



"2009" SEMINAR INFORMATION

INDEX

GM & Ford

General Motors

4L60/65/70-E.....	5
5L40-E.....	41
6L80.....	55
4T65-E.....	57
AW81-40LE.....	65

Medium Duty Trucks

Allison 6 Speed.....	81
Sprinter Freightliner 722.6 NAG1.....	100

Ford

4R70W.....	105
5R55W/S.....	108
4R100.....	111
5R110W.....	115
AX4N-4F50N.....	118

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Raybestos.....	IFC	Whatever It Takes (WIT).....	63
Lubegard.....	2	Transmission Digest.....	64
ALTO.....	4	Automotive Video (AVI).....	102
Hard Parts for Transmissions (HFT).....	17	JBH Tools.....	103
Transgo.....	18	Valve Body Express (VBX).....	104
Wesco Puerto Rico.....	19	Techpac/Fitzall.....	120
Superflow.....	20	TransTec.....	IBC
Sonnax.....	58	Life Automotive.....	BC
Superior (Centerfold).....	60 & 61		

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"Tech in Time for 2009" Seminar Information

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Welcome to the ATSG "Tech in Time for 2009" Technical Training Seminar.

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*The information and part numbers contained in this booklet have
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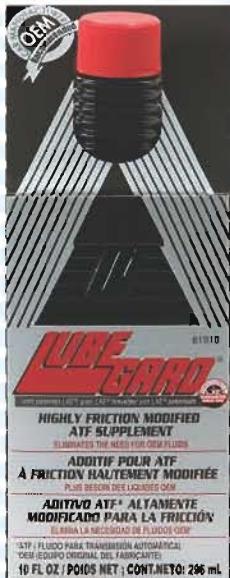


ATSG

excerpt from 1999 ATSG Book

FORD AODE / 4R70W

(Another Use For LUBEGARD® Highly Modified ATF Supplement)



ISSUE: In the Ford AODE and 4R70W, a shudder or vibration may occur under light-to-moderate acceleration above 35 mph in third or fourth gear, or during a 3-4 upshift or a 4-3 downshift. This condition may be caused by the converter clutch. The condition normally is noticed on vehicles with 20,000 or more miles when the torque converter clutch engages or disengages and the vehicle is under light load.

ACTION: It has been found that by changing the vehicles transmission fluid and adding the LUBEGARD Highly Friction Modified ATF Supplement you can **ELIMINATE** the PROBLEM.

The vehicle may have to be driven up to 100 miles for the condition to be corrected.



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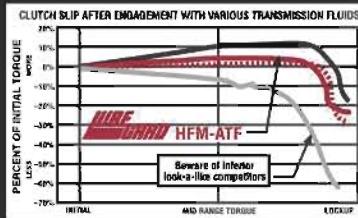


Part # 61910

For use to convert DEXRON®/MERCON® ATF into a Highly Friction Modified ATF

LUBEGARD® HIGHLY FRICTION MODIFIED ATF SUPPLEMENT

- Eliminates the need for multiple OEM fluids
- Converts DEXRON®/MERCON® ATF into any highly friction modified ATF's such as: Honda® Genuine ATF, Toyota® Type III/TIV, Chrysler Mopar® ATF + 3® (7176), & Mopar® ATF + 4® (9602), and all other highly friction modified ATF's
- Recommended for use in Ford AODE & 4R70W transmissions with shudder problems that do not require MERCON® V ATF
- Also contains same benefits as LUBEGARD ATF Protectant



The chart above shows:
 ■ DEXRON® III/ MERCON® ATF alone
 ■ LUBEGARD® HFM-ATF Supplement with DEXRON® III/ MERCON® ATF
 ■ Chrysler Mopar® ATF +3® (7176)
 ■ Inferior look-a-like competitor

MAKE	MANUFACTURER'S ATF	MAKE	MANUFACTURER'S ATF
Acura	Honda Genuine/ Z-1	Kia, Hyundai, Mitsubishi	SP III ATF
Chrysler	MOPAR® ATF +3® (7176) ATF + 4® (9602)	Lexus	Toyota Type T, T II & T IV
Chrysler/Dodge	MOPAR® ATF +3® (7176) ATF + 4® (9602)	Mitsubishi	Mitsubishi Diamond SP/SP II
Eagle	MOPAR® ATF +3® (7176) ATF + 4® (9602)	Plymouth	MOPAR® ATF +3® (7176) ATF + 4® (9602)
Honda	Honda Genuine/ Z-1	Saturn	Saturn Transaxle Fluid
Hyundai	SP III	Sterling	Sterling ATF
Jeep	MOPAR® ATF +3® (7176) ATF + 4® (9602)	Toyota	Toyota Type T, T II & T IV

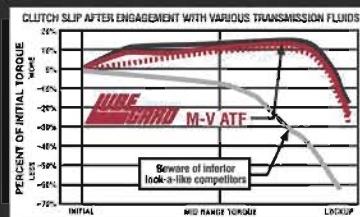


Part # 62005

For use to enhance DEXRON®/MERCON® ATF to perform like MERCON® V ATF

LUBEGARD® M-V ATF SUPPLEMENT

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- Enhances DEXRON®/MERCON® ATF to perform like a MERCON® V ATF
- Also contains same benefits as LUBEGARD ATF Protectant



The chart above shows:
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 ■ LUBEGARD® M-V Supplement with DEXRON® III/ MERCON® ATF
 ■ MERCON® V
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4L60/65/70E PUMP & INPUT SHAFT USAGE

COMPLAINT: Diagnostic Trouble Codes P0716 and P0717 may be stored, no torque converter fill, burnt frictions in the input drum, planetary gear set destruction or TCC application problems.

CAUSE: Incorrect interchangeability practices of pump covers and input shafts.

CORRECTION: At the start of production for the 2006 model year an Input Speed Sensor was added to some 4L60/65/70E transmissions. This necessitated changes to the pump cover and input shaft. The ISS signal is an input to the control module (PCM or TCM) that will be used to better monitor and control line pressure, shift patterns, torque converter clutch slip speed and gear ratios. This component will allow the 4L60/65/70-E transmissions to enable use of computer instructions (algorithm) related to shift energy, and abuse torque management and provide much improved diagnostic capabilities.

The new turbine input shaft speed sensor was gradually phased into production and certain design level criteria had to be followed. The following information is intended to provide a general outline of the stages involved to implement the use of the ISS.

- (1) In model years 1997 to early 2005, the 4L60E series transmissions utilized a pump cover with no provisions for an ISS, the input shaft sealing ring grooves had not changed and there was no speed sensor rotor. The pump cover used the 1st design internal stator shaft sleeve and the 1st design boost valve which is 1.664" with a boost valve sleeve of 1.910" in length as well as two springs that went on the TCC apply valve, (Refer to Figure 1).
- (2) Effective February 1st, 2005, the oil pump cover now uses a new design TCC valve with a single spring, (Refer to Figure 2).
- (3) Effective March 7th, 2005, the oil pump cover now uses a more compact boost valve and sleeve. The snap ring groove location for the boost sleeve is now situated 2.57" from the bottom of the bore compared to 2.68" for the previous design. The bore length for the boost sleeve and snap ring has been reduced by approximately 0.110", also seen in Figure 2.
- (4) After July 16th, 2005, the pump cover casting was modified in order to situate the ISS connector. This modification removed metal directly below the PR valve and boost sleeve bore and extended a cast wall inward. The internal TCC release passage was also modified at this time. The ISS mounting holes are not yet machined into the oil pump cover, (Refer to Figure 3).

Oil pump cover changes also affected the stator shaft and stator shaft sleeve so as to relocate with oil passages within the oil pump cover.

At the same time, the turbine shaft oil seal ring grooves were moved inboard towards the rear of the unit approximately 0.190"(in.) to produce an area with which to manufacture 15 rotor teeth, this can also be seen in Figure 3.



4L60/65/70E PUMP & INPUT SHAFT USAGE

CORRECTION

continued: (4) Late in 2005 and early in the 2006 model year, some pre ISS models may still not have the ISS mounting holes machined into the cover. This will be evident as a smooth un-machined surface without the ISS mounting holes. For non ISS models, an ISS hole plug will be used in place of the ISS assembly, (Refer to Figure 4).

As ISS models were introduced, later in the 2006 model year, the machining took place and the input speed sensor (ISS) was added, (Refer to Figure 5), the presence of the ISS also necessitated a new internal wire harness to accommodate the ISS and software changes to the PCM provided code capability for ISS malfunctions.

On Non-ISS models that have a functional ISS hole in the pump cover, the rubber plug with an o-ring seal must be installed. Failure to do so will result in no converter charge and the vehicle will not move.

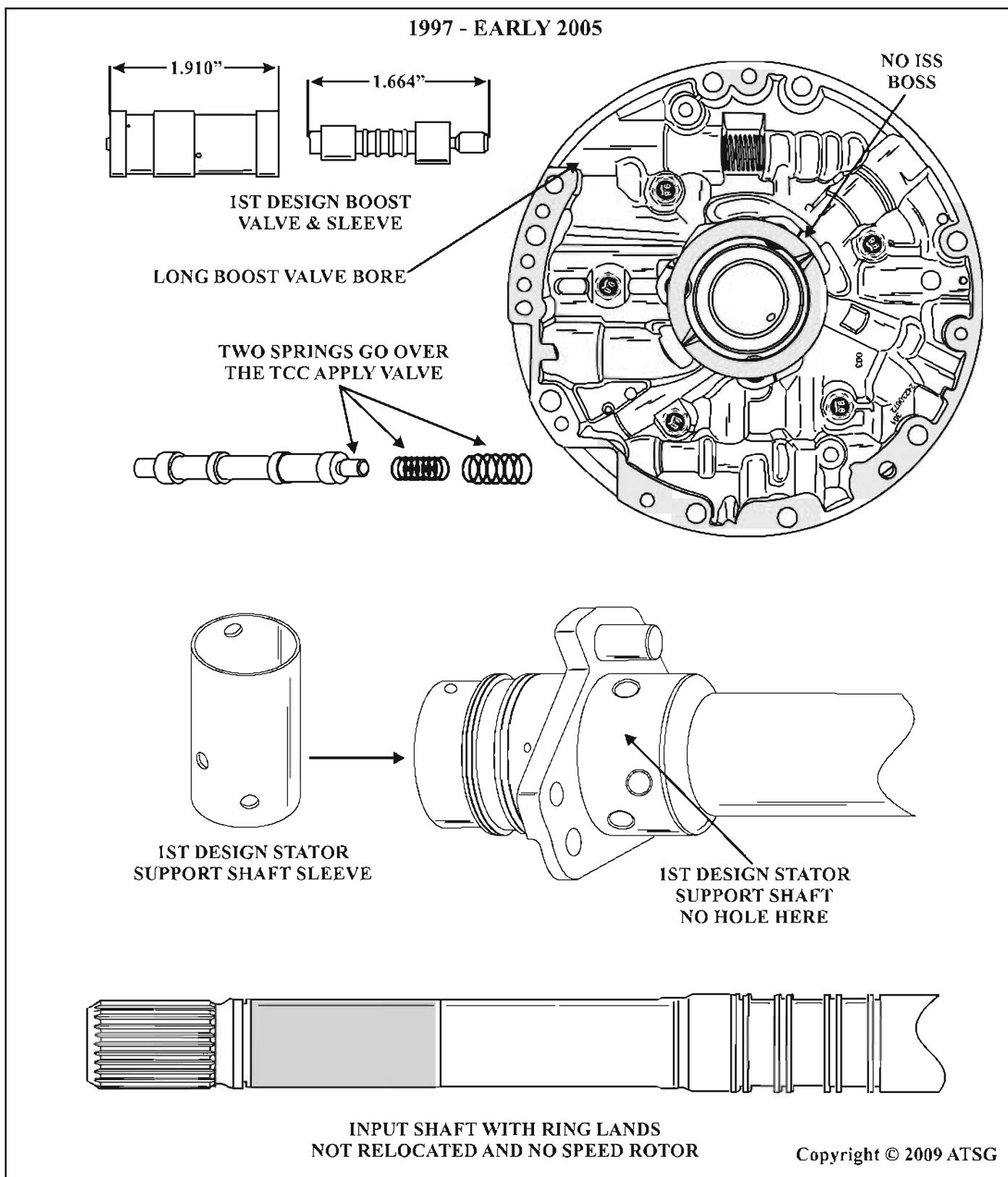
If an input shaft is used without the speed rotor, and the pump cover has an ISS, codes P0716 or P0717 will be stored which could cause TCC slip and gear ratio calculation errors.

If the pump cover and input shaft are mismatched, severe friction and geartrain damage will occur in a short period of time.

NOTE: When parts are modified and are phased into production in order to prepare for the change, it is imperative that the correct replacement parts are used. The parts you may find in a particular transmission may not coincide exactly with the published phase in time periods. The dates provided are for general purposes to assist in easier intensification of parts.

A very special thanks to Paul Tinges from Hardparts For Transmissions for his hospitality in supplying the parts that made this bulletin possible.

4L60/65/70E PUMP & INPUT SHAFT USAGE



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Figure 1
Automatic Transmission Service Group

4L60/65/70E PUMP & INPUT SHAFT USAGE

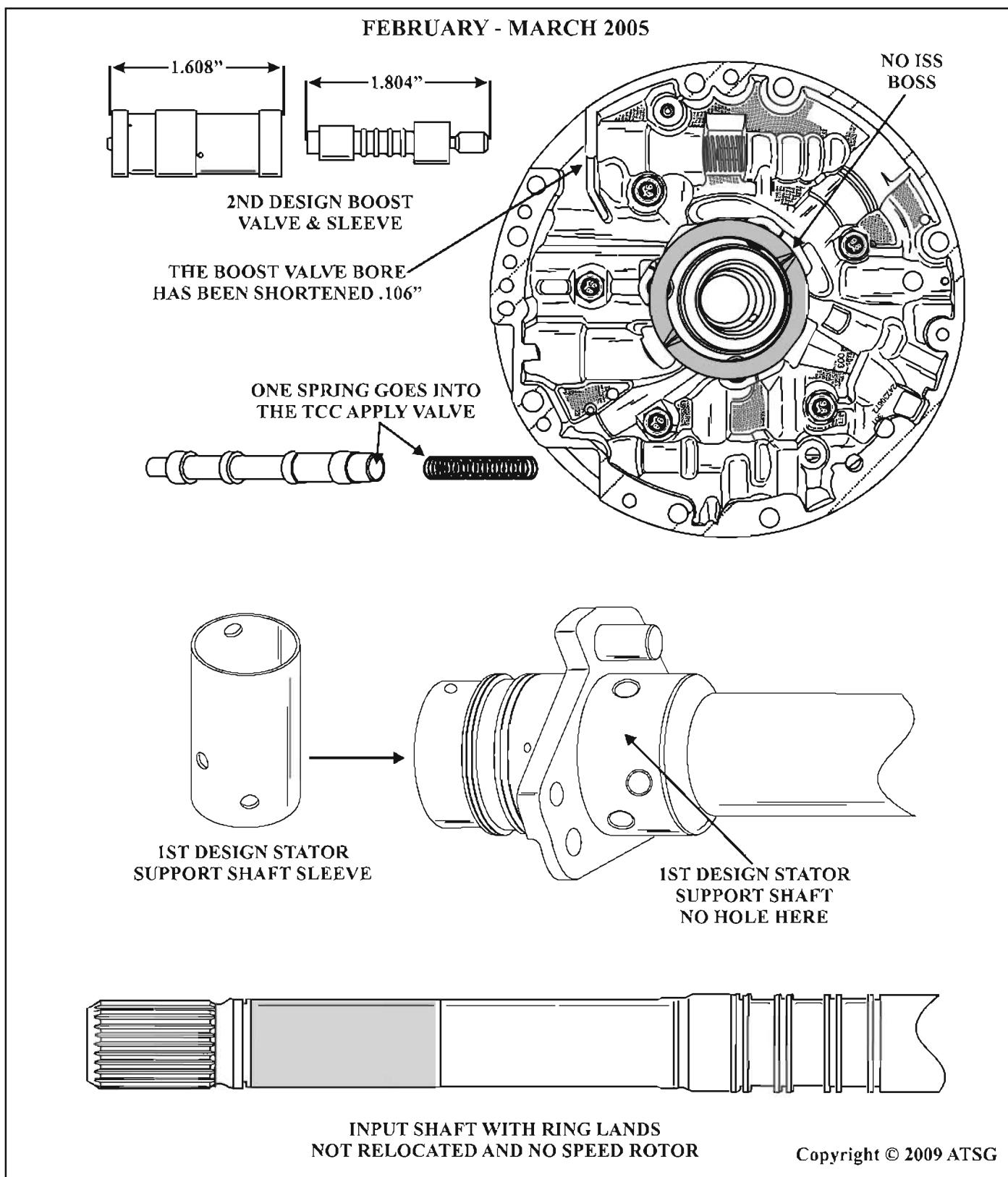


Figure 2
Automatic Transmission Service Group

4L60/65/70E

PUMP & INPUT SHAFT USAGE

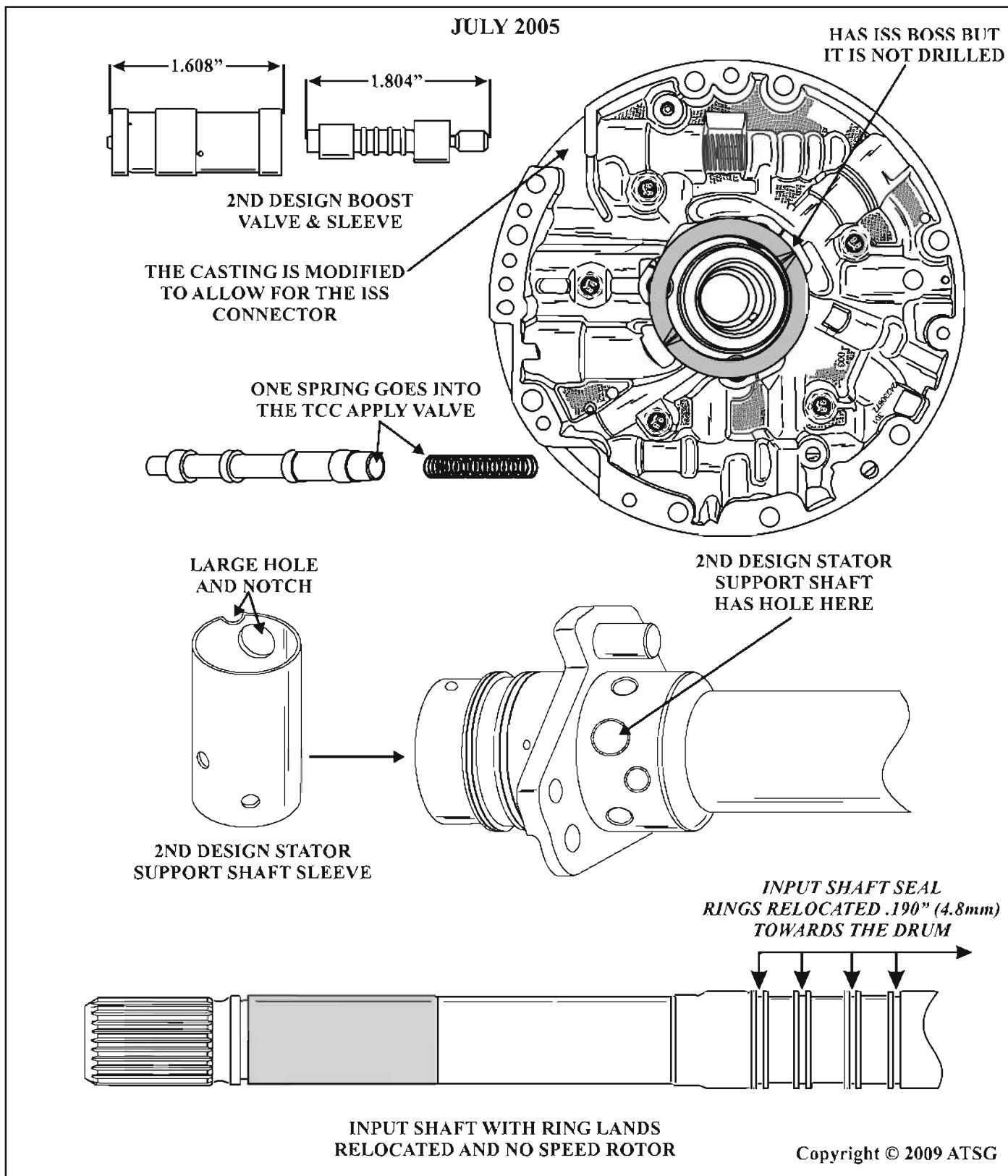


Figure 3
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4L60/65/70E PUMP & INPUT SHAFT USAGE

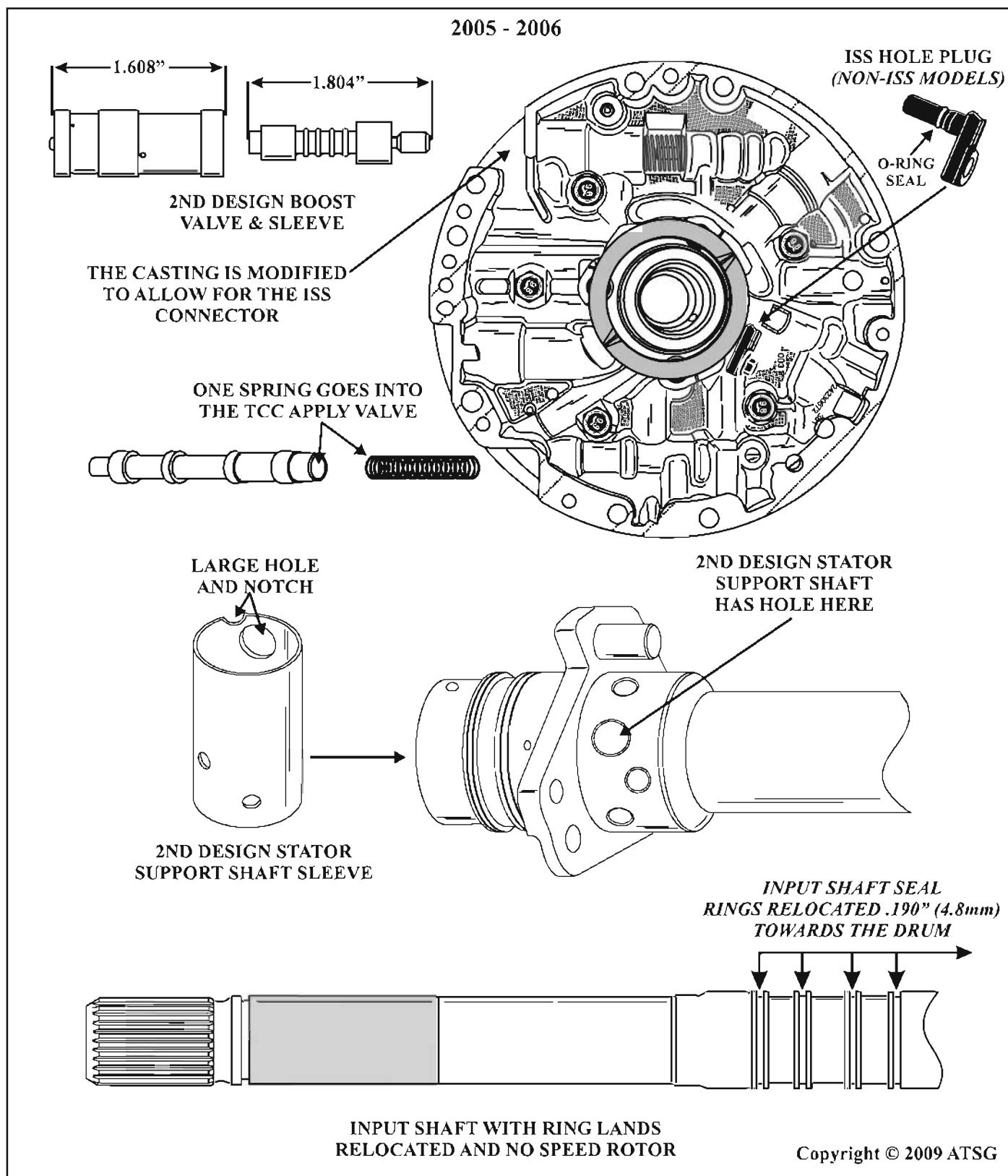
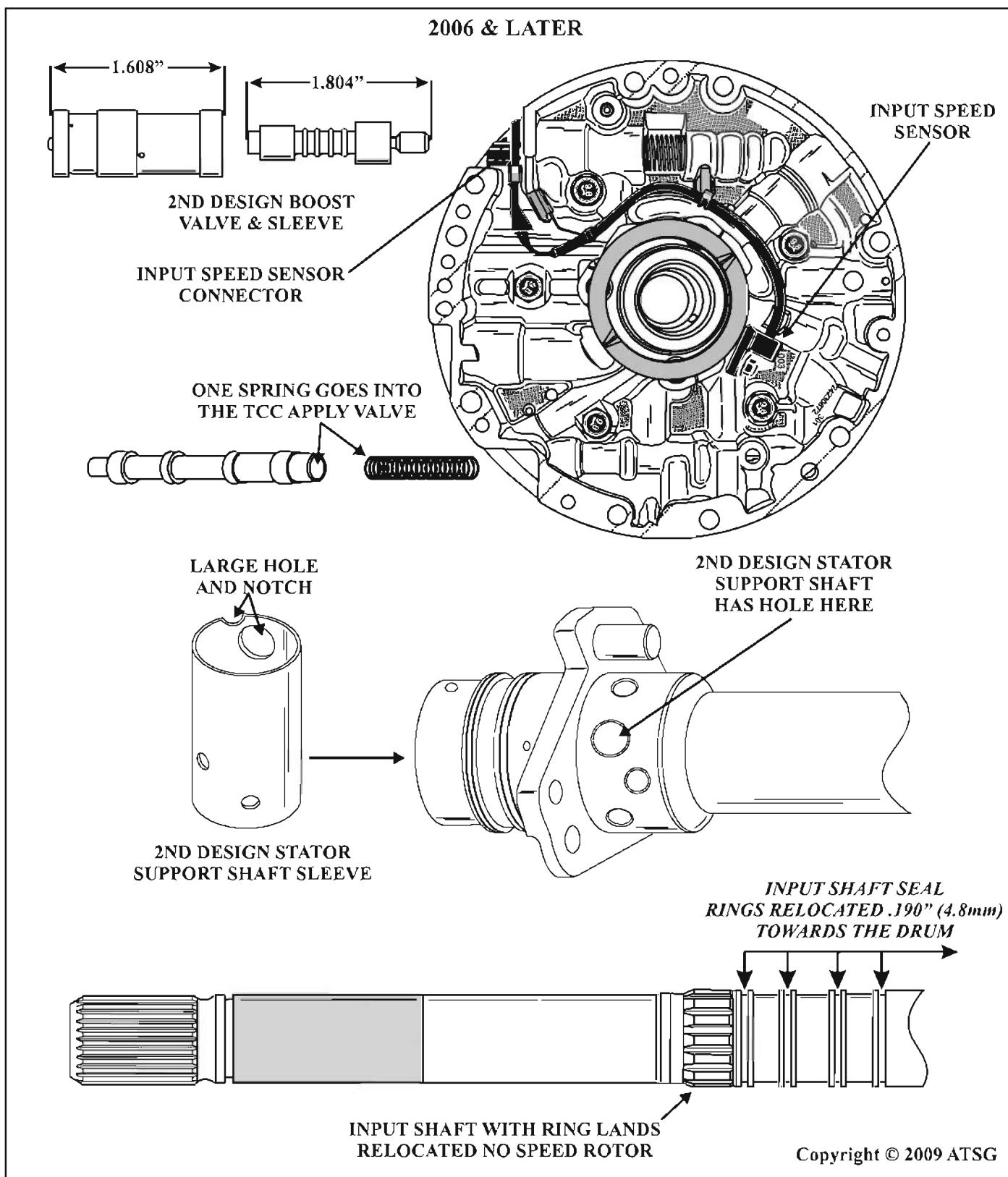


Figure 4
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4L60/65/70E PUMP & INPUT SHAFT USAGE



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Figure 5
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THM 4L65E/4L70E

2009 CHANGES

CHANGES: Beginning at the start of production for 2009 model year, General Motors replaced the external NSBU switch with an Internal Mode Switch (IMS), as shown in Figure 1. They also eliminated the 3-2 downshift solenoid and 3-2 downshift valve and spring from the valve body, as shown in Figure 6.

REASON: Internal Mode Switch greatly improved the reliability, with elimination of water intrusion. Elimination of the 3-2 downshift solenoid improved 3-2 downshift feel and increased band durability.

PARTS AFFECTED:

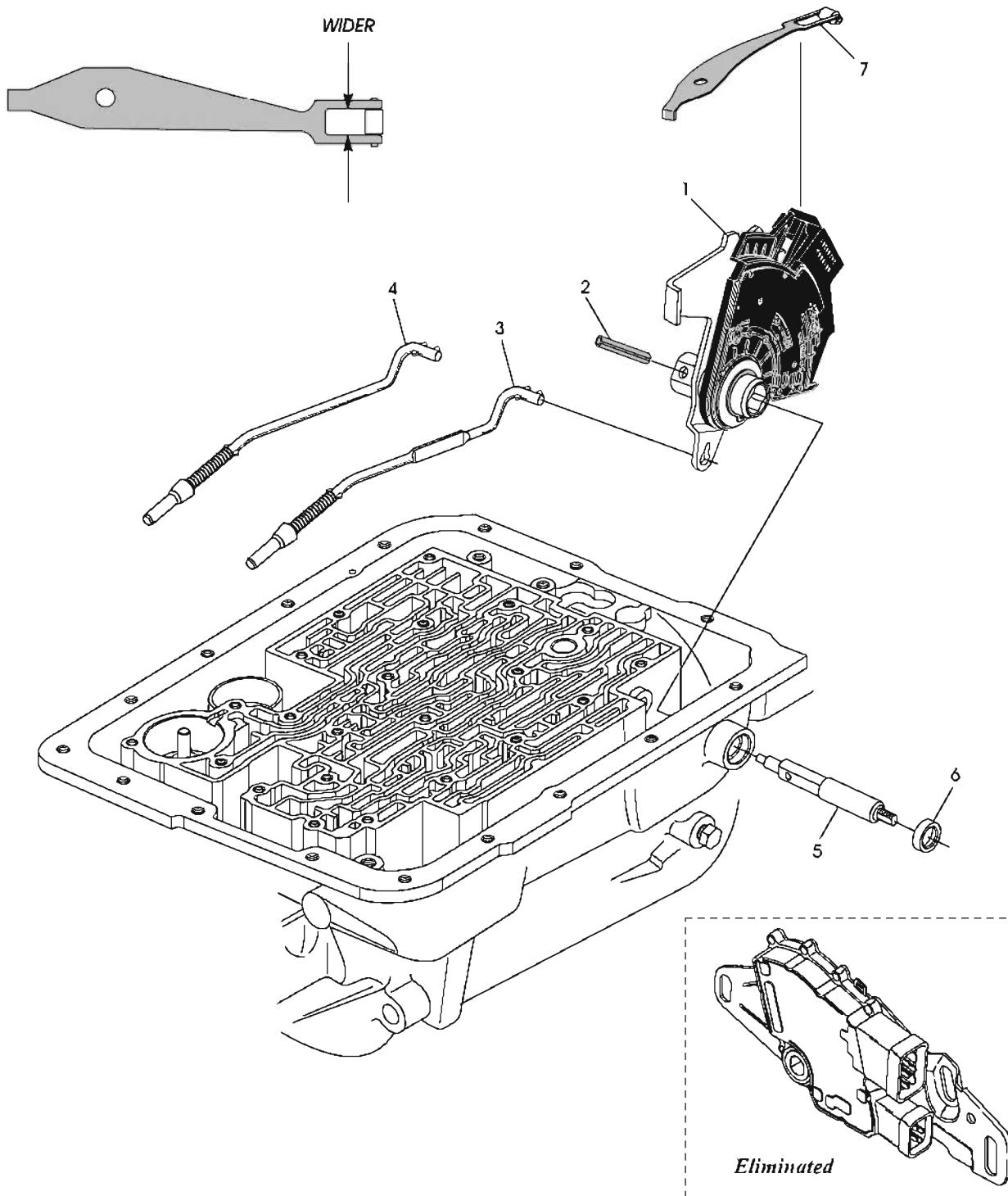
- (1) DETENT SPRING AND ROLLER - Manufactured wider at the "fork" or roller end, to accommodate the Internal Mode Switch (IMS), as shown in Figure 1.
- (2) MANUAL SHAFT - Now has flats on the internal part of the shaft, and a hole through it for the added rolled pin, to accommodate the added IMS, as shown in Figure 1.
- (3) PARKING ROD - Now manufactured with a "Flat" in the middle of the park rod that produces the clearance needed in all detent positions for the added IMS, as shown in Figure 1.
- (4) PRESSURE SWITCH ASSEMBLY - Eliminated, as shown in Figure 6.
- (5) INTERNAL HARNESS AND CASE CONNECTOR - With the elimination of the pressure switch assembly, the TFT Sensor was relocated in the new internal harness assembly, as shown in Figure 2. With the addition of the IMS, the pin functions must also change in the case connector. New case connector pin functions and pin identification is shown in Figure 3. New Internal Mode Switch connectors and pin functions are shown in Figure 4. We have also provided you with a wire schematic from the internal components to the external case connector in Figure 5.
- (6) VALVE BODY CASTING - Valve body is now cast shut where the 3-2 downshift solenoid was previously located and the pressure switch side of the valve body is no longer configured for the pressure switch, as shown in Figure 6.
- (7) SPACER PLATE - The valve body spacer plate also required elimination of the holes for the 3-2 downshift line-up and now has the gaskets molded to both sides of the plate. They also eliminated the two snap-in screens and installed three new flat screens molded in with the valve body gaskets, as shown in Figure 7.

INTERCHANGEABILITY:

The new design Park Rod is the only piece that can be used to back service previous models and the previous Park Rod "cannot" be used on 2009 models. None of the remaining parts listed above will interchange with previous design level parts.

SERVICE INFORMATION:

Internal Mode Switch, 2009 Models	24235261
Internal Wire Harness and Case Connector, 2009 Models	24237980

2009 4L65/4L70E INTERNAL MODE SWITCH LOCATION


1 NEW INTERNAL MODE SWITCH.

2 NEW RETAINING ROLLED PIN.

3 NEW PARK ROD ASSEMBLY.

4 PREVIOUS PARK ROD ASSEMBLY.

5 NEW MANUAL SHAFT.

6 MANUAL SHAFT SEAL.

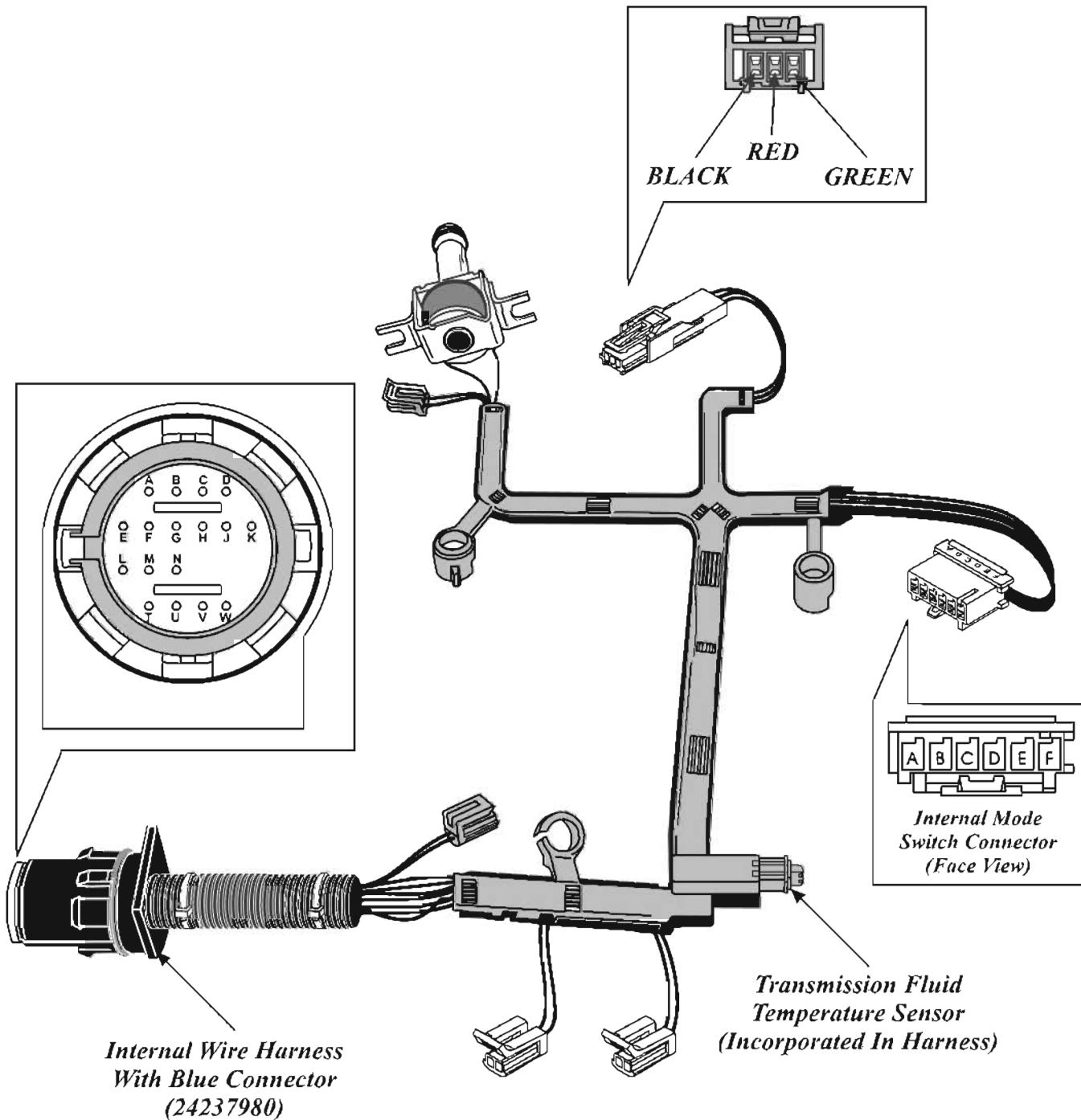
7 NEW DETENT SPRING AND ROLLER ASSEMBLY.

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Figure 1

Automatic Transmission Service Group

2009 4L65/4L70E INTERNAL WIRING HARNESS ASSEMBLY



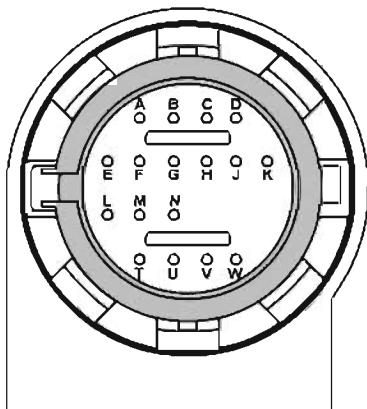
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Figure 2

Automatic Transmission Service Group

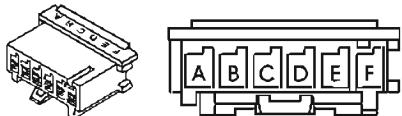


2009 4L65/4L70E CASE CONNECTOR PIN IDENTIFICATION AND FUNCTION

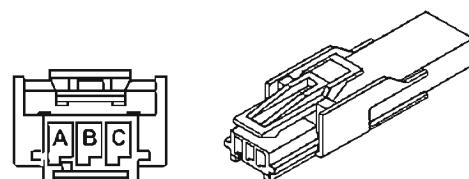


Term.	Wire Color	Function
A	Lt. Green	1-2 Shift Solenoid Ground Signal
B	Yellow	2-3 Shift Solenoid Ground Signal
C	Purple	Pressure Control Solenoid High
D	Lt. Blue	Pressure Control Solenoid Low
E	Red	Ignition 12V Feed
F	Red/Black	Internal Mode Switch Terminal "C", Switch Signal A
G	Dk. Green/White	Internal Mode Switch Terminal "D", Switch Signal B
H	Yellow/Black	Internal Mode Switch Terminal "B", Switch Signal P
J	Gray/White	Internal Mode Switch Terminal "E", Switch Signal C
K	Black	Input Speed Sensor (ISS) Signal
L	Brown	Transmission Fluid Temperature Sensor High
M	Gray	Transmission Fluid Temperature Sensor Low
N	Black/White	Internal Mode Switch Terminal "F", Ground
T	Black	TCC Control Solenoid Ground Signal
U	Pink	TCC PWM Solenoid Ground Signal
V	Dk. Green	Input Speed Sensor (ISS) Low Reference
W	Orange	Internal Mode Switch Terminal "A", Park/Neutral Signal

New Internal Mode Switch Harness Connector



Input Shaft Speed Sensor Harness Connector



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Figure 3



2009 4L65/4L70E INTERNAL MODE SWITCH

INTERNAL MODE SWITCH PARITY CHART

RANGE	INTERNAL MODE SWITCH SIGNAL A	INTERNAL MODE SWITCH SIGNAL B	INTERNAL MODE SWITCH SIGNAL C	INTERNAL MODE SWITCH SIGNAL P
P	LOW/OFF	HIGH/ON	HIGH/ON	LOW/OFF
R	LOW/OFF	LOW/OFF	HIGH/ON	HIGH/ON
N	HIGH/ON	LOW/OFF	HIGH/ON	LOW/OFF
D	HIGH/ON	LOW/OFF	LOW/OFF	HIGH/ON
3	LOW/OFF	LOW/OFF	LOW/OFF	LOW/OFF
2	LOW/OFF	HIGH/ON	LOW/OFF	HIGH/ON
1	HIGH/ON	HIGH/ON	LOW/OFF	LOW/OFF

NOTE: HIGH/ON = APPROXIMATELY 5 VOLTS

LOW/OFF = APPROXIMATELY 0 VOLTS

Added Internal Mode Switch Codes

P1820 - Internal Mode Switch, Circuit A, Low Voltage

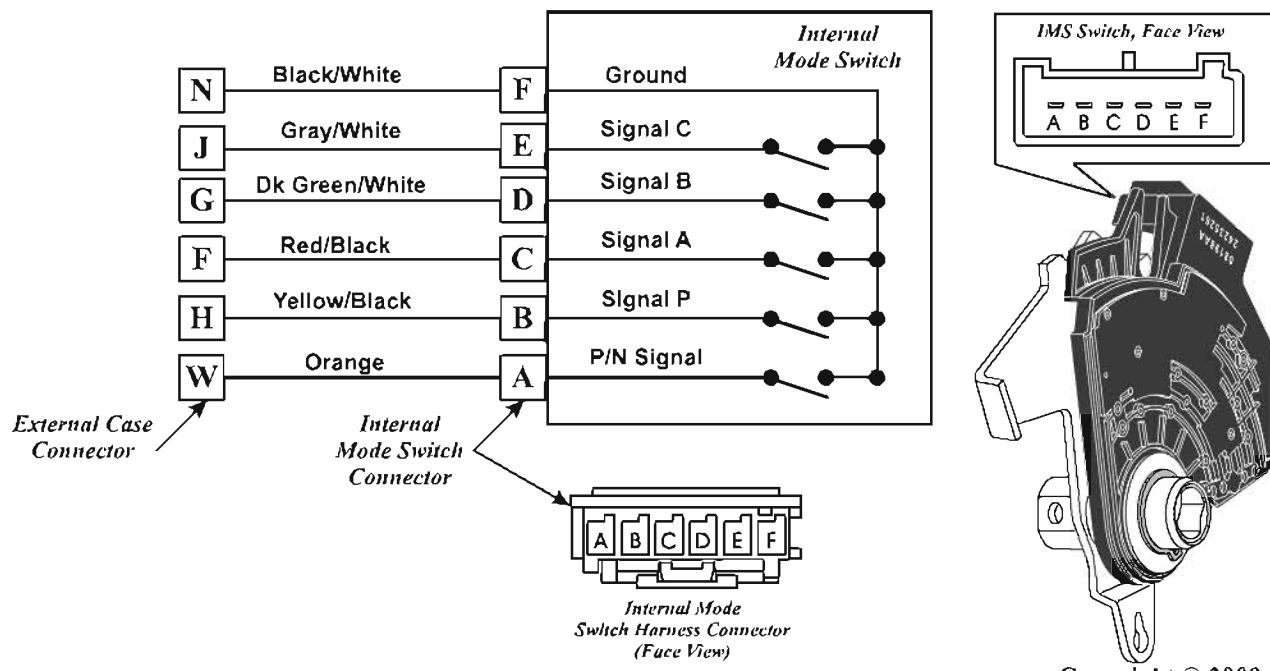
P1822 - Internal Mode Switch, Circuit B, High Voltage

P1823 - Internal Mode Switch, Circuit P, Low Voltage

P1825 - Internal Mode Switch, Invalid Range

P1826 - Internal Mode Switch, Circuit C, High Voltage

P1915 - Internal Mode Switch, Does not indicate Park/Neutral (P/N) During Start



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Figure 4

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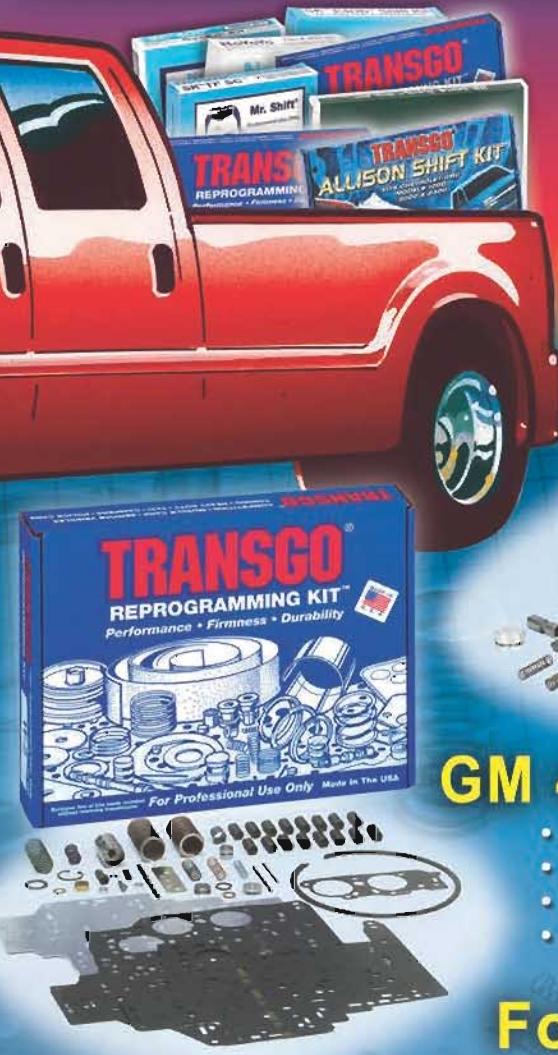
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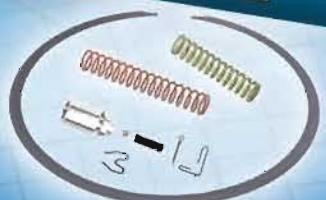
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Reduces: Case Lug Blow Out
Stops: Broken Lugs



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Stops: Band Failure & 2-3 Cutloose Converter Slip - Codes



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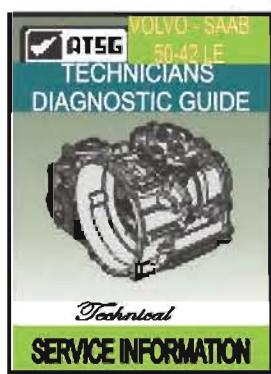


The logo for Wesco Automatic Transmission Parts. The word "WESCO" is written in a large, bold, black, sans-serif font. The letter "W" is stylized with a thick vertical stroke and two diagonal strokes forming a V-shape. Below "WESCO", the words "AUTOMATIC" and "TRANSMISSION PARTS" are stacked in a smaller, bold, black, sans-serif font.

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- Precision machined adapters



2009 4L65/4L70E WIRE SCHEMATIC

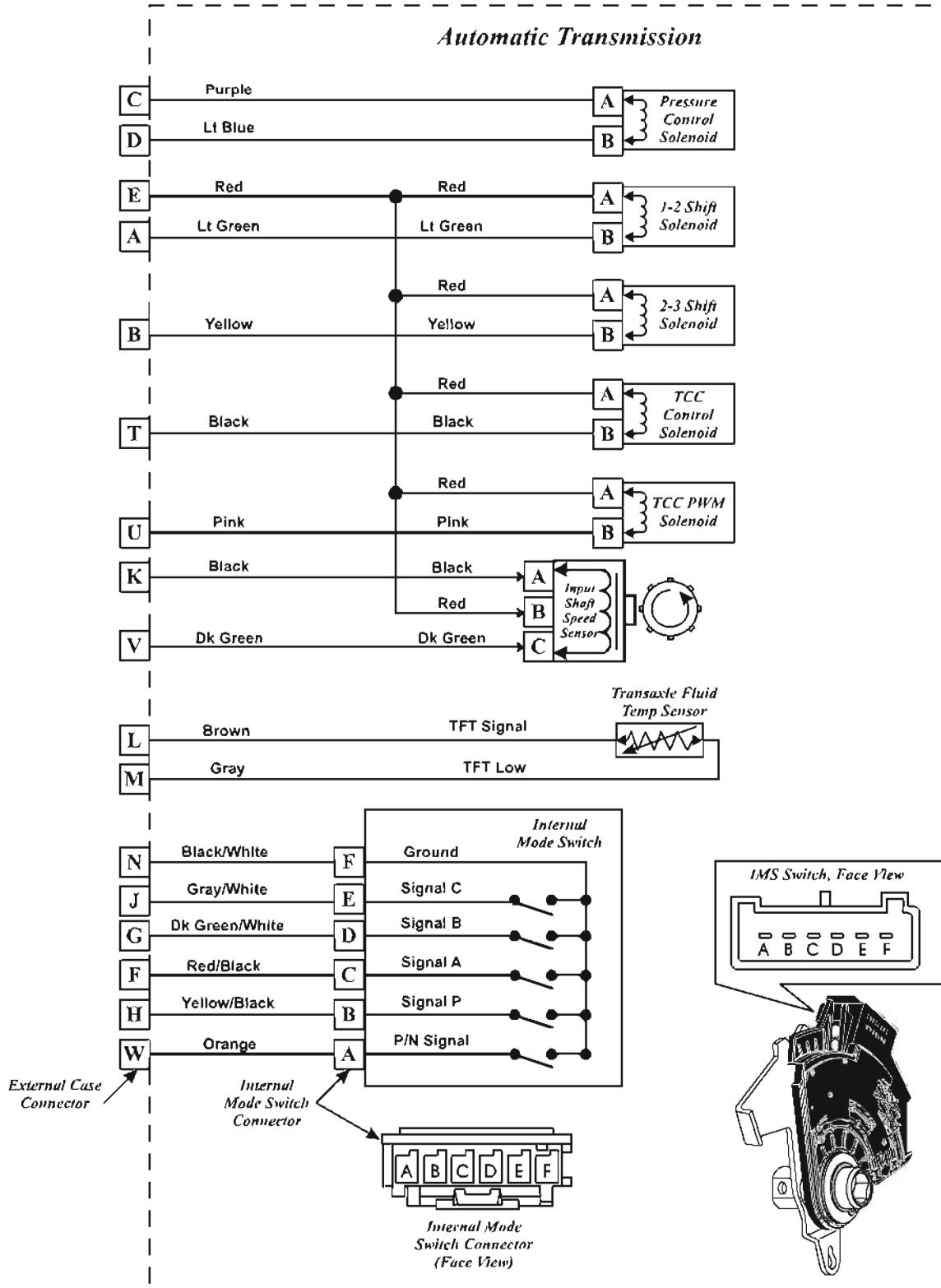
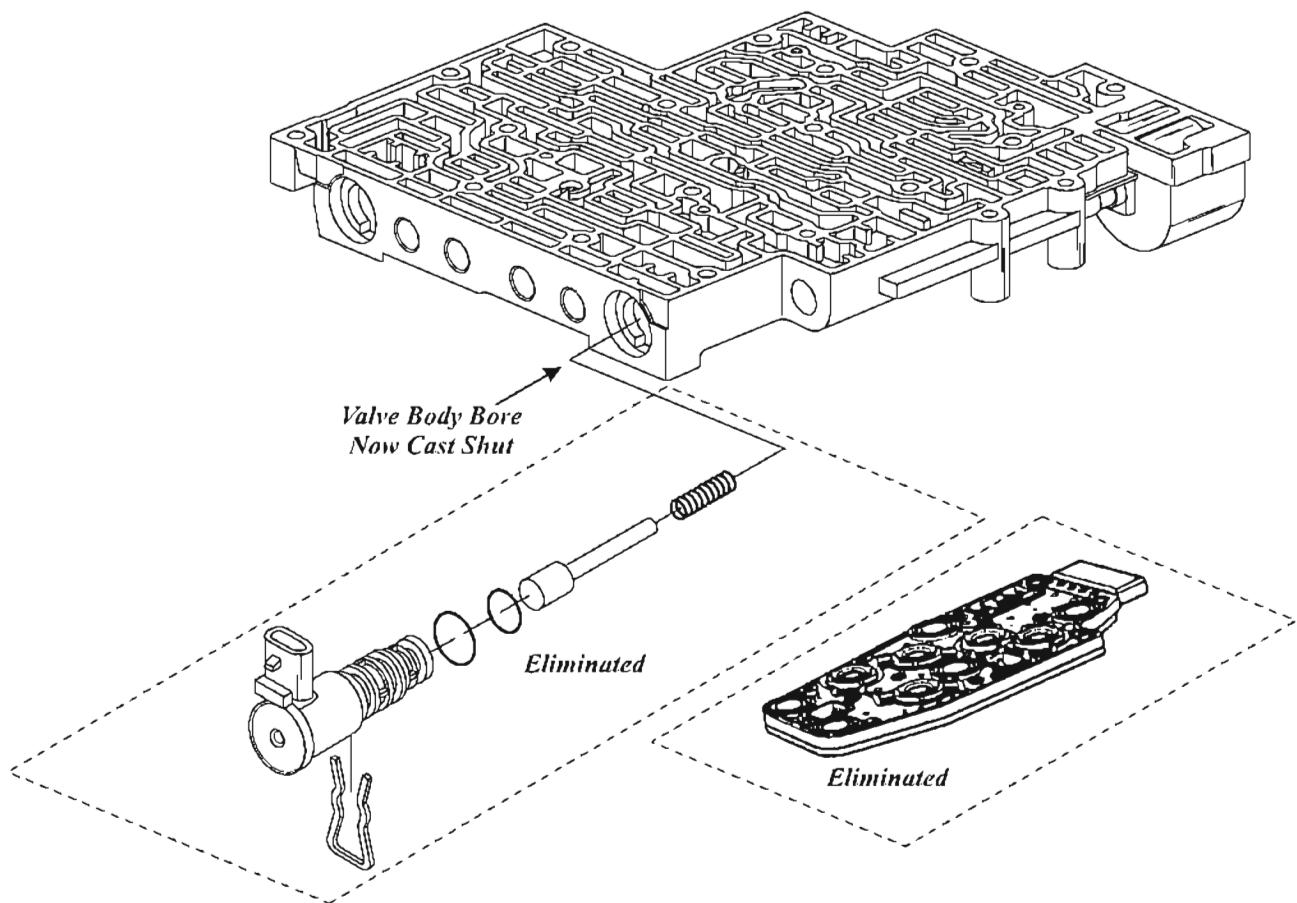


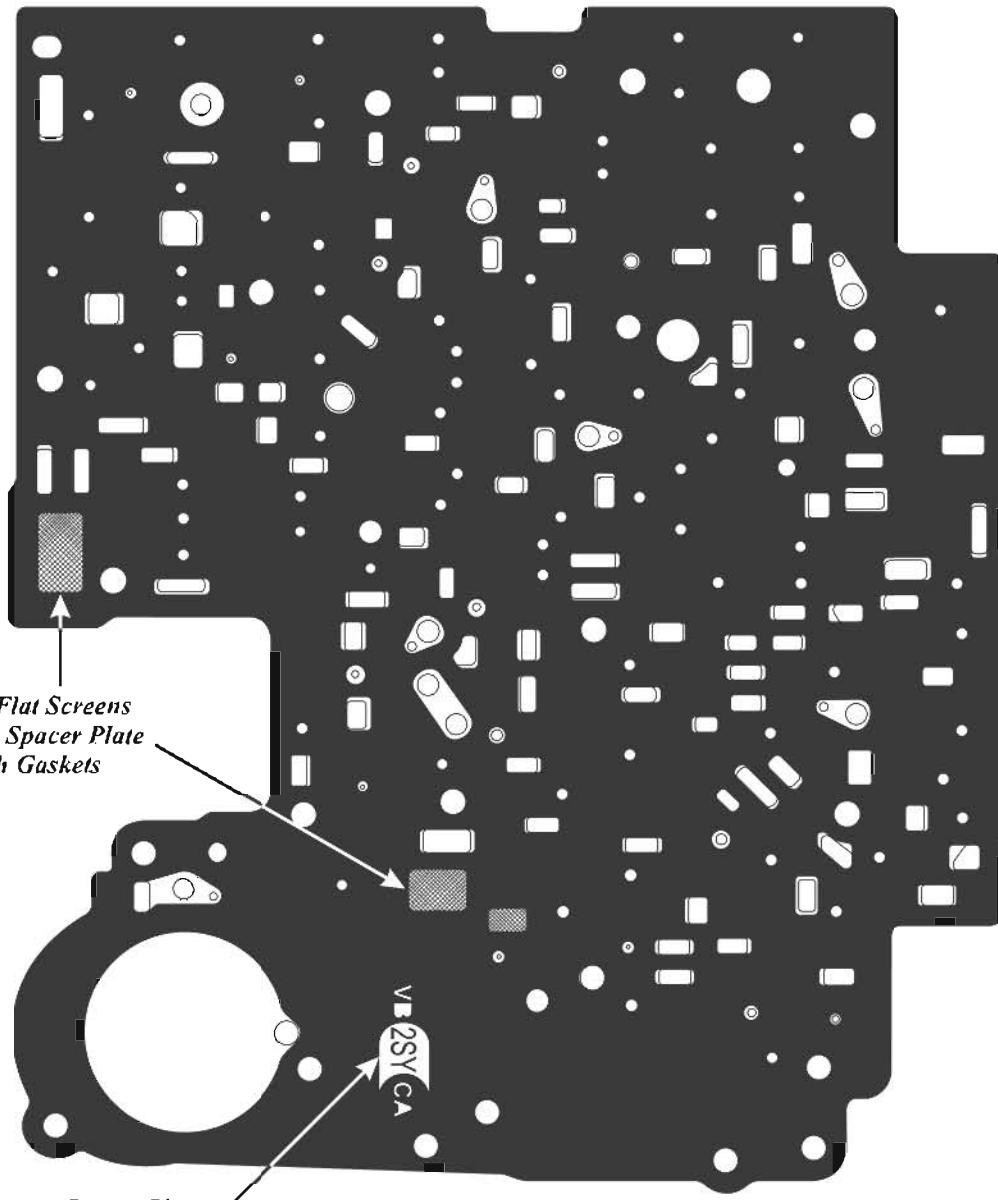
Figure 5

2009 4L65/4L70E VALVE BODY CASTING



2009 THM 4L65E/4L70E SPACER PLATE CHART

PART NO.	24238166	24238223	24245348	24245346	
I.D. CODE	2SL	2SK	2SS	2SY	
FITS THESE MODELS	9HDD	9HED	9SYD 9TYD	9CED 9CND 9KND 9KPD 9LPD 9LSD 9SBD	9SHD 9SMD 9STD 9TBD 9TC 9TSD 9TTD
NOTE: ALL 2009 Models have bonded gaskets with screens, as shown below.					



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Figure 7

THM 4L60-E

1993-2009 SPACER PLATE IDENTIFICATION

The Valve Body Spacer Plate for the THM 4L60-E transmission has changed every year, since it was first introduced in 1993, and they will not interchange from year to year. The valve body casting changed once again for model year 2001 and at that time the I.D. code on the spacer plate went to 3 digits, as shown in Figure 1. The location of the I.D. code stamped in the spacer plates are also shown in Figure 1. Use the chart below that refers you to a Figure number to identify the spacer plates, which models they fit and the part number to purchase one if necessary.

Refer to Figure 2 for 1993 4L60-E spacer plate identification.

Refer to Figure 3 for 1994 4L60-E spacer plate identification.

Refer to Figure 4 for 1995 4L60-E spacer plate identification.

Refer to Figure 5 for 1996 4L60-E spacer plate identification.

Refer to Figure 6 for 1997 4L60-E spacer plate identification.

Refer to Figure 7 for 1998 4L60-E spacer plate identification.

Refer to Figure 8 for 1999 4L60-E spacer plate identification.

Refer to Figure 9 for 2000 4L60-E spacer plate identification.

Refer to Figure 10 for 2001 4L60-E spacer plate identification.

Refer to Figure 11 for 2002 4L60-E spacer plate identification.

Refer to Figure 12 for 2003 4L60-E spacer plate identification.

Refer to Figure 13 for 2004 4L60-E spacer plate identification.

Refer to Figure 14 for 2005 4L60-E spacer plate identification.

Refer to Figure 15 for 2006 4L60-E spacer plate identification.

Refer to Figure 16 for 2007 4L60-E (Regular) spacer plate identification.

Refer to Figure 17 for 2007 4L60-E (Alternate W/Bonded Gaskets) spacer plate identification.

Refer to Figure 18 for 2008 4L60-E (Regular) spacer plate identification.

Refer to Figure 19 for 2008 4L60-E (Alternate W/Bonded Gaskets) spacer plate identification.

Refer to Figure 20 for 2009 4L60-E spacer plate identification (All Bonded Gaskets).

THM 4L60-E SPACER PLATE I.D. CODE LOCATIONS



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Figure 1

Automatic Transmission Service Group

1993 THM 4L60-E SPACER PLATE CHART						
PART NO.	8684122	8684123	8684124	8684125	8684126	
I.D. CODE	JV	JW	JX	JY	JZ	
FITS THESE MODELS	MJD MND MSD TAD TBD MDD	SHD TLD CAD CBD KAD TWD	CCD CFD KBD	CJD CHD KCD	CKD CLD KDD	

Figure 2

1994 THM 4L60-E SPACER PLATE CHART						
PART NO.	8686011	8686012	8686013	8686037	8686038	8686039
I.D. CODE	KO	KP	KS	KT	KU	KV
FITS THESE MODELS	BBD	BWD	FDD SFD	FFD YDD	HBD	HDD
PART NO.	8686040	8686041	8686042	8686043	8686044	8686045
I.D. CODE	KW	KX	KY	KZ	LA	LB
FITS THESE MODELS	SHD TLD MJD CAD CBD KAD MND TWD	MSD TAD TBD MDD	SAD	CCD CFD KBD	CHD CJD KCD CPD	CMD CUD KPD
PART NO.	24200361	24200608	24200609			
I.D. CODE	LC	LD	LE			
FITS THESE MODELS	BFD	AHD	BCD			

Figure 3

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1995 THM 4L60-E SPACER PLATE CHART						
PART NO.	24201484	24201485	24201486	24201487	24201488	24201489
I.D. CODE	MP	MS	MT	MU	MV	MW
FITS THESE MODELS	STD	SHD TLD CAD CBD KHD CRD CSD	TAD TBD TYD TZD	CCD CDD CHD CJD CLD CND CWD KTD KWD LHD	CKD CMD KMD LUD	MSD MDD
PART NO.	24201490	24201491	24201492	24201493	24201494	24202313
I.D. CODE	MX	MY	MZ	NA	NB	NC
FITS THESE MODELS	BBD BCD	BWD	AHD	BFD	FFD YDD	HBD
PART NO.	24202314	24202813	24203084	24203918		
I.D. CODE	ND	NE	NG	NH		
FITS THESE MODELS	HDD HCD	FCD	HSD	FDD		

Figure 4



1996 THM 4L60-E SPACER PLATE CHART						
PART NO.	24203222	24204438	24203283	24203947	24203948	24203949
I.D. CODE	PA	PC	PG	PL	PM	PN
FITS THESE MODELS	SAD	CCD CFD KBD WBD	HDD HCD	BBD	BCD	BWD
PART NO.	24203950	24203951	24203952	24203953	24203946	24204435
I.D. CODE	PP	PS	PT	PU	PW	PX
FITS THESE MODELS	AHD	FBD FCD	BFD BKD	FFD YDD	CPD	SHD TLD MSD TAD TBD MDD
PART NO.	24204438	24207492	24205978	24205979		
I.D. CODE	PY	PZ	SC	SD		
FITS THESE MODELS	CAD CBD KAD	CHD CJD KCD WHD	HBD	HSD		

Figure 5

1997 THM 4L60-E SPACER PLATE CHART						
PART NO.	24203222	24203224	24203225	24203283	24203951	24203953
I.D. CODE	PA	PC	PD	PG	PS	PU
FITS THESE MODELS	SAD	CCD CFD KBD	CHD CJD KCD	HDD HCD	FBD FCD	FFD YDD
PART NO.	24204435	24204438	24205978	24205979	24207864	
I.D. CODE	PX	PY	SC	SD	SE	
FITS THESE MODELS	SHD TLD MSD TAD TBD MDD	CAD CBD KAD	HBD	HSD	HLD	

Figure 6

1998 THM 4L60-E SPACER PLATE CHART						
PART NO.	24203222	24203224	24203283	24203951	24203953	24205978
I.D. CODE	PA	PC	PG	PS	PU	SC
FITS THESE MODELS	SAD	CHD CJD CPD KCD KXD LPD	HCD HDD HFD	FBD FCD	FFD YDD	HBD
PART NO.	24205979	24207864	24209351	24210565		
I.D. CODE	SD	SE	TA	TB		
FITS THESE MODELS	HSD	HLD HND	CAD CBD KAD MSD SHD TAD	HJD		

Figure 7

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1999 THM 4L60-E SPACER PLATE CHART						
PART NO.	24203222	24203224	24203283	24203951	24203953	24205978
I.D. CODE	PA	PC	PG	PS	PU	SC
FITS THESE MODELS	SAD	CPD KBD KCD KXD LHD LPD LSD LUD	HCD HDD HFD	FBD FCD	FFD YDD	HBD
PART NO.	24205979	24207864	24209351	24210565	24210523	
I.D. CODE	SD	SE	TA	TB	TC	
FITS THESE MODELS	HSD	HLD HND	CAD CBD KAD MSD SHD TAD WBD	HJD	CCD CFD CHD CJD KBD KCD	

Figure 8

2000 THM 4L60-E SPACER PLATE CHART						
PART NO.	24203222	24203224	24203283	24203951	24203953	24205978
I.D. CODE	PA	PC	PG	PS	PU	SC
FITS THESE MODELS	SAD	KXD LHD LPD LUD	HCD HDD HFD	FBD FCD	FFD HPD YDD	HBD
PART NO.	24207864	24209351	24210565	24210523		
I.D. CODE	SE	TA	TB	TC		
FITS THESE MODELS	HND	CAD CBD KAD MSD SHD TAD WBD	HJD	CCD CFD CHD CJD KBD KCD		

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 Figure 9
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2001 THM 4L60-E SPACER PLATE CHART						
PART NO.	24218156	24218157	24218158	24218160	24218161	24218159
I.D. CODE	IPA	IPC	IPG	IPS	IPU	ISE
FITS THESE MODELS	1SAD	1LHD	1HFD	1FBD 1FCD	1FFD 1HPD 1YDD	1HND
PART NO.	24218162	24218163				
I.D. CODE	ITA	ITC				
FITS THESE MODELS	1CAD 1CBD 1KAD 1MSD 1SHD 1TAD WBD	1CCD 1CFD 1CHD 1CJD 1KBD 1KCD				

Figure 10

2002 THM 4L60-E SPACER PLATE CHART						
PART NO.	24218156	24218157	24218158	24218160	24218161	24218159
I.D. CODE	IPA	IPC	IPG	IPS	IPU	ISE
FITS THESE MODELS	2SAD	2LHD	2HFD	2FBD 2FCD	2FFD 2HPD 2YDD	2HND
PART NO.	24218162	24218163	24220200			
I.D. CODE	ITA	ITC	ITJ			
FITS THESE MODELS	2CAD 2CBD 2KAD 2MSD 2SHD 2TAD WBD	2CCD 2CFD 2CHD 2CJD 2KBD 2KCD	SDD TDD			

Figure 11

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2003 THM 4L60-E SPACER PLATE CHART					
PART NO.	24218156	24218158	24218161	24218159	
I.D. CODE	IPA	IPG	IPU	ISE	
FITS THESE MODELS	3SAD	3HFD	3HAD 3YDD	3HND	
PART NO.	24218162	24218163	24220200		
I.D. CODE	ITA	ITC	ITJ		
FITS THESE MODELS	3CAD 3CBD 3KAD 3MSD 3SHD 3TAD	3CHD 3CJD 3KCD 3SCD	3SDD 3TDD		

Figure 12

2004 THM 4L60-E SPACER PLATE CHART						
PART NO.	24218158	24218161	24218159	24218162	24218163	
I.D. CODE	PG	PU	SE	TA	TC	
FITS THESE MODELS	4HFD	4HAD 4YDD	4HND	4CAD 4CBD 4KAD 4MSD 4SHD	4SPD 4SVD 4TAD 4TVD 4YDD	4CHD 4CJD 4KCD 4SCD 4SSD
PART NO.	24220200	24220980				
I.D. CODE	TJ	TM				
FITS THESE MODELS	4SDD 4TDD	4PCD 4PKD				

Figure 13

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2005 THM 4L60-E SPACER PLATE CHART						
PART NO.	24218158	24218161	24218162	24218163	24220200	
I.D. CODE	PG	PU	TA	TC	TJ	
FITS THESE MODELS	5HHD 5HKD	5YZD	5CAD 5CBD 5KAD 5MSD 5SHD	5SPD 5SVD 5TAD 5TPD 5TVD	5CHD 5CJD 5CPD 5KCD 5SCD	5SDD 5TDD
PART NO.	24220980	24230162				
I.D. CODE	TM	TP				
FITS THESE MODELS	5PCD 5PKD	5HAD				

Figure 14

2006 THM 4L60-E SPACER PLATE CHART						
PART NO.	24218158	24230163	24218161	24218162	24218163	
I.D. CODE	PG	PM	PU	TA	TC	
FITS THESE MODELS	6HHD 6HKD	6SKD 6SZD 6TKD	6HZD	6CAD 6CBD 6KAD 6SPD 6SVD 6TPD 6TVD	6CHD 6CJD 6CMD 6CPD 6CSD	6CWD 6CZD 6KCD 6KMD 6KZD
PART NO.	24220200	24220980	24230162	24233900		
I.D. CODE	TJ	TM	TP	TT		
FITS THESE MODELS	6SDD 6TDD	6PCD 6PKD	6HAD	6KLD 6SJD		

Figure 15

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2007 THM 4L60-E SPACER PLATE CHART (<i>Regular</i>)						
PART NO.	24235177	24238646	24218162	24239053	24218163	24220200
I.D. CODE	PH	PO	TA	TB	TC	TJ
FITS THESE MODELS	7HSD 7HTD	7SKD 7SZD 7TKD	7CAD 7CBD 7KAD 7SFD 7SLD 7TFD 7TLD	7CFD 7KFD	7CMD 7CSD 7CWD 7KMD 7KZD	7SDD 7TDD
PART NO.	24220980	24230162	24233900			
I.D. CODE	TM	TP	TT			
FITS THESE MODELS	7PCD 7PKD	7HSD	7CHD 7CJD 7CLD 7CVD	7KCD 7KLD 7SJD		

Figure 16

2007 THM 4L60-E SPACER PLATE CHART (<i>Alternate W/ Bonded Gaskets</i>)						
PART NO.	24241784	24241785	24241783	24241780	24241782	24241779
I.D. CODE	IHA	IHB	IHC	IHH	IJJ	IHO
FITS THESE MODELS	7CAD 7CBD 7KAD 7SFD 7SLD 7TFD 7TLD	7CFD 7KFD	7CMD 7CSD 7CWD 7KMD 7KZD	7HSD 7HTD	7SDD 7TDD	7SKD 7SZD 7TKD
PART NO.	24241781	24241786				
I.D. CODE	IHP	IHT				
FITS THESE MODELS	7HBD	7CHD 7CJD 7CLD 7CVD	7KCD 7KLD 7SJD			

Figure 17

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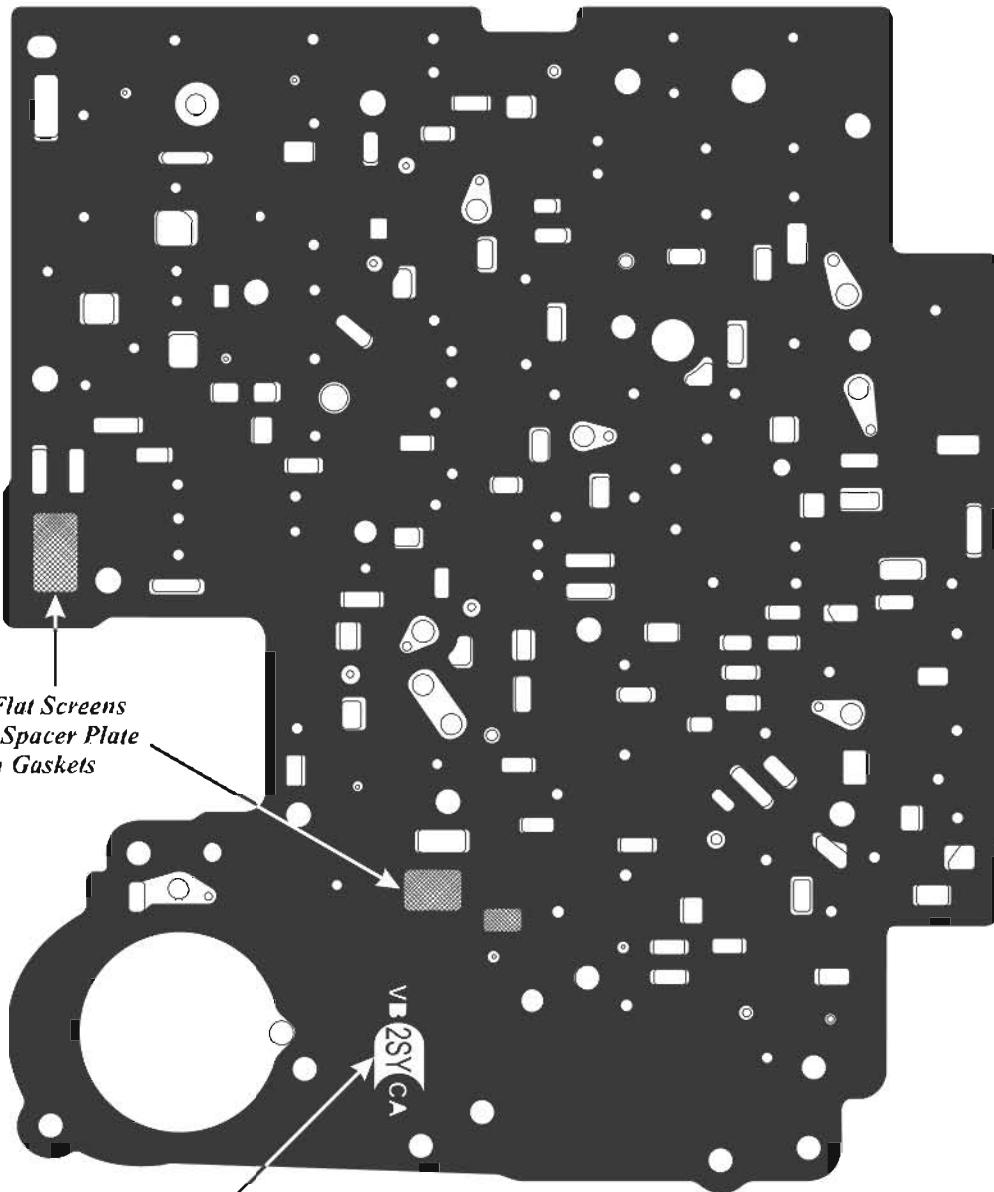


2008 THM 4L60-E SPACER PLATE CHART (<i>Regular</i>)					
PART NO.	24218162	24239053			24230162
I.D. CODE	TA	TB			TP
FITS THESE MODELS	8CAD	8CFD	8SAD	8KGD	8HBD
	8KAD	8CJD	8SJD	8LFM	
	8KED	8CLD	8SUD	8LGD	
	8LAD	8CVD	8SWD	8LJD	
	8SFD	8KFD	8TAD	8LND	
	8SLD	8KLD	8TWD	8LVD	
	8TFD			8TZD	
	8TLD				
PART NO.	24235177	24240307			
I.D. CODE	PH	PV			
FITS THESE MODELS	8HSD	8SKD			

Figure 18

2008 THM 4L60-E SPACER PLATE CHART (<i>Alternate W/ Bonded Gaskets</i>)						
PART NO.	24241784	24241785		24241780	24243216	24243215
I.D. CODE	IHA	IHB		IHH	IHK	IHM
FITS THESE MODELS	8CAD	8CFD	8SAD	8HSD	8KGD	8KED
	8KAD	8CJD	8SJD		8LFM	8LAD
	8SFD	8CLD	8SUD		8LGD	
	8SLD	8CVD	8SWD		8LJD	
	8TFD	8KFD	8TAD		8LND	
	8TLD	8KLD	8TWD		8LVD	
			8TZD			
PART NO.	24241781	24241778				
I.D. CODE	IHP	IHV				
FITS THESE MODELS	8HBD	8SKD				

Figure 19

2009 THM 4L60-E SPACER PLATE CHART					
PART NO.	24238166	24238223	24245348	24245346	
I.D. CODE	2SL	2SK	2SS	2SY	
FITS THESE MODELS	9HDD	9HED	9SYD 9TYD	9CED 9CND 9KND 9KPD 9LPD 9LSD 9SBD	9SHD 9SMD 9STD 9TBD 9TCD 9TSD 9TTD
<i>NOTE: ALL 2009 Models have bonded gaskets with screens, as shown below.</i>					
 <p><i>Three New Flat Screens "Molded" To Spacer Plate With Both Gaskets</i></p> <p>2SY</p> <p>Spacer Plate Identification</p>					

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Figure 20

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4L60E/4L65E/4L70E WATER CONTAMINATION

COMPLAINT: A 2004 to 2006 Chevy full size truck, or a 2004 to 2006 Cadillac Escalade comes in with a complaint of a shudder condition at approximately 40-50 mph (64-80 km/h) when TCC engages. After preliminary diagnoses the pan is dropped and evidence of water contamination is found. The vehicles cooling system has been checked and is found **not** to be the cause of the water contamination.

CAUSE: Water has entered the transmission by water dripping from the cowl area onto the transmission dipstick due to a poor seal between the air inlet grille panel and the hood, (Refer to Figure 1).

CORRECTION: To repair this condition start by removing the two (2) air inlet grille caps by pulling up on the caps, (Refer to Figure 2).

Next, loosen the two (2) sheet metal screws on both ends of the air inlet grille panel. Then remove the four (4) attaching clips running along the edges of the center air inlet grille panel, (Refer to Figure 3).

Next, measure and cut a piece of 7/64" hose 50 inches (1.27 meters) long. Then with a sharp utility knife, cut down the center of the hose into a "C" shape which will allow the hose to be pushed over the cowl seam, See Figure 4.

Next, apply a thin layer of Weather Stripping adhesive into the center of the cut hose.

Next, lift up on the air inlet grille panel in order to expose the cowl area metal edge, then place the hose over the cowl metal edge between the two inner fender brace bolts, See Figure 4, and retain the hose with the two most outer air inlet retaining clips.

Next, push back towards the windshield, on the air inlet grille and tighten the end screws, do not exceed 18 inch pounds. Install the two air inlet grille end caps. Put the vehicle in an area where a water soaking test can be performed.

Next, place a shop rag over the top of the transmission dipstick, (Refer to Figure 5), and close the hood.

Next, spray water over the windshield and cowl area for three (3) minutes, then open the hood and check to see if the shop rag is wet, if not is not the job has been successfully completed. If the shop rag is wet, the area where it leaked will have to be located and then this procedure will have to be repeated.

SERVICE INFORMATION:

Reference Factory Technical Service Bulletin.....05-07-30-017B

A special thanks to Alvin Beverly of Harrell & Beverly Transmissions in Sanford, FL for the heads up on this problem.

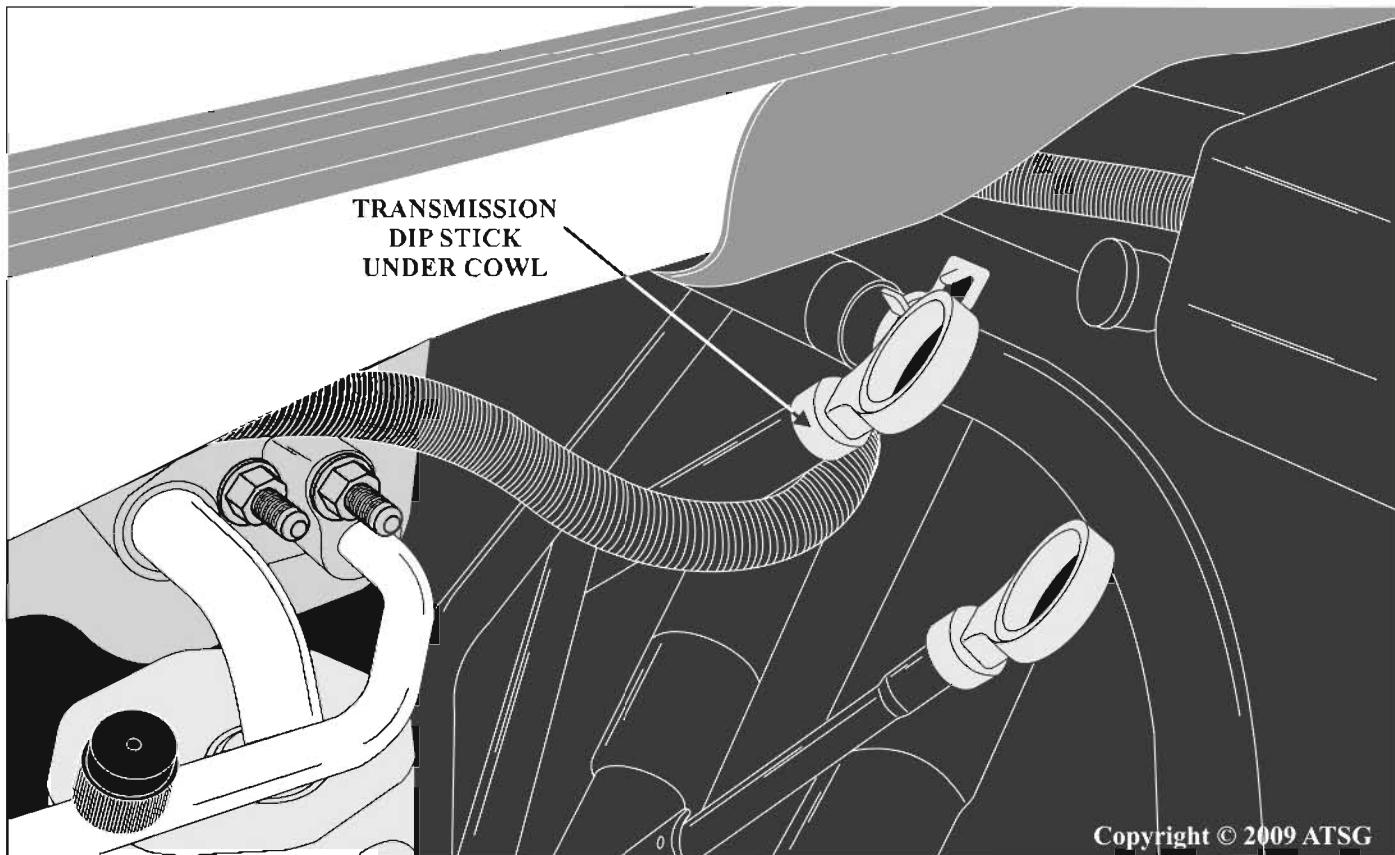
**4L60E/4L65E/4L70E
WATER CONTAMINATION**

Figure 1

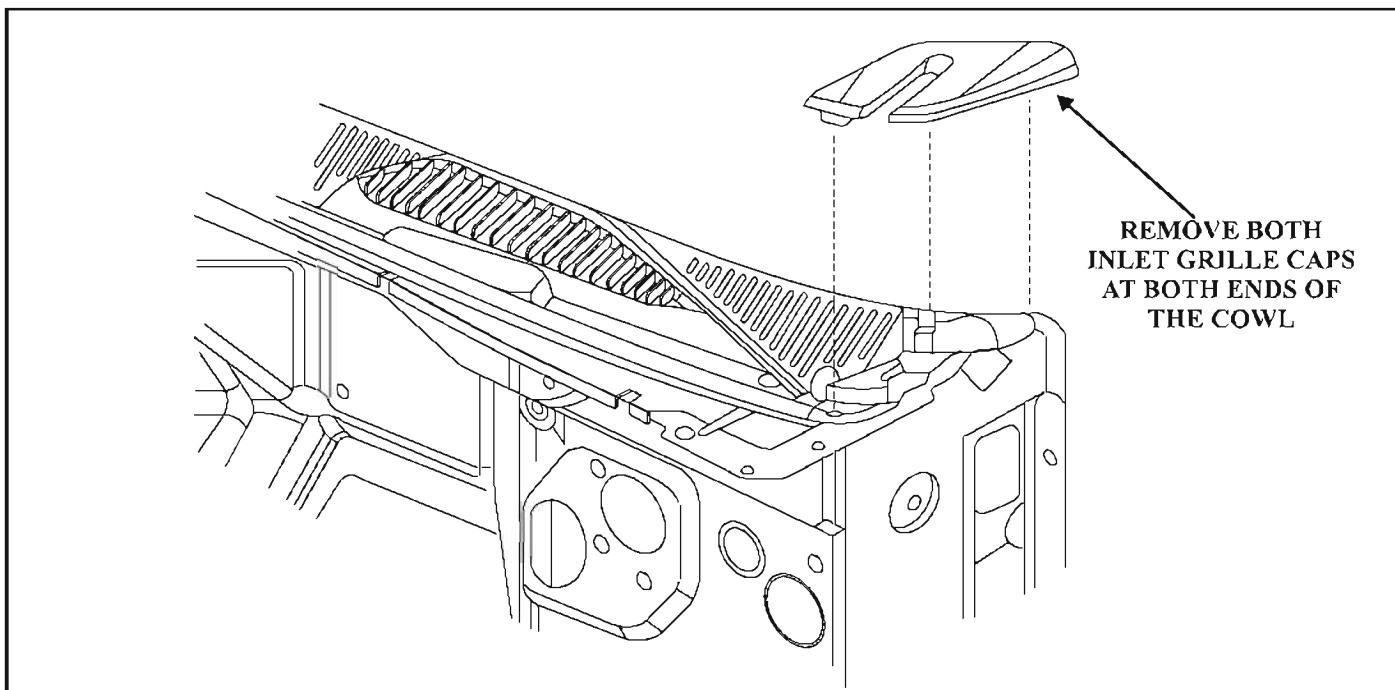
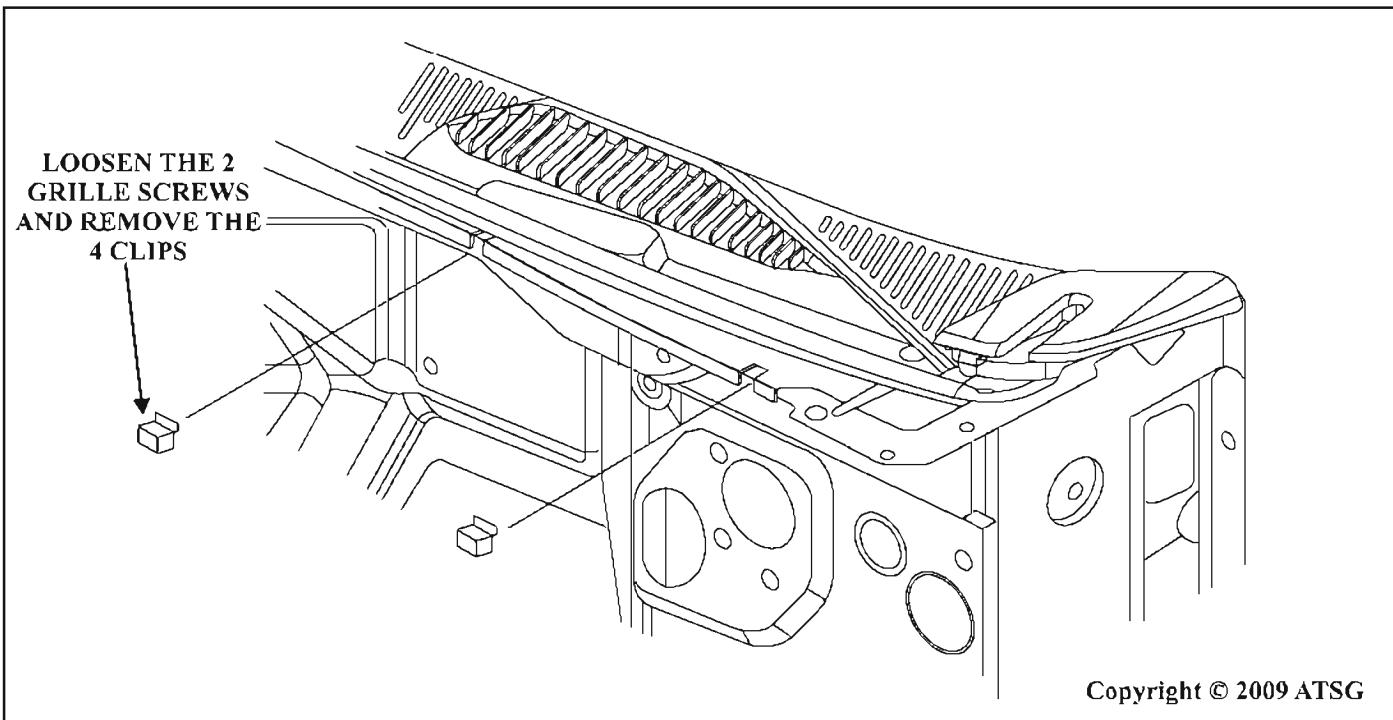


Figure 2

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4L60E/4L65E/4L70E WATER CONTAMINATION



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Figure 3

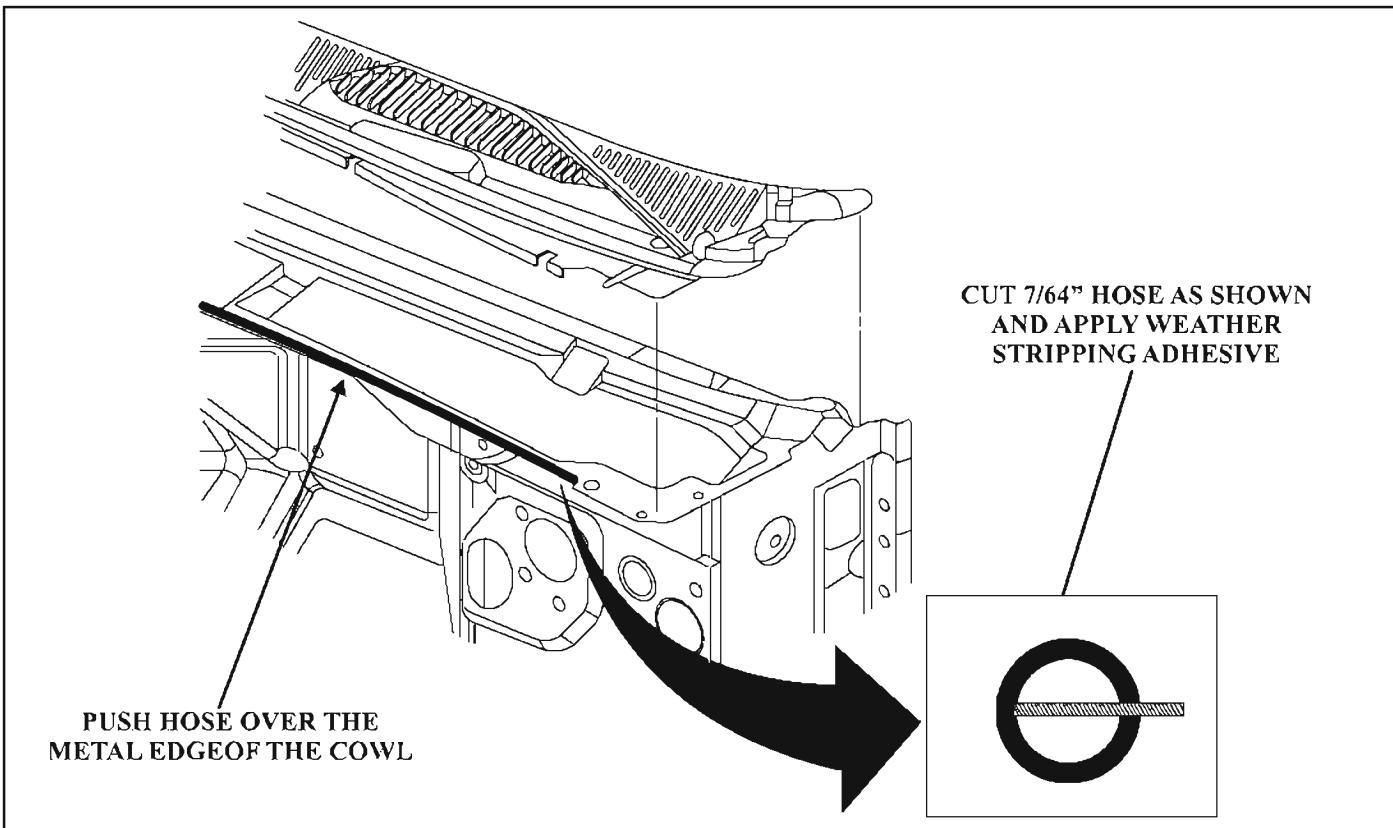


Figure 4
Automatic Transmission Service Group

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**4L60E/4L65E/4L70E
WATER CONTAMINATION**

After shop rag is in place, close the hood and soak the windshield and cowl area for 3 minutes. If the rag is dry, the operation has been successful, if it is not, the leak will have to be located and this procedure will have to be repeated.

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Figure 5



5L40E

ACCUMULATOR SPECIFICATIONS & ID

COMPLAINT: Shift feel complaints and possible clutch pack burn-up.

CAUSE: Accumulator component mis-assembly.

CORRECTION: There are four accumulator assemblies on the valve body of a 5L40E and there are also many combinations, it is also possible to have an accumulator assembly with the same casting number on the housing located in different positions on the valve body, (Refer to Figure 1). GM and BMW do not supply accumulator specifications because they do not sell any accumulator components separately.

The diameter of the accumulator piston can also vary as well as accumulator spring dimensions. The variations are different from one model year to another as well as make and model.

The illustration in Figure 2 provides measurements, accumulator housing casting numbers and model year date location which is crucial to correct accumulator placement and assembly. The spacer plate identification number is also in the equation, the location of which is seen in Figure 3.

The charts in Figures 4 to 22 indicate vehicle make, year of manufacture, accumulator piston and spring specifications and locations as well as the related housing casting numbers and spacer plate ID numbers.

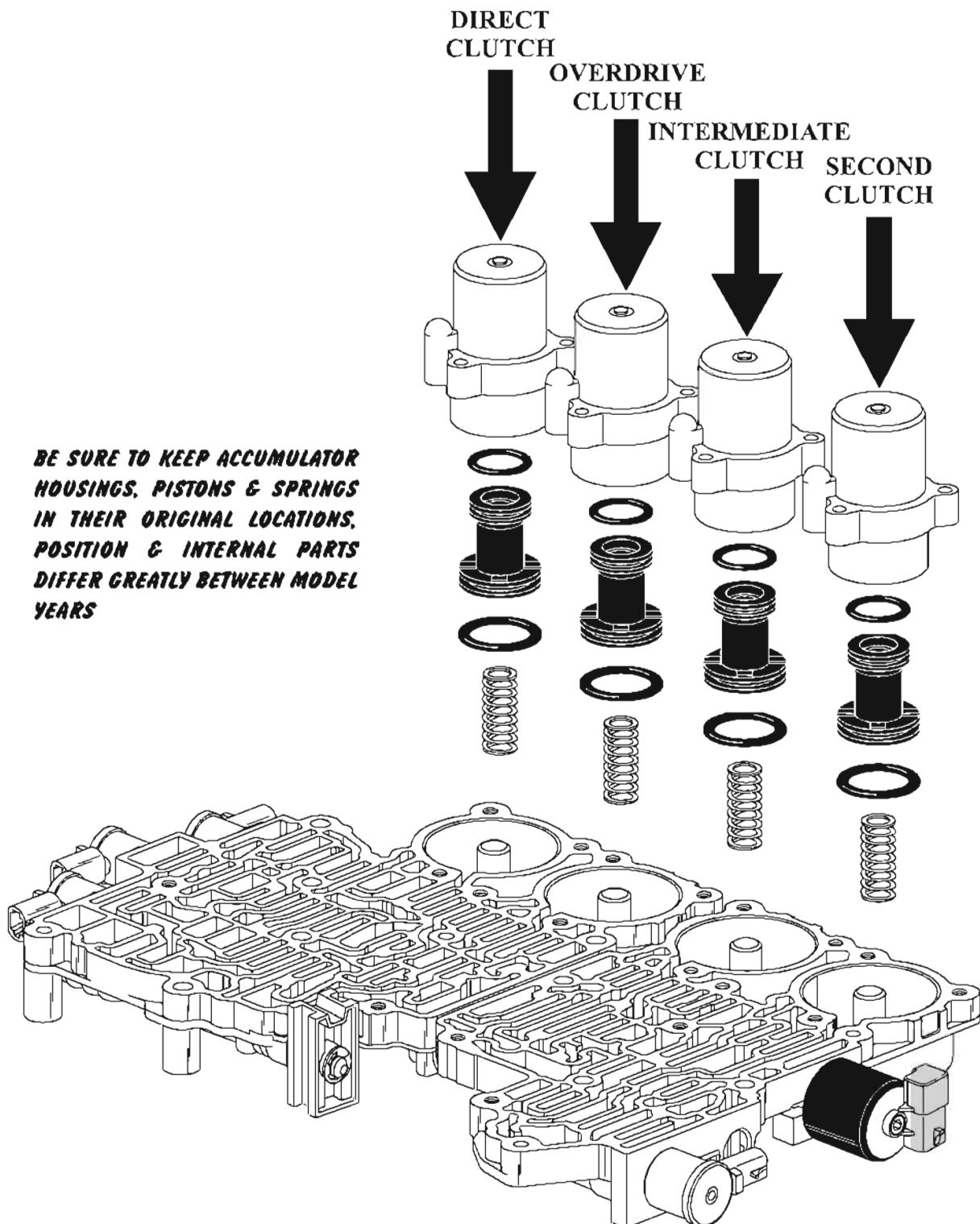
NOTE: There are accumulator assembly combinations that are not covered here, exercise caution when disassembling them as they may be different than what is listed here.

A special thanks to Jeff Parlee of Valve Body Express for his assistance in the compilation of this material.

Many thanks to Paul Tinges of Hardparts For Transmissions for his assistance in the compilation of this material.

5L40E

ACCUMULATOR SPECIFICATIONS & ID

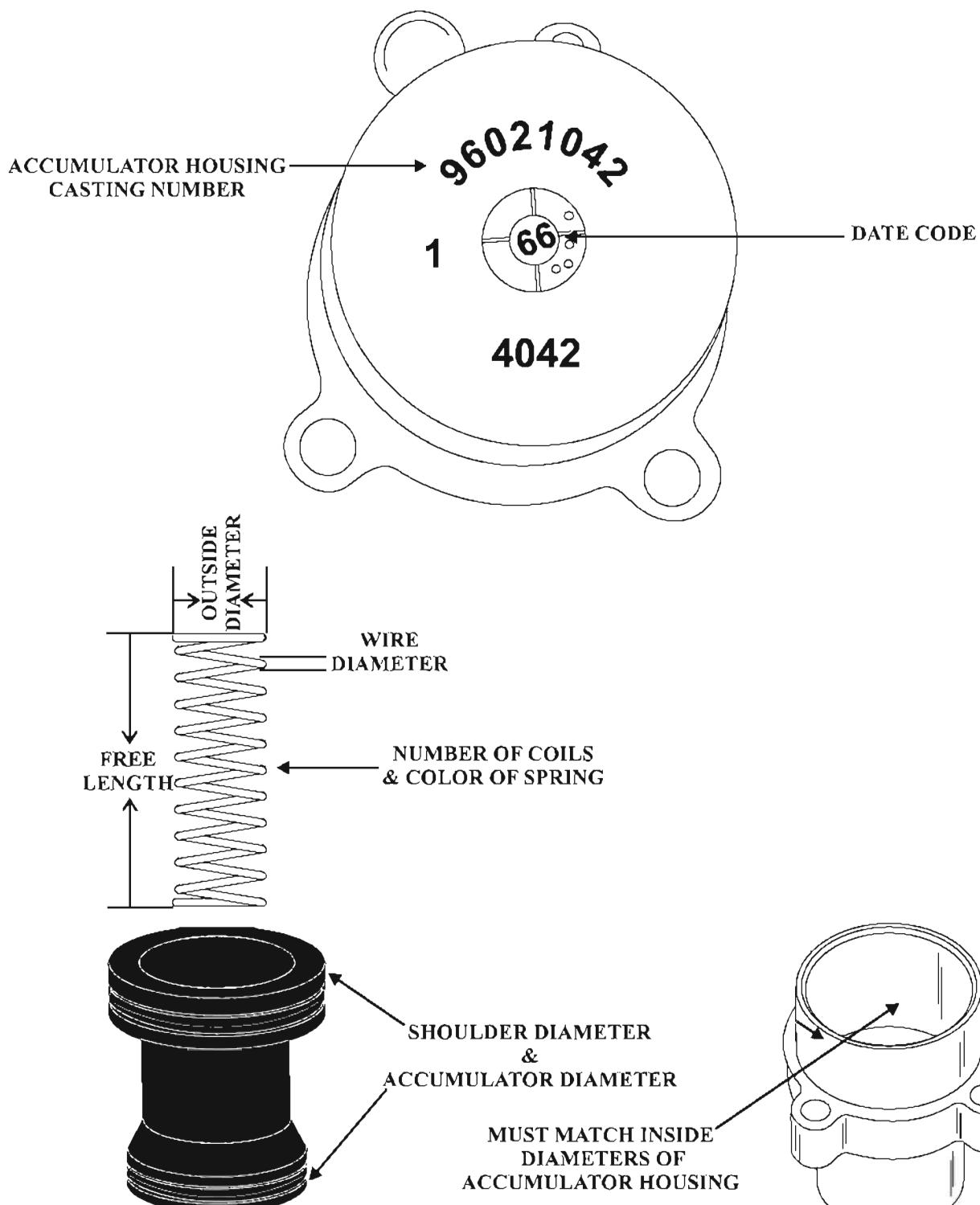


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Figure 1
Automatic Transmission Service Group

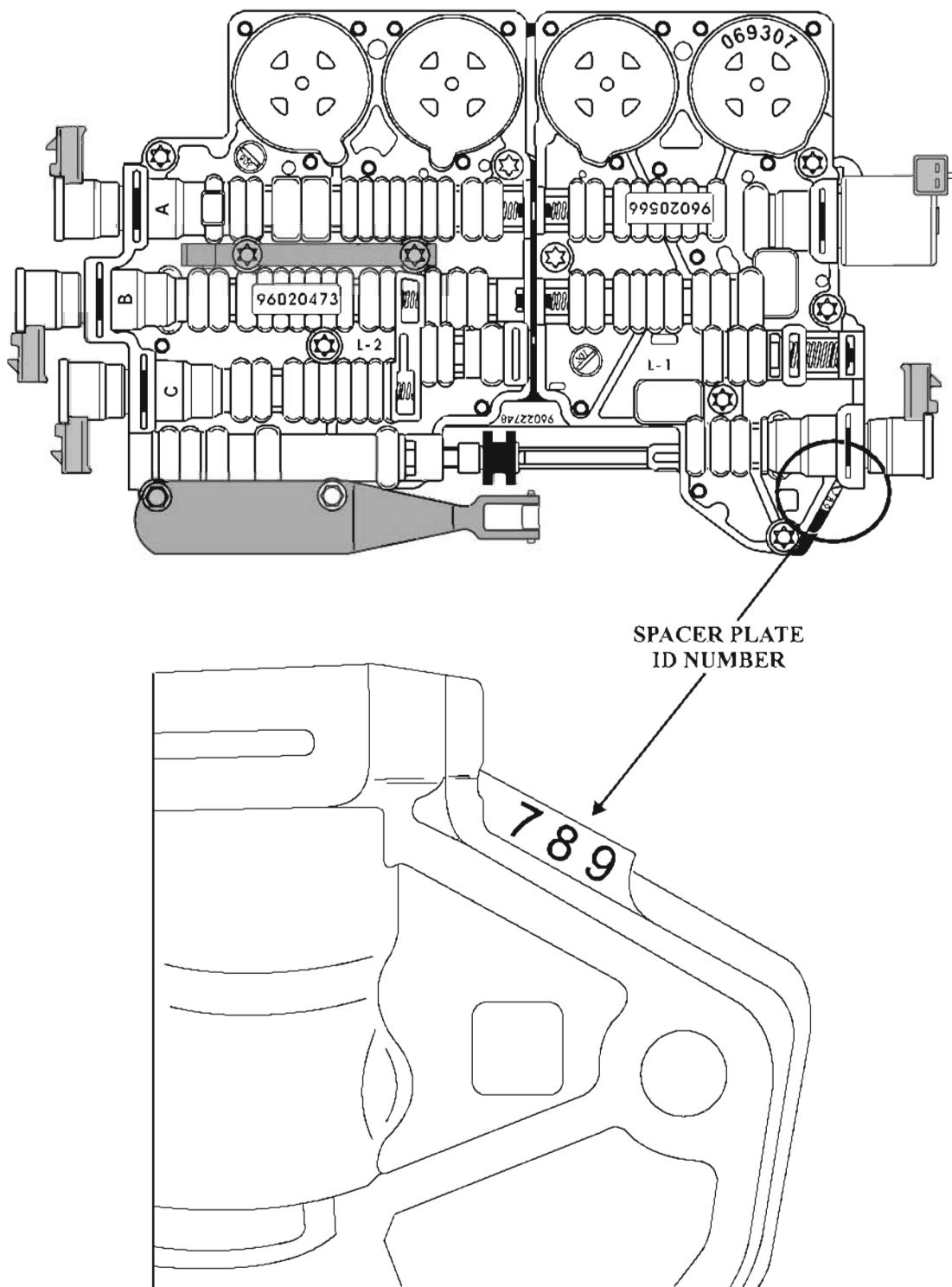
5L40E

ACCUMULATOR SPECIFICATIONS & ID



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Figure 2
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5L40E
ACCUMULATOR SPECIFICATIONS & ID

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Figure 3
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"2009" SEMINAR INFORMATION

45

SL40E

ACCUMULATOR SPECIFICATIONS & ID

SL40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2002 CADILLAC				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96020762	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.418" (36.02MM)	1.280" (32.51MM)	1.280" (32.51MM)
SPRING FREE LENGTH	2.250" (57.15MM)	2.335" (59.31MM)	2.335" (59.31MM)	2.380" (60.45MM)
SPRING OUTSIDE DIAMETER	0.734" (18.64MM)	0.734" (18.64MM)	0.734" (18.64MM)	0.734" (18.64MM)
SPRING WIRE DIAMETER	0.093" (2.362MM)	0.083" (2.108MM)	0.083" (2.108MM)	0.095" (2.413MM)
NUMBER OF COILS COLOR OF SPRING	11 GREEN	10 ORANGE	10 ORANGE	11 PLAIN
SPACER PLATE ID NUMBER	378			

Figure 4

SL40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2003 CADILLAC				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96020762	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.418" (36.02MM)	1.280" (32.51MM)	1.280" (32.51MM)
SPRING FREE LENGTH	2.236" (56.79MM)	2.335" (59.31MM)	2.335" (59.31MM)	2.370" (60.20MM)
SPRING OUTSIDE DIAMETER	0.734" (18.64MM)	0.734" (18.64MM)	0.734" (18.64MM)	0.734" (18.64MM)
SPRING WIRE DIAMETER	0.090" (2.286MM)	0.082" (2.083MM)	0.082" (2.083MM)	0.093" (2.362MM)
NUMBER OF COILS COLOR OF SPRING	10 GREEN	10 ORANGE	10 ORANGE	10.5 PLAIN
SPACER PLATE ID NUMBER	378			

Figure 5

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SL40E

ACCUMULATOR SPECIFICATIONS & ID

SL40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2003 CADILLAC				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96020762	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.418" (36.02MM)	1.280" (32.51MM)	1.280" (32.51MM)
SPRING FREE LENGTH	2.235" (59.31MM)	2.300" (58.42MM)	2.300" (58.42MM)	2.370" (60.20MM)
SPRING OUTSIDE DIAMETER	0.734" (18.64MM)	0.734" (18.64MM)	0.734" (18.64MM)	0.734" (18.64MM)
SPRING WIRE DIAMETER	0.095" (2.413MM)	0.083" (2.108MM)	0.083" (2.108MM)	0.095" (2.413MM)
NUMBER OF COILS COLOR OF SPRING	10 PLAIN	9.5 ORANGE	9.5 ORANGE	10.5 PLAIN
SPACER PLATE ID NUMBER	378			

Figure 6

SL40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2003 UNKNOWN VEHICLE				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020761
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.418" (36.02MM)	1.340" (34.04MM)	1.173" (29.79MM)
SPRING FREE LENGTH	2.235" (59.31MM)	2.350" (59.69MM)	2.335" (59.31MM)	2.565" (65.15MM)
SPRING OUTSIDE DIAMETER	0.732" (18.59MM)	0.730" (18.54MM)	0.733" (18.62MM)	0.732" (18.59MM)
SPRING WIRE DIAMETER	0.090" (2.286MM)	0.081" (2.083MM)	0.090" (2.286MM)	0.093" (2.362MM)
NUMBER OF COILS COLOR OF SPRING	10 PLAIN	10 ORANGE	10 BLUE	10 BLUE
SPACER PLATE ID NUMBER	378			

Figure 7

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5L40E

ACCUMULATOR SPECIFICATIONS & ID

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2003 CADILLAC				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96020762	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96020762	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96020761	SECOND CLUTCH ACCUMULATOR HOUSING # 96023532
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.281" (32.54MM)	1.281" (32.54MM)	1.173" (29.79MM)	1.281" (32.54MM)
SPRING FREE LENGTH	2.410" (61.21MM)	2.220" (56.39MM)	2.410" (61.21MM)	INNER-1.611" (40.92MM) OUTER-2.650" (67.31MM)
SPRING OUTSIDE DIAMETER	0.737" (18.72MM)	0.735" (18.67MM)	0.737" (18.72MM)	INNER-.473" (12.01MM) OUTER-.737" (18.72MM)
SPRING WIRE DIAMETER	0.093" (2.362MM)	0.089" (2.261MM)	0.093" (2.362MM)	INNER-.088" (2.235MM) OUTER-.088" (2.235MM)
NUMBER OF COILS COLOR OF SPRING	10.5 PLAIN	10 WHITE	10.5 PLAIN	INNER-6 PLAIN OUTER-9 WHITE
SPACER PLATE ID NUMBER	374			

Figure 8

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2004 CADILLAC				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020761
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.418" (36.02MM)	1.340" (34.04MM)	1.173" (29.79MM)
SPRING FREE LENGTH	2.228" (56.59MM)	2.320" (58.93MM)	2.221" (56.41MM)	2.560" (65.02MM)
SPRING OUTSIDE DIAMETER	0.730" (18.54MM)	0.728" (18.49MM)	0.730" (18.54MM)	0.730" (18.54MM)
SPRING WIRE DIAMETER	0.090" (2.286MM)	0.082" (2.083MM)	0.090" (2.286MM)	0.094" (2.388MM)
NUMBER OF COILS COLOR OF SPRING	10 PLAIN	10 ORANGE	10 WHITE	11 BLUE
SPACER PLATE ID NUMBER	378			

Figure 9

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ACCUMULATOR SPECIFICATIONS & ID

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2004 CADILLAC				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96020762	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.418" (36.02MM)	1.281" (32.54MM)	1.281" (32.54MM)
SPRING FREE LENGTH	2.220" (56.39MM)	2.318" (58.88MM)	2.310" (58.67MM)	2.385" (60.58MM)
SPRING OUTSIDE DIAMETER	0.730" (18.54MM)	0.726" (18.44MM)	0.727" (18.47MM)	0.733" (18.62MM)
SPRING WIRE DIAMETER	0.090" (2.286MM)	0.080" (2.032MM)	0.082" (2.083MM)	0.094" (2.388MM)
NUMBER OF COILS COLOR OF SPRING	10 GREEN/BLUE	10 ORANGE	10 ORANGE	11 PLAIN
SPACER PLATE ID NUMBER	378			

Figure 10

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
1998 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96021042	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020761
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.340" (34.04MM)	1.340" (34.04MM)	1.173" (29.79MM)
SPRING FREE LENGTH	2.250" (57.15MM)	2.250" (57.15MM)	2.250" (57.15MM)	2.184" (55.47MM)
SPRING OUTSIDE DIAMETER	0.730" (18.54MM)	0.730" (18.54MM)	0.730" (18.54MM)	0.727" (18.47MM)
SPRING WIRE DIAMETER	0.088" (2.235MM)	0.088" (2.235MM)	0.088" (2.235MM)	0.076" (1.930MM)
NUMBER OF COILS COLOR OF SPRING	10 LT. BLUE	10 LT. BLUE	10 LT. BLUE	10 YELLOW
SPACER PLATE ID NUMBER	066			

Figure 11

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ACCUMULATOR SPECIFICATIONS & ID

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
1998 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96021042	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.340" (34.04MM)	1.340" (34.04MM)	1.280" (32.51MM)
SPRING FREE LENGTH	2.250" (57.15MM)	2.250" (57.15MM)	2.250" (57.15MM)	2.250" (57.15MM)
SPRING OUTSIDE DIAMETER	0.735" (18.67MM)	0.735" (18.67MM)	0.735" (18.67MM)	0.735" (18.67MM)
SPRING WIRE DIAMETER	0.090" (2.286MM)	0.090" (2.286MM)	0.090" (2.286MM)	0.090" (2.286MM)
NUMBER OF COILS COLOR OF SPRING	10 LT. GREEN	10 LT. GREEN	10 LT. GREEN	10 LT. GREEN
SPACER PLATE ID NUMBER	008			

Figure 12

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
1998 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96021042	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.340" (34.04MM)	1.340" (34.04MM)	1.280" (32.51MM)
SPRING FREE LENGTH	2.260" (57.40MM)	2.260" (57.40MM)	2.260" (57.40MM)	2.245" (57.02MM)
SPRING OUTSIDE DIAMETER	0.730" (18.54MM)	0.730" (18.54MM)	0.730" (18.54MM)	0.733" (18.62MM)
SPRING WIRE DIAMETER	0.085" (2.159MM)	0.085" (2.159MM)	0.085" (2.159MM)	0.085" (2.159MM)
NUMBER OF COILS COLOR OF SPRING	10 PLAIN	10 PLAIN	10 PLAIN	10 PLAIN
SPACER PLATE ID NUMBER	008			

Figure 13

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ACCUMULATOR SPECIFICATIONS & ID

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
1999 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.418" (36.02MM)	1.340" (34.04MM)	1.280" (32.51MM)
SPRING FREE LENGTH	2.240" (56.90MM)	2.230" (56.64MM)	2.240" (56.90MM)	2.390" (60.71MM)
SPRING OUTSIDE DIAMETER	0.735" (18.67MM)	0.729" (18.52MM)	0.735" (18.67MM)	0.735" (18.67MM)
SPRING WIRE DIAMETER	0.090" (2.286MM)	0.080" (2.032MM)	0.090" (2.286MM)	0.093" (2.362MM)
NUMBER OF COILS COLOR OF SPRING	10 WHITE	10 YELLOW	10 WHITE	11 PLAIN
SPACER PLATE ID NUMBER	789			

Figure 14

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
1999 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96022005	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96021042	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96020762	SECOND CLUTCH ACCUMULATOR HOUSING # 96021042
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.418" (36.02MM)	1.340" (34.04MM)	1.340" (34.04MM)	1.280" (32.51MM)
SPRING FREE LENGTH	2.220" (56.39MM)	2.250" (57.15MM)	2.250" (57.15MM)	2.390" (60.71MM)
SPRING OUTSIDE DIAMETER	0.735" (18.67MM)	0.733" (18.62MM)	0.735" (18.67MM)	0.735" (18.67MM)
SPRING WIRE DIAMETER	0.080" (2.032MM)	0.090" (2.286MM)	0.090" (2.286MM)	0.093" (2.362MM)
NUMBER OF COILS COLOR OF SPRING	10 YELLOW	10 LT. GREEN	10 LT. GREEN	11 PLAIN
SPACER PLATE ID NUMBER	789			

Figure 15

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ACCUMULATOR SPECIFICATIONS & ID

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
1999 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96022005	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96021042	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96020762	SECOND CLUTCH ACCUMULATOR HOUSING # 96021042
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.418" (36.02MM)	1.340" (34.04MM)	1.280" (32.51MM)	1.340" (34.04MM)
SPRING FREE LENGTH	2.215" (56.26MM)	2.235" (56.77MM)	2.245" (57.02MM)	2.395" (60.83MM)
SPRING OUTSIDE DIAMETER	0.730" (18.54MM)	0.734" (18.64MM)	0.734" (18.64MM)	0.734" (18.64MM)
SPRING WIRE DIAMETER	0.078" (1.981MM)	0.090" (2.286MM)	0.090" (2.286MM)	0.090" (2.286MM)
NUMBER OF COILS COLOR OF SPRING	10 YELLOW	10 LT. BLUE	10 LT. BLUE	11 PLAIN
SPACER PLATE ID NUMBER	789			

Figure 16

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2000 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96022005	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.418" (36.02MM)	1.418" (36.02MM)	1.340" (34.04MM)	1.280" (32.51MM)
SPRING FREE LENGTH	2.330" (59.18MM)	2.330" (59.18MM)	2.245" (57.02MM)	2.410" (61.21MM)
SPRING OUTSIDE DIAMETER	0.735" (18.67MM)	0.735" (18.67MM)	0.735" (18.67MM)	0.735" (18.67MM)
SPRING WIRE DIAMETER	0.080" (2.032MM)	0.080" (2.032MM)	0.088" (2.235MM)	0.091" (2.311MM)
NUMBER OF COILS COLOR OF SPRING	10 ORANGE	10 ORANGE	10 LT. BLUE	10.5 PLAIN
SPACER PLATE ID NUMBER	801			

Figure 17

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ACCUMULATOR SPECIFICATIONS & ID

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2002 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96022005	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96020762	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.418" (36.02MM)	1.418" (36.02MM)	1.280" (32.51MM)	1.280" (32.51MM)
SPRING FREE LENGTH	2.330" (59.18MM)	2.330" (59.18MM)	2.370" (60.20MM)	2.370" (60.20MM)
SPRING OUTSIDE DIAMETER	0.732" (18.59MM)	0.732" (18.59MM)	0.730" (18.54MM)	0.730" (18.54MM)
SPRING WIRE DIAMETER	0.080" (2.032MM)	0.080" (2.032MM)	0.090" (2.286MM)	0.090" (2.286MM)
NUMBER OF COILS COLOR OF SPRING	10 ORANGE	10 ORANGE	11 PLAIN	11 PLAIN
SPACER PLATE ID NUMBER	275			

Figure 18

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2003 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020761
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.418" (36.02MM)	1.340" (34.04MM)	1.173" (29.79MM)
SPRING FREE LENGTH	2.221" (56.41MM)	2.340" (59.44MM)	2.230" (56.64MM)	2.580" (65.32MM)
SPRING OUTSIDE DIAMETER	0.735" (18.67MM)	0.725" (18.42MM)	0.735" (18.67MM)	0.730" (18.54MM)
SPRING WIRE DIAMETER	0.090" (2.286MM)	0.082" (2.083MM)	0.090" (2.286MM)	0.093" (2.362MM)
NUMBER OF COILS COLOR OF SPRING	10 PLAIN	10 ORANGE	10 PLAIN	10 LT BLUE
SPACER PLATE ID NUMBER	378			

Figure 19

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ACCUMULATOR SPECIFICATIONS & ID

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2004 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020761
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.418" (36.02MM)	1.340" (34.04MM)	1.173" (29.79MM)
SPRING FREE LENGTH	2.225" (56.52MM)	2.340" (59.44MM)	2.225" (56.52MM)	2.565" (65.15MM)
SPRING OUTSIDE DIAMETER	0.730" (18.54MM)	0.725" (18.42MM)	0.730" (18.54MM)	0.730" (18.54MM)
SPRING WIRE DIAMETER	0.090" (2.286MM)	0.082" (2.083MM)	0.090" (2.286MM)	0.093" (2.362MM)
NUMBER OF COILS COLOR OF SPRING	10 LT. BLUE	10 ORANGE	10 LT. BLUE	10.5 LT. BLUE
SPACER PLATE ID NUMBER	378			

Figure 20

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2004 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96022005	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96021042	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.418" (36.02MM)	1.340" (34.04MM)	1.340" (34.04MM)	1.280" (32.51MM)
SPRING FREE LENGTH	2.221" (56.41MM)	2.240" (56.90MM)	2.235" (56.77MM)	2.390" (60.71MM)
SPRING OUTSIDE DIAMETER	0.730" (18.54MM)	0.730" (18.54MM)	0.730" (18.54MM)	0.735" (18.67MM)
SPRING WIRE DIAMETER	0.077" (1.956MM)	0.086" (2.184MM)	0.088" (2.235MM)	0.090" (2.286MM)
NUMBER OF COILS COLOR OF SPRING	10 YELLOW	10 BLUE	10 GREEN	10.5 PLAIN
SPACER PLATE ID NUMBER	789			

Figure 21

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ACCUMULATOR SPECIFICATIONS & ID

5L40E ACCUMULATOR ASSEMBLY IDENTIFICATION CHART				
2005 BMW				
COMPONENT SPECIFICATIONS	DIRECT CLUTCH ACCUMULATOR HOUSING # 96021042	OVERDRIVE CLUTCH ACCUMULATOR HOUSING # 96022005	INTERMEDIATE CLUTCH ACCUMULATOR HOUSING # 96021042	SECOND CLUTCH ACCUMULATOR HOUSING # 96020762
PISTON SHOULDER DIAMETER	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)	1.654" (42.01MM)
PISTON ACCUM. DIAMETER	1.340" (34.04MM)	1.418" (36.02MM)	1.340" (34.04MM)	1.173" (29.79MM)
SPRING FREE LENGTH	2.235" (56.77MM)	2.350" (59.69MM)	2.235" (56.77MM)	2.580" (65.53MM)
SPRING OUTSIDE DIAMETER	0.725" (18.42MM)	0.725" (18.42MM)	0.725" (18.42MM)	0.730" (18.54MM)
SPRING WIRE DIAMETER	0.090" (2.286MM)	0.082" (2.083MM)	0.090" (2.286MM)	0.093" (2.362MM)
NUMBER OF COILS COLOR OF SPRING	10 LT. GREEN	10 ORANGE	10 LT. GREEN	10.5 LT. BLUE
SPACER PLATE ID NUMBER	378			

Figure 22

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GM 6L80 SLIPS IN FORWARD DTC P2728

COMPLAINT: Vehicles equipped with the 6L80 transmission may exhibit a complaint of a slip on take-off in the forward ranges, typically in 1st gear. This complaint may also be accompanied by diagnostic trouble codes, P2723 Clutch Pressure Control Solenoid 5 (1-2 3-4) "Stuck Off," or P2728 Clutch Pressure Control Solenoid 5 (1-2 3-4) "Performance."

CAUSE: The cause may be a shrunken or missing number 1 nylon check ball. Refer to figure 1 for the location of the check ball in the upper valve body assembly. The number one check ball is located in the upper valve body, as shown in Figure 1. When the transmission is operating in drive 1st, 2nd, 3rd, 4th, 5th or 6th gear, drive 1-6 fluid seats the check ball against the drive braking passage and enters the 2-6 clutch/1-2-3-4 clutch feed circuit to apply the 1-2-3-4 clutch. When the check ball shrinks or disintegrates, 1-2-3-4 Clutch pressure will pass thru the ball seat to an exhaust provided by Clutch Select Valve 2. See figure 1 for partial schematic. **Note:** The DTC's listed above are performance codes related to the solenoid that controls the 1-2-3-4 Clutch application, a missing check ball can cause these codes to set, do not assume the TCM/Solenoid assembly is faulty, it could be a simple check ball!

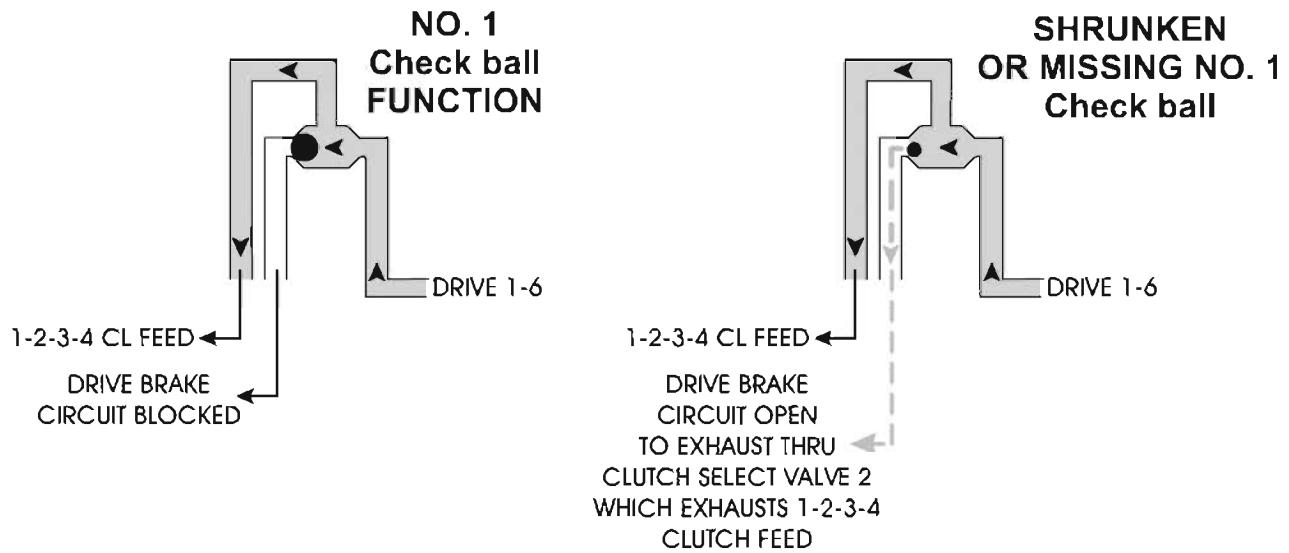
CORRECTION: Replace the nylon check balls with 1/4" torlon check balls available in most aftermarket Torqueflight kits, including 42-48RE. These check balls are made out of more durable material.

SERVICE INFORMATION:

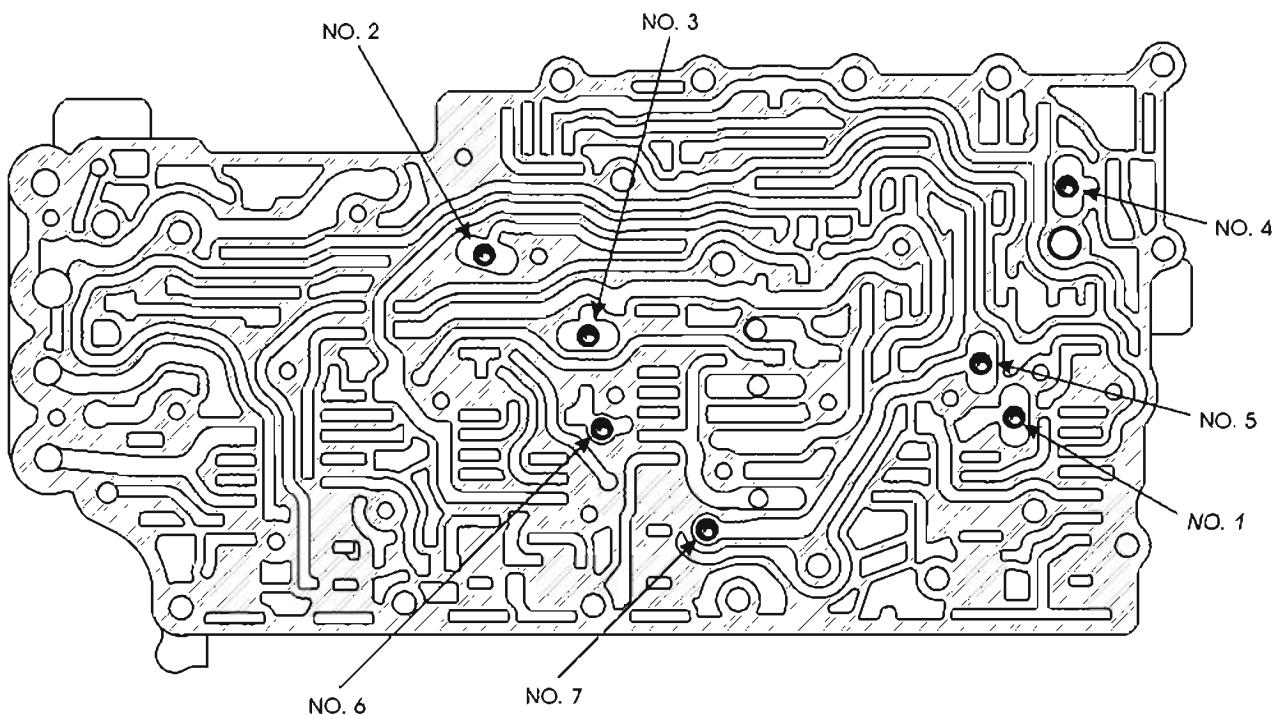
TORLON 1/4" CHECK BALL (Chrysler part number).....52118261

*Special thanks to
Vito at Globe Trans.*

**6L80 NUMBER 1 CHECK BALL LOCATION
AND FUNCTION IN 1ST GEAR**



UPPER VALVE BODY ASSEMBLY



4T60E/4T65E TORQUE CONVERTER CLUTCH STUCK OFF

COMPLAINT: After overhaul of a 4T65E, the MIL lamp comes on during the road test. A scan of the PCM reveals code P0741 for "TCC Stuck Off" is stored. Upon switching to the scan tool data list, the TCC Duty Cycle is at maximum but TCC Slip is high and there is no rpm drop when TCC is commanded on.

The problem remained after the installation of multiple converters and valve bodies, new solenoids, all the possible Sonnax® valve repair kits as well as the replacement of the delivery sleeve in the center of the channel plate and the turbine shaft sealing rings. Cooler flow was checked and all shift adapt were reset.

CAUSE: A stator support shaft from a 4T60E was installed into the 4T65E.

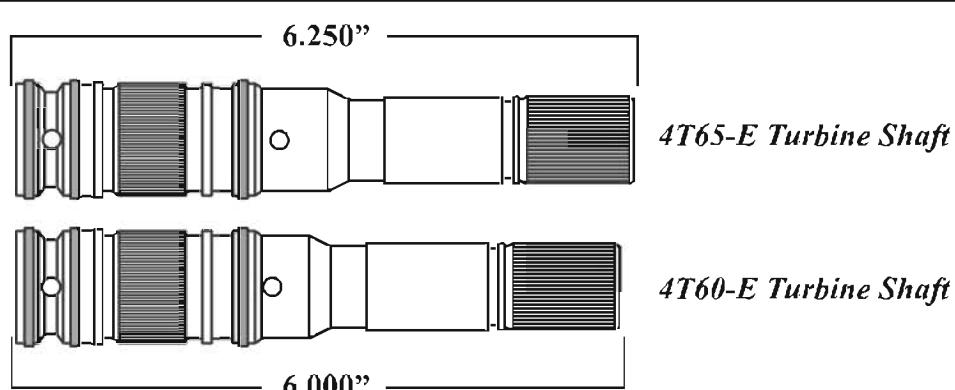
CORRECTION: When the stator support or turbine shaft requires replacement in either the 4T60E or the 4T65E, care must be taken as these parts do not interchange.

The two shafts in a 4T65E are dimensionally taller than the same two shafts in the 4T60E, (Refer to figures 1 and 2). When the turbine shafts are placed side by side it would appear there would be contact between the turbine and stator shafts due to the difference in the ramp of the shafts which would produce metal contamination and noise. There is no contact between the stator and turbine shaft, however, it is the location of the TCC feed orifice along with the difference in the ramped area that caused the P0741 code and the lack of TCC application, (Refer to figure 3).

The longer shaft would restrict oil flow to the TCC apply circuit at the inner ramped area of the stator shaft resulting in no converter clutch apply, (Refer to figure 4).

A special thanks to Brian at Ledgewood Transmissions in Ledgewood, N.J. for the feedback which made this bulletin possible.

A very special thank you to Jeff Hunt, at Whatever It Takes for supplying the parts for this material.

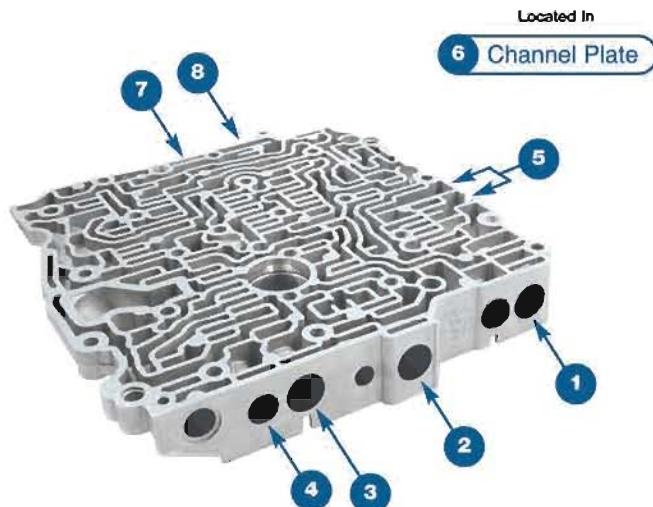


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Figure 1

Sonnax Breaks the Codes for Your 4T65-E Valve Body

Problems with codes P0741 or P1811?
We have the answers.



PROBLEM

- Harsh reverse engagement
- Soft upshifts, especially 1-2
- Low line rise, fwd or reverse

- P1811 Code
- Poor or intermittent line rise
- Slip/shudder condition

- Code 741
- No lockup
- Falling out of lockup hot

- TCC slip
- Code 741
- Ratio codes

- Delayed engagements
- Flared 1-2 shift
- Low reverse pressure

- Code 1811
- Maximum adapt or long shift
- TCC slippage

- Erratic or temperature-sensitive shifts
- 2nd gear start
- 2-3 shuttle shift
- No 3rd or 4th gear
- Anodized valves unavailable

SOLUTION

1	Boost Valve & Sleeve Assembly	84754-30K
2	Oversized Torque Signal Valve	84754-44 <small>84754-TL4 Tool Kit Required</small>
3	TCC Apply Valve Kit	84754-43K
4	TCC Regulated Apply Valve Kit	84754-34K <small>84754-TL3 Tool Kit Required</small>
5	Oversized 1-2 (Fwd) or Reverse Servo Boost Valve Kit	84754-40K <small>84754-TL2 & -TL4 Tool Kits Required</small>
6	AFL Valve & Sleeve Kit	84596-02K <small>F-84596-TL Tool Kit & VB-FIX Fixture Required</small>
7	Shift Valves	84754-36K <small>2-3 Shift</small>
8	Shift Valves	84754-37K <small>3-2 Downshift</small>
7	Shift Valves	84754-38K <small>3-4 Shift</small>
8	Shift Valves	84754-39K <small>4-3 Downshift</small>



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4T60E/4T65E TORQUE CONVERTER CLUTCH STUCK OFF

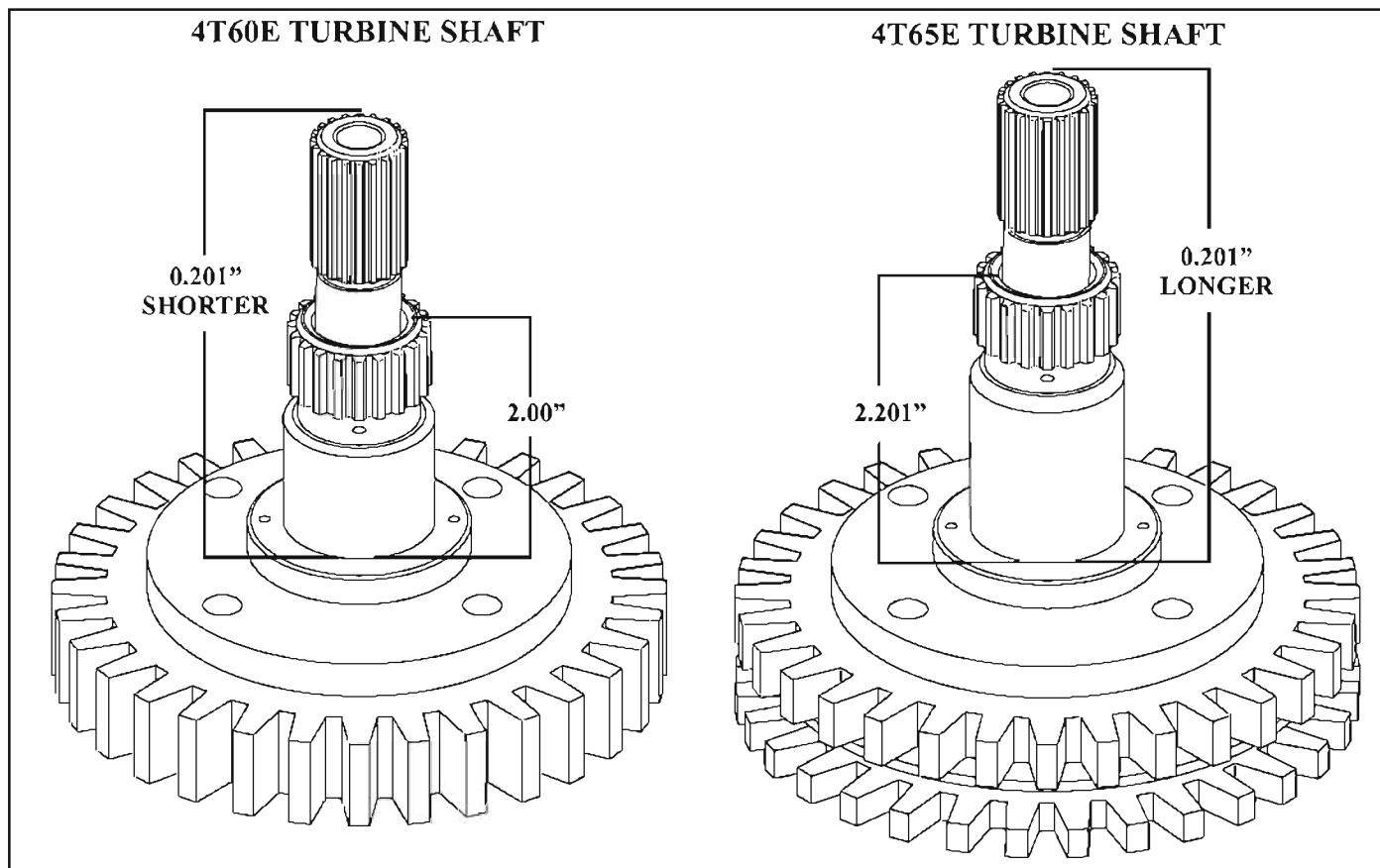


Figure 2

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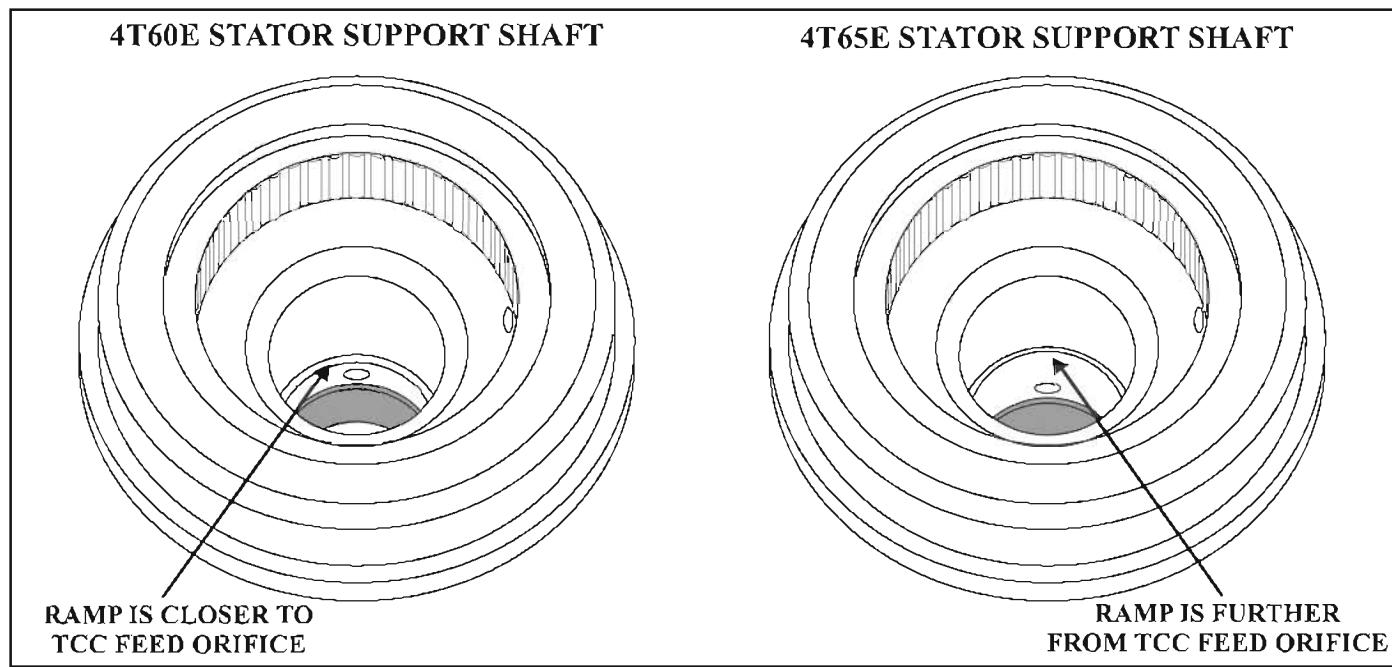


Figure 3

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SUPERIOR'S New Bench Buddy & Accumulator Buddy May be the Best Friends Transmission Builders Ever Had

Save time and money with the latest patent pending Simple Solutions from Superior Transmission Parts. Impregnated with a special super fine abrasive, Bench Buddy and Accumulator Buddy brushes easily remove small burrs and polish the inside of a valve bore with virtually no enlargement of the bore diameter itself.

- Improves the surface finish of a bore by up to 50%
- Restore smooth valve operation in seconds
- Services bores from a 1/4" to 2"

With these brushes you can use valve bodies and accumulator bores that in the past may have been questionable. No workbench should be without a Bench Buddy or Accumulator Buddy.

Remove Small Burrs and Polish Bores – FAST!

INSTRUCTIONS:

- Step 1.** Select the proper size brush for the bore being polished.
- Step 2.** Insert stem of brush into a cordless, electric, or air powered drill.
- Step 3.** Insert brush into bore being polished.

- Step 4.** Begin spinning brush (**DO NOT EXCEED 3000RPM**) working it in and out until bore is polished. We recommend polishing bore from 10 to 30 seconds.
- Step 5.** When finished polishing, blow out the bore with air hose and clean with solvent to remove any small debris.

For your safety, Superior recommends wearing eye protection at all times while using the Bench Buddy and the Accumulator Buddy.TM

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Here's What Builders Are Saying About Superior's New Bench Buddy & Accumulator Buddy

SUPERIOR BENCH BUDDY

BRUSH SIZE

BRUSH SIZE	BORE SIZE
1"	1" to 3/4" (1.0 to .750)
5/8"	5/8" to 1/2" (.625 to .500)
1/2"	1/2" to 3/8" (.500 to .375)
3/8"	3/8" to 1/4" (.375 to .250)

PART # BB100



SUPERIOR ACCUMULATOR BUDDY



SUPERIOR ACCUMULATOR BUDDY™

BRUSH SIZE

1 3/8"	1 3/8" to 1" (1.375 to 1.0)
1 5/8"	1 5/8" to 1 3/8" (1.625 to 1.375)
2"	2" to 1 5/8" (2.0 to 1.625)

PART # AB100

SUPERIOR
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"Where has the Bench Buddy been all my life? I can't believe that it wasn't invented sooner."

Lee Thompson
Autopro Service and Repair

"I'm done with wrapping sandpaper on a stick forever!"

Alan Meacham
Florida Transmission

"The Bench Buddy is the easiest, faster way to remove burrs and polish valve bores that I have ever seen. It works great."

Marty Rudolph
AAA-1 Transmission

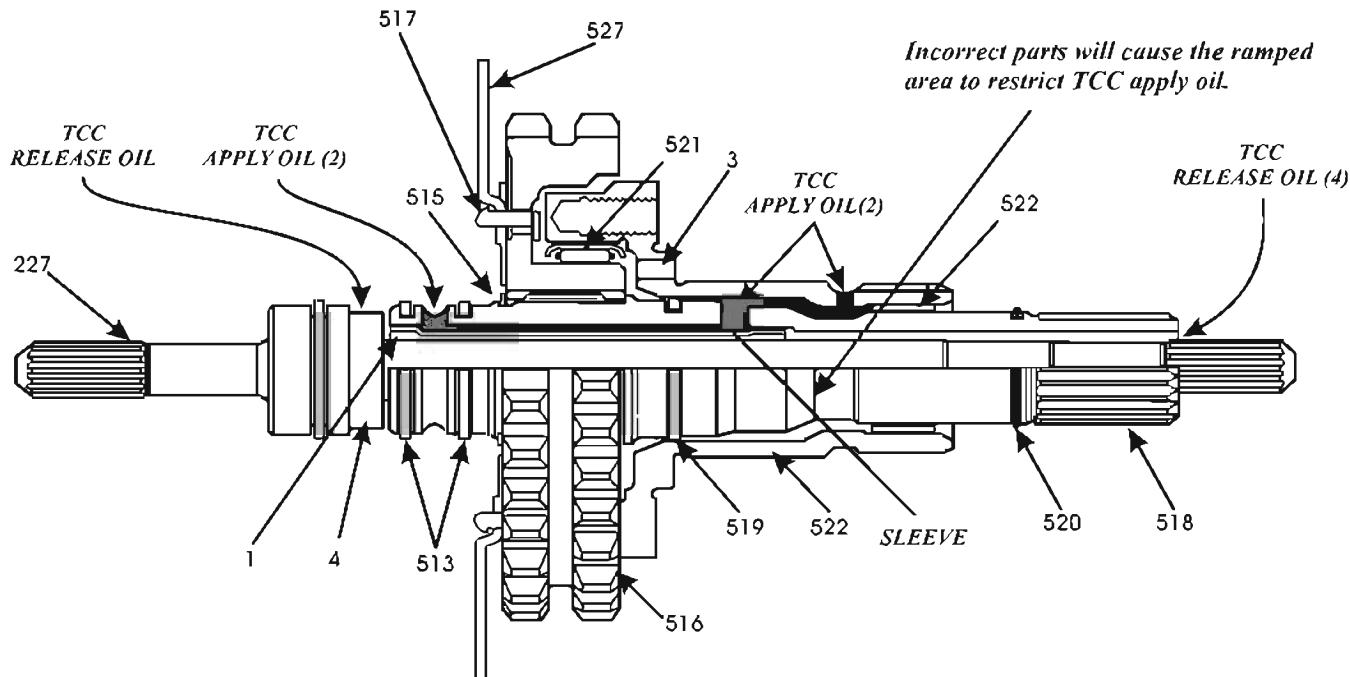
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Jerry Kilgore
RPM Transmission

on the Web @ www.superiortransmission.com

4T60E/4T65E TORQUE CONVERTER CLUTCH STUCK OFF

OIL PUMP DRIVE SHAFT & TURBINE SHAFT TCC PASSAGES



Legend:

- | | |
|--------------------------------------|---|
| (1) Steel Sleeve | (517) Drive Sprocket Thrust Washer |
| (2) TCC Apply Passage | (518) Turbine Shaft |
| (3) Converter Seal Drainback Passage | (519) Turbine Shaft Oil Seal Ring |
| (4) TCC Release Passage | (520) Turbine Shaft O-Ring Seal |
| (227) Oil Pump Drive Shaft | (521) Drive Sprocket Bearing |
| (513) Turbine Shaft Oil Seal Ring | (522) Drive Sprocket Support |
| (515) Drive Sprocket Retaining Ring | (523) Drive Sprocket Support Bushing |
| (516) Drive Sprocket | (527) Turbine Speed Sensor Reluctor Wheel |

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Figure 4



AL - Birmingham
Florence
CO - Denver
FL - Orlando
Tampa
GA - Atlanta
Lake City

KY - Louisville
MS - Jackson
MN - Minneapolis
MO - St. Louis
NC - Charlotte
IN - Evansville
Indianapolis

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TN - Knoxville
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TX - Dallas
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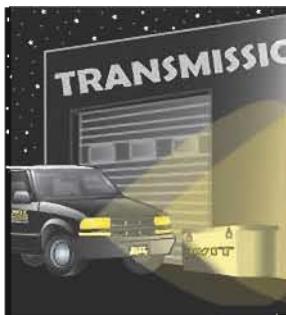
Company Profile

Whatever It Takes (WIT) was founded in 1999 by Kenny Hester, a 30-year veteran in the Transmission parts supply business. WIT is the complete source for all its customer's transmission parts needs, whether it is new, used, or remanufactured. Parts are currently distributed by 21 branch locations throughout the U.S. With the main remanufacturing and distribution located within 10 minutes of U.P.S.' major Air Hub, Whatever It Takes is able to quickly ship parts worldwide. The majority of the sales staff have been in the business for over 18 years. WIT is an employee owned, customer driven company, there are no stockholders or investors to report to. As owners, the WIT employees' only job is to provide the customer with the things they need to be the most successful shop possible.



Customer Service

Customer Service is the cornerstone that W.I.T. was founded on, and has helped it become a major competitor in the transmission parts business. Whatever It Takes prides itself on its excellent customer service and having the parts you need by maintaining a minimum fill rate of 98.8%. W.I.T. prides itself on taking care of its customers. Service, Experience, Quality, Product Availability, Timely Credits, a dedicated Customer Service line are just a few of the reasons why Whatever It Takes has become a major competitor in the transmission parts business. WIT is able to ship its parts overnight to most of the North and South Eastern U.S. With its strategically placed stores, it is possible for WIT to service about 80 % of the country within 2 days. In addition to using UPS & Fed-Ex to ship its packages Whatever It Takes also offers free Night-Box delivery to many areas. By making this commitment, WIT helps to increase its customer's profit margin. With Night-Box delivery, Builders no longer have to wait around for UPS or FedEx to arrive; their package is delivered overnight so the parts are waiting on them the next morning.



Products

Whatever It Takes carries top-quality products from manufacturers such as Raybestos, Toledo Trans-Kits, Allomatic, ATEC-Transtool, ATSG, Autocraft Manufacturing, Borg Warner, CVC Torque Converters, DT Components, Hayden Coolers, Life Automotive, Lubegard, Powertrain Systems, Precision International, Rostra, Sachs Clutch Kits, Sonnax, SPX Filtran, Stellar Group, Superior, Teckpak-Fitzall, Transgo, Tri- Components, TTXE, Valeo Clutch Kits, Zoom Technology, OE manufacturers and many others. In addition to new O.E. parts, W.I.T. also carries a full line of remanufactured and used parts for both Automatic & Standard transmission. W.I.T. manufactures Standard transmissions & transfer cases that include a 12 month/unlimited mile warranty against parts and workmanship.*



Research & Development

The Research & Development team stays current with the latest transmissions & take photos of every part in these transmissions in order to provide most complete transmission catalog in the industry. They gather information on common wear issues with each new transmission, and develop text descriptions for all the Catalogs and WIT's website (www.wittrans.com). The R & D team was responsible for creating W.I.T.'s Catalog CD with point and click technology, The Award winning & most up-to-date Vehicle to Automatic Transmission Guide in the Industry, & now the only Vehicle to Manual Transmission Guide in the industry!



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David Bailey, VP of Branch Operations....800-940-0197 ext.1501
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Automotive Technical Newsletters

Volume 24, No. 10

48RE • 450-43LE • 5R110W • AX4S/AX4N/4F50N

At the beginning of the 2005 model year, an electronically controlled actuator replaced the throttle-valve cable on Dodge trucks with the 5.9-liter diesel and 48RE transmission.

After overheat, an Alain Seiki 450-43LE exhibits deteriorating shift quality and slips badly in reverse after the truck is driven a mile or two.

During the 2005 model year, Ford redesigned low/reverse-clutch retaining snap ring for bot-

and gas applications. 2006-and-up Ford vehicles equipped with the AX4S, AX4N or 4F50N may be difficult to fill with fluid.



Dodge 48RE

Transmission Throttle-Valve Actuator

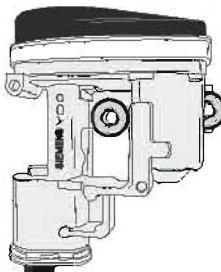
Change:

Beginning at the start of production for model year 2005, Dodge trucks equipped with the 5.9-liter diesel and 48RE transmission were equipped with an electronically controlled transmission throttle-valve actuator (TTVA). This actuator (see Figure 1) has replaced the previous throttle-valve cable, which controlled the throttle valve in the valve body.

Reason:

For electronic control of the throttle valve in the valve body.

Figure 1
Transmission Throttle-Valve Actuator



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AW81-40LE

PRELIMINARY INFORMATION

The AW80-40LE is a four speed electronically shifted transaxle that is used in the Chevy Aveo from 2004 to present. The AW80-40 uses six clutch packs and two one-way clutches. The AW80-40LE utilizes five solenoids, Shift Solenoid 1 and 2, Timing Solenoid, TCC Solenoid and a Pressure Control Solenoid.

The Timing Solenoid is normally closed and is used to time the 3-4 and 4-3 shift by controlling the apply and release of the forward (C1) clutch. It is also used to prevent a reverse engagement should reverse accidentally be selected while moving forward 5 mph or greater.

The TCM contains 6 shift strategies, Economic Mode, Power Mode, Up-Slope 1 Mode, Up-Slope 2 Mode, Down-Slope 1 Mode and Down-Slope 2 Mode.

Be careful when replacing electrical components as the components for the 1.2L engine differs from those for the 1.4L, 1.5L and 1.6L engines.

Refer to figure 1 for clutch and solenoid application.

Refer to figure 2 for clutch position and gear ratios.

Refer to Figure 3 for solenoid identification and resistance.

Refer to figure 4 and 5 for case passage identification.

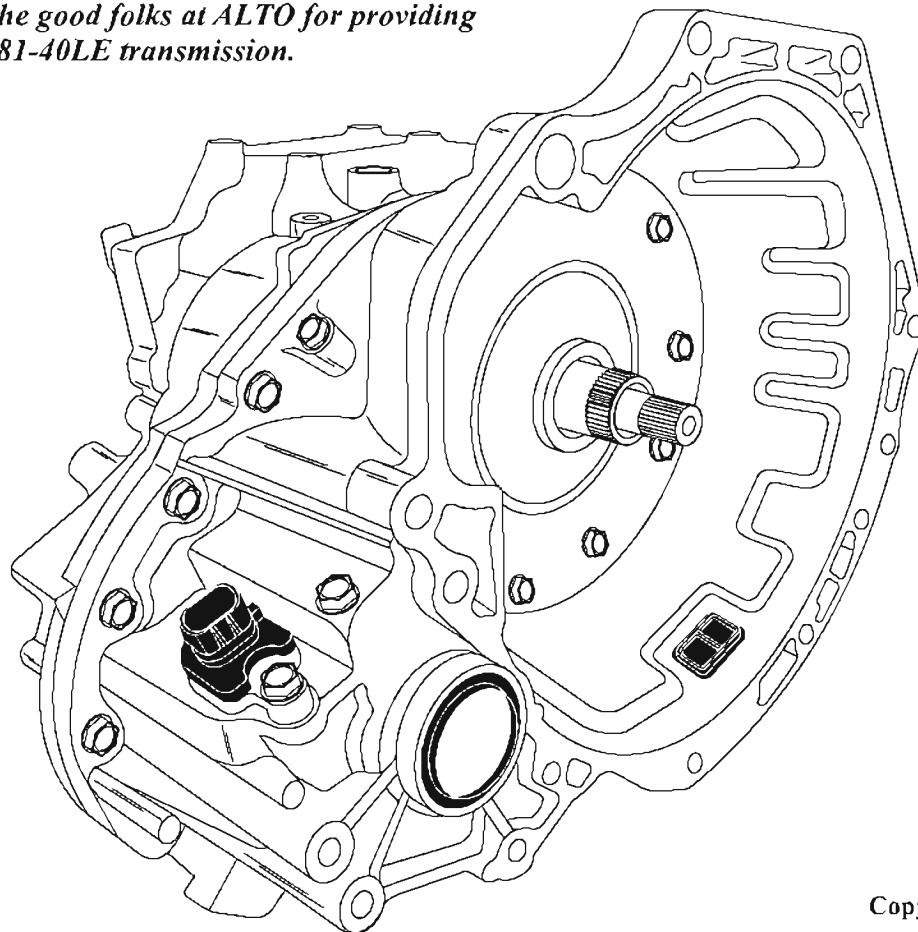
Refer to figure 6 for valve body checkball location.

Refer to figure 7 for upper valve body identification.

Refer to figure 8 for lower valve body identification.

Refer to figures 9 to 14 for Timing Solenoid operation & hydraulics

Many thanks to the good folks at ALTO for providing ATSG with a AW81-40LE transmission.



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AW81-40LE

PRELIMINARY INFORMATION

Shift Application Chart													
Gear	Shifts	Solenoids			Clutch			Brake			One-Way Clutch		
		SS 1	SS 2	Timing	C1	C2	C3	B1	B2	B3	F1	F2	
P	-	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	O/R	O/R	
Rev	Below 5 mph	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	O/R	INEF	
	5 mph & Above	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	O/R	O/R	
N	-	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	O/R	O/R	
D	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	O/R	HOLD	
	2nd	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	HOLD	O/R	
	3rd	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	O/R	O/R	
	3-4	OFF	ON	ON-OFF	ON-OFF	ON	OFF	OFF-ON	ON	OFF	O/R	O/R	
	4th	OFF	ON	OFF	OFF	ON	OFF	ON	ON	OFF	O/R	O/R	
2	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	O/R	HOLD	
	2nd	ON	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	HOLD	O/R	
	3rd	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	O/R	O/R	
1	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	ON	O/R	INEF	
	2nd	ON	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	HOLD	O/R	

C1 - Forward Clutch
 C2 - Direct Clutch
 C3 - Reverse Clutch
 B1 - O/D and 2nd Brake Clutch
 B2 - 2nd Brake Clutch
 B3 - 1st and Reverse Brake Clutch
 F1 - 2nd Gear One-Way Freewheel Clutch (Sprag)
 F2 - 1st Gear One-Way Freewheel Clutch (Sprag)

TCC and Line Pressure Control Solenoids not shown in chart above
 O/R - Overrun (Freewheeling)
 INEF - Holding but ineffective due to B3 clutch apply

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Figure 1

AW81-40LE

PRELIMINARY INFORMATION

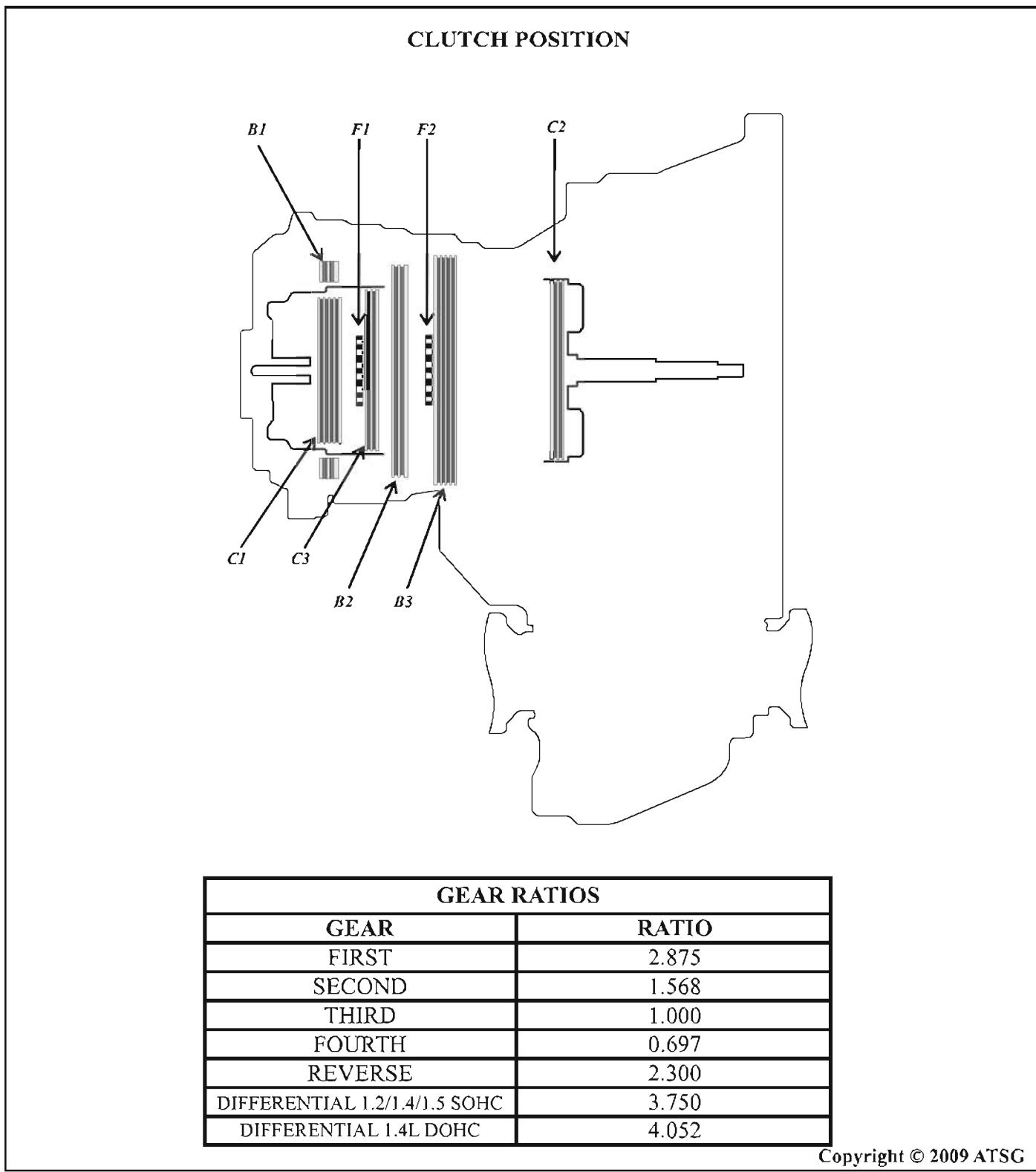
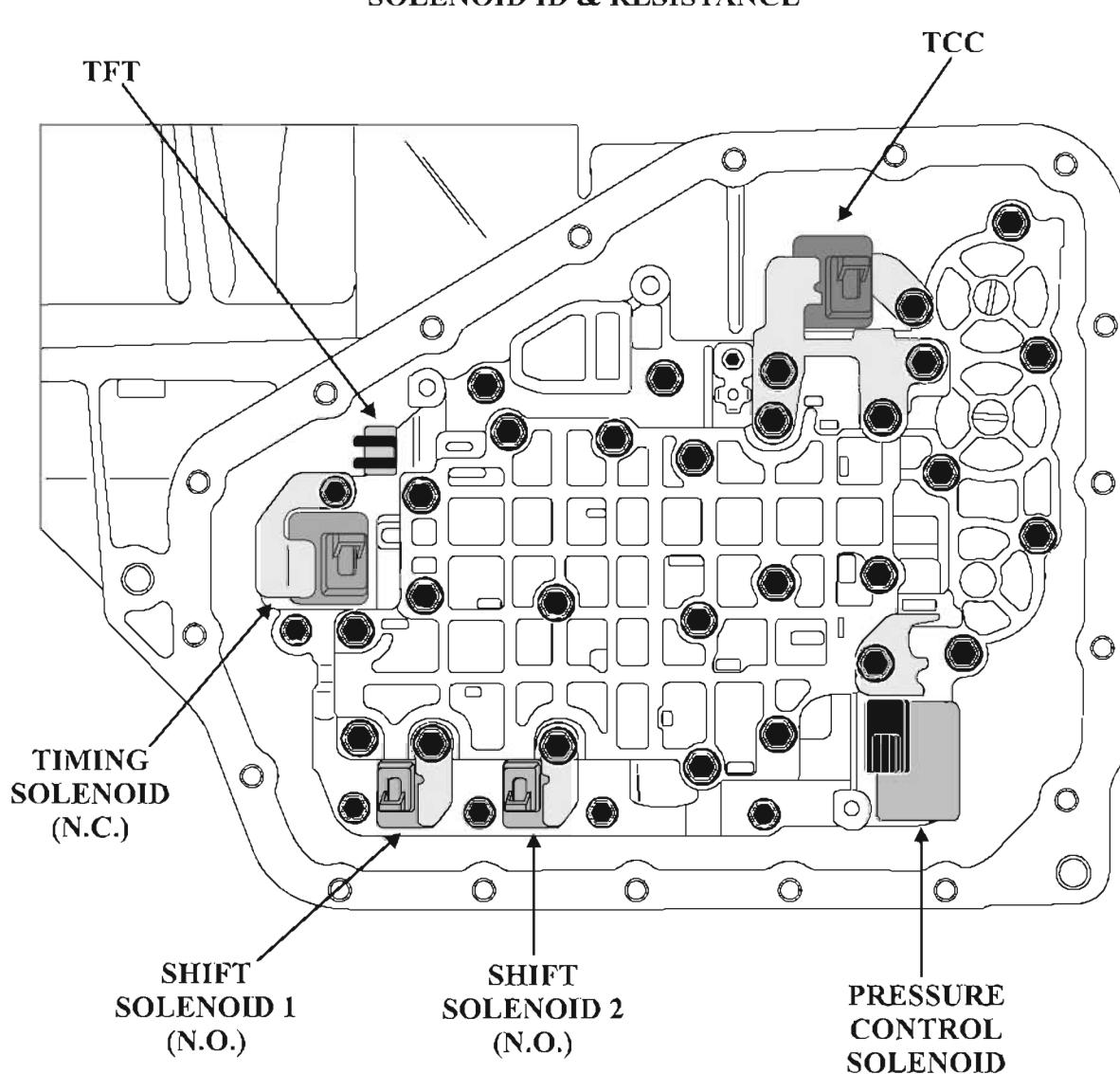


Figure 2



AW81-40LE

PRELIMINARY INFORMATION



SOLENOID RESISTANCE	
SHIFT SOLENOID 1 & 2 TCC SOLENOID TIMING SOLENOID	11 - 16 OHMS @ 68°
PRESSURE CONTROL SOLENOID	5 - 5.6 OHMS @ 68°

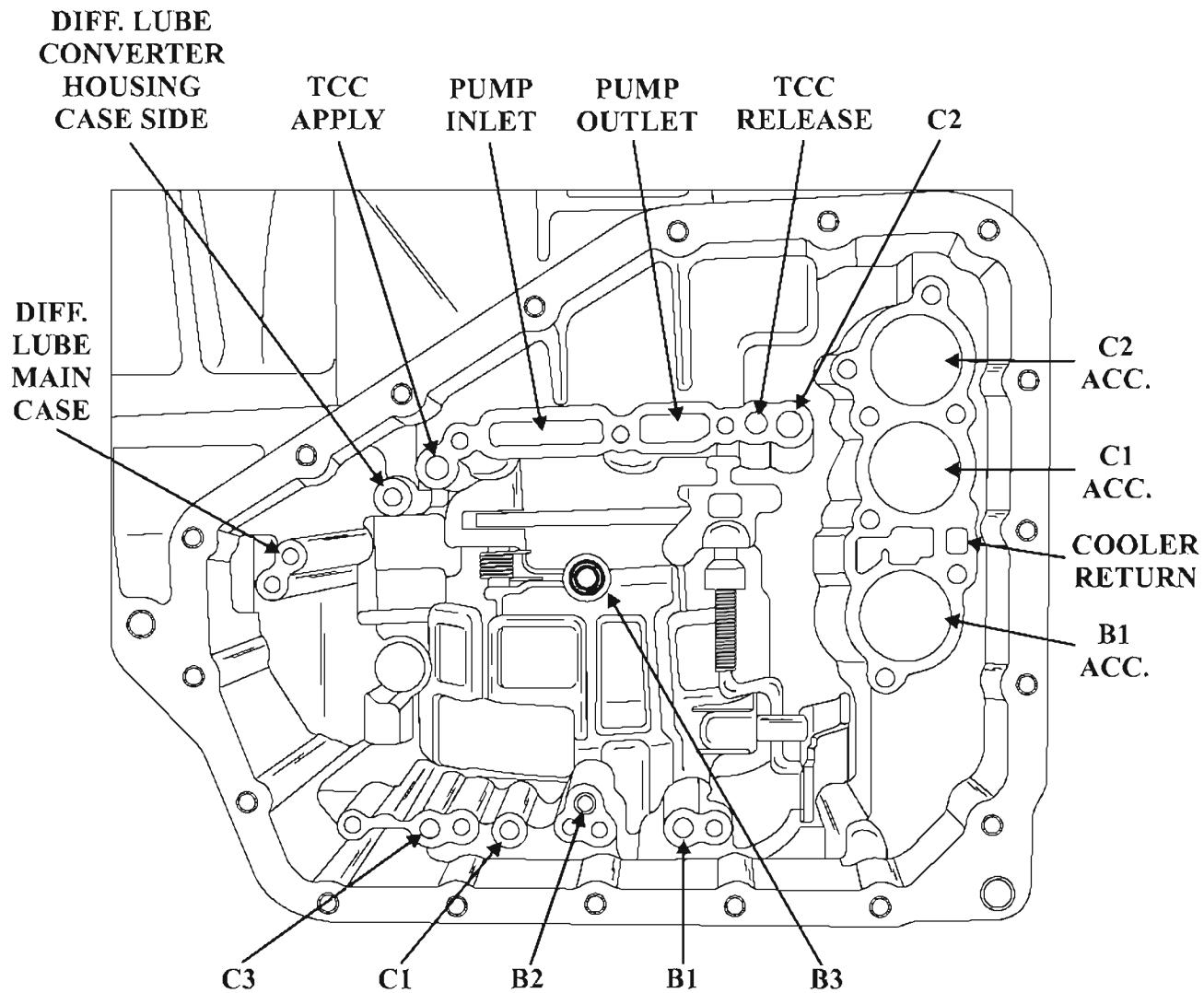
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Figure 3

AW81-40LE

PRELIMINARY INFORMATION

CASE PASSAGE IDENTIFICATION



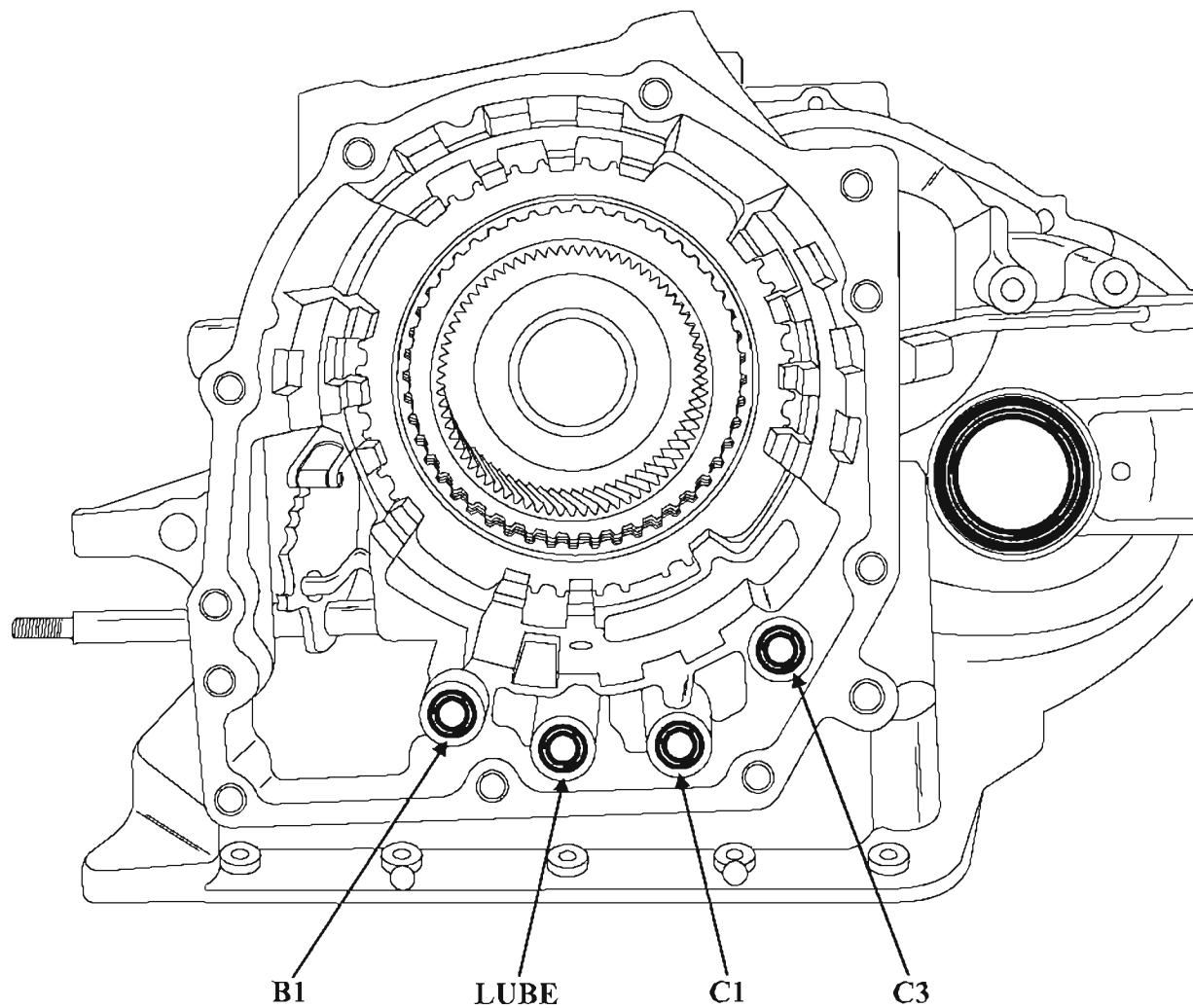
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Figure 4

AW81-40LE

PRELIMINARY INFORMATION

CASE PASSAGE IDENTIFICATION



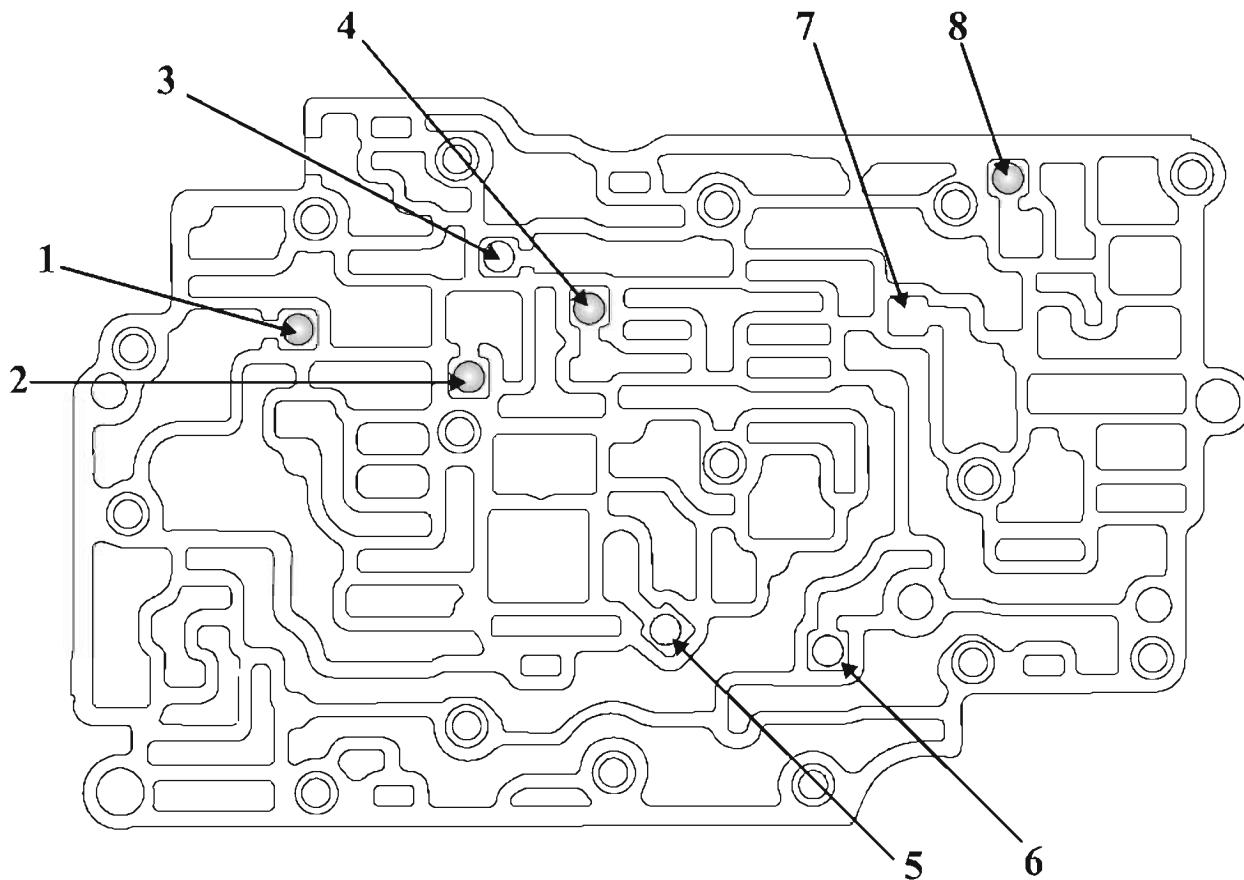
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Figure 5

AW81-40LE

PRELIMINARY INFORMATION

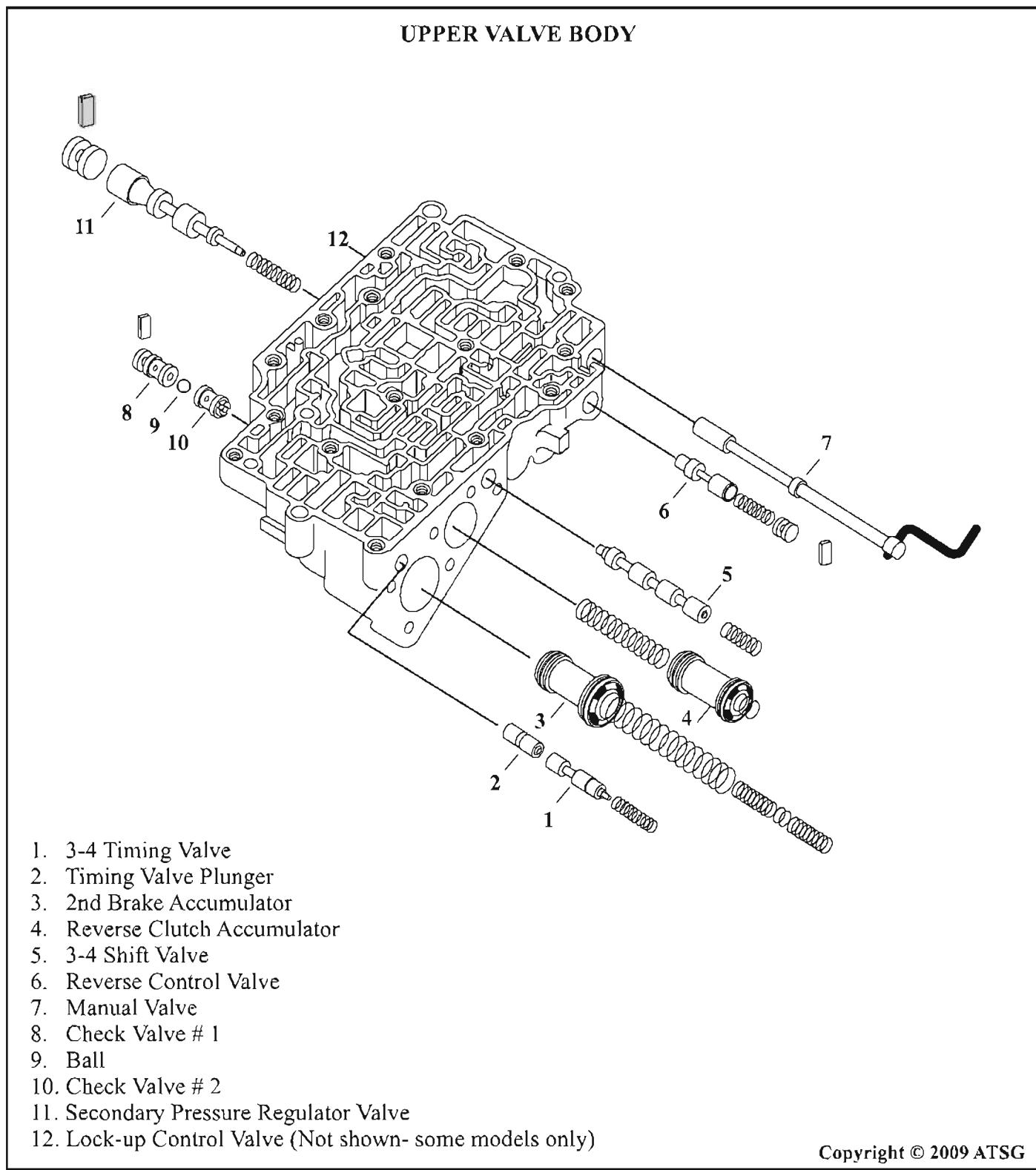
CHECKBALL LOCATIONS



- 1 - B1 Accumulator Orifice Control Ball
- 2 - Prevents Internal Transmission Lube while in Park
- 3 - B1 Clutch and Accumulator Orifice Control Ball
- 4 - B2 Clutch and Accumulator Orifice Control Ball
- 5 - B3 Clutch Orifice Control Ball
- 6 - C2 Clutch and Accumulator Orifice Control Ball
- 7 - Not used in all models (No hole in spacer plate)
- 8 - C3 Clutch and Accumulator Orifice Control Ball

AW81-40LE

PRELIMINARY INFORMATION



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Figure 7

AW81-40LE PRELIMINARY INFORMATION

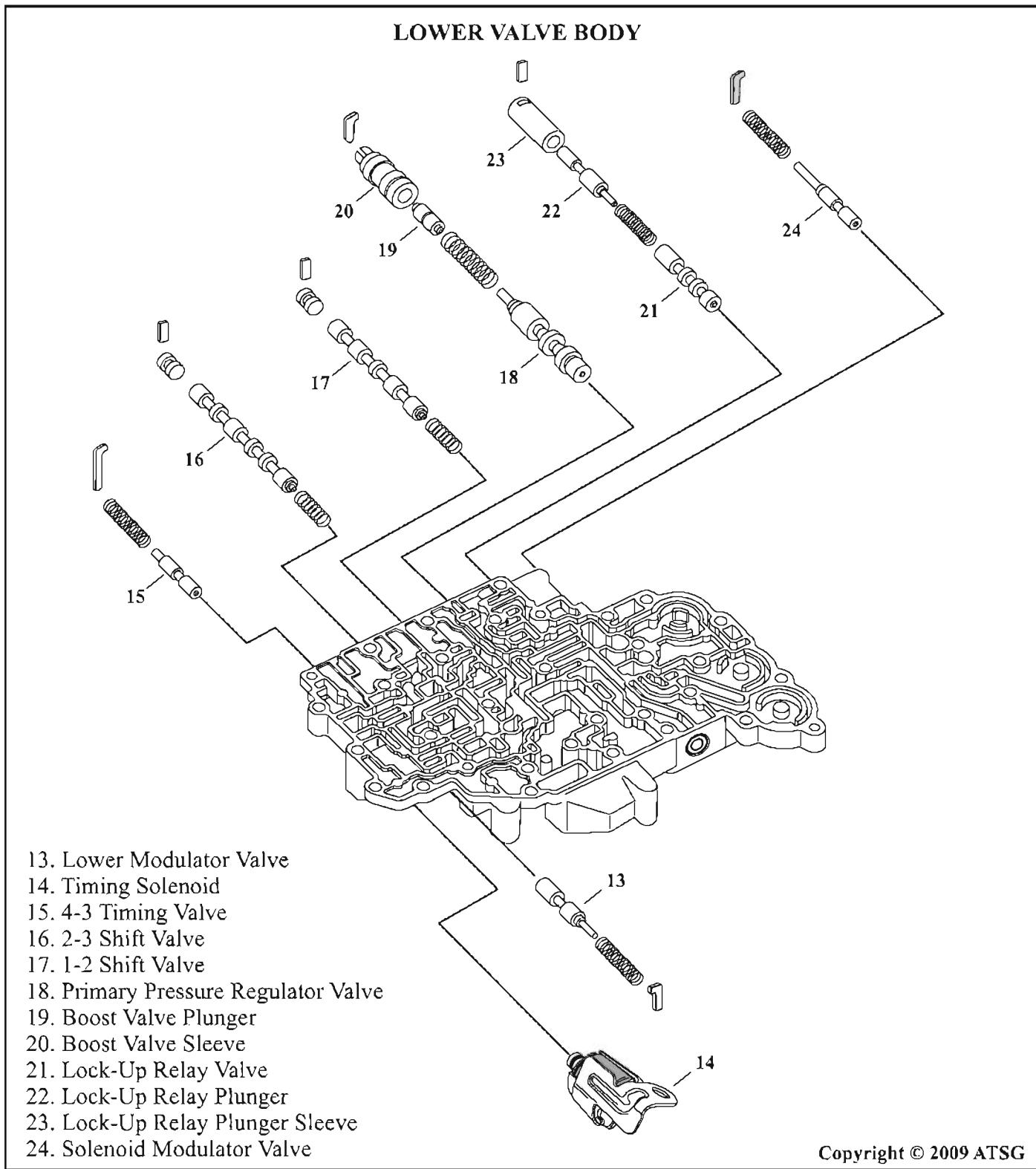


Figure 8



AW81-40LE PRELIMINARY INFORMATION

TIMING SOLENOID OPERATION

The Timing Solenoid is a normally closed solenoid and influences 3 valves in the valve body, a two piece 3-4 Timing Valve, the 4-3 Timing Valve and the Reverse Control Valve.

When a shift is made into 4th gear, the C1 (Forward Clutch) releases and the B1 (OD & 2nd Brake Clutch) applies. The Timing solenoid assists in the controlled release of the C1 clutch by the way it operates the 3-4 Timing Valve. The Solenoid remains off in all forward gears and is pulsed during the 3-4 and 4-3 shift. With the solenoid being a normally closed solenoid, when it is off these valves remain in the stroked position. When the solenoid is turned on, solenoid pressure is drained and the valves close by spring tension. Figures 9, 10 and 11 provide partial hydraulics which illustrates what occurs with the Timing Solenoid and related valves during the 3 to 4 shift. You will also notice that shift solenoids 1 and 2 are off in 3rd. The C1 clutch is fed pressure through the 3-4 shift valve. When a shift into 4th is made shift solenoid 2 turns on and strokes the 3-4 shift valve. This opens up a passage way for the C1 clutch to be exhausted past the 2-3 shift valve. At the same time the 3-4 shift valve supplies pressure into the B1 clutch circuit. When this circuit starts to pressurize, it splits the two piece timing valve past a 0.45" orifice in the spacer plate. The splitting of the valve plays a role in the apply of the B1 clutch as well as the rate in which the C1 clutch is released.

When a 4-3 shift occurs, the Timing Solenoid is pulsed at the same time shift solenoid 2 turns off. This forces the C1 apply pressure to be briefly forced through a 0.040" orifice by the 4-3 Timing Valve for a regulated and controlled apply (Refer to Figure 12).

This Timing Solenoid is also used to prevent a Reverse engagement should reverse be selected while the vehicle is moving forward 5 mph or greater as you can see in Figures 13 and 14.

Should this solenoid fail open, the vehicle will exhibit a no reverse, a delayed engagement into drive and a flare on the 4-3 downshift. If it fails closed a hard 3-4 and 4-3 downshift can be expected.

AW81-40LE

PRELIMINARY INFORMATION

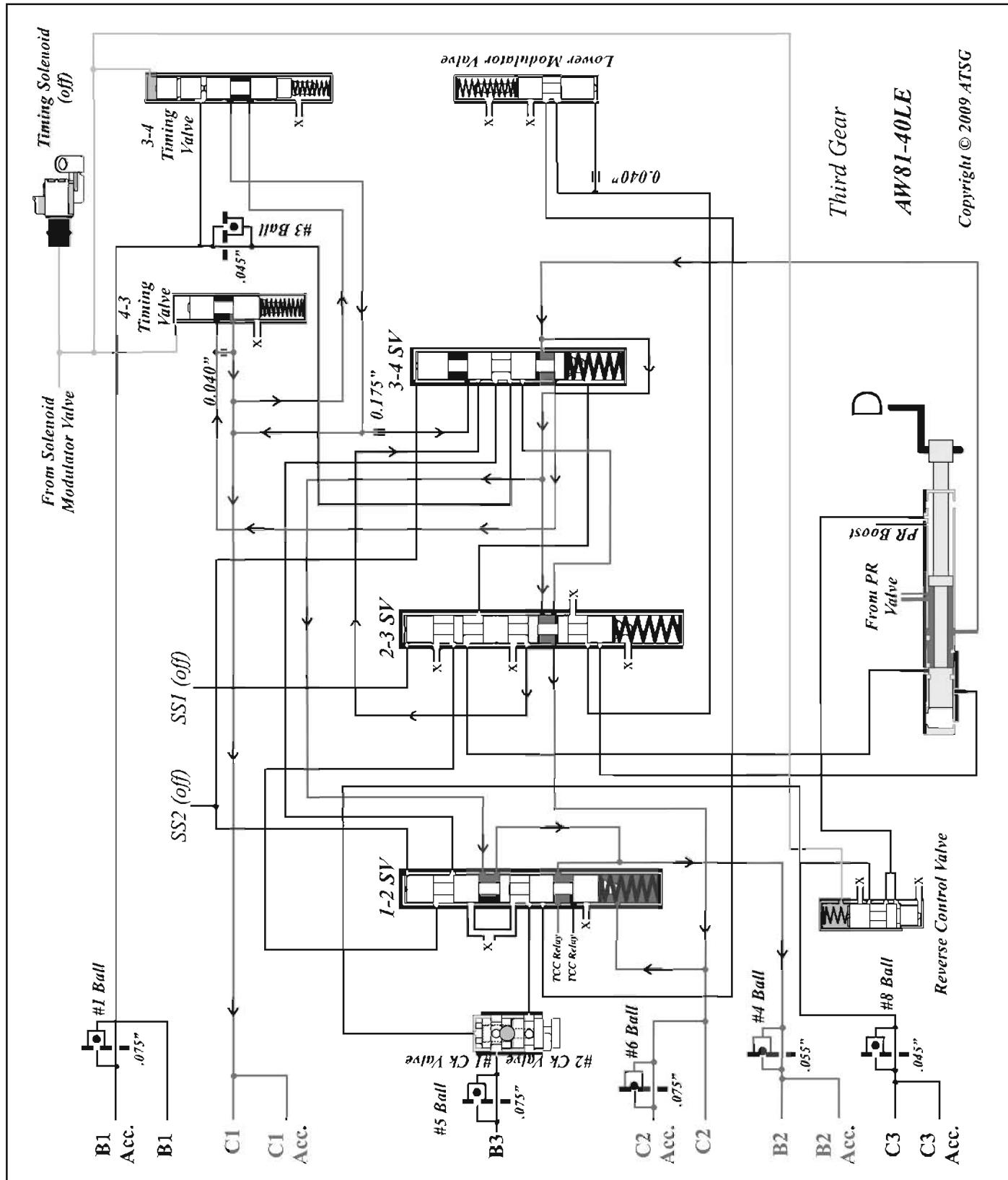


Figure 9

Automatic Transmission Service Group

AW81-40LE PRELIMINARY INFORMATION

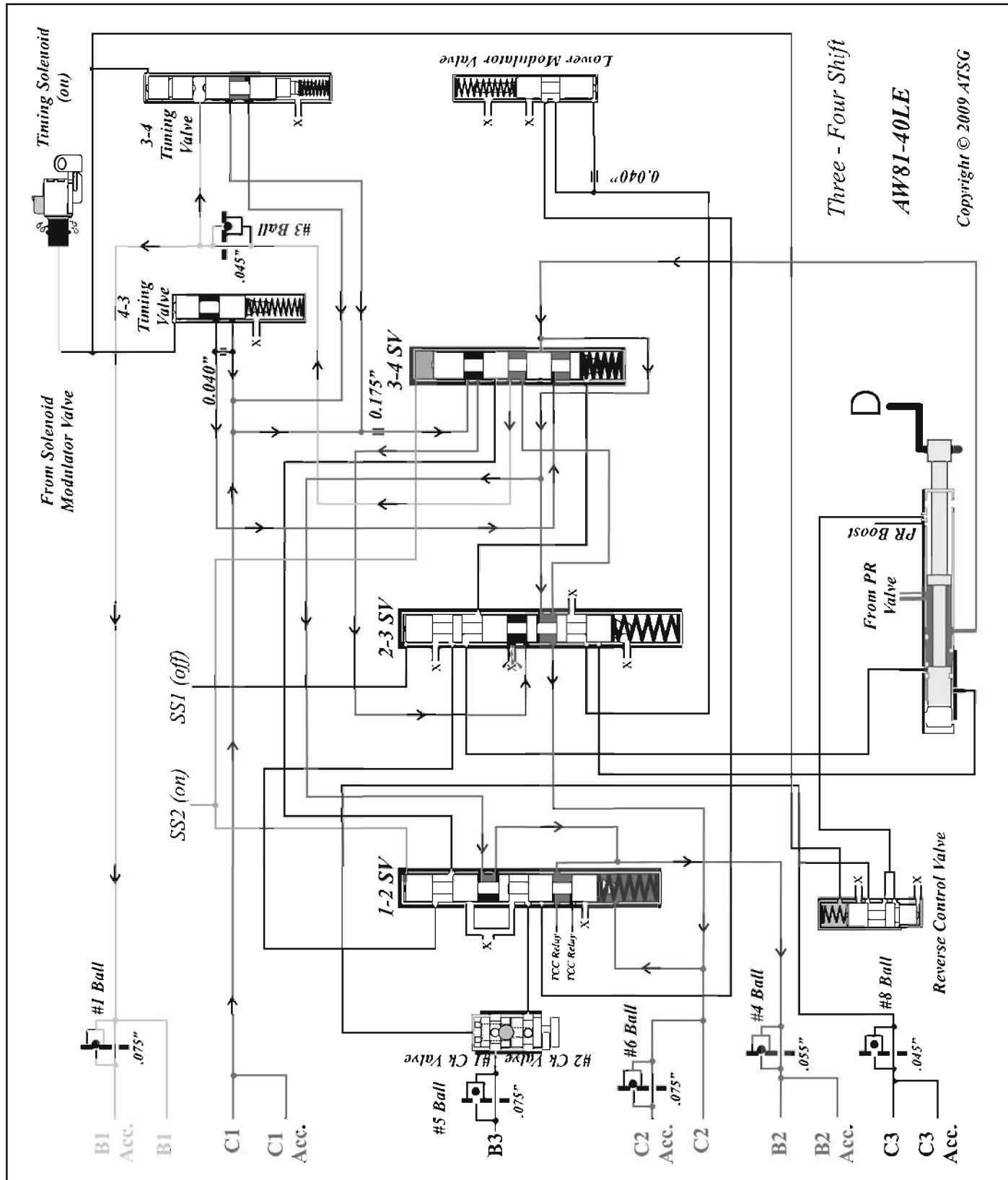


Figure 10

AW81-40LE PRELIMINARY INFORMATION

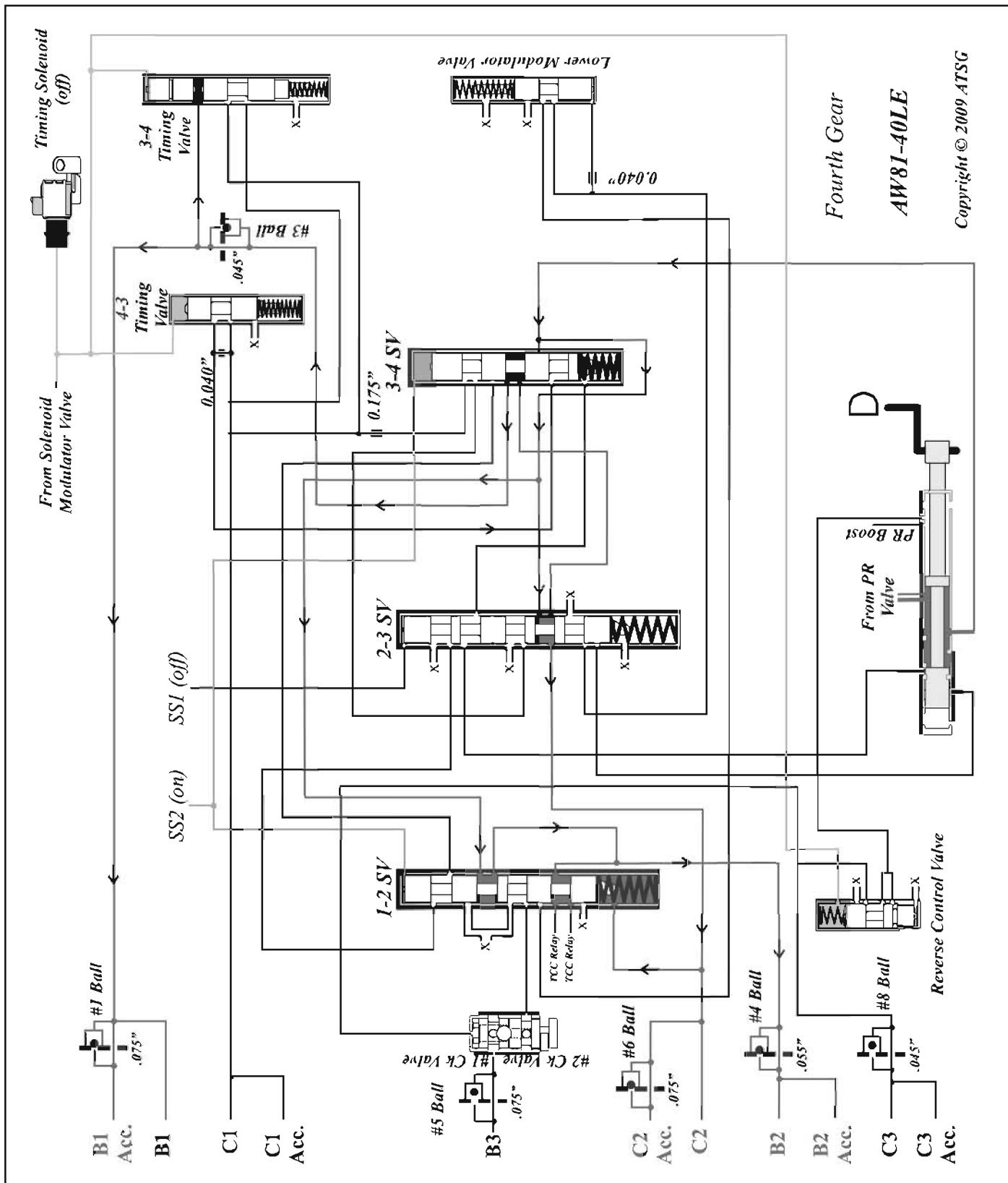


Figure 11

Automatic Transmission Service Group



AW81-40LE

PRELIMINARY INFORMATION

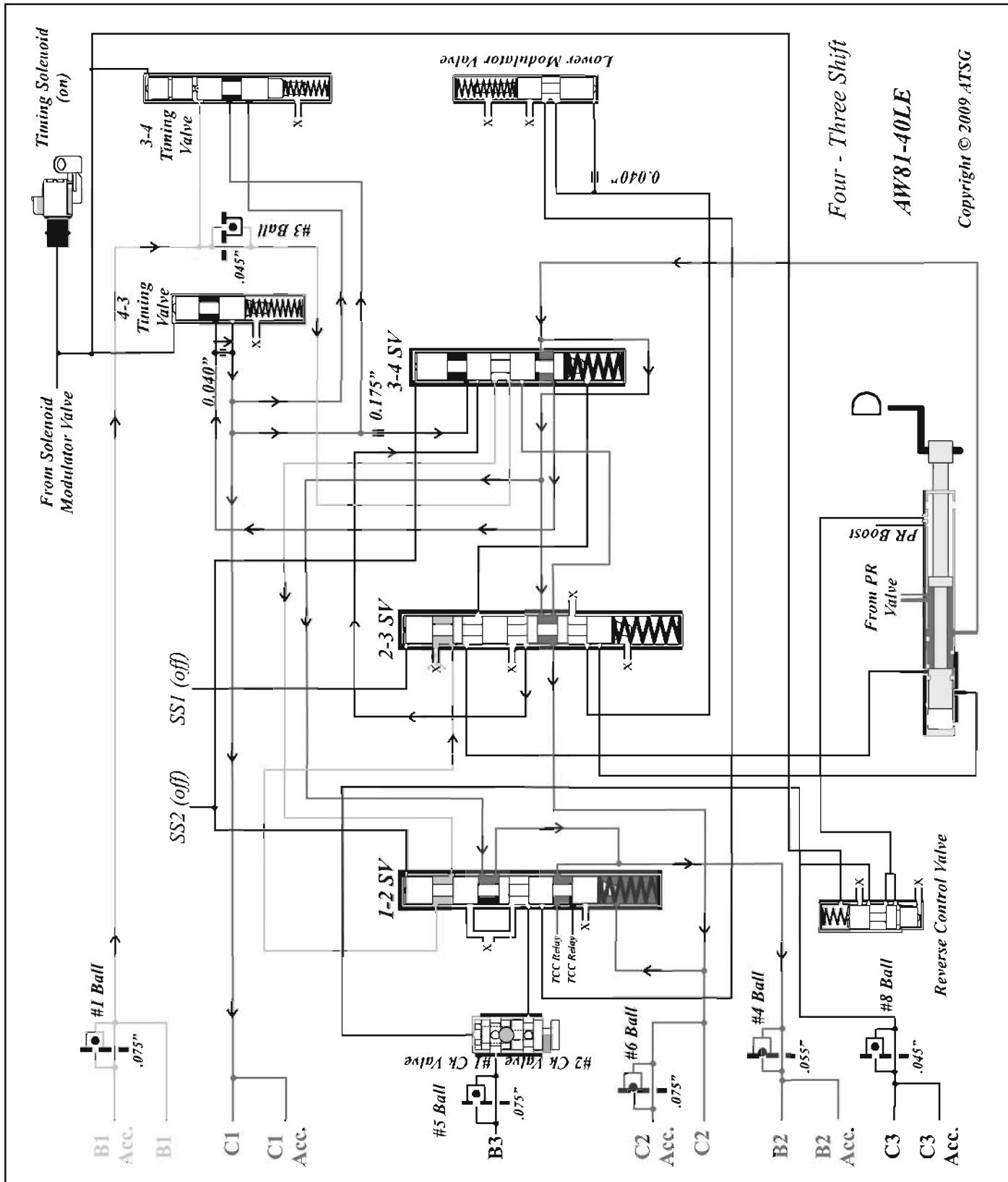


Figure 12

AW81-40LE

PRELIMINARY INFORMATION

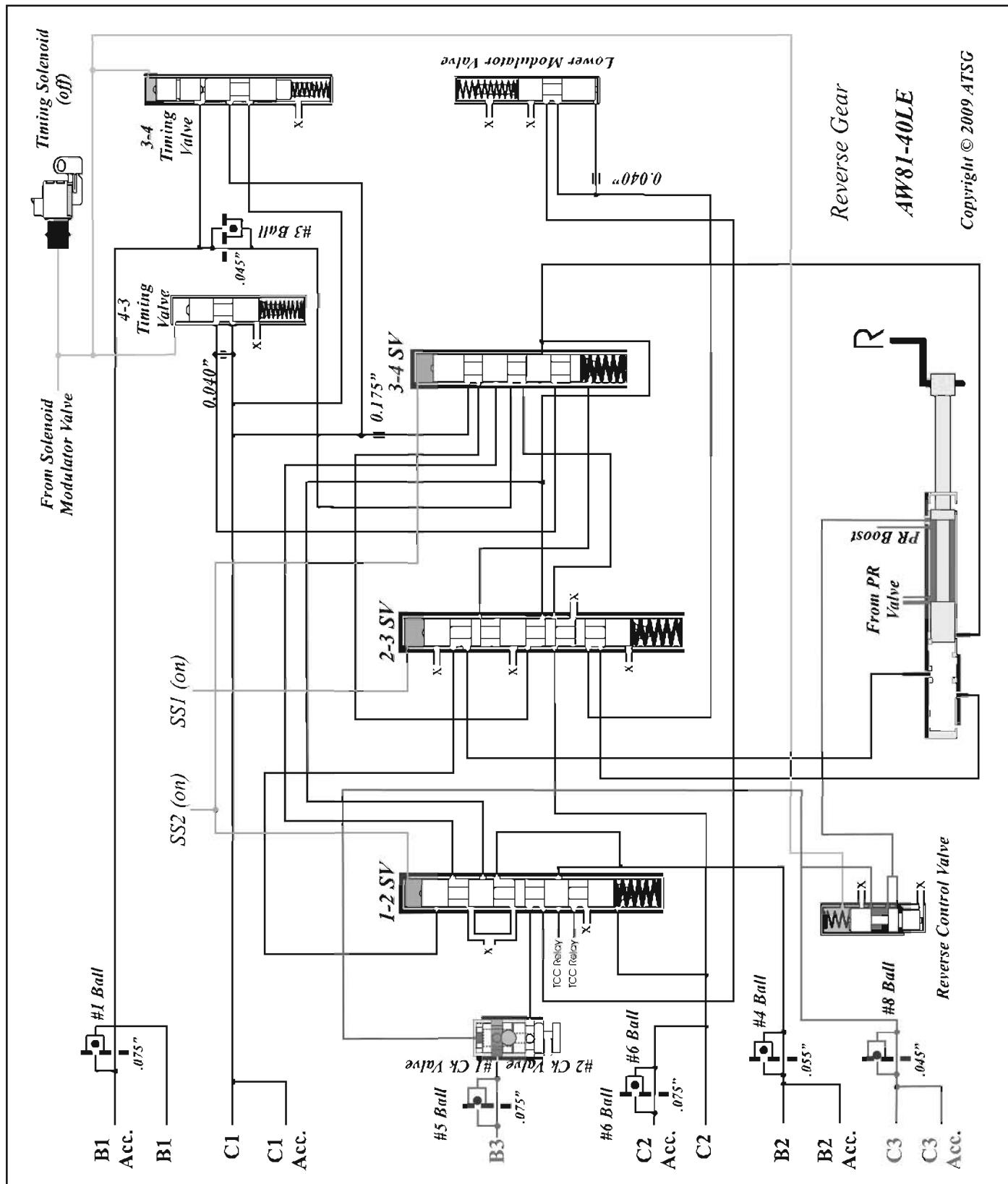


Figure 13

Automatic Transmission Service Group

AW81-40LE

PRELIMINARY INFORMATION

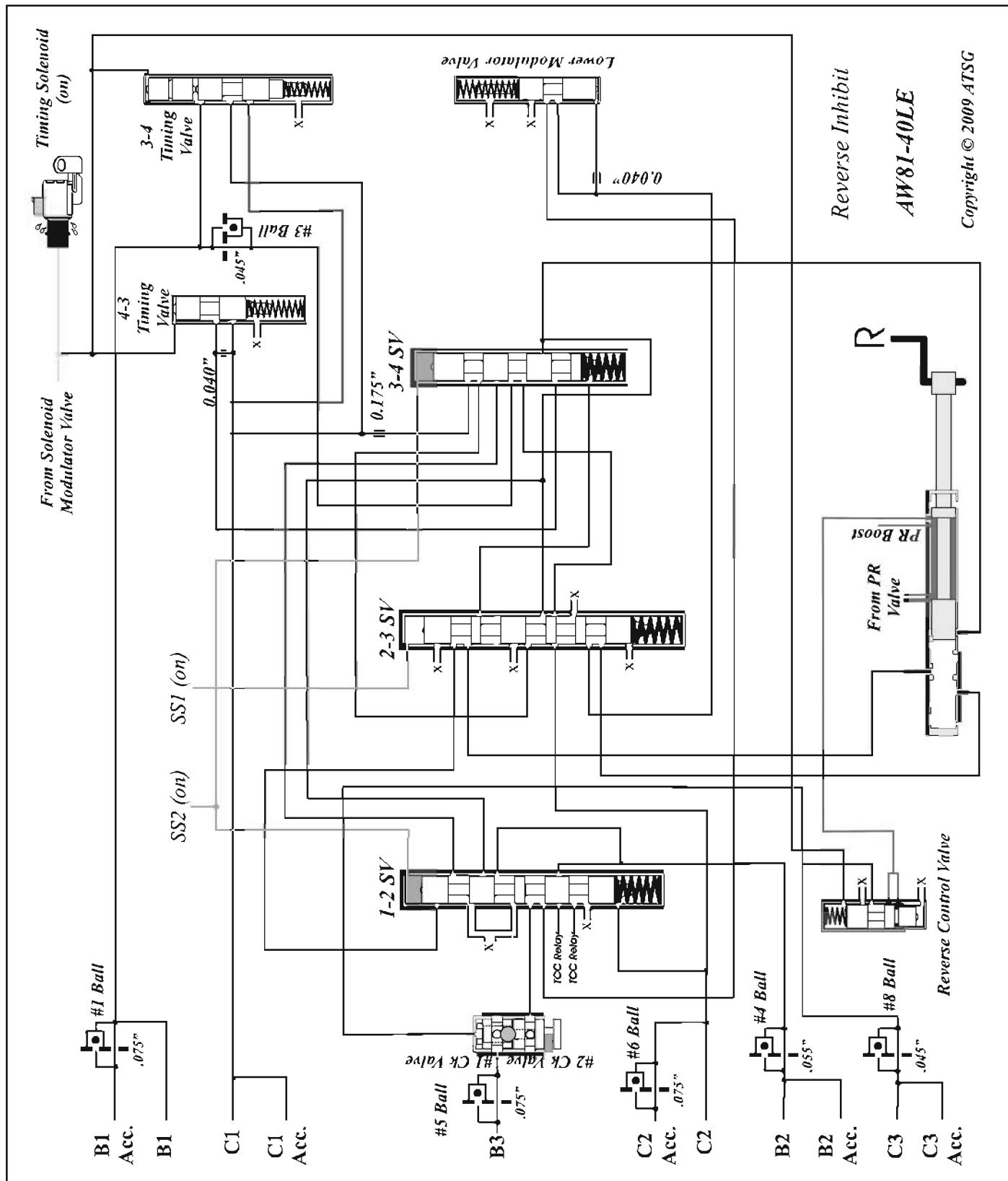


Figure 14



2006 ALLISON 1000/2000 "6 SPEED"

Beginning at start of production for the 2006 model year, General Motors revised the Allison 1000/2000 automatic transmissions by converting them into "6 Speed" units for light duty (8600-19850 GVW) and medium duty (19850-30000 GVW) commercial trucks.

The 1000 and 2000 Series transmissions both have helical cut planetary gear systems to minimize noise concerns and come in two different gear ratio configurations. The 1000 Series uses closer steps to improve the shift quality that we now expect from an automatic transmission. The 2000 Series uses wider steps to accommodate the greater vehicle weights associated with the 2000 Series. The gear ratios for both of the units are shown in Figure 1

The 6 Speed transmissions have a Park position, Reverse, Neutral and six forward speeds with 5th & 6th gear being overdrive ratios, and are completely electronic shift controlled. The 6 Speed is the same basic transmission with revised names for the clutch packs. They are 1-2-3-4 clutch and 4-5-6 clutch for the two rotating clutch packs. The three stationary clutch packs are 3-5-Reverse clutch, 2-6 clutch and Low/Reverse clutch. The 5 clutch packs direct the flow of torque through the transmission using 3 constant mesh planetary gear sets in various combinations. The clutches and planetary sets act singly or together to provide 6 forward ranges, Neutral and Reverse. A combination of two clutches are required to be engaged, in order to attain a torque path from the input shaft to the output shaft of the transmission. Refer to the chart in Figure 1 for the component locations and applications.

The vehicle is equipped with a column type shift selector that incorporates a driver shift request switch with "+/-" buttons, and a "Tow/Haul" button located on the end of the shift lever. Although specific installations vary, typical positions for the manual shift selector are as follows:

P - Park position allows the engine to be started and engages the parking pawl to prevent the vehicle from moving. For safety reasons, the vehicle's parking brake should always be used in addition to the "Park" position.

R - Reverse allows the vehicle to be moved in a rearward direction.

N - Neutral position allows the engine to start and operate without driving the vehicle. If necessary, this position should be selected to restart the engine while the vehicle is moving.

D - Drive range should be used for all normal driving conditions for maximum efficiency and fuel economy. Drive range enables the transmission to upshift and downshift in each of the six forward gear ratios, according to the normal shift pattern that is programmed into the TCM.

M - Manual selection of ranges is provided when the selector is moved to the "M" position. By using the plus/minus (+/-) buttons on the gear selector lever, the driver can select the range of gears desired for the current driving conditions.

1 - Manual Low has the same starting ratio as Drive range but prevents the transmission from shifting above first gear.

Electrical Components

Several internal components have also changed with the introduction of the 6 speed transmission. The solenoids have changed, as well as their names, and the internal wire harness and case connector have changed as well, to accommodate the solenoid connector changes and the new Internal Mode Switch (IMS). Refer to Figure 2 for the solenoid locations, part numbers, and new names. Notice also in Figure 2, that there has been a new oil feed pipe added from the main valve body to the main modulated pressure solenoid body. The new case connector pins are now flat, instead of round, and the new pin assignments are illustrated in Figure 7 along with a solenoid resistance chart.

Pressure Switch Assembly (PSA)

The Pressure Switch Assembly (PSA) for the six speed is shown in Figure 3, 4, 5, and 6. The TFT sensor is still located in the PSA and the resistance chart for the TFT is also found in Figure 7.

ELECTRICAL OPERATION

The electronic control of the transmission is performed by the Transmission Control Module (TCM). The TCM processes signals from various switches and sensors, to determine shift sequences, shift timing, and clutch apply and release pressures. The TCM also uses this information to control solenoids and valves, supply system status, and provide diagnostic information for service technicians.

EXTERNAL COMPONENTS**SPEED SENSORS**

The speed sensors are variable reluctance devices which convert mechanical motion to an AC voltage. Each sensor consists of a wire coil wrapped around a pole piece that is adjacent to a permanent magnet. These elements are contained in a housing which is mounted adjacent to a rotating ferrous member, such as a gear tooth. Two signal wires extend from one end of the housing and an exposed end of the pole piece is at the opposite end of the housing. As a ferrous object, such as a gear tooth approaches and passes through the gap at the end of the pole piece, an AC voltage pulse is induced in the wire coil. The TCM calculates the frequency of these AC pulses and converts it to a speed value. The AC voltage generated varies from 150mV at low speed to 15V at high speed. The signal wires from the sensor are formed as twisted pairs to cancel magnetically induced fields. The cable is also shielded to protect from voltage-related fields. The typical speed sensor is shown to the right. Noise from other sources is eliminated by using two-wire differential inputs at the TCM.

Input Speed Sensor

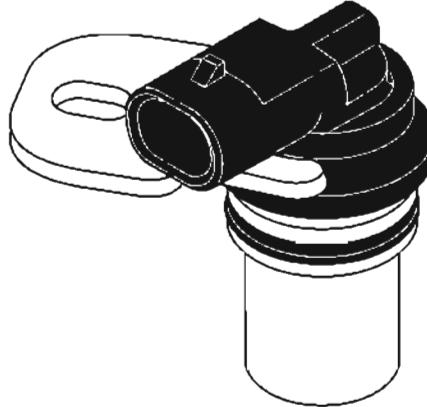
The Input Speed Sensor is externally mounted in the torque converter housing, and directed at the ribs protruding from the torque converter as shown in Figure 1.

Turbine Speed Sensor

The Turbine Speed Sensor is externally mounted in the main transmission case, and directed at the tone wheel or the PTO drive gear attached to the 1-2-3-4 clutch housing as shown in Figure 1.

Output Speed Sensor

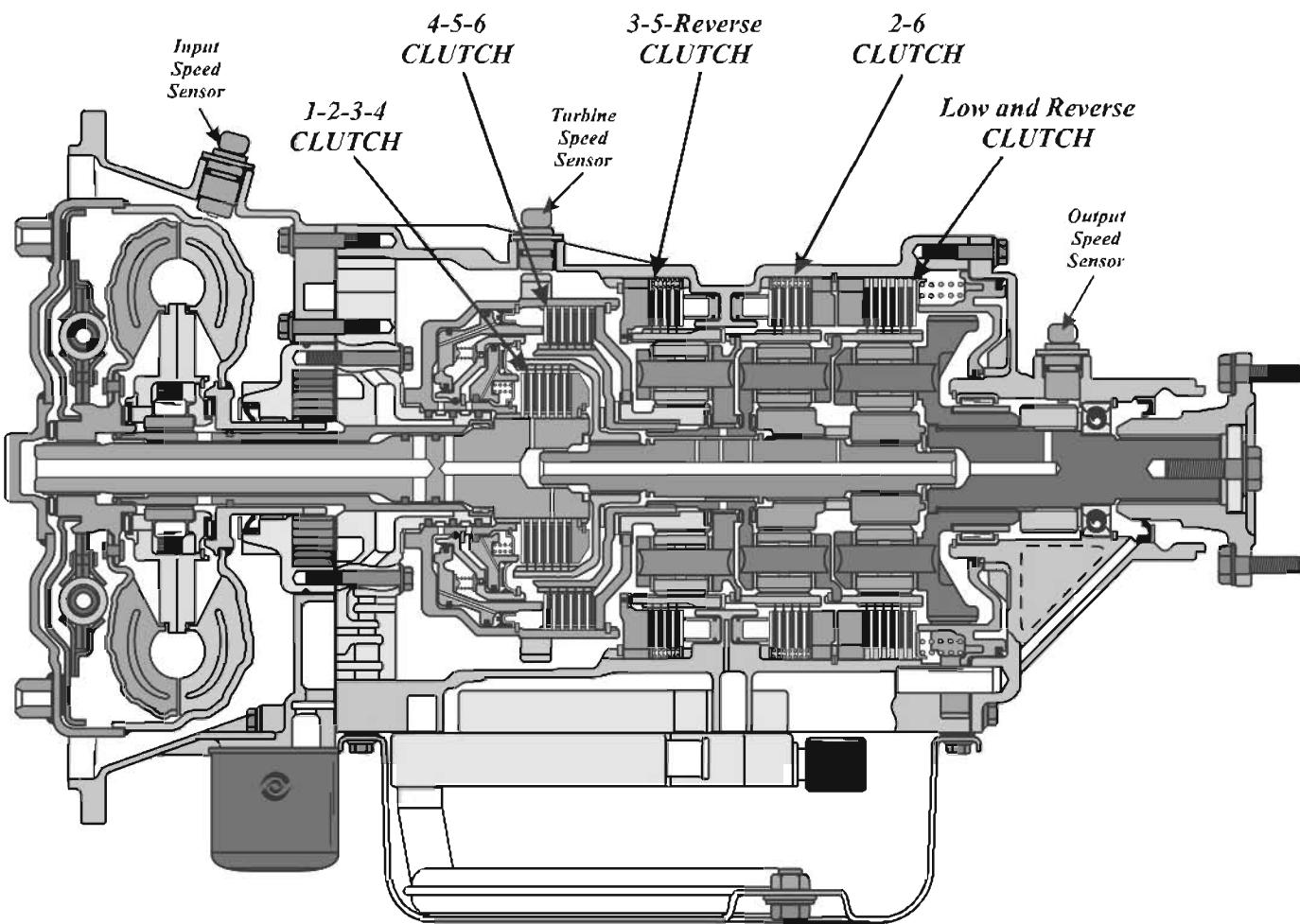
The Output Speed Sensor is externally mounted in the extension housing, on the 2WD models, and directed at the teeth of a tone wheel splined to and rotating with the output shaft as shown in Figure 1. The 4WD models are mounted in the transfer case.

TYPICAL SPEED SENSOR***Turbine Speed Sensor ALL***2600 Ohms
@ 77 °F***Output Speed Sensor 2WD***2600-3160 Ohms
@ 77 °F***Output Speed Sensor 4WD***1420-2140 Ohms
@ 77 °F

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ALLISON 1000/2000 SERIES "6 SPEED" TRANSMISSION



Range	1-2-3-4 Clutch	4-5-6 Clutch	3-5-Rev Clutch	2-6 Clutch	Lo/Rev Clutch	PCS 1	PCS 2	SS1	SS2	SS3	TCC PCS	Ratios	
												1000	2000
Park					ON				<i>X</i>	<i>X</i>	<i>X</i>		
Reverse			ON		ON			<i>X</i>	<i>X</i>	<i>X</i>		4.49	5.09
Neutral					ON				<i>X</i>	<i>X</i>	<i>X</i>		
OD-1st	ON				ON					<i>X</i>		3.10	3.51
OD-2nd	ON			ON		<i>X</i>	<i>X</i>					1.81	1.90
OD-3rd	ON		ON						<i>X</i>			1.41	1.44
OD-4th	ON	ON				<i>X</i>	<i>X</i>	<i>X</i>		<i>X</i>	*	1.00	1.00
OD-5th		ON	ON							<i>X</i>	*	0.71	0.74
OD-6th		ON		ON		<i>X</i>	<i>X</i>			<i>X</i>	*	0.61	0.64

X = Electrical Power Applied To Solenoid.

* = TCC PCS Solenoid, To Apply Converter Clutch At Appropriate Speed.

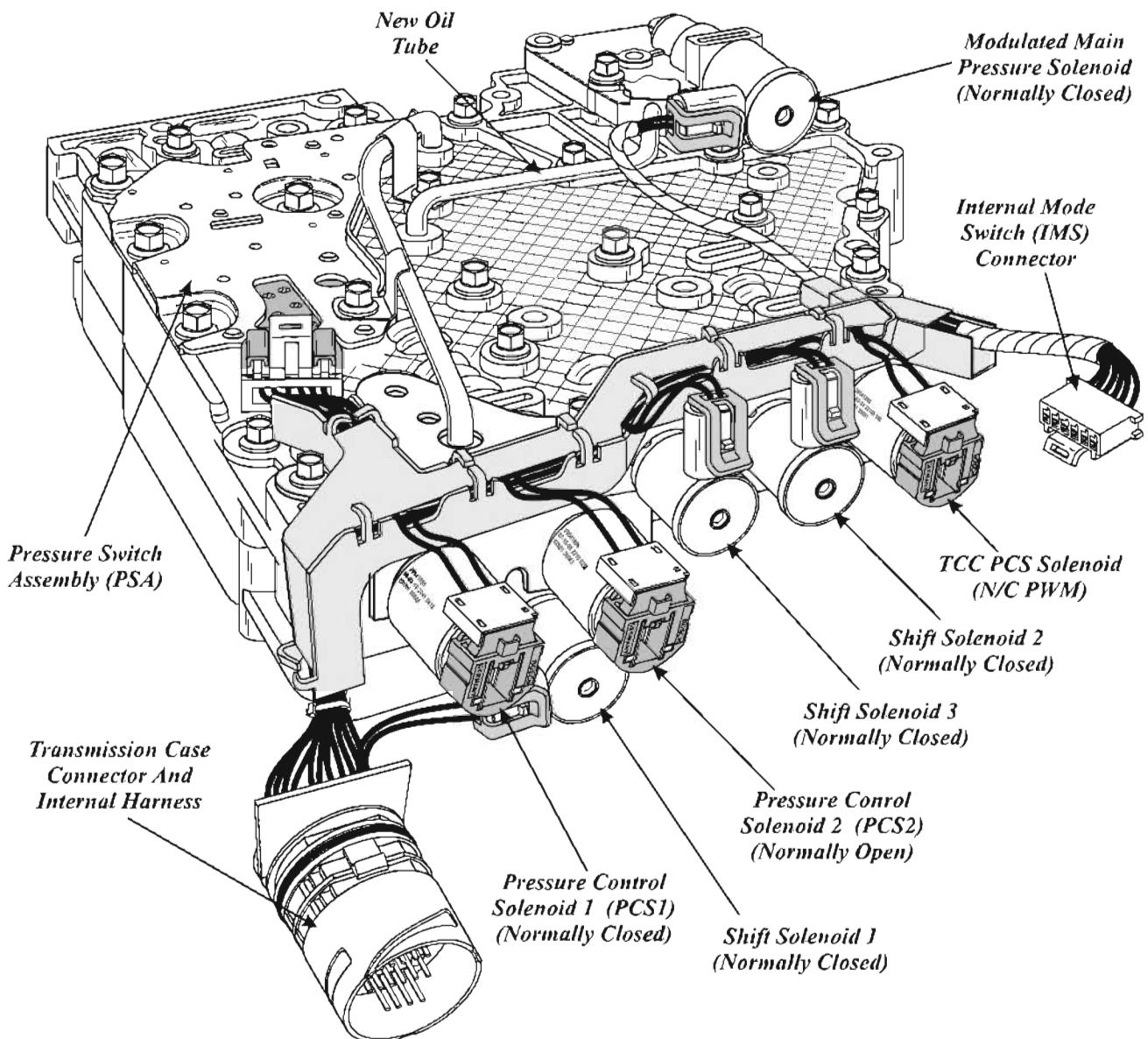
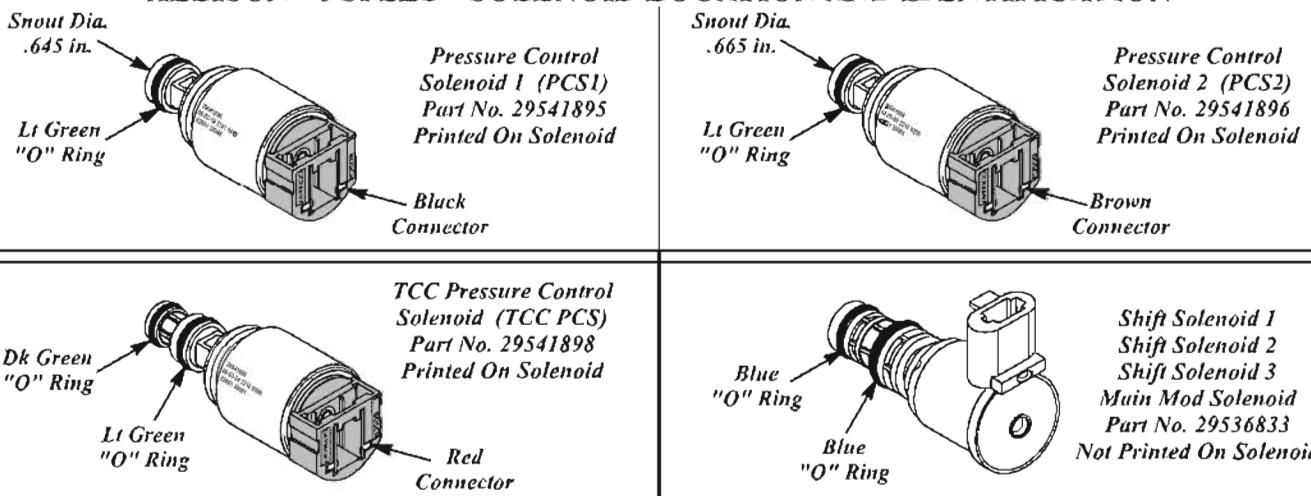
NOTE: Solenoid chart above is for "Steady State" parameters, NOT Transitions.

Not listed here are failsafe strategies because they are too numerous. They can range from a failsafe to neutral to a no vehicle start failsafe all determined by the fault present. If the case connector is unplugged, the transmission will have 3rd and reverse gears.

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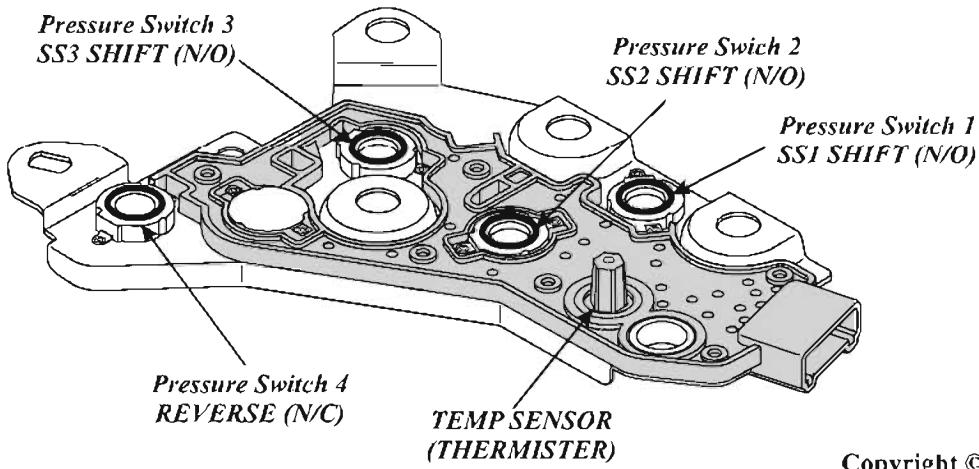
ALLISON "6 SPEED" SOLENOID LOCATION AND IDENTIFICATION



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Figure 2

PRESSURE SWITCH ASSEMBLY

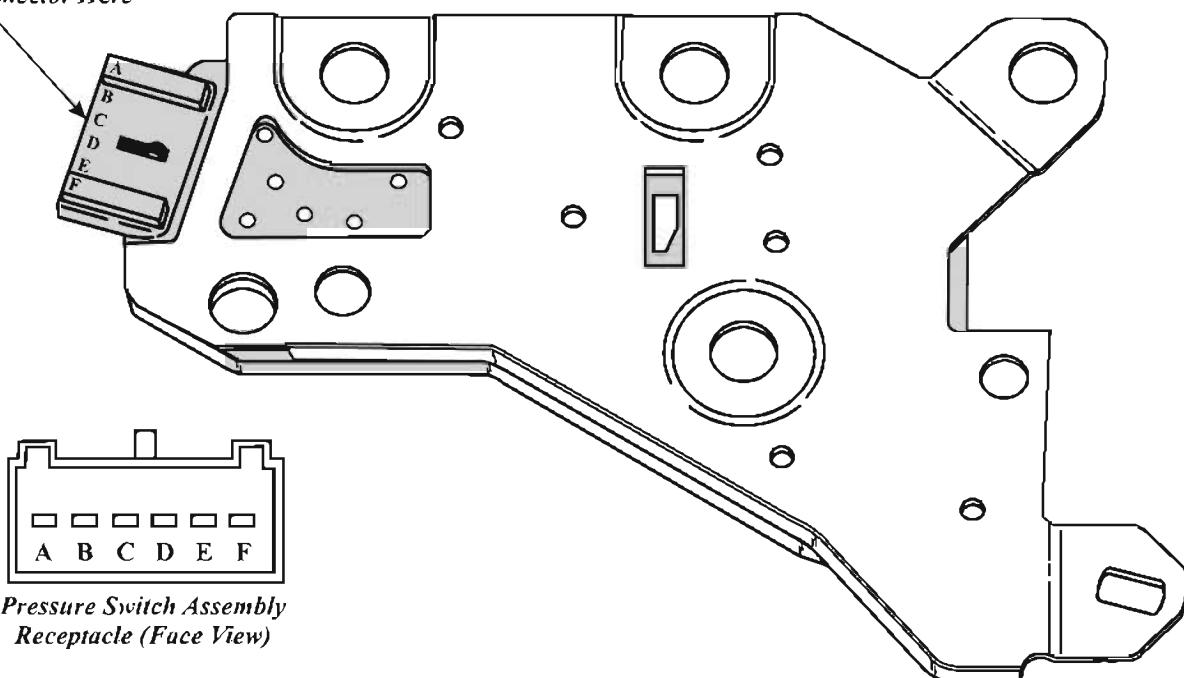


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Figure 3

PRESSURE SWITCH CONNECTOR PIN FUNCTION AND IDENTIFICATION

Terminal Identification
Cast In Connector Here



- (A) SSI SHIFT SIGNAL TO PCM (CASE CONNECTOR TERMINAL "D")
- (B) SS2 SHIFT SIGNAL TO PCM (CASE CONNECTOR TERMINAL "F")
- (C) SS3 SHIFT SIGNAL TO PCM (CASE CONNECTOR TERMINAL "E")
- (D) REVERSE SWITCH TO PCM (CASE CONNECTOR TERMINAL "K")
- (E) TEMP SENSOR HIGH (CASE CONNECTOR TERMINAL "G")
- (F) TEMP SENSOR LOW (CASE CONNECTOR TERMINAL "H")

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Figure 4

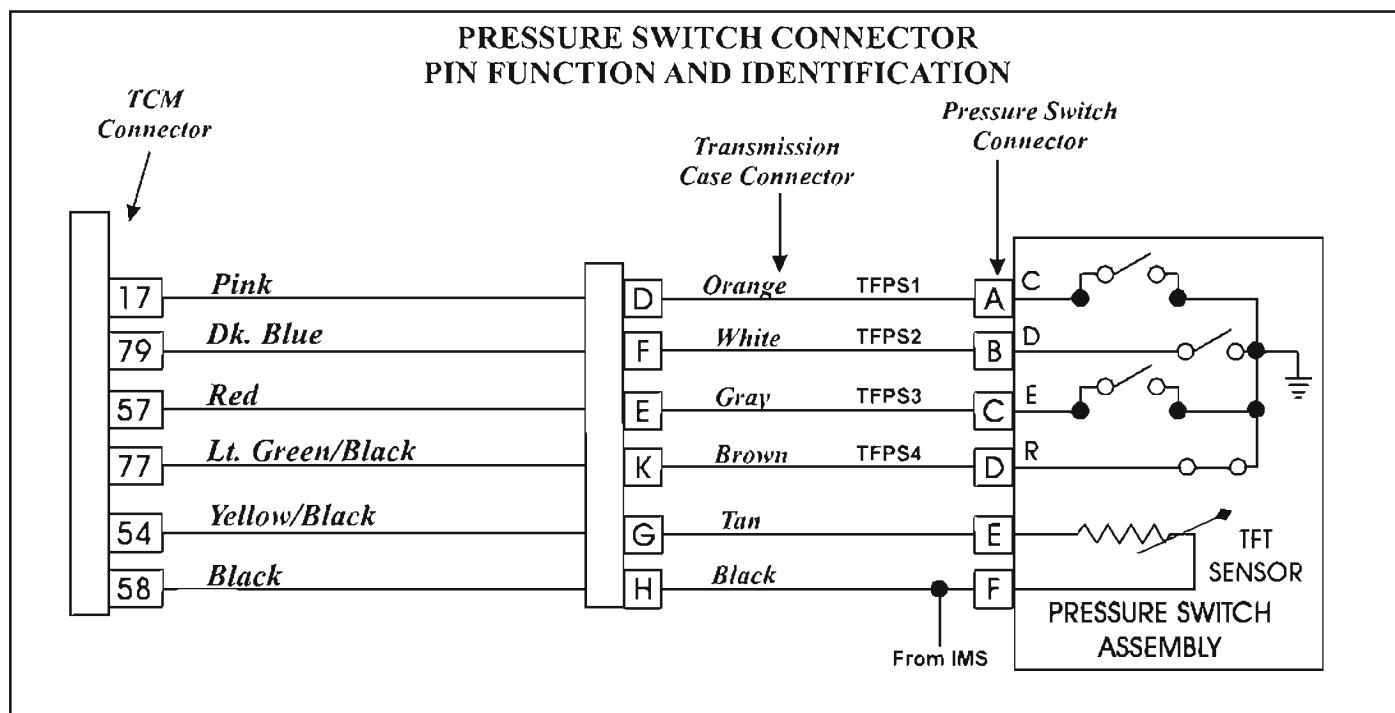


Figure 5

PRESSURE SWITCH ASSEMBLY

The Pressure Switch Assembly (PSA) is made up of three normally open switches and one normally closed switch. All switches and their locations are identified in Figure 3. Fluid pressure is fed from shift valves 1, 2, and 3 to 1, 2, and 3 switches, and from the manual valve to the TFPS4 switch. This logic indicates the current transmission operating range to the TCM.

The three pressure switches corresponding to the shift valves are normally open (N/O) when there is no pressure to the switch, so that electrical current is stopped at the switch. When pressure is routed to the switch from the shift valves, the switch closes and allows current to flow from the positive contact and through the switch. Refer to Figure 4.

The pressure switch corresponding to reverse is a normally closed (N/C) switch, and pressure is fed to the switch except when the transmission is placed into the reverse position.

The Pressure Switch Assembly also contains the temperature sensor (thermister) to notify the TCM of the current sump temperature. Changes in fluid temperature are indicated by changes in sensor resistance. Increasing temperature will create decreased sensor resistance (See Figure 7).

The PSA terminal identification and functions are illustrated in Figure 4 to assist in switch diagnosis. There is also a complete wiring schematic from the Pressure Switch Assembly through the transmission case connector and to the TCM shown in Figure 5, and complete wire schematic in Figure 11.

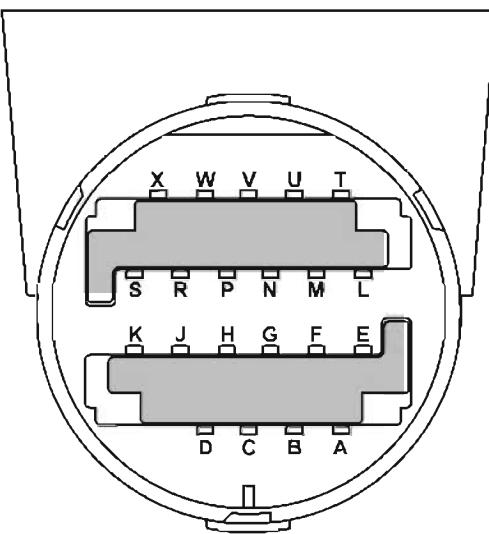
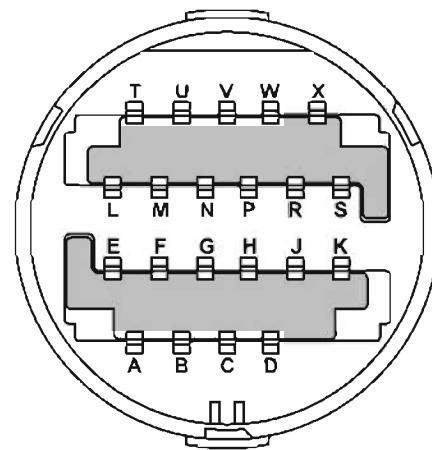
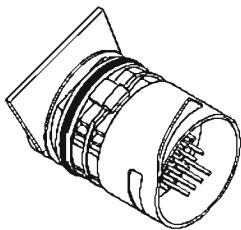
We have also provided a pressure switch logic state chart in Figure 6.

Pressure Switch Logic State Chart				
Range	TFPS1	TFPS2	TFPS3	TFPS4
Park	Closed	Closed	Closed	Open
Rev	Open	Closed	Closed	Closed
Neut	Closed	Closed	Closed	Open
1	Open	Closed	Open	Open
2	Open	Open	Open	Open
3	Closed	Open	Open	Open
4	Closed	Open	Closed	Open
5	Open	Open	Closed	Open
6	Open	Open	Closed	Open

Figure 6



ALLISON "6 SPEED" CASE CONNECTOR TERMINAL IDENTIFICATION

View Looking Into
Case ConnectorView Looking Into
Vehicle Harness Connector

PIN	WIRE COLOR	CIRCUIT	PIN DESIGNATION
A	Grn	1222	Solenoid 1 Ground
B	Lt Grn	1223	Solenoid 2 Ground
C	Violet	2527	Solenoid 3 Ground
D	Org	1224	PSA Signal C
E	Grey	1226	PSA Signal E
F	Wht	1225	PSA Signal D
G	Tan	1227	TFT Sensor, 5 Volt Reference
H	Blk	2762	TFT/Internal Mode Switch, Gnd
J	Pink	418	TCC PCS Solenoid, Low
K	Brn	2529	PSA Signal Reverse
L	Red	1228	EPC/TCC/PCS 1 Solenoids, 12V
M	Dk Blue	1229	Pressure Control Solenoid 1 Low
N	Red/Blk	323	SS1, SS2, SS3, PCS 2, 12V
P	Blue	2469	Pressure Control Solenoid 2 Low
R	Violet/Blk	1786	Internal Mode Switch P/N Signal
S	Yellow	1530	EPC Solenoid, Low
T	Blk/White	773	Internal Mode Switch C Signal
U	Tan/White	772	Internal Mode Switch B Signal
V	Yellow/Blk	771	Internal Mode Switch A Signal
W	Pink/Blk	776	Internal Mode Switch P Signal
X	Red	1228	EPC/TCC/PCS 1 Solenoids, 12V

Note: Pin L and X both feed the same solenoids.

Resistance Chart @ 20 °C (68 °F)

Pins	Solenoid	Resistance
L & M	PCS1	5.1 - 5.9 Ohms
N & P	PCS2	5.1 - 5.9 Ohms
L & J	TCC PCS	5.1 - 5.9 Ohms
N & A	SS1	21 - 23 Ohms
N & B	SS2	21 - 23 Ohms
N & C	SS3	21 - 23 Ohms
L & S	Main Mod	21 - 23 Ohms

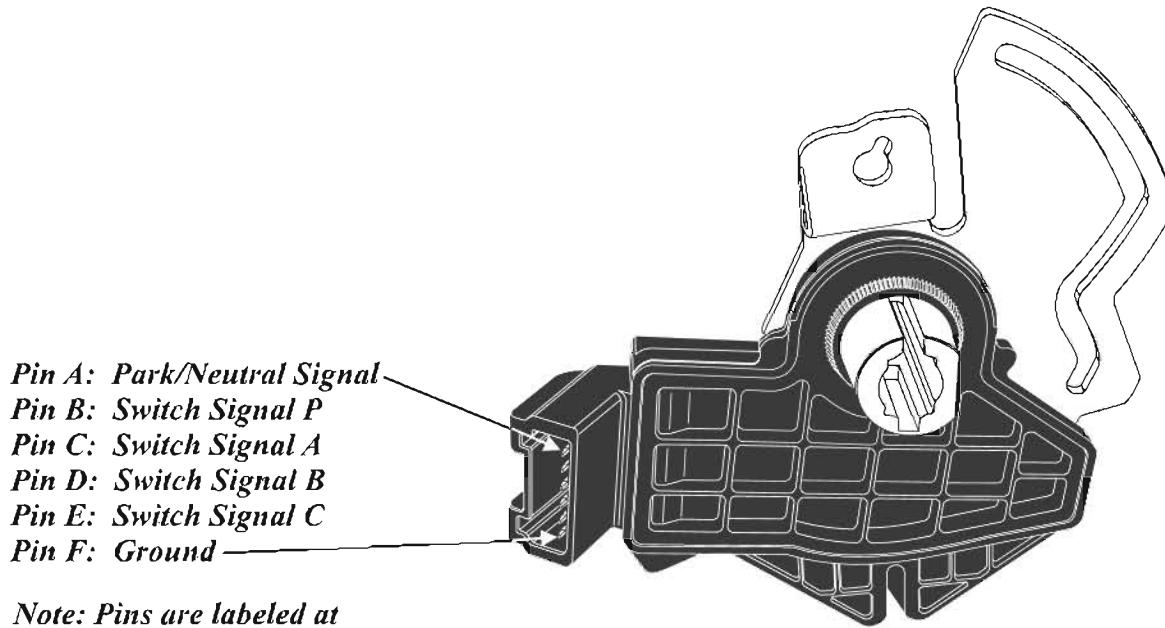
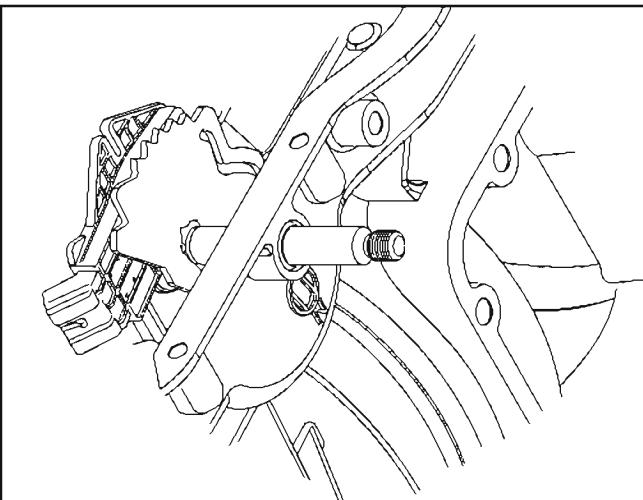
TFT Resistance Chart Pins G & H

Fluid Temp	Resistance
0 °C (32 °F)	9045-9646
20 °C (68 °F)	3398-3542
40 °C (104 °F)	1424-1493
60 °C (140 °F)	654.7-683.9
80 °C (176 °F)	326.6-340.1
100 °C (212 °F)	173.8-182.0
120 °C (248 °F)	98.17-103.6

Internal Mode Switch (IMS)

The previous external NSBU switch has been replaced with an Internal Mode Switch (IMS), which is mounted internally on the manual shaft as shown below. The IMS transmits selector position information to the TCM through the pass-thru case connector. The IMS detects the angular position of the manual shaft. This position is communicated to the TCM so that certain vehicle control functions can be coordinated with the position of the shift lever. The IMS has redundant circuitry to alert the TCM in the event of a single wire or switch failure. The park/neutral signal output is typically used as confirmation that the transmission is in Neutral before the engine is started.

Refer to Figure 9 for partial wire schematic and Internal Mode Switch parity test. The internal harness and case connector, including terminal assignments were also changed to accommodate the IMS. Refer to Figure 7 for the new case connector pin identification and Figure 11 for full wire schematic.

INTERNAL MODE SWITCH LOCATION

Note: Pins are labeled at bottom of switch.



INTERNAL MODE SWITCH PARITY CHART

RANGE	INTERNAL MODE SWITCH SIGNAL A	INTERNAL MODE SWITCH SIGNAL B	INTERNAL MODE SWITCH SIGNAL C	INTERNAL MODE SWITCH SIGNAL P
P	LOW/OFF	HIGH/ON	HIGH/ON	LOW/OFF
R	LOW/OFF	LOW/OFF	HIGH/ON	HIGH/ON
N	HIGH/ON	LOW/OFF	HIGH/ON	LOW/OFF
D	HIGH/ON	LOW/OFF	LOW/OFF	HIGH/ON
*M	LOW/OFF	LOW/OFF	LOW/OFF	LOW/OFF
2	LOW/OFF	HIGH/ON	LOW/OFF	HIGH/ON
I	HIGH/ON	HIGH/ON	LOW/OFF	LOW/OFF

NOTE: HIGH/ON = APPROXIMATELY 5 VOLTS

LOW/OFF = APPROXIMATELY 0 VOLTS

*M mode allows TAP Up/TAP Down feature functionally, 1st thru 6th ranges.
When in M range, logic states do not change.

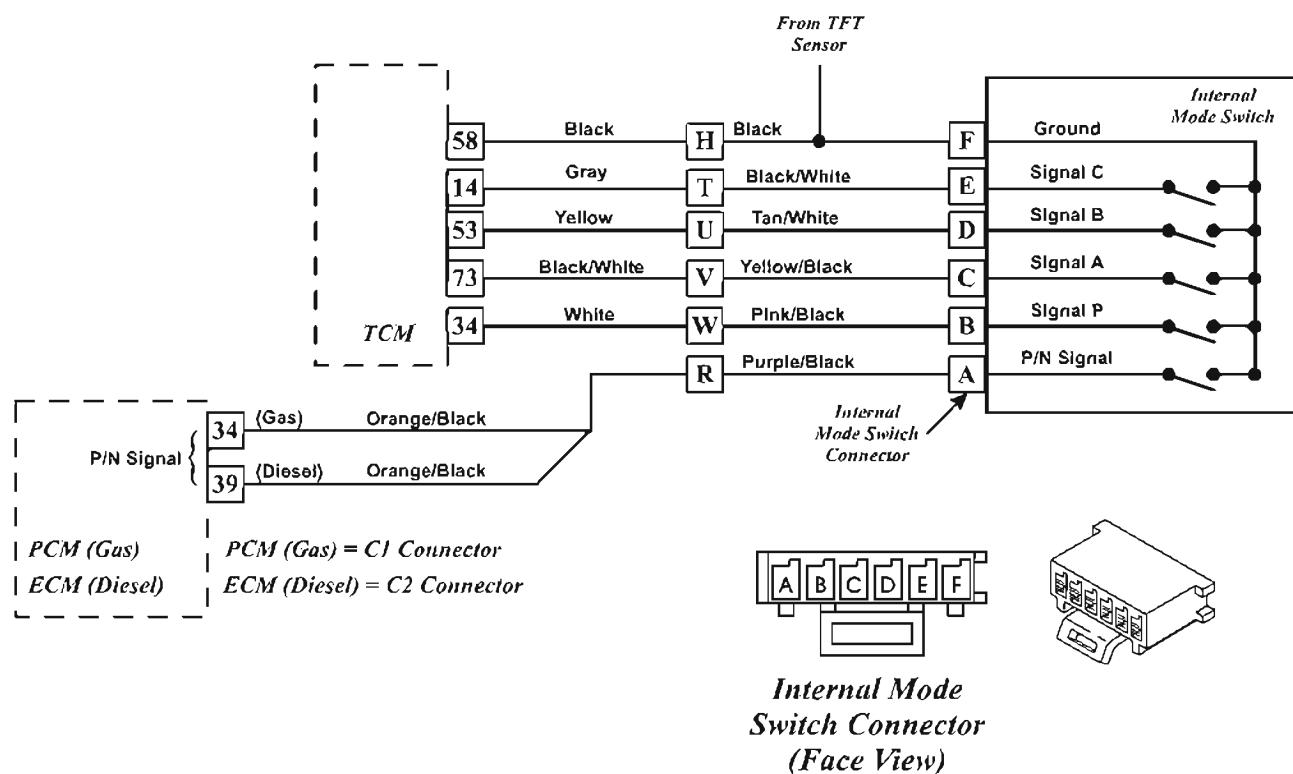
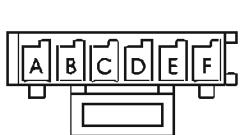
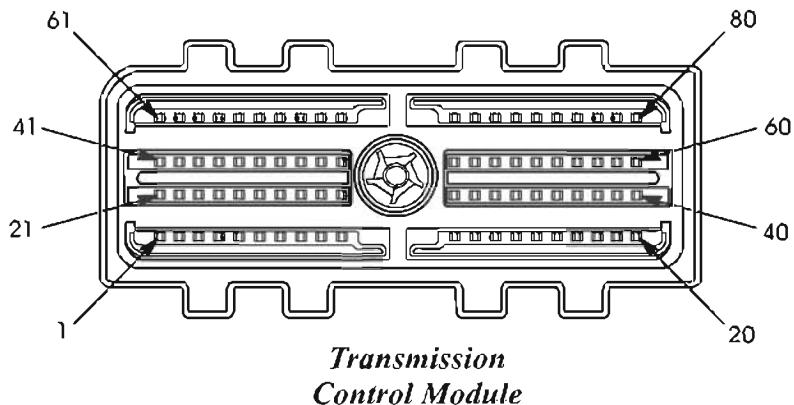
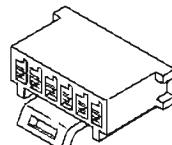
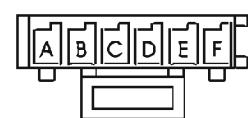
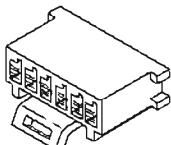


Figure 9

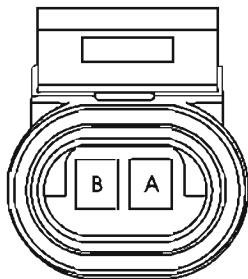
ALLISON "6 SPEED" CONNECTOR TERMINAL IDENTIFICATION



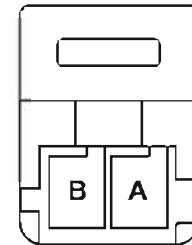
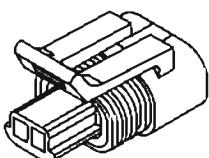
*Pressure Switch Assembly
Harness Connector*



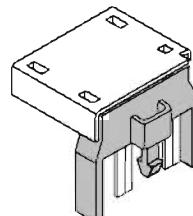
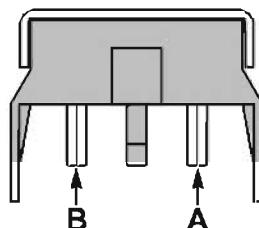
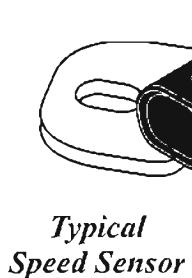
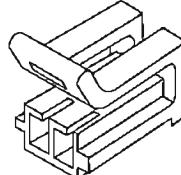
*Internal Mode Switch
Harness Connector*



*All Speed Sensor
Harness Connectors*



*SS1, SS2, SS3, EPC (Main Mod.)
Solenoid Connector*



*PCS1, PCS2, TCC PCS,
Solenoid Connector*

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ALLISON 6 SPEED WIRE SCHEMATIC

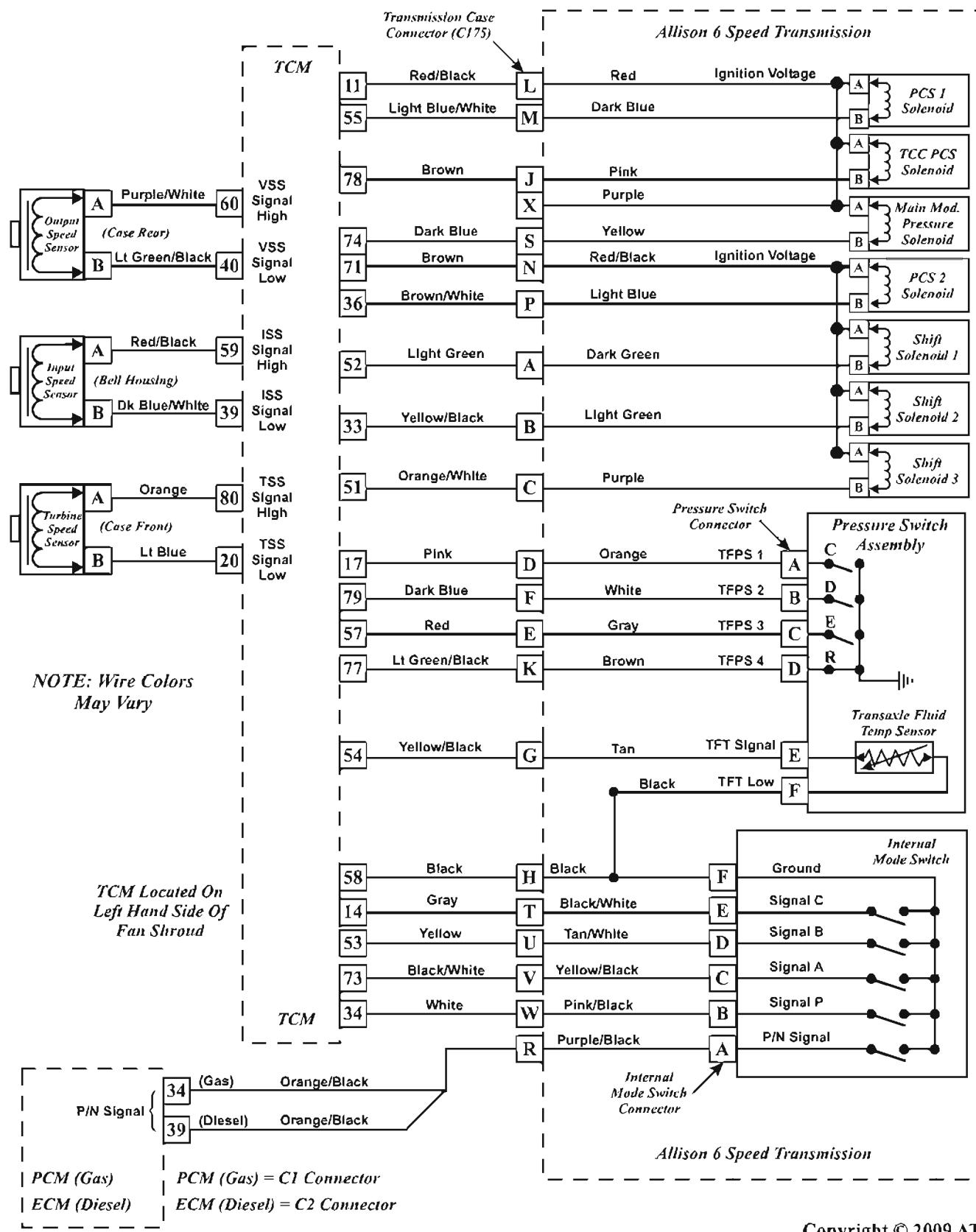


Figure 11

**Diagnostic Trouble Code (DTC)****Type Definitions**

The DTC Type Definitions contain the characteristics for all types of DTCs. The DTC type is based on the action that the control module takes when storing DTC information, and whether or not the control module illuminates a service lamp or displays a message on a Driver Information Center (DIC). The DTC descriptions in the DTC chart are listed in numeric order and indicate the DTC types for domestic and export vehicle applications. Each DTC is categorized into one of the following types:

Type "A"

This DTC is emissions related. The control module stores the DTC in History, Freeze Frame and Failure Records, during the 1st trip in which the conditions for setting the DTC are met. The control module also illuminates the Malfunction Indicator Lamp (MIL) during the 1st trip in which the conditions for setting the DTC are met.

Type "B"

This DTC is emissions related. The control module stores the DTC in Failure Records, during the 1st trip in which the conditions for setting the DTC are met. The control module stores the DTC in History and Freeze Frame during the 2nd consecutive trip in which the conditions for setting the DTC are met. The control module also illuminates the Malfunction Indicator Lamp (MIL) during the 2nd consecutive trip in which the conditions for setting the DTC are met.

Type "C"

This DTC is non-emissions related. The control module stores the DTC in History and Failure Recoeds during the 1st trip in which the conditions for setting the DTC are met. The control module does not store the DTC in Freeze Frame and does not illuminate the MIL. For some Type C DTCs, a message may be displayed on a DIC, if equipped. For other Type C DTCs, a seperate service lamp, other than the MIL, may be illuminated. Type C DTCs that do not display a message on the DIC or illuminate a seperate service lamp were formerly referred to as Type D.

DTC	Description	2007 DIAGNOSTIC TROUBLE CODE (DTC) CHART	
		6.6L	8.1L
P0117	Engine Coolant Temperature Circuit Low Voltage (High Temperature)	C	C
P0118	Engine Coolant Temperature Circuit High Voltage (Low Temperature)	C	C
P0120	Throttle Position Sensor 1 Performance Problem	*A	*A
P0122	Throttle Position Sensor 1 Circuit Low Voltage	*A	*A
P0123	Throttle Position Sensor 1 Circuit High Voltage	*A	*A
P0218	Transmission Overtemperature	C	C
P0220	Throttle Position Sensor 2 Performance Problem	*A	*A
P0222	Throttle Position Sensor 2 Circuit Low Voltage	*A	*A
P0223	Throttle Position Sensor 2 Circuit High Voltage	*A	*A

* The control module commands the TAC system to operate in the Reduced Engine Power mode.

A message or an indicator lamp displays "Reduced Engine Power".

Under certain conditions, the control module commands the engine OFF.



DTC	Description	2007 DIAGNOSTIC TROUBLE CODE (DTC) CHART		DTC TYPE
		6.6L	8.1L	
P0561	System Voltage Unstable	C	C	
P0562	System Voltage Low	C	C	
P0563	System Voltage High	C	C	
P0602	Transmission Control Module Not Programmed	C	C	
P0613	Transmission Control Module Processor	C	C	
P0634	TCM Internal Temperature Too High	B	B	
P0658	Acutator Supply Voltage 1 Low	A	A	
P0659	Acutator Supply Voltage 1 High	B	B	
P0700	TCM Requested MIL Illumination	A	A	
P0701	Transmission Control System Performance	C	C	
P0703	Brake Switch Circuit	C	C	
P0706	Internal Mode Switch (IMS) Circuit (PRNDL Input)	A	A	
P0708	Internal Mode Switch (IMS) Circuit High Input	A	A	
P0711	Transmission Fluid Temperature (TFT) Sensor Circuit Performance	B	B	
P0712	Transmission Fluid Temperature Circuit Low Voltage (High Temperature)	B	B	
P0713	Transmission Fluid Temperature Circuit High Voltage (Low Temperature)	B	B	
P0716	Turbine Speed Sensor Circuit Performance	A	A	
P0717	Turbine Speed Sensor Circuit No Signal	A	A	
P071A	Transmission Tow/Haul Mode Switch Circuit	C	C	
P0721	Output Speed Sensor Circuit Performance	A	A	
P0722	Output Speed Sensor Circuit No Signal	A	A	
P0729	Incorrect 6th Gear Ratio	A	A	
P0731	Incorrect 1st Gear Ratio	A	A	
P0732	Incorrect 2nd Gear Ratio	A	A	
P0733	Incorrect 3rd Gear Ratio	A	A	
P0734	Incorrect 4th Gear Ratio	A	A	
P0735	Incorrect 5th Gear Ratio	A	A	
P0736	Incorrect Reverse Gear Ratio	A	A	
P0741	Torque Converter Clutch System Stuck Off	B	B	
P0742	Torque Converter Clutch System Stuck On	B	B	
P0751	Shift Solenoid 1 (SS1) Stuck Off	A	A	
P0752	Shift Solenoid 1 (SS1) Stuck On	A	A	
P0756	Shift Solenoid 2 (SS2) Stuck Off	A	A	
P0757	Shift Solenoid 2 (SS2) Stuck On			

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Figure 13

Automatic Transmission Service Group



DTC	Description	2007 DIAGNOSTIC TROUBLE CODE (DTC) CHART	
		6.6L	8.1L
P0761	Shift Solenoid 3 (SS3) Stuck Off	A	A
P0762	Shift Solenoid 3 (SS3) Stuck On	A	A
P0776	Pressure Control Solenoid 2 (PCS2) Stuck Off	A	A
P0777	Pressure Control Solenoid 2 (PCS2) Stuck On	A	A
P0815	Upshift Switch Circuit	C	C
P0816	Downshift Switch Circuit	C	C
P0826	Upshift and Downshift Switch Circuit	B	B
P0827	TAP Up and Down Shift Switch Circuit Low	B	B
P0828	TAP Up and Down Shift Switch Circuit High	B	B
P0842	Transmission Pressure Switch 1, Circuit Low	A	A
P0843	Transmission Pressure Switch 1, Circuit High	A	A
P0847	Transmission Pressure Switch 2, Circuit Low	A	A
P0848	Transmission Pressure Switch 2, Circuit High	A	A
P0851	Internal Mode Switch, P/N Signal Short to Ground	C	C
P0852	Internal Mode Switch, P/N Signal Open	C	C
P0872	Transmission Pressure Switch 3, Circuit Low	A	A
P0873	Transmission Pressure Switch 3, Circuit High	A	A
P0877	Transmission Pressure Switch 4, Circuit Low	B	B
P0878	Transmission Pressure Switch 4, Circuit High	B	B
P0880	Transmission Control Module (TCM) Power Input Signal Loss	C	C
P0881	Transmission Control Module (TCM) Power Input Signal Unstable	C	C
P0882	Transmission Control Module (TCM) Power Input Signal Low	C	C
P0883	Transmission Control Module (TCM) Power Input Signal High	C	C
P0894	Transmission Component Slipping	B	B
P0960	Pressure Control Solenoid, Main Modulation Circuit Open	A	A
P0962	Pressure Control Solenoid, Main Modulation Circuit Low	A	A
P0963	Pressure Control Solenoid, Main Modulation Circuit High	A	A
P0964	Pressure Control Solenoid 2 (PCS2) Control Circuit Open	A	A
P0966	Pressure Control Solenoid 2 (PCS2) Control Circuit Low	A	A
P0967	Pressure Control Solenoid 2 (PCS2) Control Circuit High	A	A
P0972	Shift Solenoid 1 (SS1) Control Circuit Open	A	A
P0973	Shift Solenoid 1 (SS1) Control Circuit Low	A	A
P0974	Shift Solenoid 1 (SS1) Control Circuit High	A	A
P0975	Shift Solenoid 2 (SS2) Control Circuit Open	A	A

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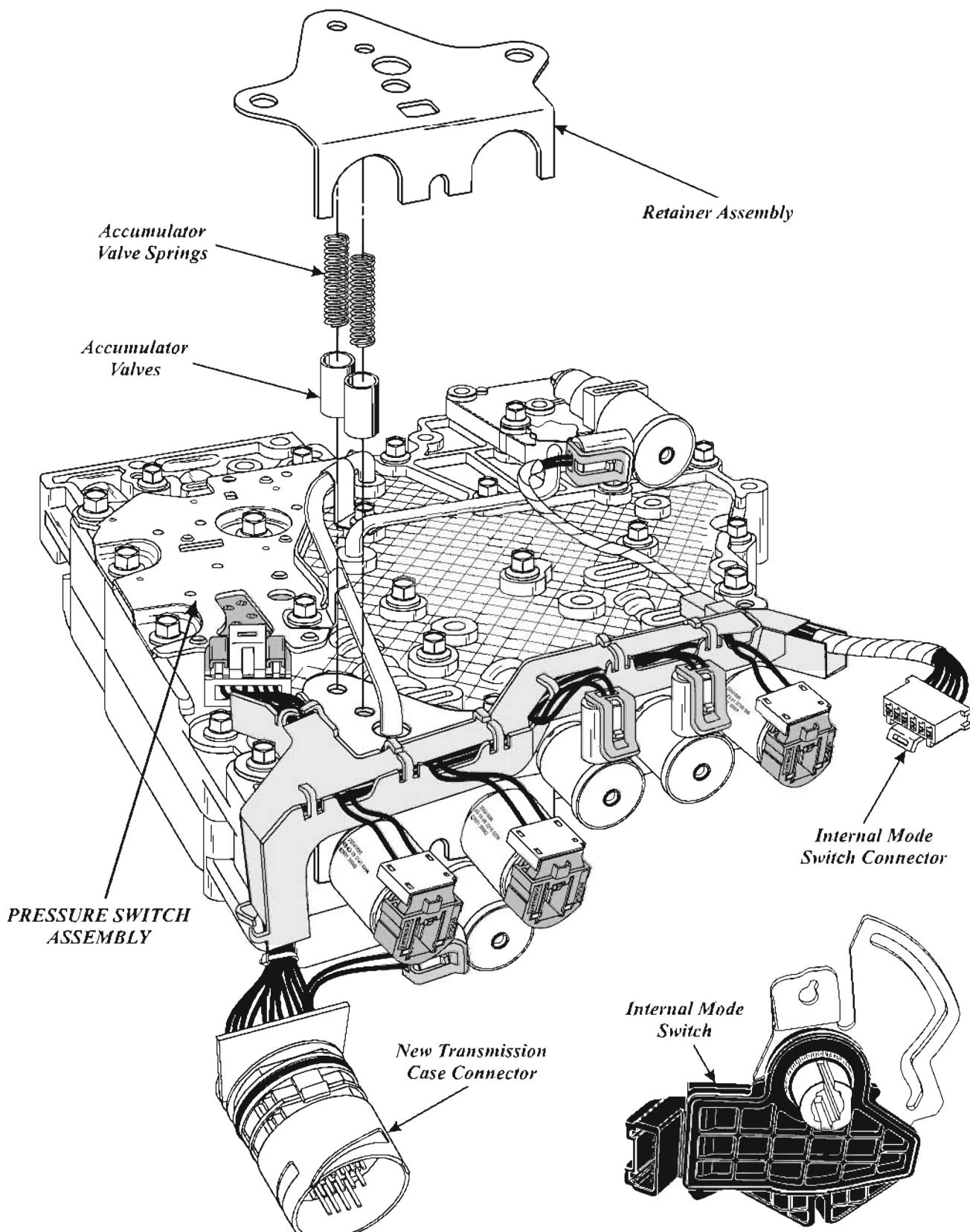
Figure 14



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Figure 15

Automatic Transmission Service Group

ALLISON SERIES 1000/2000 COMPLETE VALVE BODY


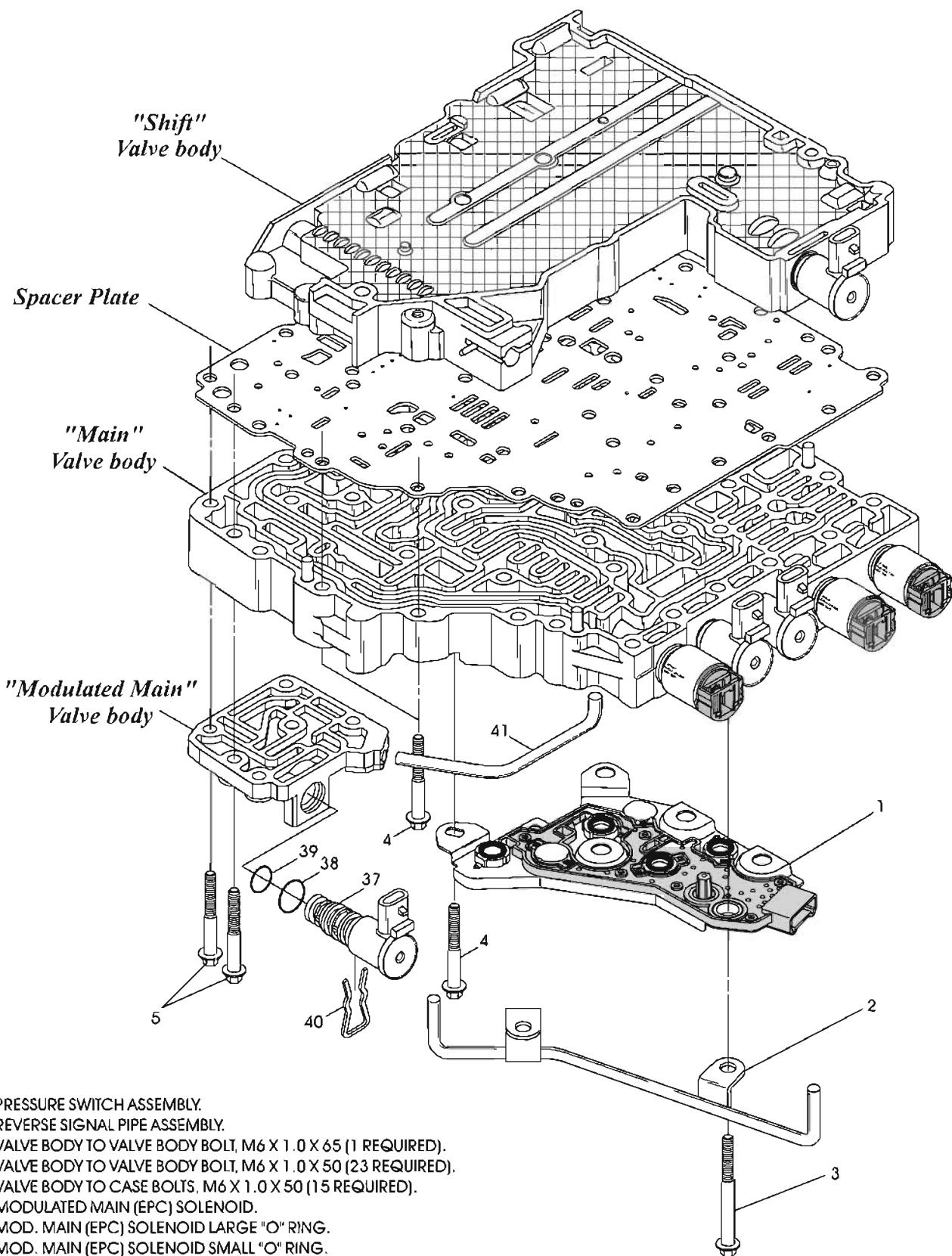
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Figure 16

Automatic Transmission Service Group



ALLISON "6 SPEED" VALVE BODY EXPLODED VIEW



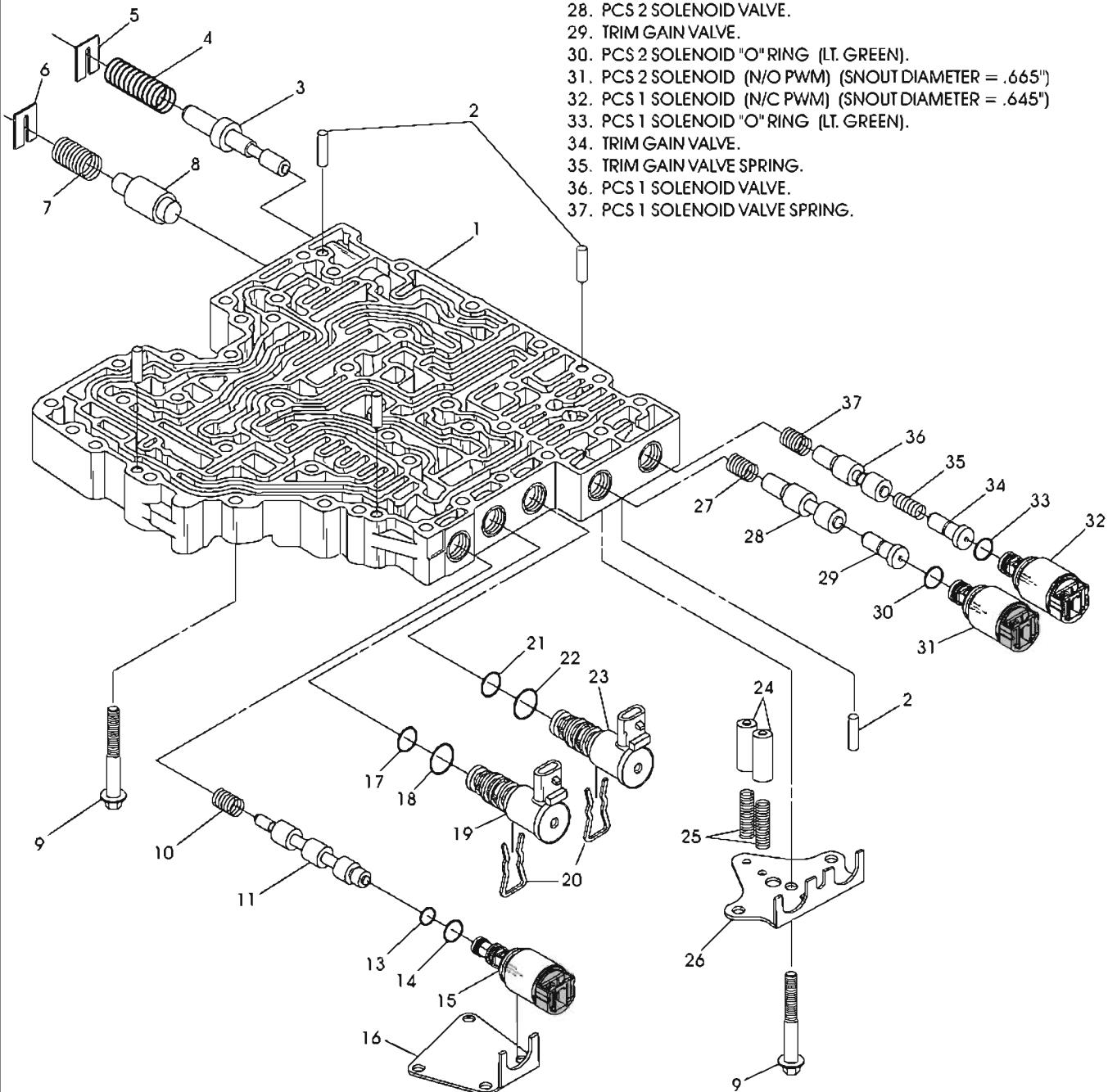
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Figure 17



ALLISON "6 SPEED", "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 PRESSURE REGULATOR VALVE SPRING RETAINER.
7. EXHAUST PRESSURE REGULATOR VALVE SPRING.
8. EXHAUST PRESSURE REGULATOR VALVE.
9. BOLT, M6 X 1.0 X 50 (23 REQUIRED)
10. TCC PCS SOLENOID VALVE SPRING.
11. TCC PCS SOLENOID VALVE.
12. TCC PCS SOLENOID SMALL "O" RING (DK. GREEN).
13. TCC PCS SOLENOID LARGE "O" RING (LT. GREEN).
14. TCC PCS SOLENOID (LOCK-UP PWM).
15. TCC PCS SOLENOID RETAINING BRACKET.
16. SHIFT SOLENOID "2" SMALL "O" RING.
17. SHIFT SOLENOID "2" LARGE "O" RING.
18. SHIFT SOLENOID "3" SMALL "O" RING.
19. SHIFT SOLENOID "3" LARGE "O" RING.
20. SHIFT SOLENOID RETAINING CLIPS.
21. SHIFT SOLENOID "3" SMALL "O" RING.
22. SHIFT SOLENOID "3" LARGE "O" RING.
23. SHIFT SOLENOID "3".
24. ACCUMULATOR VALVES.
25. ACCUMULATOR SPRINGS.
26. PCS 1 AND PCS 2 SOLENOID RETAINING BRACKET.
27. PCS 2 SOLENOID VALVE SPRING.
28. PCS 2 SOLENOID VALVE.
29. TRIM GAIN VALVE.
30. PCS 2 SOLENOID "O" RING (LT. GREEN).
31. PCS 2 SOLENOID (N/O PWM) (SNOUT DIAMETER = .665")
32. PCS 1 SOLENOID (N/C PWM) (SNOUT DIAMETER = .645")
33. PCS 1 SOLENOID "O" RING (LT. GREEN).
34. TRIM GAIN VALVE.
35. TRIM GAIN VALVE SPRING.
36. PCS 1 SOLENOID VALVE.
37. PCS 1 SOLENOID VALVE SPRING.

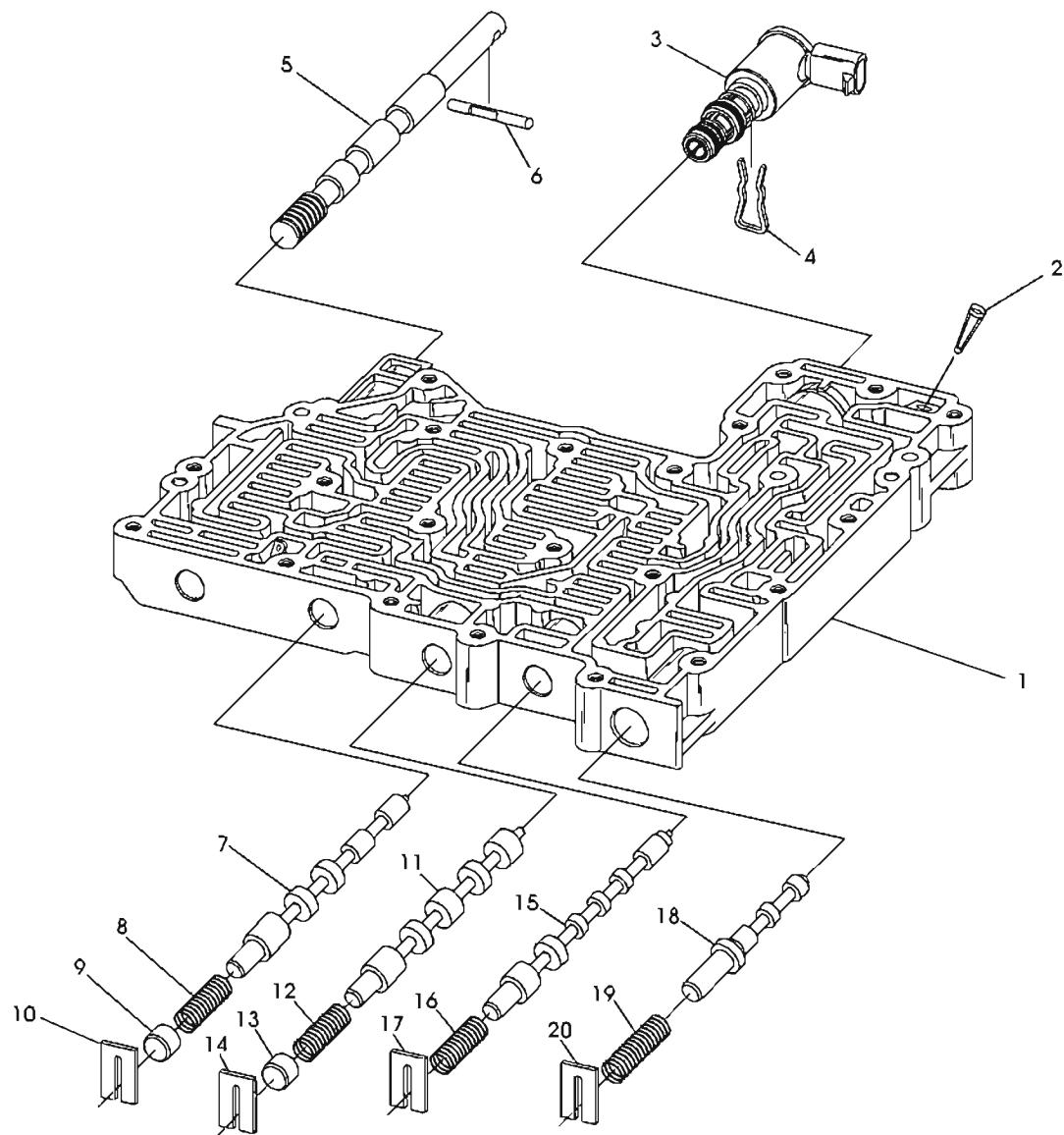


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Figure 18

ALLISON "6 SPEED", "SHIFT" VALVE BODY EXPLODED VIEW

1. SHIFT VALVE BODY CASTING.
2. SOLENOID SCREEN.
3. SHIFT SOLENOID "1".
4. SHIFT SOLENOID "1" RETAINING CLIP.
5. MANUAL SELECTOR VALVE.
6. MANUAL SELECTOR VALVE PIN.
7. SHIFT SOLENOID "2" SHIFT VALVE.
8. SHIFT SOLENOID "2" SHIFT VALVE SPRING.
9. SHIFT SOLENOID "2" SHIFT VALVE BORE PLUG.
10. SHIFT SOLENOID "2" SHIFT VALVE LINE-UP RETAINER.
11. SHIFT SOLENOID "3" SHIFT VALVE.
12. SHIFT SOLENOID "3" SHIFT VALVE SPRING.
13. SHIFT SOLENOID "3" SHIFT VALVE BORE PLUG.
14. SHIFT SOLENOID "3" SHIFT VALVE LINE-UP RETAINER.
15. SHIFT SOLENOID "1" SHIFT VALVE.
16. SHIFT SOLENOID "1" SHIFT VALVE SPRING.
17. SHIFT SOLENOID "1" SHIFT VALVE LINE-UP RETAINER.
18. MAIN CONTROL VALVE.
19. MAIN CONTROL VALVE SPRING.
20. MAIN CONTROL VALVE LINE-UP RETAINER.





FREIGHTLINER/DODGE SPRINTER "722.6/NAG1 LIMP MODE"

COMPLAINT: The vehicle comes into the shop with the transmission in "Limp Mode", no codes are stored in the TCM memory, but there may be a "System Under Voltage" message in the "Driver Information Center".

CAUSE: Sprinters equipped with electric ventilation fans mounted in the roof are wired into the Transmission Control Module power supply circuit, (Refer to Figure 1). There are too many amps being drawn for one relay when the fans turn on which causes a voltage drop across the Transmission Control Relay which causes a voltage drop to the transmission which results in a "Limp In" condition. The key to this problem is, it goes to limp mode only when the fan comes on.

CORRECTION: There is a relay and wiring package available from the dealer to correct this condition by the addition of a separate relay to isolate the ventilation fan circuit from the transmission relay, (Refer to Figure 2).

NOTE: The relay box is located under the driver's seat and will require removal of the seat from the floor. Then the relay box cover will have to be removed to gain access to the relay and the wiring.

SERVICE INFORMATION:

Ventilation Fan Relay & Wiring Package.....CF41H040

FREIGHTLINER/DODGE SPRINTER “LIMP MODE”

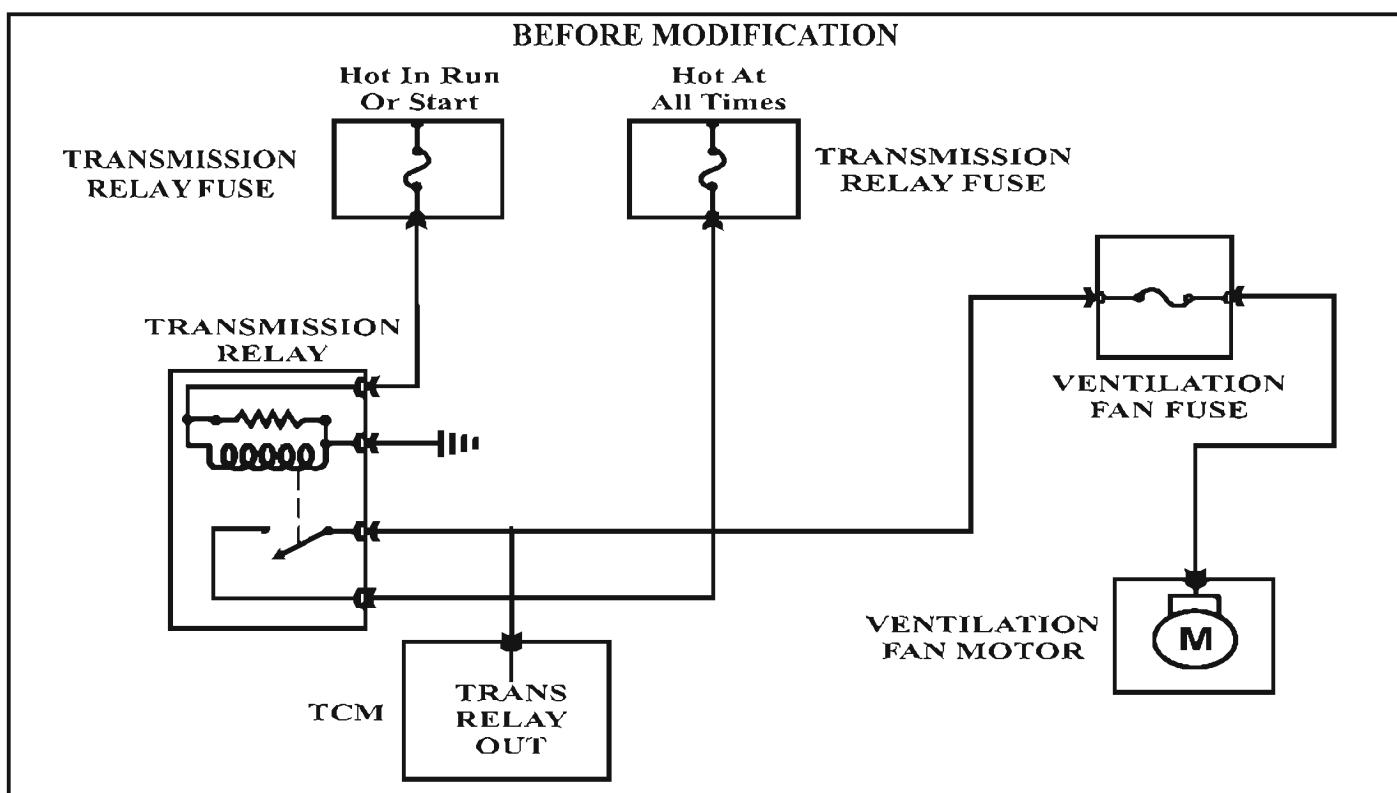


Figure 1

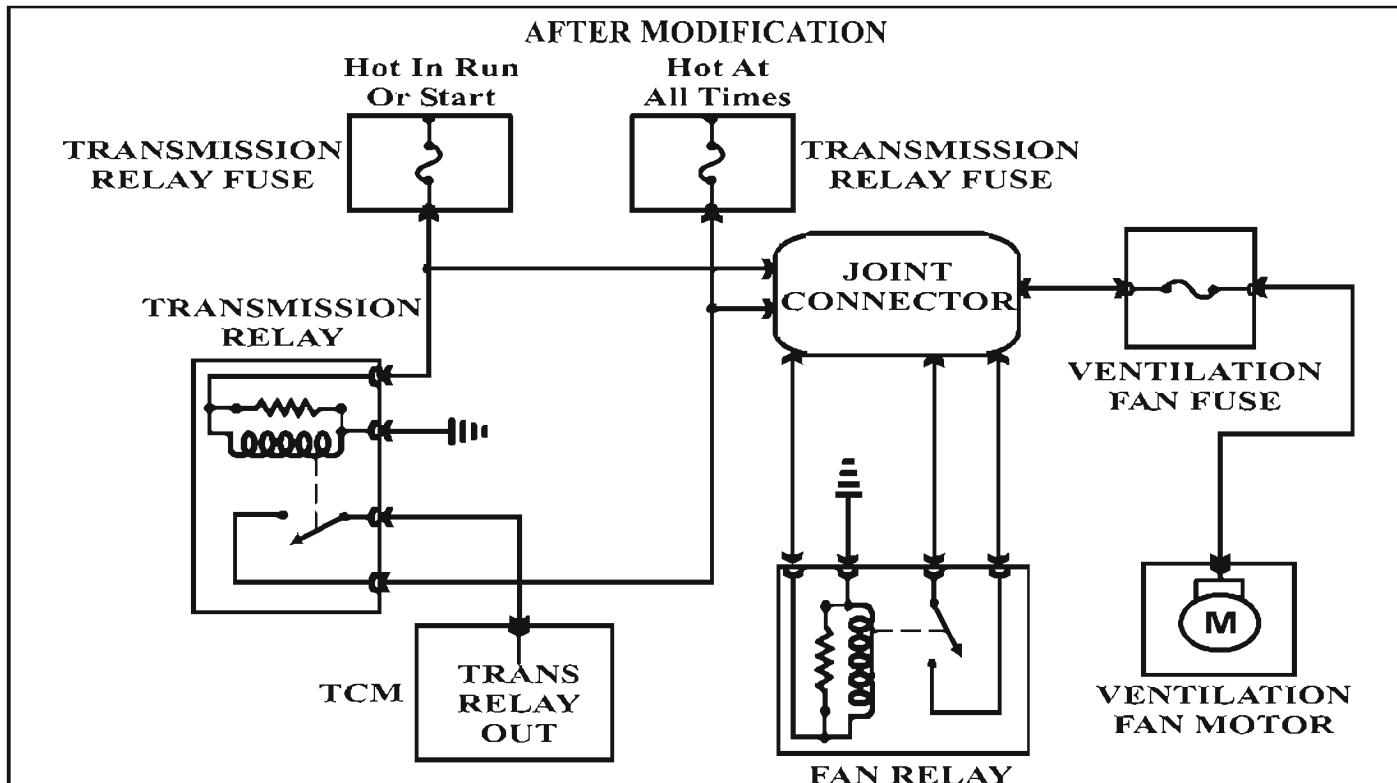


Figure 2
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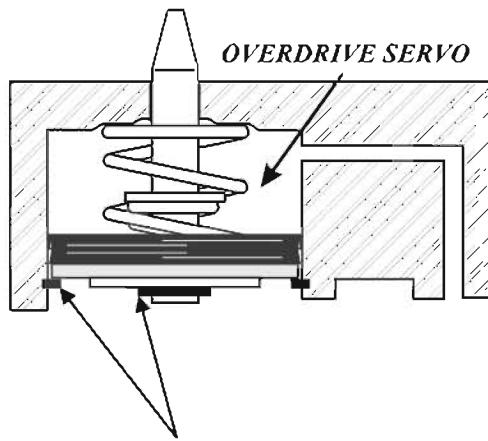
FORD MOTOR COMPANY**2001-UP VEHICLES EQUIPPED WITH THE 4R70W
4R70E-4R75E TRANSMISSIONS 3-4 NEUTRAL
BEFORE OR AFTER REBUILD**

COMPLAINT: Some Ford Motor Company vehicles 2001 - later that are equipped with the 4R70W-4R70E, and 4R75E transmissions may exhibit a 3-4 upshift neutral condition either before, or after rebuild. A no engine braking with the shifter in the manual 2 range may also be noticed as well.

CAUSE: One possible cause for this condition may be that pieces of the overdrive servo retaining snap ring, or the overdrive servo piston "E-Clip" may be broken. (See Figure 1). When these pieces break off, they may become lodged in the overdrive servo regulator valve and restrict the movement of the valve (See Figures 2 and 3) for valve location and identification. This can cause the overdrive band to not have the ability to make a full apply, resulting in a 3-4 neutral condition, and possibly a no engine braking condition with the shifter in the manual 2 range.

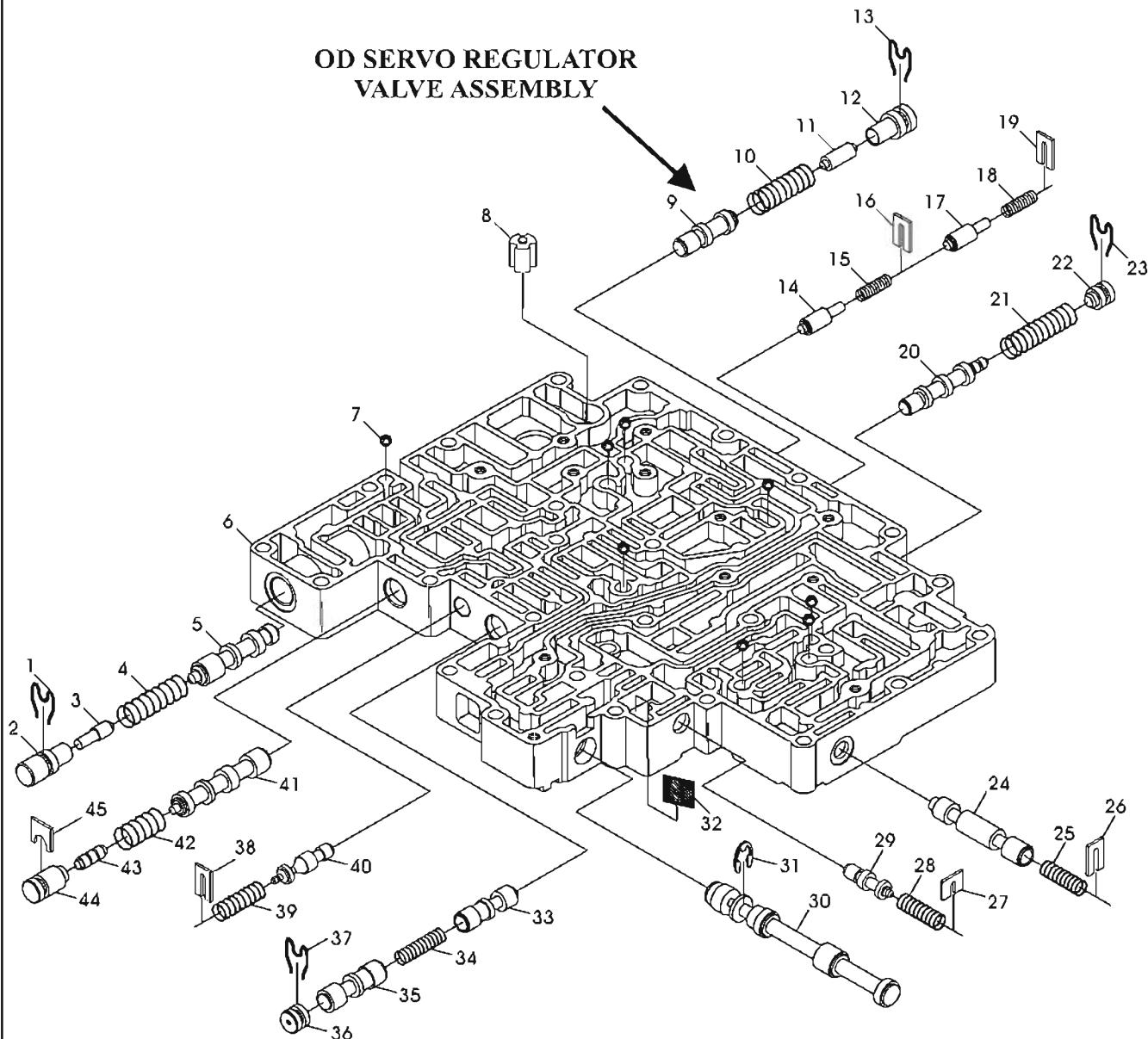
CORRECTION: It is recommended that during transmission service, or overhaul, to carefully remove the overdrive servo regulator valve assembly from the valve body, and clean out any debris that may be found.

Note: if the OD servo regulator boost valve and sleeve is either worn, or sticking, there is a replacement valve assembly offered from Sonnax, part number 76948-29K.

OVERDRIVE SERVO CROSS-SECTION

**PIECES OF THE E CLIP OR THE
SNAP RING MAY BREAK OFF AND
LODGE IN THE OD SERVO REGULATOR VALVE**

FORD 4R70W
2001-UP MAIN VALVE BODY EXPLODED VIEW



FORD 4R70W MAIN VALVE BODY LEGEND

- 1 MAIN PRESSURE REGULATOR BOOST VALVE SLEEVE RETAINER.
- 2. MAIN PRESSURE REGULATOR BOOST VALVE SLEEVE.
- 3 MAIN PRESSURE REGULATOR BOOST VALVE.
- 4 MAIN PRESSURE REGULATOR VALVE SPRING.
- 5 MAIN PRESSURE REGULATOR VALVE.
- 6 MAIN VALVE BODY CASTING.
- 7 CHECK BALL, 1/4" DIAMETER (8 REQUIRED).
- 8 CONVERTER DRAIN BACK VALVE.
- 9 O.D. SERVO REGULATOR VALVE.
- 10 O.D. SERVO REGULATOR VALVE SPRING.
- 11 O.D. SERVO REGULATOR BOOST VALVE.
- 12 O.D. SERVO REGULATOR BOOST VALVE SLEEVE.
- 13 BOOST VALVE SLEEVE RETAINER.
- 14 3-4 CAPACITY MODULATOR VALVE.
- 15 3-4 CAPACITY MODULATOR VALVE SPRING.
- 16 3-4 CAPACITY MODULATOR VALVE SPRING RETAINER.
- 17 LOW SERVO CAPACITY MODULATOR VALVE.
- 18 LOW SERVO CAPACITY MODULATOR VALVE SPRING.
- 19 LOW SERVO CAPACITY MODULATOR VALVE SPRING RETAINER.
- 20 3-4 SHIFT VALVE.
- 21 3-4 SHIFT VALVE SPRING.
- 22 3-4 SHIFT VALVE SPRING BORE PLUG.
- 23 3-4 SHIFT VALVE BORE PLUG RETAINER.
- 24 2-3 BACKOUT VALVE.
- 25 2-3 BACKOUT VALVE SPRING.
- 26 2-3 BACKOUT VALVE SPRING RETAINER.
- 27 SOLENOID PRESSURE REGULATOR VALVE SPRING RETAINER.
- 28 SOLENOID PRESSURE REGULATOR VALVE SPRING.
- 29 SOLENOID PRESSURE REGULATOR VALVE.
- 30 MANUAL CONTROL VALVE.
- 31 MANUAL CONTROL VALVE "E" CLIP.
- 32 EPC SOLENOID SCREEN.
- 33 1-2 SHIFT VALVE.
- 34 2-3 SHIFT VALVE SPRING.
- 35 2-3 SHIFT VALVE.
- 36 2-3 SHIFT VALVE BORE PLUG.
- 37 2-3 SHIFT VALVE BORE PLUG RETAINER.
- 38 CONVERTER PRESSURE REGULATOR VALVE SPRING RETAINER.
- 39 CONVERTER PRESSURE REGULATOR VALVE SPRING.
- 40 CONVERTER PRESSURE REGULATOR VALVE.
- 41 BYPASS CLUTCH CONTROL VALVE.
- 42 BYPASS CLUTCH CONTROL VALVE SPRING.
- 43 BYPASS CLUTCH CONTROL BOOST VALVE.
- 44 BYPASS CLUTCH CONTROL BOOST VALVE SLEEVE.
- 45 BYPASS CLUTCH CONTROL VALVE SLEEVE RETAINER.

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Figure 3

5R55W/S

WATER IN THE TRANSMISSION

COMPLAINT: The vehicle begins to develop driveability complaints and after a preliminary check of the oil condition, evidence of water contamination is found to be present.

CAUSE: The transmission vent hose is routed to the upper front of the bellhousing where it exits into a casting pocket of the case.

Directly above this area is an AC pipe which is constantly dripping condensate onto the top front of the bellhousing. This water fills up the cavity in the case where the open end of the vent hose is located and water pours into the vent line which allows this water from the AC pipe to get into the transmission. In Figure 1 the water line can be seen in the vent hose pocket from the accumulation of water from the AC line.

The water runs down the back of the engine turning all in it's path to rust as seen in Figure 2.

CORRECTION: In order to prevent this from happening again, a good fix would be to cut the vent hose just behind the bellhousing and install a vent cap into the end of the hose and relocate it out of harms way as seen in Figures 3 and 4.

Many thanks to Don Stone from AAA Quality Transmissions in Stuart Florida.

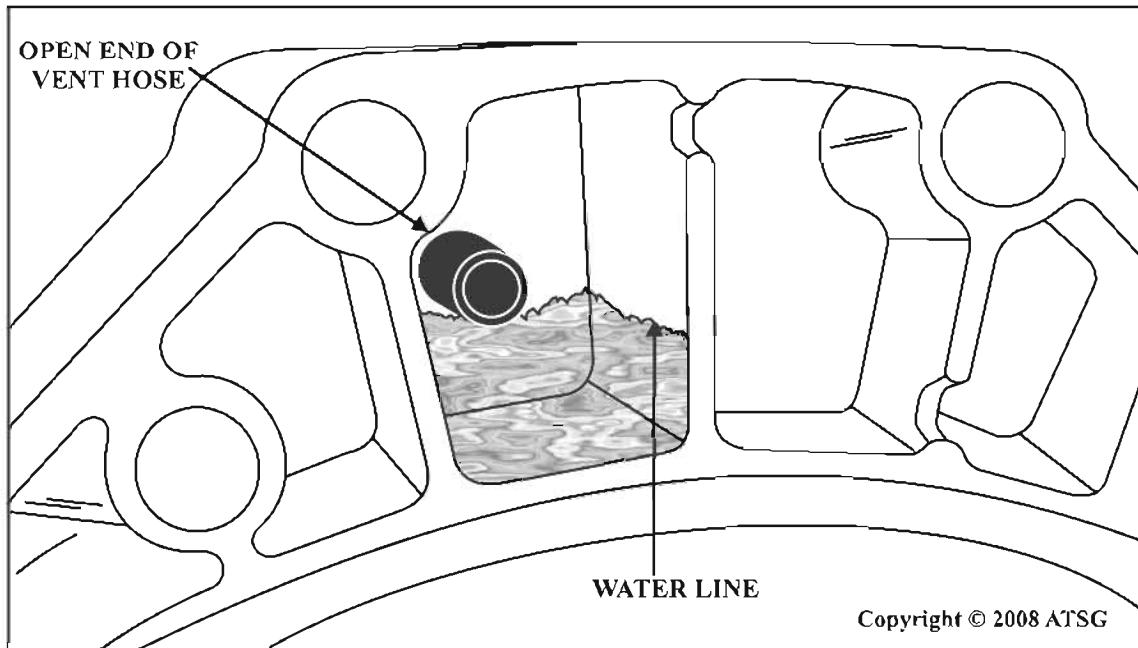
5R55W/S
WATER IN THE TRANSMISSION

Figure 1

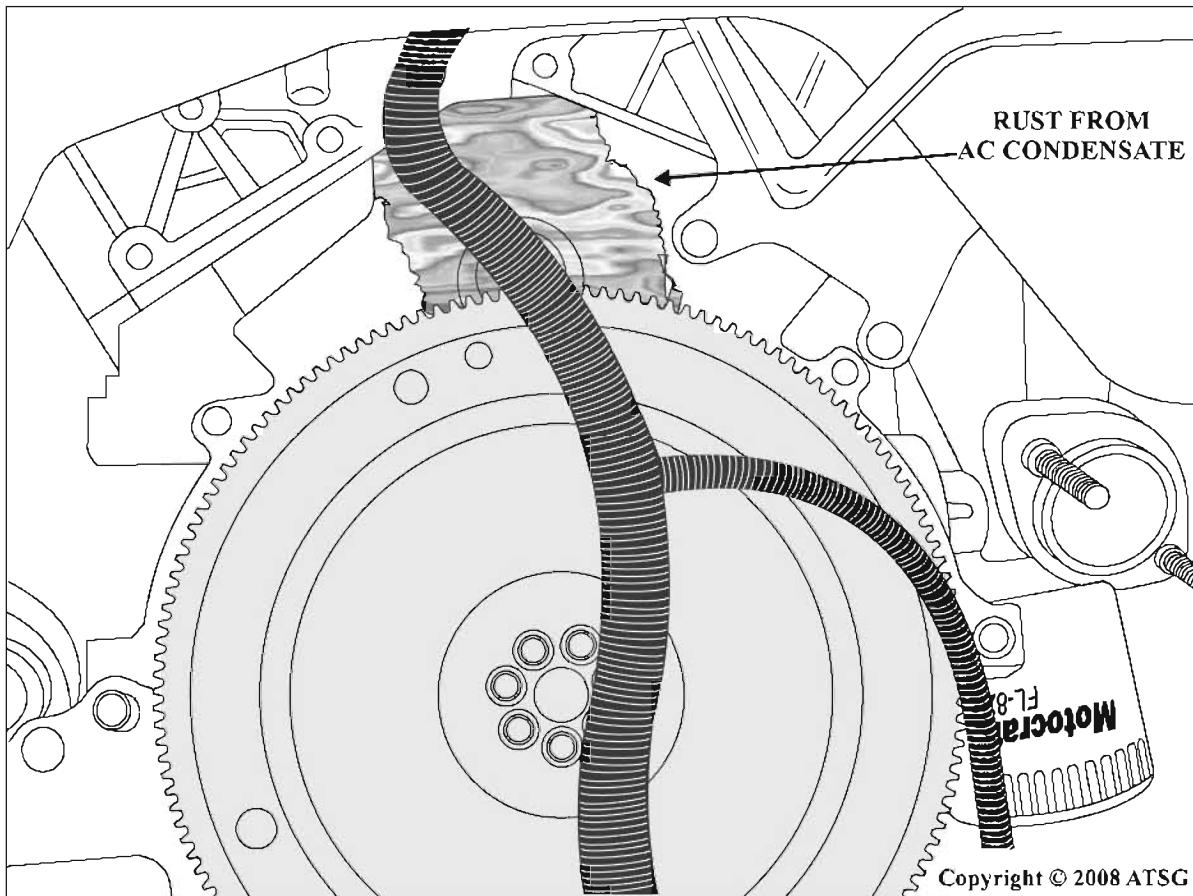


Figure 2

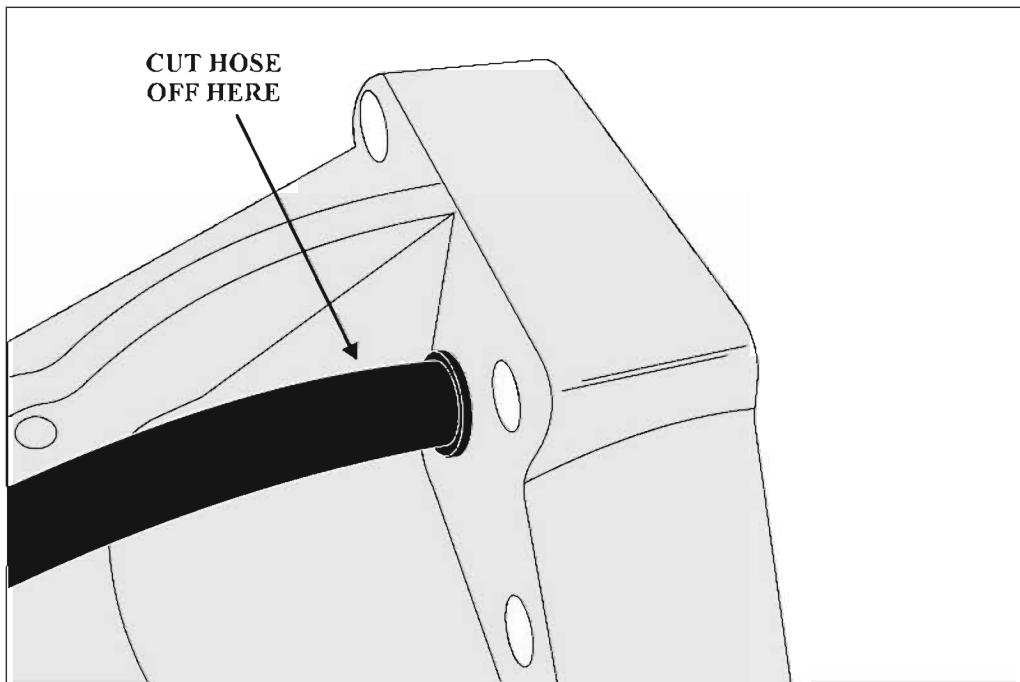
5R55W/S
WATER IN THE TRANSMISSION

Figure 3

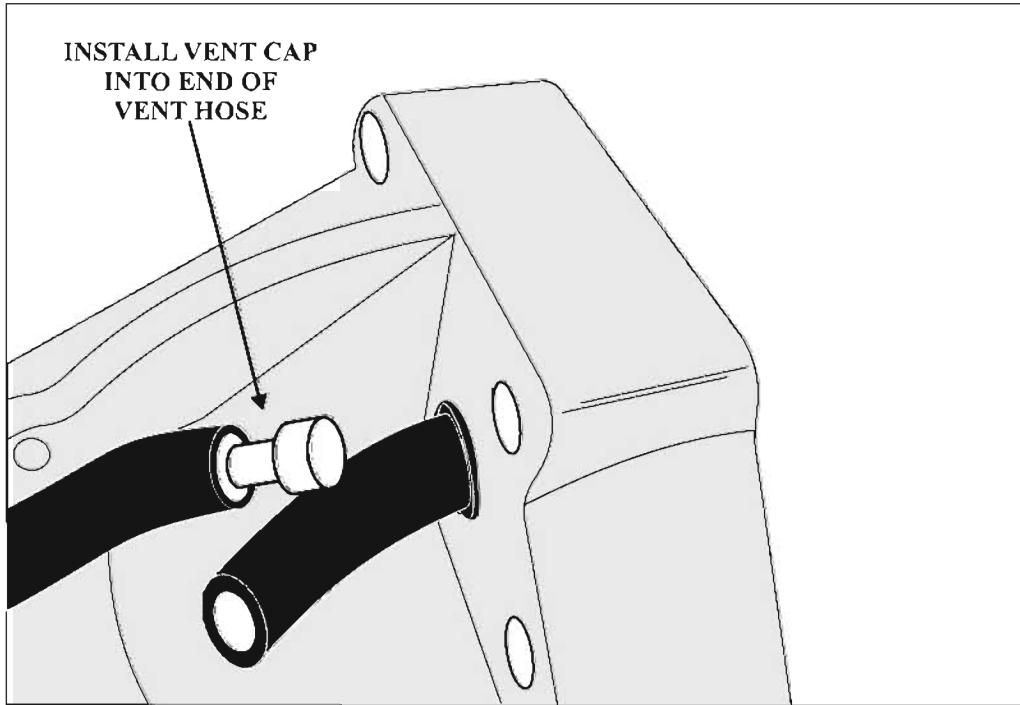


Figure 4

**FORD 4R100
SETTING DTC P0715-P0717**

COMPLAINT: Ford Motor Company vehicles equipped with the 4R100 transmission may come into the shop exhibiting a fourth gear takeoff, and when scanned, DTC P0715 (Insufficient Input from TSS), and DTC P0717 (TSS Signal Intermittent). It will also be noticed that when monitoring scanner data, that Shift Solenoid 1 is on, and Shift Solenoid 2 is off. This indicates that First Gear is being commanded. Replacing the TSS, wiring, and the PCM have not solved the problem.

CAUSE: The cause in this case is a sticking solenoid regulator valve in the main control body. When the solenoid regulator valve sticks wide open, fluid pressure that goes to the solenoid pack is cut off. With the shift selector in "D" and no pressure to the shift solenoids, results in a fourth gear start. The reason that the TSS codes appear is that when the transmission is taking off in fourth, the overdrive clutches are applied which prevents the coast clutch drum from spinning. In order for the TSS to return a reading to the PCM, the coast clutch drum has to be spinning. The TSS reads off the lugs on the outside of the coast clutch drum. (See Figure 1) In first, second, and third gears, The overdrive clutches are not applied, which allows the coast clutch drum to spin freely. This means that in first, second, or third gears, the PCM expects to see a signal from the TSS. With the transmission taking off in fourth, the PCM does not see a signal from the TSS and will set the DTC's. The location of the TSS (Turbine Shaft Speed Sensor) is shown in(Figure 2).

CORRECTION: Locate and free up the solenoid regulator valve. (See Figures 3 and 4) If the solenoid regulator valve cannot be properly freed up, replace the Valve Body.

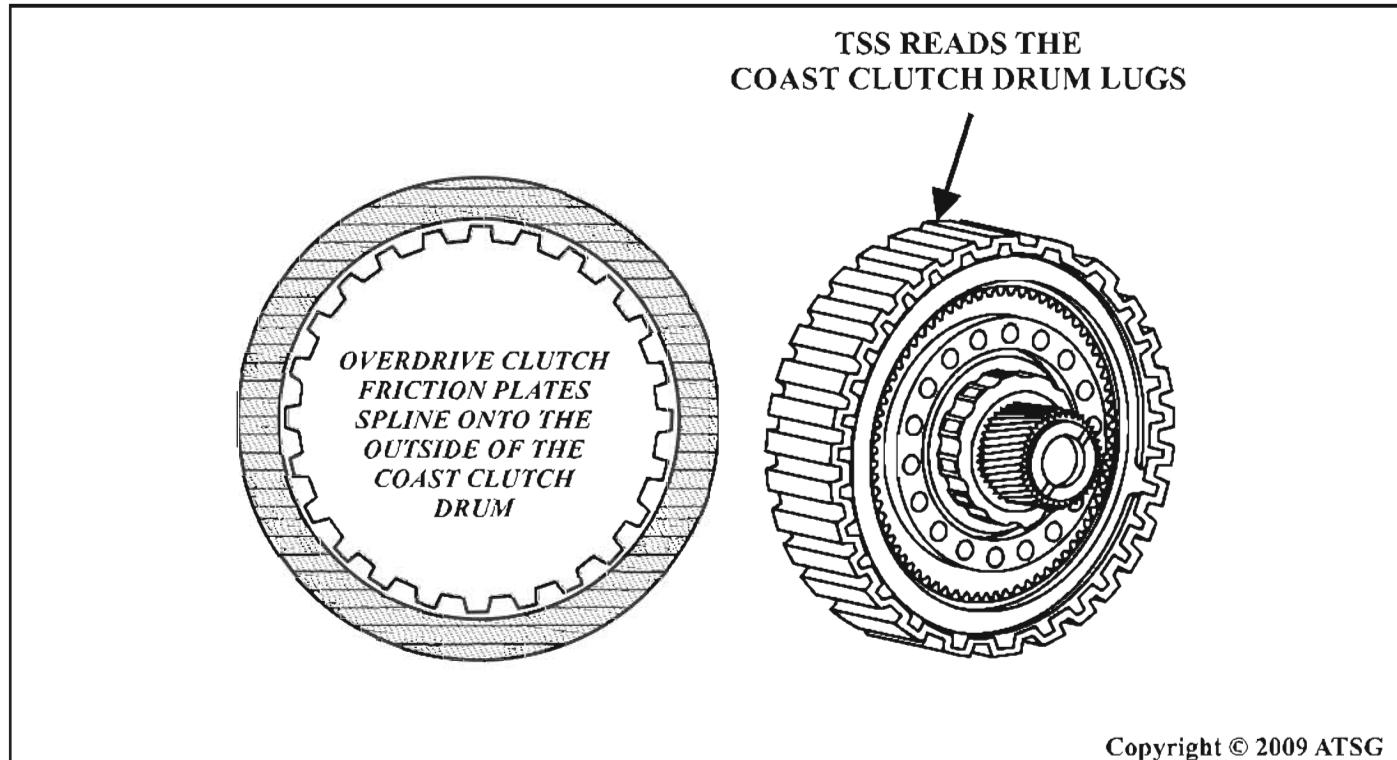


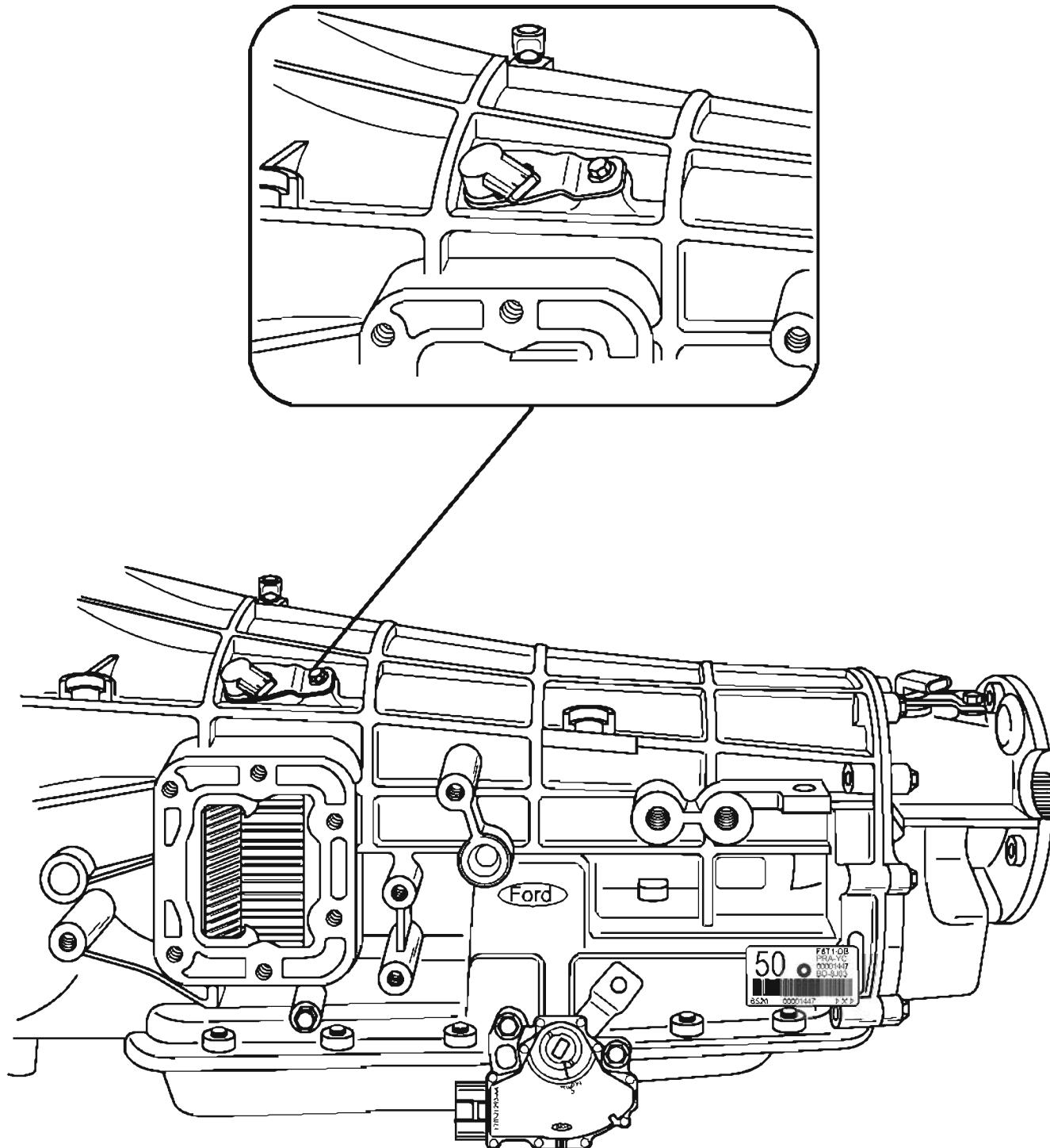
Figure 1

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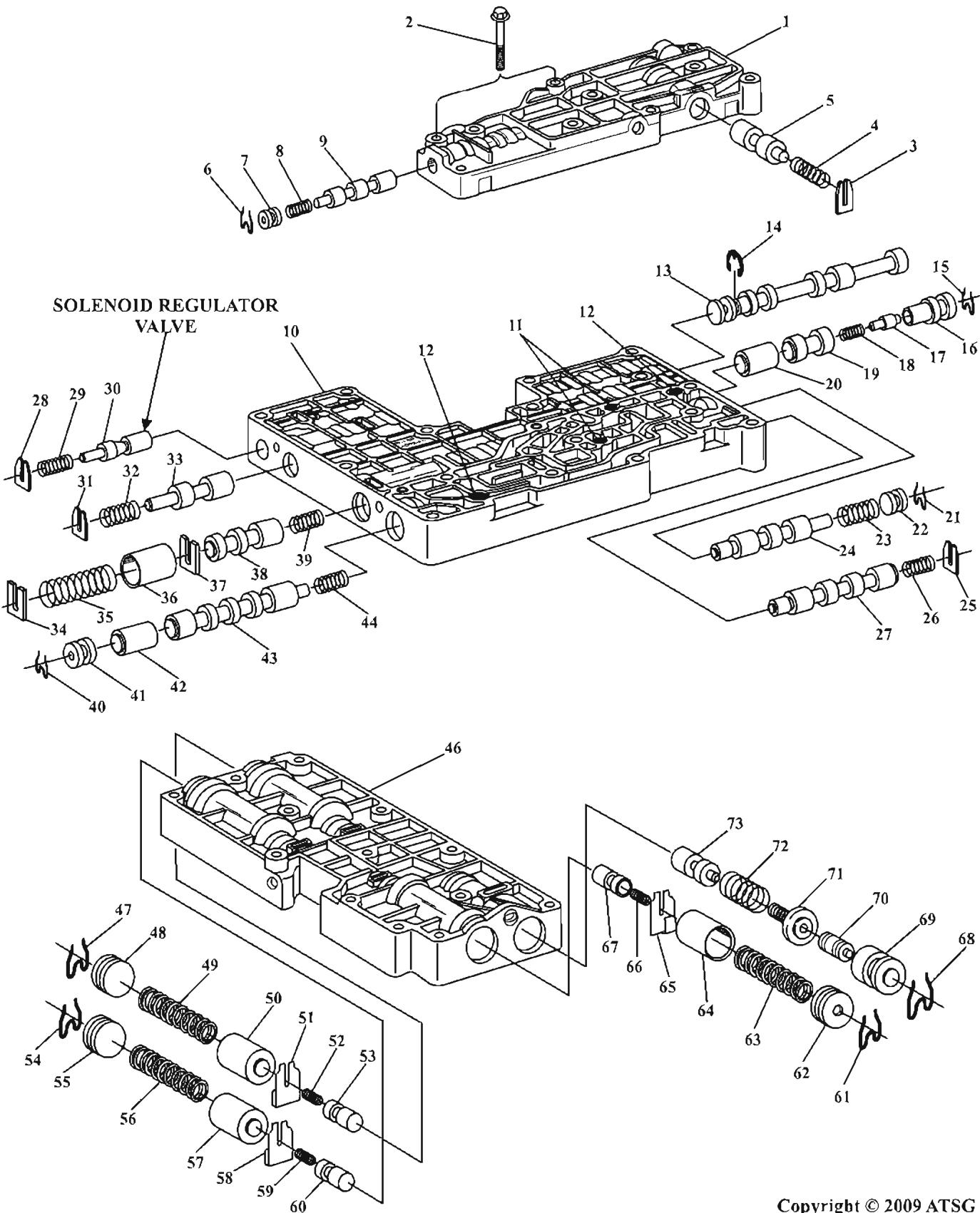
Turbine Shaft Speed Sensor

*PTO Models Only = 496-1244 Ohms Resistance
Part Number F81Z-7M101-BA*

*Non PTO Models Only = 781-1979 Ohms Resistance
Part Number F81Z-7M101-AA*



**FORD 4R100
MAIN, LOWER, AND ACCUMULATOR VALVE BODIES EXPLODED VIEW**





FORD 4R100
MAIN, LOWER, AND ACCUMULATOR VALVE BODY LEGEND

Item	Description	Item	Description
1	Lower Valve Body	47	Spring Clip Bore Plug Retainer
2	Hex Head Bolt, M1 X 36 (2 Required)	48	Direct Clutch Accumulator Regulator Plunger Bore Plug
3	Retaining Plate	49	Direct Clutch Accumulator Regulator Plunger Spring
4	Manual 1-2 Transition Valve Spring	50	Direct Clutch Accumulator Regulator Plunger
5	Manual 1-2 Transition Valve	51	Direct Clutch Accumulator Regulator Valve Retainer
6	Spring Clip Bore Plug Retainer	52	Direct Clutch Accumulator Regulator Valve Spring
7	Engagement Valve Bore Plug	53	Direct Clutch Accumulator Regulator Valve
8	Engagement Valve Spring	54	Spring Clip Bore Plug Retainer
9	Engagement Valve	55	O.D. Clutch Accumulator Regulator Plunger Bore Plug
10	Main Valve Body	56	O.D. Clutch Accumulator Regulator Plunger Spring
11	Checkball 1/4", 2 Required (7E195)	57	O.D. Clutch Accumulator Regulator Plunger
12	Checkball 5/16", 2 Required (7E195)	58	O.D. Clutch Accumulator Regulator Valve Retainer
13	Manual Control Valve	59	O.D. Clutch Accumulator Regulator Valve Spring
14	Manual Valve "E" Clip	60	O.D. Clutch Accumulator Regulator Valve
15	Spring Clip Bore Plug Retainer	61	Spring Clip Bore Plug Retainer
16	Low Reverse Modulator Valve Sleeve	62	Int. Clutch Accumulator Regulator Plunger Bore Plug
17	Low Reverse Modulator Valve Plunger	63	Int. Clutch Accumulator Regulator Plunger Spring
18	Low Servo Modulator Valve Spring	64	Int. Clutch Accumulator Regulator Plunger
19	Low Servo Modulator Valve	65	Int. Clutch Accumulator Regulator Valve Retainer
20	Low Reverse Modulator Valve	66	Int. Clutch Accumulator Regulator Valve Spring
21	Spring Clip Bore Plug Retainer	67	Int. Clutch Accumulator Regulator Valve
22	3-4 Shift Valve Bore Plug	68	Spring Clip Bore Plug Retainer
23	3-4 Shift Valve Spring	69	Line Pressure Modulator Plunger Sleeve
24	3-4 Shift Valve	70	Line Pressure Modulator Plunger
25	Retaining Plate	71	Line Pressure Modulator Spring And Retainer Assembly
26	2-3 Shift Valve Spring	72	Line Pressure Modulator Valve Spring
27	2-3 Shift Valve	73	Line Pressure Modulator Valve
28	Retaining Plate		
29	Solenoid Regulator Valve Spring		
30	Solenoid Regulator Valve		
31	Retaining Plate		
32	Coast Clutch Shift Valve Spring		
33	Coast Clutch Shift Valve		
34	Retaining Plate		
35	4-3-2 Shift Timing Control Valve Plunger Spring		
36	4-3-2 Shift Timing Control Valve Plunger		
37	Retaining Plate		
38	4-3-2 Shift Timing Valve		
39	4-3-2 Shift Timing Valve Spring		
40	Spring Clip Bore Plug Retainer		
41	1-2 Shift Valve Bore Plug		
42	1-2 Shift Valve		
43	Drive 2 Valve		
44	1-2 Shift Valve Spring		
46	Accumulator Valve Body (7G422 Model Sensitive)		

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FORD 5R110W-TORQSHIFT TRANSMISSION DELAYED FORWARD AND, OR REVERSE ENGAGEMENT LOW MAINLINE PRESSURE

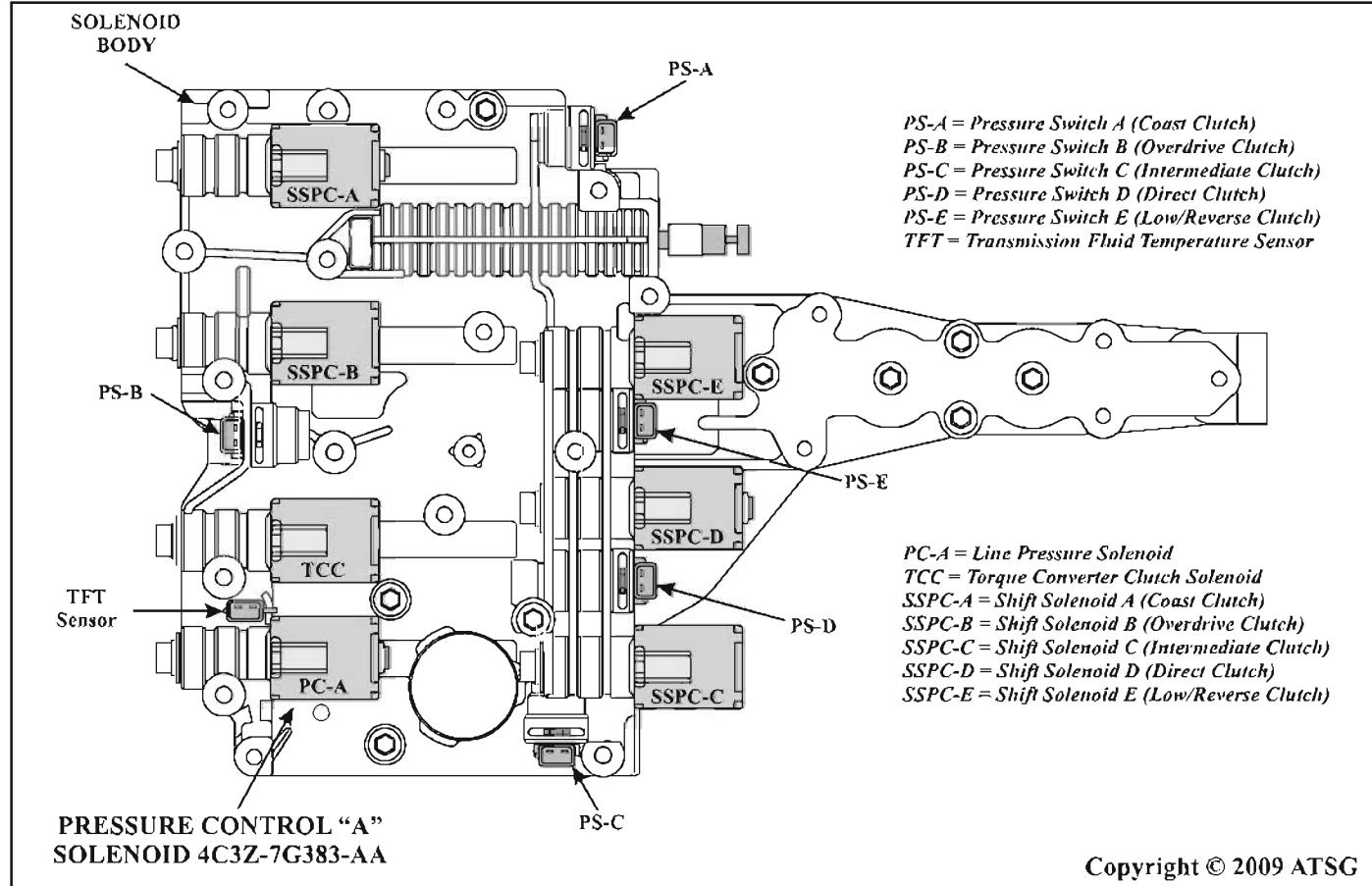
COMPLAINT: Before or after overhaul, Ford Motor Company vehicles that are equipped with the 5R110W-Torqshift transmissions may exhibit a delayed forward and reverse engagement condition. Upon performing a line pressure test, it may be observed that the line pressure readings are below specification. (See Figure 2)

CAUSE: If the line pressure readings are found to be below specifications, the cause may be, that in the pump cover assembly, there may be either a sticking pressure regulator valve, or that the pressure regulator valve, or the pressure regulator valve bore may be worn. (See Figure 3) A faulty pressure control "A" Solenoid may also cause a low line pressure condition as well (See Figure 1)

CORRECTION: If the pressure regulator valve, or the pump cover is found to be damaged, repair bore, and install new pressure regulator valve assembly with Sonnax kit. See service information. Replace pressure control solenoid "A". *Note:* ATSG recommends replacing the PCA solenoid during overhaul. See service information.

SERVICE INFORMATION:

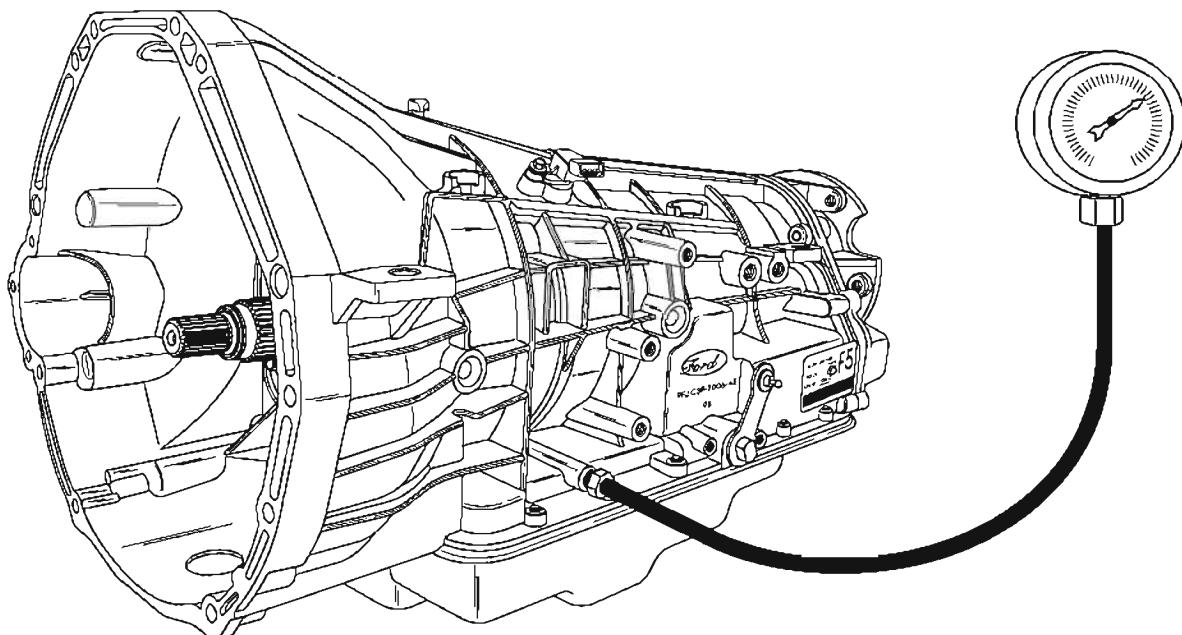
SONNAX PRESSURE REGULATOR VALVE KIT.....	36940-03K
SONNAX REAMER KIT.....	F-36940-TL3
FORD PRESSURE CONTROL SOLENOID "A".....	4C3Z-7G383-AA



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Figure 1
Automatic Transmission Service Group

LINE PRESSURE TESTS



LINE PRESSURE CHART		
Range	Idle Speed	Stall Speed
P/N	50 psi	—
R	100 psi	320 psi
(D)	70 psi	320 psi
3	80 psi	260 psi
2	80 psi	215 psi
1	80 psi	270 psi

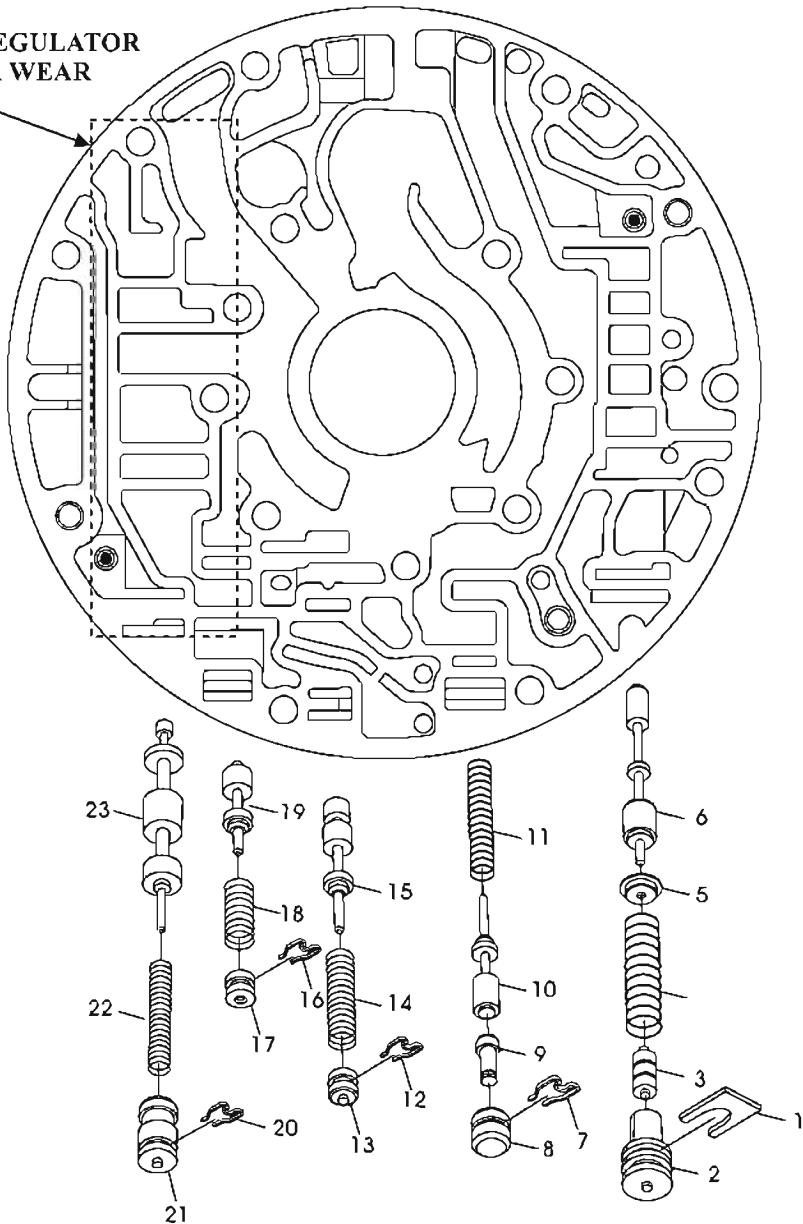
All Pressures Listed Are Approximate

PRECAUTIONS:

- (1) Perform the line pressure test in all ranges prior to performing the stall speed test. If line pressure is low at idle, "do not" carry out the stall speed test or additional transmission damage will occur. Do not maintain wide open throttle (WOT) in any range for more than 5 seconds or transmission damage may occur.
- (2) Apply the parking brake and block wheels during the line pressure test. Vehicle movement during the test may cause personal injury or damage to the vehicle and equipment.

OIL PUMP COVER ASSEMBLY EXPLODED VIEW

CHECK PRESSURE REGULATOR
VALVE BORE FOR WEAR



- 1 CONVERTER CLUTCH CONTROL VALVE BORE PLUG RETAINER.
- 2 CONVERTER CLUTCH CONTROL VALVE SLEEVE.
- 3 CONVERTER CLUTCH CONTROL VALVE PLUG.
- 4 CONVERTER CLUTCH CONTROL VALVE SPRING.
- 5 CONVERTER CLUTCH CONTROL VALVE SPRING SEAT.
- 6 CONVERTER CLUTCH CONTROL VALVE.
- 7 COOLER BYPASS VALVE BORE PLUG RETAINER (ORANGE I.D.).
- 8 COOLER BYPASS VALVE BORE PLUG.
- 9 THERMOSTATIC VALVE ASSEMBLY.
- 10 COOLER BYPASS VALVE.
- 11 COOLER BYPASS VALVE SPRING.
- 12 CONVERTER PRESSURE LIMIT VALVE BORE PLUG RETAINER.

- 13 CONVERTER PRESSURE LIMIT VALVE BORE PLUG.
- 14 CONVERTER PRESSURE LIMIT VALVE SPRING.
- 15 CONVERTER PRESSURE LIMIT VALVE.
- 16 CONVERTER ANTI-DRAIN BACK VALVE BORE PLUG RETAINER.
- 17 CONVERTER ANTI-DRAIN BACK VALVE BORE PLUG.
- 18 CONVERTER ANTI-DRAIN BACK VALVE SPRING.
- 19 CONVERTER ANTI-DRAIN BACK VALVE.
- 20 MAIN REGULATOR VALVE BORE PLUG RETAINER.
- 21 MAIN REGULATOR VALVE BORE PLUG.
- 22 MAIN REGULATOR VALVE SPRING.
- 23 MAIN REGULATOR VALVE.

FORD AX4N-4F50N 1999-UP DELAYED REVERSE ENGAGEMENT-SLIPS IN REVERSE

COMPLAINT: 1. Some 2004 model year Ford Motor Company vehicles equipped with the 4F50N transaxle may come into the shop with a complaint of a delayed reverse engagement, or a slipping in reverse condition.

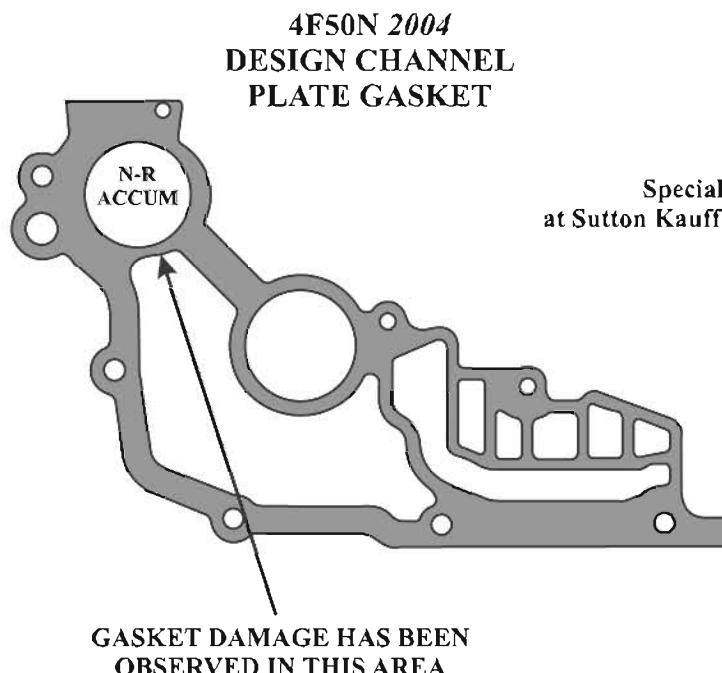
2. After overhaul, some 1999- up Ford Motor Company vehicles equipped with the AX4N-4F50N transaxle, may exhibit a delayed reverse engagement, or a slipping in reverse condition.

CAUSE: 1. Upon transaxle disassembly it may be observed that the channel plate gasket may be damaged at the N-R accumulator. (See Figure 1) This damage causes a fluid pressure loss to the reverse clutch pack resulting in either a delayed reverse engagement, or a slipping in reverse condition.

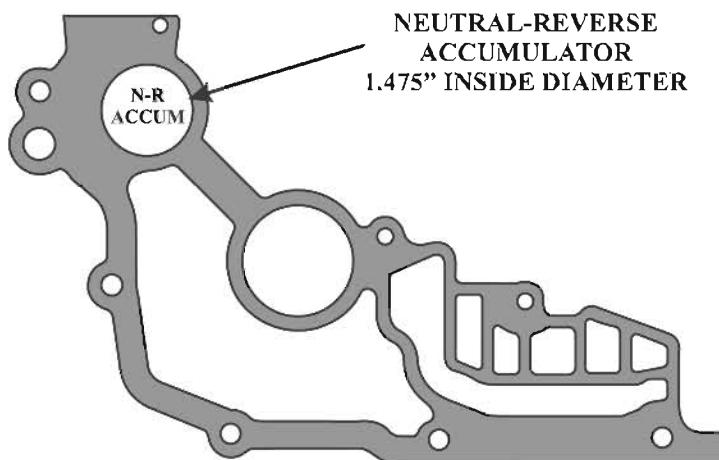
2. During overhaul, the wrong channel cover gasket may have been installed. For the model year 2004, the bore in the case where the N-R accumulator is was increased in diameter, and the channel plate gasket inside diameter was increased to accommodate the change.

CORRECTION: 1. Currently all of the 2004-up channel plate gaskets that are now available have been updated to a new design level to prevent this problem from re-occurring. It appears that a change to the composition of the gasket material was made.

2. During overhaul, make sure to use the proper channel plate gasket for your application. The 1999-2003 gasket is shown for identification (See Figure 2). The 2004-up gasket is shown for identification (See Figure 3).



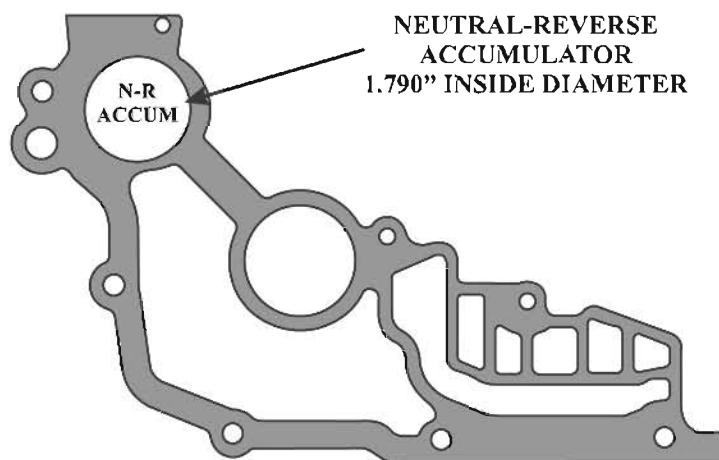
AX4N-4F50N 1999-2003 CHANNEL PLATE GASKET I.D.

AX4N-4F50N 1999-2003
DESIGN CHANNEL
PLATE GASKET

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Figure 2

4F50N-2004-UP CHANNEL PLATE GASKET I.D.

4F50N 2004-UP
DESIGN CHANNEL
PLATE GASKET

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Figure 3

Automatic Transmission Service Group



Electronic Solutions



GM RWD MULTI-FIT LOCK-UP
K77929U

Fits 81-89 200-4R, 82-92 700-R4,
93 up 4L60E
20-40 Ohms



GM FWD MULTI-FIT LOCK-UP
K84856U

Fits 82-95 125C, 81-85 325-4L,
84-92 440-T4
20-40 Ohms



GM EPC PRESSURE REGULATOR
34605U

Fits 90-02 4L30, 93-02 4L60E,
91-03 4L80E
3.5 – 4.66 Ohms, OEM Plug Compatible



GM RWD PWM/ TCC
K34326U

Fits 93-06 TCC 4L60E,
93-95 PWM 4L60E, 91-06 4L80E
9-14 Ohms, OEM Plug Compatible



4L60E ON/OFF 3-2 DOWNSHIFT
K77926

Fits 96-06 PWM 4L60E
20-31 Ohms, OEM Plug Compatible



GM MULTI-FIT SHIFT AND LOCK-UP
K84825U

Fits 93-06 Shift 4L60E,
93-99 Shift and TCC 4T60E
20-40 Ohms, OEM Plug Compatible



4L80E SHIFT SOLENOID
K34825U

Fits 91-06 4L80E
20-40 Ohms, OEM Plug Compatible



4T60E PWM
K84858

Fits 93-99 4T60E
9-14 Ohms, OEM Plug Compatible



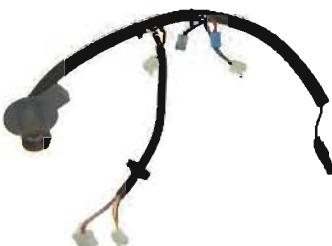
4L60E INTERNAL WIRING HARNESS
K77929H

Fits 93-02 4L60E



4T60E INTERNAL WIRING HARNESS
T84446EC

*Fits 93-99 4T60E



4T65E INTERNAL WIRING HARNESS
T84446G

Fits 96-02 4T65E



4L80E INTERNAL WIRING HARNESS
T34446AA

Fits 94-03 4L80E



AODE MCCC
76918

Fits 92- Early 95 AODE
1-3 Ohms, OEM Plug Compatible



AODE/ 4R70W MCCC
76921

Fits 95-97 AODE, 4R70W
10-16 Ohms, OEM Plug Compatible



AODE/ 4R70W Shift Pack
76919

Fits 92-97 AODE, 95-97 4R70W
20-40 Ohms per solenoid, OEM Plug Compatible



4R44 SHIFT/ COAST
56841U

Fits 95 up 4R44E, 4R55E, 5R55E
22-48 Ohms, OEM Plug Compatible

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Technical Inserts

Inside TransTec® kits you'll find technical literature with illustrations that simplify rebuilding transmissions.



Technical Bulletins

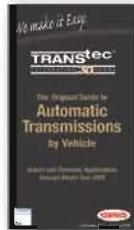
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