



Technical Service Information

ZF-4HP-18FLE AND ZF-4HP-18FLA PRELIMINARY INFORMATION

The ZF-4HP-18FLE is mounted longitudinal in the front of the vehicle, and was produced in 2 Wheel Drive models (FLE) and All Wheel Drive (FLA) models, as shown in Figure 1. This unit is totally electronic controlled and is totally different than any 4-HP-18 unit that you are currently familiar with.

ZF-4HP-18FLE And ZF-4HP-18FLA Is Found In The Following Vehicles;

<i>Audi - - - 100 Quattro, A6</i>	<i>1991-1997</i>
<i>Audi - - - A8</i>	<i>1994-1996</i>
<i>Porsche - - - 944</i>	<i>1991-1994</i>

There has been very little pertinent information published on these units. The information in this bulletin has been prepared from an actual transaxle and valve body, and has been formulated to provide you with the preliminary information needed to diagnos and repair electrical and valve body concerns.

Refer to Figure 1 for illustrations of both the 4-HP-18FLE (2WD) and 4-HP-18FLA (AWD) models.

Refer to Figure 2 for internal component resistance charts and connector pin identification.

Refer to Figure 3 for complete wiring schematic with computer terminal identification and transaxle terminal identification, which makes it easier for electrical diagnosis.

Refer to Figure 4 for the solenoid application chart and component application chart.

Refer to Figure 5 for illustration of the complete valve body assembly.

Refer to Figure 6 for exploded view of oil filter and oil filter transfer plate.

Refer to Figure 7 for exploded view of the manual valve body.

Refer to Figure 8 for exploded view of the solenoid body, and notice that it provides you with the factory setting for the adjustment on the pressure regulator valve for EDS-1 solenoid. The Legend for Figure 8 which identifies the solenoid body components and solenoids is found on Page 10.

Refer to Figure 9 for exploded view of the valve body assembly components.

Refer to Figure 10 for exploded detail view of the "Rear Side" of the main valve body. The Legend for Figure 10 which identifies the main valve body components is found on Page 13.

Continued on Page 2.

SPECIAL NOTE:

All nomenclatures in this bulletin are ATSG interpretations, not Audi's nor ZF.

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Continued from Page 1.

Refer to Figure 11 for exploded detail view of the "Front Side" of the main valve body.

Refer to Figure 12 for valve body spring specifications. The spring dimensions listed in Figure 12 were "Observations" from only one valve body, and may vary from one model to another.

Refer to Figure 13 for Solenoid Body screen and retainer locations, and to Figure 14 for the Manual Valve Body retainer locations.

Refer to Figure 15 for the Main Valve Body "Top Side" retainer locations, check valve and checkball locations, and the locations of the small flat disc orifices.

Refer to Figure 16 for the Main Valve Body "Bottom Side" check valve location, and the location of the small flat disc orifices.

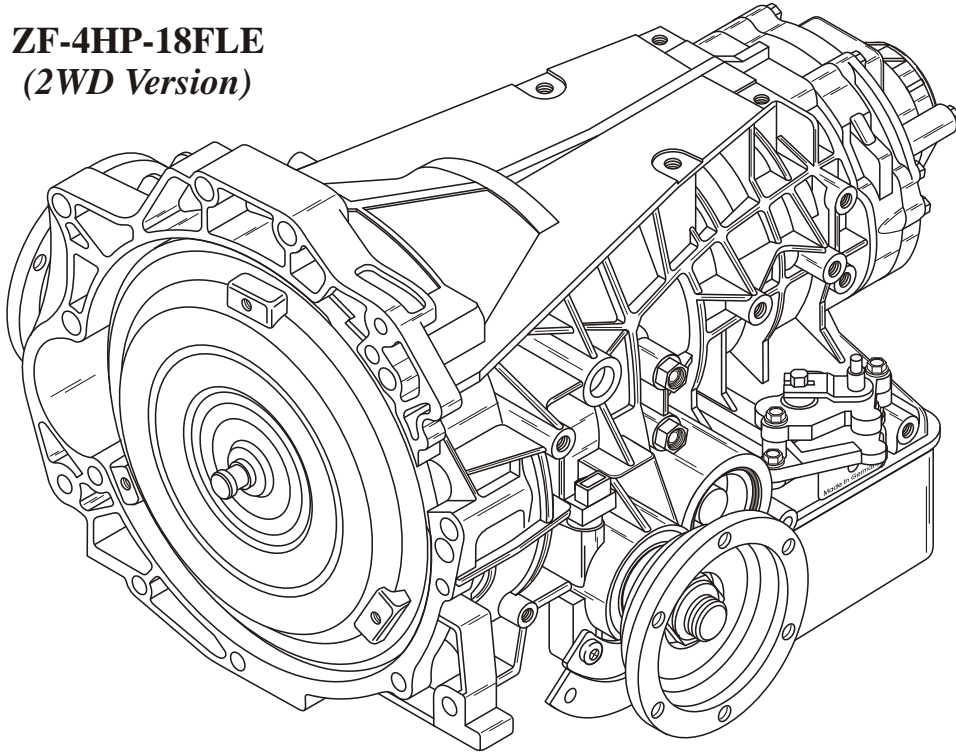
Refer to Figure 17 for location of the small flat disc orifices in the channel plate.

Refer to Figure 18 for the two pressure tap locations on the back of case.

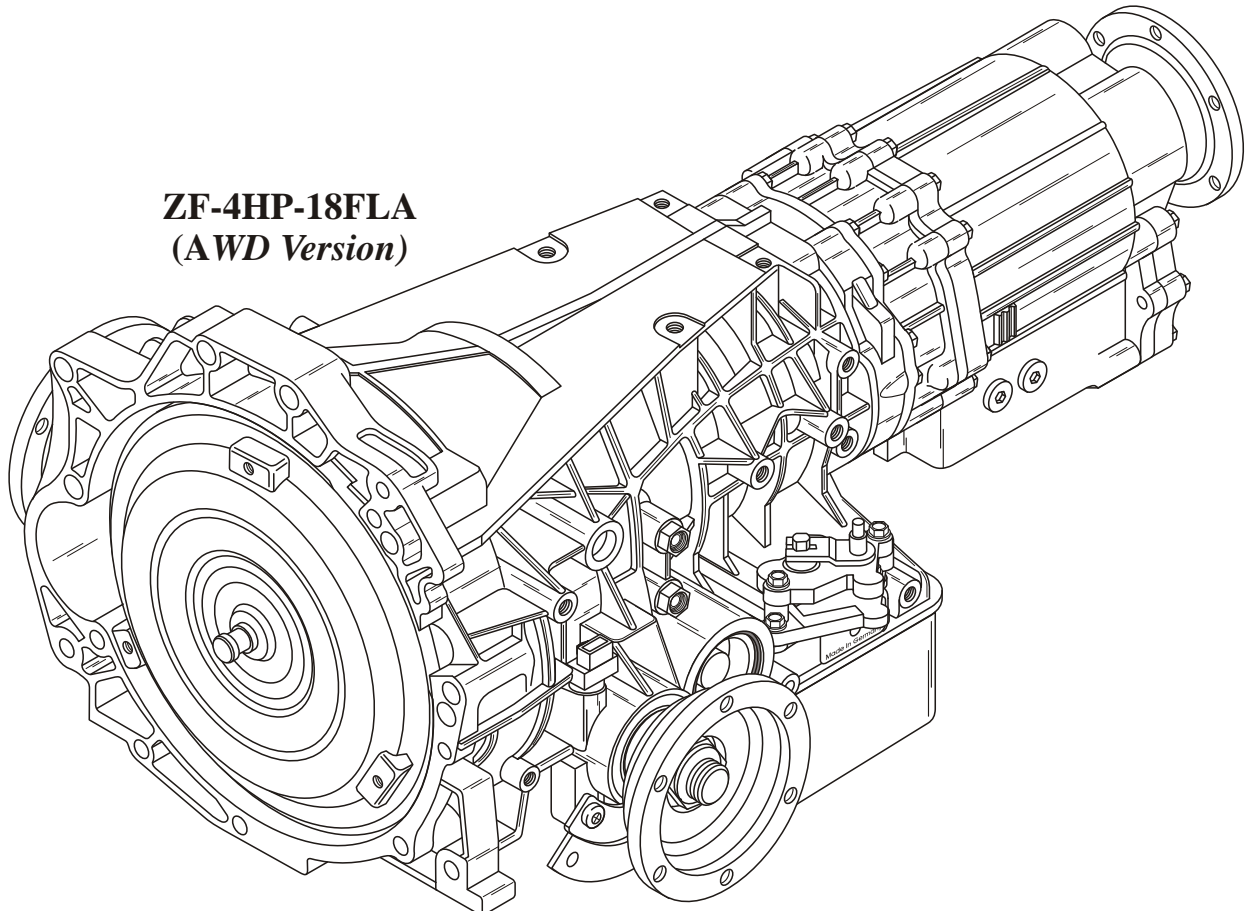
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ZF-4HP-18FLE
(2WD Version)



ZF-4HP-18FLA
(AWD Version)



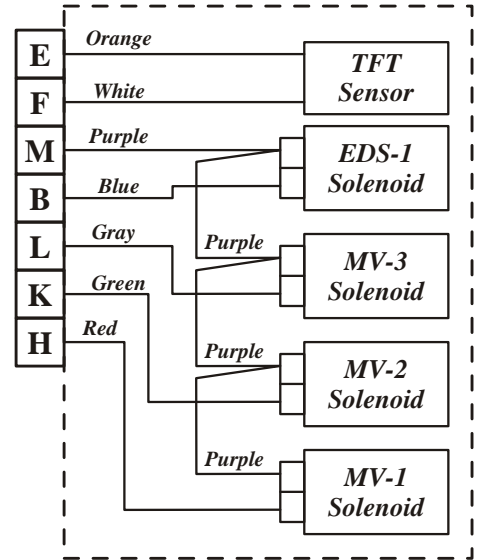
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Figure 1

RESISTANCE CHARTS AND TERMINAL IDENTIFICATION

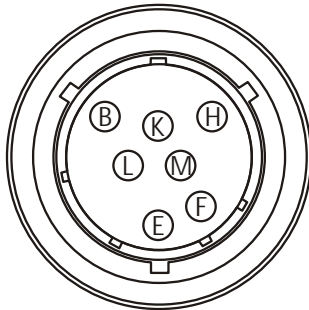
<i>Internal Component</i>	<i>Connector Terminals</i>	<i>Resistance In Ohms</i>
<i>MV-1 Solenoid</i>	<i>M & H</i>	<i>30-40 Ohms @ 68°F (20°C)</i>
<i>MV-2 Solenoid</i>	<i>M & K</i>	<i>30-40 Ohms @ 68°F (20°C)</i>
<i>MV-3 Solenoid</i>	<i>M & L</i>	<i>30-40 Ohms @ 68°F (20°C)</i>
<i>EDS-1 Solenoid</i>	<i>M & B</i>	<i>5-8 Ohms @ 68°F (20°C)</i>
<i>TFT Sensor</i>	<i>E & F</i>	<i>920-960 Ohms @ 68°F (20°C)</i>

SPECIAL NOTE:
Solenoid nomenclatures are ATSG interpretations, not Audi's nor ZF.

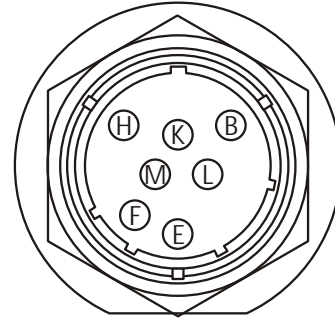


TRANSAXLE SOLENOID CONNECTOR TERMINAL IDENTIFICATION

*View Looking Into
Vehicle Harness Connector*

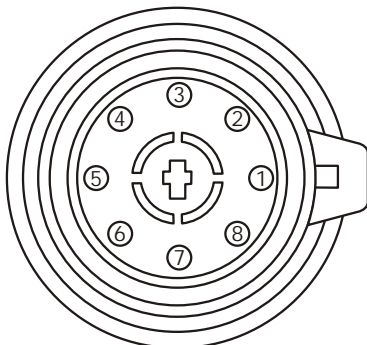


*View Looking Into
Transaxle Case Connector*

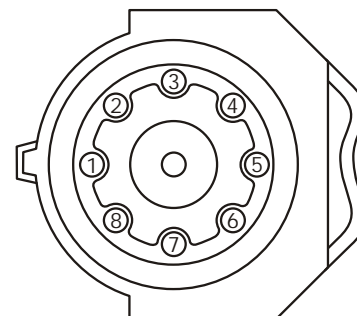


TRANSAXLE RANGE SWITCH CONNECTOR TERMINAL IDENTIFICATION

*View Looking Into
Transaxle Range Switch
Vehicle Harness Connector*

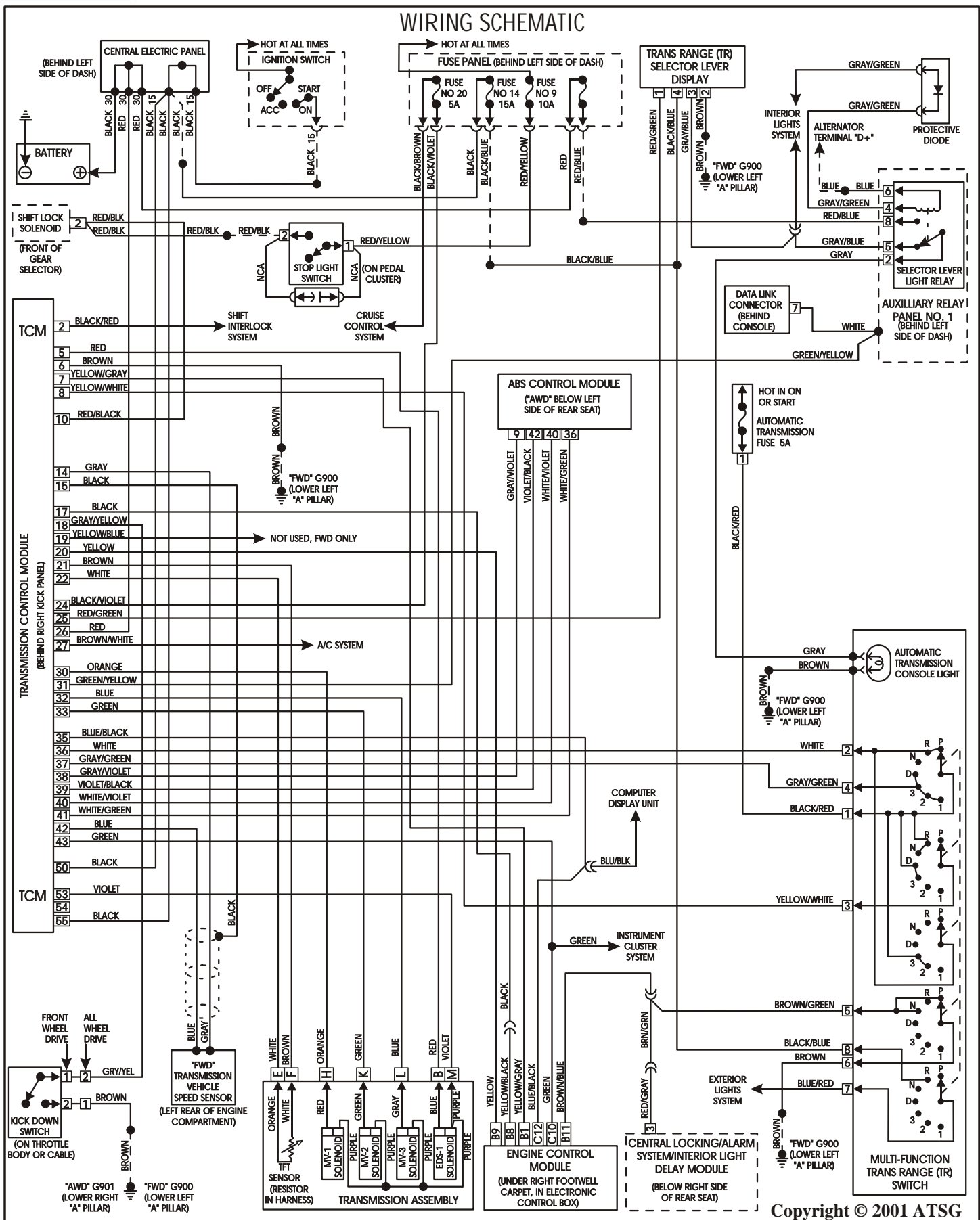


*View Looking Into
Transaxle Range
Switch Connector*



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Figure 2



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Figure 3

ZF-4HP-18FLE SOLENOID AND COMPONENT APPLICATION CHART

RANGE	MV-1 Sol.	MV-2 Sol.	MV-3 Sol.	EDS-1 Sol.	"A" Clutch	"B" Clutch	2-4 Band	"C" Clutch	"D" Clutch	"E" Clutch
Park/Neut		ON		**						
Reverse		ON	*	**		ON			ON	
Drive-1st			ON	**	ON					
Drive-2nd	ON		ON	**	ON		ON	ON		
Drive-3rd	ON			**	ON			ON		ON
Drive-4th				**			ON	ON		ON
Manual-1st			ON	**	ON				ON	
"Failsafe" ***				Max.	ON		ON	ON		

* ON For Reverse Inhibit Feature.

** Pressure Regulating.

*** Electrical failure while in 4th gear, vehicle remains in 4th gear until engine is turned off. When vehicle is once again started, transaxle will be in "Failsafe" 2nd gear.

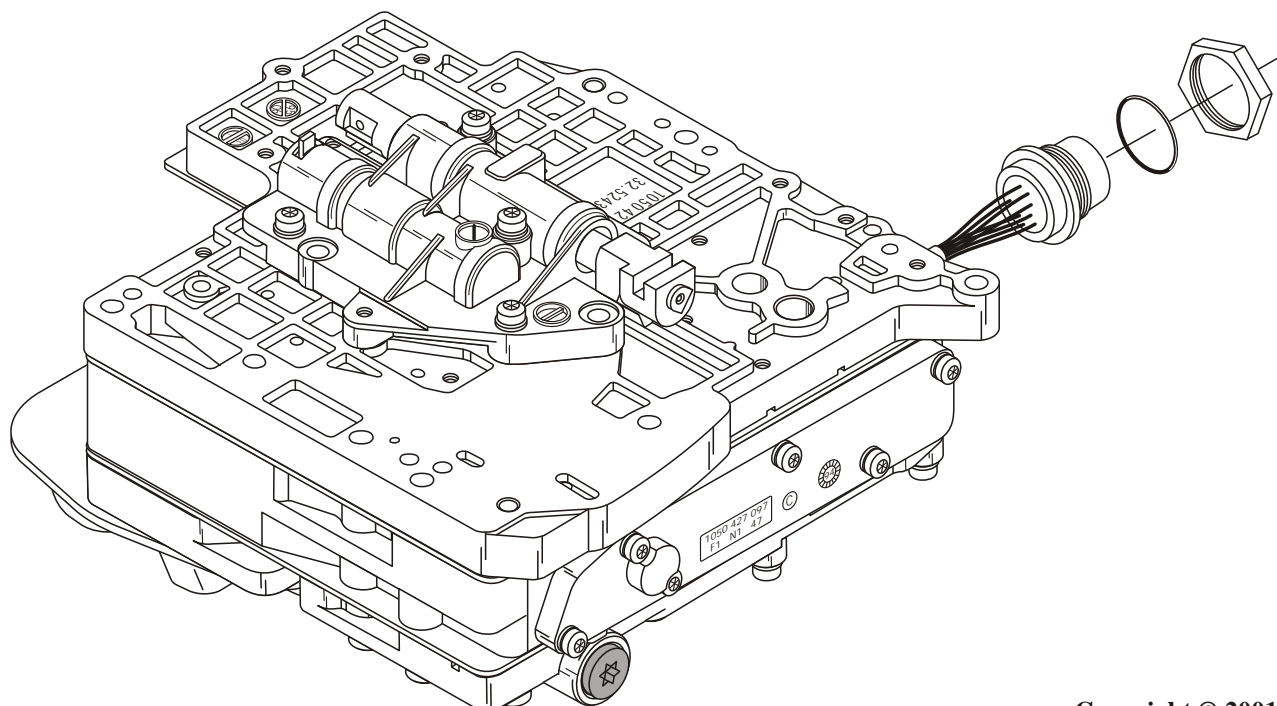
SPECIAL NOTE:

Solenoid and Clutch nomenclature are ATSG interpretations, not Audi's nor ZF.

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Figure 4

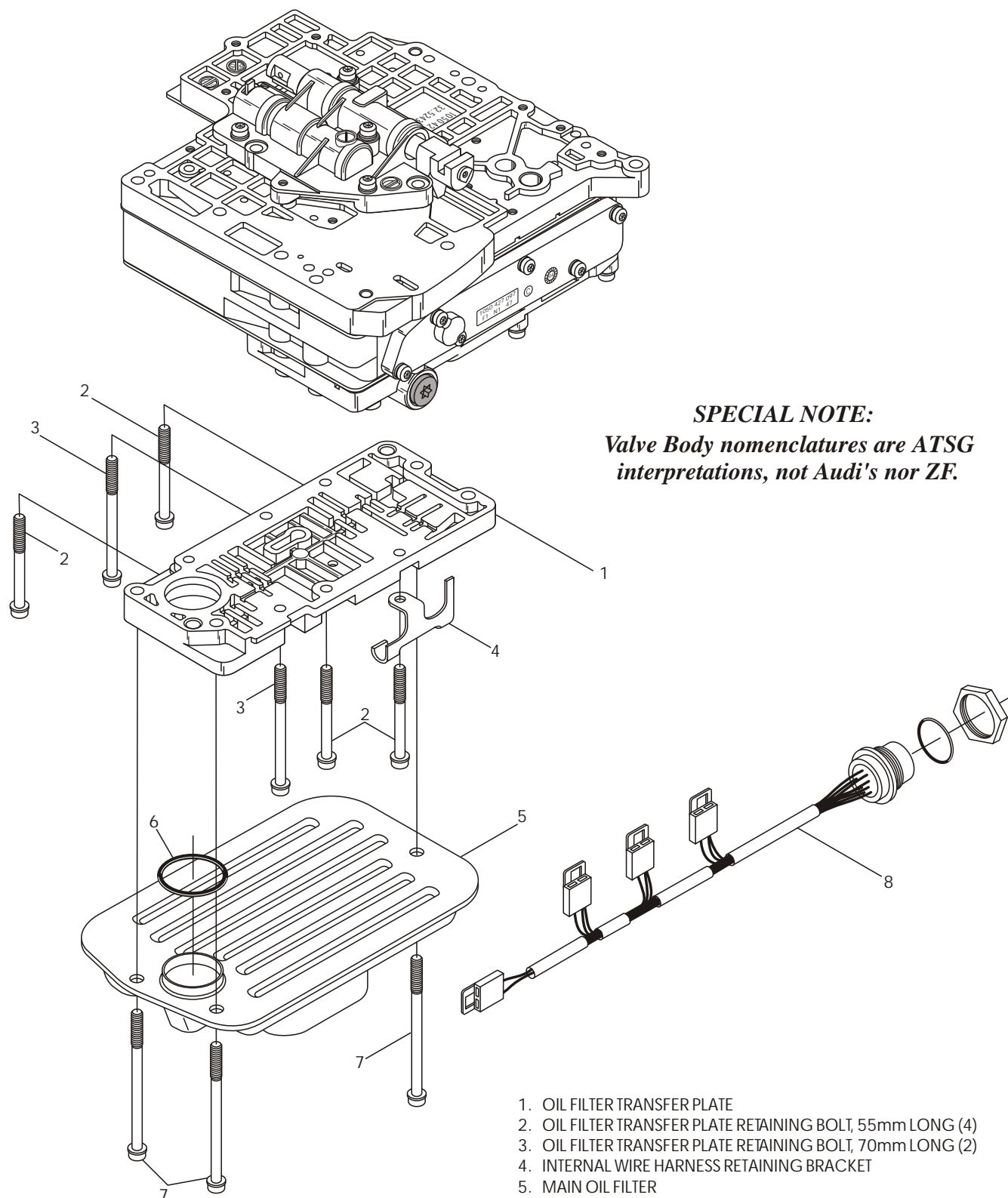
ZF-4HP-18FLA/E VALVE BODY COMPLETE



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Figure 5

ZF-4HP-18FLA/E OIL FILTER AND FILTER TRANSFER PLATE



SPECIAL NOTE:

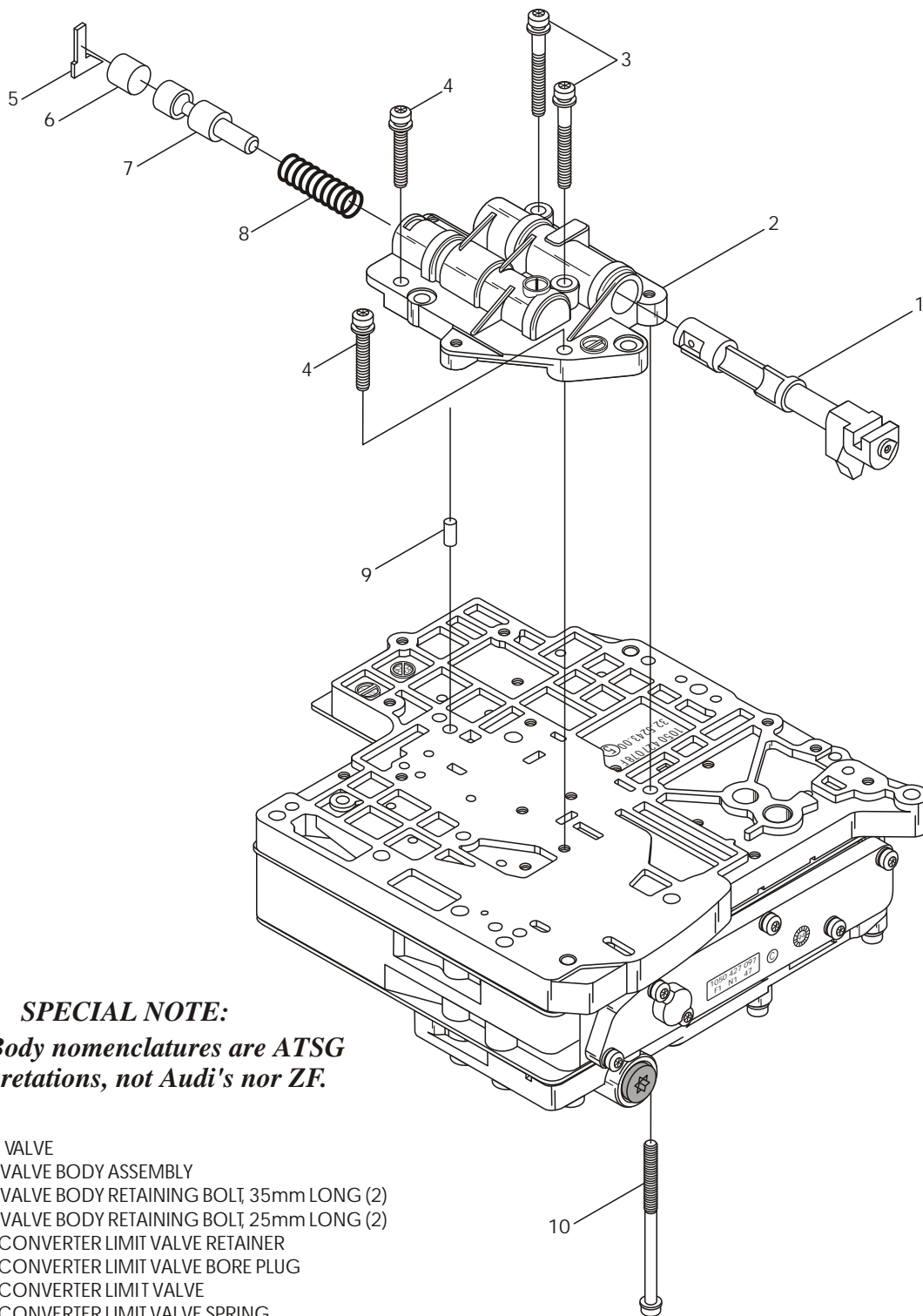
Valve Body nomenclatures are ATSG interpretations, not Audi's nor ZF.

1. OIL FILTER TRANSFER PLATE
2. OIL FILTER TRANSFER PLATE RETAINING BOLT, 55mm LONG (4)
3. OIL FILTER TRANSFER PLATE RETAINING BOLT, 70mm LONG (2)
4. INTERNAL WIRE HARNESS RETAINING BRACKET
5. MAIN OIL FILTER
6. MAIN OIL FILTER "O" RING
7. FILTER AND VALVE BODY ASSEMBLY TO CASE RETAINING BOLTS

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Figure 6

ZF-4HP-18FLA/E MANUAL VALVE BODY



SPECIAL NOTE:

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1. MANUAL VALVE
2. MANUAL VALVE BODY ASSEMBLY
3. MANUAL VALVE BODY RETAINING BOLT, 35mm LONG (2)
4. MANUAL VALVE BODY RETAINING BOLT, 25mm LONG (2)
5. TORQUE CONVERTER LIMIT VALVE RETAINER
6. TORQUE CONVERTER LIMIT VALVE BORE PLUG
7. TORQUE CONVERTER LIMIT VALVE
8. TORQUE CONVERTER LIMIT VALVE SPRING
9. ALIGNMENT DOWEL PIN, .235" DIAMETER, .612" LONG
10. LOWER PLATE/MANUAL VALVE BODY BOLT, 65mm LONG (1)

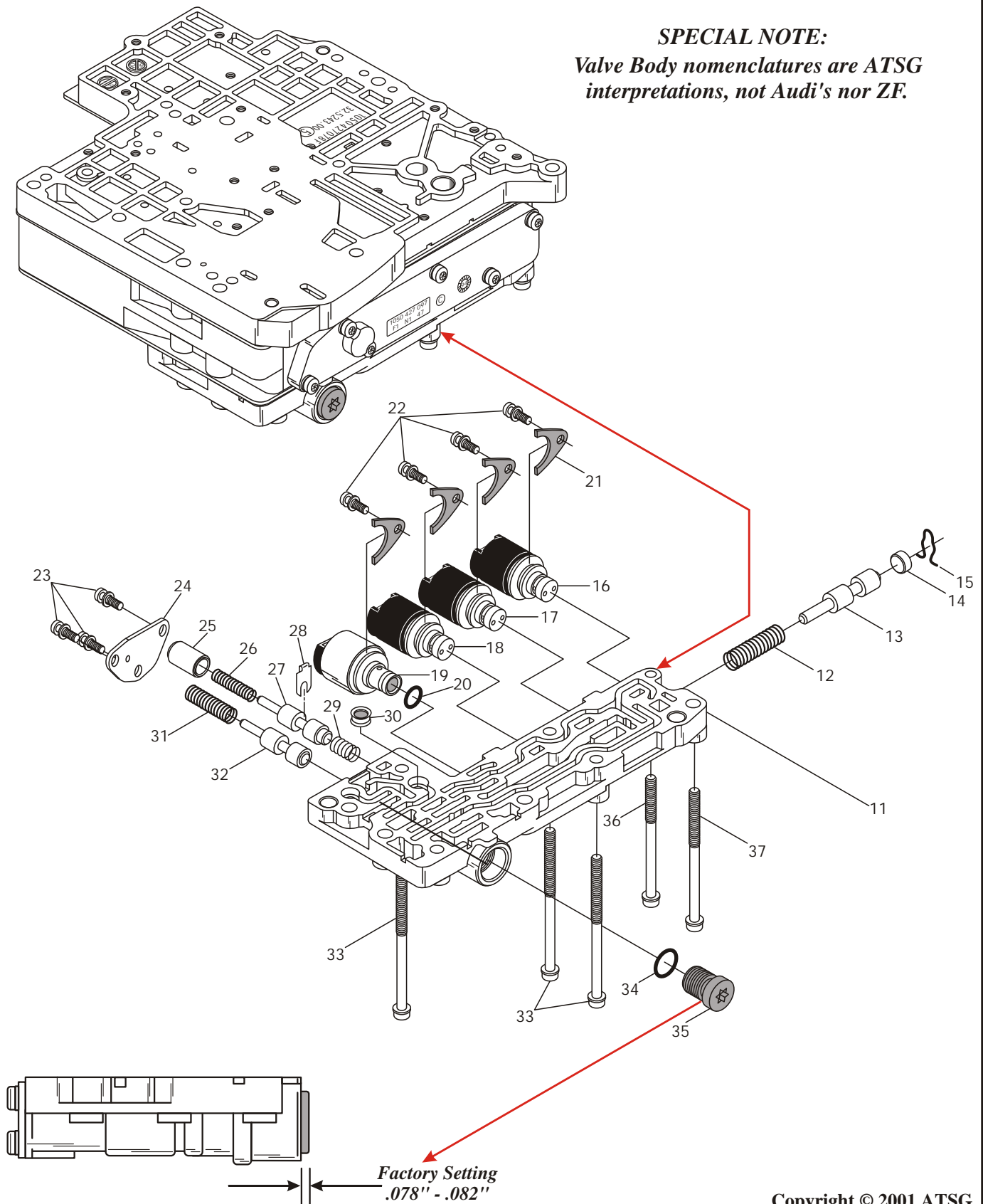
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Figure 7

ZF-4HP-18FLA/E SOLENOID VALVE BODY

SPECIAL NOTE:

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Figure 8



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11. SOLENOID VALVE BODY CASTING
12. PRESSURE REGULATOR VALVE SPRING, MV-1 THRU MV-3 SOLENOIDS
13. PRESSURE REGULATOR VALVE, MV-1 THRU MV-3 SOLENOIDS
14. PRESSURE REGULATOR VALVE BORE PLUG, MV-1 THRU MV-3 SOLENOIDS
15. PRESSURE REGULATOR VALVE RETAINING CLIP, MV-1 THRU MV-3 SOLENOIDS
16. MV-1 SOLENOID, OEM PART NUMBER 0501 313 500 (SHIFT CONTROL)
17. MV-2 SOLENOID, OEM PART NUMBER 0501 313 500 (SHIFT CONTROL)
18. MV-3 SOLENOID, OEM PART NUMBER 0501 313 500 (SHIFT CONTROL)
19. EDS-1 SOLENOID, OEM PART NUMBER 0501 311 843 (LINE PRESSURE)
20. EDS-1 SOLENOID "O" RING
21. SOLENOID RETAINING BRACKET (4 REQUIRED)
22. SOLENOID RETAINING BRACKET BOLT, 12mm LONG (4 REQUIRED)
23. RETAINING PLATE BOLT, 12mm LONG (3 REQUIRED)
24. SOLENOID BODY RETAINING PLATE
25. MODULATING VALVE PLUNGER
26. MODULATING VALVE SPRING
27. MODULATING VALVE
28. MODULATING VALVE RETAINING CLIP
29. MODULATING VALVE BALANCE SPRING
30. EDS-1 SOLENOID SCREEN
31. PRESSURE REGULATOR VALVE SPRING, FOR EDS-1 SOLENOID
32. PRESSURE REGULATOR VALVE, FOR EDS-1 SOLENOID
33. SOLENOID VALVE BODY RETAINING BOLT, 70mm LONG (3 REQUIRED)
34. MODULATING VALVE ADJUSTING SCREW "O" RING
35. MODULATING VALVE ADJUSTING SCREW
36. SOLENOID VALVE BODY RETAINING BOLT, 60mm LONG (1 REQUIRED)
37. SOLENOID VALVE BODY RETAINING BOLT, 65mm LONG (1 REQUIRED)

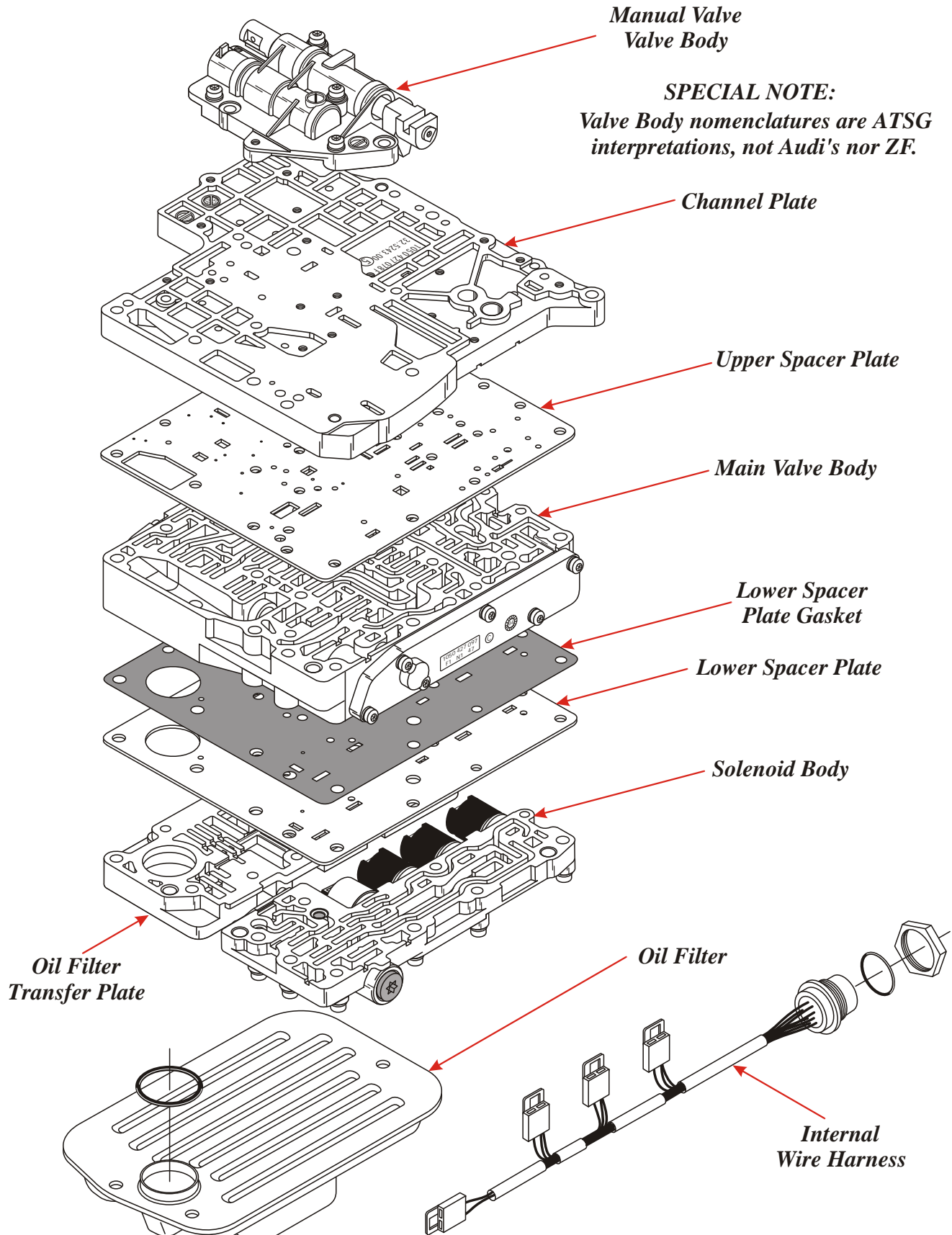
SPECIAL NOTE:

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Figure 8 LEGEND

ZF-4HP-18FLA/E COMPONENT ASSEMBLY



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Figure 9

ZF-4HP-18FLA/E MAIN VALVE BODY "REAR SIDE" DETAIL

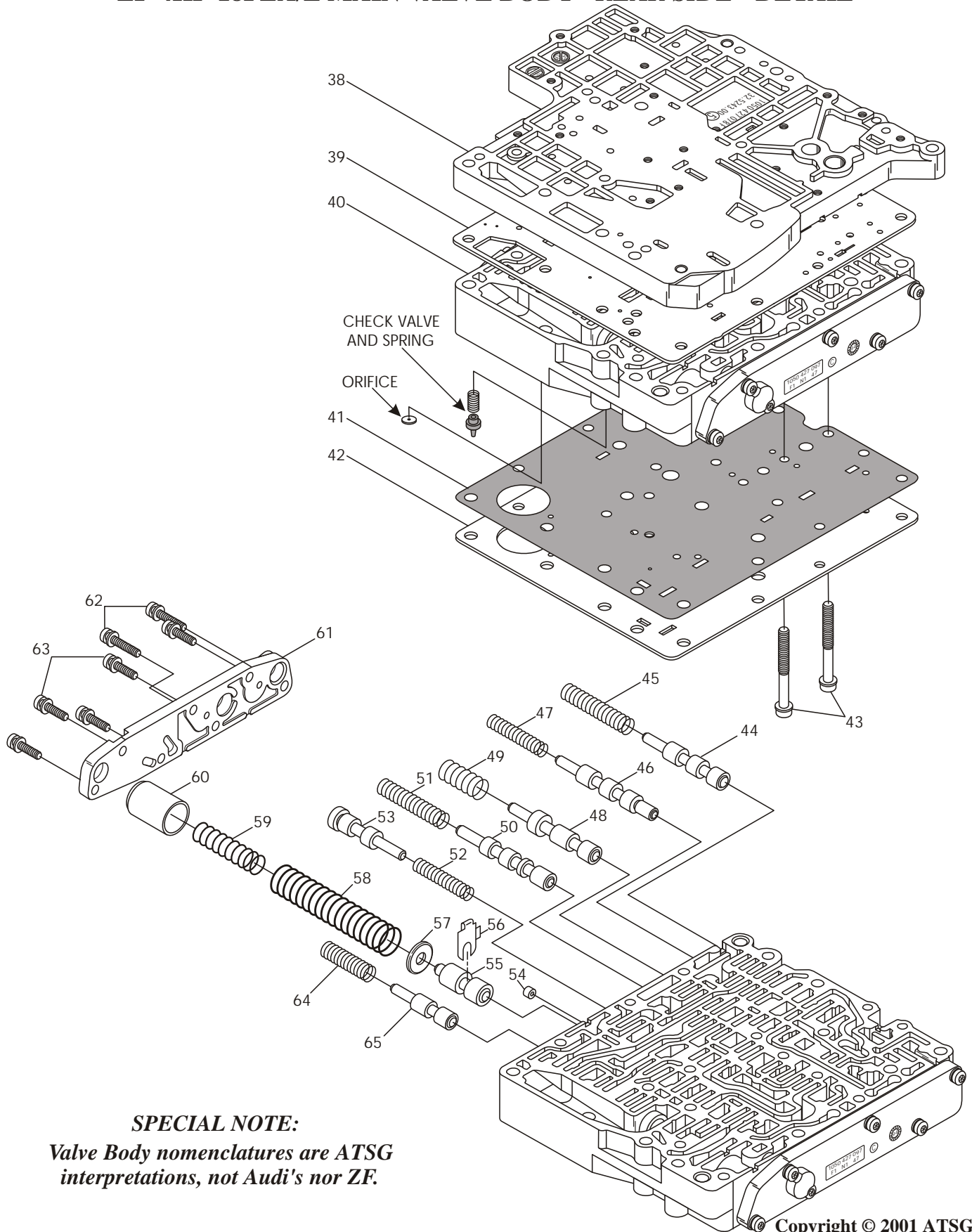
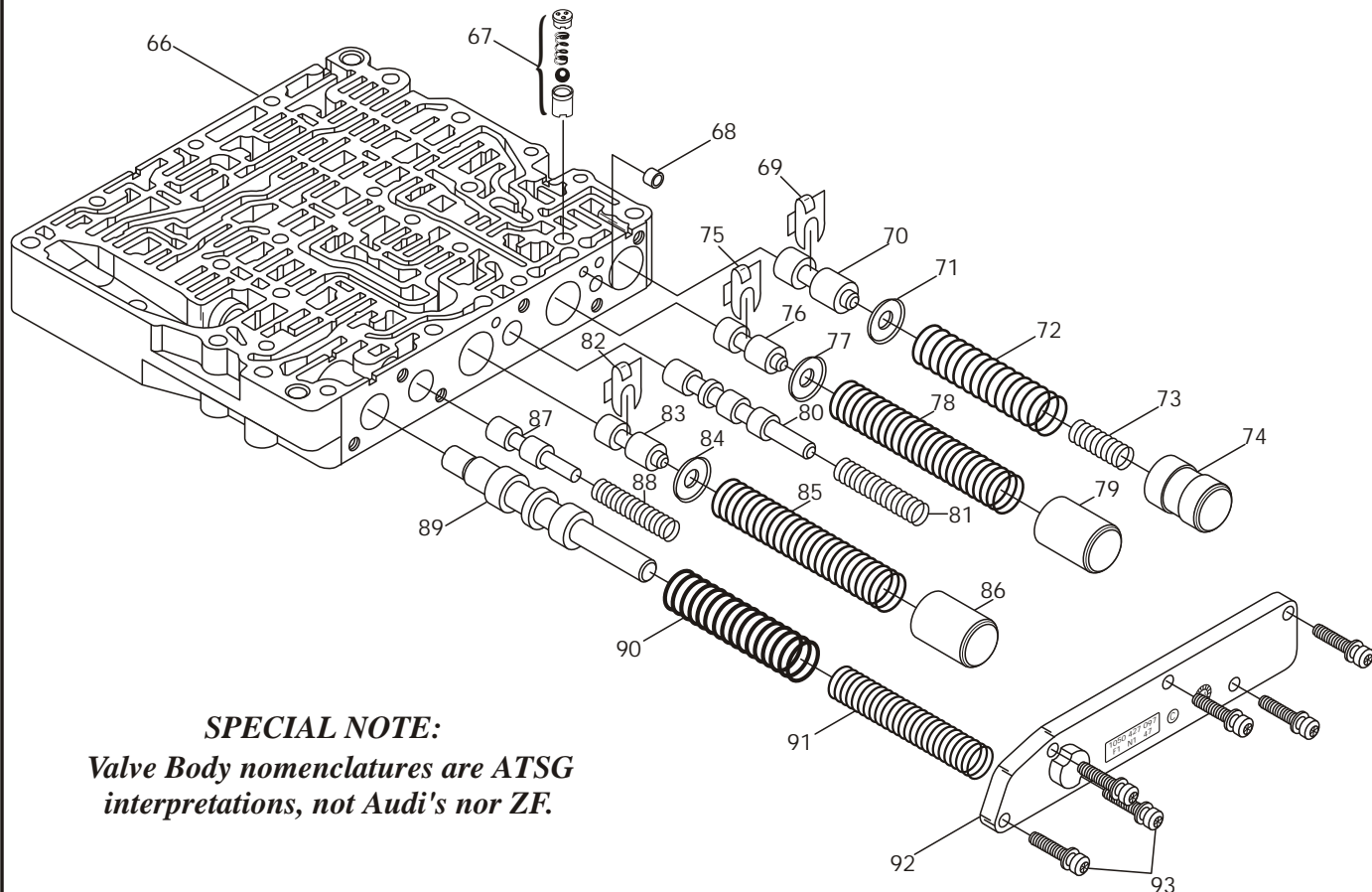


Figure 10

ZF-4HP-18FLA/E MAIN VALVE BODY "FRONT SIDE" DETAIL



SPECIAL NOTE:

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- 38. CHANNEL PLATE ASSEMBLY
- 39. UPPER SPACER PLATE
- 40. MAIN VALVE BODY ASSEMBLY
- 41. MAIN VALVE BODY TO LOWER SPACER PLATE GASKET
- 42. LOWER SPACER PLATE
- 43. SPACER PLATE TO CHANNEL PLATE BOLT, 50mm LONG (2)
- 44. SHIFT VALVE NUMBER ONE
- 45. SHIFT VALVE NUMBER ONE SPRING
- 46. SHIFT VALVE NUMBER TWO
- 47. SHIFT VALVE NUMBER TWO SPRING
- 48. SAFETY MODE VALVE
- 49. SAFETY MODE VALVE SPRING
- 50. SHIFT VALVE NUMBER THREE
- 51. SHIFT VALVE NUMBER THREE SPRING
- 52. 3-4 TRACTION VALVE SPRING
- 53. 3-4 TRACTION VALVE
- 54. .060" ORIFICED CUP PLUG IN VALVE BODY CASTING
- 55. "A" CLUTCH ACCUMULATOR VALVE
- 56. "A" CLUTCH ACCUMULATOR VALVE RETAINER
- 57. "A" CLUTCH ACCUMULATOR VALVE SPRING SEAT
- 58. "A" CLUTCH ACCUMULATOR OUTER SPRING
- 59. "A" CLUTCH ACCUMULATOR INNER SPRING
- 60. "A" CLUTCH ACCUMULATOR PLUNGER
- 61. REAR SIDE VALVE RETAINING COVER
- 62. REAR SIDE COVER RETAINING SCREWS, 22mm LONG (2)
- 63. REAR SIDE COVER RETAINING SCREWS, 18mm LONG (5)
- 64. "C" CLUTCH TRACTION VALVE SPRING
- 65. "C" CLUTCH TRACTION VALVE
- 66. MAIN VALVE BODY CASTING

- 67. "D" CLUTCH ONE-WAY CHECK VALVE, (.020" ORIFICE)
- 68. .070" ORIFICED CUP PLUG IN VALVE BODY CASTING
- 69. "D" CLUTCH ACCUMULATOR VALVE RETAINER
- 70. "D" CLUTCH ACCUMULATOR VALVE
- 71. "D" CLUTCH ACCUMULATOR VALVE SPRING SEAT
- 72. "D" CLUTCH ACCUMULATOR OUTER SPRING
- 73. "D" CLUTCH ACCUMULATOR INNER SPRING
- 74. "D" CLUTCH ACCUMULATOR PLUNGER
- 75. "C" CLUTCH ACCUMULATOR VALVE RETAINER
- 76. "C" CLUTCH ACCUMULATOR VALVE
- 77. "C" CLUTCH ACCUMULATOR VALVE SPRING SEAT
- 78. "C" CLUTCH ACCUMULATOR SPRING
- 79. "C" CLUTCH ACCUMULATOR PLUNGER
- 80. 1ST AND REVERSE VALVE
- 81. 1ST AND REVERSE VALVE SPRING
- 82. "E" CLUTCH ACCUMULATOR VALVE RETAINER
- 83. "E" CLUTCH ACCUMULATOR VALVE
- 84. "E" CLUTCH ACCUMULATOR VALVE SPRING SEAT
- 85. "E" CLUTCH ACCUMULATOR SPRING
- 86. "E" CLUTCH ACCUMULATOR PLUNGER
- 87. 4-3 TRACTION VALVE
- 88. 4-3 TRACTION VALVE SPRING
- 89. MAIN LINE PRESSURE REGULATOR VALVE
- 90. MAIN LINE PRESSURE REGULATOR VALVE OUTER SPRING
- 91. MAIN LINE PRESSURE REGULATOR VALVE INNER SPRING
- 92. FRONT SIDE VALVE RETAINING COVER
- 93. FRONT SIDE COVER RETAINING SCREWS, 18mm LONG (6)

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Figure 11



Technical Service Information

ZF 4HP-18FLA/E SPRING SPECIFICATIONS

<i>Manual Valve Body</i>	<i>Solenoid Valve Body</i>	<i>Main Valve Body</i>	
		<i>"Back Side"</i>	<i>"Front Side"</i>
SPRING ILLUSTRATION NO. 8 FREE LENGTH = 1.618" SPRING DIAMETER = .495" WIRE DIAMETER = .062"	SPRING ILLUSTRATION NO. 11 FREE LENGTH = 1.688" SPRING DIAMETER = .375" WIRE DIAMETER = .042"	SPRING ILLUSTRATION NO. 45: FREE LENGTH = 1.865" SPRING DIAMETER = .382" WIRE DIAMETER = .035"	SPRING ILLUSTRATION NO. 72: FREE LENGTH = 2.860" SPRING DIAMETER = .612" WIRE DIAMETER = .048"
	SPRING ILLUSTRATION NO. 26 FREE LENGTH = 1.475" SPRING DIAMETER = .320" WIRE DIAMETER = .042"	SPRING ILLUSTRATION NO. 47: FREE LENGTH = 1.595" SPRING DIAMETER = .365" WIRE DIAMETER = .031"	SPRING ILLUSTRATION NO. 73: FREE LENGTH = 1.589" SPRING DIAMETER = .429" WIRE DIAMETER = .035"
	SPRING ILLUSTRATION NO. 29 FREE LENGTH = .760" SPRING DIAMETER = .370" WIRE DIAMETER = .028"	SPRING ILLUSTRATION NO. 49: FREE LENGTH = 1.194" SPRING DIAMETER = .443" WIRE DIAMETER = .031"	SPRING ILLUSTRATION NO. 78: FREE LENGTH = 3.530" SPRING DIAMETER = .575" WIRE DIAMETER = .039"
	SPRING ILLUSTRATION NO. 31 FREE LENGTH = 1.530" SPRING DIAMETER = .340" WIRE DIAMETER = .042"	SPRING ILLUSTRATION NO. 51: FREE LENGTH = 1.832" SPRING DIAMETER = .364" WIRE DIAMETER = .031"	SPRING ILLUSTRATION NO. 81: FREE LENGTH = 1.815" SPRING DIAMETER = .365" WIRE DIAMETER = .031"
		SPRING ILLUSTRATION NO. 52: FREE LENGTH = 1.289" SPRING DIAMETER = .298" WIRE DIAMETER = .027"	SPRING ILLUSTRATION NO. 85: FREE LENGTH = 3.530" SPRING DIAMETER = .575" WIRE DIAMETER = .039"
		SPRING ILLUSTRATION NO. 58: FREE LENGTH = 3.216" SPRING DIAMETER = .590" WIRE DIAMETER = .042"	SPRING ILLUSTRATION NO. 88: FREE LENGTH = 1.712" SPRING DIAMETER = .361" WIRE DIAMETER = .031"
		SPRING ILLUSTRATION NO. 59: FREE LENGTH = 1.592" SPRING DIAMETER = .432" WIRE DIAMETER = .035"	SPRING ILLUSTRATION NO. 90: FREE LENGTH = 2.909" SPRING DIAMETER = .605" WIRE DIAMETER = .066"
		SPRING ILLUSTRATION NO. 64: FREE LENGTH = 1.514" SPRING DIAMETER = .363" WIRE DIAMETER = .038"	SPRING ILLUSTRATION NO. 91: FREE LENGTH = 3.612" SPRING DIAMETER = .445" WIRE DIAMETER = .042"

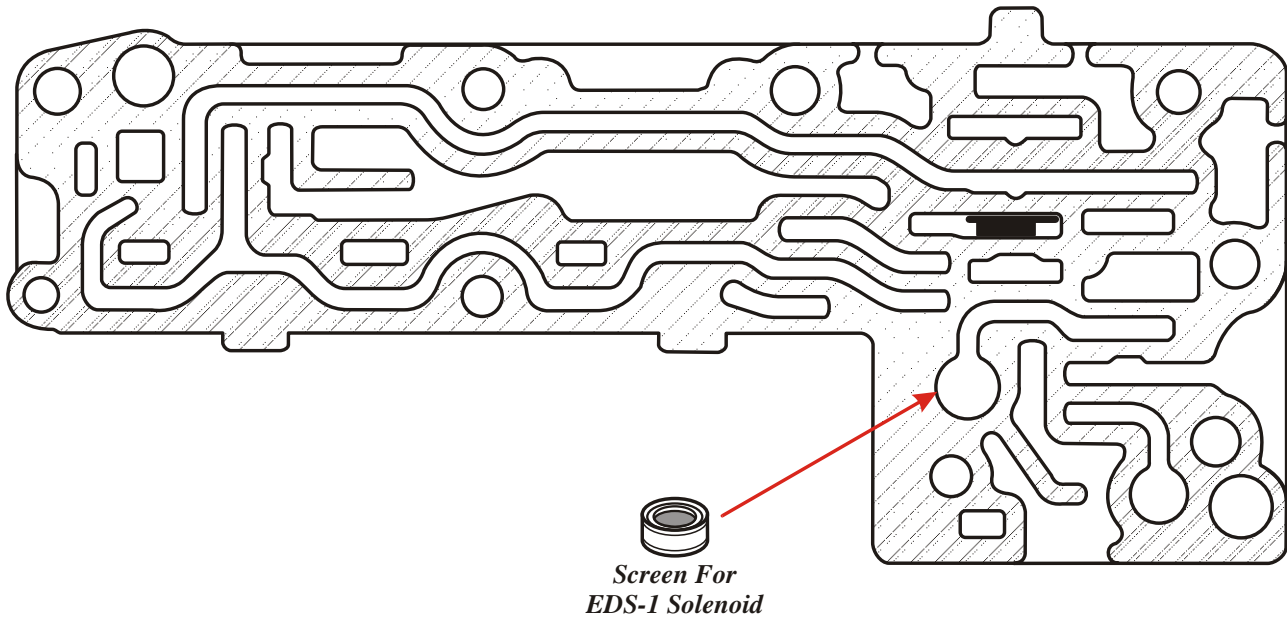
Special Note:

The spring dimensions listed above were "Observations" from only one valve body, and may vary from one model to another.

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Figure 12

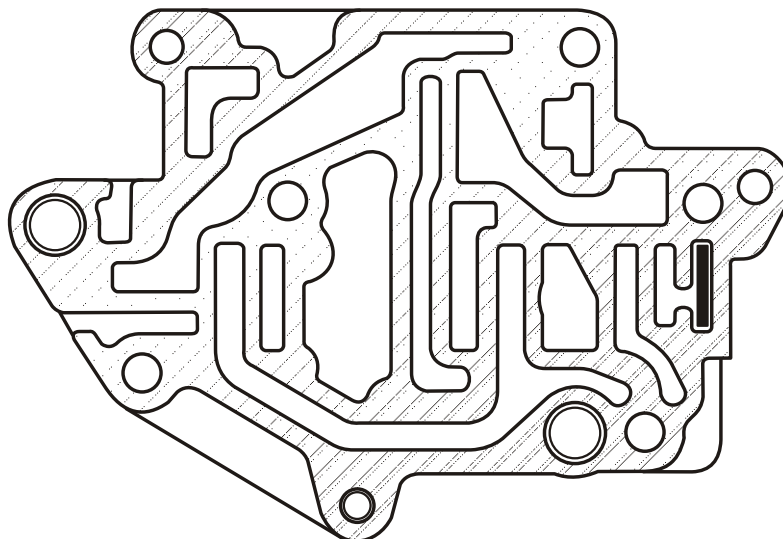
SOLENOID BODY RETAINER AND SCREEN LOCATIONS



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Figure 13

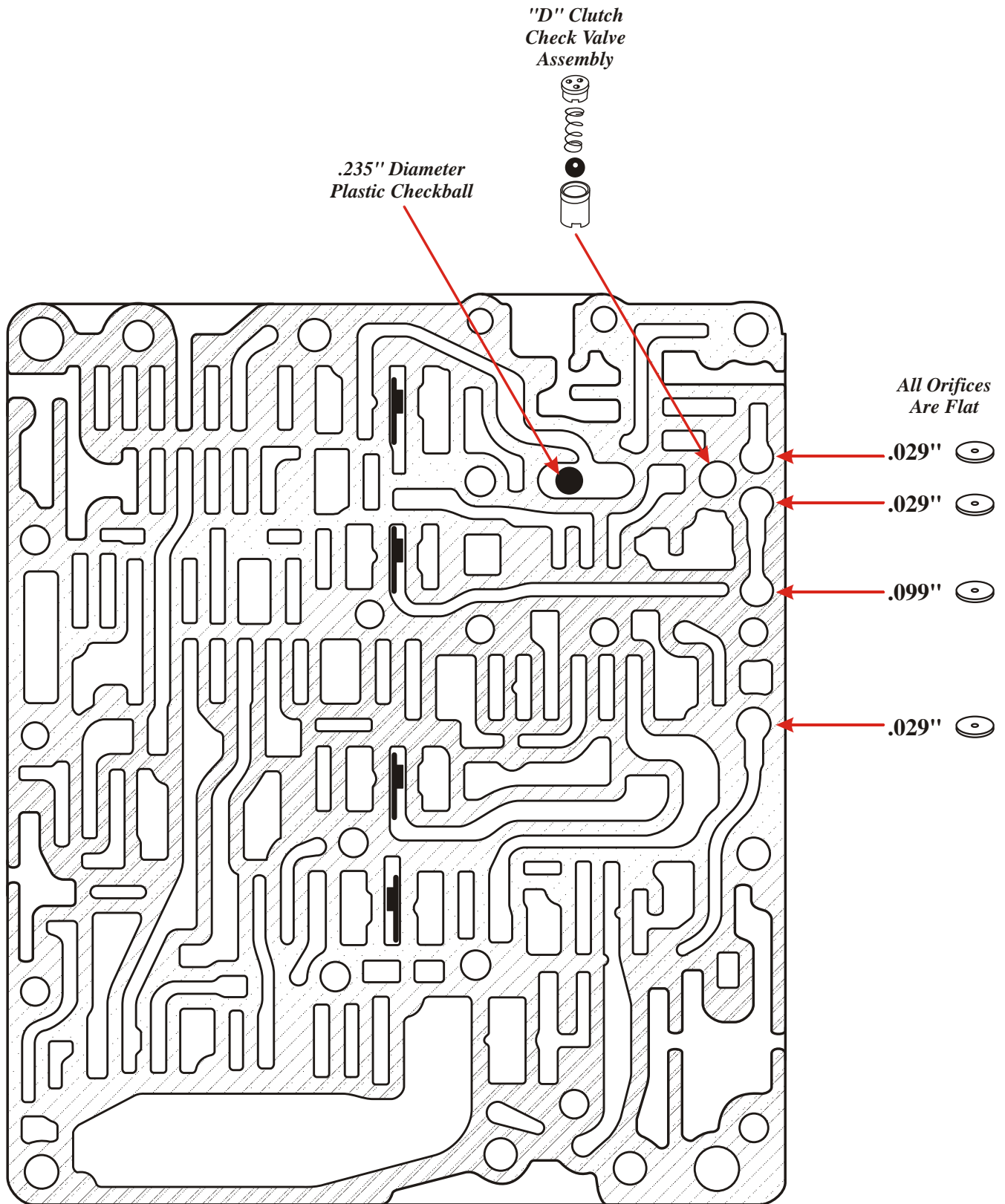
MANUAL VALVE BODY RETAINER LOCATIONS



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Figure 14

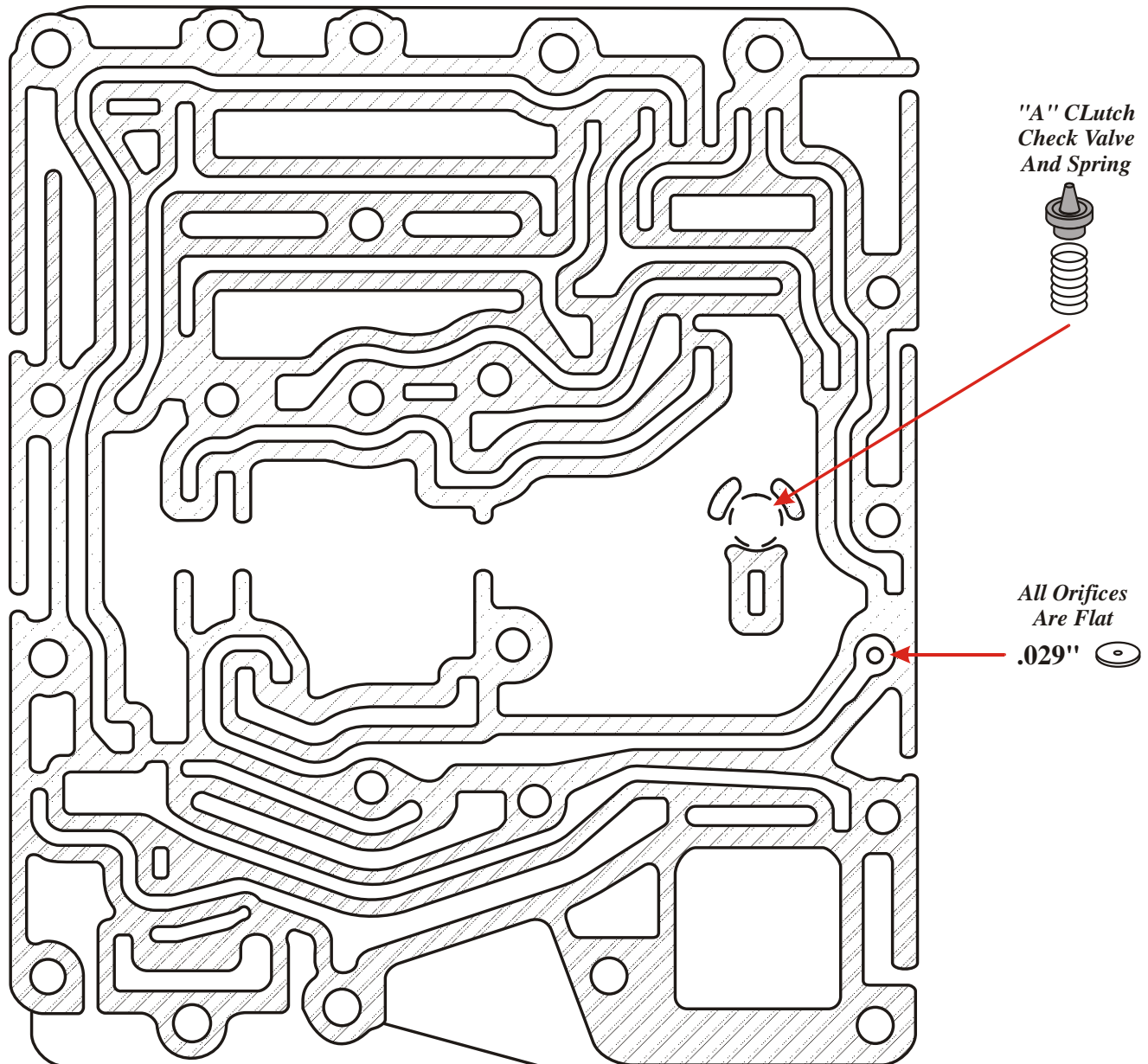
MAIN VALVE BODY BODY "TOP SIDE" RETAINER AND ORIFICE LOCATIONS



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Figure 15

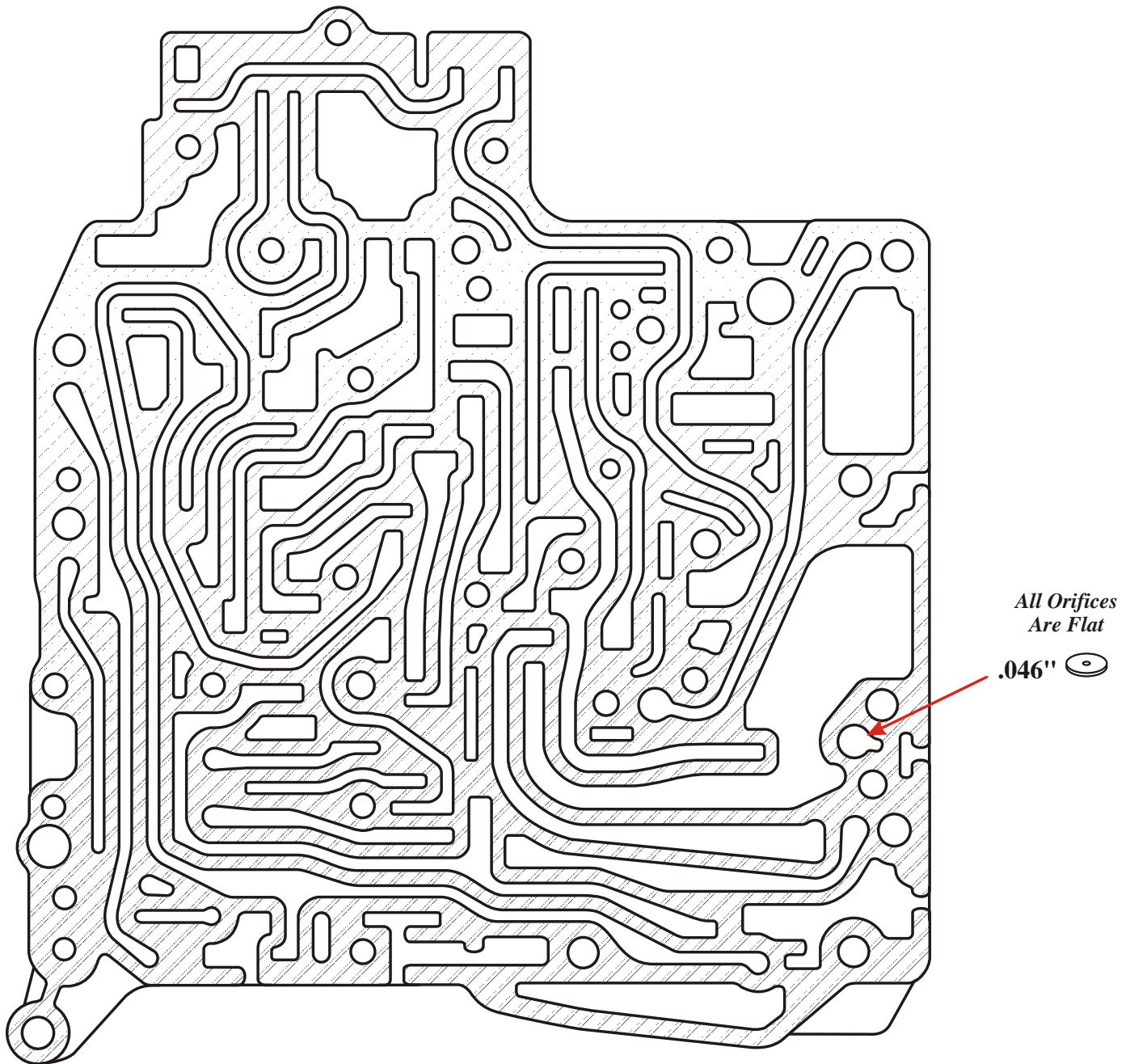
MAIN VALVE BODY BODY "BOTTOM SIDE" VALVE AND ORIFICE LOCATIONS



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Figure 16

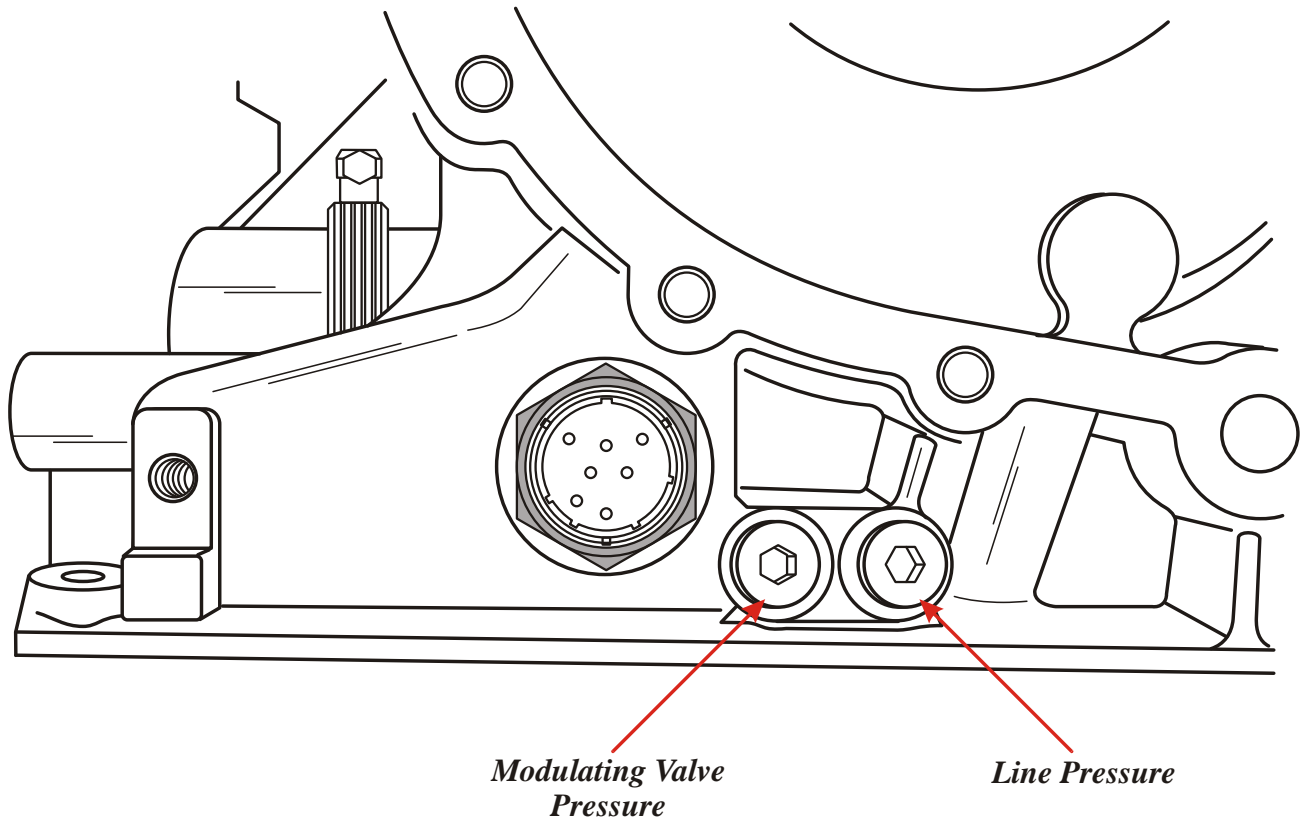
CHANNEL PLATE ORIFICE LOCATIONS



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Figure 17

PRESSURE TAP LOCATIONS



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Figure 18