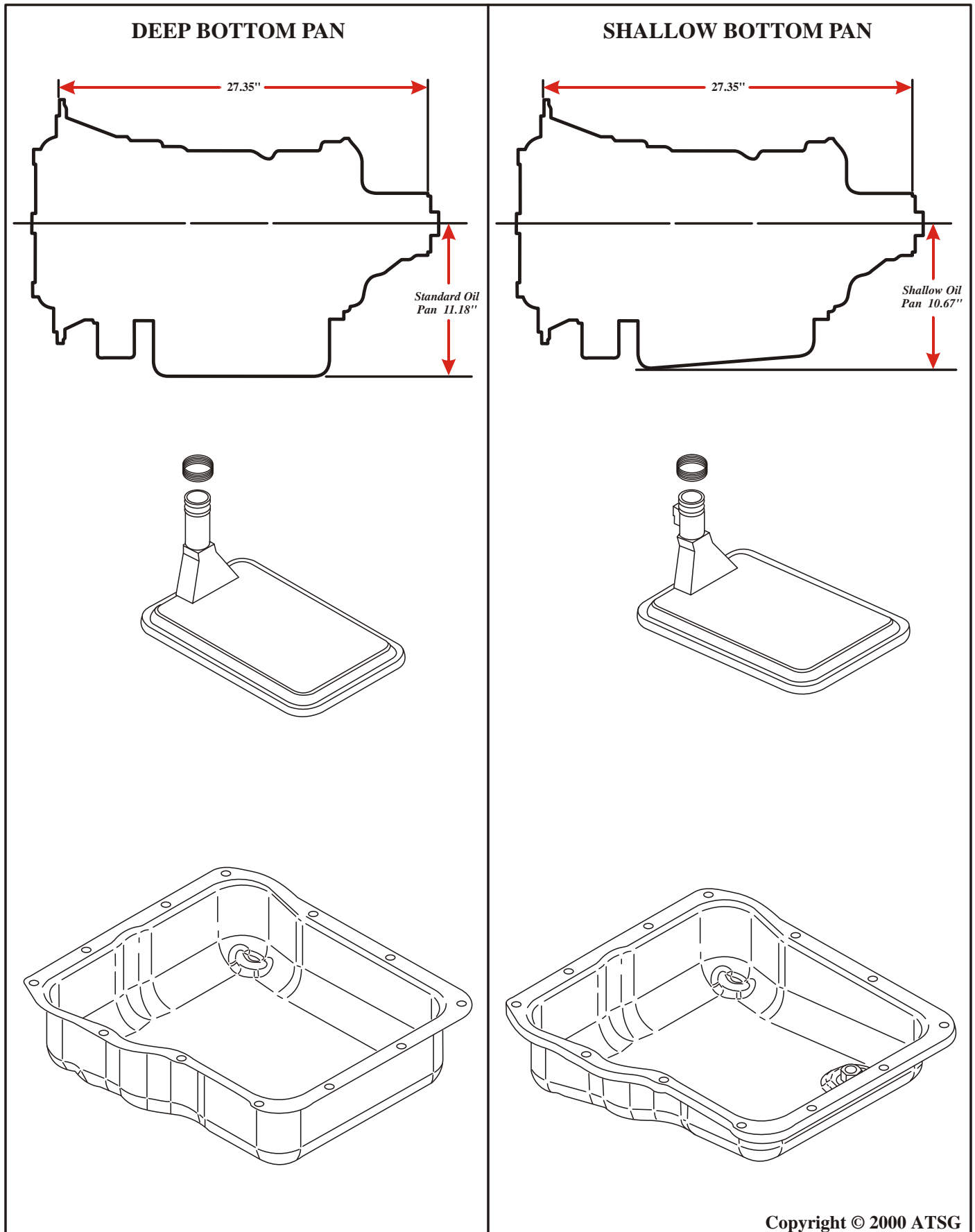
Notice in Figure 6 that the standard General Motors case connector has been utilized, and the Park/Neutral switch is exactly the same switch used currently on the THM 4L60-E transmission. Two different bottom pan configurations are also provided to make these units even more versatile, and the dimensions have been provided in Figure 7. The 1000 and 2000 Series transmissions utilize five clutch packs (No Bands-No Freewheels) to obtain the five forward gears and reverse. We have provided you with a cut-away illustration to identify the clutch packs and their location in the unit, and a clutch application and solenoid chart to assist you in diagnosis as shown in Figure 4.

GEAR	<i>1000 Series Ratios</i>	<i>2000 Series Ratios</i>
<i>First</i>	<i>3.10</i>	<i>3.51</i>
<i>Second</i>	<i>1.81</i>	<i>1.90</i>
<i>Third</i>	<i>1.41</i>	<i>1.44</i>
<i>Fourth</i>	<i>1.00</i>	<i>1.00</i>
<i>Fifth</i>	<i>0.71</i>	<i>0.74</i>
<i>Reverse</i>	<i>4.49</i>	<i>5.09</i>



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Figure 6



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Figure 7

The illustration in Figure 8 identifies the six solenoids on the valve body that are used to control the shifting from gear to gear, shift feel as it is clutch to clutch, and the converter clutch apply and release. A solenoid resistance chart and terminal identification has been provided in Figure 9, and a wiring schematic of the internal wire harness and colors is shown in Figure 10.

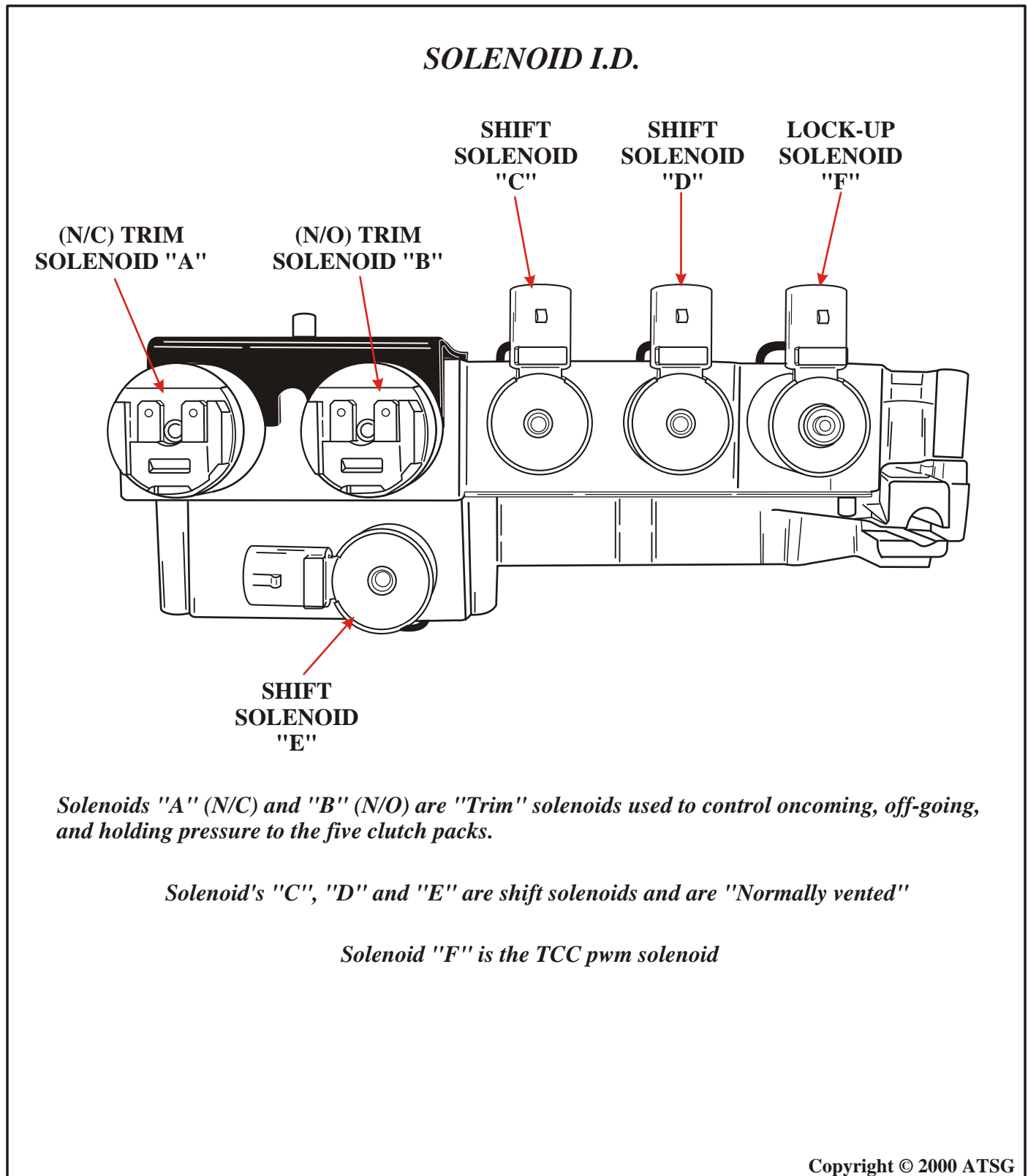
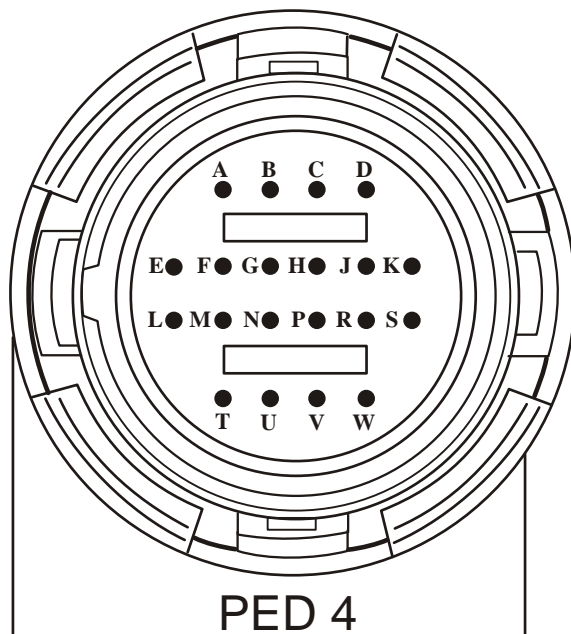


Figure 8

SOLENOID AND TEMP. SENSOR RESISTANCE CHART

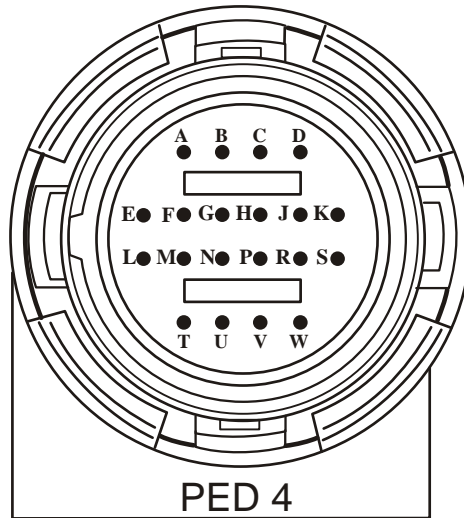


CONNECTOR FACE VIEW AS IN THE VEHICLE

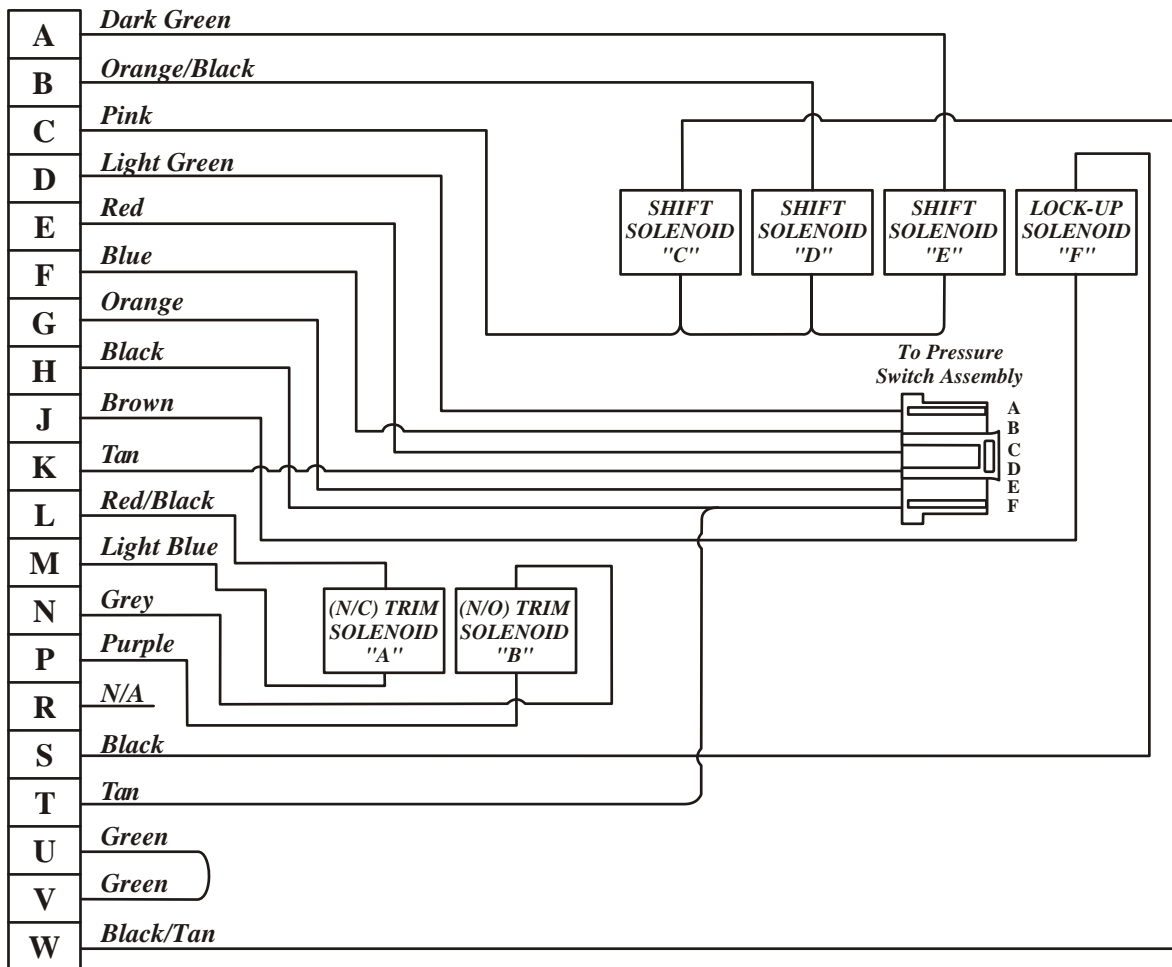
<i>Solenoid</i>	<i>Terminals</i>	<i>Resistance In Ohms</i>
A	L and M	6 W
B	N and P	6 W
C	C and W	22 W
D	C and B	22 W
E	C and A	22 W
F	J and S	11 W
TEMP SENSOR	H and G	2.8K W @ 72° F

All Ohms readings are actual at room temperature.

INTERNAL WIRE SCHEMATIC



PED 4
CONNECTOR FACE VIEW



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Figure 10

Both of the new units also utilize the familiar GM Pressure Switch Assembly with the normally open and normally closed switches, and temperature sensor. We have provided you with terminal identification and function in Figure 11. Figure 12 illustrates the bottom side showing switch location and whether they are "Normally Open" or "Normally Closed". The Pressure Switch Assembly bolts to the main valve body as shown in Figure 13. Figures 14, 15, and 16 are exploded views of the valve body.

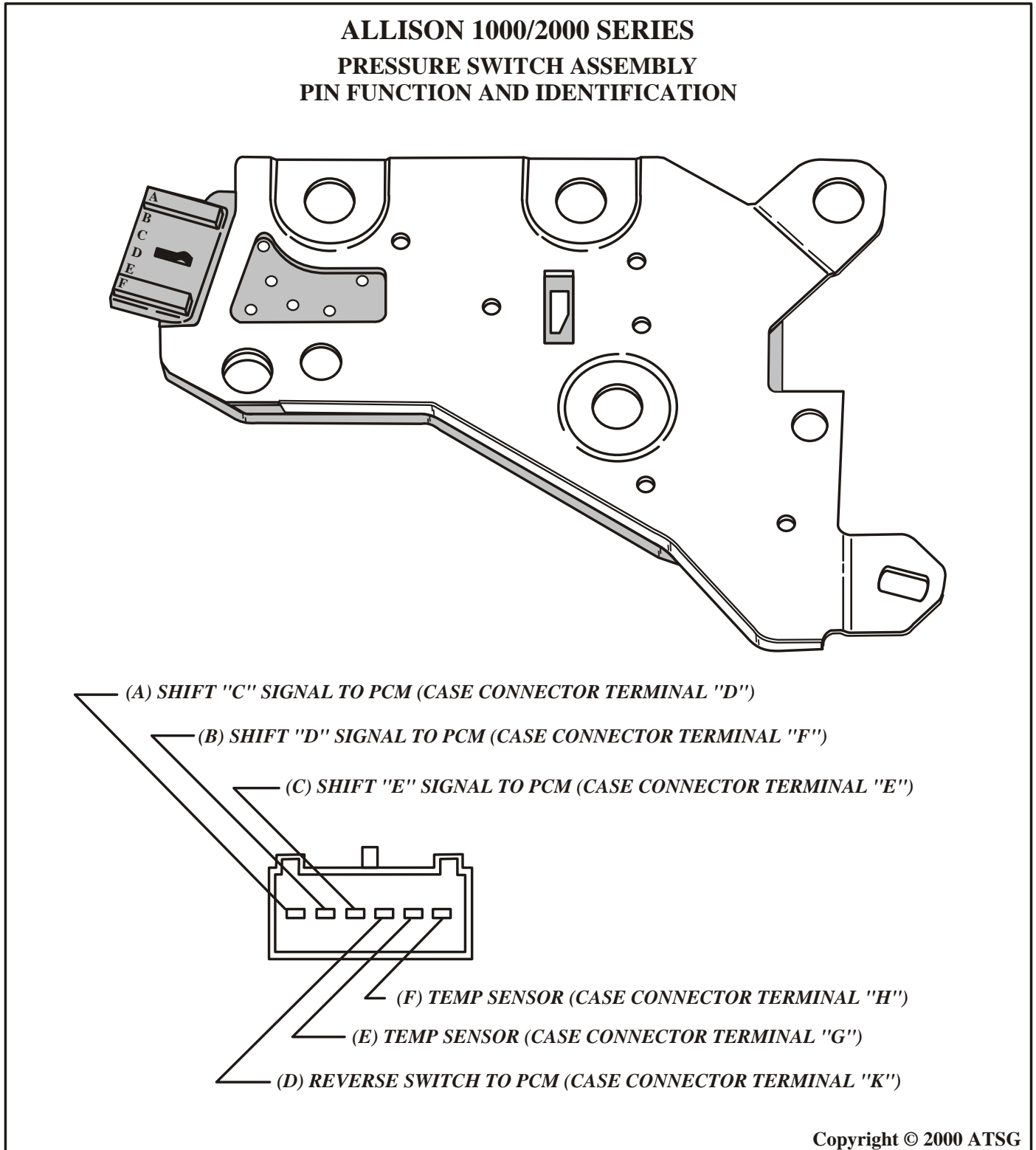
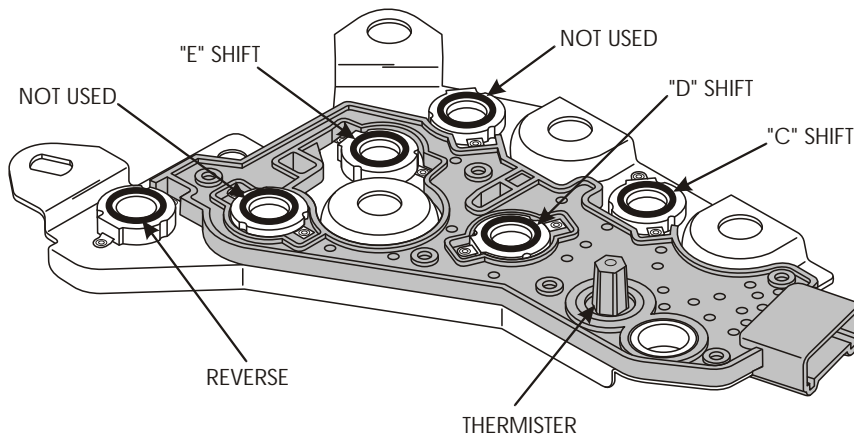
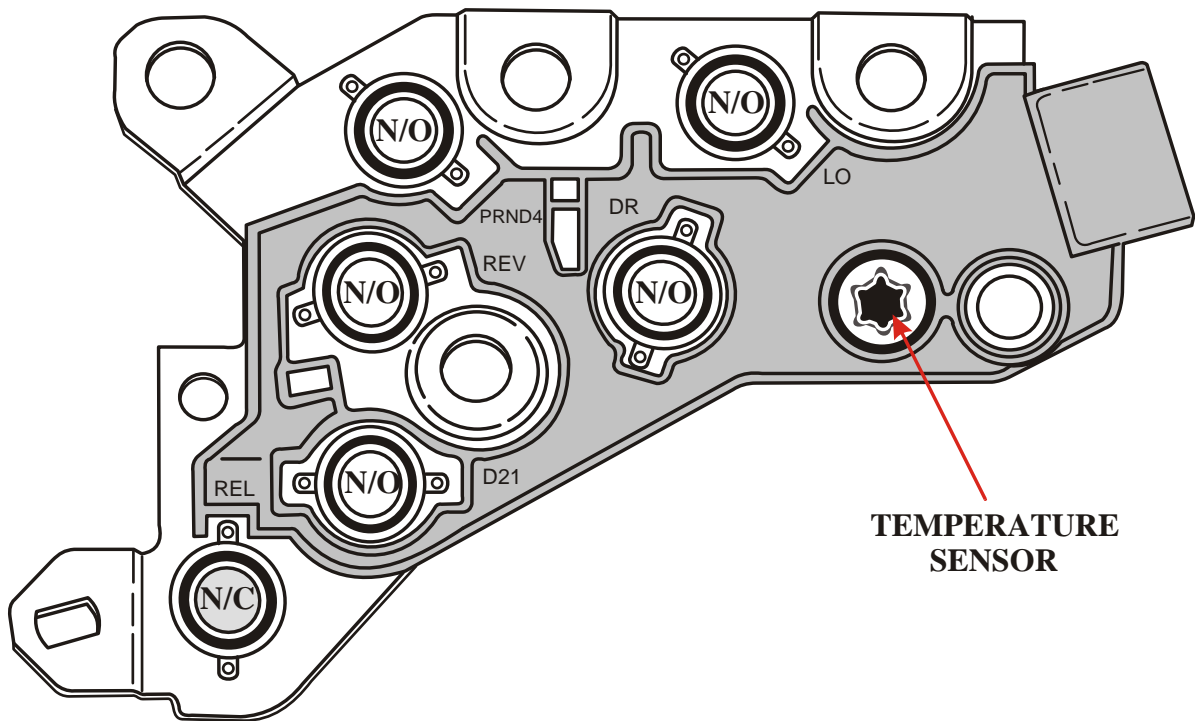
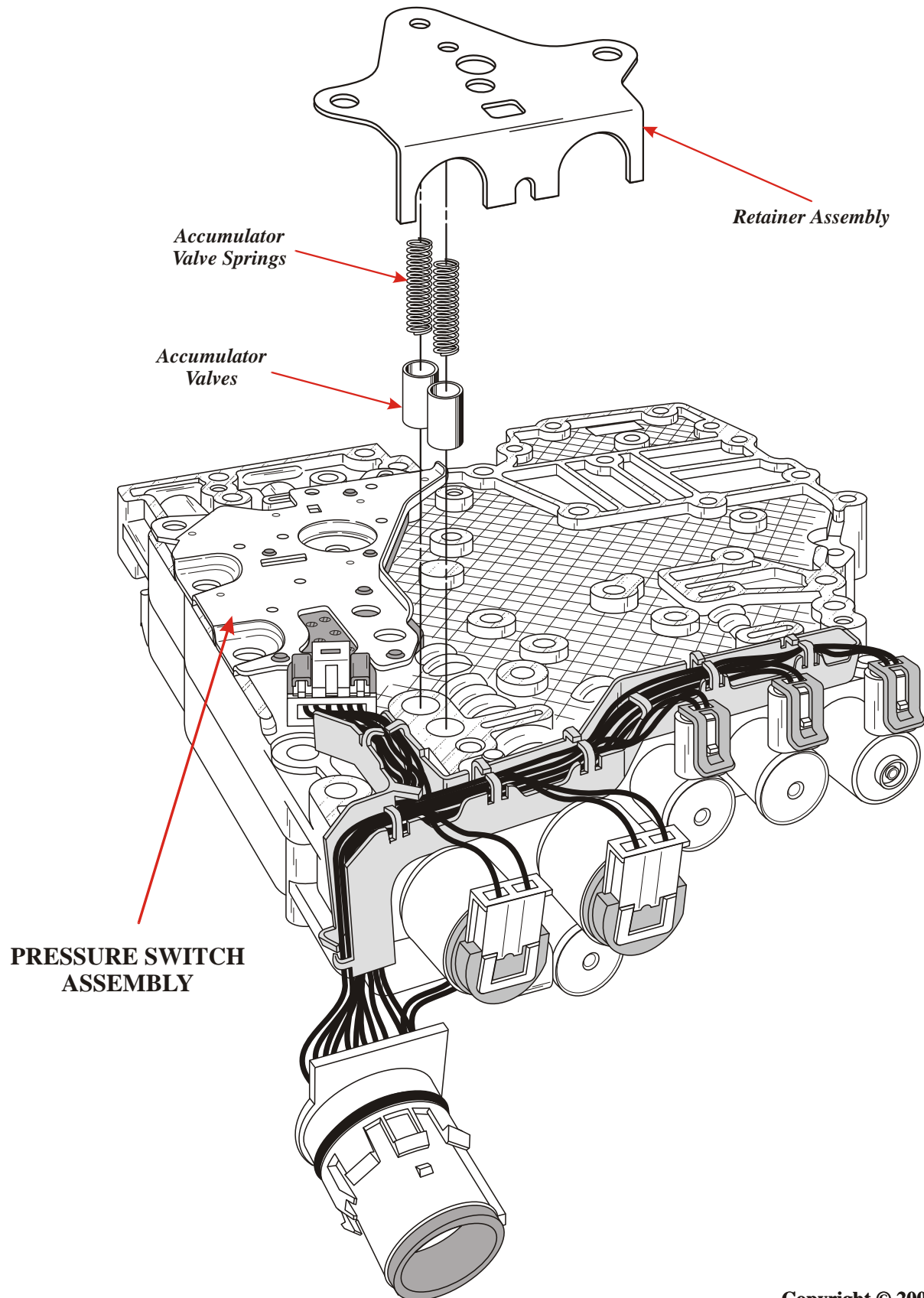


Figure 11

PRESSURE SWITCH ASSEMBLY SWITCH OPERATION AND FUNCTION



ALLISON SERIES 1000/2000 COMPLETE VALVE BODY



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Figure 13

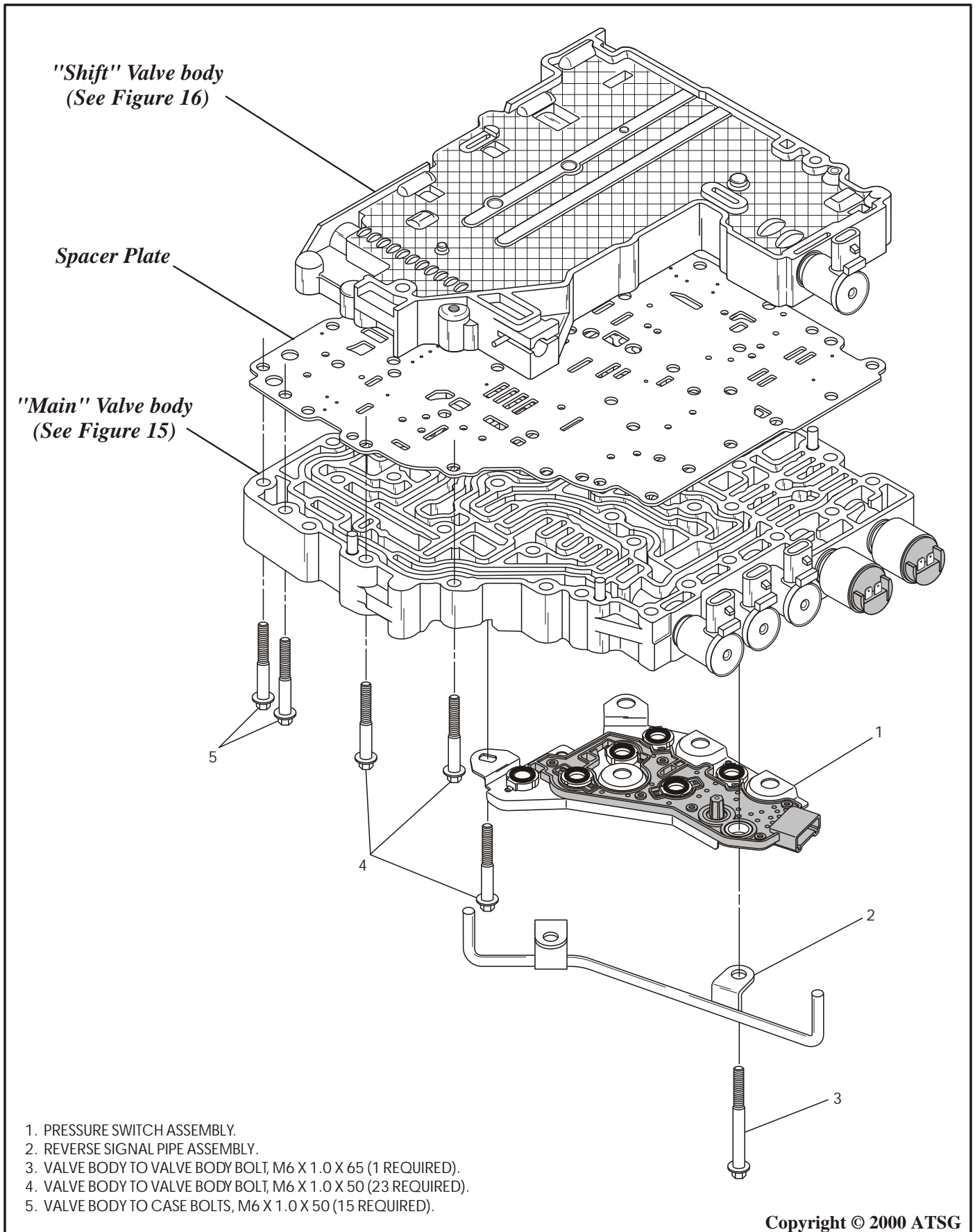
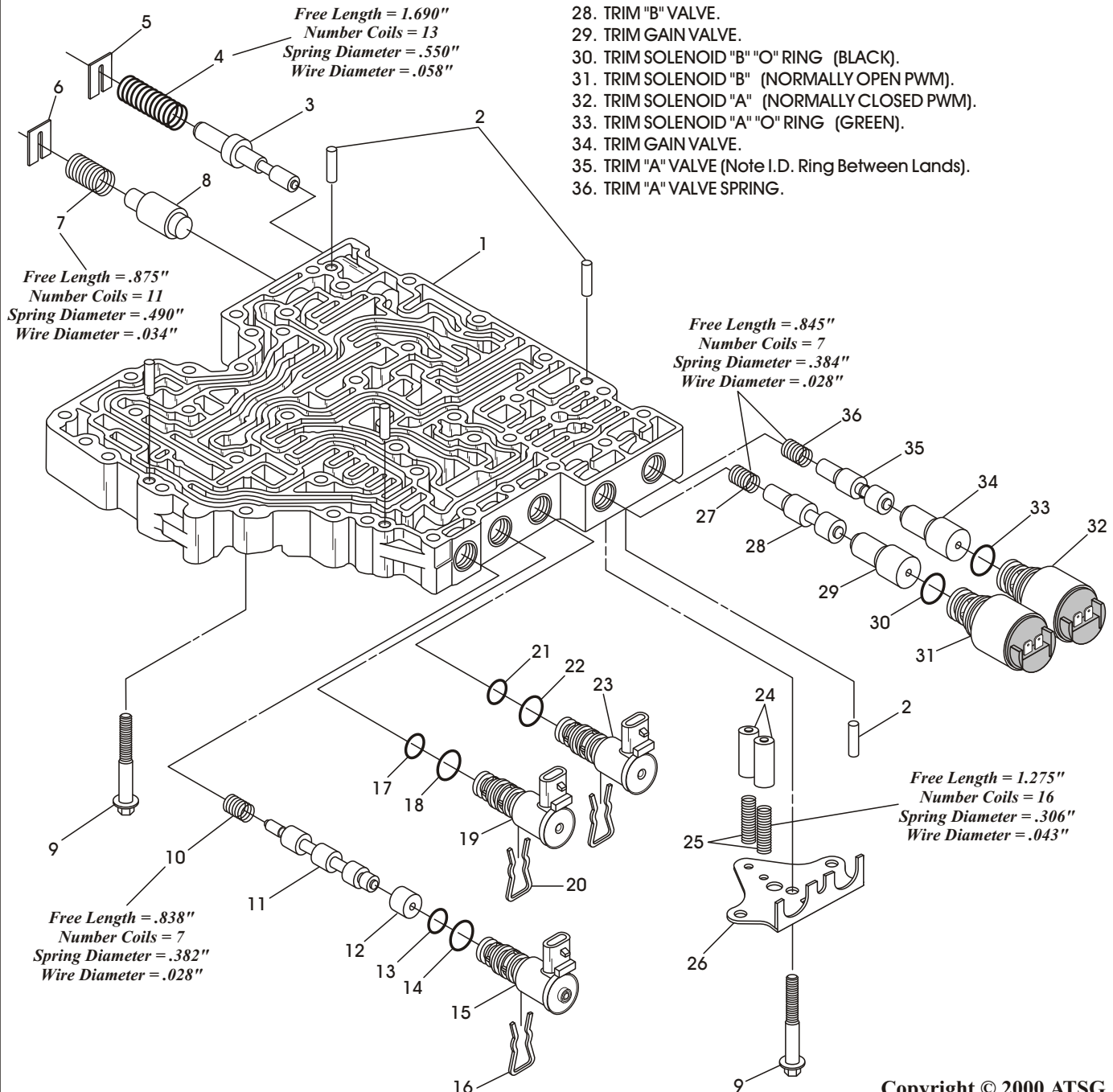


Figure 14

"MAIN" VALVE BODY EXPLODED VIEW

1. MAIN VALVE BODY CASTING.
 2. ALIGNMENT DOWELS (5 REQUIRED).
 3. MAIN CONTROL RELIEF VALVE.
 4. MAIN CONTROL RELIEF VALVE SPRING.
 5. MAIN CONTROL RELIEF VALVE SPRING RETAINER.
 6. EXHAUST BACKFILL VALVE SPRING RETAINER.
 7. EXHAUST BACKFILL VALVE SPRING.
 8. EXHAUST BACKFILL VALVE.
 9. BOLT, M6 X 1.0 X 50 (23 REQUIRED)
 10. SOLENOID "F" TRIM VALVE SPRING.
 11. SOLENOID "F" TRIM VALVE.
 12. SOLENOID "F" TRIM VALVE SLEEVE.
 13. SOLENOID "F" SMALL "O" RING.
 14. SOLENOID "F" LARGE "O" RING.
 15. SOLENOID "F" (LOCK-UP PWM).
 16. SOLENOID "F" RETAINING CLIP.
 17. SHIFT SOLENOID "D" SMALL "O" RING.
 18. SHIFT SOLENOID "D" LARGE "O" RING.
 19. SHIFT SOLENOID "D".
 20. SHIFT SOLENOID "D" RETAINING CLIP.
 21. SHIFT SOLENOID "E" SMALL "O" RING.
 22. SHIFT SOLENOID "E" LARGE "O" RING.
 23. SHIFT SOLENOID "E".
 24. TRIM PRESSURE ACCUMULATORS.
 25. TRIM PRESSURE ACCUMULATOR SPRINGS.
 26. TRIM SOLENOID "A" AND "B" RETAINING BRACKET.
 27. TRIM "B" VALVE SPRING.
 28. TRIM "B" VALVE.
 29. TRIM GAIN VALVE.
 30. TRIM SOLENOID "B" "O" RING (BLACK).
 31. TRIM SOLENOID "B" (NORMALLY OPEN PWM).
 32. TRIM SOLENOID "A" (NORMALLY CLOSED PWM).
 33. TRIM SOLENOID "A" "O" RING (GREEN).
 34. TRIM GAIN VALVE.
 35. TRIM "A" VALVE (Note I.D. Ring Between Lands).
 36. TRIM "A" VALVE SPRING.
-
- Free Length = 1.690"*
Number Coils = 13
Spring Diameter = .550"
Wire Diameter = .058"



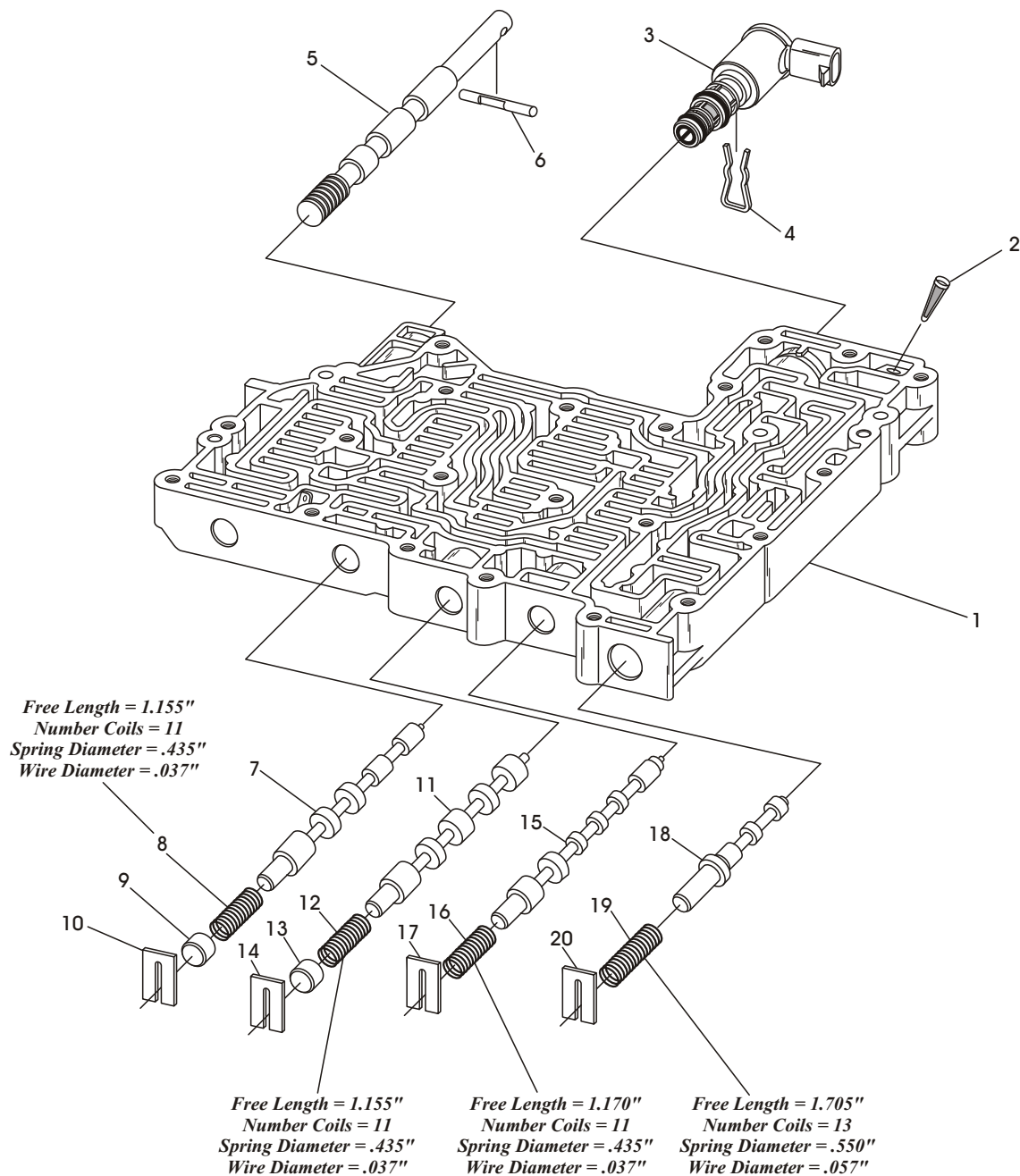
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Figure 15

"SHIFT" VALVE BODY EXPLODED VIEW

1. SHIFT VALVE BODY CASTING.
2. SOLENOID SCREEN.
3. SHIFT SOLENOID "C".
4. SHIFT SOLENOID "C" RETAINING CLIP.
5. MANUAL SELECTOR VALVE.
6. MANUAL SELECTOR VALVE PIN.
7. SOLENOID "D" SHIFT VALVE.
8. SOLENOID "D" SHIFT VALVE SPRING.
9. SOLENOID "D" SHIFT VALVE BORE PLUG.
10. SOLENOID "D" SHIFT VALVE LINE-UP RETAINER.

11. SOLENOID "E" SHIFT VALVE.
12. SOLENOID "E" SHIFT VALVE SPRING.
13. SOLENOID "E" SHIFT VALVE BORE PLUG.
14. SOLENOID "E" SHIFT VALVE LINE-UP RETAINER.
15. SOLENOID "C" SHIFT VALVE.
16. SOLENOID "C" SHIFT VALVE SPRING.
17. SOLENOID "C" SHIFT VALVE LINE-UP RETAINER.
18. MAIN CONTROL VALVE.
19. MAIN CONTROL VALVE SPRING.
20. MAIN CONTROL VALVE LINE-UP RETAINER.



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Figure 16

Figure 17 will show you retainer locations, and the only screen in the valve body. Notice that there are not any checkballs to worry about. Figure 18 illustrates air pressure check locations for the five clutch packs.

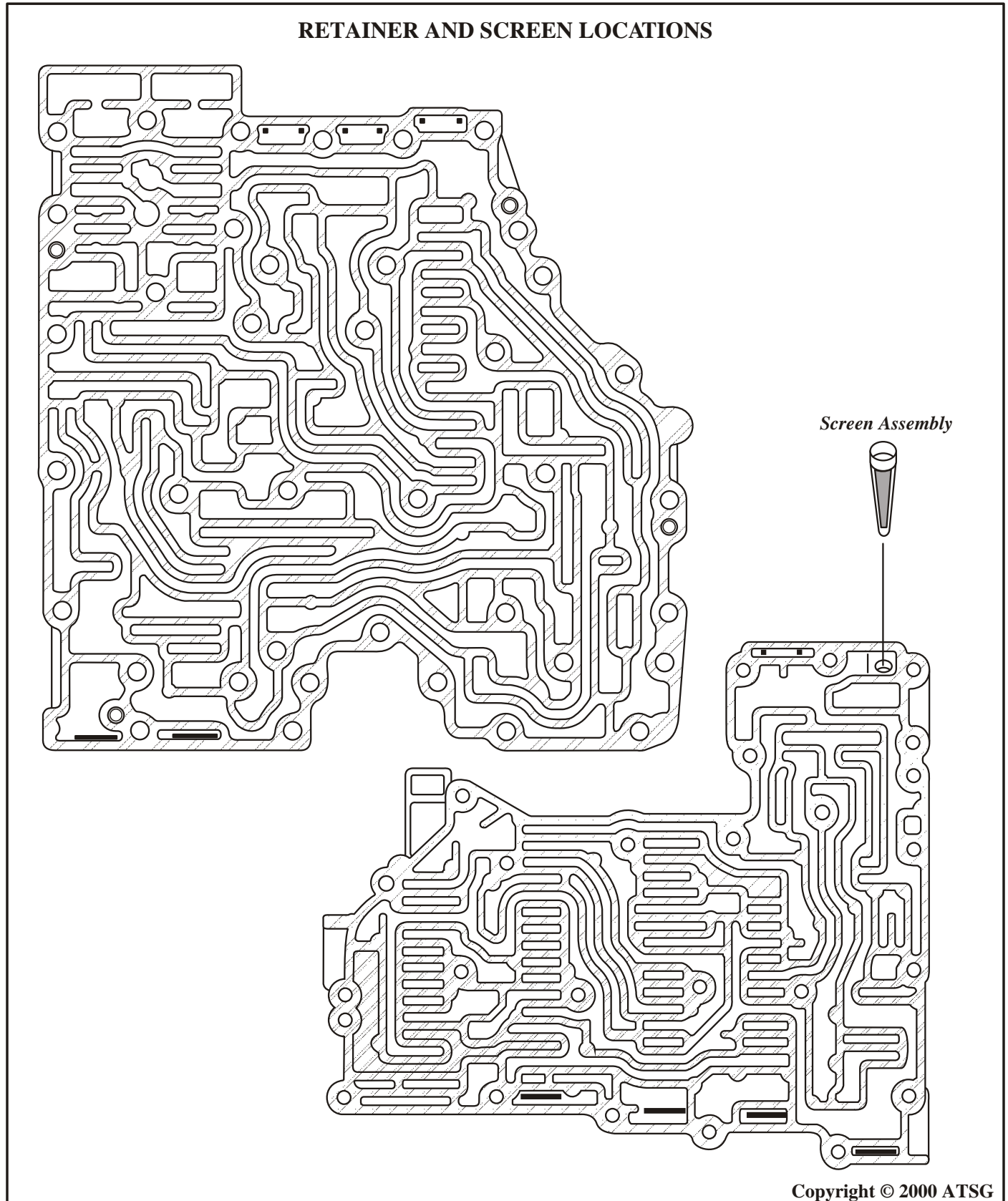
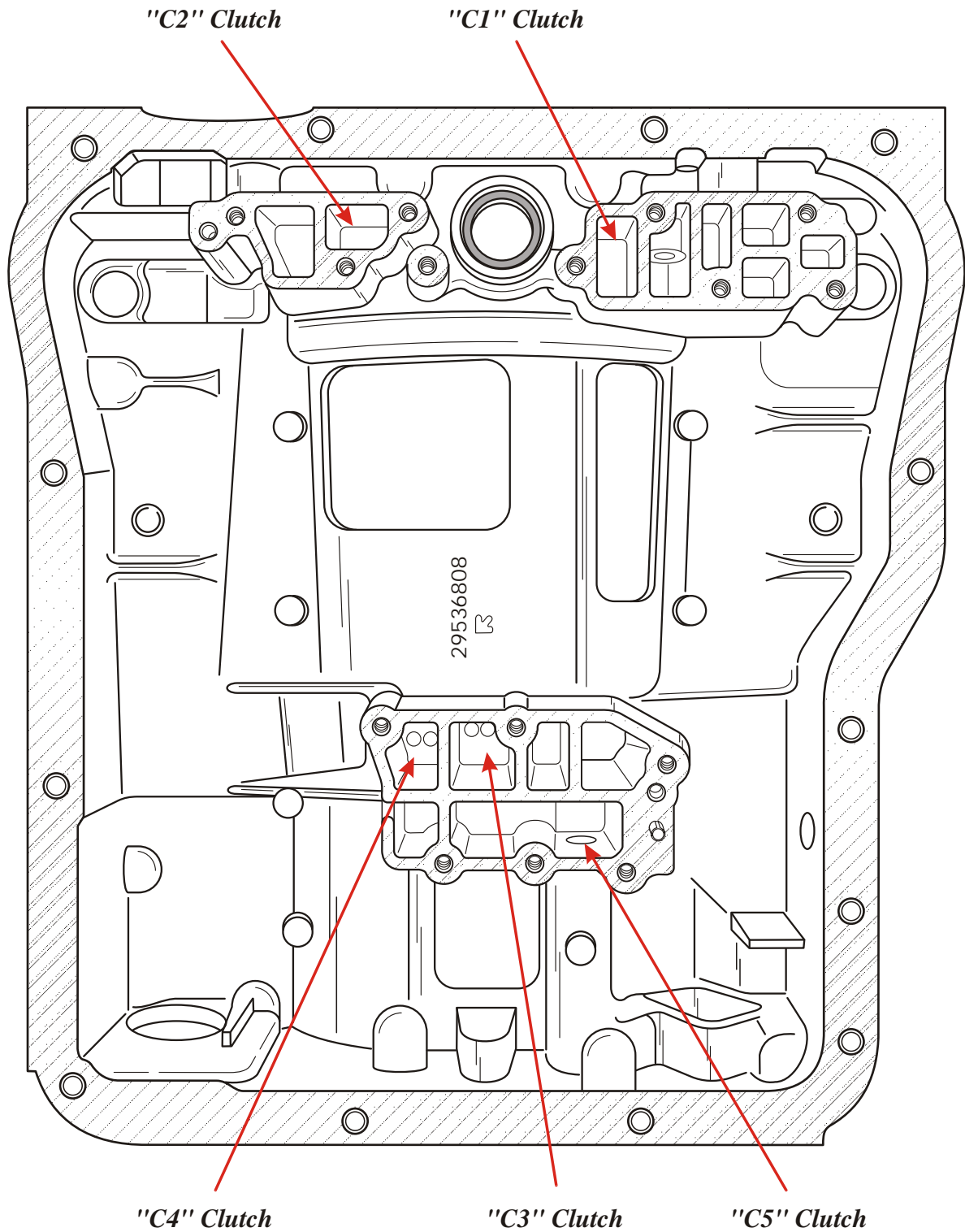


Figure 17

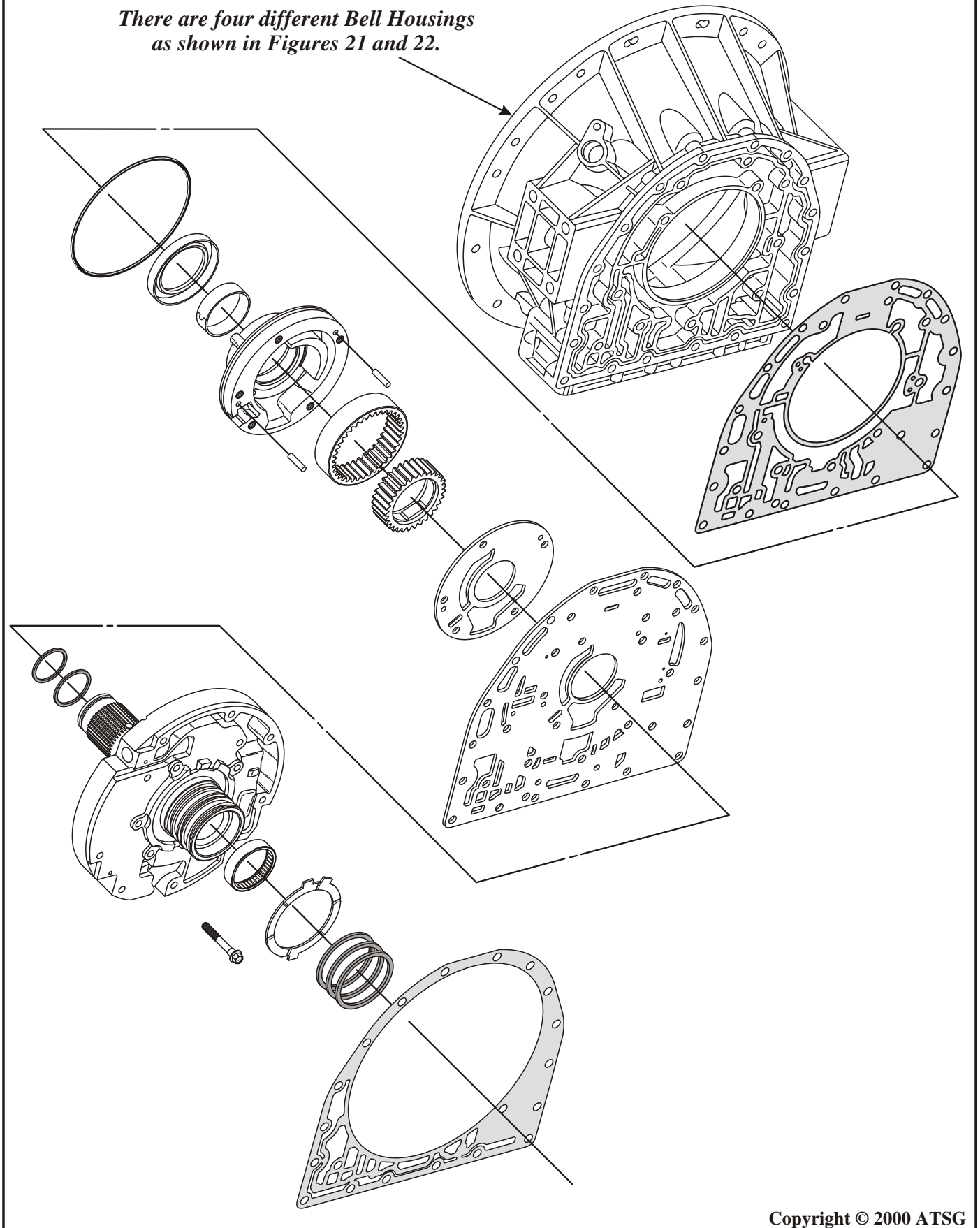
AIR PRESSURE TEST PORTS



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Figure 18

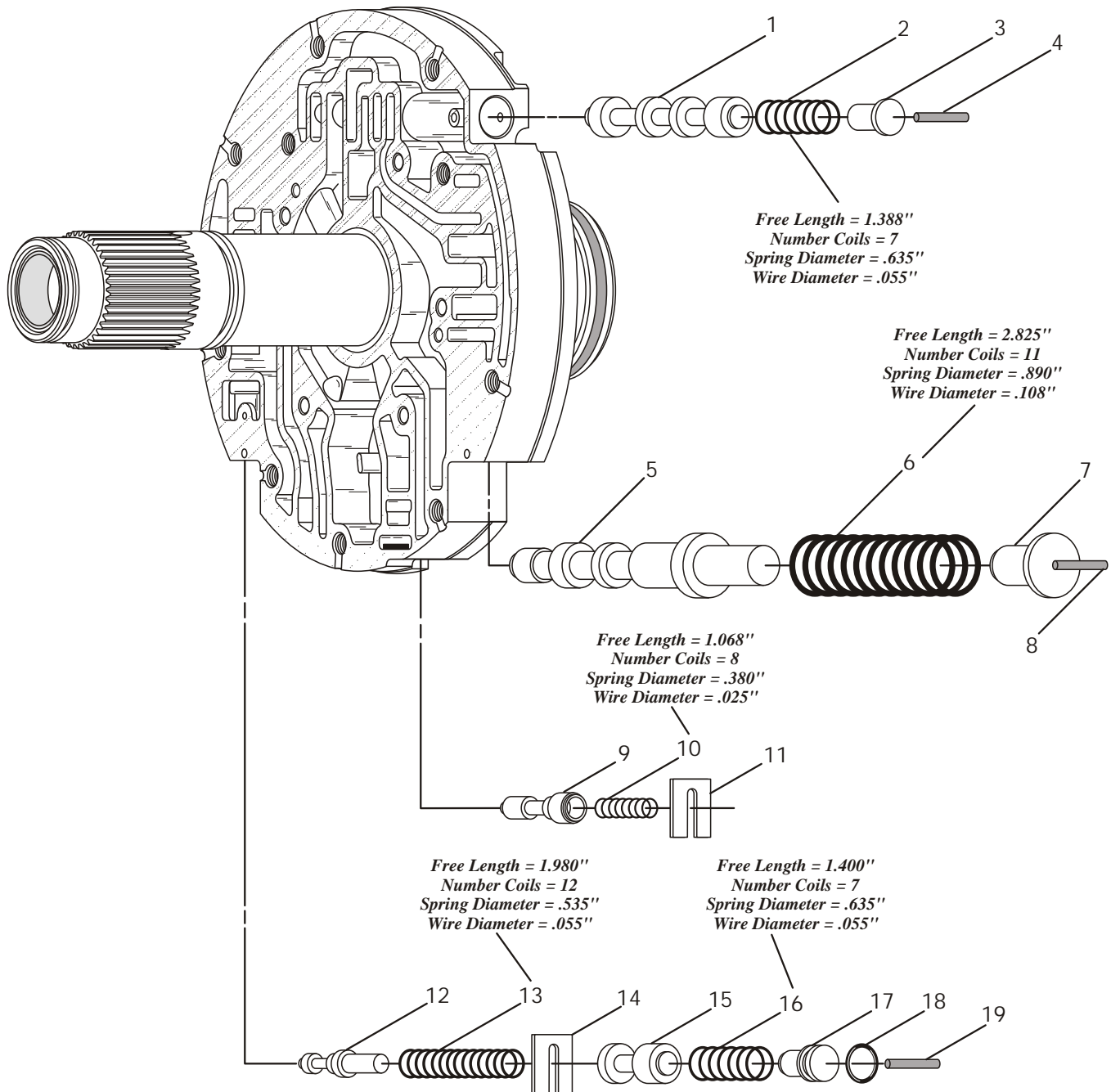
There are four different Bell Housings as shown in Figures 21 and 22.



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Figure 19

OIL PUMP COVER EXPLODED VIEW



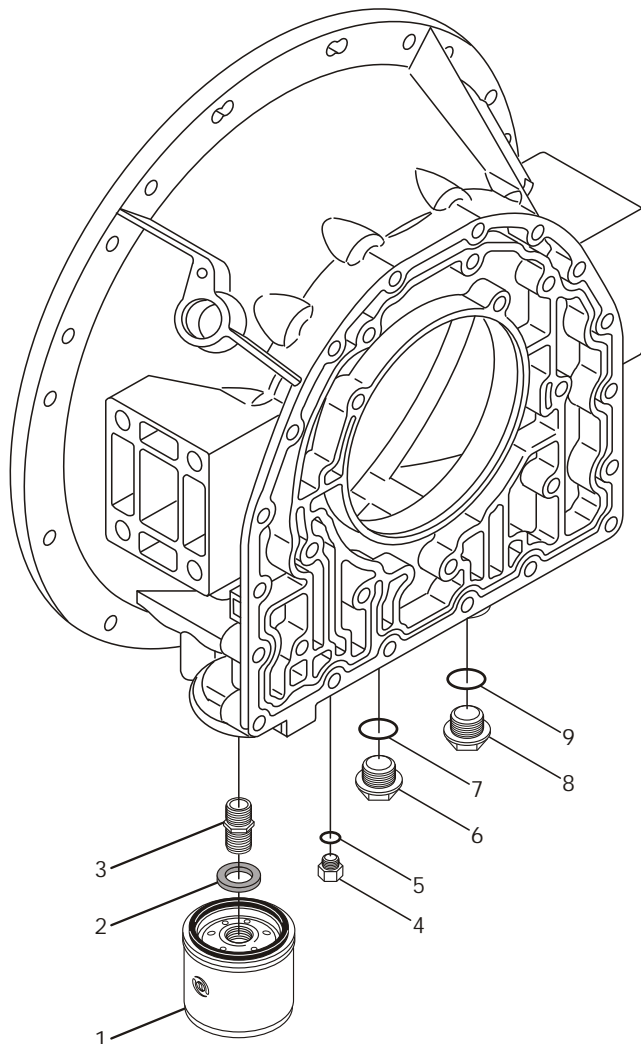
1. CONVERTER FLOW VALVE.
2. CONVERTER FLOW VALVE SPRING.
3. CONVERTER FLOW VALVE STOP.
4. CONVERTER FLOW VALVE STOP RETAINING PIN.
5. MAIN PRESSURE REGULATOR VALVE.
6. MAIN PRESSURE REGULATOR VALVE SPRING.
7. PRESSURE REGULATOR VALVE STOP.
8. PRESSURE REGULATOR VALVE STOP RETAINING PIN.
9. CLUTCH BACKFILL VALVE.
10. CLUTCH BACKFILL VALVE SPRING.

11. CLUTCH BACKFILL VALVE RETAINER.
12. CONVERTER RELIEF VALVE.
13. CONVERTER RELIEF VALVE SPRING.
14. CONVERTER RELIEF VALVE SPRING RETAINER.
15. LUBE REGULATOR VALVE.
16. LUBE REGULATOR VALVE SPRING.
17. LUBE REGULATOR VALVE SPRING STOP.
18. LUBE REGULATOR VALVE STOP "O" RING.
19. LUBE REGULATOR VALVE STOP RETAINING PIN.

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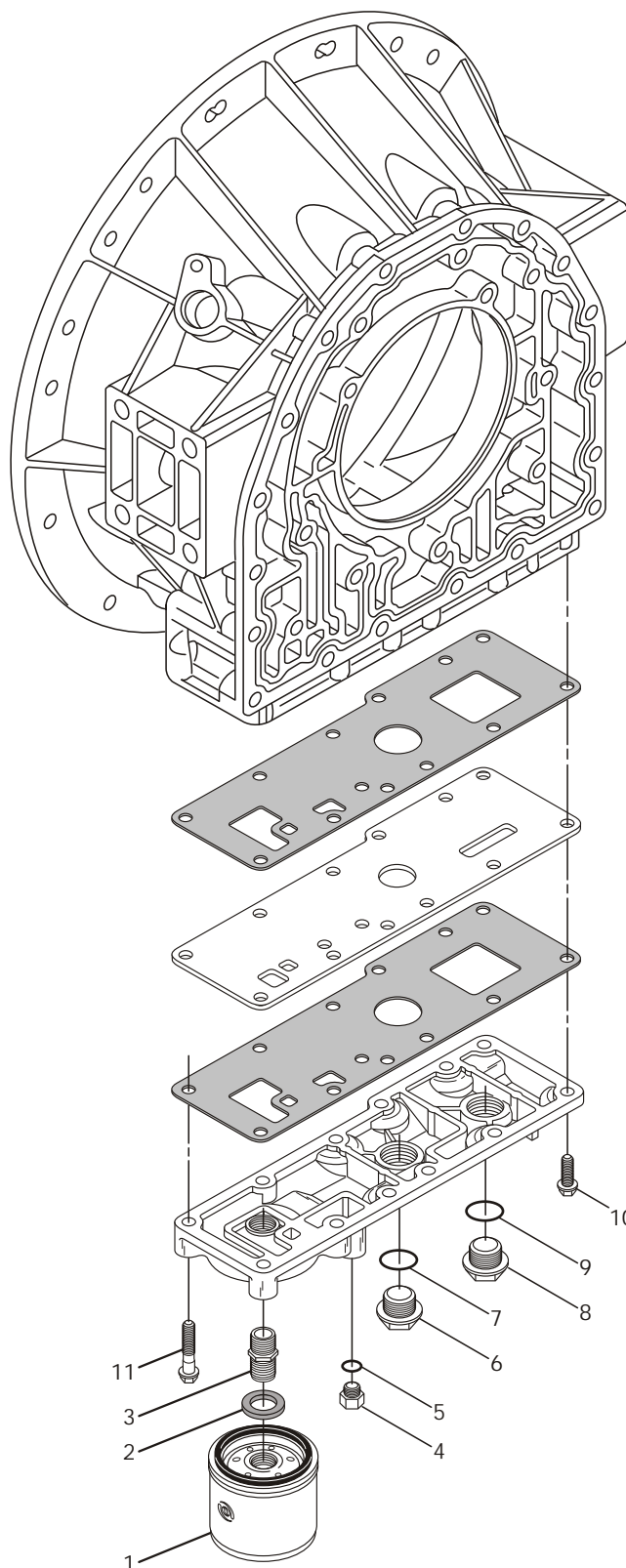
Figure 20

SAE NUMBER 3 BELL HOUSING WITH INTEGRAL FILTER AND COOLER PORTS



1. MAIN CONTROL FILTER ASSEMBLY.
2. MAIN CONTROL FILTER MAGNET.
3. MAIN CONTROL FILTER ADAPTER TUBE.
4. MAIN LINE PRESSURE TAP PLUG.
5. MAIN LINE PRESSURE PLUG "O" RING.
6. TO COOLER SHIPPING PLUG.
7. TO COOLER SHIPPING PLUG "O" RING.
8. FROM COOLER SHIPPING PLUG.
9. FROM COOLER SHIPPING PLUG "O" RING.
10. COOLER MANIFOLD RETAINING BOLT, M8 x 1.25 x 30 (8 REQ).
11. COOLER MANIFOLD RETAINING BOLT, M8 x 1.25 x 40 (4 REQ).

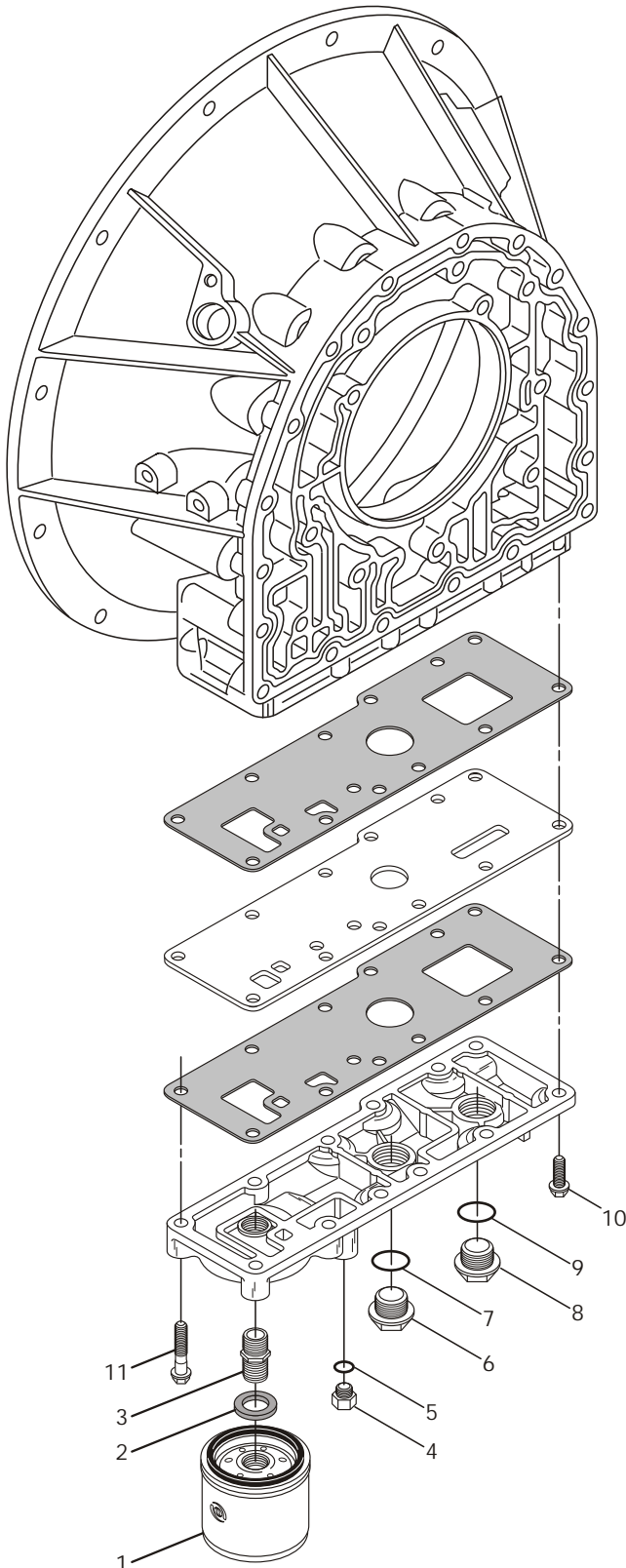
SAE NUMBER 3 BELL HOUSING WITH MANIFOLD FOR FILTER AND COOLER PORTS



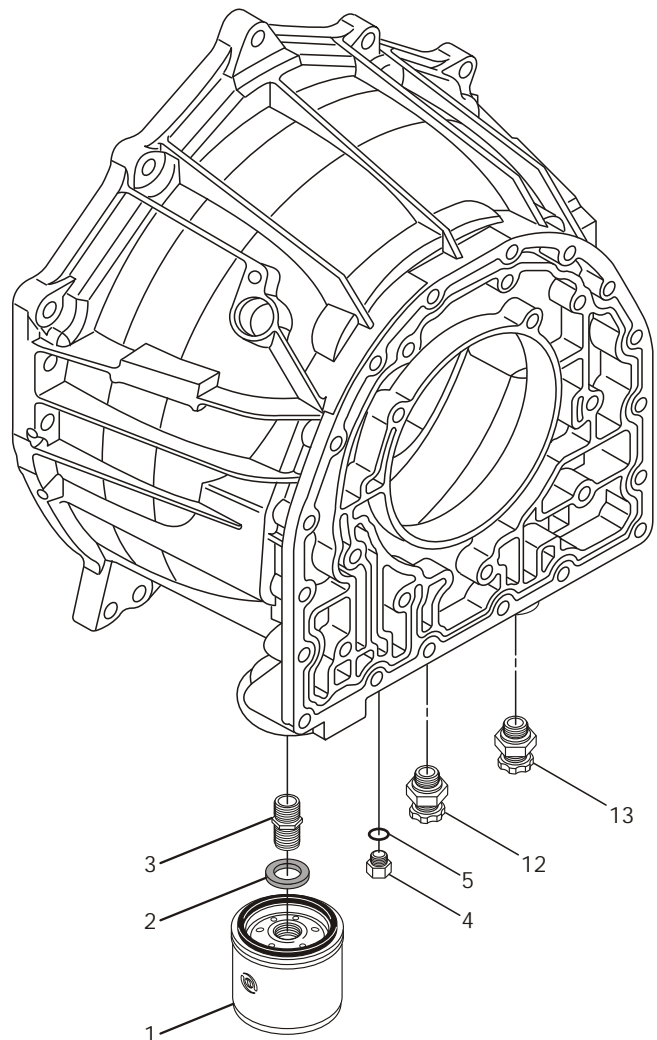
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Figure 21

SAE NUMBER 2 BELL HOUSING WITH MANIFOLD FOR FILTER AND COOLER PORTS



SAE NUMBER 8 BELL HOUSING WITH INTEGRAL FILTER AND COOLER PORTS



1. MAIN CONTROL FILTER ASSEMBLY.
2. MAIN CONTROL FILTER MAGNET.
3. MAIN CONTROL FILTER ADAPTER TUBE.
4. MAIN LINE PRESSURE TAP PLUG.
5. MAIN LINE PRESSURE PLUG "O" RING.
6. TO COOLER SHIPPING PLUG.
7. TO COOLER SHIPPING PLUG "O" RING.
8. FROM COOLER SHIPPING PLUG.
9. FROM COOLER SHIPPING PLUG "O" RING.
10. COOLER MANIFOLD RETAINING BOLT, M8 x 1.25 x 30 (8 REQ).
11. COOLER MANIFOLD RETAINING BOLT, M8 x 1.25 x 40 (4 REQ).
12. TO COOLER CONNECTOR FITTING ASSEMBLY.
13. FROM COOLER CONNECTOR FITTING ASSEMBLY.

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Figure 22