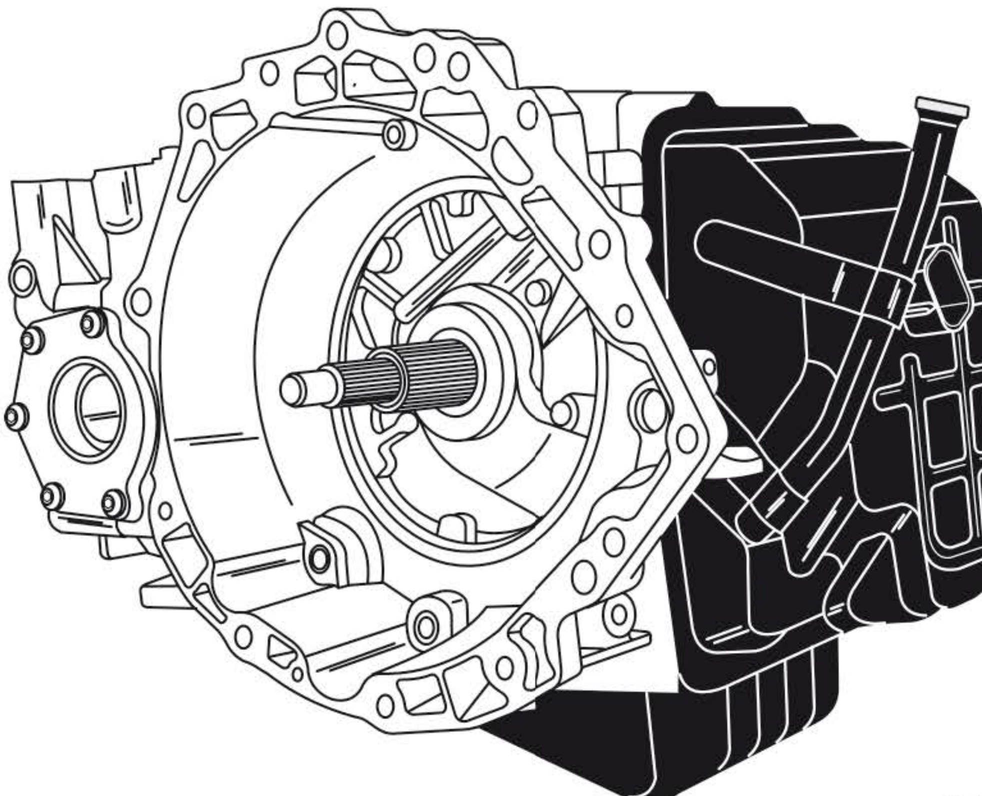
THE 62TE

PRELIMINARY INFORMATION

2007-Present Chrysler Pacifica
2007-Present Chrysler Sebring
2008-Present Dodge Avenger



Introduction

The new 62TE transaxle by the Chrysler Group is fitted behind a 3.5L V6 engine in the Avenger, Sebring and Sebring Convertibles (JS Body) and the 4.0L V6 engines in Pacifica (CS Body) vehicles. It has 6 forward speeds with a 7th gear used in a specific downshift sequence known as the "four prime (4')." Four prime ratio is 1.573:1 which is a ratio between third gear (2.284:1) and fourth gear (1:452:1), Refer to Figure 1. Four prime is used for a smoother highway speed kick-down from sixth gear and to provide a better ratio for climbing grades under certain conditions.

Double-Swap Shifts

This transmission is another technical first for Chrysler in that this transmission introduces the double-swap shifts where there is an exchange of two shift elements for two other shift elements. This occurs on the 2-3, 3-2 and 4-2 shifts (Figure 1). A freewheel device (one-way clutch or sprag) is used to assist in smoother shifts with its nonsynchronous application and release properties. It holds in first, third and fourth assisting in a smoother 1-2, 2-1, 4-5 and 5-4 shifts (Figures 1 and 2).

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EMCC

The Torque Converter has been redesigned from a circular geometry to an elliptical geometry of the torus making the converter dimensionaly shorter longitudinally by 12 mm and weighing less. This new converter allows the use of precise Electronically Modulated Converter Clutch (EMCC) lockup strategy that allows the clutch to slip continuously under certain driving combinations.

Internal Components

This 62TE replaces the 41TE but retained a large percentage of parts from the 4 speed design so many of the internal parts will be very familiar. The geartrain consists of a Main Centerline Shaft that is very close to the 41TE transmission having a turbine shaft that connects to an Underdrive/Overdrive/Reverse Clutch drum assembly, followed by the 2/4 Clutch Retainer and Piston, two planetary gear sets and the L/R clutch. The Underdrive Centerline (transfer shaft) consists of the Direct Clutch, the Low Clutch and a Freewheel device (one-way clutch [OWC] or sprag). With the added Underdrive Centerline Shaft combined with a transmission having shift adapt strategies, it required the addition of a new speed sensor to accompany the Input Shaft Speed (ISS) sensor and the Output Shaft Speed (OSS) sensor and it is called the Transfer Shaft Speed (TSS) sensor (Figure 1).

Solenoids

The 41TE transmission was operated through only 4 clutch control solenoids; the UD, L/R, 2/4 and OD. The 62TE uses the same solenoids as well as 4 others; the Direct Clutch Solenoid (DC), Low Clutch Solenoid (LC), a Pressure Control (PC) Solenoid and an Electronic Modulated Converter Clutch (MCC) Solenoid. With a more efficient pump and a pressure control solenoid, pressure supply can be matched to torque requirements which is essential during both low speeds and heavy throttle conditions. A pressure control sensor (transducer) is also used to increase pressure control efficiency (Figure 2, 3 and 4).

Failsafe

The Underdrive and 2/4 Solenoids are Normally Applied Solenoids while the remaining clutch control solenoids are Normally Vented. As a result of this, when the electrical system shuts down, failsafe or limp-in mode is third gear. This mode was chosen by the engineers for several reasons:

1.Most importantly, the default gear is on a freewheel (OWC) removing the danger posed by a high speed downshift on slippery road surfaces.
2.The gear ratio obtained is sufficient enough without having jeopardized the operation in hilly terrain.
3.The friction elements applied have proved to be highly reliable.

As previously mentioned in the Internal Components paragraph, with the added underdive shaft consisting of a Direct Clutch, a Low Clutch and the Freewheel One-Way Clutch, an additional speed sensor was required on the output called the Transfer Shaft Speed Sensor. It may also be referred to as the Intermediate Speed Sensor (N_c). The rpm information this sensor provides to the computer is used for control purposes of the underdrive unit shifts and double swap shifts. It is also used for ratio checks of the underdrive unit. There are 2 underdrive unit ratios, 1.4537 when the underdrive unit is in the low ratio and 1.00 when it is in the direct ratio.

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With having a total of three speed sensors, the 62TE utilizes three possible ratio checks. One is the ratio check of the overall Turbine Shaft Speed Sensor (N_t) to the Output Shaft Speed Sensor (N_o). This measures the overall transmission ratio. A second ratio check is made between the Turbine Shaft Speed Sensor (N_t) and the Transfer Shaft Speed Sensor (N_c) which checks the main transmission centerline ratio. And then a check is made between the Transfer Shaft Speed Sensor (N_c) and the Output Shaft Speed Sensor (N_o). The control logic is to continuously check the three ratios while in gear. Should any of the three ratios fall outside of the tolerance range due to clutch slippage or clutch failure for a given period of times, the transmission is intelligently put into 3rd gear failsafe.

Another type of failsafe feature built into the 62TE transmission is a hydraulic blocker that will prevent the possibility of the Direct Clutch and Low Clutch being applied at the same time. If this were to happen a complete bind up would occur. The hydraulic blocker is designed to block the Low Clutch circuit whenever the pressure in the Direct Clutch circuit reaches a level high enough to begin to apply the Direct Clutch. It is not until the Direct Clutch circuit has minimal pressure that the blocker is released. The same action will occur when the Low Clutch is applied, the blocker valve will block pressure from entering the Direct Clutch circuit.

As an additional safety measure, the control logic is capable of simulating the blocker valve by the way in which it will control the Direct Clutch and Low Clutch Solenoid should the blocker valve get stuck in a mid position.

Another failsafe feature is that the Direct Clutch and Low Clutch circuit each have a pressure switch signal. If both pressure switches report an applied state simultaneously to the computer, the computer will initiate failsafe.

Temperature Based Shift Schedules
Temperature based shift schedules are used to deliver acceptable driveability and shift quality among other reasons. There are Extreme Cold, Super Cold, Cold, Warm and Hot mode strategies.

Extreme Cold
For start-ups below -16ºF, the controller will declare a neutral state placing the transmission in default causing third gear in all Drive or AutoStick ranges and reverse gear in the Reverse range. Shifting of the transmission will resume when temperature warms to a level greater than -12ºF.

Supercold
For start-ups below 0ºF or transitions from Extreme Cold to Supercold, an elevated shift schedule will be selected by the computer to prevent excessive shifting to facilitate quicker warm-ups. AutoStick will be operational enabling the driver to launch the vehicle in higher gears for reduced traction on slippery surfaces. The Supercold range clears when temperatures warms to greater than +10ºF.

Cold/Warm/Hot
For start-ups where initial transmission fluid temperatures are greater than +10ºF as well as when the transmission warms during a drive cycle, then it will pass into and through the cold, warm and hot operating ranges. Shift and TCC scheduling will adjust accordingly. Cold is defined as being in the range of above +10ºF and below +36ºF and clears when transmission temperature exceeds +40ºF. Warm is between +40ºF and +80ºF while hot is greater than +80ºF.

We would like to thank the good folks at ALTO for the use of their transmission in putting this material together!

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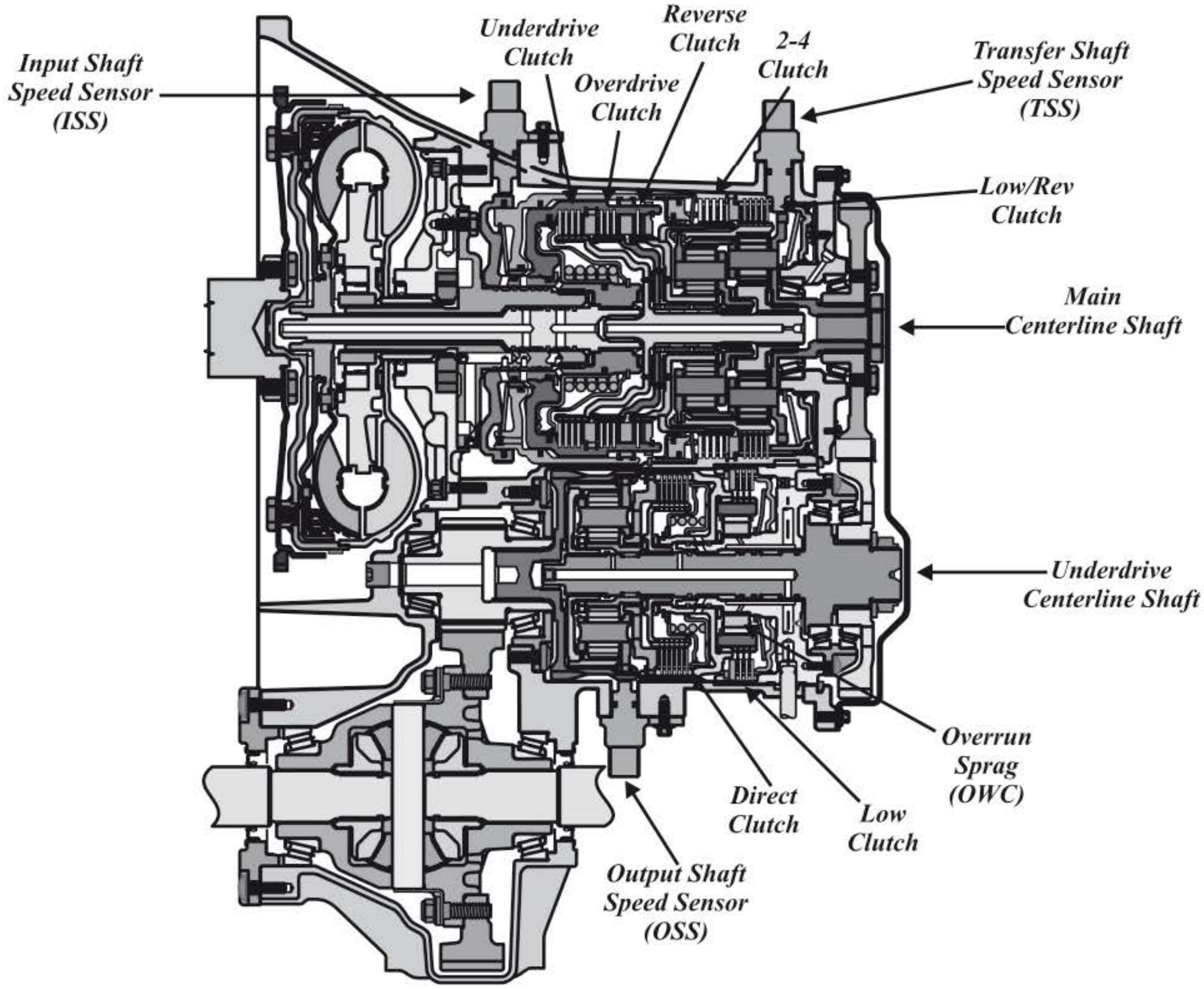
CLUTCH APPLICATION CHART & COMPONENT LOCATIONS



62TE		ELEMENTS APPLIED							
GEAR	RATIO	UD	OD	R	2-4	L-R	LC	DC	OWC
1	4.127	X				X	(X)		H
2	2.842	X				X		X	
3*	2.284	X			X		X‡		H
4'	1.573	X			X			X	
4	1.452	X	X				X‡		H
5	1.000	X	X					X	
6	0.689		X		X			X	
R	3.215			X		X	X		

*** Limp-in Mode**
‡ Applied in coast only

(X) On in manual low. In OD-1 "On" at launch; "Off" at 150 rpm output speed
4' - Four Prime

Figure 1

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SOLENOID, PRESSURE SWITCH AND CLUTCH APPLICATION CHART

			Solenoid Status								Pressure Switch Status					Clutch Status							
GEAR	RATIO	LP (PSI)	VFS	PWM	PWM	PWM	PWM	PWM	PWM	VFS	OD	L/R	2-4	LC	DR	UD	OD	L/R	2-4	LC	DR	REV	
			LP	UD	OD	PND L/R	2-4 R-L/R	LC	DR	LU													
			%DC	NA	NV	NV	NA	NV	NV	%DC													
P/N		135	dcc			X						X						X					
Rev	3.215	235	dcc															X		X		X	
OD-1	4.127	135	dcc	X		X	X	X(a)				X		X(a)		X		X		X(a)			
OD-2	2.842	135	dcc	X		X	X		X			X			X	X		X			X		←
OD-3	2.284	135	dcc					X		(dcc)			X	X		X		X	X	X			←
Default	2.284	135	dcc													X			X				←⋯
OD-4'	1.573	135	dcc						X	(dcc)			X		X	X			X		X		
OD-4	1.452	95	dcc		X		X	X		dcc	X			X		X	X			X			←
OD-5	1.000	95	dcc		X		X		X	dcc	X				X	X	X				X		
OD-6	0.689	95	dcc	X	X				X	dcc	X		X		X		X		X		X		←⋯

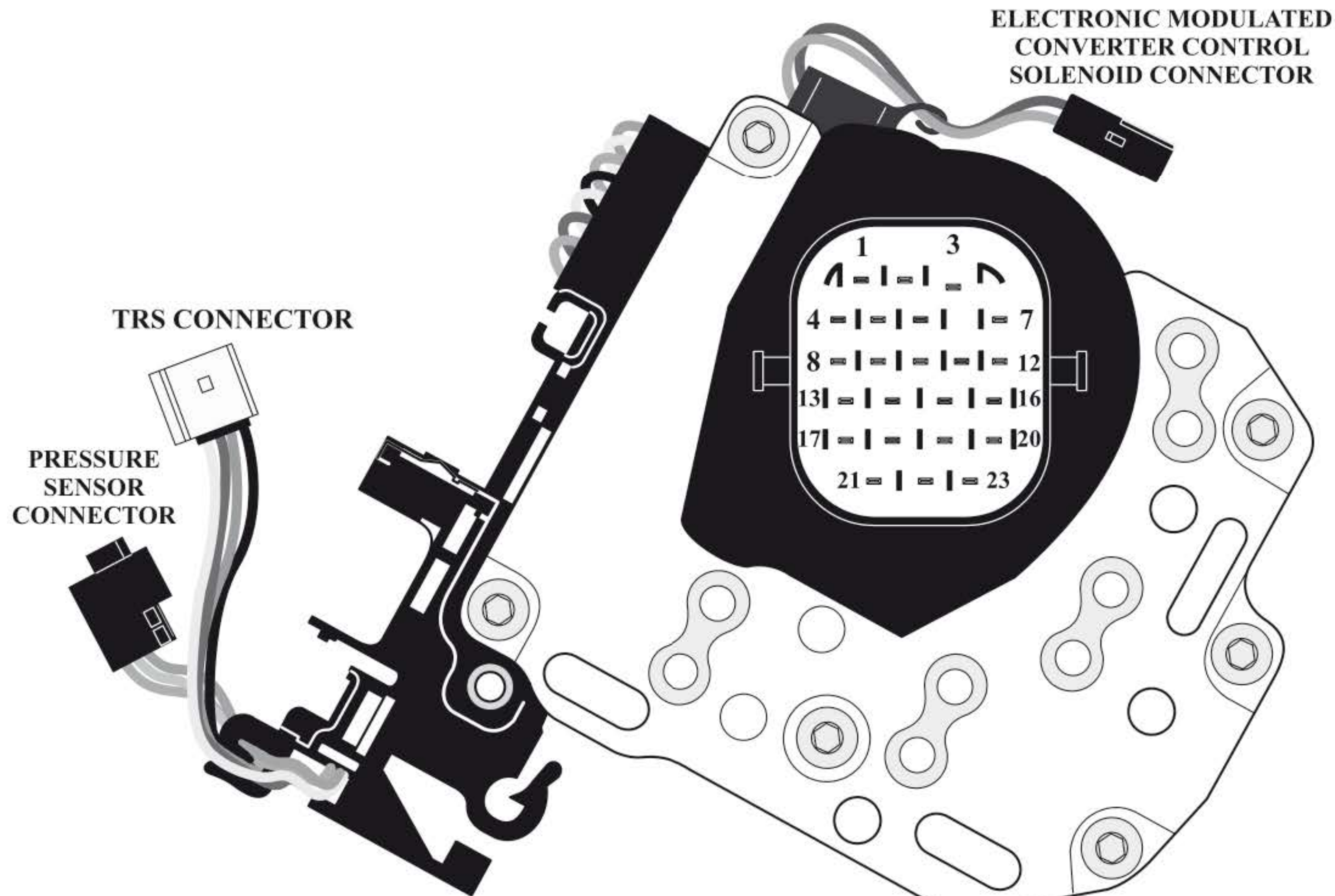
(a) released after output exceeds 150rpm. Not released in Manual-1
dcc- duty cycle control
(dcc) - overheat strategy only
4' - fourth prime
← - 2-3, 3-2, 4-2 - Double Swap Shifts
←⋯ - 6-4' - Kickdown to fourth prime

Figure 2

THE 62TE

PRELIMINARY INFORMATION

SOLENOID BODY TERMINAL LOCATION AND IDENTIFICATION



PIN #	ASSIGNMENT	PIN COLOR
1	Press. Sen. Gnd.	Gold
2	LR Solenoid	Tin
3	EMCC Solenoid	Tin
4	Press. Sen. 5V	Gold
5	C1	Tin
6	Press. Sen. Signal	Gold
7	UD Solenoid	Tin
8	C2	Tin
9	C3	Tin
10	Relay Power	Tin
11	OD PS	Gold
12	Line Press. Sol.	Tin

PIN #	ASSIGNMENT	PIN COLOR
13	C4	Tin
14	2/4 PS	Gold
15	DC PS	Gold
16	LR PS	Gold
17	LC Solenoid	Tin
18	LC PS	Gold
19	OD Solenoid	Tin
20	DC Solenoid	Tin
21	2/4 Solenoid	Tin
22	TFT Sensor Signal	Tin
23	TFT Sensor Ground	Tin

Figure 3

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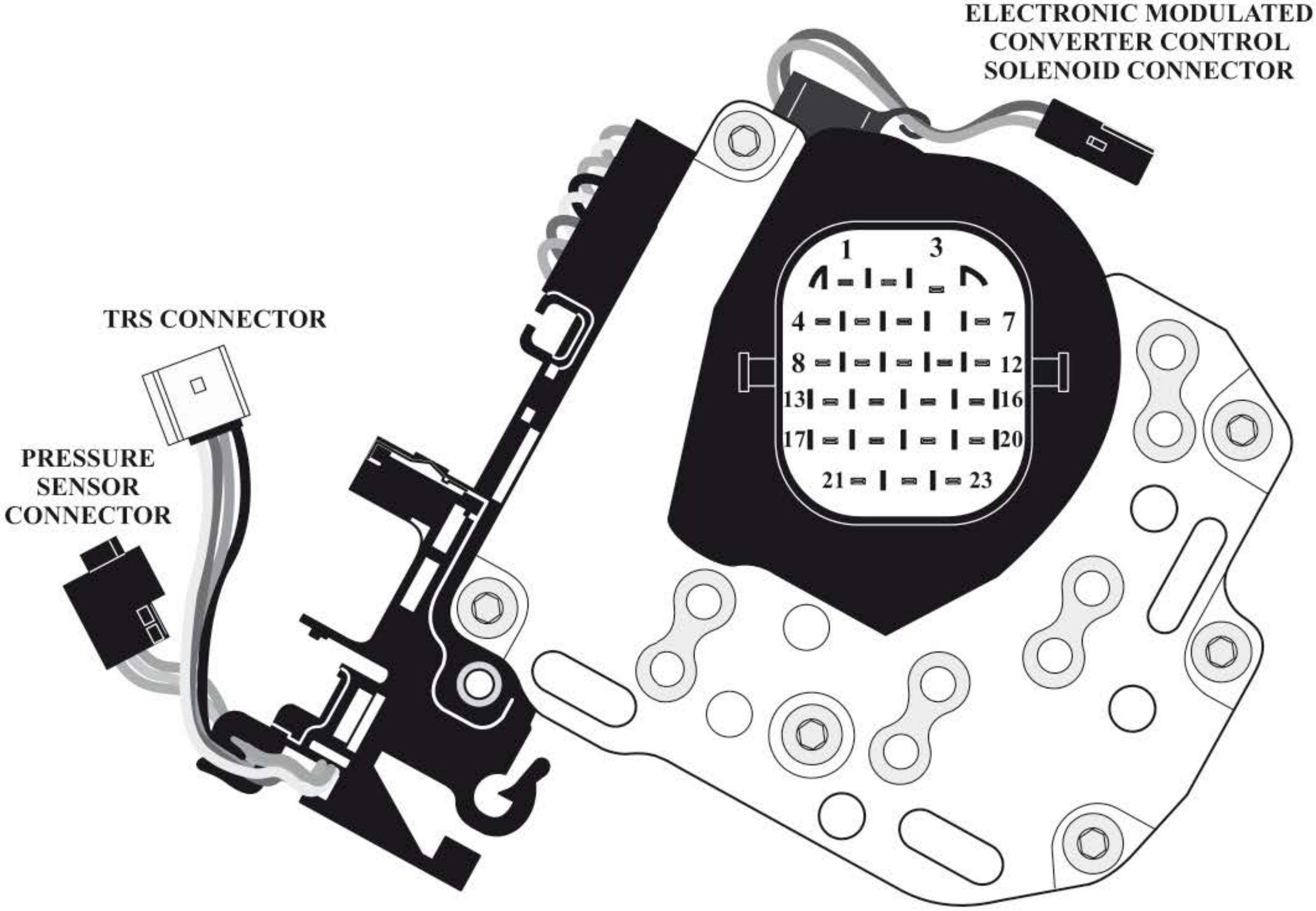
SOLENOID RESISTANCE CHECK



POSITIVE METER LEAD	NEGATIVE METER LEAD	COMPONENT	APPROXIMATE RESISTANCE (OHMS)
10	2	L/R Solenoid	2
	3	EMCC Solenoid	5
	7	UD Solenoid	2
	11	OD PS Resistor	300
	12	LP Solenoid	6
	14	2-4 PS Resistor	300
	15	DC PS Resistor	300
	16	L/R PS Resistor	300
	17	LC Solenoid	2
	18	LC PS Resistor	300
	19	OD Solenoid	2
	20	DC solenoid	2
	21	2-4 Solenoid	2
22	23	TFT Sensor	11k @ room temp

Figure 4

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INTERNAL HARNESS TERMINAL IDENTIFICATION

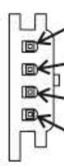
EMCC Solenoid Internal Harness Connector View and ID

Relay Power Supply from #10 Terminal in Solenoid Body (Brown Wire)
Ground Control to #3 Terminal in Solenoid Body (Blue Wire)

Line Pressure Sensor Internal Harness Connector View and ID

5 Volt Supply from #4 Terminal in Solenoid Body (Green Wire)
Signal Voltage to #6 Terminal in Solenoid Body (White Wire)
Ground to #1 Terminal in Solenoid Body (Orange Wire)

TRS Internal Harness Connector View and ID



C1 to #5 Terminal in Solenoid Body (Black Wire)
C4 to #13 Terminal in Solenoid Body (Grey Wire)
C3 to #9 Terminal in Solenoid Body (Red Wire)
C2 to #8 Terminal in Solenoid Body (Yellow Wire)

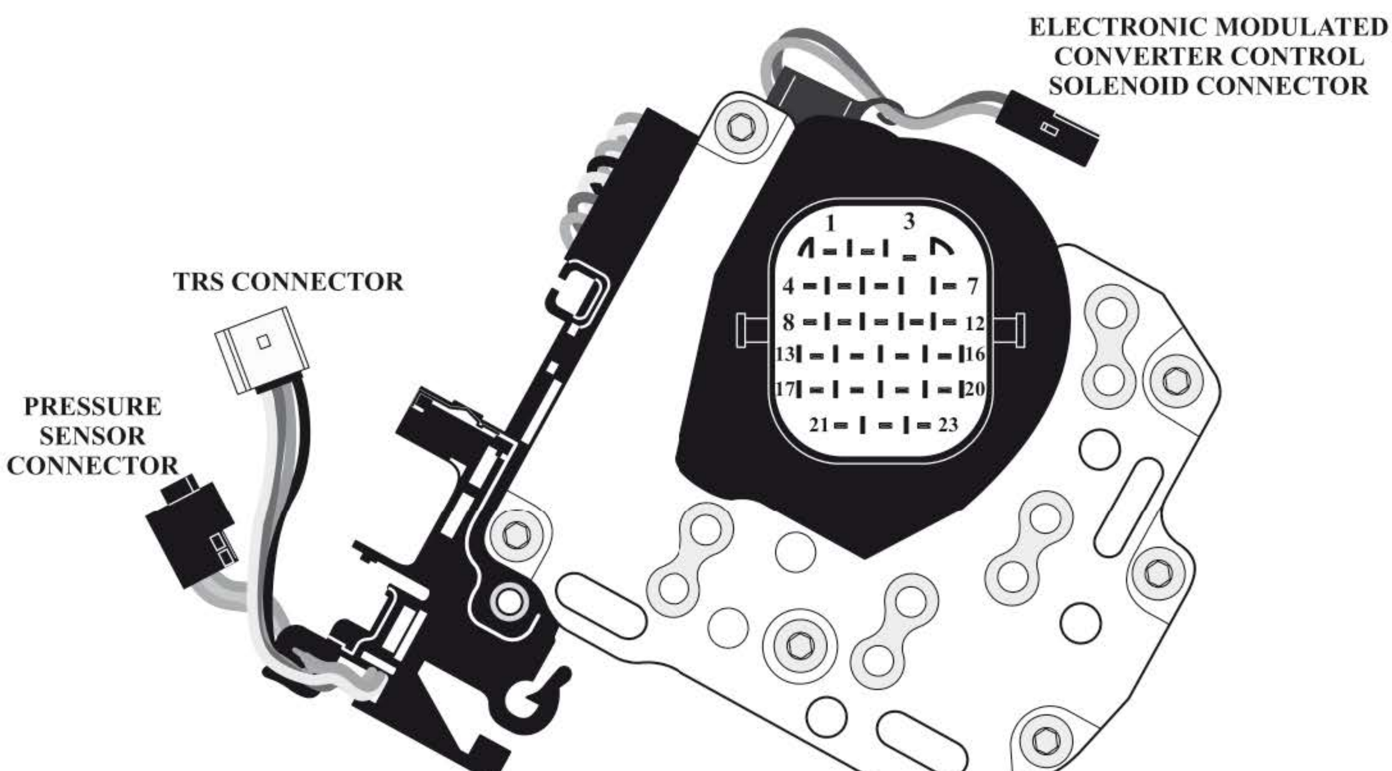


Figure 5

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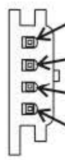
TRANSMISSION RANGE SENSOR OPEN/CLOSED SIGNAL CHART

TRS Internal Harness Connector View and ID



The Transmission Range Sensor can be bench tested using a DVOM set to ohms. Place the negative anywhere on the valve body as close to the detent plate as possible. With the positive lead, check each circuit one at a time through all of its ranges either through the main transmission case connector or at the sensor itself. Refer to the chart below. C represents "Closed or Continuity" while O represent "Open."

	P	R	N	OD	D	SM
C2	C	C	C	O	O	O
C3	C	O	O	O	C	O
C4	O	O	C	C	O	O
C1	C	O	C	O	O	O

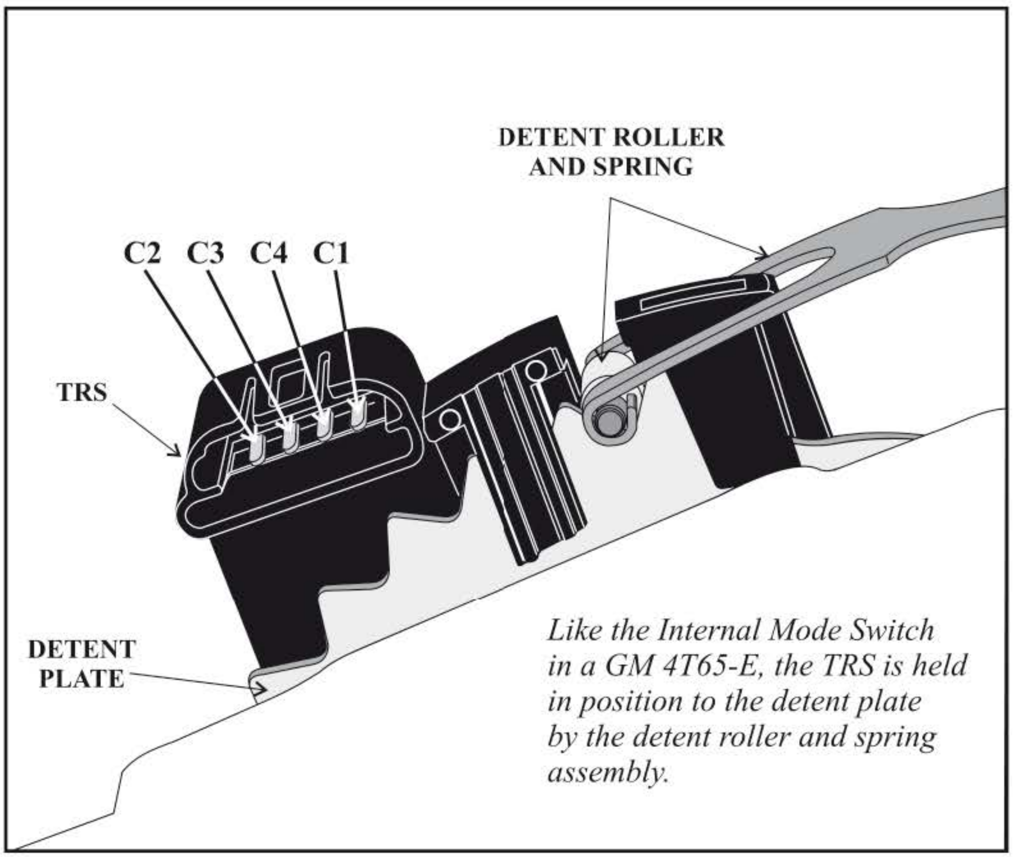


Figure 6

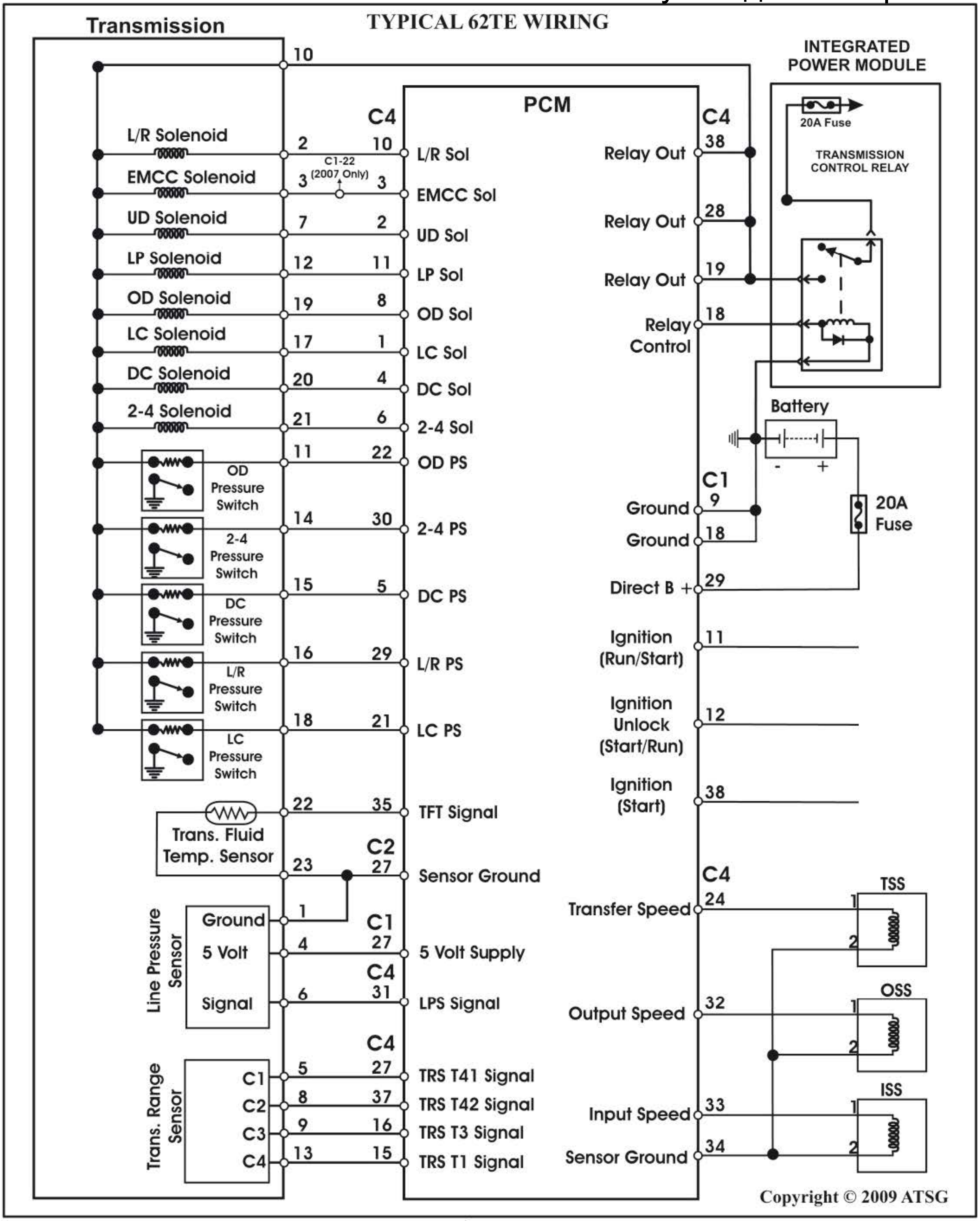

TYPICAL 62TE WIRING
Transmission
INTEGRATED POWER MODULE
PCM
20A Fuse
TRANSMISSION CONTROL RELAY
L/R Solenoid
EMCC Solenoid
UD Solenoid
LP Solenoid
OD Solenoid
LC Solenoid
DC Solenoid
2-4 Solenoid
C1-22 (2007 Only)
L/R Sol
EMCC Sol
UD Sol
LP Sol
OD Sol
LC Sol
DC Sol
2-4 Sol
Relay Out
Relay Out
Relay Out
Relay Control
Battery
OD Pressure Switch
2-4 Pressure Switch
DC Pressure Switch
L/R Pressure Switch
LC Pressure Switch
OD PS
2-4 PS
DC PS
L/R PS
LC PS
Ground
Ground
Direct B +
20A Fuse
Ignition (Run/Start)
Ignition Unlock (Start/Run)
Ignition (Start)
Trans. Fluid Temp. Sensor
TFT Signal
Sensor Ground
Line Pressure Sensor
Ground
5 Volt
Signal
5 Volt Supply
LPS Signal
Trans. Range Sensor
TRS T41 Signal
TRS T42 Signal
TRS T3 Signal
TRS T1 Signal
Transfer Speed
Output Speed
Input Speed
Sensor Ground
TSS
OSS
ISS
C1
C2
C4

Figure 7

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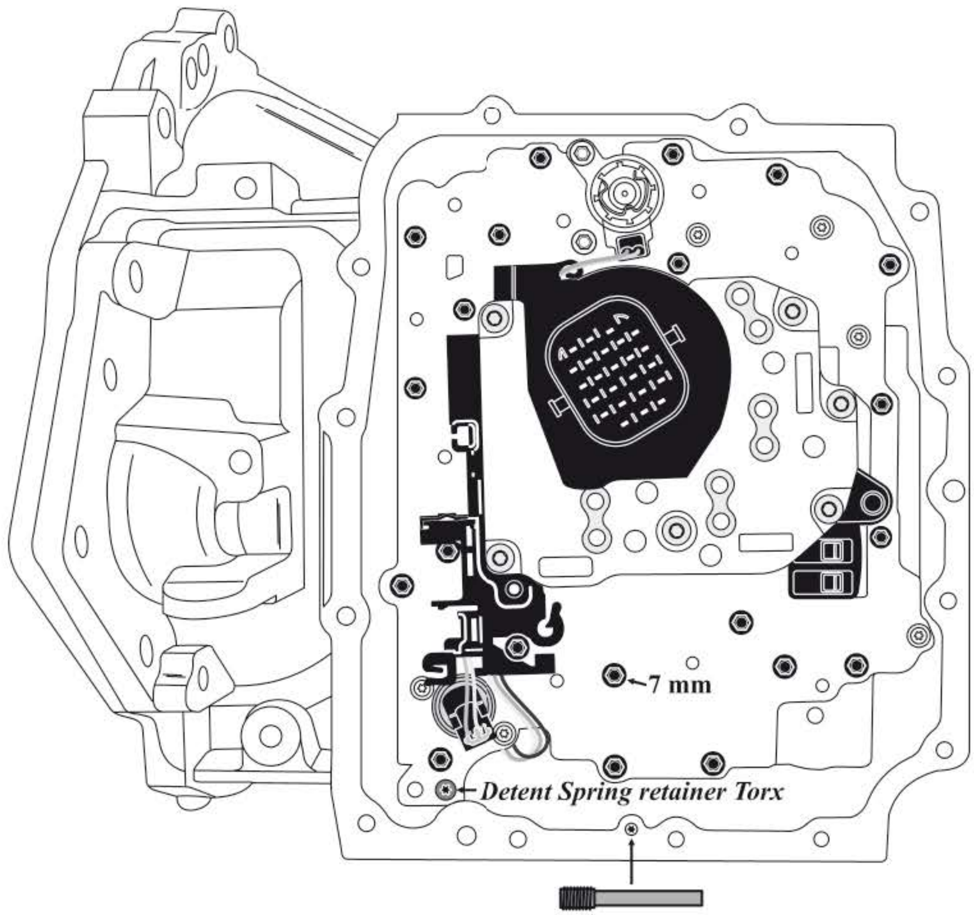

There are twenty one 7 mm hex-head bolts securing the valve body to the case as seen above in black along with one T25 Torx shoulder screw (grey) for the detent spring. Only these bolts need to be unfastened in order to remove the Valve Body assembly from the case.

If the manual shaft needs to be removed from the case, there is a manual shaft anchor pin that will need to be removed and it has the smallest Torx this tech has ever seen in an automatic transmission. It took a # 8 Torx with a slight tap in to get this little guy out. It is very easy to strip it so be careful.

Figure 8

THE 62TE

PRELIMINARY INFORMATION

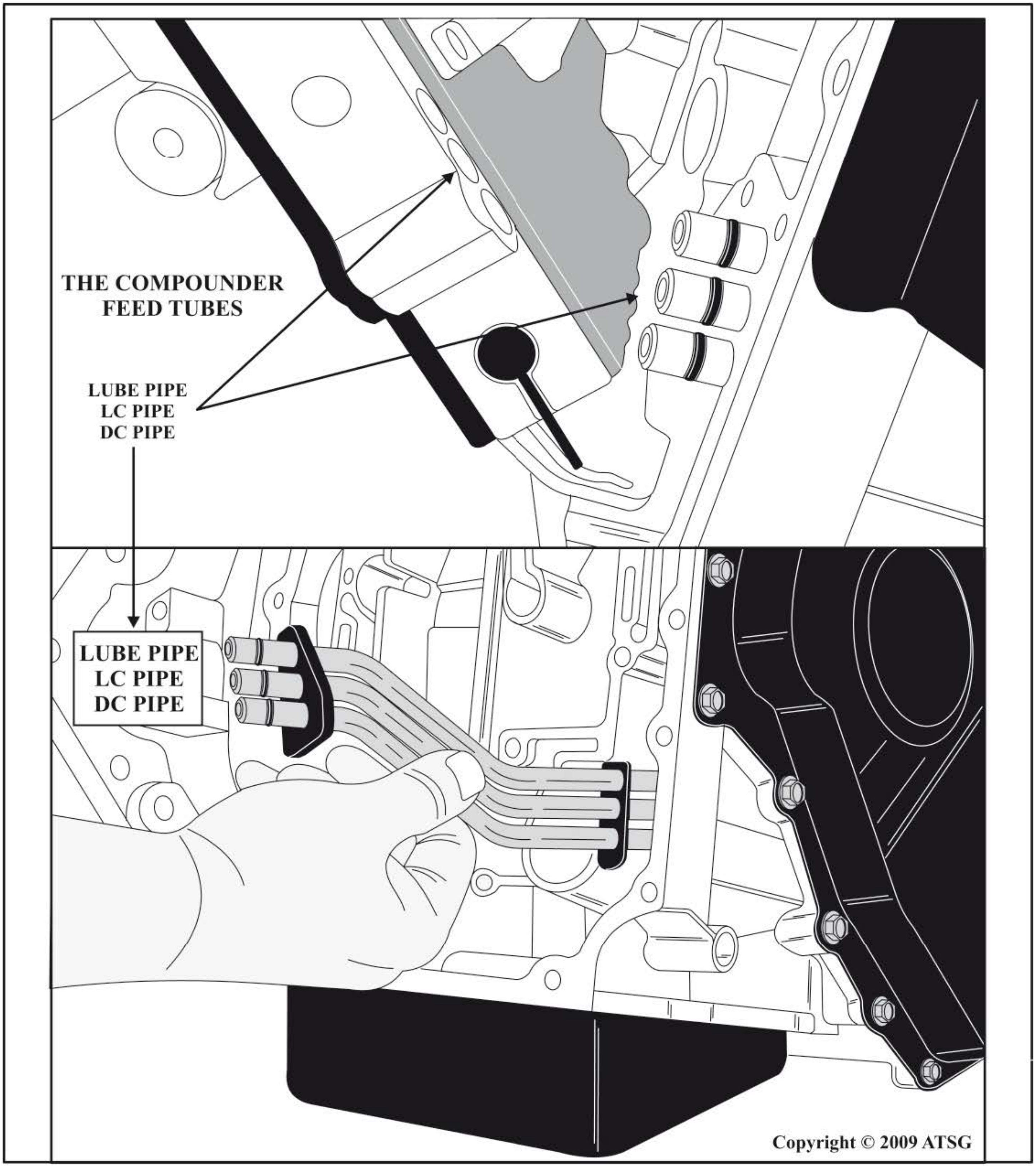

Figure 9

THE 62TE

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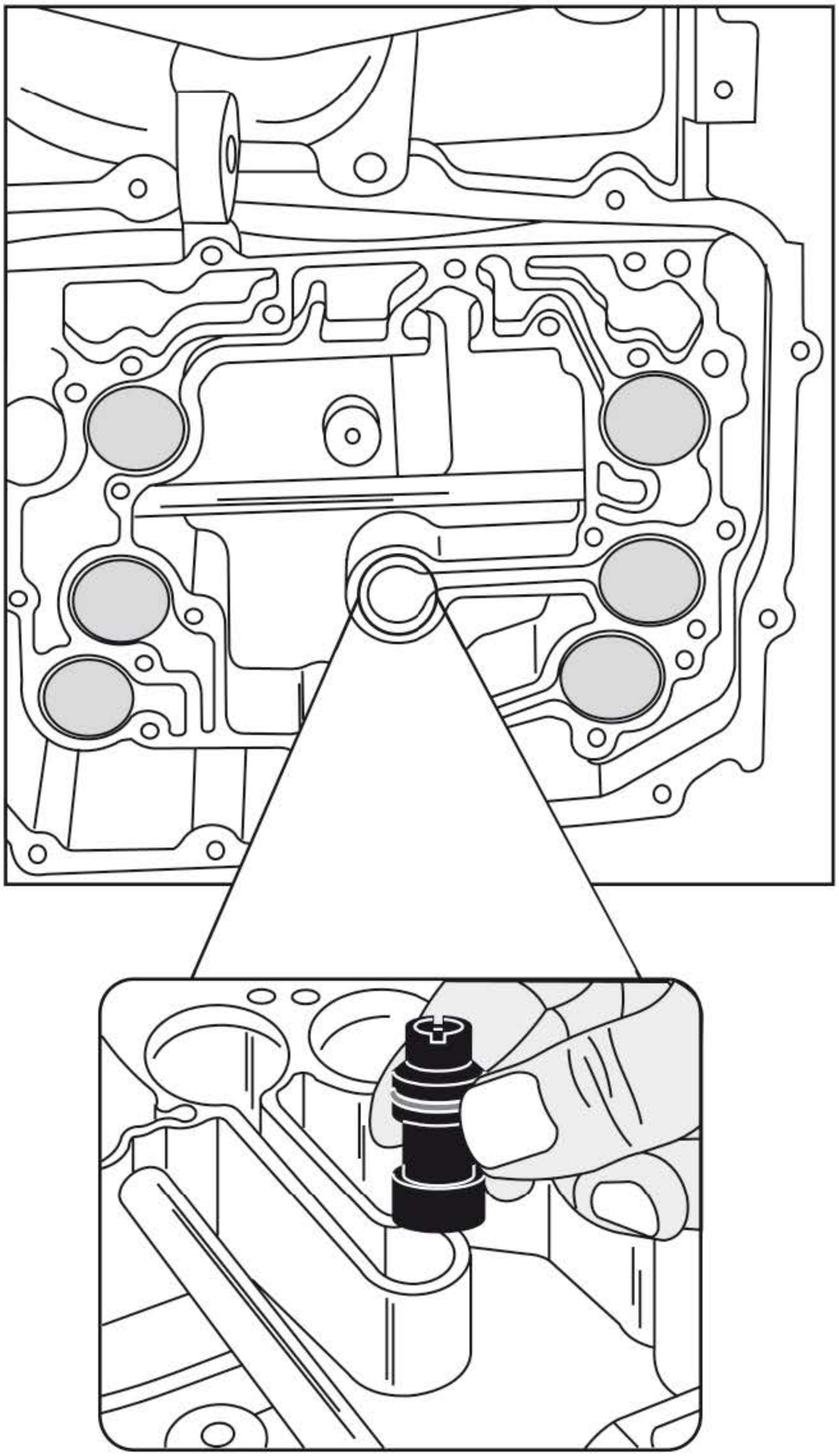
2-4 CLUTCH OIL SUPPLY PIPE LOCATION



2-4 CLUTCH OIL SUPPLY PIPE AND O'RING

Figure 10

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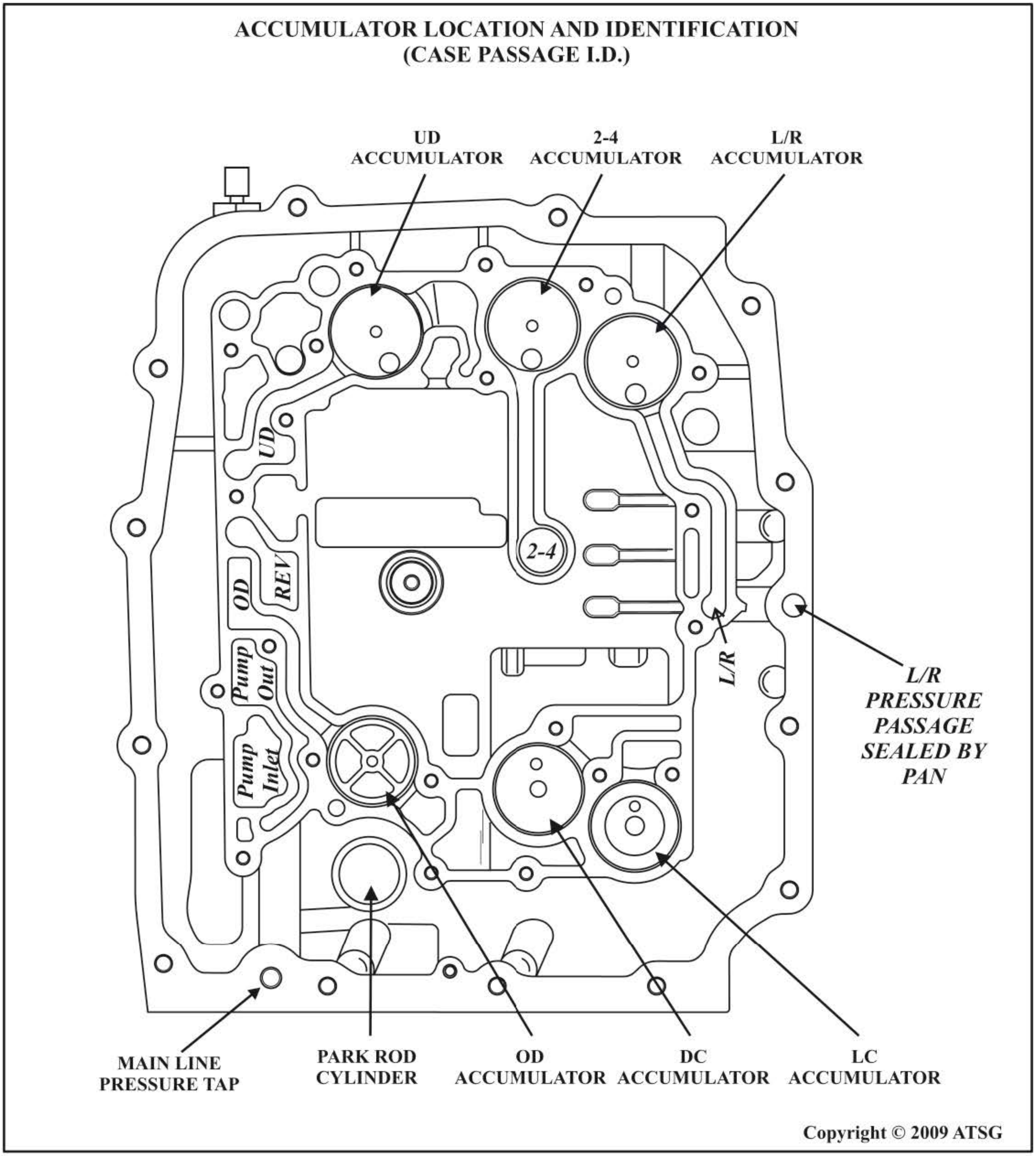

Figure 11

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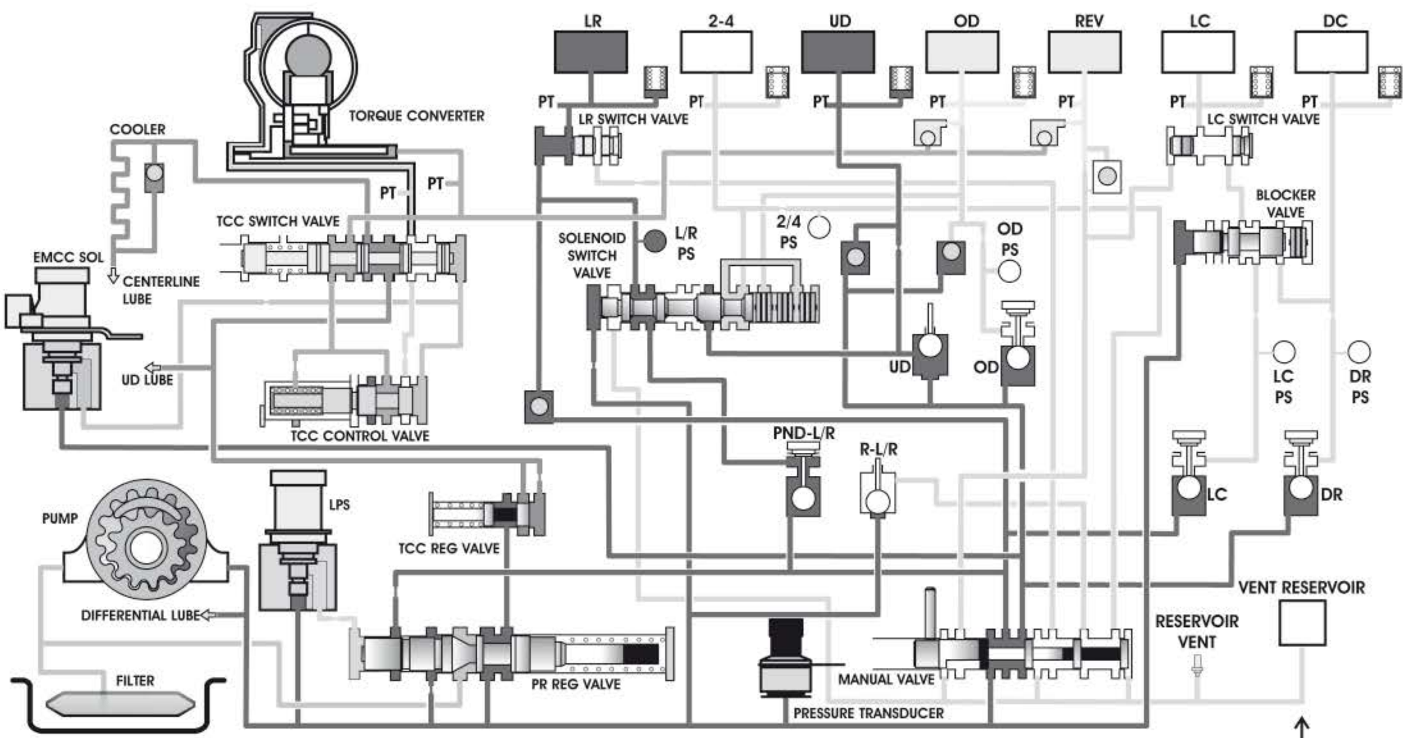
DRIVE FIRST GEAR EMCC



35-135	35-110	30-80	0-5	15-40		0-30	0-100
LINE PRESSURE (D)	COOLER FLOW	TCC APPLY	DRIBBLER	LUBE	SUCTION	EMCC SOLENOID	LP SOLENOID

THE VENT RESERVOIR

The 62TE is a clutch control system based on volume tracking. For this reason it is desirable to minimize or exclude air in the clutch circuits as a prerequisite for optimal pressure control needed for precision shift control. The hydraulic circuit was designed to prevent pockets of trapped air with an additional step to route the clutch vent circuit into a common exhaust chamber called a "vent reservoir." The vent reservoir's exit path is located at the top of the valve body (See Figure 13) allowing a fluid trap to be maintained above the clutch circuits venting all air when the clutch circuits vent.

Figure 12

PROFITS:

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RT™ 4L60E

Improves: Shift firmness - **Fix** TCC Slip Code1870 - Eliminates the need to replace TCC Regulator and Isolator valves - No reaming. Restores pressure regulator booster valve function. Includes **"Booster Recovery System™" Patent Pending** Eliminates the need to replace TCC PWM solenoid due to sticky valve. TCC will have full apply even if solenoid has failed - saves $$. Adjust 1-2 shift firmness without removing VB.

For **Hot Rods** use kit # **RT-4L60E-HD** Includes Pan and Valve Body Gaskets.

RT™ AX4S

Also fits AXODE

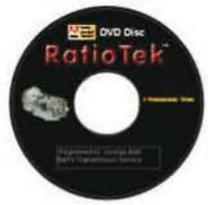
Both kits include a bypass booster valve sleeve assembly and the **Patent Pending "Booster Recovery System™"** restoring pressure regulator valve function. Improve shift firmness. Billet retainers your gonna love!

RT™ 4F50N

Also fits AX4N

RT™ E4OD/4R
Kit fits E40D and 4R100

Comes with 3 high tech regulator valves for the "stick free" accumulator body. Improves TCC torque capacity. Provides adjustable shift firmness.



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VENT RESERVOIR CIRCUIT

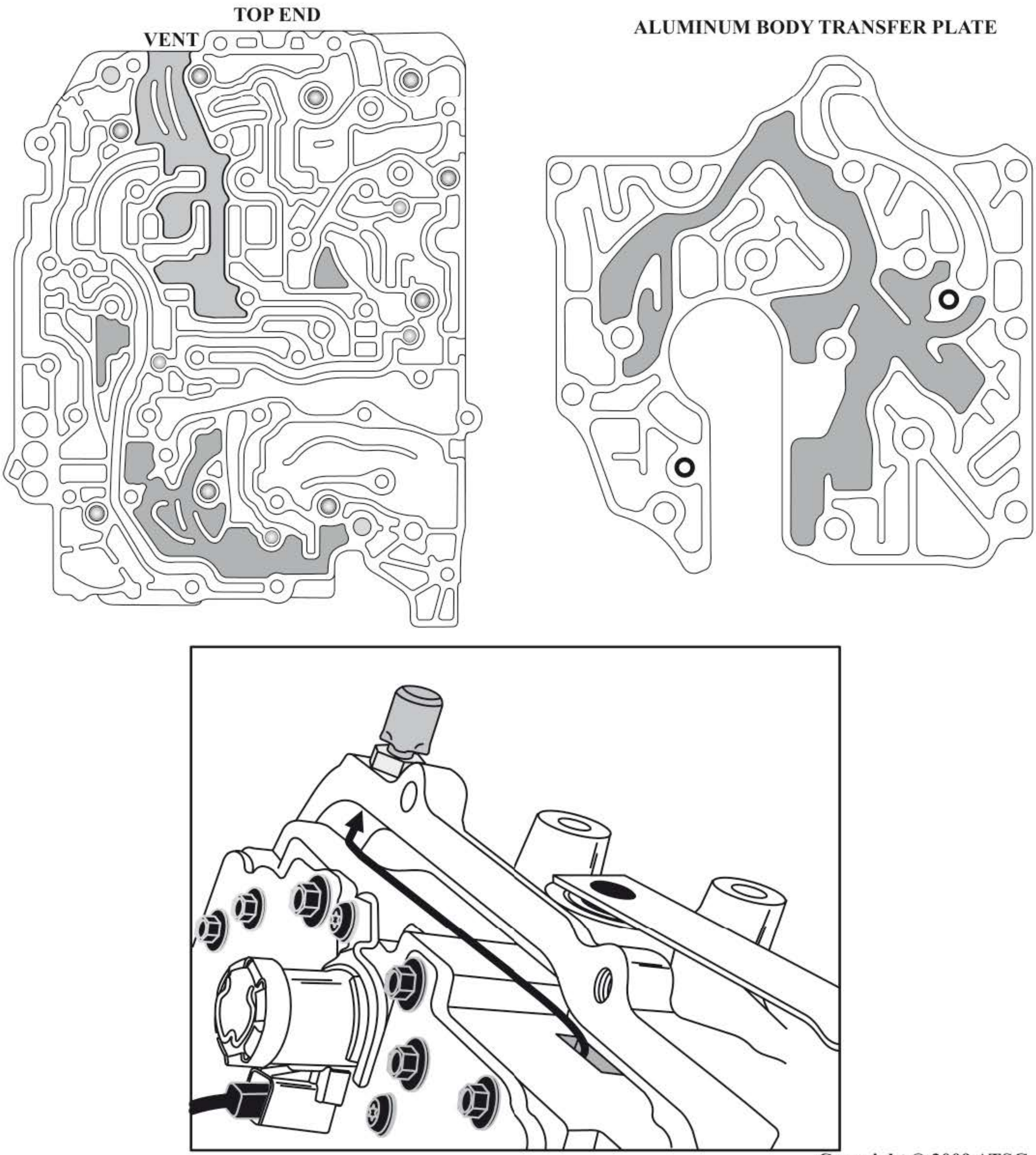

Figure 13

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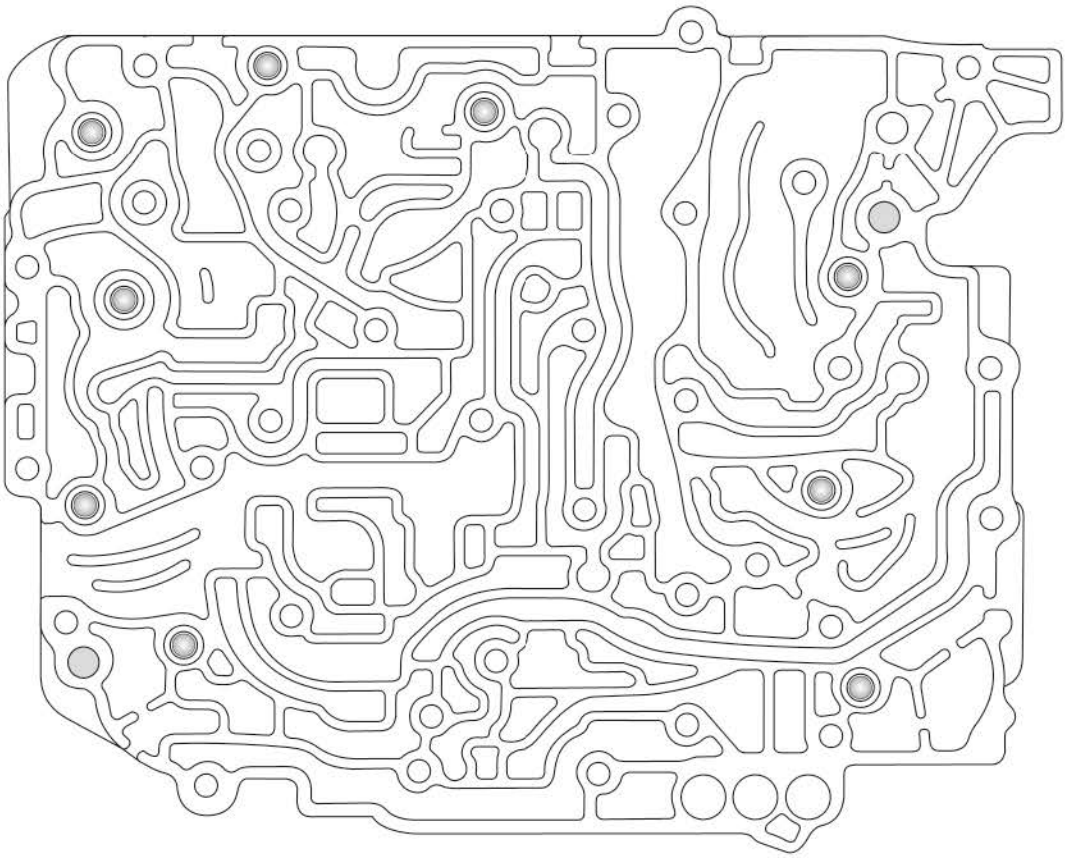
PRESSURE SEALING BALLS



NO CLUTCH PRESSURE TAPS

The expense of machined pressure taps and the cost of inserting the plug combined with potential areas for leaks gave way to the decision of eliminating all Clutch Pressure Taps. However, the ability to perform clutch circuit pressure testing on the assembly line is necessary to ensure correct assembly and ongoing quality. A design was made which comprised of check balls positioned in specific tapered ports in the valve body that allowed a test machine to come in with a probe and unseat the check balls where measurement of clutch pressure could then be taken. Once the test has been completed and the test machine retracts, the check balls are then used to seal their respective clutch circuit. The 9 check balls seen above are the check balls used during this factory clutch testing procedure. Do not attempt to remove these balls but check to see that they seal pressure.

There are 4 hydraulic shift control balls that are not used for this purpose and they do fall out of the valve body. Refer to Figure 15 for their location and identification.

Although there are no Clutch Pressure Taps, there is a main line pressure tap located at the bottom left hand side of the pan along side a pan bolt (See page 109).

Figure 14

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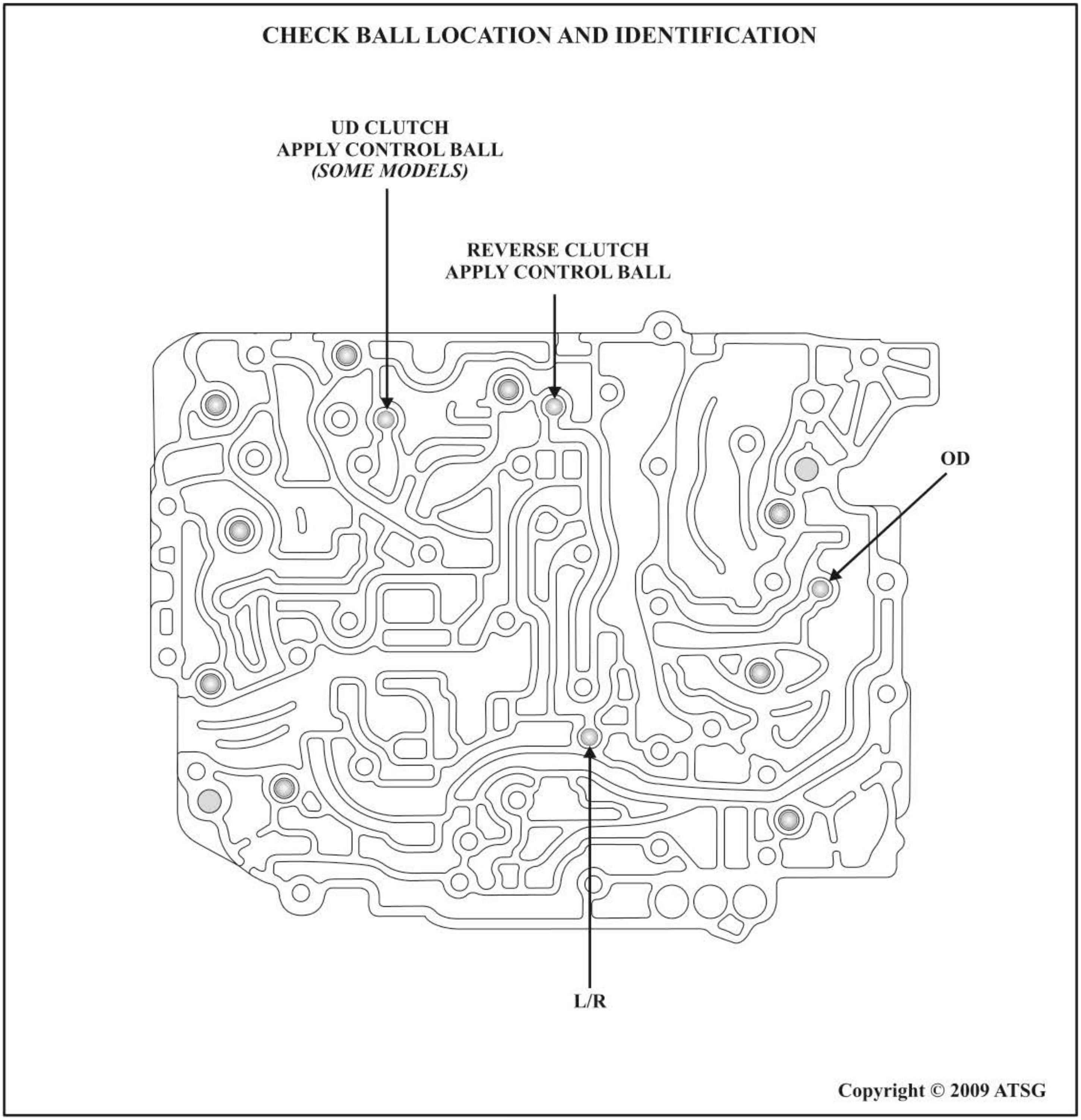

Figure 15

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PRELIMINARY INFORMATION

VALVE LOCATION AND IDENTIFICATION

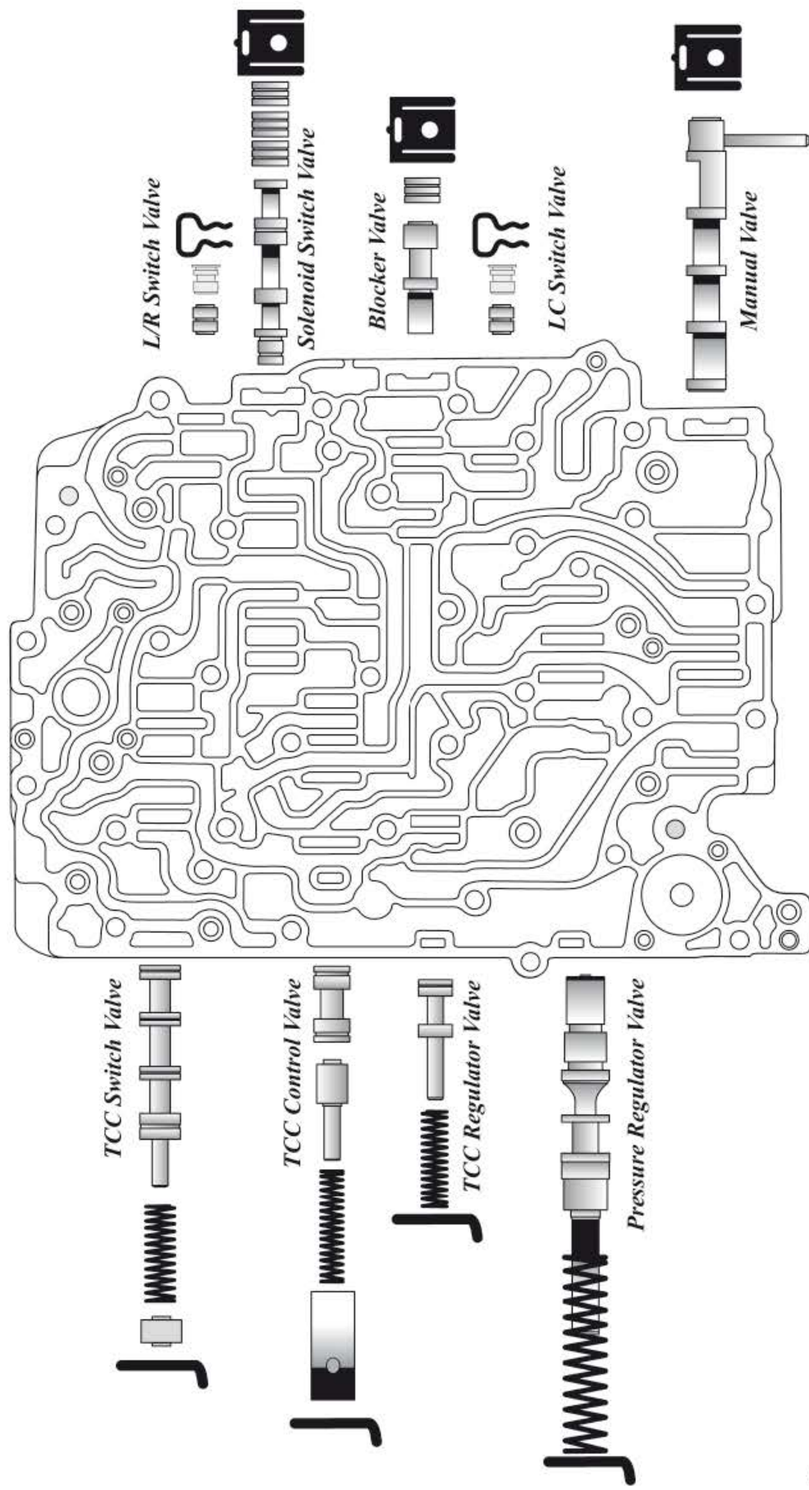

Figure 16

THE 62TE

PRELIMINARY INFORMATION

VALVE RETAINER LOCATIONS

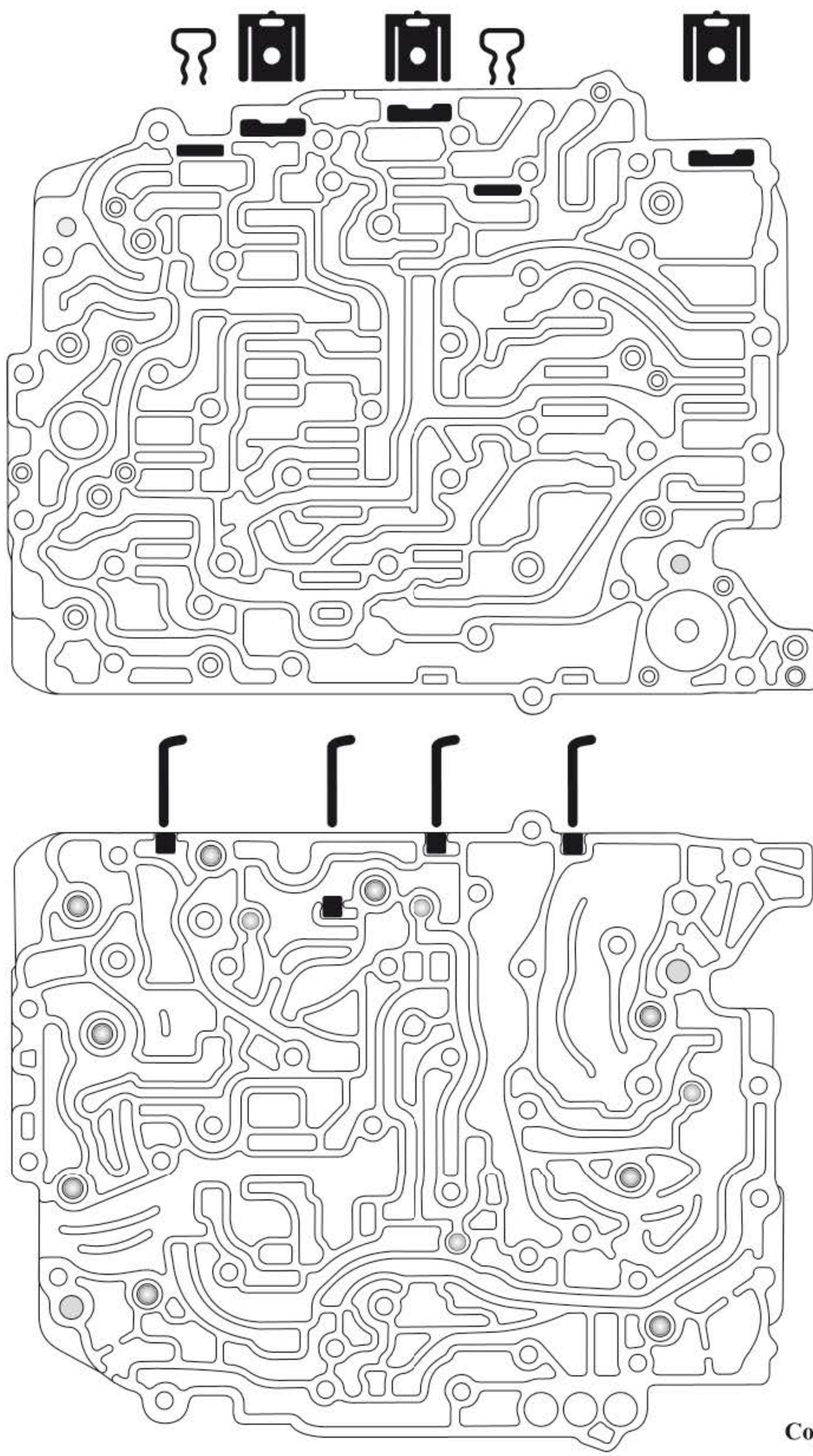

Figure 17

THE 62TE

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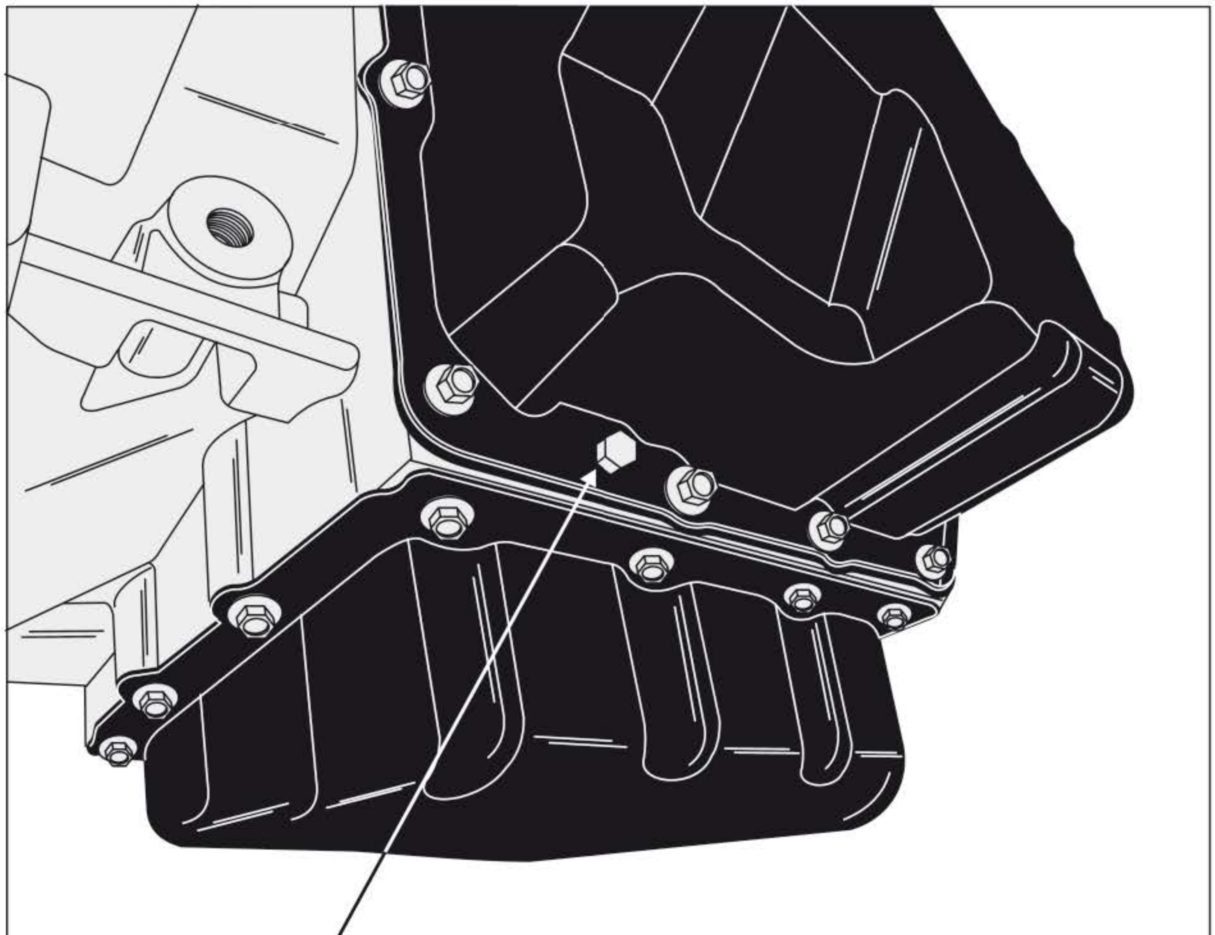
LINE PRESSURE TAP LOCATION



Line pressure is monitored by the Transducer and regulation is achieved by changing the duty cycle of the VLPS controlled by the Transmission Control System in the PCM. 5% duty cycle = solenoid OFF which equals maximum line pressure. 62% duty cycle = solenoid ON which equals minimum line pressure. The Transmission Control System calculates the desired line pressure based on inputs from both engine load and transmission.

The Transmission Control System calculates torque input to the transmission and uses it as the primary input to the desired pressure calculation. This is called Torque Based Line Pressure. In addition, the line pressure is set to a preset level 827 or 931 kPa (120 or 135 psi) during shifts and in Park and Neutral to ensure consistent shift quality. The desired line pressure is continuously being compared to the actual line pressure. If the actual line pressure is consistently lower than the target while driving, the line pressure low DTC P0868 will set.

Figure 18

THE 62TE

PRELIMINARY INFORMATION

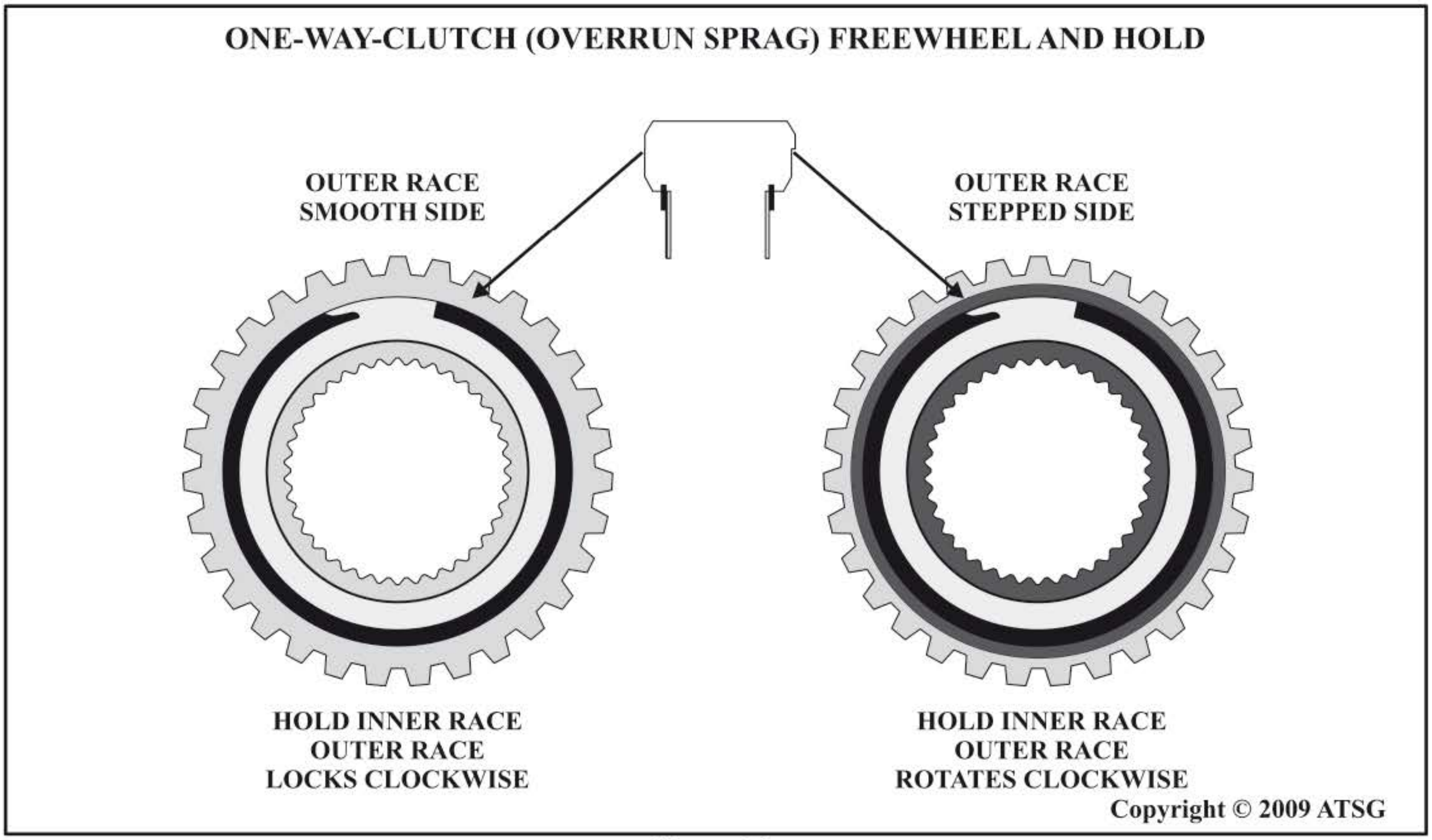


Figure 19

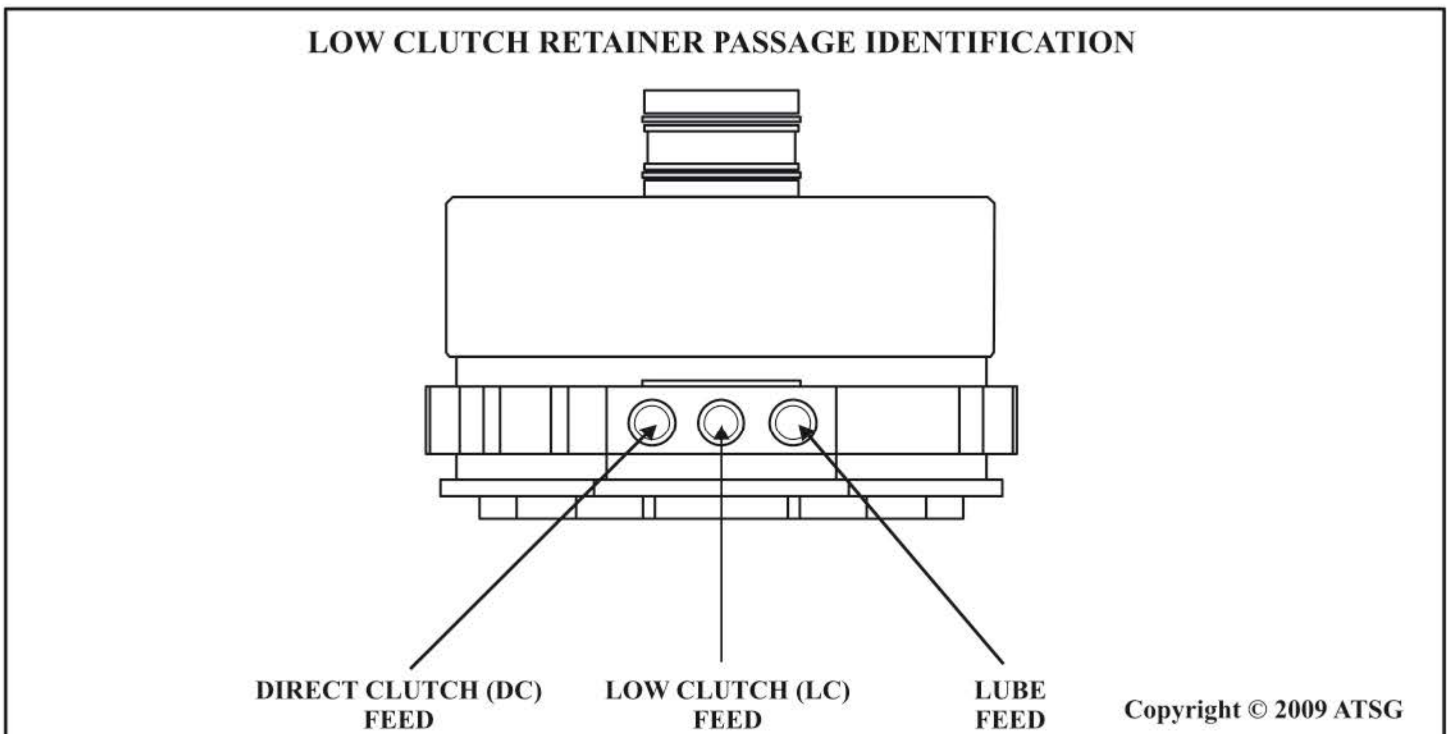


Figure 20

THE 62TE

PRELIMINARY INFORMATION

UNDERDRIVE CENTERLINE SHAFT RING AND PASSAGE IDENTIFICATION

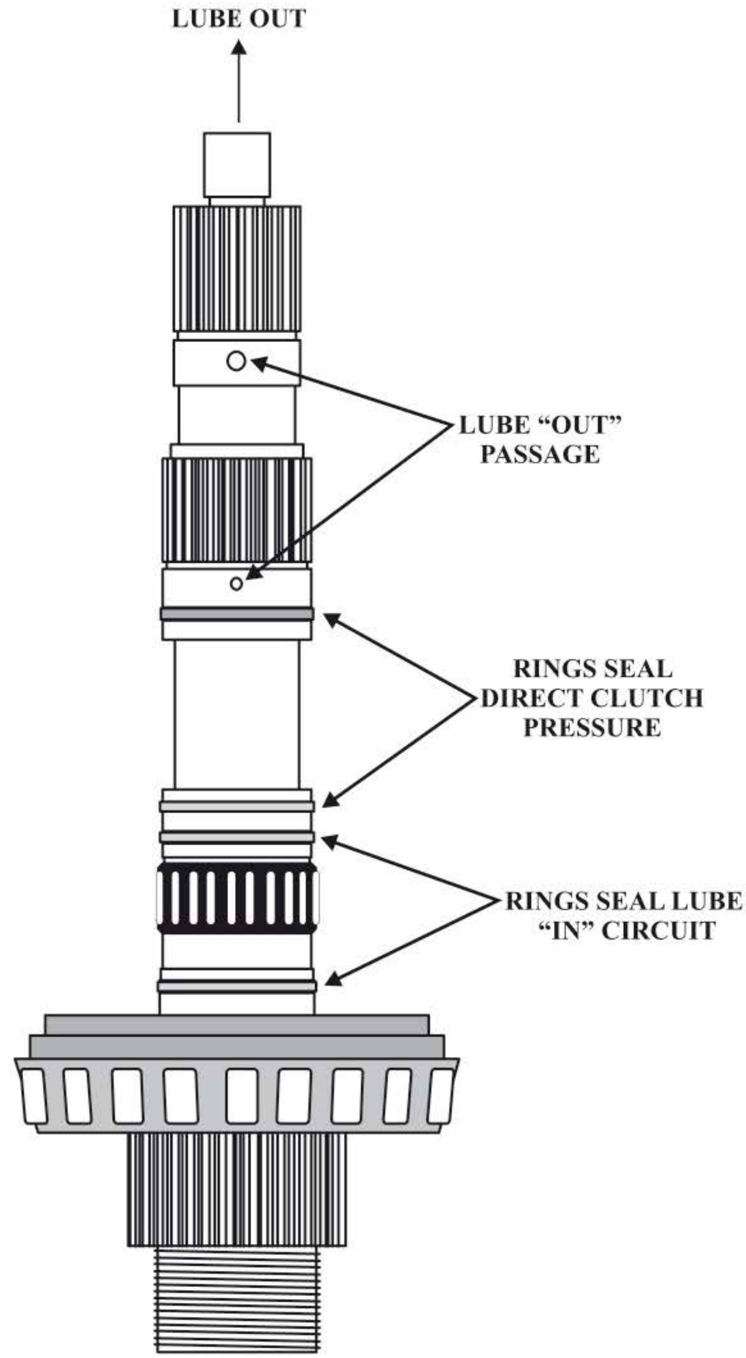


Figure 21

THE 62TE

PRELIMINARY INFORMATION

SINGLE SIDED DIRECT CLUTCH FRICTION PLATES

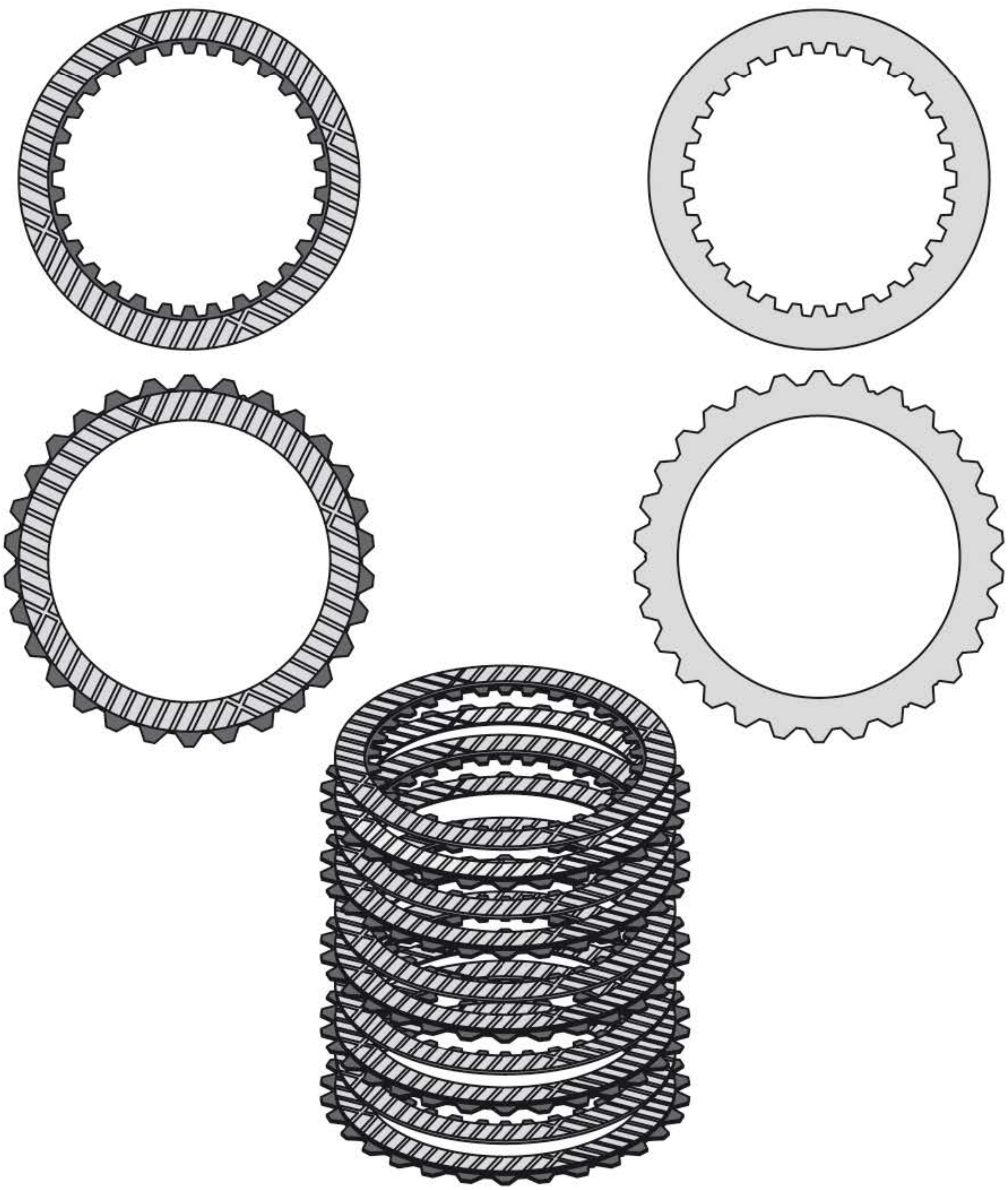


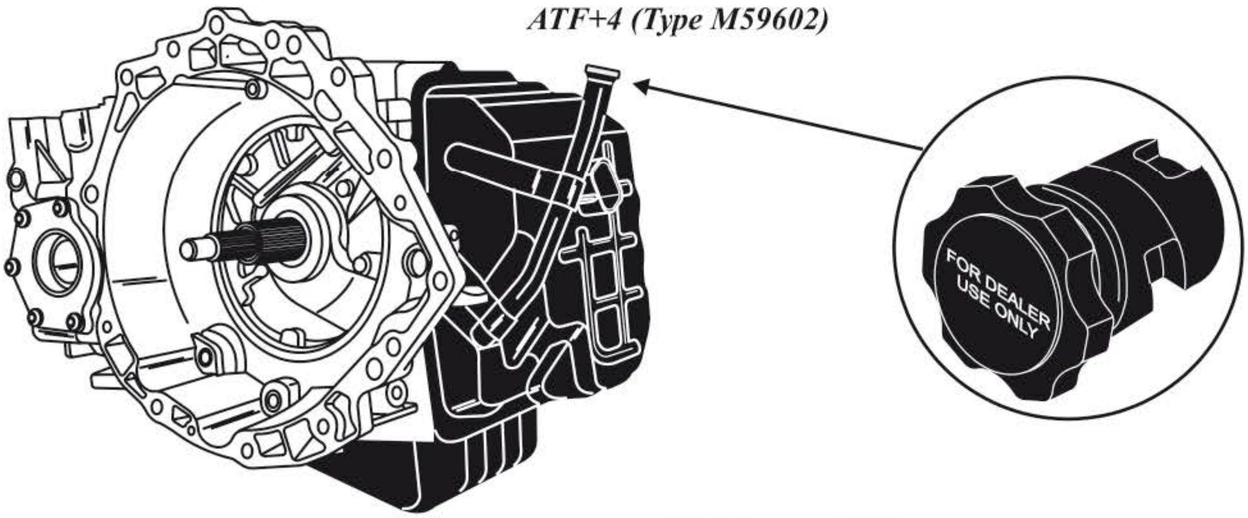
Figure 22

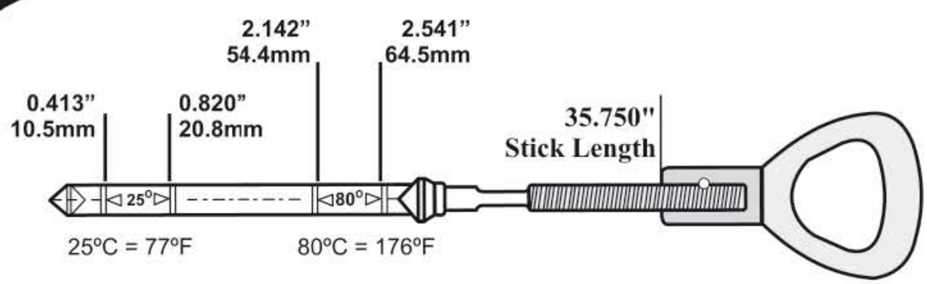
THE 62TE

PRELIMINARY INFORMATION

FLUID CHECKING PROCEDURE

ATF+4 (Type M59602)





Approximate measurements taken from the bottom of the stick to the individual fill lines.

FLUID CHECKING PROCEDURE STICK # 9336

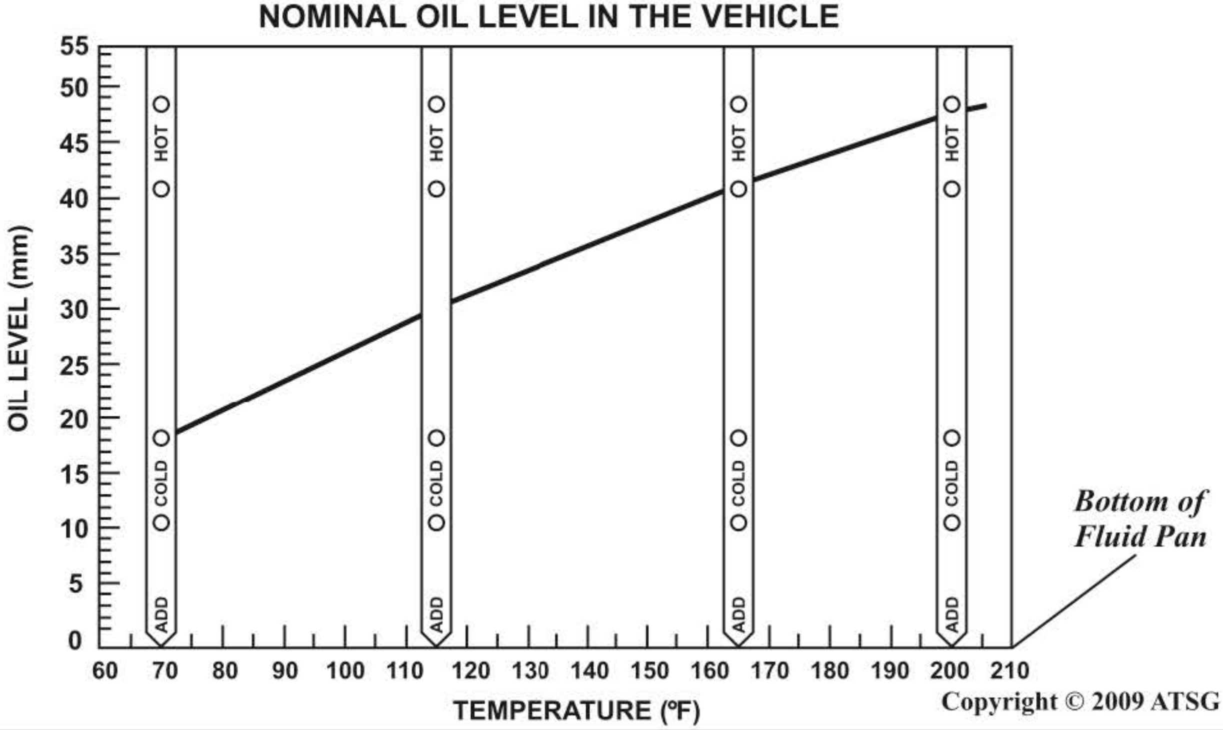


Figure 23